

## Scandinavian Airlines System

PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
CHAPTER 27 TAB			27-00-00			27-01-00		
FLIGHT CONTROLS			CONT.					
EFFECTIVE PAGES			909	DEC 22/00	01	501	APR 22/07	02
SEE LAST PAGE OF LIST FOR			910	DEC 10/98	01	502	DEC 22/06	02
NUMBER OF PAGES			911	DEC 22/01	01	503	DEC 22/06	02
			912	AUG 22/00	01	504	APR 22/03	01
27-CONTENTS			913	AUG 22/01	01	505	APR 22/04	02
1	AUG 22/05	SAS	914	AUG 22/01	01	506	APR 22/03	02
2	AUG 22/07	SAS	915	APR 22/05	01	507	APR 22/03	02
3	AUG 22/07	SAS	916	DEC 10/98	01	508	APR 22/03	01
4	AUG 22/05	SAS	917	DEC 10/98	01	509	APR 22/03	01
5	APR 22/05	SAS	918	DEC 10/98	01	510	APR 22/03	01
6	APR 22/05	SAS	919	DEC 10/98	01	511	APR 22/03	02
7	APR 22/05	SAS	920	DEC 10/98	01	512	APR 22/03	02
8	APR 22/05	SAS	921	DEC 10/98	01	513	APR 22/03	02
9	APR 22/01	SAS	922	DEC 10/98	01	514	APR 22/03	02
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12	AUG 22/04	SAS	925	DEC 10/98	01	602	DEC 22/07	02
13	AUG 22/04	SAS	926	DEC 10/98	01	603	DEC 22/07	02
14	DEC 22/03	SAS	927	DEC 22/01	02	604	DEC 22/07	02
15	DEC 22/03	SAS	928	AUG 22/01	01	605	DEC 22/07	02
R 16	AUG 22/09	SAS.1	929	AUG 22/01	01	606	DEC 22/07	02
17	AUG 22/05	SAS	930	DEC 22/00	01	607	DEC 22/07	02
18	DEC 22/06	SAS	931	DEC 10/98	01	608	DEC 22/07	02
19	DEC 22/06	SAS	932	DEC 10/98	01	609	DEC 22/07	02
20	DEC 22/06	SAS	933	DEC 10/98	01	610	DEC 22/07	02
21	AUG 22/07	SAS	934	DEC 10/98	01	611	DEC 22/07	02
22	DEC 22/06	SAS	935	DEC 10/98	01	612	DEC 22/07	02
23	AUG 22/07	SAS	936	DEC 10/98	01	613	DEC 22/07	02
24	APR 22/03	SAS	27-00-01			614	DEC 22/07	02
R 25	AUG 22/09	SAS.1	1	DEC 10/98	01	615	DEC 22/07	02
26	APR 22/03	SAS	2	DEC 10/98	01	R 616	AUG 22/09	02.1
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3	DEC 22/01	02	203	APR 22/05	01	620	DEC 22/07	02
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903	DEC 10/98	01	213	APR 22/07	09	630	DEC 22/07	01
904	DEC 10/98	01	214	APR 22/07	14	631	DEC 22/07	01
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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
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3	FEB 10/93	01	27-10-00			108	APR 22/01	01
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7	DEC 22/01	02	204	AUG 22/05	01	502	DEC 22/01	01
8	DEC 22/03	01	205	AUG 22/05	01	503	MAY 10/95	01
9	DEC 22/01	02	206	AUG 22/05	01	504	APR 22/99	01
10	DEC 22/01	04	207	AUG 22/05	01	505	APR 22/01	01
11	DEC 22/01	04	208	AUG 22/05	01	506	FEB 10/95	01
12	DEC 22/01	04	209	AUG 22/05	01	507	DEC 22/00	01
13	DEC 22/01	04	210	AUG 22/05	01	508	DEC 22/05	01
14	DEC 22/01	02	211	AUG 22/05	01	509	AUG 22/99	01
15	DEC 22/01	03	212	APR 22/06	01	510	AUG 22/01	01
16	DEC 22/01	08				511	DEC 22/04	02
17	DEC 22/01	17	27-11-00			512	DEC 22/04	02
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19	DEC 22/01	07	2	AUG 22/01	01	514	AUG 22/01	06
20	DEC 22/01	19	3	AUG 10/97	02	515	AUG 22/01	15
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22	APR 22/00	03	5	AUG 22/01	04	517	AUG 22/03	01
23	AUG 10/92	15	6	APR 22/99	01	518	APR 22/06	06
24	AUG 22/01	05	7	DEC 22/01	04	519	APR 22/06	01
25	FEB 10/90	02	8	DEC 22/01	01	520	AUG 22/08	08
26	AUG 22/01	05	9	MAY 10/91	01	521	APR 22/06	09
27	AUG 22/01	04	10	DEC 22/99	03	522	APR 22/06	01
28	MAY 10/92	12	11	APR 10/98	03	523	AUG 22/03	03
29	APR 22/00	06	12	NOV 10/88	02	524	AUG 22/03	05
30	AUG 22/01	03	13	AUG 22/02	03	525	AUG 22/01	11
31	AUG 22/01	04	14	MAY 01/86	01	526	AUG 22/03	05
32	AUG 22/01	03	15	MAY 01/86	01	527	AUG 22/03	11
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34	AUG 22/01	06	17	AUG 22/01	03	529	AUG 22/01	02
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27-11-00		CONT.	27-11-01			27-11-06		
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546	APR 22/06	08	404	DEC 22/00	01	404	MAY 10/91	02
547	AUG 22/01	09	405	FEB 10/90	01	405	DEC 22/00	07
548	APR 22/06	06	406	DEC 22/05	01	406	APR 22/99	01
549	APR 22/06	12	407	APR 22/01	01	407	APR 22/04	01
550	AUG 22/01	09	408	AUG 22/07	06	408	APR 22/04	01
551	APR 22/06	08	409	AUG 22/05	03	409	APR 22/04	06
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557	DEC 22/01	11	601	MAY 10/90	01	403	MAY 10/91	09
558	DEC 22/01	13	602	APR 22/01	01	404	NOV 10/97	01
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561	DEC 22/01	02				407	NOV 01/84	01
562	AUG 22/01	02	27-11-02			408	MAY 10/90	03
563	DEC 22/01	02	401	DEC 22/00	01	409	AUG 22/07	01
564	AUG 22/01	02	402	DEC 22/04	01	410	DEC 22/00	01
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566	AUG 22/01	02	404	APR 22/01	01	412	BLANK	
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569	DEC 22/01	10	407	APR 22/08	03	602	MAY 10/90	01
570	AUG 22/01	10	408	AUG 22/05	01	603	AUG 22/05	01
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575	APR 22/08	24				402	MAY 10/90	01
576	APR 22/08	14	27-11-02			403	MAY 10/90	03
577	APR 22/08	14	601	AUG 10/93	01	404	APR 22/08	02
578	APR 22/08	05	602	APR 22/01	01	405	FEB 10/96	01
579	APR 22/08	05	603	APR 22/02	01	406	AUG 22/01	01
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580B	DEC 22/01	08	27-11-03			401	AUG 22/05	01
580C	AUG 22/01	08	401	APR 22/04	04	402	AUG 22/01	01
580D	APR 22/08	14	402	DEC 22/00	01	403	APR 10/98	01
580E	APR 22/08	29	403	AUG 22/02	03	404	APR 10/98	01
580F	APR 22/08	17	404	MAY 10/91	22	405	APR 22/08	03
580G	APR 22/08	21	405	AUG 22/02	09	406	AUG 22/05	01
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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
27-11-15			27-11-24			27-11-34		
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402	AUG 22/08	01	602	APR 10/98	01	602	MAY 10/90	01
403	AUG 22/08	01	603	MAY 10/90	01	603	FEB 01/87	01
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27-11-16			27-11-26			401	APR 22/05	01
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408	APR 22/07	01	408	AUG 22/01	02	409	DEC 22/05	01
409	APR 22/07	01				410	DEC 22/05	02
410	APR 22/07	01	27-11-26			411	DEC 22/04	01
27-11-16			601	MAY 10/90	01	412	DEC 22/05	01
601	MAY 10/90	01	602	MAY 10/90	01	413	APR 22/06	02
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603	FEB 01/87	01	604	BLANK		415	APR 22/08	02
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27-11-18			27-11-28			27-11-36		
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403	MAY 10/90	01	403	APR 10/98	01	603	FEB 01/87	01
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403	FEB 10/97	01				415	APR 22/06	03
404	APR 22/09	02	27-11-34			416	AUG 10/98	02
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407	APR 22/08	01	403	MAY 10/90	01	602	APR 22/01	01
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27-11-39			27-11-48		CONT.	27-13-00		
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404	APR 22/08	02	27-11-49			406	DEC 22/00	01
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603	FEB 01/87	01				507	AUG 10/91	09
604	AUG 22/05	01	27-11-49			508	AUG 10/91	02
			601	AUG 22/02	01	509	AUG 22/08	05
27-11-48			602	APR 22/01	01	510	DEC 22/06	05
201	APR 22/99	03	603	MAY 10/90	01	511	APR 22/06	05
202	APR 22/01	01	604	DEC 22/01	01	512	AUG 10/91	02
203	FEB 10/95	01	605	AUG 22/05	01	513	APR 22/06	04
204	APR 22/01	01	606	BLANK		514	NOV 10/95	02
205	FEB 10/95	01				515	APR 22/06	04
206	APR 22/99	10	27-13-00			516	DEC 22/00	02
207	DEC 22/01	02	1	MAY 10/96	01	517	APR 22/06	04
208	AUG 22/06	06	2	MAY 01/83	01	518	BLANK	
209	APR 22/08	04	3	DEC 22/01	01			
210	AUG 10/95	01	4	BLANK				
211	DEC 22/05	01						
212	AUG 10/95	01						

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
27-18-10			27-21-00		CONT.	27-21-00		CONT.
401	AUG 10/91	01	37	FEB 10/89	01	547	APR 22/08	01
402	AUG 10/91	01	38	BLANK		548	DEC 22/05	04
403	AUG 22/08	02				549	DEC 22/01	24
404	APR 22/01	02	27-21-00			550	DEC 22/07	15
405	DEC 22/01	02	101	DEC 22/00	01	551	DEC 22/01	12
406	DEC 22/01	01	102	AUG 10/92	01	552	DEC 22/07	16
407	AUG 10/91	01	103	AUG 10/92	01	553	DEC 22/07	19
408	APR 22/08	02	104	AUG 10/92	01	554	DEC 22/07	19
409	APR 22/08	02	105	APR 22/07	01	555	DEC 22/07	18
410	AUG 10/91	01	106	BLANK		556	DEC 22/07	16
411	AUG 10/91	01				557	DEC 22/07	18
412	DEC 22/00	01	27-21-00			558	DEC 22/07	14
413	AUG 10/91	01	501	AUG 22/02	06	559	DEC 22/07	17
414	BLANK		502	AUG 22/02	02	560	APR 22/02	14
			503	AUG 22/02	02	561	APR 22/02	11
27-18-10			504	AUG 22/02	05	562	APR 22/07	13
601	AUG 10/90	01	505	AUG 22/02	14	563	APR 22/07	11
602	APR 22/01	01	506	AUG 22/02	16	564	APR 22/07	12
603	DEC 22/01	01	507	AUG 22/02	06	565	APR 22/02	13
604	BLANK		508	FEB 10/90	01	566	DEC 22/05	12
			509	AUG 22/03	02	567	DEC 22/05	15
27-21-00			510	FEB 10/90	01	568	DEC 22/01	23
1	AUG 22/01	02	511	FEB 10/90	01	569	DEC 22/05	15
2	AUG 22/99	01	512	FEB 10/90	01	570	DEC 22/05	14
3	AUG 10/87	02	513	AUG 22/03	02	571	DEC 22/05	16
4	AUG 22/01	02	514	APR 22/08	03	572	BLANK	
5	AUG 22/99	01	515	FEB 10/90	01			
6	AUG 22/99	02	516	APR 22/08	06	27-21-01		
7	MAY 01/86	01	517	APR 22/08	08	401	DEC 22/00	01
8	DEC 22/01	07	518	APR 22/08	04	402	DEC 10/98	01
9	DEC 22/01	04	519	FEB 10/90	01	403	DEC 10/98	01
10	FEB 10/90	01	520	FEB 10/90	01	404	DEC 10/98	01
11	DEC 22/01	11	521	FEB 10/97	01	405	DEC 22/01	01
12	MAY 01/86	02	522	AUG 10/92	02	406	AUG 22/03	01
13	NOV 10/88	01	523	APR 22/08	01	407	APR 22/08	02
14	NOV 10/89	01	524	APR 22/08	08	408	APR 22/08	02
15	DEC 22/01	08	525	APR 22/99	02	409	AUG 22/05	01
16	MAY 01/86	02	526	FEB 10/90	01	410	AUG 22/05	01
17	DEC 22/01	19	527	AUG 22/01	03	411	AUG 22/05	01
18	MAY 01/86	02	528	AUG 22/01	02	R 412	AUG 22/09	01.1
19	APR 22/01	11	529	AUG 22/01	03	413	AUG 22/05	01
20	MAY 01/86	06	530	DEC 22/01	02	414	BLANK	
21	DEC 22/01	13	531	AUG 22/08	01			
22	DEC 22/01	06	532	AUG 22/03	02	27-21-01		
23	AUG 22/99	09	533	AUG 22/03	06	601	AUG 10/90	01
24	AUG 22/99	04	534	DEC 22/01	03	602	DEC 10/98	01
25	APR 22/01	04	535	DEC 22/01	04	603	DEC 22/01	01
26	AUG 22/99	06	536	DEC 22/01	04	604	DEC 22/01	01
27	NOV 10/87	06	537	DEC 22/01	05			
28	AUG 22/99	03	538	DEC 22/01	04	27-21-02		
29	NOV 10/88	05	539	DEC 22/01	03	201	APR 22/03	01
30	DEC 22/00	07	540	DEC 22/01	05	202	APR 22/01	01
31	FEB 10/89	02	541	APR 22/07	02	203	AUG 10/97	01
32	MAY 10/95	09	542	APR 22/07	08	204	AUG 10/97	01
33	APR 22/01	08	543	AUG 22/05	02	205	AUG 10/95	01
34	AUG 22/01	06	544	APR 22/08	06	206	AUG 22/05	01
35	AUG 22/01	05	545	DEC 22/07	06	207	DEC 22/01	01
36	NOV 10/88	01	546	DEC 22/07	07	208	DEC 22/01	01

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
27-21-02		CONT.	27-21-07			27-21-13		CONT.
209	APR 22/01	01	401	APR 22/06	02	209	AUG 22/05	04
210	DEC 22/01	01	402	FEB 10/91	01	210	AUG 22/05	03
211	DEC 22/01	01	403	AUG 22/01	01	211	AUG 22/01	02
212	DEC 22/08	01	404	FEB 10/91	01	212	AUG 22/01	02
213	AUG 22/05	01	405	FEB 10/91	01	213	AUG 22/01	02
214	AUG 22/05	01	406	APR 22/06	02	214	DEC 22/01	02
215	APR 22/01	01	407	APR 22/06	02	215	DEC 22/00	02
216	APR 22/05	01	408	APR 22/06	02	216	AUG 22/01	03
217	APR 22/05	01	409	APR 22/06	08			
218	APR 22/05	01	410	DEC 22/00	01	27-21-15		
219	APR 22/05	01				201	MAY 10/96	01
220	APR 22/06	02	27-21-07			202	FEB 10/91	01
221	APR 22/06	02	601	AUG 10/90	01	203	APR 22/07	02
222	APR 22/06	02	602	AUG 10/90	01	204	FEB 10/96	02
223	APR 22/06	02	603	AUG 10/90	01	205	FEB 10/91	01
224	APR 22/06	02	604	AUG 22/05	01	206	FEB 10/90	01
						207	APR 22/07	02
27-21-02			27-21-10			208	MAY 10/96	01
601	AUG 10/97	01	201	APR 22/06	01	209	APR 22/06	02
602	AUG 22/06	01	202	FEB 10/91	02	210	AUG 22/07	02
603	AUG 10/97	01	203	FEB 10/91	01	211	AUG 22/07	02
604	AUG 10/97	01	204	FEB 10/91	01	212	APR 22/06	24
605	DEC 22/07	01	205	AUG 10/93	01	213	APR 22/07	06
606	BLANK		206	MAY 10/96	01	214	APR 22/07	03
			207	FEB 10/91	01	215	APR 22/06	03
27-21-05			208	AUG 10/93	01	216	APR 22/06	01
401	APR 22/99	01	209	NOV 10/91	01	217	APR 22/06	01
402	AUG 22/02	04	210	APR 22/08	02	218	BLANK	
403	AUG 10/97	01	211	DEC 22/01	01			
404	AUG 22/00	08	212	DEC 22/01	01	27-21-18		
405	FEB 10/95	01	213	DEC 22/01	01	401	AUG 10/90	01
406	FEB 10/95	01	214	DEC 22/01	01	402	AUG 10/90	02
407	APR 22/08	05	215	APR 22/03	02	403	NOV 10/96	02
408	APR 22/08	12	216	APR 22/06	02	404	APR 22/08	03
409	DEC 22/00	06	217	APR 22/06	03	405	AUG 10/90	02
410	MAY 10/97	01	218	DEC 22/01	05	406	DEC 22/00	02
			219	APR 22/08	06	407	DEC 22/00	02
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602	AUG 10/90	01	27-21-11			27-21-19		
603	MAY 10/89	01	201	AUG 22/01	01	401	AUG 10/90	02
604	AUG 10/90	01	202	FEB 10/91	01	402	AUG 10/90	02
605	DEC 22/01	01	203	FEB 10/91	01	403	APR 22/01	02
606	DEC 22/01	01	204	APR 22/08	02	404	AUG 10/97	02
607	AUG 22/05	01	205	APR 22/08	08	405	APR 22/08	03
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			207	DEC 22/01	06	407	AUG 10/92	02
27-21-06			208	AUG 22/01	01	408	AUG 10/92	02
401	DEC 22/00	02				409	DEC 22/00	02
402	DEC 10/98	01	27-21-13			410	DEC 22/00	02
403	DEC 22/00	02	201	AUG 22/01	01			
404	APR 22/08	03	202	AUG 22/01	01	27-21-23		
405	APR 22/08	03	203	AUG 22/01	01	201	DEC 22/01	06
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			205	FEB 10/91	01	203	DEC 22/01	06
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			207	AUG 22/01	01	205	DEC 22/01	06
			208	AUG 22/07	04	206	APR 22/04	26

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
27-23-00			27-28-00		CONT.	27-31-00		
1	AUG 22/00	01	511	AUG 22/06	06	101	AUG 10/92	02
2	DEC 22/00	01	512	AUG 22/06	04	102	MAY 10/95	08
3	DEC 22/01	01	513	APR 22/01	02	103	MAY 10/95	01
4	DEC 22/01	01	514	AUG 22/06	02	104	MAY 10/95	02
						105	APR 22/06	01
						106	BLANK	
27-23-00			27-28-01			27-31-00		
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102	FEB 10/95	01	402	AUG 10/91	01	502	AUG 22/01	01
103	FEB 10/95	01	403	DEC 22/01	01	503	APR 22/99	01
104	BLANK		404	AUG 10/96	01	504	AUG 10/92	02
			405	AUG 10/88	01	505	FEB 10/90	01
27-23-00			406	AUG 10/91	01	506	AUG 22/06	01
501	AUG 10/97	01	407	AUG 22/08	02	507	FEB 10/90	02
502	AUG 10/90	01	408	AUG 10/96	01	508	FEB 10/90	01
503	AUG 10/90	01	409	AUG 10/91	01	509	APR 22/99	27
504	DEC 22/00	01	410	AUG 10/91	01	510	AUG 22/01	26
505	AUG 22/05	01	411	AUG 10/91	01	511	AUG 22/01	26
506	AUG 22/05	01	412	DEC 22/00	01	512	MAY 10/95	03
507	AUG 22/05	01	413	DEC 22/00	02	513	APR 22/06	02
508	BLANK		414	BLANK		514	MAY 10/95	03
						515	AUG 10/91	02
27-23-01			27-28-05			516	AUG 10/91	03
201	MAY 10/96	01	401	DEC 10/98	02	517	MAY 10/95	01
202	AUG 10/90	01	402	FEB 10/91	01	518	MAY 10/95	02
203	AUG 22/05	01	R 403	AUG 22/09	02.1	519	AUG 10/91	02
204	AUG 10/90	01	R 404	AUG 22/09	04.101	520	AUG 10/91	02
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206	BLANK		27-30-00			522	APR 22/06	05
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201	AUG 10/97	02	203	APR 22/06	01	525	APR 22/06	03
202	MAY 10/90	28	204	APR 22/06	01	526	APR 22/06	04
203	DEC 22/00	02				527	APR 22/06	08
204	DEC 22/00	14	27-31-00			528	APR 22/06	08
205	DEC 22/00	14	1	DEC 22/01	16	529	APR 22/06	16
206	BLANK		2	APR 22/06	01	530	APR 22/06	01
			3	DEC 22/00	09	531	APR 22/06	01
27-28-00			4	APR 22/01	08	532	APR 22/06	14
1	DEC 22/00	01	5	MAY 10/91	08	533	APR 22/06	14
2	FEB 01/86	01	6	MAY 10/88	02	534	DEC 22/05	10
			7	FEB 01/86	01	535	APR 22/06	31
27-28-00			8	AUG 22/99	02	536	APR 22/06	10
101	DEC 22/00	02	9	APR 22/06	01	537	APR 22/06	06
102	AUG 10/97	01	10	FEB 01/86	01	538	APR 22/01	07
103	FEB 10/95	01	11	MAY 10/95	01	539	APR 22/00	07
104	BLANK		12	APR 22/00	01	540	AUG 22/03	06
			13	DEC 22/01	12	541	APR 22/00	07
27-28-00			14	DEC 22/01	01	542	APR 22/06	19
501	APR 22/01	01	15	FEB 01/86	01	543	APR 22/06	19
502	DEC 22/01	01	16	APR 22/00	09	544	APR 22/06	21
503	AUG 22/06	04	17	DEC 22/00	09	545	APR 22/06	20
504	AUG 10/96	01	18	AUG 10/89	06	546	APR 22/06	21
505	DEC 22/01	01	19	DEC 22/01	01	547	APR 22/06	14
506	AUG 10/91	01	20	DEC 22/01	01	548	APR 22/06	18
507	AUG 22/08	05	21	DEC 22/00	03	549	APR 22/06	14
508	APR 22/08	05	22	BLANK		550	APR 22/06	15
509	AUG 22/06	04						
510	AUG 10/96	02						

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
27-31-00		CONT.	27-31-02			27-31-05		
551	APR 22/06	13	401	APR 22/06	03	601	DEC 22/07	02
552	APR 22/06	14	402	MAY 10/90	01	602	NOV 10/90	01
553	APR 22/08	15	R 403	AUG 22/09	01.1	603	NOV 10/90	01
554	APR 22/08	14	404	APR 22/06	04	604	APR 22/02	01
555	APR 22/08	19	405	APR 22/06	01	605	DEC 22/07	02
556	APR 22/08	20	406	AUG 22/06	02	606	APR 22/06	01
557	APR 22/08	23	407	APR 22/06	03	607	DEC 22/01	01
558	APR 22/07	29	408	DEC 22/05	02	608	APR 22/01	01
559	APR 22/07	33	409	AUG 22/05	01			
560	APR 22/07	33	410	APR 22/06	03	27-31-06		
561	APR 22/07	30	411	APR 22/06	02	R 401	AUG 22/09	04.1
562	APR 22/06	18	412	APR 22/02	01	402	APR 22/08	01
563	APR 22/06	21				R 403	AUG 22/09	05.1
564	APR 22/06	18	27-31-02			R 404	AUG 22/09	03.1
565	APR 22/06	19	601	NOV 10/90	01	R 405	AUG 22/09	05.1
566	APR 22/06	17	602	NOV 10/90	01	406	APR 22/08	03
567	APR 22/06	21	R 603	AUG 22/09	01.1	R 407	AUG 22/09	03.1
568	APR 22/06	23	604	AUG 22/05	01	408	BLANK	
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570	APR 22/06	25	606	BLANK		27-31-07		
571	APR 22/06	26				401	DEC 22/05	04
572	APR 22/06	21	27-31-03			402	APR 22/06	01
573	APR 22/06	22	401	AUG 10/96	01	403	DEC 22/05	04
574	APR 22/06	25	402	NOV 10/90	01	404	AUG 22/06	04
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576	APR 22/06	23	404	DEC 22/01	02	406	BLANK	
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578	APR 22/06	19	406	DEC 22/01	03	27-31-10		
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580A	DEC 22/07	04				403	NOV 10/95	01
580B	APR 22/06	04	27-31-05			404	DEC 22/00	06
580C	APR 22/06	05	201	DEC 22/05	02	405	DEC 22/00	04
R 580D	AUG 22/09	04.1	202	APR 22/06	01	406	AUG 22/01	06
			203	DEC 22/05	02	407	DEC 22/00	11
27-31-01			204	AUG 22/02	01	408	BLANK	
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404	AUG 10/90	01	27-31-05			602	NOV 10/90	01
R 405	APR 22/08	03.101	401	DEC 22/07	03	603	APR 22/02	01
406	APR 22/06	05	402	AUG 22/07	03	604	AUG 22/05	01
407	APR 22/01	01	403	APR 22/06	01			
408	APR 22/06	03	404	AUG 22/01	01	27-31-11		
409	AUG 22/06	01	405	APR 22/06	01	401	APR 22/06	07
410	AUG 22/05	01	406	APR 22/06	01	402	MAY 10/96	01
R 411	AUG 22/09	02.1	407	AUG 22/07	03	403	MAY 10/96	01
R 412	AUG 22/09	03.1	408	AUG 22/07	02	404	APR 22/06	07
413	DEC 22/00	02	409	AUG 22/07	02	405	APR 22/06	06
414	APR 22/99	02	410	AUG 22/07	03	406	APR 22/06	09
			411	AUG 22/07	02			
27-31-01			412	AUG 22/07	02	27-31-12		
601	NOV 10/90	01	R 413	AUG 22/09	01.1	401	AUG 22/05	01
602	NOV 10/90	01	414	AUG 22/05	01	402	MAY 10/93	01
603	NOV 10/87	01	415	AUG 22/05	01	403	MAY 10/93	01
604	AUG 22/05	01	416	AUG 22/05	01	404	NOV 10/90	01
605	APR 22/02	01	417	AUG 22/05	02	405	NOV 10/90	01
606	BLANK		418	AUG 22/07	06	406	MAY 10/93	02

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
27-31-12		CONT.	27-31-19		CONT.	27-32-00		
407	APR 22/08	03	411	APR 22/06	01	101	AUG 22/00	01
408	NOV 10/90	01	412	DEC 22/05	02	102	NOV 10/90	03
409	NOV 10/90	01	413	AUG 22/08	05	103	DEC 22/00	07
410	DEC 22/01	02	414	DEC 22/05	05	104	AUG 22/01	02
411	NOV 10/90	02	415	DEC 22/05	06	105	FEB 10/95	01
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27-31-12			27-31-21			27-32-00		
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602	NOV 10/90	01	402	NOV 10/90	02	502	NOV 10/92	05A
603	APR 22/02	01	403	NOV 10/90	01	503	NOV 10/92	01A
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			405	APR 22/99	02	505	DEC 22/05	01A
27-31-15			406	BLANK		506	DEC 22/01	09A
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402	APR 22/04	01	27-31-31			508	APR 22/09	01A
403	APR 22/99	01	201	AUG 10/95	01	509	AUG 22/01	03A
404	APR 22/99	01	202	AUG 10/95	01	510	AUG 22/01	09A
405	APR 22/99	01	203	AUG 10/95	02	511	AUG 22/05	05A
406	APR 22/04	01	204	APR 22/08	02	512	AUG 22/05	12A
407	APR 22/99	02	205	APR 22/05	02	513	APR 22/05	32A
408	APR 22/08	05	206	AUG 10/95	02	514	AUG 22/02	15A
409	APR 22/04	02	207	AUG 10/95	01	515	FEB 10/96	12A
410	APR 22/99	01	208	NOV 10/95	02	R 516	AUG 22/09	06A.1
411	APR 22/04	02	209	NOV 10/95	02			
412	APR 22/04	02	210	APR 22/05	02	27-32-01		
413	DEC 22/01	02				401	AUG 22/01	01
414	DEC 22/01	02	27-31-58			402	AUG 22/01	02
415	DEC 22/01	01	601	NOV 10/90	01	403	AUG 22/01	01
416	BLANK		602	NOV 10/90	01	404	AUG 22/01	02
			603	NOV 10/90	01			
27-31-17			604	APR 22/02	01	27-32-02		
401	APR 22/99	02	605	APR 22/02	01	401	AUG 10/93	02
402	APR 22/99	01	606	BLANK		402	AUG 22/01	01
403	APR 22/99	01				403	FEB 10/95	01
404	APR 22/99	01	27-31-68			404	MAY 10/90	09
405	APR 22/99	01	201	APR 22/99	02			
406	APR 22/01	03	202	DEC 22/00	02	27-32-05		
407	APR 22/06	03	203	DEC 22/00	02	401	DEC 22/00	01
408	AUG 22/05	02	204	AUG 22/03	02	R 402	AUG 22/09	01.1
409	AUG 22/05	02				403	DEC 22/00	01
410	AUG 22/05	02				404	APR 22/04	12
			27-32-00					
27-31-19			1	AUG 22/99	02	27-32-07		
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202	APR 22/03	01	3	APR 22/06	02	402	DEC 22/00	01
			4	MAY 01/87	02	403	DEC 22/00	01
27-31-19			5	FEB 10/95	01	404	DEC 22/00	01
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402	DEC 22/05	03	7	DEC 22/01	02	406	DEC 22/01	01
403	DEC 22/05	02	8	DEC 22/01	02	407	DEC 22/00	01
404	APR 22/09	02	9	DEC 22/01	02	408	DEC 22/00	01
405	DEC 22/05	03	10	DEC 22/01	01	409	DEC 22/00	01
406	DEC 22/05	02	11	AUG 22/05	09	410	DEC 22/00	01
407	APR 22/09	01	12	MAY 10/96	01			
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## Scandinavian Airlines System

PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
27-38-00			27-41-00		CONT.	27-41-00		CONT.
1	AUG 01/82	01	27	DEC 22/01	17	543	AUG 22/08	35
2	MAY 10/95	01	28	AUG 22/03	14	R 544	AUG 22/09	09.1
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101	DEC 22/05	01	30	BLANK		546	DEC 10/98	02
102	AUG 22/01	01	27-41-00			547	DEC 10/98	02
27-38-00			101	APR 22/02	23	548	AUG 22/08	37
501	AUG 22/01	03	102	AUG 10/92	25	R 549	AUG 22/09	29.1
502	AUG 22/01	01	103	NOV 10/91	29	550	AUG 22/08	16
503	AUG 10/91	01	104	APR 22/04	09	551	AUG 22/08	18
504	MAY 10/97	02	105	MAY 10/94	33	552	AUG 22/08	23
505	AUG 22/02	02	106	APR 22/02	27	553	AUG 22/08	07
506	AUG 10/90	01	107	AUG 22/01	21	554	APR 22/03	22
507	DEC 22/02	05	108	AUG 22/01	18	555	APR 22/03	23
508	MAY 10/97	04	27-41-00			556	APR 22/03	23
509	DEC 22/01	03	501	DEC 22/04	02	R 557	AUG 22/09	18.1
510	MAY 10/97	03	502	MAY 10/90	02	558	APR 22/03	23
511	AUG 22/02	03	503	MAY 10/90	02	559	APR 22/01	11
512	MAY 10/97	03	504	AUG 22/05	02	560	APR 22/01	18
27-38-01			505	APR 22/08	03	561	APR 22/01	14
401	DEC 22/05	02	506	APR 22/08	03	562	DEC 22/01	20
402	DEC 22/05	01	507	APR 22/08	03	563	DEC 22/01	19
403	DEC 22/05	01	508	MAY 10/90	02	564	DEC 22/01	16
404	AUG 22/07	02	509	MAY 10/90	02	565	APR 22/01	23
405	APR 22/08	02	510	DEC 22/07	03	566	DEC 22/01	21
406	AUG 22/07	04	511	MAY 10/95	02	567	DEC 22/01	20
407	DEC 22/05	04	512	AUG 22/00	02	568	DEC 22/01	17
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27-41-00			514	AUG 22/00	01	R 570	AUG 22/09	23.1
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2	DEC 22/01	02	516	DEC 22/07	04	572	APR 22/01	23
3	DEC 22/01	01	517	DEC 22/07	03	573	AUG 22/01	24
4	DEC 22/01	04	518	DEC 22/07	02	574	AUG 22/01	26
5	AUG 22/03	02	519	DEC 22/07	02	575	AUG 22/01	26
6	AUG 22/03	07	520	APR 22/04	05	576	AUG 22/01	25
7	AUG 22/03	02	521	DEC 22/01	07	577	APR 22/01	26
8	DEC 22/99	05	522	DEC 10/98	03	578	AUG 22/05	19
9	AUG 22/01	06	523	AUG 22/99	06	579	AUG 22/05	20
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13	AUG 22/03	03	527	AUG 22/00	07	580C	DEC 22/01	12
14	AUG 22/03	04	528	DEC 10/98	03	580D	DEC 22/01	12
15	AUG 22/03	18	529	AUG 22/00	17	580E	DEC 22/01	12
16	AUG 22/03	24	530	APR 22/01	04	580F	AUG 22/05	12
17	AUG 22/03	04	531	APR 22/01	06	580G	AUG 22/05	11
18	AUG 22/03	13	532	DEC 22/01	11	580H	DEC 22/01	11
19	AUG 22/03	11	533	AUG 22/08	09	580I	DEC 22/01	18
20	AUG 22/01	06	534	AUG 22/08	10	580J	DEC 22/08	16
21	FEB 10/91	10	535	AUG 22/08	09	580K	DEC 22/01	18
22	AUG 22/99	13	536	AUG 22/08	09	580L	DEC 22/01	15
23	DEC 22/01	12	537	AUG 22/08	09	580M	DEC 22/01	15
24	DEC 22/01	14	538	AUG 22/08	12	R 580N	AUG 22/09	17.101
25	AUG 22/03	20	539	AUG 22/08	12	580O	AUG 22/05	15
26	DEC 22/01	14	R 540	AUG 22/09	13.1	580P	BLANK	
			R 541	AUG 22/09	25.1			
			R 542	AUG 22/09	25.1			

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27-41-01			27-41-06		CONT.	27-41-10		CONT.
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403	FEB 10/96	01				615	AUG 22/07	02
404	APR 22/01	01	27-41-07			616	AUG 22/08	02
405	APR 22/01	01	401	AUG 22/01	01	617	APR 22/08	02
406	APR 22/01	01	402	APR 22/99	01	618	DEC 22/08	02
			403	AUG 22/03	03	619	APR 22/08	02
27-41-02			404	DEC 22/01	04	620	APR 22/08	02
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402	DEC 10/98	02	406	BLANK		622	AUG 22/08	02
403	DEC 10/98	02				623	AUG 22/08	02
404	DEC 10/98	02	27-41-08			624	APR 22/08	01
405	DEC 10/98	02	401	AUG 22/99	01			
406	DEC 10/98	05	402	FEB 10/91	03	27-41-11		
407	DEC 10/98	05	403	FEB 10/91	02	401	APR 22/04	01
408	AUG 22/07	05	404	APR 22/06	03	402	AUG 10/90	01
409	DEC 22/07	02	405	DEC 22/01	03	R 403	AUG 22/09	02.1
410	DEC 22/01	02	406	AUG 22/00	02	404	APR 22/01	01
411	DEC 10/98	02				405	APR 22/04	02
412	AUG 22/00	02	27-41-09			406	AUG 22/00	02
413	DEC 22/01	02	401	APR 22/04	01			
414	APR 22/99	01	402	APR 22/04	01	27-41-13		
			403	AUG 22/01	02	401	APR 22/01	01
27-41-03			404	APR 22/04	01	402	AUG 10/90	01
401	APR 22/04	02	405	APR 22/01	02	403	APR 22/06	01
402	AUG 22/01	01	406	APR 22/01	01	404	AUG 22/07	01
403	APR 22/05	04				405	AUG 22/00	01
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404	AUG 10/91	03	408	NOV 10/87	02	404	APR 22/01	02
405	DEC 10/98	02	409	NOV 10/87	02	405	AUG 22/00	02
406	AUG 22/02	01	410	DEC 22/01	01	406	BLANK	
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27-41-05			414	DEC 22/07	03	402	AUG 22/01	01
401	AUG 22/03	02	415	DEC 22/00	03	403	AUG 10/90	01
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403	NOV 10/90	03						
404	DEC 22/01	03	27-41-10			27-41-18		
405	AUG 22/07	03	601	AUG 22/05	01	401	APR 22/04	02
406	AUG 22/07	03	602	AUG 22/03	01	402	AUG 22/02	01
407	DEC 10/98	02	603	APR 22/05	01	403	AUG 22/02	01
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27-41-06			606	AUG 22/08	02	406	APR 22/04	06
401	AUG 22/01	02	607	AUG 22/08	01	407	APR 22/04	05
402	NOV 10/90	02	608	AUG 22/05	01	408	APR 22/04	06
403	NOV 10/90	02	609	AUG 22/05	01			
404	NOV 10/90	02	610	AUG 22/08	02			
405	AUG 22/07	03	611	AUG 22/08	02			
406	DEC 22/01	02	612	AUG 22/08	02			

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
27-41-19			27-48-01		CONT.	27-51-00		CONT.
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27-41-20			402	AUG 10/90	02	46	DEC 22/01	13
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27-48-00			204	BLANK		106	AUG 10/91	01
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2	AUG 22/03	02	27-51-00			108	AUG 10/91	02
3	AUG 22/03	04	1	DEC 22/99	04	109	AUG 10/91	01
4	DEC 22/00	05	2	FEB 10/95	01	110	AUG 22/01	11
5	APR 22/99	15	3	APR 22/99	01	111	AUG 22/01	07
6	DEC 10/98	01	4	AUG 22/03	05	112	DEC 22/99	26
			5	MAY 01/87	01			
27-48-00			6	AUG 10/92	01	27-51-00		
101	FEB 10/95	01	7	AUG 22/03	05	201	DEC 22/01	01
102	FEB 10/95	12	8	AUG 10/92	01	202	AUG 22/06	01
103	FEB 10/95	12	9	NOV 10/94	02	203	AUG 22/99	01
104	FEB 10/95	12	10	MAY 01/87	02	204	AUG 22/06	02
			11	MAY 01/87	02	205	AUG 22/99	01
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506	DEC 22/00	02	18	DEC 22/01	01	212	APR 22/09	03
507	DEC 22/00	02	19	DEC 22/01	03	213	AUG 22/06	02
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509	AUG 10/98	02	21	MAY 01/87	03	215	APR 22/09	02
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516	DEC 22/99	02	574	AUG 22/06	19	404	FEB 10/92	01
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520	DEC 22/99	02	578	DEC 22/00	02	408	DEC 22/05	08
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526	APR 22/01	07	580D	DEC 22/00	10	402	MAY 10/95	01
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528	DEC 22/01	06	580F	DEC 22/00	05	404	APR 22/09	02
529	APR 22/99	02	580G	AUG 22/99	08	405	FEB 10/92	01
530	APR 22/99	02	580H	AUG 22/06	15	406	FEB 10/92	01
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539	APR 22/99	02	5	APR 22/01	02	415	APR 22/04	01
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543	DEC 22/01	01	9	APR 22/01	12	419	DEC 22/07	02
544	DEC 22/01	01	10	DEC 22/01	18	420	DEC 22/07	03
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546	DEC 22/01	02	12	APR 22/01	23	422	DEC 22/07	08
547	APR 22/99	02	13	APR 22/01	17	423	DEC 22/07	17
548	APR 22/01	05	14	APR 22/01	20	424	DEC 22/07	02
549	AUG 22/08	07	15	AUG 22/03	19	425	APR 22/09	03
550	AUG 22/05	01	16	APR 22/01	16	R 426	APR 22/09	08.101
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552	APR 22/03	02	18	APR 22/01	20	R 428	AUG 22/09	08.101
553	APR 22/03	04	19	APR 22/01	18	R 429	AUG 22/09	07.101
554	APR 22/03	04	20	APR 22/01	11	R 430	AUG 22/09	05.101
555	APR 22/03	02	21	APR 22/01	08	R 431	DEC 22/07	13.101
556	APR 22/03	02	22	APR 22/01	03	R 432	AUG 22/09	11.101
557	APR 22/03	02				R 433	AUG 22/09	10.101
558	APR 22/01	08	27-51-01			R 434	AUG 22/09	13.101
559	APR 22/03	03	401	APR 22/01	01	R 435	AUG 22/09	14.101
560	APR 22/03	03	402	AUG 22/01	16	R 436	AUG 22/09	12.101
561	APR 22/03	05	403	AUG 22/01	22	R 437	AUG 22/09	14.101
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27-51-04			27-51-04		CONT.	27-51-07	CONFIG 1	
201	DEC 22/01	01	619	APR 22/02	01	401	AUG 22/07	01
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203	DEC 22/07	01				403	APR 22/06	01
204	DEC 22/00	01	27-51-05			404	AUG 22/05	01
205	DEC 22/00	01	401	APR 22/01	01	405	AUG 22/05	01
206	DEC 22/00	01	402	APR 22/99	01	406	APR 22/06	01
207	APR 22/01	01	403	FEB 10/91	01	407	AUG 22/05	01
208	DEC 22/03	01	404	APR 22/09	01	408	AUG 22/07	01
209	DEC 22/03	01	405	FEB 10/91	01	409	APR 22/06	01
210	DEC 22/00	01	406	FEB 10/91	01	410	APR 22/06	01
211	DEC 22/00	01	407	MAY 10/91	02	411	APR 22/06	01
212	DEC 22/00	01	408	MAY 10/91	02	412	APR 22/06	01
213	DEC 22/00	01	409	FEB 10/91	02			
214	DEC 22/01	01	410	APR 22/05	02	27-51-07	CONFIG 2	
215	DEC 22/01	01	411	DEC 22/07	02	401	APR 22/00	01
216	DEC 22/01	01	412	DEC 22/01	02	402	DEC 10/98	01
217	DEC 22/01	01	413	APR 22/05	02	403	NOV 10/95	01
218	DEC 22/01	01	414	DEC 10/98	02	404	DEC 10/98	01
219	AUG 22/07	01	415	APR 22/01	02	405	DEC 10/98	01
220	DEC 22/01	01	416	APR 22/99	01	406	DEC 10/98	01
221	DEC 22/01	01				407	DEC 22/03	08
222	DEC 22/01	01	27-51-06			408	APR 22/00	01
223	APR 22/01	01	201	AUG 22/06	01	409	DEC 10/98	01
224	APR 22/00	01	202	APR 22/99	01	410	AUG 22/07	04
225	DEC 22/01	01	203	AUG 10/97	01	411	AUG 22/05	03
226	DEC 22/01	01	204	DEC 22/01	02	412	AUG 22/05	03
227	DEC 22/01	01	205	DEC 22/01	02	413	AUG 22/05	03
228	DEC 22/01	01	206	AUG 10/95	01	414	DEC 22/01	01
229	AUG 22/06	01	207	AUG 10/95	01	415	DEC 22/01	01
230	DEC 22/01	01	208	AUG 22/03	04	416	DEC 22/01	01
231	DEC 22/01	01	209	APR 22/09	02	417	DEC 22/01	01
232	AUG 22/06	01	210	FEB 10/91	01	418	DEC 10/98	01
233	AUG 22/07	01	211	FEB 10/91	01	419	DEC 10/98	01
234	DEC 22/01	01	212	APR 22/01	01	420	DEC 22/01	01
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236	DEC 22/01	01	214	AUG 22/06	01	422	BLANK	
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27-51-04			218	AUG 22/06	01	402	APR 22/99	01
601	DEC 22/07	02	219	APR 22/01	01	403	NOV 10/90	01
602	FEB 10/95	01	220	DEC 22/01	01	404	NOV 10/90	01
603	NOV 01/86	01	221	AUG 22/06	01	405	NOV 10/90	01
604	FEB 10/89	01	222	AUG 22/08	01	406	DEC 10/98	01
605	NOV 01/86	01	223	DEC 22/01	01	407	APR 22/99	01
606	APR 22/02	01	224	APR 22/01	01	408	AUG 22/07	01
607	APR 22/02	01	225	APR 22/01	01	409	DEC 22/01	01
608	APR 22/02	01	226	APR 22/01	01	410	APR 22/01	01
609	APR 22/02	01	227	APR 22/01	01	411	APR 22/99	01
610	APR 22/02	01	228	DEC 22/01	01	412	APR 22/01	01
611	AUG 22/05	01	229	DEC 22/01	01	413	APR 22/01	01
612	APR 22/02	01	230	APR 22/05	01	414	DEC 22/05	02
613	APR 22/02	01	231	APR 22/05	01			
614	APR 22/02	01	232	APR 22/05	01	27-51-15		
615	APR 22/02	01	233	APR 22/05	02	401	APR 22/09	01
616	APR 22/02	01	234	APR 22/01	01	402	AUG 22/00	01
617	APR 22/02	01	235	APR 22/01	01	403	NOV 10/90	01
618	APR 22/02	01	236	BLANK		404	NOV 10/90	01

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
27-51-15		CONT.	27-51-20		CONT.	27-51-21		CONT.
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410	APR 22/01	01	424	AUG 22/06	15	612	APR 22/02	01
411	APR 22/01	01	425	DEC 22/01	06	613	AUG 22/05	01
412	DEC 10/98	01	426	APR 22/06	14	614	APR 22/02	01
413	APR 22/01	01	427	APR 22/06	13	615	APR 22/02	01
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416	APR 22/01	01	430	DEC 22/07	18			
417	APR 22/01	01				27-51-22		
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401	APR 22/09	01	605	AUG 22/01	02	406	FEB 10/91	02
402	NOV 10/90	01	606	AUG 22/01	02	407	MAY 10/96	02
403	AUG 10/98	01	607	AUG 22/06	03	408	APR 22/01	01
404	MAY 10/92	05	608	AUG 22/05	02	409	AUG 22/02	01
405	MAY 10/92	05	609	AUG 22/06	03	410	AUG 22/03	09
406	MAY 10/92	03	610	AUG 22/05	03	411	AUG 22/02	08
407	AUG 10/95	03	611	AUG 22/06	03	R 412	AUG 22/09	08.1
408	MAY 10/92	03	612	AUG 22/05	03	R 413	AUG 22/09	14.1
409	APR 22/01	02	613	AUG 22/05	03	414	AUG 22/02	13
410	APR 22/05	02	614	BLANK		415	AUG 22/02	11
411	AUG 22/07	02				416	AUG 22/02	01
412	AUG 10/98	06	27-51-21			417	AUG 22/02	01
413	APR 22/01	06	401	APR 22/00	01	418	DEC 22/05	07
414	APR 22/08	06	402	APR 22/01	07			
415	APR 22/01	06	403	AUG 22/06	02	27-51-23		
416	DEC 10/98	06	404	AUG 22/06	04	401	APR 22/05	01
417	APR 22/01	06	405	APR 22/01	02	402	FEB 10/91	01
418	APR 22/01	05	406	NOV 10/94	02	403	APR 22/00	01
419	AUG 22/01	03	407	FEB 10/95	02	404	FEB 10/91	01
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			409	APR 22/00	02	406	AUG 22/99	01
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			415	AUG 22/06	13	27-51-23		
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			27-51-21			401	APR 22/01	01
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			606	APR 22/02	01	407	DEC 22/07	02
						408	AUG 22/06	02

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
27-51-25			27-51-27		CONT.	27-51-32		CONT.
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403	AUG 22/99	01	423	AUG 22/06	04	225	APR 22/06	03
404	AUG 22/99	01	424	AUG 22/06	04	226	APR 22/06	03
405	AUG 22/99	03	425	AUG 22/07	04	227	APR 22/06	03
406	AUG 22/99	01	426	AUG 22/02	02	228	APR 22/06	01
407	AUG 22/99	01	427	AUG 22/02	02			
408	APR 22/99	04	428	AUG 22/02	02	27-51-32		
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411	APR 22/99	06						
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602	MAY 10/90	01	403	AUG 22/99	02	403	FEB 10/96	28
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			406	AUG 10/92	01	406	DEC 22/01	05
			407	MAY 10/95	01	407	APR 22/06	06
27-51-26			408	AUG 10/92	01	408	APR 22/99	01
401	APR 22/99	01	409	FEB 10/91	01	409	APR 22/99	01
402	APR 22/99	01	410	APR 22/01	01	410	APR 22/99	01
403	APR 22/99	01	411	DEC 22/05	02	411	APR 22/99	01
404	APR 22/99	04	412	APR 22/05	01	412	APR 22/99	01
405	APR 22/99	03	413	AUG 22/07	02	413	APR 22/08	09
406	APR 22/08	02	414	DEC 22/05	02	414	DEC 22/01	05
407	APR 22/99	01	415	DEC 22/05	02	415	APR 22/04	05
408	APR 22/99	01	416	DEC 22/05	02	416	APR 22/04	05
409	APR 22/99	01	417	DEC 22/05	02	417	APR 22/04	08
410	AUG 22/05	01	418	DEC 22/05	02	418	APR 22/04	06
411	AUG 22/05	01	419	DEC 22/05	02	419	APR 22/04	07
412	AUG 22/05	01	420	DEC 22/05	02	420	APR 22/04	08
413	AUG 22/05	01	421	DEC 22/05	02	421	FEB 10/94	04
414	AUG 22/05	01	422	DEC 22/05	01	422	APR 22/01	05
415	AUG 22/05	02				423	APR 22/01	06
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411	APR 22/01	02	212	APR 22/06	02	208	APR 22/99	01
412	AUG 22/02	01	213	APR 22/08	01	209	APR 22/99	01
413	DEC 22/02	02	214	APR 22/06	03	210	APR 22/99	01
414	AUG 22/07	04	215	APR 22/06	03	211	APR 22/99	01
415	AUG 22/06	05	216	APR 22/06	03	212	APR 22/99	01
416	AUG 22/06	07	217	APR 22/06	03	213	DEC 22/01	03
417	AUG 22/06	05	218	APR 22/06	03	214	DEC 22/01	04
418	AUG 22/06	05	219	APR 22/06	03	215	APR 22/08	04
419	AUG 22/06	04	220	APR 22/06	03	216	APR 22/01	04
420	AUG 22/06	05	221	APR 22/06	03	217	APR 22/01	05
			222	APR 22/06	03	218	DEC 22/01	04

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
27-51-34		CONT.	27-51-37			27-51-40		
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223	APR 22/01	06	405	APR 22/08	02			
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226	DEC 22/01	10	27-51-37			402	MAY 10/90	01
227	DEC 22/01	10	601	DEC 22/07	02	403	APR 22/08	01
228	AUG 22/99	09	602	FEB 10/95	01	404	MAY 10/90	01
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233	APR 22/01	08	401	APR 22/01	01	409	APR 22/01	01
234	APR 22/01	08	402	FEB 10/95	01	410	APR 22/01	01
235	APR 22/01	06	403	NOV 10/90	01	411	APR 22/01	01
236	AUG 22/06	05	404	DEC 10/98	01	412	APR 22/08	01
237	AUG 22/06	07	405	AUG 22/07	02	413	DEC 22/01	01
238	BLANK		406	APR 22/08	01	414	DEC 22/01	01
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602	MAY 10/90	01	27-51-38			27-51-41		
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			603	MAY 10/90	01	603	DEC 22/01	01
27-51-35			604	BLANK		604	MAY 10/97	09
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27-51-35			406	AUG 22/07	02	802	DEC 22/01	01
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27-51-36			27-51-39			404	DEC 10/98	01
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402	NOV 10/90	01	602	FEB 10/95	01	406	APR 22/01	01
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27-51-45		CONT.	27-58-00			27-61-00		CONT.
205	DEC 22/00	12	501	DEC 10/98	01	209	FEB 10/95	01
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208	FEB 10/95	02	504	BLANK		212	AUG 22/06	02
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212	APR 10/98	03	402	NOV 10/90	01	216	AUG 22/06	03
213	AUG 22/01	08	403	APR 22/01	01	217	DEC 10/98	02
214	DEC 22/05	30	404	APR 22/01	02	218	AUG 22/06	04
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203	NOV 10/93	40	3	AUG 10/96	01	507	FEB 10/94	09
204	DEC 22/00	01	4	NOV 01/83	01	508	NOV 10/90	01
205	DEC 22/00	01	5	MAY 10/92	01	509	FEB 10/94	01
206	DEC 22/00	01	6	NOV 01/83	01	510	FEB 10/94	01
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208	DEC 22/00	01	8	NOV 01/86	02	512	DEC 22/00	24
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211	DEC 22/00	01	11	AUG 22/00	01	515	DEC 22/00	01
212	APR 22/06	08	12	APR 22/00	09	516	AUG 10/98	01
213	AUG 22/01	01	13	APR 22/00	01	517	APR 22/01	01
214	DEC 22/00	01	14	AUG 22/99	03	518	APR 22/01	01
215	AUG 22/01	01	15	MAY 10/92	05	519	NOV 10/90	01
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27-58-00			20	AUG 22/03	01	524	APR 22/01	01
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2	AUG 10/87	01	22	APR 22/06	01	526	AUG 22/02	01
3	DEC 22/01	01				527	APR 22/01	01
4	DEC 22/05	05	27-61-00			528	APR 22/01	01
5	DEC 22/05	03	101	AUG 10/91	01	529	APR 22/01	01
6	DEC 22/05	08	102	APR 22/06	01	530	APR 22/01	01
7	APR 22/02	05	103	DEC 10/98	01	531	APR 22/01	01
8	APR 22/02	03	104	AUG 10/91	01	532	APR 22/01	10
9	APR 22/02	02				533	APR 22/01	09
10	APR 22/02	01	27-61-00			534	APR 22/01	11
			201	AUG 22/06	02	535	APR 22/01	12
27-58-00			202	AUG 22/06	02	536	APR 22/01	11
101	NOV 10/87	09	203	AUG 22/06	02	537	DEC 22/06	06
102	NOV 10/89	01	204	AUG 22/06	02	538	APR 22/01	11
103	NOV 01/86	02	205	AUG 22/06	02	539	DEC 22/01	07
104	BLANK		206	AUG 22/01	01	540	APR 22/01	08
			207	AUG 22/07	02	541	APR 22/01	07
			208	DEC 10/98	01	542	APR 22/01	08

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
27-61-00		CONT.	27-61-01			27-61-04		
543	APR 22/01	08	401	DEC 10/98	01	401	DEC 10/98	01
544	APR 22/01	09	402	DEC 10/98	01	402	DEC 10/98	01
545	APR 22/08	09	403	DEC 10/98	01	403	DEC 10/98	01
546	AUG 22/08	09	404	AUG 22/07	04	404	DEC 10/98	02
547	AUG 22/08	09	405	FEB 10/91	01	405	DEC 10/98	03
548	APR 22/08	09	406	FEB 10/91	01	406	DEC 10/98	03
549	APR 22/08	11	407	NOV 10/94	01	407	DEC 10/98	03
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553	APR 22/01	09	411	MAY 10/92	01	401	DEC 10/98	02
554	APR 22/01	10	412	MAY 10/92	01	402	DEC 10/98	01
555	APR 22/01	09	413	AUG 22/01	01	403	AUG 22/01	04
556	APR 22/01	09	414	AUG 22/01	01	404	DEC 10/98	06
557	APR 22/01	07	415	AUG 22/01	01	405	AUG 22/01	07
558	APR 22/01	07	416	DEC 22/04	01	406	AUG 10/94	01
559	APR 22/01	07	417	DEC 22/01	01			
560	APR 22/01	08	418	DEC 22/01	01	27-61-10		
561	APR 22/09	06	419	DEC 22/01	01	401	APR 22/01	04
562	APR 22/06	16	420	APR 22/99	01	402	AUG 22/01	01
563	APR 22/06	20	421	DEC 10/98	01	403	AUG 22/01	01
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566	AUG 22/01	13	27-61-01			406	APR 22/01	01
567	AUG 22/01	12	601	AUG 10/90	01	407	APR 22/01	01
568	DEC 22/01	12	602	AUG 10/90	01	408	BLANK	
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571	APR 22/08	18	605	DEC 22/02	01	1	AUG 22/00	01
572	APR 22/08	15	606	AUG 22/06	01	2	AUG 22/00	01
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574	APR 22/01	15	608	BLANK		4	AUG 22/00	01
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577	APR 22/06	15	401	APR 22/00	01	7	APR 22/08	01
578	APR 22/06	14	402	AUG 22/99	01	8	APR 22/00	01
579	APR 22/08	14	403	DEC 10/98	01	9	AUG 22/03	01
580	APR 22/08	09	404	AUG 22/04	01	10	DEC 22/01	01
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580F	AUG 22/01	11	410	DEC 22/01	01	102	NOV 01/86	01
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580J	AUG 22/01	04	414	AUG 22/05	01	27-62-00		
580K	AUG 22/01	09	415	APR 22/08	13	501	APR 22/06	02
580L	AUG 22/01	10	416	DEC 22/06	03	502	APR 22/06	04
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580P	AUG 22/01	14	420	DEC 22/08	03	506	APR 22/06	03
580Q	AUG 22/01	12	421	AUG 22/08	06	507	APR 22/06	15
580R	AUG 22/01	13	422	AUG 22/08	02	508	DEC 22/00	01
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515	APR 22/06	08	405	DEC 22/01	03	105	AUG 10/87	02
516	APR 22/06	09	406	DEC 22/01	03	106	AUG 10/87	01
517	APR 22/06	12	407	DEC 22/00	01	107	AUG 10/87	01
518	AUG 22/08	06	408	AUG 22/01	03	108	AUG 10/87	02
519	DEC 22/00	12				109	AUG 10/87	01
520	AUG 22/99	03	27-62-10			110	AUG 10/87	01
521	DEC 22/00	06	401	DEC 10/98	01	111	AUG 10/87	01
522	DEC 22/00	01	402	NOV 10/90	01	112	MAY 10/95	01
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			405	AUG 22/99	01	115	MAY 10/92	19
27-62-04			406	DEC 10/98	01	116	AUG 22/99	01
201	AUG 22/01	01				117	AUG 22/99	01
202	APR 22/01	03	27-80-00			118	AUG 22/99	01
203	AUG 22/01	03	201	APR 22/06	02			
204	AUG 22/01	01	202	APR 22/06	02	27-81-00		
205	AUG 22/01	01	203	APR 22/06	02	201	NOV 10/97	01
206	AUG 22/01	03	204	APR 22/06	01	202	AUG 22/01	01
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208	APR 22/04	01	206	BLANK		204	MAY 10/96	02
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212	AUG 22/01	01	2	APR 22/04	01	208	MAY 10/95	01
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214	APR 22/04	01	4	DEC 22/00	02	210	MAY 10/95	01
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218	AUG 22/01	07	8	DEC 22/00	05	214	AUG 22/01	01
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221	APR 22/06	07	11	DEC 22/00	03	217	AUG 22/01	01
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205	DEC 22/01	01	21	DEC 22/01	04	227	DEC 22/04	01
206	DEC 22/01	03	22	DEC 22/01	02	228	DEC 22/04	01
			23	DEC 22/01	02	229	DEC 22/04	05
27-62-07			24	DEC 22/01	04	230	DEC 22/04	04
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			29	AUG 22/01	02	235	AUG 22/01	01
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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
27-81-00			27-81-00		CONT.	27-81-01		CONT.
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504	AUG 22/01	01	562	APR 22/08	05	426	APR 22/08	02
505	DEC 22/00	01	563	APR 22/08	06	427	APR 22/08	02
506	DEC 22/00	01	564	APR 22/01	02	428	APR 22/08	02
507	DEC 22/00	01	565	DEC 22/03	02	429	AUG 22/08	02
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509	APR 22/01	01	567	APR 22/06	03	431	APR 22/08	01
510	DEC 22/00	01	568	DEC 22/08	02	432	APR 22/08	01
511	APR 22/01	01	569	APR 22/04	06	433	AUG 22/08	01
512	DEC 22/06	01	570	APR 22/04	06	434	APR 22/08	01
513	APR 22/01	01	571	APR 22/04	06	435	APR 22/08	01
514	APR 22/01	01	572	APR 22/04	06	436	APR 22/08	02
515	APR 22/01	01	573	AUG 22/08	06	437	APR 22/08	02
516	DEC 22/00	01	574	APR 22/04	06	438	APR 22/08	01
517	APR 22/01	01	575	APR 22/04	06	439	APR 22/08	01
518	DEC 22/00	01	576	APR 22/04	06	440	APR 22/08	01
519	AUG 22/08	02	577	AUG 22/08	06	441	APR 22/08	01
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521	APR 22/01	01	579	AUG 22/08	06	443	APR 22/08	02
522	DEC 22/00	01	580	AUG 22/08	05	444	APR 22/08	02
523	DEC 22/00	01	580A	AUG 22/08	07	445	APR 22/08	01
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526	APR 22/08	02	580D	AUG 22/08	05	27-81-01		
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540	APR 22/08	02	404	APR 22/01	01	404	DEC 22/08	01
541	APR 22/08	01	405	AUG 22/08	01	405	DEC 22/08	02
542	APR 22/08	01	406	APR 22/05	01	406	DEC 22/08	02
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544	APR 22/08	01	408	APR 22/01	02	408	DEC 22/08	05
545	APR 22/08	01	409	FEB 10/91	01	409	DEC 22/08	04
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550	APR 22/08	02	414	AUG 22/06	01	414	DEC 22/08	05
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553	APR 22/08	01	417	DEC 22/02	01	417	DEC 22/08	02
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555	APR 22/08	01	419	AUG 22/00	01	419	DEC 22/08	02
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557	APR 22/01	02	421	AUG 22/00	01	421	DEC 22/08	03
558	AUG 22/08	05	422	APR 22/08	02	422	DEC 22/08	04

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27-81-02		CONT.	27-81-03		CONT.	27-81-05		
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503	AUG 22/05	01	412	NOV 10/90	01	406	AUG 10/92	01
504	DEC 22/00	01	413	DEC 22/01	01	407	FEB 10/91	01
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506	APR 22/02	01	415	AUG 22/01	01	409	NOV 10/94	02
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513	APR 22/08	02	205	NOV 10/90	01	416	DEC 22/01	02
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515	AUG 22/05	01	207	AUG 10/98	01	418	DEC 22/01	03
516	AUG 22/05	01	208	AUG 22/02	01	419	DEC 22/01	03
517	APR 22/08	02	209	APR 22/01	01	420	FEB 10/91	03
518	APR 22/08	03	210	APR 22/01	01	421	DEC 22/01	04
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520	APR 22/08	02	212	NOV 10/90	01	423	DEC 22/01	05
521	APR 22/08	02	213	AUG 10/92	01	424	FEB 10/91	04
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604	NOV 10/90	01	233	AUG 22/08	02	404	MAY 10/96	01
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406	NOV 10/90	01				415	APR 22/08	01
						416	APR 22/08	01

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27-81-10		CONT.	27-81-11		CONT.	27-81-16		
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420	DEC 22/99	01	444	AUG 22/05	01	404	NOV 10/90	02
421	DEC 22/01	01				405	AUG 10/92	02
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403	APR 22/01	01	415	APR 22/08	02	401	AUG 10/98	01
404	AUG 10/92	01	416	DEC 22/05	03	402	APR 22/01	01
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406	AUG 10/92	01	418	APR 22/08	02	404	AUG 10/92	01
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413	APR 22/03	01	425	AUG 22/01	01	411	AUG 22/01	01
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424	AUG 22/05	01	406	AUG 22/01	01	402	APR 22/01	01
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603	AUG 10/90	01	255	AUG 22/99	07	803	NOV 10/94	01
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203	APR 22/01	01	260	APR 22/08	12	403	AUG 22/01	01
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205	APR 22/01	01	262	APR 22/08	10	405	NOV 10/90	01
206	APR 22/01	01	263	APR 22/08	13	406	NOV 10/90	01
207	APR 22/01	01	264	APR 22/08	12	407	AUG 10/92	01
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210	DEC 22/07	01	267	DEC 22/06	09	410	APR 22/08	02
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230	APR 22/08	14	416	APR 22/08	03	606	APR 22/02	01
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232	APR 22/08	16	418	APR 22/08	03	608	APR 22/02	01
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FLIGHT CONTROLS - DESCRIPTION AND OPERATION

1. General

A. Aerodynamic characteristics of the 767 have been tailored to reduce drag and provide high performance. Single leading edge slats and trailing edge flaps are used for high aerodynamic efficiency, functional reliability, and low maintenance requirements. Hydraulically powered conventional flight controls with redundant systems provide fail-safe control throughout the flight envelope.

2. Introduction

A. Primary Flight Controls (Fig. 1)

(1) The primary flight controls of the airplane are the ailerons (inboard and outboard), elevators, and rudder. Each control surface is powered by cable operated power control actuators (PCA's). Each PCA receives hydraulic power from a separate hydraulic system. The primary flight controls use all three hydraulic systems for redundancy. There is no reversion to manual control of the surfaces if hydraulic power fails.

B. Secondary Flight Controls (Fig. 1)

- (1) The secondary flight controls are the spoiler/speedbrakes, horizontal stabilizer, leading edge (LE) slats, and trailing edge (TE) flaps.
- (2) Six spoiler/speedbrakes are installed on each wing. They are hydraulically powered and electronically controlled. The spoiler/speedbrakes receive hydraulic power from all three hydraulic systems.
- (3) Six LE slats are installed on each wing. The slats are powered either hydraulically or electrically. Normally, hydraulic motors rotate drive shafts that drive the rotary actuators. Electric motors power the drive shafts as a backup. The slats receive hydraulic power from the center system.
- (4) Two TE flaps (inboard and outboard) are installed on each wing. The flaps are powered either hydraulically or electrically. Normally, hydraulic motors rotate drive shafts that drive rotary actuators. Electric motors power the drive shafts as a backup. The flaps receive hydraulic power from the center system.

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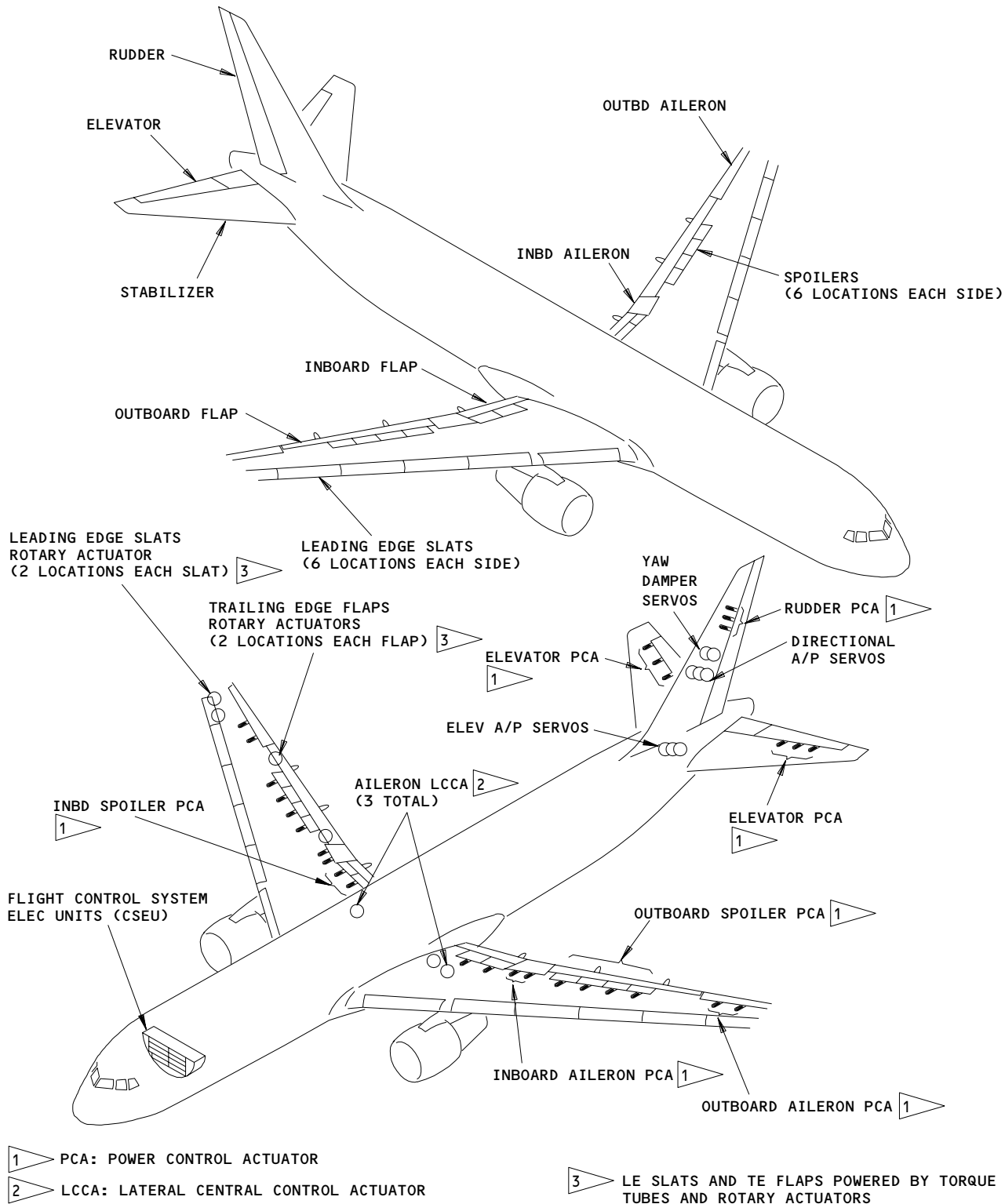
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# BOEING

## 767 MAINTENANCE MANUAL



Flight Controls Introduction  
Figure 1

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- (5) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND; the horizontal stabilizer is hydraulically powered and manually or electrically controlled. The stabilizer receives hydraulic power from the left and center systems.
  - (6) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND; the horizontal stabilizer is hydraulically powered and electrically controlled. The stabilizer receives hydraulic power from the left and center systems.
- C. Flight Control Actuators, Servos, and Electronics (Fig. 1)
- (1) Three lateral central control actuators (LCCA) provide power boost to the wing control cables. Each LCCA is powered by a separate hydraulic system. The LCCA's have internal servovalves for autopilot inputs. All of the LCCA's have the same part number.
  - (2) The 767 uses a total of twenty-nine power control actuators to move the control surfaces. Each PCA uses one of the three hydraulic systems. There are six different part numbers for the PCA's.
  - (3) Six autopilot servos provide electronic control inputs to the flight control systems. There are three elevator servos and three directional servos. The elevator and directional servos use all three hydraulic systems. Each hydraulic system supplies one elevator servo and one directional servo.
  - (4) Two yaw damper servos provide gust damping inputs to the rudder system. Each servo uses one of two hydraulic systems. The two yaw damper servos have the same part number.
  - (5) The control system electronics unit (CSEU) is a group of power supply and electronic modules used in the flight control system. There are two (left and right) CSEU's installed for redundancy.
- D. Flight Controls - Hydraulic Distribution (Fig. 2)
- (1) Three independent hydraulic systems provide power to the flight controls. Each system uses a combination of pumps to supply power.
  - (2) Flight control redundancy is provided by the use of multiple hydraulic systems. The aileron, elevator, rudder, and spoiler PCA's use all three hydraulic systems. The elevator and directional servos and LCCA's each use one of the three hydraulic systems. The slats, flaps, and rudder ratio changer use a single hydraulic system.
  - (3) The ram air turbine (RAT) is an emergency hydraulic source. The RAT is used in the event of a double engine failure. The RAT is used by the primary flight control system only.

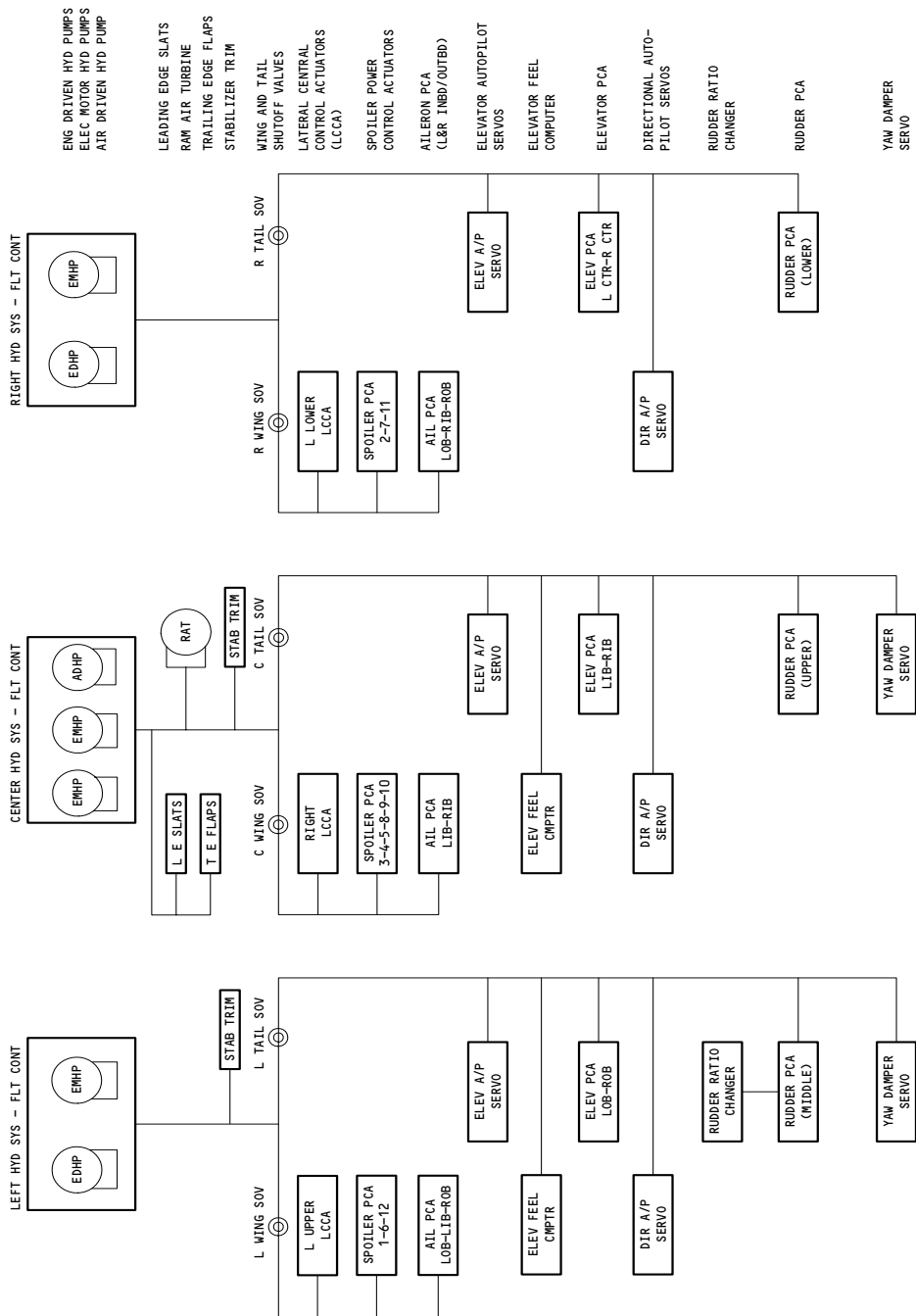
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Flight Controls - Hydraulic Distribution  
Figure 2

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- (4) The wing and tail shutoff valves are used for system isolation. The valves are provided for ground use only. The valves are normally open in flight.
  - (5) Safety harness attachment receptacles are provided on the wing and horizontal stabilizer upper surfaces for use by maintenance personnel working high above ground. For additional information, on Flight Controls Safety Harness Receptacle refer to AMM 20-10-27/201.
- E. Flight Controls - Shear Rivets

(1) Shear rivets provide a means by which normal operation of essential flight systems can be maintained in the event of failure or jamming of related or interconnected secondary systems. Each shear rivet location is marked by a SHEAROUT placard that includes the quantity and part number of the shear rivet. The chart below contains a list of all the shear rivets that are used in the flight control system along with references to the related maintenance manual sections.

MANUAL REFERENCE	PART THAT CONTAINS THE SHEAR RIVET
AMM 27-11-24/401	Right LCCA Torque Tube
AMM 27-11-26/401	Debris Guard - Right Aileron Control Quadrant
AMM 27-21-18/401	Offset Torque Tube - Yaw Damper Summing Lever Assembly
AMM 27-31-06/401	Crank Assembly - PCU Input, Elevator Control

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FLIGHT CONTROLS – MAINTENANCE PRACTICES

1. General

- A. Control cables are thin strands of tinned carbon steel.
- B. A thin film of grease protect the cables from corrosion.
- C. Corrosion occurs where the grease film is not there.
  - (1) This lets moisture get on the cables.

TASK 27-00-00-642-001

2. Corrosion Prevention

A. Procedure

S 162-002

- (1) At regular times, wipe off the grease with a dry, lint-free cloth.

S 212-003

- (2) Examine the cable for corrosion.

S 642-004

- (3) Apply a thin film of grease on the cable (AMM 12-21-31/301).

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FLIGHT CONTROLS - DDG MAINTENANCE PROCEDURES

1. General

- A. This procedure has the maintenance tasks that prepare the airplane for flight with certain systems/components deactivated.
- B. It also has the tasks that put the airplane back to its usual condition.
- C. These are the tasks for the components in the flight controls system:
  - (1) DDG 27-03-1 Preparation - FLIGHT CONTROL SHUTOFF Valves Inoperative
  - (2) DDG 27-03-1 Restoration - FLIGHT CONTROL SHUTOFF Valves Inoperative
  - (3) DDG 27-03-2 Preparation - FLIGHT CONTROL SHUTOFF OFF Valve Lights Inoperative
  - (4) DDG 27-03-2 Restoration - FLIGHT CONTROL SHUTOFF OFF Valve Lights Inoperative
  - (5) DDG 27-08-1 Preparation - Control Surface Position Indicating System Inoperative
  - (6) DDG 27-08-1 Restoration - Control Surface Position Indicating System Inoperative
  - (7) DDG 27-11-1 Preparation - Aileron Trim System Inoperative
  - (8) DDG 27-11-1 Restoration - Aileron Trim System Inoperative
  - (9) DDG 27-11-2 Preparation - Outboard Aileron Lockout System Inoperative
  - (10) DDG 27-11-2 Restoration - Outboard Aileron Lockout System Inoperative
  - (11) DDG 27-21-1 Preparation - Rudder Ratio System - Rudder Ratio Light Inoperative
  - (12) DDG 27-21-1 Restoration - Rudder Ratio System - Rudder Ratio Light Inoperative
  - (13) DDG 27-32-1 Preparation - Stall Warning Test Systems Inoperative
  - (14) DDG 27-32-1 Restoration - Stall Warning Test Systems Inoperative
  - (15) DDG 27-41-2 Preparation - Horizontal Stabilizer Primary Trim Channels Inoperative
  - (16) DDG 27-41-2 Restoration - Horizontal Stabilizer Primary Trim Channels Inoperative
  - (17) DDG 27-51-1 Preparation - Automatic Flap Load Relief Retraction Inoperative
  - (18) DDG 27-51-1 Restoration - Automatic Flap Load Relief Retraction Inoperative
  - (19) DDG 27-62-1 Preparation - Auto Speed Brake System Inoperative
  - (20) DDG 27-62-1 Restoration - Auto Speed Brake System Inoperative

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- (21) DDG 27-63-1 Preparation - AUTO SPDBRK, SPOILERS, and STAB TRIM Lights Inoperative
- (22) DDG 27-63-1 Restoration - AUTO SPDBRK, SPOILERS, and STAB TRIM Lights Inoperative

TASK 27-00-00-049-001

2. DDG 27-03-1 Preparation - FLT CONTROL SHUTOFF Valves Inoperative

A. General

- (1) This task contains the maintenance instructions to prepare the airplane for operation under DDG requirement 27-03-1, FLT CONTROL SHUTOFF Valves Inoperative.

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zone  
135 Wing Landing Gear Wheel Well, LH

D. Procedure

S 869-202

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

S 869-206

- (2) Make sure that the FLT CONTROL SHUTOFF L, R, and C switches on the right side panel, P61 are in the ON positions.

S 869-205

**WARNING:** MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. AILERONS, RUDDERS, ELEVATORS, FLAPS, SPOILERS, LANDING GEAR, AND THRUST REVERSERS CAN MOVE QUICKLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (3) Pressurize the applicable hydraulic system (AMM 29-11-00/201).

S 869-285

- (4) Do these steps to make sure the applicable valve(s) is open:
  - (a) Move the control column or control wheel, as applicable, and make sure the EICAS display show the applicable indication.

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- S 429-218
- (5) Put a 'VALVE INOP' placard on the applicable switch.
- S 049-004
- (6) Remove pressure from the applicable hydraulic system (AMM 29-11-00/201).
- S 869-284
- (7) If electrical power is not necessary, remove electrical power (AMM 24-22-00/201).

TASK 27-00-00-449-277

3. DDG 27-03-1 Restoration - FLT CONTROL SHUTOFF Valves Inoperative

A. General

- (1) This task contains the instructions to put the airplane back to its usual condition after operation under DDG 27-03-1, FLT CONTROL SHUTOFF Valves Inoperative.

B. References

- (1) FIM 27-23-00/101, Rudder and Elevator Shutoff Valves  
(2) AMM 27-13-00/601, Aileron and Spoiler Hydraulic Shutoff Valves  
(3) AMM 27-23-00/501, Rudder and Elevator Shutoff Valves

C. Access

- (1) Location Zone  
135 Wing Landing Gear Wheel Well, LH

D. Procedure

S 819-208

- (1) Do the troubleshooting for the EICAS Message FLT CONT VALS Displayed (FIM 27-23-00/101).

S 729-209

- (2) Do the functional test of the applicable valve:
- (a) Do this task: Aileron and Spoiler Hydraulic Shutoff Valves Inspection/Check (AMM 27-13-00/601).
- (b) Do this task: Rudder and Elevator Shutoff Valves Adjustment/Test (AMM 27-23-00/501).

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S 029-008

- (3) Remove the 'VALVE INOP' placard from the applicable switch.

TASK 27-00-00-049-278

4. DDG 27-03-2 Preparation - FLT CONTROL SHUTOFF OFF Valve Lights Inoperative

A. General

- (1) This task contains the maintenance instructions to prepare the airplane for operation under DDG requirement 27-03-2, FLT CONTROL SHUTOFF OFF Valve Lights Inoperative.

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zone
  - 211 Control Cabin, LH
  - 212 Control Cabin, RH

D. Procedure

S 869-333

- (1) Make sure you can communicate between the flight compartment and ground or an observer. (You can also use EICAS control surface position).

S 869-036

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

S 869-320

**WARNING:** MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. AILERONS, RUDDERS, ELEVATORS, FLAPS, SPOILERS, LANDING GEAR, AND THRUST REVERSERS CAN MOVE QUICKLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (3) Pressurize the hydraulic system (AMM 29-11-00/201) that has the inoperative FLT CONTROL SHUTOFF OFF light.

S 869-213

- (4) Make sure the applicable FLT CONTROL SHUTOFF switches on the P61 Pilot's Overhead Maintenance Panel are ON.

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- S 869-214
- (5) If the FLT CONTROL SHUTOFF OFF light inoperative is the L TAIL light, do these steps:
- (a) Move Control Column full aft, then full forward.
  - (b) Make sure that the elevators move up, then down.
- S 869-268
- (6) If the FLT CONTROL SHUTOFF OFF light inoperative is the L WING light, do these steps:
- (a) Move then hold the control wheel full left.
  - (b) Make sure that the left aileron moves up.
  - (c) Release the control wheel.
- S 869-237
- (7) If the FLT CONTROL SHUTOFF OFF light inoperative is the C TAIL light, do these steps:
- (a) Move the control column full aft, then full forward.
  - (b) Make sure that the elevators move up, then down.
- S 869-238
- (8) If the FLT CONTROL SHUTOFF OFF light inoperative is the C WING light, do these steps:
- (a) Move then hold the control wheel full left.
  - (b) Make sure that the left inboard aileron move up and the right inboard aileron move down.
  - (c) Release the control wheel.
- S 869-215
- (9) If the FLT CONTROL SHUTOFF OFF light inoperative is the R TAIL light, do these steps:
- (a) Move the control column full aft, then full forward.
  - (b) Make sure that the elevators move up, then down.
- S 869-216
- (10) If the FLT CONTROL SHUTOFF OFF light inoperative is the R WING light, do these steps:
- (a) Move and hold control wheel full right.
  - (b) Make sure that the right ailerons move up and the left outboard aileron move down.
- S 869-217
- (11) Remove hydraulic pressure from the applicable system (AMM 29-11-00/201).

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S 869-038

- (12) If electrical power is not necessary, remove electrical power (AMM 24-22-00/201).

TASK 27-00-00-449-039

5. DDG 27-03-2 Restoration - FLT CONTROL SHUTOFF OFF Valve Lights Inoperative

A. General

- (1) This task contains the instructions to put the airplane back to its usual condition after operation under DDG 27-03-2, FLT CONTROL SHUTOFF OFF Valve Lights Inoperative.

B. References

- (1) AMM 27-13-00/601, Aileron and Spoiler Hydraulic Shutoff Valves  
(2) AMM 27-23-00/501, Rudder and Elevator Shutoff Valves

C. Access

- (1) Location Zone  
211 Control Cabin, LH  
212 Control Cabin, RH

D. Procedure

S 969-040

- (1) Replace the applicable indicator switch light.

S 729-041

- (2) Do a test of the applicable indicator light:  
(a) Do this task: Aileron and Spoiler Shutoff Valve - Check (AMM 27-13-00/601).  
(b) Do this task: Rudder and Elevator Shutoff Valve Functional Test (AMM 27-23-00/501).

TASK 27-00-00-049-226

6. DDG 27-08-1 Preparation - Control Surface Position Indicating System Inoperative

A. General

- (1) This task contains the maintenance instructions to prepare the airplane for operation under DDG requirement 27-08-1, Control Surface Position Indicating System Inoperative.

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B. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zone
  - 211 Control Cabin, LH
  - 212 Control Cabin, RH

D. Procedure

S 429-290

- (1) Put a placard near EICAS screen to indicate which indication is inoperative.

S 869-219

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

S 869-220

**WARNING:** MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. AILERONS, RUDDERS, ELEVATORS, FLAPS, SPOILERS, LANDING GEAR, AND THRUST REVERSERS CAN MOVE QUICKLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (3) Pressurize the left, center, and right hydraulic systems (AMM 29-11-00/201).

S 729-222

- (4) Do these steps to make sure that the spoilers and ailerons are operational:
  - (a) Move then hold the control wheel full left.
    - 1) Make sure that all the left and right wing spoilers extend.

**NOTE:** The two inboard spoilers will extend approximately 20 degree. The four outboard spoilers will extend approximately 45 degrees.

- 2) Make sure the left ailerons move up and the right ailerons move down.

**NOTE:** The inboard aileron will deflect approximately 21 degrees up or down. The outboard ailerons will deflect approximately 30 degrees up and 15 degrees down.

- 3) Release the control wheel.

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- (b) Move then hold the control wheel full right.  
1) Make sure that all the left and right wing spoilers extend.

NOTE: The two inboard spoilers will extend approximately 20 degree. The four outboard spoilers will extend approximately 45 degrees.

- 2) Make sure the right ailerons move up and the left ailerons move down.

NOTE: The inboard aileron will deflect approximately 21 degrees up or down. The outboard ailerons will deflect approximately 30 degrees up and 15 degrees down.

- 3) Release the control wheel.

S 729-288

- (5) Do these steps to make sure that the elevators are operational:  
(a) Move Control Column full aft, then full forward.  
(b) Make sure that the elevators move up, then down.

NOTE: The elevator will deflect approximately 28 degree up and 20 degree down.

S 719-334

- (6) Do these steps to make sure that the rudder is operational:  
(a) Push on the rudder pedal full left then full right.  
(b) Make sure that the rudder moves left then right.

NOTE: The rudder will deflect approximately 26 degrees left or right.

S 869-223

- (7) Remove Pressure from the left, center, and right hydraulic systems (AMM 29-11-00/201).

S 869-224

- (8) If electrical power is not necessary, remove electrical power (AMM 24-22-00/201).

TASK 27-00-00-449-225

7. DDG 27-08-1 Restoration - Control Surface Position Indicating System Inoperative

A. General

- (1) This task contains the instructions to put the airplane back to its usual condition after operation under DDG 27-08-1, Control Surface Position Indicating System Inoperative.

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B. References

- (1) FIM 27-18-00/101, Aileron Position Indicating System
- (2) FIM 27-28-00/101, Rudder Position Indicating System
- (3) FIM 27-38-00/101, Elevator Position Indicating System
- (4) FIM 27-48-00/101, Stabilizer Trim Position Indicating System

C. Access

- (1) Location Zone
  - 211 Control Cabin, LH
  - 212 Control Cabin, RH

D. Procedure

S 819-227

- (1) Do the following applicable steps to troubleshoot the applicable system:
  - (a) Do this task: Aileron Position Indicating System Check (FIM 27-18-00/101).
  - (b) Do this task: Rudder Position Indicating Problem Check (FIM 27-28-00/101).
  - (c) Do this task: Elevator Position Indicating System Check (FIM 27-38-00/101).
  - (d) Do this task: Stabilizer/Trim Position Indicating System Check (FIM 27-38-00/101).

S 029-291

- (2) Remove the placard near the EICAS screen.

TASK 27-00-00-049-335

8. DDG 27-11-1 Preparation - Aileron Trim System Inoperative

A. General

- (1) This task contains the maintenance instructions to prepare the airplane for operation under DDG requirement 27-11-1, Aileron Trim System Inoperative.

B. Special Tools and Equipment

- (1) A27088-13 Aileron Trim Actuator Dummy Link
- (2) Rig Pins from Kit A20004-78 (AMM 20-10-24):
  - (a) A6 - P/N A20004-22

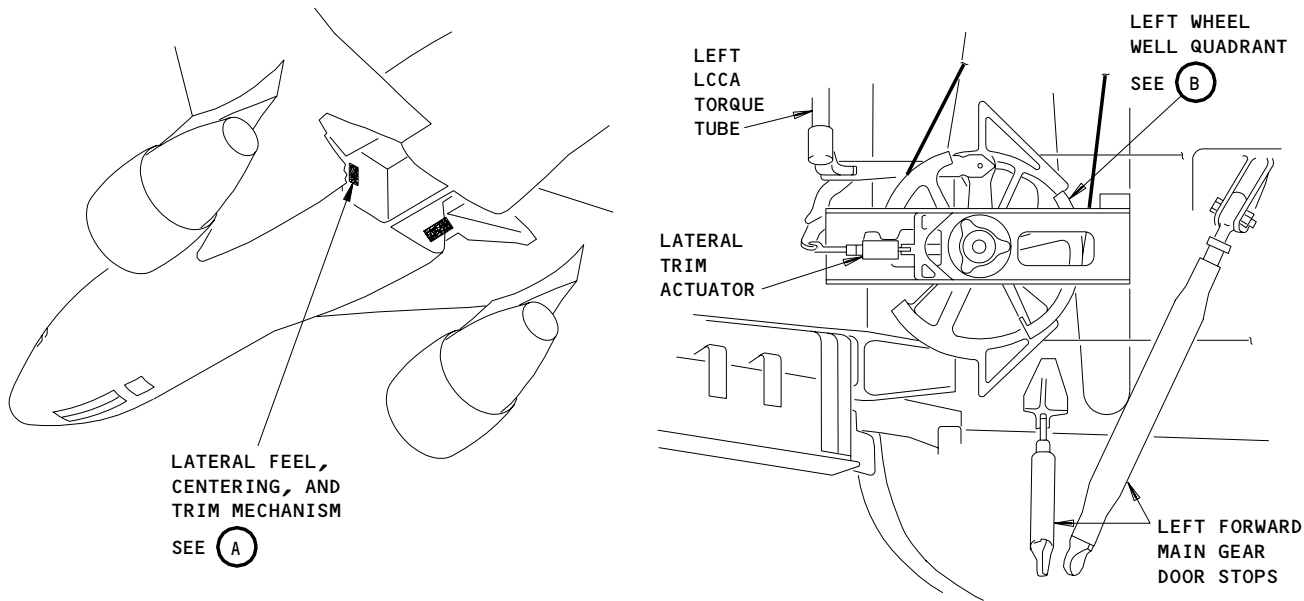
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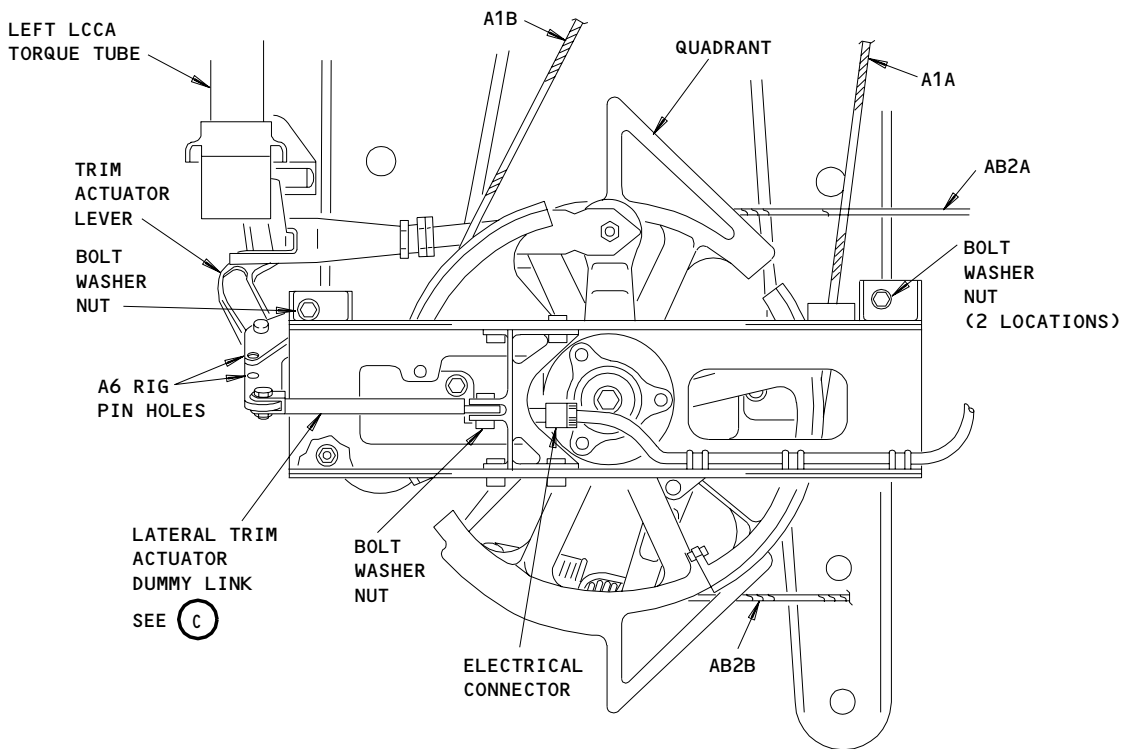
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LATERAL FEEL, CENTERING, AND TRIM MECHANISM

(A)



LEFT WHEEL WELL QUADRANT

(B)

MEL 27-11-1 Aileron Trim System -  
Dummy Trim Actuator Link Installation  
Figure 901 (Sheet 1)

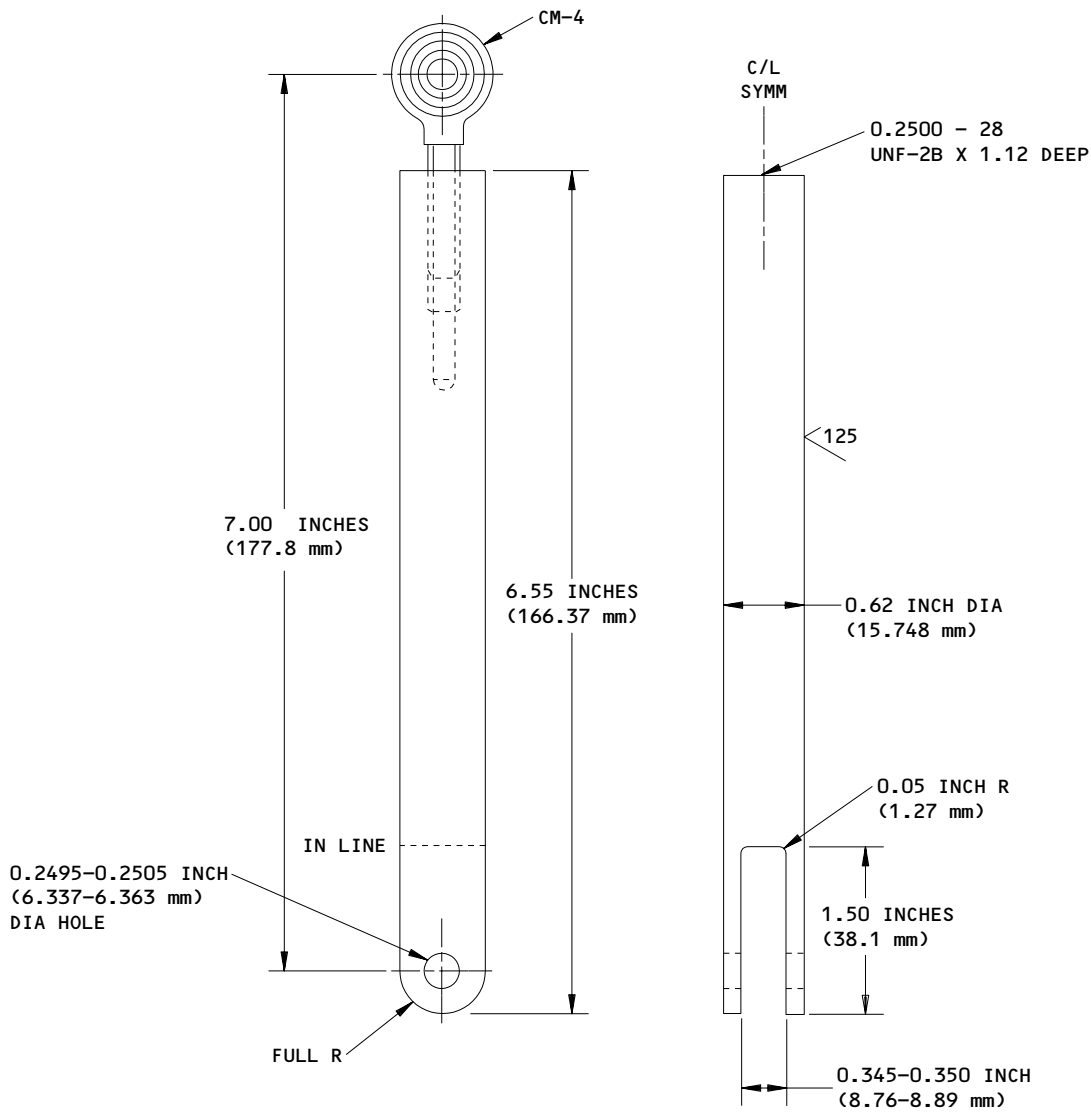
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A27088-13  
LATERAL (AILERON) TRIM ACTUATOR DUMMY LINK

(C)

MEL 27-11-1 Aileron Trim System -  
Dummy Trim Actuator Link Installation  
Figure 901 (Sheet 2)

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C. Standard Tools and Equipment

- (1) Collar – Circuit Breaker, Locking, Pasco Plastics P/N S-4933959,  
Pasco Plastics, Santa Fe Springs, CA

D. References

- (1) AMM 24-22-00/201, Electrical Power – Control
- (2) AMM 27-11-09/401 Lateral Trim Actuator
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 32-00-15/201, Landing Gear Door Locks

E. Access

- (1) Location Zone  
730 Main Landing Gear and Doors, LH

F. Procedure

S 429-336

- (1) Put the placard "INOP" on the trim switches on the aft pilot's control stand, P8.

S 049-337

- (2) If the system is not out of tolerance (the control wheels are at the center), do the deactivation of the aileron trim control system:
  - (a) Open this circuit breaker and attach the DO-NOT-CLOSE tag and the collar:
    - 1) On the Overhead Panel, P11:
      - a) 11K15 AILERON TRIM

S 049-338

- (3) If the system is out of tolerance (the control wheels are not at the center), do the deactivation of the aileron trim control system:
  - (a) Remove the lateral trim actuator (AMM 27-11-09/401).
  - (b) Put a cap on the electrical connector.
    - 1) Put the electrical connector in a safe location.
  - (c) Align the rig pin holes and install the rig pin A6 (Fig. 902).
  - (d) Install the dummy trim actuator link with the bolts, washers and nuts (Fig. 902).
  - (e) Remove the rig pin A6.

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S 869-342

- (4) Put the Airplane Back to Its Usual Condition.
- (a) Remove the DO-NOT-CLOSE tags and the collars (if installed), and close these circuit breakers on the overhead panel, P11:
    - 1) 11K15, AILERON TRIM
    - 2) 11H15, FLT CONT SHUTOFF WING L
    - 3) 11H26, FLT CONT SHUTOFF WING R
  - (b) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (c) Remove the door locks from the main landing gear doors and close the doors (AMM 32-00-15/201).
- (d) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).
- (e) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-00-00-449-340

9. DDG 27-11-1 Restoration - Aileron Trim System Inoperative

A. General

- (1) This task contains the instructions necessary to put the airplane back to its usual condition after operation under DDG 27-11-2, Aileron Trim System Inoperative.

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-11-09/401 Lateral Trim Actuator
- (3) AMM 32-00-15/201, Landing Gear Door Locks
- (4) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

- (1) Location Zone  
730 Main Landing Gear and Doors, LH

D. Procedure

S 449-343

- (1) If the deactivation was done with a circuit breaker, do the reactivation of the aileron trim control system:
  - (a) Remove the DO-NOT-CLOSE tag and the collar (if installed), and close this circuit breaker on the P11 overhead panel:
    - 1) 11K15 AILERON TRIM

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S 449-345

- (2) If the deactivation was done with a dummy actuator link, do the reactivation of the aileron trim control system:
- (a) Supply electrical power (AMM 24-22-00/201).
  - (b) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (c) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).
- (d) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the P61 panel to OFF and attach the DO-NOT-OPERATE tags.
  - 1) Make sure that the amber lights come on.
- (e) Open these circuit breakers on the P11 overhead panel and attach DO-NOT-CLOSE tags:
  - 1) 11K15, AILERON TRIM
  - 2) 11H15, FLT CONT SHUTOFF WING L
  - 3) 11H16, FLT CONT SHUTOFF WING CTR
  - 4) 11H26, FLT CONT SHUTOFF WING R

S 029-344

- (3) Remove the placard "INOP" from the trim switches on the aft pilot's control stand, P8.
- (a) Remove the dummy trim actuator link (Fig. 902).
  - (b) Install the lateral trim actuator (AMM 27-11-09/401).

TASK 27-00-00-049-009

10. DDG 27-11-2 Preparation - Outboard Aileron Lockout System Inoperative

A. General

- (1) This task contains the maintenance instructions to prepare the airplane for operation under DDG requirement 27-11-2, Outboard Aileron Lockout System Inoperative.

B. Access

(1) Location Zone

561	Outboard Aileron, LH
661	Outboard Aileron, RH

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- (2) Access Panel
  - 561CB Outboard Aileron, LH
  - 661CB Outboard Aileron, RH

C. Procedure

S 429-010

- (1) Put this placard near the left and right primary flight displays:
  - (a) DO NOT EXCEED 270 KIAS OR 0.73 MACH

S 429-011

- (2) Put this placard at the pilots' center panel near the flight controls position indicators on the lower EICAS:
  - (a) L (R) OUTBOARD AILERON LOCKOUT INOPERATIVE

S 049-012

- (3) Do these steps to deactivate the outboard aileron lockout actuators:
  - (a) Open these circuit breakers and attach the DO-NOT-CLOSE tag:
    - 1) P11 Overhead Circuit Breaker Panel
      - a) 11C17 OUTBOARD AILERON LOCKOUT L
      - b) 11C18 OUTBOARD AILERON LOCKOUT R
  - (b) Deactivate the outboard aileron actuator on the left wing.
    - 1) Remove the access panel 561CB.
    - 2) Disconnect the electrical connectors M462 from the left outboard aileron lockout actuator.
    - 3) Seal the electrical connector with cap.
    - 4) Install the access panel 561CB.
  - (c) Deactivate the outboard aileron actuator on the right wing.
    - 1) Remove the access panel 661CB.
    - 2) Disconnect the electrical connector D1636 from the right outboard aileron lockout actuator.
    - 3) Seal the electrical connector with cap.
    - 4) Install the access panel 661CB
  - (d) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
    - 1) P11 Overhead Circuit Breaker Panel
      - a) 11C17 OUTBOARD AILERON LOCKOUT L

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b) 11C18 OUTBOARD AILERON LOCKOUT R

TASK 27-00-00-449-013

11. DDG 27-11-2 Restoration - Outboard Aileron Lockout System Inoperative

A. General

- (1) This task contains the instructions necessary to put the airplane back to its usual condition after operation under DDG 27-11-2, Outboard Aileron Lockout System Inoperative.

B. Access

- (1) Location Zone
  - 561 Outboard Aileron, LH
  - 661 Outboard Aileron, RH
- (2) Access Panel
  - 561CB Outboard Aileron, LH
  - 661CB Outboard Aileron, RH

C. Procedure

S 869-014

- (1) Open these circuit breakers and attach the DO-NOT-CLOSE tag:
  - (a) P11 Overhead Circuit Breaker Panel
    - 1) 11C17 OUTBOARD AILERON LOCKOUT L
    - 2) 11C18 OUTBOARD AILERON LOCKOUT R

S 449-292

- (2) Do these steps to activate the outboard aileron lockout actuator on the left wing:
  - (a) Remove the access panel 561CB.
  - (b) Connect the electrical connector M462 to the outboard aileron lockout actuator.
  - (c) Install the access panel 561CB.

S 449-293

- (3) Do these steps to activate the outboard aileron lockout actuator on the right wing:
  - (a) Remove the access panel 661CB.

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- (b) Connect the electrical connector D1636 to the outboard aileron lockout actuator.
- (c) Install the access panel 661CB.

S 869-019

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
  - (a) P11 Overhead Circuit Breaker Panel
    - 1) 11C17 OUTBOARD AILERON LOCKOUT L
    - 2) 11C18 OUTBOARD AILERON LOCKOUT R

S 819-210

- (5) Do the troubleshooting for the EICAS Message AILERON LOCKOUT Displayed (FIM 27-11-00/101).

S 729-211

- (6) Do this task: Test Outboard Aileron Lockout Actuator (AMM 27-11-00/501).

S 029-020

- (7) Remove the L (R) OUTBOARD AILERON LOCKOUT INOPERATIVE placard from the pilot's center panel near the flight controls position indicator.

S 029-021

- (8) Remove the DO NOT EXCEED 240 KIAS OR 0.60 MACH placard from the left and right Primary Flight Display.

TASK 27-00-00-049-279

12. DDG 27-21-1 Preparation - Rudder Ratio System - Rudder Ratio Light Inoperative

A. General

- (1) This task contains the maintenance instructions to prepare the airplane for operation under DDG requirement 27-21-1, Rudder Ratio System - Rudder Ratio Light Inoperative.

**NOTE:** The RUDDER RATIO light does not have to work, however, the advisory level EICAS message RUDDER RATIO must operate normally.

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B. References

(1) AMM 27-21-00/501, System Test - Rudder and Rudder Trim Control.

C. Access

(1) Location Zones

211 Control Cabin, LH

212 Control Cabin, RH

D. Procedure

S 719-294

**WARNING:** DO NOT DISPATCH THE AIRPLANE IF THE AMBER "RUDDER RATIO" MESSAGE APPEARS ON THE EICAS.

(1) Do this task to make sure the RUDDER RATIO EICAS system operates normally: "Rudder Ratio Flight Deck Annuciation Test" of the System Test - "Rudder and Rudder Trim Control" (AMM 27-21-00/501).

**NOTE:** One control channel must operate for dispatch. If both channels are inoperative, the amber RUDDER RATIO message will appear on the EICAS and dispatch is not permitted.

TASK 27-00-00-449-280

13. DDG 27-21-1 Restoration - Rudder Ratio System - Rudder Ratio Light Inoperative

A. General

(1) This task contains the instructions to put the airplane back to its usual condition after operation under DDG 27-21-1, Rudder Ratio System - Rudder Ratio Light Inoperative.

B. References

(1) AMM 27-21-00/501, System Test - Rudder and Rudder Trim Control.

C. Access

(1) Location Zone

211 Control Cabin, LH

212 Control Cabin, RH

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D. Procedure

S 969-231

- (1) Replace the applicable indicator switch light.

S 719-232

- (2) Do a test of the applicable indicator light:
  - (a) Do this task: Rudder Ratio Flight Deck Annunciation Test (AMM 27-21-00/501).

TASK 27-00-00-049-281

14. DDG 27-32-1 Preparation - Stall Warning Test Systems Inoperative

A. General

- (1) This task contains the maintenance instructions to prepare the airplane for operation under DDG requirement 27-32-1, Stall Warning Test System Inoperative.

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems
- (3) AMM 34-11-00/201, Pitot-Static System
- (4) FIM 27-32-00/101, Stall Warning System

C. Access

- (1) Location Zone
  - 119, 120 Main Equipment Center
  - 211, 212 Control Cabin

D. Procedure

S 429-295

- (1) Put an 'INOP' placard on the stall warning test switch on the P5 panel.

S 869-200

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

S 749-201

- (3) AIRPLANES WITH THE ADVANCED STALL WARNING COMPUTERS, (P/N 285T1104-XX);  
Do these steps:
  - (a) Look at the Warning Electronics Unit (WEU) bite module on the P51 panel for a fault indication.

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- (b) If a fault code is shown, do the applicable maintenance (FIM 27-32-00/101).
- (c) If board faults or unsatisfactory interactions between computers do not show, the airframe configuration code and option code will be shown.
- (d) If the problem continues and no fault codes show, do the test that follows.

E. Stall Warning Test

S 219-189

- (1) Make sure the trailing edge flaps and leading edge slats are fully retracted and the flap lever is in the zero (flaps up) detent.

S 869-191

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 869-192

- (3) Move the flap control lever to the 25-unit detent, and make sure the flaps and slats extend.

S 219-193

- (4) Make sure the left and right angle-of-attack vanes are parallel to the ground.

S 869-194

- (5) Pressurize the upper left and upper right pitot-static probes to 150 knots (0.55 psig regulated air pressure) (AMM 34-11-00/201).

S 719-195

- (6) Do these steps to make sure the left stall warning system operates correctly:
  - (a) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:
    - 1) PROBE HEAT AOA L
  - (b) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
    - 1) AIR/GND SYS 1
  - (c) Make sure the left AOA vane is sufficiently cool to touch.
    - 1) If not, stop until the vane is cool.
  - (d) Turn the left AOA vane in the counterclockwise direction (the trailing edge of the vane will move up) approximately 20 degrees.
    - 1) Make sure the left stick shaker shakes the control columns.

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- (e) Turn the left AOA vane to the initial position, and make sure the left stick shaker stops the movement.
- (f) Remove the DO-NOT-CLOSE tags and close this circuit breaker on the P6 panel:
  - 1) PROBE HEAT AOA L
- (g) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - 1) AIR/GND SYS 1

S 719-196

- (7) Do these steps to make sure the right stall warning system operates correctly:
  - (a) Open this circuit breaker, on the P6 panel, and attach a DO-NOT-CLOSE tag:
    - 1) PROBE HEAT AOA R
  - (b) Open these circuit breakers, on the P11 panel, and attach DO-NOT-CLOSE tags:
    - 1) AIR/GND SYS 2
    - 2) LANDING GEAR POSITION AIR/GND SYS 2 ALTN
  - (c) Make sure the right AOA vane is sufficiently cool to touch.
    - 1) If not, stop until the vane is cool.
  - (d) Turn the right AOA vane in the clockwise direction (the trailing edge of the vane will move up) approximately 20 degrees and do this check:
    - 1) Make sure the right stick shaker shakes the control columns.
  - (e) Turn the right AOA vane to its initial position, and make sure the right stick shaker stops the movement.
  - (f) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P6 panel:
  - (g) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
    - 1) AIR/GND SYS 2
    - 2) LANDING GEAR POSITION AIR/GND SYS 2 ALTN

S 869-197

- (8) Move the flap control lever to the UP detent and make sure the flaps and slats retract.

S 719-198

- (9) Do these steps to make sure the stick nudger system operates correctly:
  - (a) Open these circuit breakers, on the P6 panel, and attach DO-NOT-CLOSE tags:
    - 1) PROBE HEAT AOA R
    - 2) PROBE HEAT AOA L
  - (b) Open these circuit breakers, on the P11 panel, and attach DO-NOT-CLOSE tags:
    - 1) AIR/GND SYS 1
    - 2) AIR/GND SYS 2
    - 3) LANDING GEAR POSITION AIR/GND SYS 2 ALTN

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- (c) Make sure the left and right AOA vanes are sufficiently cool to touch.
  - 1) If not, stop until the vane is cool.
- (d) Turn the left AOA vane in the counterclockwise direction and the right AOA vane in the clockwise direction (the trailing edges of the two vanes will move up) approximately 20 degrees, and do these checks:
  - 1) Make sure the control columns move forward and stay in the forward position
  - 2) Make sure the two stick shakers operate.
- (e) Turn the left (or right) AOA vane to its initial position and do these checks:
  - 1) Make sure the two control columns move back to the initial center position
  - 2) Make sure the left (or right) stick shaker stops.
  - 3) Make sure the right (or left) stick shaker continues to shake the two columns.
- (f) Turn the other AOA vane to its initial position and make sure the stick shaker movement stops.
- (g) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
  - 1) PROBE HEAT AOA R
  - 2) PROBE HEAT AOA L
- (h) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - 1) AIR/GND SYS 1
  - 2) AIR/GND SYS 2
  - 3) LANDING GEAR POSITION AIR/GND SYS 2 ALTN

S 869-199

- (10) Put the airplane back to its usual condition.

TASK 27-00-00-449-082

15. DDG 27-32-1 Restoration - Stall Warning Test Systems Inoperative

A. General

- (1) This task contains the instructions necessary to put the airplane back to its usual condition after operation under DDG 27-32-1, Stall Warning Test Systems Inoperative.

B. References

- (1) AMM 27-32-01/401, Stall Warning Module
- (2) FIM 27-32-00/101, Stall Warning System

C. Access

- (1) Location Zone
  - 119, 120 Main Equipment Center
  - 211, 212 Control Cabin

D. Procedure

S 029-083

- (1) Remove the placard 'INOP' from the stall warning test switch on the P5 panel.

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S 429-084

- (2) Replace the applicable stall warning module (AMM 27-32-01/401).

TASK 27-00-00-049-296

16. DDG 27-41-2 Preparation - Horizontal Stabilizer Primary Trim Channels Inoperative

A. General

- (1) This task contains the maintenance instructions to prepare the airplane for operation under DDG requirement 27-41-2, Horizontal Stabilizer Primary Trim Channels Inoperative.

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems

C. Access

- (1) Location Zones
  - 211 Control Cabin, LH
  - 212 Control Cabin, RH

D. Procedure

S 869-297

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

S 869-301

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Pressurize the left and center hydraulic systems (AMM 29-11-00/201).

S 869-299

- (3) Make sure that these circuit breakers are closed:
  - (a) On the Overhead Circuit Breaker panel, P11:
    - 1) 11C12, STAB TRIM SHUTOFF L

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2) 11C13, STAB TRIM SHUTOFF CENTER

S 729-300

- (4) Do these steps to determine if the L autopilot channel is inoperative.
- (a) Put the L STAB TRIM shutoff valve switch on the control stand in NORM.
  - (b) Put the C STAB TRIM shutoff valve switch on the control stand in CUTOUT.
  - (c) Move either the captain's or first officer's stabilizer trim control switches on the control wheel to APL NOSE UP position.
    - 1) Make sure the stabilizer leading edge moves down.
    - 2) If the stabilizer leading edge does not move down, the left stabilizer trim control module (M211) is inoperative, put the placard "INOP" on the L autopilot channel.
  - (d) Move either the captain's or first officer's stabilizer trim control switches on the control wheel to APL NOSE DN position.
    - 1) Make sure the stabilizer leading edge moves up.
    - 2) If the stabilizer leading edge does not move up, the left stabilizer trim control module (M211) is inoperative, put the placard "INOP" on the L autopilot channel.

S 729-302

- (5) ON AIRPLANES WITH STAB TRIM LEVERS;  
Do these steps to make sure that the horizontal stabilizer trim operates normally using STAB TRIM levers.
- (a) Move both stabilizer manual trim levers on control stand to full forward to APL NOSE DN.
    - 1) Make sure the the stabilizer leading edge moves up.
  - (b) Move both stabilizer manual trim levers on control stand to full aft to APL NOSE UP.
    - 1) Make sure the the stabilizer leading edge moves down.

S 729-303

- (6) ON AIRPLANES WITH ALTN STAB TRIM SWITCHES;  
Do these steps to make sure that the horizontal stabilizer trim operates normally using ALTN STAB TRIM switches.
- (a) Push the ALTN STAB TRIM switch forward to APL NOSE DN.
    - 1) Make sure the the stabilizer leading edge moves up.
  - (b) Push the ALTN STAB TRIM switch aft to APL NOSE UP.
    - 1) Make sure the the stabilizer leading edge moves down.
  - (c) Push the ALTN STAB TRIM switch to neutral position.

S 729-304

- (7) Do these steps to determine if the R autopilot channel is inoperative.
- (a) Put the L STAB TRIM shutoff valve switch on the control stand in CUTOUT.
  - (b) Put the C STAB TRIM shutoff valve switch on the control stand in NORM.

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- (c) Move either the captain's or first officer's stabilizer trim control switches on the control wheel to APL NOSE UP position.
  - 1) Make sure the stabilizer leading edge moves down.
  - 2) If the stabilizer leading edge does not move down, the right stabilizer trim control module (M212) is inoperative, put the placard "INOP" on the R autopilot channel.
- (d) Move either the captain's or first officer's stabilizer trim control switches on the control wheel to APL NOSE DN position.
  - 1) Make sure the stabilizer leading edge moves up.
  - 2) If the stabilizer leading edge does not move up, the right stabilizer trim control module (M212) is inoperative, put the placard "INOP" on the R autopilot channel.

S 729-305

- (8) ON AIRPLANES WITH STAB TRIM LEVERS;  
Do these steps to make sure that the horizontal stabilizer trim operates normally using STAB TRIM levers.
  - (a) Move both stabilizer manual trim levers on control stand to full forward to APL NOSE DN.
    - 1) Make sure the the stabilizer leading edge moves up.
  - (b) Move both stabilizer manual trim levers on control stand to full aft to APL NOSE UP.
    - 1) Make sure the the stabilizer leading edge moves down.
  - (c) Move the levers to the neutral position.

S 729-306

- (9) ON AIRPLANES WITH ALTN STAB TRIM SWITCHES;  
Do these steps to make sure that the horizontal stabilizer trim operates normally using ALTN STAB TRIM switches.
  - (a) Push the ALTN STAB TRIM switch forward to APL NOSE DN.
    - 1) Make sure the the stabilizer leading edge moves up.
  - (b) Push the ALTN STAB TRIM switch aft to APL NOSE UP.
    - 1) Make sure the the stabilizer leading edge moves down.
  - (c) Push the ALTN STAB TRIM switch to neutral position.

S 869-321

- (10) Remove Pressure from the left, center, and right hydraulic systems (AMM 29-11-00/201).

S 869-322

- (11) If electrical power is not necessary, remove electrical power (AMM 24-22-00/201).

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TASK 27-00-00-449-307

17. DDG 27-41-2 Restoration - Horizontal Stabilizer Primary Trim Channels

Inoperative

A. General

- (1) This task contains the instructions necessary to put the airplane back to its usual condition after operation under DDG 27-41-2, Horizontal Stabilizer Primary Trim Channels Inoperative.

B. References

- (1) AMM 27-41-05/401, Stabilizer Trim Control Module

C. Access

- (1) Location Zone  
311, 312 Area Aft of Pressure Bulkhead to BS 1725  
211, 212 Control Cabin

D. Procedure

S 429-310

- (1) If the placard 'INOP' was on the L autopilot channel, do these steps to remove and replace the left stabilizer trim control module (M211):  
(a) Remove the "INOP" placard.  
(b) Replace the left Stabilizer Trim Control Module (M211) (AMM 27-41-05/401).

S 429-309

- (2) If the placard 'INOP' was on the R autopilot channel, do these steps to remove and replace the right stabilizer trim control module (M212):  
(a) Remove the "INOP" placard.  
(b) Replace the right Stabilizer Trim Control Module (M212) (AMM 27-41-05/401).

TASK 27-00-00-049-121

18. DDG 27-51-1 Preparation - Automatic Flap Load Relief Retraction Inoperative

A. General

- (1) This task contains the instructions necessary to prepare the airplane for operation under DDG requirement 27-51-1, Automatic Flap Load Relief Retraction Inoperative.

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(3) AMM 32-00-15/201, Landing Gear Door Lock  
(4) AMM 32-00-20/201 Landing Gear Downlock

C. Access

- (1) Location Zone  
144, 145 MLG Wheel Well  
221, 222 Control Cabin  
730, 740 Main Landing Gear and Doors

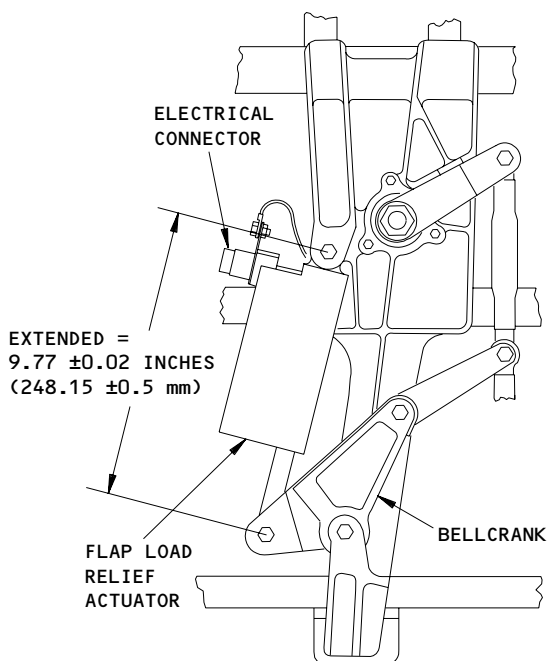
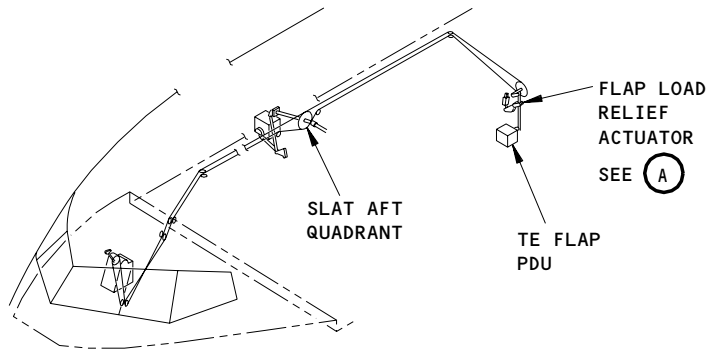
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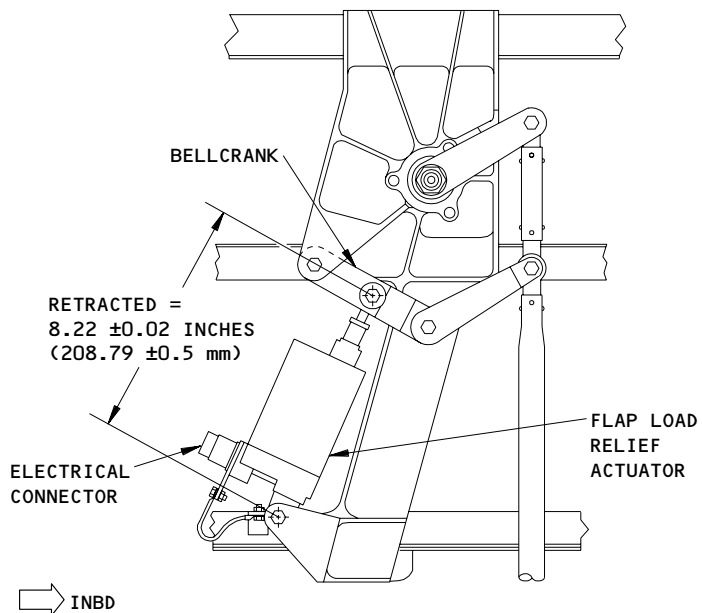
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767-200 AIRPLANES  
FLAP LOAD RELIEF ACTUATOR  
(FRONT VIEW)

(A)



767-300 AIRPLANES  
FLAP LOAD RELIEF ACTUATOR  
(FRONT VIEW)

(A)

MEL 27-51-1 Automatic Flap Load Relief Retraction  
Figure 902

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D. Procedure

S 869-122

- (1) Put a placard "FLAPS 25 or 30 INOP" near flap handle.

S 219-313

- (2) Make sure the downlocks are installed on the main landing gear (AMM 32-00-20/201).

S 499-312

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 869-314

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

S 219-315

- (5) Make sure that the flaps and slats are in in fully retracted position.

S 219-316

- (6) Make sure the flap control lever is in the zero (FLAPS UP) detent, and attach a DO-NOT-OPERATE tag.

S 869-318

- (7) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 869-317

- (8) Open these circuit breakers and and attach DO-NOT-CLOSE tags:  
(a) On the Main Power Distribution Panel, P6:  
1) 6D24, ALTN FLAP PWR

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- 2) 6D21, ALTN SLAT INBD PWR
- 3) 6F24, ALTN SLAT OUTBD PWR
- (b) On the Overhead Panel, P11:
  - 1) 11J13, FLAP LOAD RELIEF
  - 2) 11J24, FLAPS ALTN CONT
  - 3) 11H23, SLAT ALTN CONT INBD
  - 4) 11H24, SLAT ALTN CONT OUTBD

S 229-319

- (9) Measure and make sure the distance between the center of the flap load relief actuator bolt holes is correct as shown in the Detail A of Fig 901.

S 869-323

- (10) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
  - (a) On the P6 panel:
    - 1) 6D24, ALTN FLAP PWR
    - 2) 6D21, ALTN SLAT INBD PWR
    - 3) 6F24, ALTN SLAT OUTBD PWR
  - (b) On the P11 panel:
    - 1) 11J13, FLAP LOAD RELIEF
    - 2) 11J24, FLAPS ALTN CONT
    - 3) 11H23, SLAT ALTN CONT INBD
    - 4) 11H24, SLAT ALTN CONT OUTBD

S 099-327

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (11) Remove the door locks from the main landing gear doors and close the doors (AMM 32-00-15/201).

S 099-326

- (12) Remove the DO-NOT-OPERATE tag from the flap control lever.

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S 869-325

- (13) If electrical power is not necessary, remove electrical power (AMM 24-22-00/201).

TASK 27-00-00-449-124

19. DDG 27-51-1 Restoration - Automatic Flap Load Relief Retraction Inoperative

A. General

- (1) This task contains the instructions necessary to put the airplane back to its usual condition after operation under DDG 27-51-1, Automatic Flap Load Relief Retraction Inoperative.

B. References

- (1) AMM 27-51-00/501, Trailing Edge Flap System  
(2) FIM 27-51-00/101, Trailing Edge Flap System

C. Access

- (1) Location Zone  
221, 222 Control Cabin

D. Procedure

S 029-125

- (1) Remove the placard "FLAPS 25 or 30 INOP" from the Flap Handle.

S 819-328

- (2) Do the troubleshooting for the trailing edge flap system (AMM 27-51-00/501).

S 729-329

- (3) Do this task: "Flap Load Alleviation System - Test" (AMM 27-51-00/501).

TASK 27-00-00-049-131

20. DDG 27-62-1 Preparation - Auto Speed Brake System Inoperative

A. General

- (1) This task contains the instructions necessary to prepare the airplane for operation under DDG requirement 27-62-1, Auto Speed Brake System Inoperative.

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B. Standard Tools and Equipment

- (1) Collar – Circuit Breaker, Locking; Paco Plastics P/N S-4933959; Paco Plastics, Santa Fe Springs, CA

C. Access

- (1) Location Zone  
221, 222 Control Cabin

D. Procedure

S 429-132

- (1) Put the placard "AUTO SPEED BRAKE INOP" at the control stand near the speed brake handle.

S 429-241

- (2) Put the placard "INOP" on the AUTO SPDBRK light on the P11 Overhead Panel.

S 869-133

- (3) Open this circuit breaker and attach a collar and a "DO-NOT-CLOSE" tag:
  - (a) On the Overhead Panel, P11:
    - 1) 11G11, AUTO SPEEDBRK

S 429-242

- (4) AUTO SPDBRK light on overhead panel will illuminate – place tape over the light or remove bulb.

S 869-332

- (5) Tell dispatch it is possible that the permitted landing weight of the airplane will be decreased.

TASK 27-00-00-449-134

21. DDG 27-62-1 Restoration – Auto Speed Brake System Inoperative

A. General

- (1) This task contains the instructions necessary to put the airplane back to its usual condition after operation under DDG 27-62-1, Auto Speed Brake System Inoperative.

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B. References

- (1) FIM 27-62-00/101, Auto-Speedbrake Control System

C. Access

- (1) Location Zone  
221, 222 Control Cabin

D. Procedure

S 029-135

- (1) Remove the AUTO SPEED BRAKE INOP placard from the control stand.

S 029-243

- (2) Remove tape or replace bulb on the AUTO SPDBRK light on the overhead panel.

S 869-331

- (3) Remove the circuit breaker collar and DO-NOT-CLOSE tag, and close this circuit breaker:

- (a) On the overhead panel, P11:  
1) 11G11, AUTO SPEEDBRK

S 819-137

- (4) Do the troubleshooting for the auto speedbrake control system (FIM 27-62-00/101).

TASK 27-00-00-049-282

22. DDG 27-63-1 Preparation - AUTO SPDBRK, SPOILERS, and STAB TRIM Lights

Inoperative

A. General

- (1) This task contains the instructions necessary to prepare the airplane for operation under DDG requirement 27-63-1, AUTO SPDBRK, SPOILERS, and STAB TRIM Lights Inoperative.

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 27-61-00/501, Spoiler/Speedbrake Control System  
(3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

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C. Standard Tools and Equipment

- (1) Collar – Circuit Breaker, Locking; Paco Plastics P/N S-4933959; Paco Plastics, Santa Fe Springs, CA

D. Access

- (1) Location Zone  
221, 222 Control Cabin

E. AUTO SPEED BRAKE LIGHT INOPERATIVE;  
Procedure

S 429-348

- (1) Put the placard "AUTO SPDBRK LIGHT INOP" on the overhead panel, P5.

S 869-245

- (2) Open this circuit breaker, install a circuit breaker collar, and attach a "DO-NOT-CLOSE" tag:  
(a) On the Overhead Panel, P11:  
1) 11G11, AUTO SPEEDBRK

S 219-246

- (3) Make sure the EICAS message, AUTO SPEED BRAKE, shows on the top EICAS display.

S 869-247

- (4) Move the EICAS select switch on the pilot's display select panel, P9, to L.  
(a) Make sure the EICAS message, AUTO SPEED BRAKE, shows on the top EICAS display.

S 869-248

- (5) Move the EICAS select switch on the pilot's display select panel, P9, to R.  
(a) Make sure the EICAS message, AUTO SPEED BRAKE, shows on the top EICAS display.

S 869-346

- (6) Remove the circuit breaker collar and "DO-NOT-CLOSE" tag, and close this circuit breaker:  
(a) On the overhead panel, P11:  
1) 11G11, AUTO SPEEDBRK

S 869-347

- (7) Make sure the EICAS message, AUTO SPEEDBRAKE, does not show on the top EICAS display.

F. SPOILERS LIGHT INOPERATIVE;  
Procedure

S 429-351

- (1) Put the placard "SPOILERS LIGHT INOP" on the overhead panel, P5.

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S 719-252

- (2) Do this task: Operational Test – Spoiler/Speedbrake Control System in AMM 27-61-00/501; except that the SPOILER light on the P5 overhead panel will not work.

**NOTE:** Except the SPOILER light on the P5 overhead panel, all other actions and indications will be the same as the operational test in AMM 27-61-00/501.

G. STAB TRIM LIGHT INOPERATIVE;  
Procedure

S 429-353

- (1) Put the placard "STAB TRIM LIGHT INOP" on the overhead panel, P5.

S 869-349

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

S 869-350

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Pressurize the left and center hydraulic systems (AMM 29-11-00/201).

S 869-256

- (4) Make sure these circuit breakers are closed:  
(a) On the Overhead Panel, P11:  
1) 11C12, STAB TRIM SHUTOFF L  
2) 11C13, STAB TRIM SHUTOFF CENTER  
3) 11H10, STAB TRIM POS IND L

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- 4) 11H19, STAB TRIM POS IND R
- 5) 11H11, STAB TRIM CONT L
- 6) 11H20, STAB TRIM CONT R
- 7) ON AIRPLANES WITH ALTN STAB TRIM SWITCHES;  
11A36, STAB TRIM ALT

S 869-257

- (5) Move the stabilizer to between 4 and 14 units of trim.

S 869-258

- (6) Move the FLT CONTROL SHUTOFF L and C switches on P61 panel to ON.

S 869-259

- (7) Move the EICAS computer selector on the forward electronics panel to L.

S 729-352

- (8) Do these steps to make sure that the horizontal stabilizer trim and the EICAS message, STAB TRIM, operate normally:
  - (a) Move the C STAB TRIM shutoff valve switch on the control stand to NORM.
  - (b) Move the L STAB TRIM shutoff valve switch on the control stand to CUTOUT.
  - (c) Move either the captain's or first officer's stabilizer trim control switches on the control wheel to APL NOSE DN position.
    - 1) Make sure that the EICAS message, STAB TRIM, shows on the top EICAS display.
  - (d) Move the L STAB TRIM shutoff valve switch on the control stand to NORM.
  - (e) Move either the captain's or first officer's stabilizer trim control switches on the control wheel to APL NOSE DN position.
    - 1) Make sure that the EICAS message, STAB TRIM, does not show on the top EICAS display.

S 869-354

- (9) Move the EICAS computer selector on the forward electronics panel to AUTO.

S 869-357

- (10) Move the stabilizer to the neutral position.

S 869-355

- (11) Remove Pressure from the left and center hydraulic systems (AMM 29-11-00/201).

S 869-356

- (12) If electrical power is not necessary, remove electrical power (AMM 24-22-00/201).

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TASK 27-00-00-449-283

23. DDG 27-63-1 Restoration - AUTO SPDBRK, SPOILERS, and STAB TRIM Lights

Inoperative

A. General

- (1) This task contains the instructions necessary to put the airplane back to its usual condition after operations under DDG 27-63-1, AUTO SPDBRK, SPOILERS, and STAB TRIM Lights Inoperative.

B. References

- (1) AMM 22-22-00/501, Automatic Stabilizer Trim System
- (2) AMM 27-61-00/501, Spoiler/Speedbrake Control System
- (3) AMM 27-62-00/501, Auto-Speedbrake Control System

C. Access

- (1) Location Zone  
221, 222 Control Cabin

D. Procedure

S 969-358

- (1) Replace the applicable, AUTO SPDBRK, SPOILER, or STAB TRIM light.

S 729-359

- (2) Do a test of the applicable AUTO SPDBRK, SPOILERS, or STAB TRIM light.
  - (a) Do this task: Operational Test - Spoiler/Speedbrake Control System (AMM 27-61-00/501).
  - (b) Do this task: "Master Dim and It's Interface with the Auto-Speedbrake Warning System - Test" in the Auto-Speedbrake - System Test (AMM 27-62-00/501).
  - (c) Do this task: "Test the STAB TRIM Fault Light Interface" in the System Test - Automatic Stabilizer Trim System (AMM 22-22-00/501).

S 029-360

- (3) Remove the applicable placard "AUTO SPDBRK LIGHT INOP", "SPOILERS LIGHT INOP", or "STAB TRIM LIGHT INOP" from the overhead panel, P5.

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FLIGHT CONTROL CABLES – DESCRIPTION AND OPERATION

1. General

- A. The flight control cables transmit the pilots' control inputs to the related control surfaces. A typical control cable system ends at a drum or quadrant using swaged terminals. The cables are tensioned to the proper rigging load by turnbuckles. Long cable runs are supported by idler pulleys. Air seals are used to reduce pressure loss when cables are routed through pressure bulkheads.
- B. Control cable runs are identified by code letter descriptions and identify cable function (Ref Flight Control Cables – Maintenance Practices).

2. Component Details

A. Ailerons

- (1) Aileron control cables are routed from the control wheels to the left and right drum assemblies under the flight deck floor. The dual set of cables separate and run down each side of the fuselage under the main deck floor. The primary cables on the left side stop at the aileron feel, centering and trim assembly. The backup cables on the right side go through the override mechanism and stop at the right aileron control output quadrant.
- (2) The feel, centering, and trim mechanism controls the upper and lower left lateral central control actuators (LCCAs) thru mechanical linkages. The right LCCA is controlled through mechanical linkages and a set of cables from the feel, centering and trim mechanism. If the primary control path fails, the secondary control path drives a cable set between left and right LCCA output quads which operates left side controls. Cable sets in each wing operate the inboard and outboard aileron power control actuators (PCAs).

B. Rudder

- (1) Rudder control cables are routed from the forward quadrants under the flight deck floor, above the main deck ceiling, through the aft bulkhead air pressure seals, up into the vertical stabilizer, ending on the feel, centering and trim aft quadrant.

C. Elevators

- (1) Both control cable sets are able to operate the elevator controls. Override mechanisms at the control columns and aft quadrants allow control with failure in one control path.
- (2) The captains cable set runs from control column quadrant, down the fuselage left side, through aft bulkhead air pressure seals. The cables are routed over the stabilizer wing box to the left aft quadrant. The first officers cables run under the flight deck floor, up into the main deck ceiling. The cables are routed through aft bulkhead air pressure seals, over the stabilizer wing box to the right aft quadrant.

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- (3) Input into one aft quadrant operates the elevator PCAs on that side. The opposite side elevator PCAs are operated through a cable backdrive in front of the stabilizer rear spar only under the conditions of a linkage disconnection.

D. Stabilizer Trim

- (1) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
Stabilizer trim control cables start from control stand drums. One cable set transmits the control input to the stabilizer hydraulic valves, the other arms the valve. The cables run under the flight deck floor, up into the main deck ceiling. The cable sets separate, run down the left and right ceiling sides, then merge together. Passing through the aft bulkhead air pressure seals, the cables end at the stabilizer trim control module quadrants.
- (2) Three cables connect the stabilizer wing box to the stabilizer trim position transmitter/limit switches. The cables go up from the wing box top to pulleys mounted below the stabilizer trim control modules. The cables run down to the position transmitter/limit switches, then up to the stab wing box bottom.

E. Flaps/Slats

- (1) The flap/slats control cables are routed from the control stand drum below the flight deck floor to the right fuselage side. The cables run below the main deck floor to the lead edge slats aft quadrant. From the leading edge slats aft quadrant, the cables run to the flap aft quadrant.

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FLIGHT CONTROL CABLES – MAINTENANCE PRACTICES

1. General

- A. This procedure supplies flight-control cable data for reference only.
- B. For specific airplane cable part number (cable material, cable size and length dimensions) and cable fitting, use the illustrated part catalog (AIPC). The figures that follow supply cable data for the flaps, slats, aileron, rudder, elevator, and horizontal stabilizer control systems. To remove or install a control cable, refer to AMM 20-10-03/401.

**NOTE:** You can mix zinc-only and tin-zinc coated cables but opposite cable segments in the same cable loop must be of the same type (For example, in Fig. 202, cables A1A-4 and A1B-4 must be replaced together with both new cables either zinc-only or tin-zinc.) This will prevent asymmetric cable stretch that can make cable rigging bad.

TASK 27-00-01-702-003

2. Refer to the Figures that Follow for the Cable Data

A. General

- (1) Aileron Control Cables (Fig. 202)
- (2) Rudder Control Cables (Fig. 203)
- (3) Elevator Control Cables (Fig. 204)
- (4) Horizontal Stabilizer Trim Control Cables (Fig. 205)
- (5) Stabilizer Trim Limit Switch and Position Transmitter Module Cables (Fig. 206)
- (6) Flap/Slat Control Cables (Fig. 207)
- (7) Air Pressure Seals (Fig. 208)

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



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
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CONTROL SYSTEM	CABLE CODE	CABLE FUNCTION
AILERON	A1A	AILERON CONTROL - R AIL UP, L AIL DOWN
	A1B	AILERON CONTROL - L AIL UP, R AIL DOWN
	A2A	AILERON CONTROL, RIGHT WING - R AIL UP, L AIL DOWN
	A2B	AILERON CONTROL, RIGHT WING - L AIL UP, R AIL DOWN
	AB2A	AILERON BUS CONTROL - R AIL UP, L AIL DOWN
	AB2B	AILERON BUS CONTROL - L AIL UP, R AIL DOWN
	AB3A	AILERON BUS AFT POWER - R AIL UP, L AIL DOWN
	AB3B	AILERON BUS AFT POWER - L AIL UP, R AIL DOWN
	A3A	AILERON CONTROL, LEFT WING - R AIL UP, L AIL DOWN
	A3B	AILERON CONTROL, LEFT WING - L AIL UP, R AIL DOWN
	A4A	AILERON CONTROL, RIGHT WING - R AIL UP, L AIL DOWN
	A4B	AILERON CONTROL, RIGHT WING - L AIL UP, R AIL DOWN
	RUDDER	RA
RB		RUDDER CONTROL, BODY, CTR TOP FUSE - RUDDER RIGHT
ELEVATOR	E1A	ELEVATOR CONTROL, BODY, LEFT SIDE - ELEVATOR DOWN
	E1B	ELEVATOR CONTROL, BODY, LEFT SIDE - ELEVATOR UP
	E2A	ELEVATOR CONTROL, BODY, CTR TOP FUSE - ELEVATOR DOWN
	E2B	ELEVATOR CONTROL, BODY, CTR TOP FUSE - ELEVATOR UP
ELEVATOR SLAVE	EA0	ELEVATOR SLAVE CONTROL - ELEVATOR UP
	EBO	ELEVATOR SLAVE CONTROL - ELEVATOR DOWN
STAB TRIM CONTROL	ST1A	STAB TRIM CONTROL LEVER - STAB LEADING EDGE UP 
	ST1B	STAB TRIM CONTROL LEVER - STAB LEADING EDGE DOWN 
STAB TRIM ARMING	ST2A	STAB TRIM ARMING LEVER - STAB LEADING EDGE UP 
	ST2B	STAB TRIM ARMING LEVER - STAB LEADING EDGE DOWN 
STAB TRIM POSITION INDICATING	---	STAB TRIM LIMIT SWITCH/POSITION TRANSMITTER
FLAPS/SLATS	WFA	FLAPS/SLATS CONTROL - FLAPS/SLATS UP
	WFB	FLAPS/SLATS CONTROL - FLAPS/SLATS DOWN

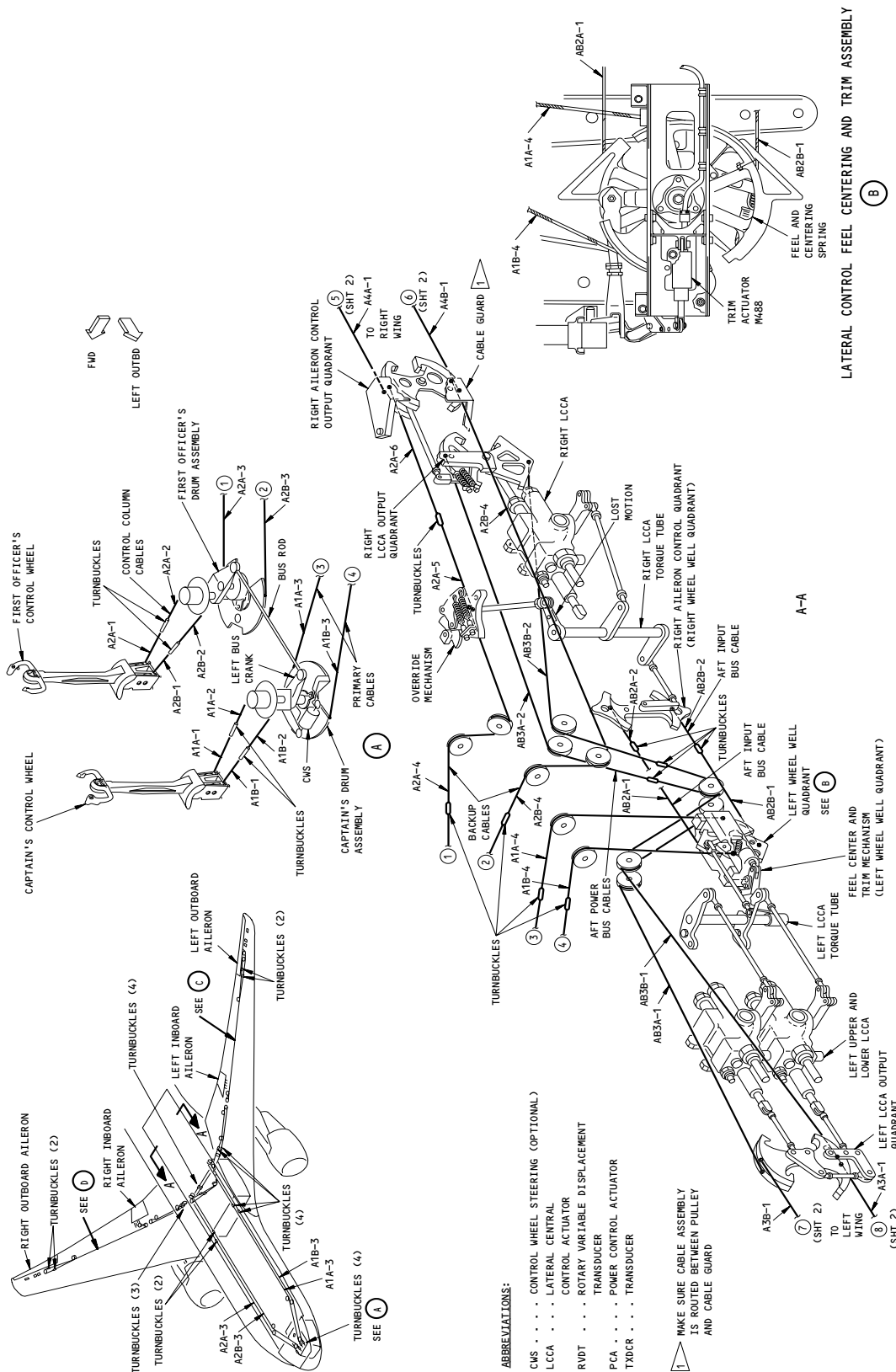
 AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND

Flight Control Cable Functions  
Figure 201

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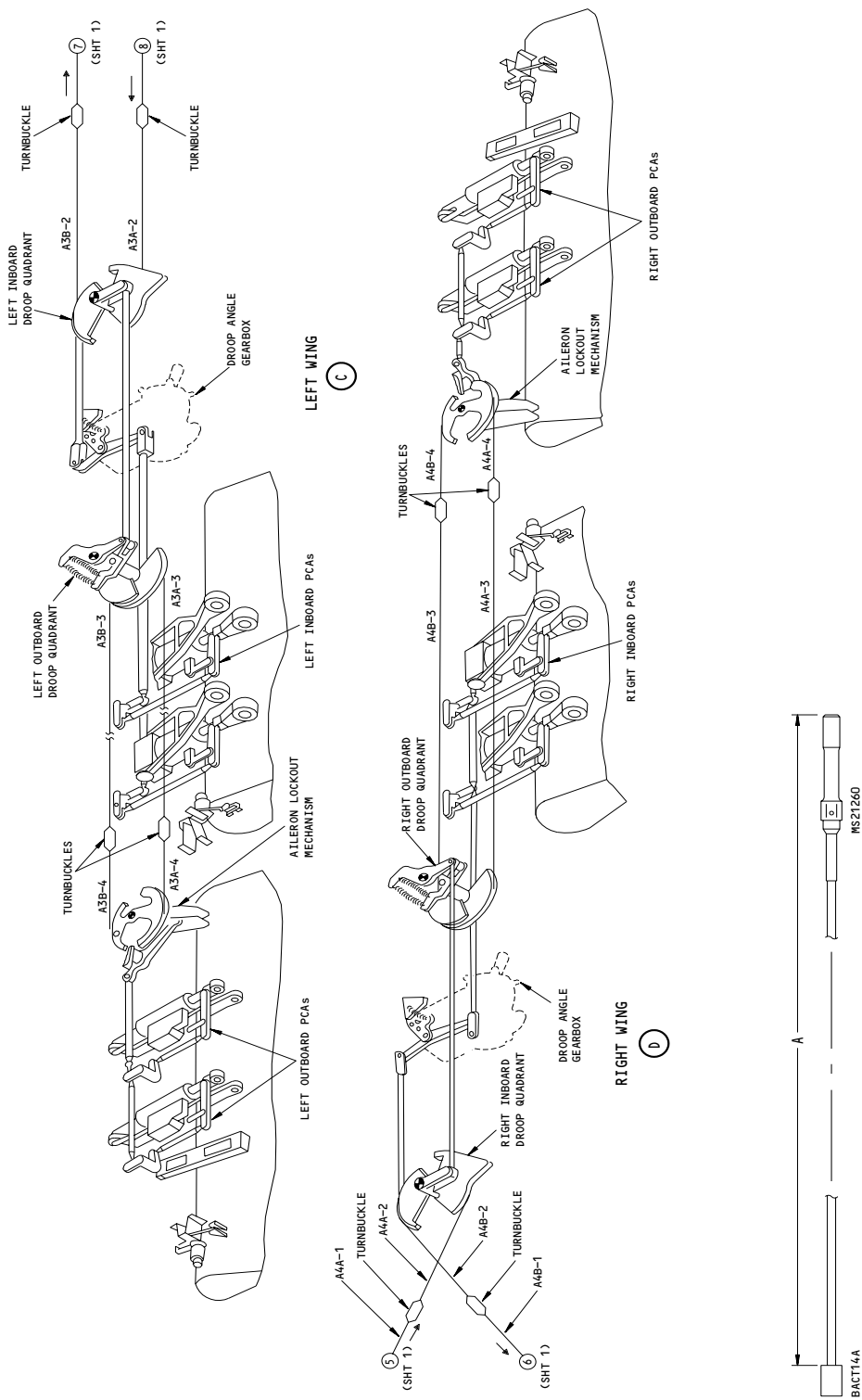
LATERAL CONTROL FEEL CENTERING AND TRIM ASSEMBLY

Aileron Control Cables  
Figure 202 (Sheet 1)

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Aileron Control Cables  
Figure 202 (Sheet 2)

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AILERON CONTROL CABLES <span style="float: right;">3</span>					FITTINGS		
CABLE CODE	NO. REQ.	PART NUMBER	"A" LENGTH (INCH)	"B" LENGTH (INCH)	-1	-2	-3
A1A-1	1	BACC2C4C00735DG	73.5	—	BACT14A4	MS21260S4RH	—
-2	1	BACC2C4C00137CG	13.7	—		MS21260S4LH	—
-3	1	BACC2C4C05049FG	504.9	—		MS21260L4RH	—
-4	1	BACC2C4C03097EG	309.7	—		MS21260L4LH	—
A1B-1	1	BACC2C4C00714DG	71.4	—		MS21260S4RH	—
-2	1	BACC2C4C00155CG	15.5	—		MS21260S4LH	—
-3	1	BACC2C4C04852FG	485.2	—		MS21260L4RH	—
-4	1	BACC2C4C03308EG	330.8	—		MS21260L4LH	—
A2A-1	1	BACC2C4C00735DG	73.5	—		MS21260S4RH	—
-2	1	BACC2C4C00137CG	13.7	—		MS21260S4LH	—
-3	1	BACC2C4C04843FG	484.3	—		MS21260L4RH	—
-4	1	BACC2C4C03361EG	336.1	—		MS21260L4LH	—
-5	1	BACC2C4C00185DG	18.5	—		MS21260S4RH	—
-6	1	BACC2C4C00298CG	29.8	—		MS21260S4LH	—
A2B-1	1	BACC2C4C00714DG	71.4	—		MS21260S4RH	—
-2	1	BACC2C4C00155CG	15.5	—		MS21260S4LH	—
-3	1	BACC2C4C05030FG	503.0	—		MS21260L4RH	—
-4	1	BACC2C4C03581EG	358.1	—		MS21260L4LH	—
AB2A-1	1	BACC2C4C01113DG	111.3	—		MS21260S4RH	—
-2	1	BACC2C4C00748CG	74.8	—		MS21260S4LH	—
AB2B-1	1	BACC2C4C01113DG	111.3	—	MS21260S4RH	—	
-2	1	BACC2C4C00748CG	74.8	—	MS21260S4LH	—	
AB3A-1	1	BACC2C4C02345DG	234.5	—	MS21260S4RH	—	
-2	1	BACC2C4C00707CG	70.7	—	MS21260S4LH	—	
AB3B-1	1	BACC2C4C01826DG	182.6	—	MS21260S4RH	—	
-2	1	BACC2C4C01220CG	122.0	—	MS21260S4LH	—	
A3A-1	1	BACC2C4C00173CG	17.3	—	MS21260S4LH	—	
-2	1	BACC2C4C01752DG	175.2	—	MS21260S4RH	—	
-3	1	BACC2C4C05012FG	501.2	—	MS21260L4RH	—	
-4	1	BACC2C4C00288EG	28.8	—	MS21260L4LH	—	
A3B-1	1	BACC2C4C00204DG	20.4	—	MS21260S4RH	—	
-2	1	BACC2C4C01711CG	171.1	—	MS21260S4LH	—	
-3	1	BACC2C4C04961FG	496.1	—	MS21260L4RH	—	
-4	1	BACC2C4C00340EG	34.0	—	MS21260L4LH	—	
A4A-1	1	BACC2C4C00172DG	17.2	—	MS21260S4RH	—	
-2	1	BACC2C4C01694CG	169.4	—	MS21260S4LH	—	
-3	1	BACC2C4C04994EG	499.4	—	MS21260L4LH	—	
-4	1	BACC2C4C00289FG	28.9	—	MS21260L4RH	—	
A4B-1	1	BACC2C4C00192CG	19.2	—	MS21260S4LH	—	
-2	1	BACC2C4C01700DG	170.0	—	MS21260S4RH	—	
-3	1	BACC2C4C04951EG	495.1	—	MS21260L4LH	—	
-4	1	BACC2C4C00337FG	33.7	—	↓ BACT14A4	MS21260L4RH	

TABLE I 1

WIRE ROPE: CARBON STEEL TYPE I, COMPOSITION A (TZ), 1/8 INCH DIA, 7 X 19  
FITTINGS: CORROSION RESISTANT STEEL

Aileron Control Cables  
Figure 202 (Sheet 3)

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AILERON CONTROL CABLES <sup>3</sup>					FITTINGS		
CABLE CODE	NO. REQ.	PART NUMBER	"A" LENGTH (INCH)	"B" LENGTH (INCH)	-1	-2	-3
A1A-1	1	BACC2C4C00735DG	73.5	—	BACT14A4 ↓ BACT14A4	MS21260S4RH	—
-2	1	BACC2C4C00137CG	13.7	—		MS21260S4LH	—
-3	1	BACC2C4C06254FG	625.4	—		MS21260L4RH	—
-4	1	BACC2C4C03097EG	309.7	—		MS21260L4LH	—
A1B-1	1	BACC2C4C00714DG	71.4	—		MS21260S4RH	—
-2	1	BACC2C4C00155CG	15.5	—		MS21260S4LH	—
-3	1	BACC2C4C06060FG	606.0	—		MS21260L4RH	—
-4	1	BACC2C4C03308EG	330.8	—		MS21260L4LH	—
A2A-1	1	BACC2C4C00735DG	73.5	—		MS21260S4RH	—
-2	1	BACC2C4C00137CG	13.7	—		MS21260S4LH	—
-3	1	BACC2C4C06046FG	604.6	—		MS21260S4RH	—
-4	1	BACC2C4C03361EG	336.1	—		MS21260L4LH	—
-5	1	BACC2C4C00185DG	18.5	—		MS21260S4RH	—
-6	1	BACC2C4C00298CG	29.8	—		MS21260S4LH	—
A2B-1	1	BACC2C4C00714DG	71.4	—		MS21260S4RH	—
-2	1	BACC2C4C00155CG	15.5	—		MS21260S4LH	—
-3	1	BACC2C4C06237FG	623.7	—		MS21260L4RH	—
-4	1	BACC2C4C03581EG	358.1	—		MS21260L4LH	—
AB2A-1	1	BACC2C4C01113DG	111.3	—		MS21260S4RH	—
-2	1	BACC2C4C00748CG	74.8	—		MS21260S4LH	—
AB2B-1	1	BACC2C4C01113DG	111.3	—	MS21260S4RH	—	
-2	1	BACC2C4C00748CG	74.8	—	MS21260S4LH	—	
AB3A-1	1	BACC2C4C02345DG	234.5	—	MS21260S4RH	—	
-2	1	BACC2C4C00707CG	70.7	—	MS21260S4LH	—	
AB3B-1	1	BACC2C4C01826DG	182.6	—	MS21260S4RH	—	
-2	1	BACC2C4C01220CG	122.0	—	MS21260S4LH	—	
A3A-1	1	BACC2C4C00173CG	17.3	—	MS21260S4LH	—	
-2	1	BACC2C4C01752DG	175.2	—	MS21260S4RH	—	
-3	1	BACC2C4C05012FG	501.2	—	MS21260L4RH	—	
-4	1	BACC2C4C00288EG	28.8	—	MS21260L4LH	—	
A3B-1	1	BACC2C4C00204DG	20.4	—	MS21260S4RH	—	
-2	1	BACC2C4C01711CG	171.1	—	MS21260S4LH	—	
-3	1	BACC2C4C04961FG	496.1	—	MS21260L4RH	—	
-4	1	BACC2C4C00340EG	34.0	—	MS21260L4LH	—	
A4A-1	1	BACC2C4C00172DG	17.2	—	MS21260S4RH	—	
-2	1	BACC2C4C01694CG	169.4	—	MS21260S4LH	—	
-3	1	BACC2C4C04994EG	499.4	—	MS21260L4LH	—	
-4	1	BACC2C4C00289FG	28.9	—	MS21260L4RH	—	
A4B-1	1	BACC2C4C00192CG	19.2	—	MS21260S4LH	—	
-2	1	BACC2C4C01700DG	170.0	—	MS21260S4RH	—	
-3	1	BACC2C4C04951EG	495.1	—	MS21260L4LH	—	
-4	1	BACC2C4C00337FG	33.7	—	MS21260L4RH	—	

TABLE II <sup>2</sup>

WIRE ROPE: CARBON STEEL TYPE I, COMPOSITION A (TZ), 1/8 INCH DIA, 7 X 19  
 FITTINGS: CORROSION RESISTANT STEEL

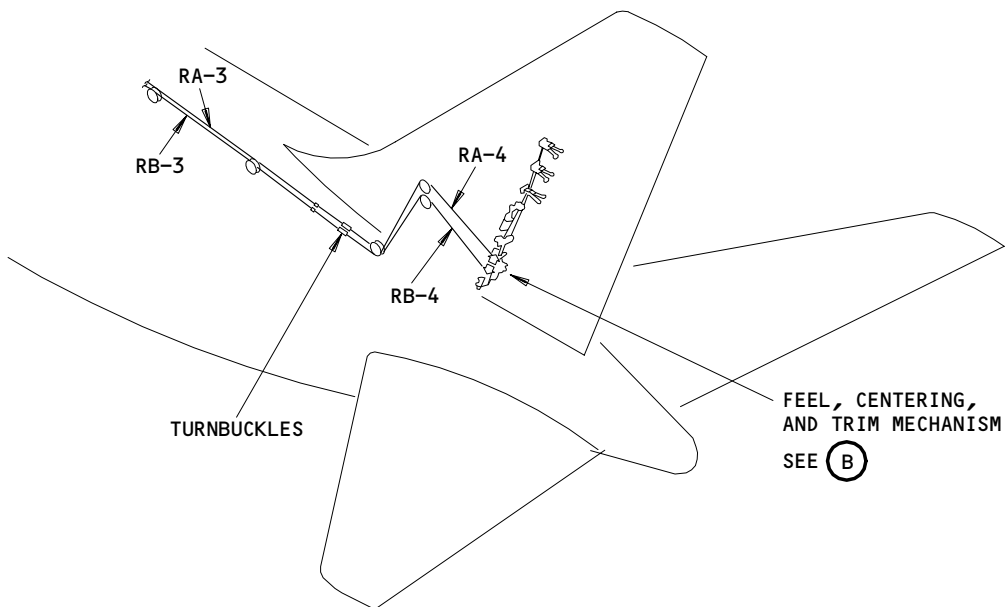
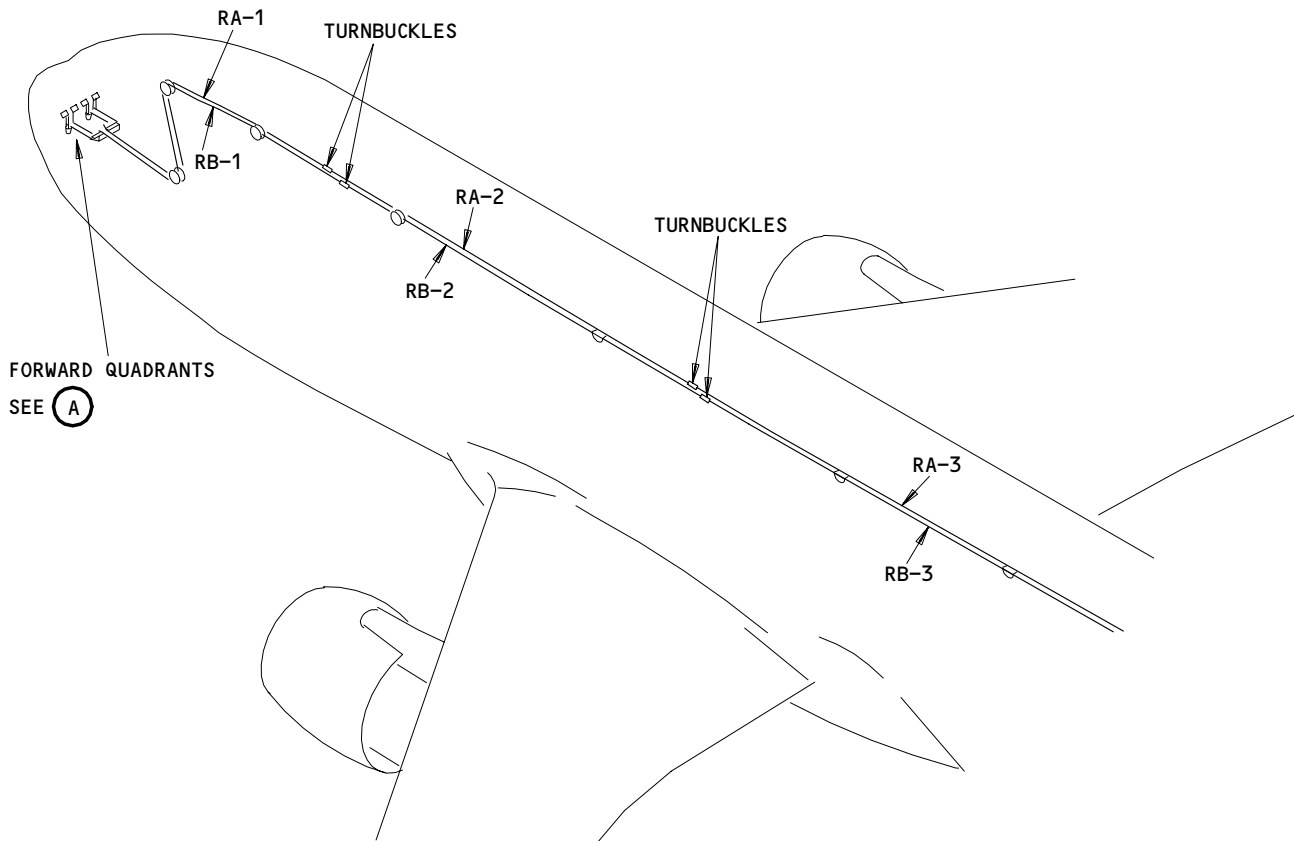
- <sup>1</sup> THESE CABLES WERE INITIALLY INSTALLED ON 767-200 AIRPLANES.
- <sup>2</sup> THESE CABLES WERE INITIALLY INSTALLED ON 767-300 AIRPLANES.
- <sup>3</sup> THE CABLE INFORMATION IN THIS TABLE IS FOR REFERENCE USE ONLY. FOR SPECIFIC AIRPLANE CABLE PART NUMBER (CABLE MATERIAL, CABLE SIZE AND LENGTH DIMENSIONS) AND CABLE FITTING, USE THE CURRENT AIRCRAFT ILLUSTRATED PARTS CATALOG (AIPC).

Aileron Control Cables  
Figure 202 (Sheet 4)

EFFECTIVITY

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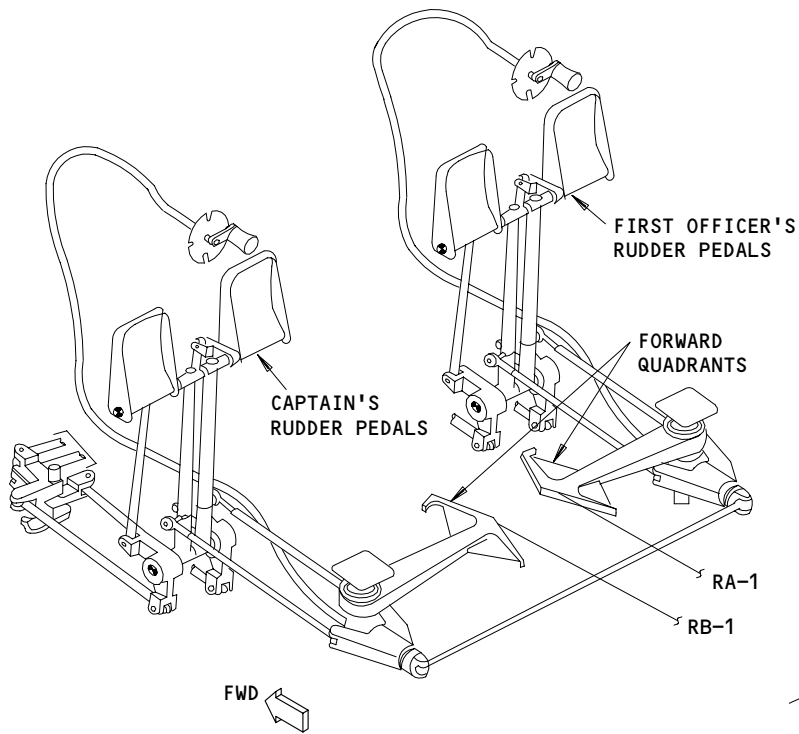
Rudder Control Cables  
Figure 203 (Sheet 1)

EFFECTIVITY	
	ALL

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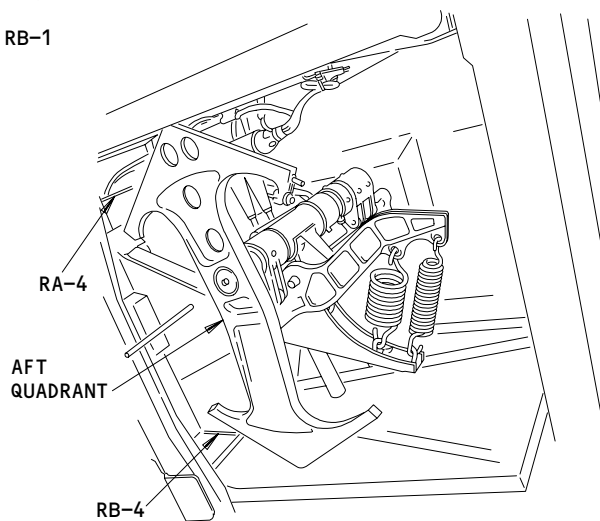
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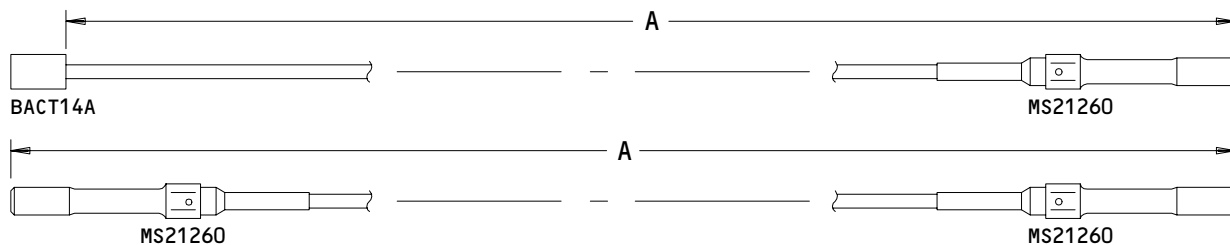
FORWARD QUADRANTS

(A)



FEEL, CENTERING AND TRIM MECHANISM

(B)



Rudder Control Cables  
Figure 203 (Sheet 2)

EFFECTIVITY

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## 767 MAINTENANCE MANUAL

767-300 RUDDER CONTROL CABLES <span style="float: right;">3</span>					FITTINGS		
CABLE CODE	NO. REQ.	PART NUMBER	"A" LENGTH (INCH)	"B" LENGTH (INCH)	-1	-2	-3
RA-1	1	BACC2C4C03531FG <span style="float: right;">1</span>	353.1	—	BACT14A4	MS21260L4RH	—
-1	1	BACC2C4C03512FG <span style="float: right;">2</span>	351.2	—	BACT14A4	MS21260L4RH	—
-2	1	BACC2C4C06330EF	633.0	—	MS21260L4RH	MS21260L4LH	—
-3	1	BACC2C4C07910EE	791.0	—	MS21260L4LH	MS21260L4LH	—
-4	1	BACC2C4C02065FG	206.5	—	BACT14A4	MS21260L4RH	—
RB-1	1	BACC2C4C03884FG <span style="float: right;">1</span>	388.4	—	BACT14A4	MS21260L4RH	—
-1	1	BACC2C4C03866FG <span style="float: right;">2</span>	386.6	—	BACT14A4	MS21260L4RH	—
-2	1	BACC2C4C06232EF	623.2	—	MS21260L4RH	MS21260L4LH	—
-3	1	BACC2C4C07663EF	766.3	—	MS21260L4RH	MS21260L4LH	—
-4	1	BACC2C4C01940EG	194.0	—	BACT14A4	MS21260L4LH	—

TABLE I

WIRE ROPE: CARBON STEEL TYPE I, COMPOSITION A (TZ), 1/8 INCH DIA, 7 X 19  
 FITTINGS: CORROSION RESISTANT STEEL

- 1 SAS 150-154; MTH 275
- 2 ALL EXCEPT SAS 150-154; ALL EXCEPT MTH 275

767-200 SERIES RUDDER CONTROL CABLES <span style="float: right;">3</span>					FITTINGS		
CABLE CODE	NO. REQ.	PART NUMBER	"A" LENGTH (INCH)	"B" LENGTH (INCH)	-1	-2	-3
RA-1	1	BACC2C4C03512FG	351.2	—	BACT14A4	MS21260L4RH	—
-2	1	BACC2C4C05122EF	512.2	—	MS212604RH	MS21260L4LH	—
-3	1	BACC2C4C06594EE	659.4	—	MS212604LH	MS21260L4LH	—
-4	1	BACC2C4C02065FG	206.5	—	BACT14A4	MS21260L4RH	—
RB-1	1	BACC2C4C03866FG	386.6	—	BACT14A4	MS21260L4RH	—
-2	1	BACC2C4C05022EF	502.2	—	MS21260L4RH	MS21260L4LH	—
-3	1	BACC2C4C06341EF	634.1	—	MS21260L4RH	MS21260L4LH	—
-4	1	BACC2C4C01940EG	194.0	—	BACT14A4	MS21260L4LH	—

TABLE II

WIRE ROPE: CARBON STEEL TYPE I, COMPOSITION A (TZ), 1/8 INCH DIA, 7 X 19  
 FITTINGS: CORROSION RESISTANT STEEL

- 3 THE CABLE INFORMATION IN THIS TABLE IS FOR REFERENCE USE ONLY. FOR SPECIFIC AIRPLANE CABLE PART NUMBER (CABLE MATERIAL, CABLE SIZE AND LENGTH DIMENSIONS) AND CABLE FITTING, USE THE CURRENT AIRCRAFT ILLUSTRATED PARTS CATALOG (AIPC).

Rudder Control Cables  
 Figure 203 (Sheet 3)

EFFECTIVITY

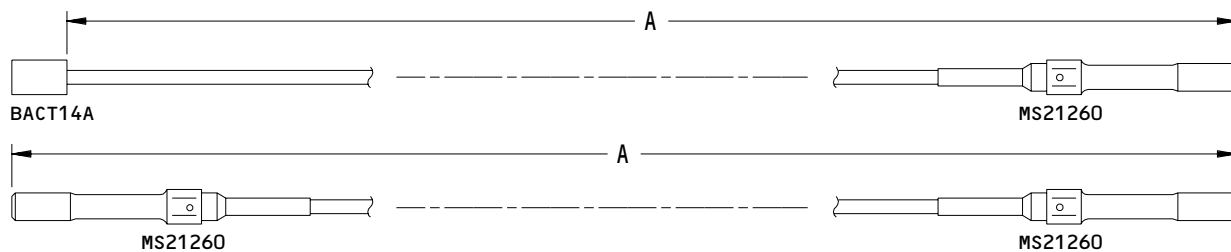
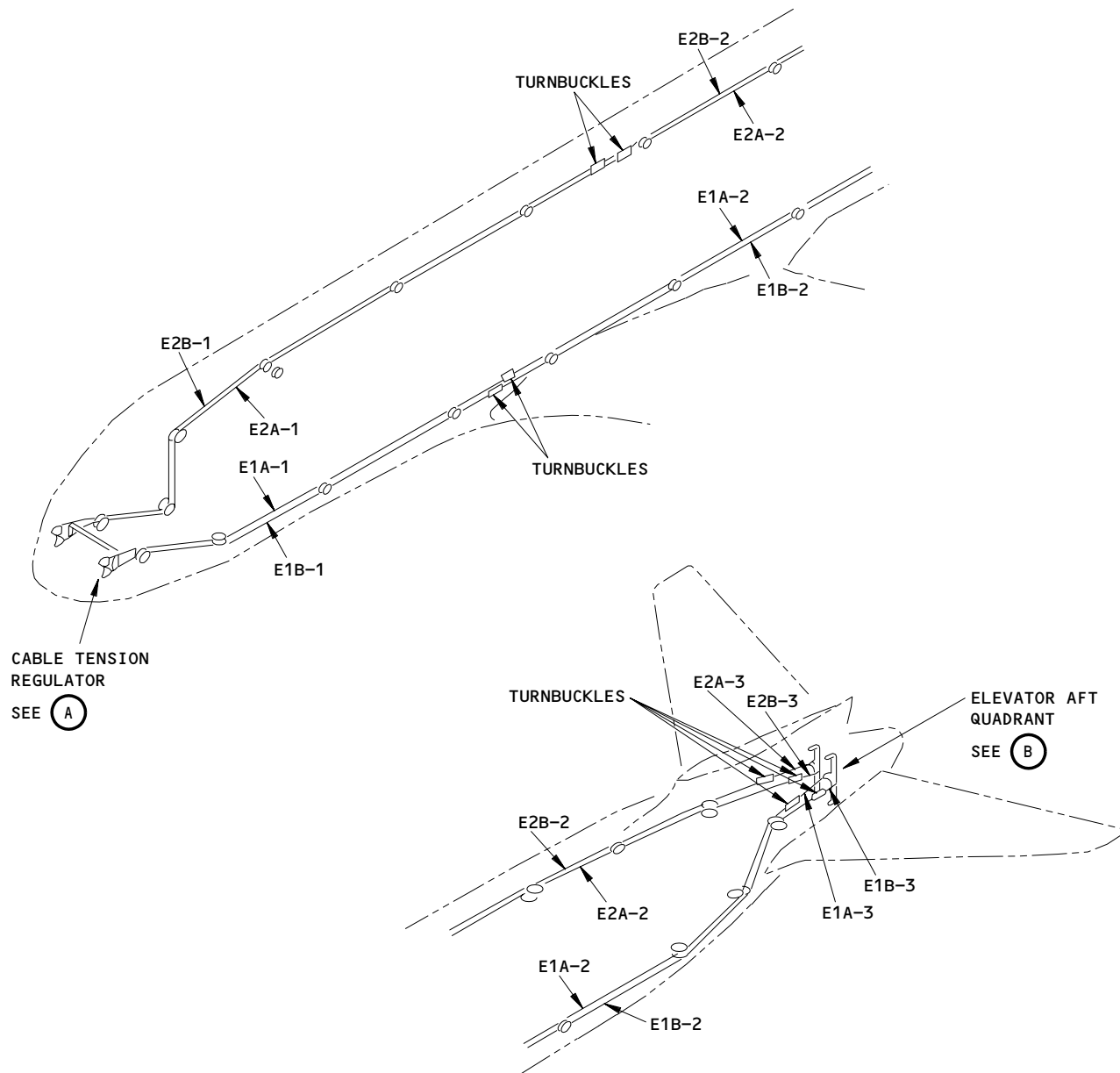
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Elevator Control Cables  
Figure 204 (Sheet 1)

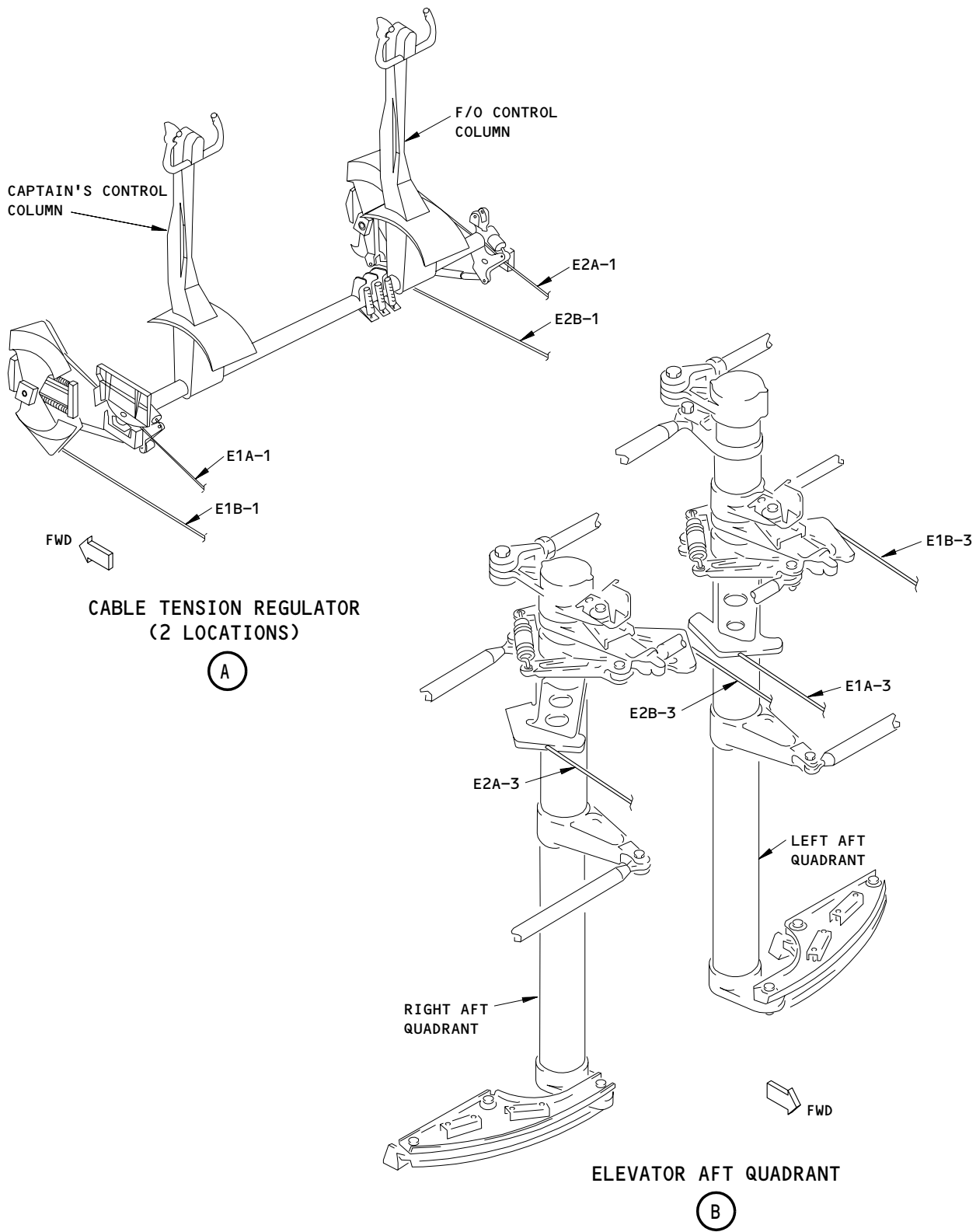
EFFECTIVITY

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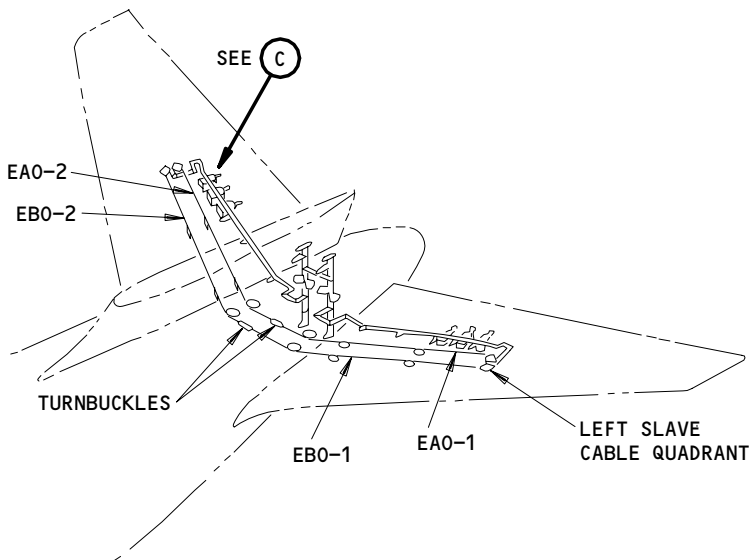
Elevator Control Cables  
Figure 204 (Sheet 2)

EFFECTIVITY	ALL
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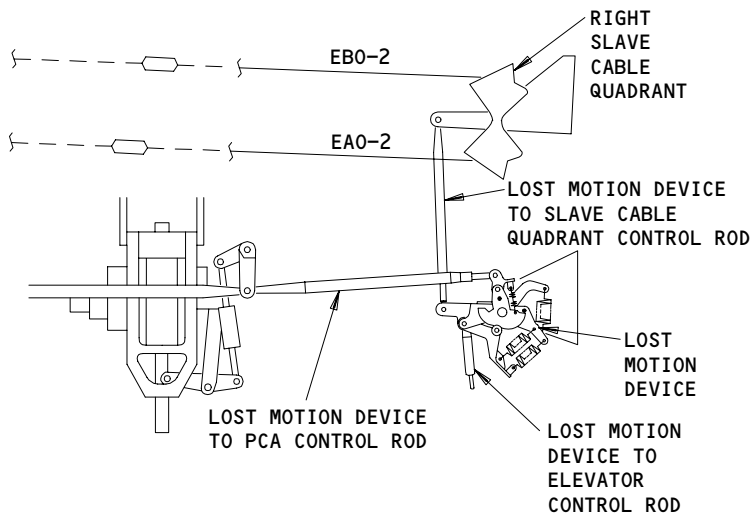
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ELEVATOR SLAVE CABLES



(C)

Elevator Control Cables  
Figure 204 (Sheet 3)

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



767-300 SERIES ELEVATOR CONTROL CABLES 					FITTINGS		
CABLE CODE	NO. REQ.	PART NUMBER	"A" LENGTH (INCH)	"B" LENGTH (INCH)	-1	-2	-3
E1A-1	1	BACC2C4C06981FG	698.1	—	BACT14A4	MS21260L4RH	—
-2	1	BACC2C4C12065EF	1206.5	—	MS21260L4RH	MS21260L4LH	—
-3	1	BACC2C4C00575EG	57.5	—	BACT14A4	MS21260L4LH	—
E1B-1	1	BACC2C4C06745FG	674.5	—	BACT14A4	MS21260L4RH	—
-2	1	BACC2C4C12548EF	1254.8	—	MS21260L4RH	MS21260L4LH	—
-3	1	BACC2C4C00362EG	36.2	—	BACT14A4	MS21260L4LH	—
E2A-1	1	BACC2C4C10696FG 	1069.6	—	BACT14A4	MS21260L4RH	—
-1	1	BACC2C4C10651FG 	1065.1	—	BACT14A4	MS21260L4RH	—
-2	1	BACC2C4C08856EF	885.6	—	MS21260L4RH	MS21260L4LH	—
-3	1	BACC2C4C00571EG	57.1	—	BACT14A4	MS21260L4LH	—
E2B-1	1	BACC2C4C10439FG 	1043.9	—	BACT14A4	MS21260L4RH	—
-1	1	BACC2C4C10386FG 	1038.6	—	BACT14A4	MS21260L4RH	—
-2	1	BACC2C4C09308EF	930.8	—	MS21260L4RH	MS21260L4LH	—
-3	1	BACC2C4C00374EG	37.4	—	BACT14A4	MS21260L4LH	—
EA0-1	1	BACC2C4C02328DG	232.8	—	BACT14A4	MS21260S4RH	—
-2	1	BACC2C4C02426CG	242.6	—	BACT14A4	MS21260S4LH	—
EBO-1	1	BACC2C4C02589DG	258.9	—	BACT14A4	MS21260S4RH	—
-2	1	BACC2C4C02212CG	221.2	—	BACT14A4	MS21260S4LH	—

TABLE I

WIRE ROPE: CARBON STEEL TYPE I, COMPOSITION A (TZ), 1/8 INCH DIA, 7 X 19  
FITTINGS: CORROSION RESISTANT STEEL

-  SAS 150-154; MTH 275
-  ALL EXCEPT SAS 150-154; ALL EXCEPT MTH 275
-  THE CABLE INFORMATION IN THIS TABLE IS FOR REFERENCE USE ONLY. FOR SPECIFIC AIRPLANE CABLE PART NUMBER (CABLE MATERIAL, CABLE SIZE AND LENGTH DIMENSIONS) AND CABLE FITTING, USE THE CURRENT AIRCRAFT ILLUSTRATED PARTS CATALOG (AIPC).

Elevator Control Cables  
Figure 204 (Sheet 4)

EFFECTIVITY

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MAINTENANCE MANUAL


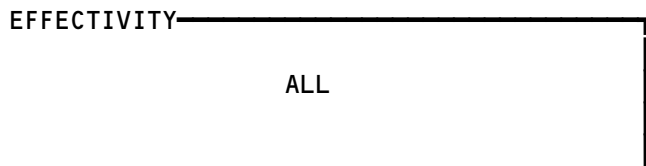
767-200 SERIES ELEVATOR CABLES 					FITTINGS		
CABLE CODE	NO. REQ.	PART NUMBER	"A" LENGTH (INCH)	"B" LENGTH (INCH)	-1	-2	-3
E1A-1	1	BACC2C4C05771FG	577.1	—	BACT14A4	MS21260L4RH	—
-2	1	BACC2C4C10741EF	1074.1	—	MS21260L4RH	MS21260L4LH	—
-3	1	BACC2C4C00575EG	57.5	—	BACT14A4	MS21260L4LH	—
E1B-1	1	BACC2C4C05529FG	552.9	—	BACT14A4	MS21260L4RH	—
-2	1	BACC2C4C11224EF	1122.4	—	MS21260L4RH	MS21260L4LH	—
-3	1	BACC2C4C00362EG	36.2	—	BACT14A4	MS21260L4LH	—
E2A-1	1	BACC2C4C09440FG	944.0	—	BACT14A4	MS21260L4RH	—
-2	1	BACC2C4C07533EF	753.3	—	MS21260L4RH	MS21260L4LH	—
-3	1	BACC2C4C00571EG	57.1	—	BACT14A4	MS21260L4LH	—
E2B-1	1	BACC2C4C09180FG	918.0	—	BACT14A4	MS21260L4RH	—
-2	1	BACC2C4C07988EF	798.8	—	MS21260L4RH	MS21260L4LH	—
-3	1	BACC2C4C00374EG	37.4	—	BACT14A4	MS21260L4LH	—
EA0-1	1	BACC2C4C02323DG	232.3	—	BACT14A4	MS21260S4RH	—
-2	1	BACC2C4C02428CG	242.8	—	BACT14A4	MS21260S4LH	—
EBO-1	1	BACC2C4C02586DG	258.6	—	BACT14A4	MS21260S4RH	—
-2	1	BACC2C4C02209CG	220.9	—	BACT14A4	MS21260S4LH	—

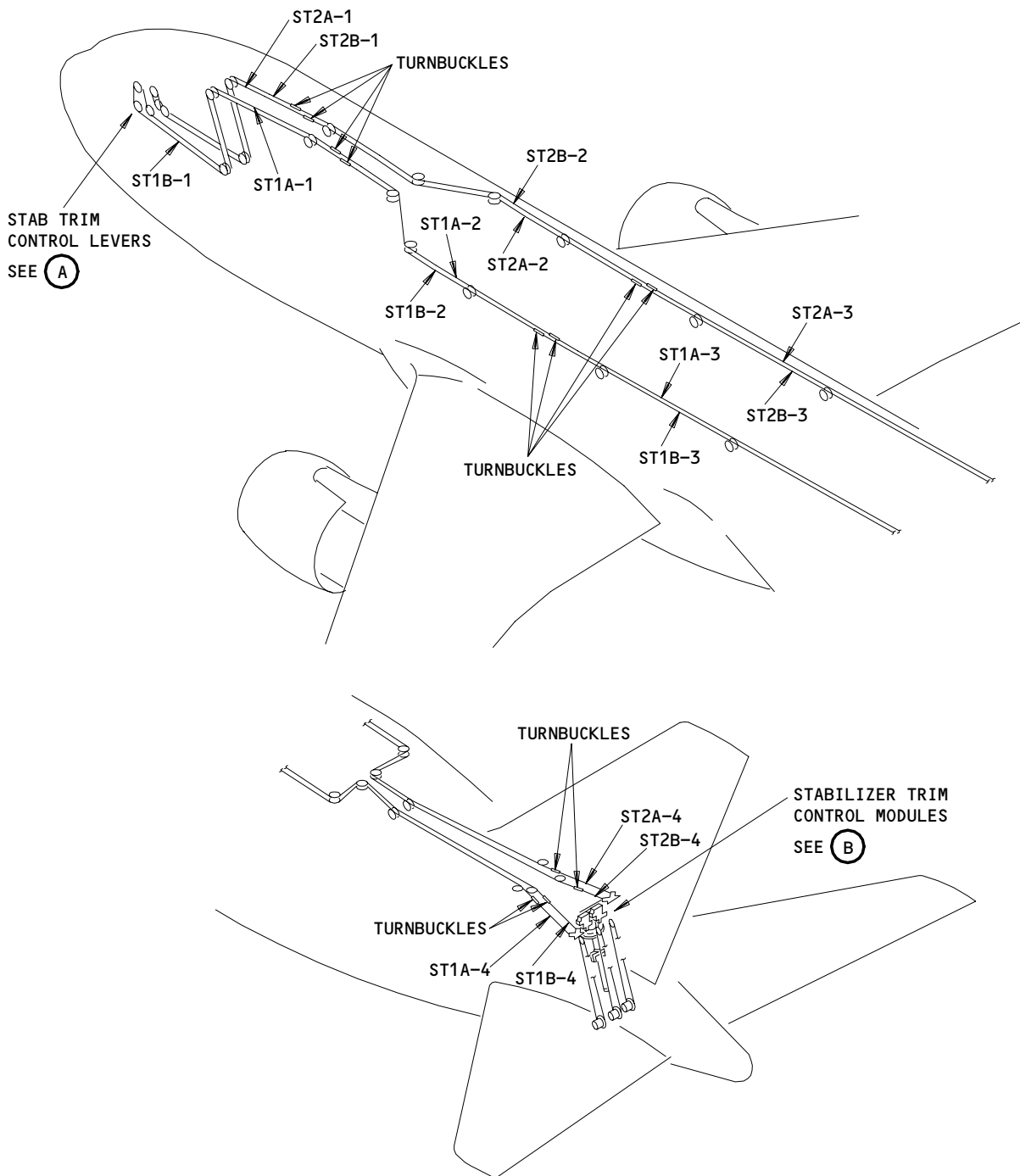
TABLE II

WIRE ROPE: CARBON STEEL TYPE I, COMPOSITION A (TZ), 1/8 INCH DIA, 7 X 19  
 FITTINGS: CORROSION RESISTANT STEEL

Elevator Control Cables  
 Figure 204 (Sheet 5)



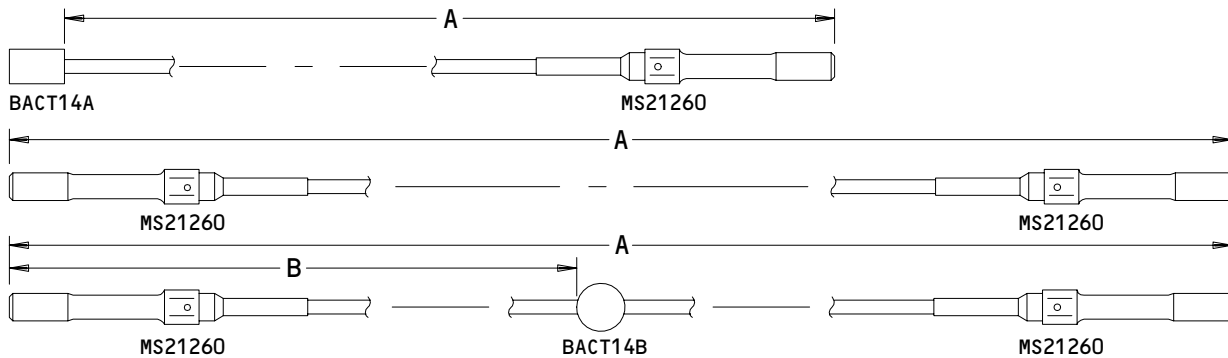
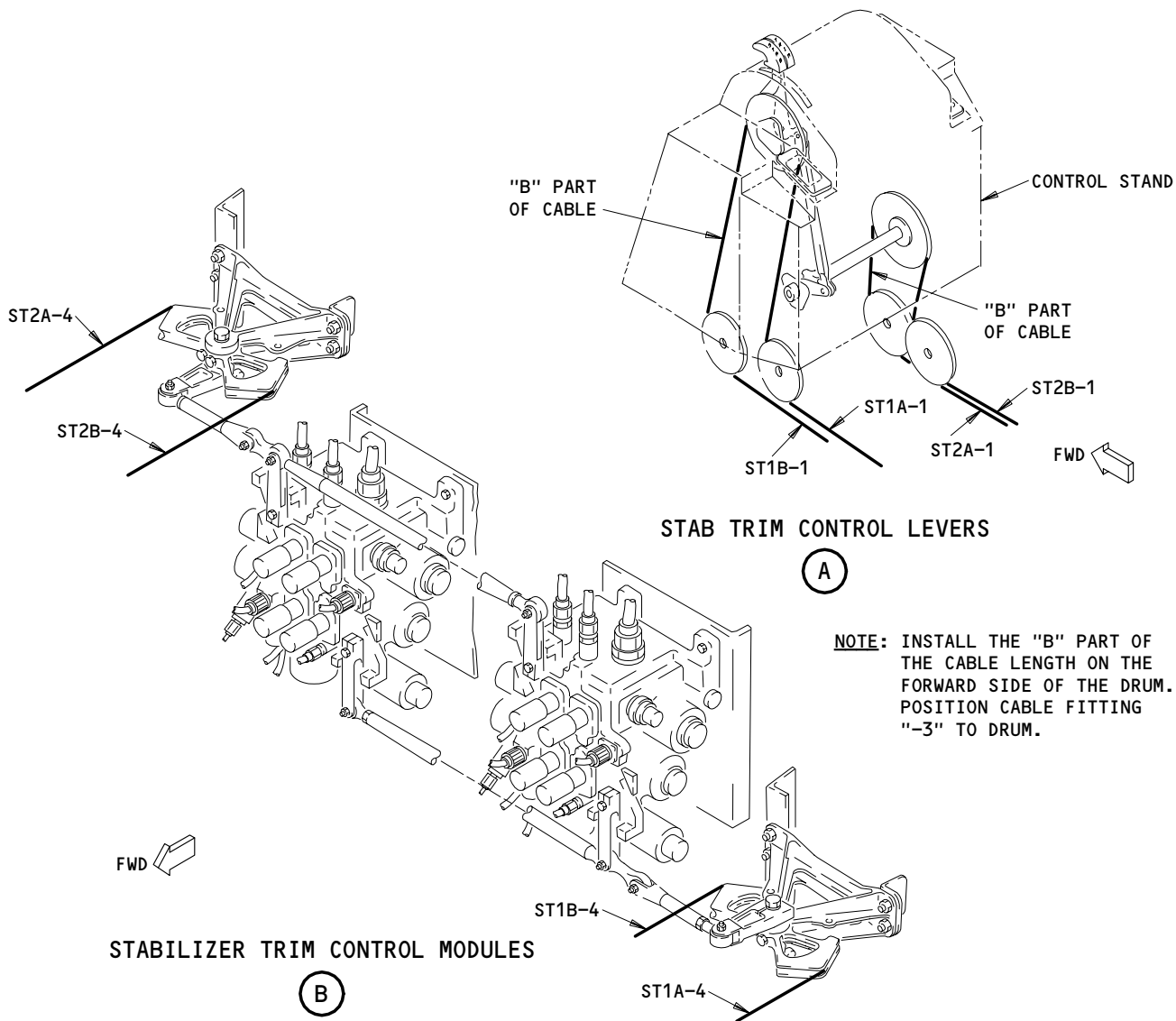
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Horizontal Stabilizer Trim Control Cables  
Figure 205 (Sheet 1)

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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767-300 SERIES STABILIZER TRIM CONTROL CABLES <span style="border: 1px solid black; padding: 0 2px;">1</span>					FITTINGS		
CABLE CODE	NO. REQ.	PART NUMBER	"A" LENGTH (INCH)	"B" LENGTH (INCH)	-1	-2	-3
ST1A } ST1B } -1	1	251T2050-87	806.1	400.2	MS21260L3RH	MS21260L3RH	BACT14B3
ST1A-2	1	BACC2C3D06298EF	629.8	—	MS21260L3RH	MS21260L3LH	—
-3	1	BACC2C3D08551EF	855.1	—	MS21260L3RH	MS21260L3LH	—
-4	1	BACC2C3D00541EG	54.1	—	BACT14A3	MS21260L3LH	—
ST1B-2	1	BACC2C3D06558EF	655.8	—	MS21260L3RH	MS21260L3LH	—
-3	1	BACC2C3D08532EF	853.2	—	MS21260L3RH	MS21260L3LH	—
-4	1	BACC2C3D00416EG	41.6	—	BACT14A3	MS21260L3LH	—
ST2A } ST2B } -1	1	251T2050-86	670.2	331.7	MS21260L3RH	MS21260L3RH	BACT14B3
ST2A-2	1	BACC2C3D07048EF	704.8	—	MS21260L3RH	MS21260L3LH	—
-3	1	BACC2C3D08385EF	838.5	—	MS21260L3RH	MS21260L3LH	—
-4	1	BACC2C3D00540EG	54.0	—	BACT14A3	MS21260L3LH	—
ST2B-2	1	BACC2C3D06955EF	695.5	—	MS21260L3RH	MS21260L3LH	—
-3	1	BACC2C3D08843EF	884.3	—	MS21260L3RH	MS21260L3LH	—
-4	1	BACC2C3D00306EG	30.6	—	BACT14A3	MS21260L3LH	—

WIRE ROPE: CARBON STEEL TYPE I, COMPOSITION A (TZ), 3/32 INCH DIA, 7 X 7  
FITTINGS: CORROSION RESISTANT STEEL

**NOTE:** LENGTH "B" IS MEASURED FROM THE END OF THE RIGHT-HAND MS21260L FITTING.

1 THE CABLE INFORMATION IN THIS TABLE IS FOR REFERENCE USE ONLY. FOR SPECIFIC AIRPLANE CABLE PART NUMBER (CABLE MATERIAL, CABLE SIZE AND LENGTH DIMENSIONS) AND CABLE FITTING, USE THE CURRENT AIRCRAFT ILLUSTRATED PARTS CATALOG (AIPC).

Horizontal Stabilizer Trim Control Cables  
Figure 205 (Sheet 3)

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

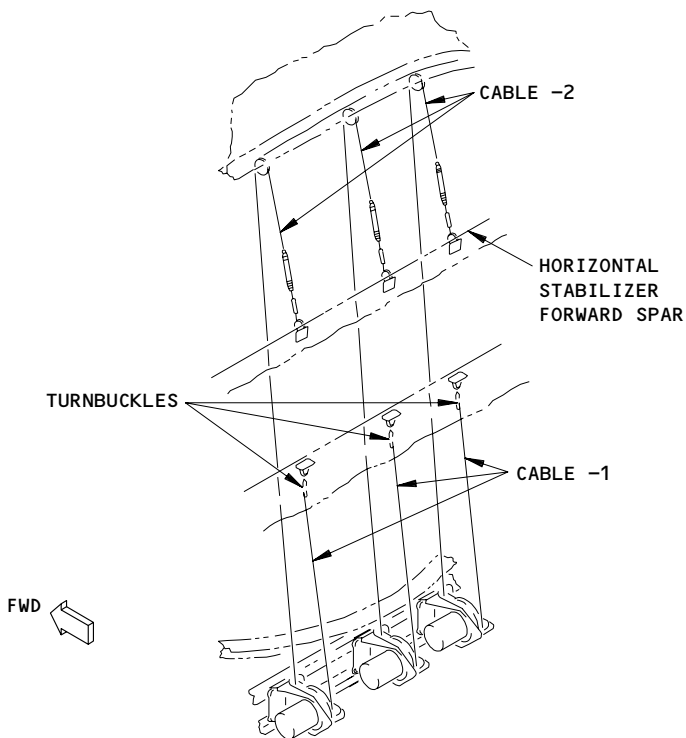
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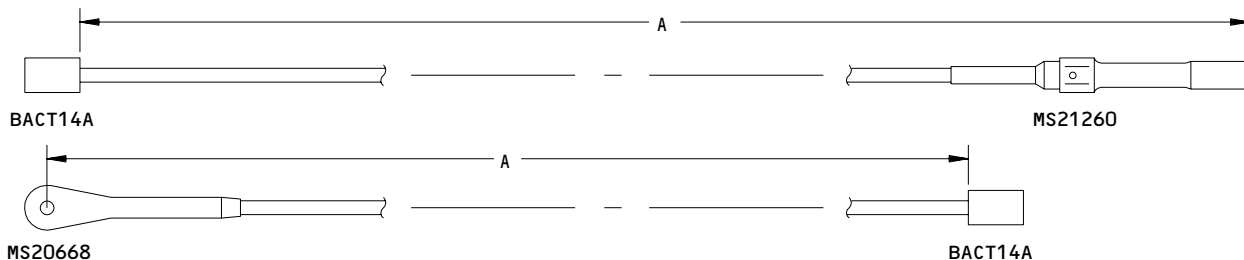
## 767 MAINTENANCE MANUAL

STABILIZER TRIM POSITION AND LIMIT SWITCH CONTROL CABLES <sup>1</sup>					FITTINGS		
CABLE CODE	NO. REQ.	PART NUMBER	LENGTH A (INCH)	LENGTH B (INCH)	-1	-2	-3
-1	3	BACC13AM2B407	40.7	—	MS21260-S2LH	BACT14A2	—
-2	3	BACC13AM2T1225	122.5	—	MS20668-2	BACT14A2	—

WIRE ROPE: CARBON STEEL, TIN OR ZINC COATED - TYPE I, COMPOSITION A,  
1/16 INCH DIA, 7 X 7  
FITTINGS: CORROSION RESISTANT STEEL



**STABILIZER TRIM LIMIT SWITCH AND POSITION TRANSMITTER MODULES**



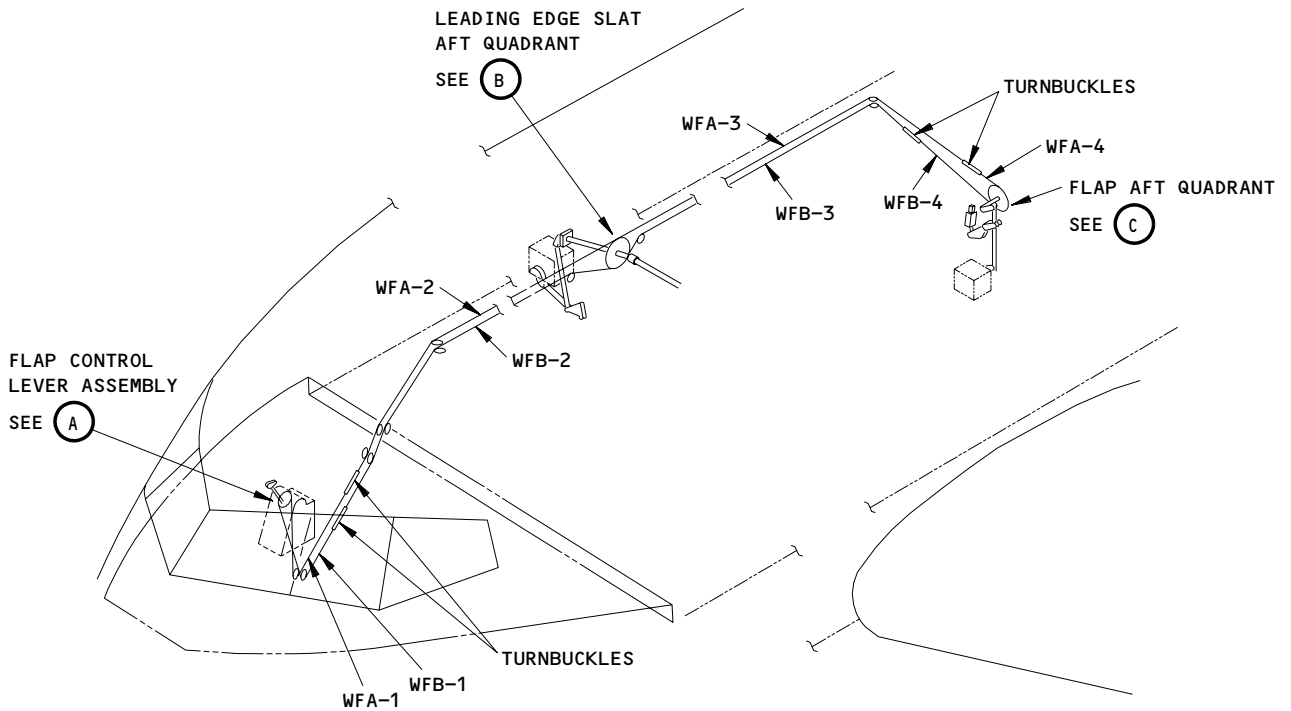
<sup>1</sup> THE CABLE INFORMATION IN THIS TABLE IS FOR REFERENCE USE ONLY. FOR SPECIFIC AIRPLANE CABLE PART NUMBER (CABLE MATERIAL, CABLE SIZE AND LENGTH DIMENSIONS) AND CABLE FITTING, USE THE CURRENT AIRCRAFT ILLUSTRATED PARTS CATALOG (AIPC).

**Stabilizer Trim Limit Switch and Position Transmitter Module Cables  
Figure 206**

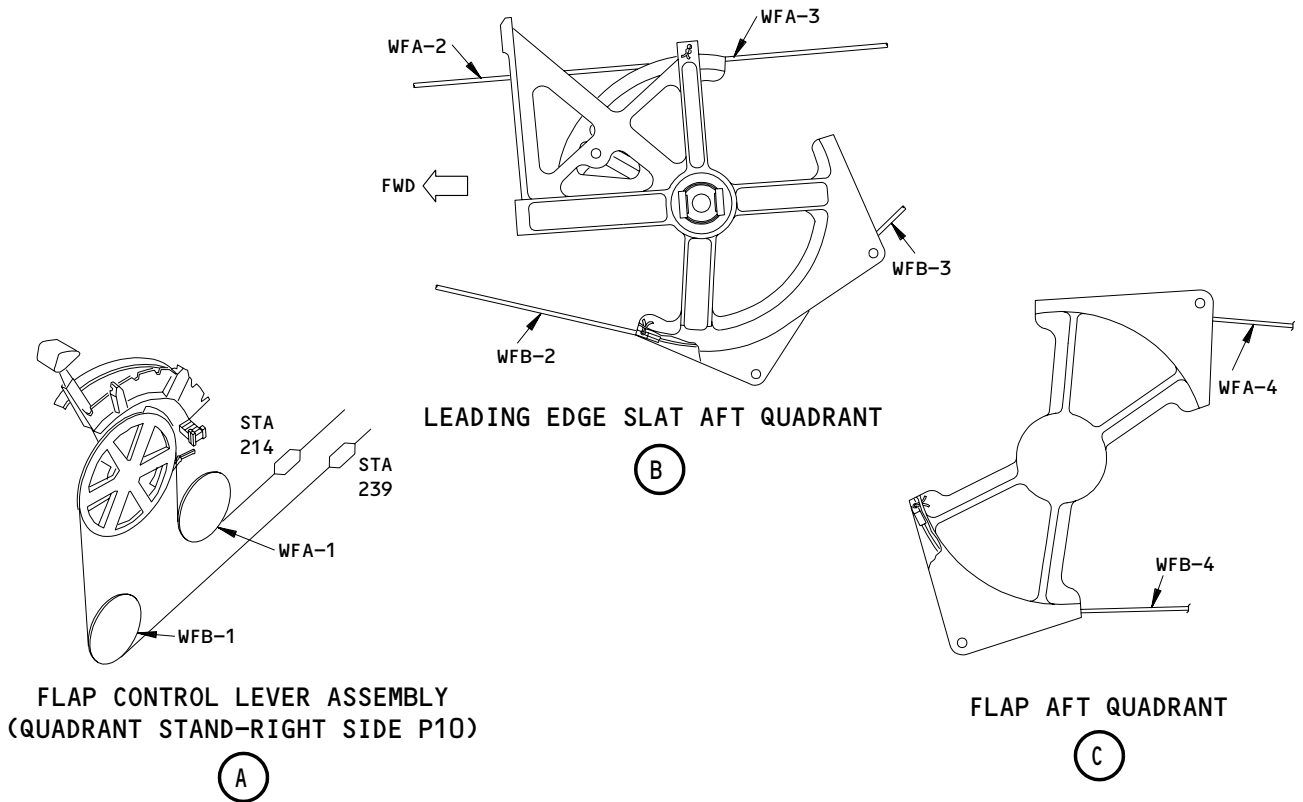
EFFECTIVITY

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**LEADING EDGE SLATS AND TRAILING EDGE FLAPS**



Flaps/Slats Control Cables  
Figure 207 (Sheet 1)

EFFECTIVITY	
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## 767 MAINTENANCE MANUAL

767-300 SERIES FLAP/SLAT CONTROL CABLES <sup>1</sup>					FITTINGS		
CABLE CODE	NO. REQ.	PART NUMBER	"A" LENGTH (INCH)	"B" LENGTH (INCH)	-1	-2	-3
WFA } WFB }	-1	1 251T2050-85	179.6	102.4	MS21260L3RH	MS21260L3RH	BACT14B3
WFA-2	1	BACC2C3D06901EG	690.1	—	BACT14A3	MS21260L3LH	—
-3	1	BACC2C3D03456FG	345.6	—	↓	MS21260L3RH	—
-4	1	BACC2C3D00202EG	20.2	—		MS21260L3LH	—
WFB-2	1	BACC2C3D06701EG	670.1	—		MS21260L3LH	—
-3	1	BACC2C3D03232FG	323.2	—	↓	MS21260L3RH	—
-4	1	BACC2C3D00463EG	46.3	—	BACT14A3	MS21260L3LH	—

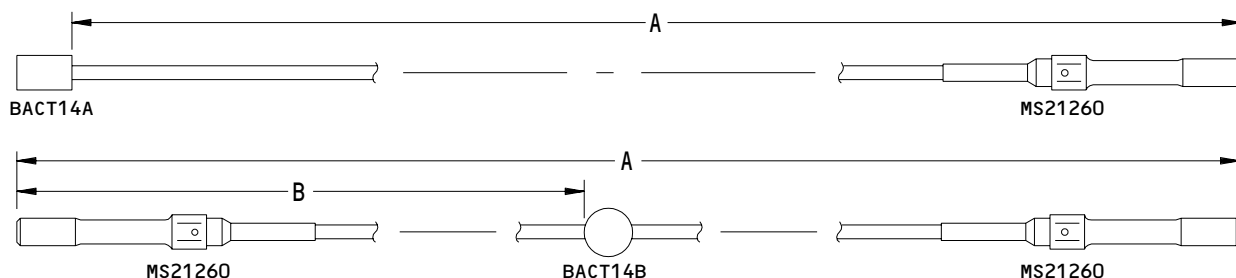
TABLE I

WIRE ROPE: CARBON STEEL TYPE I, COMPOSITION A (TZ), 3/32 INCH DIA, 7 X 7  
 FITTINGS: CORROSION RESISTANT STEEL

767-200 SERIES FLAP/SLAT CONTROL CABLES <sup>1</sup>					FITTINGS		
CABLE CODE	NO. REQ.	PART NUMBER	"A" LENGTH (INCH)	"B" LENGTH (INCH)	-1	-2	-3
WFA } WFB }	-1	1 251T2050-85	179.6	102.4	MS21260L3RH	MS21260L3RH	BACT14B3
WFA-2	1	BACC2C3D05684EG	568.4	—	BACT14A3	MS21260L3LH	—
-3	1	BACC2C3D03456FG	345.6	—	↓	MS21260L3RH	—
-4	1	BACC2C3D00202EG	20.2	—		MS21260L3LH	—
WFB-2	1	BACC2C3D05486EG	548.6	—		MS21260L3LH	—
-3	1	BACC2C3D03232FG	323.2	—	↓	MS21260L3RH	—
-4	1	BACC2C3D00463EG	46.3	—	BACT14A3	MS21260L3LH	—

TABLE II

WIRE ROPE: CARBON STEEL TYPE I, COMPOSITION A (TZ), 3/32 INCH DIA, 7 X 7  
 FITTINGS: CORROSION RESISTANT STEEL



<sup>1</sup> THE CABLE INFORMATION IN THIS TABLE IS FOR REFERENCE USE ONLY. FOR SPECIFIC AIRPLANE CABLE PART NUMBER (CABLE MATERIAL, CABLE SIZE AND LENGTH DIMENSIONS) AND CABLE FITTING, USE THE CURRENT AIRCRAFT ILLUSTRATED PARTS CATALOG (AIPC).

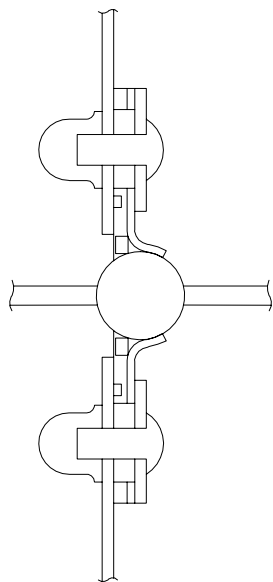
Flap/Slats Control Cables  
 Figure 207 (Sheet 2)

EFFECTIVITY

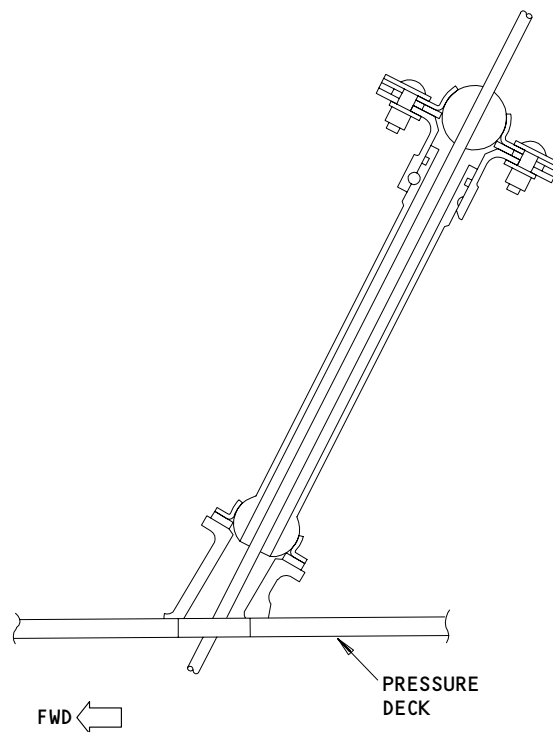
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CABLE SYSTEM	NO. SEALS	LOCATION	ACCESS PANEL NO.
AILERON CABLES	4	PRESSURE DECK, NEAR AFT SPAR	
RUDDER CABLES	2	AFT PRESSURE BULKHEAD	312AL
ELEVATOR CABLES	4	AFT PRESSURE BULKHEAD	312AL
STABILIZER TRIM CABLES	4	AFT PRESSURE BULKHEAD	312AL
FLAP/SLATS CABLES	---	----	----



AFT PRESSURE BULKHEAD AIR-PRESSURE SEAL  
(EXAMPLE)



PRESSURE DECK AIR-PRESSURE SEAL  
(EXAMPLE)

Air-Pressure Seals  
Figure 208

EFFECTIVITY ————  
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FLIGHT CONTROLS LATERAL TRIM CORRECTION – ADJUSTMENT/TEST

1. General

- A. There is no aileron and rudder trim limits for in-service airplanes. This procedure is provided as a guide to check for excessive trims. If there is excessive trim, this procedure provides steps to troubleshoot and decrease the amount of trim needed to maintain a straight and level flight.

**NOTE:** Most operators report less than 1 unit of rudder trim during flight, however some airplanes require up to 2 units of rudder trim.

The rudder and lateral trim is economic issue, not airworthiness issue. You are not required to reduce the trim, but by reducing the trim you will save fuel.

For example, each unit of rudder trim needed during flight will cause fuel to burn approximately 0.3% more.

- B. This procedure changes the number of shims at the forward attach points on the outboard flaps. The installation of more shims will move the trailing edge of the flap down. The removal of shims will move the trailing edge of the flap up.
- C. Make sure the control system components are correctly adjusted when you measure the trim necessary.

TASK 27-01-00-825-001

2. Trailing Edge Flap Adjustment

A. Equipment

- (1) TE Flap PDU Lock – A27009-7
- (2) TE Flap Sling – A27027-53
- (3) Shackles, 3/8 inch.

B. Consumable Materials

- (1) A00247 Sealant BMS 5-95

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 27-11-00/501, Aileron Control System
- (4) AMM 27-21-00/501, Rudder Control System
- (5) AMM 27-21-18/401, Yaw Damper
- (6) AMM 27-31-00/501, Aileron Control System
- (7) AMM 27-51-00/201, Trailing Edge Flap System
- (8) AMM 27-51-00/501, Trailing Edge Flap System

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- (9) AMM 27-51-03/401, Inboard Flap
- (10) AMM 27-51-20/401, Outboard Flap
- (11) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (12) AMM 27-61-00/501, Spoiler/Speedbrake Control System
- (13) AMM 27-81-01/401, Inboard Leading Edge Slat
- (14) AMM 27-81-02/501, Outboard Leading Edge Slat
- (15) AMM 29-11-00/201, Main Hydraulic System
- (16) SRM 51-40-02/001, Rivets

D. Access

(1) Location Zones

- |         |  |
|---------|--|
| 144     | Right MLG Wheel Well                   |
| 211/212 | Control Cabin                          |
| 560/660 | Wing Trailing Edge - Outboard          |
| 730/740 | Left/Right Main Landing Gear and Doors |

(2) Access Panels

- |             |   |
|-------------|---|
| 566BT/666BT | LE of Outboard Flap                     |
| 566DT/666DT | LE of Outboard Flap                     |
| 566GT/666GT | LE of Outboard Flap - Aft of Front Spar |
| 566HT/666HT | LE of Outboard Flap - Aft of Front Spar |
| 566NT/666NT | LE of Outboard Flap - Aft of Front Spar |
| 566PT/666PT | LE of Outboard Flap - Aft of Front Spar |

E. Make Sure the Lateral Trim Error Is Not Caused By Another System

S 225-002

- (1) Make sure these systems are correctly adjusted:
  - (a) Make sure the aileron adjustment is correct (Ref 27-11-00/501).
  - (b) Make sure the spoilers are adjusted correctly (Ref 27-61-00/501).
  - (c) Make sure the inboard and the outboard trailing edge flaps are adjusted correctly (Ref 27-51-00/501).
  - (d) Make sure that all vortex generators on the outboard trailing edge flaps are intact.
  - (e) Inspect the leading edge of the outboard trailing edge flap for any irregularities such as excessive dirt accumulation, chipped or ridged paint, or surface erosion. If any defects are found, restore a smooth aerodynamic surface.

F. Find the Necessary Shim Dimensions

S 755-003

- (1) Do a test flight with these conditions to find the aileron trim and rudder trim input required to maintain a straight and level flight:
  - (a) Flight Speed: Approximately 0.80 mach.
  - (b) Altitude: Approximately 35,000 feet.
  - (c) Fuel Load: Symmetric.
  - (d) Hold wings level with the control wheel.
  - (e) If necessary, apply the aileron trim to maintain wings level.
  - (f) If necessary, apply rudder trim to maintain straight heading.

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S 975-040

- (2) Write the rudder trim necessary during the test flight.

S 815-041

- (3) If the amount of rudder trim required is "excessive", you can do the following steps to find and fix the problems:

NOTES: (1) There is no trim limit for in-service airplanes. You have to decide what is "excessive". The following steps are provided as a guide to find the reasons and reduce the rudder trim required if you choose to do so.

(2) Aileron trim at Flaps 25 and Flaps 30 is typically less than 1 unit, but some airplanes may require more than 1 unit. Lateral trim at Flaps 25 and Flaps 30 can be affected by adjustment of the inboard flaps upper bulb seal. Refer to AMM 27-51-03/401.

- (a) Check the yaw damper shearout rivets (AMM 27-21-18 figure 401). If sheared, replace the rivets (SRM 51-40-02/001).
- (b) Check the yaw damper offset torque tube bearings for binding (AMM 27-21-18 figure 401).
- (c) Check the rudder control cables for the correct tension (AMM 27-21-00/501).
- (d) Check the leading edge INBD slat fit and fair (AMM 27-81-01/401).
- (e) Check the leading edge OUTBD slat fit and fair (AMM 27-81-02/501).
- (f) Check the trailing edge INBD flap fit and fair (AMM 27-51-03/401).
- (g) Check the trailing edge OUTBD flap fit and fair (AMM 27-51-20/401).
- (h) Check the aileron inboard droop (AMM 27-11-00/501).
- (i) Check that the elevator system is properly adjusted (AMM 27-31-00/501).
- (j) Check that all flight control surface seals are in good condition.

S 975-004

- (4) Write the aileron trim necessary during the test flight (Fig. 501).

S 975-005

- (5) Use the chart to calculate the total shim thickness necessary to correct the lateral trim error.

EFFECTIVITY

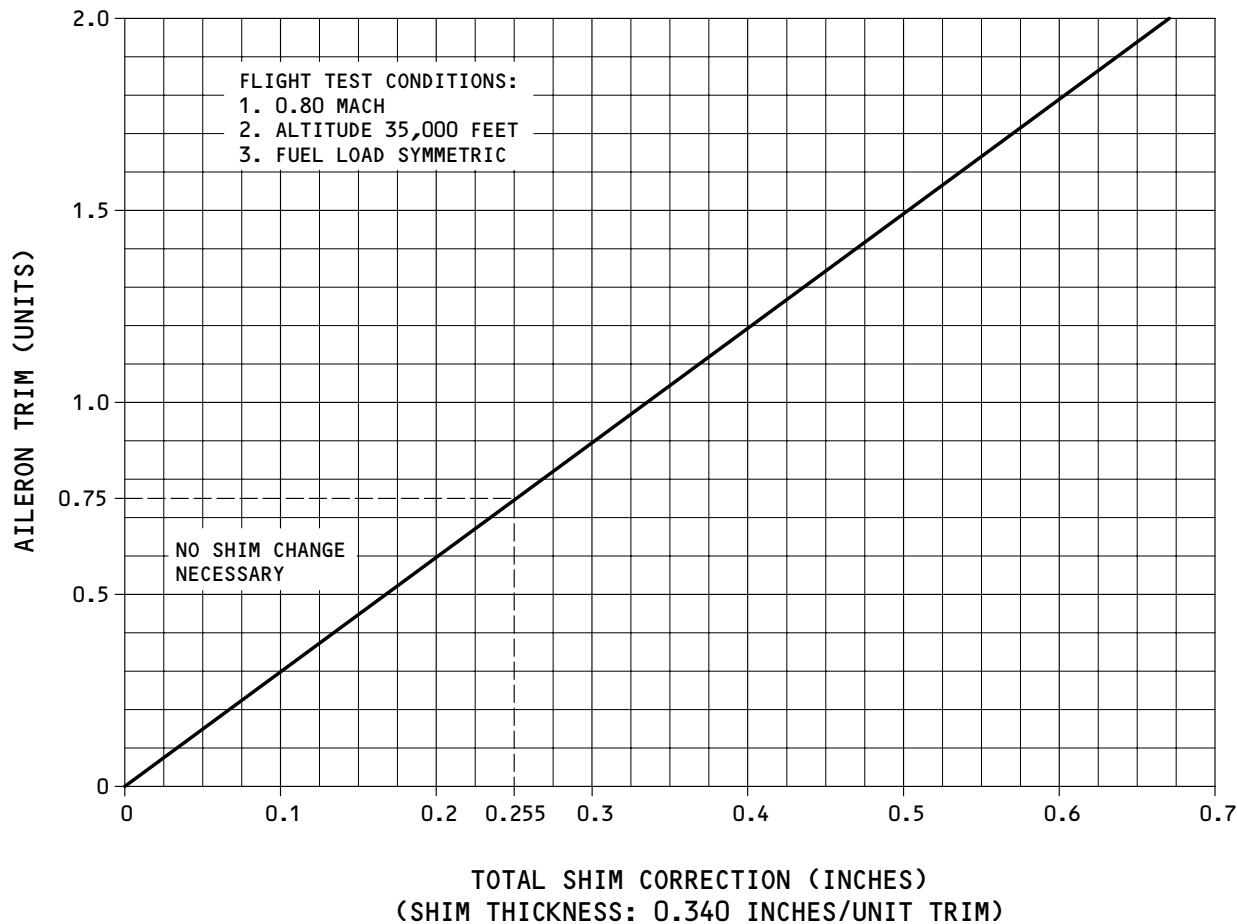
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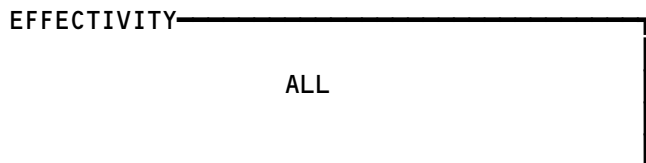


AILERON TRIM (UNITS) \_\_\_\_\_ LEFT WING HEAVY  
 \_\_\_\_\_ RIGHT WING HEAVY

TOTAL SHIM CHANGE (INCHES) \_\_\_\_\_

SHIM CHANGE (INCHES) LEFT WING \_\_\_\_\_  
 RIGHT WING \_\_\_\_\_

Lateral Trim Correction  
Figure 501



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S 975-006

- (6) Find the thickness and the location of the shims that you will change:

**NOTE:** The thickness of shims installed on one wing added to the thickness of shims removed from the other wing must be equal to the total shim thickness.

- (a) Flight test condition; Left wing heavy:
- 1) Add approximately 1/2 of the total thickness to the left outboard flap (the maximum installed thickness is 0.5 inch).
  - 2) Remove approximately 1/2 of the total thickness from the right outboard flap.
- (b) Flight test condition; Right wing heavy:
- 1) Add approximately 1/2 of the total thickness to the right outboard flap (the maximum installed thickness is 0.5 inch).
  - 2) Remove approximately 1/2 of the total thickness from the left outboard flap.

G. Prepare to Change the Thickness of the Shims on the Flap

S 865-007

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

S 865-008

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. THE AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (2) Supply power to the center hydraulic system (Ref 29-11-00/201).

S 865-009

- (3) Move the flap control lever to the 30-unit position to extend the flaps.

S 865-010

- (4) Remove power from the center hydraulic system (Ref 29-11-00/201).

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S 045-011

- (5) Do the deactivation procedure for the TE Flaps (Ref 27-51-00/201).  
H. Change the Thickness of the Shims on the Outboard Flap

S 015-012

- (1) Remove the access panels from the top surface of one outboard flap (Fig. 502) (Ref 06-44-00/201).

S 015-013

- (2) Extend the outboard spoilers No. 1 thru 4 (left wing) or 9 thru 12 (right wing) and install the locks on the spoiler actuators (Ref 27-61-00/201).

S 495-014

- (3) Attach the flap sling to the three attach points on the top surface of the flap (Fig. 503).  
(a) Adjust the center strap of the sling to get the flap attitude in the 30-unit position.  
(b) Add 3/8-inch diameter shackles to the forward inboard cable on the flap sling if it is necessary to get the correct flap dihedral.

S 495-015

- (4) Attach an overhead hoist to the sling and lift the sling to hold the weight of the flap.

**NOTE:** Make sure the hoist can hold the weight of the flap. The flap weighs approximately 422 pounds (191 Kg).

S 035-016

- (5) Remove the two bolts, washers and nuts from the forward fitting of the inboard support beam (Fig. 504).

**NOTE:** Keep a record of the length and location of the bolts for the installation.

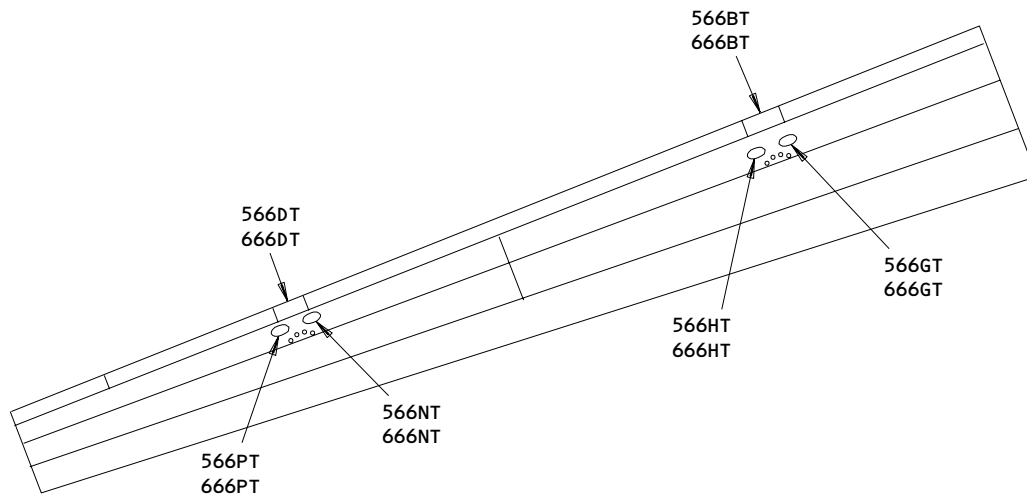
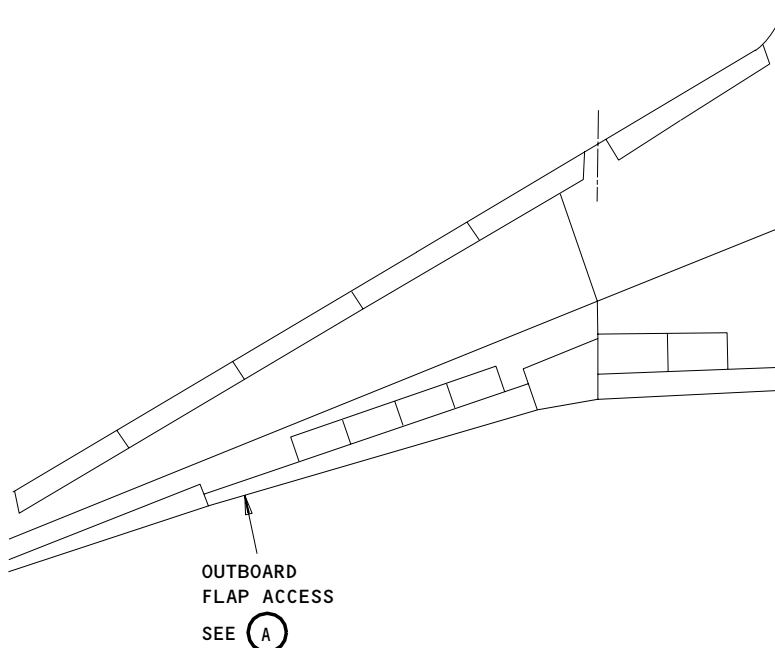
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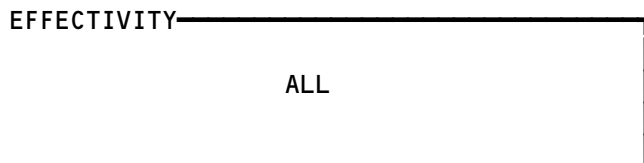


OUTBOARD FLAP ACCESS  
(TOP VIEW)  
(LEFT WING IS SHOWN, RIGHT WING IS OPPOSITE)

(A)

**NOTE:** 500-SERIES PANEL NUMBERS REFER TO LEFT WING.  
600-SERIES PANEL NUMBERS REFER TO RIGHT WING.

Access Panels  
Figure 502

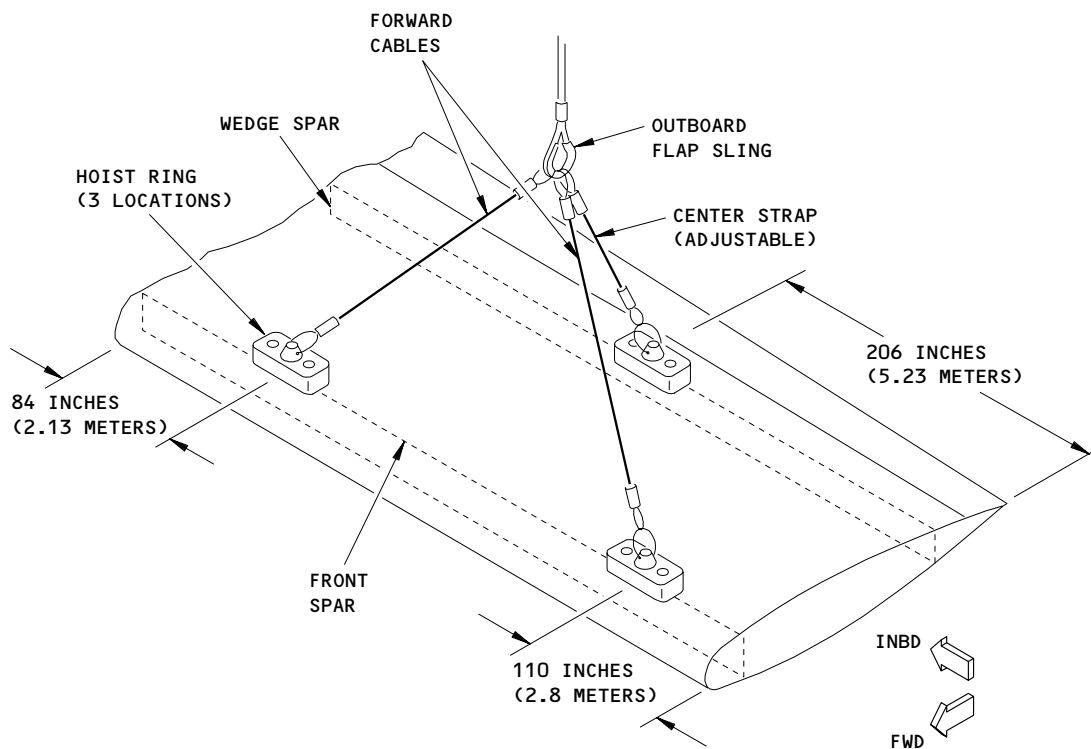
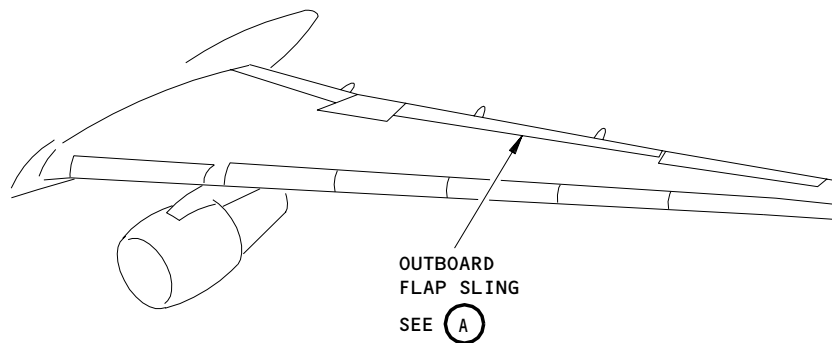


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OUTBOARD FLAP SLING

(A)

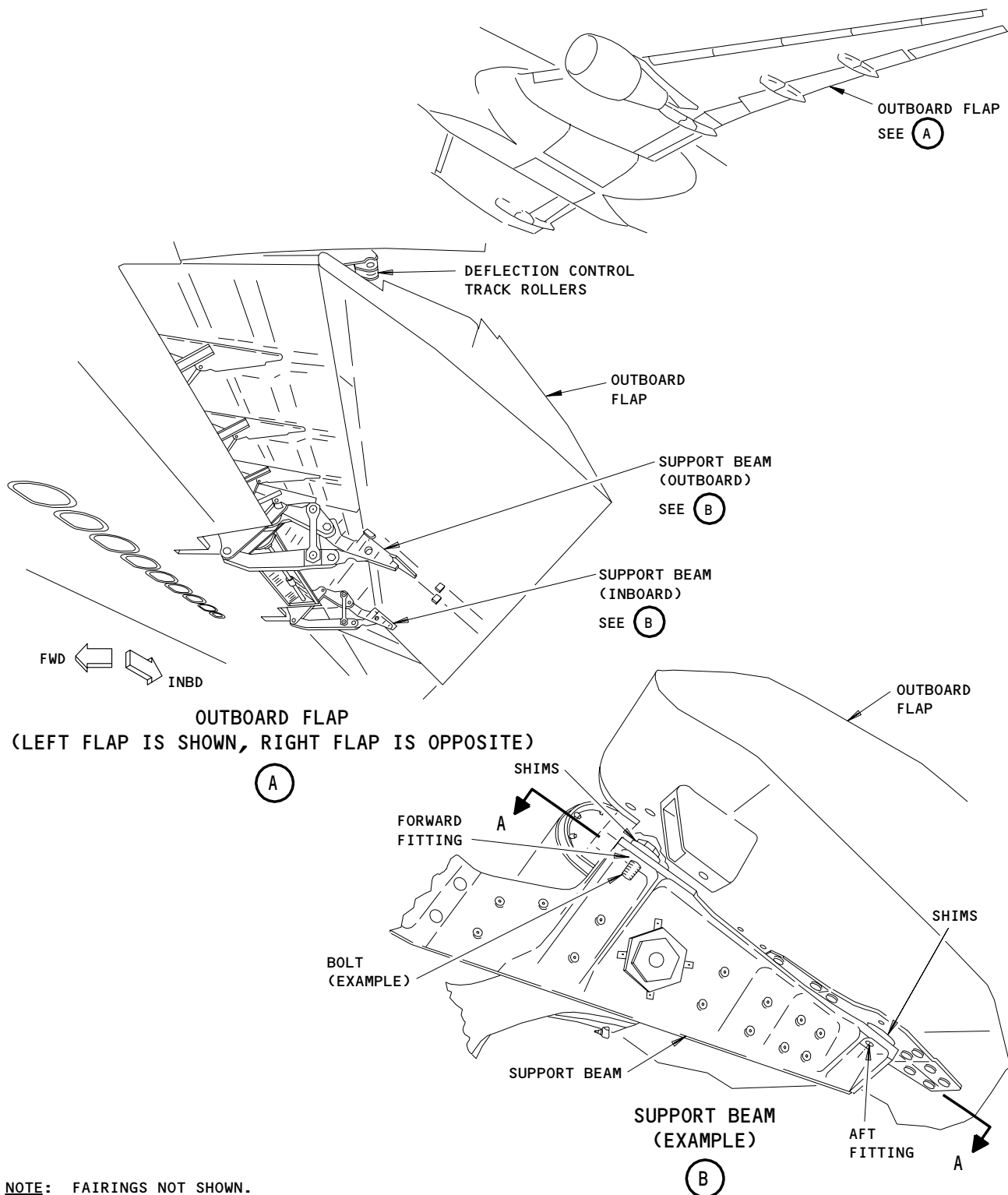
Outboard Flap Sling  
Figure 503

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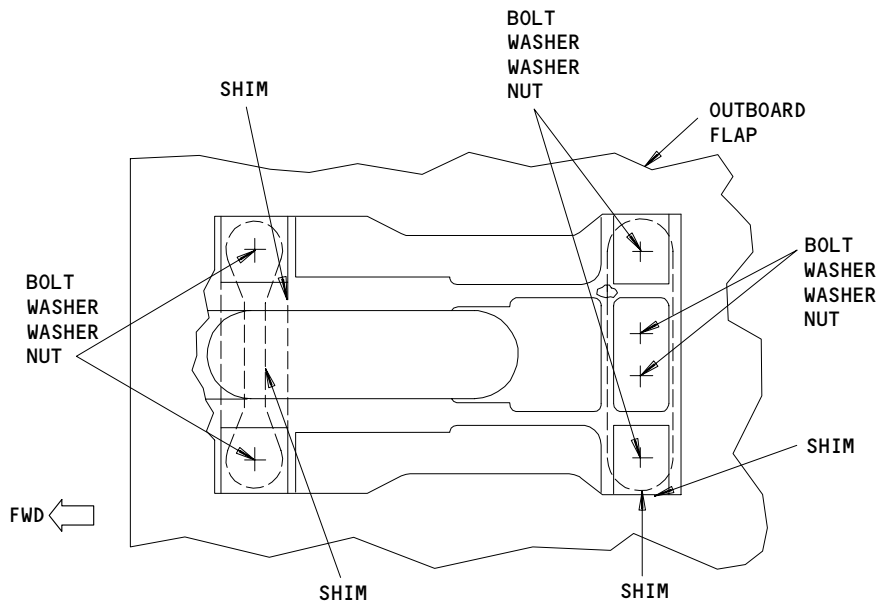
Outboard Flap Attachment  
Figure 504 (Sheet 1)

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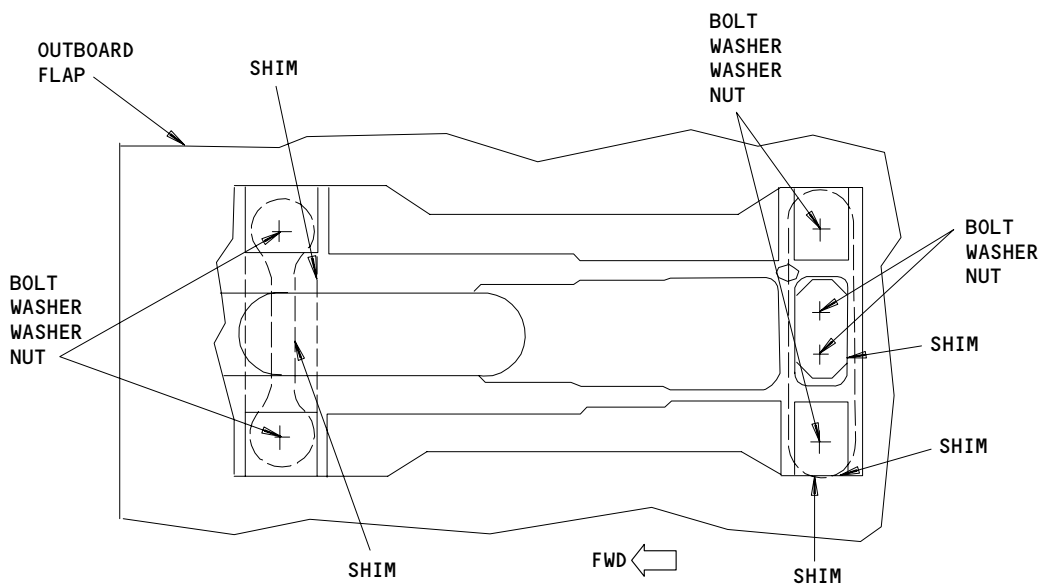
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OUTBOARD SUPPORT BEAM  
A-A



INBOARD SUPPORT BEAM  
A-A

Outboard Flap Attachment  
Figure 504 (Sheet 2)

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A45212

- S 035-017  
(6) Loosen the four nuts on the aft fitting of the inboard support beam.

- S 225-018  
(7) Measure the thickness of the shims on the forward fitting of the inboard support beam.

- S 835-019  
(8) Add or remove the applicable number of shims at the forward fitting of the inboard support beam.

**NOTE:** Make sure the thickness of the shims is less than 0.50 inch (12.7 mm).

- (a) Apply BMS 5-95 sealant to the shims.

- S 435-020  
(9) Install the bolts, washers and nuts in the forward fitting of the inboard support beam.

- S 435-021  
(10) Hand tighten the nuts on the forward and aft attach bolts.

- S 095-022  
(11) Lower the sling to remove the weight of the flap from the sling.

- S 435-023  
(12) Tighten the nuts on the forward fitting of the inboard support beam to 630-1070 pound-inches (71.2-120.9 Nm).

- S 435-024  
(13) Tighten the nuts on the aft fitting of the inboard support beam to 370-690 pound-inches (41.8-78.0 Nm).

- S 495-025  
(14) Lift the sling to hold the weight of the flap.

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S 035-023

- (15) Remove the two bolts, washers and nuts from the forward fitting of the outboard support beam.

NOTE: Keep a record of the length and location of the bolts for the installation.

S 035-024

- (16) Loosen the four nuts on the aft fitting of the outboard support beam.

S 225-025

- (17) Measure the thickness of the shims on the forward fitting of the outboard support beam.

S 825-026

- (18) Add or remove the same number of shims at the forward fitting of the outboard support beam as you changed on the inboard support beam.

NOTE: Make sure the thickness of the shims is less than 0.50 inch (12.7 mm).

- (a) Apply BMS 5-95 sealant to the shims.

S 435-027

- (19) Install the bolts, washers and nuts in the forward fitting of the outboard support beam.

S 435-028

- (20) Hand tighten the nuts on the forward and aft attach bolts.

S 095-029

- (21) Lower the sling to remove the weight of the flap from the sling.

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S 435-030

- (22) Tighten the nuts on the forward fitting of the outboard support beam to 630-1070 pound-inches (71.2-120.9 Nm).

S 435-031

- (23) Tighten the nuts on the aft fitting of the outboard support beam to 370-690 pound-inches (41.8-78.0 Nm).

S 095-032

- (24) Remove the sling from the flap.

S 825-033

- (25) Change the shims on the outboard flap on the other wing if it is necessary.

S 095-037

- (26) Remove the locks from the spoiler actuators and lower the spoilers (Ref 27-61-00/201).

S 415-027

- (27) Install the access panels on the top surface of the outboard flap.

I. Put the Airplane Back to Its Usual Condition

S 445-028

- (1) Do the activation procedure for the TE flaps (Ref 27-51-00/201).

S 865-029

- (2) Supply electrical power (Ref 24-22-00/201).

S 865-030

**CAUTION:** USE THE ALTERNATE (ELECTRICAL) POWER FOR THE FIRST TIME YOU OPERATE THE FLAPS AFTER THE FLAP ADJUSTMENT. THE ALTERNATE DRIVE WILL MOVE THE FLAPS SLOWER THAN THE PRIMARY (HYDRAULIC) DRIVE. YOU CAN CAUSE DAMAGE TO THE AIRPLANE IF THE FLAPS RETRACT WITHOUT SUFFICIENT CLEARANCE TO THE ADJACENT STRUCTURE.

- (3) Retract the flaps to the UP position with alternate (electrical) power (Ref 27-51-00/201).

**NOTE:** Monitor the flaps while they retract and make sure the flaps retract freely. Make sure the flaps do not hit the adjacent structure.

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S 865-031

- (4) Extend the flaps to the 15-unit position with alternate (electrical) power.

S 865-032

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. THE AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (5) Supply power to the center hydraulic system (Ref 29-11-00/201).

S 865-033

- (6) Retract the flaps to the zero (FLAPS UP) detent with hydraulic power.

**NOTE:** It is necessary to retract the flaps with hydraulic power to do the fit and fair adjustment. The alternate power does not retract the flaps as accurately as primary power does.

S 865-034

- (7) Remove power from the center hydraulic system (Ref 29-11-00/201).

S 825-035

- (8) Adjust the fit and fair of the outboard flaps (Ref 27-51-20/401).

**NOTE:** It is not necessary to make the trailing edges of the left and right flap symmetric in the limit of 0.06 inch (1.52 mm).

S 865-036

- (9) Remove the electrical power (Ref 24-22-00/201).

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FLIGHT CONTROL SURFACES – INSPECTION/CHECK

1. General

- A. This procedure contains tasks that examine the rudder, elevators, and ailerons for too much freeplay. Freeplay is the unwanted movement of a control surface when it is held in position by a fully powered power control actuator (PCA). Freeplay is measured at the trailing edge of the control surface and is caused by wear in the PCA linkages, hinge bearings, and hinge bolts.
- B. Some freeplay in the PCA linkages is permitted, but the wear must be divided equally between the linkage components. If one component is worn more than the other components in the system, it must be repaired.

TASK 27-02-00-736-001

2. Elevator Freeplay – Check

A. Equipment

- (1) Dial Indicator – Accurate to 0.001 inch (0.03 mm) with a minimum range of 1 inch (25 mm).

NOTE: An analog-type dial indicator is recommended.

- (2) Mounting device to hold the dial indicator tightly against the fuselage.

NOTE: A magnetic dial indicator base, and a piece of thin steel plate approximately 3 inches by 3 inches (80 mm by 80 mm) is recommended.

- (3) Dial Indicator – Accurate to 0.001 inch (0.03 mm) with a 0.10 inch (2.5 mm) range.

NOTE: An analog-type dial indicator is recommended.

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- (4) Device to tightly attach the dial indicator to the piston rod of the elevator PCA (Figure 601).

**NOTE:** The mounting device should not damage the finish of the piston rod.

- (5) Spring Force Scale, Push-Type – or transducer with the following specifications:
- (a) Specifications for the device to apply the force to the bottom surface of the elevator.

Range: 0–210 pounds (0–934 newtons), or more

Accuracy: 5% of maximum range, or less

Resolution: 1 pound (4 newtons), or less

- (b) Specifications for the device to apply the force to the top surface of the elevator.

Range: 0–50 pound (0–222 newton), or more

Accuracy: 5% of maximum range, or less

Resolution – 1 pound (4 newtons), or less

**NOTE:** A spring force scale is recommended to measure the force on the top of the elevator. A force transducer and reader is recommended to measure the force on the bottom of the elevator.

- (c) Rig pin E1 or E2 (AMM 20–10–24/201)

**B. References**

- (1) AMM 06–42–00/201 Empennage Access Doors and Panels – Maintenance Practices
- (2) AMM 20–10–24/201 Rig Pins – Maintenance Practices
- (3) AMM 24–22–00/201, Electrical Power – Control
- (4) AMM 27–31–05/601, Elevator Power Control Actuator
- (5) AMM 29–11–00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) AMM 27–31–01/401, Inboard Elevator
- (7) AMM 27–31–02/401, Outboard Elevator
- (8) IPC 55–20–51, Elevator

**C. Access**

- (1) Location Zones
 

336/346	Inboard Elevator
337/347	Outboard Elevator
211/212	Control Cabin
335/345	Horizontal Stabilizer, Rear Spar to Trailing Edge

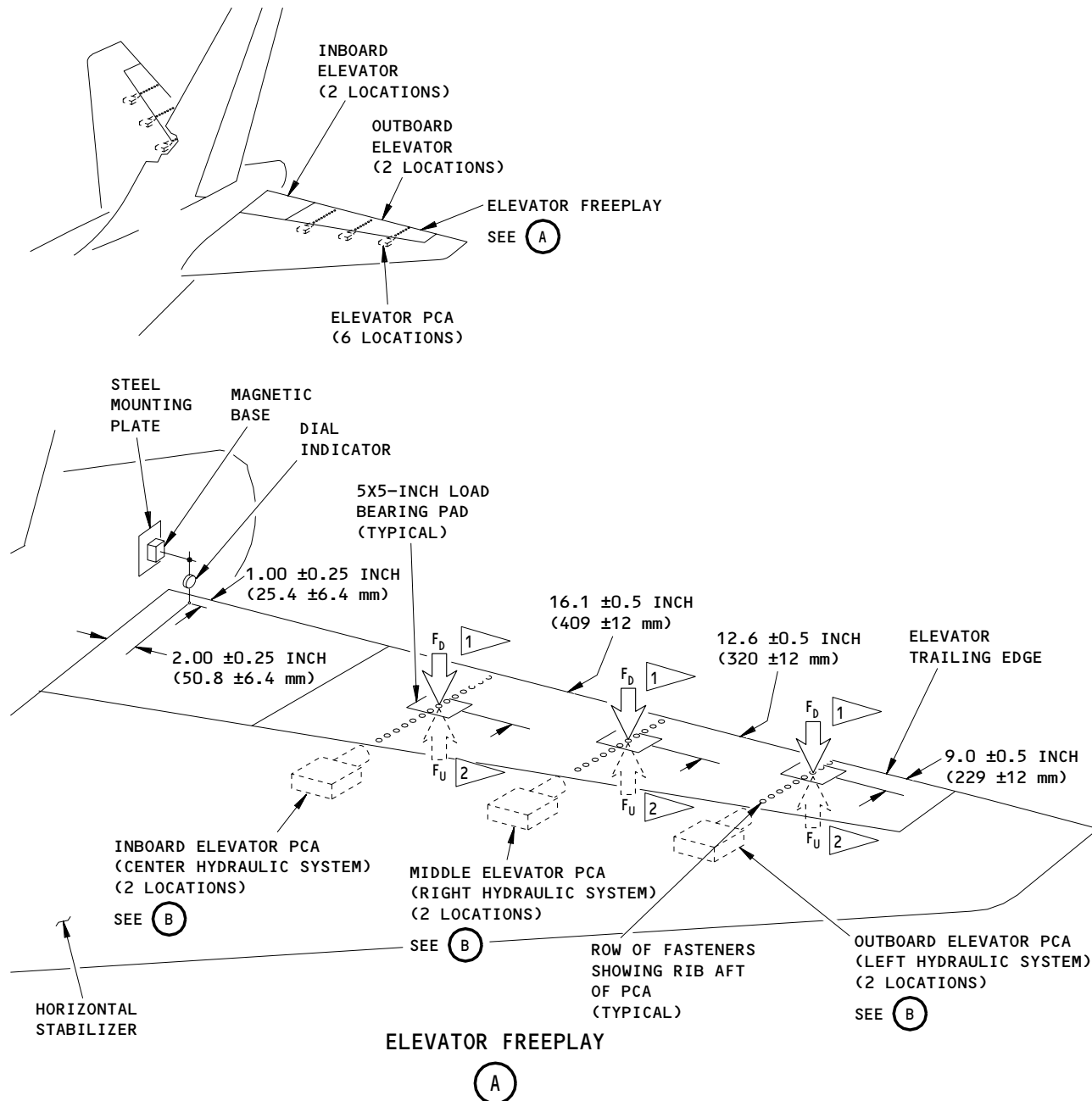
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- 1 APPLY THE DOWNWARD FORCE ( $F_D$ ) TO THE RIB AFT OF THE PCA THAT HAS HYDRAULIC POWER APPROXIMATELY AS SHOWN. USE THE LONGITUDINAL ROW OF FASTENERS ON THE ELEVATOR SKIN TO IDENTIFY THE RIB. MAKE SURE TO PROTECT THE ELEVATOR SURFACE WITH A PAD THAT DISTRIBUTES THE FORCE OVER A SURFACE AREA OF 25 SQUARE-INCHES (170 SQUARE-CENTIMETERS), OR MORE.
- 2 APPLY THE UPWARD FORCE ( $F_U$ ) TO THE RIB AFT OF THE PCA THAT HAS HYDRAULIC POWER, AS SHOWN. USE THE LONGITUDINAL ROW OF FASTENERS ON THE ELEVATOR SKIN TO IDENTIFY THE RIB. MAKE SURE TO PROTECT THE ELEVATOR SURFACE WITH A PAD THAT DISTRIBUTES THE FORCE OVER A SURFACE AREA OF 25 SQUARE-INCHES (170 SQUARE-CENTIMETERS), OR MORE.

Inboard and Outboard Elevator Freeplay Check  
Figure 601 (Sheet 1)

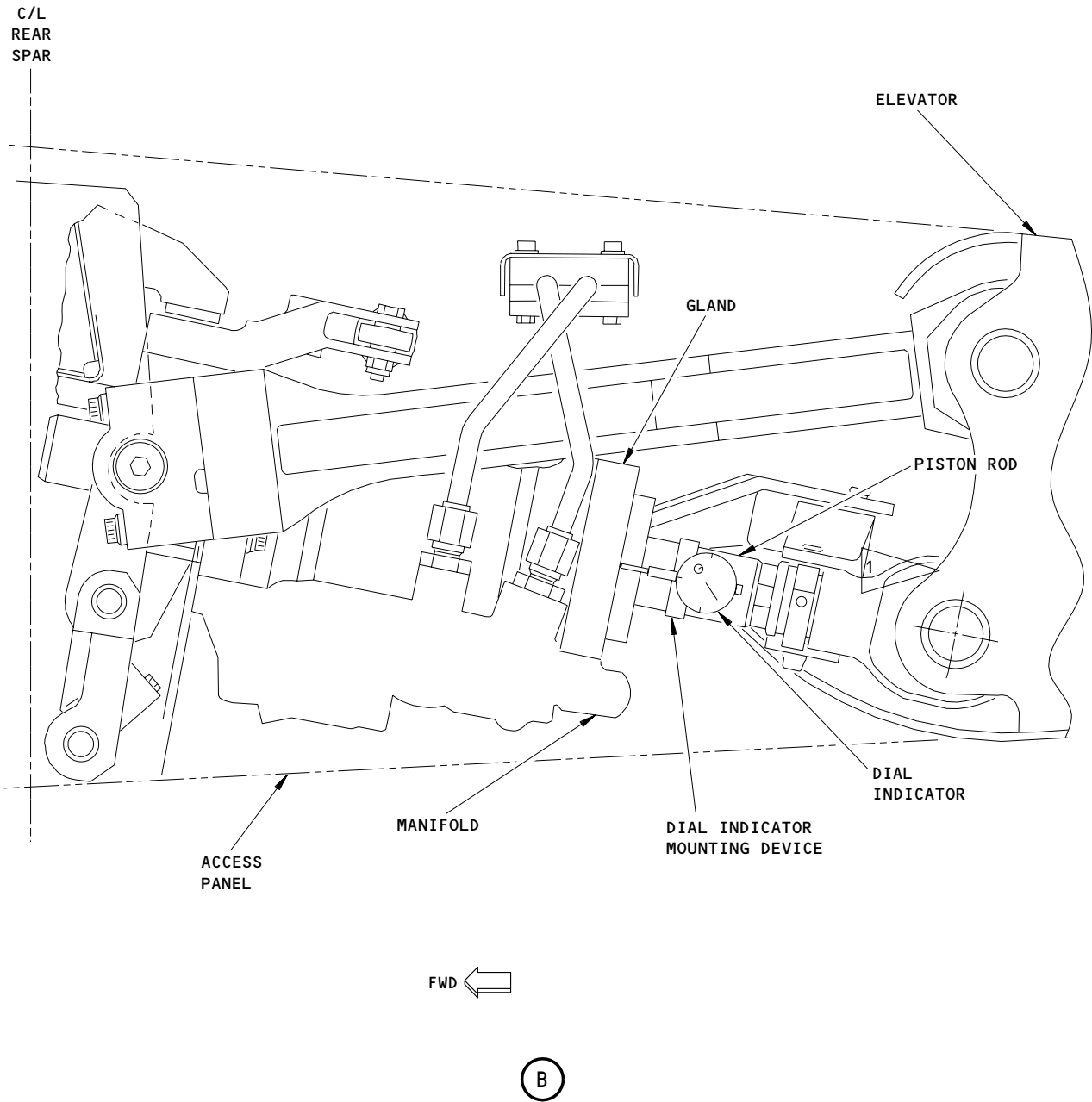
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Inboard and Outboard Elevator Freeplay Check  
Figure 601 (Sheet 2)

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D. Prepare for the Inspection

S 016-204

- (1) Open access panels 335EB, 345EB, 335GB, 345GB, 335HB, 345HB, 335AFB, and 345AFB to get access to the elevator PCAs.

S 016-205

- (2) AIRPLANES WITH A THREE-PIECE ELEVATOR SEAL;  
Open access panels 335AGB, 345AGB, 335AHB, and 345 AHB to get access to the elevator PCAs.

S 016-206

- (3) If necessary, the trailing edge beams can be removed to access the elevator PCAs. Open these access panels to access the trailing edge beams: 335ANZ, 345ANZ, 335APZ, 345APZ, 335AQZ, 345AQZ.

S 866-145

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

S 866-091

**WARNING:** THE AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE AWAY FROM THE CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (5) Supply power to the left, center, and right hydraulic systems (AMM 29-11-00/201).

S 866-092

- (6) Use the control wheel switches to move the horizontal stabilizer to approximately 2 units of trim.

S 866-190

- (7) Operate the control column to move the elevators fully up, then fully down. Do this approximately 30 times.

**NOTE:** This step will bleed the air from each hydraulic system for the elevator PCAs. Move the elevators slowly and continuously.

S 866-191

- (8) Move the control column to the neutral position.

S 866-093

- (9) Move the LEFT STAB TRIM SHUTOFF and the CENTER STAB TRIM SHUTOFF switches on the control stand panel, P10, to their CUTOUT positions.

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S 866-094

- (10) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11C12, STAB TRIM SHUTOFF LEFT
  - (b) 11C13, STAB TRIM SHUTOFF CENTER

S 866-066

- (11) Remove the power from the left, center, and right hydraulic systems (AMM 29-11-00/201).

S 866-067

- (12) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 866-068

- (13) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

E. Elevator Freeplay - Inspection (Fig. 601)

S 866-146

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Do the applicable group of steps to supply hydraulic power to one of the three PCAs for each elevator. Do only the steps for the PCA that you want to supply power to:

**NOTE:** Measure the freeplay for each of the three PCAs that move the elevator. During the freeplay measurement, make sure only the corresponding hydraulic system (for the elevator PCA that is being measured) has power.

**NOTE:** Each of the two elevators has an inboard and an outboard elevator section. The two elevator sections are permanently connected and act as one flight control surface. Taking freeplay measurements on the inner elevator measures freeplay for the outboard elevator.

- (a) Do these steps to supply hydraulic power to the middle PCAs:
- 1) Supply pressure to the right hydraulic system only (AMM 29-11-00/201).

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- 2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - a) 11H27, FLT CONT SHUTOFF TAIL RIGHT
- 3) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF TAIL R switch on the P61 panel to ON.
- (b) Do these steps to supply hydraulic power to the outboard PCAs:
  - 1) Supply pressure to the left hydraulic system only (AMM 29-11-00/201).
  - 2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - 3) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF TAIL L switch on the P61 panel to ON.
- (c) Do these steps to supply hydraulic power to the inboard PCAs:
  - 1) Supply pressure to the center hydraulic system only (AMM 29-11-00/201).
  - 2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - a) 11H18, FLT CONT SHUTOFF TAIL CTR
  - 3) Remove the DO-NOT-OPERATE tag and move the FLT CONT SHUTOFF TAIL C switch on the P61 panel to ON.

S 866-070

- (2) Do these steps to put the control column in its neutral position:
  - (a) Operate the control column to move the elevators fully up.
  - (b) Keep the elevators fully up for 10 seconds.
  - (c) Operate the control column to move the elevators fully down.
  - (d) Keep the elevators fully down for 10 seconds.
  - (e) Move the control column to its neutral position.
  - (f) Attach DO-NOT-OPERATE tags to the control columns.
  - (g) Install rig pin E1 in the torque tube for the Captain's control column.
  - (h) Install rig pin E2 in the torque tube for the First Officer's control column.

S 486-207

- (3) Do these steps to attach a dial indicator to measure the movement of the elevator:
  - (a) Attach a steel mounting plate for the dial indicator against the side of the fuselage above the surface of the elevator trailing edge.
  - (b) Attach the magnetic base to the steel mounting plate.

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- (c) Put the dial indicator plunger against the upper surface of the elevator 1.00 +/- 0.25 inch (25.4 +/- 6.4 mm) forward of the elevator trailing edge, and 2.00 +/- 0.25 inch (50.8 +/- 6.4 mm) outboard from the inboard edge of the elevator (Figure 601)

NOTE: At this location, use a dial indicator that has a minimum 1 inch range.

- 1) Make sure the plunger of the dial indicator is aligned to measure the vertical movement of the trailing edge of the elevator.
- 2) Load the plunger so that its depressed no more than 0.2 inches (5 mm).

S 486-208

CAUTION: MAKE SURE THAT THE MOUNTING DEVICE FOR THE DIAL INDICATOR DOES NOT CAUSE DAMAGE TO THE FINISH OF THE PISTON ROD.

- (4) Do these steps to attach a dial indicator to the piston rod of the elevator PCA that has hydraulic power.

CAUTION: USE A DIAL INDICATOR WITH AT LEAST 0.10 INCH (2.5 MM) OF TRAVEL TO PREVENT DAMAGE TO THE INDICATOR.

- (a) Attach a mounting device for a dial indicator to the piston rod (Figure 601).
- (b) Attach a dial indicator to the mounting device.
- (c) Do these steps to align the dial indicator to measure the movement of the piston rod:
  - 1) Put the plunger of the dial indicator against a flat area on the gland or on the manifold of the PCA.
  - 2) Make sure the dial indicator is aligned parallel to the piston rod.
  - 3) Make sure the dial indicator is set to approximately the middle of its travel.
  - 4) Make sure the dial indicator and the mounting device have a clearance of at least 0.10 inch (2.5 mm) to the adjacent structure.

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S 226-071

**CAUTION:** USE SUFFICIENT PADDING ON THE FORCE SCALE TO PREVENT DAMAGE TO THE ELEVATOR SURFACE. USE A PAD THAT IS AT LEAST 5 INCHES (130 mm) LONG AND HAS A WIDTH OF AT LEAST 5 INCHES (130 mm).

- (5) Apply a force of approximately 40 pounds (178 newtons) to the top surface of the elevator, down and perpendicular to the ground.  
Apply the force at the appropriate location:
- (a) If the elevator inboard PCA has hydraulic power, apply the force on the rib aft of the inboard PCA, 16.1 +/- 0.5 inches (409 +/- 12 mm) forward of the elevator trailing edge (Figure 601). Use the longitudinal row of fasteners on the elevator skin to identify the location of the rib.
  - (b) If the elevator middle PCA has hydraulic power, apply the force on the rib aft of the middle PCA, 12.6 +/- 0.5 inches (320 +/- 12 mm) forward of the elevator trailing edge (Figure 601). Use the longitudinal row of fasteners on the elevator skin to identify the location of the rib.
  - (c) If the elevator outboard PCA has hydraulic power, apply the force on the rib aft of the outboard PCA, 9.0 +/- 0.5 inches (229 +/- 12 mm) forward of the elevator trailing edge (Figure 601). Use the longitudinal row of fasteners on the elevator skin to identify the location of the rib.

S 226-161

- (6) Keep this force constant for approximately 20 seconds.

**NOTE:** The function of this step is to make sure that the elevator surface moves freely through the hydraulic resistances of the two PCAs that are not hydraulically powered.

S 866-097

- (7) Remove the force from the top of the elevator.

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S 226-087

**CAUTION:** USE SUFFICIENT PADDING ON THE FORCE SCALE TO PREVENT DAMAGE TO THE ELEVATOR SURFACE. USE A PAD THAT IS AT LEAST 5 INCHES LONG (130 mm) AND HAS A WIDTH OF AT LEAST 5 INCHES (130 mm).

- (8) Apply a force of 100 +/- 6 pounds (445 +/- 27 newtons) to the bottom surface of the elevator, up and perpendicular to the ground. Do not allow the force to increase to more than 106 pounds (472 newtons). If this occurs, you must release the force, and start the procedure again at the 40 pound (178 newton) force application. Apply the force at the appropriate location:
- (a) If the elevator inboard PCA has hydraulic power, apply the force on the rib aft of the inboard PCA, 16.1 +/- 0.5 inches (409 +/- 12 mm) forward of the elevator trailing edge (Figure 601). Use the longitudinal row of fasteners on the elevator skin to identify the location of the rib.
  - (b) If the elevator middle PCA has hydraulic power, apply the force on the rib aft of the middle PCA, 12.6 +/- 0.5 inches (320 +/- 12 mm) forward of the elevator trailing edge (Figure 601). Use the longitudinal row of fasteners on the elevator skin to identify the location of the rib.
  - (c) If the elevator outboard PCA has hydraulic power, apply the force on the rib aft of the outboard PCA, 9.0 +/- 0.5 inches (229 +/- 12 mm) forward of the elevator trailing edge (Figure 601). Use the longitudinal row of fasteners on the elevator skin to identify the location of the rib.

S 226-192

- (9) Keep the force constant at 100 +/- 6 pounds (445 +/- 27 Newtons) while you do these steps.
- (a) Monitor the value shown on the dial indicator at the elevator trailing edge until it becomes stable.

**NOTE:** Vibrations can cause the dial indicator to show small continual movements. You can continue if the indication average is stable.

- (b) Read the value on the dial indicator at the elevator trailing edge. Record this value as the index point for the elevator.

**NOTE:** You can adjust the dial indicator to zero. If you do this, record the index point as zero.

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- (c) Read the value on the dial indicator at the piston rod. Record this value as the index point for the piston rod.

NOTE: You can adjust the dial indicator to zero. If you do this, record the index point as zero.

S 226-193

- (10) Increase the force to 200 +/- 6 pounds (890 +/- 27 newtons). Do not allow the force to increase to more than 206 pounds (917 newtons). If this occurs, you must release the force, and start the procedure again at the 40 pound (178 newton) force application.

S 266-194

- (11) Keep the force constant at 200 +/- 6 pounds (890 +/- 27 newtons) while you do these steps:
  - (a) Monitor the value shown on the dial indicator at the elevator trailing edge until it becomes stable.

NOTE: Vibrations can cause the dial indicator to show small continual movements. You can continue if the indication average is stable.

- (b) Read the value shown on the dial indicator at the elevator trailing edge. Record the distance that the elevator moved up from the recorded index point.

NOTE: This is the distance that you will compare to the applicable freeplay limit.

- (c) Read the value on the dial indicator at the piston rod. Record the distance that the piston rod moved from the recorded index point.

NOTE: This is the value that you will use to find the applicable freeplay limit.

S 226-195

- (12) Remove the force from the elevator.

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S 226-196

- (13) Using Table 601, find the applicable minimum elevator movement value for the calculated piston rod movement (from the index point).

NOTE: For example, if the piston rod movement was 0.012 inches, the minimum elevator movement is 0.258 inches.

- (a) Make sure that the calculated elevator movement (from the index point) is more than, or equal to, the minimum elevator movement. If the calculated elevator movement is less than the minimum elevator movement, the measurement is not correct.

NOTE: The measurement may be incorrect due to incorrectly installed equipment, or incorrectly followed instructions.

S 226-197

- (14) Using Table 601, find the applicable elevator freeplay limit for the calculated piston rod movement (from the index point).

NOTE: For example, if the piston rod movement was 0.012 inches, the elevator freeplay limit is 0.416 inches.

- (a) Make sure that the calculated elevator movement (from the index point) is less than, or equal to, the elevator freeplay limit. If the calculated elevator movement is more than the elevator freeplay limit, then you must make repairs to the load path connections related to the elevator PCA.

NOTE: Possible causes of excessive freeplay include: worn or loose hanger link, reaction link, PCA rod end, or trunnion connections.

- (b) If you make repairs, you must repeat the freeplay check for the applicable PCA.

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Table 601  
Elevator Freeplay Limit

ELEVATOR FREEPLAY - INSPECTION		
Piston Rod Movement (inch)	Minimum Elevator Movement (inch)	Elevator Freeplay Limit (inch)
0.000	0.098	0.256
0.001	0.112	0.269
0.002	0.125	0.283
0.003	0.138	0.296
0.004	0.152	0.309
0.005	0.165	0.323
0.006	0.178	0.336
0.007	0.192	0.349
0.008	0.205	0.363
0.009	0.218	0.376
0.010	0.231	0.389
0.011	0.245	0.402
0.012	0.258	0.416
0.013	0.271	0.429
0.014	0.285	0.442
0.015	0.298	0.456
0.016	0.311	0.469
0.017	0.325	0.482
0.018	0.338	0.496
0.019	0.351	0.509
0.020	0.365	0.522

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Table 601  
Elevator Freeplay Limit

ELEVATOR FREEPLAY - INSPECTION		
Piston Rod Movement (inch)	Minimum Elevator Movement (inch)	Elevator Freeplay Limit (inch)
0.021	0.378	0.536
0.022	0.391	0.549
0.023	0.405	0.562
0.024	0.418	0.575
0.025	0.431	0.589
0.026	0.444	0.602
0.027	0.458	0.615
0.028	0.471	0.629
0.029	0.484	0.642
0.030	0.498	0.655
0.031	0.511	0.669
0.032	0.524	0.682
0.033	0.538	0.695
0.034	0.551	0.709
0.035	0.564	0.722
0.036	0.578	0.736
0.037	0.591	0.749
0.038	0.604	0.762
0.039	0.617	0.775
0.040	0.631	0.788
0.0041	0.644	0.802

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Table 601 Elevator Freeplay Limit		
ELEVATOR FREEPLAY - INSPECTION		
Piston Rod Movement (inch)	Minimum Elevator Movement (inch)	Elevator Freeplay Limit (inch)
0.042	0.657	0.815
0.043	0.671	0.828
0.044	0.684	0.842
0.045	0.697	0.855
0.046	0.711	0.868
0.047	0.724	0.882
0.048	0.737	0.895
0.049	0.751	0.908
0.050	0.764	0.922
0.051	0.777	0.935

S 086-198

**CAUTION:** MAKE SURE THAT YOU REMOVE THE EQUIPMENT YOU ATTACHED TO THE ELEVATOR PCA BEFORE YOU REMOVE HYDRAULIC POWER. DAMAGE TO EQUIPMENT CAN OCCUR.

- (15) Do these steps to make sure that the elevator is clear to move.
- (a) Remove the dial indicator and the mounting device from the elevator PCA.
  - (b) Move the dial indicator and mounting equipment away from the elevator trailing edge.

S 866-081

- (16) Remove the power from the hydraulic system that was pressurized (AMM 29-11-00/201).

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S 866-089

- (17) Move the applicable FLT CONTROL SHUTOFF L, R, or C switch on the P61 panel to OFF. Attach a DO-NOT-OPERATE tag and make sure the switch position light comes on.

NOTE: Make sure all the switches are in their OFF positions.

S 216-090

- (18) Open these circuit breakers on the P11 panel and attach the DO-NOT-CLOSE tag:
- (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 866-176

- (19) Remove the rig pin E1 from the torque tube for the Captain's control column. Remove the rig pin E2 from the torque tube for the First Officer's control column.

S 736-099

- (20) Do the elevator freeplay check again for each of the remaining PCAs. Make sure only one PCA (for each of the two elevators) is pressurized during the check.

NOTE: Remove the dial indicator and magnetic base before you pressurize a different PCA. The elevator can move when you pressurize the hydraulic system and exceed the travel of the dial indicator.

F. Put the Airplane Back to Its Usual Condition.

S 086-200

- (1) Remove the dial indicators and mounting equipment from the airplane.

S 416-201

- (2) If you removed them, install the trailing edge beams. Close these access panels: 335ANZ, 345ANZ, 335APZ, 345APZ, 335AQZ, and 345AQZ.

S 416-202

- (3) Close access panels 335EB, 345EB, 335GB, 345GB, 335HB, 345HB, 335AFB, and 345AFB.

S 416-203

- (4) AIRPLANES WITH A THREE-PIECE ELEVATOR SEAL;  
Close access panels 335AGB, 345AGB, 335AHB, and 345AHB.

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S 866-164

**WARNING:** THE AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE AWAY FROM THE CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 866-084

- (6) Move the LEFT STAB TRIM SHUTOFF and the CENTER STAB TRIM SHUTOFF switches on the P10 panel to their NORM positions.

S 866-085

- (7) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to ON.

S 866-100

- (8) Remove the DO-NOT-OPERATE tags from the control columns.

S 866-086

- (9) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

TASK 27-02-00-736-025

3. Rudder Freeplay - Inspection

A. General

- (1) During this check, the wind/air velocities at the rudder must be below 4 mph. If it is necessary, perform this check indoors to avoid excessive wind/air velocities.

B. Equipment

- (1) Dial Indicator - Accurate to 0.001 inch (0.03 mm) with a 1 inch (25 mm) range.

**NOTE:** An analog-type dial indicator is recommended.

- (2) Device to hold the dial indicator tightly against the fuselage

**NOTE:** A magnetic indicator base, and a flat piece of steel approximately 3 inches (80 mm) long by 3 inches (80 mm) long is recommended.

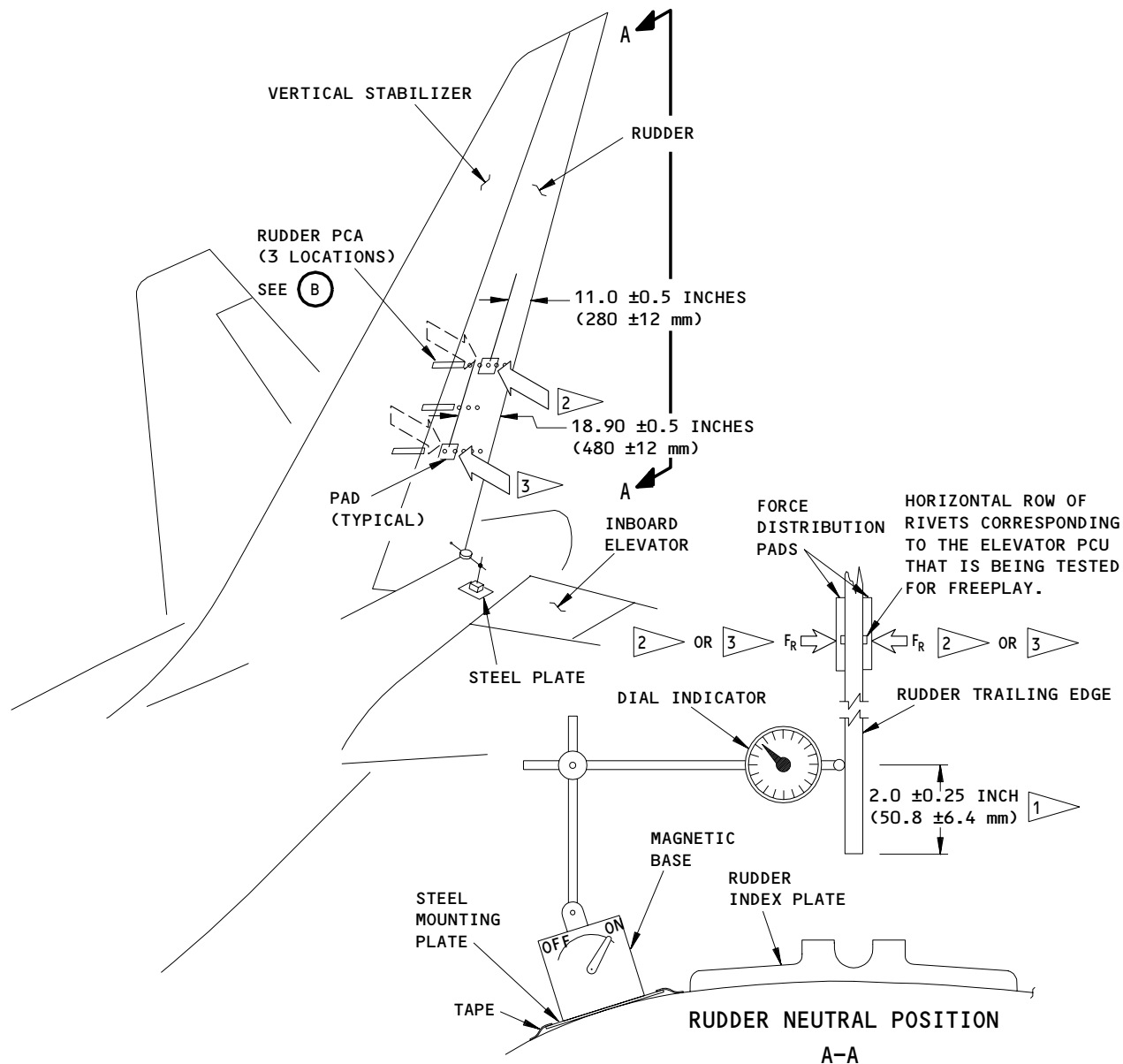
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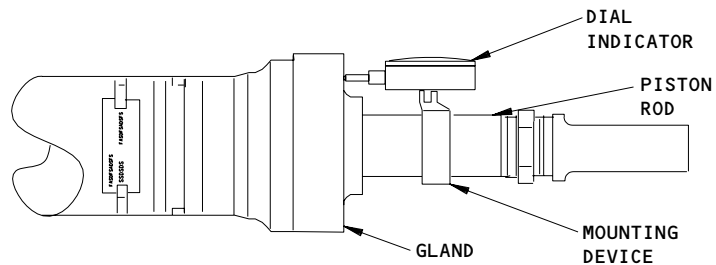
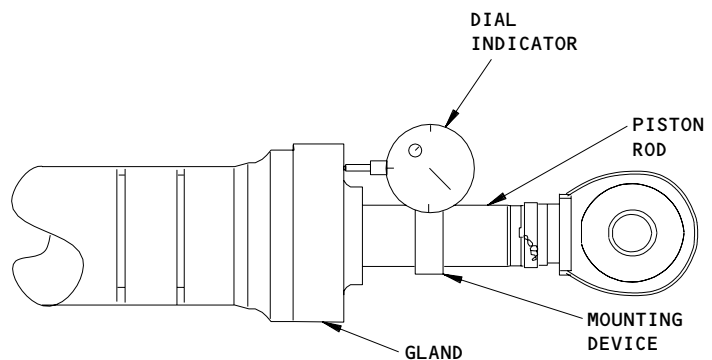
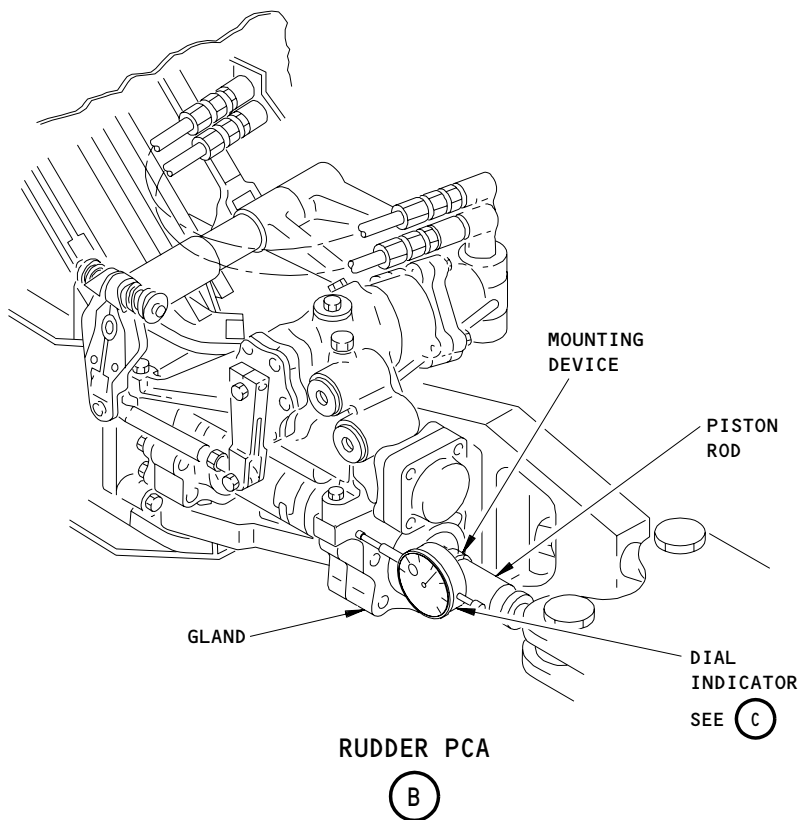


- 1 PLACE THE DIAL INDICATOR PLUNGER  $1.00 \pm 0.25$  INCH ( $25.4 \pm 6.4$  mm) FORWARD OF THE RUDDER TRAILING EDGE AND  $2.00 \pm 0.25$  INCH ( $50.8 \pm 6.4$  mm) FROM THE BOTTOM OF THE RUDDER.
- 2 THE UPPER PCA HAS HYDRAULIC PRESSURE: APPLY THE FORCE TO THE RIB AFT OF THE UPPER PCA, AS SHOWN. USE THE HORIZONTAL ROW OF FASTENERS ON THE RUDDER SKIN TO IDENTIFY THE RIB. APPLY THE FORCE TO THE LEFT SIDE OF THE RUDDER FIRST, THEN THE RIGHT SIDE OF THE RUDDER. BE SURE TO PROTECT THE RUDDER SURFACE WITH A PAD THAT DISTRIBUTES THE FORCE OVER A SURFACE AREA OF 25 SQUARE INCHES OR MORE (5 INCH BY 5 INCH MINIMUM).
- 3 THE MIDDLE PCA OR THE LOWER PCA HAS HYDRAULIC PRESSURE: APPLY THE FORCE TO THE RIB AFT OF THE LOWER PCA AS SHOWN. USE THE HORIZONTAL ROW OF FASTENERS ON THE RUDDER SKIN TO IDENTIFY THE RIB. APPLY THE FORCE TO THE LEFT SIDE OF THE RUDDER FIRST, THEN THE RIGHT SIDE OF THE RUDDER. BE SURE TO PROTECT THE RUDDER SURFACE WITH A PAD THAT DISTRIBUTES THE FORCE OVER A SURFACE AREA OF 25 SQUARE INCHES OR MORE (5 INCH BY 5 INCH MINIMUM).

Rudder Freeplay Inspection  
Figure 602 (Sheet 1)

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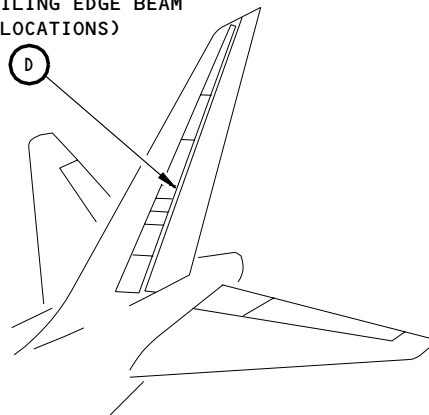
Rudder Freeplay Inspection  
Figure 602 (Sheet 2)

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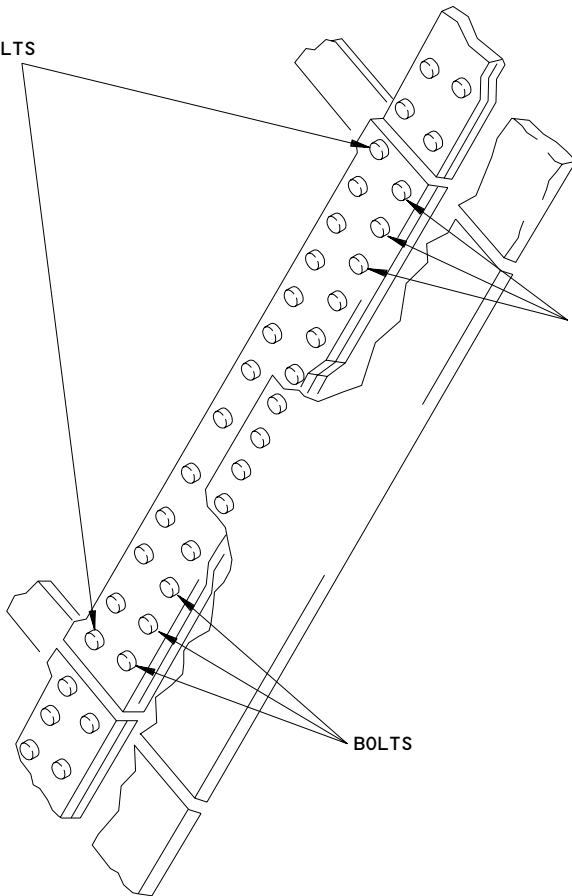
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TRAILING EDGE BEAM  
(3 LOCATIONS)

SEE (D)



BOLTS



BOLTS

BOLTS

FWD



TRAILING EDGE BEAM

(D)

Rudder Freeplay Inspection  
Figure 602 (Sheet 3)

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- (3) Dial Indicator - Accurate to 0.001 inch (0.03 mm) with a 0.1 inch (2.5 mm) range.

NOTE: An analog-type dial indicator is recommended.

- (4) Device to tightly attach the dial indicator to the piston rod of the rudder PCA (Figure 602).

NOTE: The mounting device should not damage the finish of the piston rod.

- (5) Spring Force Scale or Force Transducer, Push-Type (Commercially Available):

(a) Range: 0 to 150 Pound (0 - 670 newtons), or more

(b) Resolution - 1 pound (5 newton), or less

(c) Accuracy - 5% of maximum indicated value.

- (6) Rig pin R1 or R2 (AMM 20-10-24/201).

C. References

- (1) AMM 06-42-00/201 Empennage Access Doors and Panels - Maintenance Practices  
(2) AMM 24-22-00/201, Electrical Power - Control  
(3) AMM 20-10-24/201, Rig Pins - Maintenance Practices  
(4) AMM 27-21-01, Rudder  
(5) AMM 27-21-02, Rudder Power Control (PCA) and Reaction Link  
(6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(7) IPC 55-40-55, Rudder

D. Access

- (1) Location Zone  
211/212 Control Cabin  
324 Vertical Stabilizer  
325 Rudder

E. Prepare for the Inspection

S 016-177

- (1) Open access panels 324LL, 324ML, 324JL, 324KL, 324GL, and 324HL to get access to the rudder PCAs.

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S 016-178

- (2) If necessary, the trailing edge beam can be removed to access the rudder PCAs (Figure 602).

S 866-026

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

S 866-015

**WARNING:** THE AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND THE STABILIZER ARE FULLY POWERED SURFACES. MAKE SURE THAT ALL EQUIPMENT AND PERSONS ARE AWAY FROM THE CONTROL SURFACES BEFORE YOU SUPPLY THE HYDRAULIC POWER. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (4) Supply pressure to the left, center, and right hydraulic systems (AMM 29-11-00/201).

S 866-173

- (5) Operate the rudder pedals to move the rudder fully left, then fully right. Repeat 30 times.

S 866-179

- (6) Move the rudder pedals to the neutral position.

S 866-101

- (7) Do this check to make sure the rudder is in its neutral position:  
(a) Operate the rudder trim switch on the aft electronic control panel, P8, until the rudder trim indicator shows zero units of trim.  
(b) Make sure the rudder pedals are in their neutral positions.

S 866-167

- (8) Attach DO-NOT-OPERATE tags to the rudder pedals.

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S 866-153

- (9) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11C5, RUDDER TRIM
  - (b) 11K17, RUDDER TRIM POS

S 866-031

- (10) Remove the power from the left, center, and right hydraulic systems (AMM 29-11-00/201).

S 866-032

- (11) Move the FLT CONTROL SHUTOFF L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.
- (a) Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 866-033

- (12) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT
- F. Rudder Freeplay - Inspection (Fig. 602)

S 866-148

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Do the applicable group of steps to supply hydraulic power to one of the three PCAs for the rudder. Do only the steps for the PCA that you want to supply power to:

**NOTE:** Measure the freeplay independently for each of the three PCAs that move the rudder. During the measurement, make sure only one of the three rudder PCAs has power at a time.

- (a) Do these steps to supply hydraulic power to the lower PCA:
  - 1) Supply pressure to the right hydraulic system only (AMM 29-11-00/201).

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- 2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - a) 11H27, FLT CONT SHUTOFF TAIL RIGHT
- 3) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF TAIL R switch on the P61 panel to ON.
- (b) Do these steps to supply hydraulic power to the middle PCA:
  - 1) Supply pressure to the left hydraulic system only (AMM 29-11-00/201).
  - 2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - 3) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF TAIL L switch on the P61 panel to ON.
- (c) Do these steps to supply hydraulic power to the upper PCA:
  - 1) Supply pressure to the center hydraulic system only (AMM 29-11-00/201).
  - 2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - a) 11H18, FLT CONT SHUTOFF TAIL CTR
  - 3) Remove the DO-NOT-OPERATE tag and move the FLT CONT SHUTOFF TAIL C switch on the P61 panel to ON.

S 866-168

- (2) Do these steps to decrease the remaining pressure in the two rudder PCAs that do not have power.

NOTE: Move the rudder pedals slowly.

- (a) Remove the DO-NOT-OPERATE tags from the rudder pedals.
- (b) Operate the rudder pedals to move the rudder fully right.
- (c) Keep the rudder fully right for 10 seconds.
- (d) Operate the rudder pedals to move the rudder fully left.
- (e) Keep the rudder fully left for 10 seconds.

S 866-169

- (3) Do this check to make sure the rudder is in it's neutral position:
  - (a) Operate the rudder trim switch on the aft electronic control panel, P8, until the rudder trim indicator shows zero units of trim.

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- (b) Make sure the rudder pedals are in their neutral positions.
- (c) Make sure the rudder is in it's neutral position.

S 866-170

- (4) Attach DO-NOT-OPERATE tags to the rudder pedals.

S 826-171

- (5) Install rig pin R1 in the captain's rudder pedals. Install rig pin R2 in the first officer's rudder pedals.

S 866-140

- (6) Stop for three minutes to let the rudder position become stable.

S 826-032

**WARNING:** DO NOT MOVE THE RUDDER PEDALS DURING THE RUDDER FREEPLAY MEASUREMENT. THE RUDDER MOVES VERY QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (7) Do the steps that follow to attach a dial indicator next to the rudder lower trailing edge (Fig. 602):

**CAUTION:** USE A DIAL INDICATOR WITH AT LEAST 1-INCH (25 MM) OF TRAVEL TO PREVENT DAMAGE TO THE INDICATOR.

- (a) Use high strength tape (that will not damage painted surfaces when removed) and a steel mounting plate to attach the magnetic base to the fuselage near the rudder trailing edge.
- (b) Use adjustable rods to attach the dial indicator to the fixed rod of the magnetic base.
- (c) Put the indicator plunger approximately 1.00 +/- 0.25 inch (25.4 +/- 6.4 mm) forward of the rudder trailing edge and 2.00 +/- 0.25 inch (50.8 +/- 6.4 mm) above the bottom edge of the rudder (Fig. 602).
- (d) Give a load to the dial indicator plunger until the needle moves approximately to half of it's total travel.

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(e) Adjust the dial indicator to zero.

S 486-188

(8) Do these steps to attach a dial indicator to the piston rod of the rudder PCA.

**CAUTION:** USE A DIAL INDICATOR WITH AT LEAST 0.10 INCH (2.5 MM) OF TRAVEL TO PREVENT DAMAGE TO THE INDICATOR.

(a) Attach a mounting device for a dial indicator to the piston rod (Figure 602).

(b) Attach a dial indicator to the mounting device.

(c) Do these steps to align the dial indicator to measure the movement of the piston rod:

- 1) Put the plunger of the dial indicator against a flat area on the gland of the PCA.
- 2) Make sure the dial indicator is aligned parallel to the piston rod.
- 3) Make sure the dial indicator is set to approximately the middle of its travel.
- 4) Make sure the dial indicator and the mounting device have a clearance of at least 0.10 inch (2.5 mm) to the adjacent structure.

S 496-039

**CAUTION:** USE SUFFICIENT PADDING ON THE FORCE SCALE TO PREVENT DAMAGE TO THE RUDDER SURFACE. USE A PAD THAT IS AT LEAST 5 INCHES (130 mm) LONG AND HAS A WIDTH OF AT LEAST 5 INCHES (130 mm), OR MORE.

(9) Use the force scale to apply a 100 +/- 6 pound (445 +/- 27 Newton) force to the left side of the rudder. Apply this force perpendicular to the surface of the rudder, at the appropriate location.

(a) If the upper rudder PCA has hydraulic power, apply the force on the rudder rib aft of the upper rudder PCA, 11.0 +/- 0.5 inches (279 +/- 12 mm) forward of the rudder trailing edge (Fig. 602). Use the horizontal row of fasteners on the rudder skin to identify the location of the rib.

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- (b) If the middle or lower rudder PCA has hydraulic power, apply the force on the rudder rib aft of the lower rudder PCA, 18.9 +/- 0.5 inches (480 +/- 12 mm) forward of the rudder trailing edge (Fig. 602). Use the horizontal row of fasteners on the rudder skin to identify the location of the rib.

S 226-040

- (10) Keep the force constant at 100 +/- 6 pounds (445 +/- 27 newtons) until the value indicated on the dial indicator becomes stable.

NOTE: This force should be applied for a minimum of 2.5 minutes. This is to ensure that the rudder moves fully through the hydraulic resistance of the two PCAs that do not have hydraulic power.

S 226-180

- (11) Decrease the force to 30 +/- 3 pounds (133 +/- 13 Newtons). Do not allow the force to decrease to less than 27 pounds (120 Newtons). If this occurs, you must release the force, and start the procedure again at the 100 pound (445 Newton) force application.

S 226-181

- (12) Keep the force constant at 30 +/- 3 pounds (133 +/- 3 Newtons) while you do these steps.

- (a) Monitor the value shown on the dial indicator at the rudder trailing edge until it becomes stable.

NOTE: Vibrations can cause the dial indicator to show small continual movements. You can continue if the indication average is stable.

- (b) Read the value on the dial indicator at the rudder trailing edge. Record this value as the index point for the rudder.

NOTE: You can adjust the dial indicator to zero. If you do this, record the index point as zero.

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- (c) Read the value on the dial indicator at the piston rod. Record this value as the index point for the piston rod.

**NOTE:** You can adjust the dial indicator to zero. If you do this, record the index point as zero.

S 866-102

- (13) Slowly remove the load from the left side of the rudder.

S 226-103

**CAUTION:** USE SUFFICIENT PADDING ON THE FORCE SCALE TO PREVENT DAMAGE TO THE RUDDER SURFACE. USE A PAD THAT IS AT LEAST 5 INCHES LONG (130 MM) AND HAS A WIDTH OF AT LEAST 5 INCHES (130 MM).

- (14) Use the force scale to apply a 60 +/- 3 pound (267 +/- 13 Newton) force to the right side of the rudder. Apply this force perpendicular to the surface of the rudder, at the appropriate location. Do not allow the force to increase to more than 63 pounds (280 Newtons). If this occurs, you must release the force, and start the procedure again at the 100 pound (445 Newton) force application.
- (a) If the upper rudder PCA has hydraulic power, apply the force on the rudder rib aft of the upper rudder PCA, 11.0 +/- 0.5 inches (279 +/- 12 mm) forward of the rudder trailing edge (Fig. 602). Use the horizontal row of fasteners on the rudder skin to identify the location of the rib.
- (b) If the middle or lower rudder PCA has hydraulic power, apply the force on the rudder rib aft of the lower rudder PCA, 18.9 +/- 0.5 inches (480 +/- 12 mm) forward of the rudder trailing edge (Fig. 602). Use the horizontal row of fasteners on the rudder skin to identify the location of the rib.

S 226-189

- (15) Keep the force constant at 60 +/- 3 pounds (267 +/- 13 Newtons) while you do these steps.
- (a) Monitor the value shown on the dial indicator at the rudder trailing edge until it becomes stable.

**NOTE:** Vibrations can cause the dial indicator to show small continual movements. You can continue if the indication average is stable.

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- (b) Read the value shown on the dial indicator at the rudder trailing edge. Record the distance that the rudder moved to the left of the recorded index point.

NOTE: This is the distance that you will compare to the applicable freeplay limit.

- (c) Read the value on the dial indicator at the piston rod. Calculate the distance and direction that the piston rod moved from the recorded index point.

NOTE: This is the value that you will use to find the applicable freeplay limit.

- 1) If the piston rod retracted (moved forward), the value is positive. If the piston rod extended (moved aft), the value is negative.

S 226-156

- (16) Slowly remove the force from the right side of the rudder.

S 226-182

- (17) Using Table 602, find the applicable minimum rudder movement value for the calculated piston rod movement (from the index point).

NOTE: For example, if the piston rod movement was 0.012 inches, the minimum rudder movement is 0.260 inches.

- (a) Make sure that the calculated rudder movement (from the index point) is more than, or equal to, the minimum rudder movement. If the calculated rudder movement is less than the minimum rudder movement, the measurement is not correct.

NOTE: The measurement may be incorrect due to incorrectly installed equipment, or incorrectly followed instructions.

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S 226-183

- (18) Using Table 602, find the applicable rudder freeplay limit for the calculated piston rod movement (from the index point).

NOTE: For example, if the piston rod movement was 0.012 inches, the rudder freeplay limit is 0.470 inches.

- (a) Make sure that the calculated rudder movement (from the index point) is less than, or equal to, the rudder freeplay limit. If the calculated rudder movement is more than the freeplay limit, then you must make repairs to the load path connections for the rudder PCA.

NOTE: Possible causes of excessive freeplay include: worn or loose hanger link, reaction link, PCA rod end, or trunnion connections.

- (b) If you make repairs, you must repeat the freeplay check for the applicable PCA.

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Table 602  
Rudder Freeplay Limit

RUDDER FREEPLAY - INSPECTION		
Piston Rod Movement (inch)	Minimum Rudder Movement (inch)	Rudder Freeplay Limit (inch)
-0.022	0.000	0.001
-0.021	0.000	0.015
-0.020	0.000	0.029
-0.019	0.000	0.043
-0.018	0.000	0.057
-0.017	0.000	0.070
-0.016	0.000	0.084
-0.015	0.000	0.098
-0.014	0.000	0.112
-0.013	0.000	0.125
-0.012	0.000	0.139
-0.011	0.000	0.153
-0.010	0.000	0.167
-0.009	0.000	0.181
-0.008	0.000	0.194
-0.007	0.000	0.208
-0.006	0.012	0.222
-0.005	0.026	0.236
-0.004	0.039	0.250
-0.003	0.053	0.263
-0.002	0.067	0.277

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Table 602  
Rudder Freeplay Limit

RUDDER FREEPLAY - INSPECTION		
Piston Rod Movement (inch)	Minimum Rudder Movement (inch)	Rudder Freeplay Limit (inch)
-0.001	0.081	0.291
0.000	0.095	0.305
0.001	0.108	0.319
0.002	0.122	0.332
0.003	0.136	0.346
0.004	0.150	0.360
0.005	0.164	0.374
0.006	0.177	0.388
0.007	0.191	0.401
0.008	0.205	0.415
0.009	0.219	0.429
0.010	0.233	0.443
0.011	0.246	0.457
0.012	0.260	0.470
0.013	0.274	0.484
0.014	0.288	0.498
0.015	0.302	0.512
0.016	0.315	0.526
0.017	0.329	0.539
0.018	0.343	0.553
0.019	0.357	0.567

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Table 602  
Rudder Freeplay Limit

RUDDER FREEPLAY - INSPECTION		
Piston Rod Movement (inch)	Minimum Rudder Movement (inch)	Rudder Freeplay Limit (inch)
0.020	0.371	0.581
0.021	0.384	0.595
0.022	0.398	0.608
0.023	0.412	0.622
0.024	0.426	0.636
0.025	0.440	0.650
0.026	0.453	0.664
0.027	0.467	0.677
0.028	0.481	0.691
0.029	0.495	0.705
0.030	0.509	0.719
0.031	0.522	0.733
0.032	0.536	0.746
0.033	0.550	0.760
0.034	0.564	0.774
0.035	0.578	0.788
0.036	0.591	0.802
0.037	0.605	0.815
0.038	0.619	0.829
0.039	0.633	0.843
0.040	0.647	0.857

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Table 602  
Rudder Freeplay Limit

RUDDER FREEPLAY - INSPECTION		
Piston Rod Movement (inch)	Minimum Rudder Movement (inch)	Rudder Freeplay Limit (inch)
0.041	0.660	0.871
0.042	0.674	0.884
0.043	0.688	0.898
0.044	0.702	0.912
0.045	0.716	0.926
0.046	0.729	0.940
0.047	0.743	0.953
0.048	0.757	0.967
0.049	0.771	0.981
0.050	0.785	0.995

S 866-199

**CAUTION:** MAKE SURE THAT YOU REMOVE THE EQUIPMENT YOU ATTACHED TO THE ELEVATOR PCA BEFORE YOU REMOVE HYDRAULIC POWER. DAMAGE TO EQUIPMENT CAN OCCUR.

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- (19) Do these steps to make sure that the rudder is clear to move:
- (a) Remove the dial indicator and the mounting device from the rudder PCA piston rod.
  - (b) Move the dial indicator and the mounting equipment away from the rudder trailing edge.
  - (c) Make sure the rudder is clear to move through its full travel.

S 866-106

- (20) Remove the power from the hydraulic system that was pressurized (AMM 29-11-00/201).

S 866-107

- (21) Move the applicable FLT CONTROL SHUTOFF L, R, or C switch on the P61 panel to OFF. Attach a DO-NOT-OPERATE tag and make sure the switch position light comes on.

**NOTE:** Make sure all the switches are in their OFF positions.

S 866-108

- (22) Make sure these circuit breakers on the P11 panel are open:
- (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 866-172

- (23) Remove rig pin R1 from the captain's rudder pedals. Remove rig pin R2 from the first officer's rudder pedals.

S 736-157

**WARNING:** MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE AWAY FROM THE RUDDER BEFORE YOU CHANGE HYDRAULIC SYSTEMS. RIGGING DIFFERENCES BETWEEN THE PCAs CAN CAUSE THE RUDDER TO MOVE SUDDENLY. INJURY TO PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (24) Do the rudder freeplay check again for each of the remaining PCAs. Make sure only one PCA (that is to be measured) is pressurized during the check.
- (a) Remove the dial indicator before you pressurize a different PCA.

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- (b) Make sure that only the applicable hydraulic system has power for each PCA.
- G. Put the Airplane Back to its Usual Condition.

S 086-185

- (1) Remove the dial indicators and mounting equipment from the rudder PCA and rudder trailing edge.

S 416-186

- (2) If you removed them, install the trailing edge beams (Figure 602).

S 416-187

- (3) Close access panels 324LL, 324ML, 324JL, 324KL, 324GL, and 324HL.

S 866-174

**WARNING:** THE AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE AWAY FROM THE CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C5, RUDDER TRIM
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT
  - (e) 11K17, RUDDER TRIM POS

S 866-158

- (5) Remove the DO-NOT-OPERATE tag from the rudder pedals.

S 866-051

- (6) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF L, R, and C switches on the P61 panel to ON.

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S 866-052

- (7) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

TASK 27-02-00-736-053

4. Aileron Freeplay - Check

A. Equipment

- (1) Dial Indicator - Accurate to 0.001 inch (0.03 mm)  
(2) Device to hold the dial indicator tightly against the fuselage.

**NOTE:** A magnetic base, and a flat piece of steel approximately 5 inches (127 mm) square is recommended.

- (3) Spring Force Scale, Push-Type - 0 to 150 Pound  
(0 - 667 newtons) Range

B. References

- (1) 24-22-00/201, Electrical Power - Control  
(2) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones  
567/667 Outboard Aileron  
556/656 Inboard Aileron

D. Prepare for the Inspection/Check

S 866-054

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

S 866-040

**WARNING:** THE AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND THE STABILIZER ARE FULLY POWERED SURFACES. MAKE SURE THAT ALL EQUIPMENT AND PERSONS ARE AWAY FROM THE CONTROL SURFACES BEFORE YOU SUPPLY THE HYDRAULIC POWER. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Supply pressure to the left, right, and center hydraulic systems (Ref 29-11-00/201).

S 826-056

- (3) Operate the aileron trim switches on the aft electronic control panel, P8, until the aileron trim indicator shows zero units of trim.

S 866-110

- (4) Attach DO-NOT-OPERATE tags to the two control wheels.

S 866-111

- (5) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00/201).

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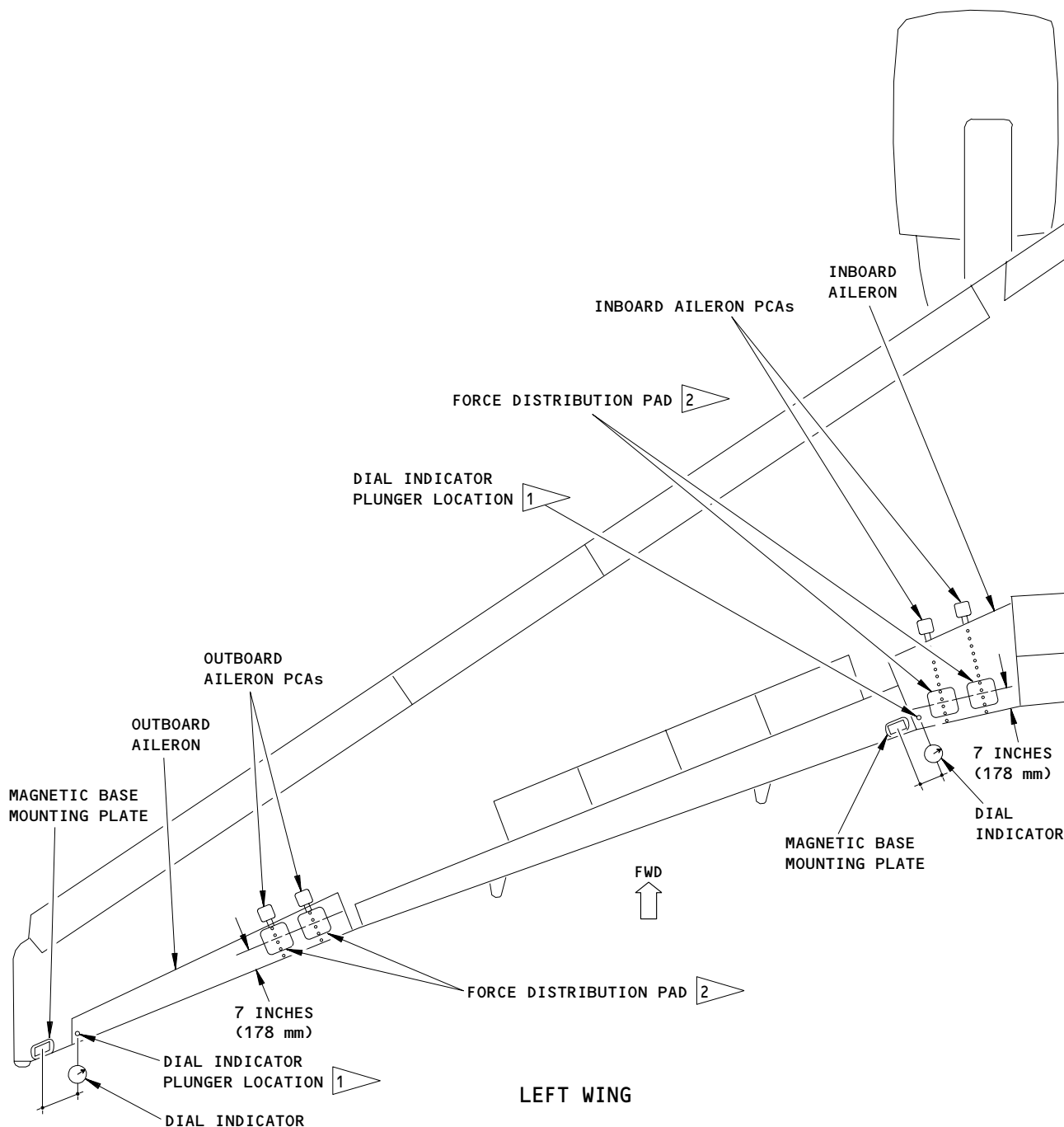
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- 1 THE LOCATION OF THE DIAL INDICATOR PLUNGERS IS 1.0 INCH (25 mm) INBOARD OF THE AILERON OUTBOARD EDGE AND 1.0 INCH (25 mm) FORWARD OF THE TRAILING EDGE OF THE OUTBOARD CORNER OF THE AILERON.
- 2 THE FORCE DISTRIBUTION PADS SHOULD BE ATTACHED TO THE TOP AND BOTTOM OF THE AILERON. THE FORCES SHOULD BE APPLIED NEAR THIS LOCATION ON THE CENTER OF THE FORCE DISTRIBUTION PADS.

Inboard and Outboard Aileron Freeplay Check  
Figure 603

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S 866-112

- (6) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 866-113

- (7) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT

E. Inboard Aileron Freeplay - Check (Fig. 603)

S 866-114

**WARNING:** THE AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND THE STABILIZER ARE FULLY POWERED SURFACES. MAKE SURE THAT ALL EQUIPMENT AND PERSONS ARE AWAY FROM THE CONTROL SURFACES BEFORE YOU SUPPLY THE HYDRAULIC POWER. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Do the applicable group of steps to supply hydraulic power to one of the two inboard aileron PCAs:
- (a) Do these steps to supply power to the inboard PCAs for the two inboard ailerons:
    - 1) Supply pressure to the center hydraulic system (Ref 29-11-00/201).
    - 2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
      - a) 11H16, FLT CONT SHUTOFF WING CTR
    - 3) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF WING C switch on the P61 panel to ON.
  - (b) Do these steps to supply power to the outboard PCA for the right inboard aileron:
    - 1) Supply pressure to the right hydraulic system (Ref 29-11-00/201).

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- 2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - a) 11H26, FLT CONT SHUTOFF WING RIGHT
- 3) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF WING R switch on the P61 panel to ON.
- (c) Do these steps to supply power to the outboard PCA for the left inboard aileron:
  - 1) Supply pressure to the left hydraulic system (Ref 29-11-00/201).
  - 2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - a) 11H15, FLT CONT SHUTOFF WING LEFT
  - 3) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF WING L switch on the P61 panel to ON.

S 866-115

- (2) Stop for three minutes to let the aileron position become stable.

S 226-060

**CAUTION:** USE SUFFICIENT PADDING ON THE FORCE SCALE TO PREVENT DAMAGE TO THE AILERON SURFACE. USE A PAD THAT IS AT LEAST 5 INCHES (127 mm) LONG AND HAS A WIDTH OF AT LEAST 5 INCHES (127 mm).

- (3) Use the force scale to apply a 25-pound (111 Newton) force to the top of the inboard aileron. Apply this force on the aileron rib opposite the outboard PCA and approximately 11 inches (280 mm) forward of the trailing edge.

S 866-116

- (4) Slowly remove the 25-pound (111 Newtons) force.

S 486-136

**CAUTION:** USE A DIAL INDICATOR WITH AT LEAST 1 INCH (25 MM) OF TRAVEL TO PREVENT DAMAGE TO THE INDICATOR.

- (5) Attach a dial indicator mounting device on the outboard flap trailing edge surface (flaps fully retracted) adjacent to the inboard aileron trailing edge, and do these steps:
  - (a) Put the indicator plunger on the aileron trailing edge as shown in Fig. 603.
  - (b) Adjust the dial indicator to zero.

S 226-062

**CAUTION:** USE SUFFICIENT PADDING ON THE FORCE SCALE TO PREVENT DAMAGE TO THE AILERON SURFACE. USE A PAD THAT IS AT LEAST 5 INCHES (127 MM) LONG AND HAS A WIDTH OF AT LEAST 5 INCHES (127 MM).

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- (6) Use the force scale to apply a 65-pound (289 Newtons) force to the bottom of the inboard aileron. Apply this force on the aileron rib opposite the outboard PCA and approximately 7 inches (178 mm) forward of the trailing edge.

S 226-141

- (7) Keep the force constant until the dial indicator value becomes stable.

S 866-117

- (8) Make sure the aileron freeplay (movement) is not more than 0.58 inch (14.7 mm).

S 866-118

- (9) Remove the 65-pound (289 Newtons) force.

S 226-142

- (10) Do the freeplay check again and do these checks:  
(a) Make sure the dial indicator base did not move.  
(b) Make sure the last measurement is approximately the same as the first.

S 866-119

- (11) Remove the power from the hydraulic system that was pressurized (Ref 29-11-00/201).

S 866-120

- (12) Move the applicable FLT CONTROL SHUTOFF WING L, R, or C switch on the P61 panel to OFF. Attach a DO-NOT-OPERATE tag and make sure the switch position light comes on.

NOTE: All the switches must be in their OFF positions.

S 866-121

- (13) Make sure these circuit breakers on the P11 panel are open:  
(a) 11H15, FLT CONT SHUTOFF WING LEFT

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- (b) 11H16, FLT CONT SHUTOFF WING CTR
- (c) 11H26, FLT CONT SHUTOFF WING RIGHT

S 736-122

- (14) Do the freeplay check again for each of the remaining PCAs. Make sure only one PCA (for each aileron) is pressurized during the check.

F. Outboard Aileron Freeplay - Check (Fig. 603)

S 866-123

**WARNING:** THE AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND THE STABILIZER ARE FULLY POWERED SURFACES. MAKE SURE THAT ALL EQUIPMENT AND PERSONS ARE AWAY FROM THE CONTROL SURFACES BEFORE YOU SUPPLY THE HYDRAULIC POWER. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Do the applicable group of steps to supply hydraulic power to one of the two outboard aileron PCAs:
  - (a) Do these steps to supply power to the outboard PCA for the right aileron and the inboard PCA for the left aileron:
    - 1) Supply pressure to the left hydraulic system (Ref 29-11-00/201).
    - 2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
      - a) 11H15, FLT CONT SHUTOFF WING LEFT
    - 3) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF WING L switch on the P61 panel to ON.
  - (b) Do these steps to supply power to the inboard PCA for the right aileron and the outboard PCA for the left aileron:
    - 1) Supply pressure to the right hydraulic system (Ref 29-11-00/201).
    - 2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
      - a) 11H26, FLT CONT SHUTOFF WING RIGHT

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- 3) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF WING R switch on the P61 panel to ON.

S 866-124

- (2) Stop for three minutes to let the aileron position become stable.

S 226-125

**CAUTION:** USE SUFFICIENT PADDING ON THE FORCE SCALE TO PREVENT DAMAGE TO THE AILERON SURFACE. USE A PAD THAT IS AT LEAST 5 INCHES (127 mm) LONG AND HAS A WIDTH OF AT LEAST 5 INCHES (127 mm).

- (3) Use the force scale to apply a 25-pound (111 Newtons) force to the top of the outboard aileron. Apply this force on the aileron rib opposite the outboard PCA and approximately 3 inches (76 mm) forward of the trailing edge.

S 226-061

**CAUTION:** USE A DIAL INDICATOR WITH AT LEAST 1 INCH OF TRAVEL TO PREVENT DAMAGE TO THE INDICATOR.

- (4) Attach a dial indicator mounting device on the top wing tip structure adjacent to the outboard aileron trailing edge, and do these steps (Fig. 603):

**NOTE:** You can attach the dial indicator mounting device on the top wing surface, between the aileron and the flap, to take freeplay measurements at the opposite aileron lower corner.

- (a) Put the indicator plunger on the aileron trailing edge as shown in Fig. 603.
- (b) Adjust the dial indicator to zero.

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S 866-126

- (5) Slowly remove the 25-pound (111 Newtons) force.

S 226-127

**CAUTION:** USE SUFFICIENT PADDING ON THE FORCE SCALE TO PREVENT DAMAGE TO THE AILERON SURFACE. USE A PAD THAT IS AT LEAST 5 INCHES (127 mm) LONG AND HAS A WIDTH OF AT LEAST 5 INCHES (127 mm).

- (6) Use the force scale to apply a 25-pound (111 Newtons) force to the bottom of the outboard aileron. Apply this force on the aileron rib opposite the outboard PCA and approximately 3 inches (76 mm) forward of the trailing edge.

S 866-143

- (7) Keep the force constant until the dial indicator value becomes stable.

S 226-137

- (8) Make sure the outboard aileron freeplay (movement) is not more than 0.22 inch (5.6 mm).

S 866-128

- (9) Remove the force from the bottom of the outboard aileron.

S 226-144

- (10) Do the freeplay check again and do these checks:  
(a) Make sure the dial indicator base did not move.  
(b) Make sure the last measurement is approximately the same as the first.

S 866-129

- (11) Remove the power from the hydraulic system that was pressurized (Ref 29-11-00/201).

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S 866-138

- (12) Move the applicable FLT CONTROL SHUTOFF WING L or R switch on the P61 panel to OFF. Attach a DO-NOT-OPERATE tag and make sure the switch position light comes on.

NOTE: Make sure all the switches are in their OFF positions.

S 216-139

- (13) Make sure these circuit breakers on the P11 panel are open:
  - (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT

S 736-130

- (14) Do the freeplay check again for each of the remaining PCAs. Make sure only one PCA (for each aileron) is pressurized during the check.

G. Put the Airplane Back to its Usual Condition

S 866-063

- (1) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00/201).

S 866-133

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT

S 866-132

- (3) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the P61 panel to ON.

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- S 866-134
- (4) Remove the DO-NOT-OPERATE tags from the control wheels.
- S 866-147
- (5) Remove electrical power if it is not necessary (Ref 24-22-00/201).

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STABILIZER TRIM ACTUATOR INSPECTION – MAINTENANCE PRACTICES

TASK 27-05-03-212-802

1. Stabilizer Trim Actuator

A. General

(1) This procedure is a scheduled maintenance task.

B. Inspection

S 212-002

(1) Do the inspection.

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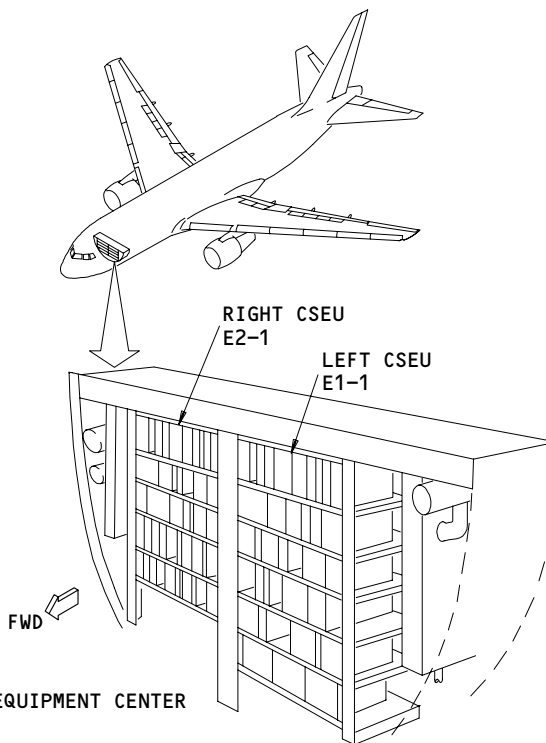
FLIGHT CONTROL SYSTEM ELECTRONICS UNIT (CSEU) – DESCRIPTION AND OPERATION

1. General (Fig. 1)

- A. The Control System Electronics Unit (CSEU) is a collection of twelve flight control modules and four power supply modules. The CSEU is energized by its own power supply modules.
- B. The CSEU interfaces with other primary airplane systems to provide the computation and control functions for yaw damping (AMM 22-21-00), stabilizer trim (AMM 27-41-00), aileron lockout (AMM 27-11-00), rudder control authority (AMM 27-21-00), and spoiler deployment (AMM 27-61-00).

LEFT CSEU MODULES  
(RIGHT CSEU SIMILAR)

- YAW DAMPER MODULE L
- RUDDER RATIO CHANGER MODULE L
- STAB TRIM AND AIL LOCKOUT MODULE L
- SPOILER CONTROL MODULE NO.1 L
- SPOILER CONTROL MODULE NO.2 L
- SPOILER CONTROL MODULE NO.3 L
- POWER SUPPLY MODULE NO.1 L
- POWER SUPPLY MODULE NO.2 L



Flight Control System Electronics Unit (CSEU)  
Figure 1

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- C. The system consists of independent left and right CSEUs which contain eight modules. All modules are line replaceable units (LRU). Equivalent modules can be changed between equivalent shelf positions on the left and right CSEUs.
- D. The left CSEU is on the E1-1 shelf, and the right CSEU is on the E2-1 shelf. These shelves are found in the main equipment center. Access is thru the electronics access door, 119AL, found on the bottom of the fuselage, aft of the nose wheel well.
- E. The CSEU consists of the following modules:
  - (1) Yaw damper module (YDM) (M522 LH, M523 RH)
  - (2) Rudder ratio changer module (RRC) (M528 LH, M529 RH)
  - (3) Stabilizer trim and aileron lockout module (SAM) (M524 LH, M525 RH)
  - (4) Spoiler control module (SCM)  
(M530, M531, M532 LH; M533, M534, M535 RH)
  - (5) Power supply module (PSM) (M536, M537 LH; M538, M539 RH)
- F. The CSEU modules provide the electrical interface between the sensors and the signal sources. These include the air/ground logic sensors, and hydraulic pressure sense signals, the pilot's and first officer's flight control transducers, and the control surfaces transducers and actuators.
- G. Built-In-Test Equipment (BITE) in the CSEU modules supply continuous monitor features specified for the monitor circuits. When the CSEU is powered, the background is continuously monitored for faults, and the inflight failure data is stored.

2. Component Details (Fig. 2)

A. Yaw Damper Module (YDM)

- (1) The YDM receives electrical input information from the Inertial Reference System (IRS) and the Air Data Computing System (ADCS). When the airplane is in the air, the YDM controls the rudder to inhibit dutch roll (yaw combined with roll) oscillation, and to provide turn coordination. Two YDMs are installed. One supplements the other. If one YDM fails, the other YDM takes over all control functions. Refer to AMM 22-21-00 for more information.

(2) 767-300;

The YDM also receives electrical input information from the Modal Suppression Accelerometer.

B. Rudder Ratio Changer (RRC) Module

- (1) The RRC module varies rudder control authority as a function of airplane speed. Two RRCs are installed. One RRC is always in control and the other is on standby. If one RRC fails, the other RRC takes over the control functions. The RRC uses airspeed inputs from the ADCS and the SAMs to control rudder deflection. Refer to AMM 27-21-00 for more information.

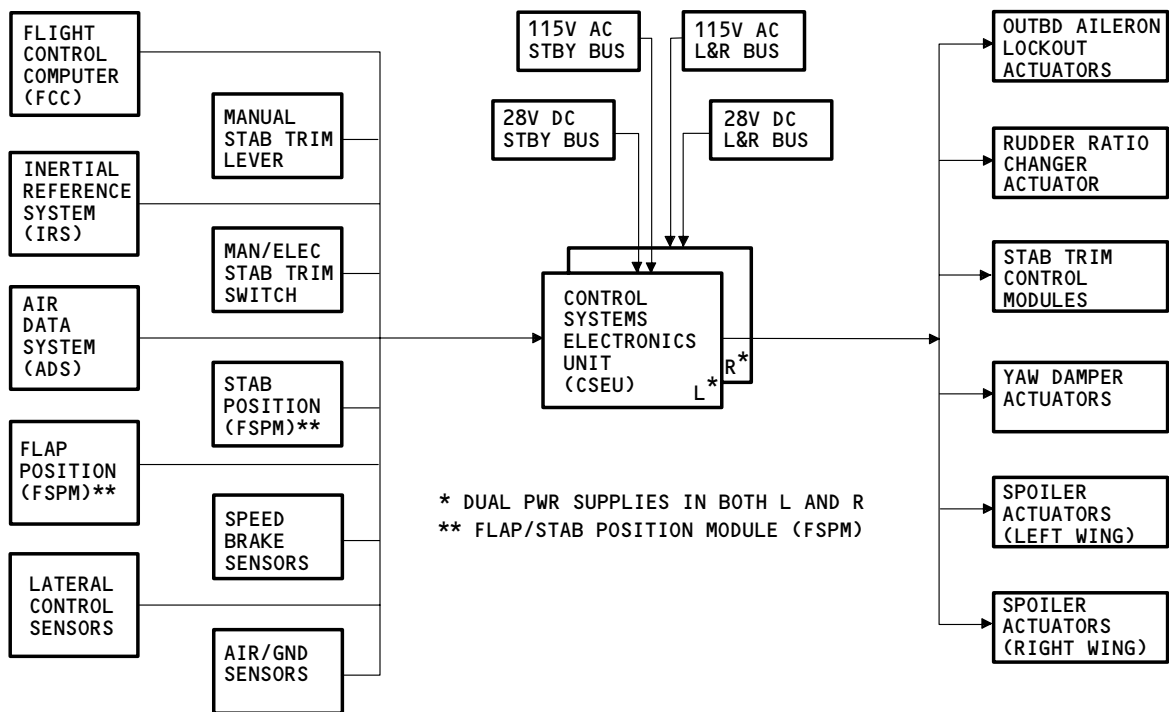
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CSEU System Interface  
Figure 2

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C. Stabilizer Trim and Aileron Lockout Module (SAM)

(1) 767-200;

The SAM supplies stabilizer trim control and outboard aileron lockout functions relative to the airspeed, and airspeed output data to the RRC. Two SAMs are installed. One SAM is always in control and the other is on standby. If one SAM fails, the other SAM switches over when the airplane is in the mach trim mode, or if two or more flight control computers (FCC) are engaged.

(2) 767-300;

The SAM supplies stabilizer trim control and outboard aileron lockout functions relative to the airspeed, and the airspeed output data to the RRC. Two SAMs are installed. One SAM is in control, the other SAM is on standby during half-speed autotrim or mach trim operation. If one SAM fails, the other SAM will switch over. The two SAMs must operate simultaneously for full-rate autotrim and full-rate electric trim operations.

(3) The SAM gets ADCS inputs and supplies its outputs to the aileron lockout actuators to engage or disengage the outboard ailerons from aileron control. Electrical information supplied from the FCC, ADCS, flap and stabilizer position modules (FSPM), stabilizer trim control modules (STCM), and captain's and first officer's trim switches, controls the stabilizer trim operation. Refer to AMM 27-41-00 and AMM 27-11-00 for more information.

D. Spoiler Control Module (SCM)

(1) A total of six SCMs are installed. Each SCM controls a symmetrical pair of spoilers, one on the left wing and one on the right wing. The spoilers are deployed during flight or landing to reduce lift and increase drag.

(2) The SCMs are part of the airplane's lateral control and speedbrake systems. Inputs to the pilot's or first officer's control wheel, or the speedbrake handle cause transducers to send electrical signals to the SCMs. The SCMs then send the applicable signals to the spoilers' power control actuators (PCA) for spoiler deployment.

(3) Each SCM must be fully operational. If the first channel of the SCM fails, the SCM switches to its second channel for continued operation.

(4) The SCM uses lateral control, speedbrake, and air/ground sensors for the lateral control and speedbrake operation. Refer to AMM 27-61-00 for more information.

(5) The newer model SCMs have a BITE display on the front panel and will be referred to as the -200 series SCMs. The older model SCMs have faultballs and will be referred to as the -100 series SCMs.

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- (6) In an airplane that has both -200 and -100 series SCMs installed, the most effective maintenance occurs when you have at least one -200 series SCM installed on each shelf.
  - (7) A -200 series SCM is recommended for installation at a shelf position where intermittent problems occur, or when it is necessary to replace an SCM during the fault isolation procedure, to make use of its expanded capacity for fault detection and fault isolation.
- E. Power Supply Module (PSM)
- (1) The PSM supplies the CSEU with the necessary dc regulated and ac unregulated power. A total of four PSMs (two for the left CSEU and two for the right CSEU) are installed.
  - (2) The two PSMs in each CSEU use power combining (dc) and power changeover (ac) networks to make sure there is continuity to the CSEU loads if one PSM fails. Either PSM can carry the entire CSEU load. However, there is no power combining between the left CSEU PSMs (M536, M537) and the right CSEU PSMs (M538, M539).
  - (3) The PSMs (M536, M537) for the left CSEU receive the 28-volt dc and 115-volt ac power sources from the dc and ac standby buses. The PSMs (M538, M539) for the right CSEU receive the 28-volt dc and 115-volt ac power sources from the main left and right dc and ac buses.
  - (4) Power generated by the PSMs also supplies the linear variable differential transformers (LVDT), and the rotary variable differential transformers (RVDT), for the position monitor and feedback function of the applicable flight controls and control surfaces. The LVDTs and the RVDTs are frequently referred to as the transducers.

### 3. Operation

#### A. Functional Description

- (1) CSEU power supply module distribution (Fig. 3)
  - (a) Two interchangeable PSMs provide each CSEU with unregulated 26 volt ac for LVDT excitation, the unregulated 28 volt dc for internal power supply monitoring, and the regulated plus and minus 15-volt dc and the plus 5-volt dc for logic card power requirements.
  - (b) Each PSM is equipped to electrically monitor its own outputs and provide power status signals to the warning and control circuits. Three power status discrete signals are PSM FAIL, PSM VALID and PSM RESET.
  - (c) The PSM FAIL discrete monitors the PSM circuits failures. The PSM VALID discrete monitors the regulated dc power supply for out of tolerance conditions. The PSM RESET discrete provides the SAM and YDM with advance warning of the loss of dc voltage regulation.
  - (d) Power Supply Module (PSMs) are powered by the airplane 115v ac, 400 Hz power bus. PSM internal monitor circuitry is powered by the 28v dc bus.
  - (e) The PSMs supply power to these components:
    - 1) Stabilizer Trim/Aileron Lockout Module
    - 2) Spoiler Control Module
    - 3) Yaw Damper Module

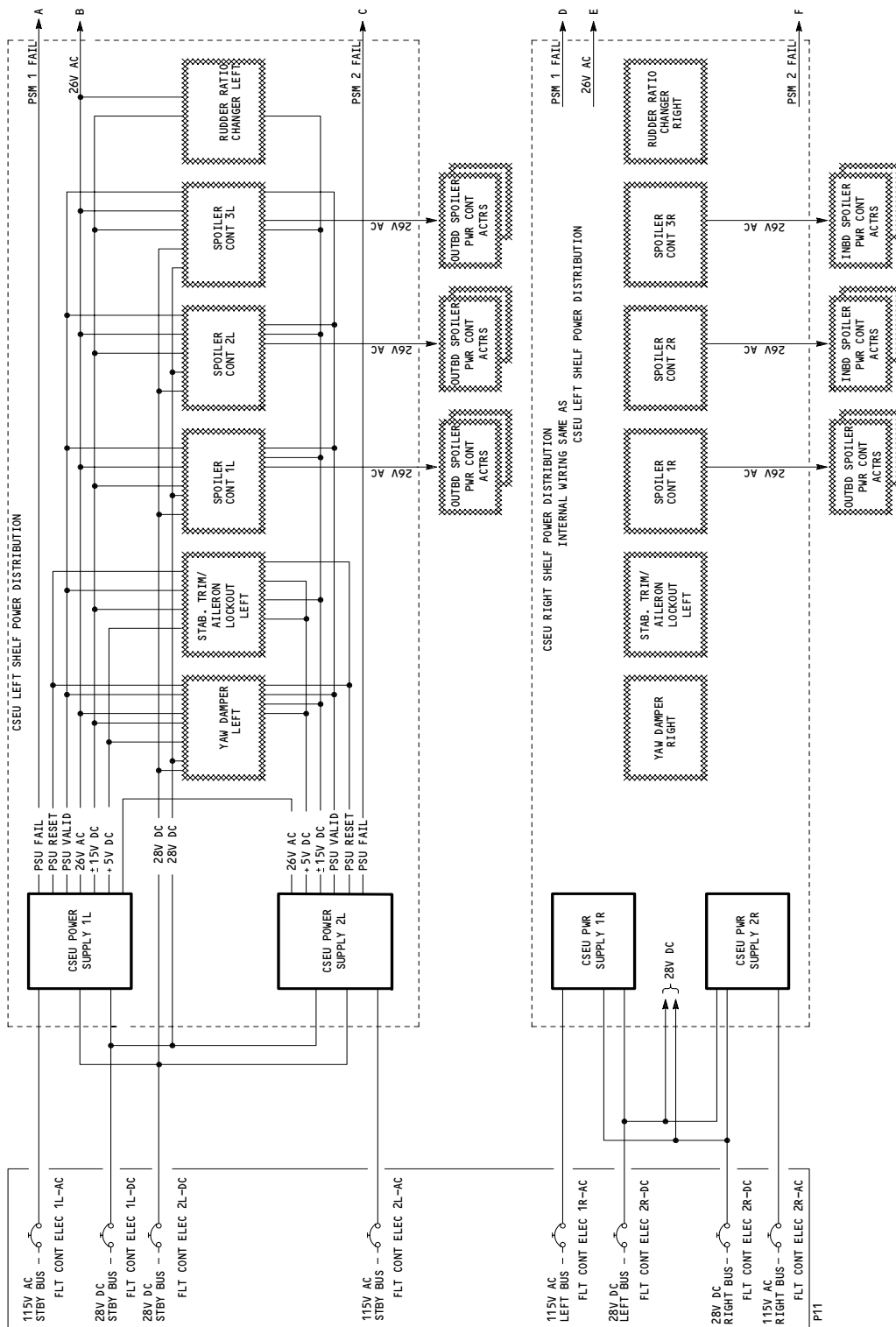
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CSEU Power Distribution Schematic  
Figure 3 (Sheet 1)

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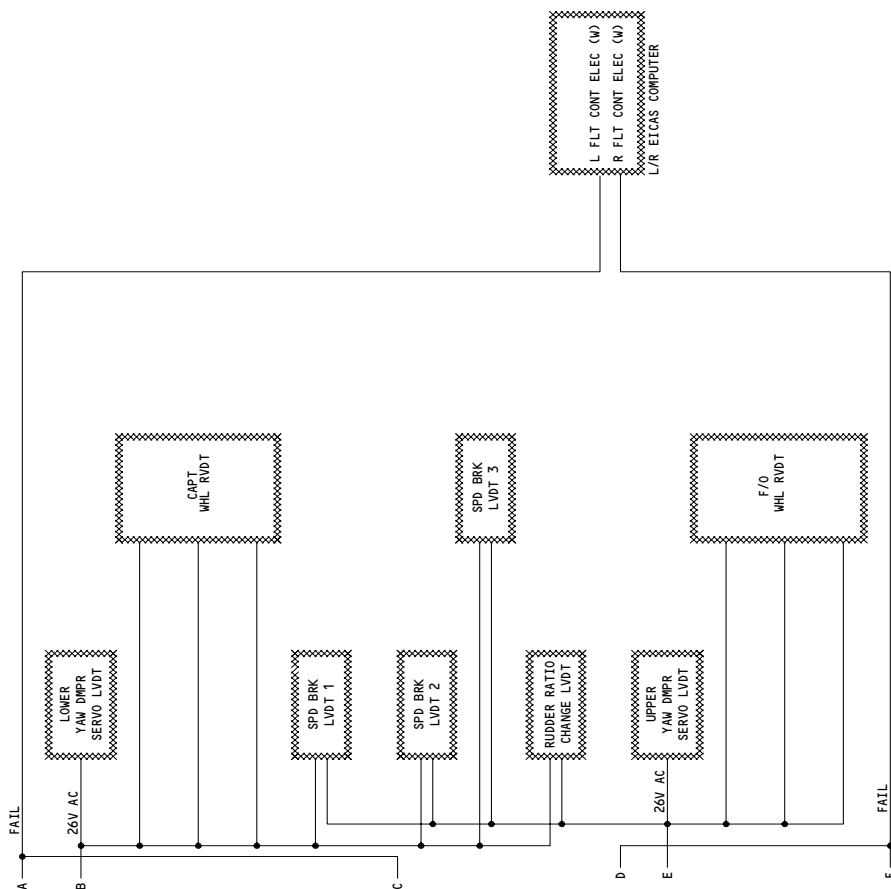
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CSEU Power Distribution Schematic  
Figure 3 (Sheet 2)

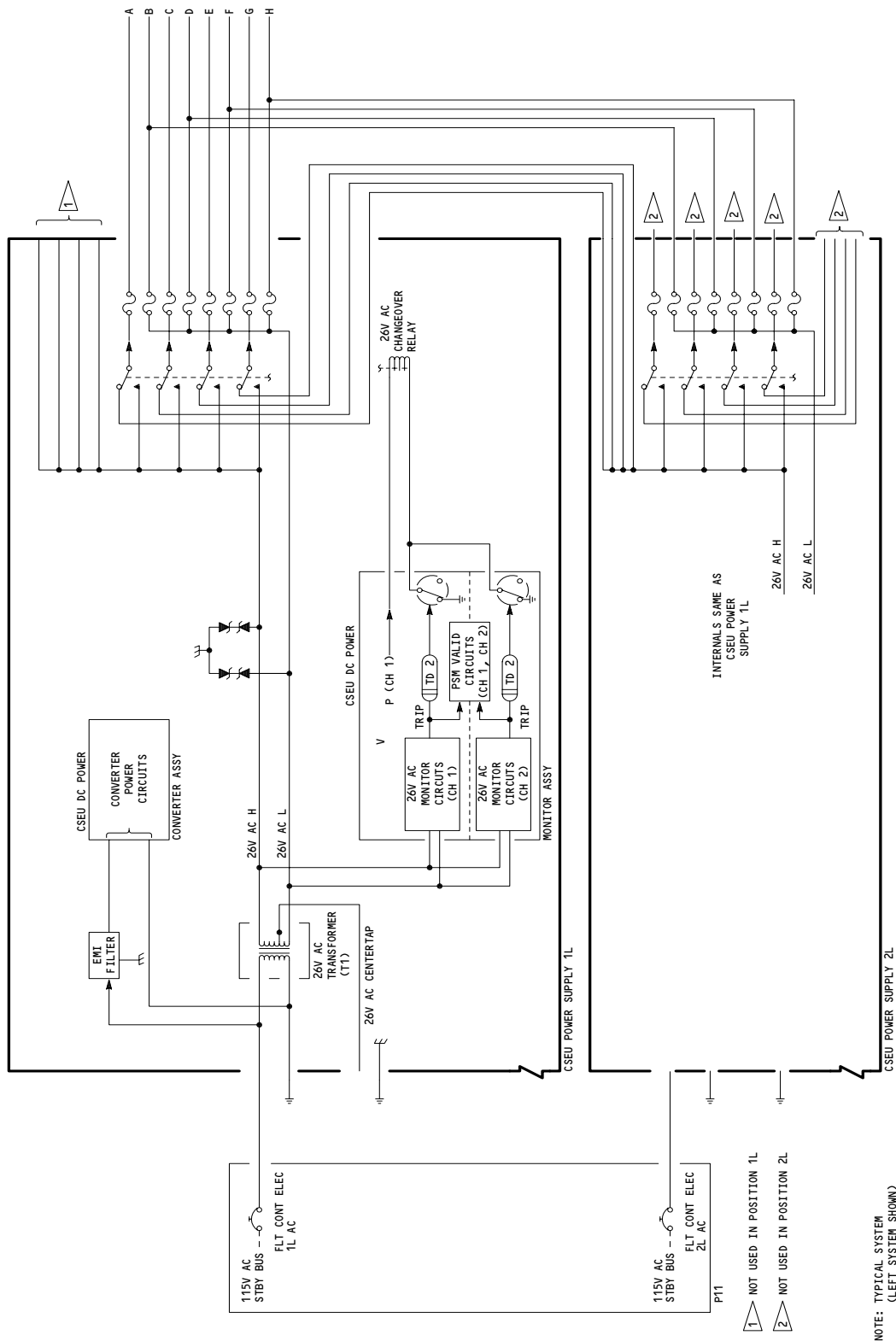
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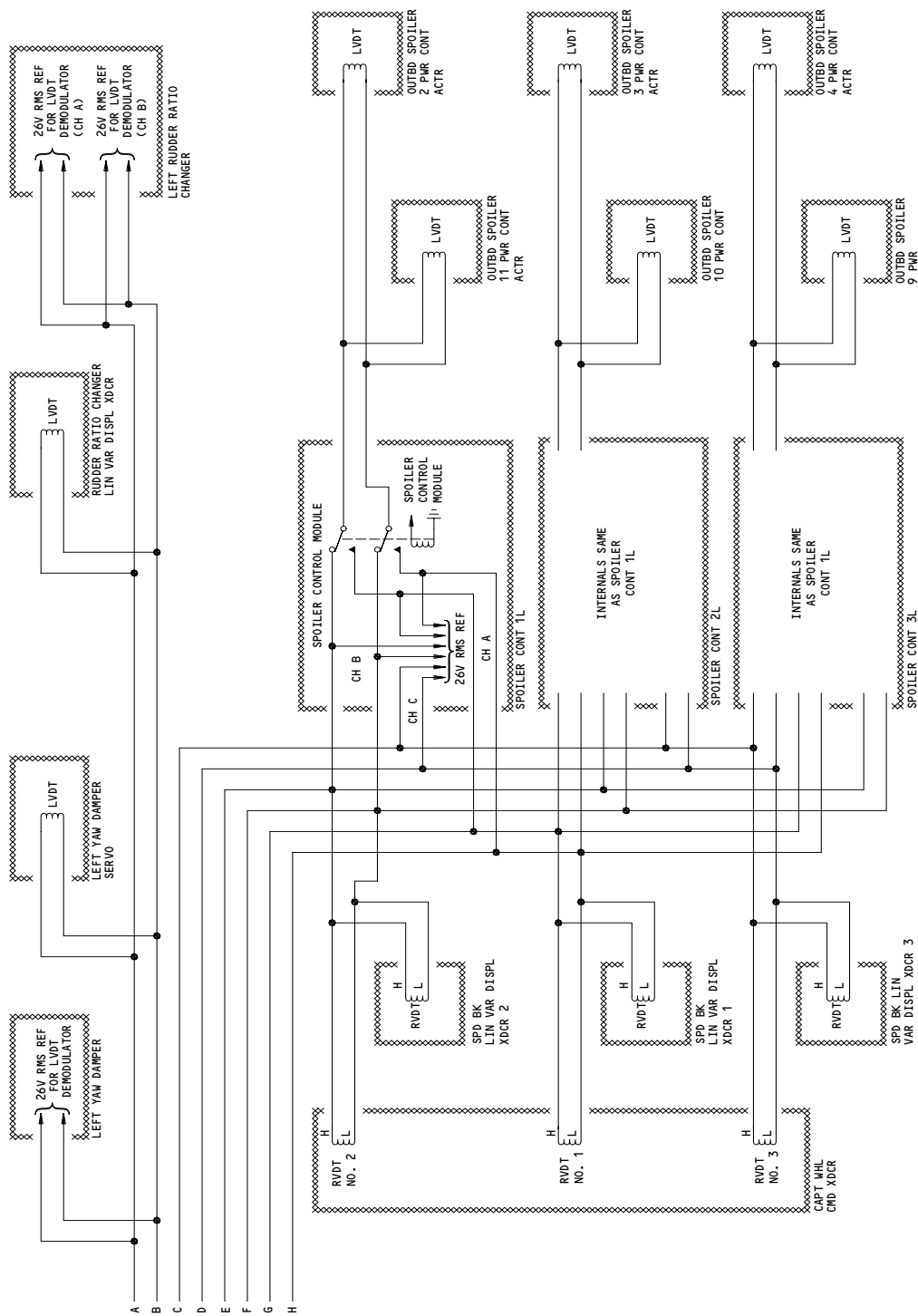
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CSEU AC Power Schematic  
Figure 4 (Sheet 1)

EFFECTIVITY  
-103 POWER SUPPLY MODULE

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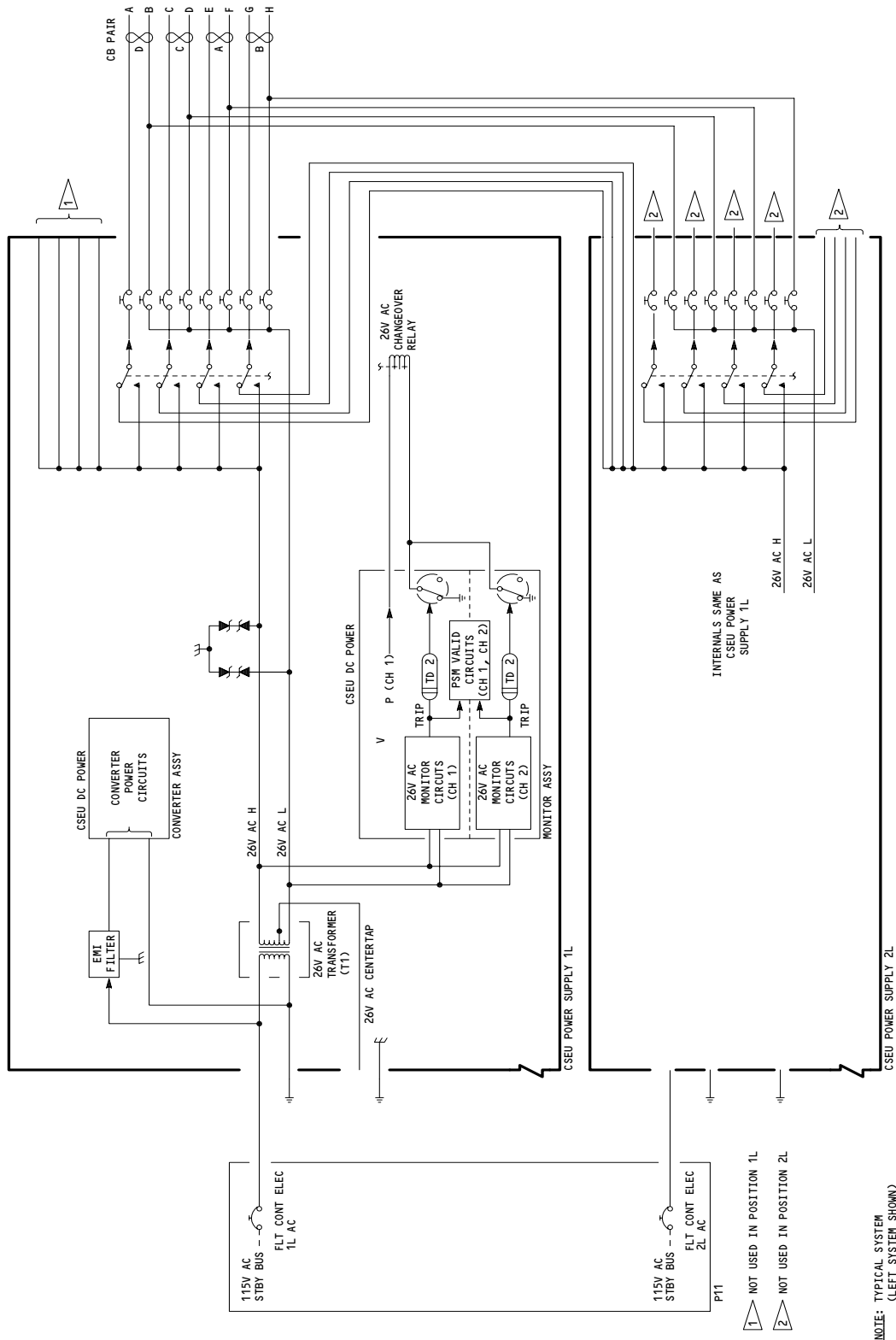


NOTE: TYPICAL SYSTEM (LEFT SYSTEM SHOW)

CSEU AC Power Schematic  
Figure 4 (Sheet 2)

EFFECTIVITY  
-103 POWER SUPPLY MODULE

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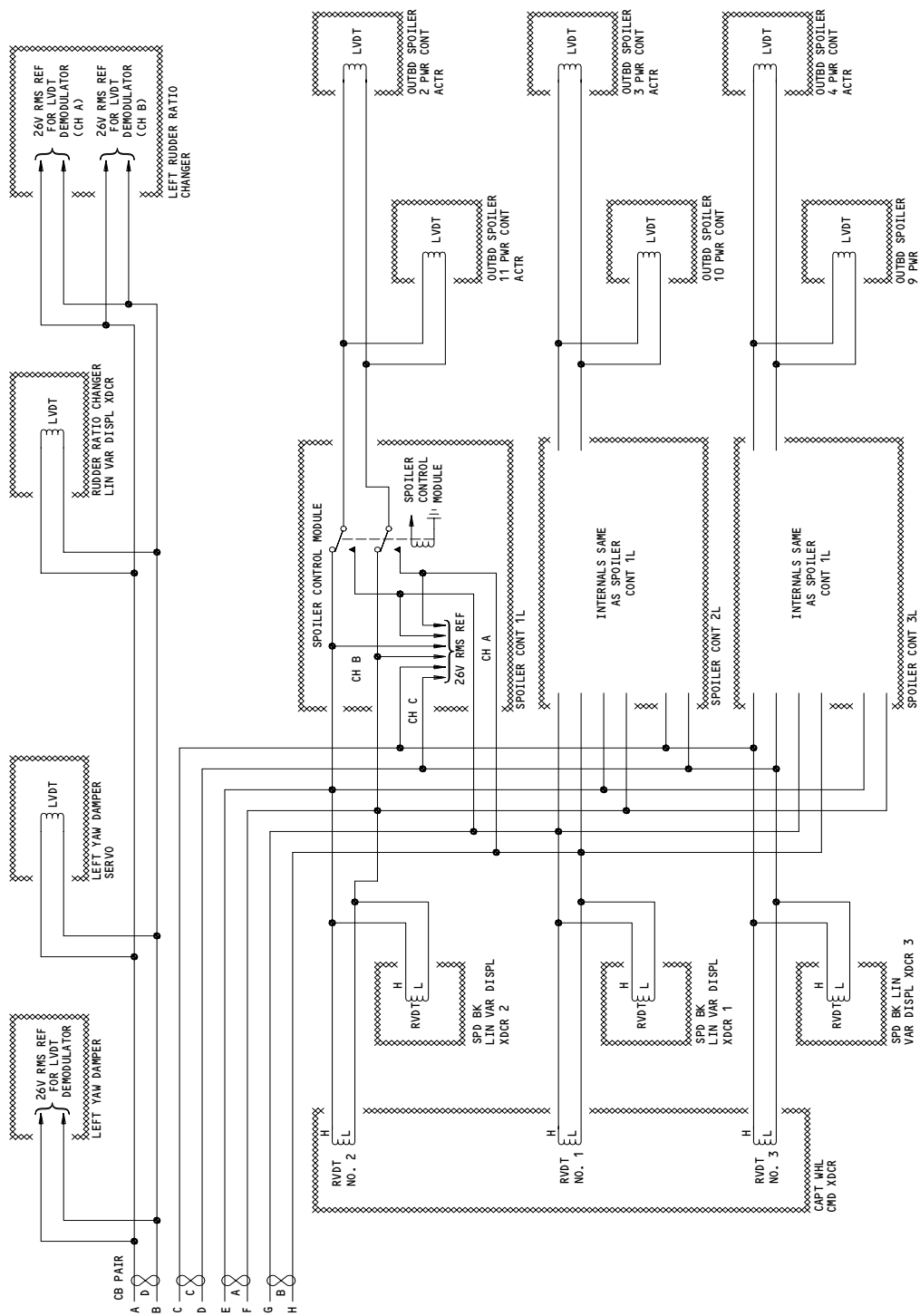


CSEU AC Power Schematic  
Figure 4 (Sheet 3)

NOTE: TYPICAL SYSTEM  
(LEFT SYSTEM SHOWN)

EFFECTIVITY  
-104 POWER SUPPLY MODULES

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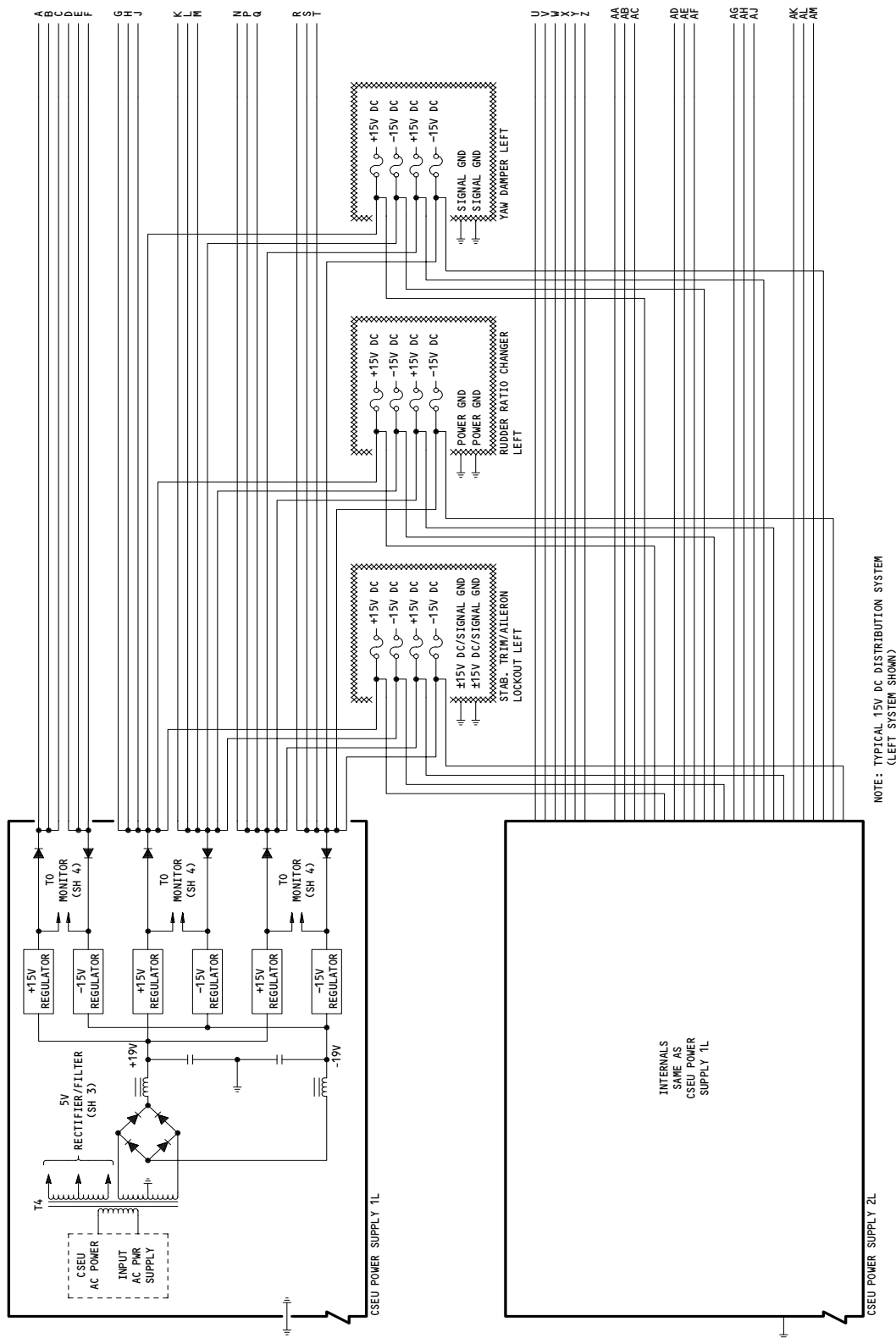


NOTE: TYPICAL SYSTEM (LEFT SYSTEM SHOW)

CSEU AC Power Schematic  
Figure 4 (Sheet 4)

EFFECTIVITY  
-104 POWER SUPPLY MODULES

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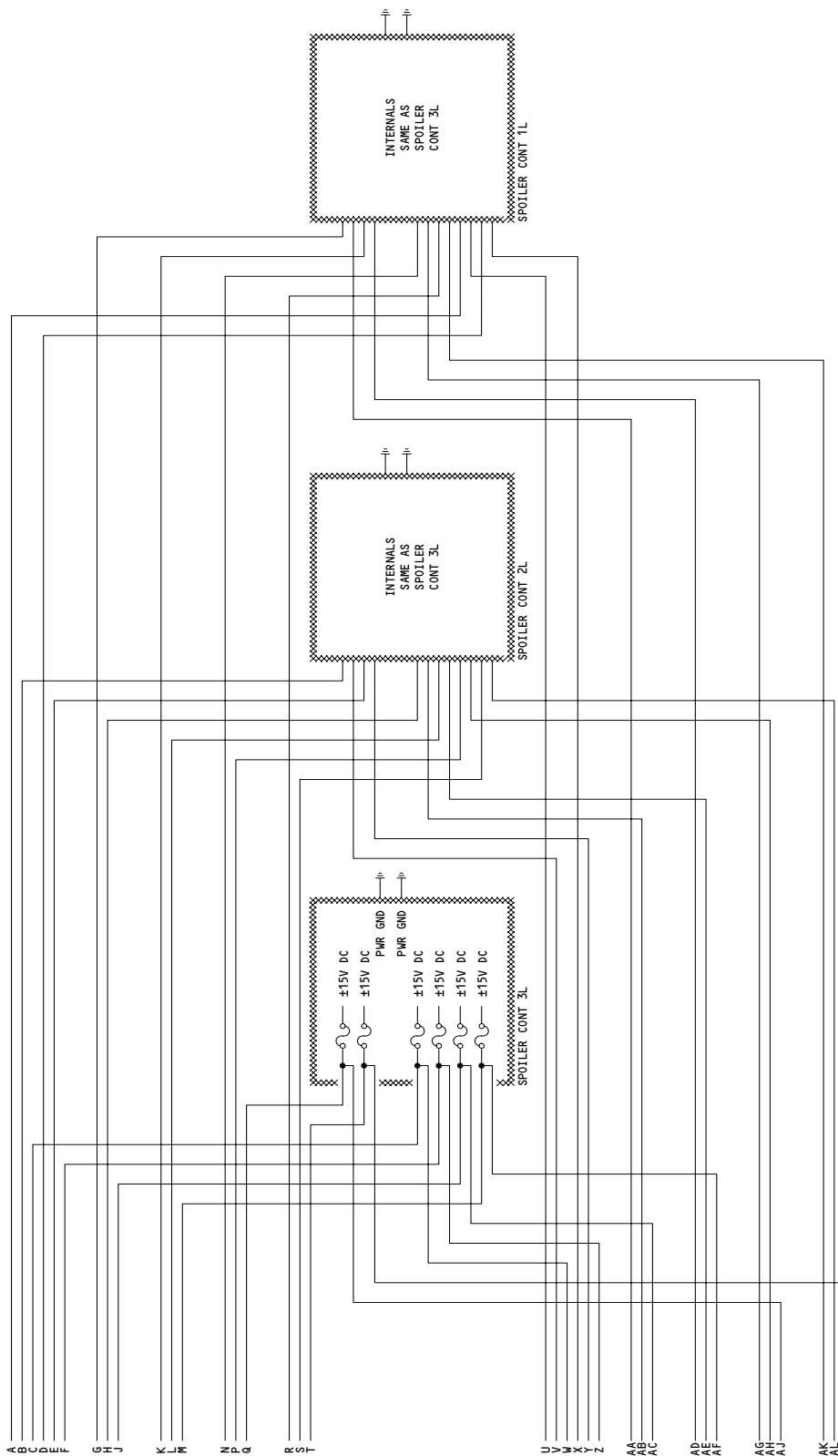


NOTE: TYPICAL 15V DC DISTRIBUTION SYSTEM (LEFT SYSTEM SHOWN)

CSEU DC Power Schematic  
Figure 5 (Sheet 1)

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NOTE: EXAMPLE SYSTEM  
(THE LEFT SYSTEM IS SHOWN)

CSEU DC Power Schematic  
Figure 5 (Sheet 2)

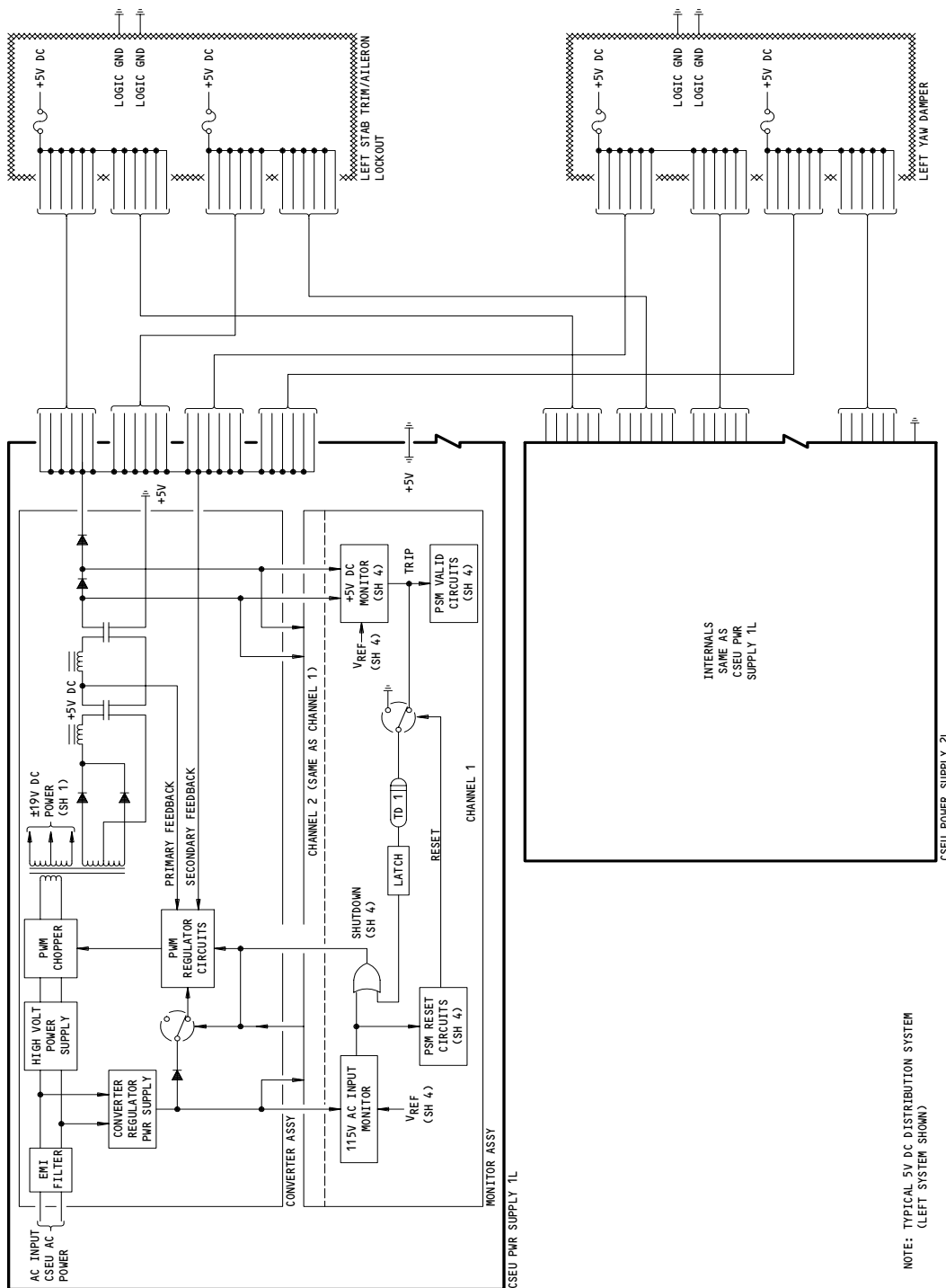
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NOTE: TYPICAL 5V DC DISTRIBUTION SYSTEM  
(LEFT SYSTEM SHOWN)

CSEU DC Power Schematic  
Figure 5 (Sheet 3)

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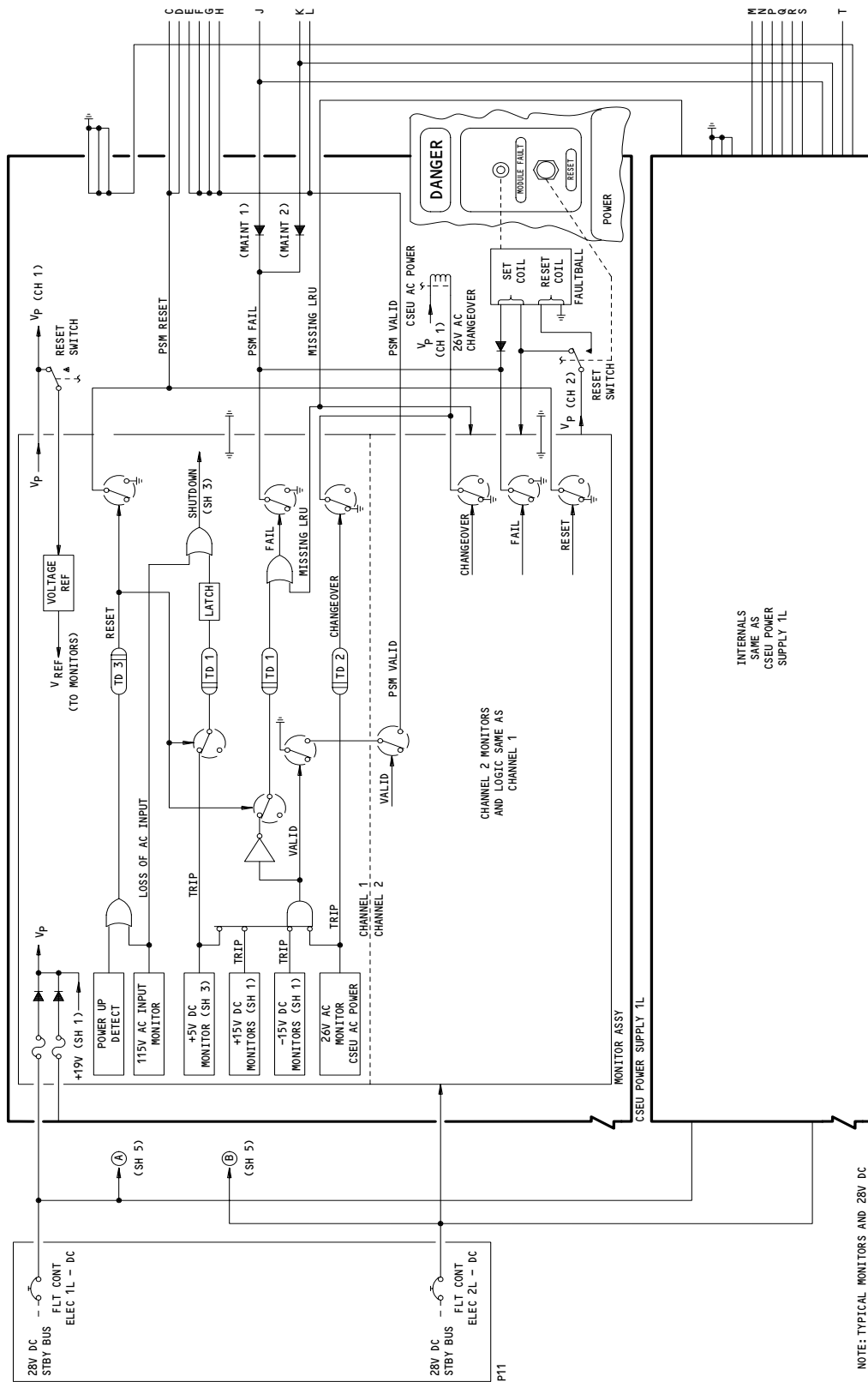
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NOTE: TYPICAL MONITORS AND 28V DC DISTRIBUTION SYSTEM (LEFT SYSTEM SHOWN)

CSEU DC Power Schematic  
Figure 5 (Sheet 4)

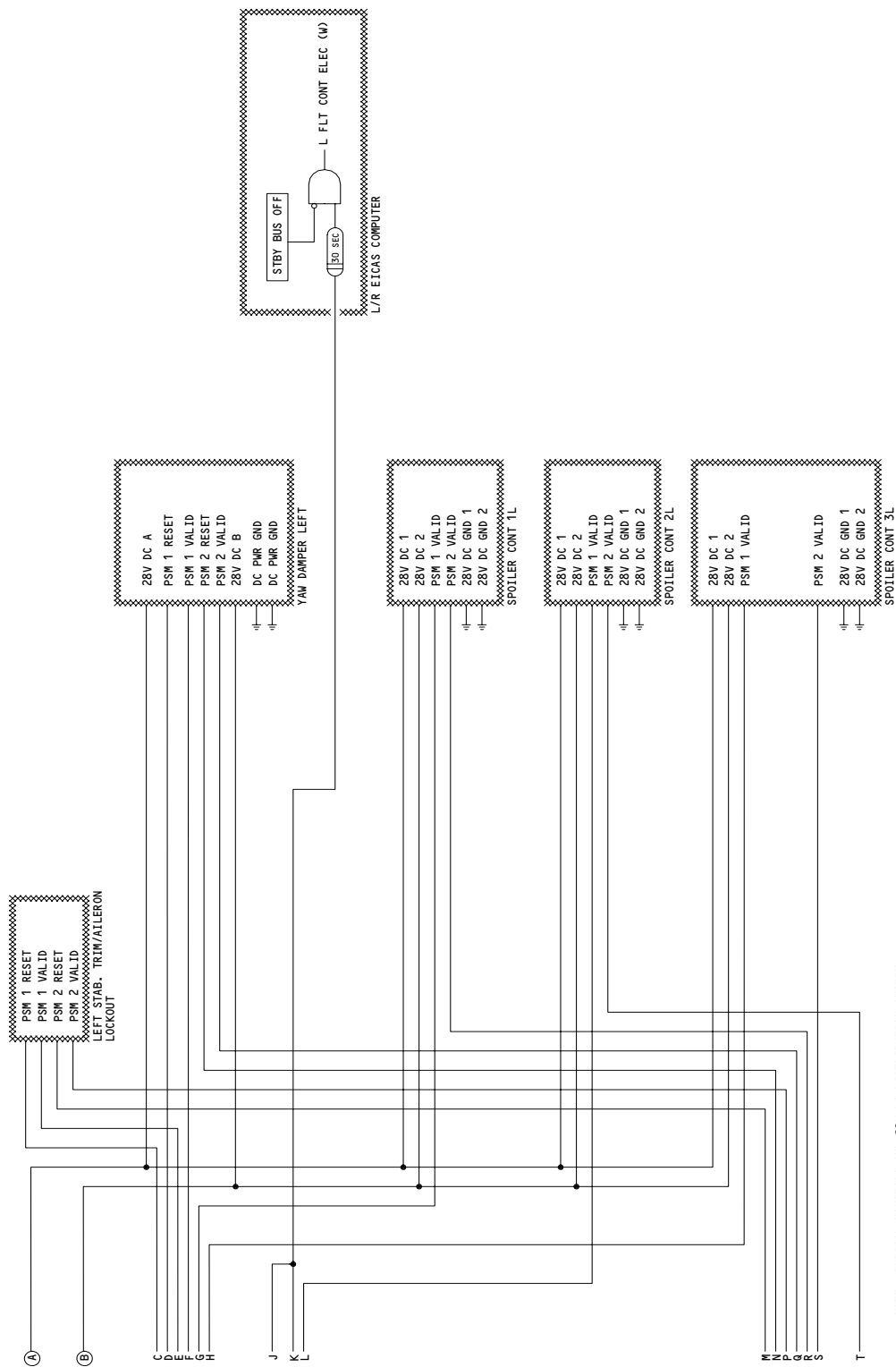
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NOTE: TYPICAL MONITORS AND 28V DC DISTRIBUTION SYSTEM (LEFT SYSTEM SHOWN)

CSEU DC Power Schematic  
Figure 5 (Sheet 5)

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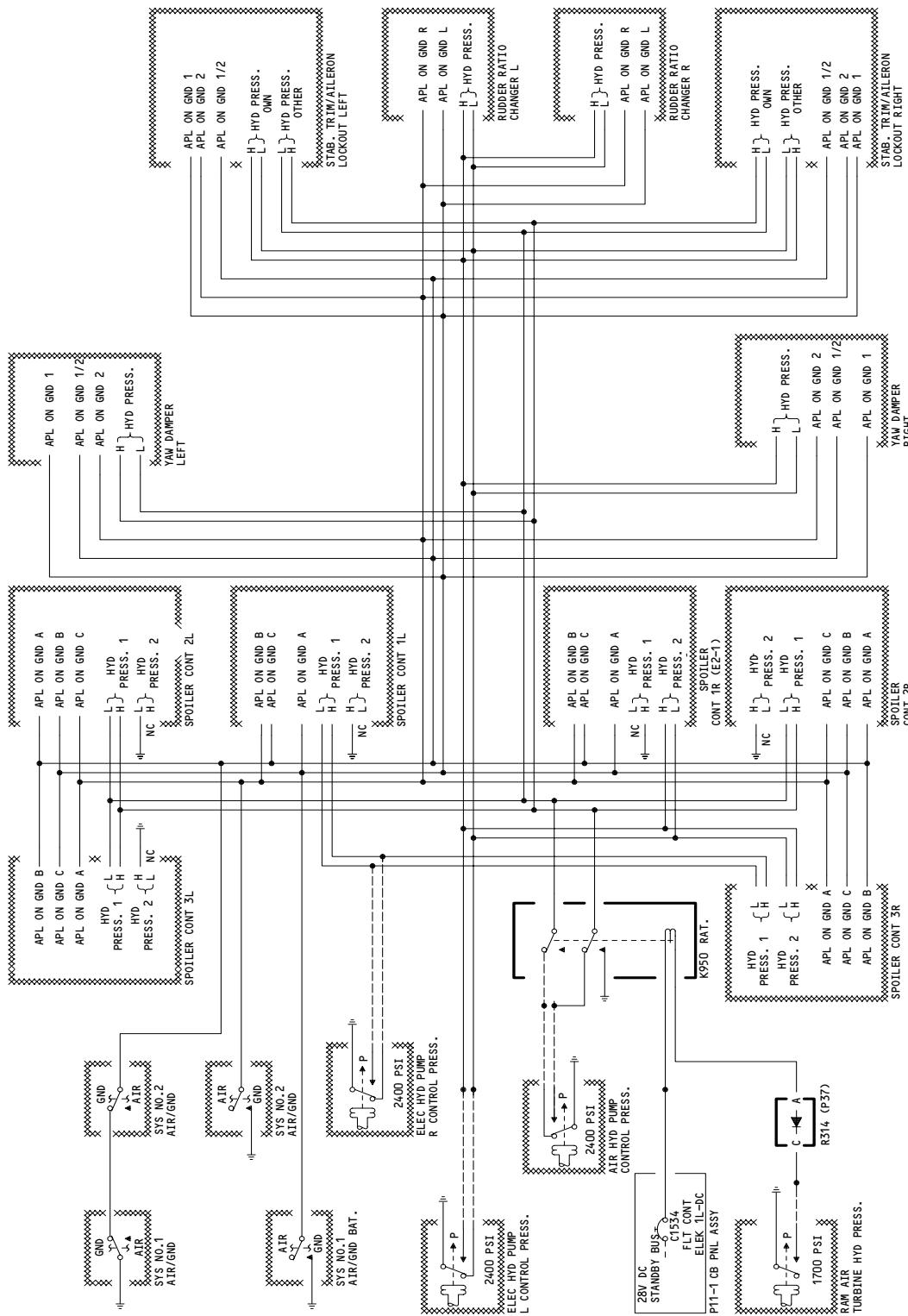
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- 4) Rudder Ratio Changer Module
- 5) Excitation for LVDTs and RVDTs for LRUs
- (f) Each PSM provides the following outputs:
  - 1)  $\pm 15$ v dc power distribution buses from three separate  $\pm 15$ v dc power regulators.
  - 2) +5v dc power distribution bus from a single +5v dc power regulator.
  - 3) 26v ac power distribution.
- (g) DC power output lines from the PSM on the same shelf are connected in parallel inside each CSEU so that a loss of either PSM will not cause the loss of any CSEU.
- (h) Four AC power output lines from the PSM provide 26v ac to demodulator cards in the SCMs, the YDMs, and the RRCs. These lines also provide 26v ac excitation to the three control wheel RVDTs (3), the speedbrake lever LVDTs (3), the spoiler power control actuators (6), the yaw damper servos (2), and the rudder ratio changers (2).
- (i) One PSM at a time on the same shelf provides 26v ac excitation to the CSEU modules on that shelf. The other PSM is on standby. When the PSM detects a fault in the 26v ac, the change over circuitry in the PSM switches over to the standby PSM to provide uninterrupted 26v ac to the CSEU modules.
- (j) AIRPLANES WITH THE -103 POWER SUPPLY MODULES;  
Internal fuses in each of the two sides of the 26v ac line protect the PSM from shorted components. But an open 26v ac fuse does not set the PSM MODULE faultball to yellow.
- (k) AIRPLANES WITH -104 POWER SUPPLY MODULES;  
Front panel mounted circuit breakers in each of the two sides of the 26v ac line protect the PSM from shorted components and help to troubleshoot these faults. But an open circuit breaker does not set the PSM MODULE faultball to yellow.
- (l) Under normal conditions, the "A" subchannel of the SCM controls the spoiler panels. The 26v ac excitation voltage for the spoiler PCA LVDTs comes from the PSM circuit which supplies the SCMs "A" subchannel. If the SCM makes a "switch" decision, control of the spoiler panels and PCA excitation are switched to the "B" subchannel.
- (2) CSEU air/ground and hydraulic discrete inputs (Fig. 6)
  - (a) Each of the control modules within the left and right CSEUs receives air/ground mode signals and hydraulic pressure sense signals. The module uses these signals to enable or inhibit its own CSEU functions.
  - (b) Four air/ground relays supply an air/ground discrete signal to the CSEU when a proximity switch electronics unit (PSEU) output signal is received (AMM 32-09-02).
  - (c) The air/ground relays energize when the PSEU output signal to the CSEU is a ground, which indicates the main gear truck is not tilted (the airplane is in the ground mode).
  - (d) Examples of the air/ground mode discrete effects on the CSEU operation include the enable of the rudder ratio changer ground tests, and the enable of the speedbrake commands by the SCM.

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INCORPORATES:  
SB 27-126  
SB 27-059

CSEU Air/Ground and Hydraulic Discrete Inputs  
Figure 6

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- (e) Hydraulic pressure sense switches operate from the left, right and center hydraulic systems. These switches provide a high and low pair of logic discrete signals (pressure is valid/pressure is not valid) to the CSEU (AMM 29-11-00).
  - (f) Examples of a valid hydraulic pressure discrete (the system pressure is good) effects on the CSEU operation include the enable of the rudder ratio changer engage relays in the air, and the enable of the monitor of the SCM failures.
  - (g) An invalid air/ground discrete or hydraulic pressure discrete to the CSEU will cause an AIR/GRD, a HYD PRESS, or other applicable faultball (or fault message on modules with BITE displays) to show a failure.
- (3) Stabilizer Trim/Aileron Lockout Module
- (a) Stabilizer Trim System controls the airplane pitch axis during flight by up or down movement of the horizontal stabilizer leading edge. Movement up of the horizontal stabilizer will move the airplane nose down. Movement down of the horizontal stabilizer will move the airplane nose up.
  - (b) Stabilizer Trim System has these trim modes:
    - 1) Manual and Manual Electric Trim Modes - the pilots' commands trim the stabilizer manually.
    - 2) Auto Trim Mode - the autopilot flight control computers (FCC) trim the stabilizer automatically (AMM 22-22-00).
    - 3) Mach Trim Mode - the stabilizer is trimmed as the mach increases. The mach trim system is active when there are no manual, electric, and automatic trim commands present, and the SAM is valid and the flaps are up.
  - (c) Manual mechanical control trim mode:
    - 1) The manual mechanical control trim mode is controlled by inputs to the manual trim levers which bypass the SAM and controls the stabilizer trim control module (STCM) directly. Refer to AMM 27-41-05 for more information on the STCM.
  - (d) Manual electric control trim mode:
    - 1) In manual electric control trim mode, the stabilizer control is from the dual electric trim switches on the control wheels. When you push these switches up or down, you send trim commands to the control and arm solenoid valves in the two STCMs through their respective SAMs. When these STCM valves operate, hydraulic pressure is applied to release the secondary brake to the applicable hydraulic trim motor and to drive the stabilizer jackscrew.
    - 2) The electric trim switches send the necessary signals to the two SAMs to drive the stabilizer at full rate. Stabilizer movement will continue until you release the switches, or until the electrical limit switches operate.
    - 3) Manual electric trim has priority over the mach trim and the single channel auto stabilizer trim modes, except for the multichannel autoland mode (when the autoland mode is selected for two or three FCCs), which inhibits all other electric trim commands.
- (4) CSEU fault annunciation (Fig. 7)

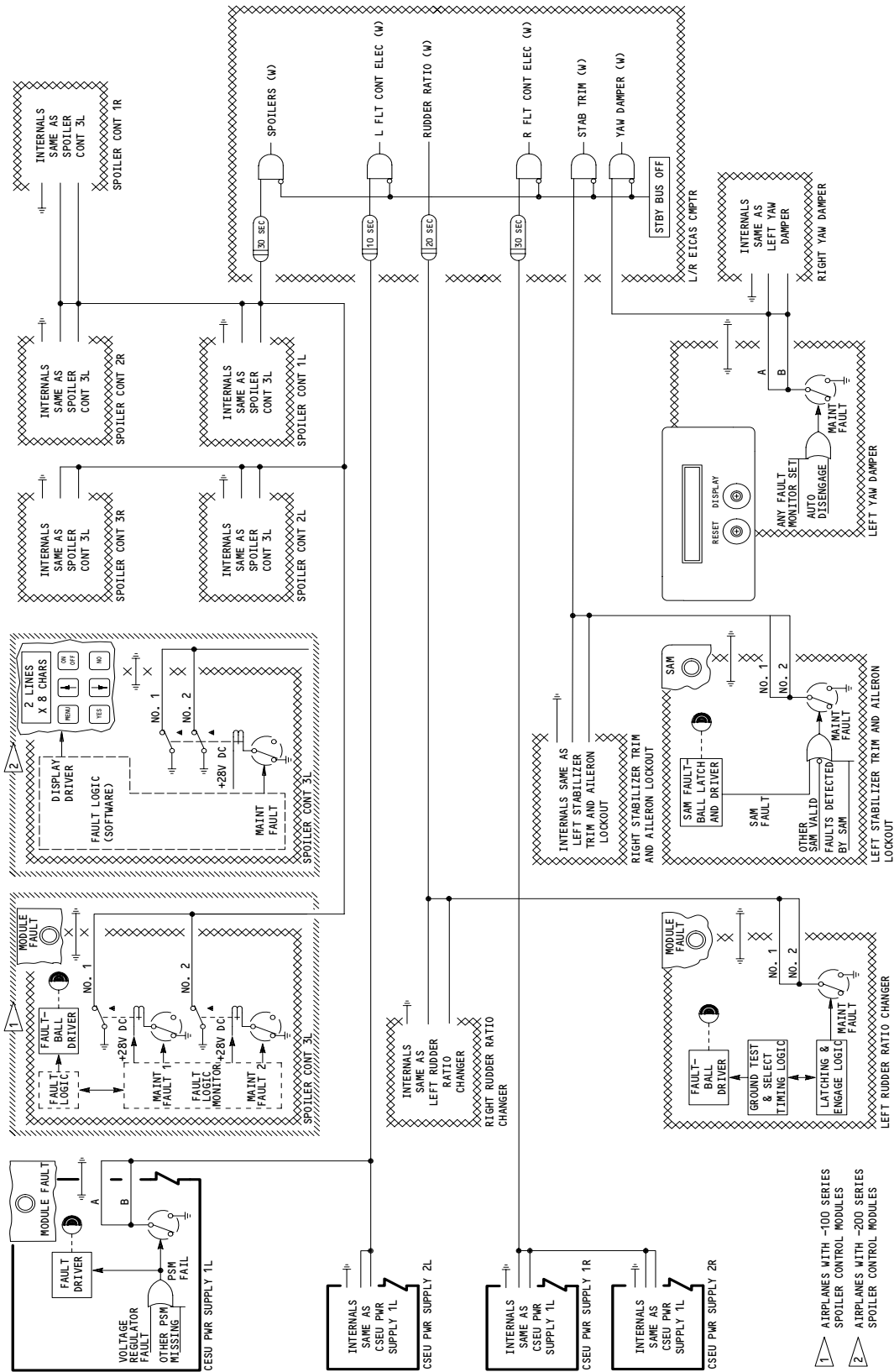
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CSEU Fault Annunciation Schematic  
Figure 7

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- (a) Fault monitor circuits monitor the electrical networks and supply fault annunciation and warning of failures in each CSEU module. The fault annunciations are the applicable amber lights on the pilots' overhead panel, P5.
  - (b) The Engine Indication and Crew Alerting System (EICAS) display on the pilots' center instrument panel supplies the EICAS messages via the EICAS computers. The applicable module faultballs on the face of the module or the applicable fault indications in the module memory also latch.
- B. CSEU BITE (Fig. 7)
- (1) Each CSEU module faceplate contains faultballs (or a BITE display) as part of the continuous BITE monitor function to identify the fault down to the LRU level, including the intermittent fault, within its system.
  - (2) Faultballs, when unlatched, show the color black for normal system operation, and show yellow, when latched, for a fault indication. When you push the maintenance reset button, you clear (unlatch) the faultball unless the fault is still present.
  - (3) The faultballs, EICAS messages (maintenance, status, advisory or caution), and the amber lights operate in combinations to indicate failures.
  - (4) In addition to faultballs for fault indication, the RRC module contains a BITE test switch. By placing the switch from NORMAL to TEST, hydraulic power is applied to extend the RRC actuator in 15 seconds. The IN TEST light on the module comes on and stays on for 15 seconds. When the switch is returned from TEST to NORMAL, the actuator is retracted and the IN TEST light stays on for 15 seconds. The TEST FAIL faultball latches if the test fails.
  - (5) Power Supply Module (PSM)
    - (a) After power up, the PSM will continuously monitor its outputs for power failures.
    - (b) All PSM outputs are continuously monitored. When an output is out of tolerance, its monitor sets the PSM "MODULE FAULT" and causes EICAS message L(R) FLT CONT ELEC to be displayed.
    - (c) Removal of either PSM activates the EICAS message L(R) FLT CONT ELEC and sets the MODULE fault indication on the remaining PSM.
    - (d) For a  $\pm 5$ v dc output power loss, the internal monitor circuitry will cause the PSM to shut down, set PSM "MODULE" fault, and causes EICAS message L(R) FLT CONT ELEC to be displayed.
    - (e) For a  $\pm 15$ v dc output power loss, the internal monitor circuitry sets PSM "MODULE" fault indication and causes the EICAS message L(R) FLT CONT ELEC to be displayed.
    - (f) For a 26v ac output power loss the internal monitor circuitry will transfer control to standby module, set PSM "MODULE" indication and causes the EICAS message L(R) FLT CONT ELEC to be displayed.
    - (g) Push the reset button on the PSM front panel to reset the monitor circuits and a "MODULE" fault indication.

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- (6) Stabilizer Trim/Aileron Lockout Module
- (a) The SAMs continuous built-in-test (BITE) monitors enable it to detect abnormal conditions and set the applicable faultball, STAB TRIM message and light indicator. These faultballs are used to identify the internal faults and interfacing line replaceable unit (LRU) faults:
- 1) SAM
    - a) The SAM faultball is set when the SAMs arm, or when the control channels disagree, or when the internal control processing unit fails. The SAM faultball is reset by the RESET switch, and will stay reset if there are no faults.
    - b) When the SAM faultball is set, the other faultballs and fault annunciations are inhibited.
    - c) A SAM fault inhibits these modes:
      - Autotrim
      - Mach Trim
      - Aileron Lockout
      - Rudder Ratio Changer
  - 2) FCC
    - a) The FCC fault is set when the SAMs FCC input monitors detect invalid data. The left SAM monitors inputs from left and center FCCs and the right SAM monitors inputs from right and center FCCs. The FCC faultball is cleared on the ground if valid FCC data is received. FCC faults are cleared in air if valid FCC data is received for two seconds.
  - 3) ADC
    - a) The ADC faultball is set if the primary or secondary computed mach number or computed airspeed from the ADC disagree. ADC fault is cleared on the ground if valid ADC data is received. In the air mode, valid ADC data received for at least 30 seconds will clear the ADC fault.
  - 4) COL TRIM SW
    - a) The COL TRIM SW faultball is set when the input coincidence monitor detected faults in the thumb switch inputs, the ARM and the CONTROL manual trim discrettes disagree.
  - 5) MAN LEVER SW
    - a) The MAN LEVER SW faultball is set when its input monitor detects a fault in the manual stabilizer Trim Lever switch. If the switch is closed or the lever is out of detent for longer than 30 seconds and the hydraulic pressure is high on either system the MAN LEVER SW faultball will be set. This faultball will usually be cleared when you push the RESET switch.

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- 6) HYD PRESS SW
    - a) The HYD PRESS SW faultball is set when the hydraulic low discrete and the hydraulic high discrete from the Elec Hyd Pump Press Sw are in the same state (both high or low). This faultball will usually be cleared when you push the RESET switch.
  - 7) STCM
    - a) STCM faultball is set when the STCM secondary brake is released (Brake Pressure Switch S1 closed) for two seconds without a valid trim command or when the secondary brake is not released (Brake Pressure Switch S1 opened) within two seconds of a valid trim command. The STCM monitor is disabled during standby manual trim or column manual trim commands.
  - 8) L(R) AIL. LOCK. ACT.
    - a) The L(R) AIL. LOCK. ACT. faultball is set by a left or right aileron lockout actuator failure. After 30 seconds, the time for normal operation, if the actuator position disagrees with the commanded position, this faultball will set yellow.
  - 9) FSPM
    - a) The FSPM faultball is set if the stabilizer position signal input exceeds the nose up stabilizer travel limit, or an open circuit occurs for longer than 1.5 seconds.
    - b) Faultballs can be reset when you push the RESET switch. On the ground, the FSPM faultball will clear immediately if valid data is received.
  - 10) AIR/GND RELAY
    - a) AIR/GND RELAY faultball is set when the three air/ground inputs to the SAM disagree. This faultball will autoreset with a GND/AIR or AIR/GND transition.
- (b) When any SAM faultball sets, a white EICAS message STAB TRIM also is displayed.
- 1) Push the RESET switch on the front panel of the SAM to clear all faultballs unless the fault is still present.
- (c) The amber STAB TRIM message and light indicator are displayed when the SAM receives a manual electric trim command and only one of the STCM secondary brakes is released (the brake pressure switch remains open). The stabilizer system trims at half rate trim instead of the normal full rate trim.
- (d) The EICAS message UNSCHD STAB TRIM and light indicator are displayed when the SAM unscheduled trim monitor detects the stabilizer moves more than 0.3 degrees in either direction without a valid SAM trim command in the applicable direction.

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- (7) Fault Indications on the Spoiler Control Module (SCM)
- (a) Fault Isolation in the SCM
- 1) The redundancy management function of the SCM checks the circuitry and input signals for possible fault conditions. It issues "switch" or "switch inhibit" actions as necessary to maintain system operation and to determine first or second fault status. This circuitry also generates applicable panel light and/or EICAS indications and sends the fault data to the maintenance monitor.
  - 2) AIRPLANES WITH -100 SERIES SPOILER CONTROL MODULES;  
The maintenance monitor determines which units are at fault (RVDT, LVDT, PCA, or SCM) and sets the appropriate faultballs on the SCM front panel.
  - 3) AIRPLANES WITH -200 SERIES SPOILER CONTROL MODULES;  
The maintenance monitor detects faults and records the applicable fault message into memory. To identify the defective airplane components, you must operate the BITE display on the SCM front panel to show the fault messages and fault details (Figs. 12, 13). See the SCM front panel for the other items available with the BITE display.
  - 4) Figure 8 is a block diagram of the SCM showing inputs from the control wheel RVDTs and the speed brake LVDTs to each of the three subchannels: active (A), standby (B), and model (C). Subchannel A normally drives the spoiler PCAs. Excitation voltage for the PCA LVDTs comes from subchannel B. When a fault is detected in subchannel A, spoiler control is switched to subchannel B and LVDT excitation comes from subchannel A. Feedback from the PCA is used for nulling the command signal and is also fed to the threshold monitors in the B and C subchannels for comparison with the command signals. The servo amplifiers in subchannel B are also monitored.
  - 5) Redundancy management first checks the servo amplifiers in subchannel B (SAL and SAR). A bad amplifier results in a "switch inhibit" decision since the standby subchannel is inoperative. If the servos check good, the command signals in subchannels B and C are compared with the PCA feedback signals in the threshold monitors (BR, BL, CR, and CL).

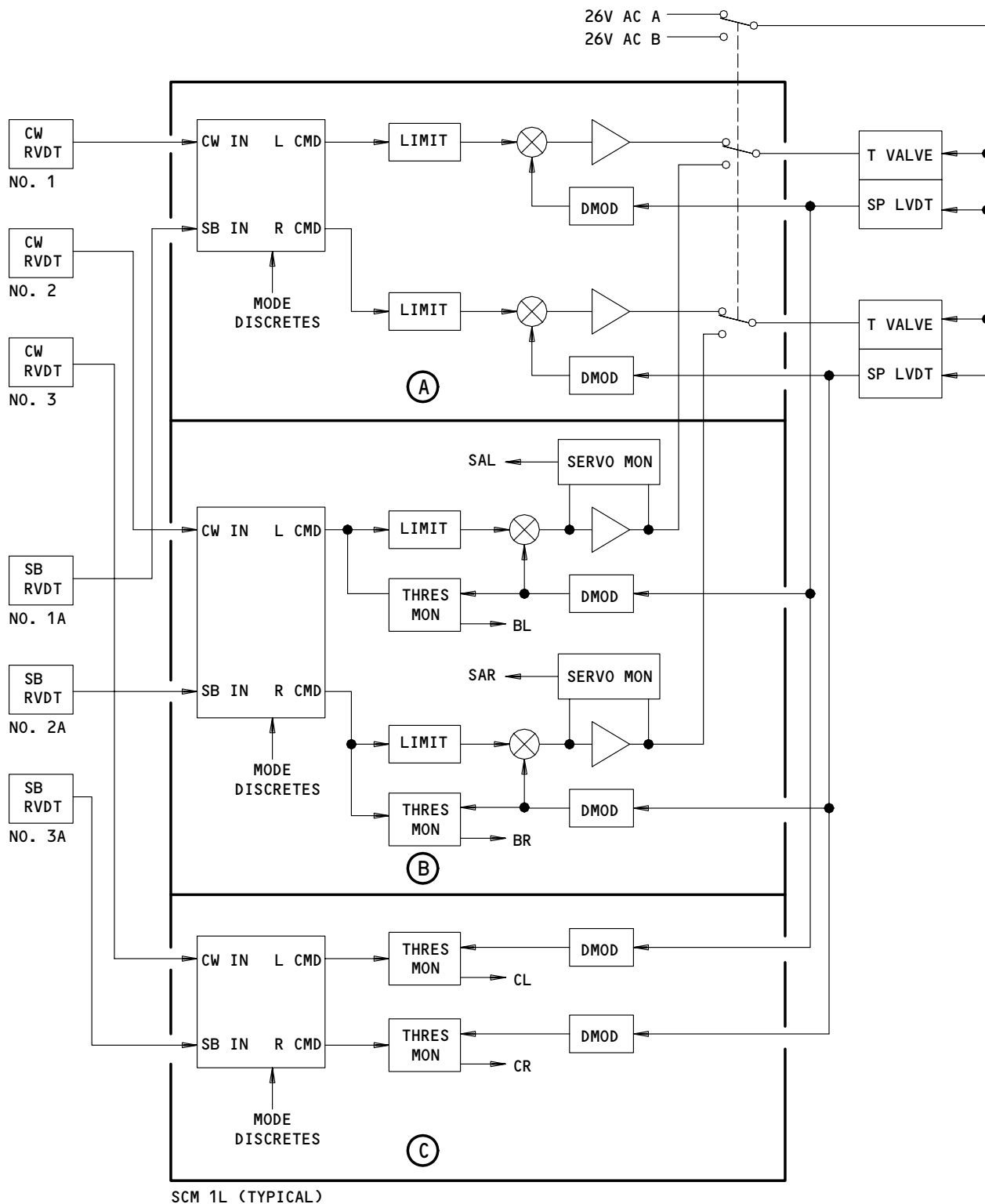
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Redundancy Management Schematic  
Figure 8

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- 6) A fault detected in either B or C results in a "switch inhibit" condition. Faults in both B and C subchannels will result in a "switch" decision. In either case, the decision constitutes a "first fault" and generates a SPOILERS message on the EICAS maintenance page.
- 7) AIRPLANES WITH -100 SERIES SPOILER CONTROL MODULES;  
If the detected fault is caused by a bad transducer (input or feedback), the maintenance monitor will determine which transducer is bad. If no fault is detected in the transducers, the fault is in the module itself. Timing for the fault logic is given below:

T0 = 0.0 sec	Starts at the leading edge of the failure logic (SAL+SAR+BL+CL+CR) of the B or C subchannel.
T1 = 0.4 sec	A "switch" or "switch inhibit" decision is made. If "switch inhibit", the maintenance monitor checks for SB or CW transducer failures.
T2 = 2.4 sec	Gives the spoiler panel time to move to the commanded position after a channel switch. If the fault does not clear, a PCA faultball is set. If it does clear, a different applicable faultball will be set (SB or CW XDCR or MODULE FAULT).

- 8) AIRPLANES WITH -200 SERIES SPOILER CONTROL MODULES;  
If the detected fault is caused by one of the inputs to the SCM, a fault message for the input will be stored in the SCM memory. If no input fault is detected, then either the PCA or the SCM module is defective. Timing for the fault logic is given below:

T0 = 0.0 sec	Starts at the leading edge of the failure logic (SAL+SAR+BL+CL+CR) of the B or C subchannel.
T1 = 0.4 sec	A "switch" or "switch inhibit" decision is made.
T2 = 2.4 sec	If a "switch inhibit" decision is made at time T1, a module fault is set. If a "switch" decision is made at time T1 and the spoiler panel does not move to the commanded position, a PCA fault is set or a module fault is set.

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- 9) An explanation of how the redundancy management and maintenance monitors work will be discussed below using the captain's inputs and a failure of control wheel RVDT #2.
- (b) Redundancy Management
- 1) The captain's control wheel RVDTs 1, 2, and 3 are connected to the active (A), standby (B), and model (C) subchannels in each of the SCMs in the left CSEU as shown in Fig. 9. The captain's speed brake lever LVDTs 1A, 2A, and 3A are connected in a similar arrangement. The first officer's inputs are connected to the SCMs in the right CSEU using the same pattern. In this example, all subchannel B servo amplifiers are assumed to check good. Captain's control wheel RVDT #2 is bad.
  - 2) In SCM 1L, the threshold monitor of subchannel B detects a difference in the command from RVDT #2 and the feedback from the spoiler PCA which has been driven to the correct position by subchannel A (ie, RVDT #1). Thus a "switch inhibit" decision is made by redundancy management. Spoiler control remains with subchannel A.
  - 3) In SCM 2L, the model subchannel, C, receives the bad signal from RVDT #2 and so an error is detected between it and the PCA feedback. A "switch inhibit" decision is made here, also.
  - 4) Module 3L has the bad RVDT #2 signal applied to the active subchannel, A, which drives the spoiler panels to the wrong position. The threshold monitors in both subchannels B and C detect errors between their (good) commands and the (bad) feedback signal. These dual errors result in a "switch" decision by redundancy management. Control of the spoiler panels is switched to subchannel B.
  - 5) At this point, the faulty RVDT has not yet been determined. The threshold monitors only detect a difference in the command and feedback signals. They cannot determine which is in error. That is left to the maintenance monitor.
- (c) AIRPLANES WITH -100 SERIES SPOILER CONTROL MODULES;  
Maintenance Monitor

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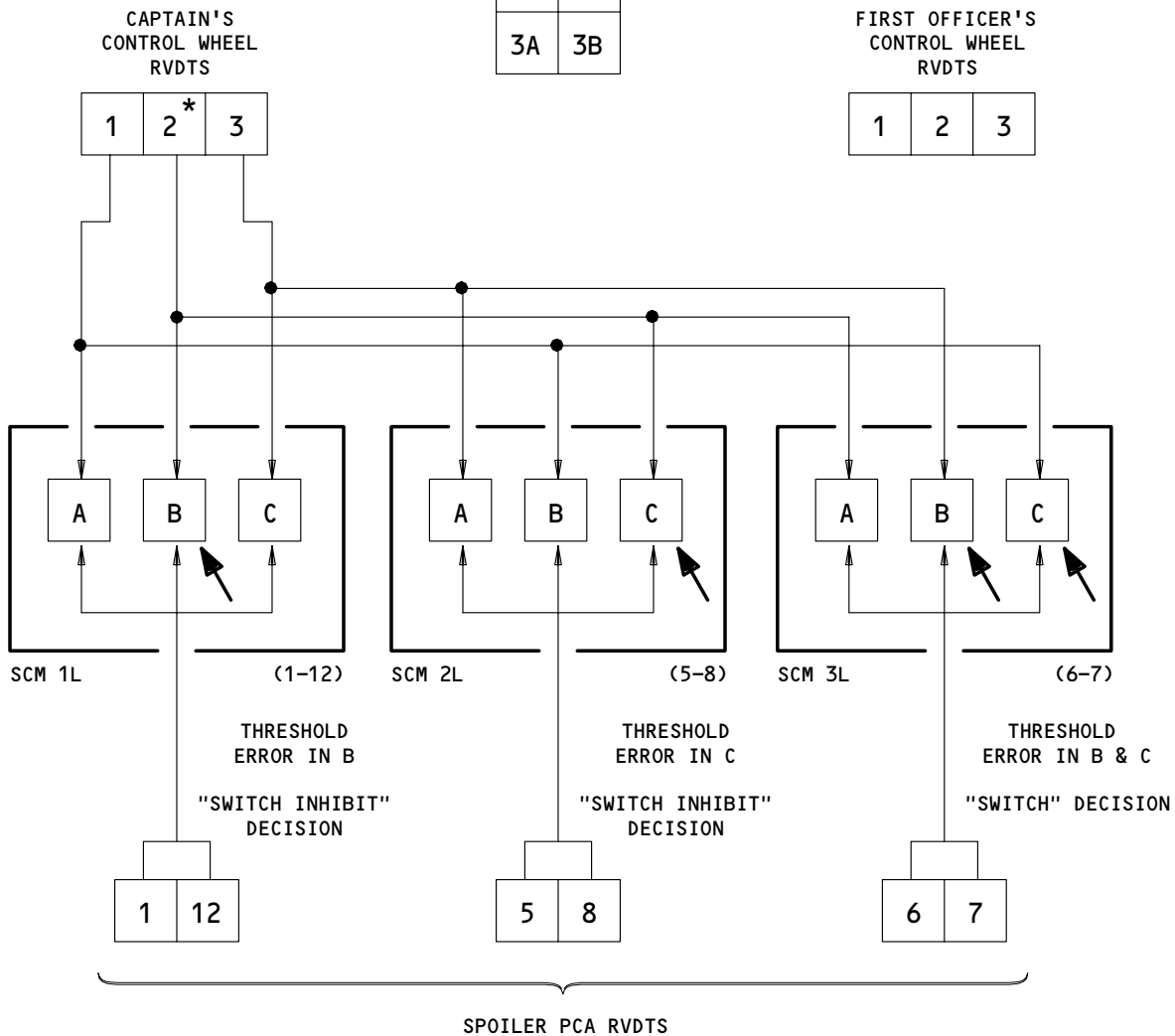
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SPEED BRAKE LVDTs

1A	1B
2A	2B
3A	3B



- \* = BAD RVDT
- A = ACTIVE SUB-CHANNEL
- B = STANDBY SUB-CHANNEL
- C = MODEL SUB-CHANNEL
- ↗ = SUB-CHANNEL DETECTING ERROR

Redundancy Management  
Figure 9

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- 1) The maintenance monitor uses a comparator circuit for transducer inputs to the A and B subchannels of the SCM and a voting logic circuit which uses inputs from all three SCM comparator circuits to determine which transducer is at fault. Identical circuits monitor the RVDTs and the LVDTs (Fig. 10).
- 2) The comparator produces a logic one if the two inputs disagree and a logic zero if they agree. Output (X, Y, and Z in Fig. 10) is fed to all three SCMs. In the example above, SCM 1L compares RVDTs #1 and #2 which produces a logic one at X since the two signals disagree. SCM 2L compares RVDTs #1 and #3. Since both are good, the comparator outputs a logic zero at Y. SCM 3L, comparing RVDTs #2 and #3, produces a logic one at Z since the two do not agree.
- 3) The required input for the voting logic is 1-1-0 on the three leads to the AND gate. The logic used to set the faultball is a VOTE FAIL and a "switch" decision. This condition is met, in the example, only in SCM 3L. Therefore, the RVDT faultball (CW XDCR) is set on this SCM.
- 4) The faultball will always be set on the SCM whose active subchannel, A, is receiving input from the faulty transducer (RVDT or LVDT). Table 1 identifies which control wheel or speedbrake lever transducer is at fault when a given faultball is set.

TABLE 1 CONTROL WHEEL AND SPEEDBRAKE LEVER FAULTBALLS		
SCM With XDCR	Faulty Transducer	
Faultball Set	CW RVDT	SB LVDT
1L	1 (Capt)	1A (Capt)
2L	3 (Capt)	3A (Capt)
3L	2 (Capt)	2A (Capt)
1R	1 (F/O)	1B (F/O)
2R	3 (F/O)	3B (F/O)
3R	2 (F/O)	2B (F/O)

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SPEED BRAKE LVDTs

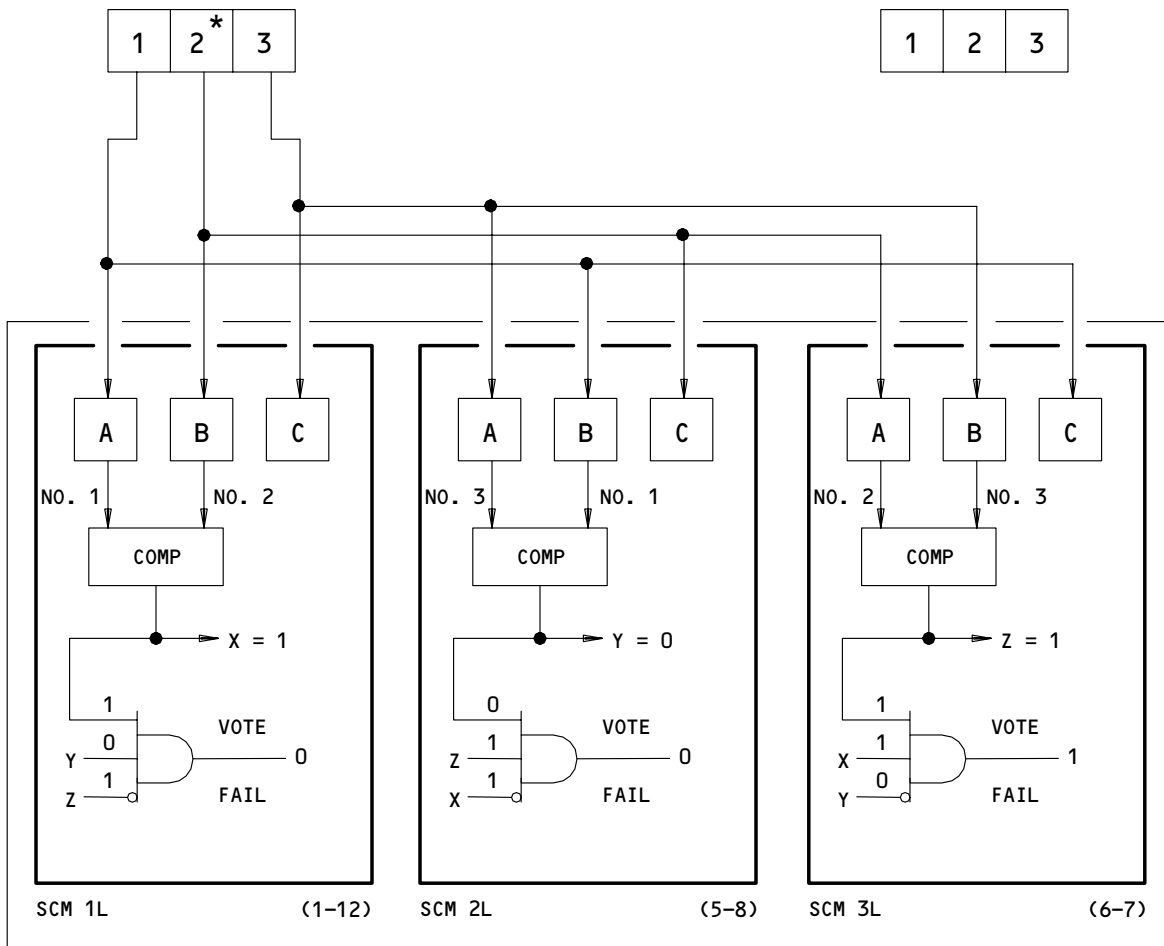
1A	1B
2A	2B
3A	3B

CAPTAIN'S  
CONTROL WHEEL  
RVDTs

1	2*	3
---	----	---

FIRST OFFICER'S  
CONTROL WHEEL  
RVDTs

1	2	3
---	---	---



CSEU-L (TYPICAL)

- \* = BAD RVDT
- A = ACTIVE SUB-CHANNEL
- B = STANDBY SUB-CHANNEL
- C = MODEL SUB-CHANNEL


**NOTE:**  
COMPARATOR OUTPUT = 1 IF INPUTS DISAGREE

Maintenance Monitor Transducer Failure Detection  
Figure 10


EFFECTIVITY  
AIRPLANES WITH -100 SERIES SPOILER  
CONTROL MODULES

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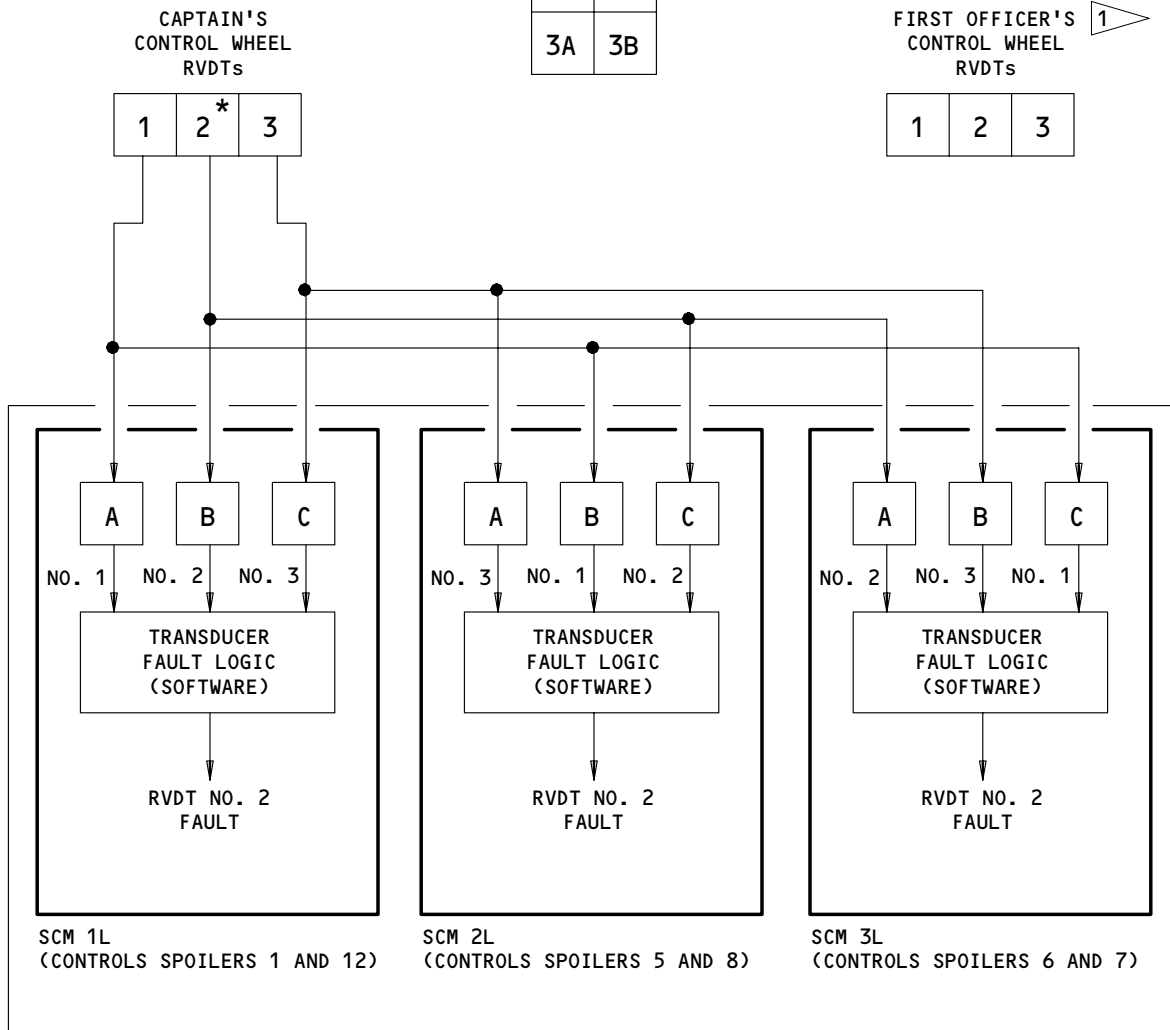


SPEED BRAKE LVDTs 1 

1A	1B
2A	2B
3A	3B

FIRST OFFICER'S CONTROL WHEEL RVDTs 

1	2	3
---	---	---



CSEU-L (EXAMPLE)

- \* = BAD RVDT
- A = ACTIVE SUB-CHANNEL
- B = STANDBY SUB-CHANNEL
- C = MODEL SUB-CHANNEL

 THESE COMPONENTS HAVE EQUIVALENT CIRCUIT CONNECTIONS TO THE SCMs AS THE CAPTAIN'S CONTROL WHEEL RVDTs

Maintenance Monitor Transducer Failure Detection  
Figure 10A

EFFECTIVITY  
AIRPLANES WITH -200 SERIES SPOILER  
CONTROL MODULES

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- 5) Spoiler PCA feedback RVDT faults require an additional step for detection (Fig. 11). The threshold monitor detects a difference between the command and feedback signals and causes a "switch" decision. This is because both the B and C subchannels detect errors.
  - 6) After the subchannels have been switched, the PCA will receive a signal from a different RVDT. If either the control wheel transducer or the speedbrake lever transducer were at fault, the threshold error would go away after the changeover and the applicable XDCR faultball would be set.
  - 7) If the fault does not go away within 2.0 seconds of the changeover, the PCA feedback RVDT is at fault. The PCA faultball will be set on the SCM which made the "switch" decision. There is no way to tell if the faultball is set from a faulty transducer on the right or the left PCA.
  - 8) The module faultball indicates a problem with the SCM itself and can be set in one of three ways:
    - a) When there is a fault detected in either subchannel B or subchannel C, but not both (a "switch inhibit" decision), no other faults have been detected, and time T1 (0.4 sec) has elapsed.
    - b) When there is a fault detected in B and C subchannels (ie, a "switch" decision), no other faults have been detected, and time T2 (2.4 sec) has elapsed; and
    - c) When an RVDT or LVDT fault is indicated by the comparator circuit and a "switch inhibit" decision has been made (fault in B or C but not both).
- (d) AIRPLANES WITH -200 SERIES SPOILER CONTROL MODULES;  
Maintenance Monitor
- 1) The maintenance monitor reads and compares the three input signals from the captain's control wheel transducers. If one input signal does not agree with the other two signals, the maintenance monitor moves the control away from the defective transducer (Fig. 10A). A CW RVDT FAULT message and fault details are stored in the existing fault memory to identify the defective control wheel RVDT unit (Fig. 13).

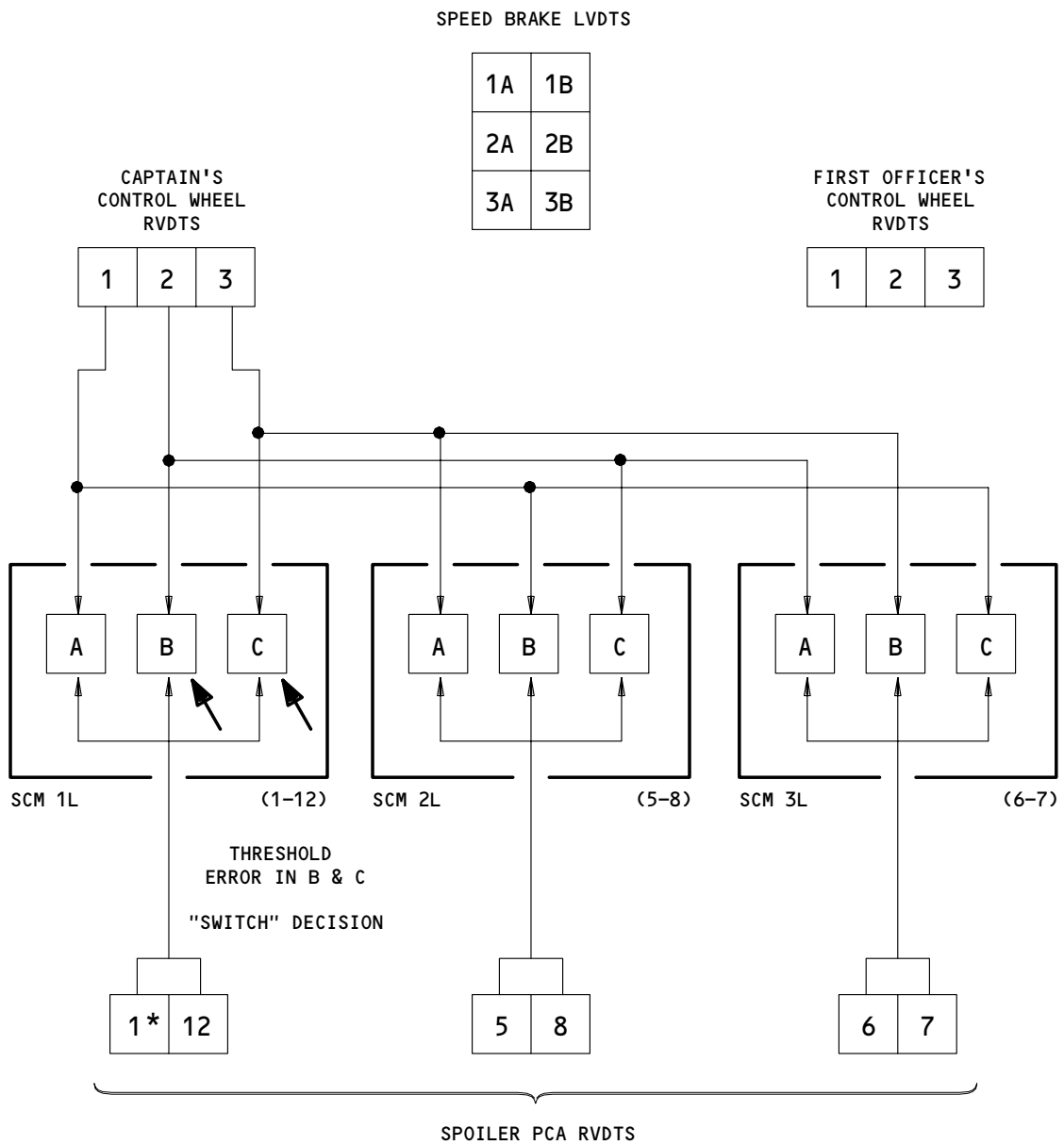
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- \* = BAD RVDT
- A = ACTIVE SUB-CHANNEL
- B = STANDBY SUB-CHANNEL
- C = MODEL SUB-CHANNEL
- ↗ = SUB-CHANNEL DETECTING ERROR

PCA RVDT Failure Detection  
Figure 11

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(8) AIRPLANES WITH -100 SERIES SPOILER CONTROL MODULES;

Fault Logic Anomalies

- (a) The faultball logic is designed to indicate failures of the units they address. Other failures, however, can cause faultballs to set. Module faultballs can be set by a fault in the Air/Ground system itself or in any of the individual relays that provide air/ground discretes to the SCM. Truck tilt switch failures can also set SCM module faultballs. Breaks in the wiring between any of the transducers (LVDTs and RVDTs) and the SCM can cause module faultballs to set. These problems are addressed in the Control System Electronics Unit Fault Isolation, FIM 27-09-00/101.

C. Control

- (1) The CSEU module operates automatically whenever it is powered; it has no operating controls or adjustments.

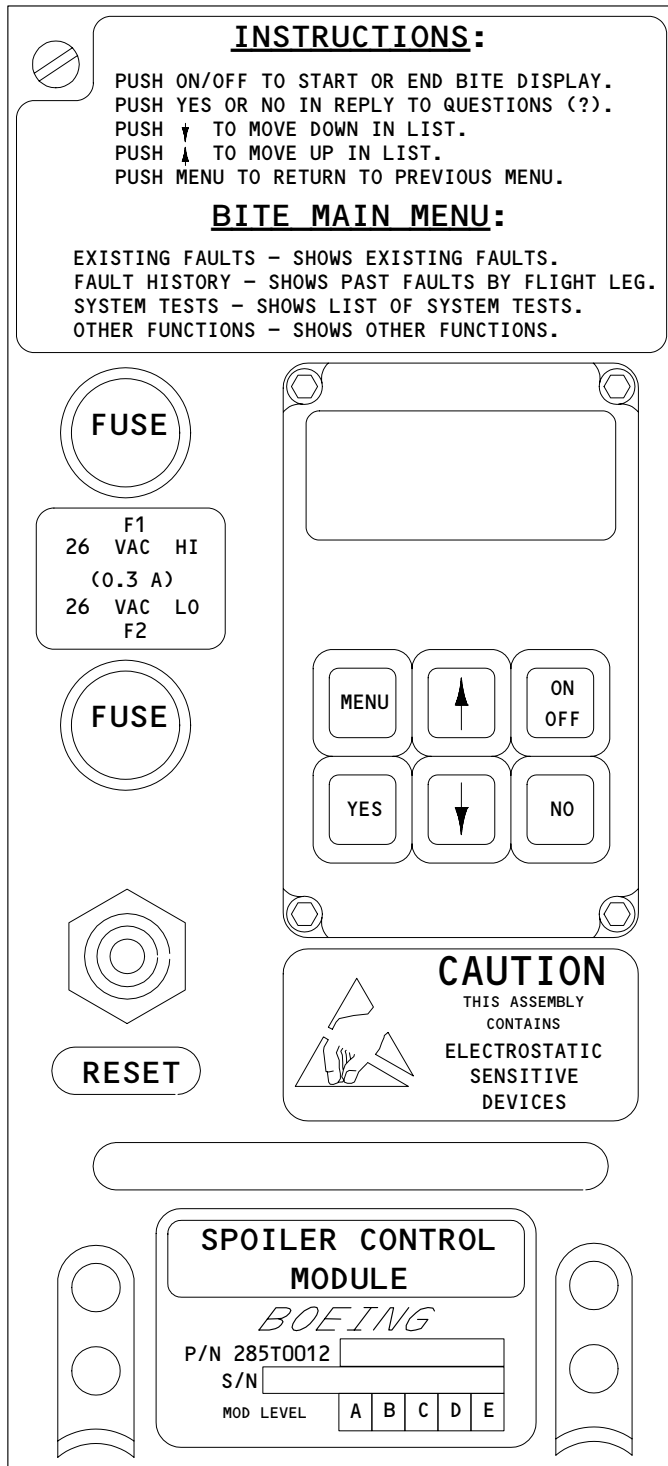
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Spoiler Control Module (-200 Series) With BITE Display  
Figure 12

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MAINTENANCE MANUAL

FAULT MESSAGE	DISCUSSION
SCM FAULT	THIS FAULT SHOWS WHEN A PROBLEM IS DETECTED IN THE SPOILER CONTROL MODULE (SCM) WITH SHOWS THIS MESSAGE. IF THE SCM SHELF POSITION IS CHANGED, THIS FAULT WILL CONTINUE TO SHOW ON THE SAME SCM.
SCM 1L FAULT SCM 2L FAULT SCM 3L FAULT	SCM 1R FAULT SCM 2R FAULT SCM 3R FAULT THIS FAULT SHOWS WHEN A SCM ON THE SAME SHELF DETECTS: <ul style="list-style-type: none"> <li>• A DIFFERENT SCM THAT IS NOT INSTALLED CORRECTLY</li> <li>• A CIRCUIT BOARD ON THE DIFFERENT SCM THAT IS DISLODGED</li> <li>• A DISCONNECTED INTERCONNECT WIRE BETWEEN THE TWO SCMs.</li> </ul>
26 VAC 27-61-13 26 VAC 27-61-15 26 VAC 27-61-17	26 VAC 27-61-14 26 VAC 27-61-16 26 VAC 27-61-18 THIS FAULT SHOWS WHEN A SCM DETECTS A 26V AC POWER SIGNAL THAT IS LESS THAN 16.5V AC. A DEFECTIVE POWER SUPPLY MODULE (PSM), OR A SHORTED CIRCUIT IN THE SPEEDBRAKE TRANSDUCER, THE CONTROL WHEEL TRANSDUCER, THE SCM, OR THE WIRING BETWEEN THESE COMPONENTS, CAN CAUSE THIS FAULT. THIS FAULT WILL SHOW ON ALL 3 SCMs ON THE SAME SHELF IF THERE IS A DEFECTIVE PSM. ALSO, THE WIRING DIAGRAM MANUAL (WDM) REFERENCE SHOWN IN THE FAULT DETAILS WILL AGREE ON ALL 3 SCMs.
A/G SYS1 FAULT A/G SYS2 FAULT AIR/GND FAULT	EACH SCM HAS 3 AIR/GROUND SENSOR INPUTS. AN OPEN SIGNAL TELLS THE SCM THAT THE AIRPLANE IS IN THE AIR. A GROUND SIGNAL TELLS THE SCM THAT THE AIRPLANE IS ON THE GROUND. THIS FAULT SHOWS WHEN 1 OF THE 3 AIR/GROUND INPUTS DISAGREES FOR 25 SECONDS, WHEN A DISAGREE OCCURS DURING A REDUNDANCY MANAGEMENT OPERATION (A "SWITCH" OR A "SWITCH INHIBIT" ACTION). THIS FAULT CAN SHOW WHEN YOU CHANGE THE AIR/GROUND STATE OF THE AIRPLANE DURING NORMAL MAINTENANCE OPERATIONS.
SB LVDT FAULT	THERE ARE 3 SPEEDBRAKE TRANSDUCERS (LINEAR VARIABLE DIFFERENTIAL TRANSFORMERS OR LVDTs) FOR EACH SHELF. EACH TRANSDUCER SENDS A SIGNAL TO EACH SCM. THIS FAULT SHOWS WHEN 1 OF THE SPEEDBRAKE TRANSDUCER SIGNALS IS OUT OF THE TOLERANCE RANGE OF THE OTHER 2 SIGNALS. FOR A DEFECTIVE LVDT, THIS FAULT WILL SHOW ON ALL 3 SCMs ON THE SAME SHELF. IF THIS FAULT SHOWS TWO TIMES ON THE SAME SCM, THEN ALL 3 OF THE SPEEDBRAKE TRANSDUCER SIGNALS WERE OUT OF THE TOLERANCE RANGE WITH EACH OTHER.
CW RVDT FAULT	THERE ARE 3 CONTROL WHEEL TRANSDUCERS (ROTARY VARIABLE DIFFERENTIAL TRANSFORMERS OR RVDTs) FOR EACH SHELF. EACH TRANSDUCER SENDS A SIGNAL TO EACH SCM. THIS FAULT SHOWS WHEN 1 OF THE CONTROL WHEEL TRANSDUCER SIGNALS IS OUT OF THE TOLERANCE RANGE OF THE OTHER 2 SIGNALS. FOR A DEFECTIVE RVDT, THIS FAULT WILL SHOW ON ALL 3 SCMs ON THE SAME SHELF. IF THIS FAULT SHOWS TWO TIMES ON THE SAME SCM, THEN ALL 3 OF THE CONTROL WHEEL TRANSDUCER SIGNALS WERE OUT OF THE TOLERANCE RANGE WITH EACH OTHER.
L FSPM FAULT R FSPM FAULT C FSPM FAULT	THE SCMs IN SHELF POSITIONS 2R AND 3L CAN GET INPUTS FROM THE SAM MODULE THAT PREVENT CONTROL WHEEL COMMANDS. THESE SIGNALS OCCUR AT HIGH AIRSPEEDS. A GROUND SIGNAL TELLS THE SCM THAT CONTROL WHEEL COMMANDS ARE PREVENTED. AN OPEN SIGNAL TELLS THE SCM THAT CONTROL WHEEL COMMANDS ARE NOT PREVENTED. THIS FAULT SHOWS WHEN 1 OF THE 3 SAM INPUTS DISAGREES FOR 25 SECONDS, OR WHEN A DISAGREE OCCURS DURING A REDUNDANCY MANAGEMENT OPERATION (A "SWITCH" OR A "SWITCH INHIBIT" ACTION).

-200 Series SCM - Fault Message Description  
Figure 13 (Sheet 1)

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MAINTENANCE MANUAL

FAULT MESSAGE	DISCUSSION
SAM FAULT	EACH SCM HAS 3 FLAP POSITION INPUTS. AN OPEN SIGNAL TELLS THE SCM THAT THE FLAPS ARE IN THE RETRACTED POSITION. A GROUND SIGNAL TELLS THE SCM THAT THE FLAPS ARE IN THE EXTENDED POSITION. THIS FAULT SHOWS WHEN 1 OF THE 3 FLAP POSITION INPUTS DISAGREES FOR 25 SECONDS, OR WHEN A DISAGREE OCCURS DURING A REDUNDANCY MANAGEMENT OPERATION (A "SWITCH" OR A "SWITCH INHIBIT" ACTION).
PSM 1 FAULT      PSM 2 FAULT	THIS FAULT SHOWS WHEN A SCM DOES NOT RECEIVE A VALID POWER SIGNAL FROM THE PSM ON THE SAME SHELF. THIS USUALLY OCCURS WHEN THERE IS A DEFECTIVE PSM. FOR A DEFECTIVE PSM, THIS FAULT WILL SHOW ON ALL 3 SCMs ON THE SAME SHELF. THIS FAULT ALSO SHOWS WHEN THERE IS A WIRING FAULT FROM THE PSM TO THE SCM THAT SHOWS THIS FAULT.
PCA 1 FAULT      PCA 7 FAULT PCA 2 FAULT      PCA 8 FAULT PCA 3 FAULT      PCA 9 FAULT PCA 4 FAULT      PCA 10 FAULT PCA 5 FAULT      PCA 11 FAULT PCA 6 FAULT      PCA 12 FAULT	A POWER CONTROL ACTUATOR (PCA) IS THE UNIT AT THE WING WHICH USES THE HYDRAULIC PRESSURE TO RAISE AND LOWER THE SPOILER PANEL. EACH SCM CONTROLS A SYMMETRICAL PAIR OF PCAs, ONE ON THE LEFT WING AND ONE ON THE RIGHT WING. THIS FAULT SHOWS WHEN THE SCM ATTEMPTS TO CONTROL THE POSITION OF THE SPOILER BUT IS NOT ABLE TO. THE PCA NUMBER CAN BE USED TO FIND THE WING LOCATION OF THE POSSIBLE DEFECTIVE COMPONENTS. THE FAULTS "PCA 1" TO "PCA 6" CORRESPOND TO THE SPOILERS 1 (OUTBOARD) TO 6 (INBOARD) ON THE LEFT WING. THE FAULTS "PCA 7" TO "PCA 12" CORRESPOND TO THE SPOILERS 7 (INBOARD) TO 12 (OUTBOARD) ON THE RIGHT WING.
L HYD PRESS SW R HYD PRESS SW C HYD PRESS SW	THE HYDRAULIC SYSTEM PRESSURE SWITCHES SEND VALID HYDRAULIC DISCRETE SIGNALS TO THE SCMs. THESE SIGNALS ARE A PAIR OF HIGH AND LOW LOGIC INPUTS. THIS FAULT SHOWS WHEN THE HYDRAULIC INPUTS TO THE SCM ARE NOT IN THE USUAL CONDITION. THIS FAULT IS USUALLY CAUSED BY A FAILURE OF THE HYDRAULIC PRESSURE SWITCH, AND DOES NOT IMPLY THAT THE HYDRAULIC PRESSURE IS LOW.
L HYD PRESS LO R HYD PRESS LO C HYD PRESS LO	THIS FAULT SHOWS THE SCM DETECTS LOW HYDRAULIC PRESSURE. ONLY ONE OF THESE FAULT MESSAGES CAN SHOW ON A SINGLE SCM. ADDITIONAL AMBER LIGHTS AND EICAS MESSAGES WILL OCCUR IF THE HYDRAULIC PRESSURE STAYS LOW.
SPOILER SHUTDOWN	THIS FAULT SHOWS WHEN THE SCM DOES A SHUTDOWN OF THE SPOILER PANEL IT CONTROLS. A SPOILER SHUTDOWN ALSO SENDS A CAUTION MESSAGE TO THE TOP EICAS DISPLAY.
AMBR DUE TO HYD	THIS FAULT SHOWS WHEN THE SCM SENDS A CAUTION MESSAGE TO THE TOP EICAS DISPLAY WHILE IT DETECTS LOW HYDRAULIC PRESSURE.
27-00-13 WIRING	THIS FAULT SHOWS WHEN THE SCM DETECTS A FAILURE OF THE HYDRAULIC INPUTS, AND THE HYDRAULIC INPUTS ARE WIRED SO THAT THE SCM ALWAYS DETECTS VALID HYDRAULIC PRESSURE.
SCM ERROR	THIS FAULT SHOWS WHEN A SCM MONITOR DETECTS AN ERROR FOR A SCM THAT IS NOT APPLICABLE FOR THAT SHELF POSITION.
NO CSEU POWER	THIS FAULT SHOWS WHEN THE "PSM 1 VALID" AND THE "PSM 2 VALID" LOGICAL SIGNALS SENT TO THE SCM ARE FALSE. THIS FAULT USUALLY OCCURS WHEN THE CIRCUIT BREAKERS FOR THE TWO PSMs ON ONE SHELF ARE NOT CLOSED.

-200 Series SCM - Fault Message Description  
Figure 13 (Sheet 2)

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 FAULT ISOLATION/MAINT MANUAL

CONTROL SYSTEM ELECTRONICS UNIT

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKERS	--		FLIGHT COMPT, P11	
FLT CONT ELEC 1L AC - C1538		1	11C6	*
FLT CONT ELEC 1R AC - C1536		1	11G17	*
FLT CONT ELEC 1L DC - C1534		1	11C7	*
FLT CONT ELEC 1R DC - C1531		1	11G18	*
FLT CONT ELEC 2L AC - C1537		1	11C8	*
FLT CONT ELEC 2R AC - C1535		1	11G26	*
FLT CONT ELEC 2L DC - C1533		1	11C9	*
FLT CONT ELEC 2R DC - C1532		1	11G27	*
ACTUATOR - (FIM 27-61-00/101)				
INBOARD POWER CONTROL PCA				
OUTBOARD POWER CONTROL PCA				
COLUMN - (FIM 27-31-00/101)				
CONTROL				
COMPUTER - (FIM 31-41-00/101)				
EICAS LEFT, M10181				
EICAS RIGHT, M10182				
COMPUTER - (FIM 34-12-00/101)				
AIR DATA LEFT, M100				
AIR DATA RIGHT, M101				
INDICATOR - (FIM 27-48-00/101)				
STABILIZER TRIM POSITION LEFT, N68				
LEVER - (FIM 27-41-00/101)				
STABILIZER TRIM				
LEVER - (FIM 27-61-00/101)				
SPEEDBRAKE CONTROL				
MODULE - POWER SUPPLY NO. 1 LEFT, M536	2	1	119AL, MAIN EQUIPMENT CENTER	27-09-00
MODULE - POWER SUPPLY NO. 2 LEFT, M537	2	1	119AL, MAIN EQUIPMENT CENTER	27-09-00
MODULE - POWER SUPPLY NO. 1 RIGHT, M538	2	1	119AL, MAIN EQUIPMENT CENTER	27-09-00
MODULE - POWER SUPPLY NO. 2 RIGHT, M539	2	1	119AL, MAIN EQUIPMENT CENTER	27-09-00
MODULE - SPOILER CONTROL NO. 1 LEFT, M530	2	1	119AL, MAIN EQUIPMENT CENTER	27-09-00
MODULE - SPOILER CONTROL NO. 2 LEFT, M531	2	1	119AL, MAIN EQUIPMENT CENTER	27-09-00
MODULE - SPOILER CONTROL NO. 3 LEFT, M532	2	1	119AL, MAIN EQUIPMENT CENTER	27-09-00
MODULE - SPOILER CONTROL NO. 1 RIGHT, M533	2	1	119AL, MAIN EQUIPMENT CENTER	27-09-00
MODULE - SPOILER CONTROL NO. 2 RIGHT, M534	2	1	119AL, MAIN EQUIPMENT CENTER	27-09-00
MODULE - SPOILER CONTROL NO. 3 RIGHT, M535	2	1	119AL, MAIN EQUIPMENT CENTER	27-09-00
MODULE - STABILIZER TRIM/AILERON LOCKOUT LEFT, M524	3	1	119AL, MAIN EQUIPMENT CENTER	27-09-00
MODULE - STABILIZER TRIM/AILERON LOCKOUT RIGHT, M525	3	1	119AL, MAIN EQUIPMENT CENTER	27-09-00
MODULE - RUDDER RATIO CHANGER LEFT, M528	3	1	119AL, MAIN EQUIPMENT CENTER	27-09-00
MODULE - RUDDER RATIO CHANGER RIGHT, M529	3	1	119AL, MAIN EQUIPMENT CENTER	27-09-00
MODULE - (FIM 22-21-00/101)				
YAW DAMPER LEFT, M522				
YAW DAMPER RIGHT, M523				

\* SEE THE WDM EQUIPMENT LIST

Control System Electronics Unit - Component Index  
 Figure 101 (Sheet 1)

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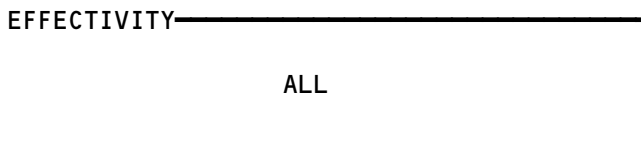



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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
MODULE - (FIM 27-58-00/101) FLAP/STABILIZER POSITION, M838, M839, M840 MODULE - (FIM 27-48-00/101) STABILIZER LIMIT SWITCH AND POSITION TRANSMITTER, M519, M520 MODULE - (FIM 27-48-00/101) STABILIZER TRIM CONTROL, M211, M212 <sup>1</sup> STABILIZER TRIM CONTROL, M1607, M1608 <sup>2</sup> SWITCH - (FIM 27-41-00/101) STABILIZER STANDBY, S538 <sup>1</sup> CAPTAIN STABILIZER TRIM CONTROL WHEEL, S80 FIRST OFFICER STABILIZER TRIM CONTROL WHEEL, S81 TRANSDUCER - (FIM 27-21-00/101) RUDDER RATIO CHANGER LVDT, TS194 TRANSDUCER - (FIM 27-61-00/101) SPEEDBRAKE LVDT, TS35, TS36, TS37 SPOILER RVDT, TS5081, TS5082				

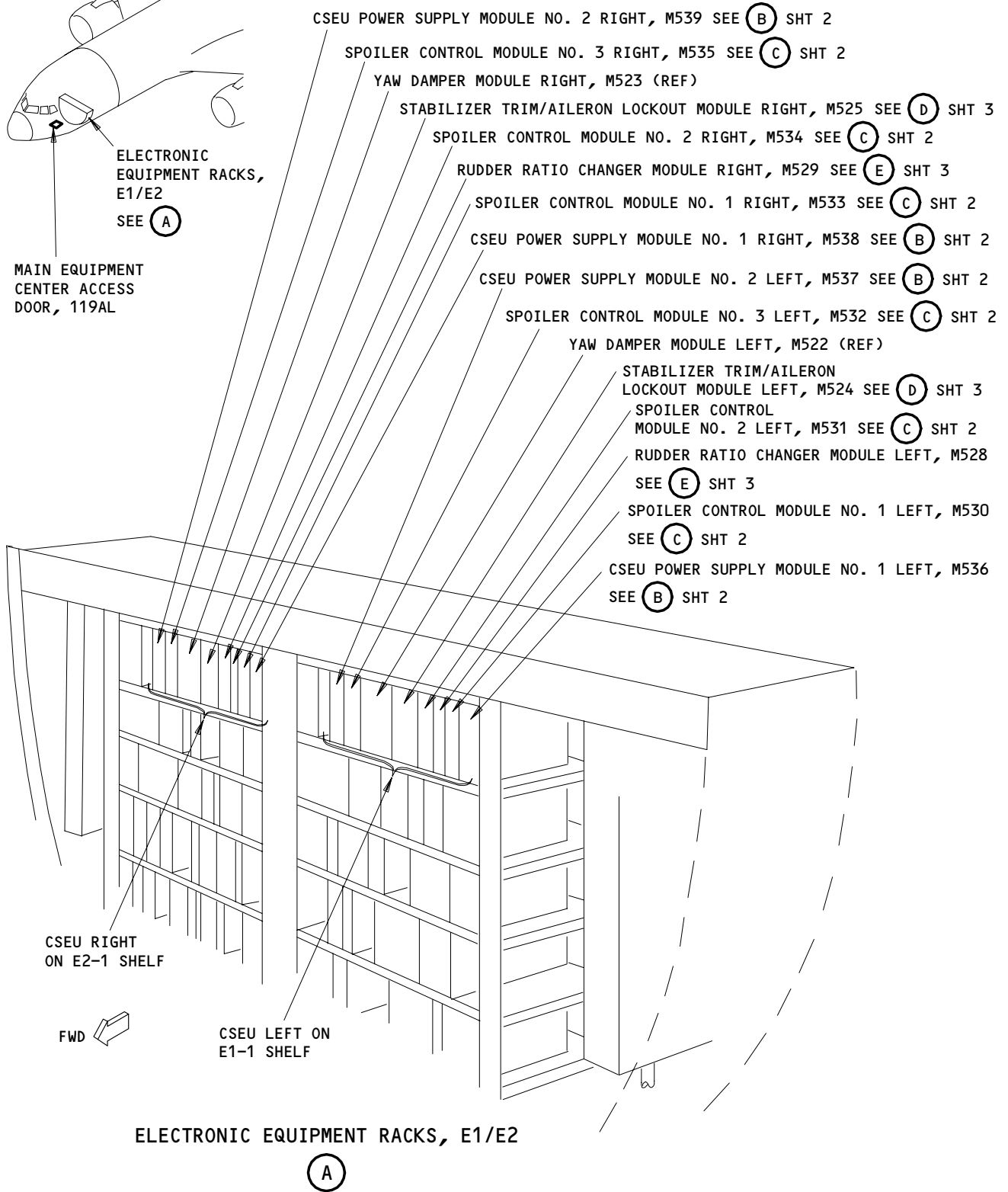
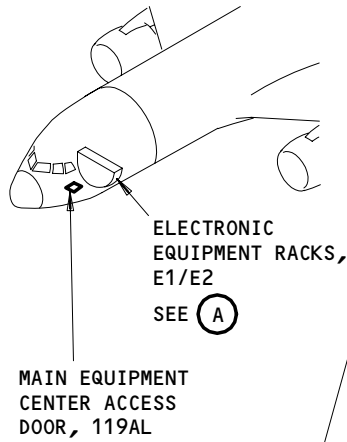
- <sup>1</sup> AIRPLANES WITH ALT STAB TRIM LEVERS
- <sup>2</sup> AIRPLANES WITH ALT STAB TRIM SWITCHES

Control System Electronics Unit - Component Index  
Figure 101 (Sheet 2)



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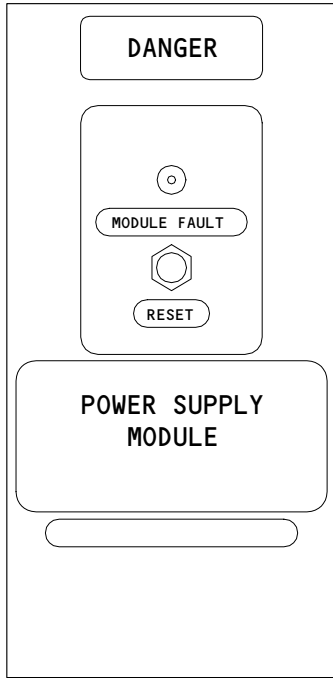
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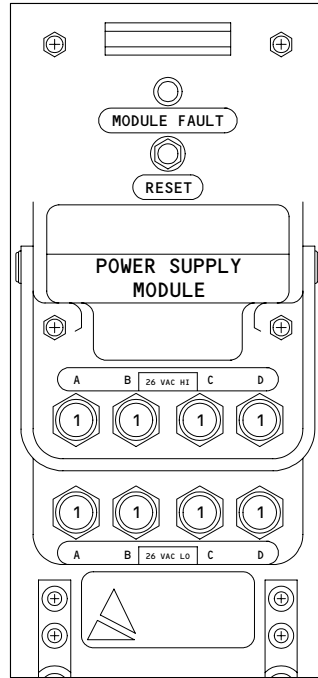
Control System Electronics Unit - Component Location  
Figure 102 (Sheet 1)

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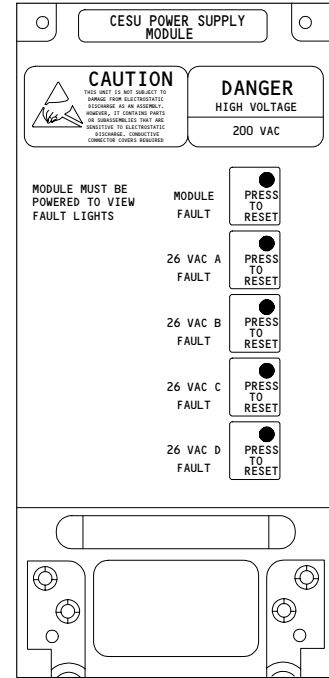
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(-103)



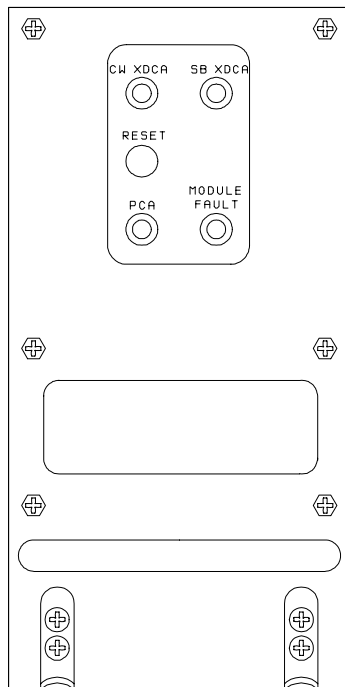
(-104)



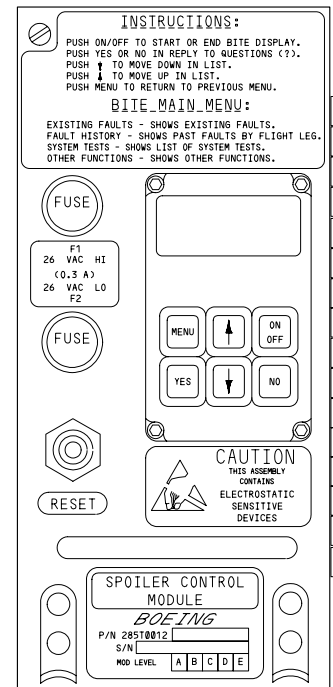
(-201)

POWER SUPPLY MODULE

B



(-100 SERIES)



(-200 SERIES)

SPOILER CONTROL MODULE

C

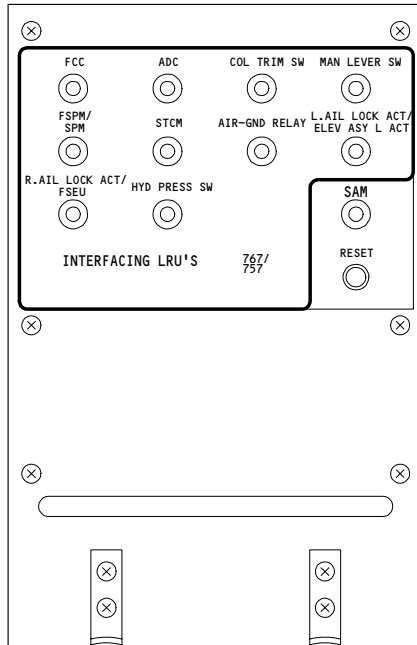
Control Surface Electronics Unit - Component Location (Details from Sht 1)  
Figure 102 (Sheet 2)

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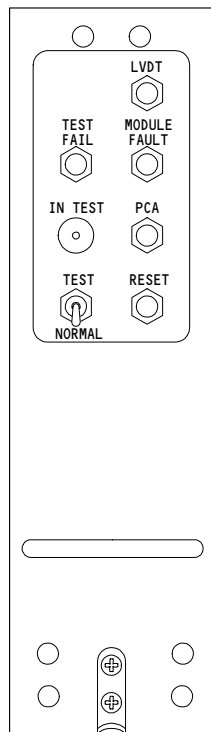
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STABILIZER TRIM/AILERON LOCKOUT MODULE (EXAMPLE)

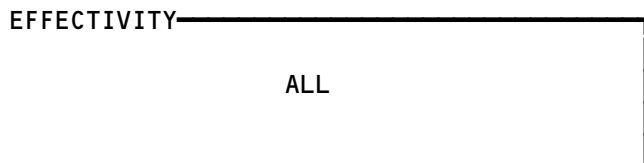
(D)



RUDDER RATIO CHANGER MODULE (EXAMPLE)

(E)

Control System Electronics Unit - Component Location (Details from Sht 1)  
Figure 102 (Sheet 3)



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FLIGHT CONTROL SYSTEM ELECTRONICS UNIT (CSEU) – MAINTENANCE PRACTICES

1. General

- A. This procedure gives the removal/installation and the installation test instructions for these flight control system electronics unit (CSEU) modules:
- (1) CSEU Power Supply Module (M536, M537, M538, M539)
  - (2) Spoiler Control Module (M530, M531, M532, M533, M534, M535)
  - (3) Stabilizer Trim/Aileron Lockout Module (M524, M525)
  - (4) Rudder Ratio Changer Module (M528, M529)
- B. The removal and installation of the Yaw Damper Module (M522, M523) is in AMM 22-21-04/401.

TASK 27-09-00-022-003

2. Remove the Component (Fig. 201)

A. General

- (1) The CSEU modules are on the left (E1-1) or the right (E2-1) shelves in the main electronic/electrical equipment center. Each module is mounted on a tray and held in place by two hold-down extractors (self-locking mechanism).

B. 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 27-61-00/201, Spoiler/Speedbrake

C. Prepare for Removal

S 862-001

**WARNING:** DO THE SPOILERS DEACTIVATION PROCEDURE, 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.

**CAUTION:** ALL THE FLIGHT CONTROL MODULES ARE STATIC SENSITIVE. DO NOT HANDLE BEFORE READING PROCEDURE FOR HANDLING ELECTROSTATIC DISCHARGE SENSITIVE DEVICES. ALL FLIGHT CONTROL MODULES CONTAIN DEVICES THAT CAN BE DAMAGED BY STATIC DISCHARGE.

- (1) 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 862-005

- (2) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G17, FLT CONT ELEC 1R AC
  - (f) 11G18, FLT CONT ELEC 1R DC
  - (g) 11G26, FLT CONT ELEC 2R AC
  - (h) 11G27, FLT CONT ELEC 2R DC

S 862-006

- (3) Open the circuit breakers applicable to the module you want to remove and attach DO-NOT-CLOSE tags:
- (a) When you remove the stabilizer trim/aileron lockout module, open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
    - 1) 11H11, STAB TRIM CONT LEFT
    - 2) 11H20, STAB TRIM CONT RIGHT
  - (b) When you remove the rudder ratio changer module, open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11G10, RUDDER RATIO

S 012-063

- (4) Open the electronics access door 119AL (AMM 06-41-00/201).
- D. Procedure

S 862-002

**CAUTION:** DO NOT TOUCH THE RUDDER RATIO CHANGER MODULE OR THE SPOILER CONTROL MODULE BEFORE YOU DO THE PROCEDURE FOR ELECTROSTATIC DISCHARGE SENSITIVE DEVICES. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THESE MODULES.

- (1) If you are removing the Rudder Ratio Changer Module or the Spoiler Control Module, do the procedure for electrostatic discharge sensitive devices (AMM 20-41-01/201).

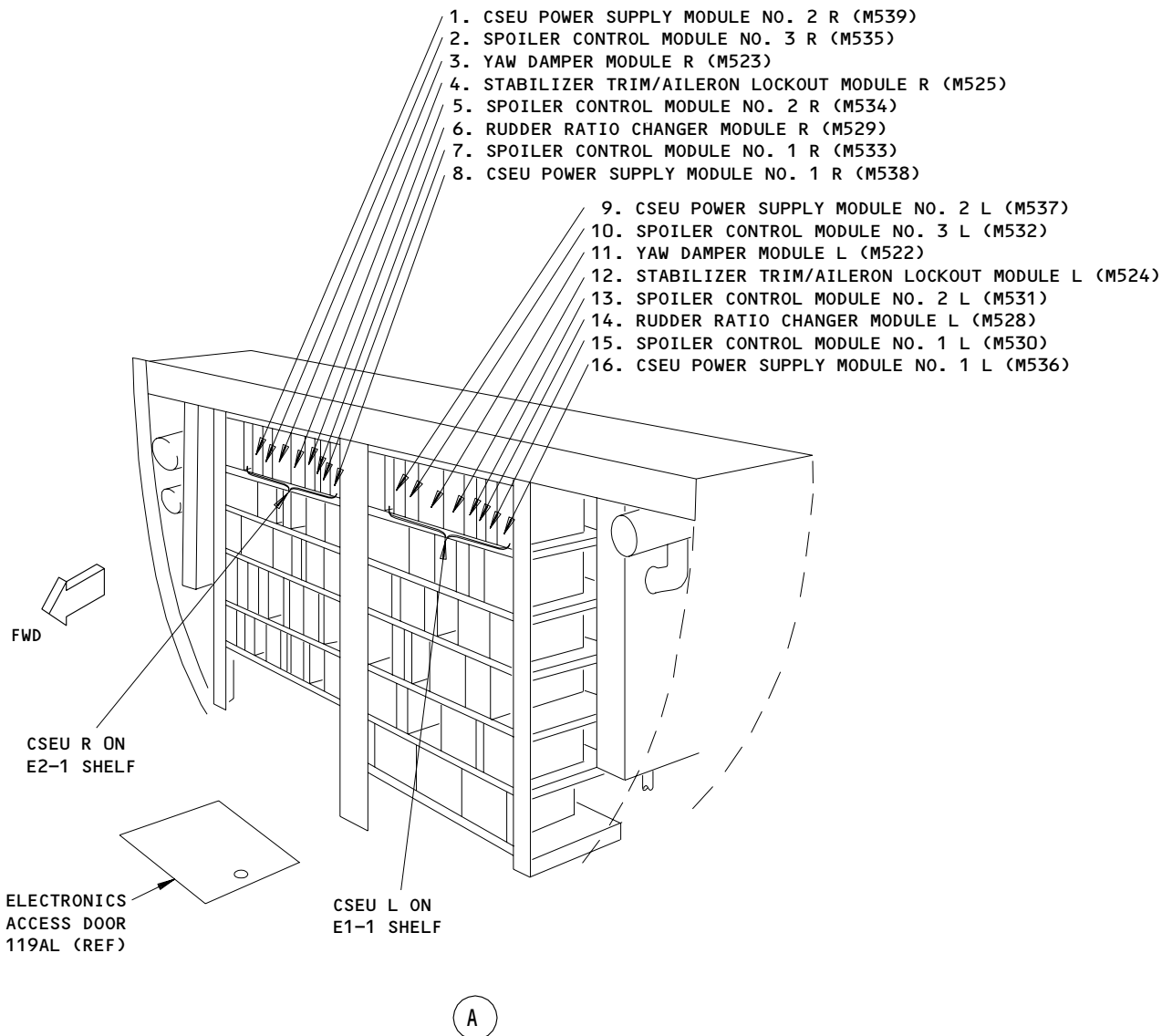
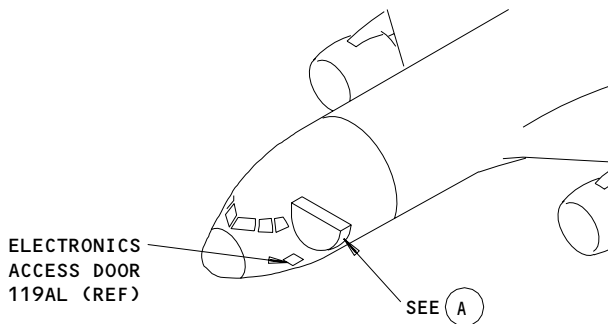
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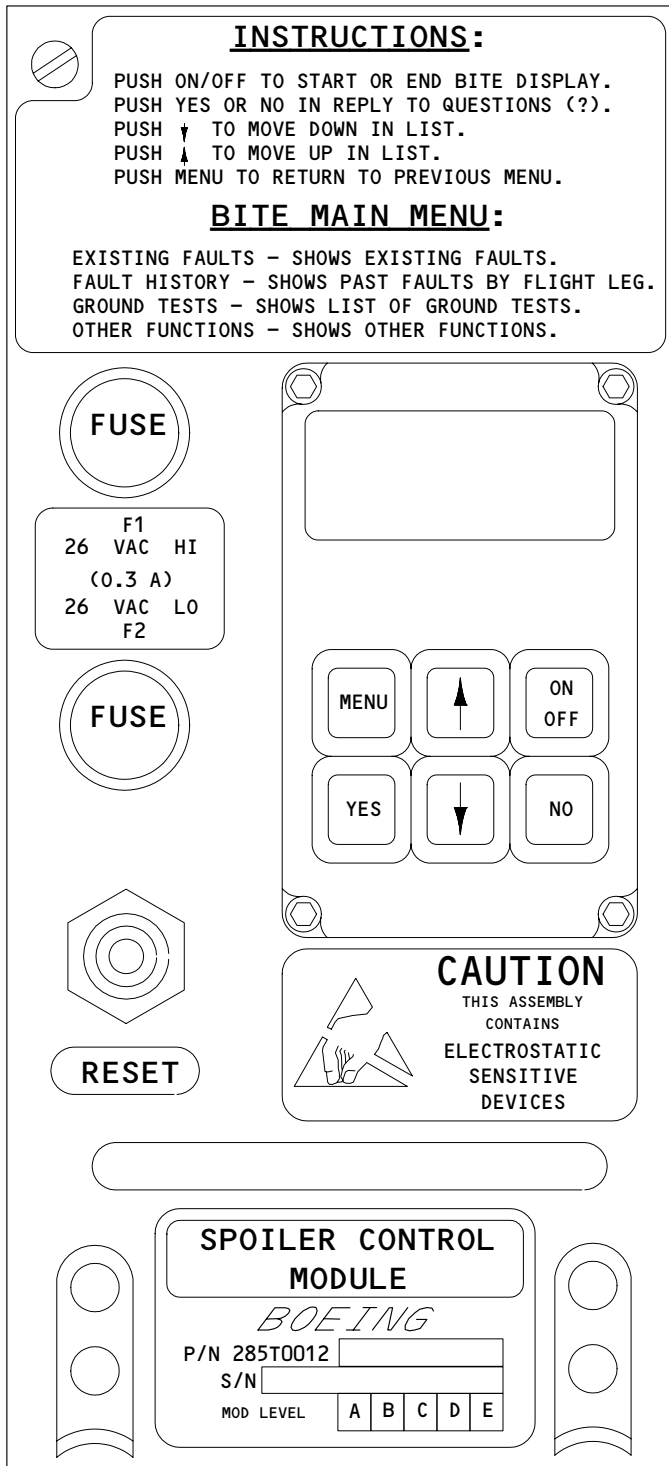
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**A**  
CSEU Module Installation  
Figure 201

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Spoiler Control Module (-200 Series) With BITE Display  
Figure 202

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S 022-007

- (2) Remove the module from the shelf (AMM 20-10-01/401).

TASK 27-09-00-422-008

3. Install the Component (Fig. 201)

A. References

- (1) AMM 20-10-01/401, E/E Rack-Mounted Components
- (2) AMM 20-41-01/201, Electro-Static Sensitive Devices
- (3) AMM 27-61-00/201, Spoiler/Speedbrake

B. Access

- (1) Location Zones
  - 119/120 Main Equipment Center
  - 211/212 Flight Compartment
- (2) Access Panel
  - 119AL Main Equipment Center

C. Procedure

S 862-059

**CAUTION:** DO NOT TOUCH THE RUDDER RATIO CHANGER MODULE OR THE SPOILER CONTROL MODULE BEFORE YOU DO THE PROCEDURE FOR ELECTROSTATIC DISCHARGE SENSITIVE DEVICES. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THESE MODULES.

- (1) If you are installing the Rudder Ratio Changer Module or the Spoiler Control Module, do the procedure for electrostatic discharge sensitive devices (AMM 20-41-01/201).

S 422-028

- (2) If both the 285T0017-103 and -104 CSEU power supply modules are installed you should do this step. This step will make the best use of the -104 module:
  - (a) Install the -104 modules in the 1L (M536) and 1R (M538) positions. You can move a -103 module from these positions to the 2L (M537) or 2R (M539) positions.

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S 812-058

- (3) If you are about to install a spoiler control module in an airplane that has the -200 and the -100 series SCMs installed, the best fault isolation occurs when you have at least one -200 series SCM installed on each shelf.
- (a) When a -200 series SCM is available, it will provide the fastest and best fault isolation for spoiler system troubleshooting.
  - (b) A -200 series SCM is recommended for installation at a shelf position where intermittent problems occur, or when it is necessary to replace a SCM during the fault isolation procedure, to make use of its expanded capacity for fault detection and fault isolation.

S 422-009

- (4) Install the module on the shelf (Ref 20-10-01/401).

S 862-010

- (5) Remove the DO-NOT CLOSE tags and close these circuit breakers on the P11 panel if opened:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G10, RUDDER RATIO
  - (f) 11G17, FLT CONT ELEC 1R AC
  - (g) 11G18, FLT CONT ELEC 1R DC
  - (h) 11G26, FLT CONT ELEC 2R AC
  - (i) 11G27, FLT CONT ELEC 2R DC
  - (j) 11H11, STAB TRIM CONT LEFT
  - (k) 11H20, STAB TRIM CONT RIGHT

S 862-004

- (6) Put the system back to its initial condition.

S 862-011

- (7) Do the system test for the module you installed.

TASK 27-09-00-742-064

4. Installation Test of CSEU Module(s)

A. General

- (1) An additional test to verify the interface with the autoflight system is required after the replacement of the Stabilizer Trim/Aileron Lockout Module.

B. References

- (1) AMM 22-00-02/201, Autoflight BITE
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-11-00/501, Aileron and Aileron Trim Control System (Test Outboard Aileron Lockout) - Adjustment/Test

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- (4) AMM 27-21-00/501, Rudder and Rudder Trim Control System (Test Rudder Ratio Changers) - Adjustment/Test
- (5) AMM 27-61-00/201, Spoiler/Speedbrake
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) AMM 32-09-02/201, Air/Ground Relays

C. Access

- (1) Location Zones
  - 119/120 Main Equipment Center
  - 211/212 Flight Compartment
- (2) Access Panel
  - 119AL Main Equipment Center

D. Prepare to Test

S 862-060

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

S 862-061

- (2) Pressurize the left, right, and center hydraulic systems (AMM 29-11-00/201).

E. Do a Test of the Power Supply Module (PSM)

S 282-013

- (1) AIRPLANES WITH -104 POWER SUPPLY MODULES;  
Make sure that all circuit breakers on the front panels of the CSEU Power Supply Modules (1L, 2L, 1R, and 2R) are closed.

S 282-014

- (2) Make sure a failure does not show (a faultball is not latched) on the CSEU power supply module front panel.

**NOTE:** The faultball is yellow if it is latched (indicates a fault) and black if it is unlatched (indicates normal operation).

F. Do a System Test for the Spoiler Control Modules (SCMs)

S 862-029

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Pressurize the left, right, and center hydraulic systems and reservoirs (AMM 29-11-00/201).

S 282-030

- (2) Make sure the control wheel is in the neutral position.

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- S 282-031
- (3) Make sure the speedbrake lever, on the pilot's aft control stand P8, is in the down-and-locked position.
- S 862-032
- (4) Push the ECS MSG button on the EICAS MAINT panel on the right side panel, P61.
- S 862-033
- (5) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11G11, AUTO SPEEDBRAKE
- S 862-034
- (6) Push the RESET button on each of the six SCMs.
- S 282-035
- (7) AIRPLANES WITH -200 SERIES SCMs;  
Do the steps that follow to make sure EXISTING FAULTS? shows on the BITE display for each of the -200 series SCMs:
- (a) Push the ON/OFF button on the front panel of each -200 series SCM to the ON position.
- (b) If EXISTING FAULTS? does not show on the BITE display, you must enter the correct shelf position in the display:
- 1) Push the NO button to show the correct shelf position.
- 2) Push the YES button two times to select and confirm the correct shelf position.
- NOTE: EXISTING FAULTS? will now show in the display.
- (c) Push the ON/OFF button on the front panel of each -200 series SCM to the OFF position.
- S 282-036
- (8) Make sure the SPOILERS light is off, and the EICAS message SPOILERS does not show on the top or bottom display.
- S 282-037
- (9) Make sure all persons and equipment are away from all control surfaces.

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S 862-038

- (10) Make sure the airplane is in the ground mode (AMM 32-09-02/201).

NOTE: When you change the air/ground state of the airplane, an air/ground system fault will occur if the air/ground signals disagree for more than 25 seconds.

NOTE: Use at least 10 seconds to complete each of the flight control movements that follow. Before you begin the next movement, hold the flight control in its position for 4 seconds.

S 862-039

- (11) Move the speedbrake lever from the down-and-locked position to the full-up position.

S 862-040

- (12) Move the control wheel from the neutral position to the full right position.

S 862-041

- (13) Move the control wheel back to the neutral position.

S 862-042

- (14) Move the control wheel from the neutral position to the full left position.

S 862-043

- (15) Move the control wheel back to the neutral position.

S 862-044

- (16) Move the speedbrake lever from the full-up position to the down-and-locked position.

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S 862-045

**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.

(17) Put the air/ground relay system (systems No. 1 and No. 2) in the air mode (AMM 32-09-02/201).

**NOTE:** AIRPLANES WITH -200 SERIES SCMs;  
If you follow an air to ground transition in 10 seconds or less with a full speedbrake command, you will advance the flight leg data stored in the FAULT HISTORY memory. The SCM does not prevent the advance of the flight leg data in the procedure that follows.

S 862-046

(18) Move the speedbrake lever from the down-and-locked position to the full-up position.

S 862-047

(19) Move the control wheel from the neutral position to the full right position.

S 862-048

(20) Move the control wheel back to the neutral position.

S 862-049

(21) Move the control wheel from the neutral position to the full left position.

S 862-050

(22) Move the control wheel back to the neutral position.

S 862-051

(23) Move the speedbrake lever from the full-up position to the down-and-locked position.

S 282-052

(24) Make sure the SPOILERS light does not come on, and the EICAS message SPOILERS does not show on the top or bottom display.

S 282-053

(25) AIRPLANES WITH -100 SERIES SCMs;  
Make sure all faultballs on the front panels of each of the -100 series SCMs do not show yellow.

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S 812-054

- (26) If the SPOILERS light does not come on, the EICAS message SPOILERS does not show on the top or bottom display, and no faultballs show yellow on -100 series SCMs, then the spoiler system and the spoiler control modules operate correctly.

S 862-055

- (27) Put the air/ground relay system back to the ground mode (AMM 32-09-02/201).

S 862-056

- (28) Remove hydraulic power if it is not necessary (AMM 29-11-00/201).

S 862-057

- (29) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead circuit breaker panel, P11:  
(a) 11G11, AUTO SPEEDBRAKE

G. Do a Test of the Stabilizer Trim/Aileron Lockout Module (SAM)

S 722-024

- (1) Do MCDP Ground Test-65 STAB TRIM to test the auto stabilizer trim interfaces with the Autopilot/Flight Director (AMM 22-00-02/201).

S 862-025

- (2) Do the outboard aileron lockout test (AMM 27-11-00/501) to test the aileron lockout section of SAM.

H. Do a Test of the Rudder Ratio Changer Module (RRCM)

S 712-062

- (1) Do the procedure to test the left or right RRCM (AMM 27-21-00/501).

NOTE: This procedure is a part of the System Test - Rudder and Rudder Trim Control task in 27-21-00/501.

I. Put the Airplane Back to Its Initial Condition

S 862-026

- (1) Remove hydraulic power if it is not necessary (AMM 29-11-00/201).

S 862-027

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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FLIGHT CONTROLS – MAINTENANCE PRACTICES

1. General

- A. Aileron and Tabs help control aircraft movements and are moved by:
  - (1) Control wheels
  - (2) Cables
  - (3) Boosters
  - (4) Linkages
  - (5) Actuators
- B. Corrosion can occur on the following items:
  - (1) Pilots control wheel bearings.
  - (2) Bearings in the linkage of the power control actuator, outboard aileron lockout mechanism, and aileron control feel mechanism.
  - (3) Springs in the inboard aileron droop mechanism.
  - (4) Wheel well control rod bearings.
  - (5) Bearings in the input linkage of the power control actuators.
- C. The deployment of flight control surfaces exposes portions of the aileron control system to:
  - (1) Ground contaminants, thrust reverser soot, runway dirt, and inclement weather, all of which contributes to corrosion.

TASK 27-10-00-642-001

2. Corrosion Prevention

- A. References
  - (1) AMM 06-44-00/201, Wing Access Doors and Panels
  - (2) AMM 12-21-07/301, Aileron and Aileron Trim – Servicing (Lubrication)
  - (3) AMM 12-21-31/301, Control Cables – Servicing (Lubrication)
  - (4) AMM 27-11-06/403, Aileron Control Wheel and Bearings – Removal/Installation
  - (5) SRM 51-10-02, Inspection and removal of Corrosion Damage
- B. Access
  - (1) Location Zones
    - 211/212 Control Cabin
    - 556 Inboard Aileron (Left)
    - 656 Inboard Aileron (Right)
    - 567 Outboard Aileron (Left)
    - 667 Outboard Aileron (Right)
    - 730 Left Hand Main Landing Gear Doors
    - 740 Right Hand Main Landing Gear Doors
    - 561/661 Rear Spar to Trailing Edge

EFFECTIVITY

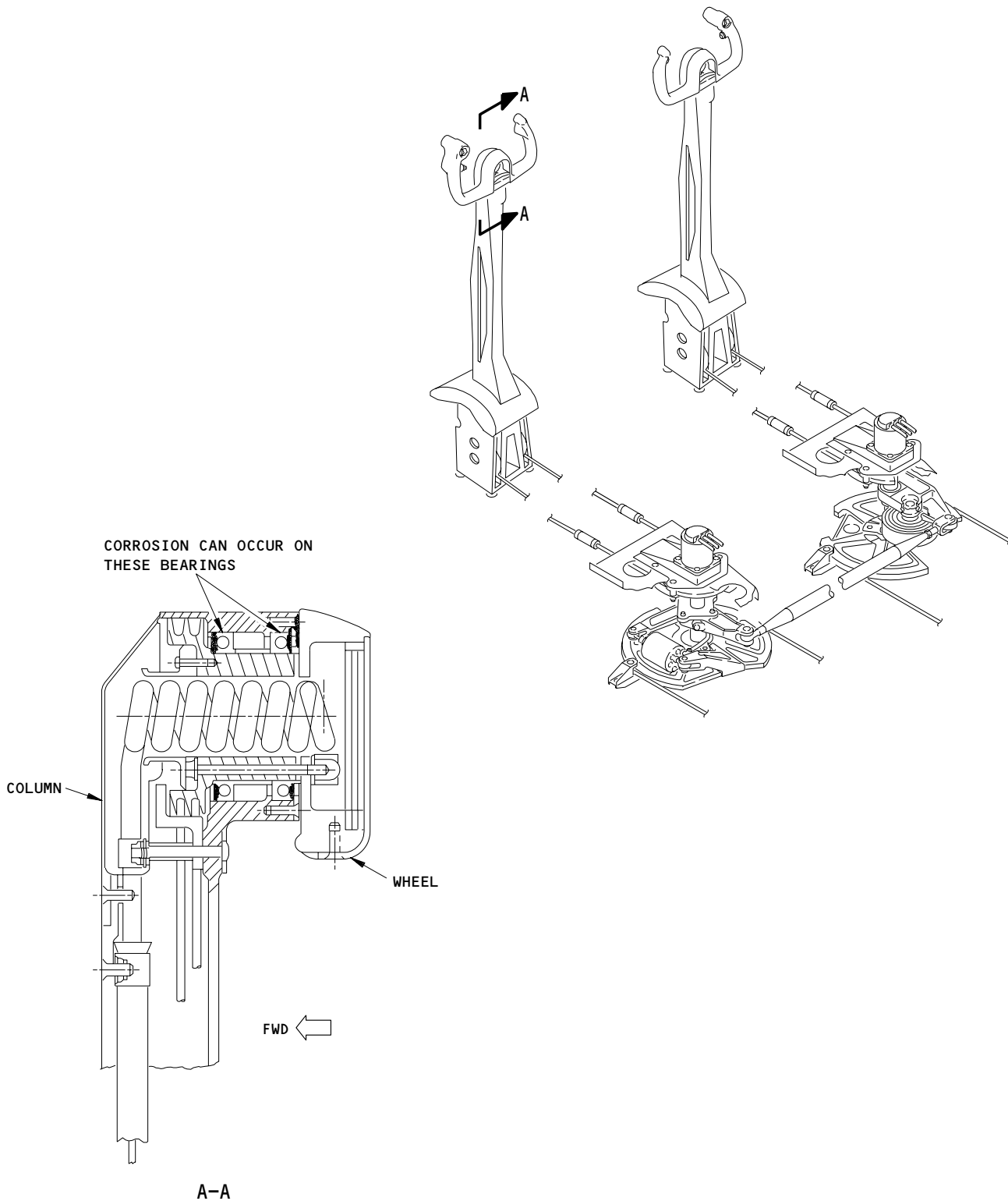
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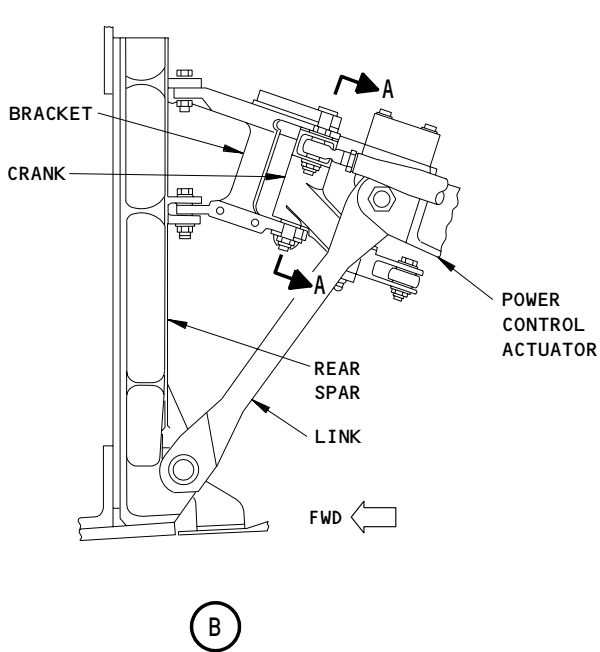
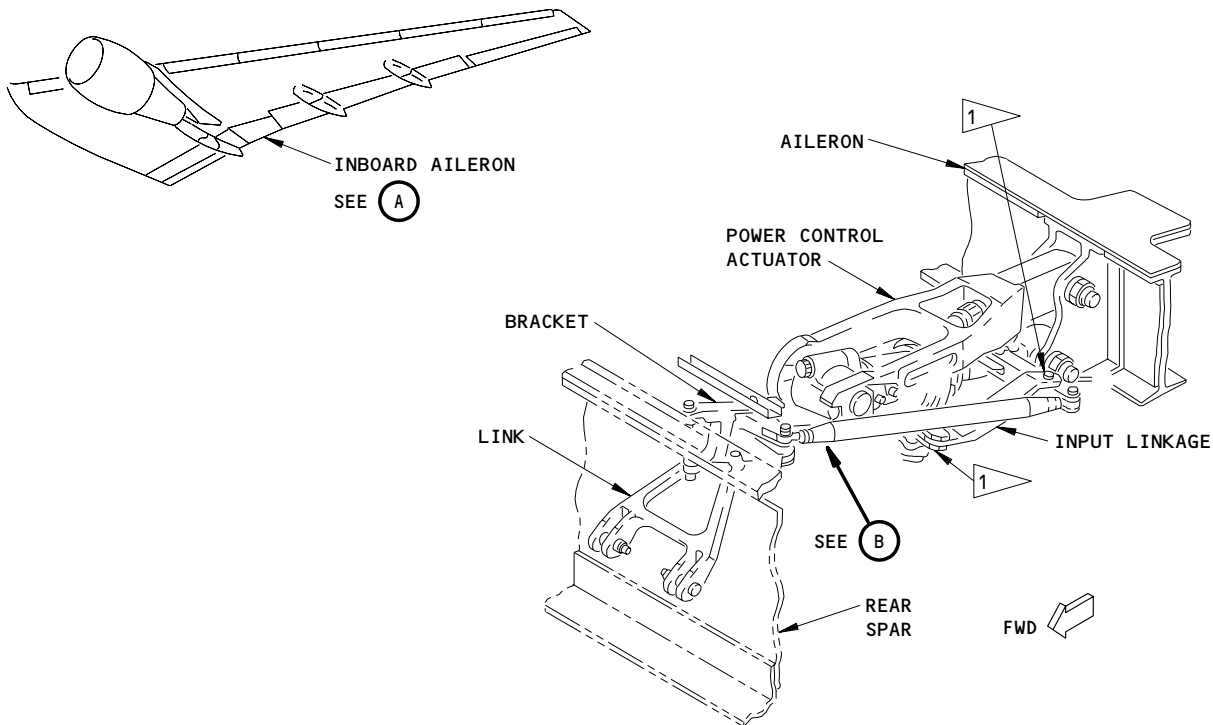
Control Wheel and Column Assembly  
Figure 201

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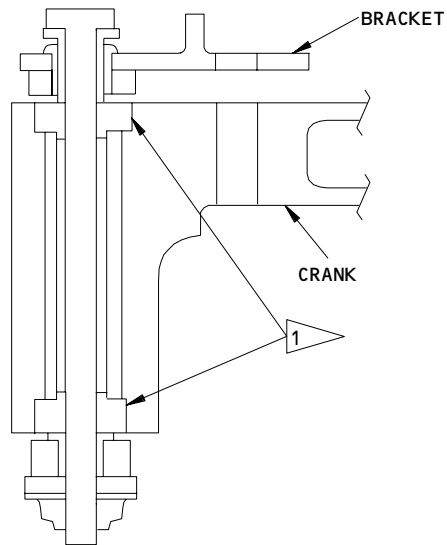
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INBOARD AILERON

(A)



1 CORROSION CAN OCCUR ON THESE BEARINGS

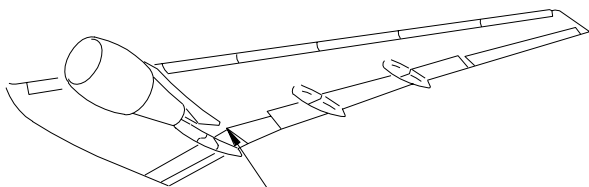
Inboard Aileron Power Control Actuator  
Figure 202

EFFECTIVITY	ALL
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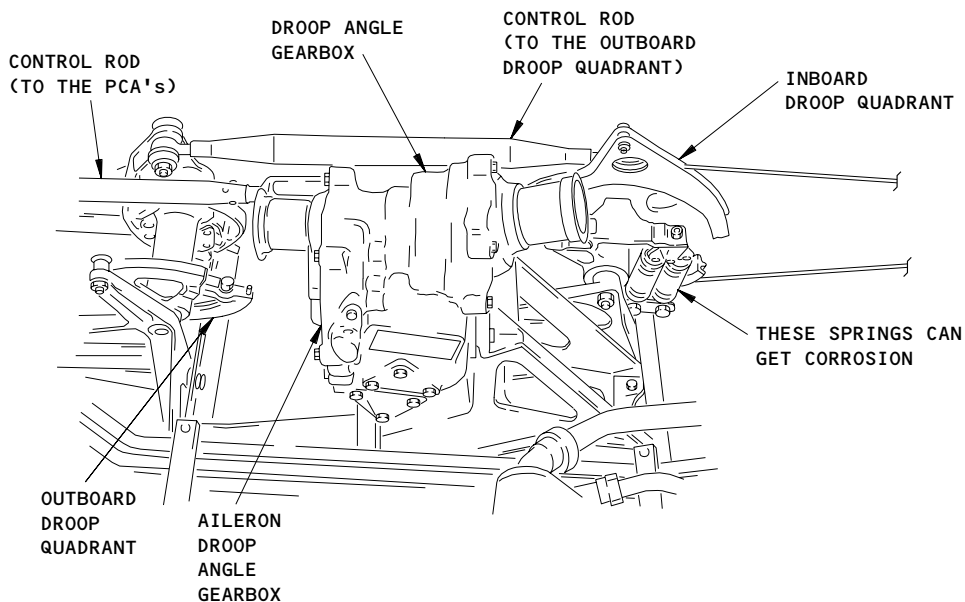
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INBOARD AILERON  
DROOP MECHANISM

SEE (A)

LEFT WING  
(RIGHT WING IS OPPOSITE)



INBOARD AILERON DROOP MECHANISM

(A)

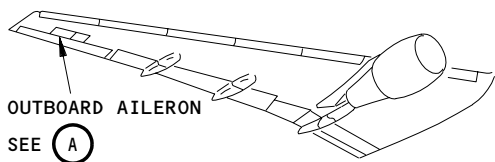
Inboard Aileron Droop Mechanism Installation  
Figure 203

EFFECTIVITY	ALL
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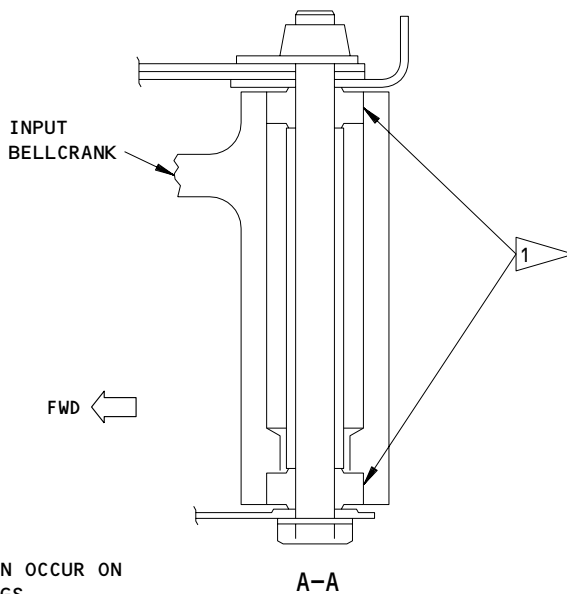
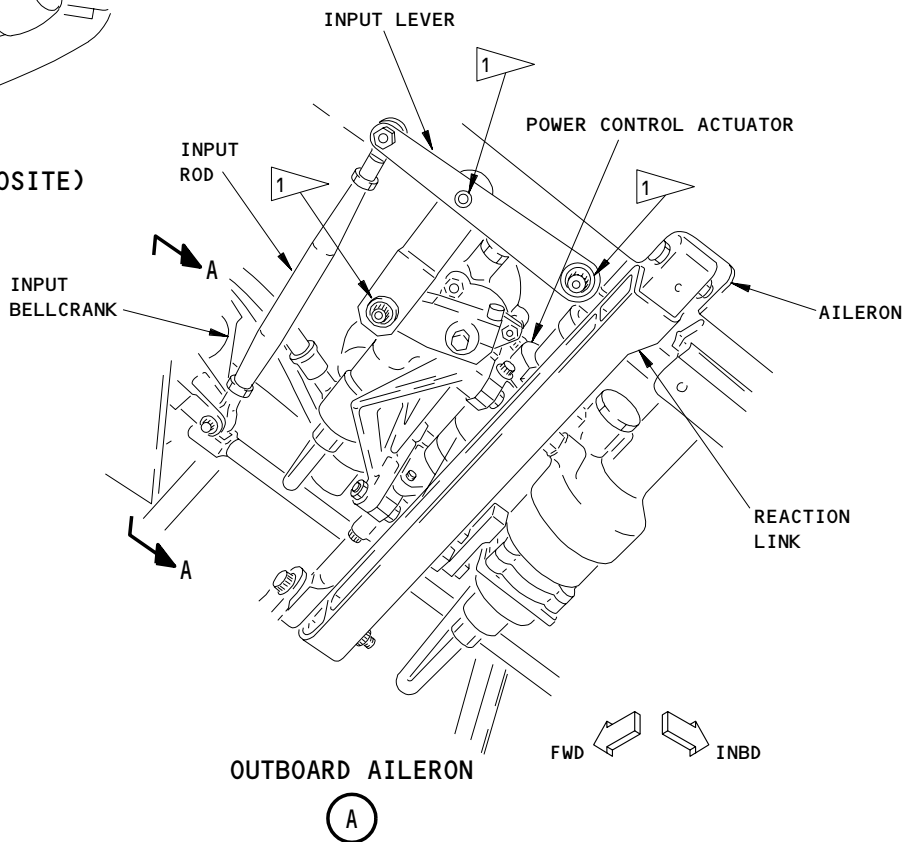
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RIGHT WING  
(LEFT WING IS OPPOSITE)



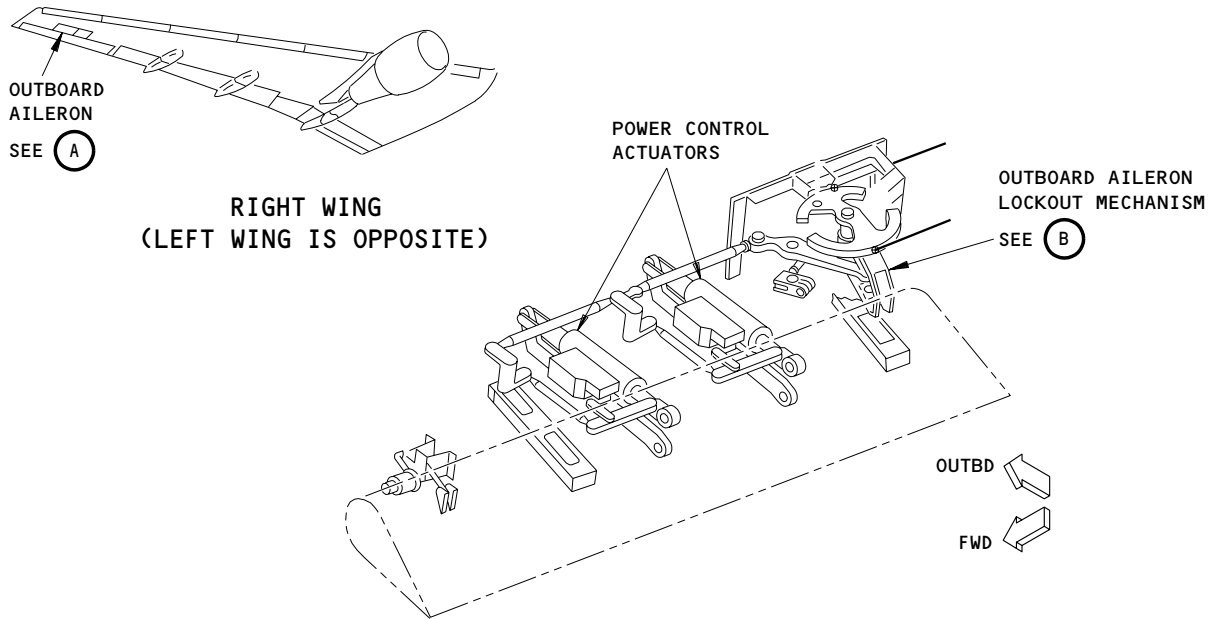
Outboard Aileron Power Control Actuator  
Figure 204

EFFECTIVITY	ALL
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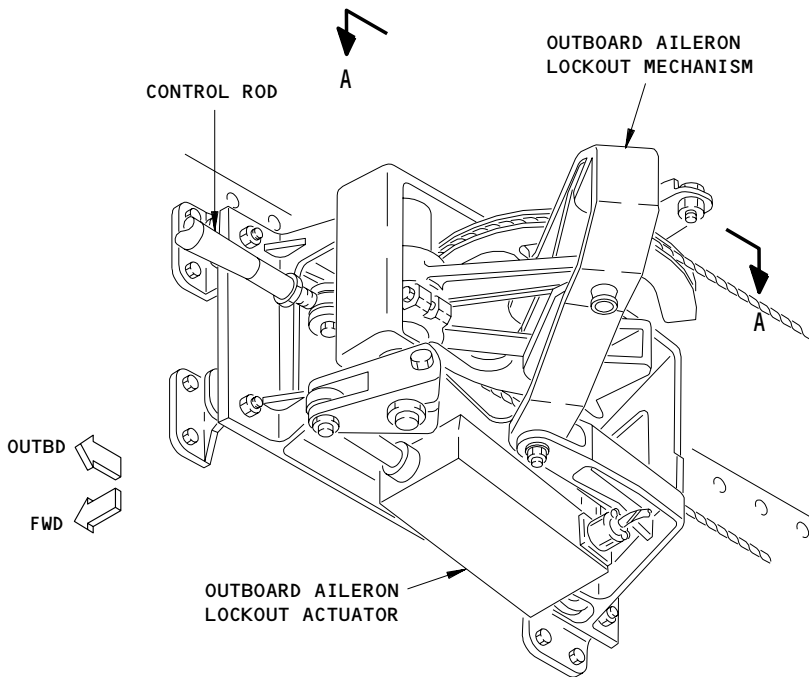
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OUTBOARD AILERON

(A)



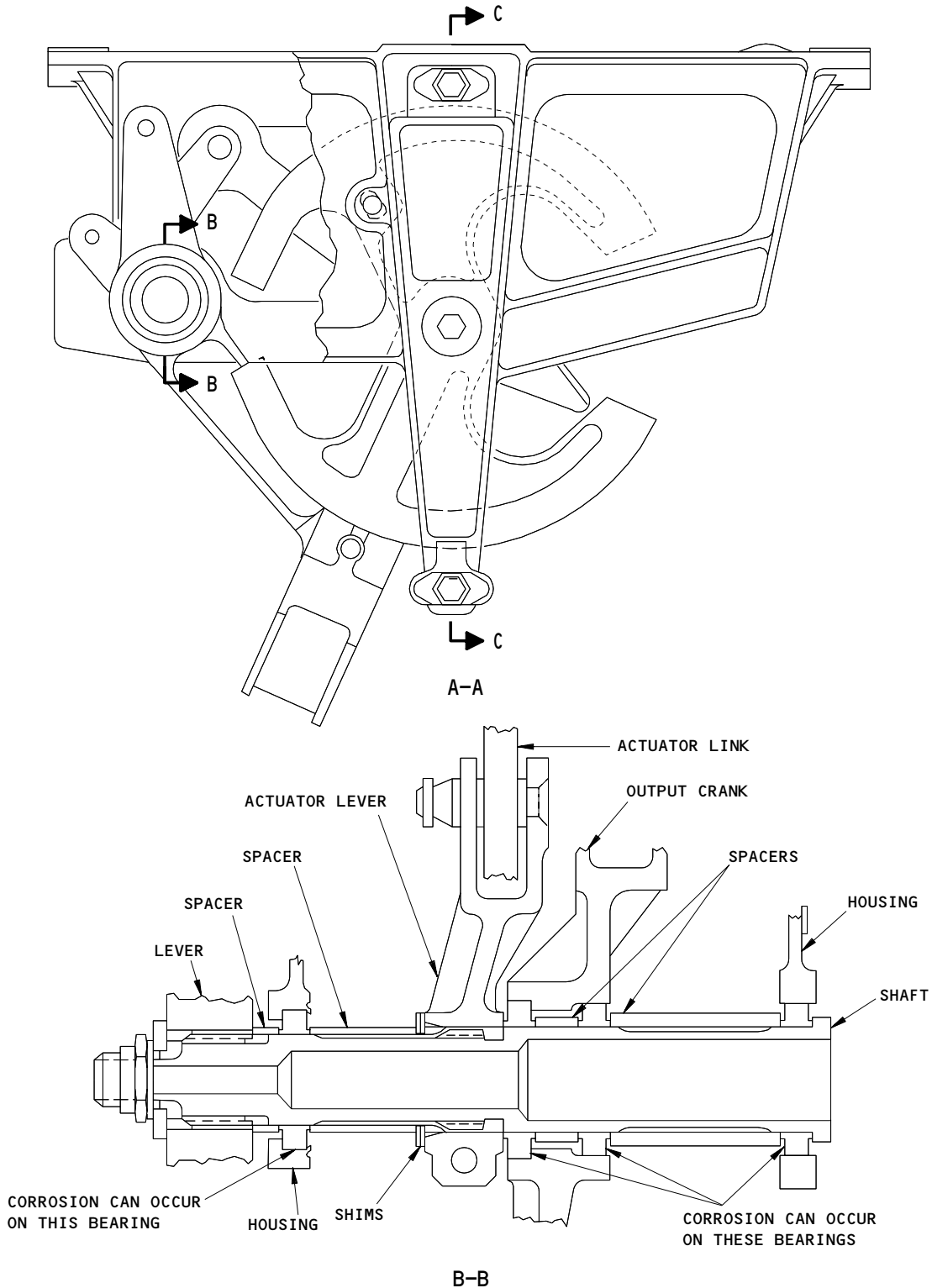
OUTBOARD AILERON LOCKOUT MECHANISM

(B)

Outboard Aileron Lockout Mechanism  
Figure 205 (Sheet 1)

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Outboard Aileron Lockout Mechanism  
Figure 205 (Sheet 2)

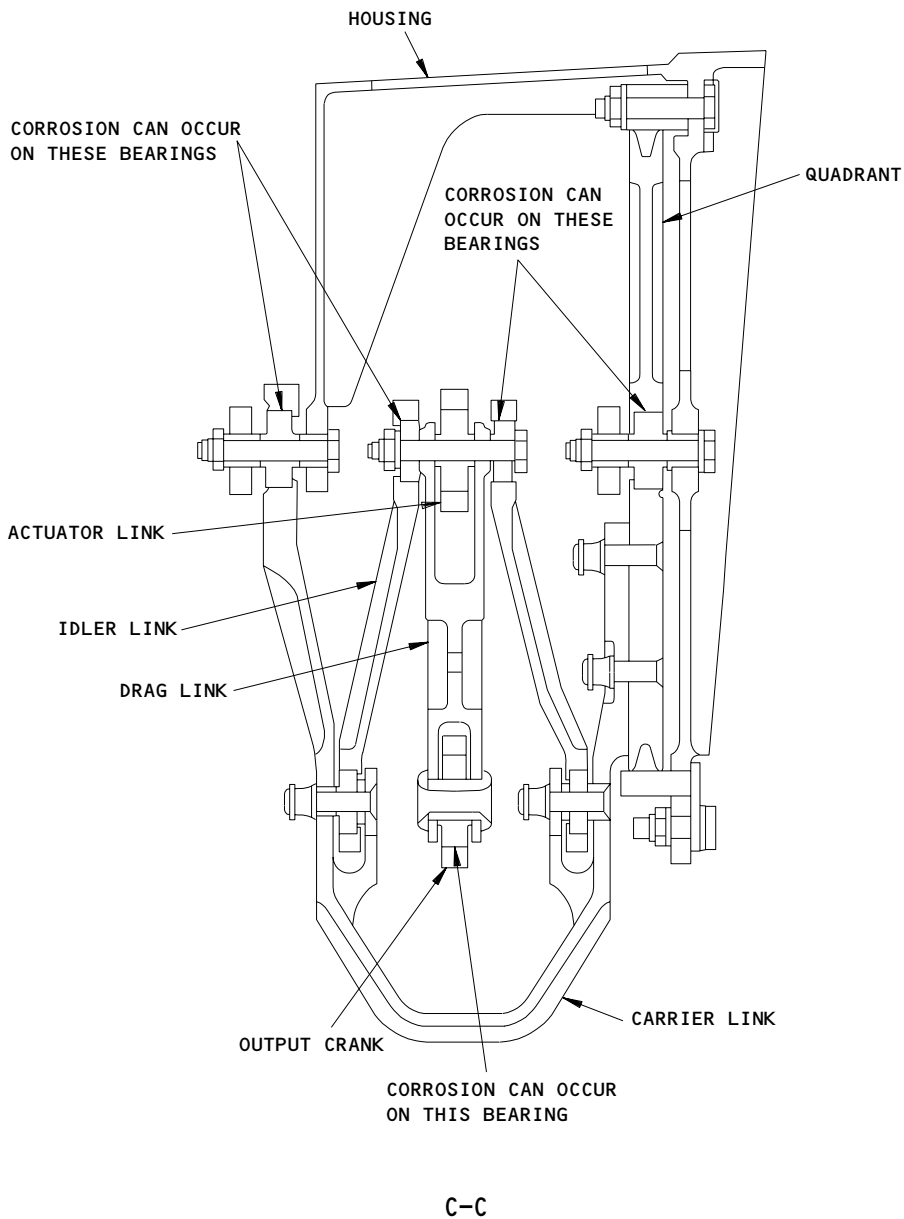
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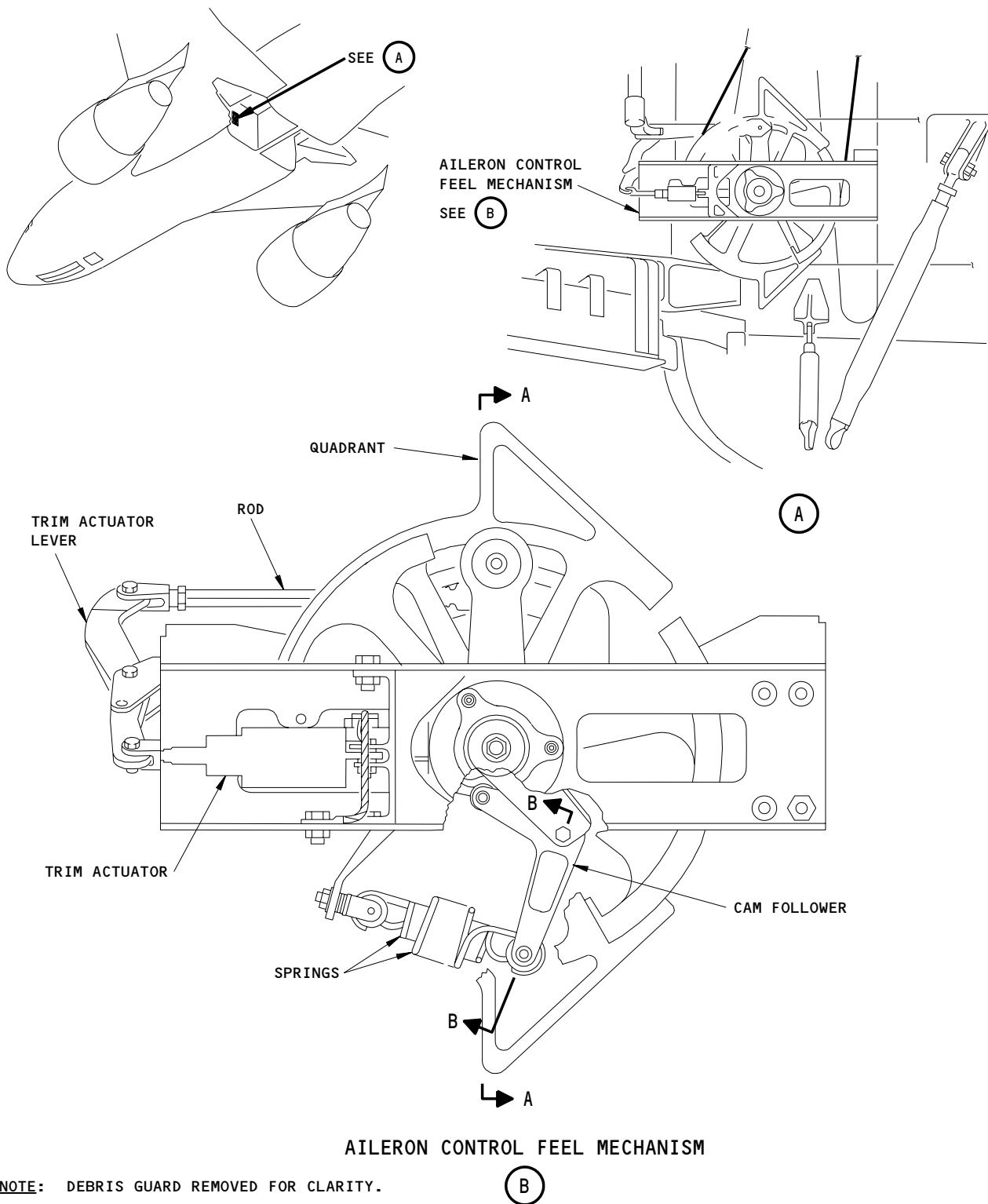
Outboard Aileron Lockout Mechanism  
Figure 205 (Sheet 3)

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Aileron Control Feel Mechanism  
Figure 206 (Sheet 1)

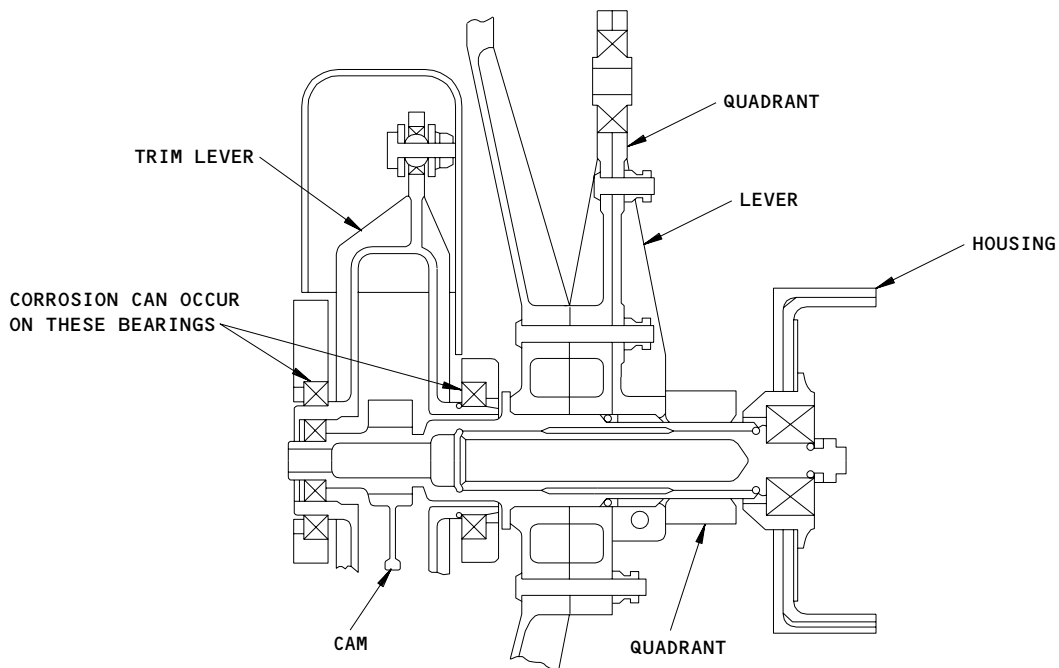
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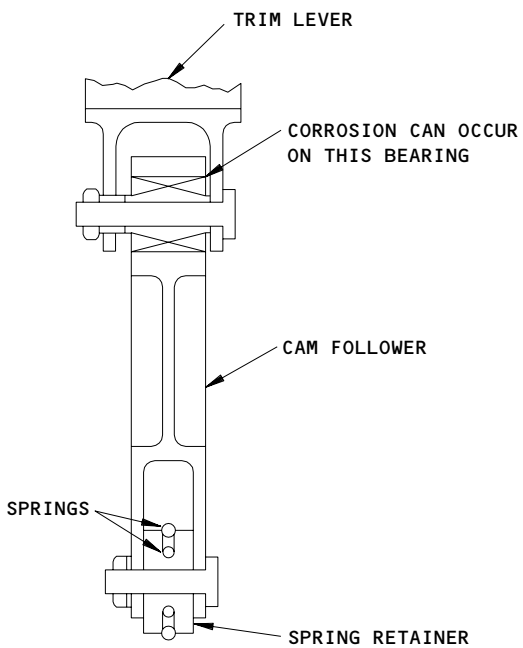
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A-A



(ROTATED CCW)  
B-B

Aileron Control Feel Mechanism  
Figure 206 (Sheet 2)

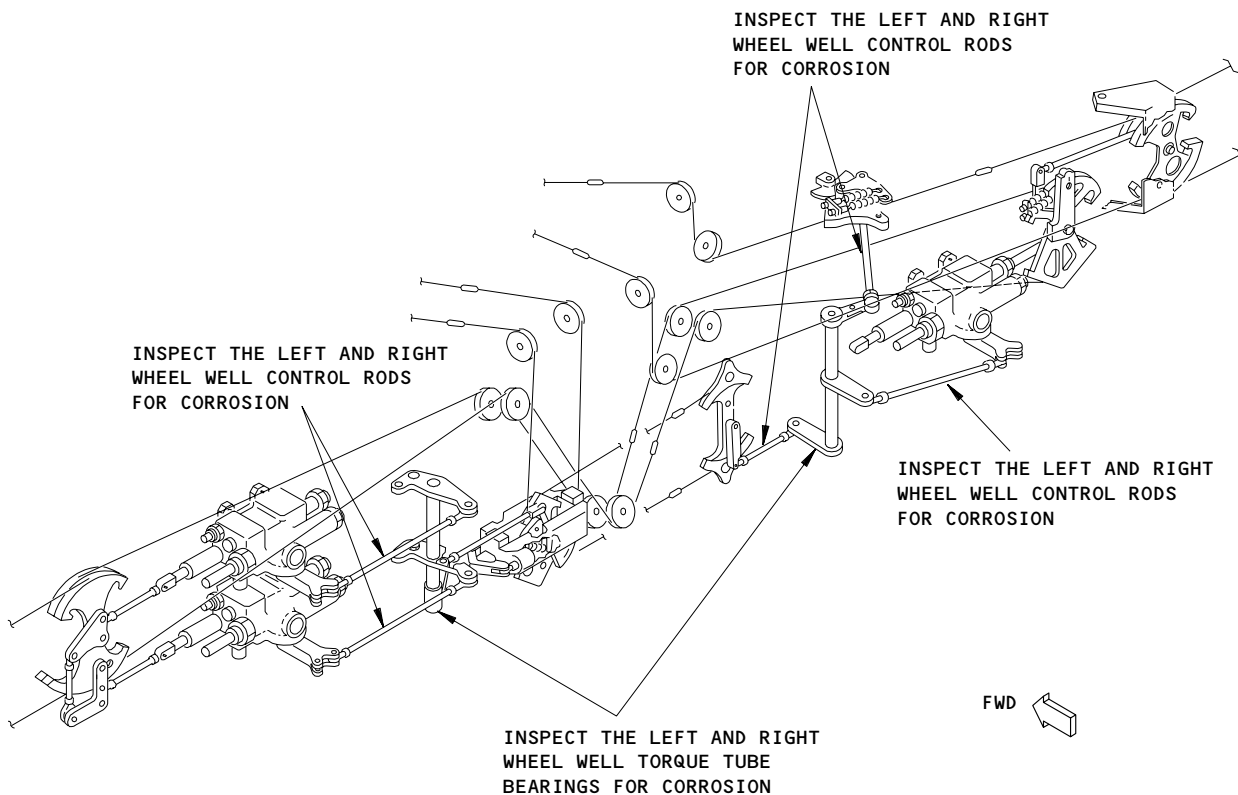
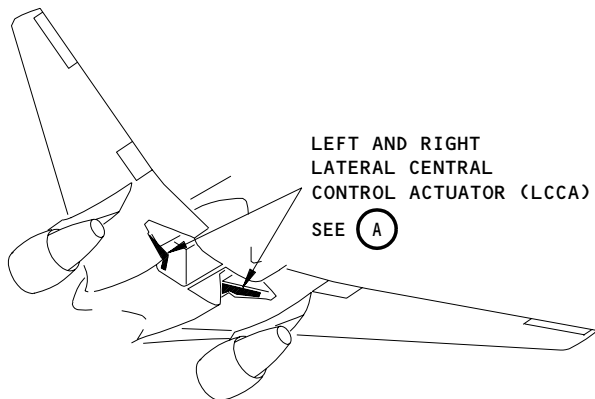
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J12105



LEFT AND RIGHT LATERAL CENTRAL  
CONTROL ACTUATOR

(A)

Wheel Well Control Rod Bearing Inspection  
Figure 207

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J12109

- (2) Access Panels
  - 561/661 AB Wing TE Structure, Aileron Controls
  - 561/661 BB Wing TE Inboard Aileron Actuators
  - 561/661 CB Wing TE Structure, Aileron Controls
  - 561/661 RBX Outboard Aileron Lockout Mechanism
  - 561/661 MB Outboard aileron Actuators

C. Procedure

S 202-005

- (1) Inspect control wheel bearings and wheelwell control rod bearings for corrosion (noticeable white deposits, discoloration, and flaking), (Figure 201, 207).

S 202-008

- (2) Inspect Cables, Linkages, Boosters, and Actuators for corrosion (Noticeable white deposits, discoloration, flaking, and scaling).

S 102-006

- (3) For corrosion damage, it is necessary to do rework to the damage area to find the penetration depth of the damage into a structural member before you can establish its classification as allowable damage or damage requiring repair or replacement.

S 142-007

- (4) Remove all corrosion, evaluate damage and repair or replace all discrepant structure areas common to the flight controls. Follow up with an application of protective finishes and corrosion inhibiting compounds to retard future corrosion (SRM 51-10-02).

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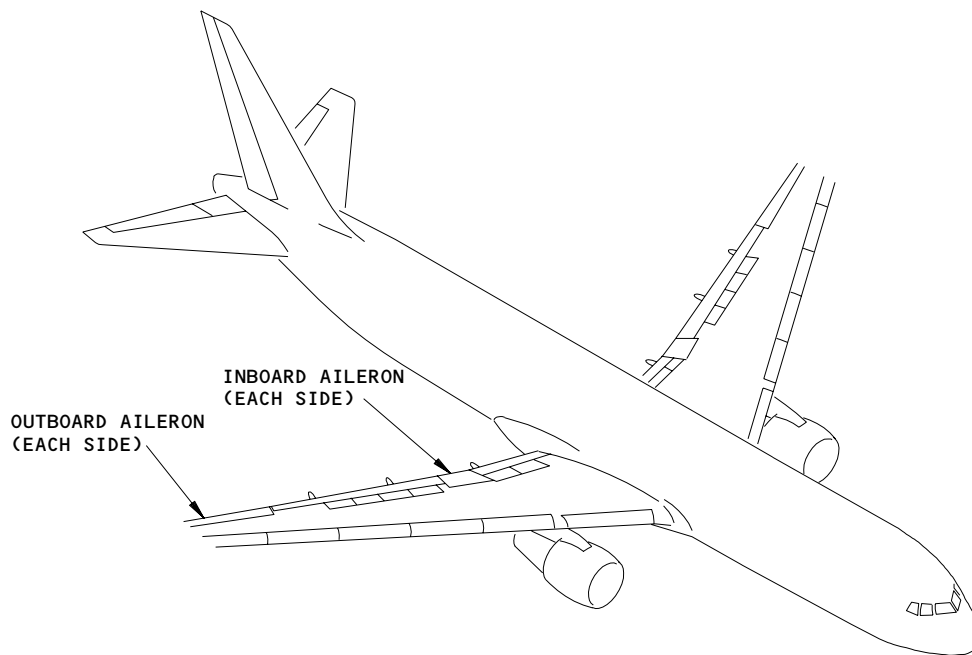
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AILERON AND AILERON TRIM CONTROL SYSTEM – DESCRIPTION AND OPERATION

1. General

- A. The inboard and outboard ailerons and the spoilers (AMM 27-61-00/001), provide lateral control of the airplane (Fig. 1). At cruise speeds (approximately 278 knots), the outboard ailerons are locked in the neutral position to prevent over control. The inboard ailerons droop ten degrees when the flaps are fully extended to change the attitude of the airplane during landings.
- B. Description and operation of the stabilizer trim/aileron lockout module (SAM) is covered in the following paragraphs. Removal and installation of the SAM is covered in AMM 27-09-00/201.



Ailerons  
Figure 1

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- C. The ailerons are controlled by cable systems and powered by hydraulic actuators. Control wheel inputs are transferred by body cables to three lateral central control actuators (LCCAs). The LCCAs drive wing cables to the power control actuators (PCAs) at each aileron surface. Aileron trim switches electrically operate the ailerons.
- D. The autopilot system (AMM 22-11-00/001) provides automatic control of the ailerons. Electrical signals command the LCCA electrohydraulic servo valves to drive the wing cables. The "Control Wheel Steering" mode enables the flight crew to use the control wheels without disconnecting the autopilot system.
- E. The aileron position indicator is displayed on the lower EICAS display unit status page (Fig. 2). For more information on the aileron position indicating system, refer to AMM 27-18-00/001. EICAS will also indicate a failure in the aileron lockout system.

2. Component Locations (Fig. 3)

- A. The aileron drum assemblies are under the flight deck floor aft of the control column bases. The lost motion and load limiter assemblies are part of the first officer's drum. The control wheel force transducer is attached to the captain's drum. A bus rod connects the captain's drum to the first officer's drum. Both drum assemblies have three spoiler RVDTs (AMM 27-61-00/001) attached to them.
- B. The body cables run under the main deck floor along the sides of the fuselage. The primary body cables lie along the left side of the airplane and end in the left wheel well. The backup body cables lie along the right side of the airplane and end in the right wheel well. The wing cables run along the wing rear spars from the LCCA output quadrants to the lockout mechanisms.
- C. Several aileron components are found in the wheel wells and adjacent wing rear spars. The left wheel well area contains the feel, centering, and trim mechanism, the left LCCA torque tube, two LCCAs, and the left LCCA output quadrant. The right wheel well area contains the right aileron control quadrant, the right LCCA torque tube, the aileron control override mechanism, one LCCA, the right LCCA output quadrant, and the right aileron control output quadrant.
- D. The inboard ailerons are attached to the wing trailing edge between the inboard and outboard flaps. The outboard ailerons are attached to the wing trailing edge outboard of the outboard flaps. There are two PCAs attached to the leading edge of each aileron surface. Each aileron surface has one position transmitter. They are located outboard and forward of the PCAs.
- E. The inboard aileron droop mechanisms are on the wing rear spar, just inboard of the inboard ailerons. The aileron lockout mechanisms are on the wing rear spar just inboard of the outboard ailerons.

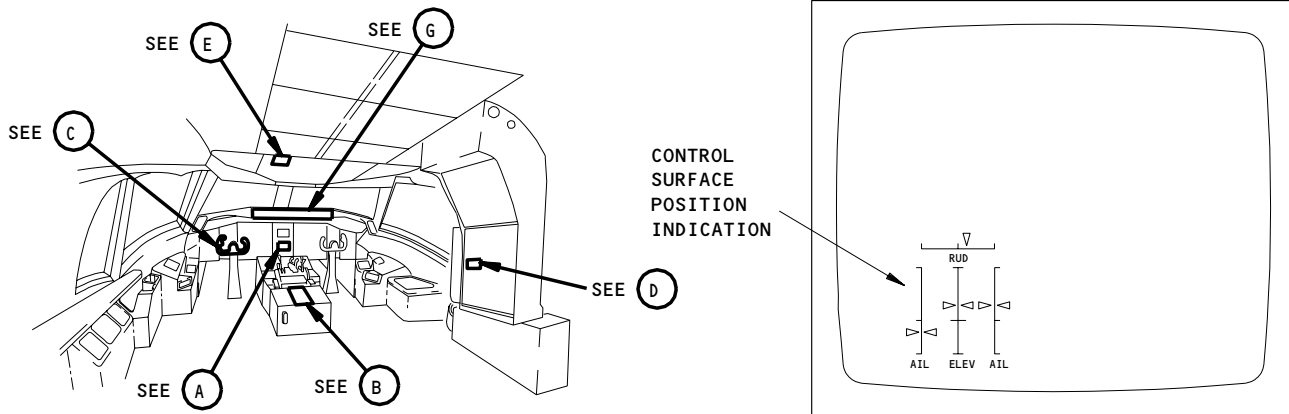
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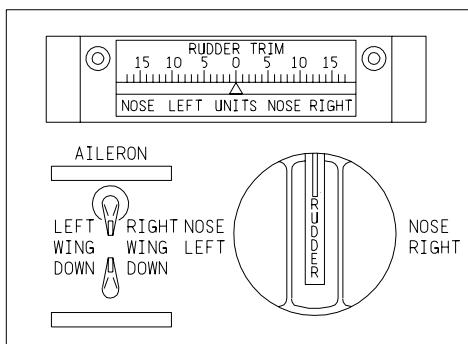
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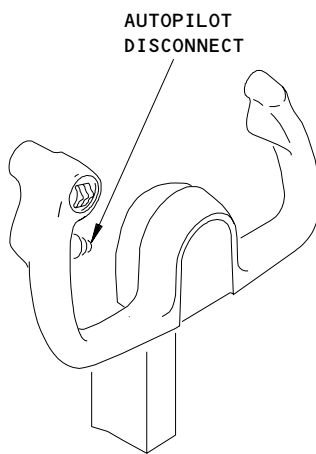
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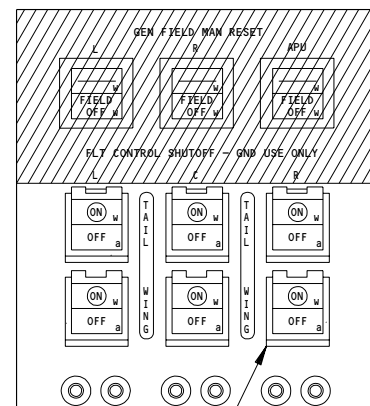
LOWER EICAS DISPLAY (P2)



LATERAL TRIM SWITCHES (P8)

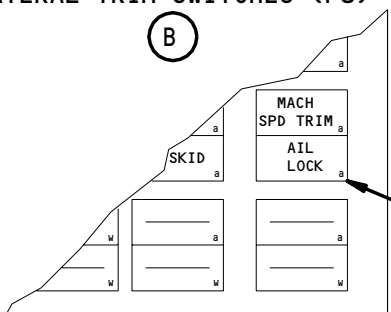


CONTROL WHEEL

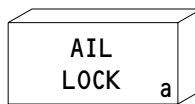


WING SHUTOFF SWITCHES

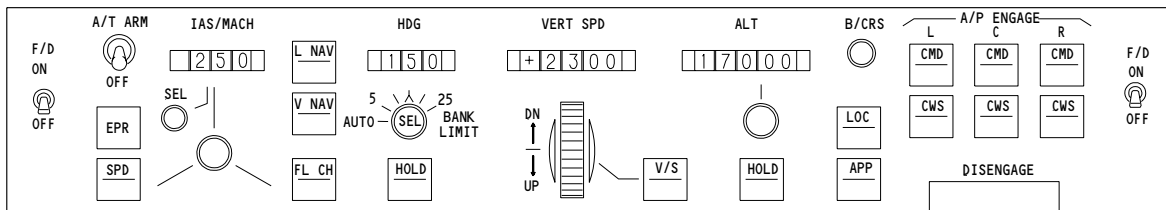
HYD/GEN FIELD CONT (P61)



P5 OVERHEAD PANEL



AIL LOCK



AUTOPILOT MODE CONTROL PANEL (P55)

Aileron System  
Figure 2

EFFECTIVITY

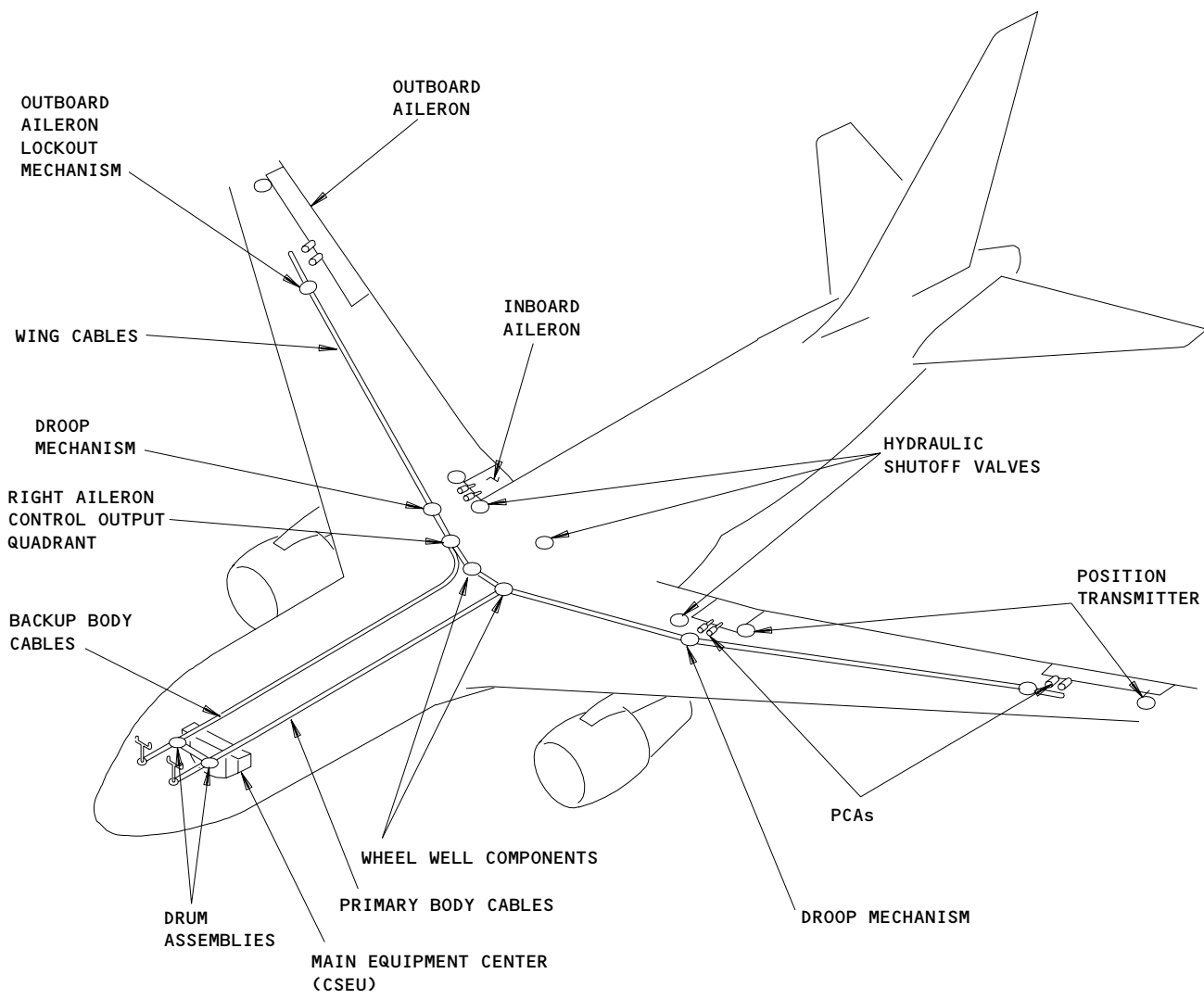
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Component Locations  
Figure 3

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- F. Three shutoff valves (AMM 27-13-00/001) control hydraulic fluid flow to the aileron and spoiler PCAs. The valves are for ground use only. They are controlled by push-button switches on the right side panel, P61.
- G. The flight control system electronics unit (CSEU) modules are on the top shelf of the main equipment center. The stabilizer trim and aileron lockout modules (SAMs) are part of the CSEU system. The SAM monitors the condition of the aileron lockout mechanism. A failure of either mechanism causes a yellow fault ball to appear on the face of the related SAM. The fault ball is reset by pressing the reset button on the face of the SAM.

3. Component Details

A. Control Wheels (Fig. 4)

- (1) The control wheels on the 767 are similar to those used on other airplanes. Each has four control switches on the outboard horn: stabilizer trim, microphone, interphone, and autopilot disconnect. Mechanical stops limit wheel rotation to 65 degrees in either direction. The control wheel and the column cable quadrant rotate on a common shaft.
- (2) The control columns house the cables that connect the control wheels to the aileron drum assemblies. The cables are attached to the column cable quadrants at the top of the columns and run through the columns and under the flight deck floor.

B. Aileron Drum Assemblies (Fig. 4)

- (1) The drum assemblies are located between the flight deck floor and the nose gear wheel well. Access to the drums is through the main equipment center or flight deck floor access panels.
- (2) The drum assembly consists of two cable drums and a bus crank mounted one above the other on a shaft. The upper drum is attached to the control column cables. The bus crank of each drum assembly is attached to the other by a bus rod. The captain's lower drum is attached to the primary body cables and the first officer's lower drum is attached to the backup body cables. Each drum assembly has a spoiler RVDT unit mounted on the top drum. The control wheel steering force transducer is located between the bus crank and lower drum on the captain's drum assembly. The transducer senses control wheel inputs. Three pounds (1.4 kilograms) of control wheel force produces a transducer signal to the data management unit (DMU).

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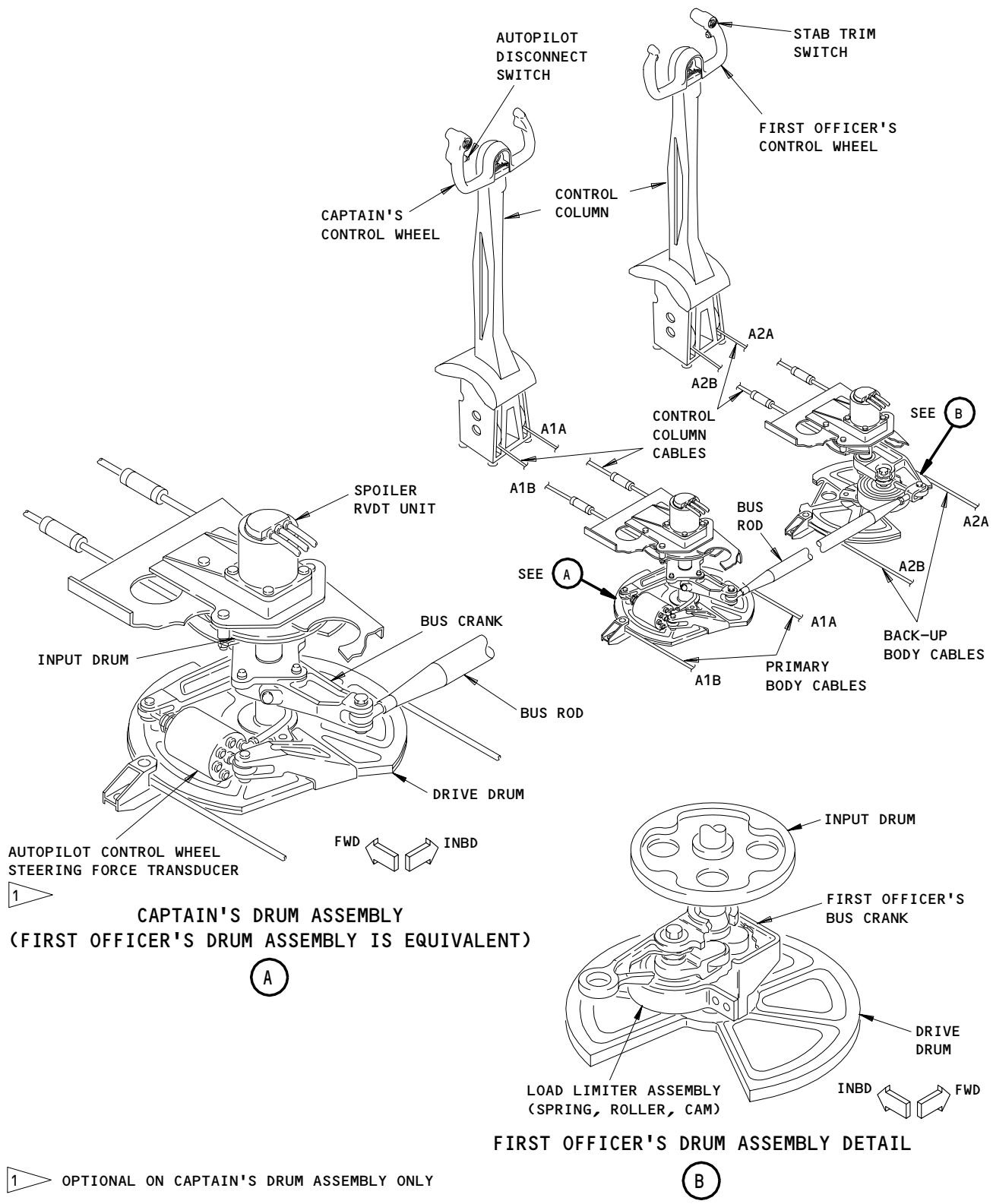
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**CAPTAIN'S DRUM ASSEMBLY**  
(FIRST OFFICER'S DRUM ASSEMBLY IS EQUIVALENT)

**FIRST OFFICER'S DRUM ASSEMBLY DETAIL**

1 OPTIONAL ON CAPTAIN'S DRUM ASSEMBLY ONLY

**Aileron Forward Components**  
**Figure 4**

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- (3) The load limiter is attached to the bottom of the bus crank and the vertical shaft of the first officer's drum assembly. The bus crank is bearing mounted to the shaft. The load limiter consists of a spring, a cam, and a cam follower. A twenty six pound (11.8 kilogram) force on the first officer's control wheel rim will unseat the follower from the cam and allow the crank to move.
  - (4) The first officer's lost motion assembly consists of a crank attached to the vertical shaft and two stops on the lower drum. The lower drum is bearing mounted to the shaft. The shaft can rotate three degrees left or right before the crank contacts the stops on the lower drum. This allows LCCA valves to be fully opened without trying to drive the backup cables.
- C. Lateral Control Feel, Centering, and Trim Mechanism (Fig. 5)
- (1) The feel, centering, and trim mechanism is in the left wheel well. The mechanism consists of a quadrant, an actuator, linkage that connects the actuator to a spring-loaded cam follower, and a detented cam on the quadrant shaft.
  - (2) The left wheel well quadrant is mounted on the forward bulkhead. The primary body cables terminate at the quadrant. The aft bus input cables connect the left wheel well quadrant to the right aileron control quadrant. An adjustable control rod connects the quadrant to the left LCCA torque tube. The feel, centering, and trim mechanism is fixed to the left wheel well quadrant.
  - (3) The trim actuator is a 28 volt dc electric motor and acme screw. The actuator case is attached to structure and the output shaft is attached to the trim linkage. The actuator rotates the trim linkage which positions the left wheel well quadrant.
  - (4) The feel, centering, and trim mechanism provides a resistive force in the primary cables when the control wheels are rotated. This gives the flight crew a sense of feel when operating the ailerons. The mechanism returns the control wheels to the neutral or trimmed position when the wheels are released. The aileron system can be trimmed to a new neutral position by operating two aileron trim switches on the aft electronic control panel P8. The two switches energize the trim actuator which rotates the cam follower. As the cam follower and cams rotate, the quadrant backdrives the primary body cables, aft bus input cables, and control wheels. A decal on the control column indicates the amount of trim in the system.
- D. Right Aileron Control Quadrant (Fig. 5)
- (1) The right aileron control quadrant is mounted on the right wheel well forward bulkhead. The aft bus input cable connects the right aileron control quadrant to the left wheel well quadrant. An adjustable control rod links the quadrant to the right LCCA torque tube.

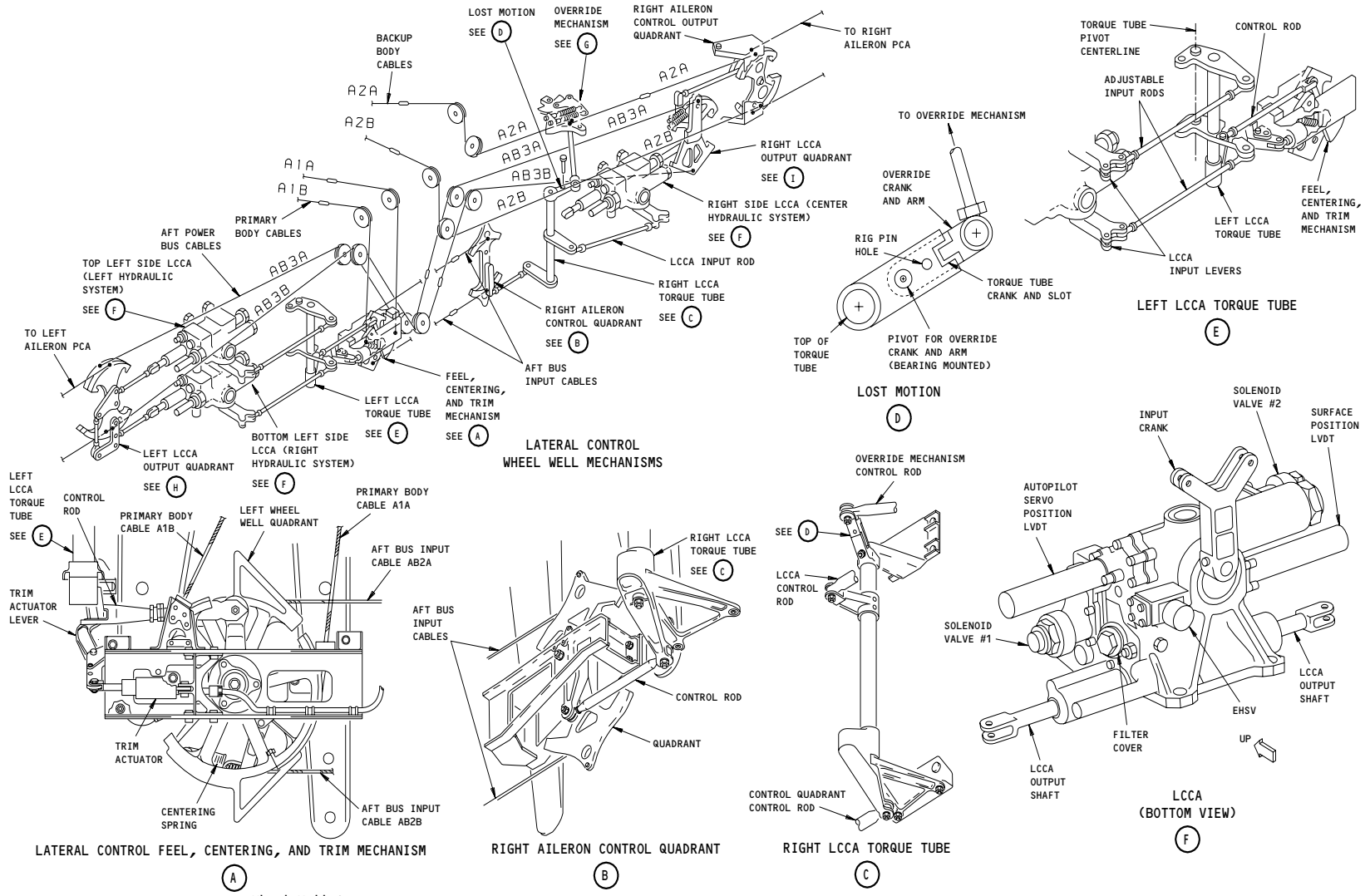
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Wheel Well Components  
Figure 5 (Sheet 1)

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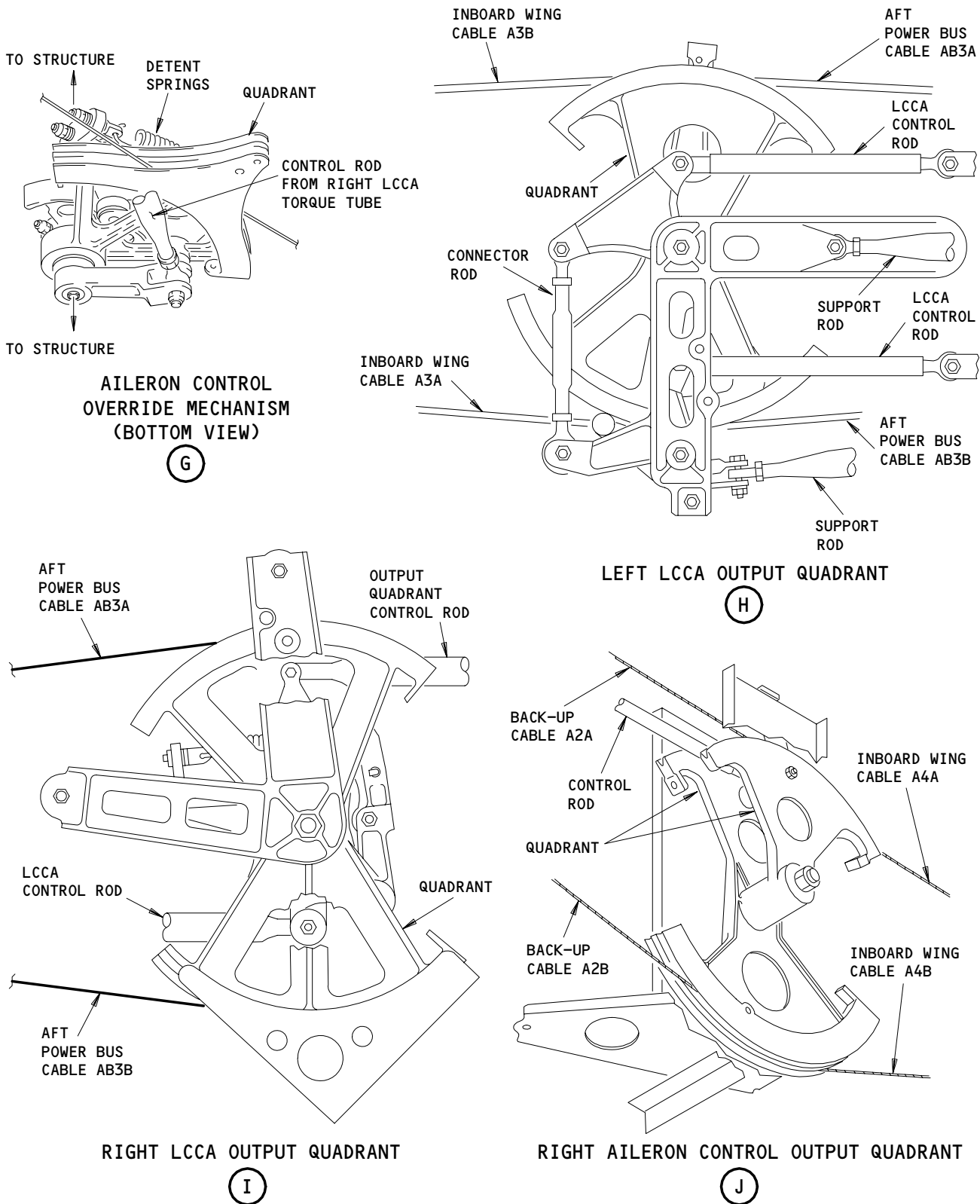
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Wheel Well Components  
Figure 5 (Sheet 2)

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- E. LCCA Torque Tubes (Fig. 5)
- (1) The left LCCA torque tube is attached to the junction of the left wing rear spar and the left wheel well. The torque tube transfers control wheel inputs from the left aft quadrant to the left upper and lower LCCAs through adjustable control rods.
  - (2) The right LCCA torque tube is attached to the junction of the right wing rear spar and the right wheel well. The torque tube transfers control wheel inputs from the right aileron control quadrant to the right LCCA. The torque tube can also be operated by the override mechanism. The torque tube has an input crank, an output crank, and a lost motion device. A shear out at the right LCCA torque tube ensures a left or right cable system override in the unlikely event of an aileron control override mechanism jam.
- F. Aileron Control Override Mechanism (Fig. 5)
- (1) The override mechanism is attached to the right wing rear spar above the right LCCA. The mechanism consists of a cam, a cam follower, two springs, and a control rod. The cam, control rod, and quadrant share the same shaft but the quadrant is free to rotate independent of the shaft. The cam follower is attached to the quadrant and rests in the cam detent.
  - (2) The override mechanism is installed with the backup cable system. If the primary cable system breaks, the override mechanism provides an alternate path for control wheel inputs to the right and left LCCA torque tubes. If the right LCCA torque tube becomes jammed, the override mechanism will allow the backup cable system to operate the right aileron control output quadrant. When the right LCCA torque tube is jammed, the cam and control rod on the mechanism will not move. Backup cable input will rotate the quadrant and force the follower out of the cam detent. This allows the backup body cables to rotate the right aileron control output quadrant and drive the right wing cable system.
- G. Lateral Central Control Actuators (LCCAs) (Fig. 5)
- (1) The LCCAs are located outboard of the LCCA torque tubes. Two LCCAs, one above the other, are on the left wing rear spar, one LCCA is on the right wing rear spar. The left hydraulic system powers the top left side LCCA, the right system powers the bottom left side LCCA, and the center system powers the right side LCCA. The three LCCAs are identical and interchangeable.
  - (2) The LCCA consists of adjustable input and output rods, a control valve, a 25 micron wire mesh filter, two solenoid valves, an electrohydraulic servo valve (ESHV), two pressure regulators, a relief valve, a bypass check valve, an autopilot servo valve, a booster piston, and two linear variable differential transducers (LVDTs).

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- (3) The three LCCAs keep control wheel forces to a low value compatible with good airplane control by hydraulically boosting the control wheel inputs to the wing cables. Control wheel inputs are carried by the primary body cables to the left wheel well quadrant. The quadrant drives the left torque tube directly and the right torque tube through the aft power bus cable. The LCCAs receive their inputs from the torque tubes and drive their respective output quadrants and wing cables.
- H. Left LCCA Output Quadrant (Fig. 5)
- (1) The left LCCA output quadrant is attached to the left wing rear spar just outboard of the two left LCCAs. The quadrant has two adjustable control rods connecting it to the left side LCCAs. A connector rod links the input cranks providing a path for either left side LCCA to drive the quadrant. Two sets of cables are attached to the quadrant: the left inboard wing cables and the aft power bus cables. The wing cables drive the droop mechanism. The aft power bus cables connect the left LCCA output quadrant to the right LCCA output quadrant.
- I. Right LCCA Output Quadrant (Fig. 5)
- (1) The right LCCA output quadrant is attached to the right wing rear spar just outboard of the right side LCCA. The aft power bus cables link the quadrant to the left LCCA output quadrant. Adjustable control rods connect the quadrant to the right side LCCA and the right aileron control output quadrant. The quadrant has a breakout assembly to prevent it from jamming the right aileron control output quadrant.
- J. Right Aileron Control Output Quadrant (Fig. 5)
- (1) The right aileron control output quadrant is attached to the right wing rear spar just outboard of the right LCCA output quadrant. The right aileron control output quadrant is connected to the right LCCA output quadrant by a control rod and to the droop mechanism by the wing cable system. The backup body cables terminate at the quadrant.
- K. Aileron Droop Mechanism (Fig. 6)
- (1) The droop mechanism is attached to the wing rear spar inboard of the inboard aileron. The mechanism consists of an inboard quadrant, a summing lever, and an outboard quadrant. The inboard quadrant receives its input through the wing cable system. The quadrant transfers this input to the summing lever and outboard quadrant through control rods. The inboard quadrant has a breakout assembly that prevents the quadrant from jamming if the inboard aileron will not operate.
- (2) The summing lever combines inputs from the inboard quadrant and from the trailing edge flaps through the aileron droop angle gearbox (Ref 27-51-00, Description and Operation). The summing lever transfers these inputs to the inboard PCAs through an adjustable control rod.
- (3) The outboard quadrant is driven by the inboard quadrant. The outboard quadrant transfers input to the outboard wing cables that operate the outboard aileron lockout mechanism. The outboard quadrant has a breakout assembly that prevents the quadrant from jamming if the outboard aileron will not operate.

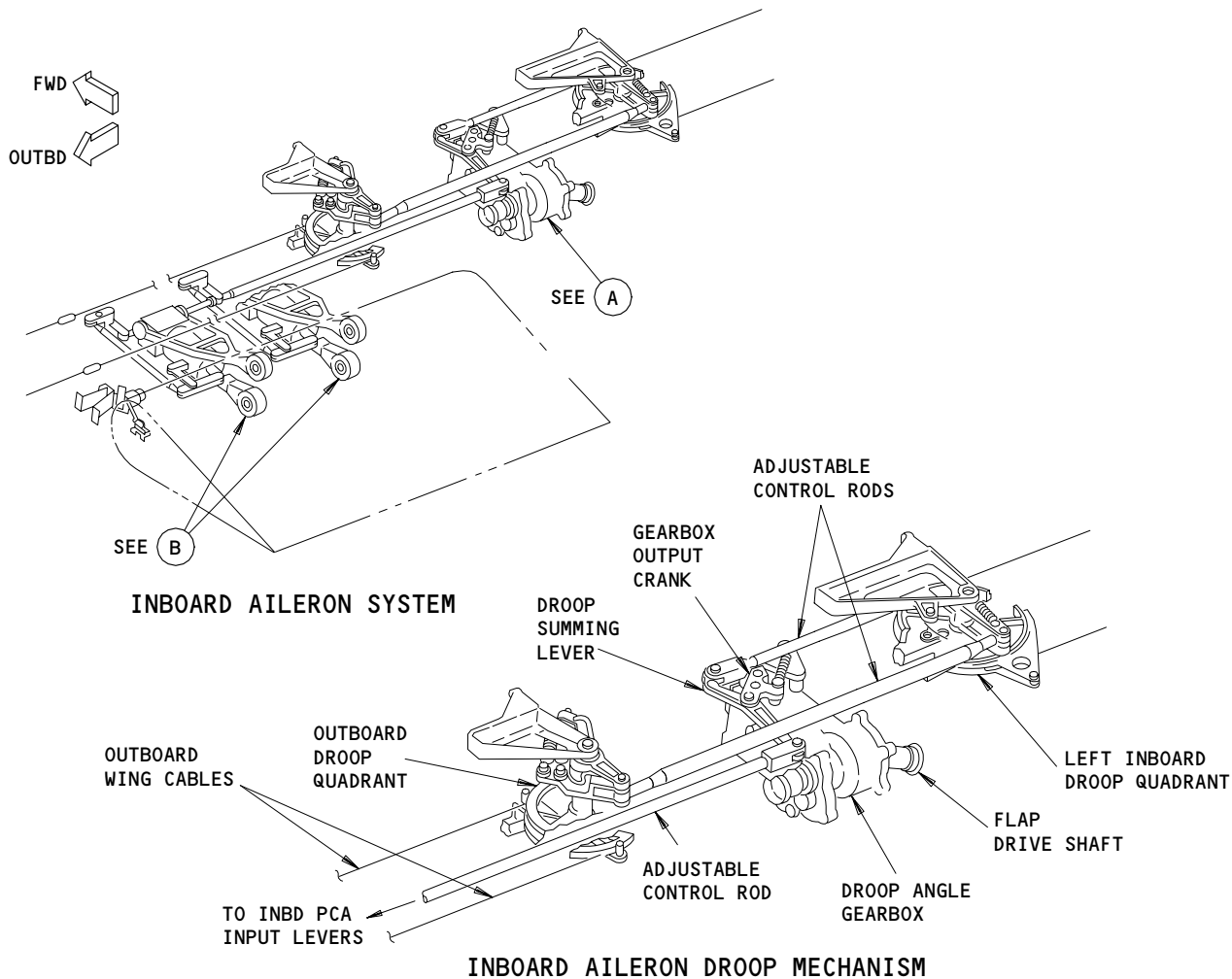
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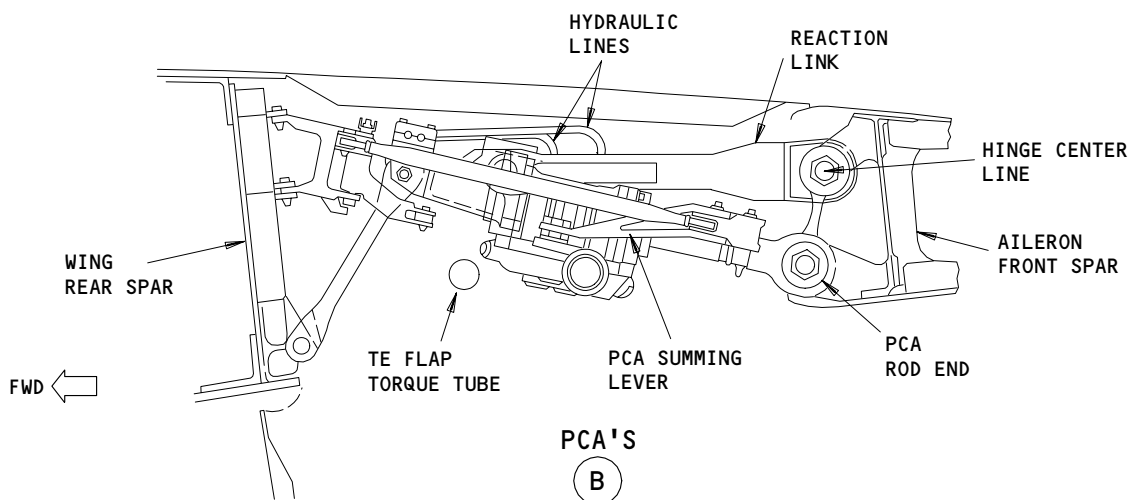
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(A)



(B)

Inboard Aileron Components  
Figure 6

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- L. Inboard Power Control Actuators (PCAs) (Fig. 6)
- (1) There are two PCAs attached to each inboard aileron. The PCAs are accessible through a wing lower surface panel forward of the aileron. The actuators are attached to the wing rear spar by a link assembly and to the aileron surface by a reaction link and the actuator piston. Each actuator is powered by a separate hydraulic system.
  - (2) To find out if a PCA is by-passing, compare the temperature of the PCA's with a PCA that is on a surface that is not quickly drooping. If one of the PCA's is hot to the touch compared to the other PCA, the hot PCA is most likely by-passing fluid and must be removed and inspected/overhauled at the next convenient opportunity where manpower and components are available.
- M. Inboard Aileron (Fig. 6)
- (1) The inboard aileron is made of aluminum ribs and spars covered by graphite-epoxy-nomex core skin panels. The aileron has a removable lower nose panel, an attach point for each PCA, and two hinge bearings. The inboard aileron has no balance weights. Each aileron has a position transmitter mounted on the outboard forward corner (AMM 27-18-00/001).
- N. Outboard Aileron Lockout Mechanism (Fig. 7)
- (1) The lockout mechanism is attached to the wing rear spar just inboard of the outboard aileron PCAs. The lockout mechanism consists of a mechanical linkage and an electric actuator. Inputs to the lockout mechanism come from the wing cable system and the SAM. The mechanism drives the outboard aileron PCAs through an adjustable control rod.
  - (2) The actuator consists of a 28 volt dc motor, a jackscrew output rod, and internal limit switches. The actuator receives its command signals from the SAM as a function of airspeed. At cruise speed, the actuator is extended and the lockout mechanism linkage is positioned to prevent input to the outboard PCAs.
- O. Aileron Lockout Mechanical Operation (Fig. 7)
- (1) The lockout mechanism mechanical linkage consists of an actuator lever, an output crank, an actuator link, a drag link, an idler link, and a quadrant guard. The function of the linkage is to prevent input from the wing cables from being transmitted to the outboard PCAs. The lockout actuator moves the linkage from the unlocked to the locked-out position by extending and retracting its output rod.
  - (2) The actuator output rod is retracted at low speeds. In this position, cable inputs to the quadrant drive the idler link, which drives the drag link. The drag link causes the output crank to rotate, which operates the control rod to the outboard PCAs.

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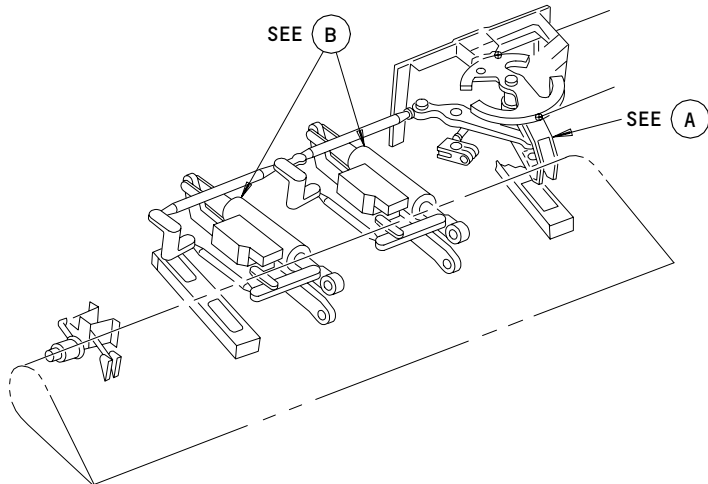
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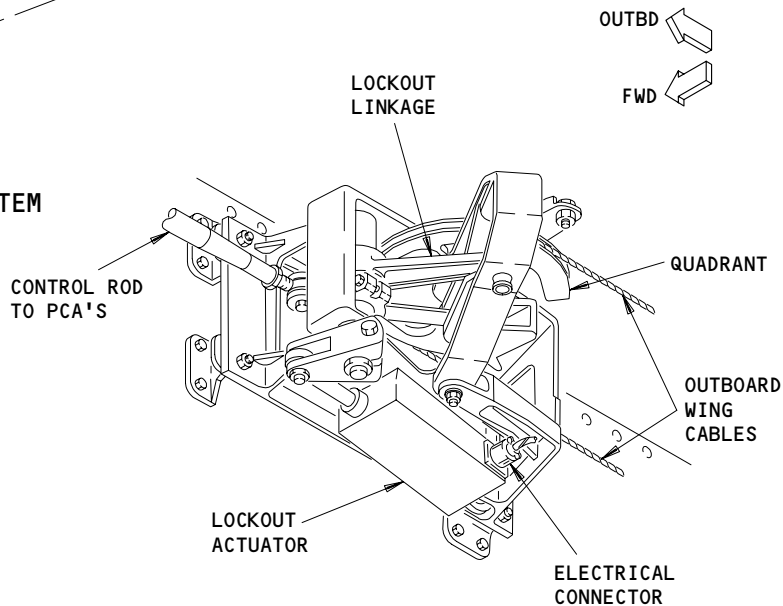
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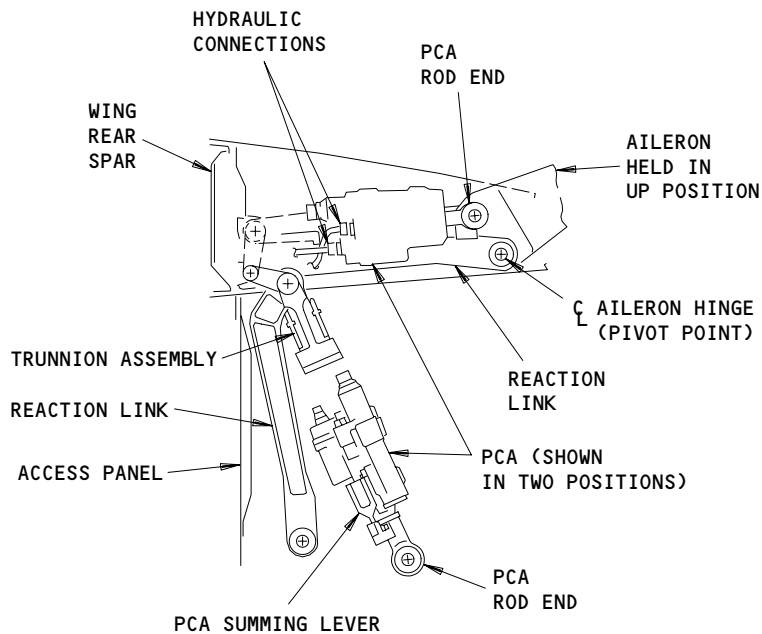




**OUTBOARD AILERON SYSTEM**



**OUTBOARD AILERON LOCKOUT MECHANISM**

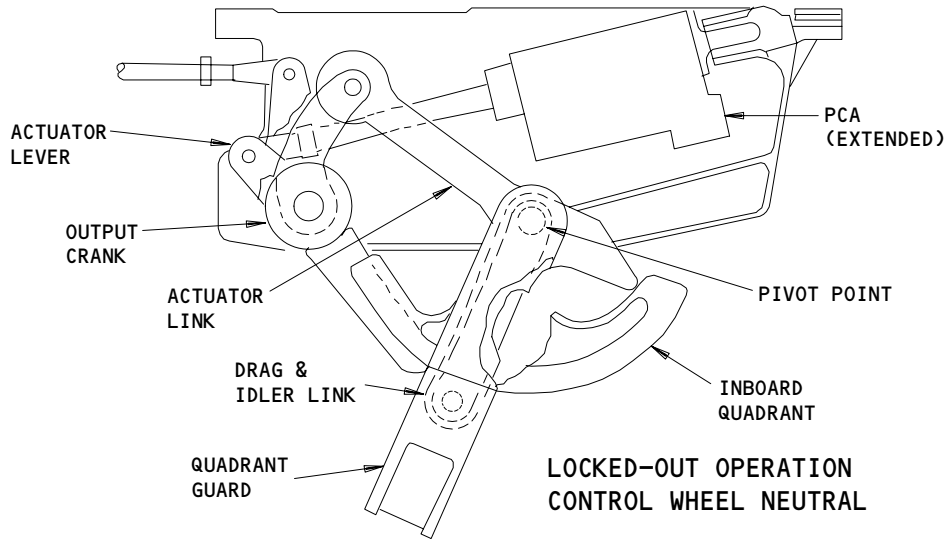
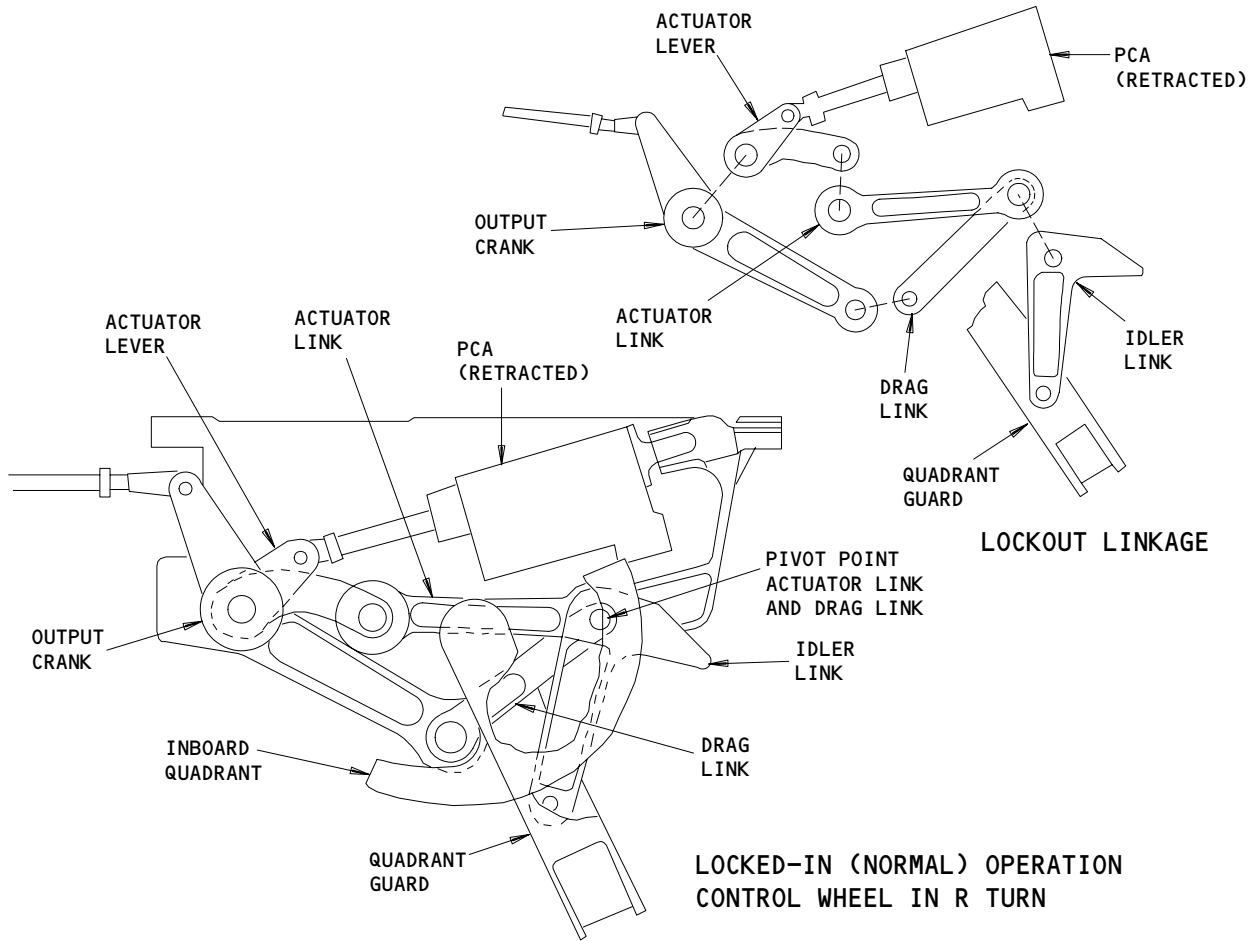


**POWER CONTROL ACTUATOR (PCA)**

**Outboard Aileron Components  
Figure 7 (Sheet 1)**

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LOCKOUT LINKAGE OPERATION

(C)

Outboard Aileron Components  
Figure 7 (Sheet 2)

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(3) When the actuator extends at cruise speed, the linkage is repositioned. The drag link, idler link, and quadrant guard are now aligned and pivot at the same point. In this position, cable inputs to the quadrant rotate the quadrant and the idler link. Since the drag link and the idler link pivot at the same point, the idler link does not drive the drag link. As long as drag link does not move, there is no movement of the output crank and no input to the outboard PCAs.

P. Outboard Power Control Actuators (PCAs) (Fig. 7)

(1) There are two PCAs attached to each outboard aileron. The PCAs are accessible through a wing lower surface panel forward of the aileron. The actuators are attached to the wing rear spar by a trunnion assembly and to the aileron surface by a reaction link and the actuator rod end. Each actuator is powered by a separate hydraulic system.

Q. Outboard Aileron (Fig. 7)

(1) The outboard aileron is made of a nomex honeycomb core with a graphite-epoxy skin bonded to the core. There are seven aluminum attach fittings for the two PCAs and five hinges. There are seven static dischargers on the trailing edge of the aileron. The outboard ailerons have two adjustable balance weights that stabilize the aileron in flight if both PCAs lose hydraulic power. A position transmitter is fixed to the forward edge of each aileron outboard of the PCAs (AMM 27-18-00/001).

(2) A record should be kept of all painting and repairs done to the outboard ailerons to ensure that the operational balance moment is not exceeded. Outboard aileron surfaces which exceed the operational balance moment may flutter during flight. Refer to the Structural Repair Manual (SRM 51-60-00) for operational balance moment determination.

R. Aileron Fault Indications (Fig. 8 and 13)

(1) An amber warning light and amber EICAS message alert the flight crew to failures in the aileron lockout system. The amber AIL LOCK light on the pilot's overhead panel P5 and the EICAS message AILERON LOCKOUT will appear simultaneously. The warning indicates a failure of either lockout actuator or a failure of the SAM aileron lockout function. Aileron lockout failure annunciation also occurs during the air data computer self test.

(2) The SAMs are located on the top shelf of the main equipment center. The only aileron function in the modules is aileron lockout. A single aileron lockout failure will appear as a fault ball on the SAM face.

4. Operation

A. Functional Description

- (1) Aileron position is displayed on the lower EICAS screen. For more information on the aileron position indicating system, Ref 27-18-00.
- (2) Control Wheels and Forward Quadrants - Normal Operation (Fig. 9)

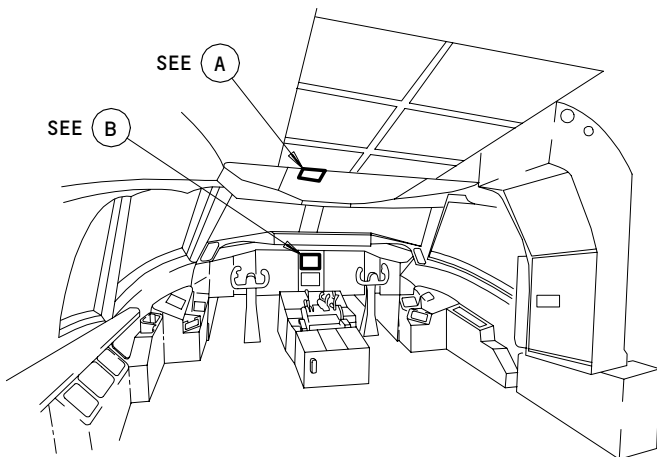
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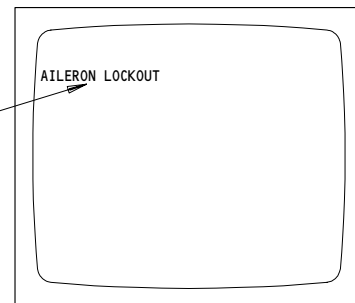
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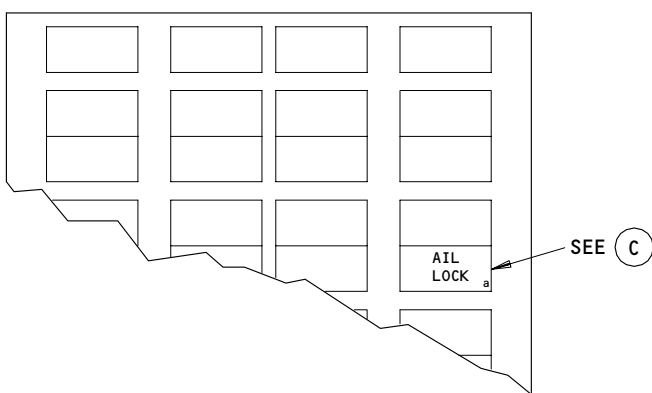


AMBER CREW  
ALERT MESSAGE  
"AILERON LOCKOUT"



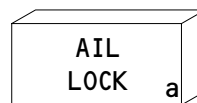
UPPER EICAS  
DISPLAY UNIT

(B)

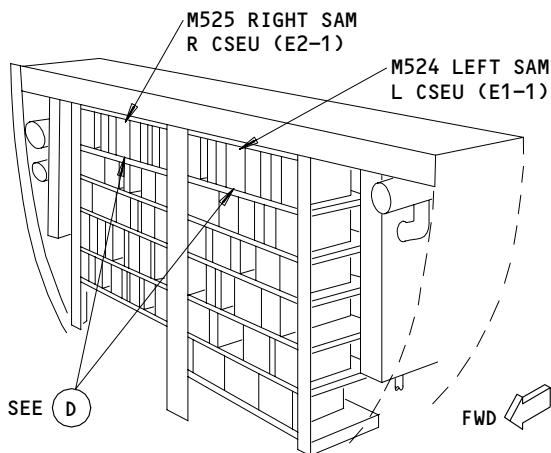


P5 OVERHEAD PANEL

(A)

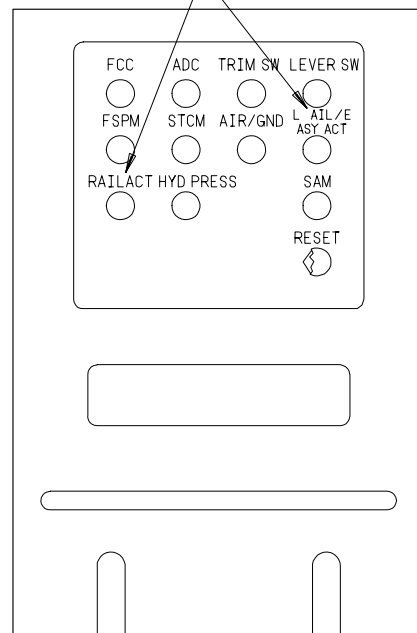


(C)



MAIN EQUIPMENT CENTER - CONTROL  
SYSTEM ELECTRONICS UNIT (CSEU)

AILERON LOCKOUT  
FAULT BALLS



STABILIZER TRIM AND AILERON  
LOCKOUT MODULE (SAM) - TYPICAL

(D)

Aileron Fault Indications  
Figure 8

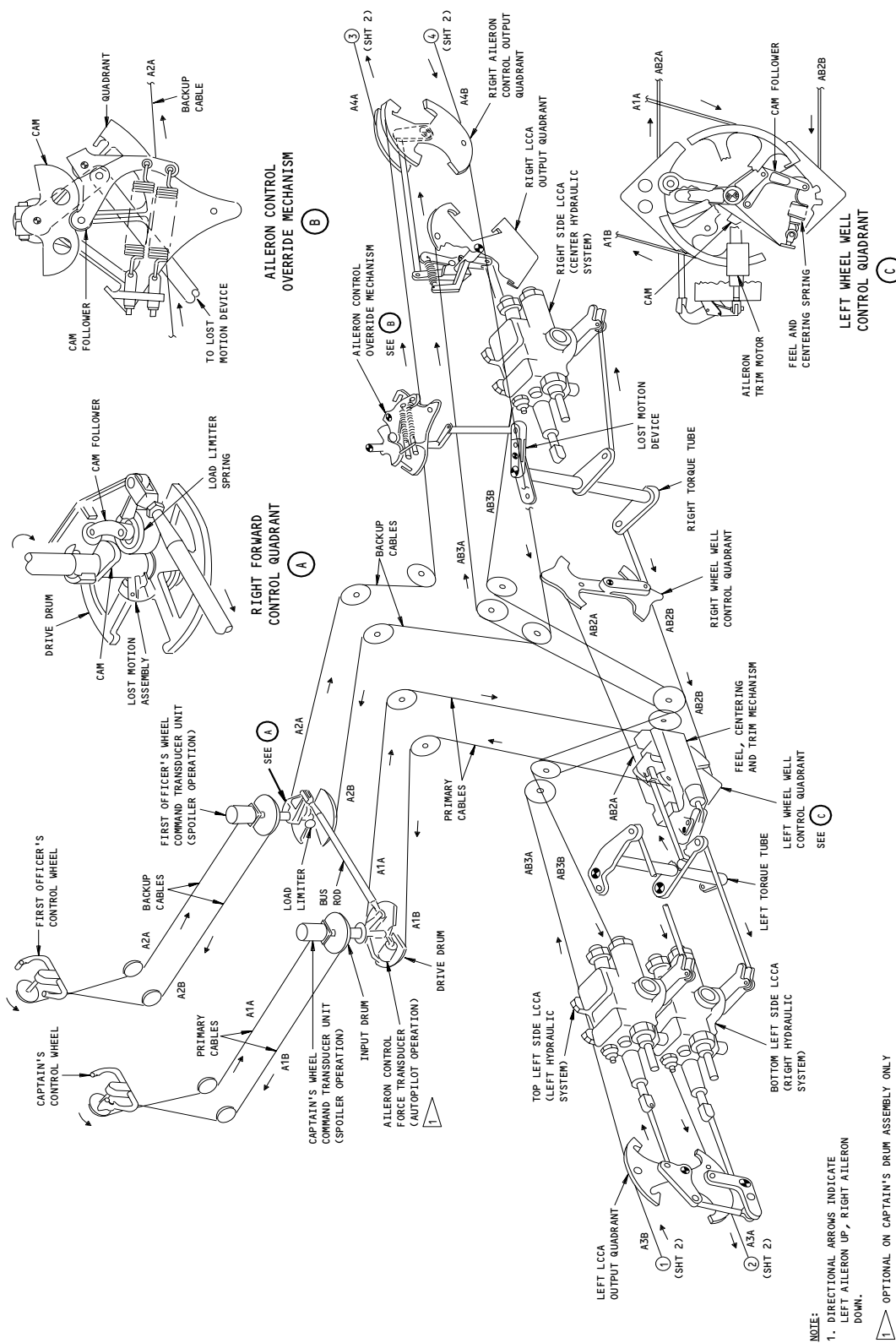
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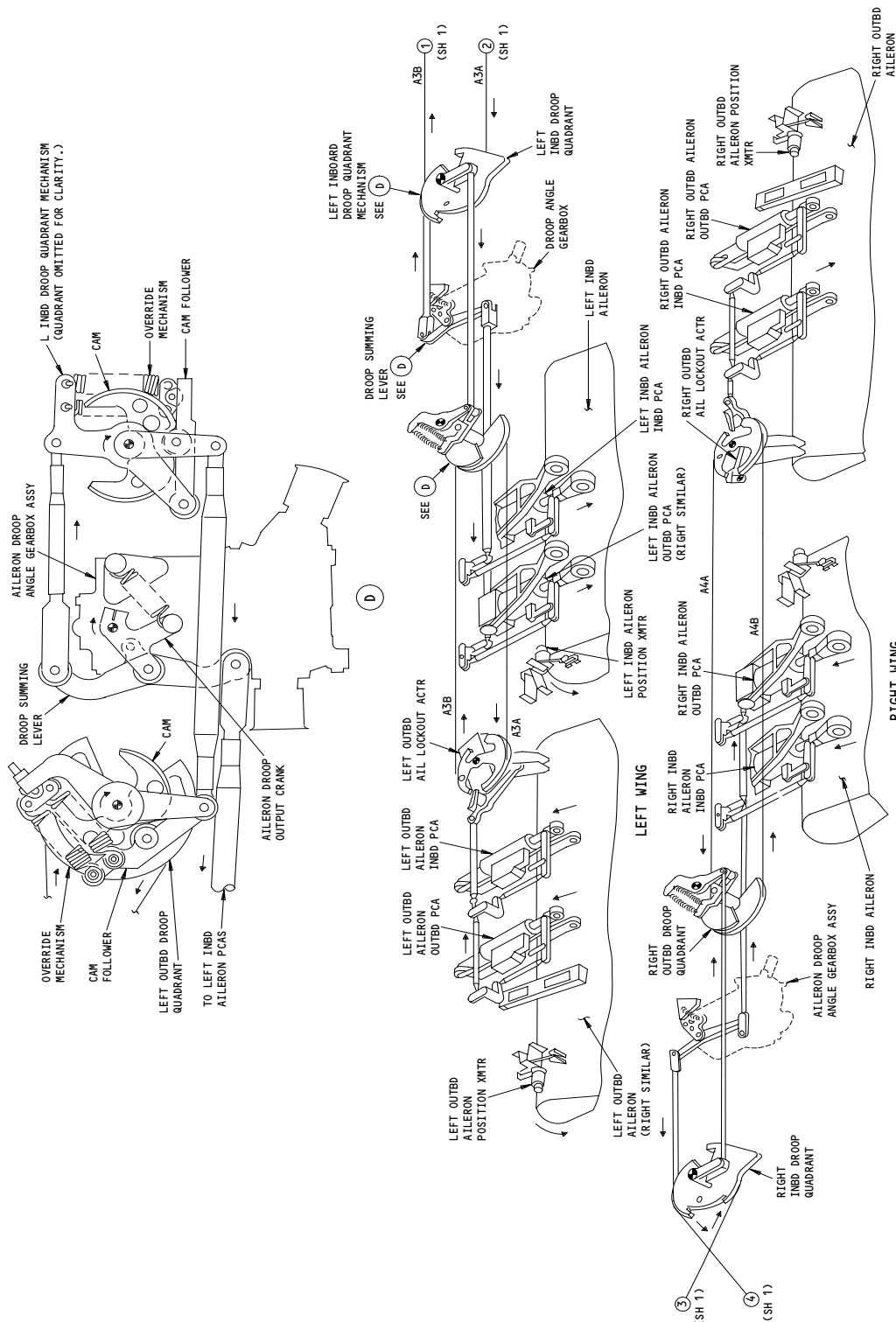


NOTE:  
1. DIRECTIONAL ARROWS INDICATE LEFT AILERON UP, RIGHT AILERON DOWN.  
OPTIONAL ON CAPTAIN'S DRUM ASSEMBLY ONLY

Aileron Control System (Mechanical Schematic) Figure 9 (Sheet 1)

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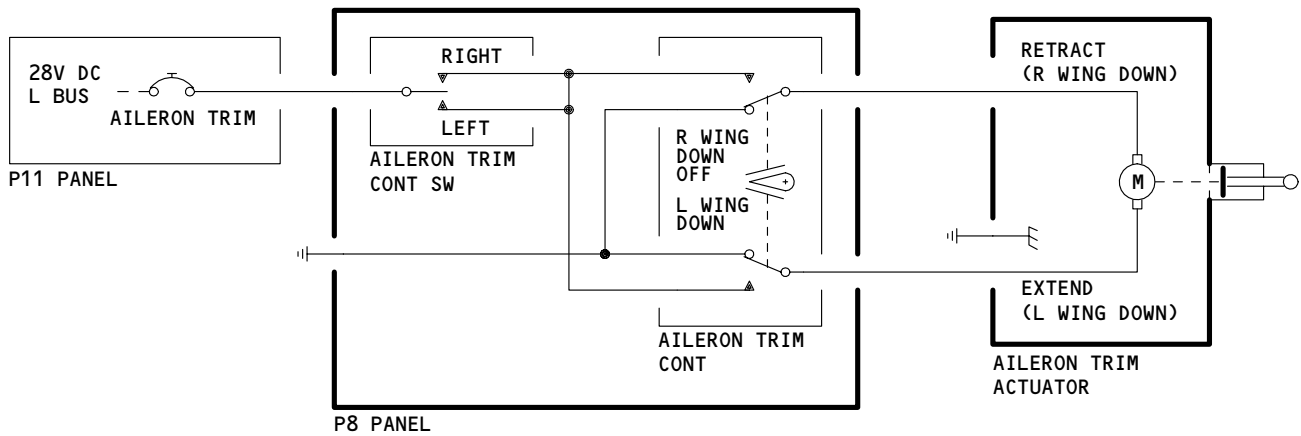


Aileron Control System (Mechanical Schematic)  
Figure 9 (Sheet 2)

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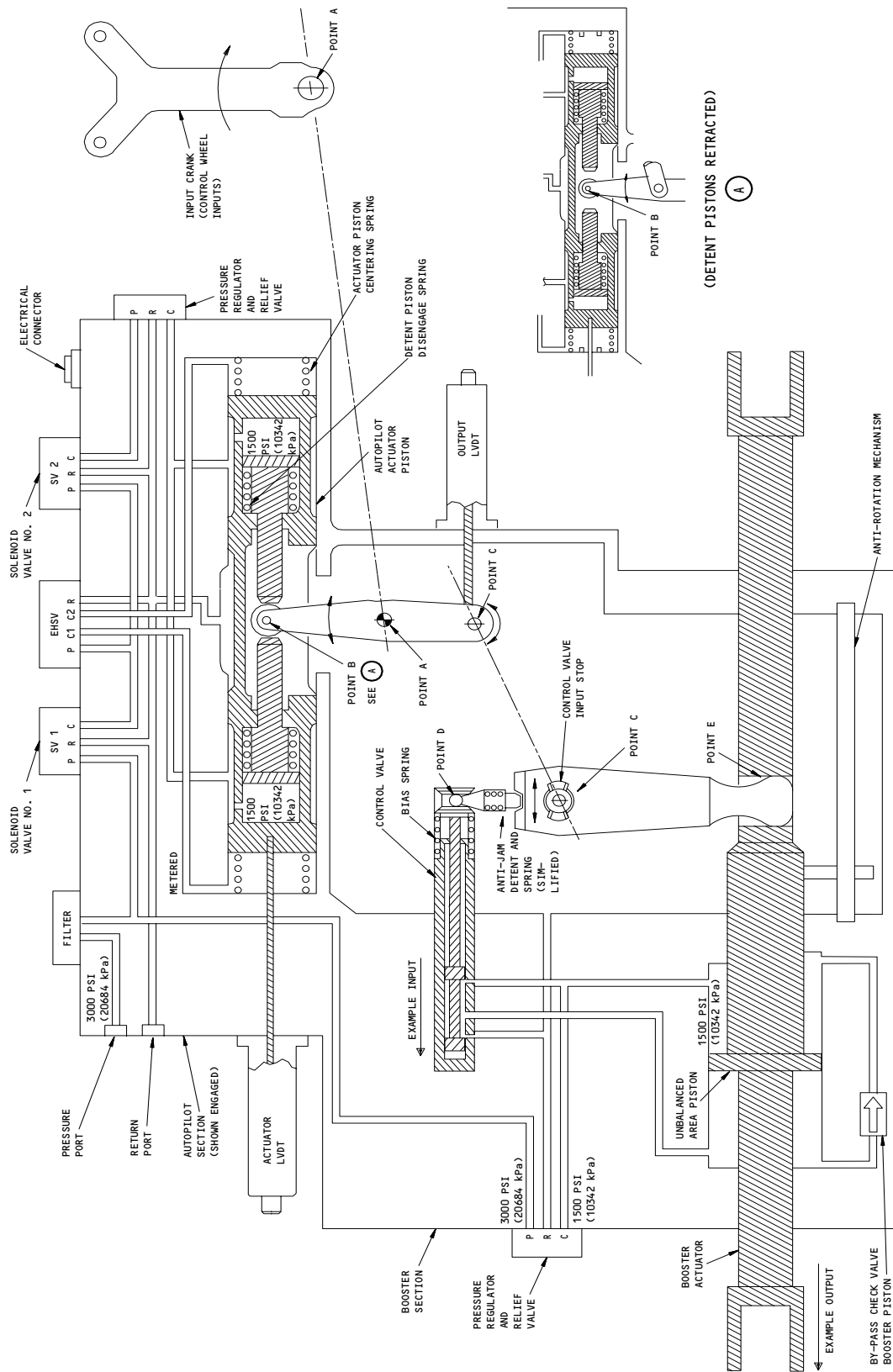


Aileron Trim Control Schematic  
 Figure 10

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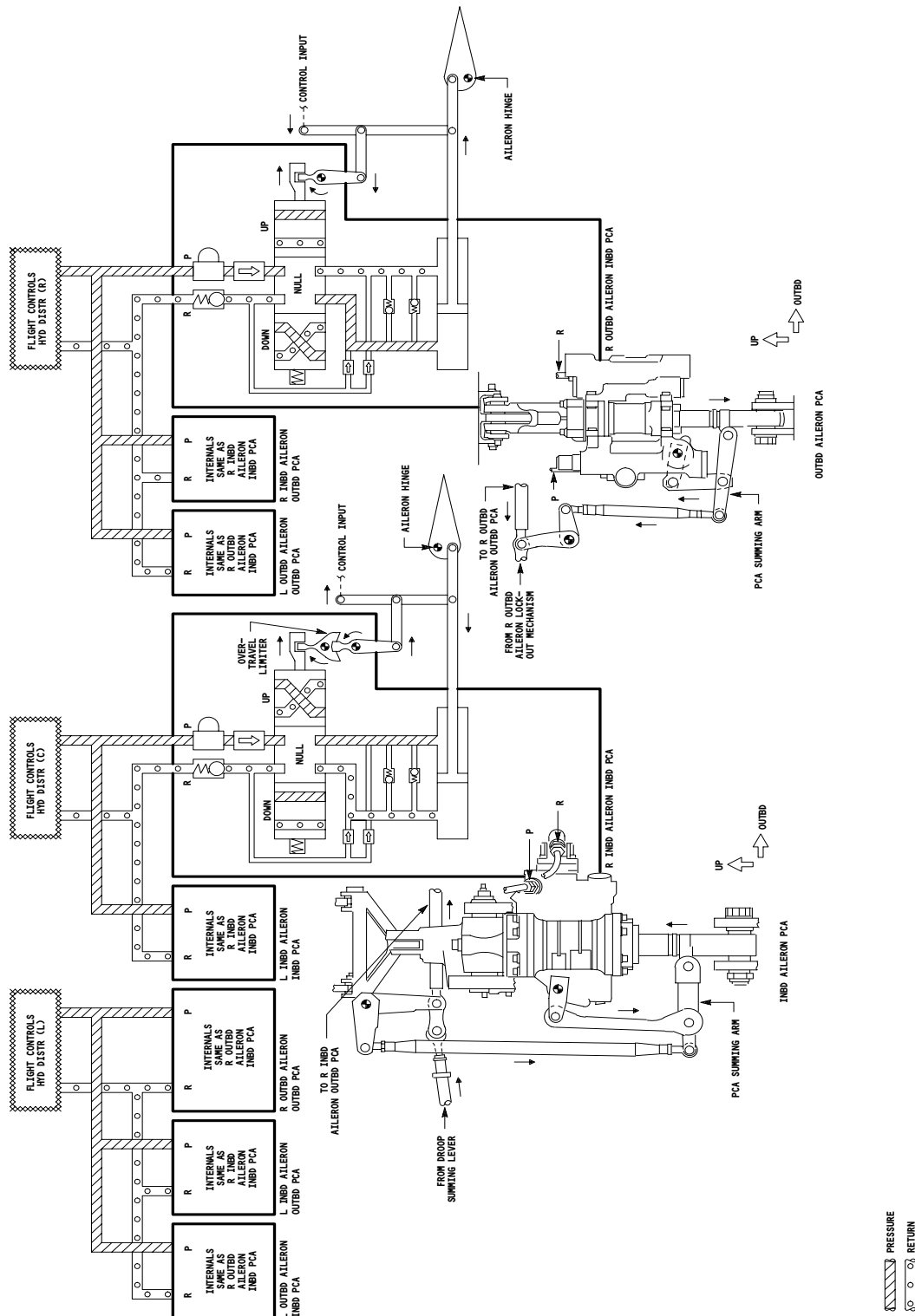
Lateral Central Control Actuator (LCCA) Schematic  
Figure 11

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Aileron Control System (Hydraulic Schematic)  
Figure 12

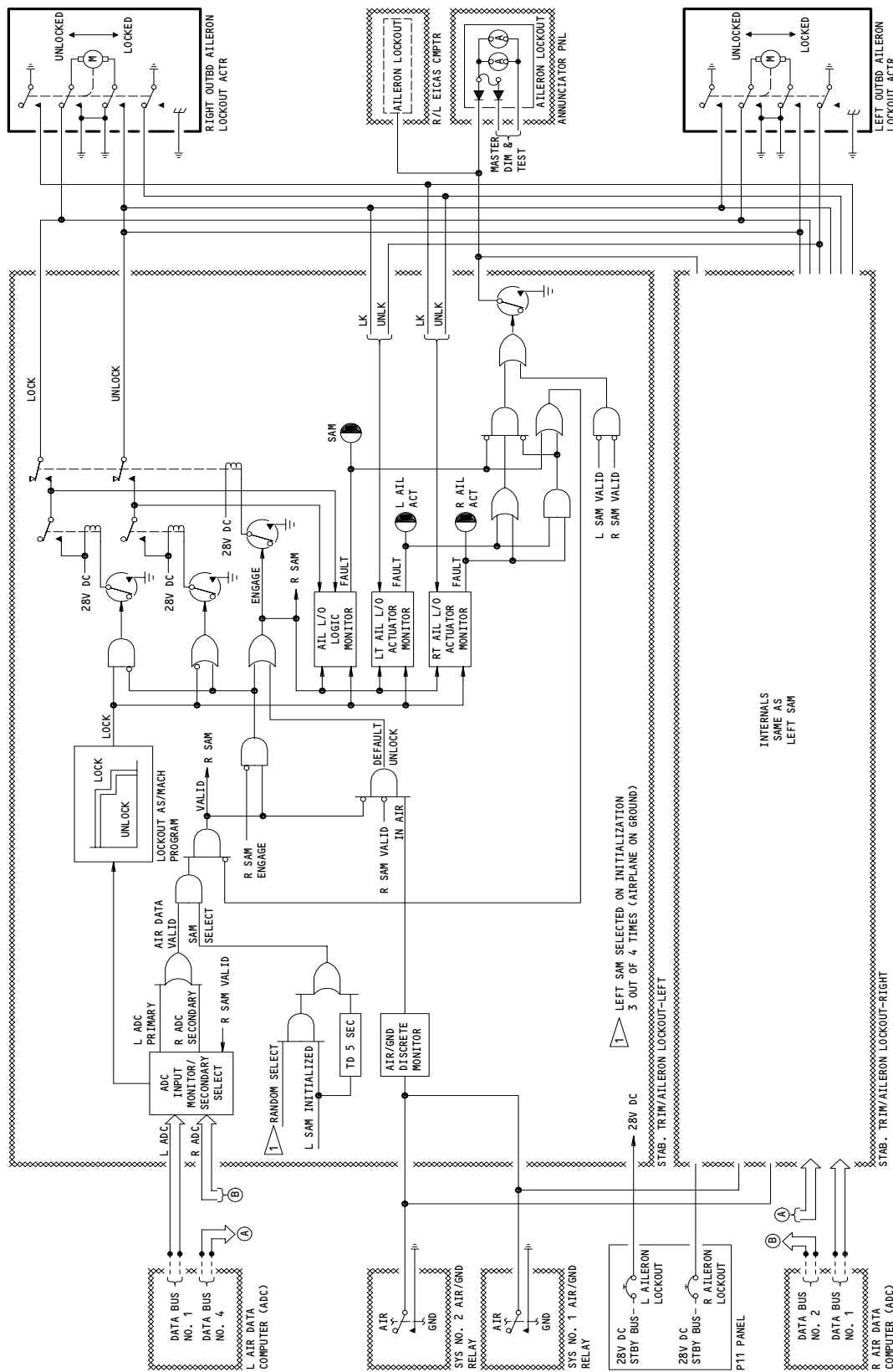
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Aileron Lockout Schematic  
Figure 13

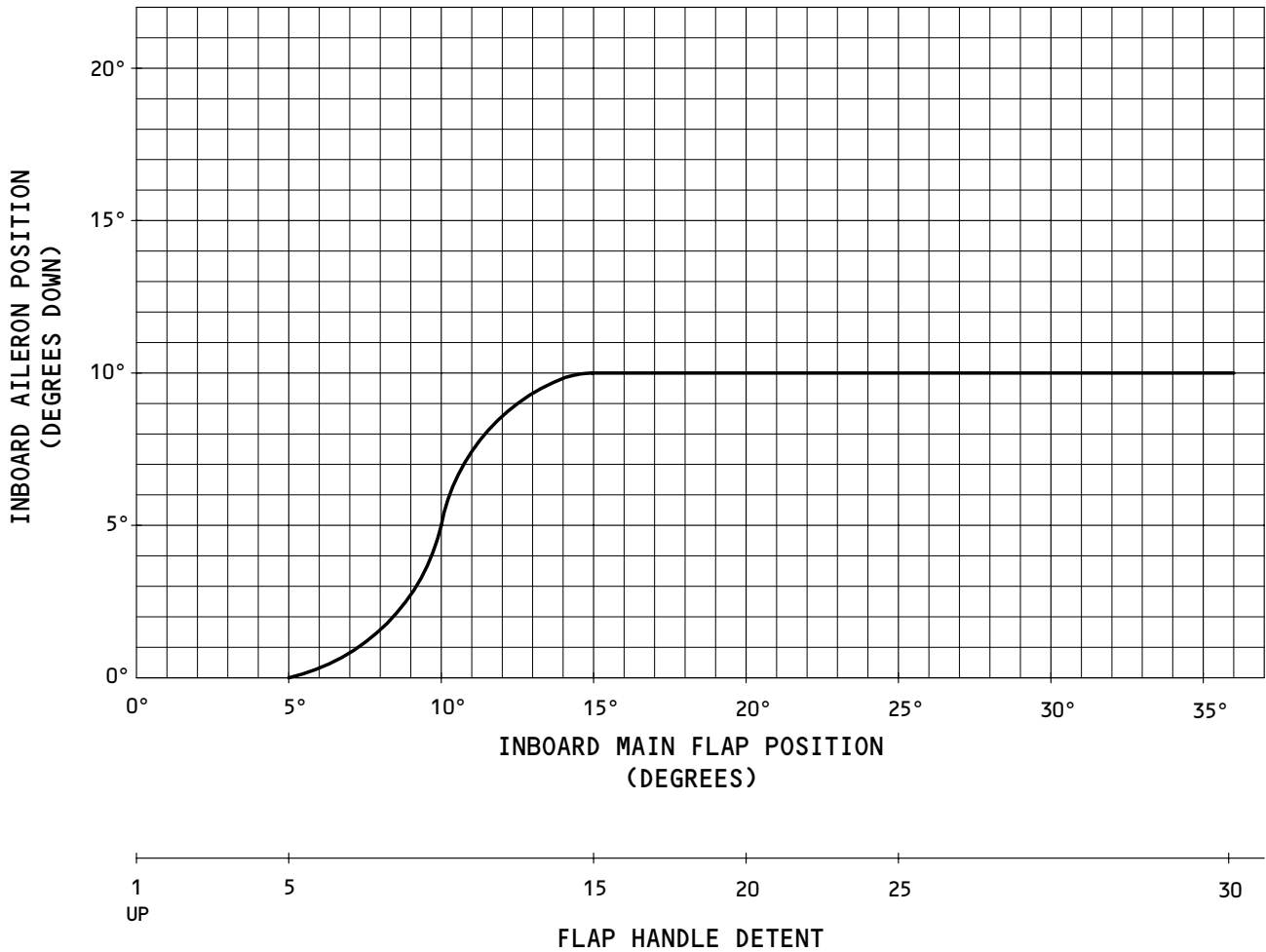
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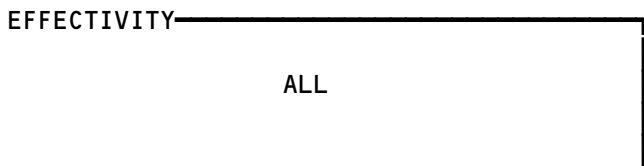
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767-200 INBOARD AILERON DROOP SCHEDULE

Inboard Aileron Droop Schedule  
Figure 14 (Sheet 1)

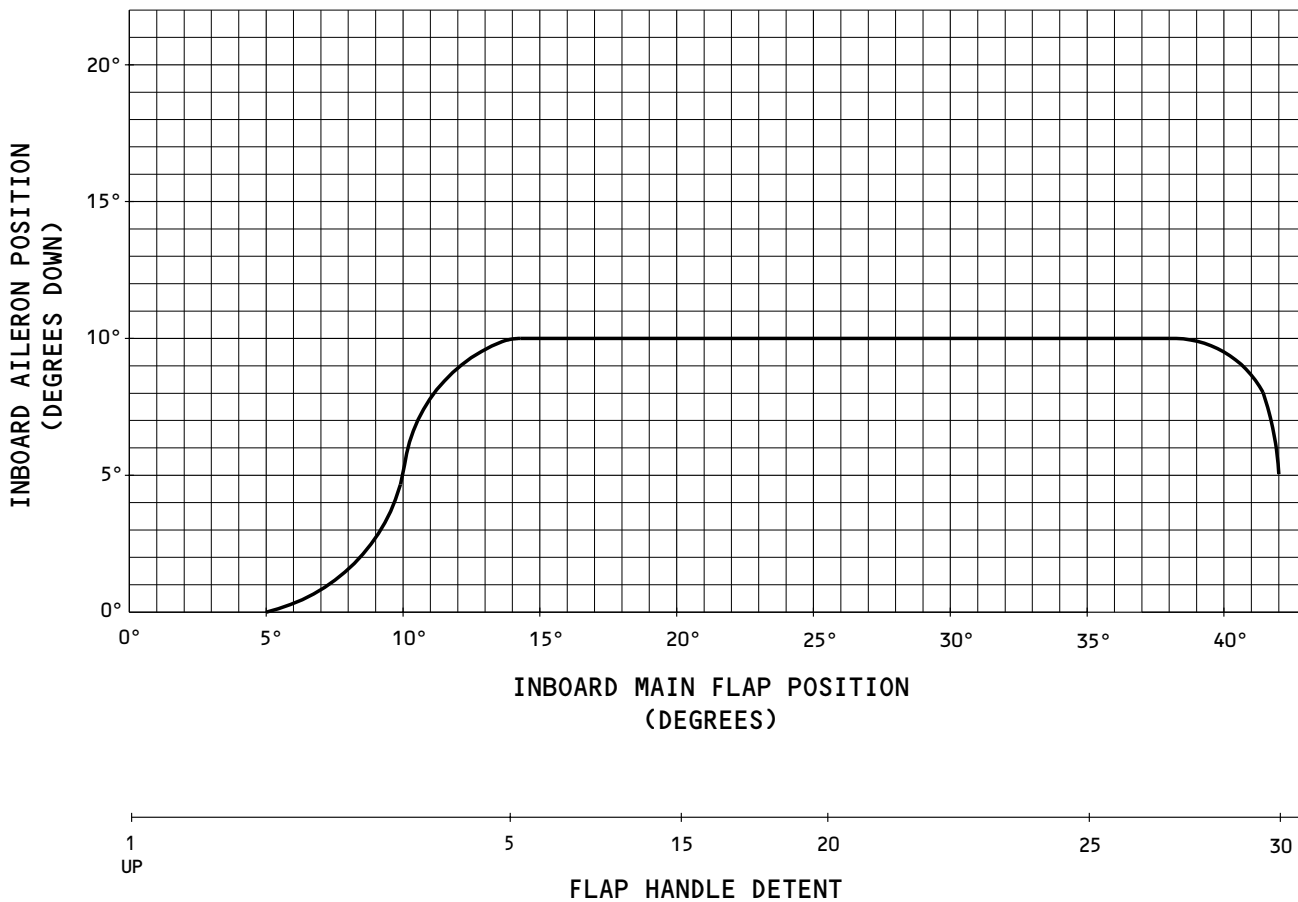


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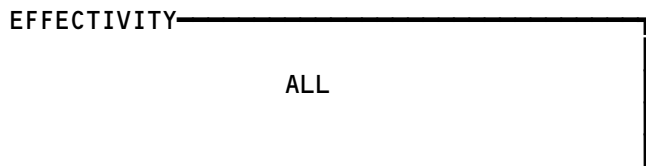
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767-300 INBOARD AILERON DROOP SCHEDULE

Inboard Aileron Droop Schedule  
Figure 14 (Sheet 2)



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- (a) The aileron control wheels provide the input to the lateral control system. The control wheels operate cables inside the control columns. These cables transfer control wheel motion to the aileron drum assemblies. The drum assemblies are linked by a bus rod. Rotating either wheel will provide input to the primary body cables. The primary body cables drive the LCCAs which operate the wing cables to the PCAs.

NOTE: When you pull either control wheel back fast from full input to neutral by hand, you may feel vibrations in the control columns. These vibrations are not an indication of incorrect operation of the aileron system. This condition occurs because the control wheel is returned to neutral at a greater rate than that which the aileron system will automatically return the wheel from full input.

- (b) Control wheel rotation will also initiate spoiler deployment (AMM 27-61-00/001). The spoiler RVDT units mounted on the top of each drum assembly sense control wheel movement. This movement is translated into electrical signals which cause lateral control spoiler assist.
- (3) Control Wheels and Drum Assemblies - Abnormal Operation (Fig. 9)
- (a) The bus rod and load limiter allow either control wheel to operate the system if the other wheel becomes jammed. If the captain's wheel jams, the left drum assembly is fixed and the primary cables cannot be operated. The first officer can break out of the jam through the load limiter and drive the backup body cables. The backup body cables will then operate the right wing cable system through the right aileron control output quadrant.
  - (b) If the first officer's wheel jams, the right drum assembly is fixed. The captain can break out of the jam through the load limiter and drive the control system through the primary body cables.

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- (4) Force Transducer Operation (Fig. 9)
  - (a) The force transducer is used by the autopilot system when it is in the control wheel steering mode. When the transducer senses control wheel input, it sends a signal to the selected flight control computer (FCC). The FCC sends a proportional signal to the LCCA servo valve. A lost motion device is designed into the transducer installation. This device assures that the transducer signal precedes the cable inputs to the LCCAs so that there will not be conflicting commands to the LCCA.
- (5) Left Wheel Well Quadrant Operation (Fig. 9)
  - (a) The left wheel well quadrant is driven by the primary body cables during normal operation. The quadrant drives the left LCCAs through the left torque tube and the right LCCA through the right aileron control quadrant. The trim actuator also drives the left quadrant in response to trim inputs. If the primary body cables break or become disconnected from the quadrant, the aft bus input cables from the right aileron control quadrant will backdrive the left wheel well quadrant.
- (6) Right Aileron Control Quadrant Operation (Fig. 9)
  - (a) The right aileron control quadrant receives its input from the left wheel well quadrant during normal operation. The right quadrant then drives the right LCCA torque tube which operates the right LCCA. If the primary body cables break, the backup body cables will drive the right LCCA torque tube through the aileron control override mechanism. The right torque tube will backdrive the right aileron control quadrant, providing input to the left and right LCCAs.
- (7) Feel, Centering, and Trim Mechanism Operation (Fig. 5, 9, and 10)
  - (a) The feel, centering, and trim mechanism provides the feel force during normal operation. As the quadrant is rotated, the cam forces the spring-loaded follower out of the detent. The spring force felt at the control wheels gives the flight crew a sense of feeling that the ailerons deflect. The spring force also returns the control wheels to the neutral position. When the input is removed from the control wheel, the spring-loaded follower forces the cam to rotate the quadrant back to its original position. This backdrives the primary body cables and returns the control wheel to the neutral position.
  - (b) The trim actuator is connected to the spring-loaded follower of the feel and centering assembly. When the actuator extends or retracts, it moves the follower. The follower rotates the cam and the left wheel well quadrant. This provides an input to the LCCAs and backdrives the control wheels. The input to the LCCAs remains steady until the actuator is operated to change the trim.

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- (8) LCCA Operation (Fig. 9 and 11)
  - (a) The left and right LCCA output quadrants are bussed together by the aft power bus cable. This allows one LCCA to operate all of the wing cables if one or two LCCAs lose hydraulic power. It also prevents one LCCA from commanding a turn that does not agree with the other two LCCAs. Each LCCA is capable of operating the entire aileron system.
- (9) LCCA Operation - Autopilot Off
  - (a) Assume control wheel inputs rotate the input crank to the right. With the autopilot off, point B and point C rotate clockwise about point A. Point C also pivots about point E. As point C moves left, it moves point D and the control valve to the left. This opens the large side of the booster piston to return and pressure on the small side of the piston forces the piston to the left. As the piston moves left, point E and point D pivot about point C. This moves point D and the control valve to the right until the pressure line to the large side of the piston is closed. At this point the piston is in the commanded position.
  - (b) If the control valve jams, an anti-jam detent in the input linkage breaks out at about 160 in-lbs (18.08nm) allowing the other two LCCAs to continue operating normally.
- (10) LCCA Operation - Autopilot On
  - (a) When the autopilot system is operating, only one autopilot actuator is engaged. The other two are armed but not engaged. The LVDTs on the engaged autopilot supply the FCC with commanded position (actuator LVDT) vs actual position (output LVDT) signals. Any difference between the two becomes an error signal to the EHSV. When the EHSV receives an error signal it repositions the autopilot actuator. This moves point B to a new position which also moves point D. Control valve operation, booster piston movement and cancellation of the input by the linkage is the same as discussed in the autopilot off operation.
- (11) LCCA Operation - Pilot Override, Autopilot On
  - (a) When the autopilot is engaged, the flight crew can still operate the control wheels. This will deflect point B and move the detent piston while the actuator piston maintains the EHSV commanded position. The control valve is repositioned and the booster piston is driven in a direction to cancel out the control valve input. Since the autopilot piston did not move, the autopilot LVDT signal does not agree with output LVDT signal. This disagreement between signals will cause the autopilot to disengage unless the autopilot is in the control wheel steering mode.

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- (12) Aileron Droop Operation (Fig. 9 and 14)
- (a) Aileron droop is mechanically controlled by the aileron droop angle gearbox (AMM 27-51-00/001). A cam inside the gearbox operates an output crank as the flaps extend or retract and provides a droop input to the droop summing lever. The droop summing lever is part of the linkage between the inboard droop quadrant and the inboard aileron PCAs. When the gearbox provides a droop input, it turns the droop summing lever and moves the PCA input cranks. This commands the inboard ailerons to move down (droop) as the flaps extend or move up as the flaps retract. Inboard aileron droop does not cause movement of the aileron control cables.
  - (b) Aileron droop, the slow movement of the surface from the neutral position with hydraulic systems depressurized, and without PCA inputs, is a normal condition. Quick droop with hydraulics depressurized, can be caused by an input to the PCA's or possibly high internal leakage (found in past reports due to worn piston rings). If an airplane shows quick drooping surfaces, with hydraulics depressurized and normal surface positions with hydraulics pressurized, the airplane is considered dispatchable. However, if the airplane shows quick surface droop, the PCA's must be inspected/overhauled at the next convenient opportunity where manpower and components are available not to exceed 120 days.
- (13) PCA Functional Description (Fig. 9 and 12)
- (a) The input linkage and actuator piston provide closed-loop operation and control of the PCA. As the piston extends or retracts, the original input through the linkage is nulled out when the piston reaches the commanded position.
  - (b) An overtravel mechanism allows the input linkage to go beyond full control valve displacement. Since the inboard ailerons are fully displaced at 50 percent of control wheel rotation, this mechanism allows the control cables to continue providing inputs to the outboard ailerons and spoilers after full inboard aileron travel has been reached. The PCA control valve is positioned by the input linkage to port hydraulic fluid to the piston. A bias spring in the control valve will force the valve to the retract position if the input linkup breaks loose. The valve will move to command trailing edge down (inboard aileron PCAs retract and outside aileron PCAs extend).

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- (c) A compensator acts as an accumulator and relief valve to prevent fluid loss while the PCA is being backdriven. It maintains a small amount of pressurized fluid in the actuator in case the source hydraulic system is depressurized. This small amount of fluid assures correct operation of the anticavitation check valves. One of the three anticavitation check valves is installed in the inlet pressure line. It prevents reverse flow if the source hydraulic system is depressurized. The other two anticavitation check valves are installed in the return line to permit a low resistance fluid path from one side of the piston to the other. This prevents the piston from locking up when it is being backdriven. Two relief valves are installed in the actuator to provide internal pressure relief if the fluid pressure exceeds 3600 psi.
- (14) PCA Operation
  - (a) Assume control wheel operation results in movement of the input linkage to the right. This causes rotation of the overtravel mechanism as shown in the center of the Fig. 12. The control valve is displaced to the right and hydraulic fluid is ported to the right side of the piston causing it to retract. As the piston retracts, the input linkage pivots about the output pivot point. The overtravel mechanism rotates in the opposite direction moving the control valve to the neutral position. When the control wheel is returned to the original position, the process is reversed until the aileron reaches its initial position.
- (15) PCA Abnormal Operation
  - (a) Loss of hydraulic pressure to a single PCA will not affect the operation of the other PCA. The operating PCA will backdrive the depressurized PCA. Hydraulic fluid trapped inside the PCA will flow from one side of the piston to the other through the anticavitation check valves.
  - (b) If the PCA input linkage breaks, or becomes disconnected from one of the PCAs, the bias spring in the control valve will move the valve to command the trailing edge down (inboard aileron PCAs retract and outside aileron PCAs extend). If the command position is the same or above the failed position, the good PCA will command the aileron up, opposing the failed PCA down command. This results in no aileron movement. Movement in the up direction would occur only if forces from the good PCA and airload forces combined produce a pressure in the failed PCA that is higher than the load pressure relief valve setting. If the command position is lower than the failed PCA position, the trailing edge will move to the lower command position.

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- (c) To find out if a PCA is by-passing, compare the temperature of the PCA's with a PCA that is on a surface that is not quickly drooping. If one of the PCA's is hot to the touch compared to the other PCA, the hot PCA is most likely by-passing fluid and must be removed and inspected/overhauled at the next convenient opportunity where manpower and components are available.
- (16) Outboard Aileron Lockout Operation (Fig. 7, 9, and 13)
  - (a) The air data computers provide continuous airspeed data to the SAM (Stabilizer Trim/Aileron Lockout Module) which compares this data with reference schedules. The outboard aileron lockout actuator receives its signals from the SAM. The SAM sends an extend or retract signal to the lockout actuator depending on the airspeed. Limit switches in the actuator shut the actuator motor off at extend and retract limits to prevent damage.
- (17) Test Operation of Aileron System/Spoilers and Lateral Control Shutoff Valve Response with Single Hydraulic Source
  - (a) The test of the aileron system/spoilers and lateral control shutoff valve response with single hydraulic source makes sure that the lateral control shutoff valves operate the ailerons and spoilers when each hydraulic system is powered separately. When doing this test, the ailerons will operate correctly as the control wheel is rotated, as do all the spoiler pairs except the inboard pair of the inboard spoilers.
    - 1) Each of the spoiler pairs are supplied by the same hydraulic system except the most inboard pair, spoilers 6 and 7. Spoiler 6 is powered by the left hydraulic system and spoiler 7 is powered by the right hydraulic system. During the test of the aileron system/spoilers and lateral control shutoff valve response with a single hydraulic source, this spoiler pair 6 and 7, which is operated by the same SCM, will try to operate as a symmetrical pair when the control wheel is rotated cw and ccw with only the left or right hydraulic system pressurized.
    - 2) The SCM does not recognize that these spoilers 6 and 7 are powered by different hydraulic systems. A faultball will set on the SCM after 4 seconds when the spoiler pair does not operate symmetrically with control wheel rotation when only the left or right hydraulic system is pressurized. When the control wheel is rotated, it must be held for 4 seconds for the SCM to isolate the fault and set the faultball. The faultball that sets on the SCM will cause the pressurized spoiler not to operate if the control wheel is cycled again.

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- (b) Aileron system/spoiler operation with only the left hydraulic system powered will activate spoilers 1, 6, and 12, along with the left and right ailerons. When the control wheel is rotated full ccw, spoilers 1 and 6 will respond along with the left inboard and outboard and right outboard ailerons. When the control wheel is rotated back through neutral to full cw, spoiler 12 will respond along with the left inboard and outboard ailerons. Spoiler 7 will not respond to the cw control wheel movement, even though it is symmetrically opposite to spoiler 6. Since the SCM does not recognize that the spoiler pair is powered by different hydraulic systems, when the control wheel is returned to neutral and cycled again, spoiler 6 will begin to rise but will almost immediately return down because the SCM set a fault when spoiler 7 did not rise with the cw control wheel rotation. The small amount of rise in spoiler 6 is due to residual pressure in the hydraulic lines and not by command from the SCM.
- (c) Aileron system/spoiler operation with only the right hydraulic system powered will activate spoilers 2, 7, and 11, along with the left and right ailerons. When the control wheel is rotated full cw, spoilers 7 and 11 will respond along with the right inboard and outboard and left outboard ailerons. When the control wheel is rotated back through neutral to full ccw, spoiler 2 will respond along with the right inboard and outboard and left outboard ailerons. Spoiler 6 will not respond to the ccw control wheel movement, even though it is symmetrically opposite to spoiler 7. Since the SCM does not recognize that the spoiler pair is powered by different hydraulic systems, when the control wheel is returned to neutral and cycled again, spoiler 7 will begin to rise but will almost immediately return down because the SCM set a fault when spoiler 6 did not rise with the ccw control wheel rotation. The small amount of rise in spoiler 7 is due to residual pressure in the hydraulic lines and not by command from the SCM.
- (d) Aileron system/spoiler operation with only the center hydraulic system powered will activate spoilers 3, 4, 5, 8, 9, and 10 along with the left and right inboard ailerons. The spoilers and ailerons will respond correctly to cw and ccw control wheel movement since, they are all pressurized by the center system which results in their symmetrical operation with no SCM faults.

B. Control

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

**WARNING:** TO PREVENT INJURY OR DAMAGE, CLEAR PERSONNEL AND EQUIPMENT FROM CONTROL SURFACES BEFORE PROVIDING HYDRAULIC POWER. ISOLATE ANY SYSTEM NOT INTENDED FOR OPERATION.

- (2) Provide left, center, and right hydraulic system power (AMM 29-11-00/201).

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- (3) Aileron operation (control wheel).
  - (a) Rotate either aileron control wheel in a clockwise or counterclockwise direction to move the ailerons up or down.
  - (b) Place control wheels in the neutral position.
- (4) Aileron operation (trim actuator).
  - (a) Move aileron trim switches on aft electronic control panel P8 to LEFT WING DOWN or RIGHT WING DOWN position to adjust trim. The control wheels will move in response to switch commands.
- (5) Remove hydraulic power.
- (6) Remove electrical power if no longer required.

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FAULT ISOLATION/MAINT MANUAL

AILERON AND AILERON TRIM CONTROL SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ACTUATOR - INBOARD POWER CONTROL (PCA)	4	4	561BB, 661BB	27-11-48
ACTUATOR - BOTTOM LEFT LATERAL CENTRAL CONTROL (LCCA), M276	2	1	LEFT MAIN GEAR WHEEL WELL	27-11-14
ACTUATOR - LATERAL TRIM, M488	2	1	LEFT MAIN GEAR WHEEL WELL	27-11-09
ACTUATOR - LEFT OUTBOARD AILERON LOCKOUT, M462	6	1	561RBX	27-11-44
ACTUATOR - OUTBOARD POWER CONTROL (PCA)	6	4	561MB, 661MB	27-11-49
ACTUATOR - RIGHT LATERAL CENTRAL CONTROL (LCCA), M275	3	1	RIGHT MAIN GEAR WHEEL WELL	27-11-14
ACTUATOR - RIGHT OUTBOARD AILERON LOCKOUT, M479	6	1	661RBX	27-11-44
ACTUATOR - TOP LEFT LATERAL CENTRAL CONTROL (LCCA), M274	2	1	LEFT MAIN GEAR WHEEL WELL	27-11-14
AILERON - INBOARD	4	2	WING TRAILING EDGE	27-11-01
AILERON - OUTBOARD	6	2	WING TRAILING EDGE	27-11-02
ASSEMBLY - AILERON DRUM	1	2	119AL	27-11-03
CIRCUIT BREAKER -	1		FLIGHT COMPT, P11	
AILERON LOCKOUT L, C1026			11C17	*
AILERON LOCKOUT R, C1030			11C18	*
AILERON POS L, C4099			11K14	*
AILERON POS R, C4100			11K23	*
AILERON TRIM, C1035			11K15	*
AIR DATA AOA SENSOR L, C1			11A11	*
AIR DATA AOA SENSOR RIGHT, C3			11F31	*
AIR DATA BARO CORRECT L, C2			11A12	*
AIR DATA BARO CORRECT RIGHT, C4			11F32	*
AIR DATA CMPTR L, C625			11A10	*
AIR DATA CMPTR RIGHT, C626			11F30	*
FLT CONT ELEC 1L AC, C1538			11C6	*
FLT CONT ELEC 1L DC, C1534			11C7	*
FLT CONT ELEC 1R AC, C1536			11G17	*
FLT CONT ELEC 1R DC, C1531			11G18	*
FLT CONT ELEC 2L AC, C1537			11C8	*
FLT CONT ELEC 2L DC, C1533			11C9	*
FLT CONT ELEC 2R AC, C1535			11G26	*
FLT CONT ELEC 2R DC, C1532			11G27	*
COMPUTER - (FIM 31-41-00/101)				
EICAS L, M10181				
EICAS R, M10182				
COMPUTER - (FIM 34-12-00/101)				
L AIR DATA, M100				
R AIR DATA, M101				
FILTER - INBOARD PCA	4	2	561BB, 661BB	27-11-48
FILTER - LCCA	2	3	LEFT AND RIGHT MAIN GEAR WHEEL WELLS	27-11-15
FILTER - OUTBOARD PCA	6	2	561MB, 661MB	27-11-49
LEVER - DROOP SUMMING	5	2	561AB, 661AB	27-11-40
MECHANISM - AILERON CONTROL OVERRIDE	3	1	RIGHT MAIN GEAR WHEEL WELL	27-11-36
MECHANISM - FEEL, CENTERING, AND TRIM	2	1	LEFT MAIN GEAR WHEEL WELL	27-11-08
MECHANISM - OUTBOARD AILERON LOCKOUT	6	2	561RBX, 661RBX	27-11-44
PANEL - AILERON/RUDDER TRIM CONTROL, M74	1	1	FLT COMPT, P8	27-11-00

\*SEE THE WDM EQUIPMENT LIST

Aileron and Aileron Trim Control System - Component Index  
Figure 101 (Sheet 1)

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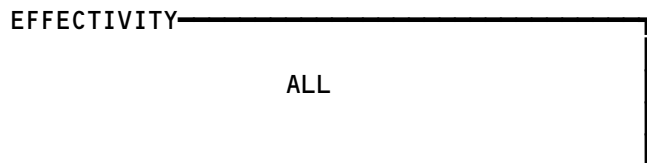
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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
QUADRANT - INBOARD DROOP	5	2	561AB, 661AB	27-11-38
QUADRANT - LEFT LCCA OUTPUT	2	1	LEFT MAIN GEAR WHEEL WELL	27-11-18
QUADRANT - OUTBOARD DROOP	5	2	561AB, 661AB	27-11-39
QUADRANT - RIGHT AILERON CONTROL	3	1	RIGHT MAIN GEAR WHEEL WELL	27-11-26
QUADRANT - RIGHT AILERON CONTROL OUTPUT	3	1	RIGHT MAIN GEAR WHEEL WELL	27-11-34
QUADRANT - RIGHT LCCA OUTPUT	3	1	RIGHT MAIN GEAR WHEEL WELL	27-11-28
ROD - BUS	1	1	119AL	27-11-03
SWITCH - AILERON TRIM CONT, YARS1, YARS2	1	2	FLT COMPT, P8, AILERON/RUDDER TRIM CONT PNL, M74	27-11-00
TUBE - LEFT LCCA TORQUE	2	1	LEFT MAIN GEAR WHEEL WELL	27-11-16
TUBE - RIGHT LCCA TORQUE	3	1	RIGHT MAIN GEAR WHEEL WELL	27-11-24
WHEEL - AILERON CONTROL	1	2	FLT COMPT	27-11-06

Aileron and Aileron Trim Control System - Component Index  
Figure 101 (Sheet 2)

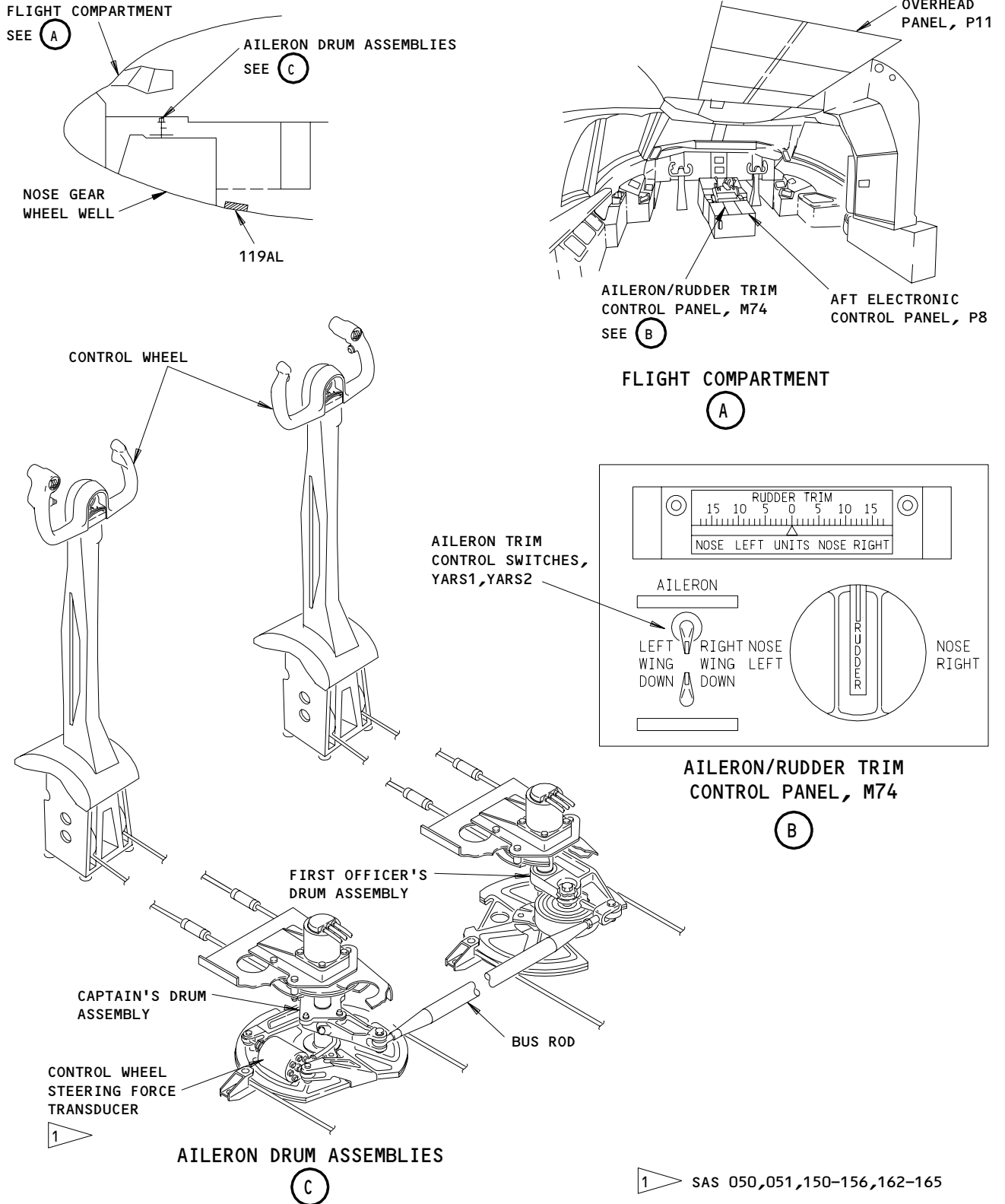


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### FAULT ISOLATION/MAINT MANUAL



**Aileron and Aileron Trim Control System - Component Location**  
**Figure 102 (Sheet 1)**

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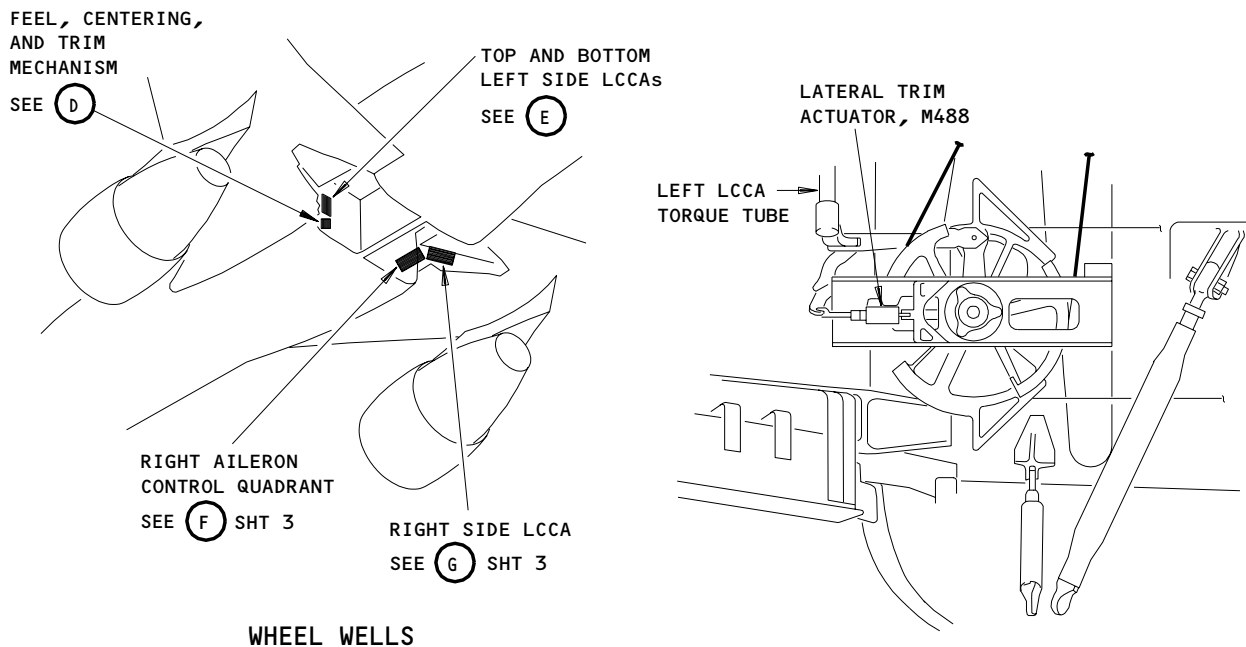
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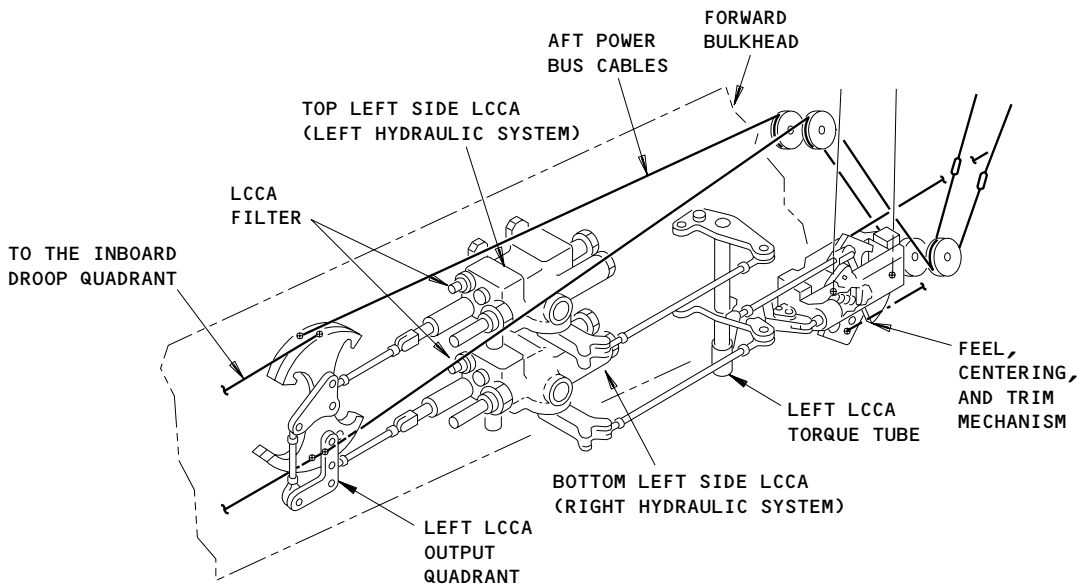
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### FAULT ISOLATION/MAINT MANUAL



FEEL, CENTERING, AND TRIM MECHANISM

(D)



LEFT LCCAs

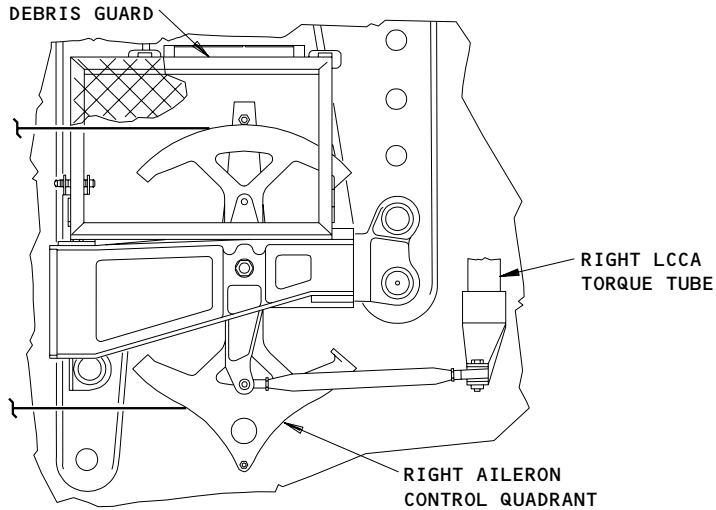
(E)

Aileron and Aileron Control System - Component Location  
Figure 102 (Sheet 2)

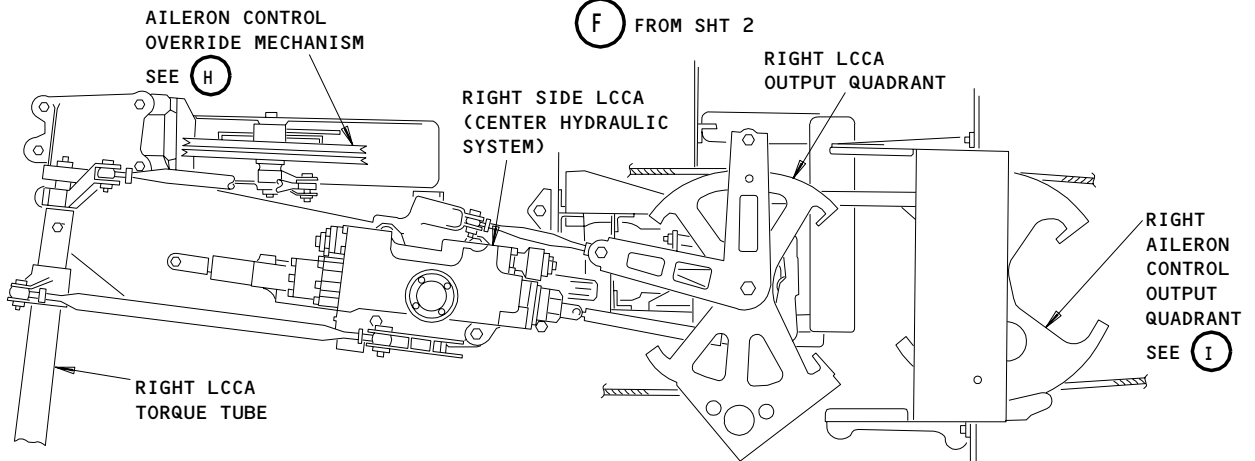
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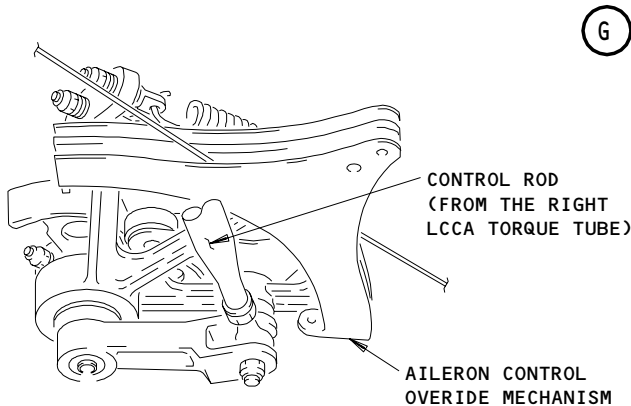




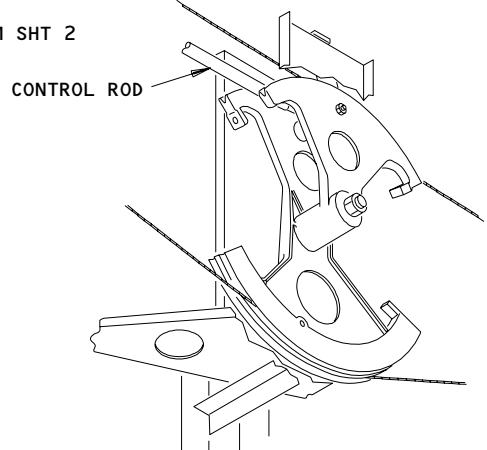
RIGHT AILERON CONTROL QUADRANT



RIGHT SIDE LCCA



AILERON CONTROL OVERRIDE MECHANISM



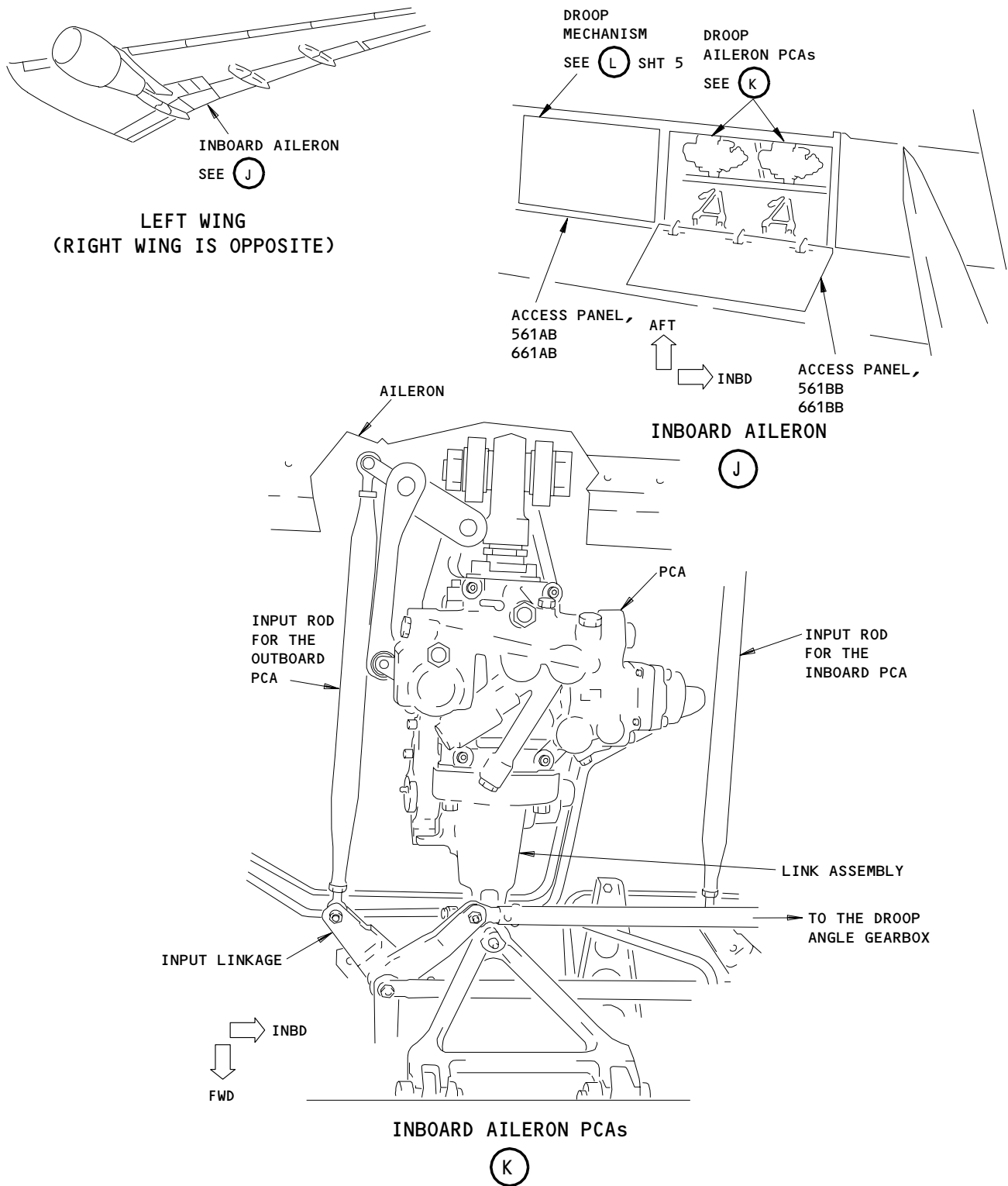
RIGHT AILERON CONTROL OUTPUT QUADRANT

Aileron and Aileron Trim Control System - Component Location  
Figure 102 (Sheet 3)

EFFECTIVITY	
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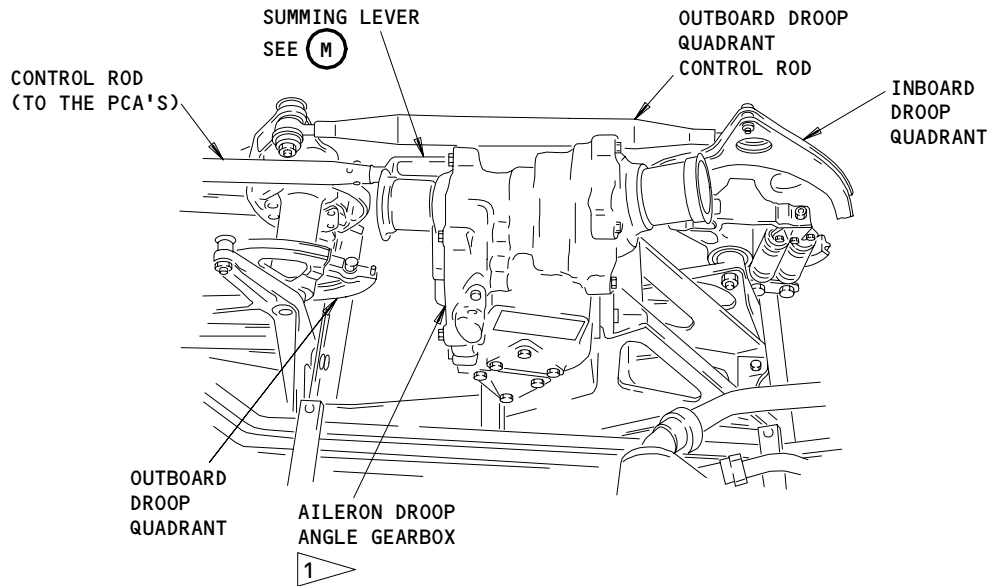
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Aileron and Aileron Trim Control System - Component Location  
Figure 102 (Sheet 4)

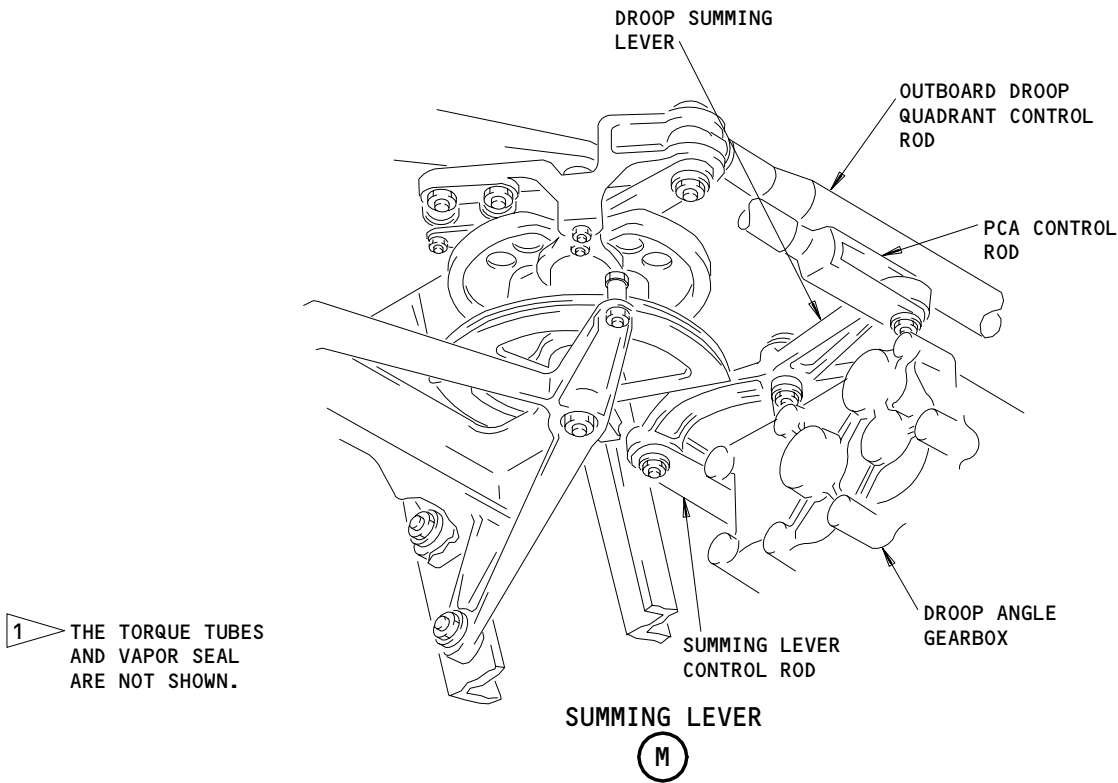
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**DROOP MECHANISM**

(L) FROM SHT 4

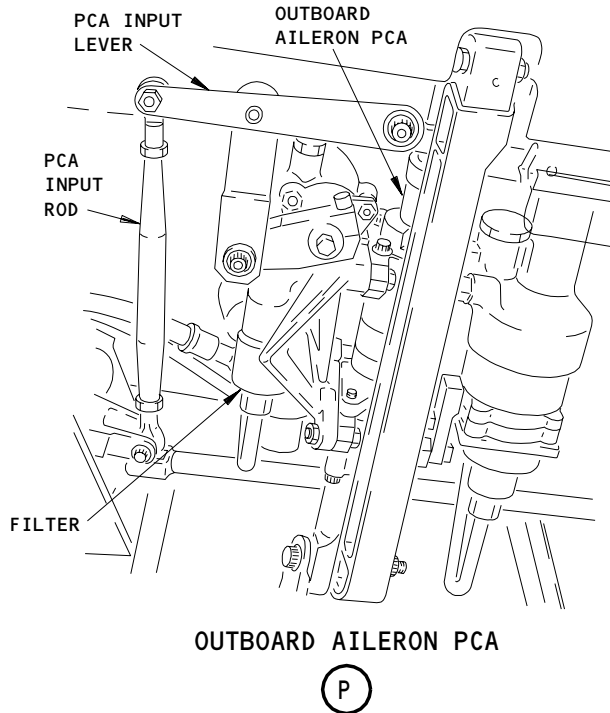
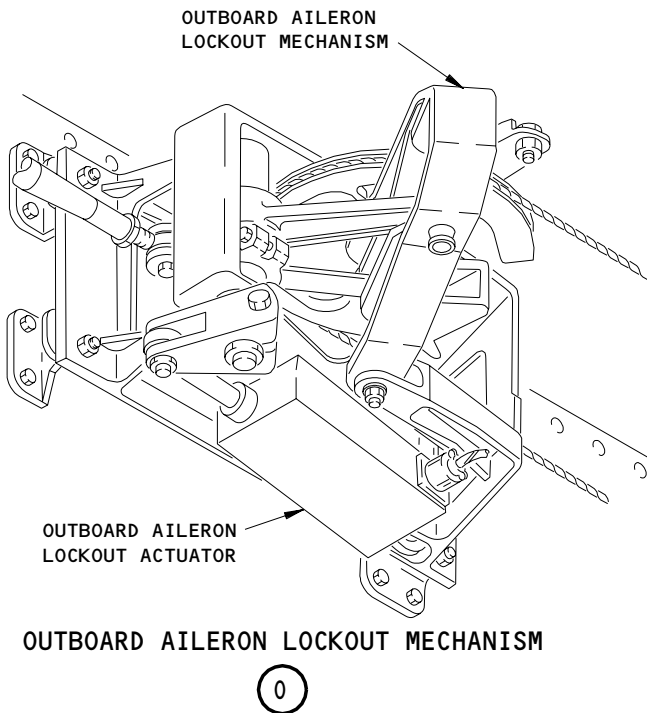
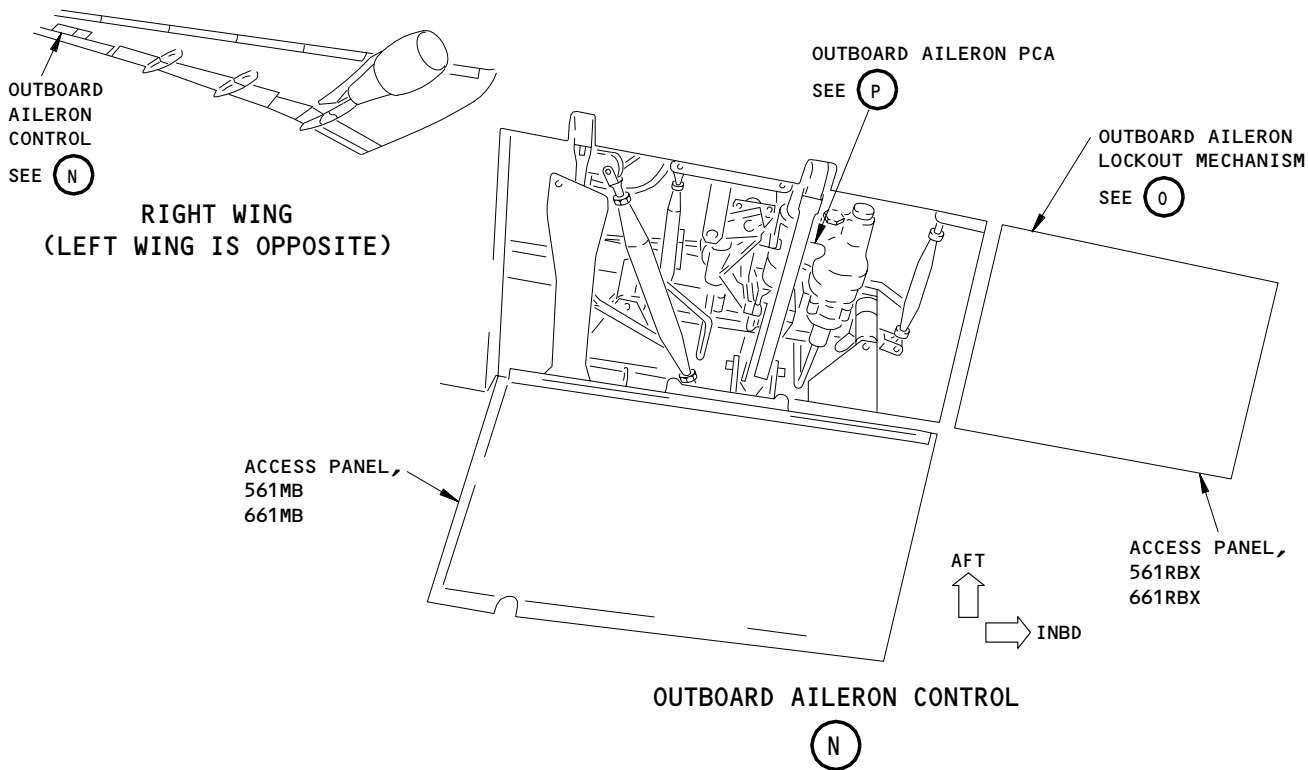


Aileron and Aileron Trim Control System - Component Location  
Figure 102 (Sheet 5)

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FAULT ISOLATION/MAINT MANUAL



Aileron and Aileron Trim Control System - Component Location  
Figure 102 (Sheet 6)

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AILERON AND AILERON TRIM CONTROL SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure contains these tasks:
- (1) Operational Test – Aileron and Aileron Trim Control System
  - (2) Adjustment – Aileron and Aileron Control System
  - (3) System Test – Aileron and Aileron Trim Control
  - (4) Aileron Response – Test (for Scheduled Maintenance)
- B. Refer to AMM 27-18-00/501 to get adjustment and test data for the aileron position indicating system.

TASK 27-11-00-715-002

2. Operational Test – Aileron and Aileron Trim Control System

A. General

- (1) Be careful because the spoilers will operate when the control wheel is moved.

**NOTE:** A single thumping noise can be heard from a PCA when the ailerons are moved full up or full down. This noise is heard only when the direction of movement of the PCA is changed. It is heard when the snubbing ring moves in the snubbing gland to change the direction of movement of the piston at the end of the stroke.

B. References

- (1) AMM 24-22-00/201, Electrical Power – Control
- (2) AMM 27-51-00/201, Trailing Edge Flap System
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones
  - 211 Control Cabin (Left)
  - 212 Control Cabin (Right)
  - 556 Inboard Aileron (Left)
  - 656 Inboard Aileron (Right)
  - 567 Outboard Aileron (Left)
  - 667 Outboard Aileron (Right)

D. Prepare for the Test

S 865-001

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

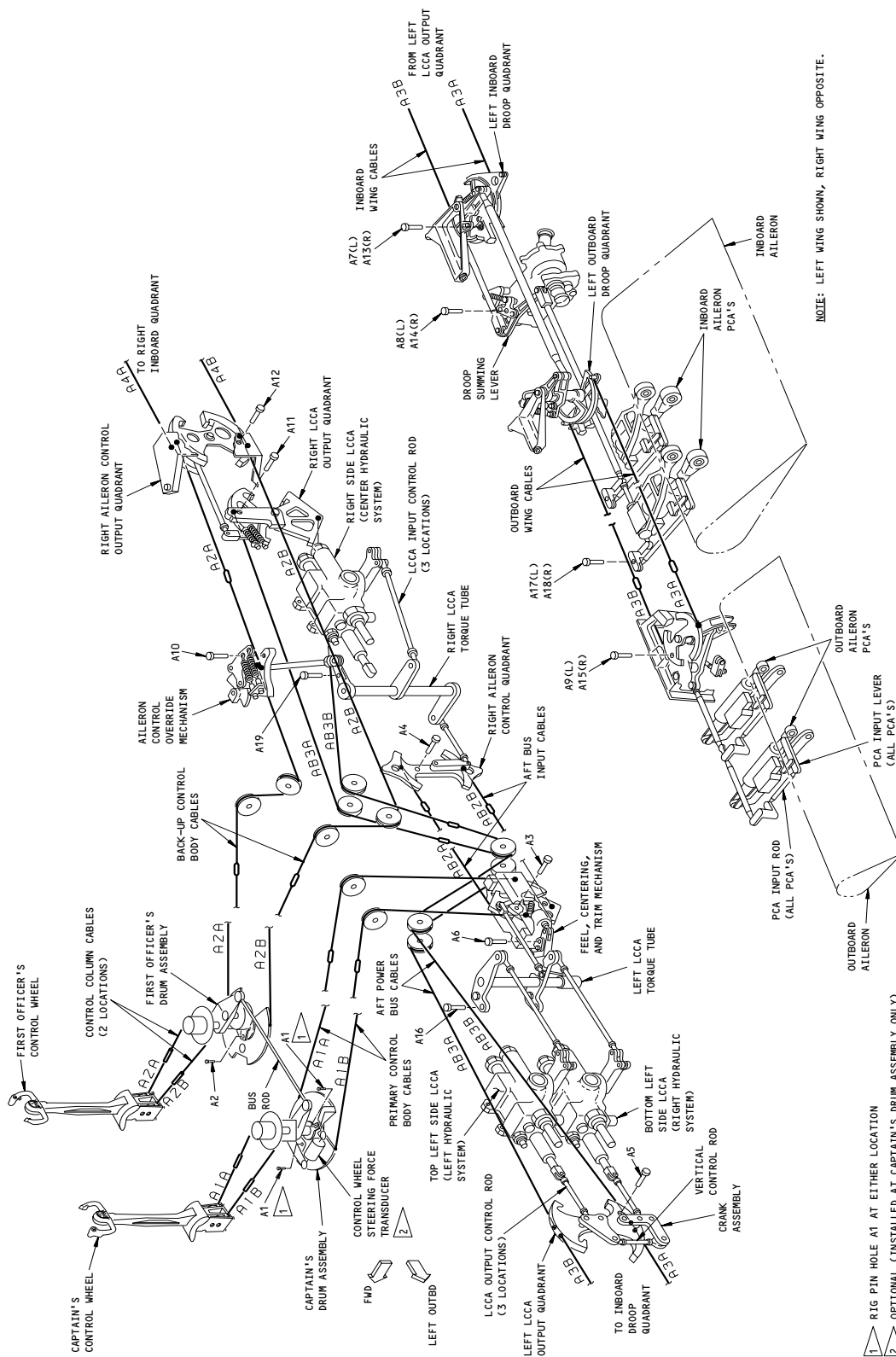
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Aileron and Aileron Trim Control System  
Figure 501

1 RIG PIN HOLE AT EITHER LOCATION  
2 OPTIONAL (INSTALLED AT CAPTAIN'S DRUM ASSEMBLY ONLY)

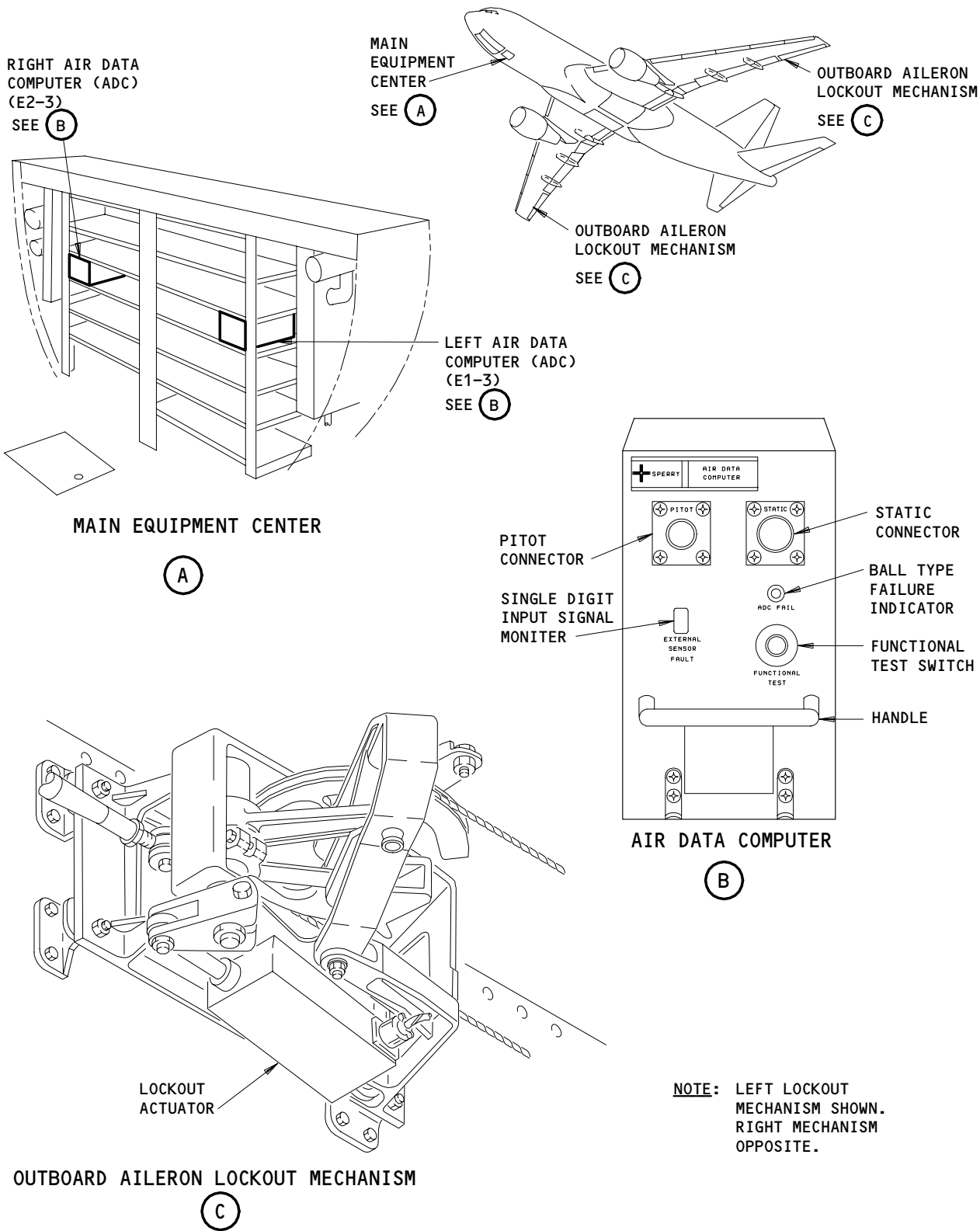
EFFECTIVITY

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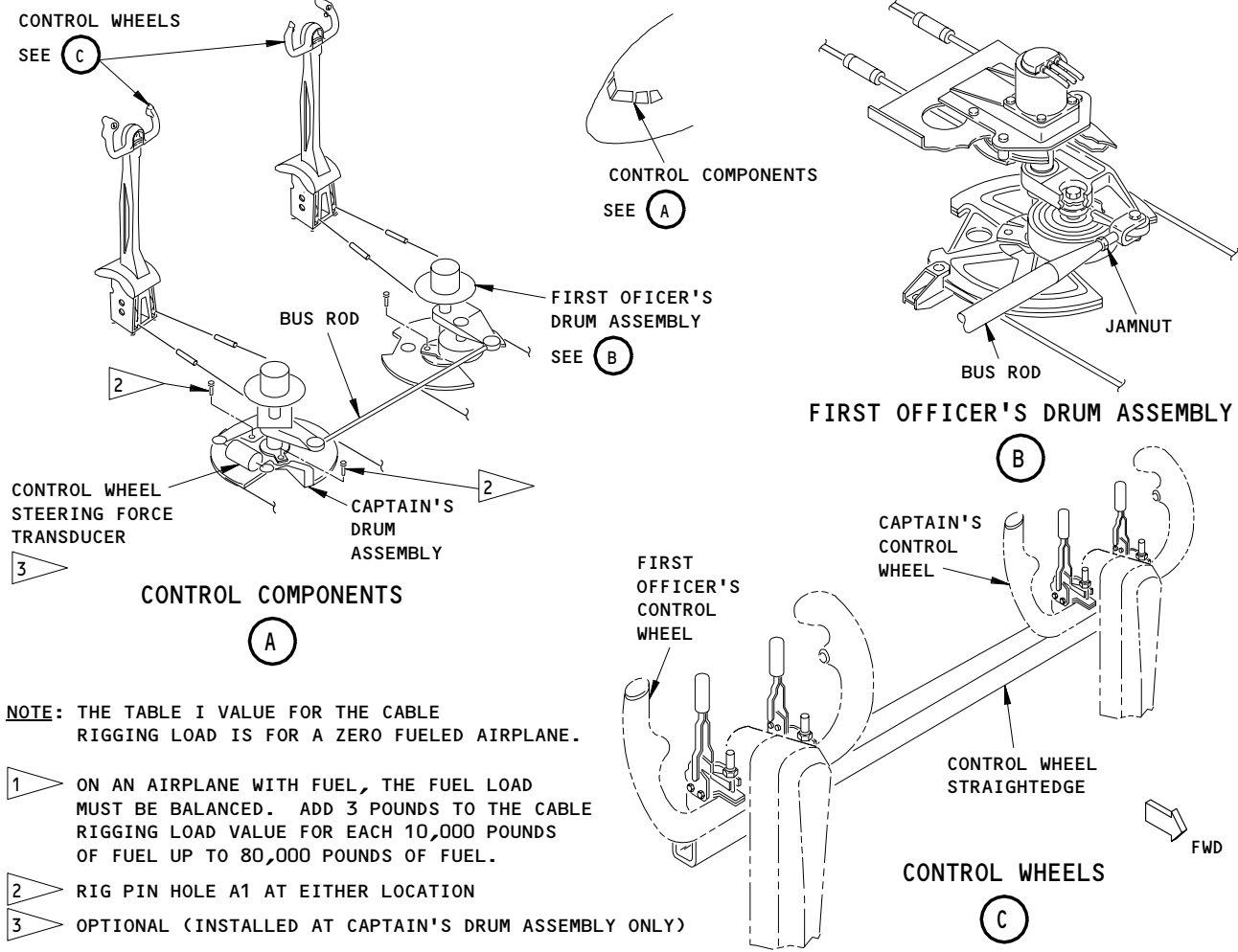


Outboard Aileron Lockout Test  
Figure 502

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TABLE I						
AILERON CABLE RIGGING LOADS						
TEMP °F	CONTROL COLUMN CABLES (A1A, A1B, A2A & A2B) +20 LBS -10 LBS	AFT BUS INPUT CABLES (AB2A & AB2B) +20 LBS -10 LBS	AFT POWER BUS CABLES (AB3A & AB3B) +20 LBS -10 LBS	BODY CABLES (A1A, A1B, A2A & A2B) +20 LBS -10 LBS	INBOARD WING CABLES (A3A, A3B, A4A & A4B) +20 LBS -10 LBS 1	OUTBOARD WING CABLES (A3A, A3B, A4A & A4B) +20 LBS -10 LBS
140	101	101	101	131	161	161
130	96	96	96	126	156	156
110	88	88	88	118	148	148
90	79	79	79	109	139	139
70	70	70	70	100	130	130
50	62	62	62	92	122	122
30	54	54	54	84	114	114
10	45	45	45	75	105	105
-10	37	37	37	67	97	97
-30	29	29	29	59	89	89
-40	23	23	23	53	83	83



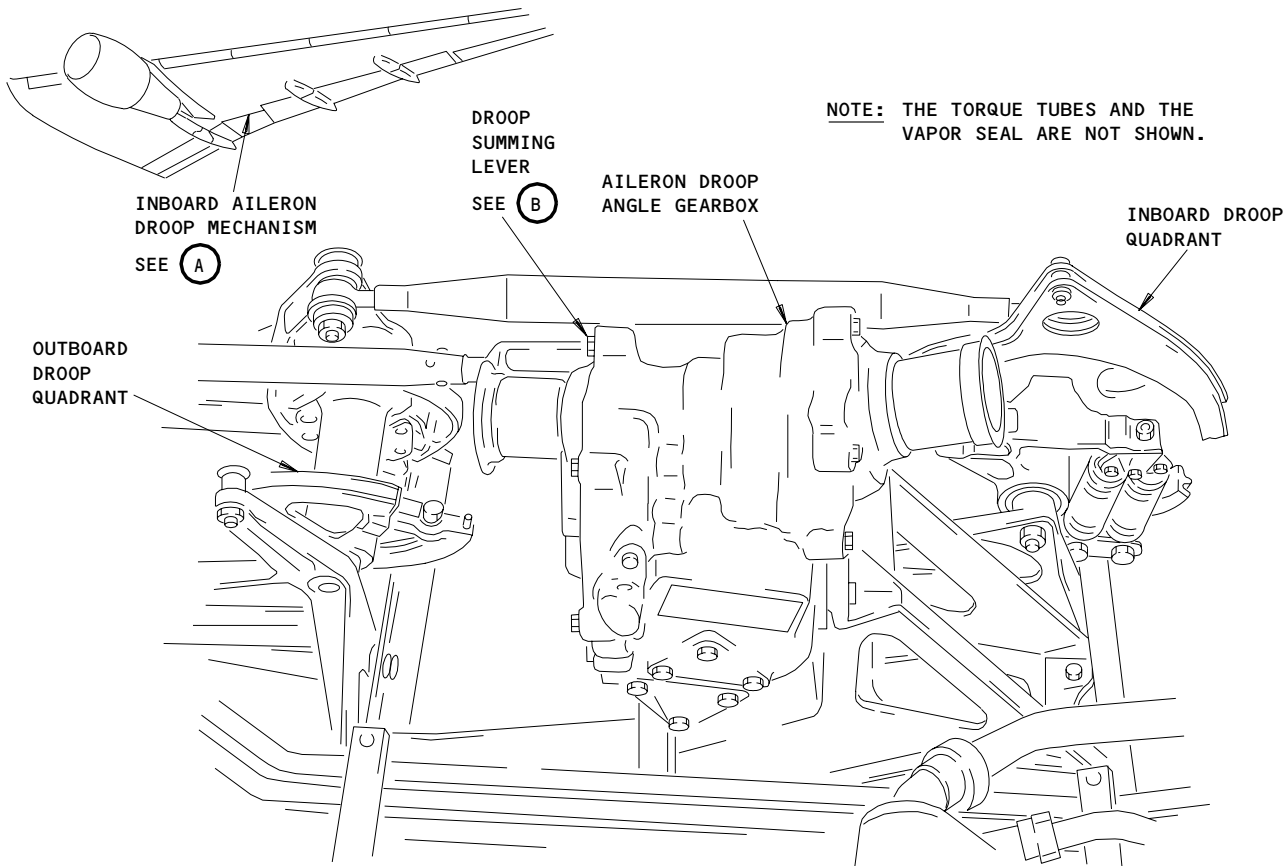
**Aileron and Aileron Trim Control System Adjustment  
Figure 503**

EFFECTIVITY

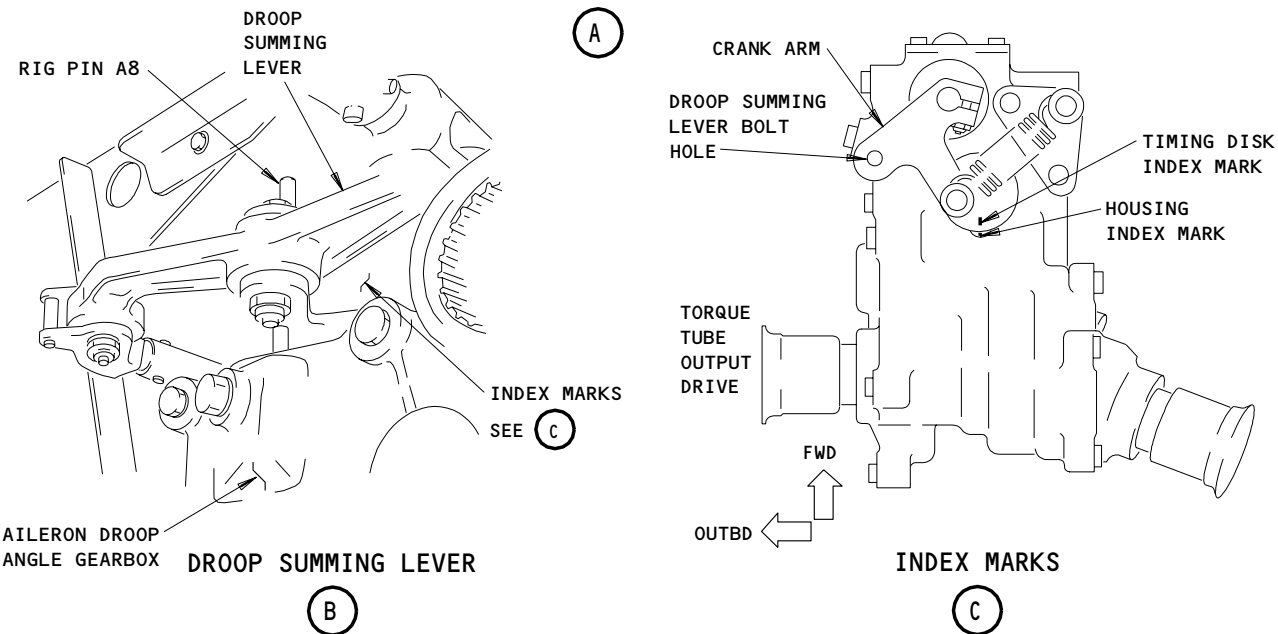
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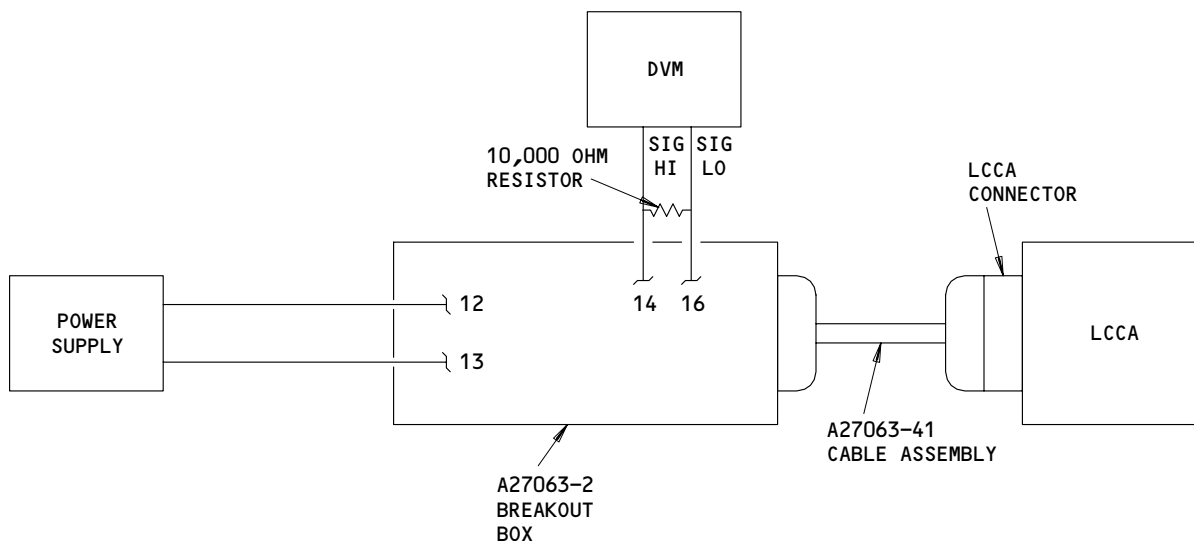
INBOARD AILERON DROOP MECHANISM



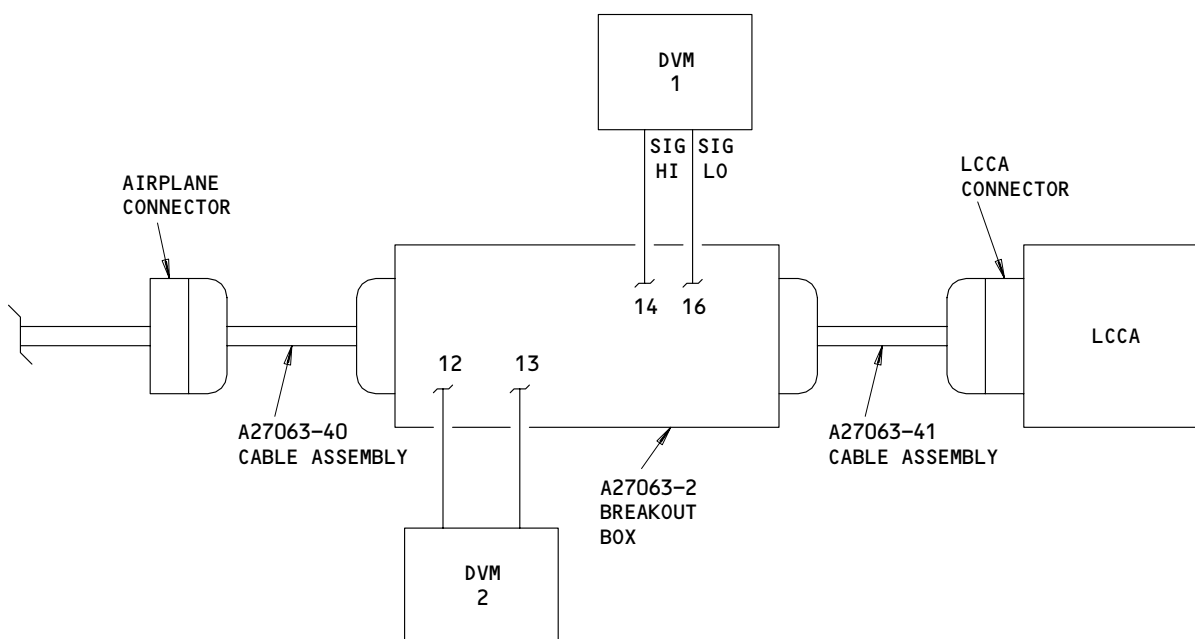
Inboard Aileron Droop Mechanism Adjustment  
Figure 504

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**METHOD 1**



**METHOD 2**

**LEGEND**

DVM - DIGITAL VOLTMETER

**NOTE:** IF ONLY ONE DVM IS USED, MONITOR THE AIRPLANE POWER AS SHOWN (DVM 2). THEN CONNECT IT TO THE BREAKOUT BOX AS SHOWN (DVM 1) TO DO THE ADJUSTMENT.

**Lateral Central Control Actuator (LCCA) Adjustment  
Figure 505**

EFFECTIVITY ————  
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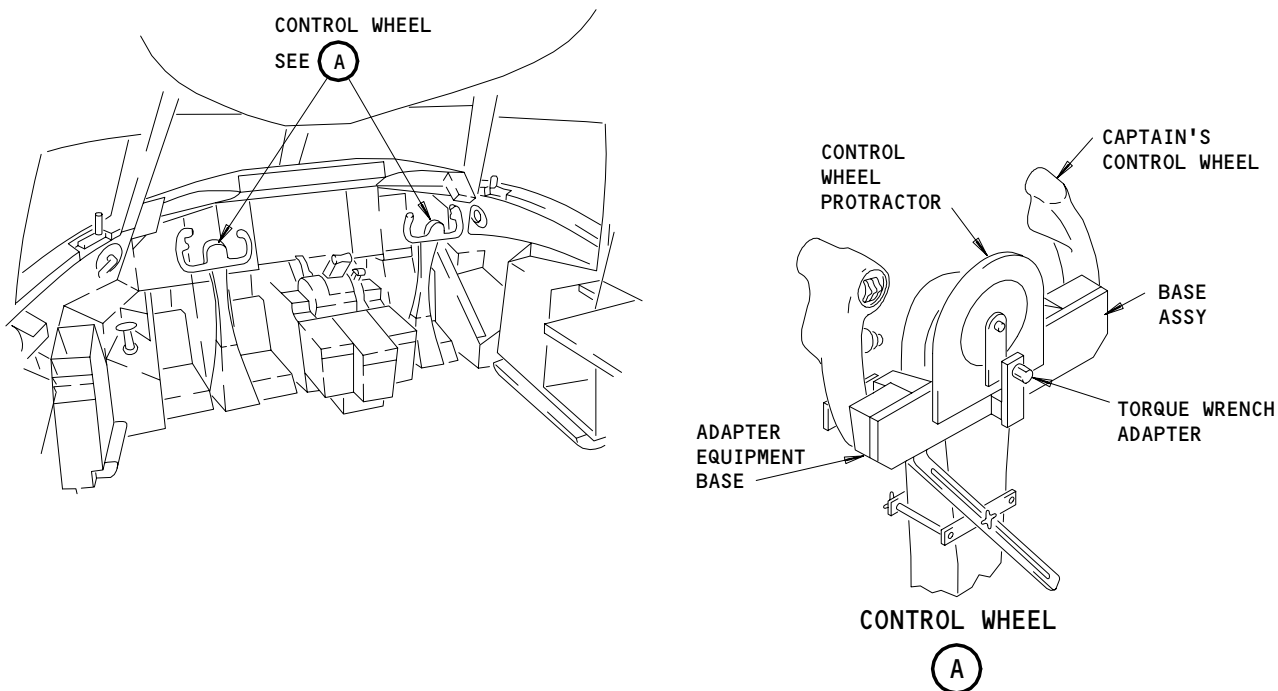
S 865-004

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 825-005

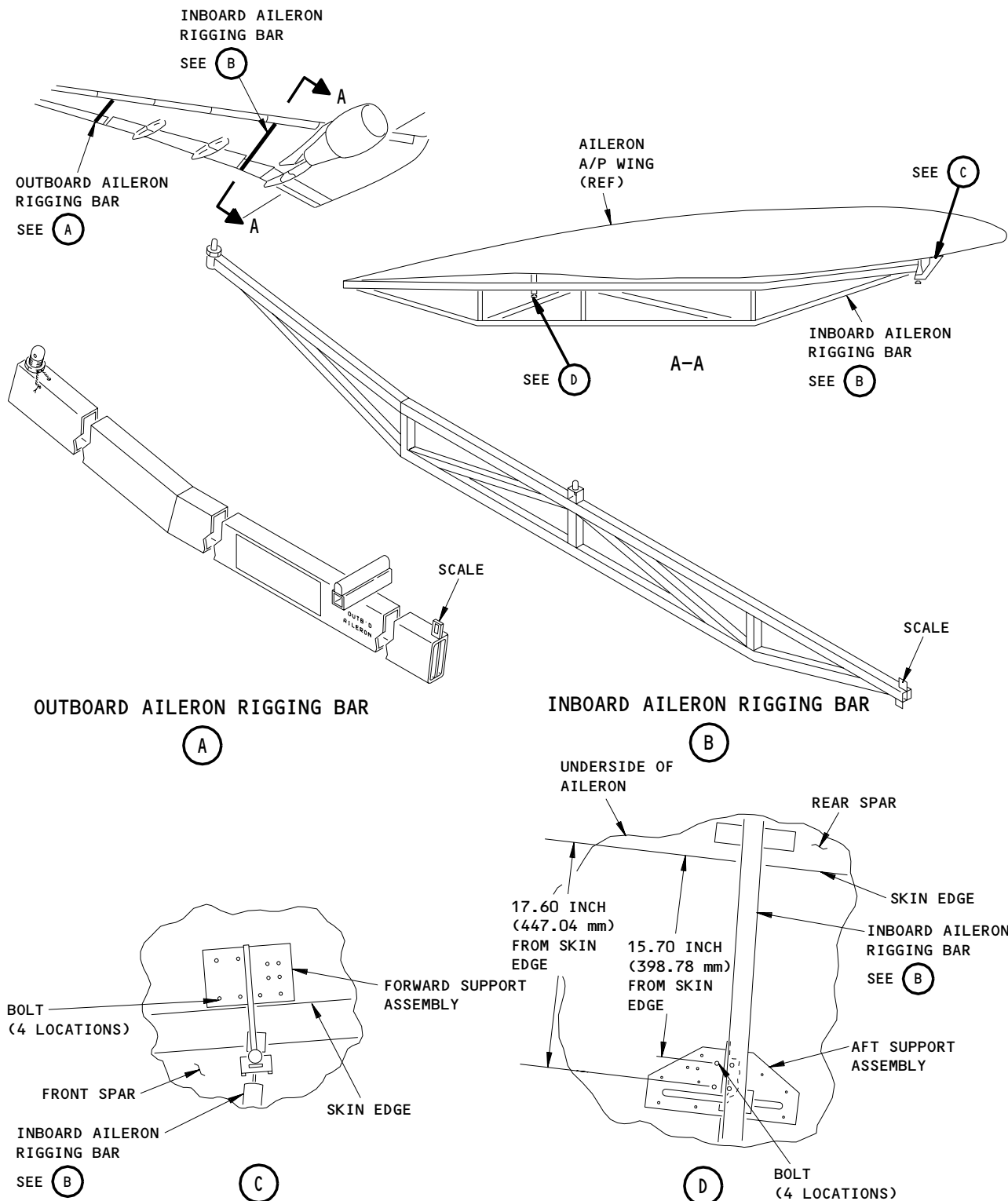
- (3) Push the STATUS button on the display select panel to show the aileron position indicator on the display.



Aileron and Aileron Trim Control System Test Equipment  
Figure 506

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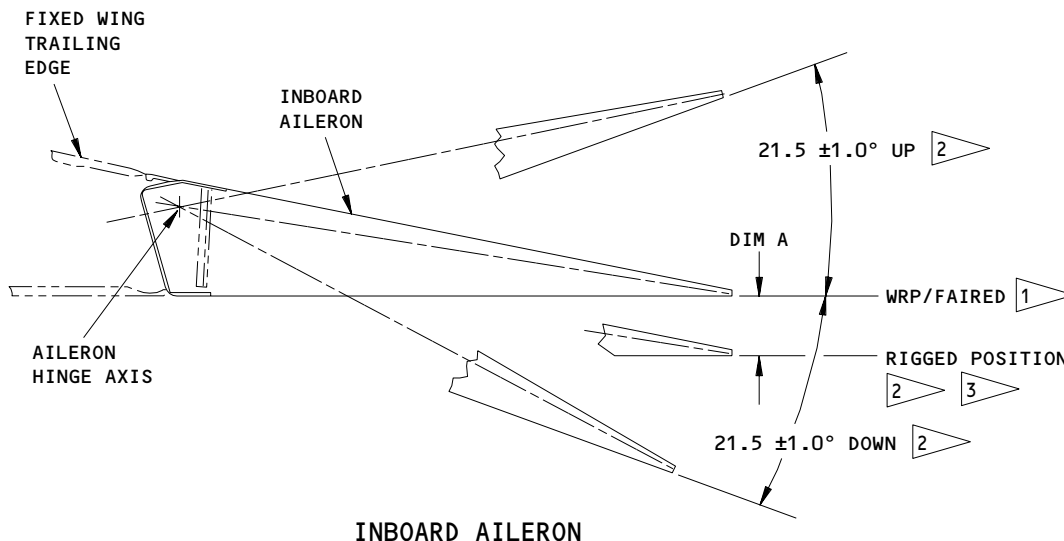
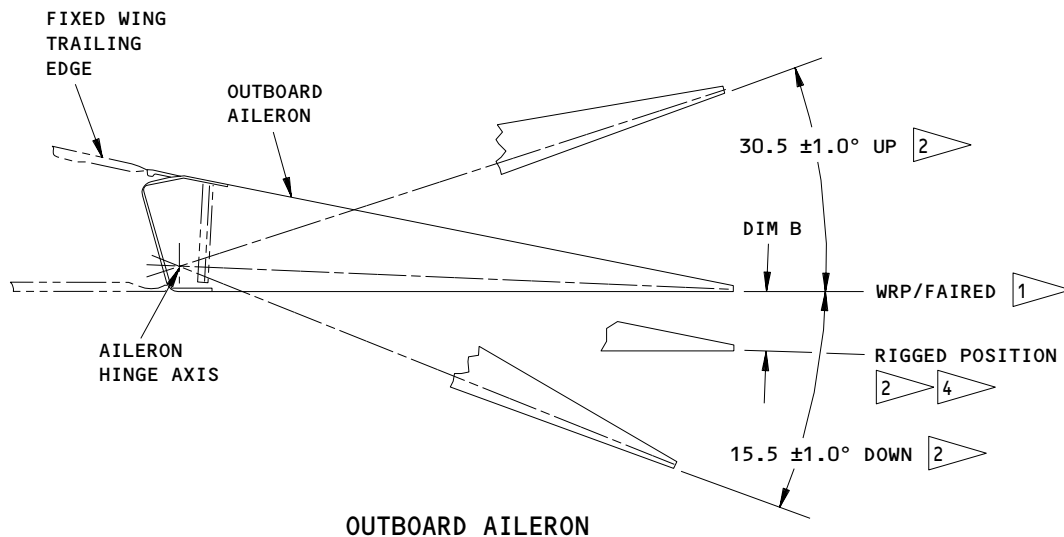
Aileron Rigging Bar Installation  
Figure 507

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- 1 THE AILERON IS IN ITS FAIRED POSITION WHEN IT IS ALIGNED WITH THE WING REFERENCE PLANE (WRP). THE WRP IS THEORETICAL AND CAN ONLY BE DETERMINED WITH THE RIGGING BAR. THE FAIRED POSITION (WRP) IS THE SAME AS "0" AILERON POSITION AS FOUND WITH THE (A27024-31 WHICH REPLACES -29) OUTBOARD AILERON RIGGING BAR OR SAME AS "1" AILERON POSITION AS FOUND WITH THE (A27024-47) INBOARD AILERON RIGGING BAR.
- 2 ADD OR SUBTRACT THE AILERON POSITION MEASUREMENT, DIM A OR DIM B, TO GET THE TOTAL AILERON TRAVEL FROM THE RIGGED POSITION.
- 3 DIM A IS  $0.40 \pm 0.10$  INCH ( $0.40 \pm 0.10$  DEGREES) DOWN FROM THE FAIRED POSITION FOR RIGGING. DIM A IS  $0.40 \pm 0.20$  INCH ( $0.40 \pm 0.24$  DEGREES) DOWN FROM THE FAIRED POSITION FOR SYSTEM TEST.
- 4 DIM B IS  $0.87 \pm 0.05$  INCH ( $2.0 \pm 0.09$  DEGREES) DOWN FROM THE FAIRED POSITION FOR RIGGING. DIM B IS  $0.87 \pm 0.15$  INCH ( $2.0 \pm 0.28$  DEGREES) DOWN FROM THE FAIRED POSITION FOR SYSTEM TEST.

**Aileron Rigged vs FaiRED Position**  
**Figure 508**

<b>EFFECTIVITY</b>	<b>ALL</b>
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**27-11-00**

E. Aileron Response Test

S 215-006

- (1) Turn one of the two control wheels clockwise and hold it there for 2 seconds. Do the checks that follow:
  - (a) Make sure that the two left ailerons move down and that the two right ailerons move up.

NOTE: The spoiler panels on the right wing will operate when the control wheel is turned.

- (b) Make sure that the ailerons move smoothly from their full down position to their full up position.
- (c) Make sure that the amber SPOILERS light on the P5 panel is OFF.

S 215-007

- (2) Turn one of the two control wheels counterclockwise and do the checks that follow:
  - (a) Make sure that the two left ailerons move up and that the two right ailerons move down.

NOTE: The spoiler panels on the left wing will operate when the control wheel is turned.

- (b) Make sure that the ailerons move smoothly from their full down position to their full up position.
- (c) Make sure that the amber SPOILERS light on the P5 panel is OFF.

F. Aileron System and Lateral Control Shutoff Valve Reponse with Single Hydraulic Source Test

S 865-008

- (1) Make sure that the FLT CONTROL SHUTOFF WING switches L, C, and R on the right side panel, P61, are ON. Make sure that the amber switch-position legend lights are OFF.

S 865-009

- (2) Remove the power from the center and right hydraulic systems (AMM 29-11-00/201).

S 215-010

- (3) Turn the control wheel to its full counterclockwise position and hold it there for at least 4 seconds. Do the checks that follow:
  - (a) Make sure that the two left ailerons and the right outboard aileron operate correctly when the control wheel is moved. Ignore the movement of the right inboard aileron.
  - (b) Make sure that spoilers 1 and 6 operate when the control wheel is moved. Make sure that the other spoilers do not move.

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S 215-011

- (4) Turn the control wheel to its full clockwise position, and hold it there for at least 4 seconds. Do the checks that follow:
- (a) Make sure the two left ailerons and the right outboard aileron operate correctly when you move the control wheel.

NOTE: Ignore the movement of the right inboard aileron.

- (b) Make sure that spoiler number 12 operates when the control wheel is moved. Make sure that the other spoilers do not move.

S 825-805

- (5) Move the control wheel to its neutral position.

S 865-015

- (6) Supply pressure to the right hydraulic system (AMM 29-11-00/201).

S 865-016

- (7) Remove the power from the left hydraulic system (AMM 29-11-00/201).

S 215-017

- (8) Turn the control wheel to its full clockwise position and hold it there for at least 4 seconds. Do the checks that follow:
- (a) Make sure that the two right ailerons and the left outboard aileron operate correctly when the control wheel is moved. Ignore the movement of the left inboard aileron.
  - (b) Make sure that spoilers number 7 and 11 operate when the control wheel is moved. Make sure that the other spoilers do not move.

S 215-018

- (9) Turn the control wheel to its full counterclockwise position and hold it there for at least 4 seconds. Do the checks that follow:
- (a) Make sure that the two right ailerons and the left outboard aileron operate correctly when the control wheel is moved. Ignore the movement of the left inboard aileron.
  - (b) Make sure that spoiler number 2 operates when the control wheel is moved. Make sure that all the other spoilers do not move.

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S 825-801

- (10) Move the control wheel to its neutral position.

S 865-022

- (11) Remove the power from the right hydraulic system (AMM 29-11-00/201).

S 865-023

- (12) Supply pressure to the center hydraulic system (AMM 29-11-00/201).

S 215-024

- (13) Turn the control wheel to its full clockwise position, and hold it there for at least 4 seconds. Do the checks that follow:
- (a) Make sure that the inboard ailerons operate correctly when the control wheel is moved. Ignore the movement of the outboard ailerons.
  - (b) Make sure that spoilers number 8, 9, and 10 operate when the control wheel is moved. Make sure that the other spoilers do not move.

S 215-025

- (14) Turn the control wheel to its full counterclockwise position and hold it there for at least 4 seconds. Do the checks that follow:
- (a) Make sure that the inboard ailerons operate correctly when the control wheel is moved. Ignore the movement of the outboard ailerons.
  - (b) Make sure that spoilers number 3, 4 and 5 operate when the control wheel is moved. Make sure that the other spoilers do not move.

S 825-026

- (15) Move the control wheel to its neutral position.

S 865-027

- (16) Remove the power from the center hydraulic system if it is not necessary (AMM 29-11-00/201).

S 865-028

- (17) Remove electrical power if it is not necessary (AMM 24-22-00/201).

#### G. Aileron Trim Control Test

S 865-029

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

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S 865-030

- (2) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 215-031

- (3) Move the aileron trim switches on the aft electronic control panel, P8, to RIGHT WING DOWN. Hold the switches in this position until the control wheel movement stops. Do the check that follows:
  - (a) Make sure that the control wheels turn clockwise approximately 30 degrees from the neutral position.

S 215-032

- (4) Move the aileron trim switches on the P8 panel to LEFT WING DOWN. Hold the switches in this position until the control wheel movement stops. Do the check that follows:
  - (a) Make sure that the control wheels turn counterclockwise approximately 30 degrees from the neutral position.

S 215-033

- (5) Operate the trim switches until the aileron trim indicator shows zero units of trim.

#### H. Test Aileron Back-up Control

S 865-034

- (1) Turn the captain's control wheel to its full clockwise or counterclockwise position and hold it there.

S 215-035

- (2) Turn the first officer's control wheel to its full clockwise position and then its full counterclockwise position. Do the check that follows:
  - (a) Make sure that the two right ailerons operate when the control wheel is moved.

S 825-036

- (3) Move the control wheel to its neutral position.

**NOTE:** The control wheel can shake when it is moved quickly from full input to its neutral position. This is not an indication of incorrect operation of the aileron system. The control wheel shakes because it is moved to its neutral position faster than usual.

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I. Test Inboard Aileron Droop

NOTE: All aileron positions are taken from the faired position (Fig. 508).

S 215-037

- (1) Make sure that the aileron trim is in its neutral position and that the control wheels are in their center position.

S 215-672

- (2) Make sure that the flaps are retracted.

S 865-038

- (3) Do the activation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 215-039

WARNING: TO PREVENT INJURY OR DAMAGE, KEEP ALL PERSONS AND EQUIPMENT AWAY FROM THE CONTROL SURFACES. THE TRAILING EDGE FLAPS AND THE LEADING EDGE SLATS ARE FULLY POWERED. MAKE SURE THAT THE ENGINE STRUT ACCESS DOORS AND THE THRUST REVERSER COWLING ARE CLOSED. THIS WILL PREVENT DAMAGE WHEN THE SLATS ARE OPERATED.

- (4) Make sure that the flap lever on the control stand, P10, is in its zero (FLAPS UP) detent. Do the check that follows:  
(a) Make sure that the inboard ailerons are in the rigged position.

S 215-040

- (5) Move the flap lever to its 5-unit detent position. Do the check that follows:  
(a) Make sure that the left inboard aileron moves to  $10.44 \pm 1.00$  degrees down from the faired position.  
(b) Make sure that the right inboard aileron moves to  $10.81 \pm 1.00$  degrees down from the faired position.

S 215-766

- (6) Move the flap lever to its 30-unit detent position. Do the check that follows (Inboard aileron droop will decrease when flaps are moved to the 30-unit detent position):  
(a) Make sure the two inboard ailerons move at the same time to  $5.50 \pm 0.75$  degrees down from the faired position.

NOTE: Make sure the difference between the left inboard aileron position and the right inboard aileron position is not more than 0.75 degree.

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S 215-712

- (7) Move the flap lever to its 15-unit detent position. Do the check that follows:
- (a) Make sure that the left inboard aileron moves to  $10.44 \pm 1.00$  degrees down from the faired position.
  - (b) Make sure that the right inboard aileron moves to  $10.81 \pm 1.00$  degrees down from the faired position.

S 215-043

- (8) Move the flap lever to its zero (FLAPS UP) detent position. Do the check that follows:
- (a) Make sure that the inboard ailerons are in the rigged position.

J. Test Outboard Aileron Lockout Actuator (Fig. 502)

S 215-044

- (1) Make sure that the aileron trim is in its neutral position and that the control wheels are in their center position.

S 215-045

- (2) Push and hold the FUNCTIONAL TEST switch on the left or right air data computer (ADC) module located on the E1-3 or E2-3 equipment shelf, or up and hold the AIR DATA TEST switch on the P61 test module and do the steps that follow:

**NOTE:** The lockout actuators will extend when the switch is pushed. The AIL LOCK light on the P5 panel will come ON. Also, an AILERON LOCKOUT message will come into view on the display.

Do not push the ADC switch when pressure is supplied to the pitot-static system. An incorrect fault condition can occur. To remove the fault, push the ADC test switch with the pitot-static system at ambient pressure.

- (a) Make sure that the outboard ailerons stay in their rigged position.

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- (b) Turn one of the two control wheels to its full clockwise position and then to its full counterclockwise position. Do the check that follows:
  - 1) Make sure that the outboard ailerons do not move more than 1 degree up or 1 degree down.
- (c) Move the control wheel to its neutral position.

S 825-046

- (3) Release the FUNCTIONAL TEST switch or AIR DATA TEST switch.

S 215-047

- (4) Turn one of the two control wheels to its full clockwise position and then to its full counterclockwise position. Do the check that follows:
  - (a) Make sure that the outboard ailerons operate correctly when the control wheel is moved.

K. Put the Airplane Back to its Usual Condition

S 865-048

- (1) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-049

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-11-00-835-429

3. Adjustment - Aileron and Aileron Control System

A. General

- (1) SYSTEM ADJUSTMENT SEQUENCE: This task adjusts the aileron control system and its components in the sequence that follows.

**NOTE:** This sequence is recommended for a complete system adjustment (refer to the specific adjustments shown in the next pages of this procedure).

- (a) Prepare for the Adjustments

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- (b) Adjustment of the Control Column Cables (A1A, A1B, A2A, and A2B)
- (c) Adjustment of the Aileron Drum Assembly Bus Rod
- (d) Adjustment of the Aileron Primary Control Body Cables (A1A and A1B)
- (e) Adjustment of the Aileron Back-Up Control Body Cables (A2A and A2B)
- (f) Adjustment of the Aft Power Bus Cables (AB3A and AB3B)
- (g) Adjustment of the Aft Bus Input Cables (AB2A and AB2B)
- (h) Adjustment of the Right Wheel Well Components
- (i) Adjustment of the Left LCCA Torque Tube
- (j) Adjustment of the Inboard Left Wing Cables (A3A and A3B)
- (k) Adjustment of the Inboard Right Wing Cables (A4A and A4B)
- (l) Adjustment of the Outboard Left Wing Cables (A3A and A3B)
- (m) Adjustment of the Outboard Right Wing Cables (A4A and A4B)
- (n) A rig pin check of the Aileron Control Cable System
- (o) Adjustment of the Left Inboard Aileron Droop Mechanism
- (p) Adjustment of the Right Inboard Aileron Droop Mechanism
- (q) Adjustment of the LCCAs
- (r) Adjustment of the PCAs for the Left Inboard Aileron
- (s) Adjustment of the PCAs for the Right Inboard Aileron
- (t) Adjustment of the PCAs for the Left Outboard Aileron
- (u) Adjustment of the PCAs for the Right Outboard Aileron

- (2) **OUT OF SEQUENCE ADJUSTMENTS:** It is possible to adjust some components in a different sequence. You must do some other adjustments before the component adjustment and some adjustments after it is done. The necessary adjustments are as follows:

**NOTE:** Prepare for adjustment steps must be done before the out of sequence adjustments that follow.

**NOTE:** When replacing a component between rig pins no adjustment outside of the rig pins is necessary. When replacing a component outside of the rig pins, make sure you do an adjustment for that component and any necessary adjustments before and after that component.

- (a) Adjustment of Control Column Cables does not require other pre/post aileron system adjustments.
- (b) Adjustment of Aileron Drum Assembly Bus rod requires the Control Column Cables to be adjusted first.
- (c) Adjustment of the Aileron Primary Body cables requires the Control Column Cables to be adjusted first.
- (d) Adjustment of Aileron Back-Up Body Cables requires the Control Column Cables to be adjusted first.
- (e) Adjustment of the Aft Power Bus Cables requires:
  - 1) Adjustments of the Aileron Primary Control Body Cables and the Back-Up Body Cables before this adjustment.

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- 2) A fit check of rig pins A7 and A12 after this adjustment.
- (f) Adjustment of the Aft Bus Input Cables requires:
  - 1) Adjustments of the Aileron Primary Body Cables and of the Aileron Back-Up Body Cables before this adjustment.
  - 2) Adjustments of the Right Wheel Well Components and of the Left LCCA Torque Tube after this adjustment.
- (g) Adjustment of the Right Wheel Well Components requires:
  - 1) Adjustments of the Aft Power Bus Cables and of the Aft Bus Input Cables before this adjustment.
  - 2) A fit check of rig pins A4, A10 and A13 after this adjustment.
- (h) Adjustment of the Left side (right hydraulic system) LCCA requires:
  - 1) Adjustments of the Left LCCA Torque Tube and of the Right Wheel Well Components before this adjustment.
  - 2) Completion of the "Prepare for the LCCA adjustment" steps before this adjustment.
  - 3) Completion of the "Complete the LCCA adjustment" steps after this adjustment.
  - 4) A fit check of rig pins A3 and A5 after this adjustment.
- (i) Adjustment of the Left side (left hydraulic system) LCCA requires:
  - 1) Adjustments of the Left LCCA Torque Tube and of the Right Wheel Well Components before this adjustment.
  - 2) Completion of the "Prepare for the LCCA adjustment" steps before this adjustment.
  - 3) Completion of the "Complete the LCCA adjustment" steps before this adjustment.
  - 4) A fit check of rig pins A3 and A5, after this adjustment.
- (j) Adjustment of the Right side (Center hydraulic system) LCCA requires:
  - 1) Adjustments of the Left LCCA Torque Tube and of the Right Wheel Well Components before this adjustment.
  - 2) Completion of the "Prepare for the LCCA adjustment" steps before this adjustment.

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- 3) Completion of the "Complete the LCCA adjustment" steps after this adjustment.
- 4) A fit check of rig pins A4, A11 and A19 after this adjustment.
- (k) Adjustment of the Inboard Left Wing Cables requires:
  - 1) Adjustments of the Aft Power Bus Cables and of the Right Wheel Well Components before this adjustment.
  - 2) A fit check of rig pins A8, A9 and A11 after this adjustment.
- (l) Adjustment of the Inboard Right Wing Cables requires:
  - 1) Adjustments of the Aileron Back-Up Body Cables and of the Right Wheel Well Components before this adjustment.
  - 2) A fit check of rig pins A10, A11, A14 and A15 after this adjustment.
- (m) Adjustment of the Outboard Left Wing Cables requires:
  - 1) Adjustment of the Inboard Left Wing Cables before this adjustment.
- (n) Adjustment of the Outboard Right Wing Cables requires:
  - 1) Adjustment of the Inboard Right Wing Cables before this adjustment.
- (o) Adjustment of the Left Inboard Aileron Droop requires:
  - 1) Adjustment of the Inboard Left Wing Cable before this adjustment.
  - 2) A fit check of rig pins A7 and A17 after this adjustment.
- (p) Adjustment of the Right Inboard Aileron Droop requires:
  - 1) Adjustment of the Inboard Right Wing Cable before this adjustment.
  - 2) A fit check of rig pins A13 and A18 after this adjustment.
- (q) Adjustment of the Left Inboard Aileron PCAs requires:
  - 1) Adjustment of the Left Inboard Aileron Droop before this adjustment.
  - 2) A fit check of rig pins A7 and A17 after this adjustment.
- (r) Adjustment of the Right Inboard Aileron PCAs requires:
  - 1) Adjustment of the Right Inboard Aileron Droop before this adjustment.
  - 2) A fit check of rig pins A13 and A18 after this adjustment.
- (s) Adjustment of the Left Outboard Aileron PCAs requires:
  - 1) Adjustment of the Outboard Left Wing Cables before this adjustment.
  - 2) A fit check of rig pin A9 after this adjustment.
- (t) Adjustment of the Right Outboard Aileron PCAs requires:
  - 1) Adjustment of the Outboard Right Wing Cables before this adjustment.
  - 2) A fit check of rig pin A15 after this adjustment.
- (3) Adjust the aileron PCAs with the airplane on its landing gear and the engines (or equivalent weights) installed on the struts. For other adjustments to the aileron control system, the airplane can be on jacks or its landing gear.
- (4) Before this procedure is done, make sure that the airplane temperature is stable (use a tolerance of  $\pm 5^{\circ}\text{F}$ ) along the cable. Make sure that the temperature has been stable for at least 1 hour.

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**B. Equipment**

- (1) Inboard Aileron Rigging Bar - A27024-55 (Recommended), -47 (Optional), -2 (Optional)
- (2) Inboard Aileron Rigging Bar Mount Equipment - A27110-1
- (3) Outboard Aileron Rigging Bar - A27024-31 (Recommended) and A27024-29 (Optional)
- (4) Rig Pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) A1 - P/N A20004-15
  - (b) A2 - P/N A20004-17
  - (c) A3 - P/N A20004-22
  - (d) A4 - P/N A20004-19
  - (e) A5 - P/N A20004-22
  - (f) A6 - P/N A20004-22
  - (g) A7 - P/N A20004-20
  - (h) A8 - P/N A20004-15
  - (i) A9 - P/N A20004-22
  - (j) A10 - P/N A20004-17
  - (k) A11 - P/N A20004-15
  - (l) A12 - P/N A20004-21
  - (m) A13 - P/N A20004-20
  - (n) A14 - P/N A20004-15
  - (o) A15 - P/N A20004-22
  - (p) A16 - P/N A20004-16
  - (q) A17 - P/N A20004-15
  - (r) A18 - P/N A20004-15
  - (s) A19 - P/N A20004-15
- (5) Power Supply, (LCCA Adjustment Procedure 1) - Powertron Model 5900  
Industrial Test Equipment Corp.  
Port Washington, New York
- (6) Digital Voltmeter - John Fluke 8020B or equivalent  
John Fluke Manufacturing Co., Inc.  
Everett, Washington
- (7) Breakout Box, Cables - A27063-91 (Preferred)  
Position Transmitter Tester - PTTS-892B (Alternate)  
Phase Synchronous Voltmeter - 101-AC5/6/7/8 (Alternate)
- (8) Bubble Protractor - Commercially Available
- (9) 10,000 ohm Resistor - Commercially Available
- (10) Control Wheel Straightedge - A27020-1
- (11) Cable Tensiometer - Commercially Available

**C. Consumable Materials**

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

**D. References**

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control

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- (3) AMM 25-52-01/401, Cargo Compartment Sidewall Panels
- (4) AMM 27-51-00/201, Trailing Edge Flap System
- (5) AMM 27-51-00/501, Trailing Edge Flap System
- (6) AMM 27-51-40/401, Aileron Droop Angle Gearbox
- (7) AMM 27-61-00/501, Spoiler/Speedbrake Control System
- (8) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (9) AMM 32-00-15/201, Landing Gear Door Locks
- (10) AMM 32-00-20/201, Landing Gear Downlocks
- (11) FIM 22-00-03/101, Fig. 107, Aileron Servo
- (12) FIM 22-00-04/101, Fig. 109, Test - Autoflight BITE MCDP

E. Access

(1) Location Zones

- 211 Control Cabin (Left)
- 212 Control Cabin (Right)
- 556 Inboard Aileron (Left)
- 656 Inboard Aileron (Right)
- 561 Rear Spar to Trailing Edge (Left)
- 661 Rear Spar to Trailing Edge (Right)
- 567 Outboard Aileron (Left)
- 667 Outboard Aileron (Right)

(2) Access Panels

- 561AB Wing TE Structure, Aileron Controls (Left)
- 661AB Wing TE Structure, Aileron Controls (Right)
- 561BB Wing TE Inboard Aileron Actuator (Left)
- 661BB Wing TE Inboard Aileron Actuator (Right)
- 561MB Outboard Aileron Actuator (Left)
- 661MB Outboard Aileron Actuator (Right)
- 561RBX Outboard Aileron Lockout Mechanism (Left)
- 661RBX Outboard Aileron Lockout Mechanism (Right)

F. Prepare for the Adjustment

S 865-050

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

S 215-051

- (2) Make sure that the landing gear downlocks are installed (AMM 32-00-20/201).

S 495-052

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the main gear doors and install the door locks (AMM 32-00-15/201).

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S 865-053

- (4) Move the FLT CONTROL SHUTOFF WING switches L, C, and R on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure that the amber switch-position legend lights come ON.

S 865-054

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT

S 865-055

- (6) Retract the trailing edge flaps (AMM 27-51-00/201).

S 865-056

- (7) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 015-057

- (8) Open these access panels (AMM 06-44-00/201):

**NOTE:** If performing the adjustment out of sequence, only the applicable access panels must be opened.

- (a) 561AB/661AB to get access to the droop mechanism and summing lever.
- (b) 561BB/661BB to get access to the inboard aileron PCAs.
- (c) 561RBX/661RBX to get access to the outboard aileron lockout mechanism.
- (d) 561MB/661MB to get access to the outboard aileron PCAs.

G. Adjust the Control Column Cables (A1A, A1B, A2A, and A2B)

S 495-075

- (1) Attach the control wheel straightedge across the bottom of the control wheels.

**NOTE:** Remove the control wheel clipboard before the straightedge is installed.

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S 035-067

- (2) Disconnect the bus rod from the crank for the first officer's drum assembly.

S 215-076

- (3) Adjust the cables between the control wheels and the drum assemblies to the value shown (Fig. 503). Do the checks that follow:
  - (a) Make sure that rig pins A1 (for the captain's drum assembly), A2 (for the first officer's drum assembly), can be easily installed (Fig. 501).
  - (b) Make sure that the control wheels are aligned correctly. It is permitted for one surface rest to be 0.03 inch (0.76 mm) (or less) away from the straightedge.
  - (c) Remove the rig pins A1 and A2.

H. Adjust the Aileron Drum Assembly Bus Rod

S 495-068

- (1) Install rig pins A1 (for the captain's drum assembly) and A2 (for the first officer's drum assembly) (Fig. 501).

S 825-069

- (2) Adjust the bus rod until the rod end bolt can be easily installed. Install the bolt and tighten the locknut.
  - (a) Make sure that rig pins A1 and A2 can be easily installed. (Fig. 501).
  - (b) Remove the rig pins A1 and A2.

I. Adjust the Aileron Primary Control Body Cables (A1A and A1B)

S 035-058

- (1) Disconnect the control rod between the feel, centering, and trim mechanism and the left LCCA torque tube.

S 825-059

- (2) Operate the aileron trim switches on the aft electronic control panel, P8, until rig pin A6 (Fig. 501) (for the feel, centering, and trim mechanism) can be easily installed. Remove the rig pin.

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S 825-060

- (3) Adjust the cable tension to the value shown (Fig. 503). Do the check that follows:

**NOTE:** The turnbuckles for cables A1A and A1B are located behind a sidewall panel. This panel is opposite of the third panel aft of the forward cargo doors. Cables A1A and A1B are the second cables in from the compartment. Refer to AMM 25-52-01/401 for the sidewall panel removal procedure.

- (a) Make sure that rig pins A1 (for the captain's drum assembly), A3 (for the feel, centering, and trim mechanism), and A6 can be easily installed (Fig. 501).

J. Adjust the Aileron Back-Up Control Body Cables (A2A and A2B)

S 035-062

- (1) Disconnect the control rod between the right LCCA torque tube and the aileron-control override mechanism.

S 035-063

- (2) Disconnect the control rod between the right LCCA output quadrant and the right aileron-control output quadrant.

S 215-064

- (3) Adjust the cable tension to the value shown (Fig. 503). Do the checks that follow:

**NOTE:** The turnbuckles for back-up body cables A2A and A2B are located behind the third sidewall panel aft of the forward cargo door. Cables A2A and A2B are the second cables in from the compartment. Refer to AMM 25-52-01/401 for the sidewall panel removal procedure.

- (a) Make sure that rig pins A2 (for the first officer's drum assembly), A10 (for the override mechanism), and A12 (for the right aileron control output quadrant) can be easily installed (Fig. 501).

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(b) Make sure that the breakout cam is in its center position in the override mechanism.

K. Adjust the Aft Power Bus Cables (AB3A and AB3B)

S 035-077

- (1) Disconnect the output control rods between the left LCCAs (top and bottom) and the left LCCA output quadrant.

S 035-078

- (2) Disconnect the output control rod between the right side (center hydraulic system) LCCA and the right LCCA output quadrant.

NOTE: The control rods will stay disconnected until the LCCAs are adjusted.

S 215-430

- (3) Make sure the cam is in its center position on the right LCCA output quadrant.

S 215-079

- (4) Adjust the cable tension to the value shown (Fig. 503). Do the check that follows:
- (a) Make sure that rig pins A5 (for the left LCCA output quadrant) and A11 (for the right LCCA output quadrant) can be easily installed (Fig. 501).
  - (b) Remove the rig pins.

L. Adjust the Aft Bus Input Cables (AB2A and AB2B)

S 825-070

- (1) Operate the aileron trim switches on the P8 panel until rig pin A6 (for the feel, centering, and trim mechanism) can be easily installed (Fig. 501). Remove the rig pin.

S 035-071

- (2) Disconnect the control rod between the right aileron control quadrant and the right LCCA torque tube.

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S 215-072

- (3) Adjust the cable tension to the value shown (Fig. 503). Do the check that follows:
  - (a) Make sure that rig pins A3 (for the feel, centering, and trim mechanism) and A4 (for the right aileron control quadrant) can be easily installed (Fig. 501).

M. Adjust the Right Wheel Well Components

S 215-097

- (1) Make sure that the aileron-control override mechanism roller is in its center (detent) position of the cam.

S 215-098

- (2) Adjust the control rod between the right LCCA torque tube and the aileron control override mechanism. Make sure that these rig pins can be easily installed at the same time:
  - (a) A10 (for the aileron control override mechanism)
  - (b) A19 (for the right LCCA torque tube)

S 435-099

- (3) Tighten the thumb nut.

S 095-100

- (4) Remove rig pin A10.

S 215-101

- (5) Adjust the control rod between the right aileron control quadrant and the right LCCA torque tube. Make sure that these rig pins can be easily installed at the same time:
  - (a) A4 (for the right aileron control quadrant)
  - (b) A19 (for the right LCCA torque tube)

S 435-102

- (6) Tighten the thumb nut.

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S 095-103

- (7) Remove rig pins A4 and A19.

S 215-104

- (8) Adjust the control rod between the right LCCA output quadrant and the right aileron output quadrant. Make sure that these rig pins can be easily installed at the same time.
- (a) A11 (for the right LCCA output quadrant)
  - (b) A12 (for the right aileron output quadrant)

S 435-105

- (9) Tighten the thumb nut.

S 095-106

- (10) Remove rig pins A11 and A12.

N. Adjust the Left LCCA Torque Tube

S 215-107

- (1) Install rig pin A3 (for the feel, centering, and trim mechanism). Make sure that rig pin A16 (for the left LCCA torque tube) can be easily installed. If the rig pins can not be easily installed at the same time, do these steps:
- (a) Disconnect the control rod between the left LCCA torque tube and the feel, centering, and trim mechanism.
  - (b) Adjust the control rod until rig pin A16 can be easily installed in the left LCCA torque tube.
  - (c) Tighten the thumb nut.

S 095-603

- (2) Remove rig pins A3 and A16.

O. Adjust the Inboard Left Wing Cables (A3A and A3B)

S 035-080

- (1) Disconnect the control rod between the inboard quadrant of the left droop mechanism and the droop summing lever.

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S 225-431

- (2) Make sure that the disc index mark on the droop angle gearbox is aligned with the housing index mark, use a tolerance of  $\pm 0.015$  inch (0.38mm) (Fig. 504).

S 215-081

- (3) Adjust the cables to the value shown (Fig. 503). Do the checks that follow:

**NOTE:** Add 3 pounds (1.36 kg) to the cable rigging load for each 10,000 pounds (4536 kg) of fuel up to 80,000 pounds (36287 kg) of fuel.

- (a) Make sure that rig pins A5 (for the left LCCA output quadrant) and A7 (for the inboard quadrant - left droop mechanism) can be easily installed (Fig. 501).
- (b) Remove rig pin A5.

P. Adjust the Inboard Right Wing Cables (A4A and A4B)

S 035-086

- (1) Disconnect the control rod between the inboard quadrant of the right droop mechanism and the droop summing lever.

S 215-087

- (2) Adjust the cable tension to the value shown (Fig. 503). Do the check that follows:

**NOTE:** Add 3 pounds (1.36 Kg) to the cable rigging load for each 10,000 pounds (4535 kg) of fuel up to 80,000 pounds (36287 kg) of fuel.

- (a) Make sure that rig pins A12 (for the right aileron control output quadrant) and A13 (for the inboard quadrant - right droop mechanism) can be easily installed (Fig. 501).

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(b) Remove rig pin A12.

Q. Adjust the Outboard Left Wing Cables (A3A and A3B)

S 495-432

(1) Install rig pin A7 (for the inboard quadrant - left droop mechanism).

S 215-093

(2) Make sure that the cam is in its center position on the outboard quadrant of the left droop mechanism.

S 215-094

(3) Adjust the cable tension to the value shown (Fig. 503). Do the check that follows:

**NOTE:** The turnbuckles for the left outboard wing cables A3A and A3B are located behind access panel 561LB (AMM 06-44-00/201).

(a) Make sure that rig pin A9 (for the left aileron lockout mechanism) can be easily installed (Fig. 501).

(b) Remove rig pins A7 and A9.

R. Adjust the Outboard Right Wing Cables (A4A and A4B)

S 495-433

(1) Install rig pin A13 (for the inboard quadrant - right droop mechanism).

S 215-095

(2) Make sure that the cam is in its center position on the outboard quadrant of the right droop mechanism.

S 215-096

(3) Adjust the cable tension to the value shown (Fig. 503). Do the check that follows:

**NOTE:** The turnbuckles for the outboard right wing cables A4A and A4B are located behind access panel 661LB (AMM 06-44-00/201).

(a) Make sure that rig pin A15 (for the right aileron lockout mechanism) can be easily installed (Fig. 501).

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(b) Remove rig pins A13 and A15.

S. Do a Check of the Aileron Control Cable System

S 495-108

- (1) Make sure that these rig pins can be easily installed at the same time (Fig. 501):
- (a) A1 (for the captain's drum assembly)
  - (b) A2 (for the first officer's drum assembly)
  - (c) A3 (for the feel, centering, and trim mechanism)
  - (d) A4 (for the aileron control quadrant)
  - (e) A5 (for the left LCCA output quadrant)
  - (f) A6 (for the feel, centering, and trim mechanism)
  - (g) A7 (for the inboard quadrant - left droop mechanism)
  - (h) A8 (for the Left Droop summing Lever)
  - (i) A9 (for the left aileron lockout mechanism)
  - (j) A10 (for the aileron control override mechanism)
  - (k) A11 (for the right LCCA output quadrant)
  - (l) A12 (for the right aileron control output quadrant)
  - (m) A13 (for the inboard quadrant - right droop mechanism)
  - (n) A14 (for the Right Droop summing Lever)
  - (o) A15 (for the right aileron lockout mechanism)
  - (p) A16 (for the Left LCCA Torque Tube)
  - (q) A17 (for the input crank of the Left Aileron Outboard PCA)
  - (r) A18 (for the input crank of the Right Aileron Inboard PCA)
  - (s) A19 (for the Right LCCA Torque Tube)

S 095-109

- (2) Remove the rig pins.

T. Adjust the Left Inboard Aileron Droop Mechanism

S 225-110

- (1) Make sure that the disc index mark on the droop angle gearbox is aligned with the housing index mark (use a tolerance of  $\pm 0.015$  inch) (Fig. 504).

S 495-111

- (2) Install rig pins A7 (for the inboard quadrant - left droop mechanism) and A8 (for the left droop summing lever) (Fig. 501).

S 825-112

- (3) Adjust the control rod between the inboard quadrant and the summing lever until the bolts can be easily installed.

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S 035-113

- (4) Install the control rod and tighten the locknuts. Apply a thin layer of grease to the threads that show.

S 095-114

- (5) Remove rig pins A7 and A8 (Fig. 501).

U. Adjust the Right Inboard Aileron Droop Mechanism

S 225-115

- (1) Make sure that the disk index mark on the droop angle gearbox is aligned with the housing index mark (use a tolerance of  $\pm 0.015$  inch) (Fig. 504).

S 495-116

- (2) Install rig pins A13 (for the inboard quadrant - right droop mechanism) and A14 (for the right droop summing lever).

S 825-117

- (3) Adjust the control rod between the inboard quadrant and the summing lever until the bolts can be easily installed.

S 035-118

- (4) Install the control rod and tighten the locknuts. Apply a thin layer of grease to the threads that show.

S 095-119

- (5) Remove rig pins A13 and A14.

V. Adjust the Lateral Central Control Actuator (LCCA)

**NOTE:** Four procedures are supplied to adjust the LCCAs.

PROCEDURE 1 - uses a commercially available power supply, a resistor, a digital voltmeter (DVM), and breakout box equipment.

PROCEDURE 2 - uses airplane power and a DVM with the breakout box equipment.

PROCEDURE 3 - uses a phase synchronous voltmeter only.

PROCEDURE 4 - uses the MCDP TEST 66.

S 845-806

- (1) Prepare for the LCCA Adjustment.
  - (a) Disconnect these control rods:
    - 1) Disconnect the control rod to the outboard aileron PCA linkage from the outboard aileron lockout mechanism (both wings). Use a bungee cord to attach the linkage to the airplane structure.

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- 2) Disconnect the control rod to the inboard aileron PCA linkage from the droop summing lever (both wings). Use a bungee cord to attach the linkage to the airplane structure.
- (b) Adjust the three LCCA input control rods to a length of 20.20 ±0.05 inches. Install the control rods.
- (c) Install rig pins A1 (for the captain's drum assembly), A2 (for the first officer's drum assembly), and A3 (for the feel, centering, and trim mechanism) (Fig. 501).
- (d) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - 1) 11E17, FLT CONT CMPTR PWR L
  - 2) 11E18, FLT CONT CMPTR SERVO L
  - 3) 11E20, FLT CONT CMPTR PWR C
  - 4) 11E21, FLT CONT CMPTR SERVO C
  - 5) 11E35, FLT CONT CMPTR PWR R
  - 6) 11E36, FLT CONT CMPTR SERVO R

S 825-689

- (2) Adjust the Right Side (center hydraulic system) LCCA (PROCEDURE 1)
  - (a) Make sure that the LCCA output rod is disconnected from the right LCCA.
  - (b) Install rig pins A10 (for the aileron control override mechanism), A11 (for the right LCCA output quadrant), and A19 (for the right LCCA torque tube) (Fig. 501).

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (c) Supply pressure to the center hydraulic system only (AMM 29-11-00/201).
- (d) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:

**NOTE:** This circuit breaker is opened in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

- 1) 11H16, FLT CONT SHUTOFF WING CTR

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- (e) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF WING C switch on the P61 panel to ON.

NOTE: This switch is moved to OFF position in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

- (f) Do these steps to connect the breakout box equipment:
- 1) Disconnect the airplane connector from the LCCA. Connect the breakout box and the -41 cable assembly to the LCCA as shown (Fig. 505).
  - 2) Connect the DVM to the breakout box at pins 14 (SIG HI) and 16 (SIG LO).
  - 3) Connect the power supply to the breakout box at pins 12 and 13. Connect the resistor between pins 14 and 16. Adjust the power supply to  $26 \pm 0.020$  volts ac RMS, 400 Hz.
- (g) Adjust the input control rod to the right LCCA until the output voltage is  $0 \pm 0.050$  volt ac RMS at DVM 1.
- (h) Tighten the two nut and bolt assemblies on the output control rods to clamp threads.
- (i) Make sure that the voltage stays at  $0 \pm 0.050$  volt ac RMS.
- (j) Adjust the right LCCA output control rod until the rod end bolts can be easily installed.
- (k) Tighten the two nut and bolt assemblies on the output control rods to clamp threads.
- (l) Do these steps to remove the breakout box equipment:
- 1) Disconnect the power supply, the resistor, and the DVM from the breakout box.
  - 2) Disconnect the breakout box and the -41 cable assembly from the LCCA connector. Connect the airplane connector to the LCCA connector.
- (m) Remove rig pins A1, A2, A3, A10, A11, and A19 (Fig. 501).

NOTE: These rig pins A1, A2, A3 are installed in section "Prepare for LCCA Adjustment" of this procedure.

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- (n) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - 1) 11E17, FLT CONT CMPTR PWR L
  - 2) 11E18, FLT CONT CMPTR SERVO L
  - 3) 11E20, FLT CONT CMPTR PWR C
  - 4) 11E21, FLT CONT CMPTR SERVO C
  - 5) 11E35, FLT CONT CMPTR PWR R
  - 6) 11E36, FLT CONT CMPTR SERVO R
- (o) Do the MCDP test 07 SERVO AIL (FIM 22-00-03/101, Fig. 107).

**NOTE:** This procedure does a check of the autopilot/flight director and thrust management interface.

- (p) Remove the power from the center hydraulic system (AMM 29-11-00/201).
- (q) Continue to "Adjust the PCAs for the left Inboard Aileron" procedure.

S 825-688

- (3) Adjust the Right Side (center hydraulic system) LCCA (PROCEDURE 2)
  - (a) Make sure that the LCCA output control rod is disconnected from the right LCCA.
  - (b) Install rig pins A10 (for the aileron control override mechanism), A11 (for the right LCCA output quadrant), and A19 (for the right LCCA torque tube) (Fig. 501).

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (c) Supply pressure to the center hydraulic system only (AMM 29-11-00/201).
- (d) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:

**NOTE:** This circuit breaker is opened in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

- 1) 11H16, FLT CONT SHUTOFF WING CTR

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- (e) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF WING C switch on the P61 panel to ON.

NOTE: This switch is moved to OFF in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

- (f) Do these steps to connect the breakout box equipment:
- 1) Disconnect the airplane connector from the LCCA. Connect the breakout box and the -41 cable assembly to the LCCA as shown (Fig. 505).
  - 2) Connect the DVM to the breakout box at pins 14 (SIG HI) and 16 (SIG LO).
  - 3) Connect the breakout box and the -40 cable assembly to the airplane connector. Connect the DVM to the breakout box at pins 12 and 13.
- (g) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

NOTE: These circuit breakers are opened in section "Prepare for LCCA Adjustment" of this procedure.

- 1) 11E17, FLT CONT CMPTR PWR L
  - 2) 11E18, FLT CONT CMPTR SERVO L
  - 3) 11E20, FLT CONT CMPTR PWR C
  - 4) 11E21, FLT CONT CMPTR SERVO C
  - 5) 11E35, FLT CONT CMPTR PWR R
  - 6) 11E36, FLT CONT CMPTR SERVO R
- (h) Make sure that the input voltage (at DVM2) is between 24 to 30 volts ac RMS, 400 Hz.
- (i) Adjust the input control rod to the right LCCA until the output voltage (at DVM 1) is  $0 \pm 0.050$  volt ac RMS.
- (j) Tighten the two nut and bolt assemblies on the output control rods to clamp threads.
- (k) Make sure that the voltage stays at  $0 \pm 0.050$  volt ac RMS.

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- (l) Adjust the right LCCA output control rod until the rod end bolts can be easily installed. Tighten the nuts.
- (m) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - 1) 11E17, FLT CONT CMPTR PWR L
  - 2) 11E18, FLT CONT CMPTR SERVO L
  - 3) 11E20, FLT CONT CMPTR PWR C
  - 4) 11E21, FLT CONT CMPTR SERVO C
  - 5) 11E35, FLT CONT CMPTR PWR R
  - 6) 11E36, FLT CONT CMPTR SERVO R
- (n) Do these steps to remove the breakout box equipment:
  - 1) Disconnect the breakout box and the -40 cable assembly from the airplane connector. Disconnect the DVMs from the breakout box.
  - 2) Disconnect the breakout box and the -41 cable assembly from the LCCA connector. Connect the airplane connector to the LCCA connector.
- (o) Remove rig pins A1, A2, A3 (installed in section "Prepare for LCCA Adjustment" of this procedure), A10, A11, and A19 (Fig. 501).
- (p) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - 1) 11E17, FLT CONT CMPTR PWR L
  - 2) 11E18, FLT CONT CMPTR SERVO L
  - 3) 11E20, FLT CONT CMPTR PWR C
  - 4) 11E21, FLT CONT CMPTR SERVO C
  - 5) 11E35, FLT CONT CMPTR PWR R
  - 6) 11E36, FLT CONT CMPTR SERVO R
- (q) Do the MCDP test 07 SERVO AIL (FIM 22-00-03/101, Fig. 107).

NOTE: This procedure does a check of the autopilot/flight director and thrust management system interface.

- (r) Remove the power from the center hydraulic system (AMM 29-11-00/201).

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(s) Continue to "Adjust the PCAs for the left Inboard Aileron" procedure.

S 825-690

- (4) Adjust the Right Side (center hydraulic system) LCCA (PROCEDURE 3)
- (a) Make sure that the right LCCA output control rod is disconnected from the right LCCA.
  - (b) Install rig pins A10 (for the aileron control override mechanism), A11 (for the right LCCA output quadrant), and A19 (for the right LCCA torque tube) (Fig. 501).

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (c) Supply pressure to the center hydraulic system only (AMM 29-11-00/201).
- (d) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:

**NOTE:** This circuit breaker is opened in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

1) 11H16, FLT CONT SHUTOFF WING CTR

- (e) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF WING C switch on the P61 panel to ON.

**NOTE:** This switch is moved to OFF in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

- (f) Disconnect the airplane connector from the right LCCA.

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- (g) Use the tool instructions to prepare the phase synchronous voltmeter for use.
- (h) Attach the necessary cable assembly from the phase synchronous voltmeter to the LCCA's LVDT.
- (i) Adjust the input control rod to the right LCCA until the output voltage (at DVM 1) is  $0 \pm 0.050$  volts ac RMS.
- (j) Tighten the two nut and bolt assemblies on the output control rods to clamp threads.
- (k) Make sure that the voltage stays at  $0 \pm 0.050$  volt ac RMS.
- (l) Adjust the right LCCA output control rod until the rod end bolts can be easily installed. Tighten the nuts.
- (m) Disconnect the phase synchronous voltmeter cables from the LCCA connector. Connect the airplane connector to the LCCA connector.
- (n) Remove rig pins A1, A2, A3 (installed in section "Prepare for LCCA Adjustment" of this procedure), A10, A11, and A19 (Fig. 501).
- (o) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

NOTE: These circuit breakers are opened in section "Prepare for LCCA Adjustment" of this procedure.

- 1) 11E17, FLT CONT CMPTR PWR L
  - 2) 11E18, FLT CONT CMPTR SERVO L
  - 3) 11E20, FLT CONT CMPTR PWR C
  - 4) 11E21, FLT CONT CMPTR SERVO C
  - 5) 11E35, FLT CONT CMPTR PWR R
  - 6) 11E36, FLT CONT CMPTR SERVO R
- (p) Do the MCDP test 07 SERVO AIL (FIM 22-00-03/101, Fig. 107).

NOTE: This procedure does a check of the autopilot/flight director and thrust management system interface.

- (q) Remove the power from the center hydraulic system (AMM 29-11-00/201).

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(r) Continue to "Adjust the PCAs for the left Inboard Aileron" procedure.

S 825-692

(5) Adjust the Right Side (center hydraulic system) LCCA (PROCEDURE 4)

- (a) Make sure that the right LCCA output control rod is disconnected from the right LCCA.
- (b) Install rig pins A10 (for the aileron control override mechanism), A11 (for the right LCCA output quadrant), and A19 (for the right LCCA torque tube) (Fig. 501).
- (c) Supply pressure to the center hydraulic system only (AMM 29-11-00/201).
- (d) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:

NOTE: This circuit breaker is opened in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

1) 11H16, FLT CONT SHUTOFF WING CTR

- (e) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF WING C switch on the P61 panel to ON.

NOTE: This switch is moved to OFF in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

- (f) Supply electrical power (AMM 24-22-00/201).
- (g) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

NOTE: These circuit breakers are opened in section "Prepare for LCCA Adjustment" of this procedure.

- 1) 11E17, FLT CONT CMPTR PWR L
- 2) 11E18, FLT CONT CMPTR SERVO L
- 3) 11E20, FLT CONT CMPTR PWR C
- 4) 11E21, FLT CONT CMPTR SERVO C
- 5) 11E35, FLT CONT CMPTR PWR R

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- 6) 11E36, FLT CONT CMPTR SERVO R
- (h) Start the MCDP Ground Test 66 - XDCR OUTPUTS (FIM 22-00-04/101).
    - 1) Push YES/ADV until 66 AIL SURF DEG shows.
  - (i) Adjust the input control rod to the right LCCA until the applicable servo display is 0.0 ±0.1 degree.
  - (j) Tighten the two nut and bolt assemblies on the output control rods to clamp threads.
  - (k) Make sure the applicable servo display is 0.0 ±0.1 degree.
  - (l) Adjust the right LCCA output control rod until the rod end bolts can be easily installed. Tighten the nuts.
  - (m) Remove electrical power (AMM 24-22-00/201).
  - (n) Remove rig pins A1, A2, and A3 installed in section "Prepare for LCCA Adjustment" of this procedure (Fig. 501).
  - (o) Do the MCDP test 07 SERVO AIL (FIM 22-00-03/101, Fig. 107).

**NOTE:** This procedure does a check of the autopilot/flight director and thrust management system interface.

- (p) Remove the power from the center hydraulic system (AMM 29-11-00/201).
- (q) Continue to "Adjust the PCAs for the left Inboard Aileron" procedure.

S 825-693

- (6) Adjust the Left Top Side (left hydraulic system) LCCA (PROCEDURE 1).
  - (a) Disconnect the output control rod for the left top side (left hydraulic system) LCCA from the left LCCA output quadrant.
  - (b) Disconnect the vertical control rod from the left side of the left LCCA output quadrant.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (c) Supply pressure to the left and center hydraulic systems (AMM 29-11-00/201).

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- (d) Make sure that pins A5 (for the left LCCA output quadrant) and A16 (for the left LCCA torque tube) can be easily installed and removed (Fig. 501).
- (e) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

NOTE: These circuit breakers are opened in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

- 1) 11H15, FLT CONT SHUTOFF WING LEFT
- 2) 11H16, FLT CONT SHUTOFF WING CTR
- (f) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L and C switches on the P61 panel to ON.

NOTE: These switches are moved to OFF in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

- (g) Do these steps to connect the breakout box equipment:
  - 1) Disconnect the airplane connector from the left top side (left hydraulic system) LCCA. Connect the breakout box and the -41 cable assembly to the LCCA as shown (Fig. 505).
  - 2) Connect the DVM to the breakout box at pins 14 (SIG HI) and 16 (SIG LO).
  - 3) Connect the power supply to the breakout box at pins 12 and 13. Connect the resistor between pins 14 and 16. Adjust the power supply to  $26 \pm 0.020$  volts ac RMS, 400 Hz.
- (h) Adjust the input control rod that is connected between the left LCCA torque tube and the left top side (left hydraulic system) LCCA until the output voltage (at DVM 1) is  $0 \pm 0.050$  volt ac RMS.
- (i) Tighten the lock nuts. Make sure that the output voltage stays at  $0 \pm 0.050$  volt ac RMS.
- (j) Adjust the output control rod of the left top side (left hydraulic system) LCCA until the rod end bolts can be easily installed without binding.
- (k) Make sure that rig pins A5 and A16 can be easily installed and removed (Fig. 501).
- (l) Tighten the two nut and bolt assemblies on the output control rods to clamp threads.
- (m) Make sure that rig pins A5 and A16 can be easily installed and removed (Fig. 501).
- (n) Do these steps to remove the breakout box equipment:
  - 1) Disconnect the power supply, the resistor, and the DVM from the breakout box.
  - 2) Disconnect the breakout box and the -41 cable assembly from the left top side (left hydraulic system) LCCA connector. Connect the airplane connector to the LCCA.

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- (o) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:

NOTE: This circuit breaker is opened in section "Prepare for Adjustment" of Procedure "Adjustment - Aileron and Aileron Control System".

- 1) 11H26, FLT CONT SHUTOFF WING RIGHT  
(p) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF WING R switch on the P61 panel to ON.

NOTE: This switch is moved to OFF in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

S 825-698

- (7) Adjust Left Bottom (right hydraulic system) LCCA (PROCEDURE 1):
- (a) Make sure vertical control rod at the left side output quadrant is disconnected.
  - (b) Supply pressure to the right hydraulic system (left and center hydraulic systems are already pressurized) (AMM 29-11-00/201).
  - (c) Make sure rig pins A5 and A16 can be easily installed and removed (Fig. 501).
  - (d) Do these steps to connect the breakout box equipment:
    - 1) Disconnect the airplane connector from the left bottom side (right hydraulic system) LCCA. connect the breakout box and the -41 cable assembly to the LCCA as shown (Fig. 505).
    - 2) Connect the DVM to the breakout box at pins 14 (SIG HI) and 16 (SIG LO).
    - 3) Connect the power supply to the breakout box at pins 12 and 13. Connect the resistor between pins 14 and 16. Adjust the power supply to  $26 \pm 0.020$  volts ac RMS, 400 Hz.
  - (e) Adjust the input control rod that is connected between the left LCCA torque tube and the Left Bottom LCCA until the output voltage (at DVM 1) across pins 14 and 16 is  $0 \pm 0.050$  volt ac RMS.
  - (f) Adjust the vertical control rod of the left LCCA output quadrant until the bolts can be easily installed and install the rod end bolts.
  - (g) Tighten the locknuts and lockwire. Make sure that the rod end bolts are free to move. Do the checks that follow:
    - 1) Make sure that the output voltage stays at  $0 \pm 0.050$  volt ac RMS.

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- (h) Make sure that rig pins A4 (for the right aileron control quadrant), A10 (for the aileron control override mechanism), A5 and A11 (for the left and right LCCA output quadrants), A12 (for the right aileron control output quadrant), A16 and A19 (for the left and right LCCA torque tubes) can be easily installed (Fig. 501). Remove the rig pins.
- (i) Do these steps to remove the breakout box equipment:
  - 1) Disconnect the power supply, the resistor, and the DVM from the breakout box.
  - 2) Disconnect the breakout box and the -41 cable assembly from the left bottom side (right hydraulic system) LCCA. Connect the airplane connector to the LCCA.
- (j) Remove rig pins A1, A2, and A3 installed in section "Prepare for LCCA Adjustment" of this procedure (Fig. 501).
- (k) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

NOTE: These circuit breakers are opened in section "Prepare for LCCA Adjustment" of this procedure.

- 1) 11E17, FLT CONT CMPTR PWR L
  - 2) 11E18, FLT CONT CMPTR SERVO L
  - 3) 11E20, FLT CONT CMPTR PWR C
  - 4) 11E21, FLT CONT CMPTR SERVO C
  - 5) 11E35, FLT CONT CMPTR PWR R
  - 6) 11E36, FLT CONT CMPTR SERVO R
- (l) Do the MCDP test 07 SERVO AIL (FIM 22-00-03/101, Fig. 107).

NOTE: This procedure does a check of the autopilot/flight director and thrust management system interface.

- (m) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).
- (n) Continue to "Adjust the PCAs for the left Inboard Aileron" procedure.

S 825-694

- (8) Adjust the Left Top Side (left hydraulic system) LCCA (PROCEDURE 2):
  - (a) Disconnect the output control rod for the left top side (left hydraulic system) LCCA from the left LCCA output quadrant.

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- (b) Disconnect the vertical control rod from the left side of the left LCCA output quadrant.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (c) Supply pressure to the left and center hydraulic systems (AMM 29-11-00/201).
- (d) Make sure that pins A5 (for the left LCCA output quadrant) and A16 (for the left LCCA torque tube) can be easily installed and removed (Fig. 501).
- (e) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

**NOTE:** These circuit breakers are opened in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

- 1) 11H15, FLT CONT SHUTOFF WING LEFT
  - 2) 11H16, FLT CONT SHUTOFF WING CTR
- (f) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L and C switches on the P61 panel to ON.

**NOTE:** These switches are moved to OFF in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

- (g) Do these steps to connect the breakout box equipment:
- 1) Disconnect the airplane connector from left top side (left hydraulic system) LCCA. Connect the breakout box and the -41 cable assembly to the LCCA as shown (Fig. 505).
  - 2) Connect the DVM to the breakout box at pins 14 (SIG HI) and 16 (SIG LO).

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- 3) Connect the breakout box and the -40 cable assembly to the airplane connector. Connect the DVM to the breakout box at pins 12 and 13.
- (h) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

NOTE: These circuit breakers are opened in section "Prepare for LCCA Adjustment" of this procedure.

- 1) 11E17, FLT CONT CMPTR PWR L
  - 2) 11E18, FLT CONT CMPTR SERVO L
  - 3) 11E20, FLT CONT CMPTR PWR C
  - 4) 11E21, FLT CONT CMPTR SERVO C
  - 5) 11E35, FLT CONT CMPTR PWR R
  - 6) 11E36, FLT CONT CMPTR SERVO R
- (i) Make sure that the input voltage (at DVM 2) is 24 to 30 volts ac RMS, 400 Hz.
  - (j) Adjust the input control rod that is connected between the left LCCA torque tube and the left top side (left hydraulic system) LCCA until the output voltage (at DVM 1) is  $0 \pm 0.050$  volt ac RMS.
  - (k) Tighten the lock nuts. Make sure that the output voltage stays at  $0 \pm 0.050$  volt ac RMS.
  - (l) Adjust the output control rod on the left top side (left hydraulic system) LCCA until the rod end bolts can be easily installed.
  - (m) Tighten the two nut and bolt assemblies on the output control rods to clamp threads.
  - (n) Make sure that rig pins A5 and A16 can be easily installed and removed (Fig. 501).
  - (o) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
    - 1) 11E17, FLT CONT CMPTR PWR L
    - 2) 11E18, FLT CONT CMPTR SERVO L
    - 3) 11E20, FLT CONT CMPTR PWR C
    - 4) 11E21, FLT CONT CMPTR SERVO C
    - 5) 11E35, FLT CONT CMPTR PWR R

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- 6) 11E36, FLT CONT CMPTR SERVO R
- (p) Do these steps to remove the breakout box equipment:
  - 1) Disconnect the breakout box and the cable assembly from the airplane connector. Disconnect the DVMs from the breakout box.
  - 2) Disconnect the breakout box and the -40 cable assembly from the left top side (left hydraulic system) LCCA. Connect the airplane connector to the LCCA.

S 825-699

- (9) Adjust the Left Bottom Side (right hydraulic system) LCCA (PROCEDURE 2):
  - (a) Make sure vertical control rod at the left side output quadrant is disconnected.
  - (b) Supply pressure to the right hydraulic system (left and center hydraulic systems are already pressurized) (AMM 29-11-00/201).
  - (c) Make sure that pins A5 (for the left LCCA output quadrant) and A16 (for the left LCCA torque tube) can be easily installed and removed (Fig. 501).
  - (d) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:

NOTE: This circuit breaker is opened in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

- 1) 11H26, FLT CONT SHUTOFF WING RIGHT
- (e) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF WING R switch on the P61 panel to ON.

NOTE: This switch is moved to OFF in section "Prepare for Adjustment" in procedure "Adjustment - Aileron and Aileron Control System".

- (f) Do these steps to connect the breakout box equipment:
  - 1) Disconnect the airplane connector from the left bottom side (right hydraulic system) LCCA. Connect the breakout box and the -41 cable assembly to the LCCA as shown (Fig. 505).
  - 2) Connect the DVM to the breakout box at pins 14 (SIG HI) and 16 (SIG LO).
  - 3) Connect the breakout box and the -40 cable assembly to the airplane as shown (Fig. 505). Connect the DVM to the breakout box at pins 12 and 13.

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- (g) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - 1) 11E17, FLT CONT CMPTR PWR L
  - 2) 11E18, FLT CONT CMPTR SERVO L
  - 3) 11E20, FLT CONT CMPTR PWR C
  - 4) 11E21, FLT CONT CMPTR SERVO C
  - 5) 11E35, FLT CONT CMPTR PWR R
  - 6) 11E36, FLT CONT CMPTR SERVO R
- (h) Make sure that the input voltage (at DVM 2) is 24 to 30 volts ac RMS, 400 Hz.
- (i) Adjust the input control rod that is connected between the left LCCA torque tube and the left bottom side (right hydraulic system) LCCA until the output voltage is  $0 \pm 0.050$  volt ac RMS.
- (j) Adjust the vertical control rod of the left LCCA output quadrant until the bolts can be easily installed and install the rod end bolts.
- (k) Tighten the lock nuts and lockwire. Make sure that the rod end bolts are free to move. Make sure that rig pins A5 and A16 can be easily installed and removed (Fig. 501). Make sure that the output voltage stays at  $0 \pm 0.050$  volt ac RMS.
- (l) Make sure that rig pins A4 (for the right aileron control quadrant), A10 (for the aileron control override mechanism), A5 and A11 (for the left and right LCCA output quadrants), A12 (for the right aileron control output quadrant), A16 and A19 (for the left and right LCCA torque tubes) can be easily installed (Fig. 501). Remove the rig pins.
- (m) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - 1) 11E17, FLT CONT CMPTR PWR L
  - 2) 11E18, FLT CONT CMPTR SERVO L
  - 3) 11E20, FLT CONT CMPTR PWR C
  - 4) 11E21, FLT CONT CMPTR SERVO C
  - 5) 11E35, FLT CONT CMPTR PWR R
  - 6) 11E36, FLT CONT CMPTR SERVO R
- (n) Do these steps to remove the breakout box equipment:
  - 1) Disconnect the breakout box and the -40 cable assembly from the airplane connector. Disconnect the DVMs from the breakout box.

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- 2) Disconnect the breakout box and the -41 cable assembly from the left bottom side (right hydraulic system) LCCA.  
Connect the airplane connector to the LCCA.
- (o) Remove rig pins A1, A2 and A3 installed in section "Prepare for LCCA Adjustment" of this procedure (Fig. 501).
- (p) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - 1) 11E17, FLT CONT CMPTR PWR L
  - 2) 11E18, FLT CONT CMPTR SERVO L
  - 3) 11E20, FLT CONT CMPTR PWR C
  - 4) 11E21, FLT CONT CMPTR SERVO C
  - 5) 11E35, FLT CONT CMPTR PWR R
  - 6) 11E36, FLT CONT CMPTR SERVO R
- (q) Do the MCDP test 07 SERVO AIL (FIM 22-00-03/101, Fig. 107).

**NOTE:** This procedure does a check of the autopilot/flight director and thrust management system interface.

- (r) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).
- (s) Continue to "Adjust the PCAs for the left Inboard Aileron" procedure.

S 825-695

- (10) Adjust the Left Top Side (left hydraulic system) LCCA (PROCEDURE 3):
  - (a) Disconnect the output control rod for the left top side (left hydraulic system) LCCA from the left LCCA output quadrant.
  - (b) Disconnect the vertical control rod from the left side of the left LCCA output quadrant.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (c) Supply pressure to the left and center hydraulic systems (AMM 29-11-00/201).

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- (d) Make sure that rig pins A5 (for the left LCCA output quadrant) and A16 (for the left LCCA torque tube) can be easily installed and removed (Fig. 501).
- (e) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

NOTE: These circuit breakers are opened in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

- 1) 11H15, FLT CONT SHUTOFF WING LEFT
- 2) 11H16, FLT CONT SHUTOFF WING CTR
- (f) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L and C switches on the P61 panel to ON.

NOTE: These switches are opened in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

- (g) Disconnect the airplane connector from the left top side (left hydraulic system) LCCA.
- (h) Use the tool instructions to prepare the phase synchronous voltmeter for use.
- (i) Attach the necessary cable assembly from the phase synchronous voltmeter to the left top side LCCA's LVDT.
- (j) Adjust the input control rod that is connected between the left LCCA torque tube and the left top side (left hydraulic system) LCCA until the output voltage on the phase synchronous voltmeter is  $0 \pm 0.050$  volt ac RMS.
- (k) Tighten the locknuts. Make sure that the output voltage stays at  $0 \pm 0.050$  volt ac RMS.
- (l) Adjust the top LCCA output control rod until the rod end bolts can be easily installed. Tighten the nuts. Make sure that rig pins A5 and A16 are able to move freely (Fig. 501).
- (m) Disconnect the phase synchronous voltmeter and the cable assembly from the left top side (left hydraulic system) LCCA. Connect the airplane connector to the LCCA.

S 825-701

- (11) Adjust the Left Bottom Side (right hydraulic system) LCCA (PROCEDURE 3):
  - (a) Make sure vertical control rod at the left side output quadrant is disconnected.

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- (b) Supply pressure to the right hydraulic system (left and center hydraulic systems are already pressurized) (AMM 29-11-00/201).
- (c) Make sure that pins A5 (for the left LCCA output quadrant) and A16 (for the left LCCA torque tube) can be easily installed and removed (Fig. 501).
- (d) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:

NOTE: This circuit breaker is opened in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

- 1) 11H26, FLT CONT SHUTOFF WING RIGHT
- (e) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF WING R switch on the P61 panel to ON.

NOTE: This switch is opened in section "Prepare for Adjustment" of procedure "Adjustment - Aileron and Aileron Control System".

- (f) Disconnect the airplane connector from the left bottom side (right hydraulic system) LCCA.
- (g) Use the tool instructions to prepare the phase synchronous voltmeter for use.
- (h) Attach the necessary cable assembly from the phase synchronous voltmeter to the bottom left side LCCA's LVDT.
- (i) Adjust the input control rod that is connected between the left LCCA torque tube and the left bottom side (right hydraulic system) LCCA until the output voltage is  $0 \pm 0.050$  volt ac RMS.
- (j) Adjust the vertical control rod of the left LCCA output quadrant until the bolts can be easily installed and install the rod end bolts.
- (k) Tighten the locknuts and lockwire. Make sure that rig pins A5 and A16 can be easily installed (Fig. 501). Make sure that the output voltage stays at  $0 \pm 0.050$  volt ac RMS.
- (l) Make sure that rig pins A4 (for the right aileron control quadrant), A10 (for the aileron control override mechanism), A5 and A11 (for the left and right LCCA output quadrants), A12 (for the right aileron control output quadrant), A16 and A19 (for the left and right LCCA torque tubes) can be easily installed (Fig. 501). Remove the rig pins.

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- (m) Disconnect the phase synchronous voltmeter and its cable assembly from the bottom left side (right hydraulic system) LCCA. Connect the airplane connector to the LCCA.
- (n) Remove rig pins A1, A2 and A3 installed in section "Prepare for LCCA Adjustment" of this procedure (Fig. 501).
- (o) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

NOTE: These circuit breakers are opened in section "Prepare for LCCA Adjustment" of this procedure.

- 1) 11E17, FLT CONT CMPTR PWR L
- 2) 11E18, FLT CONT CMPTR SERVO L
- 3) 11E20, FLT CONT CMPTR PWR C
- 4) 11E21, FLT CONT CMPTR SERVO C
- 5) 11E35, FLT CONT CMPTR PWR R
- 6) 11E36, FLT CONT CMPTR SERVO R

- (p) Do the MCDP test 07 SERVO AIL (FIM 22-00-03/101, Fig. 107).

NOTE: This procedure does a check of the autopilot/flight director and thrust management system interface.

- (q) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 825-697

- (12) Adjust the Top Left Side (left hydraulic system) LCCA and the Bottom Left Side (right hydraulic system) LCCA (PROCEDURE 4)
  - (a) Supply electrical power (AMM 24-22-00/201).
  - (b) Supply pressure to the left, right and center hydraulic system (AMM 29-11-00/201).
  - (c) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

NOTE: These circuit breakers are opened in section "Prepare for LCCA Adjustment" of this procedure.

- 1) 11E17, FLT CONT CMPTR PWR L

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- 2) 11E18, FLT CONT CMPTR SERVO L
  - 3) 11E20, FLT CONT CMPTR PWR C
  - 4) 11E21, FLT CONT CMPTR SERVO C
  - 5) 11E35, FLT CONT CMPTR PWR R
  - 6) 11E36, FLT CONT CMPTR SERVO R
- (d) Start the MCDP Ground Test 66 - XDCR OUTPUTS (FIM 22-00-04/101).
- 1) Push YES/ADV until 66 AIL SURF DEG shows.
- (e) Adjust the input control rod to the left top LCCA and/or to the left bottom LCCA until the applicable servo display is  $0.0 \pm 0.1$  degree. Tighten the locknuts.
- (f) Adjust the left top LCCA and/or left bottom LCCA output control rod (s) until the rod end bolts can be easily installed. Tighten the nuts.
- (g) Remove rig pins A1, A2, and A3 (Fig. 501).

NOTE: These pins are installed in section "Prepare for LCCA Adjustment" of this procedure.

- (h) Do the MCDP test 07 SERVO AIL (FIM 22-00-03/101, Fig. 107).

NOTE: This procedure does a check of the autopilot/flight director and thrust management system interface.

- (i) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 845-808

- (13) Complete the LCCA adjustment
- (a) Connect the control rod from the outboard aileron lockout mechanism to the outboard aileron PCA linkage (both wings).
  - (b) If performing the LCCA adjustment out of sequence, connect the control rod from the droop summing lever to the inboard aileron PCA linkage (both wings).

W. Adjust the PCAs for the Left Inboard Aileron

S 495-230

- (1) Install rig pins A7, in the left inboard droop quadrant, and A8, in the left droop summing lever (Fig. 501).

S 825-231

- (2) Do these steps to connect the control rod for the inboard aileron PCAs to the droop summing lever:
- (a) Install rig pin A17, in the input crank of the outboard PCA for the left aileron.

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- (b) Adjust the control rod until the rod end bolts can be easily installed.
- (c) Tighten the control rod locknuts and rod end bolts.

S 095-233

- (3) Remove rig pins A7, A8, and A17.

S 495-236

- (4) Install the inboard aileron rigging bar with the mount equipment against the wing bottom surface. Put the bar approximately 1.0 inch (25.4mm) inboard from and parallel to the outboard edge of the inboard aileron (Fig. 507).

S 825-234

- (5) If it is necessary, adjust the PCA input rods until their length is 20.31 ±0.05 inches (515.9mm +/-1.27mm).

S 035-235

- (6) Disconnect the input rod from the outboard PCA.

S 865-237

- (7) Supply pressure to the center hydraulic system only (AMM 29-11-00/201).

NOTE: The inboard PCA will be powered.

S 495-444

- (8) Install rig pin A3, in the feel, centering, and trim mechanism (Fig. 501)

S 985-269

- (9) During the input rod adjustment, manually move the input lever for the outboard PCA across its neutral position.

NOTE: This step is necessary to bleed unwanted hydraulic pressure from the outboard PCA.

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S 825-268

- (10) Increase the length of the input rod for the inboard PCA until the aileron moves below the faired position approximately 1.00 inch (25.4 mm).

NOTE: The aileron faired position is found when the bottom trailing edge of the aileron is aligned with the "1" mark on the rigging bar scale.

S 825-298

- (11) Adjust the input rod until the aileron is  $0.40 \pm 0.10$  inch (10.16  $\pm$  2.54 mm) ( $0.40 \pm 0.10$  degrees) below its faired position (Fig. 508).

NOTE: The aileron is now in the rigged position.

S 435-299

- (12) Tighten the input rod locknuts and rod end bolts.

NOTE: Make sure that the aileron stays in the rigged position.

S 835-301

- (13) Keep a record of the position of the aileron trailing edge.

NOTE: This is the datum position that will be used when the outboard PCA is adjusted.

S 865-303

- (14) Remove the power from the center hydraulic system (AMM 29-11-00/201).

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S 435-304

- (15) Install the bolt to temporarily connect the input rod to the outboard PCA.

S 865-306

- (16) Supply pressure to the left hydraulic system only (AMM 29-11-00/201) and stop for 3 minutes.

NOTE: The outboard PCA will be powered.

S 825-336

- (17) Increase the length of the input rod for the outboard PCA until the aileron is approximately 1.00 inch (25.4mm) below the faired position.

S 825-338

- (18) Adjust the input rod for the outboard PCA until the aileron is less than 0.1 inch (2.54mm) away from the datum position.

S 435-339

- (19) Tighten the input rod locknuts and rod end bolts.

NOTE: Make sure that the aileron is not more than 0.1 inch (2.54mm) away from the datum position.

S 865-341

- (20) Remove the power from the left hydraulic system (AMM 29-11-00/201).

S 865-343

- (21) Supply pressure to the center hydraulic system only (AMM 29-11-00/201) and stop for three minutes.

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S 835-344

- (22) Keep a record of the position of the aileron trailing edge.

S 865-345

- (23) Remove the power from the center hydraulic system and supply pressure to the left hydraulic system only (AMM 29-11-00/201). Stop for 3 minutes.

S 225-346

- (24) Make sure that the aileron trailing edge is not more than 0.10 inch away from the position that you recorded. If it is necessary, adjust the input rod of the outboard PCA again. Tighten the jam nuts.

NOTE: After the nuts are tightened, make sure that the aileron is not more than 0.10 inch (2.54mm) away from the position that you recorded.

S 865-347

- (25) Remove the power from the left hydraulic system (AMM 29-11-00/201).

S 435-348

- (26) Install a lockwire on the inboard and outboard PCA input rods and apply a thin layer of grease to the threads that show.

S 095-350

- (27) Remove rig pin A3 and the inboard aileron rigging bar.

NOTE: The left inboard aileron is now in the rigged position.

X. Adjust the PCAs for the Right Inboard Aileron

S 495-351

- (1) Install rig pins A13, in the right inboard droop mechanism, and A14, in the right droop summing lever (Fig. 501).

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- S 825-352
- (2) Do these steps to connect the control rod for the inboard aileron PCAs to the droop summing lever:
- (a) Install rig pin A18 in the input crank of the inboard PCA for the right aileron.
  - (b) Adjust the control rod until the rod end bolts can be easily installed.
  - (c) Tighten the control rod locknuts and rod end bolts.
- S 095-354
- (3) Remove rig pins A13, A14, and A18.
- S 495-357
- (4) Install the inboard aileron rigging bar against the wing bottom surface. Put the bar approximately 1.0 inch (25.4mm) inboard from and parallel to the outboard edge of the inboard aileron (Fig. 507).
- S 825-355
- (5) If it is necessary, adjust the PCA input rods until their length is 20.31 ±0.05 inches (515.9 mm +/-1.27 mm).
- S 035-356
- (6) Disconnect the input rod from the outboard PCA.
- S 865-454
- (7) Supply pressure to the center hydraulic system only (AMM 29-11-00/201).
- NOTE:** The inboard PCA will be powered.
- S 495-445
- (8) Install rig pin A3 in the feel, centering, and trim mechanism.

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S 985-375

- (9) During the input rod adjustment, manually move the input lever for the outboard PCA across its neutral position.

NOTE: This step is necessary to bleed unwanted hydraulic pressure from the outboard PCA.

S 825-479

- (10) Increase the length of the input rod for the inboard PCA until the aileron moves below the faired position approximately 1.00 inch (25.4 mm).

NOTE: The aileron faired position is found when the bottom trailing edge of the aileron is aligned with the 1 mark on the rigging bar scale.

S 825-404

- (11) Adjust the input rod until the aileron is  $0.40 \pm 0.10$  inch ( $10.16 \pm 2.54$  mm) ( $0.40 \pm 0.10$  degrees) below the faired position.

NOTE: The aileron is now in its rigged position.

S 435-405

- (12) Tighten the input rod locknuts and rod end bolts.

NOTE: Make sure that the aileron stays in its rigged position.

S 835-407

- (13) Keep a record of the position of the aileron trailing edge.

NOTE: This is the datum position that will be used when the outboard PCA is adjusted.

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S 865-677

- (14) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 435-410

- (15) Install the bolt to temporarily connect the input rod to the outboard PCA.

S 865-412

- (16) Supply pressure to the right hydraulic system only (AMM 29-11-00/201) and stop for three minutes.

NOTE: The outboard PCA will be powered.

S 825-500

- (17) Increase the length of the input rod for the outboard PCA until the aileron is approximately 1.00 inch (25.4mm) below the faired position.

S 825-458

- (18) Adjust the input rod until the aileron is less than 0.1 inch (2.54mm) away from the datum position.

S 435-446

- (19) Tighten the input rod locknuts and rod end bolts.

NOTE: Make sure that the aileron is not more than 0.1 inch (2.54mm) away from the datum position.

S 865-448

- (20) Remove the power from the right hydraulic system (AMM 29-11-00/201).

S 865-450

- (21) Supply pressure to the center hydraulic system only (AMM 29-11-00/201) and stop for three minutes.

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S 835-451

- (22) Keep a record of the position of the aileron trailing edge.

S 865-452

- (23) Remove the power from the center hydraulic system and supply pressure to the right hydraulic system only (AMM 29-11-00/201). Stop for 3 minutes.

S 225-453

- (24) Make sure that the aileron trailing edge is not more than 0.10 inch (2.54mm) away from the position that you recorded. If it is necessary, adjust the input rod of the outboard PCA again. Tighten the jamnuts.

NOTE: After the nuts are tightened, make sure that the aileron is not more than 0.10 inch (2.54mm) away from the position that you recorded.

S 865-456

- (25) Remove the power from the right hydraulic system (AMM 29-11-00/201).

S 435-455

- (26) Install a lockwire on the inboard and outboard PCA input rods and apply a thin layer of grease to the threads that show.

S 095-457

- (27) Remove rig pin A3 and the inboard aileron rigging bar.

NOTE: The right inboard aileron is now in the rigged position.

Y. Adjust the PCAs for the Left Outboard Aileron

S 865-458

- (1) Do these steps to put the lockout actuator for the outboard aileron (Fig. 502) in its lockout position (actuator extended):

NOTE: The actuator must stay in its lockout position during the PCA adjustment procedure.

- (a) Move the AIR DATA CMPTR test switch on the P61 panel to L and hold it there.

NOTE: The actuator will extend in approximately 15 seconds.

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- (b) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - 1) 11C17, OUTBOARD AILERON LOCKOUT L
  - 2) 11C18, OUTBOARD AILERON LOCKOUT R
- (c) Release the AIR DATA CMPTR test switch.
- (d) Make sure that rig pin A9 (for the left aileron lockout mechanism) can move freely.

S 435-373

- (2) Make sure that the control rod from the outboard aileron PCAs to the lockout mechanism is connected.

S 495-459

- (3) Install the (A27024-31 replaces -29 which superseded -1) outboard aileron rigging bar against the wing bottom surface. Put the bar approximately 1.0 inch (2.54 cm) outboard from and parallel to the inboard edge of the outboard aileron (Fig. 507).

S 825-525

- (4) Use the outboard aileron rigging bar to find the aileron faired position.

NOTE: The faired position is found when the bottom trailing edge of the aileron is aligned with the "1" mark on the -29 (replaced by -31) rigging bar scale, or the "0" mark on the A27024-31 rigging bar scale.

S 825-678

- (5) Disconnect, and if necessary, adjust the inboard PCA input rod length to 9.62 ±0.05 inch (244.4 mm +/-1.27 mm).

S 865-463

- (6) Supply pressure to the left hydraulic system only (AMM 29-11-00/201).

NOTE: The inboard PCA will be powered.

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S 825-501

- (7) Increase the length of the inboard PCA input rod until the aileron has moved approximately 1.0 inch (25.4mm) below the faired position.

**NOTE:** Adjust the rod ends if large adjustments are necessary and the body of the rod for small adjustments. When the PCA input rods are adjusted, be very careful not to move the input rod, the PCA or any other linkages in the area. Make sure that the neutral positions of the PCAs and its linkages do not change during the adjustment.

S 825-446

- (8) Disconnect the PCA input rod from the outboard PCA lever (Fig. 501).

S 985-638

- (9) Move the outboard PCA input lever across its neutral position. Do not move the aileron control surface.

**NOTE:** This step is necessary to bleed unwanted hydraulic pressure from the PCA that is not powered.

S 435-447

- (10) Install the bolt to temporarily connect the input rod to the outboard PCA lever.

S 825-523

- (11) Adjust the input rod for the inboard PCA until the bottom trailing edge of the aileron has moved up to 0.87 ±0.05 inch (22.1mm +/-1.27mm) below the aileron faired position (Fig. 508).

**NOTE:** The outboard aileron is in the rigged position.

Move the input rod in small increments. Disconnect and move the input lever for the outboard PCA across its neutral position, as necessary, to bleed any hydraulic pressure.

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S 435-467

- (12) Engage the tab washers and tighten the inboard PCA input rod locknuts and rod end bolts.

NOTE: Make sure that the aileron stays in the rigged position.

S 835-469

- (13) Keep a record of the position of the aileron trailing edge.

NOTE: This is the datum position that will be used when the outboard PCA is adjusted.

S 865-470

- (14) Remove the power from the left hydraulic system (AMM 29-11-00/201).

S 865-473

- (15) Supply pressure to the right hydraulic system only (AMM 29-11-00/201) and stop for 3 minutes.

NOTE: The outboard PCA will be powered.

S 825-502

- (16) Increase the length of the outboard PCA input rod until the aileron has moved 1 inch (2.54 cm) below the faired position.

NOTE: When the PCA input rods are adjusted, be very careful not to move the input rod, the PCA or any other linkages in the area. Make sure that the neutral positions of the PCAs and its linkages do not change during the adjustment.

S 825-524

- (17) Adjust the input rod for the outboard PCA until the bottom trailing edge of the aileron is no more than 0.05 inch (1.27mm) away from the datum position.

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S 435-477

- (18) Engage the tab washers and tighten the input rod locknuts and rod end bolts.

NOTE: Make sure that the aileron is no more than 0.05 inch (1.27mm) away from the datum position after the locknuts are tightened.

S 865-478

- (19) Remove the power from the right hydraulic system (AMM 29-11-00/201).

S 865-480

- (20) Supply pressure to the left hydraulic system only (AMM 29-11-00/201) and stop for three minutes.

S 835-481

- (21) Keep a record of the position of the aileron trailing edge.

S 865-482

- (22) Supply pressure to the right hydraulic system and remove the power from the left hydraulic system (AMM 29-11-00/201). Stop for three minutes.

S 225-483

- (23) Make sure that the aileron is not more than 0.05 inch (1.27mm) away from the position you recorded. If it is necessary, adjust the input rod of the outboard PCA again. Tighten the jam nuts.

NOTE: After the nuts are tightened, make sure that the aileron is not more than 0.05 inch (1.27mm) away from the position you recorded.

S 865-484

- (24) Remove the power from the right hydraulic system (AMM 29-11-00/201).

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S 435-485

- (25) Install the lockwire on the inboard and outboard PCA input rods and apply a thin layer of grease to the threads that show.

S 215-448

- (26) Make sure that rig pin A9 (for the left aileron lockout mechanism) installs easily (Fig. 501).

S 865-487

- (27) Do this step to put the lockout actuator in its unlocked position (actuator retracted):

(a) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

- 1) 11C17, OUTBOARD AILERON LOCKOUT L
- 2) 11C18, OUTBOARD AILERON LOCKOUT R

Z. Adjust the PCAs for the Right Outboard Aileron

S 865-488

- (1) Do these steps to put the lockout actuator for the outboard aileron (Fig. 502) in its lockout position (actuator extended):

**NOTE:** The actuator must stay in its lockout position during the PCA adjustment procedure.

- (a) Move the AIR DATA CMPTR test switch on the P61 panel to R and hold it there.

**NOTE:** The actuator will extend in approximately 15 seconds.

- (b) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:

- 1) 11C17, OUTBOARD AILERON LOCKOUT L
- 2) 11C18, OUTBOARD AILERON LOCKOUT R

- (c) Release the AIR DATA CMPTR test switch.

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(d) Make sure that rig pin A15 (for the right aileron lockout mechanism) can move freely.

S 435-372

- (2) Make sure that the control rod from the outboard aileron PCAs to the lockout mechanism is connected.

S 495-489

- (3) Install the (A27024-31 replaces -29 which superseded -1) outboard aileron rigging bar against the wing bottom surface. Put the bar approximately 1.0 inch (25.4mm) outboard from and parallel to the inboard edge of the outboard aileron (Fig. 507).

S 825-532

- (4) Use the outboard aileron rigging bar to find the aileron faired position.

**NOTE:** The aileron faired position is found when the bottom trailing edge of the aileron is aligned with the "1" mark on the -29 (replaced by -31) rigging bar scale, or the "0" mark on the A27024-31 rigging bar scale.

S 825-531

- (5) Disconnect and if necessary adjust the inboard PCA input rod length to 9.62 ±0.05 inch (244.4mm +/-1.27mm).

S 865-493

- (6) Supply pressure to the right hydraulic system only (AMM 29-11-00/201).

**NOTE:** The inboard PCA will be powered.

S 035-494

- (7) Remove the lockwire, loosen the locknuts, and disengage the tab washers that are on the inboard PCA input rod.

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S 825-530

- (8) Increase the length of the inboard PCA input rod until the aileron has moved approximately 1.0 inch (25.4mm) below the faired position.

NOTE: Adjust the rod ends if large adjustments are necessary and the body of the rod for small adjustments. When the PCA input rods are adjusted, be very careful not to move the input rod, the PCA or any other linkages in the area. Make sure that the neutral positions of the PCAs and its linkages do not change during the adjustment.

S 825-450

- (9) Disconnect the PCA input rod from the outboard PCA lever (Fig. 501).

S 985-642

- (10) Move the outboard PCA input lever across its neutral position. Do not move the aileron control surface.

NOTE: This step is necessary to bleed unwanted hydraulic pressure from the outboard PCA.

S 435-451

- (11) Install the bolt to temporarily connect the input rod to the outboard PCA lever.

S 825-503

- (12) Adjust the input rod for the inboard PCA until the bottom trailing edge of the aileron has moved up to  $0.87 \pm 0.05$  inch (22.1mm +/-1.27mm) below the aileron faired position (Fig. 508).

NOTE: The outboard aileron is in the rigged position.

Move the input rod in small increments. Disconnect and move the input lever for the outboard PCA across its neutral position, as necessary, to bleed any hydraulic pressure.

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S 435-497

- (13) Engage the tab washers and tighten the inboard PCA input rod locknuts and rod end bolts.

NOTE: Make sure that the aileron stays in the rigged position.

S 835-499

- (14) Keep a record of the position of the aileron trailing edge.

NOTE: This is the datum position that will be used when the outboard PCA is adjusted.

S 865-500

- (15) Remove the power from the right hydraulic system (AMM 29-11-00/201).

S 865-503

- (16) Supply pressure to the left hydraulic system only (AMM 29-11-00/201) and stop for 3 minutes.

NOTE: The outboard PCA will be powered.

S 825-505

- (17) Increase the length of the outboard PCA input rod until the aileron has moved 1 inch (25.4mm) below the faired position.

NOTE: When the PCA input rods are adjusted, be very careful not to move the input rod, the PCA or any other linkages in the area. Make sure that the neutral positions of the PCAs and its linkages do not change during the adjustment.

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S 825-506

- (18) Adjust the input rod of the outboard PCA until the bottom trailing edge of the aileron is no more than 0.05 inch (1.27 mm) away from the datum position.

S 435-507

- (19) Engage the tab washers and tighten the input rod locknuts and rod end bolts.

**NOTE:** Make sure that the aileron is no more than 0.05 inch (1.27 mm) away from the datum position after the locknuts are tightened.

S 865-508

- (20) Remove the power from the left hydraulic system (AMM 29-11-00/201).

S 865-510

- (21) Supply pressure to the right hydraulic system only (AMM 29-11-00/201) and stop for 3 minutes.

S 835-511

- (22) Keep a record of the position of the aileron trailing edge.

S 865-529

- (23) Supply pressure to the left hydraulic system and remove the power from the right hydraulic system (AMM 29-11-00/201). Stop for 3 minutes.

S 215-513

- (24) Make sure that the aileron is not more than 0.05 inch (1.27mm) away from the position you recorded. If it is necessary, adjust the input rod for the outboard PCA again. Tighten the jamnuts.

**NOTE:** After the nuts are tightened, make sure that the aileron is not more than 0.05 inch (1.27mm) away from the position you recorded.

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S 865-679

- (25) Remove the power from the left hydraulic system (AMM 29-11-00/201).

S 435-515

- (26) Install the lockwire on the inboard and outboard PCA input rods and apply a thin layer of grease to the threads that show.

S 095-516

- (27) Make sure that rig pin A15 (for the right aileron lockout mechanism) install easily (Fig. 501).

S 865-517

- (28) Do this step to put the lockout actuator in its unlocked position (actuator retracted):

(a) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

- 1) 11C17, OUTBOARD AILERON LOCKOUT L
- 2) 11C18, OUTBOARD AILERON LOCKOUT R

AA. Check Inboard Aileron Droop

**NOTE:** All droop measurements are taken from the aileron faired position (Fig. 508).

S 865-645

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

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S 225-650

- (2) Move the flap lever to its 30-unit detent position. Let the flaps extend. Do the check that follows:
  - (a) Make sure the inboard ailerons move to  $5.50 \pm 0.75$  degrees down from the faired position. Make sure the ailerons move at the same time. If these conditions are not satisfactory, do the Adjust Inboard Aileron Droop procedure.

NOTE: Use a bubble protractor to measure the aileron movement in the adjustment procedure.

#### AB. Adjust Inboard Aileron Droop

NOTE: All droop measurements are taken from the aileron faired position (Fig. 508).

S 865-651

- (1) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 035-652

- (2) Disconnect the flap input and output torque tubes from the aileron gearboxes (AMM 27-51-40/401).

NOTE: Do not let the torque tubes turn. If the tubes turn, then the flap retracted overtravel stop clearance and the flap synchronization will need to be adjusted (AMM 27-51-00/501).

S 865-653

- (3) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 825-656

- (4) With the flap control lever in the 30-unit detent position. Do these steps to adjust the ailerons:
  - (a) If the left aileron is too far down, turn the gearbox input shaft counterclockwise to move the aileron up. Move the aileron up to the 4.5-degree down position (approximately) and then move it down to the  $5.50 \pm 0.75$ -degree down position.

NOTE: One-half turn of the input shaft for the left or right gearboxes will move the aileron 0.18 degree (0.17 inch) (4.32 mm). Turn input shaft in increments of one third (1/3) revolution to make the attachment of torque tubes easier.

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- (b) If the left aileron is too far up, turn the gearbox input shaft clockwise to move the aileron down to the  $5.50 \pm 0.75$ -degree down position.
- (c) If the right aileron is too far down, turn the gearbox input shaft clockwise to move the aileron up. Move the aileron up to its 4.5-degree down position (approximately) and then move the aileron down to the  $5.50 \pm 0.75$ -degree down position.
- (d) If the right aileron is too far up, turn the gearbox input shaft counterclockwise to move the aileron down to the  $5.50 \pm 0.75$ -degree down position.

S 865-659

- (5) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 435-660

- (6) Connect the torque tubes. Use the nearest alignment coupling screw holes  $\pm 1/3$  of a revolution.

**NOTE:** Do not let the torque tubes turn when you connect them to the gearbox.

S 865-661

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (7) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-662

- (8) Move the flap lever to its 0-unit detent position. Let the flaps retract.

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S 225-663

- (9) Move the flap lever to its 5-unit detent position. Let the flaps extend. Do the check that follows:
- (a) Measure the inboard aileron droop.
  - (b) Make sure that the mismatch between left and right inboard ailerons is less than 0.5 degrees (0.45 inches)(11.43 mm).
    - 1) If the mismatch is more than 0.5 degrees, do the adjustment procedure again.

S 865-518

- (10) Move the flap lever to its 0-unit detent position. Let the flaps retract.

S 865-519

- (11) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

AC. Put the Airplane Back to its Usual Condition

S 095-520

- (1) Remove the outboard aileron rigging bar.

S 095-664

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Remove the door locks for the main landing gear and close the doors (AMM 32-00-15/201).

S 865-522

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 415-523

- (4) Close the access panels that you removed.

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TASK 27-11-00-735-524

4. System Test - Aileron and Aileron Trim Control

A. General

- (1) The neutral position for the control wheels is found when the bottom sides of the wheels align with a straight edge, use a tolerance of  $\pm 0.03$  inch (0.76 mm). The aileron trim must be adjusted to 0 units of trim when the control wheel neutral position is found.
- (2) The aileron trim indicator can be used to measure the control wheel position. One unit of aileron trim is equal to 5.5 degrees of control wheel movement.
- (3) Inboard and outboard aileron positions are measured from the faired position. You must add or subtract the actual rigged position measurements, as applicable, to get the aileron travel from the rigged position (Fig. 508).

B. Equipment

- (1) Control Wheel Straightedge - A27020-1
- (2) Inboard Aileron Rigging Bar - A27024-55 (Recommended), -47 (Optional), -2 (Optional)
- (3) Outboard Aileron Rigging Bar - A27024-31 (Recommended), A27024-29 (Alternative)
- (4) Bubble Protractor or Equivalent - Commercially Available
- (5) Control Wheel Adapter Equipment - A27021-96 or -98
- (6) Control Wheel Protractor Kit - A27021-29 (two A27021-30 protractors included) 4MIT65B80307-1 (optional)
- (7) Stopwatch - Commercially Available

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-51-00/201, Trailing Edge Flap System
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

- (1) Location Zones
  - 211 Control Cabin (Left)
  - 212 Control Cabin (Right)
  - 556 Inboard Aileron (Left)
  - 656 Inboard Aileron (Right)
  - 567 Outboard Aileron (Left)
  - 667 Outboard Aileron (Right)

E. Prepare to Test

S 865-525

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

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S 865-676

- (2) Make sure that these circuit breakers on the overhead panel, P11, are closed:
  - (a) EICAS (6 locations)
  - (b) 11L9, LEFT ENGINE OIL PRESS OR  
LEFT ENGINE OIL PRESS EICAS REF
  - (c) 11L36, RIGHT ENGINE OIL PRESS OR  
RIGHT ENGINE OIL PRESS EICAS REF

S 865-665

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 825-675

- (4) Push the STATUS button on the display select panel to show the control surface position indicator on the display.
- F. Test Control Wheel Operation (Fig. 504)

S 865-674

- (1) Retract the trailing edge flaps.

S 045-529

- (2) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 215-530

- (3) Make sure that the speedbrake lever is in its down and locked position.

S 215-531

- (4) Make sure that the control wheels are in their neutral positions.

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S 025-813

- (5) Remove the medallions and chart holders from the control wheels.  
(a) Remove the two screws from the bottom of the medallion.  
(b) Remove the medallion and chart holder.

S 495-532

- (6) Install the control wheel adapter equipment and the protractor on the control wheels and do this check:  
(a) Make sure the adapter fully touches the bottom part of the control wheel.

NOTE: Make sure the control wheel equipment is balanced correctly. Make sure it does not cause more than 1.0 inch-pound of torque when you measure it at the control wheel pivot.

S 215-533

- (7) Turn the captain's control wheel to its full clockwise position and then its full counterclockwise position. Do the checks that follow:

NOTE: The control wheel can shake when it is moved quickly from full input to its neutral position. This is not an indication of incorrect operation of the aileron system. The control wheel shakes because it is moved to its neutral position faster than usual.

- (a) Make sure that the captain's control wheel travel in each direction is at least 65 degrees (measured from the neutral position). Make sure that the first officer's control wheel moves at least 63.5 degrees in each direction when the captain's control wheel is operated.  
(b) Make sure that the ailerons and the spoilers operate smoothly through their full travel range.

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S 215-534

- (8) Turn the first officer's control wheel to its full clockwise position and then its full counterclockwise position. Do the checks that follow:

NOTE: The control wheel can shake when it is moved quickly from full input to its neutral position. This is not an indication of incorrect operation of the aileron system. The control wheel shakes because it is moved to its neutral position faster than usual.

- (a) Make sure that the first officer's control wheel travel in each direction is at least 65 degrees (measured from the neutral position). Make sure that the captain's control wheel moves at least 63.5 degrees in each direction when the first officer's control wheel is operated.

S 495-535

- (9) Attach a torque wrench to the first officer's control wheel.

S 225-536

- (10) Use a clamp to hold the captain's wheel in its full clockwise position. Turn the first officer's wheel to its full counterclockwise position and do the checks that follow:

- (a) Make sure that the maximum torque is 333-444 pound-inches (37.6-50.1 newton-meters).

NOTE: The maximum torque will occur when the control wheel positions are 25-35 degrees apart.

- (b) Make sure that the first officer's control wheel can move a total of 128-135 degrees.

S 225-537

- (11) Use a clamp to hold the captain's control wheel in its full counterclockwise position. Turn the first officer's wheel to its full clockwise position and do the above checks again.

G. Test Feel, Centering, and Trim

NOTE: During this test, the control wheel may shake when it is released from an input to its neutral position. This is not an indication of incorrect operation of the aileron system. The control wheel shakes because it is moved to its neutral position faster than usual.

S 865-538

- (1) Operate the aileron trim switches on the aft electronic control panel, P8, until the aileron trim indicator (on the control wheel) shows zero units of trim.

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S 215-539

- (2) Turn the control wheel clockwise until the trim indicator shows one unit of trim. Hold it there momentarily and then release it. Do the check that follows:
  - (a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

NOTE: Use the trim indicator to measure the control wheel position. Two degrees of control wheel movement is equal to 0.07 inch (1.78 mm) measured at the trim indicator scale.

S 215-540

- (3) Turn the control wheel counterclockwise until the trim indicator shows one unit of trim. Hold it there momentarily and then release it. Do the check that follows:
  - (a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

S 215-541

- (4) Turn the control wheel clockwise until the trim indicator shows 5 units of trim. Hold it there momentarily and then release it. Do the check that follows:
  - (a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

NOTE: Use the trim indicator to measure the control wheel position. Two degrees of control wheel movement is equal to 0.07 inch (1.78 mm) measured at the trim indicator scale.

S 215-542

- (5) Turn the control wheel counterclockwise until the trim indicator shows 5 units of trim. Hold it there momentarily and then release it. Do the check that follows:
  - (a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

S 865-543

- (6) Supply pressure to the center hydraulic system only (AMM 29-11-00/201).

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S 215-544

- (7) Turn the control wheel clockwise until the trim indicator shows one unit of trim. Hold it there momentarily and then release it. Do the check that follows:
- (a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

NOTE: Use the trim indicator to measure the control wheel position. Two degrees of control wheel movement is equal to 0.07 inch (1.78mm) measured at the trim indicator scale.

S 215-545

- (8) Turn the control wheel counterclockwise until the trim indicator shows one unit of trim. Hold it there momentarily and then release it. Do the check that follows:
- (a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

S 215-546

- (9) Turn the control wheel clockwise until the trim indicator shows 5 units of trim. Hold it there momentarily and then release it. Do the check that follows:
- (a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

NOTE: Use the trim indicator to measure the control wheel position. Two degrees of control wheel movement is equal to 0.07 inch (1.78mm) measured at the trim indicator scale.

S 215-547

- (10) Turn the control wheel counterclockwise until the trim indicator shows five units of trim. Hold it there momentarily and then release it. Do the check that follows:
- (a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

S 865-548

- (11) Supply pressure to the left hydraulic system only (AMM 29-11-00/201).

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S 215-549

- (12) Turn the control wheel clockwise until the trim indicator shows one unit of trim. Hold it there momentarily and then release it. Do the check that follows:
- (a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

NOTE: Use the trim indicator to measure the control wheel position. Two degrees of control wheel movement is equal to 0.07 inch (1.78mm) measured at the trim indicator scale.

S 215-550

- (13) Turn the control wheel counterclockwise until the trim indicator shows one unit of trim. Hold it there momentarily and then release it. Do the check that follows:
- (a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

S 215-551

- (14) Turn the control wheel clockwise until the trim indicator shows five units of trim. Hold it there momentarily and then release it. Do the check that follows:
- (a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

NOTE: Use the trim indicator to measure the control wheel position. Two degrees of control wheel movement is equal to 0.07 inch (1.78mm) measured at the trim indicator scale.

S 215-552

- (15) Turn the control wheel counterclockwise until the trim indicator shows five units of trim. Hold it there momentarily and then release it. Do the check that follows:
- (a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

S 865-553

- (16) Supply pressure to the right hydraulic system only (AMM 29-11-00/201).

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S 215-554

(17) Turn the control wheel clockwise until the trim indicator shows one unit of trim. Hold it there momentarily and then release it. Do the check that follows:

(a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

NOTE: Use the trim indicator to measure the control wheel position. Two degrees of control wheel movement is equal to 0.07 inch (1.78mm) measured at the trim indicator scale.

S 215-555

(18) Turn the control wheel counterclockwise until the trim indicator shows one unit of trim. Hold it there momentarily and then release it. Do the check that follows:

(a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

S 215-556

(19) Turn the control wheel clockwise until the trim indicator shows five units of trim. Hold it there momentarily and then release it. Do the check that follows:

(a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

NOTE: Use the trim indicator to measure the control wheel position. Two degrees of control wheel movement is equal to 0.07 inch (1.78mm) measured at the trim indicator scale.

S 215-557

(20) Turn the control wheel counterclockwise until the trim indicator shows five units of trim. Hold it there momentarily and then release it. Do the check that follows:

(a) Make sure that the control wheel moves back to its neutral position (use a tolerance of  $\pm 2$  degrees).

S 865-558

(21) Supply pressure to the left and center hydraulic systems (AMM 29-11-00/201).

NOTE: Make sure that the control wheel equipment is balanced correctly. Make sure that it does not cause more than 1.0 pound-inch of torque when it is measured at the wheel pivot.

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S 865-455

- (22) Turn the control wheel clockwise and then counterclockwise to its 65-degree position. Do the checks that follow:

NOTE: Use a torque wrench with a full scale indication of no more than 300 pound-inches (33.9 Nm).

- (a) Make sure that the breakout torque in the clockwise and counterclockwise directions (measured between 1 and 2 degrees) is between 20.0 - 32.5 pound-inches (2.25 Nm-3.67 Nm).
- (b) Make sure that the torque at the  $60 \pm 2$  degree position is between 65.0 - 104.0 pound-inches (7.34 Nm-11.75 Nm).

NOTE: Measure the torques while the control wheel moves slowly through the position to higher wheel angles.

- (c) Release the control wheel from the 65-degree position. Make sure that the control wheel goes back to its neutral position (use a tolerance of  $\pm 2$  degrees).

S 215-559

- (23) Move the aileron trim switches on the P8 panel to RIGHT WING DOWN and hold them there until the control wheel movement stops. Make sure that the system is in its center detent position. Do the checks that follow:

NOTE: Hit the control wheel lightly to make sure that the system is in its center detent position.

- (a) Make sure that the control wheels turn in the clockwise direction.
- (b) Make sure that the captain's control wheel turns  $30 \pm 2$  degrees from the neutral position.

S 215-560

- (24) Move the aileron trim switches on the P8 panel to LEFT WING DOWN and hold them there until the control wheel movement stops. Make sure that the system is in its center detent position. Do the checks that follow:

NOTE: Hit the control wheel lightly to make sure that the system is in its center detent position.

- (a) Make sure that the control wheels turn in the counterclockwise direction.
- (b) Make sure that the captain's control wheel turns  $30 \pm 2$  degrees from the neutral position.

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S 865-561

- (25) Move the trim switches to RIGHT WING DOWN and hold them there until the control wheel movement stops.

S 215-562

- (26) Turn the control wheel clockwise and then counterclockwise to its full travel limits and release it. Do the check that follows:  
(a) Make sure that the control wheel goes back to a position that is  $30 \pm 2$  degrees away from the neutral position.

S 865-563

- (27) Move the trim switches to LEFT WING DOWN and hold them there until the control wheel movement stops.

S 215-564

- (28) Turn the control wheel counterclockwise and then clockwise to its travel limits and release it. Do the check that follows:  
(a) Make sure that the control wheel goes back to a position that is  $30 \pm 2$  degrees from its neutral position.

S 215-565

- (29) Move each trim switch to the RIGHT WING DOWN position while the other switch stays at its neutral position. Do the check that follows:  
(a) Make sure that the control wheels do not move.

S 215-566

- (30) Move each trim switch to the LEFT WING DOWN position while the other switch stays in its neutral position.  
(a) Make sure that the control wheels do not move.

S 865-567

- (31) Operate the trim switches until the aileron trim indicator shows zero units of trim.

H. Test Aileron Response Time

S 215-568

- (1) Make sure that the trim system is in its neutral position. Make sure that the control wheels are in their center position.

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S 225-569

- (2) Turn the control wheel to its full clockwise position in no more than 1 second. Do the check that follows:
- (a) Make sure the ailerons move to their full travel positions in no more than 3 seconds.

S 215-570

- (3) Move the control wheel to its neutral position in no more than 1 second. Do the check that follows:

**NOTE:** The control wheel can shake when it is moved quickly from full input to its neutral position. This is not an indication of incorrect operation of the aileron system. The control wheel shakes because it is moved to its neutral position faster than usual.

- (a) Make sure the ailerons move to their rigged positions in no more than 3 seconds.

S 215-571

- (4) Turn the control wheel to its full counterclockwise position in no more than 1 second. Do the check that follows:
- (a) Make sure the ailerons move to their full travel positions in no more than 3 seconds.

S 215-572

- (5) Move the control wheel to its neutral position in no more than 1 second. Do the check that follows:

**NOTE:** The control wheel can shake when it is moved quickly from full input to its neutral position. This is not an indication of incorrect operation of the aileron system. The control wheel shakes because it is moved to its neutral position faster than usual.

- (a) Make sure the ailerons move to their rigged positions in no more than 3 seconds.

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I. Test Aileron Travel

NOTE: All measurements are taken from the ailerons in their faired position (Fig. 508).

S 215-573

- (1) Make sure that the aileron trim is set to 0. Make sure the control wheels are in their center detent. Use the aileron rigging bars and do the checks that follow:

(a) Make sure the inboard ailerons are in the rigged position,  $0.40 \pm 0.24$  degree down from the aileron faired position.

NOTE: Use a bubble protractor and the inboard aileron rigging bar to make sure the inboard aileron rigging is in tolerance.

(b) Make sure the outboard ailerons are in the rigged position,  $2.0 \pm 0.28$  degrees down from the aileron faired position.

NOTE: Use a bubble protractor and the outboard aileron rigging bar to make sure the outboard aileron rigging is in tolerance.

S 225-575

- (2) Turn the control wheel clockwise to 32 and 54 degree positions ( $\pm 2$  degrees). Make sure that the inboard ailerons move to the positions shown in Table 501.

NOTE: Use a bubble protractor to measure the aileron movement from the faired position.

S 865-576

- (3) Move the control wheel to its center detent.

S 225-577

- (4) Turn the control wheel clockwise and then counterclockwise to the 32 and 54 degree positions ( $\pm 2$  degrees). Make sure that the ailerons move to the positions shown in Table 501.

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Aileron Positions from the Faired Position Table 501				
WHEEL POSITION Degrees( $\pm 2$ Degrees)	LEFT INBOARD AILERON		RIGHT INBOARD AILERON	
	POSITION Degrees	DIRECTION ( $\pm 1$ Degree)	POSITION Degrees	DIRECTION ( $\pm 1$ Degree)
32 cw	21.5	Down	21.5	Up
32 ccw	21.5	Up	21.5	Down
WHEEL POSITION Degrees( $\pm 2$ Degrees)	LEFT OUTBOARD AILERON		RIGHT OUTBOARD AILERON	
	POSITION Degrees	DIRECTION ( $\pm 1$ Degree)	POSITION Degrees	DIRECTION ( $\pm 1$ Degree)
54 cw	15.5	Down	30.5	Up
54 ccw	30.5	Up	15.5	Down

J. Test Inboard Aileron Droop

S 865-666

- (1) Make sure the aileron trim is set to 0. Make sure that the control wheels are in their center detent position.

S 865-668

**WARNING:** TO PREVENT INJURY OR DAMAGE, KEEP ALL PERSONS AND EQUIPMENT AWAY FROM THE CONTROL SURFACES. THE TRAILING EDGE FLAPS AND THE LEADING EDGE SLATS ARE FULLY POWERED. MAKE SURE THAT THE ENGINE STRUT ACCESS DOORS AND THE THRUST REVERSER COWLING ARE CLOSED. THIS WILL PREVENT DAMAGE WHEN THE SLATS ARE OPERATED.

- (2) Do the activation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 215-752

- (3) Move the flap lever to its 5-unit detent position. Do the check that follows:
  - (a) Make sure that the left inboard aileron moves to  $10.44 \pm 1.00$  degrees down from the faired position.
  - (b) Make sure that the right inboard aileron moves to  $10.81 \pm 1.00$  degrees down from the faired position.

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S 215-392

- (4) Move the flap lever to its 30-unit detent position and do this check (Inboard aileron droop decreases when the flaps are moved to the 30-unit position):
- (a) Make sure the two inboard ailerons move at the same time to  $5.50 \pm 0.75$  degrees down from the faired position.

**NOTE:** Make sure the difference between the left inboard aileron position and the right inboard aileron position is not more than 0.75 degree.

S 865-457

- (5) Move the flap lever to its 15-unit detent position. Do the check that follows:
- (a) Make sure that the left inboard aileron moves to  $10.44 \pm 1.00$  degrees down from the faired position.
- (b) Make sure that the right inboard aileron moves to  $10.81 \pm 1.00$  degrees down from the faired position.

S 225-578

- (6) Turn the control wheel (from the neutral position) clockwise and then counterclockwise to its 16 and 50-degree positions ( $\pm 1$  degree). Do the check that follows:
- (a) Make sure that the inboard ailerons move to the positions shown in Table 502.

Table 502				
WHEEL POSITION Degrees ( $\pm 1$ Degree)	LEFT INBOARD AILERON		RIGHT INBOARD AILERON	
	DISPLACEMENT Degrees	DIRECTION ( $\pm 1$ Degree)	DISPLACEMENT Degrees	DIRECTION ( $\pm 1$ Degree)
16 cw	21.5	Down	0.25	Down
50 cw	21.5	Down	21.5	Up
16 ccw	0.0		21.5	Down
50 ccw	21.5	Up	21.5	Down

S 865-579

- (7) Do the activation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 865-580

- (8) Move the flap lever to its zero detent position. Let the flaps retract.

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S 215-581

- (9) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201). Do the check that follows:
- (a) Make sure that the inboard ailerons move to their rigged position.

S 095-428

- (10) Remove the control wheel adapter equipment.

S 425-814

- (11) Install the medallions and chart holders.
- (a) Put the medallion and chart holder in place and install the two screws in the bottom of the medallion.

K. Test Aileron Lockout Operation (Fig. 502)

S 215-582

- (1) Make sure that the aileron trim is set to 0. Make sure that the control wheels are in their center positions.

S 225-583

- (2) Push the FUNCTIONAL TEST switch on the left or right air data computer (ADC) module located on the E1-3 or E2-3 equipment shelf. Hold the switch in and do these steps:

**NOTE:** The lockout actuators will extend when the switch is pushed. The AIL LOCK light on the P5 panel will come ON. Also, an AILERON LOCKOUT message will come into view on the display.

Do not push the ADC switch when pressure is supplied to the pitot-static system. An incorrect fault condition can occur. To remove the fault, push the ADC test switch with the pitot-static system at ambient pressure.

- (a) Turn the control wheel 65 degrees clockwise and then 65 degrees counterclockwise. Do the check that follows:
  - 1) Make sure that the outboard ailerons do not move more than 1 degree up or 1 degree down.
  - 2) Move the control wheel to its neutral position.

S 215-584

- (3) Release the FUNCTIONAL TEST switch and do the check that follows:
- (a) Make sure that the AIL LOCK light on the pilots' overhead panel, P5, is OFF.

S 215-585

- (4) Move the COMPUTER select switch on the P9 panel to L. Do the check that follows:
- (a) Make sure that the amber AILERON LOCKOUT message does not come into view on the display.

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S 215-586

- (5) Move the COMPUTER select switch on the P9 panel to R. Do the check that follows:
  - (a) Make sure that the amber AILERON LOCKOUT message does not come into view on the display.

S 215-587

- (6) Do a check on the left and right Stabilizer Trim/Aileron Lockout Modules (SAMs) (located on the E1-1 and E2-1 equipment shelves). Make sure that these fault balls are black on each SAM.
  - (a) ADC
  - (b) L AIL/E ASY ACT
  - (c) R AIL ACT
  - (d) SAM
  - (e) AIR/GND

L. Test Aileron Lockout Crossfeed

S 865-541

- (1) Move the COMPUTER select switch, on the P9 panel, to L.

S 865-588

- (2) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - (a) 11A10, AIR DATA CMPTR L

S 215-589

- (3) Stop for 2 seconds. Make sure that the amber AIL LOCK light on the P5 panel is OFF.

S 865-590

- (4) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - (a) 11F30, AIR DATA CMPTR R

S 215-591

- (5) Make sure that the amber AIL LOCK light is ON. Make sure that the amber AILERON LOCKOUT message comes into view on the display.

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- S 865-513  
(6) Move the COMPUTER select switch on the P9 panel to R.

- S 865-542  
(7) Make sure that the amber AILERON LOCKOUT message is shown on the display.

- S 865-592  
(8) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:  
(a) 11A10, AIR DATA CMPTR L

- S 215-593  
(9) Stop for 6 seconds. Make sure that the amber AIL LOCK light is OFF. Make sure that the amber AILERON LOCKOUT message does not come into view on the display.

- S 865-594  
(10) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:  
(a) 11F30, AIR DATA CMPTR R

M. Test Left Aileron Lockout Function

S 865-669

**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.

- (1) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

- S 865-670  
(2) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:  
(a) 11G17, FLT CONT ELEC 1R AC  
(b) 11G26, FLT CONT ELEC 2R AC

- S 215-595  
(3) Move the L AIR DATA test switch on the miscellaneous test panel, P61, to CMPTR for approximately 2 seconds. Do the checks that follow:  
(a) Make sure that the AIL LOCK light on the P5 panel comes ON.  
(b) Stop for 45 seconds. Make sure that the AIL LOCK light on P5 panel goes OFF.

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S 865-596

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC

N. Test Right Aileron Lockout Function

S 865-671

**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.

- (1) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 865-597

- (2) Stop for 10 seconds, then open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC

S 215-598

- (3) Move the R AIR DATA test switch on the P61 panel to CMPTR for approximately 2 seconds. Do the checks that follow:
  - (a) Make sure that the AIL LOCK light on the P5 panel comes ON.
  - (b) Stop for at least 45 seconds, then make sure that the AIL LOCK light on the P5 panel goes OFF.

S 865-599

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC

O. Put the Airplane Back to its Usual Condition

S 865-600

- (1) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-601

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-11-00-715-393

5. Aileron Response - Test

**NOTE:** This is a scheduled maintenance task.

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A. General

- (1) Be careful because the spoilers will operate when you move the control wheel.

**NOTE:** A single thumping noise can be heard from a PCA when the ailerons are moved full up or full down. This noise is heard only when the direction of movement of the PCA is changed. It is heard when the snubbing ring moves in the snubbing gland to change the direction of movement of the piston at the end of the stroke.

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Prepare for the Test

S 865-394

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

S 865-396

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-397

- (3) Push the STATUS switch on the display select panel to show the aileron position indicator on the display.

D. Aileron Response - Test

S 215-398

- (1) Turn one of the control wheels clockwise and hold it there for 2 seconds. Do these checks:
  - (a) Make sure the two left ailerons move down and the two right ailerons move up.

**NOTE:** The spoilers on the right wing will operate when you turn the control wheel.

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- (b) Make sure all the ailerons operate smoothly through their full travel range.

S 215-399

- (2) Turn one of the control wheels counterclockwise and do these checks:
  - (a) Make sure the two left ailerons move up and the two right ailerons move down.

NOTE: The spoilers on the left wing will operate when you turn the control wheel.

- (b) Make sure the ailerons operate smoothly through their full travel range.

E. Aileron System and Lateral Control Shutoff Valve Operation with a Single Hydraulic Source - Test

S 865-400

- (1) Remove the power from the center and right hydraulic systems (AMM 29-11-00/201).

S 215-401

- (2) Turn the control wheel fully counterclockwise and hold it there for at least 4 seconds. Do this check:
  - (a) Make sure the two left ailerons move up and the right outboard aileron moves down.

NOTE: Ignore the movement of the right inboard aileron.

S 215-402

- (3) Turn the control wheel fully clockwise and hold it there for at least 4 seconds. Do this check:
  - (a) Make sure the two left ailerons move down and the right outboard aileron moves up.

NOTE: Ignore the movement of the right inboard aileron.

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- S 865-803
- (4) Move the control wheel to its neutral position.
- S 865-405
- (5) Supply pressure to the right hydraulic system (AMM 29-11-00/201).
- S 865-406
- (6) Remove the power from the left hydraulic system (AMM 29-11-00/201).
- S 215-407
- (7) Turn the control wheel to fully clockwise and hold it there for at least 4 seconds. Do this check:
- (a) Make sure the two right ailerons move up and the left outboard aileron moves down.

NOTE: Ignore the movement of the left inboard aileron.

- S 215-408
- (8) Turn the control wheel fully counterclockwise and hold it there for at least 4 seconds. Do this check:
- (a) Make sure the two right ailerons move down and the left outboard aileron moves up.

NOTE: Ignore the movement of the left inboard aileron.

- S 865-533
- (9) Remove the power from the right hydraulic system (AMM 29-11-00/201).

- S 865-410
- (10) Supply pressure to the center hydraulic system (AMM 29-11-00/201).

- S 215-411
- (11) Turn the control wheel fully clockwise and hold it there for at least 4 seconds. Do this check:
- (a) Make sure the right inboard aileron moves up and the left inboard aileron moves down.

NOTE: Ignore the movement of the outboard ailerons.

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S 215-412

- (12) Turn the control wheel fully counterclockwise and hold it there for at least 4 seconds. Do this check:
- (a) Make sure the right inboard aileron moves down and the left inboard aileron moves up.

NOTE: Ignore the movement of the outboard ailerons.

S 865-413

- (13) Move the control wheel to its neutral position.
- F. Put the Airplane Back to Its Usual Condition

S 865-414

- (1) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 865-415

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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INBOARD AILERON - REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task supplies the data that is necessary to remove the inboard aileron. The second task supplies the data that is necessary to install it.

NOTE: It is not necessary to perform Flight Test following the replacement of the Inboard Aileron.

TASK 27-11-01-024-051

2. Remove Inboard Aileron

A. Equipment

- (1) Sling, Inboard Aileron - A27015-15 (Part of sling equipment, A27015-1)  
(a) Load positioner - commercially available  
(2) Inboard Aileron Deactivation Hook - A27013-1

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels  
(2) AMM 06-45-00/201, Engine Nacelle Access Doors and Panels  
(3) AMM 24-22-00/201, Electrical Power - Control

C. Access

(1) Location Zones

437/447	Aft Nacelle Strut Fairing
556/656	Inboard Aileron

(2) Access Panels

437/447DB	Strut T.E. Fairing
552/652JB	Spoiler Beam Installation
556/656AB	Inboard Aileron L.E. Structure
561/661AB	Wing T.E. Structure, Aileron Controls
561/661BB	Wing T.E. Inboard Aileron Actuators
561/661CB	Wing T.E. Structure, Aileron Controls

D. Prepare for Removal

S 864-001

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

S 824-002

- (2) Make sure that the control wheels are in their neutral position.

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S 864-004

- (3) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure that the amber switch-position legend lights come on.

S 864-003

- (4) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R
  - (d) 11K14, AILERON POS L
  - (e) 11K23, AILERON POS R

S 014-005

- (5) Remove access panel 437DB (left engine) or 447DB (right engine) (AMM 06-43-00/201).

S 014-006

- (6) Open access panels 552JB, 561AB, 561BB and 561CB (left aileron) or 652JB, 661AB, 661BB, and 661CB (right aileron) (AMM 06-44-00/201).

S 494-007

- (7) Install the deactivation hook (37).

S 014-025

- (8) Open access panel 556AB (left aileron) or 656AB (right aileron) (AMM 06-44-00/201).

E. Remove the Inboard Aileron

S 494-026

- (1) Use a hoist to attach the sling to the aileron (1) (Fig. 403).

**NOTE:** If you use the load positioner, movement of the aileron can be made easier.

S 034-050

- (2) Disconnect these components (Fig. 401):
  - (a) The position transmitter control-rod (22) from the aileron (1).
  - (b) The aileron PCA rod ends (29) from the aileron front spar (1).
  - (c) The reaction links (30) from the aileron front spar (1).

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S 434-027

**CAUTION:** THE PCA CAN BE DAMAGED IF IT FALLS FROM THE WING STRUCTURE. MAKE SURE THAT THE AILERON PCA'S ARE TIGHTLY ATTACHED TO THE STRUCTURE AFTER THEY ARE DISCONNECTED.

- (3) Turn the reaction links and PCAs down. Attach the PCAs to the wing structure.

S 034-028

- (4) Disconnect the hinges and jumpers (7, 15) from the aileron (1) with the steps that follow:
- (a) Loosen the bolts (12, 13) first and next remove these bolts to disconnect the inboard hinge from the structure.

**NOTE:** If you remove the bolt (12) before loosening the bolt (13), you can cause damage to the antirotation plate (14) or to the aileron (1) when you try to remove the bolt (13) with the bolt (12) removed.

- (b) Remove bolts (8) and (9) to disconnect the outboard hinge from the structure.

S 034-029

- (5) Remove the fail-safe hinge bolts (16, 21).

S 024-030

- (6) Remove the aileron (1).

TASK 27-11-01-424-031

3. Install the Inboard Aileron

A. Equipment

- (1) Sling, Inboard Aileron - A27015-15 (Part of sling equipment, A27015-1)  
(a) Loadpositioner - commercially available
- (2) Inboard Aileron Rigging Bar - A27024-55 (recommended)  
- A27024-47 (optional)  
- A27024-2 (optional)
- (3) Inboard Aileron Rigging Bar Mount Equipment - A27110-1
- (4) Bonding Meter - Avtron Model T477H, Avtron Manufacturing Inc., Cleveland, Ohio

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)

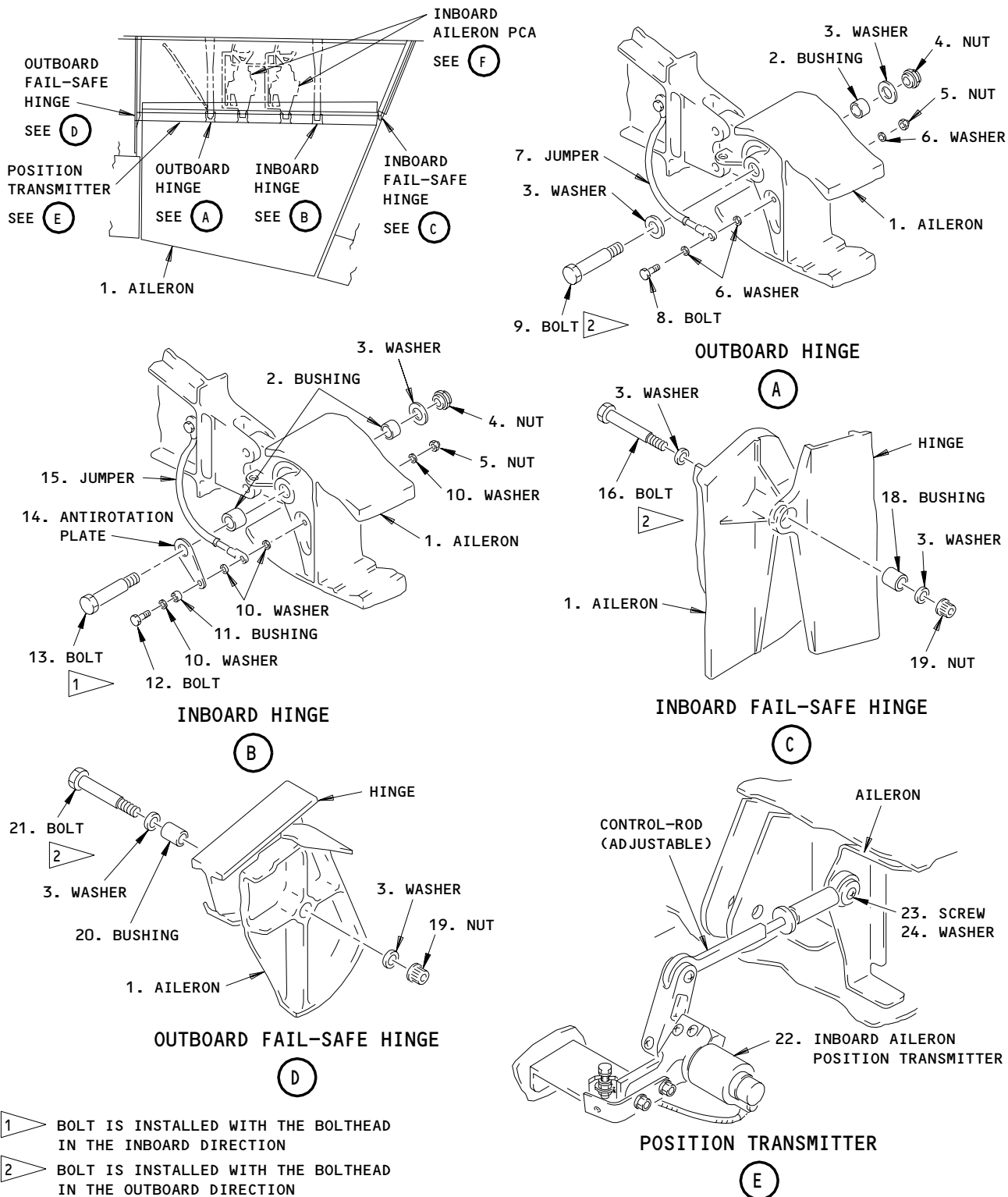
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Inboard Aileron Installation  
Figure 401 (Sheet 1)

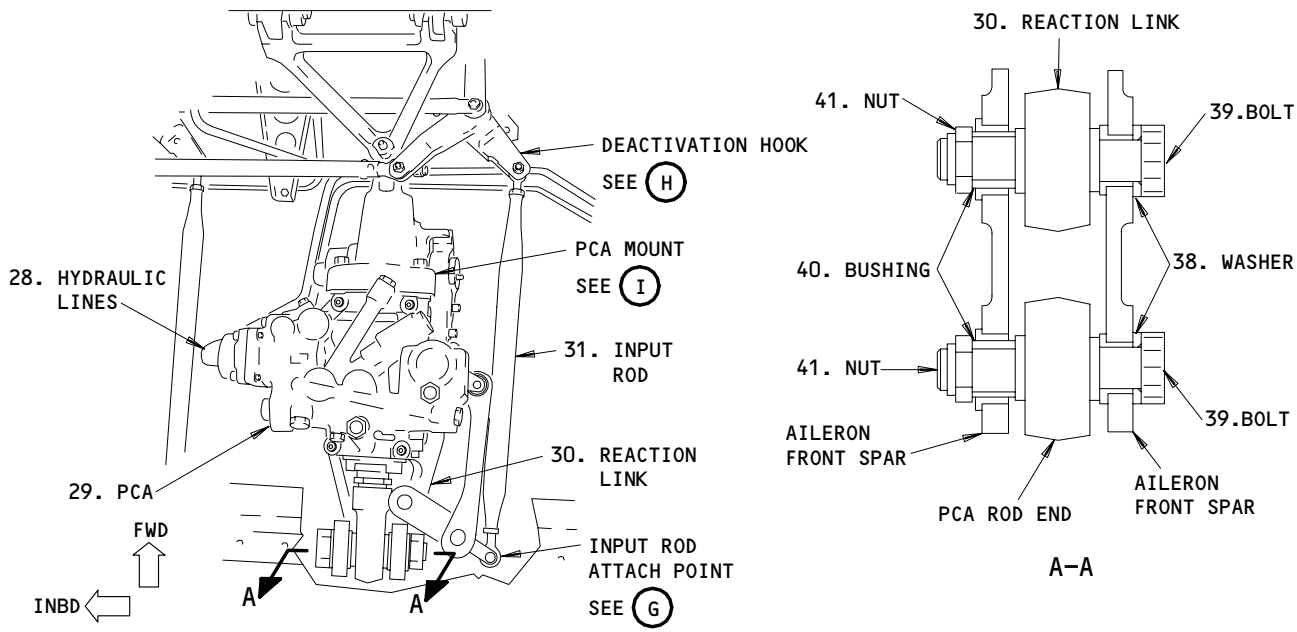
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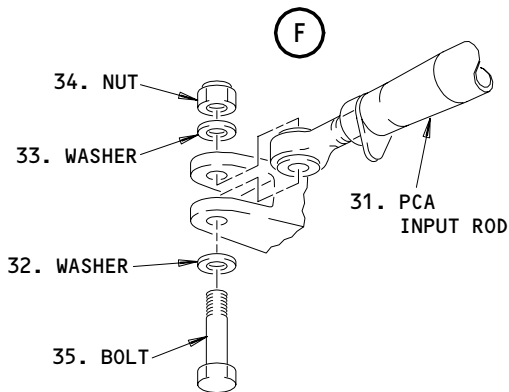
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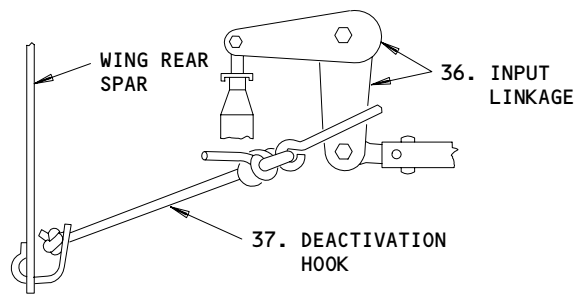
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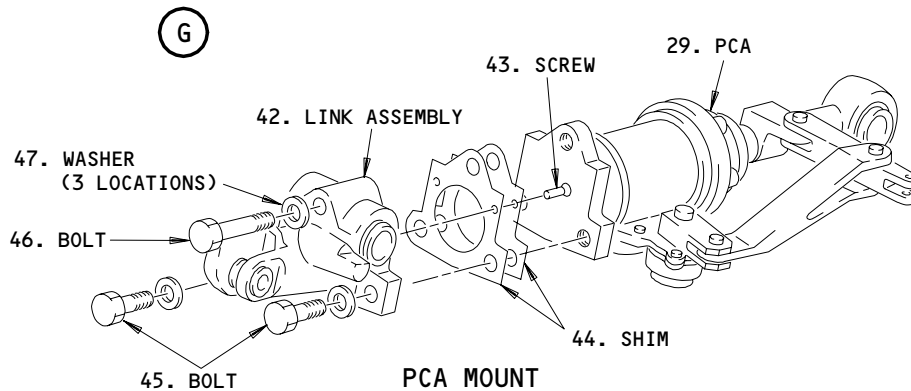
INBOARD AILERON PCA



INPUT ROD ATTACH POINT



DEACTIVATION HOOK



PCA MOUNT

Inboard Aileron Installation  
Figure 401 (Sheet 2)

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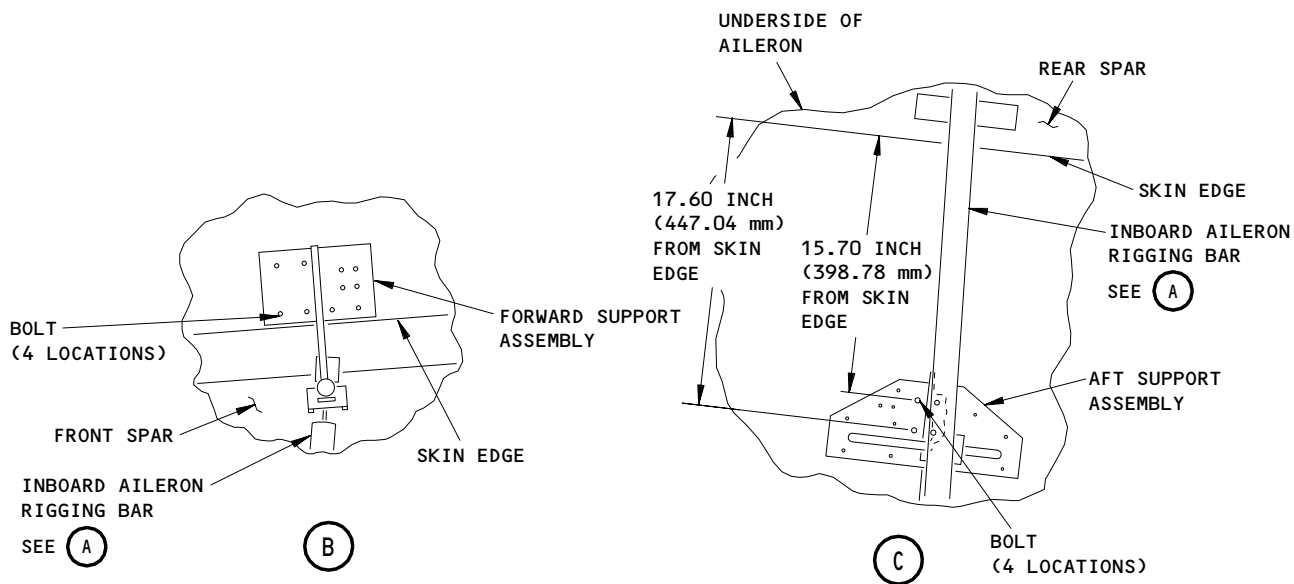
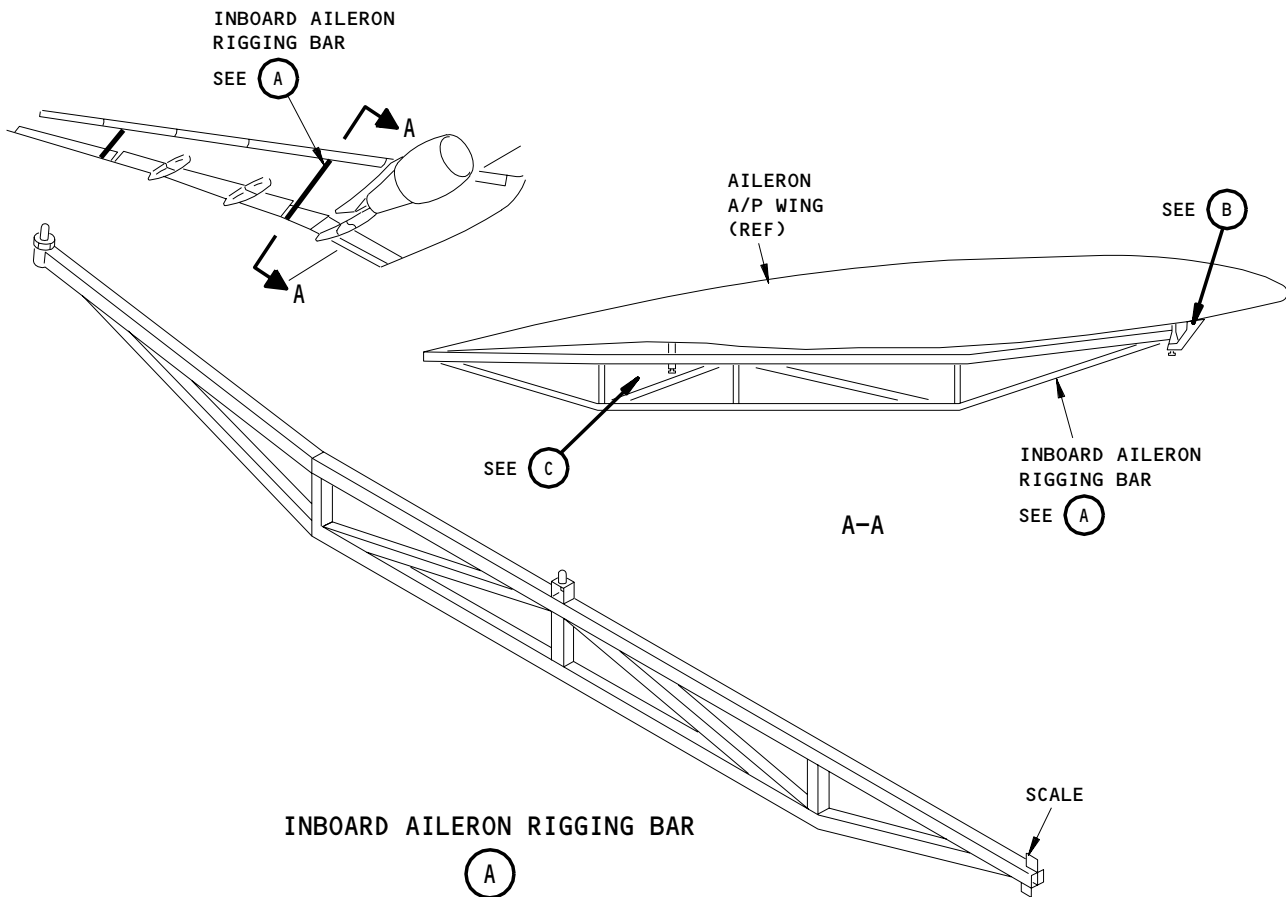
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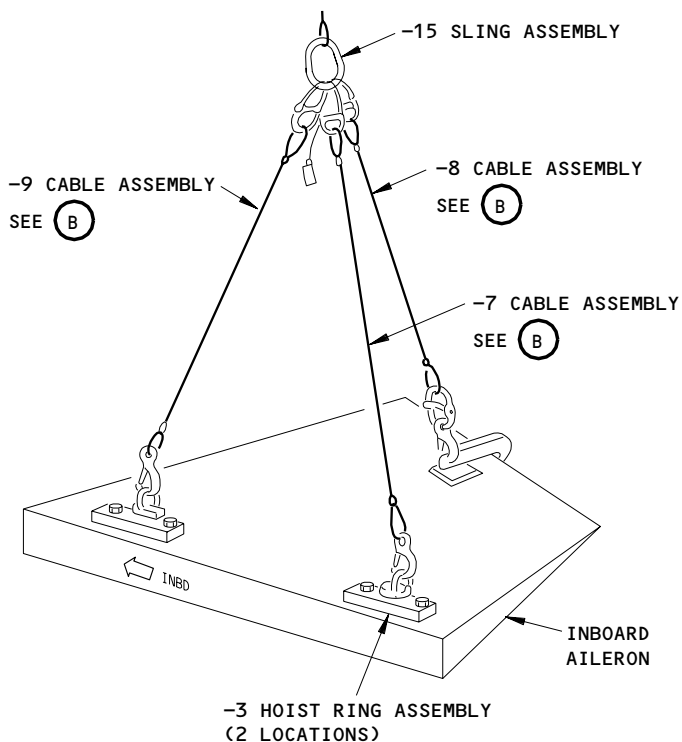
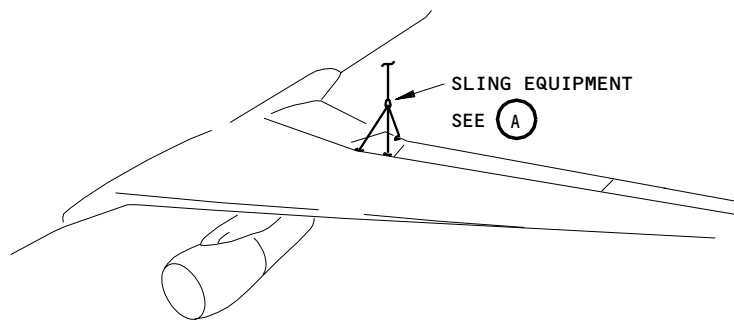




Inboard Aileron Rigging Bar Installation  
Figure 402

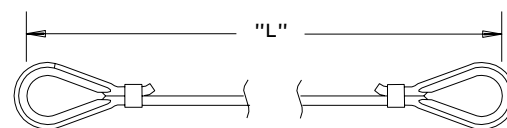
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SLING EQUIPMENT

(A)



-7,-8,-9 CABLE ASSEMBLY

CABLE ASSEMBLY	"L" ±0.25 INCH (±6.35 mm)
-7	22.2 (565.88)
-8	42.7 (1084.58)
-9	25.0 (635)

(B)

Inboard Aileron Sling Equipment Installation  
Figure 403

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- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) D00015 Grease - BMS 3-24 (Alternate)

C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Aileron	27-11-01	05	110,115

D. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-11-01/601, Inboard Aileron

E. Access

(1) Location Zones

- 437/447 Aft Nacelle Strut Fairing
- 556/656 Inboard Aileron

(2) Access Panels

- 437/447DB Strut T.E. Fairing
- 552/652JB Spoiler Beam, Installation
- 556/656AB Inboard Aileron L.E. Structure
- 561/661AB Wing T.E. Structure, Aileron Controls
- 561/661BB Wing T.E. Inboard Aileron Actuators
- 561/661CB Wing T.E. Structure, Aileron Controls

F. Install the Inboard Aileron.

S 824-032

- (1) Hoist the aileron (1) into position (Fig. 403).

**NOTE:** If you use the loadpositioner, movement of the aileron can be made easier.

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S 434-033

- (2) To connect the fail-safe hinges, do these steps:
- (a) Install the outboard hinge bolt (21), washers (3), bushing (20), and nut (19). Tighten the nut (19).
  - (b) Install the inboard hinge bolt (16), washers (3), bushing (18), and nut (19). Tighten the nut (19).

S 434-034

- (3) To connect the inboard hinge, do these steps:
- (a) Install the bushings (2).
  - (b) Push the bolt (13) through the antirotation plate (14) and the bushings (2).
  - (c) Install the washer (3) and the nut (4).
  - (d) Tighten the bolthead to 3300-3500 pound-inches (373-395 newton-meters) or tighten the nut to 2600-3400 pound-inches (294-384 newton-meters).
  - (e) Lubricate the hinge with grease.

S 434-035

- (4) To connect the inboard jumper, do these steps:
- (a) Push the bolt (12) through the washers (10), bushing (11), and the antirotation plate (14). Install the nut (5).
  - (b) Use a bonding meter to make sure that the resistance between the aileron and the airplane structure is less than 0.002 ohm.

S 434-036

- (5) To connect the outboard hinge, do these steps:
- (a) Install the bushing (2).
  - (b) Install the bolt (9), washers (3), and the nut (4).
  - (c) Tighten the bolthead to 3300-3500 pound-inches (373-395 newton-meters) or tighten the nut to 2600-3400 pound-inches (294-384 newton-meters).
  - (d) Lubricate the hinge with grease.

S 434-037

- (6) To connect the outboard jumper (7), do these steps (View A):
- (a) Install the bolt (8), washers (6), and the nut (5).
  - (b) Use a bonding meter to make sure that the resistance between the aileron and the airplane structure is less than 0.002 ohm.

S 094-038

- (7) Remove the aileron sling.

S 214-039

- (8) Manually move the aileron (1) through four full cycles.
- (a) Make sure that the aileron moves freely and does not need too much force.

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S 434-040

- (9) Do these steps to install the aileron PCAs (29) to the aileron (1):
- (a) Apply a thin layer of corrosion preventive grease to the bolts (39), bushings (40), washers (38), and nuts (41) before they are installed.
  - (b) Lubricate the PCA rod ends (29) and PCA reaction link bearings with grease before they are installed.
  - (c) Connect the reaction links (30) to the aileron front spar (1).
    - 1) Install the bolt (39), washer (38), bushing (40), and nut (41). Tighten the nut to 1000 - 1200 pound-inches (113-135 newton-meters).
  - (d) Install the bolts (39) and washers (38) that connect the PCA rod ends (29) to the aileron front spar. Make sure that they can be freely installed and do not need too much force.
    - 1) Install the bushing (40) and nut (41). Tighten the nut to 1000 - 1200 pound-inches (113-135 newton-meters).

S 434-041

- (10) Install the screw (23) and washers (24) that connect the adjustable end of the position transmitter control-rod (22) to the aileron.

S 414-042

- (11) Close access panels 556DZ, 556EZ, and 556FZ (left aileron) or 656DZ, 656EZ, and 656FZ (right aileron).

S 094-043

- (12) Remove the deactivation hook (37).

S 824-044

- (13) Adjust the PCAs to inboard aileron (AMM 27-11-00/501).

**NOTE:** This step is not necessary if no changes are made to the adjustable rods, actuators.

S 824-045

- (14) Do the procedure 3 of the aileron position indication adjustment (AMM 27-18-00/501).

**NOTE:** This step is not necessary if no changes are made to the adjustable rods, actuators.

S 714-055

- (15) Do the operational test for the aileron and aileron trim (AMM 27-11-00/501).

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G. Put the Airplane Back to Its Usual Condition.

S 864-046

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 864-047

- (2) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the P61 panel to ON.

S 864-048

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 414-049

- (4) Close the access panels you removed.

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INBOARD AILERON - INSPECTION/CHECK

1. General

- A. This procedure contains the data that is necessary to examine the inboard aileron hinges for wear. It does not supply the data that is necessary to remove or install the aileron components. Refer to the Inboard Aileron Removal/Installation procedure for this data.

TASK 27-11-01-206-002

2. Inboard Aileron Hinges - Wear Limits

A. Access

- (1) Location Zone  
556/656 Inboard Aileron

B. Procedure

S 226-001

- (1) Use the supplied data (Fig. 601) to examine the inboard aileron hinges for too much wear.

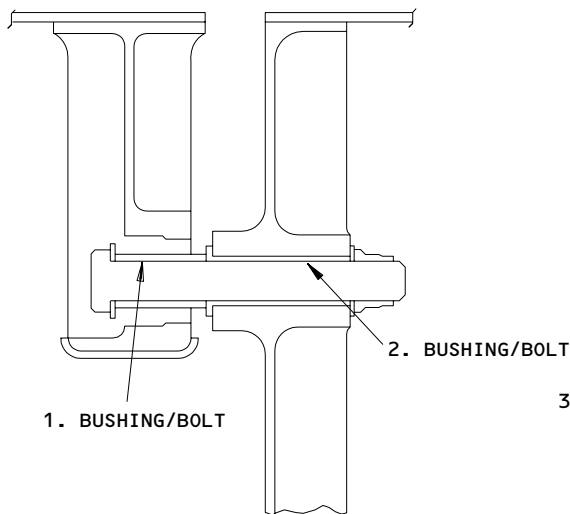
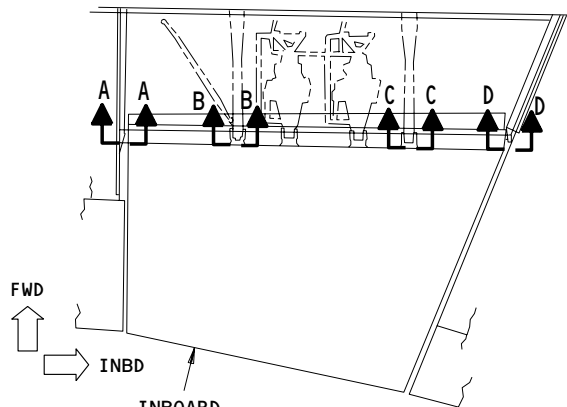
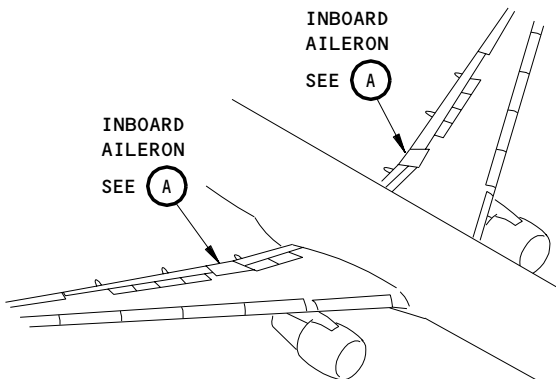
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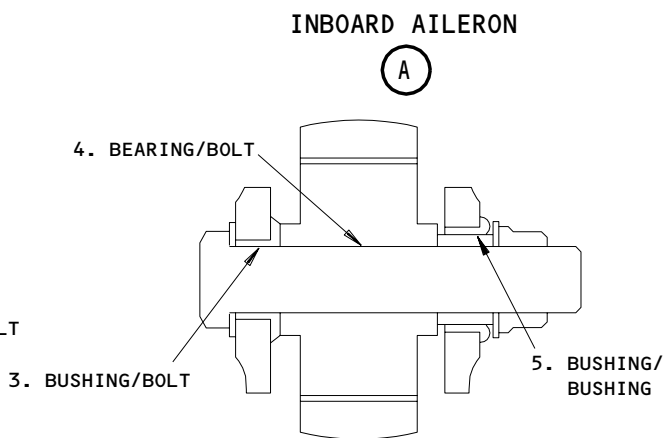
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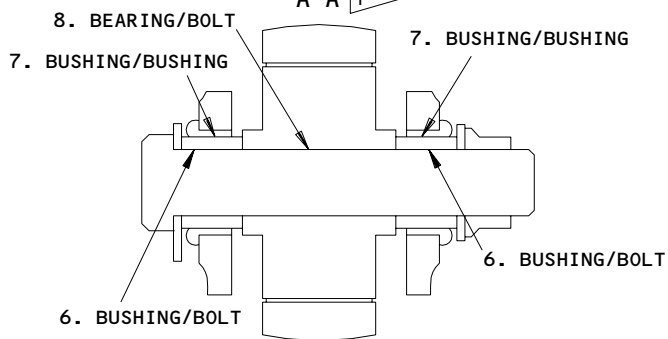
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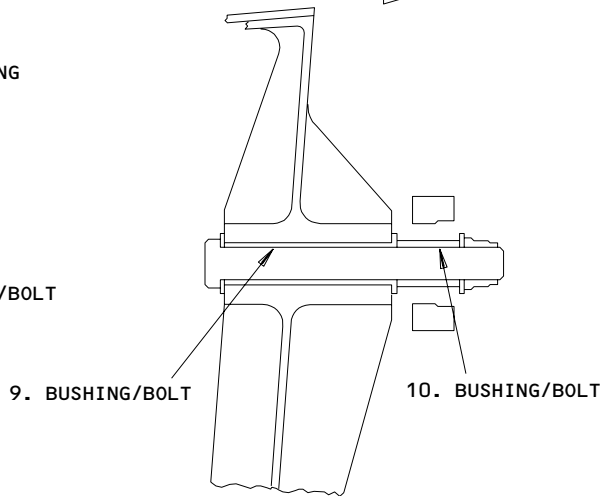
(AILERON HINGE)  
A-A 1



(AILERON HINGE)  
B-B 1



(AILERON HINGE)  
C-C 2



(AILERON HINGE)  
D-D 1

- 1 BOLT IS INSTALLED WITH THE BOLTHEAD IN THE OUTBOARD DIRECTION
- 2 BOLT IS INSTALLED WITH THE BOLTHEAD IN THE INBOARD DIRECTION

Inboard Aileron Wear Limits  
Figure 601 (Sheet 1)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4955 (12.586)		X		
2	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4957 (12.591)		X		
3	BUSHING	ID	0.8745 (22.212)	0.8753 (22.233)	0.8798 (22.347)	0.0058 (0.147)	X		
	BOLT	OD	0.8730 (22.174)	0.8740 (22.200)	0.8695 (22.085)		X		
4	BEARING	ID	0.8745 (22.212)	0.8750 (22.225)	0.8798 (22.347)	0.0058 (0.147)	X		
	BOLT	OD	0.8730 (22.174)	0.8740 (22.200)	0.8692 (22.078)		X		
5	BUSHING	ID	1.1870 (30.150)	1.1878 (30.170)	1.1935 (30.315)	0.0070 (0.178)	X		
	BUSHING	OD	1.1855 (30.112)	1.1865 (30.137)	1.1808 (29.992)		X		
6	BUSHING	ID	0.8745 (22.212)	0.8750 (22.225)	0.8798 (22.347)	0.0058 (0.147)	X		
	BOLT	OD	0.8730 (22.174)	0.8740 (22.200)	0.8692 (22.078)		X		
7	BUSHING	ID	1.1870 (30.150)	1.1878 (30.170)	1.1935 (30.315)	0.0070 (0.178)	X		
	BUSHING	OD	1.1855 (30.112)	1.1865 (30.137)	1.1808 (29.992)		X		
8	BEARING	ID	0.8745 (22.212)	0.8753 (22.233)	0.8798 (22.347)	0.0058 (0.147)	X		
	BOLT	OD	0.8730 (22.174)	0.8740 (22.200)	0.8695 (22.085)		X		
9	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4957 (12.591)		X		
10	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4955 (12.586)		X		

Inboard Aileron Wear Limits  
Figure 601 (Sheet 2)

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OUTBOARD AILERON – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is used to remove the outboard aileron and the second is used to install it.
- B. Refer to AMM 27-11-02/601 for the applicable wear limit data.

TASK 27-11-02-024-001

2. Remove The Outboard Aileron

A. Equipment

- (1) Aileron Sling – A27015-16 (Part of Aileron Sling Equipment, A27015-1)
  - (a) Loadpositioner – commercially available

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 27-51-00/201, Trailing Edge Flap System

C. Access

(1) Location Zones

- 561 Rear Spar to Trailing Edge (Left)
- 661 Rear Spar to Trailing Edge (Right)

(2) Access Panels

- 561/661CB Wing TE Structure, Aileron Controls
- 561/661RBX Wing TE Structure, Aileron Lockout Mechanism
- 561/661MB Outboard Aileron Actuators
- 561/661NB Wing TE Structure, Outboard Aileron Installation
- 561/661PB Wing TE Structure, Outboard Aileron Installation
- 561/661QB Wing TE Structure, Outboard Aileron Installation

D. Prepare for Removal

S 864-002

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

S 864-003

- (2) Extend the trailing edge flaps.

S 044-004

- (3) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 864-005

- (4) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure that the amber switch-position legend lights come ON.

S 864-011

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H15, FLT CONT SHUTOFF WING L

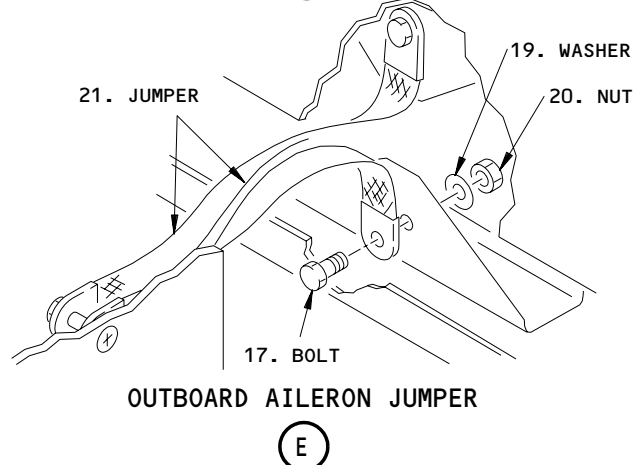
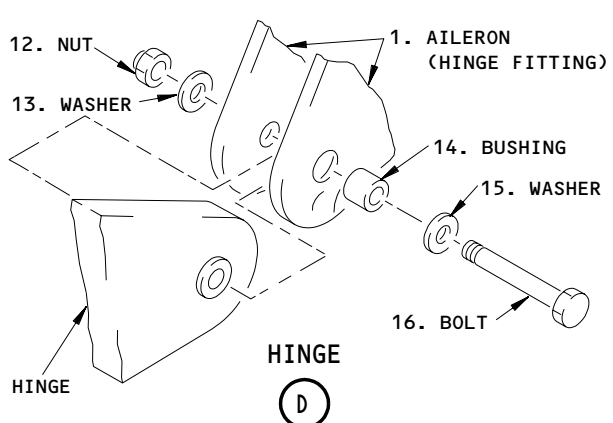
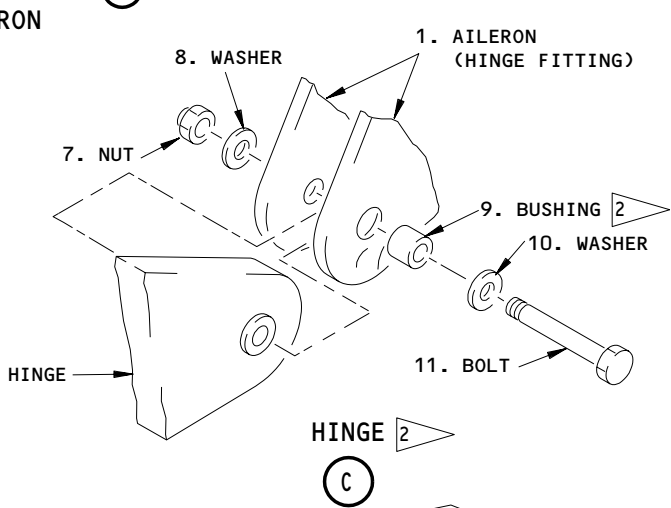
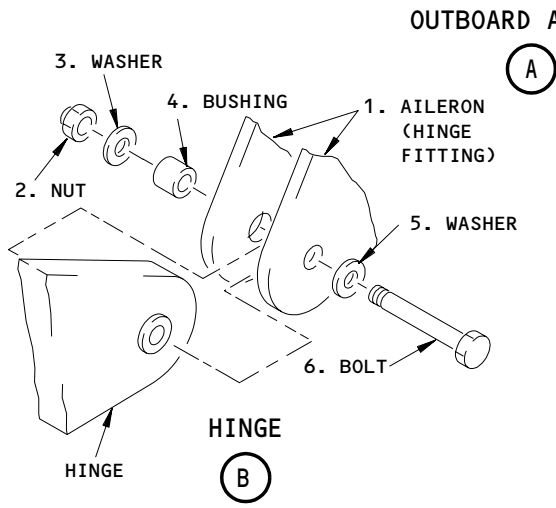
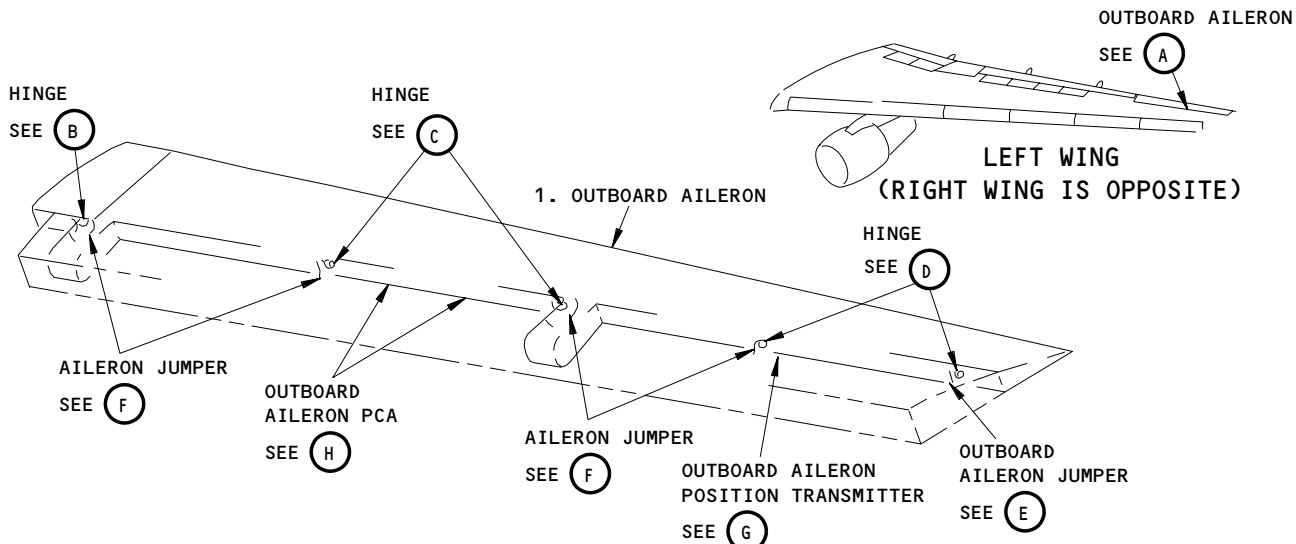
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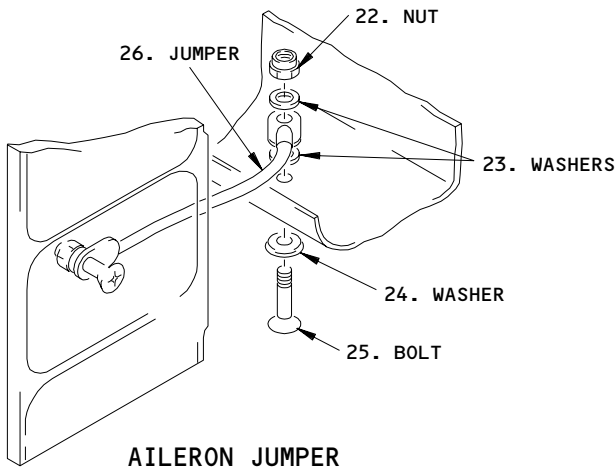
2 BUSHING IS INSTALLED ADJACENT TO THE BOLT HEAD  
BOLT HEAD IS INSTALLED IN THE OUTBOARD DIRECTION AT HINGE 3  
BOLT HEAD IS INSTALLED IN THE INBOARD DIRECTION AT HINGE 4

Outboard Aileron Installation  
Figure 401 (Sheet 1)

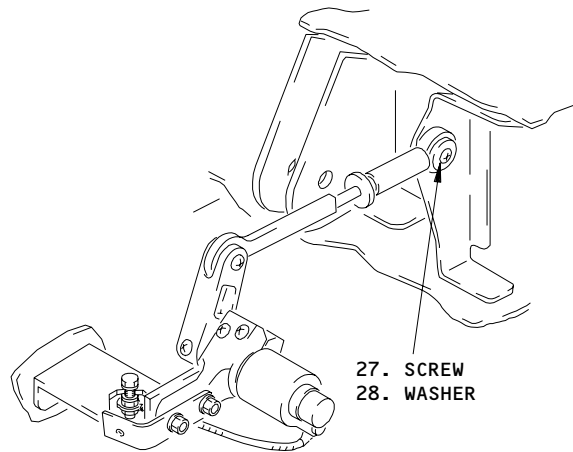
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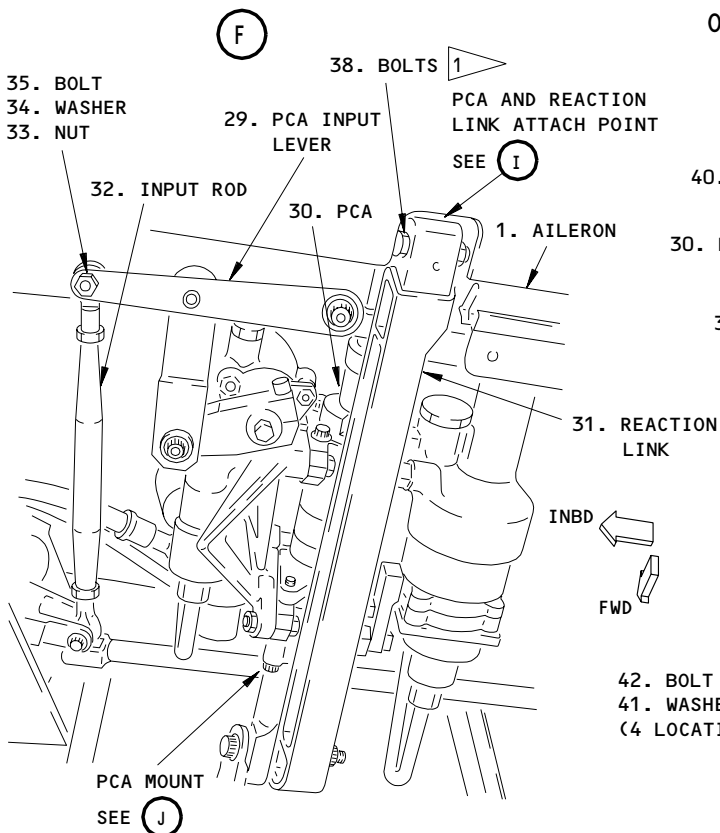
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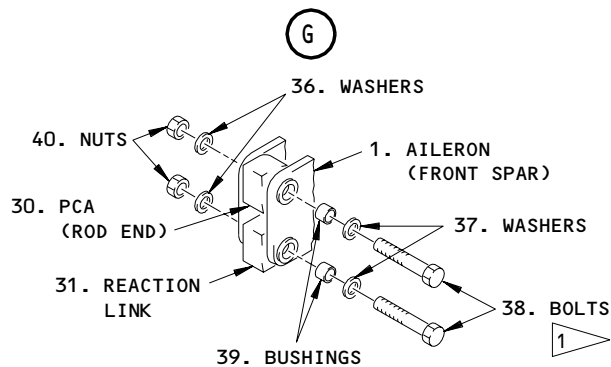
**AILERON JUMPER**



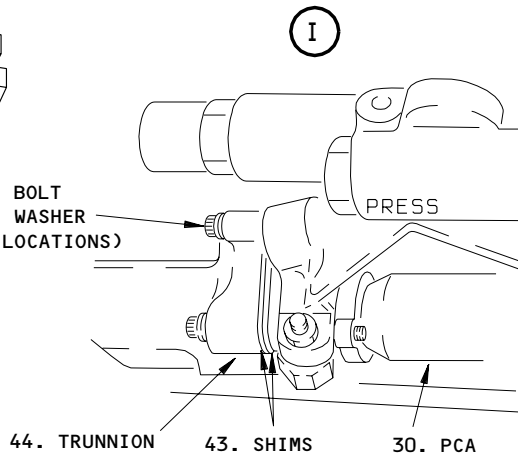
**OUTBOARD AILERON POSITION TRANSMITTER**



**OUTBOARD AILERON PCA  
(2 LOCATIONS ON EACH AILERON)**



**PCA AND REACTION  
LINK ATTACH POINT**



**PCA MOUNT**

1 INSTALL MOUNTING BOLTS WITH THE BOLTHEADS INBOARD AND THE NUTS OUTBOARD.

**Outboard Aileron Installation  
Figure 401 (Sheet 2)**

EFFECTIVITY

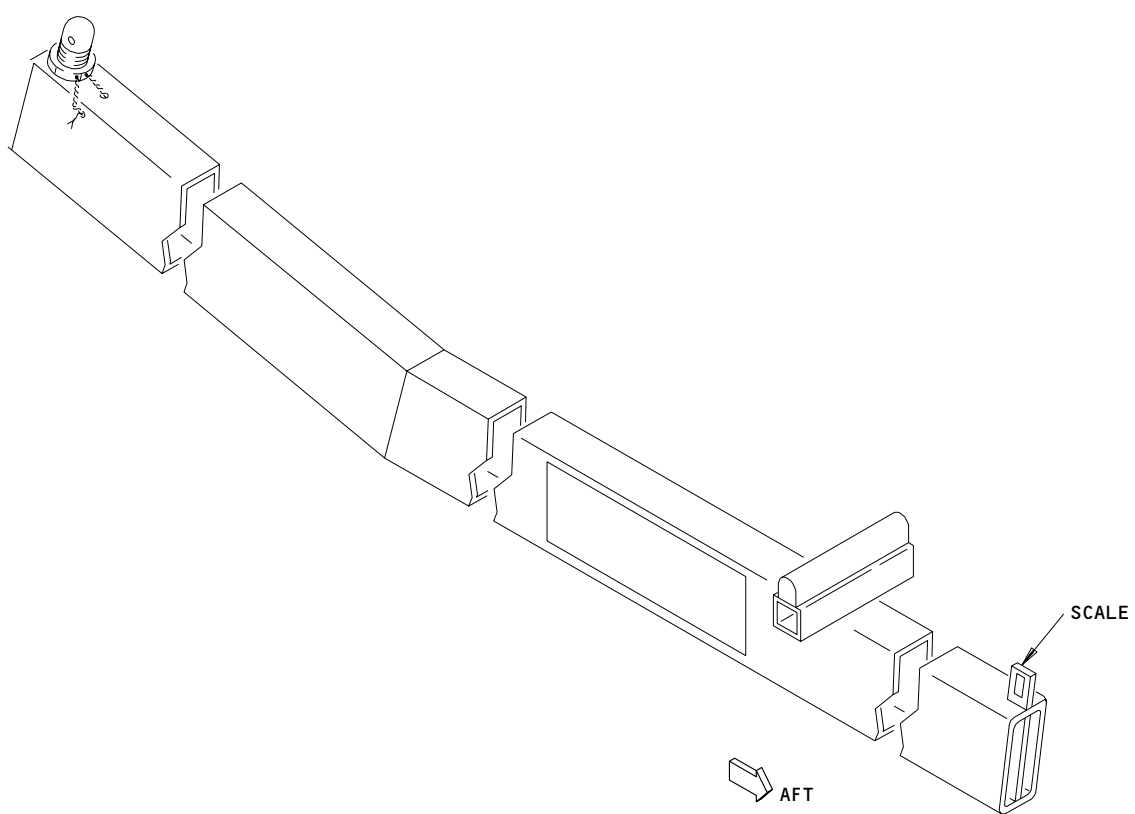
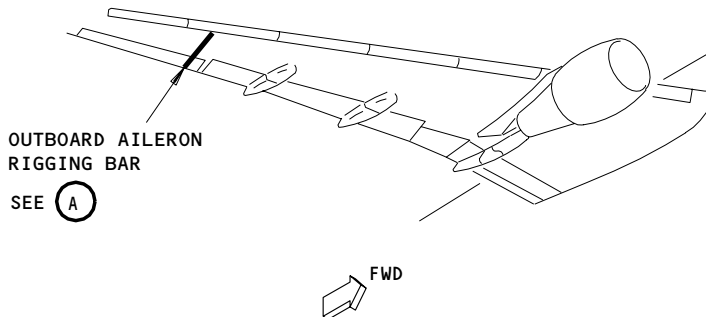
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OUTBOARD AILERON RIGGING BAR

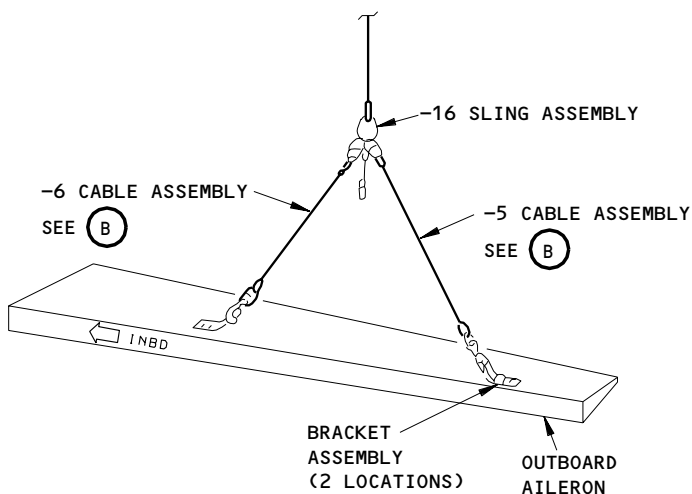
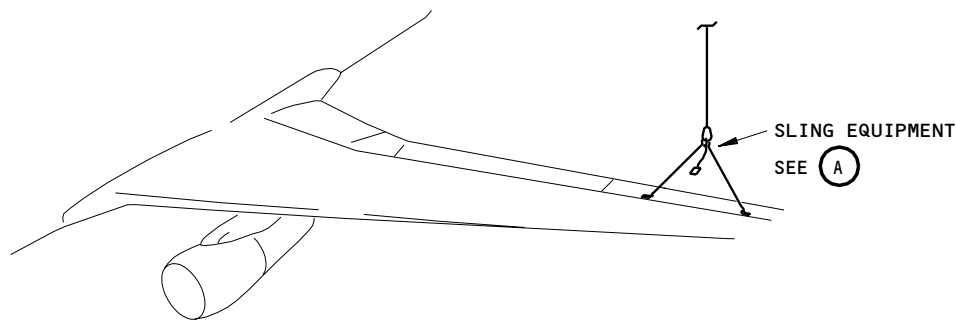
(A)

Outboard Aileron Rigging Bar Installation  
Figure 402

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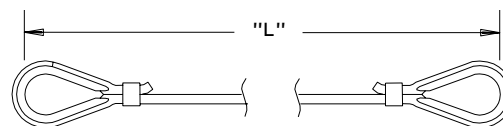
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SLING EQUIPMENT

(A)



-5, -6 CABLE ASSEMBLY

CABLE ASSEMBLY	"L" ±0.25 INCH (±6.35 mm)
-5	60.0 INCHES (1524 mm)
-6	69.9 INCHES (1775 mm)

(B)

Outboard Aileron Sling Equipment Installation  
Figure 403

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- (b) 11H16, FLT CONT SHUTOFF WING CENTER
- (c) 11H26, FLT CONT SHUTOFF WING R
- (d) 11K14, AILERON POS L
- (e) 11K23, AILERON POS R

S 014-006

- (6) Open access panels 561LB, 561RBX, 561MB, 561NB, 561PB, and 561QB (left aileron) or 661LB, 661RBX, 661MB, 661NB, 661PB, and 661QB (right aileron) (AMM 06-44-00/201).

E. Remove the Outboard Aileron

S 494-007

- (1) Use a hoist to attach the sling to the aileron (1) (Fig. 403).

**NOTE:** If you use a loadpositioner, the movement of the aileron can be made easier.

S 034-008

- (2) Disconnect the PCA rod ends (30) and the reaction links (31) from the aileron front spar (1). Turn the reaction links and PCAs down, away from the aileron.

S 034-009

- (3) Disconnect the position transmitter from the aileron front spar.

S 034-010

- (4) Do these steps to disconnect the aileron jumpers:
  - (a) Disconnect the jumpers (26) from the aileron at the four inboard hinges.
  - (b) Disconnect the jumpers (21) from the brackets that are located at the outboard end of the aileron.

S 034-012

- (5) Remove the bolts (6, 11, and 16) from the five aileron hinges.

S 024-013

- (6) Remove the aileron.

**NOTE:** To make sure that the operational balance moment is correct, keep a record of all the repairs and painting that is done. The ailerons will shake during flight if the operational balance moment is not correct. Refer to the Structural Repair Manual (SRM 51-60-00) for the operational balance moment data.

TASK 27-11-02-424-014

3. Install The Outboard Aileron

A. Equipment

- (1) Control Wheel Straightedge - A27020-1

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- (2) Aileron Sling - A27015-16 (Part of Aileron Sling Equipment, A27015-1)
    - (a) Loadpositioner - commercially available
  - (3) Outboard Aileron Rigging Bar - A27024-31 (recommended); -29 (optional)
  - (4) Bonding Meter - Avtron Model T477H, Avtron Manufacturing Inc., Cleveland, Ohio
- B. Consumable Materials**
- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
  - (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)
  - (3) D00130 Primer - BMS 10-79, Type II, Class A
  - (4) C00033 Enamel - BMS 10-60, Type II
- C. Parts**
- (1) Refer to the IPC for part numbers and effectivities of the items in the tables that follow:

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Outboard Aileron	27-11-02	05	95,96, 100,101
			27-11-02	06	115,120, 125,130

- D. References**
- (1) AMM 06-44-00/201, Wing Access Doors and Panels
  - (2) AMM 24-22-00/201, Electrical Power - Control
  - (3) AMM 27-11-00/501, Aileron and Aileron Trim Control System
  - (4) AMM 27-51-00/201, Trailing Edge Flap System
  - (5) AMM 29-11-00/201, Pressurize/Depressurize Main Hydraulic System
- E. Access**
- (1) Location Zones
    - 561 Rear Spar to Trailing Edge (Left)
    - 661 Rear Spar to Trailing Edge (Right)

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- (2) Access Panels
  - 561/661CB Wing TE Structure, Aileron Controls
  - 561/661RBX Wing TE Structure, Aileron Lockout Mechanism
  - 561/661MB Outboard Aileron Actuators
  - 561/661NB Wing TE Structure, Outboard Aileron Installation
  - 561/661PB Wing TE Structure, Outboard Aileron Installation
  - 561/661QB Wing TE Structure, Outboard Aileron Installation

F. Install the Outboard Aileron

S 644-015

- (1) Apply a thin layer of grease to the five hinge bolts (6, 11, 16) and the hinges before they are installed.

S 824-016

- (2) Use a hoist to move the aileron (1) into position (Fig. 403).

NOTE: If you use a loadpositioner, the movement of the aileron can be made easier.

S 434-017

- (3) Do these steps to connect the center hinge of the aileron to the wing:
  - (a) Install the bolt (11), washers (8 and 10), bushing (9), and the nut (7).

S 434-018

- (4) Do these steps to connect the two hinges that are located on each side of the center hinge:
  - (a) Install the bolt (11), washers (8 and 10), bushing (9), and the nut (7).
  - (b) Install the bolt (16), washers (13 and 5), bushing (14), and the nut (12).

S 434-019

- (5) Do these steps to connect the aileron to the two outboard hinges:
  - (a) Install the bolt (16), washers (13 and 15), bushings (14), and the nut (12).

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- (b) Install the bolt (6), washers (3 and 5), bushing (4), and the nut (2).

S 434-020

- (6) Do these steps to connect the jumpers (21) to the brackets that are located at the outboard end of the aileron:
  - (a) Clean the brackets to get good electrical conductivity.
  - (b) Install the bolts (17), washers (19), and nuts (20) that connect the jumpers to the brackets.
  - (c) Apply primer, and then enamel to the fasteners, jumper terminals, and brackets.
  - (d) Use a bonding meter to make sure that the resistance between the aileron and the airplane structure is less than 0.002 ohm.

S 434-021

- (7) Do these steps to connect the jumpers (26) that are located near the four inboard hinges:
  - (a) Make the aileron surface (1) under the washer rough and clean.
  - (b) Install the bolts (25), washers (24 and 23), and nuts (22) that connect the jumpers.
  - (c) Apply primer, and then enamel to the fasteners, jumper terminals, and the aileron surface.
  - (d) Use a bonding meter to make sure that the resistance between the aileron and the airplane structure is less than 0.002 ohm.

S 094-025

- (8) Remove the aileron sling.

S 214-024

- (9) Manually move the aileron (1) through its full travel and do the check that follows:
  - (a) Make sure that the aileron moves freely and does not need too much force.

S 214-023

- (10) Make sure that the control wheels are in their neutral position.

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S 494-022

- (11) Install the control wheel straight edge.

S 214-026

- (12) Make sure that the actuator piston rods are fully retracted.

S 434-027

- (13) Do these steps to install the PCAs (30) to the aileron (1):
- (a) Apply a thin layer of grease to the bolts, washers, screws, bushings, and nuts before they are installed.
  - (b) Apply a layer of grease to the aileron PCA rod ends and PCA reaction link bearings before they are installed.
  - (c) Attach the reaction links (31) to the aileron front spar (1).
  - (d) Install the bolt (38), washer (37), bushing (39), washer (36) and the nut (40).
  - (e) Install the bolt (38) and washer (37) that connect the outboard PCA rod end (30) to the aileron front spar. Make sure that they can be freely installed and do not need too much force.

**NOTE:** Move the aileron control rods and then move the aileron up and down to make the bolt (38) fit.

- (f) Install the bushing (39), washer (36), and the nut (40).
- (g) Move the inboard PCA rod end (30) up to the aileron front spar (1) and do these steps to install it:
  - 1) Manually move the aileron up and then down until the bolt (38) and washer (37) can be easily installed.
  - 2) Install the bushing (39), washer (36), and the nut (40) and tighten to 660-980 pound-inches (74.6nm-110.7nm).

S 434-028

- (14) Connect the position transmitter to the aileron.

S 824-029

- (15) Adjust the PCAs to outboard aileron (AMM 27-11-00/501).

**NOTE:** This step is not necessary if no changes are made to the adjustable rods, actuator.

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S 864-030

**WARNING:** TO PREVENT INJURY OR DAMAGE, MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE CONTROL SURFACES BEFORE HYDRAULIC POWER IS SUPPLIED. STAY AWAY FROM THE AREA DURING THEIR OPERATION.

(16) Supply hydraulic power (AMM 29-11-00/201).

S 864-039

(17) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

- (a) 11H15, FLT CONT SHUTOFF WING L
- (b) 11H16, FLT CONT SHUTOFF WING CENTER
- (c) 11H26, FLT CONT SHUTOFF WING R

S 864-031

(18) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the P61 panel to ON.

S 094-032

(19) Remove the straight edge from the control wheel.

S 824-033

(20) Do these steps to adjust the aileron position transmitter:

**NOTE:** This step is not necessary if no changes are made to the adjustable rods, actuator.

- (a) Install the aileron rigging bar against the lower wing surface. Position the bar approximately 1.0 inch (25.4mm) outboard from and parallel to the inboard edge of the outboard aileron (Fig. 402).
- (b) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - 1) 11K14, AILERON POS L

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- 2) 11K23, AILERON POS R
- (c) Make sure that these circuit breakers on the P11 panel are closed:
  - 1) 11L9, LEFT ENGINE OIL PRESS or LEFT ENGINE OIL PRESS EICAS REF
  - 2) 11L36, RIGHT ENGINE OIL PRESS or RIGHT ENGINE OIL PRESS EICAS REF
- (d) Push the STATUS button on the display select panel, P9, to show the control-surface position.
- (e) Hold the bottom trailing edge of the aileron (1)  $0.87 \pm 0.05$  inch (22.1mm +/-1.27mm) below the wing trailing edge. Use the rigging bar to find the correct distance.
- (f) Adjust the position transmitter control rod until the position pointer is aligned with the mid-scale mark.
- (g) Tighten the control-rod locknut. Install the lockwire.
- (h) Remove the outboard aileron rigging bar.

S 714-041

- (21) Do the operational test for the aileron and aileron trim (AMM 27-11-00/501).

G. Put the Airplane Back to its Usual Condition

S 444-035

- (1) Do the activation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 864-034

- (2) Retract the trailing edge flaps.

S 864-036

- (3) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-037

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

S 414-038

- (5) Close the access panels you removed (AMM 06-44-00/201).

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OUTBOARD AILERON - INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Outboard Aileron - Removal/Installation for procedures to do these tasks.

TASK 27-11-02-206-002

2. Outboard Aileron - Wear Limits

A. Access

- (1) Location Zone  
567/667 Outboard Aileron

B. Procedure

S 226-001

- (1) Use the supplied data (Fig. 601) to examine the outboard ailerons for too much wear.

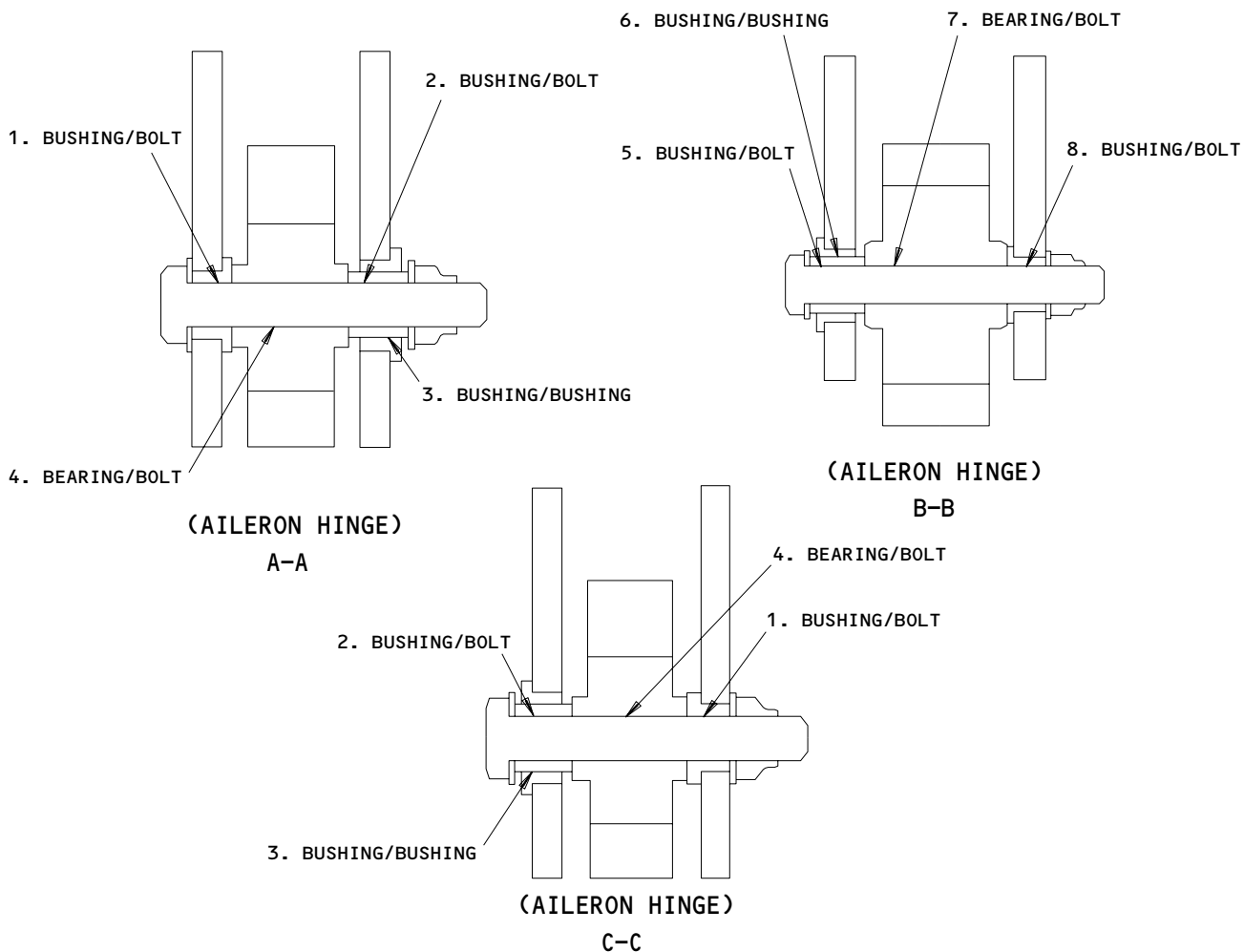
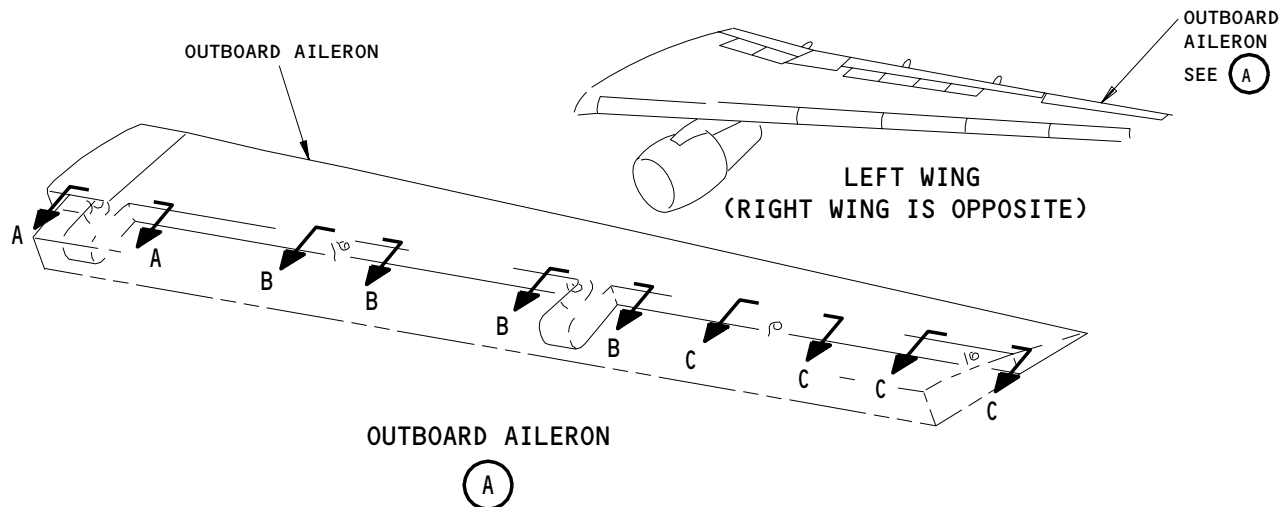
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Outboard Aileron Wear Limits  
Figure 601 (Sheet 1)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2545 (6.464)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2455 (6.236)		X		
2	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2545 (6.464)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2455 (6.236)		X		
3	BUSHING	ID	0.3750 (9.525)	0.3756 (9.540)	0.3795 (9.639)	0.0050 (0.127)	X		
	BUSHING	OD	0.3740 (9.500)	0.3745 (9.512)	0.3706 (9.413)		X		
4	BEARING	ID	0.2495 (6.337)	0.2500 (6.350)	0.2545 (6.464)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2495 (6.337)		X		
5	BUSHING	ID	0.3125 (7.938)	0.3130 (7.950)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3080 (7.823)		X		
6	BUSHING	ID	0.4375 (11.113)	0.4382 (11.130)	0.4420 (11.227)	0.0050 (0.127)	X		
	BUSHING	OD	0.4365 (11.087)	0.4370 (11.100)	0.4332 (11.003)		X		
7	BEARING	ID	0.3120 (7.925)	0.3125 (7.938)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3075 (7.811)		X		
8	BUSHING	ID	0.3125 (7.938)	0.3131 (7.953)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3081 (7.826)		X		

Outboard Aileron Wear Limits  
 Figure 601 (Sheet 2)

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AILERON DRUM ASSEMBLIES – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task supplies the data that is necessary to remove the captain's (or the first officer's) drum assembly. The second task contains the data that is necessary to install them.

TASK 27-11-03-024-001

2. Aileron Drum Assemblies – Removal

A. Equipment

- (1) Rig Pins from Kit A20004-XX (AMM 20-10-24/201):  
(a) A10 – P/N A20004-17  
(b) A12 – P/N A20004-21

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, Sidewall Panels  
(4) AMM 27-61-04/401, Spoiler RVDT Unit  
(5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(6) AMM 31-35-11/401, Aileron Control Force Transducer  
(7) AMM 32-00-15/201, Landing Gear Door Locks  
(8) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

- (1) Location Zones  
211/212 Control Cabin

D. Prepare for Removal

S 864-013

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

S 864-010

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 214-014

- (3) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

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S 494-011

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 864-015

- (5) Move the control wheels to their neutral positions.

S 494-016

- (6) Install rig pin A3 (for the feel, centering, and trim mechanism).

S 864-017

- (7) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

S 864-018

- (8) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R
  - (d) 11K15, AILERON TRIM

S 494-019

- (9) Install these rig pins for the first officer's drum assembly:
- (a) A10 (for the aileron control override mechanism)
  - (b) A12 (for the right aileron control output quadrant)

E. Remove the Drum Assemblies (Fig. 401)

S 824-020

- (1) Release the tension in these body cables at their turnbuckles:

**NOTE:** The turnbuckles for body cables A1A and A1B are located behind a sidewall panel opposite the third panel aft of the forward cargo door. The turnbuckles for body cables A2A and A2B are located behind the third sidewall panel aft of the forward cargo door. Refer to AMM 25-52-01/401 for the sidewall panel removal procedure.

- (a) A1A and A1B for the captain's drum assembly
- (b) A2A and A2B for the first officer's drum assembly.

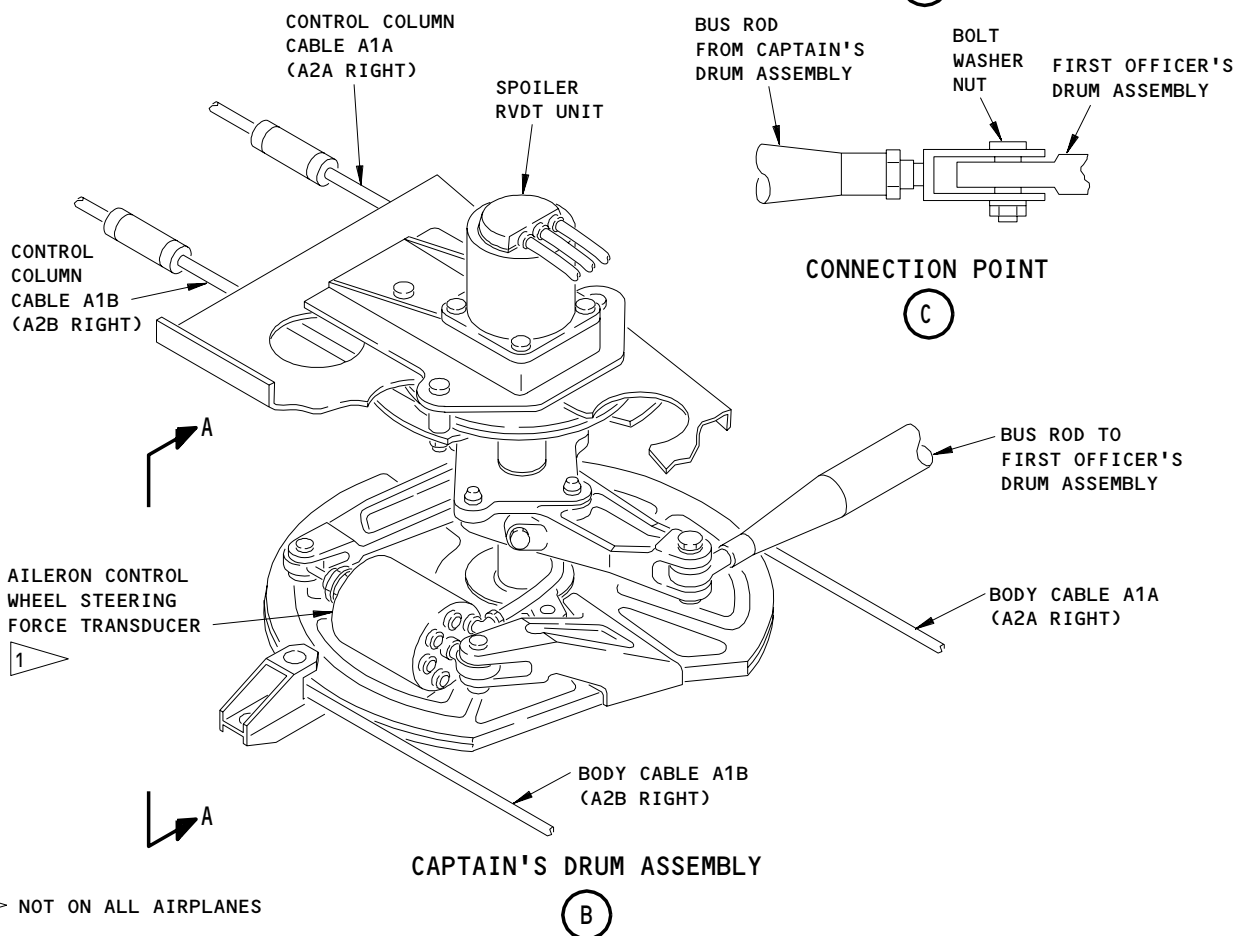
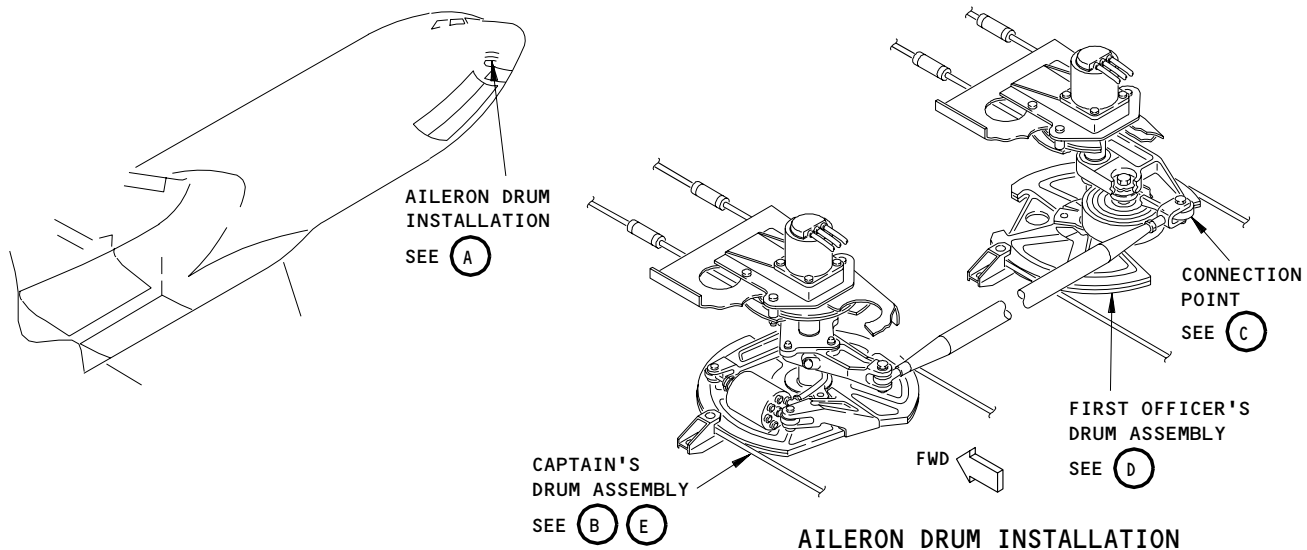
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Aileron Drum Assembly Installation  
Figure 401 (Sheet 1)

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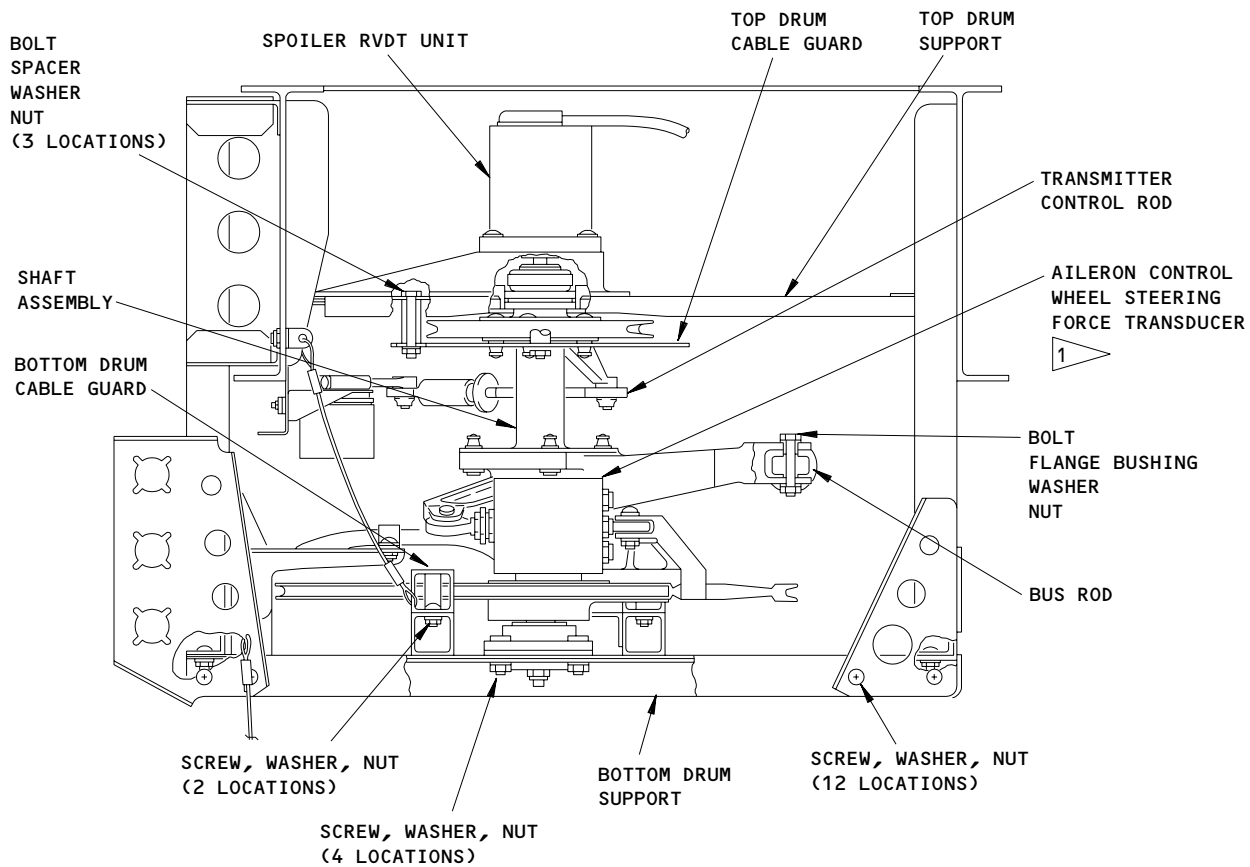
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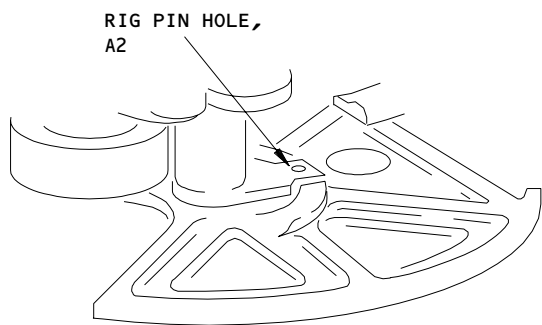
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# BOEING

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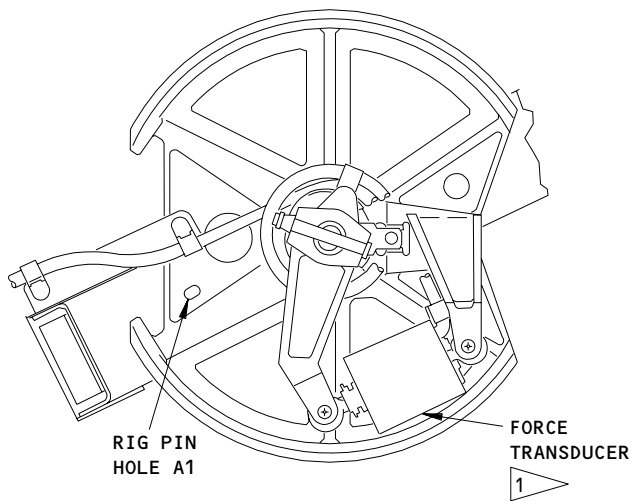


A-A



FIRST OFFICER'S DRUM ASSEMBLY

(D)



CAPTAIN'S DRUM ASSEMBLY

(E)

Aileron Drum Assembly Installation  
Figure 401 (Sheet 2)

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	ALL

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S 034-021

- (2) Disconnect these components from the drum assembly:

NOTE: Get access to the drum assemblies through the access panels that are aft of the captain's or first officer's chair. For more access, use the crawl spaces that are beside the wheel well for the nose gear (AMM 06-41-00/201).

- (a) the bus rod
- (b) the body cables and tag them for identification.

S 824-022

- (3) Release the tension in the control wheel cables at the turnbuckles.

NOTE: The turnbuckles for the control wheel cables are located forward of the drum assemblies.

S 864-023

- (4) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:

- (a) 11C6, FLT CONT ELEC 1L AC
- (b) 11C7, FLT CONT ELEC 1L DC
- (c) 11C8, FLT CONT ELEC 2L AC
- (d) 11C9, FLT CONT ELEC 2L DC
- (e) 11G17, FLT CONT ELEC 1R AC
- (f) 11G18, FLT CONT ELEC 1R DC
- (g) 11G26, FLT CONT ELEC 2R AC
- (h) 11G27, FLT CONT ELEC 2R DC

S 034-024

- (5) Remove the spoiler RVDT unit from the drum assembly (AMM 27-61-04/401).

S 034-091

- (6) If installed on the airplane, remove the control wheel steering force transducer (AMM 31-35-11/401).

NOTE: The force transducer is installed on the captain's drum assembly.

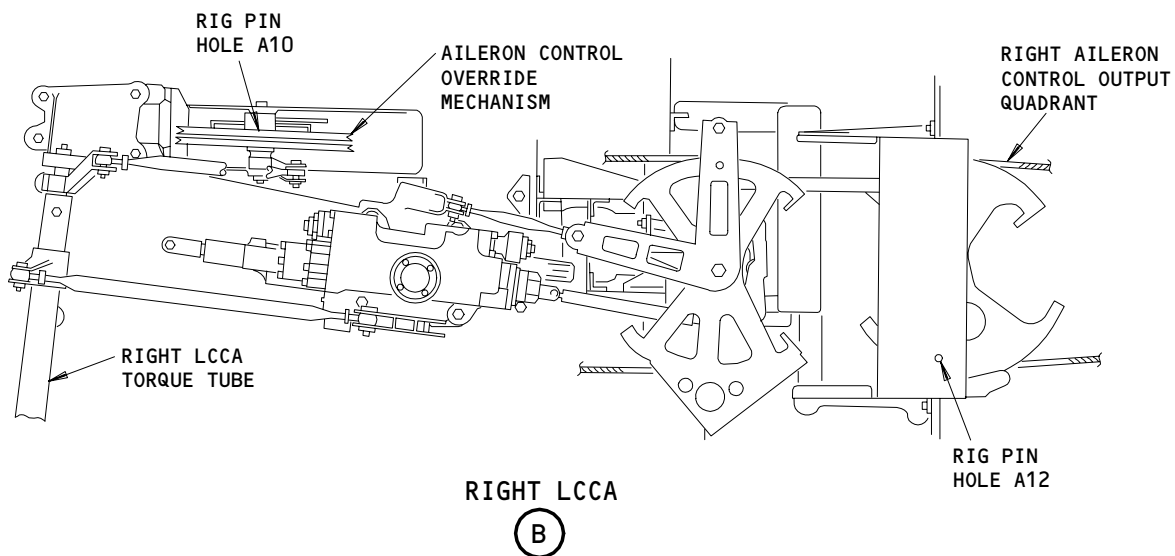
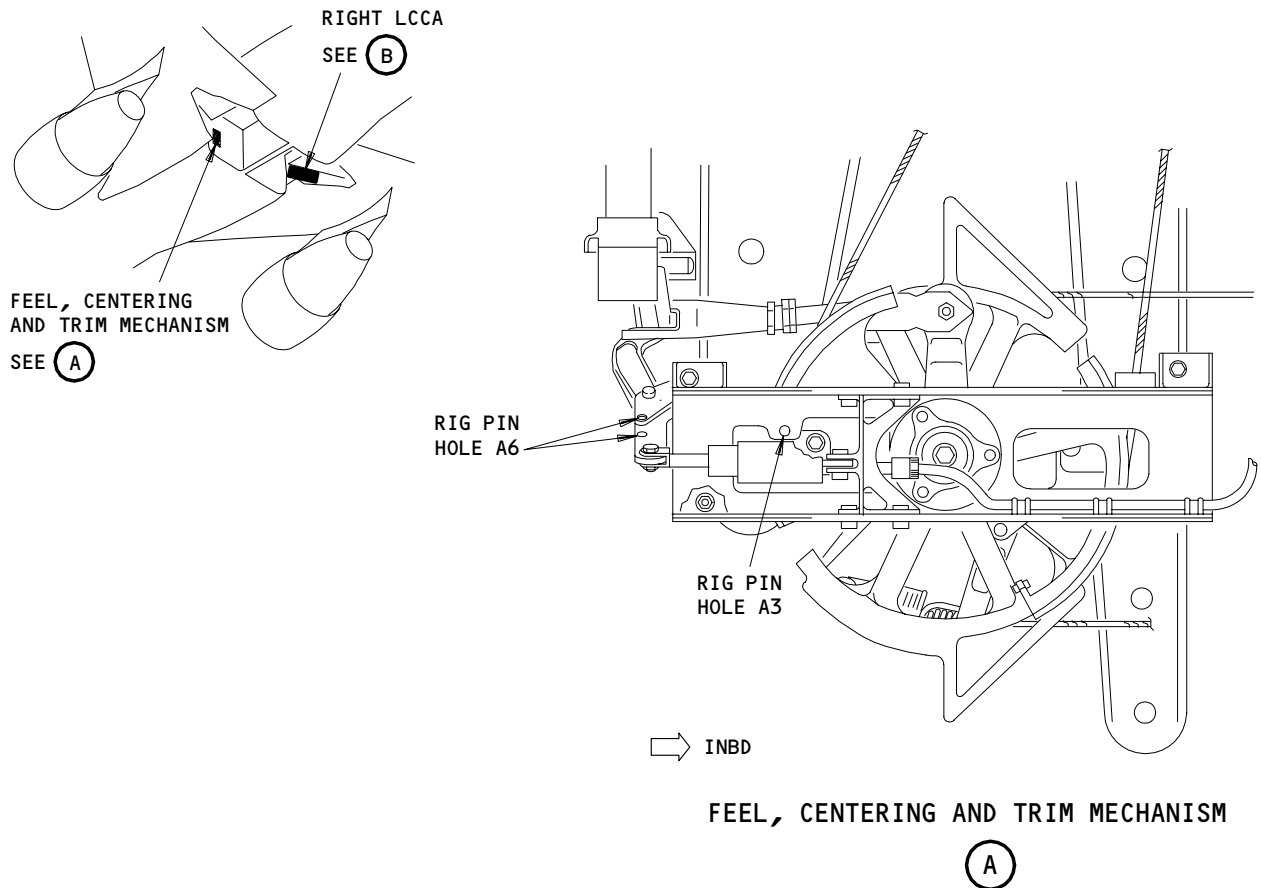
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Rig Pin Locations  
Figure 402

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- S 034-004
- (7) Disconnect the transmitter control rod from the captain's drum assembly.
- S 034-027
- (8) Remove these components:
- (a) the bolts that connect the top drum cable guard to the top drum support (3 locations)
  - (b) the control wheel cables and tag them for identification
  - (c) the bottom drum cable guard (4 screws).
- S 034-028
- (9) Hold the drum assembly, and remove the bottom drum support from the structure (12 screws).
- S 024-029
- (10) Disengage the drum assembly from the top drum support and remove it.
- S 034-030
- (11) Remove these components from the drum assembly:
- (a) the bottom drum support (4 screws)
  - (b) the top drum cable guard.

TASK 27-11-03-424-031

3. Aileron Drum Assemblies - Installation

NOTE: Refer to AMM 27-11-03/601 for the applicable wear limit data.

A. General

- (1) Before this procedure is done, make sure the airplane temperature is stable (use a tolerance of  $\pm 5^{\circ}\text{F}$ ) along the cable. Make sure the temperature has been stable for at least one hour.

B. Equipment

- (1) Control Wheel Straightedge - A27020-1
- (2) Rig Pins from Kit A20004-78 (AMM 20-10-24/201):
- (a) A1 - P/N A20004-15
  - (b) A2 - P/N A20004-17
  - (c) A3 - P/N A20004-22
  - (d) A6 - P/N A20004-22
  - (e) A10 - P/N A20004-17
  - (f) A12 - P/N A20004-21

- (3) Cable Tensiometer, Commercially Available

C. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

D. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-11-03/601, Aileron Drum Assembly

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- (4) AMM 27-61-00/501, Spoiler/Speedbrake Control System
- (5) AMM 27-61-04/401, Spoiler RVDT Unit
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) AMM 31-31-00/501, Flight Data Recorder System
- (8) AMM 31-35-11/401, Aileron Control Force Transducer
- (9) AMM 32-00-15/201, Landing Gear Door Locks

E. Access

- (1) Location Zones  
211/212 Control Cabin

F. Install the Drum Assemblies (Fig. 401)

S 434-032

- (1) Attach these components to the drum assembly:
  - (a) the bottom drum support (4 screws)
  - (b) the top drum cable guard.

S 434-033

- (2) Put the control wheel cable around the top cable drum.

S 434-034

- (3) Engage the drum assembly in the top drum support and attach the bottom drum support to the structure (12 screws).

S 434-035

- (4) Install these components:
  - (a) the body cables on the bottom cable drum
  - (b) the bottom drum cable guard (4 screws).

S 434-006

- (5) Connect the transmitter control rod to the captains drum assembly and safety the bolt with wire.

S 434-089

- (6) If you have it removed, install the control wheel steering force transducer on the captain's drum assembly (AMM 31-35-11/401).

S 214-038

- (7) Make sure that the control drum can move freely and does not need too much force.

S 434-039

- (8) Install the spoiler RVDT unit on the drum assembly (AMM 27-61-04/401).

S 494-040

- (9) Install these rig pins:
  - (a) A1, A3, and A6 for the captain's drum assembly

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(b) A2 for the first officer's drum assembly.

NOTE: Rig pins A10 and A12 were installed in the drum removal procedure and must stay installed during the steps that follow.

S 824-041

(10) Adjust the body cable tension to the values shown in Table 1.

TABLE 1 AILERON CABLE RIGGING LOADS		
TEMP °F	CONTROL COLUMN CABLES A1A, A1B, A2A, A2B (+20/-10 LBS)	BODY CABLES A1A, A1B, A2A, A2B (+20/-10 LBS)
110	88	118
90	79	109
70	70	100
50	62	92
30	54	84
10	45	75
-10	37	67
-30	29	59
-40	23	53

S 434-042

(11) Install clip locks on the body cable turnbuckles.

S 824-043

(12) Do these steps to adjust the control wheel cables:

(a) Attach the control wheel straightedge across the bottom of the control wheels.

(b) Tighten the control wheel cable tension to the value shown in Table 1 and do the checks that follow:

1) Make sure the control wheels are aligned correctly.

NOTE: It is permitted for one surface rest to be 0.03 inch (0.76 mm)(or less) away from the straightedge.

2) Make sure rig pins A1 and A2 can move freely in their holes.

(c) Install clip locks on the turnbuckles for the control wheel cables.

S 824-044

(13) Adjust the bus rod until the rod end bolts can be easily installed. Tighten the jamnut.

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- S 434-045
- (14) Install the bus rod bolts.
- S 224-046
- (15) Make sure these rig pins can move freely in their holes, then remove them:
- (a) A1, A3, and A6 for the captain's drum assembly
  - (b) A2, A10, and A12 for the first officer's drum assembly
- S 094-047
- (16) Remove the straightedge from the control wheels.
- S 864-048
- (17) Make sure these circuit breakers on the overhead panel, P11 are closed:
- (a) 11L9, LEFT ENGINE OIL PRESS or LEFT ENGINE OIL PRESS EICAS REF
  - (b) 11L36, RIGHT ENGINE OIL PRESS or RIGHT ENGINE OIL PRESS EICAS REF
- S 864-049
- (18) Push the STATUS switch on the pilot's display select panel, P9, to show the aileron position indicator on the display.
- S 864-050
- (19) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R
  - (d) 11K15, AILERON TRIM
- S 864-051
- (20) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.
- S 214-065
- (21) Turn the control wheel to its full counterclockwise position and do these checks:
- (a) Make sure the control wheel operates smoothly and does not need to much force.
  - (b) Make sure the left ailerons move up and the right ailerons move down.
- S 214-066
- (22) Turn the control wheel to its full clockwise position and do these checks:
- (a) Make sure the control wheel operates smoothly and does not need too much force.

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- (b) Make sure the left ailerons move down and the right ailerons move up.

S 214-067

- (23) Move the control wheel to its neutral position and do this check:
  - (a) Make sure the ailerons go back to their neutral positions.

S 864-052

- (24) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G17, FLT CONT ELEC 1R AC
  - (f) 11G18, FLT CONT ELEC 1R DC
  - (g) 11G26, FLT CONT ELEC 2R AC
  - (h) 11G27, FLT CONT ELEC 2R DC

S 824-053

- (25) Adjust the spoiler RVDTs (AMM 27-61-00/501).

S 824-009

- (26) Adjust the control wheel position transmitter (AMM 31-31-00/501).
- G. Put the Airplane Back to Its Usual Condition

S 094-012

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the main landing gear and close the doors (AMM 32-00-15/201).

S 414-054

- (2) Close all the access panels that were removed (AMM 06-41-00/201).

S 864-055

- (3) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-056

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

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AILERON DRUM ASSEMBLIES INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to The Aileron Drum Assembly - Removal/Installation for procedure to do these tasks.

TASK 27-11-03-206-002

2. Aileron Drum Assembly - Wear Limits

A. Access

- (1) Location Zone  
211/212 Control Cabin

B. Procedure

S 226-001

- (1) Use the supplied data (Fig. 601) to examine the aileron drum assemblies for too much wear.

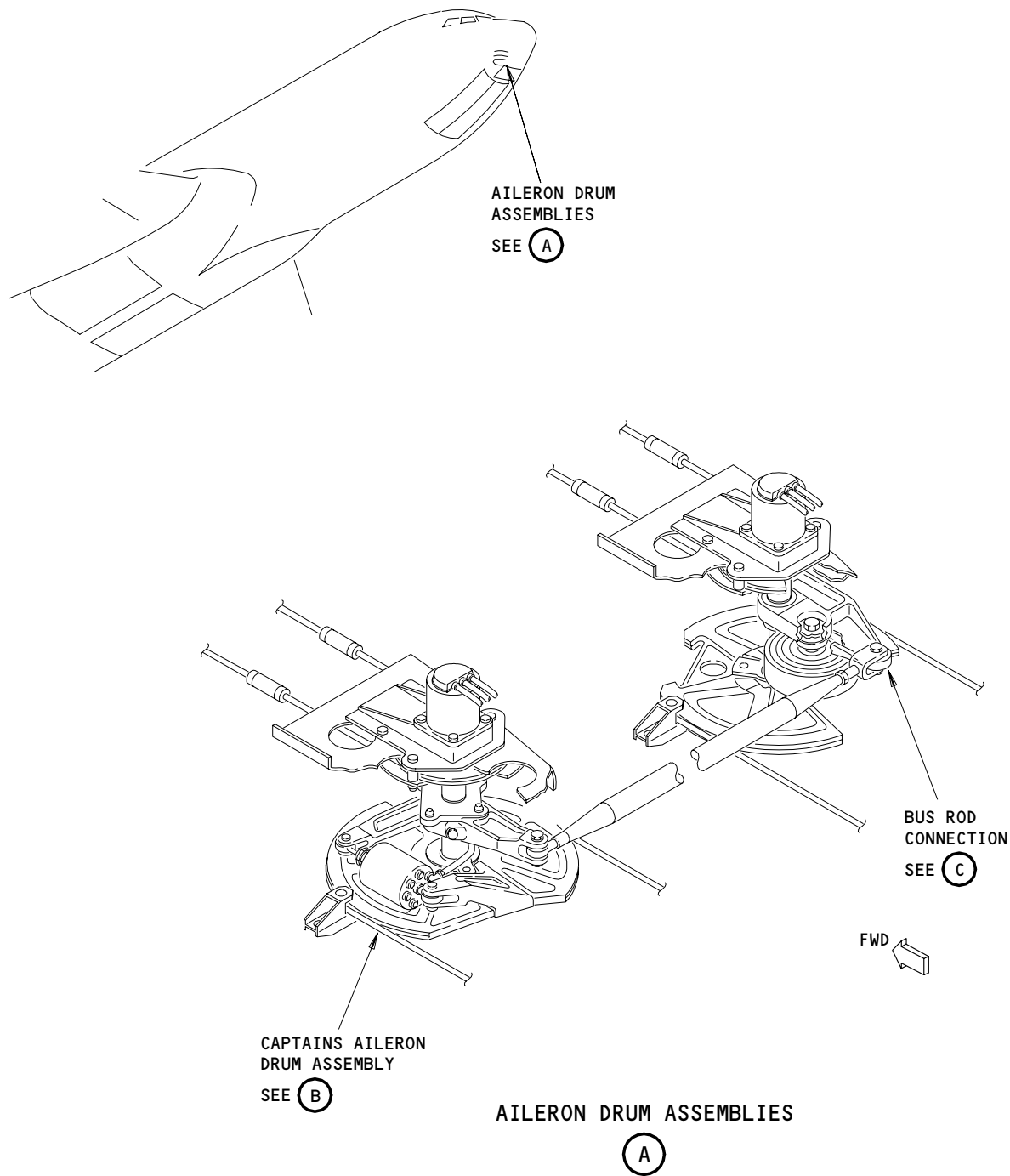
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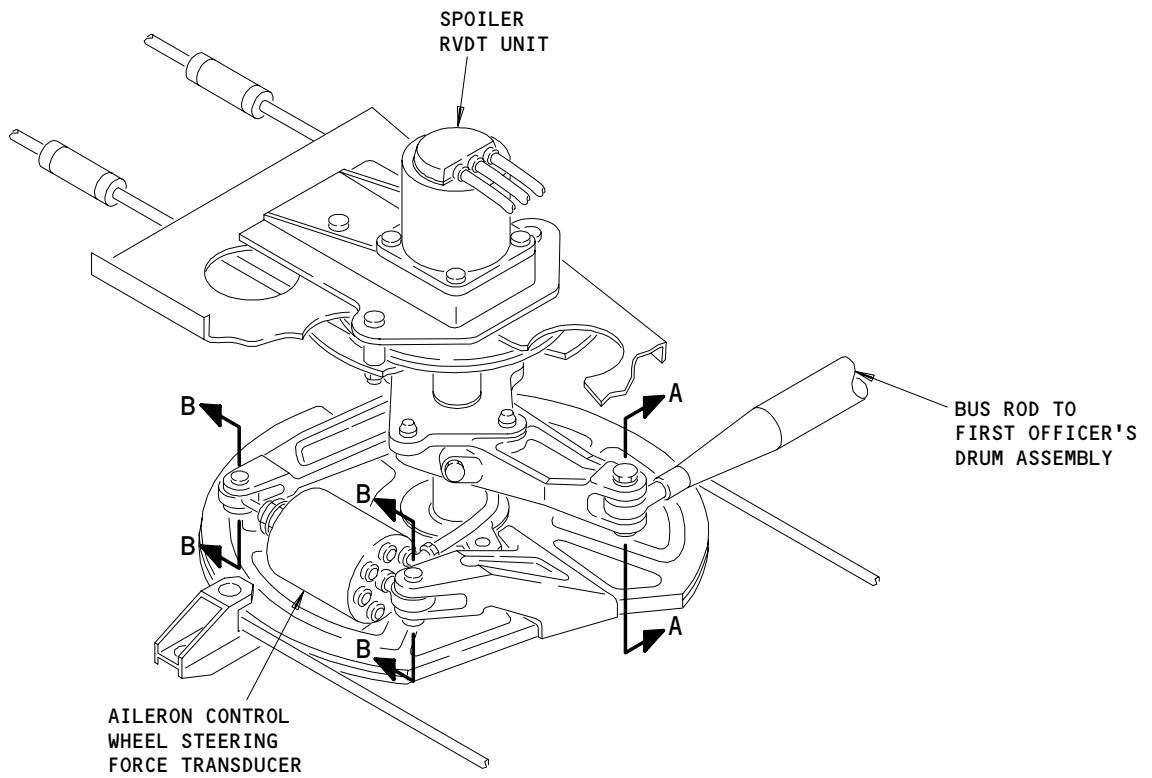
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Aileron Drum Assembly Wear Limits  
Figure 601 (Sheet 1)

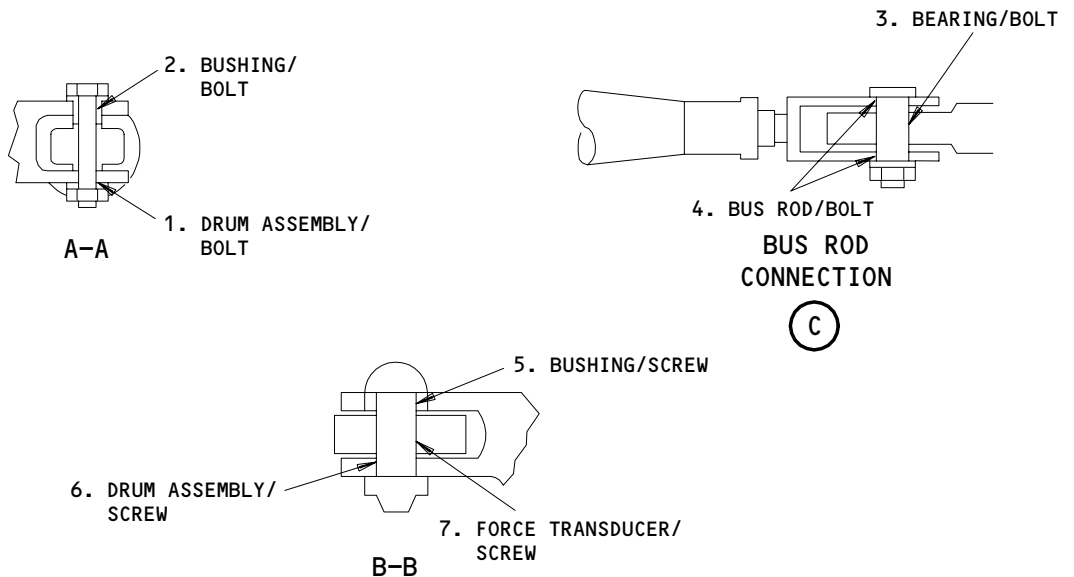
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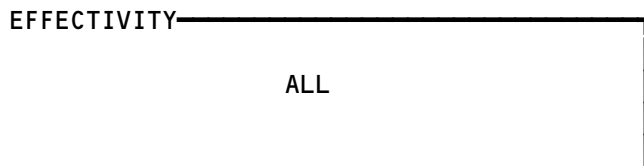


**CAPTAIN'S AILERON DRUM ASSEMBLY**

(B)



**Aileron Drum Assembly Wear Limits  
Figure 601 (Sheet 2)**



**27-11-03**



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# BOEING

## 767 MAINTENANCE MANUAL

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	DRUM ASSEMBLY	ID	0.2500 (6.350)	0.2505 (6.363)	0.2510 (6.375)	0.0030 (0.076)		X	
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2480 (6.299)		X		
2	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2510 (6.375)	0.0030 (0.076)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2480 (6.299)		X		
3	BEARING	ID	0.2495 (6.337)	0.2500 (6.350)	0.2500 (6.350)	0.0020 (0.051)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2480 (6.299)		X		
4	BUS ROD	ID	0.2500 (6.350)	0.2505 (6.363)	0.2505 (6.363)	0.0025 (0.064)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2480 (6.299)		X		
5	BUSHING	ID	0.1900 (4.826)	0.1915 (4.864)	0.1917 (4.869)	0.0050 (0.127)	X		
	SCREW	OD	0.1870 (4.750)	0.1895 (4.813)	0.1867 (4.742)		X		
6	DRUM ASSEMBLY	ID	0.1900 (4.826)	0.1920 (4.877)	0.1925 (4.890)	0.0055 (0.140)		X	
	SCREW	OD	0.1870 (4.750)	0.1895 (4.813)	0.1870 (4.750)		X		
7	FORCE TRANSDUCER	ID	0.1895 (4.813)	0.1900 (4.826)	0.1905 (4.839)	0.0040 (0.102)	X		
	SCREW	OD	0.1870 (4.750)	0.1895 (4.813)	0.1865 (4.737)		X		

 THIS PART CAN BE REPAIRED.

Aileron Drum Assembly Wear Limits  
Figure 601 (Sheet 3)

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AILERON CONTROL WHEEL AND BEARINGS - REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task supplies the data that is necessary to remove the aileron central wheel and its bearings. The second task supplies the data that is necessary to install the aileron control wheel and its bearings.
- B. This procedure is applicable to a control wheel that has a stabilizer trim switch, an autopilot disengage switch, and an interphone/microphone switch.

TASK 27-11-06-024-001

2. Aileron Control Wheel and Bearings - Removal

A. Equipment

- (1) Wire Extraction Tool - Deutsch part number M15570-20 optional to M83723-31-20  
Deutsch Company  
700-T Hathaway St.  
Banning, CA

B. References

- (1) 24-22-00/201, Electrical Power - Control

C. Access

- (1) Location Zones  
211/212 Control Cabin

D. Prepare for the Removal

S 864-007

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

S 864-008

- (2) Move the FLT CONTROL SHUTOFF WING and TAIL switches L, C, and R on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

S 864-009

- (3) Open these circuit breakers on overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11C25, INTERPHONE CAPT SUP-NUM FLT AMPL DUAL PWR
  - (b) 11C26, INTERPHONE F/O OBS DUAL PWR

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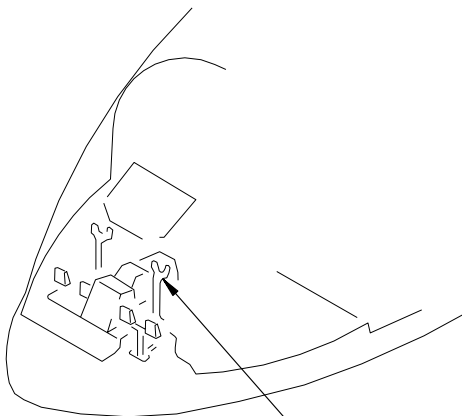
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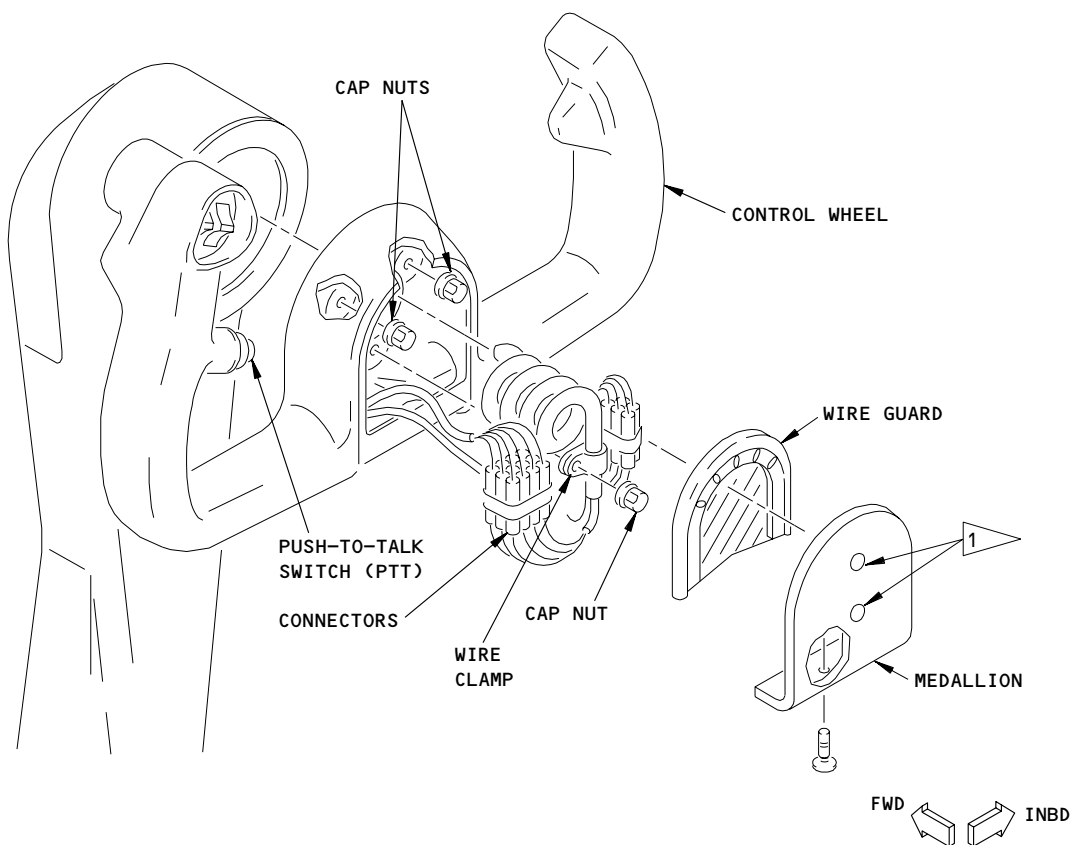
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CONTROL COLUMN

SEE (A)



CONTROL COLUMN

(A)

1 THE CHART HOLDER IS NOT SHOWN

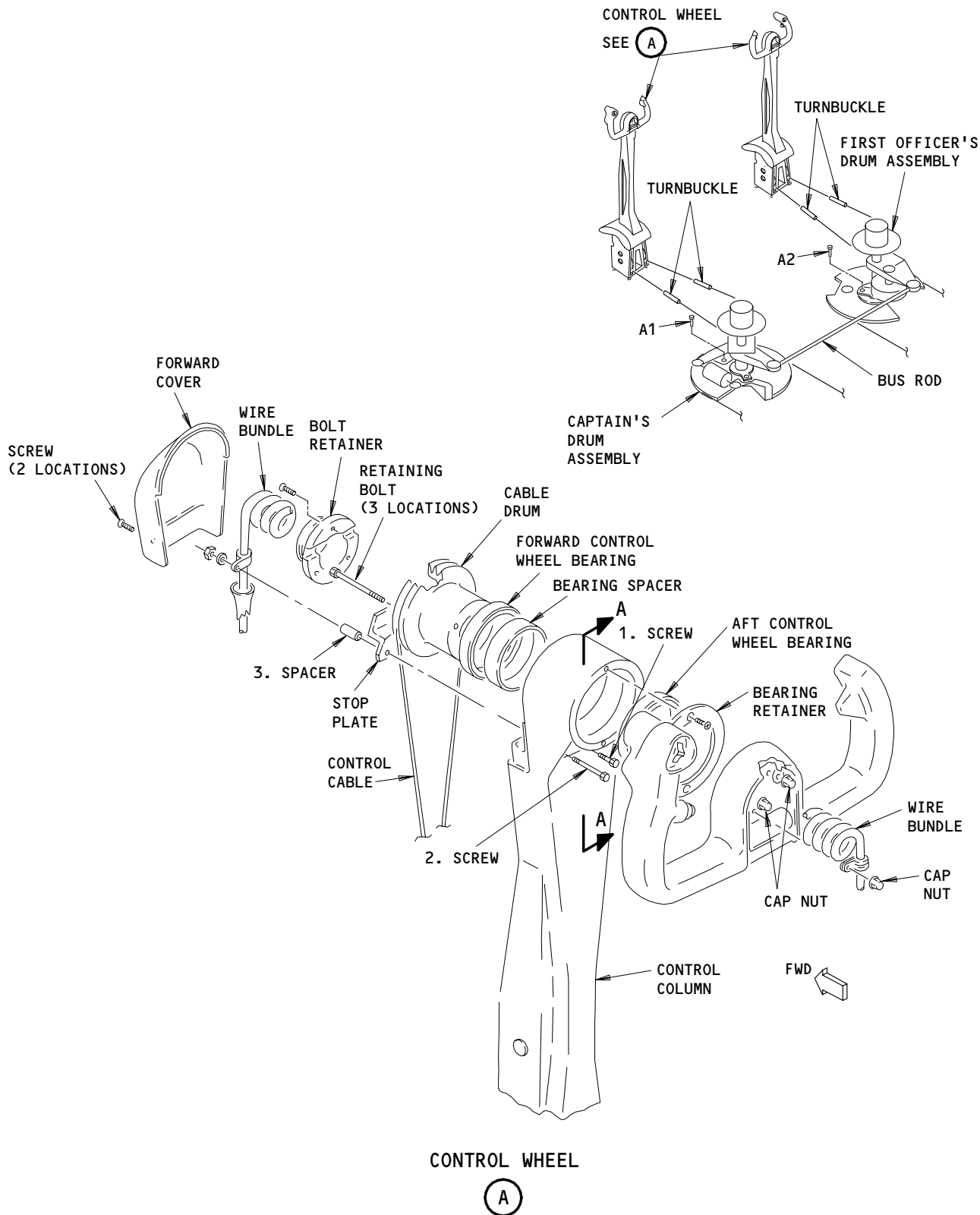
Aileron Control Wheel Installation  
Figure 401

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CONTROL WHEEL  
(A)  
Aileron Control Wheel Bearing Installation  
Figure 402 (Sheet 1)

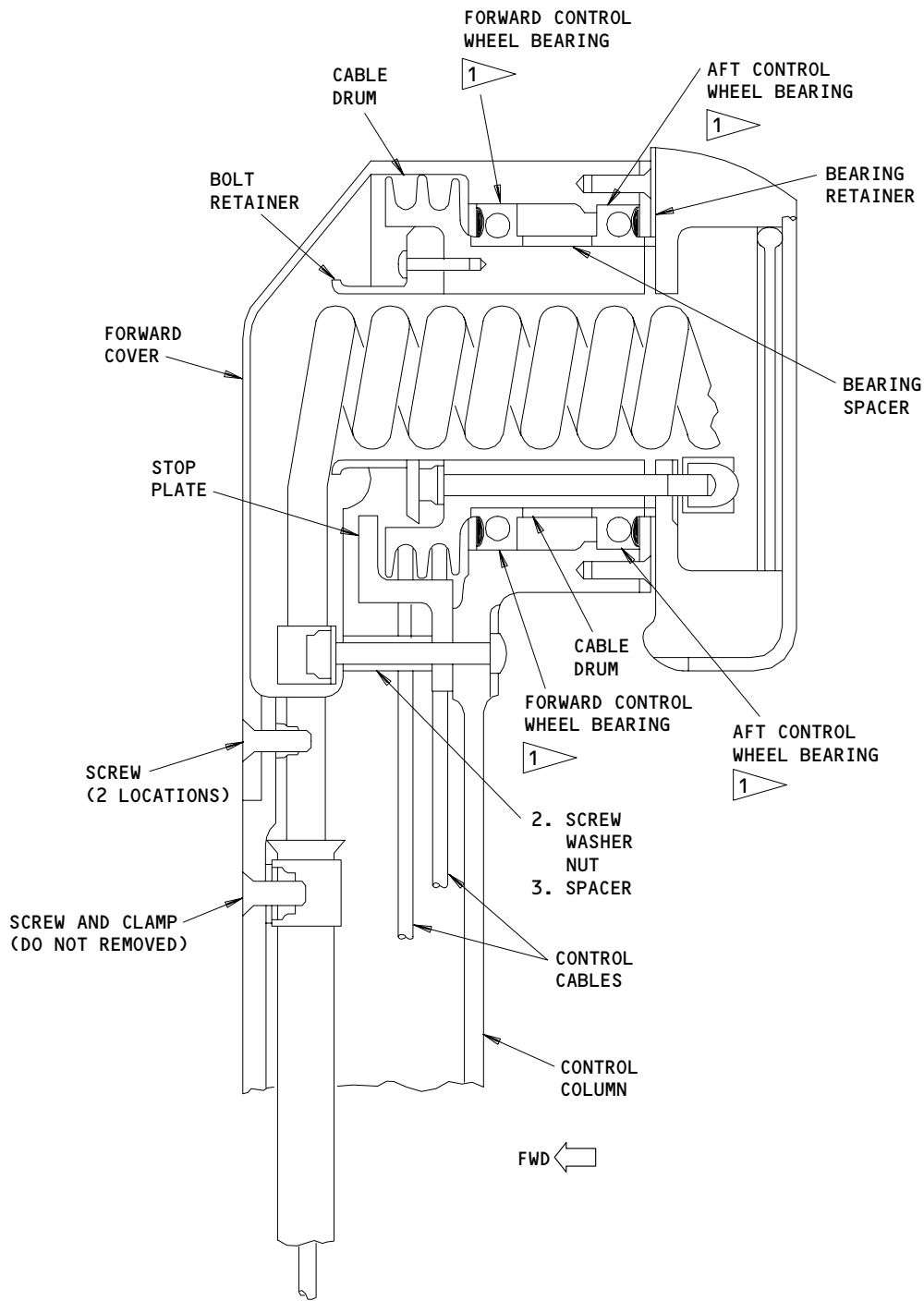
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A-A

1 INSTALL THE BEARING WITH THE SEAL SIDE OUT

Aileron Control Wheel Bearing Installation  
Figure 402 (Sheet 2)

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- (c) 11C06, FLT CONT ELEC 1L AC
- (d) 11C07, FLT CON ELEC 1L DC
- (e) 11C08, FLT CONT ELEC 2L AC
- (f) 11C09, FLT CONT ELEC 2L DC
- (g) 11G17, FLT CONT ELEC 1R AC
- (h) 11G18, FLT CONT ELEC 1R DC
- (i) 11G26, FLT CONT ELEC 2R AC
- (j) 11G27, FLT CONT ELEC 2R DC
- (k) 11A17, AUTO FLIGHT WARN
- (l) 11E17, FLT CONT CMPTR PWR L
- (m) 11E18, FLT CONT CMPTR SERVO L
- (n) 11E20, FLT CONT CMPTR PWR C
- (o) 11E21, FLT CONT CMPTR SERVO C
- (p) 11E35, FLT CONT CMPTR PWR R
- (q) 11E36, FLT CONT CMPTR SERVO R
- (r) 11G29, INTERPHONE CAPT SUP-NUM FLT AMPL DUAL PWR
- (s) 11G30, INTERPHONE F/O OBS DUAL PWR
- (t) 11H11, STAB TRIM CONT L
- (u) 11H15, FLT CONT SHUTOFF WING LEFT
- (v) 11H16, FLT CONT SHUTOFF WING CTR
- (w) 11H17, FLT CONT SHUTOFF TAIL LEFT
- (x) 11H18, FLT CONT SHUTOFF TAIL CTR
- (y) 11H20, STAB TRIM CONT R
- (z) 11H26, FLT CONT SHUTOFF WING RIGHT
- (aa) 11H27, FLT CONT SHUTOFF TAIL RIGHT

E. Remove the Aileron Control Wheel (Fig. 401)

S 034-011

- (1) Remove the medallion, the chart holder, and the wire guard from the control wheel.

S 034-012

- (2) Use the extraction tool to disconnect the wires at their connectors. Tag the wires for identification.

S 034-013

- (3) Remove the cap nuts (3 locations).

S 024-014

- (4) Carefully remove the control wheel.

F. Remove Aileron Control Wheel Bearings (Fig. 402)

S 494-015

- (1) Install rig pin A1 (A2) in the captain's (first officer's) drum assembly.

S 034-016

- (2) Remove the forward cover from the control column.

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S 034-017

- (3) Remove the screws (1, 2), washers, nuts, and the spacer (3). Remove the stop plate from the control column.

**NOTE:** Do not remove the fasteners (below the stop plate) that attach the control cable clamps to the control column.

S 034-018

- (4) Carefully remove the coiled part of the wire bundle forward and out of the top of the control column.

**NOTE:** Be careful not to remove or pull on the straight part of the wire bundle that goes down the control column.

S 034-006

- (5) Remove these components:
- (a) The bolt retainer from the control cable drum.
  - (b) The three retaining bolts from the control cable drum.
  - (c) The cable drum.
  - (d) The forward control wheel bearing.
  - (e) The bearing retainer from the aft side of the control column.
  - (f) The aft control wheel bearing.

TASK 27-11-06-424-019

3. Aileron Control Wheel and Bearings - Installation

A. Equipment

- (1) Insulation Tester (500 volts) - Commercially Available
- (2) Connector - BACC45FN14-15P
- (3) Connector - BACC45FN16-24P6

B. Consumable Materials

- (1) D00133 Lubricating Oil - MIL-L-6085

C. References

- (1) 24-22-00/201, Electrical Power - Control

D. Access

- (1) Location Zones  
211/212 Control Cabin

E. Install the Aileron Control Wheel Bearings (Fig. 402)

S 644-034

- (1) Lubricate the forward and aft control wheel bearings with oil.

**NOTE:** This step applies to bearings without seals only.

S 214-020

- (2) Make sure that the spacer between the forward and aft bearing is installed.

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S 434-002

- (3) Install these components (Fig. 402):

**CAUTION:** BE CAREFUL TO KEEP THE BEARINGS AND THE EMPTY SPACE BETWEEN THE BEARINGS CLEAN.

- (a) The forward and aft control wheel bearings.

**NOTE:** If installing control wheel bearings with seals, make sure bearings are installed with seals facing out (away from bearing spacer).

- (b) The bearing retainer on the aft side of the control column.  
(c) The control cable drum.  
(d) The three retaining bolts in the cable drum.  
(e) The bolt retainer.

**NOTE:** Make sure that the heads of the three retaining bolts fit into the slots in the bolt retainer.

S 434-021

- (4) Carefully install the coiled part of the wire bundle in the control column.

S 434-022

- (5) Install the stop plate on the control column.

S 434-023

- (6) Install the forward cover on the control column.

S 094-024

- (7) Remove rig pin A1 (A2).

F. Install the Aileron Control Wheel (Fig. 401)

S 214-025

- (1) Make sure that the push-to-talk switch moves freely before the control wheel is installed.

S 824-026

- (2) Put the wire bundle through the control wheel.

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S 434-036

**CAUTION:** MAKE SURE THE WIRE CLAMP IS INSTALLED IN THE POSITION SHOWN ON FIG. 401. PUT THE CABLE COIL IN THE CENTER OF THE CONTROL WHEEL. FRICTION WILL RESULT IF THE WIRE CLAMPS ARE NOT INSTALLED CORRECTLY AND THE CABLE COIL IS NOT PUT IN THE CENTER. DAMAGE TO EQUIPMENT CAN OCCUR.

- (3) Put the control wheel on the three retaining bolts in the control column and install the three capnuts.

S 434-003

- (4) Use the identification tags to connect the correct wires to the correct electrical connectors.

S 224-028

- (5) Pull lightly on the electrical connections to make sure they are tight.

S 764-039

- (6) Do a continuity test on the electrical circuits for each switch.

**NOTE:** As an optional test to the continuity and high potential electrical insulation tests called out at this part of the procedure, do an operational test like an MCDP Test 11 or Test 40 (FIM 22-00-03/101), a push to talk switch test, move the stab trim full speed when both stab trim switches are pushed up or down and make sure that there is no stab movement when only one stab trim switch is moved.

S 764-004

- (7) On the high-potential electrical insulation tests that follow:
  - (a) Turn the control wheel from its full clockwise position to its full counterclockwise position during each test.
  - (b) Remove electrical connectors D5131P and D5133P on the E1-1 shelf.
  - (c) Install these mating connectors:
    - 1) Mating connector BACC45FN16-24P6 to airplane connector D5131P.
    - 2) Mating connector BACC45FN14-15P to airplane connector D5133P.

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- (d) If the first officer's and/or captain's aileron control wheel and bearings were replaced, do a check with a 500 volts insulation tester between these pins:

NOTE: Do a check between the wire and ground, and also between the wires. Make sure that the insulation test does not cause an insulation breakdown. The insulation resistance must be at least 100 megohms:

Do the test at the mating connectors only. Do not probe the airplane connectors.

- 1) Connector D5131P pin 12 to connector D5131P pin 11.
  - 2) Connector D5131P pin 12 to connector D5131P pin 10.
  - 3) Connector D5131P pin 12 to connector D5133P pin 11.
  - 4) Connector D5131P pin 12 to connector D5133P pin 10.
  - 5) Connector D5131P pin 11 to connector D5131P pin 10.
  - 6) Connector D5131P pin 11 to connector D5133P pin 11.
  - 7) Connector D5131P pin 11 to connector D5133P pin 10.
  - 8) Connector D5131P pin 10 to connector D5133P pin 11.
  - 9) Connector D5131P pin 10 to connector D5133P pin 10.
  - 10) Connector D5133P pin 11 to connector D5133P pin 10.
- (e) Remove the mating connectors. Connect the four airplane connectors to the E1-1 and E2-1 shelf.

S 434-038

CAUTION: MAKE SURE THAT WIRE GUARD ASSEMBLY SLIDES SMOOTHLY IN GROOVE OF WHEEL ASSEMBLY DURING INSTALLATION. KEEP ALL WIRES AND CONNECTORS CLEAR OF PLANE OF GROOVE TO PREVENT POSSIBLE WIRE INSULATION DAMAGE DURING ASSEMBLY.

- (8) Install the medallion, the chart holder, and the wire guard on the control wheel.

G. Put the Airplane Back to Its Usual Condition

S 864-032

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11C25, INTERPHONE CAPT SUP-NUM FLT AMPL DUAL PWR
  - (b) 11C26, INTERPHONE F/O OBS DUAL PWR
  - (c) 11C06, FLT CONT ELEC 1L AC
  - (d) 11C07, FLT CON ELEC 1L DC
  - (e) 11C08, FLT CONT ELEC 2L AC
  - (f) 11C09, FLT CONT ELEC 2L DC
  - (g) 11G17, FLT CONT ELEC 1R AC
  - (h) 11G18, FLT CONT ELEC 1R DC
  - (i) 11G26, FLT CONT ELEC 2R AC
  - (j) 11G27, FLT CONT ELEC 2R DC
  - (k) 11A17, AUTO FLIGHT WARN

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(l) 11E17, FLT CONT CMPTR PWR L  
(m) 11E18, FLT CONT CMPTR SERVO L  
(n) 11E20, FLT CONT CMPTR PWR C  
(o) 11E21, FLT CONT CMPTR SERVO C  
(p) 11E35, FLT CONT CMPTR PWR R  
(q) 11E36, FLT CONT CMPTR SERVO R  
(r) 11G29, INTERPHONE CAPT SUP-NUM FLT AMPL DUAL PWR  
(s) 11G30, INTERPHONE F/O OBS DUAL PWR  
(t) 11H11, STAB TRIM CONT L  
(u) 11H15, FLT CONT SHUTOFF WING LEFT  
(v) 11H16, FLT CONT SHUTOFF WING CTR  
(w) 11H17, FLT CONT SHUTOFF TAIL LEFT  
(x) 11H18, FLT CONT SHUTOFF TAIL CTR  
(y) 11H20, STAB TRIM CONT R  
(z) 11H26, FLT CONT SHUTOFF WING RIGHT  
(aa) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 864-033

- (2) Remove the DO-NOT-OPERATE tags and move the WING and TAIL FLT CONTROL SHUTOFF switches L, C, and R on the right side panel, P61, to ON.

S 864-005

- (3) Remove electrical power if it is not necessary (Ref 24-22-00/201).

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LATERAL CONTROL FEEL, CENTERING, AND TRIM MECHANISM –  
REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task contains the data that is necessary to remove the lateral control feel, centering, and trim mechanism. The second task is used to install the lateral control feel, centering, and trim mechanism.

TASK 27-11-08-024-001

2. Feel, Centering, and Trim Mechanism – Removal

A. References

- (1) 24-22-00/201, Electrical Power – Control
- (2) 25-52-01/401, Sidewall Panels
- (3) 32-00-15/201, Landing Gear Door Locks
- (4) 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zone  
730 Left Hand Main Landing Gear and Doors

C. Prepare for Removal

S 864-039

- (1) Supply electrical power (Ref 24-22-00).

S 214-012

- (2) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 494-003

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (Ref 32-00-15).

S 864-013

- (4) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

S 864-014

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R
  - (d) 11K15, AILERON TRIM

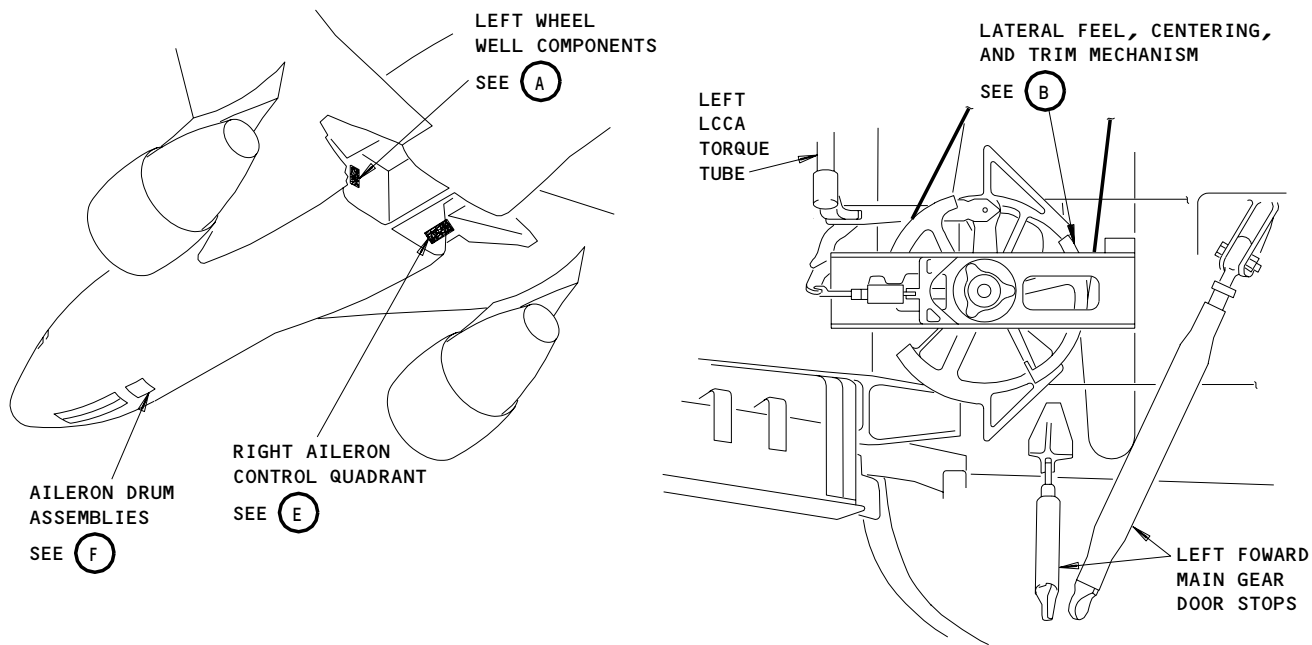
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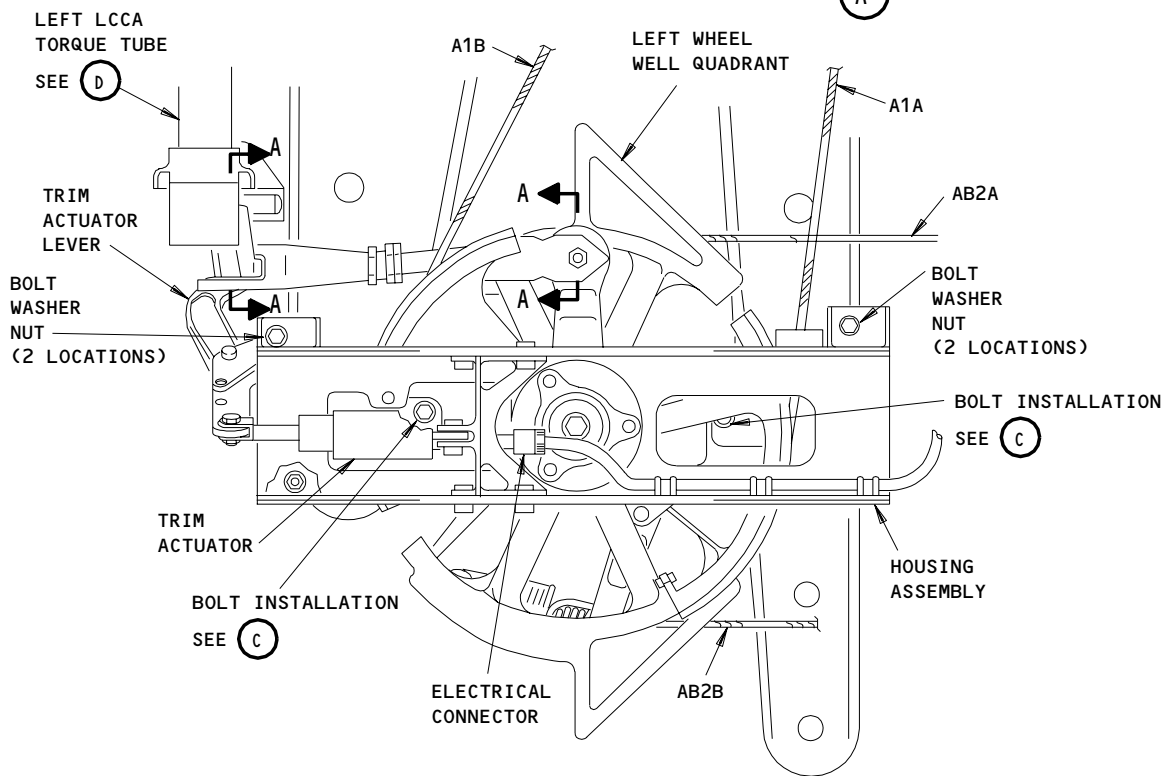
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LEFT WHEEL WELL COMPONENTS

(A)



LATERAL FEEL, CENTERING, AND TRIM MECHANISM

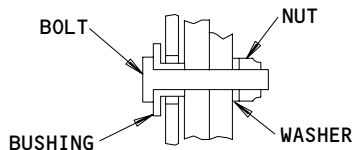
(B)

NOTE: THE DEBRIS GUARD IS NOT SHOWN.

Lateral Feel, Centering, and Trim Mechanism Installation  
Figure 401 (Sheet 1)

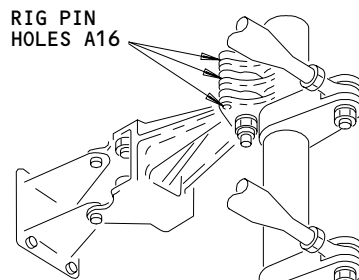
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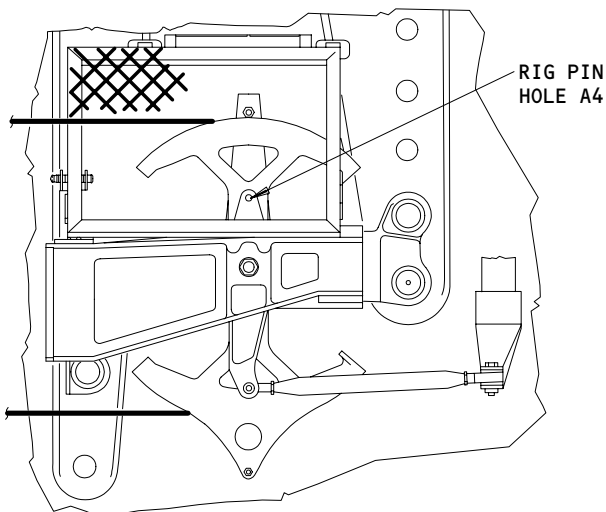
BOLT INSTALLATION

(C)



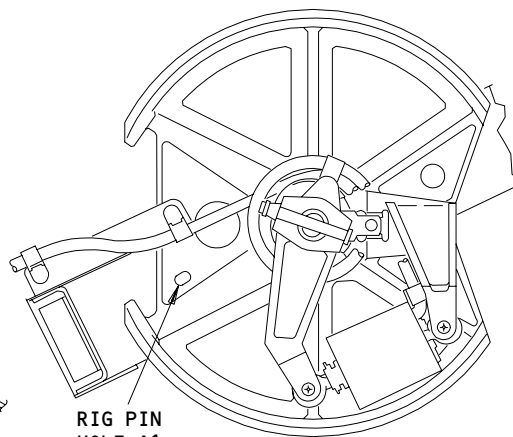
LEFT LCCA TORQUE TUBE

(D)



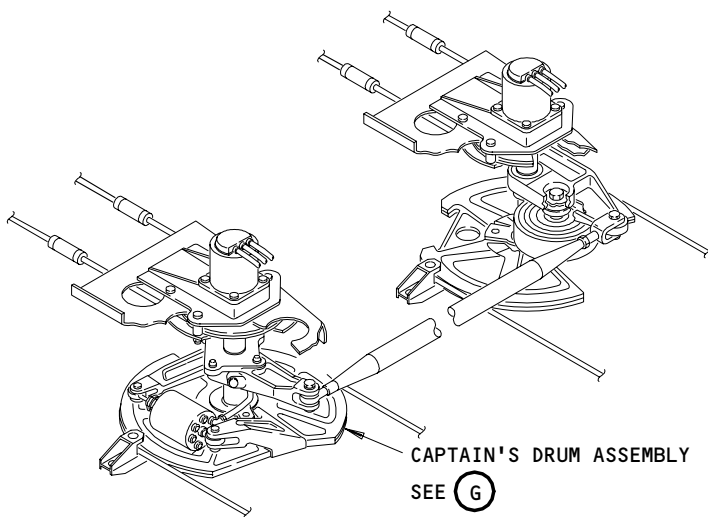
RIGHT AILERON CONTROL QUADRANT

(E)



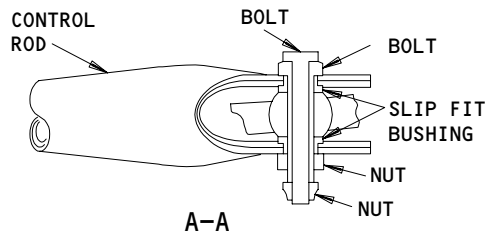
CAPTAIN'S DRUM ASSEMBLY

(G)



AILERON DRUM ASSEMBLIES

(F)



Lateral Feel, Centering, and Trim Mechanism Installation  
Figure 401 (Sheet 2)

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D. Remove the Feel, Centering, and Trim Mechanism (Fig. 401)

S 034-015

- (1) Disconnect the electrical connector from the trim actuator.

S 034-016

- (2) Remove the bonding jumpers from the actuator and the housing assembly if they are installed (Fig. 403).

S 824-017

- (3) In increments, release the tension from aft bus input cables AB2A and AB2B.

**NOTE:** The turnbuckles for cables AB2A and AB2B are in the right wheel well for the main gear.

S 824-018

- (4) In increments, release the tension from primary body cables A1A and A1B.

**NOTE:** The turnbuckles for cables A1A and A1B are found behind a sidewall panel. This panel is opposite the third panel aft of the forward cargo door. Refer to 25-52-01 for the sidewall panel removal procedure.

S 034-019

- (5) Disconnect cables A1A, A1B, AB2A, and AB2B from the feel, centering, and trim mechanism.

S 034-002

- (6) Remove these components:
- (a) The debris guard from its bracket (Fig. 402).
  - (b) The dual bolt assembly that connects the control rod for the left LCCA torque tube to the feel, centering, and trim mechanism (View A-A, Fig. 401).
  - (c) The bolts that attach the feel, centering, and trim mechanism to its bracket (6 locations).

S 024-020

- (7) Remove the feel, centering, and trim mechanism.

TASK 27-11-08-424-021

3. Feel, Centering, and Trim Mechanism - Installation

**NOTE:** Refer to 27-11-08 for the applicable wear limit data.

A. Equipment

- (1) Rig Pins from Kit A20004-78 (Ref 20-10-24):
- (a) A1 - P/N A20004-15

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- (b) A4 - P/N A20004-19
- (c) A16 - P/N A20004-16
- (2) Bonding Meter - Avtron Model T477W, Avtron Manufacturing Inc., Cleveland, Ohio
- (3) Cable Tensiometer, Commercially Available
- B. Consumable Materials
  - (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
  - (2) D00015 Grease - Corrosion Preventive - BMS 3-24 (Alternate)
  - (3) A00247 Sealant - Chromate Type - BMS 5-95
- C. References
  - (1) 20-10-22/701, Metal Surfaces Cleaning/Painting
  - (2) 24-22-00/201, Electrical Power - Control
  - (3) 27-11-08/601, Lateral Control Feeling, Centering, and Trim Mechanism
  - (4) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
  - (5) 32-00-15/201, Landing Gear Door Locks
- D. Access
  - (1) Location Zone  
730 Left Hand Main Landing Gear and Doors
- E. Install the Feel, Centering, and Trim Mechanism (Fig. 401)
  - S 494-004
    - (1) Install these rig pins:
      - (a) A1 (for the captain's drum assembly)
      - (b) A4 (for right aileron control quadrant)
      - (c) A16 (for the left LCCA torque tube).
  - S 644-022
    - (2) Lubricate the bushings with grease.
  - S 434-023
    - (3) Install the bolts that connects the feel, centering and trim mechanism to its bracket (6 locations).
  - NOTE:** Install bushings at two of the locations.
  - S 644-024
    - (4) Lubricate the dual bolt assembly with grease.

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- S 434-025
- (5) Install the dual bolt assembly that connects the control rod for the left LCCA torque tube to the feel, centering, and trim mechanism (View A-A).
- S 434-026
- (6) Do these steps to install the bonding jumpers (Fig. 403):
- (a) Use a rotary bonding brush or rotary abrasive disk to clean the trim actuator, the housing assembly, and the jumpers (Ref 20-10-22).
  - (b) Install the jumper with the bolts, washers, and the nuts (2 locations).
  - (c) Apply sealant to the bolts and nuts.
  - (d) Use a bonding meter to make sure that the resistance between the trim actuator and the mechanism is less than 0.0015 ohms.
- S 434-027
- (7) Connect the electrical connector to the trim actuator.
- S 824-028
- (8) Put cables A1A and A1B through the cable guides on the debris guard (Fig. 402).
- S 434-005
- (9) Do these steps to install the debris guard:
- (a) Put the debris guard in its correct position.
  - (b) Install the bolt, spacer, washer, and nut that connect the guard to its top support.
  - (c) Install the bolt, spacers, washer, and nut that connect the guard to its side support.
  - (d) Install the bolt, bushings, washer, and nut that connect the guard to the rod.
  - (e) Install the bolts, washers, and nuts that connect the guard to the link and the mechanism.
- S 434-029
- (10) Connect cables A1A, A1B, AB2A, and AB2B to the mechanism.

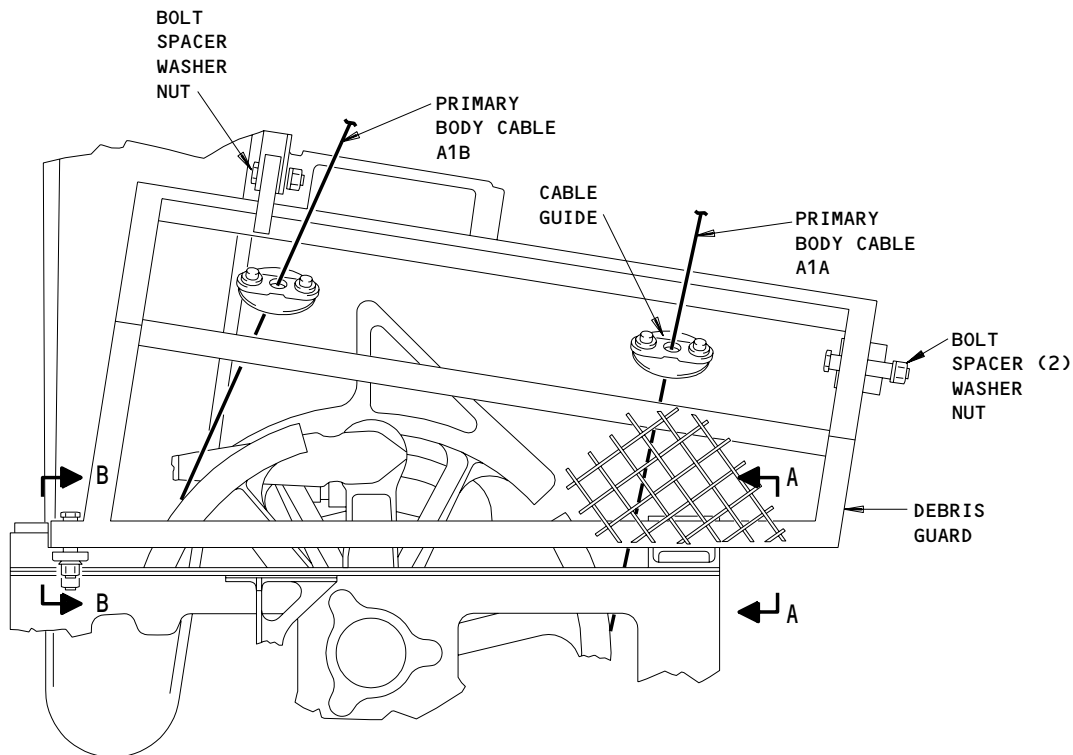
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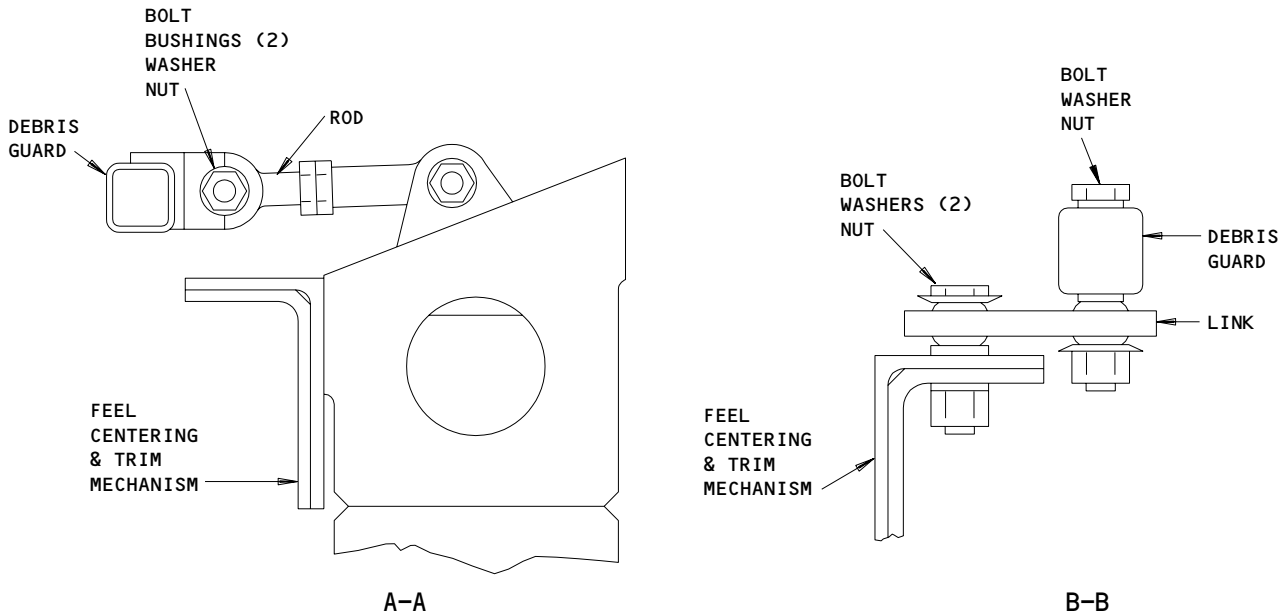
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DEBRIS GUARD



Debris Guard Installation  
Figure 402

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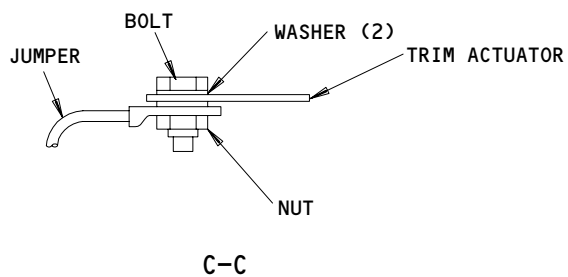
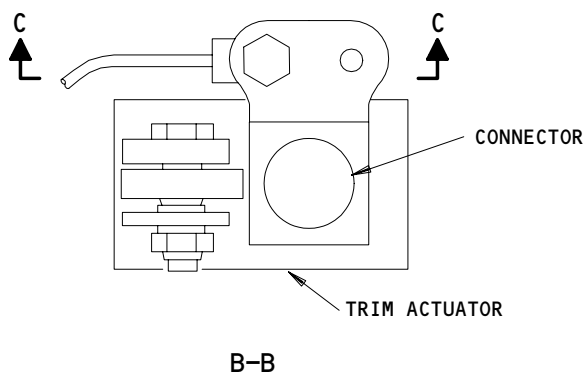
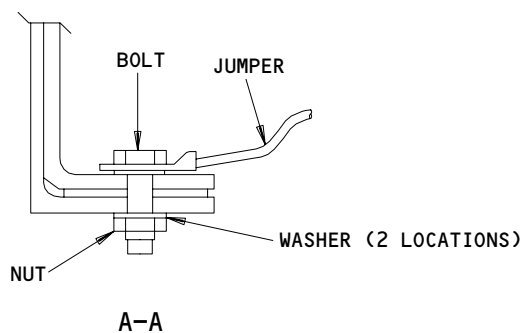
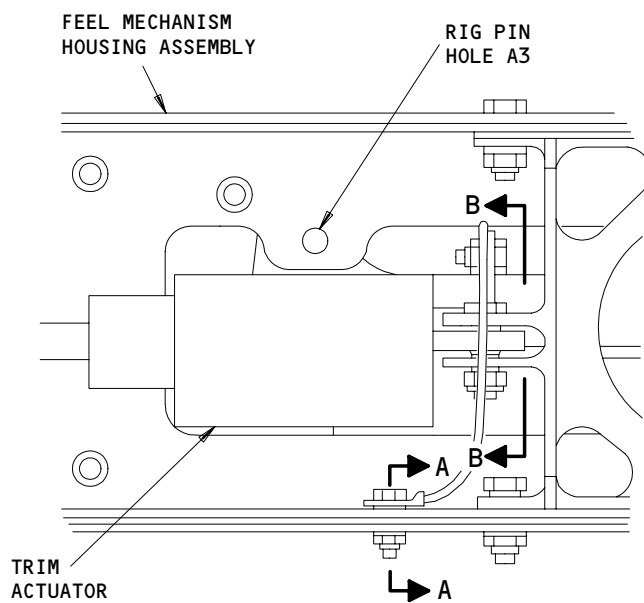
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Bonding Jumper Installation  
Figure 403

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S 824-006

- (11) Do these steps if new cables were installed:
- (a) Tighten the cables to two times the value shown in table 401.
  - (b) Remove rig pins A1, A4, and A16.
  - (c) Cycle the control wheel 25 times through its full travel range.
  - (d) Install rig pins A1, A4, and A16.

S 824-030

- (12) Adjust the cable tensions to the values shown in Table 401.

**NOTE:** Before the cables are adjusted, make sure that the airplane temperature is stable (use a tolerance of  $\pm 5^{\circ}\text{F}$ ) along the cable. Make sure that the temperature has been stable for at least 1 hour.

TABLE 401 AILERON CABLE RIGGING LOADS		
TEMP. °F	PRIMARY BODY CABLES A1A & A1B ( $\pm 10$ LBS)	AFT BUS INPUT CABLES AB2A & AB2B ( $\pm 10$ LBS)
110	118	88
90	109	79
70	100	70
50	92	62
30	84	54
10	75	45
-10	67	37
-30	59	29
-40	53	23

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S 094-031

- (13) Make sure that rig pins A1, A4, and A16 can move freely in their holes. Remove the rig pins.

S 864-010

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (14) Supply pressure to the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-032

- (15) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R
  - (d) 11K15, AILERON TRIM

S 864-033

- (16) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the P61 panel to ON.

S 864-037

- (17) Push the STATUS button on the display select panel to show the aileron position indicator on the display.

S 214-007

- (18) Turn the control wheel to its full counterclockwise position and do these checks:
- (a) Make sure the control wheel operates smoothly and does not need to much force.

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- (b) Make sure the left ailerons move up and the right ailerons move down.

S 214-008

- (19) Turn the control wheel to its full clockwise position and do these checks:
  - (a) Make sure the control wheel operates smoothly and does not need too much force.
  - (b) Make sure the left ailerons move down and the right ailerons move up.

S 214-009

- (20) Move the control wheel to its neutral position and do this check:
  - (a) Make sure the ailerons go back to their neutral positions.

S 224-035

- (21) Make sure that no more than two threads show at the turnbuckles. Install clip locks on the turnbuckles.
- F. Put the Airplane Back to Its Usual Condition

S 094-011

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

S 864-036

- (2) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-038

- (3) Remove electrical power if it is not necessary (Ref 24-22-00).

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LATERAL CONTROL FEEL, CENTERING, AND TRIM MECHANISM - INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Lateral Control Feel, Centering, and Trim Mechanism Removal/Installation for procedures to do these tasks.

TASK 27-11-08-206-002

2. Lateral Control Feel, Centering, and Trim Mechanism - Wear Limits

A. Access

- (1) Location Zone

730 Left Hand Main Landing Gear and Doors

B. Procedure

S 226-001

- (1) Use the supplied data (Fig. 601) to examine the lateral control feel, centering, and trim mechanism for too much wear.

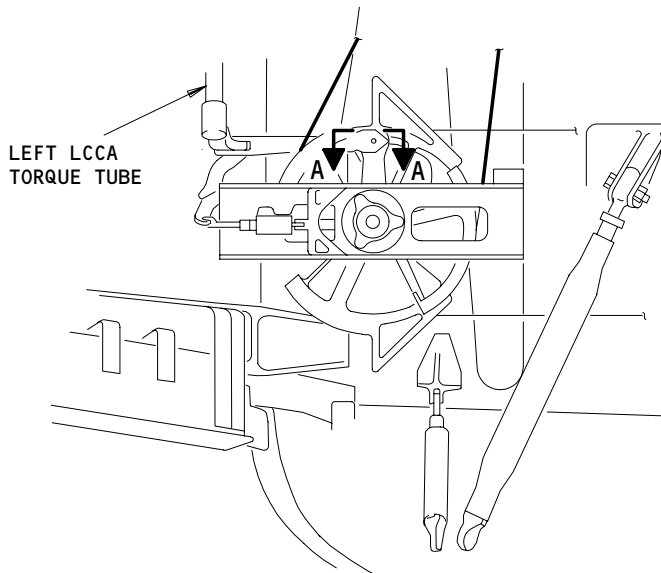
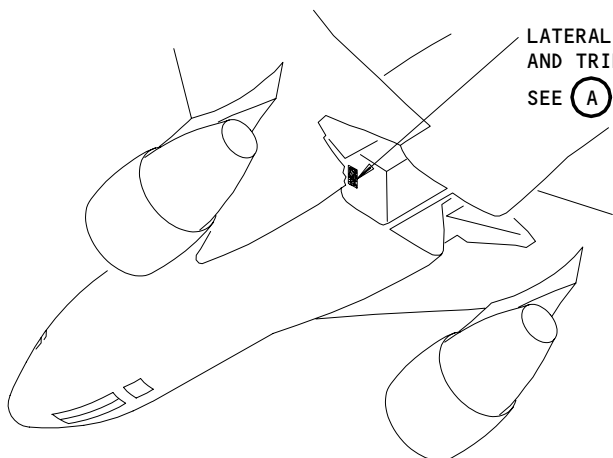
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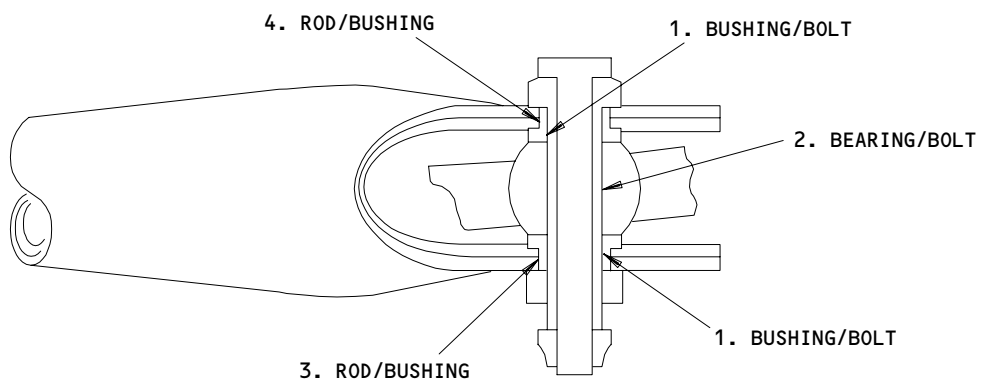
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LATERAL FEEL, CENTERING, AND TRIM MECHANISM

(A)



A-A

Lateral Feel, Centering, and Trim Mechanism Wear Limits  
Figure 601 (Sheet 1)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.3750 (9.525)	0.3796 (9.642)	0.3786 (9.616)	0.0041 (0.104)	X		
	BOLT	OD	0.3735 (9.487)	0.3745 (9.512)	0.3715 (9.436)		X		
2	BEARING	ID	0.0375 (0.951)	0.3750 (9.525)	0.3780 (9.601)	0.0035 (0.089)	X		
	BOLT	OD	0.3735 (9.487)	0.3745 (9.512)	0.3715 (9.436)		X		
3	ROD	ID	0.5000 (12.700)	0.5006 (12.715)	0.5033 (12.784)	0.0020 (0.051)	X		
	BUSHING	OD	0.5006 (12.715)	0.5013 (12.733)	0.4986 (12.664)		X		
4	ROD	ID	0.5000 (12.700)	0.5006 (12.715)	0.5031 (12.779)	0.0036 (0.091)		X	1
	BUSHING	OD	0.4990 (12.675)	0.4995 (12.687)	0.4970 (12.624)		X		

1 THIS PART CAN BE REPAIRED.

Lateral Feel, Centering, and Trim Mechanism Wear Limits  
Figure 601 (Sheet 2)

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LATERAL TRIM ACTUATOR – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task supplies the data that is necessary to remove the lateral trim actuator. The second task supplies the data that is necessary to install it.

TASK 27-11-09-024-001

2. Lateral Trim Actuator – Removal

A. References

- (1) 24-22-00/201, Electrical Power – Control
- (2) 32-00-15/201, Landing Gear Door Locks
- (3) 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zone  
730 Left Hand Main Landing Gear and Doors

C. Prepare for Removal

S 864-002

- (1) Supply electrical power (Ref 24-22-00).

S 214-003

- (2) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 494-004

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (Ref 32-00-15).

S 864-005

- (4) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

S 864-024

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R
  - (d) 11K15, AILERON TRIM

S 094-025

- (6) Remove the Lateral Trim Actuator (Fig. 401)

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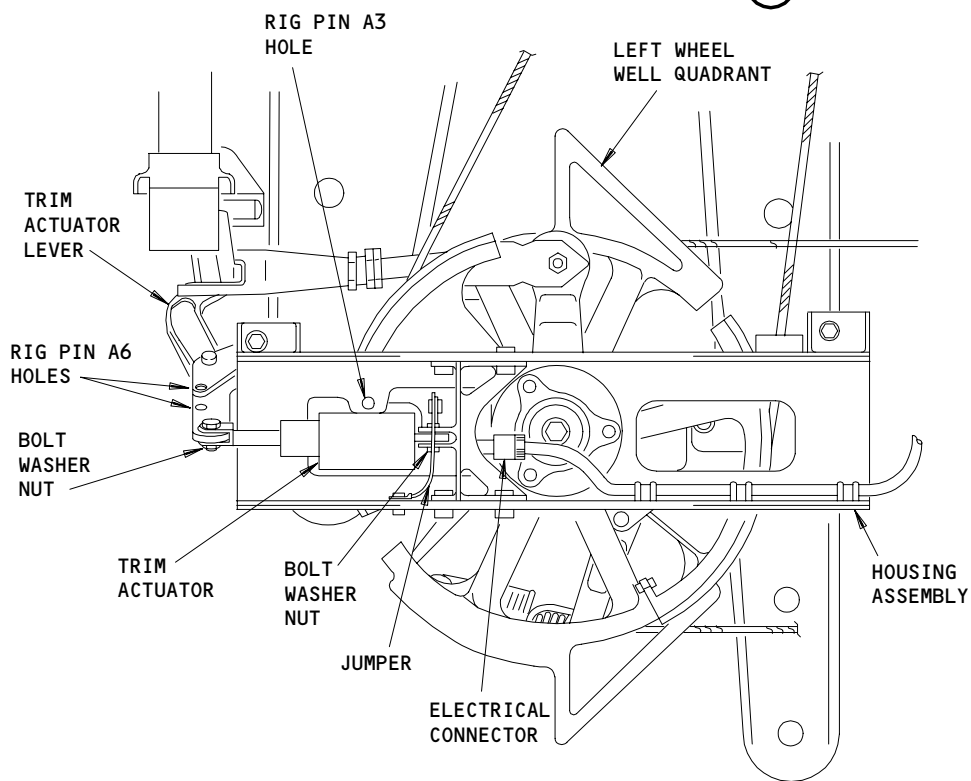
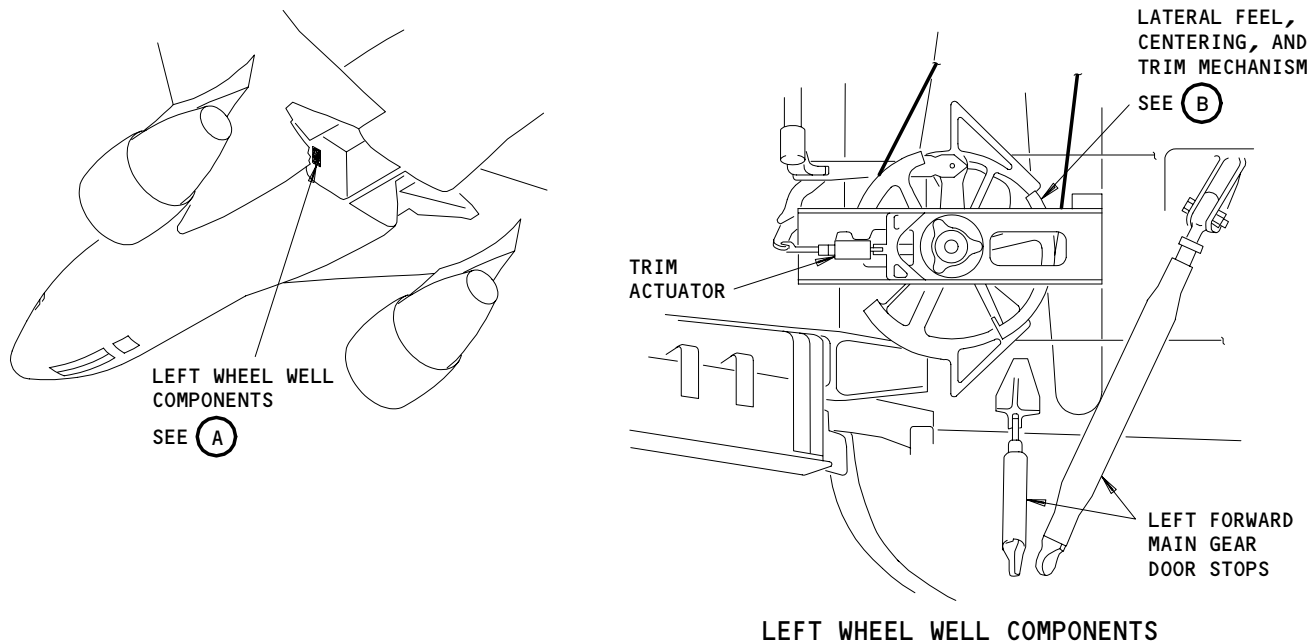
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NOTE: THE DEBRIS GUARD IS NOT SHOWN.

Lateral Feel, Centering, and Trim Mechanism Installation  
Figure 401

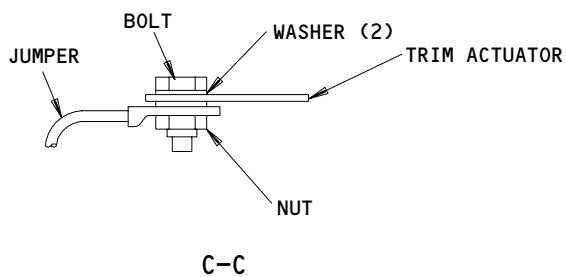
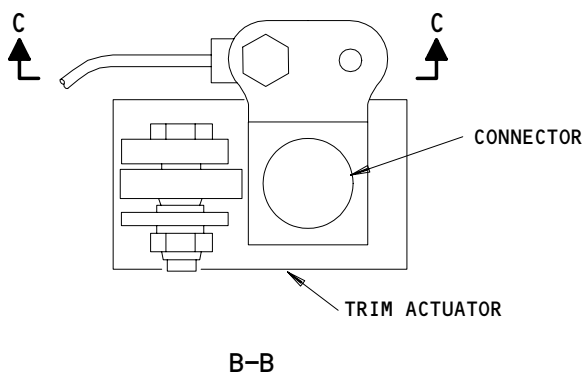
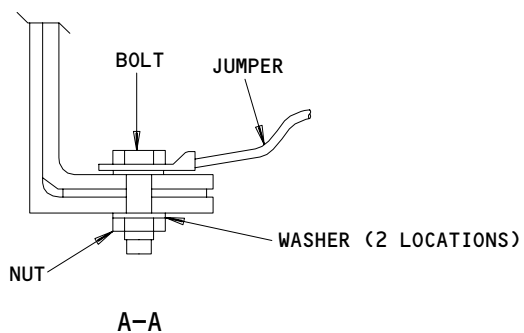
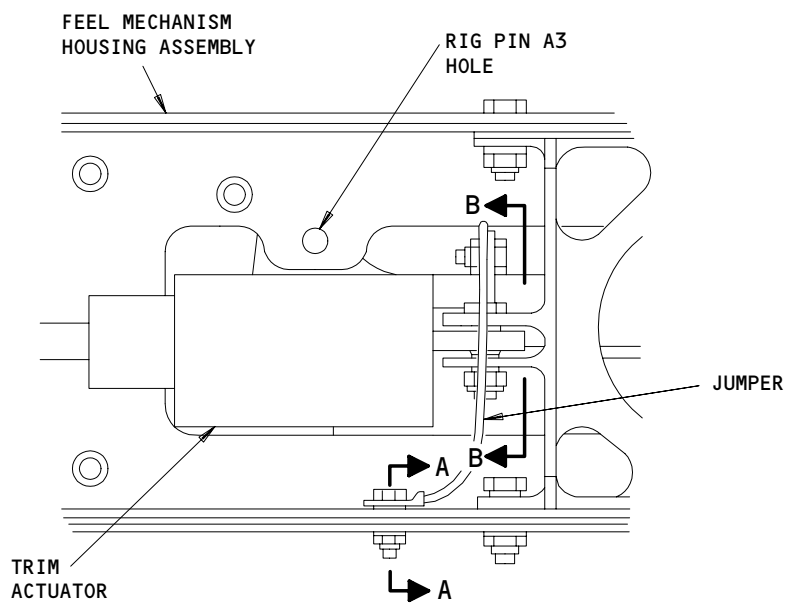
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Bonding Jumper Installation  
Figure 402

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S 034-006

- (7) Disconnect these components:
- (a) The actuator electrical connector.
  - (b) The bonding jumper(s) from the actuator.
  - (c) The actuator base from the housing assembly.
  - (d) The actuator rod from the lever assembly.

S 024-007

- (8) Remove the actuator.

TASK 27-11-09-424-008

3. Lateral Trim Actuator - Installation

A. Equipment

- (1) Rig Pins from Kit A20004-78 (Ref 20-10-24):
- (a) A3 - P/N A20004-22
  - (b) A6 - P/N A20004-22
- (2) Bonding Meter - Avtron Model T477W, Avtron Manufacturing Inc., Cleveland, Ohio

B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease - Corrosion Preventive - BMS 3-24 (Alternate)
- (3) A00247 Sealant Chromate Type - BMS 5-95

C. References

- (1) 20-10-22/701, Metal Surfaces Cleaning/Painting
- (2) 24-22-00/201, Electrical Power - Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) 32-00-15/201, Landing Gear Door Locks

D. Access

- (1) Location Zone  
730 Left Hand Main Landing Gear and Doors

E. Install the Lateral Trim Actuator (Fig. 401)

S 644-010

- (1) Lubricate all the bolts with grease.

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S 434-012

- (2) Connect the actuator base to the housing assembly.

S 434-013

- (3) Do these steps to install the bonding jumpers:
- (a) Use a rotary bonding brush or rotary abrasive disk to clean the trim actuator, the housing assembly, and the jumpers (Ref 20-10-22).
  - (b) Use the bolt, washers, and nut to install jumper(s).
  - (c) Apply sealant to the bolts and nuts.
  - (d) Use a bonding meter to make sure that the resistance between the actuator and the housing assembly is less than 0.0015 ohms.

S 434-014

- (4) Connect the electrical connector to the actuator.

S 864-016

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (5) Supply pressure to the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-017

- (6) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead panel, P11:
- (a) 11K15, AILERON TRIM

S 434-026

- (7) Do these steps to connect the actuator rod to the lever assembly:
- (a) Use the aileron trim switch to extend the trim actuator to the position required to install the actuator rod to the lever assembly.

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- (b) If necessary, rotate the left wheel well quadrant so that the bolt may be installed through the actuator rod and lever assembly.

S 864-027

- (8) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 864-018

- (9) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.

S 214-019

- (10) Move the aileron trim switches on the aft electronic control panel, P8, to LEFT WING DOWN and do the check that follows:
  - (a) Make sure the control wheel turns counterclockwise.

S 214-020

- (11) Move the aileron trim switches to RIGHT WING DOWN and do the check that follows:
  - (a) Make sure the control wheel turns clockwise.

F. Put the Airplane Back to Its Usual Condition

S 094-021

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the main landing gear doors and close the doors (Ref 32-00-15).

S 864-022

- (2) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-023

- (3) Remove electrical power if it is not necessary (Ref 24-22-00).

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LATERAL CENTRAL CONTROL ACTUATOR (LCCA) – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is used to remove the lateral central control actuator (LCCA) and the second task is used to install it.

**NOTE:** If you find an LCCA that shows signs of oil leakage, you can stop leakage by replacing O-ring and seal plate in solenoid valve and/or in servo valve of LCCA and prevent unnecessary LCCA replacement.

TASK 27-11-14-024-001

2. LCCA – Removal

A. References

- (1) AMM 24-22-00/201, Electrical Power – Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (3) AMM 32-00-15/201, Landing Gear Door Locks
- (4) AMM 32-00-20/201, Landing Gear Downlocks
- (5) AIPC 27-11-56 Fig. 3

B. Access

- (1) Location Zones  
730/740 Main Landing Gear and Doors

C. Prepare for Removal

S 864-006

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

S 214-007

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-002

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 864-008

- (4) Remove the pressure from the applicable hydraulic system (AMM 29-11-00/201):
  - (a) Left hydraulic system for the top left side LCCA.
  - (b) Right hydraulic system for the bottom left side LCCA.
  - (c) Center hydraulic system for the right side LCCA.

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S 864-009

- (5) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position legend lights come ON.

S 864-010

- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11E17, FLT CONT CMPTR PWR L
  - (b) 11E18, FLT CONT CMPTR SERVO L
  - (c) 11E20, FLT CONT CMPTR PWR C
  - (d) 11E21, FLT CONT CMPTR SERVO C
  - (e) 11E35, FLT CONT CMPTR PWR R
  - (f) 11E36, FLT CONT CMPTR SERVO R
  - (g) 11H15, FLT CONT SHUTOFF WING L
  - (h) 11H16, FLT CONT SHUTOFF WING CTR
  - (i) 11H26, FLT CONT SHUTOFF WING R

D. Remove the LCCA (Fig. 401, 402)

S 034-011

- (1) Disconnect the electrical connector (1) from the right side LCCA or the electrical connector (3) from the left side LCCAs.

S 034-012

- (2) Remove these components:
  - (a) The bolt (12 or 9), washer (13 or 10), and nut (14 or 11) that connect the LCCA input rod to the torque tube.
  - (b) The bolt (15 or 12), washer (16 or 13), and nut (17 or 11) that connect the LCCA output rod to the output quadrant.

S 034-013

- (3) Disconnect the hydraulic lines. Seal the lines and actuator ports with a cap.

S 034-014

- (4) Remove the nuts (6) and washers (5) that connect the LCCA to its support (4 locations).

S 044-015

- (5) Remove the LCCA.

TASK 27-11-14-424-016

### 3. LCCA - Installation

NOTE: Refer to AMM 27-11-14/601 for the applicable wear limit data.

#### A. Equipment

- (1) Rig Pins from Kit A20004-78 (AMM 20-10-24/201):
  - (a) A5 - P/N A20004-22
  - (b) A11 - P/N A20004-15

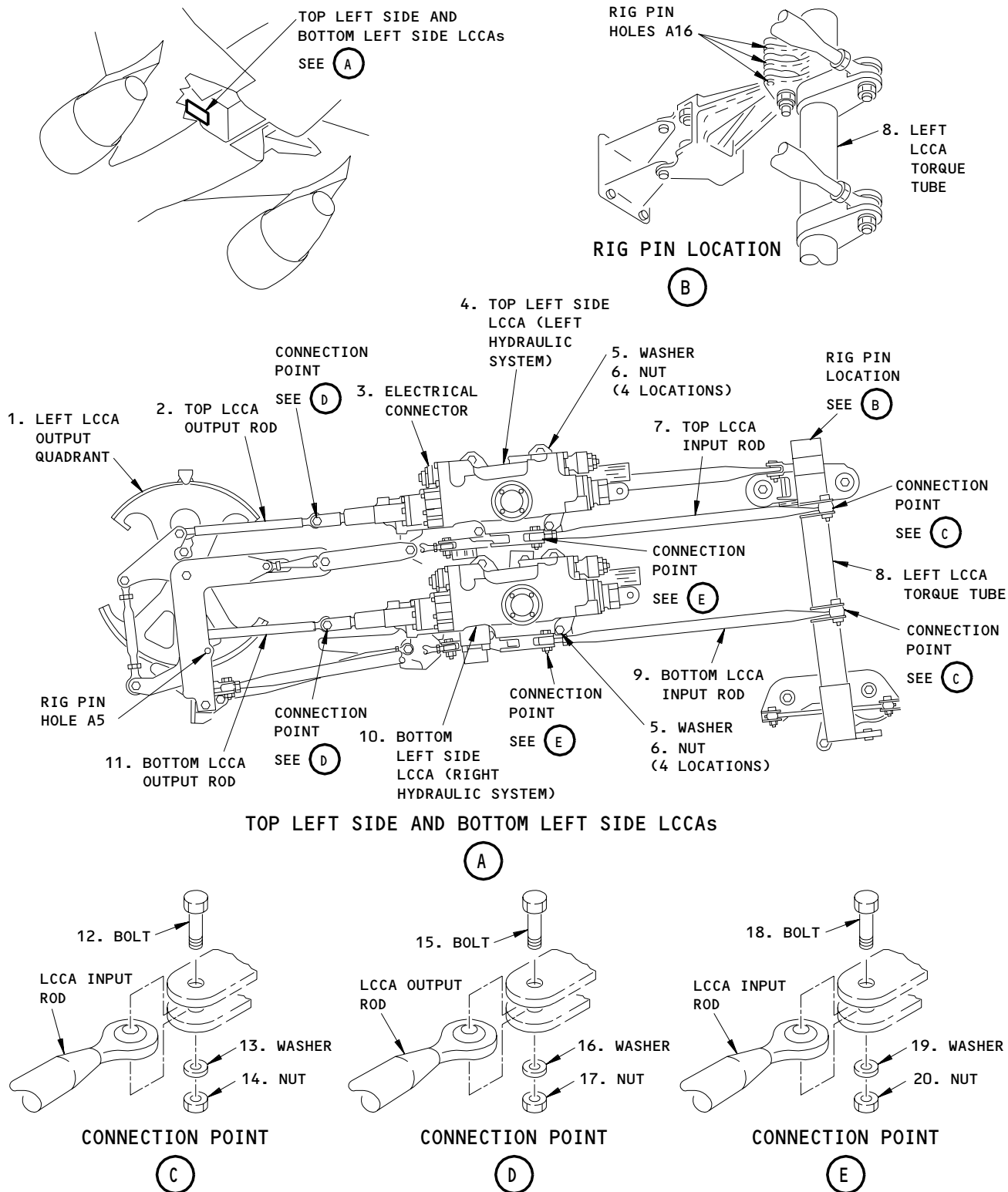
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**NOTE:** THE HYDRAULIC LINES ARE NOT SHOWN. THE CONNECTIONS ARE LOCATED BELOW THE ELECTRICAL CONNECTOR

Top and Bottom Left Side LCCAs Installation  
Figure 401

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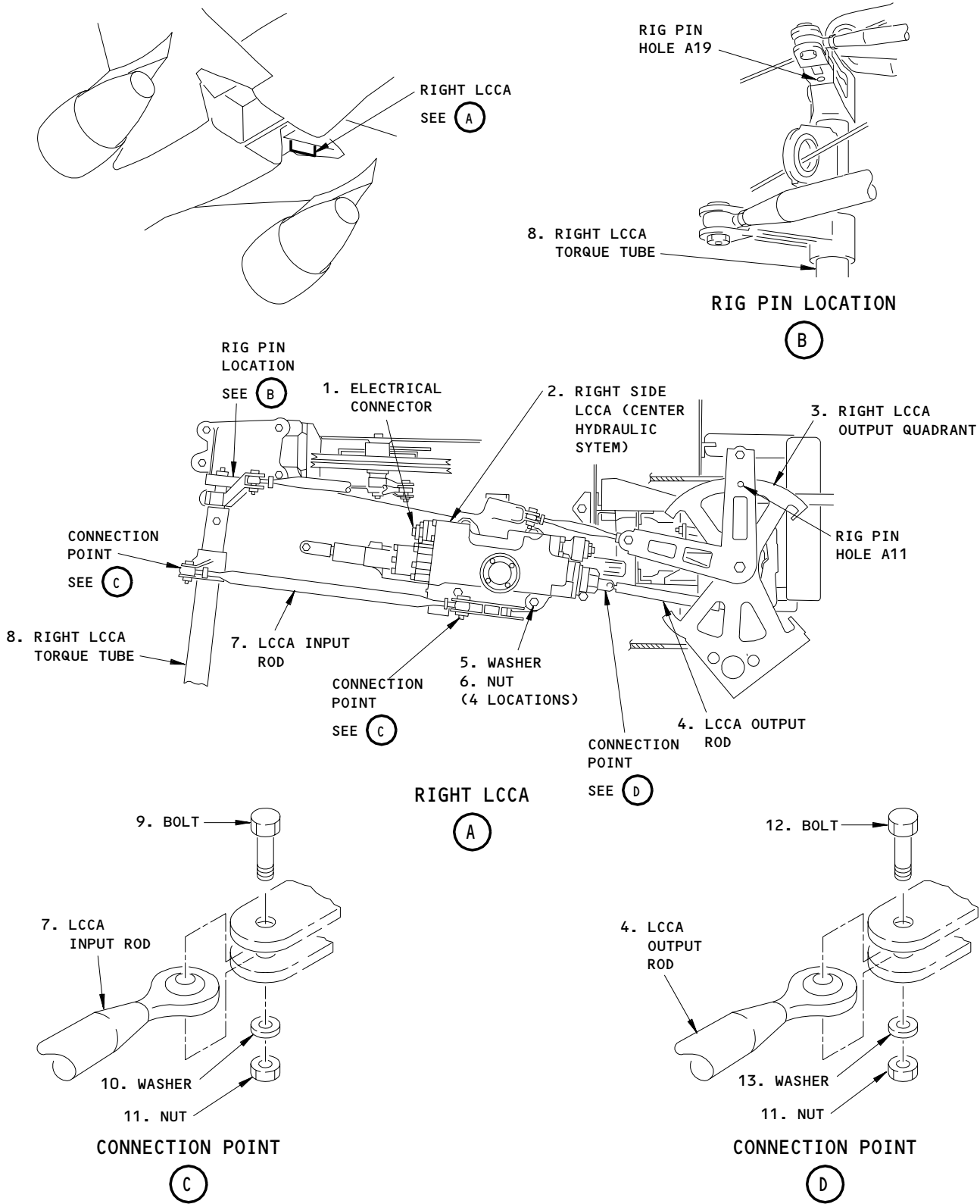
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Right Side LCCA Installation  
Figure 402

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- (c) A16 - P/N A20004-16
- (d) A19 - P/N A20004-15
- (2) Bonding Meter - Avtron Model T447W, Avtron Manufacturing Inc., Cleveland, Ohio
- B. Consumable Materials
  - (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
  - (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)
  - (3) A00251 Compound, Sealing - BMS 5-26, Type II
  - (4) C00272 Finish, Protective - BMS 3-11, Type I
- C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	4	Top Left side LCCA	27-11-14 27-11-14	01 01B	318 470

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
402	2	Right side LCCA	27-11-14 27-11-14	02 02B	280 400

- D. References
  - (1) AMM 20-10-22/701, Metal Surfaces Cleaning/Painting
  - (2) AMM 24-22-00/201, Electrical Power - Control
  - (3) AMM 27-11-00/501, Aileron and Aileron Trim Control System
  - (4) AMM 27-11-14/601, Lateral Central Control Actuator (LCCA)
  - (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
  - (6) AMM 32-00-15/201, Landing Gear Door Locks

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E. Access

- (1) Location Zones  
730/740 Main Landing Gear and Doors

F. Install the LCCA (Fig. 401, 402)

S 494-017

- (1) Install these rig pins for the right side (center hydraulic system) LCCA:  
(a) A19 (for the right LCCA torque tube)  
(b) A11 (for the right LCCA output quadrant)

S 494-018

- (2) Install these rig pins for the top left (left hydraulic system) LCCA and the bottom left (right hydraulic system) LCCA:  
(a) A16 (for the left LCCA torque tube)  
(b) A5 (for the left LCCA output quadrant)

S 124-019

- (3) Use a rotary bonding brush or rotary abrasive disk to clean the mating surfaces of the LCCA and its support (AMM 20-10-22/701).

S 644-020

- (4) Apply grease to the smooth surfaces of the bolts.

S 434-021

- (5) Do these steps to attach the LCCA to its support:  
(a) Hold the LCCA in its correct position and install the washers (5) and nuts (6) that connect it to the support (4 locations).  
(b) Apply sealing compound to the nuts and the washers. Apply the protective finish if it is necessary.  
(c) Use the bonding meter to make sure the resistance between mating surfaces is less than 0.005 ohms.

S 434-022

- (6) Connect the hydraulic lines.

S 824-023

- (7) Do the LCCA adjustment procedure (AMM 27-11-00/501).

**NOTE:** The input and output rods for the LCCA are connected during the adjustment procedure.

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G. Put the Airplane Back to Its Usual Condition

S 014-025

- (1) Remove these rig pins for the right side (center hydraulic sytem) LCCA:  
(a) A19 (for the right LCCA torque tube)  
(b) A11 (for the right LCCA output quadrant)

S 094-003

- (2) Remove these rig pins for the top left (left hydraulic system) LCCA and for the bottom left (right hydraulic system) LCCA:  
(a) A16 (for the left LCCA torque tube)  
(b) A5 (for the left LCCA output quadrant)

S 094-004

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Remove the door locks from the main landing gear doors and close the doors (AMM 32-00-15/201).

S 864-026

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:  
(a) 11E17, FLT CONT CMPTR PWR L  
(b) 11E18, FLT CONT CMPTR SERVO L  
(c) 11E20, FLT CONT CMPTR PWR C  
(d) 11E21, FLT CONT CMPTR SERVO C  
(e) 11E35, FLT COMT CMPTR PWR R  
(f) 11E36, FLT CONT CMPTR PWR R  
(g) 11H15, FLT CONT SHUTOFF WING L  
(h) 11H16, FLT CONT SHUTOFF WING CTR  
(i) 11H26, FLT CONT SHUTOFF WING R

S 864-005

- (5) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.

S 864-024

- (6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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LATERAL CENTRAL CONTROL ACTUATOR (LCCA) – INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Lateral Central Control Actuator (LCCA) – Removal/Installation for procedures to do these tasks.

TASK 27-11-14-206-002

2. Lateral Central Control Actuator (LCCA) – Wear Limits

A. Access

(1) Location Zones

730	Left Hand Main Landing Gear and Doors
740	Right Hand Main Landing Gear and Doors

B. Procedure

S 226-001

- (1) Use the supplied data (Fig. 601) to examine the top left side (left hydraulic system) LCCA, bottom left side (right hydraulic system) LCCA, and right side (center hydraulic system) LCCA for too much wear.

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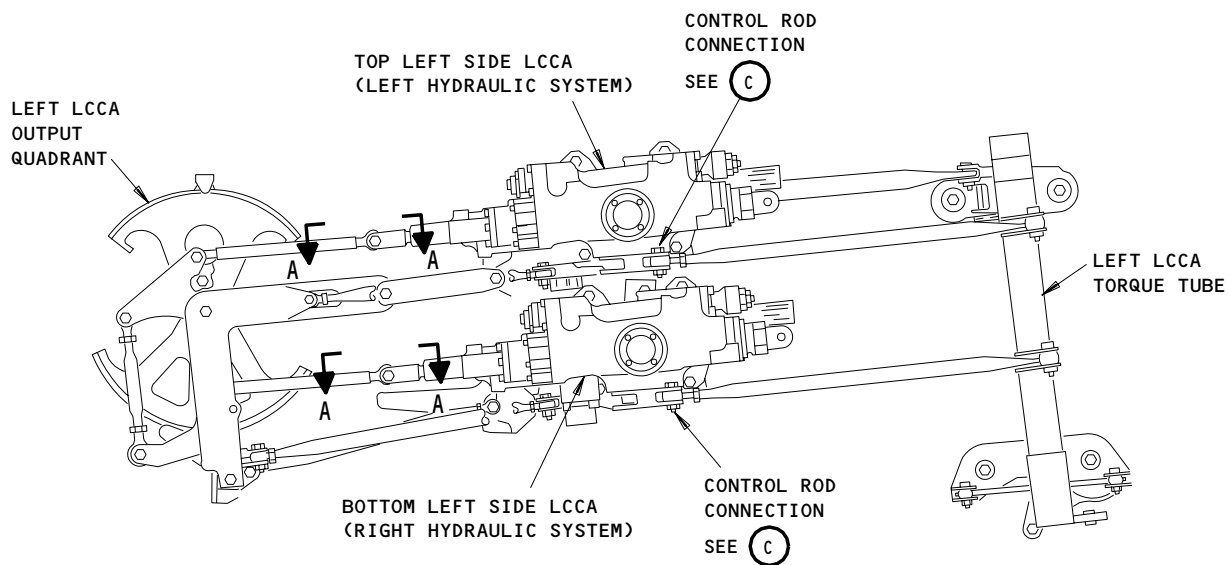
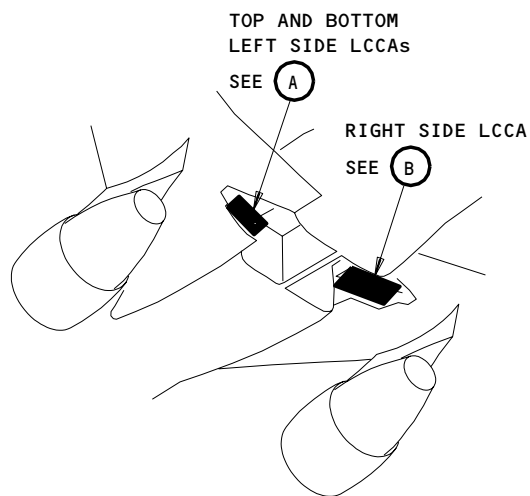
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TOP AND BOTTOM LEFT SIDE LCCAs

(A)

Left and Right LCCA Wear Limits  
Figure 601 (Sheet 1)

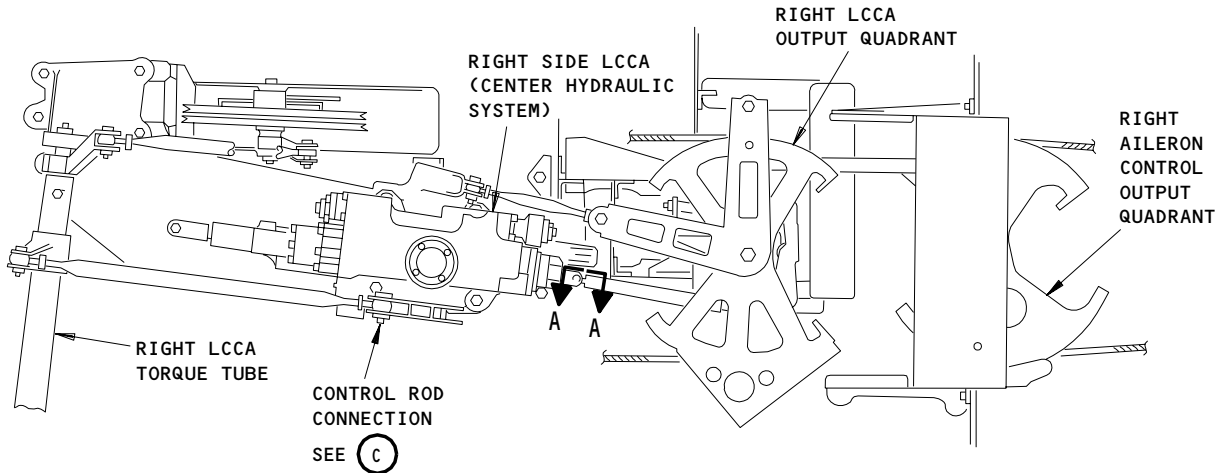
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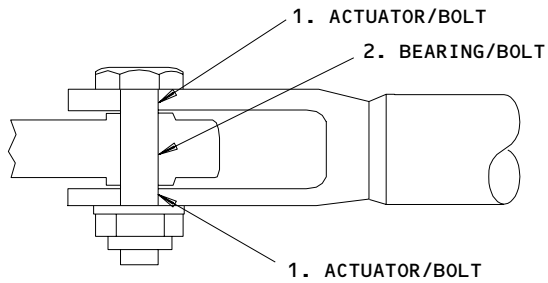
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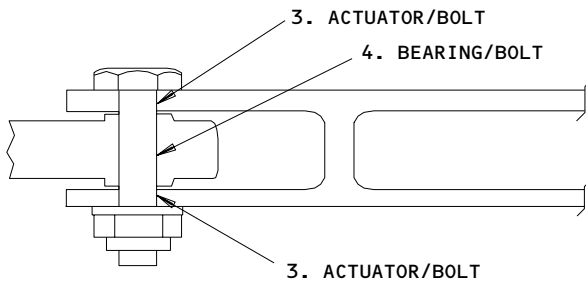
RIGHT SIDE LCCA

(B)



CONTROL ROD CONNECTION

(C)



A-A

Left and Right LCCA Wear Limits  
Figure 601 (Sheet 2)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	ACTUATOR	ID	0.2495 (6.337)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
2	BEARING	ID	0.2495 (6.337)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
3	ACTUATOR	ID	0.2500 (6.350)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
4	BEARING	ID	0.2497 (6.342)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		

Left and Right LCCA Wear Limits  
Figure 601 (Sheet 3)

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LCCA FILTER REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is used to remove the LCCA filter and the second task is used to install it.

TASK 27-11-15-024-001

2. LCCA Filter – Removal

A. References

- (1) 24-22-00/201, Electrical Power – Control
- (2) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (3) 32-00-15/201, Landing Gear Door Locks
- (4) 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zones
  - 730 Left Hand Main Landing Gear and Doors
  - 740 Right Hand Main Landing Gear and Doors

C. Prepare for Removal

S 864-008

- (1) Supply electrical power (Ref 24-22-00).

S 214-009

- (2) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 494-004

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (Ref 32-00-15).

S 864-010

- (4) Remove the pressure from the hydraulic system that supplies the LCCA filter to be removed (Ref 29-11-00).
  - (a) The left system for the top left LCCA.
  - (b) The right system for the bottom left LCCA.
  - (c) The center system for the right LCCA.

S 864-011

- (5) Move the FLT CONTROL SHUTOFF WING switches L, C, and R on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

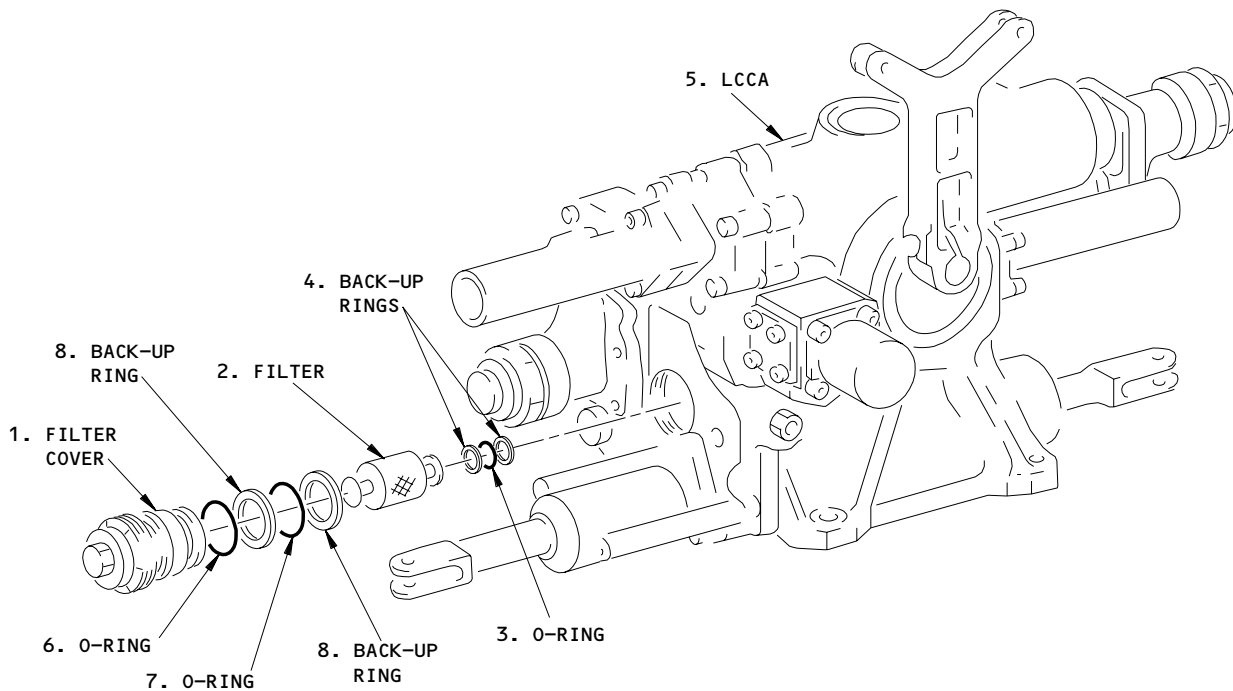
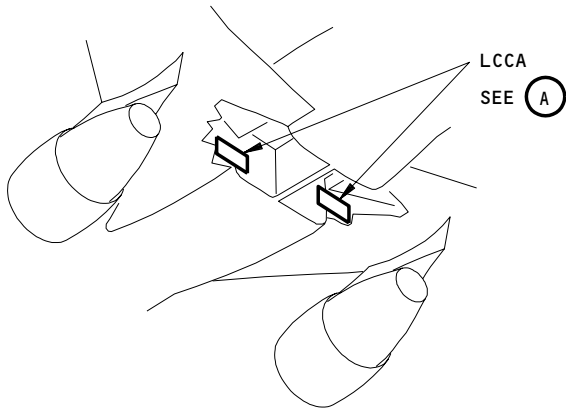
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LCCA  
(A)

LCCA Filter Installation  
Figure 401

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- S 864-003
- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R
- D. Remove the LCCA Filter (Fig. 401)

- S 034-012
- (1) Remove the lockwire from the filter cover (1).

- S 034-013
- (2) Remove the filter cover and do this step:
- (a) Remove the 0-rings (6, 7) and the back-up rings (8) from the filter cover (1).

- S 024-014
- (3) Remove the filter (2) and do this step:
- (a) Remove the o-ring (3) and the back-up rings (4) from the filter (2).

TASK 27-11-15-424-015

3. LCCA Filter - Installation

A. Consumable Materials

- (1) D00054 Lubricant, Hydraulic System 0-Rings, Backup Rings, Fittings MCS 352B

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	2	Filter	27-11-14	03	155
	3	0-Ring			160
	4	Back-up Ring			165
	6	0-Ring			140
	7	0-Ring			145
	8	Back-up Ring			150

C. References

- (1) 24-22-00/201, Electrical Power - Control
- (2) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (3) 32-00-15/201, Landing Gear Door Locks

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D. Access

(1) Location Zones

- 730 Left Hand Main Landing Gear and Doors
- 740 Right Hand Main Landing Gear and Doors

E. Install the LCCA Filter (Fig. 401)

S 644-021

- (1) Apply a thin layer of lubricant to the O-rings and fittings before they are installed.

S 434-002

- (2) Install the o-ring (3) and the backup rings (4) on the filter (2).

S 434-016

- (3) Install the two O-rings (6, 7) and the back-up rings (8) on the filter cover (1).

S 824-017

- (4) Put the filter (2) into the LCCA (5).

S 434-018

- (5) Apply lubricant to the filter cover threads. Install the filter (2) and tighten the filter cover (1) to 54 - 66 pound-feet (73.2-89.5 newton-meters).

S 434-019

- (6) Lock the filter cover with wire.

S 214-023

- (7) Do these steps to check the filter cover for leaks.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

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- (a) Supply hydraulic pressure to the system that supplies the LCCA filter you installed (AMM 29-11-00/201).
    - 1) The left system for the top left LCCA.
    - 2) The right system for the bottom left LCCA.
    - 3) The center system for the right LCCA.
  - (b) Remove the DO-NOT-CLOSE tag and close the circuit breaker on the overhead panel, P11, for the applicable system.
    - 1) 11H15, FLT CONT SHUTOFF WING L
    - 2) 1H16, FLT CONT SHUTOFF WING CTR
    - 3) 11H26, FLT CONT SHUTOFF WING R
  - (c) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF WING switch for the applicable system on the right side panel, P61, to ON.
  - (d) Make sure there is no hydraulic fluid leaking from the filter cover.
  - (e) Remove the pressure from the applicable hydraulic system (AMM 29-11-00/201).
- F. Put the Airplane Back to Its Usual Condition

S 094-005

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the main landing gear doors and close the doors (Ref 32-00-15).

S 864-006

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 864-007

- (3) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.

S 864-020

- (4) Remove electrical power if it is not necessary (Ref 24-22-00).

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LEFT LATERAL CENTRAL CONTROL ACTUATOR (LCCA) TORQUE TUBE -  
REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task supplies the data that is necessary to remove the torque tube for the left lateral central control actuator (LCCA). The second task supplies the data that is necessary to install it.

TASK 27-11-16-024-005

2. Left LCCA Torque Tube - Removal

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 32-00-15/201, Main Gear Door Locks
- (3) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zone  
730 Left Hand Main Landing Gear and Doors

C. Prepare for Removal

S 864-006

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

S 214-007

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-001

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 864-008

- (4) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

S 864-009

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

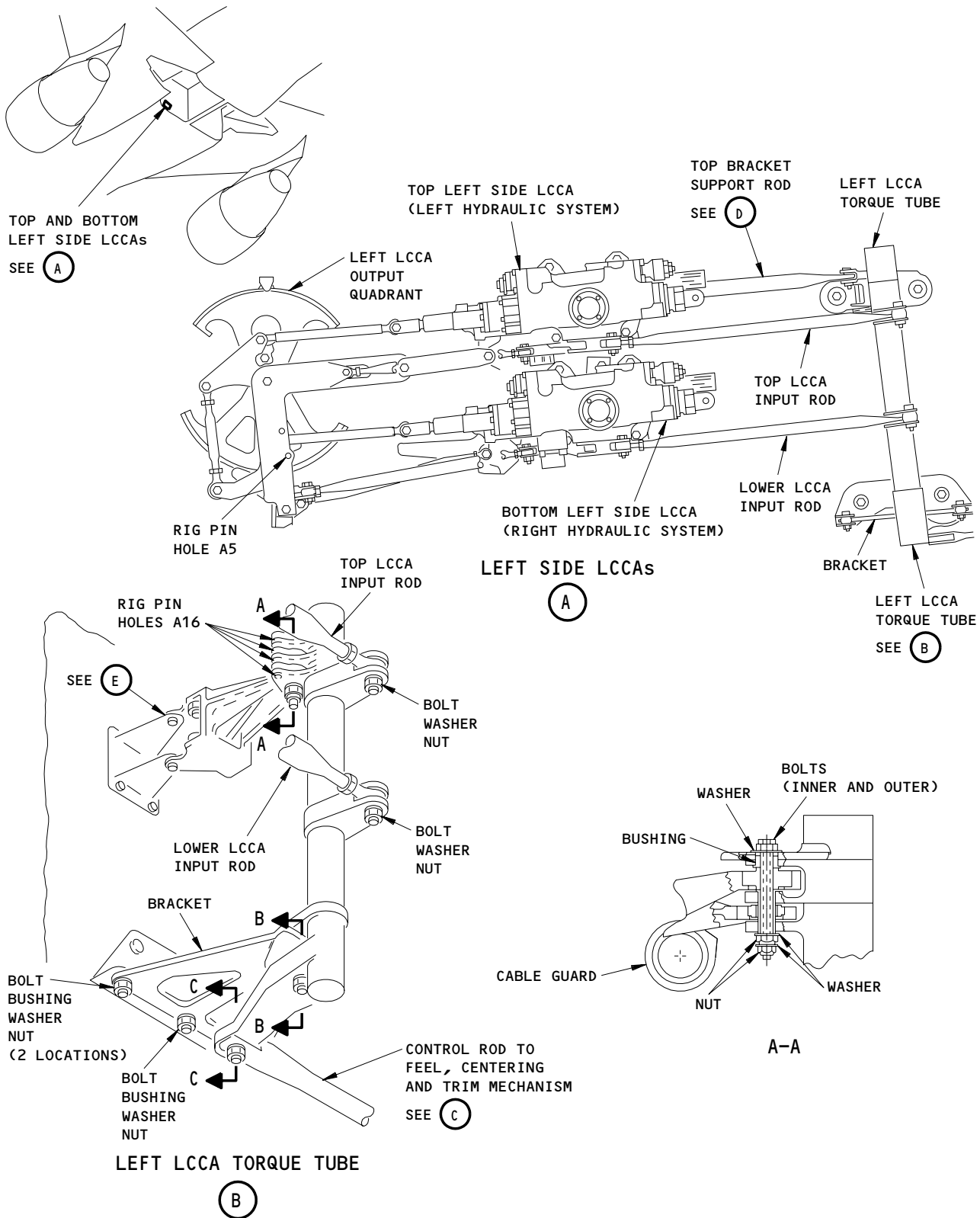
EFFECTIVITY

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Left LCCA Torque Tube Installation  
Figure 401 (Sheet 1)

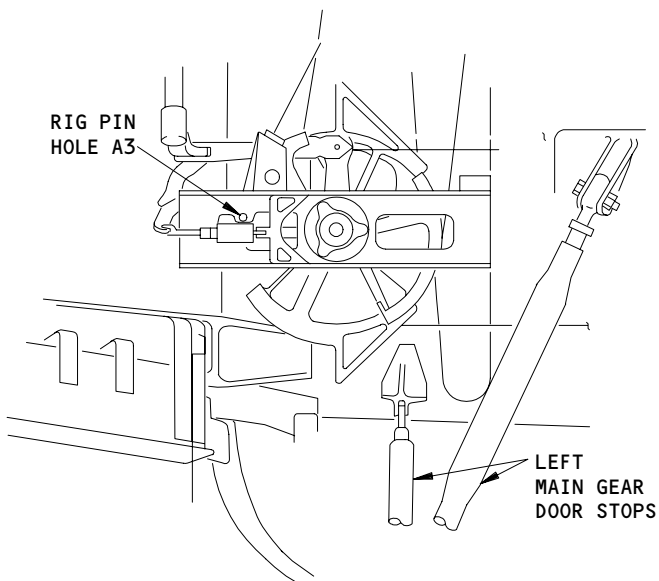
EFFECTIVITY

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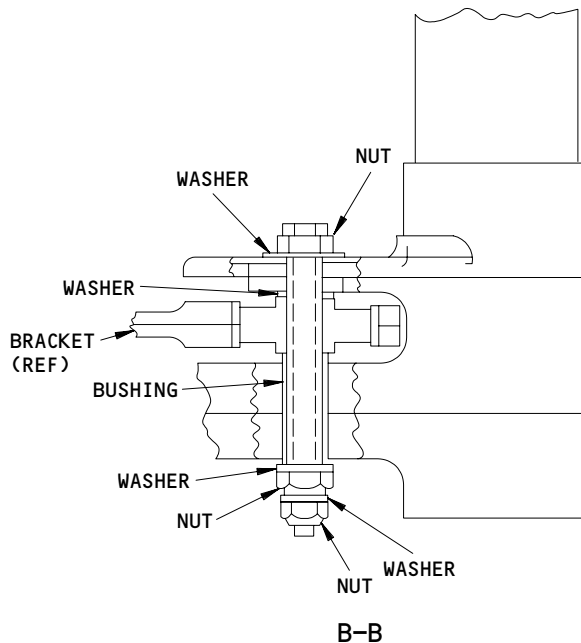
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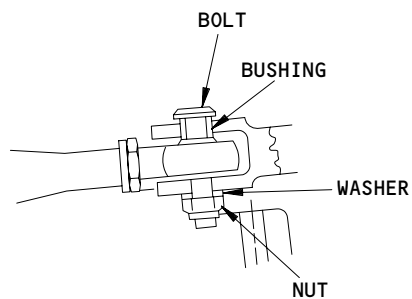


FEEL, CENTERING, AND TRIM MECHANISM

(C)

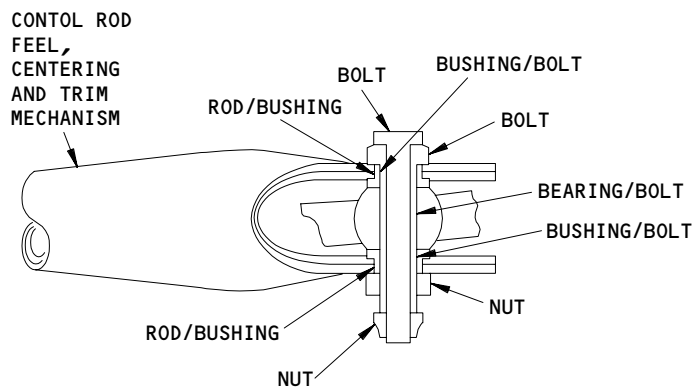


B-B



TOP BRACKET SUPPORT ROD

(D)



C-C

Left LCCA Torque Tube Installation  
Figure 401 (Sheet 2)

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	ALL

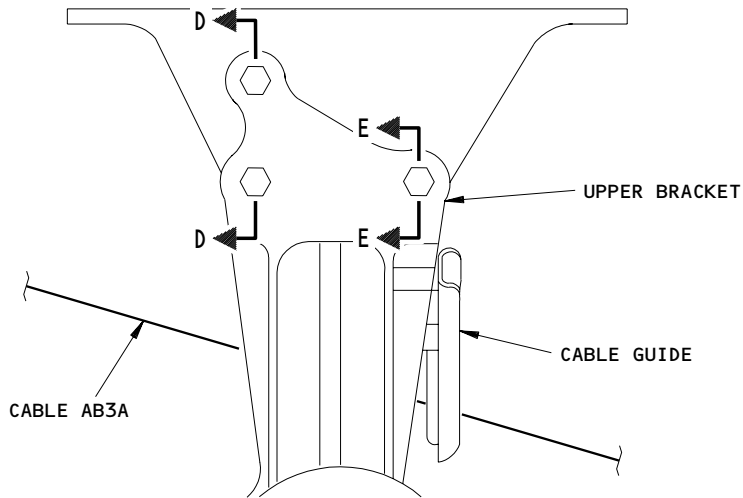
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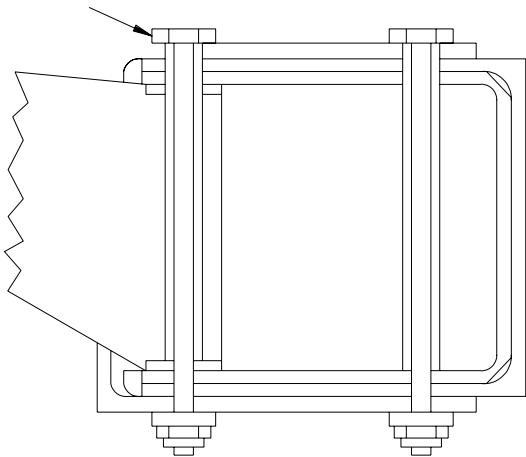
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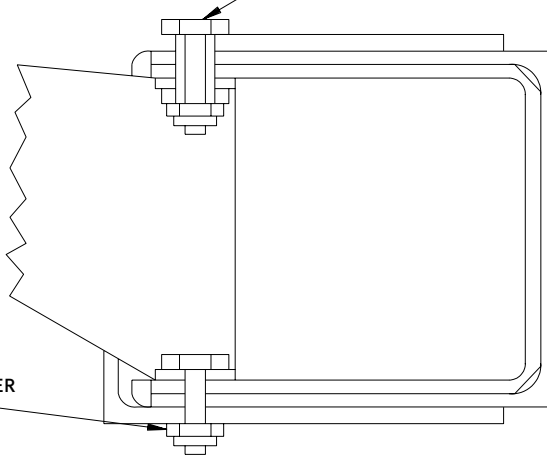
BOLT  
BUSHING  
WASHER  
NUT  
(2 LOCATIONS)

(E)



D-D

BOLT  
WASHER  
BUSHING  
WASHER  
NUT



E-E

Left LCCA Torque Tube Installation  
Figure 401 (Sheet 3)

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1363466

D. Remove the Left LCCA Torque Tube (Fig. 401)

S 034-010

- (1) Disconnect these components from the left LCCA torque tube:
  - (a) The control rod from the feel, centering, and trim mechanism (view C-C).
  - (b) The 2 input rods for the LCCAs (view B).

S 024-024

- (2) Remove the cable guard from the torque tube, if installed.

S 024-011

- (3) Remove the bolts that connect the torque tube to its brackets and remove the torque tube (views A-A, B-B, and C-C).

**NOTE:** The new 251T1305-17 torque tube assembly located in the left wheel well has a new support bracket, a shorter tube, and a new crank to increase the clearance between the lower end of the torque tube and the new landing gear door valve assembly throughout the range of the torque tube motion.

E. Remove the Lower Bracket

S 034-021

- (1) If it is necessary, do these steps to remove the bracket from the rear spar (view B).
  - (a) Remove the bolts which connect the bracket to the rear spar (3 places).
  - (b) Remove the bracket.

F. Remove the Upper Bracket

S 024-029

- (1) If it is necessary, do these steps to remove the upper bracket from the rear spar.
  - (a) Disconnect cable AB3A from the Left LCCA Output Quadrant.
    - 1) Install these rig pins
      - a) A5 (for the left LCCA output quadrant)

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- b) A11 (for the right LCCA output quadrant)
- 2) Release the tension from the aft power bus cable AB3A at the turnbuckle.

NOTE: The turnbuckle for cable AB3A is located outboard of the center bulkhead for the right wheel well.

- 3) Disconnect the cable from the left LCCA output quadrant.
- 4) Remove the cable from the cable guide.
- (b) Remove the bolts, bushings, washers, and nuts from the bracket.
- (c) Remove the bracket.

TASK 27-11-16-424-012

3. Left LCCA Torque Tube - Installation

NOTE: Refer to AMM 27-11-16/601 for the applicable wear limit data.

A. Equipment

- (1) Rig pins from Kit A20004-78 (AMM 20-10-24/201):
  - (a) A3 - P/N A20004-22
  - (b) A16 - P/N A20004-16

B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

C. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-11-00/501, Aileron and Aileron Trim Control System
- (3) AMM 27-11-16/601, Left Lateral Central Control Actuator (LCCA) Torque Tube
- (4) AMM 32-00-15/201, Main Gear Door Locks

D. Access

- (1) Location Zone  
730 Left Hand Main Landing Gear and Doors

E. Install the Lower Bracket

S 434-022

- (1) Do the steps that follow if the bracket was removed from the rear spar (view B).
  - (a) Apply grease to the bushings and bolts before installation.

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- (b) Install the bolts, bushings, washers, and nuts which connect the bracket to the rear spar.

NOTE: The middle bolt has a clearance fit of 0.125 inch (3.175 mm). Bolt-Bushing assembly must be free to wobble in the clevis after nut installation. Fill the empty space between the straight bushing OD and the flanged bushing ID with BMS 5-95 to prevent vibration.

F. Install the Upper Bracket

S 424-030

- (1) Do these steps if the bracket was removed from the rear spar.
  - (a) Apply grease to the bushings.
  - (b) Hold the bracket in position and install the bushings.
  - (c) Install the bolts, washers, and nuts.
  - (d) Connect cable AB3A to the Left LCCA Output Quadrant.
    - 1) Put the cable through the cable guide and connect it to the left LCCA output quadrant.
    - 2) Make sure that the cable is correctly positioned on all of the pulleys. Tighten cable AB3A to the correct tension (27-11-00/501) and do these steps:

NOTE: Apply the tensiometer to the cable at least six inches from the turnbuckle terminal or other fittings. To make sure you have the correct cable tension, permit a minimum of one hour at constant ambient temperature (+/- 5 degrees Fahrenheit) for airframe temperature to become stable.

- a) Make sure rig pins A5 and A11 can move freely in their holes.
- b) Install cliplocks on the turnbuckles.
- 3) Remove these rig pins
  - a) A5 (for the left LCCA output quadrant)

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- b) A11 (for the right LCCA output quadrant)  
G. Install the Left LCCA Torque Tube

S 644-013

- (1) Apply grease to the bushings and bolts before installation.

S 434-025

- (2) Install the cable guard on the torque tube, if it had one installed.

S 434-014

- (3) Do these steps to connect the torque tube to the top bracket

(view A-A):

(a) Hold the torque tube in position and install the bushings.

(b) Install the bolts, washers and the nuts.

**NOTE:** There will be a 0.1748 - 0.1767 inch  
(4.44-4.49 mm) gap between the bolt and the bearing  
after the installation.

S 434-015

- (4) Do these steps to connect the torque tube to the bottom bracket

(view C-C):

**NOTE:** The new 251T1305-17 torque tube assembly located in the left  
wheel well has a new support bracket, a shorter tube, and a  
new crank to increase the clearance between the lower end of  
the torque tube and the new landing gear door valve assembly  
throughout the range of the torque tube motion.

(a) Hold the torque tube in position and install the bushings.

(b) Install the bolt, bushings, washer, and the nut.

S 494-016

- (5) Install these rig pins:

(a) A3 (for the feel, centering, and trim mechanism)

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(b) A16 (for the left LCCA torque tube).

S 434-003

- (6) Do these steps to install the control rod from the feel, centering, and trim mechanism (view C-C):
- (a) Adjust the control rod until its rod end bolts can be easily installed. Tighten the jamnuts.
  - (b) Connect the control rod to the torque tube.
  - (c) Make sure rig pins A3 and A16 can move freely in their holes.

S 094-019

- (7) Remove rig pins A3 and A16.

S 824-017

- (8) Do the adjustment procedure for the top left side (left hydraulic system) LCCA and for the bottom left side (right hydraulic system) LCCA (AMM 27-11-00/501).

**NOTE:** The LCCA input rods are installed in the adjustment procedure.

#### H. Put the Airplane Back to its Usual Condition

S 094-002

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the main landing gear and close the doors (AMM 32-00-15/201).

S 864-020

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H15, FLT CONT SHUTOFF WING L

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- (b) 11H16, FLT CONT SHUTOFF WING CTR
- (c) 11H26, FLT CONT SHUTOFF WING R

S 864-004

- (3) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.

S 864-018

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

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LEFT LATERAL CENTRAL CONTROL ACTUATOR (LCCA) TORQUE TUBE -  
INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Left LCCA Torque Tube - Removal/Installation for procedures to do these tasks.

TASK 27-11-16-206-002

2. Left Lateral Central Control Actuator (LCCA) Torque Tube - Wear Limits

A. Access

- (1) Location Zone

730 Left Hand Main Landing Gear and Doors

B. Procedure

S 226-001

- (1) Use the supplied data (Fig. 601) to examine the left LCCA torque tube for too much wear.

EFFECTIVITY

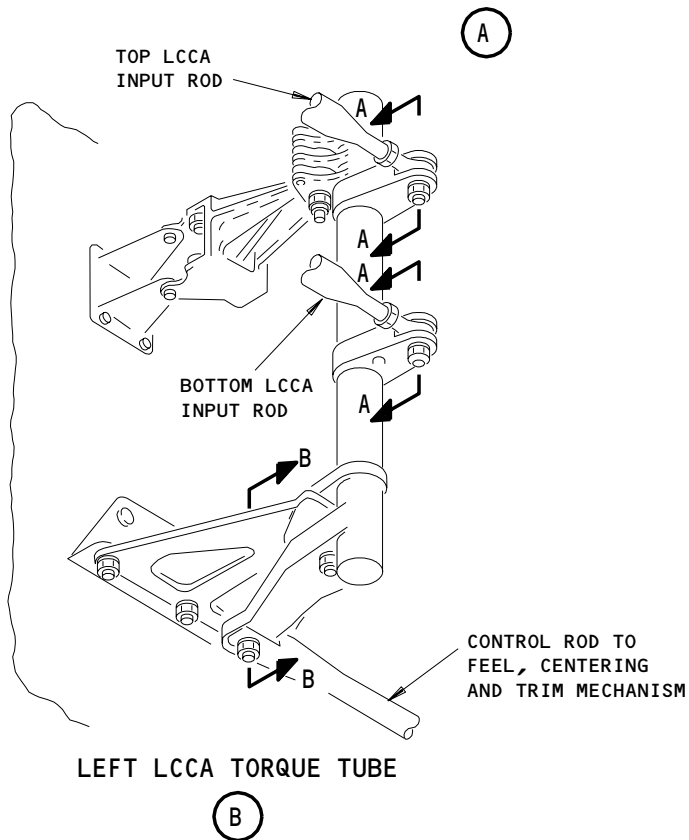
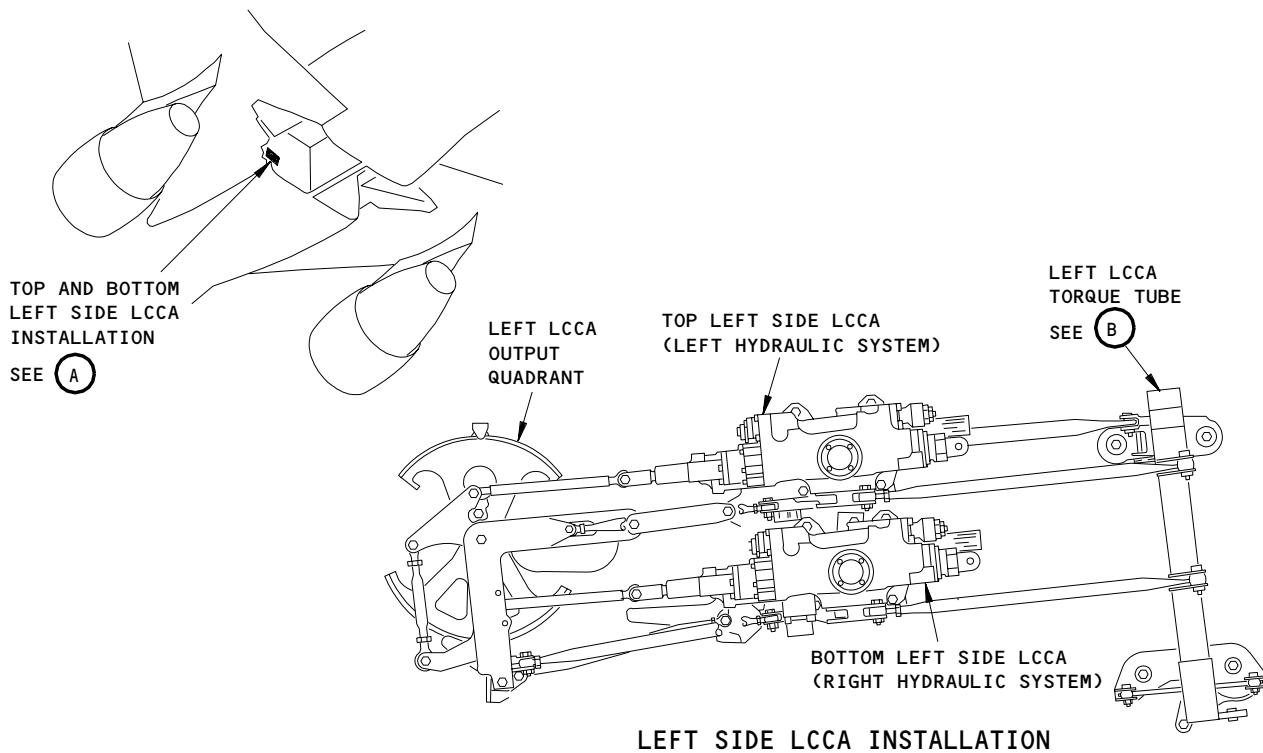
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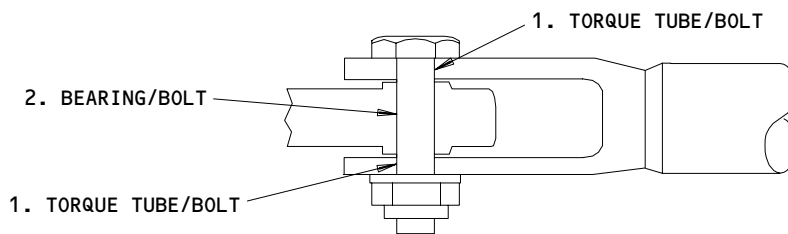




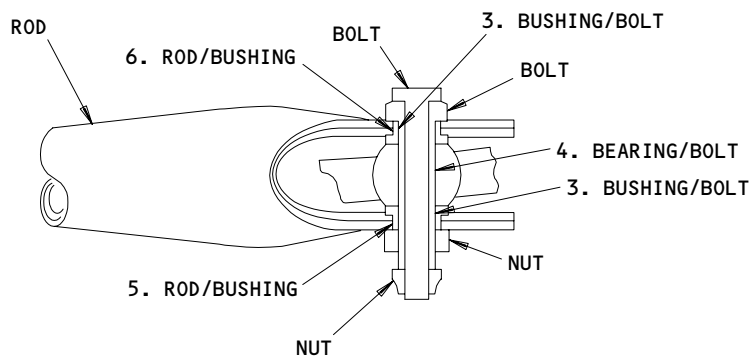
Left LCCA Torque Tube Wear Limits  
Figure 601 (Sheet 1)

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27-11-16

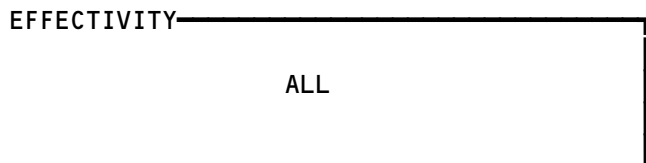


A-A



B-B

Left LCCA Torque Tube Wear Limits  
Figure 601 (Sheet 2)



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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	TORQUE TUBE	ID	0.2495 (6.337)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)		X	1
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
2	BEARING	ID	0.2497 (6.342)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
3	BUSHING	ID	0.3750 (9.525)	0.3796 (9.642)	0.3786 (9.616)	0.0041 (0.104)	X		
	BOLT	OD	0.3735 (9.487)	0.3745 (9.512)	0.3715 (9.436)		X		
4	BEARING	ID	0.3745 (9.512)	0.3750 (9.525)	0.3780 (9.601)	0.0035 (0.089)	X		
	BOLT	OD	0.3735 (9.487)	0.3745 (9.512)	0.3715 (9.436)		X		
5	ROD	ID	0.5000 (12.700)	0.5006 (12.715)	0.5033 (12.784)	0.0020 (0.051)	X		
	BUSHING	OD	0.5006 (12.715)	0.5013 (12.733)	0.4986 (12.664)		X		
6	ROD	ID	0.5000 (12.700)	0.5006 (12.715)	0.5031 (12.779)	0.0036 (0.091)		X	1
	BUSHING	OD	0.4990 (12.675)	0.4995 (12.687)	0.4970 (12.624)		X		

1 THIS PART CAN BE REPAIRED.

Left LCCA Torque Tube Wear Limits  
Figure 601 (Sheet 3)

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LEFT LATERAL CENTRAL CONTROL ACTUATOR (LCCA) OUTPUT QUADRANT -  
REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task supplies the data that is necessary to remove the output quadrant for the top left side (left hydraulic system) LCCA and for the bottom left side (right hydraulic system) LCCA. The second task contains the data that is necessary to install it.

TASK 27-11-18-024-021

2. Left LCCA Output Quadrant - Removal

A. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-51-00/201, Trailing Edge Flap System
- (4) AMM 32-00-15/201, Landing Gear Door Locks
- (5) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zone  
730 Left Hand Main Landing Gear and Doors

C. Prepare for Removal

S 864-001

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

S 214-002

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-022

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 044-003

- (4) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

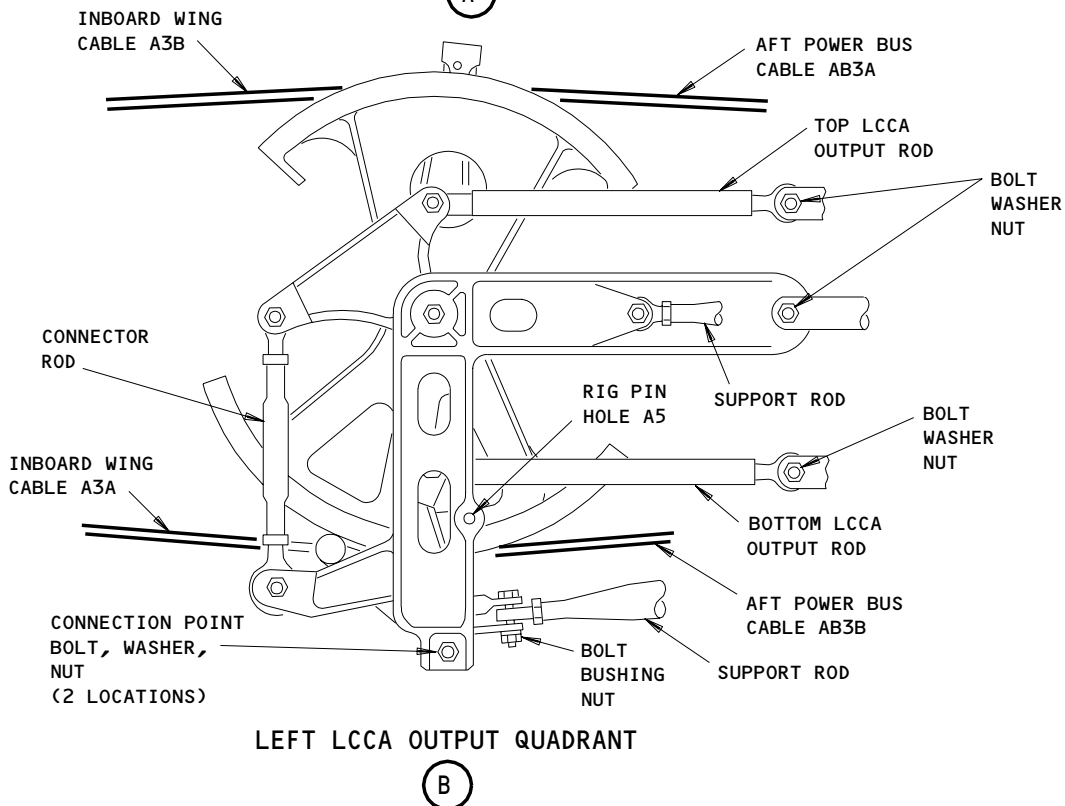
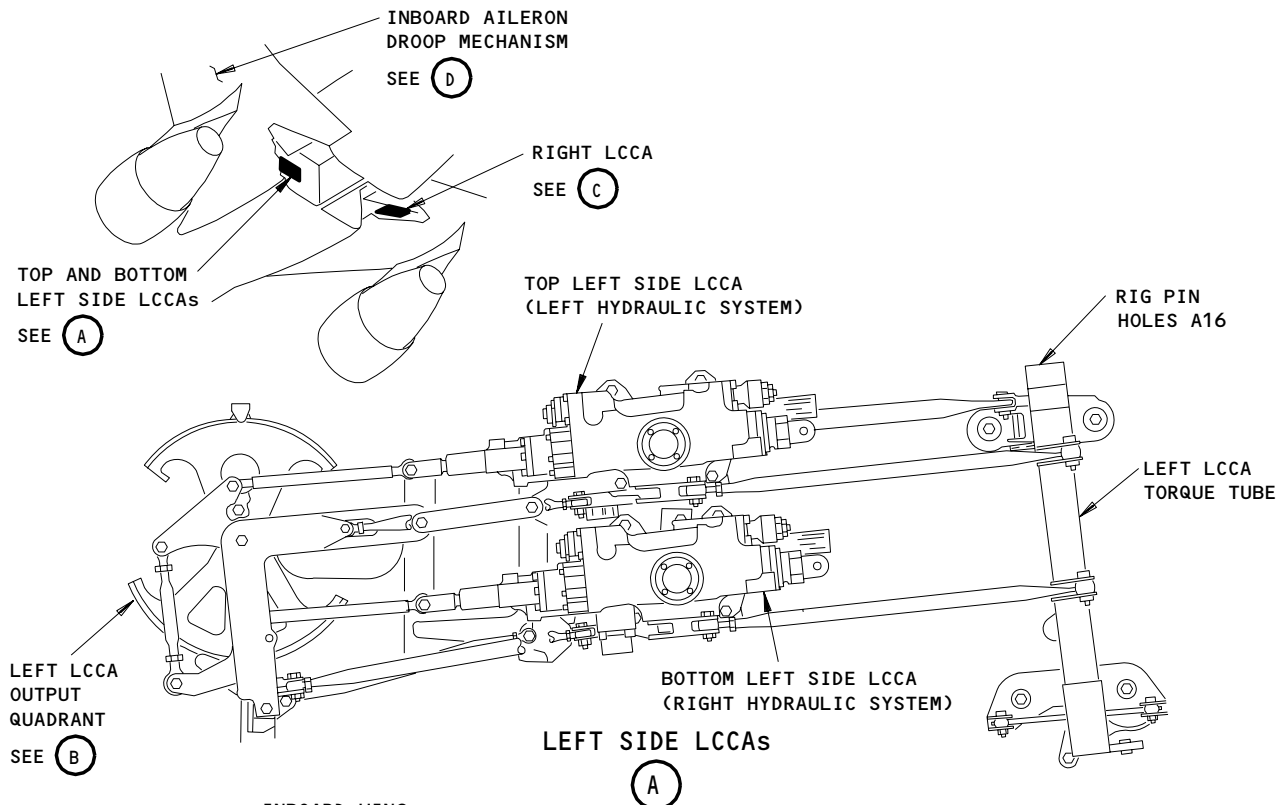
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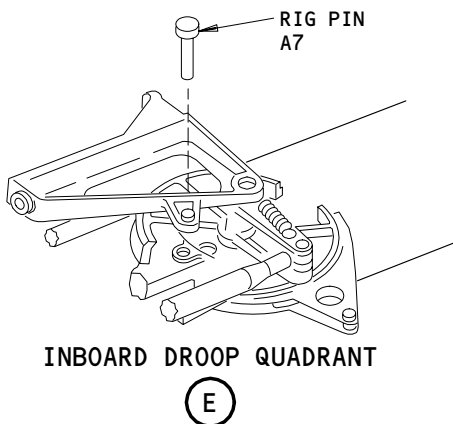
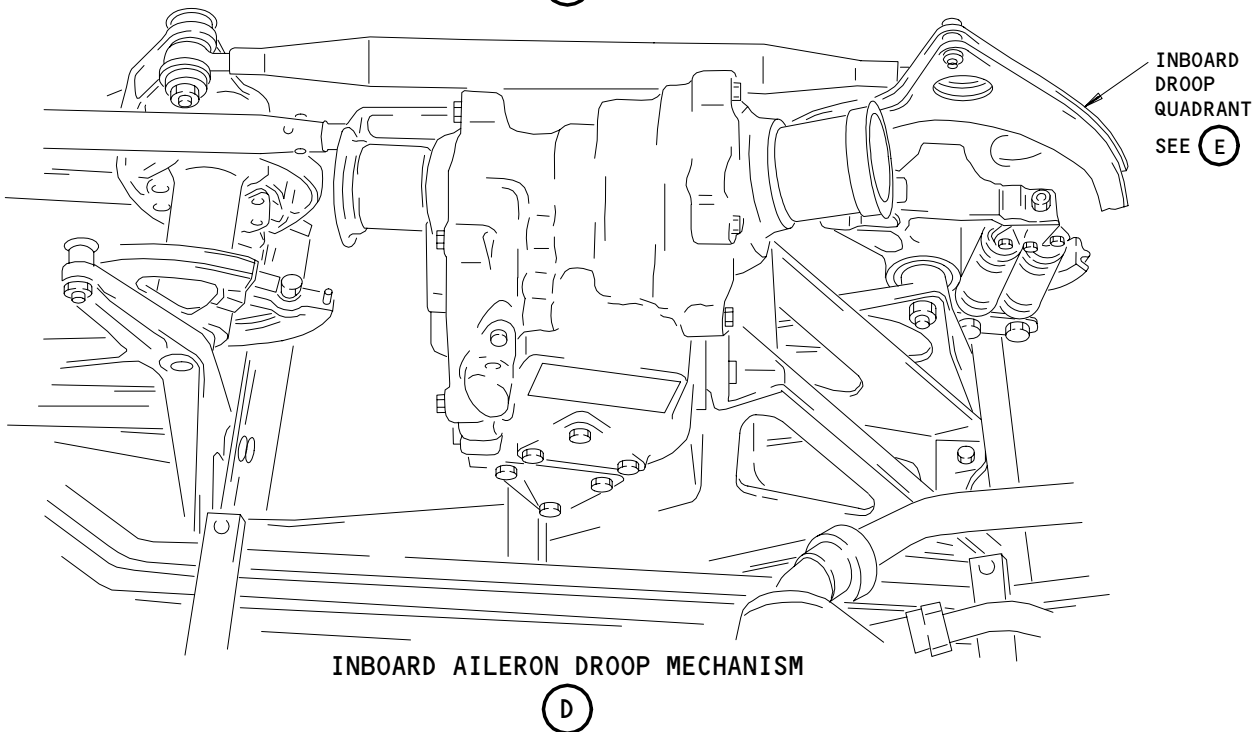
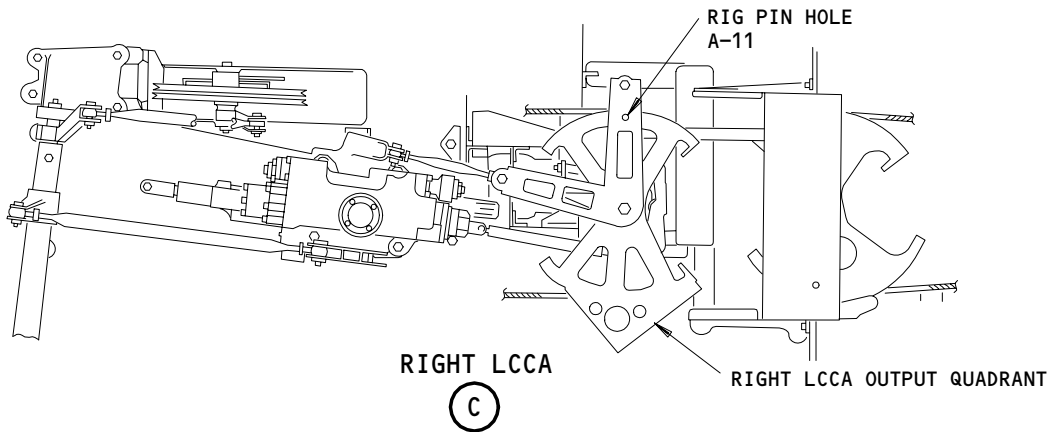
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Left LCCA Output Quadrant  
Figure 401 (Sheet 1)

EFFECTIVITY	
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Left LCCA Output Quadrant  
Figure 401 (Sheet 2)

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S 864-005

- (5) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

S 864-004

- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11E17, FLT CONT CMPTR PWR L
  - (b) 11E18, FLT CONT CMPTR SERVO L
  - (c) 11E20, FLT CONT CMPTR PWR C
  - (d) 11E21, FLT CONT CMPTR SERVO C
  - (e) 11E35, FLT CONT CMPTR PWR R
  - (f) 11E36, FLT CONT CMPTR PWR R
  - (g) 11H15, FLT CONT SHUTOFF WING L
  - (h) 11H16, FLT CONT SHUTOFF WING CTR
  - (i) 11H26, FLT CONT SHUTOFF WING R

S 014-006

- (7) Open access panel 561AB (AMM 06-44-00/201).
- D. Remove the Left LCCA Output Quadrant (Fig. 401)

S 434-023

- (1) Do these steps to disconnect the cables from the quadrant:
  - (a) Release the tension from inboard wing cables A3A and A3B at their turnbuckles.

NOTE: The turnbuckles for cables A3A and A3B are located outboard of the left LCCA output quadrant.
  - (b) Disconnect the cables from the quadrant and tag them for identification.
  - (c) Release the tension from the aft power bus cables AB3A and AB3B at the turnbuckles.

NOTE: The turnbuckles for cables AB3A and AB3B are located outboard of the center bulkhead for the right wheel well.
  - (d) Disconnect the cables from the quadrant and tag them for identification.

S 434-007

- (2) Disconnect these components:
  - (a) The LCCA output rods from the quadrant
  - (b) The two support rods and the link.

S 034-008

- (3) Remove the bolts that connect the quadrant support to the airplane structure.

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S 024-009

- (4) Remove the quadrant and support assembly.

TASK 27-11-18-424-010

### 3. Left LCCA Output Quadrant - Installation

NOTE: Refer to AMM 27-11-18/601 for the applicable wear limit data.

#### A. Equipment

- (1) Rig Pins from Kit A20004-78 (AMM 20-10-24/201):
  - (a) A5 - P/N A20004-22
  - (b) A7 - P/N A20004-20
  - (c) A11 - P/N A20004-15
  - (d) A16 - P/N A20004-16
- (2) Cable Tensiometer, Commercially Available

#### B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

#### C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-11-00/501, Aileron and Aileron Trim Control System
- (4) AMM 27-11-18/601, Left Lateral Central Control Actuator (LCCA) Output Quadrant
- (5) AMM 32-00-15/201, Landing Gear Door Locks
- (6) AMM 32-00-20/201, Landing Gear Downlocks

#### D. Access

- (1) Location Zone  
730 Left Hand Main Landing Gear and Doors

#### E. Install Left LCCA Output Quadrant

S 644-011

- (1) Apply grease to the smooth surface of the bolts and bushings before installation.

S 424-012

- (2) Apply sealant to the bolts (before installation) and install the quadrant and the support assembly.

S 434-013

- (3) Connect these components:
  - (a) Apply sealant to the bolt (before installation) and connect the link to the quadrant assembly.
  - (b) Install the bolt, washer and nut that connect the two support rods to the quadrant.
  - (c) Cables A3A, A3B, AB3A, and AB3B to the quadrant.

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- S 494-014
- (4) Install these rig pins:
- (a) A5 (for the left LCCA output quadrant)
  - (b) A7 (for the left inboard droop quadrant)
  - (c) A16 (for the left LCCA torque tube)
  - (d) A11 (for the right LCCA output quadrant).
- S 824-015
- (5) Tighten cables A3A and A3B to the tensions shown in Table 401 and do these steps:
- (a) Make sure rig pins A5 and A7 can move freely in their holes.
  - (b) Install cliplocks on the turnbuckles.
- S 824-016
- (6) Tighten cables AB3A and AB3B to the tensions shown in Table 401 and do these steps:
- (a) Make sure rig pins A5 and A11 can move freely in their holes.
  - (b) Install cliplocks on the turnbuckles.

Aileron Cable Rigging Loads Table 401		
TEMP °F	AFT POWER BUS CABLES (AB3A, AB3B) ±10 LBS	INBOARD WING CABLES A3A, A3B, A4A & A4B ±10 LBS
110	88	148
90	79	139
70	70	130
50	62	122
30	54	114
10	45	105
-10	37	97
-30	29	89
-40	23	83

- S 824-026
- (7) Do the adjustment procedure for the top left side (left hydraulic system) LCCA and for the bottom left side (right hydraulic system) LCCA (AMM 27-11-00/501).

**NOTE:** The output rods for the LCCAS will be connected during the adjustment procedure.

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F. Put the Airplane Back to Its Usual Condition

S 094-017

- (1) Remove rig pins A5, A7, A11, and A16.

S 094-025

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Remove the door locks from the main landing gear and close the doors (AMM 32-00-15/201).

S 864-018

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel P11:

- (a) 11E17, FLT CONT CMPTR PWR L
- (b) 11E18, FLT CONT CMPTR SERVO L
- (c) 11E20, FLT CONT CMPTR PWR C
- (d) 11E21, FLT CONT CMPTR SERVO C
- (e) 11E35, FLT CONT CMPTR PWR R
- (f) 11E36, FLT CONT CMPTR PWR R
- (g) 11H15, FLT CONT SHUTOFF WING L
- (h) 11H16, FLT CONT SHUTOFF WING CTR
- (i) 11H26, FLT CONT SHUTOFF WING R

S 864-024

- (4) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C and R switches on the right side panel, P61, to ON.

S 864-019

- (5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 414-020

- (6) Close access panel 561AB (AMM 06-44-00/201).

EFFECTIVITY

ALL

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02

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LEFT LATERAL CENTRAL CONTROL ACTUATOR (LCCA) OUTPUT QUADRANT  
INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for the Left LCCA Output Quadrant - Removal/Installation for procedures to do these tasks.

TASK 27-11-18-206-001

2. Left LCCA Output Quadrant Wear Limits

A. Access

- (1) Location Zone

730 Left Hand Main Landing Gear and Doors

B. Procedure

S 226-002

- (1) Use the supplied data (Fig. 601) to examine the left LCCA output quadrant for too much wear.

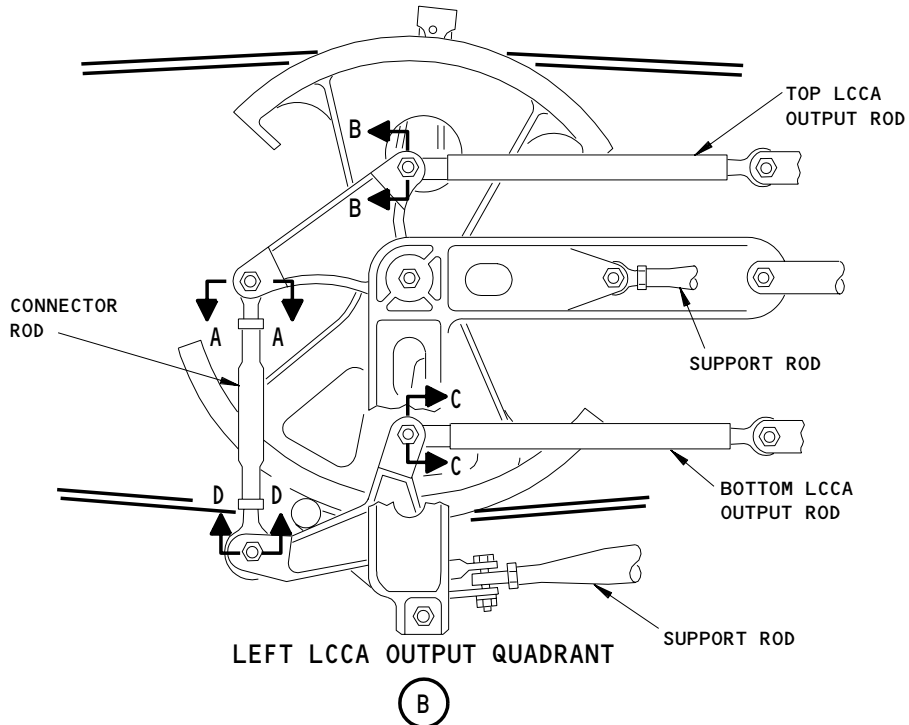
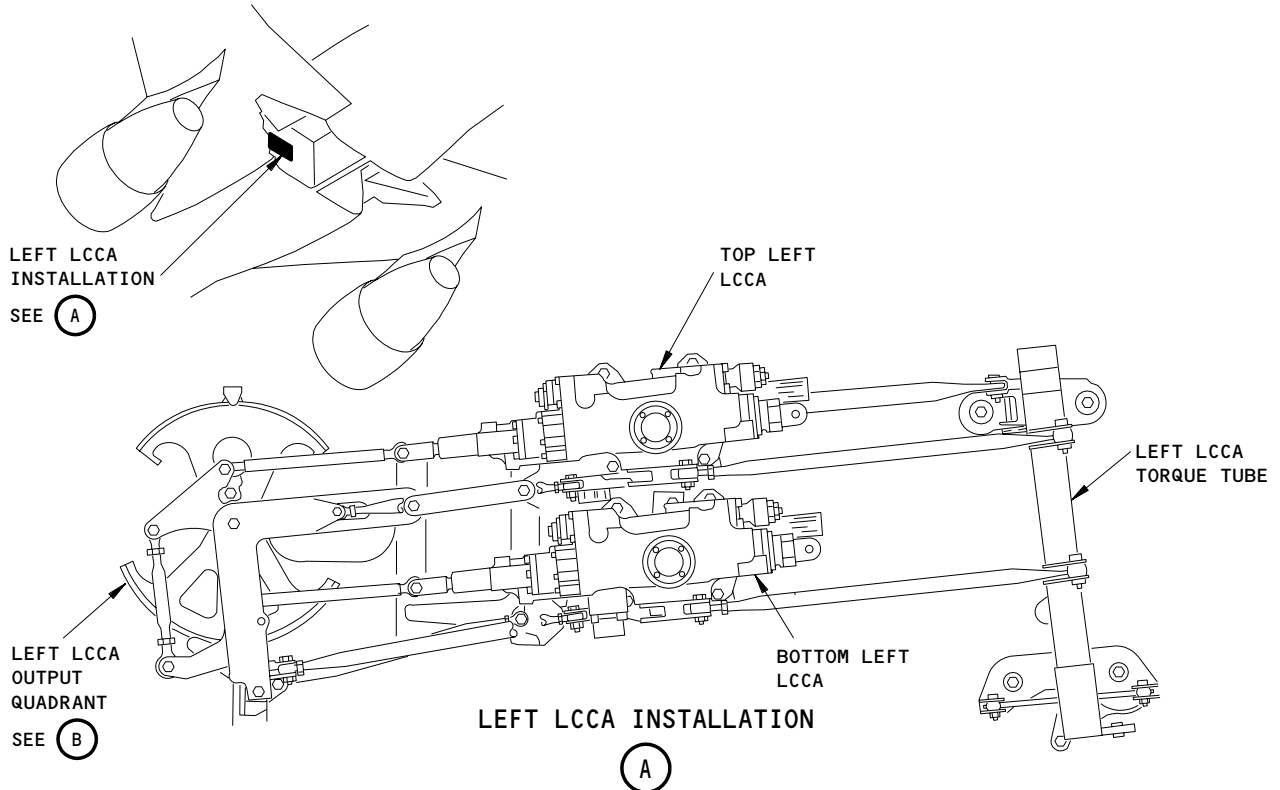
EFFECTIVITY

ALL

27-11-18

01

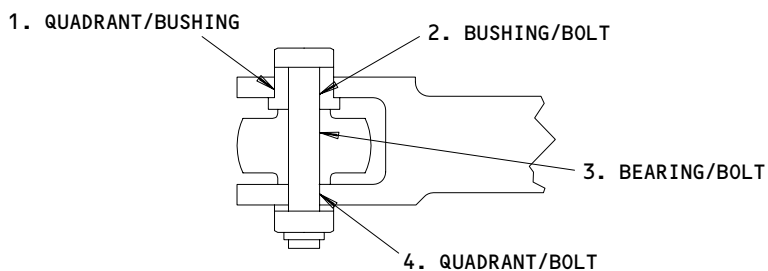
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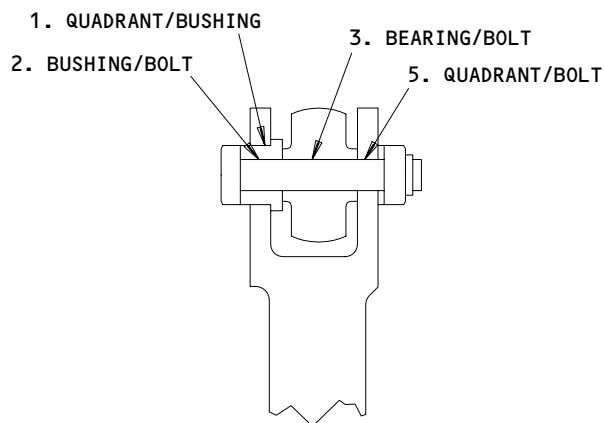
Left LCCA Output Quadrant Wear Limits  
Figure 601 (Sheet 1)

EFFECTIVITY	
ALL	

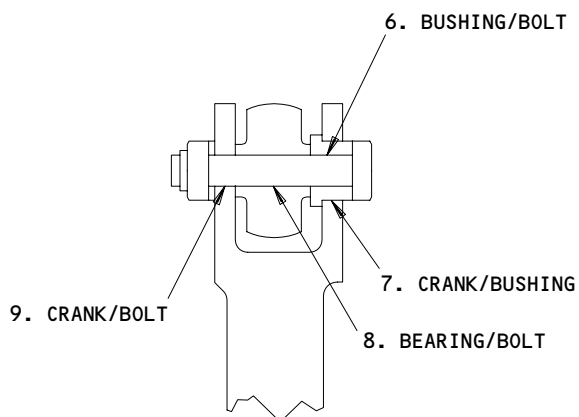
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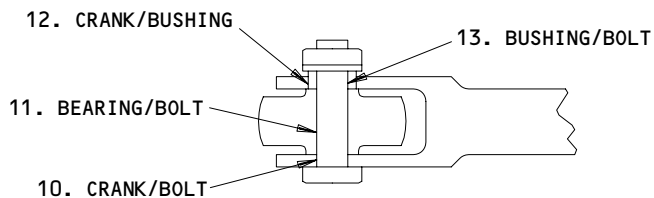
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B-B

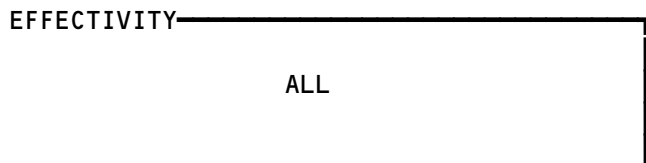


C-C



D-D

Left LCCA Output Quadrant Wear Limits  
Figure 601 (Sheet 2)



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# BOEING

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	QUADRANT	ID	0.3745 (9.512)	0.3755 (9.538)	0.3780 (9.601)	0.0035 (0.089)		X	
	BUSHING	OD	0.3740 (9.500)	0.3745 (9.512)	0.3720 (9.449)		X		
2	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
3	BEARING	ID	0.2495 (6.337)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
4	QUADRANT	ID	0.2495 (6.337)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)		X	
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
5	QUADRANT	ID	0.2500 (6.350)	0.2505 (6.363)	0.2540 (6.452)	0.0075 (0.191)		X	
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
6	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2540 (6.452)	0.0045 (0.114)	X		
	BOLT	OD	0.2480 (6.299)	0.2495 (6.337)	0.2460 (6.248)		X		
7	CRANK	ID	0.3745 (9.512)	0.3755 (9.538)	0.3780 (9.601)	0.0035 (0.089)		X	
	BUSHING	OD	0.3740 (9.500)	0.3745 (9.512)	0.3720 (9.449)		X		
8	BEARING	ID	0.2495 (6.337)	0.2500 (6.350)	0.2535 (6.439)	0.0040 (0.102)	X		
	BOLT	OD	0.2495 (6.337)	0.2505 (6.363)	0.2540 (6.452)		X		
9	CRANK	ID	0.2495 (6.337)	0.2505 (6.363)	0.2540 (6.452)	0.0045 (0.114)		X	
	BOLT	OD	0.2480 (6.299)	0.2495 (6.337)	0.2460 (6.248)		X		
10	CRANK	ID	0.3120 (7.925)	0.3130 (7.950)	0.3160 (8.026)	0.0040 (0.102)		X	
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3090 (7.849)		X		

THIS PART CAN BE REPAIRED.

Left LCCA Output Quadrant Wear Limits  
Figure 601 (Sheet 3)

EFFECTIVITY

ALL


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**BOEING**  
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MAINTENANCE MANUAL

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BEARING	ID	0.3120 (7.925)	0.3125 (7.938)	0.3155 (8.014)	0.0035 (0.089)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3090 (7.849)		X		
12	CRANK	ID	0.4375 (11.113)	0.4385 (11.138)	0.4415 (11.214)	0.0040 (0.102)		X	
	BUSHING	OD	0.4365 (11.087)	0.4375 (11.113)	0.4345 (11.036)		X		
13	BUSHING	ID	0.3125 (7.938)	0.3131 (7.953)	0.3161 (8.029)	0.0041 (0.104)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3090 (7.849)		X		

Left LCCA Output Quadrant Wear Limits  
Figure 601 (Sheet 4)

EFFECTIVITY ALL

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M34059

RIGHT LATERAL CENTRAL CONTROL ACTUATOR (LCCA) TORQUE TUBE -  
REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is used to remove the torque tube for the right lateral central control actuator (LCCA). The second task is used to install it.

TASK 27-11-24-024-001

2. Right LCCA Torque Tube - Removal

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 32-00-15/201, Landing Gear Door Locks
- (3) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zone  
740 Right Hand Main Landing Gear and Doors

C. Prepare for Removal

S 864-002

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

S 214-003

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-004

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 864-005

- (4) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

S 864-006

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

EFFECTIVITY

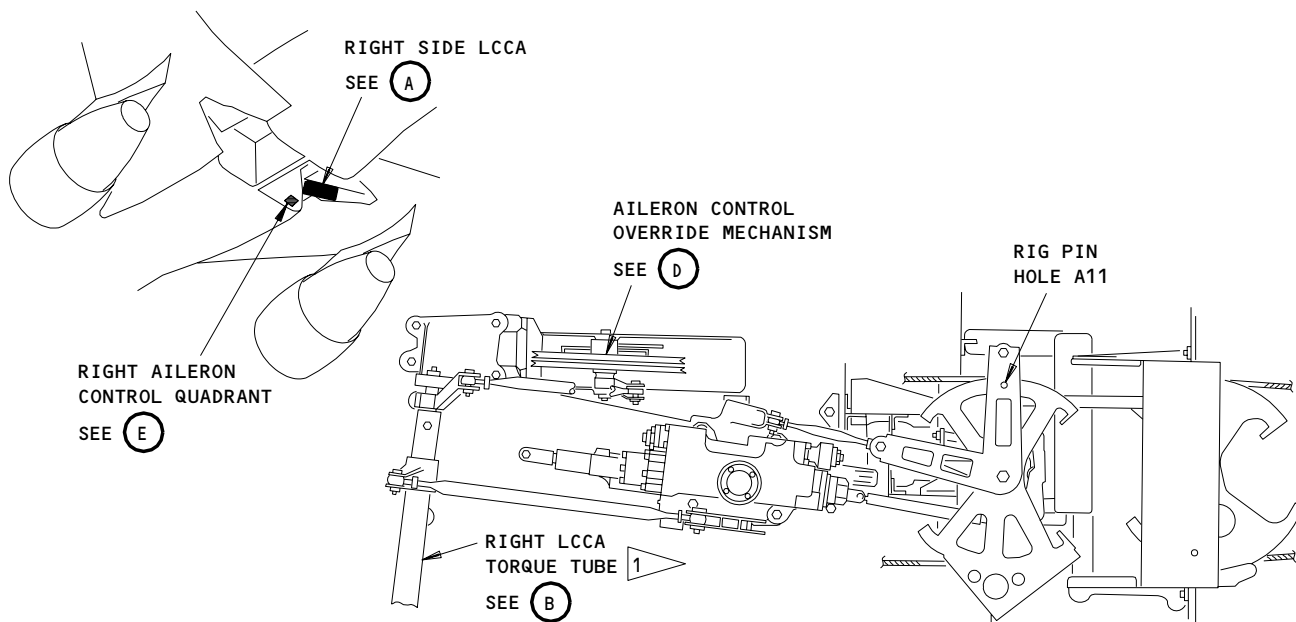
ALL

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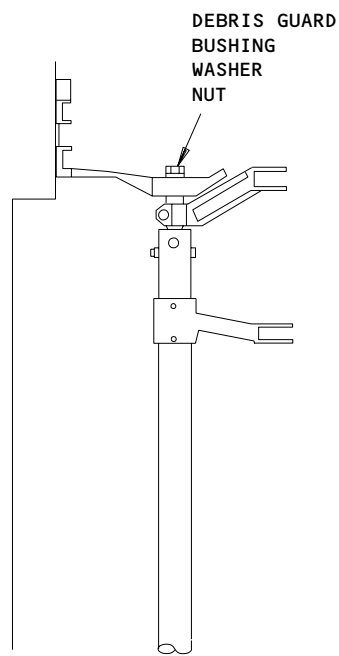
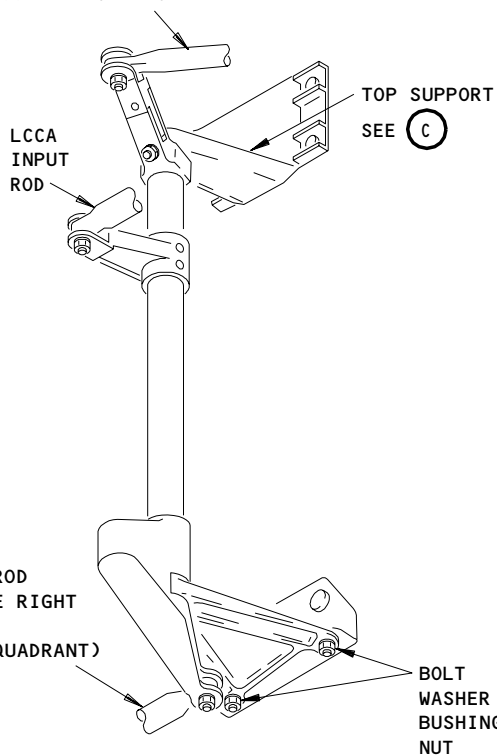




**RIGHT SIDE LCCA  
(CENTER HYDRAULIC SYSTEM)**

CONTROL ROD (TO THE  
OVERRIDE MECHANISM)

(A)



1 SHEAR RIVET LOCATION  
SHOWN BY PLACARD ON  
TORQUE TUBE

**RIGHT LCCA TORQUE TUBE**

(B)

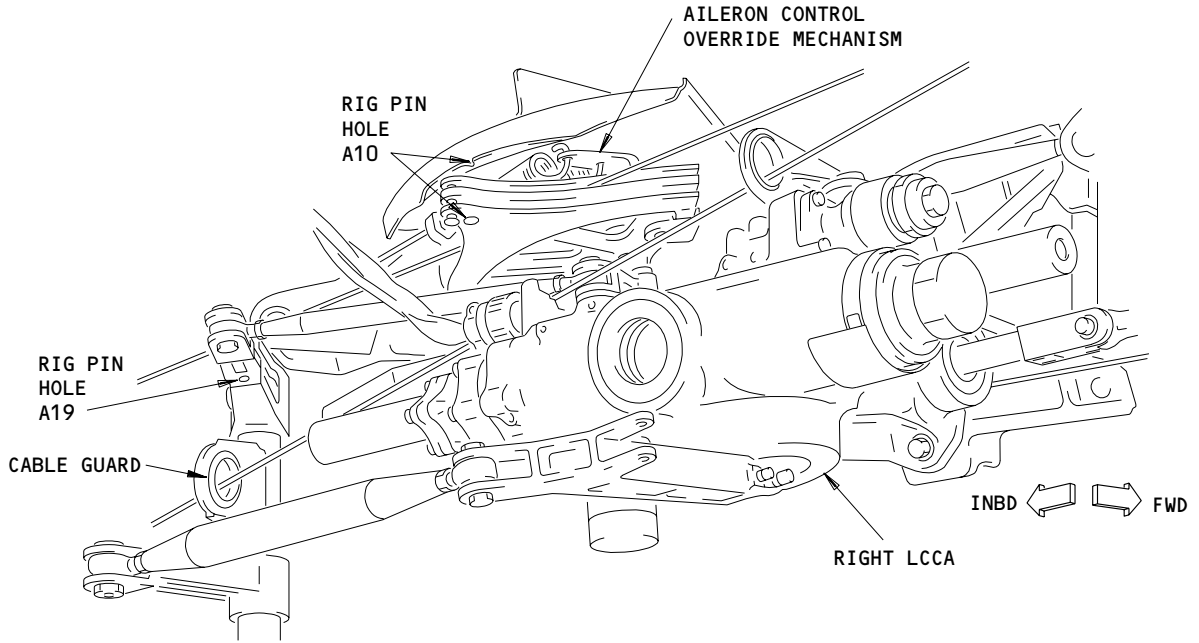
**TOP SUPPORT**

(C)

**Right Side LCCA Torque Tube  
Figure 401 (Sheet 1)**

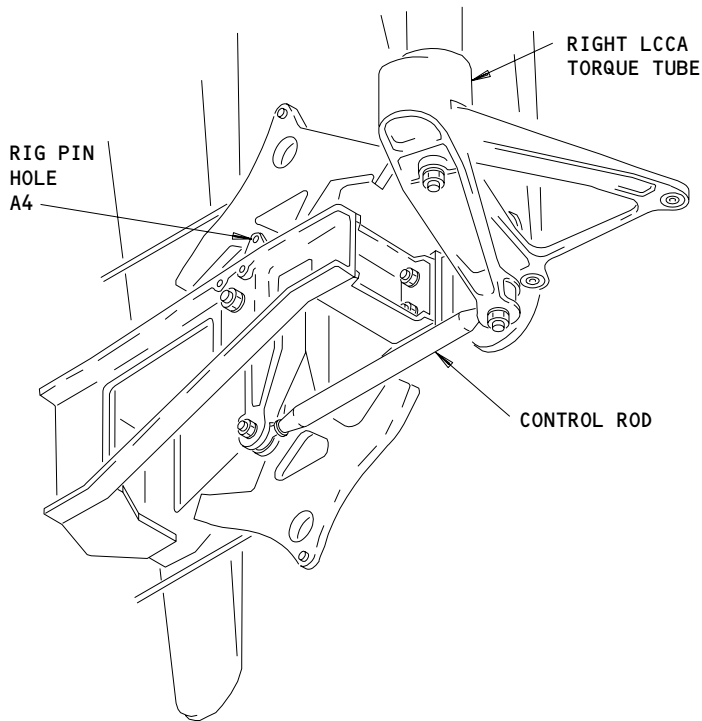
EFFECTIVITY	
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AILERON CONTROL OVERRIDE MECHANISM

(D)



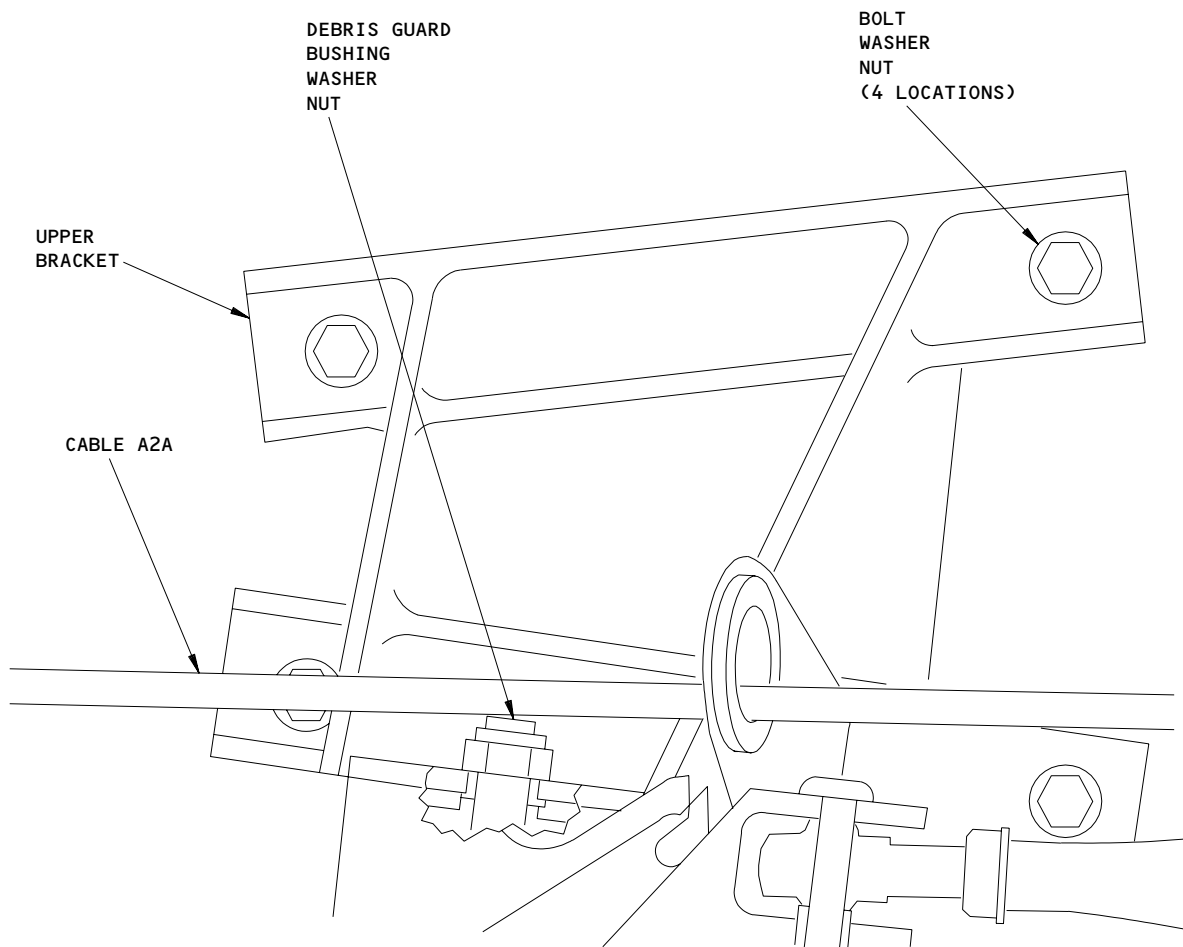
RIGHT AILERON CONTROL QUADRANT

(E)

Right LCCA Torque Tube  
Figure 401 (Sheet 2)

EFFECTIVITY	
	ALL

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(C)

Left LCCA Torque Tube Installation  
Figure 401 (Sheet 3)

EFFECTIVITY	
	ALL

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D. Remove the Right LCCA Torque Tube (Fig. 401)

S 034-007

- (1) Disconnect these components from the right LCCA torque tube:
- (a) The control rod (from the right aileron control quadrant)
  - (b) The LCCA input rod
  - (c) The control rod (to the override mechanism).

S 034-008

- (2) Do these steps to disconnect the torque tube:
- (a) Remove the bolts, washers, nuts, and bushings that connect the torque tube to the bottom support.
  - (b) Remove the nut, washer, bushing, and the debris guard that connect the torque tube to the top support.

S 024-023

- (3) Remove the cable guard from the torque tube.

S 024-009

- (4) Remove the torque tube.

E. Remove the Upper Bracket

S 024-026

- (1) If it is necessary, do these steps to remove the upper bracket from the rear spar.
- (a) AIRPLANES WITH CABLE GUIDE;
- Disconnect cable A2A-4 from the Right Aileron Control Output Quadrant.
- 1) Install these rig pins
    - a) A2 (for the first officer's drum assembly)
    - b) A12 (for the right aileron control output quadrant)
  - 2) Follow the cable A2A from the override mechanism inboard to the pulley. Follow cable A2A upward to where the cable enters the airplane and block cable A2A using cable clamps or an equivalent device.

EFFECTIVITY

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- 3) Release the tension from the cables A2A at the turnbuckle just outboard of the aileron control override mechanism.
  - 4) Disconnect cable A2A-4 from the override mechanism.
  - 5) Remove the cable from the cable guide.
- (b) Remove the bolts, washers, and nuts from the upper bracket.  
(c) Remove the bracket.

TASK 27-11-24-424-010

3. Right LCCA Torque Tube - Installation

NOTE: Refer to AMM 27-11-24/601 for the applicable wear limit data.

A. Equipment

- (1) Rig Pins from Kit A20004-78 (AMM 20-10-24/201):
  - (a) A4 - P/N A20004-19
  - (b) A10 - P/N A20004-17
  - (c) A19 - P/N A20004-15

B. Consumable Materials

- (1) A00247 Sealant - BMS 5-95
- (2) D00633 Grease - BMS 3-33 (Preferred)
- (3) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (4) D00015 Grease - BMS 3-24 (Alternate)

C. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-11-00/501, Aileron and Aileron Trim Control System
- (3) AMM 27-11-24/601, Right Lateral Central Control Actuator (LCCA) Torque Tube
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Landing Gear Door Locks

D. Access

- (1) Location Zone  
740 Right Hand Main Landing Gear and Doors

E. Install the Upper Bracket

S 424-027

- (1) Do these steps if the bracket was removed from the rear spar.
  - (a) Apply sealant to the bolts.
  - (b) Install the bolts, washers, and nuts to connect the bracket to the spar.
  - (c) AIRPLANES WITH CABLE GUIDE;  
Connect cable A2A-4 to the Override Mechanism.
    - 1) Put the cable through the cable guide and connect it to the override mechanism.

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- 2) Tighten cable A2A to the correct tension (27-11-00/501) and do these steps:

NOTE: Apply the tensiometer to the cable at least six inches from the turnbuckle terminal or other fittings. To make sure you have the correct cable tension, permit a minimum of one hour at constant ambient temperature (+/- 5 degrees Fahrenheit) for airframe temperature to become stable.

- a) Remove all cable clamps.
  - b) Make sure rig pins A2, A10 and A12 can move freely in their holes.
  - c) Install cliplocks on the turnbuckles.
- 3) Remove these rig pins
    - a) A2 (for the first officer's drum assembly)
    - b) A12 (for the right aileron control output quadrant)

F. Install the Right LCCA Torque Tube (Fig. 401)

NOTE: The torque tube upper fitting may be secured for transport with a spacer and nut. These parts must be removed before the torque tube is installed on the airplane.

S 644-011

- (1) Apply grease to the bolts and bushings before installation.

S 434-024

- (2) Install the cable guard on the torque tube.

S 434-020

- (3) Do these steps to install the torque tube:
  - (a) Install the debris guard, bushing, washer, and the nut that connect the torque tube to its top support.

NOTE: Apply grease to the bearing surfaces before installation.

- (b) Install the bushings, bolts, washers, and nuts that connect the torque tube to its bottom support.

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- S 494-012
- (4) Install these rig pins:
- (a) A4 (for the right control quadrant)
  - (b) A10 (for the override mechanism)
  - (c) A19 (for the right torque tube)
- S 434-013
- (5) Do these steps to connect the control rod (from the right aileron control quadrant):
- (a) Adjust the control rod (from the right aileron control quadrant) until the rod end bolts can be easily installed. Tighten the jamnuts.
  - (b) Connect the control rod to the torque tube.
  - (c) Make sure that rig pins A4 and A19 can move freely in their holes.
- S 434-014
- (6) Do these steps to connect the control rod (to the override mechanism) to the torque tube:
- (a) Adjust the control rod (to the override mechanism) until the rod end bolts can be easily installed. Tighten the jamnuts.
  - (b) Connect the control rod to the torque tube.
  - (c) Make sure that rig pins A10 and A19 can move freely in their holes.
- S 094-015
- (7) Remove rig pins A4, A10 and A19.
- S 824-016
- (8) Do the adjustment procedure for the right side (center hydraulic system) LCCA (AMM 27-11-00/501).

**NOTE:** The LCCA input rod will be connected during this procedure.

EFFECTIVITY

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G. Put the Airplane Back to Its Usual Condition

S 094-017

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the main landing gear doors and close the doors (AMM 32-00-15/201).

S 864-018

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 864-021

- (3) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.

S 864-019

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

EFFECTIVITY

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RIGHT LATERAL CENTRAL CONTROL ACTUATOR (LCCA) TORQUE TUBE -  
INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Right LCCA Torque Tube - Removal/Installation for procedures to do these tasks.

TASK 27-11-24-206-002

2. Right Lateral Central Control Actuator (LCCA) Torque Tube - Wear Limits

A. Access

- (1) Location Zone

740 Right Hand Main Landing Gear and Doors

B. Procedure

S 226-001

- (1) Use the supplied data (Fig. 601) to examine the right LCCA torque tube for too much wear.

EFFECTIVITY

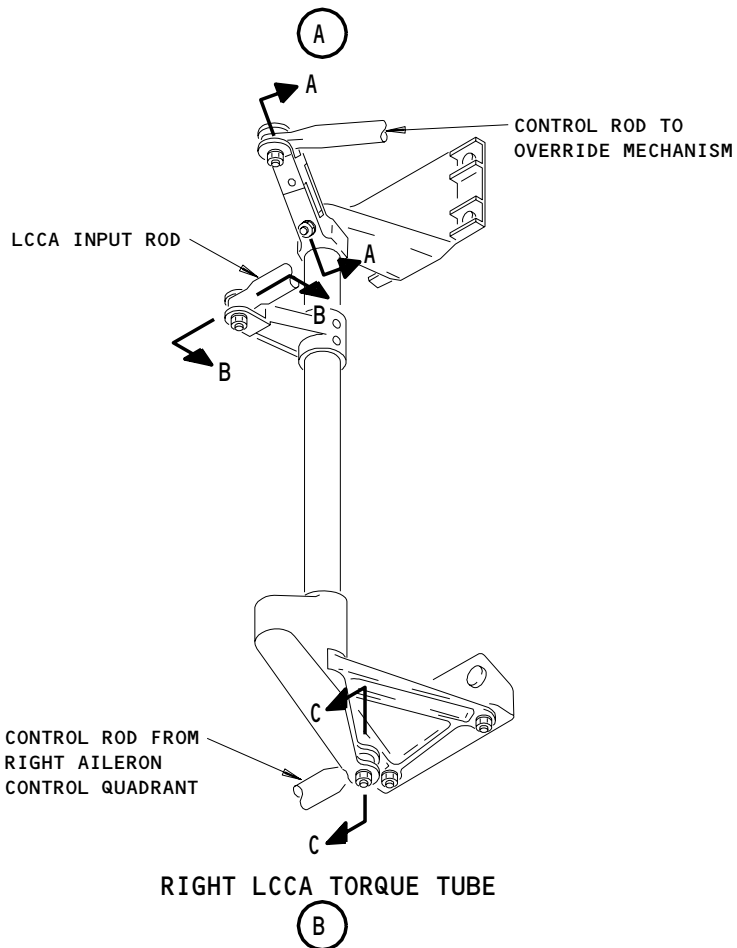
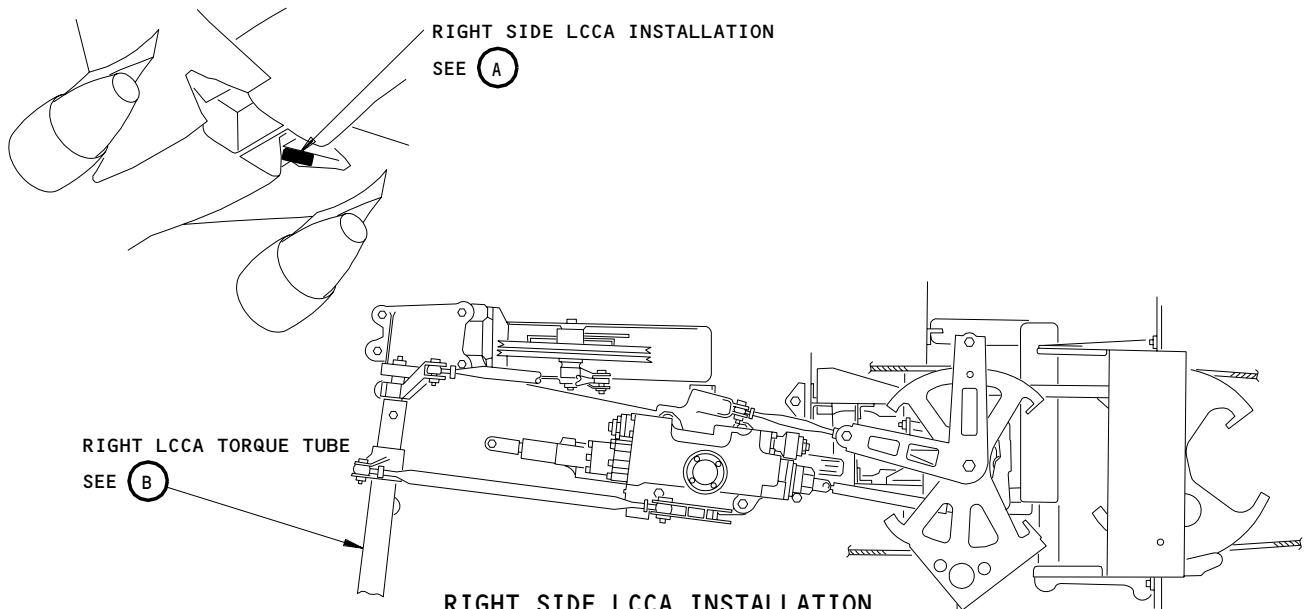
ALL

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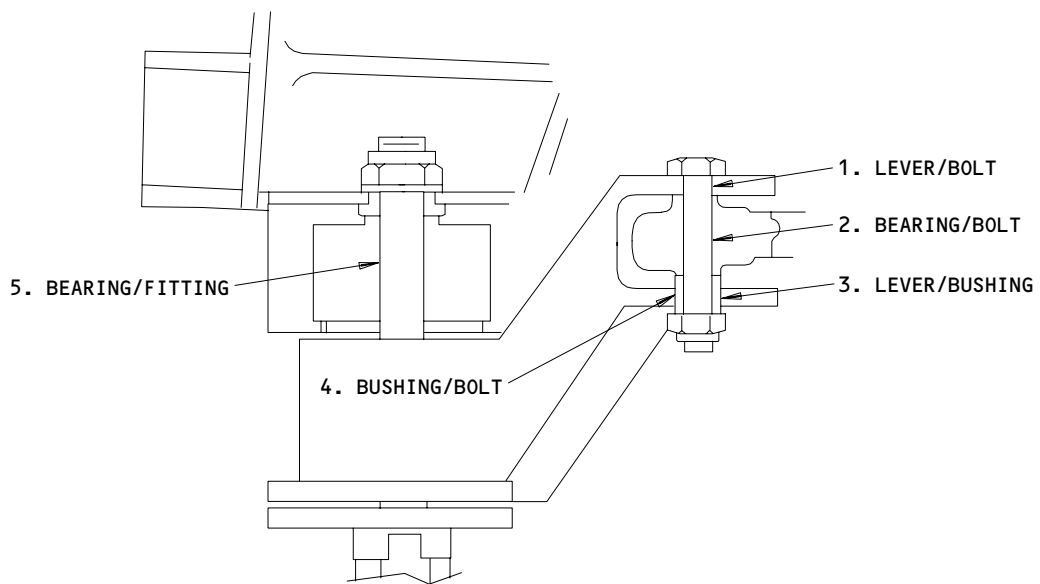
**BOEING**  
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MAINTENANCE MANUAL



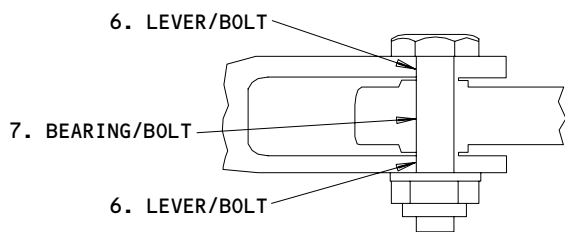
Right LCCA Torque Tube Wear Limits  
Figure 601 (Sheet 1)

EFFECTIVITY	ALL
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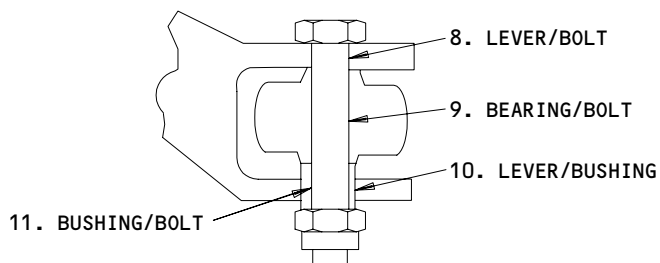
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A-A

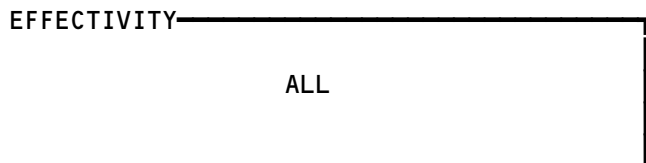


B-B



C-C

Right LCCA Torque Tube Wear Limits  
Figure 601 (Sheet 2)



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# BOEING

## 767 MAINTENANCE MANUAL

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	LEVER	ID	0.2495 (6.337)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)		X	
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
2	BEARING	ID	0.2497 (6.342)	0.2500 (6.350)	0.2535 (6.439)	0.0040 (0.102)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2460 (6.248)		X		
3	LEVER	ID	0.3745 (9.512)	0.3755 (9.538)	0.3780 (9.601)	0.0035 (0.089)		X	
	BUSHING	OD	0.3740 (9.500)	0.3745 (9.512)	0.3720 (9.449)		X		
4	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
5	BEARING	ID	0.3745 (9.512)	0.3750 (9.525)	0.3778 (9.596)	0.0028 (0.071)	X		
	FITTING	OD	0.3742 (9.505)	0.3750 (9.525)	0.3722 (9.454)			X	
6	LEVER	ID	0.2495 (6.337)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)		X	
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
7	BEARING	ID	0.2497 (6.342)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
8	LEVER	ID	0.2500 (6.350)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)		X	
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		

THIS PART CAN BE REPAIRED.

Right LCCA Torque Tube Wear Limits  
Figure 601 (Sheet 3)

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
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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
9	BEARING	ID	0.2497 (6.342)	0.2500 (6.350)	0.2525 (6.414)	0.0030 (0.076)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2470 (6.274)		X		
10	LEVER	ID	0.3750 (9.525)	0.3756 (9.540)	0.3776 (9.591)	0.0031 (0.079)		X	
	BUSHING	OD	0.3740 (9.500)	0.3745 (9.512)	0.3725 (9.462)		X		
11	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2470 (6.274)		X		

Right LCCA Torque Tube Wear Limits  
Figure 601 (Sheet 4)

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RIGHT AILERON CONTROL QUADRANT - REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is used to remove the right aileron control quadrant and the second task is used to install it.

TASK 27-11-26-024-008

2. Right Aileron Control Quadrant - Removal

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 32-00-15/201, Landing Gear Door Locks
- (3) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zone  
740 Main Landing Gear and Doors (Right)

C. Prepare for Removal

S 864-009

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

S 214-010

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-007

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 864-011

- (4) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

S 864-012

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

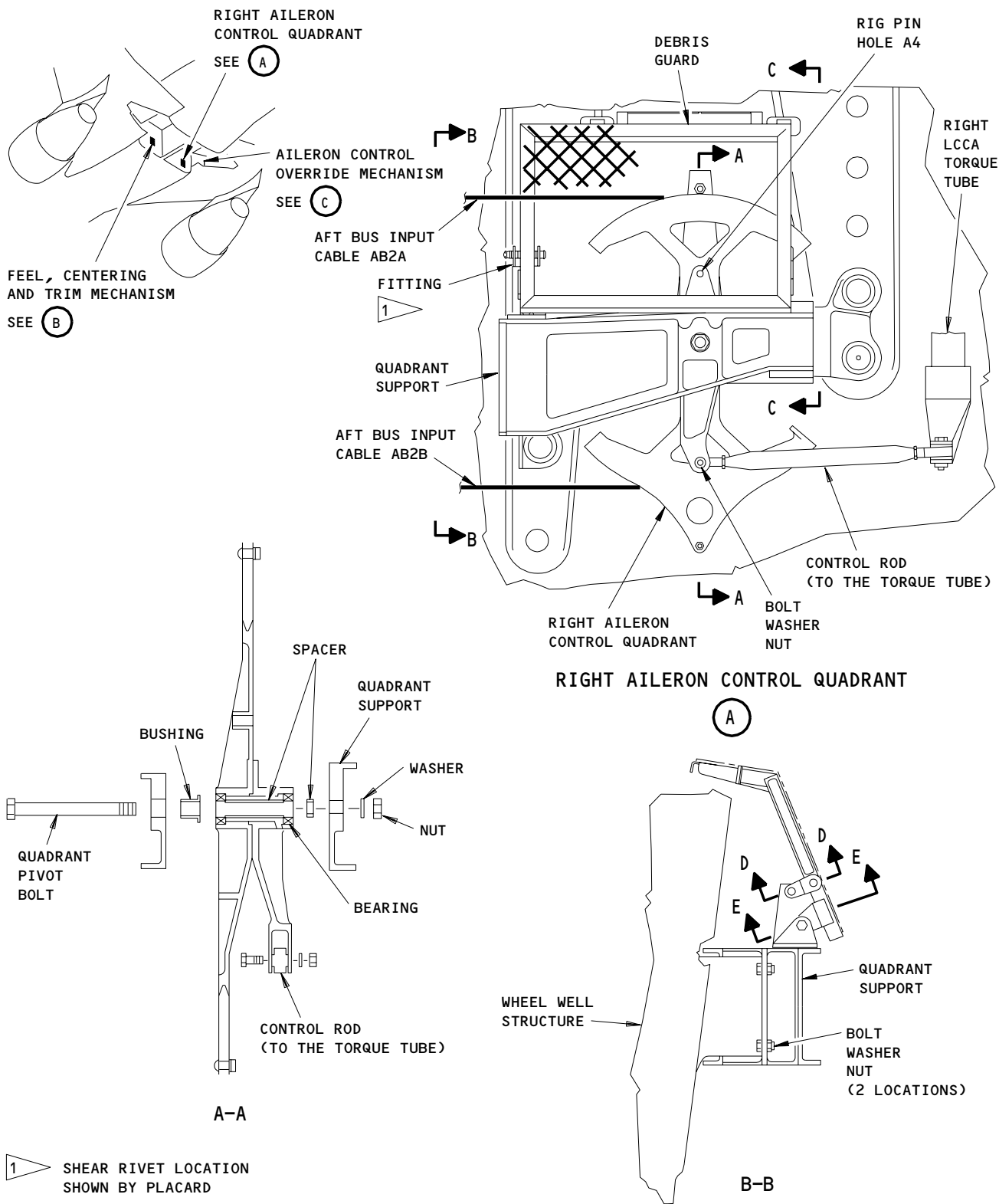
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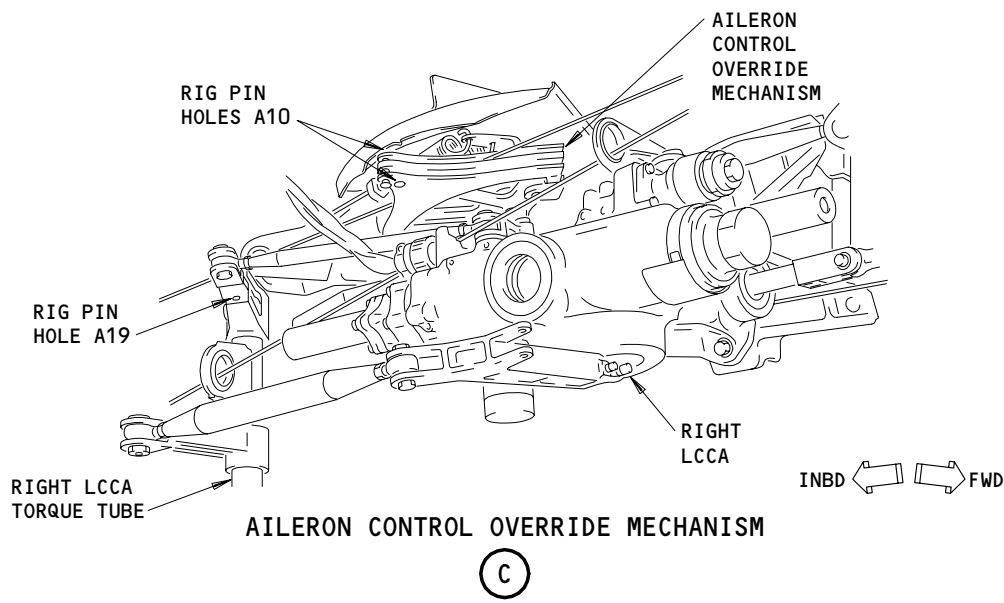
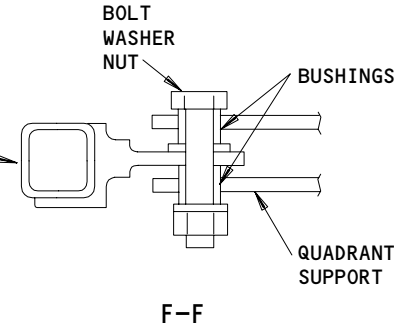
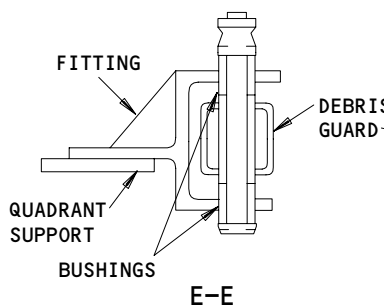
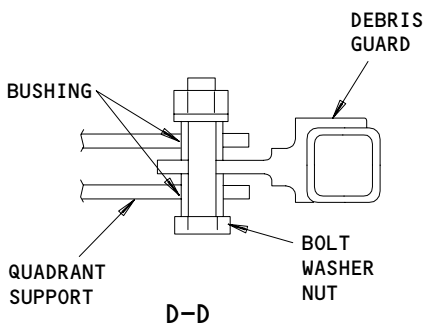
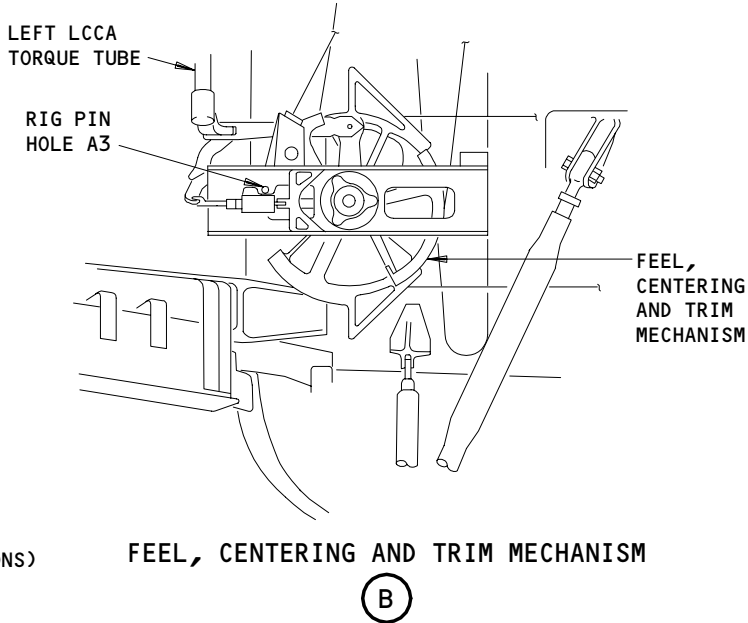
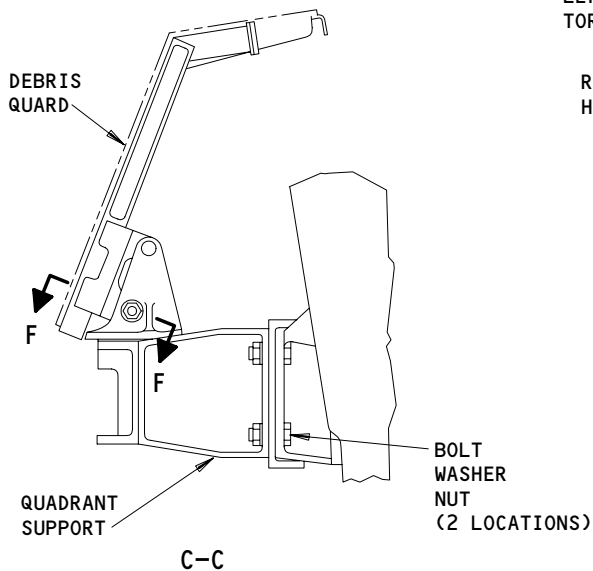
Right Aileron Control Quadrant Installation  
Figure 401 (Sheet 1)

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Right Aileron Control Quadrant Installation  
Figure 401 (Sheet 2)

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D. Remove the Right Aileron Control Quadrant (Fig. 401)

S 824-013

- (1) Release the tension from aft input bus cables AB2A and AB2B at their turnbuckles.

**NOTE:** The turnbuckles for cables AB2A and AB2B are located inboard of the right aileron control quadrant in the wheel well for the right main gear.

S 034-014

- (2) Disconnect these components from the control quadrant:
  - (a) cables AB2A and AB2B and tag them for identification
  - (b) the control rod (to the torque tube).

S 034-001

- (3) Do these steps to remove the quadrant and its support assembly:
  - (a) Remove the four bolts that connect the assembly to the airplane structure (Views B-B and C-C).
  - (b) Remove the quadrant, the support assembly, and the debris guard as an assembly from the airplane structure.

S 034-002

- (4) Do these steps to remove the control quadrant from its support assembly:
  - (a) Remove the quadrant pivot bolt.
  - (b) Remove the control quadrant.

TASK 27-11-26-424-015

3. Right Aileron Control Quadrant - Installation

**NOTE:** Refer to AMM 27-11-26/601 for the applicable wear limit data.

A. Equipment

- (1) Rig Pins from Kit A20004-78 (AMM 20-10-24/201):
  - (a) A3 - P/N A20004-22
  - (b) A4 - P/N A20004-19
  - (c) A19 - P/N A20004-15

- (2) Cable Tensiometer, Commercially Available

B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

C. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-11-26/601, Right Aileron Control Quadrant
- (3) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems
- (4) AMM 32-00-15/201, Landing Gear Door Locks

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D. Access

- (1) Location Zone  
740 Main Landing Gear and Doors (Right)

E. Install the Right Aileron Control Quadrant (Fig. 401)

S 644-016

- (1) Apply grease to the smooth surface of the bolts before installation.

S 494-017

- (2) Install these rig pins:  
(a) A3 (for the feel, centering, and trim mechanism)  
(b) A19 (for the right LCCA torque tube)

S 434-003

- (3) Do the steps to install the quadrant in its support assembly:  
(a) Align the quadrant with the hole for the pivot bolt in the support assembly.  
(b) Install the spacers, bearings, bushing, bolt, washer and the nut. Tighten the nut to 90-110 pound-inches (10.2-12.4 Nm) above the self-locking torque.

NOTE: Tighten the nut to just before it makes contact with the support assy, which time the self-locking torque should be measured. The self-locking torque should be measured. The self-locking torque should then be added to the 90 to 110 inches-pounds torque value and the nut tightened to within the calculated torque range.

S 424-018

- (4) Install the quadrant support and tighten the bolts that connect it to the airplane structure (4 locations).

S 434-019

- (5) Do these steps to install the control rod (from the torque tube):  
(a) Install rig pin A4 (for the right aileron control quadrant).  
(b) Adjust the control rod until the rod end bolts can be easily installed and tighten the jamnuts.  
(c) Connect the control rod to the control quadrant.  
(d) Make sure rig pins A4 and A19 can move freely in their holes.  
(e) Remove rig pin A19.

S 824-020

- (6) Do these steps if new cables were installed:  
(a) Tighten the cables to two times the value shown in Table 401.  
(b) Remove rig pins A3 and A4.  
(c) Cycle the control wheel 25 times through its full travel range.  
(d) Install rig pins A3 and A4.

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S 824-021

- (7) Adjust the cable tension to the values shown in Table 401.

**NOTE:** Make sure the airplane temperature is stable (use a tolerance of  $\pm 5^{\circ}$  F) along the cable. Make sure the temperature has been stable for at least one hour.

Table 401 AILERON CABLE RIGGING LOADS	
TEMP °F	AFT INPUT BUS CABLES AB2A, AB2B $\pm 10$ pounds
110	88
90	79
70	70
50	62
30	54
10	45
-10	37
-30	29
-40	23

S 214-022

- (8) Make sure rig pins A3 and A4 can move freely in their holes.

S 094-004

- (9) Remove rig pins A3 and A4.

S 864-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (10) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

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S 864-024

- (11) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 864-025

- (12) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.

S 864-026

- (13) Push the STATUS button on the display select panel to show the aileron position indicator on the display.

S 214-027

- (14) Turn the control wheel clockwise and do these checks:
- (a) Make sure the right ailerons move up and the left ailerons move down.
  - (b) Make sure the control wheel moves smoothly and does not need too much force.

S 214-028

- (15) Turn the control wheel counterclockwise and do these checks:
- (a) Make sure the control wheel moves smoothly and does not need too much force.
  - (b) Make sure the left ailerons move up and the right ailerons move down.

S 214-029

- (16) Move the control wheel to its neutral position and do this check:
- (a) Make sure the ailerons go back to their neutral positions.

S 214-030

- (17) Make sure that no more than two threads show at the turnbuckles.

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S 434-031

- (18) Install clip locks on the turnbuckles.

S 214-032

- (19) Turn the control wheel through its full travel range and do these checks:
- (a) Make sure the pulleys turn freely and do not touch the guards.
  - (b) Make sure the control wheel goes back to its neutral position when it is released.

F. Put the Airplane Back to Its Usual Condition

S 094-006

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS CAN OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the main landing gear and close the doors (AMM 32-00-15/201).

S 864-033

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-034

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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RIGHT AILERON CONTROL QUADRANT - INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Right Aileron Control Quadrant - Removal/Installation for procedures to do these tasks.

TASK 27-11-26-206-001

2. Right Aileron Control Quadrant - Wear Limits

A. Access

- (1) Location Zone

740 Right Hand Main Landing Gear and Doors

B. Procedure

S 226-002

- (1) Use the supplied data (Fig. 601) to examine the right aileron control quadrant for too much wear.

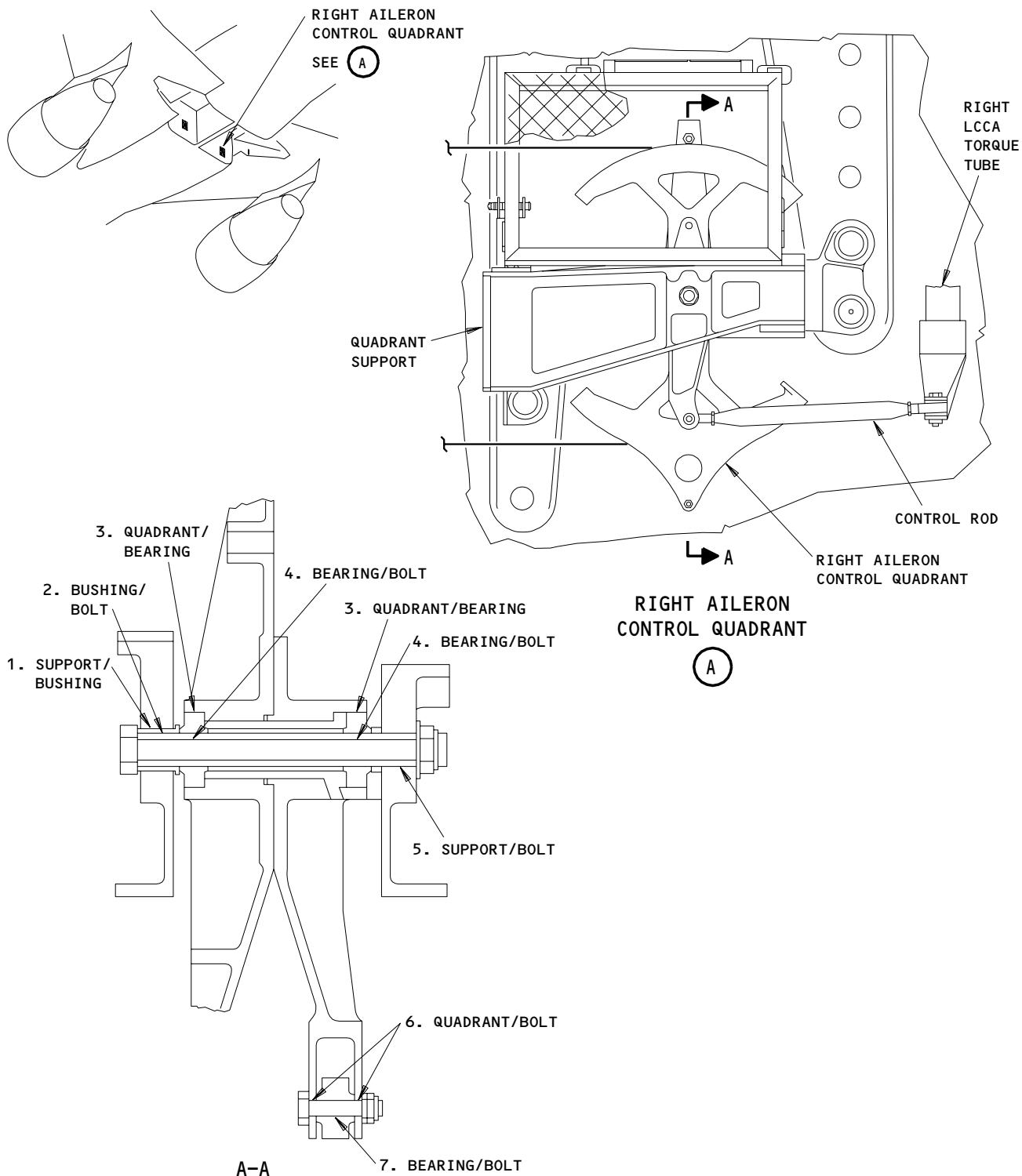
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




Right Aileron Control Quadrant Wear Limits  
Figure 601 (Sheet 1)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	SUPPORT	ID	0.6250 (15.875)	0.6255 (15.888)	0.6280 (15.951)	0.0035 (0.089)		X	
	BUSHING	OD	0.6240 (15.850)	0.6245 (15.862)	0.6220 (15.799)		X		
2	BUSHING	ID	0.5000 (12.700)	0.5006 (12.715)	0.5031 (12.779)	0.0037 (0.094)	X		
	BOLT	OD	0.4989 (12.672)	0.4994 (12.685)	0.4969 (12.621)		X		
3	QUADRANT	ID	1.1252 (28.580)	1.1258 (28.595)	1.1282 (28.656)	0.0032 (0.081)	X		
	BEARING	OD	1.1246 (28.565)	1.1250 (28.575)	1.1226 (28.514)		X		
4	BEARING	ID	0.4997 (12.692)	0.5000 (12.700)	0.5025 (12.764)	0.0031 (0.079)	X		
	BOLT	OD	0.4989 (12.672)	0.4994 (12.685)	0.4969 (12.621)		X		
5	SUPPORT	ID	0.5000 (12.700)	0.5005 (12.713)	0.5030 (12.776)	0.0036 (0.091)		X	
	BOLT	OD	0.4989 (12.672)	0.4994 (12.685)	0.4969 (12.621)		X		
6	QUADRANT	ID	0.2495 (6.337)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)		X	
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
7	BEARING	ID	0.2497 (6.342)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		

 THIS PART CAN BE REPAIRED.

Right Aileron Control Quadrant Wear Limits  
Figure 601 (Sheet 2)

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RIGHT LATERAL CENTRAL CONTROL ACTUATOR (LCCA) OUTPUT QUADRANT -  
REMOVAL/INSTALLATION

1. General

- A. This procedure contains four tasks. The first task contains the data that is necessary to remove the right LCCA output quadrant. The second task is used to install it. The third task supplies the data that is necessary to remove the right LCCA output quadrant spring. The fourth task is used to install it.

TASK 27-11-28-024-001

2. Right LCCA Output Quadrant - Removal

A. Equipment

- (1) Rig Pins from Kit A20004-78 (AMM 20-10-24/201):  
(a) A5 - P/N A20004-22  
(b) A12 - P/N A20004-21  
(c) A19 - P/N A20004-15

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 32-00-15/201, Landing Gear Door Locks  
(3) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

- (1) Location Zone  
740 Right Hand Main Landing Gear and Doors

D. Prepare for Removal

S 864-002

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

S 214-003

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-004

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 864-005

- (4) Move the FLT CONTROL SHUTOFF WING L, C, and R on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

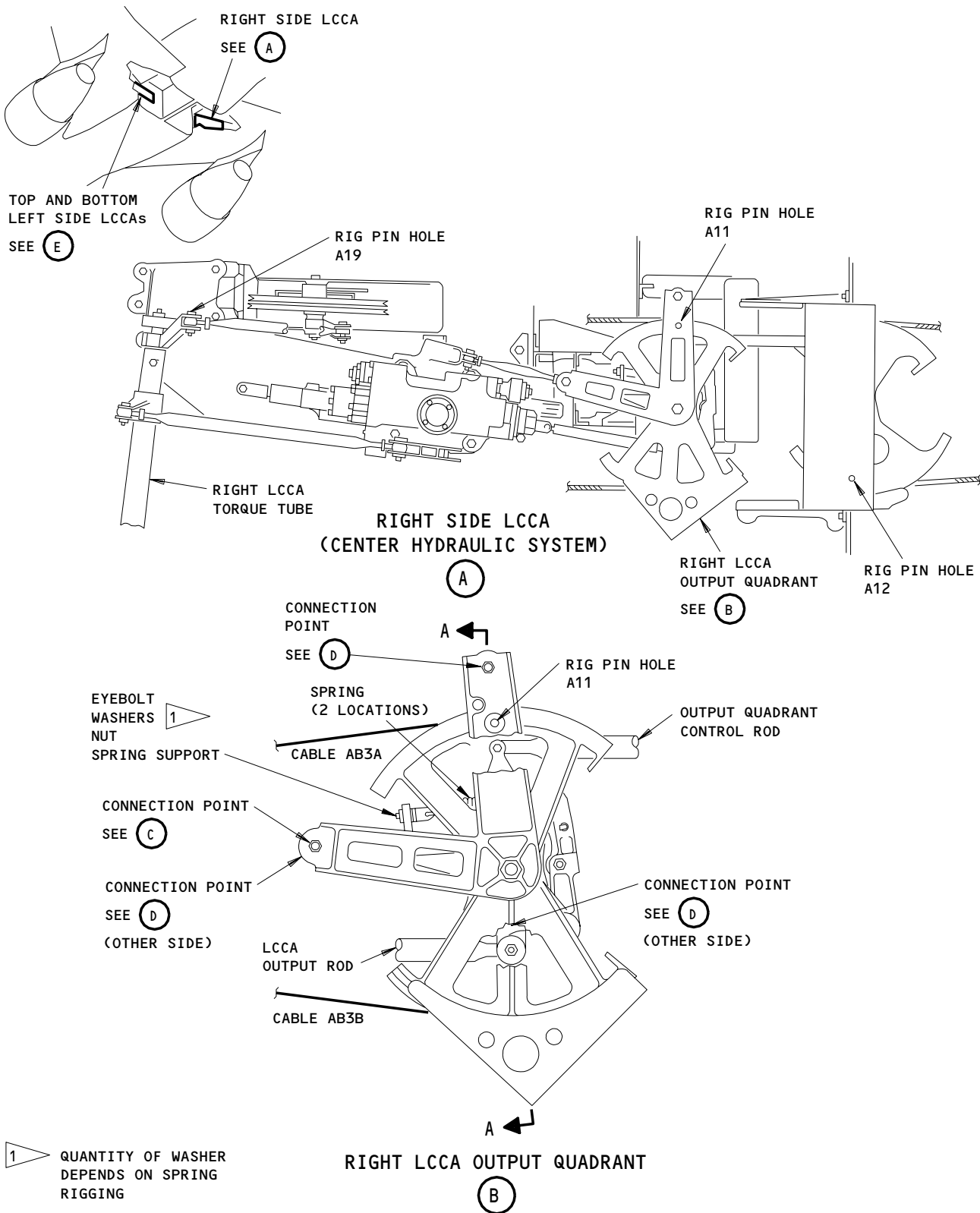
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Right LCCA Output Quadrant Installation  
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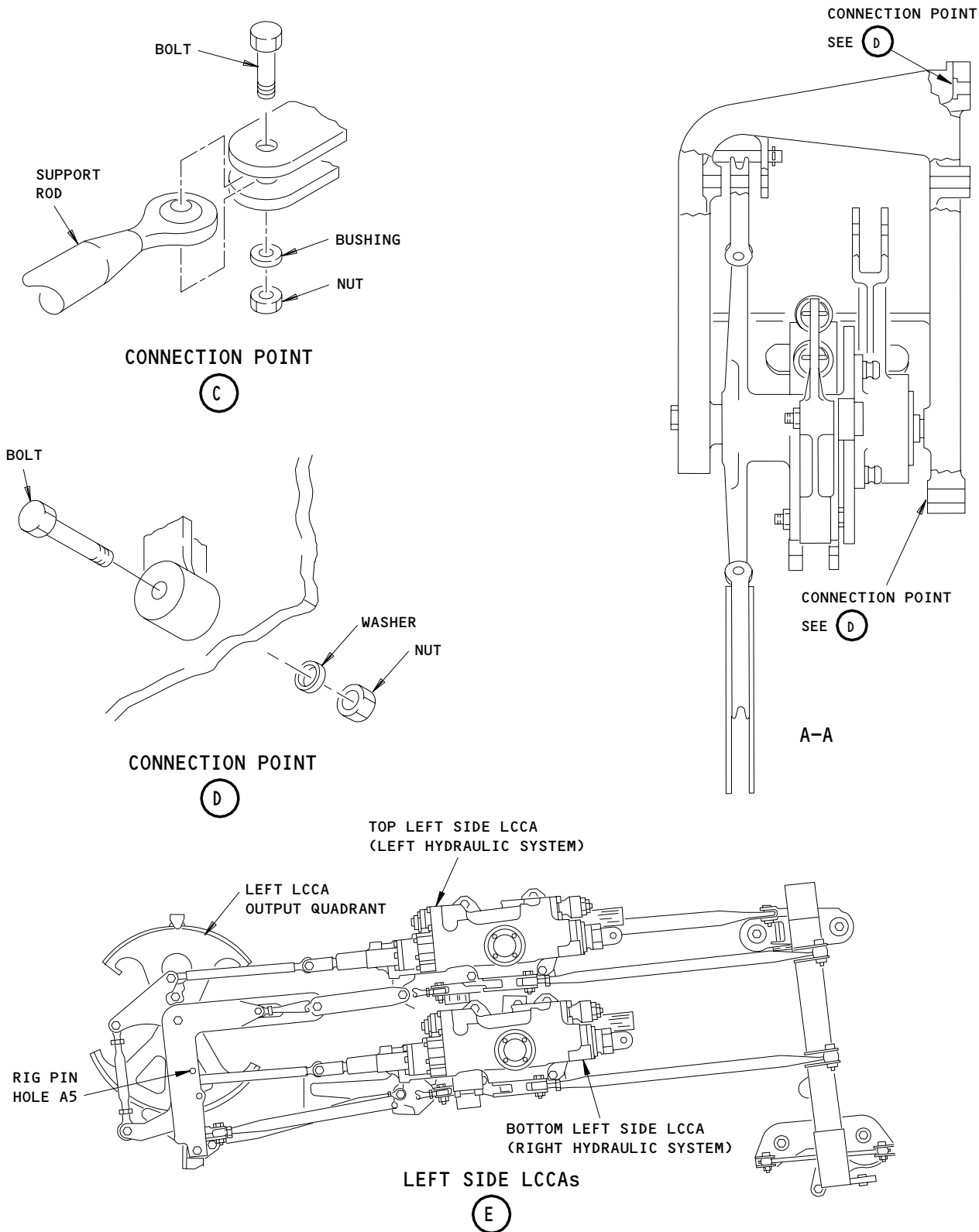
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Right LCCA Output Quadrant Installation  
Figure 401 (Sheet 2)

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S 864-006

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11E17, FLT CONT CMPTR PWR L
  - (b) 11E18, FLT CONT CMPTR SERVO L
  - (c) 11E20, FLT CONT CMPTR PWR C
  - (d) 11E21, FLT CONT CMPTR SERVO C
  - (e) 11E35, FLT CONT CMPTR PWR R
  - (f) 11E36, FLT CONT CMPTR SERVO R
  - (g) 11H15, FLT CONT SHUTOFF WING L
  - (h) 11H16, FLT CONT SHUTOFF WING CTR
  - (i) 11H26, FLT CONT SHUTOFF WING R

E. Remove the Right LCCA Output Quadrant (Fig. 401)

S 494-057

- (1) Install these rig pins:
- (a) A5 (for the left LCCA output quadrant)
  - (b) A12 (for the right aileron control output quadrant)
  - (c) A19 (for the right LCCA torque tube)

S 034-007

- (2) Do these steps to remove the cables from the quadrant:
- (a) Release the tension from aft power bus cables AB3A and AB3B at their turnbuckles.
  - (b) Remove the cables from the quadrant and tag them for identification.

NOTE: The turnbuckles for cables AB3A and AB3B are located outboard of the center bulkhead in the wheel well for the right main gear.

S 034-058

- (3) Do these steps to remove the cable A2A from the right aileron control output quadrant:
- (a) Release the tension from cable A2A at the turnbuckle.
  - (b) Remove the cable A2A from the quadrant and tag it for identification.

S 034-008

- (4) Disconnect these components from the quadrant:
- (a) The LCCA output rod.
  - (b) The output quadrant control rod.

S 034-009

- (5) Remove the bolts that connect the quadrant support to the airplane structure (5 locations).

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S 024-010

- (6) Remove the quadrant and its support.

TASK 27-11-28-424-011

### 3. Right LCCA Output Quadrant - Installation

NOTE: Refer to 27-11-28 for the applicable wear limit data.

#### A. Equipment

- (1) Rig Pins from Kit A20004-78 (AMM 20-10-24/201):
  - (a) A2 - P/N A20004-17
  - (b) A5 - P/N A20004-22
  - (c) A10 - P/N A20004-17
  - (d) A11 - P/N A20004-15
  - (e) A12 - P/N A20004-21
  - (f) A19 - P/N A20004-15
- (2) Cable Tensiometer, Commercially Available

#### B. Consumable Materials

- (1) A00247 Sealant, Chromate Type - BMS 5-95
- (2) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (3) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

#### C. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-11-00/501, Aileron and Aileron Trim Control System
- (3) AMM 27-11-28/601, Right Lateral Central Control Actuator (LCCA) Output Quadrant
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Landing Gear Door Locks

#### D. Access

- (1) Location Zone  
740 Right Hand Main Landing Gear and Doors

#### E. Install the Right LCCA Output Quadrant (Fig. 401)

S 644-012

- (1) Apply grease to the smooth surfaces of the bolts before installation.

S 424-013

- (2) Install the quadrant and its support on the airplane structure. Tighten the bolts (5 locations) and apply sealant.

S 494-014

- (3) Install these rig pins:
  - (a) A5 (for the left LCCA output quadrant)
  - (b) A11 (for the right LCCA output quadrant)
  - (c) A12 (for the right aileron control output quadrant)
  - (d) A19 (for the right LCCA torque tube)

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S 434-015

- (4) Do these steps to connect the output quadrant control rod:
- (a) Adjust the control rod until the rod end bolts can be easily installed.
  - (b) Connect the control rod.
  - (c) Make sure rig pins A11 and A12 can move freely in their holes.

S 824-053

- (5) Connect cable A2A to the quadrant.

S 824-054

- (6) Adjust the cable tension to the values shown in the Aileron Cable Rigging Loads Table (AMM 27-11-00/501). Do the checks that follow:

**NOTE:** The turnbuckles for cables A2A and A2B are located behind the third sidewall panel aft of the forward cargo door.

- (a) Make sure that rig pins A2 (for the first officer's drum assembly), A10 (for the override mechanism), and A12 (for the right aileron control output quadrant) can be easily installed.
- (b) Make sure that the breakout cam is in its center position in the override mechanism.

S 094-016

- (7) Remove rig pins A2, A10, A12 and A19.

S 824-017

- (8) Connect cables AB3A and AB3B to the quadrant. Do these steps if new cables were installed:
- (a) Tighten the cables to two times the value shown in Table 401.
  - (b) Remove rig pins A5 and A11.
  - (c) Cycle the control wheel 25 times through its full travel range.
  - (d) Install rig pins A5 and A11.

S 824-018

- (9) Adjust the cable tension to the values shown in Table 401.

**NOTE:** Make sure the airplane temperature is stable (use a tolerance of  $\pm 5$  °F) along the cable. Make sure the temperature has been stable for at least one hour.

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Aileron Cable Rigging Loads Table 401	
TEMP °F	AFT POWER BUS CABLES AB3A, AB3B ±10 LBS
110	88
90	79
70	70
50	62
30	54
10	45
-10	37
-30	29
-40	23

S 094-031

(10) Remove rig pins A5 and A11.

S 824-056

(11) Do the test of the Aileron Back-up Control (AMM 27-11-00/501).

S 824-019

(12) Do the adjustment procedure for the right LCCA (AMM 27-11-00/501).

**NOTE:** The LCCA output rod is connected during the adjustment procedure.

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S 864-020

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (13) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-049

- (14) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11E17, FLT CONT CMPTR PWR L
  - (b) 11E18, FLT CONT CMPTR SERVO L
  - (c) 11E20, FLT CONT CMPTR PWR C
  - (d) 11E21, FLT CONT CMPTR SERVO C
  - (e) 11E35, FLT CONT CMPTR PWR R
  - (f) 11E36, FLT CONT CMPTR SERVO R
  - (g) 11H15, FLT CONT SHUTOFF WING L
  - (h) 11H16, FLT CONT SHUTOFF WING CTR
  - (i) 11H26, FLT CONT SHUTOFF WING R

S 864-023

- (15) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.

S 214-024

- (16) Turn the control wheel counterclockwise and do the checks that follow:
- (a) Make sure the left ailerons move up and the right ailerons move down.
  - (b) Make sure the control wheel moves smoothly and does not need too much force.

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S 214-025

- (17) Turn the control wheel clockwise and do the checks that follow:
- (a) Make sure the right ailerons move up and the left ailerons move down.
  - (b) Make sure the control wheel moves smoothly and does not need too much force.

S 214-026

- (18) Move the control wheel back to its neutral position and do this check:
- (a) Make sure the ailerons go back to their neutral positions.

S 864-032

- (19) Make sure that no more than two threads show at the turnbuckles. Install clip locks on the turnbuckles.
- F. Put the Airplane Back to Its Usual Condition

S 084-028

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the main landing gear and close the doors (AMM 32-00-15/201).

S 864-050

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-051

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-11-28-004-033

4. Right LCCA Output Droop Quadrant Springs Removal

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control

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- (2) AMM 32-00-15/201, Main Gear Door Locks
- (3) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zone  
740 Right Hand Main Landing Gear and Doors

C. Prepare for Removal

S 864-035

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

S 214-036

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 014-037

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 864-038

- (4) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

S 864-039

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

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D. Right LCCA Output Droop Quadrant Springs Removal

S 024-040

- (1) Remove the spring from the LCCA Output quadrant:
  - (a) Remove the nut and washers from the eyebolt. Keep a record of the number of washers that were removed.
  - (b) Remove the eyebolt and the spring support from the quadrant assembly.
  - (c) Remove the LCCA Output quadrant spring.

TASK 27-11-28-404-034

5. Right LCCA Output Quadrant Springs Installation

A. Equipment

- (1) Spring Scale, Commercially Available

B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

C. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-11-00/501, Aileron and Aileron Trim Control System
- (3) AMM 27-11-28/601, Right LCCA Output Quadrant
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Main Gear Door Locks

D. Access

- (1) Location Zone  
740 Right Hand Main Landing Gear and Doors

E. Right LCCA Output Quadrant Springs Installation

S 424-045

- (1) Install the Right LCCA Output quadrant springs:
  - (a) Apply grease to the spring hooks.
  - (b) Install one end of the spring to the lever.
  - (c) Install the other end of the spring to the spring support with the eyebolt.
  - (d) Install the eyebolt to the quadrant assembly with the nut and washers. Install the same number of washers that were removed.

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F. Right LCCA Output Quadrant Springs Installation Test

S 024-041

- (1) Disconnect the control rod between the Right LCCA Output quadrant and the Right Aileron Control Output quadrant.

S 484-042

- (2) Attach the spring scale to the Right LCCA Output Quadrant lever where the control rod was removed. Position the scale at 90 degrees with the lever.

S 824-046

- (3) Make sure the force requires to breakout the cam detent is 30 to 32 lbs. The LCCA will stop the movement of the quadrant assembly.

**NOTE:** Add or remove washers if it is necessary to obtain the breakout force.

- (a) Torque the nut to 50-80 pound-inches (5.6-9.0 newton-meters).

S 084-043

- (4) Remove the spring scale from the lever.

S 424-044

- (5) Connect the control rod to the Right LCCA Output quadrant.

G. Put the Airplane Back to Its Usual Condition

S 084-027

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the main landing gear and close the doors (AMM 32-00-15/201).

S 864-028

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

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S 864-048

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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RIGHT LATERAL CENTRAL CONTROL ACTUATOR (LCCA) OUTPUT QUADRANT – INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Right LCCA Output Quadrant – Removal/Installation for procedures to do these tasks.

TASK 27-11-28-206-002

2. Right LCCA Output Quadrant Wear Limits

A. Access

(1) Location Zones

- 730 Left Hand Main Landing Gear and Doors
- 740 Right Hand Main Landing Gear and Doors

B. Procedure

S 226-001

- (1) Use the supplied data (Fig. 601) to examine the right LCCA output quadrant for too much wear.

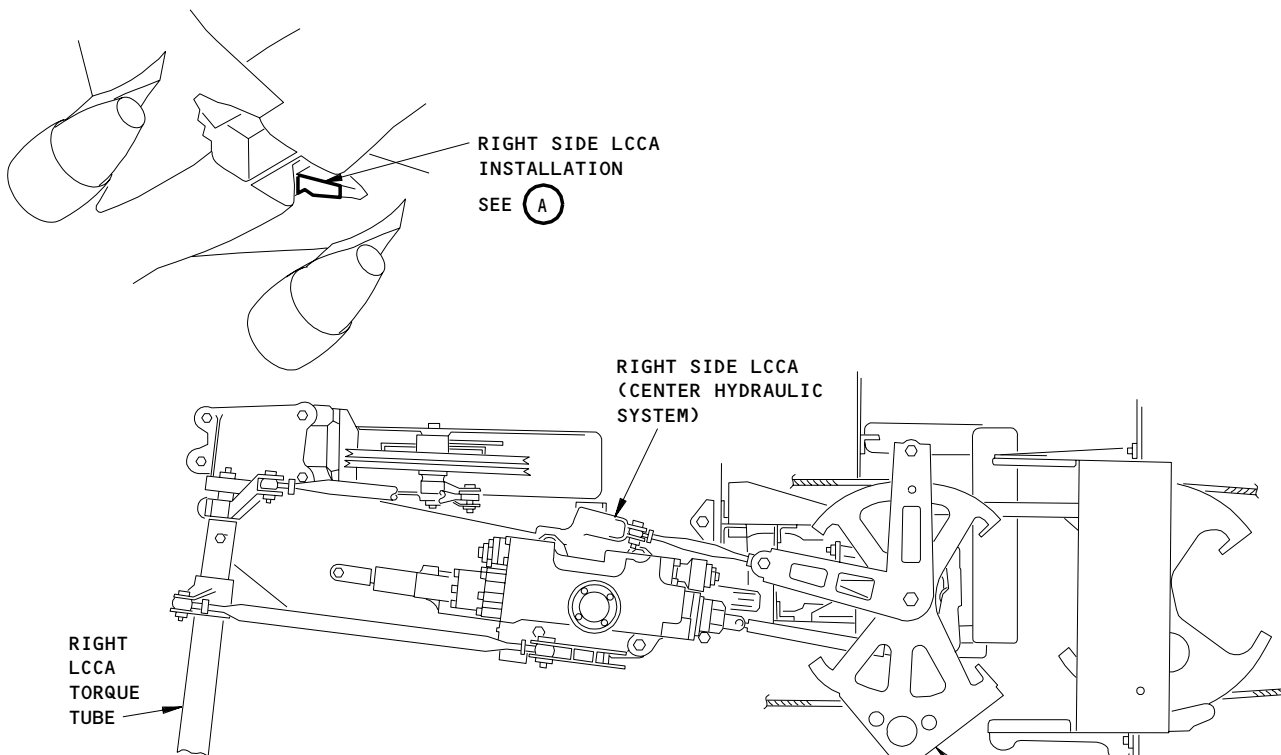
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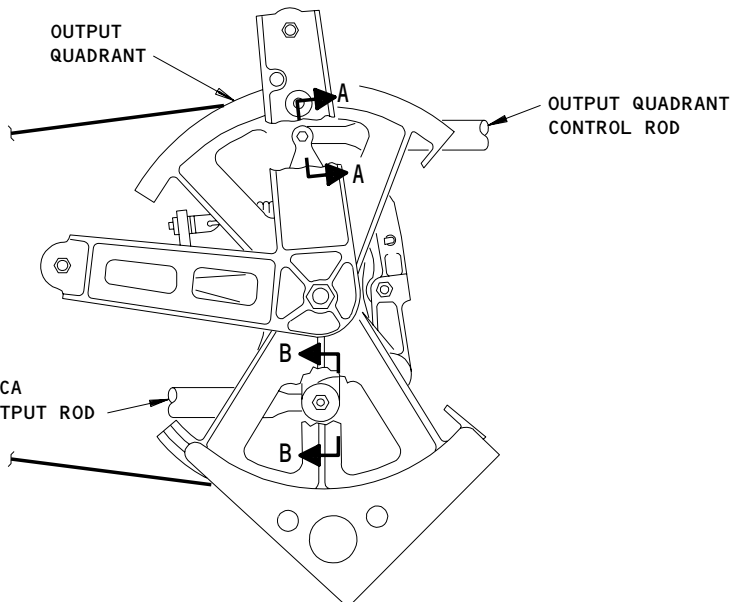
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RIGHT SIDE LCCA INSTALLATION

(A)



RIGHT LCCA OUTPUT QUADRANT

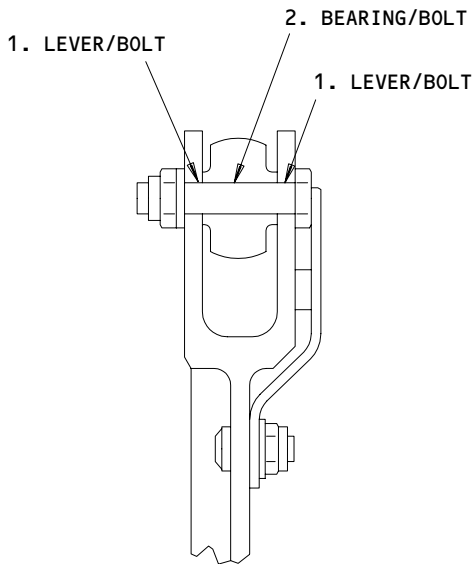
(B)

Right LCCA Output Quadrant Wear Limits  
Figure 601 (Sheet 1)

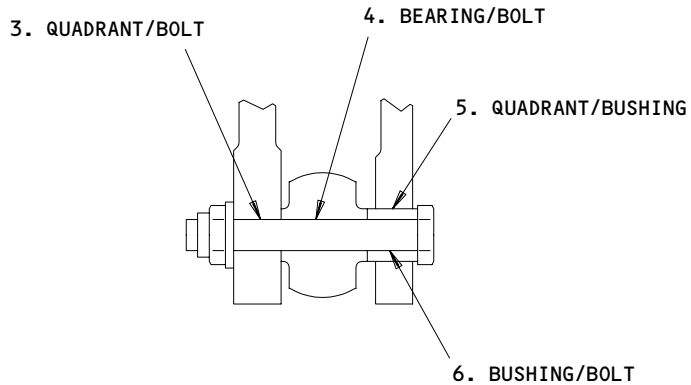
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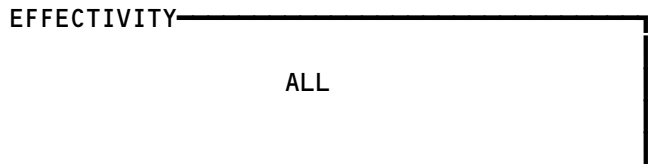


A-A



B-B

Right LCCA Output Quadrant Wear Limits  
Figure 601 (Sheet 2)



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# BOEING

## 767 MAINTENANCE MANUAL

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	LEVER	ID	0.2495 (6.337)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)		X	1
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
2	BEARING	ID	0.2497 (6.342)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
3	QUADRANT	ID	0.2495 (6.337)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)		X	1
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
4	BEARING	ID	0.2495 (6.337)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.260)		X		
5	QUADRANT	ID	0.3745 (9.512)	0.3755 (9.538)	0.3780 (9.601)	0.0035 (0.089)		X	1
	BUSHING	OD	0.3740 (9.500)	0.3745 (9.512)	0.3720 (9.449)		X		
6	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		

1 THIS PART CAN BE REPAIRED.

Right LCCA Output Quadrant Wear Limits  
Figure 601 (Sheet 3)

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RIGHT AILERON CONTROL OUTPUT QUADRANT – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is used to remove the right aileron control output quadrant. The second task contains the data that is necessary to install it.

TASK 27-11-34-024-001

2. Right Aileron Control Output Quadrant – Removal

A. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 25-52-01/401, Sidewall Panels
- (4) AMM 27-51-00/201, Trailing Edge Flap System
- (5) AMM 32-00-15/201, Landing Gear Door Locks
- (6) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zones
  - 740 Right Hand Main Landing Gear and Doors
  - 661 Rear Spar to Trailing Edge
- (2) Access Panel
  - 661AB Wing TE Structure Aileron Controls

C. Prepare for Removal

S 864-005

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

S 214-006

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-002

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 044-007

- (4) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 864-008

- (5) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

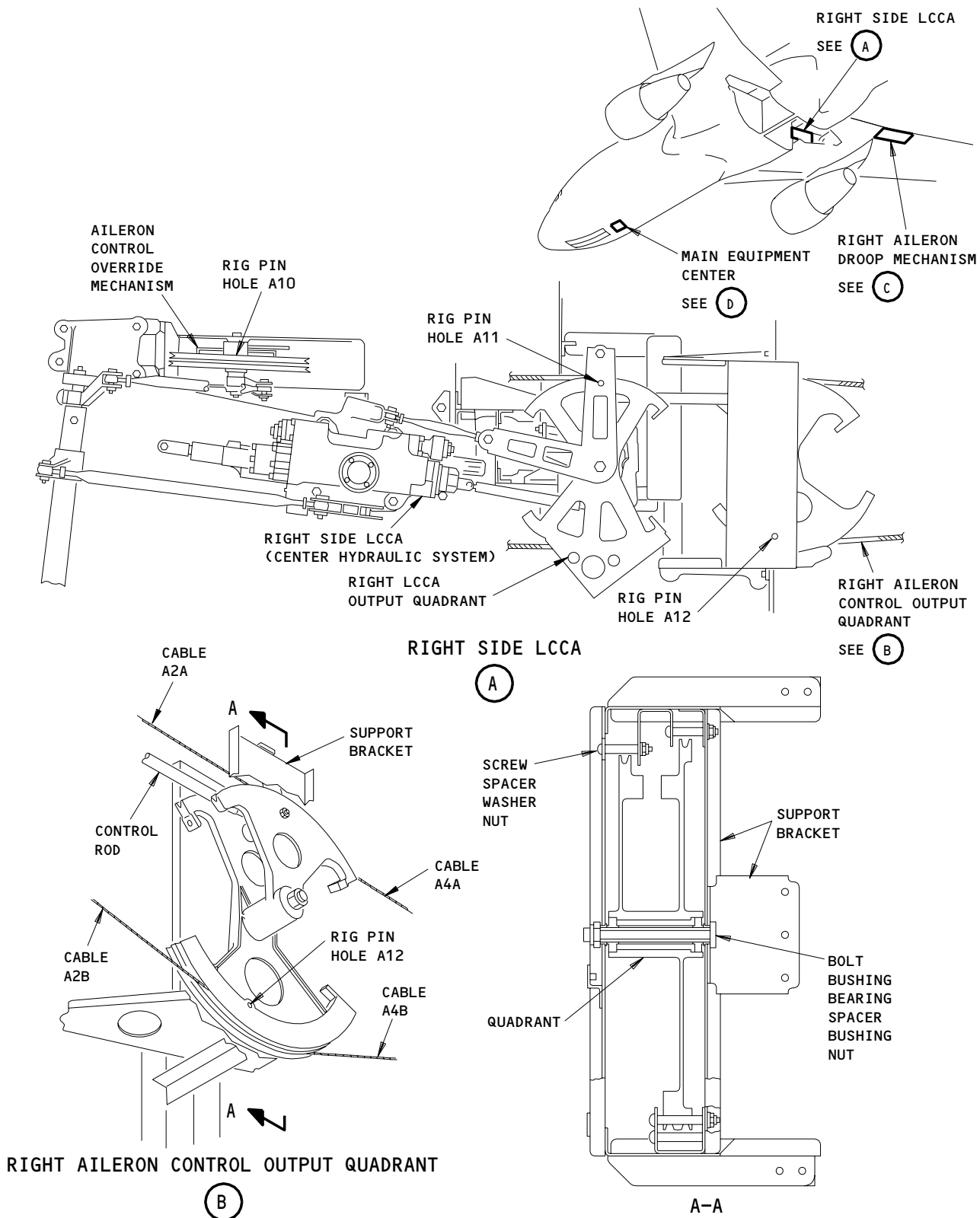
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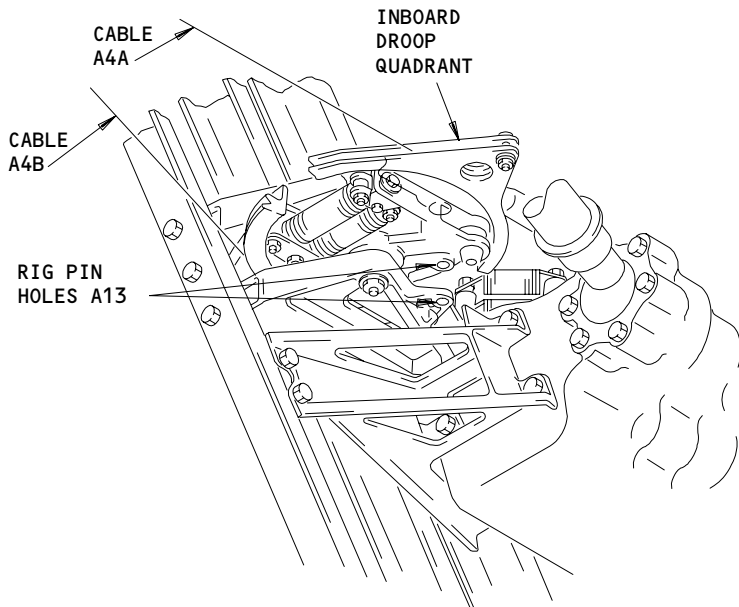
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Right Aileron Control Output Quadrant Installation  
Figure 401 (Sheet 1)

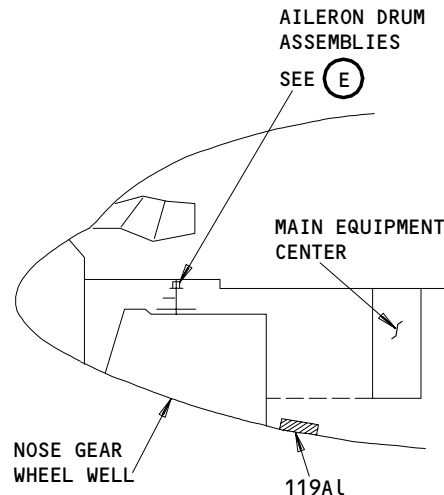
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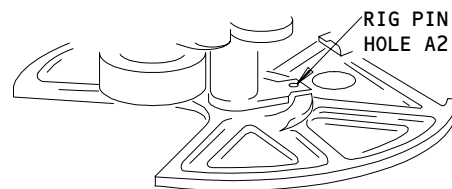
RIGHT AILERON DROOP MECHANISM

(C)



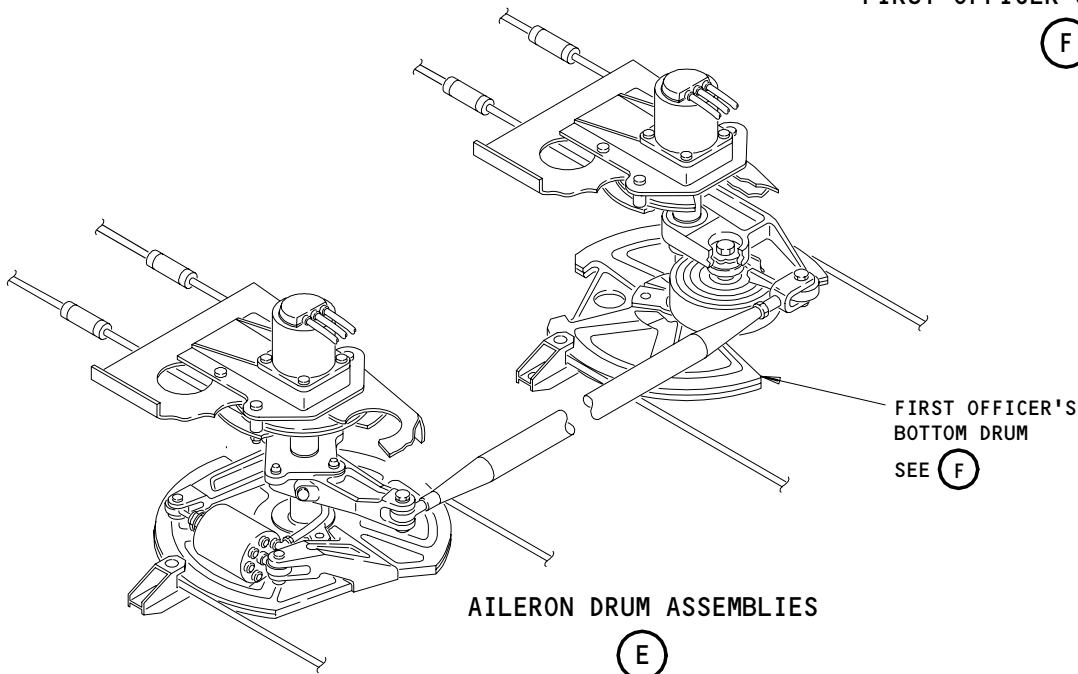
MAIN EQUIPMENT CENTER

(D)



FIRST OFFICER'S BOTTOM DRUM

(F)



(E)

Right Aileron Control Output Quadrant Installation  
Figure 401 (Sheet 2)

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S 864-009

- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 014-010

- (7) Open access panel 661AB (AMM 06-44-00/201).
- D. Remove the Right Aileron Control Output Quadrant (Fig. 401)

S 824-011

- (1) Release the tension from body cables A2A, A2B, and inboard wing cables A4A, A4B at their turnbuckles.

**NOTE:** The turnbuckle for cable A2A is located between the aileron control override mechanism and the right aileron control output quadrant in the wheel well for the right main gear. The turnbuckle for cable A2B is located behind the third sidewall panel aft of the forward cargo door. Refer to 25-52-01 for the sidewall panel removal procedure.

The turnbuckles for cables A4A and A4B are located outboard of the right aileron control output quadrant along the wing rear spar.

S 034-012

- (2) Disconnect these components:
  - (a) The cables from the quadrant and tag them for identification.
  - (b) The control rod from the quadrant.
  - (c) The quadrant from its support bracket.

S 024-013

- (3) Move the quadrant in the outboard direction and remove it.

TASK 27-11-34-424-014

### 3. Right Aileron Control Output Quadrant - Installation

**NOTE:** Refer to AMM 27-11-34/601 for the applicable wear limit data.

#### A. Equipment

- (1) Rig Pins from Kit A20004-78 (AMM 20-10-24/201):
  - (a) A2 - P/N A20004-17
  - (b) A10 - P/N A20004-17
  - (c) A11 - P/N A20004-15
  - (d) A12 - P/N A20004-21
  - (e) A13 - P/N A20004-20
- (2) Cable Tensiometer, Commercially Available

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B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-11-34/601, Right Aileron Control Output Quadrant
- (4) AMM 32-00-15/201, Landing Gear Door Locks

D. Access

- (1) Location Zones
  - 740 Right Hand Main Landing Gear and Doors
  - 661 Rear Spar to Trailing Edge
- (2) Access Panel
  - 661AB Wing TE Structure Aileron Controls

E. Install the Right Aileron Control Output Quadrant (Fig. 401)

S 494-015

- (1) Install these rig pins:
  - (a) A2 (for the first officer's drum assembly)
  - (b) A11 (for the right LCCA output quadrant)
  - (c) A13 (for the inboard quadrant of the right aileron droop mechanism).

S 644-016

- (2) Apply grease to the bolts, bushings, and bearing before installation.

S 424-017

- (3) Do these steps to install the quadrant:
  - (a) Align the quadrant with the support bracket.
  - (b) Install the bushings, spacer, bearing, and bolt that attach the quadrant to the bracket.
  - (c) Install the nut and tighten it.

S 494-018

- (4) Install rig pin A12 in the quadrant.

S 434-019

- (5) Do these steps to connect the control rod to the quadrant:
  - (a) Adjust the control rod until the rod end bolts can be easily installed. Tighten the jam nuts.
  - (b) Connect the control rod to the quadrant.
  - (c) Make sure rig pins A11 and A12 can move freely in their holes.

S 094-020

- (6) Remove rig pins A11 and A12.

S 434-021

- (7) Connect cables A2A, A2B, A4A, and A4B to the quadrant.

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- S 824-022
- (8) Do these steps if new cables have been installed:
- (a) Tighten the cables to two times the value shown in Table 401.
  - (b) Remove rig pins A2 and A13.
  - (c) Cycle the control wheel 25 times through its full travel range.
  - (d) Install rig pins A2 and A13.

- S 824-023
- (9) Adjust the cable tension to the value shown in Table 401.

**NOTE:** Make sure the airplane temperature is stable (use a tolerance of  $\pm 5^{\circ}\text{F}$ ) along the cable. Make sure the temperature has been stable for at least one hour.

Table 401 Aileron Cable Rigging Loads		
TEMP °F	BACK-UP CABLES A2A & A2A $\pm 10$ LBS	INBOARD WING CABLES A4A & A4A $\pm 10$ LBS
110	118	148
90	109	139
70	100	130
50	92	122
30	84	114
10	75	105
-10	67	97
-30	59	89
-40	53	83

- S 094-024
- (10) Remove rig pins A2 and A13.
- S 224-025
- (11) Cycle the control wheels 3 times through their full travel range, then do the checks that follow:
- (a) Make sure the cable tension is correct.
  - (b) Make sure that rig pins A2, A12, and A13 can be easily installed and removed at the same time.
  - (c) Make sure that rig pin A10 can be easily installed and removed in the override mechanism.
  - (d) Make sure the pulleys turn freely and do not touch the guards.

- S 434-026
- (12) Install the clip locks on the turnbuckles.

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F. Test Right Aileron Control Output Quadrant.

S 094-027

- (1) Make sure all the rig pins have been removed.

S 864-029

- (2) Push the STATUS switch on the pilot's display select panel, P9, to show the aileron position indicator on the display.

S 864-003

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-030

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 864-031

- (5) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.

S 214-032

- (6) Turn one of the two control wheels clockwise and do this check:
- (a) Make sure the right ailerons move up and the left ailerons move down.

S 214-033

- (7) Turn one of the two control wheels counterclockwise and do this check:
- (a) Make sure the right ailerons move down and the left ailerons move up.

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S 214-034

- (8) Use a clamp to hold the captain's control wheel in its full clockwise position and do these steps:
- (a) Turn the first officer's wheel to its full counterclockwise position and do this check:
    - 1) Make sure the right ailerons move down and the left ailerons stay down.

S 214-035

- (9) Use a clamp to hold the captain's control wheel in its full counterclockwise position and do these steps:
- (a) Turn the first officer's control wheel to its full clockwise position and do this check:
    - 1) Make sure the right ailerons move up and the left ailerons stay up.

S 864-036

- (10) Put the two control wheels back in their neutral position.
- G. Put the Airplane Back to Its Usual Condition

S 094-004

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the main landing gear and close the doors (AMM 32-00-15/201).

S 864-037

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-038

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 414-039

- (4) Close access panel 661AB (AMM 06-44-00/201).

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RIGHT AILERON CONTROL OUTPUT QUADRANT – INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Right Aileron Control Output Quadrant Removal/Installation for procedures to do these tasks.

TASK 27-11-34-206-002

2. Right Aileron Control Output Quadrant – Wear Limits

A. Access

(1) Location Zones

730	Left Hand Main Landing Gear and Doors
740	Right Hand Main Landing Gear and Doors

B. Procedure

S 226-001

- (1) Use the supplied data (Fig. 601) to examine the right aileron control output quadrant for too much wear.

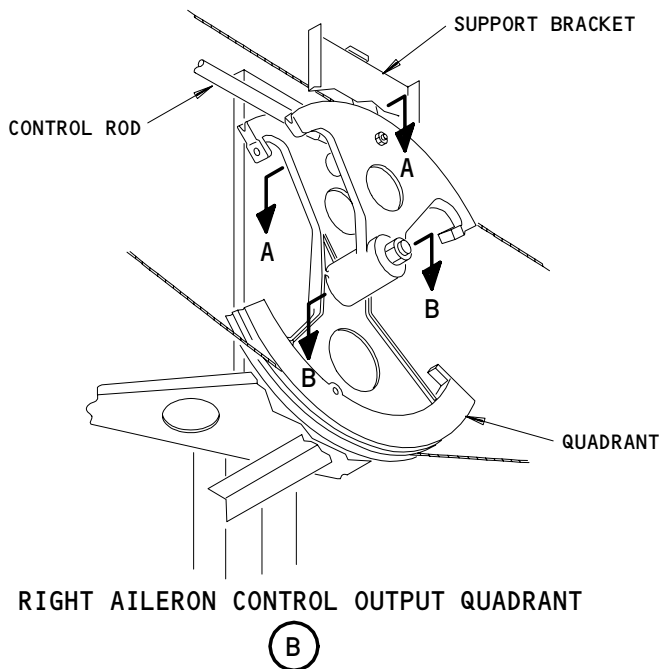
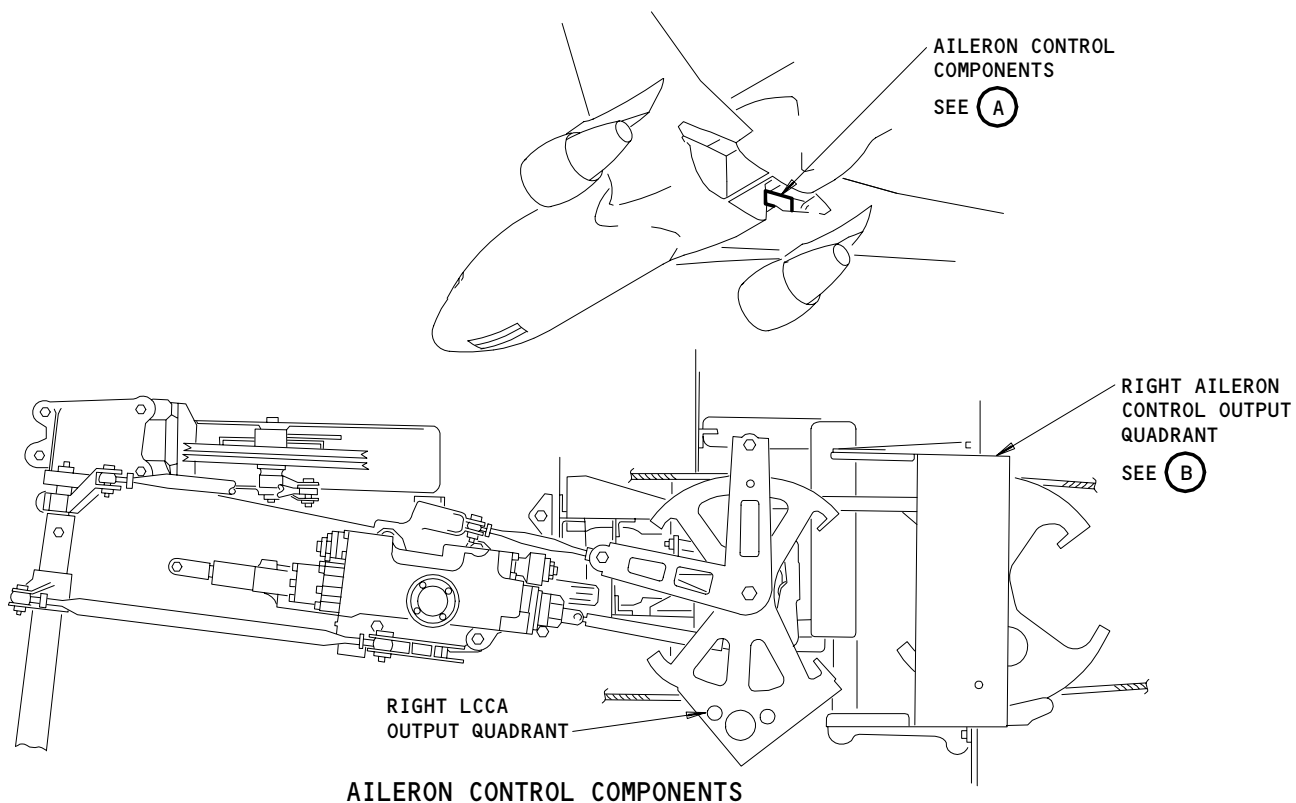
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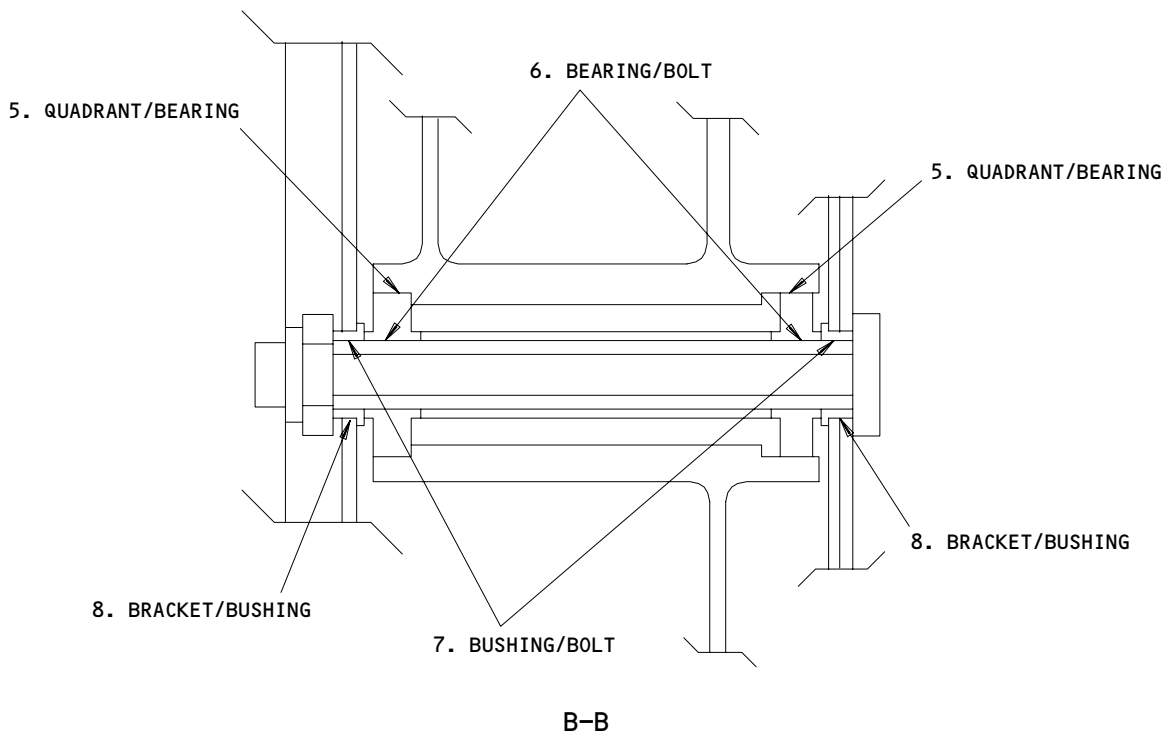
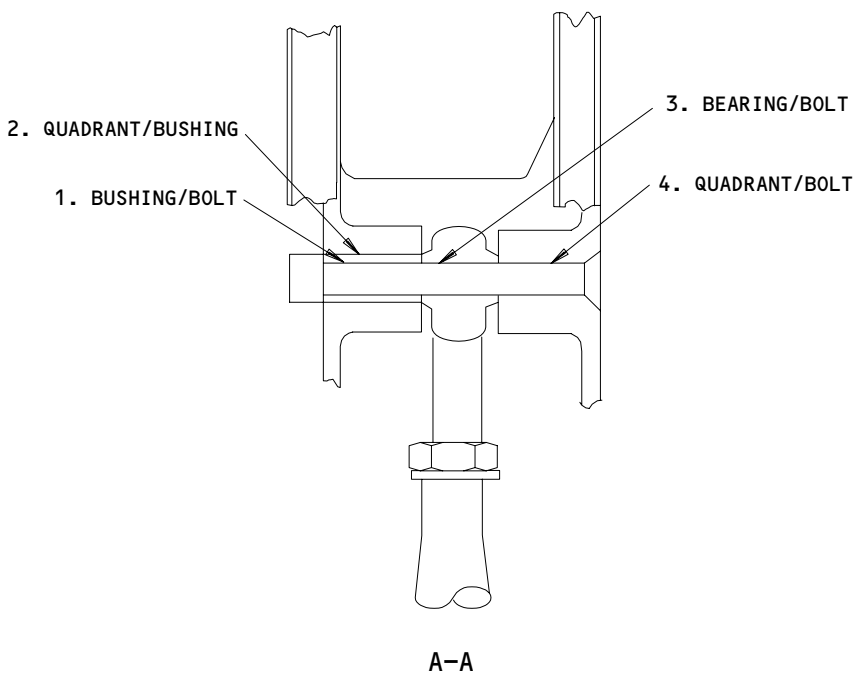
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Right Aileron Control Output Quadrant Wear Limits  
Figure 601 (Sheet 1)

EFFECTIVITY	ALL
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Right Aileron Control Output Quadrant Wear Limits  
Figure 601 (Sheet 2)

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# BOEING

## 767 MAINTENANCE MANUAL

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2540 (6.452)	0.0045 (0.114)	X		
	BOLT	OD	0.2480 (6.299)	0.2495 (6.337)	0.2460 (6.248)		X		
2	QUADRANT	ID	0.3745 (9.512)	0.3755 (9.538)	0.3780 (9.601)	0.0035 (0.089)		X	1
	BUSHING	OD	0.3740 (9.500)	0.3745 (9.512)	0.3720 (9.449)		X		
3	BEARING	ID	0.3497 (8.882)	0.2500 (6.350)	0.2535 (6.439)	0.0040 (0.102)	X		
	BOLT	OD	0.2480 (6.299)	0.2495 (6.337)	0.2460 (6.248)		X		
4	QUADRANT	ID	0.2495 (6.337)	0.2505 (6.363)	0.2540 (6.452)	0.0045 (0.114)		X	1
	BOLT	OD	0.2480 (6.299)	0.2495 (6.337)	0.2460 (6.248)		X		
5	QUADRANT	ID	1.1243 (28.557)	1.1248 (28.570)	1.1272 (28.631)	0.0022 (0.056)	X		
	BEARING	OD	1.1246 (28.565)	1.1250 (28.575)	1.1226 (28.514)		X		
6	BEARING	ID	0.4997 (12.692)	0.5000 (12.700)	0.5025 (12.764)	0.0031 (0.079)	X		
	BOLT	OD	0.4989 (12.672)	0.4994 (12.685)	0.4969 (12.621)			X	1
7	BUSHING	ID	0.5000 (12.700)	0.5015 (12.738)	0.5040 (12.802)	0.0046 (0.117)	X		
	BOLT	OD	0.4989 (12.672)	0.4994 (12.685)	0.4969 (12.621)		X		
8	BRACKET	ID	0.6250 (15.875)	0.6260 (15.900)	0.6288 (15.972)	0.0023 (0.058)		X	1
	BUSHING	OD	0.6257 (15.893)	0.6265 (15.913)	0.6237 (15.842)		X		

1 THIS PART CAN BE REPAIRED.

Right Aileron Control Output Quadrant Wear Limits  
Figure 601 (Sheet 3)

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AILERON CONTROL OVERRIDE MECHANISM – REMOVAL/INSTALLATION

1. General

A. This procedure contains these tasks:

- Aileron Control Override Mechanism – Removal
- Aileron Control Override Mechanism – Installation
- Dual Aileron Control Path Override – Test
- Aileron Control Override Quadrant Spring – Removal
- Aileron Control Override Quadrant Spring – Installation

TASK 27-11-36-024-036

2. Aileron Control Override Mechanism – Removal

NOTE: Refer to AMM 27-11-36/601 for the applicable wear limit data.

A. References

- (1) AMM 24-22-00/201, Electrical Power – Control
- (2) AMM 25-52-01/401, Sidewall Panels
- (3) AMM 32-00-15/201, Landing Gear Door Locks
- (4) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zone  
740 Main Landing Gear and Doors (Right)

C. Prepare for the Removal

S 864-001

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

S 214-002

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

WARNING: USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 864-005

- (4) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

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LATERAL FEEL,  
CENTERING, AND  
TRIM MECHANISM

SEE (H)

RIGHT SIDE LCCA

SEE (A)

MAIN EQUIPMENT  
CENTER

SEE (D)

AILERON CONTROL  
OVERRIDE MECHANISM

SEE (B)

RIGHT AILERON CONTROL  
OUTPUT QUADRANT

RIGHT LCCA  
TORQUE TUBE

INBD ←

RIGHT SIDE LCCA  
(CENTER HYDRAULIC SYSTEM)

RIGHT SIDE LCCA

(A)

RIG PIN  
HOLE A12

OVERRIDE QUADRANT

SEE (C)

RIG PIN  
HOLES A10

CONTROL  
ROD

RIG PIN  
HOLE A19

INBD ← → FWD

RIGHT SIDE LCCA

RIGHT LCCA  
TORQUE TUBE

AILERON CONTROL OVERRIDE MECHANISM

(B)

Aileron Control Override Mechanism Installation  
Figure 401 (Sheet 1)

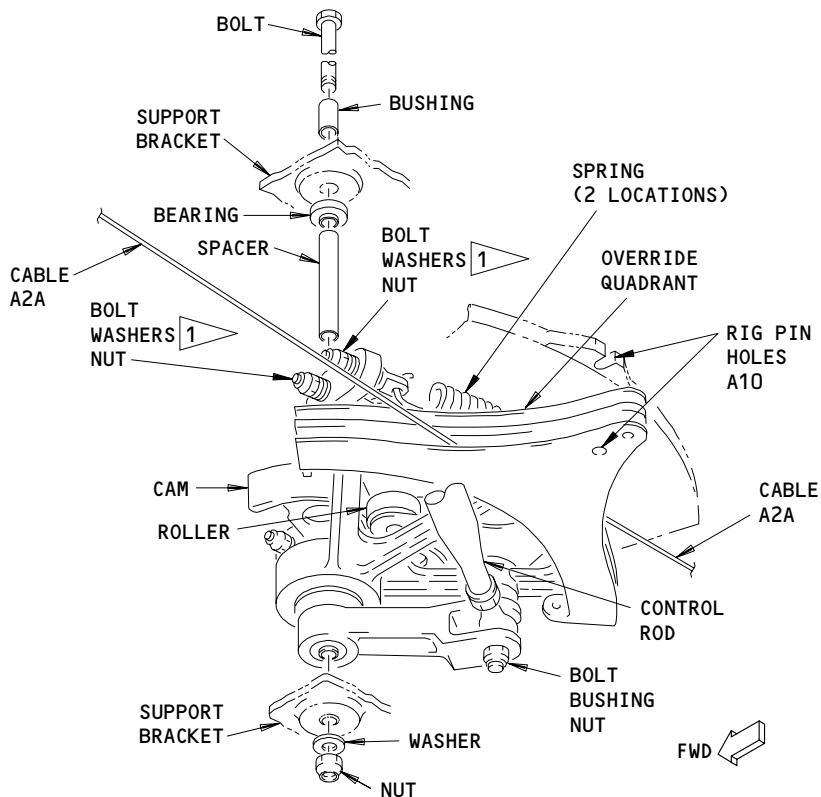
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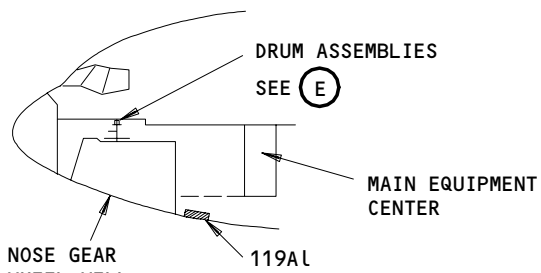
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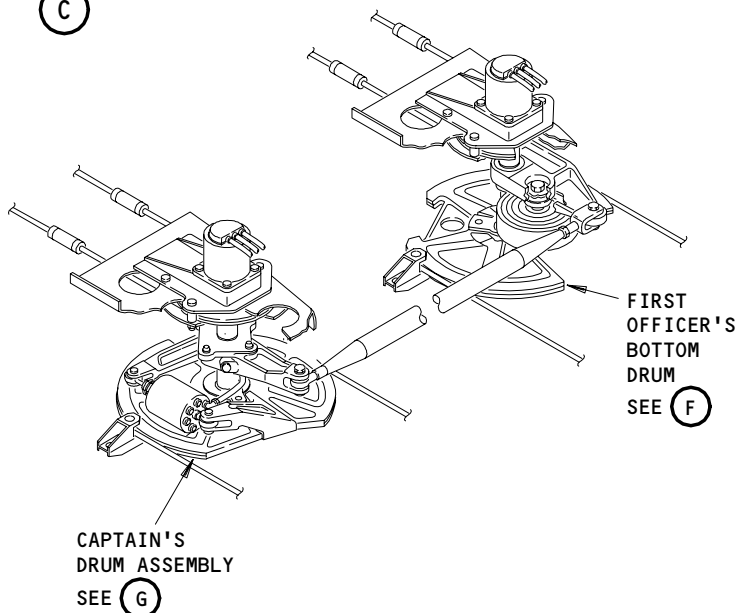
**VERRIDE QUADRANT**

(C)



**MAIN EQUIPMENT CENTER**

(D)



**DRUM ASSEMBLIES**

(E)

1 QUANTITY OF WASHER DEPENDS ON SPRING RIGGING

**Aileron Control Override Mechanism Installation**  
Figure 401 (Sheet 2)

EFFECTIVITY

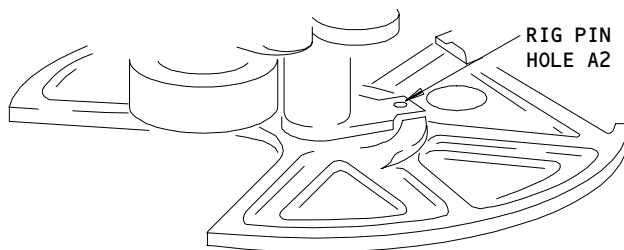
ALL

**27-11-36**

02

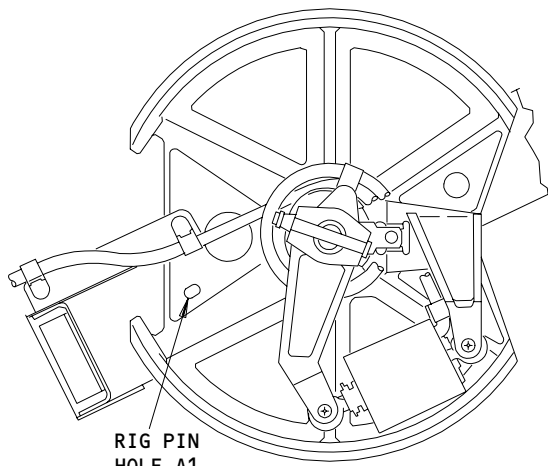
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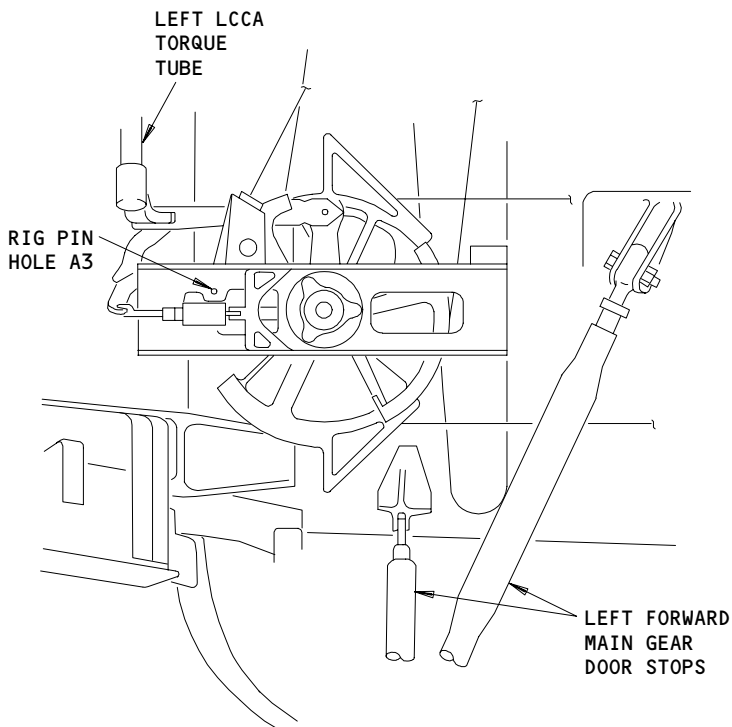
FIRST OFFICER'S BOTTOM DRUM

(F)



CAPTAIN'S DRUM ASSEMBLY

(G)



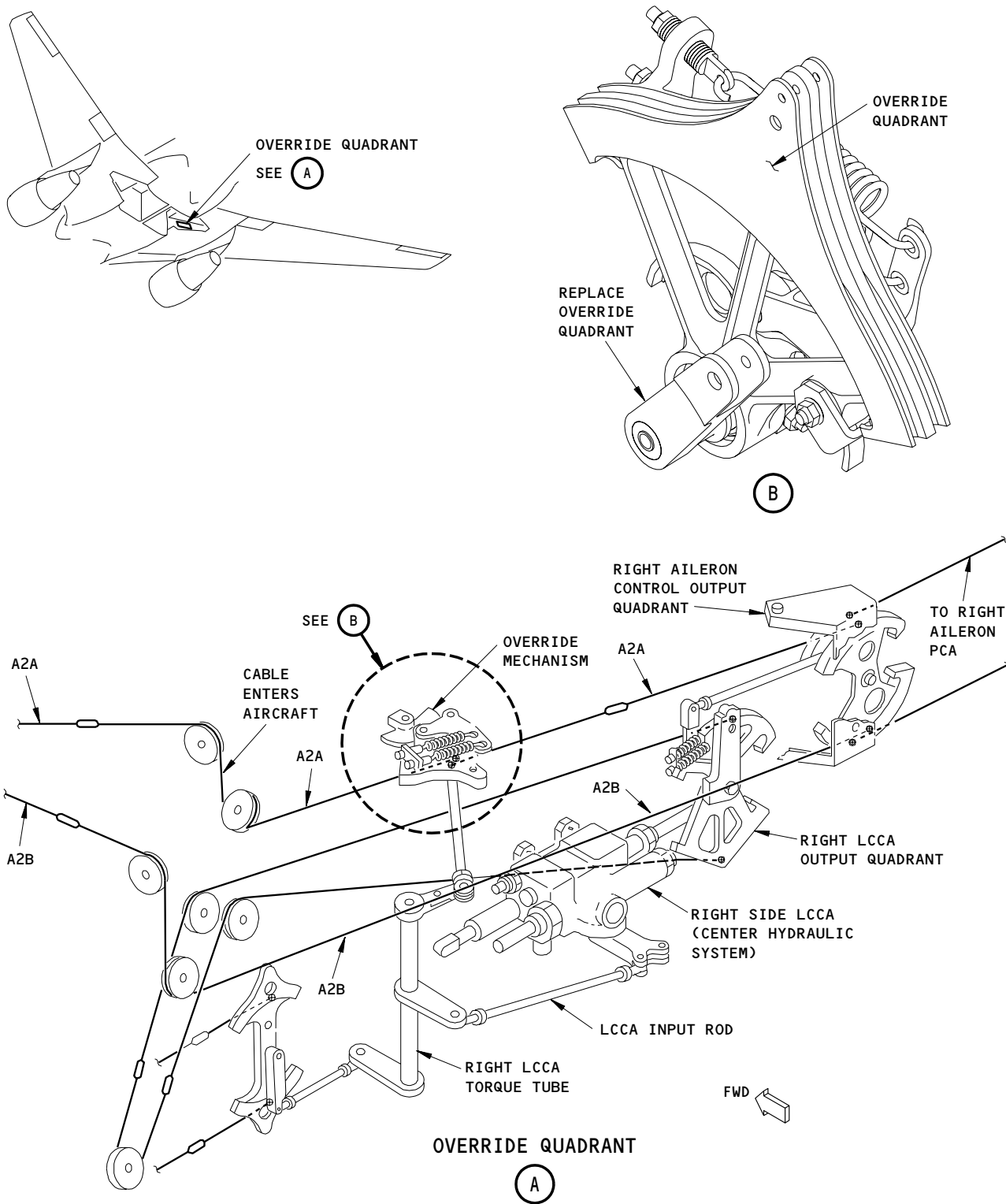
LATERAL FEEL, CENTERING, AND TRIM MECHANISM

(H)

Aileron Control Override Mechanism Installation  
Figure 401 (Sheet 3)

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Aileron Control Override Mechanism Installation  
Figure 402

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M76146

- S 864-006
- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT
- S 864-085
- (6) Disconnect the electrical power if not needed (AMM 24-22-00/201).
- S 494-091
- (7) Install these rig pins:
- (a) A1 (for the captain's drum assembly)
  - (b) A2 (for the first officer's drum assembly)
  - (c) A3 (for the feel, centering, and trim mechanism)
  - (d) A10 (override mechanism).
  - (e) A12 (for the right aileron control output quadrant)
  - (f) A19 (for the right LCCA torque tube).
- D. Override Mechanism - Removal (Fig. 401)
- S 214-082
- (1) If necessary, make sure you have available a new upper bearing and spacer to be installed in the override mechanism before you install the mechanism on the airplane (Fig. 401).
- S 824-074
- (2) In the right wheel well, locate the turnbuckle outboard of the override mechanism (along the wing rear spar) on body cable A2A and block the cable outboard of the turnbuckle using cable clamps or an equivalent device (Fig. 402).
- NOTE:** Keep tension on cables not disturbed so that the cable drums will not unwrap and the cable will not move out of the pulley guides.
- S 824-092
- (3) In the right wheel well, follow the cable A2A from the override mechanism inboard to the pulley. Follow cable A2A upward to where the cable enters the airplane and block cable A2A using cable clamps or an equivalent device (Fig. 402).
- NOTE:** Keep tension on the cables that are not disconnected. This will make sure that the cables do not unwrap from the drum or come out of the pulley guides.

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- S 824-076
- (4) Release the tension from cable A2A at the turnbuckle just outboard of the aileron control override mechanism (Fig. 402).
- S 034-079
- (5) Disconnect the control rod from the override mechanism. Keep the bolt, bushing and nut. You will use the bolt, bushing and nut for installation.
- S 034-078
- (6) Remove the cables from the override mechanism and tag them for identification.
- S 034-080
- (7) Remove and keep the nut, washer, bolt, and bushing that connect the override mechanism to the support bracket and remove the mechanism.
- S 034-012
- (8) If necessary, remove the old upper bearing (press fit) and spacer from the override mechanism on the bench (Fig. 401). Discard the upper bearing.

TASK 27-11-36-424-013

3. Aileron Control Override Mechanism - Installation

NOTE: Refer to AMM 27-11-36/601 for the applicable wear limit data.

A. Equipment

- (1) Rig Pins from Kit A20004-78 (AMM 20-10-24/201):
- (a) A1 - P/N A20004-15
  - (b) A2 - P/N A20004-17
  - (c) A3 - P/N A20004-22
  - (d) A10 - P/N A20004-17
  - (e) A12 - P/N A20004-21
  - (f) A19 - P/N A20004-15

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- (2) Cable Tensiometer - Commercially Available
- B. Consumable Materials
  - (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
  - (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)
- C. References
  - (1) AMM 20-10-24/201, Rig Pins
  - (2) AMM 24-22-00/201, Electrical Power - Control
  - (3) AMM 27-11-36/601, Aileron Control Override Mechanism
  - (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
  - (5) AMM 32-00-15/201, Landing Gear Door Locks
- D. Access
  - (1) Location Zone
    - 740 Main Landing Gear and Doors (Right)
- E. Override Mechanism - Installation (Fig. 401)
  - S 434-087
    - (1) If necessary, install (on the bench) the new upper bearing (press fit) and spacer in the override mechanism (Fig. 401).
  - S 494-014
    - (2) Make sure the following rig pins are installed:
      - (a) A1 (for the captain's drum assembly)
      - (b) A2 (for the first officer's drum assembly)
      - (c) A3 (for the feel, centering, and trim mechanism)
      - (d) A10 (override mechanism).
      - (e) A12 (for the right aileron control output quadrant)
      - (f) A19 (for the right LCCA torque tube).
  - S 644-015
    - (3) Apply grease to the bolts, bushings, bearings, and spacer before installation.
  - S 434-086
    - (4) Hold the mechanism in position and install the bolt, bushing, washer, and nut that connect the mechanism to its support bracket.

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- S 434-089
- (5) Connect body cables A2A to the override mechanism.
- S 494-088
- (6) Install rig pin A10 in the override mechanism.
- S 434-017
- (7) Do these steps to connect the control rod:
- (a) Make sure the roller is in its center position on the cam.
  - (b) If required, adjust the control rod until you can easily install the rod end bolt.
  - (c) Tighten the control rod jamnuts.
  - (d) Install the bolt, bushing, and nut that connect the control rod to the mechanism.
  - (e) Make sure rig pins A10 and A19 move freely in their holes.
- S 824-019
- (8) Do these steps if you installed new cables:
- (a) Tighten the cables to two times the value shown in Table 401.
  - (b) Remove rig pins A1, A2, A3, A10, A12, and A19.
  - (c) Operate the control wheel 25 times through its full travel range.
  - (d) Install rig pins A1, A2, A3, A10, A12, and A19.
- S 824-034
- (9) Adjust the A2A cable tension at the turnbuckle just outboard of the override mechanism to the value shown in Table 401.

**NOTE:** Apply and record tension of A2A cable using a tensiometer capable of 43-128 lbs torque range and 1/8 inch size of the cable. Apply the tensiometer to the cable at least six inches from the turnbuckle terminal or other fittings. To make sure you have the correct cable tension, permit a minimum of one hour at constant ambient temperature ( $\pm 5^{\circ}\text{F}$  tolerance) for airframe temperature to become stable.

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TABLE 401 AILERON CABLE RIGGING LOADS	
TEMP °F	CABLES A2A & A2B +20 lbs -10 lbs
110	118
90	109
70	100
50	92
30	84
10	75
-10	67
-30	59
-40	53

S 494-090

- (10) Install locking clips on the turnbuckles (AMM 20-10-05/401).

S 094-020

- (11) Remove rig pins A1, A2, A3, A10, A12, and A19.

S 094-093

- (12) Make sure that you remove all the cable clamps that you installed during the removal procedure.

S 864-021

- (13) Operate the control wheels through their full travel range three times.

S 214-044

- (14) Release the control wheel and do these checks:  
(a) Make sure you can easily install and remove rig pins A1, A2, A3, A10, and A12 at the same time.

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- (b) Make sure the pulleys turn freely and do not touch the pulley guards.

S 864-040

- (15) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT

S 864-042

- (16) Remove the DO-NOT-OPERATE tags and move the FLT CONT SHUTOFF WING L, R, and C switches on the right side panel, P61, to ON.

S 714-038

- (17) Do the "Dual Aileron Control Path Override - Test" task.
- F. Put the Airplane Back to Its Usual Condition

S 094-039

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the main landing gear doors and close the doors (AMM 32-00-15/201).

S 864-041

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-11-36-714-043

4. Dual Aileron Control Path Override - Test

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones
  - 211/212 Control Cabin

C. Prepare for the Test

S 214-022

- (1) Make sure you removed all the rig pins in the aileron system.

S 864-023

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

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S 214-064

- (3) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-065

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 864-066

- (5) Make sure the FLT CONTROL SHUTOFF WING, L, R and C switches on the right side panel P61, are in the ON position.

S 864-024

- (6) Make sure these circuit breakers on the overhead panel, P11, are closed:
- (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT
  - (d) 11L9, LEFT ENGINE OIL PRESS
  - (e) 11L36, RIGHT ENGINE OIL PRESS
  - (f) EICAS (6 LOCATIONS)

S 864-068

- (7) Push the STATUS switch on the display select panel to show the aileron position indicator on the display.

S 864-026

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (8) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 824-035

- (9) Operate the aileron trim switches on the aft electronic control panel, P8, until the trim indicator (on the control wheel) shows zero units of trim.

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S 214-029

- (10) Use a clamp to hold the captain's control wheel fully clockwise and do these steps:

**CAUTION:** DO NOT GIVE A SUDDEN LARGE INPUT TO THE FIRST OFFICER'S CONTROL WHEEL. DO NOT EXCEED A MAXIMUM FORCE OF 500 IN-LBS TO THE FIRST OFFICER'S CONTROL WHEEL. THIS CAN SHEAR THE SHEAROUT RIVETS OF THE RIGHT LCCA TORQUE TUBE.

- (a) Turn the first officer's control wheel fully counterclockwise with a slow and constant motion, and do this check:
- 1) Make sure the right ailerons move down and the left ailerons stay down.
  - 2) Get to the right wheel well to make sure that the roller of the cam follower lever moves out of its indent and rolls freely on the track.
  - 3) Replace the roller or the complete lever assembly, if the roller is frozen (SB 27-0142).

S 214-030

- (11) Use a clamp to hold the captain's control wheel fully counterclockwise and do these steps:

**CAUTION:** DO NOT GIVE A SUDDEN LARGE INPUT TO THE FIRST OFFICER'S CONTROL WHEEL. DO NOT EXCEED A MAXIMUM FORCE OF 500 IN-LBS TO THE FIRST OFFICER'S CONTROL WHEEL. THIS CAN SHEAR THE SHEAROUT RIVETS OF THE RIGHT LCCA TORQUE TUBE.

- (a) Turn the first officer's control wheel fully clockwise with a slow and constant motion, and do this check:
- 1) Make sure the right ailerons move up and the left ailerons stay up.
  - 2) Get to the right wheel well to make sure that the roller of the cam follower lever moves out of its indent and rolls freely on the track.
  - 3) Replace the roller bearing, or the complete lever assembly, if the roller bearing is frozen.

S 864-031

- (12) Move the control wheels back to their neutral positions.

S 864-072

- (13) Make sure the shearout rivets of the LCCA torque tube are not damaged. Replace rivets if necessary.

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D. Put the Airplane Back to Its Usual Condition

S 864-061

- (1) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 094-067

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Remove the door locks from the main landing gear doors and close the doors (AMM 32-00-15/201).

S 864-060

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-11-36-004-055

5. Override Quadrant Springs Removal

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 32-00-15/201, Main Gear Door Locks
- (3) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zones  
740 Right Hand Main Landing Gear and Doors

C. Prepare for Removal

S 864-045

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

S 214-046

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 484-047

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 864-059

- (4) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

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S 864-058

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

D. Override Quadrant Springs Removal

S 024-050

- (1) Remove the spring from the Override mechanism:
  - (a) Remove the nuts and washers from the bolts that connect the springs to the Override Quadrant Assembly. Keep a record of the number of washers that were removed.
  - (b) Remove the bolts from the quadrant assembly.
  - (c) Remove both springs from the lever assembly.

TASK 27-11-36-404-056

6. Override Quadrant Springs Installation

A. Equipment

- (1) Rig Pins from Kit A20004-1 (AMM 20-10-24/201):
  - (a) A10 - P/N A20004-17
- (2) Spring Scale, Commercially Available

B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

C. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-11-00/501, Aileron and Aileron Trim Control System
- (3) AMM 27-11-36/601, Aileron Control Override Mechanism
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Main Gear Door Locks

D. Access

- (1) Location Zones  
740 Right Hand Main Landing Gear and Doors

E. Override Quadrant Springs Installation

S 424-051

- (1) Install the Override quadrant innermost spring:
  - (a) Apply grease to the spring hooks.
  - (b) Install one end of the innermost spring to the lever assembly.
  - (c) Install the other end of the spring to the bolt.
  - (d) Install the bolt to the quadrant assembly with the nut and washers. Install the same number of washers that were removed.

S 734-052

- (2) Test the Override quadrant innermost spring:
  - (a) Disconnect the inboard end of the control rod that connect the Override quadrant to the LCCA Torque Tube.
  - (b) Install rig pin A10 in the override mechanism.

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MAINTENANCE MANUAL

- (c) Attach the spring scale to the free end of the control rod. Position the control rod at 90 degrees with the lever.
- (d) Make sure the force requires to breakout the cam detent is 27.0 to 29.6 lbs (120.1-131.6 newtons). The rig pin will stop the movement of the quadrant assembly.

NOTE: Add or remove washers if it is necessary to obtain the breakout force. Torque the nut to 50-80 in-lbs.

S 424-053

- (3) Install the Override quadrant outermost spring:
  - (a) Apply grease to the spring hooks.
  - (b) Install one end of the outermost spring to the lever assembly.
  - (c) Install the other end of the spring to the bolt.
  - (d) Install the bolt to the quadrant assembly with the nut and washers. Install the same number of washers that were removed.

S 734-054

- (4) Test both of the Override quadrant springs:
  - (a) Attach the spring scale to the free end of the control rod. Position the control rod at 90 degrees with the lever.
  - (b) Make sure the force requires to breakout the cam detent is 50.1 to 52.7 lbs (222.8-234.4 newtons) The rig pin will stop the movement of the quadrant assembly.

NOTE: Add or remove washers from the outermost nut if it is necessary to obtain the breakout force. Torque the nut to 50-80 in-lbs (5.7-9.0 newton-meters).

- (c) Remove the spring scale from the free end of the control rod.
- (d) Remove rig pin A10 from the override mechanism.
- (e) Reconnect the inboard end of the control rod that connect the Override quadrant to the LCCA Torque Tube.

F. Put the Airplane Back to Its Usual Condition

S 864-032

- (1) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-033

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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AILERON CONTROL OVERRIDE MECHANISM – INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Aileron Control Override Mechanism Removal/Installation for procedures to do these tasks.

TASK 27-11-36-206-002

2. Aileron Control Override Mechanism – Wear Limits

A. Access

(1) Location Zones

730	Left Hand Main Landing Gear and Doors
740	Right Hand Main Landing Gear and Doors

B. Procedure

S 226-001

- (1) Use the supplied data (Fig. 601) to examine the aileron control override mechanism for too much wear.

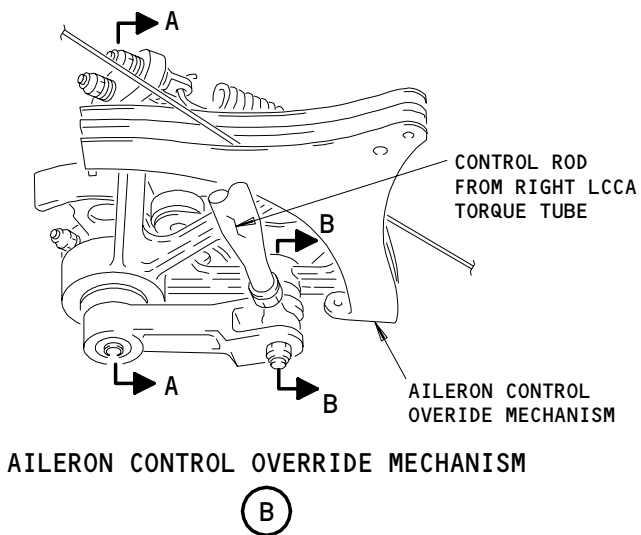
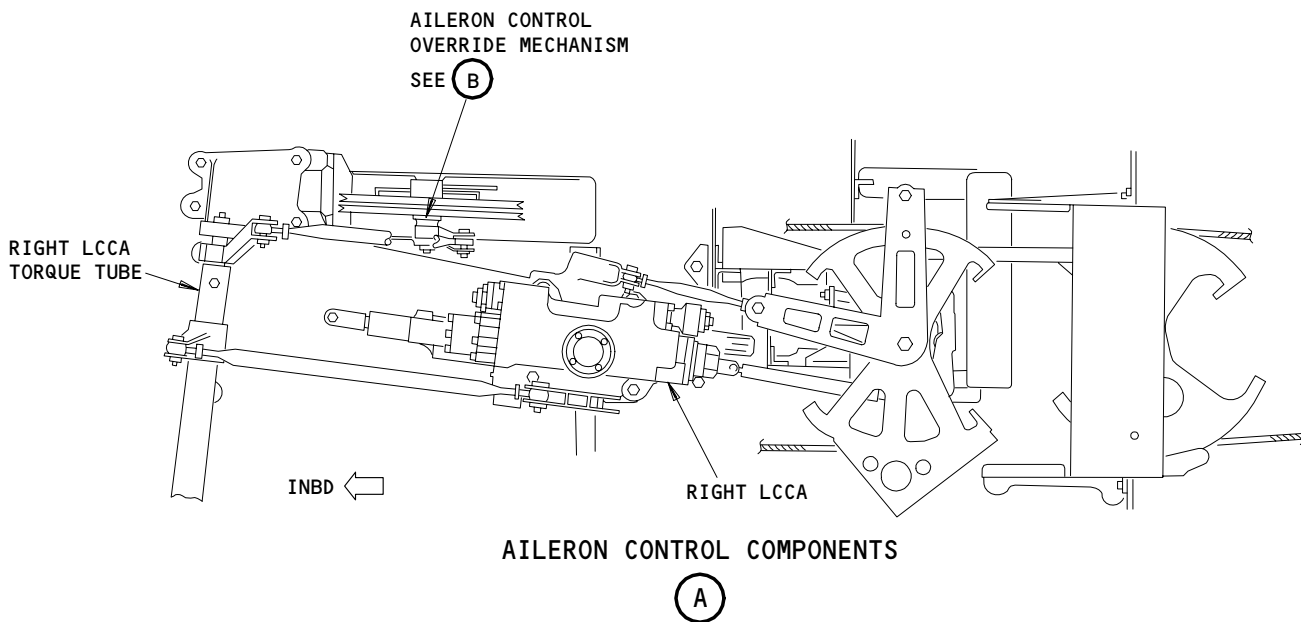
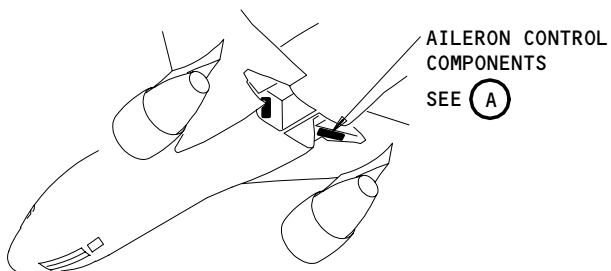
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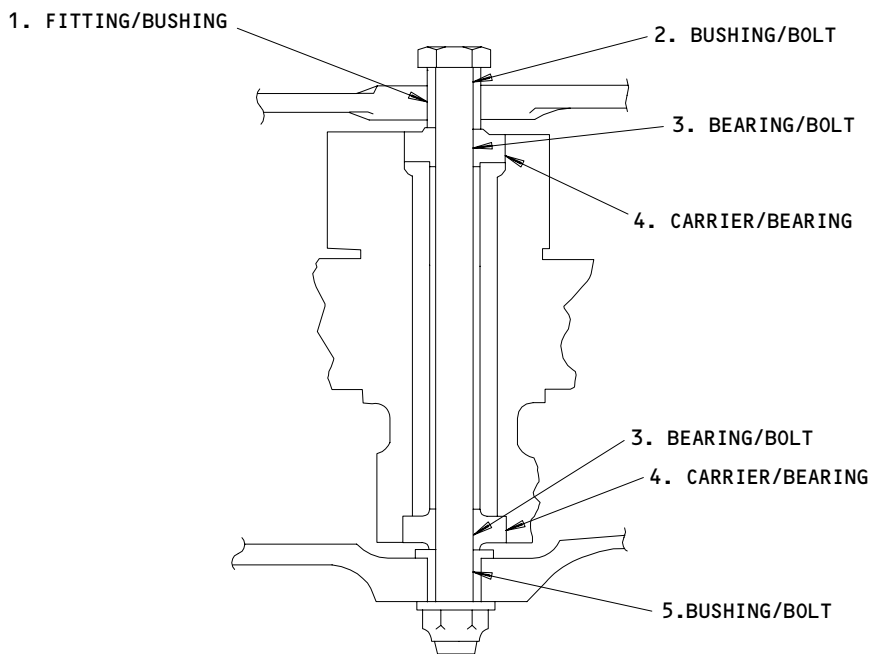
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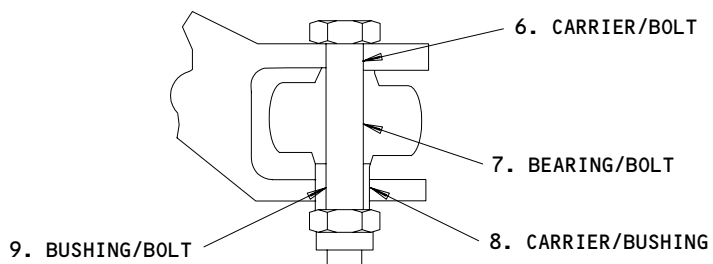
Aileron Control Override Mechanism Wear Limits  
Figure 601 (Sheet 1)

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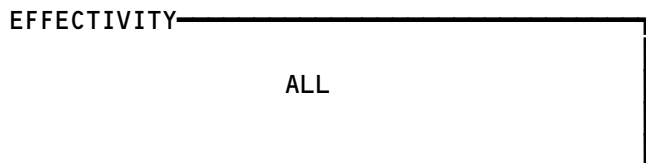


A-A



B-B

Aileron Control Override Mechanism Wear Limits  
Figure 601 (Sheet 2)



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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	FITTING	ID	0.4375 (11.113)	0.4390 (11.151)	0.4415 (11.214)	0.0045 (0.114)		X	
	BUSHING	OD	0.4365 (11.087)	0.4370 (11.100)	0.4345 (11.036)		X		
2	BUSHING	ID	0.3125 (7.938)	0.3130 (7.950)	0.3160 (8.026)	0.0040 (0.102)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3090 (7.849)		X		
3	BEARING	ID	0.3121 (7.927)	0.3125 (7.938)	0.3155 (8.014)	0.0035 (0.089)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3090 (7.849)		X		
4	CARRIER	ID	0.8113 (20.607)	0.8118 (20.620)	0.8125 (20.638)	0.0000 (0.000)	X		
	BEARING	OD	0.8121 (20.627)	0.8125 (20.638)	0.8118 (20.620)		X		
5	BUSHING	ID	0.3125 (7.938)	0.3140 (7.976)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3090 (7.849)		X		
6	CARRIER	ID	0.2495 (6.337)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)		X	
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
7	BEARING	ID	0.2497 (6.342)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
8	CARRIER	ID	0.3745 (9.512)	0.3756 (9.540)	0.3781 (9.604)	0.0036 (0.091)		X	
	BUSHING	OD	0.3740 (9.500)	0.3745 (9.512)	0.3720 (9.449)		X		
9	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		

THIS PART CAN BE REPAIRED.

Aileron Control Override Mechanism Wear Limits  
Figure 601 (Sheet 3)

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AILERON DROOP MECHANISM INBOARD QUADRANT – REMOVAL/INSTALLATION

1. General

- A. This procedure contains four tasks. The first task is used to remove the inboard droop quadrant. The second task is used to install the inboard droop quadrant. The third task is used to remove the inboard droop quadrant springs. The fourth task is used to install inboard droop quadrant springs.

TASK 27-11-38-024-036

2. Inboard Droop Quadrant Removal

A. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 27-51-00/201, Trailing Edge Flap System
- (4) AMM 32-00-15/201, Main Gear Door Locks
- (5) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zones
  - 561/661 Rear Spar to Trailing Edge
- (2) Access Panels
  - 561/661AB Wing TE Structure, Aileron Controls
  - 561/661BB Wing TE Inboard Aileron Actuators
  - 561/661CB Wing TE Structure, Aileron Controls

C. Prepare for Removal

- S 864-001
  - (1) Supply electrical power (AMM 24-22-00/201).
- S 214-002
  - (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).
- S 494-003

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

- S 044-004
  - (4) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

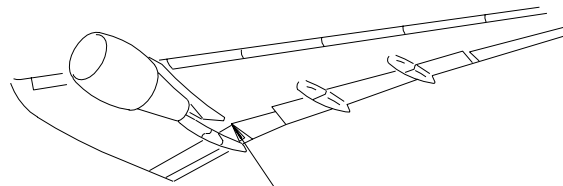
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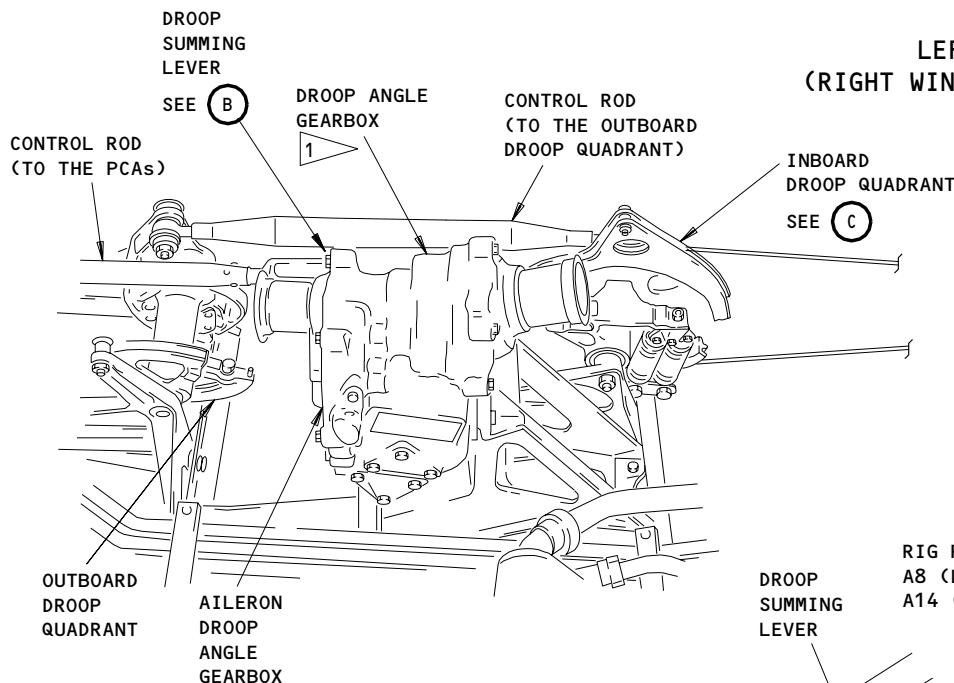
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INBOARD AILERON DROOP MECHANISM

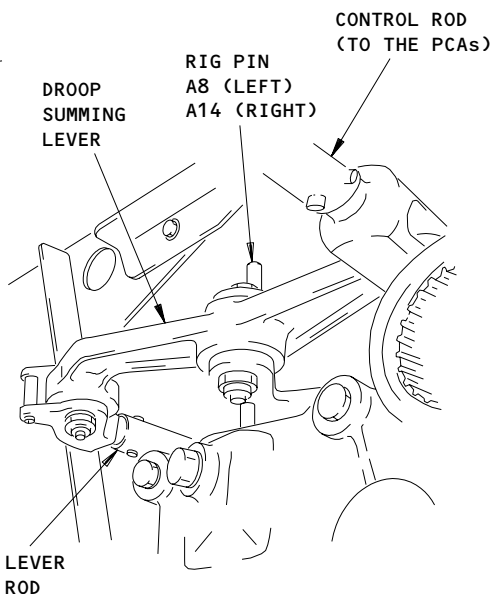
SEE (A)

LEFT WING  
(RIGHT WING IS OPPOSITE)



INBOARD AILERON DROOP MECHANISM

(A)



DROOP SUMMING LEVER  
(TOP OF THE AILERON DROOP ANGLE GEARBOX)

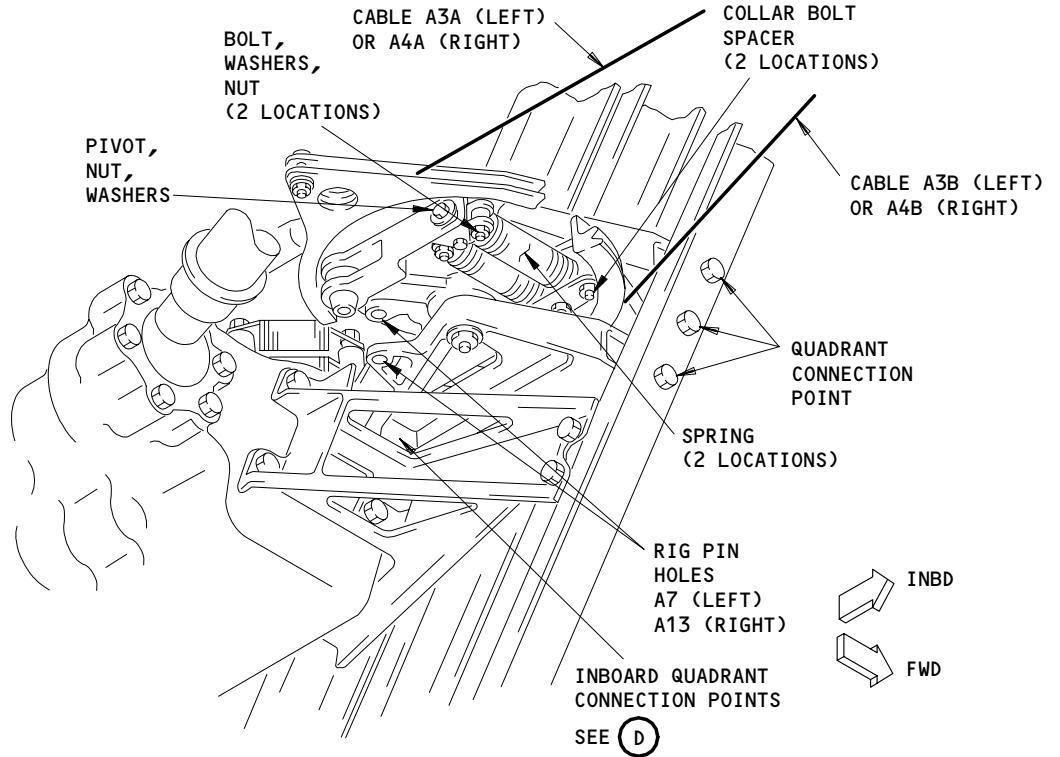
(B)

1 TORQUE TUBES AND VAPOR SEAL ARE NOT SHOWN

Inboard Droop Quadrant Installation  
Figure 401 (Sheet 1)

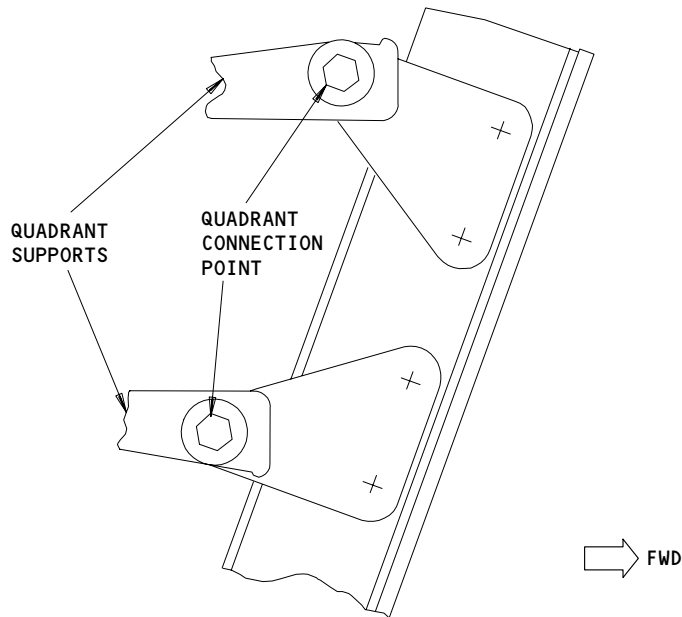
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INBOARD DROOP QUADRANT

(C)



INBOARD QUADRANT CONNECTION POINTS

(D)

Inboard Droop Quadrant Installation  
Figure 401 (Sheet 2)

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S 864-005

- (5) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

S 864-006

- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 014-037

- (7) Open these access panels (AMM 06-44-00/201):
    - (a) 561AB, 561BB, and 561CB for the left droop mechanism
    - (b) 661AB, 661BB, and 661CB for the right droop mechanism
- D. Remove the Inboard Droop Quadrant

S 034-038

- (1) Disconnect these components:
  - (a) Cables A3A and A3B from the left inboard droop quadrant, or A4A and A4B from the right inboard droop quadrant. Tag them for identification.

NOTE: The turnbuckles are located outboard of the LCCA output quadrants in the left and right wheel wells for the main gear.

- (b) The control rod (to the outboard droop quadrant) from the inboard droop quadrant.
- (c) The summing lever control rod from the summing lever.

S 034-007

- (2) Remove the bolts (5 locations) that connect the quadrant support to the wing structure.

S 024-008

- (3) Remove the inboard droop quadrant and summing lever control rod assembly.

S 034-009

- (4) Disconnect the summing lever control rod from the quadrant.

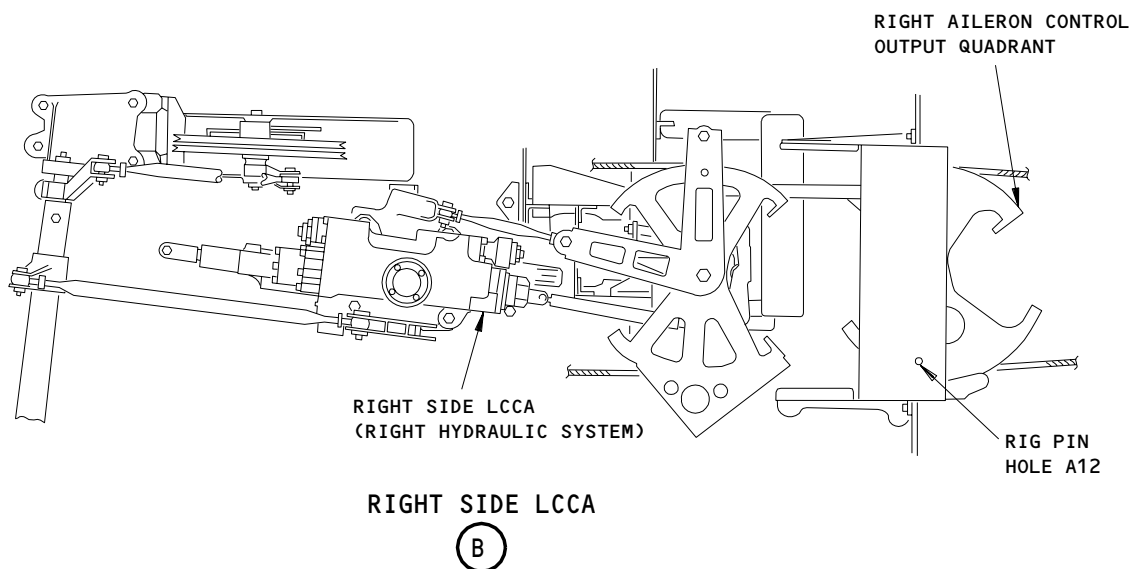
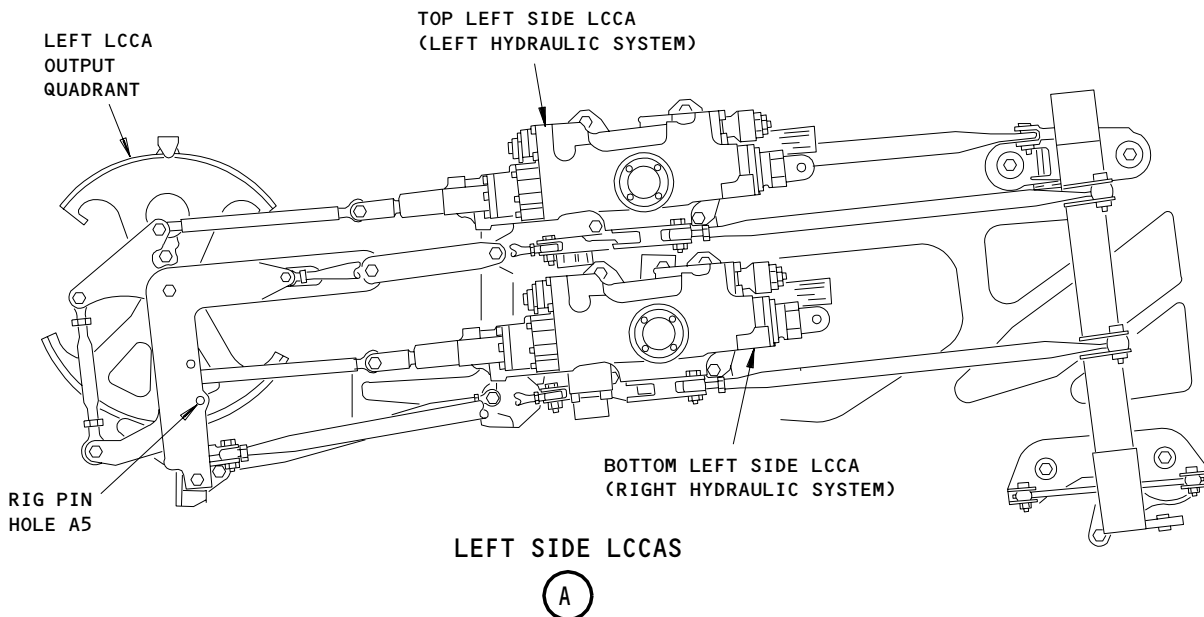
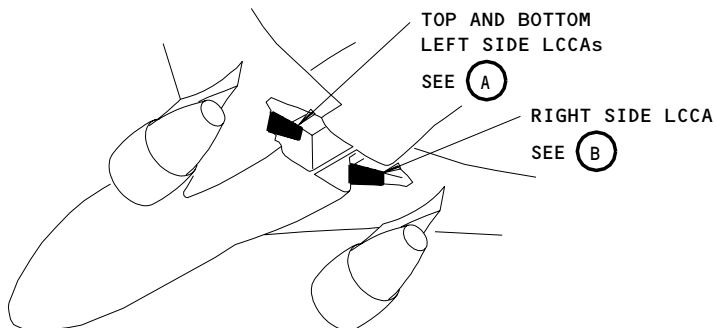
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LCCA and Lockout Mechanism Rig Pin Locations  
Figure 402

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TASK 27-11-38-424-010

3. Inboard Droop Quadrant - Installation

NOTE: Refer to AMM 27-11-38/601 for the applicable wear limit data.

A. Equipment

- (1) Rig Pins from Kit A20004-78 (AMM 20-10-24/201):
  - (a) A5 - P/N A20004-22
  - (b) A7 - P/N A20004-20
  - (c) A8 - P/N A20004-15
  - (d) A12 - P/N A20004-21
  - (e) A13 - P/N A20004-20
  - (f) A14 - P/N A20004-15
- (2) Cable Tensiometer, Commercially Available

B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-11-00/501, Aileron and Aileron Trim Control System
- (4) AMM 27-11-38/601, Aileron Droop Mechanism Inboard Quadrant
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) AMM 32-00-15/201, Main Gear Door Locks

D. Access

- (1) Location Zones
  - 561/661 Rear Spar to Trailing Edge
- (2) Access Panels
  - 561/661AB Wing TE Structure, Aileron Controls
  - 561/661BB Wing TE Inboard Aileron Actuators
  - 561/661CB Wing TE Structure, Aileron Controls

E. Install the Inboard Droop Quadrant

- S 644-011
- (1) Apply grease to the smooth surfaces of the bolts that connect the quadrant support to the airplane structure.
- S 434-012
- (2) Connect the summing lever control rod to the inboard droop quadrant.
- S 424-013
- (3) Hold the quadrant support in position and install the bolts that connect it to the airplane structure (5 locations).

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- S 434-014
- (4) Connect these components:
- (a) Cables A3A and A3B to the left droop quadrant, or A4A and A4B to the right droop quadrant.
  - (b) The control rod (to the outboard droop quadrant) to the inboard droop quadrant.
- S 494-015
- (5) Install these rig pins for the left inboard droop quadrant:
- (a) A5 (for the left LCCA output quadrant)
  - (b) A7 (for the left inboard droop quadrant)
  - (c) A8 (for the left droop summing lever)
- S 494-016
- (6) Install these rig pins for the right inboard droop quadrant:
- (a) A12 (for the right aileron control output quadrant)
  - (b) A13 (for the right inboard droop quadrant)
  - (c) A14 (for the right droop summing lever)
- S 824-017
- (7) Tighten the cables to the values shown in Table 401. Make sure the breakout cam for the outboard droop quadrant stays in its center position.

TABLE 401 AILERON CABLE RIGGING LOADS	
TEMP. °F	CABLES A3A, A3B, A4A, AND A4B ± 10 LBS.
110	148
90	139
70	130
50	122
30	114
10	105
-10	97
-30	89
-40	83

- S 494-018
- (8) Do this check:
- (a) For the left inboard droop quadrant, make sure that rig pins A5 and A7 can move freely in their holes.
  - (b) For the right inboard droop quadrant, make sure that rig pins A12 and A13 can move freely in their holes.

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S 434-019

- (9) Do these steps to install the summing lever control rod:
- (a) Adjust the control rod until the rod end bolts can be easily installed and removed.
  - (b) Tighten the control rod jamnuts.
  - (c) Connect the control rod.
  - (d) Make sure rig pins A7 and A8, or A13 and A14 can move freely in their holes.

S 094-020

- (10) Remove rig pins A5, A7, and A8, or A12, A13, and A14.

S 864-022

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (11) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-023

- (12) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 864-024

- (13) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.

S 864-025

- (14) Push the STATUS switch on the display select panel to show the aileron position indicator on the display.

S 214-026

- (15) Turn the control wheel counterclockwise and do these checks:
- (a) Make sure the left ailerons move up and the right ailerons move down.

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- (b) Make sure the control wheel moves freely and does not need too much force.

S 214-027

- (16) Turn the control wheel clockwise and do these checks:
  - (a) Make sure the right ailerons move up and the left ailerons move down.
  - (b) Make sure the control wheel moves freely and does not need too much force.

S 214-028

- (17) Release the control wheel and do this check:
  - (a) Make sure the ailerons move to their neutral positions.

S 214-029

- (18) Make sure that no more than two threads show at the turnbuckles.

S 434-030

- (19) Install clip locks on the turnbuckles.

S 724-031

- (20) Do the inboard aileron droop test procedure (AMM 27-11-00/501).
- F. Put the Airplane Back to Its Usual Condition

S 864-032

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the main landing gear doors and close the doors (AMM 32-00-15/201).

S 864-033

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-034

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 414-035

- (4) Close these access panels (AMM 06-44-00/201):
  - (a) 561AB, 561BB, 561CB for the left inboard droop mechanism
  - (b) 661AB, 661BB, 661CB for the right inboard droop mechanism

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TASK 27-11-38-004-039

4. Inboard Droop Quadrant Spring Removal

A. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-51-00/201, Trailing Edge Flap System
- (4) AMM 32-00-15/201, Main Gear Door Locks
- (5) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zones
  - 561/661 Rear Spar to Trailing Edge
- (2) Access Panels
  - 561/661AB Wing TE Structure, Aileron Controls
  - 561/661BB Wing TE Inboard Aileron Actuators
  - 561/661CB Wing TE Structure, Aileron Controls

C. Prepare for Removal

S 864-040

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

S 214-041

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-042

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 864-041

- (4) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 864-050

- (5) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

S 864-043

- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

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S 014-044

- (7) Open these access panels (AMM 06-44-00/201):  
 (a) 561AB, 561BB, and 561CB for the left droop mechanism  
 (b) 661AB, 661BB, and 661CB for the right droop mechanism

D. Inboard Droop Quadrant Spring Removal

S 024-045

- (1) Remove the spring from the droop mechanism:  
 (a) Remove the nut and washers from the pivot of the droop quadrant.  
 (b) Remove the bolt, washers, and nut that attach the spring to the bottom and top plate of the pivot.  
 (c) Remove the collar, bolt, and spacer that attach the other end of the spring to the crank.  
 (d) Remove the droop quadrant spring.

TASK 27-11-38-404-046

5. Inboard Droop Quadrant Spring Installation

A. Equipment

- (1) Rig Pins from Kit A20004-78 (AMM 20-10-24/201):  
 (2) A5 - P/N A20004-22  
 (3) A7 - P/N A20004-20  
 (4) A8 - P/N A20004-15  
 (5) A12 - P/N A20004-21  
 (6) A13 - P/N A20004-20  
 (7) A14 - P/N A20004-15  
 (8) Cable Tensiometer, Commercially Available

B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)  
 (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels  
 (2) AMM 24-22-00/201, Electrical Power - Control  
 (3) AMM 27-11-00/501, Aileron and Aileron Trim Control System  
 (4) AMM 27-11-38/601, Aileron Droop Mechanism Inboard Quadrant  
 (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
 (6) AMM 32-00-15/201, Main Gear Door Locks

D. Access

- (1) Location Zones  
     561/661      Rear Spar to Trailing Edge
- (2) Access Panels  
     561/661AB      Wing TE Structure, Aileron Controls  
     561/661BB      Wing TE Inboard Aileron Actuators  
     561/661CB      Wing TE Structure, Aileron Controls

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E. Inboard Droop Quadrant Spring Installation

S 424-047

- (1) Install the inboard droop quadrant springs:
  - (a) Apply grease to the spring hooks.
  - (b) Install one end of the spring to the crank with the bolt, bushing, washer, and collar.
  - (c) Install the other end of the spring to the top and bottom plates of the droop quadrant with the bolt, bushing, washer, and nut.
  - (d) Install the pivot to the droop quadrant with the nut and washers.

S 024-048

- (2) Disconnect these components:
  - (a) The control rod between the inboard droop quadrant and the outboard droop quadrant.
  - (b) Cables A3A and A3B from the left inboard droop quadrant, or A4A and A4B from the right inboard droop quadrant. Tag them for identification.

NOTE: The turnbuckles are located outboard of the LCCA output quadrants in the left and right wheel wells for the main gear.

S 864-049

- (3) Hold the control rod to the inboard aileron power control unit's in position.

NOTE: Measure force by pulling quadrant and holding rod tightly.

S 484-049

- (4) Attach the spring scale to the cable quadrant.

NOTE: You can put a cord around the quadrant cable groove to attach the spring scale.

S 824-050

- (5) Adjust (for detent breakout force) the nut that attaches the pivot to the inboard droop quadrant until the spring scale reads 46-53 lbs (204.6-235.7 newtons)(for nuts on the right aileron control-quadrant/droop installations), or 62-72 lbs (275-320 Newtons) (for nuts on the left aileron control-quadrant/droop installations).

NOTE: Add or remove washers if it is necessary.

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- S 084-051
- (6) Remove the spring scale from the cable quadrant.
- S 024-050
- (7) Disconnect the summing lever control rod from the droop summing lever.
- S 424-051
- (8) Connect these components:
- (a) Cables A3A and A3B to the left droop quadrant, or A4A and A4B to the right droop quadrant.
  - (b) The control rod (to the outboard droop quadrant) to the inboard droop quadrant.
- S 484-052
- (9) Install these rig pins for the left inboard droop quadrant:
- (a) A5 (for the left LCCA output quadrant)
  - (b) A7 (for the left inboard droop quadrant)
  - (c) A8 (for the left droop summing lever)
- S 484-053
- (10) Install these rig pins for the right inboard droop quadrant:
- (a) A12 (for the right aileron control output quadrant)
  - (b) A13 (for the right inboard droop quadrant)
  - (c) A14 (for the right droop summing lever)
- S 824-054
- (11) Tighten the cables to the values shown in Table 401. Make sure the breakout cam for the outboard droop quadrant stays in its center position.
- S 484-055
- (12) Do this check:
- (a) For the left inboard droop quadrant, make sure that rig pins A5 and A7 can move freely in their holes.
  - (b) For the right inboard droop quadrant, make sure that rig pins A12 and A13 can move freely in their holes.

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S 424-056

- (13) Do these steps to install the summing lever control rod:
- (a) Adjust the control rod until the rod end bolts can be easily installed and removed.
  - (b) Tighten the control rod jamnuts.
  - (c) Connect the control rod.
  - (d) Make sure rig pins A7 and A8, or A13 and A14 can move freely in their holes.

S 084-057

- (14) Remove rig pins A5, A7, and A8, or A12, A13, and A14.

S 864-059

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (15) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-060

- (16) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 864-061

- (17) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.

S 864-062

- (18) Push the STATUS switch on the display select panel to show the aileron position indicator on the display.

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S 214-063

- (19) Turn the control wheel counterclockwise and do these checks:
- (a) Make sure the left ailerons move up and the right ailerons move down.
  - (b) Make sure the control wheel moves freely and does not need too much force.

S 214-064

- (20) Turn the control wheel clockwise and do these checks:
- (a) Make sure the right ailerons move up and the left ailerons move down.
  - (b) Make sure the control wheel moves freely and does not need too much force.

S 214-065

- (21) Release the control wheel and do this check:
- (a) Make sure the ailerons move to their neutral positions.

S 214-066

- (22) Make sure that no more than two threads show at the turnbuckles.

S 424-067

- (23) Install clip locks on the turnbuckles.

S 724-068

- (24) Do the inboard aileron droop test procedure (AMM 27-11-00/501).
- F. Put the Airplane Back to Its Usual Condition

S 864-069

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the main landing gear doors and close the doors (AMM 32-00-15/201).

S 864-072

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

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- S 864-071
- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).
- S 864-070
- (4) Close these access panels (AMM 06-44-00/201):
- (a) 561AB, 561BB, 561CB for the left inboard droop mechanism
  - (b) 661AB, 661BB, 661CB for the right inboard droop mechanism

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AILERON DROOP MECHANISM INBOARD QUADRANT - INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Aileron Droop Mechanism Inboard Quadrant - Removal/Installation for procedures and do these tasks.

TASK 27-11-38-206-001

2. Aileron Droop Mechanism Inboard Quadrant - Wear Limits

A. Access

- (1) Location Zone  
561/661 Rear Spar to Trailing Edge

B. Procedure

S 226-002

- (1) Use the supplied data (Fig. 601) to examine the inboard droop quadrant for too much wear.

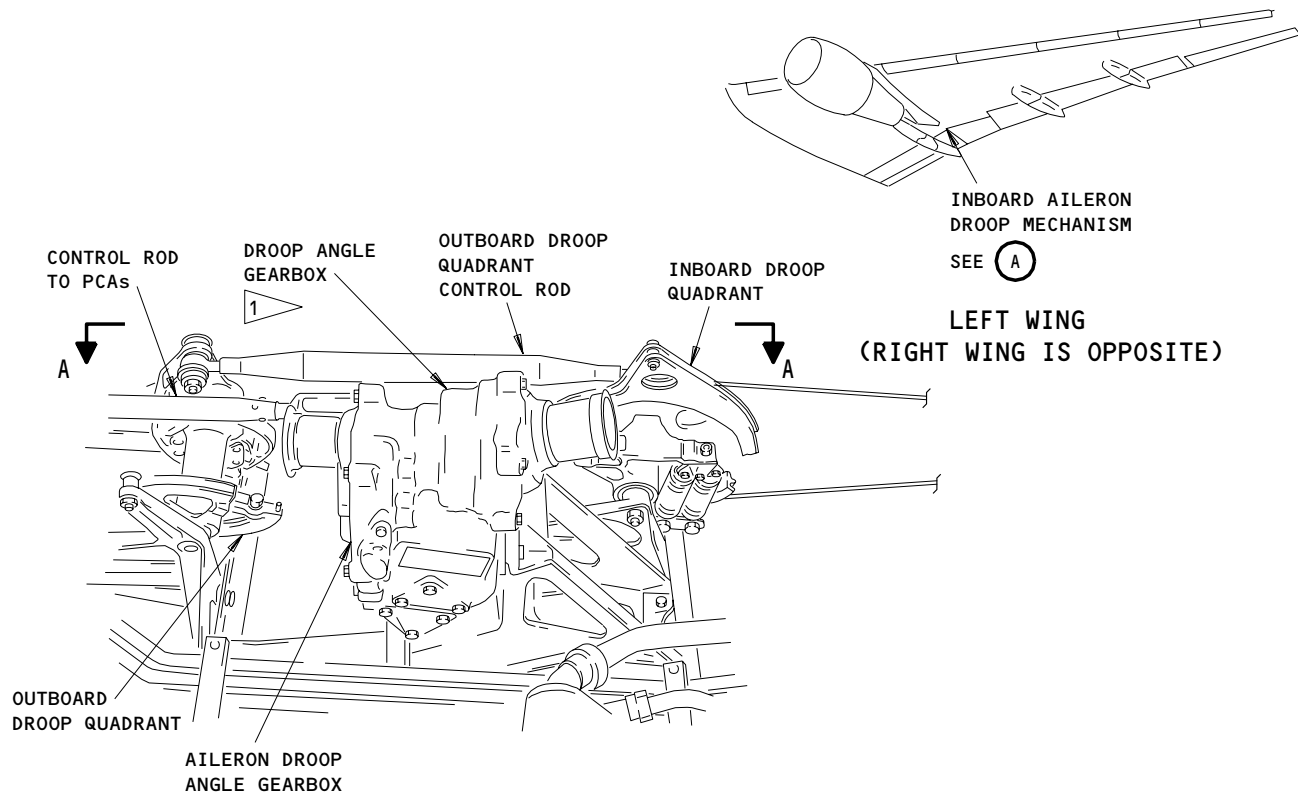
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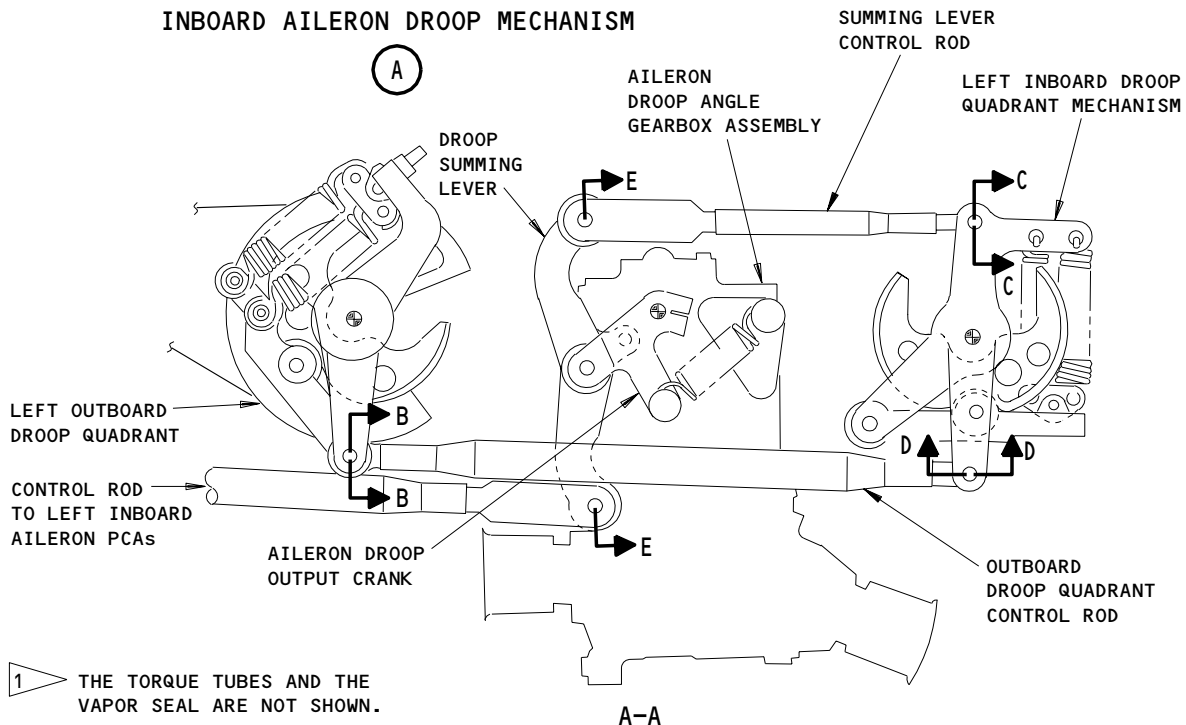
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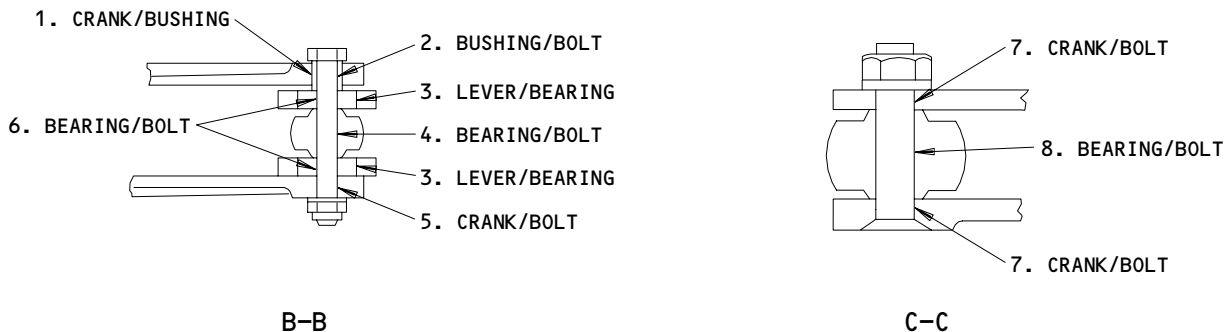
### INBOARD AILERON DROOP MECHANISM



Inboard Droop Quadrant Wear Limits  
Figure 601 (Sheet 1)

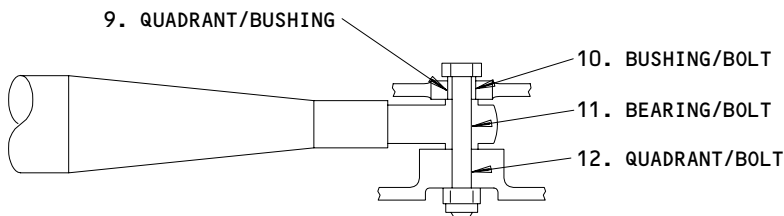
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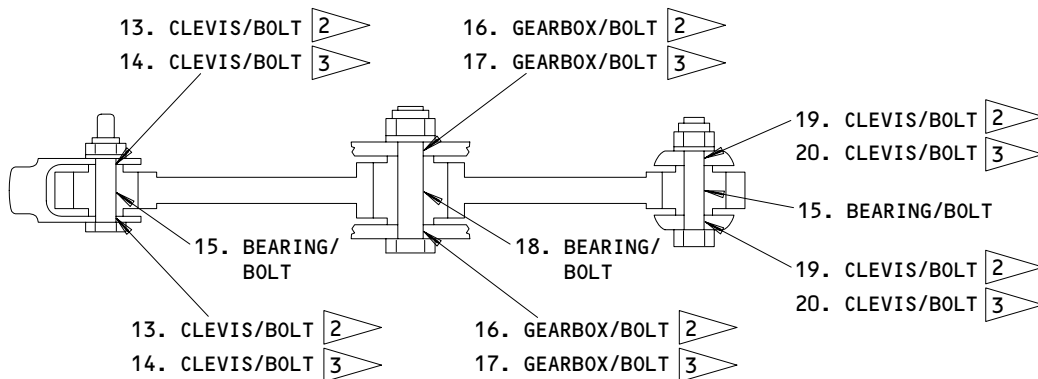


B-B

C-C



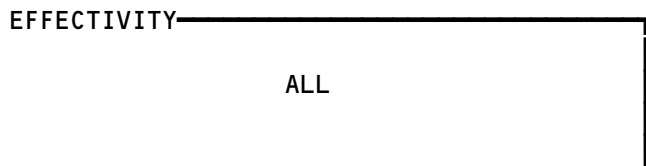
D-D



E-E

2 LEFT AILERON CONTROL SYSTEM  
3 RIGHT AILERON CONTROL SYSTEM

Inboard Droop Quadrant Wear Limits  
Figure 601 (Sheet 2)







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# BOEING

  
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**MAINTENANCE MANUAL**

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	CRANK	ID	0.3745 (9.512)	0.3755 (9.538)	0.3780 (9.601)	0.0035 (0.089)		X	
	BUSHING	OD	0.3740 (9.500)	0.3745 (9.512)	0.3720 (9.449)		X		
2	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
3	LEVER	ID	0.7500 (19.050)	0.7505 (19.063)	0.7250 (18.415)	0.0020 (0.051)		X	
	BEARING	OD	0.7496 (19.040)	0.7500 (19.050)	0.7485 (19.012)		X		
4	BEARING	ID	0.2497 (6.342)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2460 (6.248)		X		
5	CRANK	ID	0.2495 (6.337)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)		X	
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
6	BEARING	ID	0.2497 (6.342)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2460 (6.248)		X		
7	CRANK	ID	0.2495 (6.337)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
8	BEARING	ID	0.2497 (6.342)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
9	QUADRANT	ID	0.3745 (9.512)	0.3755 (9.538)	0.3780 (9.601)	0.0035 (0.089)		X	
	BUSHING	OD	0.3740 (9.500)	0.3745 (9.512)	0.3720 (9.449)		X		
10	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		

Inboard Droop Quadrant Wear Limits  
Figure 601 (Sheet 3)

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# BOEING

## 767 MAINTENANCE MANUAL

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BEARING	ID	0.2497 (6.342)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)		X	
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
12	QUADRANT	ID	0.9500 (24.130)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
13 	CLEVIS	ID	0.2495 (6.337)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)		X	
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
14 	CLEVIS	ID	0.2495 (6.337)	0.2505 (6.363)	0.2530 (6.426)	0.0035 (0.089)		X	
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2470 (6.274)		X		
15	BEARING	ID	0.2495 (6.337)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
16 	GEARBOX	ID	0.3120 (7.925)	0.3125 (7.938)	0.3155 (8.014)	0.0035 (0.089)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3095 (7.861)		X		
17 	GEARBOX	ID	0.3120 (7.925)	0.3125 (7.938)	0.3155 (8.014)	0.0035 (0.089)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3090 (7.849)		X		
18	BEARING	ID	0.3122 (7.930)	0.3125 (7.938)	0.3155 (8.014)	0.0035 (0.089)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3090 (7.849)		X		
19 	CLEVIS	ID	0.2495 (6.337)	0.2505 (6.363)	0.2535 (6.439)	0.0040 (0.102)		X	
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
20 	CLEVIS	ID	0.2495 (6.337)	0.2505 (6.363)	0.2530 (6.426)	0.0035 (0.089)		X	
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2470 (6.274)		X		

THIS PART CAN BE REPAIRED.

Inboard Droop Quadrant Wear Limits  
Figure 601 (Sheet 4)

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AILERON DROOP MECHANISM OUTBOARD QUADRANT – REMOVAL/INSTALLATION

1. General

- A. This procedure contains four tasks. The first task supplies the data that is necessary to remove the outboard droop quadrant. The second task supplies the data that is necessary to install outboard droop quadrant. The third task supplies the data that is necessary to remove the outboard droop quadrant spring. The fourth task supplies the data that is necessary to install the outboard droop quadrant spring.

TASK 27-11-39-024-001

2. Outboard Droop Quadrant – Removal

A. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 27-51-00/201, Trailing Edge Flap System
- (4) AMM 32-00-15/201, Main Gear Door Locks
- (5) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zone  
       561/661       Rear Spar to Trailing Edge
  
- (2) Access Panels
 

561/661AB	Wing T.E. Structure, Aileron Controls
561/661BB	Wing T.E. Inboard Aileron Actuators
561/661CB	Wing T.E. Structure, Aileron Controls
561/661LB	Wing T.E. Structure Outboard Aileron Installation

C. Prepare for Removal

- S 864-002
- (1) Supply electrical power (AMM 24-22-00/201).
  
- S 214-003
- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).
  
- S 494-030

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).
  
- S 044-004
- (4) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

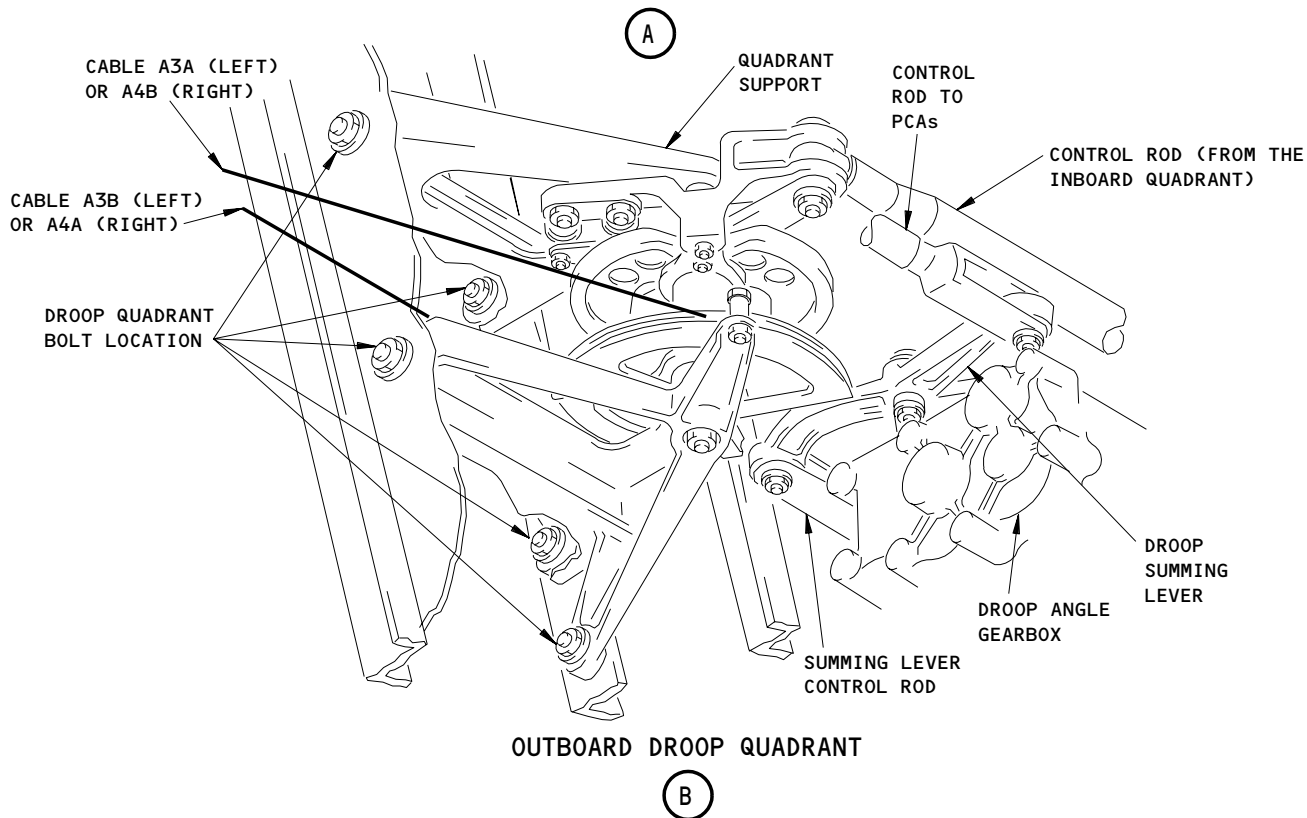
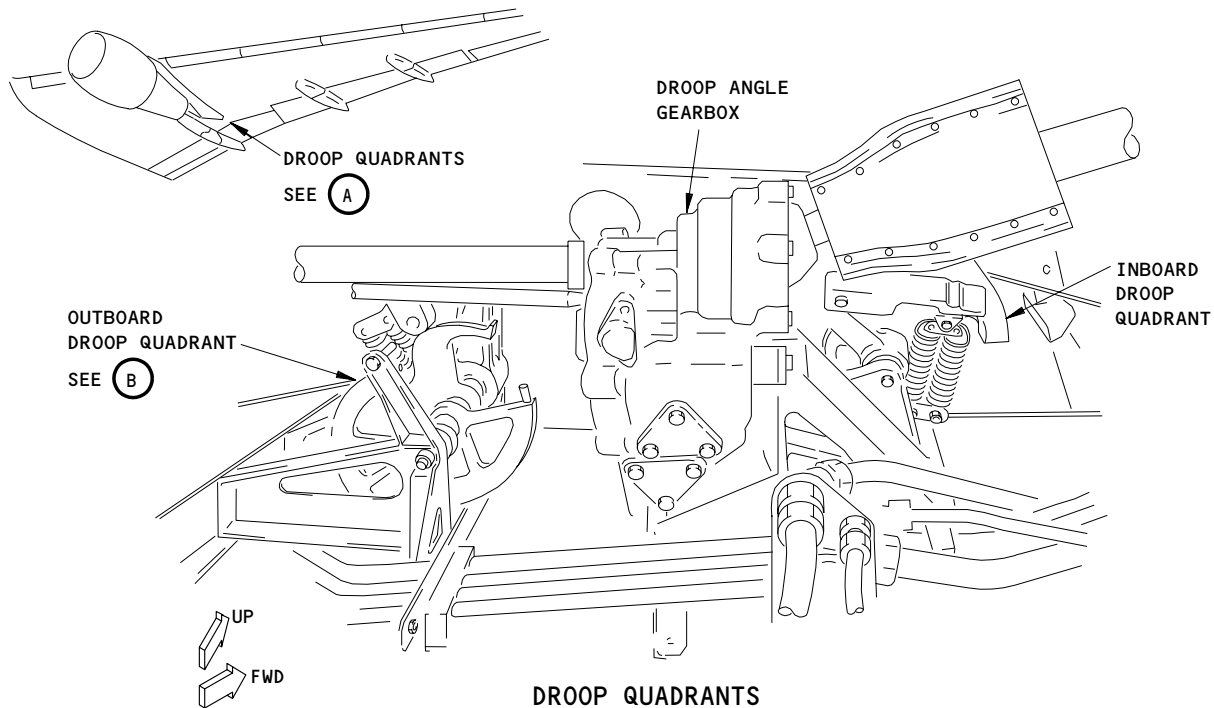
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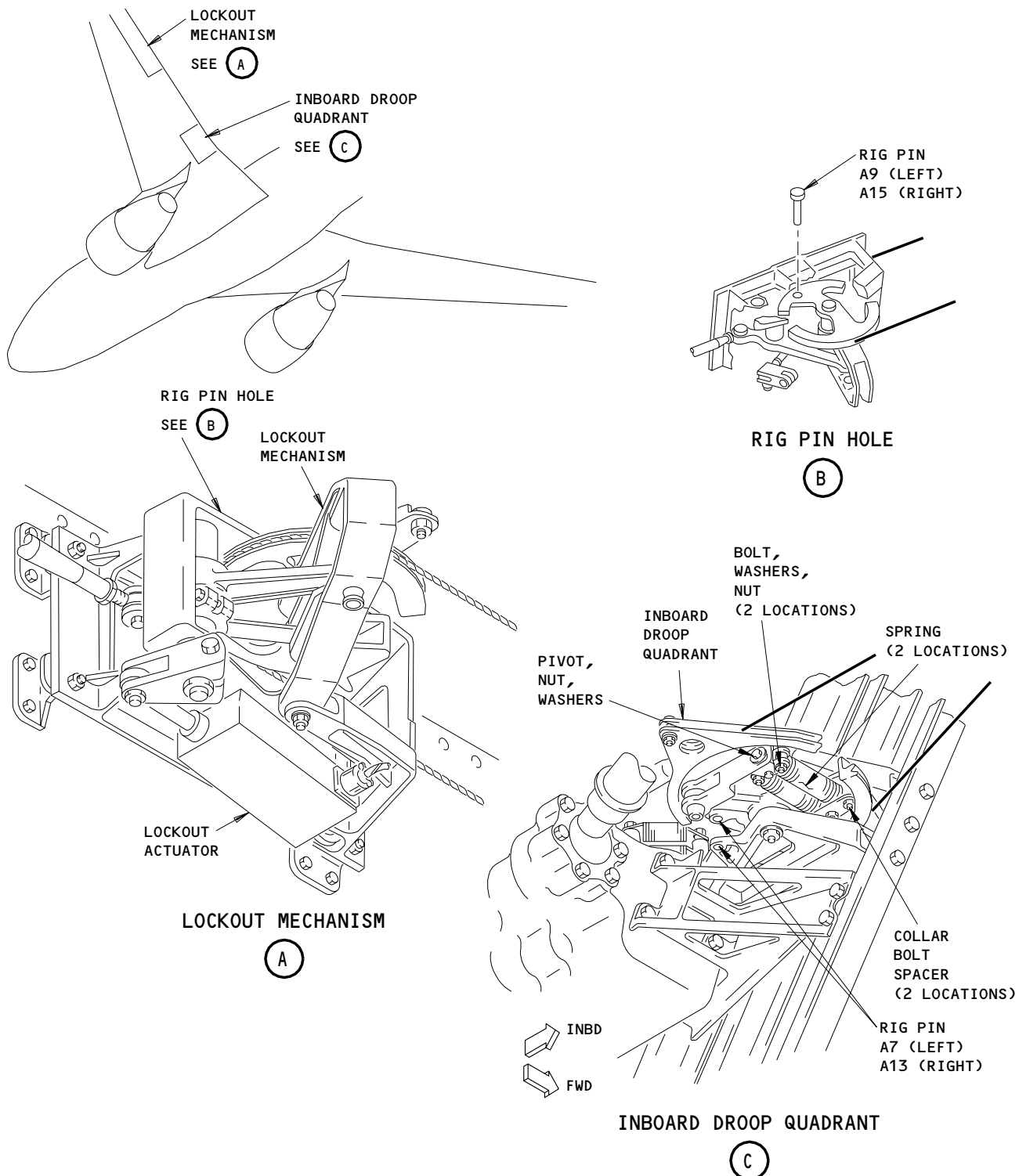


Outboard Droop Quadrant Installation  
Figure 401

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Lockout Mechanism and Inboard Droop  
Quadrant Rig Pin Locations  
Figure 402

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S 864-005

- (5) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position lights come ON.

S 864-006

- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 014-007

- (7) Open these access panels (AMM 06-44-00/201):
  - (a) 561AB, 561BB, 561CB, and 561LB to get access to the left droop mechanism.
  - (b) 661AB, 661BB, 661CB, and 661LB to get access to the right droop mechanism.

D. Remove the Outboard Droop Quadrant

S 034-008

- (1) Disconnect cables A3A and A3B from the left outboard droop quadrant, or A4A and A4B from the right outboard droop quadrant. Tag the cables for identification.

**NOTE:** The turnbuckles are located behind access panel 561LB (left) or 661LB (right).

S 034-009

- (2) Disconnect the control rod (from the inboard droop quadrant) from the outboard droop quadrant.

S 024-010

- (3) Remove the bolts (5 locations) that connect the quadrant support to the wing structure, and remove the outboard droop quadrant.

TASK 27-11-39-424-011

3. Outboard Droop Quadrant - Installation

**NOTE:** Refer to AMM 27-11-38/601 for the applicable wear limit data.

A. General

- (1) Before this procedure is done, make sure that the airplane temperature is stable (use a tolerance of  $\pm 5^{\circ}$  F) along the cable. Make sure that the temperature has been stable for at least one hour.

B. Equipment

- (1) Rig Pins from Kit A20004-78 (AMM 20-10-24/201):
  - (a) A7 - P/N A20004-20

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- (b) A9 - P/N A20004-22
- (c) A13 - P/N A20004-20
- (d) A15 - P/N A20004-22
- (2) Cable Tensiometer, Commercially Available
- C. Consumable Materials
  - (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
  - (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)
- D. References
  - (1) AMM 06-44-00/201, Wing Access Doors and Panels
  - (2) AMM 24-22-00/201, Electrical Power - Control
  - (3) AMM 27-11-00/501, Aileron and Aileron Trim Control System
  - (4) AMM 27-11-38/601, Aileron Droop Mechanism Inboard Quadrant
  - (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
  - (6) AMM 32-00-15/201, Main Gear Door Locks
- E. Access
  - (1) Location Zone
    - 561/661 Rear Spar to Trailing Edge
  - (2) Access Panels
    - 561/661AB Wing T.E. Structure, Aileron Controls
    - 561/661BB Wing T.E. Inboard Aileron Actuators
    - 561/661CB Wing T.E. Structure, Aileron Controls
    - 561/661LB Wing T.E. Structure Outboard Aileron Installation
- F. Install Outboard Droop Quadrant
  - S 644-012
    - (1) Apply a layer of grease to the bolts that connect the droop quadrant to the wing.
  - S 434-013
    - (2) Hold the quadrant support in position and install the bolts that connect the outboard droop quadrant to the wing (5 locations).
  - S 434-031
    - (3) Connect these components:
      - (a) Cables A3A and A3B to the left outboard droop quadrant, or A4A and A4B to the right outboard droop quadrant.
      - (b) The control rod (from the inboard quadrant) to the outboard droop quadrant.
  - S 214-014
    - (4) Make sure the breakout cam for the outboard droop quadrant is in its center position.
  - S 494-015
    - (5) Install these rig pins for the left outboard droop quadrant (Fig. 402):
      - (a) A7 (for the left inboard droop quadrant)
      - (b) A9 (for the left aileron lockout mechanism)

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- S 494-016
- (6) Install these rig pins for the right outboard droop quadrant (Fig. 402):
- (a) A13 (for the right inboard droop quadrant)
  - (b) A15 (for the right aileron lockout mechanism)

- S 214-017
- (7) Tighten the cables to the values shown in Table 401 and do the checks that follow:
- (a) Make sure the breakout cam for the outboard droop quadrant stays in its center position.
  - (b) Make sure that rig pins A7 and A9 (left), or A13 and A15 (right), can move freely.

TABLE 401 AILERON CABLE RIGGING LOADS	
TEMP. °F	CABLES A3A, A3B, A4A, AND A4B ± 10 LBS.
110	148
90	139
70	130
50	122
30	114
10	105
-10	97
-30	89
-40	83

- S 094-018
- (8) Remove rig pins A7 and A9, or A13 and A15, as applicable.

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S 864-032

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (9) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-020

- (10) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 864-021

- (11) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.

S 864-022

- (12) Push the STATUS button on the display select panel to show the aileron position indicator on the display.

S 214-023

- (13) Turn the control wheel clockwise and do the checks that follow:
- (a) Make sure the control wheel moves freely and does not need too much force.
  - (b) Make sure the left ailerons move down and the right ailerons move up.

S 214-024

- (14) Turn the control wheel counterclockwise and do the checks that follow:
- (a) Make sure the control wheel moves freely and does not need too much force.
  - (b) Make sure the left ailerons move up and the right ailerons move down.

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S 214-025

- (15) Move the control wheel to its neutral position and do the checks that follow:
- (a) Make sure the ailerons move to their neutral positions.
  - (b) Make sure that no more than two threads show at the cable turnbuckles.

S 434-026

- (16) Install the clip locks on the turnbuckles.

S 724-027

- (17) Do a test of the inboard aileron droop (AMM 27-11-00/501).
- G. Put the Airplane Back to Its Usual Condition

S 094-033

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the main landing gear and close the doors (AMM 32-00-15/201).

S 864-028

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-029

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 414-035

- (4) Close these access panels (AMM 06-44-00/201):
- (a) 561AB, 561BB, 561CB, and 561LB for the left outboard droop quadrant.
  - (b) 661AB, 661BB, 661CB, and 661LB for the right outboard droop quadrant.

TASK 27-11-39-004-107

4. Outboard Droop Quadrant Spring Removal

A. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-51-00/201, Trailing Edge Flap System
- (4) AMM 32-00-15/201, Main Gear Door Locks
- (5) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zones
- 561/661 Rear Spar to Trailing Edge

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- (2) Access Panels
  - 561/661AB Wing TE Structure, Aileron Controls
  - 561/661BB Wing TE Inboard Aileron Actuators
  - 561/661CB Wing TE Structure, Aileron Controls
  - 561/661LB Wing TE Structure Outboard Aileron Installation

C. Prepare for Removal

S 864-108

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

S 214-109

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-110

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 864-139

- (4) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 864-140

- (5) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

S 864-111

- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 014-112

- (7) Open these access panels (AMM 06-44-00/201):
  - (a) 561AB, 561BB, 561CB, and 561LB for the left droop mechanism
  - (b) 661AB, 661BB, 661CB, and 661LB for the right droop mechanism

D. Outboard Droop Quadrant Spring Removal

S 024-113

- (1) Remove the spring from the droop mechanism:
  - (a) Remove the nut and washers from the pivot of the droop quadrant.

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- (b) Remove the bolt, washers, and nut that attach the spring to the bottom and top plate of the pivot.
- (c) Remove the collar, bolt, and spacer that attach the other end of the spring to the crank.
- (d) Remove the droop quadrant spring.

TASK 27-11-39-404-114

5. Outboard Droop Quadrant Spring Installation

A. Equipment

- (1) Rig Pins from Kit A20004-78 (AMM 20-10-24/201):
  - (a) A7 - P/N A20004-20
  - (b) A9 - P/N A20004-22
  - (c) A13 - P/N A20004-20
  - (d) A15 - P/N A20004-22
- (2) Cable Tensiometer, Commercially Available

B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-11-00/501, Aileron and Aileron Trim Control System
- (4) AMM 27-11-38/601, Aileron Droop Mechanism Inboard Quadrant
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) AMM 32-00-15/201, Main Gear Door Locks

D. Access

- (1) Location Zones
  - 561/661 Rear Spar to Trailing Edge
- (2) Access Panels
  - 561/661AB Wing TE Structure, Aileron Controls
  - 561/661BB Wing TE Inboard Aileron Actuators
  - 561/661CB Wing TE Structure, Aileron Controls
  - 561/661LB Wing TE Structure Outboard Aileron Installation

E. Outboard Droop Quadrant Spring Installation

S 424-115

- (1) Install the outboard droop quadrant springs:
  - (a) Apply grease to the spring hooks.
  - (b) Install one end of the spring to the crank with the bolt, bushing, washer, and collar.
  - (c) Install the other end of the spring to the top and bottom plates of the droop quadrant with the bolt, bushing, washer, and nut.
  - (d) Install the pivot to the droop quadrant with the nut and washers.

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F. Outboard Droop Quadrant Springs Installation Test

S 024-116

- (1) Disconnect the cables A3A and A3B from the left outboard droop quadrant, or A4A and A4B from the right outboard droop quadrant. Tag them for identification.

NOTE: The turnbuckles are located outboard of the LCCA output quadrants in the left and right wheel wells for the main gear.

S 864-117

- (2) Hold the input linkage to the control rod (from the inboard quadrant) in position.

NOTE: Measure force by pulling quadrant and holding rod tightly.

S 484-118

- (3) Attach the spring scale to the cable quadrant.

NOTE: You can put a cord around the quadrant cable groove to attach the spring scale.

S 824-119

- (4) Adjust (for detent breakout force) the nut that attach the pivot to the droop quadrant until the breakout torque of the override mechanism is 62.5-69 pounds (278.0-307.0 newtons).

NOTE: Add or remove washers if it is necessary.

S 084-120

- (5) Remove the spring scale from the cable quadrant.

S 424-121

- (6) Connect the cables A3A and A3B to the left droop quadrant, or A4A and A4B to the right droop quadrant.

S 864-141

- (7) Make sure the breakout cam for the outboard droop quadrant is in its center position.

S 484-122

- (8) Install these rig pins for the left outboard droop quadrant:
  - (a) A7 (for the left inboard droop quadrant)
  - (b) A9 (for the left aileron lockout mechanism)

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S 484-123

- (9) Install these rig pins for the right outboard droop quadrant:
- (a) A13 (for the right inboard droop quadrant)
  - (b) A15 (for the right aileron lockout mechanism)

S 214-124

- (10) Tighten the cables to the values shown in Table 401 and do the checks that follow:
- (a) Make sure the breakout cam for the outboard droop quadrant stays in its center position.
  - (b) Make sure that rig pins A7 and A9 (left), or A13 and A15 (right), can move freely.

S 094-125

- (11) Remove rig pins A7 and A9, or A13 and A15, as applicable.

S 864-127

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (12) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-128

- (13) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 864-129

- (14) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.

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S 864-130

- (15) Push the STATUS button on the display select panel to show the aileron position indicator on the display.

S 214-131

- (16) Turn the control wheel counterclockwise and do these checks:
- (a) Make sure the control wheel moves freely and does not need too much force.
  - (b) Make sure the left ailerons move up and the right ailerons move down.

S 214-132

- (17) Move the control wheel to its neutral position and do the checks that follow:
- (a) Make sure the ailerons move to their neutral positions.
  - (b) Make sure that no more than two threads show at the cable turnbuckles.

S 424-133

- (18) Install the clip locks on the turnbuckles.

S 724-134

- (19) Do the inboard aileron droop test procedure (AMM 27-11-00/501).
- G. Put the Airplane Back to Its Usual Condition

S 864-135

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the main landing gear doors and close the doors (AMM 32-00-15/201).

S 864-136

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

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- S 864-137
- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).
- S 864-138
- (4) Close these access panels (AMM 06-44-00/201):
- (a) 561AB, 561BB, 561CB and 561LB for the left outboard droop quadrant.
  - (b) 661AB, 661BB, 661CB, and 661LB for the right outboard droop quadrant.

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AILERON DROOP MECHANISM SUMMING LEVER – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task supplies the data that is necessary to remove the summing lever for the aileron droop mechanism. The second task supplies the data that is necessary to install it.

TASK 27-11-40-024-026

2. Aileron Droop Mechanism Summing Lever – Removal

A. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 27-51-00/201, Trailing Edge Flap System
- (4) AMM 32-00-15/201, Main Gear Door Locks
- (5) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

(1) Location Zones

- 561 Rear Spar to Trailing Edge (Left )
- 661 Rear Spar to Trailing Edge (Right)

(2) Access Panels

- 561/661AB Wing T.E. Structure, Aileron Controls
- 561/661BB Wing T.E. Inboard, Aileron Actuators
- 561/661CB Wing T.E. Structure, Aileron Controls

C. Prepare for Removal

S 864-009

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

S 214-010

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-001

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the main gear doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-011

- (4) Retract the trailing edge flaps.

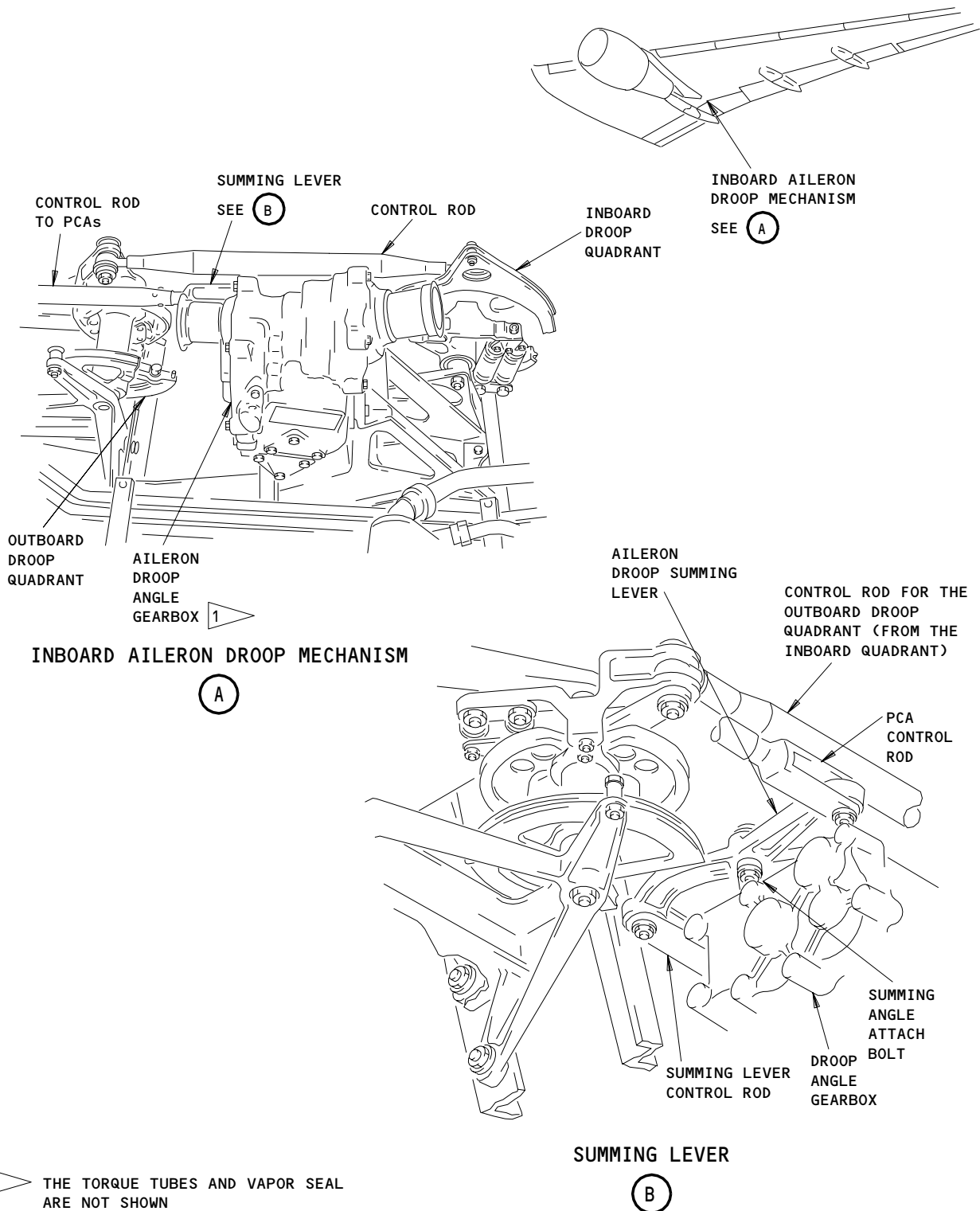
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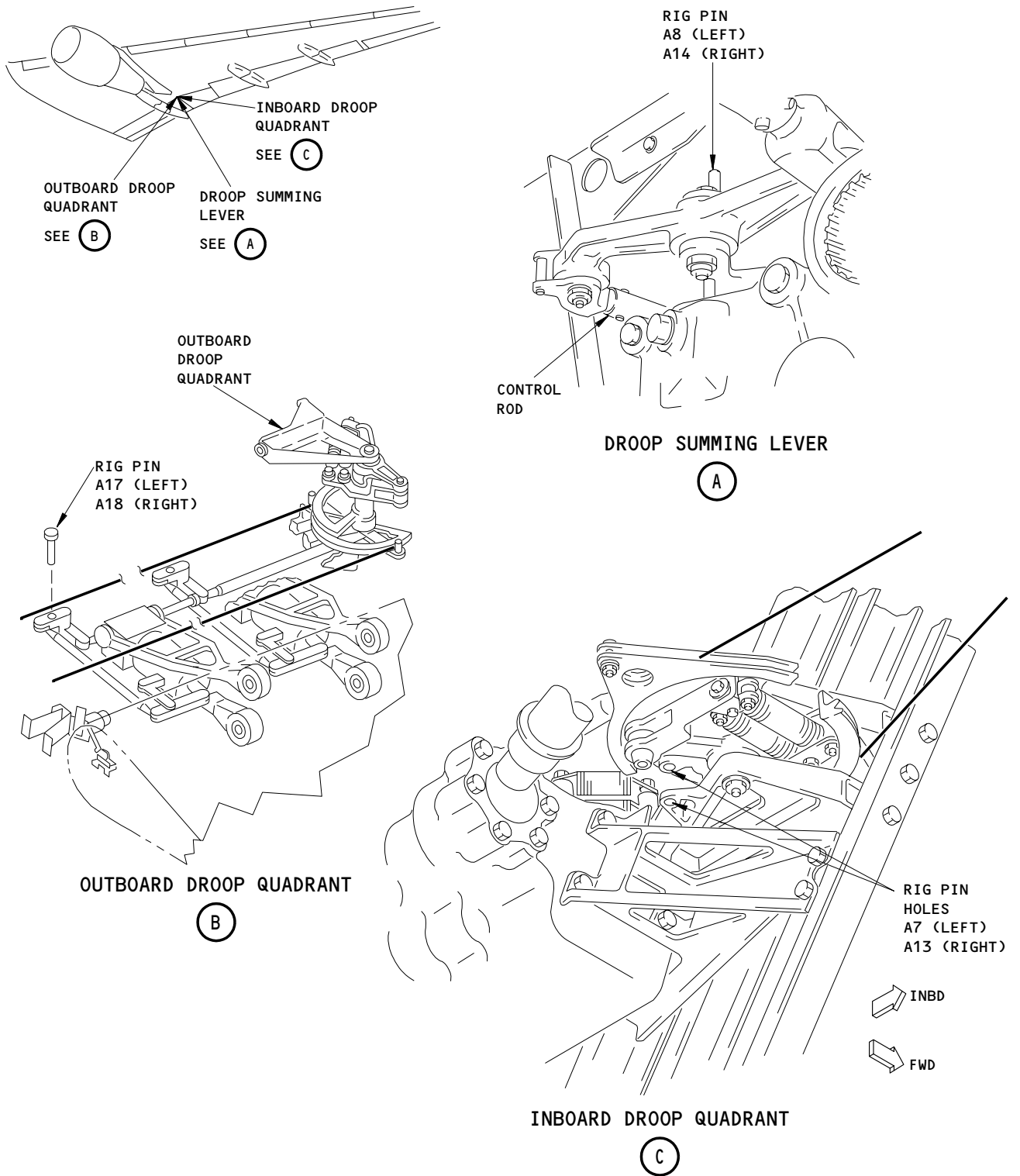
1 THE TORQUE TUBES AND VAPOR SEAL ARE NOT SHOWN

Aileron Droop Summing Lever Installation  
Figure 401

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Rig Pin Locations  
Figure 402

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- S 044-002
- (5) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).
- S 864-012
- (6) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.
- S 864-013
- (7) Open these circuit breakers on overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R
- S 014-003
- (8) Open these access panels (AMM 06-44-00/201).
- (a) 561AB, 561BB, and 561CB to get access to the left droop mechanism.
  - (b) 661AB, 661BB, and 661CB to get access to the right droop mechanism.

D. Remove the Summing Lever (Fig. 401)

- S 034-014
- (1) Disconnect the PCA control rod from the summing lever.
- S 034-015
- (2) Disconnect the summing lever control rod from the summing lever.
- S 024-016
- (3) Remove the bolt that connects the summing lever to the droop angle gearbox and remove the summing lever.

TASK 27-11-40-424-017

3. Aileron Droop Mechanism Summing Lever - Installation

NOTE: Refer to AMM 27-11-38/601 for the applicable wear limit data.

A. Equipment

- (1) Rig Pins from Kit A20004-78 (AMM 20-10-24/201):
- (a) A7 - P/N A20004-20
  - (b) A8 - P/N A20004-15
  - (c) A13 - P/N A20004-20
  - (d) A14 - P/N A20004-15
  - (e) A17 - P/N A20004-15
  - (f) A18 - P/N A20004-15

B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)

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- (2) D00015 Grease, Corrosion Preventive - BMS 3-24  
(Alternate)

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-11-38/601, Aileron Droop Mechanism Inboard Quadrant
- (4) AMM 32-00-15/201, Main Gear Door Locks

D. Access

- (1) Location Zones
  - 561 Rear Spar to Trailing Edge (Left)
  - 661 Rear Spar to Trailing Edge (Right)
- (2) Access Panels
  - 561/661AB Wing T.E. Structure, Aileron Controls
  - 561/661BB Wing T.E. Inboard, Aileron Actuators
  - 561/661CB Wing T.E. Structure, Aileron Controls

E. Install the Summing Lever

S 644-008

- (1) Lubricate the summing lever bolts with grease.

S 434-018

- (2) Connect the summing lever to the droop angle gearbox.

S 494-004

- (3) Install rig pins A7 and A8 (A13 and A14) for the left (right) summing lever.

S 824-019

- (4) Adjust the summing lever control rod until rig pins A7 and A8, or A13 and A14 can move freely.

S 094-020

- (5) Tighten the locknut for the summing lever control rod and remove rig pins A7 (for the left summing lever) or A13 (for the right summing lever).

S 494-006

- (6) Install rig pin A17 (A18) for the left (right) summing lever.

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S 824-021

- (7) Adjust the PCA control rod until rig pins A8 and A17, or A14 and A18 can move freely.

S 094-022

- (8) Remove rig pins A8 and A17 (for the left summing lever), or A14 and A18 (for the right summing lever).

F. Put the Airplane Back to Its Usual Condition

S 094-007

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the landing gear doors and close doors (AMM 32-00-15/201).

S 864-023

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 864-005

- (3) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.

S 864-024

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

S 414-025

- (5) Close these access panels (AMM 06-44-00/201):
  - (a) 561AB, 561BB, and 561CB for the left droop mechanism.

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(b) 661AB, 661BB, and 661CB for the right droop mechanism.

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OUTBOARD AILERON LOCKOUT MECHANISM – MAINTENANCE PRACTICES

1. General

- A. This procedure contains the removal and installation tasks for the outboard aileron lockout mechanism and the aileron lockout actuator.

TASK 27-11-44-022-004

2. Lockout Mechanism or Lockout Actuator – Removal

A. General

- (1) This task contains two procedures, one to remove the outboard aileron lockout mechanism and one to remove the lockout actuator.

To start one of these two procedures, first do the procedure section "Prepare for the Removal". Then, follow one of these two procedure sections as you need: "Remove the Lockout Mechanism", or "Remove the Lockout Actuator".

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels  
(2) 24-22-00/201, Electrical Power – Control  
(3) 27-51-00/201, Trailing Edge Flap System

C. Access

- (1) Location Zone  
561/661 Rear Spar to Trailing Edge
- (2) Access Panels  
561/661AB Wing T.E. Structure, Aileron Controls  
561/661LB Wing T.E. Structure, Outboard Aileron Installation  
561/661RBX Outboard Aileron Lockout Mechanism

D. Prepare for the Removal

- S 862-005  
(1) Supply electrical power (AMM 24-22-00).
- S 042-006  
(2) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00).

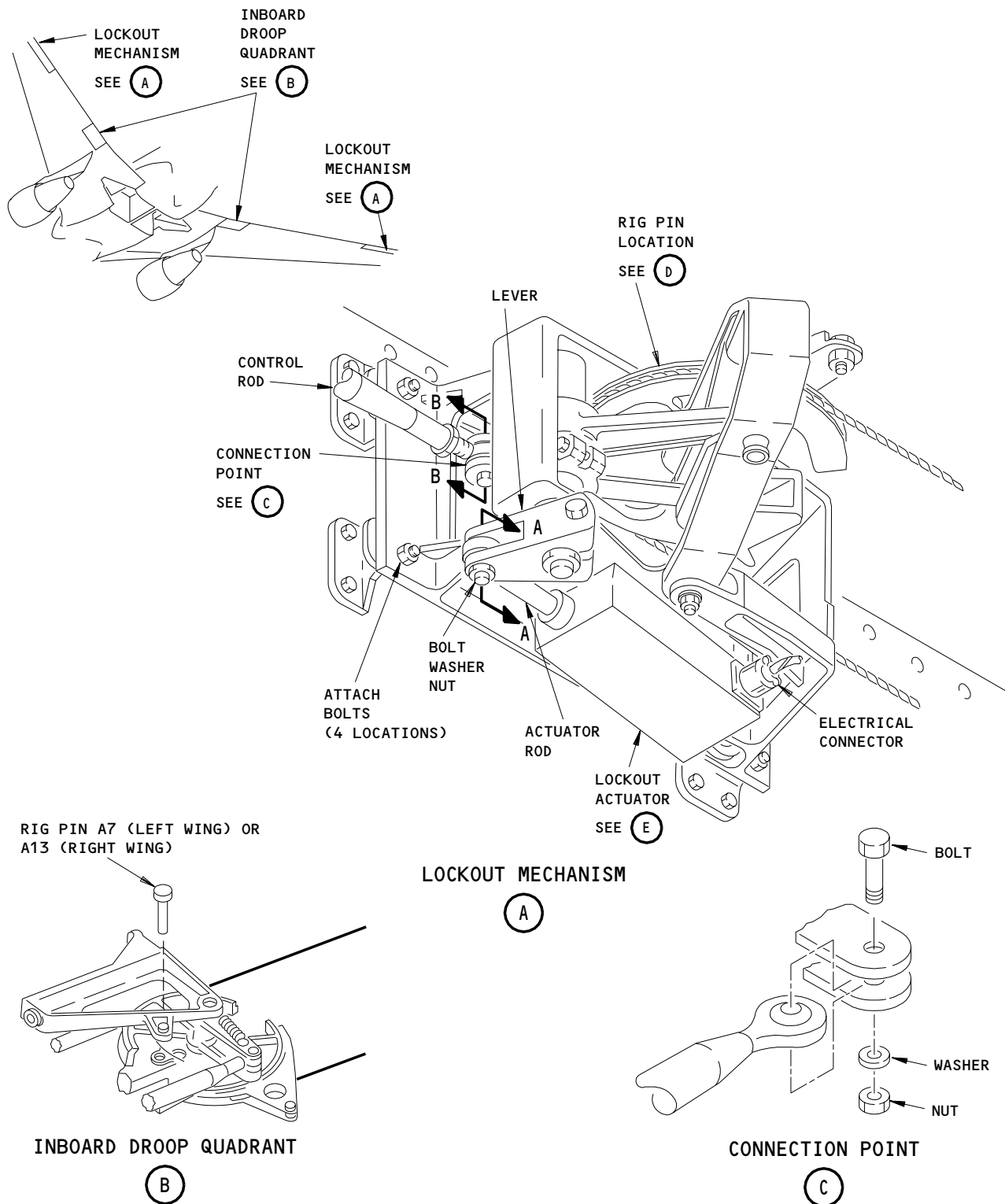
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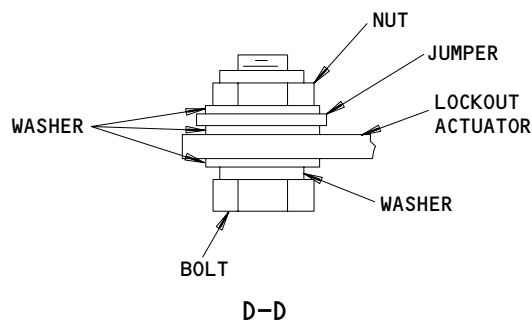
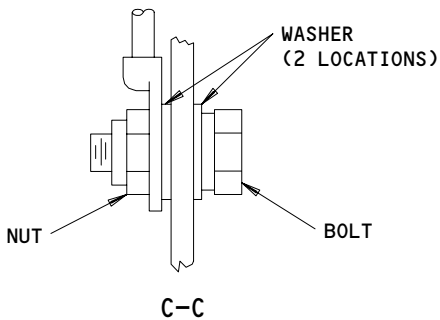
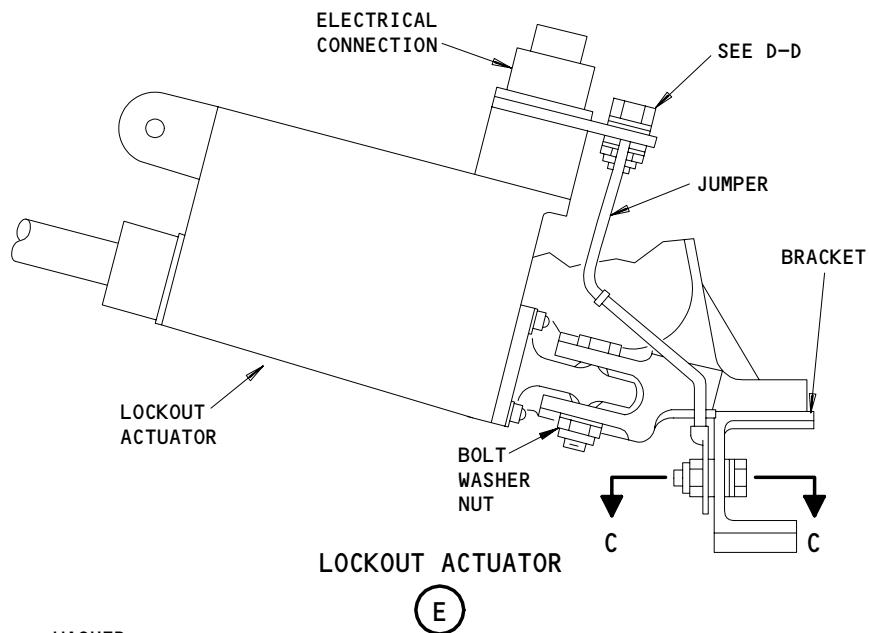
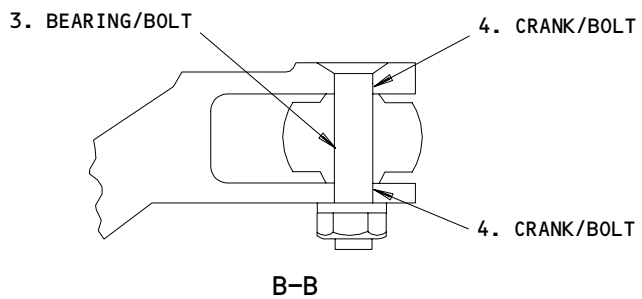
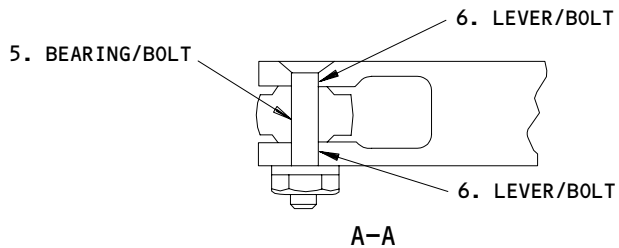
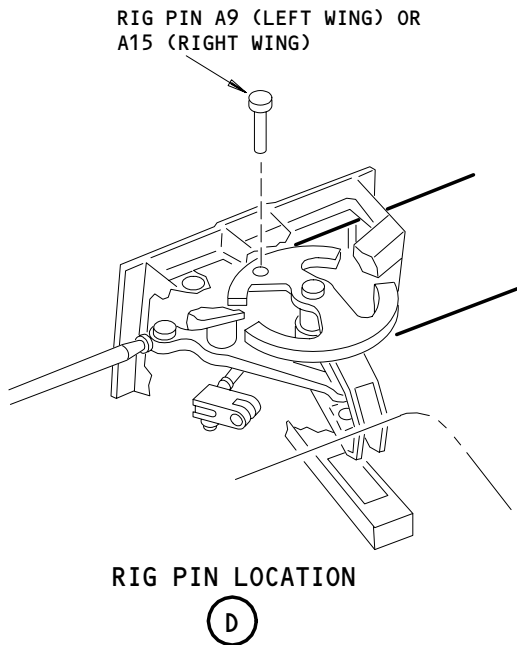
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Outboard Aileron Lockout Mechanism  
Figure 201 (Sheet 1)

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Outboard Aileron Lockout Mechanism  
Figure 201 (Sheet 2)

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S 862-007

- (3) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights are on.

S 862-008

- (4) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11C17, OUTBOARD AILERON LOCKOUT L
  - (b) 11C18, OUTBOARD AILERON LOCKOUT R
  - (c) 11H15, FLT CONT SHUTOFF WING LEFT
  - (d) 11H16, FLT CONT SHUTOFF WING CTR
  - (e) 11H26, FLT CONT SHUTOFF WING RIGHT

S 012-009

- (5) Open these access panels (AMM 06-44-00):
    - (a) 561AB, 561LB, and 561RBX (for the left lockout mechanism)
    - (b) 661AB, 661LB, and 661RBX (for the right lockout mechanism).
- E. Remove the Lockout Mechanism (Fig. 201)

S 032-010

- (1) Loosen the two outboard wing cables at their turnbuckles.

NOTE: Get access to these cables through access panels 561LB (for the left wing) or 661LB (for the right wing).

S 032-011

- (2) Disconnect these components:
  - (a) The cables from the quadrant and tag them for identification
  - (b) The control rod for the power control actuators (PCAs) from the mechanism
  - (c) The electrical connector from the actuator
  - (d) The bonding jumper(s) from the lockout actuator, if it is installed.

S 032-012

- (3) Remove the bolts (4 locations) that connect the mechanism support to the airplane structure.

S 022-013

- (4) Remove the lockout mechanism.

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F. Remove the Lockout Actuator (Fig. 201)

**NOTE:** Whenever an aileron lockout actuator is removed, operate the aileron lockout mechanism by hand to inspect if a rough bearing is installed in the mechanism. If a rough bearing is found, it can be due to corrosion formed by water introduced into the bearing, or by water inside of the bearing which gets frozen at altitude and causes the aileron lockout actuator to stall when commanded. Replace the damaged bearing as necessary.

S 032-014

- (1) Disconnect these components:
  - (a) The bonding jumper(s) from the actuator, if they are installed
  - (b) The electrical connector from the actuator
  - (c) The actuator rod from the lockout mechanism
  - (d) The actuator from the lockout mechanism support.

S 022-015

- (2) Remove the actuator.

TASK 27-11-44-422-016

3. Lockout Mechanism or Lockout Actuator - Installation

A. General

- (1) This task contains two procedures, one to install the outboard aileron lockout mechanism and one to install the lockout actuator.

Firstly, do one of these two installation procedure sections as you need: "Install the Lockout Mechanism", or "Install the Lockout Actuator". Secondly, do these two procedure sections "Lockout Actuator and Mechanism - Test" and "Put the Airplane Back to Its Usual Condition" after the completion of any of these two installation procedures.

B. Equipment

- (1) Rig Pins from Set A20004 (AMM 20-10-24):
  - (a) A7 - P/N A20004-20
  - (b) A9 - P/N A20004-22
  - (c) A13 - P/N A20004-20
  - (d) A15 - P/N A20004-22
- (2) Bonding Meter - Avtron Model T477W, Avtron Manufacturing Inc., Cleveland, Ohio
- (3) Cable Tensiometer, Commercially Available

C. Consumable Materials

- (1) A00251 Compound, Sealing - BMS 5-26, Type II
- (2) C00272 Finish, Protective - BMS 10-11, Type I

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- (3) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (4) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

D. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 20-10-22/701, Metal Surfaces Cleaning/Painting
- (3) 20-10-24/201, Rig Pins
- (4) 24-22-00/201, Electrical Power - Control
- (5) 27-11-44/601, Outboard Aileron Lockout Mechanism
- (6) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

E. Access

- (1) Location Zone  
561/661 Rear Spar to Trailing Edge
- (2) Access Panels
  - 561/661AB Wing T.E. Structure, Aileron Controls
  - 561/661LB Wing T.E. Structure, Outboard Aileron Installation
  - 561/661RBX Outboard Aileron Lockout Mechanism

F. Install the Lockout Mechanism (Fig. 201)

NOTE: Refer to AMM 27-11-44 for the applicable wear limit data.

S 642-017

- (1) Apply grease to the smooth surfaces of the bolts before you install them.

S 432-018

- (2) Do these steps to connect the lockout mechanism to the airplane structure:
  - (a) Align the mechanism with the airplane structure.
  - (b) Install and tighten the bolts that connect the mechanism to the structure (4 locations).

S 492-019

- (3) Install these rig pins:
  - (a) A7 and A9 for the left lockout mechanism
  - (b) A13 and A15 for the right lockout mechanism.

S 432-020

- (4) Connect the control rod from the power control actuators (PCAs) to the mechanism.

S 432-021

- (5) Do these steps if bonding jumper(s) were installed:
  - (a) Use a rotary bonding brush or a rotary abrasive disk to clean the connection points for the bonding jumpers (AMM 20-10-22).
  - (b) Install the bonding jumper(s) with the bolts, washers, and nuts.

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(c) Apply sealant to the bonding jumper(s) and the fasteners, then apply the protective finish.

S 222-022

(6) Use the bonding meter to make sure the resistance between the lockout actuator and the airplane structure is less than 0.002 ohms.

S 432-023

(7) Connect these components:

- (a) The electrical connector to the lockout actuator
- (b) The cables to the quadrant.

S 822-024

(8) Tighten the cables to the values shown in Table 1 and do these steps:

**NOTE:** Before you adjust the cables, make sure the airplane temperature is stable (use a tolerance of  $\pm 5^{\circ}$  F) along the cable. Make sure the temperature has been stable for at least one hour.

- (a) Make sure that rig pins A7 and A9 (for the left mechanism) or A13 and A15 (for the right mechanism) can move freely in their holes.
- (b) Make sure that no more than two threads can be seen at the turnbuckles.
- (c) Install the clip locks on the turnbuckles.

TABLE 1 AILERON CABLE RIGGING LOADS	
TEMP. °F	OUTBOARD WING CABLES A3A, A3B, A4A, A4B ±10 LBS.
110	148
90	139
70	130
50	122
30	114
10	105
-10	97
-30	89
-40	83

S 092-001

(9) Remove these rig pins:

- (a) A7 and A9 for the left lockout mechanism.

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- (b) A13 and A15 for the right lockout mechanism.  
G. Install the Lockout Actuator (Fig. 201)

NOTE: Refer to AMM 27-11-44 for the applicable wear limit data.

S 212-043

- (1) Manually turn the actuator input on the lockout mechanism and do this check:  
(a) Make sure the lockout mechanism moves freely.

S 492-025

- (2) Install rig pin A9 (for the left wing) or A15 (for the right wing) in the lockout mechanism.

S 432-026

- (3) Connect these components:  
(a) The actuator to the lockout mechanism support  
(b) The actuator rod to the lockout mechanism.

NOTE: Make sure you install the countersunk fastener.

S 432-027

- (4) Do these steps if bonding jumper(s) were installed:  
(a) Use a rotary bonding brush or a rotary abrasive disk to clean the connection points for the bonding jumpers (AMM 20-10-22).  
(b) Use the bolts, washers and nuts to install the bonding jumper(s).  
(c) Apply some of the sealant to the bonding jumper(s) and the fasteners, then apply the protective finish.

S 222-028

- (5) Use the bonding meter to make sure the resistance between the lockout actuator and the airplane structure is less than 0.002 ohms.

S 432-029

- (6) Connect the electrical connector to the lockout actuator.

S 092-030

- (7) Remove rig pin A9 (for the left wing) or A15 (for the right wing).

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H. Lockout Actuator and Mechanism - Test

**NOTE:** If an aileron lockout actuator is removed for cause, but later passes component operational tests, cold soaking of the unit can help to find out if the actuator is operating incorrectly during flight. The actuator can be cold soaked for 4 hours at -60 degrees Fahrenheit and re-tested. If the actuator fails the test following cold soaking, then remove the cover and wipe off all visual signs of moisture, bake the actuator in an oven for 6 to 8 hours at 120 degrees Fahrenheit and re-test it.

S 862-032

- (1) Push the STATUS button on the display select panel to show the aileron position indicator on the display.

S 862-003

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00).

S 862-033

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11C17, OUTBOARD AILERON LOCKOUT L
  - (b) 11C18, OUTBOARD AILERON LOCKOUT R
  - (c) 11H15, FLT CONT SHUTOFF WING LEFT
  - (d) 11H16, FLT CONT SHUTOFF WING CTR
  - (e) 11H26, FLT CONT SHUTOFF WING RIGHT

S 862-034

- (4) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON.

S 212-035

- (5) Make sure the aileron trim is in its neutral position and the control wheels are in their center positions.

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S 862-036

- (6) Push the FUNCTIONAL TEST switch on the left or right air data computer (ADC) module located on the E1-3 or E2-3 shelf.

NOTE: The lockout actuators will extend when the switch is pushed. The AIL LOCK light on the P5 panel will come on. Also, an AILERON LOCKOUT message will show on the top EICAS display.

Do not push the ADC switch when pressure is supplied to the pitot-static system. An incorrect fault condition can occur. To remove the fault, push the ADC test switch with the pitot-static system at ambient pressure.

S 212-037

- (7) Hold the FUNCTIONAL TEST switch on and do these steps:
- (a) Stop for 15 seconds to let the actuators extend.
  - (b) Make sure the ailerons stay in their neutral positions.
  - (c) Turn the control wheel clockwise and then counterclockwise full travel. Do this check:
    - 1) Make sure the ailerons do not move more than one degree.
  - (d) Move the control wheels back to their neutral positions.

S 862-038

- (8) Release the FUNCTIONAL TEST switch and stop for 45 seconds.

NOTE: This will let the lockout actuator retract.

S 212-039

- (9) Turn the control wheel to its full clockwise position and do these checks:
- (a) Make sure the control wheel moves smoothly through its full travel range.
  - (b) Make sure the two left ailerons move down and the two right ailerons move up.
  - (c) Make sure the ailerons move smoothly through their full travel range.

S 212-040

- (10) Move the control wheel to its full counterclockwise position and do these checks:
- (a) Make sure the control wheel moves smoothly through its full travel range.
  - (b) Make sure the two left ailerons move up and the two right ailerons move down.
  - (c) Make sure the ailerons move smoothly through their full travel range.

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I. Put the Airplane Back to Its Usual Condition

S 862-041

- (1) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00).

S 862-042

- (2) Remove electrical power if it is not necessary (AMM 24-22-00)

S 412-002

- (3) Close these access panels (AMM 06-44-00):  
(a) 561AB, 561LB, and 561RBX (for the left lockout mechanism).  
(b) 661AB, 661LB, and 661RBX (for the right lockout mechanism).

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OUTBOARD AILERON LOCKOUT MECHANISM – INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Outboard Aileron Lockout Mechanism – Maintenance Practices for procedures to do these tasks.

TASK 27-11-44-206-002

2. Outboard Aileron Lockout Mechanism – Wear Limits

A. Access

- (1) Location Zones

561/661 Rear Spar to Trailing Edge

B. Procedure

S 226-001

- (1) Use the supplied data (Fig. 601) to examine the outboard aileron lockout mechanism for too much wear.

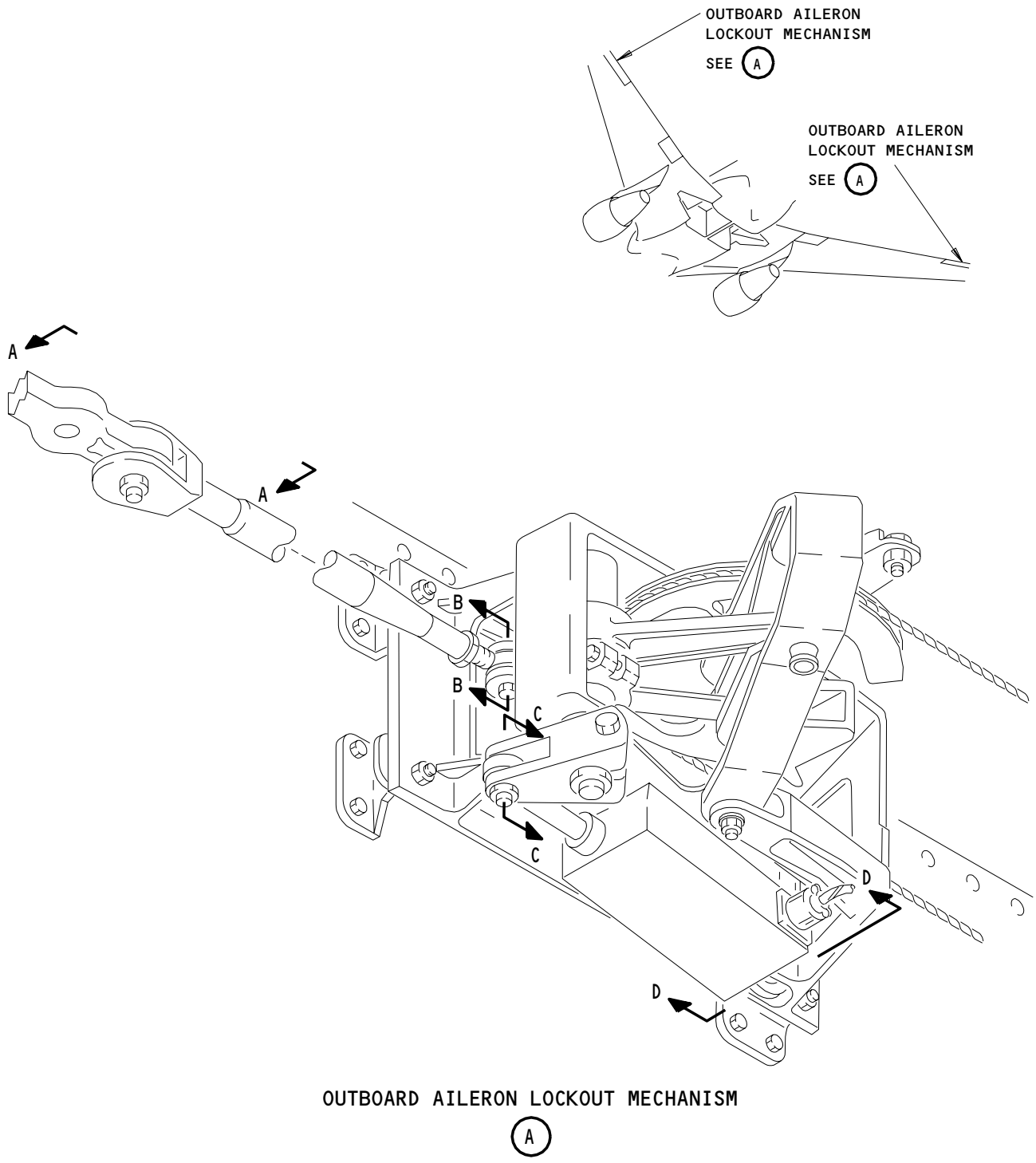
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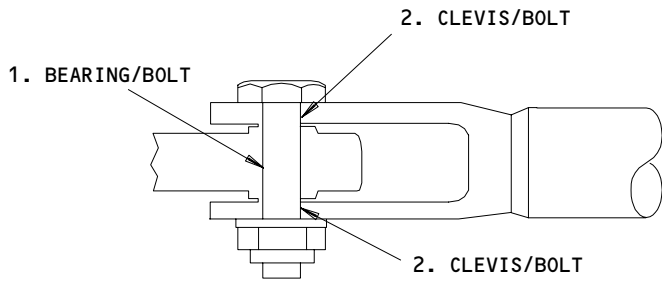
Outboard Aileron Lockout Mechanism Wear Limits  
Figure 601 (Sheet 1)

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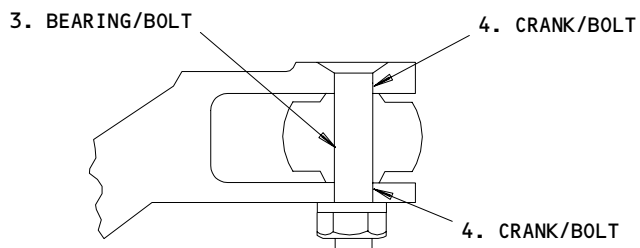
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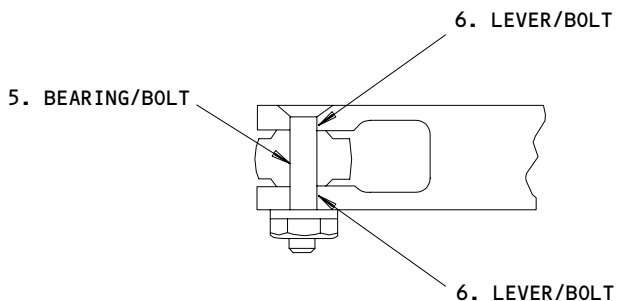




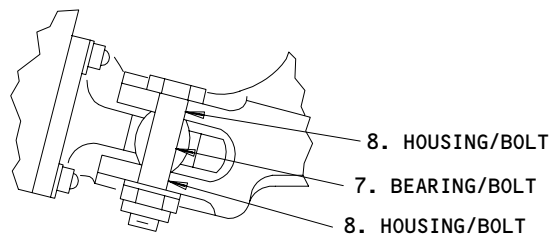
A-A



B-B

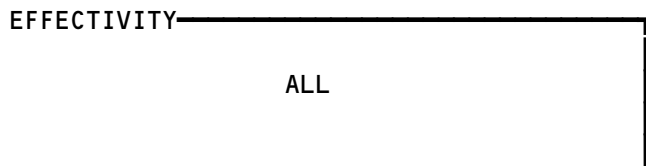


C-C



D-D

Outboard Aileron Lockout Mechanism Wear Limits  
Figure 601 (Sheet 2)



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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BEARING	ID	0.2495 (6.337)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
2	CLEVIS	ID	0.2495 (6.337)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)		X	1
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
3	BEARING	ID	0.2497 (6.342)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
4	CRANK	ID	0.2495 (6.337)	0.2505 (6.363)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2470 (6.274)		X		
5	BEARING	ID	0.2495 (6.337)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
6	LEVER	ID	0.2495 (6.337)	0.2505 (6.363)	0.2530 (6.426)	0.0035 (0.089)		X	1
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2470 (6.274)		X		
7	BEARING	ID	0.2495 (6.337)	0.2500 (6.350)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
8	HOUSING	ID	0.2495 (6.337)	0.2505 (6.363)	0.2530 (6.426)	0.0035 (0.089)		X	1
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2470 (6.274)		X		

1 THIS PART CAN BE REPAIRED.

Outboard Aileron Lockout Mechanism Wear Limits  
Figure 601 (Sheet 3)

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INBOARD AILERON POWER CONTROL ACTUATOR (PCA) – MAINTENANCE PRACTICES

1. General

- A. This procedure contains the removal and installation procedures for the inboard aileron PCA and its components. These components include the PCA filter and the hanger link for the inboard aileron PCA.

TASK 27-11-48-022-003

2. Inboard Aileron PCA and its Components – Removal

A. General

- (1) This task contains these procedures:

- Remove the Inboard Aileron PCA
- Remove the PCA Filter
- Remove the Hanger Link for the Inboard Aileron PCA.

Because this task contains three procedures, do only the applicable group of steps.

To start one of these procedures, do the "Prepare for the Removal" group of steps. Then, do the group of steps that is necessary to remove the component.

B. Equipment

- (1) Inboard Aileron Deactivation Equipment – A27013-1  
(2) Inboard Aileron PCA GAGE – A27001-2

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels  
(2) AMM 24-22-00/201, Electrical Power – Control  
(3) AMM 27-51-00/201, Trailing Edge Flap System  
(4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

- (1) Location Zones
- |         |                            |
|---------|----------------------------|
| 556/656 | Inboard Aileron            |
| 561/661 | Rear Spar to Trailing Edge |
- (2) Access Panels
- |           |                                   |
|-----------|-----------------------------------|
| 556/656AB | Inboard Aileron LE Structure      |
| 561/661BB | Wing TE Inboard Aileron Actuators |

E. Prepare for the Removal

- S 862-004
- (1) Supply electrical power (AMM 24-22-00/201).
- S 042-005
- (2) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

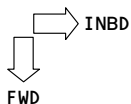
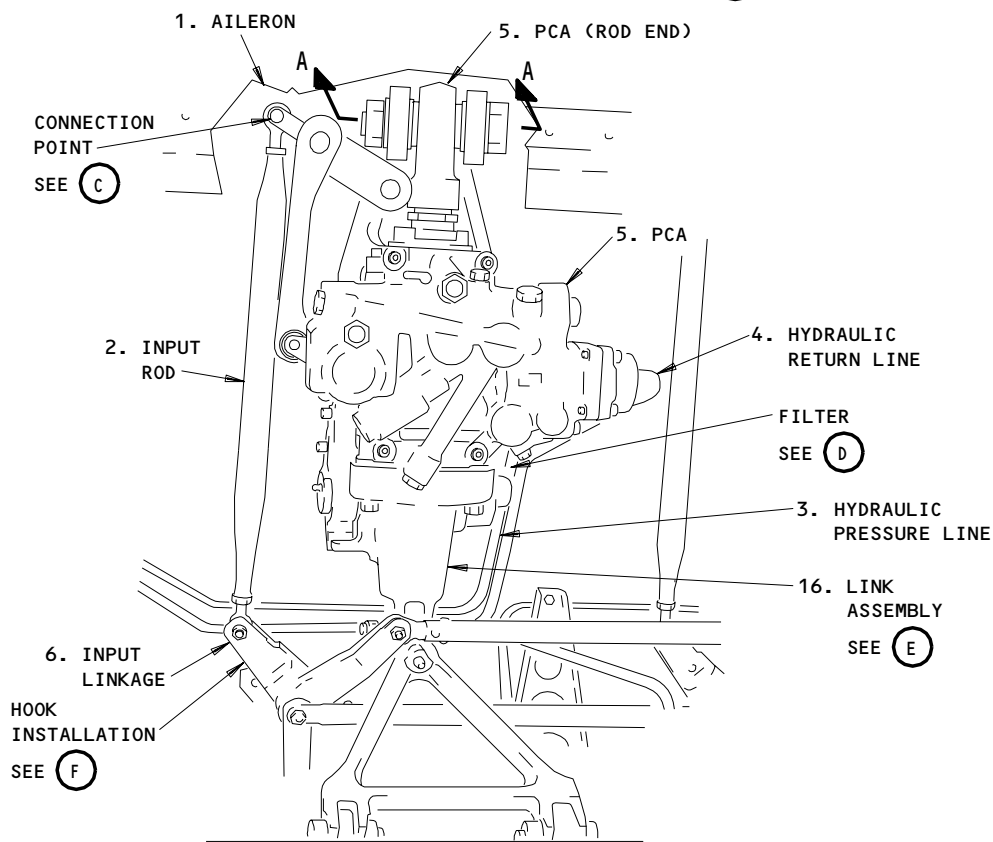
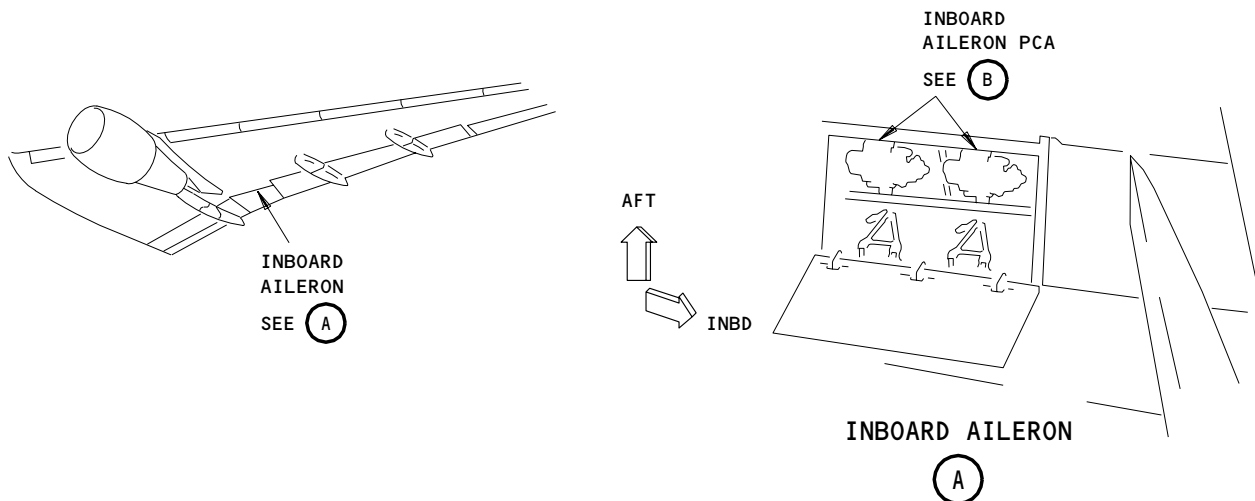
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INBOARD AILERON PCA

(B)

Inboard Aileron PCA Installation  
Figure 201 (Sheet 1)

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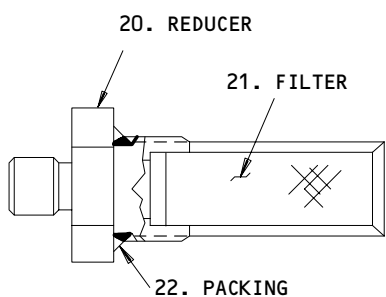
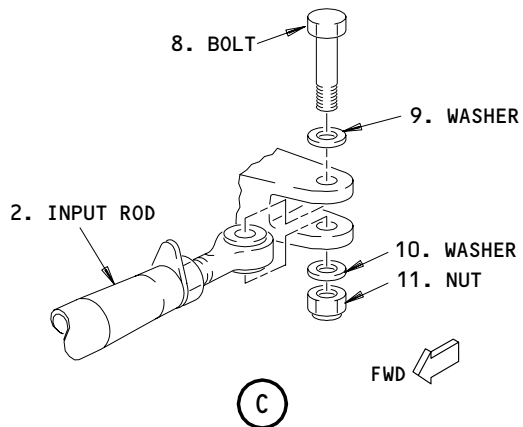
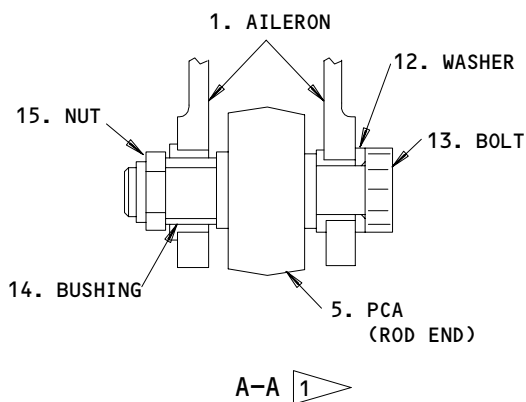
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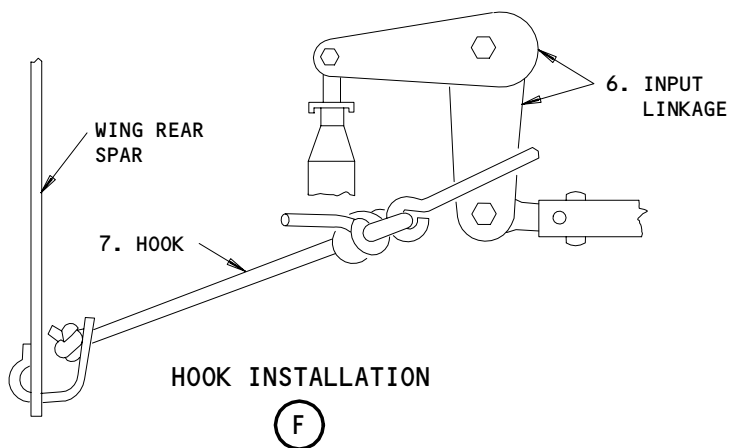
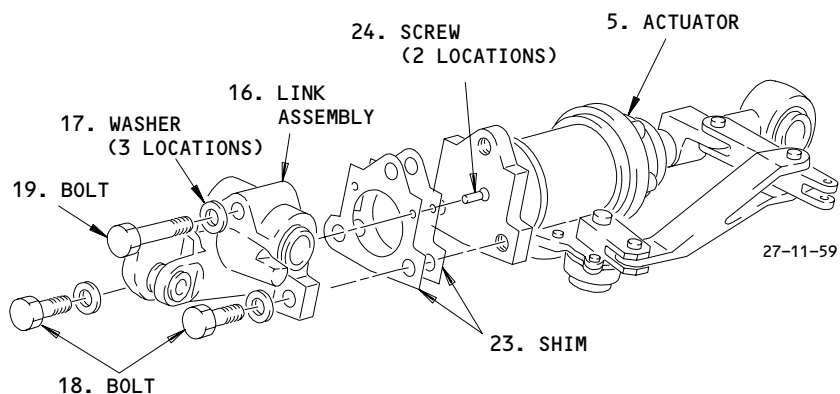
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FILTER



1 ON THE OUTBOARD PCA, BOLTHEAD MUST POINT INBOARD.  
ON THE INBOARD PCA, BOLTHEAD MUST POINT OUTBOARD.

Inboard Aileron PCA Installation  
Figure 201 (Sheet 2)

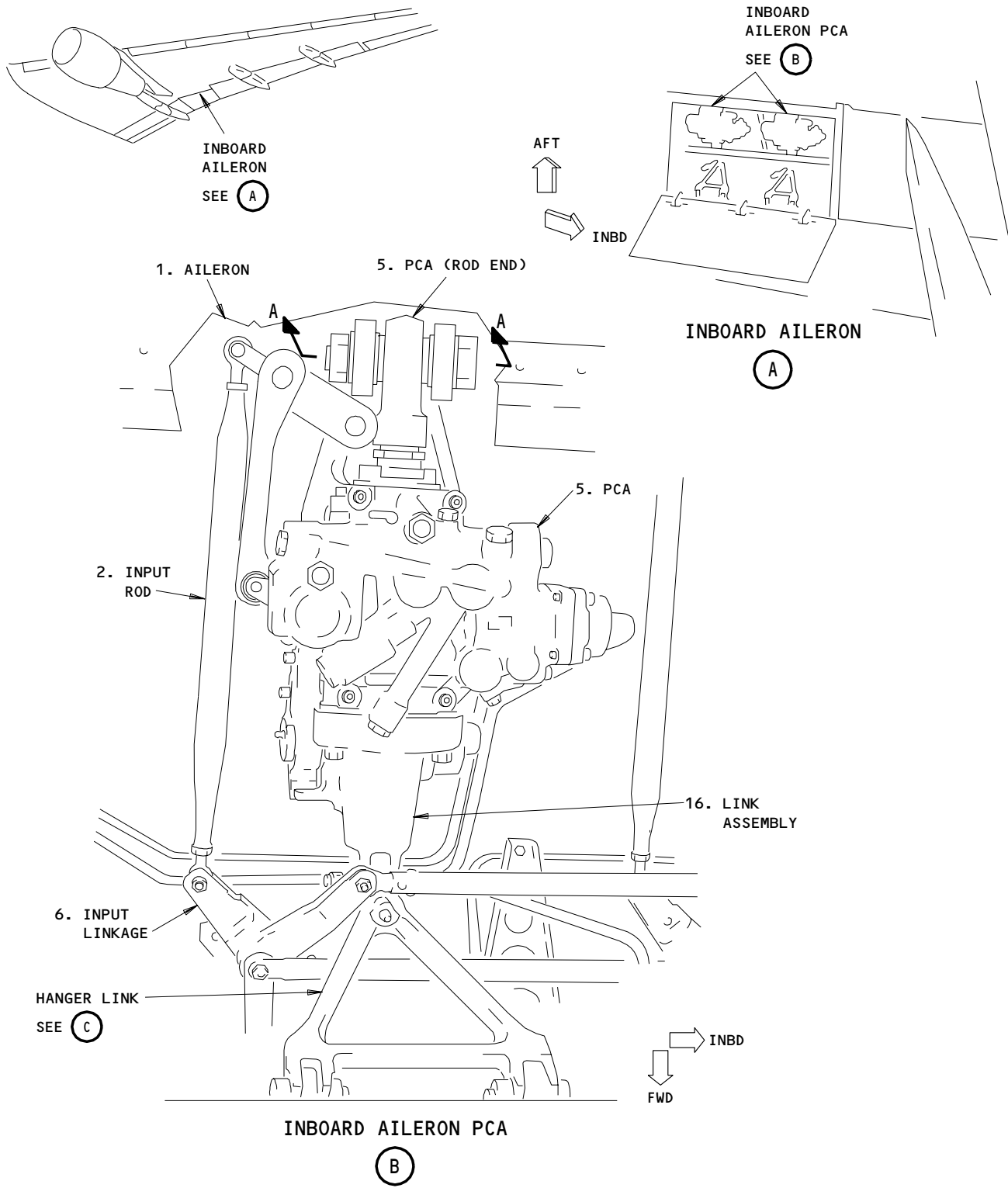
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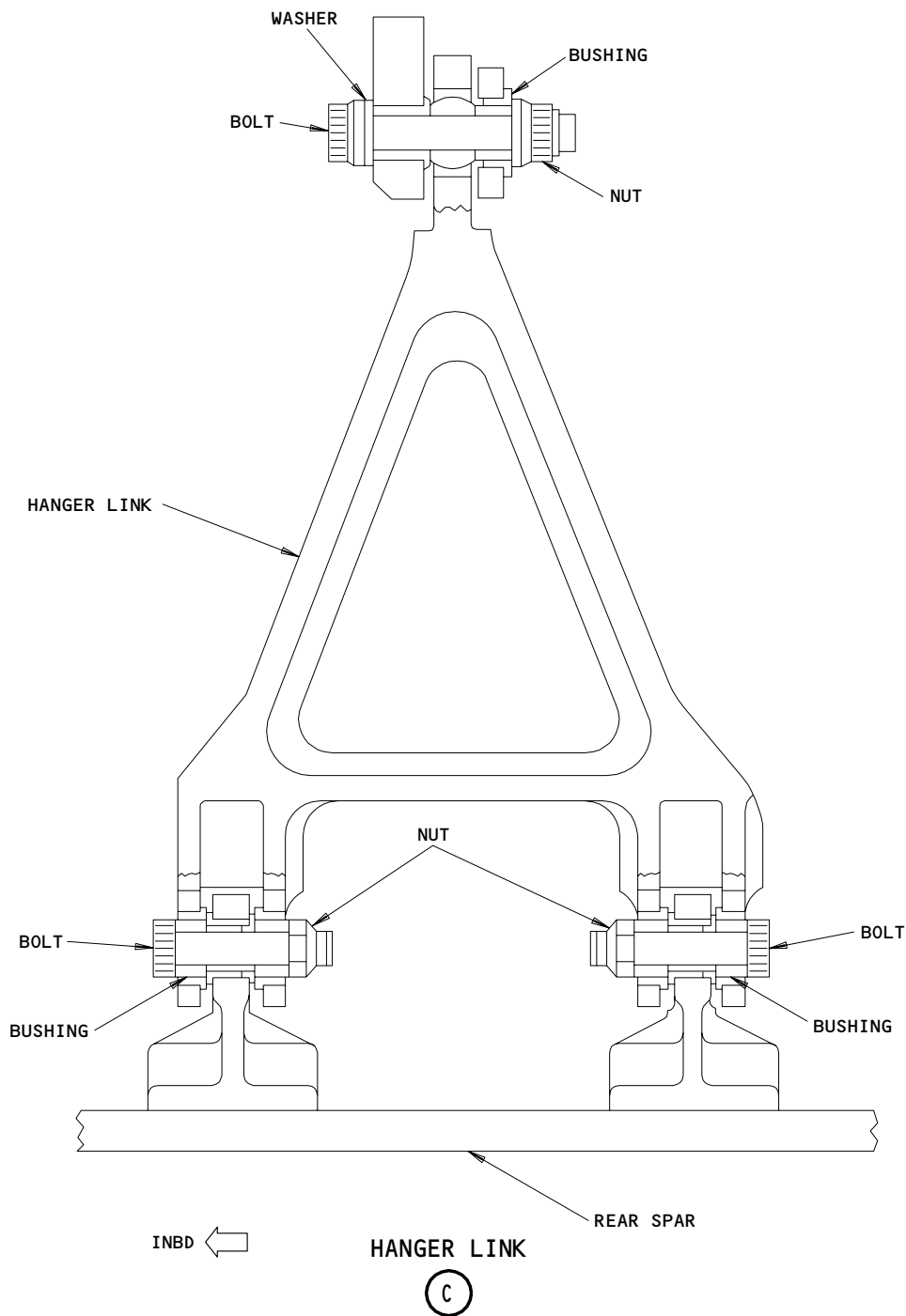


Inboard Aileron PCA Hanger Link Installation  
Figure 202 (Sheet 1)

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Inboard Aileron PCA Hanger Link Installation  
Figure 202 (Sheet 2)

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- S 862-006
- (3) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

- S 862-007
- (4) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT

- S 012-008
- (5) Open access panel 561BB (for the left aileron) or 661BB (for the right aileron) (AMM 06-44-00/201).

- S 492-093
- (6) Install the hook (7) on the PCA input linkage (6).

**NOTE:** The hook prevents input linkage movement which can accidentally lower the aileron.

F. Remove the PCA (Fig. 201)

- S 012-024
- (1) Open access panel 556AB (for the left aileron) or 656AB (for the right aileron) (AMM 06-44-00/201).
- S 862-025
- (2) Remove the pressure from the hydraulic system that supplies the PCA you will repair (AMM 29-11-00/201).

**NOTE:** The Left system supplies the outboard PCA for the left inboard aileron.  
The Center System supplies the inboard PCAs for the left and right inboard ailerons.  
The Right system supplies the outboard PCA for the right inboard aileron.

- S 032-026
- (3) Disconnect these components:
- (a) The hydraulic lines (3, 4) from the PCA and do this step:
    - 1) Seal the hydraulic lines and the PCA ports with a cap.
  - (b) The input rod (2) from the PCA (5)

**NOTE:** Do not adjust the input rod.

- (c) The PCA rod end (5) from the aileron (1).

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S 982-027

- (4) Turn the PCA (5) down.

S 222-028

- (5) Measure the shims (23) that are installed between the PCA (5) and the link assembly (16) and keep a record of the shim thickness.

**NOTE:** Do not remove the shims. The shims (23) are connected to the link assembly with screws (24). If the shims become damaged, replace them with shims of the same thickness as your record.

- (a) If it is necessary, you can adjust the shim thickness (you can use the inboard PCA gage tool, A27001-2) (Fig. 203).

**NOTE:** The ailerons must be in the rigged position.

- 1) Make sure dimension A is between 14.716 - 14.726 inches (37.37-37.40 centimeters).
- 2) Install the shims.
  - a) Make sure the Dimension A of the inboard and outboard actuator is between +/- 0.005 inches (+/- 0.127 mm) of each other.
  - b) The total dimension B must be between 0.150 - 0.250 inches (3.81-6.35 mm) (measure the dimension B with a feeler gage).

S 032-029

- (6) Remove the bolts (18, 19) and washers (17) that connect the PCA (5) to the link assembly (16).

S 022-030

- (7) Remove the PCA (5).

G. Remove the PCA Filter (Fig. 201)

S 862-031

- (1) Remove the pressure from the hydraulic system that supplies the PCA you will repair (AMM 29-11-00/201).

**NOTE:** The Left system supplies the outboard PCA for the left inboard aileron.  
The Center System supplies the inboard PCAs for the left and right inboard ailerons.  
The Right system supplies the outboard PCA for the right inboard aileron.

S 032-032

- (2) Disconnect the hydraulic pressure line (3) and seal it with a cap.

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- S 032-033  
(3) Remove the reducer (20) from the PCA.

- S 032-034  
(4) Remove the packing (22).

- S 022-035  
(5) Remove the filter (21).

H. Remove the Hanger Link for the Inboard Aileron PCA (Fig. 202)

- S 942-036  
(1) Hold the inboard aileron PCA.

- S 032-037  
(2) Remove the bolt, washer, bushing, and the nut that connect the PCA hanger link to the link assembly.

- S 032-038  
(3) Remove the bolts, bushings, and the nuts that connect the hanger link to the rear spar (2 locations).

- S 022-039  
(4) Remove the hanger link from the airplane.

TASK 27-11-48-422-040

3. Inboard Aileron PCA and its Components - Installation

A. General

- (1) This task contains these procedures:
- Install the Inboard Aileron PCA
  - Install the PCA Filter
  - Install the Hanger Link for the Inboard Aileron PCA.

Because this task contains three procedures, only the applicable groups of steps must be done.

To start one of these procedures, do the group of steps that is necessary to install the component. Then, do the applicable test. There is one test for the installation of the PCA or the Hanger Link. There is a different test for the installation of the PCA Filter.

Lastly, do the "Put the Airplane Back to Its Usual Condition" group of steps.

B. Equipment

- (1) Inboard Aileron Rigging Bar - A27024-47 (recommended)  
- A27024-2 (optional)

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- (2) Inboard Aileron Rigging Bar Mount Equipment - A27110-1
- (3) Bubble Protractor, Commercially Available
- (4) Scale - accurate to 0.01 inch (0.25 mm), Commercially Available
- C. Consumable Materials
  - (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
  - (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)
- D. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
201	5 21 22	PCA Filter Screen Packing	27-11-01	01	444 470 460

- E. References
  - (1) AMM 06-44-00/201, Wing Access Doors and Panels
  - (2) AMM 24-22-00/201, Electrical Power - Control
  - (3) AMM 27-11-00/501, Aileron and Aileron Trim Control System
  - (4) AMM 27-11-48/601, Inboard Aileron Power Control Actuator (PCA)
  - (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- F. Access
  - (1) Location Zones
    - 556/656 Inboard Aileron
    - 561/661 Rear Spar to Trailing Edge
  - (2) Access Panels
    - 556/656AB Inboard Aileron LE Structure
    - 561/661BB Wing TE Inboard Aileron Actuators
- G. Install the PCA (Fig. 201)

**NOTE:** Refer to AMM 27-11-48/601 for the applicable wear limit data.

- S 642-002
- (1) Apply grease to the smooth surfaces of the bolts before they are installed.

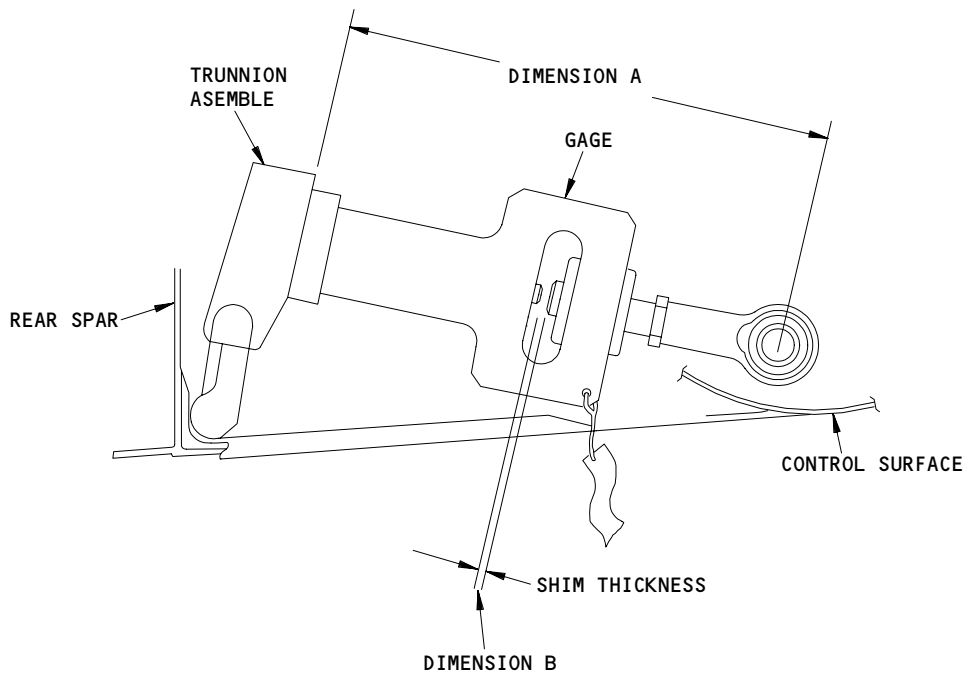
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Inboard Aileron PCA Gage Installation  
Figure 203

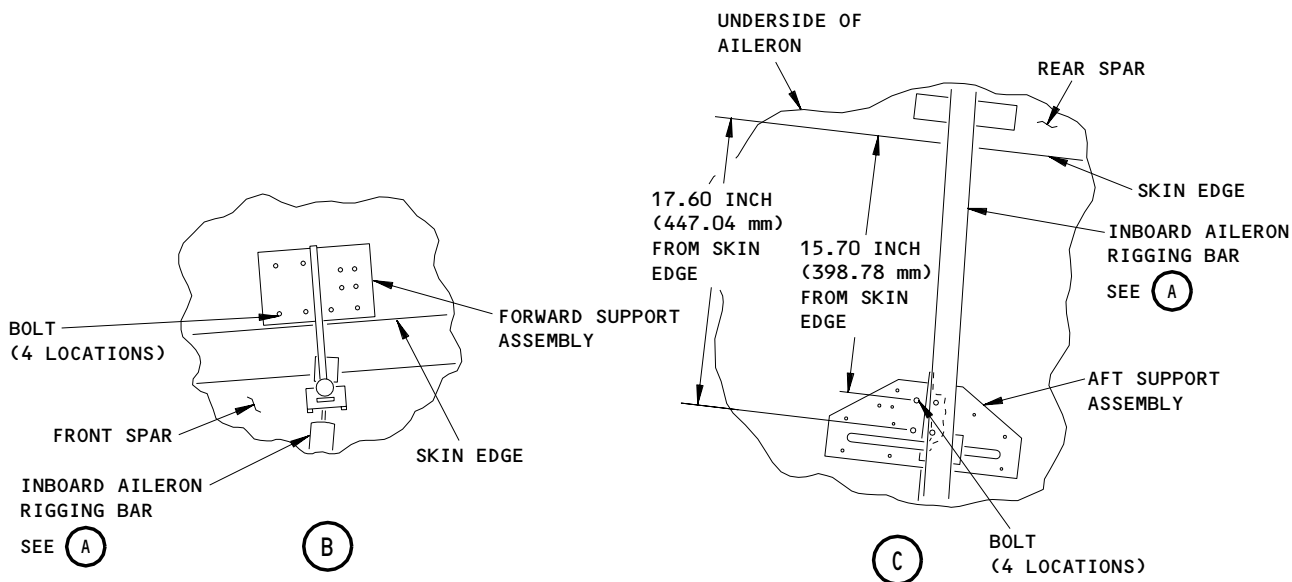
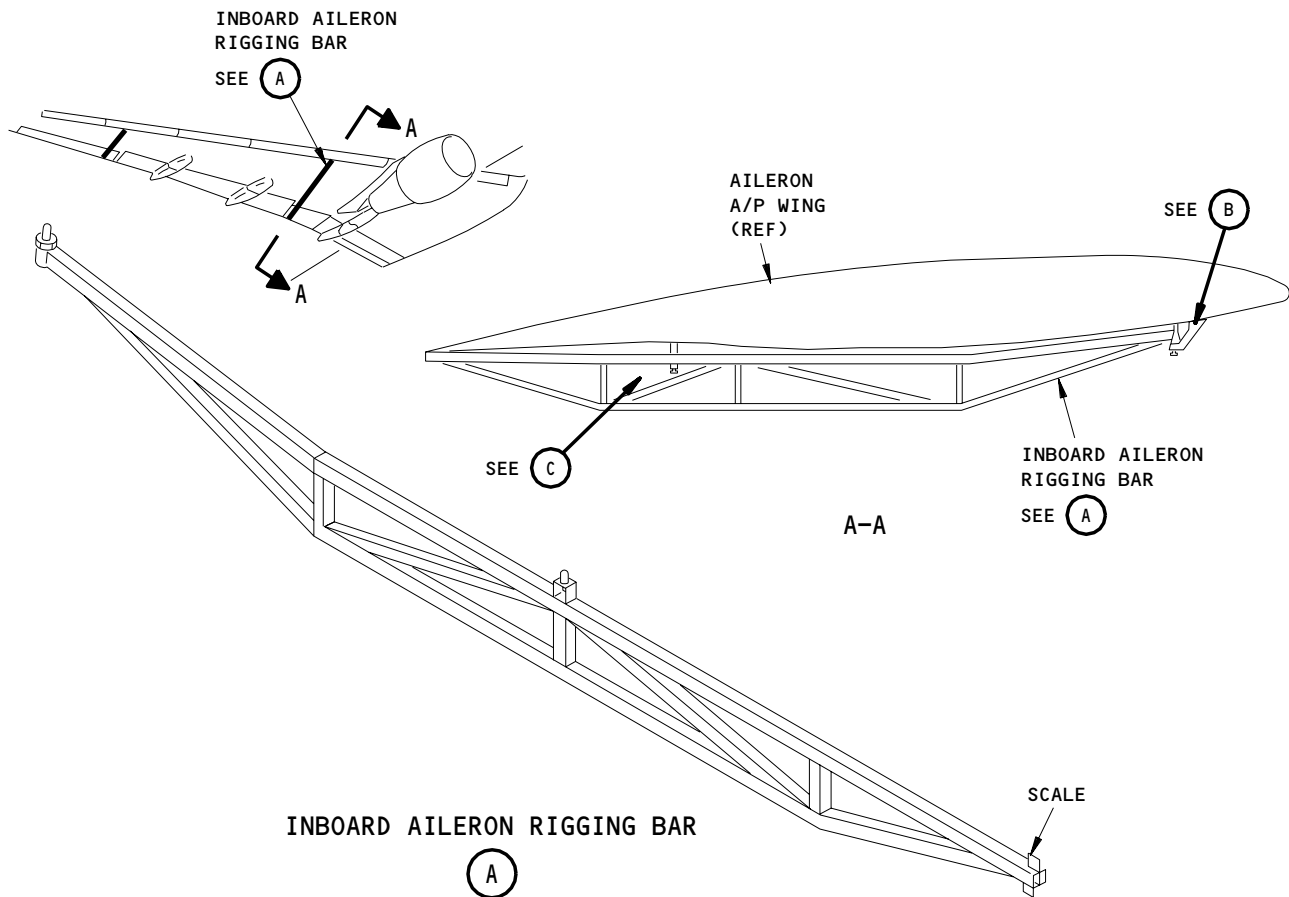
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Inboard Aileron Rigging Bar Installation  
Figure 204

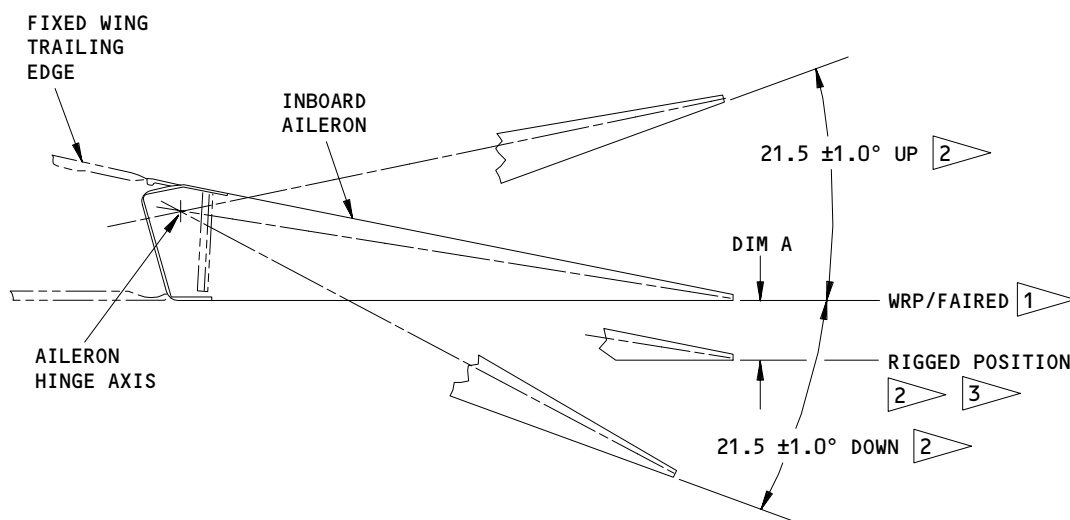
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- 1 THE AILERON IS IN ITS FAIRED POSITION WHEN IT IS ALIGNED WITH THE WING REFERENCE PLANE (WRP). THE WRP IS THEORETICAL AND CAN ONLY BE DETERMINED WITH THE RIGGING BAR. THE FAIRED POSITION (WPR) IS THE SAME AS 0° AILERON POSITION AS SHOWN WITH THE AILERON RIGGING BAR.
- 2 ADD OR SUBTRACT THE AILERON POSITION MEASUREMENT (DIM A), AS NECESSARY, TO GET THE TOTAL AILERON TRAVEL FROM THE RIGGED POSITION.
- 3 DIM A IS 0.40 ± 0.10 INCH (0.40 ± 0.10 DEGREES) DOWN FROM THE FAIRED POSITION FOR RIGGING.  
DIM A IS 0.40 ± 0.20 INCH (0.40 ± 0.24 DEGREES) DOWN FROM THE FAIRED POSITION FOR SYSTEM TEST.

Inboard Aileron Rigged vs Neutral Position  
Figure 205

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S 432-041

- (2) Install the bolts (18, 19) and washers (17) that connect the PCA (5) to the link assembly (16). Tighten the nut to 585-715 pound-inches (66-80 newton-meters).

S 982-042

- (3) Lift the PCA until the rod end is aligned with the aileron.

S 432-043

- (4) Install the bolt (13), washer (12), bushing (14), and nut (15) that connect the PCA rod end to the aileron (1). Tighten the nut to 1000-1200 pound-inches (113-135 newton-meters).

**NOTE:** On the outboard PCA, the bolthead must point inboard. On the inboard PCA, the bolthead must point outboard.

S 432-044

- (5) Install the bolt (8), washers (9,10), and nut that connect the input rod (2) to the PCA (5).

**NOTE:** Do not adjust the PCA input rod.

S 432-045

- (6) Remove the caps from the hydraulic lines (3, 4) and connect them to the PCA.

**NOTE:** Make sure there is a minimum clearance of 0.35 inch (8.89 mm) between the PCA hydraulic lines to prevent chaffing against each other.

S 092-046

- (7) Remove the hook (7) from the PCA input linkage (6).

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S 822-048

- (8) Do these steps to adjust the PCA:

**NOTE:** Use this procedure only if you replaced one of the two PCAs (on each wing).

If you replaced both PCAs on either wing at the same time, do the procedure to "Adjust the PCA" for the applicable aileron (AMM 27-11-00/501).

- (a) Make sure the flaps are in their retracted positions.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (b) Supply pressure to the hydraulic system that supplies the PCA you did not replace (AMM 29-11-00/201).

**NOTE:** The Left system supplies the outboard PCA for the left inboard aileron.  
The Center System supplies the inboard PCAs for the left and right inboard ailerons.  
The Right system supplies the outboard PCA for the right inboard aileron.

- (c) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- 1) 11H15, FLT CONT SHUTOFF WING LEFT
  - 2) 11H16, FLT CONT SHUTOFF WING CTR
  - 3) 11H26, FLT CONT SHUTOFF WING RIGHT
- (d) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to ON.

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- (e) Operate the aileron up and down through an angle of 6 to 10 degrees three times.
- (f) Make a mark for the position of the aileron trailing edge (use the flap trailing edge as a reference).

NOTE: Make sure the mark cannot move.

- (g) Remove the pressure from the hydraulic system that supplies the PCA you did not replace (AMM 29-11-00/201).

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (h) Supply pressure to the hydraulic system that supplies the PCA you replaced (AMM 29-11-00/201).
- (i) Operate the aileron up and down through an angle of 6 to 10 degrees three times.

NOTE: When the PCA input rod is adjusted, be very careful not to move the input rod, the PCA, or any other linkages in the area. Make sure the neutral positions of the PCA and its linkages do not change during the adjustment.

- (j) During the input rod adjustment, manually move the input lever for the PCA you did not replace across its neutral position.

NOTE: This will bleed unwanted hydraulic pressure from the PCA you did not replace.

- (k) Increase the length of the input rod for the PCA you replaced until this condition is satisfactory:
  - 1) The aileron trailing edge is approximately 1 inch (25.4 mm) below the mark.

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- (l) Adjust the PCA input rod until the aileron trailing edge is aligned with the mark (use a tolerance of  $\pm 0.1$  inch) ( $\pm 2.54$  mm).

**NOTE:** Make sure you move the aileron trailing edge up during the last adjustment of the input rod.

- (m) Tighten the control rod jamnuts and do this check:
  - 1) Make sure the aileron trailing edge is aligned with the mark (use a tolerance of  $\pm 0.1$  inch) ( $\pm 2.54$  mm).
- (n) Make a new mark for the position of the aileron trailing edge.
- (o) Remove the power from the hydraulic system that supplies the PCA you replaced (AMM 29-11-00/201).

**NOTE:** All hydraulic power must be removed.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (p) Supply pressure to the hydraulic system that supplies the PCA you did not replace (AMM 29-11-00/201).
- (q) Make sure the aileron trailing edge is aligned with the new position mark (use a tolerance of  $\pm 0.10$  inch) ( $\pm 2.54$  mm).
- (r) Remove the power from the hydraulic system that supplies the PCA you did not replace (AMM 29-11-00/201).
- (s) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.
- (t) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - 1) 11H15, FLT CONT SHUTOFF WING LEFT
  - 2) 11H16, FLT CONT SHUTOFF WING CTR
  - 3) 11H26, FLT CONT SHUTOFF WING RIGHT

S 412-067

- (9) Close access panel 556AB (for the left aileron) or 656AB (for the right aileron) (AMM 06-44-00/201).

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H. Install the PCA Filter (Fig. 201)

S 432-068

- (1) Install the filter (21).

NOTE: Be careful to prevent damage to the filter.

S 432-069

- (2) Install the packing (22).

S 432-070

- (3) Install the reducer (20) and tighten it to 370-300 pound-inches (33.9-41.8 newton-meters).

S 432-071

- (4) Remove the cap from the hydraulic line (3) and connect it to the PCA (5).

NOTE: Make sure there is a minimum clearance of 0.35 inch (8.89 mm) between the PCA hydraulic lines to prevent chaffing against each other.

I. Install the Hanger Link for the Inboard Aileron PCA (Fig. 202)

S 432-072

- (1) Use the bolt, washer, bushing, and nut to connect the hanger link to the link assembly. Tighten the nut to 520-650 pound-inches (58.7-73.4 newton-meters).

S 432-073

- (2) Use the bolt, bushing, and nut to connect the hanger link to the rear spar (2 locations). Tighten the nuts to 340-425 pound-inches (38.4-48.0 newton-meters).

J. Inboard Aileron PCA - Test

NOTE: This test is for the installation of the PCA or the installation of the Hanger Link.

NOTE: Make sure the airplane is on its landing gear with its engines installed before you do this test.

All aileron position measurements are taken from the faired position (Fig. 204).

S 862-075

- (1) Push the STATUS button on the display select panel to show the aileron position indicator on the display.

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S 862-001

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Supply pressure to the hydraulic system that supplies the PCA you replaced (AMM 29-11-00/201).

**NOTE:** The Left system supplies the outboard PCA for the left inboard aileron.  
The Center System supplies the inboard PCAs for the left and right inboard ailerons.  
The Right system supplies the outboard PCA for the right inboard aileron.

S 862-076

- (3) Remove the DO-NOT-CLOSE tag and close the applicable circuit breaker (below) on the P11 panel:
- (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT

S 212-077

- (4) Make sure the other two FLT CONT SHUTOFF WING circuit breakers on the P11 panel are open.

S 862-078

- (5) Remove the DO-NOT-OPERATE tag and move the applicable FLT CONTROL SHUTOFF WING L, C, or R switch on the right side panel, P61, to ON.

S 212-079

- (6) Make sure the other two FLT CONT SHUTOFF WING switches on the P61 panel are OFF.

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S 222-080

- (7) Turn the control wheel fully counterclockwise and do the applicable checks that follow:

**NOTE:** An aileron without power can move down a small distance. This condition is not unusual.

Measure the aileron movement from the faired position with a bubble protractor or scale.

- (a) If the left hydraulic system has power, make sure the left inboard aileron moves up  $21.5 \pm 1$  degrees ( $18.38 \pm .85$  inches)( $46.7 \pm 2.1$  centimeters).
- (b) If the right hydraulic system has power, make sure the right inboard aileron moves down  $21.5 \pm 1$  degrees ( $18.38 \pm .85$  inches)( $46.7 \pm 2.1$  centimeters).
- (c) If the center hydraulic system has power, make sure the left inboard aileron moves up  $21.5 \pm 1$  degrees ( $18.38 \pm .85$  inches)( $46.7 \pm 2.1$  centimeters) and the right inboard aileron moves down  $21.5 \pm 1$  degrees ( $18.38 \pm .85$  inches)( $46.7 \pm 2.1$  centimeters).

S 222-081

- (8) Turn the control wheel fully clockwise and do the applicable checks that follow:

- (a) If the left hydraulic system has power, make sure the left inboard aileron moves down  $21.5 \pm 1$  degrees ( $18.38 \pm .85$  inches)( $46.7 \pm 2.1$  centimeters).
- (b) If the right hydraulic system has power, make sure the right inboard aileron moves up  $21.5 \pm 1$  degrees ( $18.38 \pm .85$  inches)( $46.7 \pm 2.1$  centimeters).
- (c) If the center hydraulic system has power, make sure the left inboard aileron moves down  $21.5 \pm 1$  degrees ( $18.38 \pm .85$  inches) and the right inboard aileron moves up  $21.5 \pm 1$  degrees ( $18.38 \pm .85$  inches)( $46.7 \pm 2.1$  centimeters).

S 222-082

- (9) Move the control wheel to its neutral position and do these steps:

**NOTE:** If you replaced two PCA's on each wing, you must do these steps.

- (a) Install the inboard aileron rigging bar with the mount equipment against the wing bottom surface. Put the bar approximately 1.0 inch (25.4 mm) inboard from and parallel to the outboard edge of the inboard aileron (Fig. 204).

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- (b) Make sure the inboard ailerons are in the rigged position. The bottom surface of the aileron trailing edge is 0.40 +/- 0.20 inches below the faired position (Fig. 204).

NOTE: Measure the aileron movement from the faired position.

S 092-083

- (10) Remove the inboard aileron rigging bar.

S 212-084

- (11) Do a check of the PCA hydraulic connections for leaks.  
K. Inboard Aileron PCA - Test

NOTE: This test is for the installation of the PCA filter.

S 862-101

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply pressure to the hydraulic system that supplies the PCA you replaced (AMM 29-11-00/201).

NOTE: The Left system supplies the outboard PCA for the left inboard aileron.  
The Center System supplies the inboard PCAs for the left and right inboard ailerons.  
The Right system supplies the outboard PCA for the right inboard aileron.

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S 862-102

- (2) Remove the DO-NOT-CLOSE tag and close the applicable circuit breaker (below) on the P11 panel:
  - (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT

S 862-103

- (3) Make sure the other two FLT CONT SHUTOFF WING circuit breakers on the P11 panel are open.

S 862-104

- (4) Remove the DO-NOT-OPERATE tag and move the applicable FLT CONTROL SHUTOFF WING L, C, or R switch on the right side panel, P61, to ON.

S 862-105

- (5) Make sure the other two FLT CONT SHUTOFF WING switches on the P61 panel are OFF.

S 212-108

- (6) Turn the control wheel to its full counterclockwise position and do these checks:
  - (a) Make sure the left inboard aileron moves up.
  - (b) Make sure the right inboard aileron moves down.
  - (c) Make sure the inboard ailerons operate smoothly through their full travel range.

S 212-107

- (7) Turn the control wheel to its full clockwise position and do these checks:
  - (a) Make sure the left inboard aileron moves down.
  - (b) Make sure the right inboard aileron moves up.
  - (c) Make sure the inboard ailerons operate smoothly through their full travel range.

S 212-110

- (8) Move the control wheel back to its neutral position and do this check:
  - (a) Make sure the outboard ailerons move to their neutral positions.

S 212-109

- (9) Do a check of the inboard aileron PCAs for hydraulic leaks.

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L. Put the Airplane Back to Its Usual Condition

S 212-085

- (1) Make sure the control wheels are in their neutral positions.

S 862-086

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 862-087

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 862-100

- (4) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 to the ON position.

S 412-088

- (5) Install access panel 561BB (for the left aileron) or 661BB (for the right aileron) (AMM 06-44-00/201).

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INBOARD AILERON POWER CONTROL ACTUATOR (PCA) – INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Inboard Aileron PCA – Maintenance Practices for procedures to do these tasks.
- B. Aileron droop, the slow movement of the surface from the neutral position with hydraulic systems depressurized, and without PCA inputs, is a normal condition. Quick droop with hydraulics depressurized, can be caused by an input to the PCA's or possibly high internal leakage (found in past reports due to worn piston rings). If an airplane shows quick drooping surfaces, with hydraulics depressurized and normal surface positions with hydraulics pressurized, the airplane is considered dispatchable. However, if the airplane shows quick surface droop, the PCA's must be inspected/overhauled at the next convenient opportunity where manpower and components are available not to exceed 120 days.
- C. To find out if a PCA is by-passing, compare the temperature of the PCA's with a PCA that is on a surface that is not quickly drooping. If one of the PCA's is hot to the touch compared to the other PCA, the hot PCA is most likely by-passing fluid and must be removed and inspected/overhauled at the next convenient opportunity where manpower and components are available.

TASK 27-11-48-206-001

2. Inboard Aileron PCA – Wear Limits

A. Access

- (1) Location Zone  
556/656 Inboard Aileron

B. Procedure

S 226-002

- (1) Use the supplied data (Fig. 601) to examine the inboard aileron PCAs for too much wear.

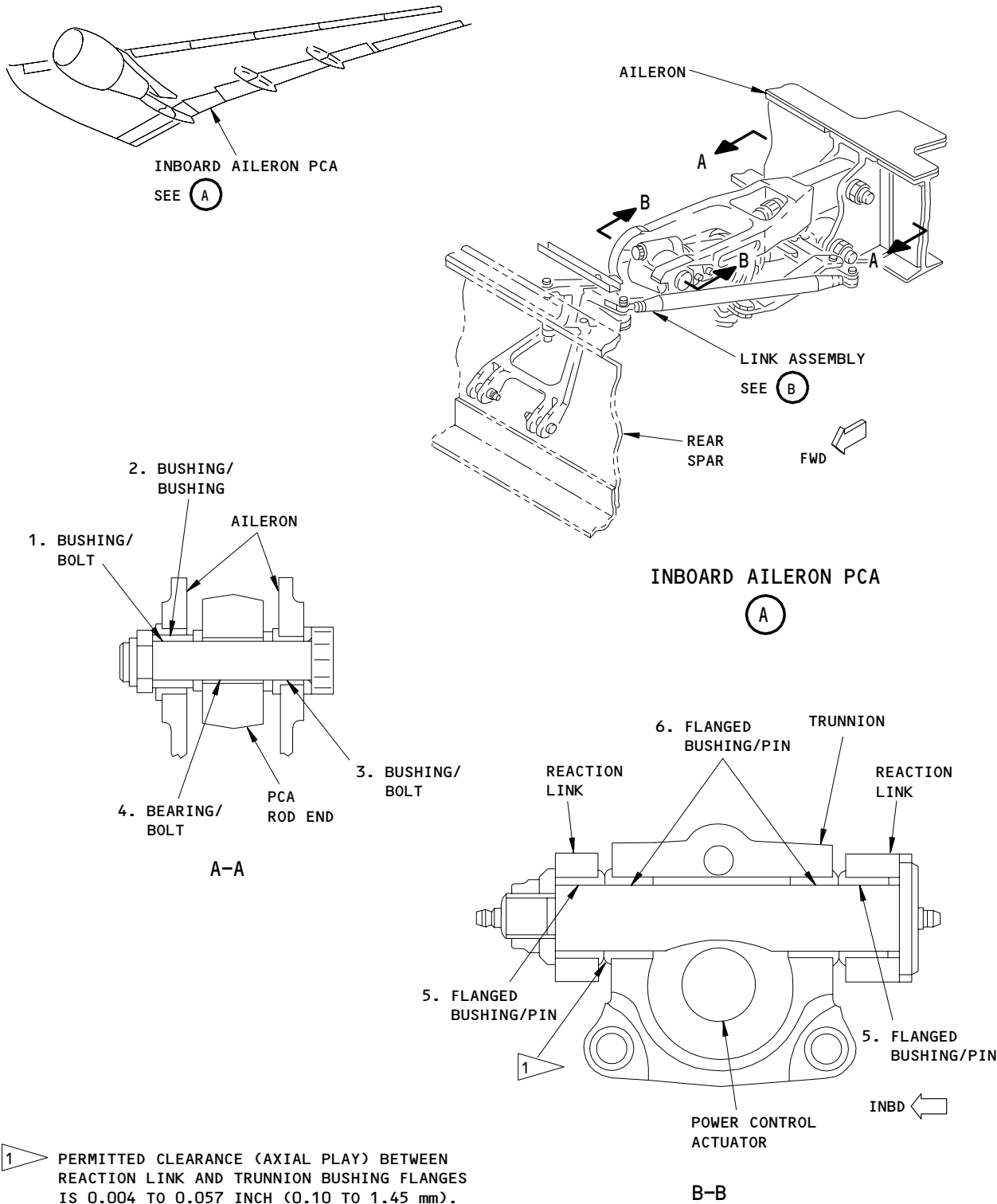
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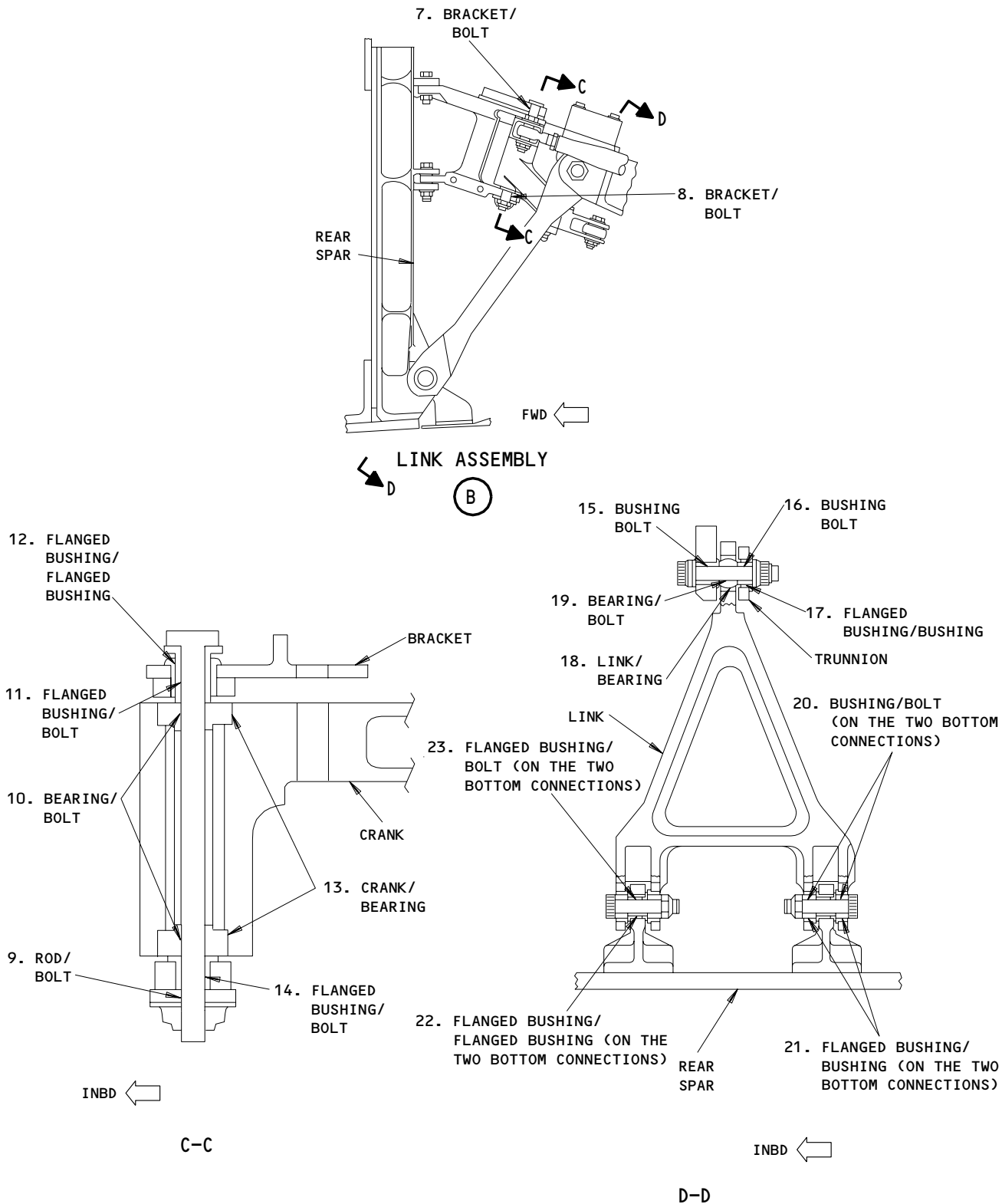
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Inboard Aileron PCA Installation - Wear Limits  
Figure 601 (Sheet 1)

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Inboard Aileron PCA Installation - Wear Limits  
Figure 601 (Sheet 2)

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# BOEING

  
**767**  
**MAINTENANCE MANUAL**

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.9995 (25.387)	1.0003 (25.408)	1.0020 (25.451)	0.0030 (0.076)	X		
	BOLT	OD	0.9985 (25.362)	0.9990 (25.375)	0.9973 (25.331)		X		
2	BUSHING	ID	1.3745 (34.912)	1.3755 (34.938)	1.3775 (34.989)	0.0035 (0.089)	X		
	BUSHING	OD	1.3725 (34.862)	1.3740 (34.900)	1.3720 (34.849)		X		
3	BUSHING	ID	0.9995 (25.387)	1.0000 (25.400)	1.0020 (25.451)	0.0030 (0.076)	X		
	BOLT	OD	0.9985 (25.362)	0.9990 (25.375)	0.9997 (25.392)		X		
4	BEARING	ID	0.9995 (25.387)	1.0000 (25.400)	1.0020 (25.451)	0.003 (0.076)	X		
	BOLT	OD	0.9985 (25.362)	0.9990 (25.375)	0.9970 (25.324)		X		
5	FLANGED BUSHING	ID	1.1253 (28.583)	1.1261 (28.603)	1.1275 (28.639)	0.0035 (0.089)	X		
	PIN	OD	1.1234 (28.534)	1.1240 (28.550)	1.1226 (28.514)		X		
6	FLANGED BUSHING	ID	1.125 (28.575)	1.1258 (28.595)	1.2575 (31.941)	0.0035 (0.089)	X		
	PIN	OD	1.1234 (28.534)	1.1240 (28.550)	1.1223 (28.506)		X		
7	BRACKET	ID	0.2500 (6.350)	0.2510 (6.375)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2475 (6.287)		X		
8	BRACKET	ID	0.2500 (6.350)	0.2510 (6.375)	0.2530 (6.426)	0.0035 (0.089)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2475 (6.287)		X		
9	ROD	ID	0.3120 (7.925)	0.3130 (7.950)	0.3150 (8.001)	0.003 (0.076)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3100 (7.874)		X		
10	BEARING	ID	0.3122 (7.930)	0.3125 (7.938)	0.3150 (8.001)	0.003 (0.076)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3095 (7.861)		X		

Inboard Aileron PCA Installation - Wear Limits  
Figure 601 (Sheet 3)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	FLANGED BUSHING	ID	0.3125 (7.938)	0.3130 (7.950)	0.3150 (8.001)	0.0030 (0.076)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3100 (7.874)		X		
12	FLANGED BUSHING	ID	0.4375 (11.113)	0.4382 (11.130)	0.4400 (11.176)	0.0030 (0.076)	X		
	FLANGED BUSHING	OD	0.4365 (11.087)	0.4370 (11.100)	0.4352 (11.054)		X		
13	CRANK	ID	0.8117 (20.617)	0.8125 (20.638)	0.8145 (20.688)	0.0020 (0.051)	X		
	BEARING	OD	0.8121 (20.627)	0.8125 (20.638)	0.8103 (20.582)		X		
14	FLANGED BUSHING	ID	0.3125 (7.938)	0.3131 (7.953)	0.3150 (8.001)	0.0030 (0.076)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3101 (7.877)		X		
15	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5025 (12.764)	0.0030 (0.076)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4977 (12.642)		X		
16	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5025 (12.764)	0.0030 (0.076)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4925 (12.510)		X		
17	FLANGED BUSHING	ID	0.6875 (17.463)	0.6880 (17.475)	0.6895 (17.513)	0.0030 (0.076)	X		
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6852 (17.404)		X		
18	LINK	ID	1.0943 (27.795)	1.0948 (27.808)	1.0963 (27.846)	0.0025 (0.064)	X		
	BEARING	OD	1.0932 (27.767)	1.0938 (27.783)	1.0223 (25.966)		X		
19	BEARING	ID	0.5000 (12.700)	0.5004 (12.710)	0.5025 (12.764)	0.0030 (0.076)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4974 (12.634)		X		
20	BUSHING	ID	0.4375 (11.113)	0.4380 (11.125)	0.4400 (11.176)	0.0030 (0.076)	X		
	BOLT	OD	0.4365 (11.087)	0.4370 (11.100)	0.4350 (11.049)		X		

Inboard Aileron PCA Installation – Wear Limits  
Figure 601 (Sheet 4)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
21	FLANGED BUSHING	ID	0.7500 (19.050)	0.7508 (19.070)	0.7518 (19.096)	0.0045 (0.114)	X		
	BUSHING	OD	0.7468 (18.969)	0.7473 (18.981)	0.7463 (18.956)		X		
22	FLANGED BUSHING	ID	0.5605 (14.237)	0.5612 (14.254)	0.5638 (14.321)	0.0000 (0.000)	X		
	FLANGED BUSHING	OD	0.5631 (14.303)	0.5638 (14.321)	0.5612 (14.254)		X		
23	FLANGED BUSHING	ID	0.4355 (11.062)	0.4362 (11.079)	0.4390 (11.151)	0.0020 (0.051)	X		
	BOLT	OD	0.4365 (11.087)	0.4370 (11.100)	0.4342 (11.029)		X		

Inboard Aileron PCA Installation - Wear Limits  
Figure 601 (Sheet 5)

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OUTBOARD AILERON POWER CONTROL ACTUATOR (PCA) – MAINTENANCE PRACTICES

1. General

- A. This procedure contains these four tasks:
- (1) Outboard Aileron PCA and Reaction Link – Removal
  - (2) Outboard Aileron PCA Filter – Removal
  - (3) Outboard Aileron PCA and Reaction Link – Installation
  - (4) Outboard Aileron PCA Filter – Installation

TASK 27-11-49-022-014

2. Outboard Aileron PCA and Reaction Link – Removal

A. Equipment

- (1) Outboard Aileron Lock – A27005-1
- (2) Outboard Aileron PCA GAGE – A27001-4
- (3) Bushing Puller – A27106-1

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power – Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zone
  - 561/661 Rear Spar to Trailing Edge
- (2) Access Panels
  - 561/661MB Outboard Aileron Actuators
  - 561/661RBX Outboard Aileron Lockout Actuators

D. Prepare for the Removal

S 012-015

- (1) Open access panels 561MB and 561RBX (for the left wing) or 661MB and 661RBX (for the right wing) (Ref 06-44-00).

S 862-016

- (2) Supply electrical power (Ref 24-22-00).

S 862-001

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply pressure to the left hydraulic system (Ref 29-11-00).

**NOTE:** Only one hydraulic system must be powered to lift the outboard aileron (3).

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- S 862-017
- (4) Turn the control wheel until the aileron you will repair is in its up position.
- S 492-018
- (5) Install the outboard aileron lock.
- S 862-019
- (6) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.
- S 862-020
- (7) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11C17, OUTBOARD AILERON LOCKOUT L
  - (b) 11C18, OUTBOARD AILERON LOCKOUT R
  - (c) 11H15, FLT CONT SHUTOFF WING LEFT
  - (d) 11H16, FLT CONT SHUTOFF WING CTR
  - (e) 11H26, FLT CONT SHUTOFF WING RIGHT
- S 862-002
- (8) Remove the power from the left hydraulic system (Ref 29-11-00).
- S 862-021
- (9) Remove the pressure from the hydraulic system that supplies power to the PCA (2) you will remove (Ref 29-11-00).

**NOTE:** The left system supplies the inboard PCA on the left aileron and the outboard PCA on the right aileron.

The right system supplies the inboard PCA on the right aileron and the outboard PCA on the left aileron.

E. Remove the PCA (Fig. 201)

- S 032-022
- (1) Disconnect these components:
- (a) The hydraulic lines (5,7) from the PCA manifolds (2) and do this step as shown in Fig. 201 View C:
    - 1) Seal the hydraulic lines and the PCA ports with a cap.
  - (b) The input rod (8) from the PCA input lever (1).
    - 1) Do not adjust the length of input rod (8).
  - (c) The reaction link (4) from the aileron (3) and do this step as shown in Fig. 201 View D:
    - 1) Turn the reaction link down.

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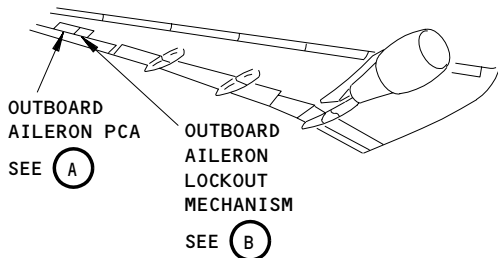
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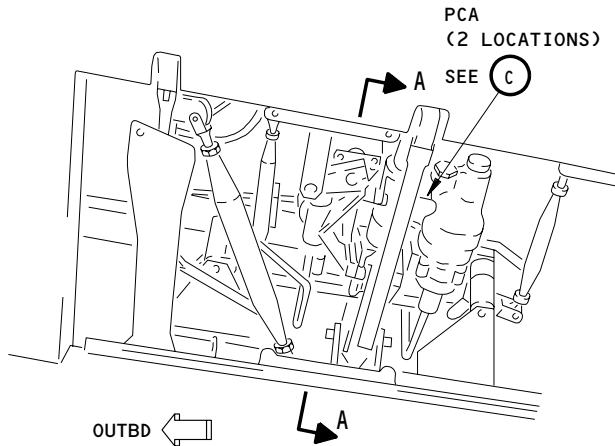
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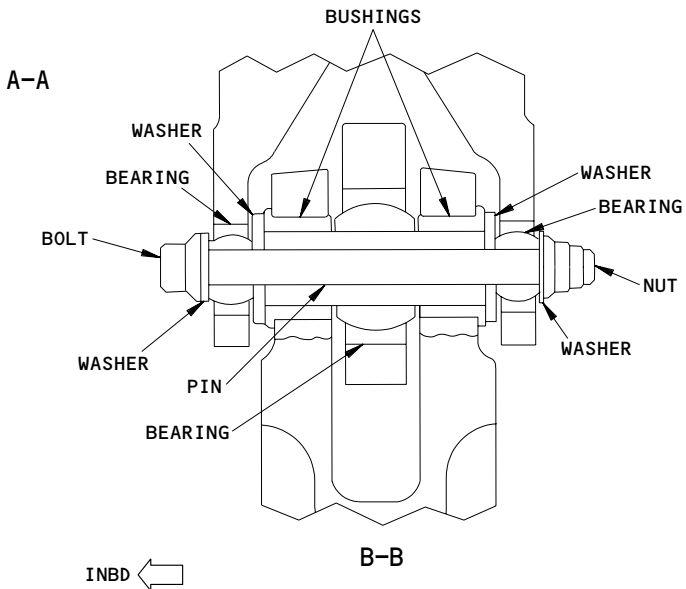
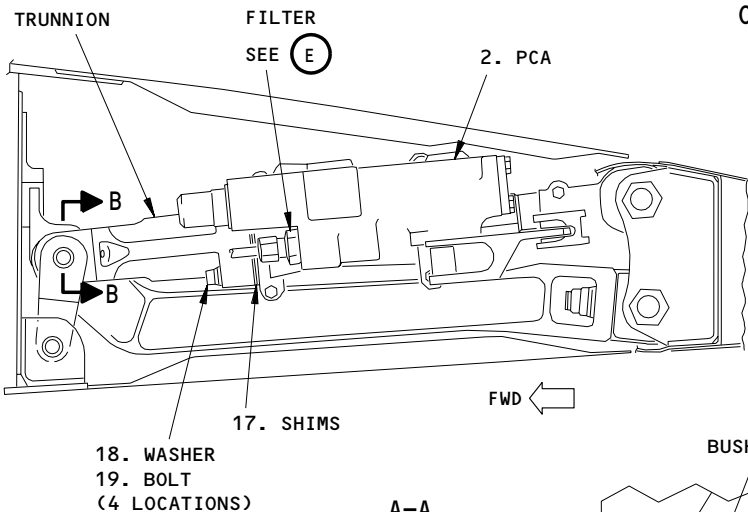




RIGHT WING  
(LEFT WING IS OPPOSITE)



OUTBOARD AILERON PCA  
(A)



Outboard Aileron PCA Maintenance  
Figure 201 (Sheet 1)

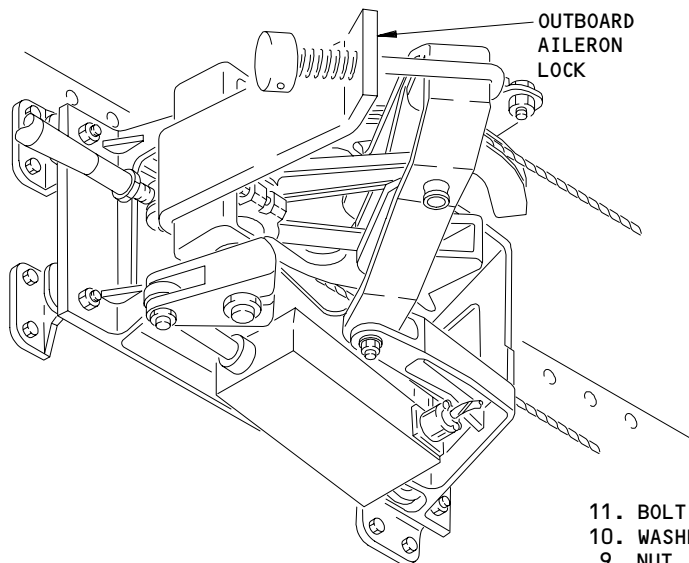
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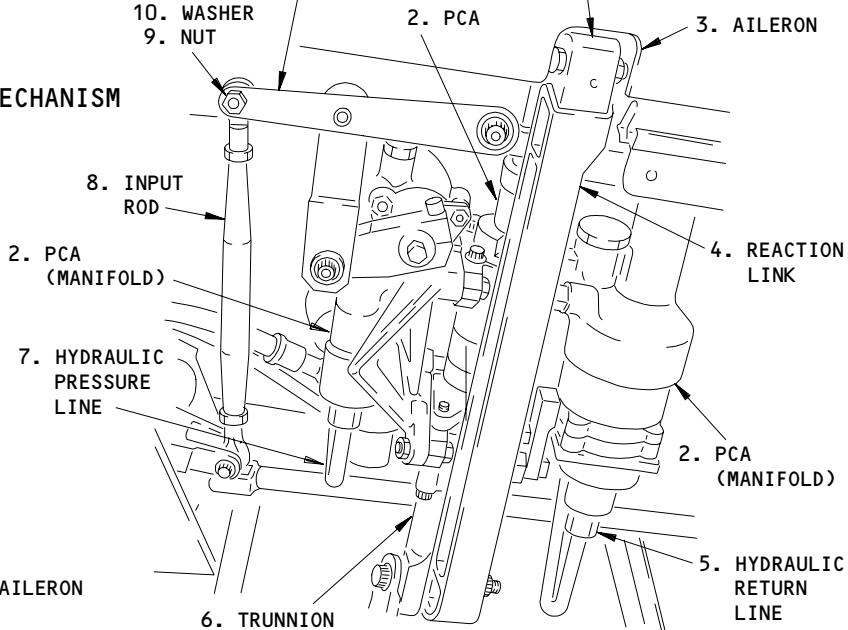


### OUTBOARD AILERON LOCKOUT MECHANISM

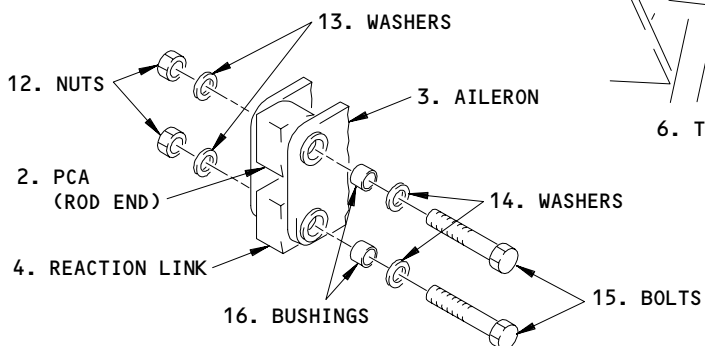
(B)

- 1. PCA INPUT LEVER
- 11. BOLT
- 10. WASHER
- 9. NUT

CONNECTION POINT  
SEE (D)

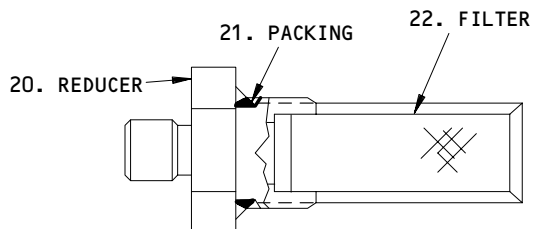


PCA  
(C)



CONNECTION POINT

(D)



FILTER

(E)

Outboard Aileron PCA Maintenance  
Figure 201 (Sheet 2)

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- (d) The PCA (2) from the aileron (3) and do this step as shown in Fig. 201 View D:  
1) Turn the PCA (2) down.

S 222-023

- (2) Measure and keep a written record of the shim (17) thickness as shown in Fig. 201 View A-A.

**NOTE:** The shims (17) are connected to the trunnion (6) with screws. Do not remove or change the shims. If you replace the shims, do not change their thickness (use your record).

- (a) If it is necessary, you can adjust the shim thickness (you can use the outboard PCA gage, A27001-4) (Fig. 202).

**NOTE:** The ailerons must be in the neutral position.

- 1) Make sure dimension A is between 11.095 - 11.115 inches (28.18-28.23 cm).
- 2) Install the shims.
  - a) Make sure the dimension A of the inboard and outboard actuator is between +/- 0.005 inches (+/- 0.127 mm) of each other.
  - b) The total shim thickness must be between 0.110 - 0.200 inches (measure the shim thickness with a feeler gage).

S 022-024

- (3) Disconnect the PCA (2) from its trunnion (6) and remove it as shown in Fig. 201 View A-A.

F. Remove the Reaction Link Assembly (Fig. 201)

**NOTE:** The reaction link assembly consists of the reaction link and the the trunnion.

S 032-025

- (1) Use the bushing puller tool to remove the bolt and bushing that connect the reaction link assembly to the airplane structure (View B-B).

S 022-026

- (2) Remove the reaction link assembly.

S 032-027

- (3) Remove the shims (17) from the trunnion (6) if the trunnion (the reaction link assembly) is replaced with the new one.

**NOTE:** These shims must be installed on the new trunnion (the new reaction link assembly).

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TASK 27-11-49-422-028

3. Outboard Aileron PCA and Reaction Link - Installation

A. Equipment

- (1) Outboard Aileron Rigging Bar - A27024-31 (Recommended); -29 (Optional)
- (2) Bubble Protractor, Commercially Available
- (3) Scale, accurate to 0.01 inch (0.254 mm), Commercially Available

B. Consumable Materials

- (1) D00015 Grease, Corrosion Preventive - BMS 3-24

C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
201	2	PCA	27-11-02	01	203

D. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 27-11-00/501, Aileron and Aileron Trim Control System
- (4) 27-11-49/601, Outboard Aileron Power Control Actuator (PCA)
- (5) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

E. Access

- (1) Location Zone  
561/661 Rear Spar to Trailing Edge
- (2) Access Panels  
561/661MB Outboard Aileron Actuators  
561/661RBX Outboard Aileron Lockout Actuators

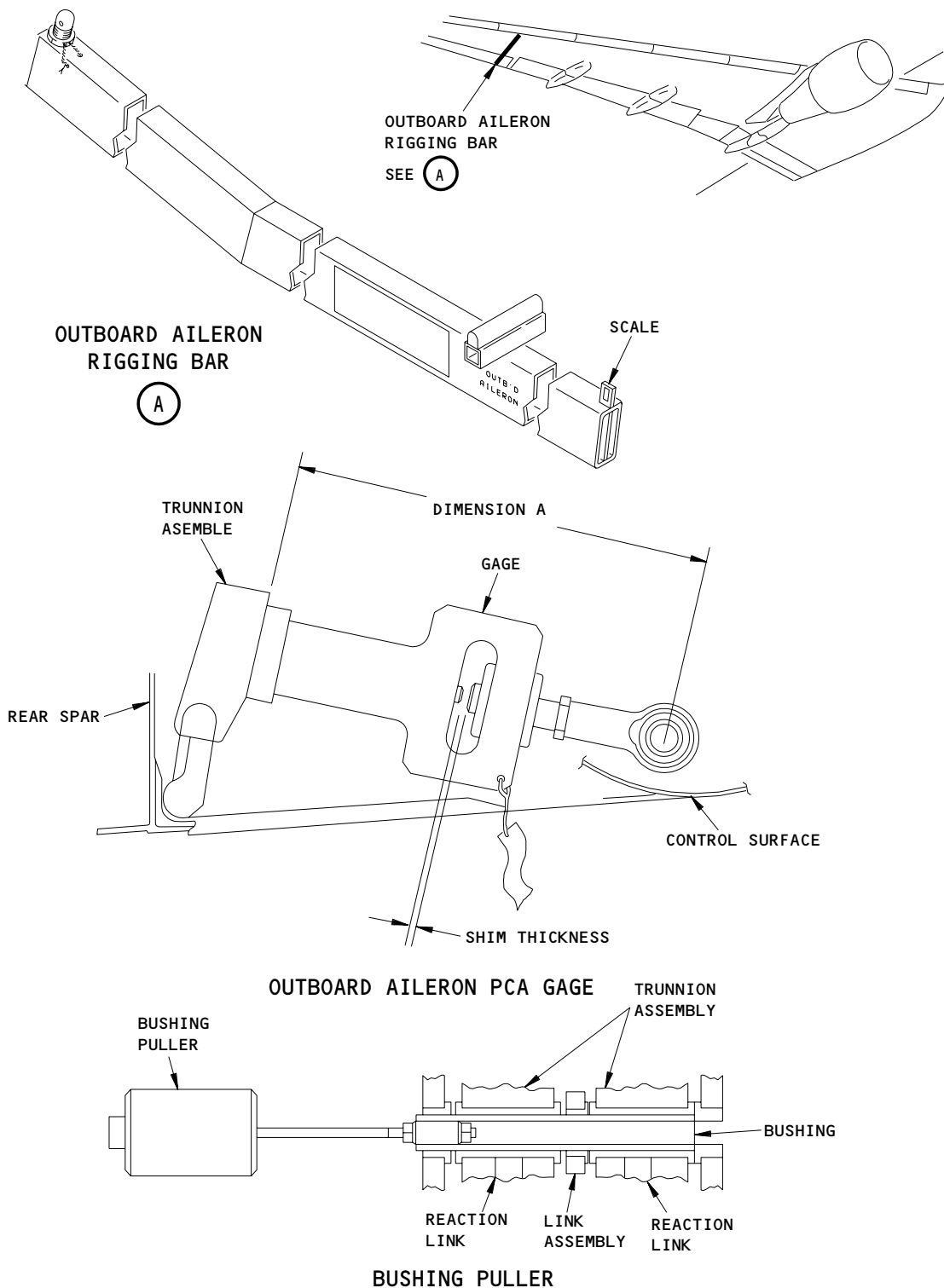
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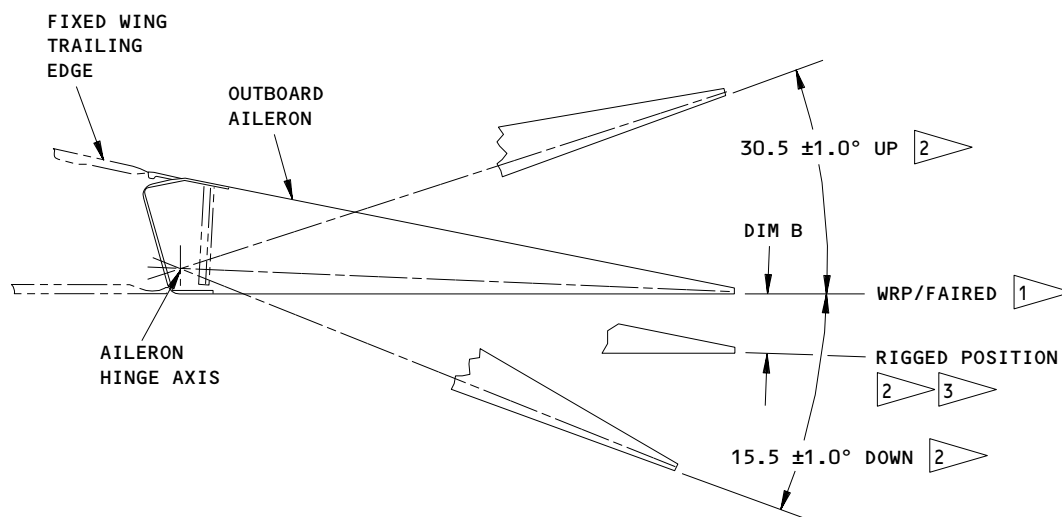
Outboard Aileron PCA Gage, Rigging Bar, and Bushing Puller Installation  
Figure 202

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- 1 THE AILERON IS IN ITS FAIRED POSITION WHEN IT IS ALIGNED WITH THE WING REFERENCE PLANE (WRP). THE WRP IS THEORETICAL AND CAN ONLY BE DETERMINED WITH THE RIGGING BAR. THE FAIRED POSITION (WPR) IS THE SAME AS 0° AILERON POSITION AS SHOWN WITH THE AILERON RIGGING BAR.
- 2 ADD OR SUBTRACT THE AILERON POSITION MEASUREMENT (DIM B), AS NECESSARY TO GET THE TOTAL AILERON TRAVEL FROM THE RIGGED POSITION.
- 3 DIM B IS 0.87 ± 0.05 INCH (2.0 ± 0.09 DEGREES) DOWN FROM THE FAIRED POSITION FOR RIGGING.  
DIM B IS 0.87 ± 0.15 INCH (2.0 ± 0.28 DEGREES) DOWN FROM THE FAIRED POSITION FOR SYSTEM TEST.

Outboard Aileron Rigged vs Neutral Position  
Figure 203

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F. Install the Reaction Link Assembly (Fig. 201)

NOTE: The reaction link assembly consists of the reaction link and the trunnion.

S 432-029

- (1) Install the shims (17) on the trunnion (6) if the shims are not installed.

NOTE: The shims (17) must be installed on the trunnion (the reaction link assembly).

NOTE: Install the shims that were removed or shims of equal thickness. Make sure the shim thickness is the same as the shim thickness before the PCA was removed.

- (a) If it is necessary, you can adjust the shim thickness (the ailerons must be in the rigged position).

NOTE: Do not adjust the shim thickness unless you cannot obtain the correct adjustment with the control rod.

- 1) Make sure dimension A for the inboard actuator is between 11.095 - 11.115 inches (281.81-282.32 mm) (Fig. 202).
- 2) Install the shim for the outboard actuator.
  - a) Make sure there is not more than a 0.003 inch (0.076 mm) difference between the dimension A measurement of the inboard and outboard actuator.
  - b) The total shim thickness for the outboard actuator must be between 0.100 - 0.200 inches (2.54-5.08 mm).

S 422-030

- (2) Install the bushing and the bolt that connect the reaction link assembly to the airplane structure as shown in View B-B.

G. Install the PCA (Fig. 201)

NOTE: Refer to 27-11-49 for the applicable wear limit data.

S 642-031

- (1) Apply grease to the bolts, nuts, washers, and bushings before they are installed.

S 422-032

- (2) Do these steps to connect the PCA (2) to its trunnion (6) View A-A:
  - (a) Hold the PCA in its correct position.
  - (b) Install the washer (18) and bolt (19) that connect the PCA to its trunnion and tighten them to 115-135 pound-inches (13.0-15.25 newton-meters) (4 locations).

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(c) Lock the bolts with wire.

S 432-033

- (3) Do these steps to connect the PCA (2) to the aileron (3) View D:
- (a) Turn the PCA up until it is aligned with the aileron connection point.
  - (b) Install the bolt (15), bushing (16), washers (13,14), and nut (12) that connect the PCA to the aileron and tighten them to 795 - 845 pound-inches.

S 432-034

- (4) Do these steps to connect the reaction link (4) to the aileron (3) (View D):
- (a) Turn the reaction link until it is aligned with the aileron connection point.
  - (b) Install the bolt (15), bushing (16), washers (13,14), and nut (12) that connect the reaction link to the aileron.

S 432-035

- (5) Connect these components (View C):
- (a) The input rod (8) to the input Lever (1)
  - (b) The hydraulic lines (5,7) to the PCA manifolds (2).

S 092-036

- (6) Remove the outboard aileron lock.

S 862-037

- (7) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11C17, OUTBOARD AILERON LOCKOUT L
  - (b) 11C18, OUTBOARD AILERON LOCKOUT R

S 822-039

- (8) Do these steps to adjust the PCA:

**NOTE:** Use this procedure only if one of the two PCAs (on each wing) was replaced.

If you replaced more than 1 PCA, do the procedure to Adjust the PCAs for the applicable aileron (Ref 27-11-00/501).

- (a) Do these steps to put the lockout actuator for the outboard aileron in its lockout position (actuator extended):
- 1) Push and hold the L or R AIR DATA test switch on the P61 panel and do these steps.

**NOTE:** The actuator will extend in approximately 15 seconds.

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- 2) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - a) 11C17, OUTBOARD AILERON LOCKOUT L
  - b) 11C18, OUTBOARD AILERON LOCKOUT R
- 3) Release the AIR DATA CMPTR test switch.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (b) Supply pressure to the hydraulic system that supplies power to the PCA you did not replace (Ref 29-11-00).

**NOTE:** The left system supplies the inboard PCA on the left aileron and the outboard PCA on the right aileron.

The right system supplies the inboard PCA on the right aileron and the outboard PCA on the left aileron.

- (c) Remove the DO-NOT-CLOSE tag and close the applicable circuit breaker on the P11 panel:
  - 1) 11H15, FLT CONT SHUTOFF WING LEFT
  - 2) 11H26, FLT CONT SHUTOFF WING RIGHT
- (d) Make sure the other two FLT CONT SHUTOFF WING circuit breakers on the P11 panel are open.
- (e) Remove the DO-NOT-OPERATE tag and move the applicable FLT CONTROL SHUTOFF WING L or R switch on the P61 panel to ON.
- (f) Make sure the other two FLT CONT SHUTOFF WING switches on the P61 panel are OFF.
- (g) Make a mark that shows the position of the aileron trailing edge (use a part of the wing that does not move).

**NOTE:** Make sure the mark cannot move during the adjustment.

- (h) Remove the power from the hydraulic system that supplies power to the PCA you did not replace (Ref 29-11-00).
- (i) Move the applicable FLT CONTROL SHUTOFF WING L or R switch on the P61 panel to OFF. Attach a DO-NOT-OPERATE tag and make sure the switch position light comes on.
- (j) Open the applicable circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - 1) 11H15, FLT CONT SHUTOFF WING LEFT
  - 2) 11H26, FLT CONT SHUTOFF WING RIGHT

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (k) Supply pressure to the hydraulic system that supplies power to the PCA you replaced (Ref 29-11-00).

**NOTE:** The left system supplies the inboard PCA on the left aileron and the outboard PCA on the right aileron.

The right system supplies the inboard PCA on the right aileron and the outboard PCA on the left aileron.

- (l) Remove the DO-NOT-CLOSE tag and close the applicable circuit breaker on the P11 panel:  
1) 11H15, FLT CONT SHUTOFF WING LEFT  
2) 11H26, FLT CONT SHUTOFF WING RIGHT
- (m) Make sure the other two FLT CONT SHUTOFF WING circuit breakers on the P11 panel are open.
- (n) Remove the DO-NOT-OPERATE tag and move the applicable FLT CONTROL SHUTOFF WING L or R switch on the P61 panel to ON.
- (o) Make sure the other two FLT CONT SHUTOFF WING switches on the P61 panel are OFF.
- (p) Increase the length of the input rod for the powered PCA until the aileron trailing edge is approximately 1 inch (25.4 mm) below the mark.
- (q) Adjust the input rod until the aileron trailing edge is aligned with the mark (use a tolerance of  $\pm 0.05$  inch ( $\pm 1.27$  mm)) and do these steps:

**NOTE:** Always move the aileron trailing edge up during the last adjustment of the input rod.

- 1) Tighten the jamnuts for the input rod.  
2) Make sure the aileron trailing edge is aligned with the mark (use a tolerance of  $\pm 0.05$  inch ( $\pm 1.27$  mm)).
- (r) Make a new mark for the position of the aileron trailing edge.
- (s) Remove the power from the hydraulic system that supplies power to the PCA you replaced (Ref 29-11-00).
- (t) Move the applicable FLT CONTROL SHUTOFF WING L or R switch on the P61 panel to OFF. Attach a DO-NOT-OPERATE tag and make sure the switch position light comes on.
- (u) Open the applicable circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:  
1) 11H15, FLT CONT SHUTOFF WING LEFT  
2) 11H26, FLT CONT SHUTOFF WING RIGHT

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (v) Supply pressure to the hydraulic system that supplies power to the PCA you did not replace (Ref 29-11-00).
- (w) Remove the DO-NOT-CLOSE tag and close the applicable circuit breaker on the P11 panel:
  - 1) 11H15, FLT CONT SHUTOFF WING LEFT
  - 2) 11H26, FLT CONT SHUTOFF WING RIGHT
- (x) Make sure the other two FLT CONT SHUTOFF WING circuit breakers on the P11 panel are open.
- (y) Remove the DO-NOT-OPERATE tag and move the applicable FLT CONTROL SHUTOFF WING L or R switch on the P61 panel to ON.
- (z) Make sure the other two FLT CONT SHUTOFF WING switches on the P61 panel are OFF.
- (aa) Make a mark for the position of the aileron trailing edge.
- (ab) Make sure the marks are not more than 0.05 inch (1.27 mm) apart. If it is necessary, do the adjustment procedure again.
- (ac) Remove the power from the hydraulic system that supplies the PCA you did not replace (Ref 29-11-00).

**NOTE:** Make sure all hydraulic power is removed.

- (ad) Move the applicable FLT CONTROL SHUTOFF WING L or R switch on the P61 panel to OFF. Attach a DO-NOT-OPERATE tag and make sure the switch position light comes on.
- (ae) Open the applicable circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - 1) 11H15, FLT CONT SHUTOFF WING LEFT
  - 2) 11H26, FLT CONT SHUTOFF WING RIGHT
- (af) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - 1) 11C17, OUTBOARD AILERON LOCKOUT L
  - 2) 11C18, OUTBOARD AILERON LOCKOUT R

H. Outboard Aileron PCA - Test

**NOTE:** Make sure the airplane is on its landing gear and has its engines installed before you do this test.

All aileron position measurements are taken from the faired position (Fig. 203).

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S 862-003

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply pressure to the hydraulic system that supplies power to the PCA you will test (Ref 29-11-00).

**NOTE:** The left system supplies the inboard PCA on the left aileron and the outboard PCA on the right aileron.

The right system supplies the inboard PCA on the right aileron and the outboard PCA on the left aileron.

S 862-041

- (2) Remove the DO-NOT-CLOSE tag and close the applicable circuit breaker on the P11 panel:
  - (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H26, FLT CONT SHUTOFF WING RIGHT

S 212-042

- (3) Make sure the other two FLT CONT SHUTOFF WING circuit breakers on the P11 panel are open.

S 862-043

- (4) Remove the DO-NOT-OPERATE tag and move the applicable FLT CONTROL SHUTOFF WING L or R switch on the P61 panel to ON.

S 212-044

- (5) Make sure the other two FLT CONTROL SHUTOFF WING switches on the P61 panel are OFF.

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S 222-045

- (6) Turn the control wheel to its full counterclockwise position and do this check:
- (a) Make sure the left outboard aileron moves up  $30.5 \pm 1.0$  degrees ( $13.66 \pm 0.44$  inches ( $34.69 \pm 1.12$  cm)) and the right outboard aileron moves down  $15.5 \pm 1.0$  degrees ( $6.76 \pm 0.44$  inches ( $17.17 \pm 1.12$  cm)).

**NOTE:** An aileron without power can move down a small distance. This condition is not unusual.

Measure the aileron movement from the faired position, with a bubble protractor or scale.

S 222-046

- (7) Turn the control wheel to its full clockwise position and do this check:
- (a) Make sure the left outboard aileron moves down  $15.5 \pm 1.0$  degrees ( $6.76 \pm 0.44$  inches ( $17.17 \pm 1.12$  cm)) and the right outboard aileron moves up  $30.5 \pm 1.0$  degrees ( $13.66 \pm 0.44$  inches ( $34.70 \pm 1.12$  cm)).

S 222-047

- (8) If a rigging bar is available, move the control wheel back to its neutral position and do these steps:

**NOTE:** If you replaced the two PCAs on each wing, you must do these steps.

- (a) Install the outboard aileron rigging bar against the wing bottom surface. Put the bar approximately 1.0 inch (25.4 mm) outboard from and parallel to the inboard edge of the outboard aileron (Fig. 202).
- (b) Make sure the outboard aileron is in the rigged position. The bottom surface of the aileron trailing edge is 0.87 +/- 0.15 inch below the faired position (Fig. 203).

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(c) Remove the outboard aileron rigging bar.

S 212-048

(9) Do a check on the hydraulic connections for leaks.

I. Put the Airplane Back to Its Usual Condition

S 862-049

(1) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).

S 862-004

(2) Remove the DO-NOT-CLOSE tags and make sure these circuit breakers on the P11 panel are closed:

(a) 11H15, FLT CONT SHUTOFF WING LEFT

(b) 11H16, FLT CONT SHUTOFF WING CTR

(c) 11H26, FLT CONT SHUTOFF WING RIGHT

S 862-071

(3) Remove the DO-NOT-OPERATE tags and make sure the FLT CONTROL SHUTOFF WING L, R, and C switches on the P61 panel are ON.

S 862-050

(4) Remove electrical power if it is not necessary (Ref 24-22-00).

S 412-051

(5) Close access panels 561MB and 561RBX (for the left wing) or 661MB and 661RBX (for the right wing) (Ref 06-44-00).

TASK 27-11-49-022-052

4. Outboard Aileron PCA Filter - Removal

A. Equipment

(1) Outboard Aileron Lock - A27005-1

B. References

(1) 06-44-00/201, Wing Access Doors and Panels

(2) 24-22-00/201, Electrical Power - Control

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- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
C. Access

- (1) Location Zone  
561/661 Rear Spar to Trailing Edge
- (2) Access Panels  
561/661MB Outboard Aileron Actuators  
561/661RBX Outboard Aileron Lockout Actuators

D. Prepare for the Removal

- S 012-053
- (1) Open access panels 561MB and 561RBX (for the left wing) or 661MB and 661RBX (for the right wing) (Ref 06-44-00).
- S 862-054
- (2) Supply electrical power (Ref 24-22-00).
- S 862-007

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply pressure to the left hydraulic system (Ref 29-11-00).

**NOTE:** Only one hydraulic system must be powered to lift the outboard aileron (3).

- S 862-055
- (4) Turn the control wheel until the aileron you will repair is in its up position.

- S 492-056
- (5) Install the outboard aileron lock (23).

- S 862-057
- (6) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

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S 862-058

- (7) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11C17, OUTBOARD AILERON LOCKOUT L
  - (b) 11C18, OUTBOARD AILERON LOCKOUT R
  - (c) 11H15, FLT CONT SHUTOFF WING LEFT
  - (d) 11H16, FLT CONT SHUTOFF WING CTR
  - (e) 11H26, FLT CONT SHUTOFF WING RIGHT

S 862-005

- (8) Remove the power from the left hydraulic system (Ref 29-11-00).

NOTE: All hydraulic power must be removed.

S 862-059

- (9) Remove the pressure from the hydraulic system that supplies power to the PCA (2) you will repair (Ref 29-11-00).

NOTE: The left system supplies the inboard PCA on the left aileron and the outboard PCA on the right aileron.

The right system supplies the inboard PCA on the right aileron and the outboard PCA on the left aileron.

E. Remove the Outboard Aileron PCA Filter (Fig. 201)

S 032-060

- (1) Disconnect the hydraulic pressure line (7) from the PCA manifold (2) and do this step:
- (a) Seal the hydraulic line with a cap.

S 032-061

- (2) Remove these components:
- (a) The reducer (20)
  - (b) The packing (21).

S 022-062

- (3) Remove the filter (22).

TASK 27-11-49-422-063

5. Outboard Aileron PCA Filter - Installation

A. Consumable Materials

- (1) D00054 Lubricant - Hydraulic System O-Rings, Backup Rings, Fittings MCS 352B

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B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
201	21 22	Packing Filter (screen)	27-11-02	01	206 208

C. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

- (1) Location Zone  
561/661 Rear Spar to Trailing Edge
- (2) Access Panels  
561/661MB Outboard Aileron Actuators  
561/661RBX Outboard Aileron Lockout Actuators

E. Install the Outboard Aileron PCA Filter (Fig. 201)

- S 642-064
- (1) Apply lubricant to the reducer threads (20) and packing (21) before they are installed.
- S 432-065
- (2) Put the filter (22) into the PCA pressure port.
- S 422-066
- (3) Install the packing (21) and the reducer (20). Tighten the reducer to 270-300 pound-inches (30.5-33.9 Newton-meters).
- S 092-067
- (4) Remove the outboard aileron lock (23).

F. Outboard Aileron PCA - Test

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S 862-006

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply pressure to the hydraulic system that supplies power to the PCA you repaired (Ref 29-11-00).

**NOTE:** The left system supplies the inboard PCA on the left aileron and the outboard PCA on the right aileron.

The right system supplies the inboard PCA on the right aileron and the outboard PCA on the left aileron.

S 862-008

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11C17, OUTBOARD AILERON LOCKOUT L
  - (b) 11C18, OUTBOARD AILERON LOCKOUT R
  - (c) 11H15, FLT CONT SHUTOFF WING LEFT
  - (d) 11H16, FLT CONT SHUTOFF WING CTR
  - (e) 11H26, FLT CONT SHUTOFF WING RIGHT

S 862-009

- (3) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the P61 panel to ON.

S 212-010

- (4) Turn the control wheel to its full counterclockwise position and do these steps:
  - (a) Make sure the left outboard aileron moves up.
  - (b) Make sure the right outboard aileron moves down.
  - (c) Make sure the outboard ailerons operate smoothly through their full travel range.

S 212-011

- (5) Turn the control wheel to its full clockwise position and do these checks:
  - (a) Make sure the left outboard aileron moves down.
  - (b) Make sure the right outboard aileron moves up.
  - (c) Make sure the outboard ailerons operate smoothly through their full travel range.

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S 212-012

(6) Move the control wheel back to its neutral position and do this check:

(a) Make sure the outboard ailerons move to their neutral positions.

S 212-013

(7) Do a check on the outboard aileron PCAs for hydraulic leaks.

G. Put the Airplane Back to Its Usual Condition

S 862-068

(1) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).

S 862-069

(2) Remove electrical power if it is not necessary (Ref 24-22-00).

S 412-070

(3) Close access panels 561MB and 561RBX (for the left wing) or 661MB and 661RBX (for the right wing) (Ref 06-44-00).

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OUTBOARD AILERON PCA – INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Outboard Aileron PCA – Maintenance Practices for procedures to do these tasks.
- B. Aileron droop, the slow movement of the surface from the neutral position with hydraulic systems depressurized, and without PCA inputs, is a normal condition. Quick droop with hydraulics depressurized, can be caused by an input to the PCA's or possibly high internal leakage (found in past reports due to worn piston rings). If an airplane shows quick drooping surfaces, with hydraulics depressurized and normal surface positions with hydraulics pressurized, the airplane is considered dispatchable. However, if the airplane shows quick surface droop, the PCA's must be inspected/overhauled at the next convenient opportunity where manpower and components are available not to exceed 120 days.
- C. To find out if a PCA is by-passing, compare the temperature of the PCA's with a PCA that is on a surface that is not quickly drooping. If one of the PCA's is hot to the touch compared to the other PCA, the hot PCA is most likely by-passing fluid and must be removed and inspected/overhauled at the next convenient opportunity where manpower and components are available.

TASK 27-11-49-206-001

2. Outboard Aileron PCA – Wear Limits

A. Access

- (1) Location Zone  
567/667 Outboard Aileron

B. Procedure

S 226-002

- (1) Use the supplied data (Fig. 601) to examine the outboard aileron PCAs for too much wear.

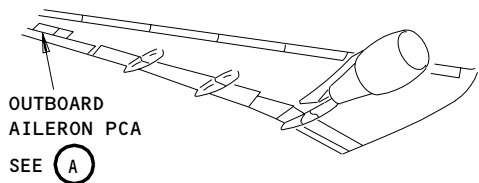
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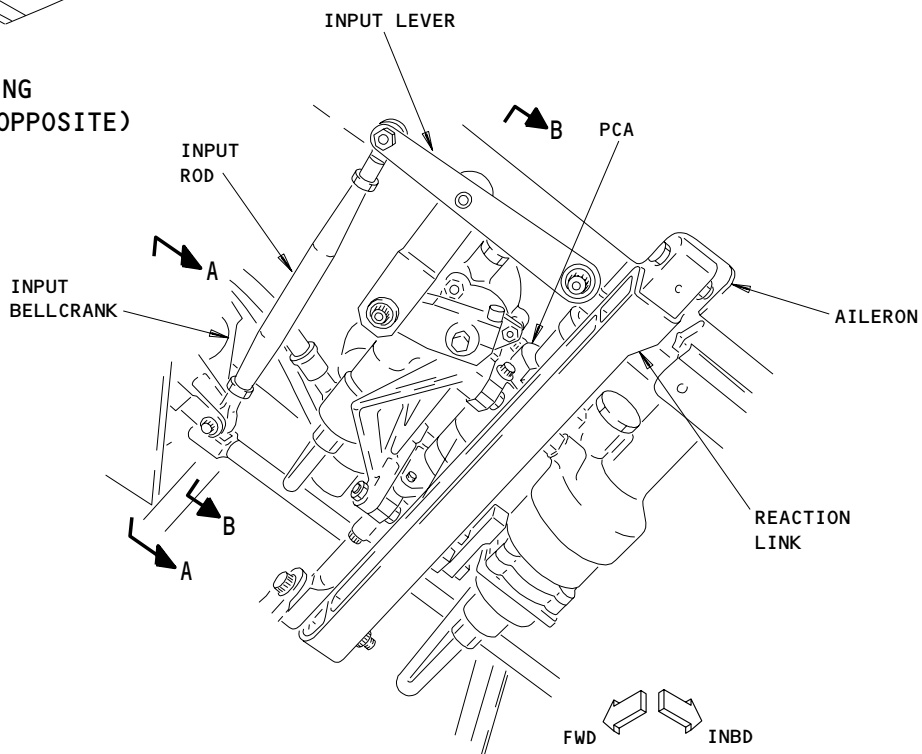
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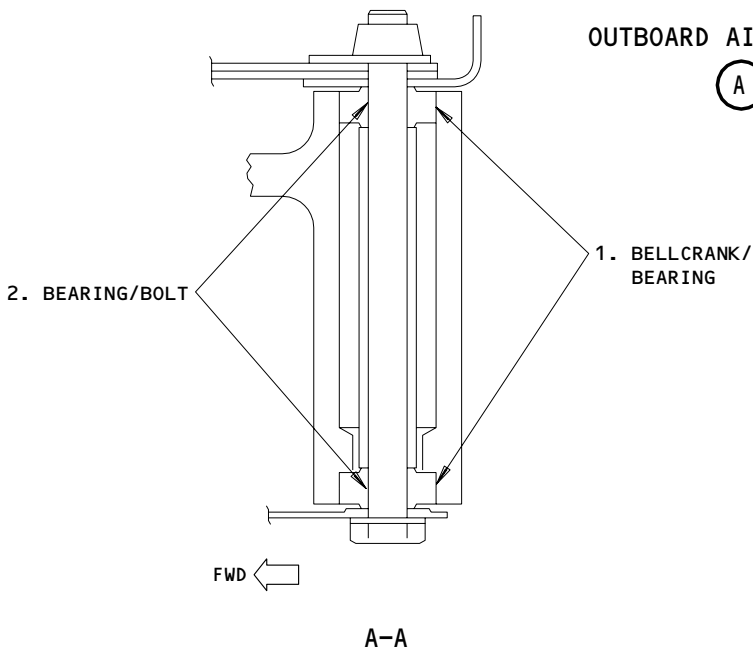


RIGHT WING  
(LEFT WING IS OPPOSITE)



OUTBOARD AILERON PCA

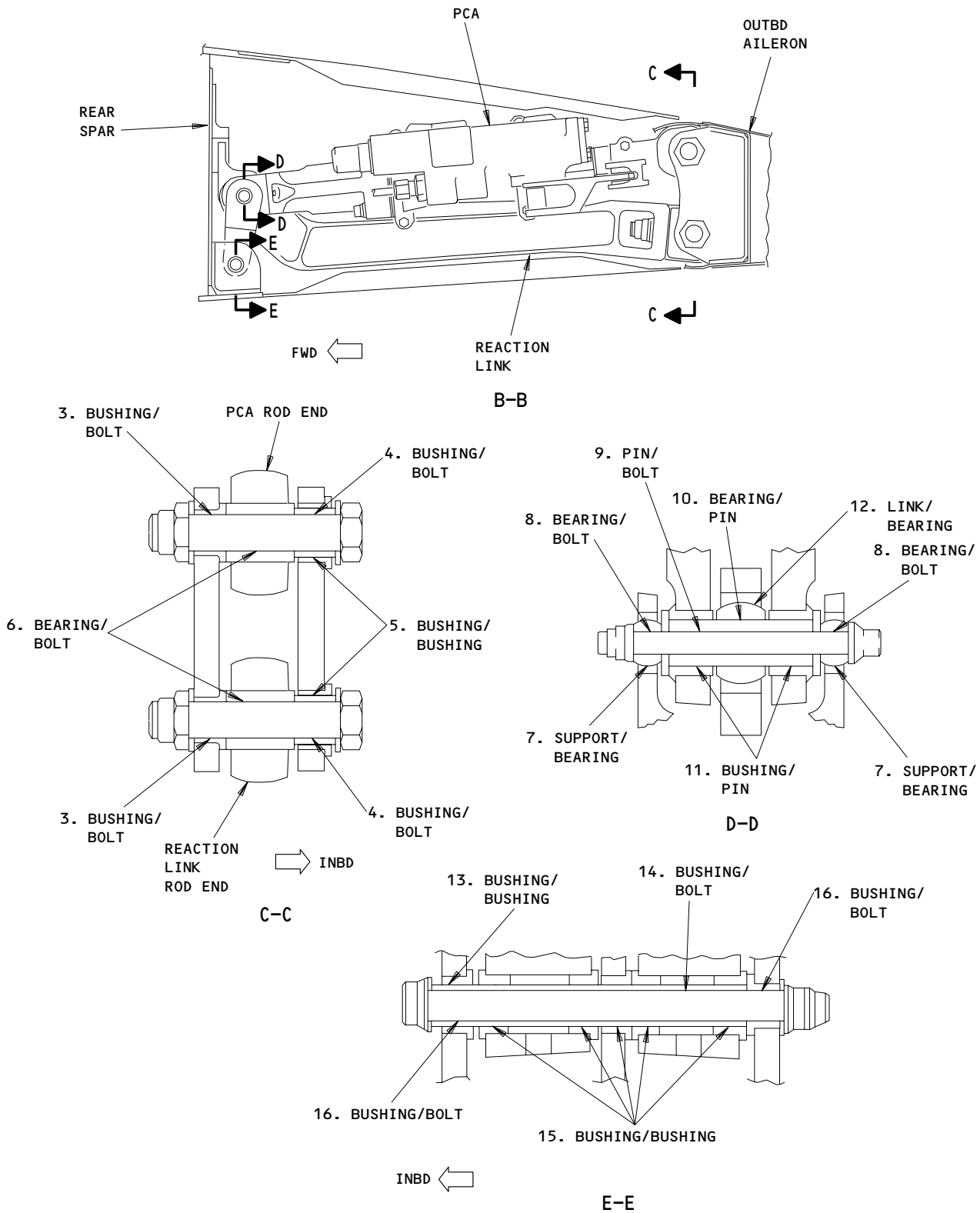
(A)



Outboard Aileron PCA Wear Limits  
Figure 601 (Sheet 1)

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Outboard Aileron PCA Wear Limits  
Figure 601 (Sheet 2)

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
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# BOEING

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BELLCRANK	ID	0.8127 (20.643)	0.8133 (20.658)	0.8150 (20.701)	0.0025 (0.064)		X	
	BEARING	OD	0.8121 (20.627)	0.8125 (20.638)	0.8108 (20.594)		X		
2	BEARING	ID	0.3122 (7.930)	0.3125 (7.938)	0.3150 (8.001)	0.0030 (0.076)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3096 (7.864)		X		
3	BUSHING	ID	0.6245 (15.862)	0.6250 (15.875)	0.6270 (15.926)	0.0030 (0.076)	X		
	BOLT	OD	0.6235 (15.837)	0.6240 (15.850)	0.6220 (15.799)		X		
4	BEARING	ID	0.6245 (15.862)	0.6250 (15.875)	0.6270 (15.926)	0.0030 (0.076)	X		
	BOLT	OD	0.6235 (15.837)	0.6240 (15.850)	0.6220 (15.799)		X		
5	BUSHING	ID	0.8745 (22.212)	0.8753 (22.233)	0.8770 (22.276)	0.0030 (0.076)	X		
	BUSHING	OD	0.8735 (22.187)	0.8740 (22.200)	0.8723 (22.156)		X		
6	BEARING	ID	0.6245 (15.862)	0.6250 (15.875)	0.6265 (15.913)	0.0025 (0.064)	X		
	BOLT	OD	0.6235 (15.837)	0.6240 (15.850)	0.6225 (15.812)		X		
7	SUPPORT	ID	0.7812 (19.842)	0.7818 (19.858)	0.7843 (19.921)	0.0030 (0.076)	X		
	BEARING	OD	0.7808 (19.832)	0.7813 (19.845)	0.7788 (19.782)		X		
8	BEARING	ID	0.3125 (7.938)	0.3129 (7.948)	0.3150 (8.001)	0.0030 (0.076)	X		
	BOLT	OD	0.3115 (7.912)	0.3120 (7.925)	0.3099 (7.871)		X		
9	PIN	ID	0.3125 (7.938)	0.3131 (7.953)	0.3150 (8.001)	0.0030 (0.076)	X		
	BOLT	OD	0.3115 (7.912)	0.3120 (7.925)	0.3101 (7.877)		X		
10	BEARING	ID	0.6250 (15.875)	0.6254 (15.885)	0.6270 (15.926)	0.0030 (0.076)	X		
	PIN	OD	0.6235 (15.837)	0.6240 (15.850)	0.6224 (15.809)		X		

Outboard Aileron PCA Wear Limits  
Figure 601 (Sheet 3)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BUSHING	ID	0.6245 (15.862)	0.6252 (15.880)	0.6270 (15.926)	0.0030 (0.076)	X		
	PIN	OD	0.6235 (15.837)	0.6240 (15.850)	0.6222 (15.804)		X		
12	LINK	ID	1.3126 (33.340)	1.3131 (33.353)	1.3150 (33.401)	0.0025 (0.064)	X		
	BEARING	OD	1.3119 (33.322)	1.3125 (33.338)	1.3106 (33.289)		X		
13	BUSHING	ID	0.4375 (11.113)	0.4380 (11.125)	0.4395 (11.163)	0.0025 (0.064)	X		
	BUSHING	OD	0.4365 (11.087)	0.4370 (11.100)	0.4355 (11.062)		X		
14	BUSHING	ID	0.3125 (7.938)	0.3130 (7.950)	0.3150 (8.001)	0.0030 (0.076)	X		
	BOLT	OD	0.3115 (7.912)	0.3120 (7.925)	0.3100 (7.874)		X		
15	BUSHING	ID	0.4370 (11.100)	0.4375 (11.113)	0.4395 (11.163)	0.0025 (0.064)	X		
	BUSHING	OD	0.4365 (11.087)	0.4370 (11.100)	0.4350 (11.049)		X		
16	BUSHING	ID	0.3125 (7.938)	0.3130 (7.950)	0.3150 (8.001)	0.0030 (0.076)	X		
	BOLT	OD	0.3115 (7.912)	0.3120 (7.925)	0.3100 (7.874)		X		

1 THIS PART CAN BE REPAIRED.

Outboard Aileron PCA Wear Limits  
Figure 601 (Sheet 4)

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AILERON AND SPOILER HYDRAULIC SHUTOFF VALVES -  
DESCRIPTION AND OPERATION

1. General

A. The aileron and spoiler hydraulic shutoff valves block hydraulic fluid flow to the aileron and spoiler PCAs and aileron LCCAs. There are three valves, one for each hydraulic system.

2. Component Details

A. Aileron and Spoiler Hydraulic Shutoff Valves (Fig. 1)

(1) The left and right hydraulic system shutoff valves are located near the inboard edge of the inboard ailerons. The center system shutoff valve is located in the left main gear wheel well on the aft bulkhead.

(2) An electrical actuator operates each three-way, two-position valve. Two limit switches in the actuator shut off power to the actuator motor when the selected position is reached. An override handle on the actuator manually operates the valve.

3. Operation (Fig. 2)

A. The valves are operated by push-on, push-off switches on right side panel P61. The control switches are normally in the ON (open) position. When the switches are OFF (closed), they are lit by an amber light. A clear plastic cover guards the switches.

NOTE: All flt control switches must be in the ON (valve open) position for flight.

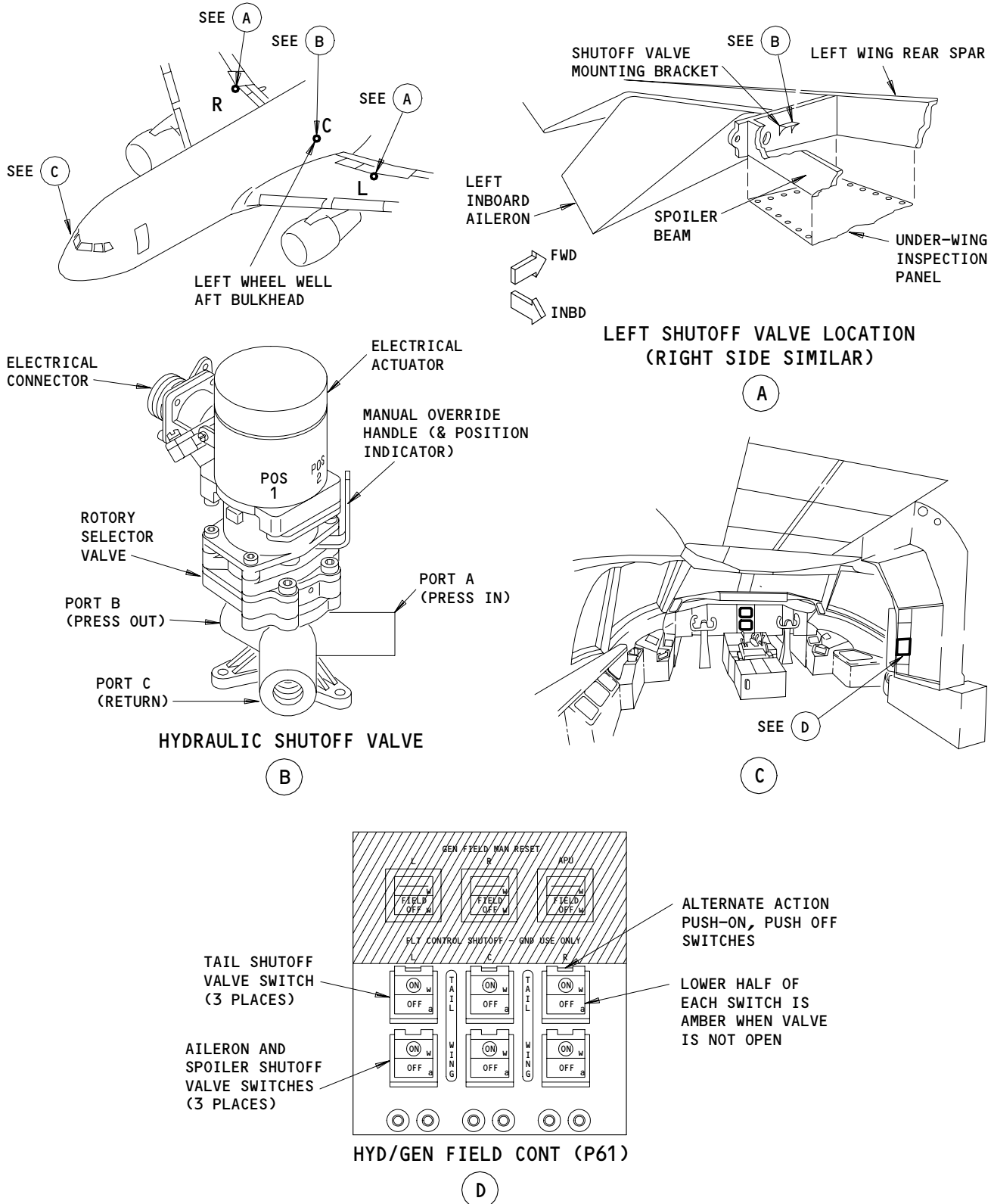
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Aileron and Spoiler Hydraulic Shutoff  
Figure 1

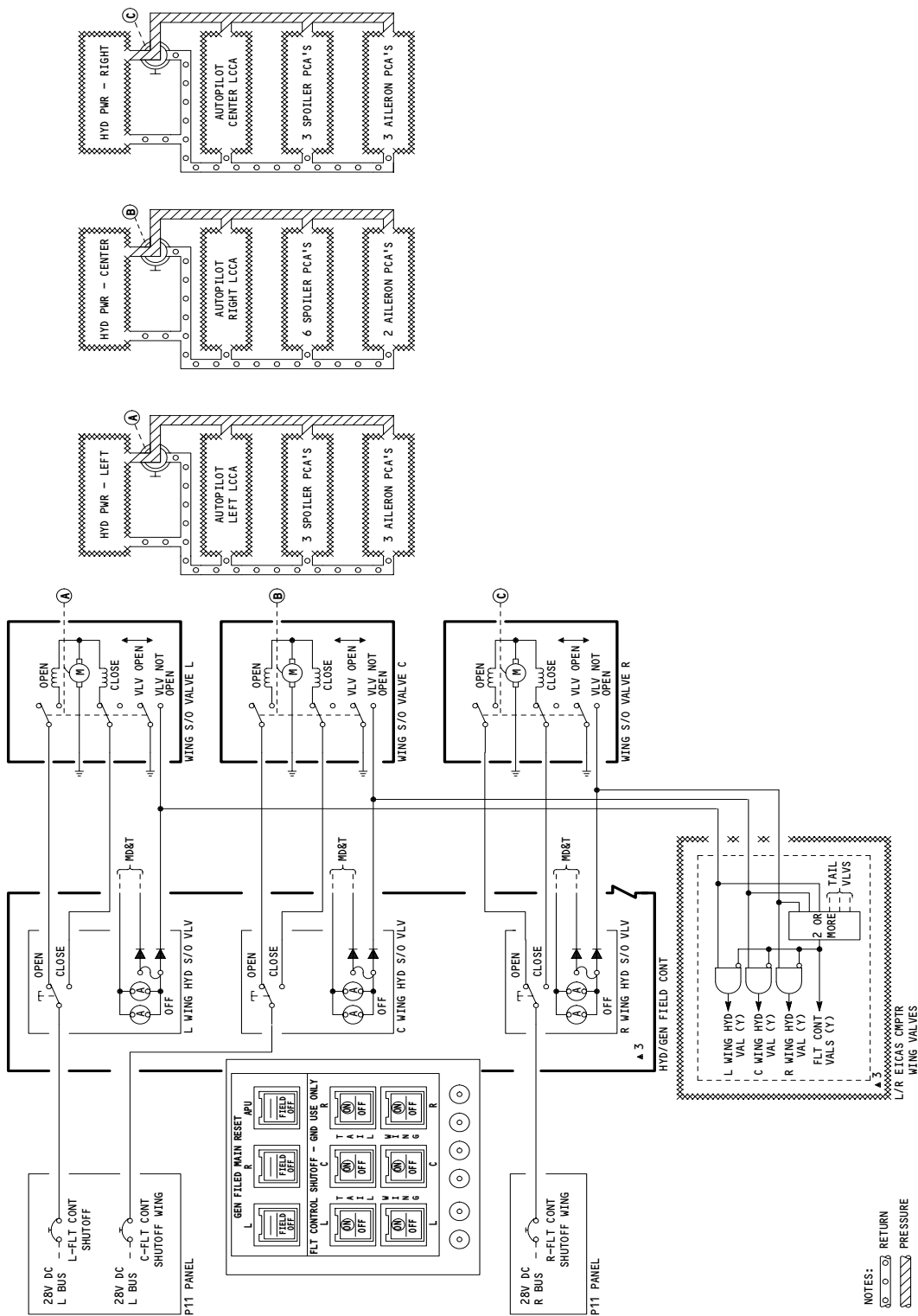
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Shutoff Valve System Schematic  
Figure 2

NOTES:  
 RETURN  
 PRESSURE

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FAULT ISOLATION/MAINT MANUAL

AILERON AND SPOILER HYDRAULIC SHUTOFF VALVES

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKER -	1		FLT COMPT, P11	
FLT CONT SHUTOFF WING C, C1016		1	11H16	*
FLT CONT SHUTOFF WING L, C1014		1	11H15	*
FLT CONT SHUTOFF WING R, C1015		1	11H26	*
PANEL - (FIM 24-22-00/101)				
GEN FIELD & HYD CONT, M1087				
SWITCH - C FLT CONT SHUTOFF WING, YDWS3	1	1	FLT COMPT, P61, GEN FIELD & HYD CONT PNL, M1087	*
SWITCH - L FLT CONT SHUTOFF WING, YDWS5	1	1	FLT COMPT, P61, GEN FIELD & HYD CONT PNL, M1087	*
SWITCH - R FLT CONT SHUTOFF WING, YDWS1	1	1	FLT COMPT, P61, GEN FIELD & HYD CONT PNL, M1087	*
VALVE - C LATERAL CONTROL SHUTOFF, V99	2	1	LEFT MAIN GEAR WHEEL WELL,	27-13-04
VALVE - L LATERAL CONTROL SHUTOFF, V100	2	1	522HB, LEFT WING	27-13-04
VALVE - R LATERAL CONTROL SHUTOFF, V98	2	1	652HB, RIGHT WING	27-13-04

\* SEE THE WDM EQUIPMENT LIST

Aileron and Spoiler Hydraulic Shutoff Valves - Component Index  
Figure 101

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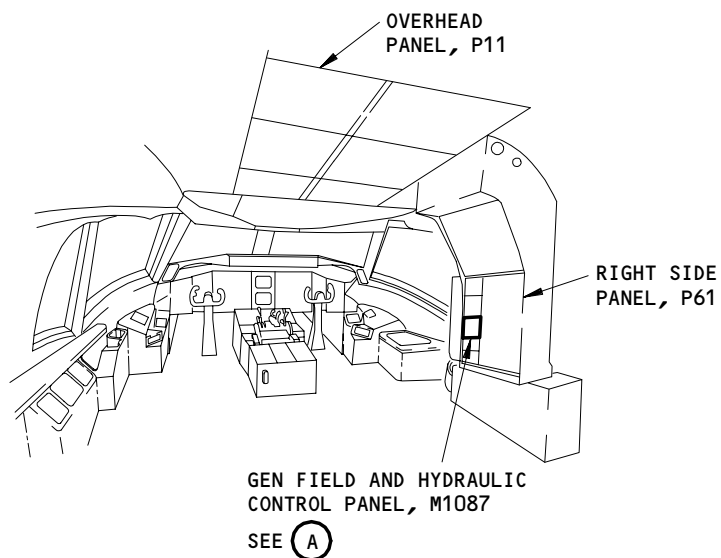
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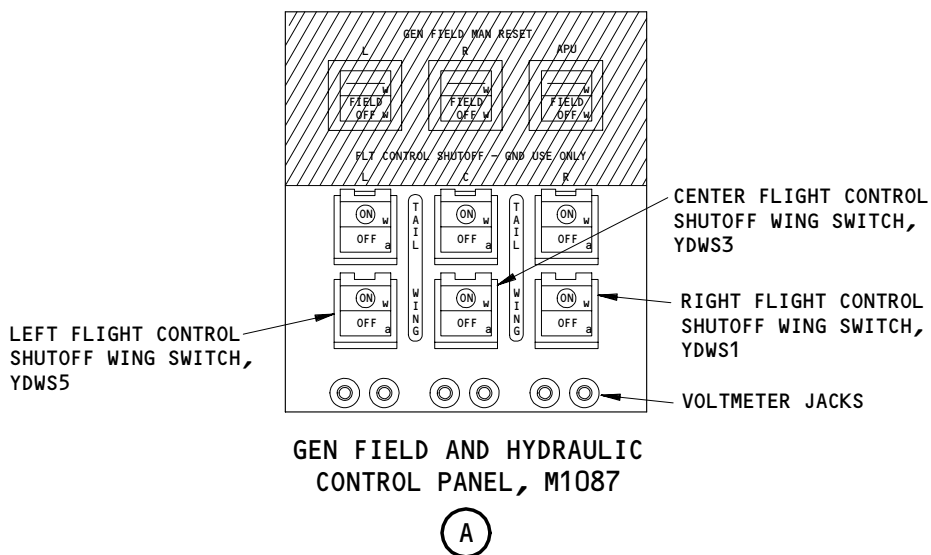
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E72334

**BOEING**  
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FAULT ISOLATION/MAINT MANUAL



FLIGHT COMPARTMENT

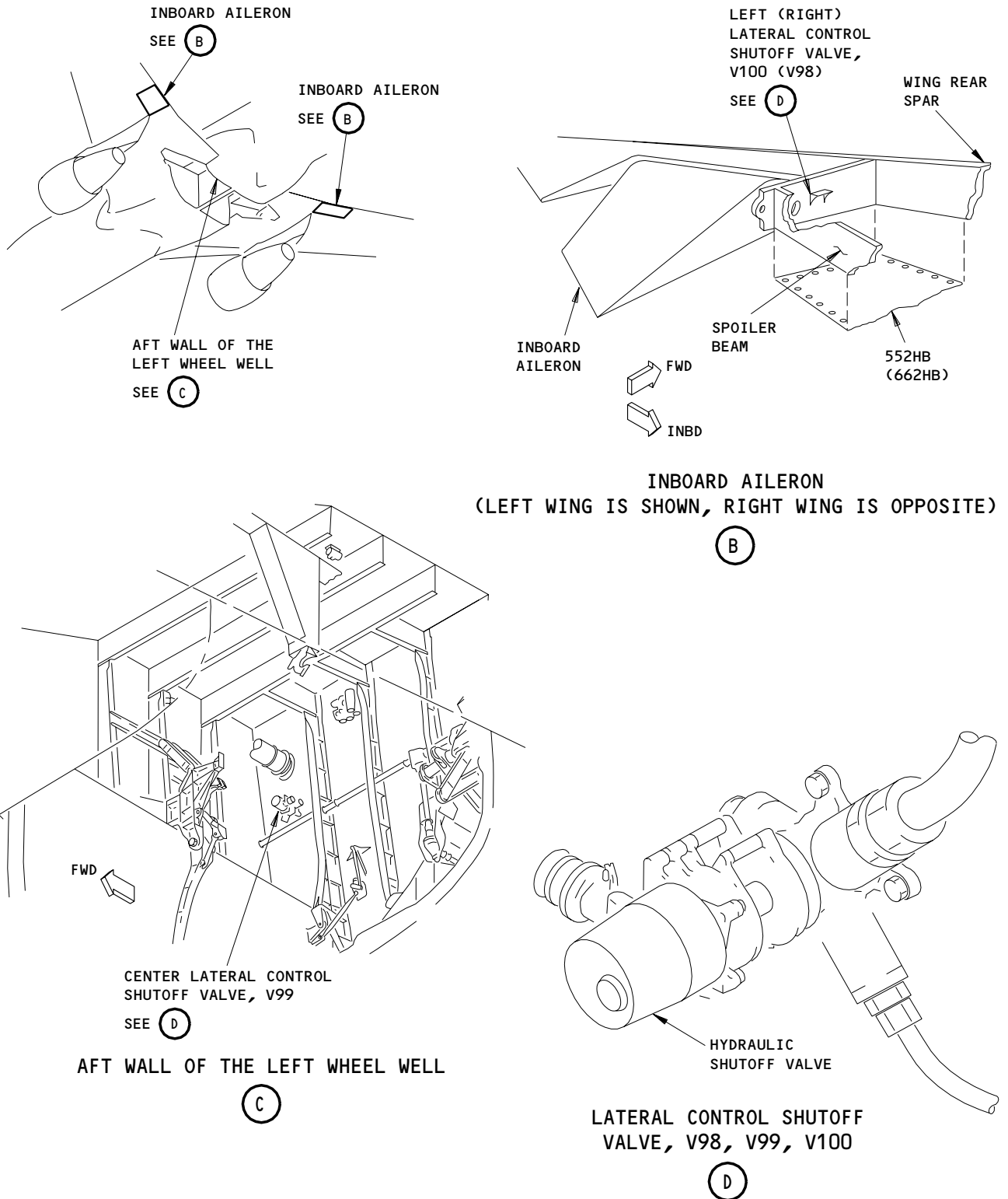


Aileron and Spoiler Hydraulic Shutoff Valves - Component Location  
Figure 102 (Sheet 1)

EFFECTIVITY	ALL
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Aileron and Spoiler Hydraulic Shutoff Valve - Component Location  
Figure 102 (Sheet 2)

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AILERON AND SPOILER HYDRAULIC SHUTOFF VALVES – INSPECTION/CHECK

1. General

- A. This procedure contains one task. The task does a check of the hydraulic shutoff valves and the applicable indicator displays.

TASK 27-13-00-216-001

2. Aileron and Spoiler Shutoff Valve – Check

A. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones
  - 552/652 MLG Support Beam to Trailing Edge
  - 730 Left Hand Main Landing Gear and Doors
- (2) Access Panels
  - 552/652HB Wing TE Structure

C. Prepare for the Check

S 866-009

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

S 216-008

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 496-002

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

**NOTE:** The shutoff valve for the center hydraulic system is located on the aft bulkhead in the left wheel well.

S 016-010

- (4) Open these access panels (AMM 06-44-00/201):
  - (a) 552HB for the shutoff valve for the left hydraulic system.

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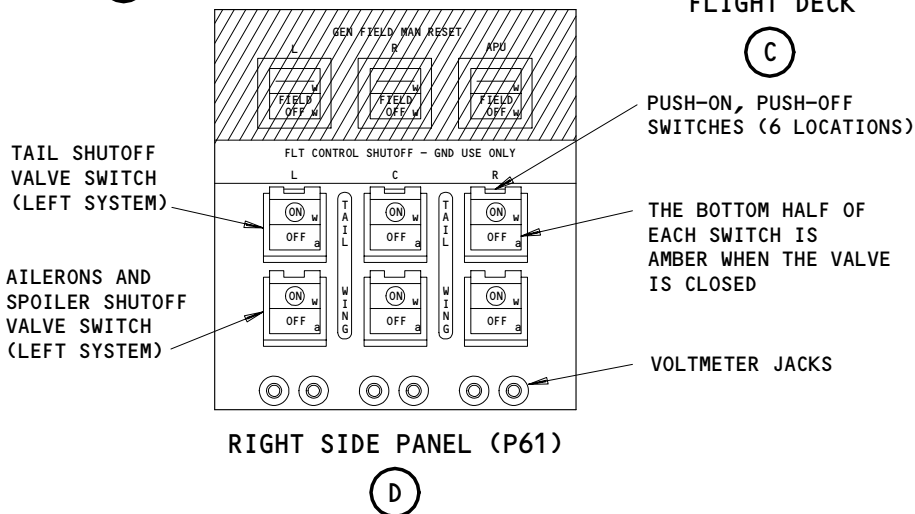
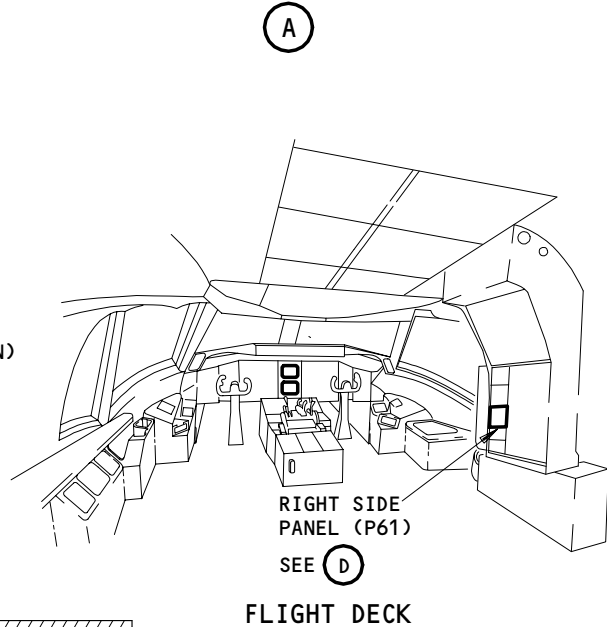
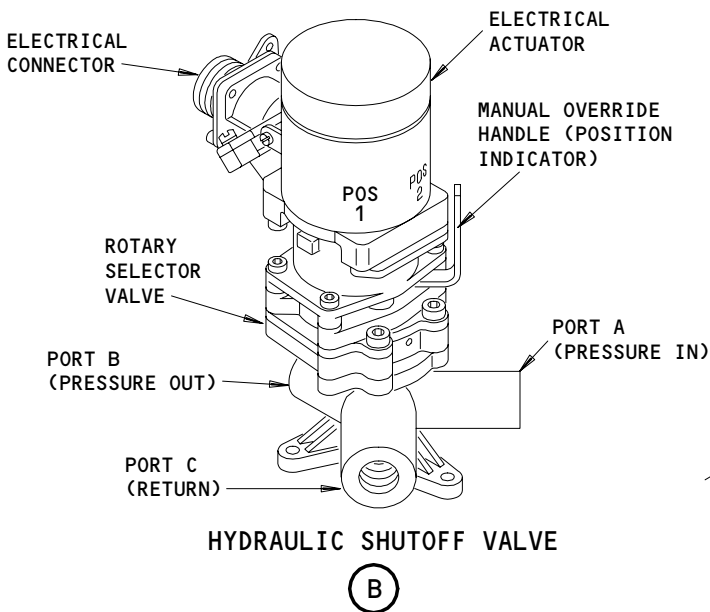
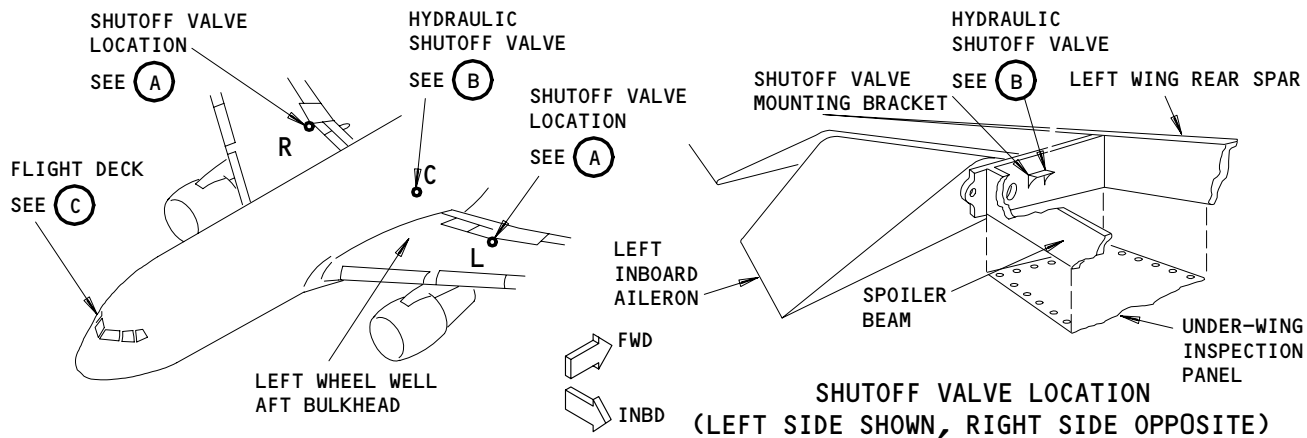
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# BOEING

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Aileron and Spoiler Hydraulic Shutoff Check  
Figure 601

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(b) 652HB for the shutoff valve for the right hydraulic system.

S 866-003

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(5) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

D. Aileron and Spoiler Shutoff Valve Check

S 216-012

- (1) Make sure these circuit breakers on the P11 panel are closed:
- (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 866-014

- (2) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to ON. Make sure the amber switch position legend lights are OFF.

S 216-013

- (3) Turn the control wheel clockwise and then counterclockwise full travel. Do the check that follows:
- (a) Make sure the ailerons move through their full travel range.

**NOTE:** The spoilers will also move when the control wheel is operated.

S 216-015

- (4) Move the FLT CONTROL SHUTOFF WING L switch on the P61 panel to OFF. Do the checks that follow:
- (a) Make sure the valve motor operates smoothly and that the motor hum stops when it has moved to its full travel position.
  - (b) Make sure the manual override (position indicator) handle on the base of the motor is in the closed position (POS 2).
  - (c) Make sure the amber switch position legend light is ON.
  - (d) Make sure the L WING HYD VAL message comes into view on the EICAS display.

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S 216-016

- (5) Do the above step again for the FLT CONTROL SHUTOFF WING C and R switches.

**NOTE:** When more than one valve is closed, an amber FLT CONT VALS message will come into view on the display.

S 216-017

- (6) Turn the control wheel clockwise and then counterclockwise full travel. Do the check that follows:  
(a) Make sure the ailerons and spoilers do not move.

S 866-018

- (7) Remove the power from the center and right hydraulic systems only (AMM 29-11-00/201).

S 216-004

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (8) Move the FLT CONTROL SHUTOFF WING L switch on the P61 panel to ON. Do the checks that follow:  
(a) Make sure the valve motor operates smoothly and that the motor hum stops when the indicator handle moves to the open position (POS 1).  
(b) Make sure the amber switch position legend light is OFF.  
(c) Turn the control wheel clockwise and then counterclockwise full travel. Do the checks that follow:  
1) Make sure the left ailerons and the right outboard aileron operate correctly. Make sure the right inboard aileron does not move.  
2) Make sure that spoilers 1, 6, and 12 operate when the control wheel is moved. Make sure the other spoilers do not move.

**NOTE:** Spoiler panel 6 will only operate during the first cycle of the control wheel. This is because the SCM will be automatically set to OFF.

- (d) Move the control wheel to its neutral position.

S 866-019

- (9) Remove the power from the left hydraulic system (AMM 29-11-00/201).

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S 866-020

- (10) Supply pressure to the center hydraulic system only  
(AMM 29-11-00/201).

S 216-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (11) Move the FLT CONTROL SHUTOFF WING C switch on the P61 panel to ON. Do the checks that follow:
- (a) Make sure the valve motor operates smoothly and that the motor hum stops when the indicator handle moves to the open position (POS 1).
  - (b) Make sure the amber switch position legend light is OFF.
  - (c) Turn the control wheel clockwise and then counterclockwise full travel. Do the checks that follow:
    - 1) Make sure the inboard ailerons operate correctly when the control wheel is moved. Make sure the outboard ailerons do not move.
    - 2) Make sure that spoilers 3, 4, 5, 8, 9, and 10 operate when the control wheel is moved. Make sure the other spoilers do not move.

S 866-021

- (12) Remove the power from the center hydraulic system  
(AMM 29-11-00/201).

S 866-022

- (13) Supply pressure to the right hydraulic system only  
(AMM 29-11-00/201).

S 216-006

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (14) Move the FLT CONTROL SHUTOFF WING R switch on the P61 panel to ON. Do the checks that follow:
- (a) Make sure the valve motor operates smoothly and that the motor hum stops when the indicator handle moves to the open position (POS 1).
  - (b) Make sure the amber switch position legend light is OFF.

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- (c) Turn the control wheel clockwise and then counterclockwise full travel. Do the checks that follow:
- 1) Make sure the right ailerons and the left outboard aileron operates correctly when the control wheel is moved. Make sure that the left inboard aileron does not move.
  - 2) Make sure that spoilers 2, 7, and 11 operate when the control wheel is moved. Make sure that the other spoilers do not move.

**NOTE:** Spoiler panel 7 will only operate during the first cycle of the control wheel. This is because the SCM will be automatically set to OFF.

- 3) Make sure that the FLT CONT VALS message can not be seen on the EICAS display.

S 866-025

- (15) Remove the power from the right hydraulic system (AMM 29-11-00/201).  
E. Put the Airplane Back to Its Usual Condition

S 096-007

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the main landing gear and close the doors (AMM 32-00-15/201).

S 866-023

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 416-024

- (3) Close access panels 552HB and 652HB (AMM 06-44-00/201).

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LATERAL CONTROL SHUTOFF VALVE - REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is used to remove one of the three lateral control shutoff valves. The second task supplies the data that is necessary to install a lateral control shutoff valve.

TASK 27-13-04-024-001

2. Shutoff Valve - Removal

A. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) 32-00-15/201, Landing Gear Door Locks
- (5) 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zones
  - 552/652 MLG Support Beam to Trailing Edge
  - 730 Left Hand Main Landing Gear and Doors
- (2) Access Panels
  - 552/652HB Wing TE Structure

C. Prepare for Removal

S 864-009

- (1) Supply electrical power (Ref 24-22-00).

S 494-002

- (2) Do these steps if you will remove the center shutoff valve:

NOTE: The center shutoff valve is located on the aft bulkhead in the left wheel well.

- (a) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

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**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Open the doors for the main landing gear and install the door locks (Ref 32-00-15).

S 014-003

- (3) Do this step if you will remove the left or right shutoff valve:  
(a) Open access panel 552HB (left) or 652HB (right)  
(AMM 06-44-00/201) .

S 864-010

- (4) Move the FLT CONTROL SHUTOFF WING switches L, C, and R on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the amber switch position legend lights come ON.

S 864-011

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11H15, FLT CONT SHUTOFF WING L  
(b) 11H16, FLT CONT SHUTOFF WING CTR  
(c) 11H26, FLT CONT SHUTOFF WING R

S 864-012

- (6) Remove the pressure from the applicable hydraulic system (Ref 29-11-00):  
(a) The left system for the left shutoff valve.  
(b) The center system for the center shutoff valve.  
(c) The right system for the right shutoff valve.

D. Remove the Shutoff Valve (Fig. 401)

S 034-013

- (1) Disconnect the electrical connector (1).

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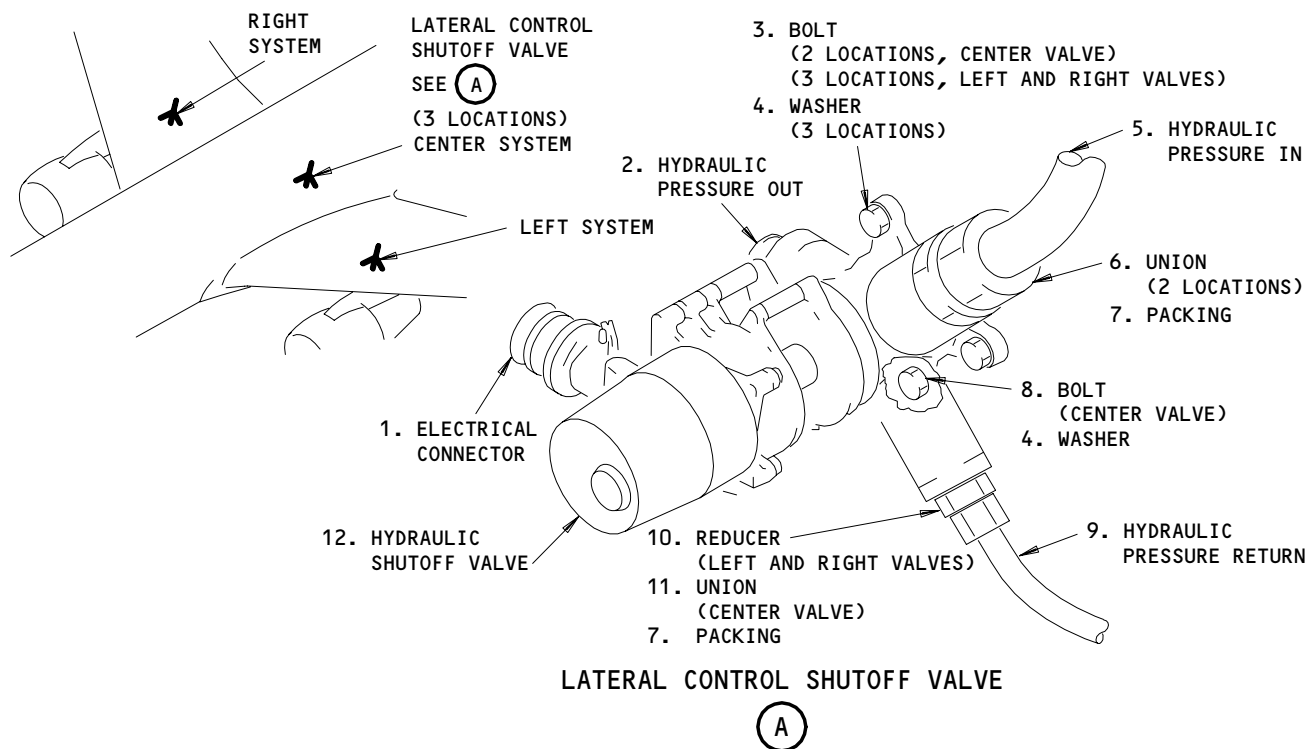
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- S 034-014
- (2) Disconnect and seal the hydraulic lines (2, 5, 9) with a cap. Seal the valve ports with a cap.
- S 034-015
- (3) Remove the bolts (3, 8) and washers (4) that connect the valve (12) to its bracket (3 locations).
- S 024-016
- (4) Remove the shutoff valve.



Lateral Control Shutoff Valve Installation  
Figure 401

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TASK 27-13-04-424-017

3. Shutoff Valve - Installation

A. Consumable Materials

- (1) C00064 Coating, MIL-C-5541, Type II, Grade C, Class 1
- (2) C00259 Primer, BMS 10-11

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	7	Packing Hydraulic Shutoff Valve	27-13-01	01	40,95
	12				42,45, 73,75, 77,100, 105

C. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 29-11-00/201, Main (Left, Right, and Center ) Hydraulic Systems
- (4) 32-00-15/201, Landing Gear Door Locks

D. Access

- (1) Location Zones
  - 552/652 MLG Support Beam to Trailing Edge
  - 730 Left Hand Main Landing Gear and Doors
- (2) Access Panels
  - 552/652HB Wing TE Structure

E. Install the Shutoff Valve (Fig. 401)

S 144-004

- (1) Clean the mating surfaces of the bracket and the shutoff valve (12) and do this step:
  - (a) Apply the coating to the surfaces.

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- S 824-005
- (2) Move the manual override lever on the valve to position 2.
- S 434-018
- (3) Align the valve (12) with its bracket and do these steps to attach it:
- (a) Install the bolt (8) and washer (4) on the center valve only.
  - (b) Install the bolt (3) and washer (4).
- S 374-019
- (4) Apply primer to the cleaned surfaces that show.
- S 434-020
- (5) Install the packing (7), the tube unions (6, 11), and the reducer (10).
- S 434-021
- (6) Connect the hydraulic lines (2, 5, 9).
- S 434-022
- (7) Connect the electrical connector (1).
- F. Test the Shutoff Valve
- S 824-023
- (1) Push the STATUS button on the display select panel to show the aileron position indicator on the display.
- S 864-006
- WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.
- (2) Supply power to the applicable hydraulic system (Ref 29-11-00):
- (a) The left system for the left shutoff valve.
  - (b) The center system for the center shutoff valve.
  - (c) The right system for the right shutoff valve.
- S 864-024
- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H15, FLT CONT SHUTOFF WING L

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- (b) 11H16, FLT CONT SHUTOFF WING CTR
- (c) 11H26, FLT CONT SHUTOFF WING R

S 214-025

- (4) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF WING switch L, C, or R (for the valve you will test) on the right side panel, P61, to ON. Do the checks that follow:
  - (a) Make sure the amber light in the switch is OFF.
  - (b) Make sure the valve position indicator (override handle) is in position 1 and that the motor hum has stopped.
  - (c) Operate the control wheels until the ailerons and spoilers that are powered move smoothly through their full travel.

S 214-026

- (5) Move the FLT CONTROL SHUTOFF WING switch L, C, or R on the P61 panel to OFF. Do the checks that follow:
  - (a) Make sure the amber light in the switch is ON.
  - (b) Make sure one of these messages comes into view on the EICAS display:
    - 1) L WING HYD VAL
    - 2) C WING HYD VAL
    - 3) R WING HYD VAL

NOTE: If two or more switches are in the OFF position, the EICAS caution and warning message will be FLT CONT VALS.

- (c) Make sure the valve position indicator (override handle) is in position 2 and that the motor hum has stopped.
  - (d) Operate the control wheels and make sure the ailerons and the spoilers do not move.
  - (e) Do a check on the valve hydraulic connections for leaks.
- G. Put the Airplane Back to Its Usual Condition

S 864-027

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers breakers on the P11 panel:
  - (a) 11H15, FLT CONT SHUTOFF WING L
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING R

S 864-032

- (2) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING switches L, C, and R on the P61 panel to ON.

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S 094-008

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Remove the door locks from the main landing gear doors and close the doors (Ref 32-00-15).

S 864-028

(4) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-029

(5) Remove electrical power if it is not necessary (Ref 24-22-00).

S 414-030

(6) Close access panel 552HB or 652HB (Ref 06-44-00).

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AILERON POSITION INDICATING SYSTEM – DESCRIPTION AND OPERATION

1. General
  - A. The aileron position indicating system provides visual indication on the flight deck of aileron angular displacement.
2. Component Details (Fig. 1)
  - A. Flight Control Surface Position Indicator
    - (1) The flight control surface position indicator is displayed on the display unit status page. The indicator shows the position of the ailerons, rudder, and elevators.
  - B. Aileron Position Transmitter
    - (1) The position transmitters are accessible through panels on the wing lower surface. Adjustable control rods attach the transmitters to the ailerons. The transmitter is adjusted to electrical zero when the aileron is in its neutral position.
3. Operation
  - A. Functional Description (Fig. 2)
    - (1) When the aileron deflects, it drives the control rod which produces an electrical signal in the transmitter. The voltage is proportional to the amount of aileron movement. The display unit receives the signal and shows aileron position. Four pointers indicate each aileron position separately.
  - B. Control
    - (1) Aileron position indicating is automatic when power is on. The 28 volts ac left and right bus powers the aileron position indicating system when the AILERON POS circuit breakers L and R on overhead circuit breaker panel P11 are closed.
    - (2) The aileron position indicator can be displayed when the related system circuit breakers on P11 are closed.

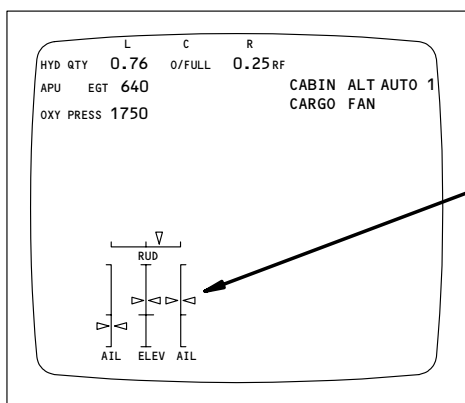
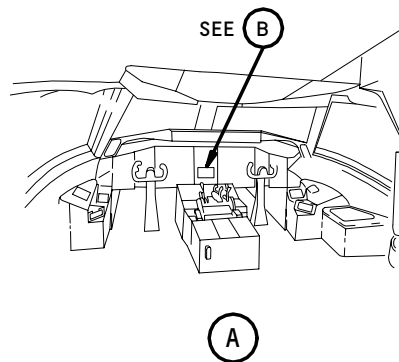
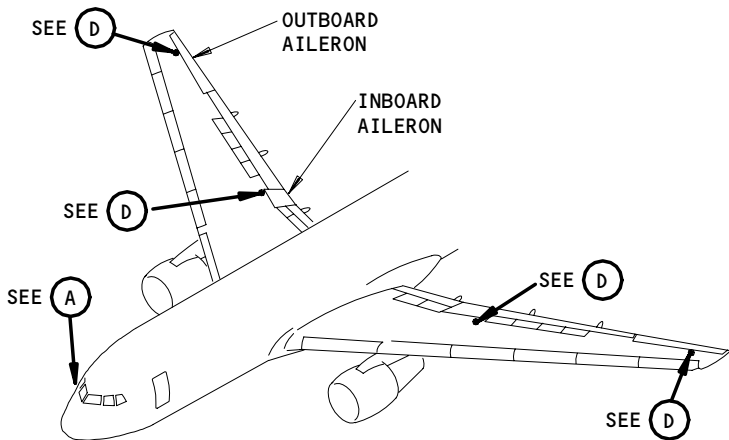
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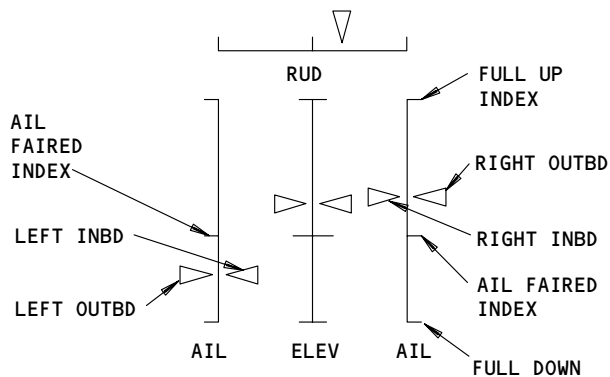
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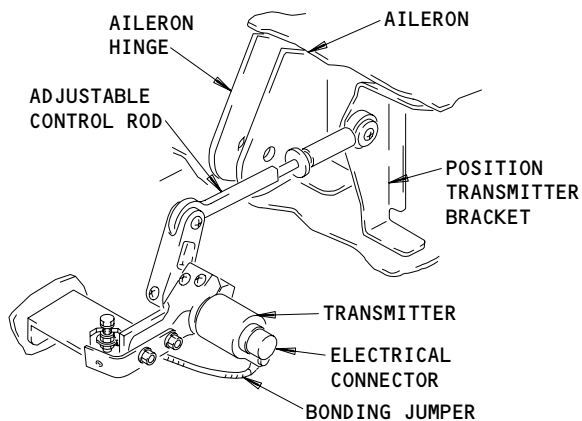
LOWER EICAS DISPLAY (P2)

(B)



CONTROL SURFACE POSITION INDICATOR (RIGHT TURN SHOWN)

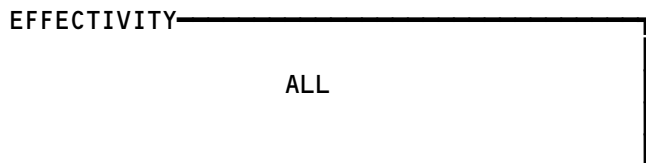
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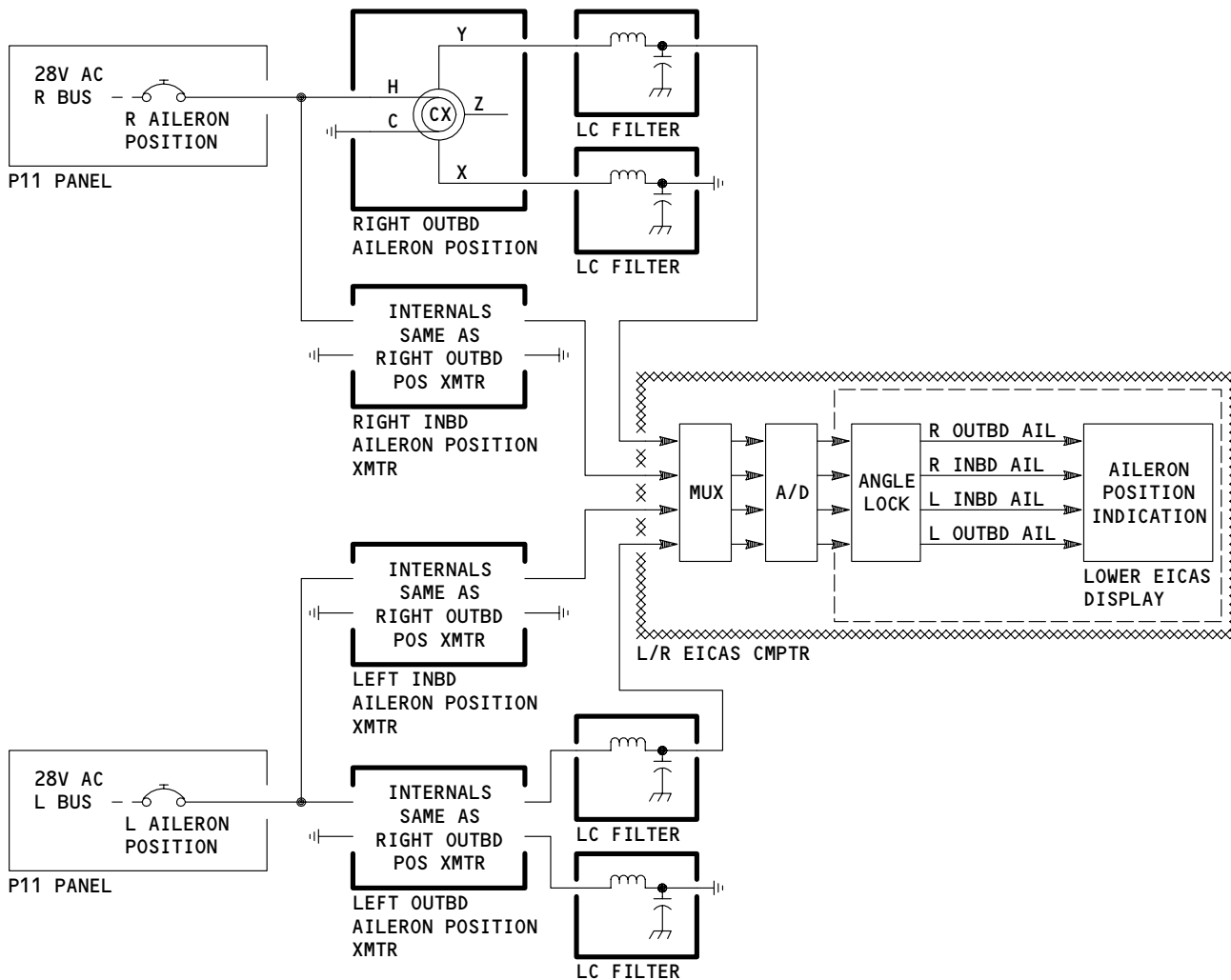
AILERON POSITION TRANSMITTER

(D)

Aileron Position Indicating System  
Figure 1



27-18-00



Aileron Position Indications Schematic  
Figure 2

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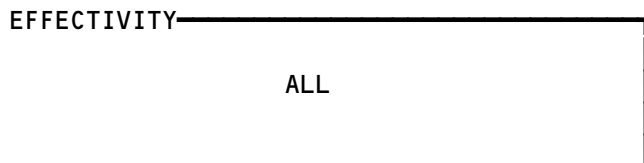
767  
 FAULT ISOLATION/MAINT MANUAL

AILERON POSITION INDICATING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKER - AILERON POS L C4099 AILERON POS R C4100	1		FLT COMPT, P11 11K14 11K23	* *
TRANSMITTER - L INBD AILERON POSITION, M470	2	1	561CB, LEFT WING	27-18-10
TRANSMITTER - L OUTBD AILERON POSITON, M471	2	1	561QB, LEFT WING	27-18-10
TRANSMITTER - R INBD AIRLERON POSITION, M486	2	1	661CB, RIGHT WING	27-18-10
TRANSMITTER - R OUTBD AILERON POSITION, M487	2	1	661QB, RIGHT WING	27-18-10

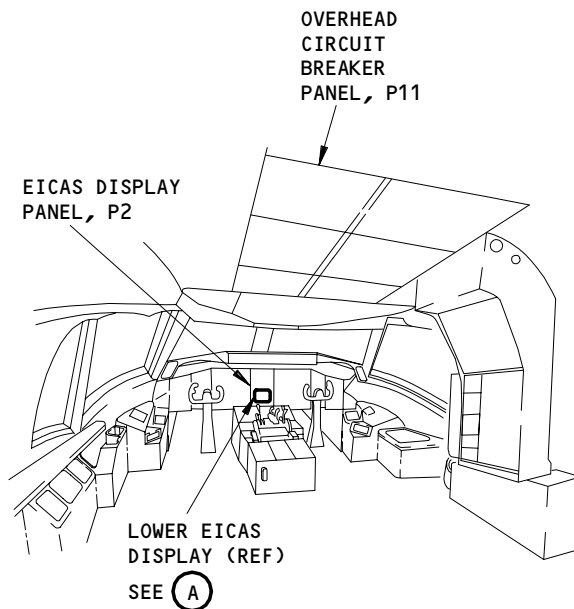
\* SEE THE WDM EQUIPMENT LIST

Aileron Position Indicating System - Component Index  
 Figure 101

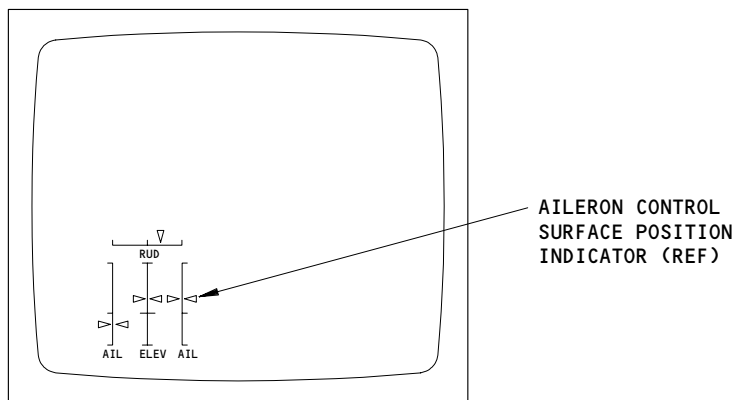


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FLIGHT COMPARTMENT



LOWER EICAS DISPLAY (REF)

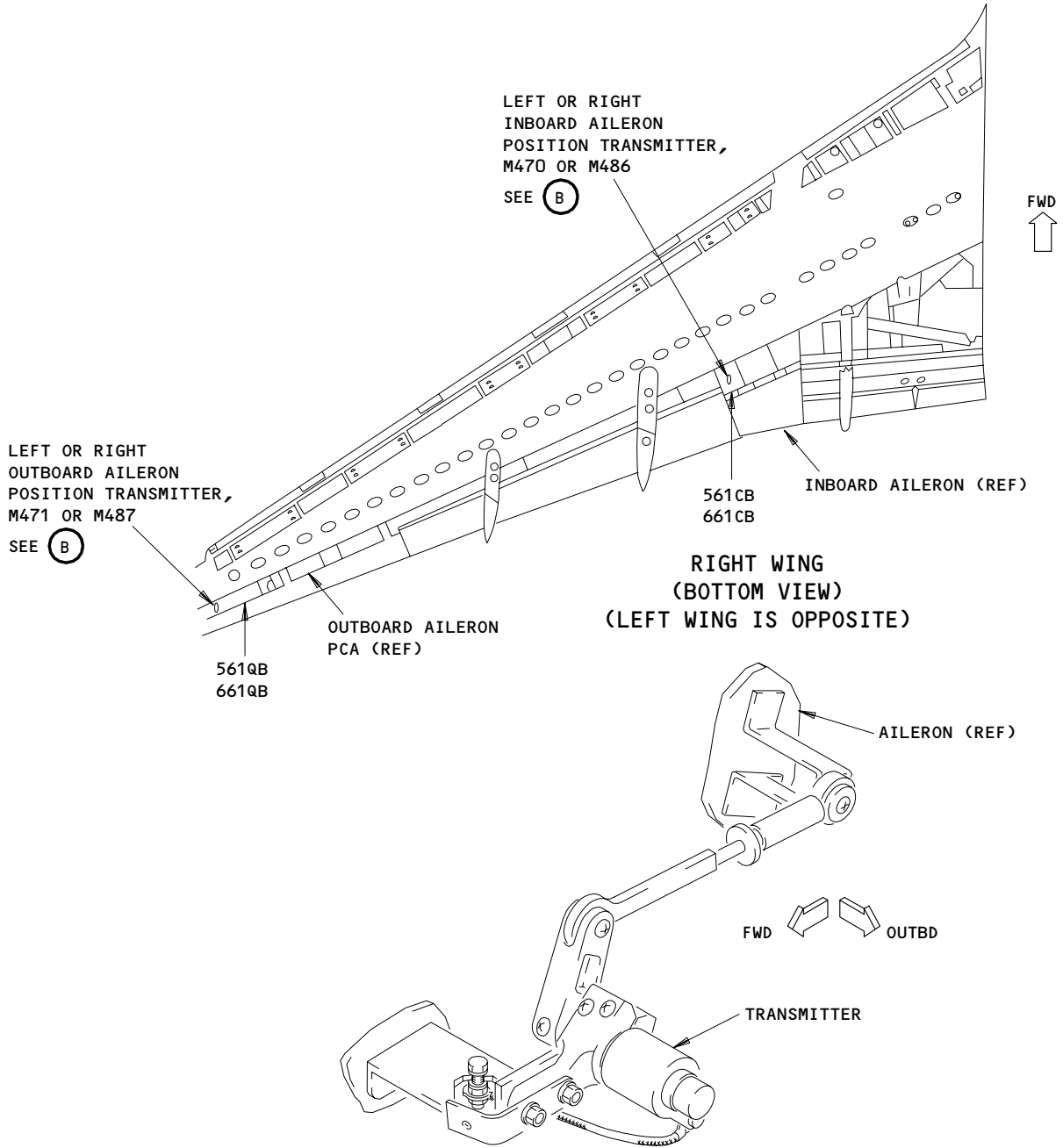
(A)

Aileron Position Indicating System - Component Location  
 Figure 102 (Sheet 1)

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LEFT OR RIGHT OUTBOARD AILERON POSITION TRANSMITTER, M471 OR M487 AND  
LEFT OR RIGHT INBOARD AILERON POSITION TRANSMITTER, M470 OR M486

(B)

**NOTE:** 500 SERIES NUMBERS ARE FOR  
THE LEFT WING ACCESS PANELS.  
600 SERIES NUMBERS ARE FOR  
THE RIGHT WING ACCESS PANELS.

Aileron Position Indicating System - Component Location  
Figure 102 (Sheet 2)

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AILERON POSITION INDICATING SYSTEM – ADJUSTMENT/TEST

1. General

A. This procedure contains these tasks:

- Aileron Position Indication – Operational Test
- Aileron Position Indication – Adjustment

These tasks are applicable to all of the four aileron position transmitters.

TASK 27-18-00-715-003

2. Aileron Position Indication – Operational Test

A. References

- (1) 24-22-00/201, Electrical Power – Control
- (2) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Prepare for the Test

S 865-004

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

S 865-002

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-039

- (3) Operate the aileron trim switches on the aft electronic control panel, P8, until this condition is satisfactory:
  - (a) The aileron trim indicators show zero units of trim.

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D. Aileron Position Indication - Operational Test

S 215-007

- (1) Push the STATUS button on the display select panel to show the aileron position indicator on the display.
  - (a) Make sure the aileron position pointers align with the mid-scale mark.

NOTE: Use a tolerance of  $\pm$  one-half an arrow width.

S 215-008

- (2) Push and hold the L AIR DATA test switch on the right side panel, P61, and do this step:

NOTE: The lockout actuators will extend when you operate the switch. The AIL LOCK light on the P5 panel will come on. Also, an AILERON LOCKOUT message will come into view on the display.

Do not operate the test switch when the pitot-static system has pressure. An incorrect fault condition can occur. To remove the fault, operate the test switch with the pitot-static system at ambient pressure.

- (a) Make sure the aileron position pointers align with the mid-scale mark.

NOTE: Use a tolerance of  $\pm$  one-half an arrow width.

S 215-009

- (3) After you release the test switch, stop for one minute and do this check:
  - (a) Make sure the aileron position pointers align with the mid-scale mark.

NOTE: Use a tolerance of  $\pm$  one-half an arrow width.

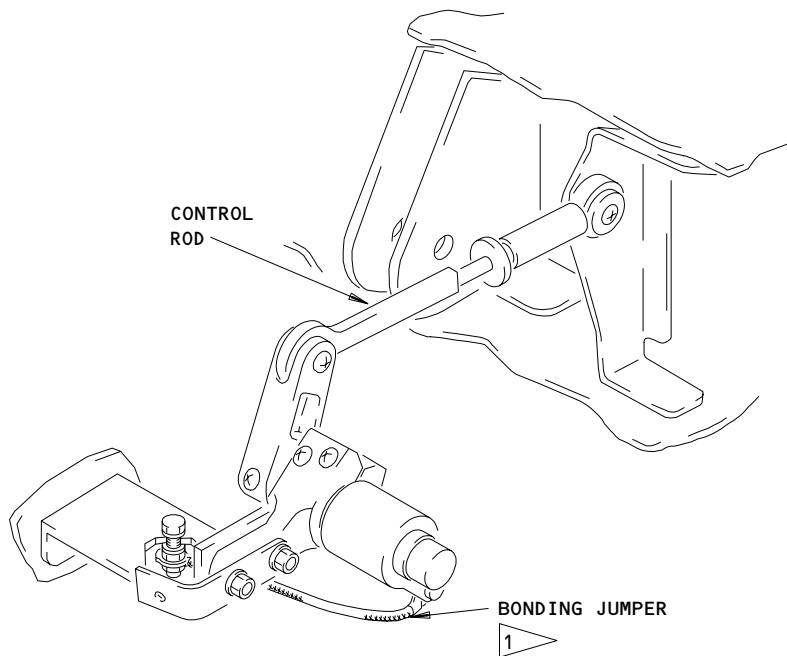
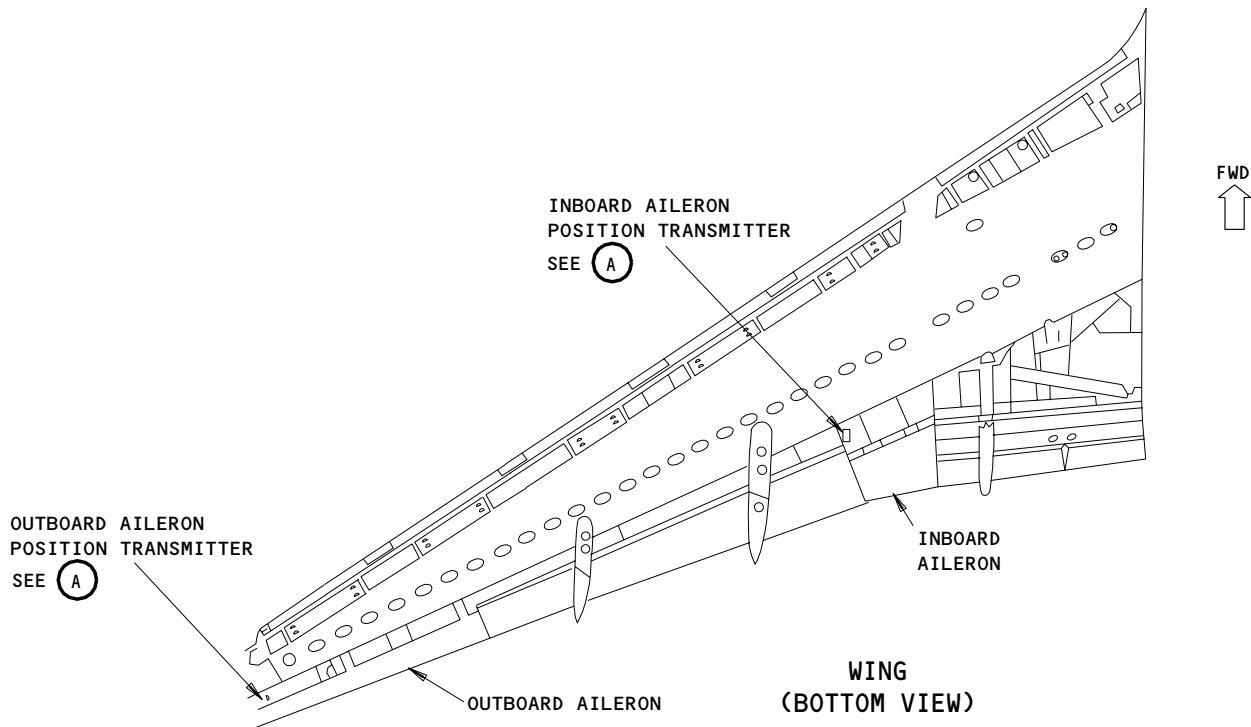
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AILERON POSITION TRANSMITTER

1 AIRPLANES WITH A BONDING JUMPER

(A)

Aileron Position Transmitter  
Figure 501

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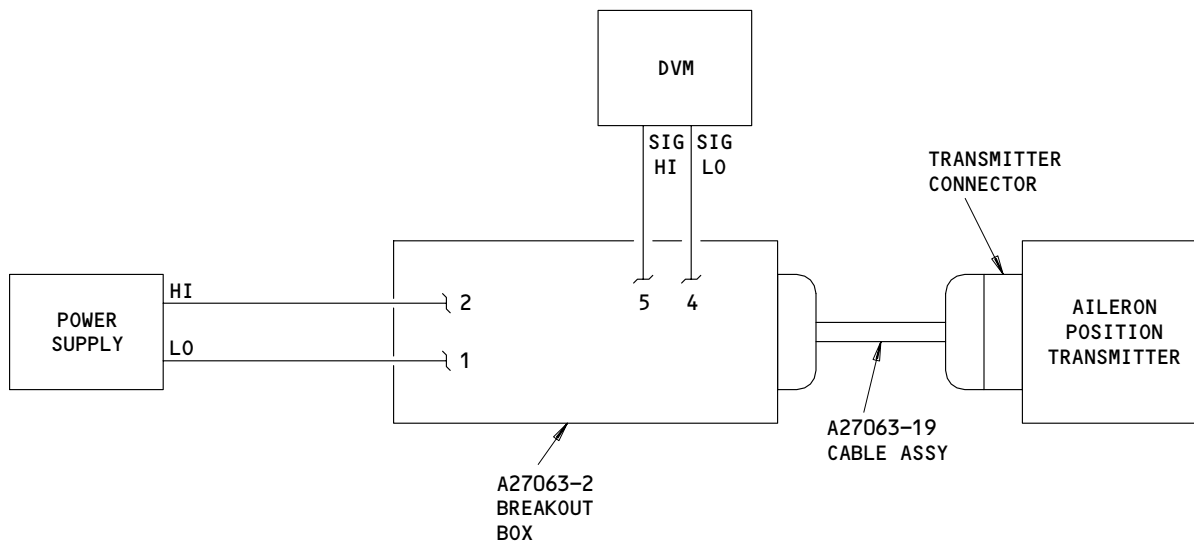
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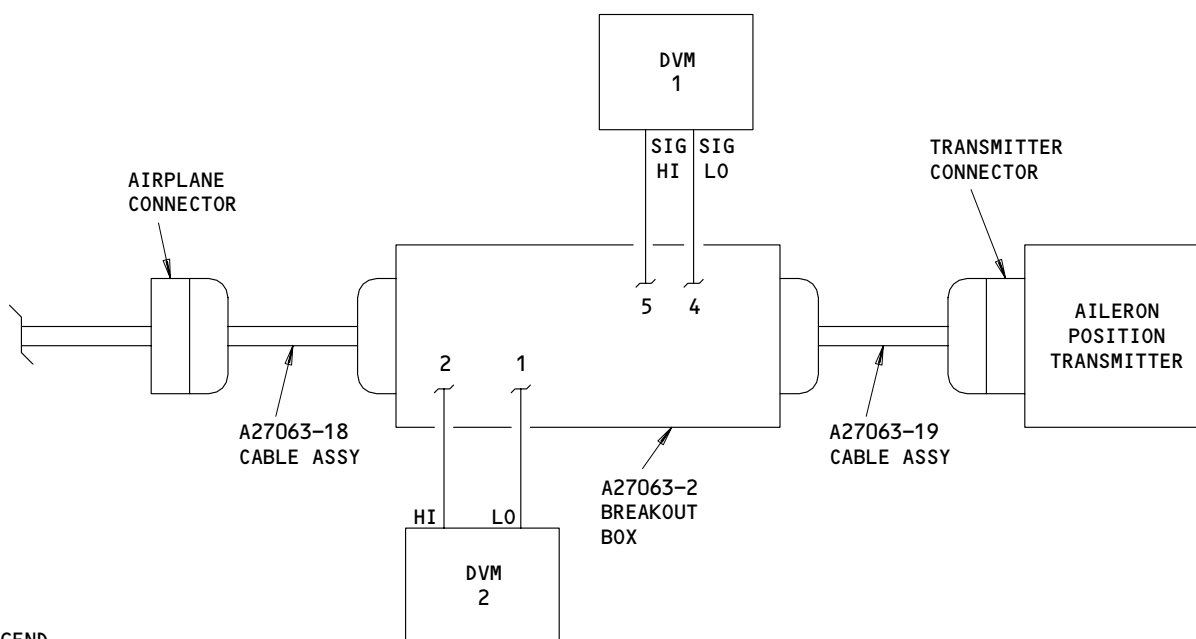
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# BOEING

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**PROCEDURE 1**



**PROCEDURE 2**

**LEGEND**

DVM - DIGITAL VOLTMETER

**NOTE:** IF ONLY ONE DVM IS USED, MONITOR THE AIRPLANE POWER AS SHOWN (DVM 2). THEN CONNECT IT TO THE BREAKOUT BOX AS SHOWN (DVM 1) TO DO THE ADJUSTMENT.

**Aileron Position Indicating System Adjustment  
Figure 502 (Sheet 1)**

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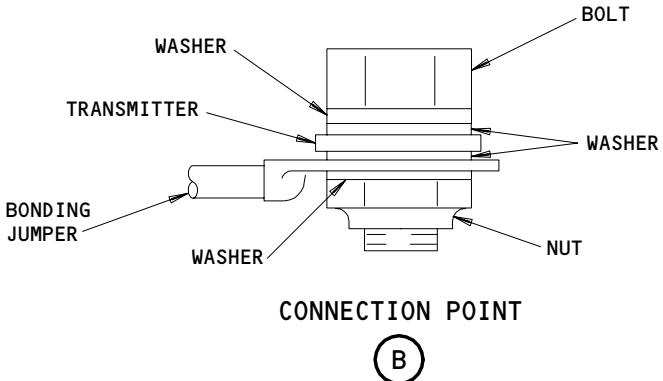
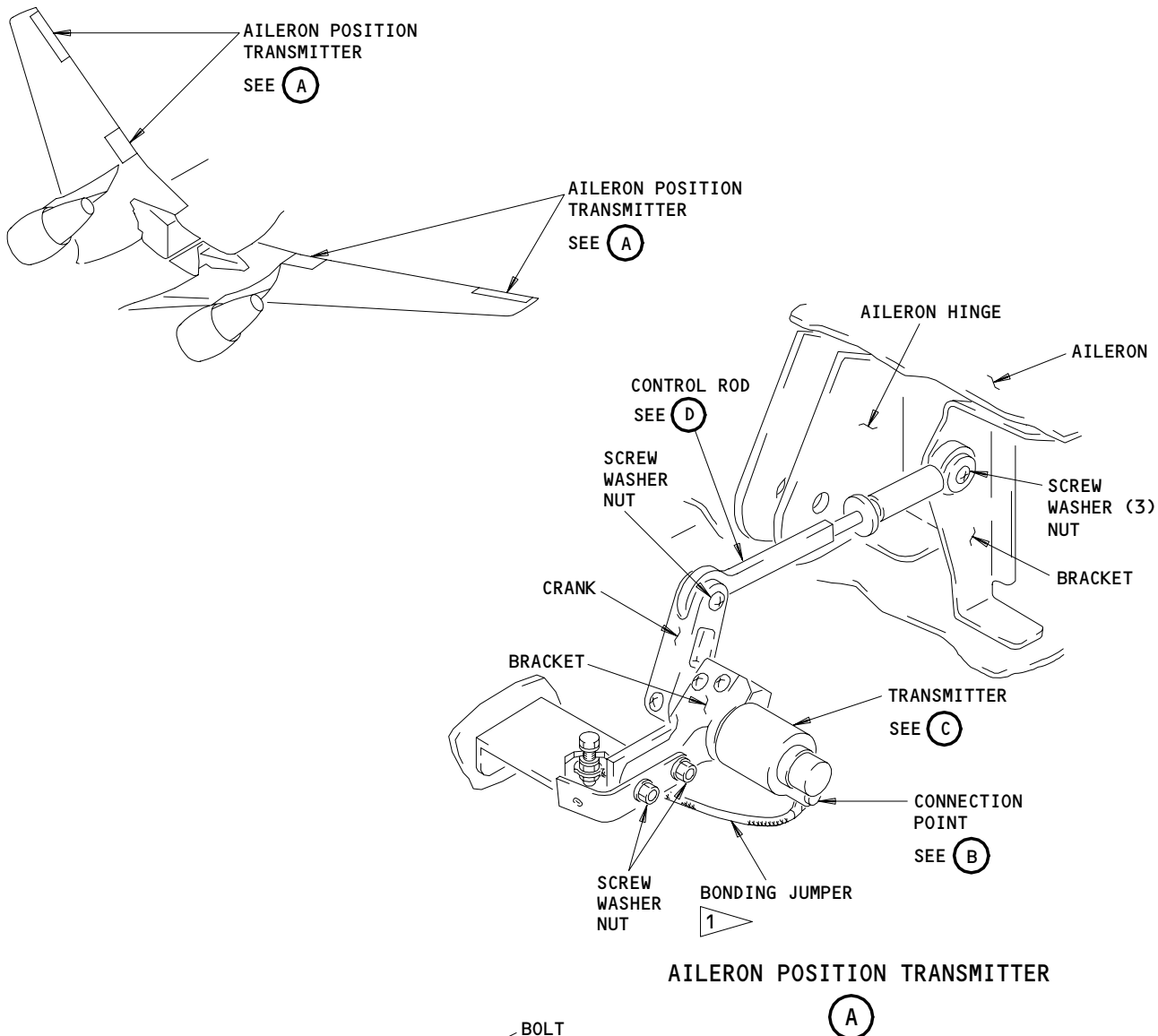
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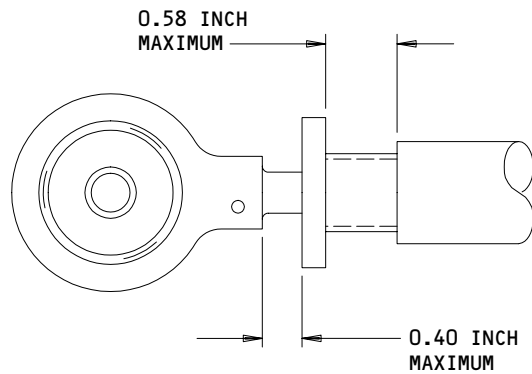
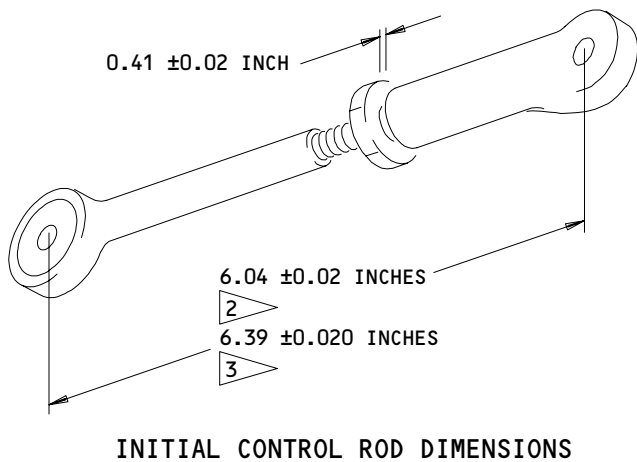
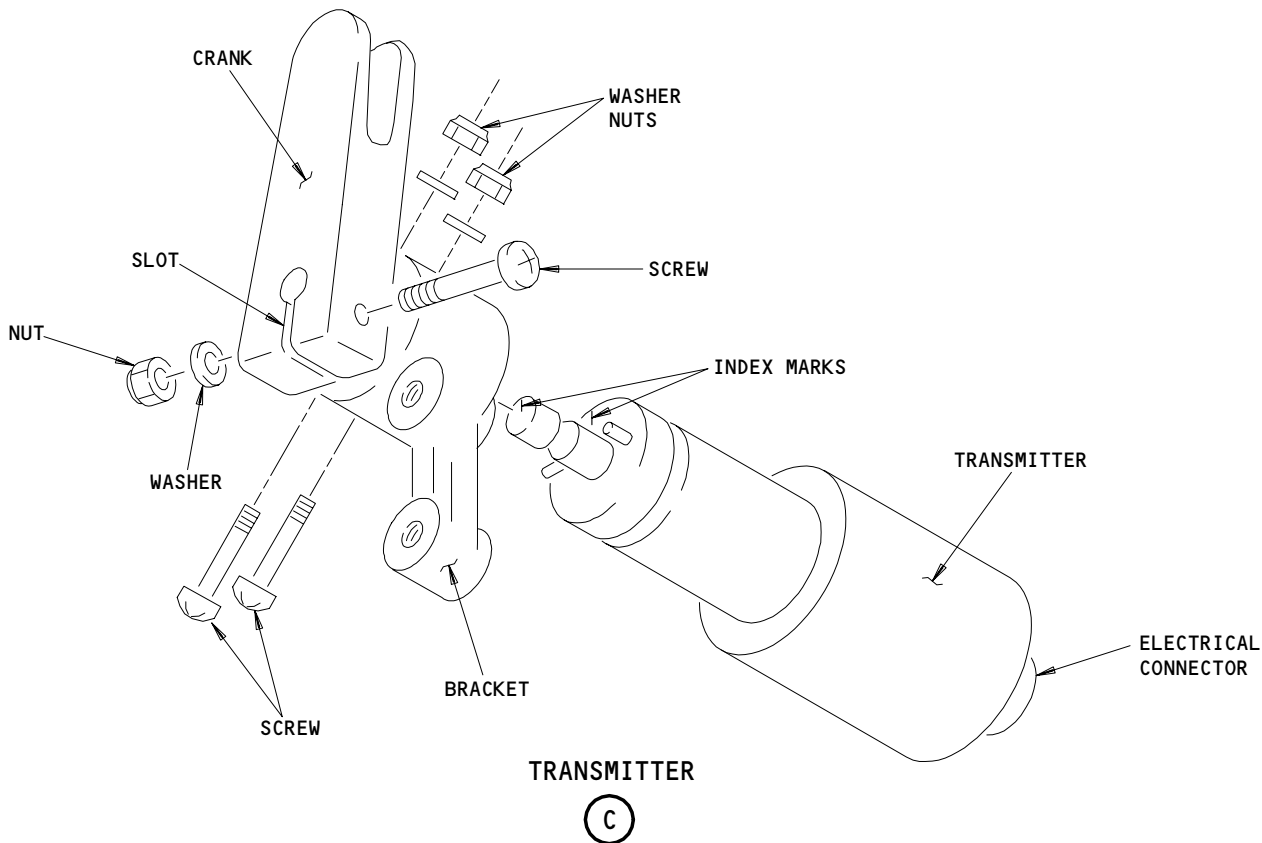
1 AIRPLANES WITH A BONDING JUMPER

Aileron Position Transmitter Installation  
Figure 502 (Sheet 2)

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CONTROL ROD

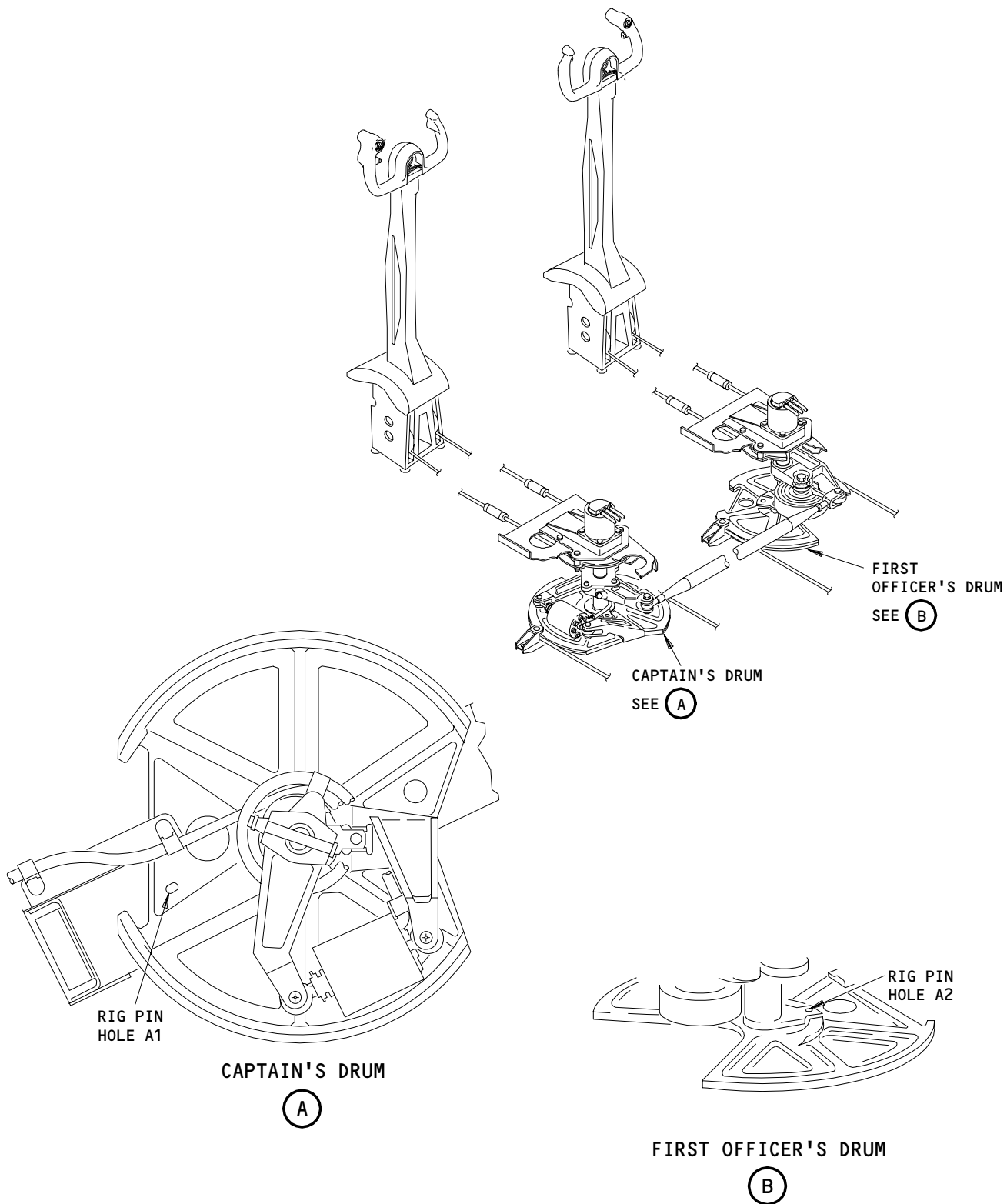
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- 2 INBOARD AILERON
- 3 OUTBOARD AILERON

Aileron Position Transmitter Installation  
Figure 502 (Sheet 3)

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Rig Pin Locations  
Figure 503

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S 215-010

- (4) Turn the control wheel fully clockwise and do these checks:  
(a) Make sure the position pointers for the left ailerons move down to the bottom mark on the scale.

NOTE: It is permitted for the arrows to go below the bottom mark.

- (b) Make sure the position pointers for the right ailerons move up to the top mark on the scale.

NOTE: It is permitted for the arrows to go above the top mark.

S 215-011

- (5) Turn the control wheels fully counterclockwise and do these checks:  
(a) Make sure the position pointers for the left ailerons move up to the top mark on the scale.

NOTE: It is permitted for the arrows to go above the top mark.

- (b) Make sure the position pointers for the right ailerons move down to the bottom mark on the scale.

NOTE: It is permitted for the arrows to go below the bottom mark.

S 865-012

- (6) Release the control wheel.

S 865-013

- (7) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:  
(a) 11K14, AILERON POS L  
(b) 11K23, AILERON POS R

S 215-014

- (8) Move the control wheel through its full travel range and do this check:  
(a) Make sure the aileron position pointers do not move.

E. Put the Airplane Back to Its Usual Condition

S 215-015

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:  
(a) 11K14, AILERON POS L  
(b) 11K23, AILERON POS R

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- S 865-016  
(2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

- S 865-017  
(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-18-00-825-018

3. Aileron Position Indication - Adjustment

A. General

- (1) There are three procedures to adjust the aileron position transmitters. (PROCEDURES 1 and 2 are recommended).

PROCEDURE 1 - Uses a commercially available power supply, a digital voltmeter (DVM), and the breakout box equipment.

PROCEDURE 2 - Uses airplane power and a DVM with the breakout box equipment.

PROCEDURE 3 - Adjusts the control rod and uses the position indicator and communication between the flight deck and the aileron.

B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)  
(2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)  
(3) A00247 Sealant, Chromate Type - BMS 5-95

C. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):  
(a) A1 - P/N A20004-15  
(b) A2 - P/N A20004-17  
(2) Breakout Box, Cables - A27063-91 (Preferred)  
Position Transmitter Tester - PTTS-892B (Alternate)  
Phase Synchronous Voltmeter - 101-AC5/6/7/8 (Alternate)  
(3) Power Supply - Powertron Model 5900  
Industrial Test Equipment Corp.  
Port Washington, New York  
(4) Digital Voltmeter - John Fluke 8020B or equivalent  
John Fluke Manufacturing Co.  
Everett, Washington

D. References

- (1) 06-44-00/201, Wing Access Doors and Panels  
(2) 20-10-24/201, Rig Pins  
(3) 24-22-00/201, Electrical Power - Control  
(4) 27-51-00/201, Trailing Edge Flap System  
(5) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

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E. Access

(1) Location Zones

211/212 Control Cabin  
561/661 Wing Rear Spar to Trailing Edge

(2) Access Panels

561/661CB Inboard Aileron Position Transmitter  
561/661QB Outboard Aileron Position Transmitter

F. Prepare for the Adjustment

S 865-098

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

S 045-019

- (2) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 015-020

- (3) Open these access panels (AMM 06-44-00/201):  
(a) 561CB (for the left inboard aileron)  
(b) 561QB (for the left outboard aileron)  
(c) 661CB (for the right inboard aileron)  
(d) 661QB (for the right outboard aileron)

S 865-021

- (4) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11K14, AILERON POS L  
(b) 11K23, AILERON POS R

S 865-023

- (5) Operate the aileron trim switches on the aft electronic control panel, P8, and do these steps:  
(a) Make sure the aileron trim indicator shows zero units of trim.  
(b) Attach DO-NOT-OPERATE tags to the aileron trim switches.

S 865-025

**WARNING:** ATTACH DO-NOT-OPERATE TAGS TO THE TWO CONTROL WHEELS. YOU WILL ADJUST THE POSITION TRANSMITTERS WITH HYDRAULIC POWER ON. ACCIDENTAL MOVEMENT OF THE CONTROL WHEELS WILL CAUSE AILERON MOVEMENT AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (6) Attach a DO-NOT-OPERATE tag to each of the two control wheels.

S 495-026

- (7) Install these rig pins:  
(a) A1 (for the captain's drum assembly)  
(b) A2 (for the first officer's drum assembly)

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S 865-001

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(8) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

G. Aileron Position Indication - Adjustment (PROCEDURE 1)

S 035-041

(1) Disconnect the electrical connector from the aileron position transmitter.

S 495-042

- (2) Do these steps to connect the breakout box equipment:
- (a) Connect the breakout box and the -19 cable assembly to the transmitter (Fig. 502).
  - (b) Connect a digital voltmeter (DVM) to the breakout box at pins 5 (SIG HI) and 4 (SIG LO).
  - (c) Connect the power supply to the breakout box at pins 1 (LO) and 2 (HI).
  - (d) Adjust the power supply to  $26 \pm 0.02$  volts ac RMS.

S 825-043

(3) Adjust the control rod for the transmitter until the voltage at DVM 1 is  $0 \pm 0.050$  volts ac RMS.

S 225-044

(4) Make sure the control rod dimensions are not more than the maximum values shown (Fig. 502).

S 825-045

- (5) Do these steps if the control rod dimensions are more than the maximum:
- (a) Loosen the screws that hold the transmitter in its bracket.
  - (b) Adjust the control rod to the initial dimensions (Fig. 502).
  - (c) Turn the transmitter in its bracket until the output voltage is very near 0.
  - (d) Tighten the screws that hold the transmitter in its bracket.

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- (e) Adjust the control rod until the output voltage is  $0 \pm 0.050$  volts ac RMS at DVM 1.
- (f) Make sure the control rod dimensions are not more than the maximum values shown (Fig. 502).

S 435-046

- (6) Lock the control rod with a wire and apply a thin layer of grease to the threads that show.

S 225-047

- (7) Make sure the output voltage stays at  $0 \pm 0.050$  volts ac RMS at DVM 1.

S 095-048

- (8) Disconnect the breakout box equipment from the transmitter.

S 395-091

- (9) If it is necessary, apply some of the sealant at these locations:
  - (a) The transmitter to bracket interface.
  - (b) The airplane to bracket interface.
  - (c) The bracket screws.
  - (d) The bonding jumper, if it is installed.

S 435-049

- (10) Connect the airplane connector to the transmitter.

S 095-076

- (11) Remove the DO-NOT-OPERATE tags from the control wheels and the aileron trim switches.

S 095-077

- (12) Remove rig pins A1 and A2.

S 865-099

- (13) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11K14, AILERON POS L

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(b) 11K23, AILERON POS R

S 215-078

- (14) Do the "Aileron Position Indication - Operational Test" task.  
H. Aileron Position Indication - Adjustment (PROCEDURE 2)

S 035-050

- (1) Disconnect the electrical connector from the aileron position transmitter.

S 495-051

- (2) Do these steps to connect the breakout box equipment:
- (a) Connect the breakout box and the -19 cable assembly to the transmitter (Fig. 502).
  - (b) Connect a digital voltmeter (DVM) to the breakout box at pins 5 (SIG HI) and 4 (SIG LO).
  - (c) Connect the breakout box and the -18 cable assembly to the airplane connector.
  - (d) Connect DVM 2 to the breakout box at pins 1 (LO) and 2 (HI) to monitor the airplane power.

S 865-052

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11K14, AILERON POS L
  - (b) 11K23, AILERON POS R

S 215-053

- (4) Make sure the airplane input voltage is between 24 and 30 volts ac RMS at DVM 2.

S 825-054

- (5) Adjust the control rod until the output voltage is  $0 \pm 0.050$  volts ac RMS at DVM 1.

S 225-055

- (6) Make sure the control rod dimensions are not more than the maximum values shown (Fig. 502).

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S 825-056

- (7) Do these steps if the control rod dimensions are more than the maximum:
- (a) Loosen the screws that hold the transmitter in its bracket.
  - (b) Adjust the control rod to the initial dimensions (Fig. 502).
  - (c) Turn the transmitter in its bracket until the output voltage is very near 0.
  - (d) Tighten the screws that hold the transmitter in its bracket.
  - (e) Adjust the control rod until the output voltage is  $0 \pm 0.050$  volts ac RMS at DVM 1.
  - (f) Make sure the control rod dimensions are not more than the maximum values shown (Fig. 502).

S 435-080

- (8) Lock the control rod with a wire and apply a thin layer of grease to the threads that show.

S 225-079

- (9) Make sure the output voltage stays at  $0 \pm 0.050$  volts ac RMS at DVM 1.

S 865-057

- (10) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11K14, AILERON POS L
  - (b) 11K23, AILERON POS R

S 095-058

- (11) Disconnect the breakout box equipment from the transmitter.

S 395-093

- (12) If it is necessary, apply some of the sealant at these locations:
- (a) The transmitter to bracket interface.
  - (b) The airplane to bracket interface.

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- (c) The bracket screws.
- (d) The bonding jumper, if it is installed.

S 435-059

- (13) Connect the airplane connector to the transmitter.

S 095-081

- (14) Remove the DO-NOT-OPERATE tags from the control wheels and the aileron trim switches.

S 095-082

- (15) Remove rig pins A1 and A2.

S 865-100

- (16) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

- (a) 11K14, AILERON POS L
- (b) 11K23, AILERON POS R

S 215-083

- (17) Do the "Aileron Position Indication - Operational Test" task.

I. Aileron Position Indication - Adjustment (PROCEDURE 3)

S 865-060

- (1) Get communication between a person in the control cabin (to monitor the aileron position indicator on the display) and a person at the wing (to adjust the transmitter).

S 215-061

- (2) Make sure you connected the electrical connector to the aileron position transmitter.

S 865-062

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

- (a) 11K14, AILERON POS L

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(b) 11K23, AILERON POS R

S 865-064

- (4) Push the STATUS switch on the display select panel to show the aileron position indicator on the display.

S 825-084

- (5) Adjust the control rod for the transmitter until the position pointer for the aileron aligns with the mid-scale mark.

NOTE: Use a tolerance of  $\pm$  one-half an arrow width.

S 225-065

- (6) Make sure the control rod dimensions are not more than the maximum values shown (Fig. 502).

S 825-066

- (7) Do these steps if the control rod dimensions are more than the maximum:
- (a) Loosen the screws that hold the transmitter in its bracket.
  - (b) Adjust the control rod to the initial dimensions (Fig. 502).
  - (c) Turn the transmitter in its bracket until the position pointer for the aileron is very near the mid-scale mark.
  - (d) Tighten the screws that hold the transmitter in its bracket.
  - (e) Adjust the control rod for the transmitter until the position pointer for the aileron aligns with the mid-scale mark.

NOTE: Use a tolerance of  $\pm$  one-half an arrow width.

- (f) Make sure the control rod dimensions are not more than the maximum values shown (Fig. 502).

S 435-067

- (8) Lock the control rod with a wire and apply a thin layer of grease to the threads that show.

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S 395-095

- (9) If it is necessary, apply some of the sealant at these locations:
- (a) The transmitter to bracket interface.
  - (b) The airplane to bracket interface.
  - (c) The bracket screws.
  - (d) The bonding jumper, if it is installed.

S 215-068

- (10) Make sure the position pointer stays aligned with the mid-scale mark.

S 095-085

- (11) Remove the DO-NOT-OPERATE tags from the control wheels and the aileron trim switches.

S 095-086

- (12) Remove rig pins A1 and A2.

S 215-087

- (13) Do the "Aileron Position Indication - Operational Test" task.

J. Put the Airplane Back to Its Usual Condition

S 415-034

- (1) Close these access panels (AMM 06-44-00/201):
- (a) 561CB (for the left inboard transmitter)
  - (b) 561QB (for the left outboard transmitter)
  - (c) 661CB (for the right inboard transmitter)
  - (d) 661QB (for the right outboard transmitter)

S 865-036

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-037

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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AILERON POSITION TRANSMITTER - REMOVAL/INSTALLATION

1. General

A. This procedure contains these tasks:

- Aileron Position Transmitter - Removal
- Aileron Position Transmitter - Installation

These tasks are applicable to the position transmitters for the inboard and outboard ailerons.

TASK 27-18-10-024-002

2. Aileron Position Transmitter - Removal

A. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 27-51-00/201, Trailing Edge Flap System

B. Access

- (1) Location Zone  
561/661 Rear Spar to Trailing Edge
- (2) Access Panels  
561/661CB Inboard Aileron Position Transmitter  
561/661QB Outboard Aileron Position Transmitter

C. Prepare for the Removal

- S 864-003
- (1) Supply electrical power (Ref 24-22-00/201).
- S 044-004
- (2) Do the deactivation procedure for the trailing edge flaps (Ref 27-51-00/201).
- S 864-005
- (3) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.
- S 864-006
- (4) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT
  - (d) 11K14, AILERON POS L
  - (e) 11K23, AILERON POS R
- S 014-007
- (5) Open the applicable access panels (Ref 06-44-00/201):
  - (a) 561CB (for the left inboard aileron transmitter)

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- (b) 561QB (for the left outboard aileron transmitter)
- (c) 661CB (for the right inboard aileron transmitter)
- (d) 661QB (for the right outboard aileron transmitter).

D. Aileron Position Transmitter - Removal (PROCEDURE 1)

NOTE: This procedure is recommended and removes the transmitter, bracket, and control rod as an assembly from the airplane.

S 034-008

- (1) Disconnect these components from the transmitter:
  - (a) The electrical connector
  - (b) The control rod
  - (c) The bonding jumper, if it is installed.

S 034-009

- (2) Remove the screws that connect the transmitter and its bracket to the airplane (2 locations).

S 024-010

- (3) Remove the transmitter and its bracket from the airplane.

S 034-029

- (4) Disconnect the control rod from the aileron and remove it.

S 034-012

- (5) Do these steps if it is necessary to remove the transmitter from its bracket:
  - (a) Remove the crank from the transmitter shaft.
  - (b) Remove the two clamp screws that hold the transmitter in its bracket.
  - (c) Remove the transmitter from its bracket.

E. Aileron Position Transmitter - Removal (PROCEDURE 2)

NOTE: This procedure removes the transmitter without the removal of the control rod and bracket attached.

S 034-027

- (1) Disconnect these components from the transmitter:
  - (a) The electrical connector
  - (b) The control rod
  - (c) The bonding jumper, if it is installed.

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S 024-028

- (2) Do these steps to remove the transmitter from its bracket:
  - (a) Remove the crank from the transmitter shaft.
  - (b) Remove the two clamp screws that hold the transmitter in its bracket.
  - (c) Remove the transmitter from its bracket.

S 034-030

- (3) Disconnect the control rod from the aileron and remove it.

TASK 27-18-10-424-013

### 3. Aileron Position Transmitter - Installation

NOTE: Refer to 27-18-10 for the data necessary to look for worn parts.

#### A. Equipment

- (1) Bonding Meter - Model T477W  
Avtron Manufacturing Inc.  
Cleveland, Ohio
- (2) Power Supply - Powertron Model 5900  
Industrial Test Equipment Corp.  
Port Washington, New York
- (3) Digital Voltmeter - John Fluke 8020B or  
equivalent  
John Fluke Manufacturing Co., Inc.  
Everett, Washington
- (4) Breakout Box, Cables - A27063-91 (Preferred)  
Position Transmitter Tester - PTTS-892B  
(Alternate)  
Phase Synchronous Voltmeter - 101-AC5/6/7/8  
(Alternate)
- (5) Rig Pins from Set A20004-XX (Ref 20-10-24/201):
  - (a) A1 - P/N A20004-15
  - (b) A2 - P/N A20004-17

#### B. Consumable Materials

- (1) A00247 Sealant, Chromate Type - BMS 5-95

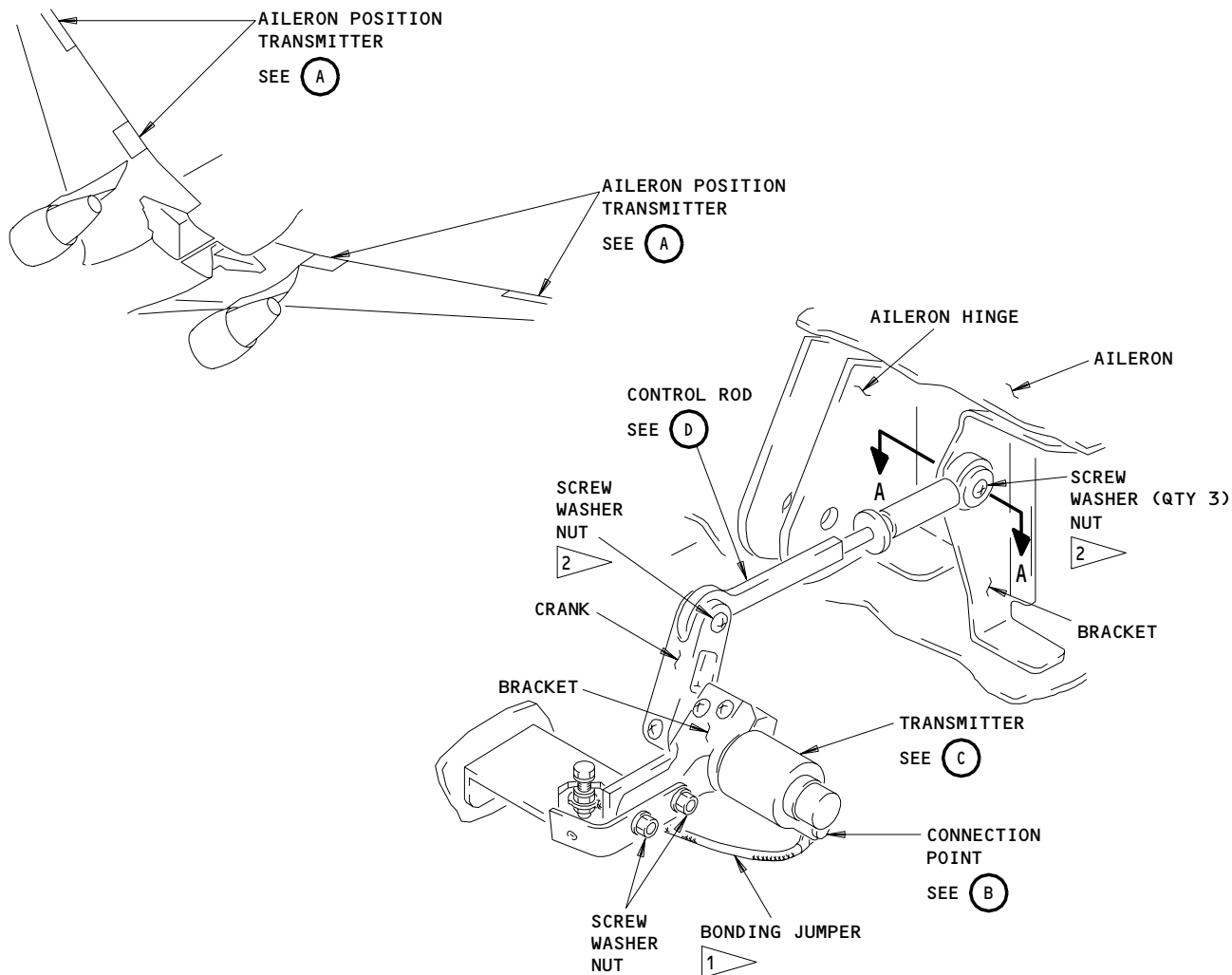
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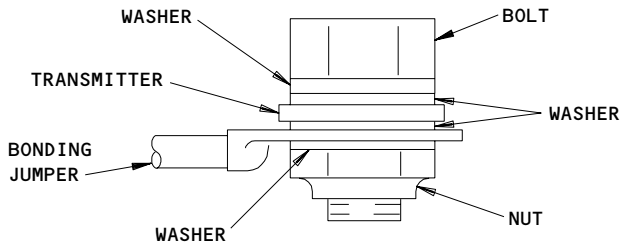
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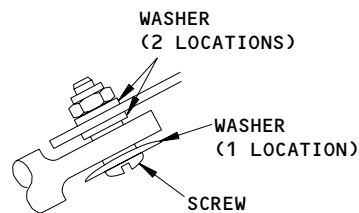
**AILERON POSITION TRANSMITTER**

(A)



**CONNECTION POINT**

(B)



A-A

- 1 AIRPLANES WITH A BONDING JUMPER
- 2 AIPC 27-18-10-05, 27-18-10-05B

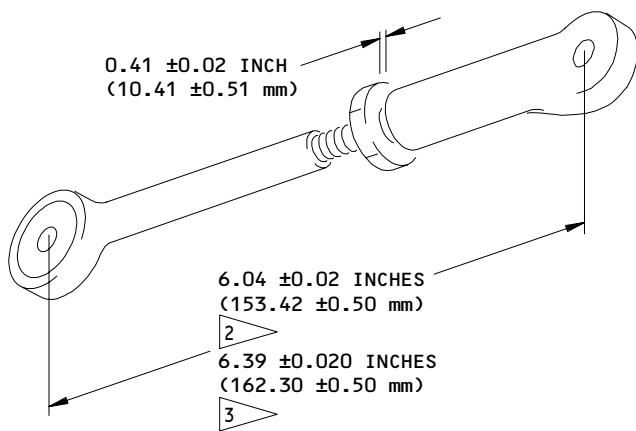
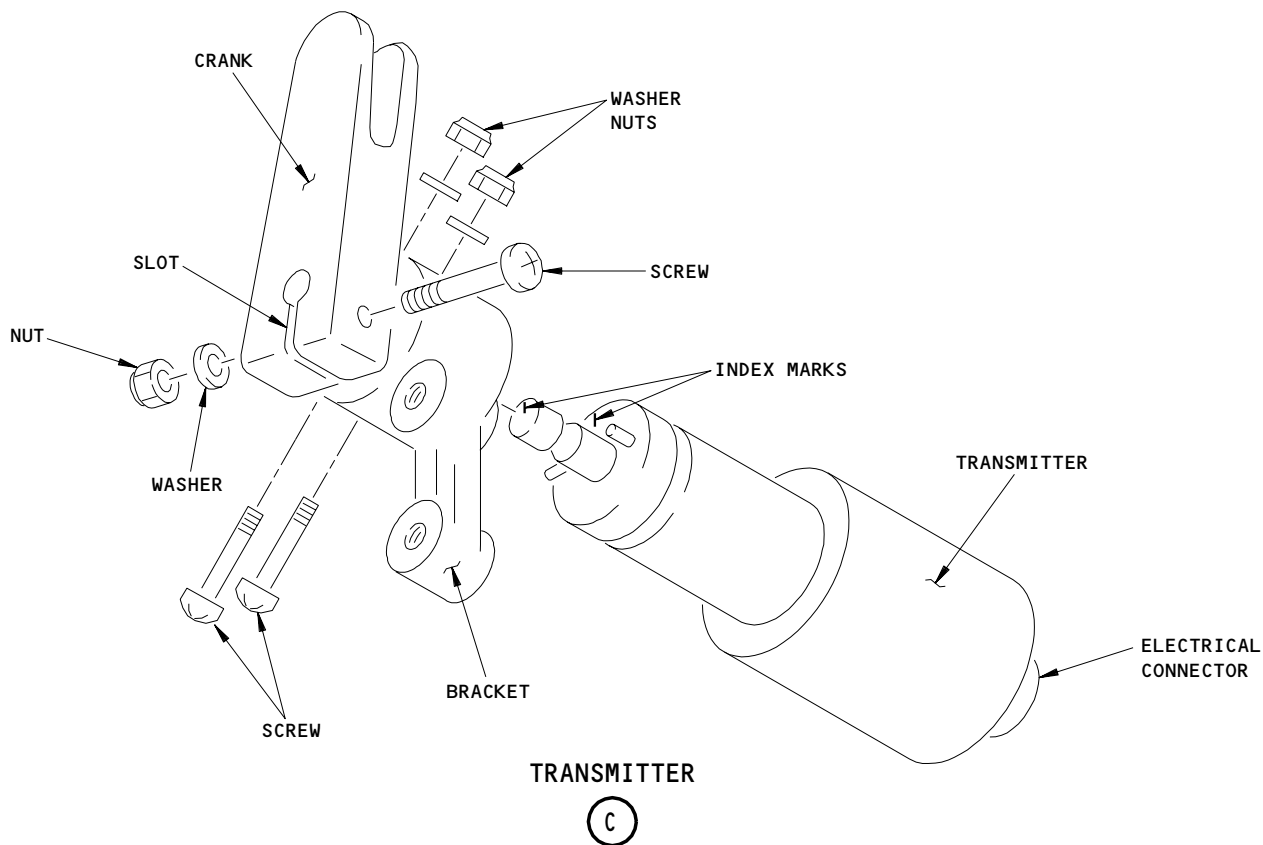
**Aileron Position Transmitter Installation  
Figure 401 (Sheet 1)**

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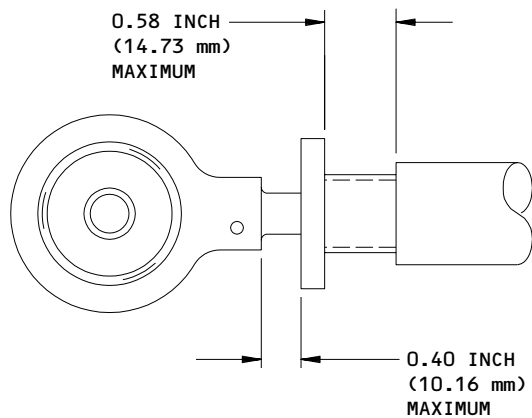
**27-18-10**

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**INITIAL CONTROL ROD DIMENSIONS**



**MAXIMUM CONTROL ROD DIMENSIONS  
(AFTER ADJUSTMENT)**

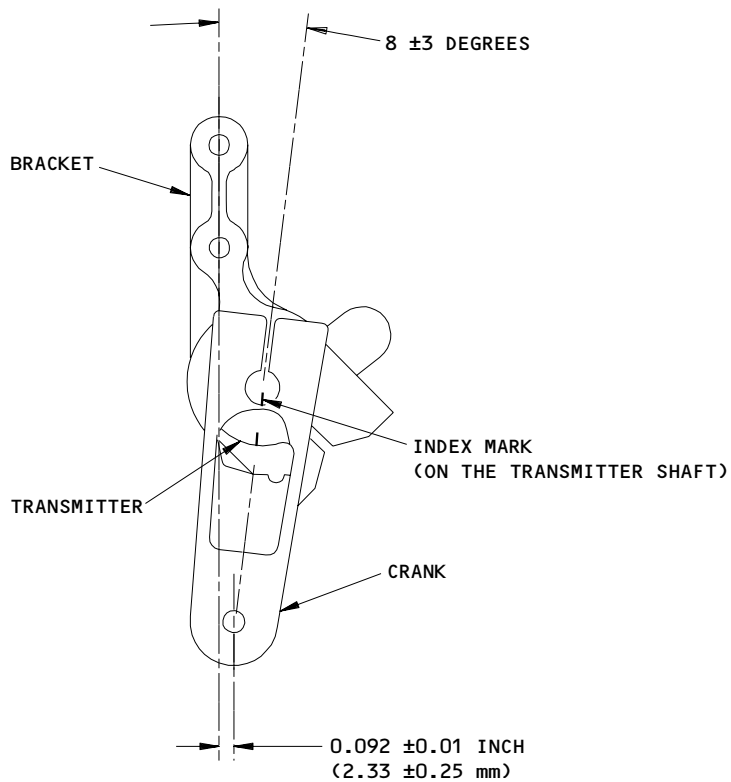
- 2 INBOARD AILERON
- 3 OUTBOARD AILERON

**CONTROL ROD**  
D

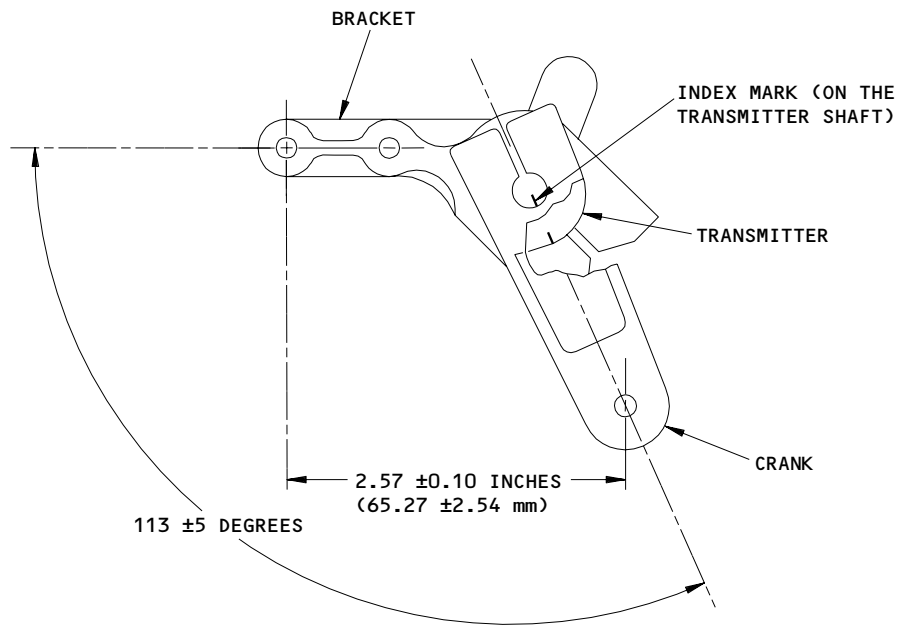
**Aileron Position Transmitter Installation  
Figure 401 (Sheet 2)**

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**27-18-10**



INBOARD AILERON POSITION TRANSMITTER



OUTBOARD AILERON POSITION TRANSMITTER

Aileron Position Transmitter Assembly  
Figure 402 (Sheet 1)

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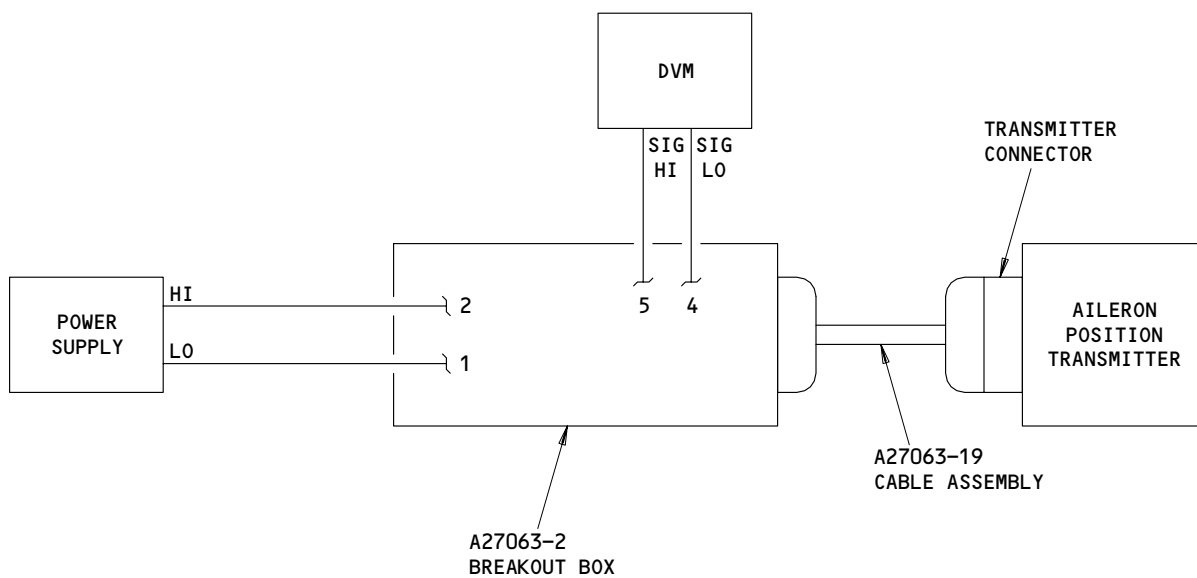
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77300





Aileron Position Transmitter Assembly  
Figure 402 (Sheet 2)

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957233

- (2) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (3) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

C. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 20-10-22/701, Metal Surface
- (3) 20-10-24/201, Rig Pins
- (4) 24-22-00/201, Electrical Power - Control
- (5) 27-18-00/501, Aileron Position Indicating System
- (6) 27-18-10/601, Aileron Position Transmitter
- (7) 27-51-00/201, Trailing Edge Flap System

D. Access

- (1) Location Zone  
561/661 Rear Spar to Trailing Edge
- (2) Access Panels  
561/661CB Inboard Aileron Position Transmitter  
561/661QB Outboard Aileron Position Transmitter

E. Aileron Position Transmitter - Installation (PROCEDURE 1)

**NOTE:** Use this procedure if you used PROCEDURE 1 to remove the position transmitter as an assembly with the bracket and control rod attached.

S 224-014

- (1) Do this check if the transmitter, crank, and bracket are assembled:
  - (a) Make sure the transmitter output voltage is 0 +/- .050 volts ac RMS when the crank and its bracket are in the positions shown (Fig. 402).

S 434-015

- (2) Do these steps if it is necessary to assemble the transmitter and its bracket:
  - (a) Use a rotary bonding brush or an abrasive disk to clean the mating surfaces of the transmitter and the bracket (Ref 20-10-22/701).
  - (b) Put the transmitter in its bracket and do these steps to initially adjust it:
    - 1) Install the clamp screws but do not tighten them.
    - 2) Make sure the top clamp screw engages the transmitter groove.
  - (c) Put the crank on the transmitter shaft and do these steps:
    - 1) Make sure the index mark on the transmitter shaft aligns with the crank slot.
    - 2) Make sure the crank screw engages the groove on the shaft.
    - 3) Tighten the screw that holds the crank on the transmitter shaft.

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- (d) Do these steps to connect the breakout box equipment:
  - 1) Connect the breakout box and the -19 cable assembly to the transmitter (Fig. 402).
  - 2) Connect the digital voltmeter (DVM) to the breakout box at pins 4 (SIG L0) and 5 (SIG HI).
  - 3) Connect the power supply to the breakout box at pins 1 (L0) and 2 (HI).
  - 4) Adjust the power supply to 26 +/- 0.020 volts ac RMS.
- (e) Put the crank and its bracket in the positions shown (Fig. 402) and do these steps:
  - 1) Turn the transmitter in its bracket until the output voltage is 0 +/- 0.050 volts ac RMS.
  - 2) Tighten the bracket clamp screws.
  - 3) Make sure the output voltage stays at 0 +/- 0.050 volts ac RMS.
- (f) Disconnect the breakout box equipment from the transmitter.

S 424-018

- (3) Do these steps to connect the transmitter assembly to the airplane:
  - (a) Use a rotary bonding brush or an abrasive disk to clean the mating surfaces of the airplane and the transmitter bracket (Ref 20-10-22/701).
  - (b) Put the transmitter assembly in its correct position.
  - (c) Install the screws, washers, and nuts that connect the transmitter assembly to the airplane (2 locations) and do this step:
    - 1) Apply some of the sealant to the screws and the bracket.

S 824-016

- (4) Adjust the control rod to the initial dimensions shown (Fig. 401).

S 434-019

- (5) Connect the control rod between the transmitter and the aileron and do this step:
  - (a) Apply grease to the screws, washers, and nuts.

S 434-020

- (6) If it was installed, connect the bonding jumper to the transmitter and do this step:
  - (a) Apply some of the sealant to the bolts.

S 224-021

- (7) Use a bonding meter to make sure the resistance between the transmitter and the airplane is a maximum of 0.003 ohms.

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S 434-022

- (8) Connect the electrical connector to the position transmitter.

S 864-023

- (9) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT
  - (d) 11K14, AILERON POS L
  - (e) 11K23, AILERON POS R

S 864-001

- (10) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to ON.

S 824-024

- (11) Adjust the aileron position transmitter (Ref 27-18-00/501).

**NOTE:** You will apply some of the sealant at the bracket to transmitter interface after you adjust the transmitter.

#### F. Aileron Position Transmitter - Installation (PROCEDURE 2)

**NOTE:** Use this procedure if you used PROCEDURE 2 to remove the position transmitter as a separate unit from the bracket and the control rod.

S 424-032

- (1) Put the transmitter in its bracket and do these steps:
- (a) Install the transmitter clamp screws but do not tighten them.
  - (b) Make sure the top clamp screw engages the transmitter groove.

S 434-033

- (2) Put the crank on the transmitter shaft and do these steps:
- (a) Make sure the crank aligns with the electrical index mark.
  - (b) Install the screw that holds the crank to the shaft and tighten it.
  - (c) Make sure the screw engages the groove in the transmitter shaft.

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- S 824-031
- (3) Adjust the control rod to the initial dimensions shown (Fig. 401).
- S 434-034
- (4) Connect the control rod between the transmitter and the aileron and do this step:
- (a) Apply some of the grease to the screw, washer, and nut.
- S 434-035
- (5) If it was installed, connect the bonding jumper to the transmitter and do this step:
- (a) Apply some of the sealant to the bolts.
- S 434-036
- (6) Connect the electrical connector to the position transmitter.
- S 864-041
- (7) Operate the aileron trim switches on the aft electronic control panel, P8, and do these steps:
- (a) Make sure the aileron trim indicator shows zero units of trim.
- (b) Attach DO-NOT-OPERATE tags to the aileron trim switches.
- S 864-042

**WARNING:** ATTACH DO-NOT-OPERATE TAGS TO THE TWO CONTROL WHEELS. YOU WILL ADJUST THE POSITION TRANSMITTERS WITH HYDRAULIC POWER ON. ACCIDENTAL MOVEMENT OF THE CONTROL WHEELS WILL CAUSE AILERON MOVEMENT AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (8) Attach a DO-NOT-OPERATE tag to each of the two control wheels.

- S 494-044
- (9) Install these rig pins:
- (a) A1 (for the captain's drum assembly)
- (b) A2 (for the first officer's drum assembly)

S 864-043

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (10) Supply pressure to the left, right, and center hydraulic systems (Ref 29-11-00/201).

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S 864-037

- (11) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT
  - (d) 11K14, AILERON POS L
  - (e) 11K23, AILERON POS R

S 864-038

- (12) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the P61 panel to ON.

S 824-040

- (13) Do these steps to initially adjust the position transmitter:
- (a) Make sure the aileron is in its neutral position.
  - (b) Get communication between a person in the control cabin (to monitor the aileron position on the display) and a person at the wing (to adjust the transmitter).
  - (c) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
    - 1) 11K14, AILERON POS L
    - 2) 11K23, AILERON POS R
  - (d) Push the STATUS button on the display select panel to show the aileron position indicator on the display.
  - (e) Loosen the screws that hold the transmitter in its bracket.
  - (f) Turn the transmitter in its bracket until the position pointer is very near the mid-scale mark.
  - (g) Tighten the screws that hold the transmitter in its bracket.
  - (h) Use a bonding meter to make sure the resistance between the transmitter and the airplane is a maximum of 0.003 ohms.

S 824-039

- (14) Adjust the aileron position transmitter (Ref 27-18-00/501).

**NOTE:** You will apply some of the sealant at the transmitter to bracket interface after you adjust the transmitter.

G. Put the Airplane Back to Its Usual Condition

S 864-045

- (1) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00/201).

S 864-025

- (2) Remove electrical power if it is not necessary (Ref 24-22-00/201).

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S 414-026

- (3) Make sure these access panels are closed (Ref 06-44-00/201):
- (a) 561CB (for the left inboard aileron transmitter)
  - (b) 561QB (for the left outboard aileron transmitter)
  - (c) 661CB (for the right inboard aileron transmitter)
  - (d) 661QB (for the right outboard aileron transmitter).

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AILERON POSITION TRANSMITTER - INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to Aileron Position Transmitter - Removal/Installation for procedures to do these tasks.

TASK 27-18-10-206-001

2. Aileron Position Transmitter - Wear Limits

A. Consumable Materials

- (1) A00247 Sealant - BMS 5-95

B. Procedure

S 226-002

- (1) Use the supplied data (Fig. 601) to examine the aileron position transmitter for too much wear.

EFFECTIVITY

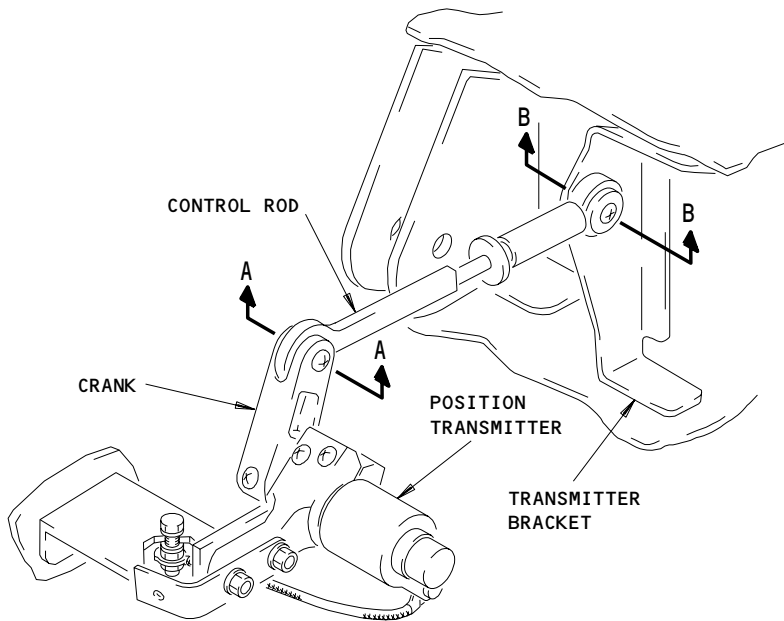
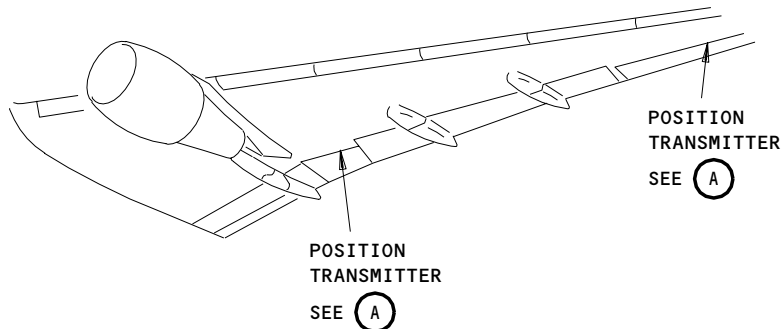
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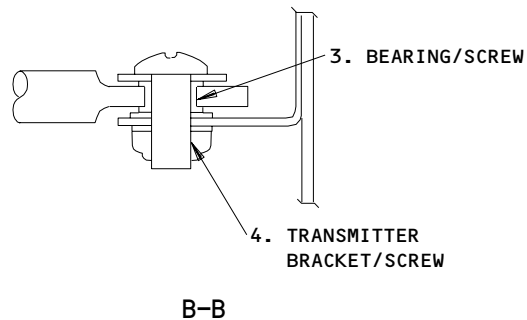
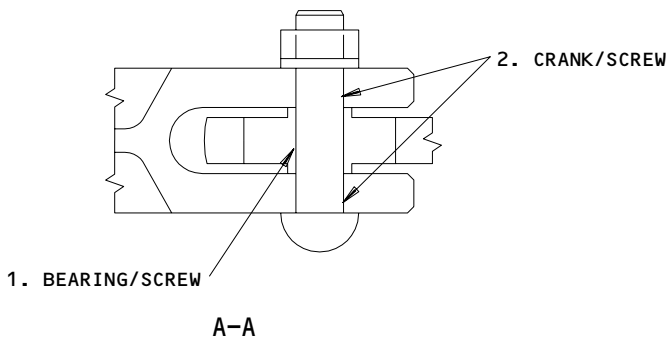
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POSITION TRANSMITTER

(A)



Aileron Position Transmitter Wear Limits  
Figure 601 (Sheet 1)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BEARING	ID	0.1895 (4.813)	0.1900 (4.826)	0.1945 (4.940)	0.0050 (0.127)	X		
	SCREW	OD	0.1870 (4.750)	0.1895 (4.813)	0.1850 (4.699)		X		
2	CRANK	ID	0.1900 (4.826)	0.1940 (4.928)	0.1985 (5.042)	0.0090 (0.229)	X		
	SCREW	OD	0.1870 (4.750)	0.1895 (4.813)	0.1850 (4.699)		X		
3	BEARING	ID	0.1895 (4.813)	0.1900 (4.826)	0.1945 (4.940)	0.0050 (0.127)	X		
	SCREW	OD	0.1870 (4.750)	0.1895 (4.813)	0.1850 (4.699)		X		
4	TRANSMITTER BRACKET	ID	0.1900 (4.826)	0.1940 (4.928)	0.1985 (5.042)	0.0090 (0.229)	X		
	SCREW	OD	0.1870 (4.750)	0.1895 (4.813)	0.1850 (4.699)		X		

Aileron Position Transmitter Wear Limits  
Figure 601 (Sheet 2)

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RUDDER AND RUDDER TRIM CONTROL SYSTEM – DESCRIPTION AND OPERATION

1. General

- A. The rudder and rudder trim control system provides directional control and stability around the vertical axis. This section provides a detailed description of rudder trim control system components and their operation. Description and operation of the tail hydraulic shutoff valves is found in AMM 27-23-00/001. The rudder position indication system description and operation is found in AMM 27-28-00/001.
- B. Description and operation of the rudder ratio changer module (RRCM) is covered in the following paragraphs. Removal and installation of the module is covered in AMM 27-09-00/201.
- C. Control (Fig. 1)
- (1) The captain's and first officer's rudder pedals provide rudder control through a cable and linkage system to the power control actuators (PCAs) at the rudder. An electric actuator which repositions the feel and centering springs provides rudder control trim about system centered position. Trim switches on the aft electronic control panel P8 control the trim actuator. Three directional autopilot servos are also connected to the input controls. A rudder ratio changer system in the input linkage reduces rudder control commands as a function of airspeed. Yaw damper servo outputs, summed with other control inputs, provide a command signal to the PCAs.
  - (2) The rudder is powered by the three hydraulic PCAs. Each PCA is independently supplied with pressure by one of three separate hydraulic systems. Any one PCA is capable of providing the required rudder travel.
  - (3) A rudder left hydraulic system fuse is installed to prevent the complete loss of hydraulic fluid, and thus, loss of airplane control, in the event of a hydraulic system rupture downstream of the fuse.
- D. Indication
- (1) Rudder position is indicated on the EICAS status page from the rudder position transmitter. A trim position indicator next to the rudder trim switch on P8 displays the amount of rudder trim. An amber RUDDER RATIO caution light and EICAS message identifies an inoperative ratio changer system. A yaw damper INOP light for each yaw damper indicates yaw damper inoperative or OFF.

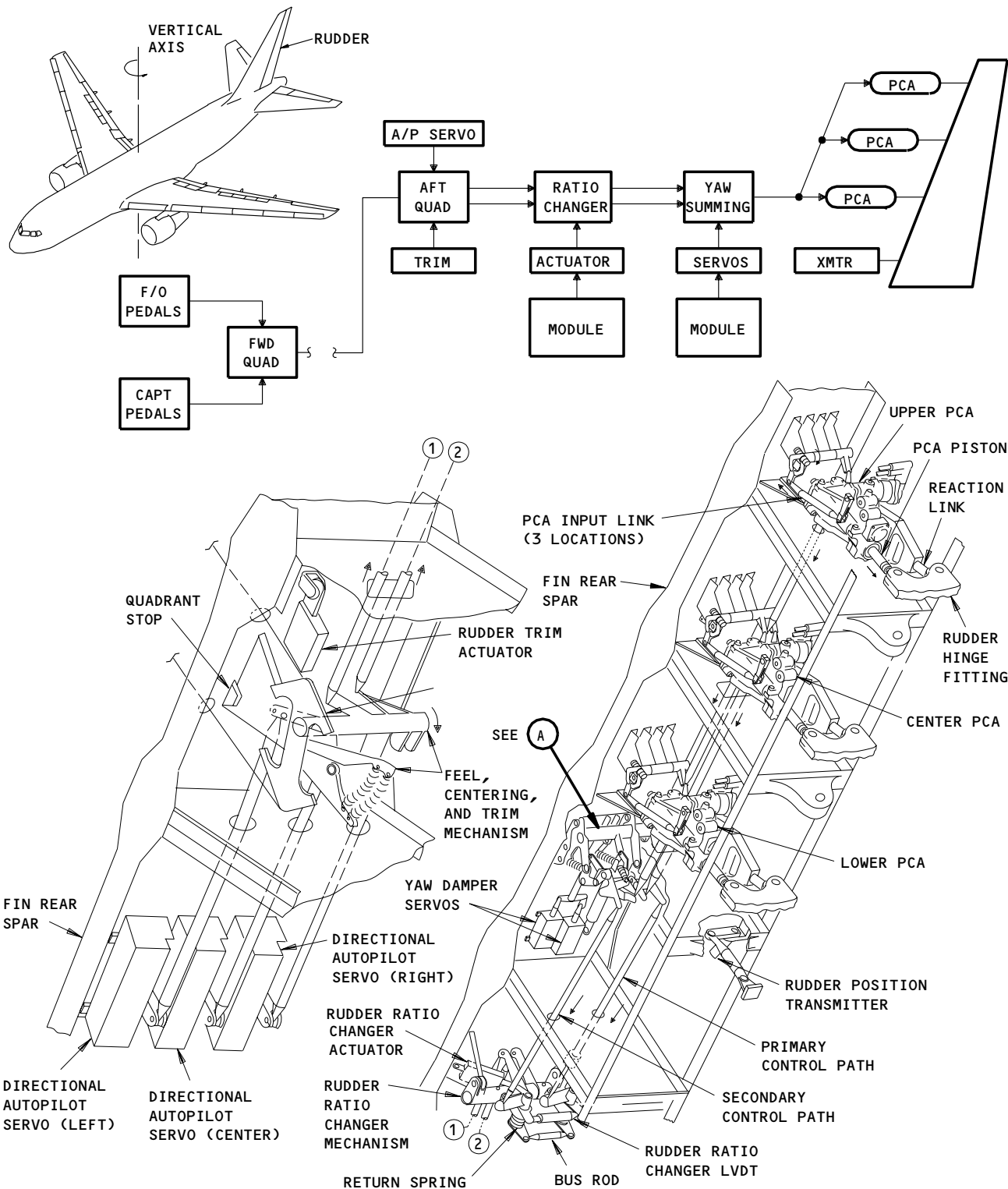
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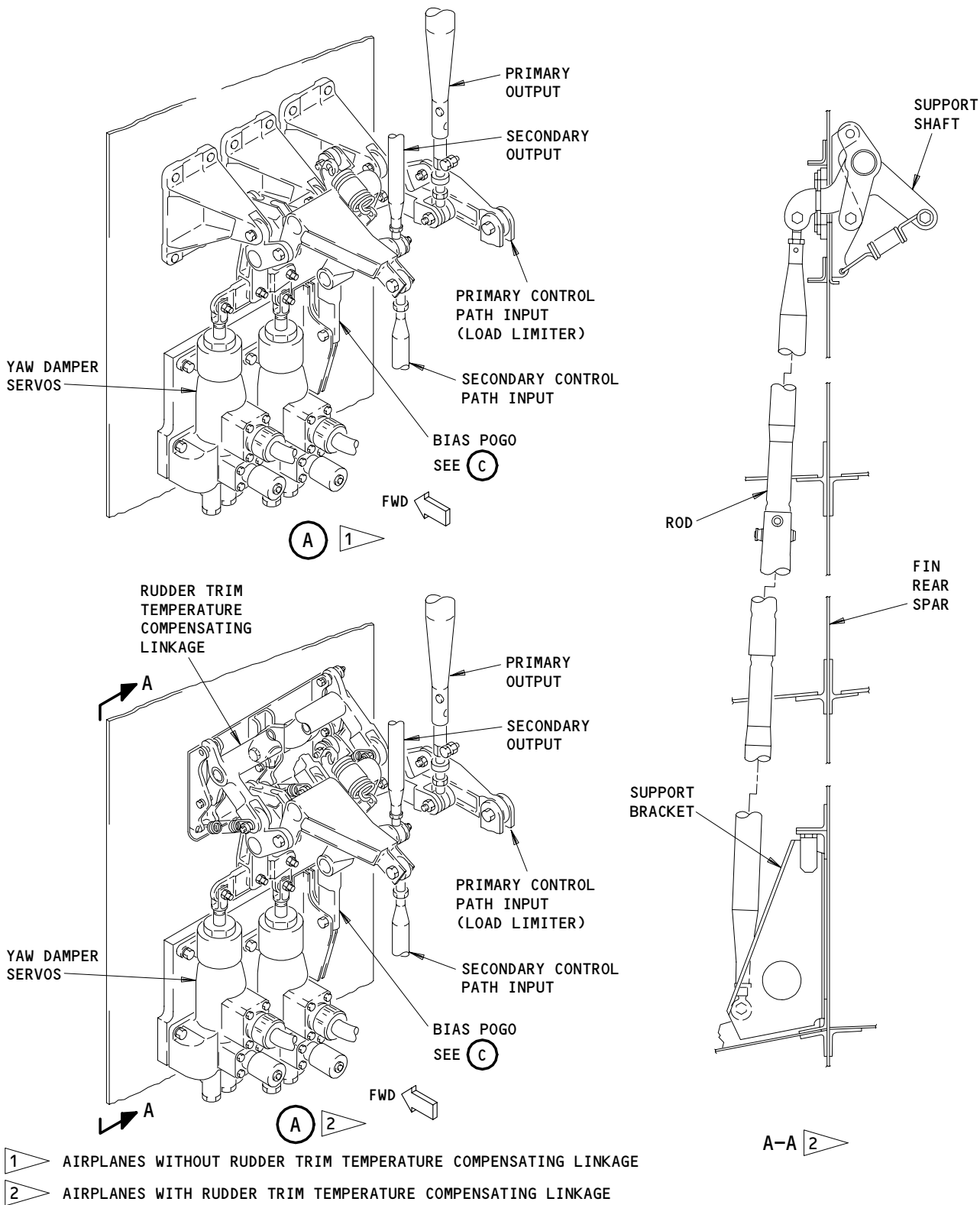
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Rudder Control System  
Figure 1 (Sheet 1)

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Rudder Control System  
Figure 1 (Sheet 2)

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## 2. Component Details

### A. Rudder Pedals (Fig. 2)

(1) Two sets of rudder pedals are located below the captain's and first officer's instrument panel. Each pair have rig pin holes (R1 or R2) in the pedal arms located beneath the flight deck floor. Access to this area is through a door forward of the nose gear wheel well. Pedal travel is limited to about four inches from neutral in either direction by stops on the two forward quadrant and jackshaft assemblies.

### B. Rudder Pedal Adjustment Crank

(1) The captain's and first officer's rudder pedal adjustment cranks are on the pedal housing front panel. The cranks adjust their respective pedals independent of one another and are detented to retain position. Each crank drives a flex cable which is connected to a jackshaft.

### C. Forward Quadrant and Jackshaft Assembly

(1) An adjustable yoke is mounted on the aft side of each forward quadrant. The yoke is attached to the pedals by two pushrods and is cable-driven by a jackshaft to provide fore and aft pedal adjustment. The forward quadrants are tied together by a bus rod so that either set of pedals can provide input to both quadrants.

(2) The quadrants are the forward terminal for the rudder cables. The left quadrant has a stop bumper that contacts structural stop to limit pedal movement. The left quadrant also contains rig pin hole R3, which is used to rig the rudder pedals and set cable tension.

### D. Rudder Control Cables (Fig. 3)

(1) The two rudder control cables are attached at the left and right forward quadrants. The cables run under the flight deck, up the rear wall of the flight deck, and above the main deck compartment to the feel, centering, and trim mechanism aft quadrant. Three turnbuckles per cable are used for adjusting tension with rig pins R3 and R4 installed. The two forward turnbuckle pairs are accessed through panels in the main deck compartment ceiling. The third turnbuckle pair is aft of the pressure bulkhead accessible through the stabilizer compartment service door.

### E. Feel, Centering, and Trim Mechanism (Fig. 4)

(1) The feel, centering, and trim mechanism is located at the vertical fin base. Access is through panel 324BL on the left fin side. All mechanism inputs and outputs are connected to its offset torque tube. The aft quadrant transfers cable inputs from the rudder pedals to the torque tube and also backdrives the cable system in response to rudder movement caused by autopilot inputs. Other input sources are the trim actuator and three directional autopilot servos. The torque tube output consists of two control rods which provide ratio changer mechanism input. Two aft quadrant stops limit the feel, centering, and trim mechanisms rotation. Rig pin R4 fixes the aft quadrant to the structural support during the rigging process.

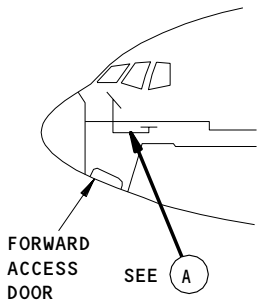
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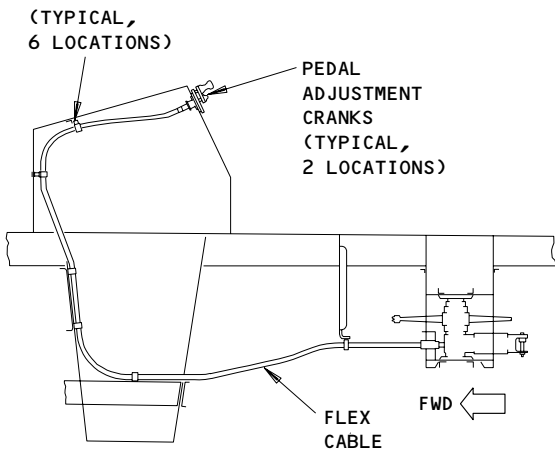
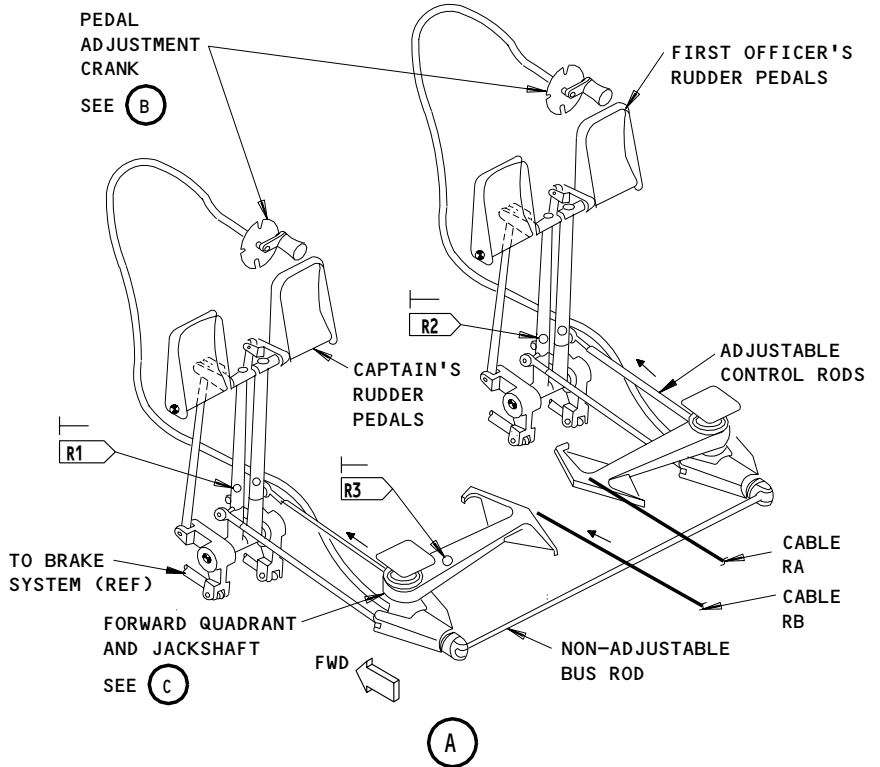
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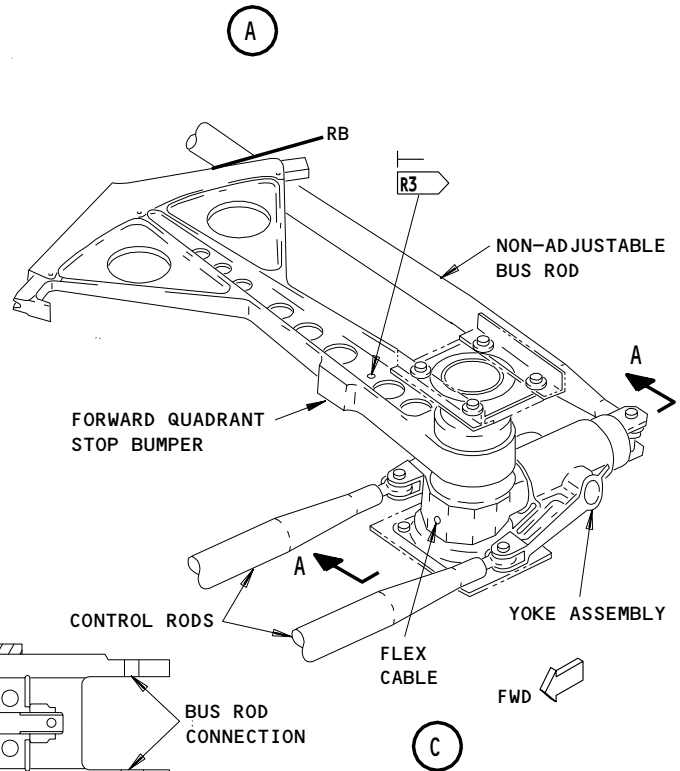


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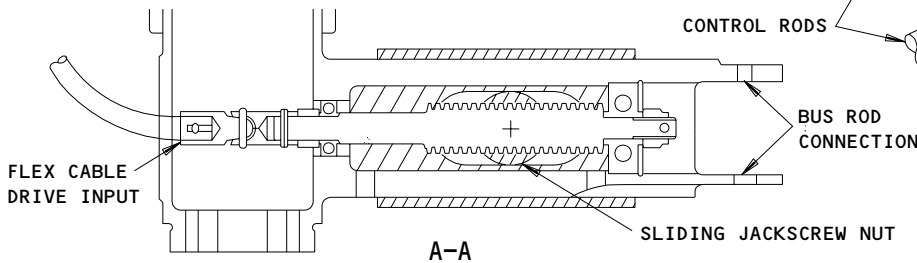
-  RIG PIN
-  ARROWS INDICATE RIGHT RUDDER INPUT



(B)



(C)



**Rudder Pedals and Forward Quadrants**  
Figure 2

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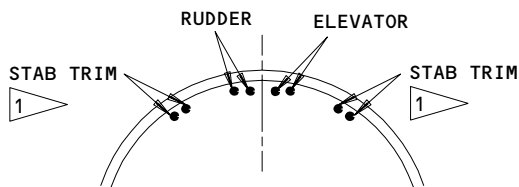
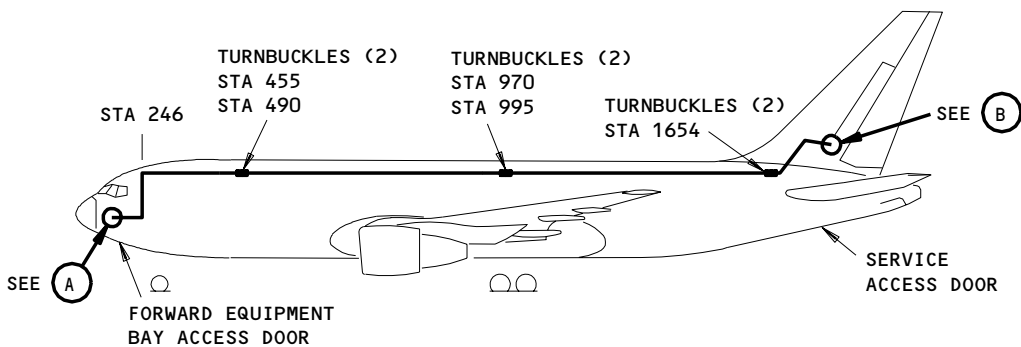
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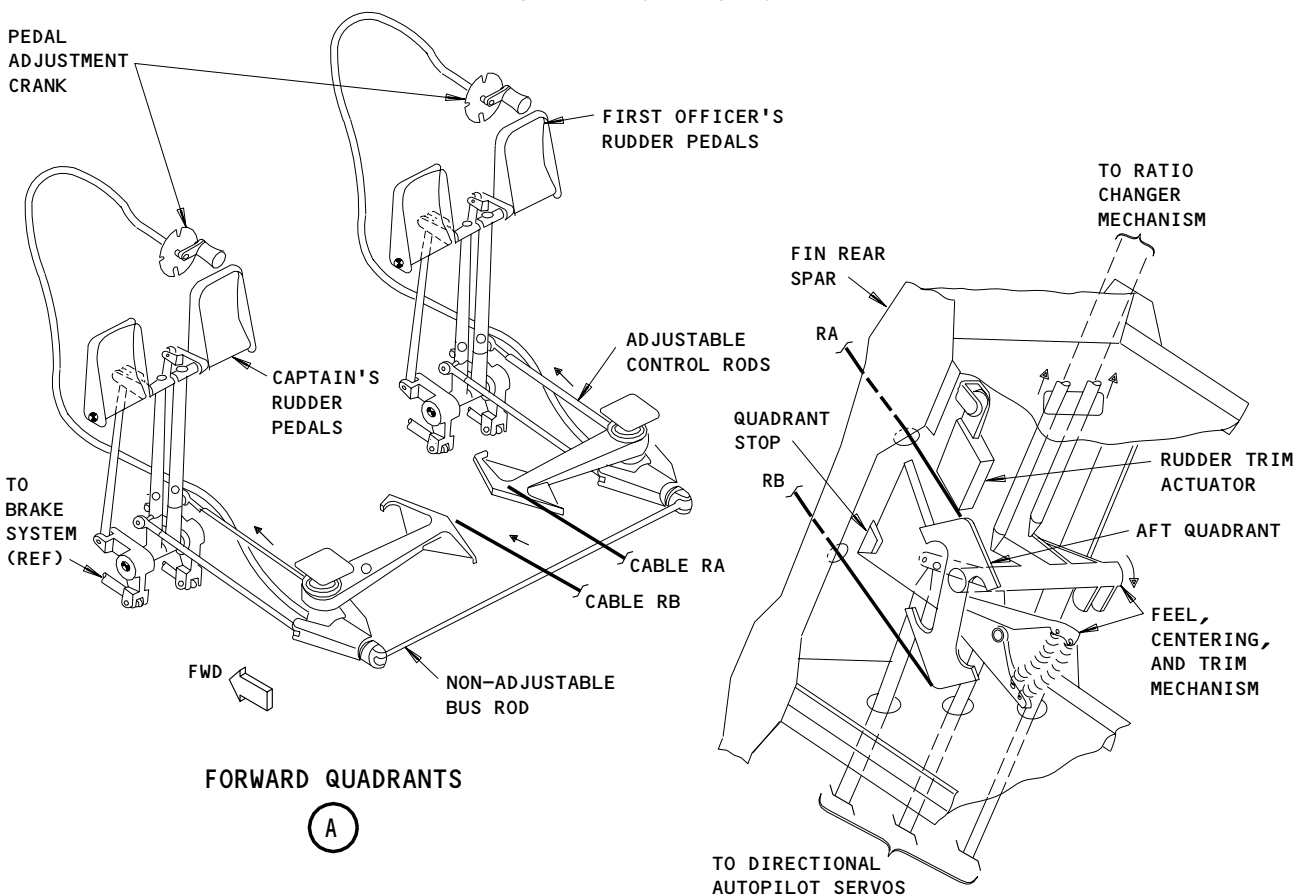
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# BOEING

## 767 MAINTENANCE MANUAL



**CABLE DISTRIBUTION**



**FORWARD QUADRANTS**

(A)

**AFT QUADRANT**

(B)

1 AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND

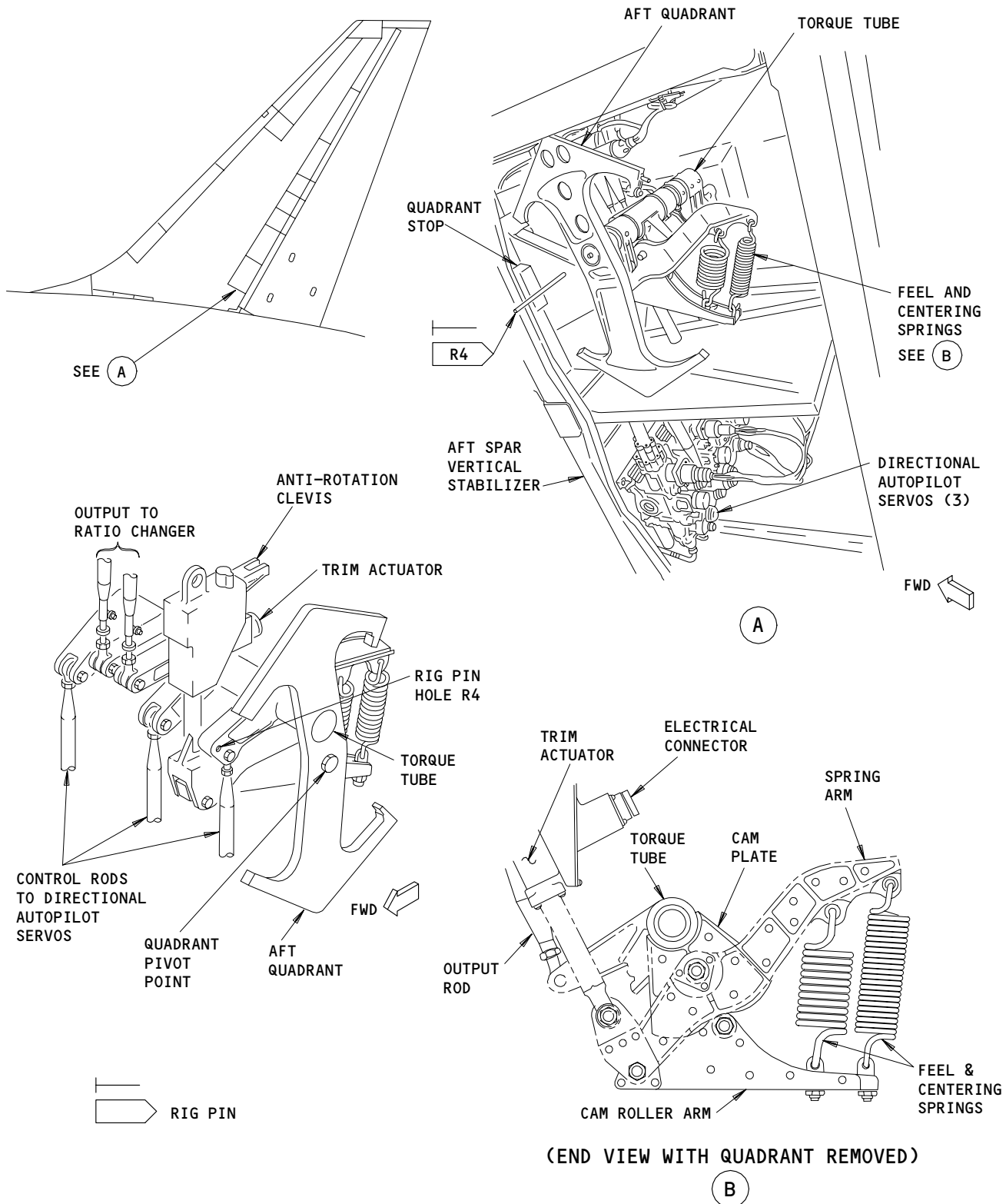
→ ARROWS INDICATE RIGHT RUDDER INPUT

**Rudder Control Cables  
Figure 3**

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Feel, Centering, and Trim Mechanism  
Figure 4

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- (2) Feel and centering functions are provided by a cam-roll-spring mechanism. It simulates a feel force to rudder pedal input and a centering force to return pedals to neutral when input is removed. The mechanism consists of two arms, spring-joined at one end and connected to the trim actuator at the other. The lower arm contains a roller which follows a cam surface. The cam is attached to the torque tube and pivots on the torque tube axis of rotation. Force to move the roller out of the cam face detent is 19 pounds (84.5 newtons), increasing with pedal deflection to 71 pounds (316 newtons) at full travel.

F. Rudder Trim Actuator

- (1) The rudder trim actuator housing is attached to the vertical fin rear spar and the actuator rod end is connected to the feel, centering, and trim mechanism. Trim commands from the trim switch cause the actuator to extend or retract which rotates the feel, centering, and trim mechanism. This provides a new zero force pedal position corresponding to the trimmed rudder position. The actuator provides the ground point for the feel, centering, and trim mechanism.
- (2) ON ALL EXCEPT SAS 050-051;  
the actuator uses an acme screw design for irreversibility and is powered by a self-contained dc motor that operates on 28 volts dc. Limit switches on the actuator control its stroke. An RVDT inside the actuator drives the flight deck trim position indicator on aft electronic control panel P8. The trim indicator provides units of trim since rudder trim in degrees is dependent on ratio changer position. The maximum trim authority is about 17 degrees (rudder travel rate of 1 degree per second) with rudder ratio changer in low-speed position. Actuator stroke is 2.74 inches (69.6 mm), full travel in one direction takes about 17 seconds.
- (3) ON SAS 050-051;  
the actuator uses an acme screw design for irreversibility and is powered by a self-contained dc motor that operates on 28 volts dc. Limit switches on the actuator control its stroke. An RVDT inside the actuator drives the flight deck trim position indicator on aft electronic control panel P8. The trim indicator provides units of trim since rudder trim in degrees is dependent on ratio changer position. The maximum trim authority is about 21.5 degrees (rudder travel rate of 1 degree per second) with rudder ratio changer in low-speed position. Actuator stroke is 3.42 inches (86.9 mm), full travel in one direction takes about 21 seconds.

G. Rudder Trim Temperature Compensating Linkage (Fig. 1 and 7)

- (1) The rudder trim temperature compensating linkage consists of two major components, a support shaft and a rod. The support shaft attaches to the yaw damper summing lever and the fin rear spar at the upper end of the linkage. The rod is attached to the support shaft arm which extends through the fin rear spar at the upper end and to a support bracket attached to the fin rear spar at the lower end. The rod is not adjustable.

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- (2) During climb, the structure cools faster than the rudder control linkage. This causes the rudder to shift left due to different expansion rates of the structure and rudder control linkage, requiring right rudder trim to compensate. As temperatures equalize during cruise, rudder trim is gradually removed, leaving only the normal cruise trim requirements. Opposite conditions occur during descent, as the structure warms faster than the rudder control linkage. The rudder trim temperature compensating linkage eliminates the need for manual rudder trim in such situations. The compensating linkage rod expands/contracts at the same rate as the rudder control linkage. Therefore, when the structure is expanding/contracting faster than the rudder linkage, the compensating linkage rod repositions the support shaft, providing input to the yaw damper summing lever to counteract rudder deflection due to different expansion/contraction rates between the structure and rudder control linkage.
- H. Directional Autopilot Servos
- (1) The three directional autopilot servos directly below the feel, centering, and trim mechanism are driven by the flight control computer. They provide autopilot input to the rudder control system in the auto-land mode only (AMM 22-13-00/001).
- I. Rudder Ratio Changer Mechanism (Fig. 5)
- (1) The rudder ratio changer mechanism is mounted in the vertical fin directly above the feel, centering, and trim mechanism. The mechanism limits rudder travel as a function of airspeed. As airspeed increases, rudder travel decreases. The ratio changer output is controlled by an electro-hydraulic actuator. This actuator is powered by the left hydraulic system and receives an actuating signal from one of the two rudder ratio changer modules (RRCMs). The actuator is hydraulically and mechanically biased to return to the retract (low speed) position.
  - (2) The ratio changer has an offset torque tube with two inputs and two outputs. The two inputs come from the feel, centering, and trim mechanism through two control rods. These control rods are adjustable for rigging purposes. Two output support bearings have bell cranks mounted to them. The bell cranks are bussed together by an adjustable interconnect rod to provide for rigging adjustments. Control rods for the primary and secondary control path outputs are attached to the bell cranks. These control rods provide input to the yaw damper summing lever. The left bell crank mounts the ratio changer actuator rod end. Both bell cranks have springs which develop 30 pound-inches (3.4 newton-meters) to return the mechanism to the low speed position. Rig pins R6 and R7 fix the cranks to the torque tube in the high speed position.
  - (3) The standby bus provides 28 volts dc power to the RRCMs for the shutdown solenoid, relays and faultball indicators. CSEU power supply modules (PSMs) provide 115 volts ac separately sourced dual power supply to the RRCMs.

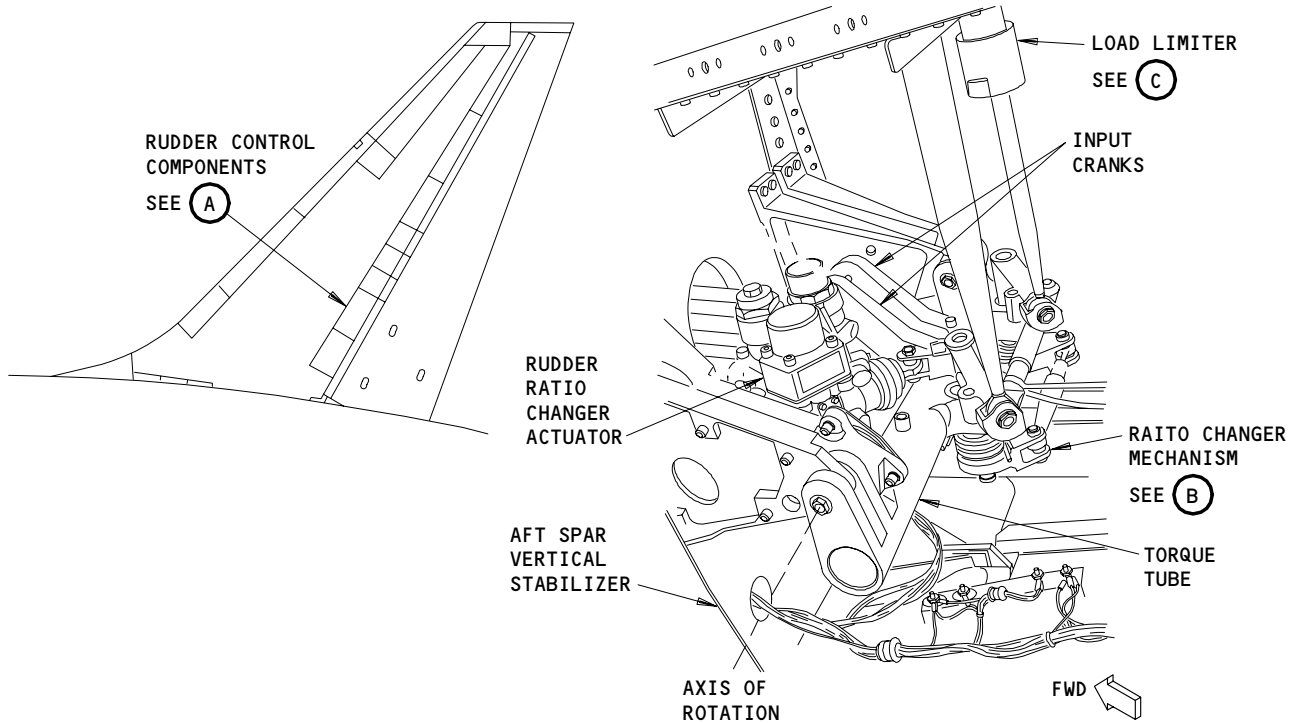
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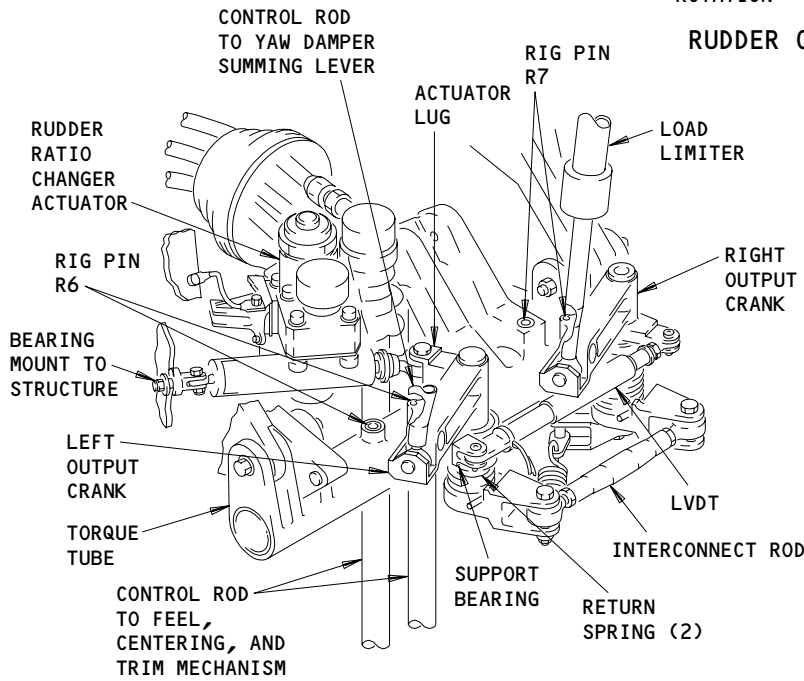
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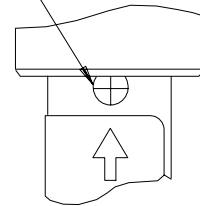
RUDER CONTROL COMPONENTS



RATIO CHANGER MECHANISM

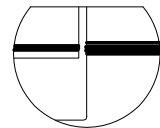
(A)

INDEX MARKS  
SEE (D)



LOAD LIMITER

(C)



INDEX MARKS

(D)

(B)

Rudder Ratio Changer Mechanism  
Figure 5

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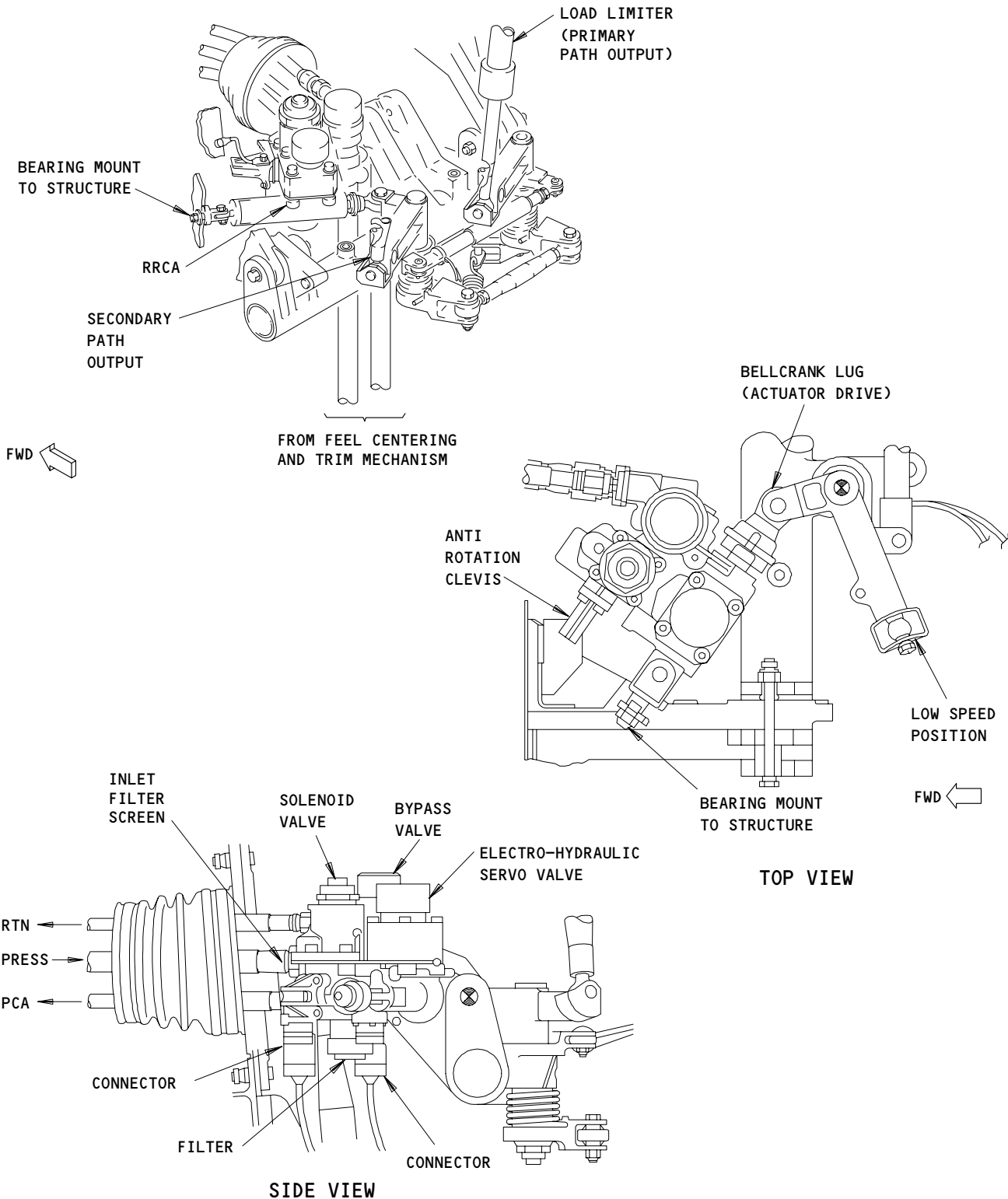
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- J. Linear Variable Differential Transformer (LVDT)
- (1) A LVDT is attached to the ratio changer between the right bell crank and the left crank support. Dual channels provide position feedback signals to the two RRCMs. The LVDT can be adjusted for rigging purposes. The housing contains a dual element LVDT powered by 26 volts ac from PSM 2R and 2L.
- K. Load Limiter Control Rod
- (1) The load limiter is a control rod with a crushable core located on the primary control path between the ratio changer and the yaw damper summing lever. The crush core is an aluminum alloy honeycomb and provides load limiting protection in the primary control path. A compressive force of 166 to 310 pounds (738-1379 newtons) is required to initiate or sustain crushing. The maximum load limiter crush distance is 4.3 inches (10.9 centimeters) if the system is jammed at one extreme and moved to the other extreme.
  - (2) Index marks visible through the load limiter inspection port verify core integrity. Unless the core is crushed, the narrow band will be aligned within the wide band (Details C and D). If the index marks are not visible, one end of the load limiter can be disconnected and the limiter checked for freeplay. Freeplay indicates a crushed core.
- L. Rudder Ratio Changer Actuator (RRCA) (Fig. 6)
- (1) The RRCA is located on top and to the left of the ratio changer mechanism. The RRCA base is bearing-mounted to the vertical fin rear spar structure and the rod end is attached to the left ratio changer bell crank. The actuator has four line replaceable units: a solenoid valve, an electro-hydraulic servo valve (EHSV), a filter, and a screen. The solenoid valve controls the hydraulic supply to the actuator. The EHSV controls the rate and direction of hydraulic flow within the actuator. The filter and screen together provide double filtering of the hydraulic fluid input.
  - (2) Inputs to the RRCA consist of hydraulic pressure (3000 psi) from the left hydraulic system and electrical signals to the solenoid valve and EHSV. Outputs from the RRCA are hydraulic pressure to the middle power control actuator and mechanical drive to the left ratio changer bell crank.
- M. Yaw Damper Summing Lever (Fig. 7)
- (1) The summing lever is located directly above the ratio changer mechanism. The lever sums control inputs from the ratio changer and the yaw damper then transfers the resultant to the rudder PCAs via output control rods. The summing lever contains rig pin hole R8.

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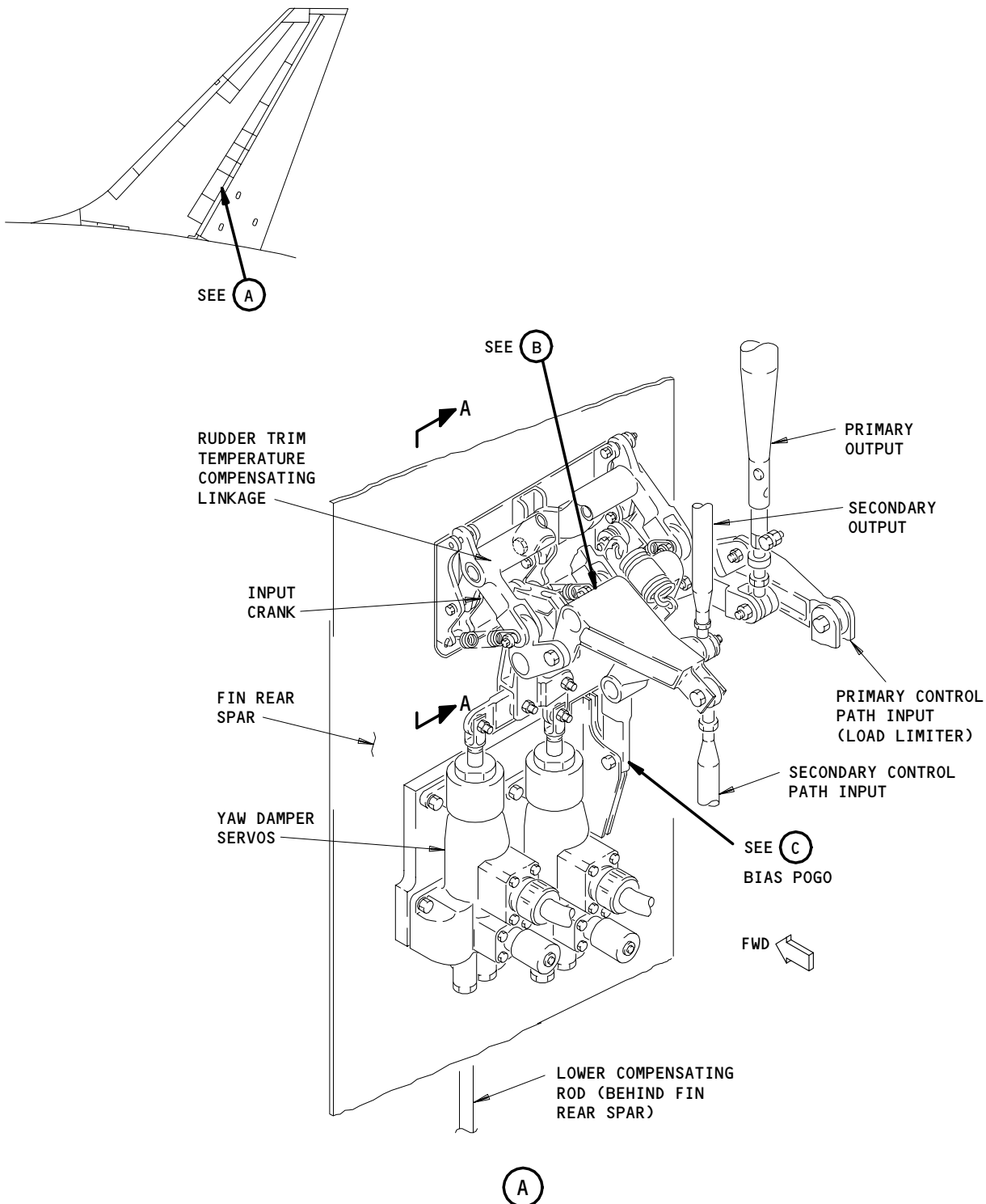
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Rudder Ratio Changer Actuator (RRCA)  
Figure 6

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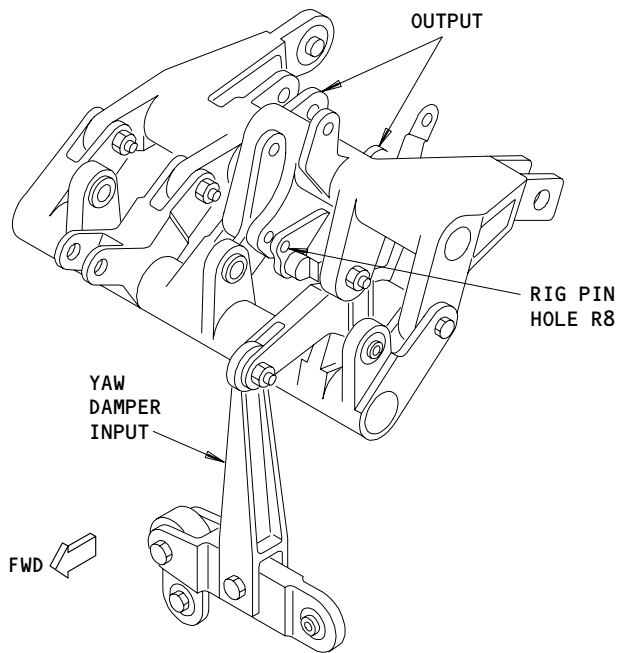
Yaw Damper Summing Lever  
Figure 7 (Sheet 1)

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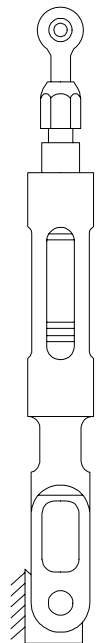
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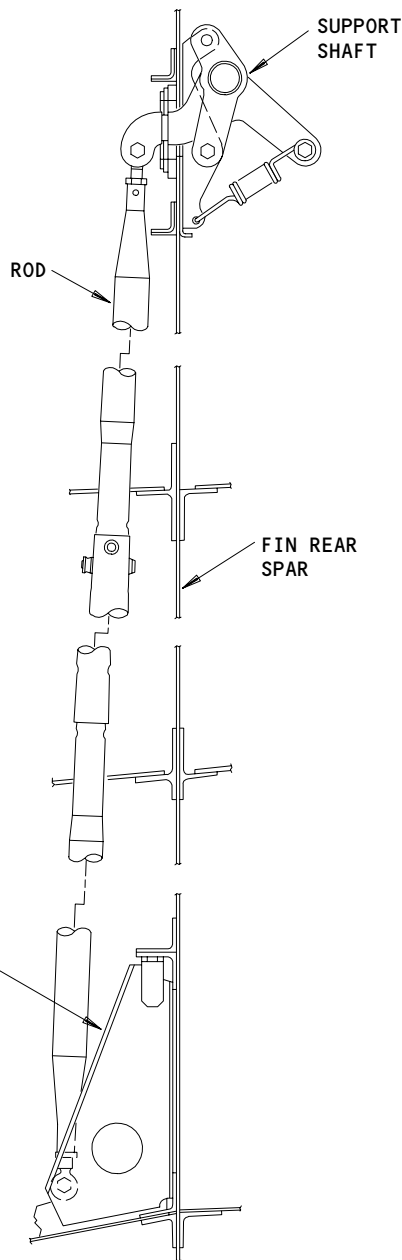
YAW DAMPER SUMMING MECHANISM

(B)



BIAS POGO ASSEMBLY

(C)



RUDDER TRIM TEMPERATURE  
COMPENSATING LINKAGE

A-A

Yaw Damper Summing Lever  
Figure 7 (Sheet 2)

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- (2) The secondary control path override mechanism provides load limiting and bias to reduce system hysteresis from linkage backlash. It consists of a cam-roller-spring assembly mounted in the summing lever secondary control path. The spring-loaded roller joins together the input and output control paths. The cam roller is offset from the yaw damper neutral detent by two degrees of rudder in order to eliminate linkage and bearing backlash. Yaw damper servos description and operation is in AMM 22-21-00/001.
- N. Summing Lever Bias Pogo
- (1) The bias pogo is attached between the summing lever torque tube and the vertical fin rear spar. During normal operation, the bias pogo removes backlash in the yaw damper linkage by maintaining a retracting force. Should a failure occur in the yaw damper input, the bias pogo provides a hardpoint for summing lever operation. Pogo retract force is 22.8 ±3.4 pounds (101.4 +/- 15.1 newtons) in the rigged position.
- O. Power Control Actuators (PCAs) (Fig. 8)
- (1) The three interchangeable PCAs are controlled by primary or secondary path inputs through the transfer bell cranks. The upper PCA is powered by the center hydraulic system, the middle PCA is powered by the left system (through the RRCA), and the lower PCA is powered by the right hydraulic system.
- (2) The PCAs are mounted in a parallel vertical row above the yaw damper summing mechanism, between the vertical fin rear spar and rudder front spar. The PCA cylinder base is mounted on a trunnion block connected to the vertical fin rear spar; the rod end is mounted to the rudder front spar. The trailing edge beam must be removed to replace any PCA. The rudder must be positioned full right and two PCA lockout tools installed.
- P. PCA Linkages
- (1) The PCA linkages transfer inputs from the yaw damper summing lever to the actuators via bell cranks. The primary control path provides input to the middle PCA transfer bell crank only. The input is transferred by a secondary crank arm, through the secondary control path, into the upper and lower transfer bell cranks. The secondary control path input is in series to all three bell cranks. The middle PCA transfer bell crank contains rig pin hole R5.
- (2) Each PCA has a cam-spring override mechanism. This mechanism allows continued rudder control in case of a jam in the PCA control valve or linkage. If a jam occurs, the flight crew can breakout the override mechanism by applying 40 pounds (178 newtons) extra pedal force at speeds below 140 knots. The breakout force is reduced with increasing airspeed. For example, the force is 8 pounds (35.6 newtons) at 300 knots.
- (3) The cam is mounted on the rotational axis of the transfer bell crank. Spring biased arms connected to the PCA input rod hold two rollers in the cam detents. A jam in a PCA valve causes the rollers to ride out of the detent when the bell cranks rotate, allowing input to the other PCAs.

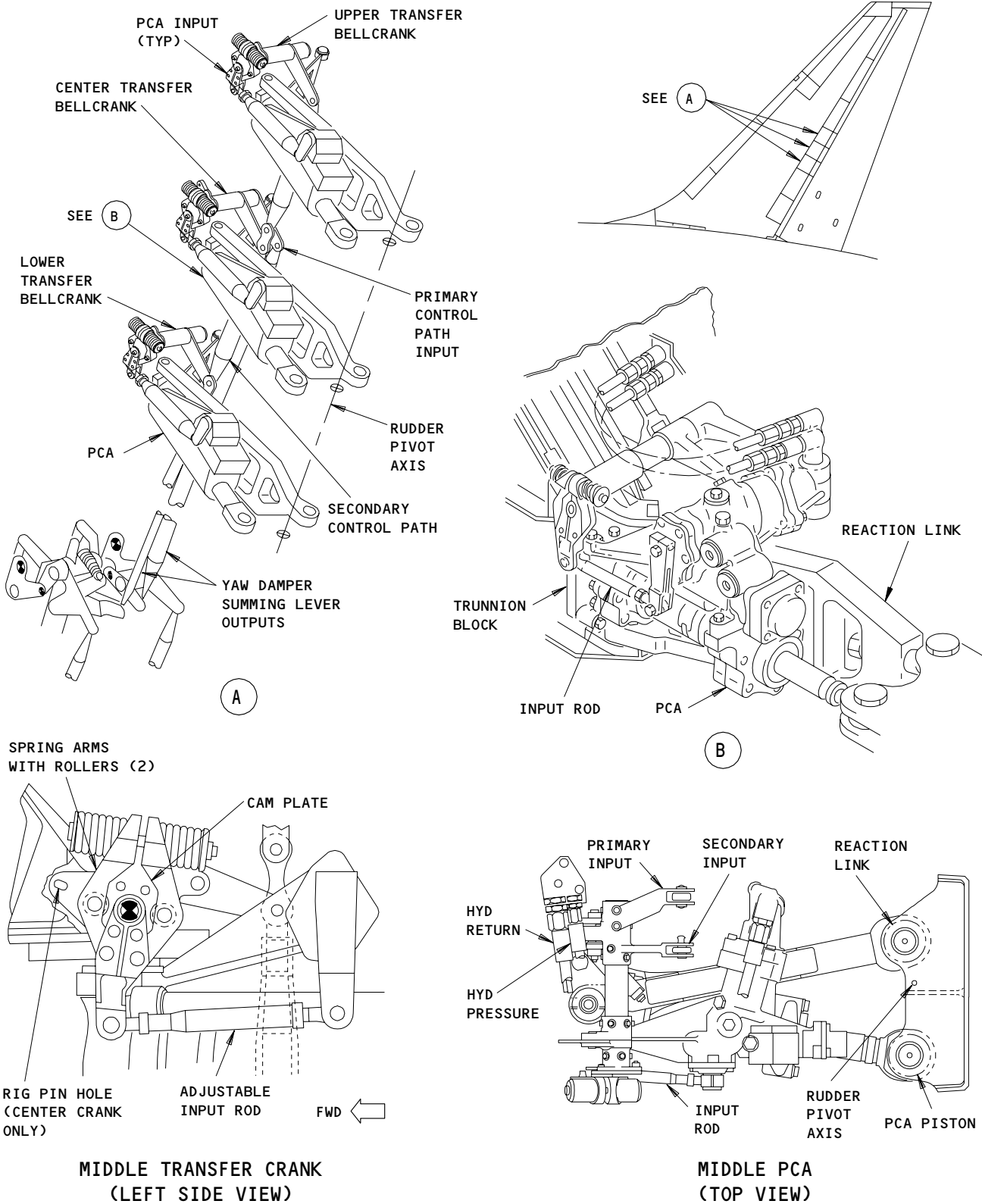
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Rudder Power Control Actuators (PCAs)  
Figure 8

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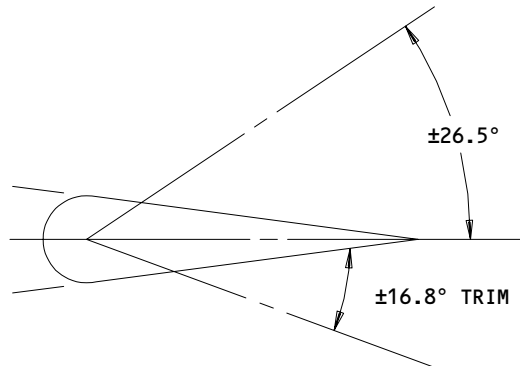
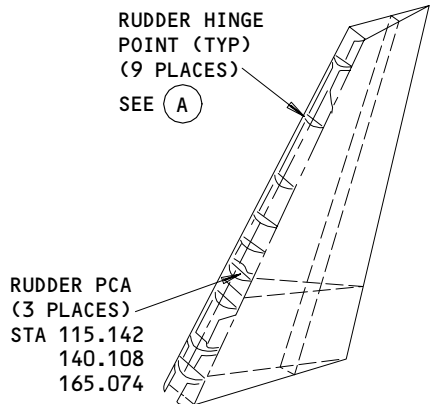
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- Q. PCA Reaction Link
- (1) The reaction link provides mechanical feedback from rudder surface movement to reposition the actuator body and null out the valve input. One end is connected to the rudder front spar on the right side of the rudder pivot. The other end is connected to the trunnion assembly on the vertical fin rear spar. Actuator connection and reaction link connections are not the same distance from the rudder pivot point. The top and bottom of the trunnion assembly ride in curved slots. The trunnion right side is connected to the hanger link which is bearing mounted to the vertical fin rear spar.
- R. Rudder (Fig. 9)
- (1) The rudder has a surface area of 178 square feet (54.25 square meters) and vertical height of about 31 feet (9.45 meters).
  - (2) ON ALL EXCEPT SAS 050-051;  
the rudder travel limits are 26 degrees at low speed and 4 degrees at 360 knots. The rudder trim limits are 17 degrees at low speed and 2.6 degrees at 360 knots.
  - (3) ON SAS 050-051;  
the rudder travel limits are 26 degrees at low speed and 4 degrees at 360 knots. The rudder trim limits are 21.5 degrees at low speed and 3.3 degrees at 360 knots.
- S. Rudder Left Hydraulic System Fuse
- (1) This hydraulic fuse is installed in the left hydraulic system pressure line upstream of the rudder power control actuators. This one fuse installed for the rudder system is located in the left hydraulic pressure line beneath the vertical fin.
  - (2) The fuse senses the hydraulic fluid flow rate to the rudder control system. In the event of hydraulic line rupture downstream, the fuse will close to prevent loss of hydraulic fluid and will preserve hydraulic pressure in the system upstream of the fuse.
- T. Rudder Structure
- (1) The rudder surface is a graphite composite which weighs 1.5 pounds (6.67 kilograms) per square foot. The entire rudder structure weighs about 430 pounds (195 Kg). Nine hinge fittings are mounted between the vertical fin rear spar and the rudder front spar. Two thrust hinges provide rudder positioning. Seven expansion link hinges account for the difference in thermal expansion between the graphite rudder and aluminum hinges. A seal between the rudder bull-nose and the fin trailing edge panels prevents air flow across the hinge line at all deflection angles. There are two drain holes in the base of the rudder. Hoisting points are located at the rudder front spar, below the third hinge and the eighth hinge from the bottom.
  - (2) A record should be kept of all painting and repairs done to the rudder to ensure that the operational balance moment is not exceeded. A rudder surface which exceeds the operational balance moment may flutter during flight. Refer to the Structural Repair Manual (SRM 51-60-00) for operational balance moment determination.

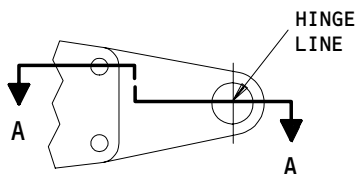
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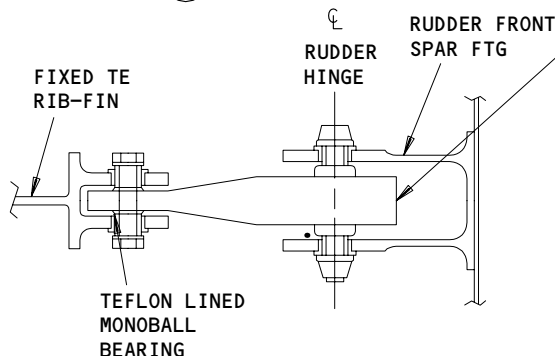
TRAVEL LIMITS



HINGE FITTINGS

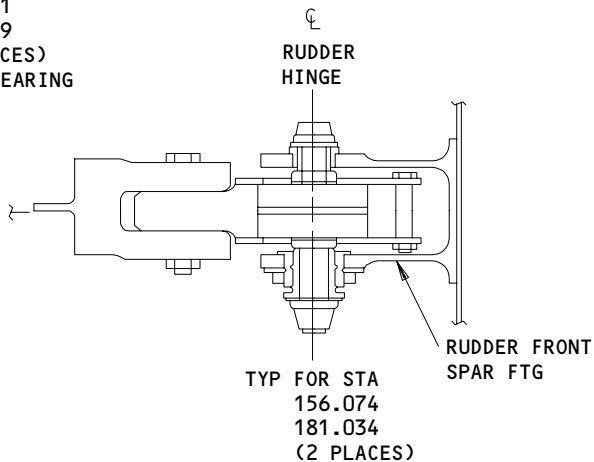
(A)

TYP FOR STA 18.260  
60.204  
106.142  
131.108  
230.972  
305.871  
380.769  
(7 PLACES)  
ROLLER BEARING



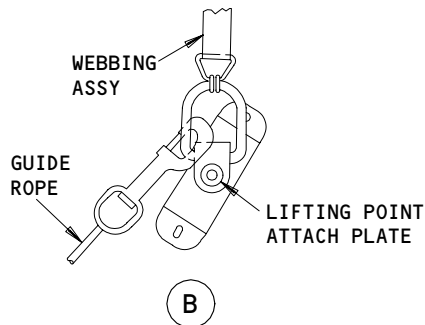
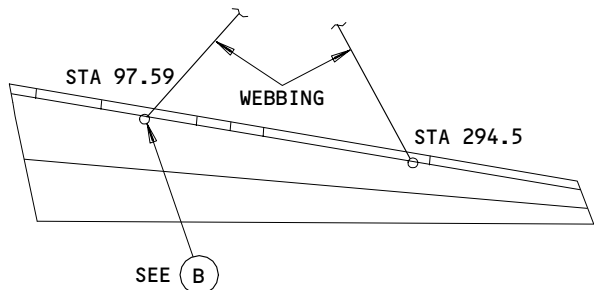
RUDDER HINGE EXPANSION LINKS

A-A



FIXED HINGE THRUST RIBS

A-A



Rudder  
Figure 9

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- U. Rudder Trim Control Switch and Indicator (Fig. 10)
  - (1) The trim position indicator is driven electrically by a RVDT in the rudder trim actuator on the feel, centering, and trim mechanism. The indicator is located on aft electronic control panel P8 next to the rudder trim knob and is powered by 28 volts ac from bus L. The RUDDER TRIM POS circuit breaker is located on overhead circuit breaker panel P11. The indicator shows up to about 17 units of left or right trim.
  - (2) The rudder trim switch is located on P8 and activates arming and control switches, which direct electrical input to the rudder trim actuator motor. The switch is spring-loaded to return to neutral. The RUDDER TRIM circuit breaker is located on P11.
- V. Warning Indications
  - (1) A white RUDDER RATIO message on the lower EICAS display unit maintenance page indicates a failure in one RRCM internal circuitry or RRCM input data error. The maintenance page can only be called up while the airplane is on the ground.
  - (2) The standby bus must be on for rudder ratio system maintenance message display.
  - (3) An amber RUDDER RATIO light indicates rudder ratio changer system shutdown. This is due to failure of both RRCMs or a failure of the ratio changer mechanism or actuator. A corresponding amber message, RUDDER RATIO, will appear on the upper EICAS display unit with the right engine in RUN mode.

### 3. Operation

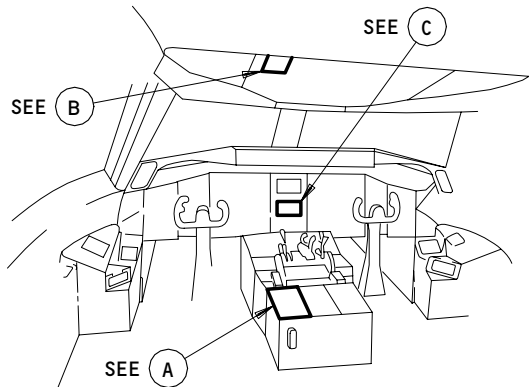
#### A. Functional Description

- (1) Pedal Adjustment
  - (a) Pedal adjustment cranks drive the adjustable yokes through a flexible cable. Rotation of the crank causes rotation of a jackscrew which moves the yoke forward or aft. Control rods between the rudder pedals and yokes move the pedals in the direction of yoke movement, adjusting closeness to the pilot.
- (2) Pedal Input to Feel, Centering, and Trim Mechanism
  - (a) Each set of pedals drives a forward quadrant through two control rods. Pushing in one pedal causes its forward quadrant to rotate and pull out the other pedal. The forward quadrants are tied together by a non-adjustable bus rod. Pedal input causes the forward quadrants to rotate in opposite directions and backdrive the other set of pedals. Rotation in opposite directions slackens one cable and tightens the other to rotate the feel, centering, and trim mechanism aft quadrant.
- (3) Rudder Feel, Centering, and Trim Mechanism (Fig. 4 and 11)

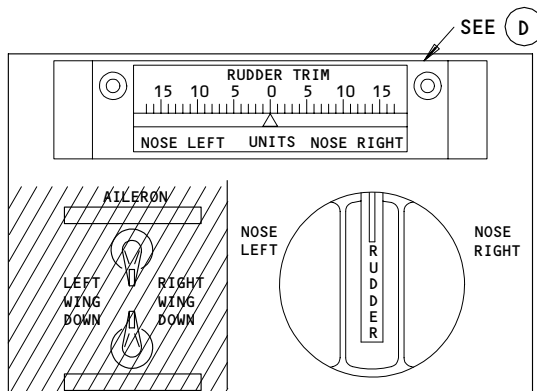
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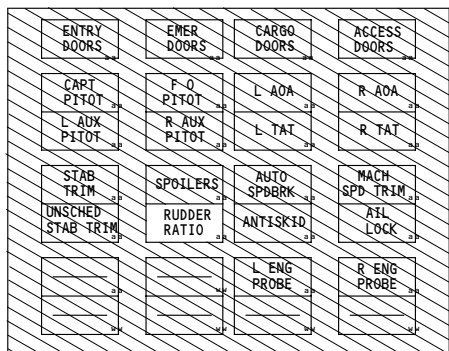


FLIGHT COMPARTMENT



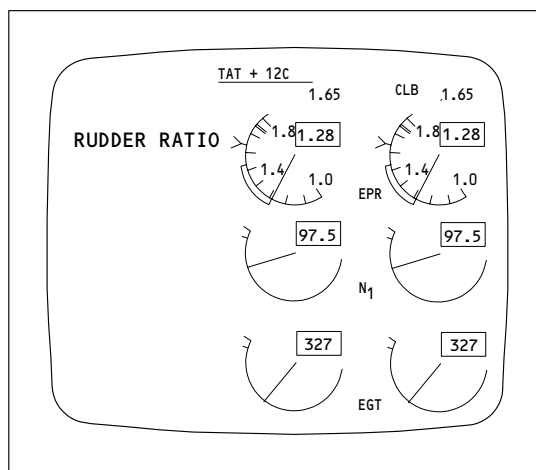
AIL/RUD TRIM CONTROL (P8)

(A)



P-5 OVERHEAD  
(TYPICAL)

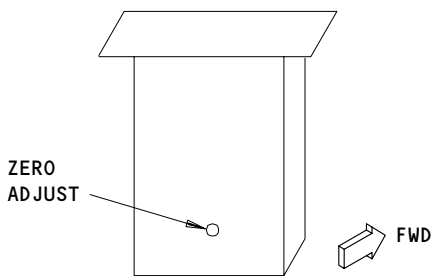
(B)



RUDDER RATIO

P-2 MAIN INST PANEL

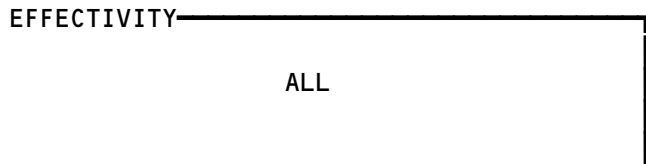
(C)



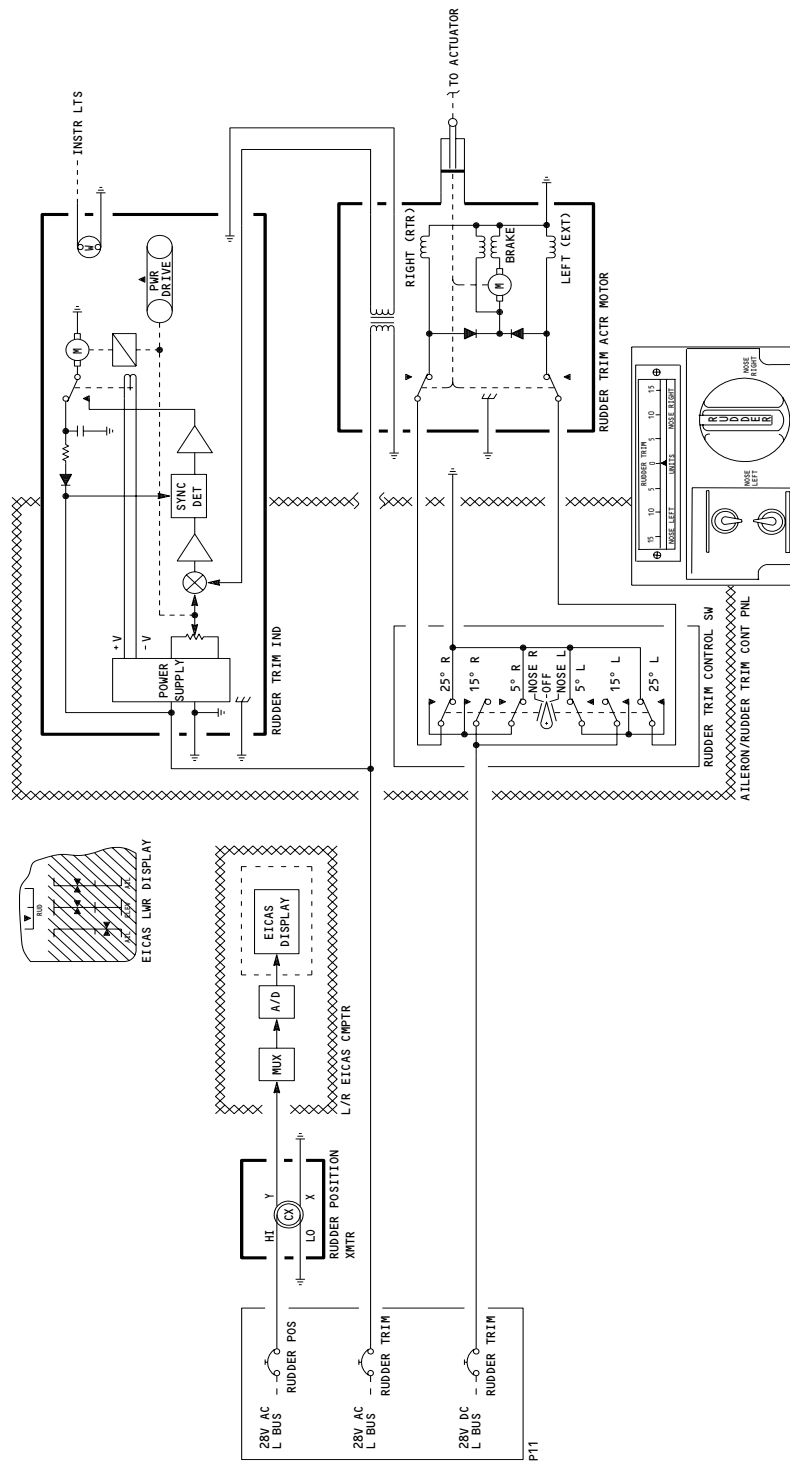
ADJUSTMENT  
INDICATOR

(D)

Rudder Trim and Warning Indications  
Figure 10



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Rudder Trim and Position Indication Schematic  
Figure 11

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- (a) Flight crew inputs through the rudder pedals and inputs from the directional autopilot servos provide a rotational force to the offset torque tube of the feel, centering, and trim mechanism. A cam plate mounted on the torque tube also rotates, forcing a roller to ride up the inclined face of the cam. As the roller rides up the cam, the spring arms spread causing the tension spring to stretch. As a result, the spring load increases. When input is removed, this load drives the cam plate back to the detent position and backdrives the rudder pedals to the centered or trimmed position.
  - (b) Feel force is the resistance to rudder pedal movement experienced by the flight crew. This force is produced by spring extension when the roller is forced to climb the inclined surface of the cam plate. Feel force increases with rudder deflection.
  - (c) The trim actuator rod end is connected to the spring arms and cam roller assembly. The upper arm is bearing-mounted on the torque tube's axis of rotation. As the trim actuator extends/retracts, the spring arms are forced to rotate about the bearing mount on the cam. The roller in the lower spring arm is held in the cam detent by the spring force. The cam is forced to follow the roller movement causing the torque tube to turn, thus providing trim input through the drive train to the rudder PCAs.
- (4) Trim Control Switch
- (a) The rudder trim switch in the flight deck provides input to the trim actuator. Rotating the trim knob arms the trim motor circuit and selects either the extend mode for left rudder trim or the retract mode for right rudder trim. The switch is powered by 28 volts dc.
  - (b) Movement of the trim switch through the 5° position removes the system ground. Movement through the 15° position arms the trim motor circuit. Rotation through the 25° position closes the control switch and selects the extend (left trim) or retract (right trim) operation. The switch has a mechanical stop at the 30° position.
- (5) Trim Actuator
- (a) The trim actuator is driven by a self-contained electric motor. The motor drive is controlled by the rudder trim switch or by activation of an internal limit switch. An electromagnetic brake prevents actuator overrun and internal mechanical stops prevent overtravel in case of a limit switch malfunction.

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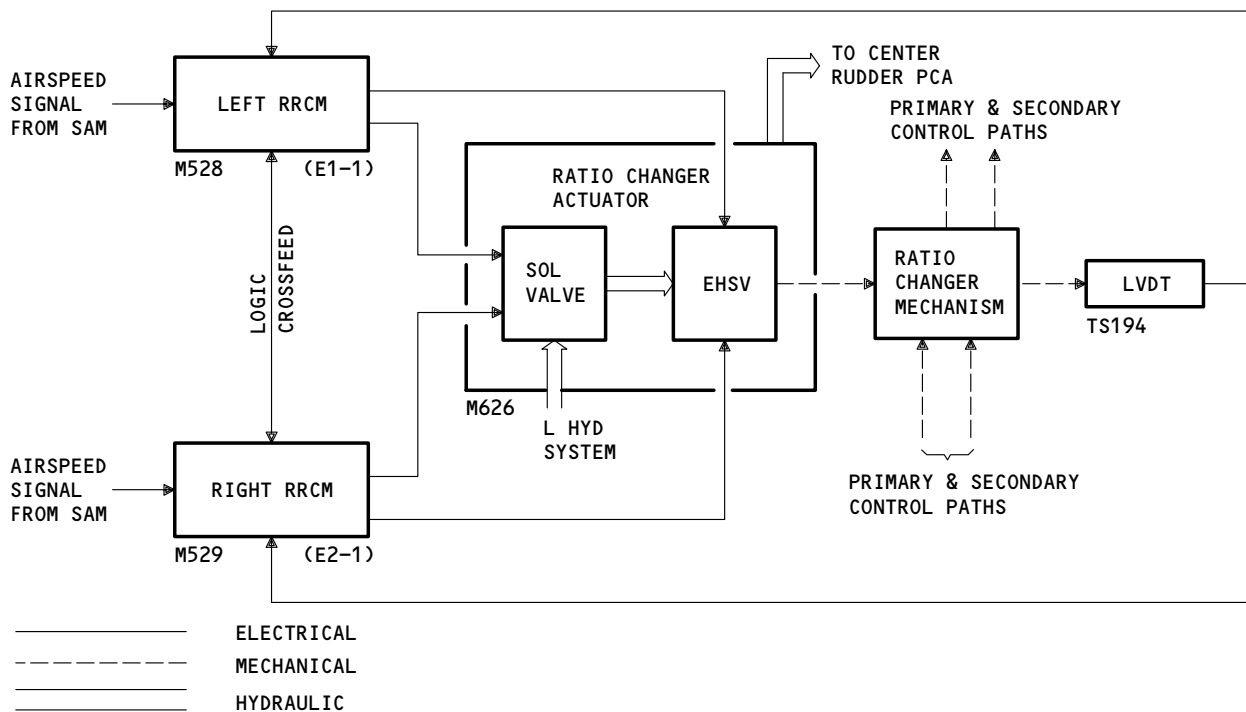
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- (6) Trim Position Indicator
- (a) The trim actuator has a self-contained position transmitter (RVDT) driven by a gear train. The RVDT sends a signal to the indicator which is summed with a feedback signal from the indicator's rebalance potentiometer. When the potentiometer shaft is in the proper position, the feedback signal cancels the RVDT signal. The indicator then displays the present trim position. When changing the trim position, the RVDT signals are not cancelled by the potentiometer signal, resulting in a difference signal. This difference signal causes a dc amplifier to drive the indicator dc motor. The motor drives the rebalance potentiometer in the correct direction to cancel out the RVDT signal. The roller-driven-pointer then displays the new trim position.
- (7) Rudder Ratio Changer System (Fig. 12 and 13)
- (a) The ratio changer system varies the amount of maximum rudder travel as a function of airspeed. The system provides for constant rudder pedal response over the entire airplane operating speed range. The rudder ratio changer actuator (RRCA) is electro-hydraulic and is driven by two separate analog control channels.



Ratio Changer Block Diagram  
Figure 12

EFFECTIVITY

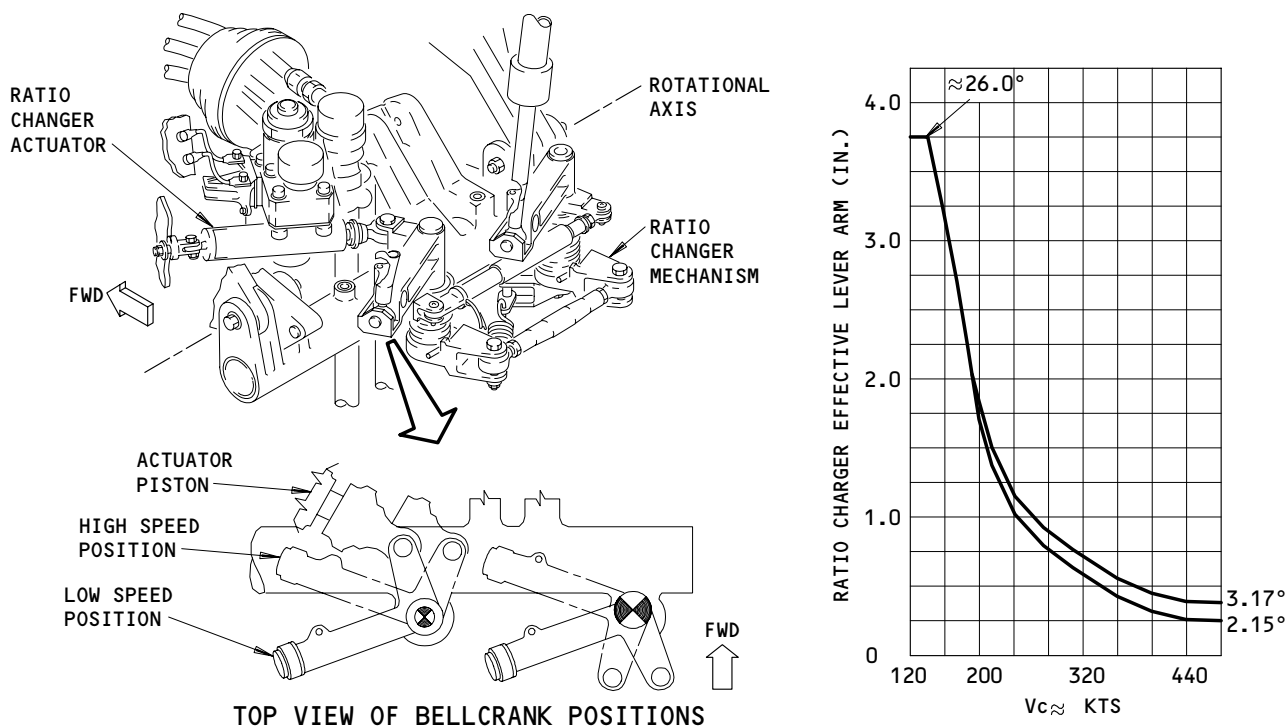
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(b) The RRCA mechanically varies the output of the ratio changer mechanism. In the low speed position, the RRCA is retracted and the left and right ratio changer cranks are swung out farther from the ratio changer torque tube axis of rotation. This increases the up or down control rod movement to the yaw damper as the torque tube rotates from control inputs. As airspeed increases, the actuator is commanded to extend, causing the left and right cranks to swing inward. This decreases the control rod movement and results in smaller control inputs to the yaw damper and PCAs. Rudder response varies from 26.5 degrees at 150 knots to 2.05 degrees at 450 knots.

(8) Ratio Changer Actuator

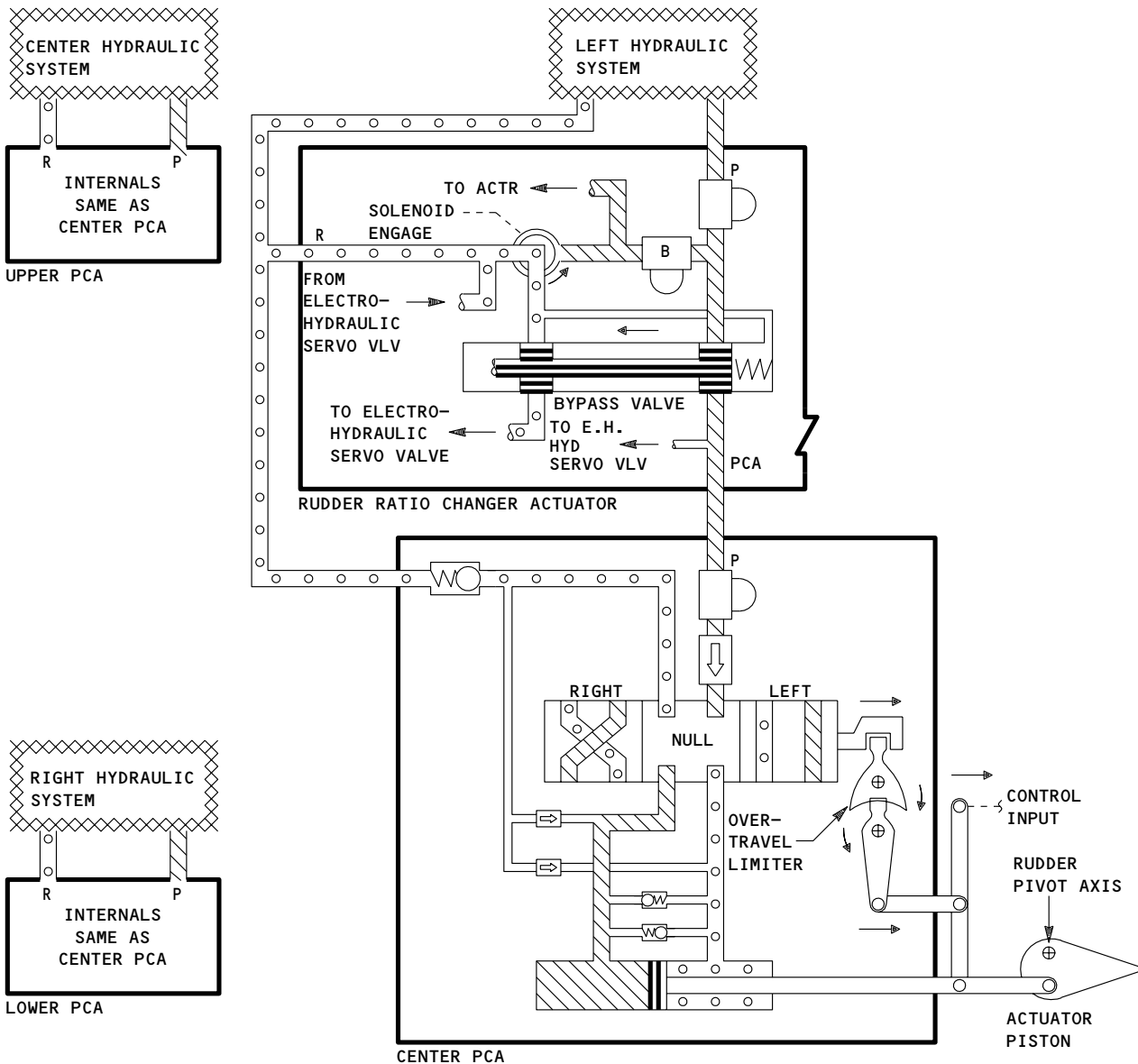
(a) The left hydraulic system supplies pressure to the ratio changer actuator. When the engage relay is activated, the solenoid valve is driven to the powered position and ports hydraulic pressure to the actuator bypass valve. The actuator bypass valve opens and left hydraulic pressure is supplied to the center rudder PCA and the EHSV. When no signal is supplied to the EHSV, the actuator is biased to return to the retract position. This corresponds to the low airspeed condition.



Rudder Ratio Changer  
Figure 13

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Rudder PCA and Ratio Changer Hydraulic Schematic  
Figure 14

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- (b) As airspeed increases, a signal is sent to the EHSV from the RRCM. The signal commands the EHSV to port left hydraulic pressure to extend the actuator piston. As airspeed decreases, the EHSV ports pressure from the extend side of the actuator to the return line. Since the actuator always has pressure on the retract side it will move toward the low airspeed position.
- (9) Rudder Ratio Changer LVDT Function
  - (a) The LVDT has two channels. Each channel feeds back the ratio changer bell crank position to a channel of its respective RRCM. The feedback information is used for nulling of the command input signal and for malfunction detection.
- (10) Rudder Ratio Changer Interfaces (Fig. 15)
  - (a) The digital air data computers (DADC) provide dual path calibrated airspeed signals to the stabilizer trim/aileron lockout modules (SAM). Air/ground relays and hydraulic sensing provide logic to the RRCM for ground testing and maintenance data annunciation.
  - (b) Each SAM receives airspeed data from both DADCs. These signals are converted into two independent program airspeed signals Vpa and Vpc (designated ARM and CONTROL) and are sent to the corresponding RRCM. Each SAM monitors DADC data input, its own operation, and Vpa and Vpc agreement. Each SAM also generates a Vp VALID signal and sends it to the RRCM to signify valid SAM output.
- (11) Rudder Ratio Changer Module (RRCM) (Fig. 16)
  - (a) Each RRCM receives two airspeed signals from its SAM. Individual commands to the actuator are produced on both RRCM dual analog computation paths. The RRCM in control is determined randomly at power up; one module will be active and the other on standby. Each airspeed signal is summed with the LVDT and equalizer circuit output. When the airspeed changes, an error exists between the LVDT and airspeed signals. This error signal is amplified and sent to the actuator's electro-hydraulic servo valve (EHSV). These signals command the actuator to drive to a new position. The LVDT is driven by the actuator through the right ratio changer crank. It provides crank position feedback to the RRCM to eliminate the error signal. The amplified error signals on each RRCM computation path are monitored by current detectors. If a difference between error signals exists, an equalization signal is subtracted from the high signal and added to the low. This equalizes the signals to the EHSV.

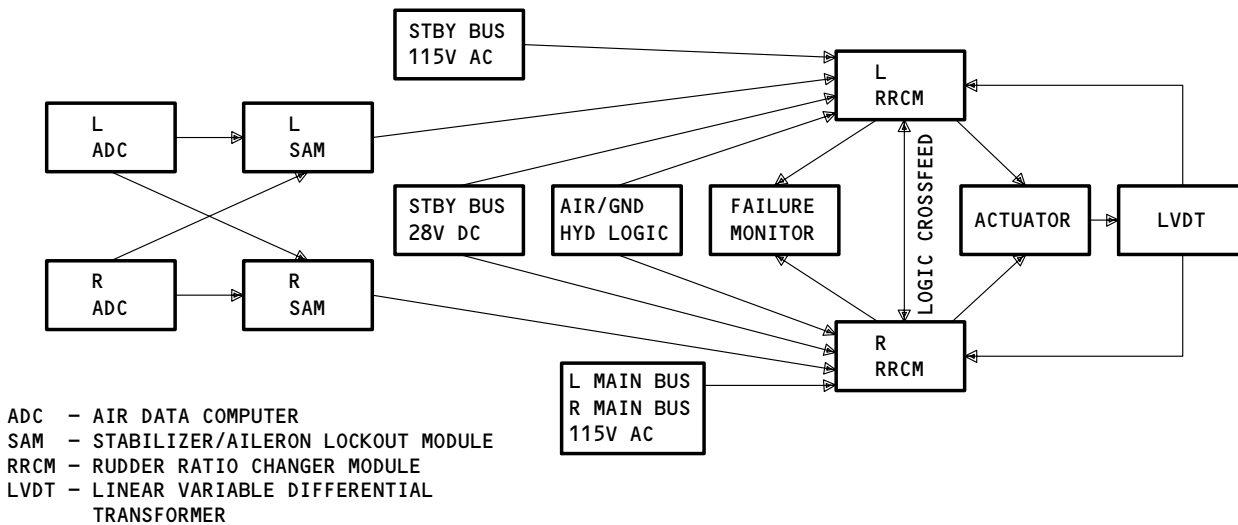
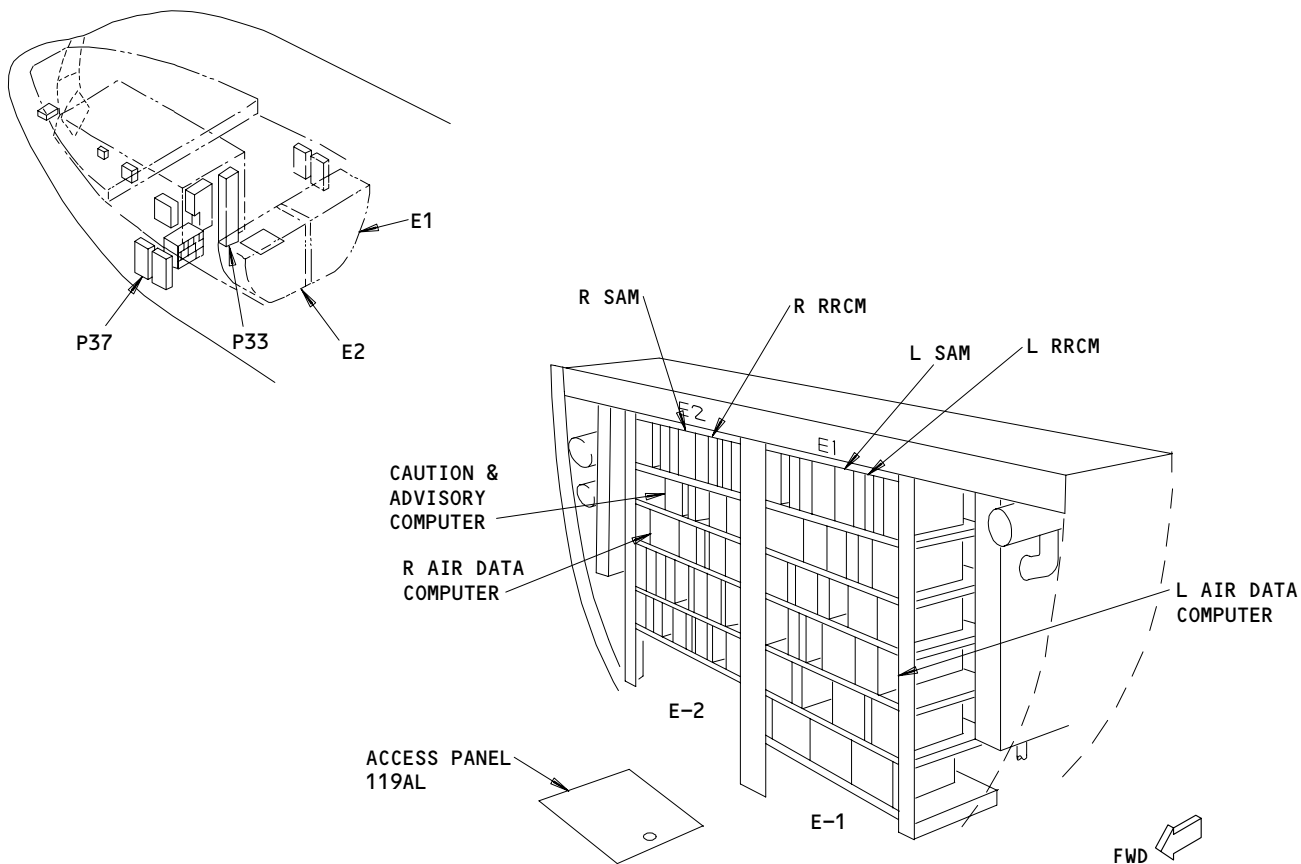
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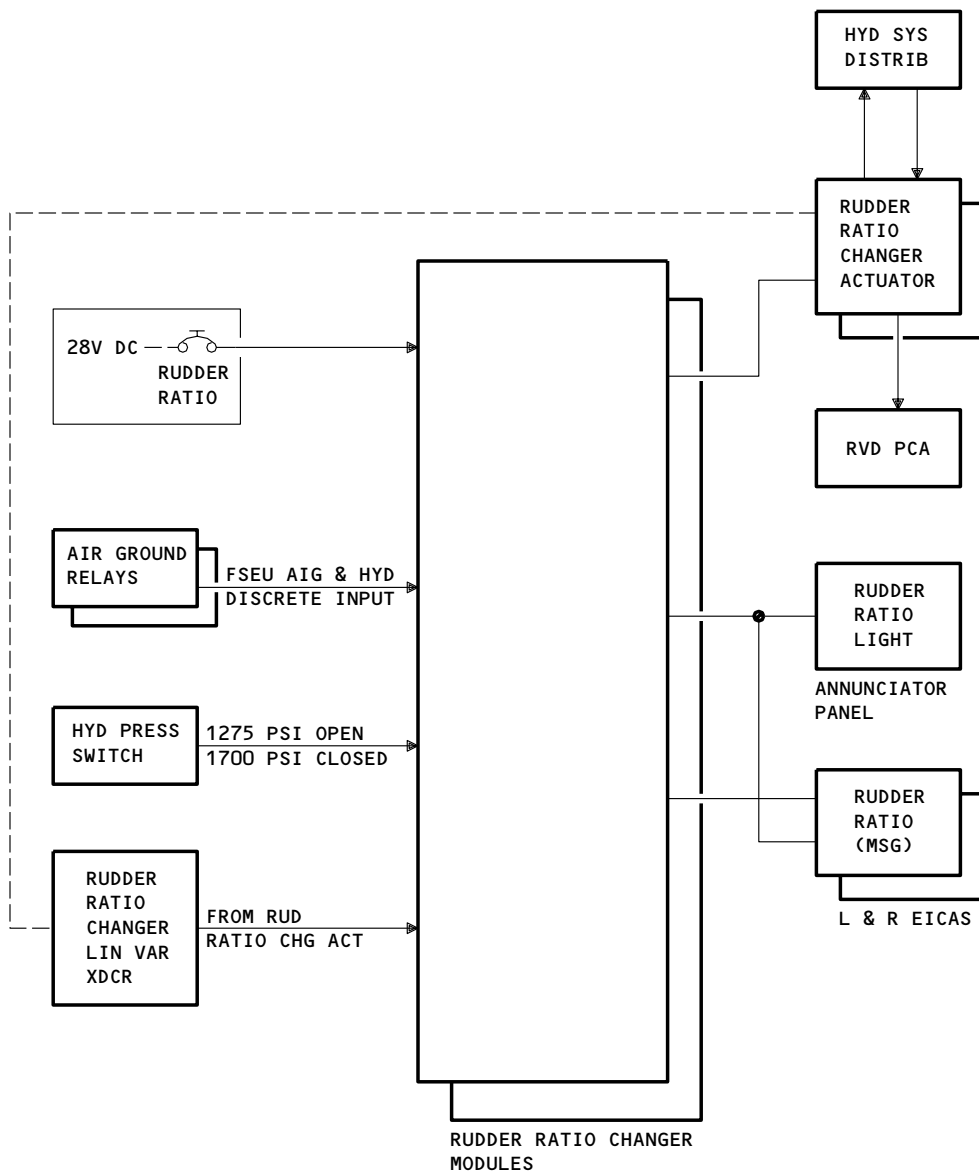
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Rudder Ratio Changer Module Interfaces  
Figure 15

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**LEGEND:**

- ELECTRICAL
- - - MECHANICAL

Rudder Ratio Changer Schematic  
Figure 16

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- (b) Failure monitoring of RRCM output is performed on the dual analog computation paths. The output monitoring consists of a command difference, command hardover, and an open load monitor. The difference and hardover monitors use current detectors on each signal path. The difference monitor compares the current output commands of the two computation paths for a difference exceeding  $\pm 2.5$  MA. Latch will occur after a 0.82-second time delay. The hardover monitor sums the output commands of the dual analog paths. The sum of two commands exceeding  $\pm 5.0$  milliamps trips the monitor. Latch will occur after a 2.5 second delay. The open load monitor checks the output voltage in each computation path. Absence of load current is reflected in the output voltage. Signal latch occurs if 7.8 volts is exceeded for 1.6 seconds.
- (12) RRCM Latch and Control Logic (Fig. 15)
  - (a) Module latch and control logic functions are performed by monitoring several inputs. These inputs are internal module monitors, validated airspeed signal from SAM (Vp), hydraulic pressure sensing, and air/ground status from the air/ground relays.
  - (b) Each module processes these inputs and provides suitable control and fault annunciation signals. The module engages/relaxes the engage relay (if in command), provides/receives control and engage interlock signals between modules. The module also provides input to the EICAS computer and amber RUDDER RATIO light.
- (13) Channel Selection and Interlock Logic
  - (a) The first module to receive a validated airspeed signal from the respective SAM takes control to become the primary channel. This module provides a low logic signal locking the other module in the STANDBY MODE. Activation of the engage relay by the module in control provides an engage interlock signal. This signal inhibits the standby module from activating its own engage relay.
- (14) Latching Logic – Power Up Sequence
  - (a) During initial power up, the Difference and Hardover Latches are set to low logic (capable of control) for 12.5 seconds. Invalid to valid transition of SAM Vp VALID signal includes a 10–15 second delay which inhibits the output monitors while system signals are synchronized.

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- (b) In the power up sequence, SAM Vp VALID signal remains invalid and the control line is high logic. The latch monitors are forced low for 12.5 seconds. Engage relays are de-energized and the amber RUDDER RATIO light is on. SAM Vp VALID signal changes from invalid to valid, forcing the hardover and difference monitors to a inhibit non-failure state. One module takes control locking the other module to standby and inhibits energizing of the other engage relay. Amber light goes out, servo and solenoid valve signals connect actuator through solenoid valve. Hydraulic power is applied and the actuator drives to the commanded position. Monitor inhibit is released and tripping function enabled.
- (15) Latching Logic - Control and Shutdown
- (a) Module in command hardover, difference or open load monitor trips, causes the control line to go to high logic and de-energizes the engage relay. Control is shifted to the standby module and a white RUDDER RATIO message appears on the maintenance page.
  - (b) Module on standby monitors trips, forces the control line to remain in high logic and inhibits passing of control from module in command. A white RUDDER RATIO message appears on the maintenance page.
  - (c) Left system hydraulic pressure loss causes both modules to de-energize their engage relays. Hydraulic shutdown of the actuator follows causing loss of ratio changer function and cycling of ratio changer to low speed position. The amber RUDDER RATIO light goes on; the RUDDER RATIO alert message (level C) appears on EICAS when the engine inhibit is removed.
  - (d) Loss of SAM Vp VALID signal drives the control line high, de-energizes the engage relay and shift or inhibit shifting of command between modules depending on which module loses the signal.
- (16) Ground Test Logic
- (a) TEST mode selection forces the module selected to energize the engage relay and drives the actuator to high speed position. The amber RUDDER RATIO light goes on and the amber RUDDER RATIO message appears on EICAS with engine run inhibit removed. The hardover monitor is inhibited. Inhibit lasts for 12.5 seconds after test switch is returned to NORMAL. Failure annunciation ceases once the test switch is returned to NORMAL. Air/ground relays prevent activation of TEST mode while aircraft is flying.
- (17) Fault Detection and Annunciation (Fig. 17)
- (a) Two types of failures will cause the engage relays to de-energize; a second failure in the electronic systems that affect both RRCMs, or a failure in the "single thread" portion of the system. The single thread components are the electro-hydraulic servo valve, the ratio changer actuator, the ratio changer mechanism, and the LVDT. Removal of one RRCM will activate an interlock which causes the amber light to come on.

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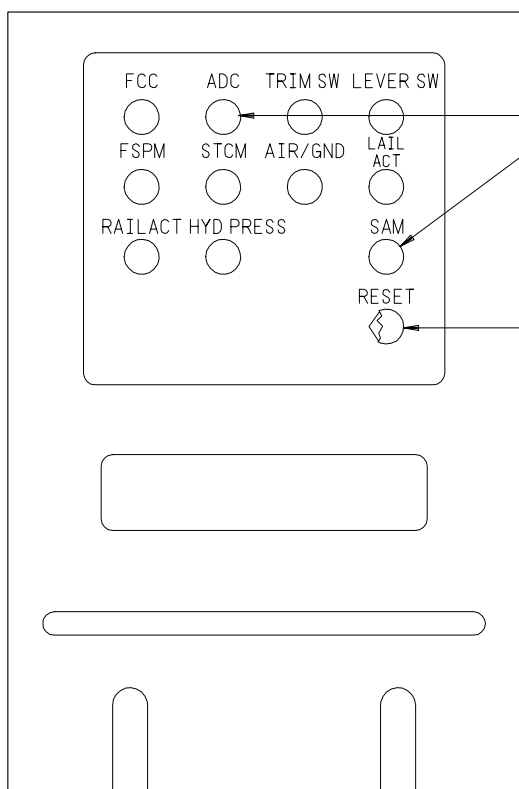
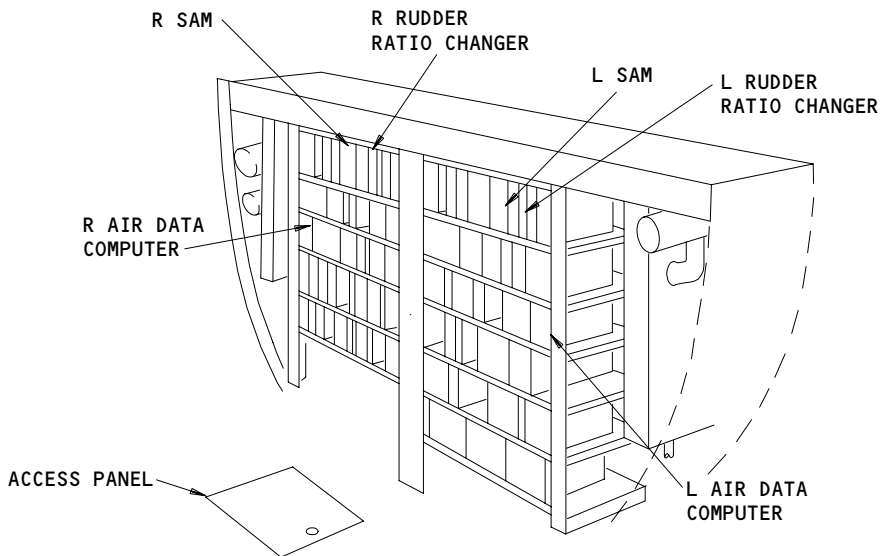
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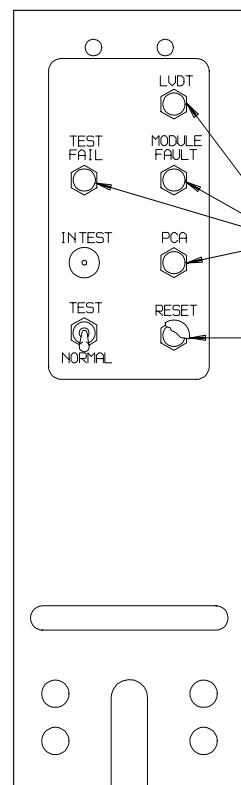
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STABILIZER TRIM AND AILERON LOCKOUT  
MODULE (SAM) - (TYP)



RUDDER RATIO  
CHANGER MODULE (TYP)

Fault Detection  
Figure 17

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- (b) Ratio changer modules continuously monitor system status, through open load, difference, and hardover monitors, and the presence of Vp valid signal. Detection of failure in any monitor shifts control to the standby module. This is a single (ratio changer) module failure.
  - (c) Detection of a single module failure provides a signal input to the EICAS computers. The EICAS computers store a white RUDDER RATIO message for ground access only. The suitable faultball will set on the ratio changer module.
  - (d) Detection of a dual module failure will de-energize the engage relay. The ratio changer actuator solenoid valve will close, allowing the actuator to retract to the low speed position. Hydraulic pressure to the middle power control actuator is cut off.
  - (e) Dual module failure causes an amber RUDDER RATIO alert message (level C) on the upper EICAS display with EICAS engine inhibit removed. The RUDDER RATIO amber caution light on overhead panel P5 comes on and suitable faultballs will set on the ratio changer module.
- (18) Maintenance Faultballs
- (a) Each RRCM contains four faultballs and a faultball reset button. The faultball display is non-volatile and can be reset only at the module.
  - (b) LVDT faultball
    - 1) Each channel of the dual channel LVDT is sent to one RRCM. Circuitry continuously monitors the LVDT secondary element common mode sum voltage to 2.5 volts ac. The faultball will set if voltage is less.
  - (c) PCA faultball
    - 1) The PCA faultball is set by any of three independent logic signals. Latching of the hardover monitor, (dual channel failure or low hydraulic pressure inhibits this faultball signal), failure of both modules within 2.5 seconds of each other, and latching of the open load monitor.
    - 2) A PCA faultball will also set if the left hydraulic system is pressurized, and pressure to the rudder is removed by closing the left rudder/elevator hydraulic shutoff valve.
  - (d) Module faultball
    - 1) Faultball will set if the difference monitor latches and the PCA faultball dual channel failure signal is not received within 2.5 seconds.
  - (e) Test Fail faultball
    - 1) Failure of BITE test or returning the test switch to NORMAL before test is complete will set the faultball.
  - (f) Reset function provides a reset signal to a set of latches. The latch provides a ground for a 28 volt dc circuit to reset the faultball.
- (19) Yaw Damper Summing Lever Paths (Fig. 18)

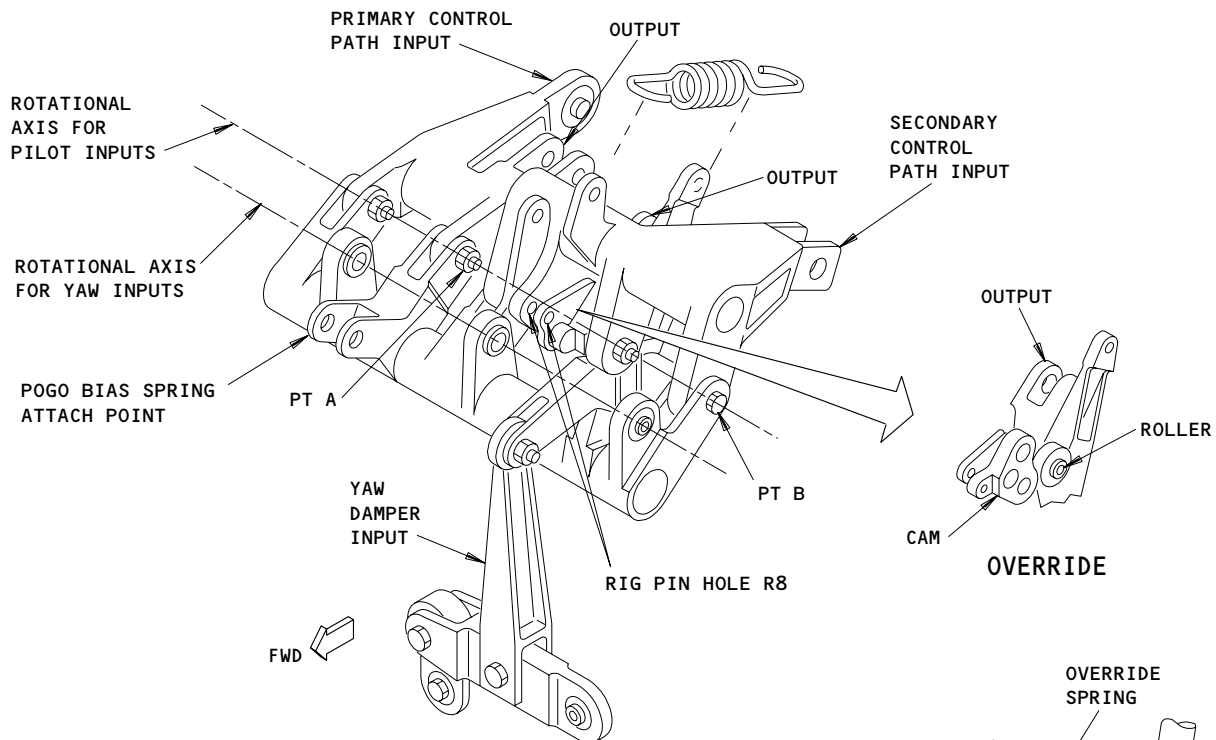
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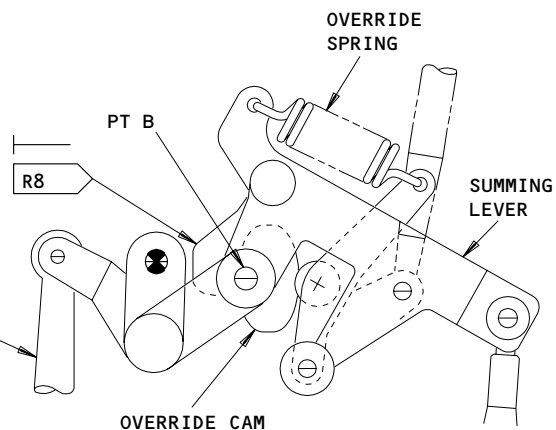
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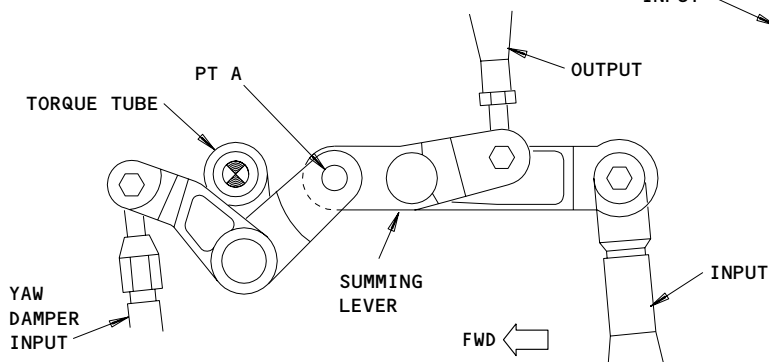
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**YAW DAMPER SUMMING MECHANISM**

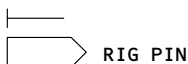


**YAW DAMPER SUMMING (SECONDARY)**



**YAW DAMPER SUMMING (PRIMARY)**

**LEGEND**



**Yaw Damper Summing Lever Paths  
Figure 18**

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- (a) Primary summing path
    - 1) Input from the ratio changer causes the summing lever to rotate about point "A". When the yaw damper input is fixed, the torque tube is fixed. Since the primary input and output rods are joined as one piece, they both rotate about point "A" and the input is passed directly to the output rod.
    - 2) Yaw damper input causes rotation of the torque tube. When the input from the ratio changer is fixed, the summing lever will rotate about the fixed input attach point. This motion is then passed to the output rod.
  - (b) Secondary summing path
    - 1) During normal operation the secondary summing path operates the same way as the primary summing path. When the yaw damper input is fixed the lever rotates about point "B". The cam, which also pivots at "B", is attached to the secondary output crank arm. When the ratio changer input is fixed, its attach point to the lever becomes a pivot for yaw damper inputs. The roller rides on the override cam slightly out of the detent to prevent backlash in the system.
    - 2) Should a jam occur in the output rods from the summing lever, the load limiter in the primary path will crush. At the same time, the roller will ride along the override cam in the secondary summing path. This enables the secondary control path to remain intact if the jam frees itself. When the jam clears, the roller will be held in the cam detent and normal rudder operation will resume through the secondary control path.
- (20) Power Control Actuator (PCA) (Fig. 11)
- (a) Each actuator is supplied hydraulic pressure by a separate system. Input to the control valve comes from the output of the yaw damper summing lever and through the transfer bell cranks to the input linkage.
  - (b) When the control valve is moved, hydraulic pressure is ported to either the retract or extend side of the piston. The opposite side is connected to the return line. As the piston drives the rudder surface, the reaction link backdrives the actuator body. This action provides feedback to the input linkage to null out valve input.
  - (c) Counterclockwise rotation of the PCA input lever ports pressure to the retract side of the actuator which causes left rudder. Clockwise rotation of the PCA input lever ports pressure to the extend side of the actuator which causes right rudder.

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- (d) When the hydraulic system to the PCA is depressurized, the inlet check valve prevents reverse flow and the return line compensator maintains a small pressure within the actuator. Two anticavitation valves are located in the return line to provide a low resistant fluid path from either side of the piston to the other. Two relief valves provide internal relief when pressure exceeds 3600 psi. The valves reset at 3000 psi.
- (21) Rudder Left Hydraulic System Fuse
  - (a) The rudder left hydraulic system fuse operates by spring-action. The fuse closes when the pressure drop across the fuse increases due to an increased hydraulic fluid flow from a failed component or line rupture downstream. The fuse automatically resets by its spring-action once the pressure on both sides of the fuse is equal.
  - (b) This fuse incorporates a time delay to regulate its spring-action closure. This prevents inadvertent setting of the fuse due to pressure surges that occur when the hydraulic system is first pressurized.
- B. BITE (Fig. 19)
  - (1) Each RRCM has self-test capability. On the front of the RRCM is a test switch. When the switch is moved to TEST, the module IN TEST light on both RRCMs will come on and the amber RUDDER RATIO light on P5 will illuminate. The amber RUDDER RATIO message will appear on EICAS with engine run inhibit removed. During the self-test process, the RRCM commands the RRCA to extend. When the switch is returned to NORMAL, the RRCA will retract, and the RUDDER RATIO and IN TEST lights will go out. Should the RRCM fail its self-test, the TEST FAIL fault ball will appear yellow.
- C. Control
  - (1) Provide electrical power (AMM 24-22-00/201).

**WARNING:** KEEP PERSONNEL AND EQUIPMENT CLEAR OF ALL CONTROL SURFACES TO PREVENT INJURY OR DAMAGE. AILERONS, ELEVATORS, RUDDER, TRAILING EDGE FLAPS, LEADING EDGE SLATS, STABILIZER AND SPOILERS ARE FULLY POWERED.

- (2) Provide left, center and right hydraulic systems power (AMM 29-11-00/201).

**NOTE:** Hydraulic power from only one system is required to operate the rudder.

- (3) Rudder Pedals Control
  - (a) Push right pedal for right rudder; push left pedal for left rudder.
  - (b) Remove foot pressure on pedals to return rudder to neutral or trimmed position.
- (4) Rudder Trim Control
  - (a) Turn trim knob right for right rudder; turn trim knob left for left rudder.

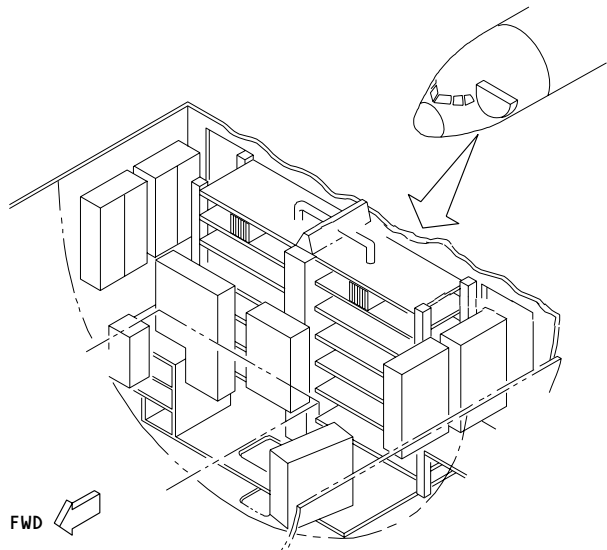
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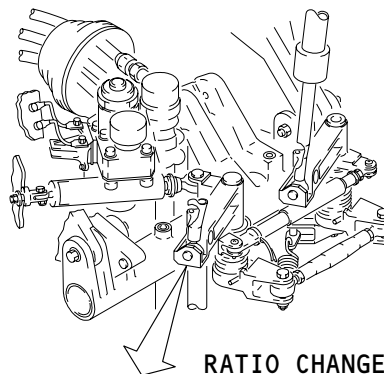
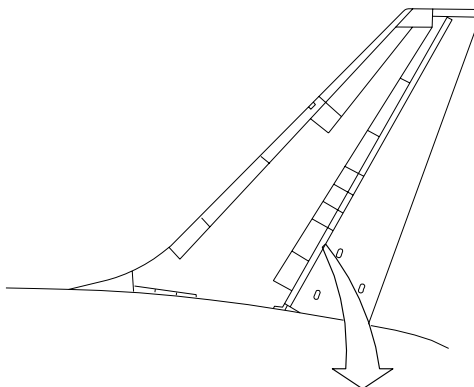
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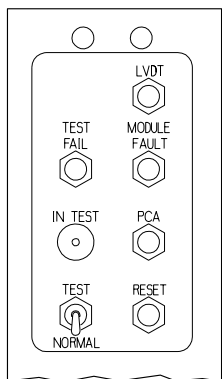
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**FORWARD EQUIPMENT CENTER**



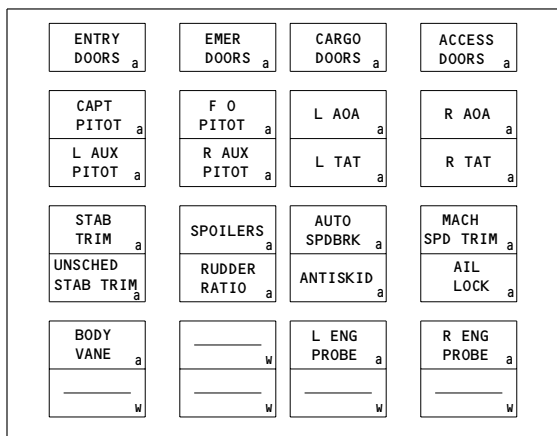
**RATIO CHANGER**



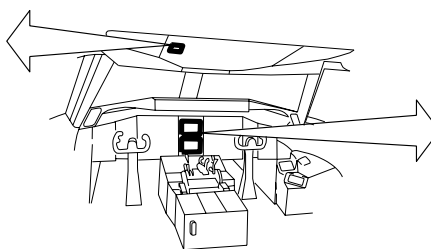
**RATIO CHANGER MODULE (TYP)**

HIGH SPEED POSITION (TEST)

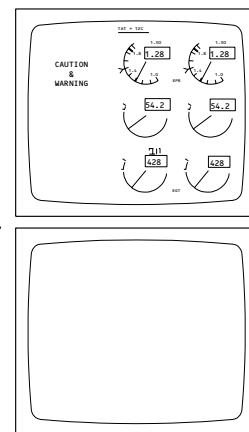
LOW SPEED POSITION (NORMAL)



**P-5 OVERHEAD**



**FLIGHT COMPARTMENT**



**P-2 MAIN INST PANEL**

**BITE  
Figure 19**

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MAINTENANCE MANUAL

- (b) Turn trim knob until trim indicator reads zero units to return rudder to neutral.
- (5) Remove hydraulic power.
- (6) Remove electrical power if no longer required.

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FAULT ISOLATION/MAINT MANUAL

RUDDER AND RUDDER TRIM CONTROL SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ACTUATOR - RUDDER POWER CONTROL (PCA)	4	3	324GL,324JL,324LL	27-21-02
ACTUATOR - RUDDER RATIO CHANGER, M626	4	1	324EL	27-21-15
ACTUATOR - RUDDER TRIM, M515	3	1	324BL,324EL	27-21-11
ASSEMBLY - RUDDER FORWARD QUADRANT AND JACK-SHAFT	2	2	113AL, FWD EQUIP CTR	27-21-07
ASSEMBLY - RUDDER PEDAL	2	2	113AL, FWD EQUIP CTR	27-21-05
ASSEMBLY - YAW DAMPER SUMMING LEVER	4	1	324EL	27-21-18
CIRCUIT BREAKER -	1		FLT COMPT, P11	
RUDDER RATIO, C1031		1	11G10	*
RUDDER TRIM, C1033		1	11K18 OR 11C5	*
RUDDER TRIM POS, C1034		1	11K17	*
CRANK - RUDDER PEDAL ADJUSTMENT	2	2	113AL, FWD EQUIP CTR	27-21-06
INDICATOR - RUDDER TRIM, N83	1	1	FLT COMPT, P8	*
LIGHT - RUDDER RATIO, YDLL18	1	1	FLT COMPT, P5, ANNUN PANEL, M10394	*
LVDT - RUDDER RATIO CHANGER, TS194	4	1	324EL	27-21-13
MECHANISM - RUDDER FEEL, CENTERING AND TRIM	4	1	324BL	27-21-10
MECHANISM - RUDDER RATIO CHANGER	4	1	324EL	27-21-13
MODULE - (FIM 27-09-00/101)				
RUDDER RATIO CHANGER L, M528				
RUDDER RATIO CHANGER R, M529				
STABILIZER TRIM/AILERON LOCKOUT L, M524				
STABILIZER TRIM/AILERON LOCKOUT R, M525				
PANEL - (FIM 30-31-00/101)				
ANNUNCIATOR, M10394				
RELAY - (FIM 31-01-33/101)				
SYSTEM 2 AIR/GROUND, K518				
RELAY - (FIM 31-01-36/101)				
SYSTEM 1 AIR/GROUND, K529				
RUDDER -	3	1	320	27-21-01
SERVO - (FIM 22-12-00/101)				
LEFT YAW DAMPER, M510				
RIGHT YAW DAMPER, M509				
SERVO - (FIM 22-13-00/101)				
C DIRECTIONAL AUTOPILOT, M278				
L DIRECTIONAL AUTOPILOT, M277				
R DIRECTIONAL AUTOPILOT, M279				
SWITCH - (FIM 29-11-00/101)				
SYS L ACMP CONTROL PRESSURE, S27				
SWITCH - RUDDER TRIM CONTROL, YARS3	1	1	FLT COMPT, P8, AILERON/RUDDER TRIM CONT PANEL, M74	*
TRANSMITTER - (FIM 27-28-00/101)				
RUDDER POSITION, M516				

\* SEE THE WDM EQUIPMENT LIST

Rudder and Rudder Trim Control System - Component Index  
Figure 101

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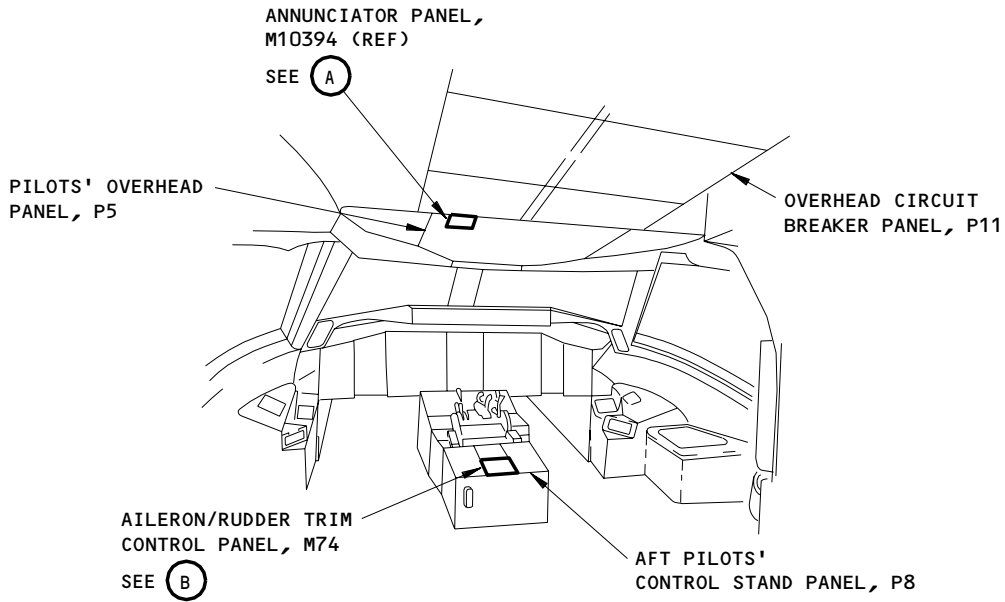
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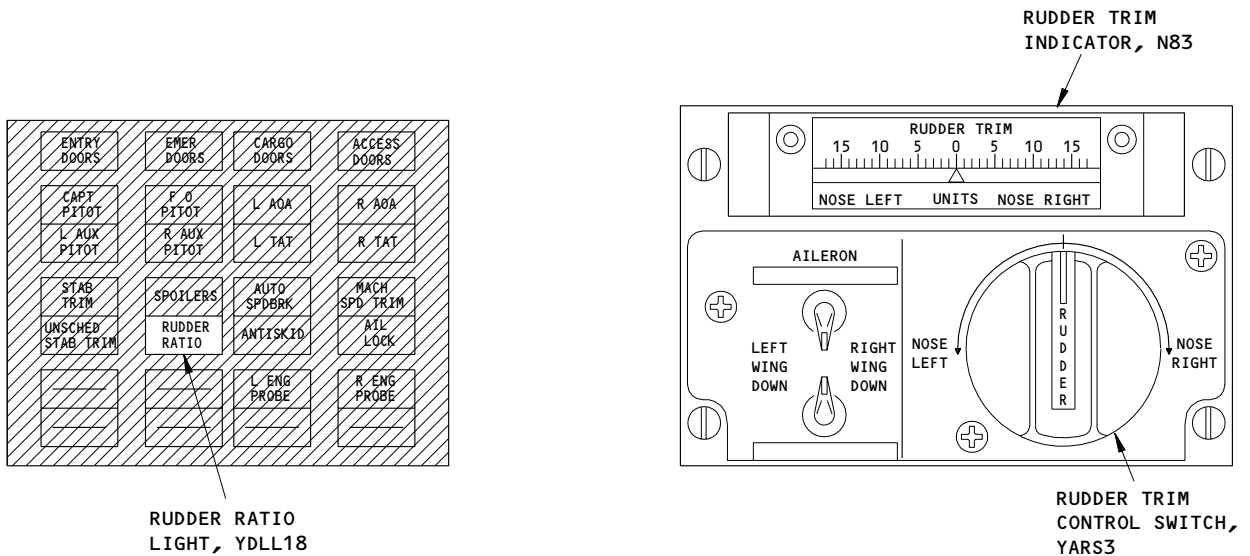
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## 767

### FAULT ISOLATION/MAINT MANUAL



**FLIGHT COMPARTMENT**



**ANNUNCIATOR PANEL, M10394 (REF)**

(A)

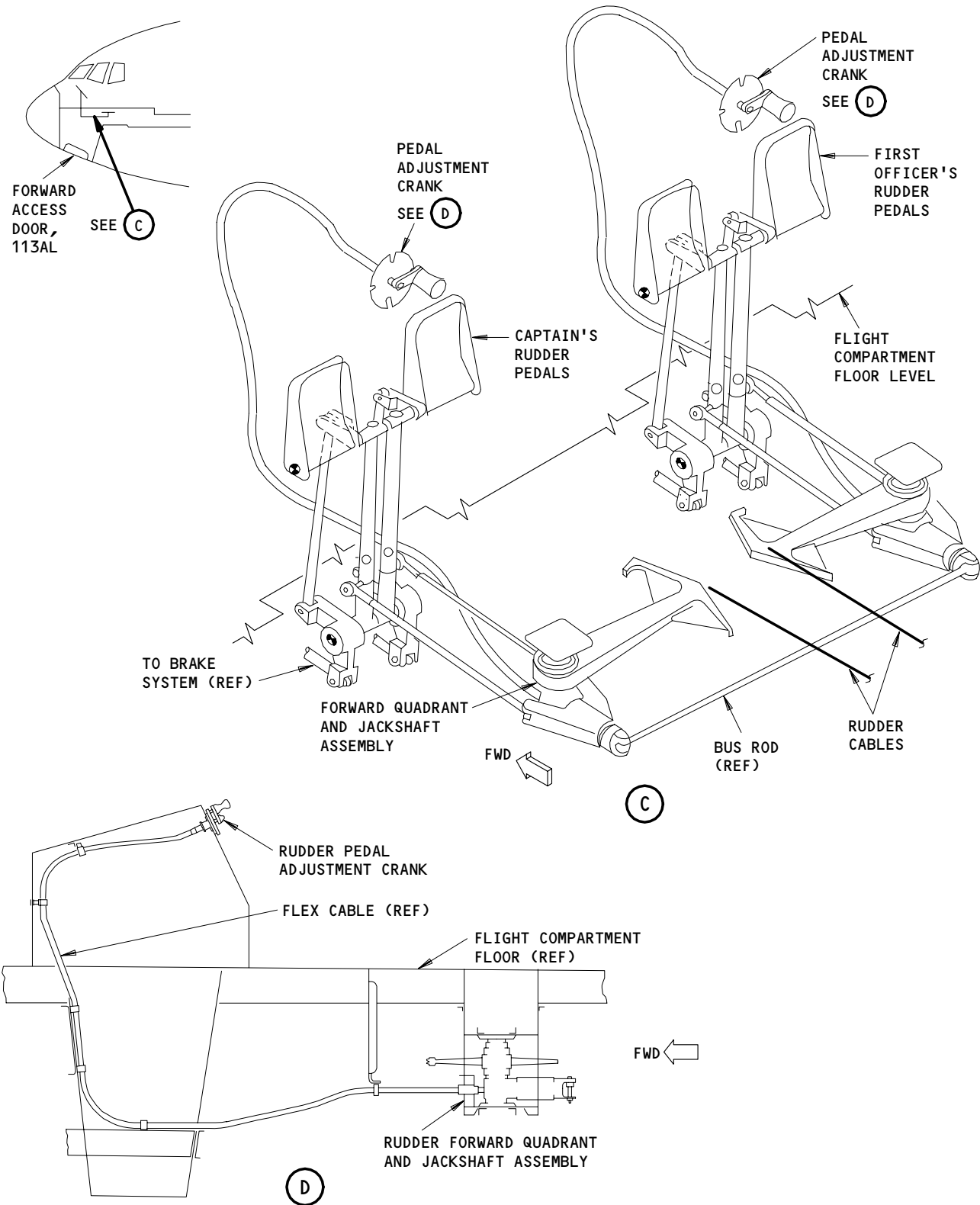
**AILERON/RUDDER TRIM CONTROL PANEL, M74**

(B)

**Rudder and Rudder Trim Control System - Component Location  
Figure 102 (Sheet 1)**

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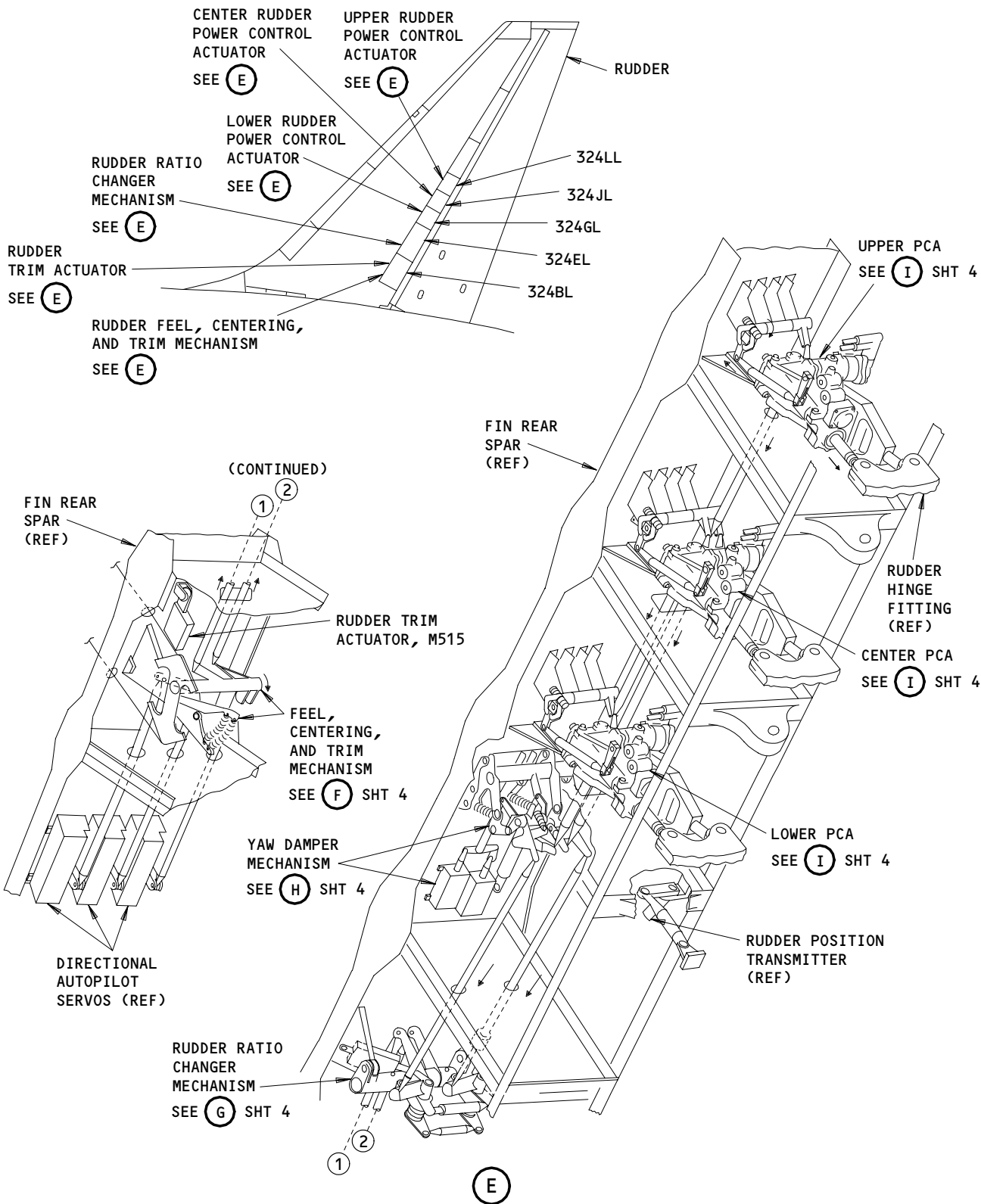
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Rudder and Rudder Trim Control System - Component Location  
Figure 102 (Sheet 2)

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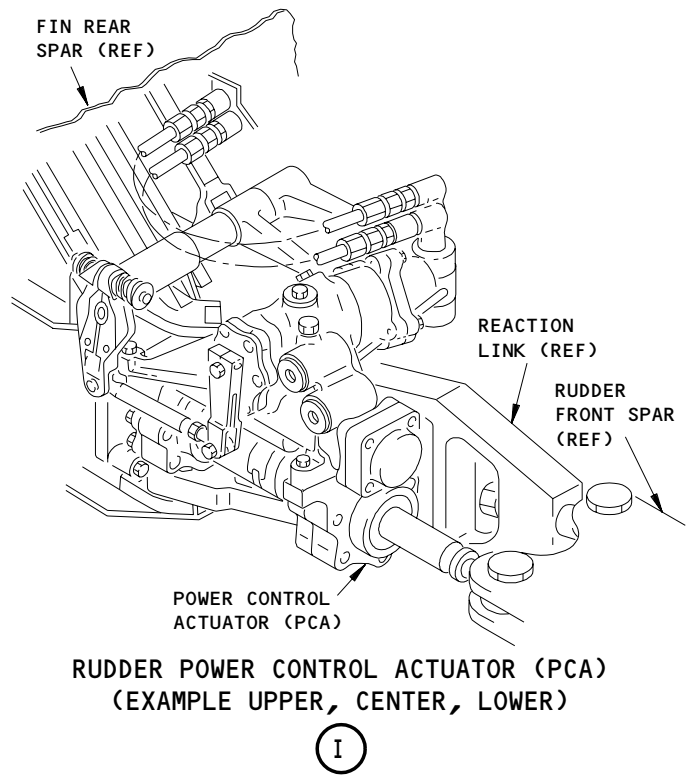
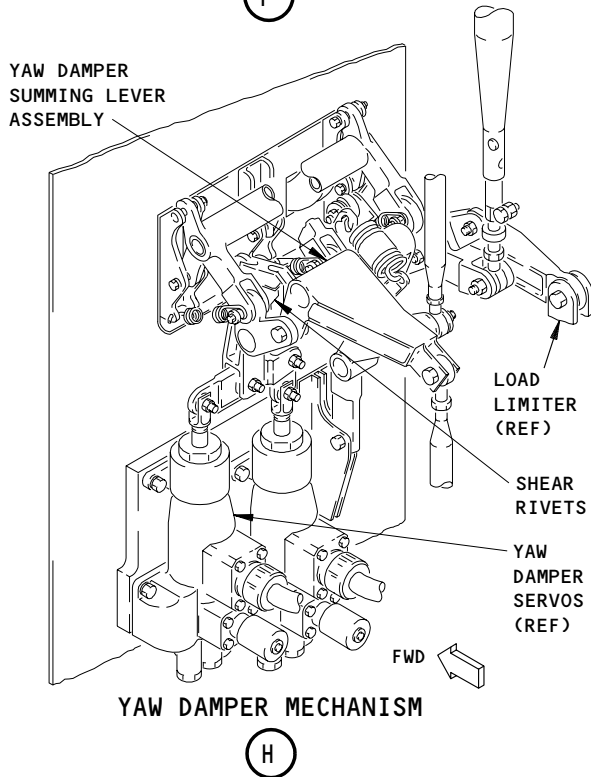
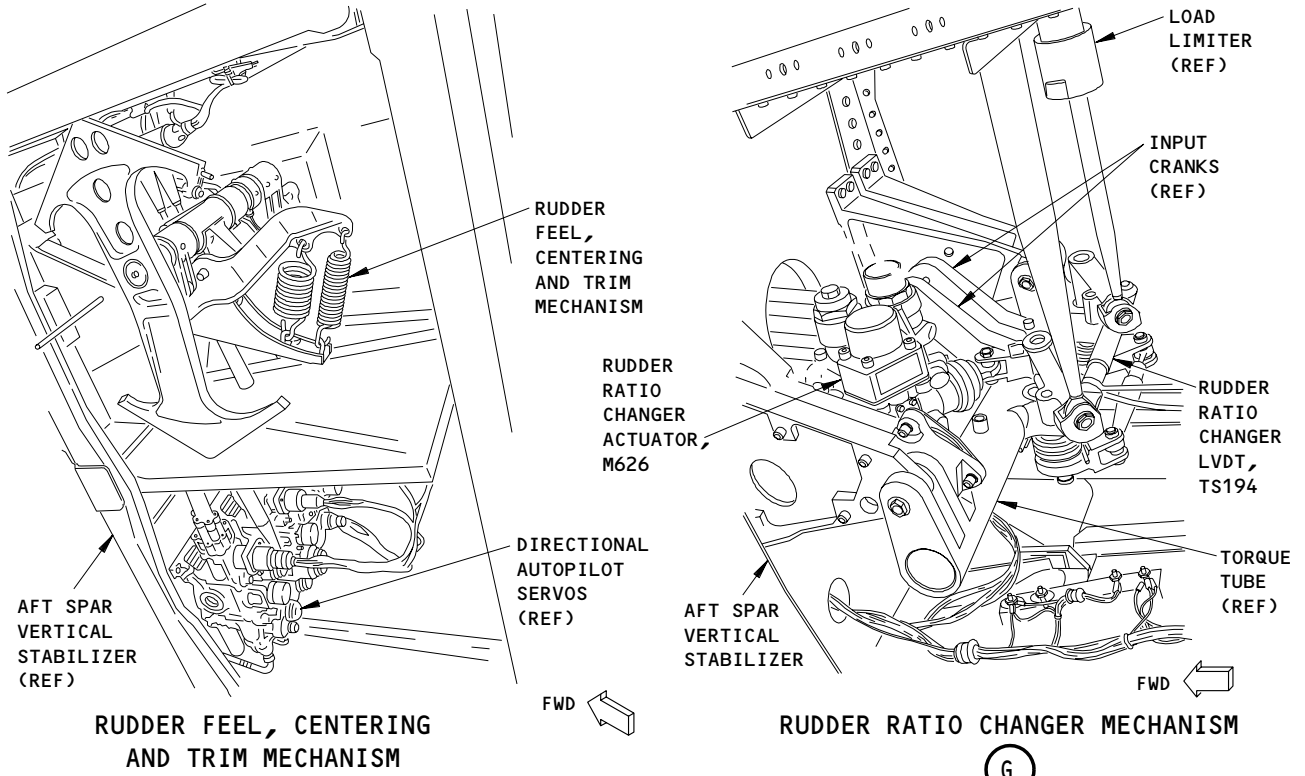
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Rudder and Rudder Trim Control System – Component Location  
Figure 102 (Sheet 3)

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Rudder and Rudder Trim Control System - Component Location (Details from Sht 3) Figure 102 (Sheet 4)

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U18713

RUDDER AND RUDDER TRIM CONTROL SYSTEM – ADJUSTMENT/TEST

1. General

A. This procedure contains these tasks:

- Operational Test – Rudder and Rudder Trim Control System
- Adjustment – Rudder and Rudder Trim Control System
- System Test – Rudder and Rudder Trim Control System
- Rudder Single Hydraulic Source – Test (for Scheduled Maintenance)
- Rudder Ratio Changer Actuator Bypass Valve – Test (for Scheduled Maintenance)

Refer to 27-28-00/501 to get adjustment and test data for the rudder position indicating system.

TASK 27-21-00-715-018

2. Operational Test – Rudder and Rudder Trim Control System

A. General

- (1) This procedure is used to make sure that the rudder and rudder trim control system operate correctly. No special equipment is necessary to do the test.

B. Equipment

- (1) Nose Gear Towing Lever Lockpin – A09003-1

C. References

- (1) AMM 24-22-00/201, Electrical Power – Control  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System  
(3) AMM 31-41-00/201, EICAS

D. Access

- (1) Location Zones  
211/212 Control Cabin

E. Prepare for the Test

S 865-019

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

S 865-020

- (2) Make sure that these circuit breakers on the overhead panel, P11, are closed:
- (a) EICAS (6 locations)
  - (b) 11A10, AIR DATA CMPTR L
  - (c) 11F30, AIR DATA CMPTR RIGHT
  - (d) 11L9, LEFT ENGINE OIL PRESS EICAS REF
  - (e) 11L36, RIGHT ENGINE OIL PRESS EICAS REF

S 825-021

- (3) Push the STATUS button on the pilot's display-select panel, P9, to show the rudder position indicator on the bottom EICAS display.

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S 865-022

- (4) Make sure that these circuit breakers on the P11, panel are closed:
- (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 865-023

- (5) Move the FLT CONTROL SHUTOFF TAIL L, C, and R switches on the right side panel, P61, to ON. Make sure that the amber switch-position legend lights are OFF.

S 865-001

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (6) Supply pressure to the left, center, and right hydraulic systems (AMM 29-11-00/201).

S 215-024

- (7) Turn the captain's pedal adjustment crank full clockwise and then counterclockwise. Make sure that the rudder pedals move in a longitudinal direction.

S 215-025

- (8) Do the above step again for the first officer's controls.

S 215-026

- (9) Push the left and right pedals to their travel limits and release. Make sure the pedals move smoothly and do not need too much force. Make sure that the pedals go back to their neutral position.

F. Test Rudder Ratio Changer Actuator Bypass Valve

S 865-027

- (1) Move the FLT CONTROL SHUTOFF TAIL C and R switches on the P61 panel to OFF. Attach DO-NOT-OPERATE tags and make sure that the amber switch-position legend lights come ON.

S 865-028

- (2) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11G10, RUDDER RATIO
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

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S 215-029

**WARNING:** MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE NOSE GEAR BEFORE THE RUDDER PEDALS ARE OPERATED. THE GEAR CAN TURN QUICKLY AND CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (3) Push the rudder pedals full forward, left and right. Make sure that the rudder does not move.

S 865-030

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11G10, RUDDER RATIO
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 865-250

- (5) Remove the DO-NOT-OPERATE tags and put the FLT CONTROL SHUTOFF TAIL C and R switches on the P61 panel to ON.

G. Test Rudder System with Single Hydraulic Source

S 015-407

- (1) Move the towing lever on the metering valve module to the tow position and install the towing lever lockpin in the nose gear (Fig. 501).

S 865-031

- (2) Make sure that the FLT CONTROL SHUTOFF TAIL L, C, and R switches on the P61 panel are ON. Make sure that the amber switch-position legend lights are OFF.

S 865-032

- (3) Remove the power from the center and right hydraulic systems (AMM 29-11-00/201). Make sure that only the left hydraulic system is powered.

S 215-033

- (4) Make sure that the amber RUDDER RATIO light on the P5 panel is OFF. If the light is ON, do the steps that follow:
  - (a) Push the RRCM RESET button on the RRCM.
  - (b) Open this circuit breaker on the P11, panel:
    - 1) 11G10, RUDDER RATIO
  - (c) Close this circuit breaker on the P11, panel:
    - 1) 11G10, RUDDER RATIO

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- S 215-034
- (5) Operate the rudder pedals to their full travel limits and do the check that follows:
- (a) Make sure that the rudder moves through its full travel range.

- S 825-035
- (6) Move the rudder pedals to their neutral position.

- S 865-036
- (7) Remove the power from the left hydraulic system (AMM 29-11-00/201).

**NOTE:** When the left hydraulic system power is removed from the rudder, an amber RUDDER RATIO light on the P5 panel will come ON. Also, an amber RUDDER RATIO message will come into view on EICAS.

If the left rudder/elevator hydraulic-shutoff valve is used to remove pressure from the rudder, a PCA faultball will set on the rudder ratio-changer module.

- S 865-037
- (8) Supply pressure to the center hydraulic system (AMM 29-11-00/201).

- S 215-038
- (9) Operate the rudder pedals to their full travel limits and do the check that follows:
- (a) Make sure that the rudder moves through its full travel range.

- S 825-039
- (10) Return the rudder pedals to their neutral position.

- S 865-040
- (11) Remove the power from the center hydraulic system (AMM 29-11-00/201).

- S 865-041
- (12) Supply pressure to the right hydraulic system (AMM 29-11-00/201).

- S 215-042
- (13) Operate the rudder pedals to their full travel limits and do the check that follows:
- (a) Make sure that the rudder moves through its full travel range.

- S 825-043
- (14) Move the rudder pedals back to their neutral position.

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S 095-408

**WARNING:** STAY AWAY FROM THE NOSE GEAR WHEELS WHEN THE LOCKPIN IS REMOVED. THE NOSE WHEELS CAN TURN TO THE CENTERED POSITION QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (15) Make sure that the nose gear wheels are in their center position and remove the nose gear towing lever lockpin.

S 865-044

- (16) Supply pressure to the left and center hydraulic systems (AMM 29-11-00/201).

S 825-045

- (17) If a PCA faultball is set on the rudder ratio changer module, push the module RESET switch.

H. Test Rudder Trim Authority and Rate

S 215-046

- (1) Turn the rudder trim switch on the aft electronic control panel, P8, clockwise and hold it there until the rudder movement stops.

(a) SAS 050-051;

Make sure the rudder movement stops in approximately 18 to 30 seconds.

(b) ALL SAS AIRPLANES EXCEPT SAS 050-051;

ALL MTH AIRPLANES;

Make sure the rudder movement stops in approximately 13 to 21 seconds.

(c) ALL SAS AIRPLANES EXCEPT SAS 050-051;

ALL MTH AIRPLANES;

Make sure that the trim indicator shows at least 14 units of right trim. Make sure that the EICAS rudder position indicator moves to the right approximately two-thirds of full scale (approximately 17 degrees).

(d) SAS 050-051;

Make sure that the trim indicator shows at least 14 units of right trim. Make sure that the EICAS rudder position indicator moves to the right approximately two-thirds of full scale. (approximately 21.5 degrees).

S 215-048

- (2) Turn the rudder trim switch on the aft electronic control panel, P8, counterclockwise and hold it there until the rudder movement stops.

(a) SAS 050-051;

Make sure the rudder movement stops in approximately 36 to 60 seconds.

(b) ALL SAS AIRPLANES EXCEPT SAS 050-051;

ALL MTH AIRPLANES;

Make sure the rudder movement stops in approximately 26 to 42 seconds.

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- (c) ALL SAS AIRPLANES EXCEPT SAS 050-051;  
ALL MTH AIRPLANES;  
Make sure that the trim indicator shows at least 14 units of left trim. Make sure that the EICAS rudder position indicator moves to the left approximately two-thirds of full scale (approximately 17 degrees).
- (d) SAS 050-051;  
Make sure that the trim indicator shows at least 14 units of left trim. Make sure that the EICAS rudder position indicator moves to the left approximately two-thirds of full scale (approximately 21.5 degrees).

S 825-050

- (3) Operate the rudder trim switch until the trim indicator shows zero units of trim.
  - (a) Make sure the rudder goes to its neutral position.

I. Test Rudder Ratio-Changer System

S 825-051

- (1) Turn the rudder trim switch on the P8 panel until the rudder trim indicator shows 9 units of trim.

S 215-052

- (2) Move the left ratio-changer module test switch, located on the E1 equipment shelf, to the TEST position.

**NOTE:** The amber RUDDER RATIO light on the P5 panel will come on when the RRCM test switch is moved to its TEST position. An amber RUDDER RATIO message will come into view on EICAS with the engine shutdown inhibit removed (AMM 31-41-00/201).

- (a) Make sure that the IN TEST light does not stay on for more than 20 seconds.
- (b) Make sure that the left and right module TEST FAIL fault balls are not set.
- (c) Make sure that the EICAS rudder position indicator moves in the direction of its neutral position.

S 215-053

- (3) Move the left ratio-changer module test switch to the NORMAL position.
  - (a) Make sure that the IN TEST light does not stay on for more than 20 seconds.
  - (b) Make sure that the left and right module TEST FAIL fault balls are not set.
  - (c) Make sure that the EICAS rudder position indicator moves away from the neutral position.

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S 215-054

- (4) Move the right ratio-changer module test switch, located on the E2 equipment shelf, to the TEST position.
  - (a) Make sure that the IN TEST light does not stay on for more than 20 seconds.
  - (b) Make sure that the left and right module TEST FAIL fault balls are not set.
  - (c) Make sure that the EICAS rudder position indicator moves in the direction of its neutral position.

S 215-055

- (5) Move the right ratio changer module test switch to the NORMAL position.
  - (a) Make sure that the IN TEST light does not stay on for more than 20 seconds.
  - (b) Make sure that the left and right module TEST FAIL fault balls are not set.
  - (c) Make sure that the EICAS rudder position indicator moves away from its neutral position.

S 825-056

- (6) Operate the rudder trim switch until the trim indicator shows zero units of trim.
    - (a) Make sure the rudder goes to its neutral position.
- J. Put the Airplane Back to Its Usual Condition

S 215-057

**CAUTION:** IF THE RRCM TEST SWITCH IS NOT MOVED TO "NORMAL", THE AMBER "RUDDER RATIO" LIGHT WILL COME ON. IF THIS LIGHT IS ON, THE AIRPLANE CAN NOT BE DISPATCHED.

- (1) Make sure that the RRCM test switch is in its NORMAL position.

S 865-058

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-059

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

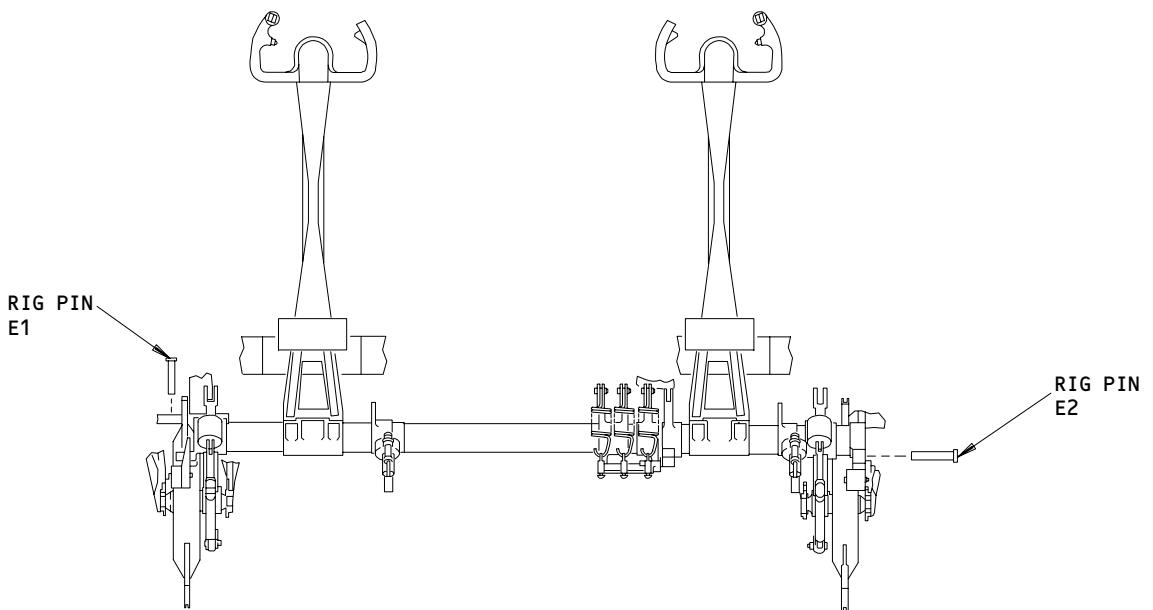
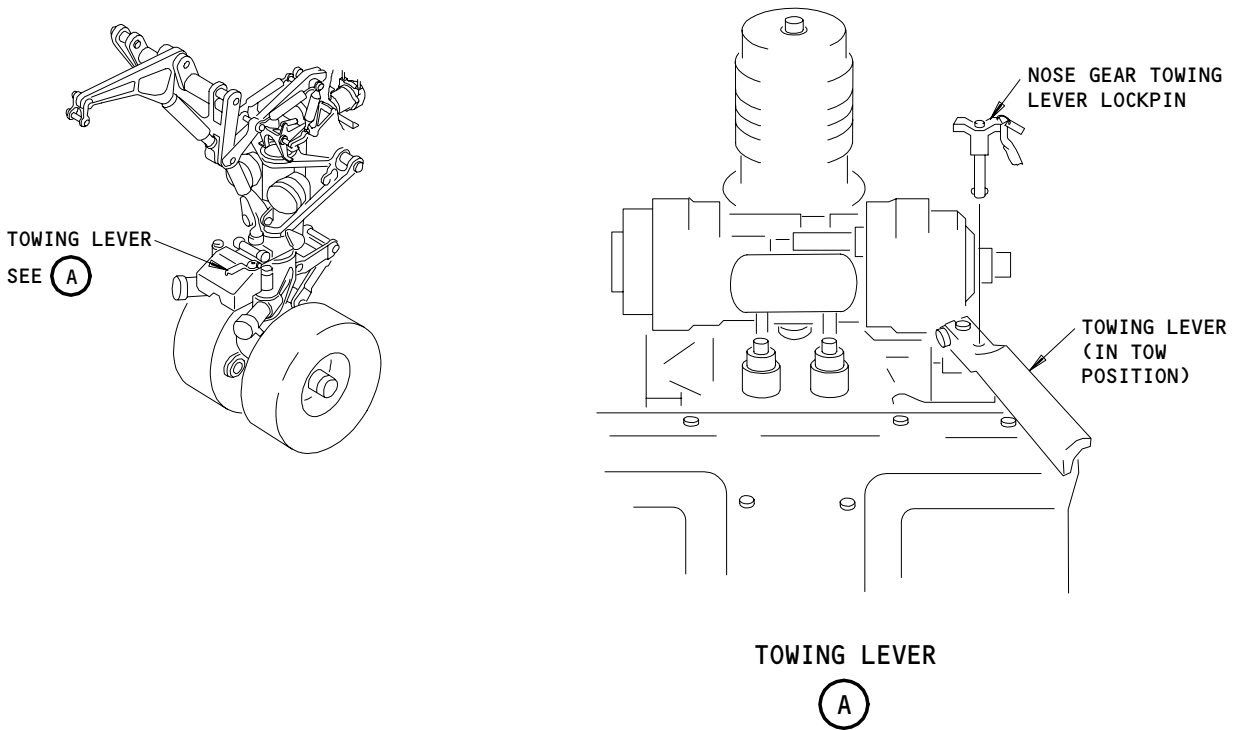
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CONTROL COLUMN TORQUE TUBE

Elevator and Nose Gear Isolation  
Figure 501

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TASK 27-21-00-825-060

3. Adjustment – Rudder and Rudder Trim Control System

A. General

- (1) SYSTEM ADJUSTMENT SEQUENCE: This task adjusts the rudder control system and its components in the sequence that follows. This sequence is recommended for a complete system adjustment:
- (a) Adjust the Rudder Pedals and Jackshaft.
  - (b) RRCA Oscillation check.
  - (c) Adjust the Control Cables RA and RB.
  - (d) Adjust the Middle Rudder PCA.
  - (e) Adjust the Top Rudder PCA.
  - (f) Adjust the Bottom Rudder PCA.
  - (g) Adjust the three Rudder PCAs System.
  - (h) Adjust the Rudder Ratio Changer Mechanism.
  - (i) Adjust the Yaw Damper Summing Lever.
  - (j) Adjust the Rudder Trim Indicator Null.
- (2) OUT OF SEQUENCE ADJUSTMENTS: It is possible to adjust some components in a different sequence. You must do some other adjustments before the component adjustment and some adjustments after it is done. The necessary adjustments are as follows:
- (a) Adjust the Rudder Pedals and Jackshaft.
    - 1) There is no task to perform before or after this adjustment.
  - (b) Adjust the Control Cables RA and RB.
    - 1) There is no task to perform before or after this adjustment.
  - (c) Adjust the Power Control Actuator (PCA).
    - 1) There is no task to perform before this adjustment.
    - 2) After the adjustment of the PCA, do the following adjustments in sequence:
      - a) Adjust the Rudder Ratio Changer Mechanism.
      - b) Adjust the Yaw Damper Summing Lever.
      - c) Adjust the Rudder Trim Indicator Null.

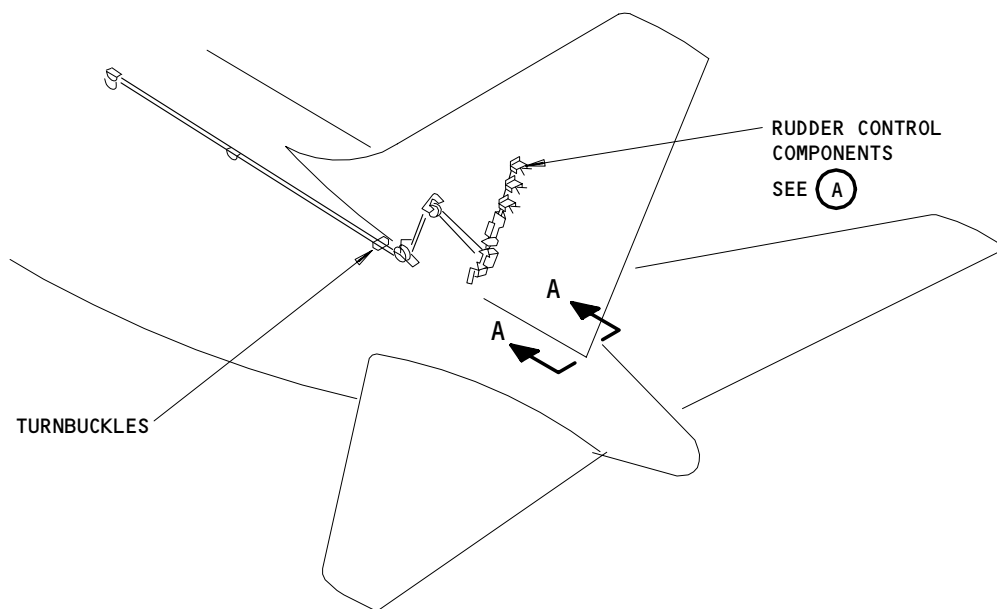
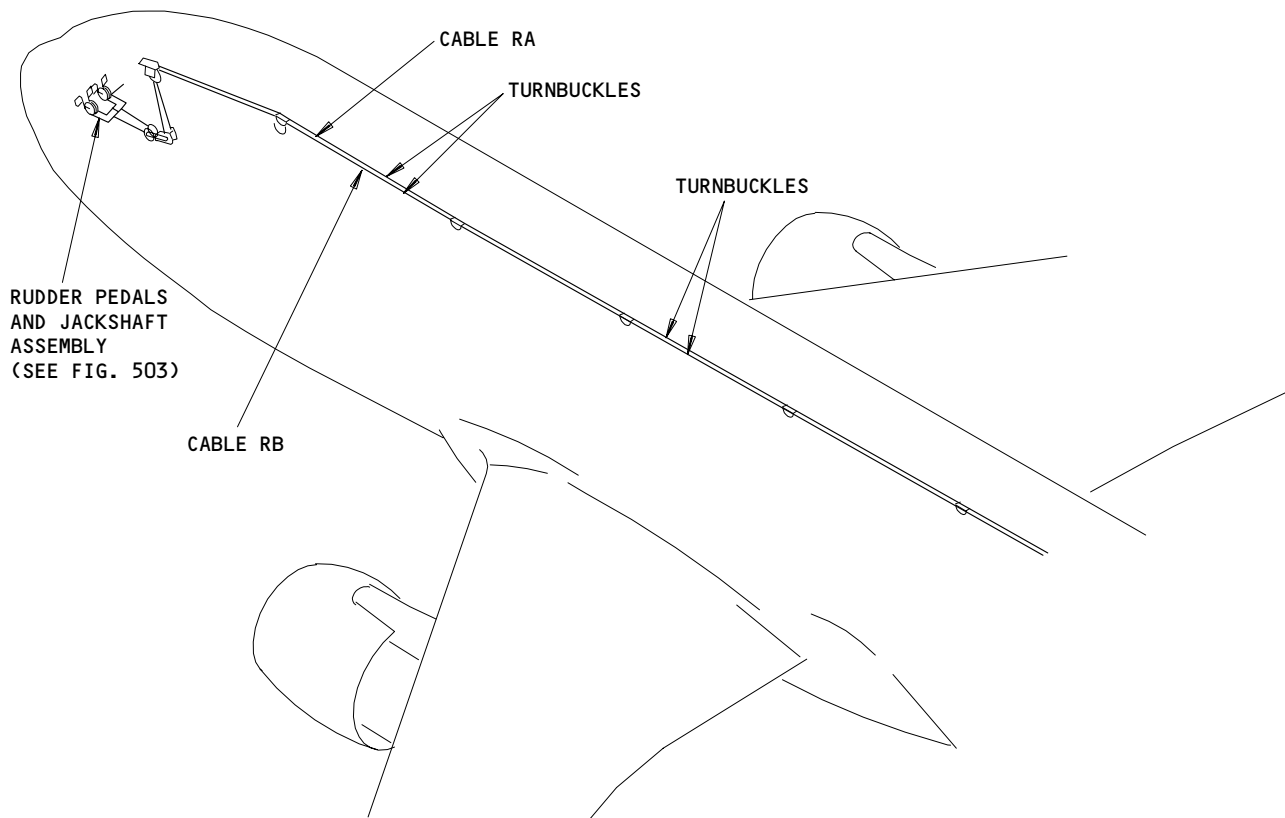
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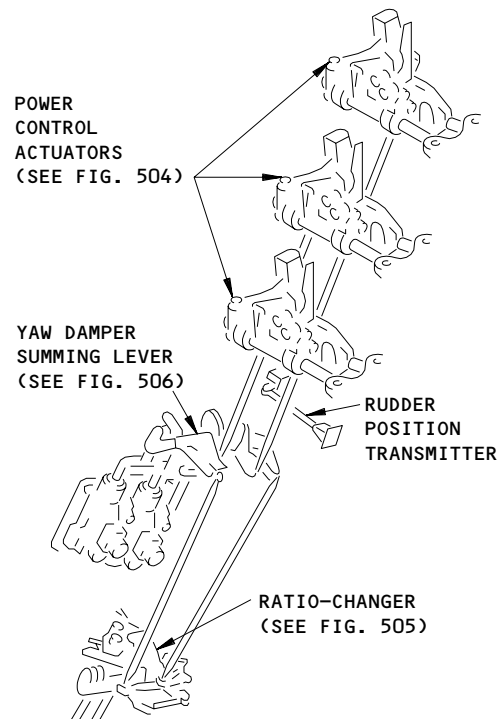
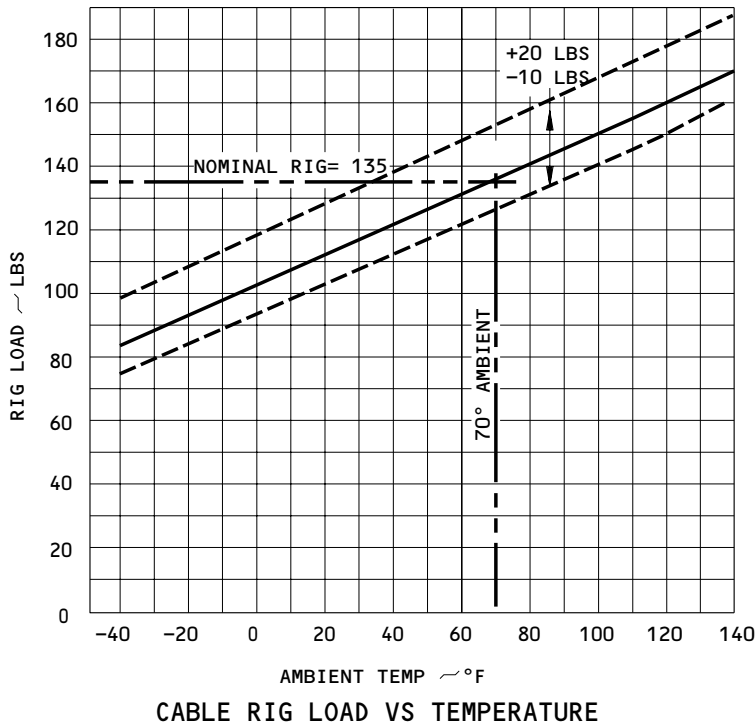
Rudder and Rudder Trim Control System Adjustment  
Figure 502 (Sheet 1)

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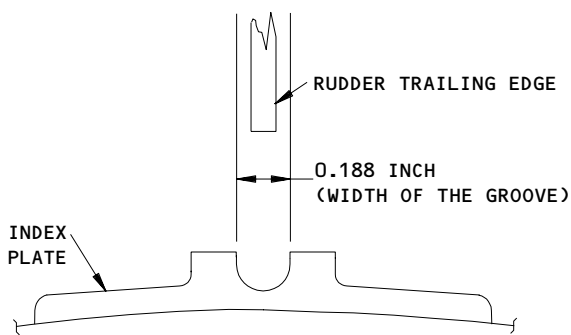
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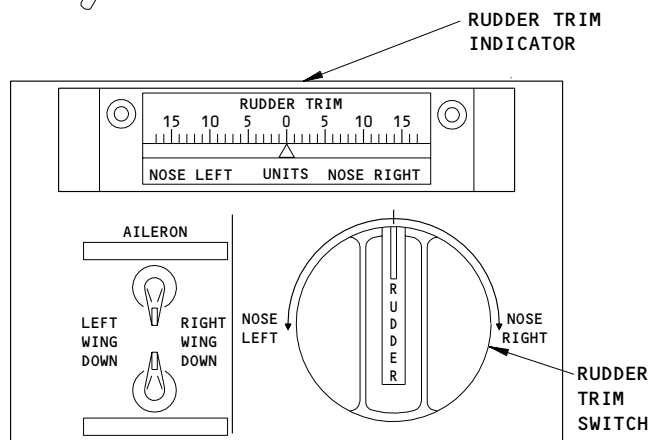
FEEL, CENTERING, AND TRIM MECHANISM (SEE FIG. 505)

DIRECTIONAL AUTOPILOT SERVOS (SEE FIG. 507)

**RUDDER CONTROL COMPONENTS**



**RUDDER NEUTRAL POSITION**  
A-A

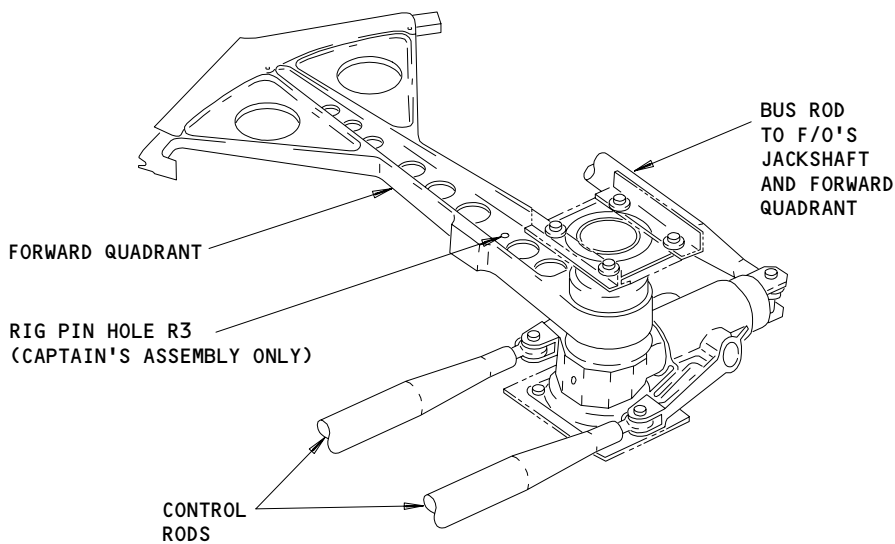
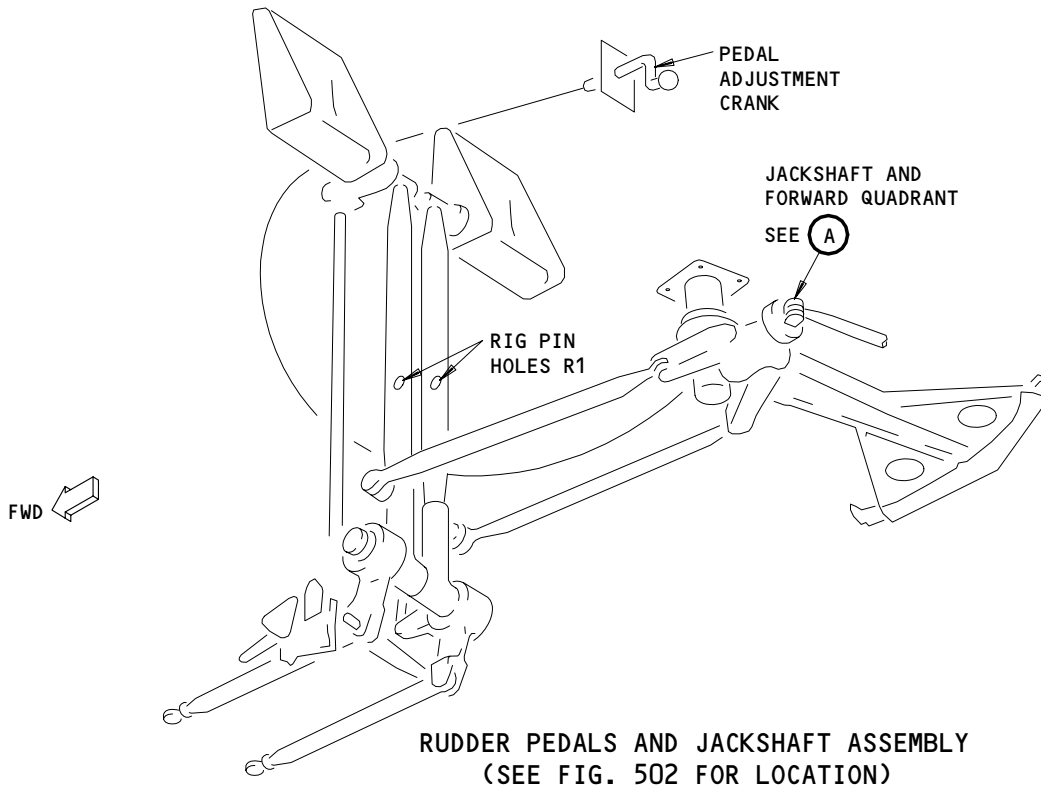


**AILERON AND RUDDER TRIM MODULE M74**

**Rudder and Rudder Trim Control System Adjustment**  
Figure 502 (Sheet 2)

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**JACKSHAFT AND FORWARD QUADRANT  
(CAPTAIN'S ASSEMBLY SHOWN,  
FIRST OFFICER'S IS APPROXIMATELY THE SAME)**

(A)

**Rudder Pedals and Jackshaft Adjustment  
Figure 503**

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- (d) Adjust the Rudder Ratio Changer (RRC) Mechanism.
    - 1) Before the adjustment of the RRC Mechanism, do the adjustments of the Rudder PCAs.
    - 2) After the adjustment of the RRC Mechanism, do the following adjustments in sequence:
      - a) Adjust the Yaw Damper Summing Lever.
      - b) Adjust the Rudder Trim Indicator Null.
  - (e) Adjust the Yaw Damper Summing Lever.
    - 1) Before the adjustment of the Yaw Damper Summing Lever, do the following adjustments in sequence:
      - a) Adjust the Rudder PCAs.
      - b) Adjust the RRC Mechanism.
    - 2) After the adjustment of the Yaw Damper Summing Lever, do the adjustment of the Rudder Trim Indicator Null.
  - (f) Adjust the Rudder Trim Indicator Null.
    - 1) Before the adjustment of the Rudder Trim Indicator Null, do the following adjustments in sequence:
      - a) Adjust the Rudder PCAs.
      - b) Adjust the RRC Mechanism.
      - c) Adjust the Yaw Damper Summing Lever.
    - 2) There is no task to perform after this adjustment.
- (3) Before this procedure is done, make sure that the airplane temperature is stable (use a tolerance of  $\pm 5^{\circ}$  F) along the cable. Make sure that the temperature has been stable for at least one hour.
- (4) You may not be able to install rig pin R4 in the feel, centering, and trim mechanism if the rudder is in the neutral position. This is due to the fact that the initial adjustment is done with 3 to 5 units of trim input.

**NOTE:** Due to the large tolerance of rig pin hole R4, trim is input into the system during initial adjustment to ensure a good repeatable position of the rudder trailing at the neutral position.

- (5) Do a check of the rudder system adjustment:
- (a) Turn the rudder trim switch on the control stand panel, P8, counterclockwise until the trim position indicator shows 3 to 5 units of left trim.

**NOTE:** Make sure to use the same amount of trim used when the rudder system was initially adjusted.

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- (b) Manually turn the feel, centering and trim aft quadrant clockwise against the spring force until rig pin R4 can be installed.

NOTE: This will ensure the rudder trailing edge is at a good repeatable position to do a check of the rudder system adjustment.

- (c) Install rig pin R4 into aft quadrant to hold in position.
- (d) Make sure the rudder trailing edge is at the neutral position ( $\pm 0.05$  inch ( $\pm 1.27$  mm)).

NOTE: Make sure the left, center and right hydraulic systems are pressurized when you do the check for the rudder trailing edge.

- (e) If the rudder trailing edge position is not as shown above, do the Rudder and Rudder Control System Adjustment procedure.
- (f) Remove rig pin R4.

#### B. Equipment

- (1) Rig pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) R1 - P/N A20004-25
  - (b) R2 - P/N A20004-25
  - (c) R3 - P/N A20004-14
  - (d) R4 - P/N A20004-20
  - (e) R5 - P/N A20004-13
  - (f) R6 - P/N A20004-14
  - (g) R7 - P/N A20004-14
  - (h) R8 - P/N A20004-12
  - (i) E1 - P/N A20004-22
  - (j) E2 - P/N A20004-22
- (2) Scale, accurate to 0.01 inch (0.25 mm) - Commercially Available
- (3) Nose Gear Towing Lever Lockpin - A09003-1
- (4) Cable Tensiometer - Commercially Available

#### C. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

#### D. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-42-00/201, Empennage Access Doors and Panels
- (3) AMM 20-10-24/201, Rig Pins
- (4) AMM 22-13-01/401, Directional Autopilot Servo
- (5) AMM 24-22-00/201, Electrical Power - Control
- (6) AMM 27-28-00/501, Rudder Position Indicating System
- (7) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (8) AMM 31-41-00/201, EICAS

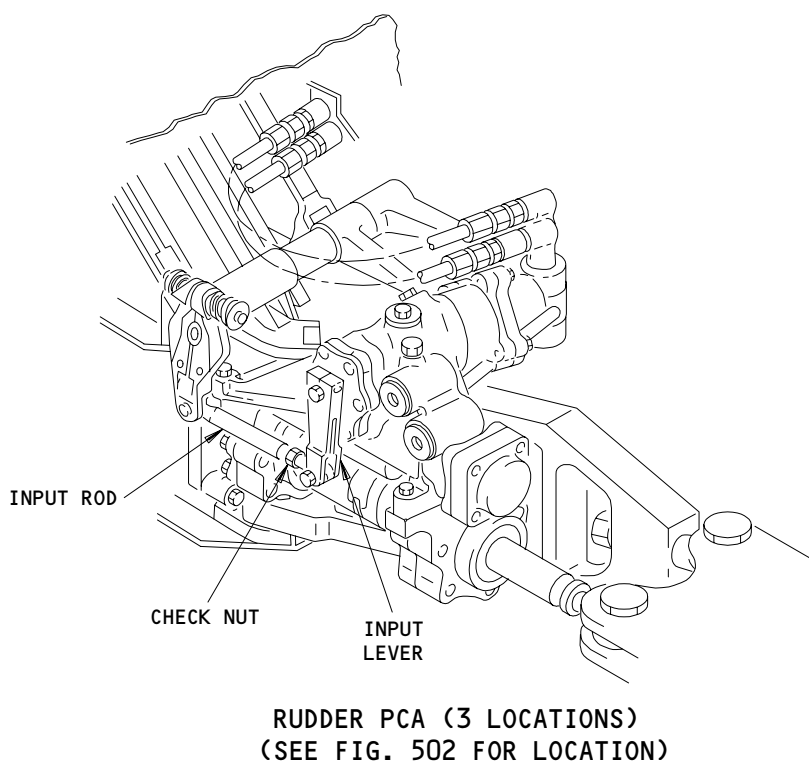
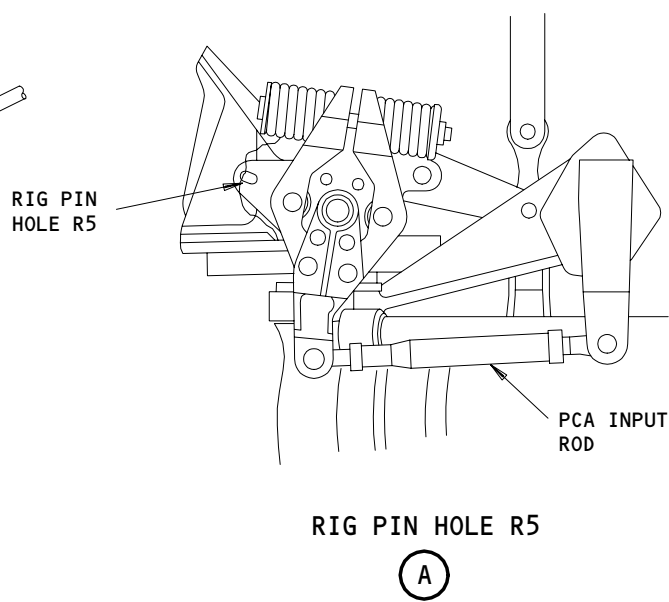
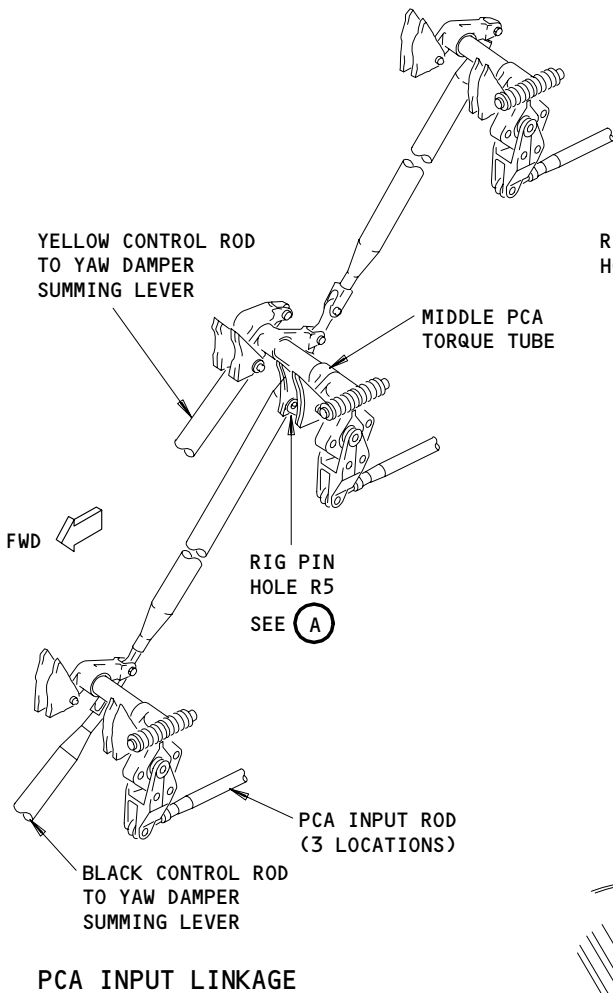
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Power Control Actuator (PCA) Adjustment  
Figure 504

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E. Access

(1) Location Zones

- 211/212 Control Cabin
- 324 Vertical Stabilizer – Rear Spar to Trailing Edge

(2) Access Panels

- 113AL Flight/Landing Gear/Engine Control Components
- 324BL Hinge Fittings and Feel, Centering, and Trim Mechanism
- 324EL Hinge Fittings and Mechanical Control Path
- 324GL Hinge Fittings and Mechanical Control Path
- 324JL Hinge Fittings and T.E. of Vertical Stabilizer
- 324LL Hinge Fittings and Mechanical Control Path

F. Prepare for Adjustment

S 865-061

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

S 865-062

- (2) Move the FLT CONTROL SHUTOFF TAIL L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure that the amber switch-position legend lights come ON.

S 865-063

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 865-389

**WARNING:** MAKE SURE TO OPEN THE CIRCUIT BREAKERS FOR THE CAPTAIN'S AND THE FIRST OFFICER'S SEATS BEFORE YOU WORK AROUND THEM. A FAILURE TO OPEN THE CIRCUIT BREAKERS CAN CAUSE THE SEATS TO MOVE ACCIDENTALLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
- (a) 6H15, CAPT SEAT

S 825-064

- (5) Move the Yaw Damper Engage switches on the pilot's overhead panel, P5, to INOP.

S 015-065

- (6) Open access panel 324BL to get access to the feel, centering, and trim mechanism (AMM 06-42-00/201).

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S 015-066

- (7) Open access panel 324EL to get access to the ratio-changer mechanism and yaw damper summing mechanism (AMM 06-42-00/201).

S 015-067

- (8) Open access panels 324GL, 324JL, and 324LL to get access to the bottom, middle, and top power control actuators (AMM 06-42-00/201).

S 015-068

- (9) Open access panel 113AL forward of the nose gear wheel well to access rig pin holes R1, R2, E1, and E2 (AMM 06-41-00/201).

S 015-069

- (10) Move the towing lever on the metering valve module to the tow position and install the towing lever lockpin in the nose gear (Fig. 501).

S 495-070

- (11) Install rig pins E1 and E2 into the control column torque tube to prevent accidental elevator movement.

G. Adjust the Rudder Pedals and Jackshaft (Fig. 503)

S 825-071

- (1) Turn the captain's pedal adjustment crank clockwise until the jackshaft is in its full forward pedal position. Turn the crank counterclockwise 3.25 turns and put it in the nearest detent.

S 825-008

- (2) Do the above step again for the first officer's pedal adjustment crank.

S 035-072

- (3) Disconnect the control rods from the left and right rudder pedal arms.

S 495-073

- (4) Install rig pin R3 into the left forward quadrant.

S 825-074

- (5) Do these steps to adjust the captain's pedals and jackshaft:  
(a) Install rig pin R1 in the captain's pedals.  
(b) Adjust the control rods until the bolts can be easily installed through the rod end bearings at the pedal arms.  
(c) Connect the control rods and tighten the jamnuts.

S 825-075

- (6) Do these steps to adjust the first officer's pedals and jackshaft:  
(a) Install rig pin R2 in the first officer's pedals.  
(b) Adjust the control rods until the bolts can be easily installed through the rod end bearings at the pedal arms.

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(c) Connect the control rods and tighten the jamnuts.

S 095-076

(7) Remove rig pins R1, R2, and R3.

S 215-077

(8) Cycle the rudder pedals. Make sure there is full quadrant travel between its stops.

S 225-078

(9) Do an inspection on all the control rods. Make sure that control rod threads can be seen in at least one-half of the control rod inspection hole.

H. Rudder Ratio Changer Actuator (RRCA) - Oscillation Check

S 495-258

(1) Install rig pin R4 (for the feel, centering, and trim mechanism).

S 865-259

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(2) Supply pressure to the left hydraulic system (AMM 29-11-00/201).

S 865-260

(3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11, panel:

(a) 11H17, FLT CONT SHUTOFF TAIL LEFT

S 865-261

(4) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF switch L on the P61, panel to ON.

S 865-268

(5) Move the left RRCM test switch on the E1 equipment shelf to TEST and do these checks:

**NOTE:** The amber RUDDER RATIO light on the P5 panel will come ON and stay ON. An amber RUDDER RATIO message will come into view on EICAS when the RRCM test switch is in its TEST position.

(a) Make sure the IN TEST light stays on for a maximum of 18 seconds.

(b) After 30 seconds, make sure all the RRCM faultballs are black.

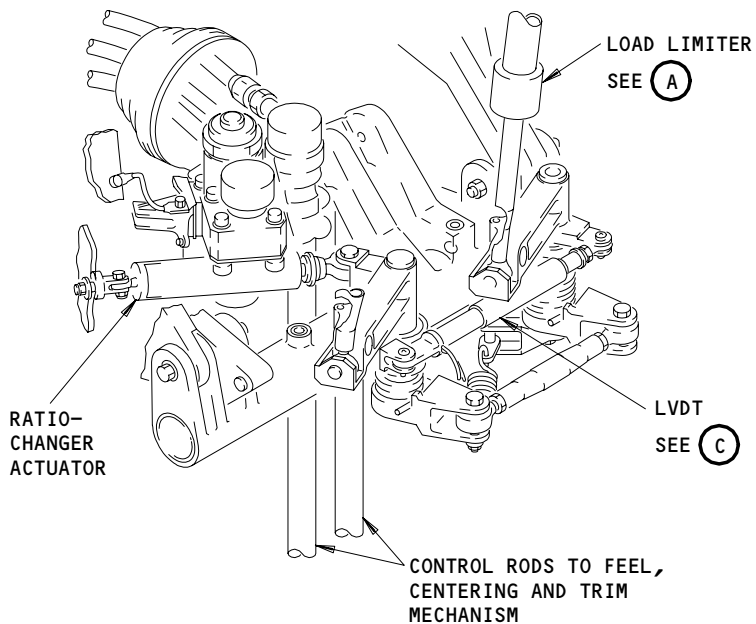
EFFECTIVITY

ALL

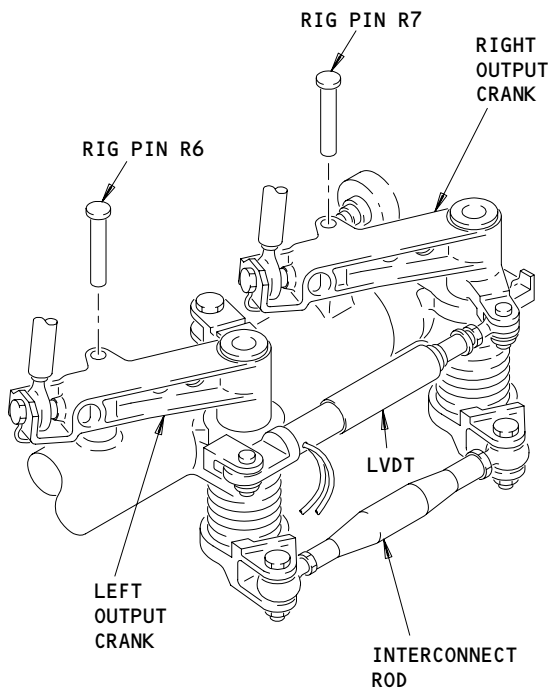
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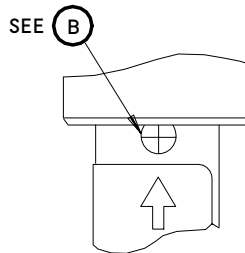


**RATIO-CHANGER MECHANISM - ACTUATOR RETRACTED**  
(SEE FIG. 502 FOR LOCATION)

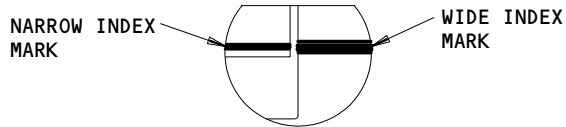


**RATIO-CHANGER MECHANISM - ACTUATOR EXTENDED**  
(SEE FIG. 502 FOR LOCATION)

INDEX MARKS



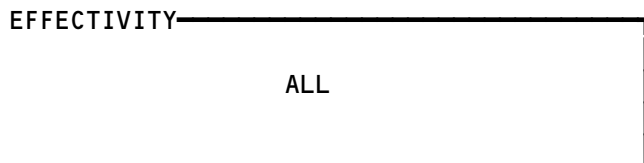
LOAD LIMITER



INDEX MARKS



**Rudder Ratio-Changer Adjustment**  
Figure 505 (Sheet 1)

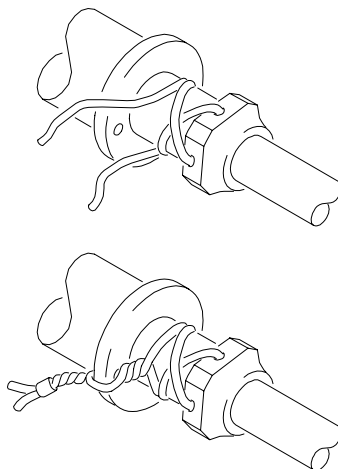
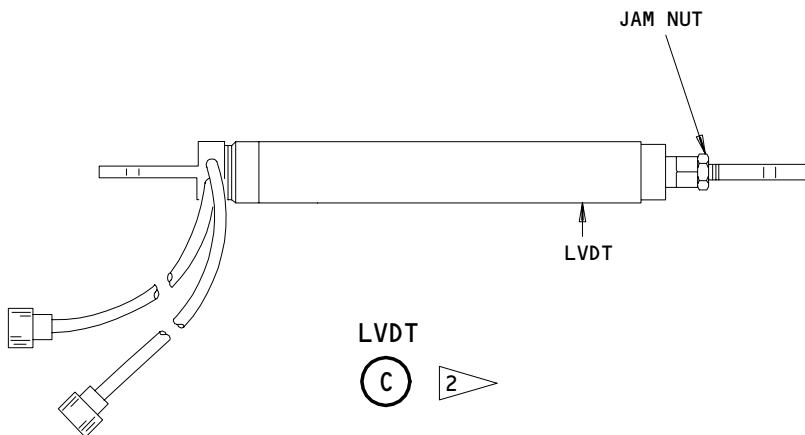
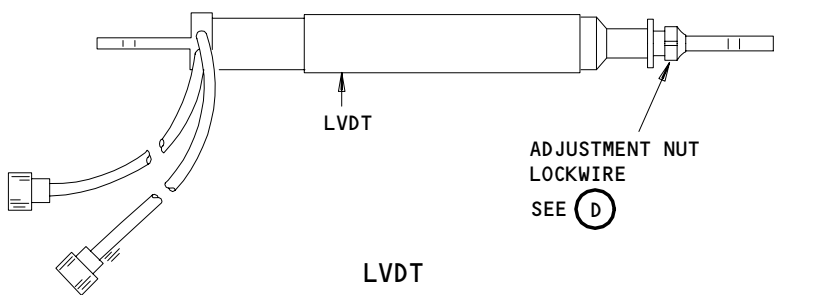


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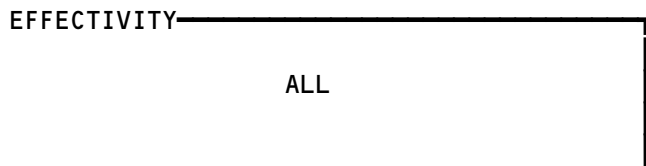


ADJUSTMENT NUT LOCKWIRE

(D)

- 1 LVDTs WITH AN ADJUSTMENT NUT
- 2 LVDTs WITH CASE ADJUSTMENT

Rudder Ratio-Changer Adjustment  
Figure 505 (Sheet 2)

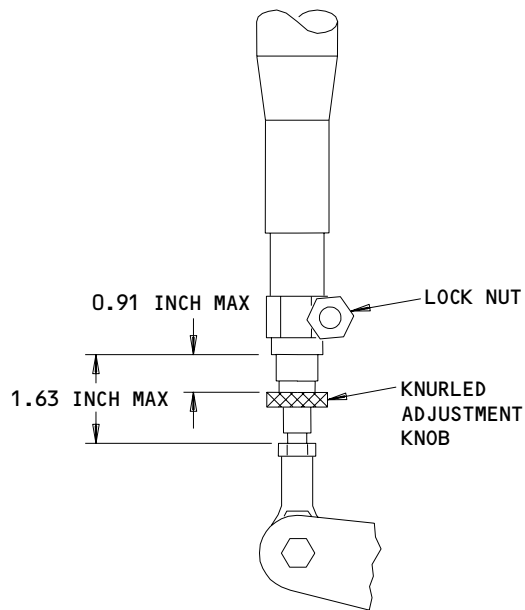
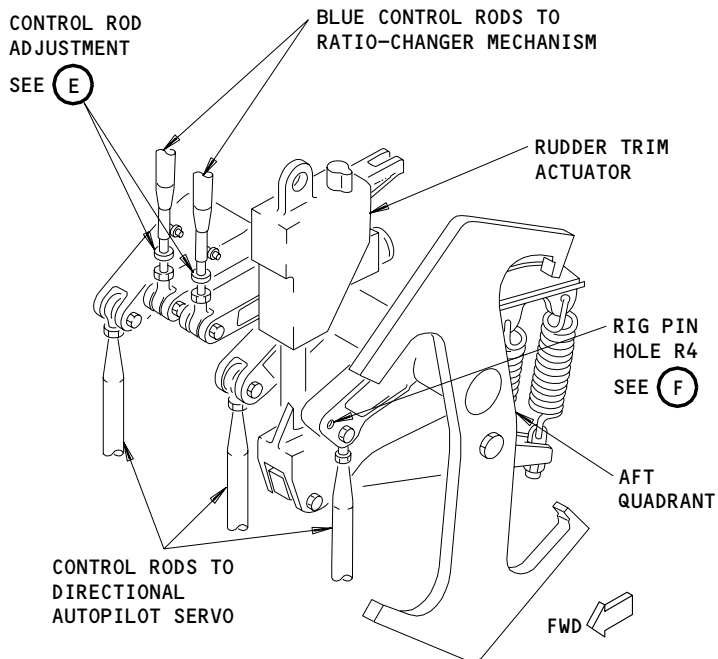


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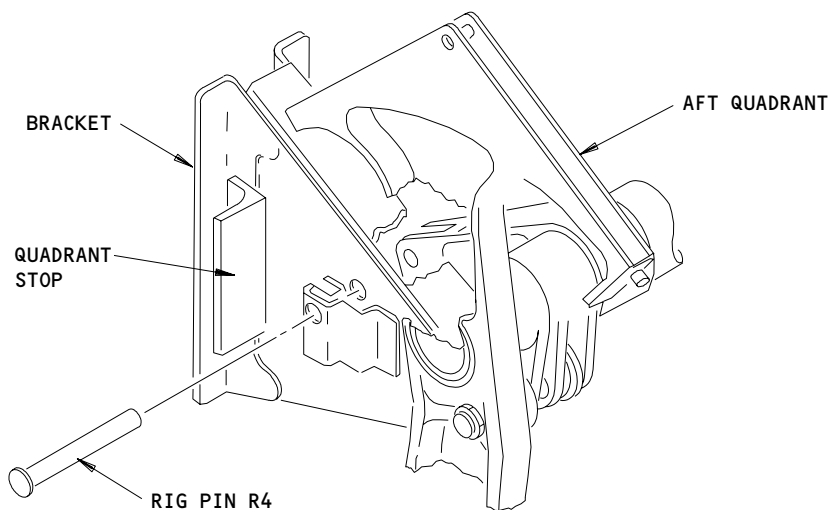




FEEL, CENTERING, AND TRIM MECHANISM  
(SEE FIG. 502 FOR LOCATION)

CONTROL ROD ADJUSTMENT

(E)



RIG PIN HOLE R4

(F)

Rudder Ratio-Changer Adjustment  
Figure 505 (Sheet 3)

EFFECTIVITY

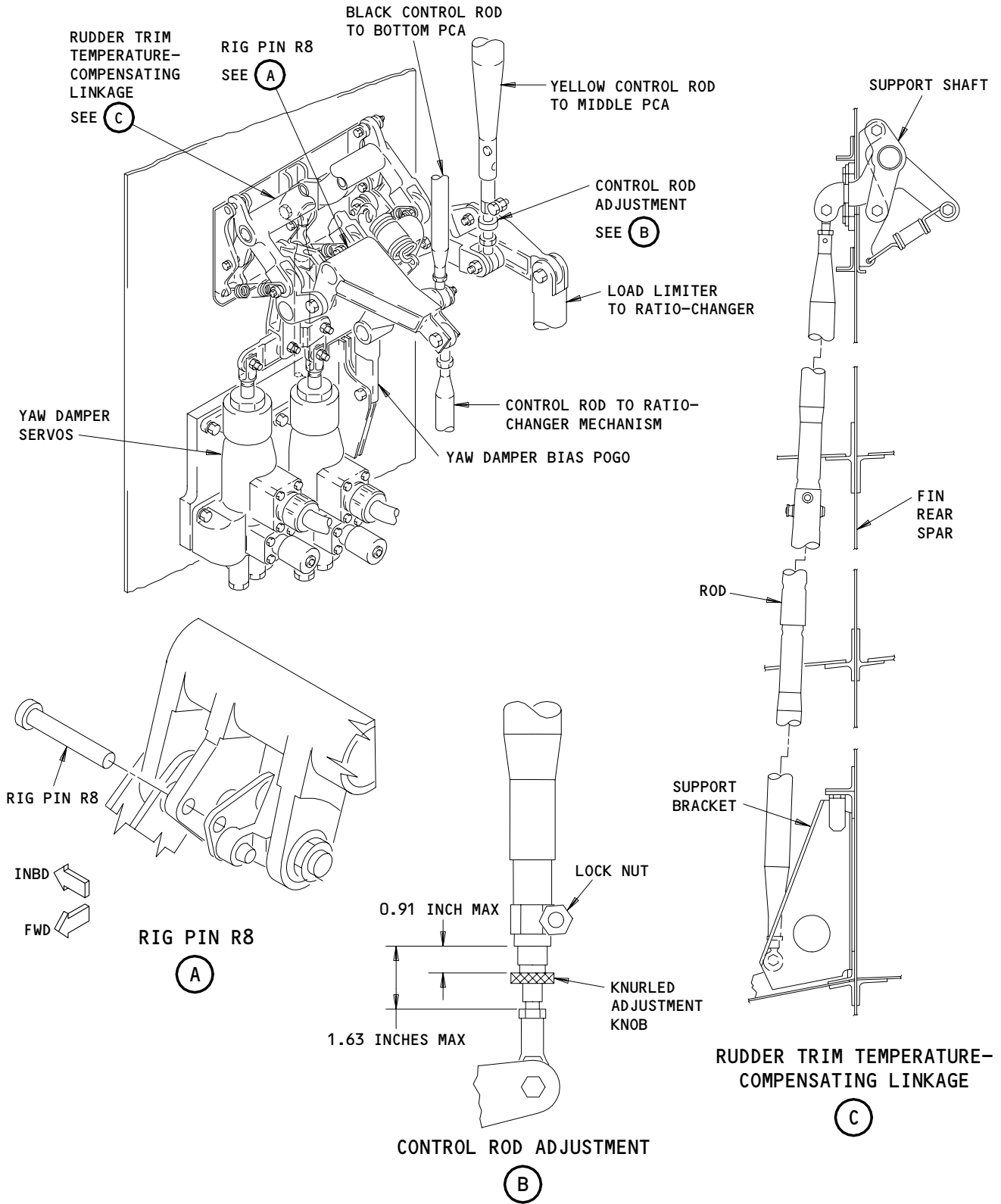
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Yaw Damper Summing Lever Adjustment  
Figure 506

EFFECTIVITY	
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- S 825-262
- (6) Observe the RRCA and Rudder Ratio Changer Output Arms for oscillations. If oscillations are noted, troubleshoot and correct the oscillation before you complete this procedure.
- S 095-263
- (7) Remove rig pin R4.
- S 865-264
- (8) Move the left RRCM test switch to NORMAL.
- S 865-320
- (9) Remove the power from the left hydraulic system (AMM 29-11-00/201).
- S 865-266
- (10) Move the L FLT CONTROL SHUTOFF switch on the P61 panel to OFF.
- S 865-382
- (11) Install a DO-NOT-OPERATE tag and make sure the switch position light comes ON.
- S 865-383
- (12) Open this circuit breaker on the P11, panel and attach a DO-NOT-CLOSE tag:
- (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
- I. Adjust Rudder Control Cables RA and RB
- S 825-079
- (1) Turn the rudder trim switch on the P8 panel until rig pin R4 can be easily installed in the feel, centering and trim mechanism (Fig. 505).
- (a) To stretch the cables, adjust the turnbuckles for cables RA and RB at the same time to  $270 \pm 18$  pounds ( $1.20 \pm 0.08$  KN). Make sure that rig pin R3 can be easily installed in the left forward quadrant.
- S 225-080
- (2) Make sure that none of the cable seals bend the cables. Adjust the cables if it is necessary.
- S 095-081
- (3) Remove rig pins R3 and R4.
- S 225-082
- (4) Cycle the rudder pedals through their full travel 25 times. Do the check that follows:
- (a) Make sure that the cables are not bent by the fairleads, rub strips, or grommets that are in the system.
- (b) Make sure that the cable guards are installed correctly and that the pulleys turn freely.

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- (c) Make sure that the cables are installed through the necessary grommets and air pressure seals.
- (d) Make sure that the cables are lubricated for full travel over their pulleys, grommets, fair leads, and quadrants.
- (e) Make sure that the cables are aligned with their pulleys and quadrants (use a tolerance of  $\pm 2$  degrees).

S 495-083

- (5) Install rig pin R4.

S 825-084

- (6) Adjust the cable tension to the load shown in Fig. 502. Make sure that rig pin R3 can be easily installed.

S 095-085

- (7) Remove rig pins R3 and R4.

S 225-086

- (8) Move the pedals through one full travel cycle and do a check of the cable tension.

S 425-087

- (9) Install clip locks on all the turnbuckles.

J. Adjust the Middle Rudder Power Control Actuator (PCA) (Fig. 504)

**NOTE:** This procedure supplies the data that is necessary to do a PCA system adjustment. To adjust a single PCA, refer to AMM 27-21-02/201

This procedure will make sure that the rudder trailing edge does not move (use a tolerance of 0.10 inch (2.54 mm) left or right of the rudder neutral position) when only one PCA is powered at a time.

S 825-088

- (1) Turn the rudder trim switch on the P8 panel counterclockwise until the trim position indicator shows 3 to 5 units of left trim.

**NOTE:** Due to the large tolerance of rig pin hole R4, trim is input into the system during initial adjustment to ensure a good repeatable position of the rudder trailing at the neutral position.

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S 985-089

**CAUTION:** MAKE SURE THAT THE RIG PIN HOLES IN THE FEEL, CENTERING, AND TRIM AFT QUADRANT ALIGN BEFORE RIG PIN R4 IS INSTALLED. IT IS POSSIBLE FOR RIG PIN R4 TO BE INSTALLED INCORRECTLY IF THE QUADRANT IS NOT IN ITS CORRECT POSITION.

- (2) Manually turn the feel, centering and trim aft quadrant clockwise against the spring force until rig pin R4 can be installed.

**NOTE:** This will make a stable position for the PCA adjustment procedure. The mechanism springs hold the rig pin hole to positively ground the ratio-changer mechanism.

S 485-394

- (3) Install rig pin R4 in the aft quadrant.

S 035-090

- (4) Disconnect the bottom end of the YELLOW (right) control rod from the yaw damper summing lever.

S 495-091

- (5) Install rig pin R5 in the middle PCA input crank.

**NOTE:** Because of the load that is caused by the load limiter/cam in the secondary loop, the PCA linkage must be manually moved to install rig pin R5.

S 495-092

- (6) Use a bungee cord to put a load on the top PCA torque tube assembly in a clockwise direction.

**NOTE:** This removes backlash in the top PCA linkage.

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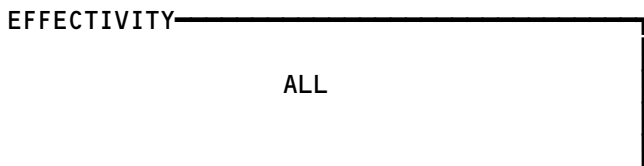
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**BOEING**  
767  
MAINTENANCE MANUAL

Not Used  
Figure 507



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S 825-094

- (7) Adjust the BLACK (left) control rod between the yaw damper summing lever and the bottom PCA. Make sure that rig pin R8 fits loosely in the load limiter/cam at the yaw damper linkage.

**NOTE:** This removes the backlash from the middle and bottom PCA linkages.

- (a) Remove rig pin R8.  
(b) Do not tighten the lock nuts.

**NOTE:** The lock nuts will be tightened after the control rod is adjusted in the Yaw Damper Summing Lever adjustment procedure.

S 865-002

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (8) Supply pressure to the left hydraulic system only (AMM 29-11-00/201).

**NOTE:** The middle PCA will be powered. This step is for the middle PCA adjustment only.

S 865-095

- (9) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11, panel:
- (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

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S 865-096

- (10) Make sure that these circuit breakers on the P11, panel are closed:
- (a) 11H11, STAB TRIM L
  - (b) 11H20, STAB TRIM R
  - (c) 11A10, AIR DATA CMPTR L
  - (d) 11F30, AIR DATA CMPTR R
  - (e) 11A11, AIR DATA AOA SENSOR L
  - (f) 11F31, AIR DATA AOA SENSOR R
  - (g) 11A12, AIR DATA BARO CORRECT L
  - (h) 11F32, AIR DATA BARO CORRECT R

S 865-097

- (11) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, C, and R switches on the P61 panel to ON.

NOTE: All the switches are opened to let unwanted hydraulic pressure bleed during the PCA adjustment.

S 825-098

- (12) Loosen the lock nut to let you adjust the middle PCA rod if necessary.

NOTE: This will let you move the rudder left or right of neutral a small distance, if necessary.

S 825-101

- (13) If a large adjustment is necessary to move the rudder to a position that is left of neutral a small amount, do the steps that follow:

NOTE: For large adjustments, an input rod end must be turned one-half turn at a time to move the rudder trailing edge very near neutral. The hydraulic system must be powered after each turn to do a check of the rudder position.

When you make the input rod longer the rudder moves to the left and when it is made shorter it moves the rudder to the right.

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**WARNING:** DO NOT DISCONNECT ALL 3 OF THE RUDDER PCA INPUT RODS WITH THE HYDRAULIC POWER ON. THE RUDDER WILL MOVE QUICKLY TO ITS FULL LEFT POSITION AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (a) Move the FLT CONTROL SHUTOFF TAIL switches L, C, and R on the P61 panel to OFF. Attach DO-NOT-OPERATE tags and make sure that the amber switch-position legend lights come ON.
- (b) Disconnect the PCA input rod end and turn it one-half turn at a time until the rudder is very near neutral. To do a check of the rudder position, connect the input rod and move the FLT CONTROL SHUTOFF TAIL switches L, C, and R to ON.
- (c) When the rudder is very near neutral, connect and tighten the PCA input rod end bolt.
- (d) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL switches L, C, and R on the P61 panel to ON.

S 825-102

- (14) If a small adjustment is needed to move the rudder to a position that is slightly left of neutral, do the steps that follow:

**NOTE:** All adjustments to the rudder PCAs must make the rudder move from left to right.

- (a) Loosen the lock nuts of the PCA input rod.
- (b) Increase the length of the PCA input rod to move the rudder left of neutral a small distance.

**NOTE:** Turn the input rod in the clockwise direction to move the rudder to the right and counterclockwise to move it to the left.

When you tighten the lock nuts the rudder will move a small amount.

S 915-103

- (15) Stop for three minutes, or move the top and bottom PCA input rods across the neutral position, to bleed the unwanted pressure from the center and right hydraulic systems.

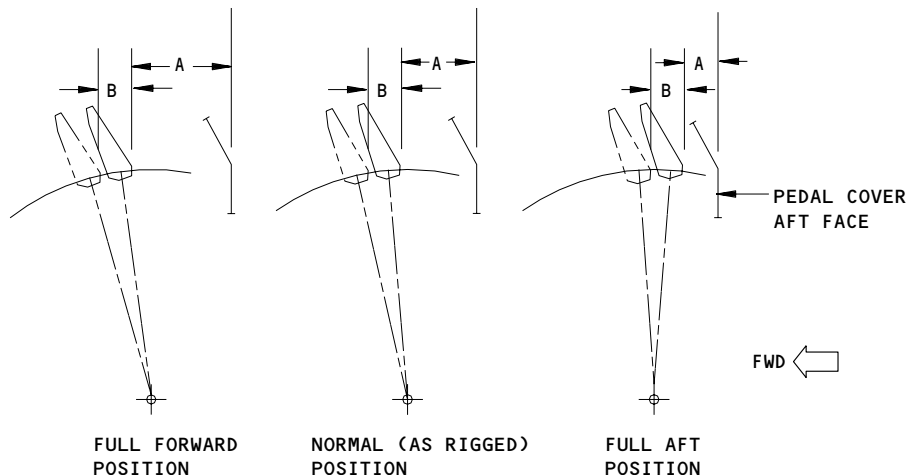
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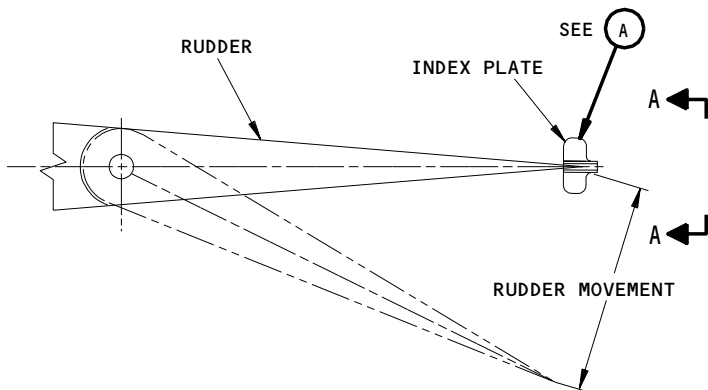
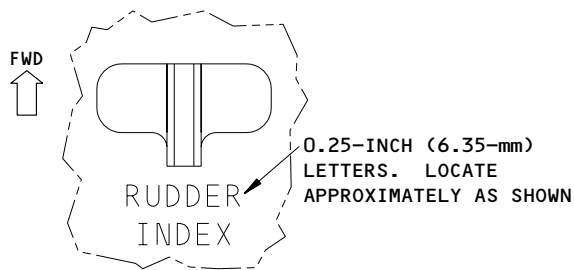
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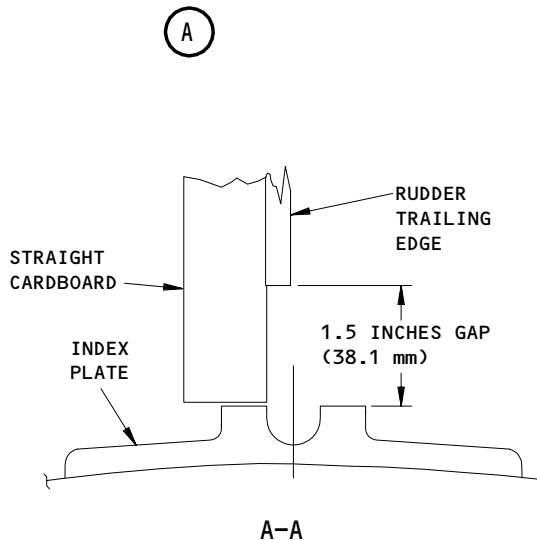
**RUDDER PEDAL TRAVEL**

**NOTE:** THE "A" DIMENSION IS THE PEDAL POSITION WHEN IT IS MEASURED FROM THE PEDAL COVER AFT FACE.

THE "B" DIMENSION IS MEASURED FROM THE RUDDER PEDAL NEUTRAL POSITION.



**DETAIL OF RUDDER INDEX PLATE AND LETTERING**

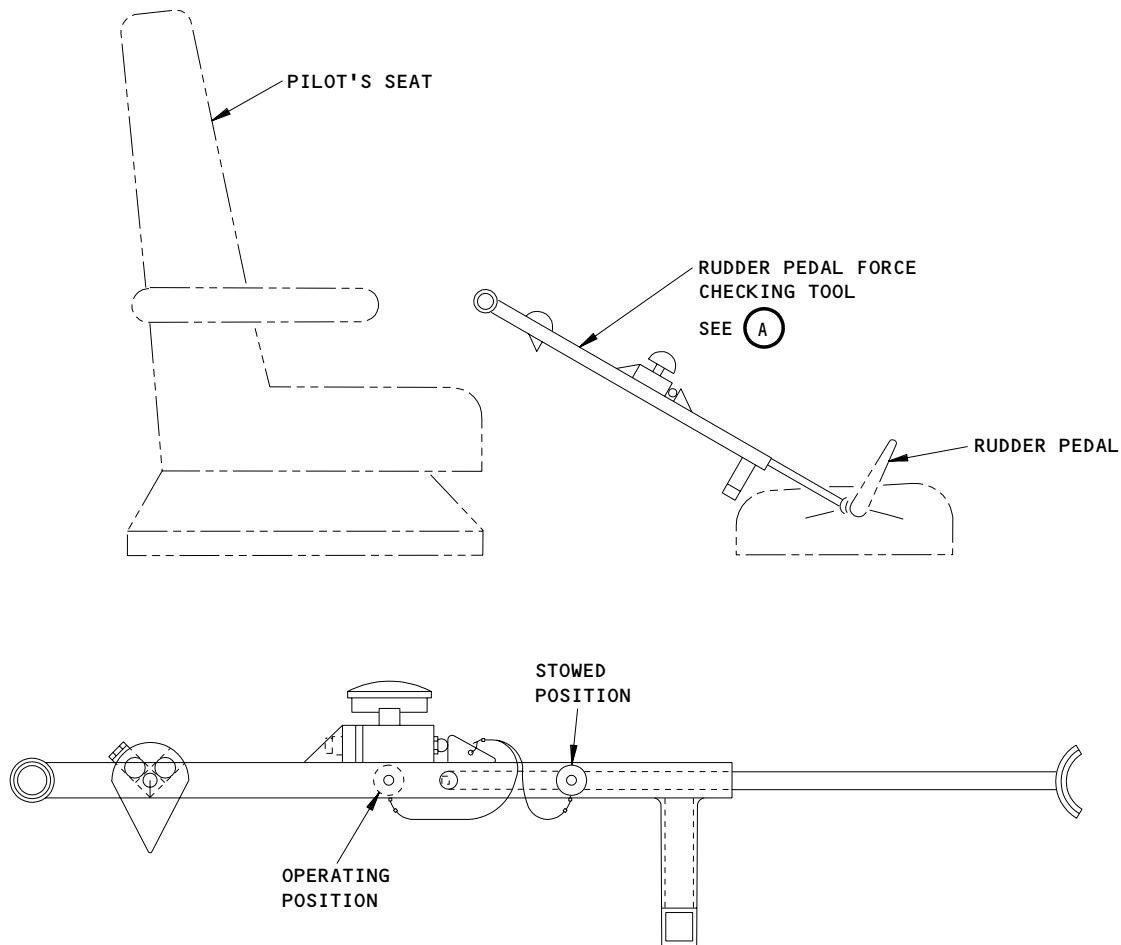


**NOTE:** PUT A PIECE OF STRAIGHT CARDBOARD ON THE RUDDER TRAILING EDGE TO FIND ITS LOCATION ON INDEX PLATE.

**Rudder and Rudder Trim Control System Test  
Figure 508**

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RUDDER PEDAL FORCE CHECKING TOOL

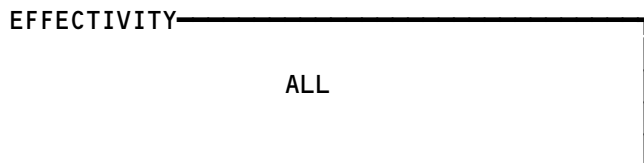
(A)

GAUGE READING MULTIPLIER

USAGE ANGLE	MULTIPLIER
0°	1.00
5°	1.00
10°	0.98
15°	0.97
20°	0.94
25°	0.91
30°	0.87
35°	0.82
40°	0.77
45°	0.71

**EXAMPLE:** IF THE USAGE IS 25°, THE MULTPLER = 0.91.  
IF THE FORCE GAUGE ON THE TOOL SHOW 20LB.  
THEN THE CORRECT FORCE MEASUREMENT IS  
20LB. X 0.91 = 18.20lb.

Rudder Pedal Force Checking Installation  
Figure 509



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S 825-104

- (16) In increments, decrease the length of the middle (top or bottom) PCA input rod until the rudder is less than 0.05 inch (1.27 mm) away from the neutral position (the datum position) (View A-A, Fig. 502).

NOTE: Between increments, stop and let the other PCA control valves bleed hydraulic pressure. This will make the rudder position become stable.

S 225-233

- (17) Make sure that the rudder position is very near neutral. Make sure that the rudder trailing edge is not out of the groove in the rudder index plate (Fig. 502).

S 435-105

- (18) Tighten the lock nuts and the input rod bolts. Make sure that the rudder does not move from its neutral position when the lock nuts are tightened.

NOTE: Make sure that the rudder does not move from the datum position when the top and bottom PCAs are adjusted.

#### K. Adjust the Top Rudder PCA

S 865-106

- (1) Remove the power from the left hydraulic system (AMM 29-11-00/201).

S 865-107

- (2) Supply pressure to the center hydraulic system only (AMM 29-11-00/201).

NOTE: The top PCA will be powered.

S 825-108

- (3) Use the middle PCA adjustment procedure to adjust the top PCA. Do not disconnect and move the other PCA input rods once the PCA has been adjusted, stop for three minutes to bleed the unwanted hydraulic pressure.

#### L. Adjust the Bottom Rudder PCA

S 865-109

- (1) Remove the power from the center hydraulic system (AMM 29-11-00/201).

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S 865-110

- (2) Supply pressure to the right hydraulic system only (AMM 29-11-00/201).

NOTE: The bottom PCA will be powered.

S 825-111

- (3) Use the middle PCA adjustment procedure to adjust the bottom PCA. Do not disconnect and move the other PCA input rods once the PCA has been adjusted, stop for three minutes to bleed the unwanted hydraulic pressure from the PCAs.

M. Adjust the Three Rudder PCAs System

S 865-112

- (1) Remove the power from the right hydraulic system (AMM 29-11-00/201).

S 865-113

- (2) Supply pressure to the left hydraulic system only (AMM 29-11-00/201).

S 225-114

- (3) Use a tolerance of  $\pm 0.05$  inch ( $\pm 1.27$  mm) and make sure that the rudder is in its neutral position (Fig. 502, View A-A). Keep a record of its position.

NOTE: This position is the datum position.

S 865-115

- (4) Supply pressure to the center hydraulic system and remove the power from the left hydraulic system (AMM 29-11-00/201). Stop for three minutes.

S 225-116

- (5) Make sure that the rudder is less than 0.05 inch (1.27 mm) away from the datum position. If the rudder is more than 0.05 inch (1.27 mm) away from the datum position, do these steps:
  - (a) In increments, adjust the top PCA input rod until the rudder is less than 0.05 inch (1.27 mm) away from the datum position. Between increments, stop and let the other PCA control valves bleed hydraulic pressure. This will make the rudder position become stable.
  - (b) Tighten the lock nuts. Do not lockwire the input rod. Make sure that the rudder does not move more than 0.05 inch (1.27 mm) away from the datum position when the lock nuts are tightened.
  - (c) Remove the power from the center hydraulic system (Ref 29-11-00/201).
  - (d) Do the "Adjust the Three PCA System" group of steps again.

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- S 865-121
- (6) Supply pressure to the right hydraulic system and remove the power from the center hydraulic system (AMM 29-11-00/201). Stop for three minutes.
- S 225-122
- (7) Make sure that the rudder is less than 0.05 inch (1.27 mm) away from the datum position. If the rudder is more than 0.05 inch (1.27 mm) away from the datum position, do these steps:
- (a) In increments, adjust the bottom PCA input rod until the rudder is less than 0.05 inch (1.27 mm) away from the datum position. Between increments, stop and let the other PCA control valves bleed pressure. This will make the rudder position become stable.
  - (b) Tighten the lock nuts. Do not lockwire the input rod. Make sure that the rudder does not move more than 0.05 inch (1.27 mm) away from the datum position when the lock nuts are tightened.
  - (c) Remove the power from the right hydraulic system (AMM 29-11-00/201).
  - (d) Do the "Adjust the Three PCA System" group of steps again.
- S 865-127
- (8) Supply pressure to the left hydraulic system and remove the power from the right hydraulic system (AMM 29-11-00/201). Stop for three minutes.
- S 225-128
- (9) Make sure that the rudder is less than 0.05 inch (1.27 mm) away from the datum position. If the rudder is more than 0.05 inch (1.27 mm) away from the datum position, do this step:
- (a) Do the "Adjust the Three PCA System" group of steps again.
- S 865-130
- (10) Remove the power from the left hydraulic system (AMM 29-11-00/201).
- S 865-131
- (11) Move the FLT CONTROL SHUTOFF TAIL L, C, and R switches on the P61 panel to OFF. Attach DO-NOT-OPERATE tags and make sure that the amber switch-position legend lights come ON.
- S 865-132
- (12) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

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S 435-133

- (13) Lockwire the lock nuts on the middle, top and bottom PCA input rods.

S 435-134

- (14) Connect the bottom end of the YELLOW control rod to the yaw damper summing lever. If it is necessary, adjust the rod until the bolt can be easily installed. Tighten the lock nut.

S 095-135

- (15) Remove rig pins R4, R5 and the bungee cord.

S 225-136

- (16) Do an inspection on all the control rods. Make sure that control rod threads can be seen in at least one-half of the control rod inspection hole.

S 825-137

- (17) Do the adjustment procedure for the Rudder Ratio Changer Mechanism.

S 825-138

- (18) Do the adjustment procedure for the Yaw Damper Summing Lever.

N. Adjust Rudder Ratio Changer Mechanism (Fig. 505)

**NOTE:** Make sure that the rudder power control actuators are adjusted correctly before you do this procedure.

S 865-163

- (1) Operate the rudder trim switch on the aft electronic control panel, P8, until the rudder trim indicator shows 3 to 5 units of left trim.

S 495-165

- (2) Manually turn the feel, centering, and trim mechanism clockwise until you can install rig pin R4.

**NOTE:** The feel springs push against the rig pin and keep the quadrant in a stable position during the adjustment.

S 215-166

- (3) Make sure the rudder ratio changer module (RRCM) test switches, on the E1 and E2 equipment shelves, are in the NORMAL position.

S 035-405

**CAUTION:** MAKE SURE THAT YOU ONLY DISCONNECT THE LEFT "BLUE" CONTROL ROD. IF YOU DISCONNECT BOTH LEFT AND RIGHT RODS, DAMAGE MAY OCCUR.

- (4) Disconnect the bottom end of the BLUE (left) control rod nearest the trim actuator from the feel, centering, and trim mechanism.

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S 865-003

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (5) Supply pressure to the left, center, and right hydraulic systems (AMM 29-11-00/201).

S 865-141

- (6) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 865-142

- (7) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, C, and R switches on the P61 panel to ON.

S 865-168

- (8) Move one of the RRCM test switches, on the E1 or E2 equipment shelf, to TEST and do these checks:

**NOTE:** The amber RUDDER RATIO light on the overhead panel, P5, will come on and stay on. The EICAS message, RUDDER RATIO, will show on the top EICAS display when the switch is in its TEST position.

- (a) Make sure the IN TEST light stays on for a maximum of 18 seconds.
- (b) After 30 seconds, make sure all the RRCM faultballs are black.

S 215-234

- (9) Make sure that rig pin R6 is able to move freely. If rig pin R6 can not be installed and move freely do the steps that follow:
- (a) Remove the LVDT lockwire.
  - (b) LVDTs WITH AN ADJUSTMENT NUT;  
turn the adjustment nut until rig pin R6 can be easily installed in the left ratio-changer crank and install a lockwire on the LVDT.
  - (c) LVDTs WITH CASE ADJUSTMENT;  
loosen the lock nut and turn the outer case until rig pin R6 can be easily installed in the left ratio-changer crank.  
Tighten the lock nut and install a lockwire.

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S 215-169

- (10) Make sure you can easily install and remove rig pin R7.

**NOTE:** If you cannot install the rig pin, start the adjustment procedure again.

S 825-167

**WARNING:** MAKE SURE THE LEFT HYDRAULIC SYSTEM DOES NOT HAVE POWER WHEN YOU ADJUST THE WHITE INTERCONNECT ROD. THE RATIO CHANGER ACTUATOR CAN MOVE QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (11) If necessary, do these steps to examine and adjust the WHITE interconnect rod:
- (a) Adjust the WHITE interconnect rod until you can easily install and remove rig pin R7.
  - (b) Tighten the lock nuts for the WHITE interconnect rod.

S 095-159

- (12) Remove rig pins R6 and R7.

S 225-174

- (13) Keep a written record of the position of the rudder trailing edge.

S 215-170

- (14) Move the RRCM test switch to NORMAL and do these steps:
- (a) Make sure the IN TEST light is on for a maximum of 18 seconds.
  - (b) After 30 seconds, make sure all the RRCM faultballs are black.
  - (c) Measure and keep a written record for the distance and direction the rudder trailing edge moves.

**NOTE:** If the rudder trailing edge moves to the right, you must decrease the length of the BLUE (right) control rod. If the rudder trailing edge moves left, you must increase the length of the BLUE (right) control rod.

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S 825-171

**WARNING:** IF IT IS NECESSARY TO REMOVE THE BOLT WHEN THE CONTROL ROD IS ADJUSTED, REMOVE THE POWER FROM THE LEFT, RIGHT, AND CENTER HYDRAULIC SYSTEMS (AMM 29-11-00/201). INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(15) Do these steps to adjust the BLUE control rods:

- (a) If the rudder trailing edge moved more than 0.03 inch (0.75 mm) when the switch was moved, do these steps:

**NOTE:** Adjustment of the rods should be to the position of the rudder trailing edge recorded above.

- 1) If a small adjustment of the BLUE (right) control rod is necessary, turn the knurled adjustment knob.

**NOTE:** One full turn of the adjustment knob will move the rudder trailing edge 0.20 inch (5.08 mm). If you turn the knob clockwise, the length of the rod will decrease.

- 2) If a large adjustment of the BLUE (right) control rod is necessary, disconnect the rod at the top end. Turn the rod full turns to keep the locknut pointed to the access door and the coarse adjuster nut pointed aft.

**NOTE:** One full turn of the rod only (with the bottom rod end and the knurled adjustment knob held) will move the rudder trailing edge 0.80 inch (20.3 mm).

One full turn of the rod and the knurled adjustment knob (at the same time, with only the bottom rod end held) will move the rudder trailing edge 0.60 inch (15.24 mm).

S 225-162

- (16) Make sure the rudder moves no more than 0.03 inch (0.76 mm) when the RRCM test switch is moved to TEST then NORMAL.

S 825-172

- (17) If the movement is not satisfactory, adjust the BLUE (right) control rod again.

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S 825-235

- (18) Adjust the BLUE (left) control rod until you can easily install the bolt that connects it.

NOTE: It is possible for the rudder to be away from its neutral position.

S 825-236

- (19) Tighten the locknut for the BLUE (left) control rod to 80 - 110 pound-inches (9.0-12.4 newton-meters).

S 215-164

- (20) Move the RRCM test switch to TEST and do these checks:
- (a) Make sure the IN TEST light stays on for a maximum of 18 seconds.
  - (b) Make sure all the RRCM faultballs are black.
  - (c) Make sure you can easily install and remove rig pins R6 and R7.

S 865-166

- (21) Move the RRCM test switch to NORMAL.

S 865-167

- (22) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 225-009

- (23) Do the inspections that follow:
- (a) Make sure you can see control rod threads in at least one-half of all the control rod inspection holes.
  - (b) Make sure the narrow index mark aligns with the wide index mark on the ratio-changer load limiter. Replace the load limiter if the marks do not align (Fig. 505).
  - (c) Do a check of the yaw damper summing lever adjustment.
0. Adjust the Yaw Damper Summing Lever (Fig. 506)

S 035-168

- (1) Disconnect the bottom end of the YELLOW (right) control rod that is connected between the yaw damper summing lever and the middle PCA.

S 495-169

- (2) Install rig pin R5 in the middle PCA input crank.

NOTE: Because the yaw damper summing lever has a load, the middle PCA input crank must be manually moved to install rig pin R5.

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S 825-170

- (3) Adjust the YELLOW (right) control rod until the bolt can be easily installed. Do not tighten the lock nut.

S 825-238

- (4) Adjust the BLACK (left) control rod between the yaw damper summing lever and the bottom PCA until rig pin R8 can be easily installed in the yaw damper summing lever. Do not tighten the lock nuts.

S 095-172

- (5) Remove rig pin R5.

S 865-004

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (6) Supply pressure to the left, center, and right hydraulic systems (AMM 29-11-00/201). Make sure that the ratio-changer actuator is powered.

S 825-173

- (7) Make sure that the rudder is in its neutral position (Fig. 502). If it is not in its neutral position, do the steps that follow:
- (a) Adjust the YELLOW (right) control rod in small increments until the rudder is in its neutral position.
  - (b) If it is necessary, adjust the BLACK (left) control rod until rig pin R8 can be easily installed.

S 435-174

- (8) Tighten the lock nut on the YELLOW control rod to 80 - 110 pound-inches. Tighten the lock nuts on the BLACK control rod. Make sure that the rudder does not move from its neutral position when the nuts are tightened.

**NOTE:** Rig pin R5 may not be installed easily after this adjustment has been made.

S 865-175

- (9) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-176

- (10) Move the FLT CONTROL SHUTOFF TAIL L, C, and R switches on the P61 panel to OFF. Attach DO-NOT-OPERATE tags and make sure that the amber switch-position legend lights come ON.

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S 865-177

- (11) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 095-237

- (12) Remove rig pins R4 and R8.

S 825-178

- (13) Operate the rudder trim switch to move the rudder to its neutral position.

S 225-179

- (14) Do an inspection on all the control rods. Make sure that control rod threads can be seen in at least one-half of the control rod inspection hole.

S 825-180

- (15) Adjust the Directional Autopilot Servos (AMM 22-13-01/401).

S 825-181

- (16) Adjust the Rudder Position Transmitter (AMM 27-28-00/501).

P. Check the Rudder Trim Indicator Null

**NOTE:** Make sure that the rudder system is rigged correctly, the yaw damper shear rivet (or link) is not sheared, or the load limiter has not been crushed before you do this procedure. Perform the ultrasonic test on the shear rivets Non-Destructive Test Manual Part 4 - Section 27-20)

S 865-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply pressure to the left, center, and right hydraulic systems (AMM 29-11-00/201).

S 865-303

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT

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- (c) 11H18, FLT CONT SHUTOFF TAIL CTR
- (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 865-183

- (3) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, C, and R switches on the P61 panel to ON.

S 825-184

- (4) Turn the rudder trim switch on the aft electronic control panel, P8, until the rudder is in its neutral position (Fig. 502).

S 825-185

- (5) Hit the left and right pedals lightly to put the feel cam roller in its detent. Do this step again if it is necessary.

S 225-186

- (6) Make sure that the rudder trim indicator shows zero and that the pointer is on the zero line width. If it is not on the line, adjust the rudder trim indicator null.

Q. Adjust the Rudder Trim Indicator Null

**NOTE:** Make sure that the rudder system is rigged correctly, the yaw damper shear rivet (or link) is not sheared, or the load limiter has not been crushed before you do this procedure.

S 865-380

- (1) Remove the power from the left, center, and right hydraulic systems (AMM 29-11-00/201).

S 865-188

- (2) Move the FLT CONTROL SHUTOFF TAIL L, C, and R switches on the P61 panel to OFF. Attach DO-NOT-OPERATE tags and make sure that the amber switch-position legend lights come ON.

S 865-305

- (3) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 035-190

**CAUTION:** MAKE SURE THAT THE RUDDER TRIM SWITCH IS NOT ACCIDENTALLY OPERATED WHEN THE MODULE IS REMOVED.

- (4) Remove the aileron and rudder trim module M74 from the P8 panel (there are 4 fasteners). Do not disconnect the electrical connectors.

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S 825-191

- (5) Turn the adjustment screw on the bottom of the rudder trim indicator until the pointer is on the zero mark.

S 425-192

- (6) Install the aileron and rudder trim module.
- R. Put the Airplane Back to Its Usual Condition

S 095-193

**WARNING:** STAY AWAY FROM THE NOSE GEAR WHEELS WHEN THE LOCKPIN IS REMOVED. THE NOSE WHEELS CAN TURN TO THE CENTERED POSITION QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Make sure that the nose gear wheels are in their center position and remove the nose gear towing lever lockpin.

S 095-194

- (2) Remove rig pins E1 and E2 from the control column torque tube.

S 215-306

**CAUTION:** IF THE RRCM TEST SWITCH IS NOT MOVED TO "NORMAL", THE AMBER "RUDDER RATIO" LIGHT WILL COME ON. IF THIS LIGHT IS ON, THE AIRPLANE CAN NOT BE DISPATCHED.

- (3) Make sure that the RRCM test switch is in its NORMAL position.

S 865-370

- (4) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-409

- (5) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, C, and R switches on the P61 panel to ON.

S 865-390

- (6) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
  - (a) 6H15, CAPT SEAT

S 865-197

- (7) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 415-198

- (8) Close the access panels you removed.

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TASK 27-21-00-735-199

4. System Test – Rudder and Rudder Trim Control

A. General

NOTE: The airplane must not be on jacks when the distances are measured.

- (1) Rudder pedal neutral is the no-load pedal position when the cam roller is in its detent on the feel, centering, and trim mechanism with zero units of trim.
- (2) Rudder neutral is found when the two sides of the rudder trailing edge are aligned with the rudder index plate groove.
- (3) Measure the rudder pedal positions from the pedal cover aft face (Fig. 508).
- (4) Measure the pedal forces at the pedal pivot center, parallel to the flight deck floor.
- (5) Rudder movement is measured from the bottom outboard corner of the rudder trailing edge to the aft near corner of the index plate groove.
- (6) To make sure that the rudder is in neutral, hit the rudder pedals lightly and let the cam roller move to its detent in the feel, centering, and trim mechanism.

B. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) E1 – P/N A20004-22
  - (b) E2 – P/N A20004-22
- (2) Force Checking Tool, Rudder Pedal – F80212-30
- (3) Nose Gear Towing Lever Lockpin – A09003-1
- (4) Scales, to measure rudder travel – Commercially Available
- (5) Square, to measure rudder pedal travel – Commercially Available

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-42-00/201, Empennage Access Doors and Panels
- (3) AMM 20-10-24/201, Rig Pins
- (4) AMM 24-22-00/201, Electrical Power – Control
- (5) AMM 27-09-00/201, Control System Electronics Unit
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) AMM 32-09-02/201, Air Ground Relay System
- (8) AMM 31-41-00/201, EICAS
- (9) AMM 34-11-00/201, Pitot-Static System

D. Access

- (1) Location Zones
  - 211/212 Control Cabin
- (2) Access Panels
  - 113AL Flight/Landing Gear/Engine Control Components
  - 324BL Hinge Fittings and Feel, Centering, and Trim Mechanism

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E. Prepare to Test

S 495-200

- (1) Move the towing lever on the metering valve module to the tow position and install the nose gear towing lever lockpin.

S 495-412

- (2) Make sure that the IRU is aligned. If necessary, do the task to "Align The IRS" (AMM 34-21-00/501).

S 015-201

- (3) Open access door 113AL (AMM 06-41-00/201).

S 495-202

- (4) Install rig pins E1 and E2 into the control column torque tube to prevent accidental elevator movement.

S 015-203

- (5) Open access panel 324BL (AMM 06-42-00/201).

S 865-371

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

S 865-205

- (7) Make sure that these circuit breakers on the P11, panel are closed:  
(a) EICAS (6 locations)  
(b) 11L9, LEFT ENGINE OIL PRESS EICAS REF  
(c) 11L36, RIGHT ENGINE OIL PRESS EICAS REF

S 865-372

- (8) Move the FLT CONTROL SHUTOFF TAIL L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure that the amber switch-position legend lights come ON.

S 865-207

- (9) Open these circuit breakers on the P11 panel, and attach DO-NOT-CLOSE tags:  
(a) 11G10, RUDDER RATIO  
(b) 11H17, FLT CONT SHUTOFF TAIL LEFT  
(c) 11H18, FLT CONT SHUTOFF TAIL CTR  
(d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

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F. Test Rudder Pedal Adjustment Mechanism Travel

S 225-208

- (1) Turn the captain's and the first officer's pedal adjustment crank counterclockwise to move the pedals to their full aft position.

NOTE: Measure the rudder pedal positions from the pedal cover aft face (Fig. 508).

- (a) Make sure that all four pedals are positioned at  $4.49 \pm 0.50$  inches.
- (b) Push the captain's left pedal and then right pedal full forward.
- (c) Make sure that the stops on the forward quadrant are touched for each pedal.
- (d) Do the steps above again for the first officer's pedals.

S 225-209

- (2) Turn the captain's and the first officer's pedal adjustment crank clockwise to move the pedals to their full forward position.
  - (a) Make sure that all four pedals are positioned at  $11.93 \pm 0.50$  inches ( $303.0 \pm 12.7$  mm).
  - (b) Push the captain's left pedal and then the right pedal full forward. Make sure that the aft stop, then the forward stop are touched for each pedal. Do this step again for the first officer's pedals.
  - (c) Cycle the pedals in a longitudinal direction four times. Make sure that the pedals move smoothly and do not need too much force.

G. Test Captain's Rudder Pedal Travel

S 225-210

- (1) Turn the pedal adjustment crank clockwise to the full forward pedal position. Then turn it counterclockwise 3.25 turns and put it in the nearest detent.
  - (a) Make sure that the pedals are positioned at  $9.11 +0.63/-0.85$  inches ( $231.4 +16.0/-21.6$  mm). Make sure that the difference between the left and right pedals is not more than 0.30 inches (7.62 mm).

H. Test First Officer's Pedal Travel

S 225-211

- (1) Do the Captain's Rudder Pedal Travel Test on the first officer's rudder pedals.

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I. Test Captain's Rudder Pedal Forces (Fig. 509)

**NOTE:** You must measure the forces with the pedal moving away from the neutral position. If the pedal moves more than the specified distance, you must repeat the test and start with the pedal at neutral position. Do not stop to take the measurements, if you stop the measurements can vary due to the loss of friction.

S 865-006

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply pressure to the left, center, and right hydraulic systems (AMM 29-11-00/201).

S 865-212

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11, panel:
  - (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 865-292

- (3) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, C, and R switches on the P61 panel to ON.

S 825-214

- (4) Operate the rudder trim switch and hit the rudder pedals lightly to move the rudder to its neutral position.

S 225-227

- (5) Slowly push the left pedal forward with the rudder pedal force checking tool, F80212-30, until the rudder trailing edge has moved  $0.41 \pm 0.03$  inch ( $10.41 \pm 0.76$  mm). Make sure that the necessary force is from 15.2 to 33.1 pounds (68 to 147 newtons).

**NOTE:** Make sure the lockpin on the tool is in the operating position and not in the stowed position.

S 225-228

- (6) Continue to push the left pedal forward until the rudder trailing edge has moved  $5.08 \pm 0.03$  inches ( $129.0 \pm 0.76$  newtons). Make sure that the necessary force is 30.1 to 51.5 pounds (68 to 229 newtons).

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S 825-229

- (7) Release the rudder pedal.

S 225-230

- (8) Push the left pedal forward until the aft quadrant is less than 0.1 inch (2.54 mm) away from the stop. Make sure that the quadrant does not touch the stop (Fig 505).  
(a) Make sure that the necessary force is from 64.6 to 93.5 pounds (287 to 416 newtons).

S 215-231

- (9) Release the pedal. Make sure that the rudder goes back to its neutral position.

S 225-244

- (10) Slowly push the right pedal forward with the rudder pedal force checking tool until the rudder trailing edge has moved  $0.41 \pm 0.03$  inch ( $10.41 \pm 0.76$  mm). Make sure that the necessary force is from 15.2 to 33.1 pounds (68 to 147 newtons).

S 225-245

- (11) Continue to push the right pedal forward until the rudder trailing edge has moved  $5.08 \pm 0.03$  inches ( $129.03 \pm 0.762$  mm). Make sure that the necessary force is 30.1 to 51.5 pounds (134-229 newtons).

S 825-246

- (12) Release the rudder pedal.

S 225-247

- (13) Push the right pedal forward until the aft quadrant is less than 0.1 inch (2.54 mm) away from the stop. Make sure that the quadrant does not touch the stop (Fig 505).  
(a) Make sure that the necessary force is from 64.6 to 93.5 pounds (287-416 newtons).

S 215-248

- (14) Release the pedal. Make sure that the rudder goes back to its neutral position.

J. Test First Officer's Rudder Pedal Forces

S 225-249

- (1) Do the captain's rudder pedal force test on the first officer's rudder pedals.

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K. Test Rudder Return to Center

S 215-250

- (1) Make sure that the rudder is in its neutral position and that the rudder trim is at zero units.

**NOTE:** Do not operate the rudder trim during this test.

S 825-251

- (2) Push the captains left pedal until the rudder has moved approximately 10.0 inches (25.4 cm) and hold it there.

S 225-252

- (3) Slowly release the pedal. Make sure that the rudder returns to its neutral position (use a tolerance of  $\pm 0.41$  inch ( $\pm 10.4$  mm)).

S 825-253

- (4) Push the captains right pedal until the rudder has moved approximately 10.0 inches (254 mm) and hold it there.

S 225-254

- (5) Slowly release the pedal. Make sure that the rudder returns to its neutral position (use a tolerance of  $\pm 0.41$  inch ( $\pm 10.4$  mm)).

S 225-255

- (6) Do the above procedure again for the first officer's rudder pedals.

S 865-256

- (7) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

L. Test Single Hydraulic System and PCA

S 865-007

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply pressure to the left hydraulic system only (AMM 29-11-00/201).

S 865-369

- (2) Make sure that these circuit breakers on the P11 panel are closed:
  - (a) 11A10, AIR DATA CMPTR L
  - (b) 11A11, AIR DATA AOA SENSOR L
  - (c) 11A12, AIR DATA BARO CORRECT L
  - (d) 11C5, RUDDER TRIM
  - (e) 11C6, FLT CONT ELEC 1L AC

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- (f) 11C7, FLT CONT ELEC 1L DC
- (g) 11C8, FLT CONT ELEC 2L AC
- (h) 11C9, FLT CONT ELEC 2L DC
- (i) 11C30, LANDING GEAR POSITION AIR/GND SYS 1
- (j) 11F30, AIR DATA CMPTR RIGHT
- (k) 11F31, AIR DATA AOA SENSOR RIGHT
- (l) 11F32, AIR DATA BARO CORRECT RIGHT
- (m) 11G10, RUDDER RATIO
- (n) 11G17, FLT CONT ELEC 1R AC
- (o) 11G18, FLT CONT ELEC 1R DC
- (p) 11G26, FLT CONT ELEC 2R AC
- (q) 11G27, FLT CONT ELEC 2R DC
- (r) 11H11, STAB TRIM CONT LEFT
- (s) 11H20, STAB TRIM R
- (t) 11K17, RUDDER TRIM POS
- (u) 767-300 AIRPLANES;  
11U23, POS AIR/GND SYS 2
- (v) 767-200 AIRPLANES;  
11U24, POS AIR/GND SYS 2

S 825-258

- (3) Turn the rudder trim switch and hit the rudder pedals lightly until the rudder is in its neutral position.

S 225-259

- (4) Push the captain's left pedal forward until the aft quadrant touches its stop.
  - (a) Make sure that the rudder trailing edge moves at least 41.10 inches (1.04 meters) (26.0 degrees) to the left.
  - (b) Make sure that the EICAS rudder position indicator moves to the full left end-mark on its scale.

S 215-260

- (5) Slowly release the pedal. Make sure that the rudder returns to its neutral position (use a tolerance of  $\pm 0.41$  inch ( $\pm 10.4$  mm)).

S 225-261

- (6) Push the captain's right pedal forward until the aft quadrant touches its stop.
  - (a) Make sure that the rudder trailing edge moves at least 41.10 inches (1.04 meters) (26.0 degrees) to the right.
  - (b) Make sure that the EICAS rudder position indicator moves to the full right end-mark on its scale.

S 215-262

- (7) Slowly release the pedal. Make sure that the rudder returns to its neutral position (use a tolerance of  $\pm 0.41$  inch ( $\pm 10.4$  mm)).

S 865-263

- (8) Supply pressure to the right hydraulic system (AMM 29-11-00/201).

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S 225-264

- (9) Make sure that the rudder does not move more than 0.05 inch (1.27 mm) away from its neutral position.

S 225-239

- (10) Push the captain's left pedal forward until the aft quadrant touches its stop.
- (a) Make sure that the rudder trailing edge moves at least 41.10 inches (1.04 meters) (26.0 degrees) to the left.
  - (b) Make sure that the EICAS rudder position indicator moves to the full left end-mark on its scale.

S 215-240

- (11) Slowly release the pedal. Make sure that the rudder returns to its neutral position (use a tolerance of  $\pm 0.41$  inch ( $\pm 10.4$  mm)).

S 225-309

- (12) Push the captain's right pedal forward until the aft quadrant touches its stop.
- (a) Make sure that the rudder trailing edge moves at least 41.10 inches (1.04 meters) (26.0 degrees) to the right.
  - (b) Make sure that the EICAS rudder position indicator moves to the full right end-mark on its scale.

S 215-242

- (13) Slowly release the pedal. Make sure that the rudder returns to its neutral position (use a tolerance of  $\pm 0.41$  inch ( $\pm 10.4$  mm)).

S 865-293

- (14) Supply pressure to the center hydraulic system and remove the power from the right hydraulic system (AMM 29-11-00/201).

S 225-266

- (15) Make sure that the rudder does not move more than 0.05 inch (1.27 mm) away from its neutral position.

S 225-310

- (16) Push the captain's left pedal forward until the aft quadrant touches its stop.
- (a) Make sure that the rudder trailing edge moves at least 41.10 inches (1.04 meters) (26.0 degrees) to the left.
  - (b) Make sure that the EICAS rudder position indicator moves to the full left end-mark on its scale.

S 215-244

- (17) Slowly release the pedal. Make sure that the rudder returns to its neutral position (use a tolerance of  $\pm 0.41$  inch ( $\pm 10.4$  mm)).

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S 225-256

- (18) Push the captain's right pedal forward until the aft quadrant touches its stop.
  - (a) Make sure that the rudder trailing edge moves at least 41.10 inches (1.04 meters) (26.0 degrees) to the right.
  - (b) Make sure that the EICAS rudder position indicator moves to the full right end-mark on its scale.

S 215-246

- (19) Slowly release the pedal. Make sure that the rudder returns to its neutral position (use a tolerance of  $\pm 0.41$  inch ( $\pm 10.4$  mm)).

S 865-368

- (20) Remove the power from the center and right hydraulic systems (AMM 29-11-00/201).

NOTE: The left hydraulic system will stay powered.

#### M. Test Rudder Ratio-Changer System

NOTE: Ignore the flight deck annunciations unless they are specified by this procedure.

S 865-269

- (1) Use the reset switches on the front panel of the rudder ratio changer modules (RRCMs) to reset the left and right RRCMs.
  - (a) Make sure that the white RUDDER RATIO message does not show on the bottom EICAS display.

S 025-268

- (2) Remove the right RRCM (M529) on the E2 forward equipment shelf (AMM 27-09-00/201).
  - (a) Make sure that the white RUDDER RATIO message shows on the bottom EICAS display.

NOTE: Stop for 25 seconds to let the white EICAS message show.

S 825-269

- (3) Turn the rudder trim switch on the P8 panel until the rudder trim indicator shows approximately 8 units of trim.

S 215-010

- (4) Do the left RRCM check that follows:
  - (a) Move the left RRCM (M528) test switch to the TEST position.
    - 1) Make sure that the EICAS rudder position indicator moves in the direction of its neutral position.
    - 2) Stop for 20 seconds.

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- (b) Move the left RRCM (M528) test switch to the NORMAL position.
  - 1) Make sure that the EICAS rudder position indicator moves away from the neutral position.
  - 2) Stop for 20 seconds.

S 825-270

- (5) Use the reset switch to set the left RRCM (M528).

S 215-273

- (6) Do the above left RRCM check 3 more times. Use the reset switch to set the left RRCM (M528) after each check.

S 215-357

- (7) Do the above left RRCM check again. Make sure that all the faultballs on the RRCM are black.

S 215-011

- (8) Do the checks that follow:
  - (a) Make sure that the amber RUDDER RATIO light is OFF.
  - (b) Stop for 20 seconds. Make sure that a RUDDER RATIO maintenance message comes into view on the bottom EICAS display.

S 425-275

- (9) Install the right RRCM, M529 (AMM 27-09-00/201).
  - (a) Make sure that the white RUDDER RATIO message does not show on the bottom EICAS display.

S 025-276

- (10) Remove the Left RRCM, M528 (AMM 27-09-00/201).
  - (a) Make sure that the white RUDDER RATIO message shows on the bottom EICAS display.

NOTE: Stop for 25 seconds to let the white EICAS message show.

S 215-358

- (11) Do the right RRCM check that follows:
  - (a) Move the right RRCM (M529) test switch to the TEST position and do the checks that follow:
    - 1) Make sure that the EICAS rudder position indicator moves in the direction of its neutral position.
    - 2) Stop for 20 seconds.
  - (b) Move the right RRCM (M529) test switch to the NORMAL position and do the checks that follow:
    - 1) Make sure that the EICAS rudder position indicator moves away from the neutral position.
    - 2) Stop for 20 seconds.

S 825-359

- (12) Use the reset switch to set the right RRCM (M529).

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S 215-376

- (13) Do the above right RRCM check 3 more times. Use the reset switch to set the right RRCM (M529) after each check.

S 215-280

- (14) Do the above right RRCM check again. Make sure that all the faultballs on the RRCM are black.

S 215-012

- (15) Do the checks that follow:
- (a) Make sure that the amber RUDDER RATIO light is OFF.
  - (b) Stop for 20 seconds. Make sure that a RUDDER RATIO message comes into view on the bottom EICAS display.

S 825-281

- (16) Turn the rudder trim switch on the P8 panel until the rudder trim goes back to zero.

S 435-282

- (17) Install the Left RRCM (M528) (Ref 27-09-00).
- (a) Make sure that the white RUDDER RATIO message does not show on the bottom EICAS display.

S 865-277

- (18) Open these circuit breakers on the P11, panel and attach DO-NOT-CLOSE tags:
- (a) 11C08, FLT CONT ELEC 2L AC
  - (b) 11C09, FLT CONT ELEC 2L DC
  - (c) 11G17, FLT CONT ELEC 1R AC
  - (d) 11G18, FLT CONT ELEC 1R DC
  - (e) 11G26, FLT CONT ELEC 2R AC
  - (f) 11G27, FLT CONT ELEC 2R DC

S 215-384

- (19) Do a check of these indications:
- (a) Make sure the amber RUDDER RATIO light on the P5 panel is off.
  - (b) Make sure that the amber RUDDER RATIO message does not show on the top EICAS display.

S 865-279

- (20) Close this circuit breaker on the P11 panel and remove the DO-NOT-CLOSE tag:
- (a) 11C08, FLT CONT ELEC 2L AC
  - (b) 11C09, FLT CONT ELEC 2L DC

S 865-280

- (21) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
- (a) 11C06, FLT CONT ELEC 1L AC
  - (b) 11C07, FLT CONT ELEC 1L DC

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S 215-281

- (22) Do a check of these indications:
- (a) Make sure the amber RUDDER RATIO light on the P5 panel is off.
  - (b) Make sure that the amber RUDDER RATIO message does not show on the top EICAS display.

S 865-282

- (23) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G18, FLT CONT ELEC 1R DC

S 865-324

- (24) Open this circuit breaker on the P11, panel and attach a DO-NOT-CLOSE tag:
- (a) 11C08, FLT CONT ELEC 2L AC
  - (b) 11C09, FLT CONT ELEC 2L DC

S 215-284

- (25) Do a check of these indications:
- (a) Make sure the amber RUDDER RATIO light on the P5 panel is off.
  - (b) Make sure that the amber RUDDER RATIO message does not show on the top EICAS display.

S 865-285

- (26) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11G26, FLT CONT ELEC 2R AC
  - (b) 11G27, FLT CONT ELEC 2R DC

S 865-325

- (27) Open this circuit breaker on the P11, panel and attach a DO-NOT-CLOSE tag:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G18, FLT CONT ELEC 1R DC

S 215-326

- (28) Do a check of these indications:
- (a) Make sure the amber RUDDER RATIO light on the P5, panel is off.
  - (b) Make sure that the amber RUDDER RATIO message does not show on the top EICAS display.

S 865-288

- (29) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11, panel:
- (a) 11C06, FLT CONT ELEC 1L AC
  - (b) 11C07, FLT CONT ELEC 1L DC
  - (c) 11C08, FLT CONT ELEC 2L AC
  - (d) 11C09, FLT CONT ELEC 2L DC
  - (e) 11G17, FLT CONT ELEC 1R AC

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(f) 11G18, FLT CONT ELEC 1R DC  
N. Test Rudder Ratio Flight Deck Annunciation

S 445-300

- (1) Do the activation procedure for the standby bus (AMM 24-22-00/201).

S 825-284

- (2) Use the reset switch to set the RRCM, PSM1, PSM2, and SAM modules on equipment shelves E1 and E2.

S 865-299

- (3) Move the R FUEL CONTROL switch to RUN. Stop for 1.5 minutes.

S 215-288

- (4) Do a check of these indications:  
(a) Make sure that the RUDDER RATIO light is OFF.  
(b) Make sure that the RUDDER RATIO message does not come into view on the top EICAS display.  
(c) Stop for 20 seconds. Make sure that a RUDDER RATIO maintenance message does not come into view on the bottom EICAS display.

S 865-289

- (5) Remove the power from the left hydraulic system (AMM 29-11-00/201).

S 215-290

- (6) Make sure that the amber RUDDER RATIO light on the P5 panel is ON.

S 215-292

- (7) Do the check that follows:  
(a) Move the EICAS computer select switch to L. Make sure that a RUDDER RATIO message comes into view on the top EICAS display.  
(b) Move the EICAS computer select switch to R. Make sure that a RUDDER RATIO message comes into view on the top EICAS display.  
(c) Stop for 20 seconds. Make sure that a RUDDER RATIO maintenance message does not come into view on the bottom EICAS display.

S 865-361

- (8) Supply pressure to the left hydraulic system (Ref 29-11-00/201).

S 215-013

- (9) Do the checks that follow:  
(a) Make sure that the amber RUDDER RATIO light on the P5 panel is OFF.  
(b) Make sure that an amber RUDDER RATIO message does not come into view on the top EICAS display.

S 865-379

- (10) Move the R FUEL CONTROL switch to CUTOFF.

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S 865-362

- (11) Open these circuit breakers on the P11, panel and attach DO-NOT-CLOSE tags :
- (a) 11H11, STAB TRIM CONT LEFT
  - (b) 11H20, STAB TRIM R

S 215-299

- (12) Make sure that the amber RUDDER RATIO light on the P5, panel is ON.

S 865-300

- (13) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11, panel:
- (a) 11H11, STAB TRIM CONT LEFT
  - (b) 11H20, STAB TRIM R

S 215-375

- (14) Do these steps:
- (a) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11G10, RUDDER RATIO
  - (b) Stop for 20 seconds. Make sure that a RUDDER RATIO maintenance message comes into view on the bottom EICAS display.
  - (c) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11, panel:
    - 1) 11G10, RUDDER RATIO
  - (d) Make sure that the RUDDER RATIO light on the P5 panel is OFF.
  - (e) Stop for 18 seconds.
  - (f) Stop for 20 seconds. Make sure that a RUDDER RATIO maintenance message does not come into view on the bottom EICAS display.
0. Test the Left RRCM

S 045-017

**WARNING:** DO THE DEACTIVATION PROCEDURE FOR FLIGHT MODE SIMULATION BEFORE YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. WHEN YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS THE AIRPLANE IS IN FLIGHT MODE. IN FLIGHT MODE, MANY OF THE AIRPLANE SYSTEMS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Do the deactivation procedure for flight mode simulation (AMM 32-09-02/201).

S 865-363

- (2) Open this circuit breaker on the P11, panel:
- (a) 11C30, LANDING GEAR POSITION AIR/GND SYS 1

S 215-305

- (3) Move the left RRCM test-switch on the E1 forward equipment shelf to the TEST position.
- (a) Make sure that the two module IN TEST lights are OFF.

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767  
MAINTENANCE MANUAL

- (b) Make sure that the amber RUDDER RATIO light on the P5 panel is OFF.
- (c) Make sure that the amber RUDDER RATIO message does not come into view on the top EICAS display.

S 045-015

**WARNING:** DO THE DEACTIVATION PROCEDURE FOR FLIGHT MODE SIMULATION BEFORE YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. WHEN YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS THE AIRPLANE IS IN FLIGHT MODE. IN FLIGHT MODE, MANY OF THE AIRPLANE SYSTEMS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Do the deactivation procedure for flight mode simulation (AMM 32-09-02/201).

S 865-392

- (5) Open these circuit breakers on the P11, panel:

**NOTE:** A aural warning will sound until the circuit breakers below are closed.

- (a) AIRPLANES WITH THE "LANDING GEAR POSITION AIR/GND SYS 2 ALT" CIRCUIT BREAKER INSTALLED AT PANEL GRID LOCATION 11C29;  
11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT
- (b) 767-300 AIRPLANES;  
11U23, POS AIR/GND SYS 2
- (c) 767-200 AIRPLANES;  
11U24, POS AIR/GND SYS 2

S 865-307

- (6) Close this circuit breaker on the P11, panel:
  - (a) 11C30, LANDING GEAR POSITION AIR/GND SYS 1

S 215-308

- (7) Make sure that the two module IN TEST lights are OFF.

S 215-309

- (8) Make sure that the amber RUDDER RATIO light on the P5 panel is OFF.

S 215-310

- (9) Make sure that the amber RUDDER RATIO message does not come into view on the top EICAS display.

S 865-393

- (10) Close these circuit breakers on the P11, panel:
  - (a) AIRPLANES WITH THE "LANDING GEAR POSITION AIR/GND SYS 2 ALT" CIRCUIT BREAKER INSTALLED AT PANEL GRID LOCATION 11C29;  
11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT
  - (b) 767-300 AIRPLANES;  
11U23, POS AIR/GND SYS 2

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(c) 767-200 AIRPLANES;  
11U24, POS AIR/GND SYS 2

S 215-312

(11) Make sure that the amber RUDDER RATIO light on the P5, panel is ON.

S 215-313

(12) Make sure that the amber RUDDER RATIO message comes into view on the top EICAS display.

S 225-314

(13) Make sure that the two module IN TEST lights stay ON for a maximum of 15 seconds.

S 215-317

(14) Make sure that the left and right RRCM faultballs are not set.

S 215-318

(15) Move the left module test switch to its NORMAL position.

(a) Make sure that the two module IN TEST lights stay ON for a maximum of 15 seconds.

(b) Make sure that the left and right RRCM fault balls are not set.

P. Test the Right RRCM

S 045-016

**WARNING:** DO THE DEACTIVATION PROCEDURE FOR FLIGHT MODE SIMULATION BEFORE YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. WHEN YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS THE AIRPLANE IS IN FLIGHT MODE. IN FLIGHT MODE, MANY OF THE AIRPLANE SYSTEMS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Do the deactivation procedure for flight mode simulation (AMM 32-09-02/201).

S 865-364

(2) Open this circuit breaker on the P11, panel:

(a) 11C30, LANDING GEAR POSITION AIR/GND SYS 1

S 215-320

(3) Move the right module test switch on the E2 forward equipment shelf to the TEST position.

(a) Make sure that the two module IN TEST lights are OFF.

(b) Make sure that the amber RUDDER RATIO light on the P5 panel is OFF.

(c) Make sure that the amber RUDDER RATIO message does not come into view on the top EICAS display.

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S 045-014

**WARNING:** DO THE DEACTIVATION PROCEDURE FOR FLIGHT MODE SIMULATION BEFORE YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. WHEN YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS THE AIRPLANE IS IN FLIGHT MODE. IN FLIGHT MODE, MANY OF THE AIRPLANE SYSTEMS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Do the deactivation procedure for flight mode simulation (AMM 32-09-02/201).

S 865-365

- (5) Open these circuit breakers on the P11, panel:

**NOTE:** A aural warning will sound until the circuit breakers below are closed.

- (a) AIRPLANES WITH THE "LANDING GEAR POSITION AIR/GND SYS 2 ALT" CIRCUIT BREAKER INSTALLED AT PANEL GRID LOCATION 11C29;  
11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT
- (b) 767-300 AIRPLANES;  
11U23, POS AIR/GND SYS 2
- (c) 767-200 AIRPLANES;  
11U24, POS AIR/GND SYS 2

S 865-366

- (6) Close this circuit breaker on the P11, panel:  
(a) 11C30, LANDING GEAR POSITION AIR/GND SYS 1

S 215-367

- (7) Make sure that the two module IN TEST lights are OFF.

S 215-324

- (8) Make sure that the amber RUDDER RATIO light on the P5, panel is OFF.

S 215-325

- (9) Make sure that the amber RUDDER RATIO message does not come into view on the top EICAS display.

S 865-326

- (10) Close these circuit breakers on the P11, panel:  
(a) AIRPLANES WITH THE "LANDING GEAR POSITION AIR/GND SYS 2 ALT" CIRCUIT BREAKER INSTALLED AT PANEL GRID LOCATION 11C29;  
11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT
- (b) 767-300 AIRPLANES;  
11U23, POS AIR/GND SYS 2
- (c) 767-200 AIRPLANES;  
11U24, POS AIR/GND SYS 2

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S 215-327

- (11) Make sure that the amber RUDDER RATIO light on the P5 panel comes ON.

S 215-328

- (12) Make sure that the amber RUDDER RATIO message comes into view on the top EICAS display.

S 215-329

- (13) Make sure that the two module IN TEST lights stay on for a maximum of 15 seconds.

S 215-332

- (14) Make sure that the left and right RRCM fault balls are not set.

S 215-333

- (15) Move the right module test switch to the NORMAL position.  
(a) Make sure that the two module IN TEST lights stay ON for a maximum of 15 seconds.  
(b) Make sure that the left and right RRCM fault balls are not set.  
(c) Make sure that the amber RUDDER RATIO light on the P5, panel is OFF.

S 215-334

- (16) Push the ECS/MSG button on the P61, panel.  
(a) Make sure that a white RUDDER RATIO message does not come into view on the bottom EICAS display.  
(b) Make sure that the rudder is in its neutral position.

S 865-335

- (17) Put the EICAS computer back to its usual condition (AMM 31-41-00/201).

S 865-387

- (18) Put the safety-sensitive systems back to their initial conditions (AMM 32-09-02/201).

Q. Test Rudder Authorities

S 865-336

- (1) Supply pressure to the right and center hydraulic systems. Make sure that the left hydraulic system is powered (AMM 29-11-00/201).

S 865-337

- (2) Make sure that this circuit breaker on the P11 panel is closed:  
(a) 11G10, RUDDER RATIO

S 825-338

- (3) Push the STATUS button on the pilots display select panel, P9, to show the rudder position indicator on the bottom EICAS display.

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S 215-339

- (4) Hit the rudder pedals lightly to position the cam roller in its detent in the feel, centering, and trim mechanism.
- (a) Make sure that the rudder trim indicator on the P8, panel shows zero units of trim. Make sure that the pointer is on the zero mark.
  - (b) Make sure that the EICAS position indicator pointer is on the mid-scale mark of the display ( $\pm$  the pointer width).

S 225-340

- (5) Pressurize the pitot-static system to 142 knots at zero altitude (impact pressure = 0.98 inches of mercury (38.2 millibars)) (AMM 34-11-00/201).

**NOTE:** Pressurize both captain's and first officer's pitot static systems.

- (a) Do the captain's authority test that follows:
  - 1) Push the captain's left pedal forward until the aft quadrant touches its stop and hold it there.
  - 2) Make sure that the rudder trailing edge moves to the left at least 41.10 inches (1.04 meters) (26.0 degrees).
  - 3) Make sure that the EICAS rudder position pointer is on the left end-scale mark.

**NOTE:** The pointer can be left of the left end-mark. This condition is permitted.

- 4) Keep a record of the rudder position. Pressurize the pitot-static system to 158  $\pm$ 2 knots at zero altitude (impact pressure = 1.21 inches of mercury (41.0 millibar)).
- 5) Make sure that the rudder moves in the direction of its neutral position.
- 6) Release the rudder pedal.
- 7) Decrease the pitot-static system to 142  $\pm$ 2 knots at zero altitude (impact pressure = 0.98 inches of mercury (33.2 millibar)).
- 8) Push the captain's right pedal forward until the aft quadrant touches its stop and hold it there.
- 9) Make sure that the rudder trailing edge moves to the right at least 41.10 inches (26.0 degrees).
- 10) Make sure that the EICAS rudder position pointer is on the right end-scale mark.

**NOTE:** The pointer can be right of the right end-scale mark. This condition is permitted.

- 11) Keep a record of the rudder position. Pressurize the pitot-static system to 158  $\pm$ 2 knots at zero altitude (impact pressure = 1.21 inches of mercury (41.0 millibar)).

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- 12) Make sure that the rudder moves in the direction of its neutral position.
- 13) Release the rudder pedal.
- (b) Do the first officer's authority test that follows:
  - 1) Pressurize the pitot-static system to 142 knots at zero altitude (impact pressure = 0.98 inches of mercury (33.2 millibar)).
  - 2) Use the first officer's rudder pedals to do the captain's authority test again.

S 225-341

- (6) Increase the pitot-static pressure to 275 knots at zero altitude (impact pressure = 3.78 inches of mercury (128 millibar)).
  - (a) Do the captain's authority test that follows:
    - 1) Push the captain's left pedal forward until the aft quadrant touches its stop and hold it there.
    - 2) Make sure that the rudder trailing edge moves left 10.33-13.32 inches (6.4-8.3 degrees).
    - 3) Release the rudder pedal.
    - 4) Push the captain's right pedal forward until the aft quadrant touches its stop and hold it there.
    - 5) Make sure that the rudder trailing edge moves to the right 10.33-13.32 inches (6.4-8.3 degrees).
    - 6) Release the rudder pedal.
  - (b) Do the first officer's authority test that follows:
    - 1) Use the first officer's rudder pedals and do the captain's authority test again.

S 225-342

- (7) Increase the pitot-static pressure to 360 knots at zero altitude (impact pressure = 6.68 inches of mercury (226 millibar)).
  - (a) Do the captain's authority test that follows:
    - 1) Push the captain's left pedal forward until the aft quadrant touches its stop and hold it there.
    - 2) Make sure that the rudder trailing edge moves to the left 5.38-7.99 inches (3.2-4.9 degrees).
    - 3) Release the rudder pedal.
    - 4) Push the captain's right pedal forward until the aft quadrant touches its stop and hold it there.
    - 5) Make sure that the rudder trailing edge moves to the right 5.38-7.99 inches (3.2-4.9 degrees).
    - 6) Release the rudder pedal. Let the rudder go back to its neutral position.
    - 7) Open this circuit breaker on the P11, panel and attach a DO-NOT-CLOSE tag:
      - a) 11G10, RUDDER RATIO
    - 8) Stop for 20 seconds. Push the captain's right pedal forward until the aft quadrant touches its stop and hold it there.
    - 9) Make sure that the rudder trailing edge moves to the right 41.10 inches (26.0 degrees).

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- 10) Release the rudder pedal.
- 11) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11, panel:
  - a) 11G10, RUDDER RATIO
- (b) Do the first officer's authority test that follows:
  - 1) Use the first officer's rudder pedals and do the captain's authority test again.
- (c) Decrease the pitot-static pressure to zero knots.

S 865-343

- (8) Return the pitot-static system to ambient pressures (AMM 34-11-00/301).

R. Rudder Trim Authority and Rate Test

**NOTE:** Make sure to shake the control wheel before you take any travel measurements to make sure the cam on the centering mechanism is in the center position.

S 215-344

- (1) Turn the rudder trim switch to its full clockwise position, hold it there and then release it.
  - (a) Make sure that the rudder trim switch goes quickly to its neutral position. Make sure that the rudder movement stops.

S 215-345

- (2) Turn the rudder trim switch to its full counterclockwise position, hold it there and then release it.
  - (a) Make sure that the rudder trim switch goes quickly to its neutral position. Make sure that the rudder movement stops.

S 215-346

- (3) Do the above two steps at least one more time.

S 215-347

- (4) Turn the rudder trim switch until the rudder is in its neutral position. Hit the rudder pedals lightly to position the cam roller in the feel, centering and trim mechanism detent.
  - (a) Make sure that the rudder trim indicator shows zero units of trim and that the pointer is on the zero mark.

S 225-349

- (5) Turn the rudder trim switch on the aft electronic control panel, P8, clockwise and hold there until the rudder movement stops. Alternately tap the left and right rudder pedals lightly to seat the feel cam roller in its detent.
  - (a) ALL SAS AIRPLANES EXCEPT SAS 050-051;  
ALL MTH AIRPLANES;  
Make sure that the rudder moves to the right and stops in 13 to 21 seconds.

EFFECTIVITY

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- (b) SAS 050-051;  
Make sure that the rudder moves to the right and stops in 18 to 30 seconds.
- (c) ALL SAS AIRPLANES EXCEPT SAS 050-051;  
ALL MTH AIRPLANES;  
Make sure that the rudder trailing edge moves to the right at least 27.0 inches (17.0 degrees).
- (d) SAS 050-051;  
Make sure that the rudder trailing edge moves to the right at least 34.1 inches (21.5 degrees).
- (e) Make sure that the rudder trim indicator shows at least 14.0 units of right trim.

S 865-248

- (6) Turn the rudder trim switch on the aft electronic control panel, P8, counterclockwise and hold it there until the rudder movement stops. Alternately tap the left and right rudder pedals lightly to seat the feel cam roller in it's detent.
  - (a) ALL SAS AIRPLANES EXCEPT SAS 050-051;  
ALL MTH AIRPLANES;  
Make sure that the rudder moves to the left and stops in 26 to 42 seconds.
  - (b) SAS 050-051;  
Make sure that the rudder moves to the left and stops in 36 to 60 seconds.
  - (c) ALL SAS AIRPLANES EXCEPT SAS 050-051;  
ALL MTH AIRPLANES;  
Make sure that the rudder trailing edge moves to the left at least 27.0 inches (17.0 degrees).
  - (d) SAS 050-051;  
Make sure that the rudder trailing edge moves to the left at least 34.1 inches (21.5 degrees).
  - (e) Make sure that the rudder trim indicator shows at least 14.0 units of left trim.

S 825-350

- (7) Operate the rudder trim switch to move the rudder to its neutral position.
- S. Put the Airplane Back to Its Usual Condition

S 095-247

**WARNING:** STAY AWAY FROM THE NOSE GEAR WHEELS WHEN THE LOCKPIN IS REMOVED. THE WHEELS CAN TURN TO THEIR CENTER POSITION QUICKLY AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure that the nose gear wheels are in their centered position. Remove the nose gear towing lever lockpin.

S 095-352

- (2) Remove rig pins E1 and E2.

EFFECTIVITY

ALL

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- S 215-353
- (3) Make sure that the RRCM test switch is in its NORMAL position.
- S 865-354
- (4) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).
- S 865-355
- (5) Remove electrical power if it is not necessary (AMM 24-22-00/201).
- S 415-356
- (6) Close the access panels you removed.

TASK 27-21-00-715-179

5. Single Hydraulic Source - Test

NOTE: This is a scheduled maintenance task.

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Prepare for the Test

- S 865-180
- (1) Supply electrical power (AMM 24-22-00/201).
- S 215-181
- (2) Make sure these circuit breakers on the overhead panel, P11, are closed:
  - (a) 11J2, EICAS CMPTR L
  - (b) 11J3, EICAS UPPER DSPL
  - (c) 11J29, EICAS CMPTR R
  - (d) 11J30, EICAS LOWER DSPL
  - (e) 11J31, EICAS DSPL SW
  - (f) 11J32, EICAS DSPL SELECT
  - (g) 11A10, AIR DATA CMPTR L
  - (h) 11F30, AIR DATA CMPTR RIGHT
  - (i) 11L9, LEFT ENGINE OIL PRESS EICAS REF
  - (j) 11L36, RIGHT ENGINE OIL PRESS EICAS REF
- S 865-381
- (3) Push the STATUS switch on the pilot's display select panel, P9, to show the rudder position indicator on the bottom EICAS display.

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ALL

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S 015-410

- (4) Move the towing lever on the metering valve module to the tow position and install the towing lever lockpin in the nose gear (Fig. 501).

S 215-183

- (5) Make sure these circuit breakers on the P11, panel are closed:
  - (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 865-184

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (6) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

C. Rudder Single Hydraulic Source - Test

S 215-185

- (1) Make sure the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, are ON.

S 865-186

- (2) Remove the power from the center and right hydraulic systems (AMM 29-11-00/201).

**NOTE:** Make sure only the left hydraulic system has power.

S 865-318

- (3) Do these steps if the amber RUDDER RATIO light on the overhead panel, P5, is on:
  - (a) Push the RESET switch on the RRCM.
  - (b) Open this circuit breaker on the P11, panel:
    - 1) 11G10, RUDDER RATIO
  - (c) Close this circuit breaker on the P11, panel:
    - 1) 11G10, RUDDER RATIO

S 215-188

- (4) Move the rudder pedals through their full travel range and do this check:
  - (a) Make sure the rudder moves through its full travel range.

S 865-317

- (5) Release the rudder pedals.

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S 865-190

- (6) Remove the power from the left hydraulic system (Ref 29-11-00/201).

**NOTE:** When you remove power from the left hydraulic system, an amber RUDDER RATIO light on the P5 panel will come on. Also, an amber RUDDER RATIO message will show on EICAS.

If you use the left rudder/elevator hydraulic shutoff valve to remove hydraulic pressure, a PCA faultball will set on the RRCM.

S 865-216

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (7) Supply pressure to the center hydraulic system (AMM 29-11-00/201).

S 215-191

- (8) Move the rudder pedals through their full travel range and do this check:  
(a) Make sure the rudder moves through its full travel range.

S 865-192

- (9) Release the rudder pedals.

S 865-193

- (10) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 865-217

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (11) Supply pressure to the right hydraulic system (AMM 29-11-00/201).

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S 215-316

- (12) Move the rudder pedals through their full travel range and do this check:  
(a) Make sure the rudder moves through its full travel range.

S 865-315

- (13) Release the rudder pedals.

S 865-218

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (14) Supply pressure to the left and center hydraulic systems (AMM 29-11-00/201).

S 865-198

- (15) If a PCA faultball shows on the RRCM, push the RESET switch.  
D. Put the Airplane Back to Its Usual Condition

S 865-199

- (1) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-200

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 095-411

**WARNING:** STAY AWAY FROM THE NOSE GEAR WHEELS WHEN THE LOCKPIN IS REMOVED. THE NOSE WHEELS CAN TURN TO THE CENTERED POSITION QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Make sure that the nose gear wheels are in their center position and remove the nose gear towing lever lockpin.

TASK 27-21-00-715-201

6. Rudder Ratio Changer Actuator Bypass Valve - Test

**NOTE:** This is a scheduled maintenance task.

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

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B. Prepare for the Test

S 865-202

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

S 215-203

- (2) Make sure these circuit breakers on the overhead panel, P11, are closed:
- (a) 11J2, EICAS CMPTR L
  - (b) 11J3, EICAS UPPER DSPL
  - (c) 11J29, EICAS CMPTR R
  - (d) 11J30, EICAS LOWER DSPL
  - (e) 11J31, EICAS DSPL SW
  - (f) 11J32, EICAS DSPL SELECT
  - (g) 11A10, AIR DATA CMPTR L
  - (h) 11F30, AIR DATA CMPTR RIGHT
  - (i) 11L9, LEFT ENGINE OIL PRESS EICAS REF
  - (j) 11L36, RIGHT ENGINE OIL PRESS EICAS REF

S 865-314

- (3) Push the STATUS switch on the pilot's display select panel, P9, to show the rudder position indicator on the bottom EICAS display.

S 215-205

- (4) Make sure these circuit breakers on the P11 panel are closed:
- (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 865-313

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (5) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 215-207

- (6) Turn the captain's pedal adjustment crank fully clockwise and then fully counterclockwise.
- (a) Make sure the rudder pedals move in a longitudinal direction.

S 215-208

- (7) Do the above step again for the first officer's pedals.

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S 215-209

- (8) Move the left and right rudder pedals through their full travel range and release them. Do these checks:
  - (a) Make sure the pedals move smoothly and do not need too much force.
  - (b) Make sure the pedals go back to the neutral position.

C. Rudder Ratio Changer Actuator Bypass Valve - Test

S 865-210

- (1) Move the FLT CONTROL SHUTOFF TAIL C and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 865-211

- (2) Open these circuit breakers on the P11, panel and attach DO-NOT-CLOSE tags:
  - (a) 11G10, RUDDER RATIO
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 215-212

**WARNING:** MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE NOSE GEAR BEFORE YOU OPERATE THE RUDDER PEDALS. THE NOSE GEAR CAN TURN QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Move the rudder pedals through their full travel range and do this check:
  - (a) Make sure the rudder does not move.

S 865-312

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11, panel:
  - (a) 11G10, RUDDER RATIO
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 865-214

- (5) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-215

- (6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 865-402

- (7) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL C and R switches on the right side panel, P61, to ON.

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RUDDER - REMOVAL/INSTALLATION

1. General

A. This procedure contains the removal and installation tasks for the rudder.

TASK 27-21-01-024-001

2. Rudder - Removal

A. Equipment

- (1) Rudder Sling - A27022-81 (Recommended)
- (2) Rudder Sling - A27022-75 (Optional)
- (3) Rig Pin R5 - P/N A20004-13, part of Set A20004-72 (AMM 20-10-24)
- (4) Load Positioner - Customer furnished for use with A27022-81. LL-5-3.

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 20-10-24/201, Rig Pins
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) SRM 51-60-00

C. Access

- (1) Location Zones
  - 324 Vertical Stabilizer, Rear Spar to Trailing Edge
  - 326 Vertical Stabilizer Tip

- (2) Access Panels

- 324BL Rudder Hinges
- 324EL Rudder Hinges
- 324GL Rudder Hinges
- 324JL Rudder Hinges
- 324LL Rudder Hinges
- 324PL Rudder Hinges
- 324SL Rudder Hinges
- 324WL Rudder Hinges
- 324HL Rudder Seal
- 324KL Rudder Seal
- 324ML Rudder Seal
- 324KR Rudder Seal
- 324NR Rudder Seal
- 325DZ Rudder Spar and Internal Structure
- 325EZ Rudder Spar and Internal Structure
- 325FZ Rudder Spar and Internal Structure
- 326DL Rudder Seal
- 326CL Fin Tip Structure

D. Prepare for the Removal

S 864-002

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

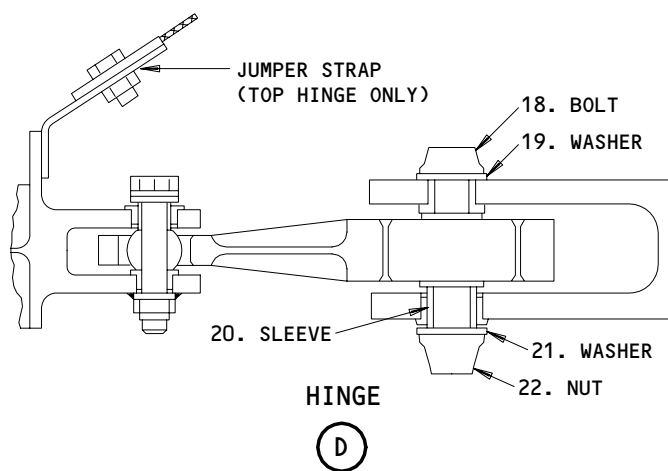
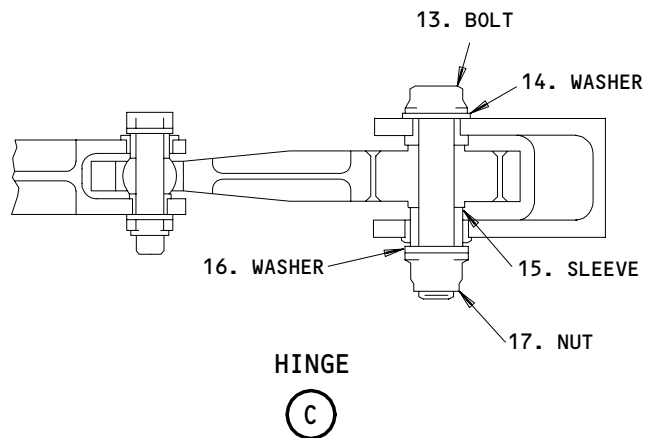
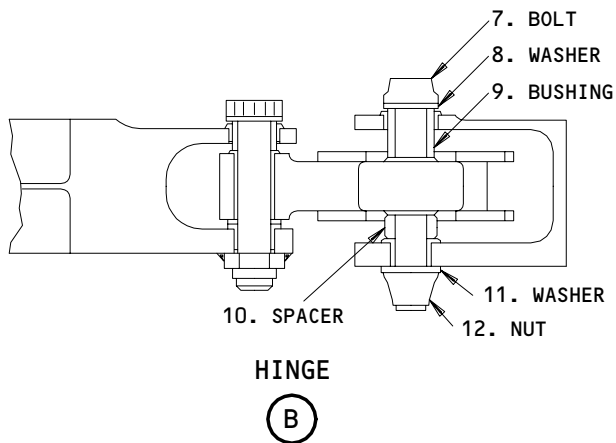
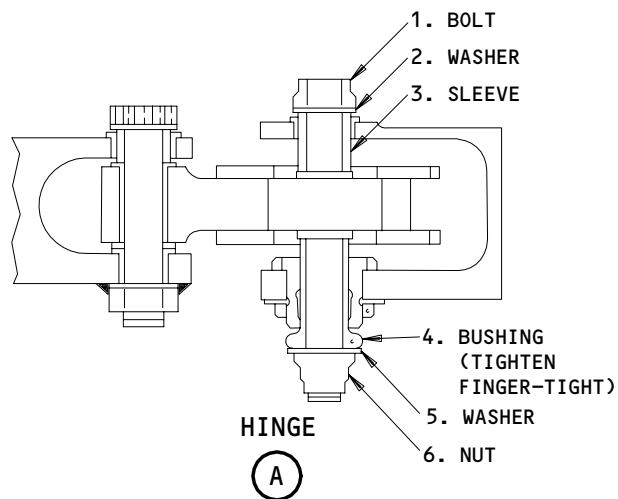
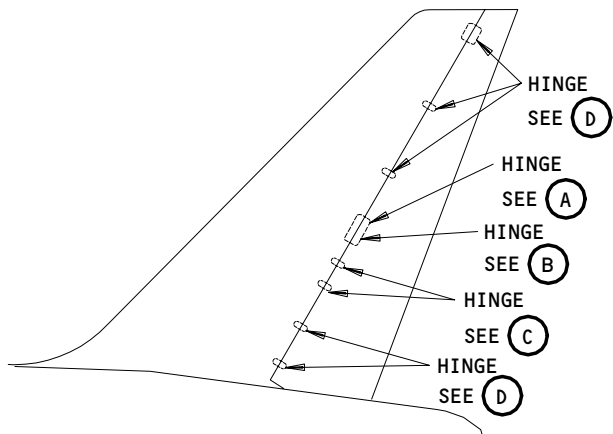
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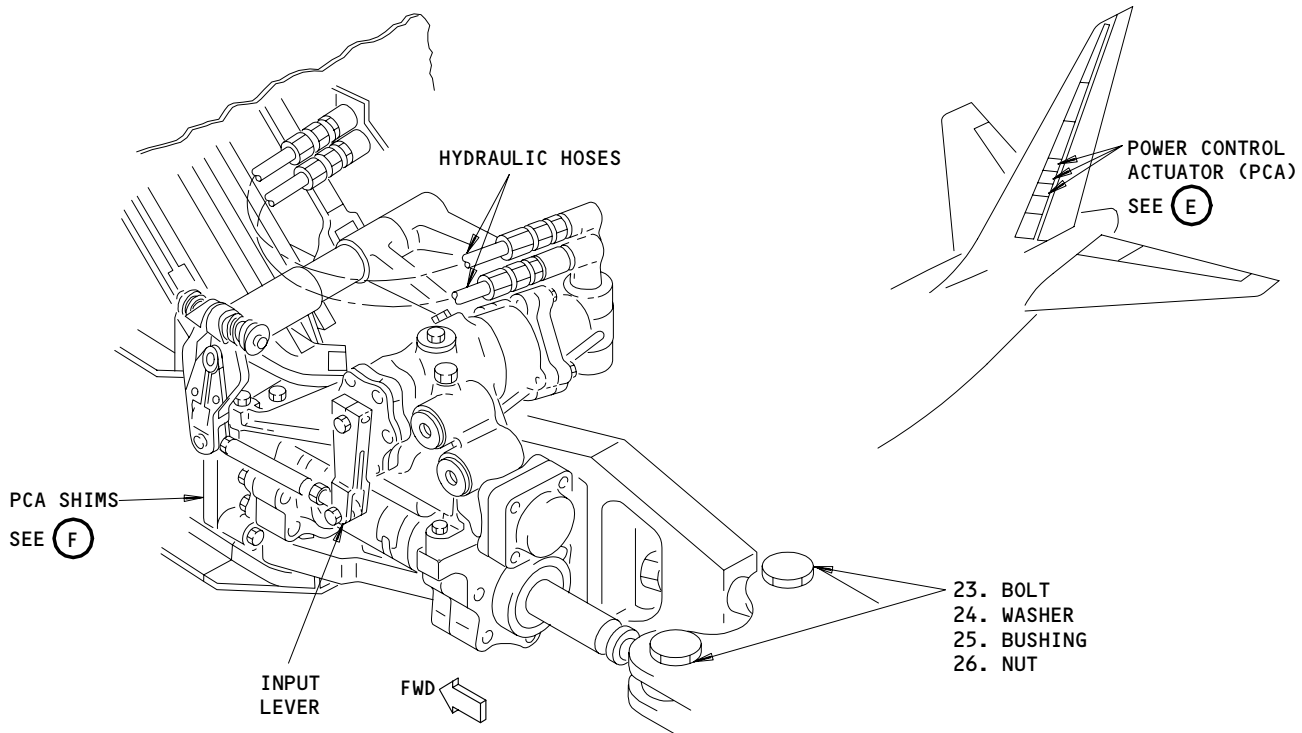
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Rudder Installation  
Figure 401 (Sheet 1)

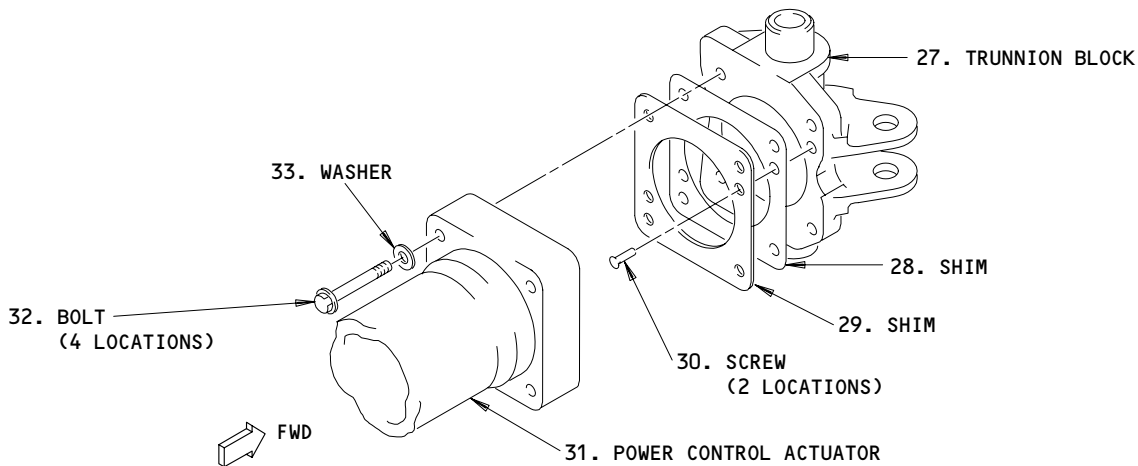
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POWER CONTROL ACTUATOR (PCA)  
(EXAMPLE)

(E)



PCA SHIMS

(F)

Rudder Installation  
Figure 401 (Sheet 2)

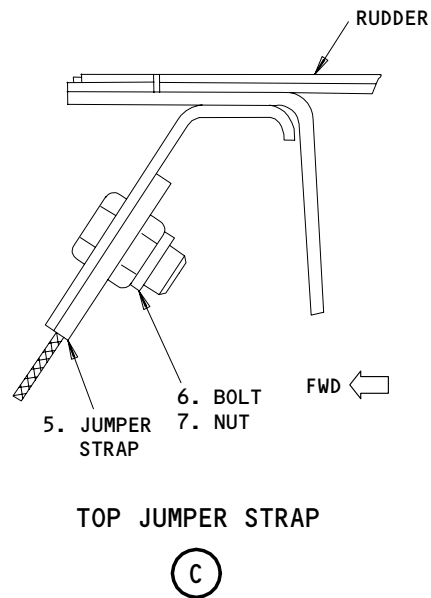
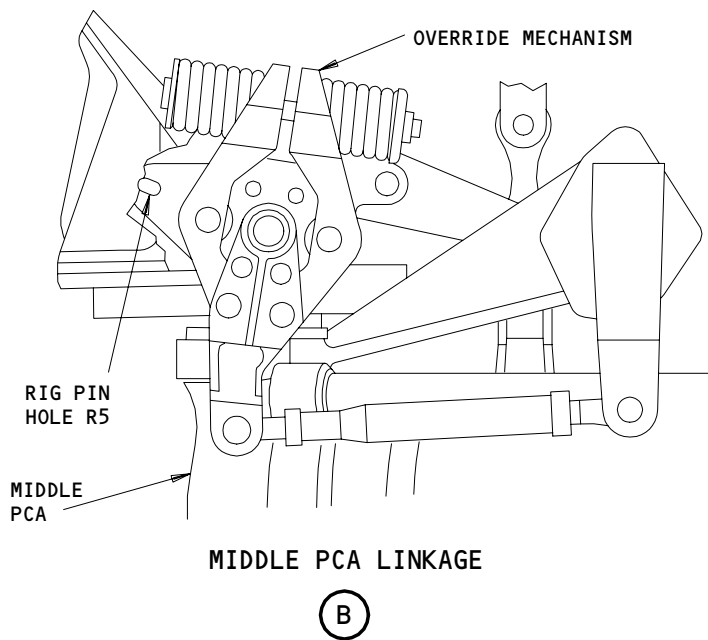
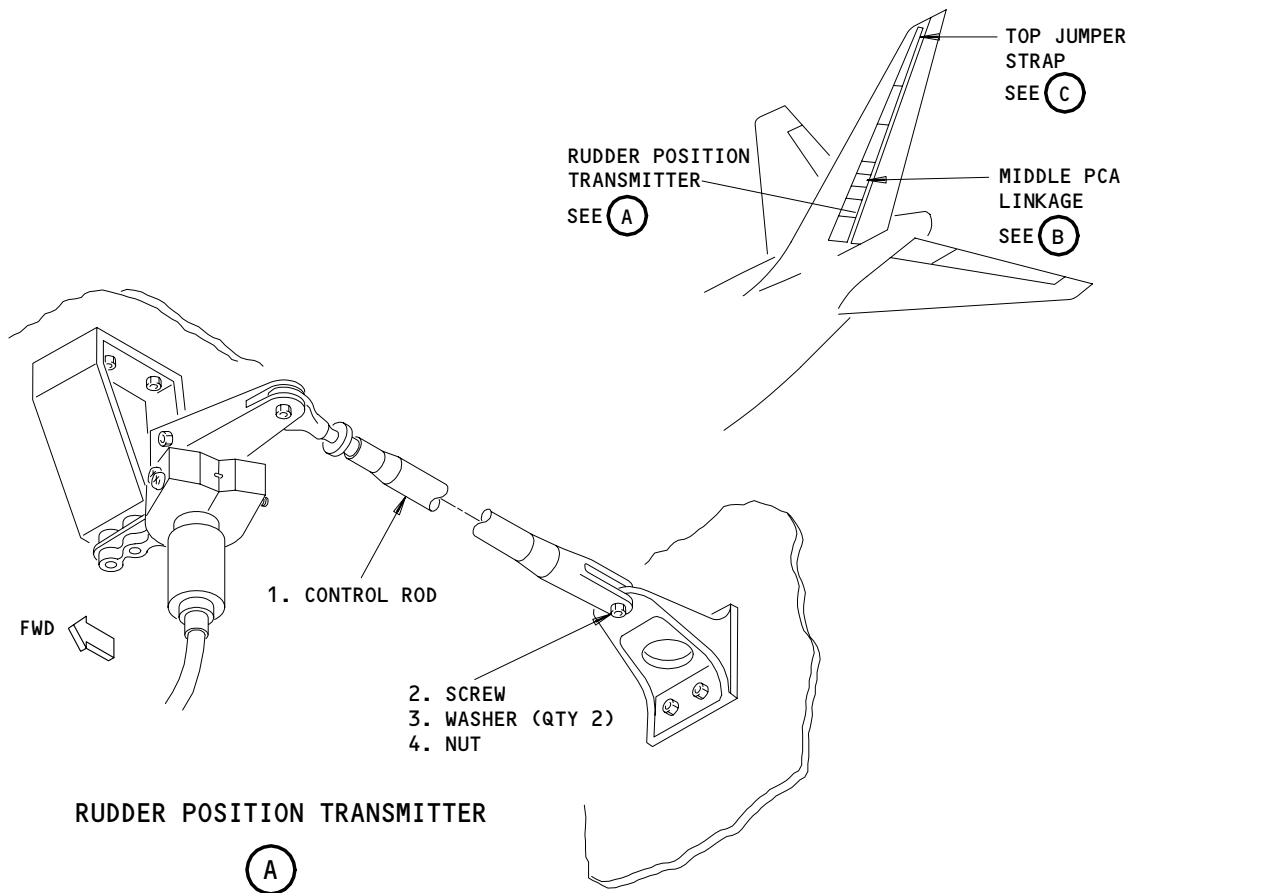
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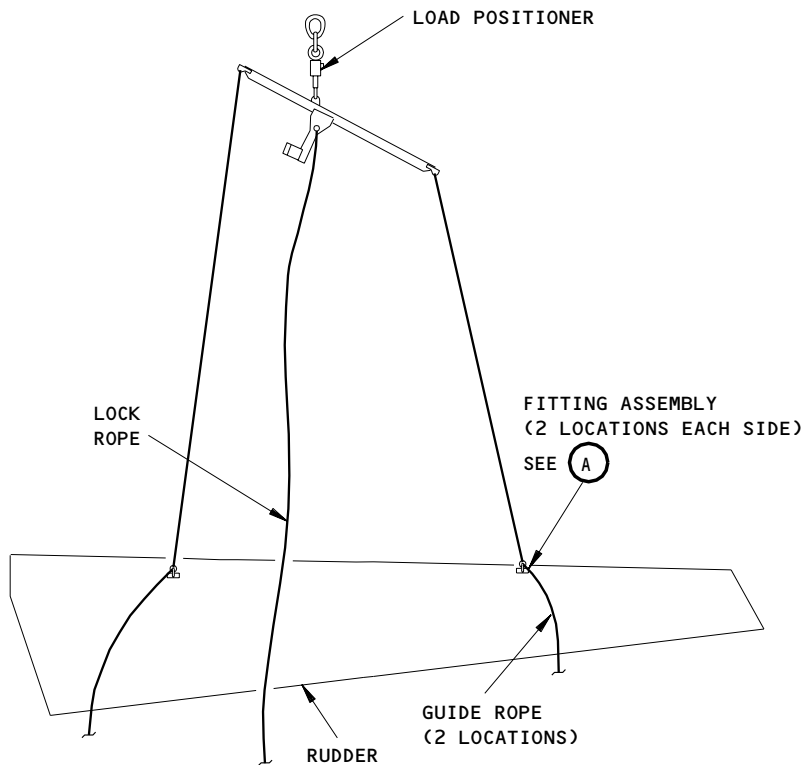
Page 403  
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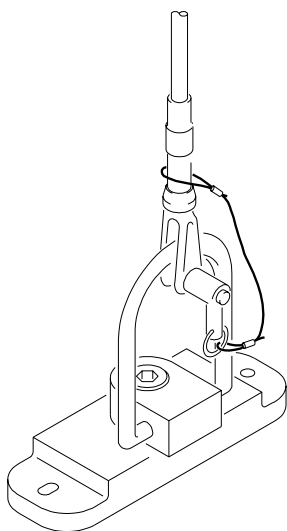
Rudder  
Figure 402

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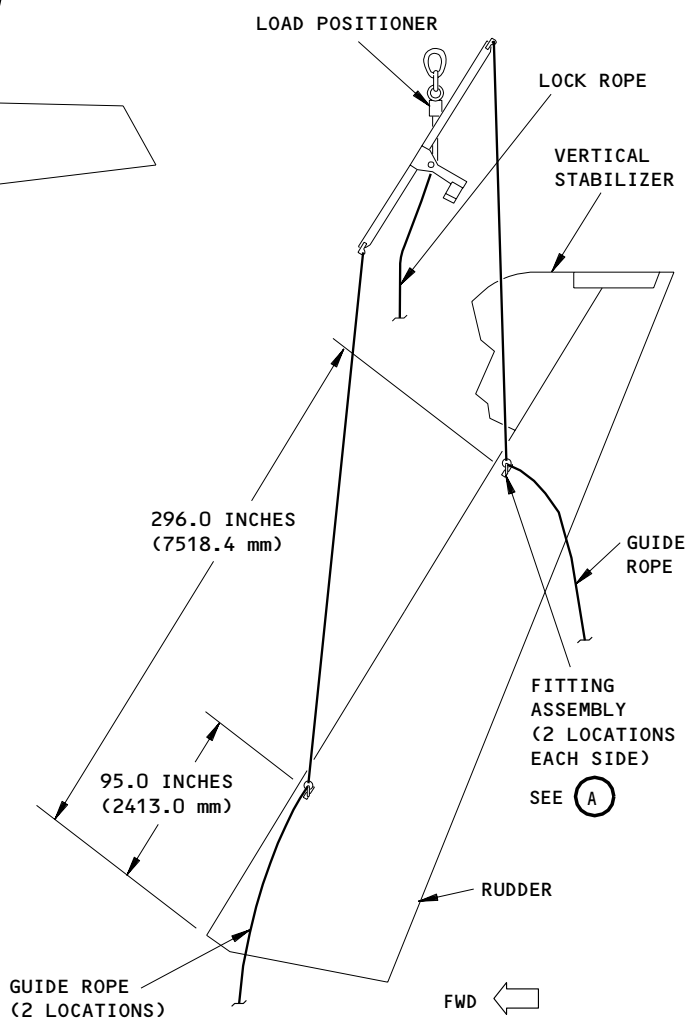


COUNTER BALANCE ROTATION  
USAGE II



FITTING ASSEMBLY

(A)



LOCKED POSITION  
USAGE I

Rudder Sling Installation  
Figure 403

EFFECTIVITY	ALL
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S 864-003

- (2) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 864-004

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 014-039

- (4) Open access panels 324BL, 324EL, 324GL, 324JL, 324LL, 324PL, 324SL, 324WL, 324HL, 324KL, 324ML, 324KR, 324NR, 325DZ, 325EZ, 325FZ, 326DL, and 326CL (AMM 06-42-00/201).

S 494-006

- (5) Install rig pin R5 in the middle PCA linkage.
- E. Remove the Rudder (Fig. 401)

S 494-007

- (1) Attach the sling to the rudder (two locations on each side) (Fig. 403).

**NOTE:** Put the sling in its locked position before you connect it to the rudder, and make sure that the locking device is fully engaged.

S 864-008

- (2) Lift the rudder until the the load is removed from its hinges.

S 034-009

- (3) Disconnect these components from the rudder:
  - (a) The jumper straps that you find near the top hinge.
  - (b) The three power control actuators (PCAs).
  - (c) The control rod for the rudder position transmitter.

S 034-010

- (4) Remove these components:
  - (a) The top three hinge bolts (View D).
  - (b) The bottom four hinge bolts (View C and D).
  - (c) The hinge bolts that are located above and below the top rudder PCA (View A and B).

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S 024-011

- (5) Move the rudder aft of the vertical fin and lower it to the ground.

NOTE: If it is necessary, pull the lock rope and use the guide ropes to turn the rudder to its "counterbalance rotation" position.

S 974-012

- (6) Keep a record of all the painting and repairs you do to the rudder.  
(a) Make sure the operational balance moment is correct.

NOTE: Flight control surfaces that have an incorrect operational balance moment can shake during flight. Refer to the Structural Repair Manual (SRM 51-60-00) for the applicable operational balance moment data.

TASK 27-21-01-424-013

3. Rudder - Installation

NOTE: Refer to AMM 27-21-01/601 for the applicable wear limit data.

A. Equipment

- (1) Rudder Sling - A27022-81 (Recommended)
- (2) Rudder Sling - A27022-75 (Optional)
- (3) Rudder PCA Gage (Shimming Tool) - A27001-1  
(2 are Necessary)
- (4) Bonding Meter - Avtron Model T477W, Avtron Manufacturing Inc., Cleveland, Ohio
- (5) Load Positioner - Customer furnished for use with A27022-81.  
LL-5-3.

B. Consumable Materials

- (1) A00247 Sealant, Chromate Type - BMS 5-95

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**BOEING**  
767  
MAINTENANCE MANUAL

- (2) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (3) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401		Rudder	55-40-51	01	95
402		Rudder	55-40-51	01	95

D. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-21-00/501, Rudder and Rudder Trim Control System
- (4) AMM 27-21-01/601, Rudder

E. Access

(1) Location Zones

- 324 Vertical Stabilizer, Rear Spar to Trailing Edge
- 326 Vertical Stabilizer Tip

(2) Access Panels

- 324BL Rudder Hinges
- 324EL Rudder Hinges
- 324GL Rudder Hinges
- 324JL Rudder Hinges
- 324LL Rudder Hinges
- 324PL Rudder Hinges
- 324SL Rudder Hinges
- 324WL Rudder Hinges
- 324HL Rudder Seal
- 324KL Rudder Seal
- 324ML Rudder Seal
- 324KR Rudder Seal
- 324NR Rudder Seal
- 325DZ Rudder Spar and Internal Structure
- 325EZ Rudder Spar and Internal Structure
- 325FZ Rudder Spar and Internal Structure
- 326DL Rudder Seal
- 326CL Fin Tip Structure

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F. Install the Rudder (Fig. 401)

S 644-036

- (1) Apply a thin layer of grease to the smooth surfaces of the bolts, bushings, and bearings before you install them.

S 494-014

- (2) Attach the sling to the rudder (two locations on each side) (Fig. 403).

**NOTE:** Put the sling in its unlocked position before you connect it to the rudder.

S 984-015

- (3) Lift the rudder to the correct upright position and lock the sling. (Fig. 403).

**NOTE:** Make sure that the locking device is fully engaged.

S 434-016

- (4) Do these steps to connect the hinge that is found below the top power control actuator (PCA) (View B):
  - (a) Install the sleeve (9), spacer (10), washers (8, 11), and the bolt (7).
  - (b) Tighten the nut (12) to 900-1250 pound-inches (101.7-141.2 newton-meters).

S 434-017

- (5) Do these steps to connect the hinge that is located above the top PCA (View A):
  - (a) Install the sleeve (3), top washer (2), and the bolt (1).
  - (b) Tighten the bushing (4) until it is finger-tight and do this check:
    - 1) Make sure there is no clearance between the bushing and the bearing.

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(c) Install the bottom washer (5) and nut (6) and tighten the nut to 900-1250 pound-inches (101.7-141.2 newton-meters).

S 434-018

(6) Lock the bottom bushing, nut, and hinge with a wire and do this step:

(a) Apply some of the sealant to the bolt.

S 434-019

(7) Do these steps to connect the bottom four hinges:

(a) Do these steps to connect the bottom two hinges (View D):

1) Install the bolts (18), washers (19, 21), and sleeves (20).

2) Install the nuts (22) and tighten them to 450-650 pound-inches.

(b) Do these steps to connect the top two hinges (View C):

1) Install the bolts (13), washers (14, 16), and sleeves (15).

2) Install the nuts (17) and tighten them to 900-1250 pound-inches.

S 434-020

(8) Do these steps to connect the top three hinges (View D):

(a) Install the bolts (18), washers (19, 21), and sleeves (20) on the hinges.

(b) Install the nuts (22) and tighten them to 450-650 pound-inches (50.9-73.4 newton-meters).

S 984-021

(9) Lower the rudder until the load is on its hinges.

S 094-022

(10) Remove the rudder sling and install the bolts in the sling connection points.

S 984-023

(11) Manually move the rudder to its neutral position.

S 434-024

(12) Do these steps to connect the reaction links to the rudder:

(a) Install the bolt (23), washer (24), bushing (25), and nut (26) (3 locations).

(b) Tighten the nut (26) to 800-1000 pound-inches (90.4-113.0 newton-meters).

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S 434-037

- (13) Do these steps if you will install a different rudder or if the rudder hinges were reworked:

**NOTE:** Install the middle PCA before the top and bottom PCAs. Use one PCA gage to hold the rudder in its neutral position. Use the other PCA gage to find the necessary shim thickness for the middle PCA.

- (a) Connect the PCA gage between the trunnion block for the middle PCA and the rudder and measure the necessary shim thickness (Fig. 404).
- (b) Remove the shimming tool and use the screws (30) to install the shims (28, 29) in the trunnion block (27) (View F).
- (c) Use the shimming tool to measure and install shims on the trunnion for the top and bottom PCAs. Do these checks:
  - 1) Make sure the tool dimension is the same (use a tolerance of  $\pm 0.003$  inch) ( $\pm 0.0762$  mm) for the three PCAs when the rudder is held in its neutral position.
  - 2) Make sure the shim thickness is between 0.062 and 0.145 inch.

S 434-025

- (14) Do these steps to install the middle rudder PCA:
- (a) Align the actuator with the holes in the trunnion block.
  - (b) Install the bolts (32) and washers (33) and tighten them to 400-500 pound-inches (45.2-56.5 newton-meters).
  - (c) Turn the actuator until the rod end is aligned with the rudder connection point.
  - (d) Install the bolts (23), washer (24), bushing (25), and nut (26) that connect the PCA rod end to the rudder.
  - (e) Tighten the nut (26) to 800-1000 pound-inches (90.4-113.0 newton-meters).
  - (f) Connect the input rod to the PCA.
  - (g) Connect the hydraulic hoses to the PCA.

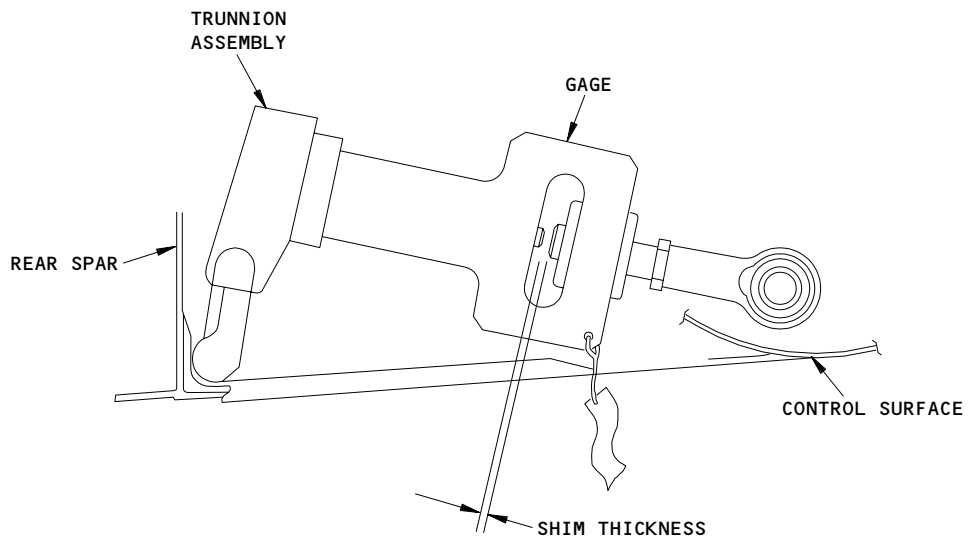
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Rudder PCA Gage Installation  
Figure 404

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S 434-026

- (15) Do the above step again for the top and bottom rudder PCAs.

S 434-027

- (16) Do this step to connect the control rod (1) for the position transmitter to the rudder (Fig. 402):  
(a) Install the screw (2), washer (3), and nut (4).

S 434-028

- (17) Do these steps to connect the jumper straps to the rudder:  
(a) Install the bolt (6) through the strap (4) and the structure and install the nut (7).  
(b) Use the bonding meter to make sure the maximum bonding resistance is 0.0025 ohm.

S 094-029

- (18) Remove rig pin R5 from the middle PCA linkage.

S 824-030

- (19) Do the adjustment procedure for the rudder PCAs (AMM 27-21-00/501).

S 714-031

- (20) Do the operational test for the rudder control system (AMM 27-21-00/501).

G. Put the Airplane Back to Its Usual Condition

S 414-032

- (1) Close access panels 324BL, 324EL, 324GL, 324JL, 324LL, 324PL, 324SL, 324WL, 324HL, 324KL, 324ML, 324KR, 324NR, 325DZ, 325EZ, 325FZ, 326DL, and 326CL (AMM 06-42-00/201).

S 864-033

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:  
(a) 11G10, RUDDER RATIO  
(b) 11H17, FLT CONT SHUTOFF TAIL LEFT  
(c) 11H18, FLT CONT SHUTOFF TAIL CTR  
(d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 864-034

- (3) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to ON.

S 864-035

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

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RUDDER - INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and wear limit tables which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to Rudder - Removal/Installation for procedures to do these tasks.

TASK 27-21-01-206-002

2. Rudder - Wear Limits

A. Procedure

S 226-001

- (1) Use the supplied data (Fig. 601) to examine the rudder for too much wear.

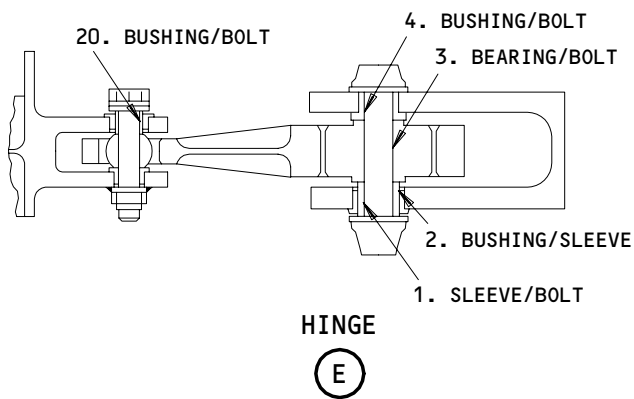
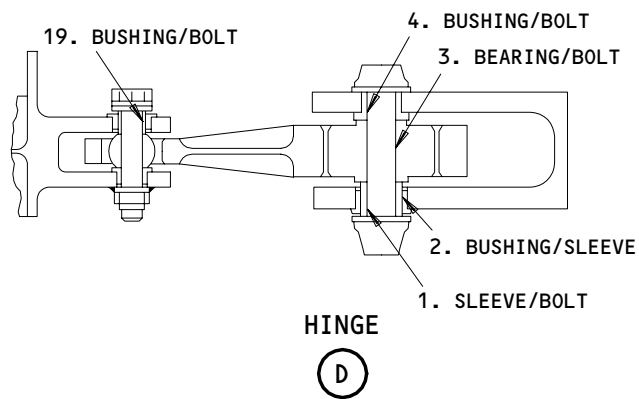
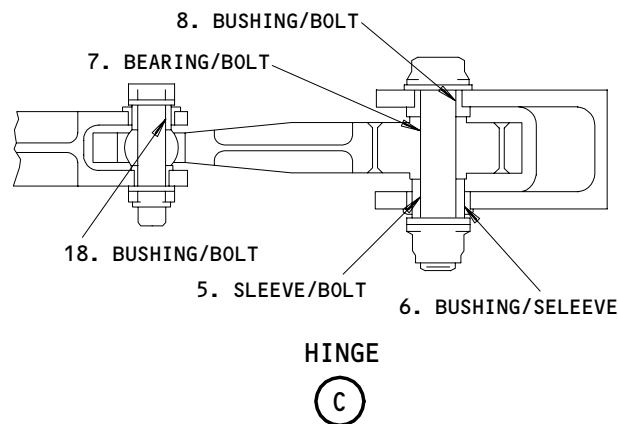
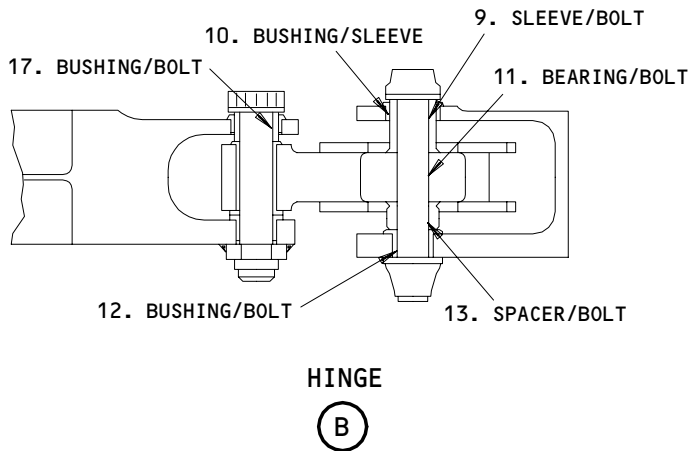
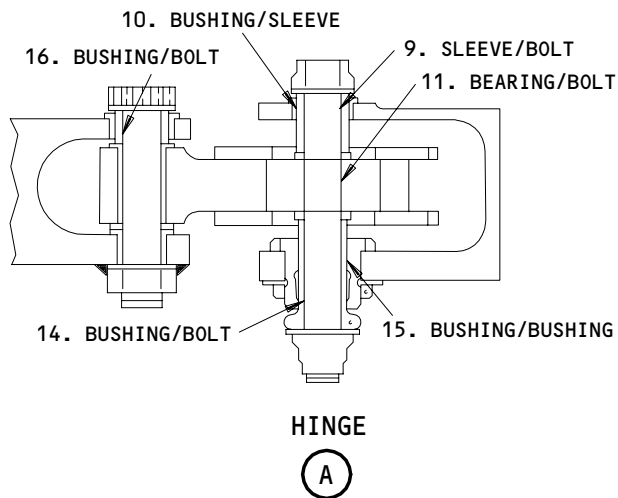
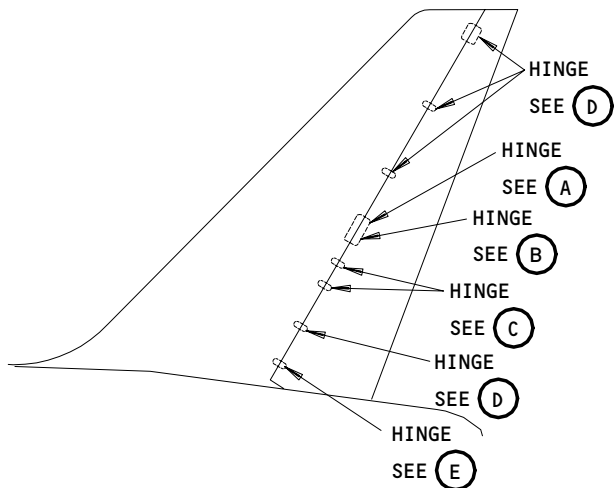
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Rudder Wear Limit  
Figure 601 (Sheet 1)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	SLEEVE	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4995 (12.687)		X		
2	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6915 (17.564)	0.0050 (0.127)	X		
	SLEEVE	OD	0.6860 (17.424)	0.6865 (17.437)	0.6826 (17.338)		X		
3	BEARING	ID	0.4995 (12.687)	0.5000 (12.700)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4957 (12.591)		X		
4	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4957 (12.591)		X		
5	SLEEVE	ID	0.6245 (15.862)	0.6250 (15.875)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6230 (15.824)	0.6240 (15.850)	0.6200 (15.748)		X		
6	BUSHING	ID	0.8745 (22.212)	0.8756 (22.240)	0.8790 (22.327)	0.0050 (0.127)	X		
	SLEEVE	OD	0.8735 (22.187)	0.8740 (22.200)	0.8703 (22.106)		X		
7	BEARING	ID	0.6245 (15.862)	0.6250 (15.875)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6230 (15.824)	0.6240 (15.850)	0.6200 (15.748)		X		
8	BUSHING	ID	0.6245 (15.862)	0.6252 (15.880)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6230 (15.824)	0.6240 (15.850)	0.6202 (15.753)		X		
9	SLEEVE	ID	0.6245 (15.862)	0.6250 (15.875)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6300 (16.002)	0.6240 (15.850)	0.6200 (15.748)		X		
10	BUSHING	ID	0.8745 (22.212)	0.8753 (22.233)	0.8795 (22.339)	0.0050 (0.127)	X		
	SLEEVE	OD	0.8735 (22.187)	0.8740 (22.200)	0.8703 (22.106)		X		

Rudder Wear Limits  
 Figure 601 (Sheet 2)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BEARING	ID	0.6245 (15.862)	0.6250 (15.875)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6230 (15.824)	0.6240 (15.850)	0.6200 (15.748)		X		
12	BUSHING	ID	0.6245 (15.862)	0.6252 (15.880)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6230 (15.824)	0.6240 (15.850)	0.6202 (15.753)		X		
13	SPACER	ID	0.6245 (15.862)	0.6250 (15.875)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6230 (15.824)	0.6240 (15.850)	0.6200 (15.748)		X		
14	BUSHING	ID	0.6245 (15.862)	0.6252 (15.880)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6230 (15.824)	0.6240 (15.850)	0.6202 (15.753)		X		
15	BUSHING	ID	0.8745 (22.212)	0.8753 (22.233)	0.8790 (22.327)	0.0050 (0.127)	X		
	BUSHING	OD	0.8735 (22.187)	0.8740 (22.200)	0.8703 (22.106)		X		
16	BUSHING	ID	0.6245 (15.862)	0.6250 (15.875)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6235 (15.837)	0.6240 (15.850)	0.6200 (15.748)		X		
17	BUSHING	ID	0.6245 (15.862)	0.6250 (15.875)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6235 (15.837)	0.6240 (15.850)	0.6200 (15.748)		X		
18	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4955 (12.586)		X		
19	BUSHING	ID	0.3750 (9.525)	0.3755 (9.538)	0.3795 (9.639)	0.0050 (0.127)	X		
	BOLT	OD	0.3740 (9.500)	0.3745 (9.512)	0.3705 (9.411)		X		
20	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4955 (12.586)		X		

Rudder Wear Limits  
Figure 601 (Sheet 3)

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RUDDER POWER CONTROL ACTUATOR (PCA) AND  
REACTION LINK - MAINTENANCE PRACTICES

1. General

- A. This procedure contains these four tasks:
- (1) Rudder PCA Filter - Removal
  - (2) Rudder PCA Filter - Installation
  - (3) Rudder PCA and Reaction Link - Removal
  - (4) Rudder PCA and Reaction Link- Installation

TASK 27-21-02-022-001

2. Rudder PCA Filter - Removal (Fig. 201)

A. Equipment

- (1) Rudder PCA Locks (3 are necessary):
  - (a) PCA Locks - A27003-28 (Part of Lock Set, A27003-23)
- (2) Nose Gear Towing Lever Lockpin - A09003-1

B. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zone
  - 324 Vertical Stabilizer, Rear Spar to Trailing Edge
- (2) Access Panels
  - 324GL Bottom Rudder PCA
  - 324JL Middle Rudder PCA
  - 324LL Top Rudder PCA

D. Prepare for the Removal

S 862-002

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

S 012-003

- (2) Open these access panels (AMM 06-42-00):
  - (a) 324GL for the bottom PCA filter
  - (b) 324JL for the middle PCA filter
  - (c) 324LL for the top PCA filter.

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S 492-004

- (3) Move the towing lever on the metering valve module to the tow position and install the towing lever lockpin in the nose gear.

S 862-005

- (4) Remove the pressure from the left, right, and center hydraulic systems and their reservoirs (AMM 29-11-00).

S 862-006

- (5) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 862-007

- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 492-081

**WARNING:** MAKE SURE THAT HYRAULIC POWER IS REMOVED BEFORE YOU INSTALL THE PCA LOCKSET TOOL. THE RUDDER CAN MOVE QUICKLY AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (7) Do these steps to install the PCA locks on the three rudder PCAs (Fig. 202):
- (a) Move the right rudder pedal to its full forward position and hold it there until the PCA locks are installed.
  - (b) Manually move the rudder to its full right position and hold it there until the PCA locks are installed.

**CAUTION:** MAKE SURE YOU INSTALL ALL THREE PCA LOCKS. THE RUDDER CAN BECOME DAMAGED IF HYDRAULIC POWER IS ACCIDENTALLY SUPPLIED TO A PCA THAT IS NOT LOCKED.

- (c) Install the PCA locks on the three PCAs.

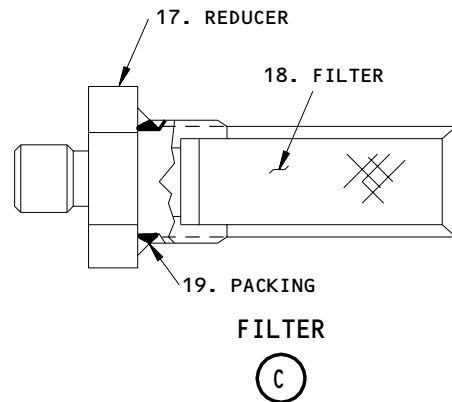
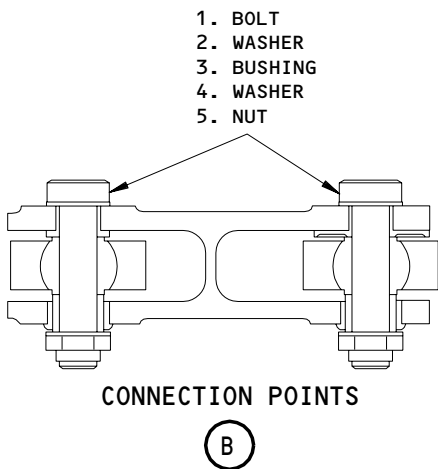
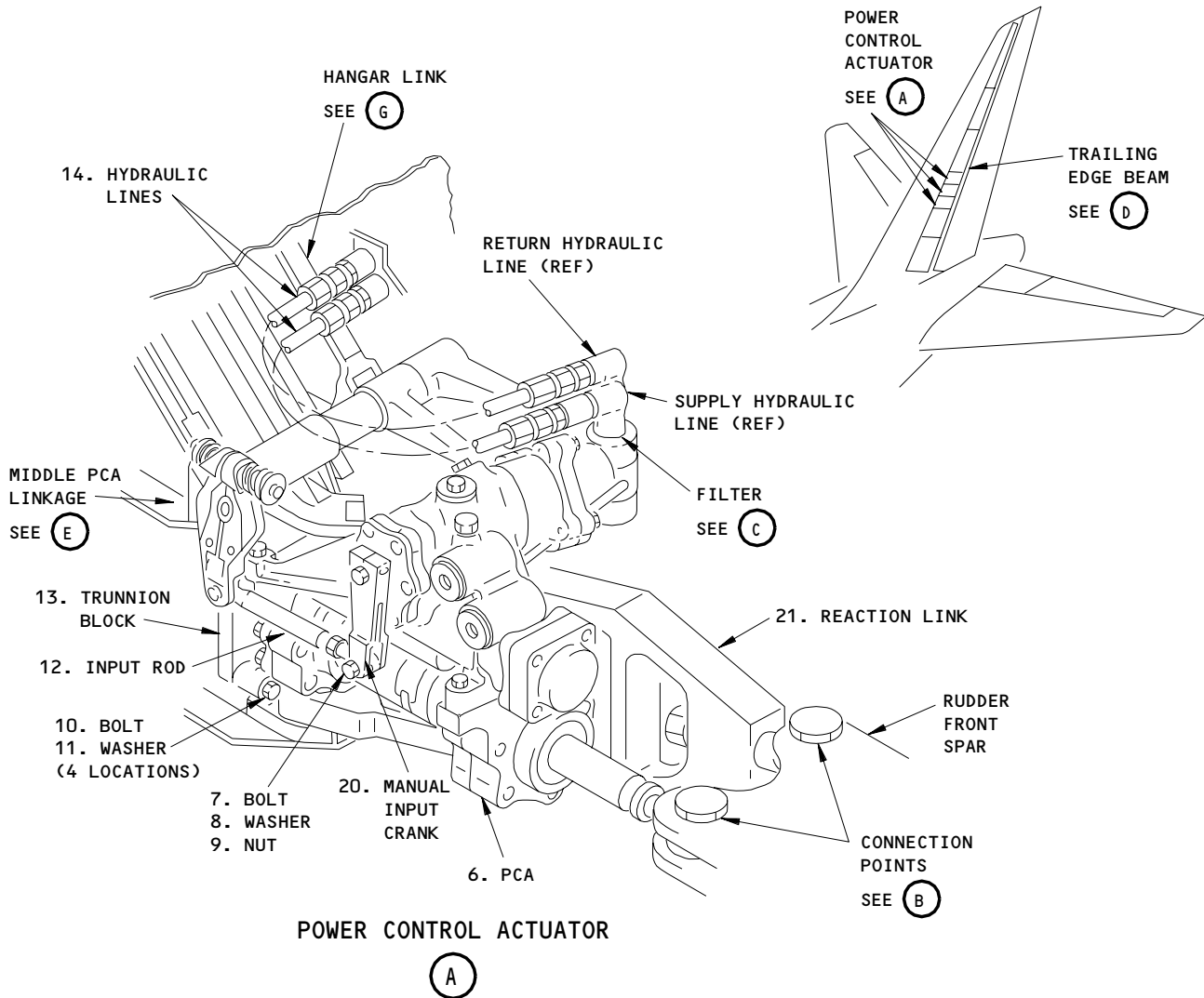
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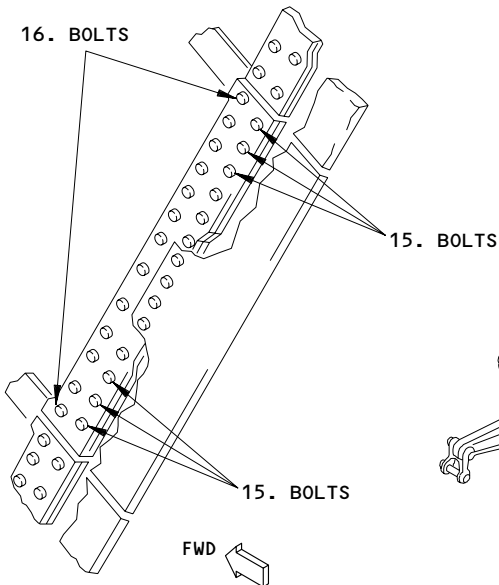
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Rudder Power Control Actuator (PCA) and Reaction Link Installation  
Figure 201 (Sheet 1)

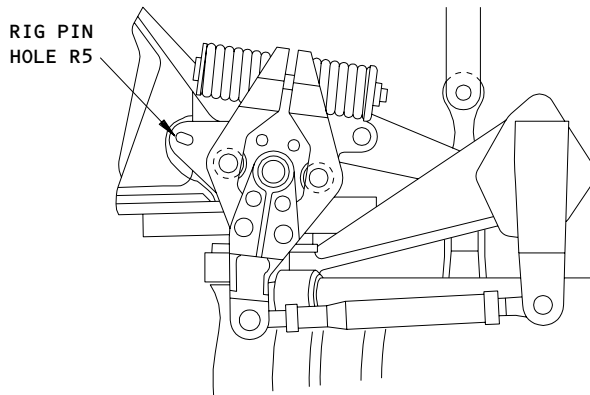
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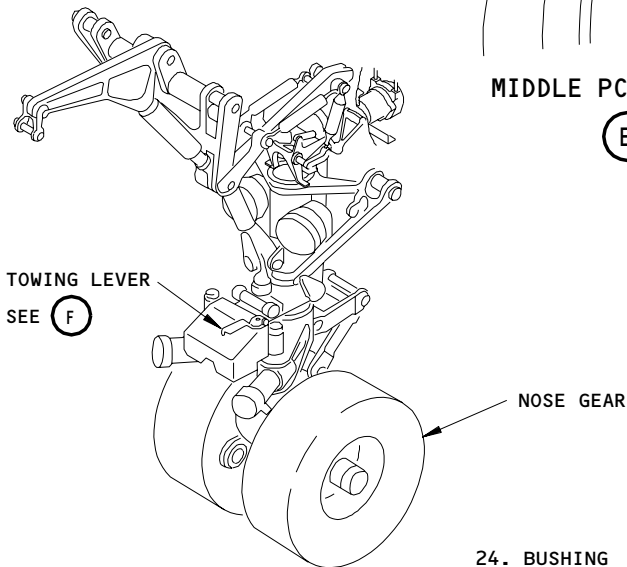
TRAILING EDGE BEAM

(D)



MIDDLE PCA LINKAGE

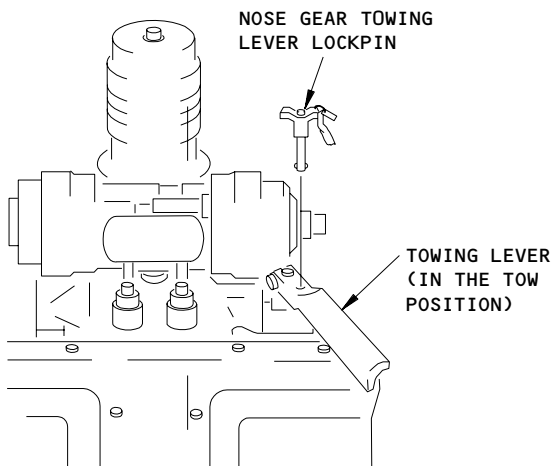
(E)



TOWING LEVER

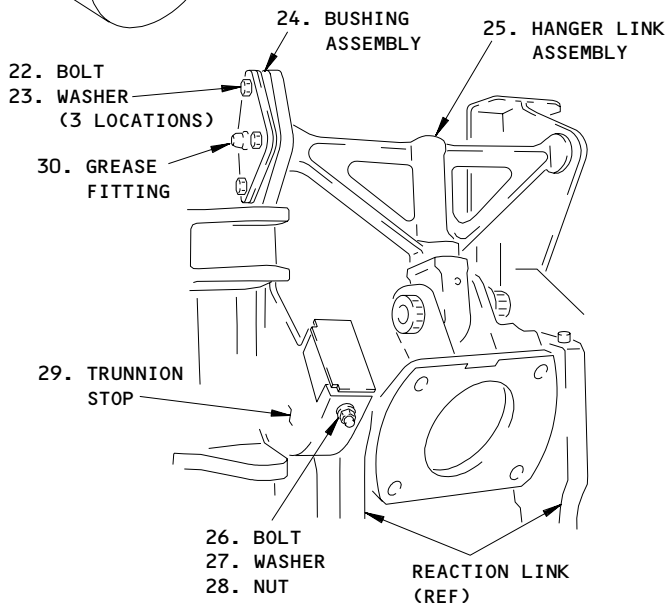
SEE (F)

NOSE GEAR



TOWING LEVER

(F)



HANGAR LINK

(G)

Rudder Power Control Actuator (PCA) and Reaction Link Installation  
Figure 201 (Sheet 2)

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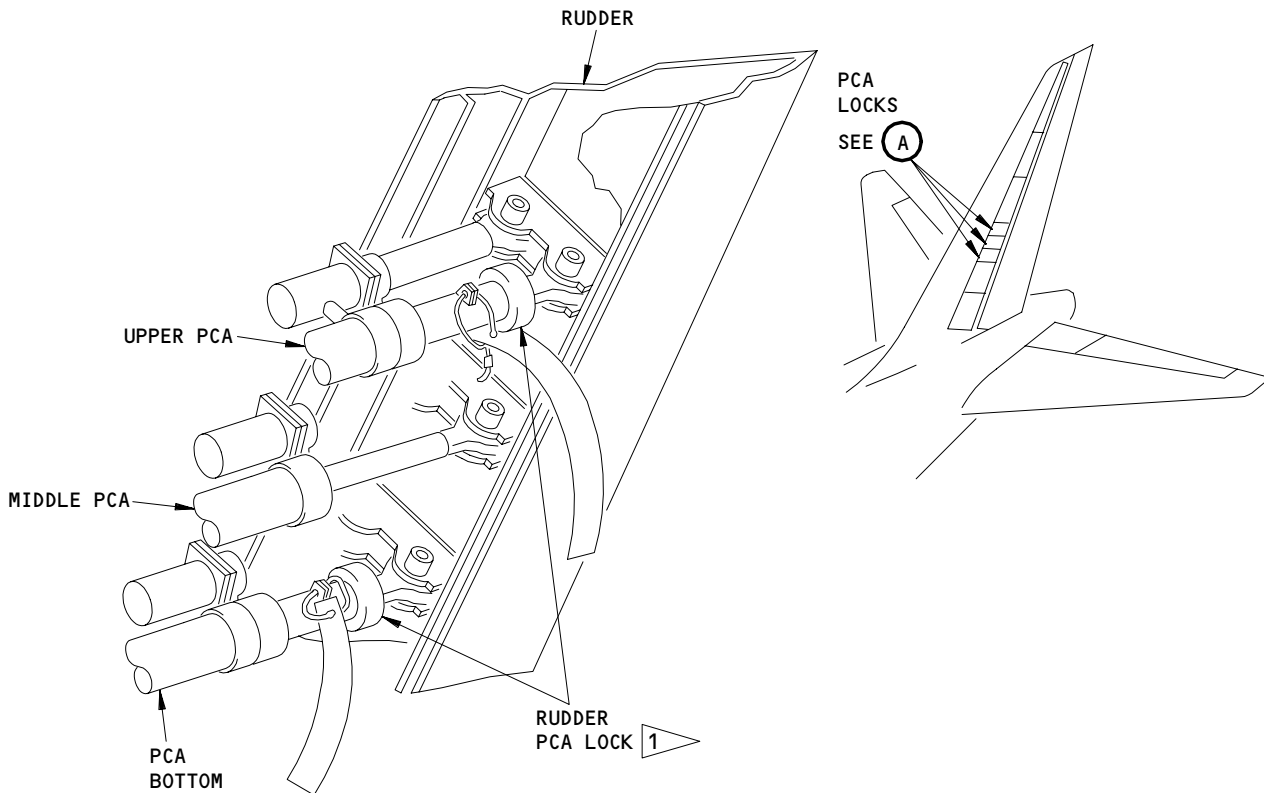
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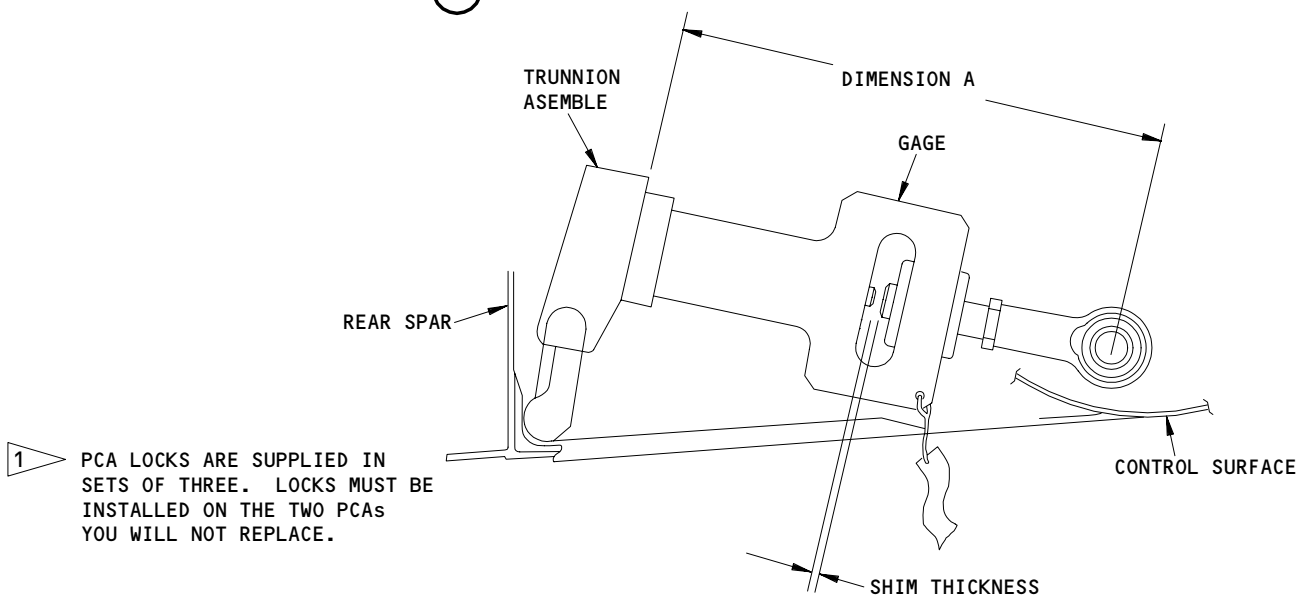




PCA LOCKS  
(WITH FLANGES ON EACH END)

FWD

(A)



1 PCA LOCKS ARE SUPPLIED IN SETS OF THREE. LOCKS MUST BE INSTALLED ON THE TWO PCAs YOU WILL NOT REPLACE.

RUDDER PCA GAGE

Rudder Actuator Lock Set and PCA Gage Installation  
Figure 202

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- (d) Release the rudder pedals.
- E. Remove the PCA Filter

S 032-008

- (1) Disconnect the hydraulic pressure line (14) and do this step:
  - (a) Seal the pressure line with a cap.

S 032-009

- (2) Remove the reducer (17).

S 032-010

- (3) Remove the packing (19).

S 022-011

- (4) Remove the filter (18).

TASK 27-21-02-422-012

3. Rudder PCA Filter - Installation (Fig. 201)

A. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
201	18	Filter	27-21-02	01	523,529
	19	Packing	27-21-02	01B	505
			27-21-02	01	522
			27-21-02	01B	500,525

B. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zone
  - 324 Vertical Stabilizer, Rear Spar to Trailing Edge
- (2) Access Panels
  - 324GL Bottom Rudder PCA
  - 324JL Middle Rudder PCA
  - 324LL Top Rudder PCA

D. Install the PCA Filter

S 432-013

- (1) Install the filter (18).

**NOTE:** Install the filter carefully to prevent damage to the filter.

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S 432-014

- (2) Install the packing (19).

S 432-015

- (3) Install the reducer (17) and tighten it to 270-300 pound-inches (30.5-33.9 newton-meters).

S 032-016

- (4) Remove the cap from the hydraulic line (14).

S 432-017

- (5) Connect the hydraulic line to the PCA (6).

S 092-082

**WARNING:** MAKE SURE THAT HYDRAULIC POWER IS REMOVED BEFORE YOU REMOVE THE PCA LOCK TOOL. THE RUDDER CAN MOVE QUICKLY AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (6) Do these steps to remove the PCA locks:
- (a) Move the right rudder pedal to its full forward position and hold it there until the PCA locks are removed.
  - (b) Manually move the rudder to its full right position and hold it there until the PCA locks are removed.
  - (c) Remove the PCA locks from the PCAs.
  - (d) Release the rudder pedals.
  - (e) Manually move the rudder back to its neutral position.

S 862-018

- (7) Supply pressure to the hydraulic system that supplies power to the PCA that was repaired (AMM 29-11-00).

**NOTE:** The center system supplies the top PCA.  
The left system supplies the middle PCA.  
The right system supplies the bottom PCA.

S 862-019

- (8) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 862-020

- (9) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to ON.

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S 212-021

- (10) Operate the rudder through 10 full travel cycles and do this step:
  - (a) Do a check for hydraulic leaks at the PCA (6).

E. Put the Airplane Back to Its Usual Condition

S 092-083

**WARNING:** STAY AWAY FROM THE NOSE WHEELS WHEN THE LOCKPIN IS REMOVED. THE WHEELS CAN TURN TO THE CENTER POSITION QUICKLY, AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the nose wheels are in their center position and remove the towing lever lockpin from the nose gear.

S 862-022

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00).

S 412-023

- (3) Close these access panels (AMM 06-42-00):
  - (a) 324GL for the bottom PCA
  - (b) 324JL for the middle PCA
  - (c) 324LL for the top PCA

S 862-024

- (4) Remove electrical power if it is not necessary (AMM 24-22-00).

TASK 27-21-02-022-025

4. Rudder PCA and Reaction Link - Removal (Fig. 201)

**NOTE:** It is necessary to remove the PCA before you can remove the reaction link.

A. Equipment

- (1) Rudder PCA Locks (2 are necessary):
  - (a) PCA Locks - A27003-28 (Part of Lock Set, A27003-23)
- (2) Rudder PCA Gage - A27001-1
- (3) Nose Gear Towing Lever Lockpin - A09003-1

B. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zone  
324 Vertical Stabilizer, Rear Spar to Trailing Edge

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- (2) Access Panels
  - 324BL T.E. of the Vertical Stabilizer
  - 324EL Rudder Mechanical Control Path
  - 324GL Bottom Rudder PCA
  - 324JL Middle Rudder PCA
  - 324LL Top Rudder PCA

D. Prepare for the Removal

S 862-026

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

S 012-027

- (2) Open these access panels (AMM 06-42-00):
  - (a) 324BL for the installation of rig pin R4
  - (b) 324EL for the installation of rig pin R8
  - (c) 324GL for the bottom PCA
  - (d) 324JL for the middle PCA and the installation of rig pin R5
  - (e) 324LL for the top PCA.

S 492-028

- (3) Move the towing lever on the metering valve module to the tow position and install the towing lever lockpin in the nose gear.

S 862-029

- (4) Remove the pressure from the left, right, and center hydraulic systems and their reservoirs (AMM 29-11-00).

S 862-030

- (5) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 862-031

- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 492-084

**WARNING:** MAKE SURE THAT HYDRAULIC POWER IS REMOVED BEFORE YOU INSTALL THE PCA LOCK TOOL. THE RUDDER CAN MOVE QUICKLY AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (7) Do these steps to install the PCA locks on the two rudder PCAs that you will not replace (Fig. 202):
  - (a) Move the right rudder pedal to its full forward position and hold it there until the PCA locks are installed.

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- (b) Manually move the rudder to its full right position and hold it there until the PCA locks are installed.

**CAUTION:** MAKE SURE YOU INSTALL PCA LOCKS ON THE TWO PCAS YOU WILL NOT REPLACE. THE RUDDER CAN BECOME DAMAGED IF HYDRAULIC POWER IS ACCIDENTALLY SUPPLIED TO A PCA THAT IS NOT LOCKED.

- (c) Install the PCA locks on the two PCAs.
- (d) Release the rudder pedals.

E. Remove the PCA

S 032-032

- (1) Remove the bolts (15, 16) from the trailing edge beam and do this step:
  - (a) Remove the trailing edge beam.

S 032-033

- (2) Disconnect these components:
  - (a) The input rod (12) from the PCA (6)

**NOTE:** Do not adjust the input rod length.

- (b) The hydraulic lines (14) from the PCA (6) and do this step:
  - 1) Seal the hydraulic lines with a cap.

S 032-034

- (3) Remove the bolt (1) that connects the PCA to the rudder front spar.

S 982-035

- (4) Move the PCA to get access to the bolts (10) on the trunnion block.

S 032-036

- (5) Remove the four bolts and washers (10 and 11) that connect the PCA to the trunnion.

S 022-037

- (6) Remove the PCA (6).

**NOTE:** Do not remove or replace the shims that are connected to the trunnion block.

- (a) If it is necessary, you can adjust the shim thickness (you can use the rudder PCA gage tool, A27001-1) (Fig. 202).

**NOTE:** The rudder must be in the neutral position.

- 1) Make sure dimension A is 17.575 - 17.585 inches (446.40-446.66 mm).

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- 2) Install the shims.
  - a) Make sure the Dimension A of the actuators is +/- 0.003 inches of each other.
  - b) The total shim thickness must be 0.062 - 0.145 inches (1.57-3.68 mm) (measure the shim thickness with a feeler gage).

F. Remove the Rudder Reaction Link

S 032-099

- (1) Remove the bolt (1) which connects the reaction link (21) to the rudder front spar.

S 032-100

- (2) Remove the bolts (26) on the upper trunnion to remove the trunnion stop (29).
  - (a) Remove the trunnion stop (29).

S 032-101

- (3) Remove the 3 bolts (22) from the bushing assembly (24).
  - (a) Remove the bushing assembly (24).

S 032-102

- (4) To remove the reaction link for the top PCA, you must remove the grease fitting (30).

**NOTE:** It can be necessary to remove the grease fitting when you remove the reaction links for the middle and bottom PCAs.

S 032-106

- (5) Do the steps that follow to remove the reaction link (21) and the hanger link (25) as an assembly.
  - (a) Move the reaction link (21) along the trunnion track to remove it from the trunnion track.
  - (b) Move the reaction link (21) and the hanger link assembly (25) up to be clear of the support bracket.
  - (c) Turn the reaction link and the hanger link assembly down to remove it.

TASK 27-21-02-422-038

5. Rudder PCA and Reaction Link - Installation (Fig. 201)

A. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24):
  - (a) R4 - P/N A20004-20

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- (b) R5 - P/N A20004-13
- (c) R8 - P/N A20004-12
- (2) Scale - Accurate to 0.01 inch (0.25 mm)
- (3) Bungee Cord, Commercially Available
- B. Consumable Materials
  - (1) D00633 Grease - BMS 3-33 (Recommended)
  - (2) D00015 Grease - BMS 3-24 (Alternate)
- C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
201	6	Actuator	27-21-02 27-21-02	01 01B	517 490

- D. References
  - (1) 06-42-00/201, Empennage Access Doors and Panels
  - (2) 20-10-24/201, Rig Pins
  - (3) 24-22-00/201, Electrical Power - Control
  - (4) 27-21-00/501, Rudder and Rudder Trim Control
  - (5) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- E. Access
  - (1) Location Zone
    - 324 Vertical Stabilizer, Rear Spar to Trailing Edge
  - (2) Access Panels
    - 324BL T.E. of the Vertical Stabilizer
    - 324EL Rudder Mechanical Control Path
    - 324GL Bottom Rudder PCA
    - 324JL Middle Rudder PCA
    - 324LL Top Rudder PCA

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F. Install the Rudder Reaction Link

NOTE: Do these steps only if you removed the rudder reaction link.

S 422-103

- (1) Do the steps that follow to install the hanger link (24) and the reaction link (21) as an assembly.
  - (a) Install the grease fitting (30) if it was removed.
  - (b) Install the bolt (1) to connect the reaction link (21) to the front spar.
    - 1) Tighten the bolt to 800 – 1000 inch pounds (90.4–113.0 newton-meters).
  - (c) Do these steps to install the bushing assembly (24).
    - 1) Temporarily put a 0.015 inch (0.38 mm) shim between the hanger link (25) and the flanged bushing (24).

NOTE: This shim is between the hanger link and the support bracket.

- 2) Install a laminated shim between the flanged bushing (24) and the support bracket.
- 3) Install the three bolts (22) which attach the flanged bushing (24) to the support bracket.
- 4) Tighten the 3 bolts to 30 – 40 inch pounds (3.4–4.5 newton-meters).
- 5) Remove the temporary 0.015 inch (0.38 mm) shim.

S 422-104

- (2) Use the bolt to install the upper trunnion stop.

G. Install the PCA

NOTE: Make sure the rudder is in the full right position and that the PCA locks are installed on the two PCAs which were not removed.

S 642-039

- (1) Apply grease to the bolts and bushings (1, 3, 7, and 10) before they are installed.

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S 982-040

- (2) Put the PCA (6) on the trunnion block (13) and align the bolt holes.

**NOTE:** Do not remove or replace the shims that are connected to the trunnion block.

S 432-041

- (3) Install the washers (11) and bolts (10) that connect the PCA to the trunnion block. Tighten the bolts to 400-500 pound-inches (45.2-56.5 newton-meters).

S 982-042

- (4) To install the rod end to the front spar, do the steps that follow:  
(a) Remove the caps for the hydraulic connections from the PCA.

**NOTE:** The caps must be removed to allow you to extend the PCA.

- (b) Connect the return hydraulic line (14) to the PCA (6).  
(c) Turn the manual input crank in the clockwise direction.  
(d) Manually extend the rod end until it is aligned with the rudder front spar.  
(e) Install the bolt (1), washer (2), bushing (3), washer (4) and nut (5).  
1) Tighten the nut to 800-1000 pound-inches (90.4-113.0 Nm).

S 432-044

- (5) Install the bolts (15, 16) that connect the trailing edge beam and tighten them.

S 432-045

- (6) Connect these components:  
(a) The hydraulic lines (14) to the PCA (6)  
(b) The input rod (12) to the PCA (6).

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S 092-085

**WARNING:** MAKE SURE THAT HYDRAULIC POWER IS REMOVED BEFORE YOU REMOVE THE THE PCA LOCK TOOL. THE RUDDER CAN MOVE QUICKLY AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (7) Do these steps to remove the PCA locks:
- (a) Move the right rudder pedal to its full forward position and hold it there until the PCA locks are removed.
  - (b) Manually move the rudder to its full right position and hold it there until the PCA locks are removed.
  - (c) Remove the locks from the PCAs.
  - (d) Release the rudder pedals.
  - (e) Manually move the rudder to its neutral position.
- H. Bleed the Rudder PCA

**NOTE:** Bleed only the PCA(S) that you replaced.

S 822-086

**CAUTION:** DO NOT BLEED MORE THAN ONE PCA AT A TIME. BECAUSE THE PCAS ARE NOT ADJUSTED, THE RUDDER CAN BECOME DAMAGED IF MORE THAN ONE PCA IS OPERATED AT THE SAME TIME.

- (1) Do these steps if you replaced the top PCA:

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (a) Supply pressure to the center hydraulic system only (AMM 29-11-00).
- (b) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead panel, P11:
  - 1) 11H18, FLT CONT SHUTOFF TAIL CTR
- (c) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF TAIL C switch on the P61 panel to ON.
- (d) Operate the rudder pedals to move the rudder through 10 full travel cycles.
- (e) Move the FLT CONTROL SHUTOFF TAIL C switch on the P61 panel to OFF. Attach a DO-NOT-OPERATE tag and make sure the switch position light comes on.
- (f) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - 1) 11H18, FLT CONT SHUTOFF TAIL CTR
- (g) Remove the power from the center hydraulic system (AMM 29-11-00).

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S 822-087

- (2) Do these steps if you replaced the middle PCA:

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (a) Supply pressure to the left hydraulic system only (AMM 29-11-00).
- (b) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - 1) 11H17, FLT CONT SHUTOFF TAIL LEFT
- (c) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF TAIL L switch on the P61 panel to ON.
- (d) Operate the rudder pedals to move the rudder through 10 full travel cycles.
- (e) Move the FLT CONTROL SHUTOFF TAIL L switch on the P61 panel to OFF. Attach a DO-NOT-OPERATE tag and make sure the switch position light comes on.
- (f) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - 1) 11H17, FLT CONT SHUTOFF TAIL LEFT
- (g) Remove the power from the left hydraulic system (AMM 29-11-00).

S 822-088

- (3) Do these steps if you replaced the bottom PCA:

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (a) Supply pressure to the right hydraulic system only (AMM 29-11-00).
- (b) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - 1) 11H27, FLT CONT SHUTOFF TAIL RIGHT
- (c) Remove the DO-NOT-OPERATE tag and move the FLT CONTROL SHUTOFF TAIL R switch on the P61 panel to ON.
- (d) Operate the rudder pedals to move the rudder through 10 full travel cycles.
- (e) Move the FLT CONTROL SHUTOFF TAIL R switch on the P61 panel to OFF. Attach a DO-NOT-OPERATE tag and make sure the switch position light comes on.
- (f) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - 1) 11H27, FLT CONT SHUTOFF TAIL RIGHT

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- (g) Remove the power from the right hydraulic system (AMM 29-11-00).

I. Adjust the Rudder PCA

**NOTE:** This adjustment is applicable if you replaced one PCA only.

If you replaced more than one PCA, do the system adjustment for all three PCAs (AMM 27-21-00).

S 492-046

- (1) Use tape to attach a piece of cardboard (that extends down to the index plate) to the rudder trailing edge.

S 492-047

- (2) Do these steps to install rig pin R4:
  - (a) Turn the rudder trim switch on the aft electronic control panel, P8, until the trim indicator shows 3 to 5 units of left trim.
  - (b) Manually turn the aft quadrant clockwise (against the spring force) until rig pin R4 can be installed.

**NOTE:** This will make a stable position for the PCA adjustment procedure. The mechanism springs hold the rig pin hole to positively ground the ratio changer mechanism.

**CAUTION:** MAKE SURE THE RIG PIN HOLES IN THE FEEL, CENTERING, AND TRIM AFT QUADRANT ARE ALIGNED BEFORE RIG PIN R4 IS INSTALLED. IT IS POSSIBLE FOR RIG PIN R4 TO BE INSTALLED INCORRECTLY IF THE QUADRANT IS NOT IN ITS CORRECT POSITION.

- (c) Install rig pin R4.

S 862-055

- (3) Do these steps if you replaced the top PCA:

**NOTE:** Make sure that power is not supplied to the center hydraulic system.

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (a) Supply pressure to the left and right hydraulic systems (AMM 29-11-00).
- (b) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - 1) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - 2) 11H27, FLT CONT SHUTOFF TAIL RIGHT
- (c) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L and R switches on the P61 panel to ON.

S 862-056

- (4) Do these steps if you replaced the middle PCA:

**NOTE:** Make sure that power is not supplied to the left hydraulic system.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (a) Supply pressure to the right and center hydraulic systems (AMM 29-11-00).
- (b) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - 1) 11H18, FLT CONT SHUTOFF TAIL CTR
  - 2) 11H27, FLT CONT SHUTOFF TAIL RIGHT

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- (c) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL R and C switches on the P61 panel to ON.

S 862-057

- (5) Do these steps if you replaced the bottom PCA:

NOTE: Make sure that power is not supplied to the right hydraulic system.

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (a) Supply pressure to the left and center hydraulic systems (AMM 29-11-00).
- (b) Remove the DO-NOT-OPERATE tags and close these circuit breakers on the P11 panel:
  - 1) 11H17, FLT CONTROL SHUTOFF TAIL LEFT
  - 2) 11H18, FLT CONT SHUTOFF TAIL CTR
- (c) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L and C switches on the P61 panel to ON.

S 212-058

- (6) Make sure the rudder trailing edge is in its groove on the rudder index plate.

S 822-059

- (7) If the rudder is not in the index plate groove, do the procedure to Adjust the Three PCA System (AMM 27-21-00).

S 822-098

- (8) Do these steps if the rudder is in the index plate groove:
  - (a) Put tape on the index plate and make a mark of the rudder trailing edge position.

NOTE: This is the datum position.

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- (b) Remove the pressure from the left, center and right hydraulic system (AMM 29-11-00).

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (c) If you replaced the top PCA, supply pressure to the center hydraulic system only (AMM 29-11-00).
- (d) If you replaced the middle PCA, supply pressure to the left hydraulic system only (AMM 29-11-00).
- (e) If you replaced the bottom PCA, supply pressure to the right hydraulic system only (AMM 29-11-00).
- (f) After 1 minute, make sure the rudder trailing edge is less than 0.05 inch (1.27 mm) away from the datum position.
- (g) If the trailing edge is more than 0.05 inches (1.27 mm) from the datum position, do these steps to adjust the input rod of the PCA you removed:
- 1) Make sure the pressure is removed from the left, center and right hydraulic systems (AMM 29-11-00).
  - 2) Disconnect the input rod.
  - 3) Adjust the threads one-half turn.

**NOTE:** Turn the threads a maximum of one-half a turn at a time. This will let the PCA bleed unwanted hydraulic pressure.

- 4) Connect the input rod.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- 5) If you replaced the top PCA, supply pressure to the center hydraulic system (AMM 29-11-00).
- 6) If you replaced the the middle PCA, supply pressure to the left hydraulic system (AMM 29-11-00).
- 7) If you replaced the bottom PCA, supply pressure to the right hydraulic system (AMM 29-11-00).

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- 8) After 1 minute, make sure the rudder trailing edge is less than 0.05 inches (1.27 mm) away from the datum position.
- 9) If the rudder trailing edge is more than 0.05 inches (1.27 mm) away from the datum position, do these steps again.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (h) Supply pressure to the left, center and right hydraulic system (AMM 29-11-00).
- (i) Put the rudder trim to the neutral position.
  - 1) Remove the rig pin R4 from the feel and centering mechanism.
- (j) Do the steps that follow:
  - 1) Put the rudder to the full left position.
    - a) Make sure the rudder is minimum of 41.10 inches (1.04 meters) from the neutral position.
  - 2) Put the rudder to the full right position.
    - a) Make sure the rudder is a minimum of 41.10 inches (1.04 meters) from the neutral position.
  - 3) Put the rudder to the neutral position.
  - 4) Remove the pressure from the center and right hydraulic systems (AMM 29-11-00).
    - a) Make sure the rudder does not move more than 0.10 inches from the neutral position.

**WARNING:** KEEP PERSONS AND EQUIPMENT FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- 5) Supply pressure to the center hydraulic system (Ref 29-11-00).

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- 6) Remove the pressure from the left hydraulic system (AMM 29-11-00).
  - a) Make sure the rudder does not move more than 0.10 inches from the neutral position.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- 7) Supply pressure to the right hydraulic system (AMM 29-11-00).
- 8) Remove the pressure from the center hydraulic system.
  - a) Make sure the rudder does not move more than 0.10 inches from the neutral position.
- 9) If the rudder is not in the limits shown, adjust the PCAs to the neutral position for the single system check.

**NOTE:** The rudder trailing edge is less than 0.05 inches from the datum position.

(k) Remove the cardboard from the rudder.

J. Rudder PCA - Test

S 862-073

- (1) Push the STATUS button on the display select panel to show the rudder position indicator on the display.

S 862-092

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

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- (2) Supply pressure to the hydraulic system that supplies power to the PCA you will test (AMM 29-11-00).

**NOTE:** The center system supplies the top PCA.  
The left system supplies the middle PCA.  
The right system supplies the bottom PCA.

S 862-105

- (3) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to ON.

S 862-093

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 862-074

- (5) Turn the rudder trim switch on the aft electronic control panel, P8, until the trim indicator shows zero units of trim.

S 212-075

- (6) Move the captain's left pedal to its full forward position and do this check:
- (a) Make sure the rudder position indicator moves to the left full travel mark.

S 212-076

- (7) Move the captain's right pedal to its full forward position and do this check:
- (a) Make sure the rudder position indicator moves to its right full travel mark.

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S 212-077

- (8) Release the rudder pedals and do this check:  
(a) Make sure the rudder position indicator goes to its neutral position.

S 212-078

- (9) Do a check on the rudder PCAs for hydraulic leaks.  
K. Put the Airplane Back to Its Usual Condition

S 092-094

**WARNING:** STAY AWAY FROM THE NOSE WHEELS WHEN THE LOCK PIN IS REMOVED. THE WHEELS CAN TURN TO THE CENTER POSITION QUICKLY, AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the nose wheels are in their center position and remove the towing lever lockpin from the nose gear.

S 862-079

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00).

S 412-095

- (3) Close access panels 324BL, 324EL, 324GL, 324JL, and 324LL (AMM 06-42-00).

S 862-080

- (4) Remove electrical power if it is not necessary (AMM 24-22-00).

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RUDDER POWER CONTROL ACTUATOR (PCA)  
AND REACTION LINK - INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Rudder Power Control Actuator - Maintenance Practices for procedures to do these tasks.

TASK 27-21-02-206-001

2. Rudder Reaction Link - Wear Limits

A. Procedure

S 226-002

- (1) Use the supplied data (Fig. 601) to examine the rudder reaction linkage for too much wear.

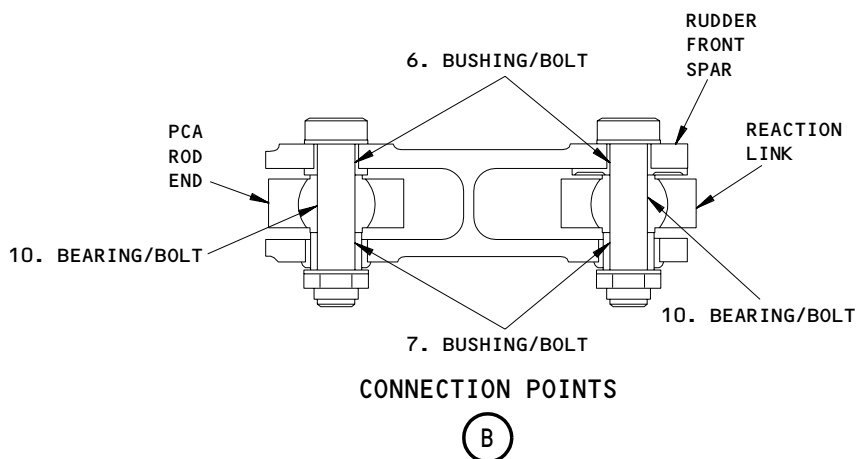
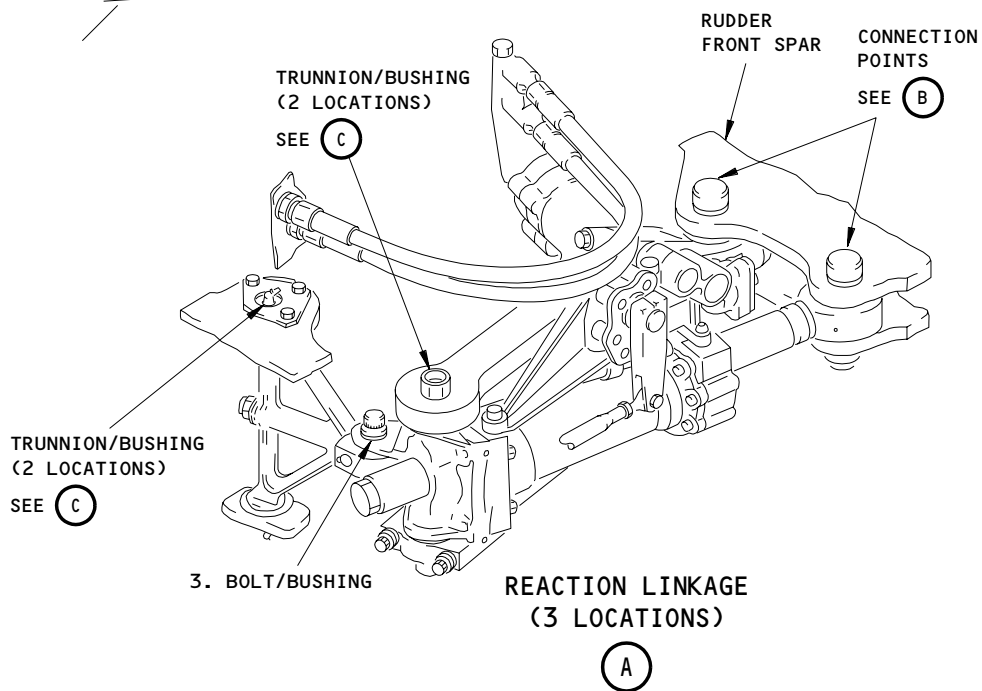
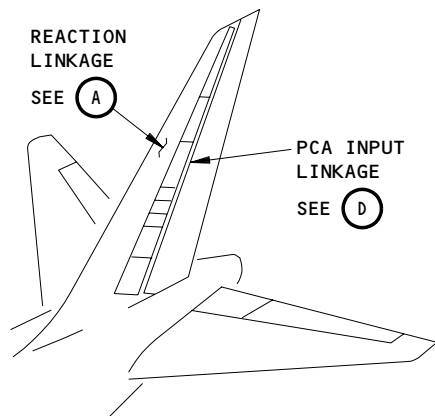
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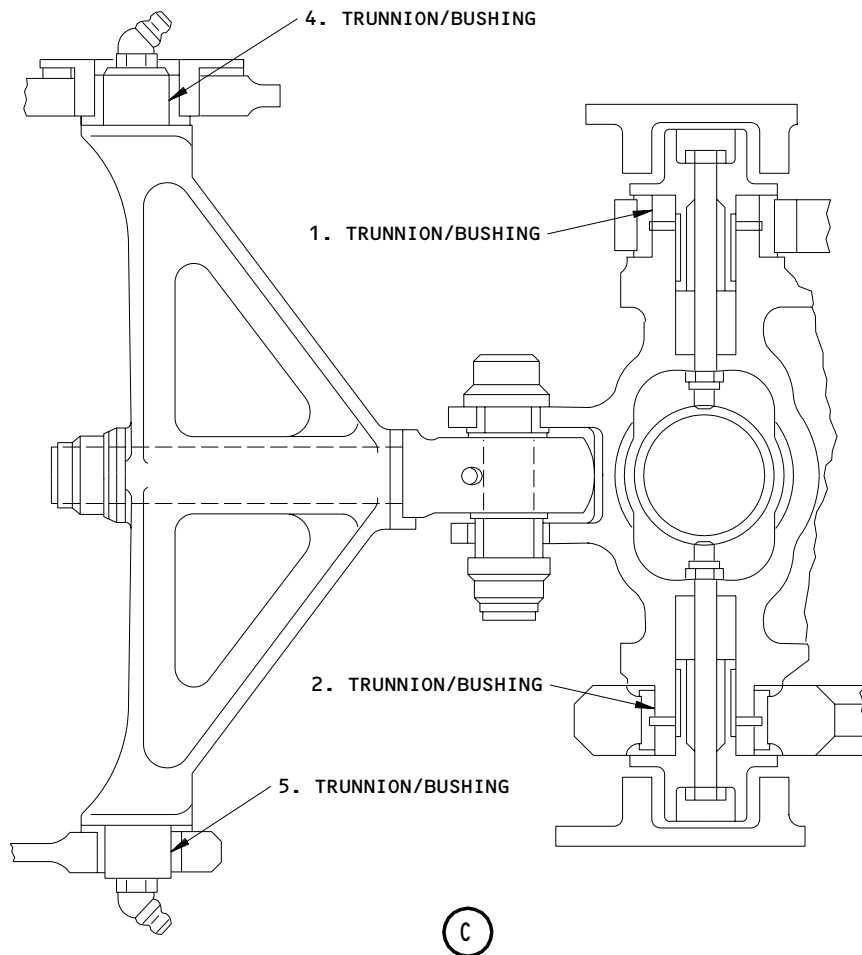
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Rudder Power Control Actuator (PCA) and Reaction Link Wear Limits  
Figure 601 (Sheet 1)

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Rudder Power Control Actuator (PCA) and Reaction Link Wear Limits  
Figure 601 (Sheet 2)

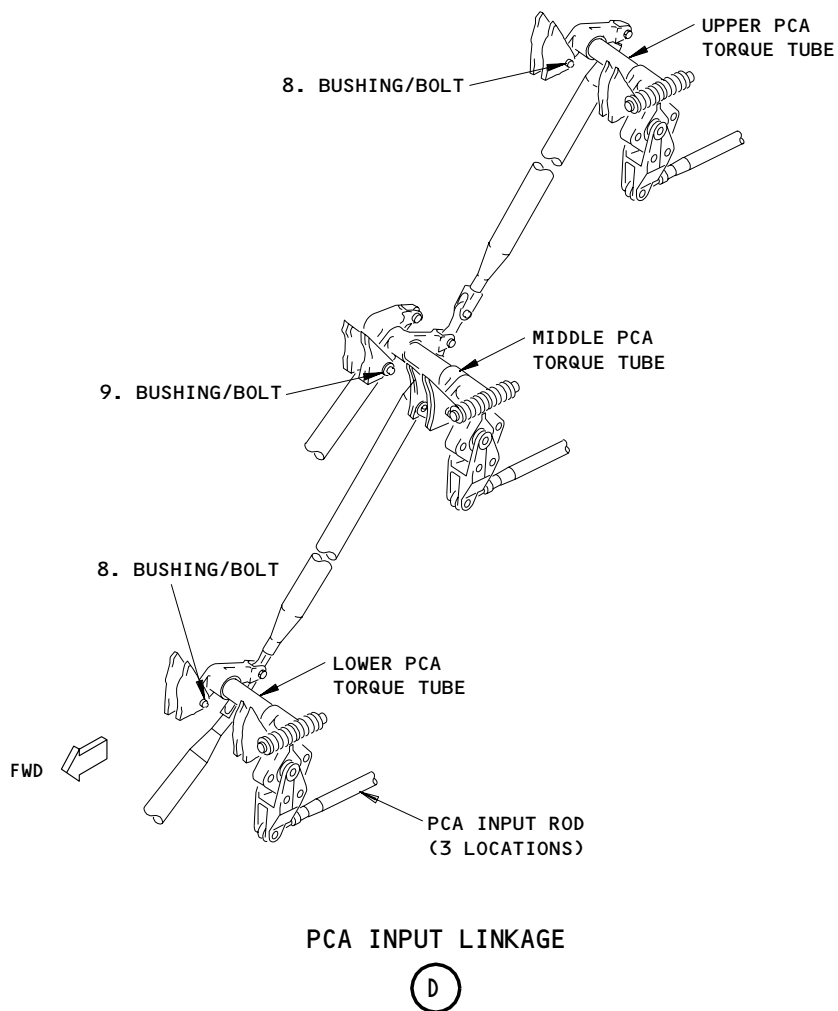
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Rudder Power Control Actuator (PCA) and Reaction Link Wear Limits  
Figure 601 (Sheet 3)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	1.2505 (31.763)	1.2515 (31.788)	1.2519 (31.798)	0.0035 (0.089)	X		
	TRUNNION	OD	1.2484 (31.709)	1.2490 (31.725)	1.2480 (31.699)			X	1
2	BUSHING	ID	1.3130 (33.350)	1.3140 (33.376)	1.3145 (33.388)	0.0040 (0.0102)	X		
	TRUNNION	OD	1.3109 (33.297)	1.3115 (33.312)	1.3105 (33.287)			X	1
3	BUSHING	ID	0.6245 (15.862)	0.6250 (15.875)	0.6260 (15.900)	0.0030 (0.076)	X		
	BOLT	OD	0.6230 (15.824)	0.6240 (15.850)	0.6220 (15.799)			X	
4	BUSHING	ID	0.8750 (22.225)	0.8760 (22.250)	0.8762 (22.255)	0.0030 (0.076)	X		
	TRUNNION	OD	0.8732 (22.179)	0.8737 (22.192)	0.8728 (22.169)			X	1
5	BUSHING	ID	0.8750 (22.225)	0.8758 (22.245)	0.8762 (22.255)	0.0030 (0.076)	X		
	TRUNNION	OD	0.8732 (22.179)	0.8737 (22.192)	0.8730 (22.174)			X	1
6	BUSHING	ID	0.8745 (22.212)	0.8753 (22.233)	0.8790 (22.301)	0.0050 (0.127)	X		
	BOLT	OD	0.8735 (22.174)	0.8740 (22.200)	0.8703 (22.106)			X	
7	BUSHING	ID	0.8745 (22.212)	0.8750 (22.225)	0.8790 (22.301)	0.0050 (0.127)	X		
	BOLT	OD	0.8735 (22.174)	0.8740 (22.200)	0.8700 (22.098)			X	
8	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2515 (6.388)	0.0030 (0.076)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2475 (6.287)			X	
9	BUSHING	ID	0.3750 (9.525)	0.3755 (9.538)	0.3765 (9.563)	0.0030 (0.076)	X		
	BOLT	OD	0.3735 (9.487)	0.3745 (9.512)	0.3725 (9.462)			X	
10	BEARING	ID	0.8745 (22.212)	0.8750 (22.225)	0.8790 (22.327)	0.0050 (0.127)		X	1
	BOLT	OD	0.8735 (22.187)	0.8740 (22.200)	0.8700 (22.098)			X	

1 THIS PART IS REPAIRABLE

Rudder Power Control Actuator (PCA) and Reaction Link Wear Limits  
Figure 601 (Sheet 4)

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RUDDER PEDALS - REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and installation tasks for the rudder pedal assemblies. These tasks are applicable to the captain's or the first officer's pedals.

TASK 27-21-05-024-003

2. Rudder Pedal Assembly - Removal

A. Equipment

- (1) Rig Pins from Set A20004-XX (Ref 20-10-24):  
    (a) R3 - P/N A20004-14  
(2) Nose Gear Towing Lever Lockpin - A09003-1

B. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels  
(2) 20-10-24/201, Rig Pins  
(3) 24-22-00/201, Electrical Power - Control

C. Access

- (1) Location Zones  
    211/212      Control Cabin  
  
(2) Access Panel  
    113AL      Flight Control Components

D. Prepare for the Removal

S 864-004

- (1) Supply electrical power (Ref 24-22-00).

S 864-005

- (2) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 864-006

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
    (a) 11G10, RUDDER RATIO  
    (b) 11H17, FLT CONT SHUTOFF TAIL LEFT  
    (c) 11H18, FLT CONT SHUTOFF TAIL CTR  
    (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

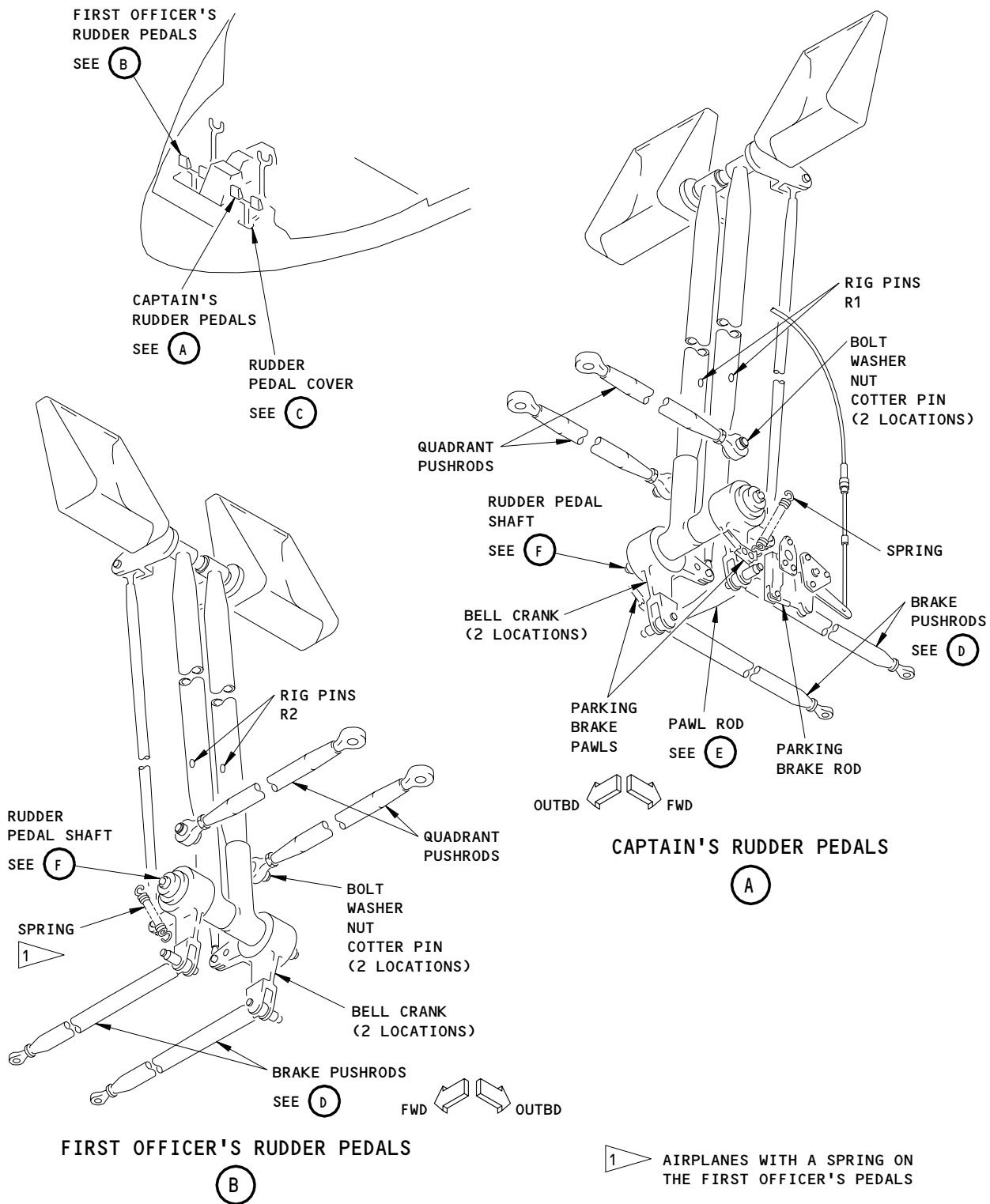
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Rudder Pedal Installation  
Figure 401 (Sheet 1)

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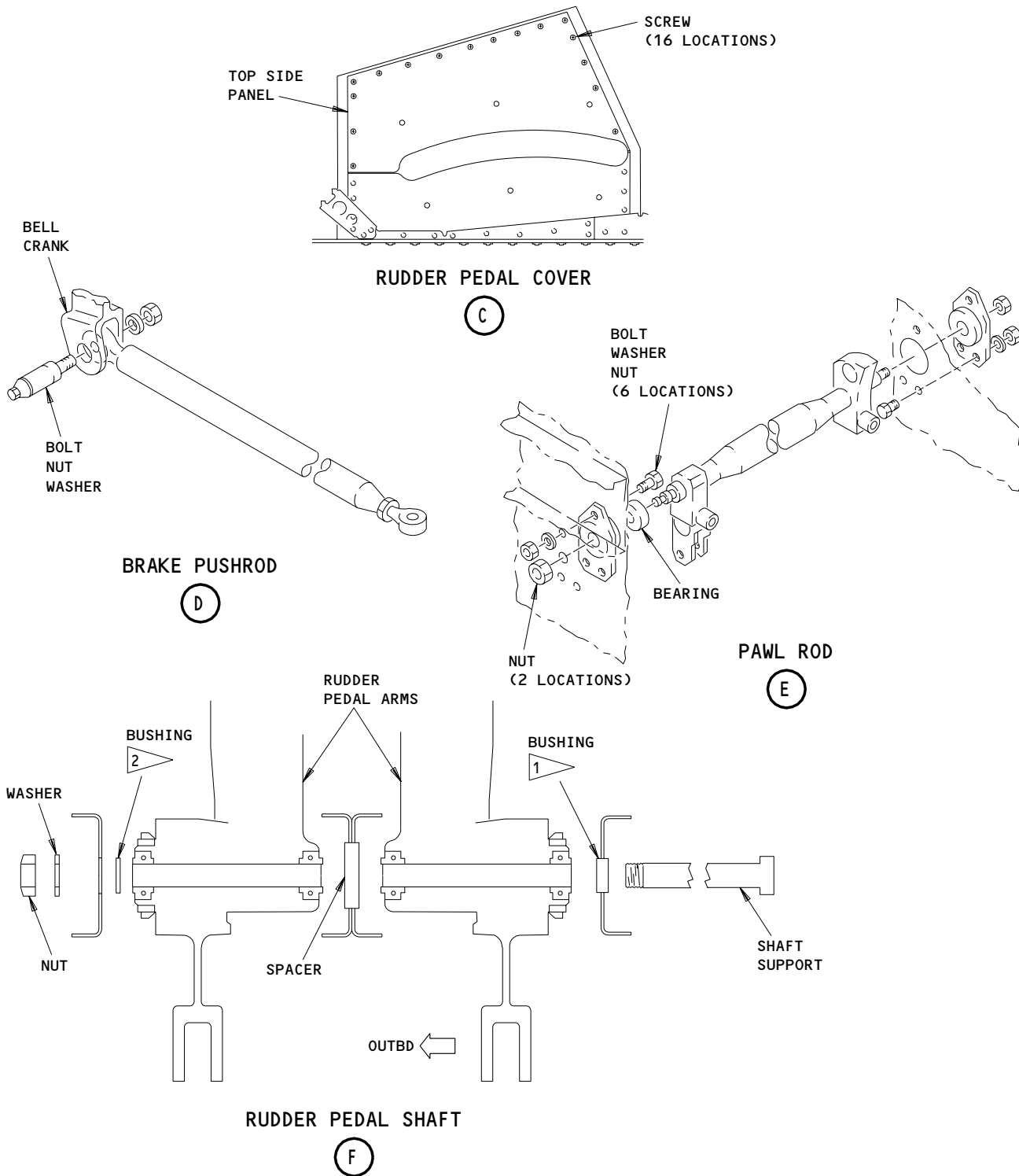
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1999038



- 1 INBOARD FOR CAPTAIN, OUTBOARD FOR FIRST OFFICER
- 2 OUTBOARD FOR CAPTAIN, INBOARD FOR FIRST OFFICER

Rudder Pedal Installation  
Figure 401 (Sheet 2)

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S 864-038

**WARNING:** MAKE SURE TO OPEN THE CIRCUIT BREAKERS FOR THE CAPTAIN'S AND THE FIRST OFFICER'S SEATS BEFORE YOU DO WORK AROUND THEM. A FAILURE TO OPEN THE CIRCUIT BREAKERS CAN CAUSE THE SEATS TO MOVE ACCIDENTALLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
  - (a) 6H15, CAPT SEAT

S 014-007

- (5) Open access door 113AL to get access to the rudder pedal assemblies (Ref 06-41-00).

S 494-008

- (6) Install rig pin R3 in the forward quadrant and jackshaft (Fig. 402).

S 494-009

- (7) Move the towing lever on the metering valve module to the tow position and install the towing lever lockpin in the nose gear (Fig. 403).

E. Rudder Pedal Assemblies - Removal (Fig. 401)

S 034-010

- (1) Disconnect these components:
  - (a) The brake pushrods from the bellcrank
  - (b) The quadrant pushrods from the rudder pedal arms.

S 034-011

- (2) On the Captain's rudder pedals, do these steps:
  - (a) Disconnect the spring from the parking brake pawl and remove it.
  - (b) Disconnect the parking brake rod from the pawl.
  - (c) Remove the pawl rod.

S 034-012

- (3) On the First Officer's pedals, disconnect and remove the spring.

S 014-014

- (4) Remove the top side panels from the rudder pedal cover.

S 034-015

- (5) Hold the rudder pedal assemblies and remove the rudder pedal shaft (View F).

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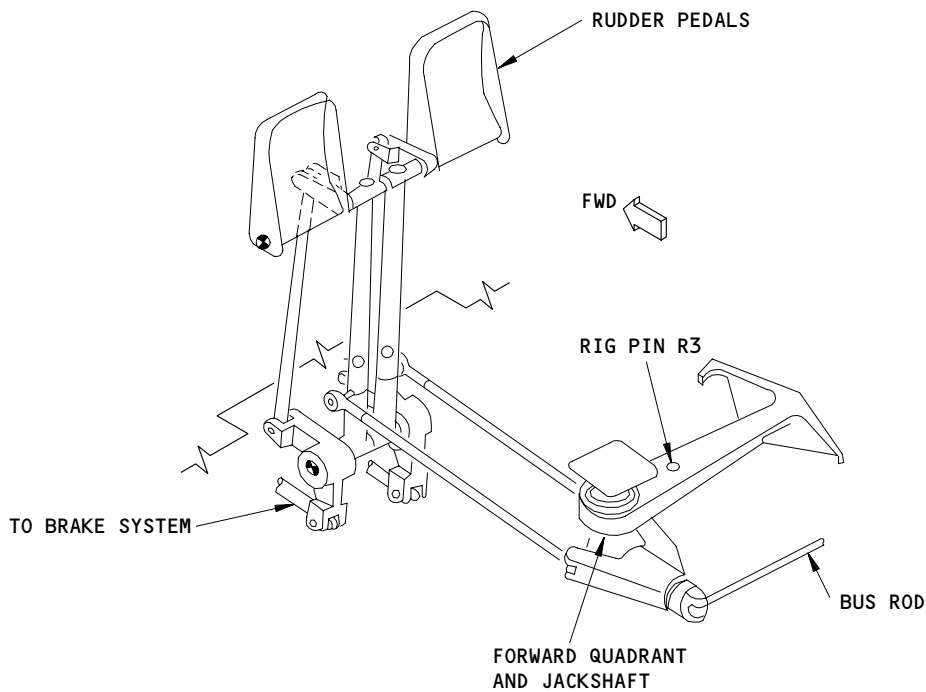
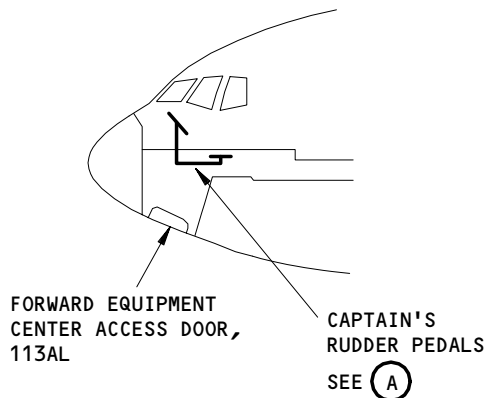
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CAPTAIN'S RUDDER PEDALS

(A)

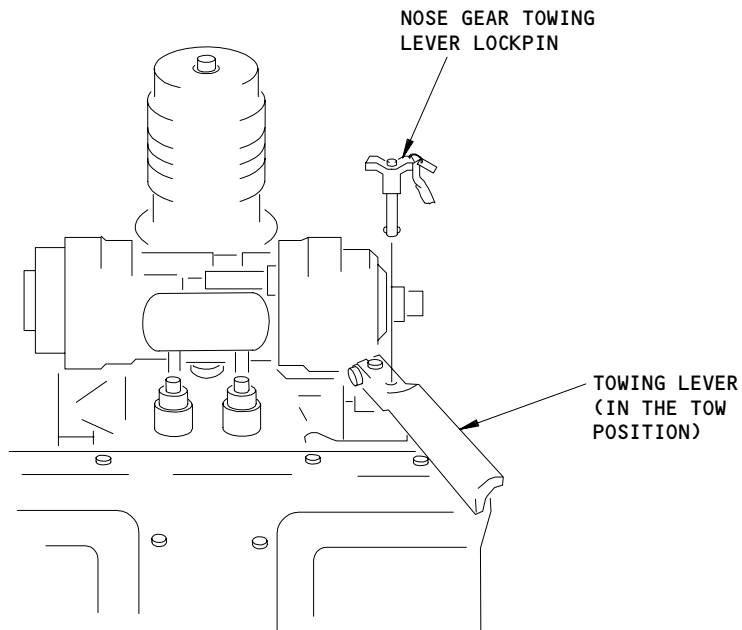
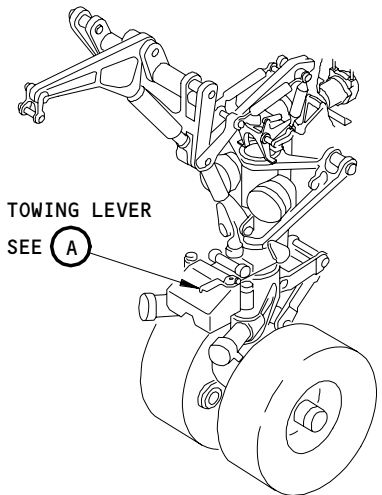
Rudder Forward Quadrant  
Figure 402

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TOWING LEVER

(A)

Nose Gear Steering Isolation  
Figure 403

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S 024-016

- (6) Turn each pedal 90 degrees and lower them through the flight deck floor.

NOTE: Make sure you do not damage the parking brake switch.

TASK 27-21-05-424-017

3. Rudder Pedal Assembly - Installation

A. Equipment

- (1) Rig Pins from Set A20004-XX (Ref 20-10-24):
  - (a) R1 - P/N A20004-25
  - (b) R2 - P/N A20004-25

B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

C. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 20-10-24/201, Rig Pins
- (3) 24-22-00/201, Electrical Power - Control
- (4) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) 32-41-00/501, Hydraulic Brake System

D. Access

- (1) Location Zones  
211/212 Control Cabin
- (2) Access Panel  
113AL Flight Control Components

E. Rudder Pedal Assembly - Installation (Fig. 401)

S 624-019

- (1) Apply the corrosion preventive compound to the rudder pedal shaft.

S 424-020

- (2) Put the rudder pedals in the support structure and do these steps:
  - (a) Install the support shaft from the inboard side of the pedal assemblies through the bushings.
  - (b) Put the washer and nut on the rudder pedal support shaft.
  - (c) Tighten the nut.

S 824-021

- (3) Do these steps to adjust the rudder pedal position:
  - (a) Turn the pedal adjustment crank clockwise until the jackshaft is in its full forward position.
  - (b) Turn the pedal adjustment crank 3.25 turns counterclockwise.
  - (c) Put the crank in its nearest detent position.
  - (d) Install these rig pins in the rudder pedal arms:
    - 1) R1 (for the captain's rudder pedals)

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2) R2 (for the first officer's rudder pedals)

S 824-022

- (4) Do these steps to adjust and install the quadrant pushrods:
- (a) Loosen the locknuts on the pushrods.
  - (b) Turn the pushrods until you can attach them to the pedal arms.
  - (c) Make sure you see control rod threads in at least one-half of the inspection hole for the pushrod.
  - (d) Tighten the locknuts 160-240 pound-inches (18.0-27.1 newton-meters) at the pushrod ends.
  - (e) Apply the corrosion preventive compound at the connection points for the pushrods.
  - (f) Connect the pushrods to the rudder pedal arms.
    - 1) Install the bolts, washers, and nuts.
    - 2) Torque the nuts to 110-150 inch-pounds (12.4-16.9 Nm).
      - a) Install the cotter pins on the nuts.

S 094-023

- (5) Remove these rig pins:
- (a) R1 (for the captain's rudder pedals)
  - (b) R2 (for the first officer's rudder pedals)
  - (c) R3 (for the forward quadrant and jackshaft).

S 414-024

- (6) Install the side panels on the rudder pedal cover.

S 434-025

- (7) On the Captain's rudder pedals, do these steps:
- (a) Apply the corrosion preventive compound to the bolts before the installation.
  - (b) Install the pawl rod.
  - (c) Connect the parking brake rod to the pawl.
  - (d) Connect the spring between the pawl and the bracket.

S 434-026

- (8) On the First Officer's rudder pedals, connect the spring.

S 434-028

- (9) Do these steps to connect the brake pushrods to the bellcrank:
- (a) Apply the corrosion preventive compound to the bolts before the installation.
  - (b) Connect the brake pushrods to the bellcrank.
  - (c) Make sure you can easily install and remove rig pin R1 in the captain's rudder pedals.
  - (d) If it is necessary, adjust the brake pushrods (Ref 32-41-00).

F. Rudder Pedal Operation - Test

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S 864-001

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply pressure to the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-029

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 864-039

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
  - (a) 6H15, CAPT SEAT
  - (b) 6J21, F/O SEAT

S 864-030

- (4) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to ON.

S 864-032

- (5) Push the STATUS button on the display select panel, P9, to show the rudder position indicator on the bottom EICAS display.

S 214-033

- (6) Operate the rudder pedals through their full travel range and do these checks:
    - (a) Make sure the pedals move smoothly and freely through their full travel range.
    - (b) Make sure the rudder operates correctly.
    - (c) Make sure the rudder position indicator operates correctly and moves through its full travel in each direction.
- G. Put the Airplane Back to Its Usual Condition

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S 094-002

**WARNING:** STAY AWAY FROM THE NOSE WHEELS WHEN THE LOCKPIN IS REMOVED. THE WHEELS CAN TURN TO THE CENTER POSITION QUICKLY, AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the nose wheels are in their center positions and remove the towing lever lockpin from the nose gear.

S 414-034

- (2) Close access panel, 113AL (Ref 06-41-00).

S 864-035

- (3) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-036

- (4) Remove electrical power if it is not necessary (Ref 24-22-00).

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RUDDER PEDAL - INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and wear limit tables which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to Rudder Pedal - Removal/Installation for procedures to do these tasks.

TASK 27-21-05-206-001

2. Rudder Pedals - Wear Limits

A. Procedure

S 226-002

- (1) Use the supplied data (Fig. 601) to examine the rudder pedals for too much wear.

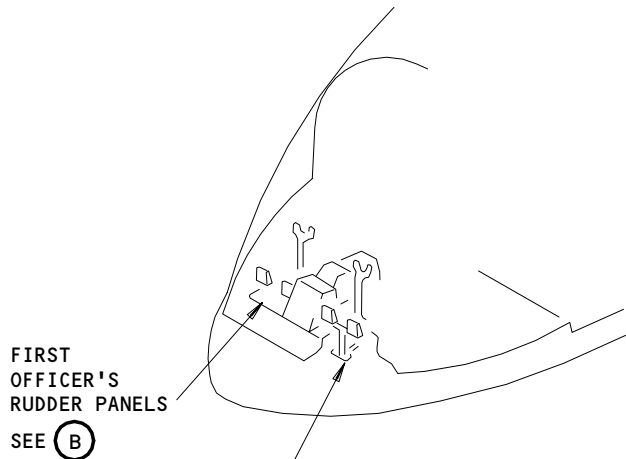
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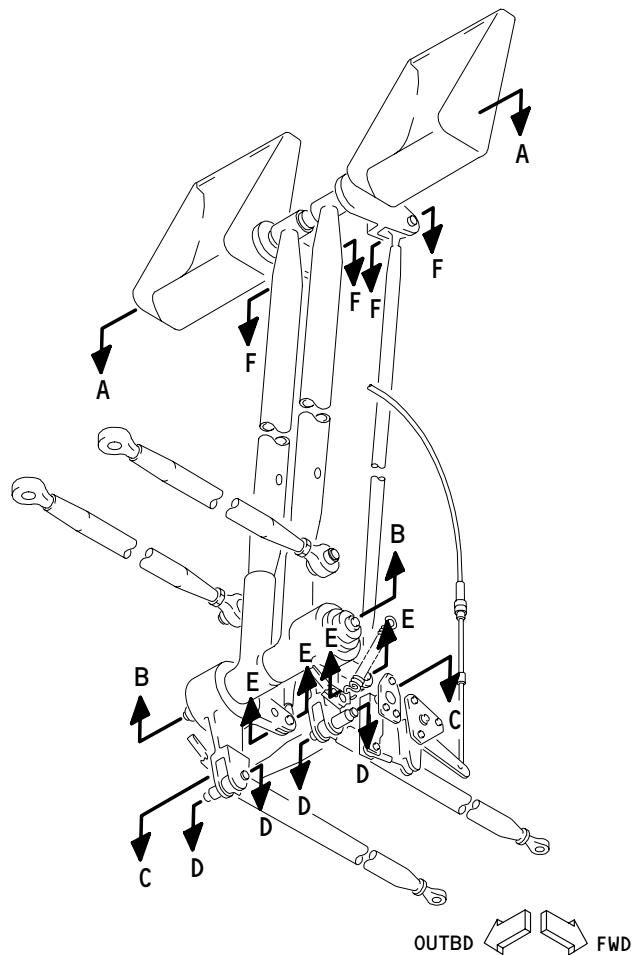
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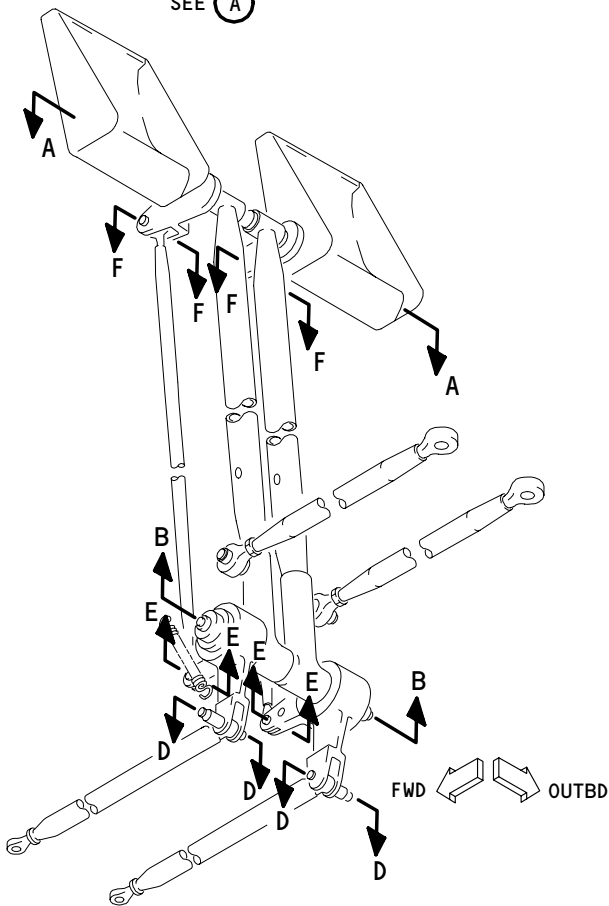
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CAPTAIN'S RUDDER PEDALS  
SEE (A)



CAPTAIN'S RUDDER PEDALS  
(A)

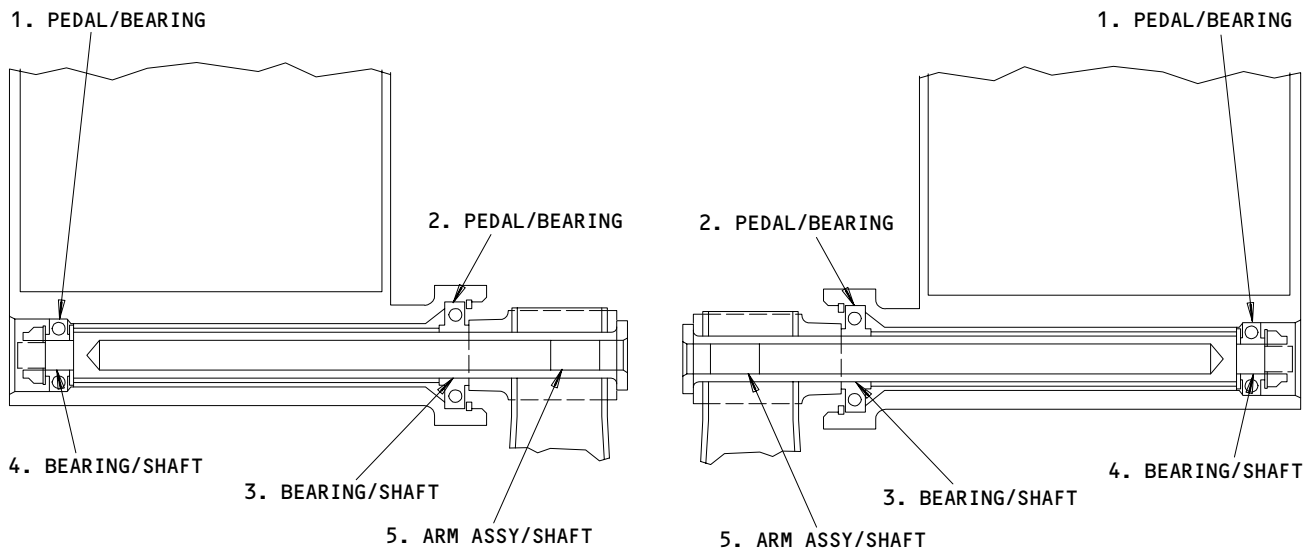


FIRST OFFICER'S RUDDER PEDALS  
(B)

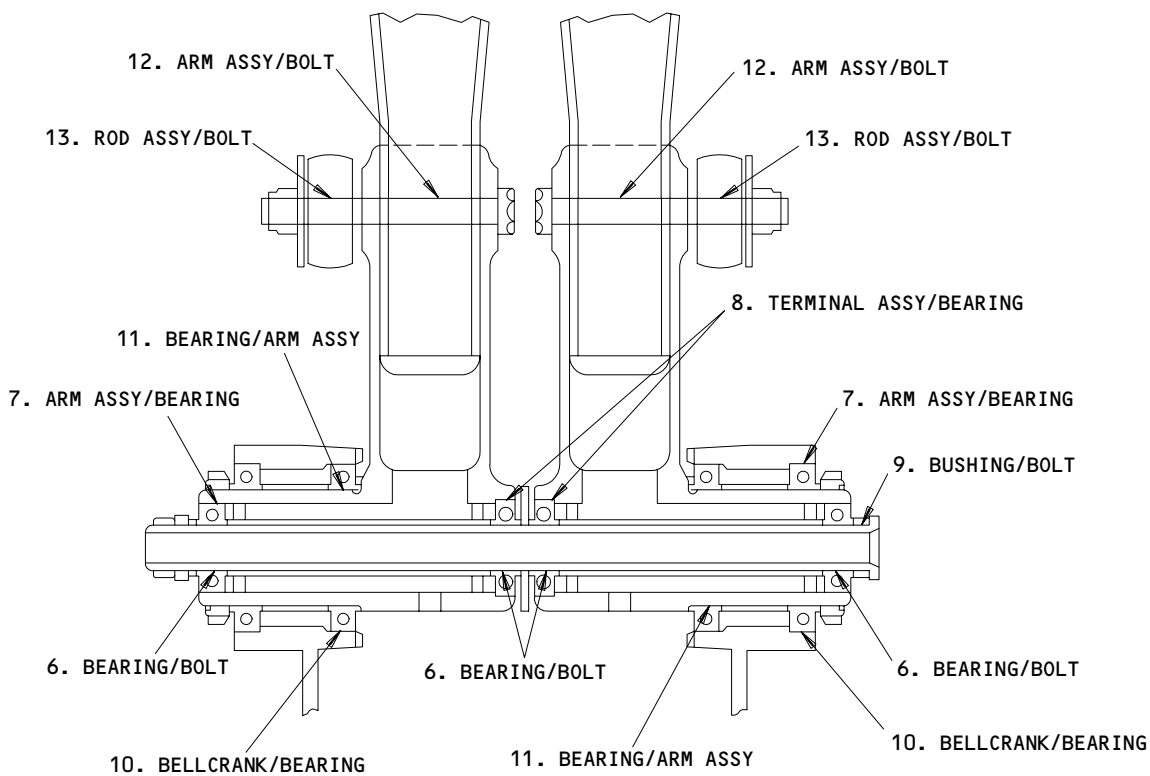
Rudder Pedal Wear Limits  
Figure 601 (Sheet 1)

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A-A



B-B

Rudder Pedal Wear Limits  
Figure 601 (Sheet 2)

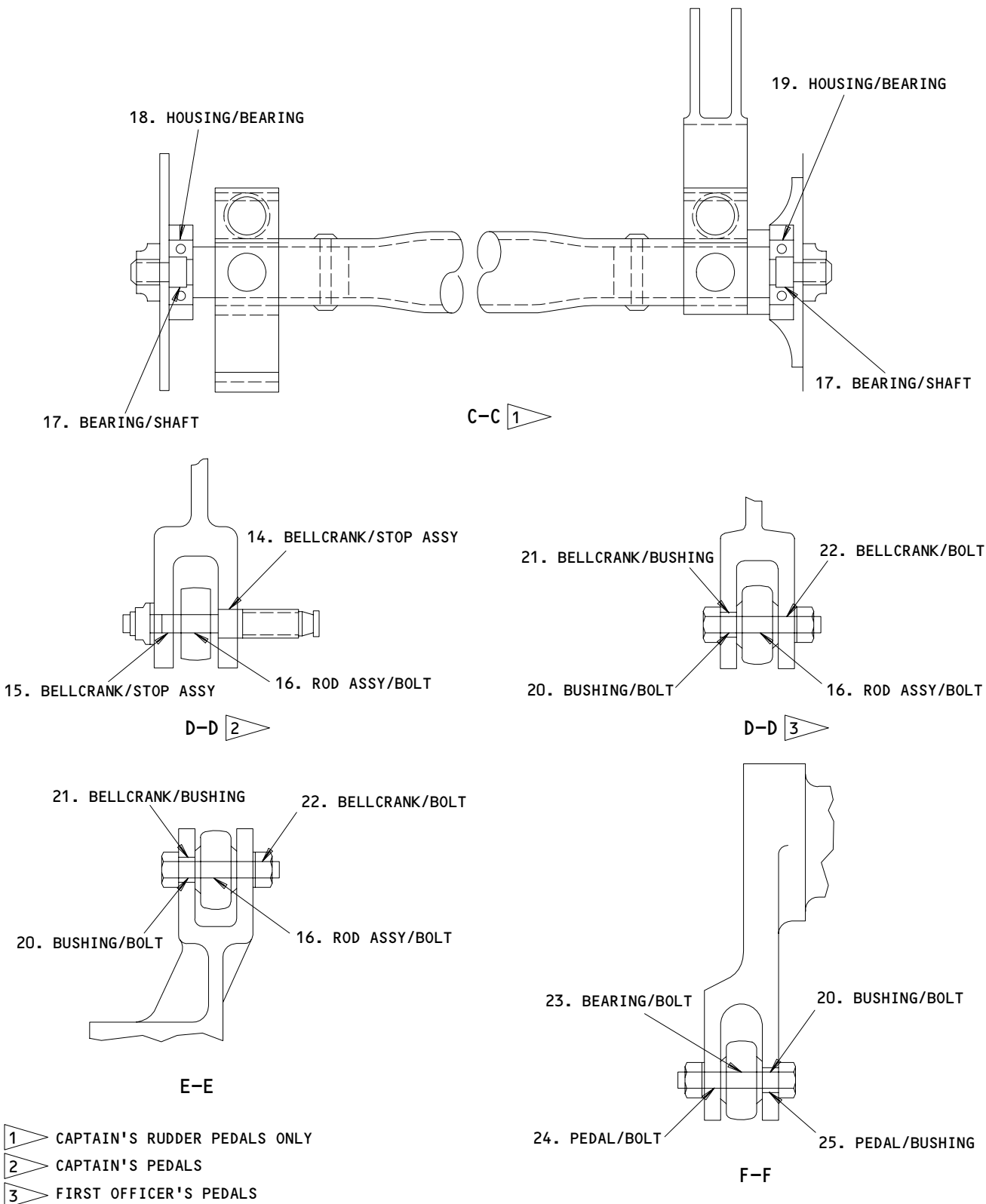
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Rudder Pedal Wear Limits  
Figure 601 (Sheet 3)








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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	PEDAL	ID	1.1248 (28.570)	1.1253 (28.583)	1.1283 (28.659)	0.0058 (0.147)		X	
	BEARING	OD	1.1245 (28.562)	1.1250 (28.575)	1.1225 (28.512)		X		
2	PEDAL	ID	1.6248 (41.270)	1.6253 (41.283)	1.6283 (41.359)	0.0058 (0.147)		X	
	BEARING	OD	1.6245 (41.262)	1.6250 (41.275)	1.6225 (41.212)		X		
3	BEARING	ID	0.7495 (19.037)	0.7500 (19.050)	0.7520 (19.101)	0.0060 (0.152)	X		
	SHAFT	OD	0.7490 (19.025)	0.7495 (19.037)	0.7460 (18.948)		X		
4	BEARING	ID	0.4995 (12.687)	0.5000 (12.700)	0.5020 (12.751)	0.0060 (0.152)	X		
	SHAFT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4960 (12.598)		X		
5	ARM ASSY	ID	0.7495 (19.037)	0.7515 (19.088)	0.7530 (19.126)	0.0060 (0.152)		X	
	SHAFT	OD	0.7490 (19.025)	0.7495 (19.037)	0.7470 (18.974)		X		
6	BEARING	ID	0.6245 (15.862)	0.6250 (15.875)	0.6280 (15.951)	0.0060 (0.152)	X		
	BOLT	OD	0.6230 (15.824)	0.6240 (15.850)	0.6220 (15.799)		X		
7	ARM ASSY	ID	1.1875 (30.163)	1.1880 (30.175)	1.1900 (30.226)	0.0040 (0.102)		X	
	BEARING	OD	1.1870 (30.150)	1.1875 (30.163)	1.1860 (30.124)		X		
8	TERMINAL ASSY	ID	1.3736 (34.889)	1.3743 (34.907)	1.3745 (34.912)	 0.0000 (0.000)		X	
	BEARING	OD	1.3745 (34.912)	1.3750 (34.925)	1.3745 (34.912)		X		
9	BUSHING	ID	0.6250 (15.875)	0.6265 (15.913)	0.6275 (15.939)	0.0055 (0.140)	X		
	BOLT	OD	0.6230 (15.824)	0.6240 (15.850)	0.6220 (15.799)		X		
10	BELLCRANK	ID	2.3125 (58.738)	2.3135 (58.763)	2.3150 (58.801)	0.0040 (0.102)		X	
	BEARING	OD	2.3115 (58.712)	2.3125 (58.738)	2.3110 (58.699)		X		

Rudder Pedal Wear Limits  
Figure 601 (Sheet 4)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BEARING	ID	1.5620 (39.675)	1.5630 (39.700)	1.5635 (39.713)	0.0040 (0.102)	X		
	ARM ASSY	OD	1.5605 (39.637)	1.5615 (39.662)	1.5595 (39.611)			X	1
12	ARM ASSY	ID	0.3745 (9.512)	0.3755 (9.538)	0.3795 (9.639)	0.0080 (0.203)		X	1
	BOLT	OD	0.3735 (9.487)	0.3745 (9.512)	0.3715 (9.436)		X		
13	ROD ASSY	ID	0.3745 (9.512)	0.3750 (9.525)	0.3760 (9.550)	0.0040 (0.102)	X		
	BOLT	OD	0.3735 (9.487)	0.3745 (9.512)	0.3720 (9.449)		X		
14	BELLCRANK	ID	0.3766 (9.566)	0.3781 (9.604)	0.3800 (9.652)	0.0100 (0.254)		X	1
	STOP ASSY	OD	0.3711 (9.426)	0.3761 (9.553)	0.3700 (9.398)		X		
15	BELLCRANK	ID	0.2500 (6.350)	0.2520 (6.401)	0.2535 (6.439)	0.0060 (0.152)		X	1
	STOP ASSY	OD	0.2485 (6.312)	0.2495 (6.337)	0.2475 (6.287)		X		
16	ROD ASSY	ID	0.2497 (6.342)	0.2500 (6.350)	0.2510 (6.375)	0.0040 (0.102)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2470 (6.274)		X		
17	BEARING	ID	0.3120 (7.925)	0.3125 (7.938)	0.3145 (7.988)	0.0045 (0.114)	X		
	SHAFT	OD	0.3117 (7.917)	0.3122 (7.930)	0.3100 (7.874)		X		
18	HOUSING	ID	0.8113 (20.607)	0.8118 (20.620)	0.8120 (20.625)	0.0000 (0.000)		X	1
	BEARING	OD	0.8120 (20.625)	0.8125 (20.638)	0.8120 (20.625)		X		
19	HOUSING	ID	0.8124 (20.635)	0.8129 (20.648)	0.8150 (20.701)	0.0040 (0.102)		X	1
	BEARING	OD	0.8120 (20.625)	0.8125 (20.638)	0.8110 (20.599)		X		
20	BUSHING	ID	0.2500 (6.350)	0.2515 (6.388)	0.2525 (6.414)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2475 (6.287)		X		

Rudder Pedal Wear Limits  
Figure 601 (Sheet 5)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
21	BELLCRANK	ID	0.3766 (9.566)	0.3781 (9.604)	0.3790 (9.627)	0.0040 (0.102)		X	1
	BUSHING	OD	0.3756 (9.540)	0.3761 (9.553)	0.3750 (9.525)		X		
22	BELLCRANK	ID	0.2500 (6.350)	0.2520 (6.401)	0.2535 (6.439)	0.0060 (0.152)		X	1
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2475 (6.287)		X		
23	BEARING	ID	0.2497 (6.342)	0.2500 (6.350)	0.2510 (6.375)	0.0040 (0.102)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2470 (6.274)		X		
24	PEDAL	ID	0.2500 (6.350)	0.2520 (6.401)	0.2535 (6.439)	0.0060 (0.152)		X	1
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2475 (6.287)		X		
25	PEDAL	ID	0.3766 (9.566)	0.3781 (9.604)	0.3806 (9.667)	0.0060 (0.152)		X	1
	BUSHING	OD	0.3756 (9.540)	0.3761 (9.553)	0.3746 (9.515)		X		

1 THIS PART CAN BE REPAIRED.  
2 INTERFERENCE FIT

Rudder Pedal Wear Limits  
Figure 601 (Sheet 6)

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RUDDER PEDAL ADJUSTMENT CRANK - REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and installation tasks for the rudder pedal adjustment cranks. These tasks are applicable to the two cranks.

TASK 27-21-06-024-001

2. Rudder Pedal Adjustment Crank - Removal

A. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):  
(a) R1 - P/N A20004-25  
(b) R2 - P/N A20004-25  
(c) R3 - P/N A20004-14

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels  
(2) AMM 20-10-24/201, Rig Pins  
(3) AMM 24-22-00/201, Electrical Power - Control

C. Access

- (1) Location Zones  
211/212 Control Cabin  
113 Area Forward of the NLG Wheel Well
- (2) Access Panel  
113AL Flight Control Components

D. Prepare for the Removal

S 864-002

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

S 864-003

- (2) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 864-004

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11H17, FLT CONT SHUTOFF TAIL LEFT  
(b) 11H18, FLT CONT SHUTOFF TAIL CTR  
(c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

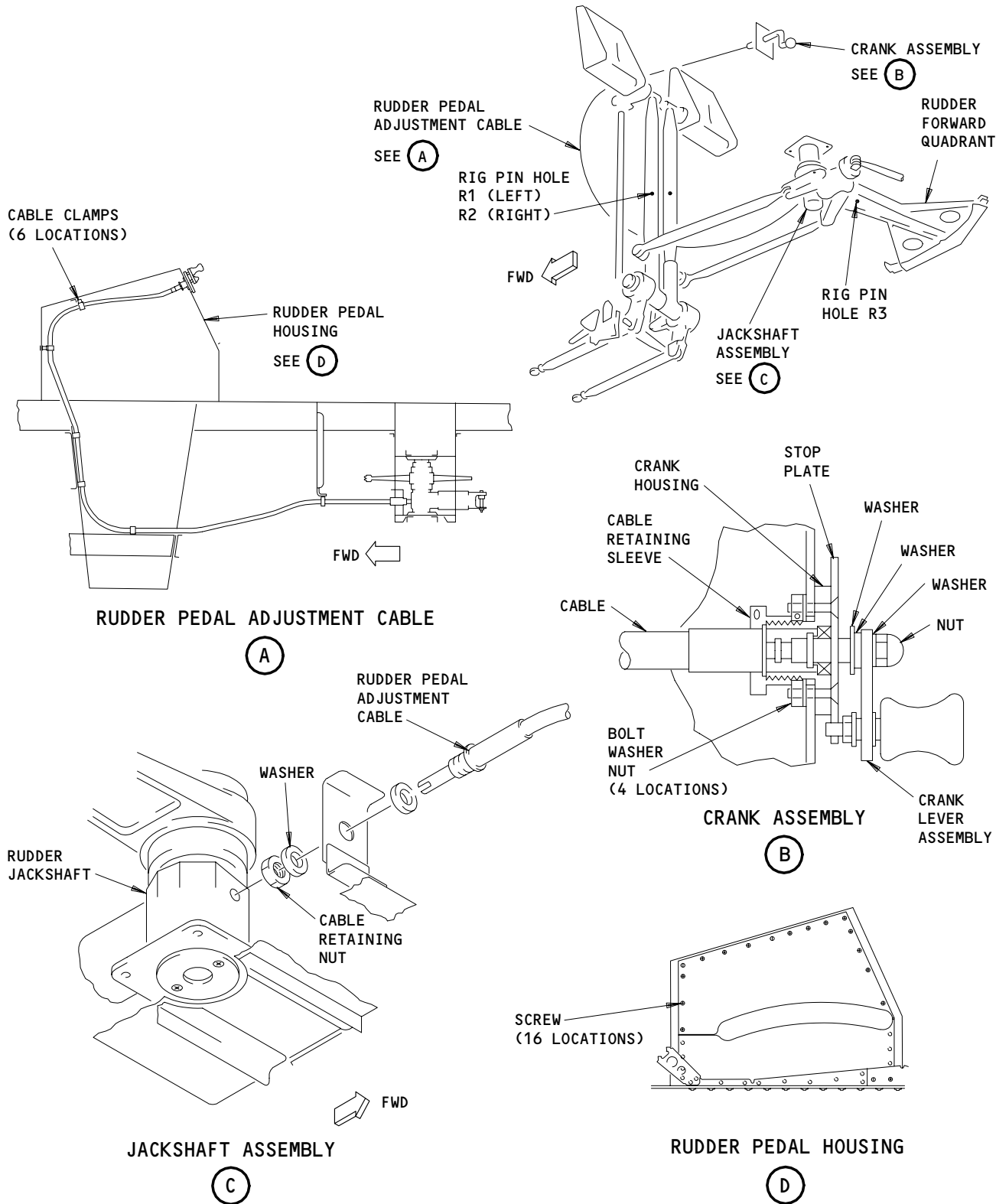
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Rudder Pedal Adjustment Crank Installation  
Figure 401

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S 864-024

**WARNING:** MAKE SURE TO OPEN THE CIRCUIT BREAKERS FOR THE CAPTAIN'S AND THE FIRST OFFICER'S SEATS BEFORE YOU DO WORK AROUND THEM. A FAILURE TO OPEN THE CIRCUIT BREAKERS CAN CAUSE THE SEATS TO MOVE ACCIDENTALLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
  - (a) 6H15 or 6J15, CAPT SEAT
  - (b) 6J21, F/O SEAT

S 014-005

- (5) Open access door, 113AL, to get access to the captain's forward quadrant (AMM 06-41-00/201).

E. Remove the Rudder Pedal Adjustment Crank (Fig. 401)

S 494-006

- (1) Install these rig pins:
  - (a) R3 (for the captain's forward quadrant)
  - (b) R1 or R2 (for the rudder pedals of the crank you will remove).

S 034-007

- (2) Do these steps to disconnect the bottom of the cable:
  - (a) Loosen the cable retaining nut at the forward quadrant.
  - (b) Remove the cable clamps (6 locations)
  - (c) Hold the cable retaining nut and washer, then pull the cable from the jackshaft and through the grommet hole.

S 034-008

- (3) Do these steps to disconnect the top of the cable:

**NOTE:** Get access to the cable housing and the crank lever assembly through the side panel for the rudder pedal housing.

- (a) Remove the nut and washer from the crank lever assembly.
- (b) Remove the crank lever assembly and the washer.
- (c) Remove the cable retaining sleeve at the crank housing and move it to the middle of the cable.
- (d) Pull the cable from the housing and remove it.

S 034-009

- (4) Remove the bolts, washers, and nuts that connect the stop plate to the housing (4 locations).

S 034-010

- (5) Remove the stop plate and the crank housing.

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TASK 27-21-06-424-011

3. Rudder Pedal Adjustment Crank - Installation

A. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control

C. Access

(1) Location Zones

- 211/212 Control Cabin
- 113 Area Forward of the NLG Wheel Well

(2) Access Panel

- 113AL Flight Control Components

D. Install the Rudder Pedal Adjustment Crank (Fig. 401)

S 434-012

- (1) Do these steps to connect the cable to the rudder pedal jackshaft:
  - (a) Put the grommet on the cable.
  - (b) Push the cable through the jackshaft support, and do this step:
    - 1) Put the cable retaining nut and washer on the cable.
  - (c) Put the end of the cable in the jackshaft and do this step:
    - 1) Turn the cable until the cable engages the pin in the jackshaft.
  - (d) Apply some of the corrosion preventive compound to the cable threads.
  - (e) Tighten the cable retaining nut.

S 434-013

- (2) Install the cable clamps and do this check:
  - (a) Make sure the cable radius is more than 5.0 inch (127 mm) for all the curves in the cable.

NOTE: If the radius is less than 5.0 inch (127 mm), the cable will not operate correctly.

S 434-014

- (3) Install the bolts, washers, and nuts that connect the stop plate and crank housing to the rudder pedal housing (4 locations).

S 434-015

- (4) Do these steps to connect the cable to the crank lever assembly:
  - (a) Push the cable through the housing.
  - (b) Tighten the cable retaining sleeve.
  - (c) Put the washer on the cable end that shows.

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- (d) Install the crank lever assembly, washer, and nut on the cable end.
- (e) Install the lockwire.

S 094-016

- (5) Remove these rig pins:
  - (a) R3 (for the captain's forward quadrant)
  - (b) R1 or R2 (for the rudder pedals)

S 214-017

- (6) Turn the adjustment crank between its full travel positions and do this check:
  - (a) Make sure the cable turns smoothly and easily.

E. Put the Airplane Back to Its Usual Condition

S 414-018

- (1) Install the side panels on the rudder pedal housing.

S 864-019

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11H17, FLT CONTROL SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONTROL SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONTROL SHUTOFF TAIL RIGHT

S 864-025

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
  - (a) 6H15 or 6J15, CAPT SEAT
  - (b) 6J21, F/O SEAT

S 864-020

- (4) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to ON.

S 414-021

- (5) Close access door, 113AL (AMM 06-41-00/201).

S 864-022

- (6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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RUDDER FORWARD QUADRANT AND JACKSHAFT ASSEMBLY – REMOVAL/INSTALLATION

1. General

A. This procedure contains the removal and installation tasks for the rudder forward quadrant and jackshaft assembly. These tasks are applicable to the captain's or the first officer's assembly.

TASK 27-21-07-024-003

2. Rudder Forward Quadrant and Jackshaft – Removal (Fig. 401)

A. Equipment

(1) Rig Pins from Set A20004-XX (Ref 20-10-24):

- (a) R1 – P/N A20004-25
- (b) R2 – P/N A20004-25
- (c) R4 – P/N A20004-20

(2) Lockpin, Nose Gear Towing Lever – A09003-1

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-42-00/201, Empennage Access Doors and Panels
- (3) AMM 20-10-24/201, Rig Pins
- (4) AMM 24-22-00/201, Electrical Power – Control
- (5) AMM 31-31-10/401, Rudder Pedal Position Transducer

C. Access

(1) Location Zones

211/212	Control Cabin
113	Area Forward of the NLG Wheel Well
324	Vertical Stabilizer – Rear Spar to Trailing Edge

(2) Access Panels

113AL	Flight Control Components
312AR	Stabilizer Jackscrew Compartment
324BL	Feel, Centering, and Trim Mechanism

D. Prepare for the Removal

S 864-004

(1) Supply electrical power (Ref 24-22-00).

S 864-005

(2) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 864-006

(3) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:

- (a) 11G10, RUDDER RATIO
- (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
- (c) 11H18, FLT CONT SHUTOFF TAIL CTR
- (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

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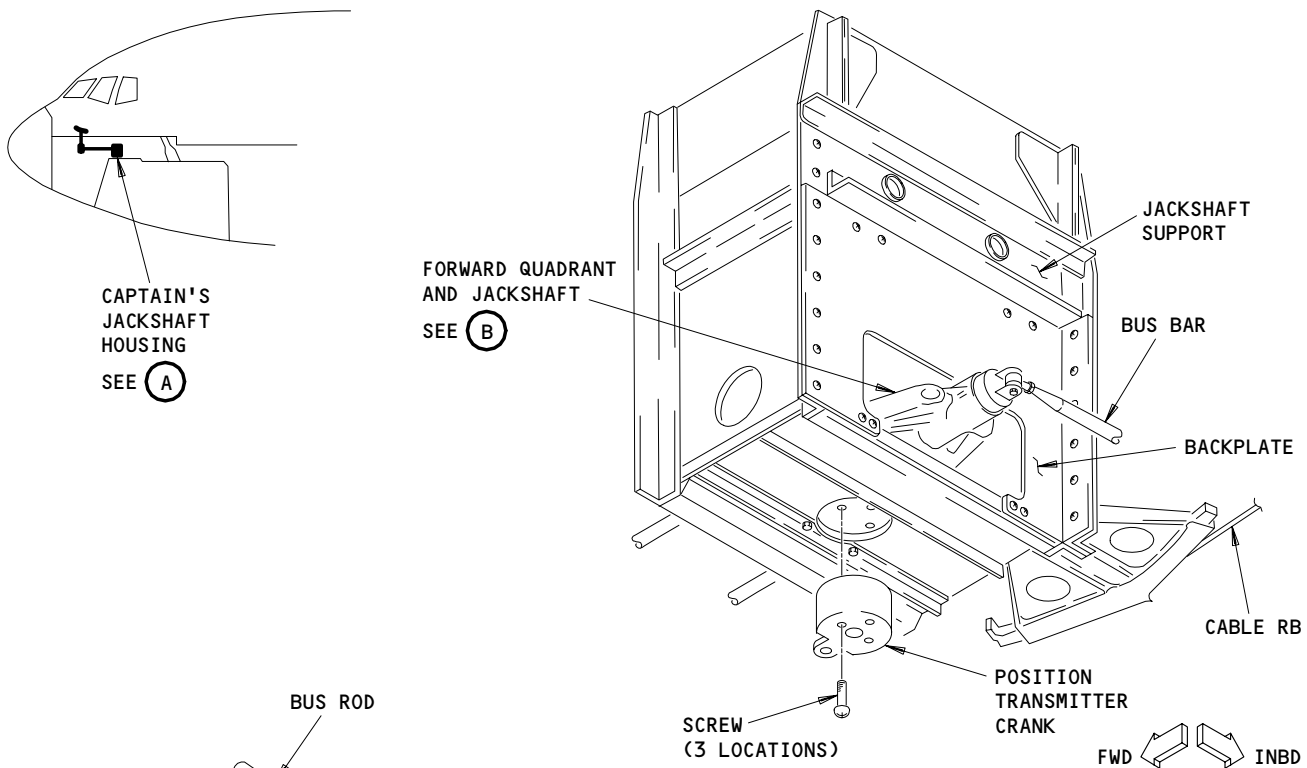
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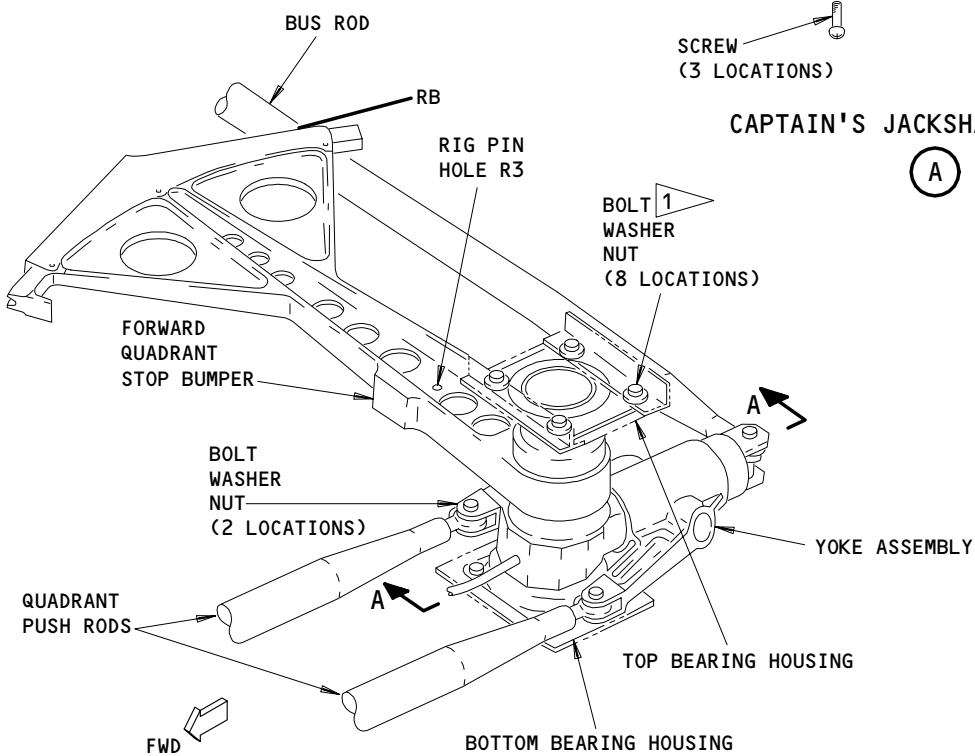
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CAPTAIN'S JACKSHAFT HOUSING

(A)



FORWARD QUADRANT AND JACKSHAFT

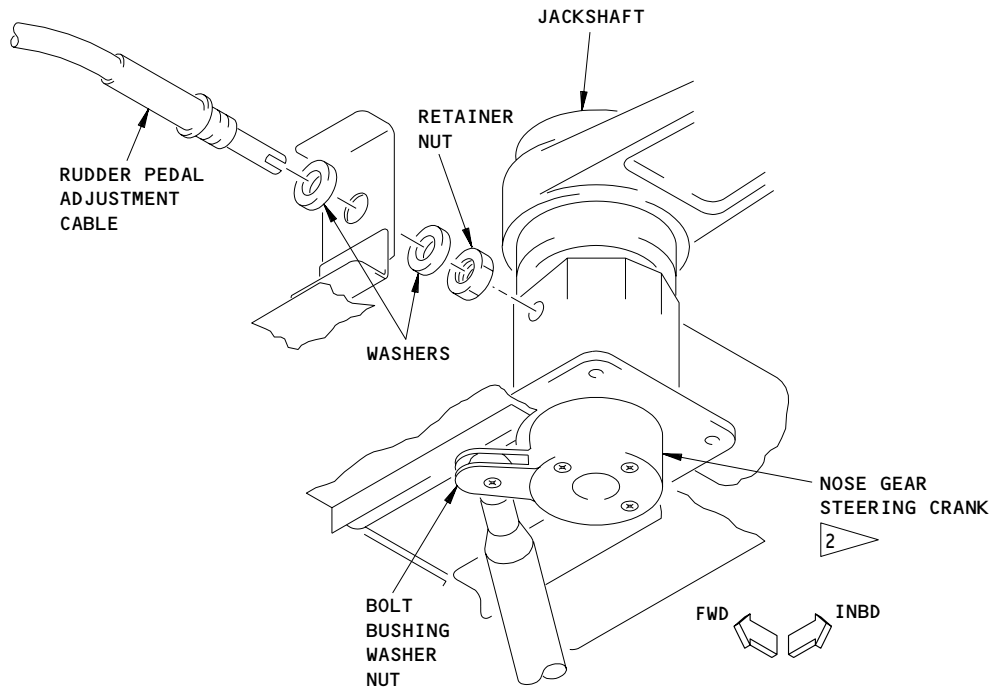
(B)

1 MAKE SURE THE HEAD POINTS UP WHEN YOU INSTALL THE BOLTS.

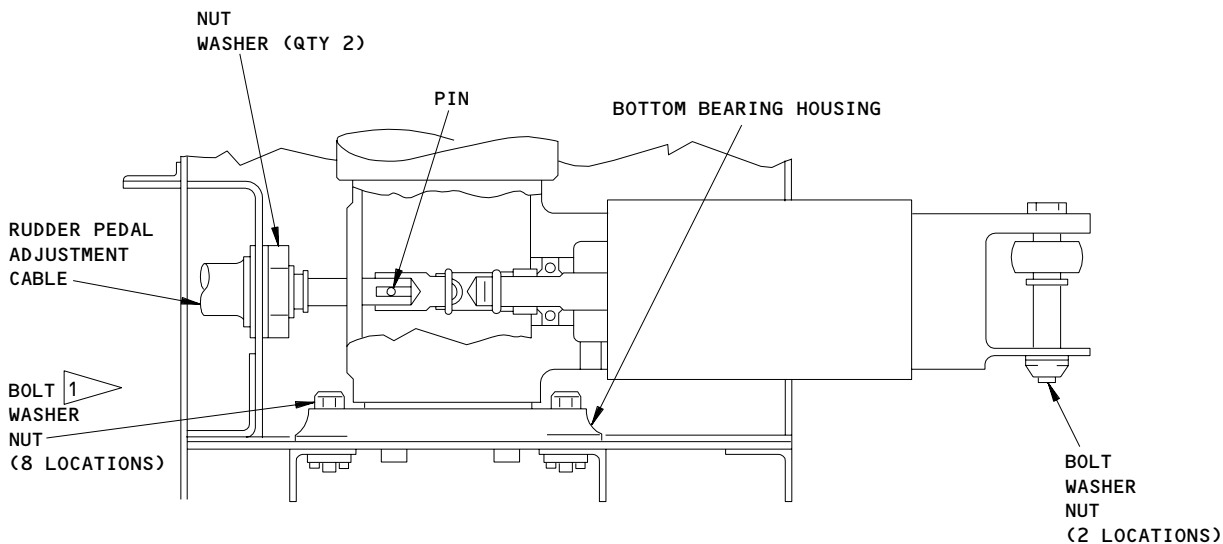
Rudder Jackshaft Installation  
Figure 401 (Sheet 1)

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FIRST OFFICER'S JACKSHAFT



**NOTE:** MAKE SURE YOU ENGAGE THE PIN IN THE JACKSHAFT.

A-A

2 IF CRANK HAS 2 HOLES, CONNECT THE CONTROL ROD TO THE OUTSIDE HOLE.

Rudder Jackshaft Installation  
Figure 401 (Sheet 2)

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S 014-007

- (4) Open access door 113AL to get access to the forward quadrant and jackshaft (Ref 06-41-00).

S 014-008

- (5) Open access panel 324BL to get access to the feel, centering, and trim mechanism (Ref 06-42-00).

S 014-009

- (6) Open access door 312AR to get access to cables RA and RB (Ref 06-42-00).

S 494-010

- (7) Install these rig pins:  
(a) R1 (for the captain's rudder pedals)  
(b) R2 (for the first officer's rudder pedals)  
(c) R4 (for the feel, centering, and trim mechanism)

S 494-011

- (8) Move the towing lever to the tow position and install the towing lever lockpin in the nose gear.

E. Rudder Forward Quadrant and Jackshaft - Removal

S 034-012

**CAUTION:** KEEP SOME TENSION IN THE CONTROL CABLES AT ALL TIMES. IF THE TENSION IS REMOVED, THE CABLES CAN BECOME INCORRECTLY ALIGNED AND WILL OPERATE INCORRECTLY. YOU MUST DO A FULL INSPECTION OF THE CONTROL CABLE SYSTEM IF THE TENSION IS REMOVED.

- (1) Do these steps to disconnect cables RA and RB from the forward quadrant:  
(a) Release the tension equally from cables RA and RB at their turnbuckles.  
(b) Use a cable clamp to hold the cables in position.  
(c) Use a tag to identify the cables.  
(d) Disconnect cables RA and RB from the forward quadrant.

S 034-013

- (2) Disconnect the bus rod from the jackshaft you will remove.

S 034-016

- (3) Remove the crank and the pushrod for the rudder pedal position transmitter from the captain's jackshaft (Ref 31-31-10).

S 034-018

- (4) Remove the backplate from the jackshaft support.

S 034-019

- (5) Disconnect the quadrant pushrods from the jackshaft you will remove.

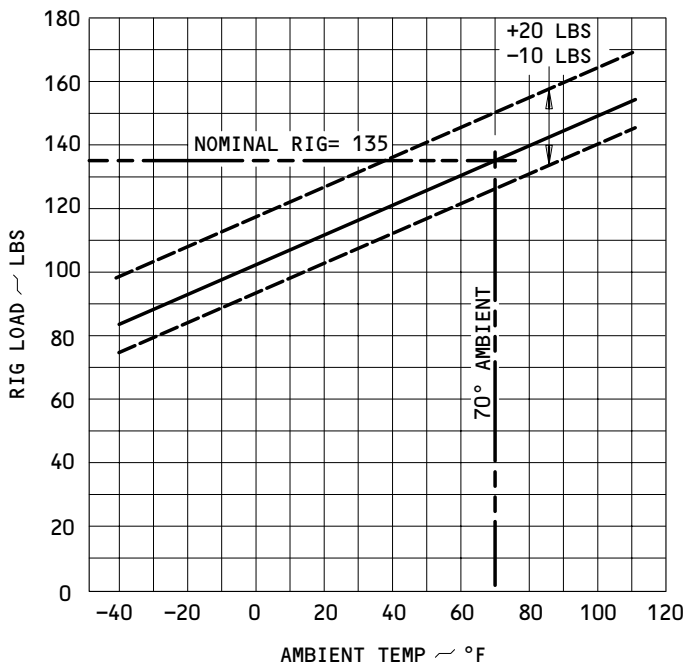
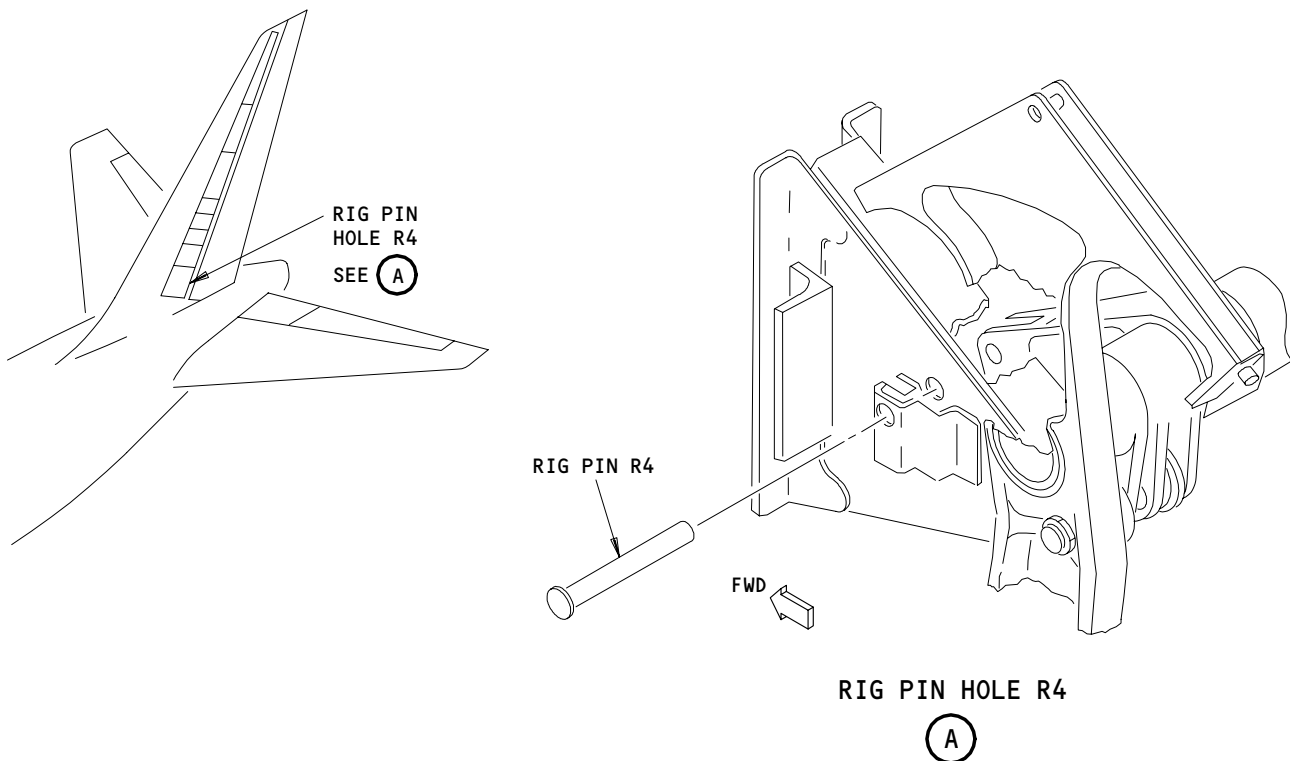
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CABLE RIG LOAD VS TEMPERATURE  
DIAGRAM 1

Rig Pin Locations and Cable Rig Load  
Figure 402

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- S 034-020
- (6) On the First Officer's jackshaft, remove the nose gear steering crank and its pushrod.
- S 034-021
- (7) Loosen the retaining nut for the rudder pedal adjustment cable at the jackshaft.
- S 034-022
- (8) Hold the nut and washer and remove the cable from the jackshaft.
- S 034-023
- (9) Remove these components:
- (a) The bolts (4 locations) that connect the top bearing housing to the airplane
  - (b) The bolts (4 locations) that connect the bottom bearing housing to the airplane.
- S 024-024
- (10) Move the quadrant in the aft direction and remove it from the airplane.

TASK 27-21-07-424-025

3. Rudder Forward Quadrant and Jackshaft - Installation (Fig. 401)

A. Equipment

- (1) Rig Pins from Set A20004-XX (Ref 20-10-24):
  - (a) R3 - P/N A20004-14
- (2) Cable Tensiometer, Commercially Available

B. Consumable Materials

- (1) C00308, Corrosion Preventive Compound -  
MIL-C-11796, Class 3

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-42-00/201, Empennage Access Doors and Panels
- (3) AMM 20-10-24/201, Rig Pins
- (4) AMM 24-22-00/201, Electrical Power - Control
- (5) AMM 27-21-00/501, Rudder and Rudder Trim Control System
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

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- (7) AMM 31-31-10/401, Rudder Pedal Position Transducer
- D. Access
- (1) Location Zones
- |         |  |
|---------|--|
| 211/212 | Control Cabin                                    |
| 113     | Area Forward of the NLG Wheel Well               |
| 324     | Vertical Stabilizer - Rear Spar to Trailing Edge |
- (2) Access Panels
- |       |                                     |
|-------|-------------------------------------|
| 113AL | Flight Control Components           |
| 312AR | Stabilizer Jackscrew Compartment    |
| 324BL | Feel, Centering, and Trim Mechanism |
- E. Forward Quadrant and Jackshaft - Installation
- S 624-026
- (1) Apply the corrosion preventive compound to all the nuts before the installation.
- S 224-027
- (2) Examine the quadrant assembly for too much wear.
- S 434-028
- (3) Put the top and bottom bearing housings and their bearings on the jackshaft.
- S 424-029
- (4) Put the quadrant assembly in its correct position in the airplane and do these steps:
- (a) Install the bolts, washers, and nuts (4 locations) that connect the bottom bearing housing to the airplane.
- (b) Install the bolts, washers, and nuts (4 locations) that connect the top bearing housing to the airplane.
- S 494-030
- (5) Install rig pin R3 in the captain's forward quadrant.
- S 434-031
- (6) Connect the bus rod to the jackshafts.
- S 434-032
- (7) Do these steps to install the rudder pedal adjustment cable:
- (a) Put the cable through the airplane structure and install the washer and the retaining nut on the cable.
- (b) Put the cable in the jackshaft.
- (c) Tighten and lock the retaining nut with a wire.

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- S 434-033
- (8) On the First Officer's Jackshaft, install the nose gear steering crank.
- S 434-034
- (9) Install the crank and the pushrod for the rudder pedal position transmitter on the captain's jackshaft (AMM 31-31-10/401).
- S 434-041
- (10) Connect the nose gear steering pushrod to the first officer's jackshaft.
- S 824-038
- (11) If it is necessary, do these steps to adjust the quadrant pushrods:
- (a) Make sure you installed rig pins R1, R2, and R3.
  - (b) Loosen the locknut at the rod end.
  - (c) Adjust the pushrod length until you can connect the rod end to the quadrant.
  - (d) Make sure you can see control rod threads in at least one-half of the pushrod inspection holes.
  - (e) Tighten the locknuts.
- S 434-039
- (12) Connect the pushrods to the jackshaft.
- S 434-040
- (13) Install the backplate on the jackshaft support.
- S 434-042
- (14) Do these steps to connect the rudder cables to the forward quadrants:

**NOTE:** Refer to the adjustment in 27-21-00 if you installed new cables.

- (a) Connect the cables to the forward quadrants.
- (b) Adjust the turnbuckles equally until the cable tension is correct (Fig. 402).
- (c) Make sure you can easily install and remove rig pins R1, R2, R3, and R4.
- (d) Remove rig pins R1, R2, R3, and R4.
- (e) Operate the rudder pedals through one full travel cycle and do these steps:
  - 1) Make sure the cable tension is correct.
  - 2) Install cliplocks on the turnbuckles and apply a thin layer of corrosion preventive compound to the threads that show.

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F. Rudder Operation - Test

S 214-043

- (1) Operate the rudder pedals through their full travel range and do these checks:
  - (a) Make sure the pedals move freely and easily.
  - (b) Make sure the aft quadrant touches its stops at the two full travel positions.

S 864-001

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Supply pressure to the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-044

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 864-045

- (4) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to ON.

S 864-047

- (5) Push the STATUS button on the display select panel, P9, to show the rudder position indicator on the bottom EICAS display.

S 214-048

- (6) Operate the rudder pedals through their full travel range and do these checks:
  - (a) Make sure the rudder operates correctly.
  - (b) Make sure the rudder position indicator operates correctly and moves through its full travel range.

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S 214-049

- (7) Release the rudder pedals and do this check:  
(a) Make sure the rudder goes back to its neutral position.
- G. Put the Airplane Back to Its Usual Condition

S 094-002

**WARNING:** STAY AWAY FROM THE NOSE WHEELS WHEN THE LOCKPIN IS REMOVED.  
THE WHEELS CAN TURN TO THE CENTER POSITION QUICKLY, AND CAN  
CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the nose wheels are in their center positions and remove the towing lever lockpin from the nose gear.

S 864-050

- (2) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-051

- (3) Remove electrical power if it is not necessary (Ref 24-22-00).

S 414-052

- (4) Close access door 113AL (Ref 06-41-00).

S 414-053

- (5) Close access panels 312AR and 324BL (Ref 06-42-00).

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RUDDER JACKSHAFT - INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to Rudder Jackshaft - Removal/Installation for procedures to do these tasks.

TASK 27-21-07-206-001

2. Rudder Jackshaft - Wear Limits

A. Procedure

S 226-002

- (1) Use the supplied data (Fig. 601) to examine the rudder jackshaft for too much wear.

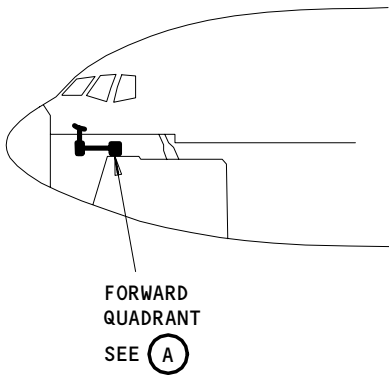
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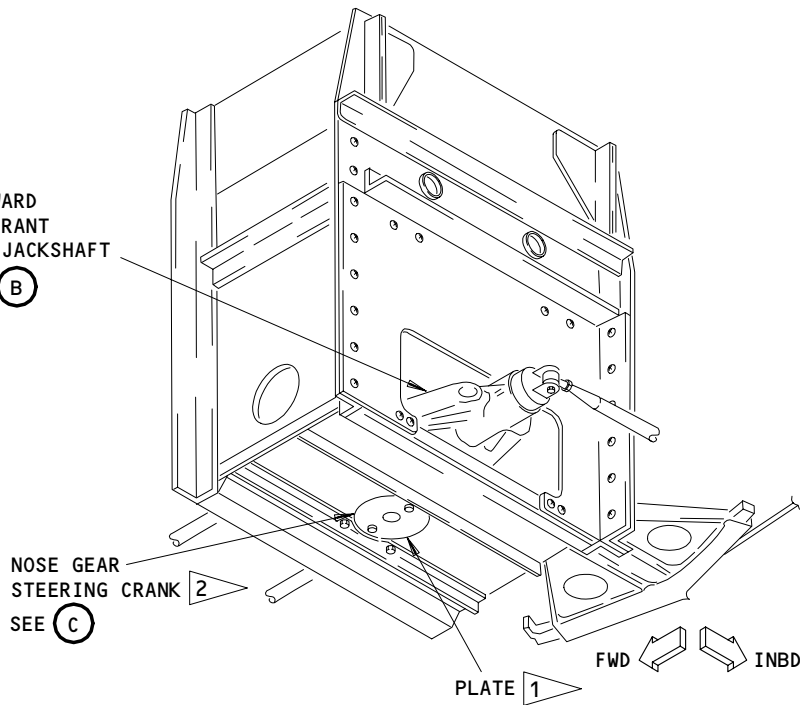
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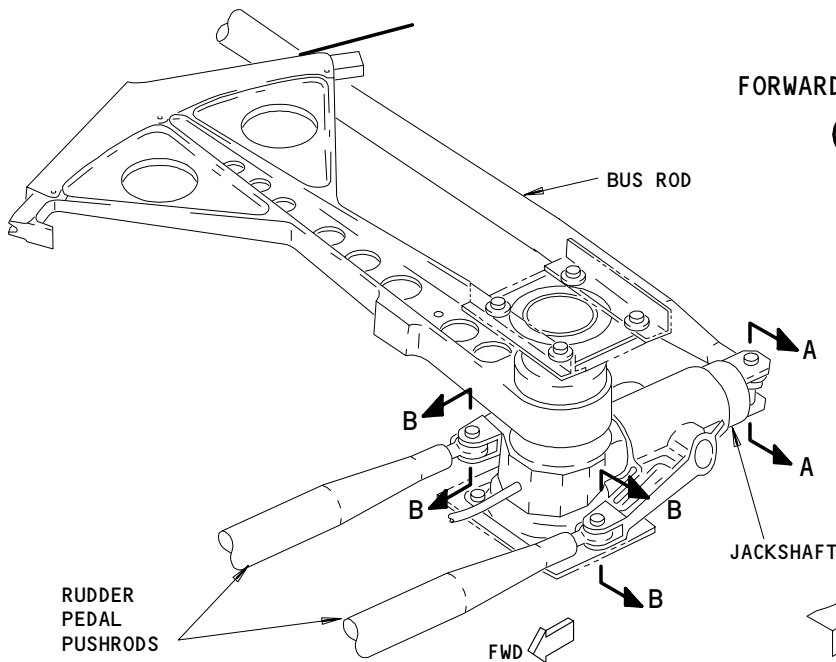


FORWARD QUADRANT AND JACKSHAFT  
SEE (B)



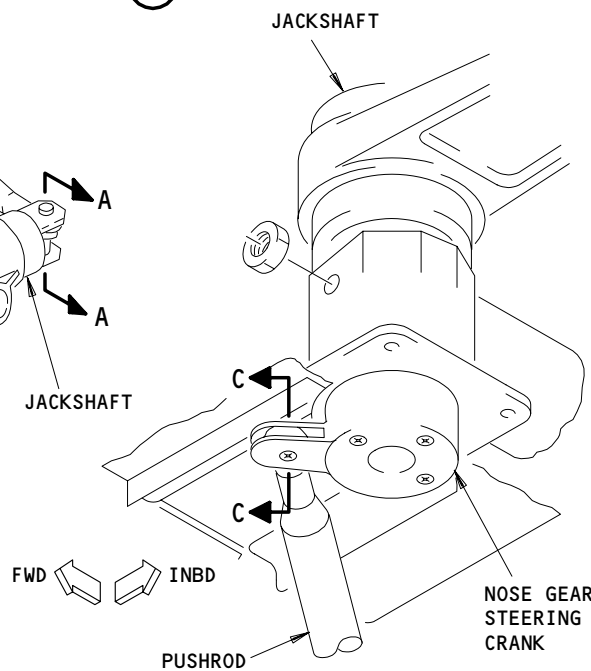
FORWARD QUADRANT

(A)



FORWARD QUADRANT AND JACKSHAFT

(B)



NOSE GEAR STEERING CRANK

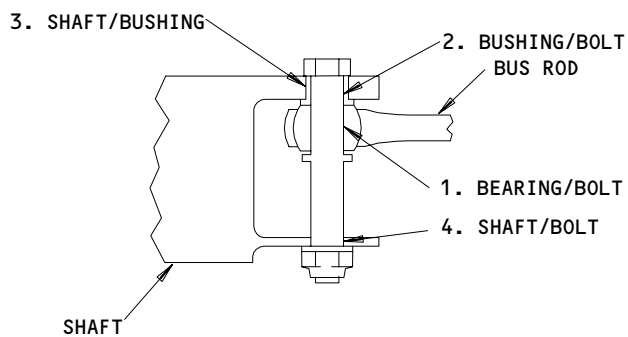
(C)

- 1 CAPTAIN'S JACKSHAFT
- 2 FIRST OFFICER'S JACKSHAFT

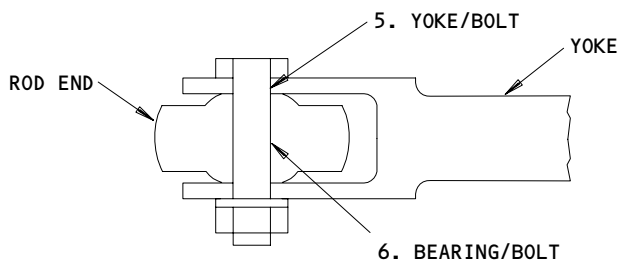
Rudder Jackshaft Wear Limits  
Figure 601 (Sheet 1)

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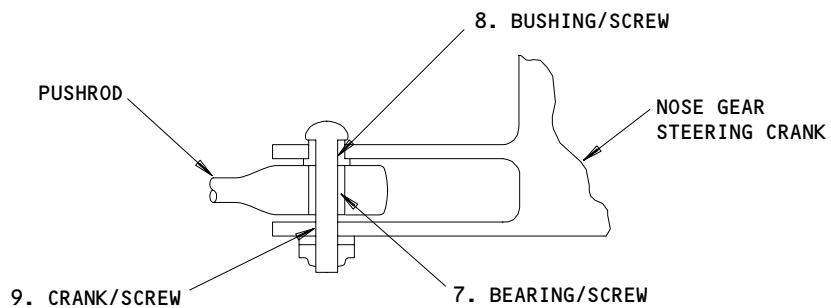
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A-A

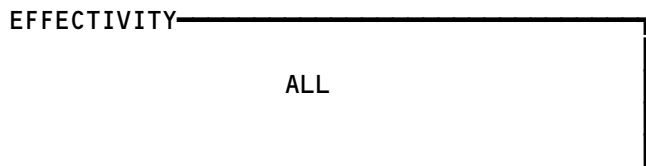


B-B



C-C

Rudder Jackshaft Wear Limits  
Figure 601 (Sheet 2)



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# BOEING

## 767 MAINTENANCE MANUAL

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BEARING	ID	0.2497 (6.342)	0.2500 (6.350)	0.2520 (6.401)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2470 (6.274)		X		
2	BUSHING	ID	0.2495 (6.337)	0.2505 (6.363)	0.2520 (6.401)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2470 (6.274)		X		
3	SHAFT	ID	0.3770 (9.576)	0.3810 (9.677)	0.3830 (9.728)	0.0081 (0.206)		X	
	BUSHING	OD	0.3759 (9.548)	0.3765 (9.563)	0.3749 (9.522)		X		
4	SHAFT	ID	0.2495 (6.337)	0.2505 (6.363)	0.2535 (6.439)	0.0070 (0.178)		X	
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2465 (6.261)		X		
5	YOKE	ID	0.3125 (7.938)	0.3135 (7.963)	0.3165 (8.039)	0.0065 (0.165)		X	
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3100 (7.874)		X		
6	BEARING	ID	0.3122 (7.930)	0.3125 (7.938)	0.3145 (7.988)	0.0055 (0.140)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3090 (7.849)		X		
7	BEARING	ID	0.1897 (4.818)	0.1900 (4.826)	0.1925 (4.890)	0.0030 (0.076)	X		
	SCREW	OD	0.1870 (4.750)	0.1895 (4.813)	0.1870 (4.750)		X		
8	BUSHING	ID	0.1900 (4.826)	0.1915 (4.864)	0.1940 (4.928)	0.0045 (0.114)	X		
	SCREW	OD	0.1870 (4.750)	0.1895 (4.813)	0.1870 (4.750)		X		
9	CRANK	ID	0.1900 (4.826)	0.1915 (4.864)	0.1940 (4.928)	0.0045 (0.114)	X		
	SCREW	OD	0.1870 (4.750)	0.1895 (4.813)	0.1870 (4.750)		X		

THIS PART CAN BE REPAIRED.

Rudder Jackshaft Wear Limits  
Figure 601 (Sheet 3)

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RUDDER FEEL, CENTERING, AND TRIM MECHANISM – MAINTENANCE PRACTICES

1. General

- A. This procedure contains four tasks. The first task removes the rudder feel, centering and trim mechanism and its components. The second task installs the rudder feel, centering and trim mechanism and its components. The third task adjusts the feel and centering springs. The fourth task does the test for the feel, centering and trim mechanism.

TASK 27-21-10-022-001

2. Rudder Feel, Centering, and Trim Mechanism and its Components – Removal

A. General

- (1) This task contains these two procedures:

- Rudder Feel, Centering, and Trim Mechanism – Removal
- Spring Arm and Cam Roller Arm Assembly – Removal.

Because this task contains two procedures, do only the applicable groups of steps.

To start one of these procedures, do the "Prepare for the Removal" group of steps. Then, do the group of steps that is necessary to remove the component.

B. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24):  
(a) R3 – P/N A20004-14  
(b) R4 – P/N A20004-20  
(c) R5 – P/N A20004-13  
(2) Lockpin, Nose Gear Towing Lever – A09003-1

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels  
(2) AMM 06-42-00/201, Empennage Access Doors and Panels  
(3) AMM 20-10-24/201, Rig Pins  
(4) AMM 22-00-02/201, Maintenance Monitor  
(5) AMM 24-22-00/201, Electrical Power – Control  
(6) AMM 27-21-11/201, Rudder Trim Actuator

D. Access

- (1) Location Zones  
211/212 Control Cabin  
324 Vertical Stabilizer – Rear Spar to Trailing Edge

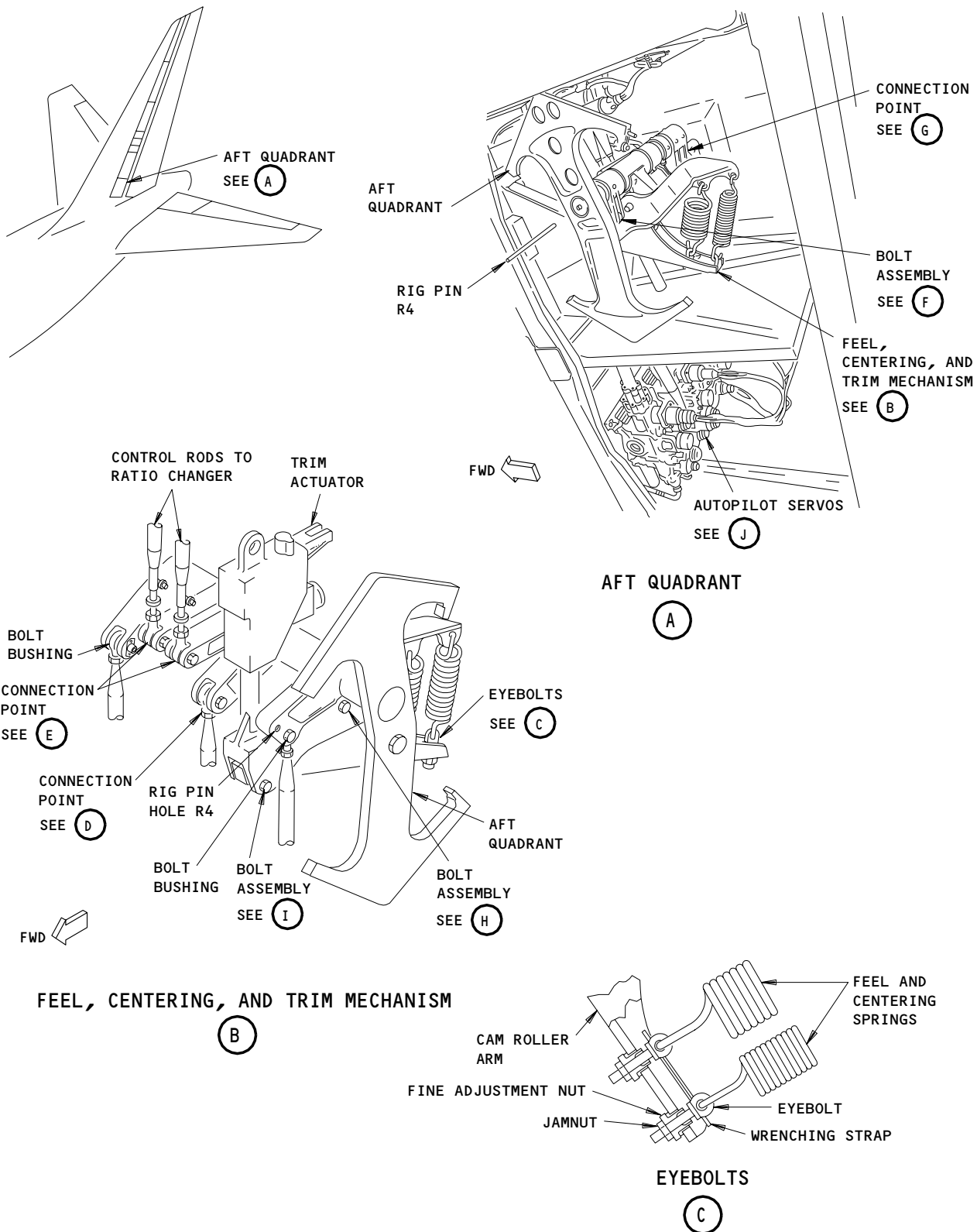
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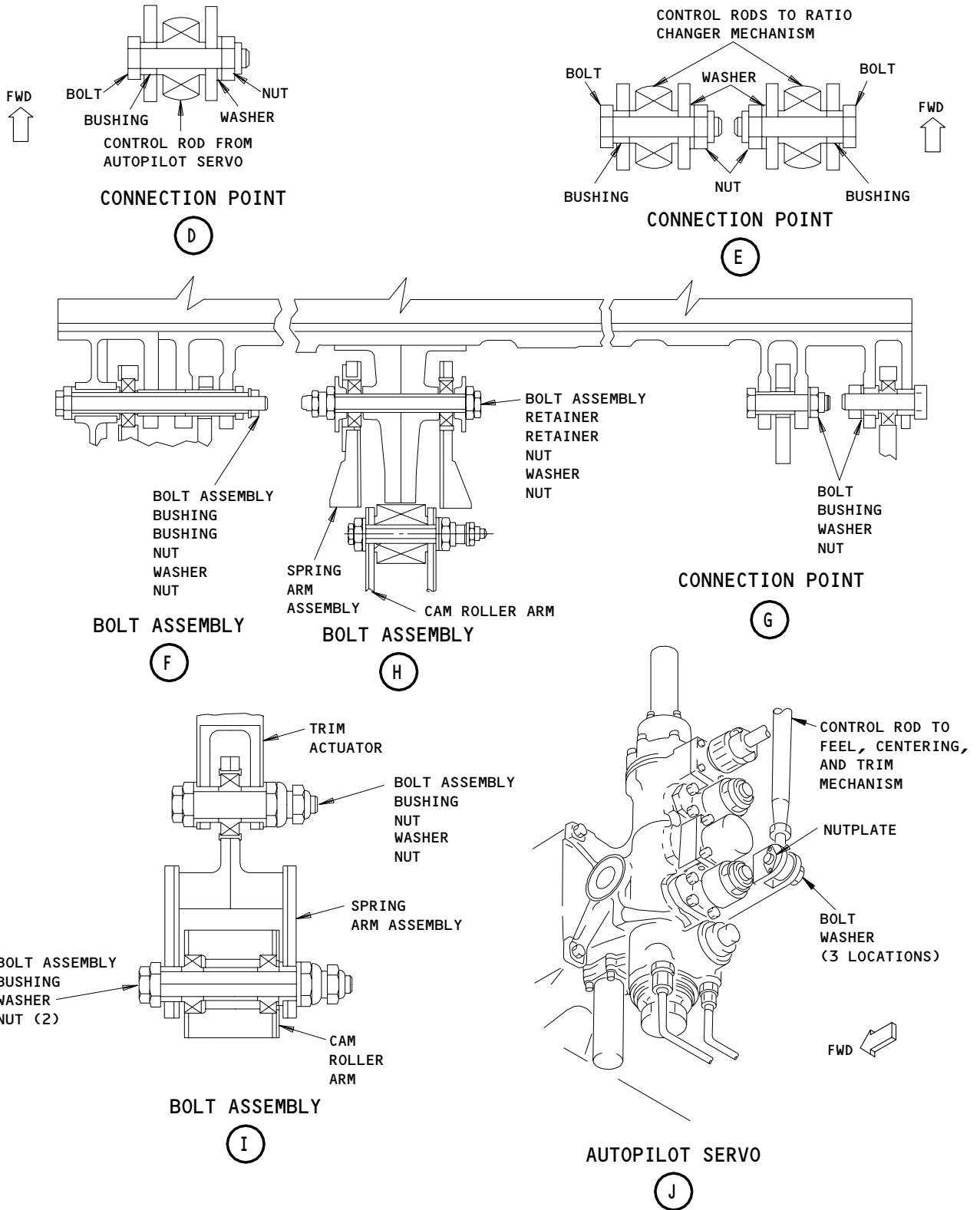
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Rudder Feel, Centering, and Trim Mechanism Maintenance  
Figure 201 (Sheet 1)

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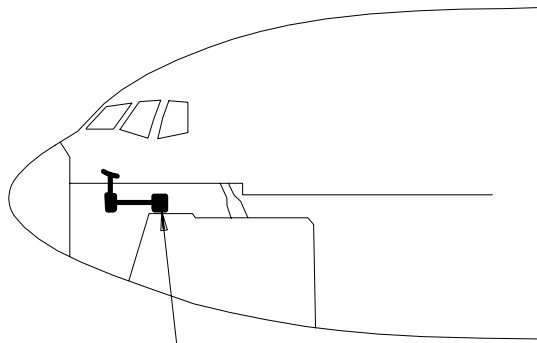


Rudder Feel, Centering, and Trim Mechanism Maintenance  
 Figure 201 (Sheet 2)

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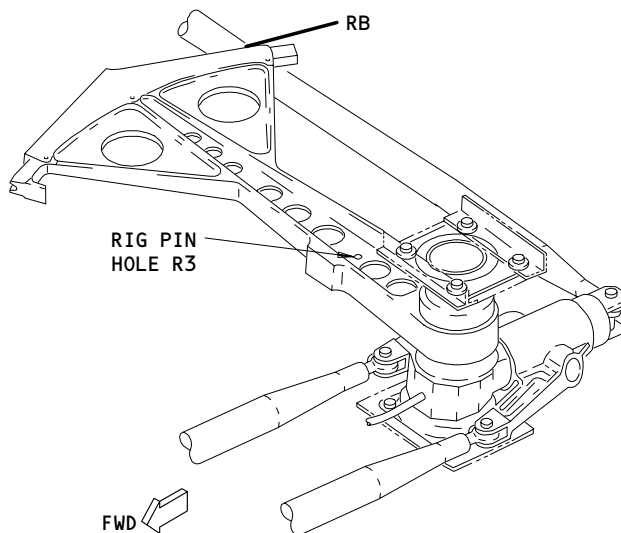
27-21-10





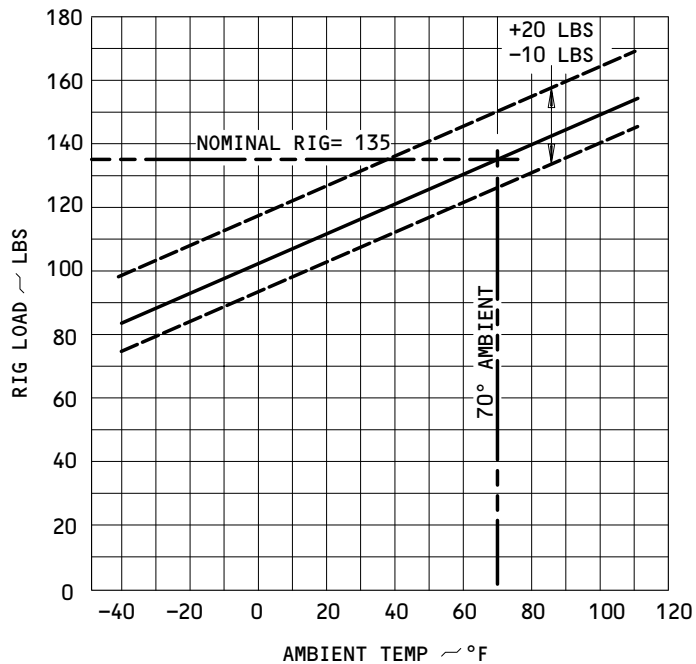
FORWARD QUADRANT AND JACKSHAFT

SEE (A)



FORWARD QUADRANT AND JACKSHAFT

(A)



CABLE RIG LOAD VS TEMPERATURE

Rig Pin R3 Location and Cable Rig Load  
Figure 202

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(2) Access Panels

- 113AL Flight Control Components
- 312AR Control Cables RA and RB
- 324BL Feel, Centering, and Trim Mechanism
- 324JL Trailing Edge of Vertical Stabilizer
- 324CR Fuel, Centering, and Trim Mechanism

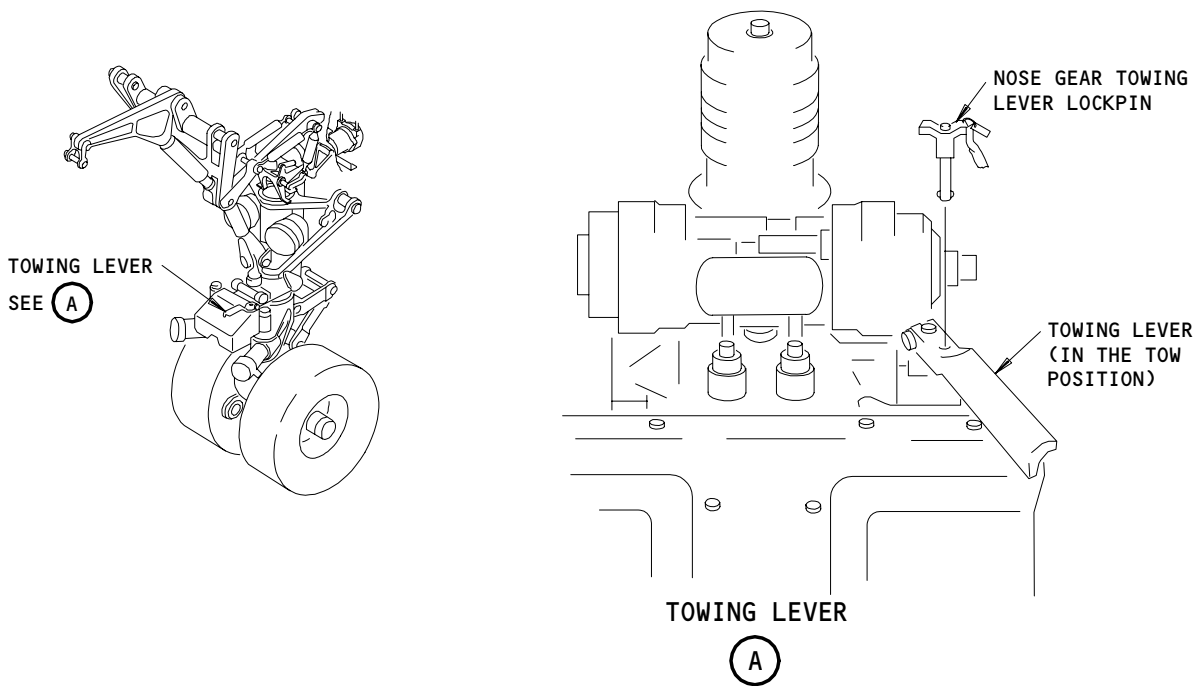
E. Prepare for the Removal

S 862-002

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

S 862-003

- (2) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.



Nose Gear Steering Isolation  
Figure 203

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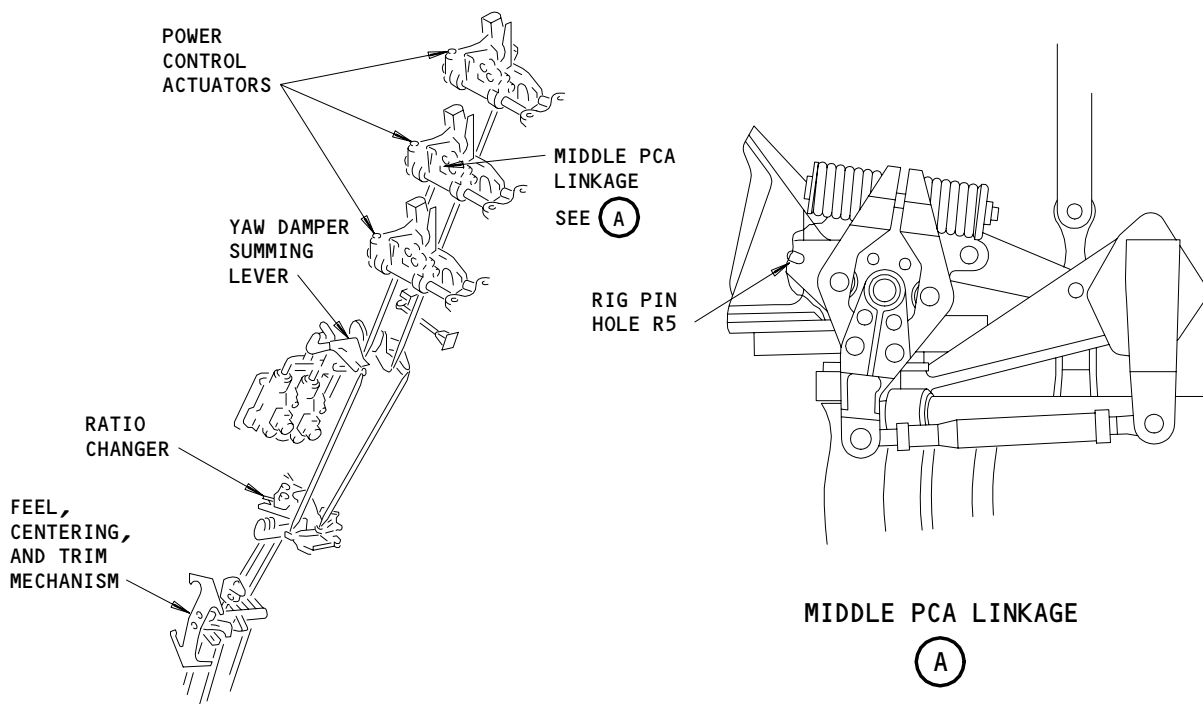
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- S 862-004
- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11E18, FLT CONT CMPTR SERVO L
  - (b) 11E21, FLT CONT CMPTR SERVO C
  - (c) 11E36, FLT CONT CMPTR
  - (d) 11G10, RUDDER RATIO
  - (e) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (f) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (g) 11H27, FLT CONT SHUTOFF TAIL RIGHT

- S 862-005
- (4) Move the towing lever on the metering valve module to the tow position and install the towing lever lockpin in the nose gear (Fig. 203).

- S 012-006
- (5) Open access door 113AL to get access to the forward quadrants (AMM 06-41-00).

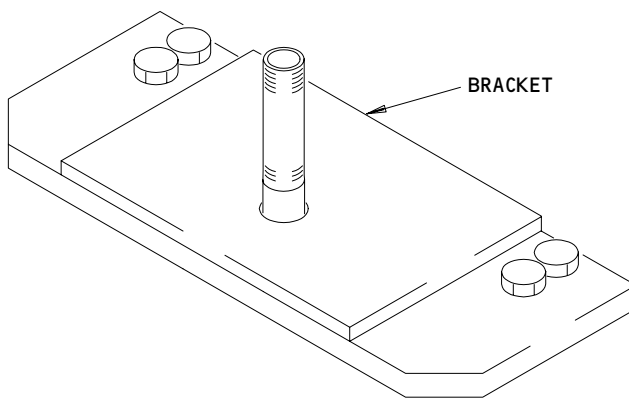
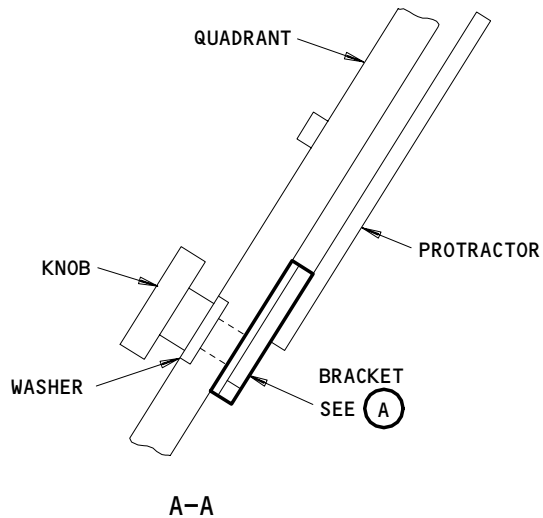
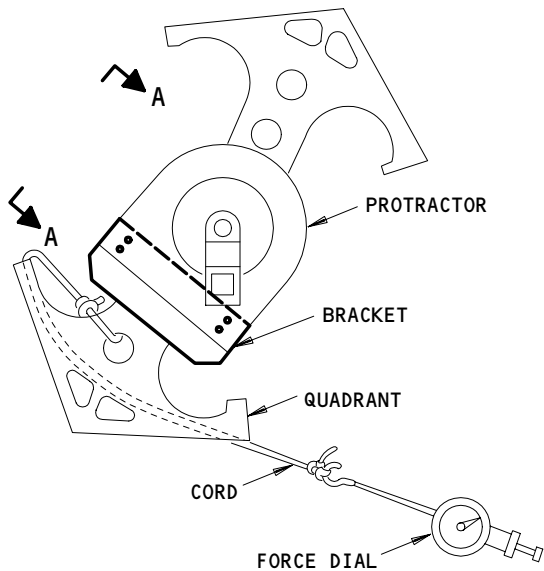
- S 012-007
- (6) Open access panels 324BL, 324CR and 324JL to get access to the feel, centering, and trim mechanism (AMM 06-42-00).



Rig Pin R5  
Figure 204

EFFECTIVITY	
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BRACKET  
(A)

Feel And Centering Force Measurement Equipment  
Figure 205

EFFECTIVITY	ALL
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S 492-008

- (7) Install these rig pins:
- (a) R3 in the captain's forward quadrant (Fig. 202)
  - (b) R4 in the feel, centering, and trim mechanism (Fig. 201)
  - (c) R5 in the linkage for the middle power control actuator (Fig. 204).

S 012-009

- (8) Open access door 312AR to get access to cables RA and RB (AMM 06-42-00).

S 032-010

**CAUTION:** KEEP SOME TENSION IN THE CONTROL CABLES AT ALL TIMES. IF THE TENSION IS REMOVED, THE CABLES CAN BECOME INCORRECTLY ALIGNED AND WILL OPERATE INCORRECTLY. YOU MUST DO A FULL INSPECTION OF THE CONTROL CABLE SYSTEM IF YOU REMOVE THE TENSION.

- (9) Do these steps to disconnect cables RA and RB from the aft quadrant:
- (a) Use a cable clamp to hold the cables in position.
  - (b) Use a tag to identify the cables.
  - (c) Release the tension equally from cables RA and RB at their turnbuckles.
  - (d) Disconnect cables RA and RB from the aft quadrant.

F. Rudder Feel, Centering, and Trim Mechanism - Removal (Fig. 201)

S 032-011

- (1) Do these steps to disconnect the control rods for the autopilot rollout guidance (ARG) servos:
- (a) Remove the bolt that connects the middle control rod, for the ARG servos, to the torque tube for the aft quadrant.
  - (b) Remove the bolts that connect the left and right control rods to the ARG servos.
  - (c) Remove the control rod bodies, for the left and right control rods, from their rod ends at the torque tube.

S 032-013

- (2) Remove the rudder trim actuator (AMM 27-21-11).

S 032-014

- (3) Do these steps to disconnect the feel, centering, and trim mechanism from its left support bracket (Detail F):
- (a) Remove the outer nut, washer, and the inner nut from the bolt assembly.

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(b) Remove the bolt assembly and its bushings.

S 032-015

(4) Remove the bolts, bushings, washers, and nuts from the right support brackets (Detail G).

S 032-012

(5) Disconnect the control rods to the rudder ratio changer mechanism (2 locations).

S 022-016

(6) Remove the feel, centering, and trim mechanism from the airplane.

S 032-017

(7) Remove the bolt assembly that connects the spring arm assembly to the cam plate on the torque tube.

S 032-018

(8) Remove the rod ends for the left and right control rods, for the ARG servos, from the torque tube.

G. Spring Arm and Cam Roller Arm Assembly - Removal (Fig. 201)

S 032-019

(1) Loosen the eyebolts until there is no tension in the springs.

S 032-020

(2) Remove these components:

(a) The two feel and centering springs

(b) The bolt assembly that connects the spring arm assembly to the trim actuator

(c) The bolt assembly that connects the spring arm assembly to the cam plate on the torque tube.

S 022-021

(3) Remove the spring arm and the cam roller arm assembly from the airplane.

S 032-022

(4) If it is necessary, remove the bolt assembly that connects the spring arm assembly to the cam roller arm.

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TASK 27-21-10-422-023

3. Rudder Feel, Centering, and Trim Mechanism and its Components - Installation

A. General

(1) This task contains these procedures:

- Feel, Centering, and Trim Mechanism - Installation
- Spring Arm and Cam Roller Arm Assembly - Installation

Because this task contains two procedures, do only the applicable groups of steps.

To start one of these procedures, do the group of steps necessary to install the component. Then, do the task for the "Feel and Centering Springs - Adjustment" and then the task for the "Feel, Centering, and Trim Mechanism - Test" groups of steps. And last, do the "Put the Airplane Back to Its Usual Condition" group of steps.

B. Equipment

(1) Cable Tensiometer - Commercially Available

C. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

D. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-42-00/201, Empennage Access Doors and Panels
- (3) AMM 22-00-02/201, Maintenance Monitor
- (4) AMM 24-22-00/201, Electrical Power - Control
- (5) AMM 27-21-11/201, Rudder Trim Actuator

E. Access

(1) Location Zones

- 211/212 Control Cabin
- 324 Vertical Stabilizer - Rear Spar to Trailing Edge

(2) Access Panels

- 113AL Flight Control Components
- 312AR Control Cables RA and RB
- 324BL Feel, Centering, and Trim Mechanism
- 324JL Trailing Edge of Vertical Stabilizer
- 324CR Feel, Centering, and Trim Mechanism

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F. Rudder Feel, Centering, and Trim Mechanism - Installation

S 622-024

- (1) Apply the corrosion preventive compound to the bolts, bushings, nuts and washers before you install them.

S 432-025

- (2) Connect the rod ends for the left and right control rods, for the autopilot rollout guidance (ARG) servos, to the torque tube.

S 862-026

- (3) Put the feel, centering, and trim mechanism in its correct position in the airplane.

S 432-031

- (4) Connect the control rods from the ratio changer mechanism (View E).

S 432-027

- (5) Do these steps to install the bolt assembly that connects the mechanism to its left support bracket (View F):
  - (a) Install the bushings and the bolt assembly.
  - (b) Install the inner nut and tighten it to 60-80 pound-inches (6.8-9.0 newton-meters).
  - (c) Install the outer nut and tighten it to 30-40 pound-inches (3.4-4.5 newton-meters).

NOTE: Do not turn the inner nut during this step.

S 432-028

- (6) Do these steps to connect the mechanism to its right support brackets (View G):
  - (a) Install the bushings and the bolts.
  - (b) Install the nuts and tighten them.

S 822-099

- (7) Do the Feel and Centering Springs - Adjustment.

S 432-029

- (8) Install the rudder trim actuator (Ref 27-21-11).

S 862-030

- (9) Operate the rudder trim switch on the aft electronic control panel, P8, until you can easily install rig pin R4.

S 432-032

- (10) Do these steps to connect the control rods for the ARG servos:
  - (a) Connect the middle control rod to the quadrant torque tube.
  - (b) Connect the left and right control rod bodies to the rod ends on the quadrant torque tube.

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- (c) Adjust the length of the left and right control rods until you can easily install the bolts at the ARG servos.
- (d) Install the bolts that connect the control rods to the ARG servos.
- (e) Make sure you see control rod threads in at least one-half of the inspection holes for the control rods.

S 432-033

- (11) Connect cables RA and RB to the aft quadrant.

**NOTE:** If you installed new cables, go to 27-21-00/501 for the cable adjustment procedure.

S 822-034

- (12) Adjust the tension in cables RA and RB to the value shown (Fig. 202) and do these steps:
  - (a) Make sure you can easily install and remove rig pins R3 and R4.
  - (b) Remove rig pins R3, R4, and R5.

S 212-035

- (13) Operate the rudder pedals through one full travel cycle and do these steps:
  - (a) Make sure the tension in the cables is correct.
  - (b) Install cliplocks on the turnbuckles.

S 722-100

- (14) Do the Rudder Feel, Centering, and Trim Mechanism - Test.
- G. Spring Arm and Cam Roller Arm Assembly - Installation (Fig. 201)

S 432-036

- (1) Do these steps to connect the cam roller arm to the spring arm assembly (View I):
  - (a) Install the spacer and the bearings in the cam roller arm.
  - (b) Align the bolt holes in the arms.
  - (c) Install the bushing, bolt assembly, and the washer.
  - (d) Install the inner nut and tighten it to 60-80 pound-inches (6.8-9.0 newton-meters).
  - (e) Install the washer and the outer nut.
  - (f) Tighten the outer nut to 30-40 pound-inches (3.4-4.5 newton-meters).

**NOTE:** Do not turn the inner nut during this step.

S 432-037

- (2) Do these steps to connect the spring arm assembly to the cam plate on the torque tube (View H):
  - (a) Align the bolt holes in the spring arm assembly with the cam plate.
  - (b) Install the retainer, bolt assembly, and the retainer.

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- (c) Install the inner nut and tighten it to 60–80 pound-inches (6.8–9.0 newton-meters).
- (d) Install the washer and the outer nut.
- (e) Tighten the outer nut to 30–40 pound-inches (3.4–4.5 Nm).

NOTE: Do not turn the inner nut during this step.

S 432-038

- (3) Do these steps to connect the trim actuator to the spring arm assembly:
  - (a) Install the bushing and the bolt assembly.
  - (b) Install the inner nut and tighten it to 60–80 pound-inches (6.8–9.0 newton-meters).
  - (c) Install the washer and the outer nut.
  - (d) Tighten the outer nut to 30–40 pound-inches (3.4–4.5 newton-meters).

NOTE: Do not turn the inner nut during this step.

S 432-039

- (4) Install the short spring between the cam roller arm and the spring arm assembly.

NOTE: You will adjust the springs in the "Feel and Centering Springs – Adjustment" group of steps below.

S 432-040

- (5) Install the long spring between the cam roller arm and the spring arm assembly.

S 862-041

- (6) Operate the rudder trim switch on the aft electronic control panel, P8, until you can easily install rig pin R4.

S 432-042

- (7) Connect the control rods from the ratio changer mechanism (View E).

S 722-102

- (8) Do the Feel and Centering Springs – Adjustment.

S 432-043

- (9) Do these steps to connect the control rods for the ARG servos:
  - (a) Connect the middle control rod to the quadrant torque tube.
  - (b) Connect the left and right control rod bodies to the rod ends on the quadrant torque tube.
  - (c) Adjust the length of the left and right control rods until you can easily install the bolts at the ARG servos.

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- (d) Install the bolts that connect the control rods to the ARG servos.
- (e) Make sure you see control rod threads in at least one-half of the inspection holes for the control rods.

S 432-044

- (10) Connect cables RA and RB to the aft quadrant.

**NOTE:** If you installed new cables, go to 27-21-00/501 for the cable adjustment procedure.

S 822-045

- (11) Adjust the tension in cables RA and RB to the value shown (Fig. 202) and do these steps:
  - (a) Make sure you can easily install and remove rig pins R3 and R4.
  - (b) Remove rig pins R3, R4, and R5.

S 212-046

- (12) Operate the rudder pedals through one full travel cycle and do these steps:
  - (a) Make sure the tension in the cables is correct.
  - (b) Install cliplocks on the turnbuckles.

S 722-103

- (13) Do the Rudder Feel, Centering, and Trim Mechanism - Test.
- H. Put the Airplane Back to Its Usual Condition

S 092-091

**WARNING:** STAY AWAY FROM THE NOSE WHEELS WHEN YOU REMOVE THE LOCKPIN. THE WHEELS CAN TURN TO THE CENTER POSITION QUICKLY, AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the nose wheels are in their center positions and remove the towing lever lockpin from the nose gear.

S 862-093

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00).

S 862-094

- (3) Remove electrical power if it is not necessary (AMM 24-22-00).

S 412-095

- (4) Close access panels 312AR, 324BL, and 324JL (AMM 06-42-00).

S 412-096

- (5) Close access door 113AL (AMM 06-41-00).

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TASK 27-21-10-822-097

4. Feel and Centering Springs - Adjustment

A. Equipment

- (1) Feel and Centering, Force Measurement Equipment:  
 A27057-13 (Reccommended)  
 A27057-9 (alternative)  
 A27057-1 (alternative)

NOTE: The attach bracket is in the tool kit. The force dial is in the A27057-1 and A27057-9 tool kits.

- (2) Protractor - 1 each A27021-30 (from the A27021-29 Kit) or 4MIT65B80307-1  
 (3) Force dial - Commercially Available (needed for use with A27057-13).

B. Access

- (1) Location Zones  
     211/212      Control Cabin  
     324          Vertical Stabilizer - Rear Spar to Trailing Edge
- (2) Access Panels  
     113AL      Flight Control Components  
     312AR      Control Cables RA and RB  
     324BL      Feel, Centering, and Trim Mechanism  
     324JL      Trailing Edge of Vertical Stabilizer  
     324CR      Feel, Centering, and Trim Mechanism

C. Do the adjustment for the feel and centering springs.

S 492-047

- (1) Connect the force measurement equipment to the quadrant as shown (Fig. 205).

S 212-048

- (2) Make sure the long feel and centering spring is loose and does not apply a force during the short spring adjustment.

S 822-063

- (3) Do these steps to adjust the short feel spring:  
 (a) Pull on the force measurement equipment until the quadrant starts to move clockwise and do these steps:  
     1) Make sure the breakout force is 4.4 to 4.6 pounds (19.6 to 20.5 newtons).  
     2) Loosen the eyebolt jamnut if it is necessary.  
     3) Adjust the fine adjustment nut for the short spring until the breakout force is correct.

NOTE: One turn of the adjustment nut is approximately equal to one pound of force.

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S 822-078

- (4) Do these steps to adjust the long feel spring:
- (a) Pull on the force measurement equipment until the quadrant starts to move clockwise and do these steps:
    - 1) Make sure the breakout force is 9.1 to 9.5 pounds (40.5 to 42.26 newtons).

NOTE: The two springs will operate.

- 2) Loosen the eyebolt jamnut if it is necessary.
- 3) Adjust the fine adjustment nut for the long spring until the breakout force is correct.

NOTE: One turn of the adjustment nut is approximately equal to 0.6 pounds of force (2.67 newtons).

- (b) Pull on the force measurement equipment until the quadrant moves  $30 \pm 0.5$  degrees clockwise and do this step:
  - 1) Make sure the necessary force is 51.5 to 53.5 pounds (229.0-238.0 newtons).
- (c) Pull on the force measurement equipment until the quadrant starts to move counterclockwise and do this step:
  - 1) Make sure the breakout force is 9.0 to 9.5 pounds (40.0-42.25 newtons).
- (d) Pull on the force measurement equipment until the quadrant moves  $30 \pm 0.5$  degrees counterclockwise and do this step:
  - 1) Make sure the necessary force is 51.5 to 53.5 pounds (229.0-238.0).
- (e) Tighten the jamnuts for the two eyebolts.

S 092-079

- (5) Remove the force measurement equipment from the quadrant.

TASK 27-21-10-712-098

5. Rudder Feel, Centering, and Trim Mechanism - Test

A. References

- (1) AMM 22-00-02/201, Maintenance Monitor

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- (2) AMM 27-21-00/501, Rudder and Rudder Trim Control System
  - (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- B. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 324 Vertical Stabilizer – Rear Spar to Trailing Edge
- (2) Access Panels
  - 113AL Flight Control Components
  - 312AR Control Cables RA and RB
  - 324BL Feel, Centering, and Trim Mechanism
  - 324JL Trailing Edge of Vertical Stabilizer
  - 324CR Feel, Centering, and Trim Mechanism

C. Do the test for the rudder feel, centering and trim mechanism.

S 862-092

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11E18, FLT CONT CMPTR SERVO
  - (b) 11E21, FLT CONT CMPTR SERVO C
  - (c) 11E36, FLT CONT CMPTR

S 222-080

- (2) Do the MCDP test 09 SERVO/RUD procedure (AMM 22-00-02).

S 862-081

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00).

S 862-082

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11G10, RUDDER RATIO

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- (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
- (c) 11H18, FLT CONT SHUTOFF TAIL CTR
- (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 862-083

- (5) Remove the DO-NOT-OPERATE tags and move the FLT CONT SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to ON.

S 212-084

- (6) Make sure these circuit breakers, on the P11 panel, are closed:
  - (a) EICAS (6 locations)
  - (b) 11L9, LEFT ENGINE OIL PRESS EICAS REF
  - (c) 11L36, RIGHT ENGINE OIL PRESS EICAS REF

S 862-085

- (7) Push the STATUS switch on the display select panel, P9, to show the rudder position indicator on the bottom EICAS display.

S 212-086

- (8) Move the rudder pedals through their full travel range and do these checks:
  - (a) Make sure the rudder moves smoothly through its full travel range.
  - (b) Make sure the rudder moves in the correct direction.
  - (c) Make sure the rudder trailing edge moves at least 41.10 inches (1.04 meters) (26 degrees) from the neutral position in each direction.
  - (d) Make sure the rudder position indicator operates correctly and moves to its full travel mark in each direction.

S 212-087

- (9) Release the rudder pedals and do this check:
  - (a) Make sure the rudder goes back to its neutral position.

S 212-088

- (10) Turn the rudder trim switch on the aft electronic control panel, P8, fully clockwise and hold it there until the rudder movement stops. Do these checks:
  - (a) Make sure the trim indicator shows a minimum of 14 units of right trim.

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- (b) Make sure the EICAS position indicator moves to the right approximately two-thirds of its full travel.

S 212-089

- (11) Turn the rudder trim switch on the P8 panel fully counterclockwise and hold it there until the rudder movement stops. Do these checks:
  - (a) Make sure the trim indicator shows a minimum of 14 units of left trim.
  - (b) Make sure the EICAS position indicator moves to the left approximately two-thirds of its full travel.

S 212-090

- (12) Operate the rudder trim switch on the P8 panel until the rudder trim indicator shows zero units of trim and do this check:
  - (a) Make sure the rudder goes back to its neutral position.

S 722-113

- (13) Do the tests of the Captain's and First Officer's Rudder Pedal Forces (AMM 27-21-00/501).

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RUDDER TRIM ACTUATOR – MAINTENANCE PRACTICES

1. General

- A. This procedure contains the removal and installation tasks for the rudder trim actuator.

TASK 27-21-11-022-002

2. Rudder Trim Actuator – Removal (Fig. 201)

A. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):  
(a) R4 – P/N A20004-20

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels  
(2) AMM 20-10-24/201, Rig Pins  
(3) AMM 24-22-00/201, Electrical Power – Control

C. Access

- (1) Location Zones  
211/212 Control Cabin  
324 Vertical Stabilizer – Rear Spar to Trailing Edge
- (2) Access Panels  
324BL Feel, Centering, and Trim Mechanism  
324EL Rudder Mechanical Control Path

D. Prepare for the Removal

S 862-003

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

S 862-004

- (2) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 862-005

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11G10, RUDDER RATIO  
(b) 11H17, FLT CONT TAIL SHUTOFF LEFT  
(c) 11H18, FLT CONT TAIL SHUTOFF CTR  
(d) 11H27, FLT CONT TAIL SHUTOFF RIGHT

S 012-006

- (4) Open access panels 324BL and 324EL (AMM 06-42-00/201).

S 492-007

- (5) Install rig pin R4 in the feel, centering, and trim mechanism.

**NOTE:** Operate the rudder trim switch on the aft electronic control panel, P8, if it is necessary.

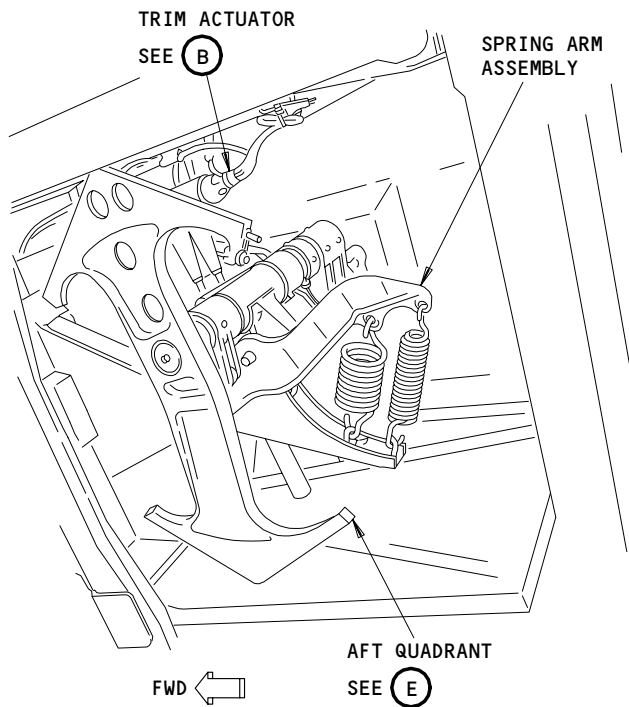
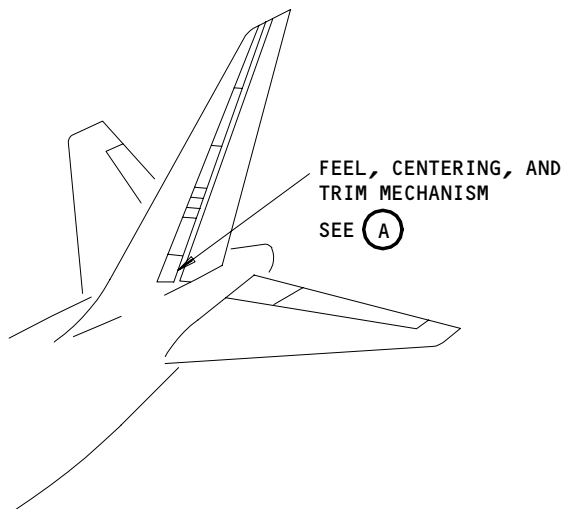
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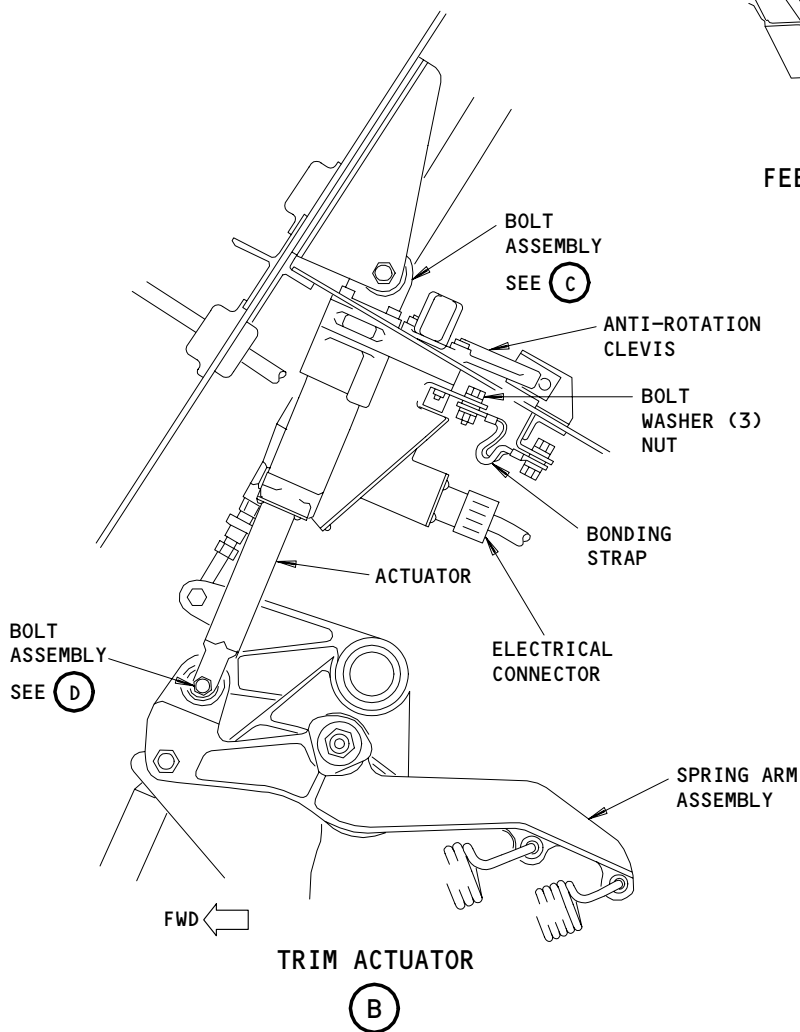
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FEEL, CENTERING, AND TRIM MECHANISM (A)

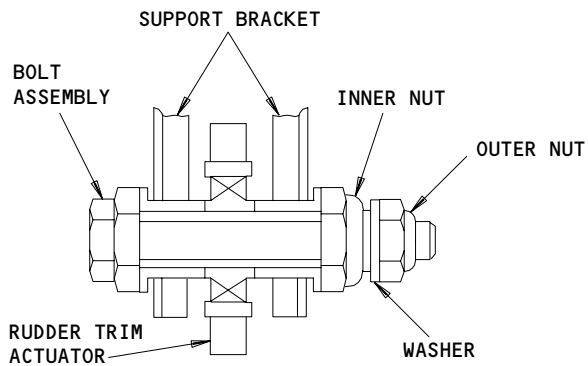


TRIM ACTUATOR (B)

Rudder Trim Actuator Installation  
Figure 201 (Sheet 1)

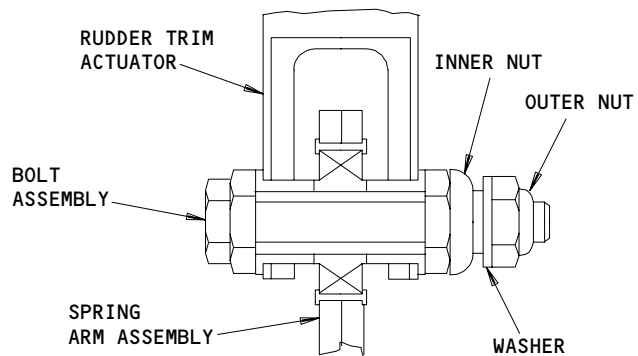
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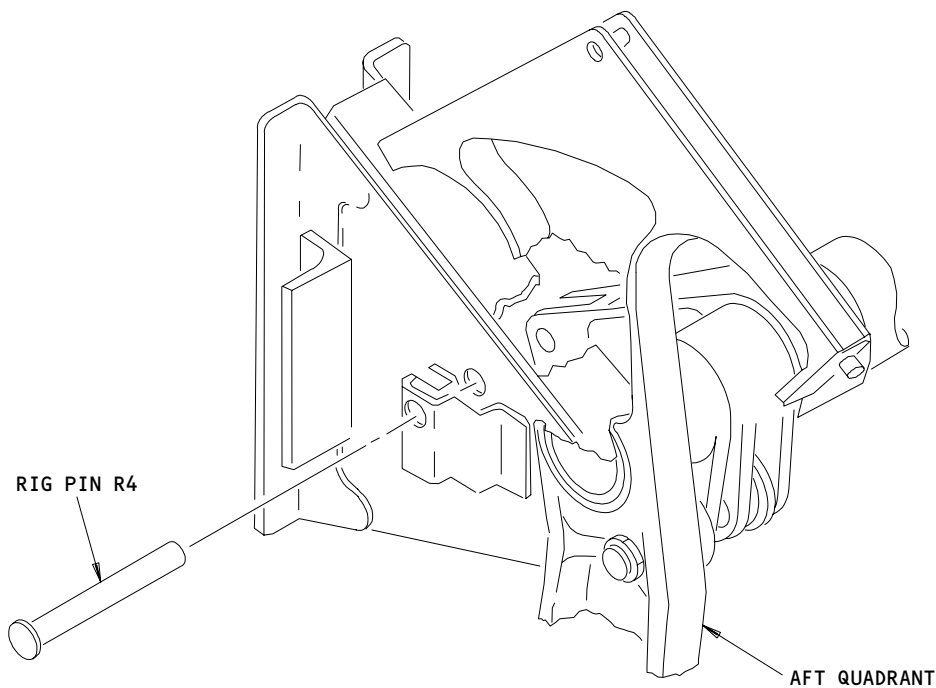
**BOLT ASSEMBLY**

(C)



**BOLT ASSEMBLY**

(D)



**RIG PIN HOLE R4**

(E)

**Rudder Trim Actuator Installation  
Figure 201 (Sheet 2)**

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S 862-008

- (6) Open this circuit breaker on the P11, panel and attach a DO-NOT-CLOSE tag:
  - (a) 11C5, RUDDER TRIM

E. Rudder Trim Actuator - Removal

S 032-009

- (1) Disconnect these components from the trim actuator:
  - (a) The electrical connector
  - (b) If it is necessary, the bonding straps.

S 032-010

- (2) Remove these components:
  - (a) The bolt assembly that connects the actuator to the spring arm assembly
  - (b) The bolt assembly that connects the actuator to the support bracket.

S 022-011

- (3) Remove the actuator from the airplane.

TASK 27-21-11-422-012

3. Rudder Trim Actuator - Installation

A. Equipment

- (1) Bonding Meter - Avtron Model T477W  
Avtron Manufacturing Inc.  
Cleveland, Ohio

B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24  
(Alternate)
- (3) A00247, Sealant, Chromate Type - BMS 5-95
- (4) C00064, Alodine, 1200
- (5) B00316, Solvent - Aliphatic Naptha, TT-N-95

C. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 324 Vertical Stabilizer - Rear Spar to Trailing Edge
- (2) Access Panels
  - 324BL Feel, Centering, and Trim Mechanism
  - 324EL Rudder Mechanical Control Path

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E. Rudder Trim Actuator - Installation

S 622-013

- (1) Apply the corrosion preventive compound to the bolts, washers, and nuts before the installation.

S 422-014

- (2) Do these steps to install the trim actuator:
  - (a) Align the actuator with the support bracket and the spring arm.
  - (b) Install the two bolt assemblies.
  - (c) Install the inner nut and tighten it to 60-80 pound-inches (6.78-9.03 newton-meters).
  - (d) Install the outer nut and tighten it to 30-40 pound-inches (3.39-4.51 newton-meters).

NOTE: Do not turn the inner nut during this step.

S 432-015

- (3) If it is necessary, do these steps to install the bonding straps:
  - (a) Clean the bonding surfaces with solvent.
  - (b) Apply the Alodine to the surfaces you cleaned.
  - (c) Connect the bonding straps to the actuator.
  - (d) Use the bonding meter to make sure the maximum resistance between the bonding surfaces is 3.8 milliohms.
  - (e) Apply the sealant to the area around the fastener.

S 432-016

- (4) Connect the electrical connector to the actuator.

S 092-017

- (5) Remove rig pin R4.

S 862-019

- (6) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead panel, P11:
  - (a) 11C5, RUDDER TRIM

F. Rudder Trim Actuator - Test

S 212-020

- (1) Make sure the rudder pedals are in their neutral positions.

S 212-021

- (2) Make sure the rudder is in its neutral position.

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S 862-001

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 862-022

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11, panel:
- (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 862-023

- (5) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to ON.

S 862-025

- (6) Push the STATUS button on the display select panel, P9, to show the rudder position indicator on the bottom EICAS display.

S 212-026

- (7) Turn the rudder trim switch to its full clockwise position and hold it there until the rudder movement stops. Do these checks:
- (a) Make sure the trim indicator shows a minimum of 14 units of right trim.
  - (b) Make sure the rudder position indicator moves approximately two-thirds of its full travel in the right direction.

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- (c) MTH ALL;  
SAS 001-049, 052-999;  
make sure the rudder moves a minimum of 27.00 inches (68.6 cm) to the right.
- (d) SAS 050-051;  
make sure the rudder moves a minimum of 34.10 inches (86.6 cm) to the right.

S 212-027

- (8) Operate the rudder trim switch until the indicator shows zero units of trim and do this check:
  - (a) Make sure the rudder goes back to its neutral position.

S 212-028

- (9) Turn the rudder trim switch to its full counterclockwise position and hold it there until the rudder movement stops. Do these checks:
  - (a) Make sure the trim indicator shows a minimum of 14 units of left trim.
  - (b) Make sure the rudder position indicator moves approximately two-thirds of its full travel in the left direction.
  - (c) MTH ALL;  
SAS 001-049, 052-999;  
make sure the rudder moves a minimum of 27.00 inches (68.5 cm) to the left.
  - (d) SAS 050-051;  
make sure the rudder moves a minimum of 34.10 inches (86.6 cm) to the left.

S 212-029

- (10) Operate the rudder trim switch until the indicator shows zero units of trim and do this check:
  - (a) Make sure the rudder goes back to its neutral position.

G. Put the Airplane Back to Its Usual Condition

S 862-030

- (1) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

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- S 862-031
- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).
- S 412-018
- (3) Close access panels 324BL and 324EL (AMM 06-42-00/201).

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RUDDER RATIO CHANGER MECHANISM – MAINTENANCE PRACTICES

1. General

A. This procedure contains the removal and installation procedures for the rudder ratio changer mechanism and its components.

TASK 27-21-13-022-001

2. Rudder Ratio Changer Mechanism and Its Components – Removal

A. General

(1) This task contains these three procedures:

- Rudder Ratio Changer Mechanism – Removal
- Rudder Ratio Changer LVDT – Removal
- Load Limiter – Removal.

Because this procedure contains more than one procedure, do only the applicable groups of steps.

To start one of these procedures, do the "Prepare for the Removal" group of steps. Then, do the group of steps that is necessary to remove the component.

B. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):
- (a) R4 – P/N A20004-20
  - (b) R5 – P/N A20004-13

C. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 20-10-24/201, Rig Pins
- (3) AMM 24-22-00/201, Electrical Power – Control
- (4) AMM 27-21-15/201, Rudder Ratio Changer Actuator
- (5) AMM 27-61-00/201, Spoiler/Speedbrake Control System

D. Access

- (1) Location Zones
- 211/212 Control Cabin
  - 324 Vertical Stabilizer – Rear Spar to Trailing Edge
- (2) Access Panels
- 324BL Rudder Feel, Centering, and Trim Mechanism
  - 324DR Mechanical Control Path
  - 324EL Mechanical Control Path

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E. Prepare for the Removal

S 862-002

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

S 862-003

- (2) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 862-004

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 042-005

**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 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 spoilers.

S 862-006

- (5) Open these circuit breakers on the P11, panel and attach DO-NOT-CLOSE tags:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G17, FLT CONT ELEC 1R AC
  - (f) 11G18, FLT CONT ELEC 1R DC
  - (g) 11G26, FLT CONT ELEC 2R AC
  - (h) 11G27, FLT CONT ELEC 2R DC

S 012-007

- (6) Open access panels 324BL, 324DR, and 324EL (AMM 06-42-00/201).

S 492-008

- (7) Install rig pin R4 in the feel, centering, and trim mechanism (Fig. 202).

F. Rudder Ratio Changer Mechanism - Removal (Fig. 201)

S 492-009

- (1) Install rig pin R5 in the middle PCA linkage.

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- S 032-010  
(2) Remove the rudder ratio changer actuator (AMM 27-21-15/201).

- S 032-011  
(3) Disconnect these components:  
(a) The LVDT electrical connectors and use a tag for identification  
(b) The control rods (25) to the feel, centering, and trim mechanism  
(c) The control rods (26) to the yaw damper summing lever.

- S 032-012  
(4) Do these steps to disconnect the rudder ratio changer mechanism (3) from its supports:  
(a) Remove the outer and inner nuts (14, 13) from the left and right supports.  
(b) Remove the bolt assembly (10), bushing (15), and bearing (16) from the right support.  
(c) Remove the bolt assembly (10) and bushings (11, 12) from the left support.

- S 022-013  
(5) Remove the rudder ratio changer mechanism (3).  
G. Rudder Ratio Changer LVDT - Removal (Fig. 201)

- S 032-014  
(1) Disconnect the LVDT electrical connectors (22), and use a tag for identification.

S 022-015

**CAUTION:** HOLD THE LVDT DURING THE REMOVAL. DAMAGE TO THE LVDT CAN OCCUR IF IT HANGS FROM ONLY ONE OF THE TWO SUPPORTS.

- (2) Do these steps to remove the LVDT:  
(a) Disconnect the LVDT (21) from the left support.  
(b) Disconnect the LVDT from the right variable crank.  
(c) Remove the LVDT.

H. Load Limiter - Removal

- S 032-016  
(1) Disconnect the load limiter (34) from the ratio changer.

- S 032-017  
(2) Disconnect load limiter (34) from the yaw damper summing lever.

- S 022-018  
(3) Remove the load limiter (34).

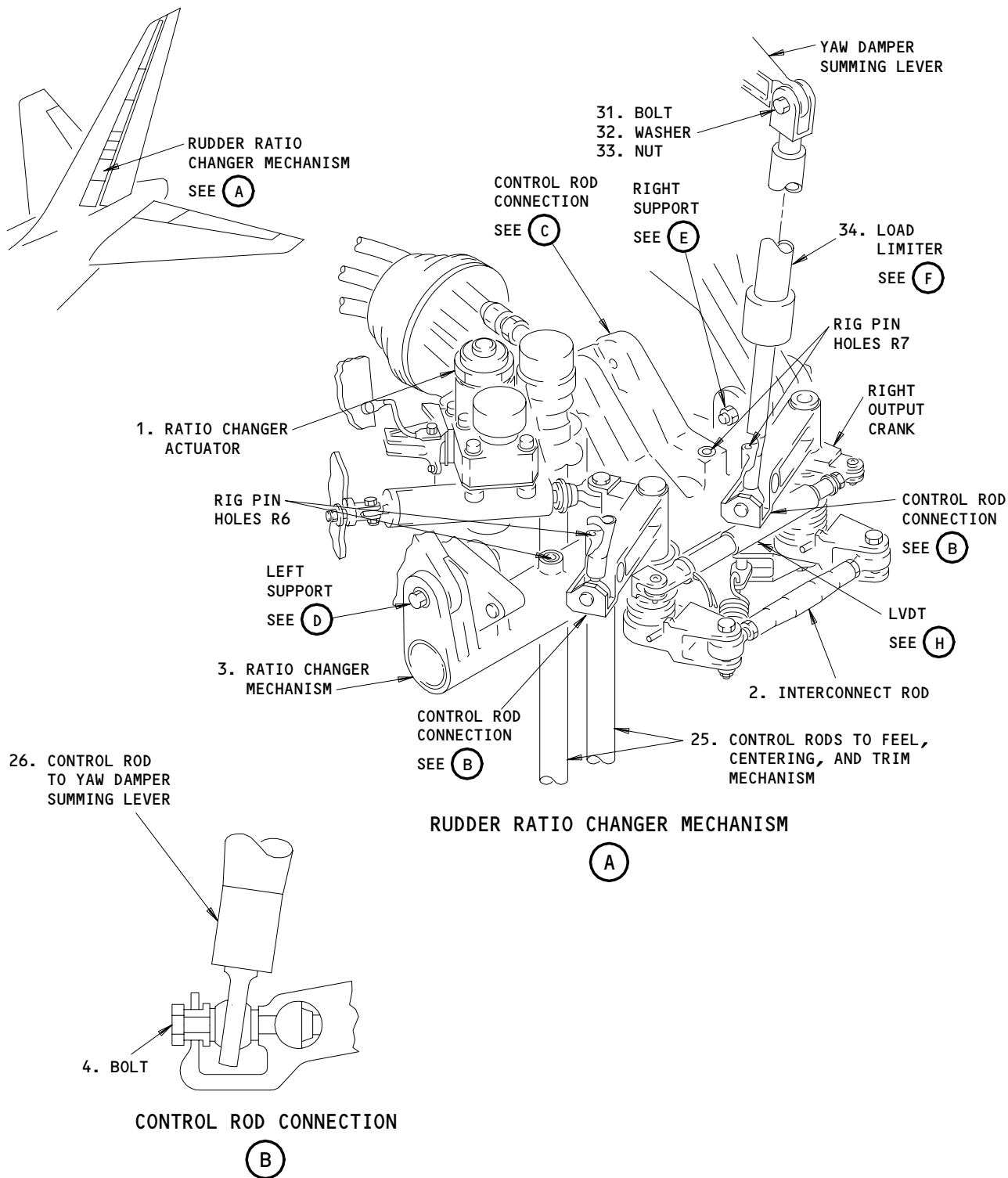
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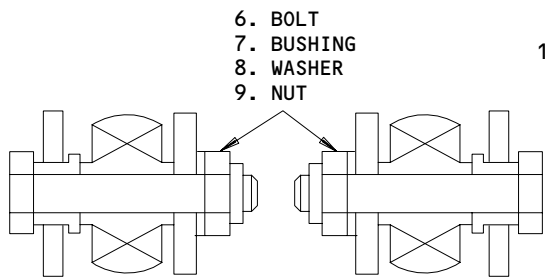
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Rudder Ratio Changer Mechanism Installation  
Figure 201 (Sheet 1)

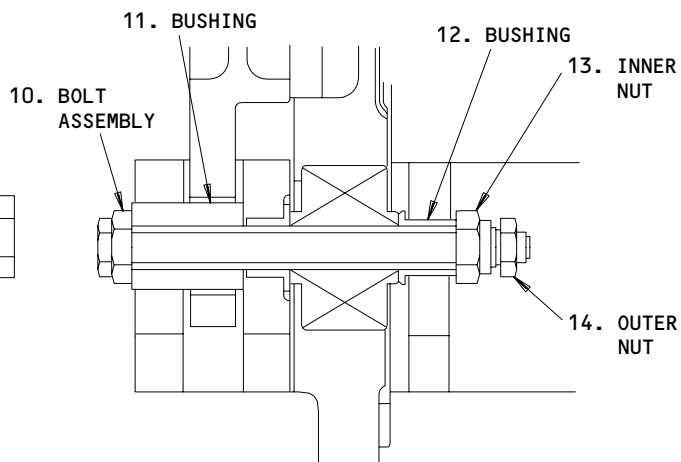
EFFECTIVITY	
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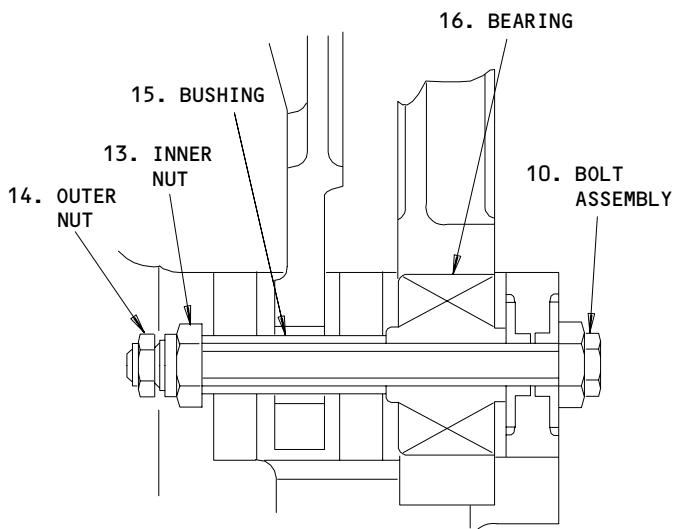
CONTROL ROD CONNECTION

(C)



LEFT SUPPORT

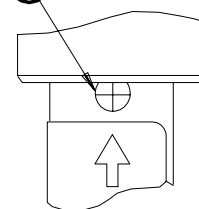
(D)



RIGHT SUPPORT

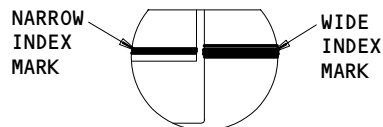
(E)

INDEX MARKS  
SEE (G)



LOAD LIMITER

(F)



INDEX MARKS

(G)

Rudder Ratio Changer Mechanism Installation  
Figure 201 (Sheet 2)

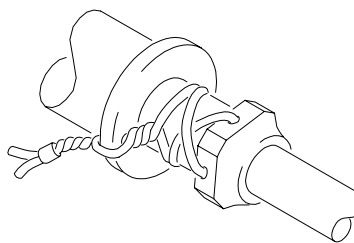
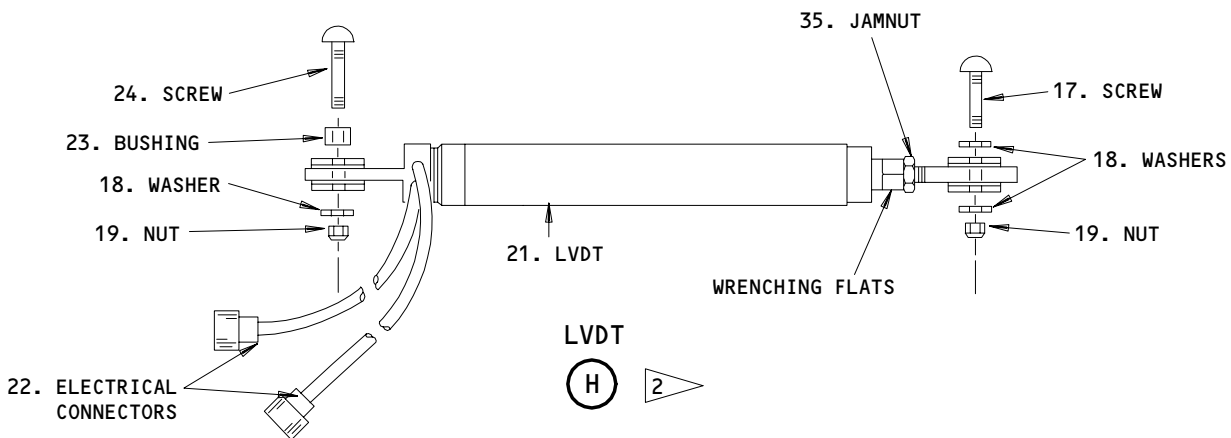
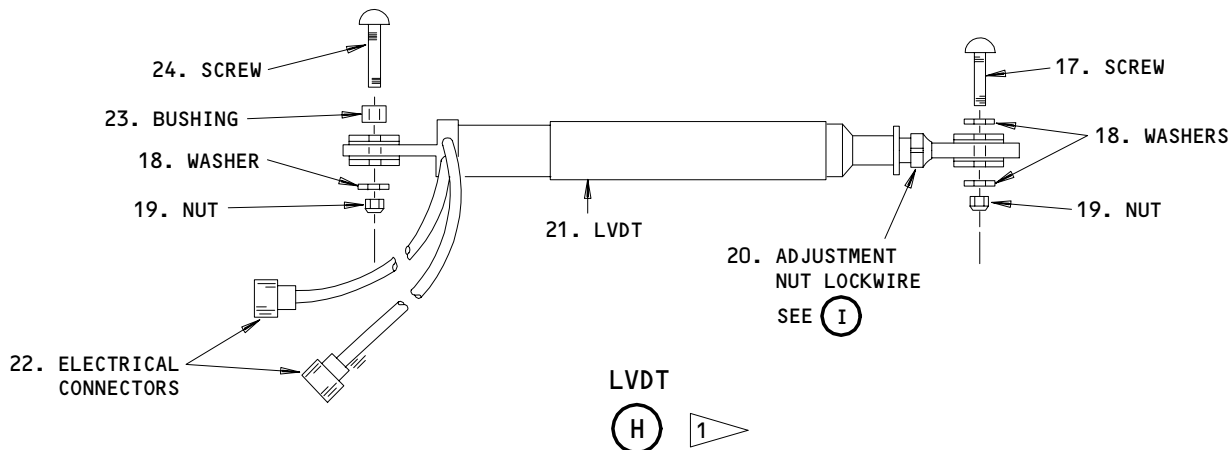
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ADJUSTMENT NUT LOCKWIRE  
(I)

- 1 LVDTs WITH AN ADJUSTMENT NUT
- 2 LVDTs WITH CASE ADJUSTMENT

Rudder Ratio Changer Mechanism Installation  
Figure 201 (Sheet 3)

EFFECTIVITY	
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TASK 27-21-13-422-019

3. Rudder Ratio Changer Mechanism and Its Components - Installation

A. General

(1) This task contains these procedures:

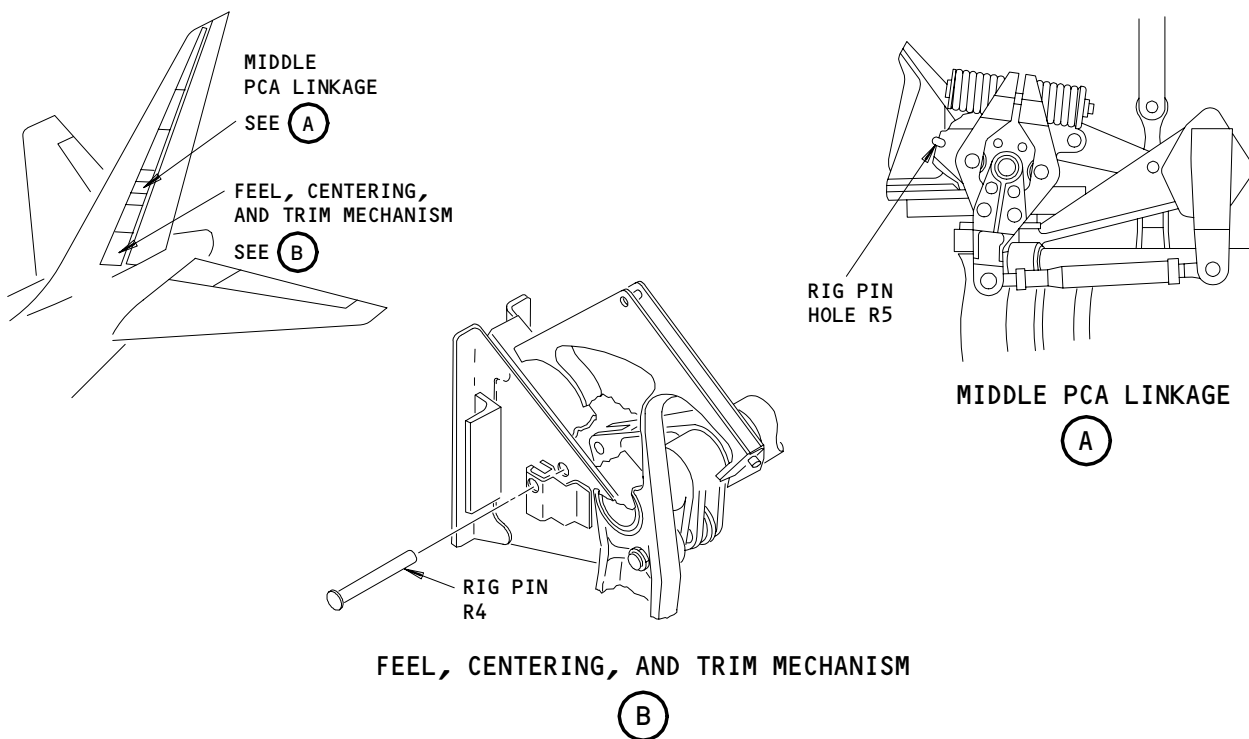
- Rudder Ratio Changer Mechanism - Installation
- Rudder Ratio Changer LVDT - Installation
- Load Limiter - Installation
- Rudder Ratio Changer - Test.

Because this procedure contains more than one procedure, do only the applicable groups of steps.

To start one of these procedures, do the group of steps that is necessary to install the component. Then, do the "Rudder Ratio Changer - Test" group of steps. And last, do the "Put the Airplane Back to Its Usual Condition" group of steps.

B. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):
- (a) R6 - P/N A20004-14
  - (b) R7 - P/N A20004-14
- (2) Nose Gear Towing Lever Lockpin - A09003-1



Rig Pin Locations  
Figure 202

EFFECTIVITY	ALL
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C. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)

D. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
201	3	Ratio Changer Mechanism	27-21-13 27-21-13	01 01B	129 200

E. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 20-10-24/201, Rig Pins
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 27-21-00/501, Rudder and Rudder Trim Control System
- (5) AMM 27-21-15/201, Rudder Ratio Changer Actuator
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

F. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 324 Vertical Stabilizer - Rear Spar to Trailing Edge
- (2) Access Panels
  - 324BL Rudder Feel, Centering, and Trim Mechanism
  - 324DR Mechanical Control Path
  - 324EL Mechanical Control Path

G. Rudder Ratio Changer Mechanism - Installation

S 642-020

- (1) Apply grease to the bushings, bearing, and the inner surface of the right support.

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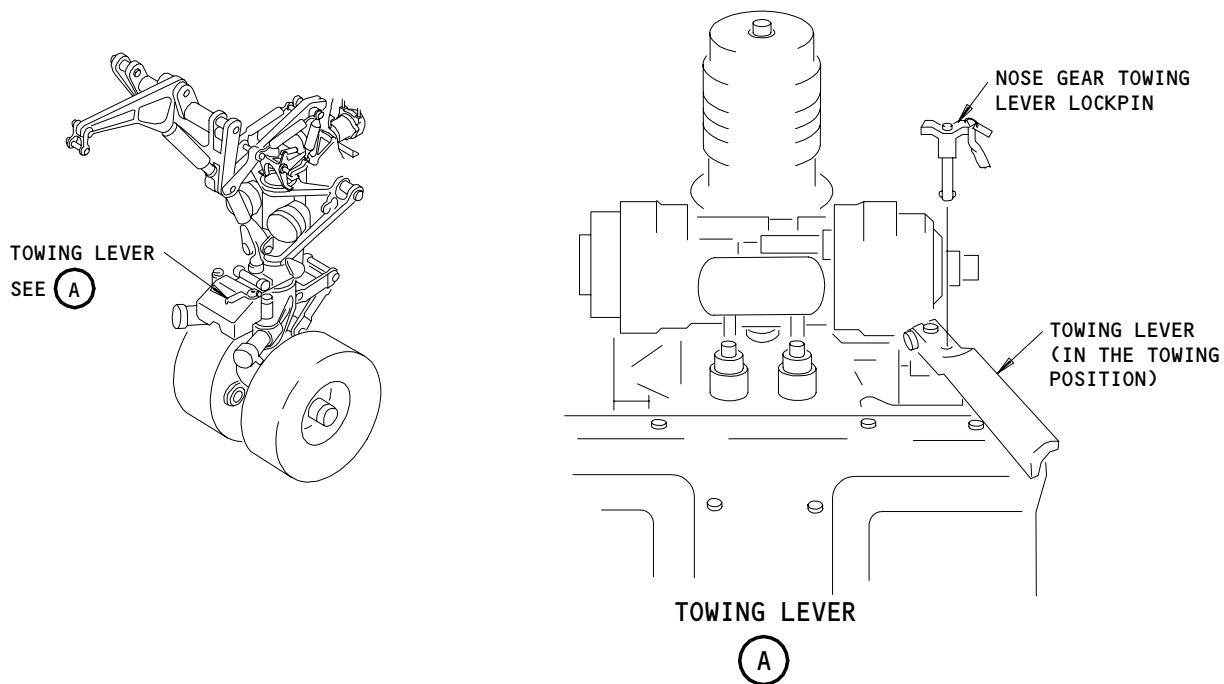
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S 422-021

- (2) Do these steps to connect the rudder ratio changer mechanism (3) to its supports:
- (a) Align the ratio changer mechanism with its supports.
  - (b) Install the bushings (11, 12) and the bolt assembly (10) in the left support bracket (View D).
  - (c) Install the bearing (16), bushing (15), and bolt assembly (10) in the right support bracket (View E).



Nose Gear Steering Isolation  
Figure 203

EFFECTIVITY	
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 **BOEING**  
767  
MAINTENANCE MANUAL

- (d) Install the inner nut (13) at the left support and tighten it to 60-80 pound-inches (6.8-9.0 newton-meters).
- (e) Install the inner nut (13) at the right support and tighten it to 60-80 pound-inches (6.8-9.0 newton-meters).
- (f) Install the outer nuts (14) at the left and right supports and tighten them to 30-40 pound-inches (3.4-4.5 newton-meters).

NOTE: Do not turn the inner nut during this step.

S 432-022

- (3) Do these steps to connect the control rods (25) from the feel, centering, and trim mechanism to the ratio changer (View C):
  - (a) Install the bolt (6), bushing (7), and washer (8).
  - (b) Install the nut (9) and tighten it.

S 432-023

- (4) Do this step to connect the control rods (26) from the yaw damper summing lever to the ratio changer (View B):
  - (a) Install bolt (4), bushing (5) and tighten.

S 432-024

- (5) Connect the electrical connectors (22) to the LVDT.

S 432-025

- (6) Install the rudder ratio changer actuator (AMM 27-21-15/201).

S 092-026

- (7) Remove rig pin R5.

S 862-051

- (8) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC

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- (c) 11C8, FLT CONT ELEC 2L AC
- (d) 11C9, FLT CONT ELEC 2L DC
- (e) 11G17, FLT CONT ELEC 1R AC
- (f) 11G18, FLT CONT ELEC 1R DC
- (g) 11G26, FLT CONT ELEC 2R AC
- (h) 11G27, FLT CONT ELEC 2R DC

S 822-027

- (9) Do the adjustment procedure for the rudder ratio changer mechanism (AMM 27-21-02/201).

S 092-028

- (10) Remove rig pin R4.

H. Rudder Ratio Changer Mechanism LVDT - Installation (Fig. 201)

S 642-029

- (1) Apply grease to the screws, washers, nuts, and bushing before you install them.

S 432-030

- (2) Install the screw (17), washers (18), and nut (19) that connect the LVDT (21) to the right output crank.

S 432-031

- (3) Install the screw (24), bushing (23), washer (18), and nut (19) that connect the LVDT to its left support.

S 432-032

- (4) Connect the electrical connectors (22) to the LVDT.

S 862-052

- (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11, panel:
  - (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G17, FLT CONT ELEC 1R AC
  - (f) 11G18, FLT CONT ELEC 1R DC
  - (g) 11G26, FLT CONT ELEC 2R AC
  - (h) 11G27, FLT CONT ELEC 2R DC

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- S 712-062  
(6) Do the Rudder Ratio Changer Actuator (RRCA) - Oscillation Check (AMM 27-21-00/501).

- S 822-033  
(7) Do the adjustment procedure for the rudder ratio changer mechanism (AMM 27-21-00/501).

- S 092-034  
(8) Remove rig pin R4.

I. Load Limiter - Installation

- S 642-035  
(1) Apply grease to the bushings, bolts, washers, and nuts before you install them.

- S 432-036  
(2) Do this step to connect the load limiter (34) to the yaw damper summing lever:  
(a) Install the bolt (31), washer (32), and nut (33) that connect the load limiter to the yaw damper summing lever and tighten.

- S 432-037  
(3) Do this step to connect the load limiter (34) to the rudder ratio changer mechanism:  
(a) Install the bolt (27), bushing (28), washer (29), and nut (30) that connect the load limiter to the ratio changer mechanism and tighten.

- S 862-000  
(4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:  
(a) 11C6, FLT CONT ELEC 1L AC  
(b) 11C7, FLT CONT ELEC 1L DC  
(c) 11C8, FLT CONT ELEC 2L AC  
(d) 11C9, FLT CONT ELEC 2L DC  
(e) 11G17, FLT CONT ELEC 1R AC  
(f) 11G18, FLT CONT ELEC 1R DC  
(g) 11G26, FLT CONT ELEC 2R AC  
(h) 11G27, FLT CONT ELEC 2R DC

- S 822-038  
(5) Do the adjustment procedure for the rudder ratio changer mechanism (AMM 27-21-00/501).

- S 092-039  
(6) Remove rig pin R4.

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J. Rudder Ratio Changer Mechanism - Test

S 492-041

- (1) Move the towing lever to the tow position and install the towing lever lockpin in the nose gear (Fig. 203).

S 862-053

- (2) Operate the rudder trim switch on the aft electronic control panel, P8, until the trim indicator shows 3 to 5 units of left trim.

S 492-052

- (3) Manually turn the feel, centering, and trim mechanism clockwise until you can install rig pin R4.

**NOTE:** The feel springs push against the rig pin and keep the quadrant in a stable position during the adjustment.

S 862-054

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 862-059

- (5) Remove DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 862-055

- (6) Remove DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to ON.

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S 212-056

- (7) Move the left rudder ratio changer module (RRCM) test switch, on the E1 equipment shelf, to TEST and do these checks:
- (a) Make sure the IN TEST light for each RRCM stays on for a maximum of 18 seconds.
  - (b) Make sure the RRCA fully extends.
  - (c) Make sure you can easily install and remove rig pins R6 and R7.
  - (d) If you cannot easily install and remove rig pins R6 and R7, do the adjustment procedure for the rudder ratio changer mechanism (AMM 27-21-00/501).
  - (e) After 30 seconds, make sure all the RRCM faultballs are black.
  - (f) Make sure the rudder does not move more than 0.03 inches (0.762 mm) when you move the RRCM test switch between NORMAL and TEST.
  - (g) Do this step if the rudder moves more than 0.03 inches (0.762 mm) :
    - 1) Do the adjustment procedure for the rudder ratio changer mechanism (AMM 27-21-00/501).
  - (h) Move the rudder ratio changer test switch back to NORMAL and do these checks:
    - 1) Make sure the IN TEST light for each RRCM stays on for a maximum of 18 seconds.
    - 2) Make sure the RRCA retracts fully.
    - 3) After 30 seconds, make sure all the RRCM faultballs are black.

S 092-060

- (8) Remove rig pin R4.

S 862-043

- (9) Push the STATUS switch on the display select panel, P9, to show the rudder position indicator on the bottom EICAS display.

S 212-044

- (10) Move the rudder pedals through their full travel range and do these checks:
- (a) Make sure the rudder moves smoothly in the correct direction.
  - (b) Make sure the rudder position indicator moves full scale in each direction on the display.

S 212-045

- (11) Release the rudder pedals and do this check:
- (a) Make sure the rudder moves back to its neutral position.

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S 862-060

- (12) Hit the left and right rudder pedals lightly to put the feel cam roller in its neutral detent position.

S 212-061

- (13) Turn the rudder trim switch, on the P8 panel, clockwise and hold it there until the rudder movement stops and do these checks:
- (a) Make sure the rudder trim indicator shows at least 14.0 units of right trim.
  - (b) Make sure the rudder position indicator moves to the right approximately two-thirds of its full travel.

S 212-057

- (14) Turn the rudder trim switch, on the P8 panel, counterclockwise and hold it there until the rudder movement stops and do these checks:
- (a) Make sure the rudder trim indicator shows at least 14.0 units of left trim.
  - (b) Make sure the rudder position indicator moves to the left approximately two-thirds of its full travel.

S 212-058

- (15) Operate the rudder trim switch until the trim indicator shows zero units of trim and do these checks:
- (a) Make sure the rudder position indicator aligns with the neutral position mark (use a tolerance of one-half an arrow width).
  - (b) Make sure the rudder is in its neutral position.
- K. Put the Airplane Back to Its Usual Condition

S 092-046

**WARNING:** STAY AWAY FROM THE NOSE WHEELS WHEN YOU REMOVE THE LOCKPIN. THE WHEELS CAN TURN TO THE CENTER POSITION QUICKLY, AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Make sure the nose wheels are in their center positions and remove the towing lever lockpin from the nose gear.

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S 212-047

**CAUTION:** MAKE SURE THE RRCM TEST SWITCH IS IN ITS "NORMAL" POSITION. IF THE SWITCH IS IN ITS "TEST" POSITION, THE "RUDDER RATIO" LIGHT WILL COME ON AND WILL PREVENT AIRPLANE DISPATCH.

(2) Make sure the RRCM test switch is in its NORMAL position.

S 862-048

(3) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00/201).

S 862-049

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

S 412-050

(5) Close access panels 324DR, 324BL, and 324EL (AMM 06-42-00/201).

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RUDDER RATIO CHANGER ACTUATOR – MAINTENANCE PRACTICES

1. General

- A. This procedure contains the removal and installation data for the rudder ratio changer actuator and its components.

TASK 27-21-15-022-001

2. Rudder Ratio Changer Actuator and its Components – Removal

A. General

- (1) This task contains these procedures:

- Rudder Ratio Changer Actuator (RRCA) – Removal
- RRCA Filter – Removal
- RRCA Screen – Removal
- RRCA Electro-Hydraulic Servo Valve (EHSV) – Removal
- RRCA Solenoid Valve – Removal
- RRCA Support Clevis – Removal

Because this procedure contains more than one task, do only the applicable groups of steps.

To start one of these procedures, do the "Prepare for the Removal" group of steps. Then, do the group of steps that is necessary to remove the component.

B. Equipment

- (1) Rig Pins from Set A20004-XX (Ref 20-10-24):

- (a) R4 – P/N A20004-20
- (b) R6 – P/N A20004-14

- (2) Rudder Ratio Changer Rigging Bar – A27109-1

C. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 20-10-24/201, Rig Pins
- (3) 24-22-00/201, Electrical Power – Control
- (4) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

- (1) Location Zones

- 211/212 Control Cabin
- 324 Vertical Stabilizer – Rear Spar to Trailing Edge

- (2) Access Panels

- 324BL Feel, Centering, and Trim Mechanism
- 324EL Mechanical Control Path

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E. Prepare for the Removal

S 862-002

- (1) Supply electrical power (Ref 24-22-00).

S 862-003

- (2) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 862-004

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 012-005

- (4) Open access panels 324BL and 324EL (Ref 06-42-00).

S 862-006

- (5) Remove the pressure from the left hydraulic system (Ref 29-11-00).

S 492-007

- (6) Operate the rudder trim switch on the aft electronic control panel, P8, until you can easily install this rig pin:
- (a) R4 in the feel, centering, and trim mechanism (Fig. 202).

F. Rudder Ratio Changer Actuator (RRCA) - Removal (Fig. 201)

S 032-008

- (1) Disconnect these components:
- (a) The hydraulic hoses (16, 19, 20) to the RRCA (37).
    - 1) Install a cap on the hoses and the actuator ports.
  - (b) The RRCA electrical connectors (29, 36) and use a tag for identification.

S 032-009

- (2) If it is necessary, remove the bonding straps (45) from the RRCA (37).

S 032-010

- (3) Do these steps to remove the RRCA:
- (a) Disconnect the RRCA from the actuator mount.
  - (b) Disconnect the RRCA from the left output crank for the ratio changer mechanism.
  - (c) Remove the RRCA (37).

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S 032-011

- (4) Remove the tube unions (15, 21) and the packing (14, 22) from the return line (16) and the line to the middle PCA (20).

NOTE: Do not remove the union from the pressure line.

G. RRCA Filter - Removal

S 032-012

- (1) Remove these components:
  - (a) The filter cap (34)
  - (b) The backup rings (33) and packing (35) from the filter cap (34).

S 022-013

- (2) Remove the filter (32).

S 032-014

- (3) Remove the backup rings (30), and packing (31) from the filter (32).

H. RRCA Screen - Removal

S 032-015

- (1) Disconnect the pressure tube (19) from the RRCA.

S 032-016

- (2) Remove these components:
  - (a) The lockwire from the union (18)
  - (b) The union (18)
  - (c) The packing (17) from the union (18).

S 022-017

- (3) Remove the screen (23).

I. RRCA Electro-Hydraulic Servo Valve (EHSV) - Removal

S 032-018

- (1) Remove the lockwire.

S 032-019

- (2) Remove the four screws (26) and washers (27).

S 022-020

- (3) Remove the EHSV (25) and the gasket plate (28).
  - (a) Remove the retainer and packing.

NOTE: AIPC 27-21-13-50, items 112 and 113

J. RRCA Solenoid Valve - Removal

S 032-021

- (1) Remove the lockwire.

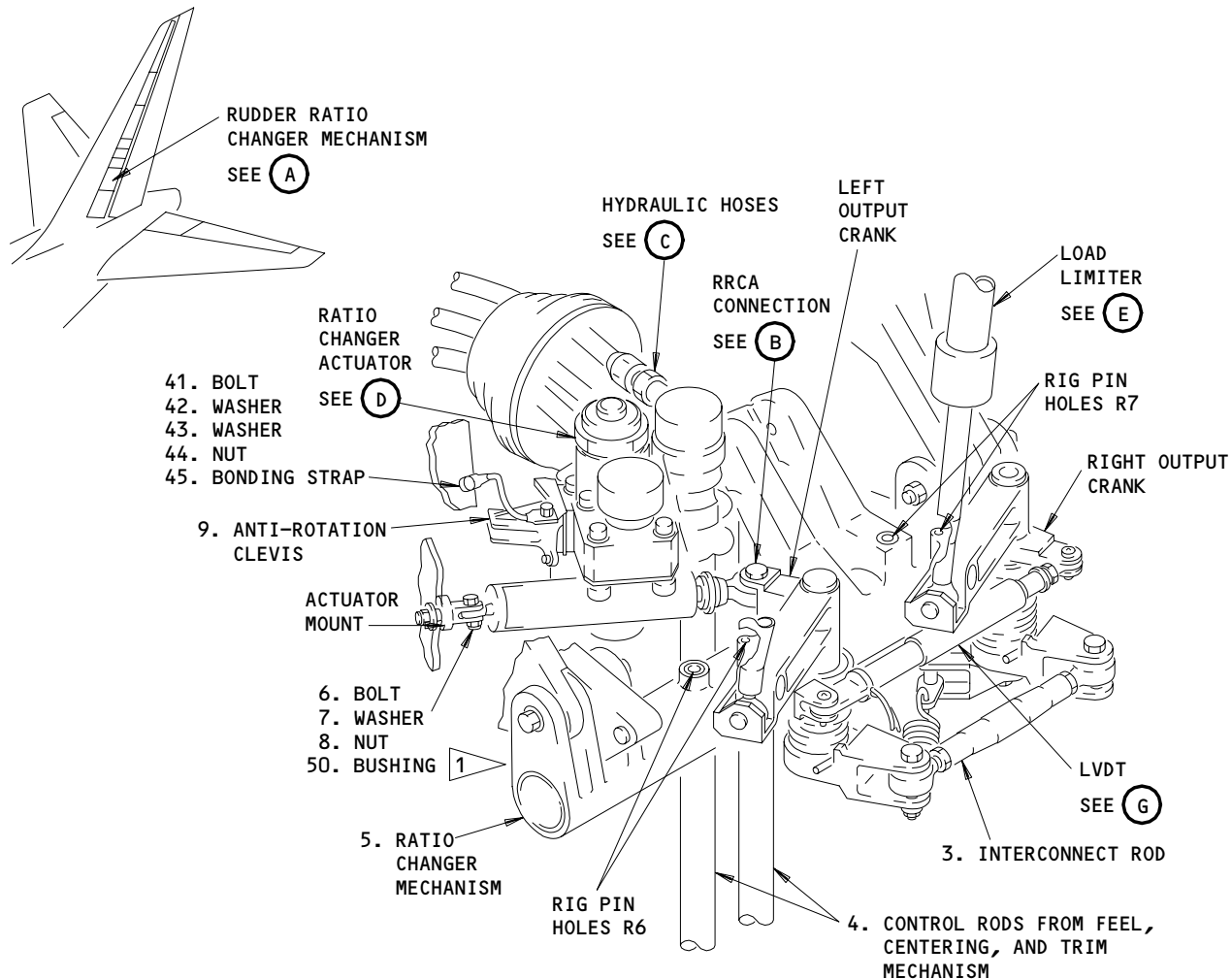
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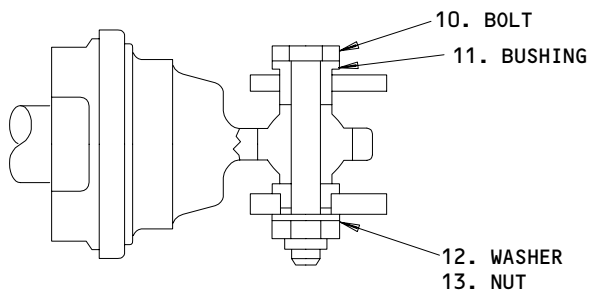
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**RUDDER RATIO CHANGER MECHANISM**

(A)



**RRCA CONNECTION**

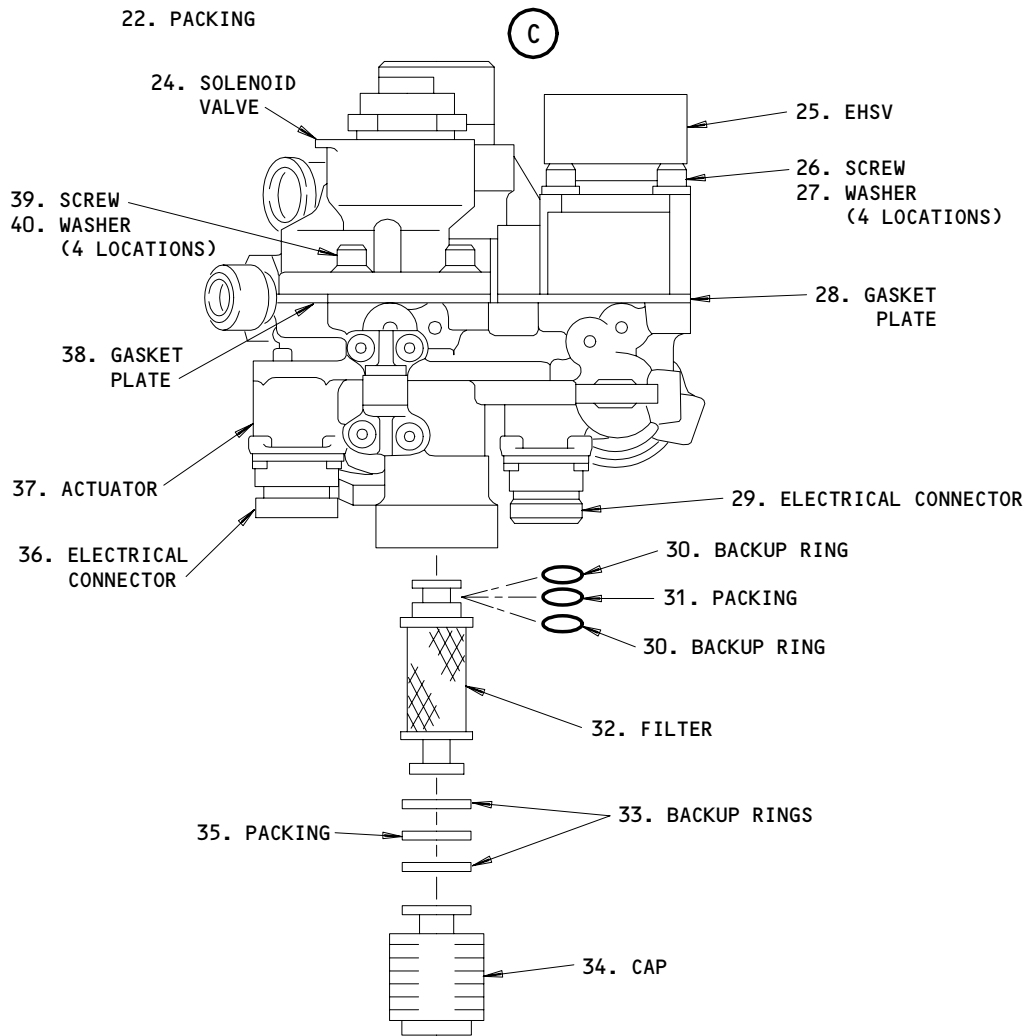
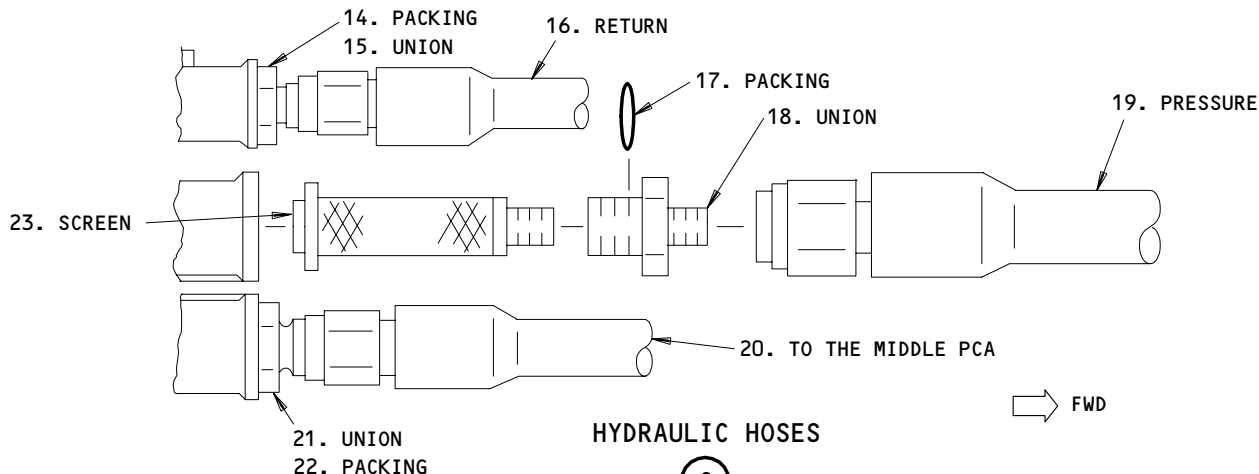
(B)

1 NOT INSTALLED ON ALL AIRPLANES

**Rudder Ratio Changer Actuator - Maintenance Practices  
Figure 201 (Sheet 1)**

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RATIO CHANGER ACTUATOR

(D)

Rudder Ratio Changer Actuator - Maintenance Practices  
Figure 201 (Sheet 2)

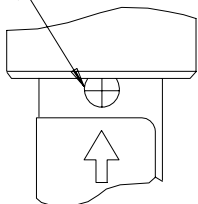
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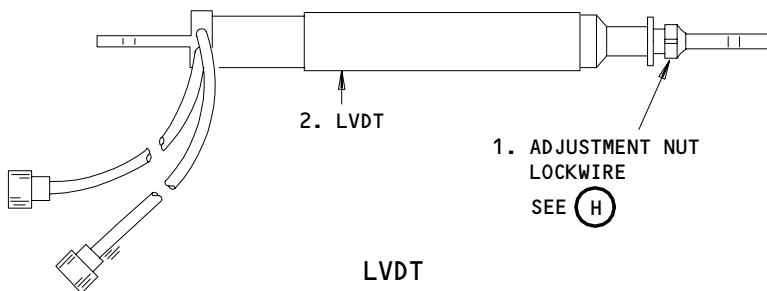
(E)

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WIDE INDEX MARK

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(F)

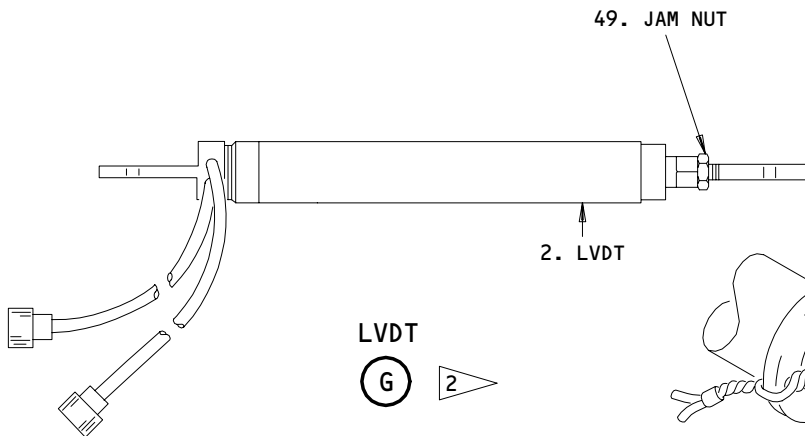


2. LVDT

1. ADJUSTMENT NUT  
LOCKWIRE  
SEE (H)

LVDT

(G) 1

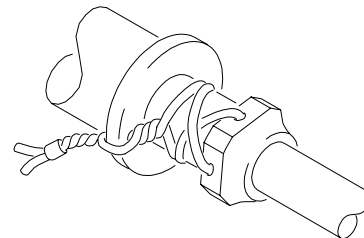


49. JAM NUT

2. LVDT

LVDT

(G) 2



ADJUSTMENT NUT LOCKWIRE

(H)

1 LVDTs WITH AN ADJUSTMENT NUT

2 LVDTs WITH CASE ADJUSTMENT

Rudder Ratio Changer Actuator - Maintenance Practices  
Figure 201 (Sheet 3)

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S 032-022

- (2) Remove the four screws (39) and washers (40).

S 022-023

- (3) Remove the solenoid valve (24) and the gasket plate (38).  
(a) Remove the retainer and packing.

NOTE: AIPC 27-21-13-50, items 112 and 113

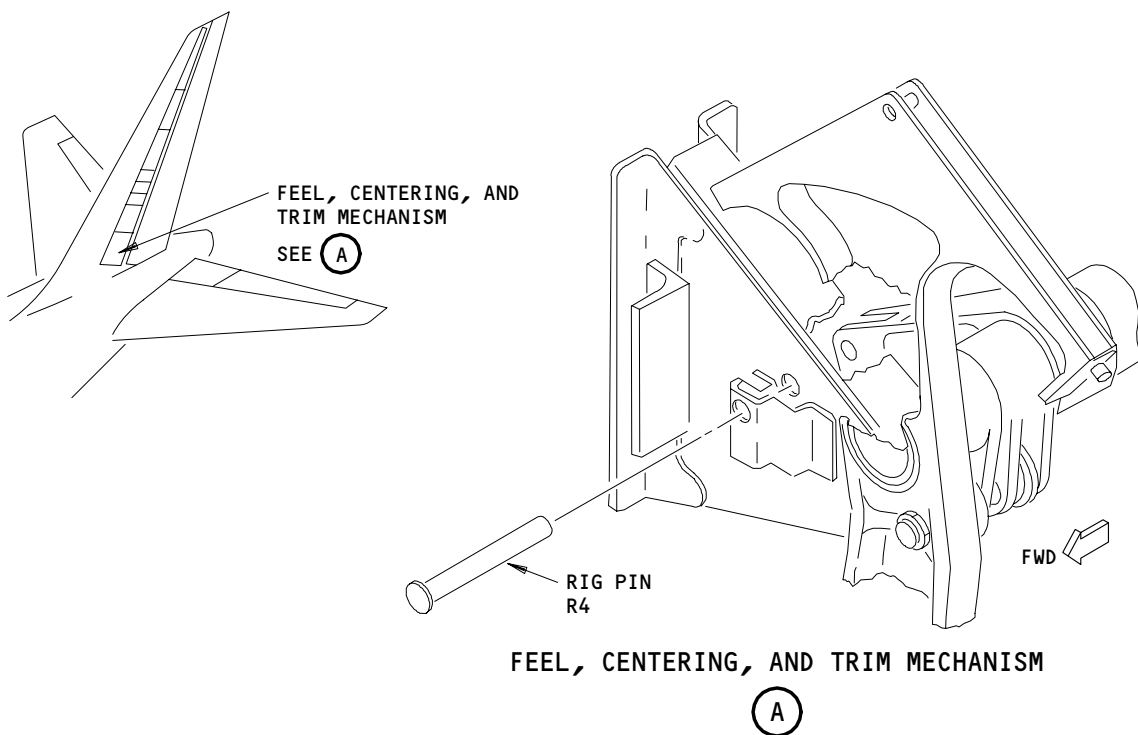
K. RRCA Support Clevis - Removal

S 022-066

- (1) Disconnect the RRCA from the left output crank.

S 022-070

- (2) Disconnect the RRCA from the support clevis.



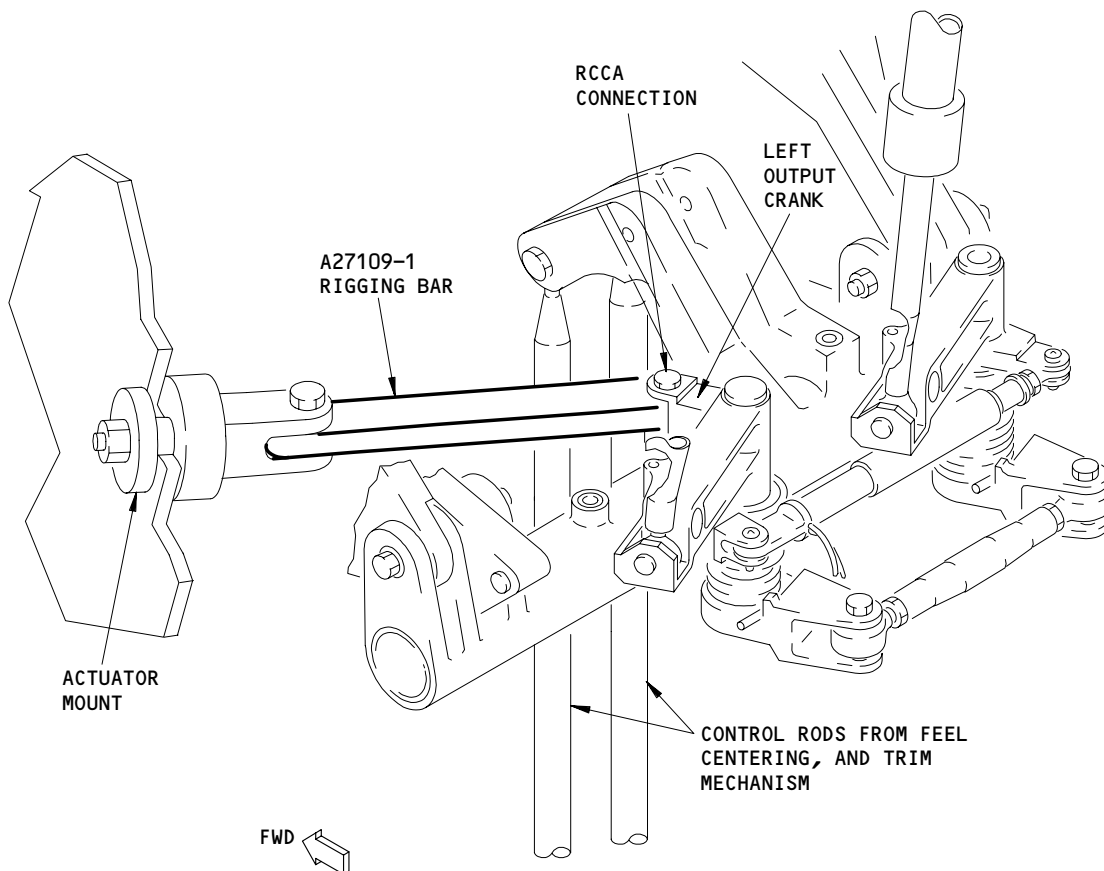
Ratio Changer Actuator  
Figure 202

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**RUDDER RATIO CHANGER RIGGING BAR**

**Rudder Ratio Changer Actuator - Maintenance Practices  
Figure 203**

EFFECTIVITY	ALL
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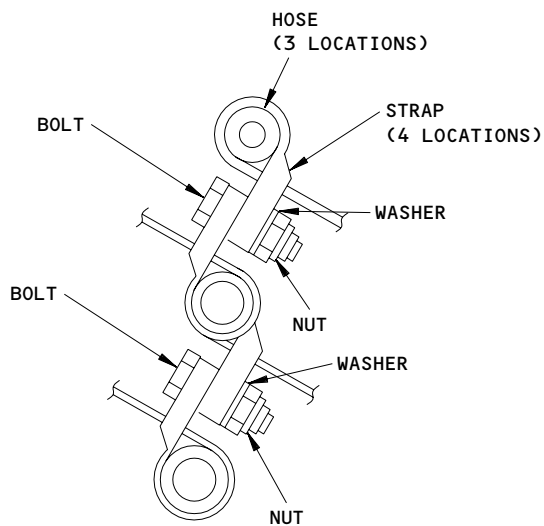
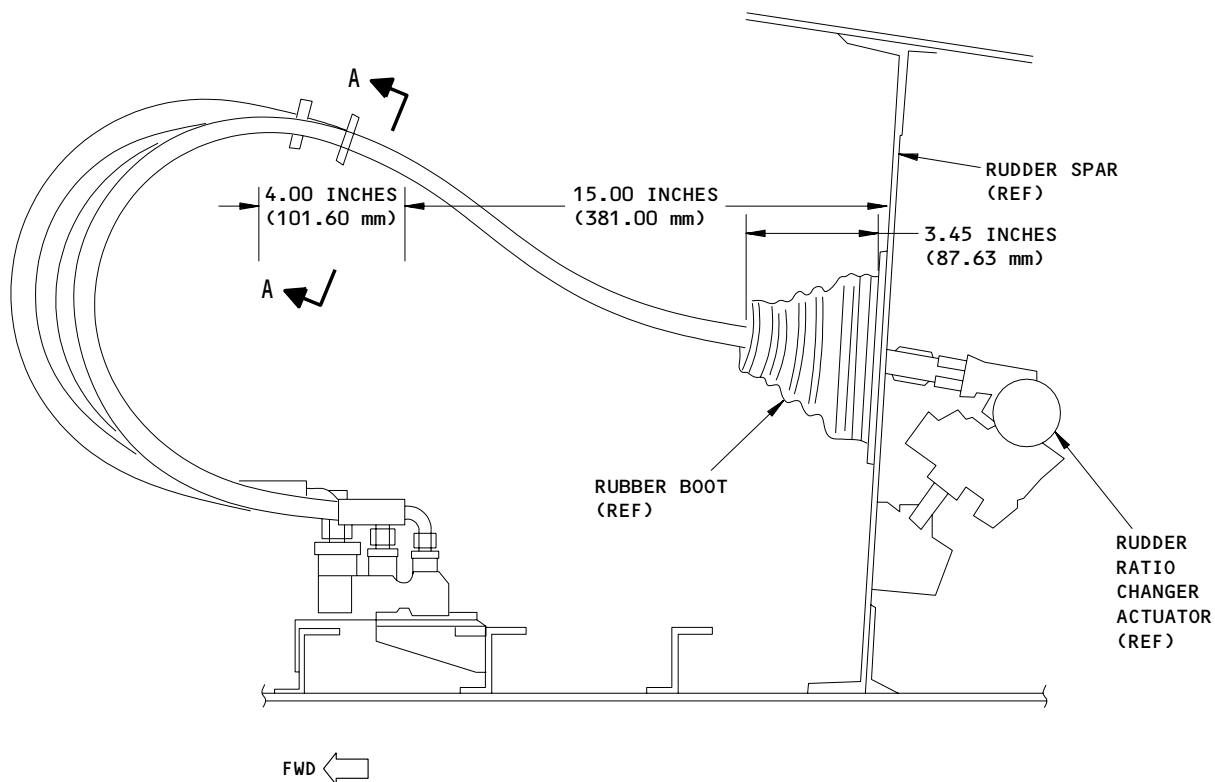
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A-A

Rudder Ratio Changer Actuator Hydraulic Hose Strap Inspection  
Figure 204

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S 022-067

- (3) Remove the support fitting, nut, washer, and shims.

**NOTE:** Do not lose or cause damage to the shims. The shim thickness sets the rig length of the RRCA.

- (a) If it is necessary, you can adjust the shim thickness (you can use the rudder ratio changer rigging bar, A27109-1) (Fig. 203).
- 1) Install the rigging bar, A27109-1, between the actuator mount and left output shaft.
  - 2) Add or remove shims until you can easily install and remove the rig pin R6. Keep a record of the shim thickness.
  - 3) Remove the rigging bar, A27109-1.

TASK 27-21-15-422-024

3. Rudder Ratio Changer Actuator and its Components - Installation

A. General

- (1) This task contains these procedures:

- Rudder Ratio Changer Actuator (RRCA) - Installation
- RRCA Filter - Installation
- RRCA Screen - Installation
- RRCA Electro-Hydraulic Servo Valve (EHSV) - Installation
- RRCA Solenoid Valve - Installation
- RRCA Support Clevis - Installation
- RRCA Hydraulic Hose Strap - Inspection
- RRCA - Test

Because this task contains more than one procedure, do only the applicable groups of steps.

To start one of the procedures, do the group of steps necessary to install the component. Then, do the "Hydraulic Hose Strap - Inspection" group of steps. Then, do the "RRCA - Test" group of steps. And last, do the "Put the Airplane Back to Its Usual Condition" group of steps.

B. Equipment

- (1) Bonding Meter - Avtron Model, T477W  
Avtron Manufacturing Inc.  
Cleveland, Ohio

C. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)

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- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) A00436 Sealant - BMS 5-45 (Supersedes BMS 5-26 Sealant)
- (4) D00153 Hydraulic Fluid - BMS 3-11
- (5) D00054 Lubricant - MCS 352B

D. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
201	14	Packing	27-21-13	01	78
			27-21-13	01B	100
	17	Packing	27-21-13	50	40
	22	Packing	27-21-13	01	84
			27-21-13	01B	110
	28	Gasket Plate	27-21-13	50	115
	30	Backup Ring			25
	31	Packing			30
	32	Filter			20
	33	Backup Ring			10
	35	Packing			15
	37	Actuator	27-21-13	01	75
			27-21-13	01B	90

E. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 27-21-00/501, Rudder and Rudder Trim Control System
- (4) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

F. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 311 Area Aft of Pressure Bulkhead to BS 1725 (Left)
  - 324 Vertical Stabilizer - Rear Spar to Trailing Edge
- (2) Access Panels
  - 311AZ Dorsal Fin
  - 324BL Feel, Centering, and Trim Mechanism
  - 324EL Mechanical Control Path

G. Rudder Ratio Changer Actuator (RRCA) - Installation

- S 642-025
  - (1) Apply grease to the bolts before you install them.
- S 432-026
  - (2) Install the packing (14, 22) tube and the unions (15, 21) to the RRCA return line (16) and the line to the middle PCA (20).

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S 422-027

- (3) Do these steps to install the RRCA:
- (a) Install the bolt (10), bushing (11), washer (12), and nut (13) that connect the RRCA (37) to the left output crank for the ratio changer mechanism.
  - (b) SAS 050, 051, 150-157, 162-167, 275-278, 280 WITHOUT SB27-127; Install the bolt (6), washer (7), and nut (8) that connect the RRCA (37) to the actuator mount.
  - (c) SAS 050, 051, 150-157, 162-167, 275-278, 280 WITH SB27-127 AND SAS 052-149, 158-161, 168-274, 279, 281-999; Install the bolt (6), washer (7), bushing (50), and nut (8) that connect the RRCA (37) to the actuator mount.

S 432-028

- (4) If it is necessary, do these steps to connect the bonding straps (45) to the RRCA:
- (a) Put the bolt (4) through the washer (5), strap (8), and the actuator connection point.
  - (b) Install the washer (6) and the nut (7).
  - (c) Make sure the resistance between the RRCA solenoid valve and the vertical fin rear spar is less than 6 milliohms.

S 432-029

- (5) Connect the RRCA electrical connectors (29, 36).

S 432-030

- (6) Connect the hydraulic hoses (16, 19, 20) to the RRCA (37).

S 822-071

- (7) Do the Rudder Ratio Changer Actuator (RRCA) - Oscillation Check (AMM 27-21-00/501).

S 822-031

- (8) Do the RRCA - Test for the rudder ratio changer mechanism.

H. RRCA Filter - Installation

S 642-032

- (1) Lubricate the cap (34) seal, packing (31, 35), and backup rings (30, 33) with hydraulic fluid before you install them.

S 432-033

- (2) Install the packing (31) and the backup rings (30) on the filter (32).

S 432-034

- (3) Put the filter (32) in its correct location in the RRCA.

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- S 432-035
- (4) Do these steps to install the filter cap (34):
    - (a) Install the packing (35) and the backup rings (33) on the cap (34).
    - (b) Apply the sealant to the cap (34) threads.
    - (c) Install the cap (34) and tighten it.
    - (d) Install the lockwire.
- I. RRCA Screen - Installation
- S 642-036
- (1) Lubricate the packing (17) with some hydraulic fluid.
- S 432-037
- (2) Put the screen (23) in its correct location in the RRCA (37).
- S 432-038
- (3) Install the packing (17) on the union (18).
- S 432-039
- (4) Install the union (18) and tighten it to 480-500 pound-inches (54.3-56.5 newton-meters).
- S 432-040
- (5) Install the lockwire.
- S 432-041
- (6) Connect the pressure port tubing (19) to the RRCA (37).
- J. RRCA Electro-Hydraulic Servo Valve (EHSV) - Installation
- S 432-042
- (1) Align the gasket plate (28) and the EHSV (25) with the four screw holes in the RRCA.
    - (a) Install the retainer and packing.
- NOTE: AIPC 27-21-13-50, items 112 and 113
- S 642-043
- (2) Apply some of the lubricant to the screws (26).
- S 432-044
- (3) Install the washers (27) and screws (26) and tighten them to 27-32 pound-inches.
- S 432-045
- (4) Install the lockwire.
- S 822-072
- (5) Do the Rudder Ratio Changer Actuator (RRCA) - Oscillation Check (AMM 27-21-00/501).

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S 822-073

- (6) Do the RRCA – Test for the rudder ratio changer mechanism (AMM 27-21-15-2/501).

K. RRCA Solenoid Valve – Installation

S 432-046

- (1) Align the gasket plate (38) and the solenoid valve (24) with the four screw holes in the RRCA.
  - (a) Install the retainer and packing.

NOTE: AIPC 27-21-13-50, items 112 and 113

S 642-047

- (2) Apply some of the lubricant to the screws (39).

S 432-048

- (3) Install the washers (40) and screws (39) and tighten them to 27-32 pound-inches.

S 432-049

- (4) Install the lockwire.

L. RRCA Support Clevis – Installation

S 422-068

- (1) Install the support fitting, shims, nut, and washer.

S 422-069

- (2) Connect the RRCA:
  - (a) Connect the RRCA to the support Clevis.
  - (b) Connect the RRCA to the left output crank.
    - 1) Make sure that the rig pin R6 can easily be installed and removed.

M. RRCA Hydraulic Hose Strap – Inspection (Fig. 204)

S 012-086

- (1) Open the access panel 311AZ (AMM 06-42-00/201).

S 212-082

- (2) Examine the RRCA hydraulic hose straps for damage.

S 962-084

- (3) Replace the straps if necessary.

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- S 222-083
- (4) Examine the RRCA hydraulic hose straps for the correct location.
- S 822-085
- (5) Adjust the straps if necessary.
- S 412-087
- (6) Close the access panel 311AZ (AMM 06-42-00/201).
- N. RRCA - Test
- S 092-050
- (1) Remove rig pin R4.
- S 862-051
- (2) Operate the rudder trim switch on the aft electronic control panel, P8, until the trim indicator shows 3 to 5 units of left trim.
- S 492-052
- (3) Manually turn the feel, centering, and trim mechanism clockwise until you can install rig pin R4.
- NOTE:** The feel springs push against the rig pin and keep the quadrant in a stable position during the adjustment.
- S 862-053
- WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.
- (4) Supply pressure to the left, right, and center hydraulic systems (Ref 29-11-00).
- S 862-054
- (5) Remove DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT
- S 862-075
- (6) Remove DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to ON.

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S 212-056

- (7) Move the left rudder ratio changer module (RRCM) test switch on the E1 equipment shelf, to TEST and do these checks:

**NOTE:** You can use the left or right RRCM to do this test.

- (a) Make sure the IN TEST light for each RRCM stays on for a maximum of 18 seconds.
- (b) Make sure the RRCA fully extends.
- (c) Make sure you can easily install and remove rig pins R6 and R7.
- (d) If you cannot easily install and remove rig pins R6 and R7, do the adjustment procedure for the rudder ratio changer mechanism (Ref 27-21-00).
- (e) After 30 seconds, make sure all the RRCM faultballs are black.
- (f) Observe the RRCA and rudder ratio changer output arms for oscillations. If oscillation are noted, troubleshoot and correct the oscillation before you complete this procedure.
- (g) Make sure the rudder does not move more than 0.03 inches (0.762 mm) when you move the RRCM test switch between NORMAL and TEST
- (h) Do this step if the rudder moves more than 0.03 inches (0.762 mm) :
  - 1) Do the adjustment procedure for the rudder ratio changer mechanism (AMM 27-21-00/501).
- (i) Move the rudder ratio changer test switch back to NORMAL and do these checks:
  - 1) Make sure the IN TEST light for each RRCM stays on for a maximum of 18 seconds.
  - 2) Make sure the RRCA retracts fully.
  - 3) After 30 seconds, make sure all the RRCM faultballs are black.

S 092-060

- (8) Remove rig pin R4.

S 862-061

- (9) Operate the rudder trim switch, on the P8 panel, until the rudder trim indicator shows zero units of trim and do these checks:
- (a) Make sure the rudder position indicator aligns with the neutral mark (use a tolerance of one-half an arrow width).
  - (b) Make sure the rudder is in its neutral position.

0. Put the Airplane Back to Its Usual Condition

S 212-062

**CAUTION:** MAKE SURE THE RRCM TEST SWITCH IS IN ITS "NORMAL" POSITION. IF THE SWITCH IS IN ITS "TEST" POSITION, THE "RUDDER RATIO" LIGHT WILL COME ON AND WILL PREVENT AIRPLANE DISPATCH.

- (1) Make sure the RRCM test switch is in its NORMAL position.

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- S 862-063
- (2) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).
- S 862-064
- (3) Remove electrical power if it is not necessary (Ref 24-22-00).
- S 412-065
- (4) Close access panels 324BL and 324EL (Ref 06-42-00).

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YAW DAMPER SUMMING LEVER ASSEMBLY – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and installation tasks for the yaw damper summing lever.

TASK 27-21-18-024-003

2. Yaw Damper Summing Lever – Removal

A. Equipment

- (1) Rig Pins from Set A20004-XX (Ref 20-10-24):  
    (a) R4 – P/N A20004-20  
    (b) R5 – P/N A20004-13  
(2) Nose Gear Towing Lever Lockpin – A09003-1

B. References

- (1) 06-42-00/201, Empennage Access Doors and Panels  
(2) 20-10-24/201, Rig Pins  
(3) 24-22-00/201, Electrical Power – Control

C. Access

- (1) Location Zone  
    324 Vertical Stabilizer, Rear Spar to Trailing Edge  
  
(2) Access Panels  
    324BL TE of Vertical Stabilizer  
    324EL Rudder Mechanical Linkages  
    324JL TE of Vertical Stabilizer

D. Prepare for the Removal

S 864-004

- (1) Supply electrical power (Ref 24-22-00).

S 864-005

- (2) Move the FLT CONTROL SHUTOFF TAIL L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights are ON.

S 864-006

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
    (a) 11A18, YAW DAMPER L  
    (b) 11F34, YAW DAMPER R  
    (c) 11G10, RUDDER RATIO  
    (d) 11H17, FLT CONT SHUTOFF TAIL LEFT  
    (e) 11H18, FLT CONT SHUTOFF TAIL CTR  
    (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 494-007

- (4) Move the towing lever on the metering valve module to the tow position and install the towing lever lockpin in the nose gear.

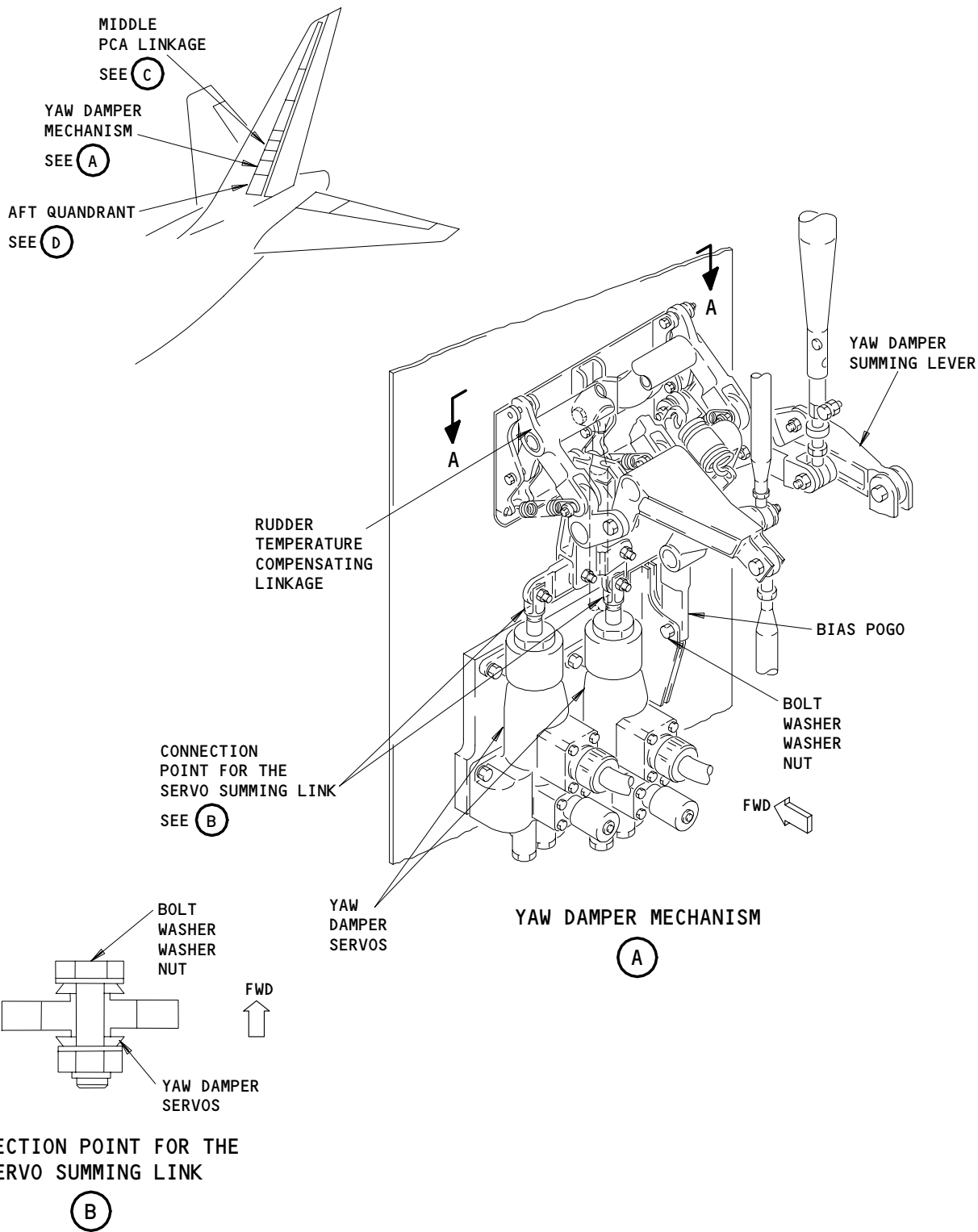
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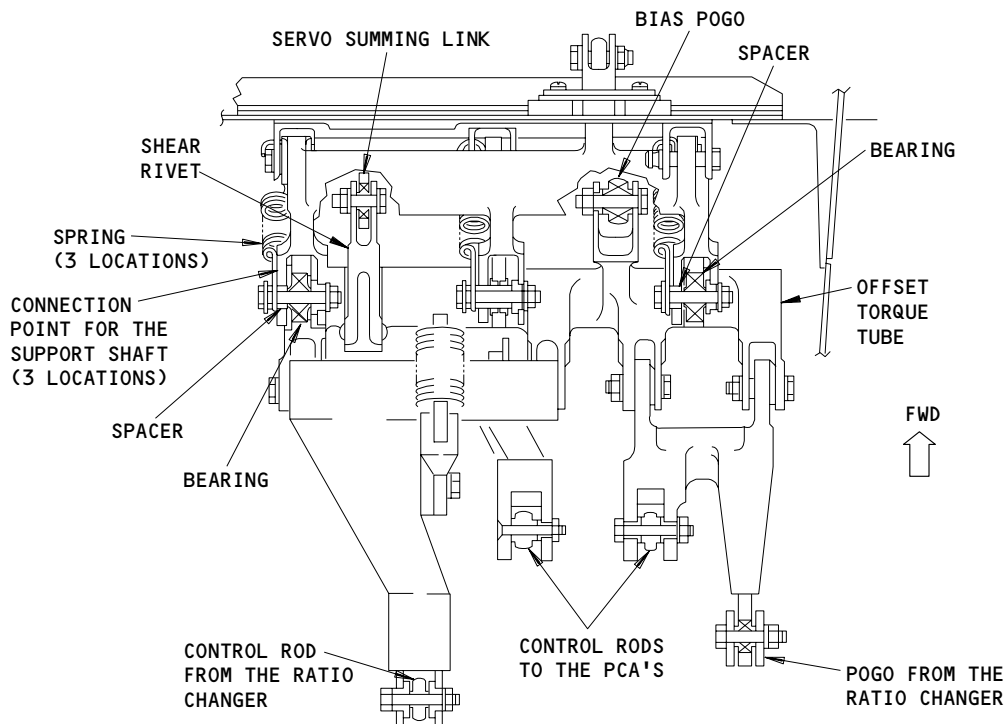
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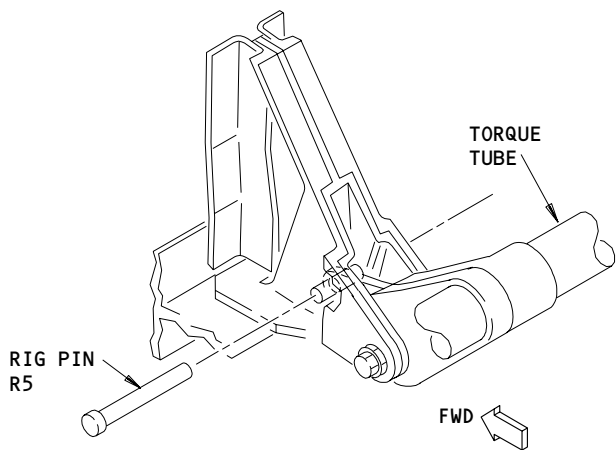
Yaw Damper Summing Lever Installation  
Figure 401 (Sheet 1)

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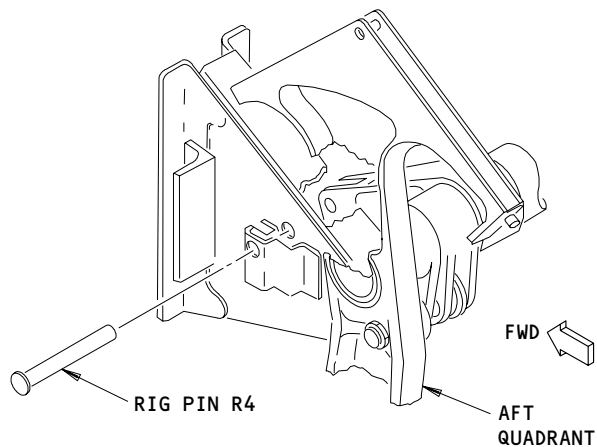


CONNECTION POINTS FOR THE SUMMING LEVER  
A-A



MIDDLE PCA LINKAGE

(C)



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(D)

Yaw Damper Summing Lever Installation  
Figure 401 (Sheet 2)

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- S 014-008
- (5) Open access panels 324BL, 324EL, and 324JL (Ref 06-42-00).
- S 494-009
- (6) Install these rig pins:
- (a) R4 (for the rudder feel, centering, and trim mechanism)
  - (b) R5 (for the middle power control actuator).
- E. Remove the Summing Lever (Fig. 401)
- S 034-010
- (1) Disconnect these components from the summing lever:
- (a) The control rods that are connected to the rudder ratio changer.
  - (b) The control rods that are connected to the power control actuators (PCA).
  - (c) The bias pogo.
- S 034-011
- (2) Disconnect the servo summing link from the yaw damper servos.
- S 034-015
- (3) Disconnect the summing lever from the connection points for the support shaft (3 locations).
- S 024-016
- (4) Remove the summing lever.

TASK 27-21-18-404-033

3. Yaw Damper Summing Lever - Installation

A. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

B. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 22-21-00/501, Yaw Damper System
- (3) 24-22-00/201, Electrical Power - Control
- (4) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

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C. Access

- (1) Location Zone  
324 Vertical Stabilizer, Rear Spar to Trailing Edge
- (2) Access Panels
  - 324BL TE of Vertical Stabilizer
  - 324EL Rudder Mechanical Linkages
  - 324JL TE of Vertical Stabilizer

D. Install the Summing Lever

- S 644-017
  - (1) Apply grease to the bushings, bearing, and spacer before you install them.
- S 434-021
  - (2) Install the bolts, bushings, springs, bearing, and spacer at the connection points for the support shaft.
- S 434-022
  - (3) Connect the servo summing link to the yaw damper servos.
- S 434-023
  - (4) Connect these components to the summing lever:
    - (a) The control rods from the rudder PCAs.
    - (b) The control rods from the rudder ratio changer.
- S 094-024
  - (5) Remove these rig pins:
    - (a) R4 (for the rudder feel, centering, and trim mechanism)
    - (b) R5 (for the middle PCA linkage).
- S 864-001

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (6) Supply pressure to the left, right, and center hydraulic systems (Ref 29-11-00).

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S 864-026

- (7) Push the STATUS button on the display select panel, P9, to show the rudder position indicator on the bottom EICAS display.

S 864-027

- (8) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11A18, YAW DAMPER L
  - (b) 11F34, YAW DAMPER R
  - (c) 11G10, RUDDER RATIO
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 864-028

- (9) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to ON.

S 714-029

- (10) Move the rudder pedals through their full travel range and do these checks:
- (a) Make sure the rudder moves smoothly through its full travel range.
  - (b) Make sure the rudder position indicator operates correctly and moves to its full scale mark in each direction.

S 714-030

- (11) Do the operational test for the yaw damper system (Ref 22-21-00).  
E. Put the Airplane Back to Its Usual Condition

S 094-002

**WARNING:** STAY AWAY FROM THE NOSE WHEELS WHEN THE LOCKPIN IS REMOVED. THE WHEELS CAN TURN TO THE CENTER POSITION QUICKLY, AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the nose wheels are in their center position and remove the towing lever lockpin from the nose gear.

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- S 864-031
- (2) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).
- S 864-032
- (3) Remove electrical power if it is not necessary (Ref 24-22-00).

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RUDDER TEMPERATURE COMPENSATING LINKAGE – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and installation tasks for the support shaft assembly and the grounding rods. These items are part of the rudder temperature compensating linkage.

TASK 27-21-19-024-004

2. Rudder Temperature Compensating Linkage – Removal

A. General

- (1) This task contains two procedures, one to remove the support shaft assembly, and one to remove the grounding rods. Because this procedure contains two procedures, do only the applicable groups of steps.

To start one of these procedures, do the "Prepare for the Removal" group of steps. Then, do the group of steps that is necessary to remove the component.

B. Equipment

- (1) Rig Pins from Set A20004-XX (Ref 20-10-24):  
(a) R4 – P/N A20004-20  
(b) R5 – P/N A20004-13  
(2) Nose Gear Towing Lever Lockpin – A09003-1

C. References

- (1) 06-42-00/201, Empennage Access Doors and Panels  
(2) 20-10-24/201, Rig Pins  
(3) 24-22-00/201, Electrical Power – Control  
(4) 27-21-18/401, Yaw Damper Summing Lever Assembly

D. Access

- (1) Location Zones  
311/312 Area Aft of Pressure Bulkhead to BS 1725  
324 Vertical Stabilizer, Rear Spar to Trailing Edge
- (2) Access Panels  
311AZ Dorsal Fin  
312AR Stabilizer Jackscrew  
324BL T.E. of the Vertical Stabilizer  
324EL Rudder Mechanical Linkages  
324JL T.E. of the Vertical Stabilizer

E. Prepare for the Removal

- S 864-005  
(1) Supply electrical power (Ref 24-22-00)
- S 864-006  
(2) Move the FLT CONTROL SHUTOFF TAIL switches L, R, and C on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

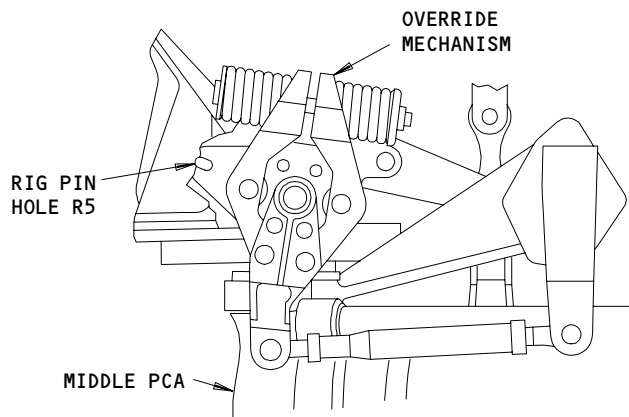
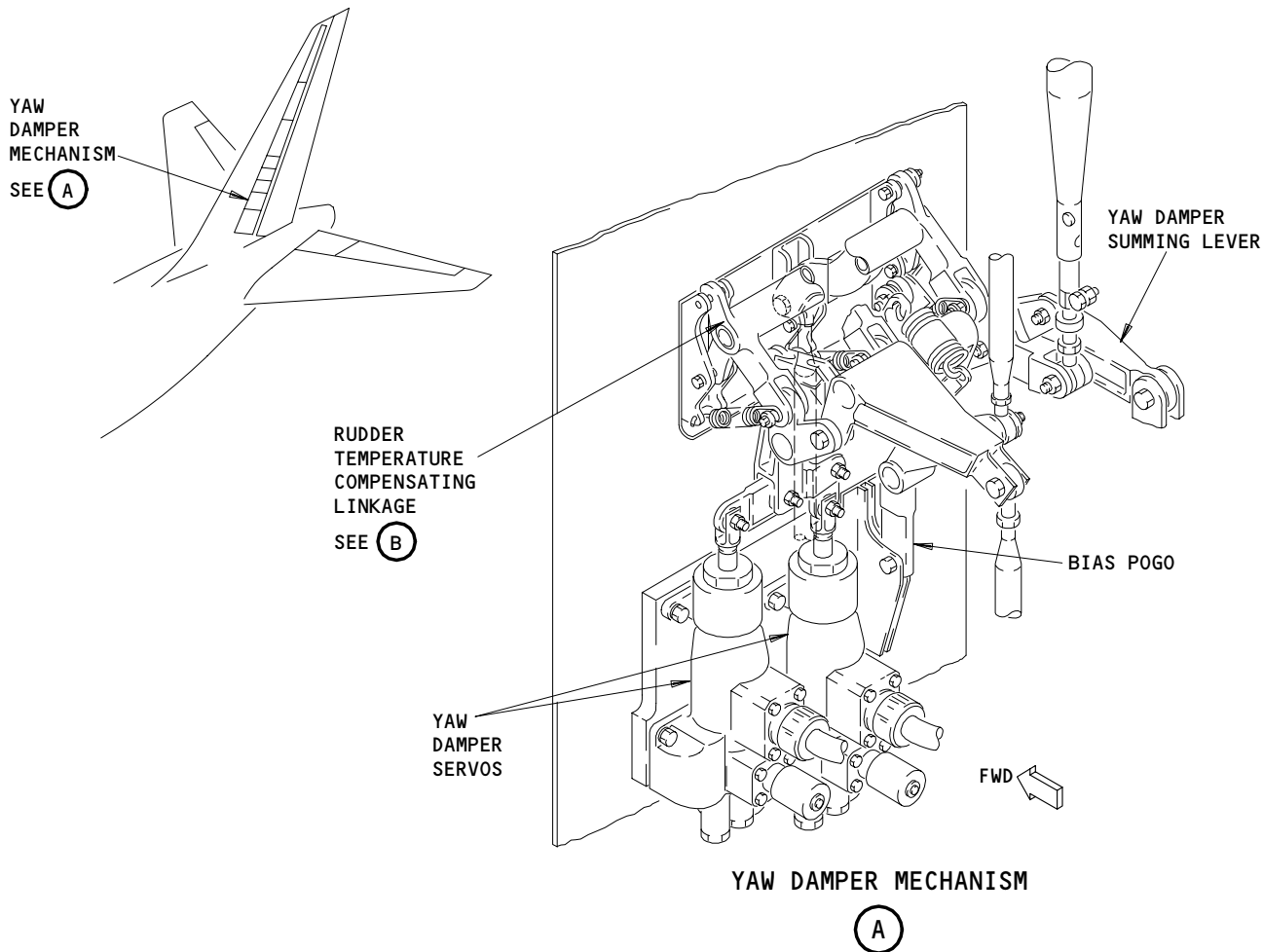
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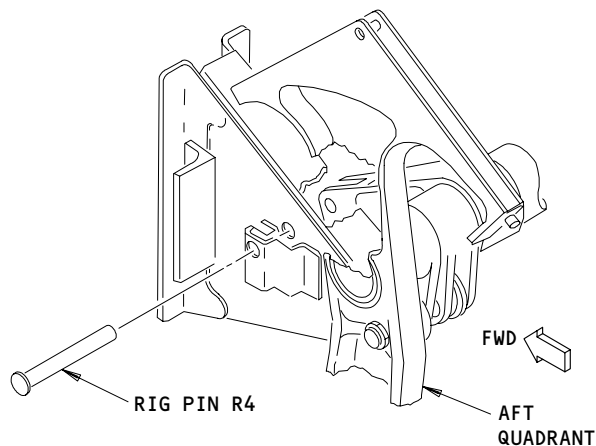
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MIDDLE PCA LINKAGE

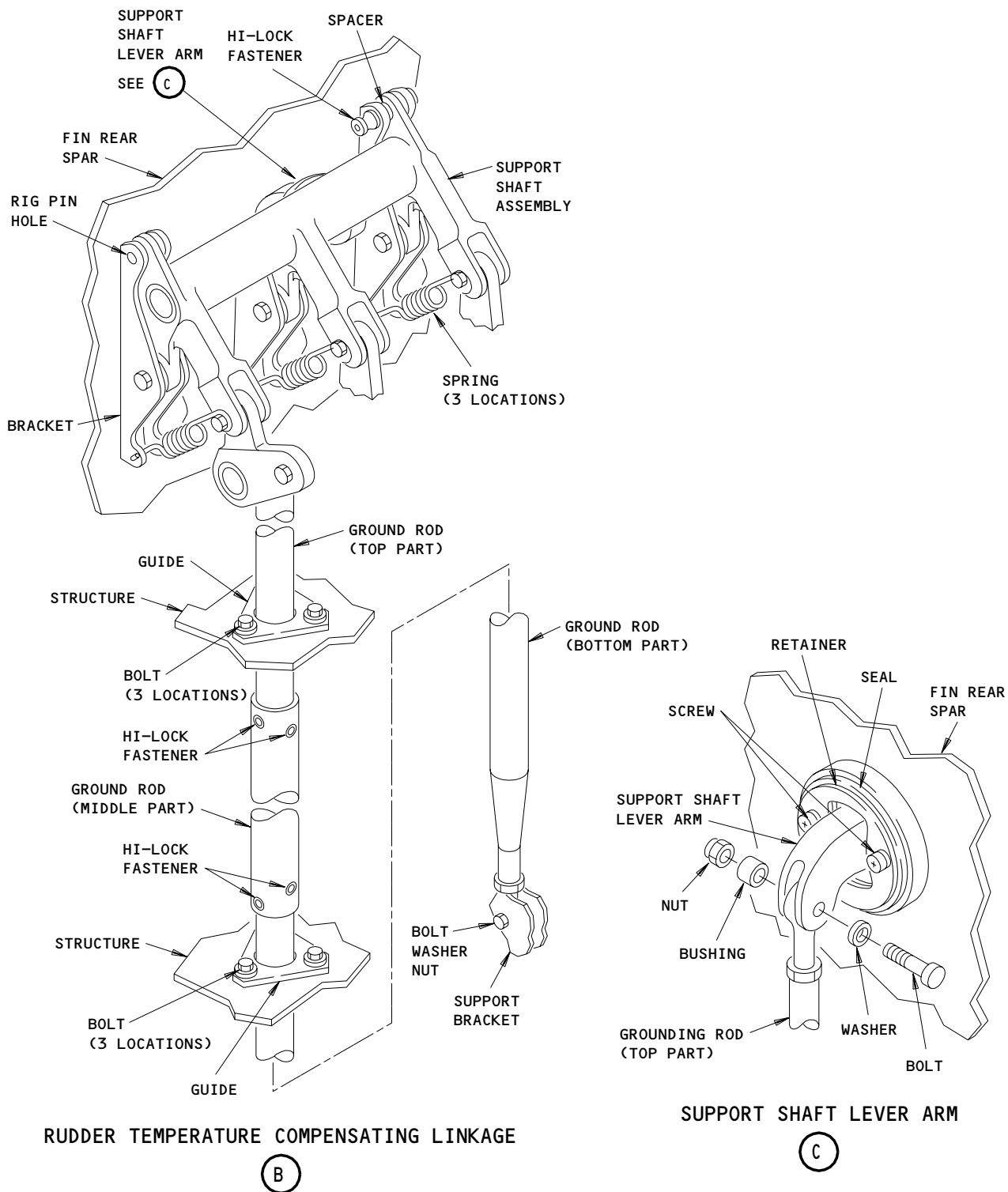


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Rudder Temperature Compensating Linkage Installation  
Figure 401 (Sheet 1)

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Rudder Temperature Compensating Linkage Installation  
Figure 401 (Sheet 2)

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S 864-007

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11A18, YAW DAMPER L
  - (b) 11F34, YAW DAMPER R
  - (c) 11G10, RUDDER RATIO
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 494-008

- (4) Move the towing lever on the metering valve module to the tow position and install the towing lever lockpin in the nose gear.

S 014-001

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (5) Open access doors 312AR and 311AZ and access panels 324BL, 324EL, and 324JL (Ref 06-42-00).

S 494-009

- (6) Install these rig pins:
- (a) R4 (for the rudder feel, centering, and trim mechanism)
  - (b) R5 (for the middle power control actuator).

F. Remove the Support Shaft Assembly (Fig. 401)

S 024-010

- (1) Remove the Yaw Damper Summing Lever Assembly (Ref 27-21-18).

S 034-011

- (2) Disconnect the top end of the grounding rod from the support shaft lever arm.

S 034-012

- (3) Remove these components:
- (a) The seal and retainer from the fin rear spar
  - (b) The "hi-lock" fastener that connects the support shaft to its bracket
  - (c) The bolts that connect the support shaft to its brackets (3 locations).

S 024-013

- (4) Remove the support shaft assembly.

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G. Remove the Grounding Rod (Fig. 401)

S 034-014

- (1) Remove the "hi-lock" fasteners that connect the middle part of the grounding rod to the top and bottom parts.

S 034-015

- (2) Disconnect these components:
  - (a) The top part of the grounding rod from the support shaft lever arm
  - (b) The bottom part of the grounding rod from the support bracket.

S 034-016

- (3) Loosen the bolts that connect the guides to the fin rear spar.

S 024-017

- (4) Remove the grounding rod parts.

TASK 27-21-19-424-018

3. Rudder Temperature Compensating Linkage - Installation

A. General

- (1) This task contains two procedures, one to install the support shaft assembly, and one to install the grounding rods. Because this task contains two procedures, do only the applicable groups of steps.

To start one of these procedures, do the group of steps that are necessary to install the component. Then, do the "Rudder Operation - Test" group of steps. And last, do the "Put the Airplane Back to Its Usual Condition" group of steps.

B. Equipment

- (1) Rig Pins from Set A20004-XX (Ref 20-10-24):
  - (a) R8 - P/N A20004-12

C. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)
- (3) D00247 Sealant, Chromate type - BMS 5-95

D. References

- (1) 06-42-00/201, Empennage Access Doors and Panels

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- (2) 20-10-24/201, Rig Pins
- (3) AMM 22-21-00/501, Yaw Damper System
- (4) 24-22-00/201, Electrical Power - Control
- (5) 27-21-18/401, Yaw Damper Summing Lever Assembly
- (6) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

E. Access

(1) Location Zones

- 311/312 Area Aft of Pressure Bulkhead to BS 1725
- 324 Vertical Stabilizer, Rear Spar to Trailing Edge

(2) Access Panels

- 311AZ Dorsal Fin
- 312AR Stabilizer Jackscrew
- 324BL T.E. of the Vertical Stabilizer
- 324EL Rudder Mechanical Linkages
- 324JL T.E. of the Vertical Stabilizer

F. Install the Support Shaft Assembly (Fig. 401)

S 644-019

- (1) Apply grease to the bushings before you install them.

S 434-020

- (2) Install the bushings and bolts that connect the support shaft to its brackets (3 locations).

S 434-021

- (3) Put the seal and the retainer on the support shaft lever arm.

NOTE: Do not connect them to the fin structure.

S 434-022

- (4) Connect the grounding rod to the support shaft lever arm.

S 434-023

- (5) Install the "hi-lock" fastener that connects the support shaft assembly to its bracket.

NOTE: This connection will be loose.

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- S 424-026
- (6) Install the Yaw Damper Summing Lever Assembly (Ref 27-21-18).
- S 214-025
- (7) Make sure a .2900 diameter rod (L size drill) can go through the rig pin hole in the bracket.
- S 824-027
- (8) Do these steps if the rod does not go through its hole:
- (a) Disconnect the grounding rod from the support shaft lever arm.
  - (b) Install rig pin R8 in the rig pin hole on the bracket.
- NOTE: Rig pin R8 is used but you could use a rod with an equivalent diameter to rig pin R8. This is not the rig pin R8 location.
- (c) Remove the "hi-lock" fasteners from the bottom end of the middle part of the grounding rod.
  - (d) Loosen the bolts that connect the guides to the fin structure.
  - (e) Connect the top part of the grounding rod to the support shaft lever arm.
  - (f) Tighten the bolts that connect the guides to the fin structure.
  - (g) Drill the "hi-lock" fastener holes until the next larger fastener will fit in the grounding rod.
  - (h) Install the larger "hi-lock" fasteners in the holes you drilled.
  - (i) Remove rig pin R8.
- S 434-028
- (9) Tighten the screws that connect the retainer and the seal to the fin rear spar.
- S 094-029
- (10) Remove the rod from the rig pin hole.
- S 094-030
- (11) Remove these rig pins:
- (a) R4 (for the rudder feel, centering, and trim mechanism)
  - (b) R5 (for the rudder middle power control actuator)

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S 414-031

- (12) Close access panels 324BL, 324EL, 324JL, and access doors 311AZ and 312AR (Ref 06-42-00).

G. Install the Grounding Rod

S 494-032

- (1) Install rig pin R8 in the rig pin hole on the support shaft assembly.

NOTE: This is the rig pin R8 location.

S 434-033

- (2) Do these steps to connect the grounding rod:  
(a) Put the grounding rod parts in their correct positions.

NOTE: The top and bottom parts must go through their guides before they go into the middle part of the grounding rod.

- (b) Connect the top part of the grounding rod to the support shaft lever arm.  
(c) Connect the bottom part of the grounding rod to the support bracket.

S 824-034

- (3) Do these steps to adjust the length of the grounding rod:  
(a) Move the middle part of the grounding rod until this condition is satisfactory:  
1) Make sure the distance between the ends of the middle part and the drain holes of the top and bottom parts are equal (approximately).  
(b) Tighten the bolts that connect the guides to the structure.  
(c) Use the hole locations shown on the middle part of the grounding rod to drill the 0.247 - 0.250 diameter holes.  
(d) Install "hi-lock" fasteners in the grounding rod holes.  
(e) Loosen the screws that hold the retainer and the seal to the fin.  
(f) Make sure the seal is in a satisfactory position (against the groove of the support shaft lever arm) and tighten the screws.

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S 094-035

- (4) Remove these rig pins:
- (a) R4 (for the rudder feel, centering, and trim mechanism)
  - (b) R5 (for the rudder middle power control actuator)
  - (c) R8 (for the support shaft assembly).

S 414-036

- (5) Close access panels 324BL, 324EL, 324JL, and access doors 311AZ and 312AR (Ref 06-42-00).

H. Rudder Operation - Test

S 864-002

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply pressure to the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-037

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11A18, YAW DAMPER L
  - (b) 11F34, YAW DAMPER R
  - (c) 11G10, RUDDER RATIO
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 864-039

- (3) Push the STATUS button on the display select panel, P9, to show the rudder position indicator on the bottom EICAS display.

S 864-040

- (4) Remove the DO-NOT-OPERATE tags and move the FLT CONT SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to ON.

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S 214-041

- (5) Move the rudder pedals through their full travel range and do these checks:
- (a) Make sure the rudder operates correctly and moves smoothly through its full travel range.
  - (b) Make sure the rudder position indicator operates correctly and moves to its full scale position in each direction.

S 714-042

- (6) Do the operational test for the yaw damper system (Ref 22-21-00).  
I. Put the Airplane Back to Its Usual Condition

S 094-003

**WARNING:** STAY AWAY FROM THE NOSE WHEELS WHEN THE LOCKPIN IS REMOVED. THE WHEELS CAN TURN TO THE CENTER POSITION QUICKLY, AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the nose wheels are in their center position and remove the towing lever lockpin from the nose gear.

S 864-043

- (2) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-044

- (3) Remove electrical power if it is not necessary (Ref 24-22-00).

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AILERON AND RUDDER TRIM CONTROL MODULE -  
MAINTENANCE PRACTICES

1. General

- A. This procedure contains the removal and installation tasks for the trim control module for the ailerons and the rudder. This procedure also contains a procedure to clean the rudder trim knob and its lightplate.

TASK 27-21-23-022-001

2. Aileron and Rudder Trim Control Module - Removal

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Prepare for the Removal

S 862-002

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

S 862-003

- (2) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 862-004

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11C5, RUDDER TRIM
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT
  - (e) 11K15, AILERON TRIM
  - (f) 11K17, RUDDER TRIM POS

D. Aileron and Rudder Trim Module - Removal (Fig. 201)

S 032-005

- (1) Turn the four fasteners that connect the trim module to the aft electronic control panel, P8.

S 022-006

- (2) Lift the trim module from the P8 panel and do these steps:
- (a) Disconnect the two electrical connectors from the trim module.
  - (b) Remove the module from the P8 panel.

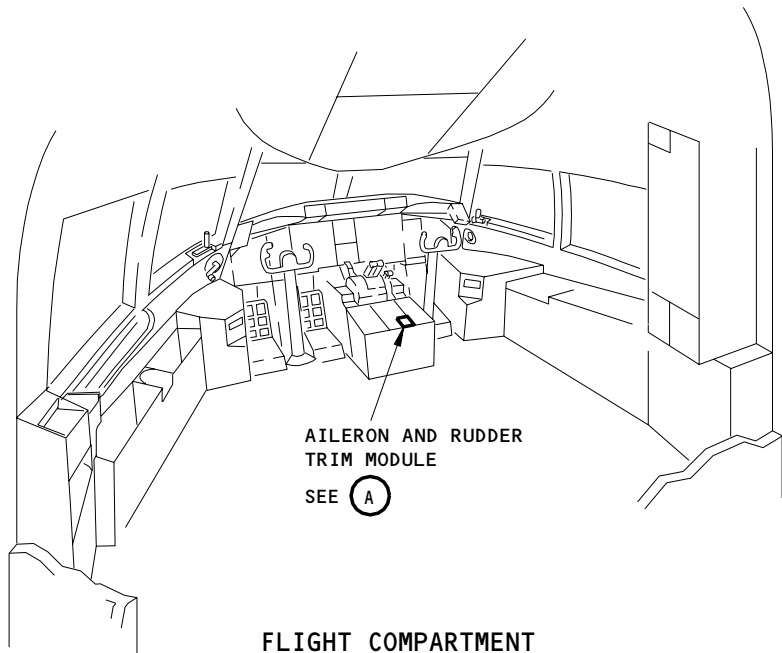
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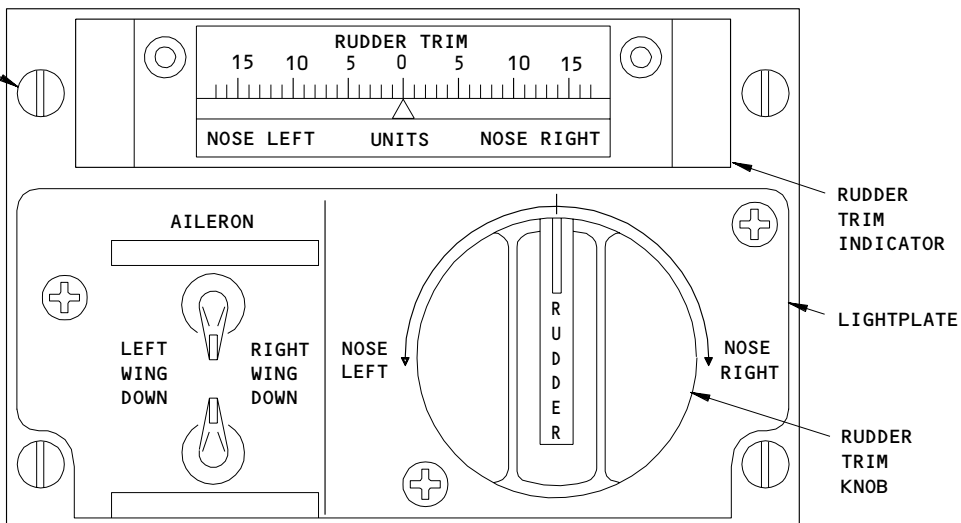
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FASTENER FOR THE TRIM MODULE (4 LOCATIONS)



AILERON AND RUDDER TRIM MODULE

(A)

Aileron and Rudder Trim Module  
Figure 201

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TASK 27-21-23-422-007

3. Aileron and Rudder Trim Control Module - Installation

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-11-00/501, Aileron and Aileron Trim Control System
- (3) AMM 27-21-00/501, Rudder and Rudder Trim Control System
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Aileron and Rudder Trim Module - Installation (Fig. 201)

S 432-008

- (1) Connect the two electrical connectors to the bottom of the trim module.

S 422-009

- (2) Put the module in its correct position and do this step:
  - (a) Turn the four fasteners that connect the trim module to the aft electronic control panel, P8.

S 212-010

- (3) Make sure the trim module is tightly held in its correct position.

S 862-011

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11C5, RUDDER TRIM
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT
  - (e) 11K15, AILERON TRIM
  - (f) 11K17, RUDDER TRIM POS

S 862-012

- (5) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to ON.

S 712-013

- (6) Do the operational test for the aileron trim control system (AMM 27-11-00/501).

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- S 712-014  
(7) Do the operational test for the rudder trim control system (AMM 27-21-00/501).

- S 212-015  
(8) Make sure the trim switch knob does not touch the lightplate surface during its operation.

D. Put the Airplane Back to Its Usual Condition

- S 862-016  
(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

- S 412-094  
(2) Relocate the existing rudder trim indicator to the new panel (AMM 27-28-05/401).

TASK 27-21-23-102-017

4. Clean the Rudder Trim Switch

A. Consumable Materials

- (1) Detergents  
(a) B00157 Spray White E or Equivalent  
(b) B00460 Winsol APC-120-WX

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 25-00-00/701, Equipment/Furnishings  
(3) AMM 27-21-00/501, Rudder and Rudder Trim Control System

C. Access

- (1) Location Zones  
211/212 Control Cabin

D. Prepare to Clean

- S 862-018  
(1) Supply Electrical Power (AMM 24-22-00/201).

- S 862-019  
(2) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

- S 862-029  
(3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11C5, RUDDER TRIM  
(b) 11H17, FLT CONT SHUTOFF TAIL LEFT  
(c) 11H18, FLT CONT SHUTOFF TAIL CTR  
(d) 11H27, FLT CONT SHUTOFF TAIL RIGHT

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- (e) 11K15, AILERON TRIM
- (f) 11K17, RUDDER TRIM POS

E. Clean the Rudder Trim Switch (Fig. 201)

S 032-020

- (1) Loosen the two screws in the rudder trim knob.

S 032-021

- (2) Remove the knob from the rudder trim switch.

S 102-022

**CAUTION:** MAKE SURE THE DETERGENT DOES NOT GO IN THE TRIM SWITCH. THE TRIM SWITCH CAN BECOME DAMAGED IF THE DETERGENT GOES IN THE TRIM SWITCH.

- (3) Use a sponge and the detergent to clean the lightplate surface and the bottom surface of the trim knob (AMM 25-00-00/701).

S 432-023

- (4) Install the knob on the rudder trim switch and tighten the two knob screws.

S 862-024

- (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11C5, RUDDER TRIM
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT
  - (e) 11K15, AILERON TRIM
  - (f) 11K17, RUDDER TRIM POS

S 862-028

- (6) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to ON.

S 712-025

- (7) Do the operational test for the rudder trim system (Ref 27-21-00).

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S 222-060

- (8) SAS 050-051, 150-157, 162-167, 275-278, 280 PRE-SB 27-0134;  
Make sure the clearance between the trim switch knob and the  
lightplate is between a minimum of 0.02 inches (0.50 mm) to a  
maximum of 0.05 inches (1.27 mm).

F. Put the Airplane Back to Its Usual Condition

S 862-027

- (1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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RUDDER AND ELEVATOR SHUTOFF VALVES – DESCRIPTION AND OPERATION

1. General

A. Three hydraulic shutoff valves isolate the rudder and elevators from hydraulic pressure. This allows for line maintenance on the rudder and elevators while the hydraulic systems are pressurized. Description and operation of the rudder and rudder trim control system is found in section 27-21-00. Description and operation of the elevator control system is found in section 27-31-00.

2. Component Details (Fig. 1)

A. Shutoff Valve

- (1) The three-port, two-position rotary selector valve is operated by a 28-volt dc motor. There are three ports in the valve body; a pressure port (pressure in), a cylinder port (pressure out), and a return port. The motor shaft rotates about 90 degrees to change the valve position.
- (2) The valves are located on the left and right fuselage sides in the stabilizer access area; enter through access door 312AR. V101 controls the left hydraulic system, V102 the right system and V103 the center system. Markings on the motor case, POS1 (open) and POS2 (closed) indicate what position the valve and manual override handle are in.

B. Shutoff Valve Control

- (1) The valves are controlled by the TAIL FLT CONTROL SHUTOFF switches L, C, and R on the right side panel P61. The switch face is flush with the panel when the valve is open and protrudes beyond the panel when the valve is closed. Spring-loaded plastic covers guard each switch; the cover will not close with the switch protruding.
- (2) TAIL FLIGHT CONTROL SHUTOFF circuit breakers L, C, and R on overhead circuit breaker panel P11 controls electrical power (28 volts dc) to the switches. Power for the L and C systems is supplied from L bus, the R system is supplied from R bus.
- (3) Voltmeter jacks located below the shutoff valves switches are used in hydraulic leak detection tests.

C. Shutoff Indication

- (1) An amber light in the FLT CONTROL SHUTOFF switches indicates the valve is closed.
- (2) An amber L, C, or R TAIL HYD VAL EICAS message (level C) indicates which valve is closed.

NOTE: If more than one valve is closed, the EICAS message changes to FLT CONT VALS.

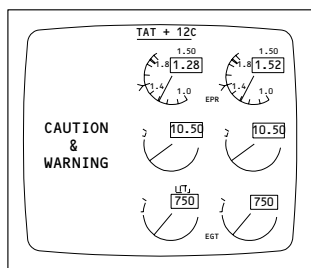
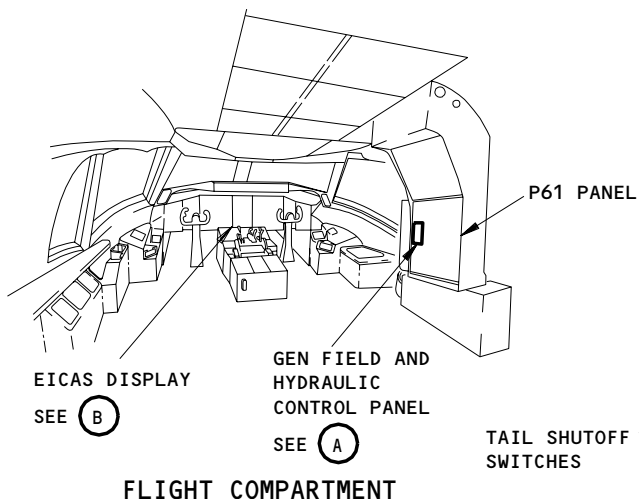
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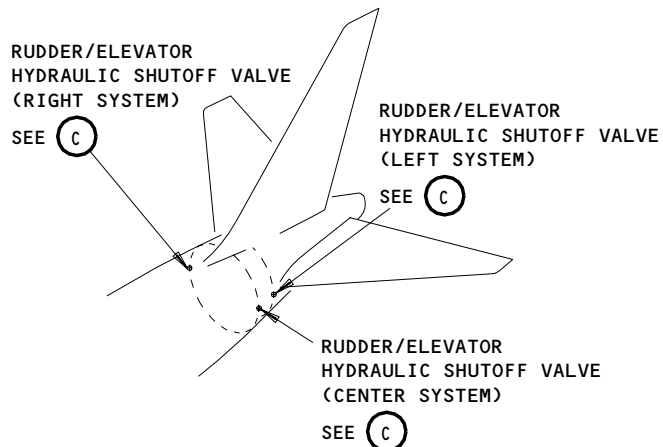
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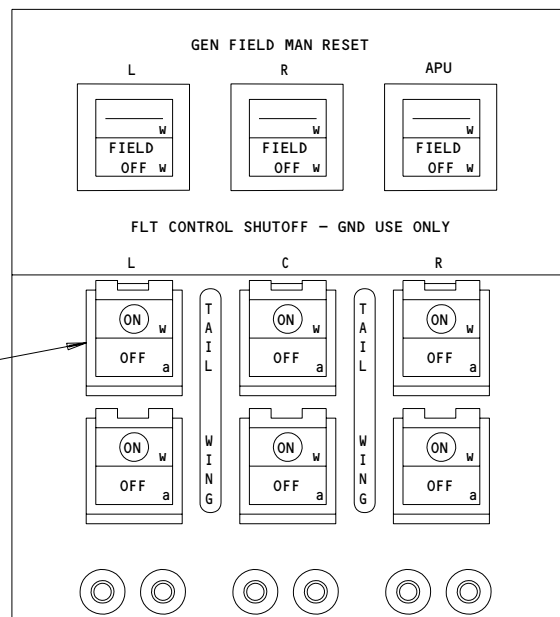


**EICAS DISPLAY**

(B)

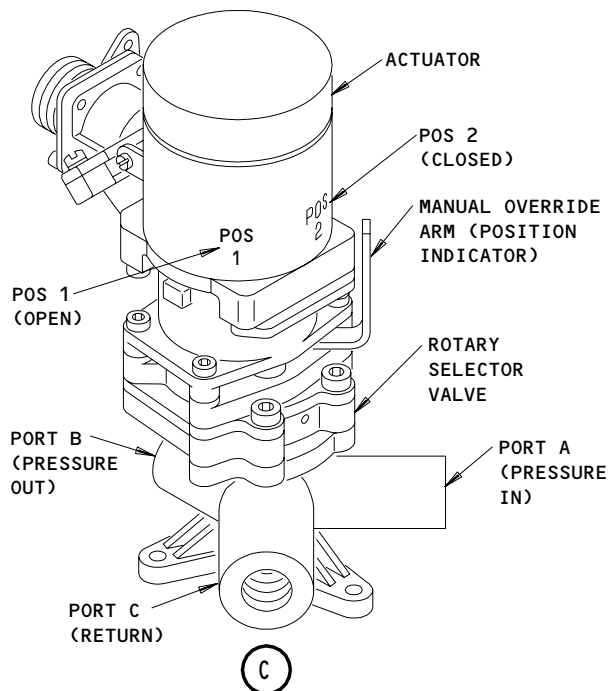


**VALVE LOCATIONS**



**GEN FIELD AND HYDRAULIC CONTROL PANEL (P61)**

(A)



(C)

**Rudder and Elevator Shutoff Valves  
Figure 1**

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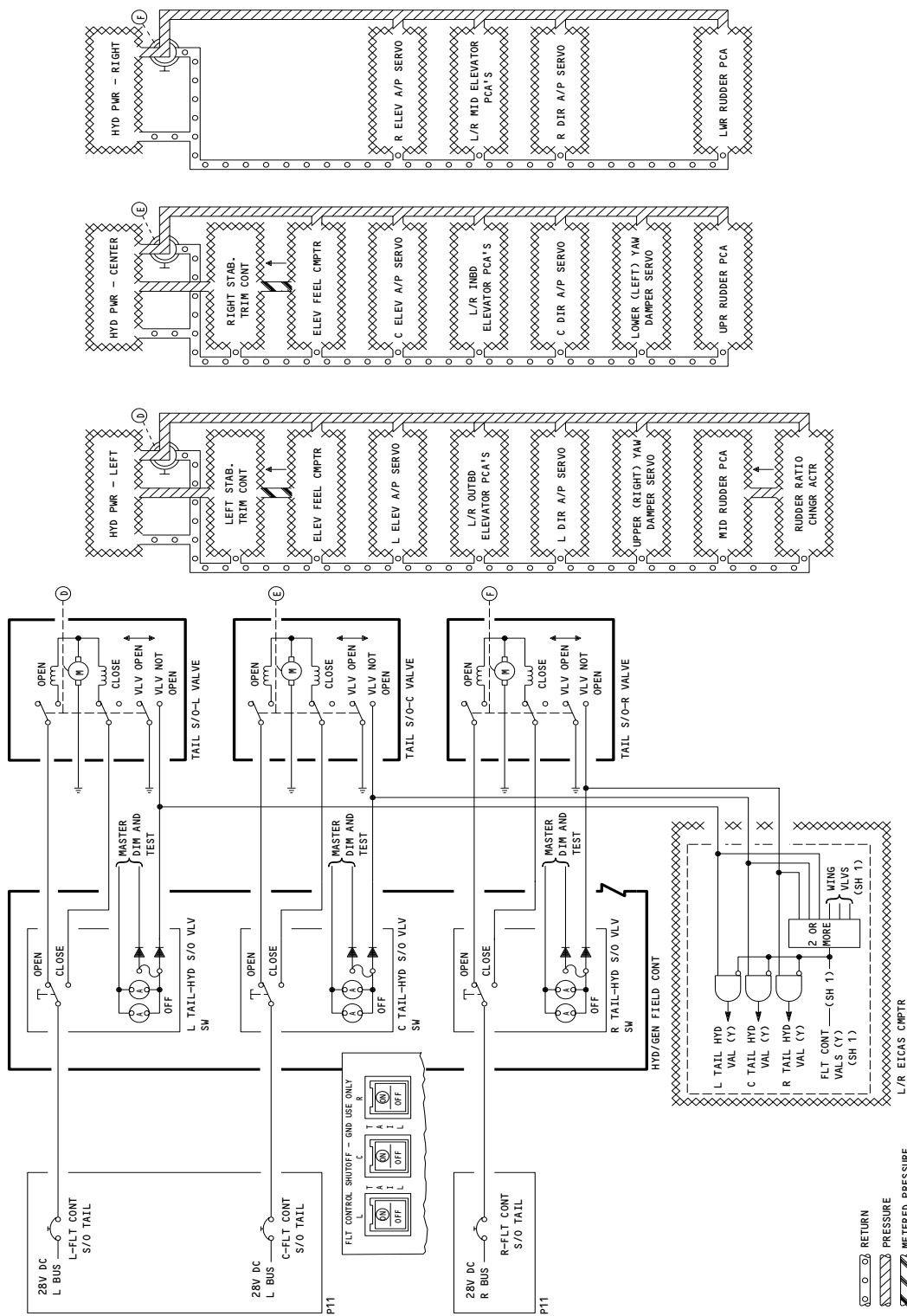
3. Operation (Fig. 2)

- A. With electrical power provided, FLT CONTROL SHUTOFF switch ON, the amber switch light is not on, and the valve opens. When the switch is placed to OFF, the amber switch light comes on and the valve closes. An L, C, or R TAIL HYD VAL EICAS message appears. As the valve reaches the open or closed position, internal limit switches open the motor circuit and de-energize the valve motor. When the valve is in the closed position, the pressure port is blocked off and the cylinder port is connected to the return port. This allows the de-pressurization of the isolated systems.

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Shutoff Valve System Schematic  
Figure 2

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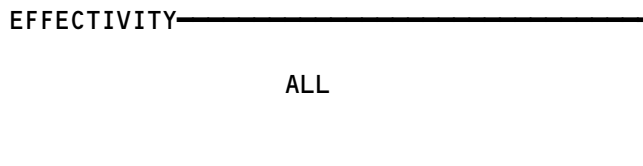
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 FAULT ISOLATION/MAINT MANUAL

RUDDER AND ELEVATOR SHUTOFF VALVES

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKER - FLT CONT SHUTOFF TAIL L, C1011 FLT CONT SHUTOFF TAIL C, C1013 FLT CONT SHUTOFF TAIL R, C1012 PANEL - (FIM 24-22-00/101) GEN FIELD & HYD CONT, M1087	1		FLT COMPT, P11 11H17 11H18 11H27	* * *
SWITCH - C FLT CONT SHUTOFF TAIL, YDWS4	1	1	FLT COMPT, P61, GEN FIELD & HYD CONT PNL, M1087	*
SWITCH - L FLT CONT SHUTOFF TAIL, YDWS6	1	1	FLT COMPT, P61, GEN FIELD & HYD CONT PNL, M1087	*
SWITCH - R FLT CONT SHUTOFF TAIL, YDWS2	1	1	FLT COMPT, P61, GEN FIELD & HYD CONT PNL, M1087	*
VALVE - C RUDDER/ELEVATOR HYDRAULIC SHUTOFF, V103	2	1	312AR	27-23-01
VALVE - L RUDDER/ELEVATOR HYDRAULIC SHUTOFF, V101	2	1	312AR	27-23-01
VALVE - R RUDDER/ELEVATOR HYDRAULIC SHUTOFF, V102	2	1	312AR	27-23-01

\* SEE THE WDM EQUIPMENT LIST

Rudder and Elevator Shutoff Valves - Component Index  
 Figure 101



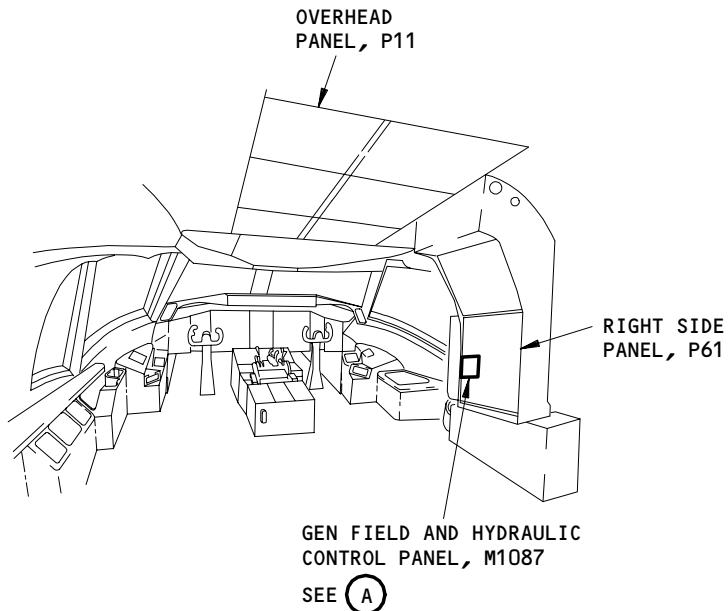
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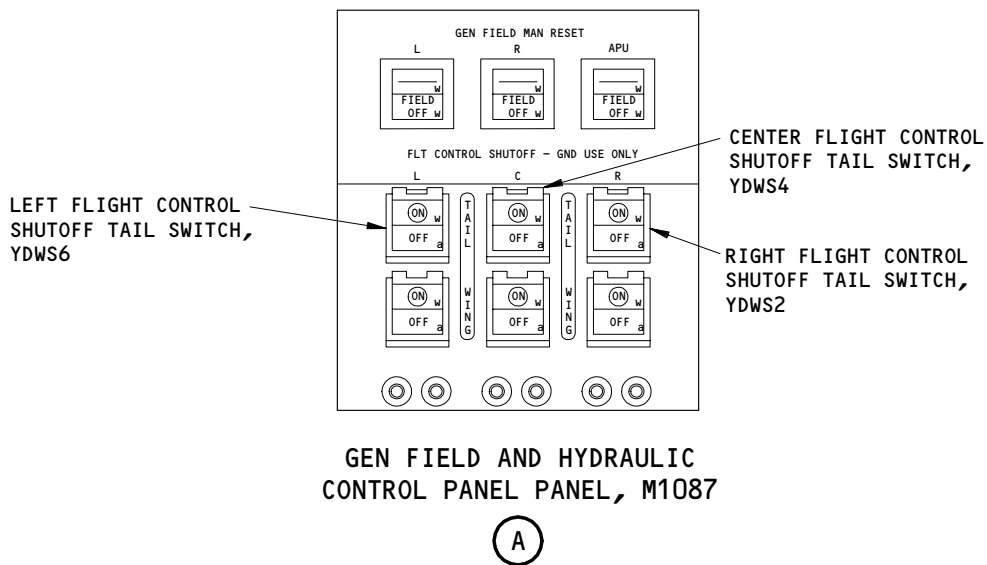
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**BOEING**  
767  
FAULT ISOLATION/MAINT MANUAL



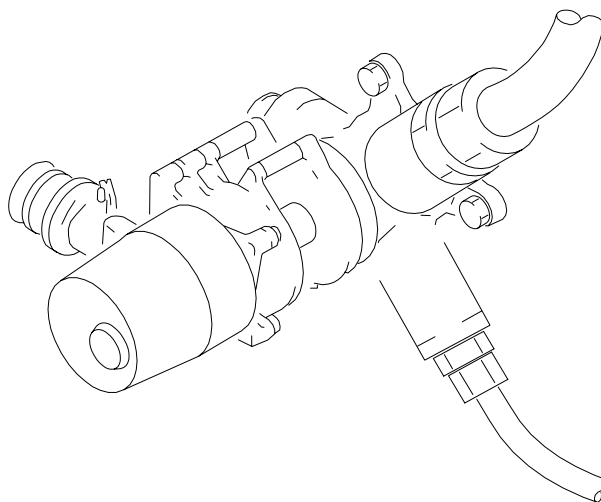
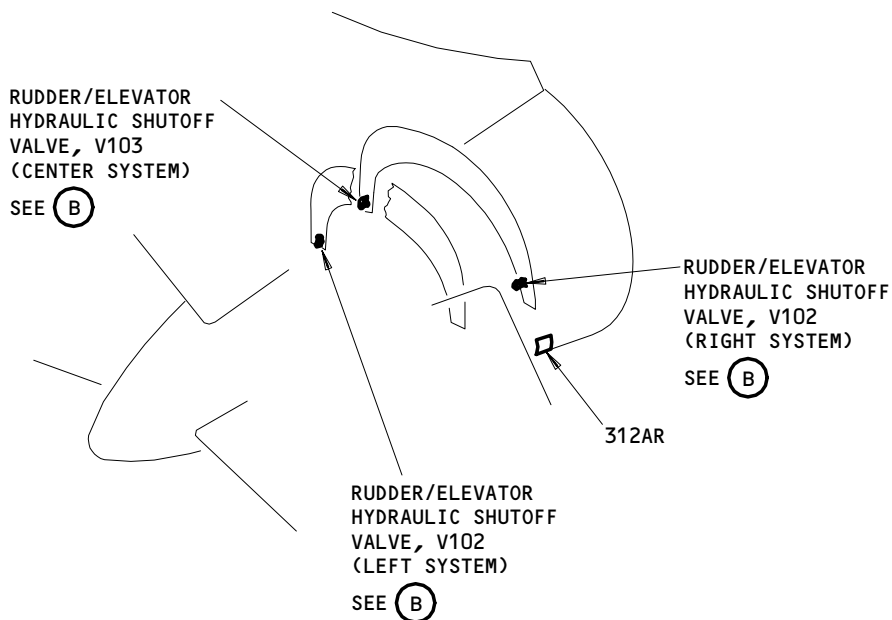
**FLIGHT COMPARTMENT**



Rudder and Elevator Shutoff Valves - Component Location  
Figure 102 (Sheet 1)

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RUDDER/ELEVATOR HYDRAULIC SHUTOFF VALVE (V101, V102, V103)

(B)

Rudder and Elevator Shutoff Valves - Component Location  
Figure 102 (Sheet 2)

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RUDDER AND ELEVATOR SHUTOFF VALVES – ADJUSTMENT/TEST

1. General

- A. This procedure contains the system test for the rudder and elevator hydraulic shutoff valves. No adjustment or operational test is necessary.

TASK 27-23-00-735-001

2. Rudder and Elevator Shutoff Valves – System Test

A. Equipment

- (1) Nose Gear Towing Lever Lockpin – A09003-1  
(2) Service Platform, Control Bay Access Door – A51001-19

B. References

- (1) 06-42-00/201, Empennage Access Doors and Panels  
(2) 24-22-00/201, Electrical Power – Control  
(3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

(1) Location Zones

- 211/212 Control Cabin  
312 Area Aft of Pressure Bulkhead to BS 1725

(2) Access Panel

- 312AR Hydraulic Shutoff Valve

D. Prepare for the Test

S 495-026

- (1) Move the towing lever to the tow position and install the towing lever lockpin in the nose gear.

S 015-002

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (2) Open access door 312AR (Ref 06-42-00).

S 865-003

- (3) Supply electrical power (Ref 24-22-00).

EFFECTIVITY

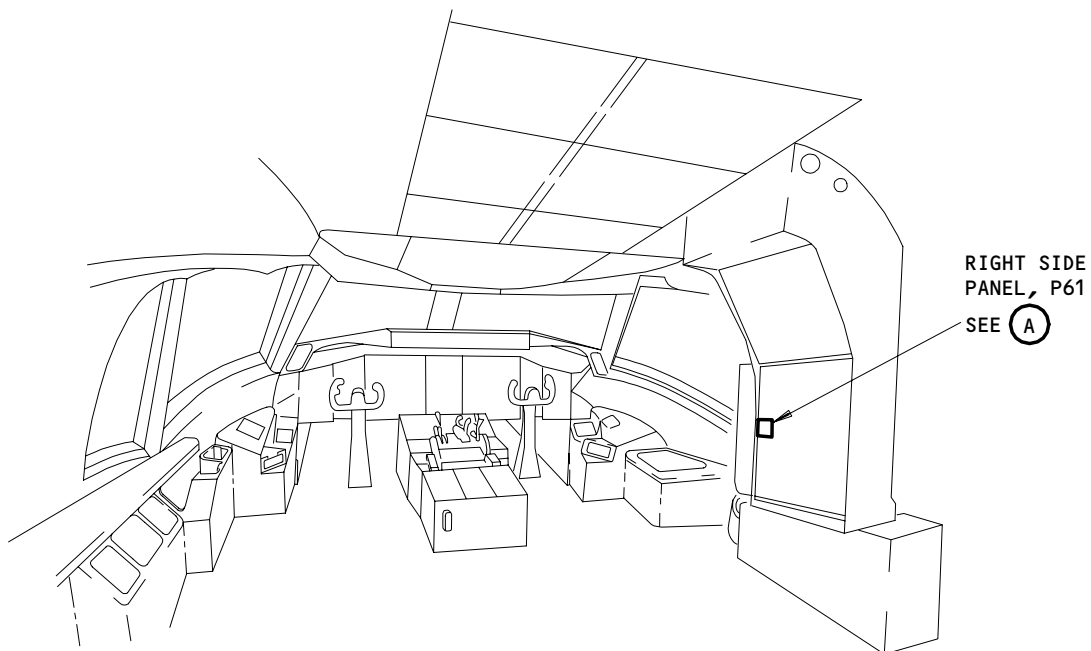
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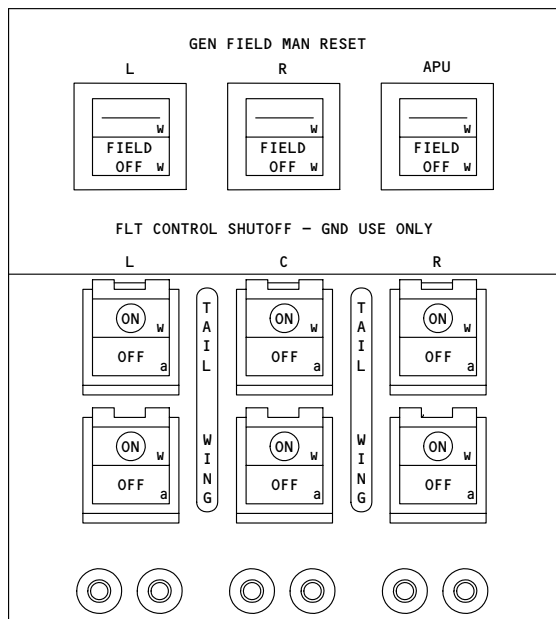
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CONTROL CABIN



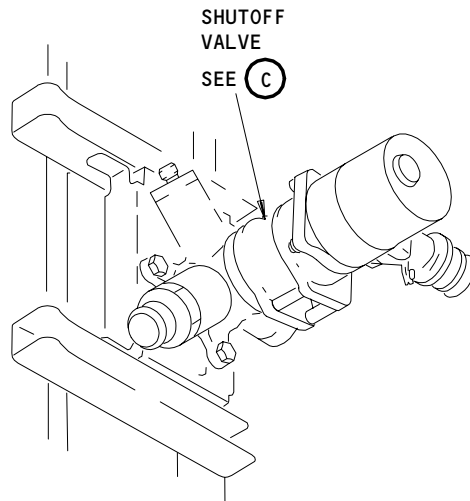
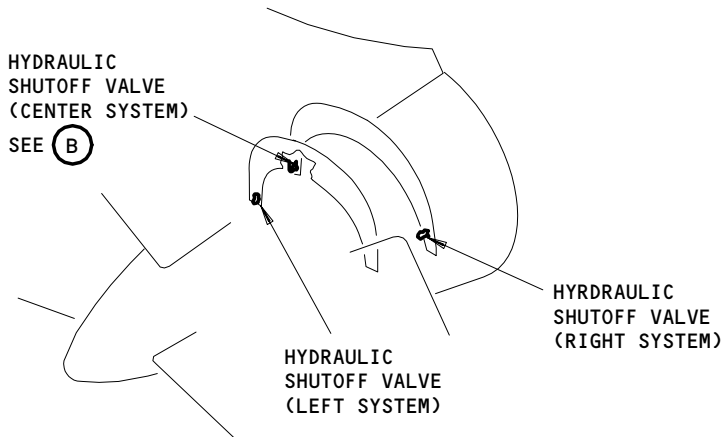
RIGHT SIDE PANEL, P61

(A)

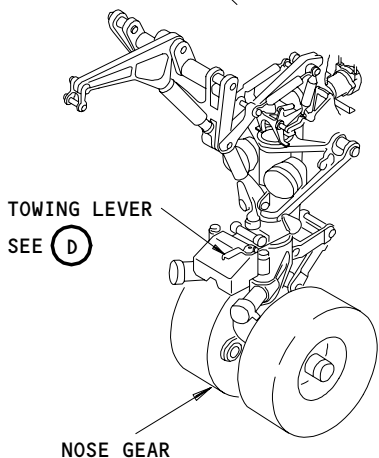
Rudder and Elevator Shutoff Valve Test  
Figure 501 (Sheet 1)

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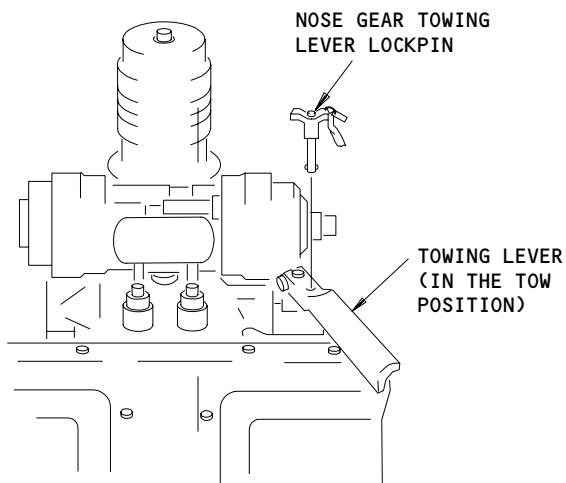
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HYDRAULIC SHUTOFF VALVE (EXAMPLE)

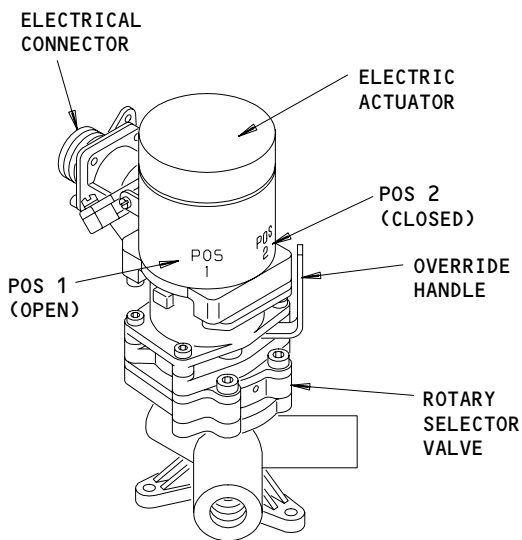


(B)



TOWING LEVER

(D)



SHUTOFF VALVE (EXAMPLE)

(C)

Rudder and Elevator Shutoff Valve Test  
Figure 501 (Sheet 2)

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S 865-004

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Supply pressure to the left, right, and center hydraulic systems (Ref 29-11-00).

S 865-006

- (5) Push the STATUS button on the display select panel, P9, to show the rudder and elevator position indicators on the bottom EICAS display.
- E. Rudder and Elevator Shutoff Valves - System Test (Fig. 501)

S 215-016

- (1) Make sure the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, are ON.

S 215-017

- (2) Operate the rudder pedals and the control column through their full travel range and do this check:
  - (a) Make sure the rudder and the elevator operate correctly through their full travel range.

S 865-007

- (3) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - (a) 11G10, RUDDER RATIO

S 215-008

- (4) Move the FLT CONTROL SHUTOFF TAIL L switch on the P61 panel to OFF and do these checks:
  - (a) Make sure the switch position light comes on.

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- (b) Make sure the actuator for the applicable shutoff valve operates smoothly.
- (c) Make sure the actuator sound stops when the valve moves to its full travel position.
- (d) Make sure the valve override handle is in the POS 2 (valve closed) position.
- (e) Make sure the EICAS message, L TAIL HYD VAL, shows on the EICAS display.

NOTE: When more than one shutoff valve is closed, the FLT CONT VALS message will show on the EICAS display.

S 215-027

- (5) Do the above step again for the FLT CONTROL SHUTOFF TAIL C, and R switches.

NOTE: All the valves will be in their closed positions.

S 215-014

- (6) Operate the rudder pedals and the control column through their full travel range and do this check:
  - (a) Make sure the rudder and the elevators do not move.

S 865-015

- (7) Remove the power from the center and right hydraulic systems (Ref 29-11-00).

S 215-010

- (8) Move the FLT CONTROL SHUTOFF TAIL L switch to ON and do these checks:
  - (a) Make sure the switch position light goes off.
  - (b) Make sure the actuator for the left system valve operates smoothly.
  - (c) Make sure the actuator sound stops when the valve override handle moves to POS 1 (valve open).

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- S 865-033
- (9) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11G10, RUDDER RATIO
- S 215-032
- (10) Operate the rudder pedals and the control column through their full travel range and do this check:
- (a) Make sure the rudder and the elevators operate correctly through their full travel range.
- S 865-011
- (11) Remove the power from the left hydraulic system (Ref 29-11-00).
- S 865-012
- (12) Supply pressure to the center hydraulic system only (Ref 29-11-00).
- S 215-013
- (13) Move the FLT CONTROL SHUTOFF TAIL C switch to ON and do these checks:
- (a) Make sure the switch position light goes off.
- (b) Make sure the actuator for the center system valve operates smoothly.
- (c) Make sure the actuator sound stops when the valve override handle moves to POS 1 (valve open).
- (d) Operate the rudder pedals and the control column through their full travel range and do this check:
- 1) Make sure the rudder and the elevators operate correctly through their full travel range.
- S 865-018
- (14) Remove the power from the center hydraulic system (Ref 29-11-00).
- S 865-019
- (15) Supply pressure to the right hydraulic system only (Ref 29-11-00).
- S 215-020
- (16) Move the FLT CONTROL SHUTOFF TAIL R switch to ON and do these checks:
- (a) Make sure the switch position light goes off.
- (b) Make sure the actuator for the right system valve operates smoothly.
- (c) Make sure the actuator sound stops when the valve override handle moves to POS 1 (valve open).
- (d) Operate the rudder pedals and the control column through their full travel range and do this check:
- 1) Make sure the rudder and the elevators operate correctly through their full travel range.

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S 215-021

- (17) Make sure the FLT CONT VALS message is not shown on the EICAS display.

S 865-022

- (18) Remove the power from the right hydraulic system (Ref 29-11-00).
- F. Put the Airplane Back to Its Usual Condition

S 095-025

**WARNING:** STAY AWAY FROM THE NOSE WHEELS WHEN THE LOCKPIN IS REMOVED. THE WHEELS CAN TURN TO THE CENTER POSITION QUICKLY, AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the nose wheels are in their center position and remove the towing lever lockpin from the nose gear.

S 415-023

- (2) Close access door 312AR (Ref 06-42-00).

S 865-024

- (3) Remove electrical power if it is not necessary (Ref 24-22-00).

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RUDDER AND ELEVATOR HYDRAULIC SHUTOFF VALVES – MAINTENANCE PRACTICES

1. General

- A. This procedure contains the removal and installation tasks for the tail hydraulic shutoff valves for the rudder and the elevator.

TASK 27-23-01-022-001

2. Rudder and Elevator Shutoff Valves – Removal

A. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 24-22-00/201, Electrical Power – Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zone  
312 Area Aft of Pressure Bulkhead to BS 1725
- (2) Access Panel  
312AR Hydraulic Shutoff Valve

C. Prepare for the Removal

S 862-002

- (1) Supply electrical power (Ref 24-22-00).

S 862-003

- (2) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
  - (a) 11G10, RUDDER RATIO

S 862-004

- (3) Move the FLT CONTROL SHUTOFF TAIL switches L, C, and R on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 862-005

- (4) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 862-006

**WARNING:** MAKE SURE THE HYDRAULIC PRESSURE IS REMOVED FROM THE SYSTEM THAT SUPPLIES THE VALVE YOU WILL REMOVE. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF THE PRESSURE IS NOT REMOVED.

- (5) Remove the pressure from the left, right, or center hydraulic system (Ref 29-11-00).

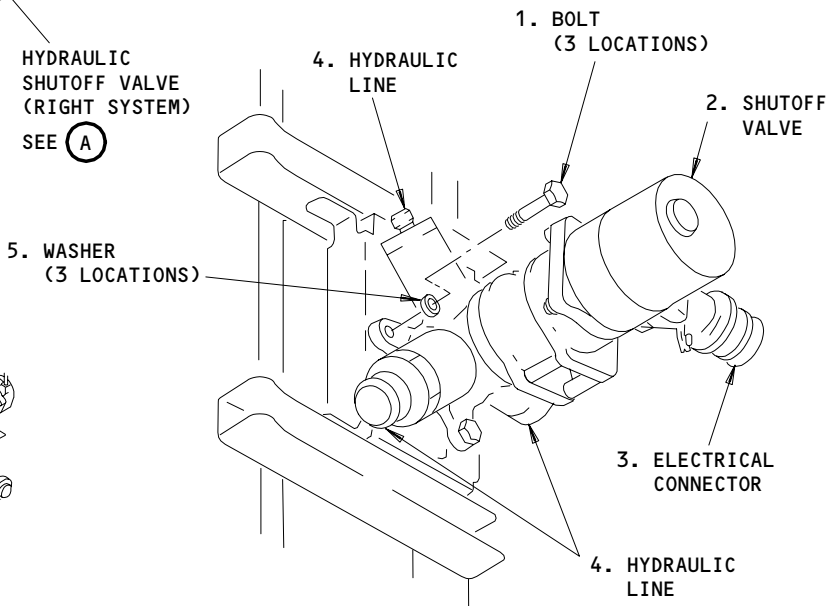
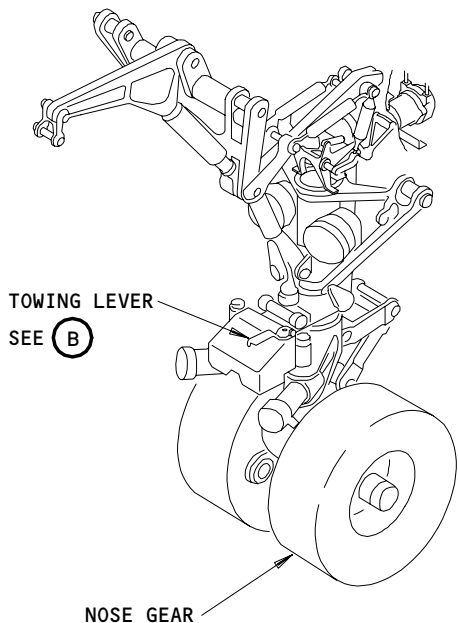
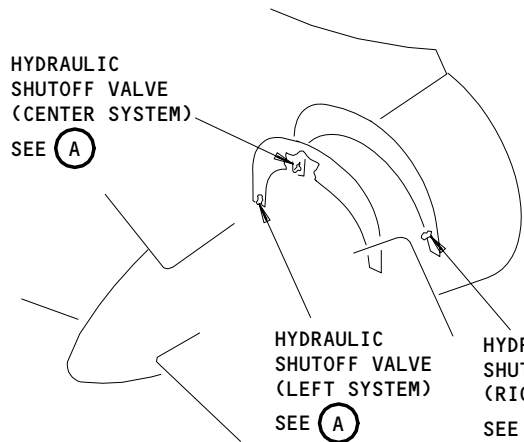
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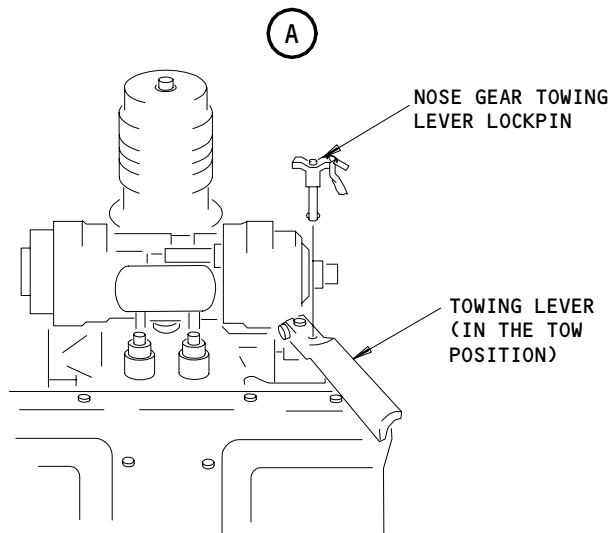
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HYDRAULIC SHUTOFF VALVE (EXAMPLE)



TOWING LEVER

(B)

Rudder and Elevator Hydraulic Shutoff Valves  
Figure 201

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S 012-007

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

(6) Open access door 312AR (Ref 06-42-00).

D. Remove the Hydraulic Shutoff Valve

S 032-008

(1) Disconnect these components from the shutoff valve:

(a) The electrical connector

(b) The hydraulic lines and do this step:

1) Put caps on the hydraulic lines and the valve ports.

S 032-009

(2) Remove the bolts that connect the shutoff valve to its bracket (3 locations).

S 022-010

(3) Remove the shutoff valve.

TASK 27-23-01-422-011

3. Rudder and Elevator Shutoff Valve - Installation

A. Consumable Materials

(1) C00064 Alodine 1200

(2) C00259 Primer - BMS 10-11, Type 1

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
201	2	Shutoff Valve	27-23-01	01	40,43, 145,147, 240,243

C. References

(1) 06-42-00/201, Empennage Access Doors and Panels

(2) 24-22-00/201, Electrical Power - Control

(3) 27-23-00/501, Rudder and Elevator Shutoff Valves

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D. Access

- (1) Location Zone  
312 Area Aft of Pressure Bulkhead to BS 1725
- (2) Access Panel  
312AR Hydraulic Shutoff Valve

E. Install the Hydraulic Shutoff Valve

S 102-012

- (1) Clean the bracket and the valve mating surfaces.

S 622-013

- (2) Apply Alodine to the valve and the bracket mating surfaces.

NOTE: The maximum bond resistance is 0.0025 ohms.

S 432-014

- (3) Do these steps to connect the shutoff valve to the airplane structure:
  - (a) Align the shutoff valve with the bolt connection points.
  - (b) Install the bolts (1) and the washers (2).

S 622-015

- (4) Apply primer to the surfaces you cleaned that are near the shutoff valve.

S 432-016

- (5) Connect these components:
  - (a) The hydraulic lines (4)
  - (b) The electrical connector (3).

S 732-017

- (6) Do the test procedure for the rudder and elevator shutoff valves (Ref 27-23-00).

S 212-018

- (7) Make sure that no hydraulic fluid leaks occurred during the test.

F. Put the Airplane Back to Its Usual Condition

S 862-019

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 862-020

- (2) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL switches L, R, and C on the right side panel, P61, to ON.

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- S 862-024
- (3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:  
(a) 11G10, RUDDER RATIO
- S 412-022
- (4) Close access door 312AR (Ref 06-42-00).
- S 862-023
- (5) Remove electrical power if it is not necessary (Ref 24-22-00).

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RUDDER HYDRAULIC FUSE – MAINTENANCE PRACTICES

1. General

- A. This procedure contains two tasks. The first task is used to remove the rudder hydraulic fuse and the second task is used to install it.

TASK 27-23-51-022-004

2. Rudder Hydraulic Fuse – Removal

A. References

- (1) 06-42-00/201, Empennage Access Doors and Panels  
(2) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zone  
312 Area Aft of Pressure Bulkhead to BS 1725
- (2) Access Panel  
312AR Stabilizer Jackscrew

C. Prepare for Removal

S 862-005

- (1) Remove the pressure from the left hydraulic system and its reservoir (Ref 29-11-00).

S 012-002

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (2) Open access door 312AR (Ref 06-42-00).

D. Remove the Fuse (Fig. 201)

S 032-006

- (1) Remove the clamps from the hydraulic lines to let them move during the fuse removal.

S 022-007

- (2) Remove the fuse from the hydraulic lines and do this step:  
(a) Seal the hydraulic lines with a cap.

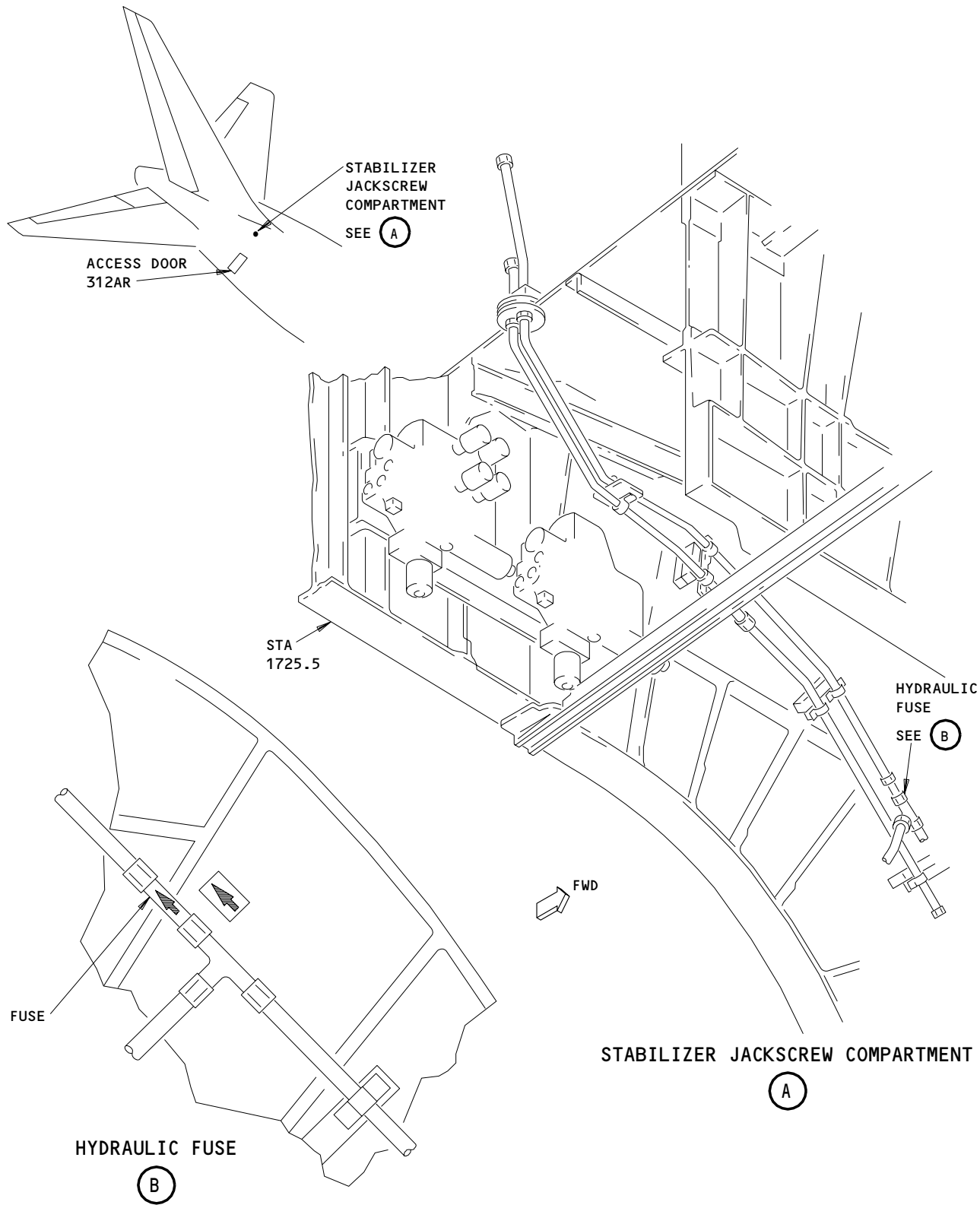
EFFECTIVITY

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Rudder Hydraulic Fuse  
Figure 201

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TASK 27-23-51-422-022

3. Rudder Hydraulic Fuse - Installation

A. Consumable Materials

- (1) D00153 Hydraulic Fluid, BMS 3-11

B. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zone  
312 Area Aft of Pressure Bulkhead to BS 1725
- (2) Access Panel  
312AR Stabilizer Jackscrew

D. Install the Fuse

S 032-008

- (1) Remove the caps from the hydraulic lines.

S 642-009

- (2) Apply a thin layer of hydraulic fluid to the fittings before installation.

S 032-010

- (3) Make sure the fuse direction is correct and connect the fuse to the hydraulic lines at each end.

S 032-011

- (4) Install the hydraulic line clamps.

E. Test the Fuse

S 862-012

- (1) Supply electrical power (Ref 24-22-00).

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S 212-015

- (2) Make sure this circuit breaker on the P11 panel is closed:  
(a) 11H17, FLT CONT SHUTOFF TAIL L

S 862-003

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply pressure to the left hydraulic system only (Ref 29-11-00).

S 212-016

- (4) Make sure the FLT CONTROL SHUTOFF TAIL L switch on the right side panel, P61, is ON.

S 822-017

- (5) Make sure the amber RUDDER RATIO light on the pilot's overhead panel, P5, is OFF. To reset the RUDDER RATIO do these steps:  
(a) Push the RRCM RESET switch on the RRCM.  
(b) Open and then close this circuit breaker on the P11 panel:  
1) 11G10, RUDDER RATIO

S 212-018

- (6) Operate the rudder pedals through their full travel range two times and do these checks:  
(a) Make sure the rudder moves through its full travel range.  
(b) Make sure there are no leaks near the hydraulic fuse.

S 412-001

- (7) Close access door 312AR (Ref 06-42-00).  
F. Put the Airplane Back to Its Usual Condition

S 862-019

- (1) Move the rudder pedals back to their neutral positions.

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- S 862-020
- (2) Remove the power from the left hydraulic system (Ref 29-11-00).
- S 862-021
- (3) Remove electrical power if it is not necessary (Ref 24-22-00).

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RUDDER POSITION INDICATING SYSTEM – DESCRIPTION AND OPERATION

1. General
  - A. The rudder position indicating system provides the flight crew with the amount of deflection of the rudder surface. This system does not include the rudder trim indication system. For information on the rudder and rudder trim control system, see 27-21-00.
2. Component Details
  - A. Position Transmitter (Fig. 1)
    - (1) The rudder position transmitter is mounted below the lower power control actuator. The transmitter's crank is attached to the rudder front spar by adjustable control rod. The position transmitter is clamped to a bracket mounted to a vertical fin rib (Fig. 1). Access through panel 324EL.
    - (2) Electrical power to the transmitter is controlled by the RUDDER POS circuit breaker on overhead circuit breaker panel P11.
  - B. Position Indicator
    - (1) The rudder position indicator appears on the lower center display. The indicator scale in each direction is equal to 26 degrees.
3. Operation
  - A. The left power bus supplies 28 volts ac to the rotor in the transmitter, which is inductively coupled to the stator. The rotor is mechanically connected to the airplane control surface and rotates with the surface at the same time. Movement of the rudder changes the rotor position which in turn changes the stator output. This output signal is interpreted by computers and displayed on the flight deck. The control surface position is displayed on the lower center display.
  - B. Press the EICAS STATUS button on panel P9 to show the flight control position on the display screen.

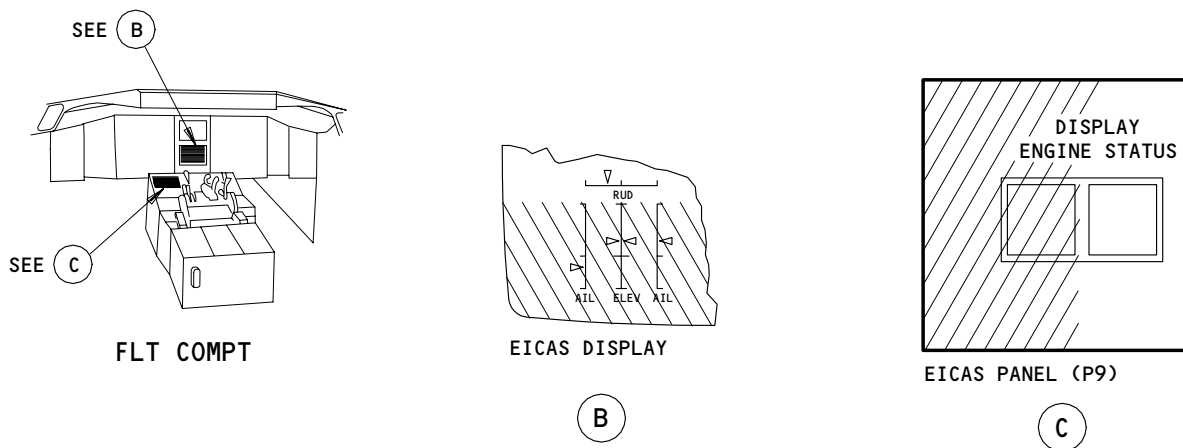
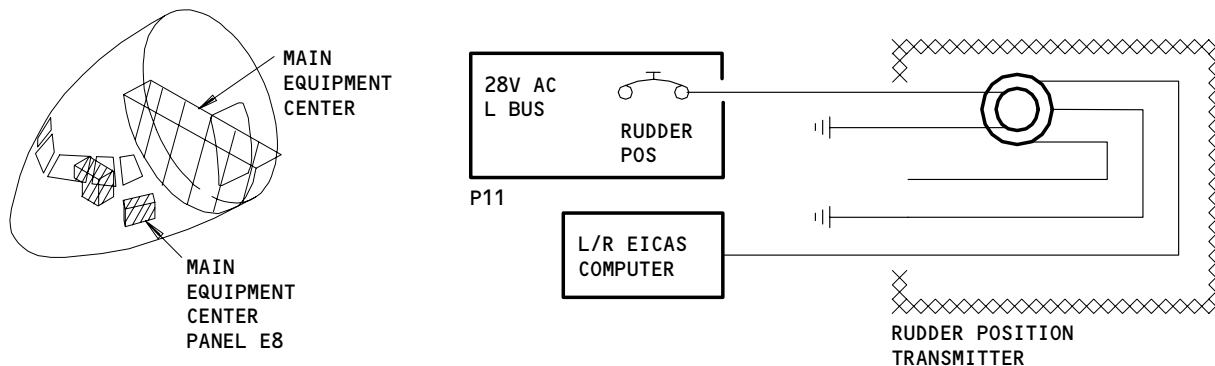
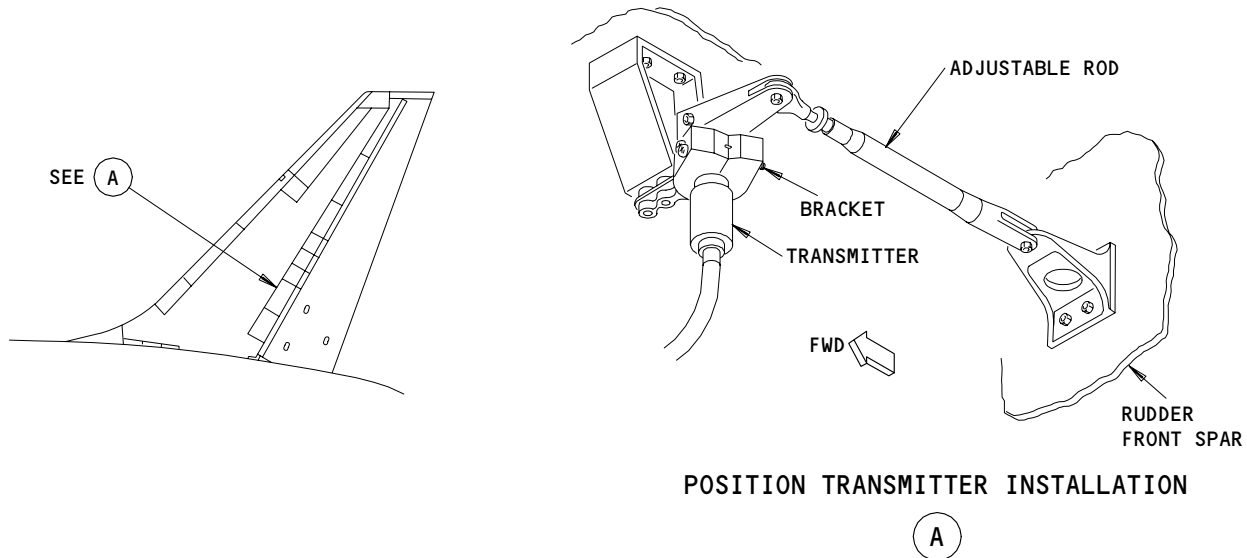
EFFECTIVITY

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**Rudder Position Indicating System  
Figure 1**

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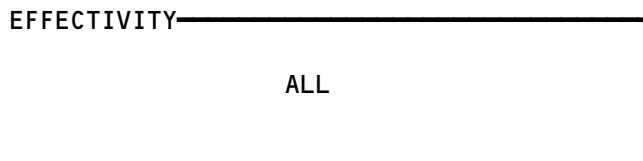
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 FAULT ISOLATION/MAINT MANUAL

RUDDER POSITION INDICATING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKER - RUDDER POS, C1005 RUDDER RATIO, C1031 RUDDER TRIM, C1033 RUDDER TRIM POS, C1034	1		FLT COMPT, P11 11K16 11G10 11C5 11K17	* * * *
PLATE - INDEX	2	1	BELOW RUDDER	27-28-00
SWITCH - RUDDER TRIM CONTROL, YARS3	1	1	FLT COMPT, P8, AILERON/RUDDER TRIM CONT PNL, M74	*
TRANSMITTER - RUDDER POSITION, M516	2	1	324EL, VERTICAL FIN	27-28-01

\* SEE THE WDM EQUIPMENT LIST

Rudder Position Indicating System - Component Index  
 Figure 101

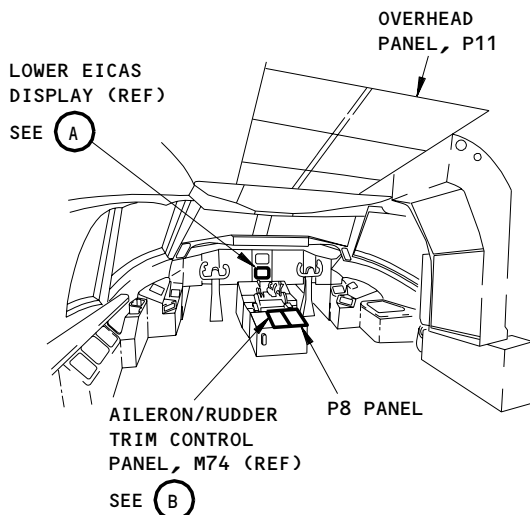


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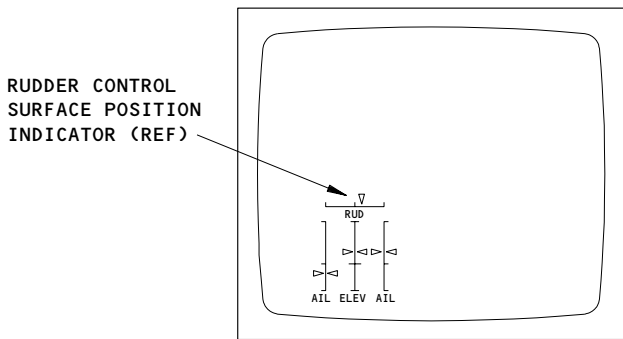
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### FAULT ISOLATION/MAINT MANUAL

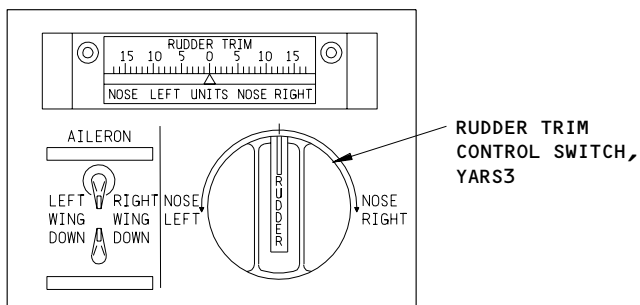


FLIGHT COMPARTMENT



LOWER EICAS DISPLAY (REF)

(A)



AILERON/RUDDER TRIM CONTROL PANEL, M74 (REF)

(B)

Rudder Position Indicating System - Component Location  
Figure 102 (Sheet 1)

EFFECTIVITY

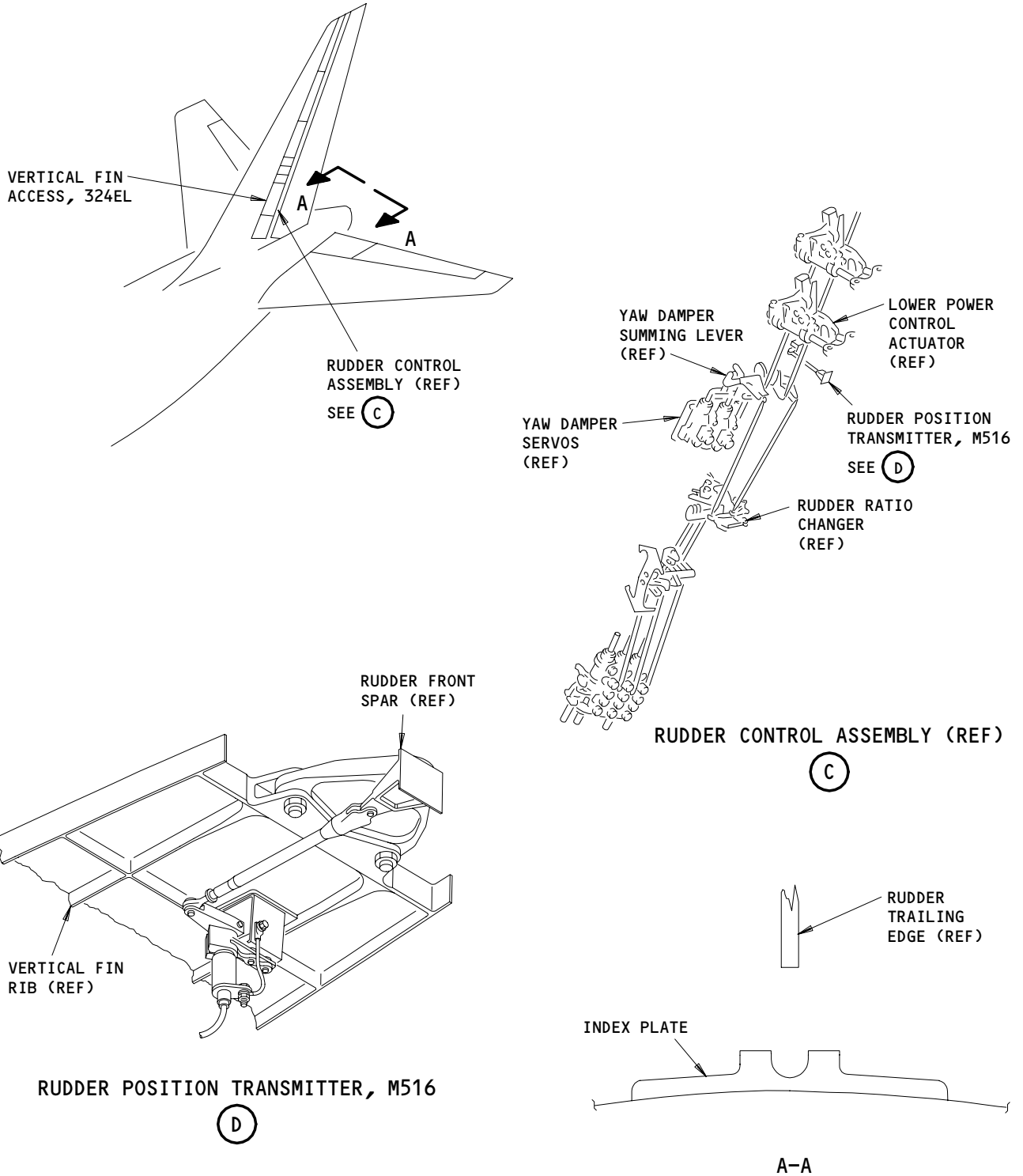
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Rudder Position Indicating System - Component Location  
Figure 102 (Sheet 2)

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RUDDER POSITION INDICATING SYSTEM – ADJUSTMENT/TEST

1. General

A. This procedure contains these tasks:

- Rudder Position Indication – Operational Test
- Rudder Position Indication – Adjustment

B. The rudder neutral position is found when the two sides of the rudder trailing edge are in the index plate groove (Fig. 502).

TASK 27-28-00-715-005

2. Rudder Position Indication – Operational Test

A. References

- (1) AMM 24-22-00/201, Electrical Power – Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Prepare for the Test

S 865-006

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

S 865-008

- (2) Push the STATUS button on the display select panel to show the rudder position indicator on the display.

S 865-001

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply pressure to the left, right, or center hydraulic system (AMM 29-11-00/201).

**NOTE:** You can do the test with pressure supplied to only one of the hydraulic systems.

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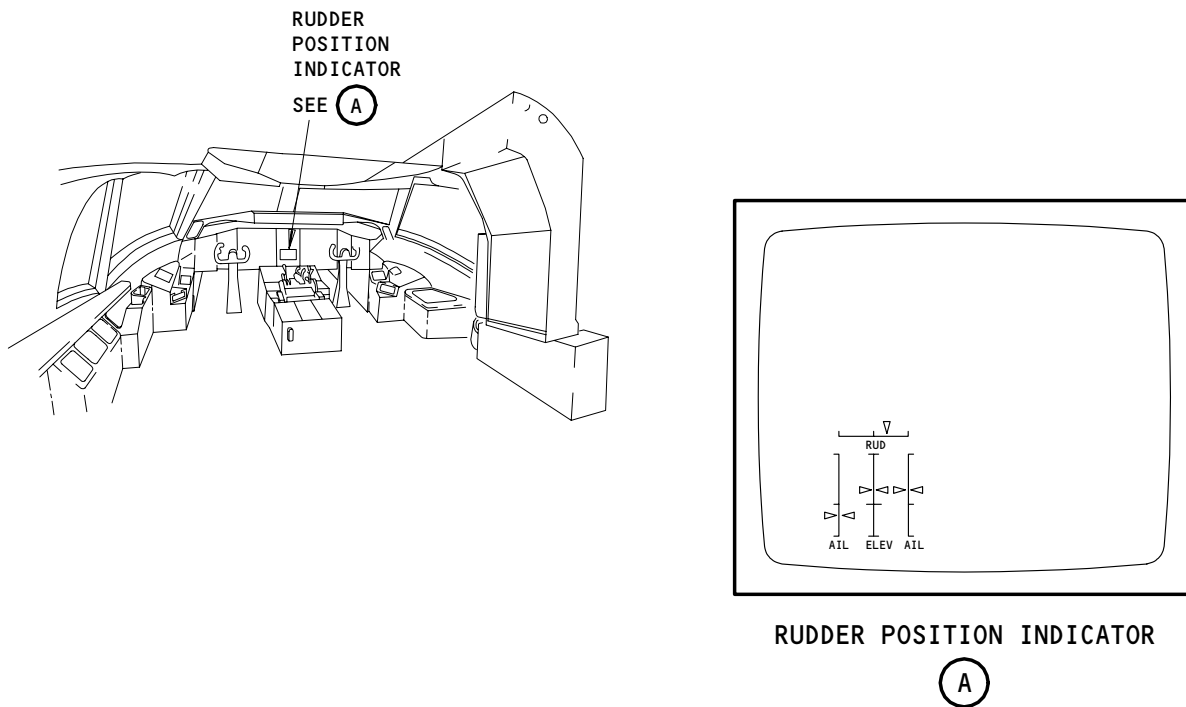
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D. Rudder Position Indication - Operational Test

S 215-009

- (1) Turn the rudder trim switch on the aft electronic control panel, P8, until the rudder is in its neutral position and do this check:
  - (a) Make sure the rudder position indicator aligns with the mid-scale mark.

NOTE: Use a tolerance of  $\pm$  one-half an arrow width.



Rudder Position Indicating  
Figure 501

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S 215-002

**WARNING:** STAY AWAY FROM THE NOSE WHEELS WHEN YOU OPERATE THE RUDDER PEDALS. THE NOSE WHEELS CAN TURN QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Push the left rudder pedal fully forward and do this check:
  - (a) Make sure the rudder position pointer moves to the left full travel mark (approximately 26 degrees) (Fig. 501).

S 215-010

- (3) Push the right rudder pedal fully forward and do this check:
  - (a) Make sure the rudder position pointer moves to the right full travel mark (approximately 26 degrees) (Fig. 501).

S 215-011

- (4) Release the rudder pedals and do this check:
  - (a) Make sure the rudder position pointer aligns with the mid-scale mark.

NOTE: Use a tolerance of +/- one-half an arrow width.

E. Put the Airplane Back to Its Usual Condition

S 865-012

- (1) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00/201).

S 865-013

- (2) Remove electrical power if it is not necessary (Ref 24-22-00/201).

TASK 27-28-00-825-014

3. Rudder Position Indication - Adjustment

A. General

- (1) Three procedures are supplied to adjust the rudder position transmitter.

PROCEDURE 1 uses a commercially available power supply, a digital voltmeter (DVM), and the breakout box equipment.

PROCEDURE 2 uses airplane power, a DVM, and the breakout box equipment.

PROCEDURE 3 uses communication between person at the flight deck reading the displays and person at the rudder.

B. Equipment

- (1) Nose Gear Towing Lever Lockpin - A09003-1

EFFECTIVITY

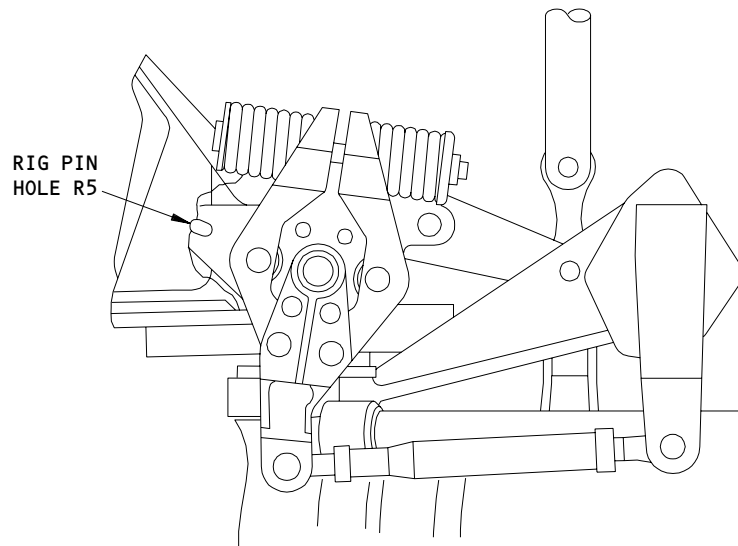
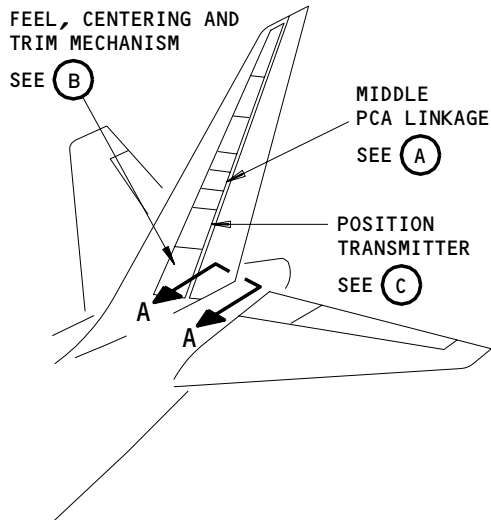
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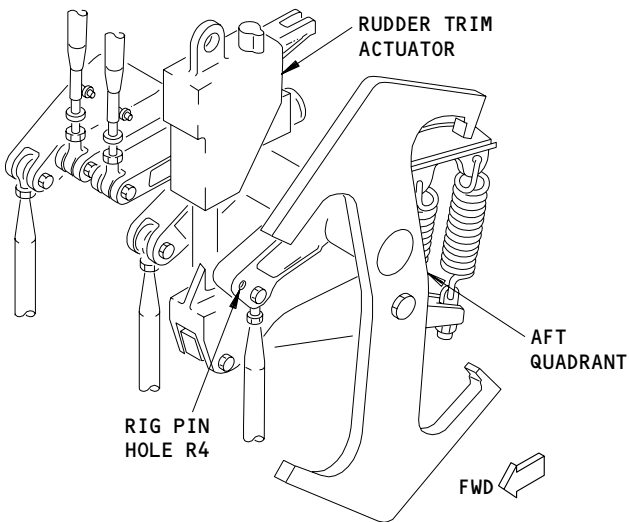
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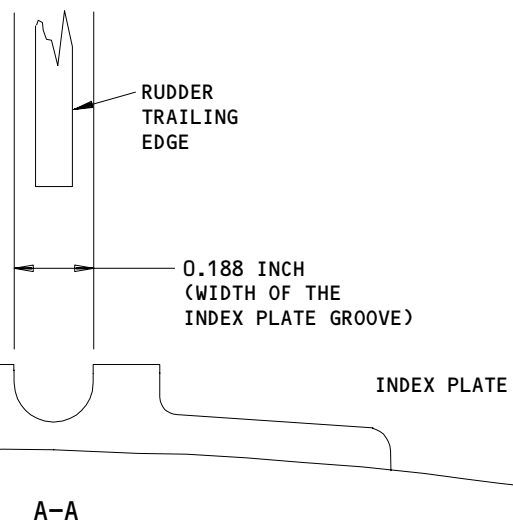
MIDDLE PCA LINKAGE

(A)



FEEL, CENTERING, AND TRIM MECHANISM

(B)



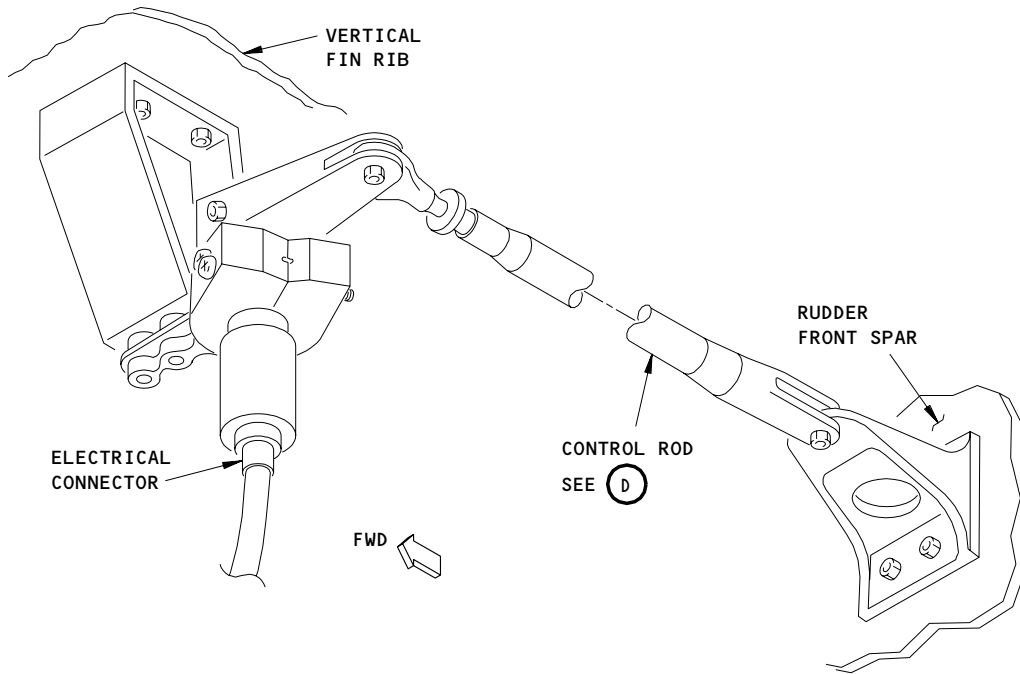
Rudder Position Indicating System Adjustment  
Figure 502 (Sheet 1)

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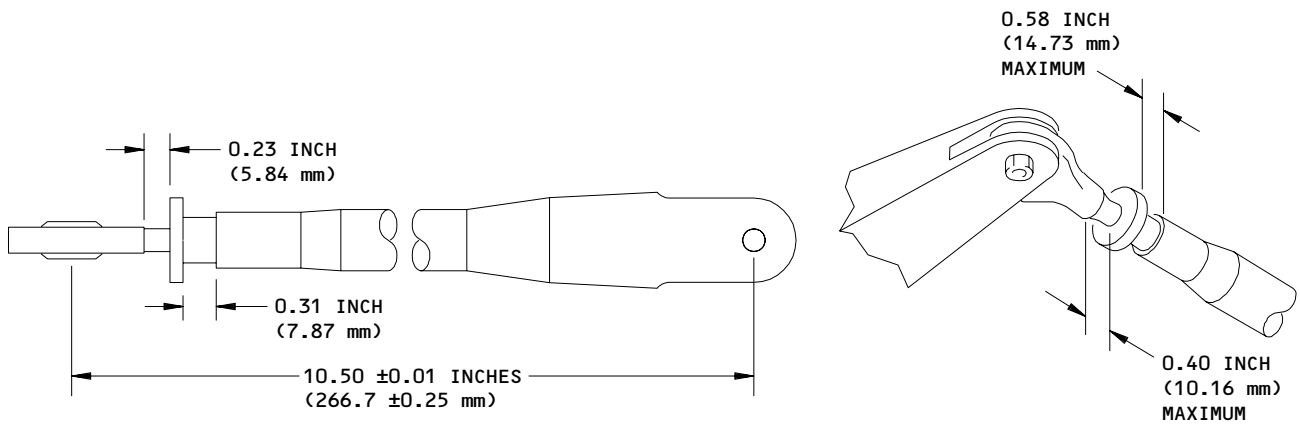
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POSITION TRANSMITTER

(C)



INITIAL CONTROL ROD DIMENSIONS

MAXIMUM CONTROL ROD DIMENSIONS  
(AFTER ADJUSTMENT)

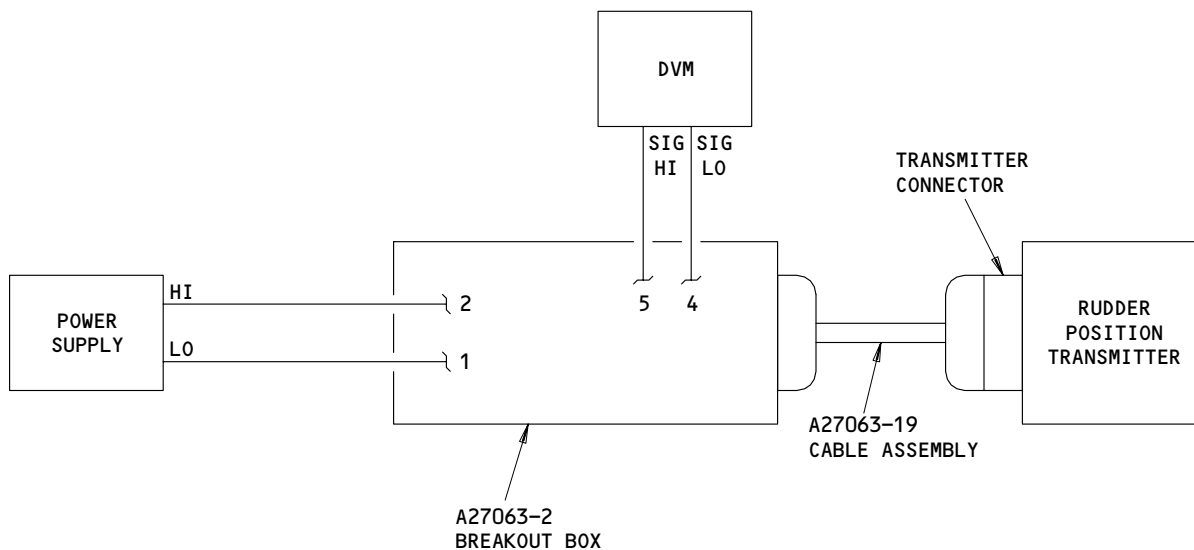
CONTROL ROD

(D)

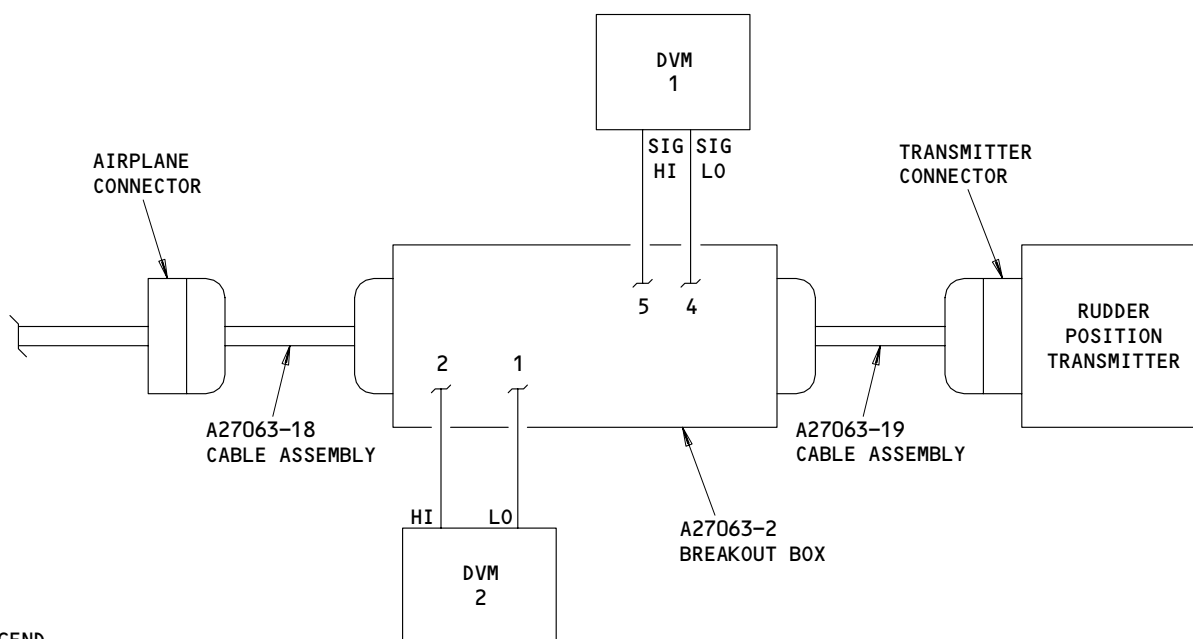
Rudder Position Indicating System Adjustment  
Figure 502 (Sheet 2)

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**PROCEDURE 1**



**PROCEDURE 2**

**LEGEND**

DVM - DIGITAL VOLTMETER

**NOTE:** IF ONLY ONE DVM IS USED, MONITOR THE AIRPLANE POWER AS SHOWN (DVM 2). THEN CONNECT IT TO BREAKOUT BOX AS SHOWN (DVM 1) TO DO THE ADJUSTMENT.

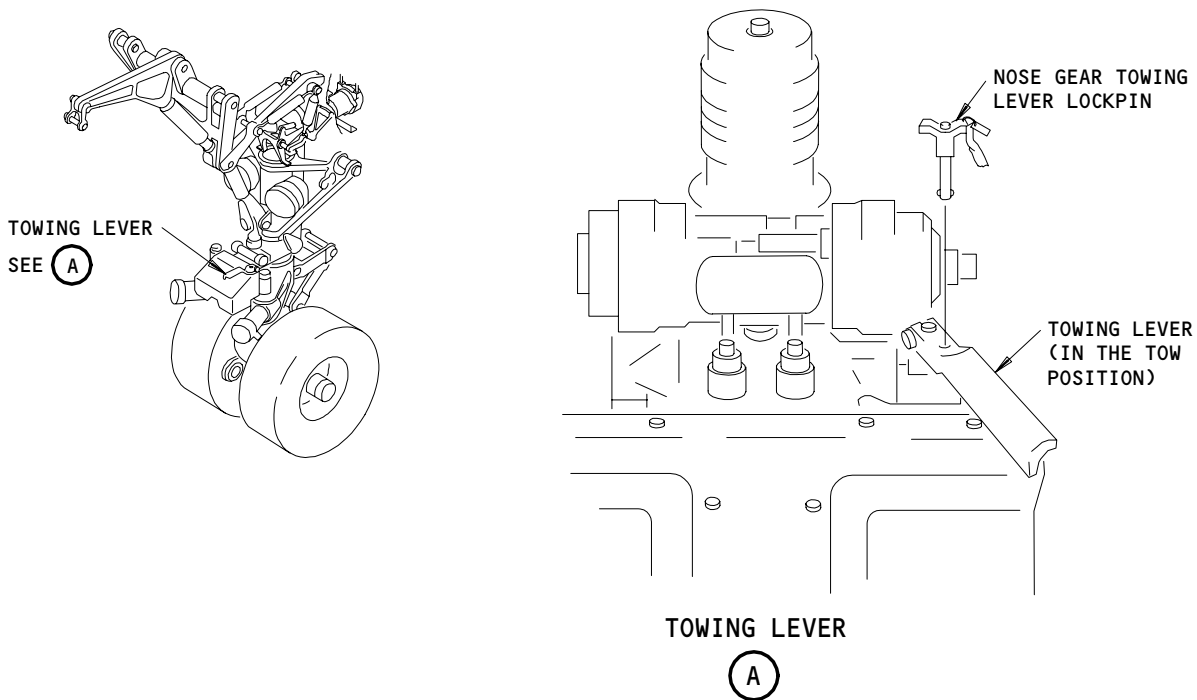
Rudder Position Indicating System Adjustment  
Figure 502 (Sheet 3)

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**BOEING**  
767  
MAINTENANCE MANUAL

- (2) Rig Pin R5 - P/N A20004-13, part of Rig Pin Set A20004-XX (AMM 20-10-24/201)
- (3) Rig Pin R4 - P/N A20004-20, part of Rig Pin Set A20004-XX (AMM 20-10-24/201)
- (4) Power Supply - Powertron Model 5900  
Industrial Test Equipment Corp.  
Port Washington, New York
- (5) Digital Voltmeter - John Fluke 8020B or equivalent  
John Fluke Manufacturing Co., Inc.  
Everett, Washington
- (6) Breakout Box - Position Sensors, Flight Controls Rigging A27063-71:
  - (a) Breakout Box - P/N A27063-2



Nose Gear Steering Isolation  
Figure 503

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- (b) Cable Assemblies - P/N A27063-18 and -19
- C. Consumable Materials
  - (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
  - (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)
- D. References
  - (1) AMM 06-42-00/201, Empennage Access Doors and Panels
  - (2) AMM 20-10-24/201, Rig Pins
  - (3) AMM 24-22-00/201, Electrical Power - Control
  - (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- E. Access
  - (1) Location Zones
    - 211/212 Control Cabin
    - 324 Vertical Stabilizer, Rear Spar to Trailing Edge
  - (2) Access Panels
    - 324EL Rudder Position Transmitter
    - 324JL Hinge Fittings and T.E. of Vertical Stabilizer

F. Prepare for the Adjustment (Fig. 501)

- S 015-015
  - (1) Open the access panels 324EL and 324JL (AMM 06-42-00/201).
- S 865-016
  - (2) Supply electrical power (AMM 24-22-00/201).
- S 495-017
  - (3) Operate the rudder trim switch on the aft electronic control panel, P8, until you can easily install rig pin R5 (Fig. 502).
- S 865-003

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).
- S 215-018
  - (5) Operate the rudder trim switch on the aft electronic control panel, P8, until the rudder is in its neutral position and install rig pin R4 (Fig. 502).

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S 495-065

**WARNING:** MAKE SURE YOU DO NOT OPERATE THE RUDDER TRIM SWITCH OR MOVE THE RUDDER PEDALS DURING THE ADJUSTMENT. THE HYDRAULIC SYSTEM HAS POWER AND ACCIDENTAL RUDDER MOVEMENT CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (6) Attach a DO-NOT-OPERATE tag to the rudder trim switch.

S 865-069

- (7) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:  
(a) 11K16, RUDDER POS

S 495-019

- (8) Move the towing lever on the metering valve module to the tow position and install the towing lever lockpin in the nose gear (Fig. 503).

G. Rudder Position Transmitter - Adjustment (PROCEDURE 1)

S 035-020

- (1) Disconnect the electrical connector from the rudder position transmitter (Fig. 502).

S 495-021

- (2) Do these steps to connect the breakout box equipment:  
(a) Connect the breakout box and the -19 cable assembly to the transmitter.  
(b) Connect the digital voltmeter (DVM) to the breakout box at pins 5 (SIG HI) and 4 (SIG LO).  
(c) Connect the power supply to the breakout box at pins 1 (LO) and 2 (HI).  
(d) Adjust the power supply to  $26 \pm 0.02$  volts ac RMS.

S 825-023

- (3) Adjust the control rod for the transmitter until the output voltage is  $0 \pm 0.050$  volts ac RMS at the DVM.

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- S 215-052
- (4) Make sure the control rod dimensions are not more than the maximum values shown (Fig. 502).
- S 825-053
- (5) Do these steps if the control rod dimensions are more than the maximum:
- (a) Loosen the screws that hold the transmitter in its bracket.
  - (b) Adjust the control rod to the initial dimensions (Fig. 502).
  - (c) Turn the transmitter in its bracket until the output voltage is very near zero.
  - (d) Tighten the screws that hold the transmitter in its bracket.
  - (e) Adjust the control rod for the transmitter until the output voltage is  $0 \pm 0.050$  volts ac RMS at the DVM.
  - (f) Make sure the control rod dimensions are not more than the maximum values shown (Fig. 502).
- S 215-024
- (6) Lock the control rod with a wire and do these steps:
- (a) Make sure the output voltage stays at  $0 \pm 0.050$  volts ac RMS.
  - (b) Apply a thin layer of grease to the threads that show.
- S 095-025
- (7) Disconnect the breakout box equipment.
- S 395-054
- (8) If it is necessary, apply some of the sealant at these locations:
- (a) The transmitter to bracket interface.
  - (b) The airplane to bracket interface.
  - (c) The bracket screws.
  - (d) The bonding jumper, if it is installed.
- S 435-026
- (9) Connect the electrical connector to the transmitter.
- S 095-027
- (10) Remove rig pin R4.
- S 865-055
- (11) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11K16      RUDDER POS
- S 095-066
- (12) Remove the DO-NOT-OPERATE tag from the rudder trim switch.
- S 715-028
- (13) Do the "Rudder Position Indication - Operational Test" task.

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H. Rudder Position Indication - Adjustment (PROCEDURE 2)

S 035-029

- (1) Disconnect the electrical connector from the transmitter (Fig. 502).

S 495-030

- (2) Do these steps to connect the breakout box equipment:
- (a) Connect the breakout box and the -19 cable assembly to the transmitter.
  - (b) Connect the digital voltmeter (DVM) to the breakout box at pins 5 (SIG HI) and 4 (SIG LO).
  - (c) Connect the breakout box and the -18 cable assembly to the airplane electrical connector.
  - (d) Connect DVM 2 to the breakout box at pins 1 (LO) and 2 (HI) to monitor the airplane power.

S 865-031

- (3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead panel, P11:
- (a) 11K16, RUDDER POS

S 225-032

- (4) Make sure the airplane voltage is between 24 and 30 volts ac RMS at DVM 2.

S 825-033

- (5) Adjust the control rod until the output voltage is  $0 \pm 0.050$  volts ac RMS at DVM 1.

S 215-056

- (6) Make sure the control rod dimensions are not more than the maximum values shown (Fig. 502).

S 865-070

- (7) Do these steps if the control rod dimensions are more than the maximum:
- (a) Loosen the screws that hold the transmitter in its bracket.
  - (b) Adjust the control rod to the initial dimensions (Fig. 502).
  - (c) Turn the transmitter in its bracket until the output voltage is very near zero.
  - (d) Tighten the screws that hold the transmitter in its bracket.
  - (e) Adjust the control rod for the transmitter until the output voltage is  $0 \pm 0.050$  volts ac RMS at DVM 1.
  - (f) Make sure the control rod dimensions are not more than the maximum values shown (Fig. 502).

S 215-034

- (8) Lock the control rod with a wire and do these steps:
- (a) Make sure the output voltage stays at  $0 \pm 0.050$  volts ac RMS at DVM 1.
  - (b) Apply a thin layer of grease to the threads that show.

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- S 865-035
- (9) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
- (a) 11K16, RUDDER POS
- S 095-036
- (10) Disconnect the breakout box equipment from the transmitter.
- S 395-057
- (11) If it is necessary, apply some of the sealant at these locations:
- (a) The transmitter to bracket interface.
  - (b) The airplane to bracket interface.
  - (c) The bracket screws.
  - (d) The bonding jumper, if it is installed.
- S 435-037
- (12) Connect the airplane electrical connector to the transmitter.
- S 865-063
- (13) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11K16, RUDDER POS
- S 095-038
- (14) Remove rig pin R4.
- S 095-067
- (15) Remove the DO-NOT-OPERATE tag from the rudder trim switch.
- S 715-039
- (16) Do the "Rudder Position Indication - Operational Test" task.
- I. Rudder Position Indication - Adjustment (PROCEDURE 3)
- S 865-058
- (1) Get communication between a person in the control cabin and a person at the tail.
- S 215-041
- (2) Make sure you connected the electrical connector to the rudder position transmitter.

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S 865-042

- (3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11K16, RUDDER POS

S 865-043

- (4) Push the STATUS button on the display select panel to show the rudder position indicator on the display.

S 825-045

- (5) Adjust the control rod until the position pointer for the rudder aligns with the mid-scale mark.

NOTE: Use a tolerance of +/- one-half an arrow width.

S 215-060

- (6) Make sure the control rod dimensions are not more than the maximum values shown (Fig. 502).

S 825-061

- (7) Do these steps if the control rod dimensions are more than the maximum:
- (a) Loosen the screws that hold the transmitter in its bracket.
  - (b) Adjust the control rod to its initial dimensions (Fig. 502).
  - (c) Turn the transmitter in its bracket until the position pointer for the rudder is very near the mid-scale mark.
  - (d) Tighten the screws that hold the transmitter in its bracket.
  - (e) Adjust the control rod for the transmitter until the position pointer for the rudder aligns with the mid-scale mark.

NOTE: Use a tolerance of  $\pm$  one-half an arrow width.

S 215-046

- (8) Lock the control rod with wire and do these steps:
- (a) Apply a thin layer of grease to the threads that show.
  - (b) Make sure the indicator arrow did not move.

S 395-062

- (9) If it is necessary, apply some of the sealant at these locations:
- (a) The transmitter to bracket interface.

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- (b) The airplane to bracket interface.
- (c) The bracket screws.
- (d) The bonding jumper, if it is installed.

S 095-047

- (10) Remove rig pin R4.

S 095-068

- (11) Remove the DO-NOT-OPERATE tag from the rudder trim switch.

S 715-048

- (12) Do the "Rudder Position Indication - Operational Test" task.
- J. Put the Airplane Back to Its Usual Condition

S 865-050

- (1) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00/201).

S 095-004

**WARNING:** STAY AWAY FROM THE NOSE WHEELS WHEN THE LOCKPIN IS REMOVED. THE WHEELS CAN TURN TO THE CENTER POSITION QUICKLY, AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (2) Make sure the nose wheels are in their center position and remove the towing lever lockpin from the nose gear (Fig. 503).

S 095-072

- (3) Remove rig pin R5.

S 415-051

- (4) Close access panels 324EL and 324JL (AMM 06-42-00/201).

S 865-064

- (5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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RUDDER POSITION TRANSMITTER - REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal task and the installation task for the rudder position transmitter.

TASK 27-28-01-024-002

2. Rudder Position Transmitter - Removal (Fig. 401)

A. Equipment

- (1) Nose Gear Towing Lever Lockpin - A09003-1

B. References

- (1) 06-42-00/201, Empennage Access Doors and Panels  
(2) 20-10-22/701, Metal Surface Cleaning/Painting  
(3) 24-22-00/201, Electrical Power - Control  
(4) 27-28-00/501, Rudder Position Indicating System

C. Access

- (1) Location Zone  
324 Vertical Stabilizer, Rear Spar to Trailing Edge
- (2) Access Panels  
324EL Rudder Mechanical Control Path  
324JL TE of Vertical Stabilizer

D. Prepare for the Removal

S 864-003

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

S 864-004

- (2) Move the FLT CONTROL SHUTOFF TAIL switches L, C, and R on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 864-005

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT
  - (e) 11K16, RUDDER POS

S 864-006

- (4) Move the towing lever to the tow position and install the towing lever lockpin in the nose gear.

S 014-007

- (5) Open access panels 324EL and 324JL (Ref 06-42-00/201).

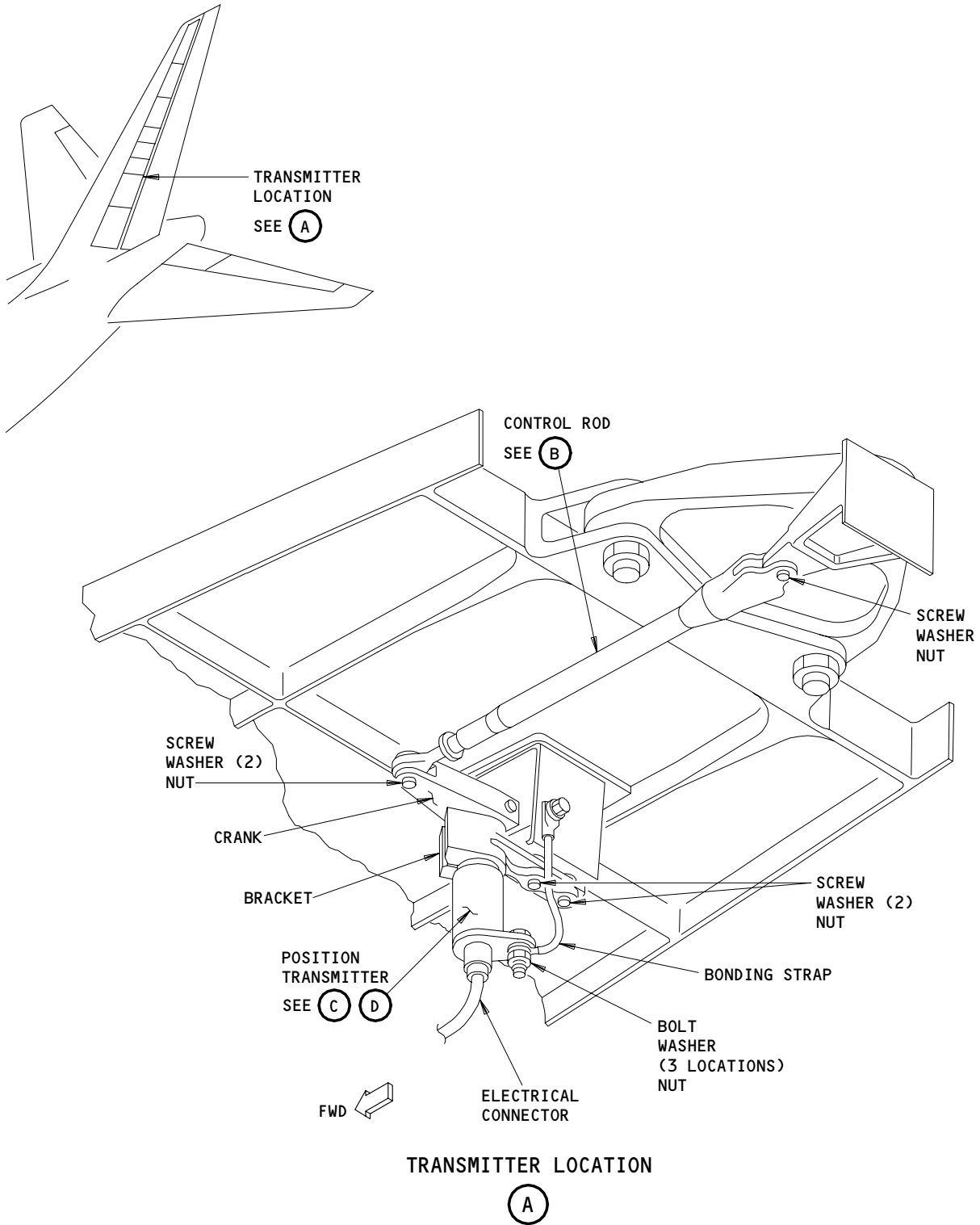
EFFECTIVITY

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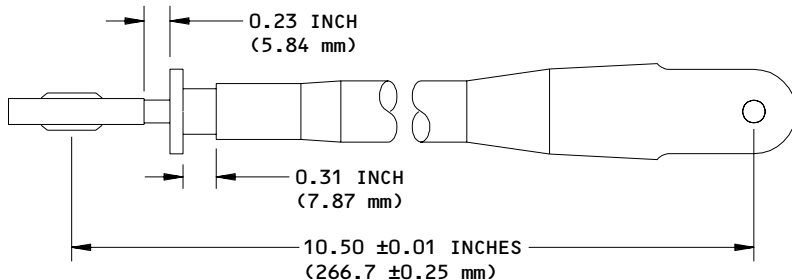
Rudder Position Transmitter Installation  
Figure 401 (Sheet 1)

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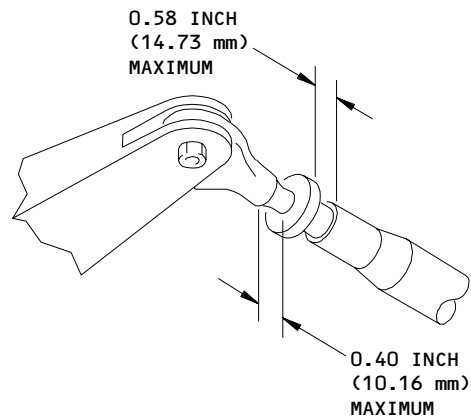
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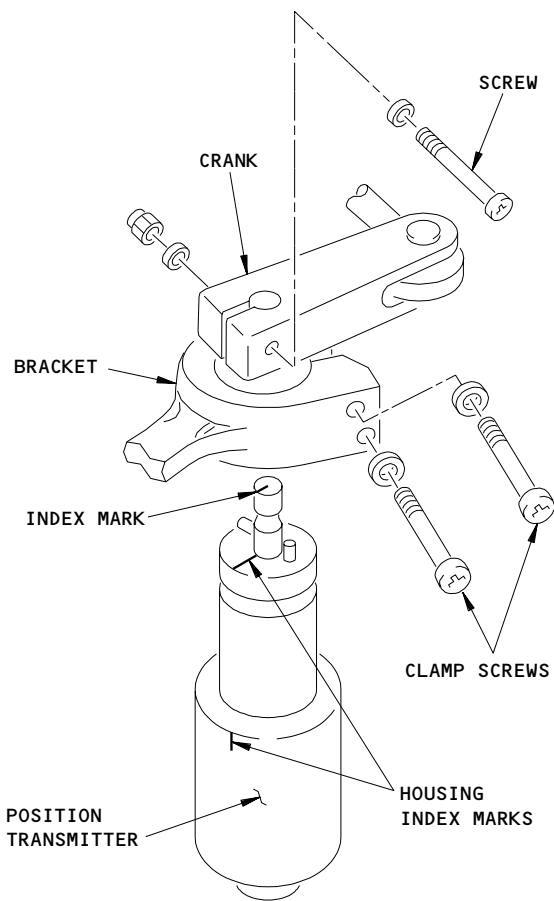
INITIAL CONTROL ROD DIMENSIONS



MAXIMUM CONTROL ROD DIMENSIONS  
(AFTER ADJUSTMENT)

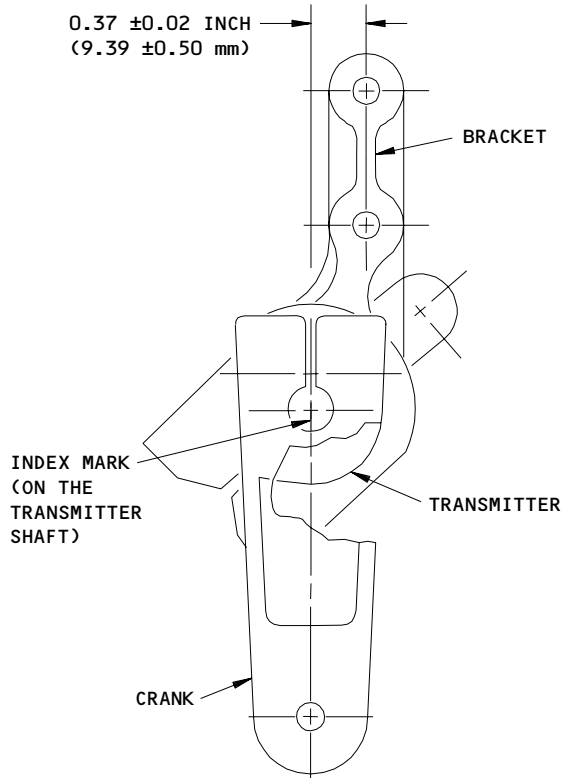
CONTROL ROD

(B)



POSITION TRANSMITTER

(C)



POSITION TRANSMITTER  
(TOP VIEW)

(D)

Rudder Position Transmitter Installation  
Figure 401 (Sheet 2)

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E. Rudder Position Transmitter - Removal (PROCEDURE 1)

NOTE: This procedure removes the transmitter and its bracket from the airplane as an assembly and is the recommended procedure.

S 034-009

- (1) Disconnect these components from the transmitter:
  - (a) The electrical connector
  - (b) The control rod
  - (c) The bonding jumper, if it is installed.

S 034-025

- (2) Remove the screws that connect the transmitter and its bracket to the airplane (2 locations).

S 024-010

- (3) Remove the transmitter and its bracket from the airplane.

S 034-026

- (4) Disconnect the control rod from the rudder and remove it.

S 034-012

- (5) Do these steps if it is necessary to remove the transmitter from its bracket:
  - (a) Remove the crank from the transmitter shaft.
  - (b) Remove the two clamp screws that hold the transmitter in its bracket.
  - (c) Remove the transmitter from its bracket.

F. Rudder Position Transmitter - Removal (PROCEDURE 2)

NOTE: This procedure removes the transmitter as a separate unit from its bracket.

S 034-027

- (1) Disconnect these components from the transmitter:
  - (a) The electrical connector
  - (b) The control rod
  - (c) The bonding jumper, if it is installed.

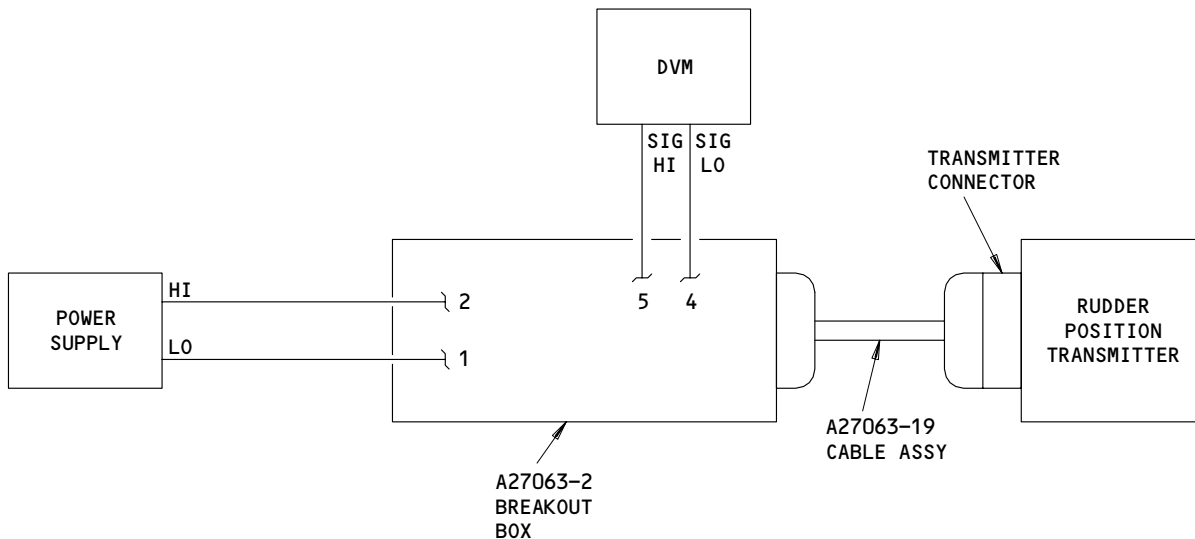
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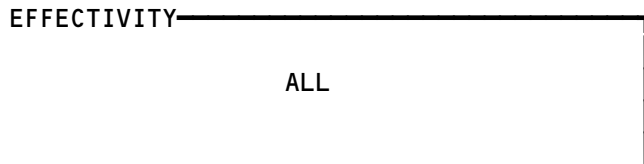
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LEGEND

DVM - DIGITAL VOLTMETER

Rudder Position Transmitter Assembly Adjustment  
Figure 402



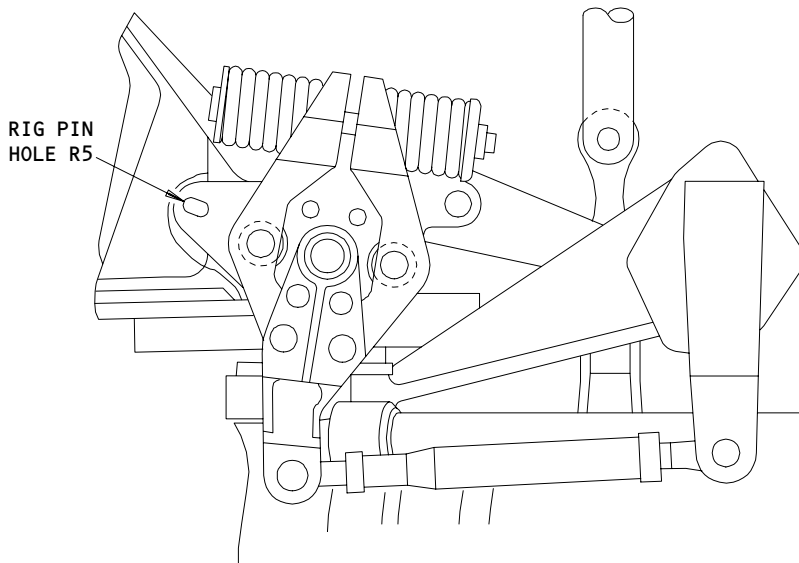
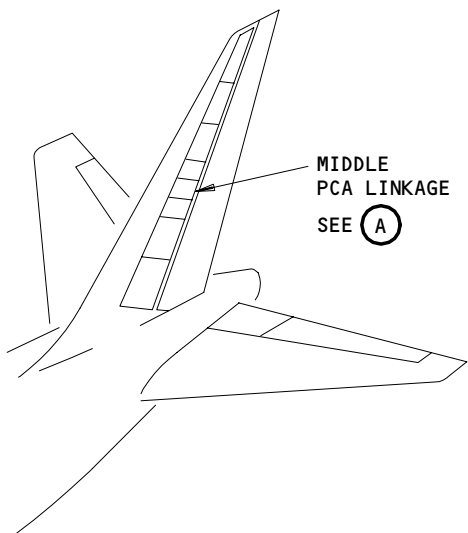
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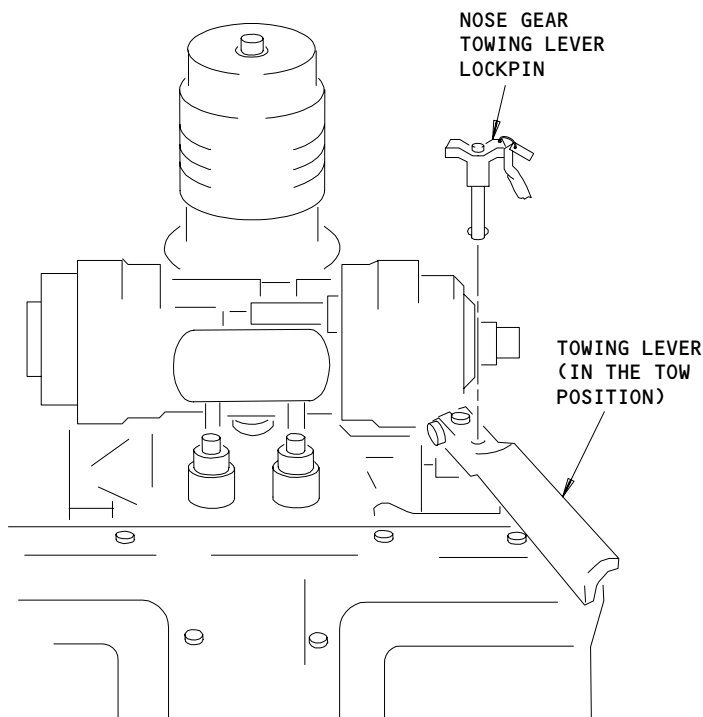
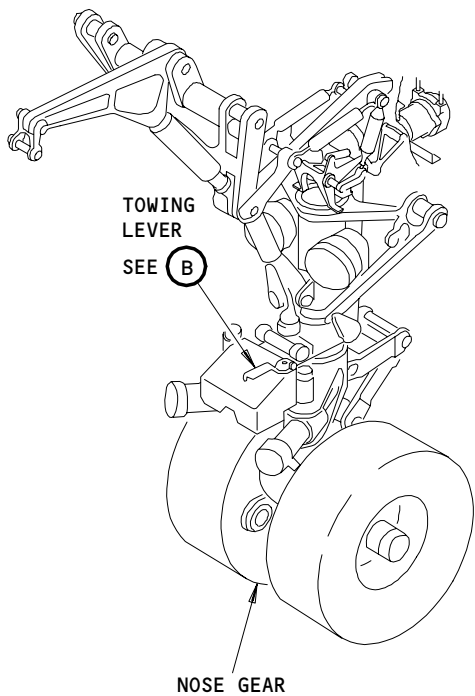
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MIDDLE PCA LINKAGE

(A)



TOWING LEVER

(B)

Rudder Power Control Actuator Maintenance  
Figure 403

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S 024-028

- (2) Do these steps to remove the transmitter from its bracket:
  - (a) Remove the crank from the transmitter shaft.
  - (b) Remove the two clamp screws that hold the transmitter in its bracket.
  - (c) Remove the transmitter from its bracket.

S 034-029

- (3) Disconnect the control rod from the rudder and remove it.

TASK 27-28-01-434-013

3. Rudder Position Transmitter - Installation (Fig. 401)

A. Equipment

- (1) Bonding Meter - Model T477W  
Avtron Manufacturing, Inc.  
Cleveland, Ohio
- (2) Power Supply - Powertron Model 5900  
Industrial Test Equipment Corp.  
Port Washington, New York
- (3) Digital Voltmeter - John Fluke 8020B or  
equivalent  
John Fluke Manufacturing Co., Inc.  
Everett, Washington
- (4) Breakout Box - Position Sensors, Flight  
Controls Rigging - A27063-71:
  - (a) Breakout Box - P/N A27063-2
  - (b) Cable Assembly - P/N A27063-19
- (5) Rig Pin R5 - P/N A20004-13, part of Set  
A20004-XX (Ref 20-10-24)
- (6) Nose Gear Towing Lever Lockpin - A09003-1

B. Consumable Materials

- (1) C00308 Compound, Corrosion Preventive - MIL-C-11796, Class 3
- (2) A00247 Sealant, Chromate Type - BMS 5-95

C. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 20-10-22/701, Metal Surface Cleaning
- (3) 20-10-24/201, Rig Pins
- (4) 24-22-00/201, Electrical Power - Control
- (5) 27-28-00/501, Rudder Position Indicating System

D. Access

- (1) Location Zone
  - 324 Vertical Stabilizer, Rear Spar to Trailing Edge
- (2) Access Panels
  - 324EL Rudder Mechanical Control Path
  - 324JL TE of Vertical Stabilizer

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E. Rudder Position Transmitter - Installation (PROCEDURE 1)

NOTE: Use this procedure if you used PROCEDURE 1 to remove the position transmitter.

S 864-045

- (1) Operate the rudder trim switch on the aft electronic control panel, P8, until you can easily install rig pin R5.

S 224-016

- (2) Do this check if the transmitter, crank, and bracket are assembled:  
(a) Make sure the transmitter output voltage is  $0 \pm 0.050$  volts ac RMS when the crank and the bracket are in the positions shown (View D, Fig. 401).

S 434-017

- (3) Do these steps if it is necessary to assemble the transmitter and its bracket:
- (a) Use a rotary bonding brush or an abrasive disk to clean the mating surfaces of the transmitter and the bracket (Ref 20-10-22/701).
- (b) Put the transmitter in its bracket and do these steps:  
1) Install the clamp screws but do not tighten them.  
2) Make sure the top clamp screw engages the transmitter groove.
- (c) Put the crank on the transmitter shaft and do these steps:  
1) Make sure the index mark on the transmitter shaft aligns with the crank slot.  
2) Make sure the crank screw engages the groove on the shaft.  
3) Tighten the screw that holds the crank on the transmitter shaft.
- (d) Do these steps to connect the breakout box equipment:  
1) Connect the breakout box and the -19 cable assembly to the transmitter (Fig. 402).  
2) Connect the digital voltmeter (DVM) to the breakout box at pins 4 (SIG LO) and 5 (SIG HI).  
3) Connect the power supply to the breakout box at pins 1 (LO) and 2 (HI).  
4) Adjust the power supply to  $26 \pm 0.020$  volts ac RMS.
- (e) Put the crank and its bracket in the positions shown (Fig. 401) and do these steps:  
1) Turn the transmitter in its bracket until the output voltage is  $0 \pm 0.050$  volts ac RMS.  
2) Tighten the bracket clamp screws.  
3) Make sure the output voltage stays at  $0 \pm 0.050$  volts ac RMS.
- (f) Disconnect the breakout box equipment from the transmitter.

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- S 424-019
- (4) Do these steps to install the position transmitter:
- (a) Use a rotary bonding brush or an abrasive disk to clean the mating surfaces of the airplane and the transmitter bracket (Ref 20-10-22/701).
  - (b) Put the transmitter assembly in its correct position.
  - (c) Install the screws, washers, and nuts that connect the transmitter assembly to the airplane (2 locations) and do this step:
    - 1) Apply some of the sealant to the screws and the bracket.
- S 824-030
- (5) Adjust the control rod to the initial dimensions shown (Fig. 401).
- S 434-031
- (6) Connect the control rod between the transmitter and the rudder and do this step:
- (a) Apply some of the sealant to the screws, washers, and nuts.
- S 434-032
- (7) If it was installed, connect the bonding jumper to the transmitter and do these steps:
- (a) Apply some of the sealant to the bolts.
  - (b) Use a bonding meter to make sure the resistance between the transmitter and the airplane is a maximum of 0.010 ohms.
- S 434-033
- (8) Connect the electrical connector to the transmitter.
- S 864-034
- (9) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT
  - (e) 11K16, RUDDER POS
- S 864-044
- (10) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the right side panel, P61, to ON.
- S 824-020
- (11) Adjust the rudder position transmitter (Ref 27-28-00/501).

**NOTE:** You will apply some of the sealant at the bracket to transmitter interface after you adjust the transmitter.

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F. Rudder Position Transmitter - Installation (PROCEDURE 2)

NOTE: Use this procedure if you used PROCEDURE 2 to remove the position transmitter.

S 864-046

- (1) Operate the rudder trim switch on the aft electronic control panel, P8, until you can easily install rig pin R5.

S 424-036

- (2) Put the transmitter in its bracket and do these steps:
  - (a) Install the transmitter clamp screws but do not tighten them.
  - (b) Make sure the top clamp screw engages the transmitter groove.

S 434-037

- (3) Put the crank on the transmitter shaft and do these steps:
  - (a) Make sure the index mark on the transmitter shaft aligns with the crank slot.
  - (b) Install the screw that holds the crank to the shaft and tighten it.
  - (c) Make sure the screw engages the groove in the transmitter shaft.

S 824-035

- (4) Adjust the control rod to the initial dimensions shown (Fig. 401).

S 434-039

- (5) Connect the control rod between the transmitter and the rudder and do this step:
  - (a) Apply some of the sealant to the screws, washers, and nuts.

S 434-038

- (6) If it was installed, install the bonding jumper to the transmitter and do this step:
  - (a) Apply some of the sealant to the bolts.

S 434-040

- (7) Connect the electrical connector to the transmitter.

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S 864-047

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (8) Supply pressure to the left, right, and center hydraulic systems (Ref 29-11-00/201).

S 864-041

- (9) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11G10, RUDDER RATIO
  - (b) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (c) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (d) 11H27, FLT CONT SHUTOFF TAIL RIGHT
  - (e) 11K16, RUDDER POS

S 864-042

- (10) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to ON.

S 824-048

**WARNING:** BE VERY CAREFUL AND DO NOT OPERATE THE RUDDER PEDALS OR THE RUDDER TRIM SWITCH DURING THE ADJUSTMENT. HYDRAULIC POWER IS ON AND ACCIDENTAL RUDDER MOVEMENT CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (11) Do these steps to initially adjust the position transmitter:
- (a) Make sure the rudder is in its neutral position.
  - (b) Get communication between a person in the control cabin (to monitor the position indicator on EICAS) and a person at the tail (to adjust the transmitter).

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- (c) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (d) Push the STATUS button on the P9 panel to show the rudder position indicator on the bottom EICAS display.
- (e) Loosen the screws that hold the transmitter in its bracket.
- (f) Adjust the control rod for the position transmitter to the initial dimensions shown (Fig. 401).
- (g) Turn the transmitter in its bracket until the position pointer is very near the mid-scale mark.
- (h) Tighten the screws that hold the transmitter in its bracket.
- (i) Use a bonding meter to make sure the resistance between the transmitter and the airplane is a maximum of 0.010 ohms.

S 824-050

- (12) Adjust the Rudder Position Transmitter (Ref 27-28-00/501).

**NOTE:** You will apply some of the sealant at the bracket to transmitter interface after you adjust the transmitter.

G. Put the Airplane Back to Its Usual Condition

S 864-049

- (1) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00/201).

S 094-001

**WARNING:** STAY AWAY FROM THE NOSE WHEELS WHEN THE LOCKPIN IS REMOVED. THE WHEELS CAN TURN TO THE CENTER POSITION QUICKLY, AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (2) Make sure the nose wheels are in their center position and remove the towing lever lockpin from the nose gear.

S 864-023

- (3) Remove electrical power if it is not necessary (Ref 24-22-00/201).

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- S 414-024  
(4) Close access panels 324EL and 324JL (Ref 06-42-00/201).

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RUDDER TRIM POSITION INDICATOR - REMOVAL/INSTALLATION

TASK 27-28-05-024-001

1. Rudder Trim Indicator - Removal

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Prepare for the Removal

S 864-002

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

S 864-003

- (2) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11K17, RUDDER TRIM POS  
(b) 11C5 or 11K18, RUDDER TRIM

D. Rudder Trim Indicator - Removal (Fig. 401)

S 034-004

- (1) Remove the indicator screws (2 locations).

S 034-005

- (2) Lift the rudder trim indicator from the aft electronic control panel, P8, to get access to the electrical connector.

S 034-006

- (3) Disconnect the electrical connector from the rudder trim indicator.

S 024-007

- (4) Remove the rudder trim indicator.

TASK 27-28-05-424-008

2. Rudder Trim Indicator - Installation

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 27-21-00/501, Rudder and Rudder Trim Control System  
(3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Rudder Trim Indicator - Installation

S 434-009

- (1) Connect the electrical connector to the rudder trim indicator.

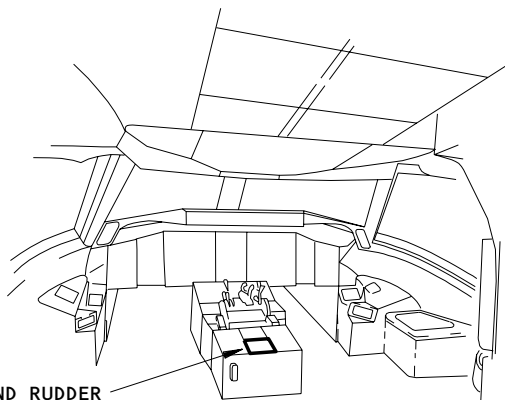
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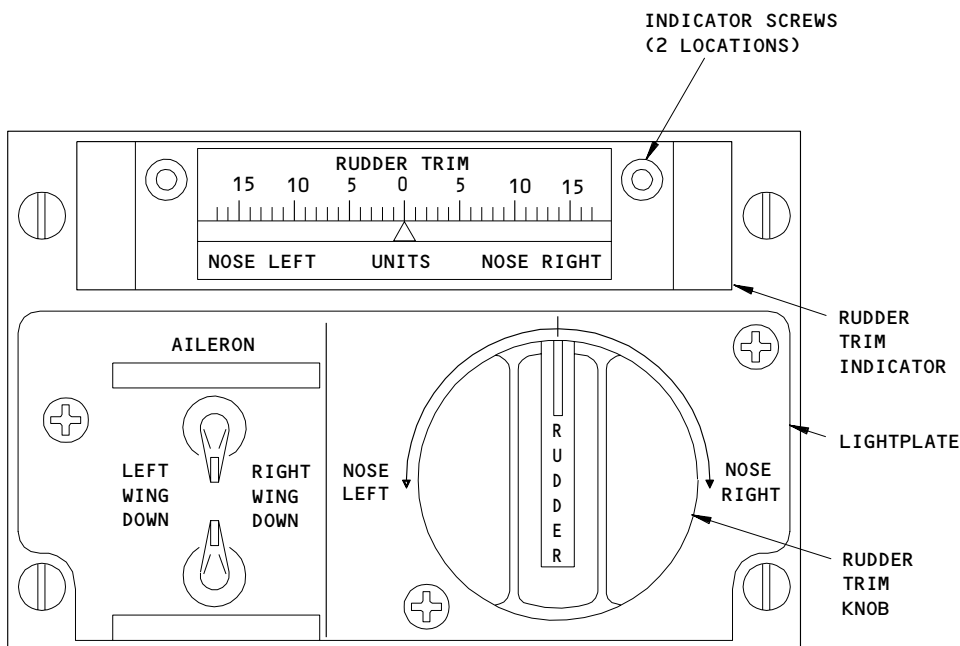
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AILERON AND RUDDER TRIM MODULE

SEE (A)

FLIGHT COMPARTMENT



AILERON AND RUDDER TRIM MODULE

(A)

Rudder Trim Indicator - Removal/Installation  
Figure 401

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S 864-010

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11K17, RUDDER TRIM POS
  - (b) 11C5 or 11K18, RUDDER TRIM

S 824-011

- (3) Do a check of the rudder trim indicator null:

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (a) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).
- (b) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - 1) 11G10, RUDDER RATIO
  - 2) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - 3) 11H18, FLT CONT SHUTOFF TAIL CTR
  - 4) 11H27, FLT CONT SHUTOFF TAIL RIGHT
- (c) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, C, and R switches on the P61 panel to ON.
- (d) Turn the rudder trim switch on the aft electronic control panel, P8, until the rudder is in its neutral position.
- (e) Hit the left and right pedals lightly to put the feel cam roller in its detent. Do this step again if it is necessary.
- (f) Make sure that the rudder trim indicator shows zero and that the pointer is on the zero line width.
  - 1) If it is not on the line, adjust the rudder trim indicator null (AMM 27-21-00/501)

S 864-012

- (4) Put the indicator in the indicator panel.

S 424-013

- (5) Install the indicator screws (2 locations).

D. Rudder Trim Indicator - Test

S 864-014

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

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- (1) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-015

- (2) Hit the left and right rudder pedals lightly to put the feel cam roller in its neutral detent position.

S 864-016

- (3) Push the STATUS button on the display select panel, P9, to show the rudder position indicator on the bottom EICAS display.

S 214-017

- (4) Turn the rudder trim switch on the aft electronic control panel, P8, clockwise and hold it there until the rudder movement stops.
  - (a) Make sure the rudder trim indicator shows at least 14.0 units of right trim.
  - (b) Make sure the rudder position indicator moves to the right approximately two-thirds of its full travel.

S 214-018

- (5) Turn the rudder trim switch on the aft electronic control panel, P8, counterclockwise and hold it there until the rudder movement stops.
  - (a) Make sure the rudder trim indicator shows at least 14.0 units of left trim.
  - (b) Make sure the rudder position indicator moves to the left approximately two-thirds of its full travel.

S 214-019

- (6) Operate the rudder trim switch until the trim indicator shows zero units of trim.
  - (a) Make sure the rudder position indicator aligns with the neutral position mark (use a tolerance of one-half an arrow width).
  - (b) Make sure the rudder is in its neutral position.

E. Put the Airplane Back to Its Usual Condition

S 864-020

- (1) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-021

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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ELEVATOR CONTROLS – CORROSION PROTECTION

1. General

- A. Elevator and tabs controls the aircraft around the horizontal axis and consists of:
  - (1) Control wheel.
  - (2) Cables.
  - (3) Boosters and linkages.
  - (4) Actuators and Indicators.
- B. Corrosion can occur on the bearings in the input linkage of the power control unit.

TASK 27-30-00-642-001

2. Corrosion Prevention

- A. Equipment
  - (1) Lock – Elevator Actuator – A27111-11
- B. References
  - (1) AMM 06-42-00/201, Empennage Access Doors and Panels
  - (2) AMM 24-22-00/201, Electrical Power – Control
  - (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- C. Access
  - (1) Location Zones
    - 335/345 Horizontal Stabilizer, Rear Spar to Trailing Edge
- D. Access Panels
  - 335EB/335GB/335HB/335AFB Left Elevator PCAs
  - 345EB/345GB/345HB/345AFB Right Elevator PCAs
- E. Procedure

S 862-012

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

S 862-013

- (2) Put the LEFT and CENTER STAB TRIM SHUTOFF TAIL valve switches on the control stand panel, P10, to the CUTOUT position.

S 862-014

- (3) Do the steps that follow to remove the hydraulic power:
  - (a) Remove the pressure from the left, right, and center hydraulic systems and reservoirs (AMM29-11-00/201).

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- (b) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.
- (c) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - 1) 11A36, ALT STAB TRIM
  - 2) 11C12, STAB TRIM SHUTOFF L
  - 3) 11C13, STAB TRIM SHUTOFF CENTER
  - 4) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - 5) 11H18, FLT CONT SHUTOFF TAIL CTR
  - 6) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 862-010

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

S 862-011

- (5) Put a DO-NOT-OPERATE tag on the control columns.

S 012-009

- (6) Remove these access panels (AMM 06-42-00/201):
  - (a) For the left elevator PCAs:  
335EB, 335GB, 335HB, and 335AFB
  - (b) For the right elevator PCAs:  
345EB, 345GB, 345HB, and 345AFB

S 202-005

- (7) Visually inspect Elevator Power Control Actuator inboard, outboard, and center Input Linkages bearings, bolts, nuts, and surrounding areas for possible signs of corrosion (Noticeable white deposits, flaking, scaling, and discoloration) (SRM 51-10-02/1).

S 102-006

- (8) For corrosion damage, it is necessary to do rework to the damage area to find the penetration depth of the damage before you can establish its allowable damage or damage requiring repair or replacement.

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S 142-007

- (9) Remove all corrosion, evaluate damage, and repair or replace discrepant item. Follow up with an application of protective finishes and corrosion inhibiting compounds (SRM 51-10-02/201).

S 842-008

- (10) Put the Airplane back to Its usual condition.

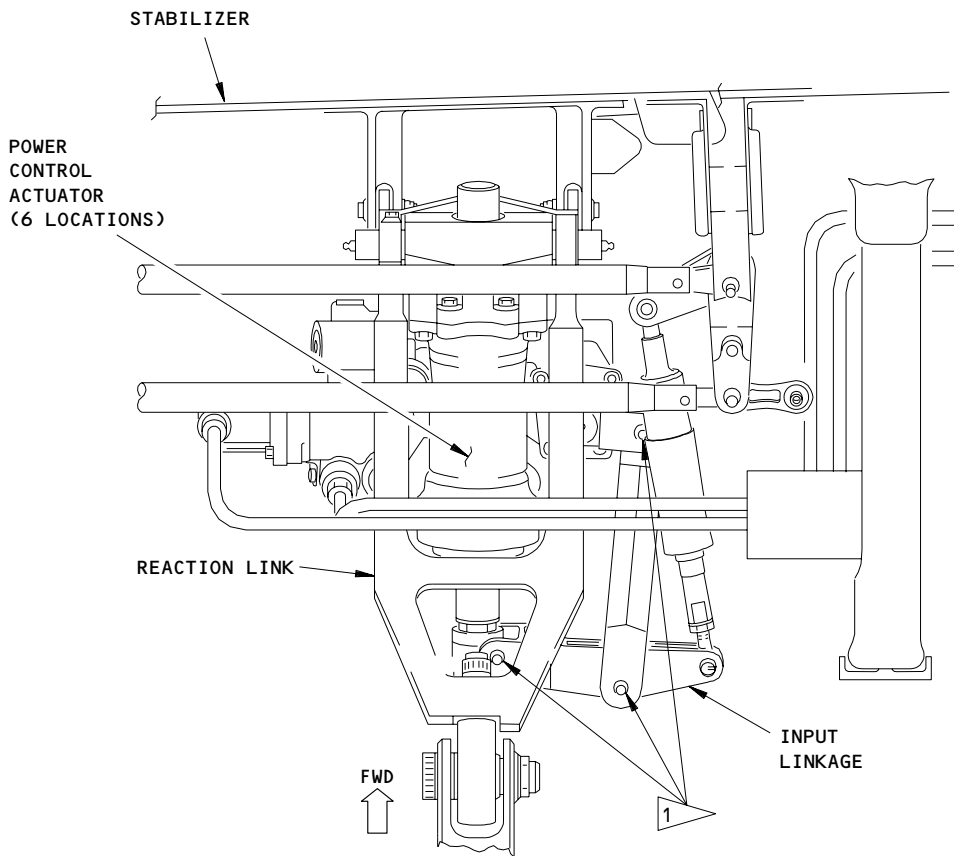
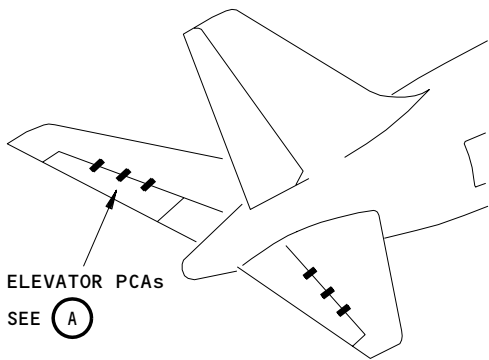
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ELEVATOR PCA (EXAMPLE)

(A)

1 CORROSION CAN OCCUR ON THESE BEARINGS

Elevator Power Control Actuator Installation  
Figure 201

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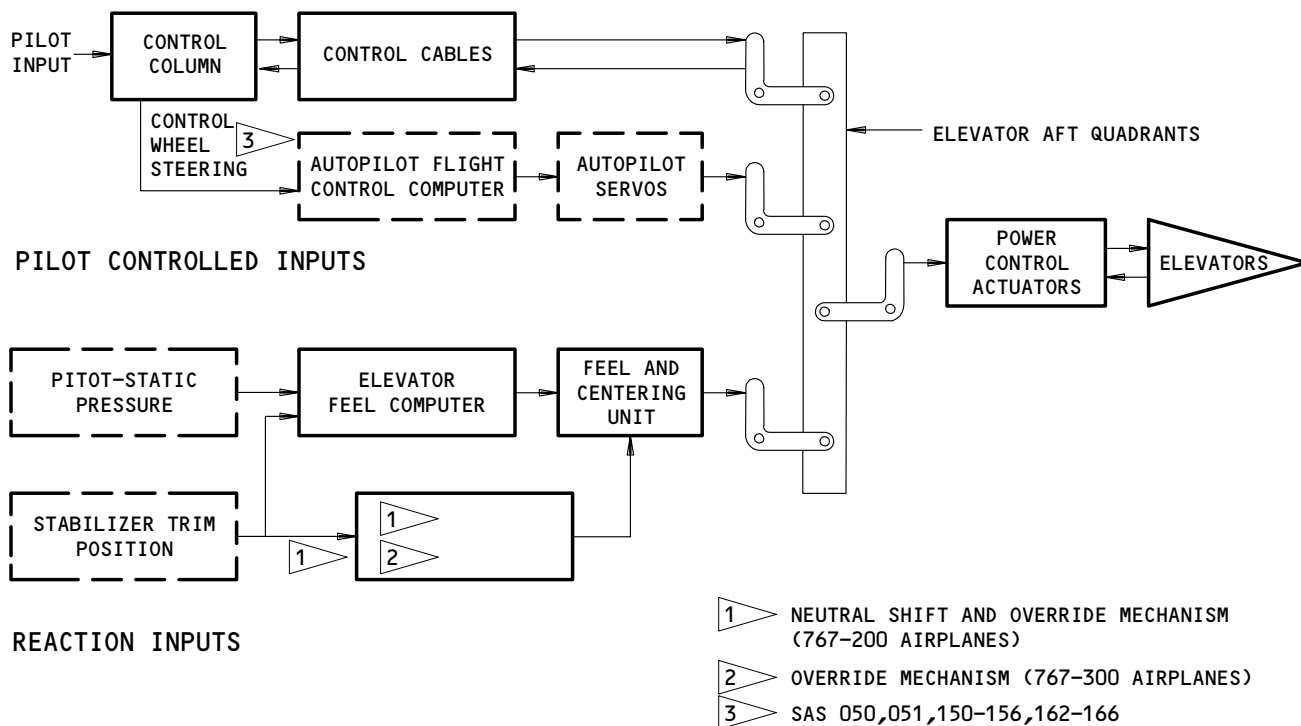
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ELEVATOR CONTROL SYSTEM – DESCRIPTION/OPERATION

1. General (Fig. 1)

- A. The elevator control system provides primary control of the airplane about its pitch axis. The elevators vary airplane pitch attitude for climb, descend, and altitude hold. The elevator control system automatically responds to mach and speed trim demands and initiates automatic stabilizer trim functions.
- B. Two inboard and two outboard elevators are connected to the stabilizer rear spar by hinges. Each inboard and outboard elevator is connected by two interconnect links. The outboard elevator is rigged faired with the inboard elevator. Deflection of the elevators is caused by six power control actuators (PCA's). Three PCA's are attached to each left and right outboard elevator. Each set of three PCA's is powered by the left, right, and center hydraulic systems. Only one PCA is needed to control each of the elevators.

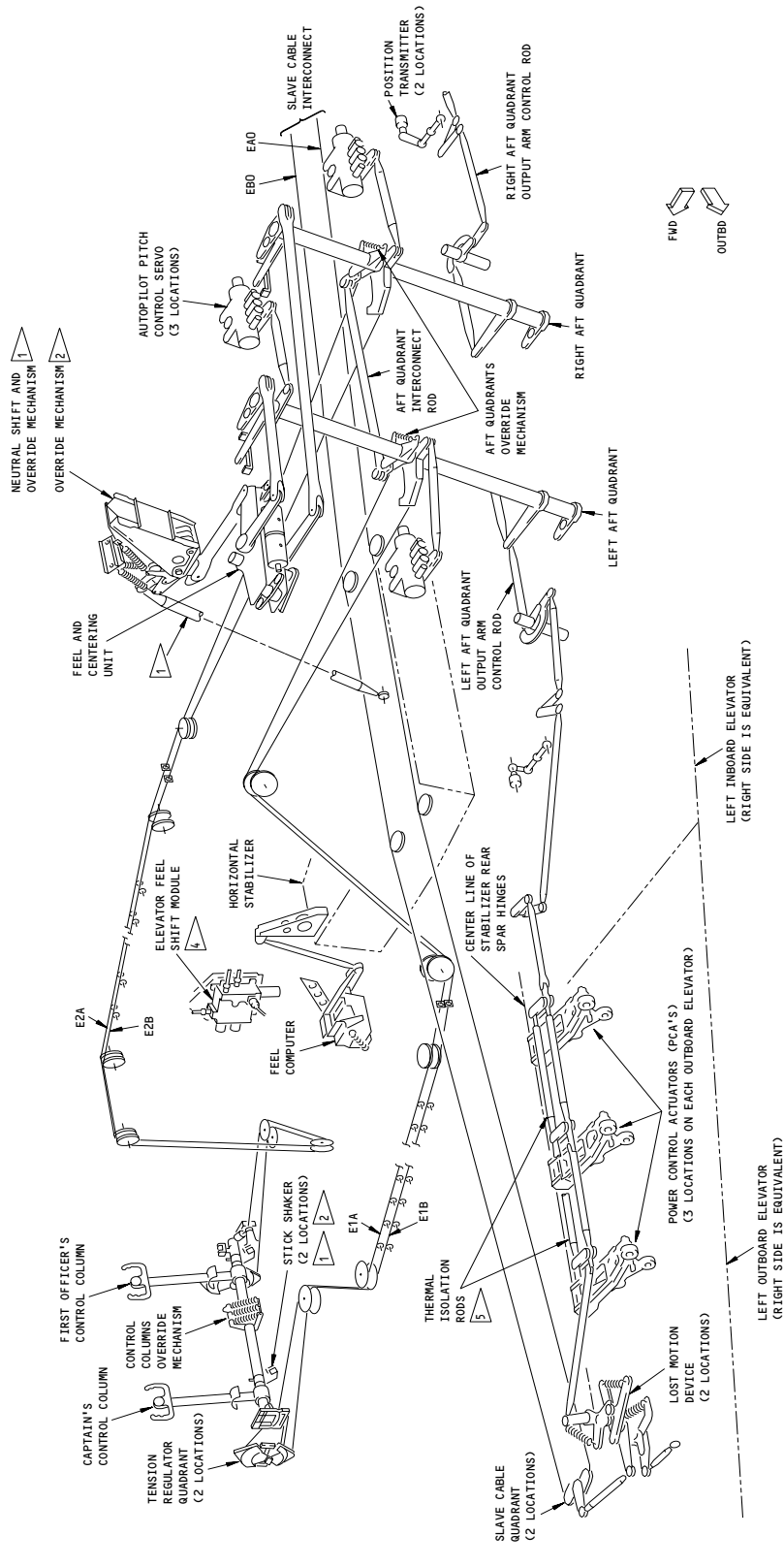


Elevator Control Modes and Mechanical Linkages  
Figure 1 (Sheet 1)

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- 1 767-200 AIRPLANES
  - 2 767-300 AIRPLANES
  - 4 767-400 AIRPLANES
- THESE THERMAL ISOLATION RODS ARE OPTIONAL AND MAY NOT BE INCLUDED IN THE AIRCRAFT CONFIGURATION.

Elevator Control Modes and Mechanical Linkages  
Figure 1 (Sheet 2)

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- C. The elevator control system consists of two equal systems in parallel. The captain's control column inputs to the left outboard elevator PCA's. The first officer's control column inputs to the right outboard elevator PCA's. The left and right elevator control systems are interconnected through override mechanisms at the control columns and aft quadrants. The left and right outboard elevators are connected by a slave cable interconnect. The captain's and first officer's elevator controls have equal authority. The two systems normally act together as one system because of the override mechanisms. If one system becomes immobilized, the other system will control independent of the first. Only one system is needed to control the airplane.
- D. In the manual mode, control column inputs are transmitted through tension regulator quadrants. The tension regulator quadrants drive the cable systems and provide cable tension. The two cable systems translate column motion to the aft quadrant assemblies. The aft quadrant assemblies are aligned parallel and are bussed together by an override mechanism. The aft quadrant assemblies serve as the interface between the cable systems and the elevator PCA input control rods. The aft quadrant assemblies translate aft quadrant rotary motion into linear motion for the PCA input rods. The input rods control the PCA control valves. The left and right elevator PCA input control rods and linkages are interconnected by the two lost motion devices and a slave cable system which guards against control linkage jams.
- E. The elevator feel unit is connected to the elevator aft quadrant assemblies by pushrods. The feel unit supplies neutral position and feel force for the elevator controls. The neutral shift linkage provides neutral position to the feel unit. The neutral position is determined by stabilizer position input to the neutral shift linkage. The feel force is the sum of mechanical and hydraulic feel spring forces in the feel unit. Hydraulic feel force is supplied by the feel computer. Hydraulic feel pressure increases with an increase in airspeed and nose down trim. The feel computer consists of two analog computers operating in parallel. The pilot feels effect of higher pressure only at the feel unit. The feel force is unaffected if one computer is inoperative.
- F. The autopilot system provides automatic elevator control. The autopilot servos power the aft quadrant assemblies through their actuating rods and cranks. The left and center autopilot servos input to the left aft quadrant. The right autopilot servo inputs to the right aft quadrant. (See AMM 22-10-00/001, Autopilot (Flight Control) - Description and Operation.) ON SOME AIRPLANES (See Fig. 1 for effectivity), the control wheel steering (CWS) feature of the autopilot system allows pilot input to the elevator without disengaging the autopilot. The CWS inputs through the autopilot servos. (See AMM 22-12-00/001, Autopilot/Flight Director Pitch Channel - Description and Operation.)

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- G. Elevator surface position and system fault indication is provided by the engine indicating and crew alerting system (EICAS). The control surfaces position indicator appears in the lower left hand corner of the lower EICAS screen when the STATUS button is pushed. Elevator control system fault indications appear on both EICAS screens.
- H. A stall warning condition is indicated by the shaking of two stick shakers located on the control column torque tube. The stick shakers are activated by a ground signal from the left and right stall warning modules. The stall warning modules monitor leading edge slat and flap position, and airplane angle of attack to determine stall proximity. (See AMM 27-32-00/001, Stall Warning System - Description and Operation.)

## 2. Component Details

### A. Control Column Assembly (Fig. 2)

- (1) The control column torque tube assemblies are located under the cabin floor. Access is through the forward equipment bay hatch. The control columns are mounted on torque tubes. The torque tubes are supported by offset pivot bearings at each end. The outboard ends of the control column torque tube are connected to force transducer bellcranks. The force transducer bellcrank is mounted on a pivot to the torque tube bellcrank and is restrained by the force transducer and lost motion limiter. The force transducer bellcranks are connected by non-adjustable pushrods to the forward cable tension regulator quadrants. The inboard ends of the control column torque tubes are linked together by a column override spring assembly. Override alignment is maintained by three springs. The springs hold a roller on the left torque tube in a cam detent position on the right torque tube.
- (2) There are two rig pin locations on the control column torque tubes. Vertical rig pin hole E-1 goes through the outboard end of the left torque tube. Horizontal rig pin hole E-2 goes through the bellcrank below the outboard end of the right torque tube.

### B. Tension Regulator Quadrant (Fig. 2)

- (1) The tension regulator quadrants are located below the cabin floor forward of the control column torque tube. Access is through the forward equipment bay hatch. One quadrant is attached to each of the captain's and first officer's torque tube bellcranks by non-adjustable pushrods. Elevator control cables run from the tension regulator quadrants to the elevator aft quadrants. The tension regulator quadrants control cable tension by compensating for dimensional changes in cables and structure from changes in temperature and applied forces.

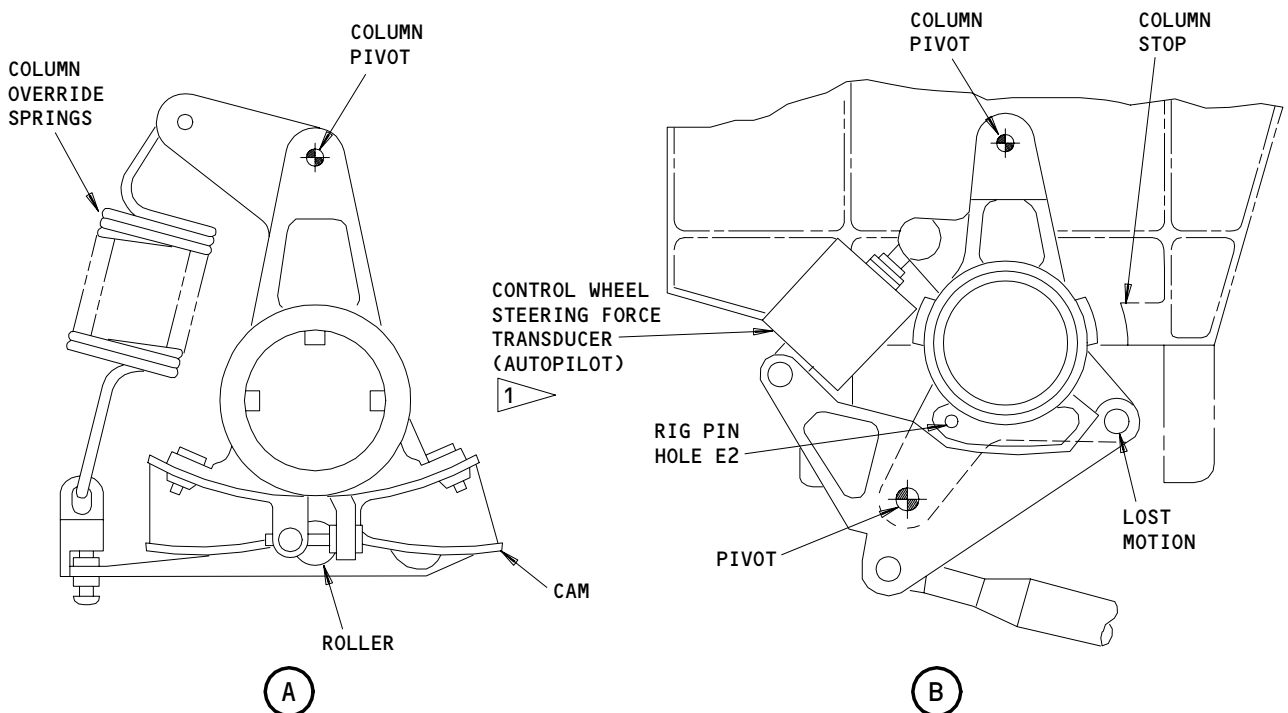
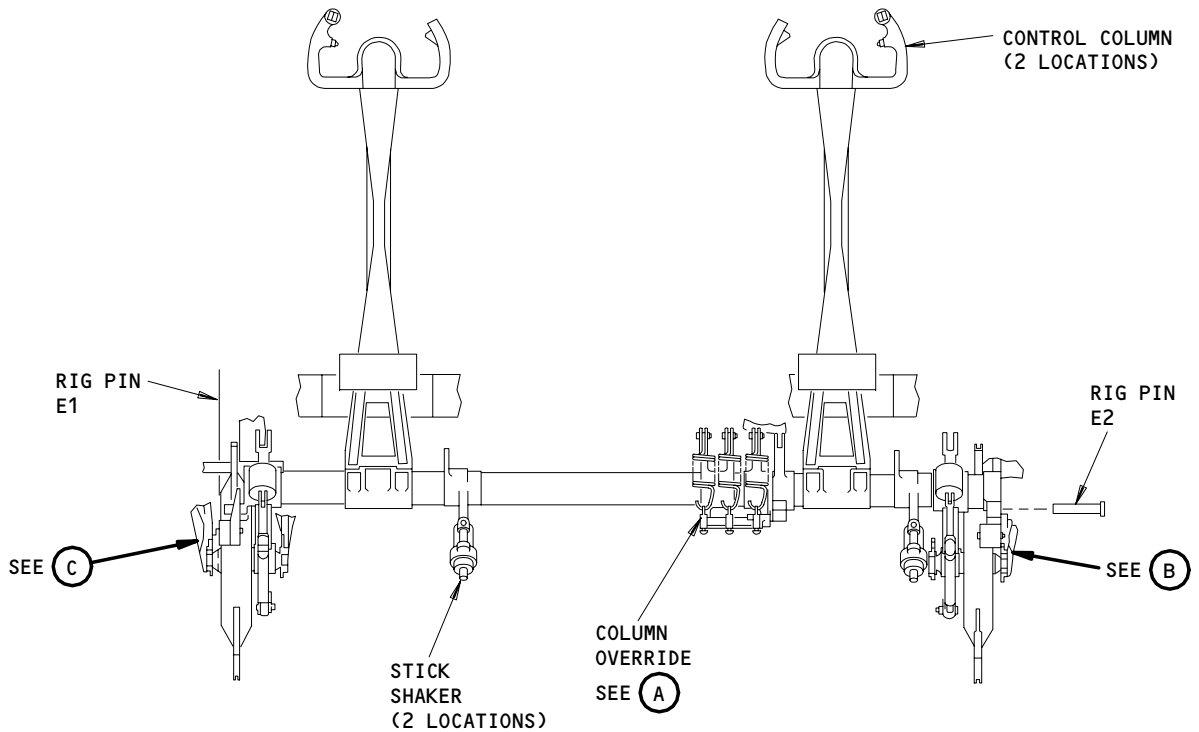
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1 SAS 050,051,150-156,162-166

Control Column Assembly  
Figure 2 (Sheet 1)

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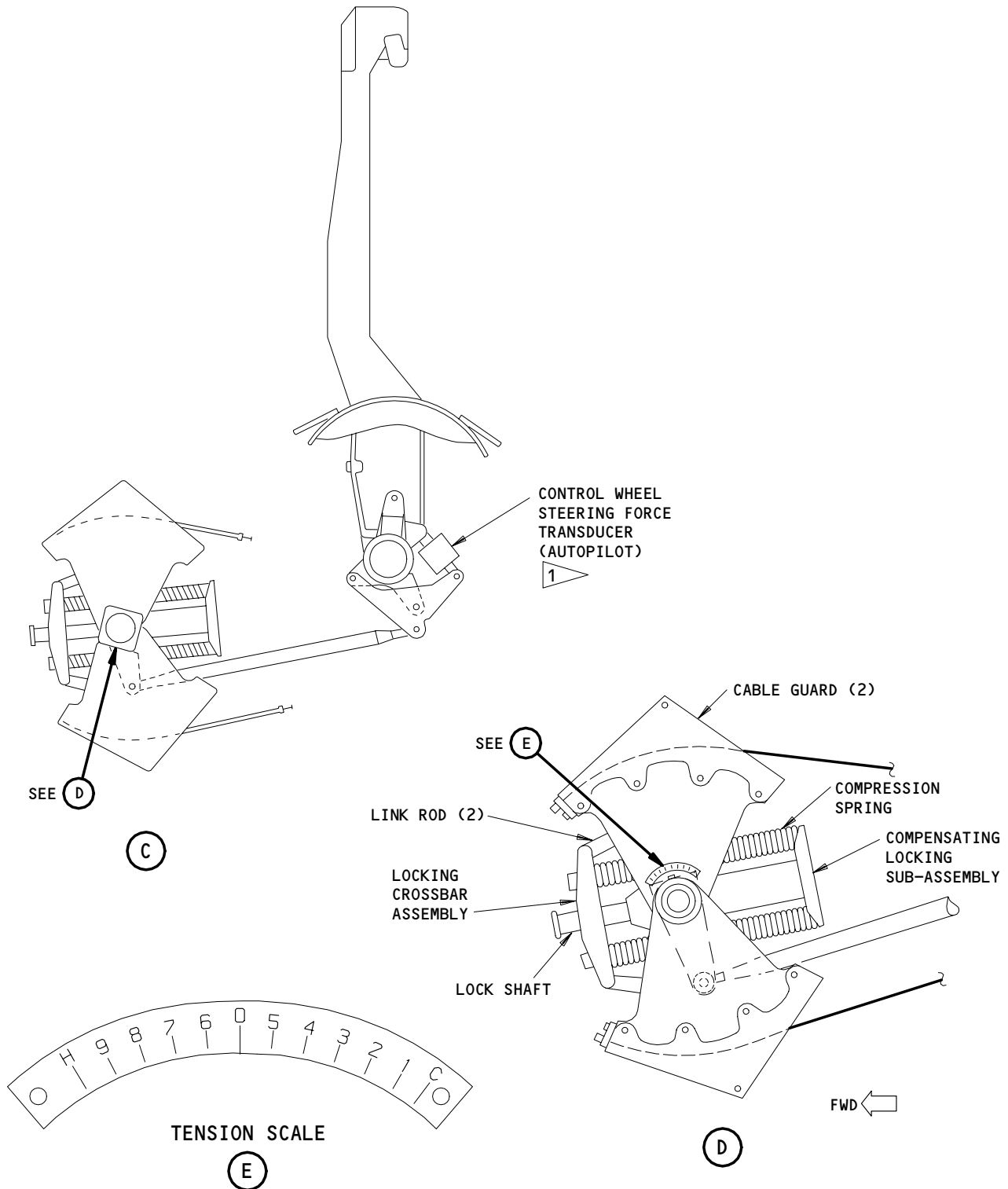
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Control Column Assembly  
Figure 2 (Sheet 2)

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C. Elevator Aft Quadrant (Fig. 3)

- (1) The elevator aft quadrants are located just aft of the horizontal stabilizer. Access is through the lower service door aft of the horizontal stabilizer compartment. The aft quadrants are supported by offset pivot bearings at the top and bottom of the quadrants. The aft quadrants are attached to bulkhead structure. The elevator aft quadrants receive inputs from the pilot's control cables, autopilot servo actuators, and the feel unit. Control outputs from the aft quadrants are sent through non-adjustable pushrods to the PCA input linkage.
- (2) The aft quadrants are interconnected by an adjustable pushrod and override assembly. There are two rig pin locations on the elevator aft quadrants. Rig pin E3 goes through the forward flange of the bulkhead of the left aft quadrant. Rig pin E4 goes through the forward flange of the bulkhead of the right aft quadrant.

D. Power Control Actuator (PCA) (Fig. 3)

- (1) There are three PCAs attached to each outboard elevator and stabilizer rear spar. Each PCA on each side is powered by a single and different hydraulic system, either the left, right, or center. Rig pin holes E-5 (left side) and E-6 (right side) are located in the bellcrank to the input arm on the middle PCA. Access to the PCAs is through removable access panels on the under side of horizontal stabilizer.
- (2) The PCA's are supported by a trunnion block and hangar link at the stabilizer rear spar. The PCA's are attached to the elevator by a reaction link and the PCA rod end. The PCA input linkage is connected to the PCA summing arm through the PCA input rod. The PCA summing arm is connected to the actuator bellcrank. The PCA's drive the elevators to the desired trim position.

E. Inboard and Outboard Elevators (Fig. 5)

- (1) The elevator surfaces consist of an inboard and outboard elevator on each side. The inboard and outboard elevators on each side are rigidly connected by two interconnect links. The inboard elevator is connected by three hinges to the stabilizer rear spar. The outboard elevator is connected by six hinges to the stabilizer rear spar. Each outboard elevator is driven by three PCAs.

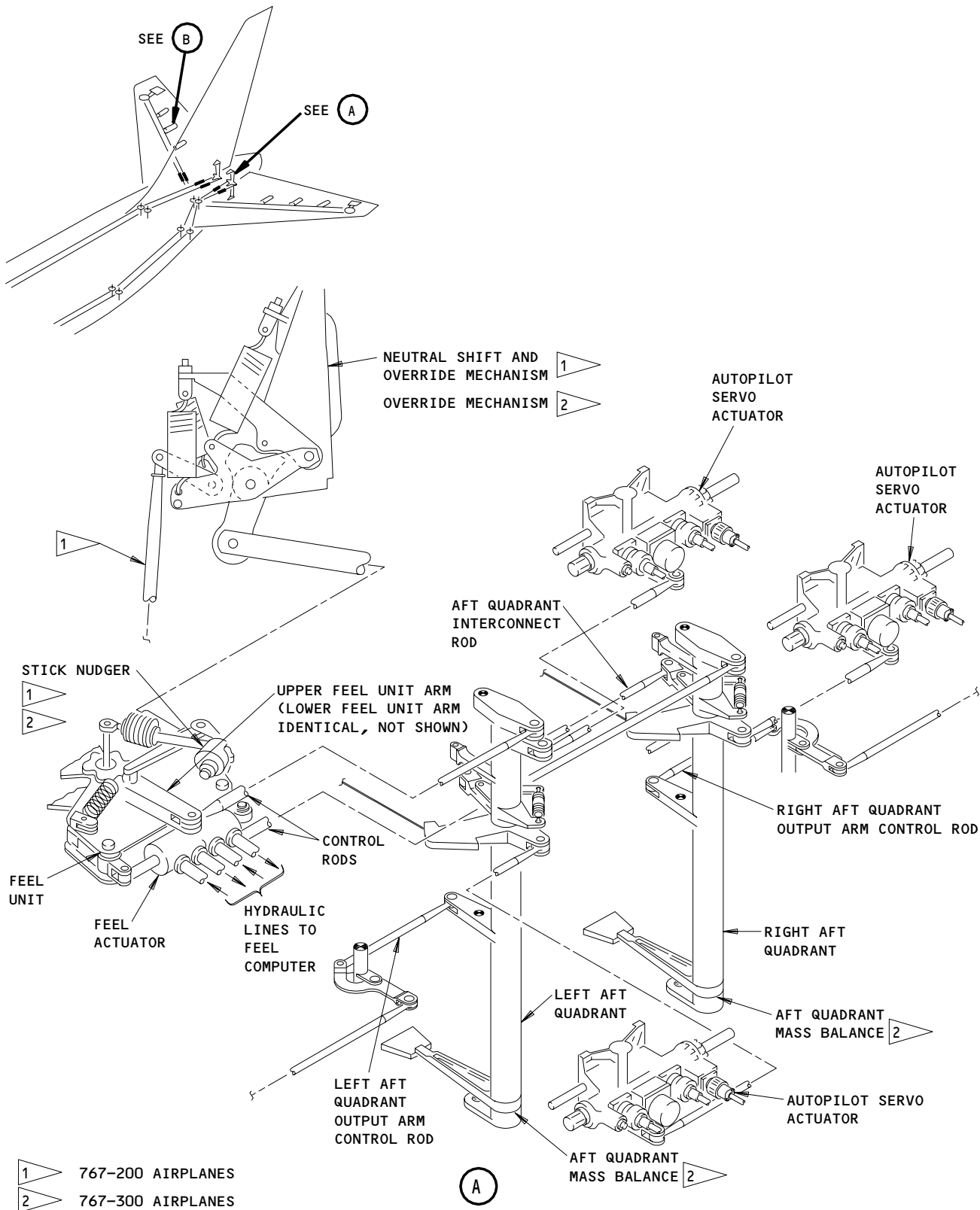
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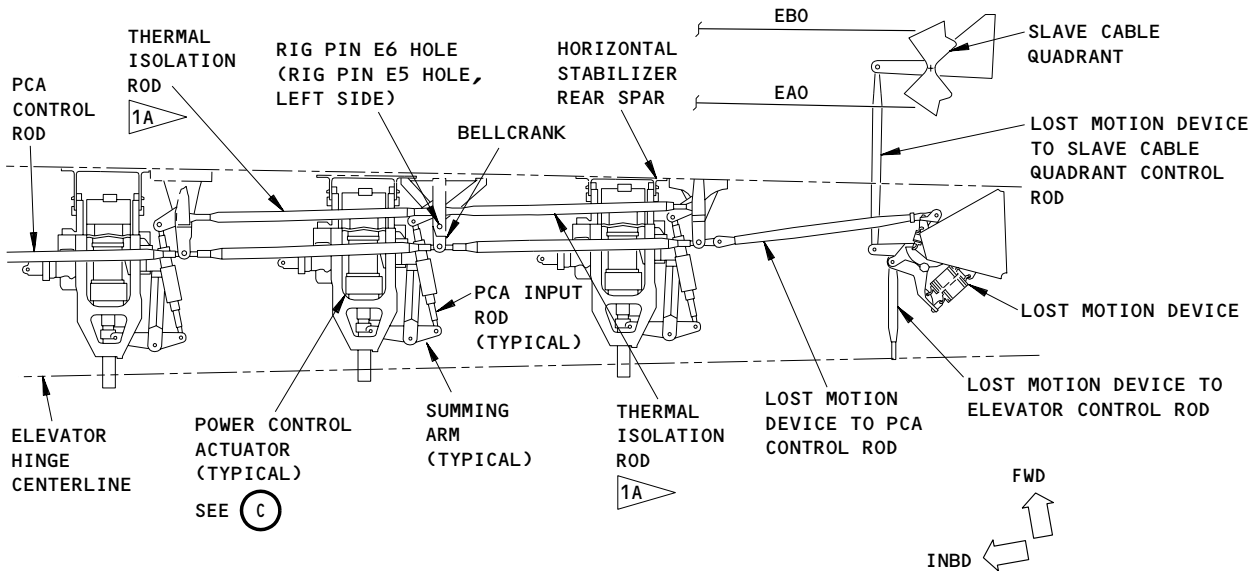


**Elevator Aft Quadrant Linkages**  
Figure 3 (Sheet 1)

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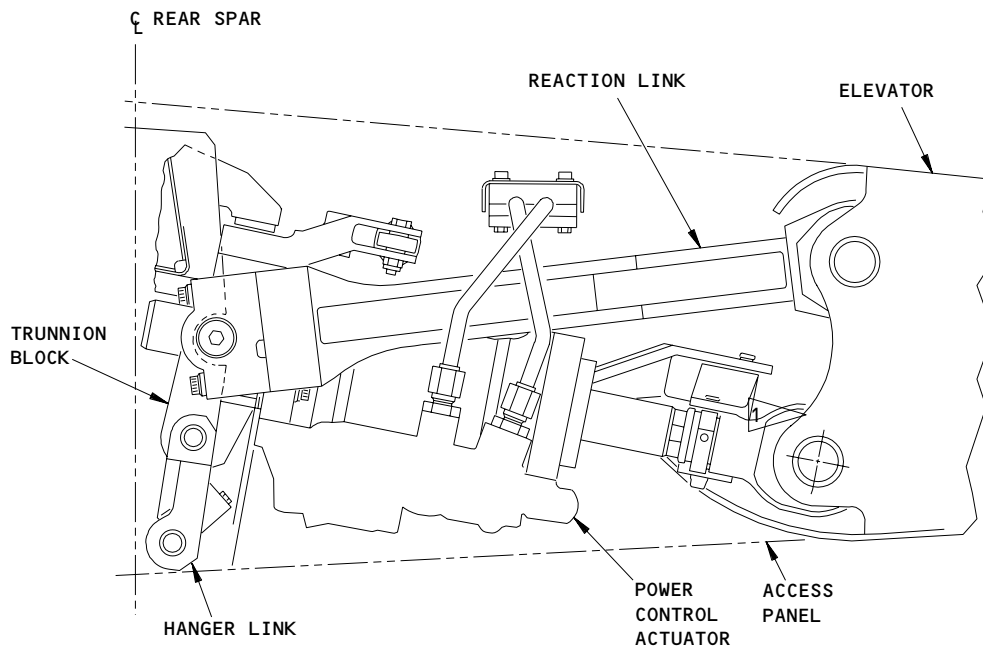
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(RIGHT SIDE IS SHOWN,  
LEFT SIDE IS OPPOSITE)

(B)



(C)

1A THESE THERMAL ISOLATION RODS ARE OPTIONAL AND MAY NOT BE INCLUDED IN THE AIRCRAFT CONFIGURATION.

Elevator Aft Quadrant Linkages  
Figure 3 (Sheet 2)

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- F. Elevator Slave Cable Interconnect (Fig. 3)
- (1) The outboard elevators are slaved together through a slave cable interconnect bus. The slave cable interconnect runs through the stabilizer torque box. Slave cable quadrants are located near the outboard end of the outboard elevator. The slave cable quadrants are connected to the outboard elevator through an override and adjustable pushrod. The PCA input linkage is connected to the slave cable quadrant through a lost motion device and a PCA input override. Rig pin holes E7 and E9 (left side) and E8 and E10 (right side) are located in the linkage between the elevator and slave cable quadrant. Access to the slave cable interconnect is through removable panels on the underside of the horizontal stabilizer.
- G. Feel Computer (Fig. 4)
- (1) The feel computer is mounted to a bulkhead in the horizontal stabilizer compartment on the left side of the airplane. The feel computer consists of two analog computers in parallel. One analog is powered by the left hydraulic system and the other is powered by the center hydraulic system. An adjustable pushrod and crank from the feel computer is attached to the horizontal stabilizer. The feel computer receives position inputs from the horizontal stabilizer through the pushrod and crank. The feel computer receives pressure inputs from the pitot-static system. The feel computer sends two hydraulic pressures in parallel to the feel actuator to supply artificial feel to the elevator control system. The feel computer varies hydraulic pressure to simulate feel effects with changes in airspeed and stabilizer position. The feel computer output feel pressure is also connected to the stabilizer trim control modules. Access to the feel computer is through the lower service door forward of the horizontal stabilizer.
  - (2) On some airplanes the feel computer hydraulic return lines have line-mounted relief valves to provide required back pressure.
- H. Feel Actuator (Fig. 3)
- (1) The feel actuator is part of the feel unit assembly. The feel actuator is located outboard of and level with the top of the left elevator aft quadrant. The feel actuator consists of two hydraulic cylinders connected end to end. The feel actuator piston rods are connected to levers on the feel unit. The feel actuator cylinders are supported by the piston rods. Hydraulic pressure at the rod end of each cylinder is connected to the hydraulic pressure output of the feel computer. Access to the feel actuator is through the lower service door aft of the horizontal stabilizer.

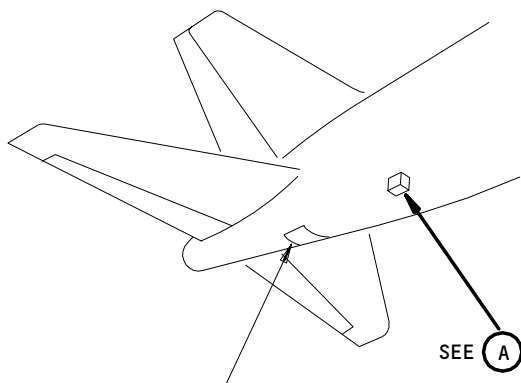
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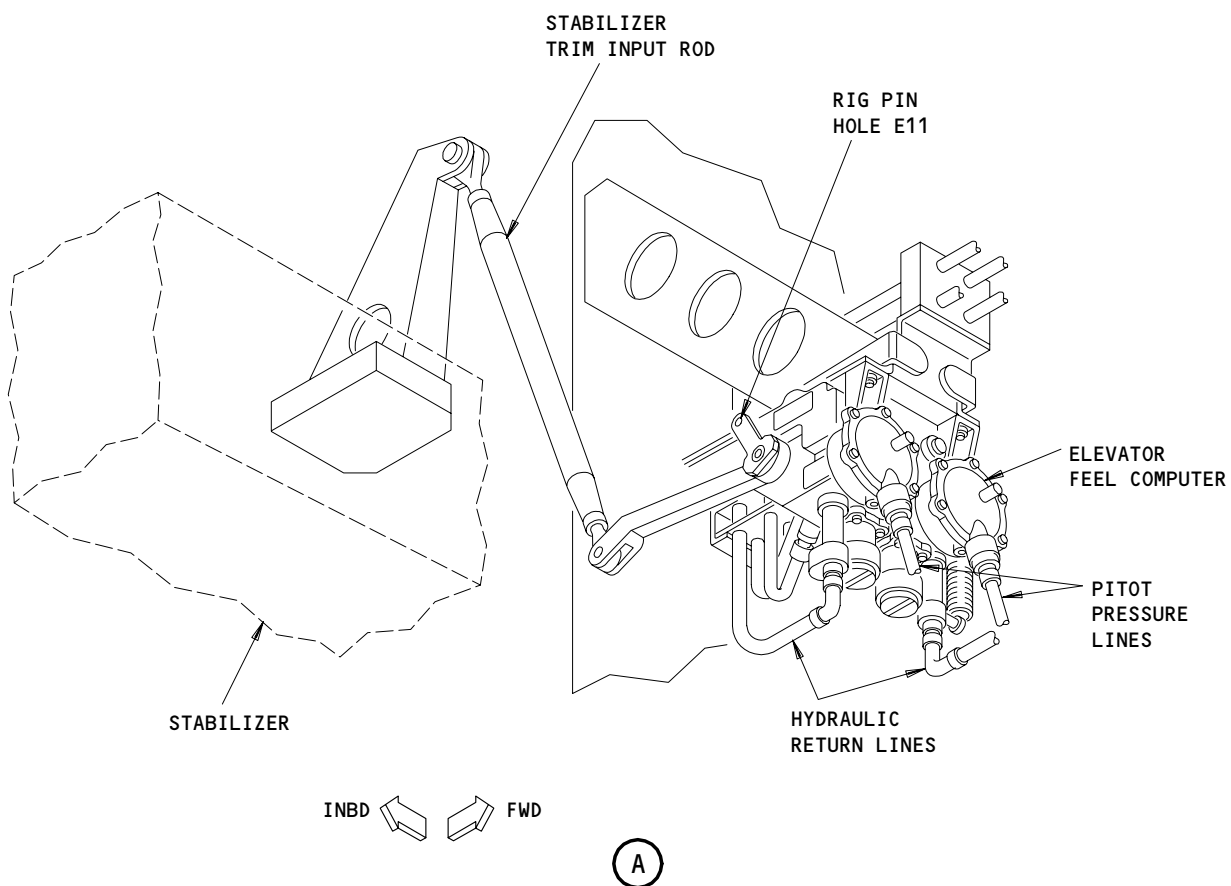
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FORWARD  
STABILIZER  
COMPARTMENT  
ACCESS DOOR



Elevator Feel Computer  
Figure 4

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I. Feel Unit

(1) The feel unit is mounted on the aft side of the bulkhead aft of the stabilizer. The feel unit transmits hydraulic and mechanical feel forces through cranks and adjustable pushrods to the elevator aft quadrants. The feel unit is supported by a single pivot on the bulkhead, and is restrained from rotation by the pushrod attached to the neutral shift and override mechanism (767-200 airplanes) or override mechanism (767-300 airplanes). Access to the feel unit is through the lower service door aft of the horizontal stabilizer.

J. 767-200;

Neutral Shift and Override Mechanism (Fig. 3)

(1) This mechanism is located in horizontal stabilizer compartment on forward side of bulkhead directly forward of feel unit. A crank assembly is connected to horizontal stabilizer by an adjustable pushrod. A cam lever assembly is connected to feel unit by a non-adjustable pushrod. Access to neutral shift and override mechanism is through lower surface door forward of horizontal stabilizer.

K. 767-300;

Override Mechanism (Fig. 3)

(1) This mechanism is located in horizontal stabilizer compartment mounted on forward side of bulkhead directly forward of feel unit. A cam lever assembly is connected to feel unit by a non-adjustable pushrod. The override mechanism is not connected to horizontal stabilizer and does not provide neutral shift to the elevator system. Access to the override mechanism is through lower surface door forward of horizontal stabilizer.

3. Operation

A. Functional Description (Fig. 5)

(1) The elevators vary airplane pitch attitude for climb, descend, and altitude hold. There are two elevators on each side of the airplane and are connected together by two interconnect links. The elevators are attached by hinges to the stabilizer rear spar. Fore and aft motion of the control columns causes deflection of the elevator control surfaces. The captain's and first officer's elevator control systems have equal authority. The movement of either control column controls both the left and right elevator systems through forward and aft overrides. The forward override is located at the control column torque tubes. The aft override is located at the aft quadrants. Control column movement is transmitted through a torque tube assembly to two pushrods. The two pushrods drive two forward tension regulator quadrants. The tension regulator quadrants drive the two cable systems and provide cable tension. The cable systems are connected to the right and left elevator aft quadrants. The aft quadrants are driven by the control cables in the manual mode and by the autopilot servo actuators in the automatic mode. Aft quadrant rotation is restrained by the feel unit. The aft quadrants serve as the interface between the cable systems and the elevator PCA input control rods and linkages. The aft quadrants translate rotary motion into linear motion for the PCA input rods. The input rods control the PCA control valves.

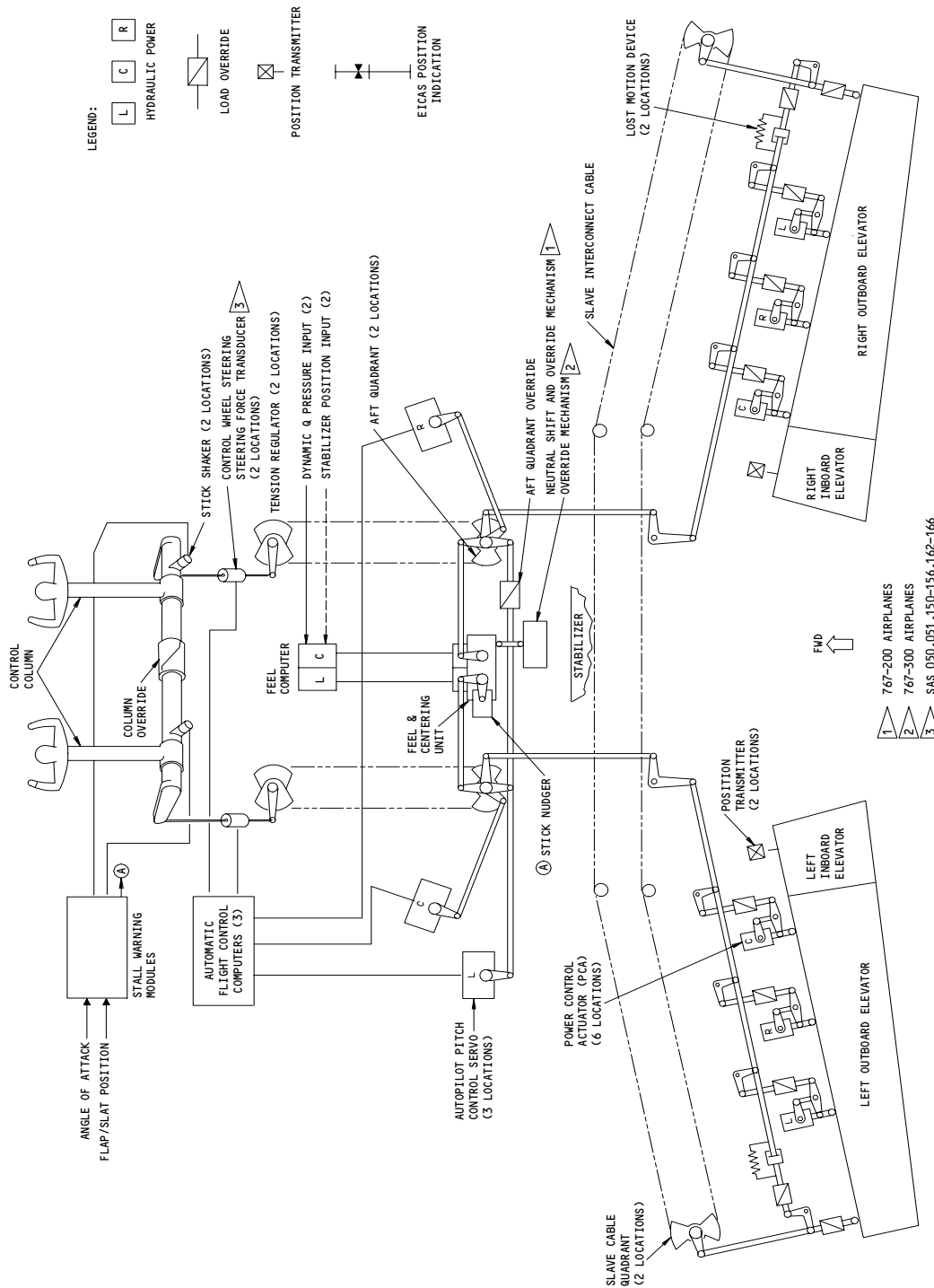
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Elevator Control System Operation  
Figure 5

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- (2) Override springs bias the override interconnect to one side at each aft quadrant. With one aft quadrant jammed, the override springs on the interconnect will yield when a force of 25 pounds (111.2 newtons) is applied. In override travel, limit stops limit the override to 20 degrees of maximum asymmetry of the elevator surfaces in either direction.
- (3) The PCAs receive control inputs through control rods and linkages from the aft quadrants. A control input to the PCA summing control arm displaces the arm from neutral and moves the control linkage to the overtravel linkage. The overtravel linkage shifts the servo valve spool. The servo valve meters hydraulic pressure to one side of the piston in the actuator power cylinder and connects the other side of the piston to the return side of the hydraulic system. The actuator piston and the output rod moves in response to the differential pressure across the piston, moving the elevator. As the actuator output rod moves, feedback through the summing control arm moves the servo valve spool back to the neutral position. With the servo valve spool in neutral position, pressure across the actuator piston in the power cylinder is equalized, stopping any further motion.
- (4) The slave cable interconnect provides a control input to the PCA's from the opposite elevator if linkage between the PCA's and the elevator aft quadrant is broken. If the linkage between the left aft quadrant and left elevator PCA's is broken, the right aft quadrant drives the input linkage to the right PCA's. The right PCA's drive the right elevators and the right elevators drive the slave interconnect cable. The slave interconnect cable drives the left PCA input linkage through the left PCA override and lost motion device. The left PCA's drive the left elevators. If the linkage between the right aft quadrant and right elevator PCA's is broken, the left aft quadrant will provide the input to the right side elevators by the reverse process.
- (5) The lost motion device permits the PCA input lever to be moved without the pilot feeling resistance from the elevator through the slave cable interconnect linkage. The lost motion device in the PCA input connection to the slave cable interconnect causes one elevator to trail the opposite elevator by 2 degrees when driven through the slave cable interconnect.
- (6) The elevator feel computer provides feel pressure to the elevator feel unit for regulation of the feel force at the elevator control column. The feel computer gives almost constant feel force in all flight conditions. The system limits autopilot authority. The computer is a dual system to provide redundant feel pressures to the feel unit. Hydraulic pressure, supplied to both computer systems from independent hydraulic systems, is regulated above return pressure to provide two hydraulic feel pressure outputs from the feel computer.

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- (7) Pitot air pressure on the computer bellows opposes static air pressure on the opposite side of the bellows. This opposition results in a differential bellows force dependent on airspeed and altitude of the airplane. The differential force moves the bellows by deflecting the input spring arm, transmitting a force to the feel force valve. The force positions the feel force valve to meter the feel pressure to the feel pressure port.
- (8) The stabilizer input arm is coupled to the stabilizer to position the stabilizer camshaft assembly. Rotation of the camshaft positions a stop arm in the main housing. As the pitot pressure increases, the bellows piston force rapidly increases the feel pressure until the bellows piston contacts the stop arm. Until this point, the bellows piston force is opposed by the spring arm assembly only. Upon contact with the stop arm, the increasing piston force is divided between the spring arm and stop arm. The rate in the increase of feel pressure with the piston force is reduced.
- (9) A pressure differential switch provides a monitor of the feel pressures. Normally, both feel pressures are equal and the monitor circuit is open. If the feel pressures differ by 25 percent or more, the pressure differential switch actuates and closes the monitor circuit. When the circuit is closed, a message (ELEV FEEL) will appear on the EICAS screen when the STATUS button is pushed.
- (10) The elevator feel unit provides the feel force for the elevator control system. The feel force is a force which moves the controls to the neutral position and resists displacement from the neutral position. The feel force is the sum of the mechanical feel spring force and the hydraulic feel spring force. The mechanical feel spring acts on the cam and roller attached to the first officer's input crank arm of the feel unit. The mechanical feel spring, cam and roller provide neutral position and constant centering and feel force at all speeds.

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(11) Hydraulic pressure from the feel computer is supplied to the feel actuator. The feel actuator cylinders provide a retracting force on the piston rods to pull the feel unit levers together. The feel levers supply tension loads in the links and ties attached to the output shaft assemblies on the captain's and first officer's input cranks. The tension forces on the output shaft assemblies supply a hydraulic feel and centering force to the input cranks. Deflection of the output shaft assemblies, by inputs from the aft quadrants, is resisted by the tension of the links and ties on the output shaft assemblies. Deflection of the output shaft assemblies causes the deflection of the hydraulic levers. Deflection of the levers forces hydraulic fluid from the feel actuator cylinders back through the lines to the feel computer. The hydraulic fluid rubs the return side of the hydraulic valve in the feel computer. The force required to allow hydraulic fluid to flow back through the feel computer determines the hydraulic feel force. The feel force at either control column is the total resistive forces felt at the captain's and first officer's output cranks of the feel unit plus friction. The captain and first officer feel the same force because of the override connections between the left and right elevator systems.

(12) 767-200;

The position of the neutral shift linkage fixes the position of the feel unit and determines the location of the neutral position of the elevator system. The crank assembly in the neutral shift linkage floats at stabilizer trim equal to +2 degrees to -6.4 degrees. The grounding spring holds the spring carrier assembly in the neutral shift linkage against the grounding stop at stabilizer trim equal to +2 degrees to -6.4 degrees. At -6.4 degrees of stabilizer trim, the crank assembly contacts the stop tube in the neutral shift linkage. At -6.4 degrees to -12.5 degrees of stabilizer trim, the crank assembly forced against the tube stop rotates the spring carrier assembly away from the grounding stop. Rotation of the spring carrier assembly and cam lever assembly rotates the feel unit through a pushrod. Rotation of the feel unit by the pushrod from the neutral shift linkage shifts the neutral position of the elevator system. The neutral position of the outboard elevator moves from faired position to 2.0 degrees up as the stabilizer moves from -6.4 degrees to -12.5 degrees of trim. Movement of the neutral position of the outboard elevator from faired position to 2.0 degrees up increases the effective nose-up trim as the stabilizer goes from -6.4 degrees to -12.5 degrees. If the feel unit internal mechanisms jam, the neutral shift linkage yields and provides the feel and centering force to the elevator system.

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- (13) 767-300;  
The override mechanism is not connected to horizontal stabilizer and does not provide neutral shift to feel unit.  
If the feel unit internal mechanisms jam, the override mechanism yields and provides feel and centering force to elevator system.
- B. Fault Indication (Fig. 6)
- (1) Elevator control system fault monitoring is provided by the EICAS system. The EICAS system elevator fault monitoring can be obtained by pushing the STATUS button or one of the maintenance buttons on the EICAS MAINT panel. Elevator control system warnings and cautions will appear on the EICAS screen automatically.
- C. Control (Fig. 1, Fig. 5, Fig. 7)
- (1) Manual Operation
- (a) Provide electrical power (AMM 24-22-00).
- (b) Check that the following overhead circuit breaker panel P11 circuit breakers are closed.
- 1) 11H17, FLT CONT SHUTOFF TAIL L
  - 2) 11H18, FLT CONT SHUTOFF TAIL CENTER
  - 3) 11H27, FLT CONT SHUTOFF TAIL R
  - 4) 11L9, LEFT ENGINE OIL PRESS EICAS REF
  - 5) 11L36, RIGHT ENGINE OIL PRESS EICAS REF
- (c) Check that LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on sidewall panel P61 are in ON position.

**WARNING:** THE AILERONS, ELEVATORS, RUDDER, SPOILERS, STABILIER, SLATS, AND TRAILING EDGE FLAPS ARE FULLY POWERED SURFACES. ENSURE PERSONNEL AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE PROVIDING HYDRAULIC POWER. INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT COULD RESULT.

- (d) Provide left, right, and center systems hydraulic power (AMM 29-11-00).
- (e) Pull control columns aft, both elevators will move up smoothly and stop at the same angle as shown on the position indicator.
- (f) Release control columns, both elevators, control columns, and position indications will return to neutral position unassisted.

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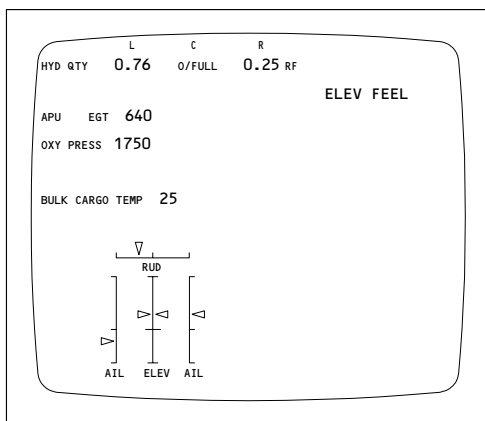
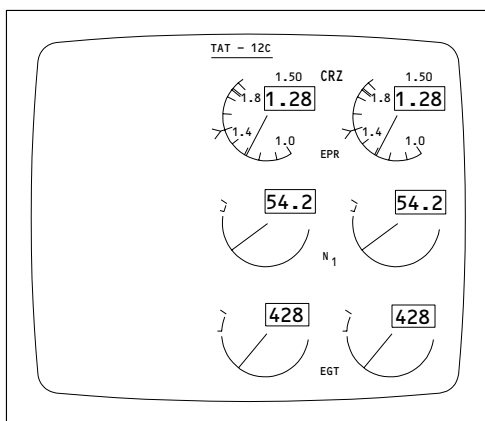
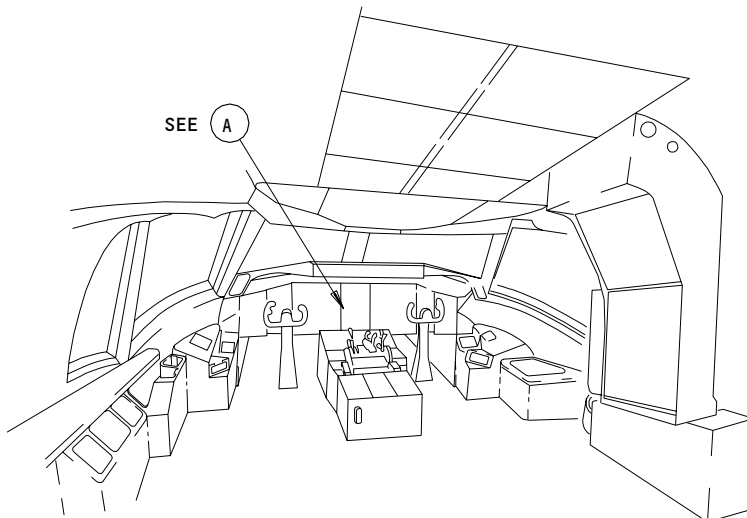
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# BOEING

## 767 MAINTENANCE MANUAL



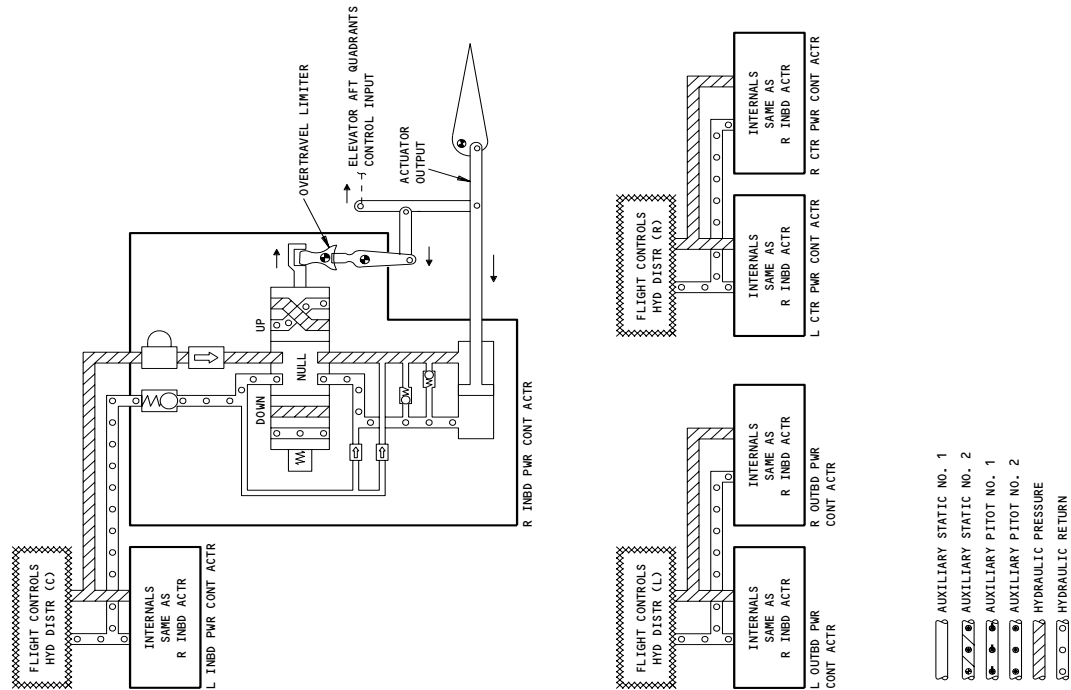
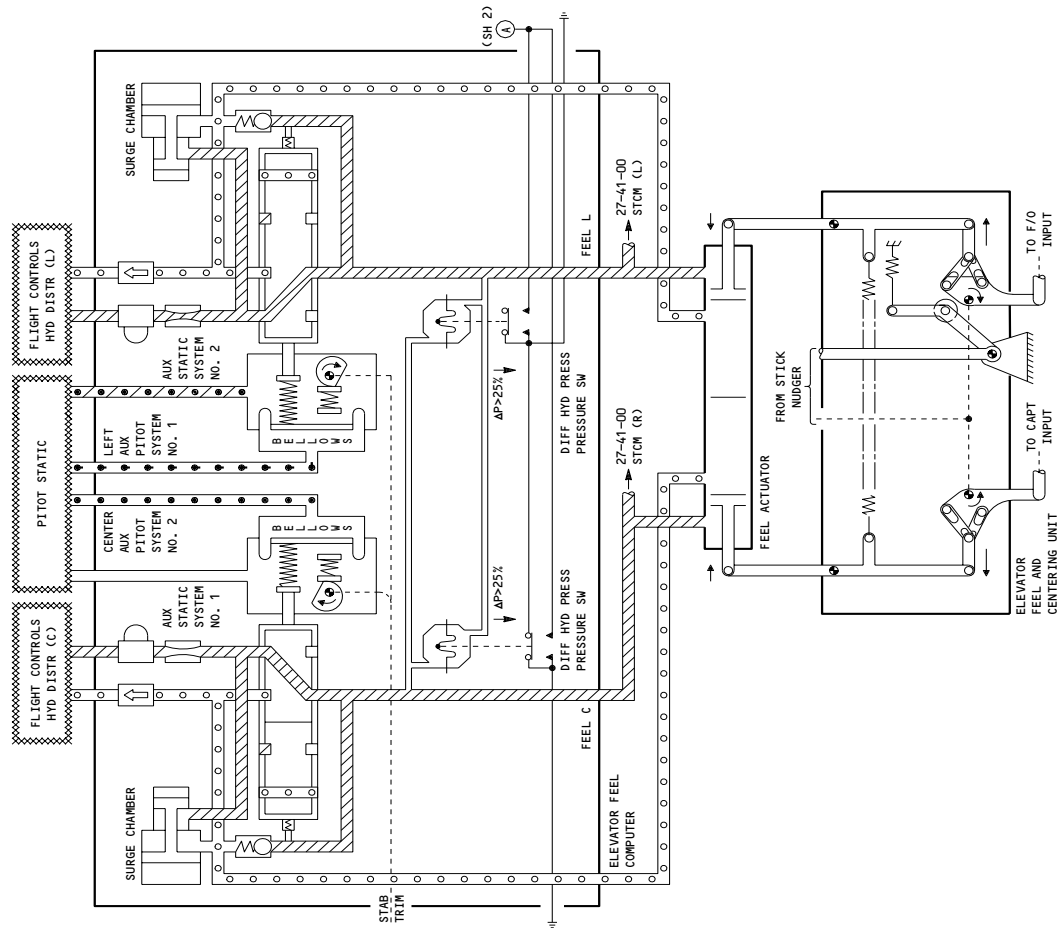
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A

Elevator Control and Fault Indication  
Figure 6

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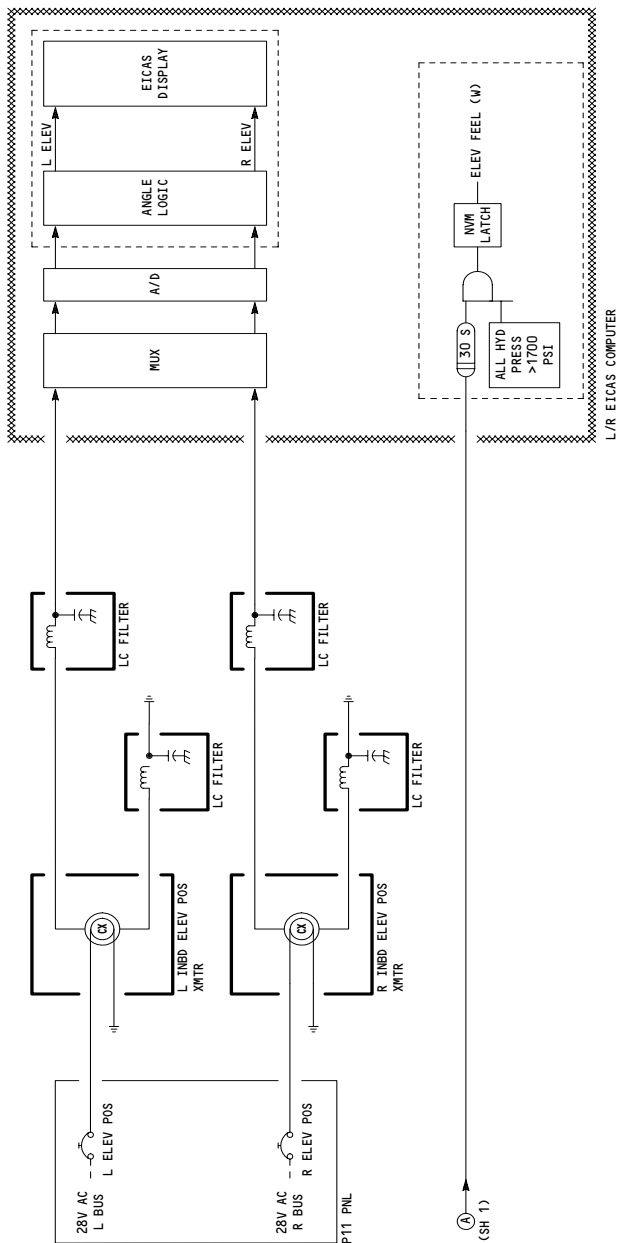


Elevator Control System Schematic  
Figure 7 (Sheet 1)

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▲ INCORPORATES:  
SB 31-007

Elevator Control System Schematic  
Figure 7 (Sheet 2)

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- (g) Push control columns forward, both elevators will move down smoothly and stop at the same angle as shown on the position indicator.
  - (h) Release control columns, both elevators, control columns, and position indications will return to neutral position unassisted.
  - (i) Remove left, right, and center systems hydraulic power (AMM 29-11-00).
  - (j) Remove electrical power (AMM 24-22-00).
- (2) Autopilot Operation
- (a) Refer to AMM 22-10-00/001, Autopilot (Flight Control) - Description and Operation for elevator control in the auto flight mode.

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767  
FAULT ISOLATION/MAINT MANUAL

ELEVATOR CONTROL SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
ACTUATOR - ELEVATOR FEEL	3	1	313AL, ELEV MECH LINKAGES	27-31-17
ACTUATOR - ELEVATOR POWER CONTROL	4	6	335EB,335GB,335HB, L STAB 345EB,345GB,345HB, R STAB	27-31-05
COLUMN - CONTROL	1	2	113AL, FWD EQUIP BAY	27-31-10
COMPUTER - ELEVATOR FEEL, M950	2	1	312AR, STAB JACKSCREW	27-31-19
COMPUTERS - (31-41-00/101) LEFT EICAS, M10181 RIGHT EICAS, M10182				
DEVICE - LOST MOTION	4	2	335JB,345JB, STAB	27-31-00
ELEVATOR - INBOARD	4	2	REAR SPAR OF HORIZONTAL STAB	27-31-01
ELEVATOR - OUTBOARD	4	2	REAR SPAR OF HORIZONTAL STAB	27-31-02
INDICATOR - (27-38-00/101) ELEVATOR POSITION				
MECHANISM - NEUTRAL SHIFT AND OVERRIDE <span style="border: 1px solid black; padding: 0 2px;">1</span>	3	1	313AL, ELEV MECH LINKAGES	27-31-21
MECHANISM - OVERRIDE <span style="border: 1px solid black; padding: 0 2px;">2</span>	3	1	313AL, ELEV MECH LINKAGES	27-31-21
MECHANISM - AFT QUADRANT OVERRIDE	3	1	313AL, ELEV MECH LINKAGES	27-31-00
OVERRIDE - CONTROL COLUMN	1	1	113AL, FWD EQUIP BAY	27-31-00
PLATE - INDEX	4	2	OPPOSITE ELEV TRAILING EDGE ON EMPENNAGE	27-31-00
QUADRANT - ELEVATOR AFT	3	2	313AL, ELEV MECH LINKAGES	27-31-15
QUADRANT - ELEVATOR CONTROL TENSION REGULATOR	1	2	113AL, FWD EQUIP BAY	27-31-12
QUADRANT - SLAVE CABLE	4	2	335JB,345JB, STAB	27-31-00
SERVO - (22-12-00/101) ELEVATOR AUTOPILOT				
TRANSMITTER - (27-38-00/101) ELEVATOR POSITION				
UNIT - ELEVATOR FEEL	3	1	313AL, ELEV MECH LINKAGES	27-31-17

- 1 767-200 AIRPLANES  
2 767-300 AIRPLANES

Elevator Control System - Component Index  
Figure 101

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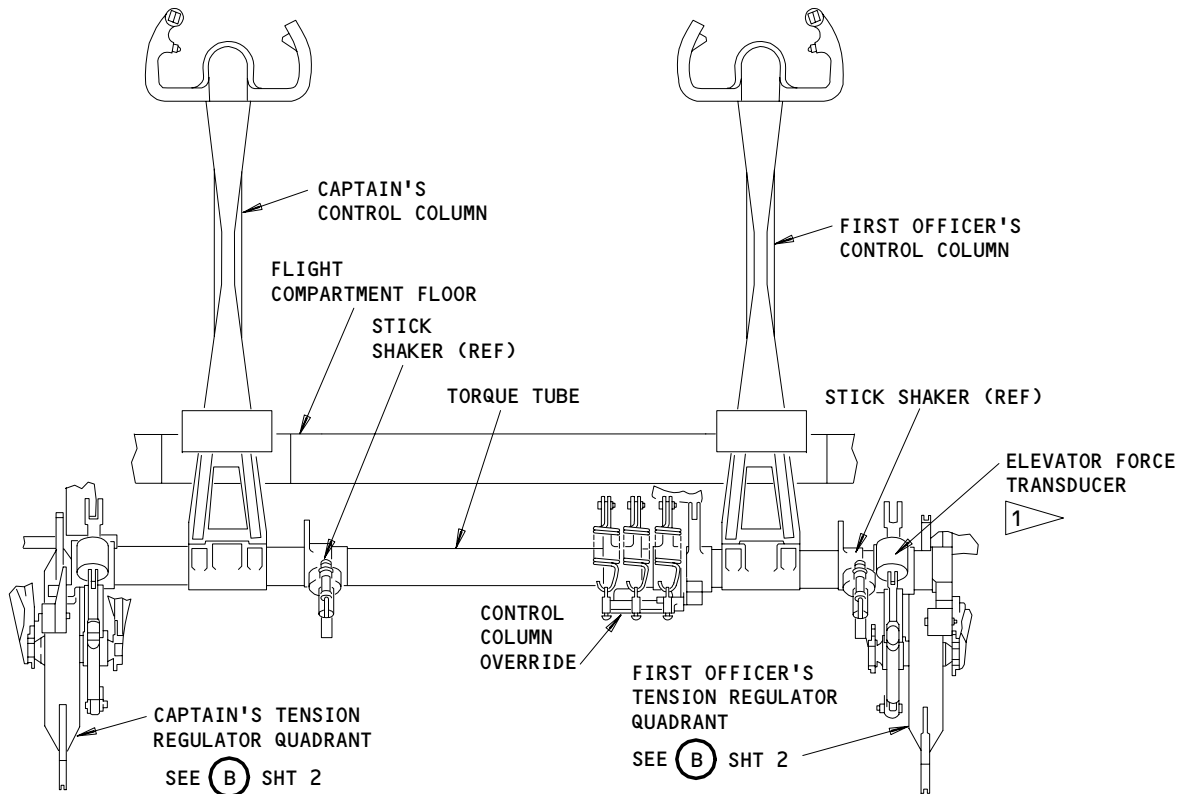
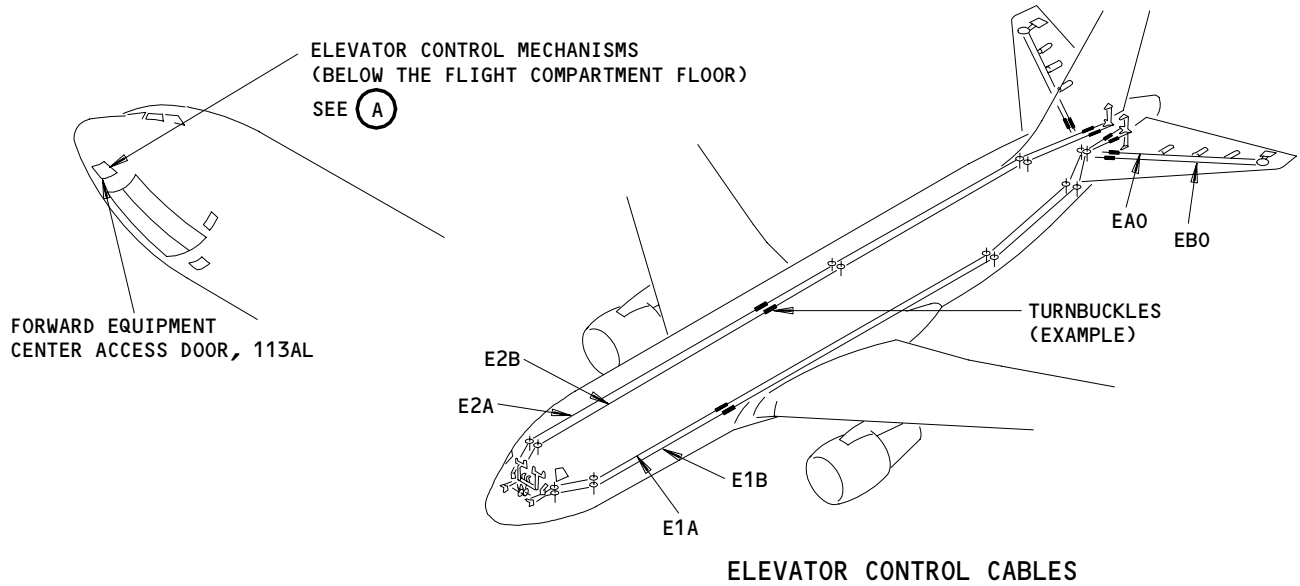
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FAULT ISOLATION/MAINT MANUAL



**ELEVATOR CONTROL MECHANISMS  
(VIEW IN THE FORWARD DIRECTION)**

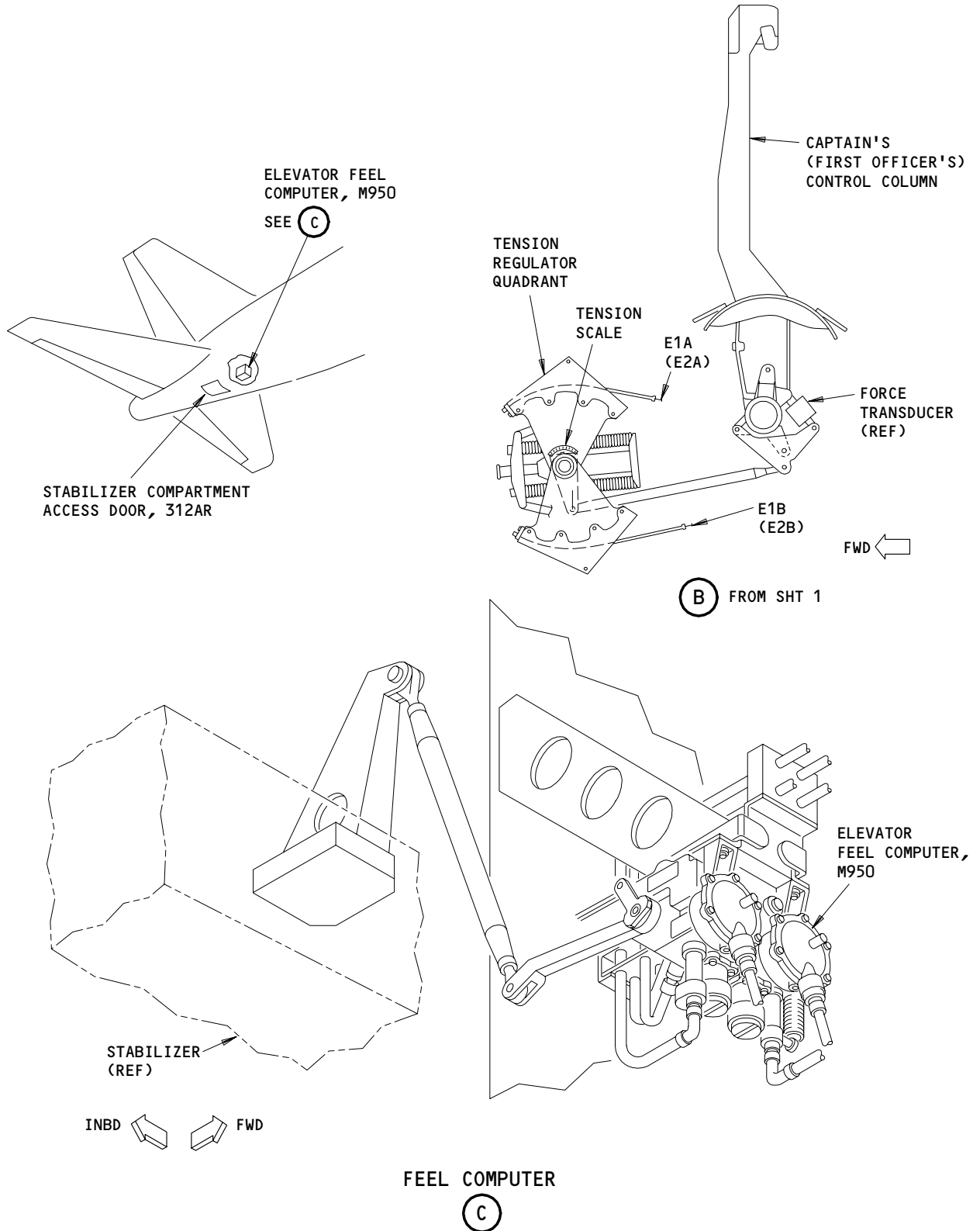
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(A)

Elevator Control System - Component Location  
Figure 102 (Sheet 1)

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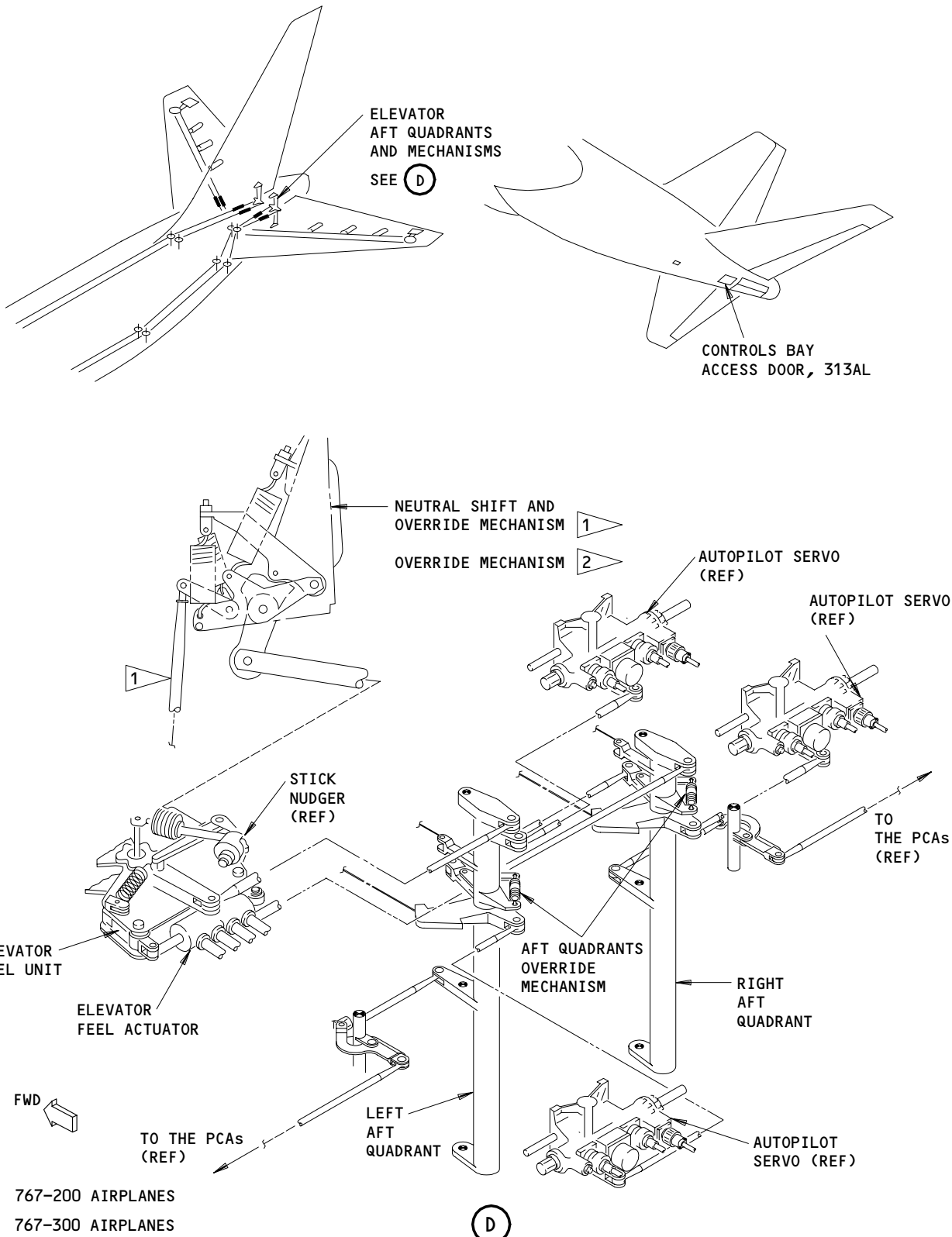


Elevator Control System - Component Location  
Figure 102 (Sheet 2)

EFFECTIVITY	ALL
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- 1 767-200 AIRPLANES
- 2 767-300 AIRPLANES

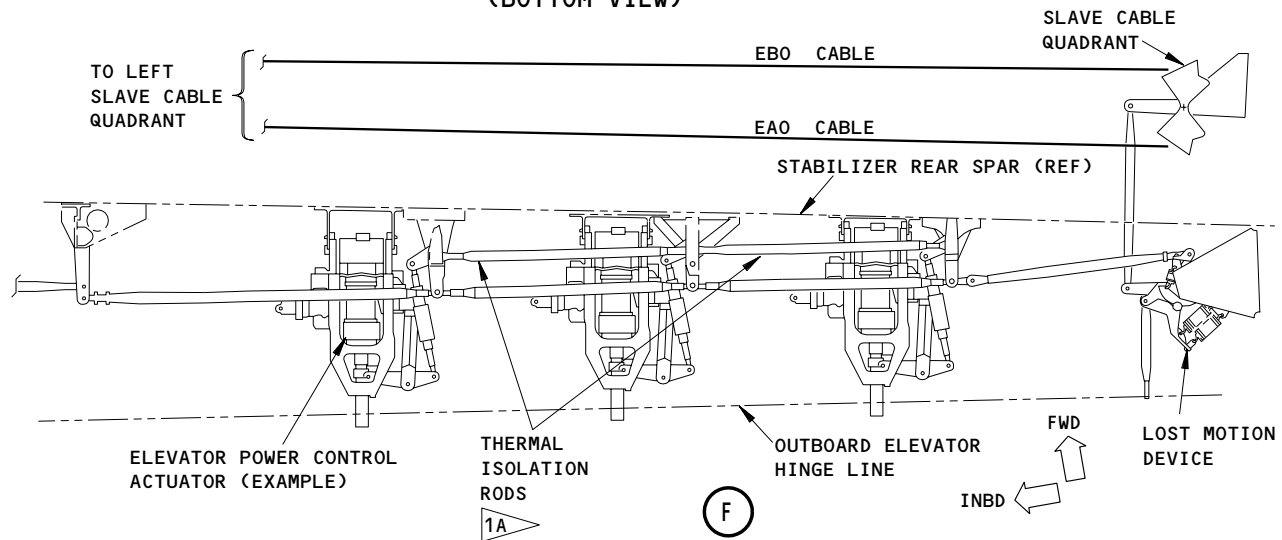
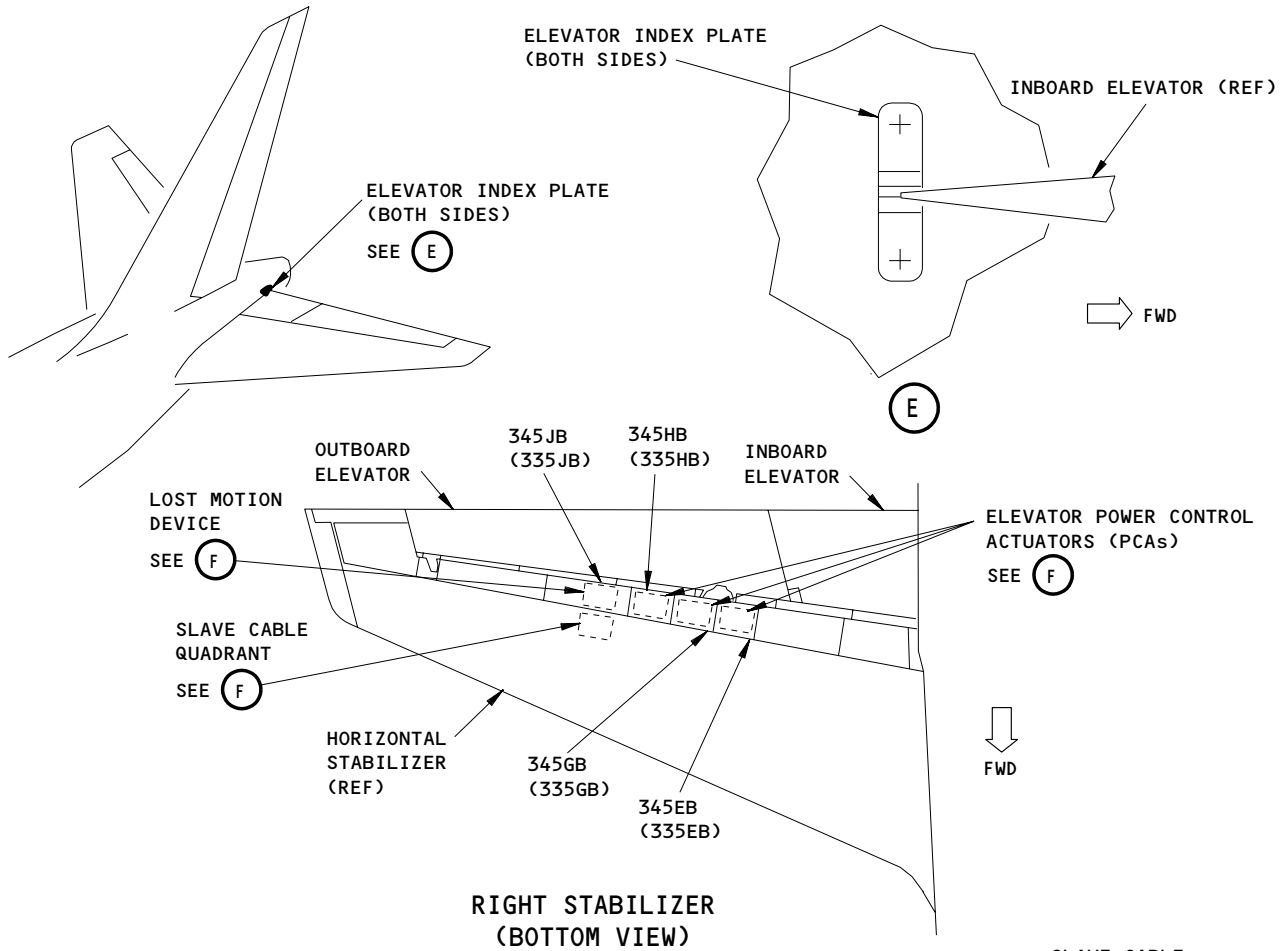
**D**  
Elevator Control System - Component Location  
Figure 102 (Sheet 3)

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767  
FAULT ISOLATION/MAINT MANUAL



1A THESE THERMAL ISOLATION RODS ARE OPTIONAL AND MAY NOT BE INCLUDED IN THE AIRCRAFT CONFIGURATION.

Elevator Control System - Component Location  
Figure 102 (Sheet 4)

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ELEVATOR CONTROL SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure contains these tasks for the Operational Test, Adjustment, and System Tests for the Elevator Control System:

Operational Test – Elevator Control System  
Elevator Control System – Adjustment  
System Test – Elevator Controls  
Shutoff Valve Operation With a Single Hydraulic Source  
Dual Control Path Override System Test  
Elevator Neutral Shift and Override Mechanism Test (767-200 AIRPLANES)

The last 3 tasks (the Shutoff Valve Operation With a Single Hydraulic Source, the Dual Control Path Override System Test, and the Elevator Neutral Shift and Override Mechanism Test) are necessary for scheduled maintenance. The task for the Operational Test contains the instructions to do these last three tasks. Thus, if you do all of the steps in the Operational Test task, it is not necessary to do the last three tasks in this list.

TASK 27-31-00-715-001

2. Operational Test – Elevator Control System

A. General

- (1) No ground support equipment is necessary to do the operational test for the elevator control system. This test lets maintenance people monitor all functions of the elevator control system to make sure that it operates freely.

NOTE: A single thumping noise can be heard from a PCA when an elevator is moved full up or full down. This noise is heard only when the direction of movement of the PCA is changed at the end of the stroke. It is caused when the snubbing ring moves in the snubbing gland to change the direction of movement of the piston at the end of the stroke.

B. References

- (1) 24-22-00/201, Electrical Power – Control  
(2) 29-11-00/201, Main (Left, Right, and Center) Hydraulic System  
(3) 31-41-00/501, Engine Indication and Crew Alerting Systems

C. Access

- (1) Location Zone  
211/212 Control Cabin

D. Elevator Control System Operational Test (Fig. 501)

S 865-002

- (1) Supply electrical power (Ref 24-22-00).

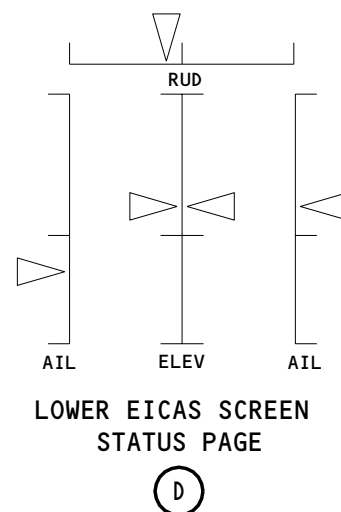
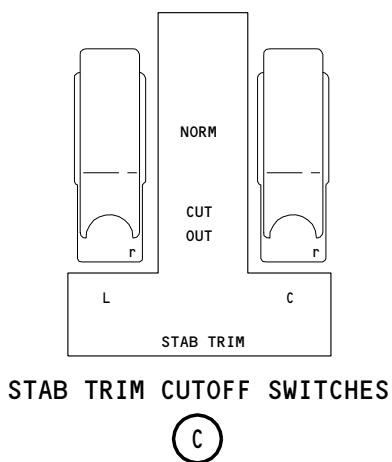
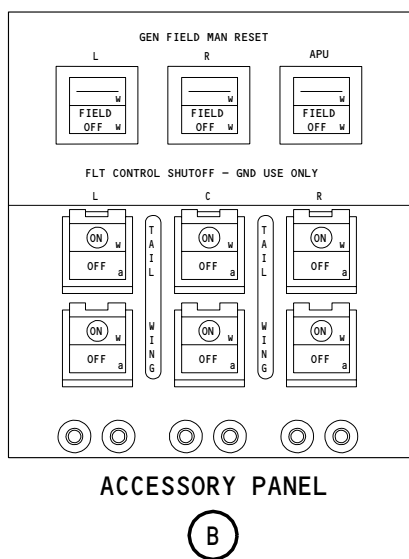
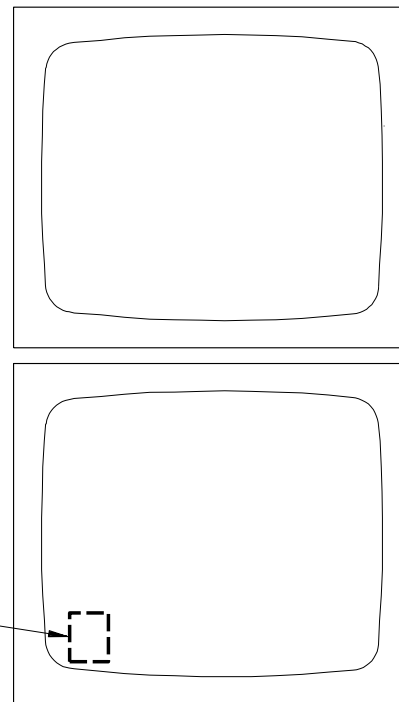
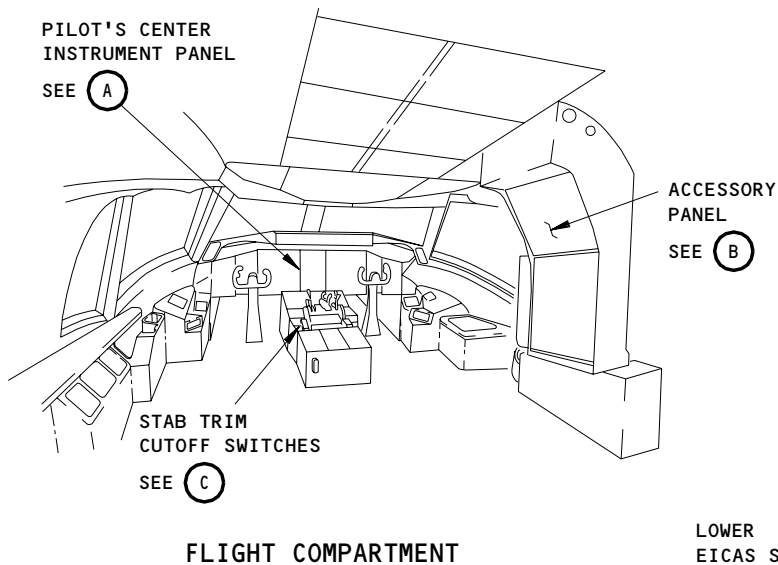
EFFECTIVITY

ALL

27-31-00

02

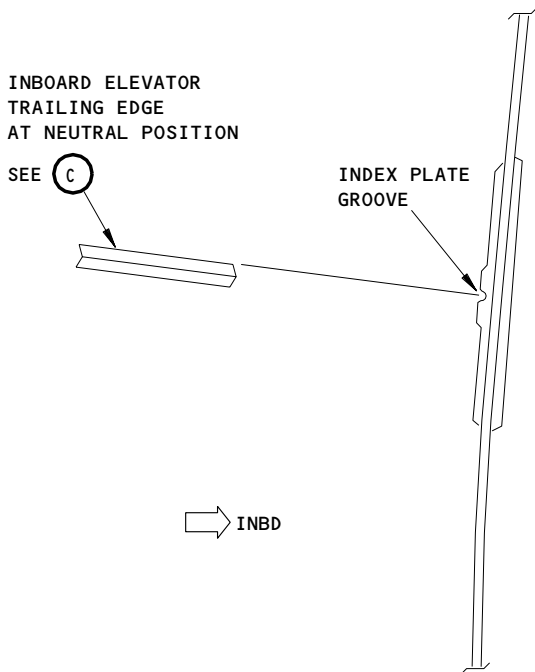
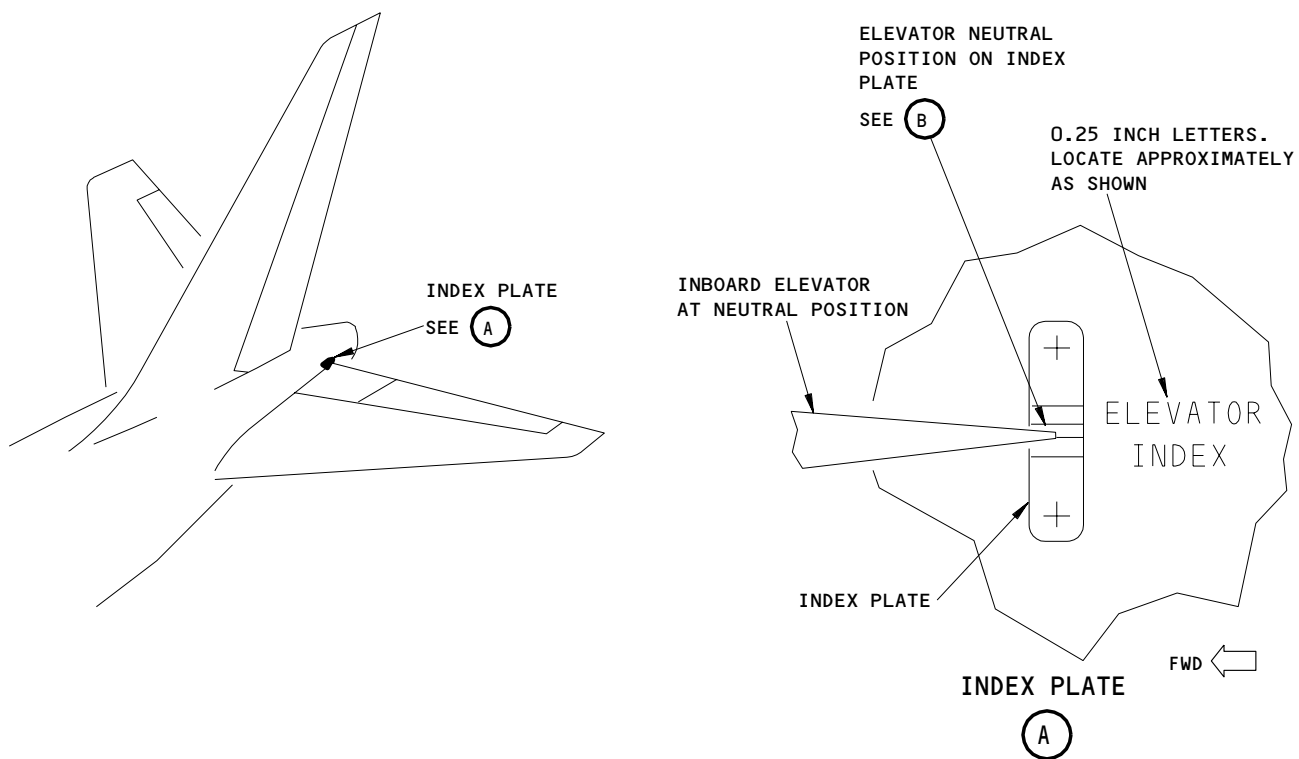
Page 501  
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Elevator Control System (Flight Compartment)  
Figure 501

EFFECTIVITY	ALL
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27-31-00



ELEVATOR NEUTRAL POSITION ON INDEX PLATE

(B)

Elevator Travel Positions  
Figure 502 (Sheet 1)

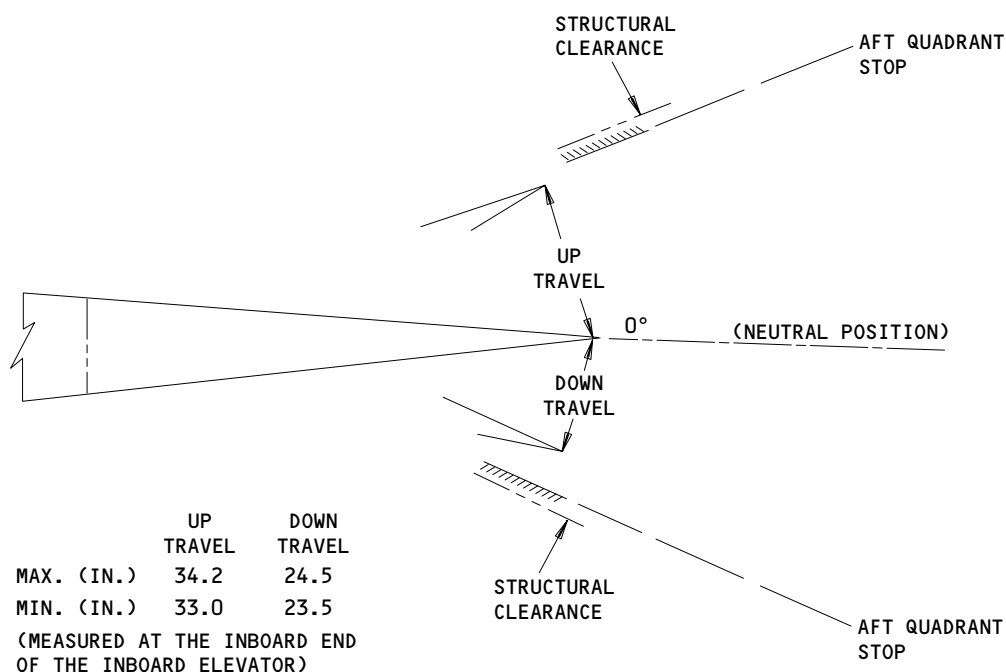
EFFECTIVITY	ALL
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01

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14799



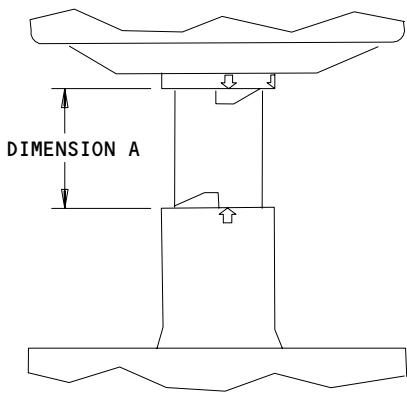
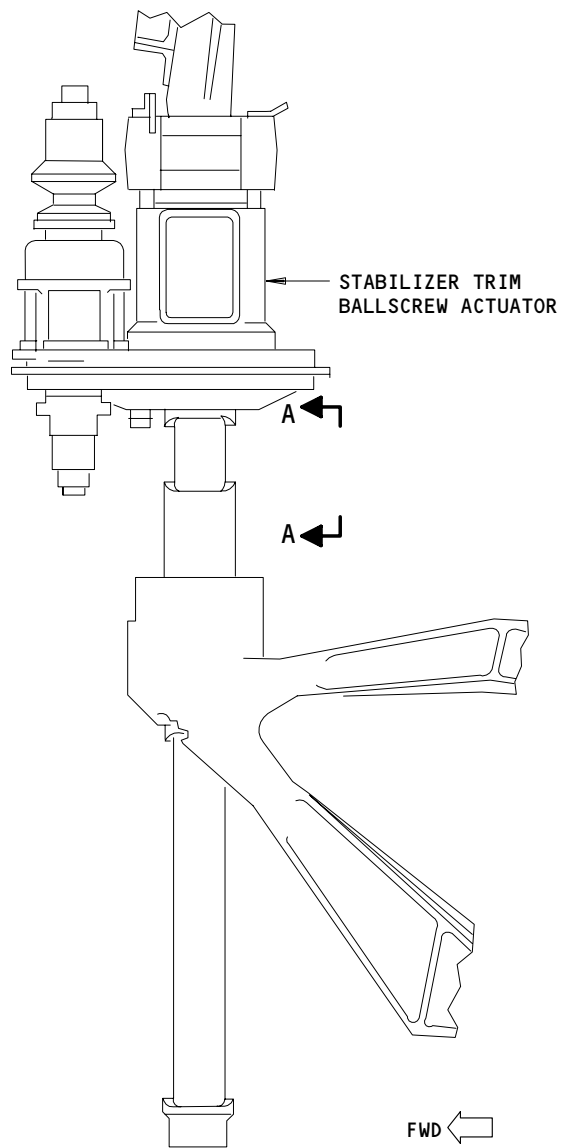
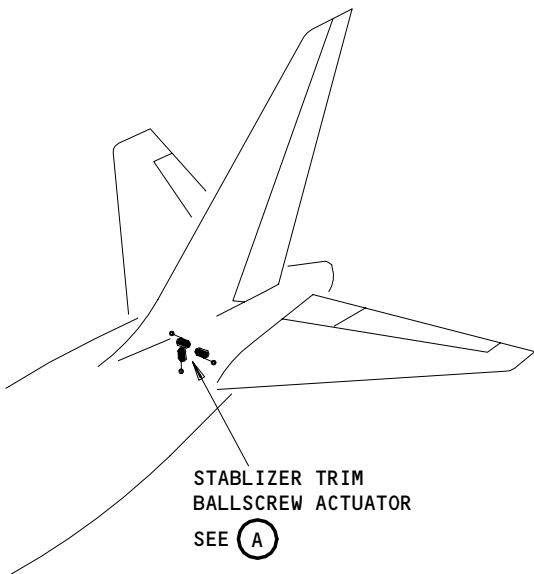
ELEVATOR TRAVEL LIMITS

(C)

Elevator Travel Positions  
Figure 502 (Sheet 2)

EFFECTIVITY	ALL
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27-31-00



A-A

STABILIZER TRIM BALLSCREW ACTUATOR

(A)

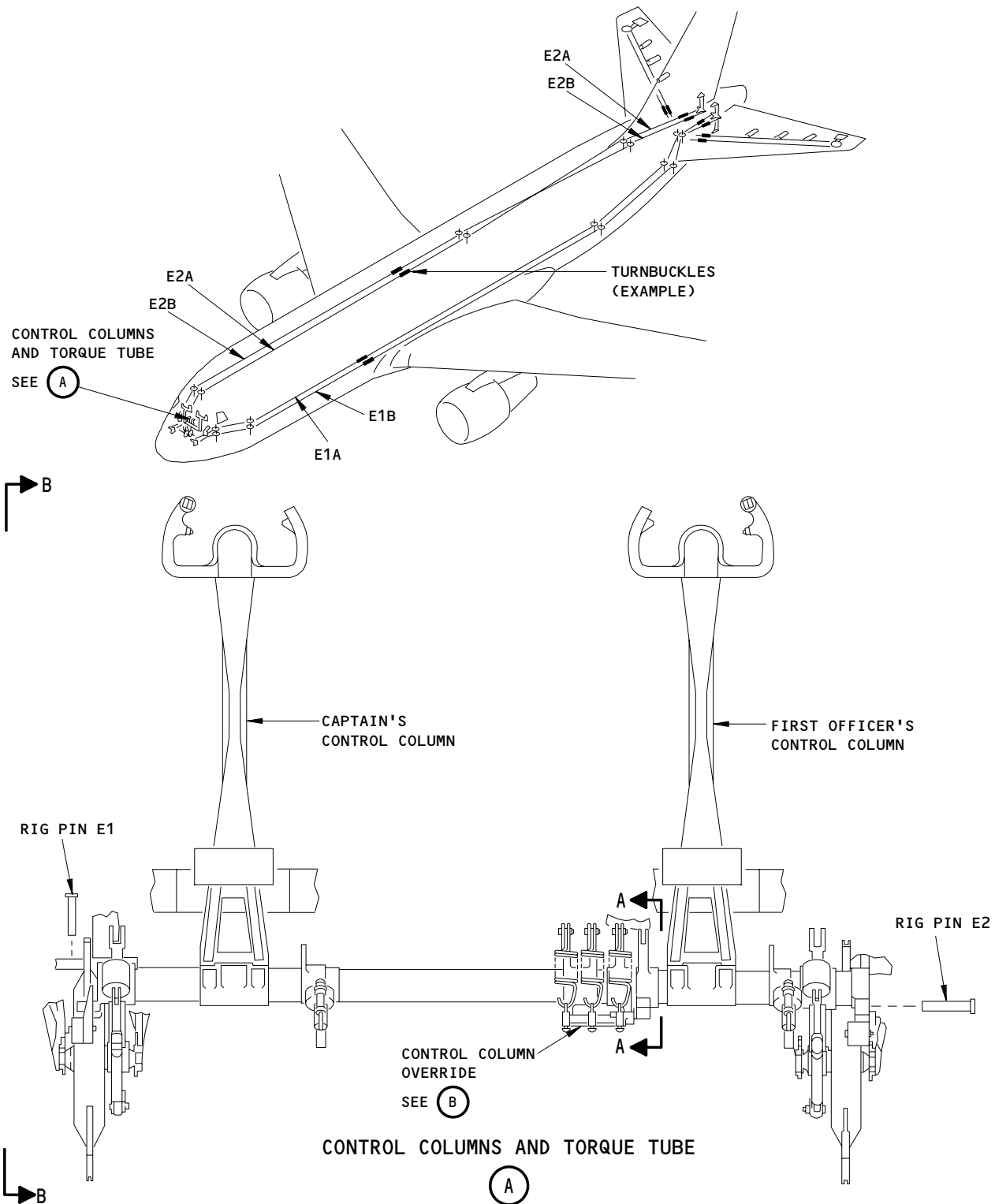
Stabilizer Dimension A  
Figure 503

EFFECTIVITY	ALL
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27-31-00

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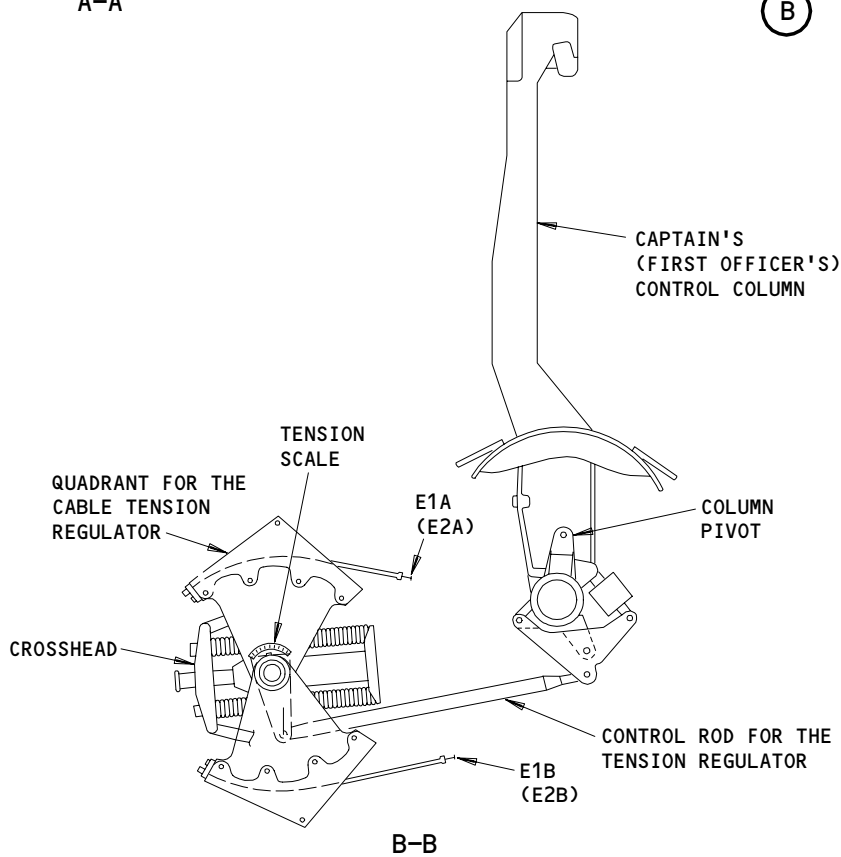
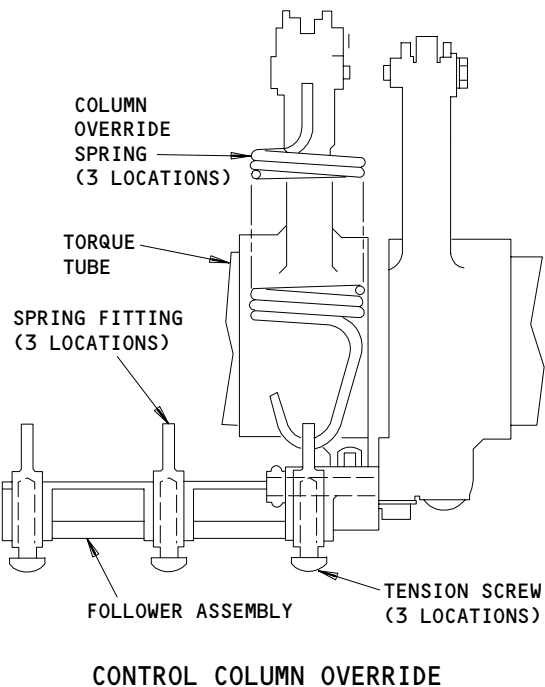
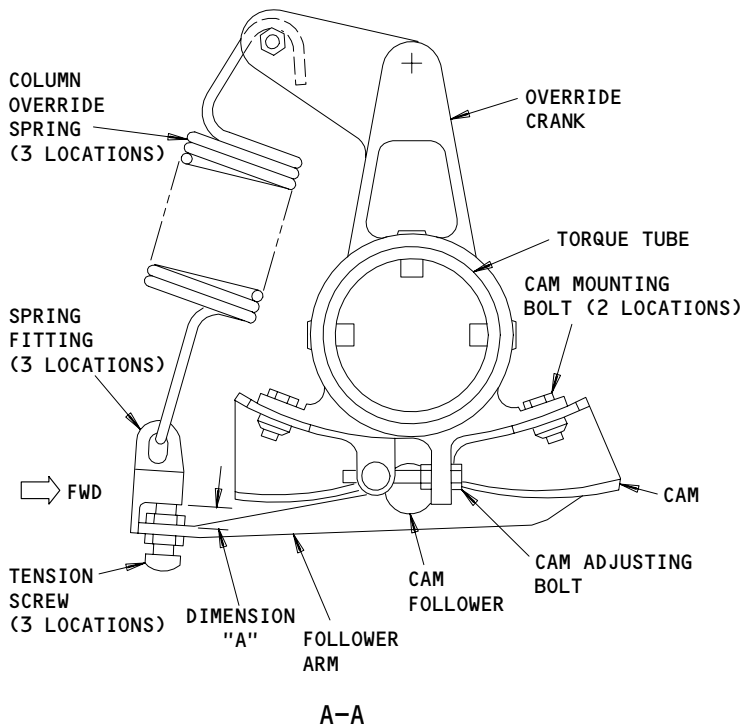


Control Column Adjustment  
Figure 504 (Sheet 1)

EFFECTIVITY	ALL
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27-31-00

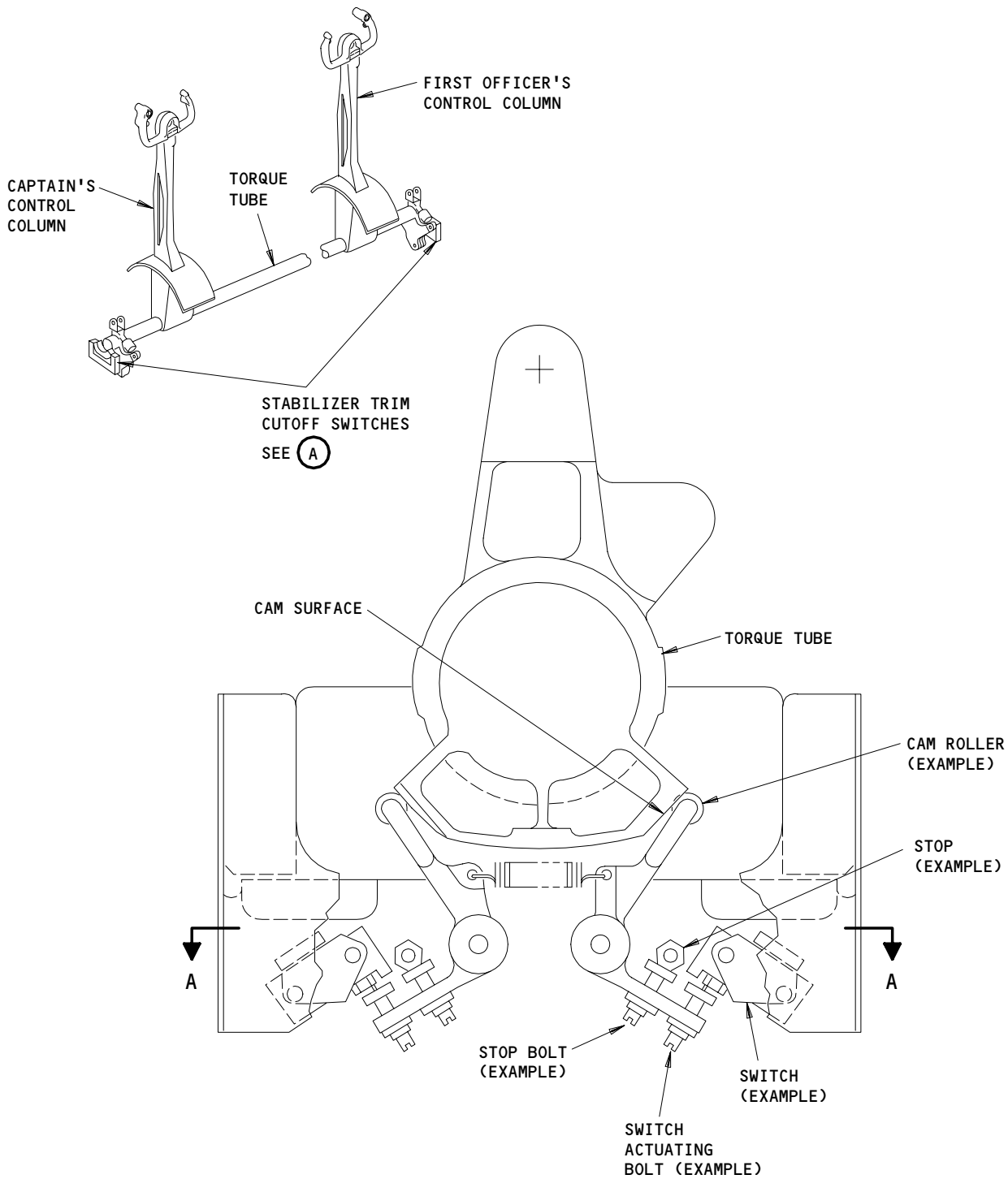




Control Column Adjustment  
Figure 504 (Sheet 2)

EFFECTIVITY	
	ALL

27-31-00



STABILIZER TRIM CUTOFF SWITCHES

(A)

Stabilizer Trim Cutoff Switches Adjustment  
Figure 505 (Sheet 1)

EFFECTIVITY	
	ALL

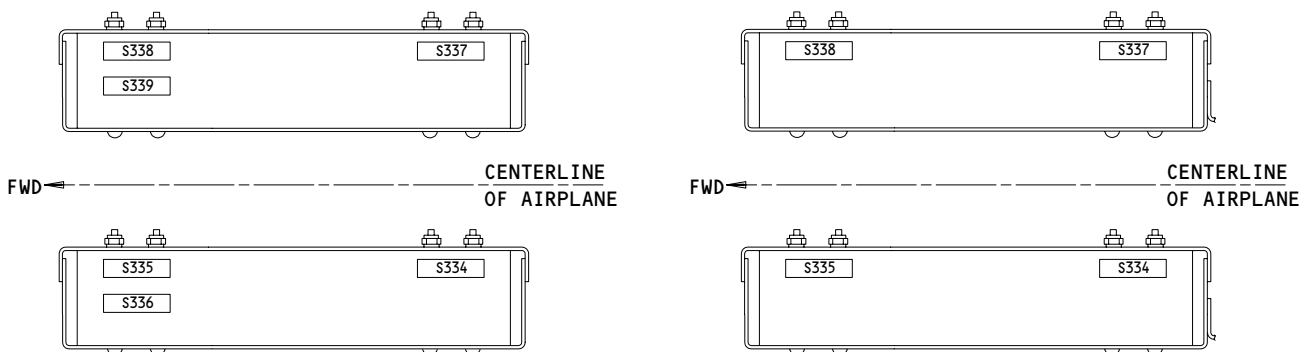
27-31-00

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213832

**FIRST OFFICER'S COLUMN**



**CAPTAIN'S COLUMN**

**767-200 AIRPLANES**

**767-300 AIRPLANES**

A-A

**TABLE 1**

SWITCH	COLUMN POSITION	PIN - CONNECTOR - LOCATION			PIN - CONNECTOR - LOCATION			CIRCUIT CONTROL
S334	RIG	14	D5131P	E1-1	21	D4337J	E1-3	CONTINUITY
S335	RIG	13	D5131P	E1-1	16	D5131P	E1-1	CONTINUITY
S336	RIG	13	D5131P	E1-1	19	D4337J	E1-3	CONTINUITY
S337	RIG	14	D5139P	E2-1	21	D4345J	E1-5	CONTINUITY
S338	RIG	13	D5139P	E2-1	10	D5139P	E2-1	CONTINUITY
S339	RIG	13	D5139P	E2-1	19	D4345J	E1-5	CONTINUITY

**TABLE 2**

SWITCH	COLUMN POSITION	PIN - CONNECTOR - LOCATION			PIN - CONNECTOR - LOCATION			CIRCUIT CONTROL
S334	2.2°-2.7° FWD	14	D5131P	E1-1	21	D4337J	E1-3	NO CONTINUITY
S335	2.0°-2.5° AFT	13	D5131P	E1-1	16	D5131P	E1-1	NO CONTINUITY
S336	3.0°-3.5° AFT	13	D5131P	E1-1	19	D4337J	E1-3	NO CONTINUITY
S337	2.2°-2.7° FWD	14	D5139P	E2-1	21	D4345J	E1-5	NO CONTINUITY
S338	2.0°-2.5° AFT	13	D5139P	E2-1	10	D5139P	E2-1	NO CONTINUITY
S339	3.0°-3.5° AFT	13	D5139P	E2-1	19	D4345J	E1-5	NO CONTINUITY

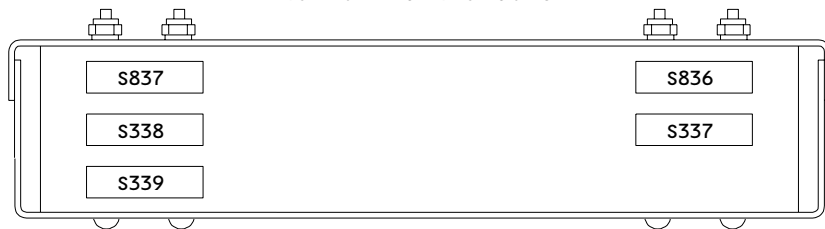
767-200 AIRPLANES

**Stabilizer Trim Cutoff Switches Adjustment  
Figure 505 (Sheet 2)**

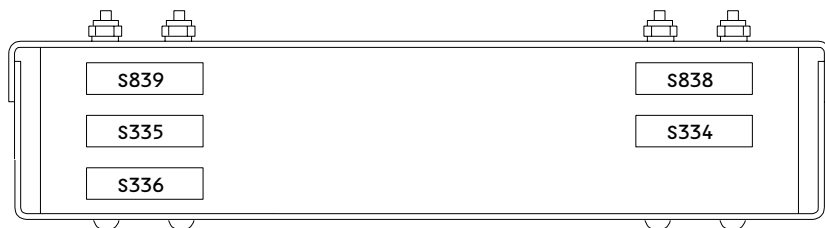
EFFECTIVITY  
SAS 050, 051, 150-166, 275-277,  
279 PRE-SB 27-102

**27-31-00**

FIRST OFFICER'S COLUMN



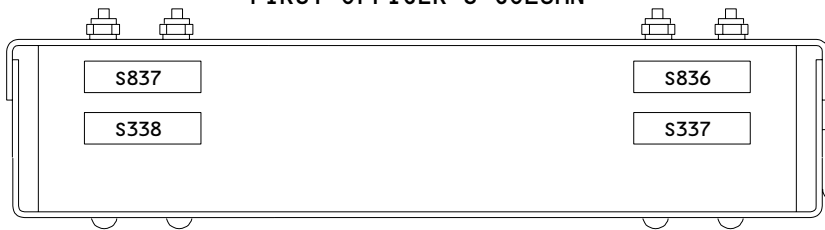
FWD ← ----- CENTERLINE OF AIRPLANE



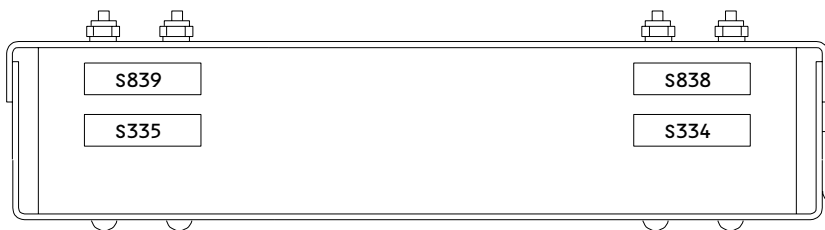
CAPTAIN'S COLUMN

(767-200)  
A-A

FIRST OFFICER'S COLUMN



FWD ← ----- CENTERLINE OF AIRPLANE



CAPTAIN'S COLUMN

(767-300)  
A-A

Stabilizer Trim Cutoff Switches Adjustment  
Figure 505 (Sheet 3)

EFFECTIVITY  
SAS 050, 051, 150-166, 275-277, 279  
POST-SB 27-102;  
SAS 052-149, 167-274, 278, 288-999

27-31-00

**BOEING**  
767  
MAINTENANCE MANUAL

SWITCH	COLUMN POSITION	PIN	CONNECTOR	LOCATION	PIN	CONNECTOR	LOCATION	CIRCUIT CONTROL
S334	RIG	14	D5131P	E1-1	21	D4365J	E1-3	CONTINUITY
S335	RIG	13	D5131P	E1-1	16	D5131P	E1-1	CONTINUITY
S336 <sup>1</sup>	RIG	13	D5131P	E1-1	19	D4337J	E1-3	CONTINUITY
S337	RIG	14	D5139P	E2-1	21	D4345J	E1-5	CONTINUITY
S338	RIG	13	D5139P	E2-1	10	D5139P	E2-1	CONTINUITY
S339 <sup>1</sup>	RIG	13	D5139P	E2-1	19	D4345J	E1-5	CONTINUITY
S836	RIG	14	D5131P	E1-1	21	D4365J	E1-3	CONTINUITY
S837	RIG	13	D5131P	E1-1	16	D5131P	E1-1	CONTINUITY
S838	RIG	14	D5139P	E2-1	21	D4345J	E1-5	CONTINUITY
S839	RIG	13	D5139P	E2-1	10	D5139P	E2-1	CONTINUITY

TABLE 1

SWITCH	COLUMN POSITION	PIN	CONNECTOR	LOCATION	PIN	CONNECTOR	LOCATION	CIRCUIT CONTROL
S334	2.2°-2.7° FWD	14	D5131P	E1-1	21	D4365J	E1-3	NO CONTINUITY
S335	2.0°-2.5° AFT	13	D5131P	E1-1	16	D5131P	E1-1	NO CONTINUITY
S336 <sup>1</sup>	3.0°-3.5° AFT	13	D5131P	E1-1	19	D4337J	E1-3	NO CONTINUITY
S337	2.2°-2.7° FWD	14	D5139P	E2-1	21	D4345J	E1-5	NO CONTINUITY
S338	2.0°-2.5° AFT	13	D5139P	E2-1	10	D5139P	E2-5	NO CONTINUITY
S339 <sup>1</sup>	3.0°-3.5° AFT	13	D5139P	E2-1	19	D4345J	E1-5	NO CONTINUITY
S836	2.2°-2.7° FWD	14	D5131P	E1-1	21	D4365J	E1-3	NO CONTINUITY
S837	2.0°-2.5° AFT	13	D5131P	E1-1	16	D5131P	E1-1	NO CONTINUITY
S838	2.2°-2.7° FWD	14	D5139P	E2-1	21	D4345J	E1-5	NO CONTINUITY
S839	2.0°-2.5° AFT	13	D5139P	E2-1	10	D5139P	E2-1	NO CONTINUITY

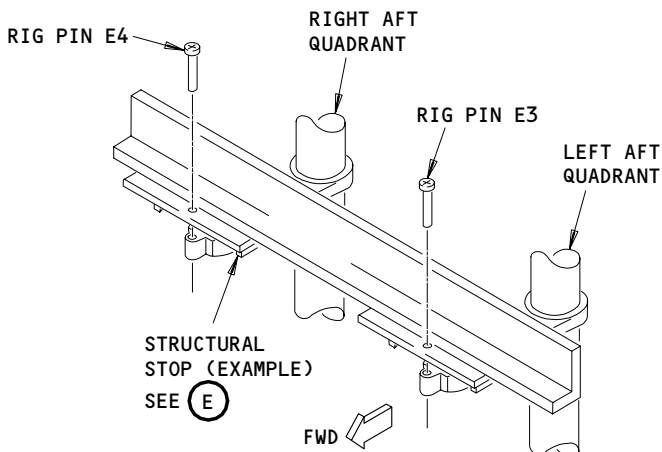
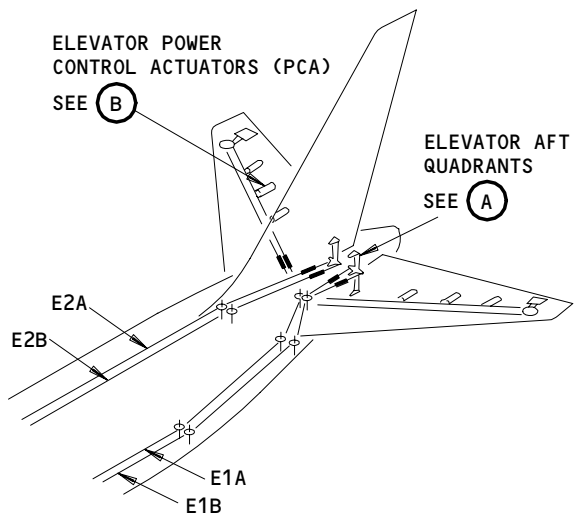
TABLE 2

<sup>1</sup> 767-200 AIRPLANES

Stabilizer Trim Cutoff Switches Adjustment  
Figure 505 (Sheet 4)

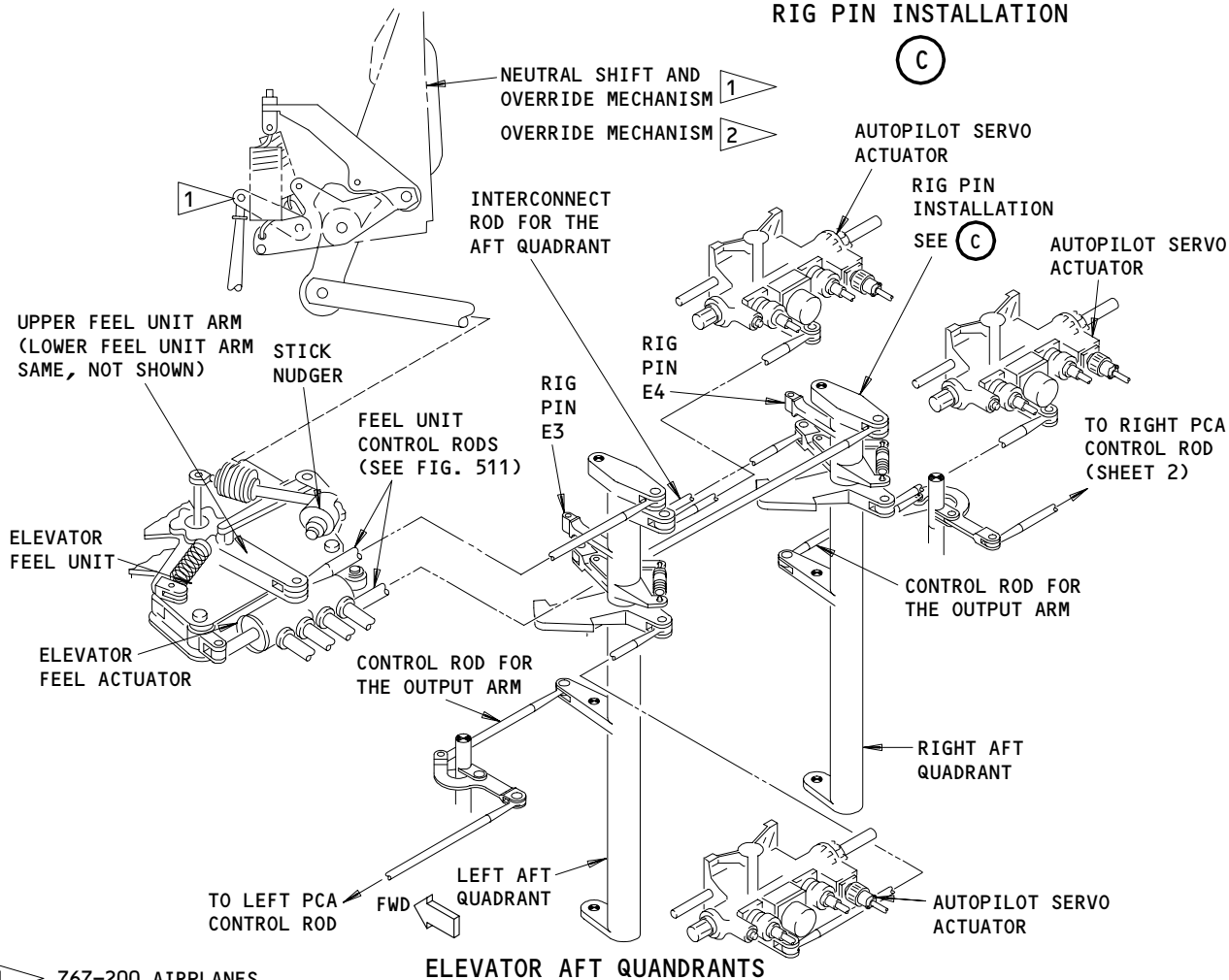
EFFECTIVITY  
SAS 050, 051, 150-166, 275-277, 279  
POST-SB 27-102;  
SAS 052-149, 167-274, 278, 280-999

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**RIG PIN INSTALLATION**

(C)



(A)

- 1 767-200 AIRPLANES
- 2 767-300 AIRPLANES

Elevator Aft Linkage Adjustments  
Figure 506 (Sheet 1)

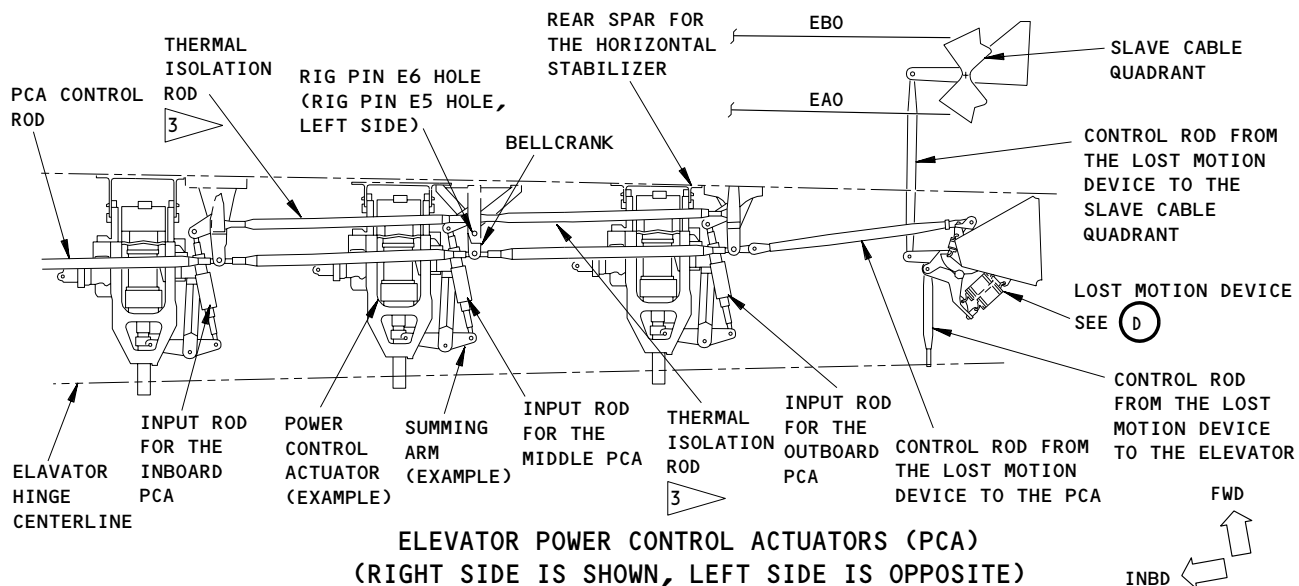
EFFECTIVITY

ALL

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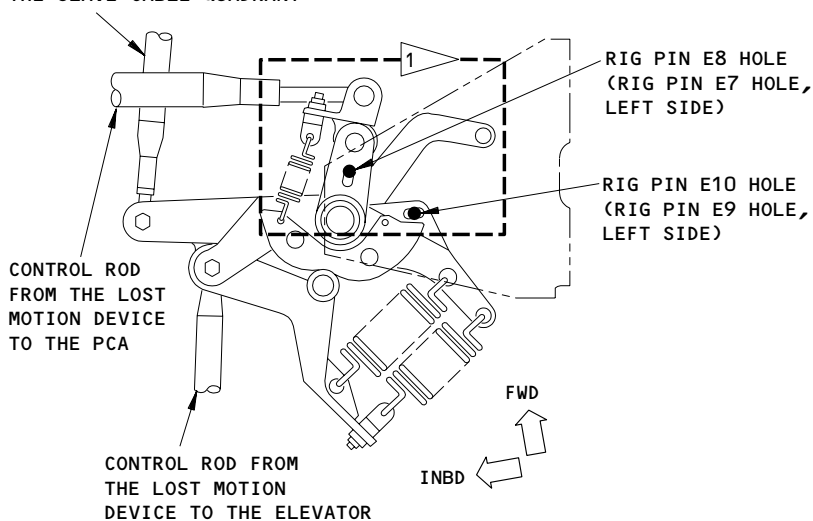
03

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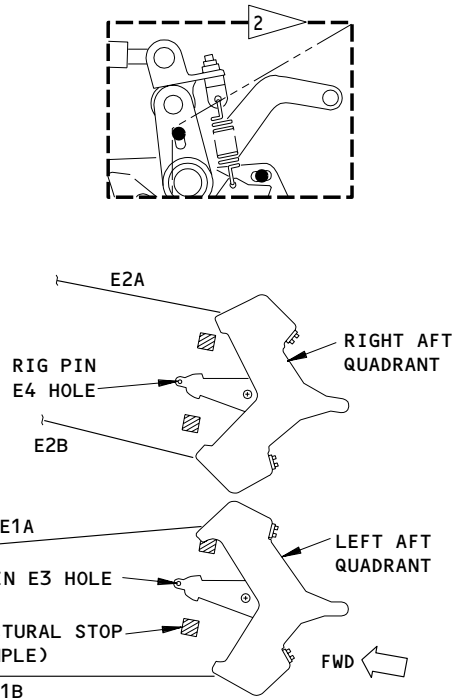
(B)

CONTROL ROD FROM THE LOST MOTION DEVICE TO THE SLAVE CABLE QUADRANT



(D)

- 1 SPRING POSITION FOR THE LEFT SIDE
- 2 SPRING POSITION FOR THE RIGHT SIDE
- 3 THESE THERMAL ISOLATION RODS ARE OPTIONAL AND MAY NOT BE INCLUDED IN THE AIRCRAFT CONFIGURATION.



(E)

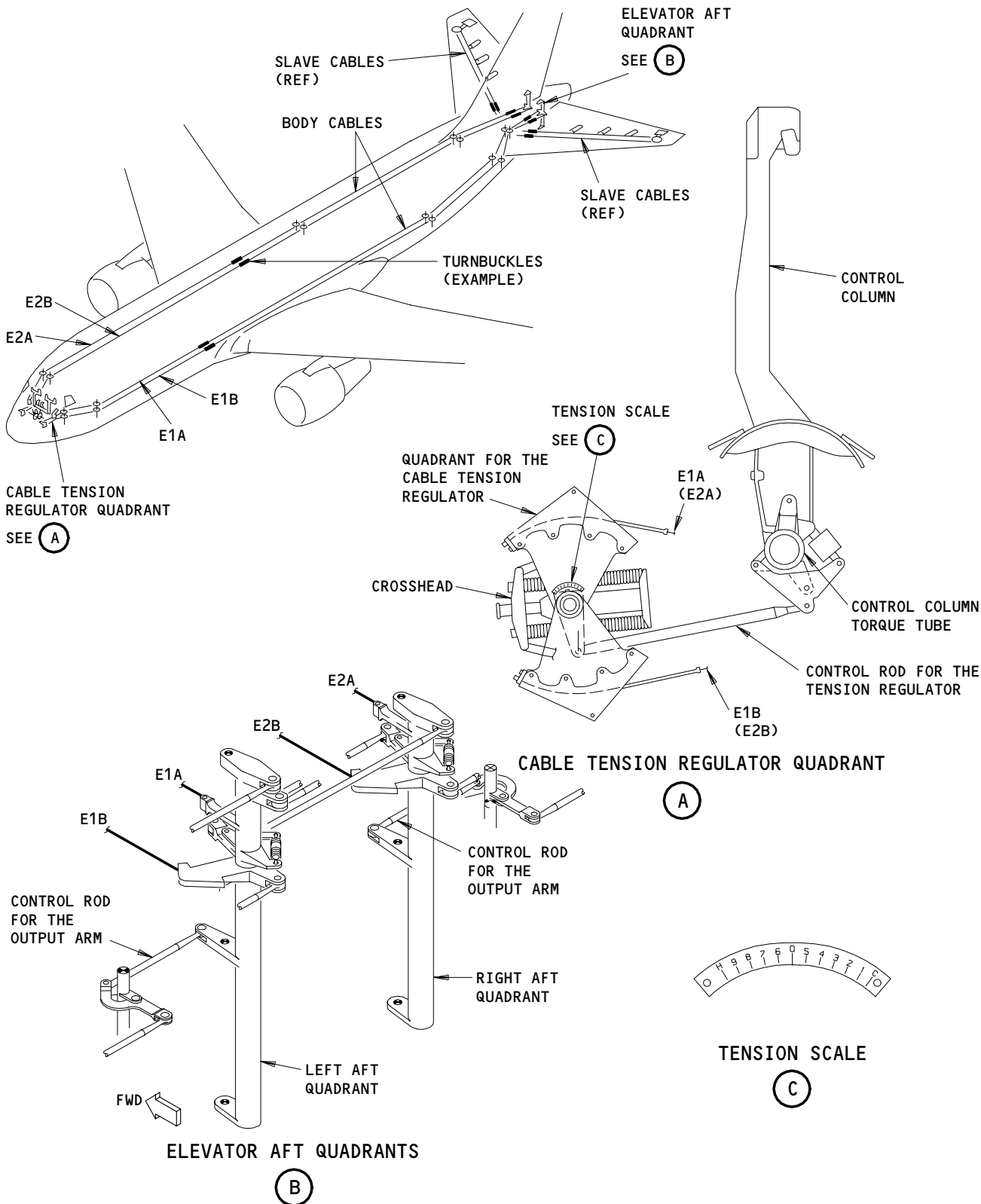
Elevator Aft Linkage Adjustments  
Figure 506 (Sheet 2)

EFFECTIVITY	ALL
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# BOEING

## 767 MAINTENANCE MANUAL



**Elevator Body Cable Tension Requirements  
Figure 507 (Sheet 1)**

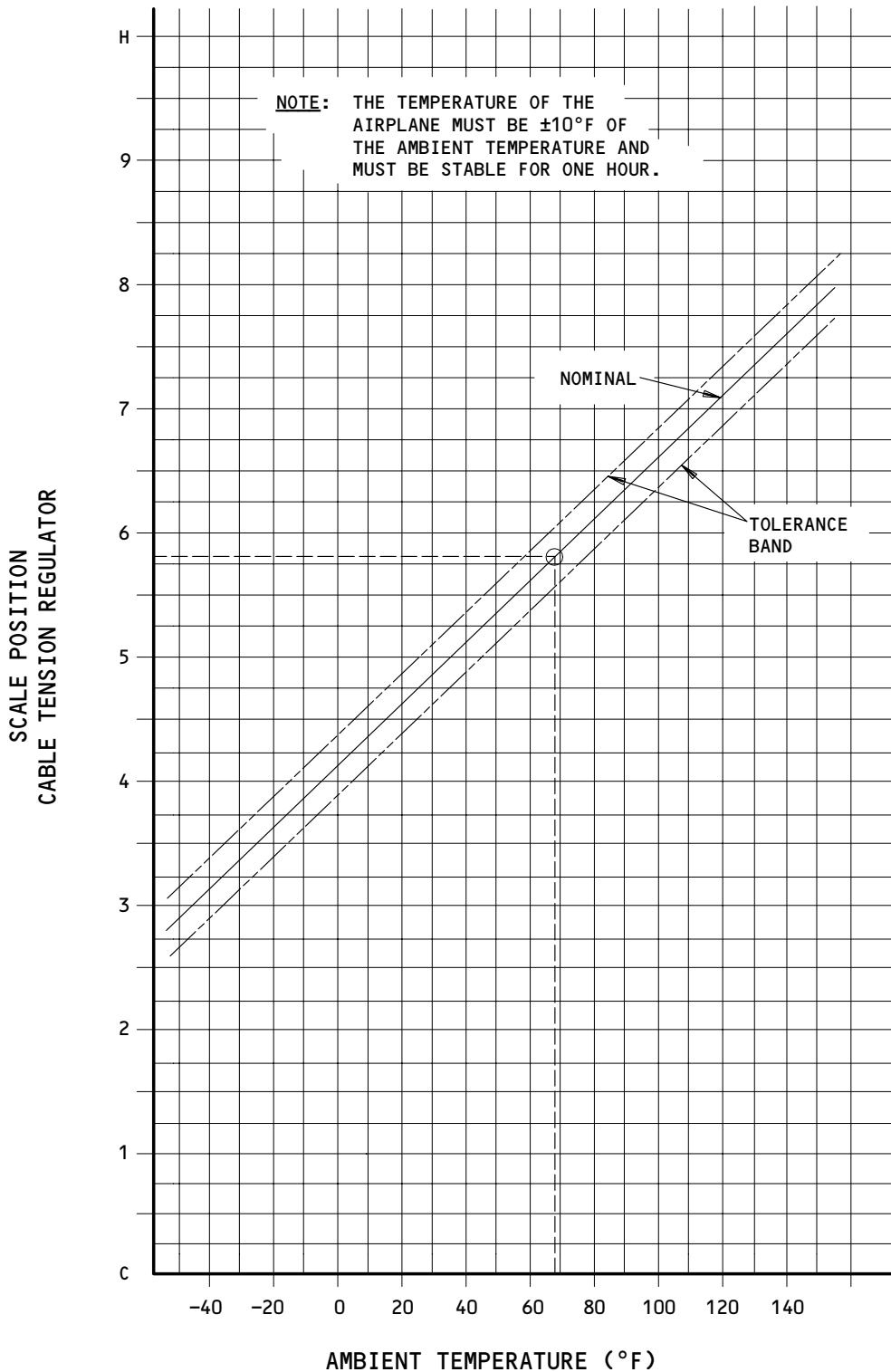
EFFECTIVITY	ALL
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03

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CABLE TENSION REGULATOR SCALE SETTING VS TEMPERATURE

Elevator Body Cable Tension Requirements  
Figure 507 (Sheet 2)

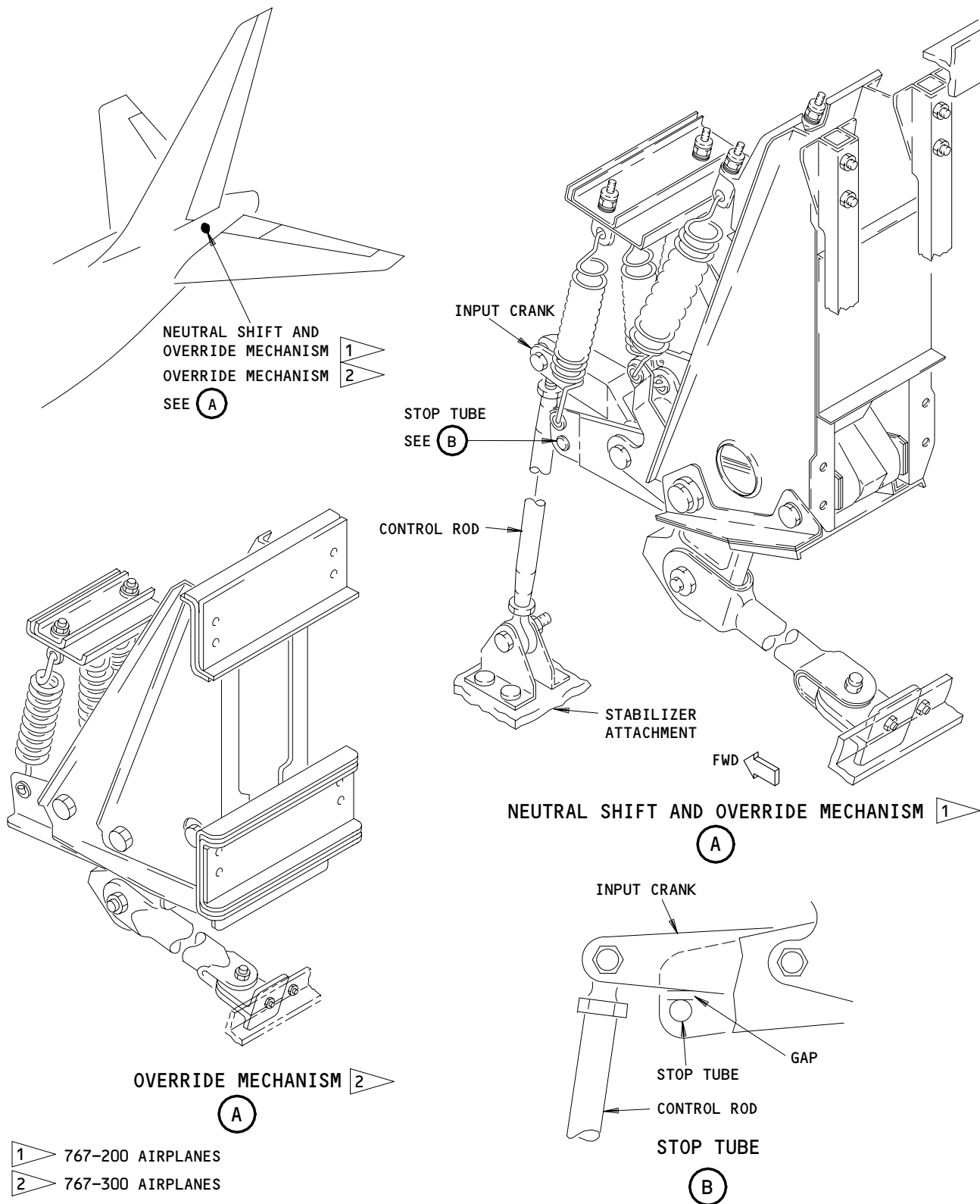
EFFECTIVITY

ALL
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Neutral Shift and Override Adjustment  
Figure 508

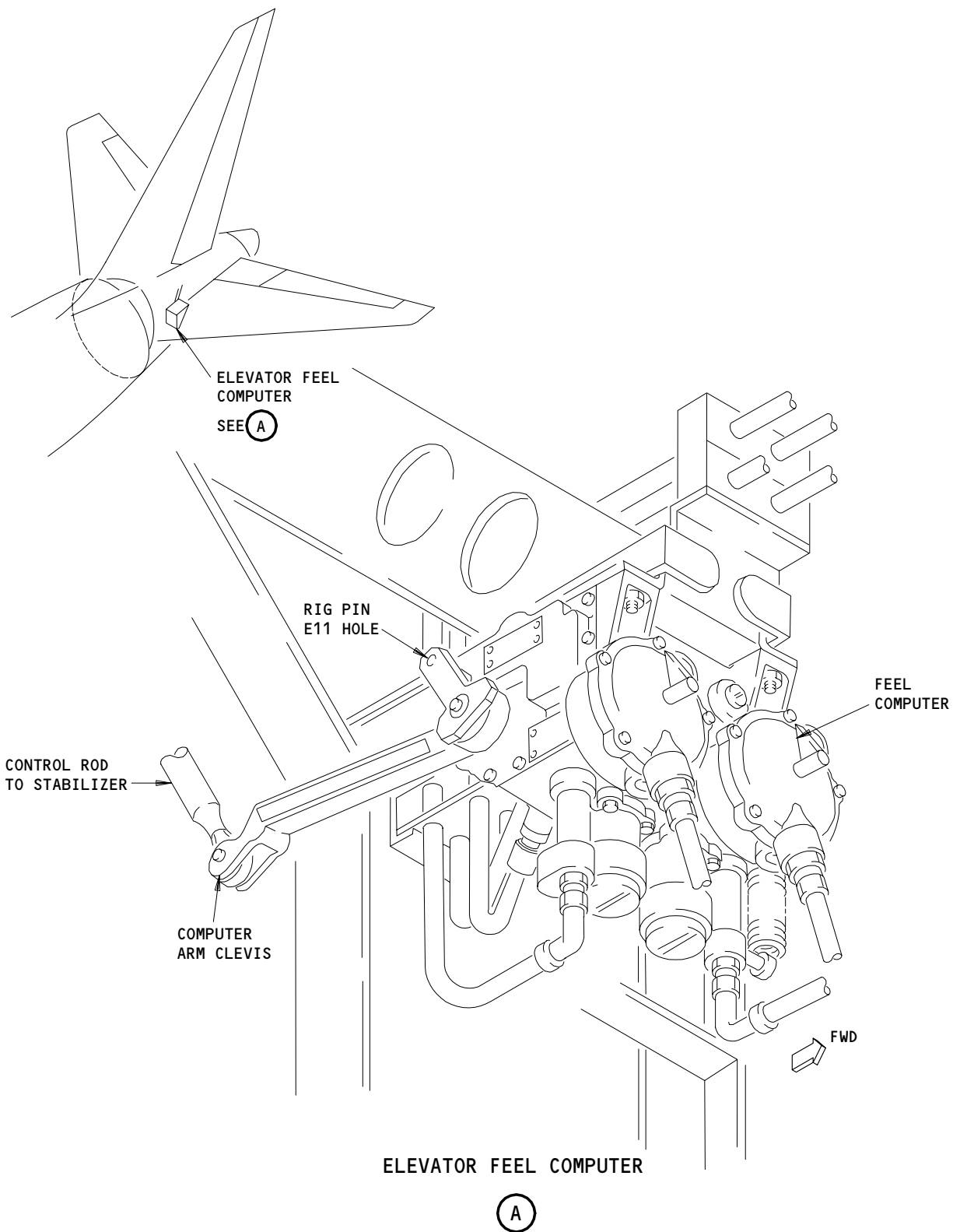
EFFECTIVITY

ALL

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03

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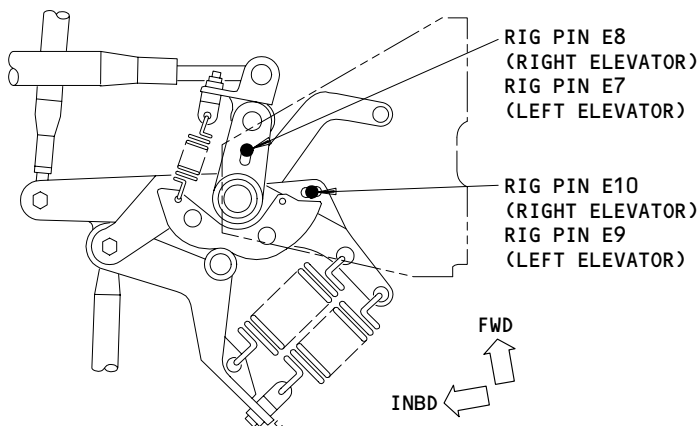
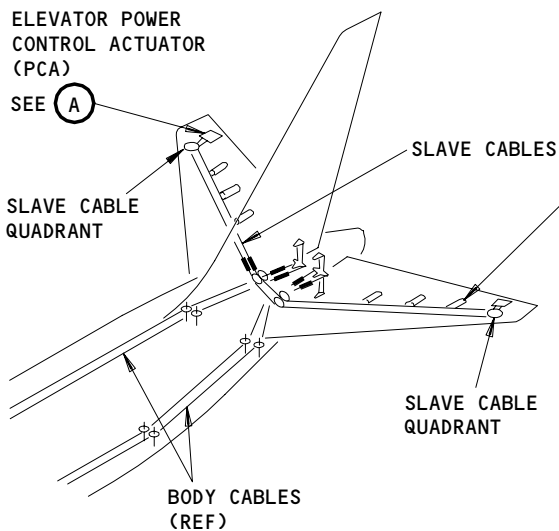
Elevator Feel Computer Adjustment  
Figure 509

EFFECTIVITY	
	ALL

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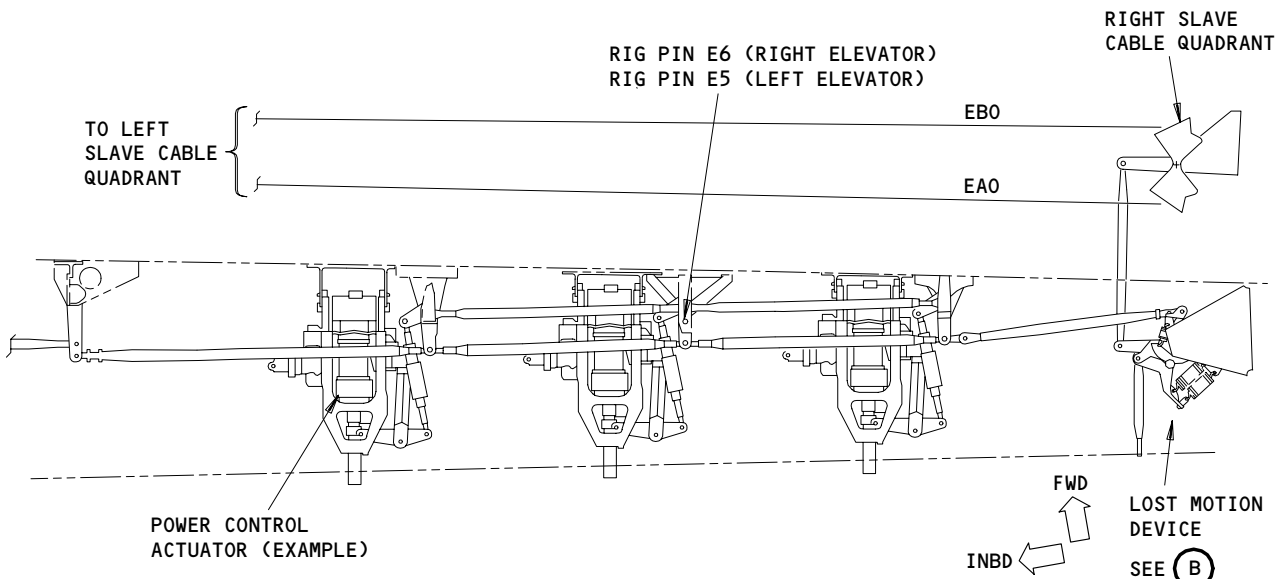
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LOST MOTION DEVICE

(B)



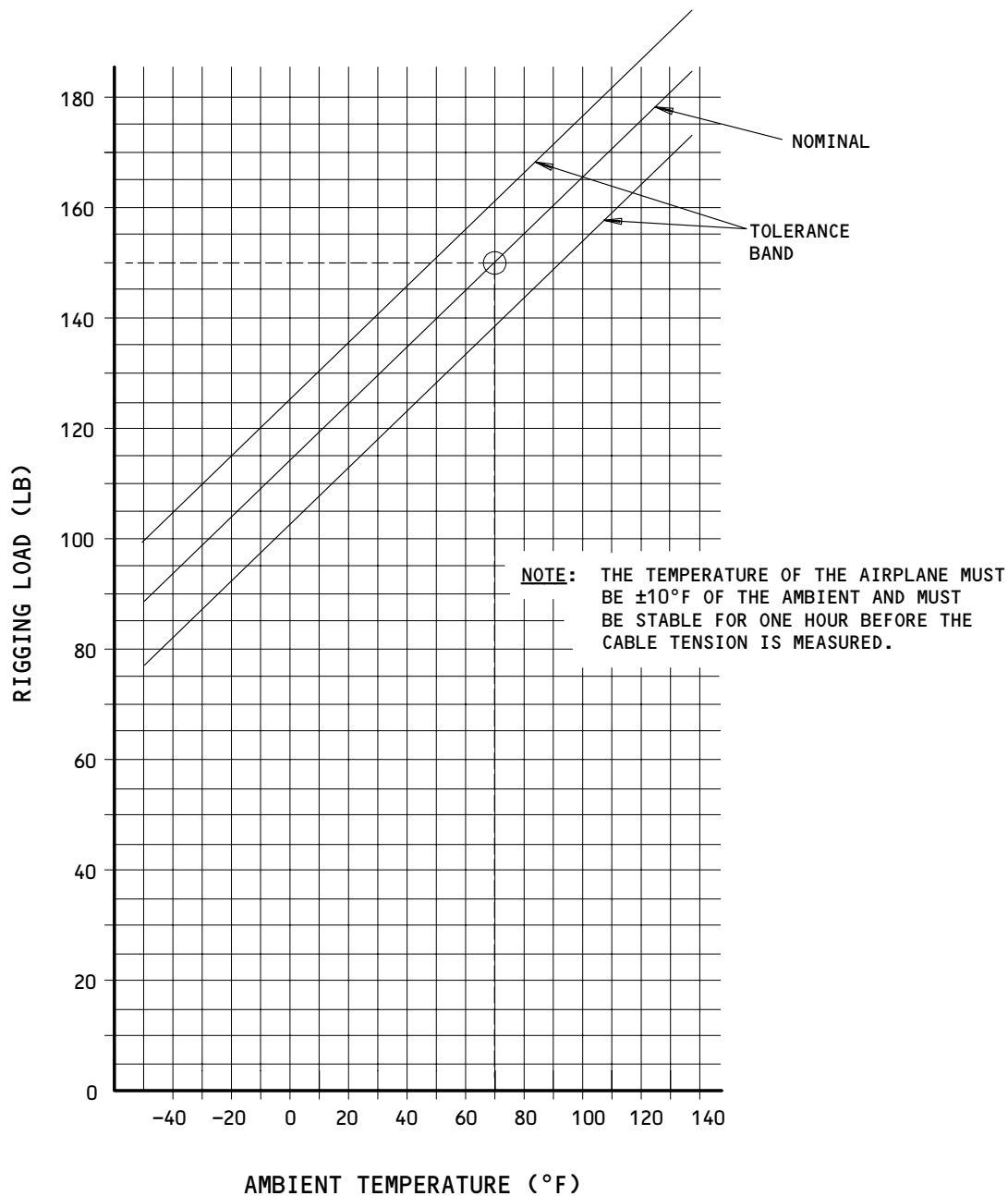
ELEVATOR POWER CONTROL ACTUATORS (PCA)  
(RIGHT SIDE SHOWN, LEFT SIDE IS OPPOSITE)

(A)

Elevator Slave Cable Tension Requirements  
Figure 510 (Sheet 1)

EFFECTIVITY	
	ALL

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SLAVE CABLE RIG LOAD VS TEMPERATURE

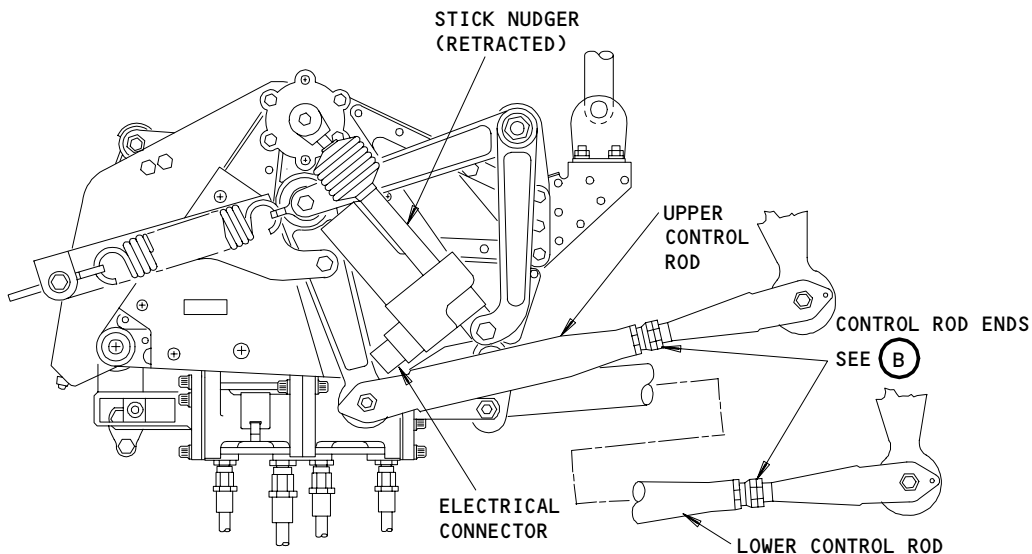
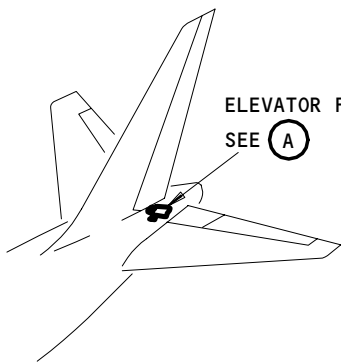
Elevator Slave Cable Tension Requirements  
Figure 510 (Sheet 2)

EFFECTIVITY ————  
ALL

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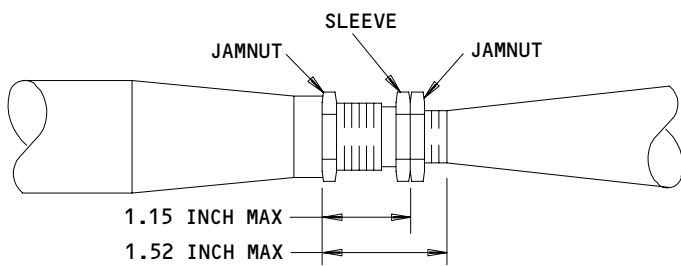
02

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ELEVATOR FEEL UNIT

(A)



CONTROL ROD ENDS

(B)

Elevator Feel Unit Adjustment  
Figure 511

EFFECTIVITY	
ALL	

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S 865-322

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO A PERSON OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Pressurize the left, center, and right hydraulic systems (AMM 29-11-00/201).

S 865-004

- (3) Make sure these circuit breakers on the P11 panel are closed:
- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 215-005

- (4) Make sure that the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, are ON.

S 215-006

- (5) Make sure that the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, are NORM.

S 865-008

- (6) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND; use the stab trim levers to move the horizontal stabilizer to neutral (2 units of trim).

S 865-009

- (7) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND; use the alternate stab trim switches to move the horizontal stabilizer to neutral (2 units of trim).

S 865-011

- (8) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel to CUTOUT.

S 865-323

- (9) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the P61 panel to OFF.
- (a) Make sure that the FLT CONT SHUTOFF TAIL valve indicating lights (left, right, and center) are amber when in the OFF position.

EFFECTIVITY

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S 865-013

- (10) Move the control columns.  
(a) Make sure that the elevators do not move.

NOTE: The elevators may hang down because of their weight when the control column is moved and no hydraulic power is supplied.

S 865-014

- (11) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the P61 panel to ON.  
(a) Make sure that there is no ELEV FEEL message on the EICAS screen when the STATUS button is pushed.

S 865-324

- (12) Put the CENTER FLT CONT SHUTOFF TAIL valve switch on the P61 panel to OFF.

S 865-016

- (13) Move the control columns to remove remaining hydraulic pressure.  
(a) Make sure that the ELEV FEEL message on the EICAS screen comes on.

NOTE: Wait at least 30 seconds for the message to come on.

S 865-017

- (14) Put the CENTER FLT CONT SHUTOFF TAIL valve switch on the P61 panel to ON.  
(a) Make sure that the ELEV FEEL message is not shown on the EICAS display.

S 865-325

- (15) Put the LEFT FLT CONT SHUTOFF TAIL valve switch on the P61 panel to OFF.

S 865-336

- (16) Move the control columns to remove remaining hydraulic pressure.  
(a) Make sure that the ELEV FEEL message comes on.

NOTE: Wait at least 30 seconds for the message to come on.

S 865-020

- (17) Put the LEFT FLT CONT SHUTOFF TAIL valve switch on the P61 panel to ON.  
(a) Make sure that the ELEV FEEL message is not shown on the EICAS display.

EFFECTIVITY

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S 865-326

- (18) Move the control columns full forward and release.  
(a) Make sure that the elevators go to the neutral position.

S 865-022

- (19) Move the control columns full aft and release.  
(a) Make sure that the elevators go to the neutral position.

S 865-023

- (20) Move the control columns full forward and hold and then full aft and hold.  
(a) Make sure that the elevators move smoothly and with no blockage through full travel.  
(b) Make sure that the elevator position indicators show the position of the elevators correctly.

S 865-327

- (21) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel to NORM.

S 865-025

- (22) Remove hydraulic power if it is not necessary (AMM 29-11-00/201).

S 865-328

- (23) Remove electrical power if it is not necessary (AMM 24-22-00/201).

E. Shutoff Valve Operation with a Single Hydraulic Source Test

S 215-027

- (1) Make sure that the LEFT, CENTER, AND RIGHT FLT CONTROL SHUTOFF TAIL valve switches on the P61 panel are ON.

S 215-028

- (2) Make sure that the amber OFF switch position lights are off.

S 865-029

- (3) Supply power to the left hydraulic system (AMM 29-11-00/201).

S 865-030

- (4) Operate the control columns through full travel and then put them to the neutral position.

S 215-031

- (5) Make sure that the elevators move correctly to the control column movement.

S 865-032

- (6) Remove the power from the left hydraulic system (AMM 29-11-00/201).

S 865-033

- (7) Supply power to the center hydraulic system (AMM 29-11-00/201).

EFFECTIVITY

ALL

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- S 865-034
- (8) Operate the control columns through full travel and then put them to the neutral position.
- S 215-035
- (9) Make sure that the elevators move correctly to the control column movement.
- S 865-036
- (10) Remove power from the center hydraulic system (AMM 29-11-00/201).
- S 865-037
- (11) Supply power to the right hydraulic system (AMM 29-11-00/201).
- S 865-038
- (12) Operate the control columns through full travel and then put them to the neutral position.
- S 215-039
- (13) Make sure that the elevators move correctly to the control column movement.
- S 865-040
- (14) Remove the power from the right hydraulic system (AMM 29-11-00/201).
- S 865-041
- (15) Remove electrical power if it is not necessary (AMM 24-22-00/201).
- F. Dual Control Path Override System Test
- S 865-042
- (1) Supply electrical power (AMM 24-22-00/201).
- S 865-043
- (2) Pressurize the left, right, and center hydraulic systems (AMM 29-11-00/201).
- S 865-044
- (3) Hold the first officer's control column in the neutral position and pull the captain's control column aft.
- (a) Make sure that the left elevator moves up.
- NOTE: The right elevator will start to move up after the left elevator. The right elevator will move at a slower rate than the left elevator.
- S 865-045
- (4) Let the captain's control column go to the neutral position.

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S 865-046

- (5) Hold the captain's control column in the neutral position and push the first officer's control column forward.
  - (a) Make sure that the right elevator moves down.

NOTE: The left elevator will start to move down after the right elevator. The left elevator will move at a slower rate than the right elevator.

S 865-047

- (6) Let the first officer's control column go to the neutral position.

S 865-048

- (7) Remove power from the left, center, and right hydraulic systems if it is not necessary (AMM 29-11-00/201).

S 865-049

- (8) Remove electrical power if it is not necessary (AMM 24-22-00/201).
- G. 767-200;  
Elevator Neutral Shift and Override Mechanism Test

S 865-050

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

S 865-051

- (2) Pressurize the left and center hydraulic systems (AMM 29-11-00/201).

S 865-052

- (3) Put the CENTER STAB TRIM SHUTOFF switch on the P10 panel to CUTOUT.

S 865-055

- (4) Move the horizontal stabilizer in the airplane nose-up direction (stabilizer leading edge down) until the elevators start to move from the neutral position.
  - (a) Make sure that the elevators start to move at approximately 8.4 units of trim.

S 865-056

- (5) Move the stabilizer to the greenband range.
  - (a) Make sure the elevators go to the neutral position.

S 865-057

- (6) Remove the power from the left and center hydraulic systems if it is not necessary (AMM 29-11-00/201).

S 865-058

- (7) Put the CENTER STAB TRIM SHUTOFF switch on the P10 panel to NORM.

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S 865-059

- (8) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-31-00-825-060

3. Elevator Control System - Adjustment

A. General

- (1) **SYSTEM ADJUSTMENT SEQUENCE:** The procedure contains steps to adjust the elevator control system components and mechanisms. The sequence that follows is recommended for complete system adjustment:

**NOTE:** The elevator control system must be adjusted after a control rod or cable is replaced.

- (a) **Override Cam:** Refer to the "Adjust the Override Cam" paragraph
  - (b) **Override Springs:** Refer to the "Adjust the Override Springs" paragraph
  - (c) **Stabilizer Cutoff Switches:** Refer to the "Adjust the Stabilizer Cutoff Switches" paragraph
  - (d) **Body Cables:** Refer to the "Adjust the Body Cables" paragraph
  - (e) **Feel Unit Rods:** Refer to the "Adjust the Feel Unit Rods" paragraph
  - (f) **Autopilot Servo Rods:** Refer to the "Adjust the Elevator Autopilot Servo Rods" paragraph
  - (g) 767-200;  
**Neutral Shift Rod:** Refer to the "Adjust the Neutral Shift Control Rod" paragraph
  - (h) **Feel Computer Rod:** Refer to the "Adjust the Feel Computer Control Rod" paragraph
  - (i) **PCA Rods:** Refer to the "Adjust the Power Control Actuator (PCA) Control Rods" paragraph
  - (j) **Slave Cables:** Refer to the "Adjust the Slave Cables" paragraph
  - (k) **Lost Motion-to-PCA Rods:** Refer to the "Lost Motion to PCA Control Rod Adjustment" paragraph
  - (l) **PCA Input Rods:** Refer to the "Adjust the Power Control Actuator (PCA) Input Rods" paragraph
  - (m) **Lost Motion-to-Elevator Rods:** Refer to the "Adjust the Lost Motion-to-Elevator Control Rod" paragraph
  - (n) **Elevator Position Transmitter Rods:** Refer to the "Elevator Position Transmitter Rod Adjustment" paragraph
- (2) **OUT OF SEQUENCE ADJUSTMENTS:** A component and mechanism can be adjusted out of the recommended sequence if the conditions below are correct. Necessary components must be adjusted subsequently.

**NOTE:** Prepare for Adjustment steps must be done before the out of sequence adjustments that follow.

- (a) **Override Cam**
  - 1) Do the "Prepare for Adjustment" paragraph
  - 2) Do the "Adjust the Override Cam" paragraph

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- 3) Do the "Adjust the Body Cables" paragraph
  - 4) Do the "Adjust the Feel Unit Rods" paragraph
  - 5) Do the "Adjust the Elevator Autopilot Servo Rods" paragraph
- (b) Override Springs
- 1) Do the "Prepare for Adjustment" paragraph
  - 2) Do the "Adjust the Override Springs" paragraph
  - 3) Do the "Adjust the Body Cables" paragraph
  - 4) Do the "Adjust the Feel Unit Rods" paragraph
  - 5) Do the "Adjust the Elevator Autopilot Servo Rods" paragraph
- (c) Stabilizer Cutoff Switches
- 1) Do the "Prepare for Adjustment" paragraph
  - 2) Do the "Adjust the Stabilizer Cutoff Switches" paragraph
  - 3) Examine the cable tension regulators when you connect the second control rod for the left and right torque tubes.
    - a) If the regulators show a value in the tolerance band for the Elevator Body Cable Tension Requirements (Fig. 507), no more adjustments are necessary.
    - b) If the regulator values are out of the tolerance band, you must do these adjustments:
      - Do the "Adjust the Body Cables" paragraph
      - Do the "Adjust the Feel Unit Rods" paragraph
      - Do the "Adjust the Elevator Autopilot Servo Rods" paragraph
- (d) Body Cables
- 1) Do the "Prepare for Adjustment" paragraph
  - 2) Do the "Adjust the Override Cam" paragraph
  - 3) Do the "Adjust the Override Springs" paragraph
  - 4) Do the "Adjust the Stabilizer Cutoff Switches" paragraph
  - 5) Do the "Adjust the Body Cables" paragraph
  - 6) Do the "Adjust the Feel Unit Rods" paragraph
  - 7) Do the "Adjust the Elevator Autopilot Servo Rods" paragraph
- (e) Feel Unit Control Rods
- 1) Do the "Prepare for Adjustment" paragraph
  - 2) Do the "Adjust the Override Cam" paragraph
  - 3) Do the "Adjust the Override Springs" paragraph
  - 4) Do the "Adjust the Stabilizer Cutoff Switches" paragraph
  - 5) Do the "Adjust the Body Cables" paragraph
  - 6) Do the "Adjust the Feel Unit Rods" paragraph
  - 7) Do the "Adjust the Elevator Autopilot Servo Rods" paragraph
- (f) Autopilot Servo Rods
- 1) Do the "Prepare for Adjustment" paragraph
  - 2) Do the "Adjust the Override Cam" paragraph
  - 3) Do the "Adjust the Override Springs" paragraph
  - 4) Do the "Adjust the Stabilizer Cutoff Switches" paragraph
  - 5) Do the "Adjust the Body Cables" paragraph
  - 6) Do the "Adjust the Feel Unit Rods" paragraph
  - 7) Do the "Adjust the Elevator Autopilot Servo Rods" paragraph
- (g) 767-200;  
Neutral Shift Control Rod
- 1) Do the "Prepare for Adjustment" paragraph
  - 2) Do the "Adjust the Neutral Shift Control Rod" paragraph

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- (h) Feel Computer Control Rod
  - 1) Do the "Prepare for Adjustment" paragraph
  - 2) Do the "Adjust the Feel Computer Control Rod" paragraph
- (i) PCA Control Rods
  - 1) Do the "Prepare for Adjustment" paragraph
  - 2) Do the "Adjust the Override Cam" paragraph
  - 3) Do the "Adjust the Override Springs" paragraph
  - 4) Do the "Adjust the Stabilizer Cutoff Switches" paragraph
  - 5) Do the "Adjust the Body Cables" paragraph
  - 6) Do the "Adjust the Feel Unit Rods" paragraph
  - 7) Do the "Adjust the Power Control Actuator (PCA) Control Rods" paragraph
- (j) Slave Cables
  - 1) Do the "Prepare for Adjustment" paragraph
  - 2) Do the "Adjust the Slave Cables" paragraph
- (k) Lost Motion-to-PCA Control Rods
  - 1) Do the "Prepare for Adjustment" paragraph
  - 2) Do the "Lost Motion to PCA Control Rod Adjustment" paragraph
- (l) PCA Input Rods
  - 1) Do the "Prepare for Adjustment" paragraph
  - 2) Do the "Adjust the Power Control Actuator (PCA) Input Rods" paragraph
- (m) Lost Motion-to-Elevator Control Rods
  - 1) Do the "Prepare for Adjustment" paragraph
  - 2) Do the "Lost Motion to PCA Control Rod Adjustment" paragraph
  - 3) Do the "Adjust the Power Control Actuator (PCA) Input Rods" paragraph
  - 4) Do the "Adjust the Lost Motion-to-Elevator Control Rod" paragraph
- (n) Elevator Position Transmitter Control Rods
  - 1) Do the "Prepare for Adjustment" paragraph
  - 2) Do the "Adjust the Override Cam" paragraph
  - 3) Do the "Adjust the Override Springs" paragraph
  - 4) Do the "Adjust the Stabilizer Cutoff Switches" paragraph
  - 5) Do the "Adjust the Body Cables" paragraph
  - 6) Do the "Adjust the Feel Unit Rods" paragraph
  - 7) Do the "Adjust the Power Control Actuator (PCA) Control Rods" paragraph
  - 8) Do the "Elevator Position Transmitter Rod Adjustment" paragraph

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- (3) **ADJUSTMENT REQUIREMENTS:** The elevator control system is adjusted correctly if it operates smoothly through its full travel range and if the conditions that follow are correct:

**NOTE:** The stabilizer trim control system must be correctly adjusted (AMM 27-41-00/501) before the elevator control system is adjusted.

- (a) Elevator Body Cables E1A, E1B, E2A, E2B

**NOTE:** Adjustment is not necessary for the appropriate cables if the conditions that follow are correct.

- 1) The cable adjustment is correct if the conditions that follow can occur at the same time:
  - Rig pin E2 is in the base of the right control column (Fig. 504)
  - All cables have the correct tension
  - Rig pins E3 and E4 can be freely put in the left and right aft quadrant arms (Fig. 506).
- 2) Tensions in cables E1A, E1B, E2A, and E2B are correct if the indication on the tension regulator indicator is in tolerance for ambient temperatures.

- (b) Elevator Feel Unit and Aft Interconnect Rod

- 1) The feel unit is adjusted correctly if the conditions that follow can occur at the same time:
  - The captain's auxiliary pitot system is pressurized to 4.0 psig (395 knots)
  - Rig pins E3 and E4 can be freely put in the left and right aft quadrant arms (Fig. 506).

- (c) Feel Computer

- 1) The feel computer is adjusted correctly if the conditions that follow can occur at the same time:
  - a) 767-200 AIRPLANES;  
Dimension A on the ballscrew actuator is at  $3.00 \pm 0.03$  inches (76.2 +/- 0.8 mm)
  - b) 767-300 AIRPLANES;  
Dimension A on the ballscrew actuator is at  $2.50 \pm 0.03$  inches (63.5 +/- 0.8 mm)
  - c) Rig pin E11 can be freely put in the feel computer arm.

- (d) Power Control Actuator (PCA) Control Rod

- 1) The left side PCA control rod is adjusted correctly if the conditions that follow can occur at the same time:
  - Rig pin E5 can be freely put in the center PCA input crank
  - Rig pin E3 can be freely put in the left aft quadrant stop arm (Fig. 506).

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- 2) The right side PCA control rod is correctly adjusted if the conditions that follow can occur at the same time:
  - Rig pin E6 can be freely put in the center PCA input crank
  - Rig pin E4 can be freely put in the right aft quadrant stop arm (Fig. 506).
- (e) Slave Cables EA0, EB0
  - 1) Cable tensions are correct if the conditions that follow can occur at the same time:
    - Rig pin E9 can be freely put in the lost motion device on the left side
    - Rig pin E10 can be freely put in the lost motion device on the right side (Fig. 506).
- (f) Lost Motion Input Rod
  - 1) The left side lost motion input rod is correctly adjusted if the conditions that follow can occur at the same time:
    - Rig pin E5 can be freely put in the center PCA input crank
    - Rig pin E7 can be freely put in the lost motion device (Fig. 506).
  - 2) The right side lost motion input rod is correctly adjusted if the conditions that follow can occur at the same time:
    - Rig pins E6 can be freely put in the center PCA input crank
    - Rig pin E8 can be put in the lost motion device (Fig. 506).
- (g) Power Control Actuator (PCA)
  - 1) The power control actuators are correctly adjusted if:
    - Both elevators move up and down and stop at the same angle (as shown on the position indicators) in the necessary tolerances.

NOTE: The indicators can be used to verify gross elevator surface position at various column positions. The power control actuator adjustment check is good if the top surface of the trailing edge of both elevators aligns with the center of the index plate groove within 0.05 inch (1.3 millimeter).

- 2) Each PCA is adjusted by the adjustment of its PCA input rod.
- (h) Slave System Elevator Input Rod
  - 1) The left slave system elevator input rod is adjusted correctly if the conditions that follow can occur at the same time:
    - Rig pin E5 can be freely put in the left side PCA bellcrank
    - Rig pin E9 can be freely put in the lost motion device (Fig. 506).

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2) The right slave system elevator input rod is adjusted correctly if the conditions that follow can occur at the same time:

- Rig pin E6 can be freely put in the right side PCA bellcrank
- Rig pin E10 can be freely put in the lost motion device (Fig. 506).

(i) Elevator Position Transmitter

1) The elevator position transmitter is adjusted correctly if the conditions that follow can occur at the same time:

- The horizontal stabilizer is at neutral (2 units of trim)
- Elevator position indicators follow the movement of elevators correctly.

#### B. Equipment

- (1) Control Wheel Adapter Equipment - A27021-96 or -98
- (2) Milliohmmeter -0- to 0.1- ohm range

(3) Rig Pins from Set A20004-XX (AMM 20-10-24/201):

- (a) E1 - P/N A20004-22
- (b) E2 - P/N A20004-22
- (c) E3 - P/N A20004-17
- (d) E4 - P/N A20004-17
- (e) E5 - P/N A20004-15
- (f) E6 - P/N A20004-15
- (g) E7 - P/N A20004-21
- (h) E8 - P/N A20004-21
- (i) E9 - P/N A20004-21
- (j) E10 - P/N A20004-21
- (k) E11 - P/N A20004-17

(4) Service Platform, Control Bay Access Door - A51001-19

(5) Control Column Protractor - 1 each A27021-30 (from the A27021-29 kit) or 4MIT65B80307-1

#### C. Consumable Materials

- (1) C00308 Compound - Corrosion Preventive  
MIL-C-11796 Class III

#### D. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-42-00/201, Empennage Access Doors and Panels
- (3) AMM 20-10-24/201, Rig Pins
- (4) AMM 22-00-02/201, Autoflight Bite
- (5) AMM 22-10-00/501, Autopilot (Flight Control)
- (6) AMM 22-12-01/401, Elevator Autopilot Servo
- (7) AMM 24-22-00/201, Electrical Power - Control
- (8) AMM 27-38-00/501, Elevator Position Indicating System
- (9) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System
- (10) AMM 34-11-00/201, Pitot-Static Systems

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E. Access

(1) Location Zones

113	Area Forward of NLG Wheel Well (Left)
313	Stabilizer Torsion Box Compartment (Left)
335/345	Horizontal Stabilizer – Rear Spar to Trailing Edge

(2) Access Panels

113AL	Forward Equipment Bay
313AL	Elevator Mechanical Linkage
335EB/335GB/335HB/ 335JB/335AFB	Elevator Control Mechanism and Elevator Hinges (Left)
345EB/345GB/345HB/ 345JB/345AFB	Elevator Control Mechanism and Elevator Hinges (Right)
335DB	Elevator Bellcrank (Left)
345DB	Elevator Bellcrank (Right)

F. Prepare for Adjustment

S 865-061

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

S 865-261

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** START ONE HYDRAULIC SYSTEM AT A TIME UNLESS SPECIFIED DIFFERENTLY. HIGH LOADS MAY OCCUR IN THE ELEVATOR, RUDDER, AND STABILIZER STRUCTURES FROM FORCES THAT CAN RESULT FROM INCORRECTLY ADJUSTED POWER CONTROL ACTUATORS. DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 225-063

- (3) Move the horizontal stabilizer such that Dimension A on the stabilizer trim ballscrew actuator is  $3.84 \pm 0.03$  inches (97.5 +/- 0.7 mm) (neutral position) (Fig. 503).

S 865-064

- (4) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-065

- (5) Put the RIGHT, LEFT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to OFF.

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- S 865-066
- (6) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand, P10, to CUTOUT.
- S 865-067
- (7) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

- S 015-068
- (8) Open the access door, 113AL, for the forward equipment bay (AMM 06-41-00/201).

- S 015-069
- (9) Open the access door, 312AR, for the stabilizer trim ballscrew actuator (AMM 06-42-00/201).

- S 015-070
- (10) Open the access door, 313AL, for the elevator mechanical linkages (AMM 06-42-00/201).

S 495-314

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (11) Install the service platform on the controls bay access door, 313AL.

- S 015-072
- (12) Remove the access panels that follow (AMM 06-42-00/201):
- (a) 335EB, 335GB, 335HB, 335JB, and 335AFB for left elevator adjustments.

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(b) 345EB, 345GB, 345HB, 345JB, and 345AFB for right elevator adjustments.

G. Adjust the Override Cam (Fig. 504)

S 495-073

- (1) Install rig pin E1 in the left column torque tube.

S 035-074

- (2) Disconnect the control rods from the left and right column torque tubes.

S 825-075

- (3) Do the steps that follow to adjust the override cam:
- (a) Loosen the cam mounting bolts.
  - (b) Adjust the cam adjusting bolt such that rig pin E2 can be put in freely.
  - (c) Tighten the cam mounting bolts and the adjusting bolt check nut.

NOTE: Do not tighten adjacent bolts or nuts one after the other.

S 095-315

- (4) Remove rig pins E1 and E2.

H. Adjust the Override Springs (Fig. 504)

S 495-076

- (1) Install the control wheel adapter equipment on the captain's and first officer's control wheels.

NOTE: The adapter equipment is used to measure control column force and angular travel.

S 495-077

- (2) Install rig pin E2.

S 825-078

- (3) Adjust the column override springs so that the override breakout torque value measured about the column and torque tube pivot is  $904 \pm 72$  lb-in ( $102 \pm 8$  newton-meters).

NOTE: This is equivalent to  $25 \pm 2$  lbs ( $111 \pm 9$  newtons) applied at the finger reference point (the center of the control wheel grip).

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S 825-079

- (4) Do the steps that follow to adjust the spring tension:  
(a) Adjust the tension screws.

NOTE: One turn of all three screws will change the breakout torque by approximately 45 lb-in (5.1 newton-meters).

- (b) Make sure that Dimension A is the same at each of the screws with a tolerance of 0.03 inch (0.8 mm).

S 095-263

- (5) Remove rig pin E2.

S 095-080

- (6) Remove the control wheel adapter equipment.  
I. Adjust the Stabilizer Cut-Off Switches (Fig. 505)

S 825-263

- (1) If the stabilizer cut-off switches are not rigged directly after you completed the adjustment of the override cam, do these steps:  
(a) Install the rig pins E1 and E2.  
(b) If the rig pin E2 cannot be put in freely, make sure the adjustment for the override cam is correct.  
(c) Remove the rig pins E1 and E2.

S 035-264

- (2) Make sure the switch actuating bolts for the left and right stabilizer cutoff switches are completely loosened from the stops and switches.

S 825-265

- (3) Adjust the switch actuating bolts for the stabilizer trim cutoff switches as follows (Fig. 505):  
(a) SAS 050, 051, 150-166, 275-277, 279 PRE-SB 27-102;  
Do the steps that follow:  
1) Adjust each bolt to let the switch transfer within the angle shown in Table 2.  
2) Tighten the jamnuts for the switch actuating bolts.

NOTE: Be careful not to change the adjustment.

- (b) SAS 050, 051, 150-166, 275-277, 279 POST-SB 27-102;  
SAS 052-149, 167-274, 278, 280-999;  
Adjust each bolt to let the switch transfer within the angle shown in Table 2.

NOTE: Open the opposite switch shown in Table 501, with a shim between the stop bolt and its stop.

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- 1) 767-200 AIRPLANES;  
Use the table that follows:

TABLE 501	
CHECK SWITCH	OPEN SWITCH
S334	S836
S335	S837
S336	-----
S337	S838
S338	S839
S339	-----
S836	S334
S837	S335
S838	S337
S839	S338

- 2) 767-300 AIRPLANES;  
Use the table that follows:

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TABLE 501	
CHECK SWITCH	OPEN SWITCH
S334	S836
S335	S837
S337	S838
S338	S839
S836	S334
S837	S335
S838	S337
S839	S338

3) Tighten the jamnuts for the switch actuating bolts.

NOTE: Be careful not to change the adjustment.

S 865-266

- (4) Put the control column to the neutral position.  
 (a) Install the rig pin E1.

S 825-267

- (5) Do the steps that follow to adjust the stop bolt for each stabilizer trim cutoff switch:  
 (a) Turn the stop bolt until it touches the stop.  
 (b) Turn the stop bolt 1/2 to 3/4 of a turn (180 to 270 degrees) more into the stop.  
 (c) Tighten the jamnut for the stop bolt.

NOTE: Be careful not to change the adjustment.

If there is a space between the cam and the cam rollers, ignore the space.

S 825-268

- (6) Use the volt-ohmmeter to make sure the switches have continuity as shown in Table 1 Fig 505 (Sheet 2).

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S 085-269

- (7) Remove the rig pin E1.

S 825-270

- (8) Use the volt-ohmmeter to make sure there is no continuity through the switches as shown in Table 2 Fig 505 (Sheet 2).  
(a) If it is necessary, adjust the stop bolt for the stabilizer trim switch.  
(b) Do the check again to make sure there is no continuity.

S 435-271

- (9) Connect the control rods to the left and right column torque tubes.

**NOTE:** If a large force is necessary to connect the second rod, adjust the body cables, the feel unit rod, and the autopilot servo rods.

J. Adjust the Body Cables (Fig. 507)

S 825-081

- (1) Do these steps to adjust the body cables:  
(a) Remove the aft quadrant interconnect rod (Fig. 506).  
(b) Install rig pins E5 and E6 in the left and right middle PCA input linkage.  
(c) Disconnect the aft quadrant output arm control rods from the left and right aft quadrants.  
(d) Disconnect two feel unit control rods and three autopilot servo actuator control rods from the left and right aft quadrants.  
(e) Disconnect the tension regulator control rod from the captain's tension regulator.  
(f) Insert rig pin E2 in the base of the first officer's control column (Fig. 504).

**WARNING:** BE CAREFUL WHEN YOU ENGAGE OR DISENGAGE THE CABLE TURNBUCKLES. A SUDDEN MOVEMENT BY THE TENSION REGULATOR OR CABLES CAN CAUSE INJURY TO A PERSON.

- (g) Adjust the turnbuckles on cables E2A and E2B to the correct SCALE POSITION vs AMBIENT TEMPERATURE.

**NOTE:** Adjust both turnbuckles at the same time such that both cables are loaded evenly.

- 1) Make sure that rig pin E4 can be freely put in the right aft quadrant (Fig. 506).  
(h) Install rig pin E4.  
(i) Align the pressure seals for cables E2A and E2B to remove any bends in the cable.  
(j) Install rig pin E3 in the left aft quadrant (Fig. 506).

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- (k) Adjust the aft quadrant interconnect rod until the rod end bolt can be freely installed through the clevis and rod ends.

**WARNING:** BE CARDFUL WHEN YOU ENGAGE OR DISENGAGE THE CABLE TURNBUCKLES. A SUDDEN MOVEMENT BY THE TENSION REGULATOR OR CABLES CAN CAUSE INJURY TO A PERSON.

- (l) Adjust the turnbuckles on cables E1A and E1B to the correct SCALE POSITION vs AMBIENT TEMPERATURE.

**NOTE:** Adjust both turnbuckles at the same time such that both cables are loaded evenly.

- 1) Make sure the tension regulator control rod bolt can be freely installed through the captain's tension regulator and rod end.
- (m) Connect the tension regulator control rod to the captain's tension regulator.
- (n) Align the pressure seals for E1A and E1B to remove any bends in the cable.
- (o) Make sure that rig pins E1, E2, E3, and E4 (Fig. 504 and 506) can be removed with finger pressure only.
- (p) Remove rig pins E1, E2, E3, and E4.
- (q) Make sure the conditions that follow are correct:
  - 1) The cables do not touch pulleys or quadrant flanges for the total cable travel.
  - 2) The cables are in 2 degrees of the plane of the pulley or quadrant.
  - 3) Cables are installed through grommets and seals in the structure.
  - 4) Fairleads, rub strips, and grommets do not move the cables from the rigged or normal operational position.
  - 5) The pulleys rotate without blockage from the guards.
- (r) Operate the cable system through full travel 25 times.
- (s) Make sure that rig pins E1, E2, E3 and E4 can be put in with finger pressure only.
- (t) Install locking clips on all of the turnbuckles.
- (u) Make sure that rig pins E1, E2, E3 and E4 can be put in with finger pressure only.
- (v) Connect three autopilot servo actuator control rods to the left and right aft quadrant.
- (w) Connect the feel unit upper arm control rod to the left aft quadrant.

S 865-082

- (2) For the feel unit adjustment, keep rig pins E5 and E6 installed and the control rods that follow disconnected:
  - (a) Left and right aft quadrant output arm control rods.
  - (b) Feel unit lower arm control rod.

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S 825-083

- (3) Adjust the feel unit rods (refer to the "Adjust the Feel Unit Rods" paragraph).

K. Adjust the Feel Unit Rods (Fig. 506)

**NOTE:** The body cables must be adjusted before the feel unit rod can be adjusted.

S 865-267

**CAUTION:** DO NOT LET THE PRESSURE GO ABOVE 4.75 PSI (426 KNOTS). THIS WILL PREVENT DAMAGE TO THE FEEL COMPUTER. MAKE PRESSURE CHANGES SUCH THAT THE INDICATED RATE OF CLIMB (OR DESCENT) IS LESS THAN 5000 FEET PER MINUTE FOR THE STATIC SYSTEM AND 300 KNOTS PER MINUTE FOR THE PITOT SYSTEM. APPLICABLE GAUGE SAVER RESTRICTORS OR EQUIVALENT DEVICES MUST BE USED.

- (1) Pressurize auxiliary pitot system No. 2 to 4.0 psi (395 knots) (AMM 34-11-00/201).

S 865-085

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11C13, STAB TRIM SHUTOFF CENTER
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR

S 865-086

- (3) Put the CENTER FLT CONT SHUTOFF TAIL valve switch on the P61 panel to ON.

S 865-087

- (4) Put the CENTER STAB TRIM SHUTOFF VALVE switch on the P10 panel to NORM.

S 865-088

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (5) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-089

- (6) Make sure that the horizontal stabilizer is such that Dimension A on the stabilizer jackscrew is  $3.84 \pm 0.03$  inches (97.5 +/- 0.8 mm) (neutral position).

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S 825-090

- (7) Do the steps that follow to adjust the feel unit control rods:
- (a) Shake the left quadrant to make sure that the feel unit has set the elevator to its neutral position.
  - (b) Adjust the feel unit upper control rod until rig pin E3 can be freely put in the left aft quadrant stop arm.
  - (c) Remove rig pin E3.
  - (d) Adjust the length of the lower control rod for the feel unit such that the bolt can be freely installed through the clevis and bearing of the feel unit crank.
  - (e) Install the control rod between the feel unit and the right aft quadrant.
  - (f) Shake the right aft quadrant to make sure that the feel unit has set the elevator to its neutral position.
  - (g) Make sure that rig pins E3 and E4 can be put in with finger pressure only.
  - (h) Make sure that the upper and lower control rod ends correctly engage the thread.

NOTE: The length of the threads that show on the rod end cannot be more than as shown (Fig. 511).

S 865-091

- (8) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 095-092

- (9) Remove rig pins E3, E4, E5, and E6.

S 435-093

- (10) Connect the control rods to the output arms of the left and right aft quadrants.

S 865-094

- (11) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel to CUTOUT.

S 865-095

- (12) Put the CENTER FLT CONT SHUTOFF TAIL valve switch on the P61 panel to OFF.

S 865-096

- (13) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11C13, STAB TRIM SHUTOFF CENTER
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR

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S 865-097

- (14) Remove pressure from auxiliary pitot system No. 2 (AMM 34-11-00/201).

S 825-350

- (15) Adjust the Elevator Autopilot Servo Rods (AMM 22-12-01/401).  
L. Adjust the Elevator Autopilot Servo Rods (AMM 22-12-01/401).

**NOTE:** The body cables and feel unit rods must be adjusted before the autopilot servo rods can be adjusted.

S 825-351

- (1) Adjust the Neutral Shift Control Rod.  
M. 767-200;  
Adjust the Neutral Shift Control Rod (Fig. 508)

S 865-098

- (1) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-103

- (2) Make sure these circuit breakers on the P11 panel are closed:  
(a) 11A36, ALT STAB TRIM  
(b) 11C13, STAB TRIM SHUTOFF CENTER

S 865-107

- (3) Move the horizontal stabilizer such that Dimension A on the stabilizer trim ballscrew actuator is  $14.65 \pm 0.02$  inches (372.1 +/- 0.5 mm) (8.4 units on the position indicator) (Fig. 503).

S 865-108

- (4) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 865-109

- (5) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel to CUTOUT.

S 865-113

- (6) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:  
(a) 11A36, ALT STAB TRIM  
(b) 11C13, STAB TRIM SHUTOFF CENTER

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- S 825-114
- (7) Adjust the control rod that connects the horizontal stabilizer to the neutral shift mechanism such that this condition occurs:
- (a) There must be a 0.002 to 0.015 inch (0.05 to 0.38 mm) gap between the input crank and the stop tube in the neutral shift mechanism.
- S 215-115
- (8) Make sure that the control rod ends correctly engage the threads.
- S 215-116
- (9) Make sure that the rod end threads can be seen through the inspection hole.
- N. Adjust the Feel Computer Control Rod (Fig. 509)
- S 865-117
- (1) Pressurize the center hydraulic system (AMM 29-11-00/201).
- S 865-119
- (2) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL COLUMN;  
remove the DO-NOT-CLOSE tags and close this circuit breaker on the P11 panel:
- (a) 11C13, STAB TRIM SHUTOFF CENTER
- S 865-120
- (3) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11A36, ALT STAB TRIM  
(b) 11C13, STAB TRIM SHUTOFF CENTER
- S 865-122
- (4) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel to NORM.
- S 865-129
- (5) 767-200 AIRPLANES;  
Move the horizontal stabilizer such that Dimension A on the stabilizer trim ballscrew actuator is  $3.00 \pm 0.03$  inches (76.2 +/- 0.8 mm) (Fig. 503).
- S 865-358
- (6) 767-300 AIRPLANES;  
Move the horizontal stabilizer such that Dimension A on the stabilizer trim ballscrew actuator is  $2.50 \pm 0.03$  inches (63.5 +/- 0.8 mm) (Fig. 503).
- S 865-130
- (7) Remove the power from the center hydraulic system (AMM 29-11-00/201).

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- S 865-131
- (8) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel to CUTOUT.
- S 865-268
- (9) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND; open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
- (a) 11C13, STAB TRIM SHUTOFF CENTER
- S 865-133
- (10) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND; open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11A36, ALT STAB TRIM
- (b) 11C13, STAB TRIM SHUTOFF CENTER
- S 035-135
- (11) Disconnect the control rod from the feel computer.
- S 495-136
- (12) Put rig pin E11 in the feel computer arm.
- S 825-137
- (13) Adjust the control rod length until the bolt can be freely installed through the computer arm clevis and rod end.
- S 435-138
- (14) Install the bolt.
- S 215-139
- (15) Make sure the rod end threads are correctly engaged.
- S 215-140
- (16) Make sure that the rod end threads can be seen through the inspection hole.
- S 095-141
- (17) Remove rig pin E11 and make sure that it can be freely put in with finger pressure only.
0. Adjust the Power Control Actuator (PCA) Control Rods (Fig. 506)
- NOTE:** The body cables and the feel unit rods must be adjusted before the PCA control rods can be adjusted.
- S 215-142
- (1) Make sure that the power from the left, right, and center hydraulic systems is removed (AMM 29-11-00/201).

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S 215-143

- (2) Make sure that rig pin E3 can be put in the left aft quadrant and E5 can be put in the left middle PCA input crank.

S 825-144

- (3) If rig pins E3 and E5 cannot be put in, do the steps that follow to adjust the left control rod:
- (a) Disconnect the inboard end of the Left PCA control rod at the bellcrank above access panel 335DB (One bay inboard from inboard PCA).
  - (b) Install rig pin E5 in the left middle PCA input crank.
  - (c) Install rig pin E3 in the left aft quadrant stop arm.
  - (d) Adjust the control rod length until the rod end bolt can be installed freely through the clevis and rod end with finger pressure only.
  - (e) Install the rod end bolt and make sure that rig pin E5 can be put in with finger pressure only.
  - (f) Make sure that the rod end threads are correctly engaged.
  - (g) Make sure that the rod end threads can be seen through the inspection hole.

S 095-269

- (4) Remove rig pins E3 and E5.

S 215-144

- (5) Make sure that rig pin E4 can be put in the right aft quadrant and E6 can be put in the right middle PCA input crank.

S 825-145

- (6) If rig pins E4 and E6 cannot be put in, do the steps that follow to adjust the right control rod:
- (a) Disconnect the inboard end of the Right PCA control rod at the bellcrank above access panel 345DB (One bay inboard from inboard PCA).
  - (b) Install rig pin E6 in the right middle PCA input crank.
  - (c) Install rig pin E4 in the right aft quadrant stop arm.
  - (d) Adjust the control rod length until the rod end bolt can be installed freely through the clevis and rod end with finger pressure only.
  - (e) Install the rod end bolt and make sure that rig pin E6 can be put in with finger pressure only.
  - (f) Make sure that the rod end threads are correctly engaged.
  - (g) Make sure the rod end threads can be seen through the inspection hole.

S 095-145

- (7) Remove rig pins E4 and E6.

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P. Adjust the Slave Cables (Fig. 510)

S 215-146

- (1) Make sure that the power from the left, right, and center hydraulic systems is removed.

S 035-147

- (2) Disconnect the rods that follow for the left and right elevators:
  - (a) Disconnect the forward end of the control rod that is between the lost motion device and the elevator.
  - (b) Disconnect the outboard end of the control rod that is between the lost motion device and the outboard PCA.

S 825-148

- (3) Do the adjustment that follows only if new cables have been installed:
  - (a) Install rig pin E9 in the left lost motion device.
  - (b) Adjust the turnbuckles in the center section of the horizontal stabilizer to apply a tension of 280 to 320 pounds (1246 - 1423 newtons) to cables EAO and EB0.
  - (c) Adjust the turnbuckles so rig pin E10 can be freely put in the right lost motion device.
  - (d) Remove rig pins E9 and E10.
  - (e) Manually cycle the elevator system and make sure that the conditions that follow are correct:
    - 1) The cables do not contact a pulley or quadrant flanges for its total cable travel.
    - 2) The cables are in 2 degrees of the plane of the pulley or quadrant.
    - 3) The cables are installed through grommets.
    - 4) The cables are not moved by rub strips.
    - 5) Pulleys turn freely without blockage from the guards.
  - (f) Manually cycle the slave cables through full travel 25 times.

S 495-149

- (4) Put rig pin E9 in the left motion device.

S 825-150

- (5) Adjust the tension of the slave cable to the value shown (Fig. 510).

S 215-151

- (6) Make sure that rig pin E10 can be freely put in the right lost motion device with finger pressure only.

S 435-152

- (7) Install locking clips on the turnbuckles.

S 095-153

- (8) Remove rig pins E9 and E10.

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S 435-154

- (9) Connect the rods that follow for the left and right elevators:
- (a) Connect the control rod that is between the lost motion device and the elevator.
  - (b) Connect the control rod that is between the lost motion device and the outboard PCA.

Q. Lost Motion to PCA Control Rod Adjustment

S 215-155

- (1) Make sure that power from the left, right, and center hydraulic systems is removed.

S 825-156

- (2) Do the steps that follow to adjust the control rod from the lost motion device to the PCA on the left elevator:
- (a) Disconnect the control rod that is between the lost motion device and the elevator.
  - (b) Disconnect the control rod that is between the lost motion device and the outboard PCA.
  - (c) Put rig pin E5 in the left middle PCA (Fig. 506), and rig pins E7 and E9 in the left lost motion device (Fig. 510).
  - (d) Adjust the length of the control rod that is between the lost motion device and the outboard PCA.

NOTE: The bolt must be able to be freely installed through the clevis and the rod end with finger pressure only.

- (e) Adjust the control rod until rig pin E7 is free.
- (f) Install the control rod bolt and make sure that rig pin E7 can be put in with finger pressure only.
- (g) Make sure that the threads on the rod end engage correctly.
- (h) Make sure the rod end threads can be seen through the inspection hole.
- (i) Connect the control rod that is between the lost motion device and the elevator.

S 825-157

- (3) Do the steps that follow to adjust the control rod from the lost motion device to the PCA on the right elevator:
- (a) Disconnect the control rod that is between the lost motion device and the elevator.
  - (b) Disconnect the control rod that is between the lost motion device and the outboard PCA.
  - (c) Put rig pin E6 in the right middle PCA (Fig. 506), and rig pins E8 and E10 in the right lost motion device (Fig. 510).

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- (d) Adjust the length of the control rod that is between the lost motion device and the outboard PCA.

NOTE: The bolt must be able to be freely installed through the clevis and the rod end with finger pressure only.

- (e) Adjust the control rod until rig pin E8 is free.
- (f) Install the control rod bolt and make sure that rig pin E8 can be put in with finger pressure only.
- (g) Make sure that the threads on the rod end engage correctly.
- (h) Make sure that the rod end threads can be seen through the inspection hole.
- (i) Connect the control rod that is between the lost motion device and the elevator.

S 095-158

- (4) Remove rig pins E5, E6, E7, E8, E9, and E10 (Figs. 506 and 510).
- R. Adjust the Power Control Actuator (PCA) Input Rods (Fig. 506)

S 845-317

(1) General

- (a) When the PCA input rods are adjusted, only pressurize the hydraulic system that powers that PCA. The PCAs on both elevators are powered by the hydraulic systems that follow:

NOTE: Allow time for PCAs that are not powered to depressurize before you do an adjustment on a powered PCA.

- 1) The outboard PCA is powered by the left hydraulic system.
  - 2) The middle PCA is powered by the right hydraulic system.
  - 3) The inboard PCA is powered by the center hydraulic system.
- (b) The middle PCA is adjusted first. This will be the neutral position to which the inboard and outboard PCAs are adjusted. This makes sure the null positions of all three PCAs are the same.
  - (c) If work platforms cannot be put under both elevators at the same time, adjust all three PCAs on one elevator. After all the PCAs on one elevator are adjusted, adjust the PCAs on the other elevator.
  - (d) If work platforms can be put under both elevators at the same time, adjust the PCAs on both elevators that have power from the same hydraulic system. Pressurize the hydraulic systems, one at a time, and adjust the appropriate PCAs before you pressurize the next hydraulic system.

S 845-161

- (2) Prepare for the adjustment as follows:

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE AREA BELOW THE ELEVATOR. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF AN OBJECT FALLS.

- (a) Make sure the PCA control rod is adjusted as shown in Adjust the Power Control Acuator (PCA) Control Rods.
- (b) Make sure the lost motion input rod is adjusted as shown in the Lost Motion to PCA Control Rod Adjustment.
- (c) Make sure that Dimension A on the stabilizer trim ballscrew actuator is  $3.84 \pm 0.03$  inch (97.5 +/- 0.8 mm) (Fig. 503).

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (d) Pressurize the left, center, and right hydraulic systems (AMM 29-11-00/201).
- (e) Move the elevator from the neutral position to the nose up position and the nose down 25 times.
  - 1) Complete the movement with the elevator in the neutral position after it was moved from the nose down position.

**NOTE:** Do not move the column again until the adjustments are made to all six PCAs.

**CAUTION:** DO NOT PRESSURIZE THE PITOT SYSTEM MORE THAN 4.75 PSIG (426 KNOTS). DAMAGE CAN OCCUR TO THE AIRPLANE IF YOU PRESSURIZE THE PITOT SYSTEM MORE THAN 4.75 PSIG (426 KNOTS).

- (f) Pressurize the auxiliary pitot systems to 4.0 psig (395 knots) (AMM 34-11-00/201).
- (g) Install rig pins E5 and E6.

S 825-009

- (3) Do these steps to adjust the input rod for the middle PCA (Fig. 506):
  - (a) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

**NOTE:** The middle PCA will be supplied with power.

- (b) Stop for 2 minutes before you measure the elevator trailing edge.

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- (c) Loosen the jam nuts and increase the length of the input rod for the middle PCA.
  - 1) Make sure you move the elevator at least 0.5 inches (13 mm) below the bottom of the groove in the index plate (Fig. 502).

- (d) Adjust the input rod until the elevator is approximately 0.25 inches below the center groove in the index plate (Fig. 502).

**NOTE:** You must first move the elevator below the bottom of the groove before you make this last adjustment.

- (e) Make sure, at the rod end of the middle PCA input rod, you can see rod end threads in a minimum of half of the inspection hole.

**NOTE:** This will make sure the threads are engaged correctly.

- (f) Tighten the jam nut, but do not install a lockwire at this time.

**NOTE:** Make sure that when you tighten the jam nut, the elevator does not move from the neutral position.

- (g) Make a record of the position of the elevator trailing edge in relation to the bottom of the groove in the index plate.

**NOTE:** This position is used as a datum for when you adjust the inboard and outboard PCAs.

S 825-010

- (4) Do these steps to adjust the input rod for the inboard PCA (Fig. 506):

- (a) Remove the power from the right hydraulic system (AMM 29-11-00/201).

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- (b) Pressurize the center hydraulic system (AMM 29-11-00/201).

**NOTE:** The inboard PCA will be supplied with power.

- (c) Stop for 2 minutes before you measure the elevator trailing edge.

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- (d) Loosen the jam nuts and increase the length of the input rod for the inboard PCA.
  - 1) Make sure you move the elevator at least 0.5 inch (13 mm) below the bottom of the groove in the index plate (Fig. 502).
- (e) Adjust the input rod until the elevator is no more than 0.05 inches away from the position you made a record of when you adjusted the middle PCA.

**NOTE:** You must first move the elevator below the bottom of the groove before you make this final adjustment.

- (f) Make sure at the rod end of the inboard PCA input rod, you can see rod end threads in a minimum of half of the inspection hole.

**NOTE:** This will make sure the threads are engaged correctly.

- (g) Tighten the jam nut, but do not install a lockwire at this time.

**NOTE:** Make sure that when you tighten the jam nut, the elevator does not move from the neutral position.

S 825-011

- (5) Do these steps to adjust the input rod for the outboard PCA (Fig. 506):

- (a) Remove the power from the center hydraulic system (AMM 29-11-00/201).

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (b) Pressurize the left hydraulic system (AMM 29-11-00/201).

**NOTE:** The outboard PCA will be supplied with power.

- (c) Stop for 2 minutes before you measure the elevator trailing edge.
- (d) Loosen the jam nuts and lengthen the input rod for the outboard PCA.
  - 1) Make sure you move the elevator at least 0.5 inch (13 mm) below the bottom of the groove in the index plate (Fig. 502).

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- (e) Adjust the input rod until the elevator is no more than 0.05 inch (1.3 mm) away from the position you made a record of when you adjusted the middle PCA.

**NOTE:** You must first move the elevator below the bottom of the groove before you make this last adjustment.

- (f) Make sure at the rod end of the outboard PCA input rod, you can see rod end threads in a minimum of half of the inspection hole.

**NOTE:** This will make sure the threads are engaged correctly.

- (g) Tighten the jam nut, but do not install a lockwire at this time.

**NOTE:** Make sure that when you tighten the jam nut, the elevator does not move from the neutral position.

S 865-337

- (6) Remove the power from the left hydraulic system (AMM 29-11-00/201).

S 865-162

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZER ARE FULLY POWERED SURFACES, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (7) Pressurize the right hydraulic system (AMM 29-11-00/201).

S 225-014

- (8) Make a record of the position of the trailing edges of the left and right elevator.

S 865-338

- (9) Remove the power from the right hydraulic system (AMM 29-11-00/201).

S 865-165

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (10) Pressurize the center hydraulic system (AMM 29-11-00/201).

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S 225-017

- (11) Make sure the elevators on the left and right side of the airplane are no more than 0.05 inch (1.3 mm) away from the position you made a record of with only the right hydraulic system powered.
- (a) Adjust the input rods of the inboard PCAs, if it is necessary.

**NOTE:** If you adjust the input rods, make sure at the rod end of the inboard PCA input rod, you can see rod end threads in a minimum of half of the inspection hole.

- (b) If you adjust the input rods of the inboard PCAs, tighten the jam nuts.

S 865-339

- (12) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 865-340

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (13) Pressurize the left hydraulic system (AMM 29-11-00/201).

S 225-020

- (14) Make sure the elevators on the left and right side of the airplane are no more than 0.05 inch (1.3 mm) away from the position you made a record of with only the right hydraulic system pressurized.
- (a) Adjust the input rods of the outboard PCAs, if it is necessary.

**NOTE:** If you adjust the input rods, make sure at the rod end of the outboard PCA input rod, you can see rod end threads in a minimum of half of the inspection hole.

- 1) If you adjusted the input rods of the outboard PCAs, tighten the jam nuts.

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S 095-447

- (15) Remove rig pins E5 and E6.

S 865-341

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (16) Pressurize the right and center hydraulic system (AMM 29-11-00/201).

S 215-022

- (17) Make sure the elevator on the left side of the airplane is in the groove of the index plate.  
(a) Adjust the length of the PCA control rod until the elevator is in the groove.

S 215-023

- (18) Make sure the elevator on the right side of the airplane is in the groove of the index plate.  
(a) Adjust the length of the PCA control rod until the elevator is in the groove.

S 865-342

- (19) Remove the power from the left, center, and right hydraulic system (AMM 29-11-00/201).

S 435-025

- (20) Safety the jam nuts on the six input rods with lockwires.

S 865-343

- (21) Remove the pressure from the auxiliary pitot systems (AMM 34-11-00/201).

S. Adjust the Lost Motion-to-Elevator Control Rod (Fig. 506)

**NOTE:** PCA input rods and the lost motion-to-PCA control rod must be adjusted before the lost motion-to-elevator control rod can be adjusted.

If shims need to be installed/removed on the PCAs, it must be done before the lost motion-to-elevator control rod is adjusted.

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S 215-166

**WARNING:** MAKE SURE RIG PINS E5 AND E6 ARE PUT IN BEFORE YOU SUPPLY HYDRAULIC POWER. THE ELEVATORS ARE POWERED WHEN THESE CONTROL RODS ARE ADJUSTED. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE RIG PINS ARE NOT INSTALLED.

- (1) Make sure that the power from the left, right and center hydraulic systems is removed (AMM 29-11-00/201).

S 035-167

- (2) Disconnect the rods that follow for the left and right elevators:
  - (a) Disconnect the control rod from the lost motion device to the elevator.
  - (b) Disconnect the control rod from the lost motion device to the slave cable quadrant.

S 495-168

- (3) Put rig pin E5 in the left middle PCA bellcrank and rig pin E7 in the left lost motion device.

S 495-169

- (4) Put rig pin E6 in the right middle PCA bellcrank and rig pin E8 in the right lost motion device.

S 865-170

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** START ONE HYDRAULIC SYSTEM AT A TIME UNLESS SPECIFIED DIFFERENTLY. HIGH LOADS CAN OCCUR IN THE ELEVATOR, RUDDER, AND STABILIZER STRUCTURES FROM THE FORCE FIGHT DUE TO INCORRECTLY ADJUSTED POWER CONTROL ACTUATORS.

- (5) Pressurize the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-172

- (6) Pressurize auxiliary pitot system No. 2 to 4.0 psig (395 knots) (AMM 34-11-00/201).

S 865-173

- (7) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR

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(c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 865-174

- (8) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the P61 panel to ON.

S 825-175

- (9) Adjust the control rod between the lost motion device and the elevator. The bolt must be able to be freely installed through the lost motion device elevator input arm clevis and the rod end.

S 435-176

- (10) Install the rod bolt.

S 215-177

- (11) Make sure the rod end threads engage correctly.

S 215-178

- (12) Make sure the rod end threads can be seen through the inspection hole.

S 425-179

- (13) Install the rod between the lost motion device and the slave cable quadrant. Do this for the left and right elevators.

S 215-180

- (14) Make sure that rig pins E5, E6, E7, E8, E9, E10 are free when the elevator is at the neutral position.

S 865-181

- (15) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-182

- (16) Remove the pressure from auxiliary pitot system No. 2 (AMM 34-11-00/201).

S 865-183

- (17) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the P61 panel to OFF.

S 865-184

- (18) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:

- (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
- (b) 11H18, FLT CONT SHUTOFF TAIL CTR
- (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 095-185

- (19) Remove rig pins E5, E6, E7, and E8.

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T. Elevator Position Transmitter Rod Adjustment

S 825-186

- (1) Do the elevator position transmitter rod adjustment (AMM 27-38-00/501).

NOTE: The PCA control rods must be adjusted before the elevator position transmitter rod is adjusted.

U. Put the Airplane Back to Its Usual Condition

S 865-187

- (1) Make sure that power from the left, right, and center hydraulic systems is removed (AMM 29-11-00/201).

S 865-188

- (2) Make sure that electrical power is removed (AMM 24-22-00/201).

S 865-189

- (3) Make sure that these circuit breakers on the P11 panel are closed:
  - (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 865-190

- (4) Make sure that the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL switches on the P61 panel are at ON.

S 865-191

- (5) Make sure that the RIGHT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel are at NORM.

S 215-192

- (6) Make sure that all rig pins are removed from the system.

S 415-193

- (7) Close the access door, 113AL (AMM 06-41-00/201).

S 415-194

- (8) Close the access door, 312AR (AMM 06-42-00/201).

S 095-195

- (9) Remove the service access platform.

S 415-196

- (10) Close the controls bay access door, 313AL (AMM 06-42-00/201).

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S 415-197

- (11) Install the access panels that follow (AMM 06-42-00/201):
- (a) 335EB, 335GB, 335HB, 335JB, and 335AFB for left elevator adjustments.
  - (b) 345EB, 345GB, 345HB, 345JB, and 345AFB for right elevator adjustments.

- V. SAS 050, 051, 150-156, 162-165;  
Do the Check for the Transducer

**NOTE:** This test uses the semi-automatic maintenance function of the autopilot flight director system (AFDS). The maintenance control and display panel (MCDP) is in the electronics equipment bay. The MCDP has switches for test control and interactive test direction. The front panel of the MCDP has instructions to do the tests (AMM 22-00-02/201) and (AMM 22-10-00/501).

S 865-307

- (1) Do the steps that follow to prepare for the test:
- (a) Supply electrical power (AMM 24-22-00/201).
  - (b) Do the initial power up test.
    - 1) Push the MCDP ON/OFF switch.
      - a) Make sure the fail light in the ON/OFF switch goes off in approximately 5 seconds.
    - 2) Operate the FLT FAULTS switch.
      - a) Make sure the FLT FAULTS mode is engaged.
    - 3) Operate the GRD TEST switch.
      - a) Make sure the GRD TEST mode is engaged.
    - 4) Use the GRD TEST SEL UP and DOWN switches or the no/SKIP switch to get the specified test.

**NOTE:** The display will show TEST NO. TEST NAME? .

- a) Use the YES/ADV switch to engage the correct test.

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (c) Supply pressure to the left, right, and center hydraulic system (AMM 29-11-00/201).
- (d) Move the elevators through their full travel range 25 times.

S 725-308

- (2) To do the check for the left transducer, do the steps that follow:
  - (a) Put the MCDP to the 66 XDCR OUT TEST (FIM 22-00-02/101).
  - (b) Get the message, 66 L COL - LBS/LCR, on the top line.

**NOTE:** Below this message there are 3 values for the output of the left force transducer.

- (c) Make sure the control column is released.
  - 1) The 3 values for the output of the left force transducer must be between -2 lbs to +2 lbs (-9 to +9 newtons).
  - 2) If the values for the output is not between -2 lbs to +2 lbs (-9 to +9 newtons), do these steps to adjust the cable tension:

**NOTE:** To adjust the cable tension, use the turnbuckles in the 48 section of the airplane.

- a) To find which cable is not adjusted correctly, put a small tension on each cable, one cable at a time (monitor the output values each time you put tension on one of the cables).
- b) Remove the locking clip from the applicable turnbuckle.
- c) Turn the turnbuckle approximately 1/4 turn at a time until the 3 output values are between -2 lbs to +2 lbs (-9 to +9 newtons).

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S 725-309

- (3) To do a check for the right force transducer, do the steps that follow:

- (a) Put the MCDP to the 66 XDCR OUT TEST (AMM 22-00-02/201).
- (b) Get the message 66 R COL-LBS/LCR on the top line.

NOTE: Below this message there are 3 values for the output of the left force transducer.

- (c) Make sure the control column is released.
  - 1) The 3 values for the output of the left force transducer must be between -2 lbs to +2 lbs (-9 to +9 newtons).
  - 2) If the values for the output is not between -2 lbs to +2 lbs (-9 to +9 newtons) do these steps to adjust the cable tension:

NOTE: To adjust the cable tension, use the turnbuckles in the 48 section of the airplane.

- a) To find which cable is not adjusted correctly, put a small tension on each cable on cable at a time (monitor the output values each time you put tension on one of the cables).
- b) Remove the locking clip from the applicable turnbuckle.
- c) Turn the turnbuckle approximately 1/4 turn at a time until the 3 output values are between -2 lbs to + 2 lbs (-9 to +9 newtons).

S 725-310

- (4) After you adjust the the right force transducer, you must do the check for the left force transducer (Continue to adjust the left and then the right force transducer until the left and right force transducers are between -2lbs to +2 lbs (-9 to + 9 newtons) without an adjustment).

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S 845-386

- (5) Do the steps that follow to Put the Airplane back to Its Usual Condition
  - (a) Install the locking clips in the applicable turnbuckles.
  - (b) Put the MCDP to the OFF position.
  - (c) Remove the hydraulic power if it is not necessary (AMM 29-11-00/201).

TASK 27-31-00-735-198

4. System Test - Elevator Controls

A. General

- (1) The tests in this procedure makes sure the complete elevator system operates correctly.
- (2) The stabilizer trim control system must be adjusted before this procedure is done (AMM 27-41-00/501).

B. Equipment

- (1) Rig Pin E4 - P/N A20004-17, part of Set A20004-XX (20-10-24).
- (2) Control Wheel Adapter Equipment - A27021-96 or -98
- (3) Scale for determining linear dimension - Commercially Available
- (4) Force Gage - DPPH-200 (Preferred)  
Chatillon Inc.  
83-30 Kew Garden Rd.  
Kew Gardens, New York 11415
- (5) Force Gage - DPPH-100 (Optional)  
Chatillon Inc.  
83-30 Kew Garden Rd.  
Kew Gardens, New York 11415
- (6) Force Gage - FDV-100 (Optional)  
Wagner Instruments  
88 River Rd.  
Greenwich, CT 06836
- (7) Control Column Protractor - A27021-29 (contains 2 each A27021-30 protractors) or 4MIT65B80307-1 protractor (2 required)

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- (8) Service Platform, Control Bay Access Door - A51001-19

C. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 20-10-24/201, Rig Pins
- (3) 22-12-01/401, Elevator Autopilot Servo
- (4) 24-22-00/201, Electrical Power - Control
- (5) 27-32-00/501, Stall Warning System
- (6) 27-38-00/501, Elevator Position Indicating System
- (7) 29-11-00/201, Main (Left, Right, and Center) Hydraulic System
- (8) 31-41-00/501, Engine Indicating and Crew Alerting System
- (9) 32-09-02/201, Air/Ground Relays
- (10) 34-11-00/201, Pitot-Static System
- (11) 34-21-00/501, Inertial Reference System

D. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 313 Stabilizer Torsion Box Compartment
- (2) Access Panel
  - 313AL Elevator Mechanical Linkages

E. Prepare for Tests (Fig. 501)

S 865-199

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

S 015-203

- (2) Open the controls bay access door, 313AL (AMM 06-42-00/201).

S 495-204

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (3) Install the service platform above the controls bay access door, 313AL.

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S 865-205

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Pressurize the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-206

- (5) Use the control column switches to move the horizontal stabilizer to the airplane nose down electrical travel limit ( $0 \pm 0.25$  units of trim on position indicator).

F. Control Columns Test

S 735-207

- (1) Do the steps that follow to do the control column travel limits test:
- (a) Make sure that the left, right, and center hydraulic systems are pressurized (AMM 29-11-00/201).
  - (b) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND; use the stab trim lever to move the stabilizer to  $0 \pm 0.25$  units of trim on the position indicator.

**NOTE:** As the stabilizer gets near the mechanical travel limits, operate the stab trim levers in short cycles. This is so the stabilizer trim ballscrew actuator will not hit the mechanical stops hard.

- (c) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND; use the alternate stabilizer trim switches to move the stabilizer to  $0 \pm 0.25$  units of trim on position indicator.

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**NOTE:** As the stabilizer gets near the mechanical travel limits, operate the alternate stab trim switches in short cycles. This is so the stabilizer trim ballscrew actuator will not hit the mechanical stops hard.

- (d) Attach the surface protractor to the control column.
- (e) Move the control columns to the forward stop and then to the aft stop.
  - 1) Make sure that the control columns move smoothly and freely through the forward and aft movement.
- (f) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND; use the stab trim levers to carefully move the stabilizer to the airplane nose up mechanical travel limit ( $14.2 \pm 0.3$  units of trim on the position indicator).

**NOTE:** As the stabilizer gets near the mechanical travel limits, operate the stab trim levers in short cycles. This is so the stabilizer trim ballscrew actuator will not hit the mechanical stops hard.

- (g) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND; use the alternate stab trim switches to carefully move the stabilizer to the airplane nose up mechanical travel limit ( $14.2 \pm 0.3$  units of trim on the position indicator).

**NOTE:** As the stabilizer gets near the mechanical travel limits, operate the alternate stab trim switches in short cycles. This is so the stabilizer trim ballscrew actuator will not hit the mechanical stops hard.

- (h) Move the control columns to the forward stop and then to the aft stop.
  - 1) Make sure the control columns move smoothly and freely through the forward and aft movement.
- (i) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND; use the stab trim levers to move the stabilizer to the neutral position (2 units of trim on the position indicator).
- (j) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND; use the alternate stab trim switches to move the stabilizer to the neutral position (2 units of trim on the position indicator).
- (k) Push the first officer's column to the forward stop.
- (l) Make sure that the travel from the center position to the forward stop is 8.25 to 8.50 degrees.
- (m) Pull the first officer's column to the aft stop.
- (n) Make sure that the travel from the center position to the aft stop is 10.67 to 10.90 degrees.
- (o) Let the control column go to the neutral position.

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- (p) Push the captain's control column to the forward stop.
- (q) Make sure that the travel from the center position to the forward stop is 8.75 to 9.00 degrees.
- (r) Pull the captain's control column to the aft stop.
- (s) Make sure that the travel from the center position to the aft stop is 11.0 to 11.25 degrees.
- (t) Let the control column go to the neutral position.
- (u) Remove the surface protractor.

S 735-208

- (2) Do the steps that follow to do the column breakout force test:
  - (a) Make sure that the left, right, and center hydraulic systems are pressurized (AMM 29-11-00/201).
  - (b) Make sure that the horizontal stabilizer is in the neutral position (2 units of trim on the position indicator).
  - (c) Install the control wheel adapter and force gage.
  - (d) Make sure that auxiliary pitot systems No. 1 and 2 are not pressurized (AMM 34-11-00/201).
  - (e) Make sure that zero knots is applied to the elevator feel computer.
  - (f) Move the first officer's control column slowly forward.
  - (g) Measure and write down the control column force when the right elevator has moved 0.10 to 0.20 inches (2.5 to 5.1 mm) from the neutral position.

NOTE: Linear measurement of elevator travel is the straight line distance between these two points:

- the top corner of the inboard trailing edge of the inboard elevator
- the center of the forward edge of the index plate groove.

- (h) Make sure that the control column force is between 3.5 and 6.0 pounds.
- (i) Let the control column go to the neutral position.
  - 1) Make sure the elevators go to neutral.
- (j) Move the first officer's control column slowly aft.
- (k) Measure and write down the control column force when the right elevator has moved 0.10 to 0.20 inch (2.5 to 5.1 mm) from the neutral position.
- (l) Make sure that the control column force is between 3.5 and 6.0 pounds.
- (m) Let the control column go to the neutral position.
  - 1) Make sure the elevators go to neutral.
- (n) Move the captain's control column slowly forward.

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- (o) Measure and write down the control column force when the left elevator has moved 0.10 to 0.20 inches (2.5 to 5.1 mm) from the neutral position.

NOTE: Linear measurement of elevator travel is the straight line distance between these two points:

- the top corner of the inboard trailing edge of the inboard elevator
- the center of the forward edge of the index plate groove.

- (p) Make sure that the control column force is between 3.5 and 6.0 pounds.
- (q) Let the control column go to the neutral position.
  - 1) Make sure the elevators go to neutral.
- (r) Move the captain's control column slowly aft.
- (s) Measure and write down the control column force when the left elevator has moved 0.10 to 0.20 inch (2.5 to 5.1 mm) from the neutral position.
- (t) Make sure that the control column force is between 3.5 and 6.0 pounds.
- (u) Let the control column go to the neutral position.
  - 1) Make sure the elevators go to neutral.

S 735-209

- (3) Do the steps that follow to do the column, quadrant, and slave override functions test:
  - (a) Make sure that the horizontal stabilizer is in the neutral position (2 units of trim on the position indicator).
  - (b) Put rig pin E4 in the right aft quadrant stop.
  - (c) Make sure that the left, right, and center hydraulic systems are pressurized.
  - (d) Slowly pull on the captain's control column until the force on the column is 30 pounds (133 newtons).
  - (e) Make sure that the elevator moves 1.0 inch (25 mm), or less.
  - (f) Increase the force on the column to 55 pounds (245 newtons).
  - (g) Make sure that the elevator moves 1.1 inch (28 mm) or more.
  - (h) Continue to pull on the captain's column.
  - (i) Measure the necessary control column force to move the left elevator 8.9 to 10.0 inches (226 to 254 mm).
  - (j) Make sure that the control column force is 75 to 95 pounds (333 to 422 newtons).
  - (k) Let the control column go to the neutral position.
  - (l) Slowly push on the captain's column until the force on the column is 30 pounds (133 newtons).
  - (m) Make sure that the left elevator moves 1.0 inch (25 mm) or less.
  - (n) Increase the force to 55 pounds (244 newtons).
  - (o) Make sure that the elevator moves 1.1 inch (28 mm) or more.
  - (p) Continue to push the captain's control column.

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- (q) Measure the necessary control column force to move the left elevator 8.9 to 10.0 inches (226 to 254 mm).
- (r) Make sure that the force is 75 to 95 pounds (333 to 422 newtons).
- (s) Let the control column go to the neutral position.
- (t) Remove rig pin E4.

G. Elevator Neutral and Travel Limits Test

S 735-210

- (1) Do the elevators at neutral position test.
  - (a) Make sure that the left, right, and center hydraulic systems are pressurized (AMM 29-11-00/201).
  - (b) Make sure that the horizontal stabilizer is at the neutral position with Dimension A set to (3.84 +/- 0.03 inches (97.5 +/- 0.8 mm)).

**CAUTION:** DO NOT LET THE PRESSURE GO ABOVE 4.75 PSI (426 KNOTS). THIS WILL PREVENT DAMAGE TO THE FEEL COMPUTER. MAKE PRESSURE CHANGES SUCH THAT THE INDICATED RATE OF CLIMB (OR DESCENT) IS LESS THAN 5000 FEET PER MINUTE FOR THE STATIC SYSTEM AND 300 KNOTS PER MINUTE FOR THE PITOT SYSTEM. APPLICABLE GAUGE SAVER RESTRICTORS OR EQUIVALENT DEVICES MUST BE USED.

- (c) Pressurize auxiliary pitot system No. 1 to 2.5 - 3.5 psig (317 - 371 knots) (AMM 34-11-00/201).
- (d) Move the control column about the neutral position to make sure that the elevators are in the neutral position.
- (e) Make sure that the top surface of the trailing edge on both of the elevators align with the center of the index plate groove by 0.05 inch (1.3 mm).
- (f) Remove the pressure from auxiliary pitot system No. 1 (AMM 34-11-00/201).

S 735-211

- (2) Do the elevator travel limits test.

**NOTE:** Linear measurement of elevator travel is the straight line distance between these two points:

- the top corner of the inboard trailing edge of the inboard elevator
- the center of the forward edge of the index plate groove.

- (a) Push the captain's control column to the forward stop.
- (b) Make sure that the elevators travel 23.5 to 24.5 inches (597 to 622 mm) down.
- (c) Pull the captain's control column to the aft stop.
- (d) Make sure that both elevators travel 33.0 to 34.2 inches (838 to 868 mm) up.
- (e) Let the control column go to the neutral position.
- (f) Push the first officer's control column to the forward stop.

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- (g) Make sure that both elevators travel 23.5 to 24.5 inches (597 to 622 mm) down.
- (h) Pull the first officer's control column to the aft stop.
- (i) Make sure that both elevators travel 33.0 to 34.2 inches (838 to 868 mm) up.
- (j) Let the control column go to the neutral position.

H. Elevator Position Indication Test

S 735-212

- (1) Do the elevator position indication test (AMM 27-38-00/501).

I. Elevator Power Control Actuators Test

S 215-213

- (1) Make sure that the left, right and center hydraulic systems are pressurized (AMM 29-11-00/201).

S 865-214

- (2) Put the RIGHT and CENTER FLT CONT SHUTOFF TAIL valve switch on the sidewall panel, P61, to OFF.

S 215-215

- (3) Make sure that the LEFT FLT CONT SHUTOFF TAIL valve switch on the P61 panel is at ON.

S 215-216

- (4) Make sure that the EICAS computer system operates (AMM 31-41-00/501).

S 865-217

- (5) Put the EICAS COMPUTER select switch to R and press the STATUS button to display the control surface positions.

S 865-218

- (6) Push the control column forward.
  - (a) Make sure that the left and right elevator position indicators move down and stop at the same position.
  - (b) Make sure that both elevators move down.

S 865-219

- (7) Pull the control column aft.
  - (a) Make sure that both of the indicators move up and stop at the same position.
  - (b) Make sure that both elevators move up.

S 865-220

- (8) Let the control column go to the neutral position.

S 865-221

- (9) Put the LEFT FLT CONT SHUTOFF TAIL valve switch on the P61 panel to OFF.

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S 865-222

- (10) Put the CENTER FLT CONT SHUTOFF TAIL valve switch on the P61 panel to ON.

S 865-223

- (11) Push the control column forward.  
(a) Make sure that the left and right elevator position indicators move down and stop at the same position.  
(b) Make sure that both elevators move down.

S 865-224

- (12) Pull the control column aft.  
(a) Make sure that both of the indicators move up and stop at the same position.  
(b) Make sure that both elevators move up.

S 865-225

- (13) Let the control column go to the neutral position.

S 865-226

- (14) Put the CENTER FLT CONT SHUTOFF TAIL valve switch on the P61 panel to OFF.

S 865-227

- (15) Put the RIGHT FLT CONT SHUTOFF TAIL valve switch on the P61 panel to ON.

S 865-228

- (16) Push the control column forward.  
(a) Make sure that the left and right elevator position indicators move down and stop at the same position.  
(b) Make sure that both elevators move down.

S 865-229

- (17) Pull the control column aft.  
(a) Make sure that both of the indicators move up and stop at the same position.  
(b) Make sure that both elevators move up.

S 865-230

- (18) Let the control column go to the neutral position.

J. Elevator Feel System Test

S 735-231

- (1) Do the feel computer test.  
(a) Make sure that the left, right and center hydraulic systems are pressurized (AMM 29-11-00/201).  
(b) Make sure that the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the P61 panel are OFF.

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- (c) Make sure these circuit breakers on the P11 panel are open:
- 1) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - 2) 11H18, FLT CONT SHUTOFF TAIL CTR
  - 3) 11H27, FLT CONT SHUTOFF TAIL RIGHT

**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.

- (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 THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (e) Do the Flight Mode Simulation procedure for the No. 1 and No. 2 air/ground system (AMM 32-09-02/201).
- (f) Make sure that the EICAS computer system operates (AMM 31-41-00/501).
- (g) Put the EICAS COMPUTER select switch to L and press the STATUS button on the pilot's display select panel.
- (h) Make sure that the ELEV FEEL message is not shown on the EICAS display.

**NOTE:** the ELEV FEEL message is a maintenance message.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZERS ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (i) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- 1) 11H17, FLT CONT SHUTOFF TAIL LEFT
- (j) Put the LEFT FLT CONT SHUTOFF TAIL valve switch on the P61 panel to ON.
- (k) Make sure that the ELEV FEEL message is shown on the EICAS display.

**NOTE:** It will take at least 30 seconds for the message to show.

- (l) Remove the DO-NOT-CLOSE tag, and close this circuit breaker on the P11 panel:
- 1) 11H18, FLT CONT SHUTOFF TAIL CTR

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- (m) Put the CENTER FLT CONT SHUTOFF TAIL valve switch on the P61 panel to ON.
- (n) Put the system No.1 and 2 air/ground relays in the ground mode (AMM 32-09-02/201).
- (o) Push the ECS/MSG button and then push AUTO READ KEY button on the EICAS maintenance panel.
- (p) Push and hold the EVENT ERASE KEY for at least 2 seconds. At the same time, cycle the control column to bleed hydraulic pressure.
- (q) Press the STATUS button on the pilots's display select panel.
  - 1) Make sure that the ELEV FEEL message is not shown on the EICAS display.

**CAUTION:** DO NOT LET THE PRESSURE GO ABOVE 4.75 PSI (426 KNOTS). THIS WILL PREVENT DAMAGE TO THE FEEL COMPUTER. MAKE PRESSURE CHANGES SUCH THAT THE INDICATED RATE OF CLIMB (OR DESCENT) IS LESS THAN 5000 FEET PER MINUTE FOR THE STATIC SYSTEM AND 300 KNOTS PER MINUTE FOR THE PITOT SYSTEM. APPLICABLE GAUGE SAVER RESTRICTORS OR EQUIVALENT DEVICES MUST BE USED.

- (r) Put the EICAS COMPUTER select switch to R.
- (s) Pressurize auxiliary pitot system No. 2 to 2.50 - 3.50 psig (317 - 371 knots) (AMM 34-11-00/201).
- (t) Make sure that the ELEV FEEL message is shown on the EICAS display.

**NOTE:** It will be at least 30 seconds before the message is shown.

**CAUTION:** DO NOT LET THE PRESSURE GO ABOVE 4.75 PSI (426 KNOTS). THIS WILL PREVENT DAMAGE TO THE FEEL COMPUTER. MAKE PRESSURE CHANGES SUCH THAT THE INDICATED RATE OF CLIMB (OR DESCENT) IS LESS THAN 5000 FEET PER MINUTE FOR THE STATIC SYSTEM AND 300 KNOTS PER MINUTE FOR THE PITOT SYSTEM. APPLICABLE GAUGE SAVER RESTRICTORS OR EQUIVALENT DEVICES MUST BE USED.

- (u) Pressurize auxiliary pitot system No. 1 to 2.50 - 3.50 psig (317 - 371 knots) (AMM 34-11-00/201).
  - 1) Make sure that the ELEV FEEL message is not shown.
- (v) Remove the pressure from auxiliary pitot system No. 2 (AMM 34-11-00/201).
- (w) Make sure that the ELEV FEEL message is shown on the EICAS display.

**NOTE:** It will take at least 30 seconds for the message to show.

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- (x) Remove the pressure from auxiliary pitot system No. 1 (AMM 34-11-00/201).
  - 1) Make sure that the ELEV FEEL message is not shown.
- (y) Put the CENTER FLT CONT SHUTOFF TAIL valve switch on the P61 panel to OFF.
  - 1) Open this circuit breakers on the P11 panel, 11H18, FLT CONT SHUTOFF TAIL CTR
  - 2) Make sure that the ELEV FEEL message is shown.
- (z) Put the CENTER FLT CONT SHUTOFF TAIL valve switch on the P61 panel to ON.
  - 1) Close this circuit breaker on the P11 panel. 11H18, FLT CONT SHUTOFF TAIL CTR
- (aa) Put the LEFT FLT CONT SHUTOFF TAIL valve switch on the P61 panel to OFF.
  - 1) Open this circuit breakers on the P11 panel, 11H17, FLT CONT SHUTOFF TAIL LEFT
  - 2) Make sure that the ELEV FEEL message is shown.
- (ab) Put the LEFT FLT CONT SHUTOFF TAIL valve switch on the P61 panel to ON.
  - 1) Close this circuit breakers on the P11 panel, 11H17, FLT CONT SHUTOFF TAIL LEFT

S 735-249

- (2) Do the feel unit test.
  - (a) Make sure that the left, right, and center hydraulic systems are pressurized (AMM 29-11-00/201).
  - (b) Make sure that the ELEV FEEL message is not shown on the EICAS display.
  - (c) Move the horizontal stabilizer such that Dimension A on the stabilizer trim ballscrew actuator is as follows (Fig. 503):
 

$3.84 \pm 0.03$ inches	(97.5 +/- 0.8 mm)	(767-200 AIRPLANES)
$7.88 \pm 0.03$ inches	(200.2 +/- 0.8 mm)	(767-300 AIRPLANES)

**CAUTION:** DO NOT LET THE PRESSURE GO ABOVE 4.75 PSI (426 KNOTS). THIS WILL PREVENT DAMAGE TO THE FEEL COMPUTER. MAKE PRESSURE CHANGES SUCH THAT THE INDICATED RATE OF CLIMB (OR DESCENT) IS LESS THAN 5000 FEET PER MINUTE FOR THE STATIC SYSTEM AND 300 KNOTS PER MINUTE FOR THE PITOT SYSTEM. APPLICABLE GAUGE SAVER RESTRICTORS OR EQUIVALENT DEVICES MUST BE USED.

- (d) 767-200 AIRPLANES;  
 Pressurize auxiliary pitot systems No. 2 to 0.46-0.49 psig (138-142 knots) (AMM 34-11-00/201).

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- (e) 767-300 AIRPLANES;  
Pressurize auxiliary pitot systems No. 2 to 1.022-1.062 psig (208-212 knots) (AMM 34-11-00/201).
- (f) Push captain's control column forward. Do not let the elevator aft quadrant stops get nearer than 0.10 to 0.20 inch (2.6 to 5.1 mm) of each other.
- (g) 767-200 AIRPLANES;  
Make sure that the force on the control column is 33 to 44 pounds.
- (h) 767-300 AIRPLANES;  
Make sure that the force on the control column is 56 to 67 pounds.
- (i) Pull the captain's control column aft. Do not let the elevator aft quadrant stops get nearer than 0.10 to 0.20 inch (2.6 to 5.1 mm) of each other.
- (j) 767-200 AIRPLANES;  
Make sure that the force on the control column is 28 to 41 pounds.
- (k) 767-300 AIRPLANES;  
Make sure that the force on the control column is 61 to 72 pounds.
- (l) Hold the captain's control column aft with the elevator aft quadrant stops 0.10 to 0.20 inch (2.6 to 5.1 mm) of each other.
- (m) Move the horizontal stabilizer to 8.5 units of trim.
- (n) 767-200 AIRPLANES;  
Make sure that the force on the control column decreases by 0 to 5 pounds (0 to 22 newtons).
- (o) 767-300 AIRPLANES;  
Make sure that the force on the control column decreases by 16 to 37 pounds (71 to 164 newtons).
- (p) 767-200 AIRPLANES;  
Use the control wheel switches to move the stabilizer to 3 units of trim.
- (q) 767-300 AIRPLANES;  
Use the control wheel switches to move the stabilizer to 2.2 units of trim.
- (r) 767-200 AIRPLANES;  
Make sure that Dimension A on the stabilizer trim ballscrew actuator is 5.50 to 5.56 inches (139.7 to 141.2 mm).
- (s) 767-300 AIRPLANES;  
Make sure that Dimension A on the stabilizer trim ballscrew actuator is 4.15 to 4.21 inches (105.4 to 106.9 mm).
- (t) Pressurize auxiliary pitots systems No. 1 and 2 to 2.60 - 2.7 psig (323-329 knots) (AMM 34-11-00/201).
- (u) Pull the captain's control column aft until the elevator moves 2.57 to 2.68 inches (65.2 to 68.0 mm) from the neutral position.

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- (v) Make sure that the force on the control column is 25 to 38 pounds.

NOTE: For accurate control column force values, use the procedure that follows: With the elevator at the neutral position, measure travel from a point on the side of the tail cone ( not the index mark). To determine this point, visually extend the elevator trailing edge.

- (w) Push the captain's control column forward until the elevator moves 2.57 to 2.68 inches (65.3 to 68.0 mm) from the neutral position.
- (x) Make sure that the force of the control column is 25 to 38 pounds.
- (y) Remove the power from the right and center hydraulic systems (AMM 29-11-00/201).
- (z) Put the RIGHT and CENTER FLT CONT SHUTOFF TAIL valve switches on the P61 panel to OFF.
- (aa) Pull the captain's control column aft until the elevator moves 2.57 to 2.68 inches (65.3 to 68.0) from the neutral position.
- (ab) Make sure that the force on the control column is 25 to 38 pounds.
- (ac) Push the captain's control column forward until the elevator moves 2.57 to 2.68 inches (65.3 to 68.0 mm) from the neutral position.
- (ad) Make sure that the force on the control column is 25 to 38 pounds.
- (ae) Put the CENTER FLT CONT SHUTOFF TAIL valve switch on the P61 panel to ON.
- (af) Pressurize the center hydraulic system (AMM 29-11-00/201).
- (ag) Remove the power from the left hydraulic system (AMM 29-11-00/201).
- (ah) Put the LEFT FLT CONT SHUTOFF TAIL valve switch on the P61 panel to OFF.
- (ai) Pull the captain's control column aft until the elevator moves 2.57 to 2.68 inches (65.3 to 68.0 mm) from the neutral position.
- (aj) Make sure that the force on the control column is 25 to 38 pounds.
- (ak) Push the captain's control column forward until the elevator moves 2.57 to 2.68 inches (65.3 to 68.0 mm) from the neutral position.
- (al) Make sure that the force on the control column is 25 to 38 pounds.
- (am) Let the control column go to the neutral position.
- (an) Remove the pressure from auxiliary pitot systems No. 1 and 2 (AMM 34-11-00/201).
- (ao) Put the LEFT and RIGHT FLT CONT SHUTOFF TAIL valve switches on the P61 panel to ON.

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S 735-251

- (3) Do the neutral shift test (767-200 AIRPLANES)
- (a) Pressurize the left and right hydraulic systems and make sure that the center hydraulic system is pressurized (AMM 29-11-00/201).
  - (b) Pressurize auxiliary pitot system No. 2 to 3.47 - 3.80 psig (370-385 knots) (AMM 34-11-00/501).
  - (c) Move the horizontal stabilizer in the airplane nose up direction until the feel unit first moves from the neutral position. This will occur near 8.5 units of trim.
  - (d) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 14.55 to 14.85 inches (369.5 to 377.2 mm) (Fig. 503).
  - (e) Move the horizontal stabilizer such that Dimension A on the stabilizer trim ballscrew actuator is  $3.84 \pm 0.03$  inches (95.7 +/- 0.8 mm) (neutral position).
  - (f) Pull the first officer's control column to the aft column stop.
  - (g) Make sure that the necessary force to pull the control column does not exceed 132 pounds (587 newtons).

NOTE: This may be done with the method that follows:  
Pull the captain's and first officer's control columns at the same time and add the applied forces.

- (h) Hold the first officer's column against the column aft stop.
- (i) Make sure that the elevators move up at least 18.9 inches (480 mm).
- (j) Remove the pressure from auxiliary pitot system No. 2 (Ref 34-11-00).

K. 767-200,300;  
Stick Nudger Test

S 735-252

- (1) Do the stick nudger test (FIM 27-32-00/101).

L. Elevator Autopilot Servo Rods Test

S 735-253

- (1) Do the elevator autopilot servo rods test (AMM 22-12-01/401).

M. Put the Airplane Back to Its Usual Condition

S 085-254

- (1) Remove the force gage and the control wheel adapter.

S 865-329

- (2) Remove power from the left, right, and center hydraulic systems (Ref 29-11-00).

S 865-330

- (3) Remove electrical power if it is not necessary (Ref 24-22-00).

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S 095-257  
(4) Remove the service platform.

S 415-258  
(5) Close the controls bay access door, 313AL (Ref 06-42-00).

TASK 27-31-00-715-272

5. Single Hydraulic Source - Test

NOTE: This is a scheduled maintenance task.

A. References

- (1) 24-22-00/201, Electrical Power - Control
- (2) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (3) 31-41-00/501, Engine Indication and Crew Alerting Systems

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Prepare for the Test

- S 865-273  
(1) Supply electrical power (Ref 24-22-00/201).
- D. Do the Test

NOTE: A single thumping noise can be heard from a PCA when an elevator is moved full up or full down. This noise is heard only when the direction of movement of the PCA is changed at the end of the stroke. It is caused when the snubbing ring moves in the snubbing gland to change the direction of movement of the piston at the end of the stroke.

- S 215-276  
(1) Make sure that the LEFT, CENTER, and RIGHT FLT CONTROL SHUTOFF TAIL valve switches on the P61 panel are ON.

- S 215-277  
(2) Make sure that the amber OFF switch position lights are off.

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S 865-278

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO A PERSON OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply power to the left hydraulic system (AMM 29-11-00/201).

S 865-288

- (4) Operate the control columns through full travel and then put them to the neutral position.  
(a) Make sure that the elevators move correctly to the control column movement.

S 865-280

- (5) Remove the power from the left hydraulic system (AMM 29-11-00/201).

S 865-281

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO A PERSON OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (6) Supply power to the center hydraulic system (AMM 29-11-00/201).

S 865-282

- (7) Operate the control columns through full travel and then put them to the neutral position.  
(a) Make sure the elevators move correctly to the control column movement.

S 865-283

- (8) Remove the power from the center hydraulic system (Ref 29-11-00/201).

S 865-284

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO A PERSON OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (9) Supply power to the right hydraulic system (AMM 29-11-00/201).

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S 865-285

- (10) Operate the control columns through full travel and then put them to the neutral position.
- (a) Make sure the elevators move correctly to the control column movement.

S 865-286

- (11) Remove the power from the right hydraulic system (AMM 29-11-00/201).
- E. Put the Airplane Back to Its Usual Condition

S 865-287

- (1) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-31-00-215-289

6. Dual Control Path Override System Test

A. References

- (1) 24-22-00/201, Electrical Power - Control  
(2) 29/11/00/201, Main (Left, Right, and Center) Hydraulic System

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Prepare for the Test

**NOTE:** A single thumping noise can be heard from a PCA when an elevator is moved full up or full down. This noise is heard only when the direction of movement of the PCA is changed at the end of the stroke. It is caused when the snubbing ring moves in the snubbing gland to change the direction of movement of the piston at the end of the stroke.

S 865-290

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO A PERSON OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Pressurize the left, right, and center hydraulic system (Ref 29-11-00/201).

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S 865-291

- (2) Hold the First Officer's control column in the neutral position and pull the Captain's control column aft.
  - (a) Make sure the left elevator moves up.

NOTE: The right elevator will start to move up after the left elevator. The right elevator will move at a slower rate than the left elevator.

S 865-292

- (3) Let the Captain's control column go to the neutral position.

S 865-293

- (4) Hold the Captain's control column in the neutral position and push the First Officer's control column forward.
  - (a) Make sure the right elevator moves down.

NOTE: The left elevator will start to move down after the right elevator. The left elevator will move at a slower rate than the right elevator.

S 865-294

- (5) Let the First Officer's control column go to the neutral position.
- D. Put the Airplane Back to Its Usual Condition

S 865-295

- (1) Remove the power from the left, center, and right hydraulic systems if it is not necessary (Ref 29-11-00/201).

S 865-316

- (2) Remove the electrical power if it is not necessary (Ref 24-22-00/201).

TASK 27-31-00-215-297

7. 767-200 AIRPLANES;

Elevator Neutral Shift and Override Mechanism Test

A. References

- (1) 24-22-00/201, Electrical Power - Control
- (2) 29-11-00/201, Main (Left, Right, and Center) Hydraulic System

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Prepare to Do the Test

S 865-298

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

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S 865-299

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO A PERSON OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Pressurize the left and center hydraulic systems (Ref 29-11-00/201).

D. Do the Test

**NOTE:** A single thumping noise can be heard from a PCA when an elevator is moved full up or full down. This noise is heard only when the direction of movement of the PCA is changed at the end of the stroke. It is caused when the snubbing ring moves in the snubbing gland to change the direction of movement of the piston at the end of the stroke.

S 865-300

- (1) Put the CENTER STAB TRIM SHUTOFF switch on the P10 panel to CUTOFF.

S 865-303

- (2) Move the horizontal stabilizer in the airplane nose-up direction (stabilizer leading edge down) until the elevators start to move from the neutral position.
  - (a) Make sure the elevators start to move at approximately 8.4 units of trim.

S 865-304

- (3) Move the stabilizer to the greenband range.
  - (a) Make sure the elevators go to the neutral position.

E. Put the Airplane Back to Its Usual Condition

S 865-305

- (1) Remove the power from the left and center hydraulic systems if it is not necessary (Ref 29-11-00/201).

S 865-306

- (2) Remove the electrical power if it is not necessary (Ref 24-22-00/201).

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TASK 27-31-00-735-442

8. Functional Test - Elevator PCA Mis-Rig

A. General

- (1) This task contains a procedure that will detect the gross mis-rig of the elevator PCAs.
  - (a) The outboard PCA is powered by the left hydraulic system.
  - (b) The middle PCA is powered by the right hydraulic system.
  - (c) The inboard PCA is powered by the center hydraulic system.

B. Equipment

- (1) Ruler or Tape Measure - Accurate to 0.1 inch (3 mm)
- (2) Masking Tape

C. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-31-05/601, Elevator PCA Bellcrank Shear Rivet Inspection
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 27-31-00-501, Adjust the PCA Input Rods

D. Access

- (1) Location Zones

336/346	Inboard Elevator
337/347	Outboard Elevator

E. Prepare for the Gross Mis-rig Inspection

S 865-402

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

S 865-439

- (2) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the NORM position.

S 865-403

**WARNING:** THE AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE AWAY FROM THE CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (3) Supply pressure to the left hydraulic system only (AMM 29-11-00/201).

**NOTE:** The stabilizer will move at half the normal speed with only the left hydraulic system pressurized.

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S 865-438

- (4) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the ON position.

S 865-404

- (5) Use the control wheel switches to move the horizontal stabilizer to the neutral position (2 units of trim on the position indicator).
  - (a) Ensure that the inboard trailing edge of the elevator is positioned on the elevator index plate.

S 865-405

- (6) Move the LEFT STAB TRIM SHUTOFF and the CENTER STAB TRIM SHUTOFF switches on the control stand panel, P10, to their CUTOUT positions.

S 865-443

- (7) Remove the pressure from the left hydraulic system (AMM 29-11-00/201).

F. Verify the Elevator PCA Rig

S 715-446

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply pressure to the right hydraulic system only (AMM 29-11-00/201).

**NOTE:** The right hydraulic system supplies power to the middle PCA.

S 715-437

- (2) Move the elevator from the neutral position to the nose up position and then to the nose down position.
  - (a) Make sure that the elevators move correctly with the control column movement.
  - (b) Move the elevator to the nose down position and then let it go back to center at the neutral position.

**NOTE:** Lightly shake the control column forward and aft to make sure it is centered.

- (c) Put tape on the index plate and make a mark for the position of the top surface of the elevator trailing edge.
  - 1) Make a mark on the tape 1.0 inch (25 mm) above and 1.0 inch (25 mm) below the elevator neutral mark that was just made.

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S 865-436

- (3) Remove the pressure from the right hydraulic system (AMM 29-11-00/201).

S 865-410

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

**NOTE:** The center hydraulic system supplies power to the inboard PCA.

S 715-435

- (5) Move the elevator from the neutral position to the nose up position and then back to the nose down position.
- (a) Make sure that the elevators move correctly to the control column movement.
- (b) Move the elevator to the nose down position and then let it go back to center at the neutral position.

**NOTE:** Lightly shake the control column forward and aft to make sure it is centered.

- 1) Verify that the elevator is within the 1.0 inch (25 mm) marks above or below the elevator neutral mark that was made on the tape.

S 865-433

- (6) Remove the pressure from the center hydraulic system. (AMM 29-11-00/201).

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S 865-441

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(7) Pressurize the left hydraulic system (AMM 29-11-00/201).

**NOTE:** The left hydraulic system supplies power to the outboard PCA.

(a) Allow enough time for the center hydraulic system to drop below 100 psi (690 kPa).

S 715-431

(8) Move the elevator from the neutral position to the nose up position, back to the nose down position, and then back to the neutral position.

(a) Make sure that the elevators move correctly to the control column movement.

1) Verify that the elevator is within the 1.0 inch (25 mm) marks above or below the elevator neutral mark that was made on the tape.

S 865-422

(9) Remove the pressure from the left hydraulic system (AMM 29-11-00/201).

S 215-424

(10) If, in the previous checks, either elevator surface was higher or lower than the 1.0 inch (25 mm) marks above and below the neutral index mark marked on the tape, then do the following:

(a) Elevator PCA Shear Rivet Inspection (AMM 27-31-05/601).

(b) Adjust the Power Control Actuator (PCA) Input Rods (AMM 27-31-00/501).

G. Put the Airplane Back to Its Usual Condition.

S 865-428

(1) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to ON.

S 865-430

(2) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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INBOARD ELEVATOR – REMOVAL/INSTALLATION

1. General

A. This procedure contains steps to remove and install the elevator.

TASK 27-31-01-024-002

2. Remove the Elevator

A. Equipment

- (1) Sling and Equipment, Inboard Elevator (from Inboard/Outboard Sling Equipment – A27012-30):
  - (a) Loadpositioner – commercially available
  - (b) Inboard Sling Assembly – A27012-2
  - (c) Clamp Assembly – A27012-26
  - (d) Hoist Ring Assembly – A27012-5  
(2 are necessary)

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 20-10-21/401, Electrical Bonding
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) SRM 51-60-02, Elevator Balancing

C. Access

(1) Location Zones

211/212	Control Cabin
336/346	Inboard Elevators
337/347	Outboard Elevators

(2) Access Panels

336BB/335BB/	Left Inboard Elevator
335CB/335DB/	
335ADB/335AEB/	
336CB	Right Inboard Elevator
346BB/345BB/	
345CB/345DB/	
345ADB/345AEB/	
346CB	

D. Prepare for the Removal

S 864-043

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply power to the left, right, and center hydraulic systems (Ref 29-11-00).

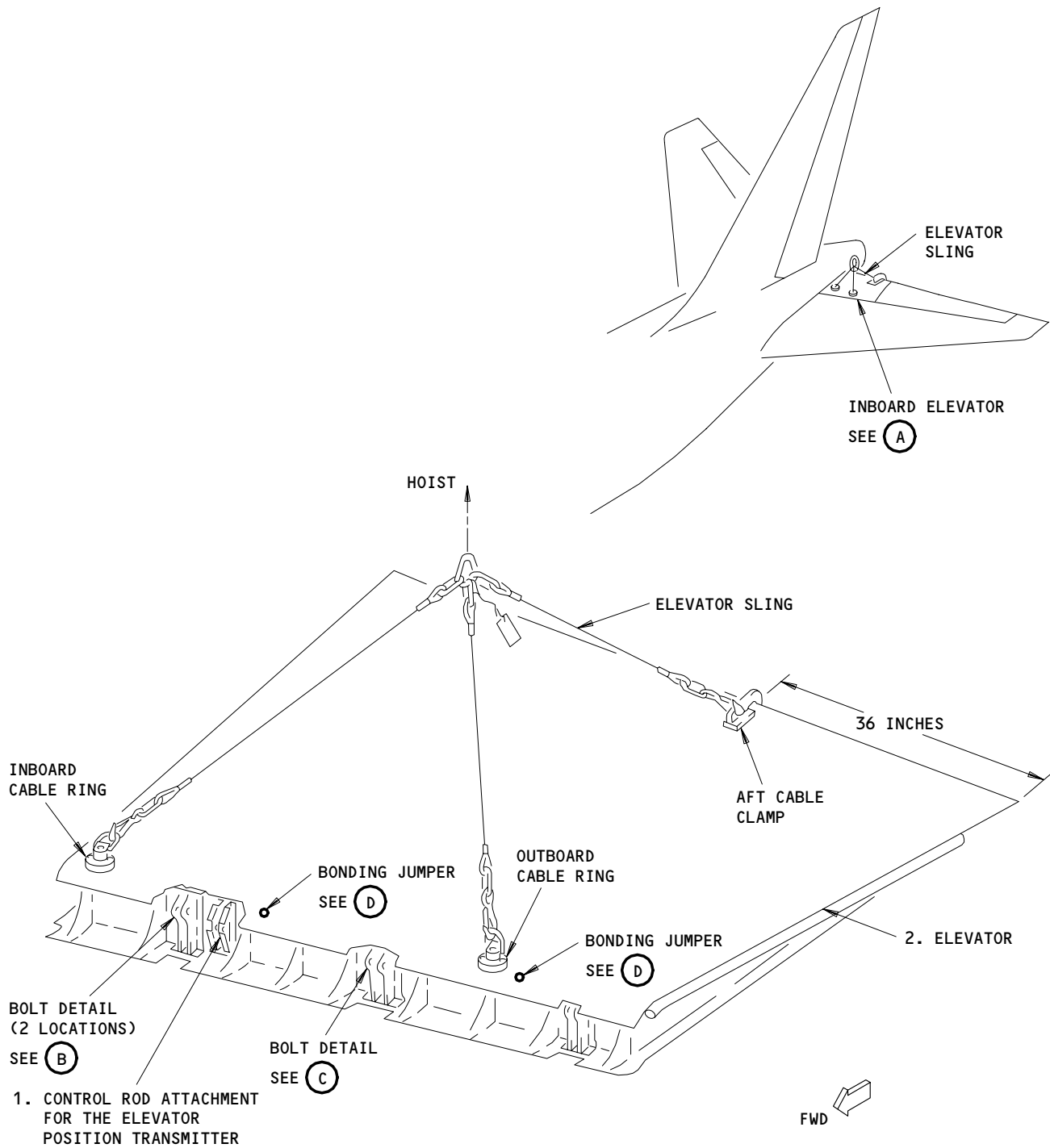
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**INBOARD ELEVATOR  
(LEFT IS SHOWN, RIGHT IS OPPOSITE)**

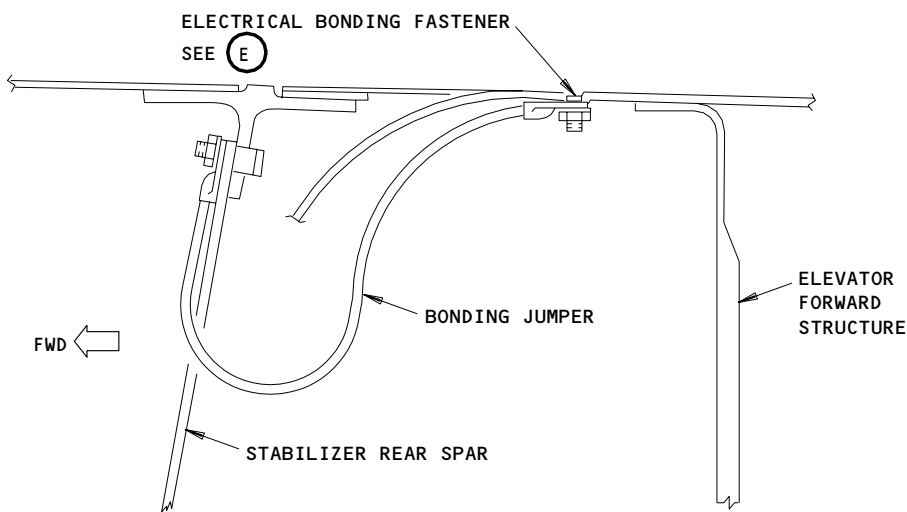
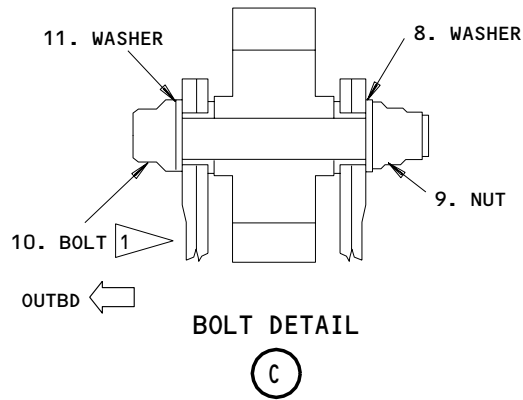
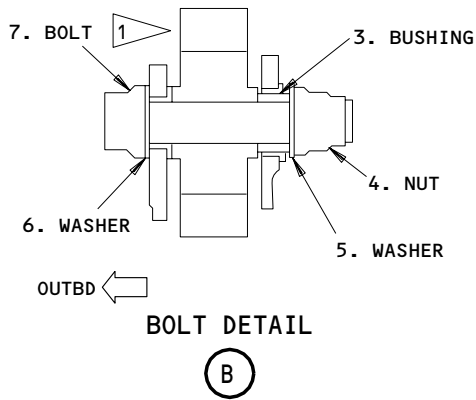
**(A)**

**Inboard Elevator Installation  
Figure 401 (Sheet 1)**

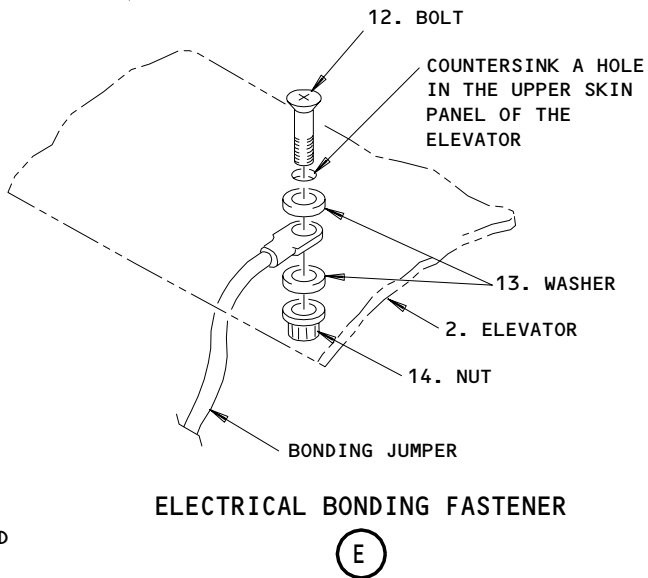
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BONDING JUMPER  
(D)



ELECTRICAL BONDING FASTENER  
(E)

1 APPLY GREASE TO THE BOLT OD, BUSHING ID, AND BEARING ID BEFORE THEY ARE ASSEMBLED

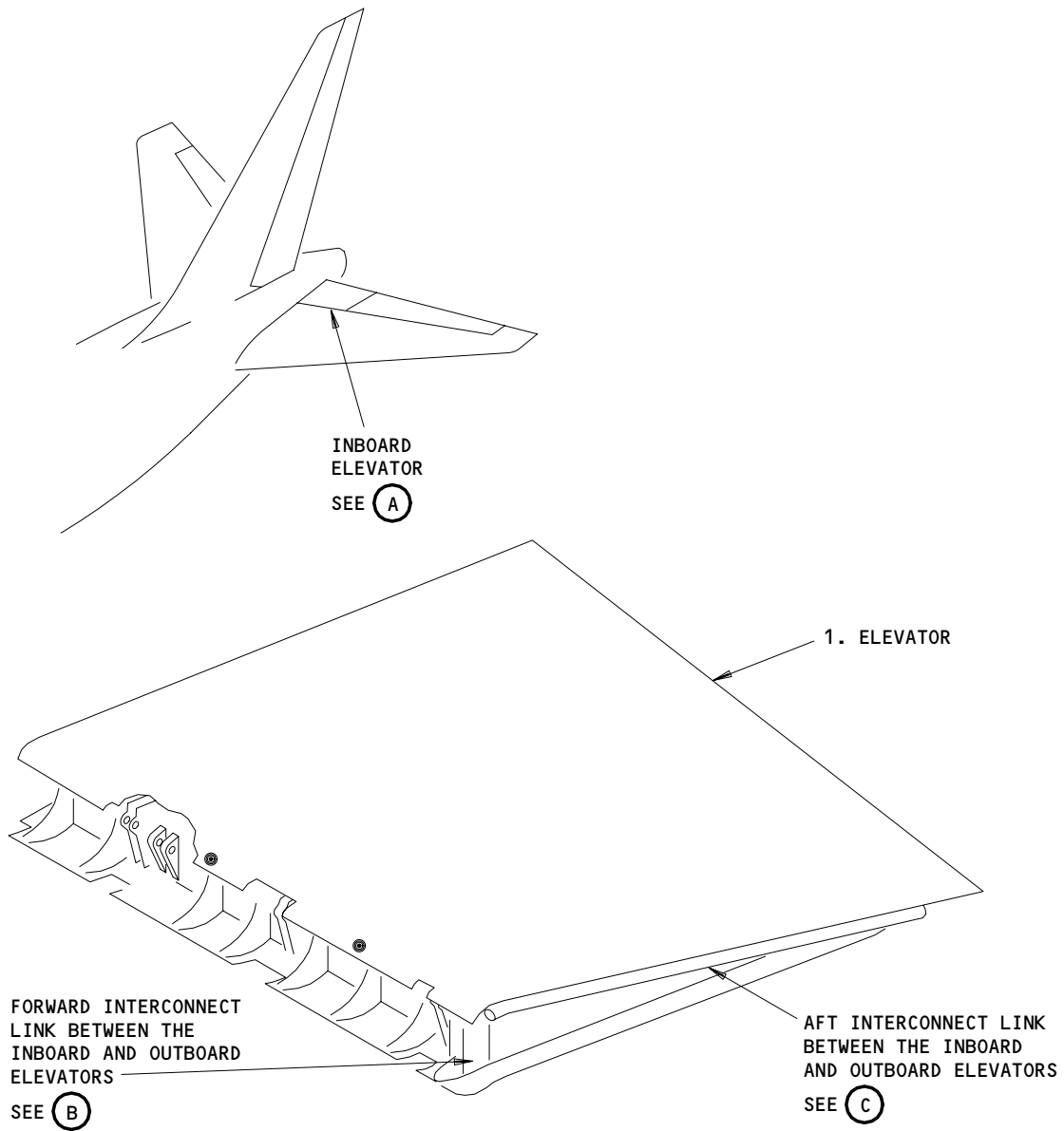
Inboard Elevator Installation  
Figure 401 (Sheet 2)

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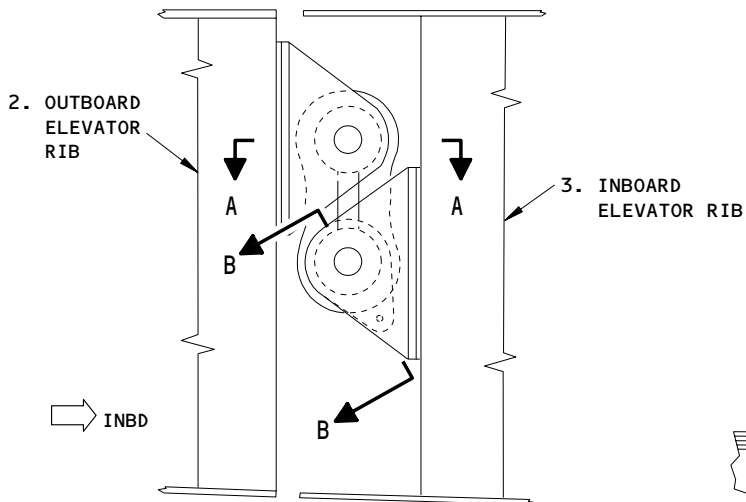


INBOARD ELEVATOR  
(LEFT IS SHOWN, RIGHT IS OPPOSITE)  
(A)

Inboard to Outboard Elevator Interconnect Links  
Figure 402 (Sheet 1)

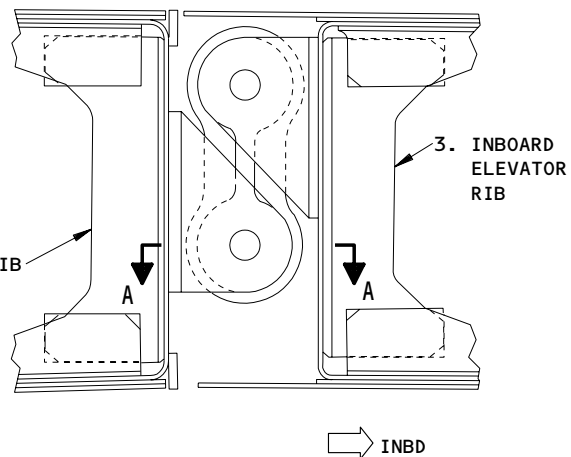
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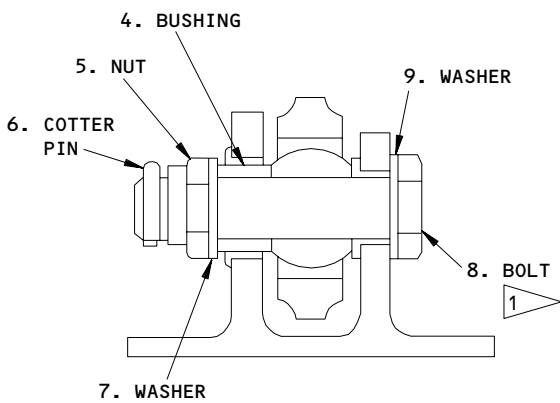
FORWARD INTERCONNECT LINK BETWEEN THE INBOARD AND OUTBOARD ELEVATORS

(B)

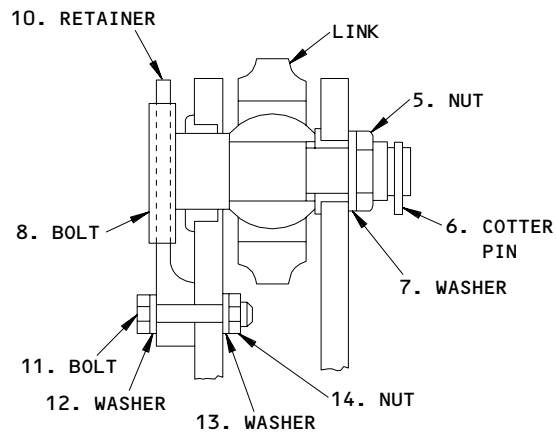


AFT INTERCONNECT LINK BETWEEN THE INBOARD AND OUTBOARD ELEVATORS

(C)



A-A



B-B

Inboard to Outboard Elevator Interconnect Links  
Figure 402 (Sheet 2)

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- S 864-003
- (2) Move the horizontal stabilizer to 2.0 units of trim (neutral) as shown on the stabilizer position indicator, located on the control stand panel, P10.
- S 864-004
- (3) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).
- S 864-005
- (4) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.
- S 864-006
- (5) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches, on the P10 panel, to the CUTOUT position.
- S 864-007
- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT
- S 494-008
- (7) Connect the sling to the elevator.
- (a) Remove and keep the plug bolts from the upper surface of the elevator to install the inboard and outboard cable rings.
- NOTE: Install the aft clamp assembly 36 inches (91.4 cm) the elevator outboard end.
- S 034-009
- (8) Disconnect the position transmitter rod for the inboard elevator (1, 2, 3) (Fig. 403).
- NOTE: Do not change the length of the rod during or after the removal.

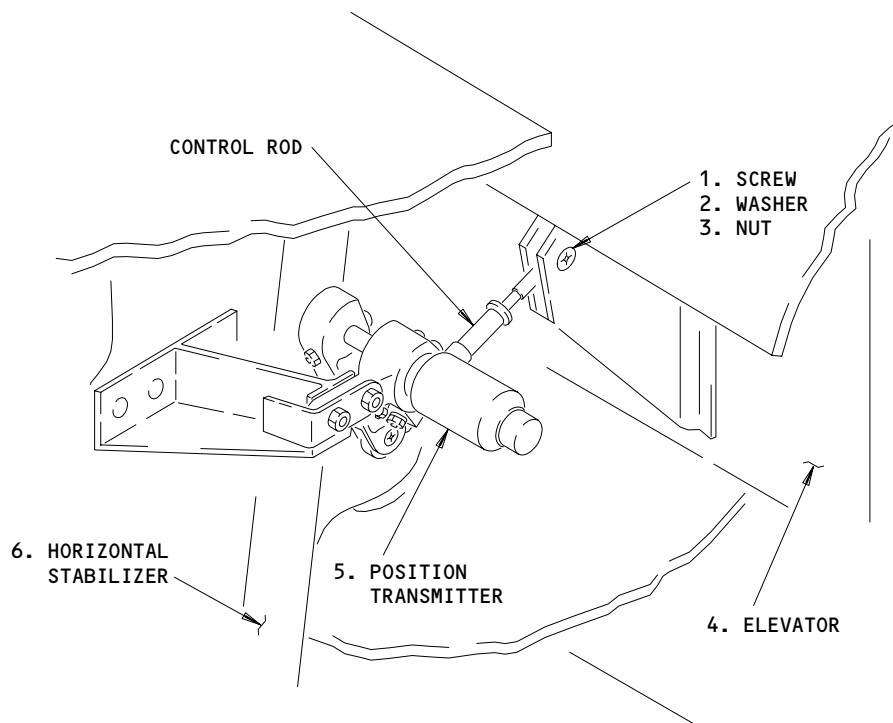
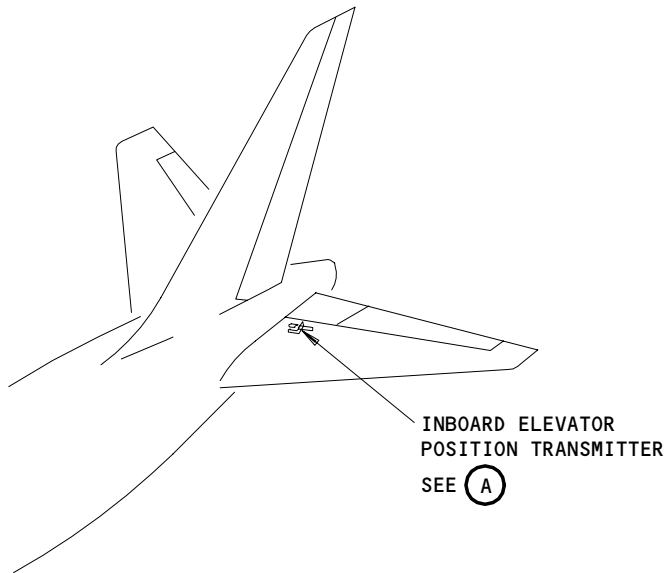
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INBOARD ELEVATOR POSITION TRANSMITTER  
(LEFT SHOWN, RIGHT IS OPPOSITE)

(A)

Elevator Position Transmitter Disconnect  
Figure 403

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S 034-010

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE AREA BELOW THE ELEVATOR. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF AN OBJECT FALLS.

- (9) Disconnect the bolts (8) from the links that attach the outboard elevator to the inboard elevator (2) (Fig. 402).

S 014-011

- (10) Remove the access panels and the panel seals that follow (Ref 06-42-00):
- (a) 336BB, 335BB, 335CB, 335DB, 335ADB, 335AEB and 336CB for the left inboard elevator.
  - (b) 346BB, 345BB, 345CB, 345DB, 345ADB, 345AEB and 346CB for the right inboard elevator.

E. Remove the Elevator

S 034-012

- (1) Disconnect the bonding jumpers from the upper skin panel on the elevator (Fig. 401) (Ref 20-10-21).

S 034-013

- (2) Remove the bolts (7, 10) from the elevator hinges.

S 024-014

- (3) Move the elevator (2) straight back and remove it from the airplane.

**NOTE:** Keep a record of all work done to the airplane (for example, paint and repairs) to make sure the operational balance moment is not too high. If the operational balance moment is too high, the elevator can shake during flight. Refer to the Structural Repair Manual (SRM 51-60-02) to find the operational balance moment.

If you use a load positioner, movement of the elevator can be made easier.

TASK 27-31-01-424-042

3. Install the Elevator

A. Equipment

- (1) Sling and Equipment, Inboard Elevator (from Inboard/Outboard Sling Equipment - A27012-30):
- (a) Inboard Sling Assembly - A27012-2

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- (b) Loadpositioner - commercially available
- (c) Clamp Assembly - A27012-26
- (d) Hoist Ring Assembly - A27012-5  
(2 are necessary)
- (2) Bonding Meter - Avtron Model T477W, Avtron  
Manufacturing Inc., Cleveland, Ohio
- B. Consumable Materials
  - (1) D00633 Grease - BMS 3-33
- C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	2	Inboard Elevator (LH)	55-20-51	01	205
	2	Inboard Elevator (RH)			210

- D. References
  - (1) AMM 06-42-00/201, Empennage Access Doors and Panels
  - (2) AMM 12-21-04/301, Elevator Control System
  - (3) AMM 20-10-21/401, Electrical Bonding
  - (4) AMM 20-10-21/601, Electrical Bonding
  - (5) AMM 24-22-00/201, Electrical Power
  - (6) AMM 27-31-01/601, Inboard Elevator
  - (7) AMM 27-38-00/501, Elevator Control System
  - (8) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

E. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 336/346 Inboard Elevators
  - 337/347 Outboard Elevators
- (2) Access Panels
  - 336BB/335BB/ Left Inboard Elevator
  - 335CB/335DB/
  - 335ADB/335AEB/
  - 336CB
  - 346BB/345BB/ Right Inboard Elevator
  - 345CB/345DB/
  - 345ADB/345AEB/
  - 346CB

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F. Prepare for the Installation

S 224-015

- (1) Make sure that the structural attach points do not have too much wear (Ref 27-31-00).

S 224-016

- (2) If a used bolt or bearing is installed, make sure it does not have too much wear (Ref 27-31-00).

S 214-017

- (3) Make sure the seals at the stabilizer trailing edge and between the outboard and inboard elevators are in satisfactory condition.

S 964-018

- (4) Replace all damaged seals.

S 214-019

- (5) Make sure all of the bushings and bolts have the correct fit before you install them.

**NOTE:** If there are burrs or sharp edges in the bushings, remove them and smooth them out.

G. Install the Elevator

S 494-020

- (1) Connect the sling to the elevator.

**NOTE:** If you use a loadpositioner, movement of the elevator can be made easier.

- (a) Remove and keep the plug bolts from the upper surface of the elevator to install the inboard and outboard cable rings.

**NOTE:** Install the aft clamp assembly 36 inches (91.4 cm) from the elevator outboard end.

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S 424-021

- (2) Put the elevator (2) at the stabilizer trailing edge.

S 424-022

- (3) Install the bolts (7), washers (5, 6), bushings (3), and nuts (4) in the elevator hinges. Tighten the nuts (4) to 440-650 pound-inches (49.7-73.4 newton-meters) of torque.

S 424-023

- (4) Install the bolt (10), washers (8, 11), and nut (9) in the elevator hinge. Tighten the nut (9) to 440-650 pound-inches (49.7-73.4 Nm) of torque.

S 434-024

- (5) Install the bonding jumpers (Ref 20-10-21/401).

**NOTE:** The bolts (12) are electrical bonding fasteners to the upper skin panels on the elevators.

- (a) Clean mating surfaces for the bonding jumper connection.

S 764-025

- (6) Use a bonding meter to make sure that the resistance of the bonding connection is less than 0.1 ohm (Ref 20-10-21/601).

S 824-044

- (7) Rotate the eccentric pin for best alignment of elevator segments at the trailing edge.

S 424-026

- (8) Install the bolts (8), washers (7, 9), bushing (4), and nuts (5) in the forward and aft interconnect links that attach the outboard elevator to the inboard elevator (Figure 402).

S 424-052

- (9) Install the bolt (11), washers (12,13), and nut (14) in the forward interconnect link (Figure 402).

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- S 424-051
- (10) Tighten the nut (5), (Figure 402), view A-A to 660-980 pound-inches (75-111 Nm).
- S 424-050
- (11) Tighten the nut (5), (Figure 402), view B-B to 400-510 pound-inches (45-58 Nm).
- S 424-049
- (12) Tighten the nut (14), (Figure 402), to 27-33 pound-inches (3-4 Nm).
- S 434-027
- (13) Install the screw (1), washer (2), and nut (3) that connect the control rod for the position transmitter to the elevator front spar (Fig. 403).

**NOTE:** Do not change the length of the control rod. If the length of the rod was changed, do the adjustment for the elevator position transmitter (Ref 27-38-00).

- S 644-028
- (14) Lubricate the elevator hinge fittings (Ref 12-21-04).
- S 414-029
- (15) Install the access panels that follow (Ref 06-42-00):
- (a) 336BB, 335BB, 335CB, 335DB, 335ADB, 335AEB and 336CB for the left inboard elevator.
  - (b) 346BB, 345BB, 345CB, 345DB, 345ADB, 345AEB and 346CB for the right inboard elevator.

- S 094-030
- (16) Remove the sling from the elevator.

- S 434-031
- (17) Install the bolts you removed from the surface of the elevator where the cable rings for the sling were installed.

#### H. Inboard Elevator Test

- S 864-032
- (1) Supply electrical power (Ref 24-22-00).

- S 214-033
- (2) Make sure that these circuit breakers on the overhead panel, P11, are closed:
- (a) 11J32, EICAS DSPL SELECT

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- (b) 11L9, LEFT ENGINE OIL PRESS OR LEFT ENGINE OIL PRESS EICAS REF
- (c) 11L36, RIGHT ENGINE OIL PRESS OR RIGHT ENGINE OIL PRESS EICAS REF.

S 864-034

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 864-035

- (4) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the NORM position.

S 864-036

- (5) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the ON position.

S 864-037

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (6) Supply power to the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-038

- (7) Slowly move the outboard elevator to the full up and full down positions. Let the control column go to the neutral position.

S 214-039

- (8) Make sure that the elevator position indicator on the EICAS screen follows the movement of the elevator correctly.

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I. Put the Airplane Back to Its Usual Condition

S 864-040

- (1) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-041

- (2) Remove electrical power (Ref 24-22-00).

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INBOARD ELEVATOR INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Inboard Elevator Removal/Installation for procedures to do these tasks.

TASK 27-31-01-226-001

2. Wear Limits for the Inboard Elevator (Fig. 601)

A. Access

- (1) Location Zones

336/346 Inboard Elevators

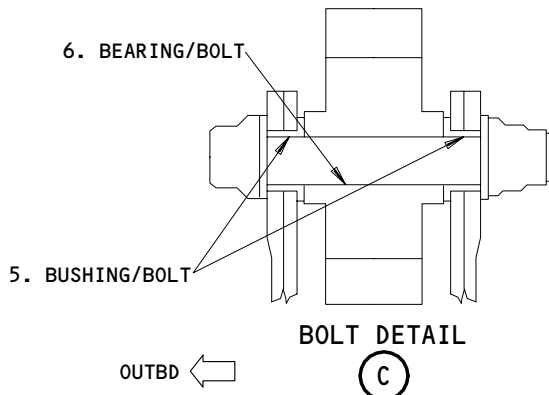
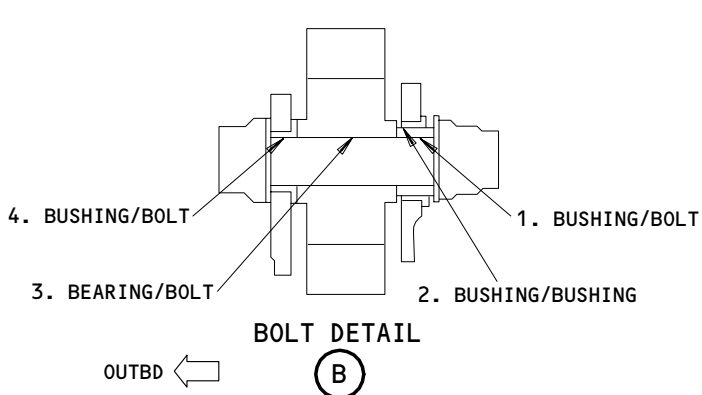
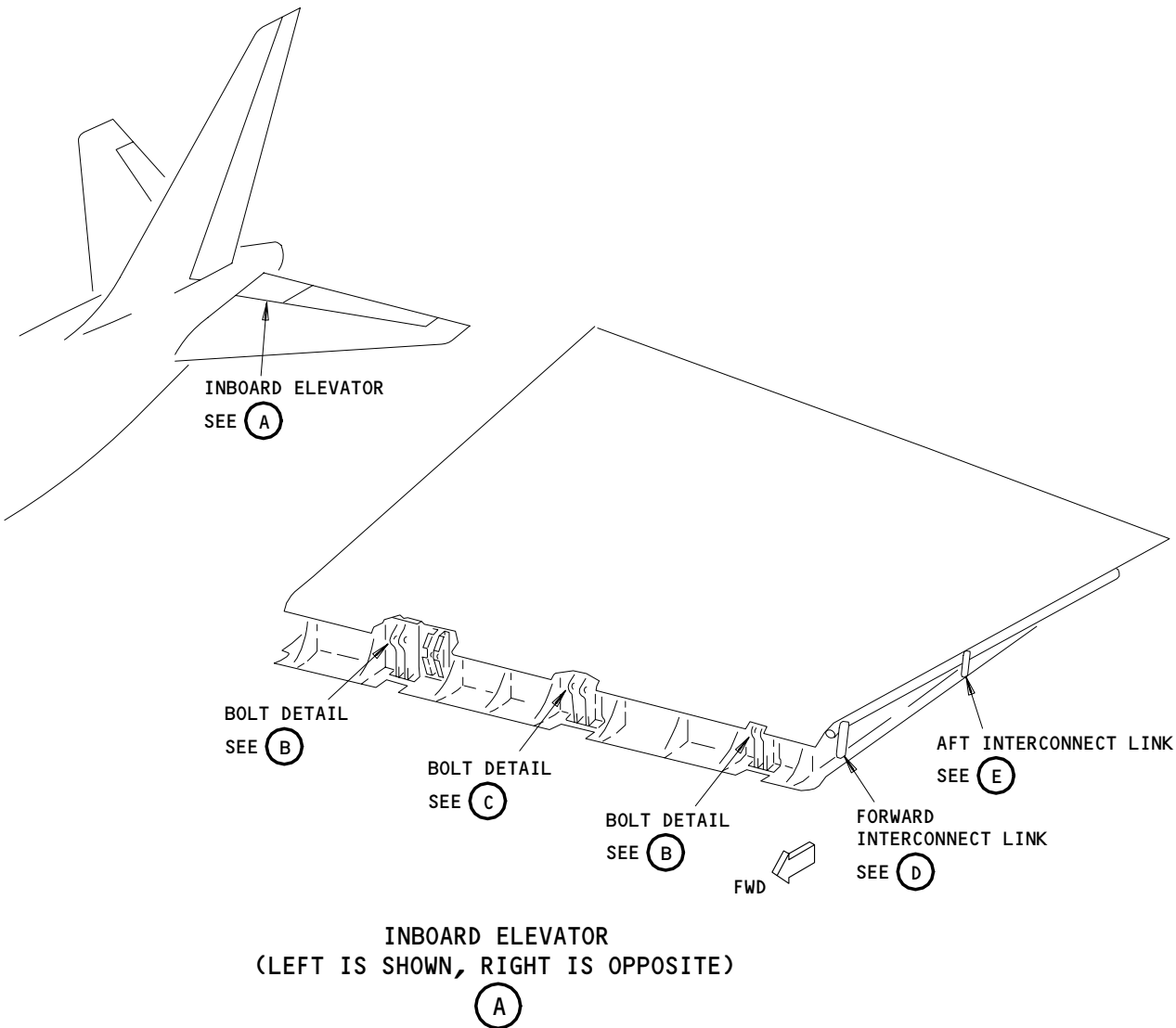
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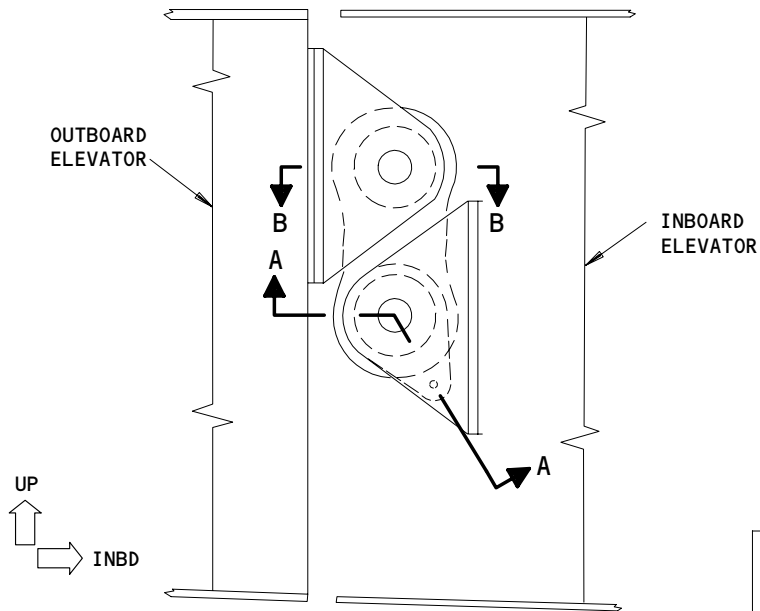
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Wear Limits for the Inboard Elevator  
Figure 601 (Sheet 1)

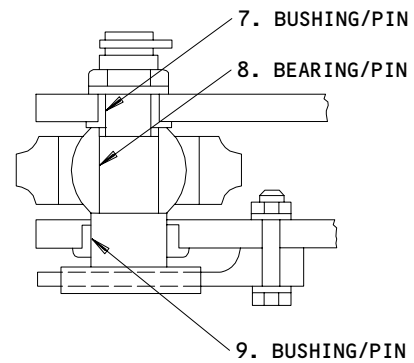
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**27-31-01**

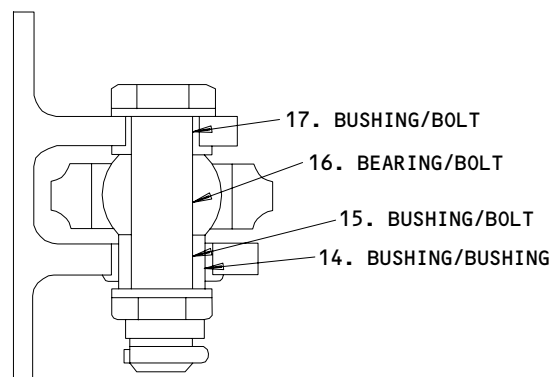


FORWARD INTERCONNECT LINK

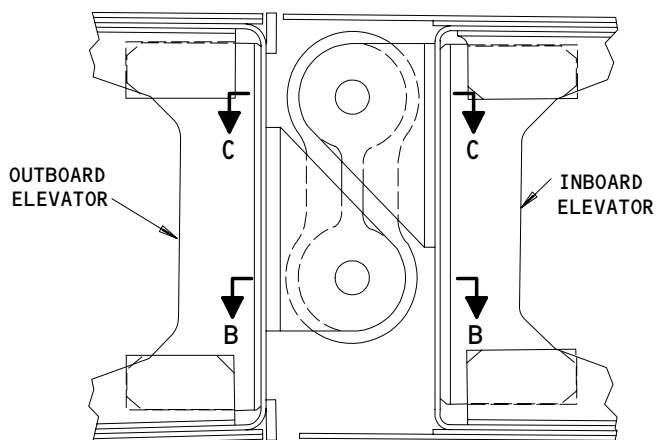
(D)



A-A

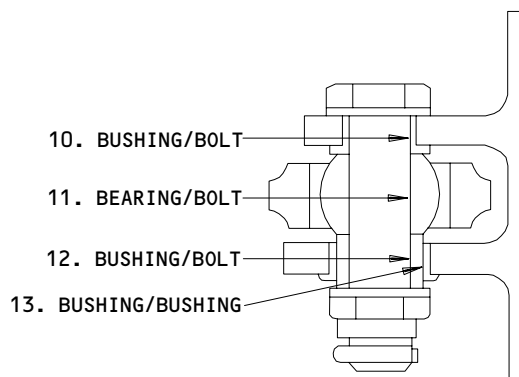


B-B



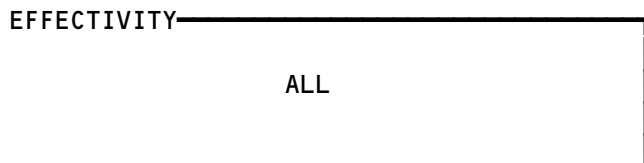
AFT INTERCONNECT LINK

(E)



C-C

Inboard Elevator Wear Limits  
Figure 601 (Sheet 2)



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# BOEING

## 767 MAINTENANCE MANUAL

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4955 (12.586)		X		
2	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6915 (17.564)	0.0050 (0.127)		X	1
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6827 (17.341)		X		
3	BEARING	ID	0.4995 (12.687)	0.5000 (12.700)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4950 (12.573)		X		
4	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)		X	1
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4957 (12.591)		X		
5	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)		X	1
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4957 (12.591)		X		
6	BEARING	ID	0.4995 (12.687)	0.5000 (12.700)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4950 (12.573)		X		
7	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)		X	1
	PIN	OD	0.4990 (12.675)	0.4995 (12.687)	0.4957 (12.591)		X		
8	BEARING	ID	0.6250 (15.875)	0.6254 (15.885)	0.6290 (15.977)	0.0050 (0.127)	X		
	PIN	OD	0.6235 (15.837)	0.6240 (15.850)	0.6204 (15.758)		X		
9	BUSHING	ID	0.8745 (22.212)	0.8753 (22.233)	0.8798 (22.347)	0.0058 (0.147)		X	1
	PIN	OD	0.8735 (22.187)	0.8740 (22.200)	0.8695 (22.085)		X		
10	BUSHING	ID	0.6245 (15.862)	0.6252 (15.880)	0.6290 (15.977)	0.0050 (0.127)		X	1
	BOLT	OD	0.6235 (15.837)	0.6240 (15.850)	0.6202 (15.753)		X		

1 THIS PART CAN BE REPAIRED.

Wear Limits for the Inboard Elevator  
Figure 601 (Sheet 3)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BEARING	ID	0.6250 (15.875)	0.6254 (15.885)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6235 (15.837)	0.6240 (15.850)	0.6204 (15.758)		X		
12	BUSHING	ID	0.6245 (15.862)	0.6250 (15.875)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6235 (15.837)	0.6240 (15.850)	0.6200 (15.748)		X		
13	BUSHING	ID	0.8745 (22.212)	0.8753 (22.233)	0.8798 (22.347)	0.0058 (0.147)		X	
	BUSHING	OD	0.8735 (22.187)	0.8740 (22.200)	0.8695 (22.085)		X		
14	BUSHING	ID	0.8745 (22.212)	0.8753 (22.233)	0.8798 (22.347)	0.0058 (0.147)		X	
	BUSHING	OD	0.8735 (22.187)	0.8740 (22.200)	0.8695 (22.085)		X		
15	BUSHING	ID	0.6245 (15.862)	0.6250 (15.875)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6235 (15.837)	0.6240 (15.850)	0.6200 (15.748)		X		
16	BEARING	ID	0.6250 (15.875)	0.6254 (15.885)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6235 (15.837)	0.6240 (15.850)	0.6204 (15.758)		X		
17	BUSHING	ID	0.6245 (15.862)	0.6252 (15.880)	0.6290 (15.977)	0.0050 (0.127)		X	
	BOLT	OD	0.6235 (15.837)	0.6240 (15.850)	0.6202 (15.753)		X		

Wear Limits for the Inboard Elevator  
Figure 601 (Sheet 4)

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OUTBOARD ELEVATOR – REMOVAL/INSTALLATION

1. General

A. This procedure contains steps to remove and install the outboard elevators.

TASK 27-31-02-004-001

2. Remove the Outboard Elevator (Fig. 401)

A. Equipment

- (1) Sling and Equipment, Outboard Elevator (from Inboard/Outboard Sling Equipment – A27012-30):
  - (a) Load positioner – commercially available.
  - (b) Outboard Sling Assembly – A27012-3
  - (c) Clamp Assembly – A27012-26
  - (d) Hoist Ring Assembly – A27012-5  
(Two are Necessary)

B. References

- (1) AMM 06-42-00/201, Empennage – Access Doors and Panels
- (2) AMM 20-10-21/401, Electrical Bonding
- (3) AMM 27-31-01/401, Inboard Elevator
- (4) SRM 51-60-02

C. Access

- (1) Location Zones
  - 335/345 Horizontal Stabilizer Trailing Edge (Left/Right)
  - 336/346 Inboard Elevator (Left/Right)
  
- (2) Access Panels
 

335DB/345DB	Elevator Control Mechanism
335EB/345EB	Elevator Control Mechanism
335GB/345GB	Elevator Control Mechanism
335HB/345HB	Elevator Control Mechanism
335JB/345JB	Elevator Spar Hinge Fitting
335KB/345KB	Elevator Spar Hinge Fitting
335LB/345LB	Elevator Spar Hinge Fitting
335MB/345MB	Elevator Spar Hinge Fitting
335AFB/345AFB	Elevator Hinges
335AJB/345AJB	Elevator Hinges
335AKB/345AKB	Elevator Hinges
336BB/346BB	Elevator Interconnect Fitting
336CB/346CB	Elevator Interconnect Fitting

D. Prepare for outboard elevator removal.

S 864-002

- (1) Put the LEFT, RIGHT and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to OFF.

S 864-003

- (2) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to CUTOUT.

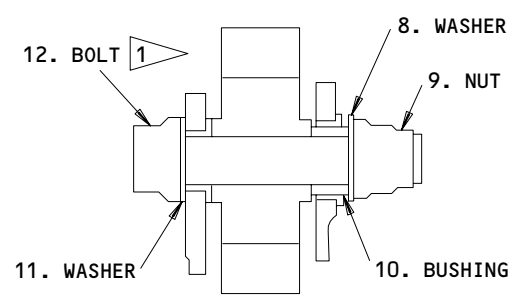
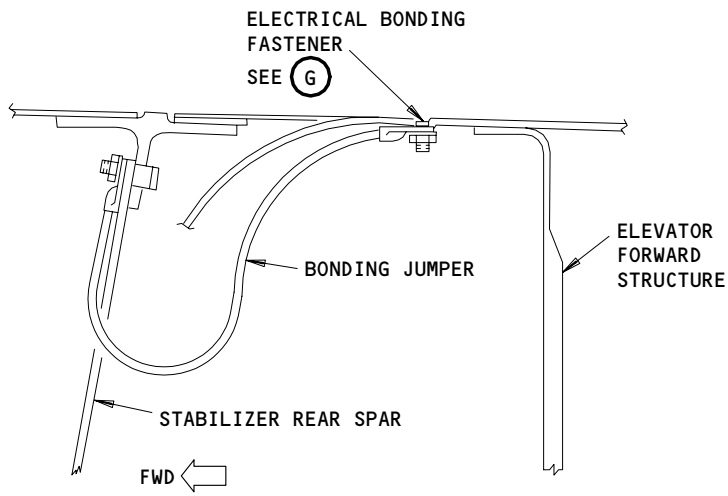
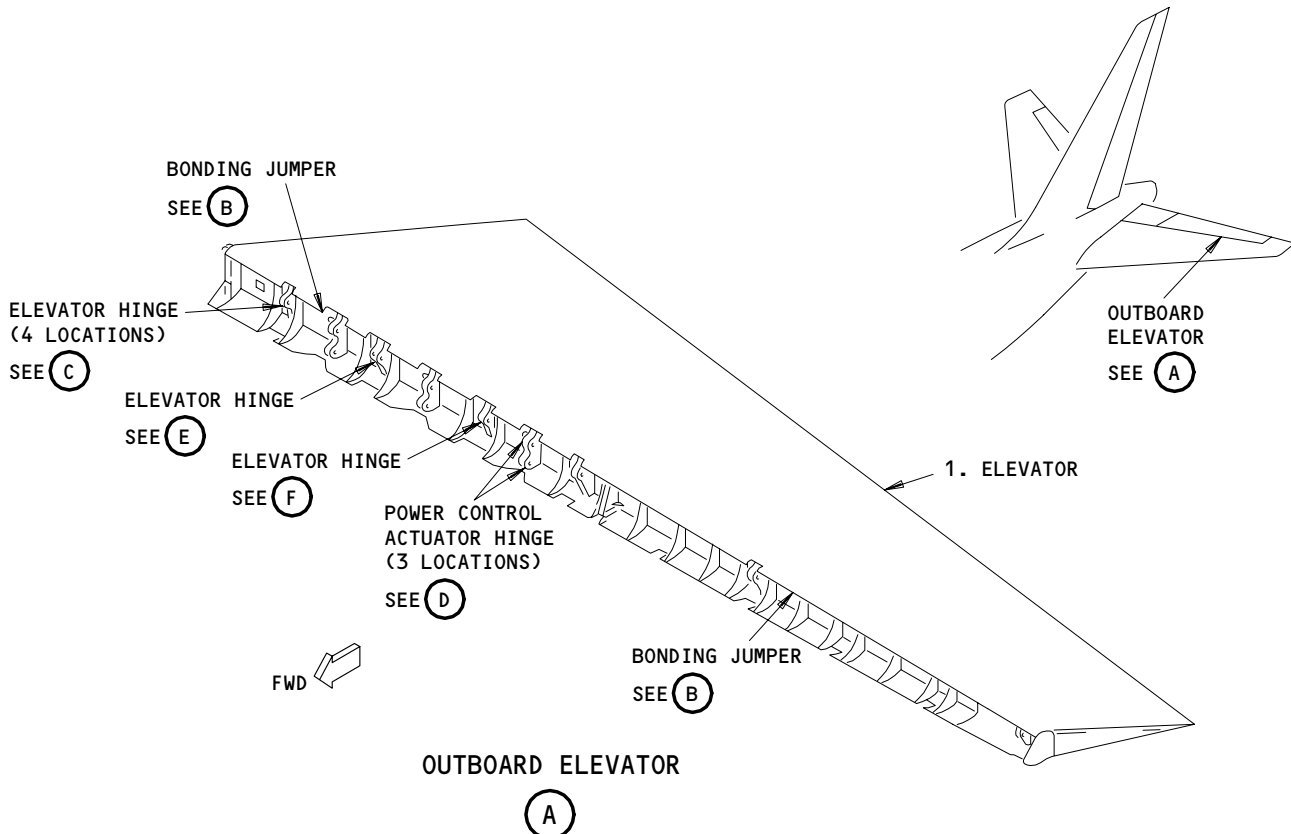
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**BONDING JUMPER (EXAMPLE)**  
(B)

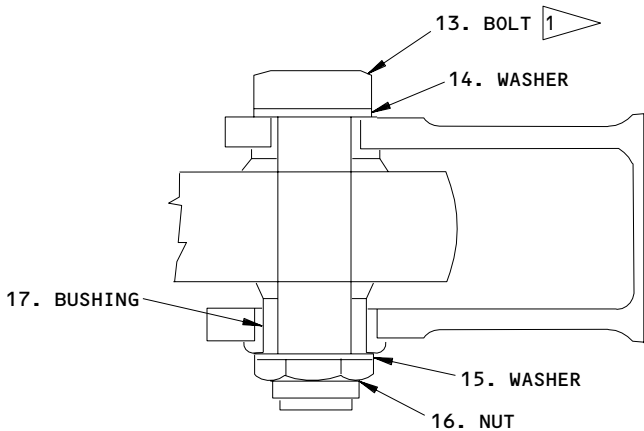
**ELEVATOR HINGE (EXAMPLE)**  
(C)

**Outboard Elevator Installation**  
**Figure 401 (Sheet 1)**

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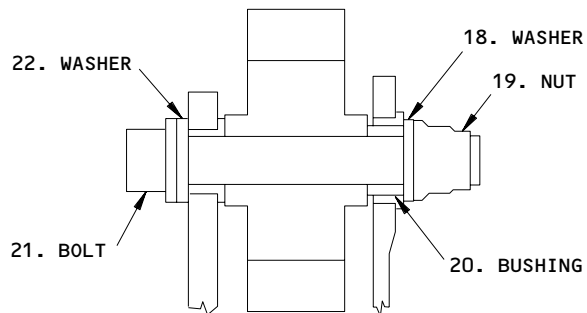
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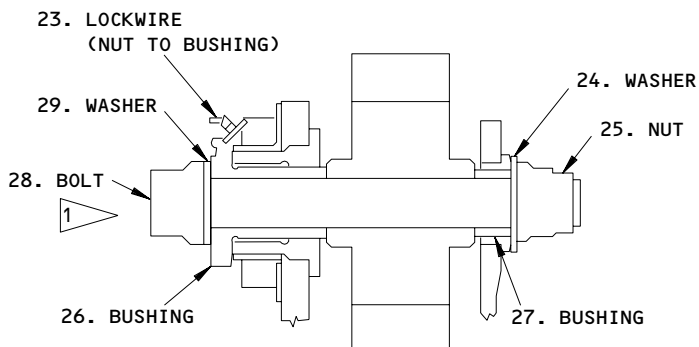
POWER CONTROL ACTUATOR HINGE (EXAMPLE)

(D)



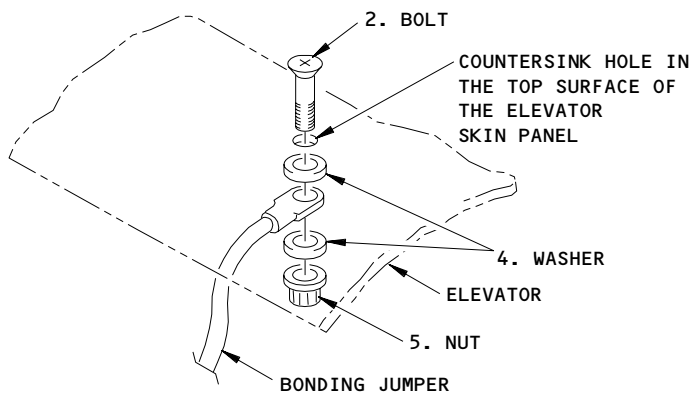
ELEVATOR HINGE

(E)



ELEVATOR HINGE

(F)



ELECTRICAL BONDING FASTENER (EXAMPLE)

(G)

1 APPLY GREASE TO THE BOLT O.D., BUSHING I.D., AND BEARING I.D. AND THEN ASSEMBLE.

Outboard Elevator Installation  
Figure 401 (Sheet 2)

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S 864-004

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 494-005

- (4) Do these steps to attach the sling to the elevator (Fig. 402):
- (a) Remove the plug bolts from the top surface of the elevator to install the inboard and outboard cable rings. Keep the plug bolts.
  - (b) Install the aft clamp assembly at the location shown.

S 014-006

- (5) Open these access panels (AMM 06-42-00/201):
- (a) For the left outboard elevator: 336BB, 335DB, 335EB, 335GB, 335HB, 335JB, 335KB, 335LB, 335MB, 335AFB, 335AJB, 335AKB, and 336CB.
  - (b) For the right outboard elevator: 346BB, 345DB, 345EB, 345GB, 345HB, 345JB, 345KB, 345LB, 345MB, 345AFB, 345AJB, 345AKB, and 346CB.

E. Remove the Outboard Elevator

S 024-054

**WARNING:** STAY AWAY FROM THE AREA BELOW THE ELEVATORS. OBJECTS CAN FALL AND CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Remove the inboard elevator (AMM 27-31-01/401).

**NOTE:** If you use the load positioner, movement of the elevator can be made easier.

S 034-008

- (2) Disconnect the input control rod from the actuator.

**NOTE:** Make sure that the length of the control rod does not change during or after the input control rod is disconnected.

S 034-009

- (3) Remove the nuts, washers, and bolts (5, 4, and 2) from the upper skin panel of the elevator.

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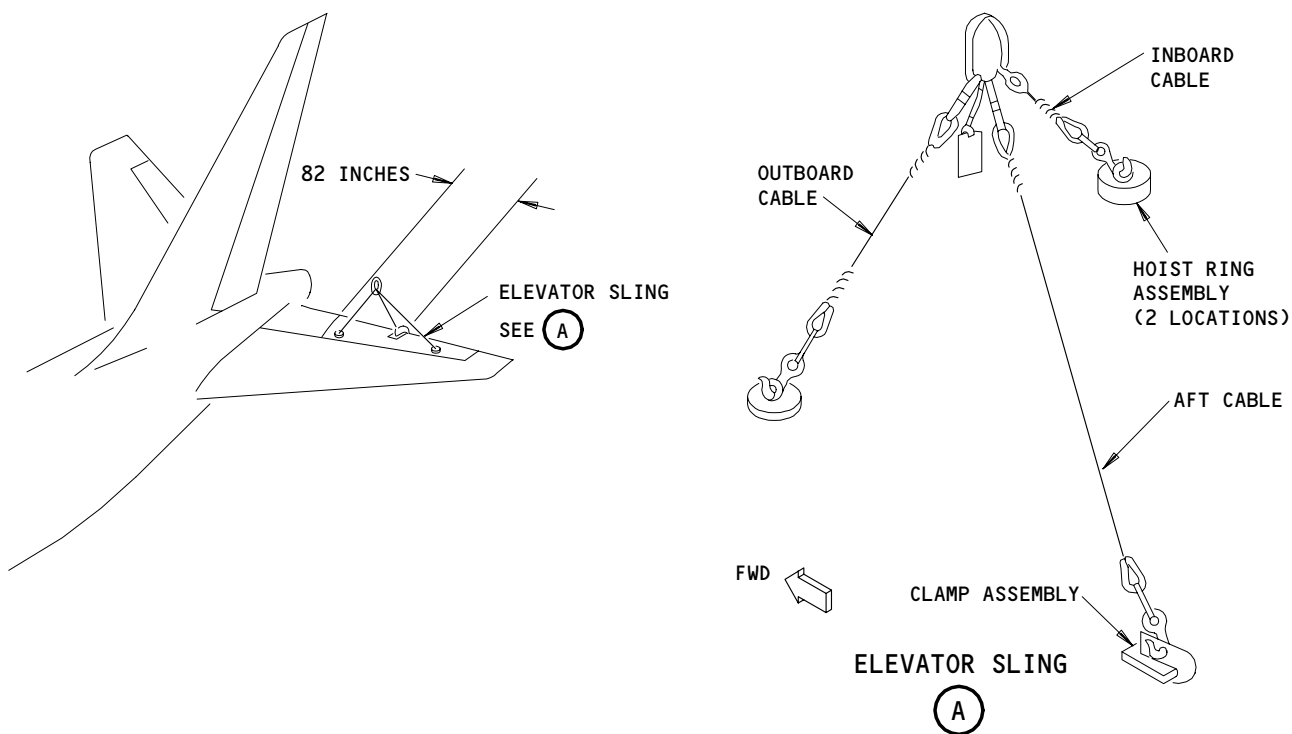
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- S 034-010  
(4) Remove the bonding jumpers (AMM 20-10-21/401).
- S 034-011  
(5) Remove the bolts (13) from the actuator rams.
- S 034-012  
(6) Remove the bolts (13) from the reaction hinges.
- S 034-013  
(7) Remove the bolts (12,21,28), washers (8,11,18,22,24,29), bushings (10,20,26,27), and nuts (9,19,25) from the elevator hinges.



Elevator Sling and Equipment Installation  
Figure 402

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- S 024-056
- (8) Disconnect the Lost Motion Device control rod from the elevator attach point by removing the bolt, washer, and nut.

- S 034-014
- (9) Remove the outboard elevator (1).

**NOTE:** Keep a record of all of the painting and the repairs done to the elevators. This will make sure that the operational balance moment is not exceeded. Flight control surfaces that exceed the operational balance moment can shake during flight. Refer to the Structural Repair Manual (SRM 51-60-02) to determine the operational balance moment.

TASK 27-31-02-404-015

3. Install the Outboard Elevator (Fig. 401)

A. Equipment

- (1) Sling and Equipment, Outboard Elevator  
(From the Inboard/Outboard Sling Equipment - A27012-30):
- (a) Loadpositioner - commercially available
  - (b) Outboard Sling Assembly - A27012-3
  - (c) Clamp Assembly - A27012-26
  - (d) Hoist Ring Assembly - A27012-5  
(Two are Necessary)
- (2) Bonding Meter - Avtron Model T477W, Avtron Manufacturing Inc., Cleveland, Ohio

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00015 Grease - BMS 3-24 (Alternate)

C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Outboard Elevator	55-20-51	01	300,305

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D. References

- (1) AMM 06-42-00/201, Empennage - Access Doors and Panels
- (2) AMM 12-21-04/301, Elevator Control System
- (3) AMM 20-10-21/401, Electrical Bonding
- (4) AMM 20-10-21/601, Electrical Bonding
- (5) AMM 24-22-00/201, Electrical Power - Control
- (6) AMM 27-31-00/501, Elevator Control System
- (7) AMM 27-31-01/401, Inboard Elevator
- (8) AMM 27-31-02/601, Outboard Elevator
- (9) AMM 29-11-00/201, Main (Left, Right, Center) Hydraulic Systems

E. Access

- (1) Location Zones
  - 335/345 Horizontal Stabilizer Trailing Edge (Left/Right)
  - 336/346 Inboard Elevator (Left/Right)
- (2) Access Panels
 

335DB/345DB	Elevator Control Mechanism
335EB/345EB	Elevator Control Mechanism
335GB/345GB	Elevator Control Mechanism
335HB/345HB	Elevator Control Mechanism
335JB/345JB	Elevator Spar Hinge Fitting
335KB/345KB	Elevator Spar Hinge Fitting
335LB/345LB	Elevator Spar Hinge Fitting
335MB/345MB	Elevator Spar Hinge Fitting
335AFB/345AFB	Elevator Hinges
335AJB/345AJB	Elevator Hinges
335AKB/345AKB	Elevator Hinges
336BB/346BB	Elevator Interconnect Fitting
336CB/346CB	Elevator Interconnect Fitting

F. Prepare for Installation

- S 224-016
- (1) Make sure that the points where the elevator attaches to the airplane structure are not worn (AMM 27-31-02/601).
- S 224-017
- (2) If a used bolt or bearing will be installed, make sure it does not have more than the permitted wear (AMM 27-31-02/601).

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S 644-052

- (3) Apply a thin layer of grease to the elevator hinge bushings and the actuator bolts.

S 214-019

- (4) Make sure that the seals at the locations that follow are not damaged:
- (a) The stabilizer trailing edge
  - (b) The inboard end of the outboard elevator.

S 964-053

- (5) Replace any damaged seals.  
G. Install the Elevator (Fig. 401)

S 434-020

- (1) Before installation, put in all of the bushings and bolts by hand.

**NOTE:** In some cases, burrs that are inside the bushings must be removed and sharp edges must be made smooth.

S 494-021

- (2) Do these steps to attach the sling to the elevator (Fig. 402):
- (a) Remove the plug bolts from the top surface of the elevator to install the inboard and outboard cable rings. Keep the plug bolts.
  - (b) Install the aft clamp assembly at the location shown.

S 944-022

- (3) Move the outboard elevator to the stabilizer trailing edge.

**NOTE:** If you use the loadpositioner, movement of the elevator can be made easier.

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- S 434-023
- (4) Install bolts (13), washer (14,15), bushing (17), and nut (16) in the reaction hinges, with head of bolt outboard for left side and right side of the airplane.
- S 434-024
- (5) Install bolt (12), washers (8,11), bushing (10), and nut (9) in the elevator hinge. Tighten nut (9) to 440-650 pound-inches (49.7-73.4 newton-meters).
- S 434-025
- (6) Install bolt (21), washers (18,22), bushing (20), and nut (19) in the elevator hinge. Tighten nut (19) to 440-650 pound-inches (49.7-73.4 newton-meters).
- S 434-026
- (7) Install bolt (28), washers (24,29), bushing (26,27), and nut (25) in the elevator hinge. Tighten nut (25) to 440-650 pound-inches (49.7-73.4 newton-meters).

NOTE: Only finger tighten bushing (26).

- S 434-027
- (8) Install bolts (13), washers (14,15), bushing (17), and nut (16) in the actuator rams with the bolt head outboard for the left side and the right side of the airplane.
- (a) Tighten the nut (16) to 1300-1500 pound-inches (146-169 newton-meters).
- S 424-057
- (9) Reconnect the Lost Motion Device control rod to the elevator attach point by installing the bolt, washer, and nut.

NOTE: Apply grease to the bolt shank before installation.

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S 434-028

- (10) Install the bonding jumpers (AMM 20-10-21/401).

NOTE: Bolts (2) are the electrical bonding fasteners to the elevators top skin panels.

- (a) Clean mating surfaces for the bonding jumper connection.

S 224-031

- (11) Use a bonding meter to make sure that the resistance of the bonding jumper connection is not more than 0.1 ohm (AMM 20-10-21/601).

S 434-030

- (12) Move the elevator to the neutral position and install the input control rod bolt with the bolt head on the outboard side.

NOTE: The input control rod stops actuator ram movement.

S 644-032

- (13) Lubricate the elevator hinge fittings (AMM 12-21-04/301).

S 424-033

- (14) Install the inboard elevator (AMM 27-31-01/401).

S 414-034

- (15) Install these access panels (AMM 06-42-00/201):

(a) For the left outboard elevator: 336BB, 335DB, 335EB, 335GB, 335HB, 335JB, 335KB, 335LB, 335MB, 335AFB, 335AJB, 335AKB, and 336CB.

(b) For the right outboard elevator: 346BB, 345DB, 345EB, 345GB, 345HB, 345JB, 345KB, 345LB, 345MB, 345AFB, 345AJB, 345AKB, and 346CB.

S 094-035

- (16) Remove the sling from the elevator.

S 434-036

- (17) Install the plug bolts on the top surface of the elevator.

H. Outboard Elevator Test

S 864-037

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

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S 214-038

- (2) Make sure that these circuit breakers on the overhead panel, P11, are closed:
- (a) 11L9, LEFT ENGINE OIL PRESS OR LEFT ENGINE OIL PRESS EICAS REF
  - (b) 11L36, RIGHT ENGINE OIL PRESS OR RIGHT ENGINE OIL PRESS \*\* \*\* EICAS REF.

S 864-039

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 864-040

- (4) Put the LEFT and CENTER STAB TRIM SHUTOFF VALVE switches on the control stand panel, P10, to NORM.

S 864-041

- (5) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF valve switches on the right side panel, P61, to ON.

S 864-042

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (6) Supply hydraulic power to the left, right, and center systems (AMM 29-11-00/201).

S 864-043

- (7) Move the stabilizer to two units of trim as shown on the stabilizer position indicator.

S 214-044

- (8) Make sure the control columns are at neutral.

S 864-045

- (9) Slowly move the outboard elevator to the full up position, then to the full down position.

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S 214-046

- (10) Let the control column go to the neutral position.

S 214-047

- (11) Make sure the elevator has a smooth and continuous movement.

S 824-048

- (12) If you made any structural or surface repair to the elevator, or replaced the old elevator with a new elevator, or made any changes to any one of the following four systems, then do the adjustments to the following four systems (AMM 27-31-00/501):

- (a) Elevator PCA control rods
- (b) Lost motion device input rod
- (c) Elevator PCA's
- (d) Elevator position transmitter rod.

S 734-049

- (13) Do the Elevator Neutral and Travel Limits Test (AMM 27-31-00/501).

I. Put the Airplane Back to Its Usual Condition

S 864-050

- (1) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-051

- (2) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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OUTBOARD ELEVATOR INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Outboard Elevator Removal/Installation for procedures to do these tasks.

TASK 27-31-02-226-001

2. Wear Limits for the Outboard Elevator (Fig. 601)

A. Access

- (1) Location Zones

337/347 Outboard Elevator

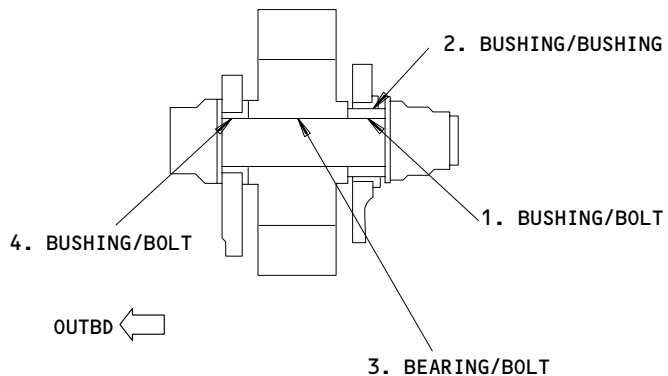
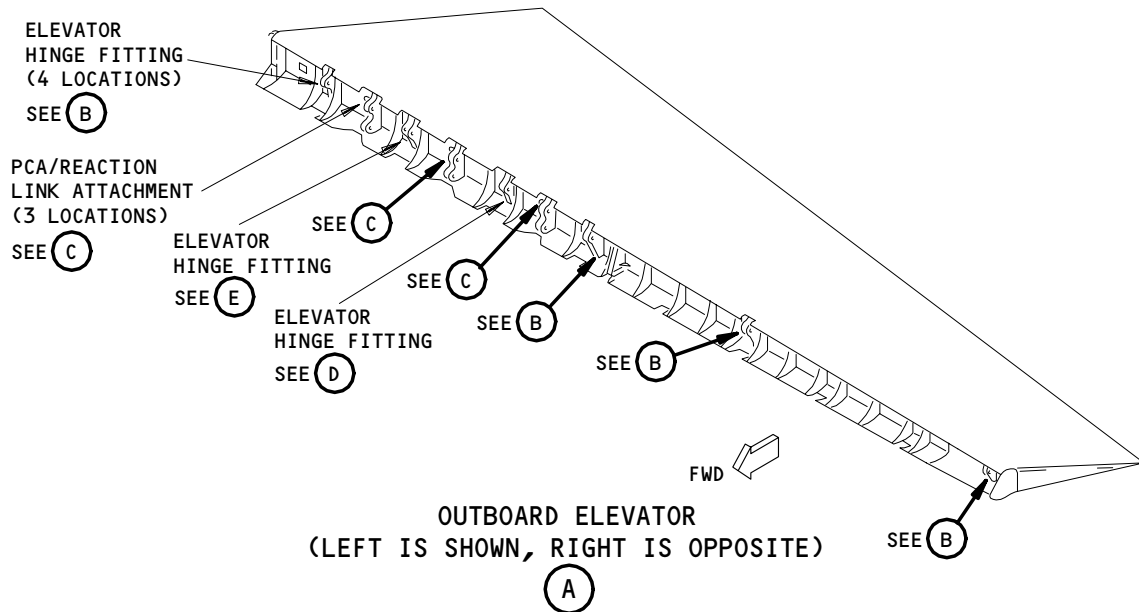
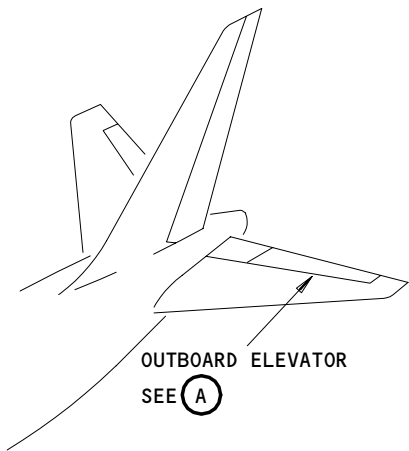
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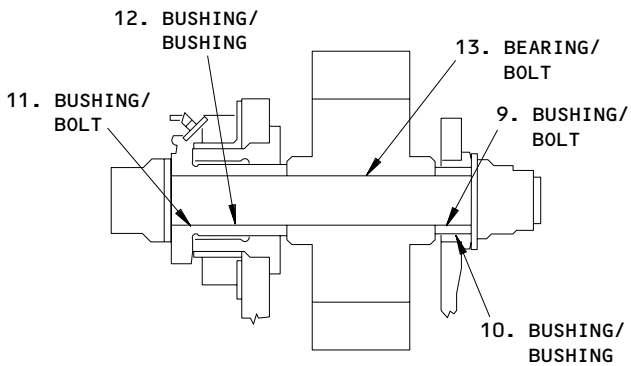


ELEVATOR HINGE FITTING  
(B)

Wear Limits for the Outboard Elevator  
Figure 601 (Sheet 1)

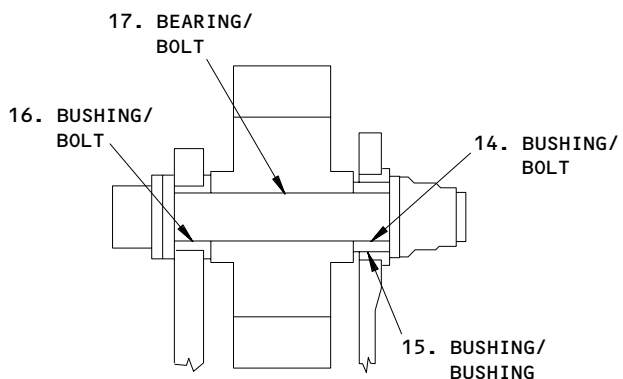
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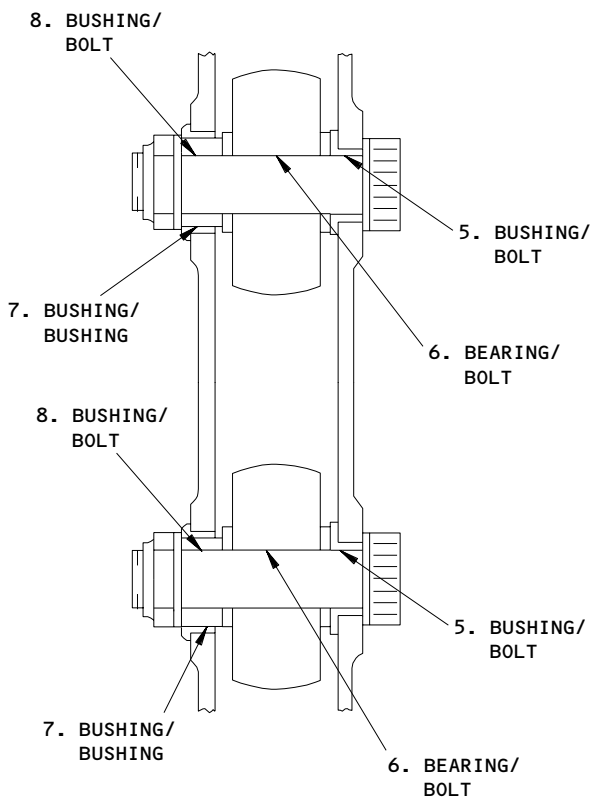
ELEVATOR HINGE FITTING

(D)



ELEVATOR HINGE FITTING

(E)



PCA/REACTION LINK ATTACHMENT

(C)

Outboard Elevator Wear Limits  
Figure 601 (Sheet 2)

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# BOEING

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4955 (12.586)		X		
2	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6915 (17.564)	0.0050 (0.127)		X	1
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6827 (17.341)		X		
3	BEARING	ID	0.4995 (12.687)	0.5000 (12.700)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4950 (12.573)		X		
4	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)		X	1
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4957 (12.591)		X		
5	BUSHING	ID	0.7495 (19.037)	0.7503 (19.058)	0.7540 (19.152)	0.0050 (0.127)		X	1
	BOLT	OD	0.7485 (19.012)	0.7490 (19.025)	0.7453 (18.931)		X		
6	BEARING	ID	0.7495 (19.037)	0.7500 (19.050)	0.7540 (19.152)	0.0050 (0.127)	X		
	BOLT	OD	0.7485 (19.012)	0.7490 (19.025)	0.7450 (18.923)		X		
7	BUSHING	ID	1.0620 (26.975)	1.0628 (26.995)	1.0665 (27.089)	0.0050 (0.127)		X	1
	BUSHING	OD	1.0605 (26.937)	1.0615 (26.962)	1.0578 (26.868)		X		
8	BUSHING	ID	0.7495 (19.037)	0.7500 (19.050)	0.7540 (19.152)	0.0050 (0.127)	X		
	BOLT	OD	0.7485 (19.012)	0.7490 (19.025)	0.7450 (18.923)		X		
9	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4955 (12.586)		X		
10	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6915 (17.564)	0.0050 (0.127)		X	1
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6827 (17.341)		X		

1 THIS PART CAN BE REPAIRED.

Wear Limits for the Outboard Elevator  
Figure 601 (Sheet 3)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4957 (12.591)		X		
12	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6917 (17.569)	0.0052 (0.132)	X		
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6825 (17.336)		X		
13	BEARING	ID	0.4995 (12.687)	0.5000 (12.700)	0.5045 (12.814)	0.0050 (0.127)		X	1
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4950 (12.573)		X		
14	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4955 (12.586)		X		
15	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6915 (17.564)	0.0050 (0.127)		X	1
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6827 (17.341)		X		
16	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)		X	1
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4957 (12.591)		X		
17	BEARING	ID	0.4995 (12.687)	0.5000 (12.700)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4950 (12.573)		X		

Wear Limits for the Outboard Elevator  
Figure 601 (Sheet 4)

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ELEVATOR INDEX PLATE – REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the elevator index plate.
- B. The steps to remove and install the right index plate are the same as the steps for the left index plate.
- C. It is important to mark the exact location of the initial index plate before removal. If you can not find the location of the initial index plate, it will be necessary to use a special tool to make sure the index plate is installed in the correct location.

TASK 27-31-03-024-001

2. Remove the Elevator Index Plate

A. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 24-22-00/201, Electrical Power – Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

(1) Location Zones

- 211/212 Control Cabin
- 311/312 Area Aft of Pressure Bulkhead to BS 1725
- 315/316 APU Compartment

(2) Access Panels

- 312AR Forward Stabilizer Compartment
- 315AL/316AR Elevator Index Plate Rivets

C. Prepare for the Removal

S 864-002

- (1) Supply electrical power (Ref 24-22-00).

S 864-031

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Pressurize the left and center hydraulic systems (Ref 29-11-00).

S 014-032

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR AND THE CONTROLS BAY ACCESS DOOR, 313AL. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (3) Open the access door for the forward stabilizer compartment, 312AR (Ref 06-42-00).

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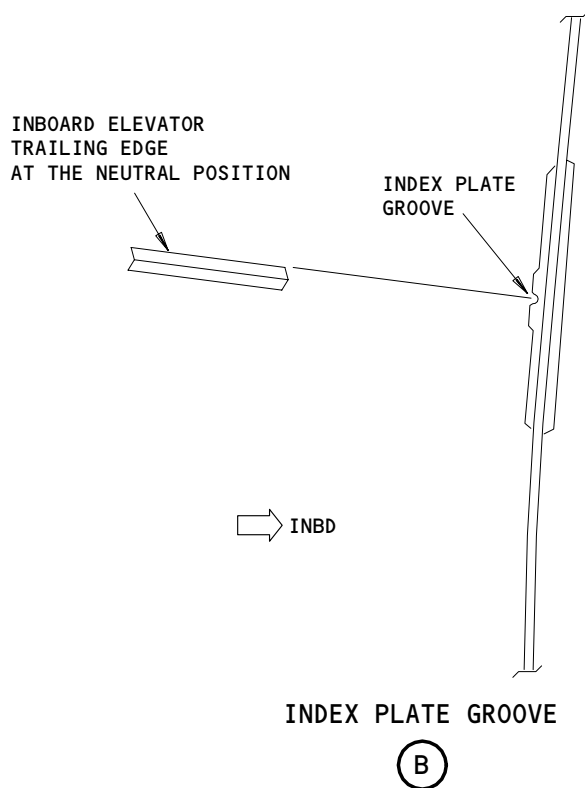
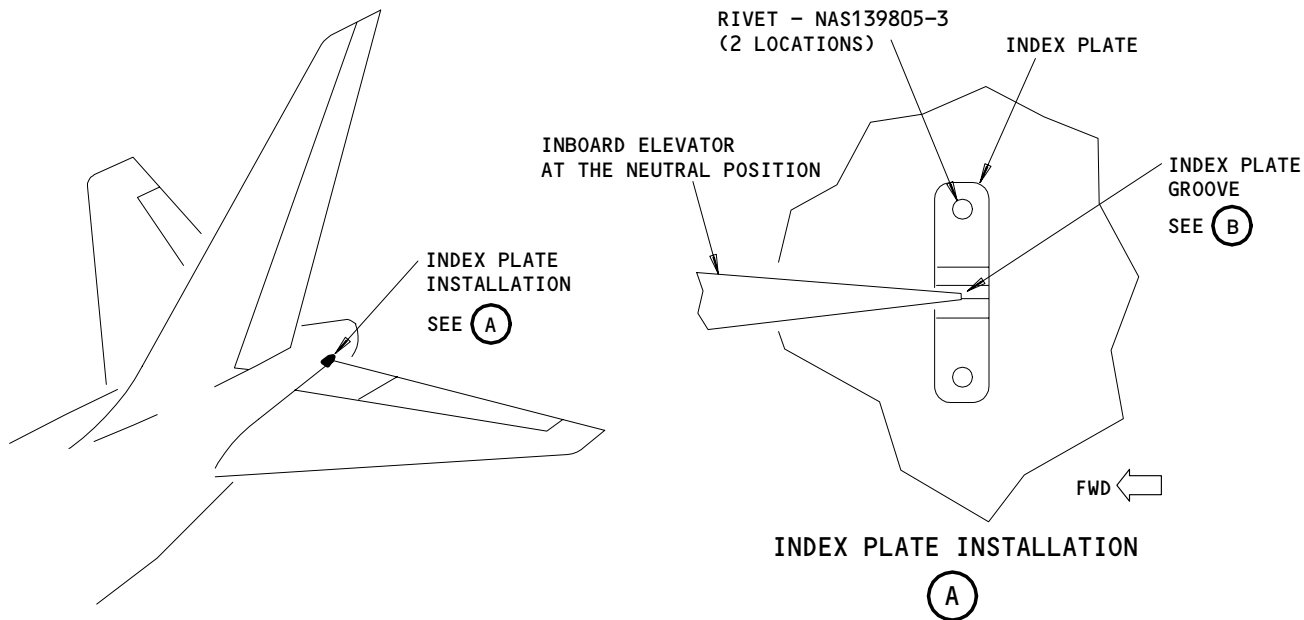
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Elevator Index Plate Installation  
Figure 401

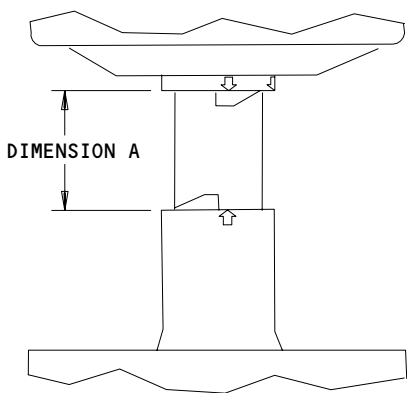
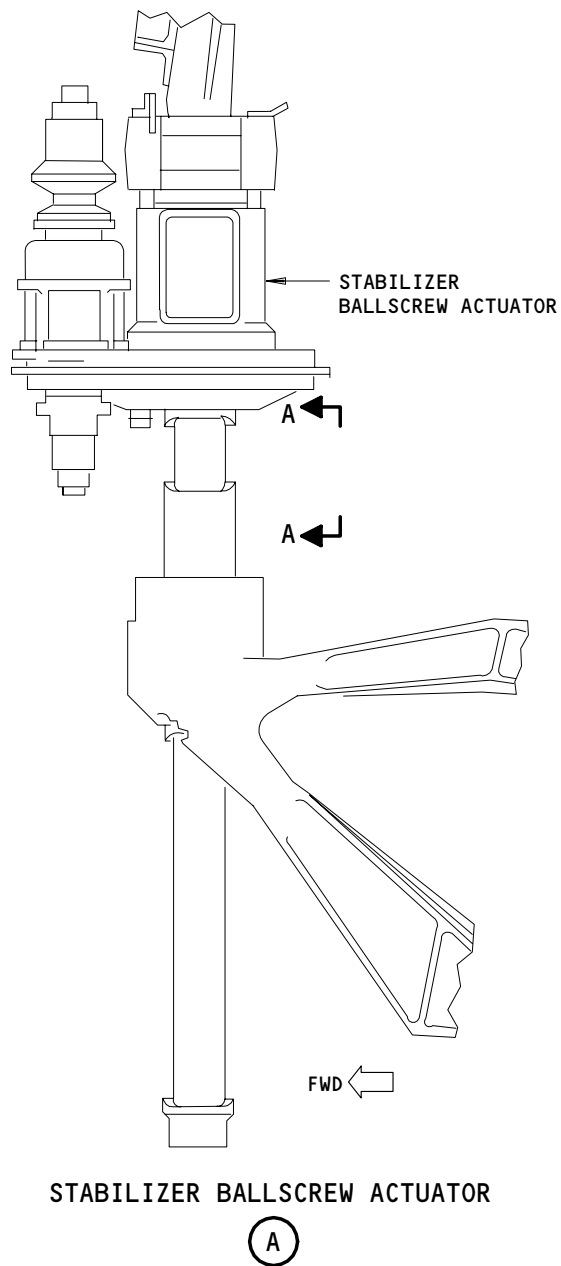
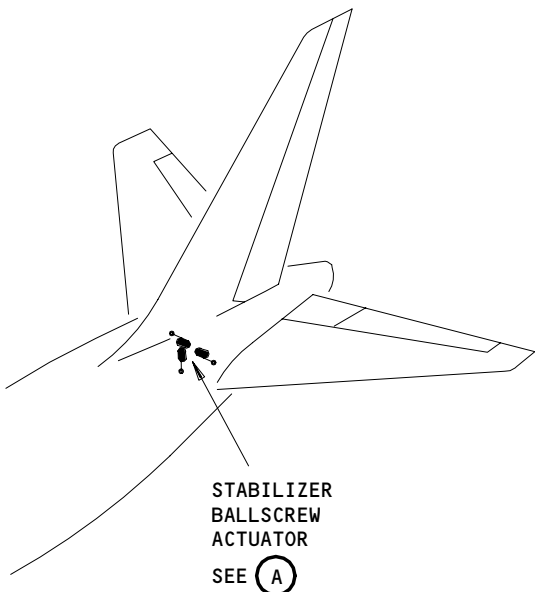
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A-A

Stabilizer Ballscrew Actuator Dimension A  
Figure 402

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S 864-005

- (4) Move the stabilizer until Dimension A on the stabilizer ballscrew actuator is  $3.84 \pm 0.03$  inches (97.5 +/- 0.762 mm) (neutral position) (Fig. 402).

S 864-006

- (5) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the CUTOUT position.

S 864-007

- (6) Put the LEFT, RIGHT and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.

S 864-008

- (7) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 014-009

- (8) Open the access doors, 315AL and 316AR, for access to the index plate rivets (Ref 06-42-00).

D. Remove the Elevator Index Plate

S 864-010

- (1) Move the control columns to the full forward position.

S 984-011

- (2) Manually turn the trailing edge of the elevator down, away from the index plate.

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S 934-034

- (3) Mark the position of the index plate onto the airplane fuselage.

**NOTE:** The new index plate will need to be installed in the same position as the old index plate.

S 034-012

- (4) Remove the rivets that connect the index plate to the airplane fuselage.

S 024-013

- (5) Remove the index plate.

TASK 27-31-03-424-014

3. Install the Elevator Index Plate

A. Equipment

- (1) Scale to Measure the Linear Dimension (Accurate to  $\pm 0.01$  inch (  $\pm 0.25$  mm)) - Commercially Available

B. Consumable Materials

- (1) A00247 Sealant, Chromate Type - BMS 5-95  
(2) Rivets, Blind, 100 Degree Flush Head - NAS1398D5-3 (Two are necessary)

C. References

- (1) 06-42-00/201, Empennage Access Doors and Panels  
(2) 24-22-00/201, Electrical Power - Control  
(3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

- (1) Location Zones  
211/212 Control Cabin  
311/312 Area Aft of Pressure Bulkhead to BS 1725  
315/316 APU Compartment
- (2) Access Panels  
312AR Forward Stabilizer Compartment  
315AL/316AR Elevator Index Plate Rivets

E. Install the Elevator Index Plate (Fig. 401)

S 434-015

- (1) Align the new index plate with the marks made on the fuselage.  
(a) Make sure the rivet holes in the fuselage align with the holes in the index plate.

**NOTE:** If the rivet holes in the fuselage do not align with the holes in the index plate, new holes must be drilled in the index plate using the old index plate as a guide.

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S 394-021

- (2) Apply a layer of sealant between the index plate and the airplane fuselage.

S 424-023

- (3) Install the index plate on the airplane fuselage with rivets, NAS1398D5-3.

S 864-016

- (4) Do the steps that follow to move the elevator to the neutral position, with the middle PCA only:

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (a) Pressurize the left, right and center hydraulic systems (Ref 29-11-00).

**NOTE:** The elevator surface will droop if all three hydraulic systems are not pressurized.

- (b) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead panel, P11:  
1) 11H27, FLT CONT SHUTOFF TAIL RIGHT
- (c) Put the RIGHT FLT CONT SHUTOFF TAIL valve switch on the right side panel, P61, to the ON position.
- (d) Move the control column forward and aft quickly 4 to 5 times.

**NOTE:** Move the control column less than one inch about its neutral position.

- (e) Let the control column go to the neutral position.

S 824-017

- (5) Put a straight edge on the top surface of the elevator trailing edge and extend it to the fuselage.

S 824-019

- (6) Make sure that the groove in the index plate aligns with the straight edge (Detail B).

F. Put the Airplane Back to Its Usual Condition

S 864-024

- (1) Remove the power from the left and center hydraulic systems (Ref 29-11-00).

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- S 864-025
- (2) Remove electrical power if it is not necessary (Ref 24-22-00).
- S 864-026
- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
- S 864-027
- (4) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the NORM position.
- S 864-028
- (5) Put the LEFT and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the ON position.
- S 414-029
- (6) Close the access panels for the auxiliary power unit, 315AL and 316AR (Ref 06-42-00).
- S 414-030
- (7) Close the access door for the forward stabilizer compartment, 312AR (Ref 06-42-00).

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ELEVATOR POWER CONTROL ACTUATOR LOCK TOOL – MAINTENANCE PRACTICES

1. General

- A. This procedure contains steps to remove and install the elevator power control actuator (PCA) locks. These locks are installed when it is necessary to hold the elevator surface in the full up position in order to perform maintenance.

TASK 27-31-05-022-001

2. Install the Elevator Power Control Actuator Lock Tool

A. General

- (1) This task contains two procedures, one to install the elevator power control actuator (PCA) locks and one to remove the elevator power control actuator (PCA) locks.

B. Equipment

- (1) Lock – Elevator Actuator – A27111-11  
(2) Elevator PCA Gage – A27001-3

C. References

- (1) AMM 06-42-00/201, Empennage 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 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

- (1) Location Zones  
211/212 Control Cabin  
335/345 Horizontal Stabilizer, Rear Spar to Trailing Edge
- (2) Access Panels  
335EB/335GB/335HB/335AFB Left Elevator PCAs  
345EB/345GB/345HB/345AFB Right Elevator PCAs

E. Do the procedure.

S 862-002

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE AREA BELOW THE ELEVATOR. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF AN OBJECT FALLS.

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

S 862-003

- (2) Put the LEFT and CENTER STAB TRIM SHUTOFF TAIL valve switches on the control stand panel, P10, to the CUTOUT position.

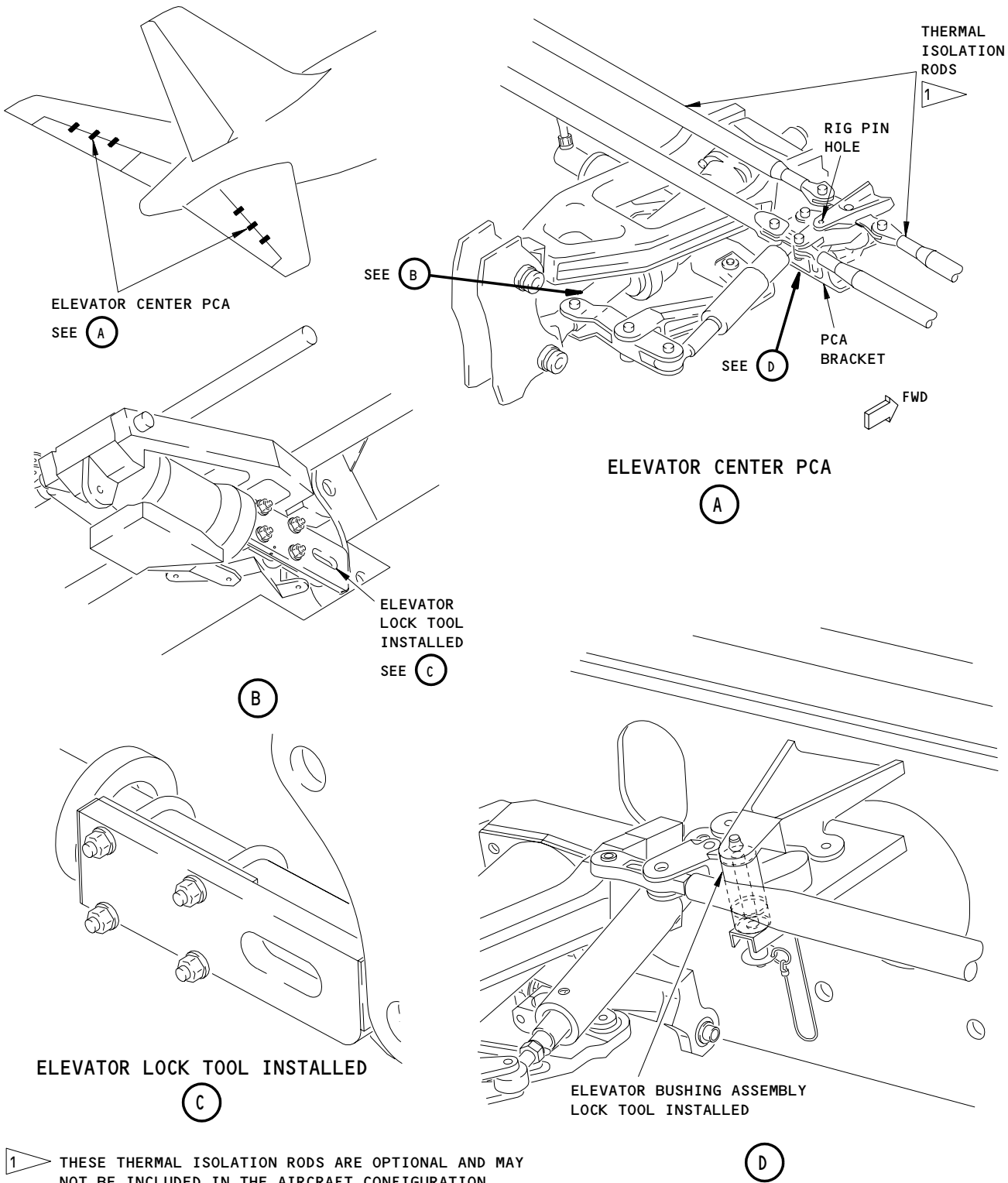
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Elevator Lock Tool Installation  
Figure 201

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S 862-004

- (3) Do the steps that follow to remove the hydraulic power:
- (a) Remove the pressure from the left, right, and center hydraulic systems and reservoirs (AMM 29-11-00/201).
  - (b) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.
  - (c) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
    - 1) 11A36, ALT STAB TRIM
    - 2) 11C12, STAB TRIM SHUTOFF L
    - 3) 11C13, STAB TRIM SHUTOFF CENTER
    - 4) 11H17, FLT CONT SHUTOFF TAIL LEFT
    - 5) 11H18, FLT CONT SHUTOFF TAIL CTR
    - 6) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 862-005

**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.

- (4) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 862-063

- (5) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

S 012-006

- (6) Remove these access panels (AMM 06-42-00/201):
- (a) For the left elevator PCAs:  
335EB, 335GB, 335HB, and 335AFB
  - (b) For the right elevator PCAs:  
345EB, 345GB, 345HB, and 345AFB

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S 982-067

- (7) In the control cabin, pull either control column aft (Nose Up) to its limit of travel and hold it in this position while performing the following operation.
- (a) Install the elevator bushing assembly lock tool on the middle elevator bellcrank (Fig. 201).

S 982-068

- (8) Slowly release the control column until it stops moving and attach a DO-NOT-OPERATE tag on each control column.

S 032-072

**CAUTION:** DO NOT SUPPLY HYDRAULIC SYSTEM PRESSURE TO ANY ELEVATOR PCA WHEN THE ELEVATOR ACTUATOR LOCKS (A27111-11) ARE INSTALLED. DAMAGE TO ELEVATOR PCAs MAY OCCUR IF ONE OR MORE ELEVATOR PCAs OF A SURFACE OPERATE WITH THE ELEVATOR ACTUATOR LOCKS INSTALLED AT THE SURFACE.

IF THIS PROCEDURE IS BEING REFERENCED BY ANOTHER MAINTENANCE TASK AND THE REMOVAL OF THE ELEVATOR PCA IS NOT REQUIRED, INSTALL THE ELEVATOR LOCK TOOL ON ALL THREE ACTUATORS FOR THE SURFACE THAT IS BEING WORKED ON.

- (9) At the elevator surface that is to be raised and locked, lift the elevator trailing edge up (by hand) the amount necessary to enable installation of the Elevator Actuator Locks. Install the Elevator Actuator Locks on the two PCAs which are not being removed (Fig. 201).

F. Remove the Elevator PCA Locks

S 982-009

- (1) At the elevator surface where Elevator Actuator Locks are to be removed, lift the elevator trailing edge up (by hand) the amount necessary to remove loading from the Elevator Actuator Locks. Remove the Elevator Actuator Locks at each of the elevator PCAs of the control surface (Fig. 201).

S 982-071

- (2) Remove the DO-NOT-OPERATE tags from the control columns.

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S 982-011

- (3) In the control cabin, pull either control column aft (Nose Up) to its limit of travel and hold it in this position while performing the following:
  - (a) Remove the lock tool for the middle elevator bellcrank (Fig. 201).

S 982-012

- (4) Gradually release the control column from the aft position and allow the control column to return to the centered position.

S 862-064

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

S 862-070

- (6) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 overgead circuit breaker panel:
  - (a) 11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 862-065

- (7) Put the LEFT, RIGHT and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the ON position.

S 862-066

- (8) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the NORM position.

S 862-015

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

G. Put the Airplane Back to Its Usual Condition

S 412-061

- (1) Install these access panels (AMM 06-42-00/201):
  - (a) For the left elevator PCAs:  
335EB, 335GB, 335HB, and 335AFB

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(b) For the right elevator PCAs:  
345EB, 345GB, 345HB, and 345AFB

S 862-062

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

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ELEVATOR POWER CONTROL ACTUATOR/REACTION LINK - REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the elevator power control actuators (PCAs) and the reaction link.

TASK 27-31-05-024-001

2. Remove the Elevator PCA and Reaction Link

A. General

- (1) This task contains two procedures, one to remove the elevator power control actuator (PCA), and one to remove the reaction link. Because this task contains two procedures, only the applicable group of steps must be done.

To start one of these procedures, do the "Prepare for the Removal" group of steps. Then, do the group of steps that is necessary to remove the component.

NOTE: The LEFT hydraulic system supplies power to the outboard PCA.  
The CENTER hydraulic system supplies power to the inboard PCA.  
The RIGHT hydraulic system supplies power to the middle PCA.

B. Equipment

- (1) Elevator PCA Gage - A27001-3

C. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels  
(2) AMM 24-22-00/201, Electrical Power - Control  
(3) AMM 27-31-05/201, Elevator Power Control Actuator/Reaction Link  
(4) AMM 27-61-00/201, Spoiler/Speedbrake Control System  
(5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

- (1) Location Zones  
335/345 Horizontal Stabilizer, Rear Spar to Trailing Edge

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- (2) Access Panels
  - 335EB/335GB/335HB/335AFB Left Elevator PCAs
  - 335ANZ/335APZ/335AQZ
  - 345EB/345GB/345HB/345AFB Right Elevator PCAs
  - 345ANZ/345APZ/345AQZ

E. Prepare for the Removal (Fig. 401)

**NOTE:** Missing PCA, rod end and trunnion bearing dust seals are not reasons for removing the PCA. Seals should be replaced at convenience or overhaul. The bearings will generate a small amount of dark colored powder which may be observed at the edge of the bearing lines. This powder is the normal product of the self lubricating bearing liner.

S 434-074

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE AREA BELOW THE ELEVATOR. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF AN OBJECT FALLS.

- (1) Remove these access panels (AMM 06-42-00/201):
  - (a) For the left elevator PCAs:
    - 1) 335EB, 335GB, 335HB, and 335AFB
    - 2) 335ANZ, 335APZ, and 335AQZ
  - (b) For the right elevator PCAs:
    - 1) 345EB, 345GB, 345HB, and 345AFB
    - 2) 345ANZ, 345APZ, and 345AQZ

S 424-077

- (2) Install the Elevator PCA Actuator Locks (AMM 27-31-05/201)
- F. Remove the Elevator PCA (Fig.401)

S 034-076

**WARNING:** DO NOT REMOVE MORE THAN ONE INPUT CONTROL ROD AT A TIME. AND MAKE SURE THAT THE MOTION LIMITER TOOL IS INSTALLED. IF YOU REMOVE MORE THAN ONE INPUT CONTROL ROD, THE ELEVATOR CAN FALL. THIS CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

**CAUTION:** MAKE SURE THE ENDS OF THE INPUT CONTROL ROD ARE DISCONNECTED. IF ONE END OF THE INPUT CONTROL ROD IS CONNECTED, DAMAGE TO THE BEARING CAN OCCUR TO THAT ROD END.

- (1) Remove the bolts (1, 3), washers (4, 16), nuts (5, 12), and bushing (9) to disconnect the ends of the input control rod (2).

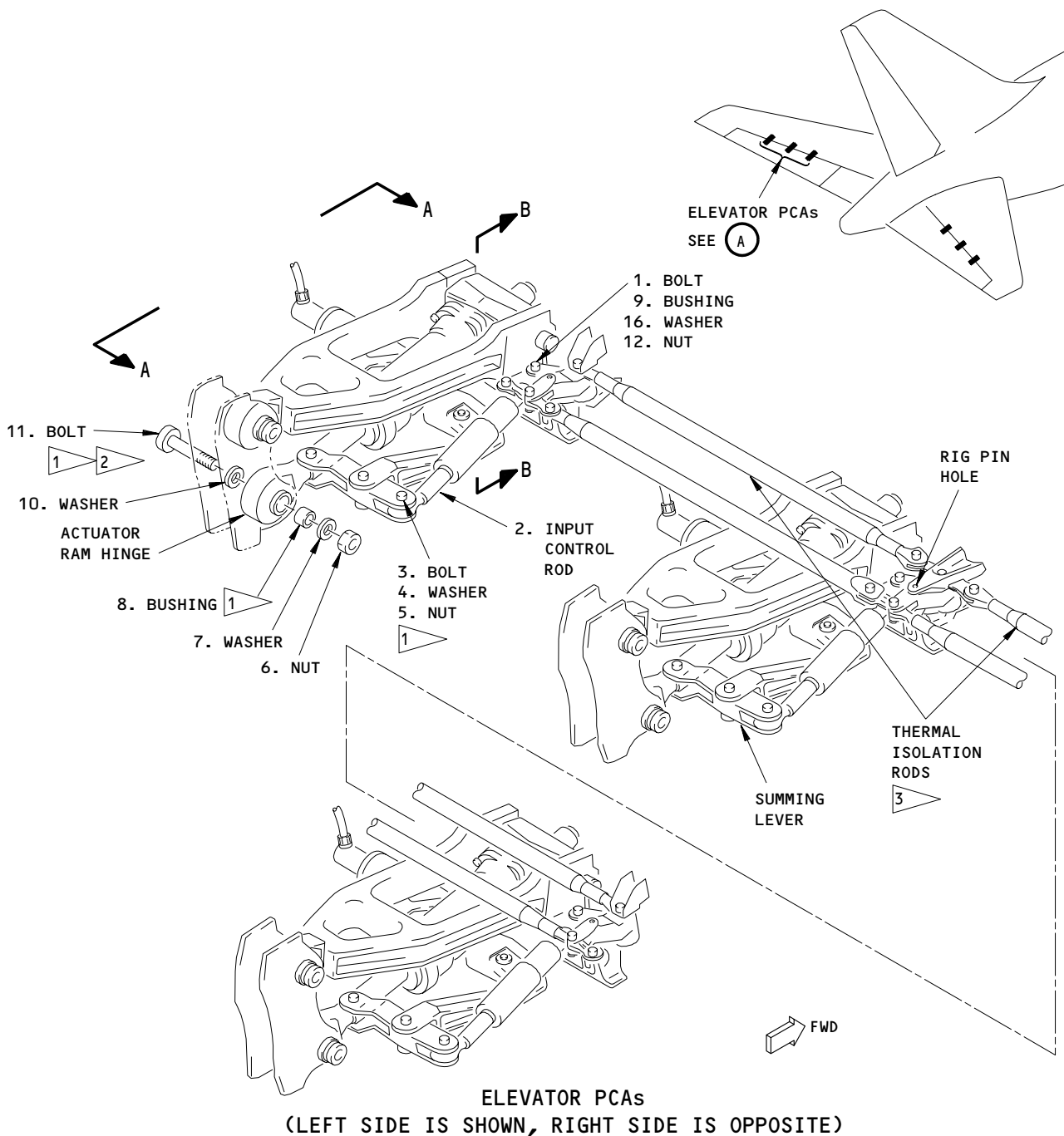
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**ELEVATOR PCAs**  
(LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE)

- A**
- 1 ▽ APPLY GREASE TO ALL SURFACES
  - 2 ▽ INSTALL BOLT WITH HEAD OF BOLT OUTBOARD FOR LEFT AND RIGHT WING ACTUATORS.
  - 3 ▽ THESE THERMAL ISOLATION RODS ARE OPTIONAL AND MAY NOT BE INCLUDED IN THE AIRCRAFT CONFIGURATION.

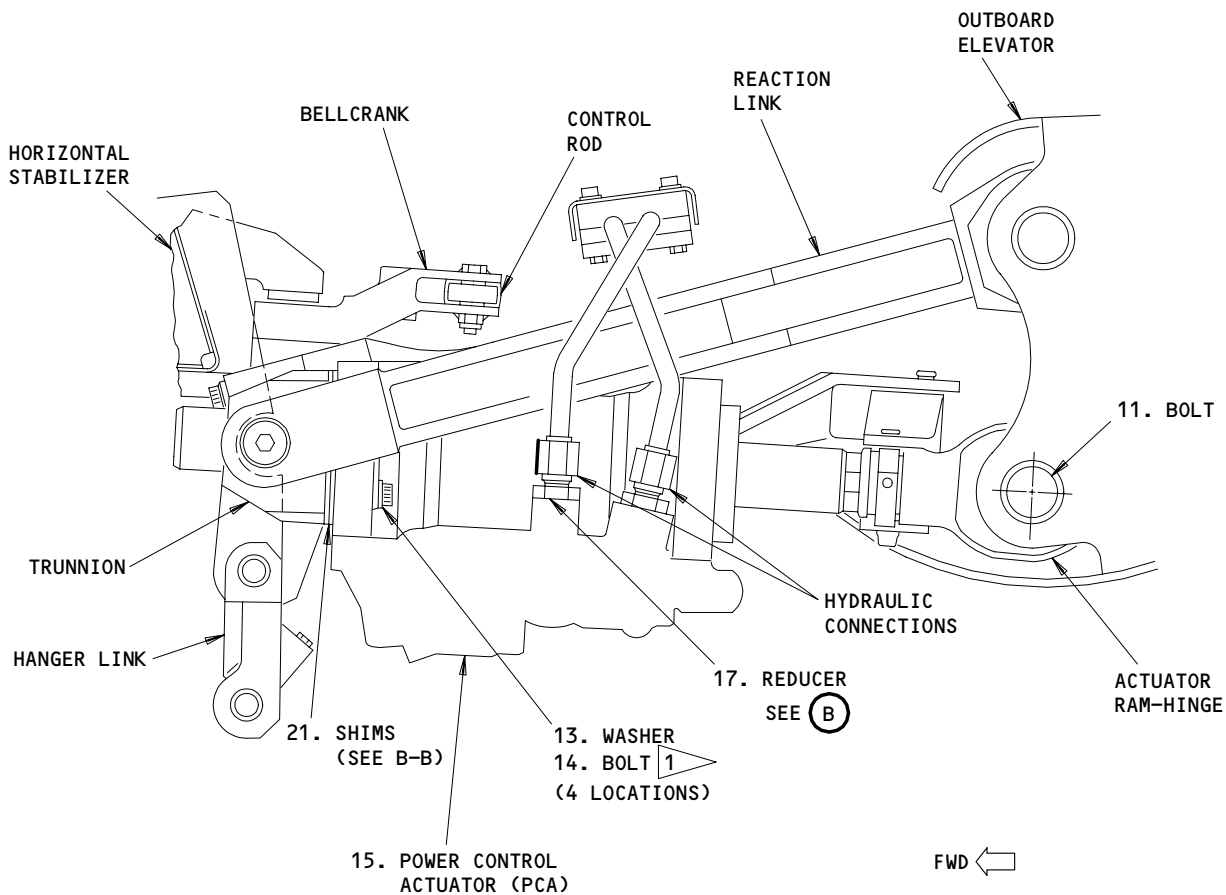
**Elevator Power Control Actuator (PCA) Installation**  
Figure 401 (Sheet 1)

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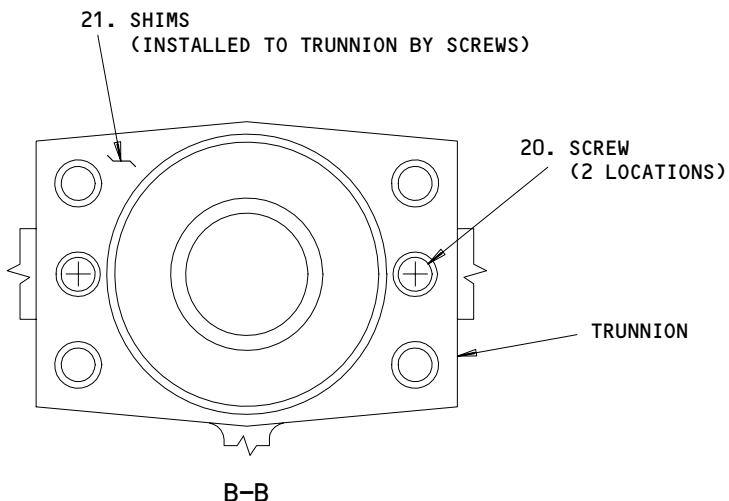
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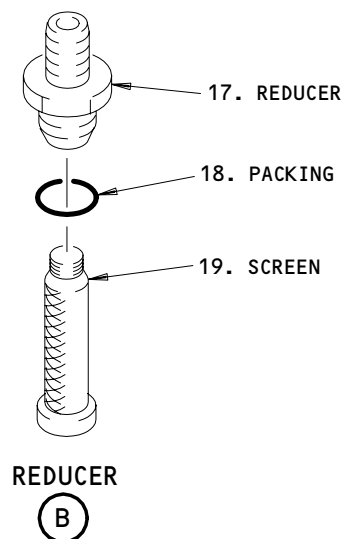
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A-A



B-B



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(B)

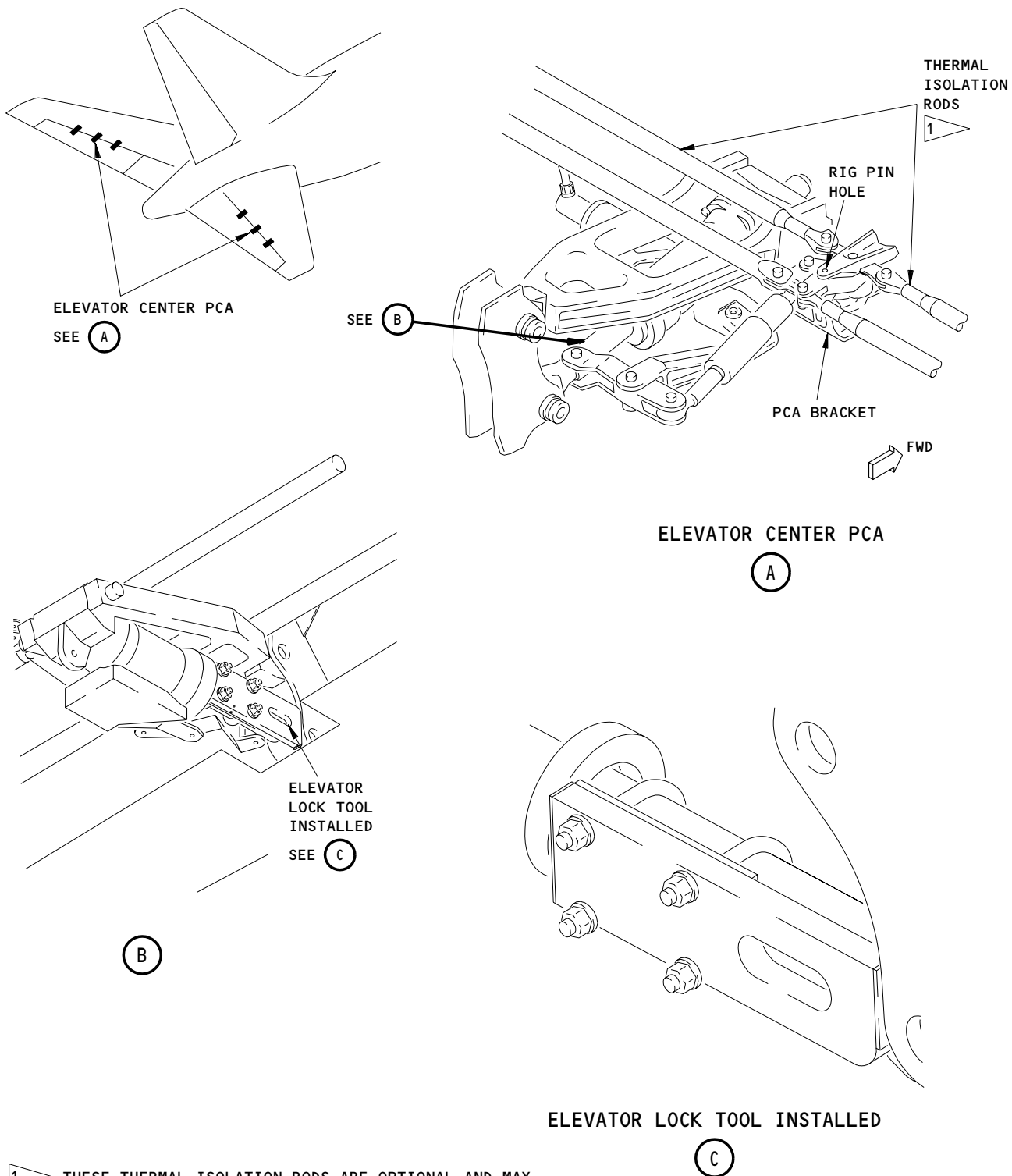
Elevator Power Control Actuator Installation  
Figure 401 (Sheet 2)

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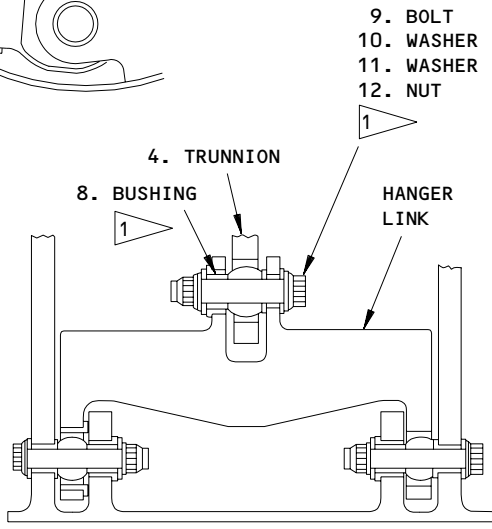
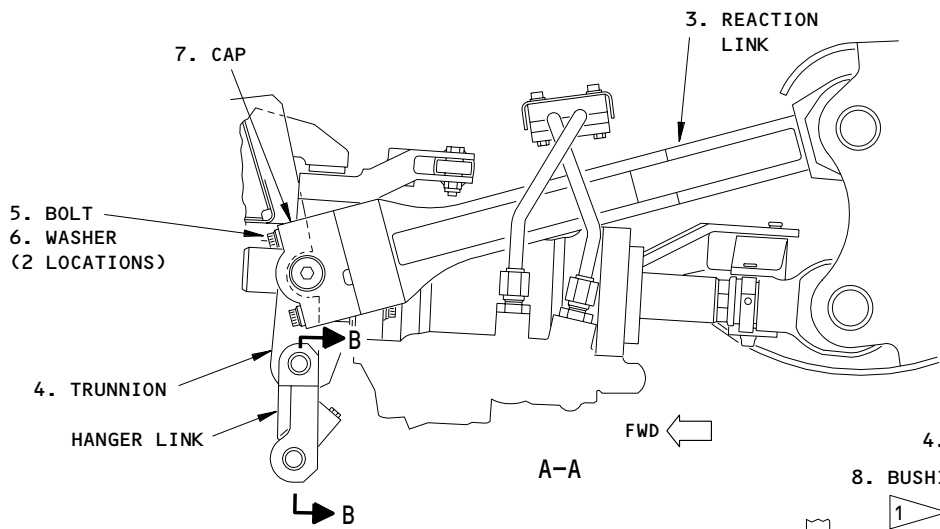
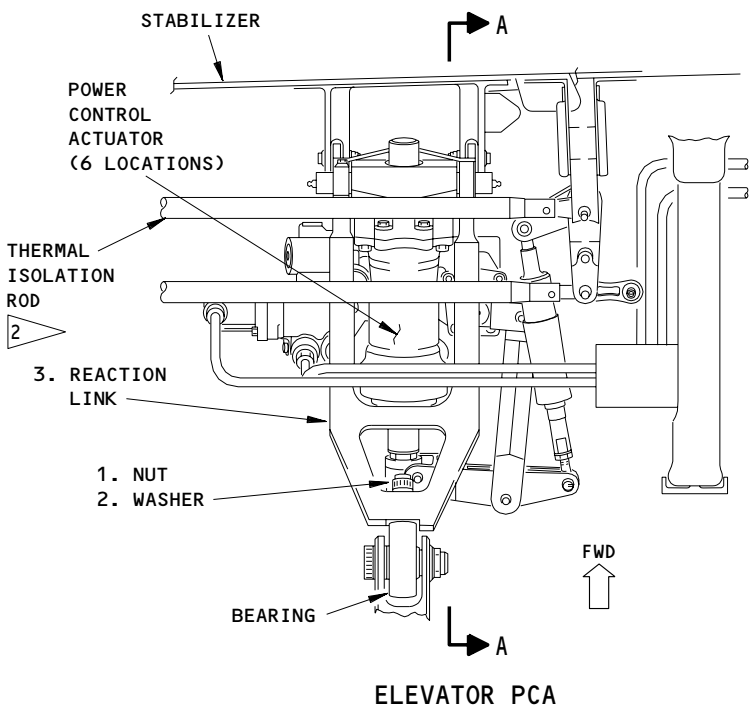
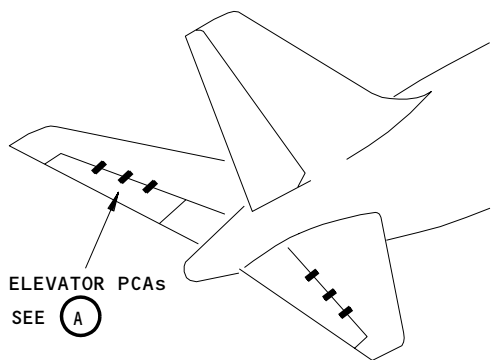
Elevator Lock Tool Installation  
Figure 402

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- 1 APPLY GREASE TO ALL SURFACES
- 2 THIS THERMAL ISOLATION ROD IS OPTIONAL AND MAY NOT BE INCLUDED IN THE AIRCRAFT CONFIGURATION.

Elevator Power Control Actuator Reaction Link Installation  
Figure 403

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S 034-009

- (2) Remove the input control rod.

NOTE: Do not change the adjustment of the input control rod during the removal/installation procedure.

S 034-014

- (3) Disconnect the hydraulic pressure and return lines from the PCA (15).  
(a) Put plugs in the hydraulic lines and caps on the ports.

S 964-015

- (4) Do the steps that follow to replace the screen (filter) in the PCA hydraulic port, if it is necessary:  
(a) Remove the reducer (17) from the hydraulic port.  
(b) Remove the screen (19) from the reducer (17).  
(c) Install a new screen (19) with new packing (18) in the reducer (17).  
(d) Install the reducer (17) in the PCA hydraulic port and tighten the reducer as follows:  
1) Tighten the reducer to 270-300 pound-inches (30.5-33.9 newton-meters).

S 824-016

- (5) Hold the PCA (15).

NOTE: Each PCA weighs approximately 25 pounds (11.3 Kg).

S 034-017

- (6) Remove the nut (6), washers (7, 10), bolt (11), and bushing (8) from the PCA ram hinge.

NOTE: The PCA can turn down a small distance.

S 034-018

- (7) Remove the four bolts (14) and washers (13) that connect the PCA to the trunnion.

NOTE: Do not remove the shims (21) that are held on the trunnion by screws (20). The thickness of the shims (21) change the adjustment and operation of the elevator control system.

S 024-019

- (8) Remove the PCA (15).

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S 964-020

- (9) If the shims (21) are damaged, install shims with the same thickness as the used shims.

**NOTE:** If you must install new shims, you can use tool No. A27001-3 which is the elevator PCA gage to measure the shim thickness (Fig. 404).

G. Remove the Reaction Link (Fig. 403)

S 034-021

- (1) Remove the elevator PCA (Refer to the Remove the Elevator PCA procedure).

S 824-022

- (2) Hold the reaction link (3) and the trunnion (4) in their correct positions.

S 034-023

- (3) Remove the bolt (9) to disconnect the trunnion (4) from the hanger link.

S 034-024

- (4) Remove the nut (1) to disconnect the reaction link (3) from the bearing.

S 034-025

- (5) Remove the reaction link (3) and the trunnion (4) as an assembly.

S 024-026

- (6) Do the steps that follow to disconnect the reaction link (3) from the trunnion (4):  
(a) Remove the bolts (5) to disconnect the cap (7) from the reaction link (3).

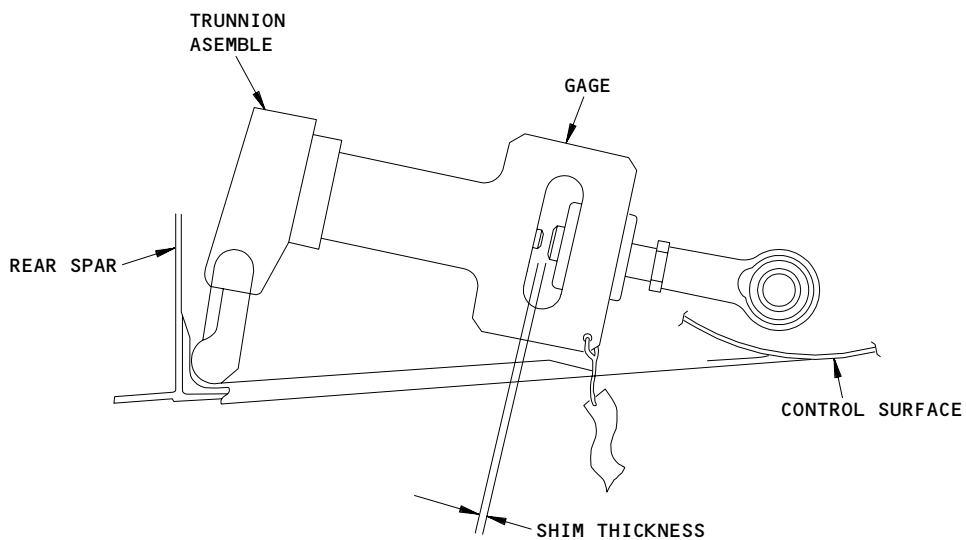
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Elevator PCA Gage Installation  
Figure 404

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F17569



- (b) Remove the cap from the trunnion (4).
- (c) Remove the trunnion (4) from the reaction link (3).

TASK 27-31-05-424-027

3. Install the Elevator PCA and Reaction Link

A. General

- (1) This task contains two procedures, one to install the elevator power control actuator (PCA), and one to install the reaction link. Because this task contains two procedures, only the applicable group of steps must be done.

At the end of the installation do the "Put the Airplane Back to Its Usual Condition" procedure.

**NOTE:** The LEFT hydraulic system supplies power to the outboard PCA.  
The CENTER hydraulic system supplies power to the inboard PCA.  
The RIGHT hydraulic system supplies power to the middle PCA.

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00015 Grease - BMS 3-24 (Alternate)

C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	15	Power Control Actuator	27-31-05	01	296
	18	Packing			330
	19	Screen			335

D. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-31-00/501, Elevator Control System
- (4) AMM 27-31-05/201, Elevator Power Control Actuator/Reaction Link
- (5) AMM 27-31-05/601, Elevator Power Control Actuator/Reaction Link

E. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 335/345 Horizontal Stabilizer, Rear Spar to Trailing Edge

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- (2) Access Panels
  - 335EB/335GB/335HB/335AFB      Left Elevator PCAs
  - 335ANZ/335APZ/335AQZ
  - 345EB/345GB/345HB/345AFB      Right Elevator PCAs
  - 345ANZ/345APZ/345AQZ

F. Install the Reaction Link (Fig. 403)

S 224-047

- (1) Make sure the wear on the trunnion and reaction link attach points is less than the permitted limits (AMM 27-31-05/601).

S 434-048

- (2) Do the steps that follow to attach the trunnion (4) to the reaction link (3):
  - (a) Put the trunnion (4) into the hole on one side of the reaction link.
  - (b) Install the cap (7) on the trunnion (4).
  - (c) Install the bolts (5) and washers (6) and tighten the bolts as follows:
    - 1) Tighten the bolts (5) to 175-225 pound-inches (19.8-25.4 newton-meters).
  - (d) Install a lockwire to connect the cap and trunnion to the reaction link.

S 434-049

- (3) Install the reaction link on the bearing.

S 434-050

- (4) Install the nut (1) and washer (2) to connect the reaction link to the bearing and tighten the nut as follows:
  - (a) Tighten the nut (1) to 950-1100 pound-inches (107.3-124.2 newton-meters).

S 434-051

- (5) Install the bolt (9), washers (10, 11), nut (12) and bushing (8) to connect the trunnion and reaction link to the hanger link.

S 434-052

- (6) Install the elevator PCA.

G. Install the Elevator PCA (Fig. 401)

S 224-028

- (1) Make sure the PCA attach points are in the permitted wear limits (AMM 27-31-05 601).

S 644-029

- (2) Apply a layer of grease on all of the bolt (14) surfaces.

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S 434-030

- (3) Hold the PCA in position and install the bolts (14) and washers (13) and tighten the bolts as follows:
- (a) Tighten the bolts (14) to 175-225 pound-inches (19.78-25.4 newton-meters).

S 824-031

- (4) Carefully align the PCA ram with the lugs on the fitting where the PCA attaches to the elevator.

S 644-032

- (5) Apply a thin layer of grease to the bushing (8).

S 434-033

- (6) Install the bushing (8) in the lug.

**NOTE:** Install bushing (8) in the inboard lug of the elevator attachment.

S 284-055

- (7) Make sure the run-on torque on the nut (6) is 90-400 pound-inches (10.1-45.1 newton-meters).

S 644-034

- (8) Apply a layer of grease to all of the bolt (11) surfaces.

S 434-035

- (9) Install the bolt (11), washer (7), and nut (6) and tighten the nut as follows:
- (a) Make sure you install the bolt (11) with the bolt head outboard for left and right wing actuators.
  - (b) Tighten the nut (6) to 1300-1500 pound-inches (147-169 newton-meters).

S 434-036

- (10) Remove the plugs and caps in the hydraulic lines and ports.

S 644-037

- (11) Apply an assembly lubricant to the hydraulic fittings.

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S 434-038

(12) Connect the hydraulic lines to the PCA.

S 644-039

(13) Apply grease to the bushing (9) and bolts (1, 3).

S 434-040

(14) Hold the input control rod (2) in its correct position and install bushing (9), bolts (1, 3), washers (4, 16), and nuts (5, 12).

S 434-067

(15) Remove the Elevator PCA Locks (AMM 27-31-05/201).

S 824-046

(16) Do the steps that follow to adjust the PCA input rod:

**NOTE:** This procedure is applicable if you replaced 1 PCA. If you replaced more than 1 PCA, do the Adjust the Power Control Actuator (PCA) Input Rods (AMM 27-31-00/501).

(a) Do these steps to find the datum position:

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERON, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- 1) Pressurize the center hydraulic system (AMM 29-11-00/201).
- 2) Make sure the Dimension A (Fig. 405) on the stabilizer trim ballscrew actuator is 3.84 +/-0.03 inches (97.5 +/- 0.762 mm).

**CAUTION:** DO NOT PRESSURIZE THE PITOT SYSTEM MORE THAN 4.75 PSIG (426 KNOTS). DAMAGE CAN OCCUR TO THE AIRPLANE IF YOU PRESSURIZE THE PITOT SYSTEM MORE THAN 4.75 PSIG (426 KNOTS).

- 3) Pressurize the auxiliary pitot systems to 4.0 psig (395 knots) (AMM 34-11-00/201).

**NOTE:** The purpose of pressurizing the auxiliary pitot line is to provide a hard centering force on the cam in the elevator feel and centering unit to make sure that the elevator system is in the neutral position.

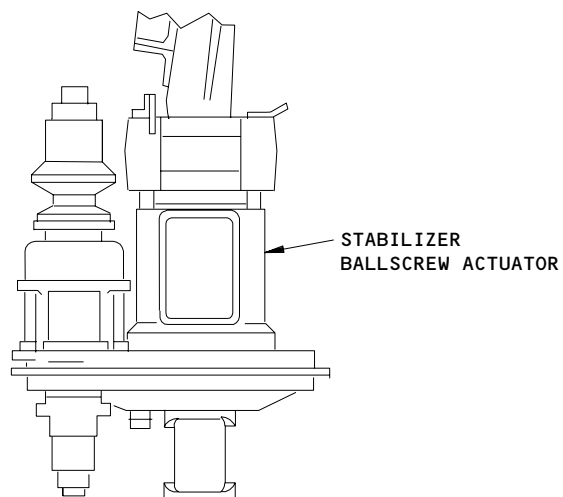
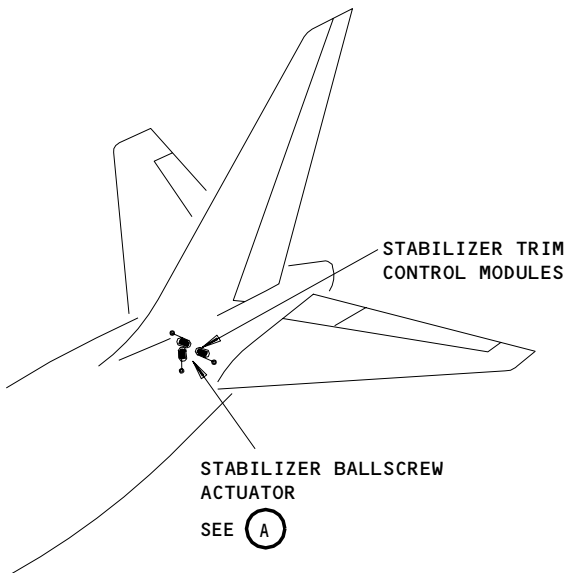
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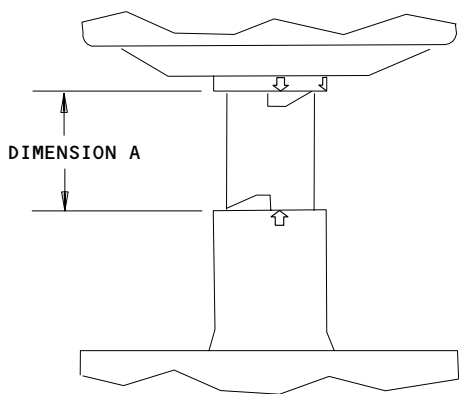
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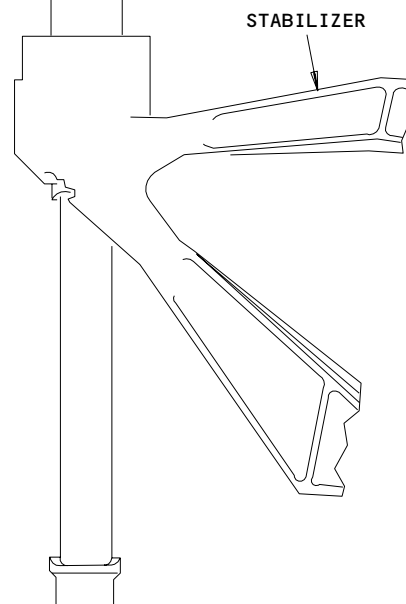


↗ A

↘ A



A-A



STABILIZER BALLSCREW ACTUATOR

(A)

Stabilizer Trim Ballscrew Actuator  
Figure 405

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- 4) Use the Captain's or the First Officer's control column to move the elevator 10 times.
- 5) Install the applicable rig pin E5 or E6.
- 6) Remove the pressure from the left, center and right hydraulic system (AMM 29-11-00/201).
  - a) Let the trailing edge of the elevator droop at least 0.5 inches (12.7 mm) below the index plate groove.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERON, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- 7) Pressurize one of the two hydraulic systems which does not supply power to the PCA you replaced (AMM 29-11-00/201).

**NOTE:** The LEFT hydraulic system supplies power to the outboard PCA.  
The CENTER hydraulic system supplies power to the inboard PCA.  
The RIGHT hydraulic system supplies power to the middle PCA.

- 8) Put tape on the index plate and make a mark for the position of the top surface of the elevator trailing edge.

**NOTE:** This is the datum position.

- 9) Remove the pressure from the applicable hydraulic system (AMM 29-11-00/201).
- (b) Do the steps that follow to adjust the input rod of the PCA you replaced:

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERON, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- 1) Pressurize the hydraulic system which supplies power to the PCA you replaced (AMM 29-11-00/201).

**NOTE:** The LEFT hydraulic system supplies power to the outboard PCA.  
The CENTER hydraulic system supplies power to the inboard PCA  
The RIGHT hydraulic system supplies power to the middle PCA.

- 2) Loosen the jamnuts and increase the length of the input rod for the applicable PCA.
  - a) Make sure you move the elevator at least 0.50 inches (12.7 mm) below the bottom of the datum position.
- 3) Adjust the input rod until the elevator is at the bottom of the datum position.

**NOTE:** You must first move the elevator below the bottom of the datum position before you make this last adjustment.

- 4) Use the inspection hole at the rod end of the PCA, to make sure you can see a minimum of half of the rod end threads.

**NOTE:** This will make sure the threads are engaged correctly.

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5) Tighten the jamnut.

**NOTE:** Make sure that the elevator does not move from the neutral position when you tighten the jamnut.

- 6) Remove the power from the applicable hydraulic system (AMM 29-11-00/201).
- 7) Remove the pressure from the Captain's auxiliary pitot system (AMM 34-11-00/201).
- 8) Install the lockwires on the applicable input rod.
- 9) Remove the applicable rig pins E5 or E6.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (c) Make sure the left, center and right hydraulic systems are pressurized (AMM 29-11-00/201).
- (d) Make sure the horizontal stabilizer is at the neutral position (2 units of trim on the position indicator).
- (e) Make sure that the top surface of the trailing edge on the left and right elevators align with the center of the index plate groove  $\pm 0.05$  inch ( $\pm 1.27$  mm).
- (f) Push the Captain's or the First Officer's control column to the forward stop.
- (g) Make sure the elevators travel 23.5 to 24.5 inches (59.7 to 62.2 cm) down.

**NOTE:** Linear measurement of elevator travel is the straight line distance between these two points:  
- Top corner of the inboard trailing edge of the inboard elevator  
- Center of the forward edge of the index plate groove

- (h) Pull the Captain's or the First Officer's control column to the aft stop.

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- (i) Make sure the elevators travel 33.0 to 34.2 inches (83.8 to 86.8 cm) up.

NOTE: Linear measurement of elevator travel is the straight line distance between these two points:  
- Top corner of the inboard trailing edge of the inboard elevator  
- Center of the forward edge of the index plate groove

- (j) Let the control column go to the neutral position.
- (k) Remove the pressure from the left, center and right hydraulic system (AMM 29-11-00/201).

S 714-065

- (17) Do the Single Hydraulic Source Test (AMM 27-31-00/501)

S 714-066

- (18) Do the Elevator PCA Input Bellcrank Assy Shear Rivet Inspection (AMM 27-31-05/601).

H. Put the Airplane Back to Its Usual Condition

S 414-053

- (1) Install these access panels (AMM 06-42-00/201):
  - (a) For the left elevator PCAs:
    - 1) 335ANZ, 335APZ, and 335AQZ
    - 2) 335EB, 335GB, 335HB, and 335AFB
  - (b) For the right elevator PCAs:
    - 1) 345ANZ, 345APZ, and 345AQZ
    - 2) 345EB, 345GB, 345HB, and 345AFB

S 864-054

- (2) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

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ELEVATOR POWER CONTROL ACTUATOR/REACTION LINK INSPECTION/CHECK

1. General

- A. This procedure has illustrations and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts with exception for the Elevator PCA Bellcrank Shear Rivet Inspection. Refer to the Elevator Power Control Actuator/Reaction Link Removal/Installation (AMM 27-31-05/401) for access, removal, or installation of the parts.

**NOTE:** Missing PCA, rod end and trunnion bearing dust seals are not reasons for removing the PCA. Seals should be replaced at convenience on overhaul. The bearings will generate a small amount of dark colored powder which may be observed at the edge of the bearing lines. This powder is the normal product of the self lubricating bearing liner.

TASK 27-31-05-226-001

2. Wear Limits for the Elevator Power Control Actuator/Reaction Link (Fig. 601)

A. Access

- (1) Location Zones

335/345 Horizontal Stabilizer - Rear Spar to Trailing Edge

TASK 27-31-05-286-003

3. AIRPLANES WITH INSPECTION HOLES IN THE BELLCRANK RIVETS (PRE-SB 27-0168);  
Elevator PCA Input Bellcrank Assembly Shear Rivet Inspection (Fig. 602)

A. General

- (1) This task contains the procedure to inspect the Elevator PCA Input Bellcrank. This task is to be performed on all three Elevator PCA Input Bellcranks on the Elevator surface which required the inspection.

B. Equipment

- (1) #50 Drill bit (0.0700 inch (1.78 mm)) or equivalent pin.  
(2) #53 Drill bit (0.0595 inch (1.51 mm)) or equivalent pin.

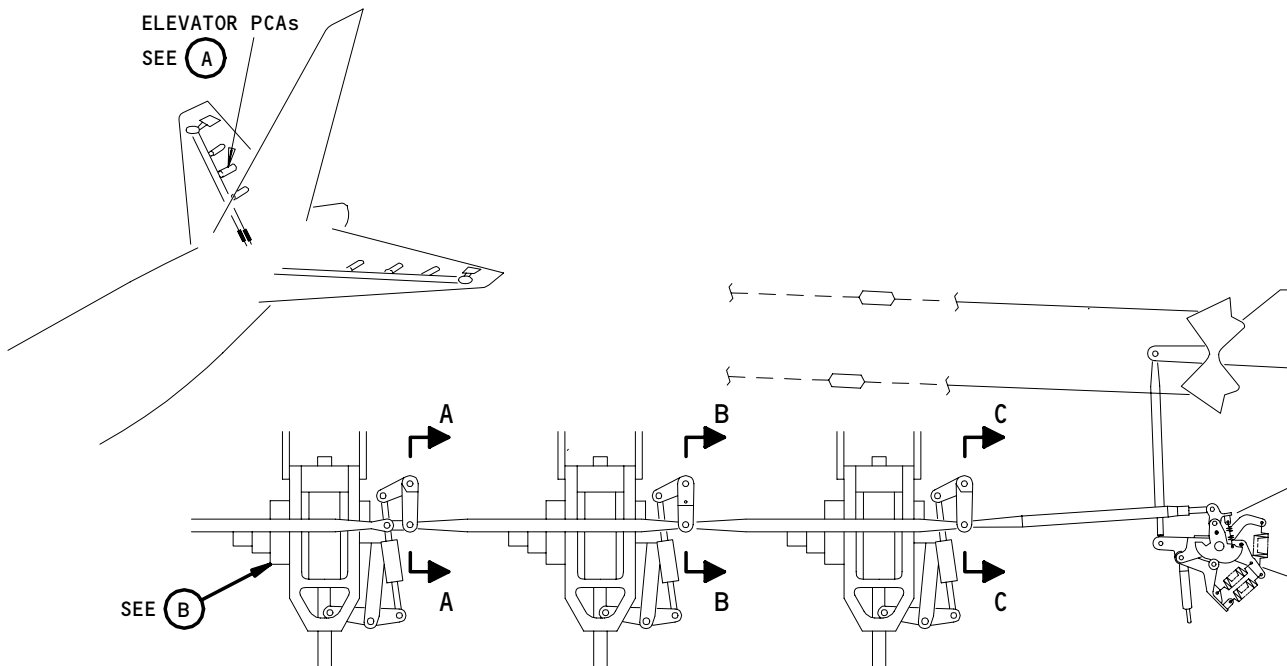
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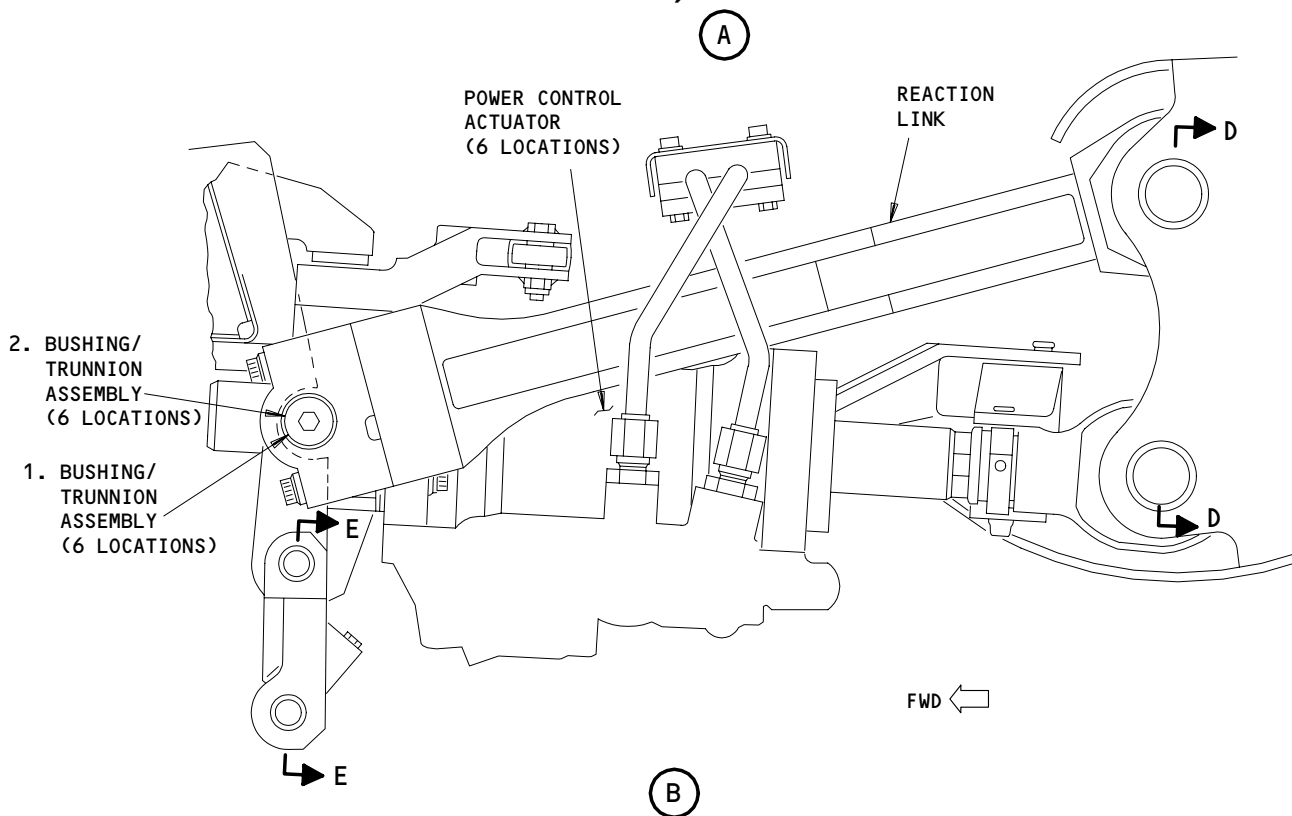
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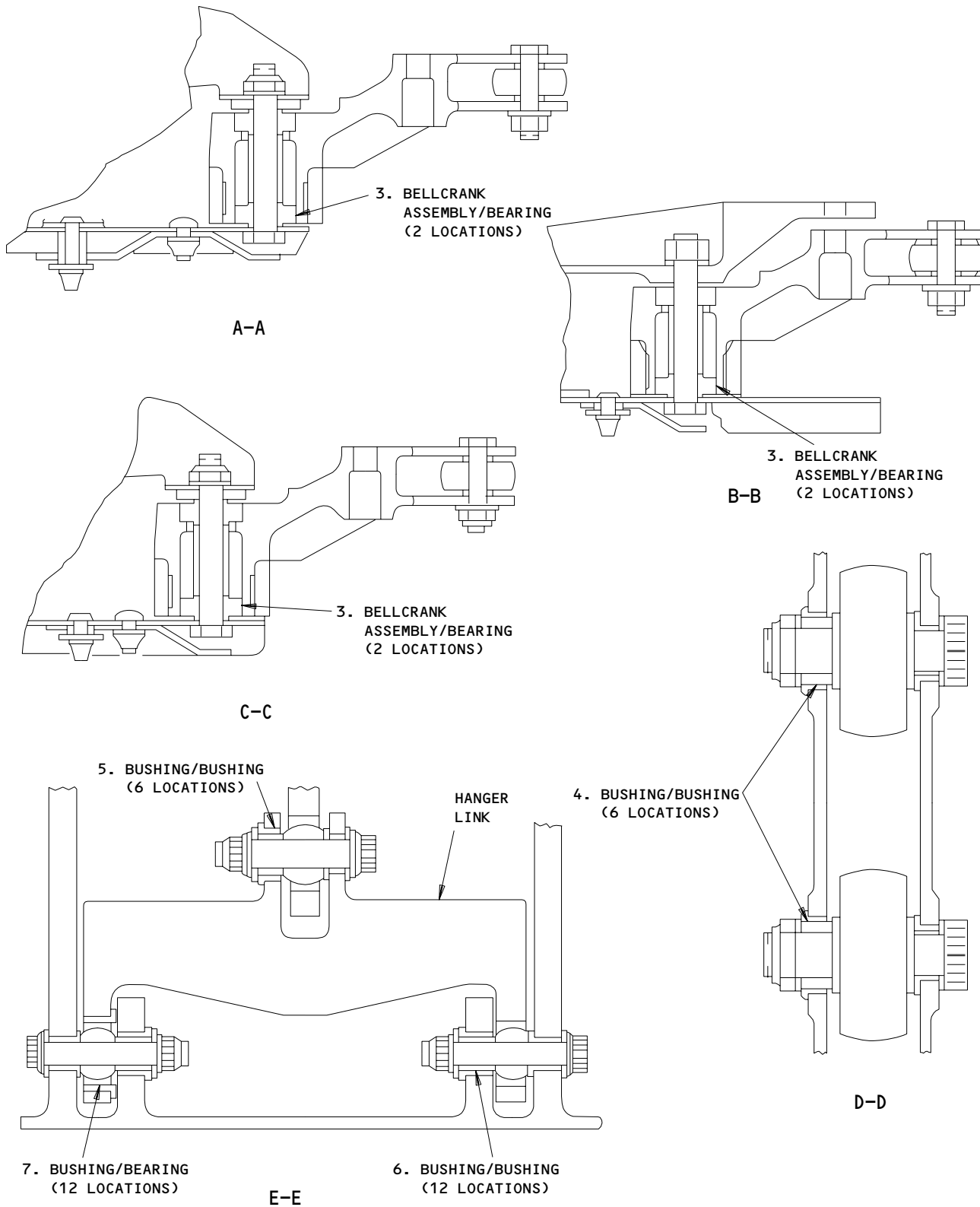
ELEVATOR PCAs  
(RIGHT SIDE IS SHOWN, LEFT SIDE IS OPPOSITE)



Wear Limits for the Elevator Power Control Actuator (PCA)  
Figure 601 (Sheet 1)

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Wear Limits for the Elevator Power Control Actuator (PCA)  
Figure 601 (Sheet 2)

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



















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








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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.8758 (22.245)	0.8766 (22.266)	0.8780 (22.301)	0.0030 (0.076)	 		
	TRUNNION ASSEMBLY	OD	0.8745 (22.212)	0.8750 (22.225)	0.8736 (22.189)				
2	BUSHING	ID	0.8758 (22.245)	0.8766 (22.266)	0.8780 (22.301)	0.0030 (0.076)	 		
	TRUNNION ASSEMBLY	OD	0.8745 (22.212)	0.8750 (22.225)	0.8736 (22.189)				
3	BELLCRANK ASSEMBLY	ID	0.8127 (20.643)	0.8133 (20.658)	0.8155 (20.714)	0.0030 (0.076)			
	BEARING	OD	0.8121 (20.627)	0.8125 (20.638)	0.8103 (20.582)				
4	BUSHING	ID	1.0628 (26.995)	1.0620 (26.975)	1.0655 (27.064)	0.0030 (0.076)	 		
	BUSHING	OD	1.0605 (26.937)	1.0625 (26.988)	1.0590 (26.899)				
5	BUSHING	ID	0.5620 (14.275)	0.5625 (14.288)	0.5640 (14.326)	0.0030 (0.076)	 		
	BUSHING	OD	0.5610 (14.249)	0.5615 (14.262)	0.5595 (14.211)				
6	BUSHING	ID	0.4375 (11.113)	0.4382 (11.130)	0.4400 (11.176)	0.0030 (0.076)	 		
	BUSHING	OD	0.4365 (11.087)	0.4370 (11.100)	0.4352 (11.054)				
7	BUSHING	ID	0.8440 (21.438)	0.8445 (21.450)	0.8468 (21.509)	0.0030 (0.076)	 		
	BEARING	OD	0.8433 (21.420)	0.8438 (21.433)	0.8415 (21.374)				

-  REPLACE THE BUSHING IN THE STRUCTURE WITH A NEW BUSHING, P/N BACB28AM07B025A
-  INSTALL WITH WET BMS 5-95 SEALANT AND MAKE SURE THEY HAVE THE CORRECT DESIGN INTERFERENCE FIT
-  REPLACE THE BUSHING IN THE HANGER LINK ASSEMBLY WITH A NEW BUSHING, P/N 252T2163
-  REPLACE THE BUSHING IN THE HANGER LINK ASSEMBLY WITH A NEW BUSHING, P/N BACB28AM09B022A
-  REPLACE THE BUSHING IN THE REACTION LINK ASSEMBLY WITH A NEW BUSHING, P/N BACB28AM14B072A
-  REPLACE THE BUSHING IN THE CAP ASSEMBLY WITH A NEW BUSHING, P/N BACB28AM14B072A
-  CHROMIUM PLATE TO A SINGLE PLATE THICKNESS OF 0.003 INCH (0.0762 mm) MINIMUM AFTER YOU GRIND IT TO THE DESIGN LIMITS
-  REPLACE THE BUSHING IN THE STRUCTURAL FITTINGS WITH NEW BUSHINGS, P/N BACB28AM17B032
-  REPLACE THE PART WHEN THE WEAR IS MORE THAN THE DESIGN LIMITS.

Wear Limits for the Elevator Power Control Actuator (PCA)  
Figure 601 (Sheet 3)

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C. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems

D. Access

- (1) Location Zones
  - 335/345 Horizontal Stabilizer, Rear Spar to Trailing Edge
- (2) Access Panels
  - 335EB/335GB/335HB Left Elevator PCA Bellcranks
  - 345EB/345GB/345HB Right Elevator PCA Bellcranks

E. Prepare for Inspection.

S 866-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE AREA BELOW THE ELEVATOR. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF AN OBJECT FALLS.

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

S 866-006

- (2) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the CUTOUT position.

S 866-007

- (3) Do the steps that follow to remove the hydraulic power:
  - (a) Remove the pressure from the left, right, and center hydraulic systems and reservoirs (AMM 29-11-00/201).
  - (b) Put the LEFT, RIGHT, and CENTER FLT CONTROL SHUTOFF TAIL valve switches on the P61 right side panel to the OFF position.
  - (c) Open these circuit breakers on the P11 Overhead Panel and attach the DO-NOT-CLOSE tags:
    - 1) 11A36, ALT STAB TRIM
    - 2) 11C12, STAB TRIM SHUTOFF LEFT
    - 3) 11C13, STAB TRIM SHUTOFF CENTER
    - 4) 11H17, FLT CNTRL SHUTOFF TAIL LEFT
    - 5) 11H18, FLT CNTRL SHUTOFF TAIL CENTER
    - 6) 11H27, FLT CNTRL SHUTOFF TAIL RIGHT

S 866-008

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

S 016-014

- (5) Remove these access panels (AMM 06-42-00/201).
  - (a) For the left elevator PCAs:
    - 335EB, 335GB, 335HB

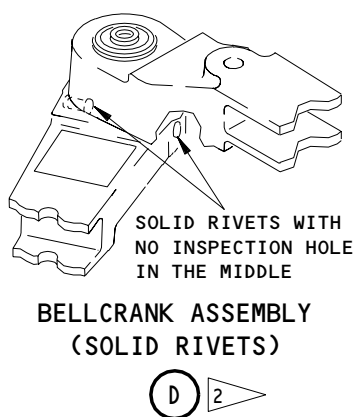
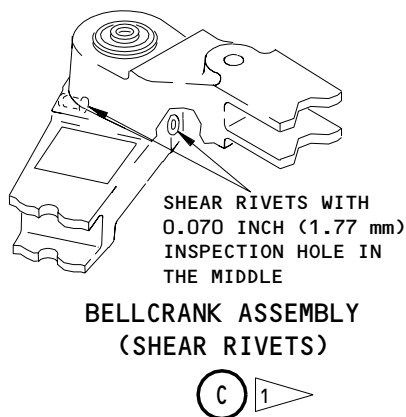
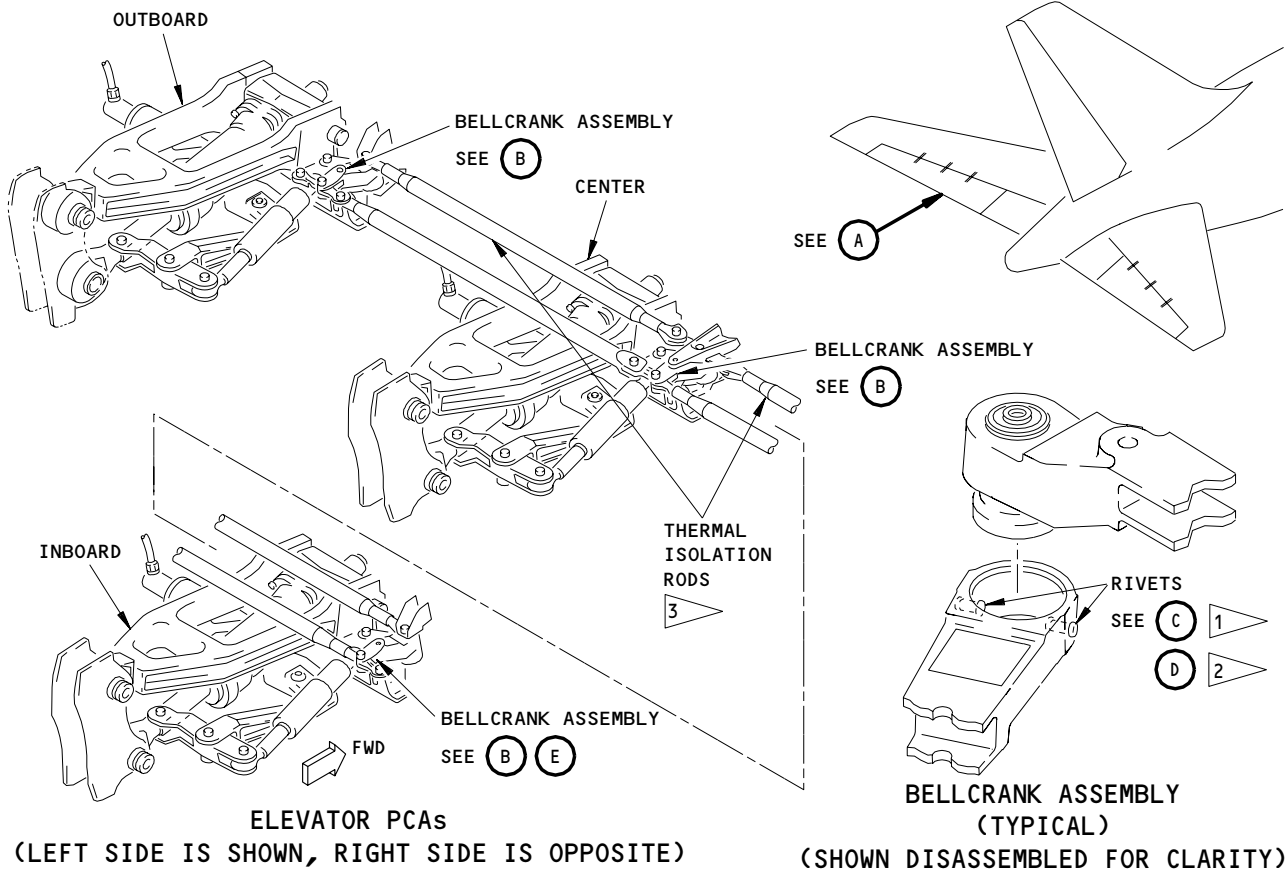
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- 1 AIRPLANES WITH SHEAR (HOLLOW) RIVETS IN THE BELLCRANK ASSEMBLIES (PRE-SB 27-0168) THIS CONFIGURATION NEEDS INSPECTION OF THE SHEAR RIVETS.
- 2 AIRPLANES WITH SOLID RIVETS (NO INSPECTION HOLES) ON THE TWO-PIECE BELLCRANK OR WITH THE ONE-PIECE BELLCRANK (POST-SB 27-0168). THIS CONFIGURATION DOES NOT NEED INSPECTION.
- 3 THESE THERMAL ISOLATION RODS ARE OPTIONAL AND MAY NOT BE INCLUDED IN THE AIRCRAFT CONFIGURATION.

Elevator PCA Input Bellcrank Assembly Shear Rivet Inspection  
Figure 602

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- (b) For the right elevator PCAs:  
345EB, 345GB, 345HB

F. Inspect the Elevator PCA Bellcrank

S 216-015

- (1) Inspect the shear rivets of all three PCA bellcrank assemblies by inserting a 0.070 inch (1.78 mm) diameter pin (of #50 drill bit) through the hole of one of the two rivets for each bellcrank.

NOTE: If a 0.070 inch (1.77 mm) diameter pin is unable to penetrate the rivet hole at all, a 0.0595 inch (1.51 mm) diameter pin (or #53 drill bit) may be used for the above inspection. Only use the 0.0595 inch (1.51 mm) diameter pin when the rivet hole diameter is less than 0.070 inches (1.78 mm).

- (a) If penetration depth is 0.50 inches (12.7 mm) or more (measure from the top of the rivet head), the rivets in the bellcrank are in good condition and no more action is required.
- (b) If penetration depth is less than 0.50 inches (12.7 mm), the bellcrank is discrepant and must be replaced (AMM 27-31-06/401)

G. Put the Airplane back to its Usual Condition.

S 416-016

- (1) Install these access panels (AMM 06-42-00/201):
  - (a) For the left elevator PCAs:  
335EB, 335GB, 335HB
  - (b) For the right elevator PCAs:  
345EB, 345GB, 345HB

S 866-009

- (2) Close these circuit breakers on the P11 Overhead Panel and remove the DO-NOT-CLOSE tags:
  - (a) 11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF LEFT
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CNTRL SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CNTRL SHUTOFF TAIL CENTER
  - (f) 11H27, FLT CNTRL SHUTOFF TAIL RIGHT

S 866-010

- (3) Put the LEFT, RIGHT, and CENTER FLT CONTROL SHUTOFF TAIL valve switches on the P61 right side panel to the ON position.

S 866-011

- (4) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the Control Stand Panel, P10, to the NORM position.

S 866-012

- (5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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- S 866-013
- (6) Put the L and C STAB TRIM switches on the P10 Control Stand Panel to the NORM position.

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ELEVATOR POWER CONTROL ACTUATOR (PCA) INPUT LINKAGE –  
REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the input linkage on the elevator power control actuators (PCAs).

TASK 27-31-06-024-001

2. Remove the PCA Input Linkage

A. Equipment

- (1) Rig Pins from Rig Pin Set A20004-XX (AMM 20-10-24/201):  
(a) E3 – P/N A20004-17  
(b) E4 – P/N A20004-17  
(c) E7 – P/N A20004-21  
(d) E8 – P/N A20004-21

B. References

- (1) 06-42-00/201, Empennage Access Doors and Panels  
(2) 20-10-24/201, Rig Pins  
(3) 24-22-00/201, Electrical Power – Control  
(4) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones  
335/345 Horizontal Stabilizer – Rear Spar to Trailing Edge
- (2) Access Panels  
335EB, 335GB, 335HB, 335AFB PCA Linkage on the Left Elevator  
345EB, 345GB, 345HB, 345AFB PCA Linkage on the Right Elevator

D. Prepare for the Removal

S 864-002

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

S 864-003

- (2) Put the LEFT and CENTER STAB TRIM SHUTOFF TAIL valve switches on the control stand panel, P10, to the CUTOUT position.

S 864-004

- (3) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-005

- (4) Put the RIGHT, LEFT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.

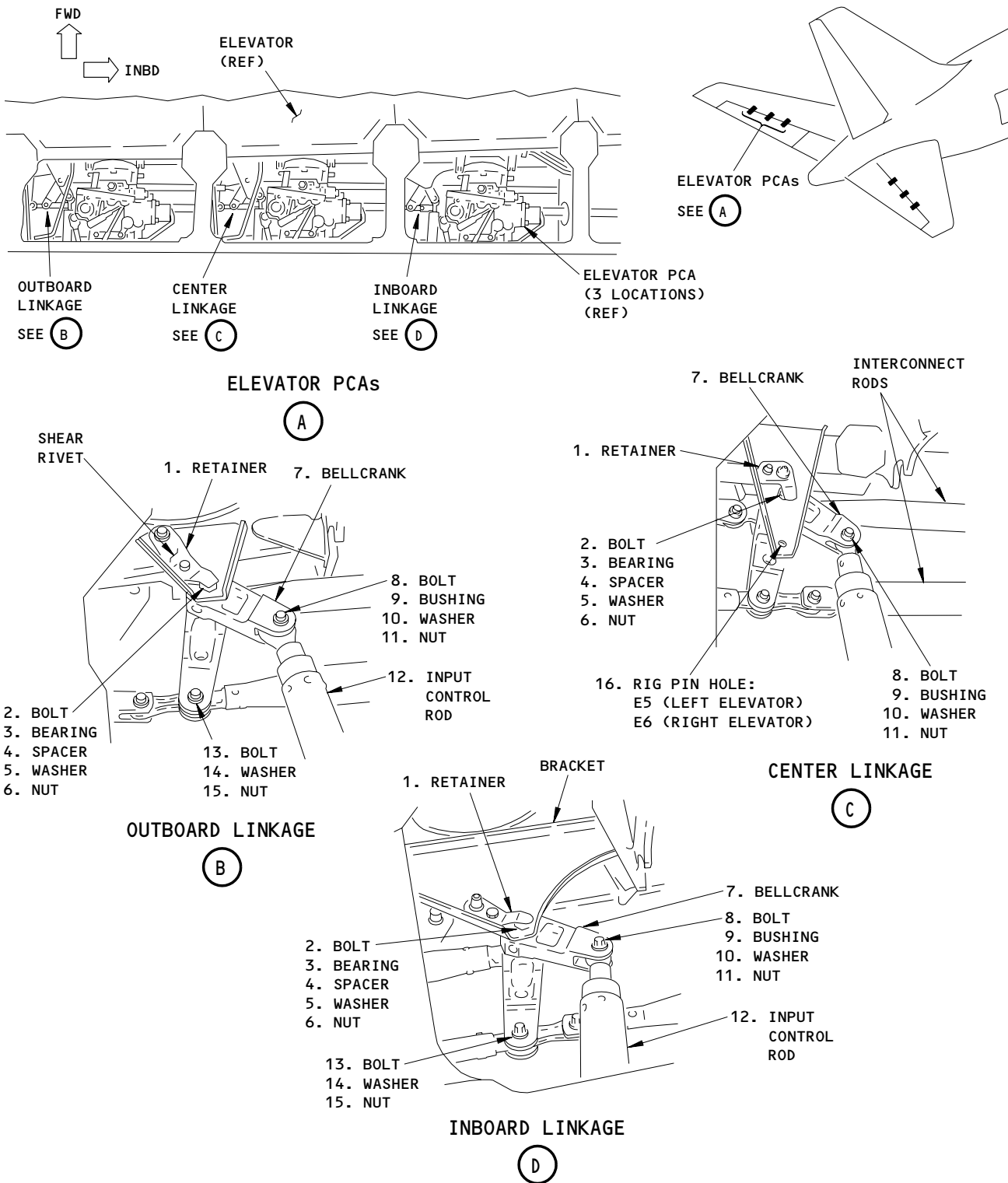
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Elevator Power Control Actuator (PCA) Input Linkage Installation  
Figure 401

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S 864-006

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 014-007

- (6) Remove these access panels (AMM 06-42-00/201):
- (a) 335EB, 335GB, 335HB, and 335AFB for the PCA linkage on the left elevator.
  - (b) 345EB, 345GB, 345HB, and 345AFB for the PCA linkage on the right elevator.

S 864-043

- (7) Move elevator surface to the full up position for better access to the bellcranks and input control rods.

**NOTE:** Hold elevator surface in the full up position during maintenance to avoid the surface from drooping over time. (Method to hold surface in up position is up to the operator). If elevator PCA locks are used to hold the surface in the full up position, the elevator bushing assembly lock tool can not be used if removing the center PCA bellcrank. Care should be taken as to not pressure the tall hydraulic systems with PCA bellcrank locks installed, especially without the elevator bushing assembly lock tool not installed.

E. Remove the PCA Input Linkage

S 494-035

**WARNING:** DO NOT SUPPLY HYDRAULIC POWER DURING THE REMOVAL/INSTALLATION OF THE PCA INPUT LINKAGE. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Install rig pin E3 (left elevator) and E4 (right elevator) into the left and right aft quadrants (AMM 27-31-15/401).

**NOTE:** Manually pulling or pushing the aft quadrants may be required to install the rig pins.

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S 414-041

- (2) Install rig pins E7 and E8 in the right and left lost motion devices (AMM 27-31-31/201).##

NOTE: Manually pushing or pulling the lost motion devices may be required to install the rig pins.

S 034-042

- (3) Make sure rig pins E3/E4 and E8/E9 are installed at all times when removing and installing the bellcranks and input rods.

S 034-040

- (4) Make sure no adjustments are made in the control rod assemblies connecting to the inboard, center, and outboard power control actuators.

S 034-009

- (5) Remove the retainer (1).

S 034-034

CAUTION: MAKE SURE THE ENDS OF THE CONTROL ROD ARE DISCONNECTED. IF ONE END OF THE ROD IS CONNECTED, DAMAGE TO THE BEARING CAN OCCUR TO THAT ROD END.

- (6) Remove the bolt (8), bushing (9), washer (10), and nut (11) that connect the bellcrank to the input control rod.

S 034-011

- (7) Disconnect the input control rod (12) at the other end and remove the control rod.

NOTE: Do not change the adjustment of the input control rod during the removal/installation. Also, do not remove the retainer, bellcrank and input control rod from the center linkage if only working on the inboard and outboard linkages.

S 034-012

- (8) Remove the bolt (13), washer (14), and nut (15) that connect the bellcrank to the interconnect rod.

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S 034-013

- (9) Remove the bolt (2), bearing (3), spacer (4), washer (5), and nut (6) that connect the bellcrank to the stabilizer bracket for the left and right bellcrank assemblies.

S 024-014

- (10) Remove the bellcrank (7).

TASK 27-31-06-424-015

3. Install the PCA Input Linkage

A. Equipment

- (1) Rig Pins from Rig Pin Set A20004-XX (AMM 20-10-24/201).
  - (a) E3 - P/N A20004-17
  - (b) E4 - P/N A20004-17
  - (c) E7 - P/N A20004-21
  - (d) E8 - P/N A20004-21

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00015 Grease - BMS 3-24 (Alternate)

C. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 20-10-24/201, Rig Pins
- (3) 24-22-00/201, Electrical Power - Control
- (4) 27-31-00/501, Elevator Control System

D. Access

- (1) Location Zones
  - 335/345 Horizontal Stabilizer - Rear Spar to Trailing Edge
- (2) Access Panels
  - 335EB, 335GB, 335HB, 335AFB PCA Linkage on the Left Elevator
  - 345EB, 345GB, 345HB, 345AFB PCA Linkage on the Right Elevator

E. Install the PCA Input Linkage

S 644-016

- (1) Apply grease to the bearing (3) and spacer (4).

S 434-017

- (2) Install the bearing (3) and spacer (4) in the bellcrank.

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S 824-018

- (3) Align the bellcrank (7) with the bracket and the interconnect rod.

S 644-019

- (4) Apply grease to the bolt (2).

S 434-020

- (5) Install the bolt (2), washer (5), and nut (6) to connect the bellcrank to the stabilizer bracket for the left and right bellcrank assemblies.

**NOTE:** Make sure bolt head is oriented upward so that the loss of the nut will minimize bolt loss.

S 434-039

- (6) Install the bolt (2), washer (5), and nut (6) to connect the bellcrank to the stabilizer bracket for the center bellcrank assembly.

**NOTE:** Make sure bolt head is oriented upward so that the loss of the nut will minimize bolt loss.

S 644-022

- (7) Apply grease to the bolt (13).

S 434-023

- (8) Install the bolt (13), washer (14), and nut (15) to connect the bellcrank to the interconnect rods.

**NOTE:** Make sure bolt head is oriented upward so that the loss of the nut will minimize bolt loss.

S 434-024

- (9) Hold the input control rod (12) in the correct position and connect the aft end.

S 644-025

- (10) Apply grease to the bolt (8).

S 434-026

- (11) Install the bolt (8), bushing (9), washer (10) and nut (11) to connect the bellcrank to the input control rod.

**NOTE:** Make sure bolt head is oriented upward so that the loss of the nut will minimize bolt loss.

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- S 434-027  
(12) Install the retainer (1).
- S 434-044  
(13) Remove rig pins E7 and E8 from the Left and Right lost motion devices (AMM 27-31-31/201).
- S 014-046  
(14) Remove equipment used to hold up the elevator surface.
- S 434-045  
(15) Remove rig pins E3 and E4 from the Left and Right aft quadrants (AMM 27-31-15/401).
- S 864-028  
(16) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:  
(a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM  
(b) 11C12, STAB TRIM SHUTOFF L  
(c) 11C13, STAB TRIM SHUTOFF CENTER  
(d) 11H17, FLT CONT SHUTOFF TAIL LEFT  
(e) 11H18, FLT CONT SHUTOFF TAIL CTR  
(f) 11H27, FLT CONT SHUTOFF TAIL RIGHT
- S 864-029  
(17) Put the LEFT, RIGHT and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the ON position.
- S 864-030  
(18) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the NORM position.
- S 824-031  
(19) Do the adjustment for the PCA input rods (AMM 27-31-00/501).
- F. Put the Airplane Back to Its Usual Condition
- S 414-032  
(1) Install these access panels (AMM 06-42-00/201):  
(a) 335EB, 335GB, 335HB, and 335AFB for the PCA linkage on the left elevator.  
(b) 345EB, 345GB, 345HB, and 345AFB for the PCA linkage on the right elevator.
- S 864-033  
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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ELEVATOR POWER CONTROL ACTUATOR (PCA) INPUT CONTROL ROD -  
REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the input control rod on the elevator power control actuators (PCAs).

TASK 27-31-07-024-001

2. Remove the PCA Input Control Rod

A. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 27-31-05/201, Elevator Power Control Actuator/Reaction Link
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones
  - 335/345 Horizontal Stabilizer - Rear Spar to Trailing Edge
- (2) Access Panels
  - 335EB, 335GB, 335HB, 335AFB      PCA Linkage on the Left Elevator
  - 345EB, 345GB, 345HB, 345AFB      PCA Linkage on the Right Elevator

C. Prepare for the Removal

S 864-002

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

S 864-003

- (2) Put the LEFT and CENTER STAB TRIM SHUTOFF TAIL valve switches on the control stand panel, P10, to the CUTOUT position.

S 864-004

- (3) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-005

- (4) Put the RIGHT, LEFT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.

S 864-006

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L

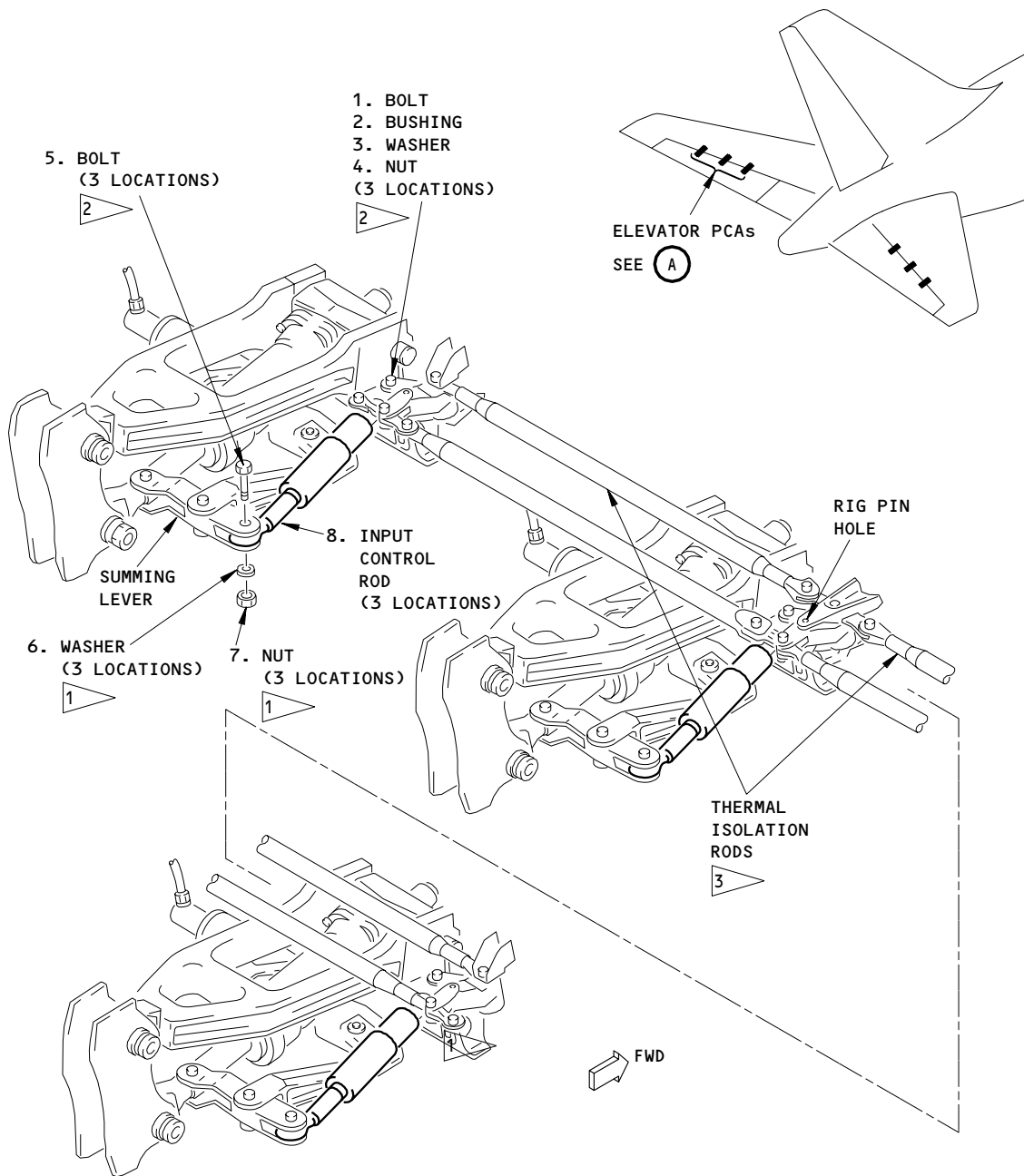
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**ELEVATOR PCAs**  
(LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE)

- ① APPLY GREASE TO ALL SURFACES
- ② INSTALL BOLT WITH HEAD OF BOLT ON TOP.
- ③ THESE THERMAL ISOLATION RODS ARE OPTIONAL AND MAY NOT BE INCLUDED IN THE AIRCRAFT CONFIGURATION.

Ⓐ

**Elevator Power Control Actuator (PCA) Input Control Rod Installation**  
Figure 401

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- (c) 11C13, STAB TRIM SHUTOFF CENTER
- (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
- (e) 11H18, FLT CONT SHUTOFF TAIL CTR
- (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 014-007

- (6) Remove these access panels (AMM 06-42-00/201):
  - (a) 335EB, 335GB, 335HB, and 335AFB for the PCA linkage on the left elevator.
  - (b) 345EB, 345GB, 345HB, and 345AFB for the PCA linkage on the right elevator.

S 484-048

- (7) Install the elevator PCA lock tool (AMM 27-31-05/201):
- D. Remove the PCA Input Control Rod

S 024-039

**WARNING:** DO NOT SUPPLY HYDRAULIC POWER DURING THE REMOVAL/INSTALLATION OF THE PCA CONTROL ROD. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Remove the nut (4), washer (3), bolt (1), and bushing (2), from the forward end of the PCA input control rod (8).
  - (a) Support the disconnected end of the input control rod (8).

S 024-038

**CAUTION:** MAKE SURE THE ENDS OF THE CONTROL ROD ARE DISCONNECTED. IF ONE END OF THE ROD IS CONNECTED, DAMAGE TO THE BEARING CAN OCCUR TO THAT ROD END.

- (2) Remove the bolt (5), washer (6), and nut (7) from the aft end of the PCA input control rod (8).
  - (a) Remove the input control rod (8) from the aircraft.

**NOTE:** Do not change the adjustment of the input control rod during the removal/installation procedure. Make a note of the position of the elevator surface and the PCA position that the input control rod was removed from so that re-installation will be easier.

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TASK 27-31-07-424-016

3. Install the PCA Input Control Rod

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00015 Grease - BMS 3-24 (Alternate)

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 27-31-05/201, Elevator Power Control Actuator/Reaction Link
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones
  - 335/345 Horizontal Stabilizer - Rear Spar to Trailing Edge
- (2) Access Panels
  - 335EB, 335GB, 335HB, 335AFB      PCA Linkage on the Left Elevator
  - 345EB, 345GB, 345HB, 345AFB      PCA Linkage on the Right Elevator

D. Install the PCA Input Control Rods (Fig. 401)

S 644-017

- (1) Apply grease to the bushings (2) and bolts (1) and bolts (5).

S 424-046

**WARNING:** DO NOT SUPPLY HYDRAULIC POWER DURING THE REMOVAL/INSTALLATION OF THE PCA CONTROL ROD. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Put the control rod (8) in its correct position and install the aft bolt (5) while supporting the forward end of the control rod (8).

**NOTE:** Install the control rod that is marked in the correct surface and PCA position. This can reduce the amount of time required to properly rig the elevator PCAs.

S 424-044

- (3) Install the bushing (2) and then the bolt (1) at the forward connection of the input control rod (8).

**NOTE:** Be sure to install the bolt (1) with the head in the up position.

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S 424-043

- (4) Install the washers (6) and (3) and the nuts (7) and (4) onto their respective bolts.

S 484-040

- (5) Remove the elevator PCA lock tool (AMM 27-31-05/201).

S 824-041

- (6) Do the task, Adjust the Power Control Actuator (PCA) Input Rods (AMM 27-31-00/501).

E. Put the Airplane Back to Its Usual Condition

S 414-034

- (1) Install these access panels (AMM 06-42-00/201):
  - (a) 335EB, 335GB, 335HB, 335AFB for the PCA linkage on the left elevator.
  - (b) 345EB, 345GB, 345HB, 345AFB for the PCA linkage on the right elevator.

S 864-035

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

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CONTROL COLUMN - REMOVAL/INSTALLATION

1. General

A. This procedure contains steps to remove and install the control columns.

TASK 27-31-10-024-001

2. Remove the Control Column

A. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) A1 - P/N A20004-15
- (2) Extraction/Insertion Tool - M15570-20 (Deutsch Company, Electronic Components Division, 700 S. Hathaway, Municipal Airport, Banning, CA 92220)

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-24/201, Rig Pins

C. Access

- (1) Location Zones
  - 113/114 Area Forward of NLG Wheel Well
  - 211/212 Control Cabin
- (2) Access Panel
  - 113AL Forward Equipment Bay

D. Prepare for the Removal (Fig. 401)

S 864-002

- (1) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.

S 864-003

- (2) To remove the captain's control column, open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11C25, INTERPHONE CAPT/OBS
  - (b) 11G29, INTERPHONE CAPT/OBS

S 864-004

- (3) To remove the first officer's control column, open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - (a) 11C26, INTERPHONE F/O
  - (b) 11G30, INTERPHONE F/O

S 864-005

- (4) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - (a) 11C11, STICK SHAKER L
  - (b) 11H11, LEFT STAB TRIM CONT
  - (c) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (d) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (e) 11H20, STAB TRIM CONT R

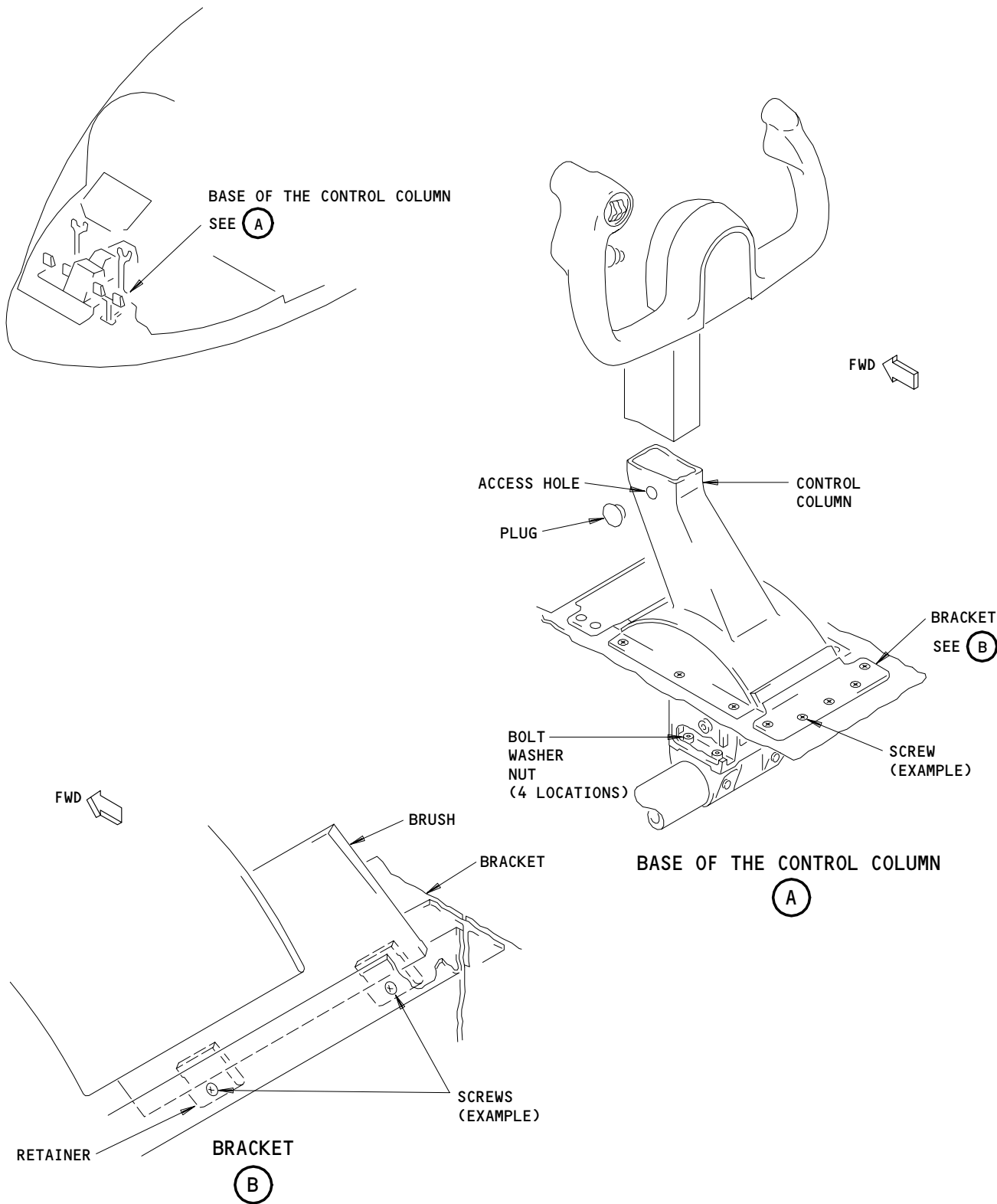
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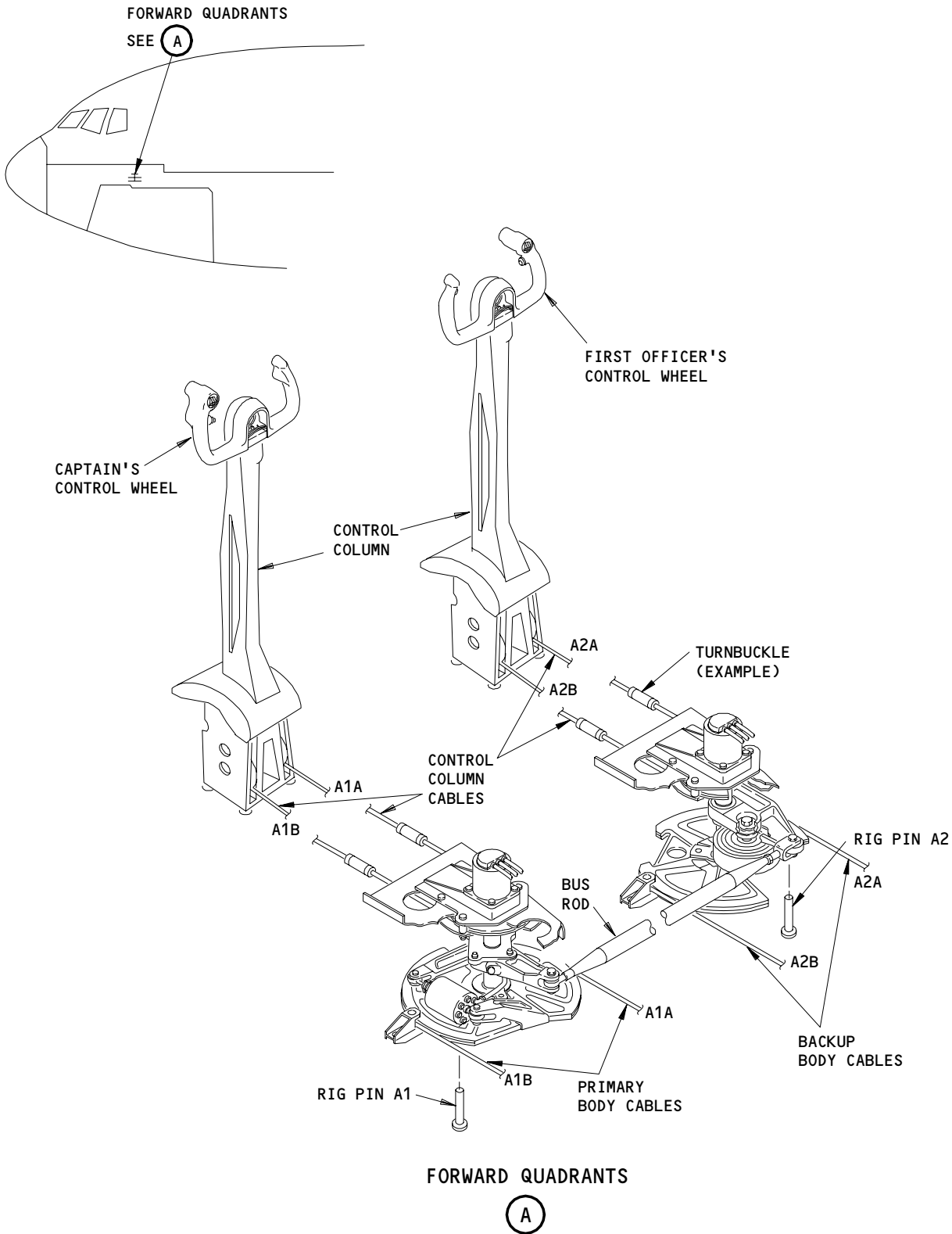
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Elevator Control Column Installation  
Figure 401

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Control Column - Aileron Cable Adjustment  
Figure 402

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- (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT
- (g) 11J22, STICK SHAKER R

S 864-006

**WARNING:** REMOVE ELECTRICAL POWER FROM THE FLIGHT COMPARTMENT SEAT. THE ACCIDENTAL ELECTRICAL OPERATION OF THE FLIGHT COMPARTMENT SEAT CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
  - (a) 6H15, CAPT SEAT
  - (b) 6J21, F/O SEAT

S 014-007

- (6) Open the access door for the forward equipment bay, 113AL (AMM 06-41-00/201)

S 494-008

- (7) Install rig pin A1 (Fig. 402)

E. Remove the Control Column (Fig. 401)

S 034-009

- (1) Remove the bracket that is aft of the control column.

S 034-010

- (2) Remove the brush from the base of the control column.

S 034-011

- (3) To remove the captain's control column, disconnect the aileron cables, A1A and A1B, at the turnbuckles.

**NOTE:** Put a tag on the cables to identify them for subsequent cable installation.

S 034-012

- (4) To remove the first officer's control column, disconnect the aileron cables, A2A and A2B, at the turnbuckles.

**NOTE:** Put a tag on the cables to identify them for subsequent cable installation.

S 034-013

- (5) Disconnect the wire leads from terminal block 207.

S 034-014

- (6) Hold the control column and remove the bolts that hold the control column to the torque tube.

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S 024-015

- (7) Remove the control column.

TASK 27-31-10-424-016

3. Install the Control Column

A. Equipment

- (1) Extraction/Insertion Tool - M15570-20 (Deutsch Company, Electronic Components Division, 700 S. Hathaway, Municipal Airport, Banning, CA 92220)

B. Consumable Materials

- (1) A00247 Sealant - Chromate Type BMS 5-95

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-24/201, Rig Pins
- (3) AMM 22-11-03/401, Autopilot Disengage Switches
- (4) AMM 23-51-03/401, Control Wheel Push-to-Talk (PTT) Switch
- (5) AMM 24-22-00/201, Electrical Power - Control
- (6) AMM 27-00-01/201, Aileron Cable Installation
- (7) AMM 27-41-01/401, Stabilizer Trim Control Wheel Switch

D. Access

(1) Location Zones

113/114	Area Forward of NLG Wheel Well
211/212	Control Cabin

(2) Access Panel

113AL	Forward Equipment Bay
-------	-----------------------

E. Install the Control Column (Fig. 401)

S 624-017

- (1) Apply a layer of sealant to the bolt threads and the thread end of the shank.

S 434-018

- (2) Hold the control column on the torque tube bracket and install the bolts.

S 164-019

- (3) Remove the sealant that is not necessary from the bolts.

S 434-020

- (4) Install the brush to the base of the control column.

S 434-021

- (5) Install the bracket that is aft of the control column.

S 434-022

- (6) Identify and connect the wire leads to terminal block 207.

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- S 434-023
- (7) Install wire clamps where they are necessary.
- S 434-024
- (8) To install the captain's control column, connect the aileron cables, A1A and A1B, at the turnbuckles.
- S 434-025
- (9) To install the first officer's control column, connect the aileron cables, A2A and A2B, at the turnbuckles.
- S 824-026
- (10) Adjust the aileron cables (Ref 27-11-00).
- S 714-027
- (11) Move the control column forward and aft and turn the control wheel through full travel.
- (a) Make sure the control column and control wheel move freely.
- S 864-028
- (12) Supply electrical power (AMM 24-22-00/201).
- S 864-029
- (13) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the P61 panel to the ON position.
- S 714-030
- (14) Make sure the control wheel switches operate the stabilizer correctly (AMM 27-41-01/401).
- S 714-031
- (15) Make sure the autopilot button operates correctly (AMM 22-11-03/401).
- S 714-032
- (16) Make sure the control wheel Push-to-Talk (PTT) switch operates correctly (AMM 23-51-03/401).
- F. Put the Airplane Back to Its Usual Condition
- S 864-033
- (1) Remove electrical power (AMM 24-22-00/201).
- S 864-034
- (2) If you removed the captain's control column, close these circuit breakers on the overhead panel.
- (a) 11C25, INTERPHONE CAPT/OBS
- (b) 11G29, INTERPHONE CAPT/OBS

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- S 864-035
- (3) If you removed the first officer's control column, close these circuit breakers on the P11 panel.
- (a) 11C26, INTERPHONE F/O
  - (b) 11G30, INTERPHONE F/O
- S 864-036
- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C11, STICK SHAKER L
  - (b) 11H11, LEFT STAB TRIM CONT
  - (c) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (d) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (e) 11H20, STAB TRIM CONT R
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT
  - (g) 11J22, STICK SHAKER R
- S 864-039
- (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6H15, CAPT SEAT
  - (b) 6J21, F/O SEAT
- S 214-040
- (6) Make sure that rig pin A1 is removed (Fig. 402).
- S 414-041
- (7) Close the access door for the forward equipment bay, 113AL (AMM 06-41-00/201).

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ELEVATOR CONTROL COLUMN - INSPECTION/CHECK

1. General

A. This procedure only has illustrations and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Elevator Control Column - Removal/Installation for procedures to do these tasks.

TASK 27-31-10-226-001

2. Wear Limits for the Elevator Control Column (Fig. 601)

A. Access

(1) Location Zones

211/212      Control Cabin

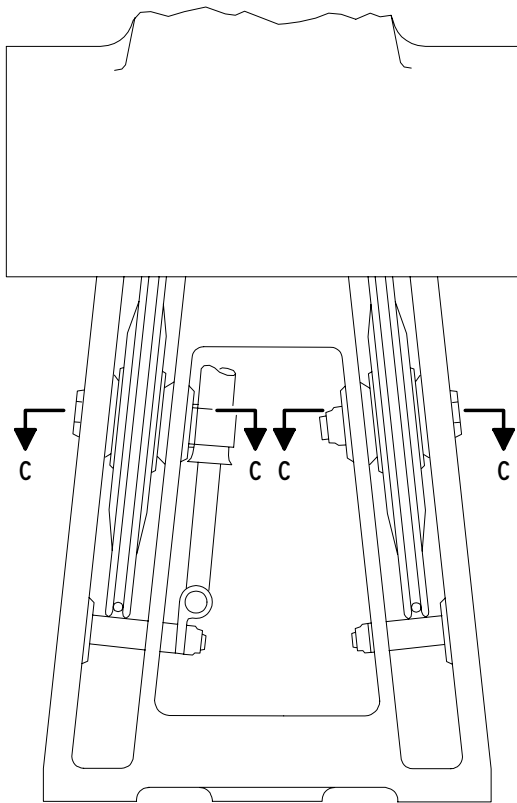
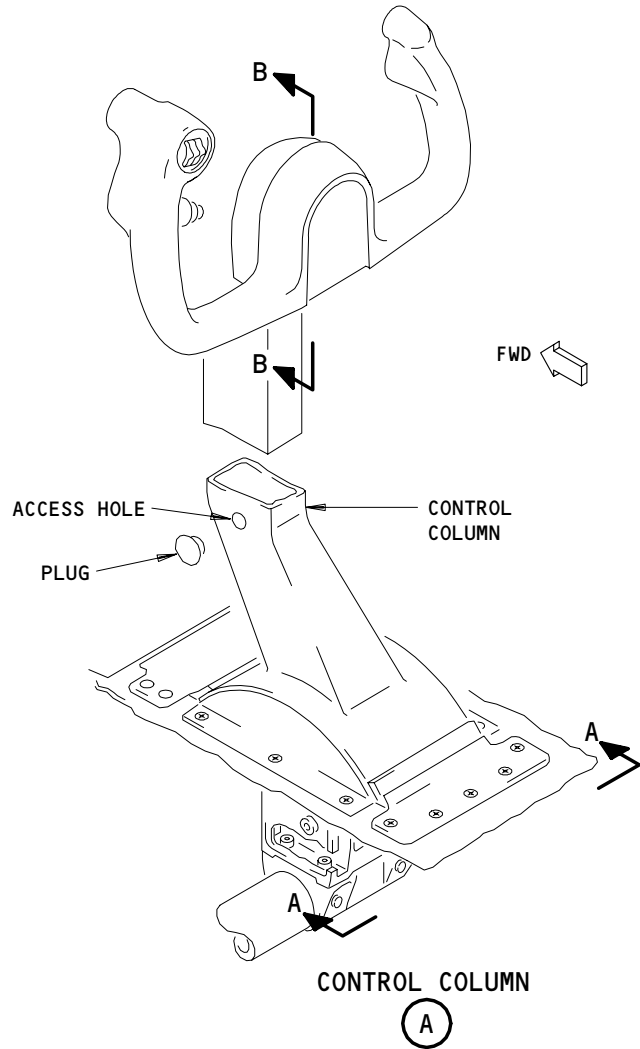
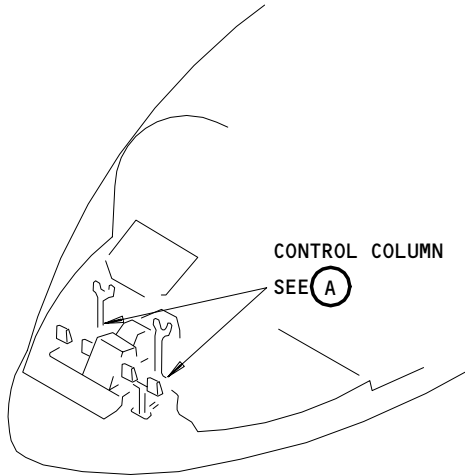
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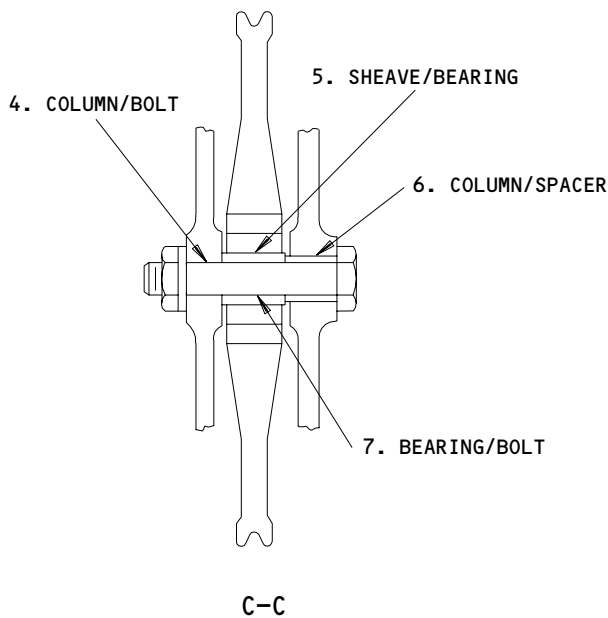
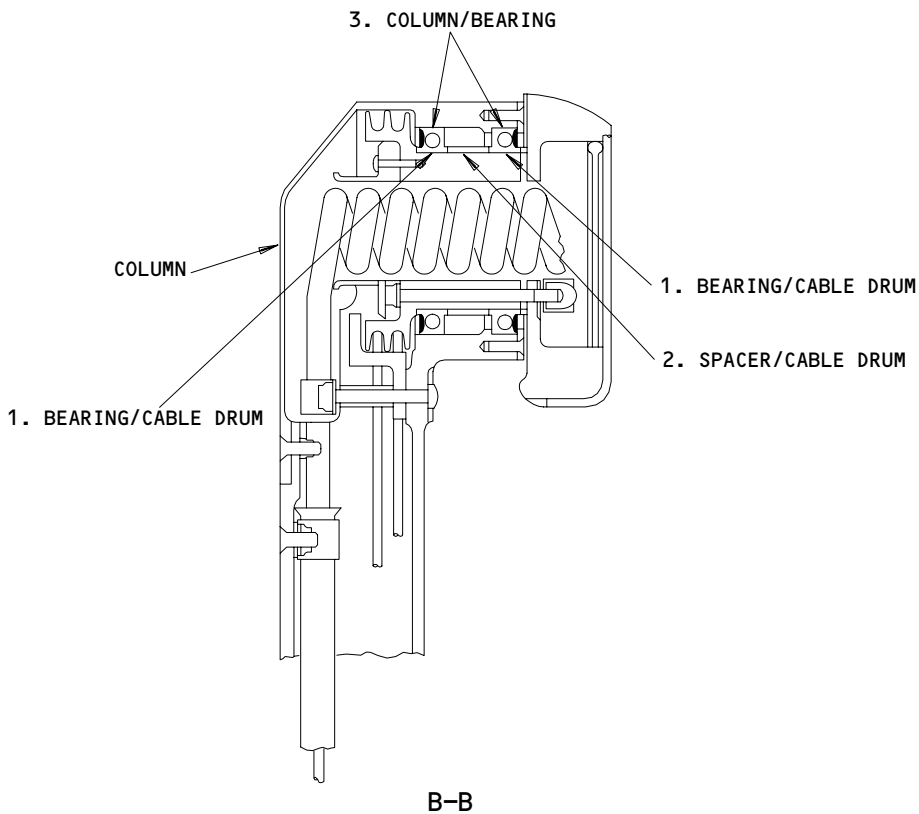
Wear Limits for the Elevator Control Column  
Figure 601 (Sheet 1)

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Wear Limits for the Elevator Control Column  
Figure 601 (Sheet 2)

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# BOEING

## 767 MAINTENANCE MANUAL

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BEARING	ID	2.3120 (58.725)	2.3130 (58.750)	2.3140 (58.776)	0.0040 (0.102)	X		
	CABLE DRUM	OD	2.3110 (58.699)	2.3120 (58.725)	2.3100 (58.674)			X	1
2	SPACER	ID	2.3200 (58.928)	2.3400 (59.436)	TBF	TBF	X		
	CABLE DRUM	OD	2.3110 (58.699)	2.3120 (58.725)	2.3100 (58.674)			X	1
3	COLUMN	ID	3.0625 (77.788)	3.0635 (77.813)	3.0645 (77.838)	0.0031 (0.079)		X	1
	BEARING	OD	3.0624 (77.785)	3.0625 (77.788)	3.0614 (77.760)		X		
4	COLUMN	ID	0.3130 (7.950)	0.3170 (8.052)	0.3190 (8.103)	0.0100 (0.254)		X	1
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3090 (7.849)		X		
5	SHEAVE	ID	0.9369 (23.797)	0.9374 (23.810)	0.9380 (23.825)	0.0010 (0.025)	X		
	BEARING	OD	0.9370 (23.800)	0.9375 (23.813)	0.9370 (23.800)		X		
6	COLUMN	ID	0.5000 (12.700)	0.5050 (12.827)	0.5070 (12.878)	0.0120 (0.305)		X	1
	SPACER	OD	0.4970 (12.624)	0.4980 (12.649)	0.4950 (12.573)		X		
7	BEARING	ID	0.3120 (7.925)	0.3125 (7.938)	0.3145 (7.988)	0.0065 (0.165)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3080 (7.823)		X		

1 THIS PART CAN BE REPAIRED.

Wear Limits for the Elevator Control Column  
Figure 601 (Sheet 3)

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CONTROL COLUMN TORQUE TUBE - REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
  - (1) A removal of a control column torque tube.
  - (2) An installation of a control column torque tube.
- B. The control column torque tube is referred to as "torque tube" in this procedure.
- C. This procedure is applicable for the captain's and first officer's torque tube.

TASK 27-31-11-004-012

2. Control Column Torque Tube - Removal

A. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) E1 - P/N A20004-22

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-24/201, Rig Pins
- (3) AMM 27-31-10/401, Control Column
- (4) AMM 27-41-04/401, Stabilizer Trim Cutoff Switch
- (5) AMM 22-12-03/401, Elevator Control Force Transducer
- (6) AMM 31-35-10/401, Elevator Control Force Transducer.
- (7) AMM 31-31-08/401, Control Column Position Transducer.

C. Access

- (1) Location Zones
  - 113/114 Area Forward of NLG Wheel Well
  - 211/212 Control Cabin
- (2) Access Panel
  - 113AL Forward Equipment Bay

D. Prepare for the Removal

S 864-001

- (1) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL Valve switches on the right side panel, P61, to the OFF position.

S 014-002

- (2) Open the access door for the forward equipment bay, 113AL (AMM 06-41-00/201).

S 484-003

- (3) If you remove the captain's torque tube, then install the rig pin E2 in the first officer's torque tube (Fig. 401).

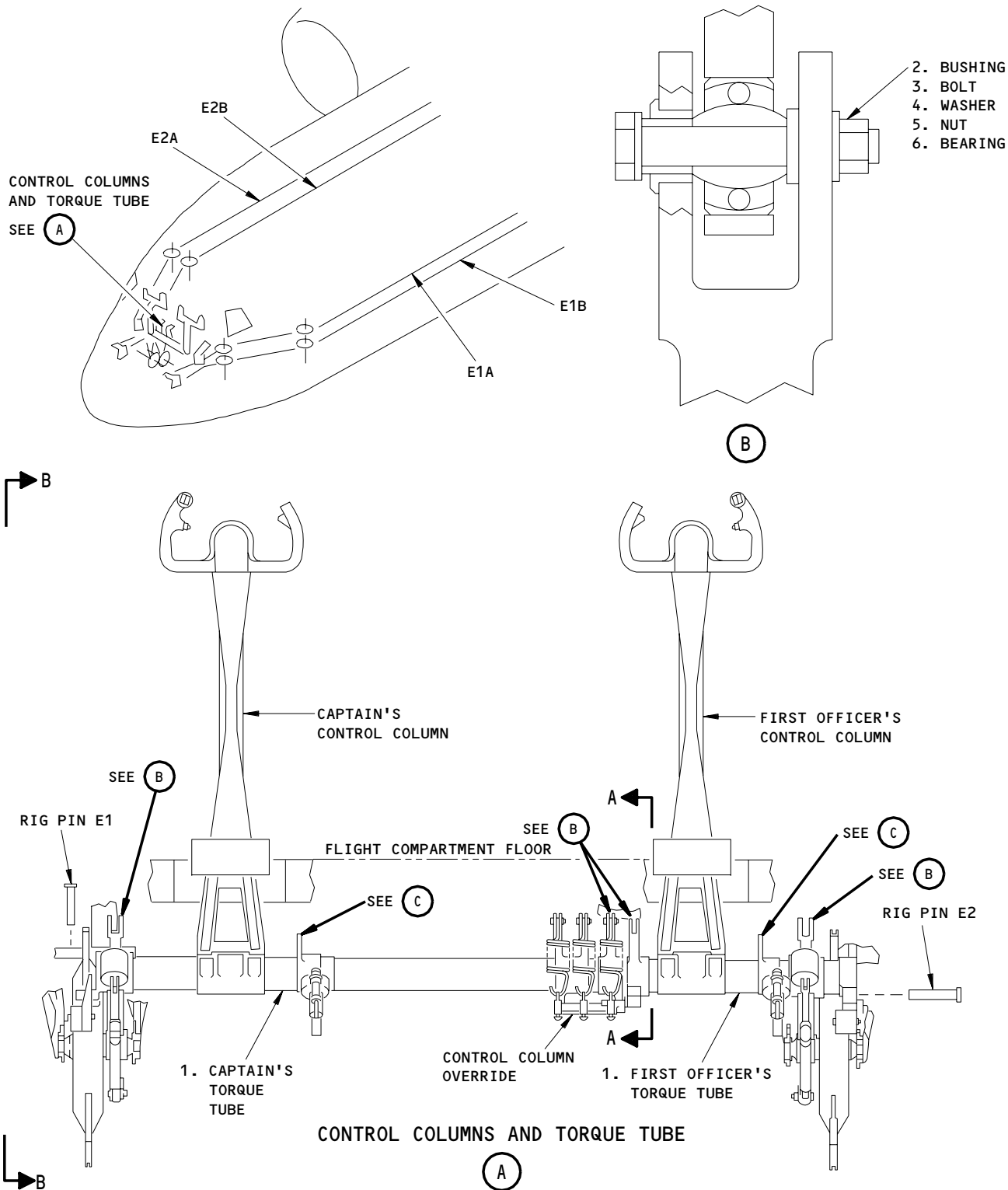
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Control Column Torque Tube Installation  
Figure 401 (Sheet 1)

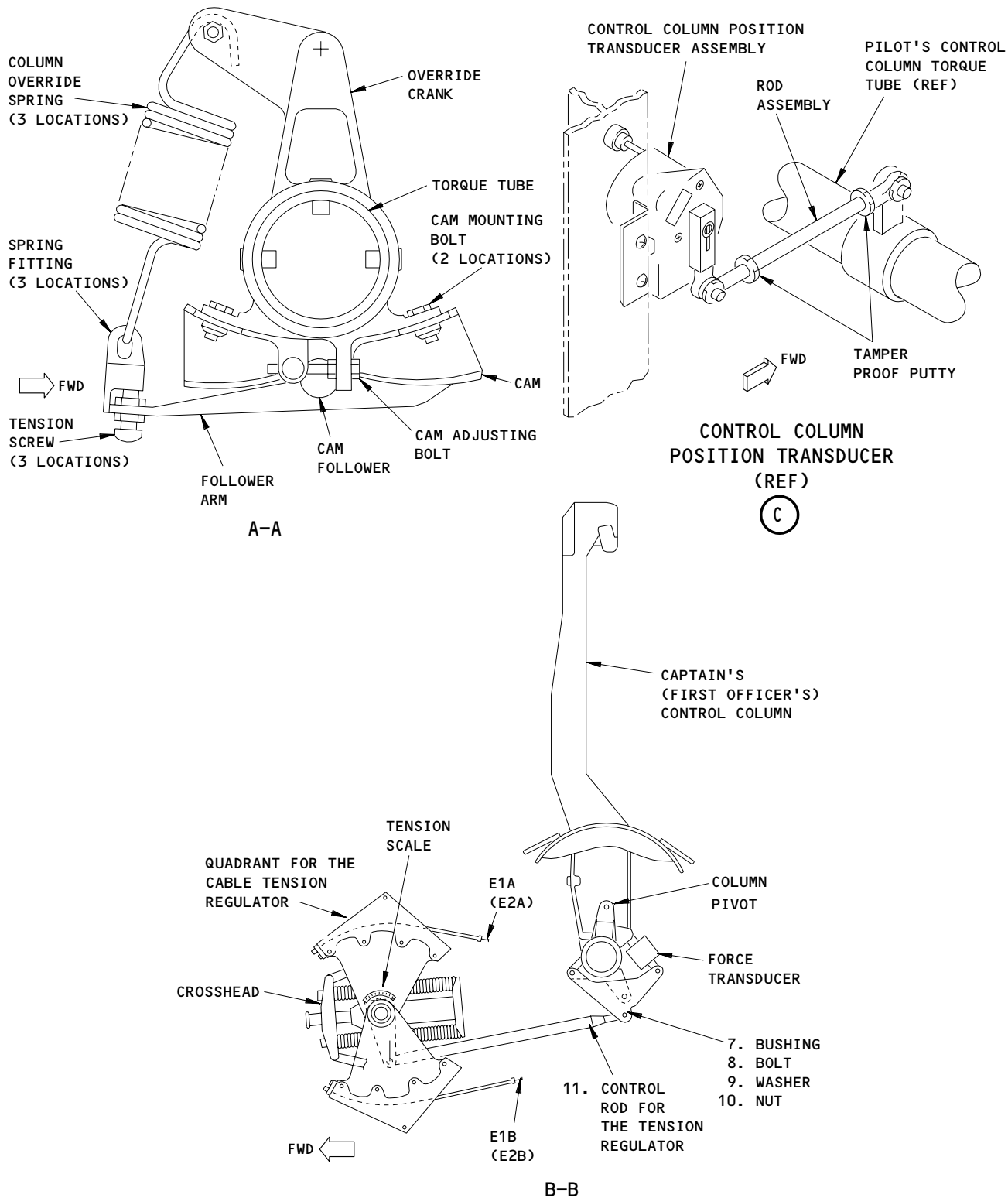
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Control Column Torque Tube Installation  
Figure 401 (Sheet 2)

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- S 484-004
- (4) If you remove the first officer's torque tube, then install the rig pin E1 in the captain's torque tube (Fig. 401).
- S 024-005
- (5) Remove the applicable control column (AMM 27-31-10/401).
- S 024-006
- (6) Remove the applicable stabilizer trim cutoff switches (AMM 27-41-04/401).
- S 024-007
- (7) Remove the elevator control force transducer (AMM 22-12-03/401).
- S 024-031
- (8) Remove the elevator control force transducer (AMM 31-35-10/401).
- S 024-038
- (9) Remove the screw, washer, and nut that connect the control column position transducer rod linkage to the torque tube.

**NOTE:** Use wire to attach the loose end of the rod assembly to the surrounding structure so that it is out of the way when you remove the torque tube. Be sure not to disturb the adjustment of the rod linkage when you remove it from the torque tube.

E. Torque Tube Removal (Fig. 401)

- S 024-008
- (1) Remove the bolt (8) to disconnect the control rod (11) to the torque tube (1).
- S 024-009
- (2) Remove the two bolts (3) that attach the torque tube (1) to the airplane structure.
- S 024-010
- (3) Remove the torque tube (1) from the airplane.

TASK 27-31-11-404-011

3. Control Column Torque Tube - Installation

A. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):  
(a) E1 - P/N A20004-22

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels  
(2) AMM 20-10-24/201, Rig Pins

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- (3) AMM 22-12-03/401, Elevator Control Force Transducer
- (4) Remove the elevator control force transducer (AMM 31-35-10/401).
- (5) AMM 27-31-00/501, Elevator Control System
- (6) AMM 27-31-10/401, Control Column
- (7) AMM 27-32-05/401, Control Column Shaker
- (8) AMM 27-32-07/401, Stick Nudger
- (9) AMM 27-41-04/401, Stabilizer Trim Cutoff Switch
- (10) AMM 31-31-08/401, Control Column Position Transducer

C. Access

- (1) Location Zones
  - 113/114 Area Forward of NLG Weel Well
  - 211/212 Control Cabin
- (2) Access Panel
  - 113AL Forward Equipment Bay

D. Torque Tube Installation (Fig. 401)

- S 424-013
  - (1) Put the torque tube (1) in its position.
- S 424-014
  - (2) Install the bushings (2), bearings (6), bolts (3), washers (4), nuts (5) that attach the torque tube to airplane structure.
- S 084-015
  - (3) Remove the rig pin E1 or E2 from the torque tube.
- S 824-016
  - (4) Adjust the override cam (AMM 27-31-00/501).
- S 424-017
  - (5) Install the applicable control column (AMM 27-31-10/401).
- S 824-018
  - (6) Adjust the override springs (AMM 27-31-00/501).
- S 424-019
  - (7) Install the applicable stabilizer trim cutoff switches (AMM 27-41-04/401).
- S 824-020
  - (8) Adjust the stabilizer cutoff switches (AMM 27-31-00/501).
- S 424-021
  - (9) Install the bushing (7), bolt (8), washer (9), and nut (10) to connect the control rod (11) to the torque tube (1).
- S 714-022
  - (10) Do the test of the control column shaker (AMM 27-32-05/401).

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- S 714-023  
(11) Do the test of the stick nudger operation (AMM 27-32-07/401).
- S 424-024  
(12) Install the elevator control force transducer (AMM 22-12-03/401).
- S 424-032  
(13) Install the elevator control force transducer (AMM 31-35-10/401).
- S 714-025  
(14) Do the test of the elevator control force transducer (AMM 22-12-03/401).
- S 714-033  
(15) Do the test of the elevator control force transducer (AMM 31-35-10/401).
- S 424-037  
(16) Attach the control column position transducer rod linkage to the torque tube by installing the bolt, washer, and nut.  
(a) If you disturbed the adjustment of the control column position transducer rod linkage, then you need to adjust the rod linkage, do the installation test (AMM 31-31-08/401).
- S 414-026  
(17) Close the access door for the forward equipment bay, 113AL (AMM 06-41-00/201).

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ELEVATOR CONTROL TENSION REGULATOR QUADRANT – REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the tension regulator quadrants in the elevator control system.

TASK 27-31-12-024-001

2. Remove the Tension Regulator Quadrant

A. Equipment

- (1) Rig Pins from Set A20004-XX (Ref 20-10-24):
  - (a) E1 – P/N A20004-22
  - (b) E2 – P/N A20004-22
- (2) Service Platform, Control Bay Access Door – A51001-19
- (3) Cable Tension Regulator Holding Tool – PN 965042, SARMA – B.P. 29, 26240 ST./Vallier-Sur-Rhone, France

B. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 06-42-00/201, Empennage Access Doors and Panels
- (3) 20-10-24/201, Rig Pins
- (4) 24-22-00/201, Electrical Power – Control
- (5) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones
  - 113/114 Area Forward of NLG Wheel Well
  - 211/212 Control Cabin
  - 313/314 Stabilizer Torsion Box Compartment
- (2) Access Panels
  - 113AL Forward Equipment Bay
  - 313AL Controls Bay

D. Prepare for the Removal

- S 864-002
- (1) Supply electrical power (Ref 24-22-00).
- S 214-003
- (2) Make sure the stabilizer is at 2 units of trim on the stabilizer position indicator (neutral position).
- S 214-004
- (3) Make sure the control columns are in the neutral position.
- S 864-005
- (4) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).
- S 864-006
- (5) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.

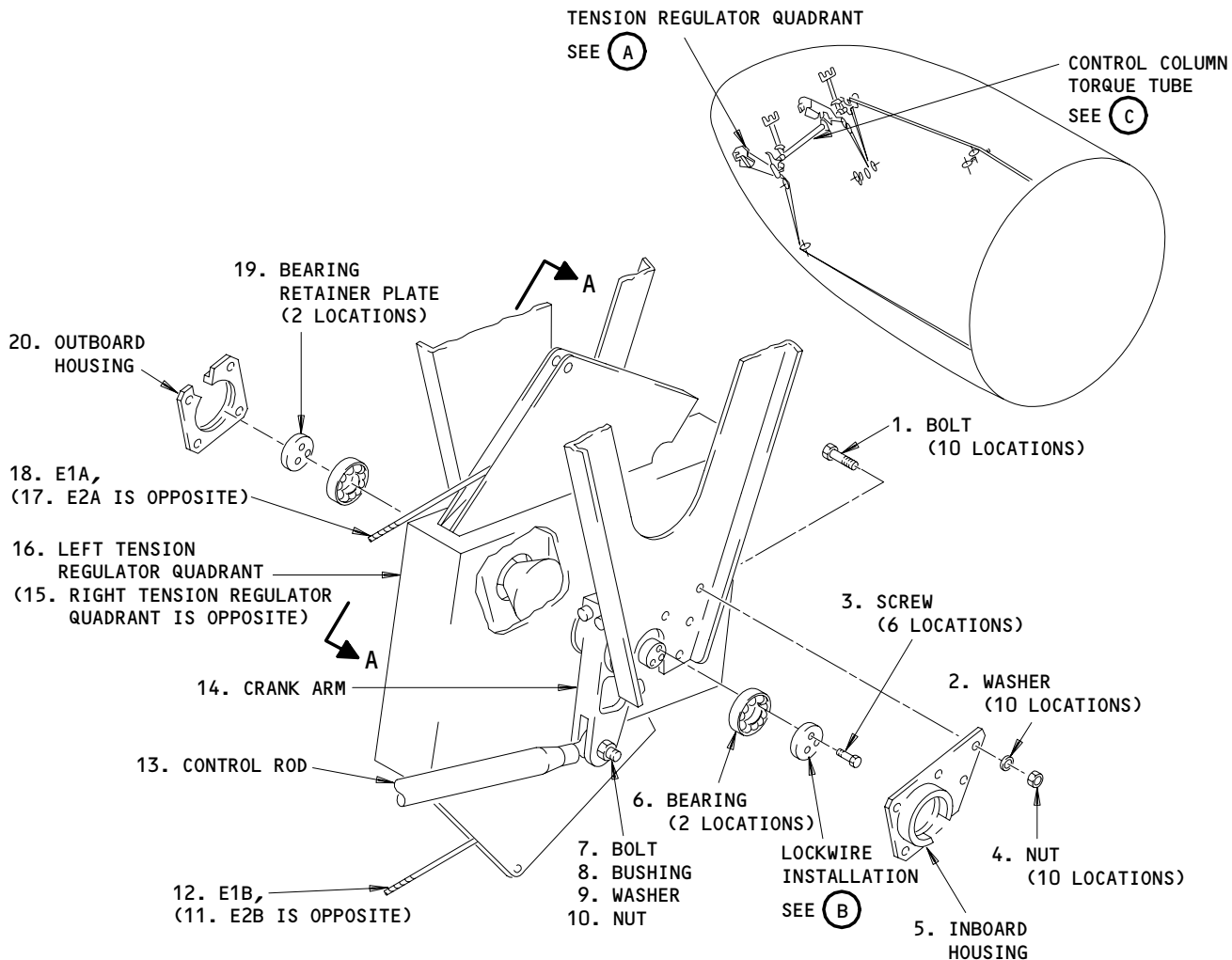
EFFECTIVITY

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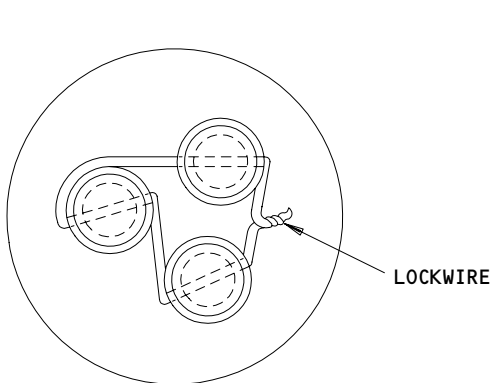
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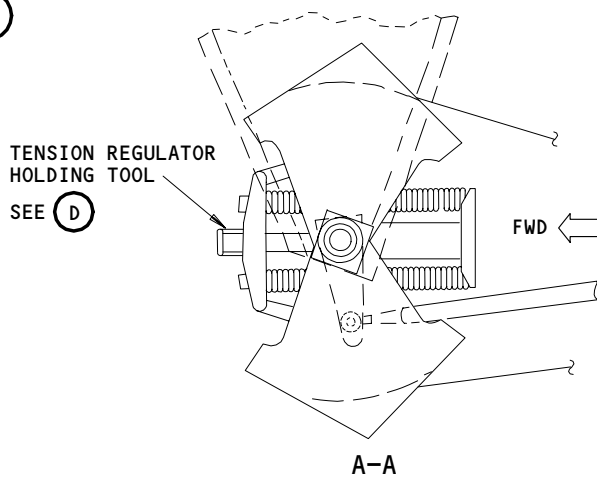
TENSION REGULATOR QUADRANT  
(LEFT QUADRANT IS SHOWN, RIGHT QUADRANT IS OPPOSITE)



LOCKWIRE INSTALLATION

(B)

(A)



Tension Regulator Quadrant Installation  
Figure 401 (Sheet 1)

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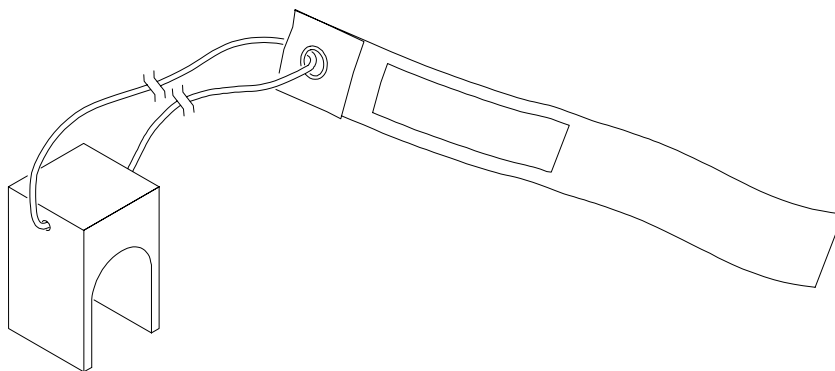
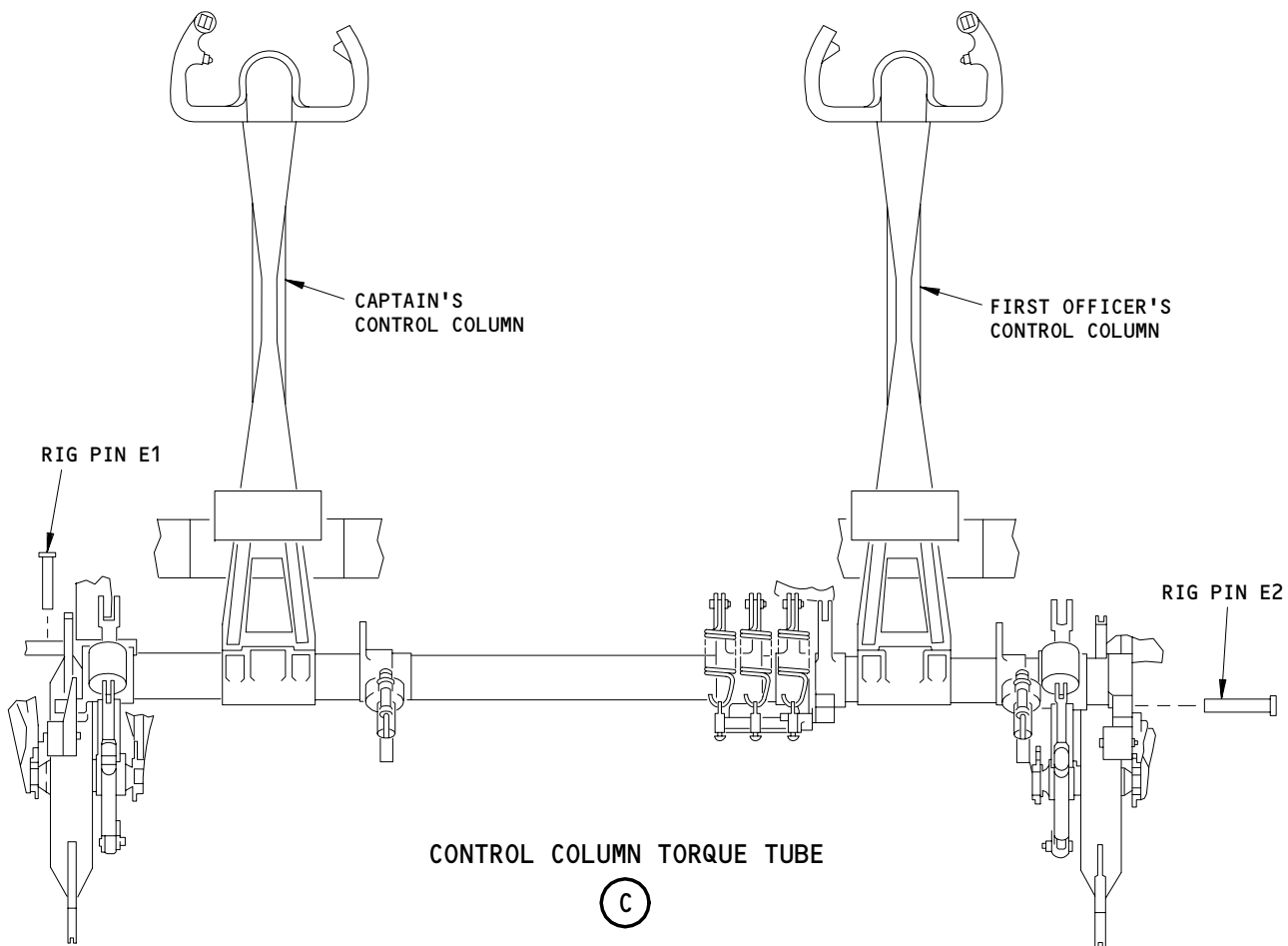
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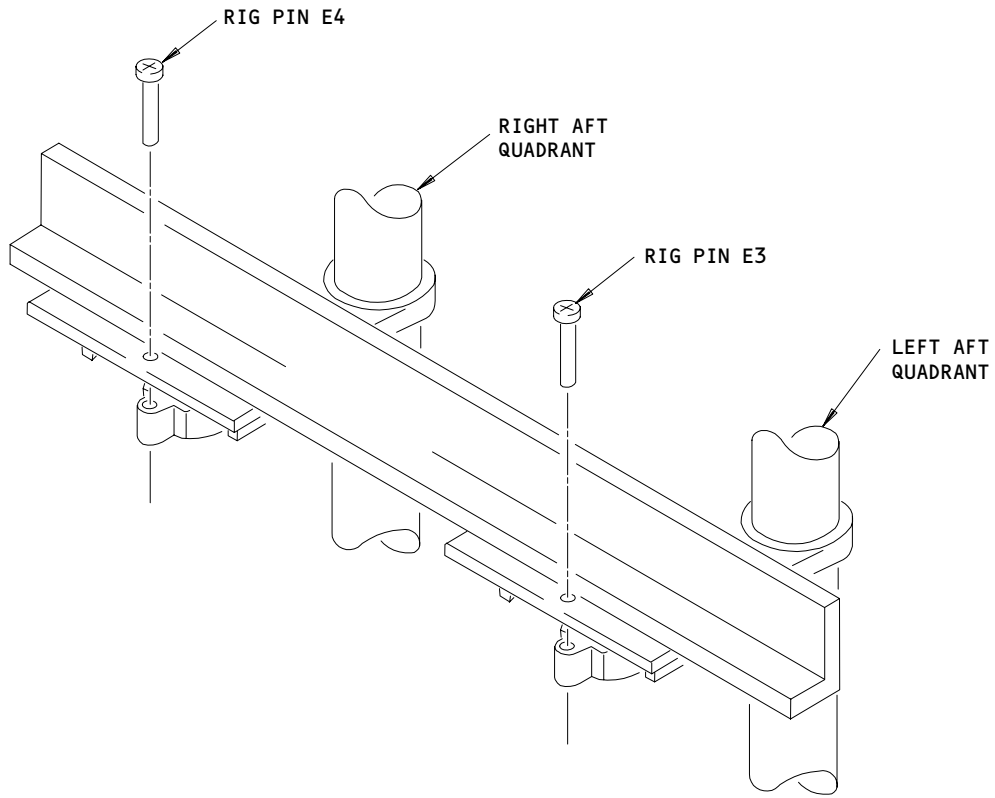
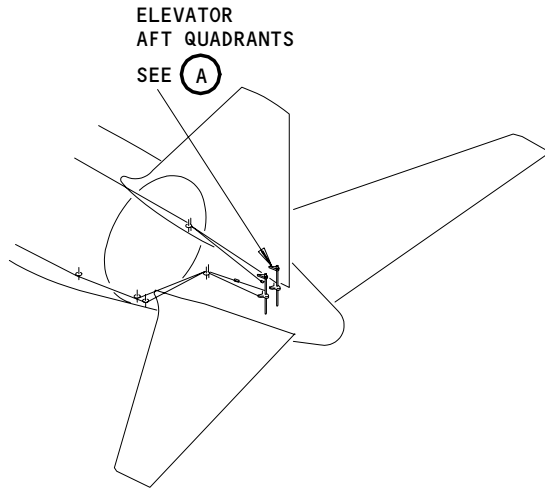
Tension Regulator Quadrant Installation  
Figure 401 (Sheet 2)

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ELEVATOR AFT QUADRANTS  
(A)

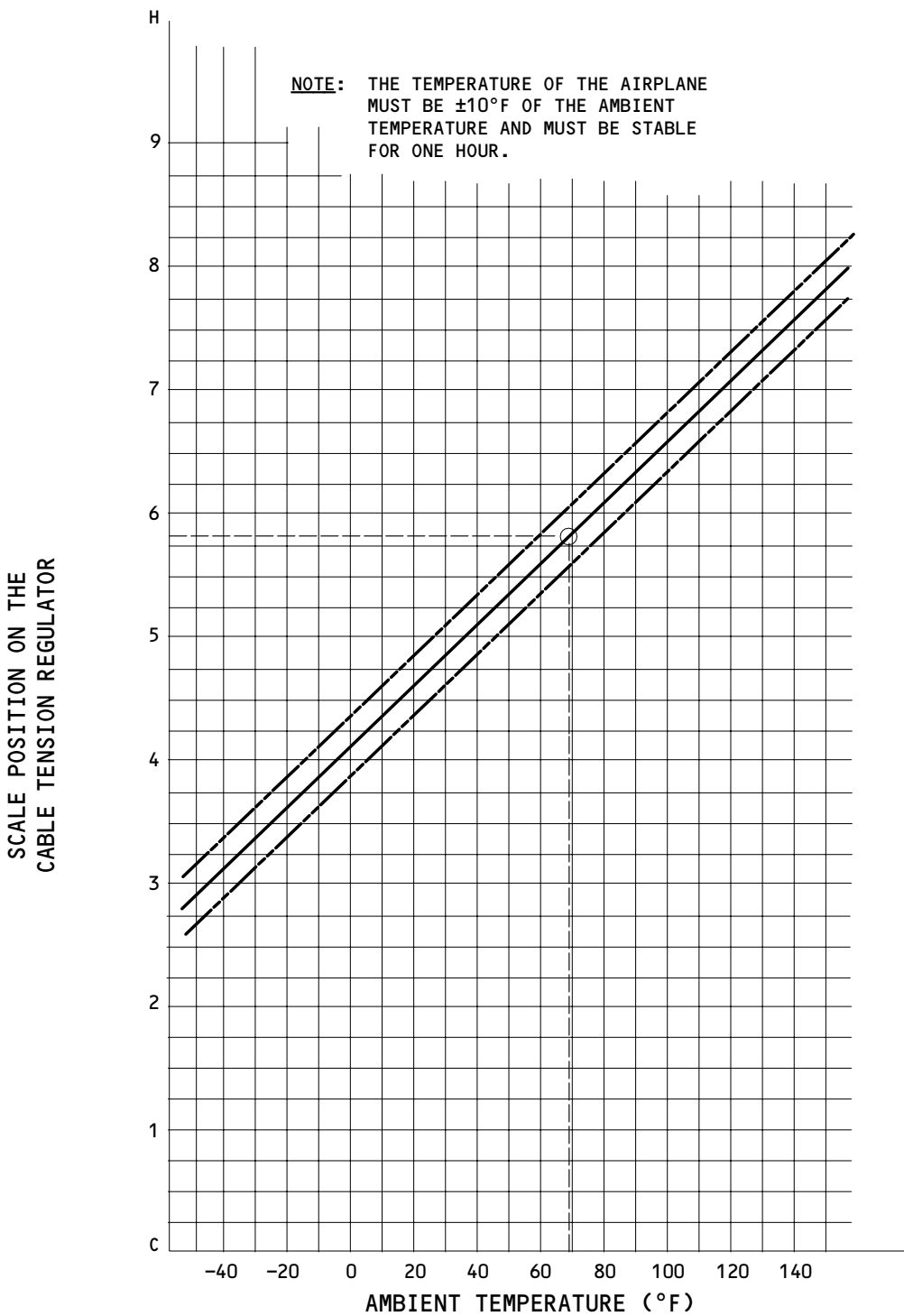
Tension Regulator Quadrant Adjustment  
Figure 402

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CABLE TENSION REGULATOR SCALE SETTING VS TEMPERATURE

Elevator Body Cable Tension  
Figure 403

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S 864-007

- (6) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the CUTOUT position.

S 864-008

- (7) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL L
  - (e) 11H18, FLT CONT SHUTOFF TAIL CENTER
  - (f) 11H27, FLT CONT SHUTOFF TAIL R

S 014-009

- (8) Open the access door for the forward equipment bay, 113AL (Ref 06-41-00).

S 014-050

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR AND THE CONTROLS BAY ACCESS DOOR, 313AL. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (9) Open the access door for the controls bay, 313AL (Ref 06-42-00).

S 094-011

- (10) Install a service platform on the access door for the controls bay, 313AL.

S 094-012

- (11) Install rig pins E1 and E2 in the torque tube for the control column (Fig. 401).

E. Remove the Tension Regulator Quadrant (Fig. 401)

S 494-013

- (1) Install the tension regulator tool between the locking shaft end and the locking cross bar of the tension regulator.

S 034-014

- (2) Loosen these body cables at the aft turnbuckles and release the tension equally in the cable:
- (a) Cables E1A (18) and E1B (12) for the left tension regulator quadrant (16).
  - (b) Cables E2A (17) and E2B (11) for the right tension regulator quadrant (15).

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- S 034-015
- (3) Disconnect the cables from the tension regulator quadrant.
  
- S 034-016
- (4) Disconnect the control rod (13) from the crank arm (14).
  
- S 824-017
- (5) Hold the tension regulator quadrant.
  
- S 034-018
- (6) Remove the screws (3) from the bearing retainer plate (19).
  
- S 034-019
- (7) Remove the plate (19) and bearings (6) on the left and right side.
  
- S 034-020
- (8) Remove the nuts (4), washers (2), and bolts (1) that hold the bearing housing (5, 20) to the airplane structure.
  
- S 024-021
- (9) Remove the tension regulator quadrant.
  
- S 094-022
- (10) Remove the tension regulator tool.

TASK 27-31-12-424-023

3. Install the Tension Regulator Quadrant

A. Equipment

- (1) Rig Pins from Set A20004-XX (Ref 20-10-24):
  - (a) E3 - P/N A20004-17
  - (b) E4 - P/N A20004-17
- (2) Cable Tension Regulator Holding Tool - PN 965042, SARMA - B.P. 29, 26240 St. Vallier-Sur-Rhone, France
- (3) Service Platform, Control Bay Access Door - A51001-19

B. Consumable Materials

- (1) D00633 Grease - Corrosion Preventive BMS 3-33 (Preferred)
- (2) D00015 Grease - Corrosion Preventive BMS 3-24 (Alternate)
- (3) A00247 Sealant - Chromate Type BMS 5-95
- (4) C00308 Compound - Corrosion Preventive MIL-C-11796 Class III

C. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 06-42-00/201, Empennage Access Doors and Panels
- (3) 20-10-24/201, Rig Pins
- (4) 24-22-00/201, Electrical Power - Control
- (5) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

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D. Access

(1) Location Zones

113/114	Area Forward of NLG Wheel Well
211/212	Control Cabin
313/314	Stabilizer Torsion Box Compartment

(2) Access Panels

113AL	Forward Equipment Bay
313AL	Controls Bay

E. Install the Tension Regulator Quadrant (Fig. 401)

S 644-024

- (1) Apply grease to the holes on the structure of the tension regulator quadrant.

S 644-025

- (2) Apply grease to the bearings (6).

S 434-026

- (3) Hold the tension regulator quadrant in its correct position and install the bearing housing (5, 20) on the left and right side.

S 434-027

- (4) Install the bearings (6) and the bearing retainer plate (19) on the left and right side.

S 434-028

- (5) Install the screws (3).

S 434-029

- (6) Safety the screws with a wire (Detail B).

S 434-031

- (7) Connect the control rod (13) to the crank arm (14). Use finger pressure only to install bolt (7).

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- S 214-030
- (8) Make sure that rig pins E1 and E2 are installed.
- S 494-032
- (9) Install the tension regulator tool.
- S 434-033
- (10) Remove the tags and connect the cables to the tension regulator.
- S 824-034
- (11) Adjust the body cables.
- (a) Do the steps that follow for the left tension regulator quadrant (16):
- 1) Adjust the turnbuckles in cables E1A (18) and E1B (12) until the tension regulator indicator shows the correct position (Figure 403):
  - 2) Make sure that you can easily install rig pin E3 with light finger pressure only (Fig. 402).
- NOTE: Adjust the turnbuckles at the same time such that there is equal tension in the cables. Remove the tension regulator tool, if installed, before the cables are at their correct tension.
- (b) Do the steps that follow for the right tension regulator quadrant (15):
- 1) Adjust the turnbuckles in cables E2A (17) and E2B (11) until the tension regulator indicator shows the correct position (Fig. 403).
  - 2) Make sure that you can easily install rig pin E4 with light finger pressure only (Fig. 402).
- NOTE: Adjust the turnbuckles at the same time such that there is equal tension in the cables. Remove the tension regulator tool, if installed, before the cables are at their correct tension.

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- S 434-035  
(12) Install lock clips on the turnbuckles.
- S 624-036  
(13) Apply corrosion preventive compound to the turnbuckle threads that you can see.
- S 094-037  
(14) Remove rig pins E1, E2, E3 and E4.
- S 494-038  
(15) Make sure that you can easily install rig pins E2 and E3 with light finger pressure only.
- S 094-039  
(16) Remove rig pins E2 and E3.
- S 864-051

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** START ONE HYDRAULIC SYSTEM AT A TIME UNLESS SPECIFIED DIFFERENTLY. HIGH LOADS CAN OCCUR IN THE ELEVATOR, RUDDER, AND STABILIZER STRUCTURES FROM FORCES CAUSED BY INCORRECTLY ADJUSTED POWER CONTROL ACTUATORS. DAMAGE TO EQUIPMENT CAN OCCUR.

- (17) Pressurize the left, right, and center hydraulic systems (Ref 29-11-00).
- S 864-041  
(18) Supply electrical power (Ref 24-22-00).
- S 864-042  
(19) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

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S 864-043

- (20) Put the LEFT, RIGHT, and CENTER TAIL FLT CONT SHUTOFF valve switches on the right side panel, P61, to the ON position.

S 864-044

- (21) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the NORM position.

S 214-045

- (22) Move the control columns through full travel and do the check that follows:  
(a) Make sure the elevators move correctly, as shown on the elevator position indicators, with the movement of the control columns.

F. Put the Airplane Back to Its Usual Condition

S 864-046

- (1) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-047

- (2) Remove electrical power (Ref 24-22-00).

S 414-048

- (3) Close the access door for the forward equipment bay, 113AL (Ref 06-41-00).

S 414-049

- (4) Remove the service platform and close the access door for the controls bay, 313AL (Ref 06-42-00).

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ELEVATOR CONTROL TENSION REGULATOR QUADRANT – INSPECTION/CHECK

1. General

A. This procedure only has an illustration and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Elevator Control Tension Regulator Quadrant – Removal/Installation for procedures to do these tasks.

TASK 27-31-12-226-001

2. Wear Limits for the Elevator Control Tension Regulator Quadrant (Fig. 601)

A. Access

(1) Location Zones

113/114 Area Forward of NLG Wheel Well

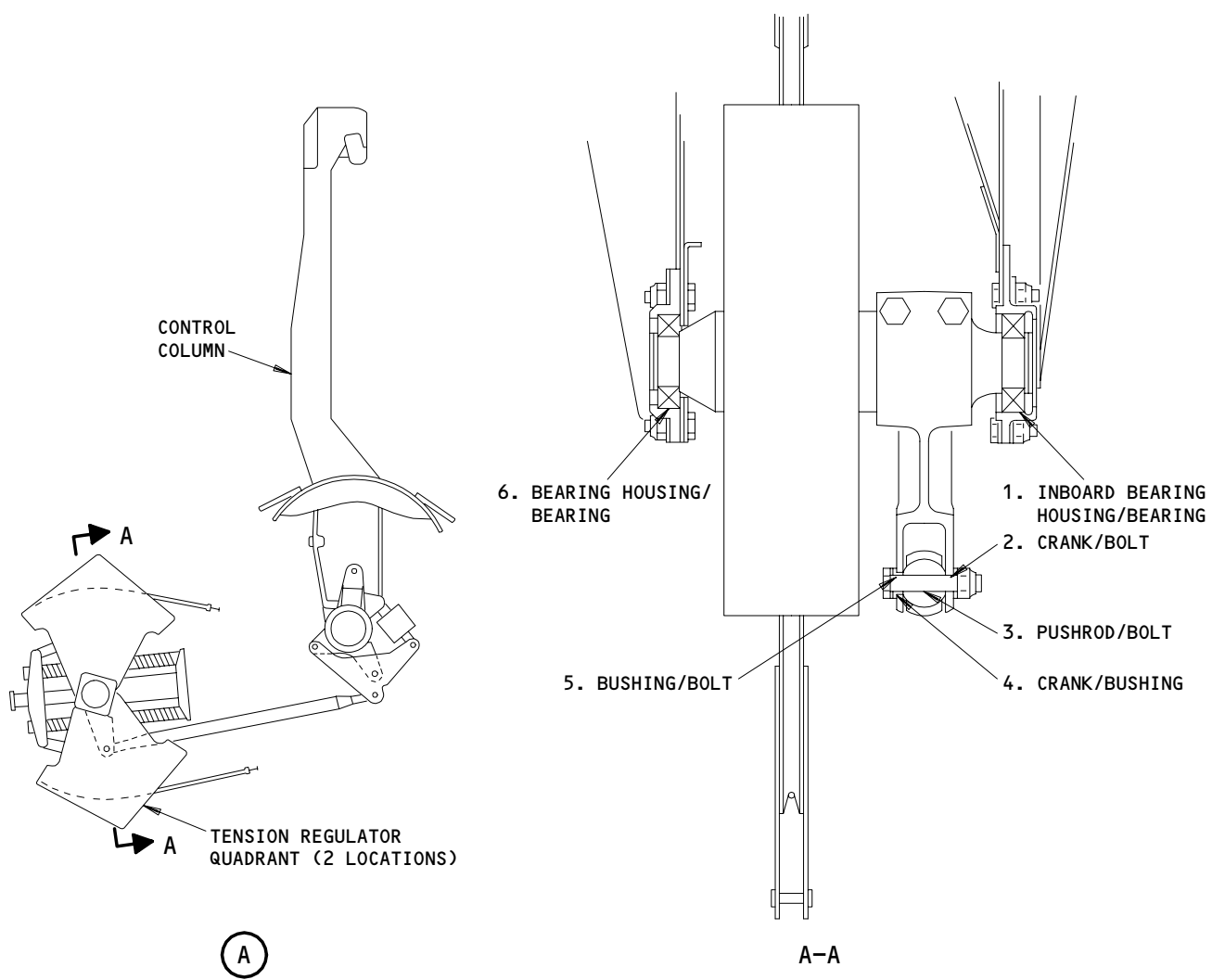
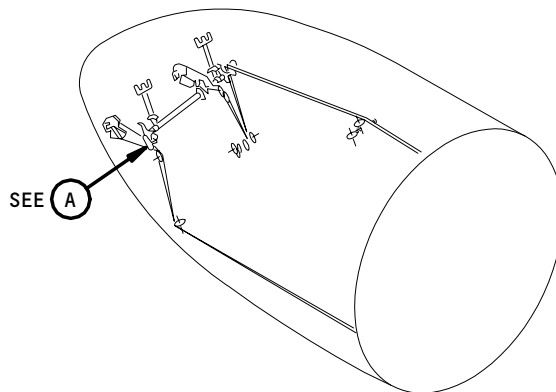
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Wear Limits for the Elevator Control Tension Regulator Quadrant  
Figure 601 (Sheet 1)

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# BOEING

## 767 MAINTENANCE MANUAL

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	INBD BEARING HOUSING	ID	1.9375 (49.213)	1.9385 (49.238)	1.9415 (49.314)	0.0070 (0.178)		1	
	BEARING	OD	1.9365 (49.187)	1.9375 (49.213)	1.9345 (49.136)		3		
2	CRANK	ID	0.3120 (7.925)	0.3130 (7.950)	0.3150 (8.001)	0.0060 (0.152)		1	
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3090 (7.849)		3		
3	PUSHROD	ID	0.3122 (7.930)	0.3125 (7.938)	0.3145 (7.988)	0.0055 (0.140)	2		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3090 (7.849)		3		
4	CRANK	ID	0.4995 (12.687)	0.5005 (12.713)	0.5025 (12.764)	0.0075 (0.191)		1	
	BUSHING	OD	0.4970 (12.624)	0.4980 (12.649)	0.4950 (12.573)		3		
5	BUSHING	ID	0.3120 (7.925)	0.3125 (7.938)	0.3145 (7.988)	0.0055 (0.140)	3		
	BOLT	OD	0.3110 (7.899)	0.3112 (7.904)	0.3090 (7.849)		3		
6	BEARING HOUSING	ID	1.9375 (49.213)	1.9385 (49.238)	1.9415 (49.314)	0.0070 (0.178)		1	
	BEARING	OD	1.9365 (49.187)	1.9375 (49.213)	1.9345 (49.136)		3		

- 1 CHROMIUM PLATE TO A MAXIMUM THICKNESS OF 0.010 INCH (0.254 mm) TO GET TO THE DESIGN LIMITS
- 2 REPLACE THE BACB10AE11 ROD END
- 3 REPLACE THE WORN PART

Wear Limits for the Elevator Control Tension Regulator Quadrant  
Figure 601 (Sheet 2)

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ELEVATOR AFT QUADRANT – REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the elevator aft quadrants.

TASK 27-31-15-024-001

2. Remove the Elevator Aft Quadrant

A. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):  
(a) E1 – P/N A20004-22  
(b) E2 – P/N A20004-22  
(c) E5 – P/N A20004-15  
(d) E6 – P/N A20004-15  
(2) Service Platform, Control Bay Access Door – A51001-19  
(3) Cable Tension Regulator Holding Tool – P/N 965042, SARMA – 26240 St. Vallier, France

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels  
(2) AMM 06-42-00/201, Empennage Access Doors and Panels  
(3) AMM 20-10-24/201, Rig Pins  
(4) AMM 24-22-00/201, Electrical Power – Control  
(5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones  
113/114 Area Forward of NLG Wheel Well  
211/212 Control Cabin  
313/314 Stabilizer Torsion Box Compartment  
335/345 Horizontal Stabilizer – Rear Spar to Trailing Edge  
(2) Access Panels  
113AL Forward Equipment Bay  
313AL Controls Bay  
335GB Elevator Mechanism (Left)  
345GB Elevator Mechanism (Right)

D. Prepare for the Removal

- S 864-002  
(1) Supply electrical power (AMM 24-22-00/201).  
S 864-003  
(2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).  
S 864-004  
(3) Put the RIGHT, LEFT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.

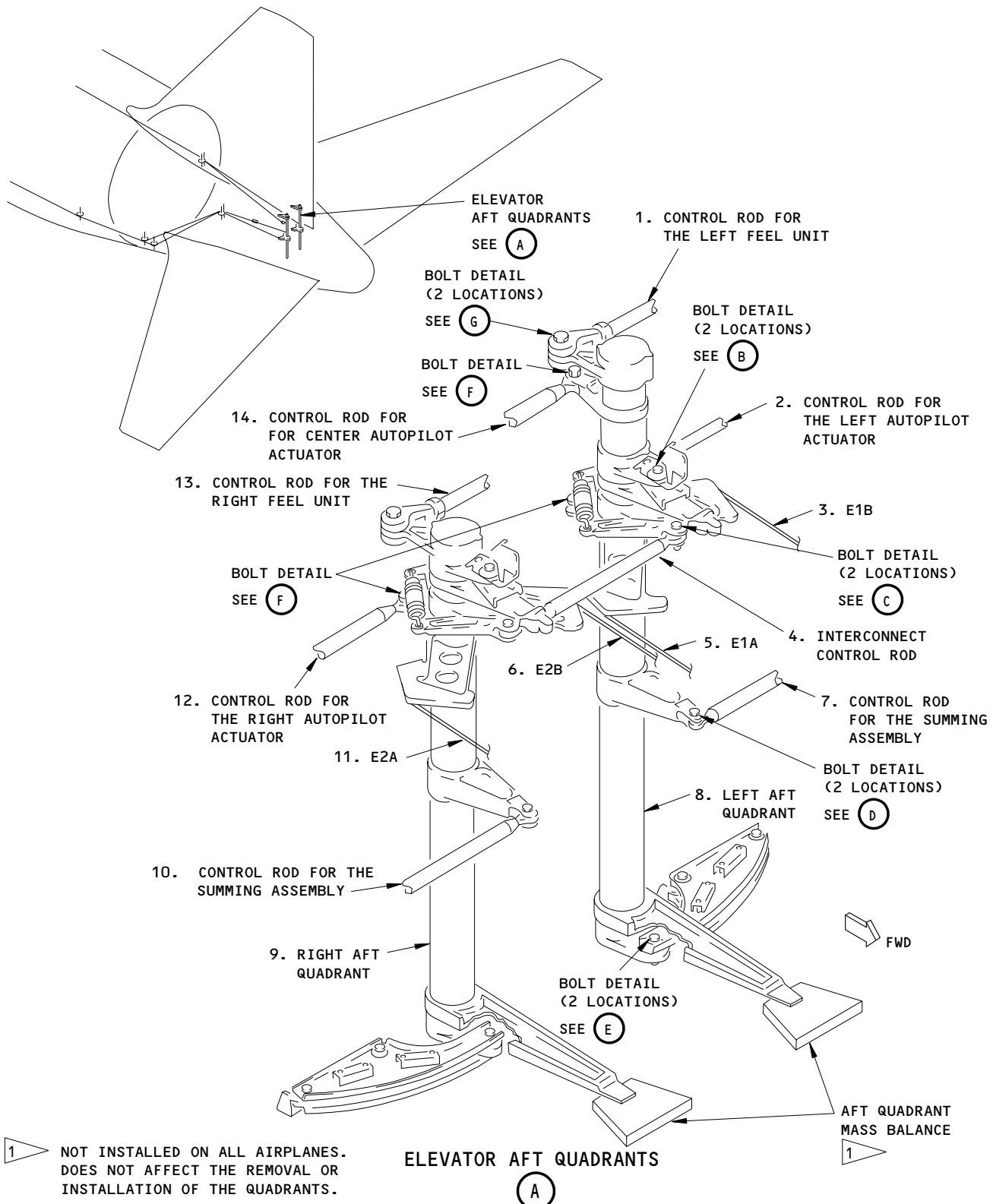
EFFECTIVITY

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1 NOT INSTALLED ON ALL AIRPLANES. DOES NOT AFFECT THE REMOVAL OR INSTALLATION OF THE QUADRANTS.

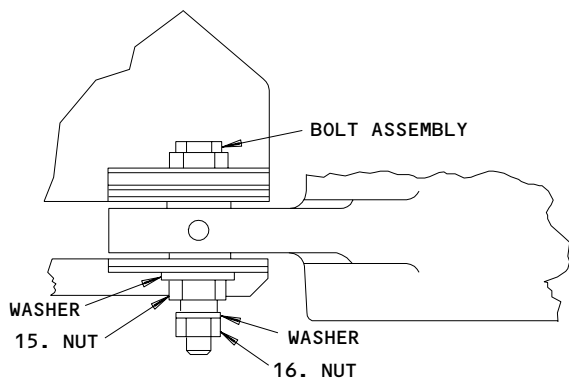
ELEVATOR AFT QUADRANTS  
(A)

Elevator Aft Quadrant - Removal/Installation  
Figure 401 (Sheet 1)

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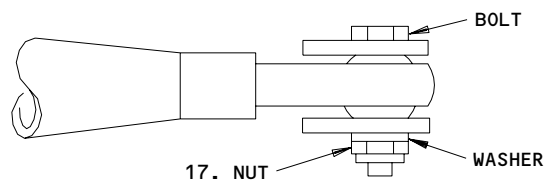
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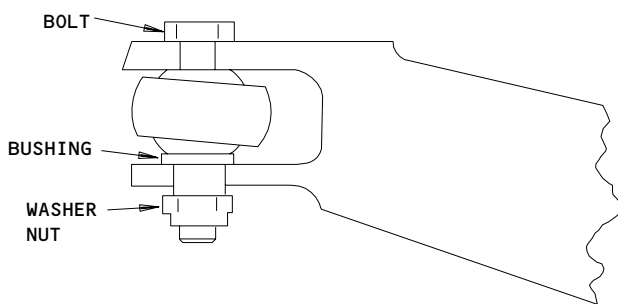
BOLT DETAIL

(B)



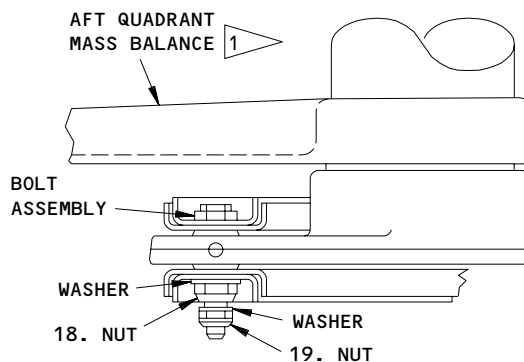
BOLT DETAIL

(C)



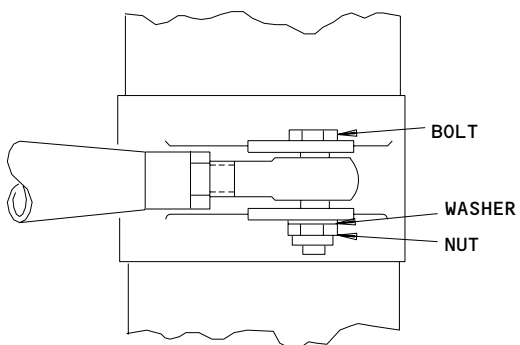
BOLT DETAIL

(D)



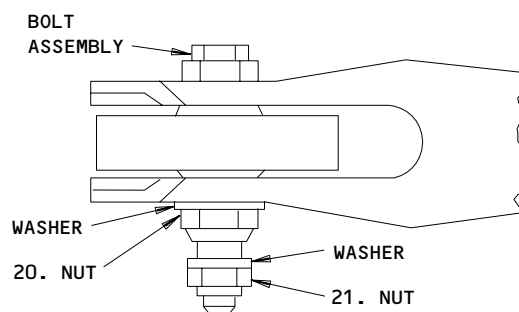
BOLT DETAIL

(E)



BOLT DETAIL

(F)



BOLT DETAIL

(G)

Elevator Aft Quadrant - Removal/Installation  
Figure 401 (Sheet 2)

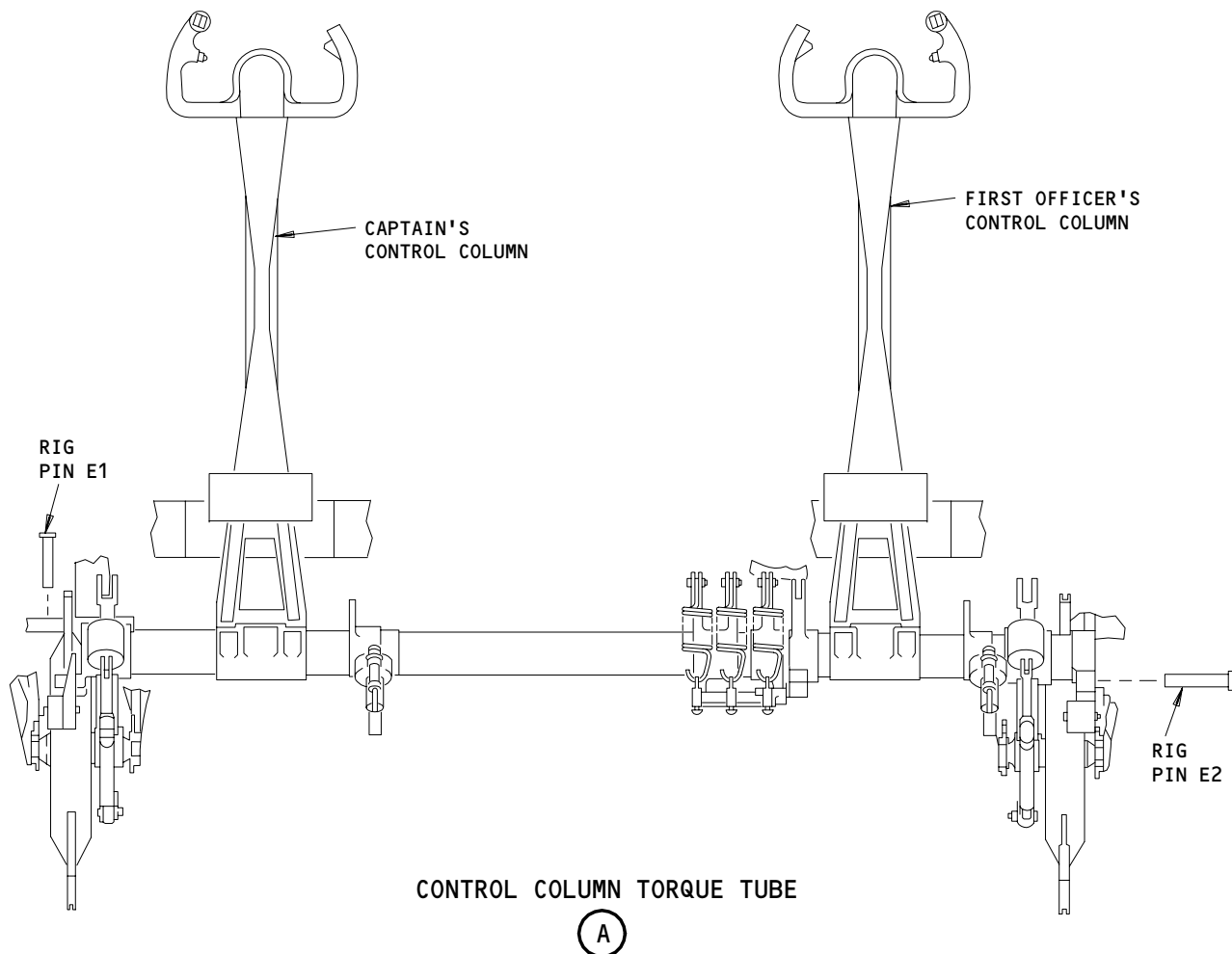
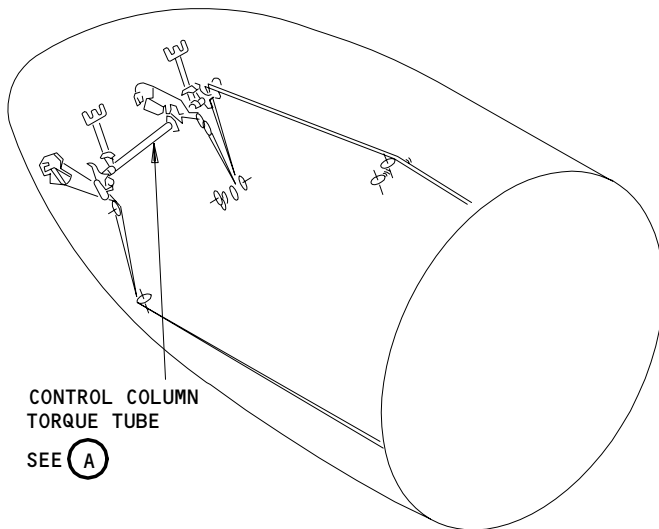
EFFECTIVITY

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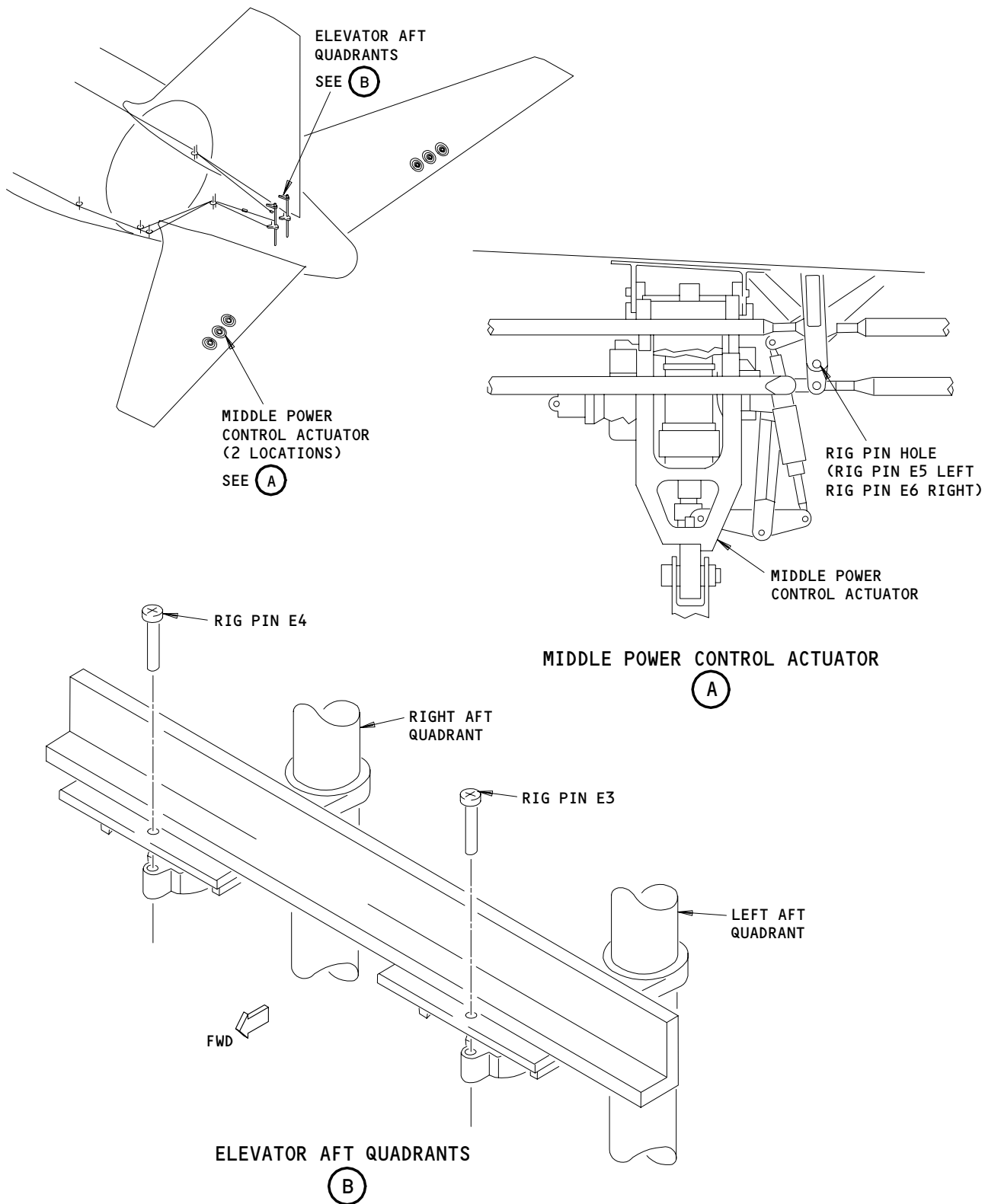


Elevator Control Column Rigging  
Figure 402

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Elevator Aft Quadrant Adjustment  
Figure 403

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S 864-005

- (4) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the CUTOUT position.

S 864-006

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11A36, ALT STAB TRIM
  - (b) 11C12, FLIGHT CONTROLS STAB TRIM SHUTOFF L
  - (c) 11C13, FLIGHT CONTROLS STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 014-007

- (6) Open the access door for the forward equipment bay, 113AL (AMM 06-41-00/201).

S 494-008

- (7) Install rig pins E1 and E2 (Fig. 402).

S 014-009

- (8) Remove access panels 335GB and 345GB (AMM 06-42-00/201).

S 494-010

- (9) Install rig pins E5 and E6 (Fig. 403).

S 014-050

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR AND THE CONTROLS BAY ACCESS DOOR, 313AL. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (10) Open the access door for the controls bay, 313AL (AMM 06-42-00/201).

S 494-012

- (11) Install a service platform on the access door for the controls bay, 313AL.

E. Remove the Elevator Aft Quadrant (Fig. 401)

S 494-013

- (1) Install tension regulator tools between the crosshead and the hub of the tension regulators (Fig. 402).

S 034-014

- (2) For the left aft quadrant (8), loosen cables E1A (3) and E1B (5).

**NOTE:** Decrease the tension equally in the body cables.

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S 034-015

- (3) For the right aft quadrant (9), loosen cables E2A (11) and E2B (6).

NOTE: Decrease the tension equally in the body cables.

S 034-016

- (4) Do the steps that follow to disconnect the cables from the right or left aft quadrants:
- (a) Attach tags to the cables for identification during subsequent installation.
  - (b) Attach cable clamps to hold the cables then disconnect the cables from the aft quadrant.

S 824-017

- (5) Hold the aft quadrants.

S 024-018

- (6) Do the steps that follow to remove the left aft quadrant (8):
- (a) Disconnect these adjustable control rods from the left aft quadrant:

NOTE: Do not change the lengths of the adjustable control rods after you disconnect them.

- 1) The control rod for the left feel unit (1)
  - 2) The control rods for the left and center autopilot actuators (2, 14)
  - 3) The interconnect control rod (4).
- (b) Disconnect the control rod for the summing assembly (7) from the left aft quadrant.
  - (c) Remove the bolt that connects the bearing arm to the lower support structure (Detail E).
  - (d) Remove the bolt that connects the bearing arm to the top support structure (Detail B).
  - (e) Remove the left aft quadrant.

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S 024-019

- (7) Do the steps that follow to remove the right aft quadrant (9):
- (a) Disconnect these adjustable control rods from the right aft quadrant:

**NOTE:** Do not change the lengths of the adjustable control rods after you disconnect them.

- 1) The control rod for the right feel unit (13)
  - 2) The control rod for the right autopilot actuator (12)
  - 3) The interconnect control rod (4).
- (b) Disconnect the control rod for the summing assembly (10) from the right aft quadrant.
  - (c) Remove the bolt that connects the bearing arm to the lower support structure (Detail E).
  - (d) Remove the bolt that connects the bearing arm to the top support structure (Detail B).
  - (e) Remove the right aft quadrant.

TASK 27-31-15-424-020

3. Install the Elevator Aft Quadrant

A. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) E1 - P/N A20004-22
  - (b) E2 - P/N A20004-22
  - (c) E3 - P/N A20004-17
  - (d) E4 - P/N A20004-17
  - (e) E5 - P/N A20004-15
  - (f) E6 - P/N A20004-15
- (2) Service Platform, Control Bay Access Door - A51001-19
- (3) Cable Tensiometer - Commercially Available
- (4) Cable Tension Regulator Holding Tool - P/N 965042, SARMA - 26240 St. Vallier, France

B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-42-00/201, Empennage Access Doors and Panels
- (3) AMM 20-10-24/201, Rig Pins
- (4) AMM 24-22-00/201, Electrical Power - Control
- (5) AMM 27-31-00/501, Elevator Control System
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) AMM 34-11-00/201, Pitot Static System

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D. Access

(1) Location Zones

113/114	Area Forward of NLG Wheel Well
211/212	Control Cabin
313/314	Stabilizer Torsion Box Compartment
335/345	Horizontal Stabilizer – Rear Spar to Trailing Edge

(2) Access Panels

113AL	Forward Equipment Bay
313AL	Controls Bay
335GB	Elevator Mechanism (Left)
345GB	Elevator Mechanism (Right)

E. Install the Elevator Aft Quadrant (Fig. 401)

S 424-021

- (1) Do the steps that follow to install the left aft quadrant (8):
- (a) Move the lower end of the aft quadrant to the lower support.
  - (b) Install the bolt, washers and nuts (Detail E).

NOTE: Do not tighten the nuts.

- (c) Align the top end of the aft quadrant with the top support structure.
- (d) Install the bolt, washers, and nuts and tighten the nuts (Detail B) as follows:
  - 1) Tighten the nut (15) to 60–80 pound-inches (6.78–9.03 newton-meters).
  - 2) Tighten the nut (16) to 30–40 pound-inches (3.39–4.52 newton-meters).
- (e) Tighten the nuts on the lower support structure (Detail E) as follows:
  - 1) Tighten the nut (18) to 30–40 pound-inches (3.4–4.5 newton-meters).
  - 2) Tighten the nut (19) to 60–80 pound-inches (6.78–9.03 newton-meters).
- (f) Make sure that rig pins E1 and E2 are installed (Fig. 402).
- (g) Make sure the tension regulator tool is between the crosshead and the hub of the left tension regulator (Fig. 402).
- (h) Connect cables E1A (3) and E1B (5) to the left aft quadrant.
- (i) Remove the tension regulator tool.
- (j) Adjust the turnbuckles in cables E1A (3) and E1B (5) until the tension regulator indicator shows the correct position (Fig. 404).

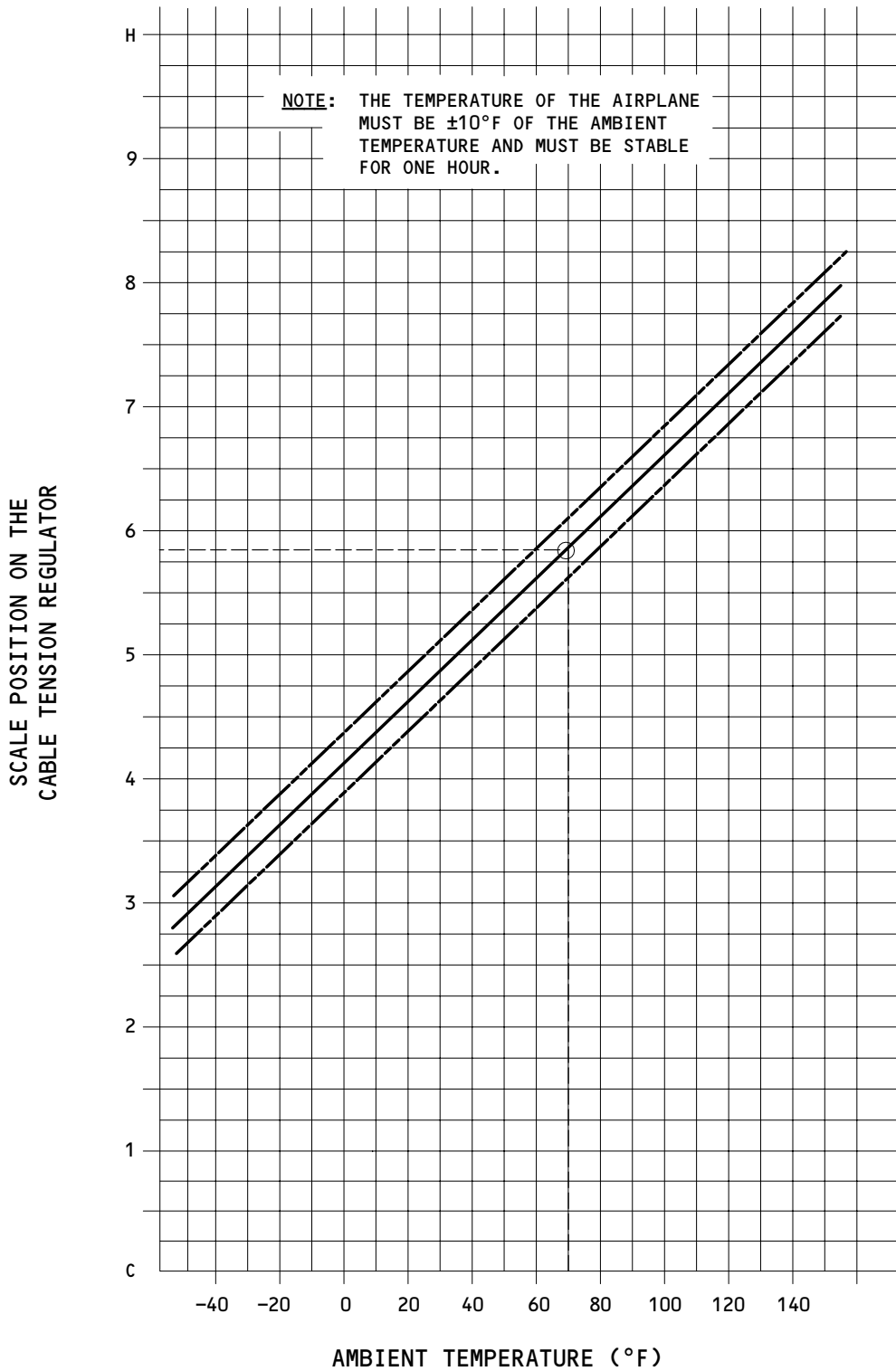
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CABLE TENSION REGULATOR SCALE SETTING VS TEMPERATURE

Elevator Control Body Cable Tension  
Figure 404

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- (k) Apply corrosion preventive compound to the turnbuckle threads that you can see.
- (l) Make sure that rig pin E3 can be easily installed with light finger pressure only (Fig. 403).
- (m) Install lock clips on the turnbuckles.
- (n) Connect the control rods for the left and center autopilot actuator (2, 14) to the left aft quadrant.
- (o) Connect the control rod for the left feel unit (1) to the left aft quadrant.
  - 1) Tighten the nuts as follows (Detail G):
    - a) Tighten the nut (20) to 60-80 pound-inches (6.8-9.0 newton-meters).
    - b) Tighten the nut (21) to 30-40 pound-inches (3.39-4.52 newton-meters).
- (p) Connect the interconnect control rod (4).
  - 1) Tighten the nut as follows (Detail C):
    - a) Tighten the nut (17) to 30-40 pound-inches (3.39-4.52 newton-meters).
- (q) Connect the control rod for the summing assembly (7) to the left aft quadrant (8).
- (r) Make sure the threads on the adjustable rod ends engage correctly.
- (s) Make sure you can see the end of the rod ends through the inspection hole.
- (t) Remove rig pins E1 and E2 (Fig. 402).
- (u) Remove rig pin E3 (Fig. 403).
- (v) Make sure that rig pins E2 and E3 can be installed with finger pressure only.
- (w) Remove rig pins E2 E3, E5 and E6.

S 424-022

- (2) Do the steps that follow to install the right aft quadrant (9):
  - (a) Move the lower end of the aft quadrant to the lower support.
  - (b) Install the bolt, washers, and nuts (Detail E).

NOTE: Do not tighten the nuts.

- (c) Align the top end of the aft quadrant with the top support structure.
- (d) Install the bolt washers, and nuts and tighten the nuts as follows:
  - 1) Tighten the nut (15) to 60-80 pound-inches (6.8-9.0 newton-meters).
  - 2) Tighten the nut (16) to 30-40 pound-inches (3.39-4.52 newton-meters).

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- (e) Tighten the nuts on the lower support structure (Detail E) as follows:
  - 1) Tighten the nut (18) to 30-40 pound-inches (3.4-4.5 newton-meters).
  - 2) Tighten the nut (19) to 60-80 pound-inches (6.8-9.0 newton-meters).
- (f) Make sure that rig pins E1 and E2 are installed (Fig. 402).
- (g) Make sure the tension regulator tool is between the crosshead and the hub of the right tension regulator.
- (h) Connect cables E2A (11) and E2B (6) to the right aft quadrant.
- (i) Remove the tension regulator tool.
- (j) Adjust the turnbuckles in cables E2A and E2B until the tension regulator indicator shows the correct position (Fig. 402).
- (k) Apply corrosion preventive compound to the threads that you can see.
- (l) Make sure that rig pin E4 can be installed with light finger pressure only (Fig. 403).
- (m) Install lock clips on the turnbuckles.
- (n) Connect the control rod for the right autopilot actuator (12) to the right aft quadrant.
- (o) Connect the control rod for the right feel unit (13) to the right aft quadrant.
  - 1) Tighten the nuts as follows (Detail G):
    - a) Tighten the nut (20) to 60-80 pound-inches (6.8-9.0 newton-meters).
    - b) Tighten the nut (21) to 30-40 pound-inches (3.4-4.5 newton-meters).
- (p) Connect the interconnect control rod (4).
  - 1) Tighten the nut as follows (Detail C):
    - a) Tighten the nut (17) to 30-40 pound-inches (3.4-4.5 newton-meters).
- (q) Connect the control rod for the summing assembly (10) to the right aft quadrant (9).
- (r) Make sure the threads on the adjustable rod ends engage correctly.
- (s) Make sure you can see the rod ends through the inspection hole.
- (t) Remove rig pins E1 and E2 (Fig. 402).
- (u) Remove rig pin E4 (Fig. 403).
- (v) Make sure that you can install rig pins E2 and E4 with finger pressure only.
- (w) Remove rig pins E2, E4, E5 and E6.

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S 864-023

**CAUTION:** DO NOT LET THE PRESSURE GO ABOVE 4.75 PSI (426 KNOTS). THIS WILL PREVENT DAMAGE TO THE FEEL COMPUTER. MAKE PRESSURE CHANGES SUCH THAT THE INDICATED RATE OF CLIMB (OR DESCENT) IS LESS THAN 5000 FEET PER MINUTE FOR THE STATIC SYSTEM AND 300 KNOTS PER MINUTE FOR THE PITOT SYSTEM. APPLICABLE GAUGE SAVER RESTRICTORS OR EQUIVALENT DEVICES MUST BE USED. DAMAGE TO EQUIPMENT CAN OCCUR IF THE PITOT SYSTEM IS NOT PRESSURIZED CORRECTLY.

- (3) Pressurize the captain's auxiliary pitot system to 4.0 psi (393 knots) (AMM 34-11-00/201).

S 864-024

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** START ONE HYDRAULIC SYSTEM AT A TIME UNLESS SPECIFIED DIFFERENTLY. HIGH LOADS CAN OCCUR IN THE ELEVATOR, RUDDER, AND STABILIZER STRUCTURES FROM A FORCE FIGHT CAUSED BY INCORRECTLY ADJUSTED POWER CONTROL ACTUATORS.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-025

- (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11A36, ALT STAB TRIM
  - (b) 11C13, FLIGHT CONTROLS STAB TRIM CENTER
  - (c) 11H18, FLT CONT SHUTOFF TAIL CENTER

S 864-051

- (6) Put the CENTER FLT CONT SHUTOFF TAIL valve switch on the right side panel, P61, to the ON position.

S 864-026

- (7) Put the CENTER STAB TRIM SHUTOFF valve switch on the control stand panel, P10, to the NORM position.

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S 864-027

- (8) Move the stabilizer to 2 units of trim on the stabilizer position indicators (neutral position).

NOTE: Use the alternate STAB TRIM switches on the control stand to do this.

S 864-031

- (9) Shake the left aft quadrant (8) to make sure the feel unit has centered the system.

S 494-032

- (10) Make sure that you can easily install rig pin E3 in the stop arm of the left aft quadrant.

S 094-033

- (11) Remove rig pin E3.

S 864-034

- (12) Shake the right aft quadrant (9) to make sure the feel unit has centered the system.

S 494-035

- (13) Make sure that you can easily install rig pin E4 in the stop arm of the right aft quadrant.

NOTE: If rig pins E3 and E4 cannot be easily installed, adjust the elevator system (AMM 27-31-00/501).

S 094-048

- (14) Remove rig pin E4.

S 864-037

- (15) Remove the pressure from the pitot-static system and remove the pitot tube tool (AMM 34-11-00/201).

S 714-042

- (16) Move the control columns through full travel and do the check that follows:  
(a) Make sure the elevators move correctly with the control column as shown on the elevator position indicators.

F. Put the Airplane Back to Its Usual Condition

S 864-043

- (1) Remove hydraulic power if it is not necessary (AMM 29-11-00/201).

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- S 864-044  
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).
- S 414-045  
(3) Install access panels 335GB and 345GB (AMM 06-42-00/201).
- S 094-046  
(4) Remove the service platform from access door for the controls bay, 313AL (AMM 06-42-00/201).
- S 414-049  
(5) Close the access door for the controls bay, 313AL (AMM 06-42-00/201).
- S 414-047  
(6) Close the access door for the forward equipment bay, 113AL (AMM 06-41-00/201).

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ELEVATOR FEEL UNIT AND FEEL ACTUATOR – REMOVAL/INSTALLATION

TASK 27-31-17-024-001

1. Remove the Elevator Feel Unit and Feel Actuator (Fig. 401)

A. General

- (1) This task contains two procedures, one to remove the elevator feel unit, and one to remove the elevator feel actuator. Because this task contains two procedures, only the applicable group of steps must be done.

To start one of these procedures, do the "Prepare for the Removal Procedure" group of steps. Then, do the group of steps that is necessary to remove the component.

B. Equipment

- (1) Rig pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) E3 – P/N A20004-17
  - (b) E4 – P/N A20004-17
- (2) Service Platform, Control Bay Access Door – A51001-19

C. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 20-10-24/201, Rig Pins
- (3) AMM 24-22-00/201, Electrical Power – Control
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 331/341 Horizontal Stabilizer – Center Section
- (2) Access Panel
  - 313AL Controls Bay

E. Prepare for the Removal

- S 864-002
  - (1) Supply electrical power (AMM 24-22-00/201).
- S 864-003
  - (2) Supply power to the center hydraulic system (AMM 29-11-00/201).

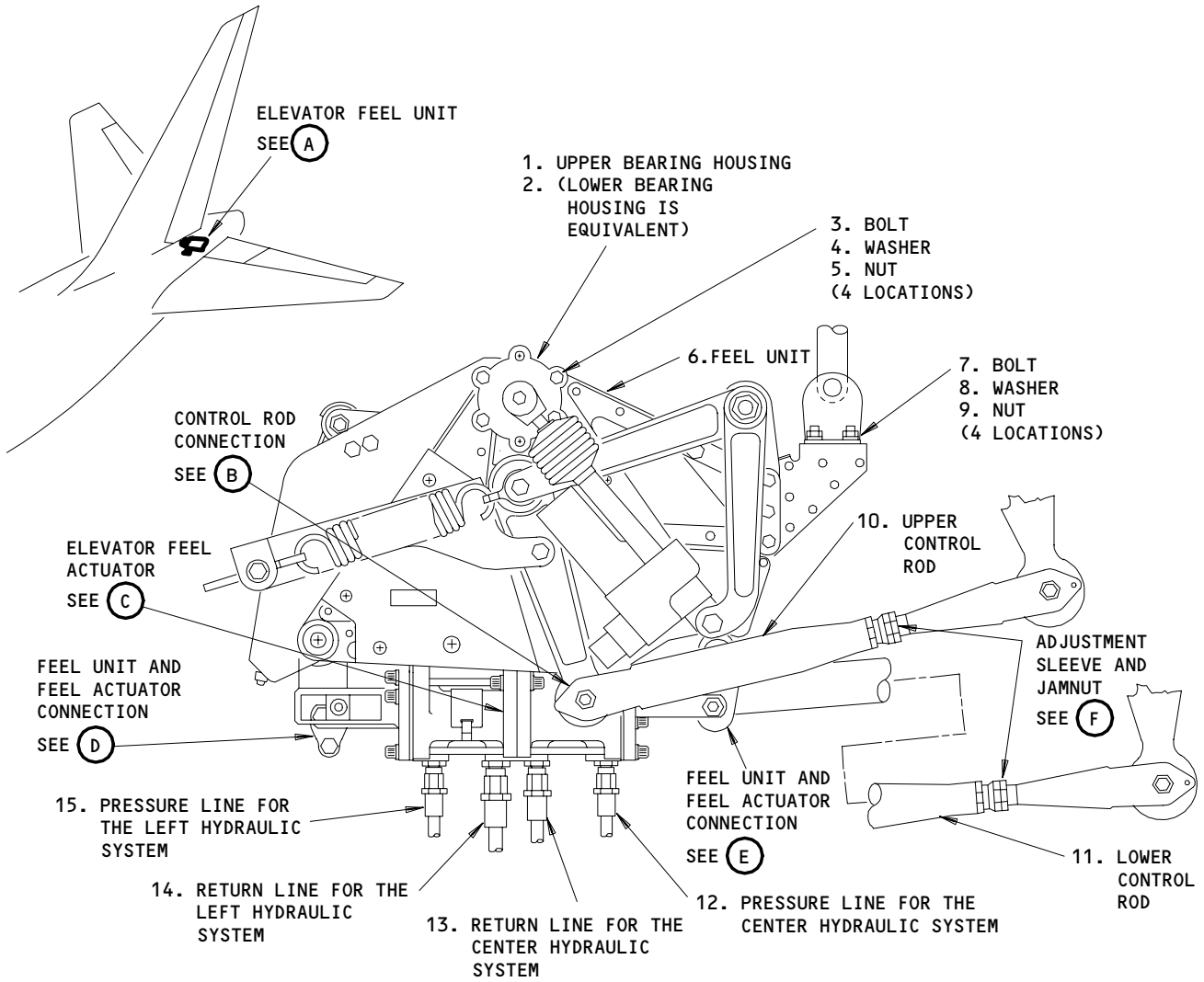
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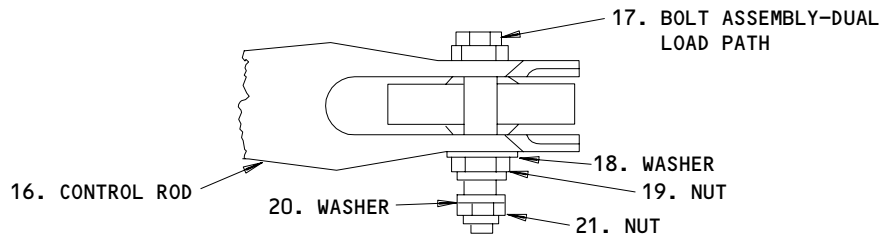
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### ELEVATOR FEEL UNIT

(A)



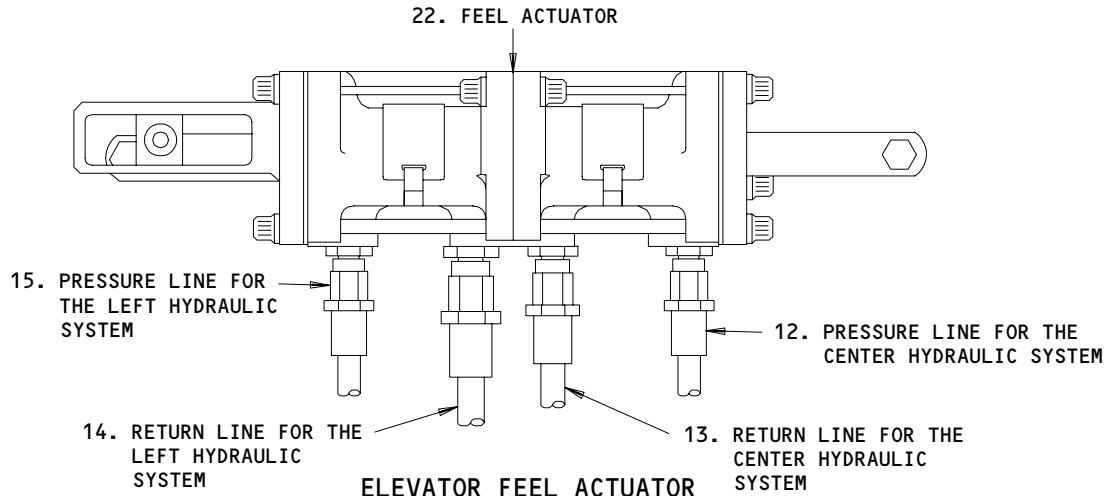
CONTROL ROD CONNECTION  
(UPPER CONTROL ROD SHOWN, LOWER CONTROL ROD IS THE SAME)

(B)

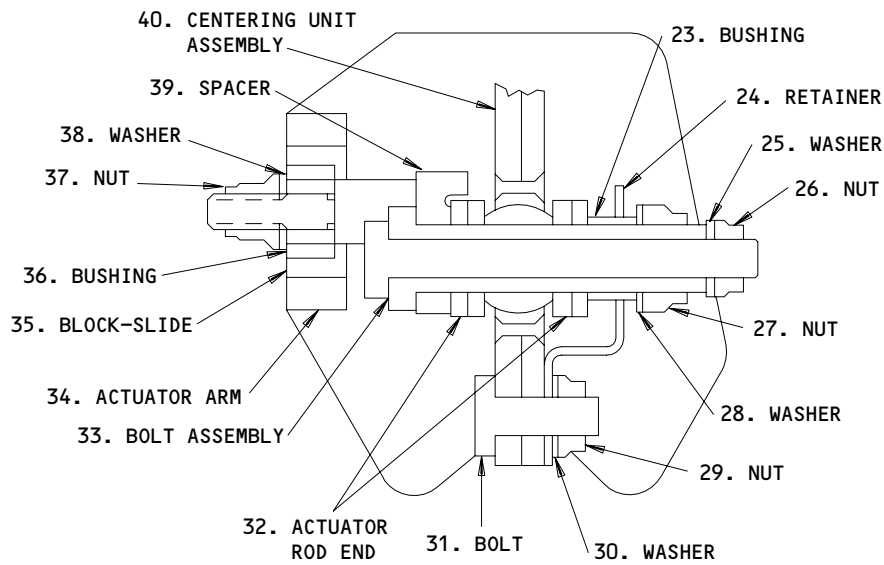
Elevator Feel Unit Installation  
Figure 401 (Sheet 1)

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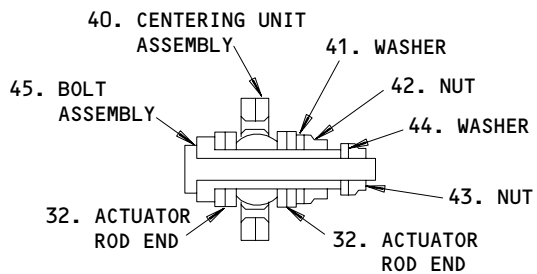


(C)



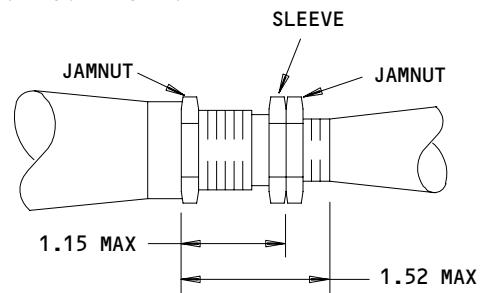
**FEEL UNIT AND FEEL ACTUATOR CONNECTION**

(D)



**FEEL UNIT AND FEEL ACTUATOR CONNECTION**

(E)



**ADJUSTMENT SLEEVE AND JAMNUT**

(F)

**Elevator Feel Unit Installation  
Figure 401 (Sheet 2)**

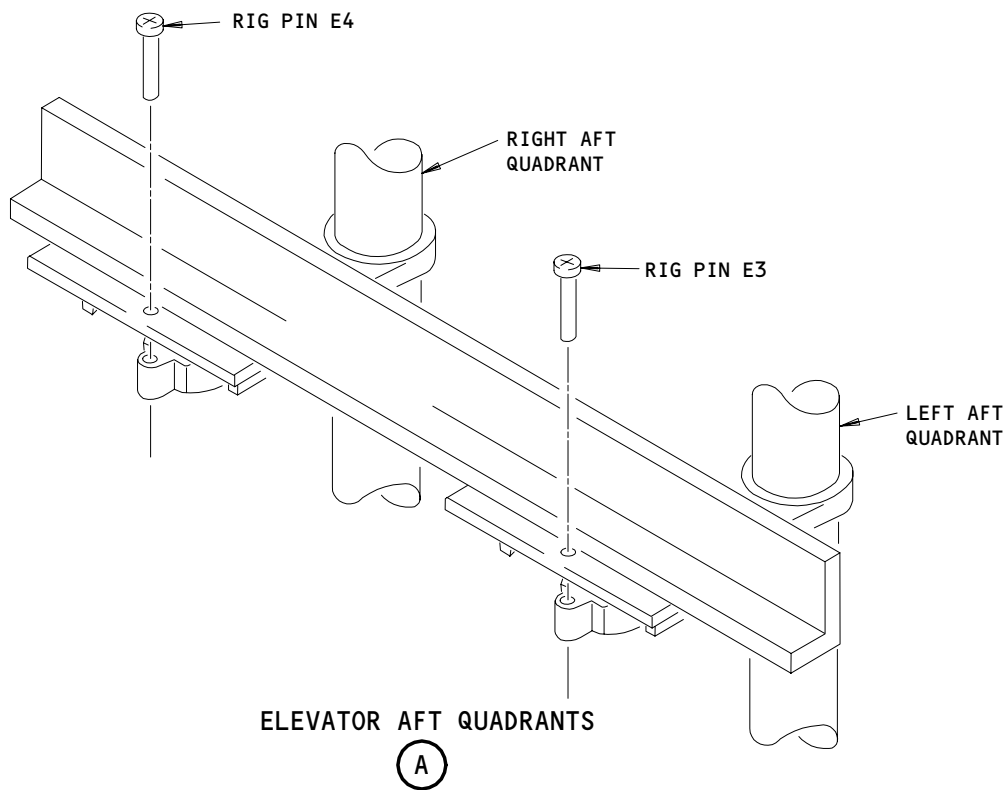
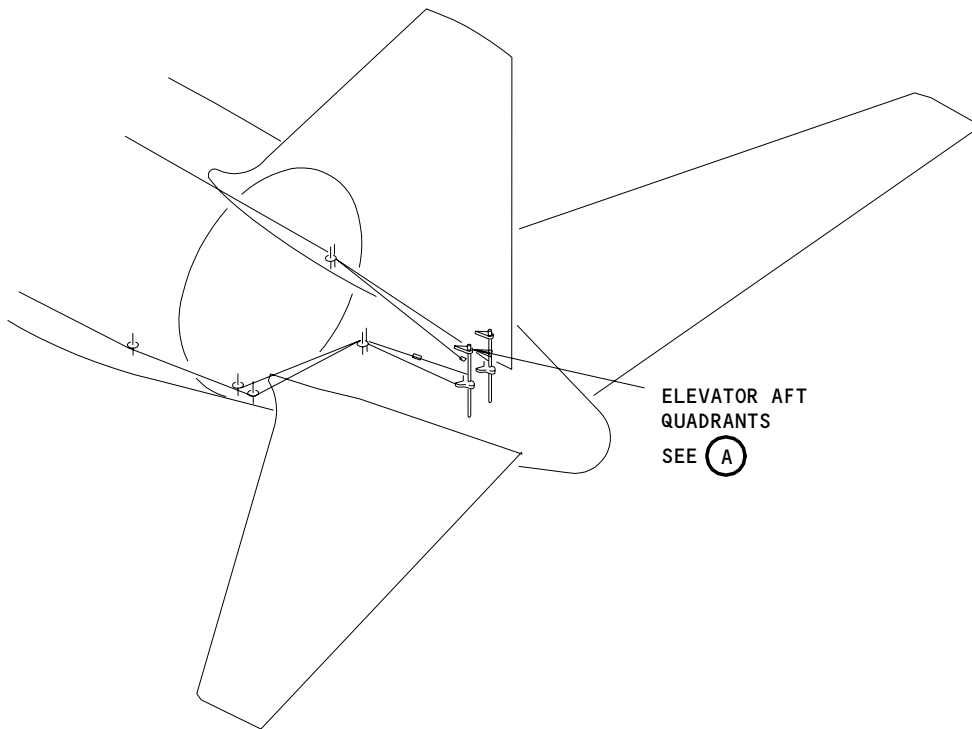
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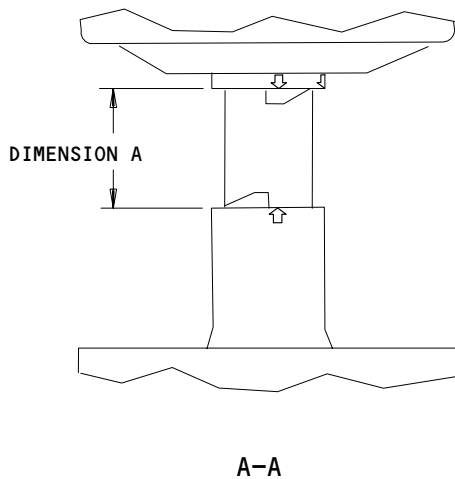
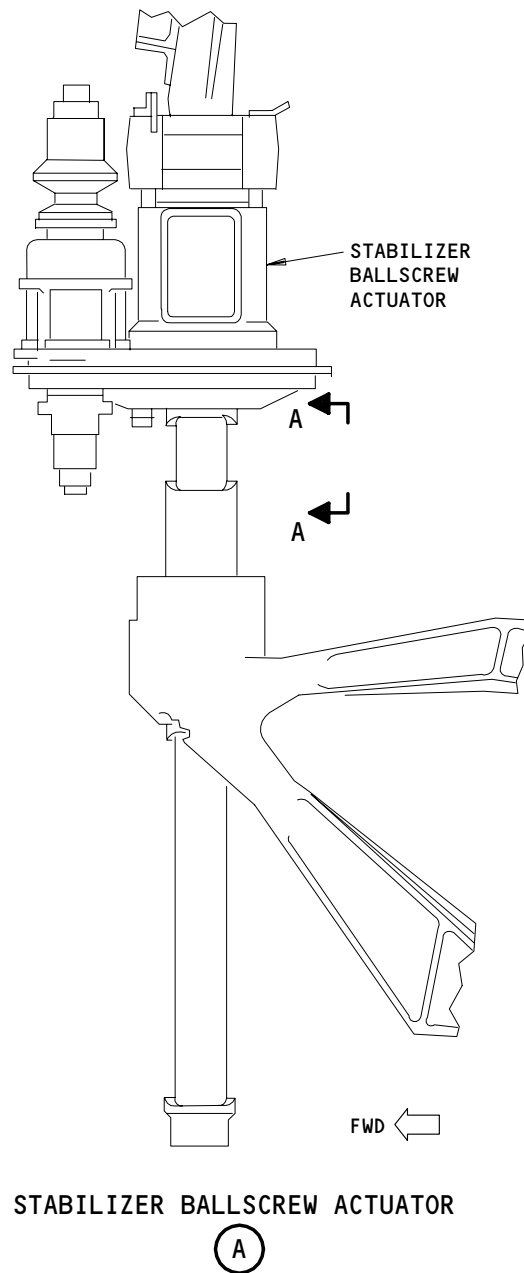
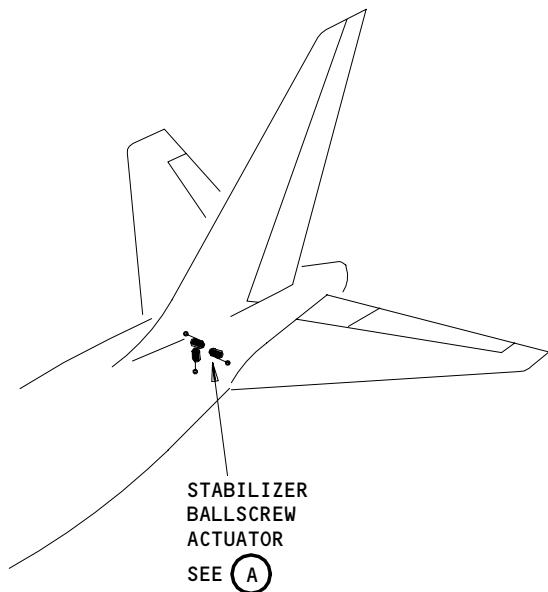
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Elevator Feel Unit Rigging  
Figure 402

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Stabilizer Trim Ballscrew Actuator - Dimension A  
Figure 403

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S 864-004

- (3) Move the stabilizer until Dimension A on the stabilizer ballscrew actuator is  $3.84 \pm 0.03$  inches (the stabilizer is at the neutral position) (Fig. 403).

**NOTE:** Use the alternate STAB TRIM levers or switches (as installed) on the control stand to do this.

S 864-008

- (4) Remove the pressure from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-009

- (5) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the CUTOUT position.

S 864-010

- (6) Put the RIGHT, LEFT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.

S 864-011

- (7) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 014-022

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (8) Open the access door for the controls bay, 313AL (AMM 06-42-00/201).

S 494-013

- (9) Install a service platform on the access door for the controls bay.
- F. Remove the Elevator Feel Unit

S 024-014

- (1) Do the steps that follow to remove the elevator feel unit:
  - (a) Install rig pins E3 and E4.
  - (b) Disconnect the hydraulic lines (12, 13, 14, 15) from the feel actuator (22) and put caps on the lines and ports.
  - (c) Hold the feel unit (6).

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(d) Disconnect the control rods (10, 11) from the feel unit (6).

NOTE: Do not move the adjustment sleeve and jamnuts.

(e) Remove the bolts that hold the feel unit (6) to the support structure.

(f) Remove the bolts (7) that connect the neutral shift rod to the feel unit housing.

(g) Remove the feel unit (6).

G. Remove the Elevator Feel Actuator

S 024-015

(1) Do the steps that follow to remove the elevator feel actuator:

(a) Disconnect the hydraulic lines (12, 13, 14, 15) from the elevator feel actuator (22) and put caps on the lines and ports.

(b) Hold the feel actuator (22) and remove the bolts that connect the actuator (22) to the feel unit (6).

(c) Remove the feel actuator (22) from the feel unit (6).

TASK 27-31-17-424-021

2. Install the Elevator Feel Unit and Feel Actuator (Fig. 401)

A. General

(1) This task contains two procedures, one to install the elevator feel unit, and one to install the elevator feel actuator. Because this task contains two procedures, only the applicable group of steps must be done.

To start one of these procedures, do the group of steps that is necessary to install the component. Then, do the "Put the Airplane Back to Its Usual Condition" group of steps.

B. Consumable Materials

(1) Lubricants - Use one of the lubricants that follow:

(a) D00054 Lubricant - Hydraulic System MCS 352B

(b) D00153 Fluid - Hydraulic BMS 3-11

C. Parts

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AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	6	Feel Unit	27-31-17	01	75
			27-31-17	01B	100
	12	Packing	27-31-17	01	110
			27-31-17	01B	140
	13	Packing	27-31-17	01	115
			27-31-17	01B	145
	14	Packing	27-31-17	01	115
			27-31-17	01B	145
	15	Packing	27-31-17	01	110
			27-31-17	01B	140

D. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 20-10-24/201, Rig Pins
- (3) AMM 22-00-02/201, Autoflight BITE
- (4) AMM 24-22-00/201, Electrical Power - Control
- (5) AMM 27-31-00/501, Elevator Control System
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) AMM 27-31-19/201, Elevator Feel Computer Line Bleed Procedure

E. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 331/341 Horizontal Stabilizer - Center Section
- (2) Access Panel
  - 313AL Controls Bay

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F. Install the Elevator Feel Unit

S 424-020

- (1) Do the steps that follow to install the elevator feel unit:
  - (a) Set the feel unit (6) on the support structure and install the bolts (3), washers (4), and nuts (5).
  - (b) Install the bolts (7), washers (8), and nuts (9) that connect the feel unit housing to the neutral shift control rod.
  - (c) Remove the caps from the hydraulic lines and ports.
  - (d) Apply some assembly lubricant to the hydraulic fittings.
  - (e) Connect the hydraulic lines (12, 13, 14, 15) to the feel unit (6).
  - (f) Connect the control rods (10, 11) to the feel unit (6) with the bolt assembly (17), washer (18), nut (19), washer (20), and nut (21).
    - 1) Tighten the nut (19) to 60-80 pound-inch.
    - 2) Tighten the nut (21) to 30-40 pound-inch.
  - (g) Remove rig pins E3 and E4.

G. Install the Elevator Feel Actuator

S 424-016

- (1) Do the steps that follow to install the elevator feel actuator:
  - (a) Set the elevator feel actuator (22) on the feel unit (6) and install the bolts.
    - 1) Tighten the nut (26) to 30-35 pound-inch.
    - 2) Tighten the nut (27) to 85-100 pound-inch.
    - 3) Tighten the nut (37) to 100-150 pound-inch.
    - 4) Tighten the nut (42) to 85-100 pound-inch.
    - 5) Tighten the nut (43) to 30-35 pound-inch.
  - (b) Remove the caps on the hydraulic lines and ports.
  - (c) Apply some assembly lubricant to the hydraulic fittings.
  - (d) Connect the hydraulic lines (12, 13, 14, 15) to the feel actuator (22).

H. Do a Test of the Elevator Feel Unit or Actuator

S 864-018

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11A36, ALT STAB TRIM

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- (b) 11C12, STAB TRIM SHUTOFF L
- (c) 11C13, STAB TRIM SHUTOFF CENTER
- (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
- (e) 11H18, FLT CONT SHUTOFF TAIL CTR
- (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 714-027

- (2) Do these steps if you installed the elevator feel unit:
  - (a) Do the adjustment requirements section and the feel computer test section of the elevator feel system test (AMM 27-31-00/501).
  - (b) Do the 08 SERVO ELEV and 68 ELEV SURF LIM ground tests in the Autoflight BITE procedure (AMM 22-00-02/201).

S 714-028

- (3) Do this step if you installed the elevator feel actuator:
  - (a) Do the test for the elevator feel unit (AMM 27-31-00/501).

S 714-030

- (4) Do the bleed procedure for the elevator feel computer line (AMM 27-31-19/201).

I. Put the Airplane Back to Its Usual Condition

S 864-017

- (1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 414-019

- (2) Remove the service platform and close the access door for the controls bay, 313AL (AMM 06-42-00/201).

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ELEVATOR FEEL LINE - BLEED PROCEDURE

1. General

- A. This procedure bleeds the hydraulic lines between the Elevator Feel Computer and Elevator Feel Unit.

TASK 27-31-19-872-114

2. Bleed the Elevator Feel Line

A. References

- (1) AMM 34-11-00/201, Pitot-Static System
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones
  - 311/312 Area Aft of Pressure Bulkhead to BS 1725
  - 313/314 Stabilizer Torsion Box Compartment
- (2) Access Panels
  - 312AR Forward Stabilizer Compartment
  - 313AL Controls Bay

C. Prepare for the Procedure

S 862-002

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

S 862-122

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO A PERSON OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Pressurize the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 862-006

- (3) Make sure these circuit breakers on the overhead panel, P11, are closed:
  - (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;
    - 11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT

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- (e) 11H18, FLT CONT SHUTOFF TAIL CTR
- (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 862-118

- (4) Use the captain's or first officer's stabilizer trim control wheel switch to move the stabilizer to 0 units of trim.

D. Bleed the Elevator Feel Line

S 862-120

**CAUTION:** DO NOT LET THE PRESSURE EXCEED 4.75 PSIG (426 KNOTS). THIS WILL PREVENT DAMAGE TO THE FEEL COMPUTER. MAKE PRESSURE CHANGES SUCH THAT THE INDICATION RATE OF CLIMB (OR DESCENT) IS LESS THAN 5000 FEET PER MINUTE FOR THE STATIC SYSTEMS AND 300 KNOTS PER MINUTE FOR THE PITOT SYSTEM. APPLICABLE GAUGE SAVER RESTRICTORS OR EQUIVALENT DEVICES MUST BE USED.

- (1) Pressurize auxiliary pitot systems No. 1 and 2 to 4.20 psig (402 - 406 knots) (AMM 34-11-00/201).

S 732-115

- (2) Operate the control column through full travel for 25 cycles to bleed the air from the elevator feel line.

**NOTE:** Approximately 100 pounds (444 newtons or 45 kilograms) of force is required to operate the control column through full travel.

E. Put the Airplane Back to its Usual Condition

S 862-117

- (1) Remove the pressure from auxiliary pitot systems No. 1 and 2 (AMM 34-11-00/201).

S 862-111

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 862-123

- (3) Remove electrical power, if it is not necessary (AMM 29-11-00/201).

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ELEVATOR FEEL COMPUTER – REMOVAL/INSTALLATION

1. General

- A. This procedure contains four tasks. The first task is the removal of the elevator feel computer. The second task is the installation of the elevator feel computer. The third task is the removal of the elevator feel computer filter. The fourth task is the installation of the elevator feel computer filter.

TASK 27-31-19-024-001

2. Elevator Feel Computer – Removal

A. Equipment

- (1) Service Platform, Control Bay Access Door –  
A51001-19

B. References

- (1) 06-42-00/201, Empennage Access Doors and Panels  
(2) 24-22-00/201, Electrical Power – Control  
(3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones  
311/312 Area Aft of Pressure Bulkhead to BS 1725  
313/314 Stabilizer Torsion Box Compartment
- (2) Access Panels  
312AR Forward Stabilizer Compartment  
313AL Controls Bay

D. Prepare for the Removal

- S 864-002  
(1) Supply electrical power (Ref 24-22-00).
- S 214-003  
(2) Remove the pressure from the main (left, right, center) hydraulic systems and reservoirs (AMM 29-11-00/201).

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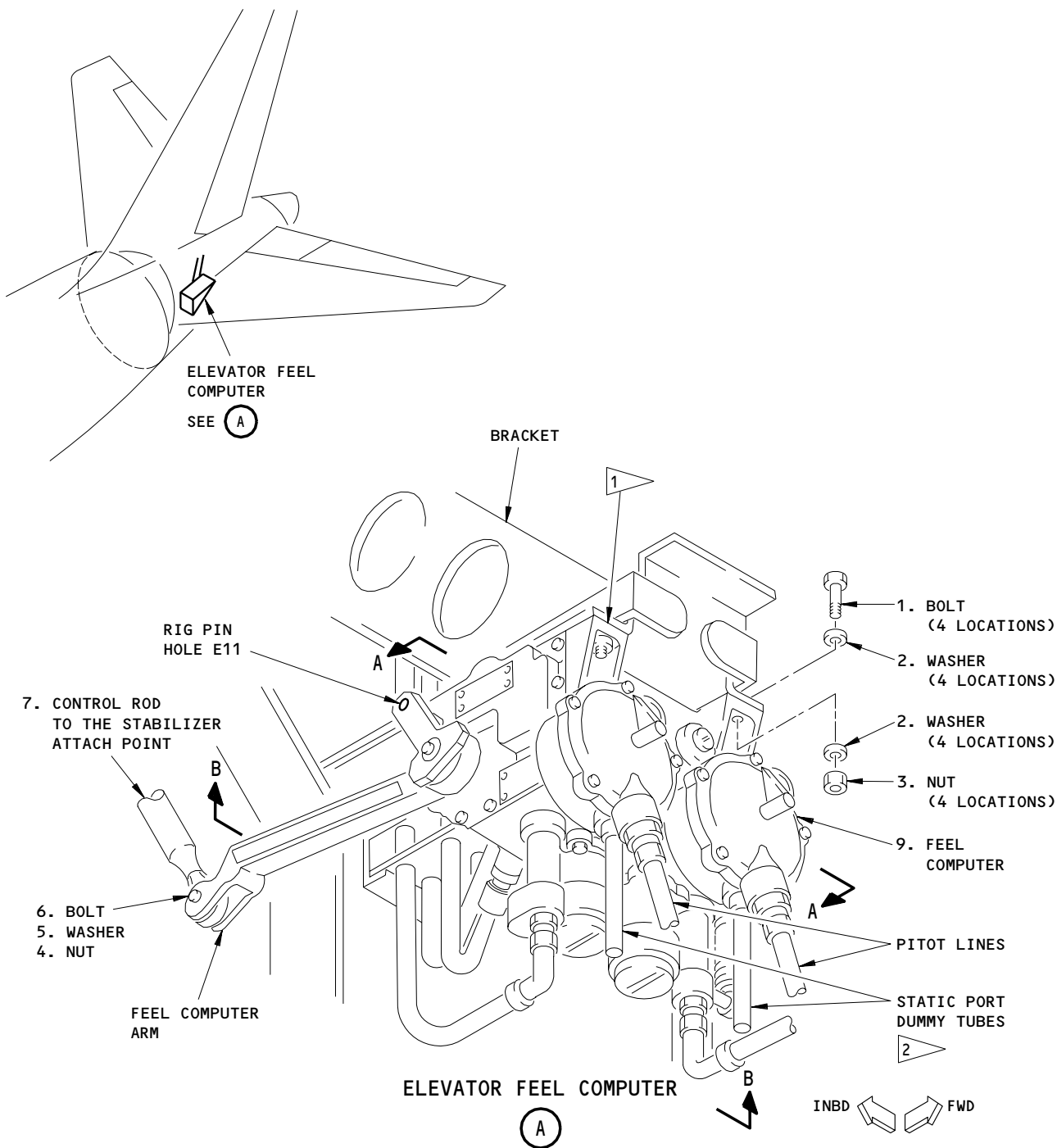
ALL

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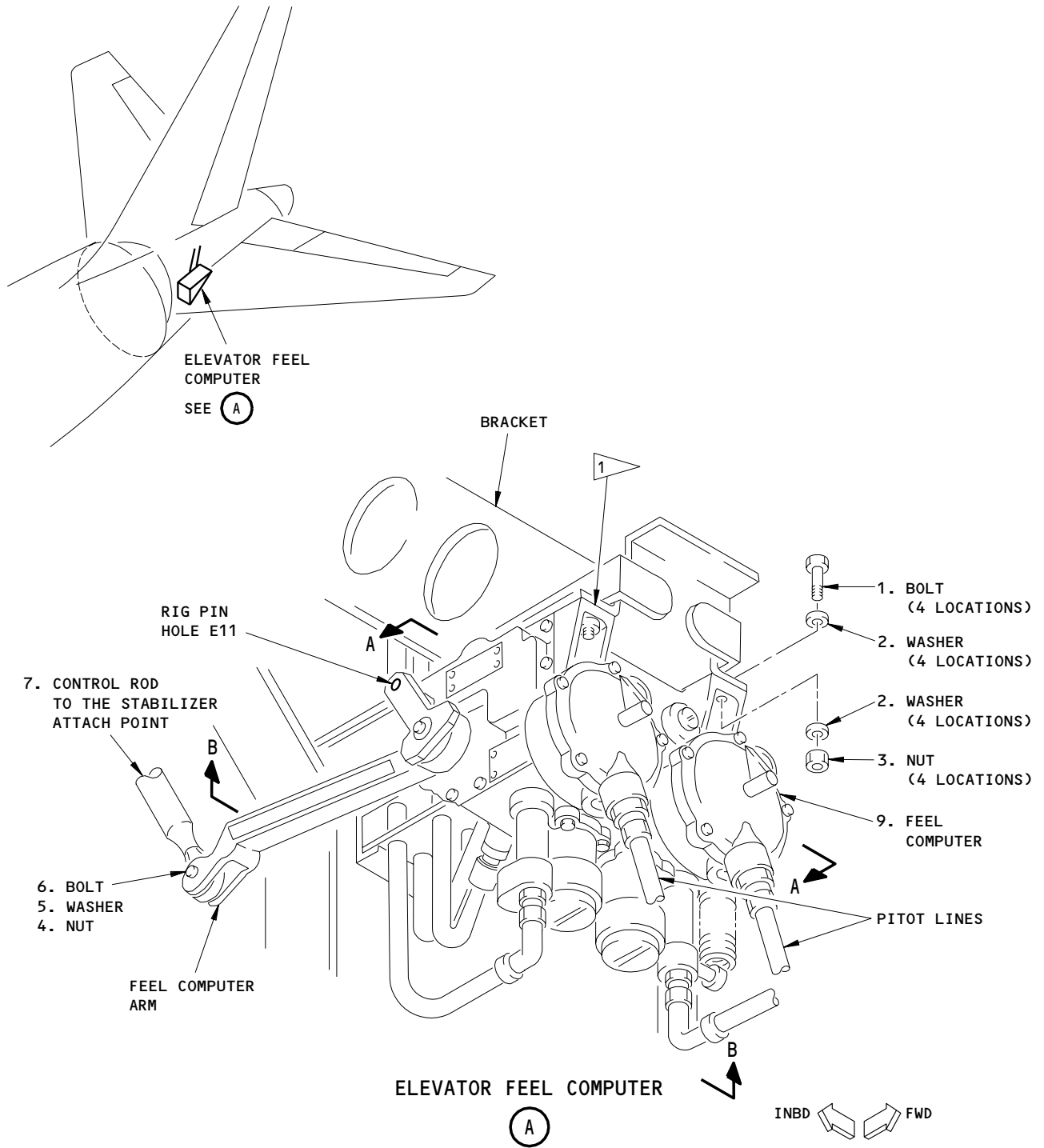


- 1 AT FOUR FASTENER LOCATIONS, CLEAN THE MATING SURFACE AND APPLY ALODINE 1200 WITH A BRUSH. MAKE SURE THAT THE RESISTANCE BETWEEN THE FEEL COMPUTER AND THE BRACKET IS NOT MORE THAN 5.0 MILLIOHMS.
- 2 THE 3-INCH DUMMY TUBES ARE TO PREVENT INADVERTENT PLUGGING OF THE STATIC PORT.

Elevator Feel Computer Installation  
Figure 401 (Sheet 1)

EFFECTIVITY  
AIRPLANES WITH A -1, -4, OR -6  
FEEL COMPUTER (WITH 3 INCH DUMMY TUBES)

27-31-19

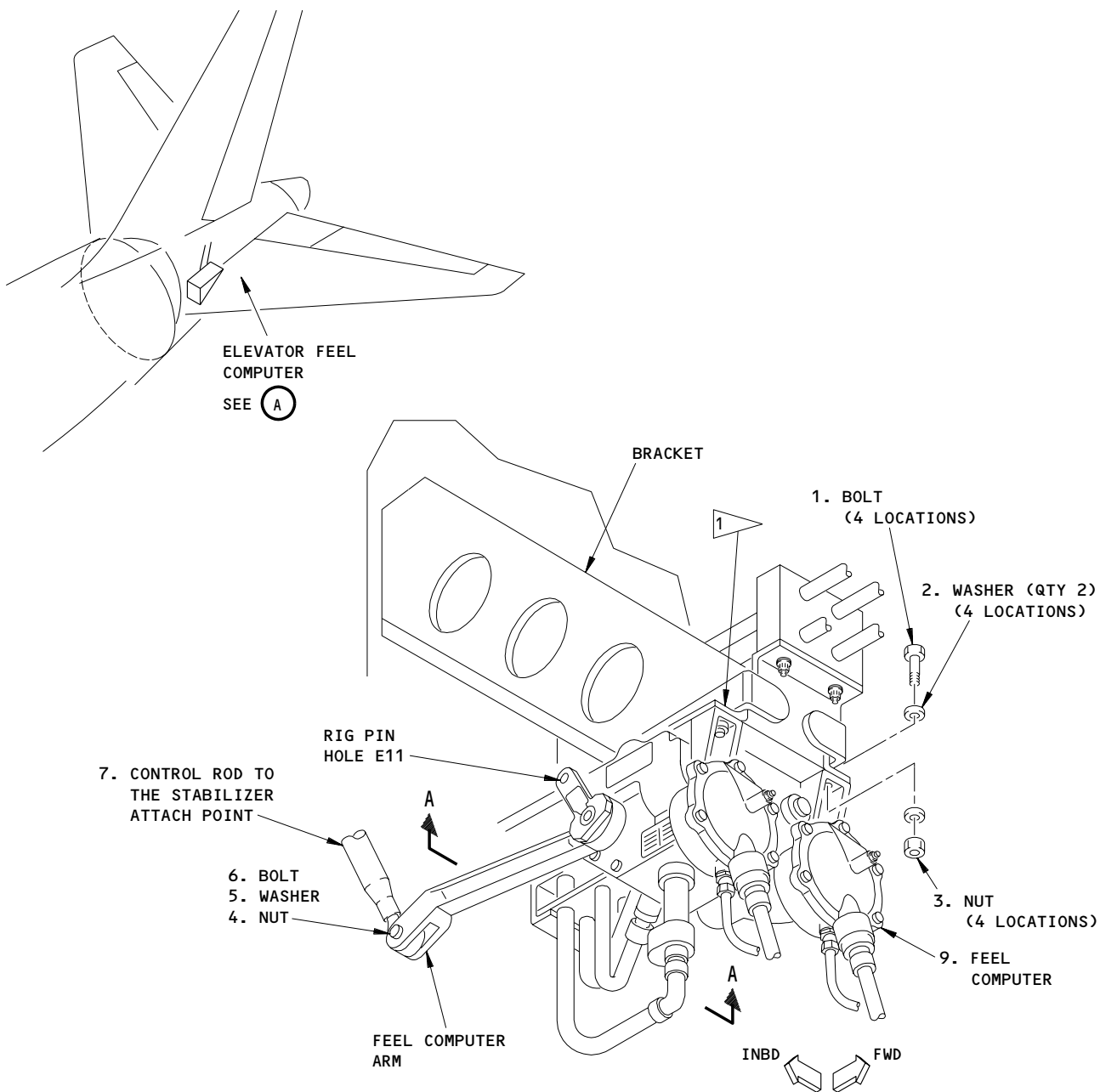


**1** AT FOUR FASTENER LOCATIONS, CLEAN THE MATING SURFACE AND APPLY ALODINE 1200 WITH A BRUSH. MAKE SURE THAT THE RESISTANCE BETWEEN THE FEEL COMPUTER AND THE BRACKET IS NOT MORE THAN 5.0 MILLIOHMS.

Elevator Feel Computer Installation  
Figure 401 (Sheet 2)

EFFECTIVITY  
AIRPLANES WITH THE -7  
ELEVATOR FEEL COMPUTER

27-31-19



**ELEVATOR FEEL COMPUTER**

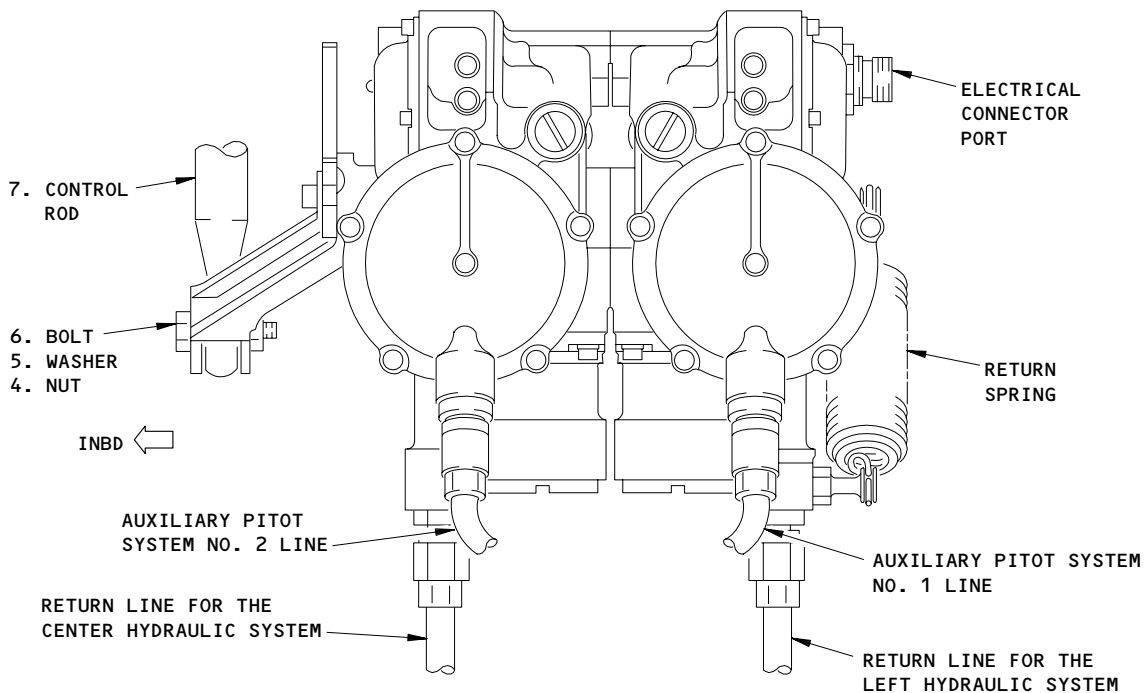
(A)

1 AT FOUR FASTENER LOCATIONS, CLEAN THE MATING SURFACE AND APPLY ALODINE 1200 WITH A BRUSH. MAKE SURE THAT THE RESISTANCE BETWEEN THE FEEL COMPUTER AND THE BRACKET IS NOT MORE THAN 5.0 MILLIOHMS.

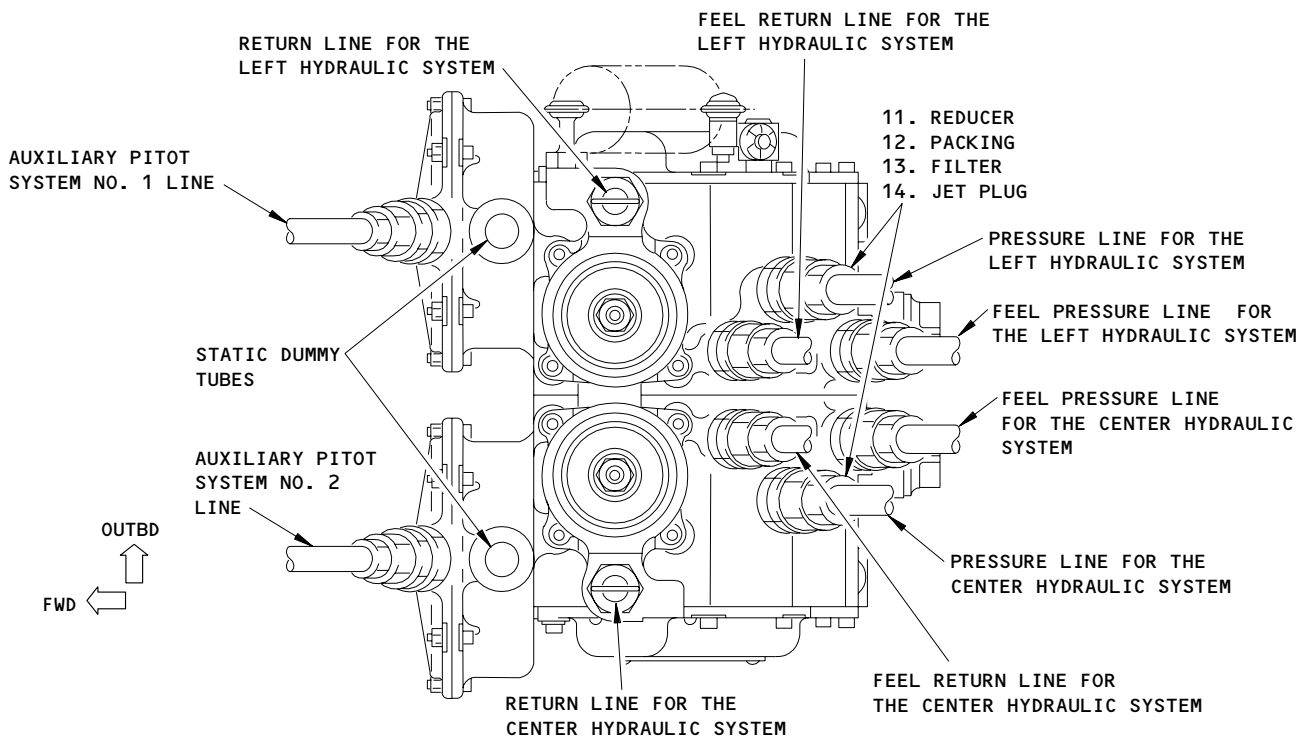
Elevator Feel Computer Installation  
Figure 401 (Sheet 3)

EFFECTIVITY  
AIRPLANES WITH THE -8  
ELEVATOR FEEL COMPUTER

27-31-19



A-A

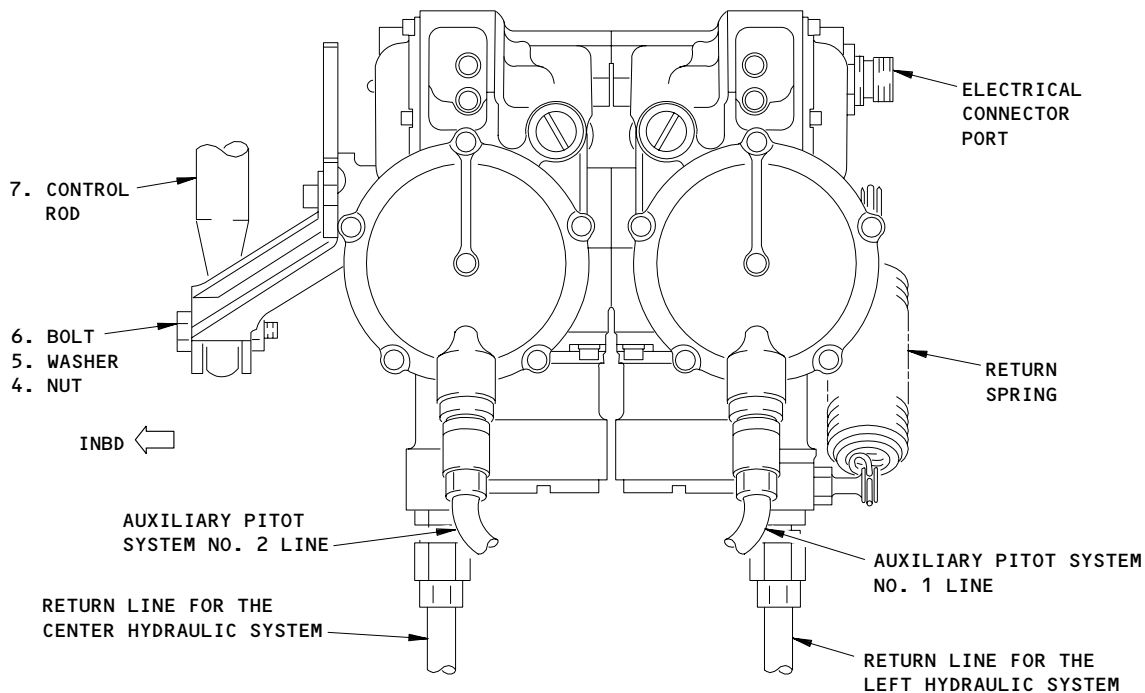


B-B

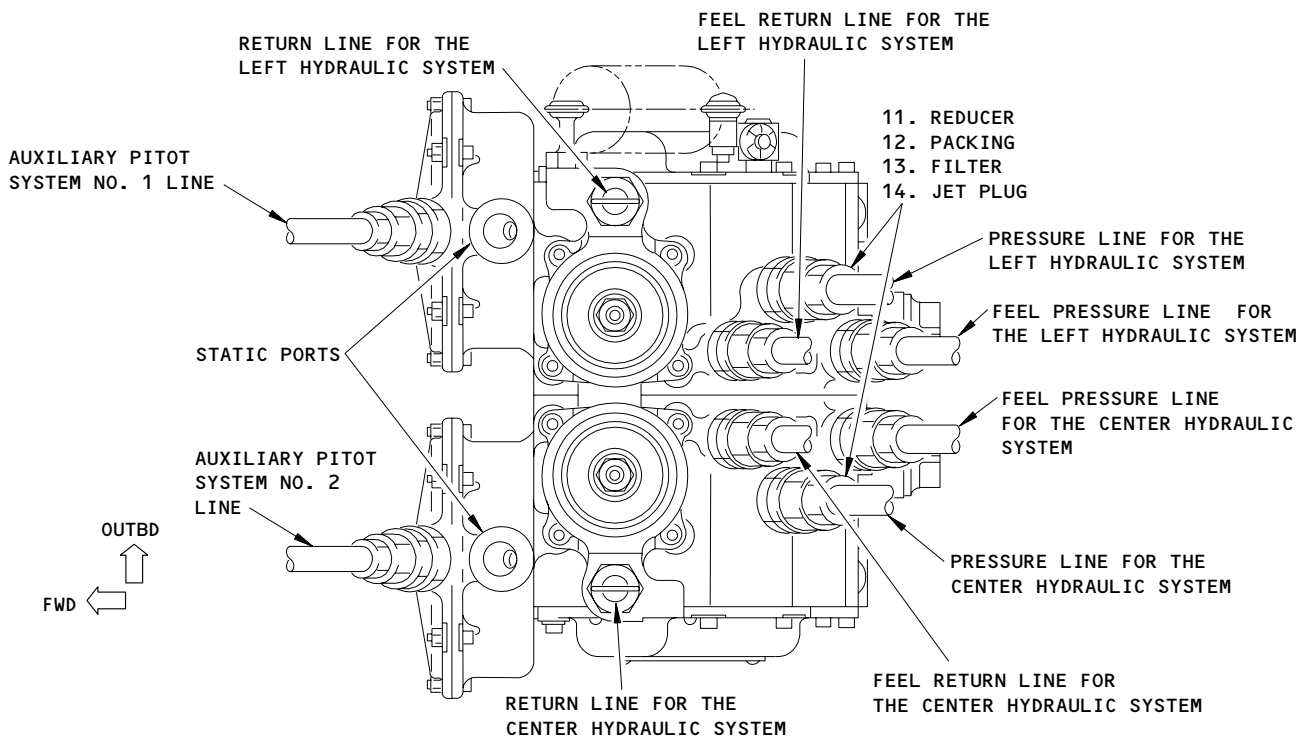
Elevator Feel Computer Installation  
Figure 401 (Sheet 4)

EFFECTIVITY  
AIRPLANES WITH A -1, -4, OR -6  
FEEL COMPUTER (WITH 3 INCH DUMMY TUBES)

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A-A

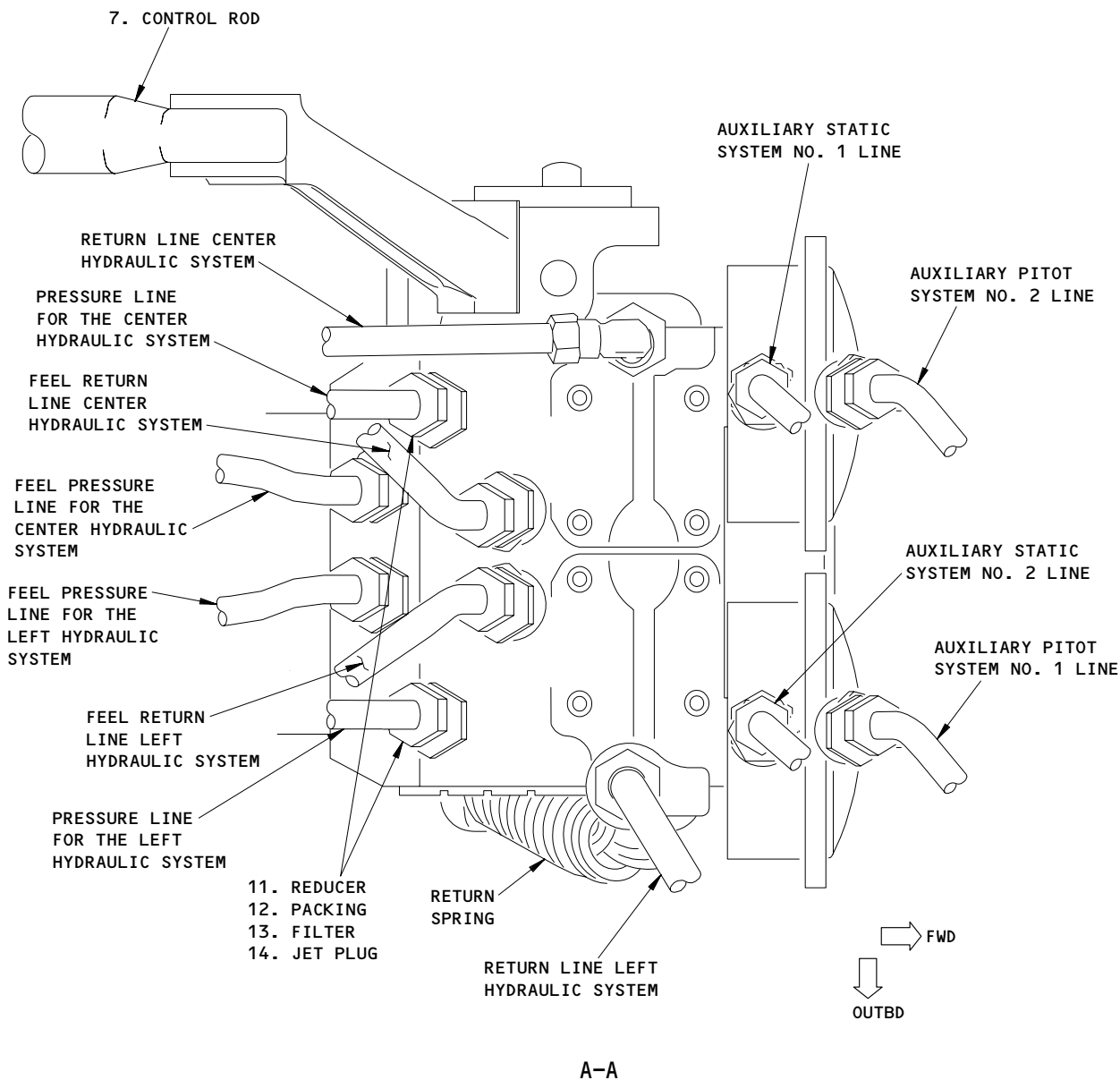


B-B

Elevator Feel Computer Installation  
Figure 401 (Sheet 5)

EFFECTIVITY  
AIRPLANES WITH A -7  
ELEVATOR FEEL COMPUTER

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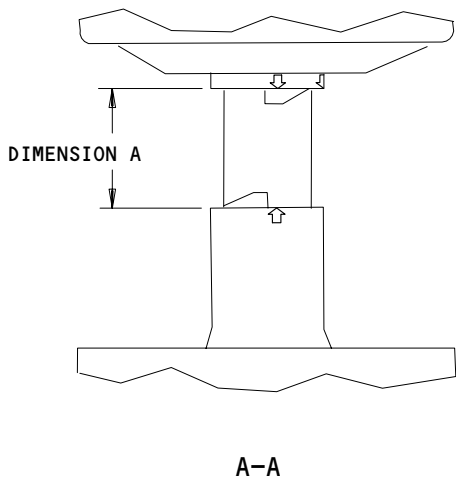
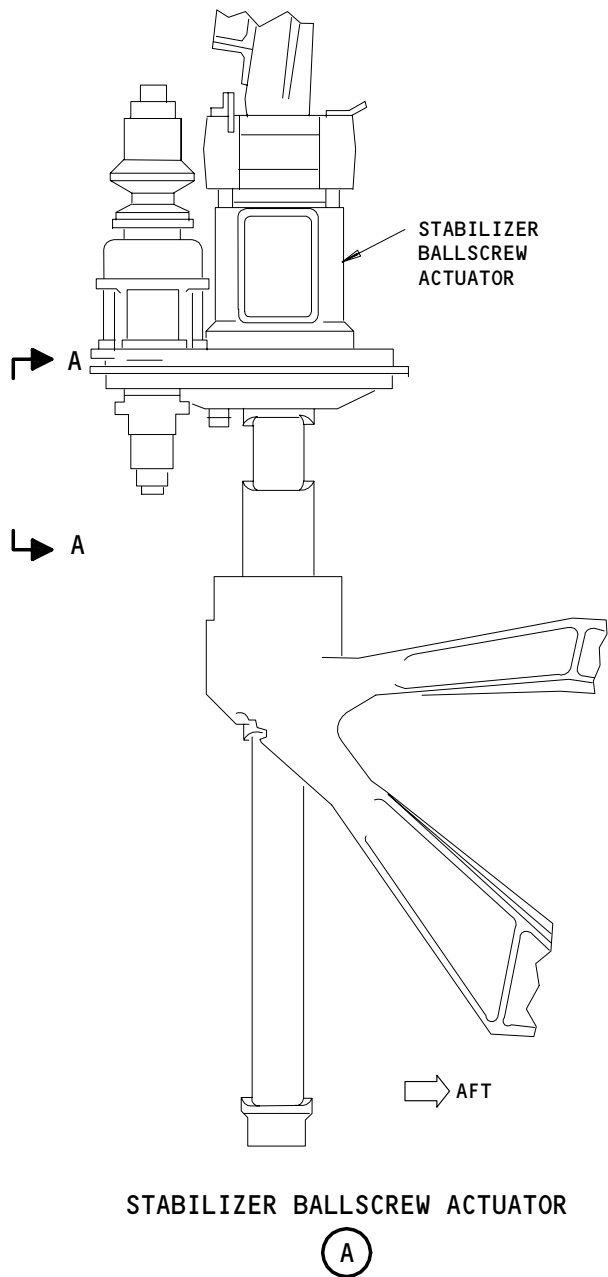
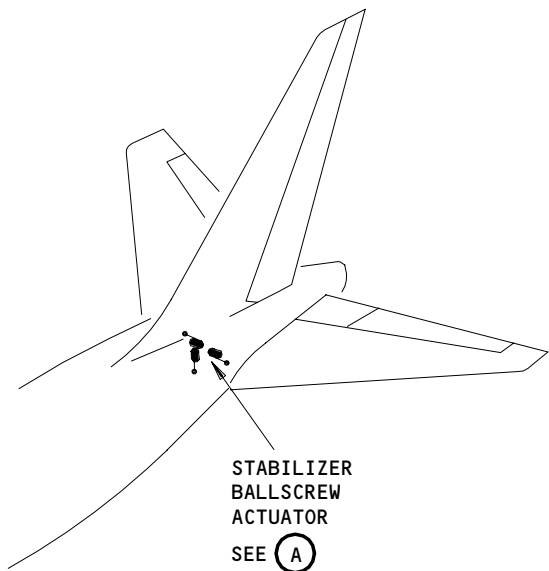
Elevator Feel Computer Installation  
Figure 401 (Sheet 6)

EFFECTIVITY  
AIRPLANES WITH THE -8  
ELEVATOR FEEL COMPUTER

27-31-19

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Stabilizer Ballscrew Actuator - Dimension A  
Figure 402

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S 864-004

- (3) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.

S 864-005

- (4) Put the LEFT and CENTER STAB TRIM SHUTOFF switches on the control stand panel, P10, to the CUTOUT position.

S 864-006

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:

- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM  
(b) 11C12, STAB TRIM SHUTOFF L  
(c) 11C13, STAB TRIM SHUTOFF CENTER  
(d) 11H17, FLT CONT SHUTOFF TAIL LEFT  
(e) 11H18, FLT CONT SHUTOFF TAIL CTR  
(f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 864-007

- (6) Operate the control column through 4 to 5 cycles to remove the remaining hydraulic pressure.

S 014-008

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR AND THE CONTROLS BAY ACCESS DOOR, 313AL. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (7) Open the access door for the forward stabilizer compartment, 312AR (Ref 06-42-00).

S 494-009

- (8) Install a service platform on the access door for the controls bay, 313AL (AMM 06-42-00/201).

E. Remove the Elevator Feel Computer (Fig. 401)

S 034-010

- (1) Disconnect the electrical connector from the feel computer (9).

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S 034-174

- (2) AIRPLANES WITH A -1, -4, OR -6 ELEVATOR FEEL COMPUTER;  
Disconnect the pitot and hydraulic lines from the feel computer (9).  
(a) Remove the 3 inch dummy tubes from the static ports and store them in a safe location.  
(b) Put caps and plugs on the pitot, static and hydraulic lines and computer ports.

S 034-173

- (3) AIRPLANES WITH A -7 ELEVATOR FEEL COMPUTER;  
Disconnect the pitot and hydraulic lines from the feel computer (9).  
(a) Put caps and plugs on the pitot and hydraulic lines and computer ports.

S 034-175

- (4) AIRPLANES WITH A -8 ELEVATOR FEEL COMPUTER;  
Disconnect the pitot, static, and hydraulic lines from the feel computer (9).

**NOTE:** Make sure you do not get hydraulic fluid in the pitot static lines.

- (a) Put caps and plugs on the pitot, static and hydraulic lines and computer ports.

S 034-012

- (5) Remove the nut (4), washer (5), and bolt (6) that connect the control rod (7) to the feel computer arm.

S 864-013

- (6) Hold the feel computer (9).

S 034-014

- (7) Remove the nuts (3), washers (2), and bolts (1) that hold the feel computer (9) to the bracket.

S 024-030

- (8) Remove the feel computer (9).

TASK 27-31-19-424-015

3. Elevator Feel Computer - Installation

A. Equipment

- (1) Bonding Meter - Avtron Model T477W, Avtron Manufacturing Inc., Cleveland, Ohio

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- (2) Service Platform, Control Bay Access Door - A51001-19
- B. Consumable Materials
  - (1) C00064 Alodine 1200 or 1200S
  - (2) Lubricants - these lubricants are permitted:
    - (a) D00054 Lubricant - Hydraulic System MCS 352B
    - (b) D00153 Fluid - Hydraulic BMS 3-11
- C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	9	Elevator Feel Computer	27-31-19 27-31-19	01 03	50 80

- D. References
  - (1) 06-42-00/201, Empennage Access Doors and Panels
  - (2) 20-10-21/601, Electrical Bonding
  - (3) 22-00-02/201, Autoflight BITE
  - (4) 24-22-00/201, Electrical Power - Control
  - (5) 27-31-00/501, Elevator Control System
  - (6) AMM 27-31-19/201, Elevator Feel Computer Line Bleed Procedure

- E. Access
  - (1) Location Zones
    - 311/312 Area Aft of Pressure Bulkhead to BS 1725
    - 313/314 Stabilizer Torsion Box Compartment
  - (2) Access Panels
    - 312AR Forward Stabilizer Compartment
    - 313AL Controls Bay

F. Install the Elevator Feel Computer (Fig. 401)

S 164-016

- (1) Clean the mating surfaces and apply a layer of alodine with a brush.

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- S 424-017
- (2) Set the feel computer (9) in the bracket and install bolts (1), washers (2), and nuts (3).
- S 284-018
- (3) Use a bonding meter to do the check that follows:
- (a) Make sure the maximum resistance between the feel computer and the bracket is less than 0.005 ohms (Ref 20-10-21).
  - (b) Make sure the maximum resistance between the feel computer and the airplane structure is less than 0.005 ohms (AMM 20-10-21/201).
- S 094-051
- (4) Remove the caps and plugs from the pitot, static and hydraulic lines, and the feel computer ports.
- NOTE:** Make sure the plugs are removed from the static ports on the elevator feel computer. The feel computer will not get an accurate reading of the static pressure if the plugs are left in the static ports.
- S 644-020
- (5) Apply an assembly lubricant or hydraulic fluid to the hydraulic fittings and O-rings.
- S 434-176
- (6) AIRPLANES WITH THE -1, -4, OR -6 ELEVATOR FEEL COMPUTER;  
Connect the pitot and hydraulic lines to the feel computer (9).
- (a) Install the 3 inch dummy tubes.
- S 434-070
- (7) AIRPLANES WITH THE -7 ELEVATOR FEEL COMPUTER;  
Connect the pitot and hydraulic lines to the feel computer (9).
- S 434-021
- (8) AIRPLANES WITH THE -8 ELEVATOR FEEL COMPUTER;  
Connect the pitot, static, and hydraulic lines to the feel computer (9).
- S 434-022
- (9) Install the bolt (6), washer (5), and nut (4) that connect the control rod (7) to the feel computer arm.
- S 434-023
- (10) Connect the electrical connector to the feel computer (9).

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S 794-171

- (11) Do a leak check of the pitot system after you connect the pitot lines back to the elevator feel computer (AMM 34-11-00/501).

S 824-024

- (12) Do the adjustment requirements section for the elevator feel computer (9) (AMM 27-31-00/501).

S 714-025

- (13) Do the elevator feel computer test section of the elevator feel system test (AMM 27-31-00/501).

S 714-026

- (14) Do the 08 SERVO ELEV and 68 ELEV SURF LIM ground tests (AMM 22-00-02/201).

S 714-170

- (15) Do the bleed procedure for the feel computer line, (AMM 27-31-19/201).

G. Put the Airplane Back to Its Usual Condition

S 094-027

- (1) Remove the service platform from the access door for the control bay, 313AL (AMM 06-42-00/201).

S 414-028

- (2) Close the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

S 864-029

- (3) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

TASK 27-31-19-004-097

4. Elevator Feel Computer Filter - Removal

A. Equipment

- (1) Service Platform, Control Bay Access Door - A51001-19

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B. Standard Tools and Equipment

- (1) Bucket - 1 gallon capacity (for hydraulic fluid)

C. References

- (1) 06-42-00/201, Empennage Access Doors and Panels  
(2) 24-22-00/201, Electrical Power - Control  
(3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

(1) Location Zones

- 311/312 Area Aft of Pressure Bulkhead to BS 1725  
313/314 Stabilizer Torsion Box Compartment

(2) Access Panels

- 312AR Forward Stabilizer Compartment  
313AL Controls Bay

E. Prepare for the Removal

S 864-135

- (1) Supply electrical power (Ref 24-22-00).

S 214-136

- (2) Make sure the pressure is removed from the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-137

- (3) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.

S 864-138

- (4) Put the LEFT and CENTER STAB TRIM SHUTOFF switches on the control stand panel, P10, to the CUTOUT position.

S 864-139

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:

- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM

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- (b) 11C12, STAB TRIM SHUTOFF L
- (c) 11C13, STAB TRIM SHUTOFF CENTER
- (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
- (e) 11H18, FLT CONT SHUTOFF TAIL CTR
- (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 864-132

- (6) Operate the control column through 4 to 5 cycles to remove the remaining hydraulic pressure.

S 014-133

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR AND THE CONTROLS BAY ACCESS DOOR, 313AL. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (7) Open the access door for the forward stabilizer compartment, 312AR (Ref 06-42-00).

S 494-134

- (8) Install a service platform on the access door for the controls bay, 313AL (Ref 06-42-00).

F. Elevator Feel Computer Filter Removal

S 024-116

- (1) Remove the filter (13):
  - (a) Remove the left and center hydraulic lines.
  - (b) Use a bucket to catch the hydraulic fluid.
  - (c) Remove the reducer (11), packing (12), filter (13), and jet-plug (14).

TASK 27-31-19-404-117

5. Elevator Feel Computer Filter - Installation

A. Equipment

- (1) Service Platform, Control Bay Access Door - A51001-19

B. Consumable Materials

- (1) D00153 Fluid Hydraulic, Fire Resistant, BMS 3-11
- (2) Parts

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AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	12	Packing	27-31-19	02	70
	13	Filter			75
	14	Jet-Plug			85

C. References

- (1) 24-22-00/201, Electrical Power - Control
- (2) 29-11-00/201, Main (Left, Right, and Center) Hydraulic System

D. Access

- (1) Location Zones
  - 311/312 Area Aft of Pressure Bulkhead to BS 1725
  - 313/314 Stabilizer Torsion Box Compartment
- (2) Access Panels
  - 312AR Forward Stabilizer Compartment
  - 313AL Controls Bay

E. Elevator Feel Computer Filter Installation

S 424-131

- (1) Install the filter (13):
  - (a) Remove filter caps if they are installed on the feel computer.
  - (b) Apply skydrol assembly lube to the reducer (11), packing (7), jet-plug (14), and the threads of the filter (13).
  - (c) Install the jet-plug (14), filter (13), packing (12), reducer (11), and left and center hydraulic lines.

F. Elevator Feel Computer Filter Installation Test

S 864-129

- (1) Do this task: "Supply Electrical Power" (Ref 24-22-00/201).

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S 864-130

- (2) Close these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 864-128

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply hydraulic power (Ref 29-11-00/201).

S 864-126

- (4) Examine the filter for a hydraulic leak.

S 864-125

- (5) Remove hydraulic power if it is not necessary (Ref 29-11-00/201).

S 864-124

- (6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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NEUTRAL SHIFT/OVERRIDE MECHANISM – REMOVAL/INSTALLATION

1. General

- A. The neutral shift / override mechanism will be called the override mechanism in this procedure.
  - (1) Airplanes with a neutral shift mechanism will have a control rod which connects the stabilizer to the neutral shift mechanism at the lower forward end of the unit.
- B. This procedure contains steps to remove and install the neutral shift and override mechanism (767-200 Airplanes), or override mechanism (767-300 Airplanes).

TASK 27-31-21-024-001

2. Remove the Neutral Shift/Override Mechanism

A. Equipment

- (1) Service Platform, Control Bay Access Door – A51001-19

B. References

- (1) 06-42-00/201, Empennage Access Doors and Panels

C. Access

- (1) Location Zones
  - 313/314 Stabilizer Torsion Box Compartment
- (2) Access Panel
  - 313AL Controls Bay

D. Prepare for the Removal

S 864-004

- (1) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the CUTOUT position.

S 864-005

- (2) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.

S 864-006

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;
    - 11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

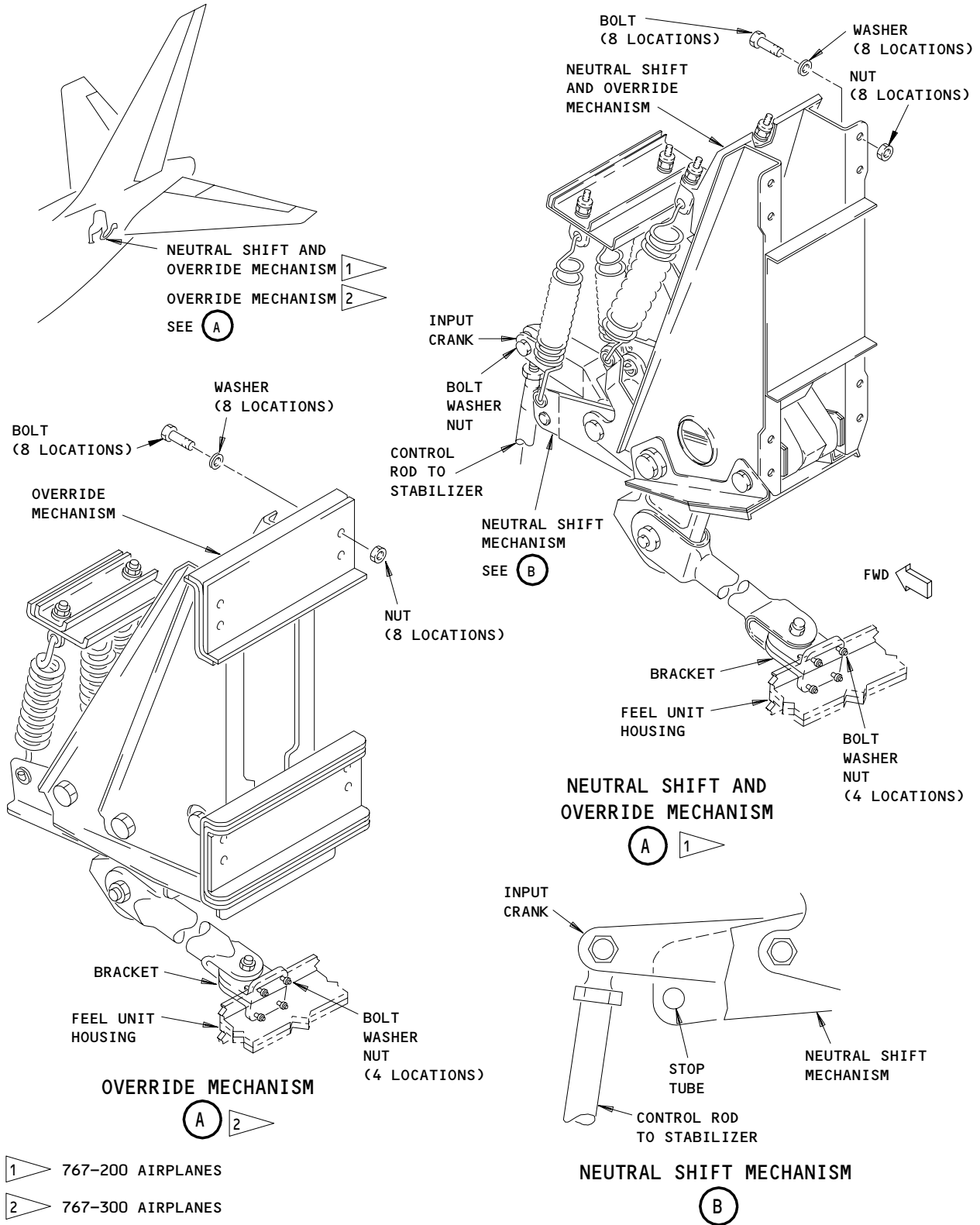
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Neutral Shift and Override Mechanism Installation  
Figure 401

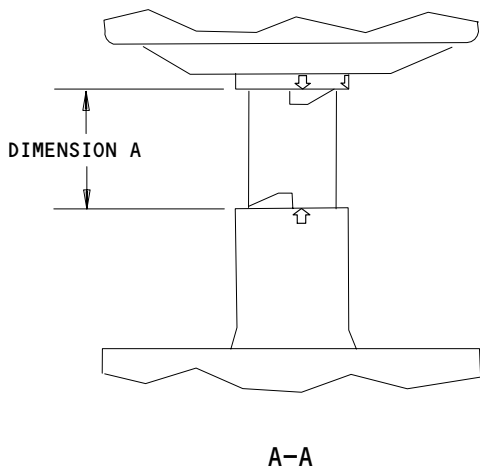
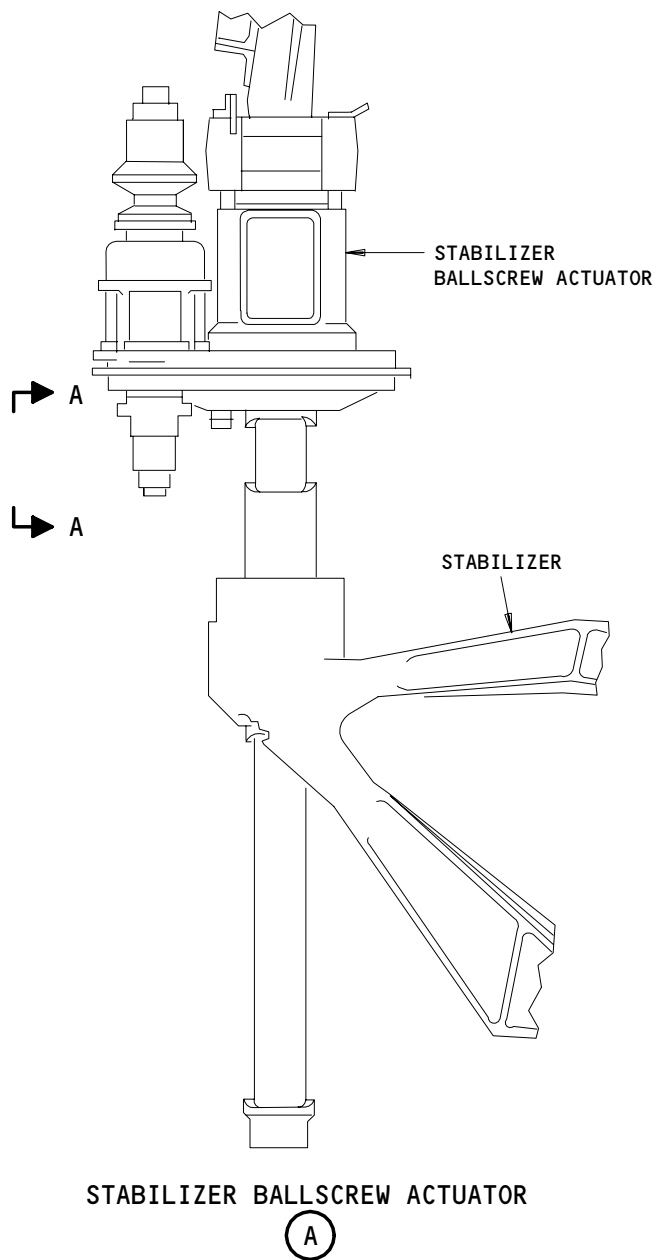
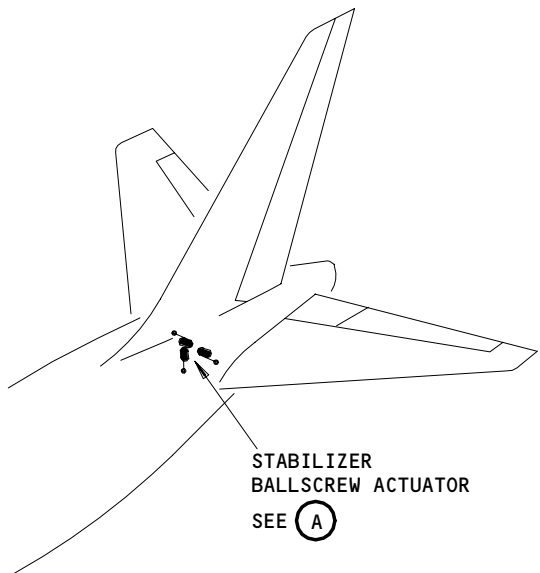
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Neutral Shift and Override Adjustment  
Figure 402

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S 014-007

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR AND THE CONTROLS BAY ACCESS DOOR, 313AL. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

(4) Open the access door for the controls bay, 313AL (Ref 06-42-00).

S 494-008

(5) Install a service platform on the access door for the controls bay, 313AL (Ref 06-42-00).

E. Remove the Neutral Shift/Override Mechanism (Fig. 401)

S 034-010

(1) 767-200 AIRPLANES;  
remove the nut, washer, and bolt that connect the input crank to the control rod that goes to the stabilizer.

S 034-011

(2) Remove the bolts, washers, and nuts that connect the bracket to the feel unit housing.

S 024-012

(3) Hold the neutral shift/override mechanism.

S 034-016

(4) Remove the bolts and washers that attach the neutral shift/override mechanism to the airplane structure.

S 024-018

(5) Remove the neutral shift/override mechanism.

TASK 27-31-21-424-021

3. Install the Neutral Shift/Override Mechanism

A. Equipment

(1) Service Platform, Control Bay Access Door -  
A51001-19

B. Consumable Materials

(1) C00308 Compound - Corrosion Preventive  
MIL-C-11796 Class III  
(2) A00247 Sealant - Chromate Type BMS 5-95

C. References

(1) 06-42-00/201, Empennage Access Doors and Panels  
(2) 27-31-00/501, Elevator Control System

D. Access

(1) Location Zones  
313/314 Stabilizer Torsion Box Compartment

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- (2) Access Panel  
313AL Controls Bay

E. Install the Neutral Shift/Override Mechanism (Fig. 401)

S 624-025

- (1) Apply a layer of sealant to the mating surfaces of the neutral shift/override mechanism and the airplane structure.

S 624-029

- (2) Apply sealant to the bolts that attach the neutral shift/override mechanism to the airplane structure.

S 424-030

- (3) Install the neutral shift/override mechanism to the airplane structure.

S 434-033

- (4) Install the bolts, washers, and nuts that connect the bracket to the feel unit housing.

S 434-034

- (5) 767-200 AIRPLANES;  
do the steps that follow to connect the input crank to the control rod:
  - (a) Apply corrosion preventive compound to all of the surfaces at the control rod and input crank connection.
  - (b) Install the bolt, washer and nut.

S 824-038

- (6) 767-200 AIRPLANES;  
do the steps that follow:
  - (a) Do the adjustment for the control rod on the neutral shift mechanism (Ref 27-31-00).
  - (b) Do the neutral shift test (Ref 27-31-00).

S 094-039

- (7) Remove the service platform and close the access door for the controls bay, 313AL (Ref 06-42-00).

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ELEVATOR LOST MOTION DEVICE AND SLAVE CABLE QUADRANT -  
MAINTENANCE PRACTICES

1. General

- A. This procedure contains four tasks. the first task is the removal of the elevator lost motion device. The second task is the installation of the lost motion device. The third task is the removal of the slave cable quadrant. The fourth task is the installation of the slave cable quadrant.

TASK 27-31-31-022-001

2. Elevator Lost Motion Device Removal

A. Equipment

- (1) Rig Pins from Rig Pin Set A20004-XX  
(Ref 20-10-24):  
(a) E7 - P/N A20004-21  
(b) E8 - P/N A20004-21  
(c) E9 - P/N A20004-21  
(d) E10 - P/N A20004-22

B. References

- (1) 06-42-00/201, Empennage Access Doors and Panels  
(2) 20-10-24/201, Rig Pins  
(3) 24-22-00/201, Electrical Power - Control  
(4) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones  
335/345 Horizontal Stabilizer - Rear Spar to Trailing Edge  
(2) Access Panels  
335HB, 345HB Elevator Control Mechanism  
335JB, 345JB Elevator Spar Hinge Fitting and  
T.E. Horizontal Stabilizer

D. Prepare for the Removal

- S 862-002  
(1) Supply electrical power (AMM 24-22-00/201).  
  
S 862-048  
(2) Make sure the pressure is removed from the left, right, and center hydraulic system (AMM 29-11-00/201).  
  
S 862-049  
(3) Put the LEFT and CENTER STAB TRIM SHUTOFF switches on the control stand panel, P10, to the CUTOFF position.

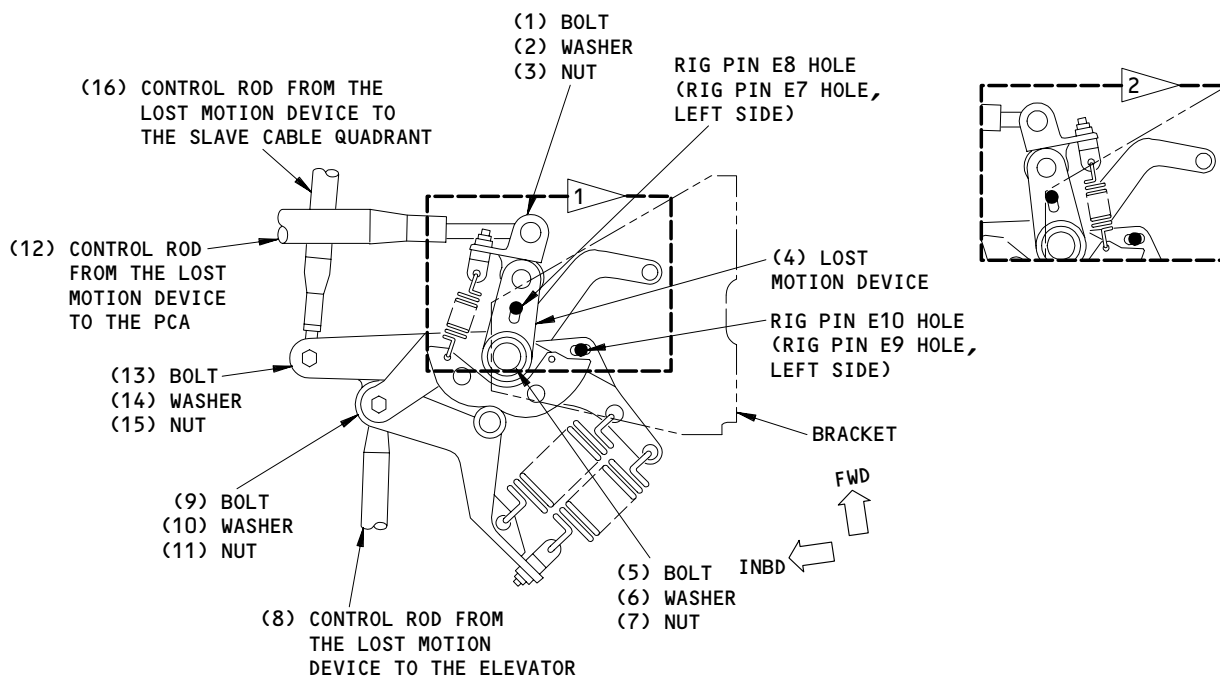
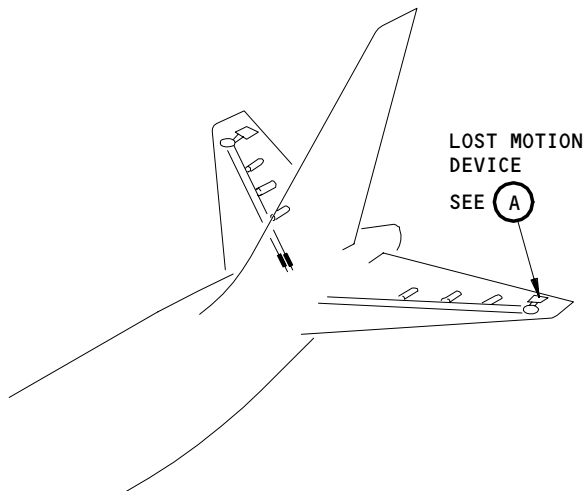
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LOST MOTION DEVICE  
(LEFT SIDE SHOWN, RIGHT SIDE IS OPPOSITE)

(A)

- 1 SPRING POSITION FOR THE LEFT SIDE
- 2 SPRING POSITION FOR THE RIGHT SIDE

Elevator Lost Motion Device - Removal/Installation  
Figure 201

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- S 862-005
- (4) Put the RIGHT, LEFT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.

- S 862-006
- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

- S 862-021
- (6) Operate the control column through 4 to 5 cycles to remove the remaining hydraulic pressure.

- S 012-007
- (7) Remove these access panels (AMM 06-42-00/201):
- (a) 335HB and 335JB for lost motion device on the left elevator.
  - (b) 345HB and 345JB for the lost motion device on the right elevator.

#### E. Elevator Lost Motion Device Removal

- S 022-020
- (1) Do these steps to remove the lost motion device:
- (a) For the left lost motion device, install rig pin E7 and E9 (Fig. 201).
  - (b) For the right lost motion device, install rig pin E8 and E10 (Fig. 201).
  - (c) Remove the nut (3), washer (2), and bolt (1) that connect the control rod (16) to the lost motion device.
  - (d) Remove the nut (11), washer (10), and bolt (9) that connect the control rod (8) to the lost motion device.
  - (e) Remove the nut (15), washer (14), and bolt (13) that connect the control rod (12) to the lost motion device.
  - (f) Remove the nut (7), washer (6), and bolt (5) that attach the lost motion device to the bracket.
  - (g) Remove the lost motion device (4).

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TASK 27-31-31-422-015

3. Elevator Lost Motion Device Installation

A. Equipment

- (1) Rig Pins from Rig Pin Set A20004-XX  
(AMM 20-10-24/201):
  - (a) E7 - P/N A20004-21
  - (b) E8 - P/N A20004-21
  - (c) E9 - P/N A20004-21
  - (d) E10 - P/N A20004-22

B. Consumable Materials

- (1) D50180 Grease - BMS 3-33 (Preferred)
- (2) D00015 Grease - BMS 3-24 (Alternate)

C. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 20-10-24/201, Rig Pins
- (3) 24-22-00/201, Electrical Power - Control
- (4) 27-31-00/501, Elevator Control System

D. Access

- (1) Location Zones
  - 335/345 Horizontal Stabilizer - Rear Spar to Trailing Edge
- (2) Access Panels
  - 335HB, 345HB Elevator Control Mechanism
  - 335JB, 345JB Elevator Spar Hinge Fitting and T.E.  
Horizontal Stabilizer

E. Lost Motion Device Installation

S 422-019

- (1) Do these steps to install the lost motion device:
  - (a) Apply grease to the bolts (1, 5, 9, and 13).
  - (b) Install the bolt (5), washer (6), and nut (7) that attach the lost motion device (4) to the brackets.
  - (c) For the left lost motion device, install rig pin E7 and E9 (Fig. 201).
  - (d) For the right lost motion device, install rig pin E8 and E10 (Fig. 201).
  - (e) Install the bolt (1), washer (2), and nut (3) to connect the control rod (16) to the lost motion device.
  - (f) Install the bolt (13), washer (14), and nut (15) to connect the control rod (16) to the lost motion device.
  - (g) Install the bolt (9), washer (10), nut (11) to connect the control rod (8) to the lost motion device.
  - (h) Remove rig pin E7, E8, E9, and E10.

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S 862-047

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 862-029

- (3) Put the LEFT, RIGHT and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the ON position.

S 862-030

- (4) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the NORM position.

S 822-031

- (5) Do the Lost Motion to PCA Control Rod Adjustment (AMM 27-31-00/501).

S 822-046

- (6) Do the Lost Motion-To-Elevator Control Rod Adjustment (AMM 27-31-00/501).

S 732-036

- (7) Do the Column, Quadrant, and Slave Override Functions Test (AMM 27-31-00/501).

F. Put the Airplane Back to Its Usual Condition

S 412-032

- (1) Install these access panels (Ref 06-42-00):
  - (a) 335HB and 335JB for the left lost motion device on the left elevator.
  - (b) 345HB and 345JB for the right lost motion device on the right elevator.

S 862-033

- (2) Remove electrical power if it is not necessary (Ref 24-22-00).

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TASK 27-31-31-022-022

4. Slave Cable Quadrant Removal

A. Equipment

- (1) Rig Pins from Rig Pin Set A20004-XX  
(Ref 20-10-24):
  - (a) E7 - P/N A20004-21
  - (b) E8 - P/N A20004-21
  - (c) E9 - P/N A20004-21
  - (d) E10 - P/N A20004-22

B. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 20-10-24/201, Rig Pins
- (3) 24-22-00/201, Electrical Power - Control
- (4) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones
  - 335/345 Horizontal Stabilizer - Rear Spar to Trailing Edge
- (2) Access Panels
  - 335HB, 345HB Elevator Control Mechanism
  - 335JB, 345JB Elevator Spar Hinge Fitting and  
T.E. Horizontal Stabilizer

D. Prepare for the Removal

- S 862-023
  - (1) Supply electrical power (AMM 24-22-00/201).
- S 862-024
  - (2) Make sure the pressure is removed from the left, right, and center hydraulic system (AMM 29-11-00/201).
- S 862-025
  - (3) Put the LEFT and CENTER STAB TRIM SHUTOFF switches on the control stand panel, P10, to the CUTOFF position.
- S 862-026
  - (4) Put the RIGHT, LEFT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.
- S 862-027
  - (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
    - (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
    - (b) 11C12, STAB TRIM SHUTOFF L

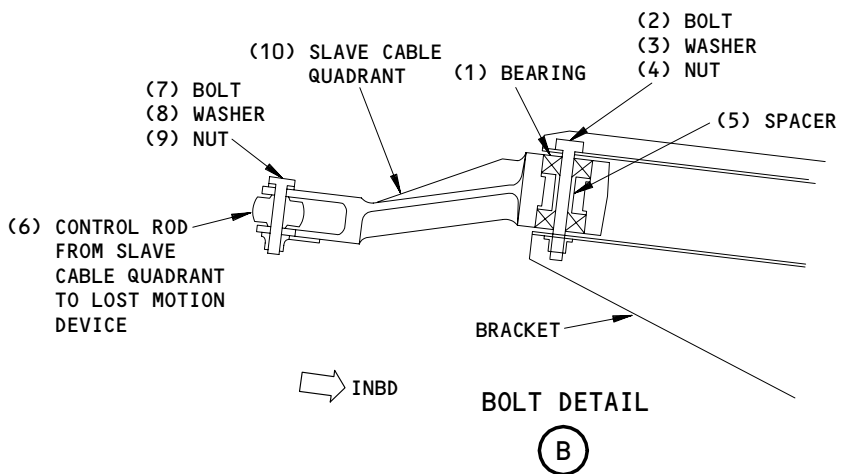
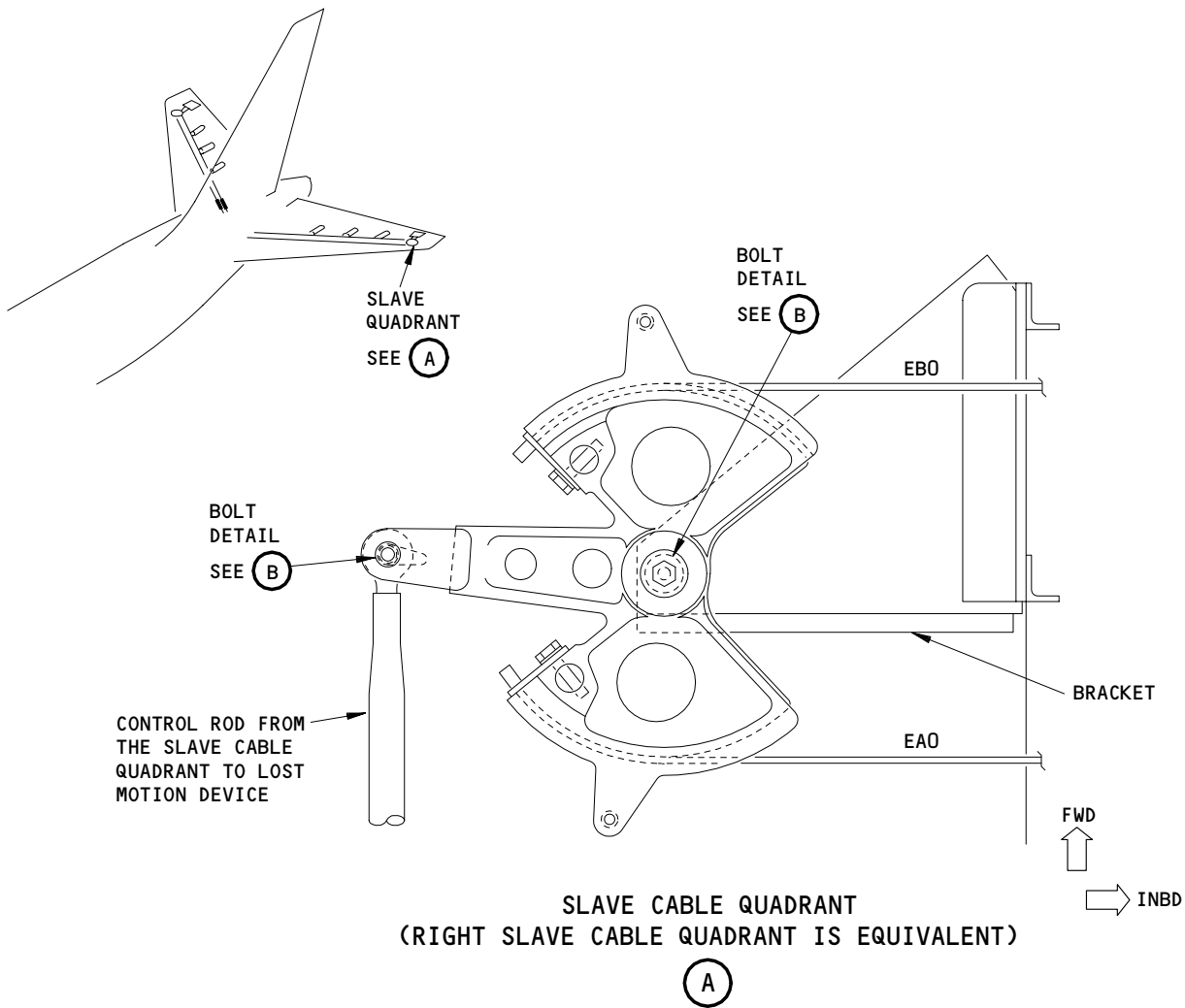
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Slave Cable Quadrant - Removal/Installation  
Figure 202

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- (c) 11C13, STAB TRIM SHUTOFF CENTER
- (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
- (e) 11H18, FLT CONT SHUTOFF TAIL CTR
- (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 862-050

- (6) Operate the control column through 4 to 5 cycles to remove the remaining hydraulic pressure.

S 012-029

- (7) Remove these access panels (AMM 06-42-00/201):
  - (a) 335HB and 335JB for lost motion device on the left elevator.
  - (b) 345HB and 345JB for the lost motion device on the right elevator.

E. Slave Cable Quadrant Removal

S 822-042

- (1) For the left lost motion device, install rig pin E7 and E9 (Fig. 201).

S 822-043

- (2) For the right lost motion device, install rig pin E8 and E10 (Fig. 201).

S 022-044

- (3) Do these steps to disconnect the cables from the slave cable quadrant:
  - (a) Attach tags to the cables for identification during subsequent installation.
  - (b) Attach cable clamps to hold the cables then disconnect the cables from the slave quadrant.

S 022-045

- (4) Do these steps to remove the slave quadrant:
  - (a) Remove the nut (9), washer (8), bolt (7) that connect the control rod (6) to the slave cable quadrant.
  - (b) Remove the nut (4), washer (3), and bolt (2) that attach the slave cable quadrant to the bracket.
  - (c) Remove the slave cable quadrant (10).

TASK 27-31-31-422-031

5. Slave Cable Quadrant Installation

A. Equipment

- (1) Rig Pins from Rig Pin Set A20004-XX (AMM 20-10-24/201):
  - (a) E7 - P/N A20004-21
  - (b) E8 - P/N A20004-21
  - (c) E9 - P/N A20004-21
  - (d) E10 - P/N A20004-22

B. Consumable Materials

- (1) D00015 Grease - Corrosion Preventative, BMS 3-24

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C. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 20-10-24/201, Rig Pins
- (3) 24-22-00/201, Electrical Power - Control
- (4) 27-31-00/501, Elevator Control System

D. Access

- (1) Location Zones
  - 335/345 Horizontal Stabilizer - Rear Spar to Trailing Edge
- (2) Access Panels
  - 335HB, 345HB Elevator Control Mechanism
  - 335JB, 345JB Elevator Spar Hinge Fitting and T.E.  
Horizontal Stabilizer

E. Slave Cable Quadrant Installation

S 422-032

- (1) Do these steps to install the slave cable quadrant:
  - (a) Apply grease to the bolts (2 and 7).
  - (b) For the left slave cable quadrant, make sure that rig pin E7 and E9 are installed.
  - (c) For the right slave cable quadrant, make sure that rig pin E8 and E10 are installed.
  - (d) Install the bolt (2), washer (3), and nut (4) that attach the slave cable quadrant (10) to the bracket.
  - (e) Install the bolt (7), washer (8), and nut (9) to connect the control rod (6) to the slave cable quadrant.
  - (f) Connect cables EA0 and EB0 to the slave cable quadrant.
  - (g) Make sure that rig pins E7 and E9 for the left slave cable quadrant and rig pins E8 and E10 for the right slave cable quadrant can be installed with light finger pressure only (Fig. 201).
  - (h) Remove rig pin E7, E8, E9, and E10.

S 822-041

- (2) Do the Slave Cables Adjustment (AMM 27-31-00/501).

S 862-051

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;
    - 11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

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- S 862-052
- (4) Put the LEFT, RIGHT and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the ON position.
- S 862-036
- (5) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the NORM position.
- S 732-038
- (6) Do the Column, Quadrant, and Slave Override Functions Test (AMM 27-31-00/501).
- F. Put the Airplane Back to Its Usual Condition
- S 412-039
- (1) Install these access panels (Ref 06-42-00):
- (a) 335HB and 335JB for the left lost motion device on the left elevator.
- (b) 345HB and 345JB for the right lost motion device on the right elevator.
- S 862-040
- (2) Remove electrical power if it is not necessary (Ref 24-22-00).

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OUTBOARD ELEVATOR LINKAGE-INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and a wear limit table which show the data for wear limits. There are no procedures for access, removal, or installation of the parts.

TASK 27-31-58-226-001

2. Wear Limits for the Outboard Elevator Linkage (Fig. 601)

A. Access

(1) Location Zones

335/345 Horizontal Stabilizer - Rear Spar to Trailing Edge

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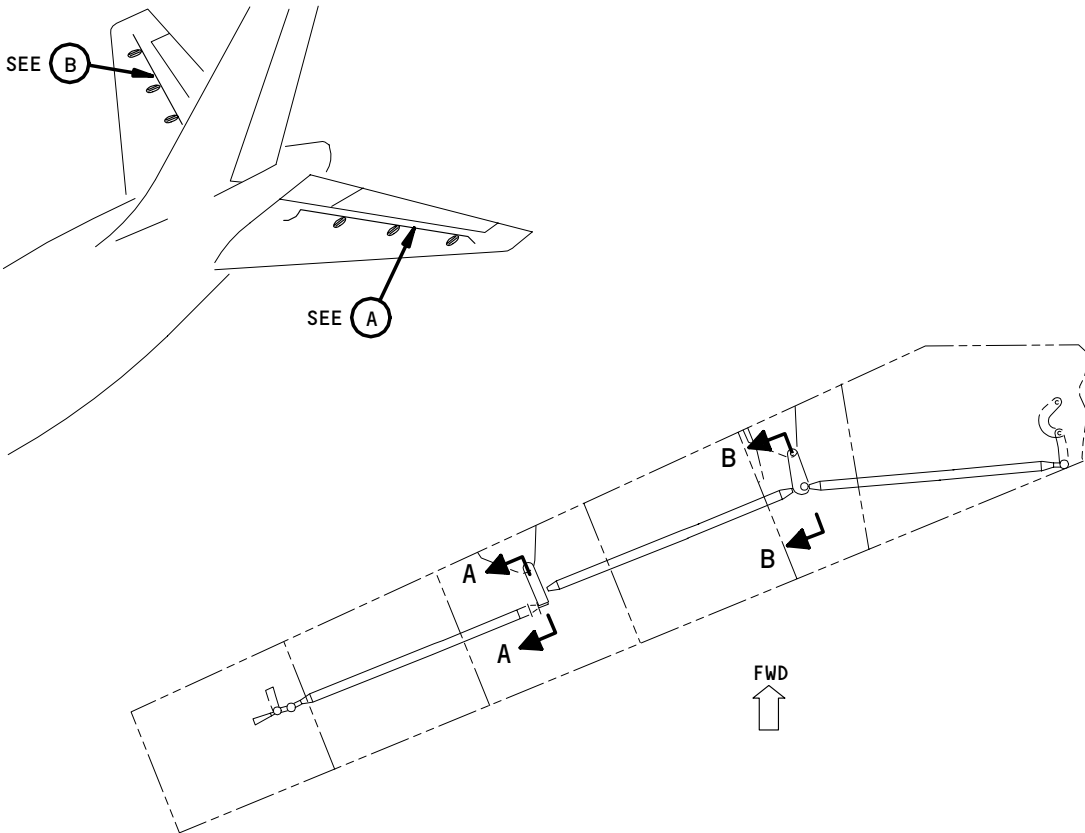
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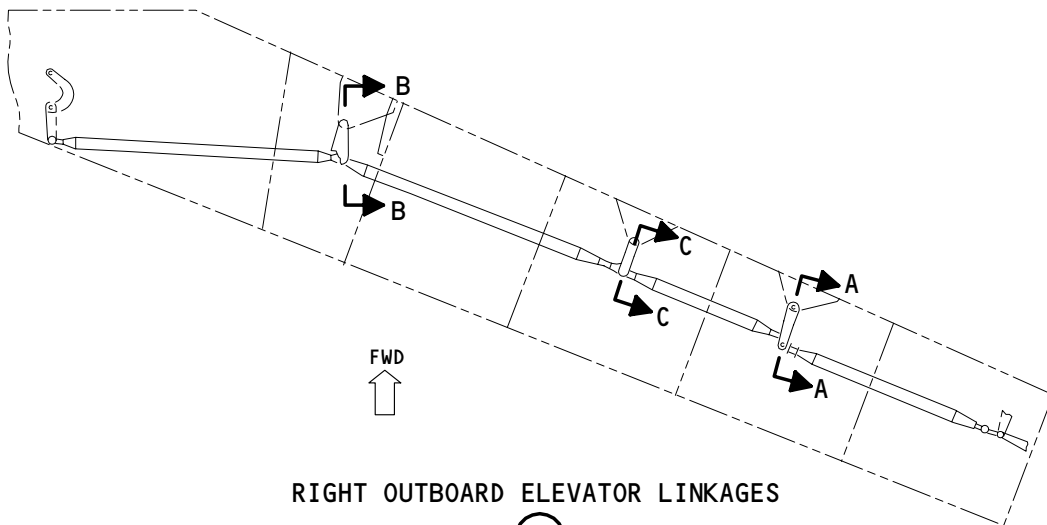
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LEFT OUTBOARD ELEVATOR LINKAGES

(A)



RIGHT OUTBOARD ELEVATOR LINKAGES

(B)

Wear Limits for the Elevator Bellcrank and Idler Crank  
Figure 601 (Sheet 1)

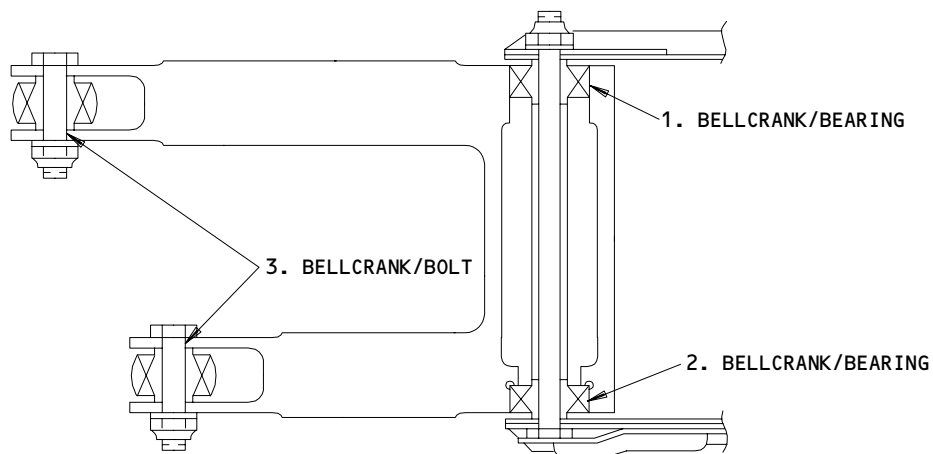
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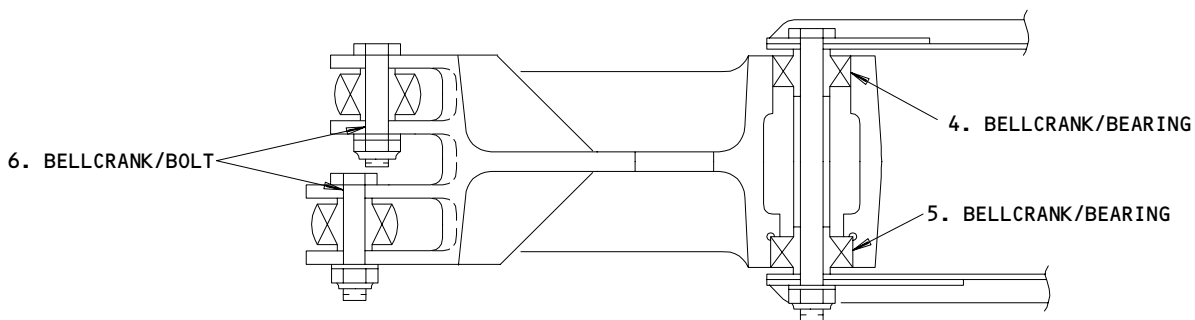
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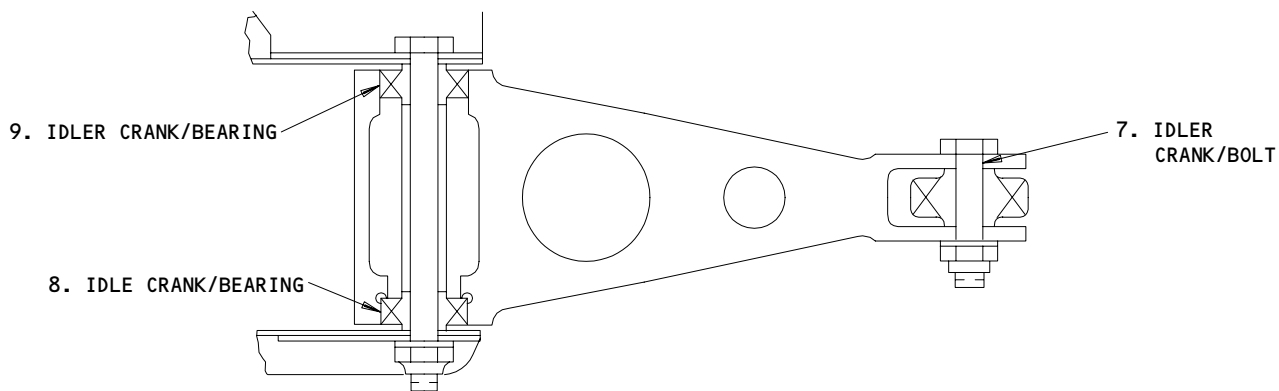
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A-A



B-B



C-C

Wear Limits for the Elevator Bellcrank and Idler Crank  
Figure 601 (Sheet 2)

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








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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BELLCRANK	ID	0.6012 (15.270)	0.9022 (22.916)	0.9028 (22.931)	0.0014 (0.036)			
	BEARING	OD	0.9009 (22.883)	0.9014 (22.896)	0.9009 (22.883)				
2	BELLCRANK	ID	0.9002 (22.865)	0.9007 (22.878)	0.9013 (22.893)	-0.0001 (-0.003)			
	BEARING	OD	0.9009 (22.883)	0.9014 (22.896)	0.9008 (22.880)				
3	BELLCRANK	ID	0.2495 (6.337)	0.2505 (6.363)	0.2525 (6.414)	0.0030 (0.076)			
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2475 (6.287)				
4	BELLCRANK	ID	0.9012 (22.890)	0.9022 (22.916)	0.9044 (22.972)	0.0030 (0.076)			
	BEARING	OD	0.9009 (22.883)	0.9014 (22.896)	0.9009 (22.883)				
5	BELLCRANK	ID	0.9002 (22.865)	0.9007 (22.878)	0.9008 (22.880)	-0.0001 (-0.003)			
	BEARING	OD	0.9009 (22.883)	0.9014 (22.896)	0.9009 (22.883)				
6	BELLCRANK	ID	0.2495 (6.337)	0.2505 (6.363)	0.2525 (6.414)	0.0030 (0.076)			
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2475 (6.287)				
7	IDLER CRANK	ID	0.2495 (6.337)	0.2505 (6.363)	0.2515 (6.388)	0.0040 (0.102)			
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2475 (6.287)				
8	IDLER CRANK	ID	0.7488 (19.020)	0.7493 (19.032)	0.7494 (19.035)	-0.0001 (-0.003)			
	BEARING	OD	0.7495 (19.037)	0.7500 (19.050)	0.7495 (19.037)				
9	IDLER CRANK	ID	0.7499 (19.047)	0.7504 (19.060)	0.7520 (19.101)	0.0000 (0.000)			
	BEARING	OD	0.7495 (19.037)	0.7500 (19.050)	0.7495 (19.037)				

Wear Limits for the Elevator Bellcrank and Idler Crank  
Figure 601 (Sheet 3)

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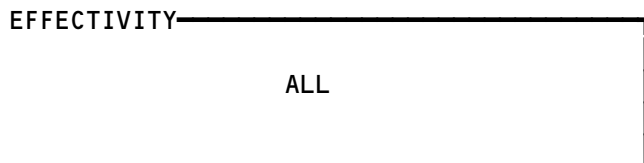
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- 1 ▷ REPLACE THE PART IF IT IS WORN MORE THAN THE MAXIMUM WEAR LIMIT. MAKE SURE OF THE DESIGN LIMITS INTERFERENCE FIT.
- 2 ▷ REMOVE CORROSION TO INCREASE THE DIAMETER OF THE HOLE BY A MAXIMUM OF 0.375 INCH (9.525 mm). INSTALL AN AL-NI-BR BUSHING WITH WET BMS 5-95 SEALANT. MAKE SURE THERE IS AN INTERFERENCE FIT OF 0.0006 INCH (0.01524 mm) MINIMUM AND 0.0015 INCH (0.0381 mm) MAXIMUM. REAM THE BUSHING INNER DIAMETER TO ITS INITIAL HOLE DESIGN DIMENSION.
- 3 ▷ REMOVE CORROSION TO INCREASE THE DIAMETER OF THE HOLE BY A MAXIMUM OF 0.125 INCH (3.175 mm). INSTALL AN AL-NI-BR BUSHING WITH WET BMS 5-95 SEALANT. MAKE SURE THERE IS AN INTERFERENCE FIT OF 0.0005 INCH (0.0127 mm) MINIMUM AND 0.0014 INCH (0.03556 mm) MAXIMUM. REAM THE BUSHING INNER DIAMETER TO ITS INITIAL HOLE DESIGN DIMENSION.

Wear Limits for the Elevator Bellcrank and Idler Crank  
Figure 601 (Sheet 4)



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ELEVATOR HYDRAULIC FUSE – MAINTENANCE PRACTICES

1. General

- A. This procedure contains steps to remove and install the elevator hydraulic fuses.

TASK 27-31-68-022-001

2. Remove the Elevator Hydraulic Fuses

A. References

- (1) 06-42-00/201, Empennage Access Doors and Panels  
(2) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

(1) Location Zones

- |         |  |
|---------|--|
| 211/212 | Control Cabin                                  |
| 312/313 | Area Aft of Pressure Bulkhead to BS 1725       |
| 314     | Horizontal Stabilizer – Center Section (Left)  |
| 341     | Horizontal Stabilizer – Center Section (Right) |

(2) Access Panels

- |       |                                   |
|-------|-----------------------------------|
| 312AR | Forward Stabilizer Compartment    |
| 341AZ | Horizontal Stabilizer Compartment |

C. Prepare for the Removal

S 862-002

- (1) Remove the pressure from the left and right hydraulic systems and reservoir (Ref 29-11-00).

S 012-003

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR AND THE CONTROLS BAY ACCESS DOOR, 313AL. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (2) Open the access door for the forward stabilizer compartment, 312AR (Ref 06-42-00).

S 012-004

- (3) Open the access door to get access to the horizontal stabilizer compartment, 341AZ (Ref 06-42-00).

D. Remove the Fuses (Fig. 201)

S 022-005

- (1) Do the steps that follow to remove the fuse:
- Remove the hydraulic line clamps for movement of the lines while you remove the fuse.
  - Remove the fuses from the hydraulic lines (2 locations).
  - Put caps on the hydraulic lines.

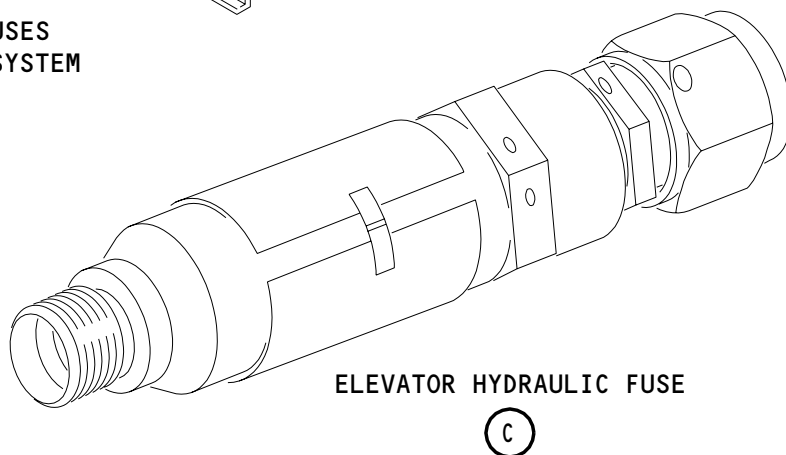
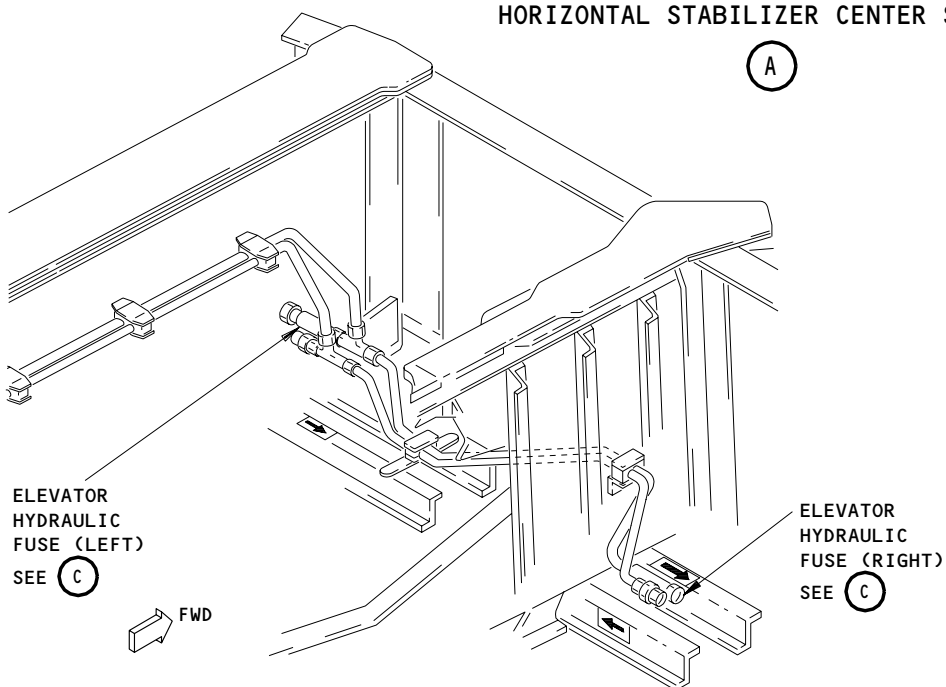
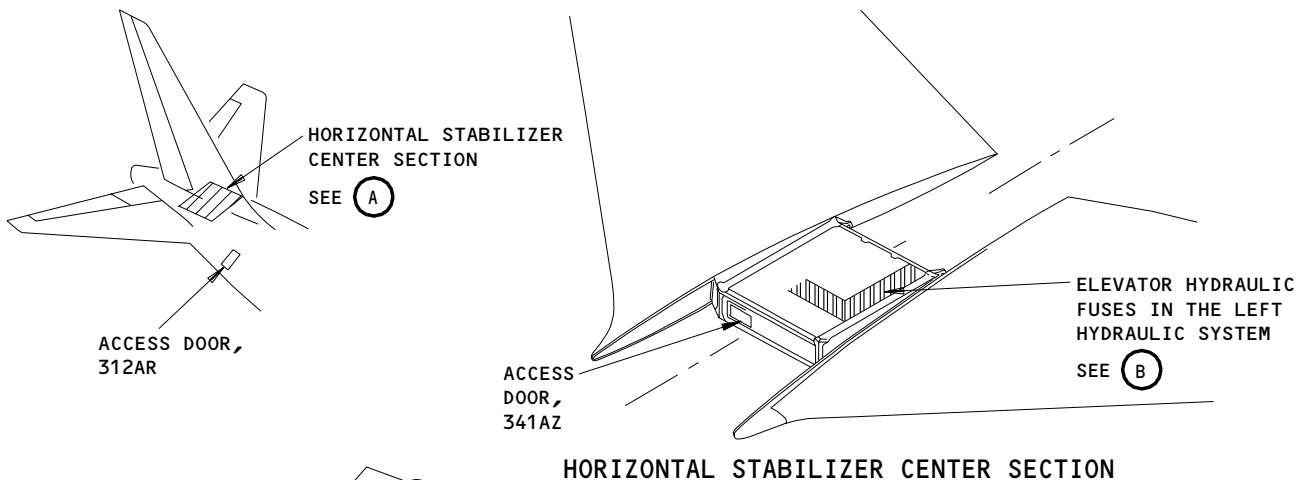
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Elevator Hydraulic Fuse Installation  
Figure 201

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TASK 27-31-68-422-006

3. Install the Elevator Hydraulic Fuses

A. Consumable Materials

- (1) D00153 Hydraulic Fluid - BMS 3-11

B. References

- (1) 06-42-00/201, Empennage Access Doors and Panels  
(2) 24-22-00/201, Electrical Power - Control  
(3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(4) 31-41-00/201, EICAS

C. Access

(1) Location Zones

- |         |  |
|---------|--|
| 211/212 | Control Cabin                                  |
| 312/313 | Area Aft of Pressure Bulkhead to BS 1725       |
| 314     | Horizontal Stabilizer - Center Section (Left)  |
| 341     | Horizontal Stabilizer - Center Section (Right) |

(2) Access Panels

- |       |                                   |
|-------|-----------------------------------|
| 312AR | Forward Stabilizer Compartment    |
| 341AZ | Horizontal Stabilizer Compartment |

D. Install the Fuses (Fig. 201)

S 422-007

- (1) Do the steps that follow to install the fuse:
- Remove the caps from the hydraulic lines.
  - Apply a thin layer of BMS 3-11 to the fittings before you install the fuse.
  - Check the placard for flow direction.
  - Install the new fuses to the hydraulic lines (2 locations).
  - Install the hydraulic line clamps, if you removed them.

E. Test for the Elevator Hydraulic Fuse

S 862-008

- (1) Supply electrical power (Ref 24-22-00).

S 212-009

- (2) Make sure these circuit breakers on the overhead panel, P11, are closed:
- 11H17, FLT CONT SHUTOFF TAIL LEFT

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- (b) 11L09, LEFT ENGINE OIL PRESS
- (c) 11L36, RIGHT ENGINE OIL PRESS 2

S 862-010

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply power to the left hydraulic system (Ref 29-11-00).

S 712-011

- (4) Do these steps to do a test for the hydraulic fuses in the elevator system:
  - (a) Make sure the L FLT CONTROL SHUTOFF TAIL valve switch on the right side panel, P61, is at the ON position.
  - (b) Move the control columns through full travel two times, then let the control columns go to the neutral position.
  - (c) Make sure the elevators move correctly with the control column movement.

S 792-017

- (5) Make sure that there are no leaks at the hydraulic line connections to the fuses.

F. Put the Airplane Back to Its Usual Condition

S 862-012

- (1) Remove the power from the left hydraulic system (Ref 29-11-00).

S 862-013

- (2) Remove electrical power if it is not necessary (Ref 24-22-00).

S 412-014

- (3) Close the access door for the forward stabilizer compartment, 312AR (Ref 06-42-00).

S 412-015

- (4) Close the access door for the horizontal stabilizer compartment, 341AZ (Ref 06-42-00).

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STALL WARNING SYSTEM – DESCRIPTION AND OPERATION

1. General (Fig. 1)

- A. The stall warning system provides warning and protection from impending stalls, indication and guidance in windshear conditions, and detection and display of system faults.
- B. In impending stall conditions, the system performs the following functions:
  - (1) Shakes the control columns to alert the flight crew.
  - (2) Nudges the elevator feel unit to force the control columns forward motion (down pitch).
- C. In windshear conditions, the system performs the following functions:
  - (1) Signals data to the Ground Proximity Warning Computer (GPWC) to provide the flight crew with visual and aural warnings (Ref 34-46-00).
  - (2) Controls the maximum pitch limit value which is signaled to the Electronic Flight Instrument System (EFIS). The maximum pitch limit value is displayed on the Electronic Attitude Director Indicator (EADI) to guide the flight crew (Ref 34-22-00).
- D. The system detects faults as follows:
  - (1) The system initiates a self-test following each power up. A WARN ELEX message is displayed on EICAS whenever a fault is detected.
  - (2) A BITE detects and displays internal faults and interface anomalies as alphanumeric codes on the Warning Electronic Unit (WEU) BITE Module.
- E. The stall warning system monitors data inputs from the following systems to perform its functions (Fig. 1):
  - (1) Airplane Mach, true air speed, computed airspeed, and indicated angle of attack from the Air Data System (Ref 34-12-00).
  - (2) LE slat position and motion from Flap/Slat Electronic Units (FSEU) (Ref 27-51-00) and Proximity Switch Electronic Unit (PSEU) (Ref 32-09-00).
  - (3) TE flap position and motion from Flap/Stab Position Modules (FSPM) (Ref 27-51-00).
  - (4) Airplane pitch angle and pitch rate from Inertial Reference System (IRS) (Ref 34-22-00).
  - (5) Speedbrake position from Spoiler Control Modules (SCM) (Ref 27-61-00).
  - (6) Power from power supply modules (Ref 31-51-00).
  - (7) Air/Ground Mode from Air/ground relay system (Ref 32-09-00).
- F. The stall warning system includes the following components:
  - (1) Left and right stick shakers
  - (2) A stick nudger
  - (3) Left and right Stall Warning Computers (SWC's)
  - (4) Left and right STALL test switches
  - (5) WEU BITE module

2. Component Details

- A. Stick Shakers (Fig. 2)

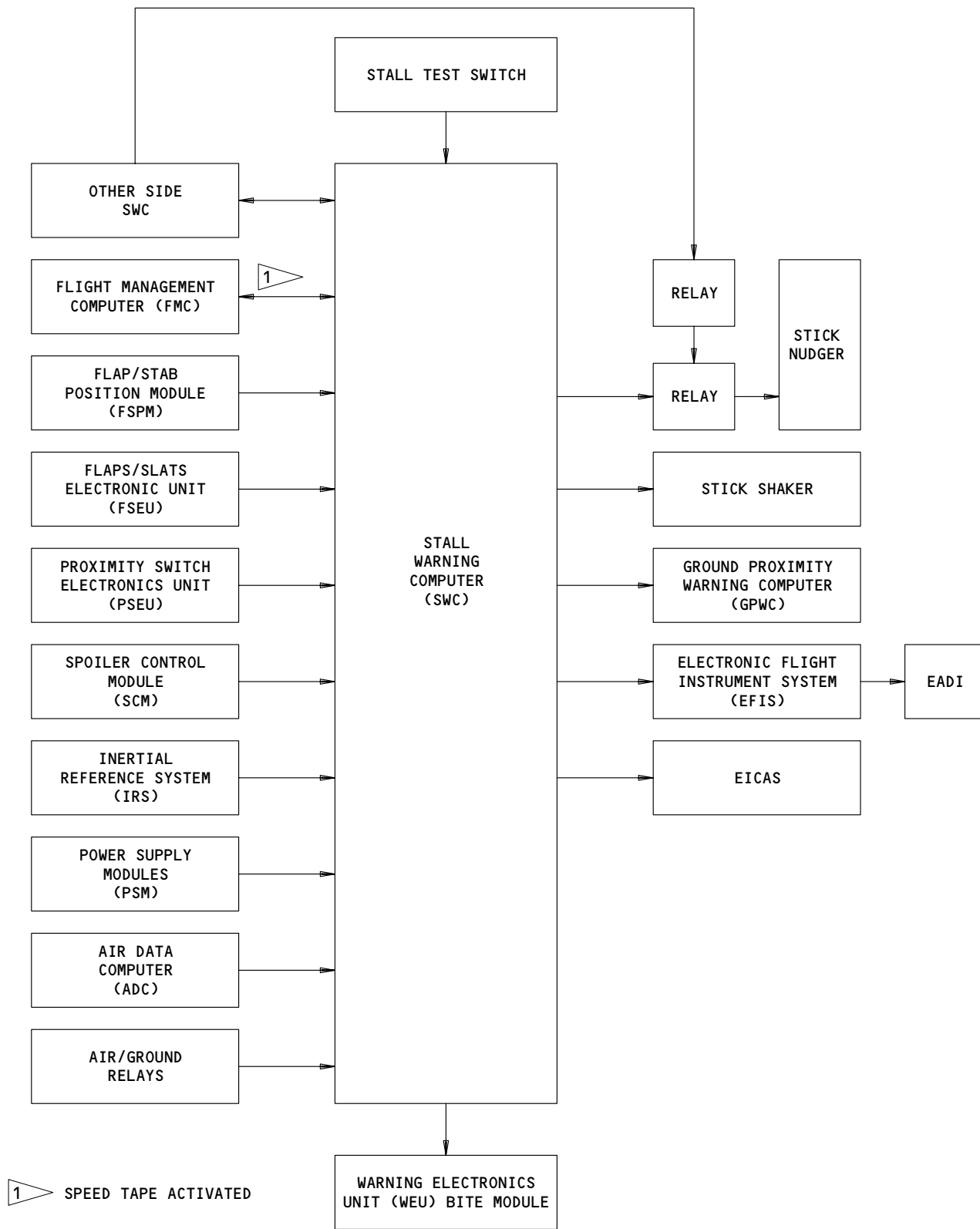
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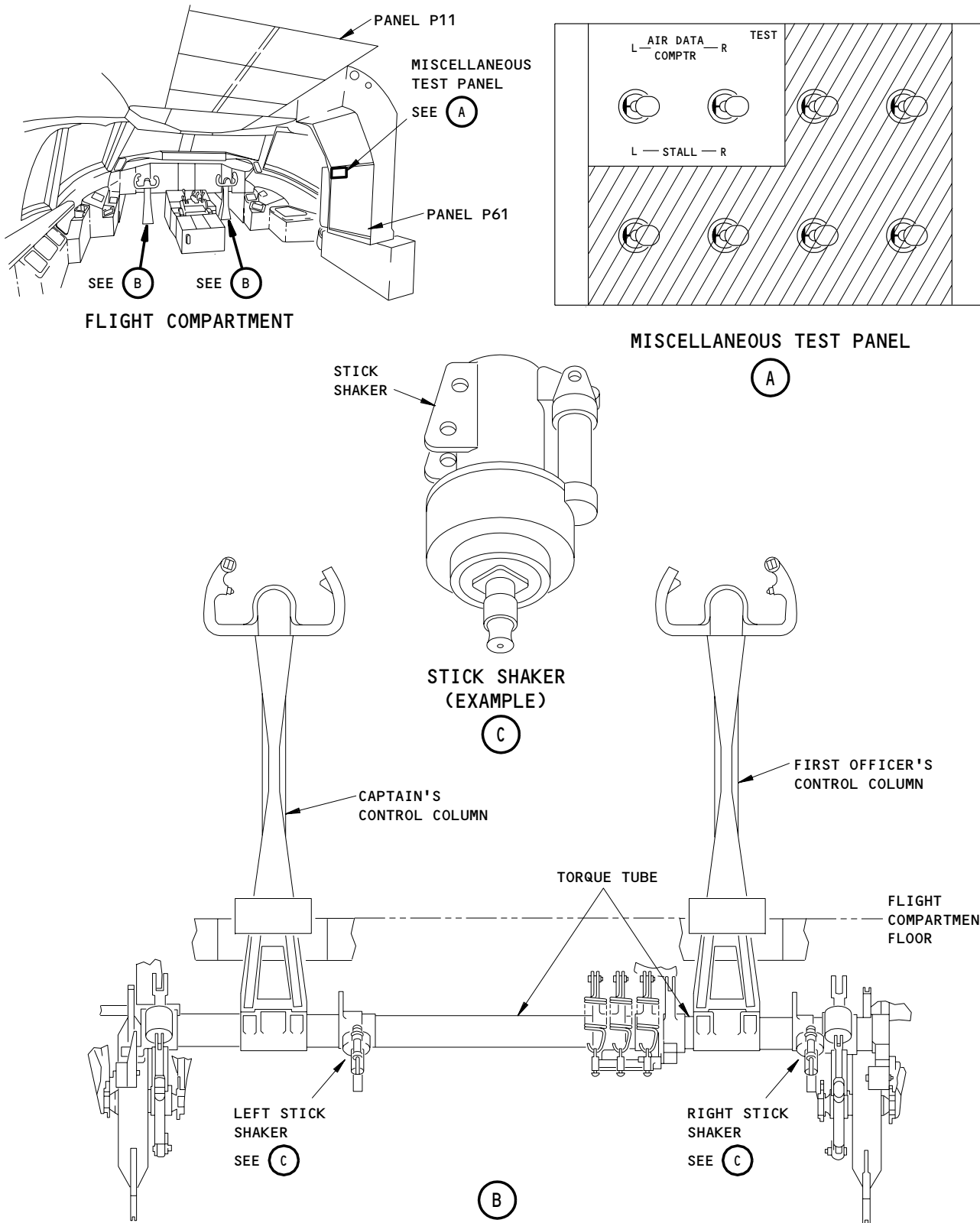
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Stall Warning System Block Diagram  
Figure 1

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STALL Test Switches and Stick Shakers  
Figure 2

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- (1) The left and right stick shakers are 28v dc motor-driven vibrating devices attached to the control column torque tubes under the flight compartment floor.
  - (2) The stick shakers are activated by the SWC's to shake the control columns to warn the flight crew in an impending stall condition. The left stick shaker is activated by the left SWC and the right stick shaker by the right SWC.
  - (3) The stick shakers may be activated on the ground for test purposes by using the STALL L/R test switches.
  - (4) Access to stick shakers is through the forward equipment bay access door.
- B. Stick Nudger (Fig. 3)
- (1) The stick nudger is a 28v dc electric motor-driven linear actuator, mounted on the elevator feel unit.
  - (2) When both SWC's detect an impending stall and the flaps and slats are fully retracted, the stick nudger linear actuator will extend. The extended nudger repositions input levers on the elevator feel unit to apply a nose down force on the control columns through cables attached to the elevator aft quadrants. The force is applied through a spring to permit the pilots to override the input.
  - (3) The nudger will retract when the angle of attack drops below the trip point or when the flaps or slats are operated.
  - (4) Access to the stick nudger is through elevator mechanical linkages access door.
- C. Stall Warning Computers (SWC's) (Fig. 4)
- (1) The two identical SWC's are microprocessor circuit cards located in the Warning Electronics Unit (WEU) P51.
  - (2) The SWC's are powered from the power supply modules. They monitor inputs from the ADC, FSEU, PSEU, FSPM, IRS, SCM, and air/ground relays.
  - (3) In impending stall conditions, the SWC's activate the stick shakers and stick nudger. In windshear conditions, the SWC's provide inputs to the GPWC and EFIS to provide the flight crew with visual and aural warnings and guidance.
  - (4) The SWC's continuously monitor internal faults and interface anomalies. Faults and anomalies are identified by EICAS messages and alphanumeric codes displayed on the WEU BITE module.
  - (5) Access to the SWC's is through main equipment center access door.
- D. STALL Test Switches (Fig. 2)
- (1) The STALL L and R test switches are located on sidewall panel P61 in flight compartment. They are used on the ground to activate the SWC's for system testing.
  - (2) The STALL L test switch activates the left stick shaker. The STALL R switch activates the right shaker. Both switches must be operated to activate the stick nudger.

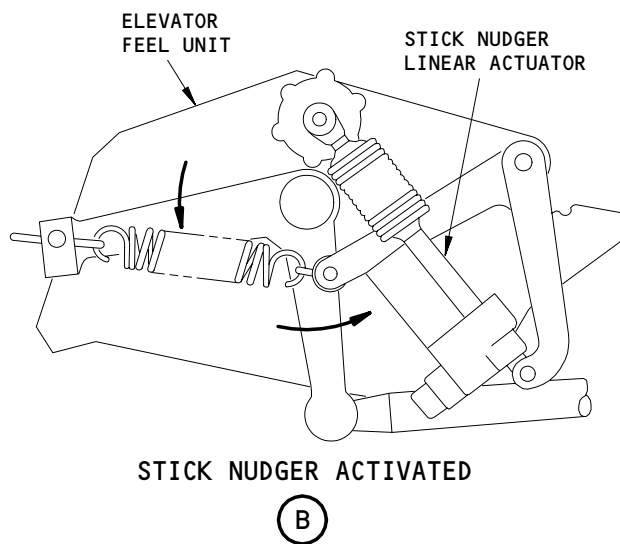
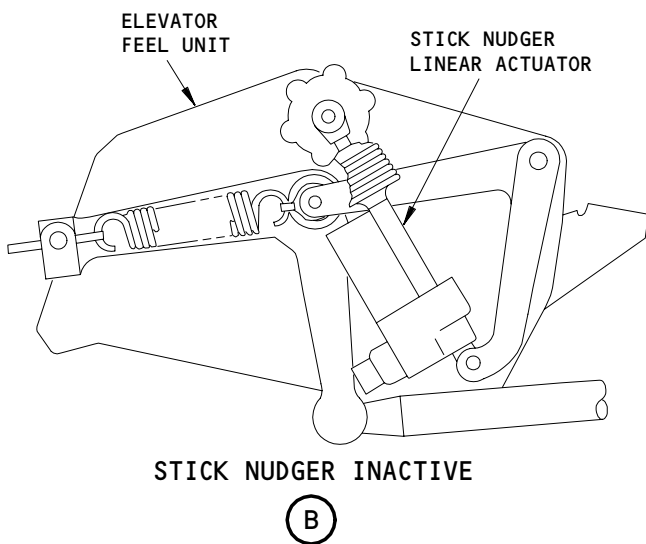
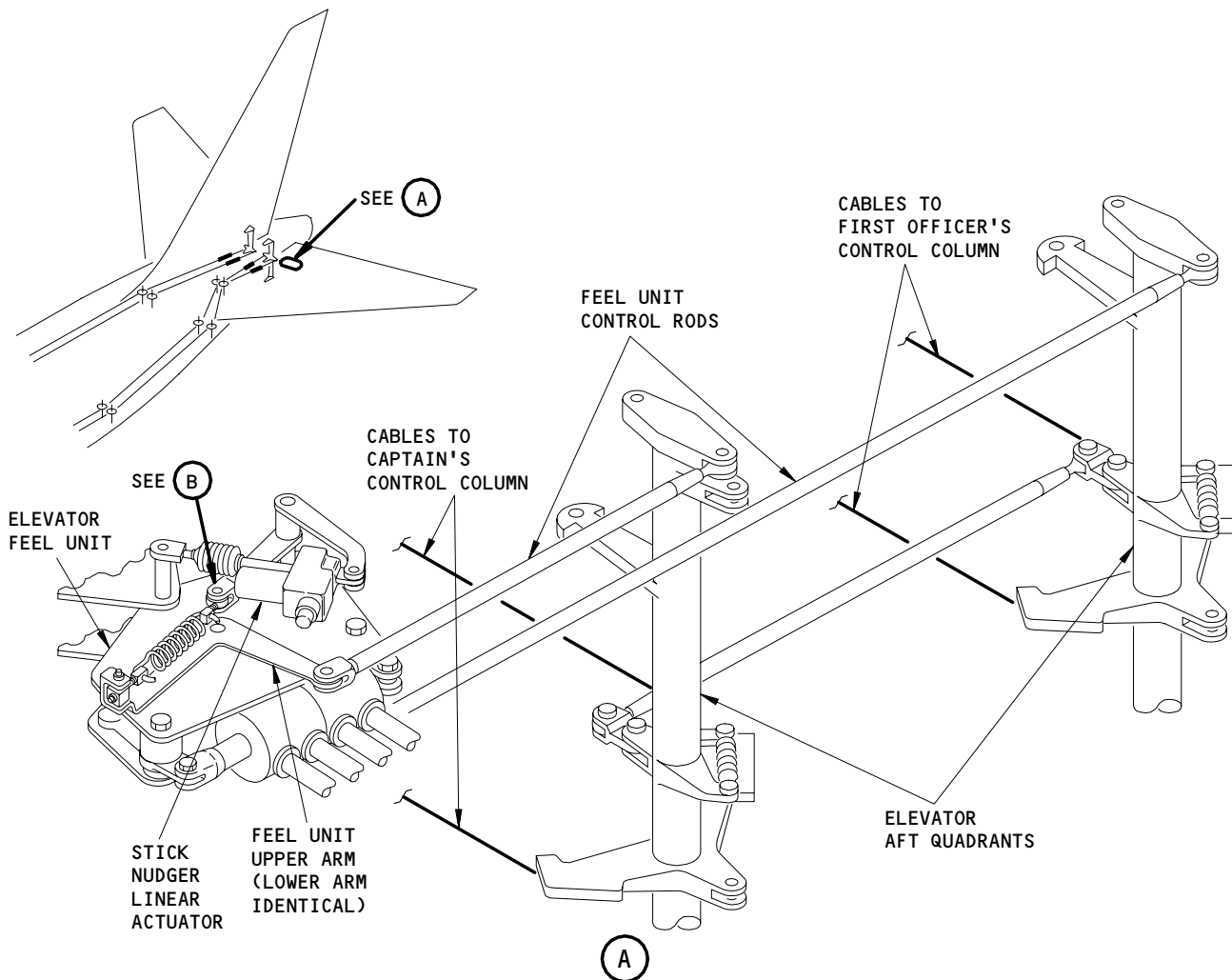
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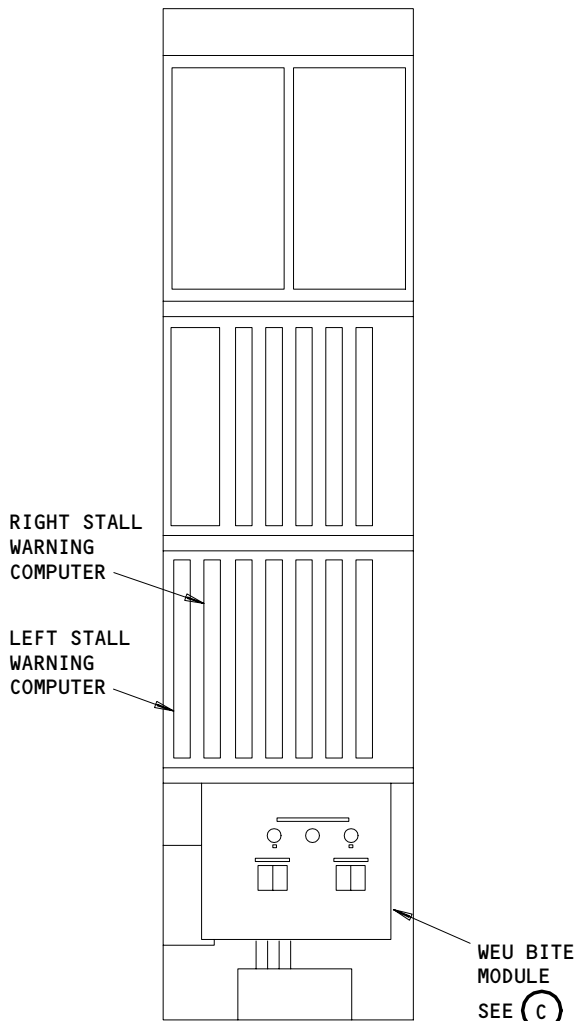
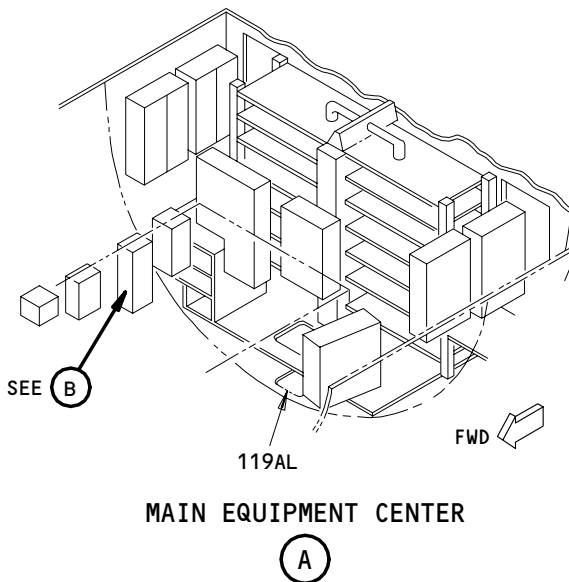
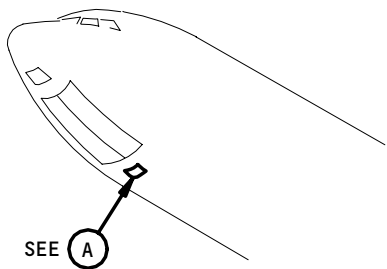
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Stick Nudger  
Figure 3

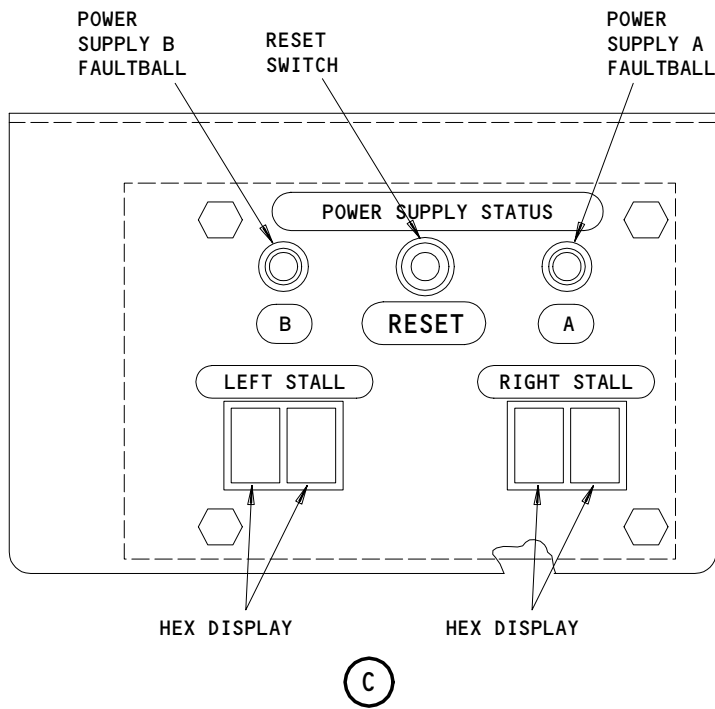
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**WARNING ELECTRONICS UNIT (WEU), P51**

B



C

**Stall Warning Computers**  
Figure 4

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E. WEU BITE Module (Fig. 4)

- (1) The BITE module is located in the WEU P51 panel, below the SWC's. It is a printed circuit board equipped with faultballs for power supplies A and B, a power reset switch, and two pairs of hex indicators to display fault codes.
- (2) The module displays alphanumeric codes for SWC's internal faults, interface anomalies, airplane configuration, airplane options, and software version.

3. Operation

A. Functional Description (Fig. 5)

- (1) The stall warning system is active in the air, and can be activated on ground by using the STALL test switches.
- (2) In the air, the SWC's monitor and compute data inputs from the interfacing systems and provide functional output signals to the stick shakers, stick nudger, and windshear detection and guidance systems.
- (3) The SWC's will activate the stick shakers and the stick nudger in the air when the airplane computed angle of attack exceeds the computed trip angle of attack of impending stall.
- (4) The two stick shakers operate independently of each other. The left stick shaker is controlled by the left SWC. The right stick shaker is controlled by the right SWC.
- (5) The Stick Nudger R relay gets 28v dc from the L BUS through the Stick Nudger circuit breaker, C1024 (11K10). The stick nudger discrete from the R Stall Warning module supplies a ground to the R relay. The relay closes and supplies 28v dc from the L BUS to the Stick Nudger L relay. The stick nudger discrete from the L Stall Warning module supplies a ground to the L relay and the Stick Nudger operates.
- (6) The SWC's compute a pitch limit value based on the difference between the computed trip angle of attack of impending stall and the airplane computed angle of attack. This value is transmitted to the EFIS, which displays the proper Pitch Limit Indicator (PLI) on the EADI to guide the pilots (Ref 34-22-00).
- (7) The SWC's also transmit the flap position to the GPWC to set the windshear sensitivity level (Ref 34-46-00).
- (8) On the ground, the SWC's can be set to a test mode. They monitor and detect internal faults and interface anomalies and display them on BITE and EICAS.

B. BITE

- (1) Following each power up, the SWC's initiate a self-test of internal faults and interface anomalies. If a fault or anomaly is detected, a WARN ELEX status message will be displayed on EICAS, and the appropriate alphanumeric fault code will be displayed on the WEU BITE module. The WARN ELEX message also indicates power supply modules failure (Ref 31-51-00). If no faults or anomalies are detected after power-up, no EICAS message will appear, and the WEU BITE module will display the system configuration and option code.

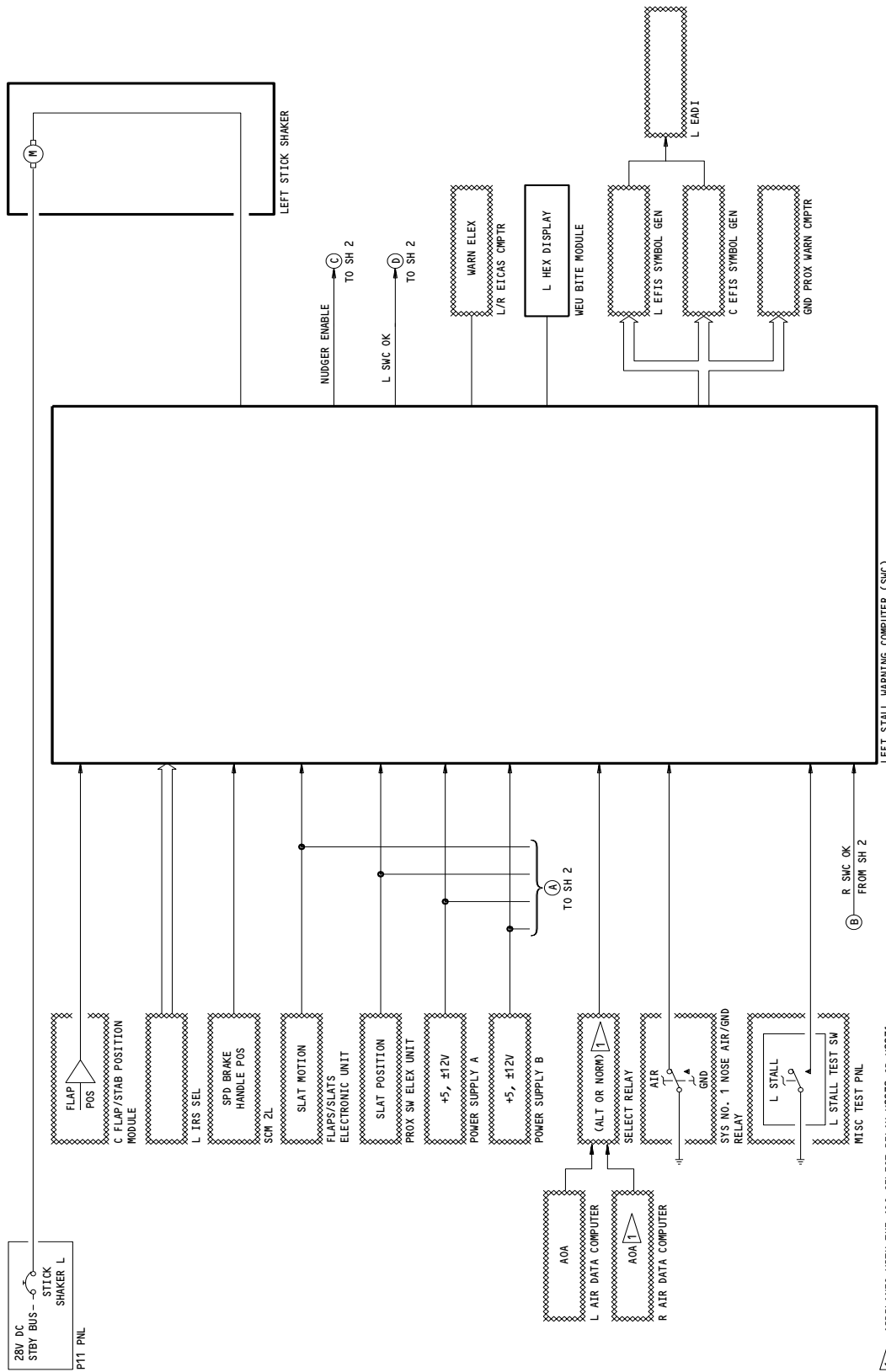
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Stall Warning System Schematic  
 Figure 5 (Sheet 1)

1 AIRPLANES WITH THE ADC SELECT RELAY K2230 OR K2231

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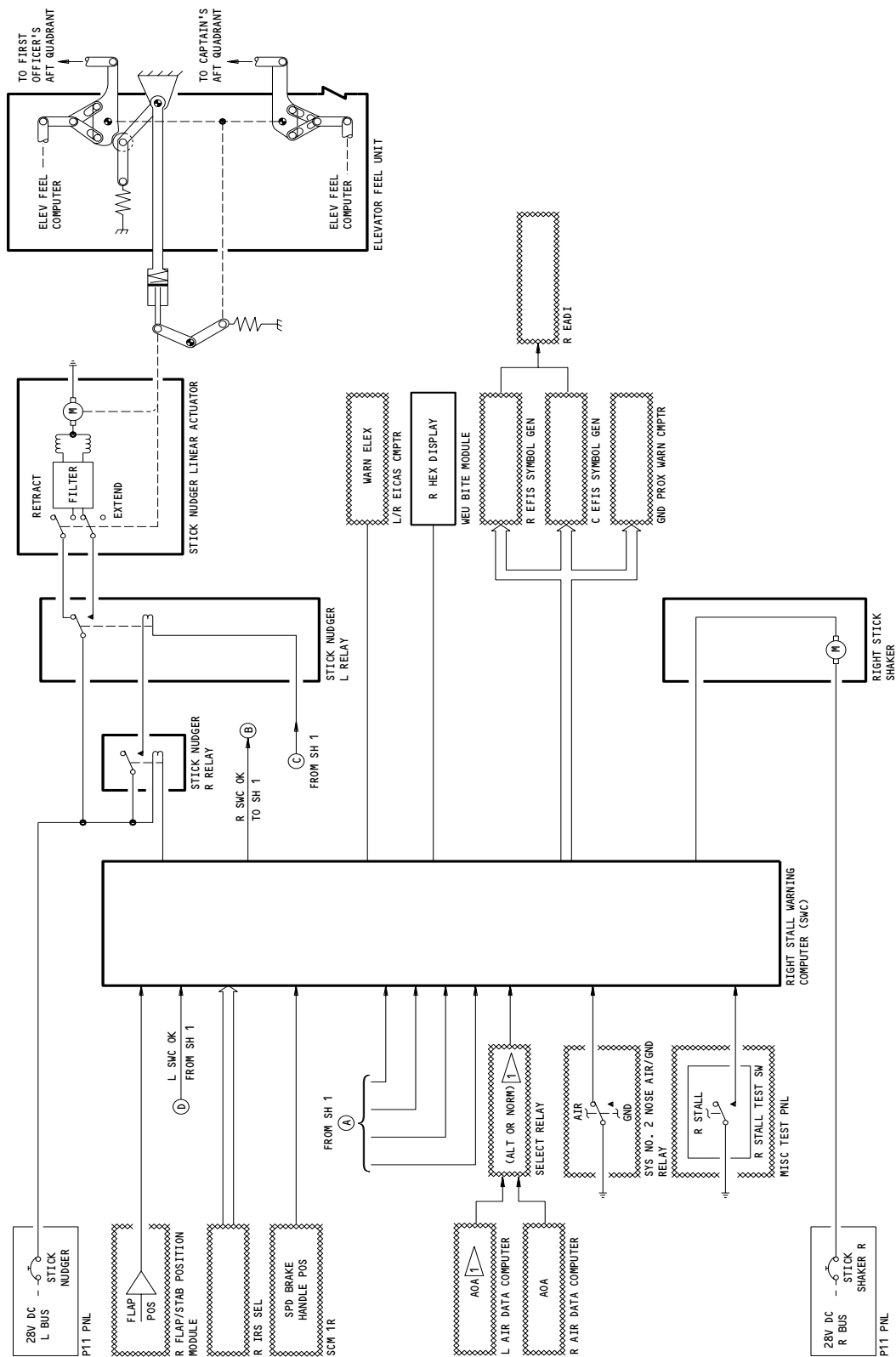
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Stall Warning System Schematic  
Figure 5 (Sheet 2)

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- (2) The BITE test is operable when the airplane is on the ground and the sign status matrix (SSM) associated with the IA0A ARINC 429 word from the ADC is indicating no computed data (NCD). The test is initiated by operating the STALL L or R test switches. The BITE checks the operation of the stick shakers, stick nudger, cross channel faults, and interface anomalies.

NOTE: If ADC test switch has been engaged the IA0A SSM will not return to NCD until the altimeter and airspeed indications (driven by the ADC test) have returned to zero. This will take at least 15 seconds. If Stall Test is run before the SSM returns to NCD, the hex indicators on the WEU BITE Module will display the interface anomaly code D8 (see below) after the STALL L (R) switch is released.

- (a) The WARN ELEX message will display continuously on EICAS during a BITE test. After the BITE test, the message will not display unless the stall warning system is not normal.
- (b) If the system is not normal, the BITE will display the code for the highest priority fault. Lower priority fault codes will be displayed in order of priority as higher priority faults are corrected. This process will continue until all faults are cleared, when the BITE will display only the airplane configuration and option installed.
- (c) If the system is normal, the stick shakers and stick nudger will operate during the BITE test.
- (d) During a BITE test, the two pairs of hex indicators will illuminate until the test switch is released. After release of test switch, the numeric value of the software version will display for approximately 1 second, followed by either the fault code or the configuration/option code.
- (e) The software version code uses only the numeric digit values between 01-09 and 80-99. This code represents only the software version configuration, and is independent from either the airplane configuration or the option selected.

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- (f) The configuration/option code shown on the WEU BITE display is a two-digit hexadecimal number which depends upon the airplane model (most significant digit) and the option(s) that it has (least significant digit).
  - (g) SAS 050-149;  
The LEFT (RIGHT) STALL hex display on the WEU BITE Module (P51) shows 37.
  - (h) SAS 150-999 AND MTH 275-999;  
The LEFT (RIGHT) STALL hex display on the WEU BITE Module (P51) shows 27.
- (3) Faults are identified by codes and categorized into internal faults and interface anomalies.
- (4) Internal faults are coded A0 thru C5, with code A0 having highest display priority. Table 1 lists internal faults in priority order and their most probable causes.

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TABLE 1

INTERNAL FAULT CODE *[1]	PROBABLE CAUSE
A0	More than one SWC failure
A1	Slats retracted input circuit on SWC
A2	Slats partially extended input circuit on SWC
A3	Slats fully extended input circuit on SWC
A4	Inbd slats retracting input circuit on SWC
A5	Inbd slats extending input circuit on SWC
A6	Outbd slats retracting input circuit on SWC
A7	Outbd slats extending input circuit on SWC
A9	Test
B0	Air/ground
B1	Gear down
B2	Opposite channel OK
B6	ARINC 429 input circuit on SWC
C0	Analog to digital converter on SWC
C1	Stick shaker output circuit on SWC
C2	Stick nudger output circuit on SWC
C4	EICAS status output circuit on SWC
C5	Channel OK output circuit on SWC

\*[1] Missing codes are not used.

- (5) Interface anomalies have a lower display priority than internal faults and will be displayed only after all internal faults are corrected. Interface anomaly codes range from D0 thru D9 plus code FX , with code D0 having the highest display priority. Table 2 lists interface anomalies in priority order, and their most probable causes.

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TABLE 2	
INTERFACE ANOMALY CODE *[1]	PROBABLE CAUSE
D0	Stick shaker inoperative due to invalid voltage at stick shaker interface
D1	Air data computer invalid
D2	Flap position invalid due to flap voltage out of tolerance
D3	Speedbrake invalid
D4	Multiple slat position inputs to SWC
D5	Loss of slat position input
D6	IRS word invalid
D7	FMC invalid
D8	Air/ground, AOA conflict
D9	Opposite channel fail
FX	Invalid configuration code

\*[1] Missing codes are not used.

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FAULT ISOLATION/MAINT MANUAL

STALL WARNING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKER -	1		FLT COMPT, P11	
LEFT STICK SHAKER, C1039		1	11C11	*
RIGHT STICK SHAKER, C1548		1	11J22	*
STICK NUDGER, C1024		1	11K10	*
COMPUTER - (FIM 31-41-00/101)				
LEFT EICAS, M10181				
RIGHT EICAS, M10182				
COMPUTER - (FIM 34-12-00/101)				
LEFT AIR DATA, M100				
RIGHT AIR DATA, M101				
DIODE - (FIM 27-58-00/101)				
ISOLATION, R183				
ISOLATION, R184				
GENERATOR - (FIM 34-22-00/101)				
CENTER EFIS SYMBOL, M149				
LEFT EFIS SYMBOL, M148				
RIGHT EFIS SYMBOL, M150				
INDICATOR - (FIM 34-22-00/101)				
LEFT ELEX ATT DIR (EADI) N4				
RIGHT ELEX ATT DIR (EADI) N44				
MODULE - (FIM 27-09-00/101)				
SPOILER CONTROL NO. 1R, M533				
SPOILER CONTROL NO. 2L, M531				
MODULE - (FIM 27-58-00/101)				
CENTER FLAP/STAB POSITION, M839				
RIGHT FLAP/STAB POSITION, M840				
MODULE - (FIM 31-51-00/101)				
POWER SUPPLY A, M616				
POWER SUPPLY B, M621				
MODULE - (FIM 32-09-03/101)				
PROXIMITY SWITCH ELECTRONICS UNIT (PSEU), M162				
MODULE - LEFT STALL WARNING, M615	2	1	119AL, MAIN EQUIP CTR	27-32-01
MODULE - RIGHT STALL WARNING, M938	2	1	119AL, MAIN EQUIP CTR	27-32-01
MODULE - WEU BITE, M1411	2	1	119AL, MAIN EQUIP CTR	27-32-02
NUDGER - STICK, M1139	3	1	313AL, ELEVATOR FEEL UNIT	27-32-07
PANEL - (FIM 30-32-00/101)				
MISCELLANEOUS TEST, M10398				
RELAY - (FIM 31-01-36/101)			119AL, MAIN EQUIP CTR, P36	*
LEFT IRS SEL, K511				*
LEFT STICK NUDGER, K760				*
RIGHT STICK NUDGER, K759				*
SYSTEM 1 AIR/GROUND, K170				*
RELAY - (FIM 31-01-37/101)			119AL, MAIN EQUIP CTR, P37	*
RIGHT IRS SEL, K510				*
SYSTEM 2 AIR/GROUND, K215				*

\* SEE THE WDM EQUIPMENT LIST

Stall Warning System - Component Index  
Figure 101 (Sheet 1)

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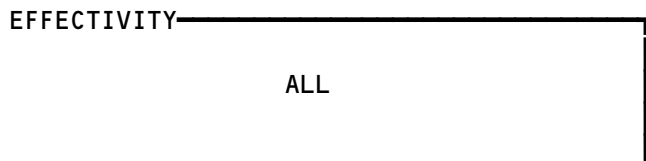
241950


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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
SHAKER - LEFT STICK, M240	1	1	113AL, FWD EQUIP CENTER	27-32-05
SHAKER - RIGHT STICK, M952	1	1	113AL, FWD EQUIP CENTER	27-32-05
SWITCH - LEFT STALL TEST, S1	1	1	FLT COMPT, P61, MISC TEST PNL, M10398	*
SWITCH - RIGHT STALL TEST, S2	1	1	FLT COMPT, P61, MISC TEST PNL, M10398	*
UNIT - (REF 27-31-00, FIG. 101) ELEVATOR FEEL				
UNIT - (REF 27-51-00, FIG. 101) FLAP/SLAT ELECTRONIC, M545				
UNIT - (REF 34-21-00, FIG. 101) CENTER INERTIAL REFERENCE, M160				
LEFT INERTIAL REFERENCE, M159				
RIGHT INERTIAL REFERENCE, M161				

\* SEE THE WDM EQUIPMENT LIST

Stall Warning System - Component Index  
Figure 101 (Sheet 2)

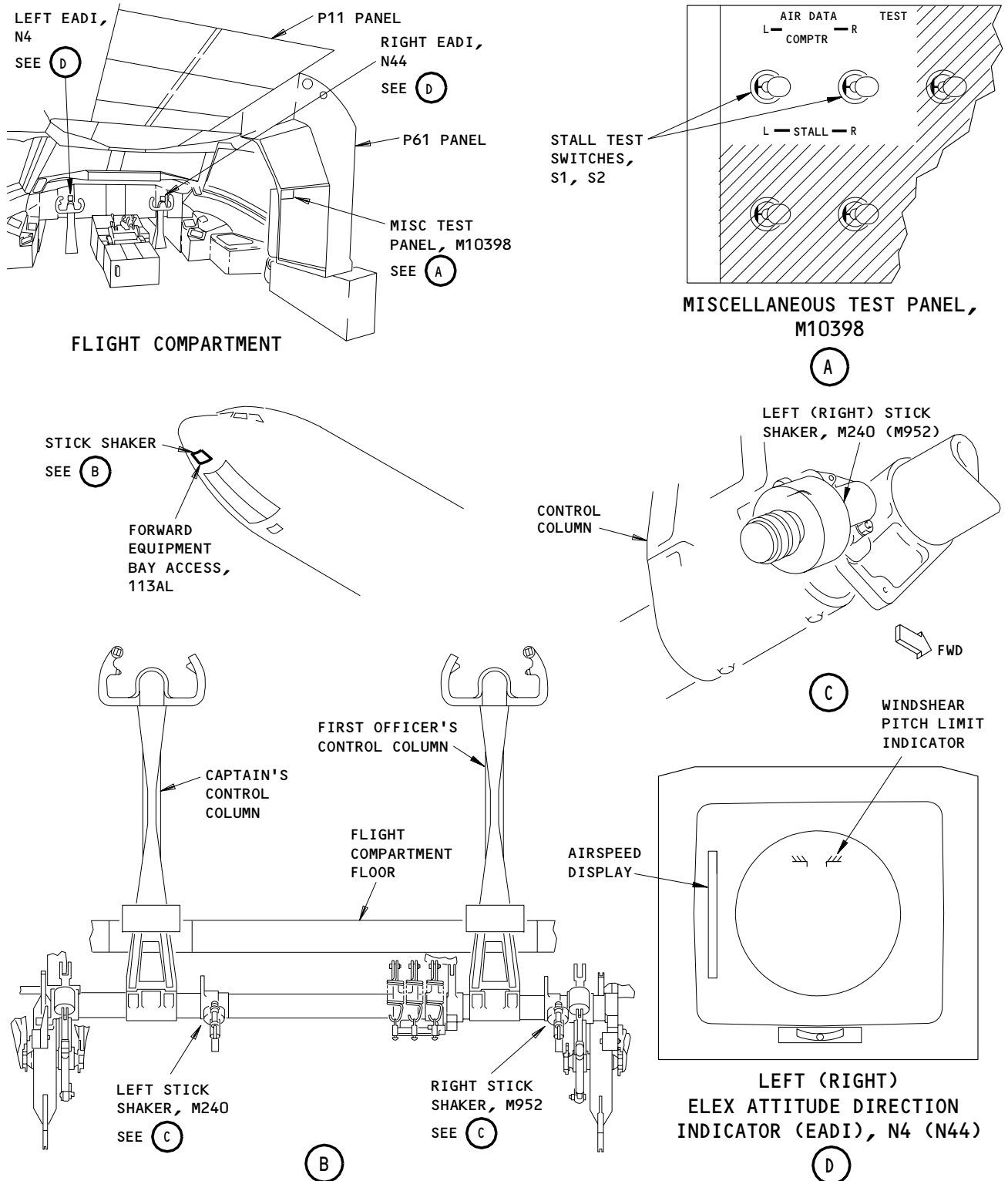


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# BOEING

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### FAULT ISOLATION/MAINT MANUAL



Stall Warning System - Component Location  
Figure 102 (Sheet 1)

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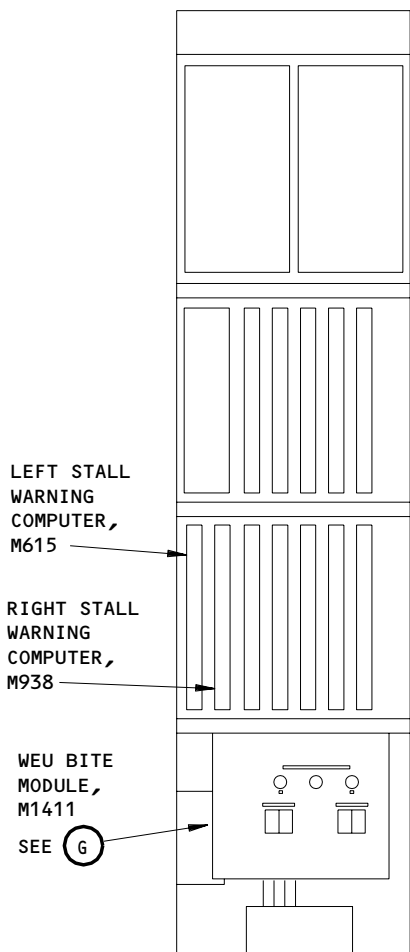
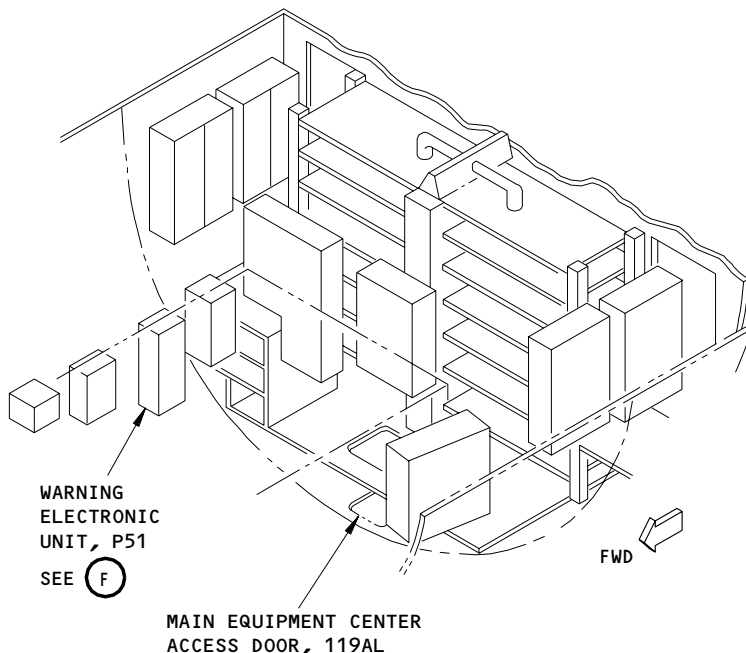
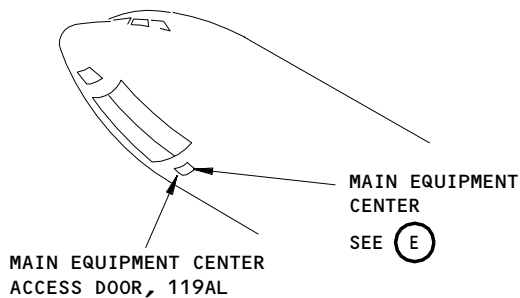
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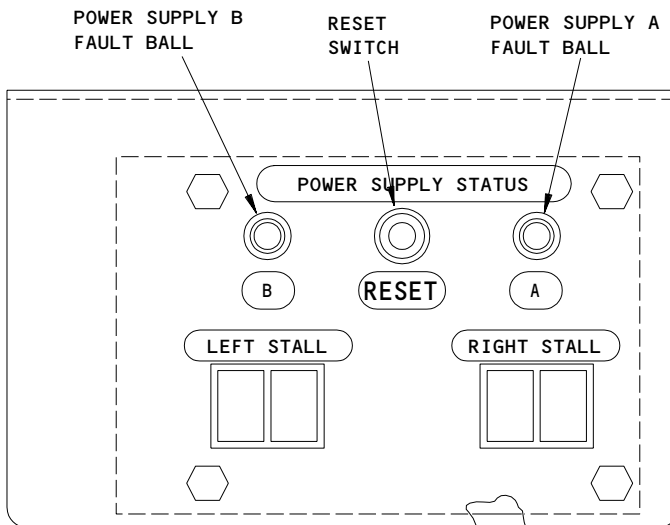


WARNING ELECTRONIC UNIT (WEU), P51

(F)

MAIN EQUIPMENT CENTER

(E)



WEU BITE MODULE, M1411

(G)

Stall Warning System - Component Location  
Figure 102 (Sheet 2)

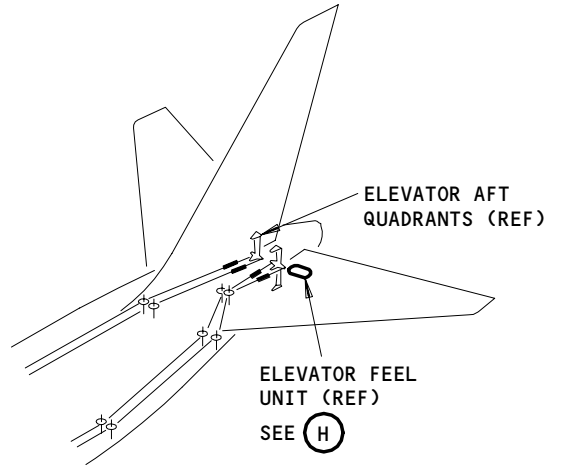
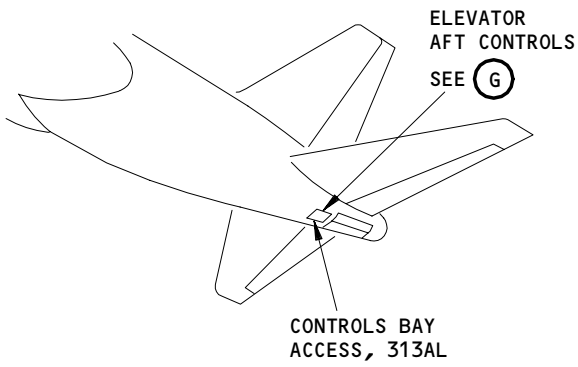
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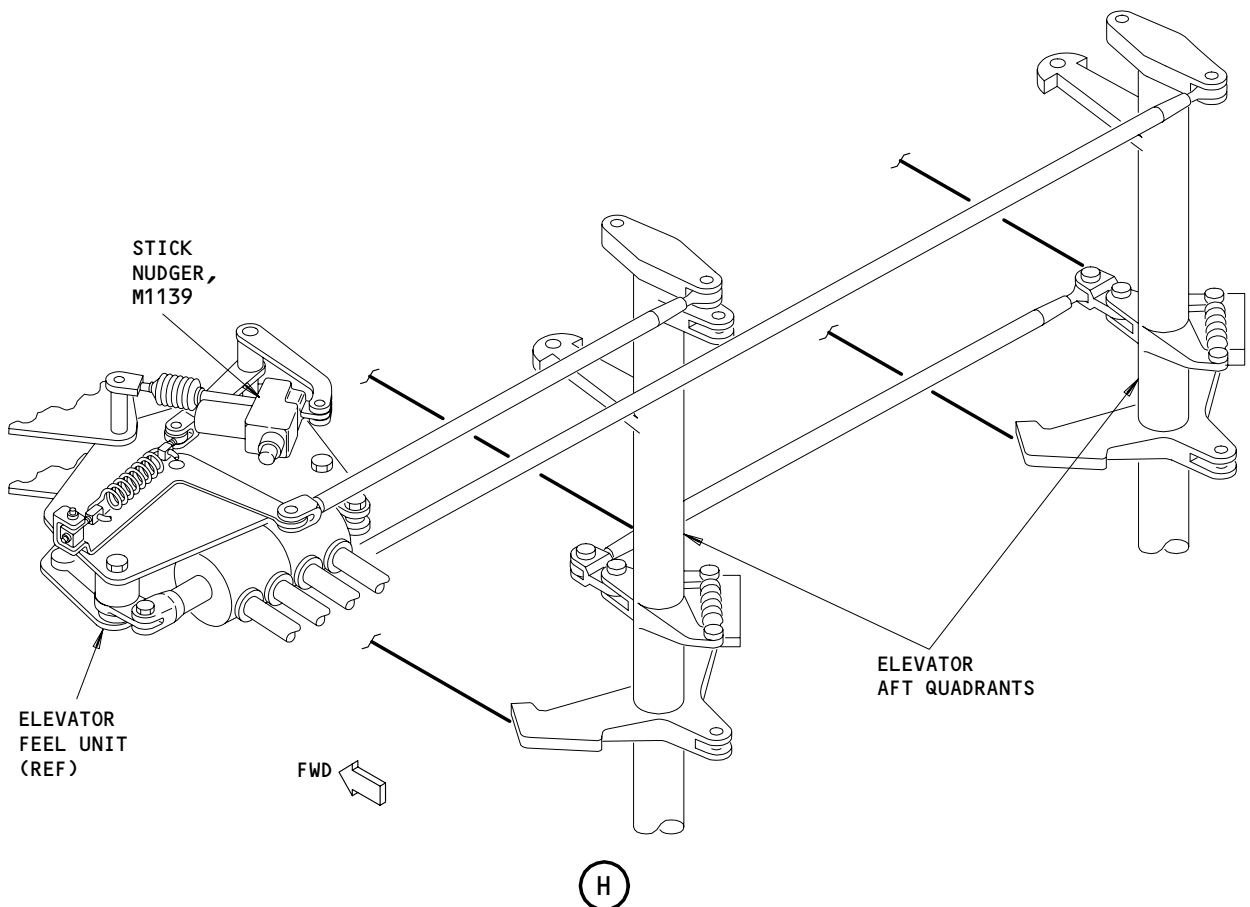
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(G)



(H)

Stall Warning System - Component Location  
Figure 102 (Sheet 3)

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STALL WARNING SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure gives an operational test and a system test of the stall warning system. There are no adjustments for the stall warning system.

TASK 27-32-00-715-004

2. Operational Test – Stall Warning System (Fig. 501, 502)

A. General

- (1) The operational test for the left and right stall warning computers (SWC) is the same. This test is written for the left SWC. When you test the right SWC, replace the left references with the right references in parentheses.

B. References

- (1) AMM 24-22-00/201, Electrical Power – Control  
(2) AMM 27-51-00/201, Trailing Edge Flap System  
(3) AMM 27-81-00/201, Leading Edge Slat System  
(4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(5) AMM 34-22-00/501, Electronic Flight Instrument System

C. Access

- (1) Location zones  
119 Main Equipment Center  
211/212 Flight Compartment
- (2) Access panel  
119AL Main Equipment Center

D. Prepare for the Operational Test

- S 865-007  
(1) Supply electrical power (AMM 24-22-00/201).
- S 865-127  
(2) Supply the center system hydraulic power (AMM 29-11-00/201).

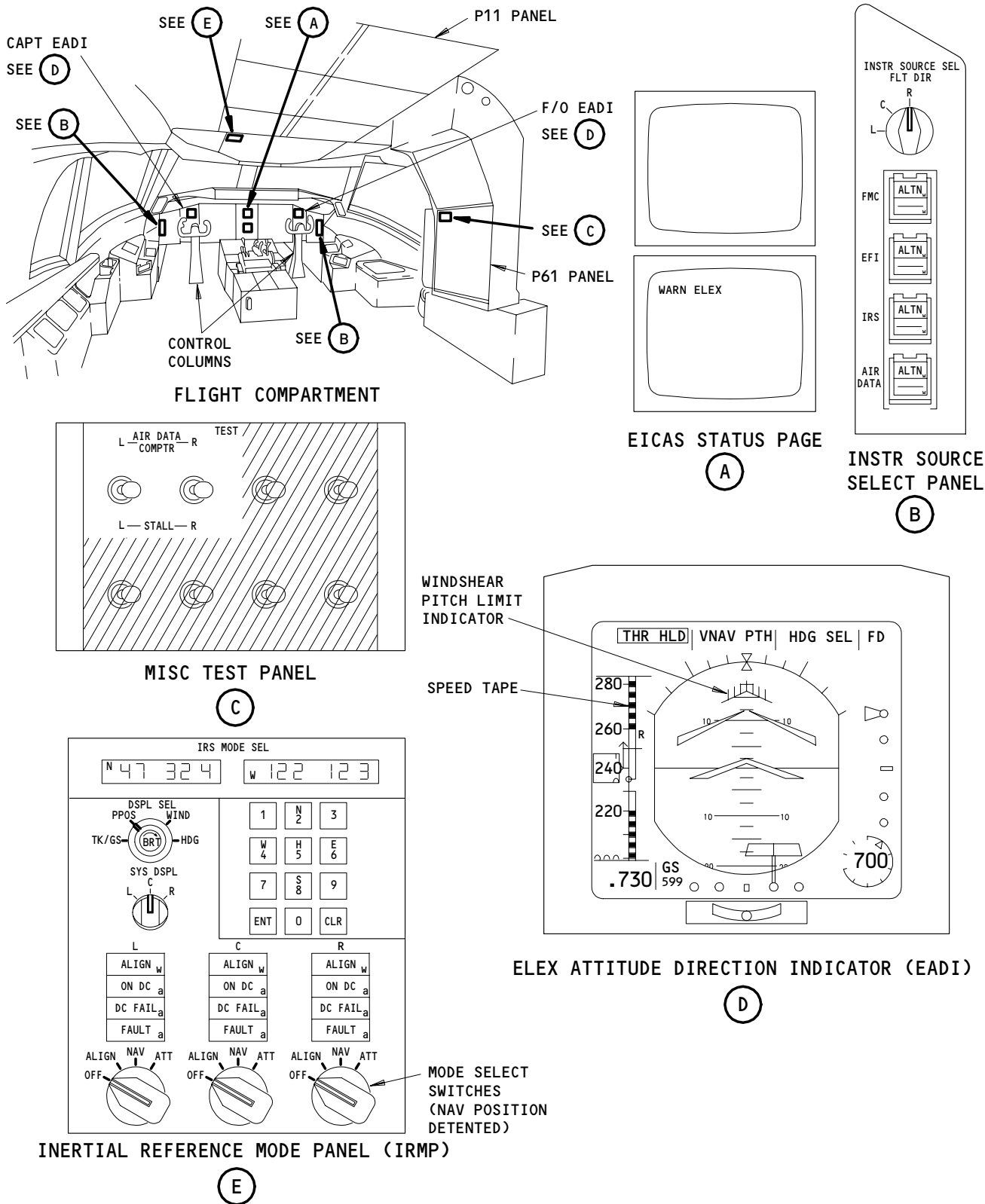
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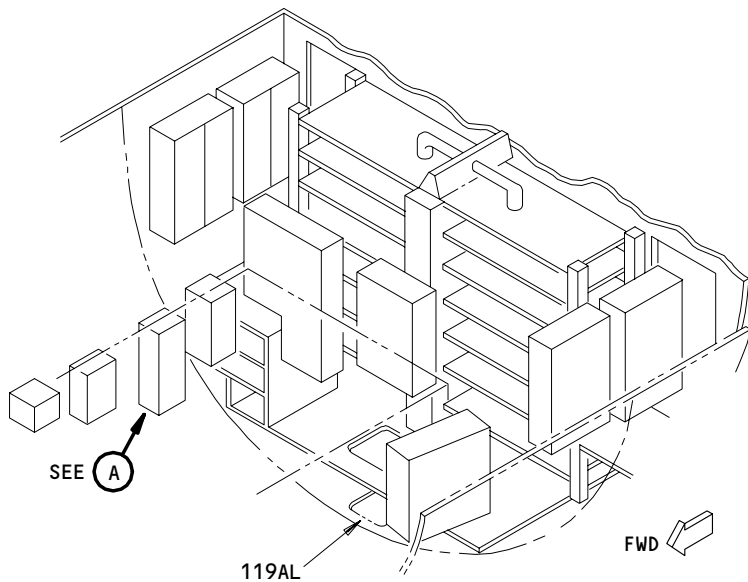
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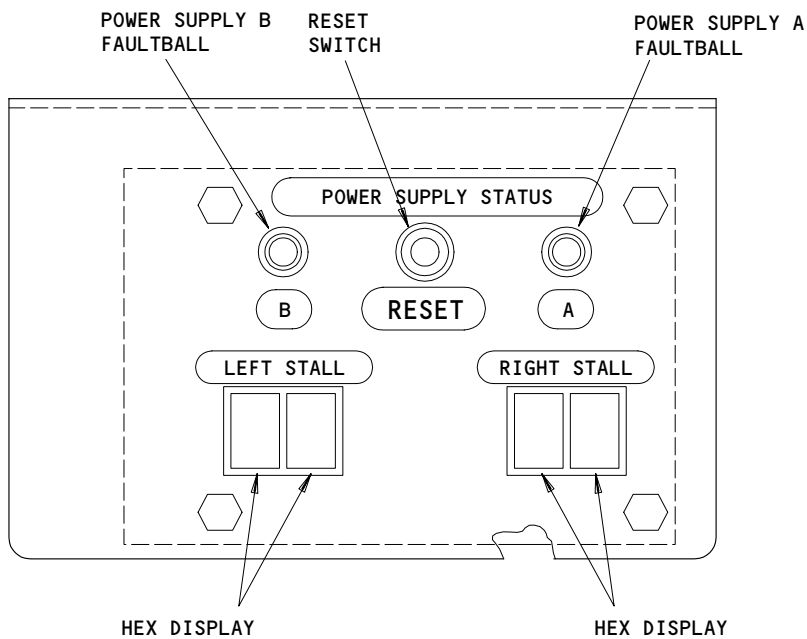
Stall Warning System Test  
Figure 501

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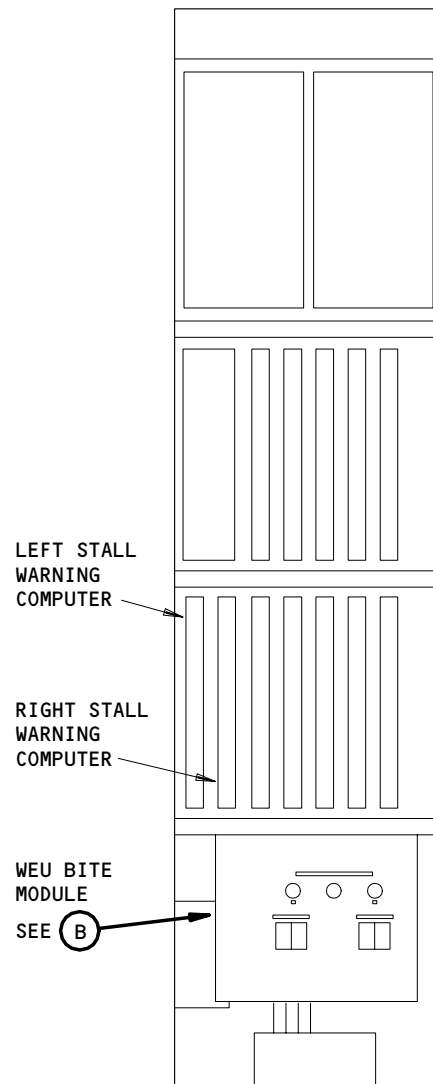


**MAIN EQUIPMENT CENTER**



**WEU BITE MODULE**

(B)



**WARNING ELECTRONIC UNIT (WEU) P51**

(A)

**Stall Warning System Test  
Figure 502**

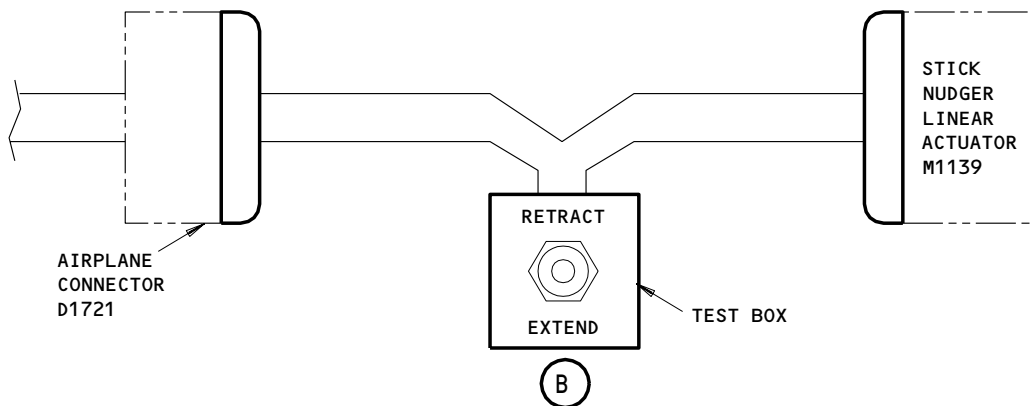
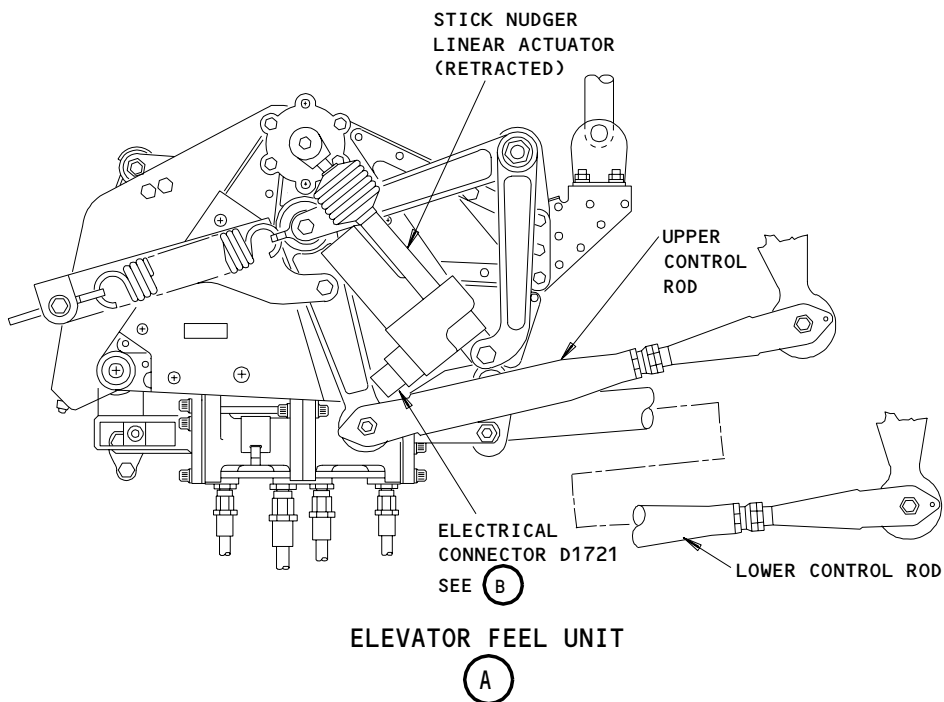
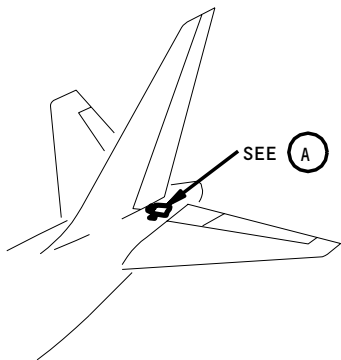
EFFECTIVITY	ALL
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Stick Nudger Adjustment/Test  
Figure 503

EFFECTIVITY	ALL
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S 285-009

- (3) Make sure that the trailing edge flaps and the leading edge slats are fully retracted (AMM 27-51-00/201 and AMM 27-81-00/201).

S 285-010

- (4) Make sure that the control columns are centered and are free to move.

S 285-013

- (5) Make sure that the IRS and EFI switches on the instrument source select panel, P1, (P3) are in normal (ALTN legend is not shown).

S 985-014

- (6) Make sure L, R, and C IRS mode select switches, on the inertial reference mode panel, P5, in the NAV position.

(a) Make sure that the Inertial Reference System is aligned (AMM 34-21-00/201).

S 285-199

- (7) Make sure the ECS/MSG display select switch, on the EICAS maintenance panel, P61, is selected.

E. Test the Stall Warning System Operation

S 015-131

- (1) Open the EE bay access panel 119AL to see the WEU BITE.

S 715-125

- (2) Push and hold the L (R) STALL test switch on side panel, P61.

S 285-016

- (3) Make sure that these actions occur:
- (a) The L (R) stick shaker operates.
  - (b) The Windshear Pitch Limit indicator (PLI) is shown on the L (R) EADI
  - (c) All segments on the LEFT (RIGHT) STALL hex display are lighted on the WEU BITE Module (P51), and fault code D9 is shown on the RIGHT (LEFT) STALL hex display.
  - (d) The EICAS status message WARN ELEX is shown.

S 985-017

- (4) Release the L (R) STALL test switch.

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S 285-018

- (5) Make sure that these actions occur:
- (a) The L (R) stick shaker stops.
  - (b) The PLI is not shown on the L (R) EADI.
  - (c) The EICAS message WARN ELEX is not shown.
  - (d) SAS 050-149;  
The LEFT (RIGHT) STALL hex display on the WEU BITE Module (P51) shows 37.
  - (e) SAS 150-999 AND MTH 275-999;  
The LEFT (RIGHT) STALL hex display on the WEU BITE Module (P51) shows 27.

F. Do the steps that follow for the flap position listed below.

S 865-149

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. OPERATION OF STALL WARNING TEST SWITCHES CAN CAUSE THE SLATS TO MOVE TO THEIR FULLY EXTENDED POSITION. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Put the flap lever in the 1-unit detent.

S 865-111

- (2) Hold down the L STALL (R STALL) TEST switch.

S 215-112

- (3) Make sure that the L (R) stick shaker operates.

S 865-113

- (4) Release the L STALL (R STALL) test switch.

S 215-114

- (5) Make sure that the L (R) stick shaker stops.

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- S 865-140
- (6) The Windshear Pitch Limit indicator (PLI) shows on the L (R) EADI at 15 degrees.
- S 865-115
- (7) Put the flap lever in the 25-unit detent.
- S 865-116
- (8) Hold down the L STALL (R STALL) test switch.
- S 215-117
- (9) Make sure that the L (R) stick shaker operates.
- S 865-118
- (10) Release the L STALL (R STALL) test switch.
- S 215-119
- (11) Make sure that the L (R) stick shaker stops.
- S 865-126
- (12) Put the flap lever to the 0 unit detent.
- G. Test the Stick Nudger Operation
- S 865-019
- (1) Push and hold the L and R STALL TEST switches on the P61 panel.
- S 285-020
- (2) After at least 5 seconds, make sure that these actions occur.
- (a) The L and R stick shakers operate.
- (b) The L and R control columns move forward and stay forward.
- S 985-021
- (3) Release the L STALL TEST switch.
- S 285-022
- (4) Make sure that these actions occur:
- (a) The two control columns return to the original, centered position.

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(b) The L stick shaker stops.

S 985-097

(5) Release R STALL TEST switch.

S 285-023

(6) Make sure that the R stick shaker stops.

H. Put the Airplane Back to Its Initial Condition.

S 865-128

(1) Remove hydraulic power if it is not necessary (AMM 29-11-00/201).

S 865-106

(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-32-00-735-025

3. System Test – Stall Warning System (Fig. 501 and 502)

A. Equipment

- (1) Data Bus Analyzer 429EB (Preferred)  
JcAIR Instrumentation  
400 Industrial Parkway  
Industrial Airport, KS 66031
- (2) Data Bus Analyzer 429-2 (Optional)  
Interface Technology  
150 E. Arrow Highway  
San Dimas, CA 91773
- (3) Cable-Stick Nudger Jumper – A27100-1
- (4) Service Platform, Control Bay Access Door –  
A51001-19

B. References

- (1) 06-42-00/201, Empennage (Major Zone 300) Access Doors and Panels
- (2) 24-22-00/201, Electrical Power – Control
- (3) 29-11-00/201, Pressurize/Depressurize Main Hydraulic System

C. Access

- (1) Location zones
  - 119 Main Equipment Center
  - 211/212 Flight Compartment
  - 313/314 Stabilizer Torsion Box Compartment

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- (2) Access panel
  - 119AL Main Equipment Center
  - 313AL Elevator Mechanical Linkages

D. Prepare for the System Test

S 715-026

- (1) Do the operational test for the stall warning system.

S 285-027

- (2) Make sure that the L, R, and C IRS ALIGN lights are off (mode select switches in the NAV position).

E. Test the System Power Supplies.

S 865-098

- (1) Open this circuit breaker on the P11 panel.
  - (a) 11J34, WARN ELEX A

S 285-028

- (2) Make sure that the EICAS message WARN ELEX is shown.

S 985-029

- (3) Push and hold the LEFT and RIGHT STALL TEST switches on the panel P61.

S 285-030

- (4) Make sure that these actions occur:
  - (a) The L and R control columns move forward.
  - (b) The L and R stick shakers operate.
  - (c) The Windshear PLI is shown on the L and R EADI.
  - (d) The EICAS message WARN ELEX is shown.
  - (e) All segments of the LEFT (RIGHT) STALL hex displays are lighted on the WEU BITE Module (P51).

S 865-031

- (5) Close this circuit breaker on the P11 panel:
  - (a) 11J34, WARN ELEX A

S 865-032

- (6) Open this circuit breaker on the P11 panel.
  - (a) 11B18, WARN ELEX B

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- S 285-107
- (7) Make sure that the stick shakers still operate and the control columns stay forward.
- S 985-033
- (8) Release the R STALL TEST switch.
- S 285-034
- (9) Make sure that these actions occur:
- (a) The two Control columns return to the center position.
  - (b) The R stick shaker stops.
  - (c) The Windshear PLI is not shown on the R EADI.
  - (d) All segments of the LEFT STALL hex display on the WEU BITE Module (P51) remain lighted and the RIGHT STALL hex display shows D9.
- S 985-035
- (10) Release the L STALL TEST switch.
- S 285-036
- (11) Make sure that these actions occur:
- (a) The L stick shaker stops.
  - (b) The Windshear PLI is not shown on L EADI.
  - (c) SAS 050-149;  
The LEFT (RIGHT) STALL hex display on the WEU BITE Module (P51) shows 37.
  - (d) SAS 150-999 AND MTH 275-999;  
The LEFT (RIGHT) STALL hex display on the WEU BITE Module (P51) shows 27.
- S 865-037
- (12) Close this circuit breaker on the P11 panel:
- (a) 11B18, WARN ELEX B
- S 285-102
- (13) Make sure that the EICAS message WARN ELEX is not shown.
- F. Test WEU BITE Module Fault Code Display
- S 865-039
- (1) Open this circuit breaker on the P11 panel:
- (a) 11C11, STICK SHAKER L  
(11J22, STICK SHAKER R)
- S 285-038
- (2) Make sure that the LEFT (RIGHT) STALL hex display on WEU BITE Module (P51) shows fault code D0, then close the circuit breaker.

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- S 865-099
- (3) Open this circuit breaker on the P11 panel:
- (a) 11A10, AIR DATA CMPTR L  
(11F30, AIR DATA CMPTR R)
- S 285-040
- (4) Make sure that the LEFT (RIGHT) STALL hex display on WEU BITE Module (P51) shows fault code D1, then close the circuit breaker.
- S 865-123
- (5) Open this circuit breaker on the P11 panel:
- (a) 11C14, FLAP/STAB POS SENSING CENTER  
(11J26, FLAP/STAB POS SENSING R)
- S 285-041
- (6) Make sure that the LEFT (RIGHT) STALL hex display on WEU BITE Module (P51) shows fault code D2, then close the circuit breaker.
- S 865-042
- (7) Open these circuit breakers on the P11 panel:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) (11G17, FLT CONT ELEC 1R AC)
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) (11G26, FLT CONT ELEC 2R AC)
  - (e) 11C7, FLT CONT ELEC 1L DC
  - (f) (11G18, FLT CONT ELEC 1R DC)
  - (g) 11C9, FLT CONT ELEC 2L DC
  - (h) (11G27, FLT CONT ELEC 2R DC)
- S 285-043
- (8) Make sure the LEFT (RIGHT) STALL hex display on the WEU BITE Module (P51) shows the fault code D3, and then close the circuit breakers that you opened on the P11 panel.
- S 985-044
- (9) Put the L(R) and C IRS MODE SELECT switches in the OFF position.
- S 285-045
- (10) Make sure that the LEFT (RIGHT) STALL hex display on WEU BITE Module (P51) shows fault code D6.
- S 985-046
- (11) Push the left (right) IRS ALTN switches (ALTN legend is shown).

**NOTE:** Put only one IRS mode select switch in the ALTN mode at any one time.

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S 985-047

- (12) Stop until the center IRS ALIGN light is OFF, then set the center IRS MODE SELECT switch to the NAV position.

S 285-104

- (13) Make sure this action occurs:
- (a) SAS 050-149;  
The LEFT (RIGHT) STALL hex display on the WEU BITE Module (P51) shows 37.
  - (b) SAS 150-999 AND MTH 275-999;  
The LEFT (RIGHT) STALL hex display on the WEU BITE Module (P51) shows 27.

S 985-058

- (14) Put the left and right IRS ALTN switches in the normal position (ALTN legend is not shown).

S 285-059

- (15) Make sure that the LEFT (RIGHT) STALL hex displays on the WEU BITE Module (P51) shows fault code D6.

S 985-060

- (16) Stop until the left (right) IRS ALIGN light is OFF, then put the L(R) IRS MODE SELECT switches in the NAV position.

S 285-121

- (17) Make sure this action occurs:
- (a) SAS 050-149;  
The LEFT (RIGHT) STALL hex display on the WEU BITE Module (P51) shows 37.
  - (b) SAS 150-999 AND MTH 275-999;  
The LEFT (RIGHT) STALL hex display on the WEU BITE Module (P51) shows 27.

S 485-122

- (18) To test the LEFT (RIGHT) WEU Stall Warning system Air/Ground discretes, attach probe A of ARINC 429 data/bus reader to Burndy block H106 (H156), TB119 on E1-5 shelf and attach probe B to Burndy block H108 (H158), TB119 on E1-5 shelf and set the receiver to decode label 270.

S 285-070

- (19) Make sure that Bit 14 = 1 and Bit 15 = 0.

S 865-071

- (20) Open this circuit breaker on the P11 panel.
- (a) 11U15, LANDING GEAR AIR/GND SYS 1  
(11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT, and  
11U23 or 11U24, LANDING GEAR POSITION AIR/GND SYS 2)

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S 285-100

- (21) Make sure that bit 15 = 1.

S 865-072

- (22) For the LEFT and the RIGHT system, open this circuit breaker on the P11 panel:  
(a) 11C30, LANDING GEAR POSITION AIR/GND SYS 1

S 865-105

- (23) For the LEFT system only, open this (these) circuit breaker(s) on the P11 panel:  
(a) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT  
(b) 11U23 or 11U24, LANDING GEAR POSITION AIR/GND SYS 2

S 285-120

- (24) Make sure that bit 14 = 0.

S 865-073

- (25) Close these circuit breakers on the P11 panel:  
(a) 11C6, FLT CONT ELEC 1L AC  
(b) 1 (11G17, FLT CONT ELEC 1R AC)  
(c) 11C8, FLT CONT ELEC 2L AC  
(d) (11G26, FLT CONT ELEC 2R AC)  
(e) 11C7, FLT CONT ELEC 1L DC  
(f) (11G18, FLT CONT ELEC 1R DC)  
(g) 11C9, FLT CONT ELEC 2L DC  
(h) (11G27, FLT CONT ELEC 2R DC)  
(i) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT  
(j) 11C30, LANDING GEAR POSITION AIR/GND SYS 1  
(k) 11U15, LANDING GEAR AIR/GND SYS 1  
(l) 11U23 or 11U24, LANDING GEAR POSITION AIR/GND SYS 2

S 865-001

- (26) Open and then close this circuit breaker on the P11 panel:  
(a) 11J34, WARN ELEX A

S 285-002

- (27) Make sure that bit 11=0 when the CB is closed and then changes to 1.

**NOTE:** The condition of bit 11 must be monitored the instant the circuit breaker is closed since bit 11=0 will be shown for less than one second.

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S 985-101

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO A PERSON OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(28) To test the slat position discretes, set the data bus analyzer to decode label 271. Monitor bits 14 through 20 for each flap action or condition shown in Table 501. Table 501 also shows the condition of each bit for each flap action or condition.

Table 501								
ACTION/CONDITION	LABEL 271, BIT NUMBER							NOTES
	20	19	18	17	16	15	14	
FLAPS UP	1	0	0	0	0	0	0	LE SLATS RETRACTED
FLAPS 1 UNIT DETENT	0	1	0	0	0	0	0	LE SLATS PARTIALLY EXTENDED
FLAPS 25 UNIT DETENT (MOTION FROM 1)	0	0	0	0	1	0	1	ONLY WHEN FLAPS ARE EXTENDING, BITS 14 and 16 SET = 1
FLAPS 25 UNIT DETENT (AT REST)	0	0	1	0	0	0	0	LE SLATS FULLY EXTENDED
FLAPS UP (MOTION TO 0 DEGREES)	0	0	0	1	0	1	0	ONLY WHEN FLAPS ARE RETRACTING, BITS 15 AND 17 SET = 1

S 865-074

(29) Open and then close this circuit breaker on the P11 panel.  
(a) 11B18, WARN ELEX B

S 285-075

(30) Make sure that bit 29 = 0 when the CB is first closed and then changes to 1.

**NOTE:** The condition of bit 29 must be monitored the instant the circuit breaker is closed since bit 29=0 will be shown for less than one second.

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S 085-076

(31) Disconnect ARINC 429 data bus reader.

G. Test the Stick Nudger

S 015-003

**WARNING:** STAY OFF THE ACCESS DOOR, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

(1) Open the access door, 313AL (Ref 06-42-00/201).

S 945-078

(2) Cover the access door, 313AL, with service platform (Ref 06-42-00).

S 035-079

(3) Disconnect the Stick Nudger Actuator connector, D1721.

S 495-080

(4) Connect the Stick Nudger Jumper Cable as shown in Fig. 503.

S 985-081

(5) Put the jumper cable switch in the retract position.

S 285-082

(6) Make sure that the stick nudger actuator is in the retracted position.

S 985-083

(7) Put the jumper cable switch in the extend position.

S 285-084

(8) Make sure that the time to fully extend the stick nudger actuator is  $5.6 \pm 0.6$  seconds.

S 985-085

(9) Put the jumper cable switch in the retract position.

S 285-086

(10) Make sure that the time to fully retract the stick nudger actuator is  $5.6 \pm 0.6$  seconds.

S 095-087

(11) Disconnect the stick nudger jumper cable.

S 435-088

(12) Connect the stick nudger actuator connector D1721.

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S 985-089

- (13) Push and hold the LEFT and RIGHT STALL WARNING TEST switches together for a minimum of 5 seconds.

S 285-090

- (14) Make sure that the two control columns move forward and stay forward.

NOTE: There may be a slight pause before the control columns move forward after the stick shaker is activated.

S 985-091

- (15) Release the LEFT and RIGHT STALL WARNING TEST switches.

S 285-092

- (16) Make sure that the two control columns return to their normal position.

H. Put the Airplane Back to Its Initial Condition

S 865-093

- (1) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 945-094

- (2) Remove the service platform.

S 415-095

- (3) Close the access door, 313AL (AMM 06-42-00/201).

S 865-096

- (4) Remove electrical power if it is necessary (AMM 24-22-00/201).

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ALL

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STALL WARNING MODULE – REMOVAL/INSTALLATION

1. General

- A. The left and right stall warning modules are in the warning electronics unit (WEU) panel, P51. The P51 panel is in the main electronics bay on the right hand side of wheel well. The removal/installation procedures for the left and right stall warning modules are the same.

TASK 27-32-01-024-001

2. Remove the Stall Warning Module (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, Electrical Power – Control

B. Access

- (1) Location Zones
  - 119/120 Main Equipment Center
  - 211/212 Flight Compartment
- (2) Access Panel
  - 119AL Main Equipment Center

C. Prepare for Removal

S 014-004

- (1) Open the access door, 119AL (Ref 06-41-00).

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) or move all persons and equipment away from the spoiler panels.

S 864-005

- (3) Remove electrical power (AMM 24-22-00).

S 864-006

- (4) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11B18, WARN ELEX B
  - (b) 11J34, WARN ELEX A

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D. Procedure

S 864-031

**CAUTION:** DO NOT TOUCH THE STALL WARNING MODULE BEFORE YOU DO THE PROCEDURE FOR ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (AMM 20-41-01). ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE STALL WARNING MODULE.

- (1) Do the procedure for electrostatic discharge sensitive devices (AMM 20-41-01).

S 014-007

- (2) Open the WEU access door.

S 024-015

- (3) Remove the stall warning module by lifting the two card extractors and sliding module out of the card guides (AMM 20-10-01).

TASK 27-32-01-424-016

3. Install the Stall Warning Module (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, Electrical Power - Control
- (5) AMM 27-32-00/501, Stall Warning System

B. Access

- (1) Location Zones

119/120	Main Equipment Center
211/212	Flight Compartment
- (2) Access Panel

119AL	Main Equipment Center
-------	-----------------------

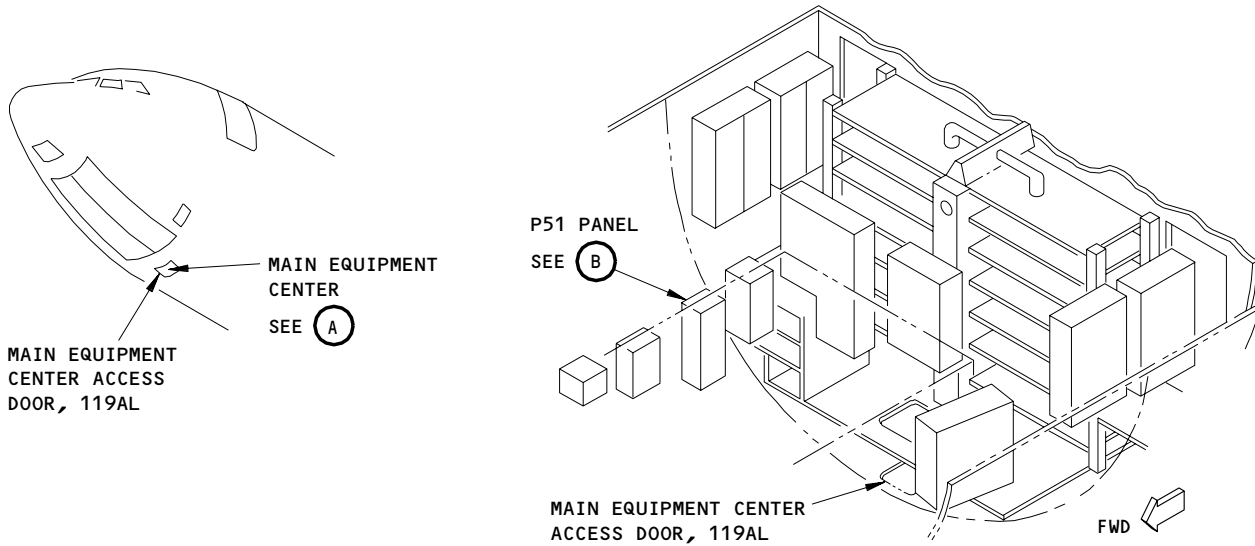
EFFECTIVITY

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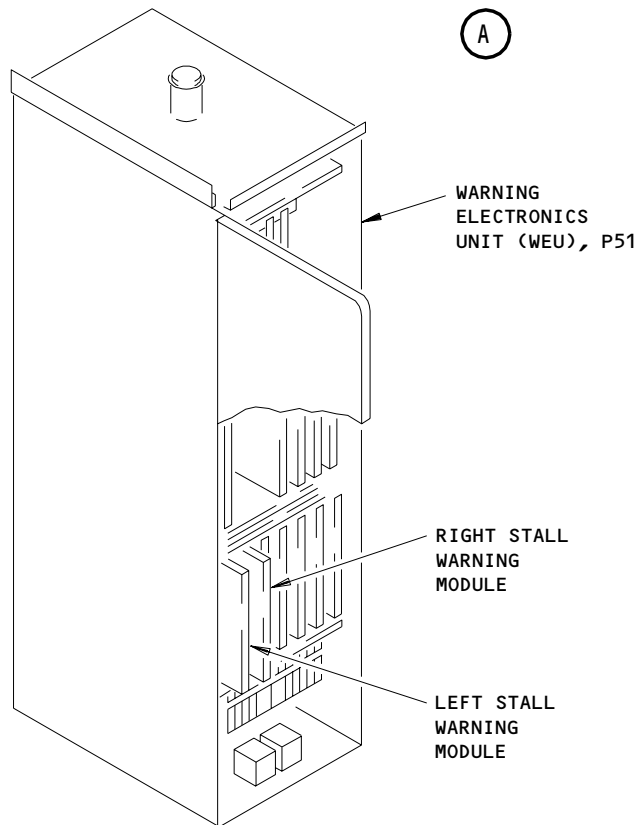
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**MAIN EQUIPMENT CENTER**



(B)

Stall Warning Module Installation  
Figure 401

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C. Procedure

S 284-017

- (1) Make sure that these circuit breakers on the overhead circuit breaker panel, P11, are open and DO-NOT-CLOSE tags are attached.
  - (a) 11B18, WARN ELEX B
  - (b) 11J34, WARN ELEX A

S 864-003

**CAUTION:** DO NOT TOUCH THE STALL WARNING MODULE BEFORE YOU DO THE PROCEDURE FOR ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (AMM 20-41-01). ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE STALL WARNING MODULE.

- (2) Do the procedure for electrostatic discharge sensitive devices (AMM 20-41-01).

S 424-018

- (3) Slide the stall warning module into the card guides until the connector is engaged. Then close the locking extractors.

S 864-026

- (4) Close the WEU access door and lock the quarter-turn fasteners.

S 864-027

- (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11B18, WARN ELEX B
  - (b) 11J34, WARN ELEX A

D. Test stall warning module.

S 714-036

- (1) Do this test: Operational Test - Stall Warning System (AMM 27-32-00/501).

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WARNING ELECTRONIC UNIT (WEU) BITE MODULE – REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

- (1) A removal for the WEU BITE Module.
- (2) An installation for the WEU BITE Module.

TASK 27-32-02-044-018

2. Remove the WEU BITE Module (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, Electrical Power – Control
- (4) 27-32-00/501, Stall Warning System
- (5) 27-61-00/201, Spoiler/Speedbrake Control System

B. Access

- (1) Location Zones
  - 119/120 Main Equipment Center
  - 211/212 Flight Compartment

- (2) Access Panel
  - 119AL Main Equipment Center

C. Prepare for Removal

S 014-002

- (1) Open the access door, 119AL (Ref 06-41-00).

S 864-016

**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 (Ref 27-61-00) or move all persons and equipment away from the spoiler panels.

S 864-003

- (3) Remove electrical power (Ref 24-22-00)

S 864-004

- (4) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11B18, WARN ELEX B
  - (b) 11J34, WARN ELEX A

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D. Procedure

S 864-005

**CAUTION:** DO NOT TOUCH THE STALL WARNING MODULE BEFORE YOU DO THE PROCEDURE FOR ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (AMM 20-41-01). ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE STALL WARNING MODULE.

- (1) Do the procedure for electrostatic discharge sensitive devices (Ref 20-41-01).

S 014-006

- (2) Open the WEU access door.

S 034-007

- (3) Remove the three fasteners that hold the module bracket to support the structure.

S 024-008

- (4) Disengage the module from the wire bundle connector, and remove the module.

TASK 27-32-02-404-017

3. Install the WEU BITE Module (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, Electrical Power - Control
- (4) 27-32-00/501, Stall Warning System
- (5) 27-61-00/201, Spoiler/Speedbrake Control System

B. Access

- (1) Location Zones
  - 119/120 Main Equipment Center
  - 211/212 Flight Compartment
- (2) Access Panel
  - 119AL Main Equipment Center

C. Procedure

S 864-009

**CAUTION:** DO NOT TOUCH THE STALL WARNING MODULE BEFORE YOU DO THE PROCEDURE FOR ELECTROSTATIC DISCHARGE SENSITIVE DEVICES (AMM 20-41-01). ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE STALL WARNING MODULE.

- (1) Do the procedure for electrostatic discharge sensitive devices (AMM 20-41-01).

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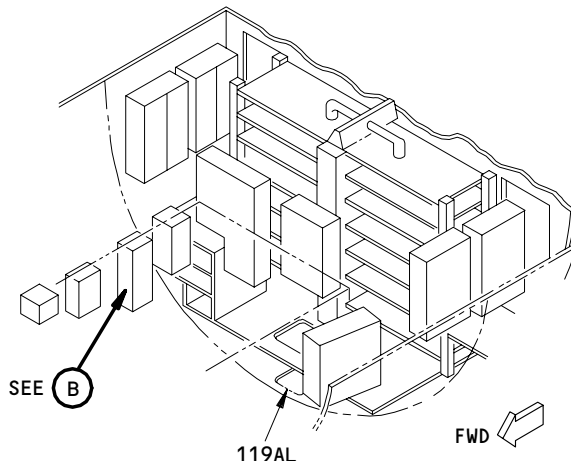
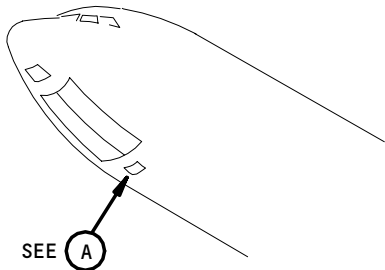
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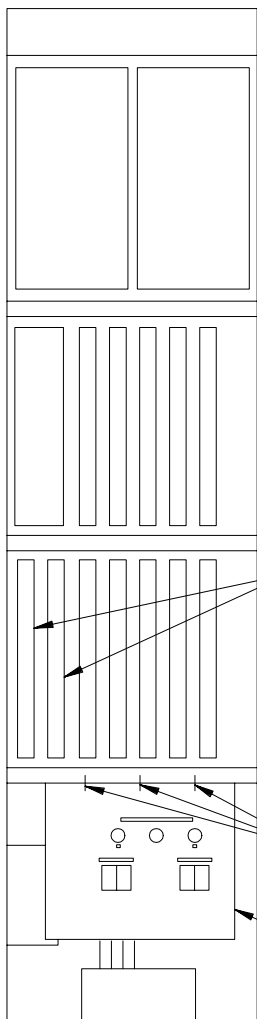
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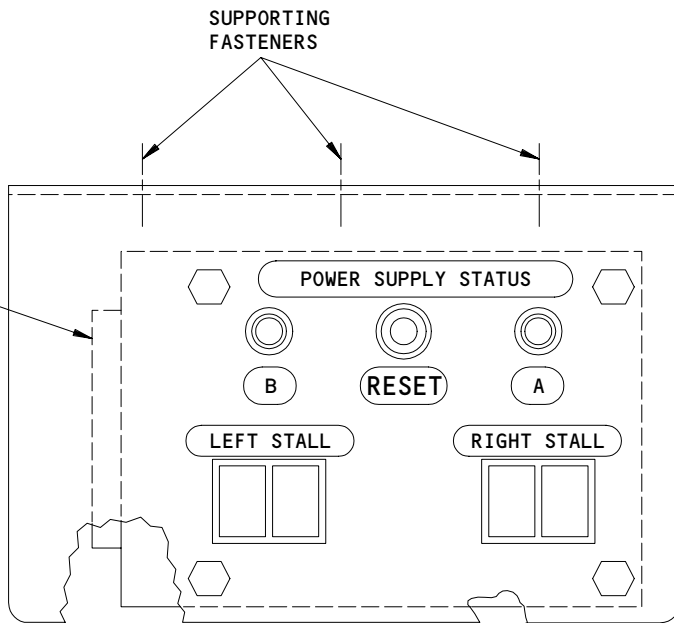
MAIN EQUIPMENT CENTER

(A)



WARNING ELECTRONIC UNIT (WEU), P51

(B)



(C)

WEU BITE Module Installation  
Figure 401

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- S 424-010
- (2) Engage the module to the wire bundle connector, and secure the jackscrew.
- S 434-011
- (3) Install the three fasteners that hold the module to the support structure.
- S 414-012
- (4) Close the WEU access door.
- S 864-013
- (5) Remove DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11B18, WARN ELEX B
  - (b) 11J34, WARN ELEX A
- S 714-014
- (6) Test the stall warning computer (Ref 27-32-00/501).
- S 414-015
- (7) Close the access door, 119AL (Ref 06-41-00).

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CONTROL COLUMN SHAKER – REMOVAL/INSTALLATION

TASK 27-32-05-024-002

1. Remove the Control Column Shaker (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 27-51-00/201, Trailing Edge Flap System
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (5) AMM 27-81-00/201, Leading Edge Slat System
- (6) AMM 34-22-00/501, Electronic Flight Instrument System

B. Access

(1) Location Zones

- |         |                                |
|---------|--------------------------------|
| 113/114 | Area Forward of NLG Wheel Well |
| 119/120 | Main Equipment Center          |
| 211/212 | Flight Compartment             |

(2) Access Panels

- |       |                       |
|-------|-----------------------|
| 113AL | Forward Equipment Bay |
| 119AL | Main Equipment Center |

C. Prepare for 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 (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

S 864-034

- (2) Remove electrical power (AMM 24-22-00/201).

S 864-003

- (3) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11C11, STICK SHAKER L
  - (b) 11J22, STICK SHAKER R

S 984-004

- (4) Hold the control columns in the neutral position and tag.

S 014-005

- (5) Open the access door, 113AL (AMM 06-41-00/201).

S 034-006

- (6) Disconnect the electrical connector from the shaker unit.

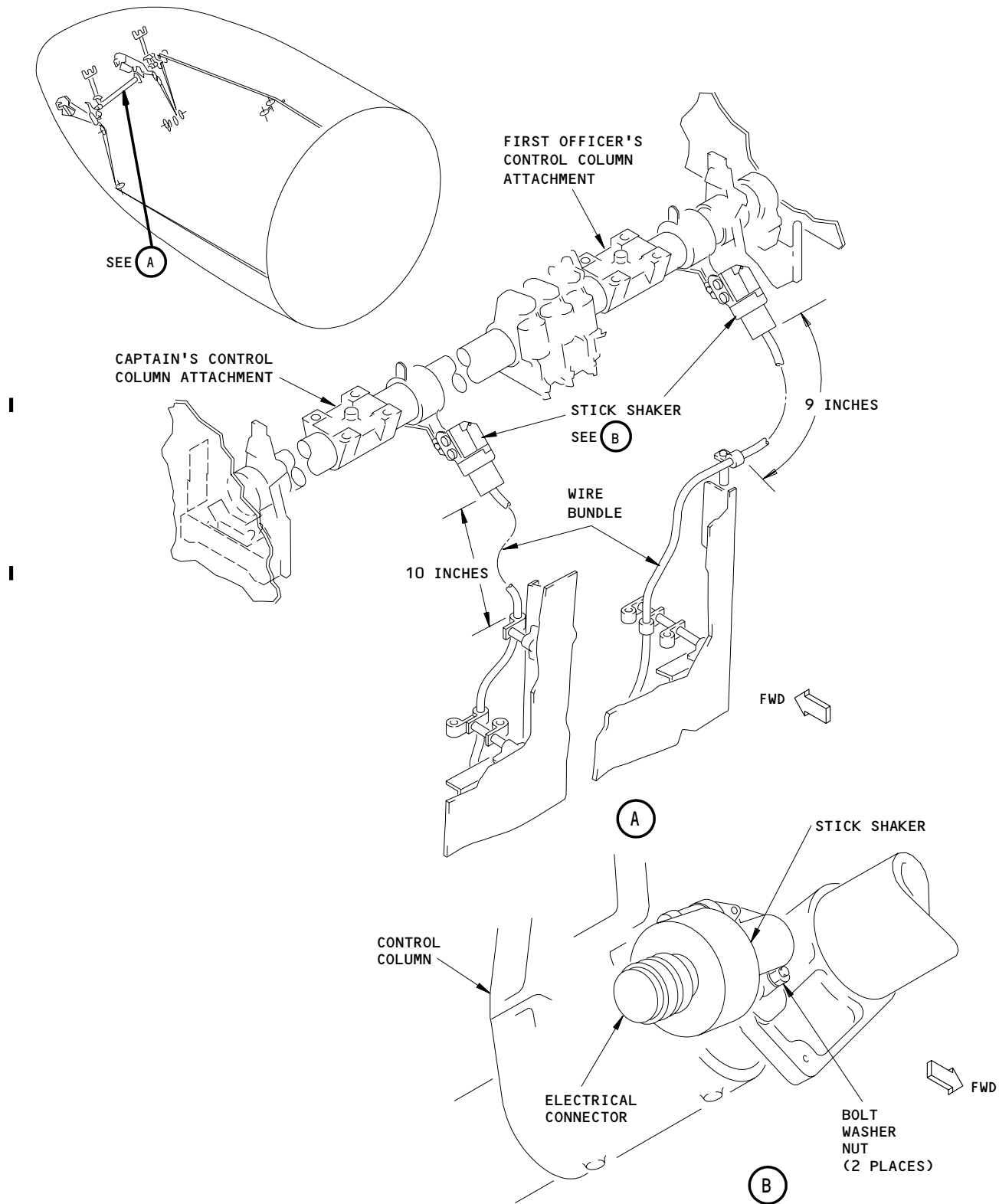
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Control Column Shaker Installation  
Figure 401

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S 034-007

- (7) Remove the nuts, washers, and bolts that hold the shaker unit to the torque tube bracket and remove the shaker.

TASK 27-32-05-424-008

2. Install the Control Column Shaker (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 27-51-00/201, Trailing Edge Flap System
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (5) AMM 27-81-00/201, Leading Edge Slat System
- (6) AMM 34-22-00/501, Electronic Flight Instrument System

B. Access

(1) Location Zones

113/114	Area Forward of NLG Wheel Well
119/120	Main Equipment Center
211/212	Flight Compartment

(2) Access Panels

113AL	Forward Equipment Bay
119AL	Main Equipment Center

C. Procedure

S 984-009

- (1) Put the shaker unit up to the torque tube bracket.

S 434-010

- (2) Install the bolts, washers, and nuts.

S 434-032

- (3) Connect the electrical connector to the receptacle on the shaker unit.

**NOTE:** Make sure that the stick shaker wire bundles have sufficient length between the connector and the last clamp point.

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- S 824-012
- (4) Adjust the wire bundle length as required (Fig. 401).
- S 864-013
- (5) Remove the DO-NOT-CLOSE tag and close these circuit breakers on the P11 panel.
- (a) 11C11, STICK SHAKER L
- (b) 11J22, STICK SHAKER R
- S 984-014
- (6) Release the control columns and remove the tags.
- D. Test the control column shaker
- S 864-017
- (1) Supply electrical power (AMM 24-22-00/201).
- S 284-018
- (2) Make sure that the trailing edge flaps and the leading edge slats are fully retracted (AMM 27-51-00/201 and AMM 27-81-00/201).
- S 984-027
- (3) Put the L, R, and C IRS mode select switches, on the inertial reference mode panel, P5, in the NAV position.
- S 984-028
- (4) Push and hold the L (R) STALL TEST switch on the side panel, P61.
- S 284-029
- (5) Make sure that the L (R) stick shaker operates.
- E. Put the airplane back to its initial condition.
- S 414-030
- (1) Close the access door.
- S 444-042
- (2) If deactivated, do the activation procedure for the spoilers (AMM 27-61-00/201).
- S 864-031
- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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STICK NUDGER - REMOVAL/INSTALLATION

TASK 27-32-07-024-008

1. Remove the Stick Nudger (Fig. 401)

A. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 27-51-00/201, Trailing Edge Flap System
- (4) 27-81-00/201, Leading Edge Slat System
- (5) 29-11-00/201, Pressurize/Depressurize Main Hydraulic System
- (6) 34-22-00/501, Electronic Flight Instrument System

B. Access

(1) Location Zones

- |         |                                    |
|---------|------------------------------------|
| 119/120 | Main Equipment Center              |
| 211/212 | Flight Compartment                 |
| 313/314 | Stabilizer Torsion Box Compartment |

(2) Access Panels

- |       |                              |
|-------|------------------------------|
| 119AL | Main Equipment Center        |
| 313AL | Elevator Mechanical Linkages |

C. Prepare for Removal

S 864-002

- (1) Supply electrical power (Ref 24-22-00).

S 864-003

- (2) Remove pressure from the left, right, and center hydraulic systems (Ref 29-11-00).

S 984-004

- (3) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the sidewall panel, P61, in the OFF position.

S 864-005

- (4) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H17, FLT CONT SHUTOFF TAIL L
  - (b) 11H18, FLT CONT SHUTOFF TAIL CENTER
  - (c) 11H27, FLT CONT SHUTOFF TAIL R
  - (d) 11K10, STICK NUDGER

S 014-045

**WARNING:** STAY OFF THE ACCESS DOOR, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (5) Open the access door, 313AL (Ref 06-42-00).

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S 984-007

- (6) Cover the access door, 313AL, with a service platform.

D. Procedure

S 034-009

- (1) Disconnect the electrical connector from the stick nudger.

S 034-046

**CAUTION:** DO NOT CHANGE THE STICK NUDGER SPRING TENSION. SPRING TENSION IS SET BY PLOTTING ANGULAR DISPLACEMENT VS TORQUE.

- (2) Remove the nut and washer that connect the stick nudger to the shaft.

S 034-011

- (3) Remove the nut, washers, and bolt that connect the stick nudger to the crank and remove the stick nudger.

TASK 27-32-07-424-012

2. Install the Stick Nudger (Fig. 401)

A. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 27-51-00/201, Trailing Edge Flap System
- (4) 27-81-00/201, Leading Edge Slat System
- (5) 29-11-00/201, Pressurize/Depressurize Main Hydraulic System
- (6) 34-22-00/501, Electronic Flight Instrument System

B. Access

(1) Location Zones

- 119/120 Main Equipment Center
- 211/212 Flight Compartment
- 313/314 Stabilizer Torsion Box Compartment

EFFECTIVITY

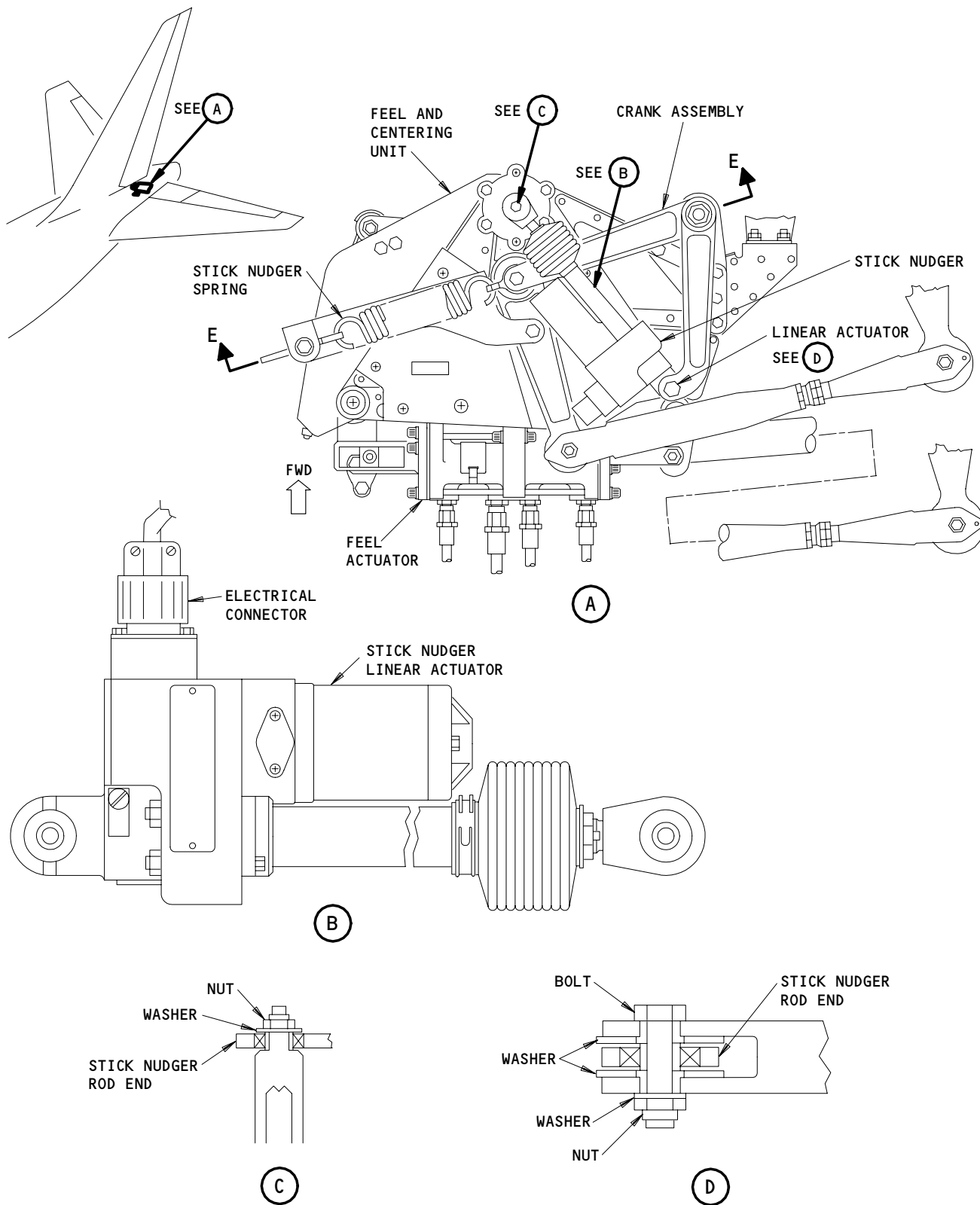
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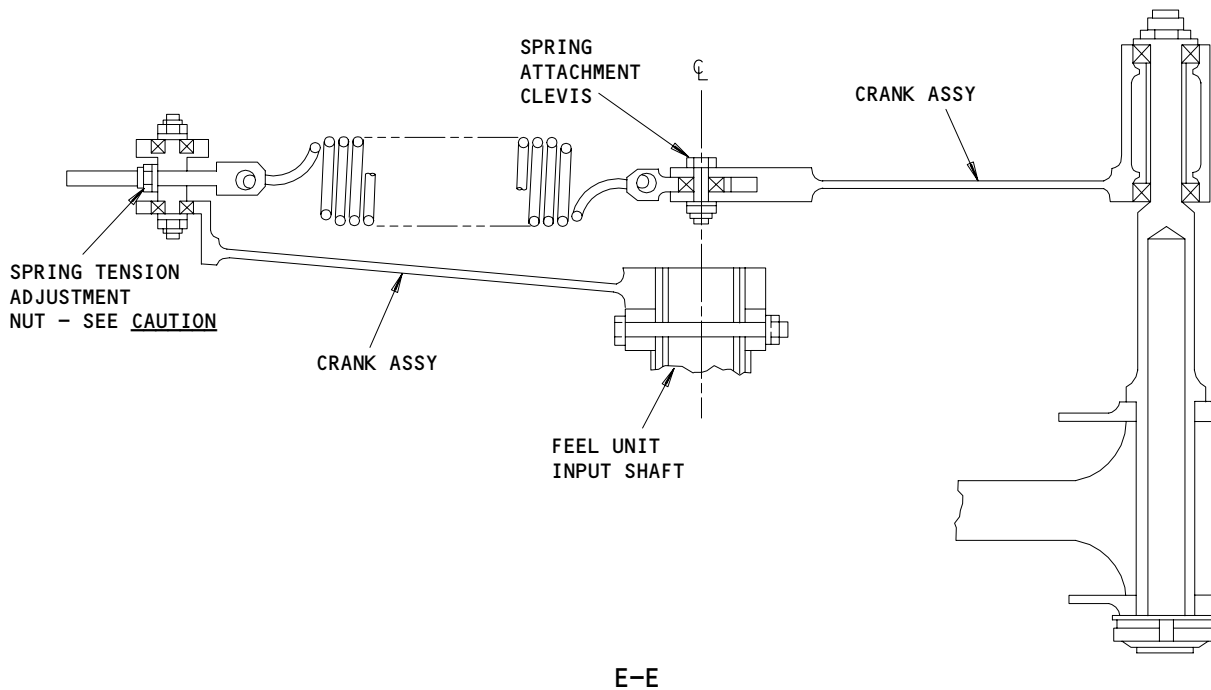
Stick Nudger Installation  
Figure 401 (Sheet 1)

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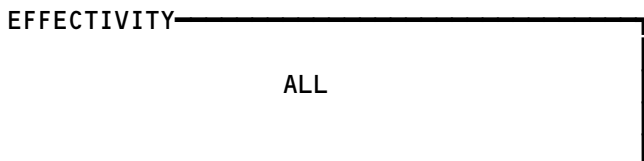
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**CAUTION:** DO NOT CHANGE SPRING TENSION,  
SPRING TENSION IS SET BY PLOTTING  
ANGULAR DISPLACEMENT VS TORQUE.

Stick Nudger Installation  
Figure 401 (Sheet 2)

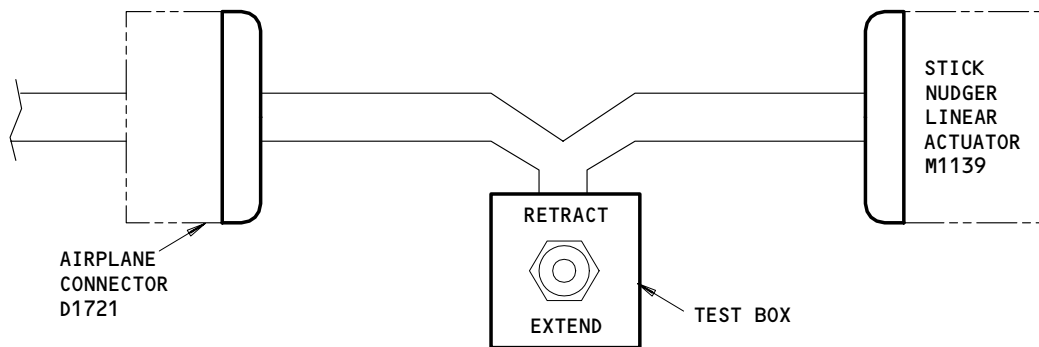


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Stick Nudger Jumper Cable  
Figure 402

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- (2) Access Panels
  - 119AL Main Equipment Center
  - 313AL Elevator Mechanical Linkages

C. Procedure

S 434-013

- (1) Put the stick nudger in position and install the bolt, washers, and nut that connects the stick nudger to the crank.

S 434-014

- (2) Install the washer and nut that connect the stick nudger to the shaft.

S 434-015

- (3) Connect the electrical connector to the stick nudger.

S 864-016

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11H17, FLT CONT SHUTOFF TAIL L
  - (b) 11H18, FLT CONT SHUTOFF TAIL CENTER
  - (c) 11H27, FLT CONT SHUTOFF TAIL R
  - (d) 11K10, STICK NUDGER

D. Adjust the stick nudger.

S 284-017

- (1) Make sure that the stick nudger actuator is in the fully retracted position.

S 824-047

**CAUTION:** DO NOT CHANGE THE STICK NUDGER SPRING TENSION. SPRING TENSION IS SET BY PLOTTING ANGULAR DISPLACEMENT VS TORQUE.

- (2) Adjust the actuator length to align the centerline of the spring attachment clevis with the centerline of feel unit input shaft within 0.03 inch (0.76 mm).

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TASK 27-32-07-714-044

3. Test the stick nudger operation

A. Equipment

- (1) Cable - Stick Nudger Jumper - A27100-1
- (2) Service Platform - Control Bay Access Door - A51001-19

B. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 27-51-00/201, Trailing Edge Flap System
- (4) 27-81-00/201, Leading Edge Slit System
- (5) 29-11-00/201, Pressurize/Depressurize Main Hydraulic System
- (6) 34-22-00/501, Electronic Flight Instrument System

C. Access

(1) Location Zones

- 119/120 Main Equipment Center
- 211/212 Flight Compartment
- 313/314 Stabilizer Torsion Box Compartment

(2) Access Panels

- 119AL Main Equipment Center
- 313AL Elevator Mechanical Linkages

D. Prepare to Test

S 864-019

- (1) Make sure that these circuit breakers on the P6 panel are closed:
  - (a) 6D3, IRS L
  - (b) 6D4, IRS C
  - (c) 6D21, ALTN SLAT INBD PWR
  - (d) 6D24, ALTN FLAP PWR
  - (e) 6F24, ALTN SLAT OUTBD PWR

S 864-020

- (2) Make sure that these circuit breakers on the P11 panel are closed:
  - (a) 11A10, AIR DATA CMPTR L
  - (b) 11A11, AIR DATA AOA SENSOR L
  - (c) 11B18, WARN ELEX B
  - (d) 11C10, SLAT POS IND
  - (e) 11C11, STICK SHAKER L
  - (f) 11C14, FLAP/STAB POS SENSING CENTER
  - (g) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR
  - (h) 11C16, FLAP SLAT ELEC UNIT 1 CONT
  - (i) 11C30, LANDING GEAR POSITION AIR/GND SYS 1
  - (j) 11F1, IRS LEFT
  - (k) 11F21, IRS CENTER
  - (l) 11F30, AIR DATA CMPTR RIGHT
  - (m) 11F31, AIR DATA AOA SENSOR RIGHT
  - (n) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR
  - (o) 11G23, FLAP SLAT ELEC UNIT 3 CONT

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- (p) 11H23, SLAT ALTN CONT INBD
- (q) 11H24, SLAT ALTN CONT OUTBD
- (r) 11J22, STICK SHAKER R
- (s) 11J24, FLAP ALTN CONT
- (t) 11J26, FLAP/STAB POS SENSING R
- (u) 11J34, WARN ELEX A
- (v) 11U24, LANDING GEAR POSITION AIR/GND SYS 2

S 864-001

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO A PERSON OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Pressurize center hydraulic system (Ref 29-11-00).

S 984-022

- (4) Put the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL switches on the P61 panel in the ON position.

S 284-023

- (5) Make sure that the trailing edge flaps and the leading edge slats are fully retracted (Ref 27-51-00 and 27-81-00).

S 284-024

- (6) Make sure that the control columns are centered and are not restrained.

S 284-025

- (7) Make sure that the EFIS is operational (Ref 34-22-00).

S 284-026

- (8) Make sure that the IRS switch on the instrument source select panel, P1 (P3), is in the normal position (ALTN light is off).

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- S 984-027
- (9) Put the L, R, and C IRS mode select switches on the inertial reference mode panel, P5, in the NAV position.
- S 034-028
- (10) Disconnect the stick nudger actuator connector D1721.
- S 494-029
- (11) Connect the stick nudger jumper cable as shown in Fig. 402.
- S 984-030
- (12) Put the jumper cable switch in the retract position.
- S 284-031
- (13) Make sure that the stick nudger actuator is in the retract position.
- S 984-032
- (14) Put the jumper cable switch in the extend position.
- S 284-048
- (15) Make sure that the time to fully extend the stick nudger actuator is  $5.6 \pm 0.6$  seconds.
- S 984-033
- (16) Put the jumper cable switch in the retract position.
- S 284-049
- (17) Make sure that the time to fully retract the stick nudger is  $5.6 \pm 0.6$  seconds.
- S 034-034
- (18) Disconnect the stick nudger jumper cable.
- S 094-035
- (19) Connect the stick nudger actuator connector D1721.
- E. Procedure
- S 984-036
- (1) Select and hold the L and R STALL TEST switches on the P61 panel.

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- S 284-037
- (2) Make sure that:
- (a) The L and R stick shakers operate.
  - (b) The two control columns move forward and remain forward.
- S 984-038
- (3) Release the L STALL TEST switch only.
- (a) The two control columns return to the original, center position.
  - (b) The L stick shaker stops.
- S 984-039
- (4) Release the R STALL TEST switch.
- S 284-040
- (5) Make sure that the R stick shaker stops.
- F. Put the airplane back to its initial condition.
- S 864-041
- (1) Remove pressure from the center hydraulic system (Ref 29-11-00).
- S 864-042
- (2) Remove electrical power if it is not necessary (Ref 24-22-00).
- S 864-043
- (3) Remove the service platform and close the access door, 313AL.

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ELEVATOR POSITION INDICATING SYSTEM – DESCRIPTION AND OPERATION

1. General (Fig. 1)
  - A. Elevator position indication is displayed on the engine indicating and crew alerting system (EICAS) screen. Indication arrows appear when the STATUS button is pushed. The left and right elevator positions are displayed by the left and right arrows respectively. The left and right elevator position indication systems are independent of each other. Each elevator has its own synchro position transmitter. Each position transmitter is attached to the stabilizer rear spar near the fuselage. The position transmitters are connected by a crank and pushrod to the elevator. The position transmitters transmit elevator position to the position indicator.
2. Component Details
  - A. Elevator Position Transmitter (Fig. 1)
    - (1) The elevator position transmitter is a synchro transmitter. The transmitter consists of a stator, rotor, housing assembly, and a shaft assembly. The elevator position transmitter rotor is connected by a crank arm and pushrod to the inboard elevator. Each transmitter is connected to the stabilizer rear spar near the fuselage.
  - B. Elevator Position Indicator (Fig. 1)
    - (1) The elevator position indicator is part of a control surfaces position indicator on the EICAS. The position indicator displays the movement of the elevators, ailerons, and rudder. The indicator accepts signals from the individual position transmitters.
3. Operation (Fig. 1)
  - A. Functional Description
    - (1) Elevator position indication is provided on the EICAS. Elevator position is shown by a control surfaces indicator on the lower EICAS screen. The indicator will appear when the STATUS button is pushed. Two position transmitters, one for each elevator, send elevator position data to the EICAS by electrical signals. The EICAS processes the signals and displays the correct position of the elevator on the screen. The elevator position indicating system is powered by two 28 V AC BUS's. The system is on as long as power is supplied to the airplane.

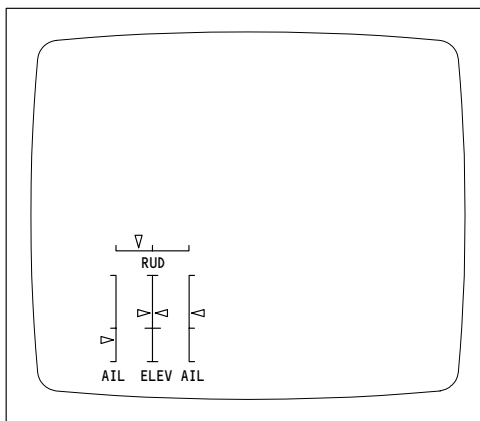
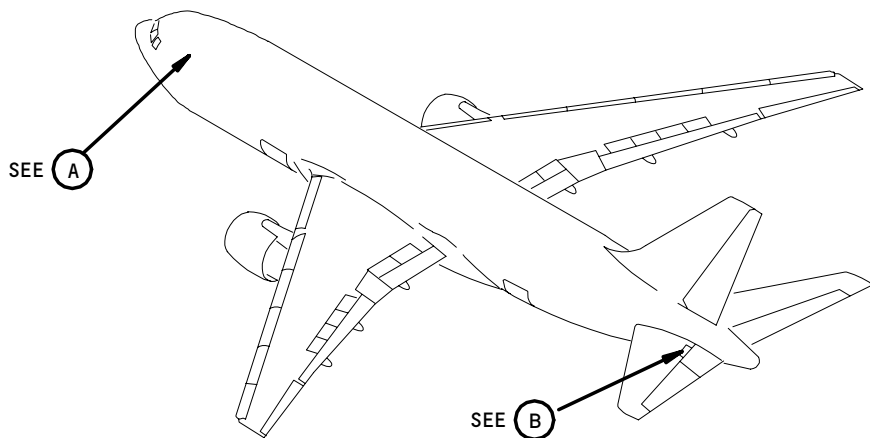
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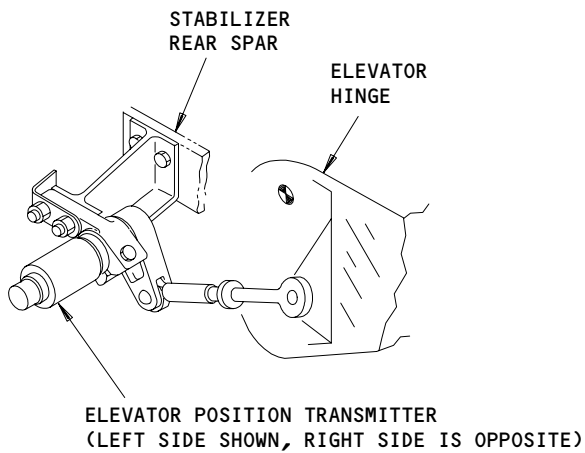
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LOWER EICAS SCREEN STATUS PAGE  
(PILOT'S CENTER INSTRUMENT PANEL)

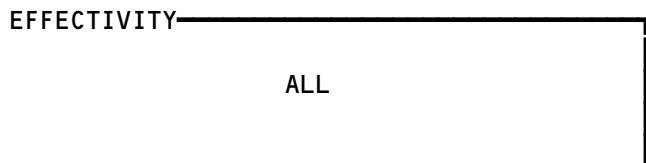
(A)



FWD ← → INBD

(B)

Elevator Position Indicating System  
Figure 1



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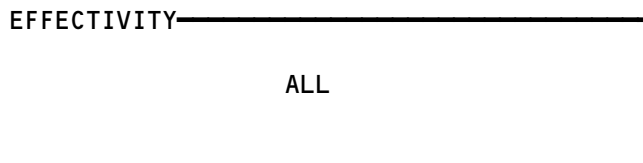
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 FAULT ISOLATION/MAINT MANUAL

ELEVATOR POSITION INDICATING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKER - ELEV POS L, C4101	--	1	FLIGHT COMPARTMENT, P11 PANEL 11K13	*
ELEV POS R, C4102	--	1	11K22	*
FILTER - INDUCTANCE CAPACITANCE (LC), M1144, M1145, M1146, M1147	--	4	311BL, FORWARD STABILIZER COMPARTMENT	*
TRANSMITTER - LEFT ELEVATOR POSITION, M517	--	1	335C, LEFT STABILIZER REAR SPAR	
TRANSMITTER - RIGHT ELEVATOR POSITION, M518	--	1	345C, RIGHT STABILIZER REAR SPAR	

\* SEE THE WDM EQUIPMENT LIST

Elevator Position Indicating System - Component Index  
 Figure 101

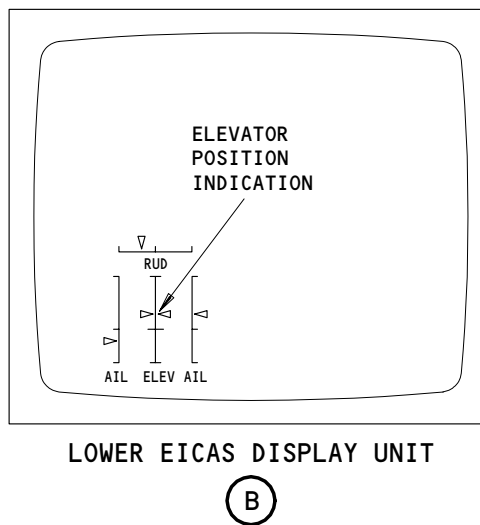
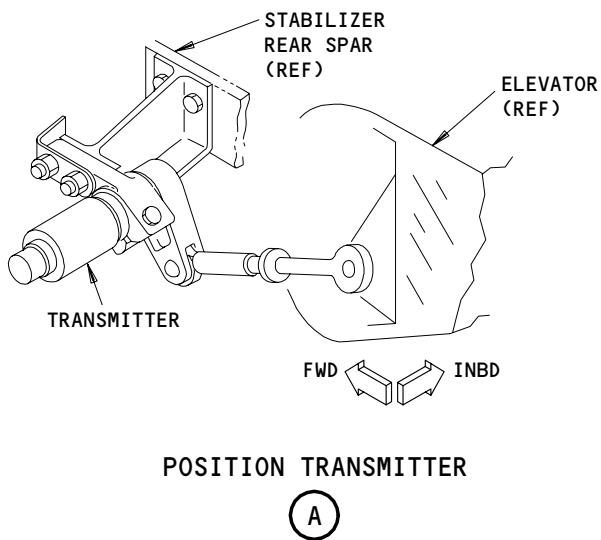
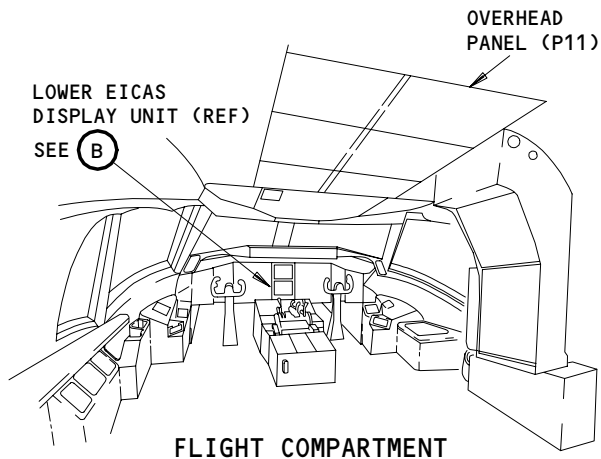
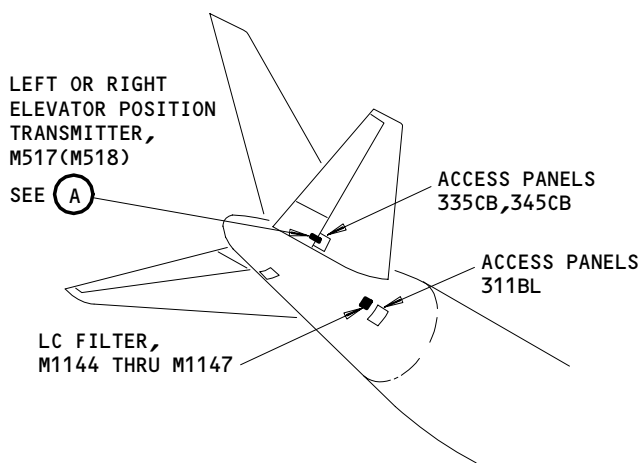


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33602



Elevator Position Indicating System - Component Location  
Figure 102

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ELEVATOR POSITION INDICATING SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure contains the operational test and adjustment for the elevator position indicating system.
- B. The system test is the same as the operational test.

TASK 27-38-00-715-001

2. Operational Test – Elevator Position Indicating System (Fig. 501)

A. References

- (1) 24-22-00/201, Electrical Power – Control
- (2) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Prepare for the Operational Tests

S 865-002

- (1) Supply electrical power (Ref 24-22-00).

S 215-003

- (2) Make sure that these circuit breakers on the overhead panel, P11, are closed:
  - (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H10, LEFT STAB TRIM POS IND
  - (e) 11H11, LEFT STAB TRIM CONT
  - (f) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (g) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (h) 11H19, STAB TRIM POS IND R
  - (i) 11H20, STAB TRIM CONT R
  - (j) 11H27, FLT CONT SHUTOFF TAIL RIGHT
  - (k) 11K13, ELEV POS L
  - (l) 11K22, ELEV POS R
  - (m) 11L9, LEFT ENGINE OIL PRESS EICAS REF
  - (n) 11L36, RIGHT ENGINE OIL PRESS EICAS REF
  - (o) 11J2, EICAS CMPTR L

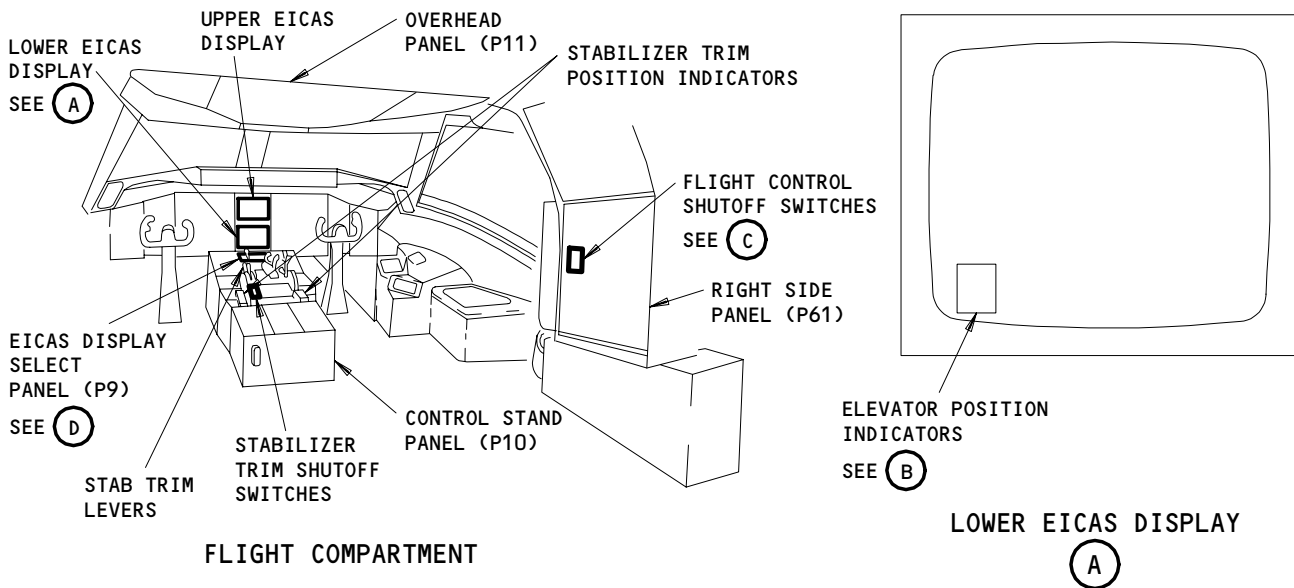
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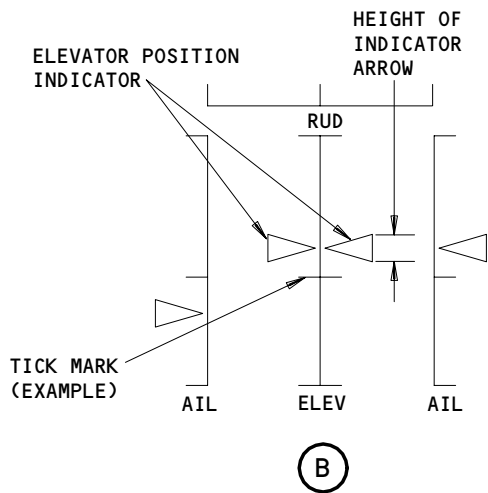
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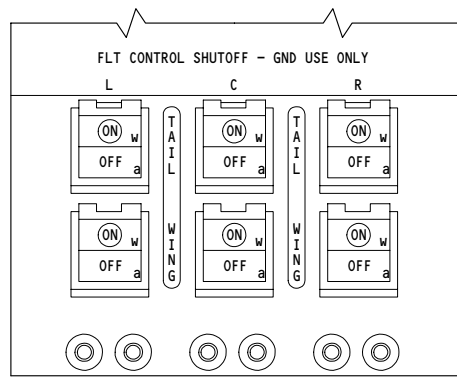
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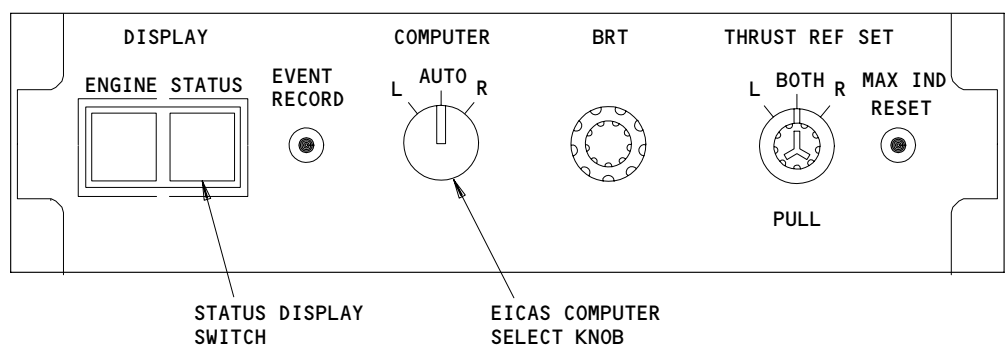
LOWER EICAS DISPLAY  
**(A)**



**(B)**



FLIGHT CONTROL SHUTOFF SWITCHES  
**(C)**



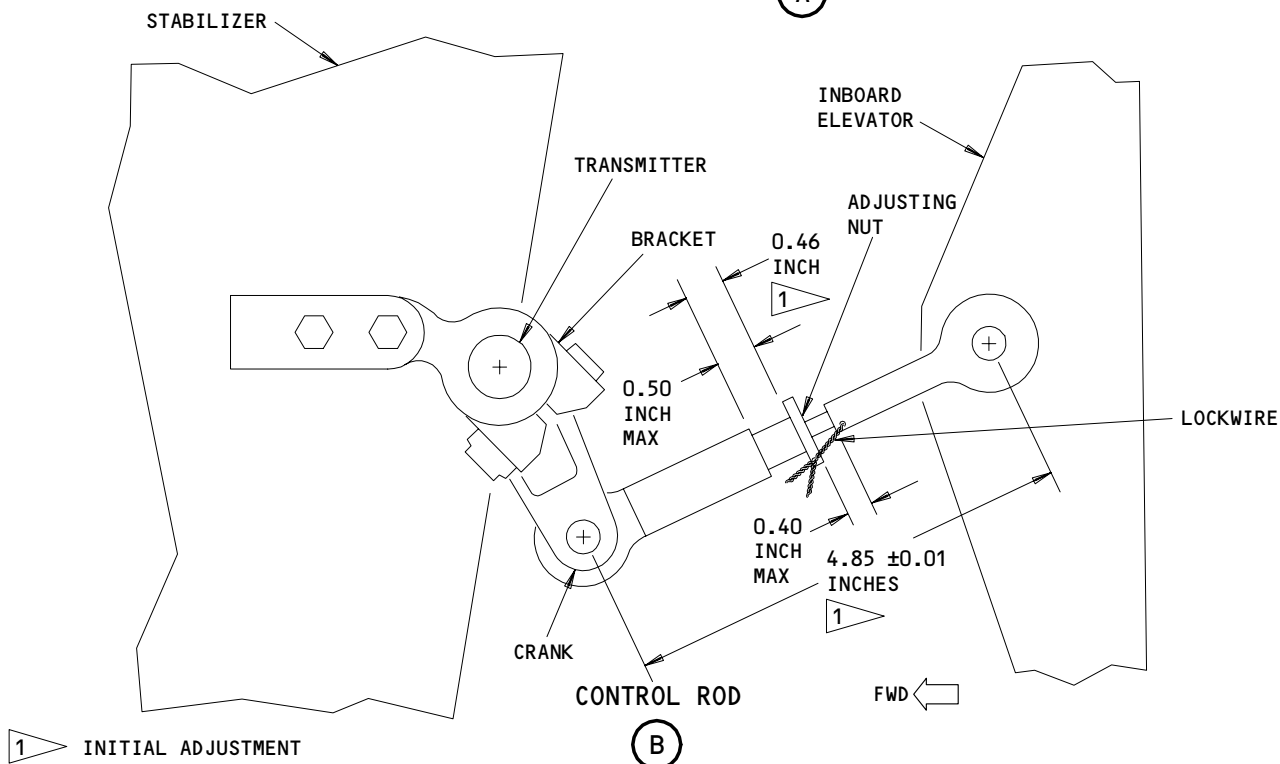
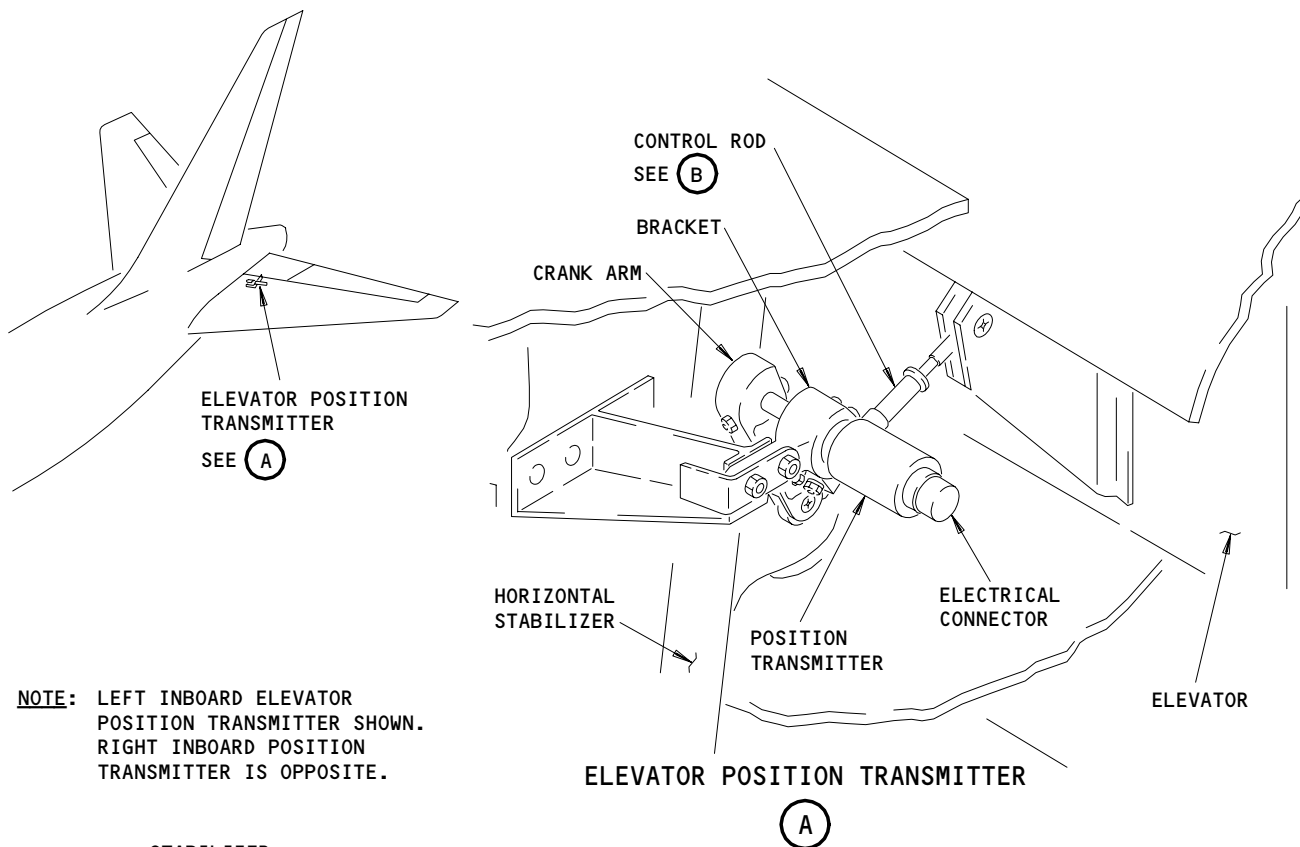
EICAS DISPLAY SELECT PANEL (P9)  
**(D)**

Elevator Position Indicating System Controls/Displays  
Figure 501

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Elevator Position Transmitter  
Figure 502

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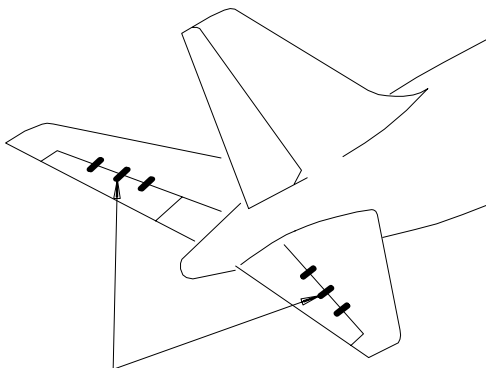
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- (p) 11J3, EICAS UPPER DSPL
- (q) 11J29, EICAS CMPTR R
- (r) 11J30, EICAS LOWER DSPL
- (s) 11J31, EICAS DSPL SW
- (t) 11J32, EICAS DSPL SELECT

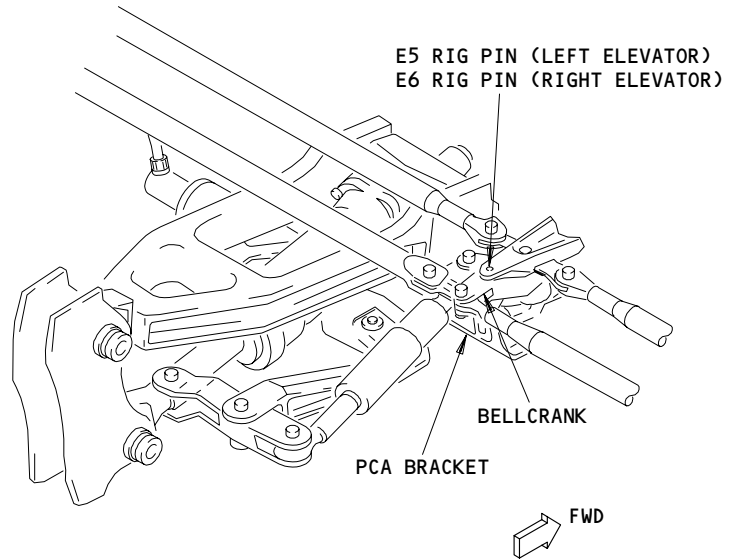
S 215-004

- (3) Make sure that the L, C, and R FLT CONTROL SHUTOFF TAIL switches on the right side panel, P61, are in the ON position.



ELEVATOR MIDDLE  
POWER CONTROL  
ACTUATOR

SEE (A)



ELEVATOR MIDDLE POWER CONTROL ACTUATOR

(A)

Elevator PCA Rig Pins  
Figure 503

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S 215-005

- (4) Make sure that the L and C STAB TRIM SHUTOFF valve switches on the control stand panel, P10, are in the NORM position.

S 865-006

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (5) Pressurize the left, right, and center hydraulic systems (Ref 29-11-00).

S 865-041

- (6) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND; use the STAB TRIM levers to move the stabilizer to 2 units of trim (neutral) on the stabilizer position indicators.

S 865-008

- (7) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND; use the alternate stab trim switches to move the stabilizer to 2 units of trim (neutral) on the stabilizer position indicators.

S 865-010

- (8) Put the L and C STAB TRIM SHUTOFF valve switches on the P10 panel to the CUTOUT position.

S 865-011

- (9) Put the EICAS select knob to the L position and push the STATUS display switch on the EICAS display select panel, P9.

D. Operational Test for the Elevator Position Indicating System

S 865-038

- (1) Move the control columns about the neutral position to make sure they are in the neutral position.

S 865-012

- (2) Make sure the position indicators align with the middle tick mark by less than the height of an indicator arrow.

S 865-013

- (3) Push the control columns to the forward stop.

S 215-014

- (4) Make sure that the elevator position indicators travel down together and stop at the lower tick mark on the scale.

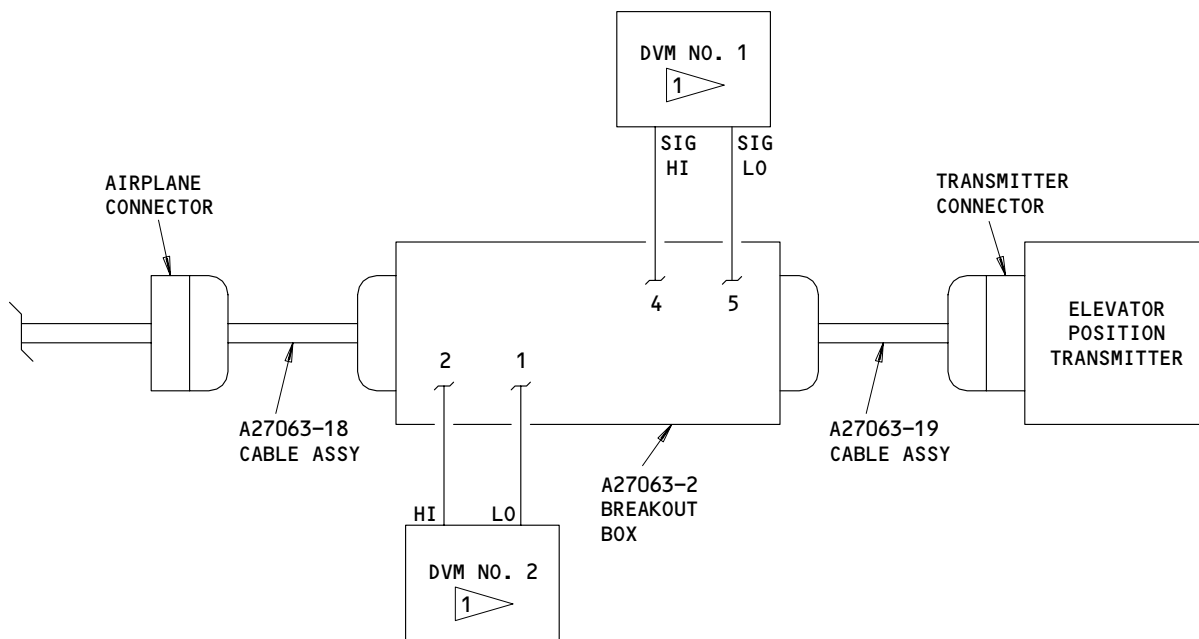
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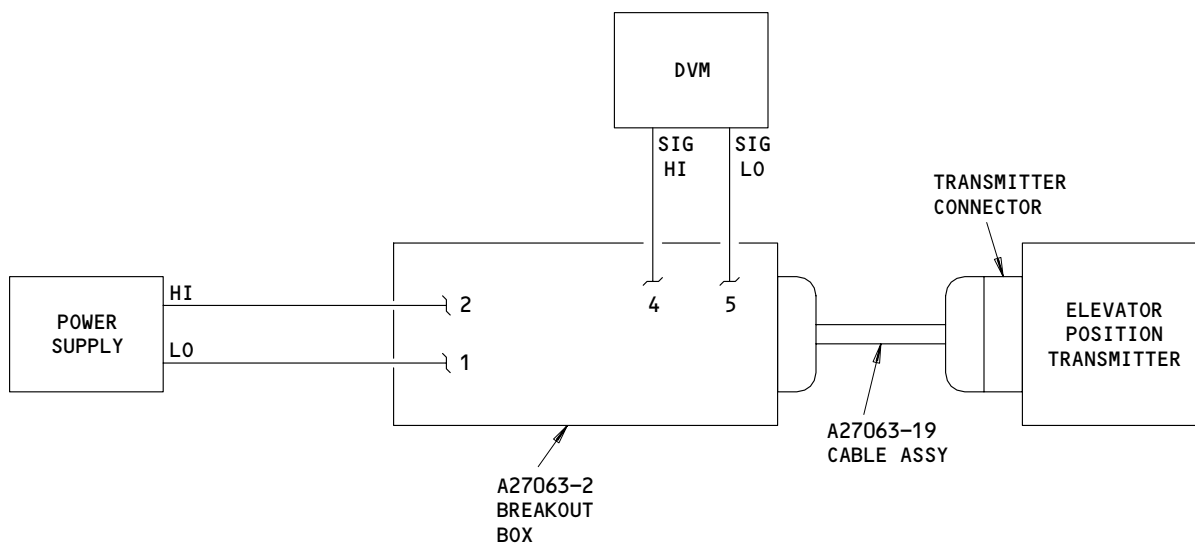
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PROCEDURE 1



PROCEDURE 2

**LEGEND**

DVM - DIGITAL VOLTMETER

**1** IF ONLY ONE DVM IS AVAILABLE,  
FIND THE AIRPLANE VOLTAGE AS SHOWN  
WITH THE DVM AT THE NO. 2 POSITION, THEN  
CONNECT IT TO THE BREAKOUT BOX AS SHOWN  
WITH THE DVM AT THE NO. 1 POSITION

Elevator Position Transmitter Adjustment Equipment  
Figure 504

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- S 865-015
- (5) Pull the control columns to the aft stop.
  
- S 215-016
- (6) Make sure that the indicators travel up together and stop at the upper tick mark on the scale.
  
- S 865-017
- (7) Let the control columns go to the neutral position.
- E. Put the Airplane Back to Its Usual Condition
  
- S 865-018
- (1) Remove hydraulic power, if it is not necessary (Ref 29-11-00).
  
- S 865-019
- (2) Remove electrical power, if it is not necessary (AMM 24-22-00).

TASK 27-38-00-825-042

3. Adjustment - Elevator Position Indicating System

A. General

- (1) Three procedures are given to do the fine adjustment of the left and right elevator position transmitters (PROCEDURES 1 and 2 are recommended).
  - (a) PROCEDURE 1 uses airplane power, digital voltmeters and breakout box equipment.
  - (b) PROCEDURE 2 uses an external power supply, digital voltmeter and breakout box equipment.
  - (c) PROCEDURE 3 uses the EICAS computer and communication between the flight deck and the elevators.

B. Equipment

- (1) Breakout Box and Cables, Rigging, Flight Controls Position Sensors (from Breakout Box Equipment A27063-71):

NOTE: This equipment is necessary for adjustment PROCEDURES 1 or 2.

- (a) Breakout Box - A27063-2
- (b) Cable Assemblies - A27063-18 and -19
- (2) Digital Voltmeter (Comercially Available)

NOTE: Two DVMs are recommended for adjustment PROCEDURE 1.

- (3) Power Supply - Powertron Model 5900 (adjustment PROCEDURE 1)
- (4) Rig Pins from Set A20004-XX (Ref 20-10-24):
  - (a) E5 - P/N A20004-15
  - (b) E6 - P/N A20004-15

C. Consumable Materials

- (1) A00247 Sealant - BMS 5-95

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D. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 20-10-24/201, Rig Pins
- (3) 24-22-00/201, Electrical Power - Control
- (4) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

E. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 335/345 Horizontal Stabilizer, Rear Spar to Trailing Edge
- (2) Access Panels
  - 335GB/335CB/335DB Power Control Actuators (Left)
  - 345GB/345CB/345DB Power Control Actuators (Right)

F. Prepare for the Adjustment

S 715-020

- (1) Do the operational test for the elevator position indicating system.

S 215-021

- (2) Make sure that the power is removed from the left, right, and center hydraulic systems (Ref 29-11-00).

S 015-022

- (3) Remove these access panels to the power control actuators (Ref 06-42-00):
  - (a) 335GB, 335CB, and 335DB on the left side
  - (b) 345GB, 345CB, and 345DB on the right side

S 495-023

**WARNING:** MAKE SURE THAT RIG PINS E5 AND E6 ARE INSTALLED BEFORE YOU SUPPLY HYDRAULIC POWER. THIS WILL PREVENT INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

THE ELEVATOR POSITION TRANSMITTERS MUST BE ADJUSTED WITH THE ELEVATOR PCAs SUPPLIED WITH POWER.

- (4) Install rig pins E5 and E6 in the middle power control actuator (PCA) bellcranks on the left and right elevators (Fig. 503).

S 865-024

- (5) Supply electrical power (Ref 24-22-00).

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S 865-025

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (6) Pressurize the left, right, and center hydraulic systems (Ref 29-11-00).

S 865-026

- (7) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11K13, ELEV POS L  
(b) 11K22, ELEV POS R

G. Elevator Position Transmitters Adjustment (PROCEDURE 1)

**NOTE:** See the General paragraph for a description of PROCEDURES 1, 2, and 3.

S 825-027

- (1) Adjust the left elevator position transmitter:  
(a) Disconnect the airplane electrical connector from the transmitter (Fig. 502).  
(b) Connect the -19 cable assembly between the transmitter and the breakout box as shown in Fig. 504.  
(c) Connect the -18 cable assembly between the airplane connector and the breakout box.  
(d) Connect digital voltmeter (DVM) No. 2 to the breakout box at pins 1 (LO) and 2 (HI).  
(e) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:  
1) 11K13, ELEV POS L  
2) 11K22, ELEV POS R  
(f) Make sure that the airplane input voltage is between 24 and 30 volts ac RMS at DVM No. 2.  
(g) Connect DVM No. 1 to the breakout box at pins 4 (SIG HI) and 5 (SIG LO).

**NOTE:** If only one DVM is available do the steps that follow:  
- Remove the DVM from the DVM No. 2 position after the airplane input voltage is found  
- Connect it at the DVM No. 1 position.

- (h) Adjust the transmitter control rod at the adjusting nut (Fig. 502) until the output voltage is  $0.0 \pm 0.05$  volt ac RMS at DVM No. 1.

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- (i) Make sure that the threads are engaged correctly on the control rod (Fig. 502).

NOTE: Turn the transmitter body in the bracket if necessary to correctly engage the thread and have the correct voltage. If the transmitter is turned, tighten the fasteners and apply sealant.

- (j) Put lockwire on the adjusting nut.
- (k) Make sure that the output voltage is  $0.0 \pm 0.05$  volt ac RMS at DVM No. 1.
- (l) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - 1) 11K13, ELEV POS L
  - 2) 11K22, ELEV POS R
- (m) Disconnect the DVMs, cables, and breakout box.
- (n) Connect the airplane electrical connector to the transmitter connector.

S 825-028

- (2) Adjust the right elevator position transmitter.

NOTE: The right elevator position transmitter adjustment procedure is the same as the left elevator position transmitter adjustment procedure.

S 715-029

- (3) Do the operational test for the elevator position indication system.
- H. Adjust the elevator position transmitters (PROCEDURE 2)

NOTE: Refer to the General paragraph for a description of PROCEDURES 1, 2 and 3.

S 825-030

- (1) Adjust the left elevator position transmitter as follows:
  - (a) Disconnect the airplane electrical connector from the transmitter (Fig. 502).
  - (b) Connect the -19 cable assembly between the transmitter and the breakout box as shown in Fig. 504.
  - (c) Adjust the power supply to  $26 \pm 0.02$  volts ac RMS.
  - (d) Connect the power supply to the breakout box at pins 1 (LO) and 2 (HI).
  - (e) Connect the digital voltmeter (DVM) to the breakout box at pins 4 (SIG HI) and 5 (SIG LO).
  - (f) Adjust the transmitter control rod at the adjusting nut (Fig. 502) until the output voltage is  $0.0 \pm 0.05$  volt ac RMS at the DVM.

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- (g) Make sure that the threads are engaged correctly on the control rod (Fig. 502).

NOTE: Turn the transmitter body in the bracket if necessary to correctly engage the thread and have the correct voltage. If the transmitter is turned, tighten the fasteners and apply sealant.

- (h) Put lockwire on the adjusting nut.  
(i) Make sure that the output voltage is  $0.0 \pm 0.05$  volt ac RMS at the DVM.  
(j) Disconnect the power supply, DVM, cable, and breakout box.  
(k) Connect the airplane electrical connector to the transmitter connector.

S 825-031

- (2) Adjust the right elevator position transmitter.

NOTE: The right elevator position transmitter adjustment procedure is the same as for the left elevator position transmitter adjustment procedure.

S 215-039

- (3) Do the operational test for the elevator position indicating system.  
I. Adjust the elevator position transmitters (PROCEDURE 3)

NOTE: Refer to the General paragraph for a description of PROCEDURES 1, 2 and 3.

S 825-032

- (1) Adjust the left elevator position transmitter:  
(a) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:  
1) 11K13, ELEV POS L  
2) 11K22, ELEV POS R  
(b) Make sure the initial adjustment of the control rod is as shown (Fig. 502).  
1) Adjust the control rod if it is necessary.  
(c) If a further adjustment is necessary, do these steps:  
1) Push the STATUS DISPLAY switch on the P9 panel (Fig. 501).  
2) Loosen the screws that hold the transmitter body in the bracket.

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- 3) Turn the transmitter body until the elevator position indicators align with the middle tick mark plus or minus 1/2 arrow width.

NOTE: You can make a slight fine adjustment with the pushrod, but make sure the threads are correctly engaged on the control rod (Fig. 502).

- 4) Tighten the screws that hold the position transmitter in the bracket.
- 5) Apply sealant to the transmitter body.
- 6) Make sure that the elevator position is shown correctly on the EICAS display.
- 7) Safety the adjusting nut with a wire.

S 825-033

- (2) Adjust the right elevator position transmitter.

NOTE: The right elevator position transmitter adjustment procedure is the same as the left elevator position transmitter adjustment procedure.

#### J. Put the Airplane Back to Its Usual Condition

S 865-034

- (1) Remove the power from the left, right and center hydraulic systems (Ref 29-11-00).

S 095-035

- (2) Remove rig pins E5 and E6 (Fig. 503).

S 415-036

- (3) Close these access panels to the power control actuators (Ref 06-42-00):
  - (a) 335GB, 335CB, and 335DB on the left side
  - (b) 345GB, 345CB, and 345DB on the right side

S 865-037

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11K13, ELEV POS L
  - (b) 11K22, ELEV POS R

S 865-040

- (5) Remove electrical power if it is not necessary (Ref 24-22-00).

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ELEVATOR POSITION TRANSMITTER - REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the elevator position transmitters.

TASK 27-38-01-024-001

2. Elevator Position Transmitter - Removal

A. References

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 24-22-00/201 Electrical Power - Control
- (3) 27-61-00/201 Spoiler Control System
- (4) 29-11-00/201 Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 335/345 Horizontal Stabilizer - Rear Spar to Trailing Edge
- (2) Access Panels
  - 335CB/335ADB Elevator Position Transmitter (Left)
  - 345CB/345ADB Elevator Position Transmitter (Right)

C. Prepare for the Removal

- S 864-002
  - (1) Supply electrical power (Ref 24-22-00).
- S 864-003
  - (2) Remove the pressure from the left, right, and center hydraulic systems (Ref 29-11-00).
- S 864-004
  - (3) Put the RIGHT, LEFT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the OFF position.
- S 864-005
  - (4) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the CUTOUT position.
- S 864-006
  - (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
    - (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;
      - 11A36, ALT STAB TRIM
    - (b) 11C12, STAB TRIM SHUTOFF L
    - (c) 11C13, STAB TRIM SHUTOFF CENTER
    - (d) 11H17, FLT CONT SHUTOFF TAIL LEFT
    - (e) 11H18, FLT CONT SHUTOFF TAIL CTR
    - (f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

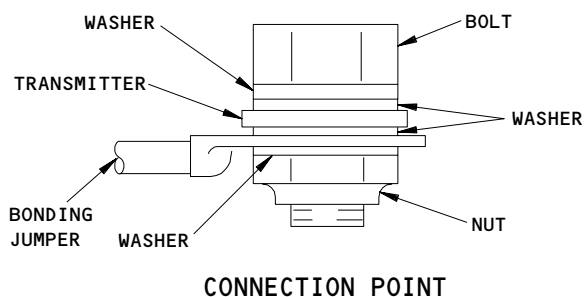
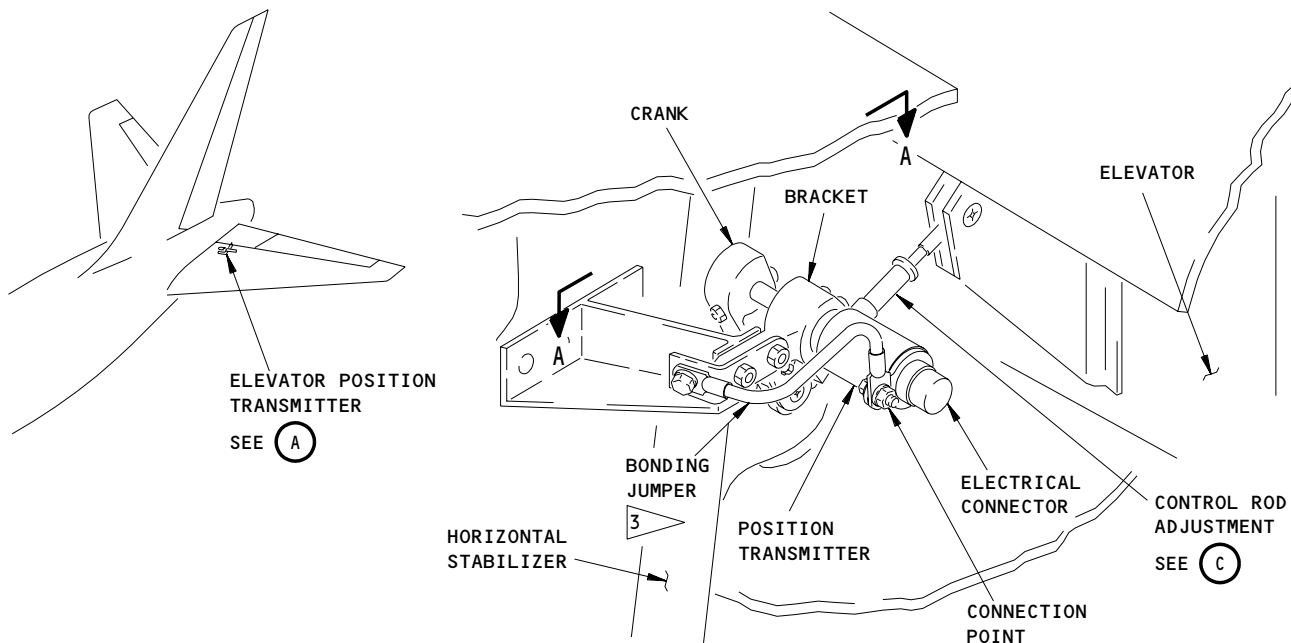
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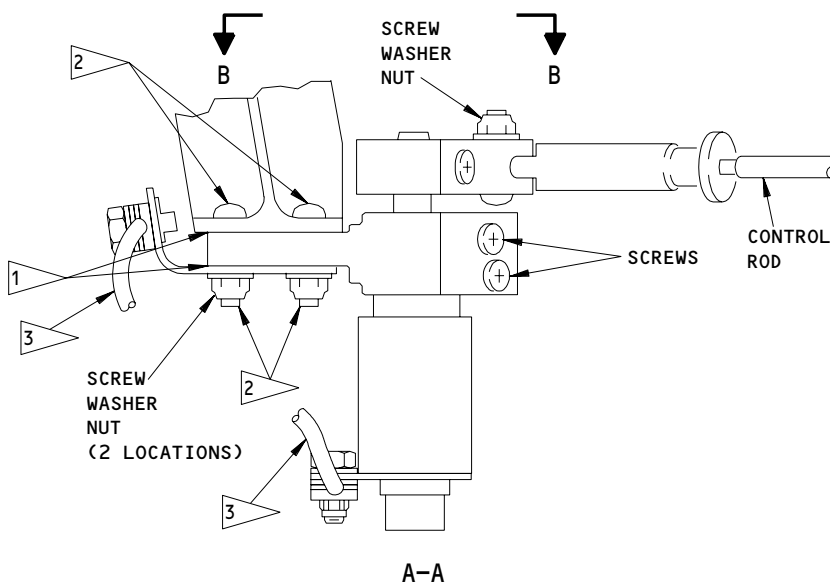
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ELEVATOR POSITION TRANSMITTER  
(LEFT TRANSMITTER IS SHOWN,  
RIGHT TRANSMITTER IS OPPOSITE)

CONNECTION POINT



- 1 APPLY A FILLET OF SEALANT
- 2 APPLY A LAYER OF SEALANT ON THE SCREW HEADS AND NUTS
- 3 AIRPLANES WITH A BONDING JUMPER

Elevator Position Transmitter Installation  
Figure 401 (Sheet 1)

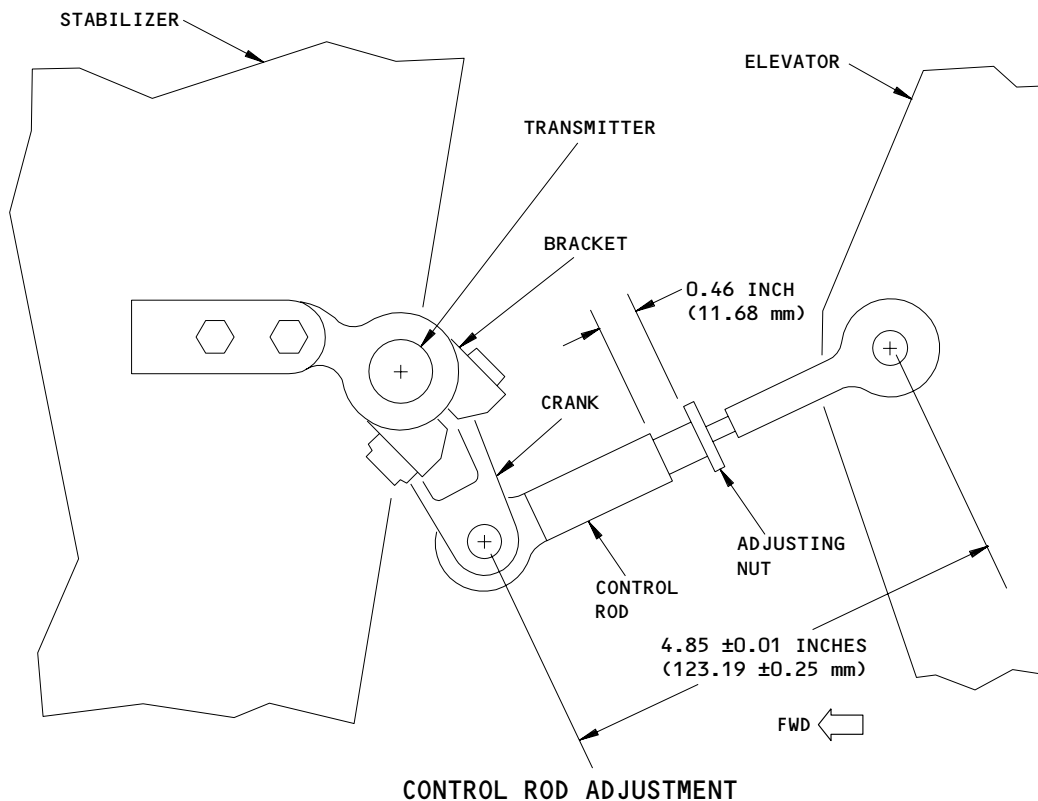
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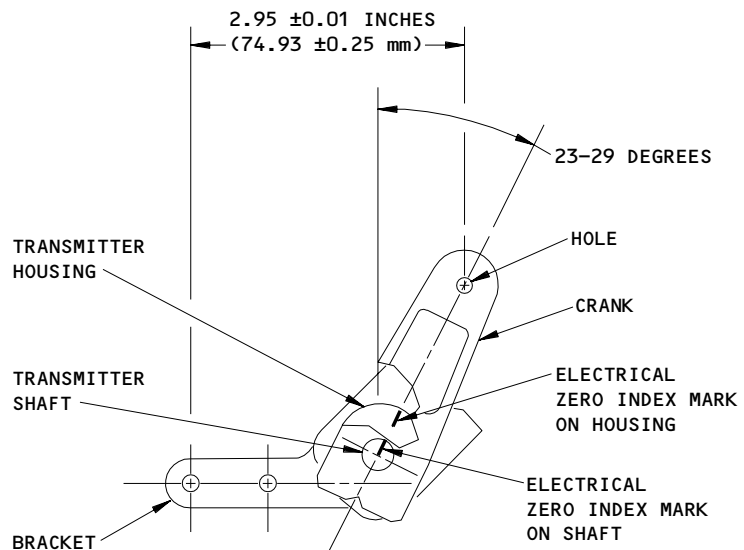
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(C)



BRACKET, TRANSMITTER, CRANK SETTING  
B-B

Elevator Position Transmitter Installation  
Figure 401 (Sheet 2)

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183421

S 044-040

**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.

- (6) Do the deactivation procedure for the spoilers (Ref 27-61-00) or move all persons and equipment away from the spoilers.

S 864-008

- (7) Remove electrical power if it is not necessary (Ref 24-22-00).

S 014-009

- (8) Remove these access panels for the elevator position transmitters (Ref 06-42-00):  
(a) 335CB and 335ADB for the left elevator position transmitter  
(b) 345CB and 345ADB for the right elevator position transmitter

D. Remove the Elevator Position Transmitter (Fig. 401)

S 034-010

- (1) Disconnect the electrical connector.

S 034-049

- (2) AIRPLANES WITH BONDING JUMPERS;  
Disconnect the bonding jumper from the transmitter.

S 164-012

- (3) Remove the sealant between the transmitter bracket and the airplane structure.

S 164-013

- (4) Remove the sealant from the screws that attach the transmitter bracket to the stabilizer.

S 034-014

- (5) Remove the nut, washer, and screw that hold the control rod to the crank.

S 034-015

- (6) Remove the nuts, washers, and screws that hold the bracket arm to the stabilizer.

S 024-016

- (7) Remove the transmitter from the bracket.

TASK 27-38-01-424-017

3. Elevator Position Transmitter - Installation

A. Consumable Materials

- (1) A00247 Sealant - BMS 5-95

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- (2) D50180 Grease, Corrosion Preventive - BMS 3-33  
(Preferred)
- (3) D00015 Grease, Corrosion Preventive - BMS 3-24  
(Alternate)

**B. References**

- (1) 06-42-00/201, Empennage Access Doors and Panels
- (2) 20-10-22/701, Metal Surface Cleaning
- (3) 24-22-00/201 Electrical Power - Control
- (4) 27-38-00/501 Elevator Position Indicating System

**C. Access**

- (1) Location Zones
  - 211/212 Control Cabin
  - 335/345 Horizontal Stabilizer - Rear Spar to Trailing Edge
- (2) Access Panels
  - 335CB/335ADB Elevator Position Transmitter (Left)
  - 345CB/345ADB Elevator Position Transmitter (Right)

**D. Install the Elevator Position Transmitter (Fig. 401)**

S 144-018

- (1) Prepare the mating surfaces between the bracket and the stabilizer to make sure there is a good electrical bond (Ref 20-10-22).

S 144-019

- (2) Prepare the mating surfaces between the transmitter and the bracket for a good electrical bond (Ref 20-10-22).

S 424-020

- (3) Install the transmitter in the bracket with the zero electrical index mark on the housing aligned in the bracket (View B-B).

S 434-021

- (4) Install the screws that hold the transmitter to the bracket and tighten the screws as follows:
  - (a) Tighten the screws to 30-35 pound-inches (3.4 - 4.0 Nm).

S 434-022

- (5) Install the crank on the transmitter shaft with the zero electrical index mark on the shaft aligned with the hole in the crank (View B-B) and tighten the screw.

S 434-023

- (6) Install the bracket to the stabilizer.

S 394-024

- (7) Apply a fillet of sealant around the sides of the bracket.

S 394-025

- (8) Apply a layer of sealant on the screw heads and nuts that attach the transmitter bracket to the stabilizer.

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S 434-026  
(9) Connect the control rod to the crank.

S 624-027  
(10) Apply corrosion preventive grease to the end of the control rod that is connected to the inboard elevator.

S 434-028  
(11) Connect the electrical connector.

S 434-054  
(12) AIRPLANES WITH BONDING JUMPERS;  
Connect the bonding jumper to the transmitter.

E. Elevator Position Transmitter Adjustment

S 214-030  
(1) Make sure that the elevator is at the neutral position and the stabilizer is at 2 units of trim.

S 224-031  
(2) Make sure the control rod is adjusted correctly (Detail B).

S 764-056  
(3) AIRPLANES WITH BONDING JUMPERS;  
Make sure the electrical resistance between the transmitter and the airplane structure is less than 0.010 ohms.

S 824-033  
(4) Do the Elevator Position Transmitter Adjustment (Ref 27-38-00).

S 714-034  
(5) Do the Operational Test for the Elevator Position Transmitter (Ref 27-38-00).

F. Put the Airplane Back to Its Usual Condition

S 864-035  
(1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:  
(a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM  
(b) 11C12, STAB TRIM SHUTOFF L  
(c) 11C13, STAB TRIM SHUTOFF CENTER  
(d) 11H17, FLT CONT SHUTOFF TAIL LEFT  
(e) 11H18, FLT CONT SHUTOFF TAIL CTR  
(f) 11H27, FLT CONT SHUTOFF TAIL RIGHT

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- S 864-036
- (2) Put the RIGHT, LEFT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, to the ON position.
- S 864-037
- (3) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the NORM position.
- S 444-045
- (4) If deactivated, do the activation procedure for the spoilers (AMM 27-61-00/201).
- S 864-038
- (5) Remove electrical power if it is not necessary (Ref 24-22-00).
- S 414-039
- (6) Install these access panels for the inboard elevator position transmitters (Ref 06-42-00):
- (a) 335CB and 335ADB for the left elevator position transmitter
  - (b) 345CB and 345ADB for the right elevator position transmitter

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HORIZONTAL STABILIZER TRIM CONTROL SYSTEM – DESCRIPTION AND OPERATION

1. General (Fig. 1)

- A. The horizontal stabilizer is a moveable airfoil which trims the airplane longitudinally. Its overall function is to alter its angle of attack during flight, as necessary, to keep the airplane in a condition of maneuvering and speed stability. The system performs the functions of: 1) transmitting the control commands; 2) moving the stabilizer as commanded; and 3) sensing the resulting stabilizer angle.
- B. AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND; the horizontal stabilizer control system is controlled by either electrical or manual inputs. These inputs are received by two stabilizer trim control modules (STCM's). The left and center hydraulic systems supply hydraulic power to the STCM's. From the inputs the STCM's receive, they regulate fluid flow to two hydraulic motors which power a ballscrew actuator. The ballscrew actuator moves the stabilizer about its center section pivot points.
- C. AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND; the stabilizer control system is controlled by electrical inputs. These inputs are received by two stabilizer trim control modules (STCM's). The left and center hydraulic systems supply hydraulic power to the STCM's. From the inputs the STCM's receive, they regulate fluid flow to two hydraulic motors which power a ballscrew actuator. The ballscrew actuator moves the stabilizer about its center section pivot points.
- D. AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND; the stabilizer trim control system has three modes of control, two electrical and one manual. The manual mode of control is provided by the stabilizer trim levers located on the left side of the control stand. The electrical modes of control are: 1) the autopilot control through the flight control computers; and 2) the manual electric trim switches on the control wheels.
- E. AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND; the stabilizer trim control system has three modes of control, all electrical. The modes of control are: 1) the autopilot control through the flight control computers; 2) the manual electric trim switches on the control wheels; and 3) the alternate stabilizer trim switches on the left side of the control stand.
- F. Stabilizer trim position is displayed on two indicators located on the control stand. The indicators receive their inputs from three limit switch and position transmitter modules (LSTM's) located beneath the forward end of the stabilizer. The stabilizer trim indicating system is covered in AMM 27-48-00/001.

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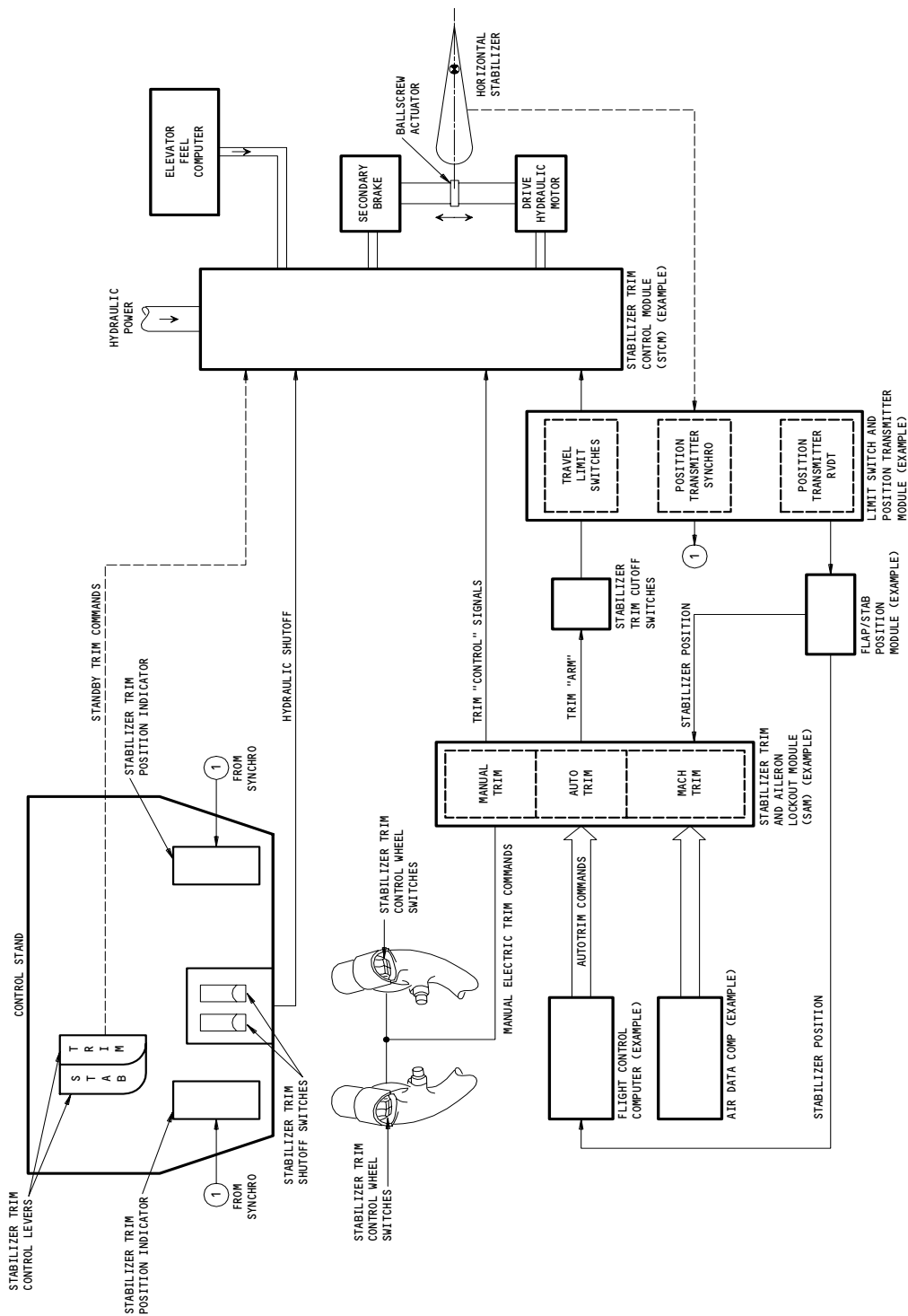
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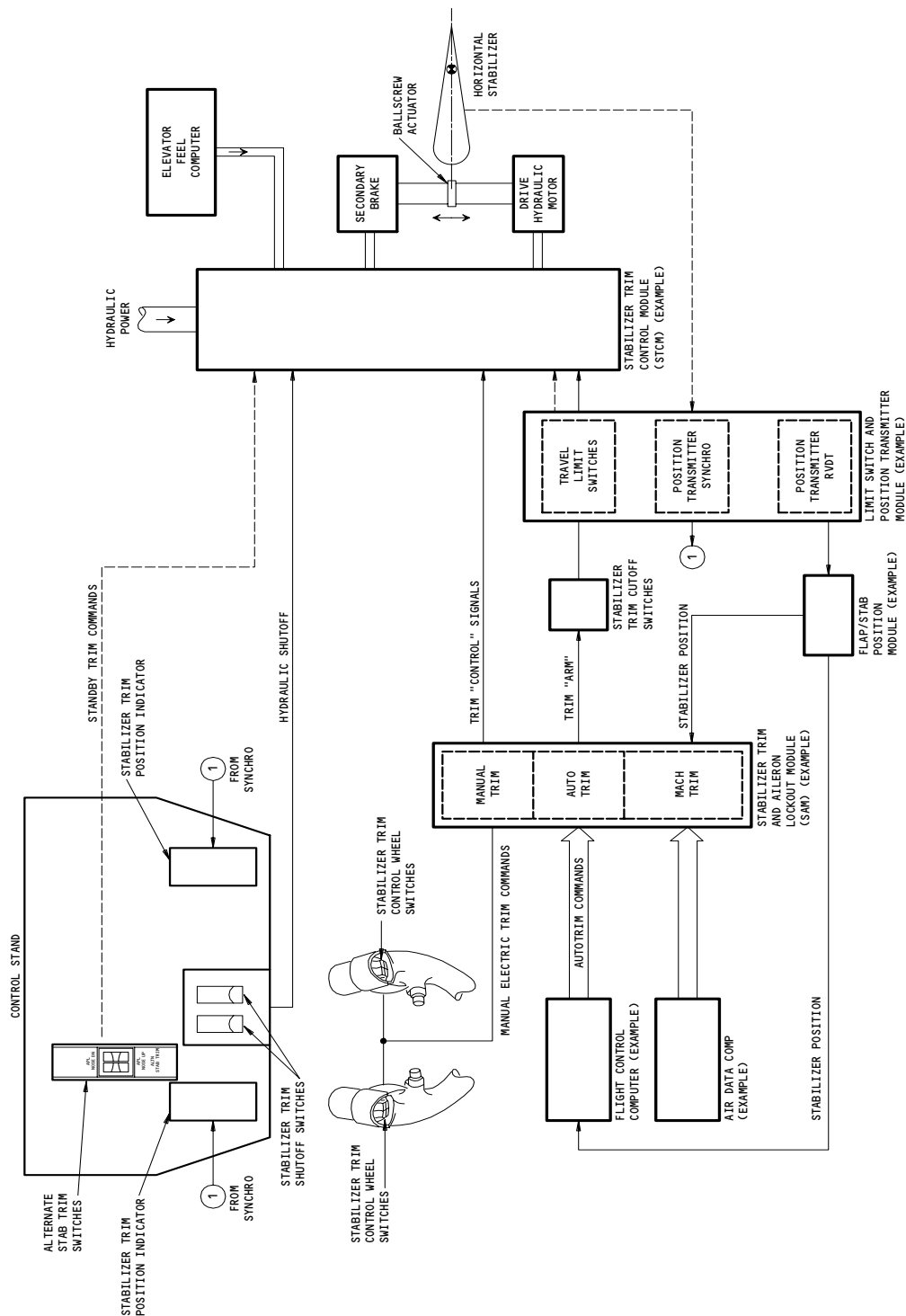




Stabilizer Trim Control System  
Figure 1 (Sheet 1)

EFFECTIVITY  
AIRPLANES WITH ALT STAB TRIM  
LEVERS ON THE CONTROL STAND

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Stabilizer Trim Control System  
Figure 1 (Sheet 2)

EFFECTIVITY  
AIRPLANES WITH ALT STAB TRIM  
SWITCHES ON THE CONTROL STAND

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- G. The term stabilizer neutral position is used during many stabilizer and elevator control system maintenance procedures. Neutral is the position at which the stabilizer is level with the earth. It is not a centered or detented position. The stabilizer is at the neutral position when dimension A on the ballscrew actuator is 3.84 ±0.03 inches (97.5 +/- 0.8 millimeters) (Fig. 6), which is approximately 2 units of trim on the stabilizer position indicators. Neutral is the stabilizer position at which most stabilizer and elevator control system component adjustments are made.
- H. Fault indication of the stabilizer control system is provided by the caution and warning system. Indication of electric trim system failures is accomplished by discrete outputs sent by the stabilizer trim/aileron lockout module (SAM) to the flight deck caution and warning system and EICAS computer.
- I. Description and operation of the SAM is covered in this section. Removal and installation of the SAM is covered in AMM 27-09-00/201.
- J. Functional Mode Priority (Fig. 2)
- (1) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
the stabilizer trim control system has three modes of control. They are the manual control mode, the manual electric control mode, and the autopilot control mode. The manual control mode (STAB TRIM control levers) override all electric control. The manual electric control mode (stabilizer trim control wheel switches) override all electric control except when all three autopilots are operating for the autoland function. The autopilot control mode (flight control computers (FCC)) is the primary electric control.
  - (2) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
the stabilizer trim control system has three modes of control. They are the alternate electric control mode, the manual electric control mode, and the autopilot control mode. The alternate electric control mode (ALTERNATE STABILIZER TRIM SWITCH) has equal priority with the other two modes. The manual electric control mode (stabilizer trim control wheel switches) override all electric control except when all three autopilots are operating for the autoland function. The autopilot control mode (flight control computers (FCC)) is the primary electric control.

2. Component Details

- A. Stab Trim Switches (Fig. 3)

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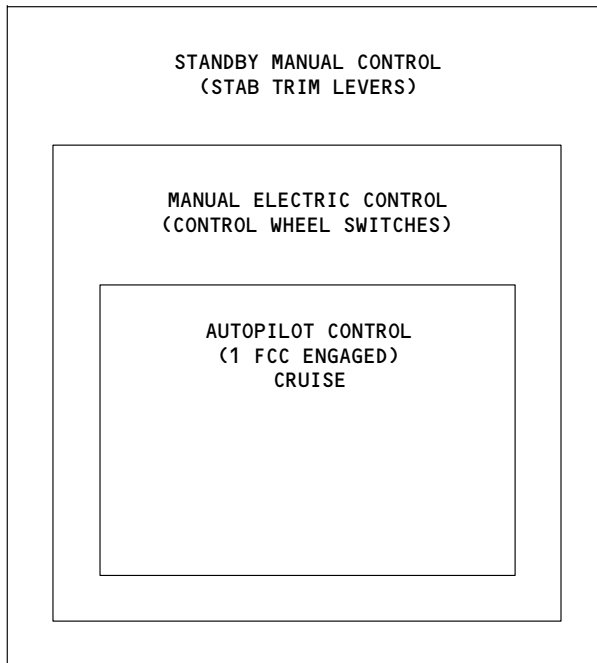
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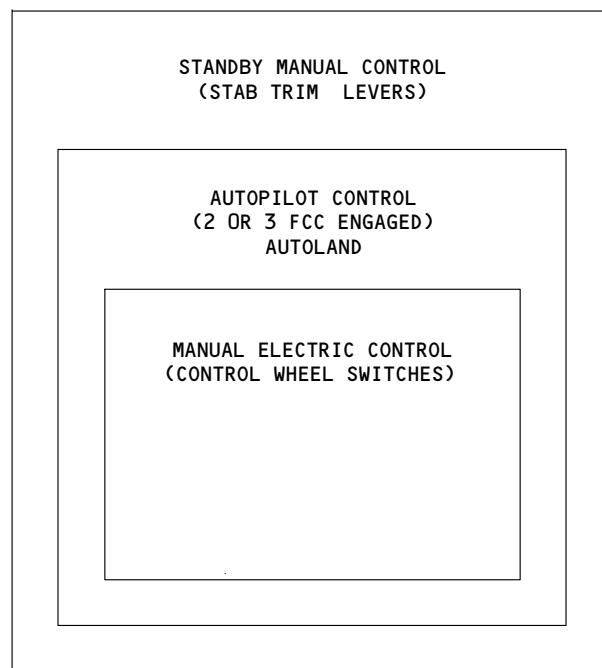
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**BOEING**  
767  
MAINTENANCE MANUAL



PRIORITY: SINGLE CHANNEL FCC



PRIORITY: MULTI CHANNEL FCC

SAM: STABILIZER TRIM AND AILERON LOCKOUT MODULE  
FCC: FLIGHT CONTROL COMPUTER

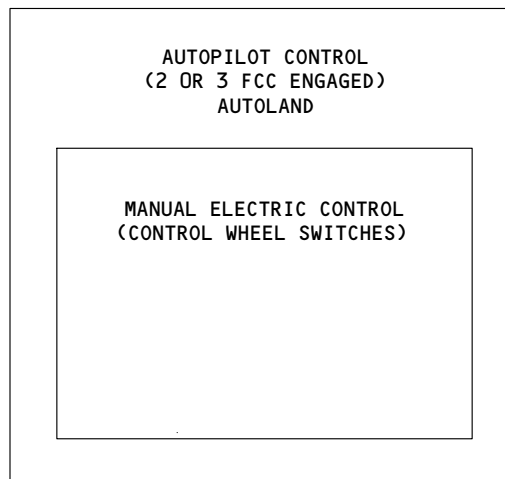
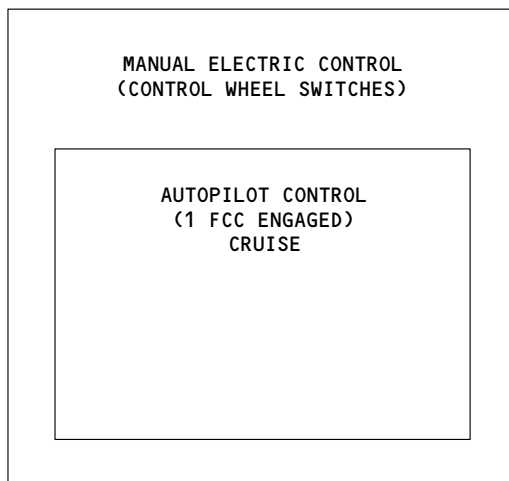
Stabilizer Trim Functional Mode Priority  
Figure 2 (Sheet 1)

EFFECTIVITY  
AIRPLANES WITH ALT STAB TRIM  
LEVERS ON THE CONTROL STAND

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SAM: STABILIZER TRIM AND AILERON LOCKOUT MODULE

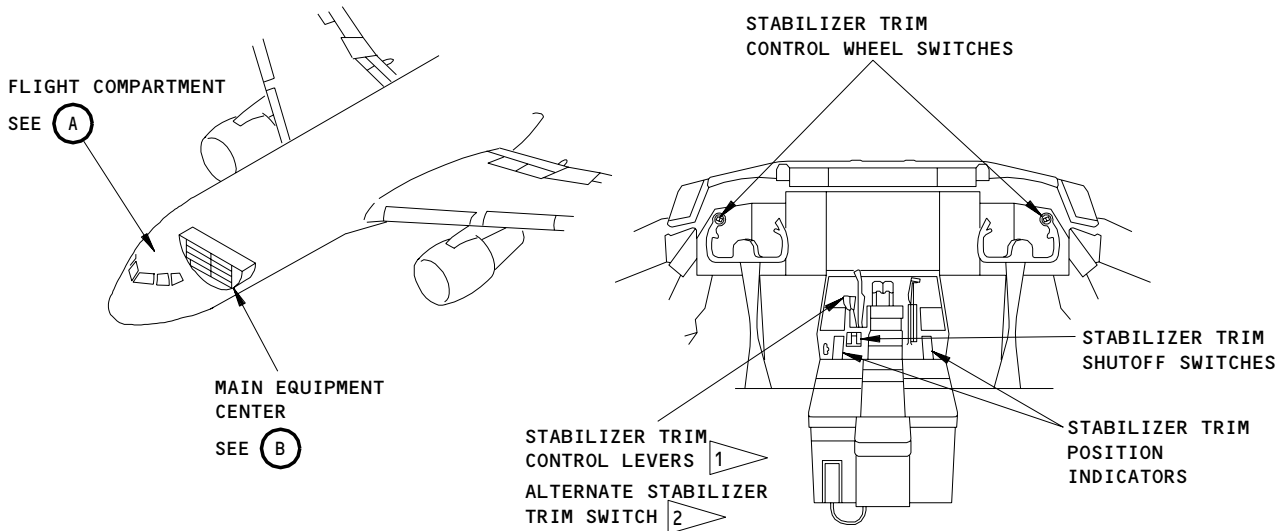
FCC: FLIGHT CONTROL COMPUTER

NOTE: THERE IS NO PRIORITY BETWEEN THE ALTERNATE-ELECTRIC-STABILIZER TRIM SYSTEM AND EITHER THE MANUAL ELECTRIC CONTROL OR AUTOPILOT CONTROL. THE STABILIZER WILL NOT MOVE IF THE ALTERNATE-ELECTRIC-STABILIZER TRIM SYSTEM IS COMMANDED IN THE OPPOSITE DIRECTION OF: 1) THE MANUAL ELECTRIC CONTROL OR 2) THE AUTOPILOT CONTROL.

Stabilizer Trim Functional Mode Priority  
Figure 2 (Sheet 2)

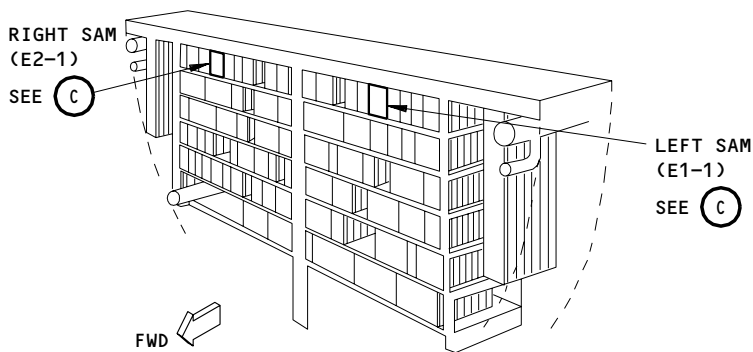
EFFECTIVITY  
AIRPLANES WITH ALTERNATE STAB  
TRIM SWITCHES ON THE CONTROL STAND

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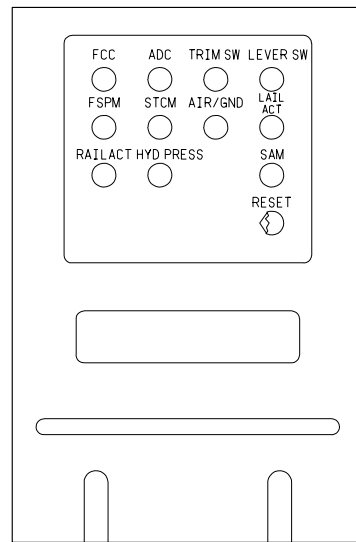
FLIGHT COMPARTMENT

(A)



MAIN EQUIPMENT CENTER

(B)



SAM

(C)

SAM: STABILIZER TRIM AND  
AILERON LOCKOUT MODULE

1 AIRPLANES WITH STABILIZER TRIM LEVERS  
ON CONTROL STAND

2 AIRPLANES WITH ALTERNATE STABILIZER  
TRIM SWITCHES ON CONTROL STAND

Stabilizer Trim System Components  
Figure 3

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- (1) Two sets of dual switches, located in the captain's and first officer's control wheels, control the stabilizer trim system in the manual-electric control mode. Each set provides manual electric arm and control trim signals to the SAM. Both signals are necessary for operation. The switches are spring-loaded to the off position. The two switches in each set are mounted side-by-side on the control wheel so both can be actuated simultaneously with one thumb.
- B. Stabilizer Trim Cutoff Switches (Fig. 4)
- (1) 767-200 AIRPLANES;  
Three single-pole single-throw switches are installed below each control column. These switches interrupt the electric trim commands in the event of a runaway stabilizer. The switches employ a pilot's natural reaction to correct a runaway condition. A column forward movement (greater than 2.2° to 2.7°) in response to an unscheduled nose-up maneuver will open a switch in the airplane nose-up stabilizer command circuit. A column aft action (greater than 2.0° to 2.5° or 3.0° to 3.5° depending on neutral shift status) will open a switch in the airplane nose-down command circuit.
  - (2) 767-300 AIRPLANES;  
Two single-pole single-throw switches are installed below each control column. These switches interrupt the electric trim commands in the event of a runaway stabilizer. The switches employ a pilot's natural reaction to correct a runaway condition. A column forward movement (greater than 2.2° to 2.7°) in response to an unscheduled nose-up maneuver will open a switch in the airplane nose-up stabilizer command circuit. A column aft action (greater than 2.0° to 2.5°) will open a switch in the airplane nose-down command circuit.
- C. Stabilizer Trim Shutoff Switches (Fig. 3)
- (1) The shutoff switches control motor-operated hydraulic shutoff valves in the STCM's. The two guarded switches are mounted on the control stand, one for each of the STCM's. The left shutoff switch controls the left STCM and the right shutoff switch controls the right STCM.
- D. AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
STAB TRIM Control Levers (Fig. 3)

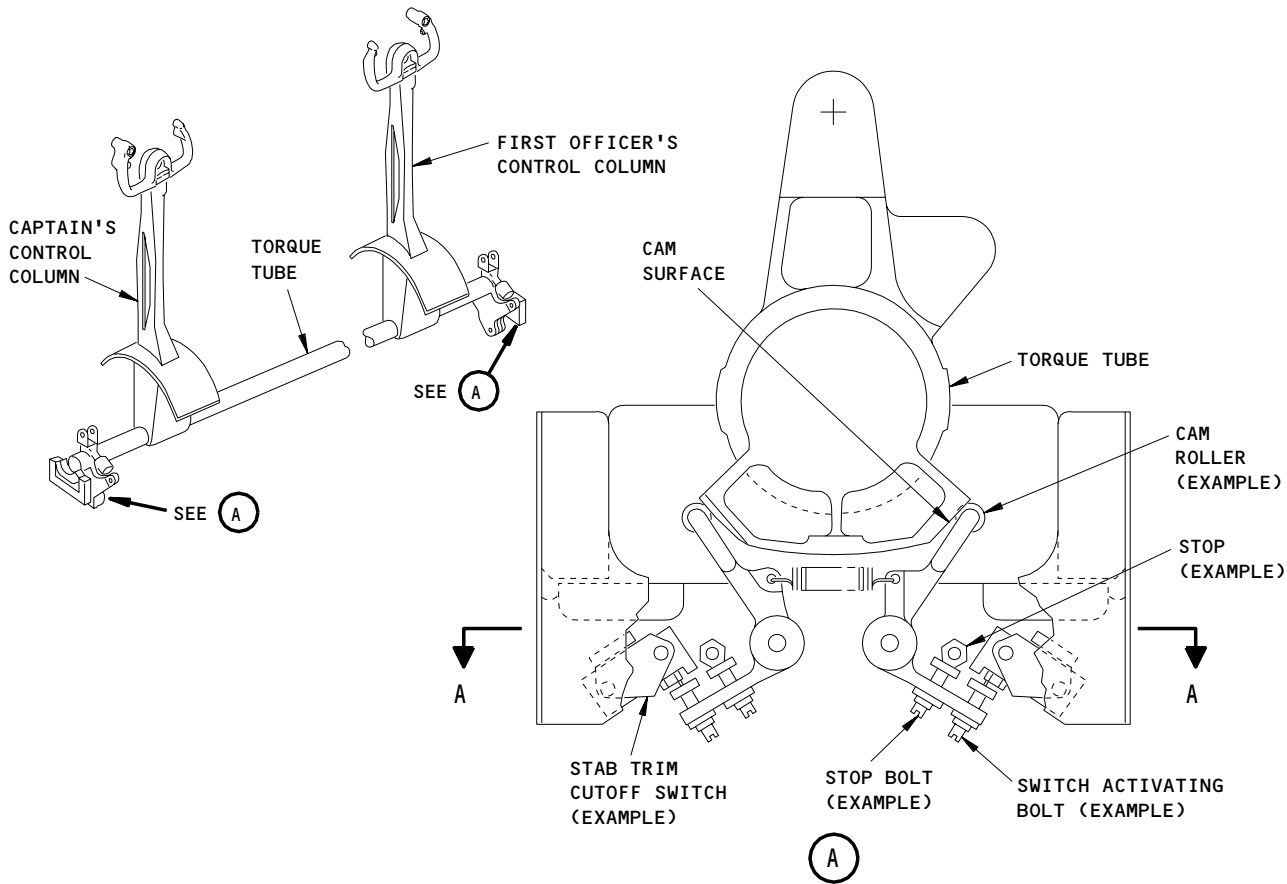
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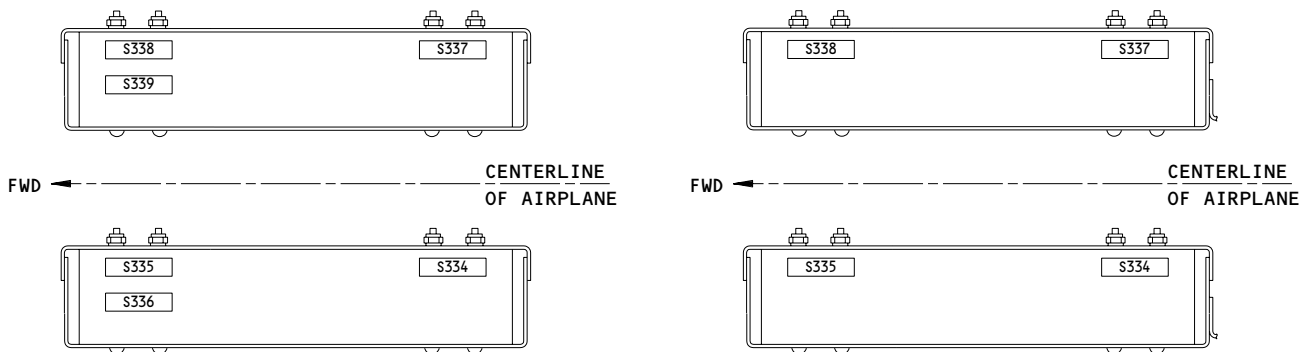
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FIRST OFFICER'S CONTROL COLUMN



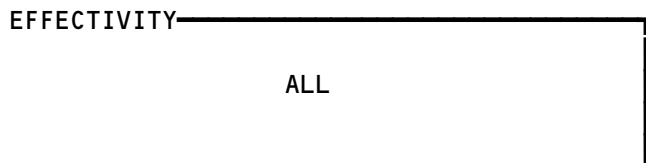
CAPTAIN'S CONTROL COLUMN

767-200 AIRPLANES

767-300 AIRPLANES

A-A

Stabilizer Trim Cutoff Switches  
Figure 4



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- (1) The control stand is equipped with two STAB TRIM control levers. The levers are connected to the STCM's by mechanical cables.
  - (2) The right lever operates the "arm" hydraulic valve and the left lever operates the "control" hydraulic valve. When both levers are moved forward, an airplane nose DOWN command is given. When both levers are moved aft, an airplane nose UP command is given. The levers will return to neutral when released. Uneven levers indicate bad cable rigging.
  - (3) The right lever rotates a cam which actuates stabilizer trim standby switch (S538) to provide an electrical ground to the SAM when the STAB TRIM control levers are engaged. This prevents erroneous annunciation of unscheduled stabilizer movement.
- E. AIRPLANES WITH ALTN STAB TRIM SWITCHES ON THE CONTROL STAND;  
Alternate Stabilizer Trim Switch (Fig. 3)
- (1) The control stand has two ALTN STAB TRIM switches. These switches are connected to the stabilizer trim control modules by electrical wires.
  - (2) The right ALTN STAB TRIM switch operates the "arm" hydraulic valve. The left ALTN STAB TRIM switch operates the "control" hydraulic valve. Move both switches forward to give an airplane-nose down command. Move both switches aft to give an airplane-nose up command. The switches will return to neutral when released.
  - (3) The right ALTN STAB TRIM switch is mechanically linked to a switch internal to the housing. This internal switch is grounded whenever the stabilizer is operated by the ALTN STAB TRIM switch to prevent incorrect indications of unscheduled stabilizer trim movement.
- F. AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
Stabilizer Trim Cable System (Fig. 5)
- (1) Two pairs of cables extend from the STAB TRIM control levers to the STCM's. The cables transfer manual trim commands to the STCM's. One pair of cables extends from the arm lever pulley to the arm input lever on the STCM's. The other pair extends from the control lever pulley to the control input lever on the STCM's. A rear quadrant and control rod at the aft end of each pair of cables convert the cable motion to linear motion at the input levers to the STCM's.

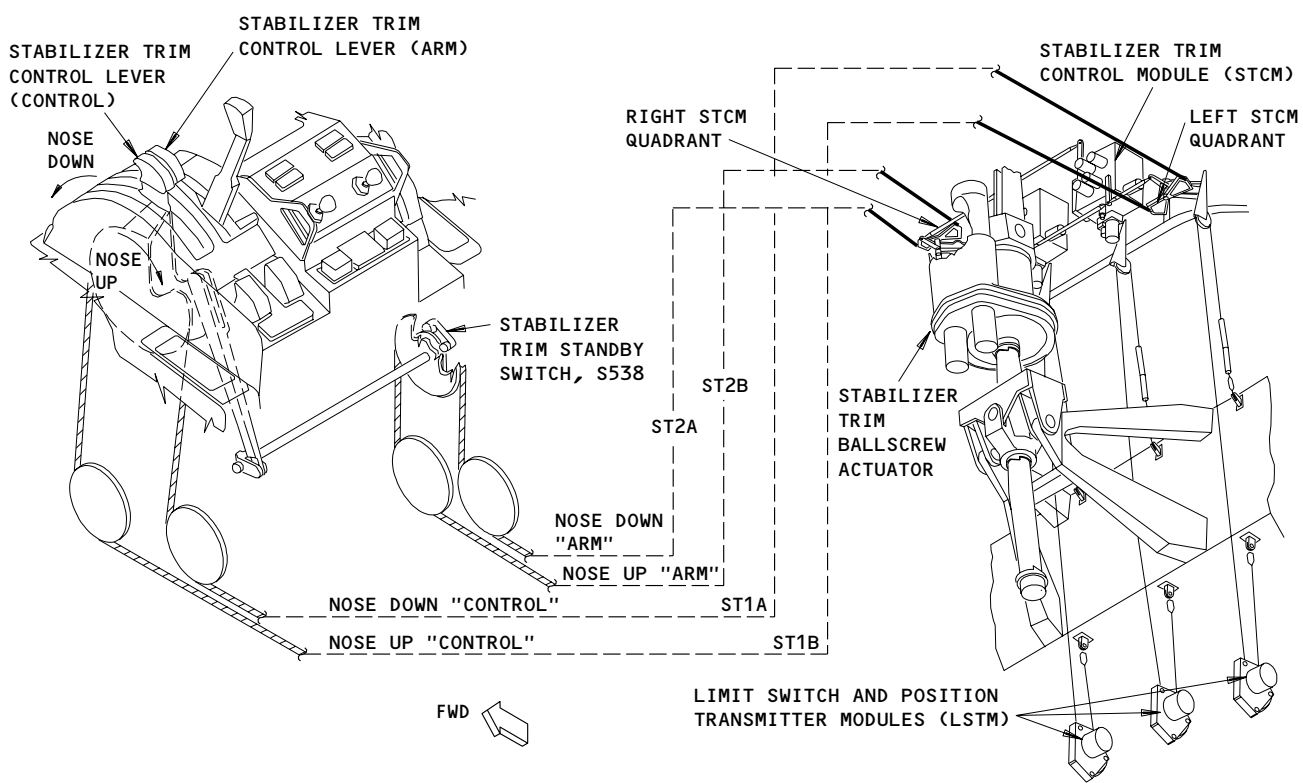
EFFECTIVITY

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Stabilizer Trim Cable System  
Figure 5

EFFECTIVITY  
AIRPLANES WITH ALT STAB TRIM  
LEVERS ON THE CONTROL STAND

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G. Stabilizer Trim Control Module (Fig. 6)

- (1) The STCM's are attached to a bulkhead above the ballscrew actuator in the stabilizer compartment. The left and right modules are interchangeable. The function of the STCM is to provide direction control and rate control to the ballscrew actuator.
- (2) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND; the STCM's respond to electrical trim commands from the SAM and manual trim commands from the STAB TRIM control levers. A control rate valve within each STCM receives a hydraulic pressure signal from the elevator feel computer. This signal is a function of airspeed. Each STCM contains a motor-operated shutoff valve which controls the supply of fluid to the ballscrew actuator. Each shutoff valve is connected to a stabilizer trim shutoff switch on the control stand. Hydraulic pressure to the left module is supplied by the left system and to the right module by the center system.
- (3) AIRPLANES WITH ALTN STAB TRIM SWITCHES ON THE CONTROL STAND; the STCM's respond to electrical trim commands from the SAM and the alternate-stabilizer trim switch. A control rate valve within each STCM receives a hydraulic pressure signal from the elevator feel computer. This signal is a function of airspeed. Each STCM contains a motor-operated shutoff valve which controls the supply of fluid to the ballscrew actuator. Each shutoff valve is connected to a stabilizer trim shutoff switch on the control stand. Hydraulic pressure to the left module is supplied by the left system and to the right module by the center system.
- (4) The hydraulic line between the left STCM and the elevator feel computer contains a relief valve. The relief valve permits fluid flow in each direction until the hydraulic pressure in the line decreases to 100 psi (689 kPa). At or below this pressure, the relief valve closes, and the check valve permits fluid to flow only into the STCM. The relief valve prevents fluid loss out of the left STCM through the rate control valve, to make sure a sufficient quantity of fluid is available during power transfer unit (PTU) operation. For information on Hydraulic Power Transfer Unit (PTU) operation, refer to AMM 29-22-00/001.

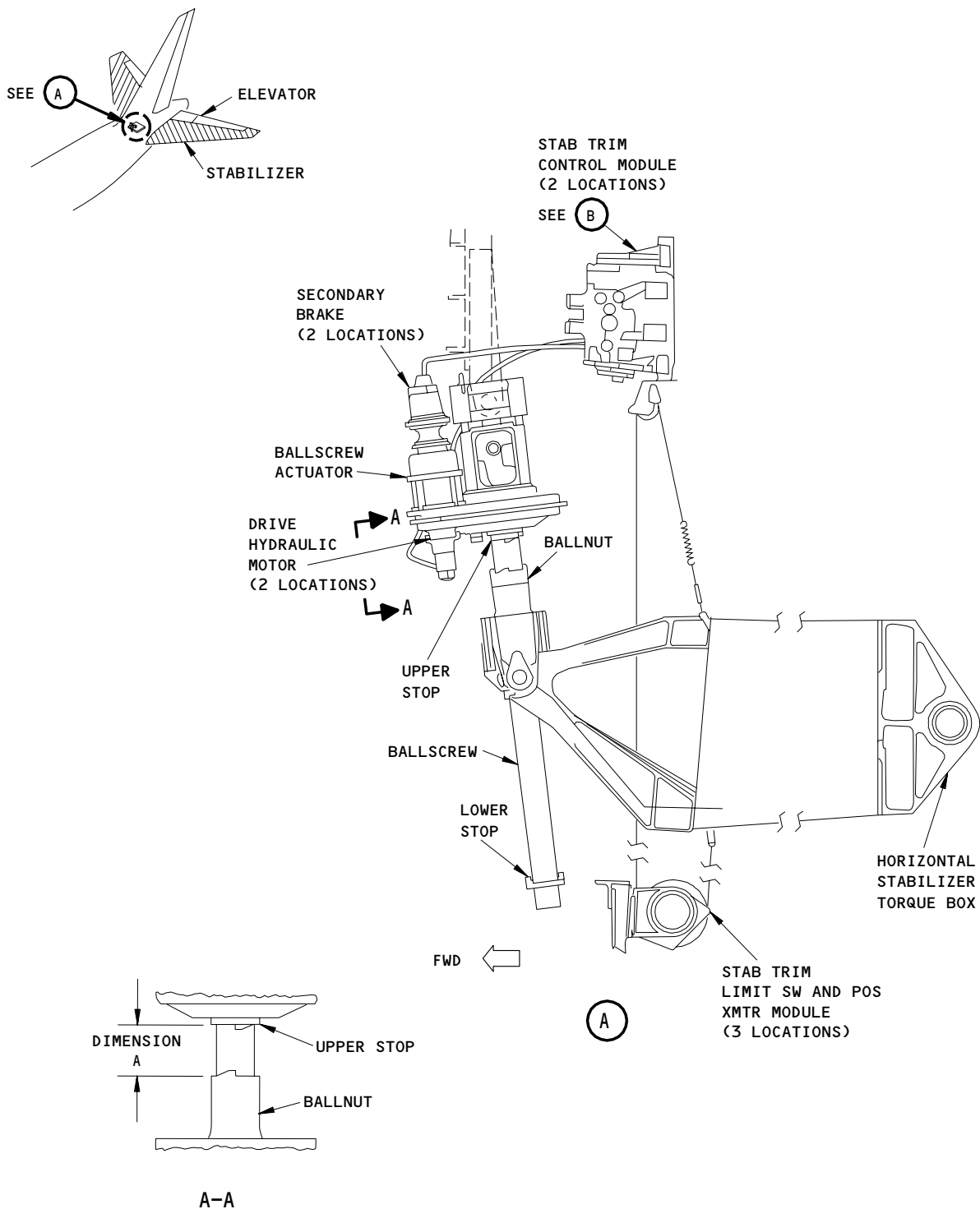
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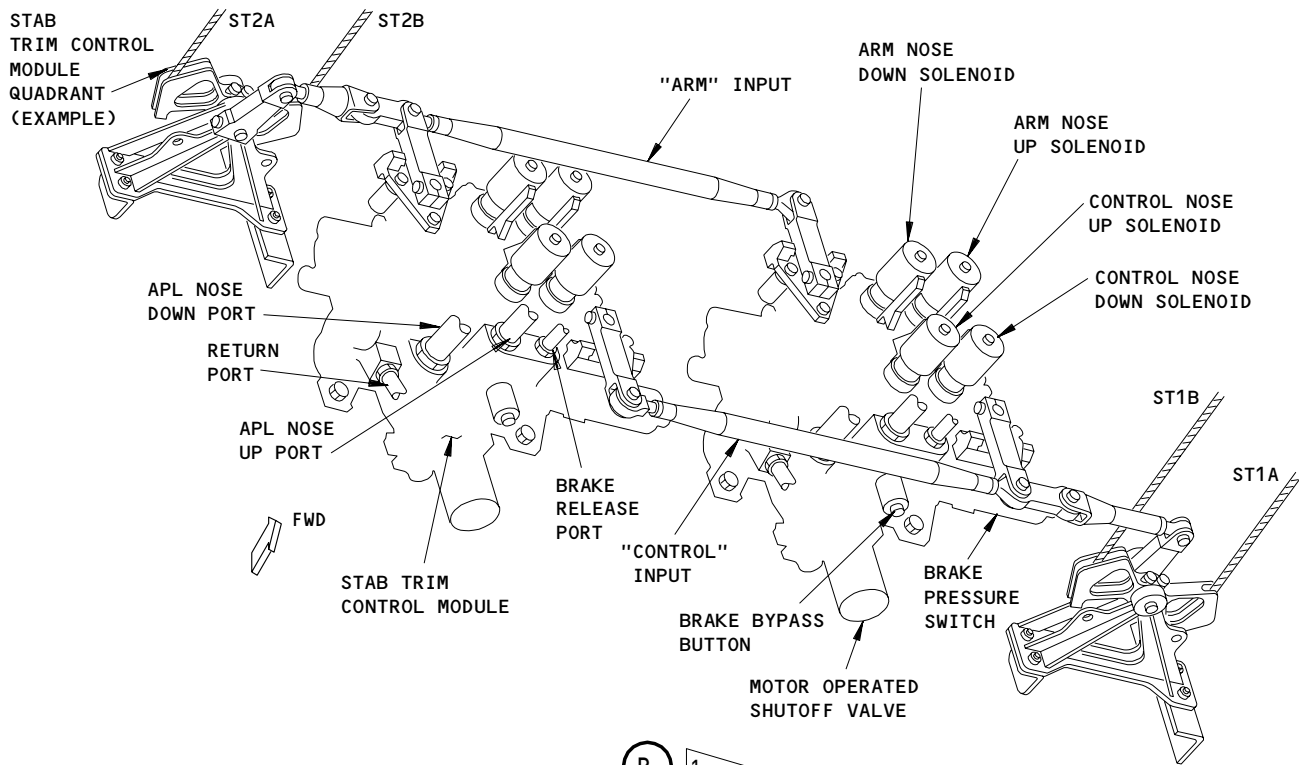
Stabilizer Trim Ballscrew Actuator Compartment Components  
Figure 6 (Sheet 1)

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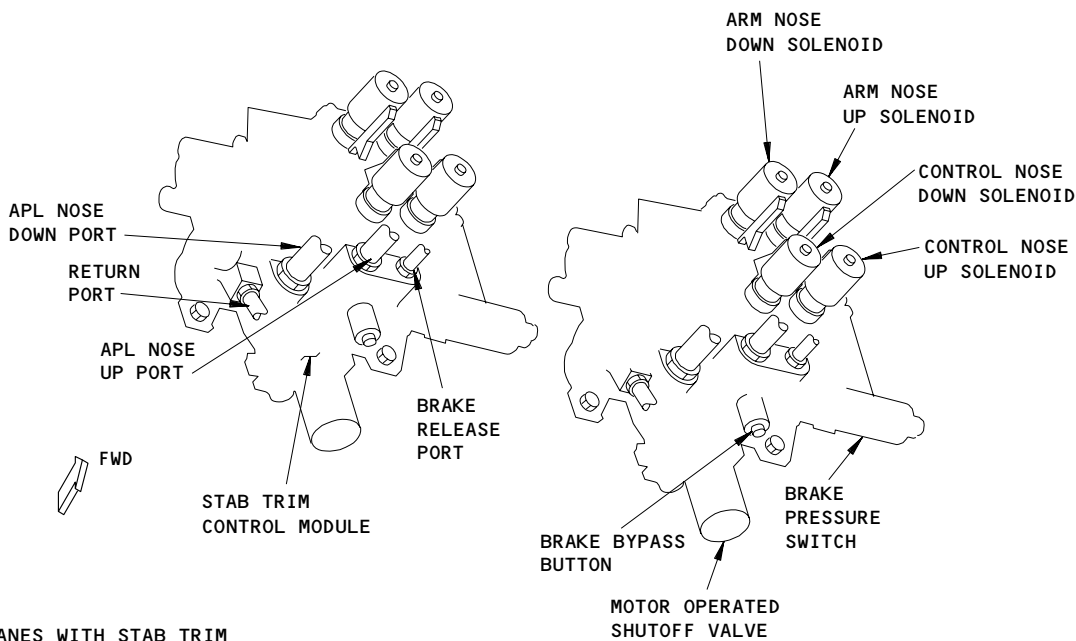
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(B) 1



(B) 2

- 1 AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND
- 2 AIRPLANES WITH ALTN STAB TRIM SWITCHES ON THE CONTROL STAND

Stabilizer Trim Ballscrew Actuator Compartment Components  
Figure 6 (Sheet 2)

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- (5) Each STCM controls the flow of hydraulic fluid to one side of the drive hydraulic motors and secondary brakes of the ballscrew actuator. A brake pressure switch on each STCM sends an agreement signal on the operating condition of the secondary brakes to the SAM. The SAM analyzes the signal as a check to make sure the brakes are operating correctly. The simultaneous operation of both STCM's will produce twice the stabilizer trim rate of just one STCM.
  - (6) Two hydraulic fuses are installed in the left hydraulic system pressure lines downstream of the left STCM. The fuses are upstream of the left and right elevator PCAs. If a hydraulic line rupture occurs downstream, the fuses close to prevent hydraulic fluid loss and permit stabilizer operation.
- H. Stabilizer Trim Ballscrew Actuator (Fig. 6)
- (1) The stabilizer trim ballscrew actuator is located forward and above the stabilizer center section. The ballscrew actuator is attached to bulkhead structure at the top and to stabilizer structure at the bottom.
  - (2) The ballscrew actuator includes two drive hydraulic motors and two hydraulically released secondary brakes. The secondary brakes are mechanically spring-loaded on and hydraulically powered off. They have a release pressure of 1000 ±50 psi (6895 +/- 345 kPa). The ballscrew actuator consists of a differential gearbox and primary brakes. The differential gearbox has a dual load path for motor operation of the ballscrew. The primary brakes are an irreversible friction brake where air loads develop the resisting torque. The ballscrew actuator is attached to the airplane by upper and lower gimbals. The upper gimbal attaches the actuator to the top of the airframe structure and the lower gimbal attaches the ballnut trunnion to the stabilizer fitting. The ballnut trunnion has dual recirculating ball circuits for smooth stabilizer movement. A safety rod provides a redundant tension load path between the upper gimbal and lower stop.
  - (3) The two drive hydraulic motors are identical units. They require no flight line adjustments. The gearbox differential has a dual load path which permits one motor to trim while the opposite brake is still applied. A single operating motor will provide only one-half rate of trim. The two secondary brakes are identical.
  - (4) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
in the manual trim mode, there are mechanical stops on the upper and lower gimbals to limit ballscrew movement. The leading edge up limit is +2° stabilizer angle or 0 units of trim on position indicator or Dimension A on ballscrew actuator of 0.50 inch (12.7 mm). The leading edge down limit is -12.5° stabilizer angle or 14.20 units of trim on position indicator or Dimension A of 24.96 inches (634.0 mm).

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- (5) AIRPLANES WITH ALTN STAB TRIM SWITCHES ON THE CONTROL STAND;  
in the alternate-electric-stabilizer trim mode, there are mechanical stops on the upper and lower gimbals to limit ballscrew movement. The leading edge up limit is +2° stabilizer angle or 0 units of trim on position indicator or Dimension A on ballscrew actuator of 0.50 inch (12.7 mm). The leading edge down limit is -12.5° stabilizer angle or 14.20 units of trim on position indicator or Dimension A of 24.96 inches (634.0 mm).
- (6) For all stabilizer trim operating modes, except alternate trim mode, the leading edge DOWN travel limit varies as follows:
  - (a) 767-300 AIRPLANES;  
the leading edge DOWN limit is -11.0 degree stabilizer angle, or 12.8 units of trim, or Dimension A of 22.43 inches (569.7 millimeters).
  - (b) 767-200 AIRPLANES;  
the leading edge DOWN limit is -9.94 degree stabilizer angle, or 11.8 units of trim, or Dimension A of 20.64 inches (575.0 mm).
- (7) For all stabilizer trim modes, except alternate trim mode, the flaps retracted/not retracted position determines the leading edge UP limit. When the flaps are UP (retracted), the UP limit is 0.50 degree stabilizer angle, or 1.5 units of trim, or Dimension A is 3.00 inches (76.2 mm).  
When the flaps are DOWN (not retracted), the UP limit is 1.75 degree stabilizer angle, or 0.25 unit of trim, or Dimension A is 0.92 inch (23.4 mm).

I. Horizontal Stabilizer Electronic Components (Fig. 3)

- (1) The stabilizer trim and aileron lockout modules (SAM), flight control computers (FCC), and air data computers (ADC) are in the main equipment center. The SAM (L) is in the E1-1 rack and SAM (R) is in the E2-1 rack. The FCC (L) is in the E1-3 rack, FCC (C) is in the E1-4 rack and FCC (R) is in the E1-5 rack. The ADC (L) is in the E1-3 rack and ADC (R) is in the E2-3 rack. The flap/stabilizer position module (FSPM) is located in the P50 card file of the flap/stabilizer position module.

3. Operation (Fig. 7)

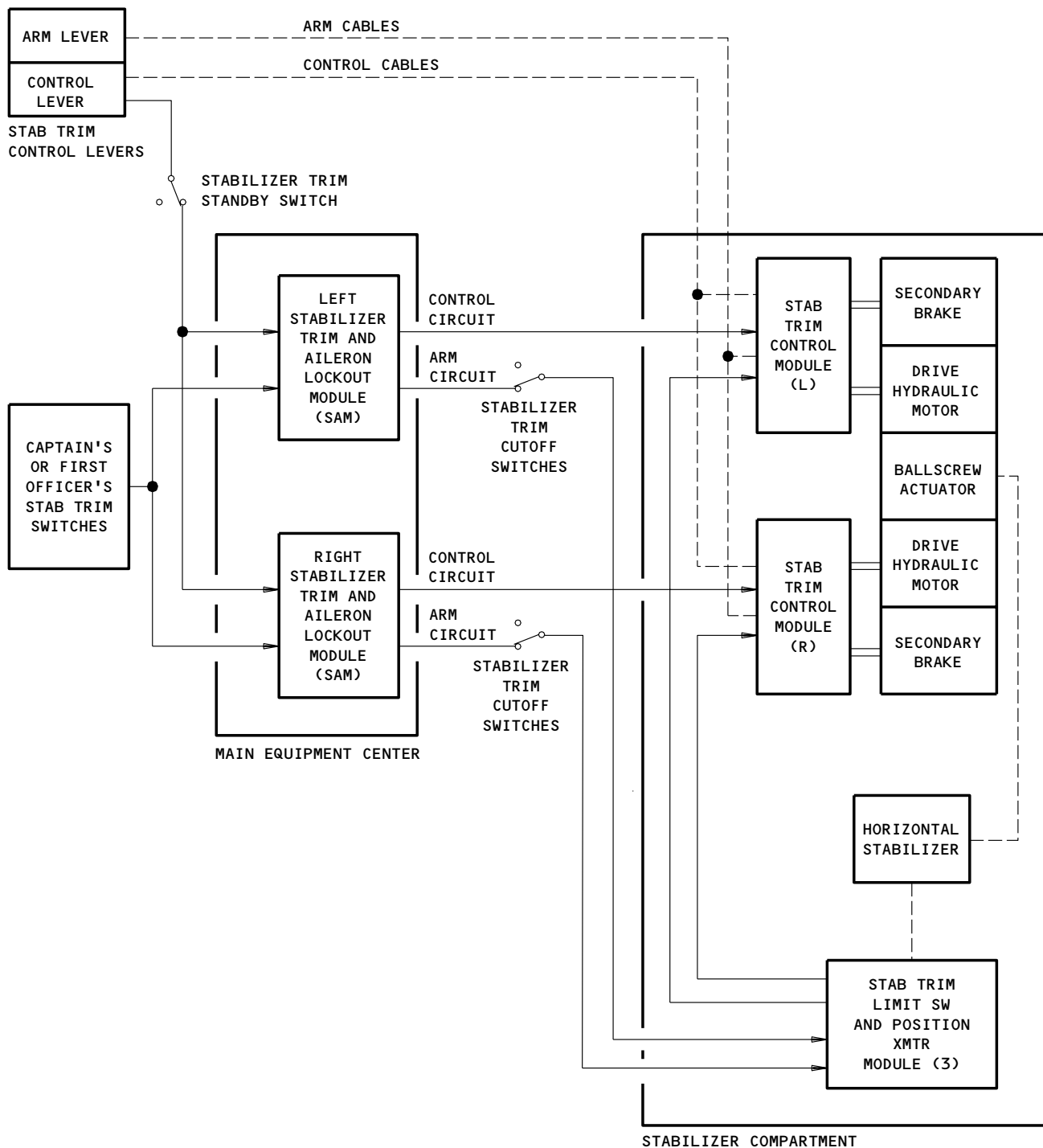
A. Functional Description

- (1) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
dual STAB TRIM levers control the stabilizer in the manual control mode. The levers are connected to STCM's by cables. One lever activates the arm hydraulic valve in the STCM's and the other lever activates the control hydraulic valve. These valves are moved by links and control rods from the rear quadrants and override all electric trim solenoid signals. The STCM's port hydraulic fluid to the ballscrew actuator. The ballscrew actuator provides stabilizer trim movement.

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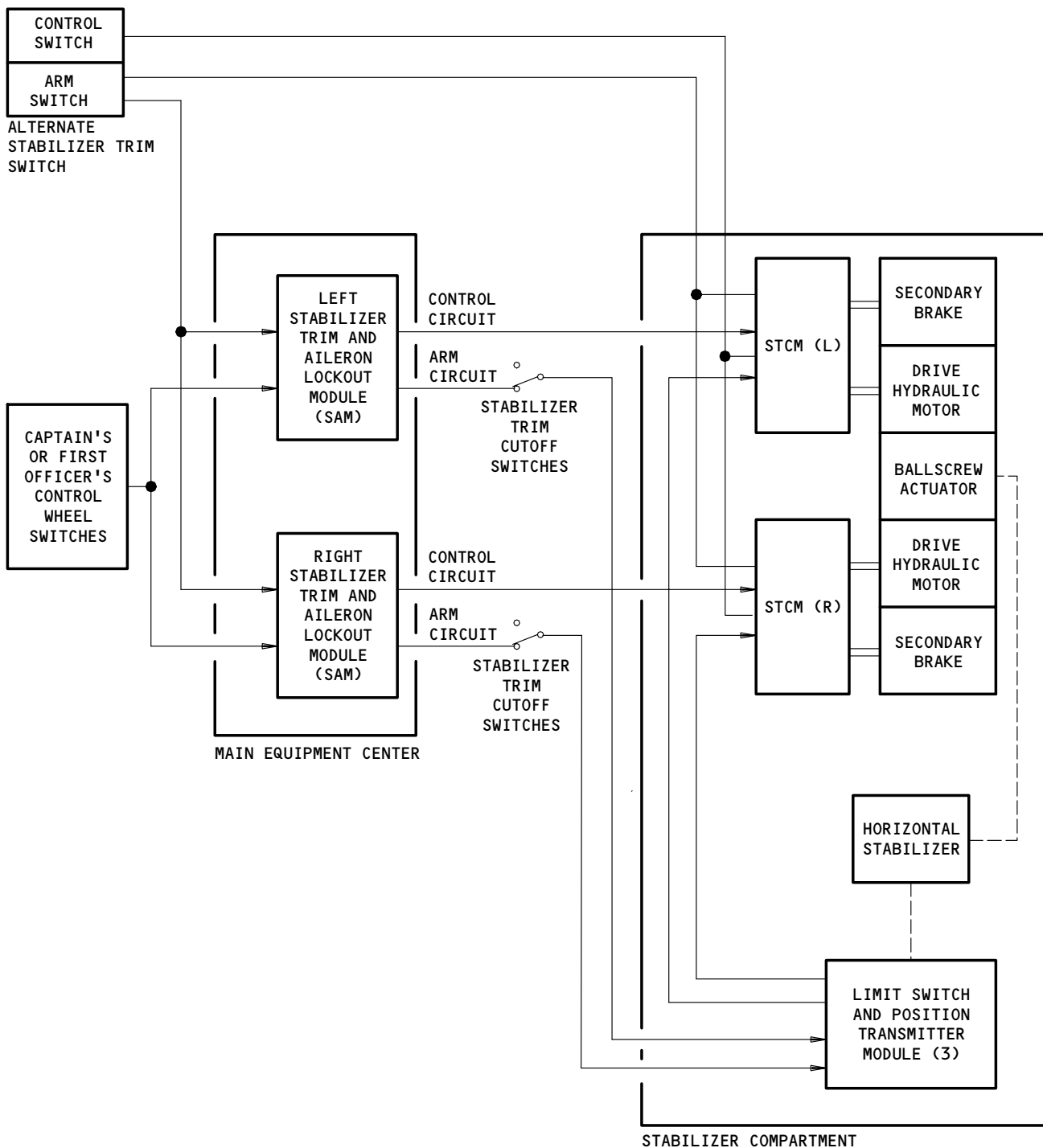


Stabilizer Trim System Manual Operation  
Figure 7 (Sheet 1)

EFFECTIVITY  
AIRPLANES WITH ALTERNATE STAB  
TRIM LEVERS ON THE CONTROL STAND

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Stabilizer Trim System Manual Operation  
Figure 7 (Sheet 2)

EFFECTIVITY  
AIRPLANES WITH THE SAM AND ALTERNATE  
STAB TRIM SWITCHES ON THE CONTROL STAND

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- (2) AIRPLANES WITH ALTN STAB TRIM SWITCHES ON THE CONTROL STAND; the two ALTN STAB TRIM switches control the stabilizer in the alternate-electric-stabilizer trim mode. One switch activates the arm hydraulic valve in the STCMs and the other switch activates the control hydraulic valve. These valves are activated by the switches through solenoids in the STCMs. The solenoids port hydraulic pressure to move the arm and control hydraulic valve, which then port pressure to the hydraulic motor and secondary brake. The hydraulic motor supplies power to the ballscrew actuator and moves the stabilizer.
- (3) During electrical trim control, the SAM selects the priority mode, either the autopilot (FCC) or the manual electric (control switches). The FCC sends the trim signals to the SAM for the autopilot mode. The captain's or first officer's stabilizer trim control wheel switches send the signals to the SAM for the manual electric mode. The SAM sends separate arm and control signals directly to the STCM NOSE UP or NOSE DOWN solenoid valves. The solenoid valves permit the flow of hydraulic fluid to the motors and brakes of the ballscrew actuator. The ballscrew actuator provides stabilizer trim movement.
- (4) The left and right STCM's receive hydraulic pressure of 3000 psi (20684 kPa) from the left and center systems. Hydraulic power is removed from the STCM's by two motor-operated shutoff valves. The valves are operated by the stabilizer trim shutoff switches on the control stand. The STCM's are located upstream of the tail isolation valves.
- (5) When the left and center hydraulic systems fail, the left STCM receives hydraulic power from a power transfer unit (PTU) driven by the right hydraulic system. An isolation valve will close when the left system pressure or quantity is low. This isolates a dedicated amount of left system fluid for the PTU to operate the left STCM. The PTU is activated when the center hydraulic system pressure is also low, and the Captain's and First Officer's control wheel switches are operated. For more information on the PTU system operation, refer to AMM 29-22-00/001, Description and Operation.
- (6) The left hydraulic system fuses installed downstream of the left STCM operate by spring-action. The fuses close when the pressure drop across the fuse increases because of a failed component or line rupture downstream. The fuses automatically reset when the pressures on the two sides are the same. A time delay in each fuse prevents setting during pressure surges that occur when the hydraulic system is pressurized.
- (7) The flow rate of hydraulic fluid to the ballscrew actuator is regulated by a rate valve within each STCM. The valve is positioned by a hydraulic pressure signal from the elevator feel computer. The signal is a function of airspeed. This action causes the trim rate of the stabilizer to be varied according to airspeed.

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- (8) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
in the standby manual control mode, mechanical input from STAB TRIM control levers through stabilizer trim cables, is input to STCM's at the manual standby arming and control valves. The spring centering of these valves moves the STAB TRIM control levers to their neutral position when they are released. Movement of the manual standby valves to the nose up/down position will cause relief of hydraulic pressure on the ends of the main arm and control valves, moving them both to the nose up/down position. The manual standby valves are upstream of the solenoid valves, thus establishing manual priority over all electrical inputs. Metered flow from system pressure through the rate control valve, now has a path through the arm and control valves in series to release the hydraulic brake and to power the nose up/down side of the hydraulic motor.
- (9) AIRPLANES WITH ALTN STAB TRIM SWITCHES ON THE CONTROL STAND;  
in the alternate-electric-stabilizer trim control mode, electrical input from ALTN STAB TRIM switch is received by the STCM. The electrical input causes nose up/down solenoids (arm and control) on the STCM to rotate, which decreases pressure on the airplane nose up/down side of the arm and control valves. The valves then move and direct hydraulic flow. This hydraulic flow comes from system pressure and is metered by a rate control valve. From the arm and control valves, the hydraulic flow goes to release the hydraulic brake and to power the nose up/down side of the hydraulic motor.
- (10) In the manual electric control or autopilot control modes, electrical input from the SAMs causes the nose up/down solenoids (arm and control) on the STCMs to rotate. This removes the pressure from the airplane nose down/up side of the main arm and control valves. The main valves now move to the airplane nose up/down position. Metered flow from system pressure through the rate control valve, now has a path through the arm and control valves in series to release the hydraulic brake and to power the nose up/down side of the hydraulic motor.
- (11) Both hydraulic released secondary brakes and drive hydraulic motors act through the differential gearbox to trim the stabilizer for airplane nose up/down trim. The ratcheted drum brake is always engaged to prevent air loads from back driving the stabilizer.
- (12) Each STCM contains a brake pressure switch. The switch sends a signal to the SAM. The SAM does a check to see if the switch is operating correctly. A manual brake bypass button on the STCM relieves pressure to the brakes. The button is used to test the secondary brake reaction torque.
- (13) Limit Switches and Position Transmitter Modules (LSTMs) set the limit for stabilizer electrical travels. LSTMs interrupt electrical trim action if a system malfunction drives the stabilizer to either the up or down mechanical motion stop.
- B. Stabilizer Trim Fault Indication System (Fig. 8)
- (1) Stabilizer position and stabilizer trim control system faults are indicated in the flight compartment for the following reasons:
- (a) Unscheduled stabilizer trim.
  - (b) Faulty stabilizer trim drive rate.

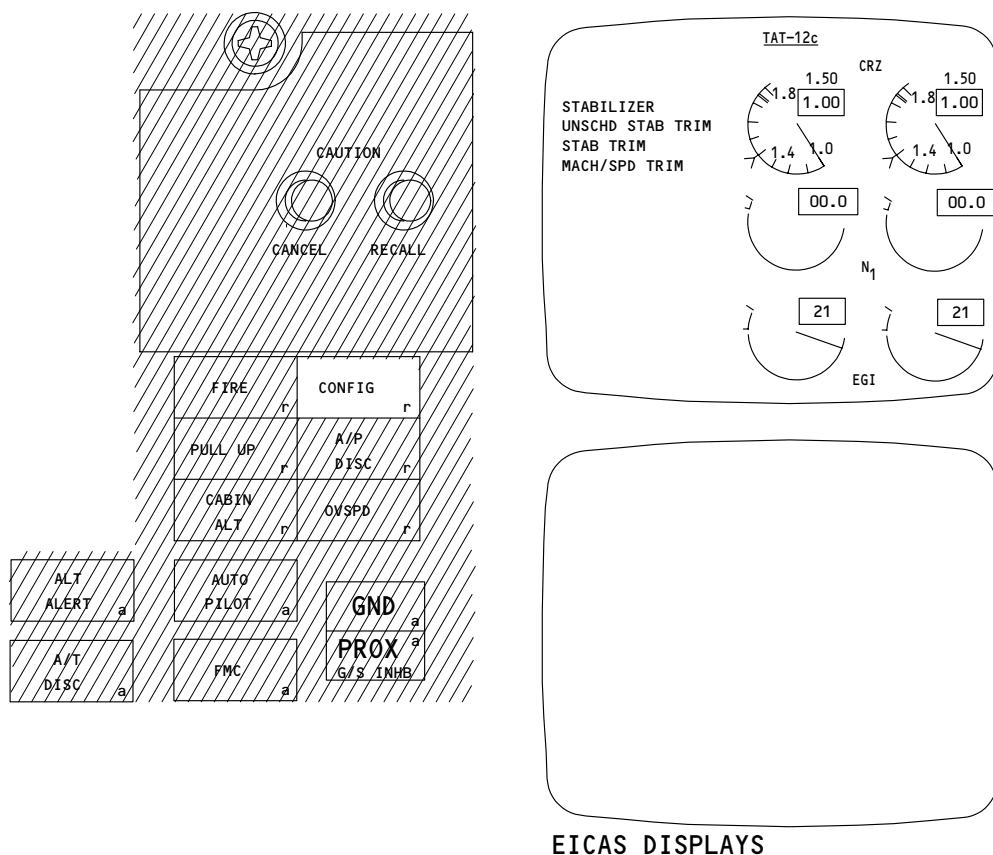
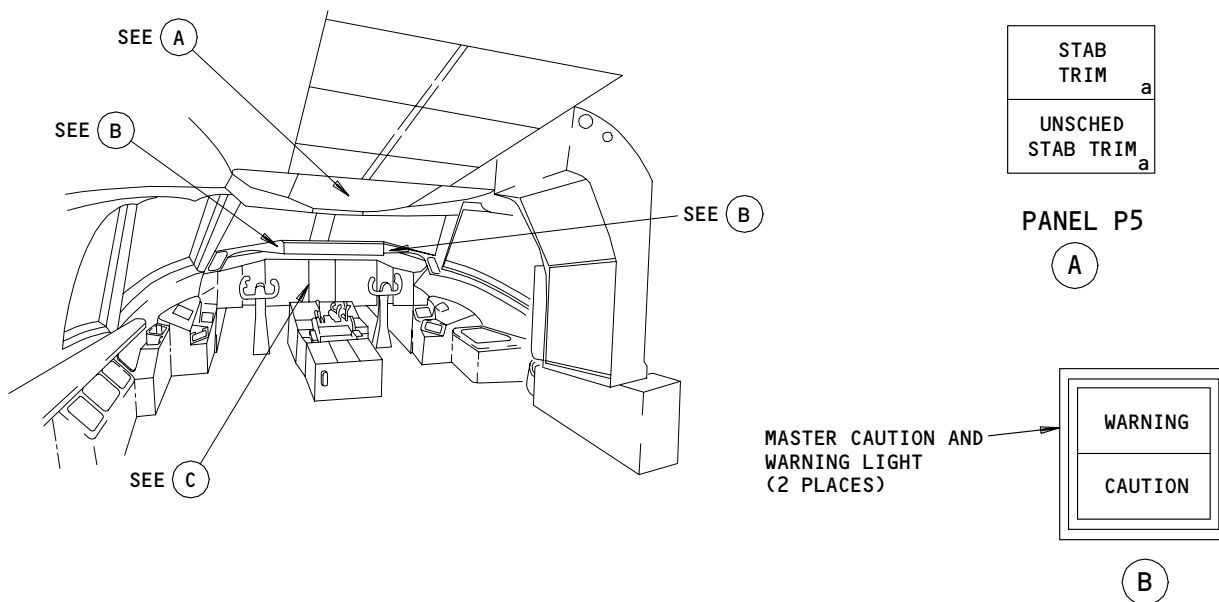
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Stabilizer Trim System Fault Indications  
Figure 8

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- (c) Loss of power to control stand stabilizer trim position indicators.
- (d) Loss of input signal to control stand stabilizer trim position indicators.
- (e) Incorrect stabilizer position for takeoff.
- (2) The unscheduled stabilizer trim fault warning alerts the crew of an unscheduled stabilizer trim. Each SAM provides an unscheduled stabilizer trim fault signal. The unscheduled trim fault warning operates when power is supplied to the airplane. The unscheduled stabilizer trim fault warnings consist of:
  - (a) An amber UNSCHED STAB TRIM light on pilot's overhead panel P5.
  - (b) An EICAS message (UNSCHD STAB TRIM).
  - (c) An aural caution
- (3) The stabilizer trim fault warning alerts the crew when there is a loss of full rate trim during manual electric trim due to actuation or aircraft wiring faults of the SAM. Each SAM provides a stabilizer trim fault signal. The fault warning is operative whenever power is supplied to the airplane. The fault warnings consist of:
  - (a) An amber STAB TRIM light on panel P5.
  - (b) An EICAS message (STAB TRIM).
  - (c) An aural caution
- (4) The stabilizer trim position indicator, located on the P10 control stand, has two indicator faults. An OFF flag will appear if there is a loss of power and the indicating tape will disappear if there is a loss of the input signal.
- (5) The takeoff configuration warning alerts the crew of an incorrect configuration prior to or during the takeoff roll. The takeoff warning is on when the airplane is on the ground and takeoff power is applied to either engine. When turned on, the takeoff warning will be activated when the stabilizer position is outside of the takeoff range. The takeoff configuration warnings consists of:
  - (a) A red CONFIG warning light on the pilot's P2 panel.
  - (b) An aural warning siren.
  - (c) An EICAS red warning message (STABILIZER).
  - (d) Illumination of the captain's and first officer's master warning lamps (P7 glareshield panel).

NOTE: Warnings a, b, and c, when activated due to a wrong configuration, can only be cancelled by correcting the configuration. Warning d may be cancelled at any time by the pilot or will automatically go out when the configuration is corrected.

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- (6) Continuous built-in test (BIT) monitoring is provided in the SAM. Each SAM isolates faults to the LRU level within the stabilizer trim and aileron lockout systems. The BIT is capable of detecting and locating to the LRU level at least 95 percent of all intermittent and steady failures.
- (a) LRU fault indication is provided on each SAM front panel by non-volatile fault balls. The fault balls are latched to annunciate transient faults. The fault balls are cleared by the power-up reset or the maintenance RESET button.
  - (b) The SAM fault ball is set by the SAM fault latch or by fault identification logic in the CONTROL microprocessor. If the SAM fault ball is set, other fault ball annunciation is disabled.
  - (c) The FCC fault ball is set by a FCC fault or an ARINC 429 bus fault. The fault is cleared if valid data is continuously received for five seconds.
  - (d) The ADC fault ball is set by an ADC fault or an ARINC 429 bus fault. The fault is cleared if valid data is continuously received for at least 30 seconds.
  - (e) The TRIM SW fault ball is set by the manual trim input coincidence monitor. The manual trim input coincidence monitor detects faults in the thumb switch inputs.
  - (f) The MAN LEVER SW faultball is set if the stabilizer trim control lever or switch is out of neutral position for more than 30 seconds.
  - (g) The FSPM fault ball is set by stabilizer or flap position faults. The fault ball is not latched.
  - (h) The STCM fault ball is set by the hydraulic brake pressure switch monitor. The brake monitor will set the fault ball if the brake is released for two seconds without a valid command or if the brake is not released within one second of a valid command. The mach/speed monitor will set the fault ball if the stabilizer moves 0.3° without a valid command or if the stabilizer does not move within two seconds of a valid command. The STCM fault ball will not be set when low hydraulic pressure is sensed by the STCM. The SAM will receive the low hydraulic pressure signal from the STCM and will set the HYD PRESS fault ball instead of the STCM fault ball.
  - (i) The AIR/GND fault ball is set from the air/ground discretes monitor. A first or second air/ground discrete fault sets the fault ball.
  - (j) The HYD PRESS fault ball is set from the hydraulic pressure monitor. Low system hydraulic pressure sets the fault ball.

C. Control (Fig. 9)

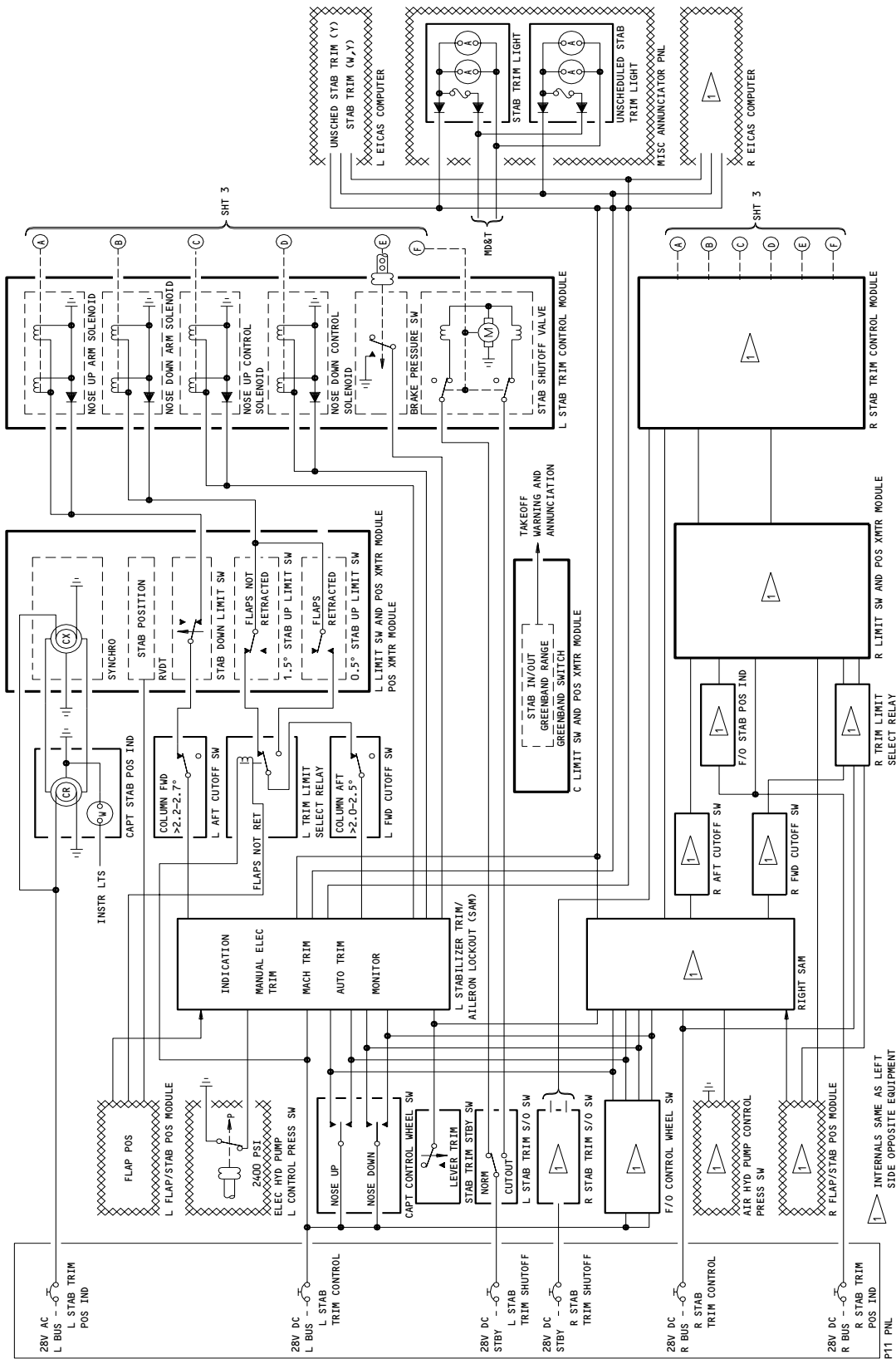
(1) Manual - Electric Operation

- (a) Provide electrical power (AMM 24-22-00/201).
- (b) Make sure that the LEFT, RIGHT AND CENTER TAIL FLT CONT SHUTOFF switches on the right side panel P61 are OFF.
- (c) Make sure these circuit breakers on overhead panel P11 are closed:
  - 1) 11C12, STAB TRIM SHUTOFF L

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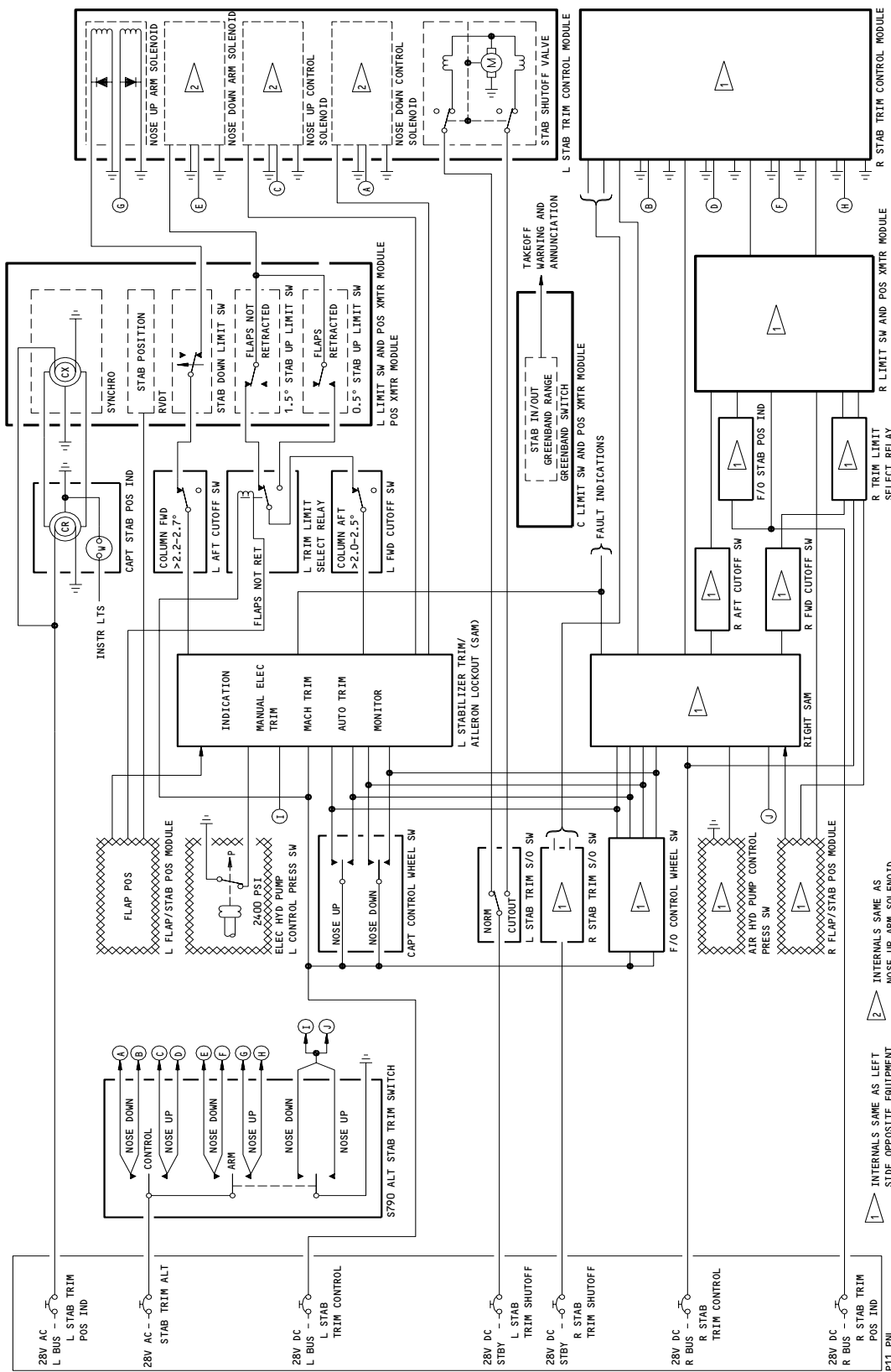


Horizontal Stabilizer Trim Control System Schematic  
Figure 9 (Sheet 1)

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SAS 150-154

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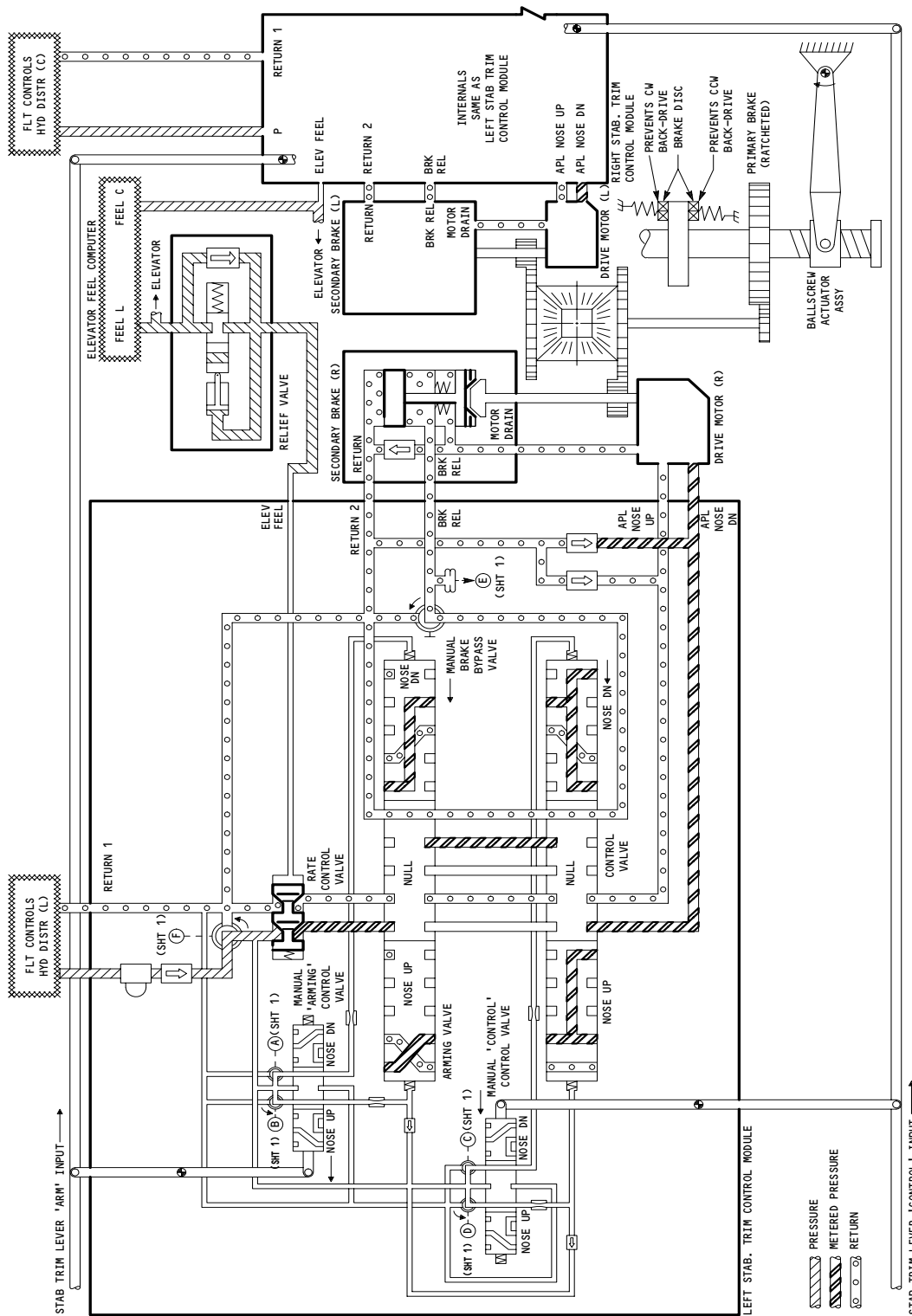


Horizontal Stabilizer Trim Control System Schematic  
Figure 9 (Sheet 2)

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SAS 155-999 AND ALL MTH AIRPLANES

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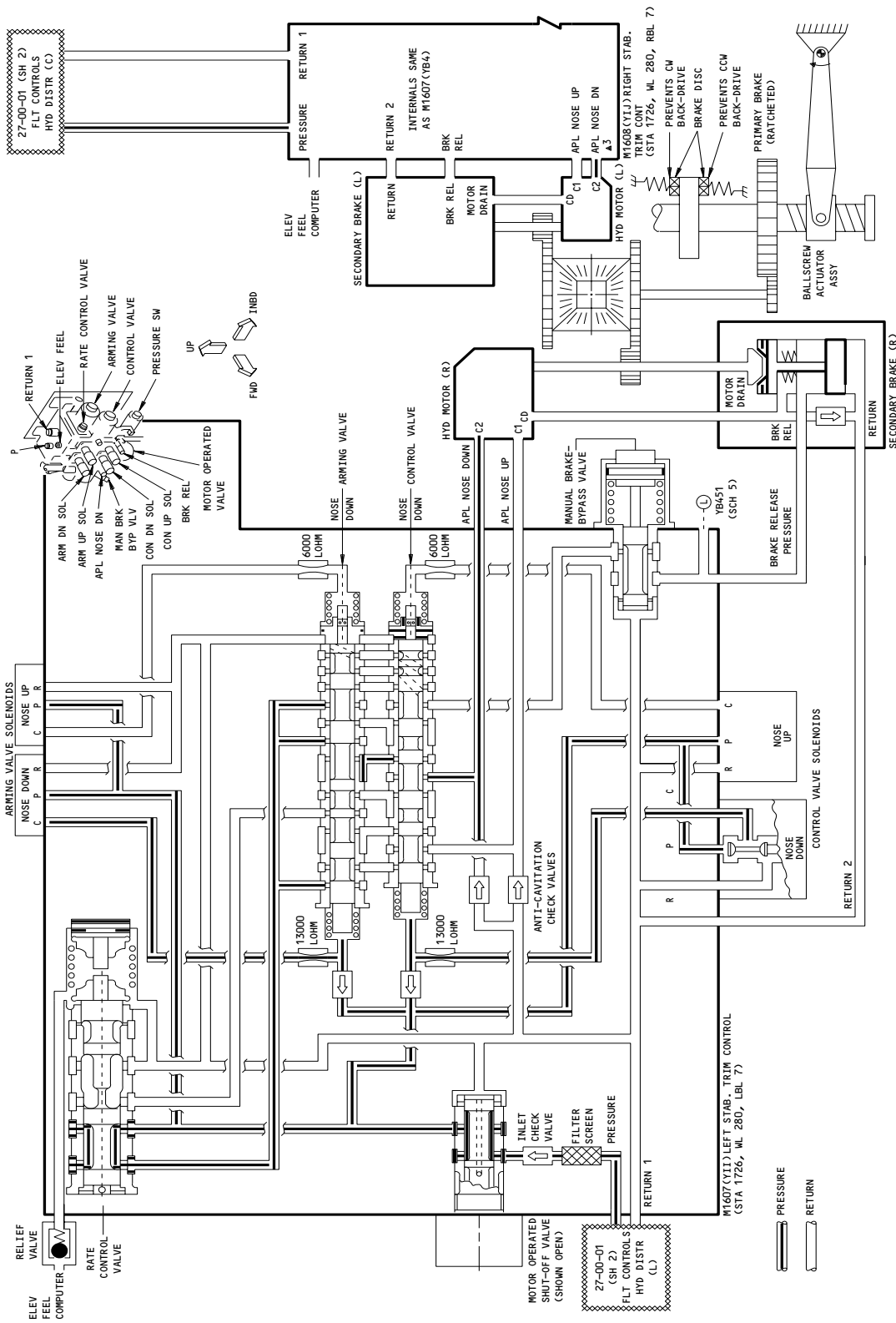




Horizontal Stabilizer Trim Control System Schematic  
Figure 9 (Sheet 3)

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SAS 150-154

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Horizontal Stabilizer Control System Schematic  
Figure 9 (Sheet 4)

EFFECTIVITY  
SAS 155-999 AND ALL MTH AIRPLANES

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- 2) 11C13, STAB TRIM SHUTOFF CENTER  
(d) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on panel P10 in the NORM position.

**WARNING:** AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT COULD RESULT.

- (e) Supply hydraulic power to the left and center systems (AMM 29-11-00/201).  
(f) Move the stabilizer in airplane NOSE DOWN (stabilizer leading edge up) direction by moving either the captain's or first officer's stabilizer trim control wheel switches.  
(g) Move the stabilizer in the airplane NOSE UP (stabilizer leading edge down) direction by moving either the captain's or first officer's stabilizer trim control wheel switches.  
(h) Remove the left and center systems hydraulic power (AMM 29-11-00/201).  
(i) Remove the electrical power (AMM 24-22-00/201).  
(2) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
Manual-Mechanical Operation

**WARNING:** AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT COULD RESULT.

- (a) Supply the left and center systems hydraulic power (AMM 29-11-00/201).

**CAUTION:** THE BALLSCREW MECHANICAL STOPS ARE INTENDED FOR BACKUP ONLY IN THE EVENT OF A LIMIT SWITCH FAILURE. AVOID RUNNING THE STABILIZER INTO MECHANICAL STOPS.

- (b) Push the STAB TRIM control levers on the control stand to move stabilizer in airplane NOSE DOWN (stabilizer leading edge up) direction.

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- (c) Pull the STAB TRIM control levers on the control stand to move stabilizer in airplane NOSE UP (stabilizer leading edge down) direction.
  - (d) Remove the left and center systems hydraulic power (AMM 29-11-00/201).
- (3) AIRPLANES WITH ALTN STAB TRIM SWITCHES ON THE CONTROL STAND;  
Alternate-Electric Operation

**WARNING:** AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE CLEAR OF ALL CONTROL SURFACES BEFORE YOU SUPPLY HYDRAULIC POWER. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD RESULT.

- (a) Supply left and center systems hydraulic power (AMM 29-11-00/201).

**CAUTION:** THE BALLSCREW MECHANICAL STOPS ARE INTENDED FOR BACKUP ONLY IN THE EVENT OF A LIMIT SWITCH FAILURE. AVOID RUNNING THE STABILIZER INTO MECHANICAL STOPS.

- (b) Push the ALTN STAB TRIM switch forward to move the stabilizer in the airplane NOSE DOWN (stabilizer leading edge up) direction.
- (c) Push the ALTN STAB TRIM switch aft to move the stabilizer in the airplane NOSE UP (stabilizer leading edge down) direction.
- (d) Remove the left and center systems hydraulic power (AMM 29-11-00/201).




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 **BOEING**  
767  
FAULT ISOLATION/MAINT MANUAL

HORIZONTAL STABILIZER TRIM CONTROL SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ACTUATOR - STAB TRIM BALLSCREW	2	1	312AR, 48 SECT	27-41-10
BRAKE - STAB TRIM SECONDARY	2	2	312AR, 48 SECT, STAB TRIM BALLSCREW ACTUATOR	27-41-13
CIRCUIT BREAKER -	1		FLT COMPT, P11	
ALT STAB TRIM, C1010 		1	11A36	*
STAB TRIM CONTROL LEFT, C1017		1	11H11	*
STAB TRIM CONTROL R, C1018		1	11H20	*
STAB TRIM SHUTOFF CENTER, C1529		1	11C13	*
STAB TRIM SHUTOFF L, C1528		1	11C12	*
COMPUTER - (FIM 31-61-00/101)				
L EICAS, M10181				
R EICAS, M10182				
INDICATOR - (FIM 27-48-00/101)				
STAB POSITION, N68, N69				
LEVER - STAB TRIM 	1	2	FLT COMPT, CONTROL STAND (P10)	27-41-02
LIGHT - STAB TRIM CAUTION, L13	1		FLT COMPT, P5, ANNUNCIATOR PNL, M10394	*
LIGHT - UNSCHED STAB TRIM CAUTION, L17	1		FLT COMPT, P5, ANNUNCIATOR PNL, M10394	*
MODULE - (FIM 27-51-00/101)				
C FLAP/STAB POS, M839				
L FLAP/STAB POS, M838				
R FLAP/STAB POS, M840				
MODULE - (FIM 27-09-00/101)				
STAB TRIM/AILERON LOCKOUT L, M524				
STAB TRIM/AILERON LOCKOUT R, M525				
MODULE - STAB TRIM CONTROL L, M211	2	1	312AR, 48 SECT	27-41-05
MODULE - STAB TRIM CONTROL R, M212	2	1	312AR, 48 SECT	27-41-05
MODULE - (FIM 27-48-00/101)				
STAB TRIM LIMIT SW AND POS XMTR, M519, M520, M521				
MOTOR - STAB TRIM DRIVE HYDRAULIC	2	2	312AR, 48 SECT, STAB TRIM BALLSCREW ACTUATOR	27-41-11
PANEL - ANNUNCIATION, M10394	1		FLT COMPT, P5	*
QUADRANT - STAB TRIM CONTROL MODULE 	2	2	312AR, 48 SECT	27-41-06
RELAY - TRIM LIMIT SELECT L, K1070	3	1	119AL, E1-1 SHELF	*
RELAY - TRIM LIMIT SELECT R, K1071	3	1	119AL, E2-1 SHELF	*

\* SEE THE WDM EQUIPMENT LIST

Horizontal Stabilizer Trim Control System - Component Index  
Figure 101 (Sheet 1)

EFFECTIVITY

ALL

**27-41-00**

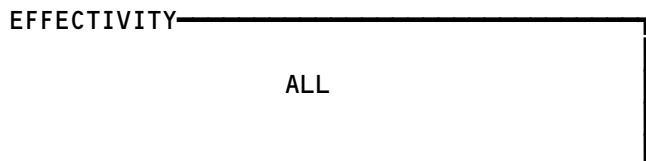
**BOEING**  
767  
FAULT ISOLATION/MAINT MANUAL

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
SOLENOID - ARM NOSE DOWN, YB4V4,YB5V4	2	2	312AR, 48 SECT, STAB TRIM CONT MOD	*
SOLENOID - ARM NOSE UP, YB4V1,YB5V1	2	2	312AR, 48 SECT, STAB TRIM CONT MOD	*
SOLENOID - CONTROL NOSE DOWN, YB4V5,YB5V5	2	2	312AR, 48 SECT, STAB TRIM CONT MOD	*
SOLENOID - CONTROL NOSE UP, YB4V2,YB5V2	2	2	312AR, 48 SECT, STAB TRIM CONT MOD	*
SWITCH - ALT STAB TRIM, S790 <span style="border: 1px solid black; padding: 0 2px;">2</span>	1	1	FLT COMPT, CONTROL STAND (P10)	27-41-03
SWITCH - BRAKE PRESS, YB4S1,YB5S1	2	2	312AR, 48 SECT, STAB TRIM CONT MOD	27-41-07
SWITCH - CAPT STAB TRIM CONT WHEEL, S80	1	1	FLT COMPT, CAPT CONT WHEEL	27-41-01
SWITCH - CAPT STAB TRIM CUTOFF, S334,S335 <span style="border: 1px solid black; padding: 0 2px;">7</span>	5	2	113AL, CAPT COLUMN TORQUE TUBE	*
SWITCH - CAPT STAB TRIM CUTOFF, S334,S335, S336 <span style="border: 1px solid black; padding: 0 2px;">5</span>	5	3	113AL, CAPT COLUMN TORQUE TUBE	*
SWITCH - CAPT STAB TRIM CUTOFF, S334,S335, S336,S838,S839 <span style="border: 1px solid black; padding: 0 2px;">6</span>	6	5	113AL, CAPT COLUMN TORQUE TUBE	*
SWITCH - CAPT STAB TRIM CUTOFF, S334,S335, S838,S839 <span style="border: 1px solid black; padding: 0 2px;">8</span>	6	4	113AL, CAPT COLUMN TORQUE TUBE	*
SWITCH - F/O STAB TRIM CONT WHEEL, S81	1	1	FLT COMPT, F/O CONT WHEEL	27-41-01
SWITCH - F/O STAB TRIM CUTOFF, S337,S338 <span style="border: 1px solid black; padding: 0 2px;">7</span>	5	2	113AL, F/O COLUMN TORQUE TUBE	*
SWITCH - F/O STAB TRIM CUTOFF, S337,S338, S339 <span style="border: 1px solid black; padding: 0 2px;">5</span>	5	3	113AL, F/O COLUMN TORQUE TUBE	*
SWITCH - F/O STAB TRIM CUTOFF, S337,S338, S339,S836,S837 <span style="border: 1px solid black; padding: 0 2px;">6</span>	6	5	113AL, F/O COLUMN TORQUE TUBE	*
SWITCH - F/O STAB TRIM CUTOFF, S337,S338, S836,S837 <span style="border: 1px solid black; padding: 0 2px;">8</span>	6	4	113AL, F/O COLUMN TORQUE TUBE	*
SWITCH - STAB TRIM SHUTOFF L, S5	1	1	FLT COMPT, CONTROL STAND	*
SWITCH - STAB TRIM SHUTOFF R, S6	1	1	FLT COMPT, CONTROL STAND	*
SWITCH - STAB TRIM STANDBY, S538	1	1	FLT COMPT, CONTROL STAND	27-41-14
VALVE - ELEV FEEL PRESS RELIEF	2	1	312AR, 48 SECT, STAB TRIM CONT MOD	27-41-00

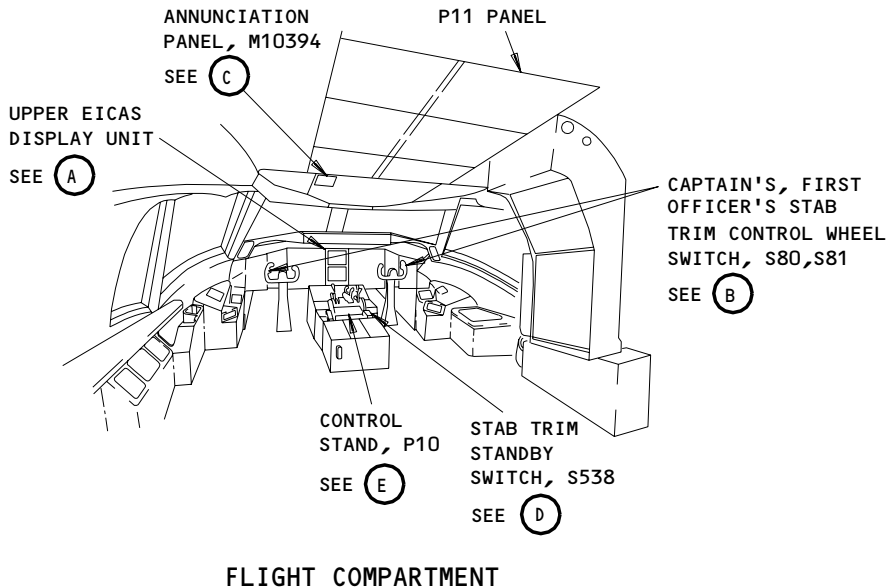
\* SEE THE WDM EQUIPMENT LIST

- 1 SAS 150-154
- 2 ALL MTH AIRPLANES AND ALL EXCEPT SAS 150-154
- 3 767-200 AIRPLANES
- 4 767-300 AIRPLANES
- 5 SAS 050,051 WITHOUT SB 27-102
- 6 SAS 050,051 WITH SB 27-102, AND SAS 052-149
- 7 SAS 150-166,275-277,279 WITHOUT SB 27-102
- 8 SAS 150-166,275-277,279 WITH SB 27-102, AND SAS 167-274,278,280-999

Horizontal Stabilizer Trim Control System - Component Index  
Figure 101 (Sheet 2)

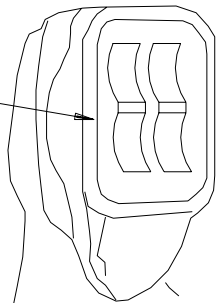


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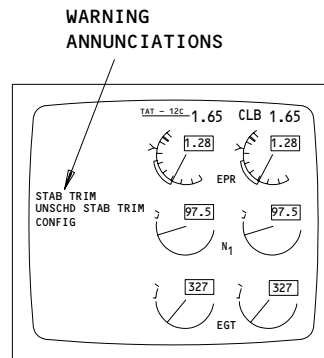


**FLIGHT COMPARTMENT**

CAPTAIN'S, FIRST OFFICER'S STAB TRIM CONTROL WHEEL SWITCH, S80, S81



(B)

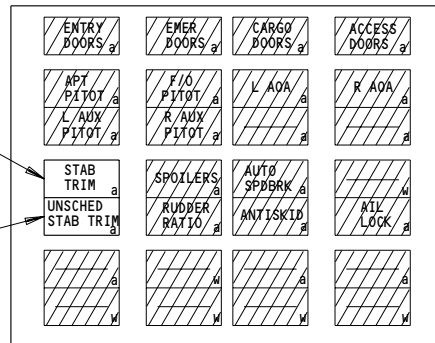


**UPPER EICAS DISPLAY UNIT**

(A)

STAB TRIM CAUTION LIGHT, L13

UNSCHEDULED STAB TRIM CAUTION LIGHT, L17



**ANNUNCIATION PANEL, M10394**

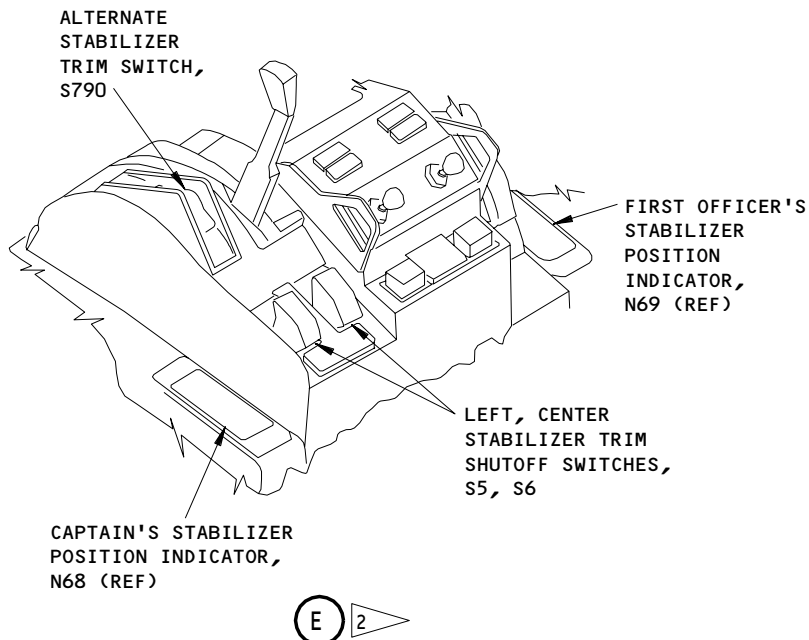
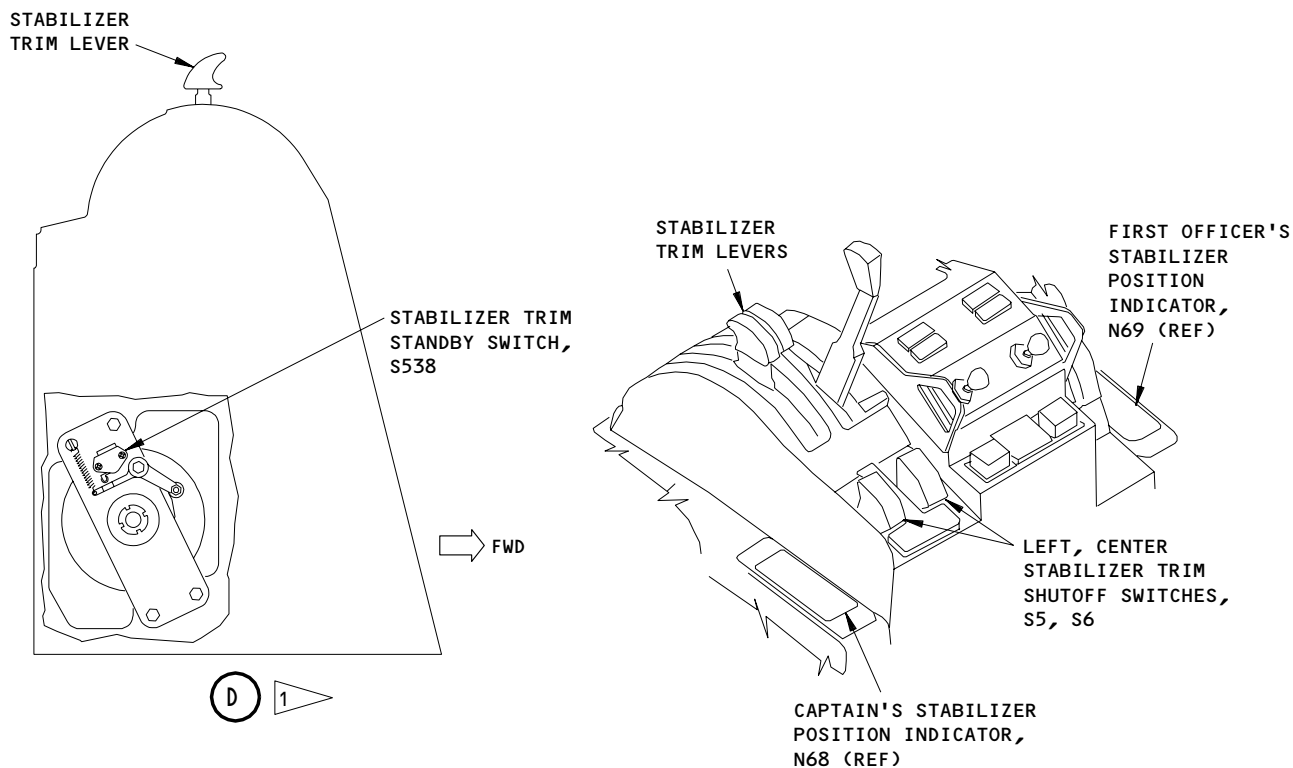
(C)

- 1 SAS 150-154
- 2 ALL MTH AIRPLANES AND ALL EXCEPT SAS 150-154

**Horizontal Stabilizer Trim Control System - Component Location**  
Figure 102 (Sheet 1)

EFFECTIVITY	ALL
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**27-41-00**



Horizontal Stabilizer Trim Control System - Component Location  
Figure 102 (Sheet 2)

EFFECTIVITY	ALL
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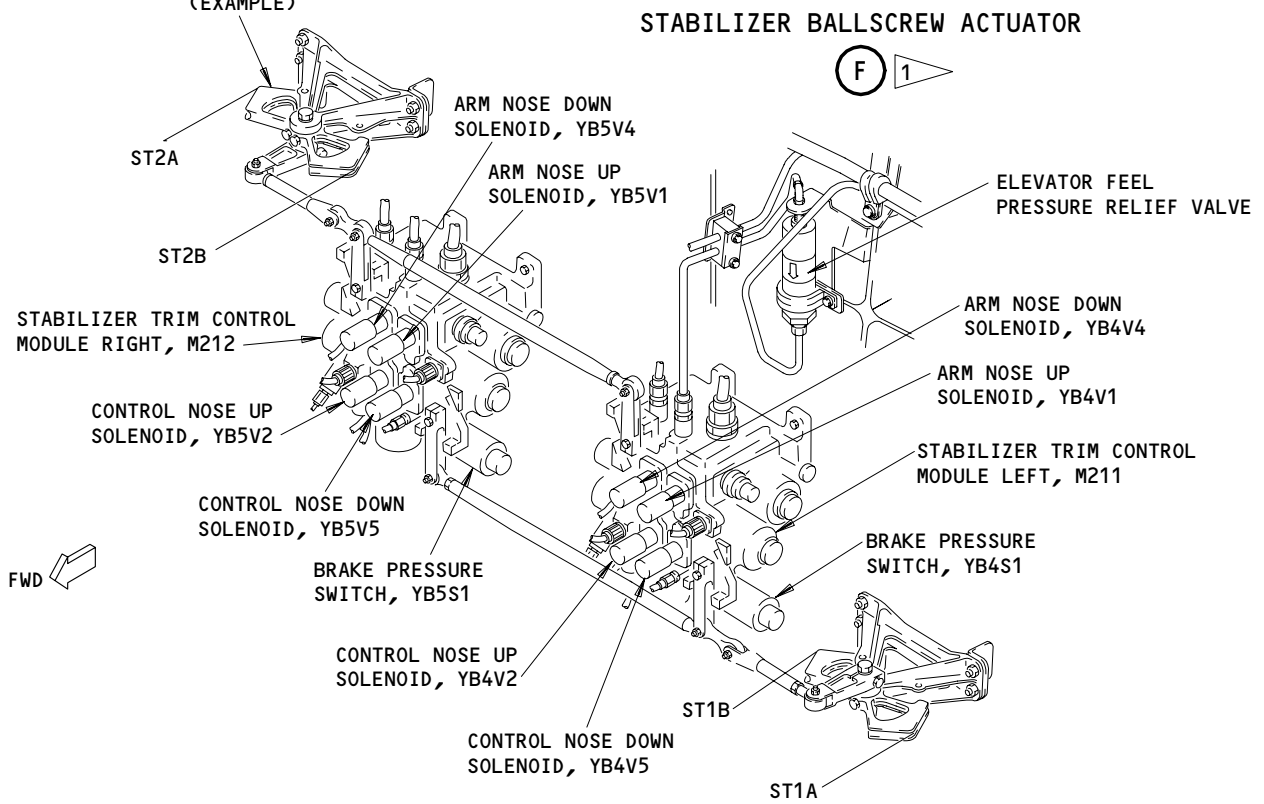
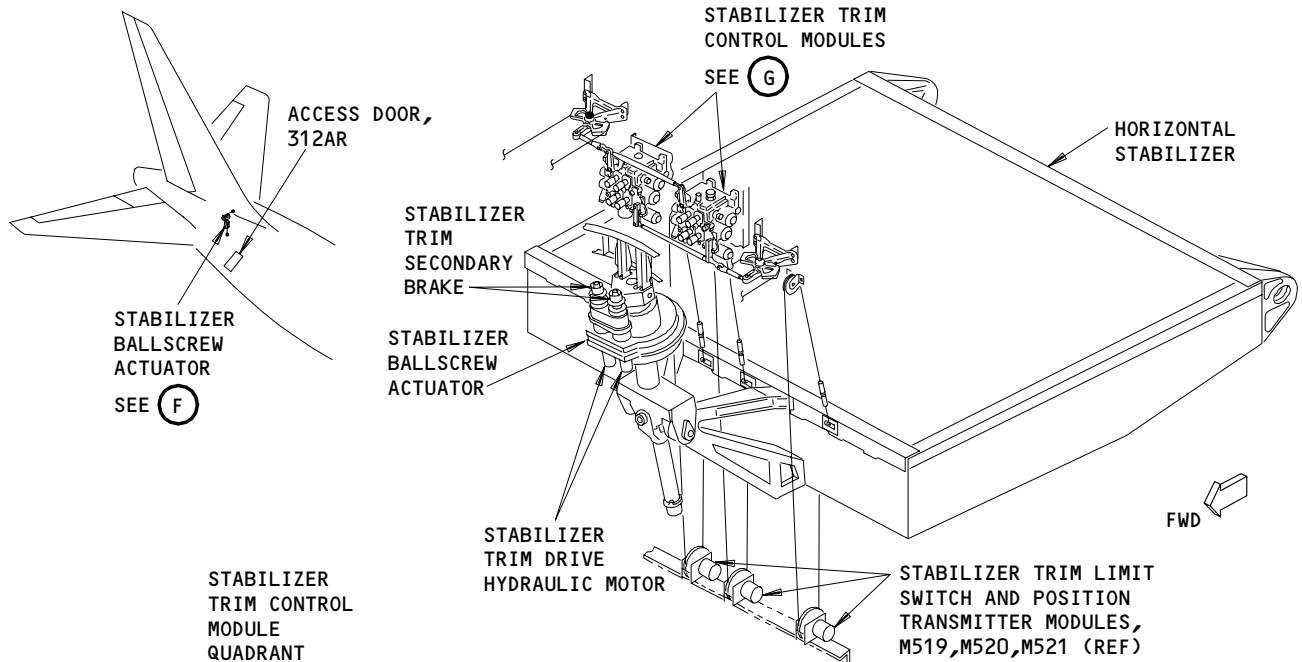
27-41-00



# BOEING

## 767

### FAULT ISOLATION/MAINT MANUAL



### STABILIZER TRIM CONTROL MODULES

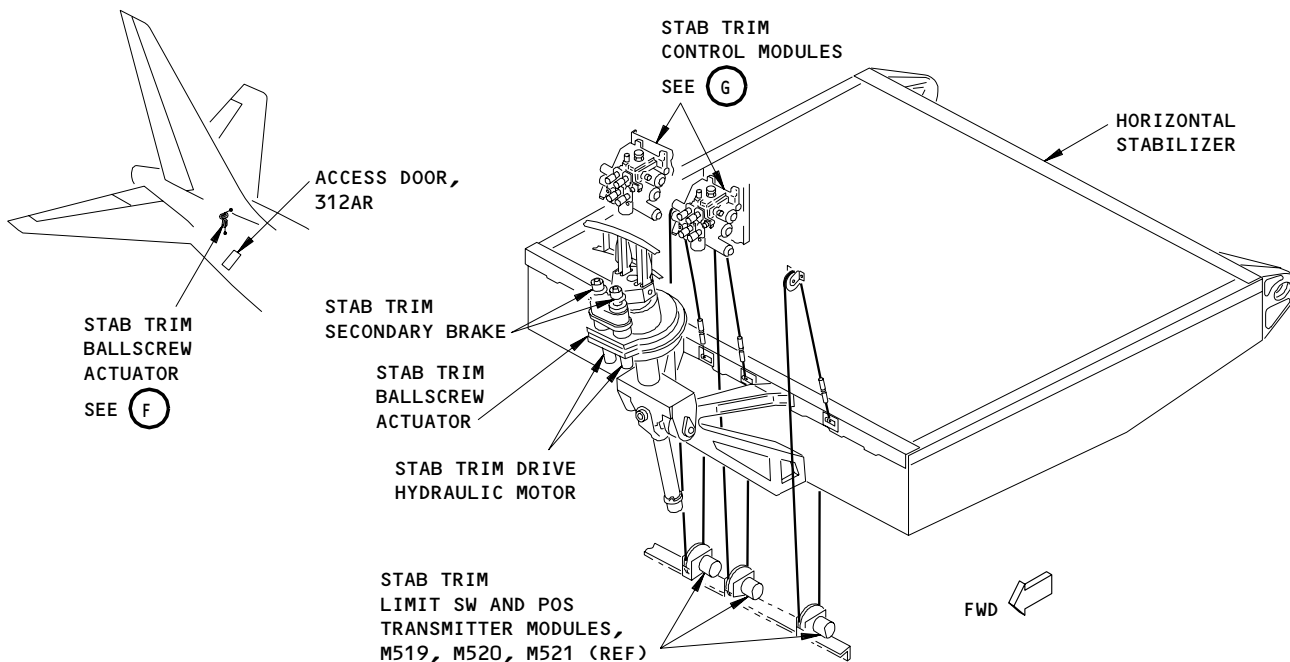
(G) 1

Component Location  
Figure 102 (Sheet 3)

EFFECTIVITY  
AIRPLANES WITH MANUAL STAB TRIM LEVERS  
ON THE CONTROL STAND

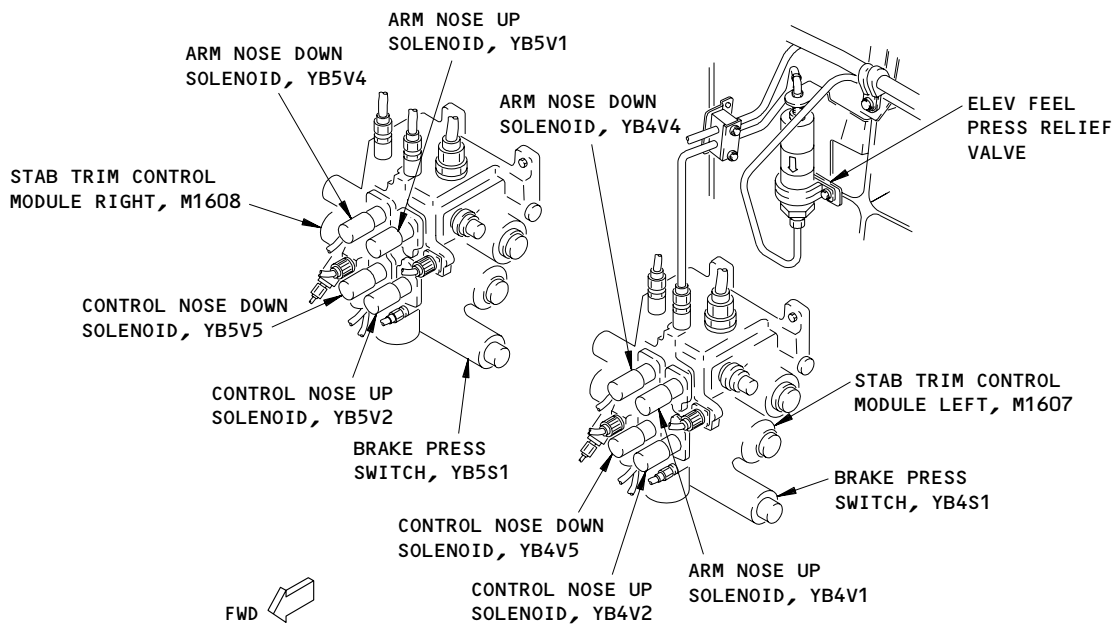
27-41-00

**BOEING**  
767  
FAULT ISOLATION/MAINT MANUAL



STAB TRIM BALLSCREW ACTUATOR

(F) 2



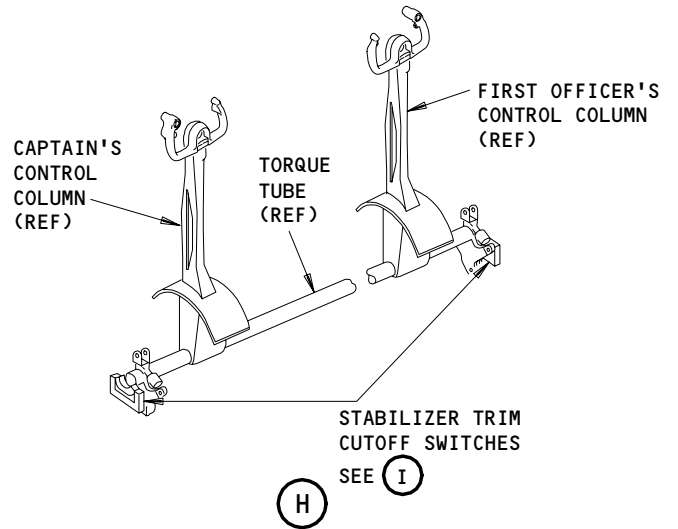
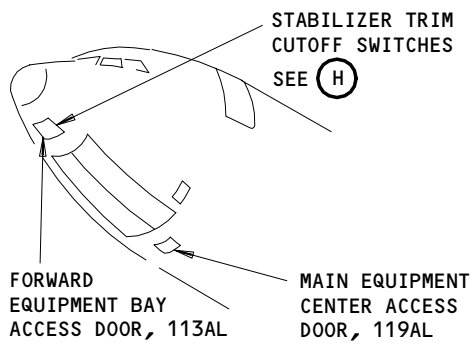
STAB TRIM CONTROL MODULES

(G) 2

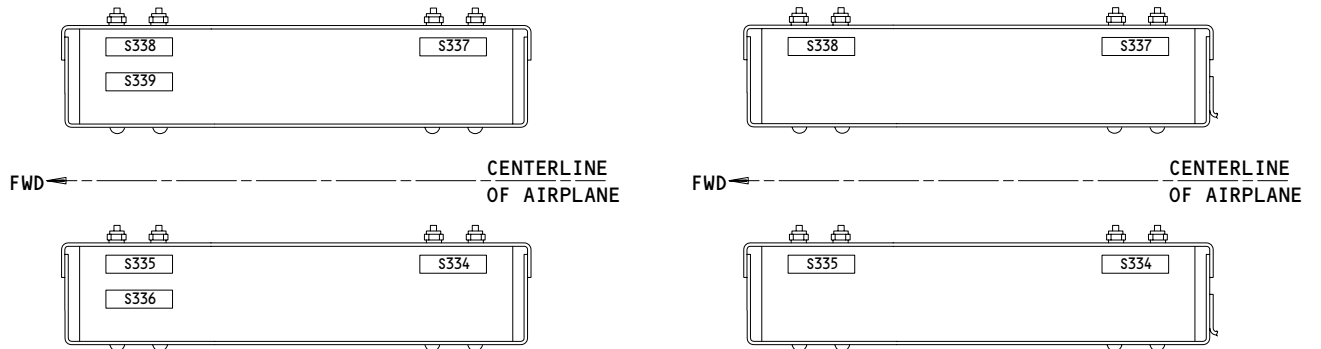
Horizontal Stabilizer Trim Control System - Component Location  
Figure 102 (Sheet 4)

EFFECTIVITY  
AIRPLANES WITH ALTERNATE STAB TRIM  
SWITCHES ON THE CONTROL STAND

27-41-00



**FIRST OFFICER'S STABILIZER TRIM CUTOFF SWITCHES**



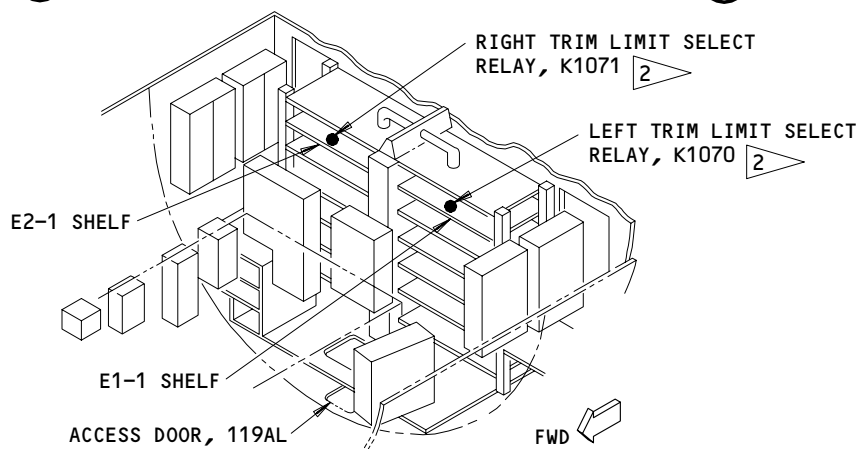
**CAPTAIN'S STABILIZER TRIM CUTOFF SWITCHES**

767-200 AIRPLANES

767-300 AIRPLANES

(I)

(I)

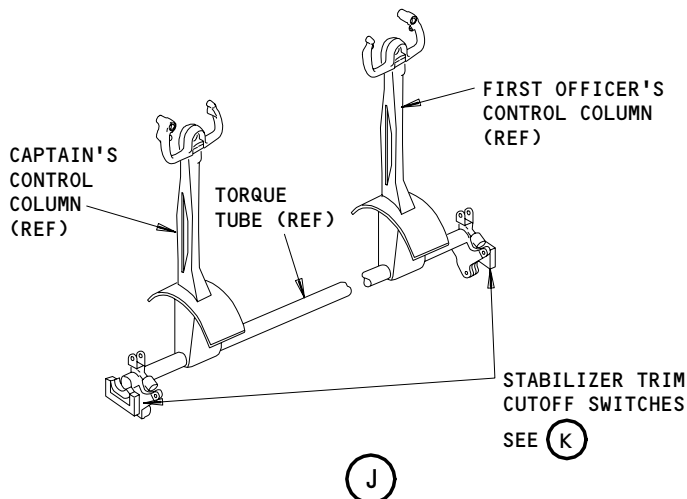
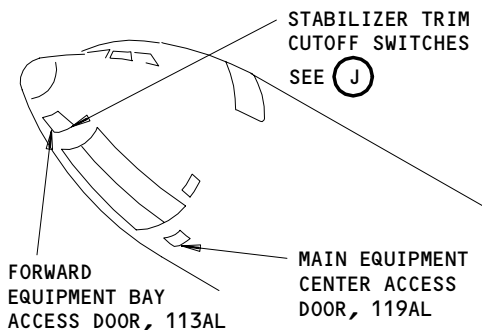


**MAIN EQUIPMENT CENTER**

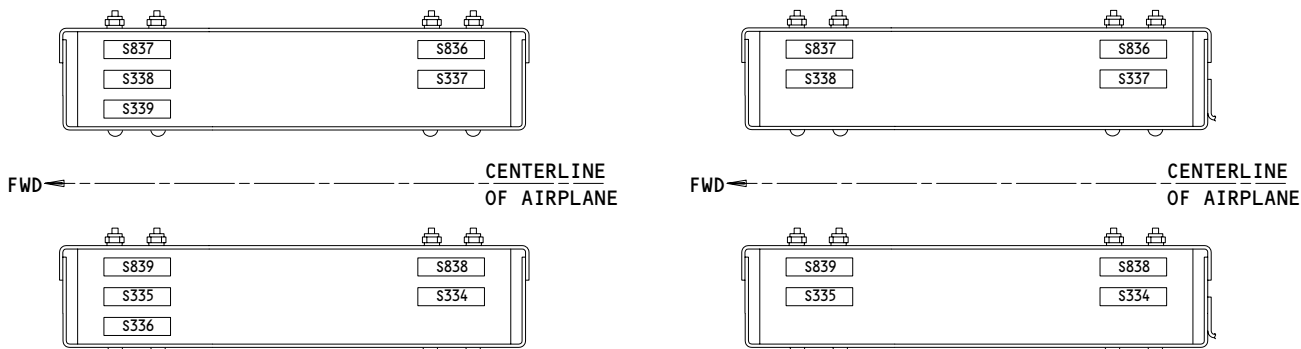
Horizontal Stabilizer Trim Control System - Component Location  
Figure 102 (Sheet 5)

EFFECTIVITY  
SAS 050, 051, 150-166, 275-277, 279  
PRE-SB 27-102

**27-41-00**



**FIRST OFFICER'S STABILIZER TRIM CUTOFF SWITCHES**



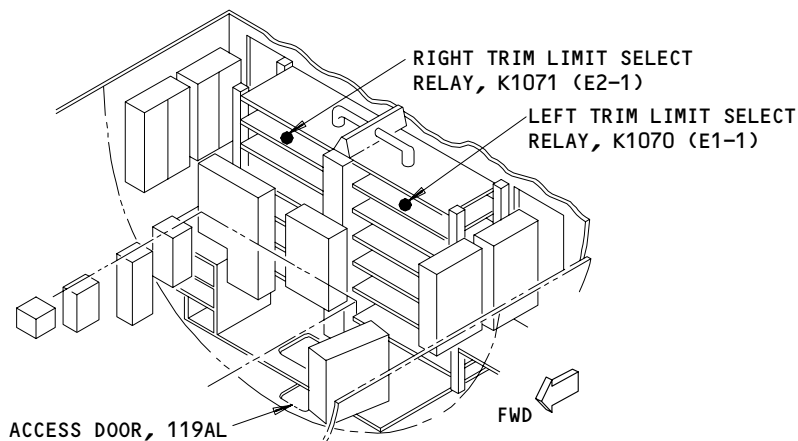
**CAPTAIN'S STABILIZER TRIM CUTOFF SWITCHES**

767-200 AIRPLANES

(K)

767-300 AIRPLANES

(K)



**MAIN EQUIPMENT CENTER**

Horizontal Stabilizer Trim Control System - Component Location  
Figure 102 (Sheet 6)

EFFECTIVITY

SAS 050, 051, 150-166, 275-277
POST-SB 27-102;
SAS 052-149, 167-274, 278, 280-999

**27-41-00**

HORIZONTAL STABILIZER TRIM CONTROL SYSTEM – ADJUSTMENT/TEST

1. General

A. This procedure contains tasks for the operational test, adjustment, and system test for the stabilizer trim control system. The tests are as follows:

- (1) Operational Test – Horizontal Stabilizer Trim Control System
- (2) Adjustment – Horizontal Stabilizer Trim Control System
- (3) System Test – Horizontal Stabilizer Trim Control System
- (4) Manual–Mechanical Stabilizer Trim Control Operational Test
- (5) Alternate Electrical Stabilizer Trim Control Test
- (6) Horizontal Stabilizer Trim Position Transmitter Limit Test
- (7) Stabilizer Trim Control Column Cut-off Switch Test
- (8) Stabilizer Trim Shutoff Switch Test
- (9) Stabilizer Trim Relief Valve Test
- (10) Horizontal Stabilizer Secondary Brake Test
- (11) Stabilizer Trim Override Capability with Split Control Column Commands Test
- (12) Stabilizer Trim Single Switch Test
- (13) Stabilizer Trim Actuator Bearing Friction Test

TASK 27-41-00-715-014

2. Operational Test

A. General

- (1) No ground support equipment is necessary to do the operational test for the horizontal stabilizer trim control system. This test lets maintenance people monitor all functions of the horizontal stabilizer trim control system to make sure that it operates correctly.

B. References

- (1) AMM 24-22-00/201, Electrical Power – Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones  
211/212 Control Cabin

D. Operational Test – Horizontal Stabilizer Trim Control System (Fig. 501)

S 865-015

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

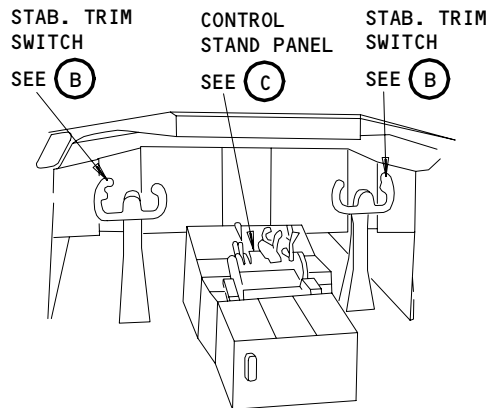
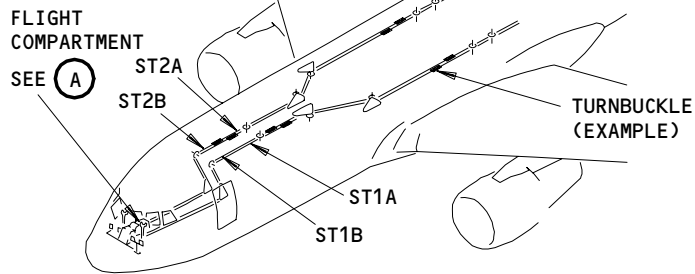
EFFECTIVITY

ALL

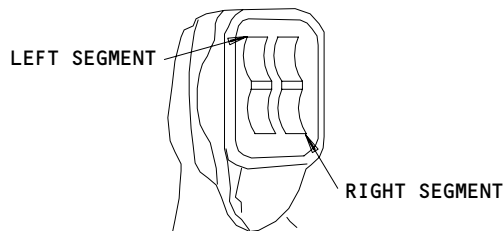
27-41-00

02

Page 501  
Dec 22/04

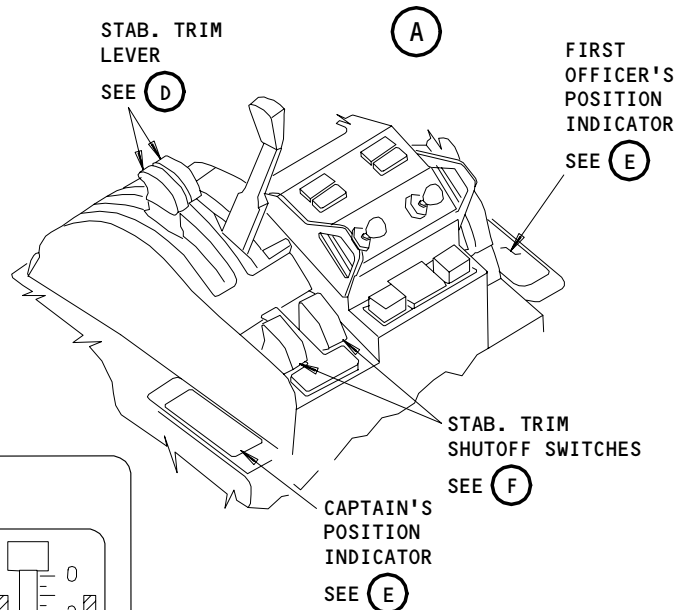


FLIGHT COMPARTMENT



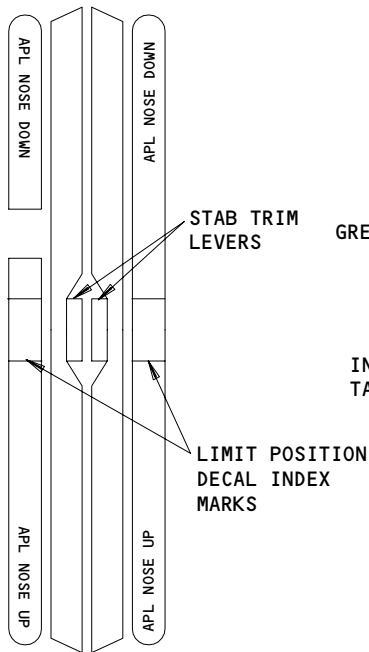
STAB. TRIM SWITCH (EXAMPLE)

(B)



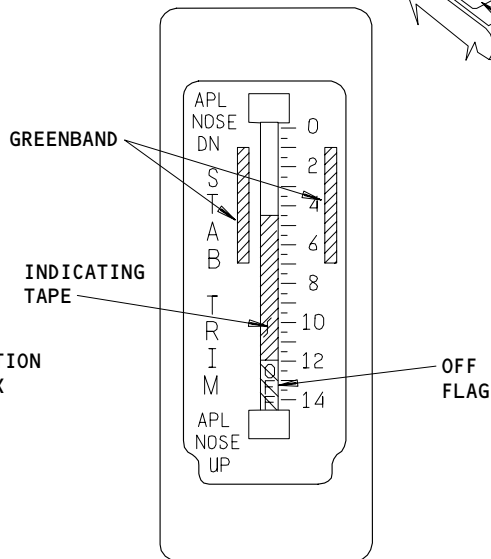
CONTROL STAND PANEL (P10)

(C)



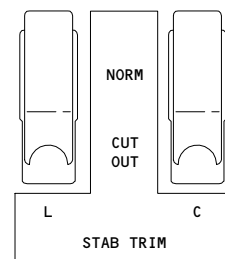
STAB. TRIM LEVERS

(D)



STAB. POSITION INDICATOR

(E)



STAB. TRIM SHUTOFF SWITCHES

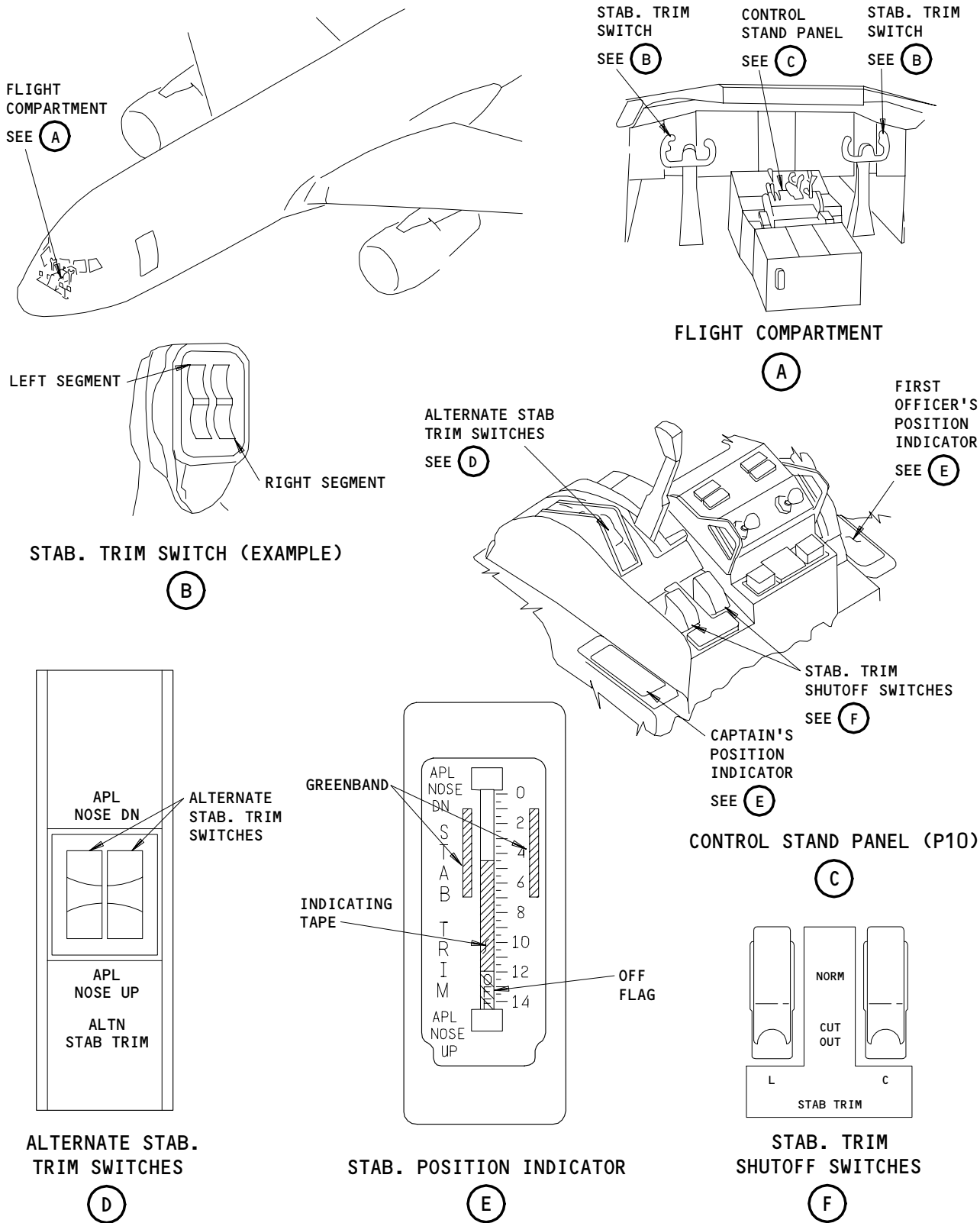
(F)

Horizontal Stabilizer Trim Control  
Figure 501 (Sheet 1)

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS

27-41-00

643701



Horizontal Stabilizer Trim Control  
Figure 501 (Sheet 2)

EFFECTIVITY  
AIRPLANES WITH ALTERNATE STAB TRIM  
SWITCHES

27-41-00

S 215-016

- (2) Make sure that these circuit breakers on the overhead panel, P11, are closed:
- (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER

S 215-017

- (3) Make sure that the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, are in the NORM position.

S 865-018

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Supply power to the left and center hydraulic systems (AMM 29-11-00/201).

S 715-001

- (5) Do the steps that follow to make sure that the stabilizer trim control system operates correctly:
- (a) AIRPLANES WITH STAB TRIM LEVERS;  
Use the STAB TRIM levers on the P10 panel to move the horizontal stabilizer to 2 units of trim.
  - (b) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Use the alternate stabilizer trim switches on the P10 panel to move the horizontal stabilizer to 2 units of trim.
  - (c) Put the L and C STAB TRIM shutoff valve switches on the P10 panel in the CUTOUT position.
  - (d) Move the captain's and first officer's stabilizer trim control wheel switches to the APL NOSE UP and APL NOSE DOWN positions.
    - 1) Make sure that the stabilizer does not move.

EFFECTIVITY

ALL

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- (e) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Move the alternate stabilizer trim switches on the P10 panel to the APL NOSE UP and APL NOSE DOWN positions.
  - 1) Make sure that the stabilizer does not move.
- (f) Put the L STAB TRIM shutoff valve switch on the P10 panel in the NORM position.
- (g) Move the captain's stabilizer trim control wheel switches to the APL NOSE DN position.
  - 1) Make sure that the stabilizer leading edge moves up.
  - 2) Make sure the EICAS message, STAB TRIM, shows on the EICAS display.
  - 3) Make sure that the amber STAB TRIM light on the P5 overhead panel comes on.
  - 4) Make sure that the stabilizer stops when the control wheel switches are released.
- (h) Move the captain's stabilizer trim control wheel switches to the APL NOSE UP position.
  - 1) Make sure that the stabilizer leading edge moves down.
  - 2) Make sure the EICAS message, STAB TRIM, shows on the EICAS display.
  - 3) Make sure that the amber STAB TRIM light on the P5 overhead panel comes on.
  - 4) Make sure that the stabilizer stops when the control wheel switches are released.
- (i) Move the first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
  - 1) Make sure that the stabilizer leading edge moves up.
  - 2) Make sure the EICAS message, STAB TRIM, shows on the EICAS display.
  - 3) Make sure that the amber STAB TRIM light on the P5 overhead panel comes on.
  - 4) Make sure that the stabilizer stops when the control wheel switches are released.
- (j) Move the first officer's stabilizer trim control wheel switches to the APL NOSE UP position.
  - 1) Make sure that the stabilizer leading edge moves down.

EFFECTIVITY

ALL

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- 2) Make sure the EICAS message, STAB TRIM, shows on the EICAS display.
  - 3) Make sure that the amber STAB TRIM light on the P5 overhead panel comes on.
  - 4) Make sure that the stabilizer stops when the control wheel switches are released.
- (k) Put the C STAB TRIM shutoff valve switch on the P10 panel in the NORM position (Both L and C switches are now in NORM).
- (l) Move the captain's stabilizer trim control wheel switches to the APL NOSE UP.
- (m) Move the captain's stabilizer trim control wheel switches to the APL NOSE DOWN.
- (n) Verify that the amber STAB TRIM light goes out and the EICAS message disappears from the display.
- (o) Put the C STAB TRIM shutoff valve switch on the P10 panel in the CUTOFF position.
- (p) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Move the alternate stabilizer trim switches to the APL NOSE DN position.
- 1) Make sure that the stabilizer leading edge moves up.
  - 2) Make sure that the amber STAB TRIM light on the P5 overhead panel does not come on.
  - 3) Make sure that the stabilizer stops when the alternate stab trim switches are released.
- (q) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Move the alternate stab trim switches to the APL NOSE UP position.
- 1) Make sure that the stabilizer leading edge moves down.
  - 2) Make sure that the amber STAB TRIM light on the P5 overhead panel does not come on.
  - 3) Make sure that the stabilizer stops when the alternate stab trim switches are released.
- (r) Put the C STAB TRIM shutoff valve switch on the P10 panel in the NORM position.
- (s) Put the L STAB TRIM shutoff valve switch on the P10 panel in the CUTOFF position.
- (t) Move the captain's stabilizer trim control wheel switches to the APL NOSE DN position.
- 1) Make sure that the stabilizer leading edge moves up.
  - 2) Make sure the EICAS message, STAB TRIM, shows on the EICAS display.
  - 3) Make sure that the amber STAB TRIM light on the P5 overhead panel comes on.

EFFECTIVITY

ALL

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- 4) Make sure that the stabilizer stops when the control wheel switches are released.
- (u) Move the captain's stabilizer trim control wheel switches to the APL NOSE UP position.
  - 1) Make sure that the stabilizer leading edge moves down.
  - 2) Make sure the EICAS message, STAB TRIM, shows on the EICAS display.
  - 3) Make sure that the amber STAB TRIM light on the P5 overhead panel comes on.
  - 4) Make sure that the stabilizer stops when the control wheel switches are released.
- (v) Move the first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
  - 1) Make sure that the stabilizer leading edge moves up.
  - 2) Make sure the EICAS message, STAB TRIM, shows on the EICAS display.
  - 3) Make sure that the amber STAB TRIM light on the P5 overhead panel comes on.
  - 4) Make sure that the stabilizer stops when the control wheel switches are released.
- (w) Move the first officer's stabilizer trim control wheel switches to the APL NOSE UP position.
  - 1) Make sure that the stabilizer leading edge moves down.
  - 2) Make sure the EICAS message, STAB TRIM, shows on the EICAS display.
  - 3) Make sure that the amber STAB TRIM light on the P5 overhead panel comes on.
  - 4) Make sure that the stabilizer stops when the control wheel switches are released.
- (x) Put the L STAB TRIM shutoff valve switch on the P10 panel in the NORM position (Both L and C switches are now at NORM).
- (y) Move the captain's stabilizer trim control wheel switches to the APL NOSE UP.
- (z) Move the captain's stabilizer trim control wheel switches to the APL NOSE DOWN.
- (aa) Verify that the amber STAB TRIM light goes out and the EICAS message disappears from the display.
- (ab) Put the L STAB TRIM shutoff valve switch on the P10 panel in the CUTOFF position.
- (ac) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Move the alternate stab trim switches to the APL NOSE DN position.
  - 1) Make sure that the stabilizer leading edge moves up.
  - 2) Make sure that the amber STAB TRIM light on the P5 overhead panel does not come on.

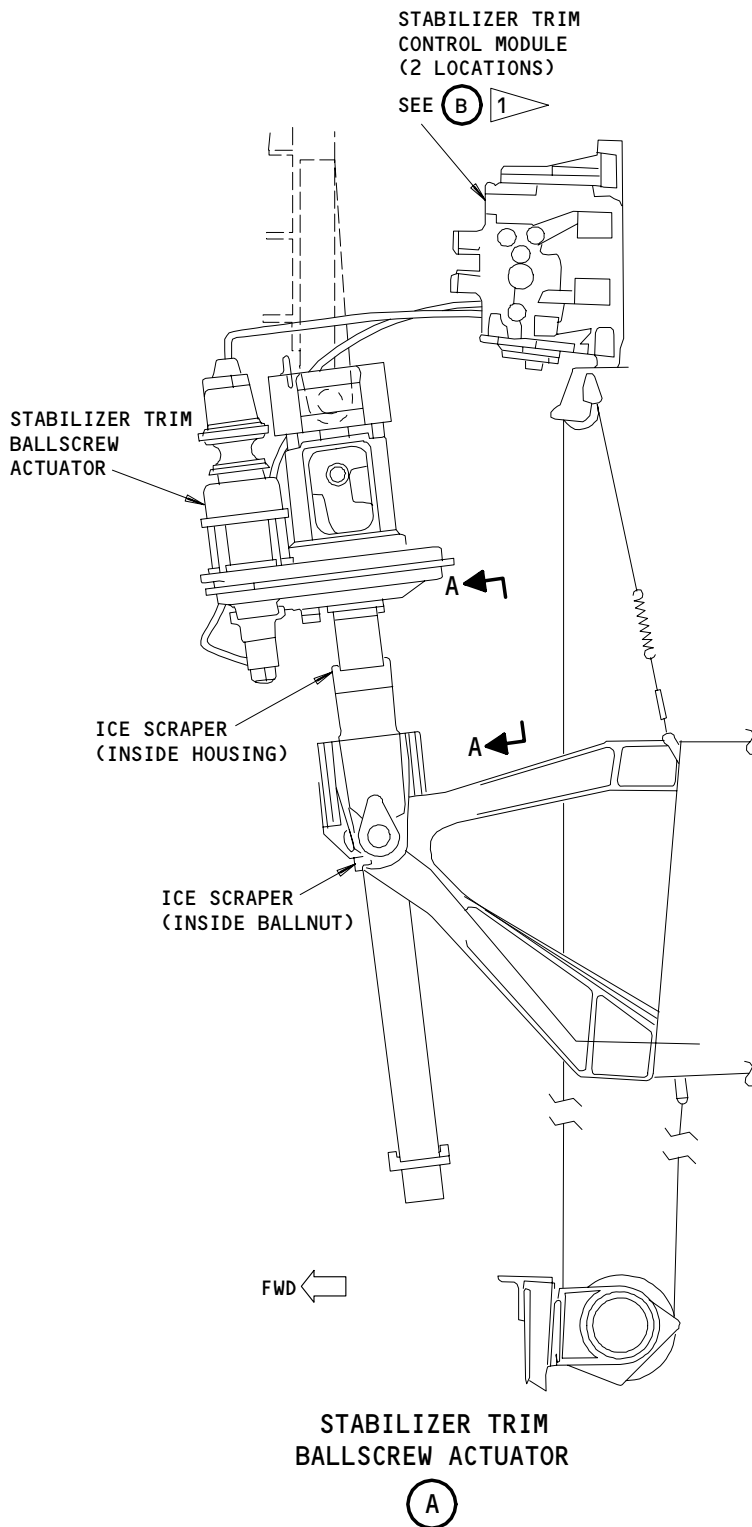
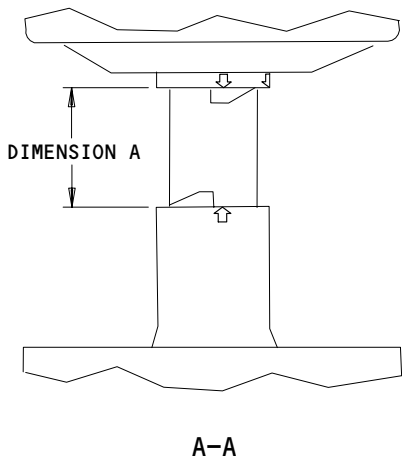
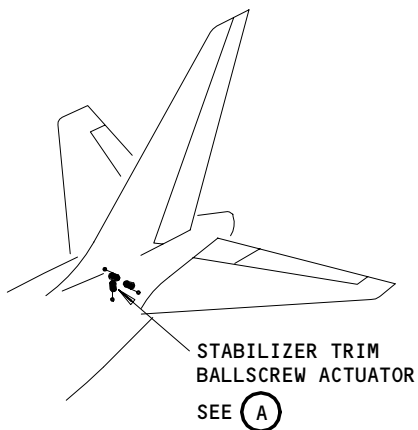
EFFECTIVITY

ALL

27-41-00

03

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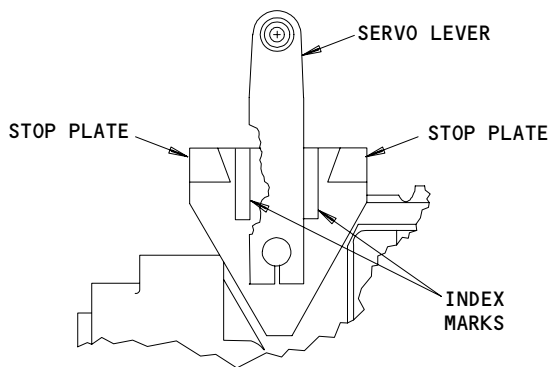
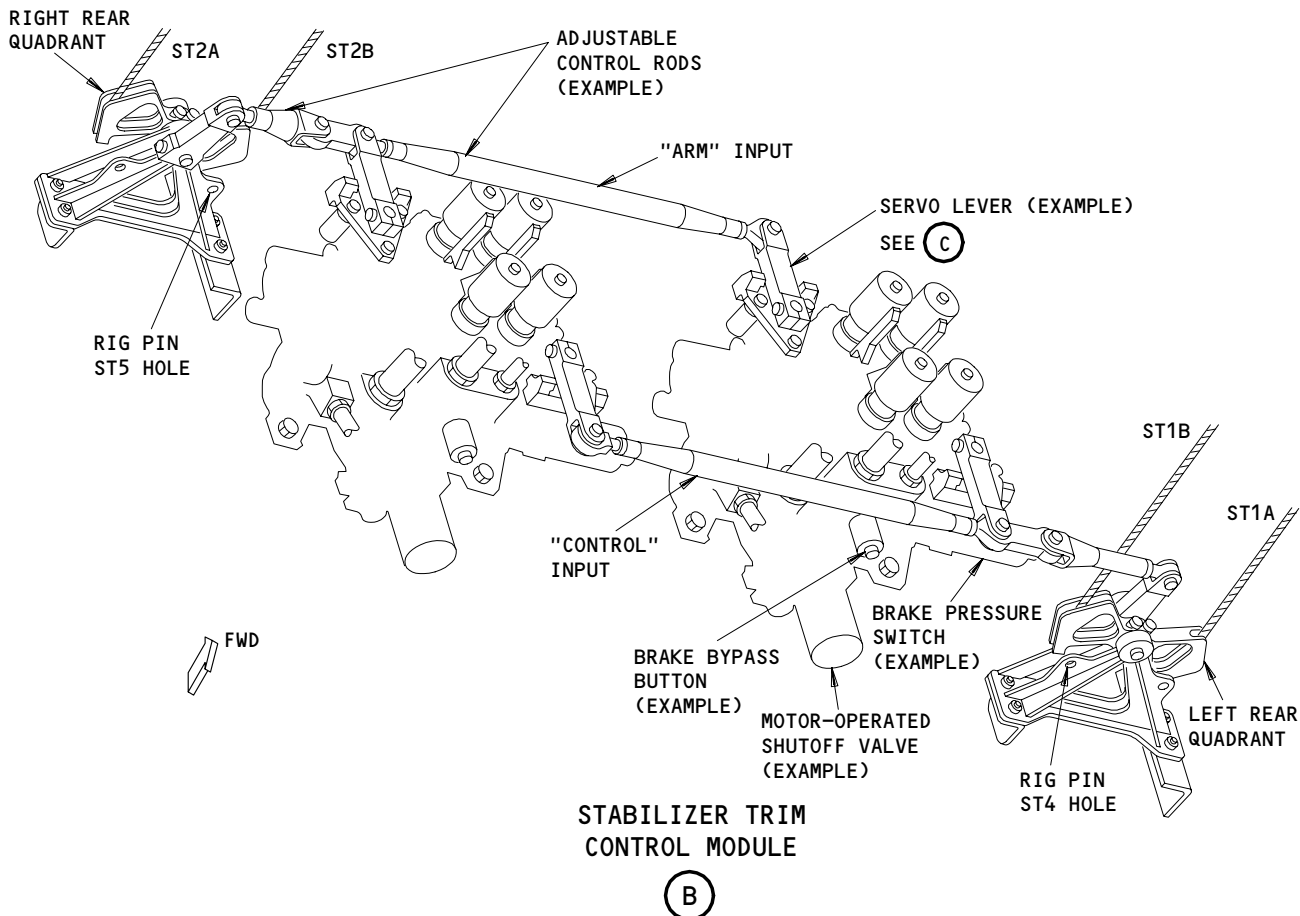


1 ON AIRPLANES WITH STAB. TRIM LEVERS ON THE CONTROL STAND

Adjustment of the Horizontal Stabilizer Trim Control System  
Figure 502 (Sheet 1)

EFFECTIVITY	ALL
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27-41-00



Adjustment of the Horizontal Stabilizer Trim Control System  
Figure 502 (Sheet 2)

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS

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- 3) Make sure that the stabilizer stops when the alternate stab trim switches are released.
- (ad) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Move the alternate stab trim switches to the APL NOSE UP position.
- 1) Make sure that the stabilizer leading edge moves down.
  - 2) Make sure that the amber STAB TRIM light on the P5 overhead panel does not come on.
  - 3) Make sure that the stabilizer stops when the alternate stab trim switches are released.
- (ae) Put the L STAB TRIM shutoff valve switch on the P10 panel in the NORM position.

**CAUTION:** DO NOT LET THE BALLSCREW ACTUATOR HIT THE MECHANICAL STOPS. DAMAGE TO THE BALLSCREW ACTUATOR AND THE STABILIZER CAN OCCUR.

- (af) AIRPLANES WITH STAB TRIM LEVERS;  
Move the stab trim levers full forward and full aft.
- 1) Make sure that the stabilizer moves smoothly and freely through full travel.
  - 2) Make sure that the stabilizer position indicators correctly show the position of the stabilizer.
  - 3) Make sure the EICAS message, STAB TRIM, does not show on the EICAS display.
  - 4) Make sure that the amber STAB TRIM light on the P5 overhead panel does not come on.
- (ag) Move the captain's stabilizer trim control switches to the APL NOSE DN and the APL NOSE UP positions.
- 1) Make sure that the stabilizer moves smoothly and freely through full travel.
  - 2) Make sure the EICAS message, STAB TRIM, does not show on the EICAS display.
  - 3) Make sure that the amber STAB TRIM light on the P5 overhead panel does not come on.
- (ah) Move the first officer's stabilizer trim control wheel switches to the APL NOSE DN and the APL NOSE UP positions.
- 1) Make sure the stabilizer moves smoothly and freely through full travel.
  - 2) Make sure the EICAS message, STAB TRIM, does not show on the EICAS display.
  - 3) Make sure that the amber STAB TRIM light on the P5 overhead panel does not come on.
- (ai) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- (aj) Move the captain's stabilizer trim control wheel switches to the APL NOSE DN position.
- 1) Make sure that the stabilizer leading edge moves up.

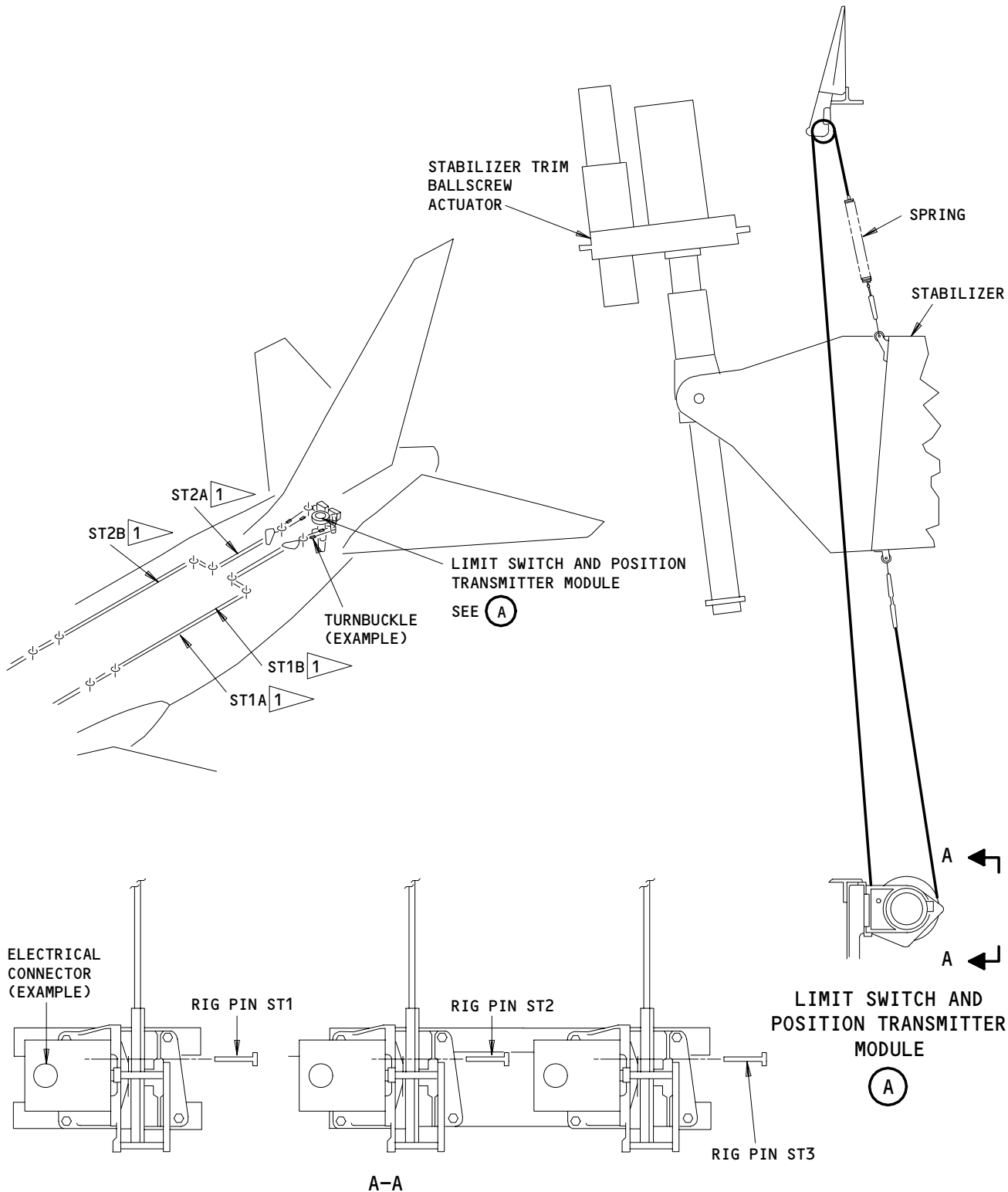
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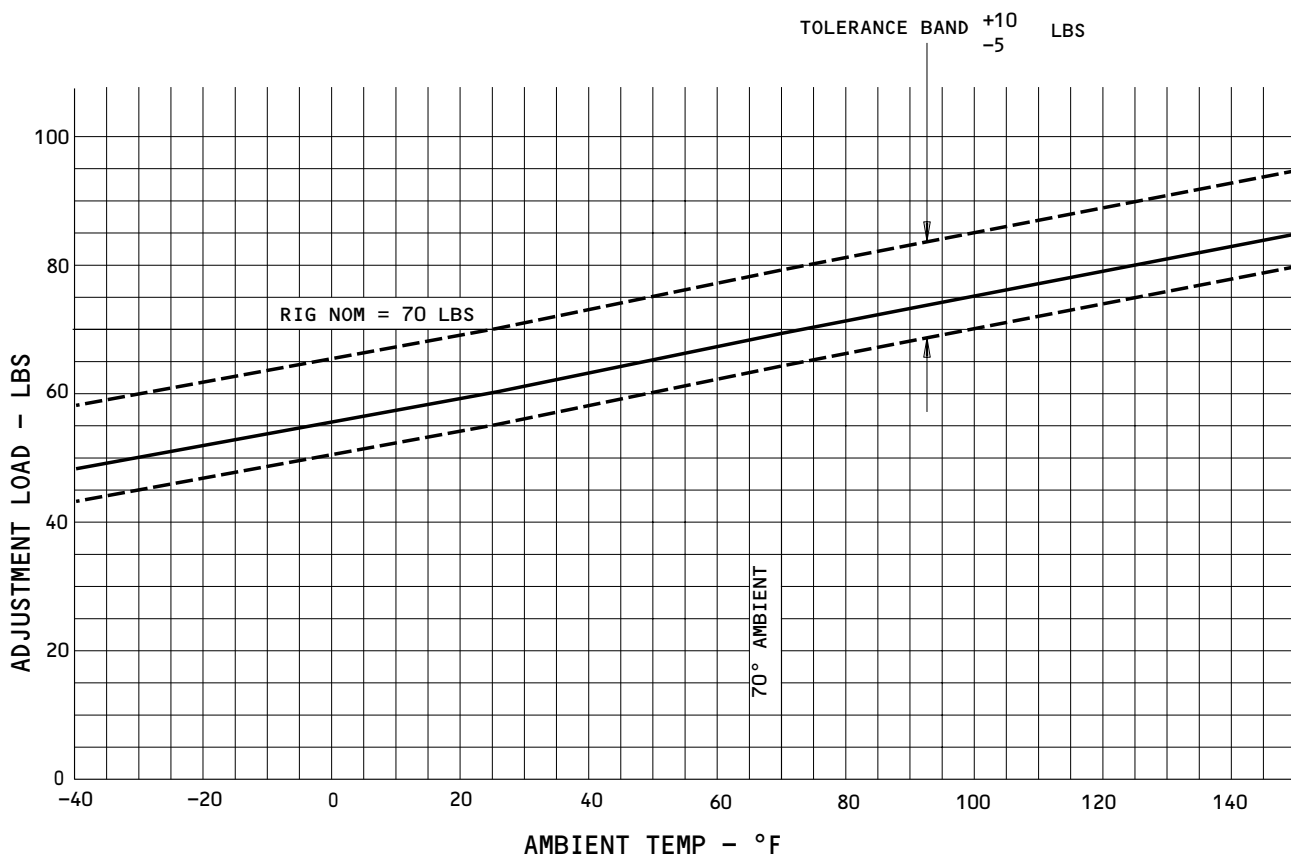
1 AIRPLANES WITH STAB. TRIM LEVERS ON THE CONTROL COLUMN

Adjustment of the Limit Switch and Position Transmitter Module  
Figure 503

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**NOTE:** THE AIRPLANE MUST BE IN 10°F OF THE AMBIENT AIR TEMPERATURE. THE TEMPERATURE MUST BE THE SAME FOR AT LEAST ONE HOUR BEFORE CABLE ADJUSTMENT LOADS ARE APPLIED



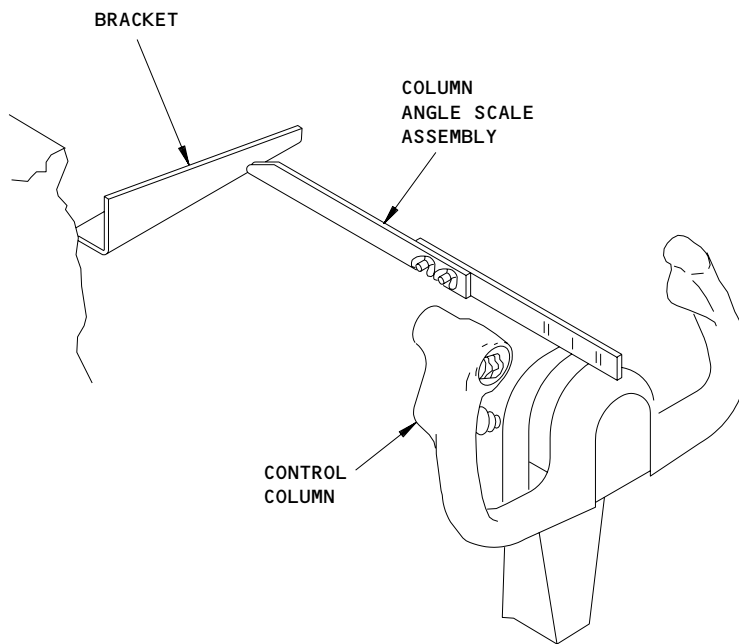
$\frac{3}{32}$  INCH DIAMETER CABLE ADJUSTMENT LOAD VS TEMP

Stabilizer Body Cable Adjustment  
Figure 504

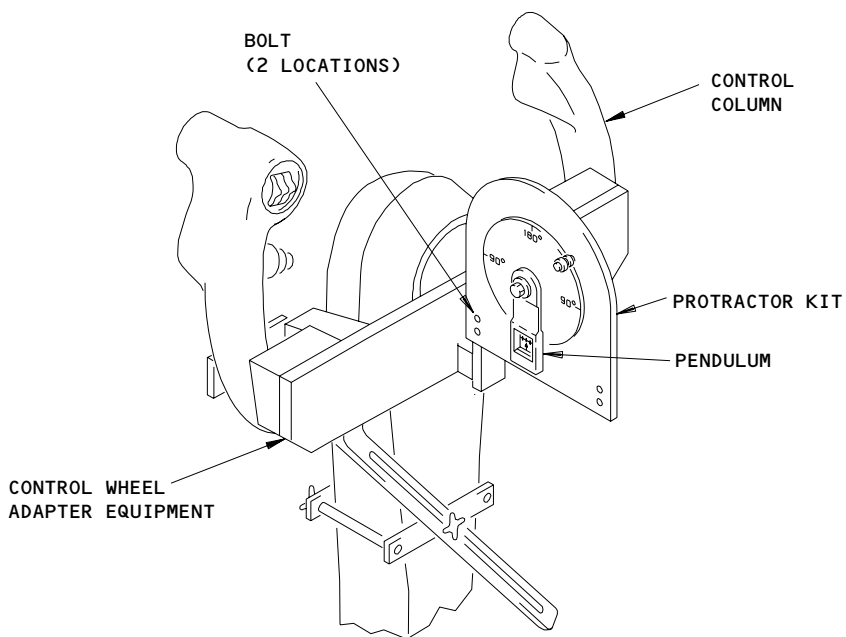
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AIRPLANES WITH STAB TRIM LEVERS

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CONTROL COLUMN ANGLE SCALE INSTALLATION



PROTRACTOR INSTALLATION - FORE AND AFT CONTROL MEASUREMENT

Control Column Angle Scale and Protractor Installation  
Fig 505

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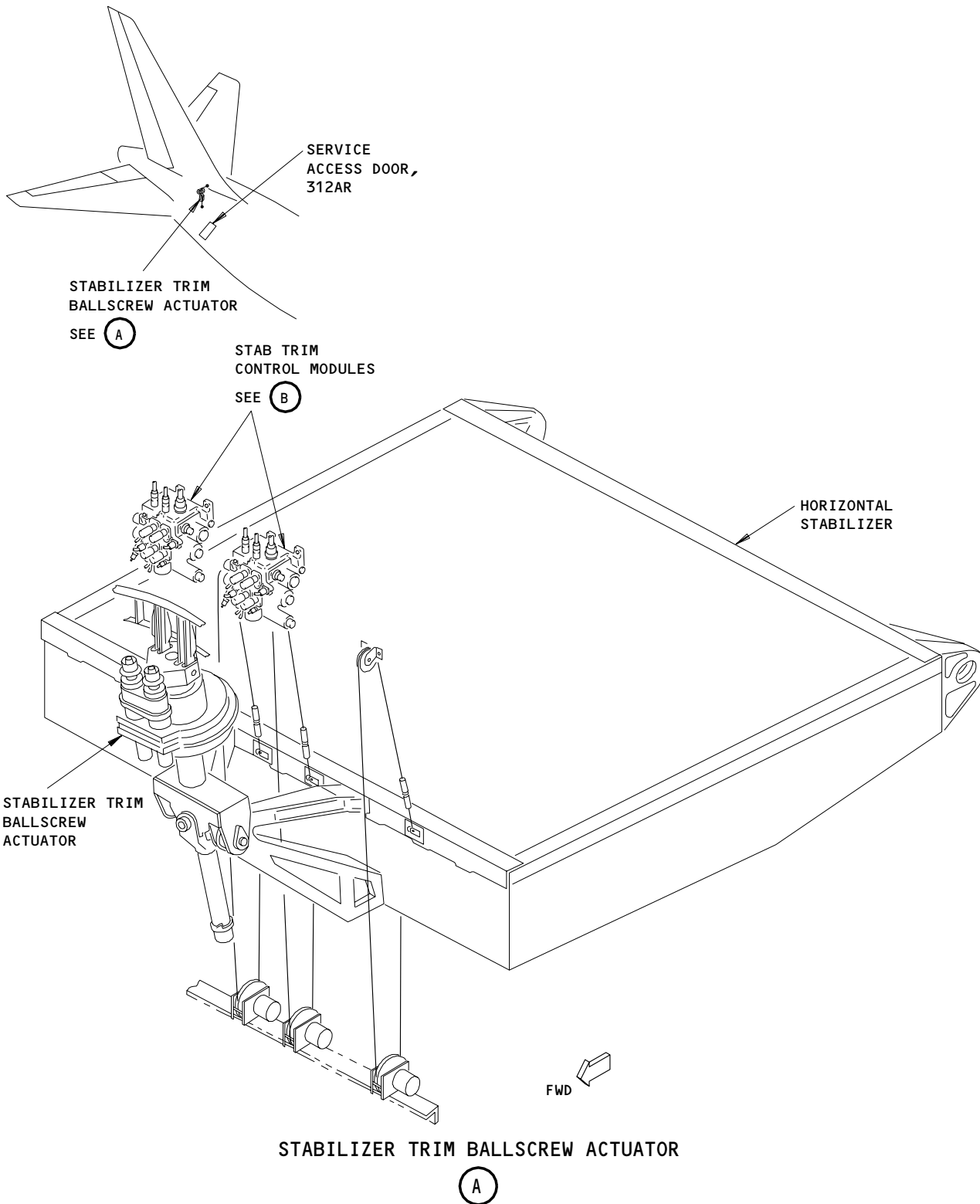
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Test of the Stabilizer Trim Relief Valve  
Figure 506 (Sheet 1)

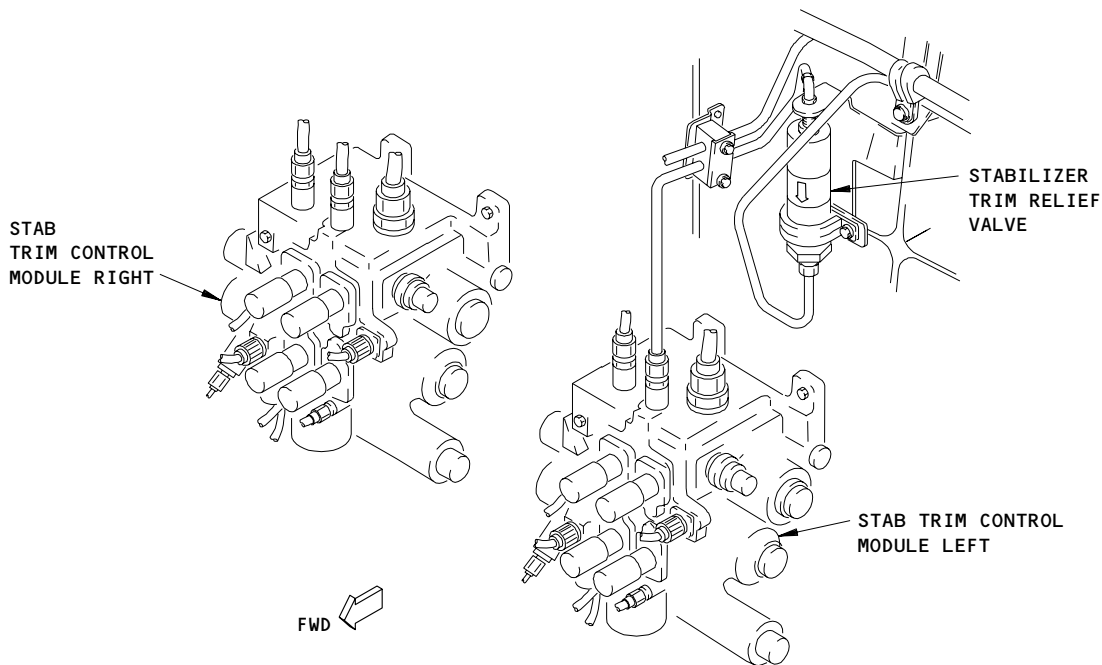
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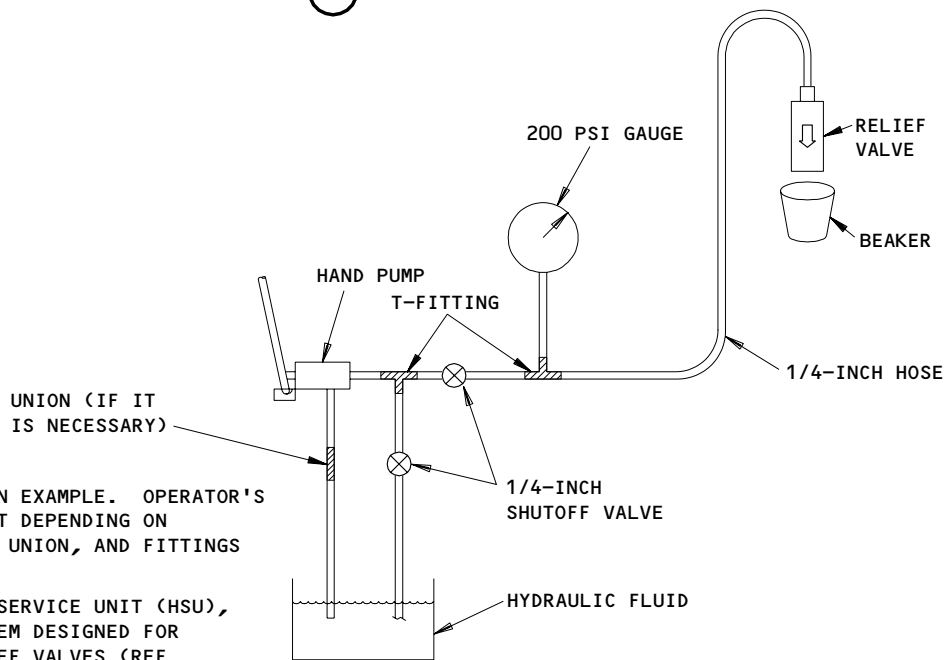
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STAB TRIM CONTROL MODULES

(B)



**NOTE:** TEST SETUP SHOWN IS AN EXAMPLE. OPERATOR'S SETUP MAY BE DIFFERENT DEPENDING ON OPERATOR'S EQUIPMENT, UNION, AND FITTINGS USED TO CONNECT THEM.

OPTIONAL - HYDRAULIC SERVICE UNIT (HSU), A SELF CONTAINED SYSTEM DESIGNED FOR TESTING PRESSURE RELIEF VALVES (REF EQUIPMENT LIST)

SETUP FOR THE OPERATIONAL TEST OF THE STABILIZER TRIM RELIEF VALVE

Test of the Stabilizer Trim Relief Valve  
Figure 506 (Sheet 2)

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- (ak) While the stabilizer moves, put the L STAB TRIM shutoff valve switch on the P10 panel in the CUTOUT position.
  - 1) Make sure that the stabilizer stops in one second.
- (al) Put the L STAB TRIM shutoff valve switch on the P10 panel in the NORM position.
  - 1) Make sure that the stabilizer starts to move in one second.
- (am) Release the control wheel switches.
  - 1) Make sure that the stabilizer stops.
- (an) Move the first officer's stabilizer trim control wheel switches to the APL NOSE UP position.
  - 1) Make sure that the stabilizer leading edge moves down.
- (ao) While the stabilizer moves, put the L STAB TRIM shutoff valve switch on the P10 panel in the CUTOUT position.
  - 1) Make sure that the stabilizer stops in one second.
- (ap) Put the L STAB TRIM shutoff valve switch on the P10 panel in the NORM position.
  - 1) Make sure that the stabilizer starts to move in one second.
- (aq) Release the control wheel switches.
  - 1) Make sure that the stabilizer stops.
- (ar) Put the L STAB TRIM shutoff valve switch on the P10 panel in the CUTOUT position.
- (as) Put the C STAB TRIM shutoff valve switch on the P10 panel in the NORM position.
- (at) Move the the captain's stabilizer trim control wheel switches to the APL NOSE UP position.
  - 1) Make sure that the stabilizer leading edge moves down.
- (au) While the stabilizer moves, put the C STAB TRIM shutoff valve switch on the P10 panel in the CUTOUT position.
  - 1) Make sure that the stabilizer stops in one second.
- (av) Move the C STAB TRIM shutoff valve switch on the P10 panel in the NORM position.
  - 1) Make sure that the stabilizer starts to move in one second.
- (aw) Release the control wheel switches.
  - 1) Make sure that the stabilizer stops.
- (ax) Move the first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
  - 1) Make sure that the stabilizer leading edge moves up.
- (ay) While the stabilizer moves, put the C STAB TRIM shutoff valve switch on the P10 panel in the CUTOUT position.
  - 1) Make sure that the stabilizer stops in one second.
- (az) Put the C STAB TRIM shutoff valve switch on the P10 panel in the NORM position.
  - 1) Make sure that the stabilizer starts to move in one second.
- (ba) Release the control wheel switches.
  - 1) Make sure that the stabilizer stops.
- (bb) Put the L STAB TRIM shutoff valve switch on the P10 panel in the NORM position.
- (bc) Move each side of the captain's stabilizer trim control wheel switch to the APL NOSE DN position while the other side stays at neutral.
  - 1) Make sure that the stabilizer does not move.

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- (bd) Move each side of the captain's stabilizer trim control wheel switch to the APL NOSE UP position while the other side stays at neutral.
  - 1) Make sure that the stabilizer does not move.
- (be) Move each side of the first officer's stabilizer trim control wheel switch to the APL NOSE DN position while the other side stays at neutral.
  - 1) Make sure that the stabilizer does not move.
- (bf) Move each side of the first officer's stabilizer trim control wheel switch to the APL NOSE UP position while the other side stays at neutral.
  - 1) Make sure that the stabilizer does not move.
- (bg) Put the C STAB TRIM shutoff valve switch on the P10 panel in the CUTOFF position.
- (bh) Use the captain's or first officer's stabilizer trim control wheel switch to move the stabilizer to 6 units of trim.
- (bi) Move the captain's or first officer's stabilizer trim control switches to the APL NOSE DN position.
- (bj) AIRPLANES WITH STAB TRIM LEVERS;  
While the stabilizer moves, move the two STAB TRIM levers to the aft stop.
  - 1) Make sure that the stabilizer moves in the other direction in one second.
- (bk) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
While the stabilizer moves, move both of the alternate stab trim switches to the aft stop.
  - 1) Make sure that the stabilizer stops in 1 second.
- (bl) AIRPLANES WITH STAB TRIM LEVERS;  
Let the stabilizer trim control wheel switch and the stab trim levers go to neutral.
- (bm) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Let the stabilizer trim control wheel switch and the alternate stab trim switches go to neutral.
- (bn) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position.
- (bo) AIRPLANES WITH STAB TRIM LEVERS;  
While the stabilizer moves, move the two STAB TRIM levers to the forward stop.
  - 1) Make sure that the stabilizer moves in the other direction in one second.
- (bp) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
While the stabilizer moves, move both of the alternate stab trim switches to the forward stop.
  - 1) Make sure that the stabilizer stops in 1 second.

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- (bq) AIRPLANES WITH STAB TRIM LEVERS;  
Let the stabilizer trim control wheel switch and the stab trim levers go to neutral.
- (br) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Let the stabilizer trim control wheel switch and the alternate stab trim switches go to neutral.
- (bs) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (bt) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.
- (bu) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
- (bv) AIRPLANES WITH STAB TRIM LEVERS;  
While the stabilizer moves, move the two STAB TRIM levers to the aft stop.
  - 1) Make sure that the stabilizer moves in the other direction in one second.
- (bw) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
While the stabilizer moves, move both of the alternate stab trim switches to the aft stop.
  - 1) Make sure that the stabilizer stops in 1 second.
- (bx) AIRPLANES WITH STAB TRIM LEVERS;  
Let the stabilizer trim control wheel switch and the stab trim levers go to neutral.
- (by) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Let the stabilizer trim control wheel switch and the alternate stab trim switches go to neutral.
- (bz) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position.
- (ca) AIRPLANES WITH STAB TRIM LEVERS;  
While the stabilizer moves, move the two STAB TRIM levers to the forward stop.
  - 1) Make sure that the stabilizer moves in the other direction in one second.
- (cb) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
While the stabilizer moves, move both of the alternate stab trim switches to the forward stop.
  - 1) Make sure that the stabilizer stops in 1 second.
- (cc) AIRPLANES WITH STAB TRIM LEVERS;  
Let the stabilizer trim control wheel switches and the STAB TRIM levers go to neutral.
- (cd) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Let the stabilizer trim control wheel switch and the alternate stab trim switches go to neutral.
- (ce) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (cf) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.
- (cg) Use the stabilizer trim control wheel switches to move the stabilizer at least 3 units of trim from either end of the travel range.

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(ch) Press and hold the BRAKE BYPASS valve button on the left stabilizer trim control module (Fig. 502).

**WARNING:** MAKE SURE THE AREA AROUND THE STABILIZER, INSIDE THE STABILIZER COMPARTMENT, IS CLEAR BEFORE YOU MOVE THE STABILIZER. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (ci) Move the captain's or first officer's stabilizer trim control wheel switches full travel in the same direction and hold for ten seconds.  
1) Make sure that the stabilizer does not move.
- (cj) Release the stabilizer trim control wheel switches and then release the BRAKE BYPASS valve button.
- (ck) Move the captain's or first officer's stabilizer trim control wheel switches through full travel.  
1) Make sure that the stabilizer operates correctly.
- (cl) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.
- (cm) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (cn) Press and hold the BRAKE BYPASS valve button on the right stabilizer trim control module (Fig. 502).
- (co) Move the captain's or first officer's stabilizer trim control wheel switches full travel in the same direction and hold for ten seconds.  
1) Make sure that the stabilizer does not move.
- (cp) Release the stabilizer trim control wheel switches and then release the BRAKE BYPASS valve button.
- (cq) Move the captain's or first officer's stabilizer trim control wheel switches through full travel.  
1) Make sure that the stabilizer operates correctly.
- (cr) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

E. AIRPLANES WITH STAB TRIM LEVERS;  
Manual-Mechanical Stabilizer Trim Control Operation Test

S 865-019

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

S 865-478

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Supply power to the left and center hydraulic systems (AMM 29-11-00/201).

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S 715-002

- (3) Do the steps that follow to make sure that the manual mechanical stabilizer trim control operates correctly:
- (a) Move the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - (b) Move the stab trim levers to the APL NOSE DN position.
    - 1) Make sure that the stabilizer leading edge moves up.
  - (c) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position while the stabilizer moves.
    - 1) Make sure the stabilizer stops.
  - (d) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
    - 1) Make sure the stabilizer starts to move.
  - (e) Release the stab trim levers.
    - 1) Make sure that the stabilizer stops when the stab trim levers are released.
  - (f) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - (g) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - (h) Move the stab trim levers to the APL NOSE UP position.
    - 1) Make sure that the stabilizer leading edge moves down.
  - (i) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position while the stabilizer moves.
    - 1) Make sure the stabilizer stops.
  - (j) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
    - 1) Make sure the stabilizer starts to move.
  - (k) Release the stab trim levers.
    - 1) Make sure that the stabilizer stops when the stab trim levers are released.

**CAUTION:** DO NOT LET THE BALLSCREW ACTUATOR HIT THE MECHANICAL STOPS. DAMAGE TO THE BALLSCREW ACTUATOR AND THE STABILIZER CAN OCCUR.

- (l) Move the stab trim levers full forward and full aft.
  - 1) Make sure that the stabilizer moves smoothly and freely through full travel.
  - 2) Make sure that the stabilizer position indicator correctly shows the position of the stabilizer, (0.25-14.00 pilot units).
- (m) Move only the left STAB TRIM lever forward.
  - 1) Make sure that the stabilizer does not move.
- (n) Move only the right STAB TRIM lever forward.
  - 1) Make sure that the stabilizer does not move.
- (o) Move only the left STAB TRIM lever aft.
  - 1) Make sure that the stabilizer does not move.

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- (p) Move only the right STAB TRIM Lever aft.
  - 1) Make sure that the stabilizer does not move.
- (q) Move the STAB TRIM levers full travel in opposite directions at the same rate.
  - 1) Make sure that the stabilizer does not move.
- (r) Change the positions of the STAB TRIM levers.

NOTE: The STAB TRIM levers must go through neutral at the same time.

- 1) Make sure that the stabilizer does not move.
- (s) Move both of the levers to neutral at the same rate.
  - 1) Make sure that the stabilizer does not move.

S 865-021

- (4) Remove power from the left and center hydraulic systems, if it is not necessary (AMM 29-11-00/201).

S 865-022

- (5) Remove electrical power if it is not necessary (AMM 24-22-00/201).
- F. AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Stabilizer Trim Single Switch Test

NOTE: You must use the alternate stabilizer trim switches.

S 865-460

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

S 865-442

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

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- (2) Pressurize the left and center hydraulic systems (AMM 29-11-00/201).
- S 865-461
- (3) Make sure that the L, R, and C FLT CONT SHUTOFF switches on the right side panel, P61 are On.
- S 865-444
- (4) Make sure these circuit breakers on the P11 panel are closed:
- (a) 11A36, STAB TRIM ALT
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF C
  - (d) 11H10, L STAB TRIM POS IND
  - (e) 11H19, R STAB TRIM POS IND
- S 865-445
- (5) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- S 865-405
- (6) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- S 865-446
- (7) Move the two alternate stab trim switches to the APL NOSE DN position.
- (a) Make sure the stabilizer moves in the airplane nose down direction.
- S 865-406
- (8) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position while the stabilizer moves.
- (a) Make sure the stabilizer stops.
- S 865-466
- (9) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (a) Make sure the stabilizer starts to move.

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- S 865-467
- (10) Release the alternate stab trim switches.
- (a) Make sure that the stabilizer stops when you release the ALTN STAB TRIM switches on the control stand panel, P10.
- S 865-468
- (11) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- S 865-410
- (12) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- S 865-492
- (13) Move the two alternate stab trim switches to the APL NOSE UP position.
- (a) Make sure the stabilizer moves in the airplane nose up direction.
- S 865-469
- (14) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position while the stabilizer moves.
- (a) Make sure the stabilizer stops.
- S 865-470
- (15) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (a) Make sure the stabilizer starts to move.
- S 865-413
- (16) Release the alternate stab trim switches.
- (a) Make sure that the stabilizer stops when the alternate stab trim switches are released.
- S 865-493
- (17) Make sure that the stabilizer is between 6 and 9 units of stabilizer trim.

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S 865-494

- (18) Move the left alternate stabilizer trim switch to the APL NOSE UP position.  
(a) Make sure that the stabilizer does not move.

S 865-495

- (19) Move the left alternate stabilizer trim switch to the APL NOSE DN position.  
(a) Make sure that the stabilizer does not move.

S 865-496

- (20) Move the right alternate stabilizer trim switch to the APL NOSE UP position.  
(a) Make sure that the stabilizer does not move.

S 865-497

- (21) Move the right alternate stabilizer trim switch to the APL NOSE DN position.  
(a) Make sure the stabilizer does not move.

S 865-471

**CAUTION:** DO NOT LET THE BALLSCREW ACTUATOR HIT THE MECHANICAL STOPS. DAMAGE TO THE BALLSCREW ACTUATOR AND THE STABILIZER CAN OCCUR.

- (22) Move the stabilizer stab trim switches full forward and full aft.  
(a) Make sure that the stabilizer moves smoothly and freely through full travel.  
(b) Make sure that the stabilizer position indicator correctly show the position of the stabilizer (0.25 - 14.0 pilot units).

S 865-498

- (23) Remove the power from the left and center hydraulic systems if it is not necessary (AMM 29-11-00/201).

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S 865-499

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

G. Horizontal Stabilizer Trim Shutoff Switches Test

S 865-023

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

S 865-118

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Supply power to the left and center hydraulic systems (AMM 29-11-00/201).

S 865-025

- (3) Make sure these circuit breakers on the P11 panel are closed:
  - (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER

S 715-003

- (4) Do the steps that follow to make sure that the stabilizer trim shutoff switches operate correctly:
  - (a) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel in the CUTOUT position.
  - (b) AIRPLANES WITH STAB TRIM LEVERS;  
Move the stab trim levers full forward and full aft slowly.
    - 1) Make sure that the stabilizer does not move.
  - (c) AIRPLANES WITH ALT STAB SWITCHES;  
Move the alternate stab switches full forward and full aft slowly.
    - 1) Make sure that the stabilizer does not move.

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- (d) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

**CAUTION:** DO NOT LET THE BALLSCREW ACTUATOR HIT THE MECHANICAL STOPS. DAMAGE TO THE BALLSCREW ACTUATOR AND THE STABILIZER CAN OCCUR.

- (e) AIRPLANES WITH STAB TRIM LEVERS;  
Move the stab trim levers full forward and hold.
  - 1) Make sure that the stabilizer moves up.
- (f) AIRPLANES WITH ALT STAB SWITCHES;  
Move the alternate stab switches full forward and hold.
  - 1) Make sure that the stabilizer moves up.
- (g) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.
- (h) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (i) AIRPLANES WITH STAB TRIM LEVERS;  
Move the stab trim levers full aft and hold.
  - 1) Make sure that the stabilizer moves down.
- (j) AIRPLANES WITH ALT STAB SWITCHES;  
Move the alternate stab switches full aft and hold.
  - 1) Make sure that the stabilizer moves down.
- (k) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

S 865-026

- (5) Remove the power from the left and center hydraulic systems if it is not necessary (AMM 29-11-00/201).

S 865-027

- (6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

H. Stabilizer Trim Cutoff Switches Test

S 865-028

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

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S 865-119

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Supply power to the left and center hydraulic systems (AMM 29-11-00/201).

S 715-004

- (3) Do the steps that follow to make sure that the stabilizer trim cutoff switches operate correctly:
- (a) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.

**CAUTION:** DO NOT LET THE BALLSCREW ACTUATOR HIT THE MECHANICAL STOPS. DAMAGE TO THE BALLSCREW ACTUATOR AND THE STABILIZER CAN OCCUR.

- (b) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold until the stabilizer stops.
- (c) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position and hold.
- (d) With the stabilizer trim control wheel switches held down, slowly push the elevator control column forward.
- 1) Make sure that the stabilizer stops before it gets to the leading edge down travel limit.
- (e) Move the control columns to the neutral position and let the stabilizer move until it stops.
- (f) Release the stabilizer trim control wheel switches.
- (g) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold.

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- (h) With the stabilizer trim control wheel switches held to the APL NOSE DN position, slowly pull the control column aft.
  - 1) Make sure that the stabilizer stops before it gets to the leading edge up travel limit.
- (i) Move the control columns to the neutral position and let the stabilizer move until it stops.
- (j) Release the stabilizer trim control wheel switches.
- (k) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (l) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- (m) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold until the stabilizer stops.
- (n) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position and hold.
- (o) With the stabilizer trim control wheel switches held to the APL NOSE UP position, slowly push the elevator control column forward.
  - 1) Make sure that the stabilizer stops before it gets to the leading edge down travel limit.
- (p) Move the control columns to the neutral position and let the stabilizer move until it stops.
- (q) Release the stabilizer trim control wheel switches.
- (r) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold.
- (s) With the stabilizer trim control wheel switches held to the APL NOSE DN position, slowly pull the control column aft.
  - 1) Make sure that the stabilizer stops before it gets to the leading edge up travel limit.
- (t) Move the control columns to the neutral position and let the stabilizer move until it stops.
- (u) Release the stabilizer trim control wheel switches.
- (v) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

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- S 865-030
- (4) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).
- S 865-031
- (5) Make sure these circuit breakers on the P11 panel are closed:
- (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER
- S 865-032
- (6) Make sure that the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel are in the NORM position.
- S 865-033
- (7) Remove electrical power (AMM 24-22-00/201).
- I. SAS 050, 051, 150-166, 275-279 POST-SB 27-102;  
SAS 167-274, 278, 280-999;  
Stabilizer Trim Override Capability with Split Control Column Commands Test

**NOTE:** For this test, the stabilizer must be at no more than 8 units of trim.

- S 865-126
- (1) Supply electrical power (AMM 24-22-00/201).

S 865-127

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- (2) Supply power to the left and center hydraulic systems (AMM 29-11-00/201).

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S 865-128

- (3) Make sure these circuit breakers on the P11 panel are closed:
- (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER
  - (c) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (d) 11H27, FLT CONTROL SHUTOFF TAIL CTR

S 865-538

- (4) Put the FLT CONT SHUTOFF TAIL L and C switches on the right side panel, P61, in the OFF position.

S 865-539

- (5) Set the C STAB TRIM shutoff switch on the control stand panel, P10, in the NORM position.

S 865-540

- (6) Set the L STAB TRIM shutoff switch on the control stand panel, P10, in the CUTOUT position.

S 865-131

- (7) Push the captain's control column full forward and hold it in position.
- (a) At the same time, pull the first officer's control column full aft and hold it in position.

NOTE: Approximately 100 pounds (445 newtons) are necessary to split the control columns.

S 865-132

- (8) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position.
- (a) Make sure the leading edge of the stabilizer moves down.

S 865-542

- (9) With the control columns still split, move the captain's or first officer's stab trim switches on the control wheel to the APL NOSE DN position.
- (a) Make sure the leading edge of the stabilizer moves up.

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S 865-135

- (10) Release the stabilizer trim control wheel switches.

S 865-136

- (11) Push the first officer's control column full forward and hold in position.  
(a) At the same time, pull the captain's control column full aft and hold in position.

NOTE: Approximately 100 pounds (445 newtons) are necessary to split the columns.

S 865-137

- (12) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position.

S 215-138

- (13) Make sure the leading edge of the stabilizer moves down.

S 865-141

- (14) Release the stabilizer trim control wheel switches.

S 865-475

- (15) With the control columns still split, move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position.

S 215-442

- (16) Make sure that the leading edge of the stabilizer moves up.

S 865-476

- (17) Release the stabilizer trim control wheel switches.

S 865-463

- (18) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.

S 865-464

- (19) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

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S 715-398

- (20) Do the steps (7) thru (17) again for the left hydraulic system.

S 865-142

- (21) Make sure the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel are in the NORM position.

S 865-333

- (22) Remove power from the left and center hydraulic systems, if it is not necessary (AMM 29-11-00/201).

S 865-334

- (23) Remove electrical power (AMM 24-22-00/201).

TASK 27-41-00-825-054

3. Adjustment - Horizontal Stabilizer Trim Control System

A. General

- (1) The system components that follow can be adjusted independently:

**NOTE:** Adjustment of other system components is not necessary before these system components are adjusted.

(a) STCM lever control rod

(b) Stabilizer body cables.

- (2) AIRPLANES WITH STAB TRIM LEVERS;

Adjustment of the complete stabilizer trim control system is to be done in a specific order, each of which must be completed before a subsequent adjustment is started.

(a) When correctly adjusted, the stabilizer trim control system operates smoothly through its travel range and meets the conditions that follow:

- 1) STCM lever control rod does not bind through full travel.
- 2) The arming and control servo levers on the STCMs are correctly adjusted if the arming and control levers are between the index (scribe) marks on the lever stop plate when the STAB TRIM control levers are in their neutral position.

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(b) Stabilizer Body Cables ST1A, ST1B, ST2A, ST2B

NOTE: If any of the conditions that follow are not correct, the applicable cables must be adjusted.

- 1) The tension in cables ST1A, ST1B, ST2A, and ST2B are correct if they are in the rig load tolerance band for the ambient temperature (Fig. 504).
- 2) With correctly tensioned cables, the cable adjustment is correct if rig pins ST4 and ST5 can be freely installed with the STAB TRIM control levers in the neutral position.

(c) Limit Switch and Position Transmitter Modules (LSTM's)

- 1) The LSTM's are correctly adjusted if the tension in the LSTM cables is  $50 \pm 5$  pounds (222 +/- 22 newtons).

(3) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;

Adjustment of the complete stabilizer trim control system is to be done in a specific order, each of which must be completed before a subsequent adjustment is started.

(4) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;

When correctly adjusted, the stabilizer trim control system operates smoothly through its travel range and meets the condition that follows:

(a) Limit Switch and Position Transmitter Modules (LSTM's)

- 1) The LSTM's cables are correctly adjusted if the tension in the cables is  $50 \pm 5$  pounds (222 +/- 22 newtons).

B. Equipment

(1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):

- (a) ST1 -P/N A20004-15
- (b) ST2 -P/N A20004-15
- (c) ST3 -P/N A20004-15
- (d) ST4 -P/N A20004-17
- (e) ST5 -P/N A20004-17

(2) Cable Tensiometer (Range 0-150 lbs or 0 - 670 newtons) - Commercially Available

(3) Ohmmeter - Commercially Available

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- (4) Voltmeter - Commercially Available
  - C. Consumable Materials
    - (1) C00308 Compound, Corrosion Preventive - MIL-C-11796 Class III
  - D. References
    - (1) AMM 06-42-00/201, Empennage Access Doors and Panels
    - (2) AMM 20-10-24/201, Rig Pins
    - (3) AMM 24-22-00/201, Electrical Power - Control
    - (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
  - E. Access
    - (1) Location Zones
      - 211/212 Control Cabin
      - 312 Area Aft of Pressure Bulkhead to BS 1725 (Right)
    - (2) Access Panel
      - 312AR Stabilizer Trim Ballscrew Actuator
  - F. Prepare for Adjustment
    - S 865-055
      - (1) Supply electrical power (AMM 24-22-00/201).
    - S 865-056
      - (2) Make sure that the power from the left and center hydraulic systems is removed (AMM 29-11-00/201).
    - S 865-057
      - (3) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, in the CUTOUT position.
    - S 215-512
      - (4) Make sure that LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the P61 panel are OFF.
    - S 865-058
      - (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
        - (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
11A36, ALT STAB TRIM
        - (b) 11C12, STAB TRIM SHUTOFF L
        - (c) 11C13, STAB TRIM SHUTOFF CENTER
    - S 015-059
- WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.
- (6) Open the access door 312AR, for the stabilizer trim ballscrew actuator (AMM 06-42-00/201).

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G. AIRPLANES WITH STAB TRIM LEVERS;  
STCM Lever Control Rods Adjustment (Fig. 502)

S 495-060

- (1) Install rig pins ST4 and ST5 in the rear quadrants.

S 215-061

- (2) Make sure that the servo levers on the STCMs are between the index (scribe) marks on the lever stop plate.

**NOTE:** The maximum permitted distance from the scribe mark to the edge of the lever is 0.03 inch (0.8 millimeter).

S 825-062

- (3) If any of the levers are not aligned by more than 0.03 inch (0.8 millimeter), do the steps that follow:
- (a) If a servo lever nearest a quadrant is not aligned, do the steps that follow:
    - 1) Disconnect the control rod from the quadrant.
    - 2) Adjust the rod end until the lever aligns in the index marks.
    - 3) Tighten the check nuts.
  - (b) If a servo lever farthest from a quadrant is not aligned, do the steps that follow:
    - 1) Disconnect the control rod from the lever on the STCM.
    - 2) Adjust the rod end until the lever aligns in the index marks.
    - 3) Tighten the check nuts.

S 095-120

**CAUTION:** DO NOT DISTURB THE LINKAGE WHEN THE RIGGING PIN IS NOT INSTALLED. MOVEMENT OF THE LINKAGE WHEN THE RIGGING PIN IS REMOVED OCCURS WHEN THE LEVERS GO TO THEIR CENTER POSITION.

- (4) Remove rig pins ST4 and ST5 and then put them back.
- (a) If the rigging pins cannot be freely installed, do the steps that follow:
  - (b) Make sure that the servo lever is between the scribe marks on the stop plate in the permitted 0.03 inch (0.8 millimeter).
  - (c) If the servo lever position is correct, the adjustment is satisfactory even if the rig pins cannot be installed freely.

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H. AIRPLANES WITH STAB TRIM LEVERS;  
Body Cables Adjustment (Fig. 504)

**NOTE:** The airplane must not be on jacks during the body cable adjustment.

S 825-064

- (1) If new cables have been installed, do the steps that follow to stretch the cables before they are adjusted:
  - (a) Install rig pins ST4 and ST5 in the rear quadrants (Fig. 502).
  - (b) Adjust the turnbuckles in ST1A, ST1B, ST2A, and ST2B, at the same time, to  $140 \pm 10$  pounds ( $623 \pm 44$  newtons) cable tension to stretch the cables.
  - (c) Adjust the turnbuckles such that the STAB TRIM levers are  $\pm 0.5$  inch ( $\pm 13$  millimeters) of the index marks on the limit position decal on the control stand (Fig. 501).
  - (d) Adjust all of the seals so that there are no bends in the cables.
  - (e) Remove rig pins ST4 and ST5.
  - (f) Cycle the control levers through full travel 25 times.
  - (g) Make sure that the conditions that follow are correct:
    - 1) The cables do not touch the pulley or quadrant flanges for the full cable travel.
    - 2) The cables are installed through grommets and air pressure seals in the structure as necessary.
    - 3) The cables are not moved by fairleads, rub strips, or grommets from the adjusted or normal operated positions.
    - 4) The pulleys turn freely with no blockage from the guards.

S 495-065

- (2) Install rig pins ST4 and ST5 in the rear quadrants (Fig. 502).

S 825-066

- (3) Adjust the turnbuckles in cables ST1A, ST1B, ST2A, and ST2B such that the conditions that follow are correct:
  - (a) The cable tension is as specified (Fig. 504).
  - (b) The control levers align with each other by 0.02 inch (0.5 millimeter) and the base of the levers are positioned within the index marks of the limit position decal.

**NOTE:** Thermal expansion of the control cables during flight can cause the difference between the levers to be more than 0.02 inch (0.5 millimeter) while in flight. If the difference between the levers is more than 0.25 inch (6.4 millimeters) while in flight, the levers can be adjusted on the ground. You can adjust the TRIM lever, forward or aft of the STAB lever, one half of the in-flight displacement to a maximum of 0.25 inch (6.4 millimeters).

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- S 095-067
- (4) Remove rig pins ST4 and ST5.
- S 865-068
- (5) Cycle the STAB TRIM levers once.
- S 225-069
- (6) Make sure that the cable tension and STAB TRIM lever position are still correct.
- S 435-070
- (7) Install locking clips on the turnbuckles.
- S 625-071
- (8) Apply corrosion preventive compound to the visible turnbuckle threads.
- I. Limit Switch and Position Transmitter Modules (LSTM) Adjustment (Fig. 503)

NOTE: For airplanes with the Stab Trim Levers, the STCM lever control rod and the body cables must be adjusted before the LSTMs are adjusted.

- S 225-072
- (1) Make sure that Dimension A on the stabilizer trim ballscrew actuator is  $12.28 \pm 0.03$  inches (311.9 +/- 0.8 millimeters) (Fig. 502).
- S 825-073
- (2) If Dimension A is not  $12.28 \pm 0.03$  inches (311.9 +/- 0.8 millimeters), do the steps that follow to correctly set the stabilizer:
- (a) AIRPLANES WITH STAB TRIM LEVERS;  
Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:  
1) 11C13, STAB TRIM SHUTOFF CENTER
- (b) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:  
1) 11A36, STAB TRIM ALT  
2) 11C13, STAB TRIM SHUTOFF CENTER
- (c) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATOR, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (d) Supply power to the center hydraulic system (AMM 29-11-00/201).
- (e) AIRPLANES WITH STAB TRIM LEVERS;  
Use the STAB TRIM levers to move the stabilizer until Dimension A on the stabilizer trim ballscrew actuator is  $12.28 \pm 0.03$  inches (311.9 +/- 0.8 millimeters).
- (f) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Use the alternate stab trim switches to move the stabilizer until Dimension A on the stabilizer trim ballscrew actuator is  $12.28 \pm 0.03$  inches (311.9 +/- 0.8 millimeters).
- (g) Remove the power from the center hydraulic system (AMM 29-11-00/201).
- (h) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- (i) AIRPLANES WITH STAB TRIM LEVERS;  
Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - 1) 11C13, STAB TRIM SHUTOFF CENTER
- (j) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - 1) 11A36, ALT STAB TRIM
  - 2) 11C13, STAB TRIM SHUTOFF CENTER

S 225-074

- (3) Make sure that the tension in each set of LSTM cables (Fig. 503) is  $50 \pm 5$  pounds (222 +/- 22 newtons) (no matter what the ambient temperature is).

S 495-075

- (4) Make sure that rig pins ST1, ST2, and ST3 can be freely installed.

S 825-076

- (5) If necessary, adjust the LSTM cable turnbuckles to get a cable tension of  $50 \pm 5$  pounds (222 +/- 22 newtons) and so rig pins ST1, ST2, and ST3 can be freely installed.
  - (a) Make sure that no more than 0.75 inches (19.1 millimeters) of thread show on the terminal assembly.

S 435-077

- (6) Install the turnbuckle locking clips.

S 095-078

- (7) Remove rig pins ST1, ST2, and ST3.

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S 215-079

- (8) Do the steps that follow to make sure that the LSTM cables are adjusted correctly:
- (a) AIRPLANES WITH STAB TRIM LEVERS;  
Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (b) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
    - 1) 11A36, ALT STAB TRIM
    - 2) 11C13, STAB TRIM SHUTOFF CENTER
  - (c) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

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- (d) Supply power to the center hydraulic system (AMM 29-11-00/201).

**CAUTION:** DO NOT LET THE BALLSCREW ACTUATOR HIT THE MECHANICAL STOPS. DAMAGE TO THE BALLSCREW ACTUATOR AND THE STABILIZER CAN OCCUR.

- (e) AIRPLANES WITH STAB TRIM LEVERS;  
Use the STAB TRIM levers to cycle the stabilizer between 1.0 and 13.5 units of trim.

**NOTE:** Do not let the stabilizer ballscrew actuator get closer than 2 inches (51 millimeters) from the up and down mechanical stops.

- (f) Make sure that the conditions that follow are correct:
  - 1) The cables do not touch the pulley or quadrant flanges for the full cable travel.
  - 2) The cables are in 2.0 degrees of the plane of the pulley or quadrant.
  - 3) The pulleys turn freely with no obstruction from the guards.
- (g) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Use the alternate stab trim switches to cycle the stabilizer between 1.0 and 13.5 units of trim.

**NOTE:** Do not let the stabilizer ballscrew actuator get closer than 2 inches (51 millimeters) from the up and down mechanical stops.

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- (h) Make sure that the conditions that follow are correct:
- 1) The cables do not touch the pulley or quadrant flanges for the full cable travel.
  - 2) The cables are in 2.0 degrees of the plane of the pulley or quadrant.
  - 3) The pulleys turn freely with no blockage from the guards.

S 865-080

- (9) AIRPLANES WITH STAB TRIM LEVERS;  
Use the STAB TRIM levers to move the stabilizer such that Dimension A on the ballscrew actuator is 12.28 ±0.03 inches (311.9 ±0.8 millimeters) (Fig. 502).

S 865-082

- (10) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Use the alternate stab trim switches to move the stabilizer such that Dimension A on the ballscrew actuator is 12.28 ±0.03 inches (311.9 ±0.8 millimeters) (Fig. 502).

S 865-084

- (11) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 865-085

- (12) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.

S 225-086

- (13) Make sure that the cable tension is still 50 ±5 pounds (222 ±22 newtons) and that rig pins ST1, ST2, and ST3 can still be freely installed.
- (a) Adjust the cable turnbuckles, if necessary.
  - (b) Make sure that no more than 0.75 inch (19.1 millimeters) of thread show on the terminal assembly.

S 095-087

- (14) Remove rig pins ST1, ST2, and ST3.

S 825-088

- (15) Do the steps that follow to do the adjustment for the center LSTM:
- (a) Do the steps that follow to move the stabilizer to the correct position for the adjustment:
    - 1) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

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- 2) Supply power to the center hydraulic system (AMM 29-11-00/201).
  - 3) AIRPLANES WITH STAB TRIM LEVERS;  
Use the STAB TRIM control levers to move the stabilizer such that Dimension A on the ballscrew actuator is  $12.75 \pm 0.03$  inches ( $323.9 \pm 0.8$  millimeters) (Fig. 502).
  - 4) AIRPLANES WITH STAB TRIM SWITCHES;  
Use the alternate stab trim switches to move the stabilizer such that Dimension A on the ballscrew actuator is  $12.75 \pm 0.03$  inches ( $323.9 \pm 0.03$  millimeters) (Fig. 502).
  - 5) Remove the power from the center hydraulic system (AMM 29-11-00/201).
  - 6) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - 7) AIRPLANES WITH STAB TRIM LEVERS;  
Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - a) 11C13, STAB TRIM SHUTOFF CENTER
  - 8) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
    - a) 11A36, ALT STAB TRIM
    - b) 11C13, STAB TRIM SHUTOFF CENTER
- (b) Disconnect the electrical connector from the center LSTM.
  - (c) Connect an ohmmeter to pins 22 and 23 on the LSTM.
  - (d) Make sure that there is electrical continuity across pins 22 and 23.
    - 1) If there is no continuity, slowly make the LSTM cable (that is connected to the bottom of the stabilizer) shorter until there is continuity.
  - (e) After there is continuity, slowly make the LSTM cable (that is connected to the bottom of the stabilizer) longer just until there is an open circuit across pins 22 and 23.
  - (f) Install the locking clips on the cable turnbuckle.
  - (g) Remove the ohmmeter.
  - (h) Install the electrical connector on the center LSTM.

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(16) Do the steps that follow to do the adjustment of the left and right LSTMs:

(a) Do the steps that follow to move the stabilizer to the correct position for the adjustment:

- 1) Remove the DO-NOT-CLOSE tag and close these circuit breakers on the P11 panel:
  - a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
11A36, ALT STAB TRIM
  - b) 11C13, STAB TRIM SHUTOFF CENTER
- 2) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- 3) Supply power to the center hydraulic system (AMM 29-11-00/201).
- 4) SAS 150-154;  
Use the STAB TRIM levers to move the stabilizer such that Dimension A on the ballscrew actuator is  $12.75 \pm 0.03$  inches ( $323.9 \pm 0.8$  millimeters).
- 5) ALL MTH AIRPLANES;  
ALL EXCEPT SAS 150-154;  
Use the alternate stab trim switches to move the stabilizer such that Dimension A on the ballscrew actuator is  $12.75 \pm 0.03$  inches ( $323.9 \pm 0.8$  millimeters).
- 6) Remove the power from the center hydraulic system (AMM 29-11-00/201).
- 7) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- 8) AIRPLANES WITH STAB TRIM LEVERS;  
Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - a) 11C13, STAB TRIM SHUTOFF CENTER
- 9) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - a) 11A36, ALT STAB TRIM
  - b) 11C13, STAB TRIM SHUTOFF

(b) Do the steps that follow to adjust the left LSTM:

- 1) Disconnect the electrical connector from the left LSTM.
- 2) Connect an ohmmeter to pins 22 and 23 of the left LSTM.

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- 3) Make sure that there is electrical continuity across pins 22 and 23.
    - a) If there is no continuity, slowly make the LSTM cable shorter until there is continuity.
  - 4) After there is continuity, slowly make the LSTM cable longer until there is an open circuit across pins 22 and 23.
  - 5) Install the locking clip on the cable turnbuckle.
  - 6) Apply corrosion preventive compound on the visible threads of the turnbuckles.
  - 7) Remove the ohmmeter from the left LSTM.
  - 8) Connect the electrical connector to the left LSTM.
  - (c) Do the steps that follow to adjust the right LSTM:
    - 1) Disconnect the electrical connector from the right LSTM.
    - 2) Connect an ohmmeter to pins 22 and 23 on the right LSTM.
    - 3) Make sure that there is electrical continuity across pins 22 and 23.
      - a) If there is no continuity, slowly make the LSTM cable shorter until there is continuity.
    - 4) After there is continuity, slowly make the LSTM cable longer until there is an open circuit across pins 22 and 23.
    - 5) Install the locking clip on the cable turnbuckle.
    - 6) Apply corrosion preventive compound on the visible threads on the turnbuckles.
    - 7) Remove the ohmmeter from the right LSTM.
    - 8) Connect the electrical connector to the right LSTM.
- J. Put the Airplane Back to Its Usual Condition

S 415-090

- (1) Close the access panel, 312AR (AMM 06-42-00/201).

S 865-686

- (2) Remove the power from the center and left hydraulic systems (AMM 29-11-00/201).

S 865-091

- (3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
11A36, ALT STAB TRIM
  - (b) 11C13, STAB TRIM SHUTOFF CENTER

S 865-092

- (4) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

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4. System Test - Horizontal Stabilizer Trim Control System (Fig. 501)

A. General

- (1) The tests in this procedure make sure the complete horizontal stabilizer trim control system operates correctly.

B. Equipment

- (1) Control Wheel Adapter Equipment - A27021-96 or -98
- (2) Protractor - A27021-30 (from the A27021-29 kit) or 4MIJ65B80307-1
- (3) Control Column Angle Scale - A27095-10 (Optional)
- (4) Hand Pump, Positive Displacement - Commercially Available
- (5) Shutoff Valve (2 Necessary) - Commercially Available
- (6) Pressure Gauge, 200 psi (1400 kPa) capacity - Commercially Available
- (7) Hose, 1/4 inch (6.4 millimeter) diameter - Commercially Available
- (8) Union, Flareless Tube - MS21902 (as required)
- (9) Hydraulic Service Unit - 06-5031-3600 (optional)  
Tronair, Inc.  
South 1740 Eber Road  
Holland, Ohio 43528-9794
- (10) Device to measure the distance from the end surface on the upper ballscrew stop and the face surface on the lower gimbal by  $\pm 0.02$  inch ( $\pm 0.5$  millimeter) - Commercially Available
- (11) Beaker with 1/4 cc graduations - Commercially Available
- (12) Stopwatch - Commercially Available

C. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System
- (4) AMM 34-11-00/201, Pitot Static Systems

D. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 312 Area Aft of Pressure Bulkhead to BS 1725 (Right)
- (2) Access Panel
  - 312AR Stabilizer Trim Ballscrew Actuator

E. Prepare for Test

- S 865-094
- (1) Supply electrical power (AMM 24-22-00/201).

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S 015-095

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (2) Open the access panel, 312AR, for the stabilizer trim ballscrew actuator (AMM 06-42-00/201).

S 865-096

- (3) Make sure these circuit breakers are closed on the overhead panel, P11:
  - (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER

S 865-097

- (4) Put the LEFT and CENTER STAB TRIM SHUTOFF switches on the P10, control stand panel in the NORM position.

S 485-503

- (5) Install the adapter equipment for the control wheels on the captain's or the first officer's control wheels (Fig. 505)

**NOTE:** The adapter equipment is used to measure angular displacement of the control column.

To measure the fore and aft angle of the control column, attach the protractor perpendicular to the face of the control wheel. The angle of the control column is read from the pendulum on the protractor.

S 865-099

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (6) Supply power to the left and center hydraulic systems (AMM 29-11-00/201).

S 865-100

- (7) Move the stabilizer to 6 units of trim.

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F. Horizontal Stabilizer Trim Electrical Operation Test (Fig. 501)

S 735-005

- (1) Do the steps that follow to make sure that the electrical stabilizer trim control operates correctly:
  - (a) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - (b) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (c) Move the captain's stabilizer trim control wheel switches to the APL NOSE DN position.
    - 1) Make sure that the stabilizer leading edge moves up.
  - (d) Put the LEFT STAB TRIM SHUTOFF valve switch on the panel P10 in the CUTOUT position while the stabilizer moves.
    - 1) Make sure that the stabilizer stops in one second.
  - (e) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
    - 1) Make sure that the stabilizer starts to move in one second.
  - (f) Release the stabilizer trim control wheel switches.
    - 1) Make sure that the stabilizer stops.
  - (g) Move the first officer's stabilizer trim control wheel switches to the APL NOSE UP position.
    - 1) Make sure that the stabilizer leading edge moves down.
  - (h) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position while the stabilizer moves.
    - 1) Make sure that the stabilizer stops in one second.
  - (i) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
    - 1) Make sure the stabilizer starts to move in one second.
  - (j) Release the stabilizer trim control wheel switches.
    - 1) Make sure that the stabilizer stops in one second.
  - (k) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Do the steps that follow:
    - 1) Move the alternate stab trim switches on the P10 panel to the APL NOSE DN position.
      - a) Make sure that the stabilizer leading edge moves up.
    - 2) While the stabilizer moves, put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
      - a) Make sure the stabilizer stops.
    - 3) Move the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
      - a) Make sure that the stabilizer starts to move.
    - 4) Release the alternate stab trim switches.
      - a) Make sure that the stabilizer stops.
  - (l) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - (m) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C12, STAB TRIM SHUTOFF L

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- (n) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - 1) 11C13, STAB TRIM SHUTOFF CENTER
- (o) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (p) Move the captain's stabilizer trim control wheel switches to the APL NOSE UP position.
  - 1) Make sure that the stabilizer leading edge moves down.
- (q) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position while the stabilizer moves.
  - 1) Make sure that the stabilizer stops in one second.
- (r) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - 1) Make sure the stabilizer starts to move in one second.
- (s) Release the control wheel switches.
  - 1) Make sure that the stabilizer stops.
- (t) Move the first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
  - 1) Make sure that the stabilizer leading edge moves up.
- (u) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position while the stabilizer moves.
  - 1) Make sure that the stabilizer stops in one second.
- (v) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - 1) Make sure that the the stabilizer starts to move in one second.
- (w) Release the stabilizer trim control wheel switches.
  - 1) Make sure that the stabilizer stops.
- (x) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Do the steps that follow:
  - 1) Move the alternate stab trim switches on the P10 panel to the APL NOSE UP position.
    - a) Make sure that the stabilizer leading edge moves down.
  - 2) While the stabilizer moves, put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
    - a) Make sure that the stabilizer stops.
  - 3) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
    - a) Make sure that the stabilizer moves.
  - 4) Release the alternate stab trim switches.
    - a) Make sure that the stabilizer stops.
- (y) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - 1) 11C12, STAB TRIM SHUTOFF L
- (z) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (aa) Move each part of the captain's stabilizer trim control wheel switch to the APL NOSE DN position while the other part stays at neutral.
  - 1) Make sure that the stabilizer does not move.

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- (ab) Move each part of the captain's stabilizer trim control wheel switch to the APL NOSE UP position while the other part stays at neutral.
  - 1) Make sure that the stabilizer does not move.
- (ac) Move each part of the first officer's stabilizer trim control wheel switch to the APL NOSE DN position while the other part stays at neutral.
  - 1) Make sure that the stabilizer does not move.
- (ad) Move each part of the first officer's stabilizer trim control wheel switch to the APL NOSE UP position while the other part stays at neutral.
  - 1) Make sure that the stabilizer does not move.
- (ae) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Do the steps that follow:
  - 1) Move each alternate stab trim control switch on the P10 panel to the APL NOSE DN position while the other one stays at neutral.
    - a) Make sure that the stabilizer does not move.
  - 2) Move each alternate stab trim control switch on the P10 panel to the APL NOSE UP position while the other one stays at neutral.
    - a) Make sure that the stabilizer does not move.

G. Stabilizer Trim Electrical Travel Limits and Column Cutoff Switches Test (Fig. 502)

S 735-101

- (1) Do the steps that follow for the electrical travel limits and column cutoff switches with only the right STCM test:
  - (a) Do the steps that follow for the nose down electrical limit test:
    - 1) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
    - 2) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
      - a) 11C12, STAB TRIM SHUTOFF L
    - 3) Make sure this circuit breaker on the P11 panel is closed:
      - a) 11C13, STAB TRIM SHUTOFF CENTER
    - 4) Make sure that the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel is in the NORM position.
    - 5) Make sure that the flaps and slats are retracted and the flap control lever is in the FLAP UP detent.
    - 6) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold until the stabilizer stops.
    - 7) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
    - 8) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
      - a) 11C13, STAB TRIM SHUTOFF CENTER

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- 9) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 3.00 +0.15/-0.42 inches (76.2 +3.8/-10.7 millimeters) (Fig. 502).
- 10) Do the steps that follow for the nose down electrical limit test with the flaps in the 5 unit detent:
  - a) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - b) Remove the DO-NOT-CLOSE tag and close the circuit breaker 11C13, STAB TRIM SHUTOFF CENTER on the P11 panel.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- c) Put the flap control lever to the 5-unit detent to move the TE flaps to the 5 degree position.
  - d) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold until the stabilizer stops.
  - e) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - f) Open the circuit breaker 11C13, STAB TRIM SHUTOFF CENTER on the P11 panel and attach a DO-NOT-CLOSE tag.
- 11) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 0.92 +0.15/-0.42 inches (23.4 +3.8/-10.7 millimeters) (Fig. 502).
  - 12) Put the flap lever in the FLAP UP detent to retract the flaps.
- (b) Do the steps that follow for the column forward cutoff test:
- 1) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - a) 11C13, STAB TRIM SHUTOFF CENTER
  - 2) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - 3) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position.
  - 4) With the stabilizer trim switches held in the APL NOSE UP position, slowly push the control column forward until the stabilizer stops.

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- 5) Measure the angle of the control column from the column neutral position with the control column angle scale.
  - a) Make sure that the angle is between 2.2 and 2.7 degrees.
- 6) Let the control column go to the neutral position and let the stabilizer move until it stops.
- 7) Release the stabilizer trim control wheel switches.
- (c) Do the steps that follow for the nose up electrical limit test:
  - 1) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - 2) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - a) 11C13, STAB TRIM SHUTOFF CENTER
  - 3) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 22.43 +0.42/-0.15 inches (569.7 +10.7/-3.8 millimeters) (Fig. 502).
- (d) 767-200;  
Do the steps that follow for the column/neutral shift cutoff test:

NOTE: Do this test for 767-200 airplanes only.

767-300 airplanes do not have neutral shift and cutoff components.

- 1) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - a) 11C13, STAB TRIM SHUTOFF CENTER
- 2) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- 3) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
- 4) While the switches are held in the APL NOSE DN position, slowly pull the control column aft until the stabilizer stops.

NOTE: The control column must be pulled aft while the stabilizer is at 11.00 or more units of trim.

- 5) Measure the angular displacement of the control column from the neutral position.
  - a) Make sure that the angular displacement is between 3.0 and 3.5 degrees.
- 6) Move the control column forward just enough (control column is more than 2.0 degrees aft of neutral) to let the stabilizer move.
- 7) When the stabilizer stops (at the electrical limit), release the control wheel switches and then the control column.
- 8) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.

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- 9) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - a) 11C13, STAB TRIM SHUTOFF CENTER
  - 10) Make sure that Dimension A on the stabilizer trim ballscrew actuator is  $14.61 +0.21/-0.41$  inches ( $371.1 +5.3/-10.4$  millimeters) (Fig. 502).
- (e) Do the steps that follow for the column aft cutoff test:
- 1) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - a) 11C13, STAB TRIM SHUTOFF CENTER
  - 2) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - 3) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
  - 4) While the stabilizer trim control wheel switches are held in the APL NOSE DN position, slowly pull the control column aft until the stabilizer stops.
  - 5) Measure the angular displacement of the control column from the neutral position with the control column angle scale.
    - a) Make sure that the angular displacement is between 2.0 and 2.5 degrees.
  - 6) Release the stabilizer trim control wheel switches and then the control column.

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- (2) Do the steps that follow for the electrical travel limits and column cutoff switches with only the left STCM test:
- (a) Do the steps that follow for the column forward cutoff test:
- 1) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - 2) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - a) 11C13, STAB TRIM SHUTOFF CENTER
  - 3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - a) 11C12, STAB TRIM SHUTOFF L
  - 4) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - 5) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position.
  - 6) While the stabilizer trim control switches are held in the APL NOSE UP position, slowly push the control column forward until the stabilizer stops.
  - 7) Measure the angular displacement of the control column from neutral position with the control column angle scale.
    - a) Make sure that the angular displacement is between 2.2 and 2.7 degrees.
  - 8) Let the control column go to the neutral position and let the stabilizer move until it stops.
  - 9) Release the stabilizer trim control wheel switches when the stabilizer stops.

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- (b) Do the steps that follow for the nose up electrical limit test:
- 1) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - 2) Open this circuit breaker on the P11 panel and attach DO-NOT-CLOSE tag:
    - a) 11C12, STAB TRIM SHUTOFF L
  - 3) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 22.43 +0.42/-0.15 inches (569.7 +10.7/-3.8 millimeters) (Fig. 502).
- (c) 767-200;  
Do the steps that follow for the column/neutral shift cutoff test:

NOTE: Do this test for 767-200 airplanes only.

767-300 airplanes do not have neutral shift and cutoff components.

- 1) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - a) 11C12, STAB TRIM SHUTOFF L
- 2) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- 3) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
- 4) While the stabilizer trim control wheel switches are held in the APL NOSE DN position, slowly pull the control column aft until the stabilizer stops.

NOTE: The control column must be pulled aft while the stabilizer is at 11.00 or more units of trim.

- 5) Measure angular displacement of the control column from the neutral position.
  - a) Make sure that the angular displacement is between 3.0 and 3.5 degrees.
- 6) Move the control column forward just enough (control column more than 2.0 degrees aft of neutral) to let the stabilizer move.
- 7) When the stabilizer stops (at the electrical limit), release the stabilizer trim control switches and then release the control column.
- 8) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- 9) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - a) 11C12, STAB TRIM SHUTOFF L
- 10) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 14.61 +0.21/-0.41 inches (371.1 +5.3/-10.4 millimeters) (Fig. 502).

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- (d) Do the steps that follow for the column aft cutoff test:
  - 1) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - a) 11C12, STAB TRIM SHUTOFF L
  - 2) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - 3) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
  - 4) While the switches are held in the APL NOSE DN position, slowly pull the control column aft until the stabilizer stops.
  - 5) Measure the angular displacement of the control column from the neutral position with the control column angle scale.
    - a) Make sure that the angle is between 2.0 and 2.5 degrees.
  - 6) Let the control column go to the neutral position.
  - 7) Release the control wheel switches when the stabilizer stops.
- (e) Do the steps that follow for the nose down electrical limit test:
  - 1) Make sure that the flaps and slats are retracted and the flap control lever is in the zero (FLAPS UP) detent.
  - 2) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold until the stabilizer stops.
  - 3) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - 4) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - a) 11C12, STAB TRIM SHUTOFF L
  - 5) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 3.00 +0.15/-0.42 inches (76.2 +3.8/-10.7 millimeters) (Fig. 502).
  - 6) Do the steps that follow to do the nose down electrical limit with the flaps in the 5 unit detent test:
    - a) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
    - b) Remove the DO-NOT-CLOSE tag and close the circuit breaker 11C12, STAB TRIM SHUTOFF L on the P11 panel.

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- c) Put the flap lever in the 5-unit detent to move the TE flaps to the 5 unit detent.
- d) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold until the stabilizer stops.
- e) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- f) Open the circuit breaker 11C12, STAB TRIM SHUTOFF L on the P11 panel and attach a DO-NOT-CLOSE tag.
- 7) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 0.92 +0.15/-0.42 inches (23.4 +3.8/-10.7 millimeters) (Fig. 502).
- 8) Put the flap lever in the FLAP UP detent to retract the flaps.

H. Trim Rate Test (Fig. 501)

S 735-006

- (1) Do the steps that follow to make sure that the stabilizer trim rate is correct when the auxiliary pitot lines are not pressurized:
  - (a) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (b) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - (c) Make sure that the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel is in the CUTOUT position.

**NOTE:** When operating an electro-hydraulic valve, you must wait at least 15 seconds before closing the associated circuit breaker. This will allow the valve enough time to operate before losing power.

- (d) Make sure this circuit breaker on the P11 panel is open:
  - 1) 11C13, STAB TRIM SHUTOFF CENTER

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- (e) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold until the stabilizer stops.
- (f) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position.
- (g) Measure the time necessary for the stabilizer to move to the nose up electrical trim stop.
  - 1) Make sure the necessary time is between 36 and 52 seconds.
- (h) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.
- (i) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - 1) 11C12, STAB TRIM SHUTOFF L
- (j) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - 1) 11C13, STAB TRIM SHUTOFF CENTER
- (k) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (l) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
- (m) Measure the time necessary for the stabilizer to move to the airplane nose down electrical trim stop.
  - 1) Make sure that the necessary time is between 36 and 52 seconds.

S 865-122

- (2) Pressurize the auxiliary pitot lines (lower left and lower right) to  $4.58 \pm 0.10$  psi (31.58 +/- 0.69 kPa) (420 knots) (AMM 34-11-00/201).

S 865-124

- (3) Make sure the LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, are ON.

S 865-125

- (4) Make sure these circuit breakers on the P11 panel are closed:
  - (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR
  - (c) 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 735-123

- (5) Do the steps that follow to make sure the trim rate is correct when the auxiliary pitot system is pressurized.
  - (a) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position.
  - (b) Measure the time necessary for the stabilizer to move to the nose up electrical trim stop.
    - 1) Make sure the necessary time is between 59 and 99 seconds.
  - (c) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.

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- (d) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - 1) 11C13, STAB TRIM SHUTOFF CENTER
- (e) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - 1) 11C12, STAB TRIM SHUTOFF L
- (f) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - 1) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
- (g) Measure the time necessary for the stabilizer to move to the airplane nose down electrical trim stop.
  - 1) Make sure that the necessary time is between 53 and 99 seconds.

S 865-117

- (6) Remove the pressure from the auxiliary pitot system (AMM 34-11-00/201).

I. AIRPLANES WITH STAB TRIM LEVERS;

Manual Operation and Mechanical Travel Limits Test

S 735-007

- (1) Do the steps that follow to make sure that stabilizer trim manual operation is correct (Fig. 501):
  - (a) Make sure that this circuit breaker on the P11 panel is closed:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (b) Make sure that the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel is in the NORM position.
  - (c) Make sure that the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel is in the CUTOUT position.
  - (d) Make sure that this circuit breaker on the P11 panel is open:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (e) Move the two STAB TRIM levers to the APL NOSE DOWN position.
    - 1) Make sure that the stabilizer leading edge moves up.
  - (f) Release the two STAB TRIM levers.
    - 1) Make sure that the stabilizer stops.
  - (g) Move the two STAB TRIM levers to the APL NOSE UP position.
    - 1) Make sure that the stabilizer leading edge moves down.
  - (h) Release the two STAB TRIM levers.
    - 1) Make sure that the stabilizer stops.
  - (i) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - (j) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (k) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (l) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

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- (m) Move the two STAB TRIM levers to the APL NOSE DOWN position.
  - 1) Make sure that the stabilizer leading edge moves up.
- (n) Release the two STAB TRIM levers.
  - 1) Make sure that the stabilizer stops.
- (o) Move the two STAB TRIM levers to the APL NOSE UP position.
  - 1) Make sure that the stabilizer leading edge moves down.
- (p) Release the two STAB TRIM levers.
  - 1) Make sure that the stabilizer stops.

S 735-008

- (2) Do the steps that follow to make sure that the stabilizer trim mechanical travel limits are correct:
  - (a) Move the two the STAB TRIM levers to the APL NOSE DOWN position until the stabilizer is at the airplane nose down mechanical stop.

NOTE: The ballscrew mechanical stops are only used if there is a limit switch failure. Avoid operation of the stabilizer into the mechanical stops that is not necessary.

- (b) Make sure that both of the stabilizer trim position indicators show  $0.00 \pm 0.25$  unit of trim.
- (c) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- (d) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - 1) 11C13, STAB TRIM SHUTOFF CENTER
- (e) Make sure that one set of the upper stop surfaces on the ballscrew touch.
- (f) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - 1) 11C13, STAB TRIM SHUTOFF CENTER
- (g) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (h) Move the two STAB TRIM levers to the APL NOSE UP position to move the stabilizer away from the airplane nose down stop.
- (i) Move the two STAB TRIM levers to the APL NOSE UP position to move the stabilizer to the airplane nose up stop.

NOTE: The ballscrew mechanical stops are only used if there is a limit switch failure. Avoid operation of the stabilizer into the mechanical stops.

- (j) Make sure that both of the stabilizer trim position indicators show  $14.2 \pm 0.3$  units of trim.
- (k) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- (l) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - 1) 11C13, STAB TRIM SHUTOFF CENTER

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(m) Make sure that one set of the lower stop surfaces on the ballscrew touch.

S 865-102

(3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:

(a) 11C12, STAB TRIM SHUTOFF L

S 865-103

(4) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

S 865-104

(5) Make sure that this circuit breaker on the P11 panel is open:

(a) 11C13, STAB TRIM SHUTOFF CENTER

S 865-105

(6) Make sure that the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel is in the CUTOUT position.

S 865-106

(7) Use the captain's or first officer's stabilizer trim control wheel switches to move the stabilizer away from the airplane nose up stop.

(a) Make sure that the ballscrew ice scraper stays fully engaged in the ballnut.

J. AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;

Alternate Electric Trim Operation and Mechanical Travel Limits Test

S 735-009

(1) Do the steps that follow to make sure that alternate electric stabilizer trim operation and mechanical travel limits are correct:

(a) Move the alternate stab trim switches to the APL NOSE DN position to move the stabilizer to the airplane nose down stop.

NOTE: The ballscrew mechanical stops are only used if there is a limit switch failure. Avoid operation of the stabilizer into the mechanical stops that is not necessary.

(b) Make sure that both of the stabilizer trim position indicators show  $0.00 \pm 0.25$  unit of trim.

(c) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.

(d) Make sure that one set of the upper stop surfaces on the ballscrew touch.

(e) Move the control column to the forward stop, then to the aft stop and then back to neutral.

(f) Make sure that the elevator system operates smoothly with no binding or chatter.

(g) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

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- (h) Move the alternate stab trim control switches to the APL NOSE UP position to move the stabilizer to the airplane nose up stop.

NOTE: The ballscrew mechanical stops are only used if there is a limit switch failure. Avoid operation of the stabilizer into the mechanical stops that is not necessary.

- (i) Make sure that both of the stabilizer trim position indicators show  $14.2 \pm 0.3$  units of trim.
- (j) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- (k) Make sure that one set of the lower stop surfaces on the ballscrew touch.
- (l) Move the control column to the forward stop, then to the aft stop, and then back to neutral.
- (m) Make sure that the elevator system operates smoothly with no binding or chatter.

K. Secondary Brake Reaction Torque Test (Fig. 501)

S 735-010

- (1) Do the steps that follow to make sure that the stabilizer trim secondary brake reaction torque is correct:
  - (a) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (b) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - (c) Make sure that the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel is in the CUTOUT position.
  - (d) Make sure that this circuit breaker on the P11 panel is open:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (e) Use the captain's or first officer's stabilizer trim control wheel switches to move the stabilizer at least three units of trim away from ends of the travel range.
  - (f) Press and hold the BRAKE BYPASS valve button on the left STCM (Fig. 502).

NOTE: The BRAKE BYPASS valve button is on the bottom of the STCM.

- (g) Move the captain's or first officer's stabilizer trim control switches full travel in the same direction and hold for 10 seconds.
  - 1) Make sure that the stabilizer does not move.
- (h) Release the control wheel switches and then release the BRAKE BYPASS valve button.
- (i) Move the control wheel switches full travel in one direction and then in the other direction.
  - 1) Make sure that the stabilizer moves correctly.

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- (j) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - (k) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (l) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (m) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - (n) Press and hold the BRAKE BYPASS valve button on the right STCM.
  - (o) Move the captain's or first officer's stabilizer trim control wheel switches full travel in the same direction and hold for 10 seconds.
    - 1) Make sure that the stabilizer does not move.
  - (p) Release the control wheel switches and then release the BRAKE BYPASS valve button.
  - (q) Move the control wheel switches full travel in one direction and then in the other direction.
    - 1) Make sure the stabilizer moves correctly.
- L. AIRPLANES WITH STAB TRIM LEVERS;  
Lever Travel Test (Fig. 501)

S 735-011

- (1) Do the steps that follow to make sure that the stabilizer trim secondary brake reaction torque is correct:
  - (a) Put a piece of masking tape that is 6.70 inches (170 millimeters) long over part of the width of the right STAB TRIM lever decal.
  - (b) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (c) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - (d) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - (e) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (f) Slowly pull the STAB TRIM control levers to the APL NOSE UP position until the stabilizer starts to move.
  - (g) Make a mark on the masking tape at the aft edge of the right STAB TRIM lever.
  - (h) Slowly push the STAB TRIM levers to the APL NOSE DOWN position forward until the stabilizer starts to move.
  - (i) Make a mark on the masking tape at the forward edge of the right STAB TRIM lever.
  - (j) Release the STAB TRIM levers.
  - (k) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER

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- (l) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (m) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.
- (n) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - 1) 11C12, STAB TRIM SHUTOFF L
- (o) Slowly pull the STAB TRIM levers to the APL NOSE UP position until the stabilizer starts to move.
- (p) Make a mark on the masking tape at the aft edge of the right lever.
- (q) Slowly push the STAB TRIM levers to the APL NOSE DOWN position until the stabilizer starts to move.
- (r) Make a mark on the masking tape at the forward edge of the right lever.
- (s) Release the STAB TRIM levers.
- (t) Measure the distance (along the decal surface) from the forward edge of the white area on the decal to the farthest forward mark on the tape.
  - 1) Make sure that the distance is 1.15 to 1.40 inches (29.2 to 35.6 millimeters).
- (u) Measure the distance (along the decal surface) from the aft boundary of the white area to the farthest aft mark on the tape.
  - 1) Make sure that the distance is 1.15 to 1.40 inches (29.2 to 35.6 millimeters).
- (v) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - 1) 11C12, STAB TRIM SHUTOFF L
- (w) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (x) Move only the left STAB TRIM lever to the APL NOSE DOWN position.
  - 1) Make sure that the stabilizer does not move.
- (y) Move only the right STAB TRIM lever to the APL NOSE DOWN position.
  - 1) Make sure that the stabilizer does not move.
- (z) Move only the left STAB TRIM lever to the APL NOSE UP position.
  - 1) Make sure that the stabilizer does not move.
- (aa) Move only the right STAB TRIM lever to the APL NOSE UP position.
  - 1) Make sure that the stabilizer does not move.
- (ab) Move the two STAB TRIM levers, full travel in opposite directions, at the same rate.
  - 1) Make sure that the stabilizer does not move.
- (ac) Change the positions of the levers.

NOTE: Both levers must go through neutral at the same time.

- 1) Make sure that the stabilizer does not move.

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(ad) Let both of the STAB TRIM levers go to neutral at the same rate.

1) Make sure that the stabilizer does not move.

M. AIRPLANES WITH STAB TRIM LEVERS;  
Lever Force Test (Fig. 501)

S 735-012

(1) Do the steps that follow to make sure that the STAB TRIM lever force is correct:

(a) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel in the CUTOUT position.

(b) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:

1) 11C12, STAB TRIM SHUTOFF L

2) 11C13, STAB TRIM SHUTOFF CENTER

(c) Apply a force at the base of the lever knob to move each STAB TRIM lever forward (one at a time) to the positions that follow (Ref Lever Travel Test):

1) The mark on the masking tape for the forward edge of the right lever when the STAB TRIM levers were slowly moved forward and the LEFT STAB TRIM SHUTOFF valve switch was at the NORM position.

2) The mark on the masking tape for the forward edge of the right lever when the STAB TRIM levers were slowly moved forward and the CENTER STAB TRIM SHUTOFF valve switch at the NORM position.

(d) Measure the maximum force on each lever.

1) Make sure that the force is not greater than 9.9 pounds (44.0 newtons).

(e) Apply a force at the upper edge of the lever knob to move each STAB TRIM lever aft (one at a time) to the positions that follow (Ref Lever Travel Test):

1) The mark on the masking tape for the aft edge of the right lever when the LEFT STAB TRIM SHUTOFF valve switch was at the NORM position.

2) The mark on the masking tape for the aft edge of the right lever when the STAB TRIM levers were slowly moved aft and the CENTER STAB TRIM SHUTOFF valve switch was at the NORM position.

(f) Measure the maximum force on each lever.

1) Make sure that the force is not greater than 7.8 pounds (34.7 newtons).

N. AIRPLANES WITH STAB TRIM LEVERS;  
Manual Override Test (Fig. 501)

S 735-013

(1) Do the steps that follow to make sure that the stabilizer trim manual override operates correctly:

(a) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:

1) 11C12, STAB TRIM SHUTOFF L

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- (b) Make sure that this circuit breaker on the P11 panel is open:
  - 1) 11C13, STAB TRIM SHUTOFF CENTER
- (c) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (d) Make sure that the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel is in the CUTOFF position.
- (e) Use the captain's or first officer's stabilizer trim control wheel switches to move the stabilizer to 6 units of trim.
- (f) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
- (g) Pull the STAB TRIM levers to the APL NOSE UP position while the stabilizer moves.
  - 1) Make sure that the stabilizer moves in the opposite direction in one second.
- (h) Let the stabilizer trim control wheel switches and STAB TRIM levers go to neutral.
- (i) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position.
- (j) Push the STAB TRIM levers to the APL NOSE DOWN position while stabilizer moves.
  - 1) Make sure that the stabilizer moves in the opposite direction in one second.
- (k) Return the stabilizer trim control wheel switches and the STAB TRIM levers to neutral.
- (l) Remove the DO-NOT-CLOSE tags and close this circuit breaker on the P11 panel:
  - 1) 11C13, STAB TRIM CENTER
- (m) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (n) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.
- (o) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - 1) 11C12, STAB TRIM SHUTOFF L
- (p) Move either the captain's or first officer's stab trim control switches to the APL NOSE DN position.
- (q) Pull the two STAB TRIM control levers to the APL NOSE UP position while the stabilizer is moving.
  - 1) Make sure that the stabilizer moves in the opposite direction in one second.
- (r) Let the stabilizer trim control wheel switches and the STAB TRIM levers go to neutral.
- (s) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position.
- (t) Push the two STAB TRIM levers to the APL NOSE DOWN position while the stabilizer moves.
  - 1) Make sure that the stabilizer moves in the opposite direction in one second.
- (u) Let the stabilizer trim control wheel switches and the STAB TRIM levers go to neutral.

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0. Stabilizer Trim Relief Valve Operation Test

S 735-107

- (1) Do the steps that follow to make sure the relief valve is open in the free flow direction.
  - (a) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - (b) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - (c) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) Make sure that this circuit breaker on the P11 panel is closed:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (e) Do the steps that follow while the stabilizer is operated through one full up/down cycle (approximately 1 unit of trim to 12 units of trim and back):
    - 1) Slowly pressurize auxiliary pitot system No. 1 to change the simulated air speed from zero to 300 knots (AMM 34-11-00/201).
    - 2) Make sure that the stabilizer trim rate decreases as the pitot-static pressure increases.
    - 3) Slowly remove the pressure from auxiliary pitot system No. 1 until the pressure is zero (AMM 34-11-00/201).
    - 4) Make sure that the stabilizer trim rate increases as the pitot-static pressure decreases.

S 735-108

- (2) Do the steps that follow to make sure there is no leakage through the relief valve below the re-seat pressure:
  - (a) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - (b) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (c) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

**WARNING:** CAREFULLY LOOSEN THE HYDRAULIC RETURN LINE ON THE LEFT STCM. THE PTU SYSTEM CAN CAUSE A PRESSURE AS HIGH AS 100 PSI AND A FLUID VOLUME AS MUCH AS 5 CUBIC INCHES TO STAY IN THE LINE. A SPRAY OF FLUID FROM THE CONNECTION CAN CAUSE INJURY TO PERSONS.

- (d) At the relief valve end, slowly loosen the retaining nut of the hydraulic line which connects the left STCM to the relief valve and let the pressure decrease.
- (e) Disconnect the hydraulic line at the STCM.
- (f) Connect the hand pump with a shutoff valve to the hydraulic line leading to the relief valve inlet as shown (Fig. 506).

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- (g) Disconnect the other hydraulic line connected to the relief valve and move it out of the way.
  - (h) AIRPLANES WITH RELIEF VALVES S/N 516 AND BEFORE;  
Do the steps that follow:
    - 1) Use the hand pump to pressurize the relief valve until it opens (105 - 110 psi (724 - 758 kPa)).
    - 2) Allow the pressure to reduce to 90 +/- 5 psi (621 +/- 34 kPa), and use the hand pump to maintain this pressure.
  - (i) AIRPLANES WITH RELIEF VALVES S/N 517 OR GREATER;  
Do the steps that follow:
    - 1) Use the hand pump to pressurize the relief valve until it opens (130 psi (896 kPa)).
    - 2) Allow the pressure to reduce to 105 psi (724 kPa), and use the hand pump to maintain this pressure.
  - (j) For 10 minutes, use a beaker to capture the fluid that drips from the relief valve.
  - (k) Make sure the amount of hydraulic fluid captured in the beaker is less than 1.5 cc's.
  - (l) If the amount of hydraulic fluid captured in the beaker is more than 1.5 cc's, replace the pressure relief valve (AMM 27-41-19/401).
- P. Put the Airplane Back to Its Usual Condition

S 865-109

- (1) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

S 085-110

- (2) Remove the hand pump from the hydraulic line which leads to the relief valve inlet.

S 435-111

- (3) Connect the hydraulic line to the STCM.

S 865-112

- (4) Make sure that these circuit breakers on the P11 panel are closed:
  - (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER

S 865-113

- (5) Make sure that the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel are in the NORM position.

S 085-114

- (6) Remove the control wheel adapter equipment.

S 865-115

- (7) Remove electrical power (AMM 24-22-00/201).

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- (8) Close the access door, 312AR (AMM 06-42-00/201).

TASK 27-41-00-715-251

5. AIRPLANES WITH STAB TRIM LEVERS:

Manual-Mechanical Stabilizer Trim Control Operational Test

NOTE: This is a scheduled maintenance task.

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Procedure

S 865-238

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

S 215-514

- (2) Make sure that LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the P61 panel are OFF.

S 865-239

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply power to the left hydraulic system (AMM 29-11-00/201).

S 715-240

CAUTION: DO NOT LET THE BALLSCREW ACTUATOR HIT THE MECHANICAL STOPS. DAMAGE TO THE BALLSCREW ACTUATOR AND THE STABILIZER CAN OCCUR.

- (4) Move the STAB TRIM levers full forward and full aft (Fig 501).  
(a) Make sure that the stabilizer moves smoothly and freely through its full travel.

S 715-241

- (5) Move only the left STAB TRIM lever forward.  
(a) Make sure that the stabilizer does not move.

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- S 715-242  
(6) Move only the right STAB TRIM lever forward.  
(a) Make sure that the stabilizer does not move.

- S 715-243  
(7) Move only the left STAB TRIM lever aft.  
(a) Make sure that the stabilizer does not move.

- S 715-244  
(8) Move only the right STAB TRIM lever aft.  
(a) Make sure that the stabilizer does not move.

- S 715-245  
(9) Move the STAB TRIM levers full travel in opposite directions at the same rate.  
(a) Make sure that the stabilizer does not move.

- S 715-246  
(10) Change the positions of the STAB TRIM levers.

NOTE: The STAB TRIM levers must go through neutral at the same time.

- (a) Make sure that the stabilizer does not move.

- S 715-247  
(11) Move the two levers to neutral at the same rate.  
(a) Make sure that the stabilizer does not move.  
D. Put the Airplane Back to Its Usual Condition

- S 865-248  
(1) Remove the power from the left hydraulic system (AMM 29-11-00/201).

- S 865-249  
(2) Remove electrical power (AMM 24-22-00/201).

TASK 27-41-00-715-278

6. AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
Alternate Electrical Stabilizer Trim Control Test

NOTE: This is a scheduled maintenance task.

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System

B. Access

- (1) Location Zones  
211/212 Control Cabin

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C. Procedure

S 865-254

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

S 215-256

- (2) Make sure that the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, are in the NORM position.

S 215-515

- (3) Make sure that LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the P61 panel are OFF.

S 865-257

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Pressurize the left and center hydraulic systems (AMM 29-11-00/201).

S 865-271

- (5) Use the alternate stabilizer trim switches on the P10 panel to move the horizontal stabilizer to 2 units of trim.

S 865-279

- (6) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel to the CUTOUT position.

S 715-272

- (7) Move the alternate stabilizer trim switches on the P10 panel to the APL NOSE UP and APL NOSE DOWN positions.  
(a) Make sure that the stabilizer does not move.

S 865-273

- (8) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

S 715-280

- (9) Move the alternate stabilizer trim switches to the APL NOSE DN position.  
(a) Make sure that the stabilizer leading edge moves up.  
(b) Make sure that the stabilizer stops when the alternate stab trim switches are released.

S 715-274

- (10) Move the alternate stabilizer trim switches to the APL NOSE UP position.  
(a) Make sure that the stabilizer leading edge moves down.

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(b) Make sure that the stabilizer stops when the alternate stab trim switches are released.

S 865-281

(11) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

S 865-282

(12) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.

S 715-275

(13) Move the alternate stab trim switches to the APL NOSE DN position.

(a) Make sure that the stabilizer leading edge moves up.

(b) Make sure that the stabilizer stops when the alternate stab trim switches are released.

S 715-276

(14) Move the alternate stabilizer trim switches to the APL NOSE UP position.

(a) Make sure that the stabilizer leading edge moves down.

(b) Make sure that the stabilizer stops when the alternate stab trim switches are released.

S 865-277

(15) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

S 865-160

(16) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

S 865-163

(17) Remove electrical power (AMM 24-22-00/201).

TASK 27-41-00-725-258

7. Horizontal Stabilizer Trim Position Transmitter Limit Test

NOTE: This is a scheduled maintenance task.

A. Equipment

(1) Control Wheel Adapter Equipment - A27021-96 or -98

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- (2) Protractor - A27021-30 (from the A27021-29 kit) or 4MIJ65B80307-1
- (3) Device to measure the distance from the end surface on the upper ballscrew stop and the face surface on the lower gimbal by  $\pm 0.02$  inch ( $\pm 0.5$  millimeter) - Commercially Available

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System
- (4) AMM 34-11-00/201, Pitot Static Systems

C. Access

(1) Location Zones

- 211/212 Control Cabin
- 312 Area Aft of Pressure Bulkhead to BS 1725 (Right)

(2) Access Panel

- 312AR Stabilizer Trim Ballscrew Actuator

D. Prepare for the Test

S 865-259

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

S 015-260

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (2) Open the access panel, 312AR, for the stabilizer trim ballscrew actuator (AMM 06-42-00/201).

S 865-168

- (3) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10, control stand panel, to the NORM position.

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S 485-169

- (4) Install the adapter equipment for the control wheels on the captain's or the first officer's control wheels (Fig. 505).

**NOTE:** The adapter equipment is used to measure control column angular displacement of the control column.

To measure the fore and aft angle of the control column, attach the protractor perpendicular to the face of the control wheel. The angle of the control column is read from the pendulum on the protractor.

S 865-170

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (5) Supply power to the left and center hydraulic systems (AMM 29-11-00/201).

S 865-171

- (6) Move the stabilizer to 6 units of trim.  
E. Electrical Travel Limit and Column Cutoff Switch Test With the Right STCM

S 725-261

- (1) Do the test of the nose down electrical limit:
- (a) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel to the CUTOUT position.
  - (b) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (c) Make sure this circuit breaker on the P11 panel is closed:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) Make sure that the flaps and slats are retracted and the flap control lever is in the FLAP UP detent.
  - (e) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold until the stabilizer stops.
  - (f) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel to the CUTOUT position.
  - (g) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (h) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 3.00 +0.15/-0.42 inches (76.2 +3.8/-10.7 millimeters) (Fig. 502).

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- (i) Do the steps that follow for the nose down electrical limit test with the flaps in the 5 unit detent:
- 1) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel to the NORM position.
  - 2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - a) 11C13, STAB TRIM SHUTOFF CENTER

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- 3) Move the flap control lever to the 5-unit detent to extend the TE flaps to the 5 unit position.
- 4) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold until the stabilizer stops.
- 5) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- 6) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - a) 11C13 STAB TRIM SHUTOFF CENTER
- 7) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 0.92 +0.15/-0.42 inches (23.4 +3.8/-10.7 millimeters) (Fig. 502).
- 8) Put the flap lever in the FLAP UP detent to retract the flaps.

S 725-262

- (2) Do the steps that follow for the column forward cutoff test:
- (a) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (b) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - (c) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position.
  - (d) With the stabilizer trim switches held in the APL NOSE UP position, slowly push the control column forward until the stabilizer stops.
  - (e) Measure the angle of the control column from the column neutral position.
    - 1) Make sure that the angle is between 2.2 and 2.7 degrees.
  - (f) Let the control column go to the neutral position and let the stabilizer move until it stops.
  - (g) Release the stabilizer trim control wheel switches.

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S 725-263

- (3) Do the steps that follow for the nose up electrical limit test:
- (a) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel to the CUTOUT position.
  - (b) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (c) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 22.43 +0.42/-0.15 inches (569.7 +10.7/-3.8 millimeters) (Fig. 502).

S 725-680

- (4) 767-200;  
Do the steps that follow for the column/neutral shift cutoff test:

NOTE: Do this test for 767-200 airplanes only.

767-300 airplanes do not have neutral shift and cutoff components.

- (a) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - 1) 11C13, STAB TRIM SHUTOFF CENTER
- (b) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (c) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
- (d) While the switches are held in the APL NOSE DN position, slowly pull the control column aft until the stabilizer stops.

NOTE: The control column must be pulled aft while the stabilizer is at 11.00 or more units of trim.

- (e) Measure the angular displacement of the control column from the neutral position.
  - 1) Make sure that the angular displacement is between 3.0 and 3.5 degrees.
- (f) Move the control column forward just enough (control column is more than 2.0 degrees aft of neutral) to let the stabilizer move.

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- (g) When the stabilizer stops (at the electrical limit), release the control wheel switches and then release the control column.
- (h) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.
- (i) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - 1) 11C13, STAB TRIM SHUTOFF CENTER
- (j) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 14.61 +0.21/-0.41 inches (371.1 +5.3/-10.4 millimeters) (Fig. 502).

S 725-265

- (5) Do the steps that follow for the column aft cutoff test:
  - (a) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (b) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - (c) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
  - (d) While the stabilizer trim control wheel switches are held in the APL NOSE DN position, slowly pull the control column aft until the stabilizer stops.
  - (e) Measure the angular displacement of the control column from the neutral position.
    - 1) Make sure that the angular displacement is between 2.0 and 2.5 degrees.
  - (f) Release the stabilizer trim control wheel switches and then release the control column.

F. Electrical Travel Limit and Column Cutoff Switch Test With the Left STCM

S 725-266

- (1) Do the steps that follow for the column forward cutoff test:
  - (a) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.
  - (b) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (c) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (d) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - (e) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position.
  - (f) While the stabilizer trim control switches are held in the APL NOSE UP position, slowly push the control column forward until the stabilizer stops.

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- (g) Measure the angular displacement of the control column from the neutral position.
  - 1) Make sure that the angular displacement is between 2.2 and 2.7 degrees.
- (h) Let the control column go to the neutral position and let the stabilizer move until it stops.
- (i) Release the stabilizer trim control wheel switches when the stabilizer stops.

S 725-267

- (2) Do the steps that follow for the nose up electrical limit test:
  - (a) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.
  - (b) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (c) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 22.43 +0.42/-0.15 inches (569.7 +10.7/-3.8 millimeters) (Fig. 502).

S 725-682

- (3) 767-200;  
Do the steps that follow for the column/neutral shift cutoff test:

NOTE: Do this test for 767-200 airplanes only.

767-300 airplanes do not have neutral shift and cutoff components.

- (a) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - 1) 11C12, STAB TRIM SHUTOFF L
- (b) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (c) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
- (d) While the stabilizer trim control wheel switches are held in the APL NOSE DN position, slowly pull the control column aft until the stabilizer stops.

NOTE: The control column must be pulled aft while the stabilizer is at 11.00 or more units of trim.

- (e) Measure angular displacement of the control column from the neutral position.
  - 1) Make sure that the angular displacement is between 3.0 and 3.5 degrees.
- (f) Move the control column forward just enough (control column more than 2.0 degrees aft of neutral) to let the stabilizer move.

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- (g) When the stabilizer stops (at the electrical limit), release the stabilizer trim control switches and then release the control column.
- (h) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.
- (i) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - 1) 11C12, STAB TRIM SHUTOFF L
- (j) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 14.61 +0.21/0.41 inches (371.1 +5.3/-10.4 millimeters) (Fig. 502).

S 725-269

- (4) Do the steps that follow for the column aft cutoff test:
  - (a) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (b) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - (c) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position.
  - (d) While the switches are held in the APL NOSE DN position, slowly pull the control column aft until the stabilizer stops.
  - (e) Measure the angular displacement of the control column from the neutral position.
    - 1) Make sure that the angle is between 2.0 and 2.5 degrees.
  - (f) Let the control column go to the neutral position.
  - (g) Release the control wheel switches when the stabilizer stops.

S 725-270

- (5) Do the steps that follow for the nose down electrical limit test:
  - (a) Make sure that the flaps and slats are retracted and the flap control lever is in the FLAPS UP detent.
  - (b) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.
  - (c) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (d) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 3.00 +0.15/-0.42 inches (76.2 +3.8/-10.7 millimeters) (Fig. 502).
  - (e) Do the steps that follow to do the nose down electrical limit with the flaps in the 5 unit detent test:
    - 1) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
    - 2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
      - a) 11C12, STAB TRIM SHUTOFF L

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**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- 3) Move the flap lever to the 5-unit detent to extend the TE flaps to the 5 unit detent.
- 4) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold until the stabilizer stops.
- 5) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- 6) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - a) 11C12, STAB TRIM SHUTOFF L
- 7) Make sure that Dimension A on the stabilizer trim ballscrew actuator is 0.92 +0.15/-0.42 inches (23.4 +3.8/-10.7 millimeters) (Fig. 502).
- 8) Put the flap lever in the FLAP UP detent to retract the flaps.

G. Put the Airplane Back to Its Usual Condition

S 085-175

- (1) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

S 865-177

- (2) Make sure that these circuit breakers on the P11 panel are closed:
  - (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER

S 865-178

- (3) Make sure that the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel are in the NORM position.

S 085-179

- (4) Remove the control wheel adapter equipment.

S 865-180

- (5) Remove electrical power (AMM 24-22-00/201).

S 415-181

- (6) Close the access door, 312AR (AMM 06-42-00/201).

TASK 27-41-00-715-284

8. Stabilizer Trim Control Column Cut-off Switch Test

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control

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- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System
- B. Access
- (1) Location Zones  
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C. Procedure

S 865-182

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

S 865-183

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Supply power to the left and center hydraulic systems (AMM 29-11-00/201).

S 865-283

- (3) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position (Fig. 501).

S 865-683

- (4) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

S 865-684

- (5) Make sure these circuit breakers on the P11 panel are closed:
- (a) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (b) 11H18, FLT CONT SHUTOFF TAIL CTR

S 865-304

**CAUTION:** DO NOT LET THE BALLSCREW ACTUATOR HIT THE MECHANICAL STOPS. DAMAGE TO THE BALLSCREW ACTUATOR AND THE STABILIZER CAN OCCUR.

- (6) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold until the stabilizer stops.

S 715-286

- (7) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position and hold.

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- S 715-287
- (8) With the stabilizer trim control wheel switches held in the APL NOSE UP position, slowly push the control column forward.
- (a) Make sure that the stabilizer stops before it gets to the leading edge down travel limit.
- S 865-288
- (9) Move the control columns to the neutral position and let the stabilizer move until it stops.
- S 865-289
- (10) Release the stabilizer trim control wheel switches.
- S 865-290
- (11) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold.
- S 715-291
- (12) With the stabilizer trim control wheel switches held in the APL NOSE DN position, slowly pull the control column aft.
- (a) Make sure that the stabilizer stops before it gets to the leading edge up travel limit.
- S 865-292
- (13) Move the control columns to the neutral position and let the stabilizer move until it stops.
- S 865-293
- (14) Release the stabilizer trim control wheel switches.
- S 865-294
- (15) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- S 865-295
- (16) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- S 865-305
- (17) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold until the stabilizer stops.
- S 715-296
- (18) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position and hold.

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S 715-297

- (19) With the stabilizer trim control wheel switches held to the APL NOSE UP position, slowly push the elevator control column forward.
- (a) Make sure that the stabilizer stops before it gets to the leading edge down travel limit.

S 715-298

- (20) Move the control columns to the neutral position and let the stabilizer move until it stops.

S 865-299

- (21) Release the stabilizer trim control wheel switches.

S 715-300

- (22) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position and hold.

S 715-301

- (23) With the stabilizer trim control wheel switches held to the APL NOSE DN position, slowly pull the control column aft.
- (a) Make sure that the stabilizer stops before it gets to the leading edge up travel limit.

S 865-302

- (24) Move the control columns to the neutral position and let the stabilizer move until it stops.

S 865-303

- (25) Release the stabilizer trim control wheel switches.

S 865-306

- (26) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

S 865-185

- (27) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

S 865-188

- (28) Remove electrical power (AMM 24-22-00/201).

TASK 27-41-00-715-307

9. Stabilizer Trim Shutoff Switch Test

NOTE: This is a scheduled maintenance task.

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

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B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Procedure

S 865-189

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

S 865-190

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Supply power to the left and center hydraulic systems (AMM 29-11-00/201).

S 865-191

- (3) Make sure these circuit breakers on the P11 panel are closed:  
(a) 11C12, STAB TRIM SHUTOFF L  
(b) 11C13, STAB TRIM SHUTOFF CENTER

S 865-308

- (4) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel in the CUTOUT position.

S 215-675

- (5) Make sure that LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the P61 panel are OFF.

S 715-309

- (6) AIRPLANES WITH STAB TRIM LEVERS;  
Move the stab trim levers full forward and then full aft slowly.  
(a) Make sure that the stabilizer does not move.

S 715-310

- (7) AIRPLANES WITH ALT STAB SWITCHES;  
Move the alternate stab switches full forward and then full aft slowly.  
(a) Make sure that the stabilizer does not move.

S 865-313

- (8) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

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S 865-436

**CAUTION:** DO NOT LET THE BALLSCREW ACTUATOR HIT THE MECHANICAL STOPS.  
DAMAGE TO THE BALLSCREW ACTUATOR AND THE STABILIZER CAN OCCUR.

- (9) AIRPLANES WITH STAB TRIM LEVERS;  
Move the stab trim levers full forward and hold.  
(a) Make sure that the stabilizer moves up.

S 715-316

- (10) AIRPLANES WITH ALT STAB SWITCHES;  
Move the alternate stab switches full forward and hold.  
(a) Make sure that the stabilizer moves up.

S 865-319

- (11) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.

S 865-320

- (12) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

S 715-321

- (13) AIRPLANES WITH STAB TRIM LEVERS;  
Move the stab trim levers full aft and hold.  
(a) Make sure that the stabilizer moves down.

S 715-322

- (14) AIRPLANES WITH ALT STAB SWITCHES;  
Move the alternate stab switches full aft and hold.  
(a) Make sure that the stabilizer moves down.

S 865-325

- (15) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

S 865-193

- (16) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

S 865-194

- (17) Remove electrical power (AMM 24-22-00/201).

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TASK 27-41-00-725-327

10. Stabilizer Trim Relief Valve Test

NOTE: This is a scheduled maintenance task.

A. Equipment

- (1) Hand Pump, Positive Displacement - Commercially Available
- (2) Shutoff Valve (2 Necessary) - Commercially Available
- (3) Pressure Gauge, 200 psi (1400 kPa) capacity - Commercially Available
- (4) Hose, 1/4 inch (6.4 millimeter) diameter - Commercially Available
- (5) Union, Flareless Tube - MS21902
- (6) Beaker with 1/4 cc graduations - Commercially Available

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System
- (4) AMM 34-11-00/201, Pitot Static Systems

C. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 312 Area Aft of Pressure Bulkhead to BS 1725 (Right)
- (2) Access Panel
  - 312AR Stabilizer Trim Ballscrew Actuator

D. Prepare for the Test

S 865-195

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

S 015-196

WARNING: STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (2) Open the access panel, 312AR, for the stabilizer trim ballscrew actuator (AMM 06-42-00/201).

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S 865-197

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply power to the left hydraulic system (AMM 29-11-00/201).

S 865-677

- (4) Make sure the RIGHT and CENTER FLT CONT SHUTOFF TAIL valve switches on the P61 panel are OFF.

S 865-678

- (5) Put the LEFT FLT CONT SHUTOFF TAIL valve switch on the P61 panel to the ON position.

E. Stabilizer Trim Relief Valve Test

S 735-228

- (1) Do the steps that follow to make sure the relief valve is open in the free flow direction:
- (a) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - (b) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
  - (c) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) Make sure that this circuit breaker on the P11 panel is closed:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (e) Do the steps that follow while the stabilizer is operated through one full up/down cycle (approximately 1 unit of trim to 12 units of trim and back):
    - 1) Slowly pressurize auxiliary pitot system No. 1 to change the simulated air speed from zero to 300 knots (AMM 34-11-00/201).
    - 2) Make sure that the stabilizer trim rate decreases as the pitot-static pressure increases.
    - 3) Slowly remove the pressure from auxiliary pitot system No. 1 until the pressure is zero (AMM 34-11-00/201).
    - 4) Make sure that the stabilizer trim rate increases as the pitot-static pressure decreases.

S 735-229

- (2) Do the steps that follow to make sure there is no leakage through the relief valve below the re-seat pressure:

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S 215-509

- (3) Make sure that LEFT, RIGHT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the P61 panel are OFF.
- (a) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.
  - (b) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (c) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

**WARNING:** CAREFULLY LOOSEN THE HYDRAULIC RETURN LINE ON THE LEFT STCM. THE PTU SYSTEM CAN CAUSE A PRESSURE AS HIGH AS 100 PSI AND A FLUID VOLUME AS MUCH AS 5 CUBIC INCHES TO STAY IN THE LINE. A SPRAY OF FLUID FROM THE CONNECTION CAN CAUSE INJURY TO PERSONS.

- (d) At the relief valve end, slowly loosen the retaining nut of the hydraulic line which connects the left STCM to the relief valve and let the pressure decrease.
- (e) Disconnect the hydraulic line at the relief valve and seal the hydraulic line with a cap.
- (f) Connect the hand pump with a shutoff valve to the relief valve inlet as shown (Fig. 506).
- (g) Disconnect the other hydraulic line connected to the relief valve and move it out of the way.
- (h) AIRPLANES WITH RELIEF VALVES S/N 516 AND BEFORE;  
Do the steps that follow:
  - 1) Use the hand pump to pressurize the relief valve until it opens (105 - 110 psi (724 - 758 kPa)).
  - 2) Allow the pressure to reduce to 90 +/- 5 psi (621 +/- 34 kPa), and use the hand pump to maintain this pressure.
- (i) AIRPLANES WITH RELIEF VALVES S/N 517 OR GREATER;  
Do the steps that follow:
  - 1) Use the hand pump to pressurize the relief valve until it opens (130 psi (896 kPa)).
  - 2) Allow the pressure to reduce to 105 psi (724 kPa), and use the hand pump to maintain this pressure.
- (j) Maintain pressure on the valve for 10 minutes. Use a beaker to capture the hydraulic fluid that drips from the relief valve.
- (k) Make sure the amount of hydraulic fluid captured in the beaker is less than 1.5 cc's.
- (l) If the amount of hydraulic fluid captured in the beaker is more than 1.5 cc's, replace the pressure relief valve (AMM 27-41-19/401).

F. Put the Airplane Back to Its Usual Condition

S 085-231

- (1) Remove the hand pump from the relief valve inlet.

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- S 435-232
- (2) Connect the hydraulic line to the relief valve.
  
- S 865-233
- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER
  
- S 865-234
- (4) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel in the NORM position.
  
- S 865-236
- (5) Remove electrical power (AMM 24-22-00/201).
  
- S 415-237
- (6) Close the access door, 312AR (AMM 06-42-00/201).

TASK 27-41-00-715-328

11. Horizontal Stabilizer Secondary Brake Test

NOTE: This is a scheduled maintenance task.

A. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System

B. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 311/312 Area Aft of Pressure Bulkhead to BS 1725
  
- (2) Access Panel
  - 312AR Stabilizer Trim Ballscrew Actuator

C. Prepare for the Test

- S 865-198
- (1) Supply electrical power (AMM 24-22-00/201).

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S 015-199

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (2) Open the access panel, 312AR, for the stabilizer trim ballscrew actuator (AMM 06-42-00/201).

S 865-200

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply power to the left and center hydraulic systems (AMM 29-11-00/201).

S 865-201

- (4) Move the stabilizer to 6 units of trim.

D. Secondary Brake Reaction Torque Test

S 735-202

- (1) Do the steps that follow to make sure that the stabilizer trim secondary brake reaction torque is correct (Fig. 501):
  - (a) Make sure this circuit breaker on the P11 panel is closed:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (b) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - (c) Make sure the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel is in the CUTOUT position.
  - (d) Open this circuit breaker on the P11 panel and install a DO-NOT-CLOSE tag:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (e) Use the captain's or first officer's stabilizer trim control wheel switches to move the stabilizer at least three units of trim away from the ends of the travel range.
  - (f) Press and hold the BRAKE BYPASS valve button on the left STCM (Fig. 502).

**NOTE:** The BRAKE BYPASS valve button is on the bottom of the STCM.

- (g) Move the captain's or first officer's stabilizer trim control switches full travel in the same direction and hold for 10 seconds.
  - 1) Make sure that the stabilizer does not move.

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- (h) Release the control wheel switches and then release the BRAKE BYPASS valve button.
  - (i) Move the control wheel switches full travel in one direction and then in the other direction.
    - 1) Make sure that the stabilizer moves correctly.
  - (j) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOFF position.
  - (k) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C12, STAB TRIM SHUTOFF L
  - (l) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - 1) 11C13, STAB TRIM SHUTOFF CENTER
  - (m) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
  - (n) Press and hold the BRAKE BYPASS valve button on the right STCM.
  - (o) Move the captain's or first officer's stabilizer trim control wheel switches full travel in the same direction and hold for 10 seconds.
    - 1) Make sure that the stabilizer does not move.
  - (p) Release the control wheel switches and then release the BRAKE BYPASS valve button.
  - (q) Move the control wheel switches full travel in one direction and then in the other direction.
    - 1) Make sure the stabilizer moves correctly.
- E. Put the Airplane Back to Its Usual Condition

S 865-203

- (1) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

S 865-206

- (2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 Panel:
  - (a) 11C12, STAB TRIM SHUTOFF L

S 865-207

- (3) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel in the NORM position.

S 865-209

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

S 415-210

- (5) Close the access door, 312AR (AMM 06-42-00/201).

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TASK 27-41-00-715-362

12. SAS 050, 051, 150-166, 275-277, 279 POST-SB 27-102;  
SAS 167-274, 278, 280-999;

Stabilizer Trim Override Capability with Split Control Column Commands Test

**NOTE:** For this test, the stabilizer must be at no more than 8 units of trim.

This is a scheduled maintenance task.

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Procedure

S 865-211

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

S 865-212

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Pressurize the left and center hydraulic system (AMM 29-11-00/201).

S 865-213

- (3) Make sure these circuit breakers on the P11 panel are closed:
  - (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER
  - (c) 11H17, FLT CONT SHUTOFF TAIL LEFT
  - (d) 11H27, FLT CONT SHUTOFF TAIL CTR

S 865-399

- (4) Put the LEFT and CENTER FLT CONT SHUTOFF TAIL valve switches on the right side panel, P61, in the OFF position.

S 865-214

- (5) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

S 865-465

- (6) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.

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S 865-216

- (7) Push the captain's control column full forward and hold it in position.  
(a) At the same time, pull the first officer's control column full aft and hold it in position.

NOTE: Approximately 100 pounds (445 newtons) are necessary to split the control columns.

S 865-217

- (8) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position.  
(a) Make sure the leading edge of the stabilizer moves down.

S 865-701

- (9) Release the stabilizer trim control wheel switches.

S 865-218

- (10) With the control columns still split, move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position.  
(a) Make sure the leading edge of the stabilizer moves up.

S 865-220

- (11) Release the stabilizer trim control wheel switches.

S 865-221

- (12) Push the first officer's control column full forward and hold in position.  
(a) At the same time, pull the captain's control column full aft and hold in position.

NOTE: Approximately 100 pounds (445 newtons) are necessary to split the control columns.

S 865-222

- (13) Move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE UP position.  
(a) Make sure that the leading edge of the stabilizer moves down.

S 865-226

- (14) Release the stabilizer trim control wheel switches.

S 865-438

- (15) With the control columns still split, move the captain's or first officer's stabilizer trim control wheel switches to the APL NOSE DN position.  
(a) Make sure that the leading edge of the stabilizer move up.

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S 865-440

- (16) Release the stabilizer trim control wheel switches.

S 865-401

- (17) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.

S 865-402

- (18) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.

S 715-403

- (19) Do the steps (7) thru (17) again for the left hydraulic system.

D. Put the Airplane Back to Its Usual Condition

S 865-329

- (1) Remove the power from the left and center hydraulic system (AMM 29-11-00/201).

S 865-330

- (2) Remove electrical power (AMM 24-22-00/201).

TASK 27-41-00-715-458

13. AIRPLANE WITH ALTERNATE STAB TRIM SWITCHES;  
Stabilizer Trim Single Switch Test

NOTE: This is a scheduled maintenance task.

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Procedure

S 865-482

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

S 865-481

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Pressurize the left and center hydraulic systems (AMM 29-11-00/201).

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- S 865-414
- (3) Make sure that the L, R and C FLT CONT SHUTOFF switches on the right side panel, P61, are ON.
- S 865-480
- (4) Make sure these circuit breakers on the P11 panel are closed:
- (a) 11A36, STAB TRIM ALT
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF C
  - (d) 11H10, L STAB TRIM POS IND
  - (e) 11H19, R STAB TRIM POS IND
- S 865-500
- (5) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel to the CUTOUT position.
- S 865-472
- (6) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- S 865-479
- (7) Move the two alternate stab trim switches to the APL NOSE DN position.
- (a) Make sure the stabilizer moves in the airplane nose down direction.
- S 865-421
- (8) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position while the stabilizer moves.
- (a) Make sure the stabilizer stops.
- S 865-422
- (9) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (a) Make sure the stabilizer starts to move.
- S 865-423
- (10) Release the alternate stab trim switches.
- (a) Make sure that the stabilizer stops when the alternate stab trim switches are released.
- S 865-473
- (11) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- S 865-474
- (12) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.

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- S 865-685
- (13) Move the two alternate stab trim switches to the APL NOSE DN position.
- S 865-426
- (14) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position while the stabilizer moves.
- (a) Make sure the stabilizer stops.
- S 865-427
- (15) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- (a) Make sure the stabilizer starts to move.
- S 865-428
- (16) Release the alternate stab trim switches.
- (a) Make sure that the stabilizer stops when the alternate stab trim switches are released.
- S 865-417
- (17) Move the two alternate stab trim switches to the APL NOSE UP position.
- (a) Make sure the stabilizer moves in the airplane nose up direction.
- S 215-437
- (18) Make sure that the stabilizer is between 6 and 9 units of stabilizer trim.
- S 865-501
- (19) Move the left alternate stabilizer trim switch to the APL NOSE UP position.
- (a) Make sure the stabilizer does not move.
- S 865-418
- (20) Move the left alternate stabilizer trim switch to the APL NOSE DN position.
- (a) Make sure the stabilizer does not move.
- S 865-419
- (21) Move the right alternate stabilizer trim switch to the APL NOSE UP position.
- (a) Make sure the stabilizer does not move.
- S 865-490
- (22) Move the right alternate stabilizer trim switch to the APL NOSE DN position.
- (a) Make sure the stabilizer does not move.

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S 865-430

**CAUTION:** DO NOT LET THE BALLSCREW ACTUATOR HIT THE MECHANICAL STOPS.  
DAMAGE TO THE BALLSCREW ACTUATOR AND THE STABILIZER CAN OCCUR.

- (23) Move the alternate stab trim switches full forward and full aft.
  - (a) Make sure that the stabilizer moves smoothly and freely through full travel.
  - (b) Make sure that the stabilizer position indicator correctly shows the position of the stabilizer (0.25 - 14.0 pilot units).
- D. Put the Airplane Back to Its Usual Condition

S 865-458

- (1) Remove the power from the left and center hydraulic systems if it is not necessary (AMM 29-11-00/201).

S 865-491

- (2) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-41-00-725-696

14. Stabilizer Trim Actuator Bearing Friction - Test

A. General

- (1) The following procedure can be used to detect high levels of corrosion in the stabilizer differential. This procedure will not detect water in the stabilizer differential, which can freeze at high altitudes. Any horizontal stabilizer trim actuator that fails this test is not a serviceable unit. A horizontal stabilizer trim actuator may contain water or corrosion and still pass this test.

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-41-11/401, Stabilizer Trim Hydraulic Motor
- (3) AMM 27-41-13/401, Stabilizer Trim Secondary Brake
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System

C. Access

- (1) Location Zones
  - 312 Area Aft of Pressure Bulkhead to BS 1725 (Right)

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- (2) Access Panel  
312AR Stabilizer Trim Ballscrew Actuator

D. Procedure

S 865-688

- (1) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

S 865-689

- (2) Remove the electrical power (AMM 24-22-00/201).

S 025-690

- (3) Remove the stabilizer left hydraulic motor and brake assemblies (AMM 27-41-11/401, AMM 27-41-13/401).
  - (a) Cover the brake input to avoid contamination of the gearbox.

S 485-691

- (4) Attach a 1/2 inch (13 mm) inside diameter plastic tube, approximately 3 inches (76 mm) long, over the motor spline.

S 485-692

- (5) Attach the plastic tube to the motor spline with a hose clamp.

S 485-693

- (6) Attach the other end of the plastic tube to a torque wrench with a hose clamp.
  - (a) If the torque necessary to move the motor shaft is more than 15 inch-pounds (1.70 Nm), the differential bearings may be corroded and should be inspected or overhauled.

S 425-694

- (7) Install the motor and brake assemblies that you removed (AMM 27-41-11/401, AMM 27-41-13/401).

S 725-695

- (8) Repeat the test with the right motor and brake assemblies removed.

E. Put the Airplane Back to Its Usual Condition

S 865-697

- (1) Remove the power from the left and center hydraulic systems, if it is not necessary (AMM 29-11-00/201).

S 865-698

- (2) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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STABILIZER TRIM CONTROL WHEEL SWITCH – REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the control wheel switches for the stabilizer trim operation.
- B. The control wheel switch is attached to an electrical cable that goes through the control wheel handles. The electrical cable is connected to a wire bundle in the control wheel hub. The wire bundle goes through the control column. If a control wheel switch is defective, the switch and cable are replaced as an assembly.

TASK 27-41-01-024-001

2. Remove the Control Wheel Switch for the Stabilizer (Fig. 401)

A. Equipment

- (1) Extraction/Insertion Tool – M15570-20,  
(Deutsu Company, Engineered Connection  
Devices, 36033 Whittier Ave, Hemet, CA 92545)

B. References

- (1) AMM 24-22-00/201, Electrical Power – Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System

C. Access

- (1) Location Zone  
211/212 Control Cabin

D. Prepare for the Removal

S 864-002

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

S 864-003

- (2) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

S 864-004

- (3) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the CUTOUT position.

S 864-005

- (4) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER
  - (c) 11H11, LEFT STAB TRIM CONT
  - (d) 11H20, STAB TRIM CONT R

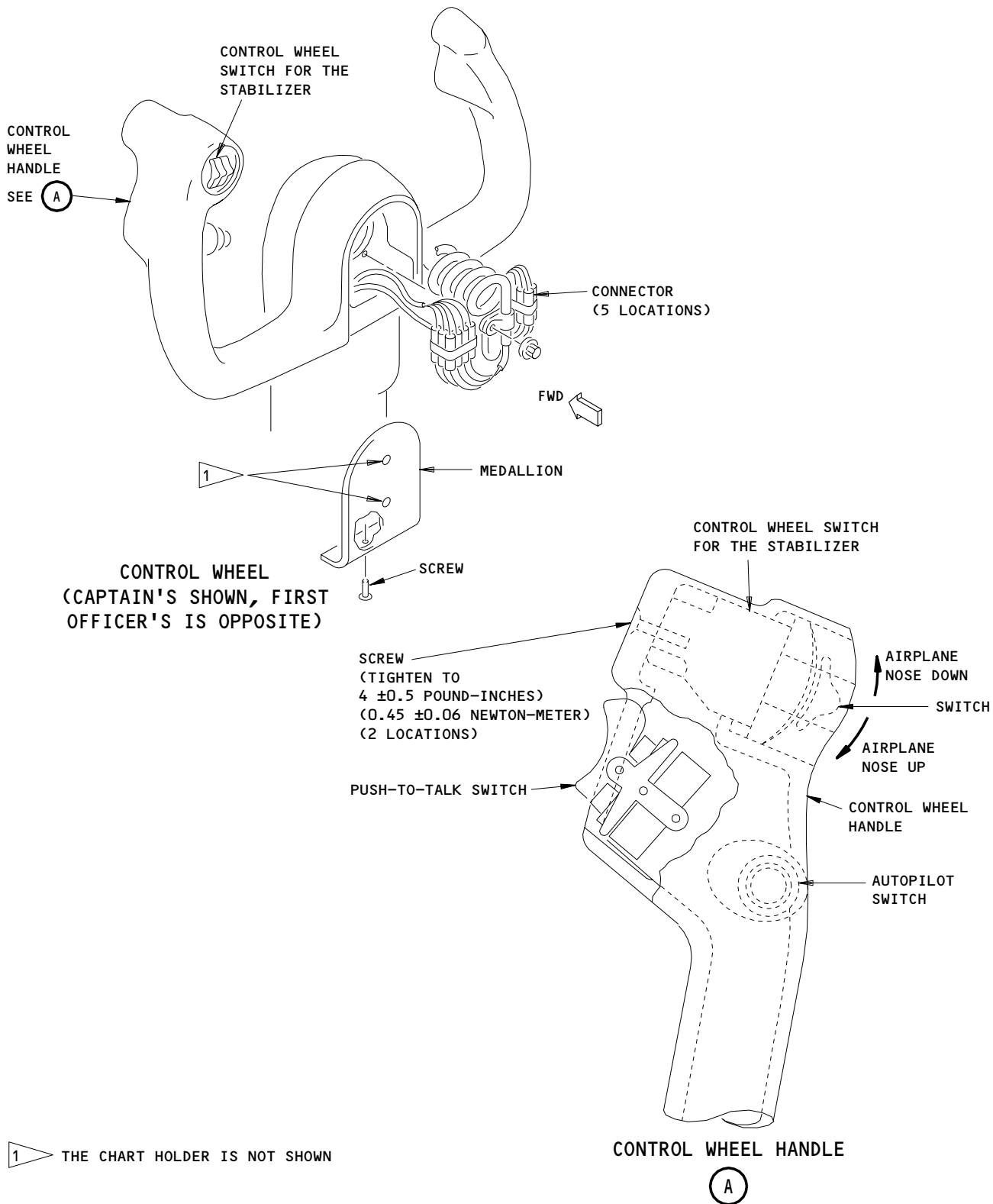
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Stabilizer Trim Control Wheel Switch Installation  
Figure 401

EFFECTIVITY	ALL
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E. Remove the Control Wheel Switch

- S 034-006
- (1) Remove the medallion.
  
- S 034-007
- (2) Disconnect the cables for the control wheel switch from the connector.
  
- S 034-008
- (3) Remove the screws that attach the control wheel switch to the control wheel handle.
  
- S 494-009
- (4) Attach a wire guide to the end of the cable for the control wheel switch.
  
- S 024-029
- (5) Pull the cable through the switch hole in the control wheel handle.
  
- S 494-030
- (6) Disconnect the cable and let the wire guide stay in the control wheel handle.

TASK 27-41-01-424-010

3. Install the Control Wheel Switch for the Stabilizer (Fig. 401)

A. Equipment

- (1) Extraction/Insertion Tool - M15570-20  
(Deutsu Company; Engineered Connection  
Devices, 36033 Whittier Ave, Hemet, CA 92545)

B. Consumable Materials

- (1) G01091 Talcum Powder - Commercially Available

C. Access

- (1) Location Zone  
211/212 Control Cabin

D. Install the Control Wheel Switch

- S 644-011
- (1) Apply some talcum powder to the cable for the control wheel switch.
  
- S 494-012
- (2) Attach the cable for the control wheel switch to the wire guide.

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S 424-013

- (3) Pull the cable through the switch hole in the control wheel handle.

S 094-014

- (4) Disconnect the cable from the wire guide.

S 434-015

- (5) Put the insulator between the cable for the control wheel switch and the interphone switch wires.

S 424-016

- (6) Pull the cable through the control wheel until the control wheel switch and the guard assembly are set correctly.

S 434-017

**CAUTION:** DO NOT TIGHTEN THE SCREWS TOO MUCH. DAMAGE TO THE SWITCH HOUSING CAN OCCUR.

- (7) Install the screws that attach the control wheel switch to the control wheel handle.

S 434-034

**CAUTION:** ENSURE THAT WIRE GUARD ASSEMBLY SLIDES SMOOTHLY IN GROOVE OF WHEEL ASSEMBLY DURING INSTALLATION. KEEP ALL WIRES AND CONNECTORS CLEAR OF PLANE OF GROOVE TO PREVENT POSSIBLE WIRE INSULATION DAMAGE DURING ASSEMBLY.

- (8) Attach the cables for the control wheel switches to the connectors in the control wheel hub.

E. Control Wheel Switch Test

S 864-019

- (1) Turn the control wheel through five cycles of full travel.

S 214-020

- (2) Make sure that the cables for the control wheel switches do not get pulled when you turn the control wheel.

S 834-021

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

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S 864-022

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Supply power to the left and center hydraulic systems (AMM 29-11-00/201).

S 864-023

- (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER
  - (c) 11H11, LEFT STAB TRIM CONT
  - (d) 11H20, STAB TRIM CONT R

S 864-024

- (6) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the NORM position.

S 864-032

- (7) Move the control wheel switches to the APL NOSE UP and the APL NOSE DN positions.

S 214-025

- (8) Make sure that the stabilizer moves as follows:
- (a) The stabilizer leading edge moves down when the control wheel switch is in the APL NOSE UP position.
  - (b) The stabilizer leading edge moves up when the control wheel switch is in the APL NOSE DN position.
- F. Put the Airplane Back to Its Usual Condition

S 434-026

- (1) Install the medallion.

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- S 864-027
- (2) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).
- S 864-028
- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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STABILIZER TRIM LEVER – REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the stabilizer trim (STAB TRIM) levers.

TASK 27-41-02-024-001

2. Remove the STAB TRIM Lever

A. Equipment

- (1) Rig pin from Set A20004-XX (AMM 20-10-24/201):  
(a) ST4 – P/N A20004-17  
(b) ST5 – P/N A20004-17

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels  
(2) AMM 06-42-00/201, Empennage Access Doors and Panels  
(3) AMM 20-10-24/201, Rig Pins  
(4) AMM 24-22-00/201, Electrical Power – Control  
(5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones  
113/114 Area Forward of the NLG Wheel Well  
211/212 Control Cabin  
311/312 Area Aft of Pressure Bulkhead to BS 1725
- (2) Access Panels  
113AL Forward Equipment Bay  
312AR Forward Stabilizer Compartment

D. Prepare for the Removal

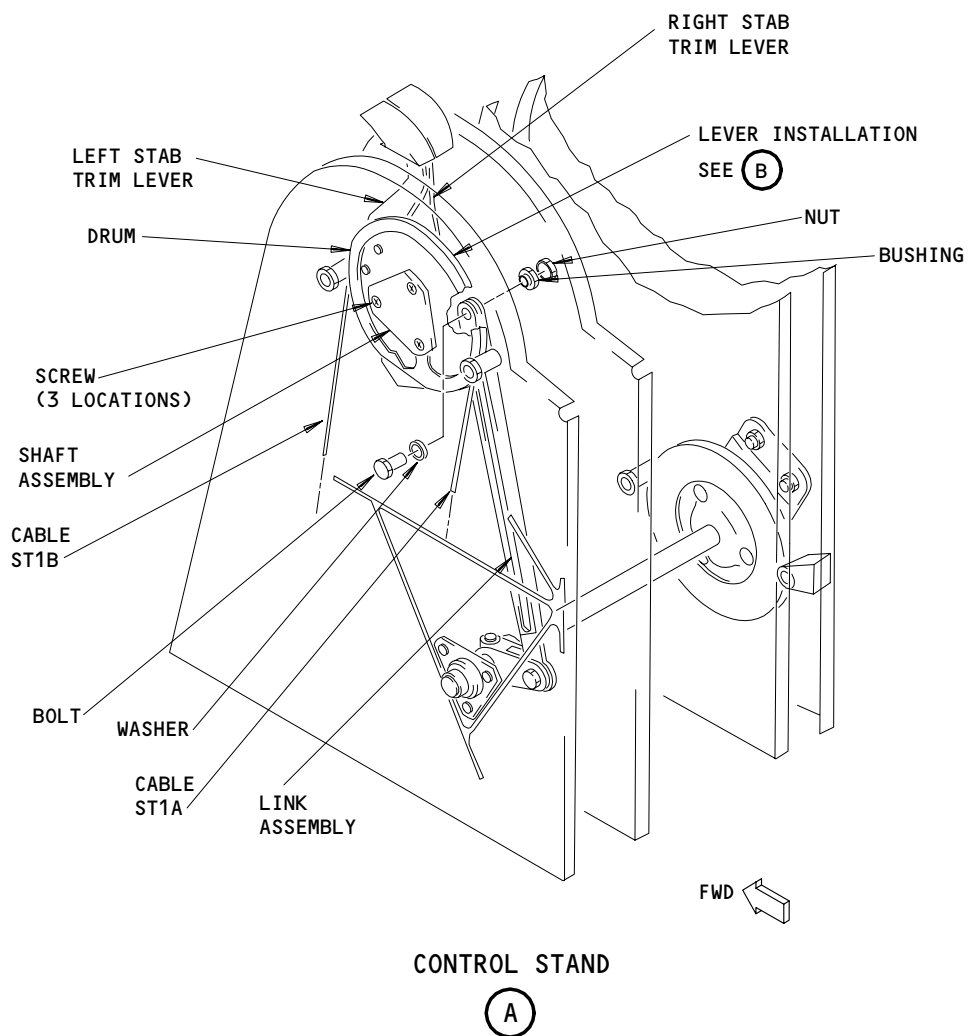
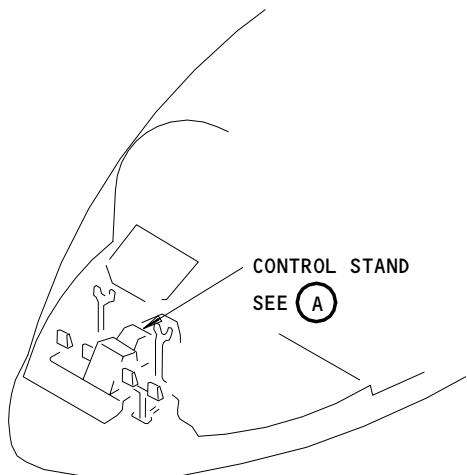
S 864-072

**WARNING:** REMOVE ELECTRICAL POWER FROM THE FLIGHT COMPARTMENT SEAT. THE ACCIDENTAL ELECTRICAL OPERATION OF THE FLIGHT COMPARTMENT SEAT CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) AIRPLANES WITH POWERED FLIGHT COMPARTMENT SEATS;  
Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

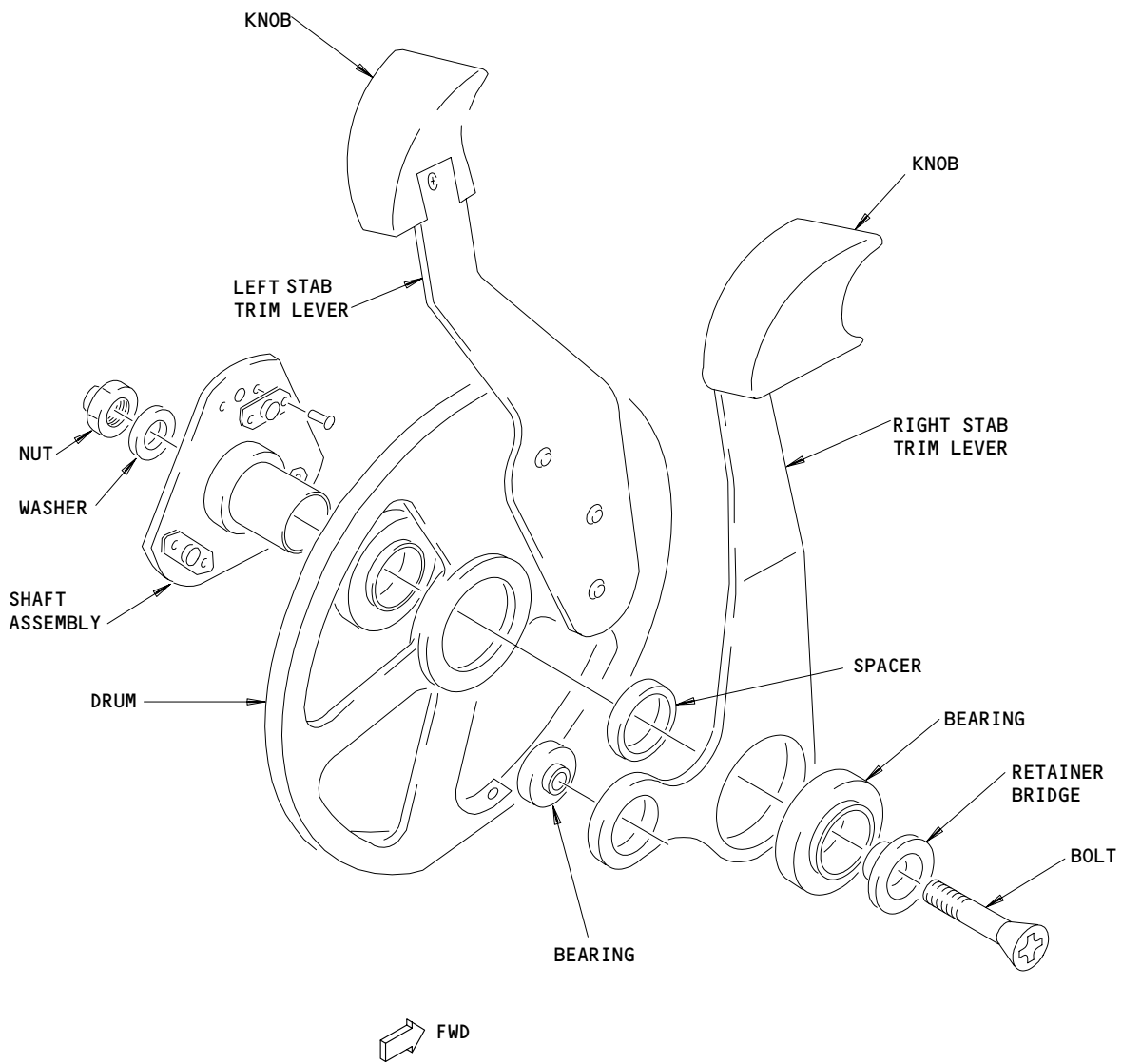
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STAB TRIM Levers Installation  
Figure 401 (Sheet 1)

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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LEVER INSTALLATION

(B)

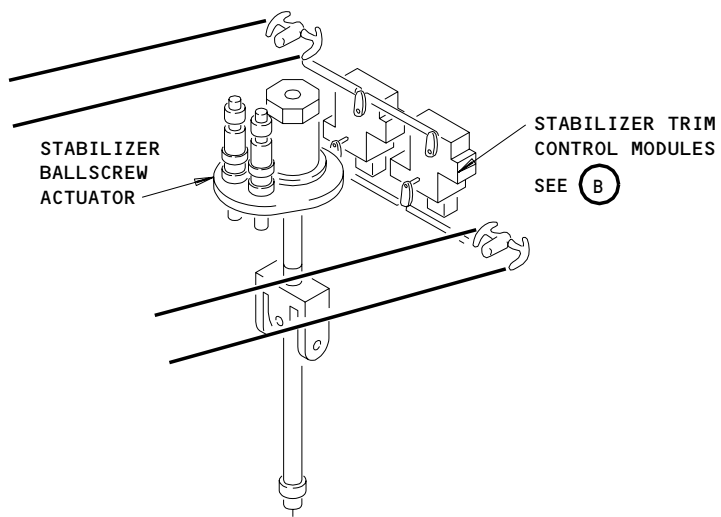
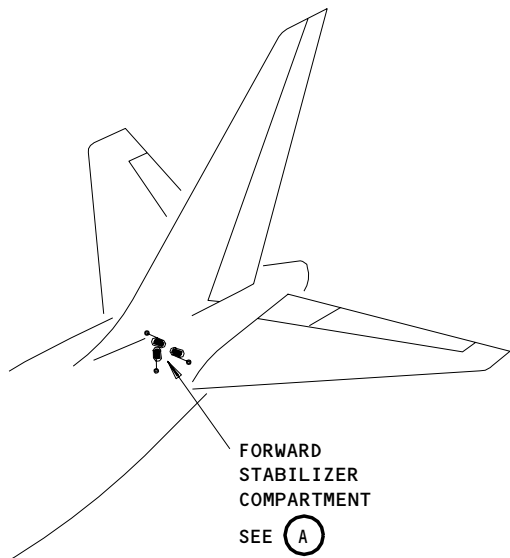
STAB TRIM Levers Installation  
Figure 401 (Sheet 2)

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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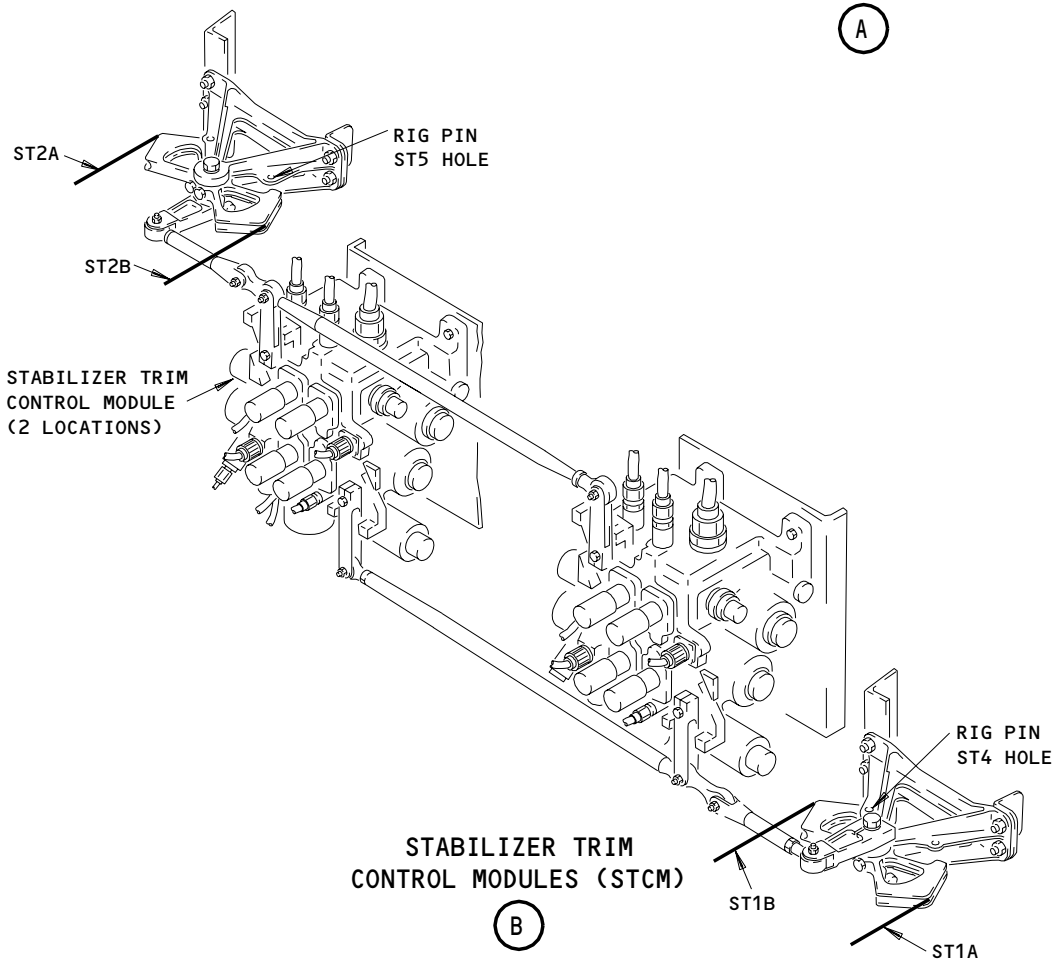
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FORWARD STABILIZER COMPARTMENT

(A)

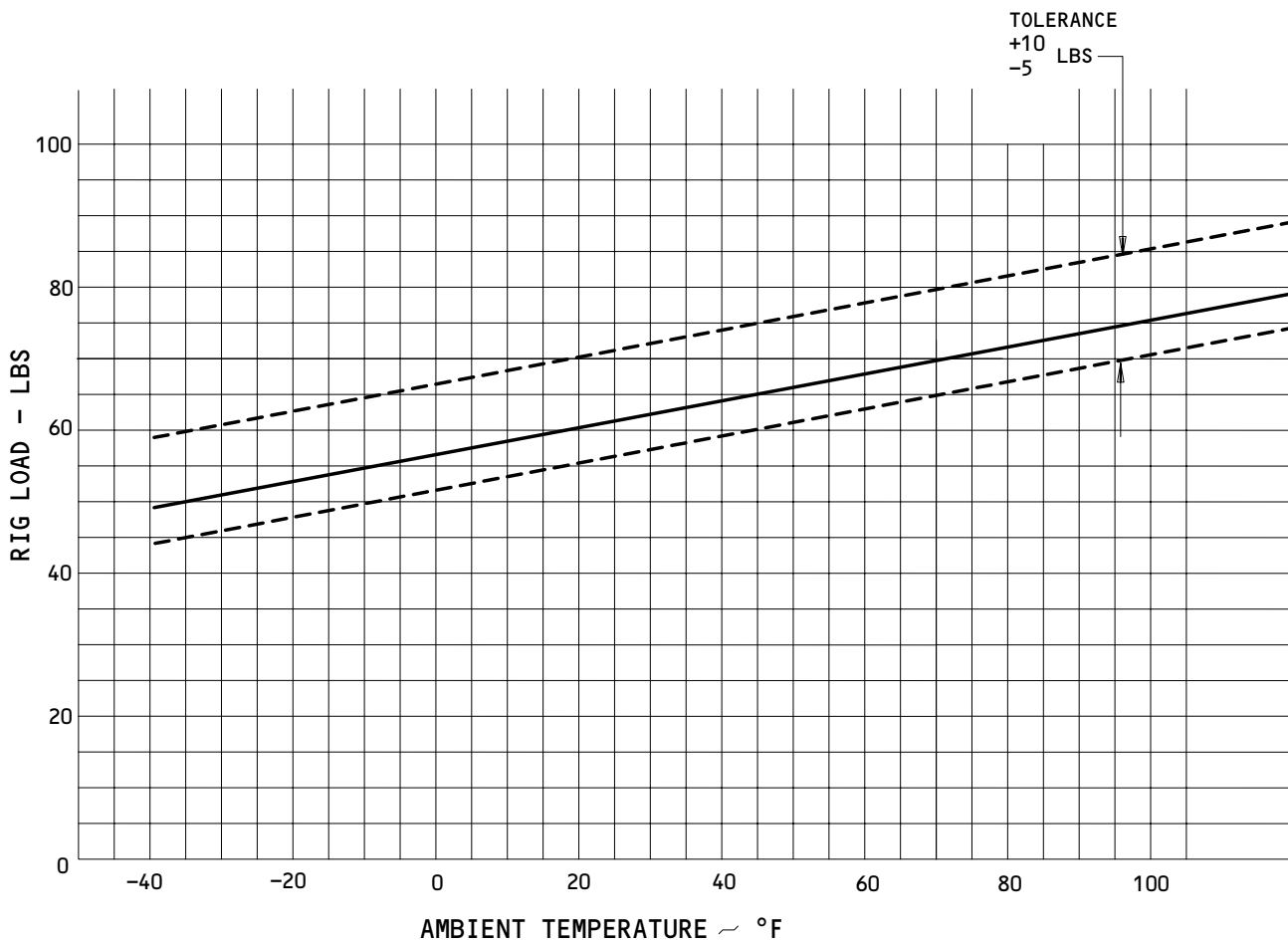


(B)

STAB TRIM Levers Adjustment  
Figure 402

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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$\frac{3}{32}$  DIAMETER CABLE RIG LOAD VS TEMP

Stabilizer Body Cable Adjustment  
Figure 403

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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- (a) 6H15 or 6J21, F/O SEAT
- (b) 6H15 or 6J15, CAPT SEAT

S 014-002

- (2) Open the access door for the forward equipment bay, 113AL (AMM 06-41-00/201).

S 014-003

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR AND THE CONTROLS BAY ACCESS DOOR, 313AL. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (3) Open the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

S 864-067

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Pressurize the left and center hydraulic systems (AMM 29-11-00/201).

S 864-005

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

S 864-006

**CAUTION:** DO NOT MOVE THE STABILIZER WITH THE RIG PINS INSTALLED. THIS CAN CAUSE DAMAGE TO THE AIRPLANE STRUCTURE.

- (6) Use the control wheel switches to move the stabilizer until you can install rig pins ST4 and ST5 (approximately at the neutral position) (Fig. 402).

S 864-007

- (7) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

S 864-008

- (8) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the CUTOUT position.

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AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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- S 864-009
- (9) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER
- E. Remove the STAB TRIM Levers (Fig. 401)
- S 494-010
- (1) Install rig pins ST4 and ST5 in the stabilizer trim control module (STCM) quadrants (Fig. 402).
- S 934-011
- (2) Find the turnbuckles in cables ST1A and ST1B and do the step that follows:
- (a) Put tags on the cable sections on both sides of each turnbuckle and remove the turnbuckle.
- NOTE:** The tags are to identify which cables are connected together when the turnbuckles are installed later.
- S 014-012
- (3) Remove the left seal assembly on the control stand for access to the STAB TRIM lever.
- S 014-013
- (4) Remove the access panel from the left side of the control stand.
- S 034-014
- (5) Remove the nut, washer, bushing, and bolt that connects the right STAB TRIM lever to the link assembly.
- S 034-015
- (6) Hold the STAB TRIM levers and remove the screws that hold the STAB TRIM levers to the airplane structure.
- S 034-016
- (7) Remove the nut and washer that hold the STAB TRIM levers to the shaft assembly.
- S 024-017
- (8) Remove the shaft assembly and the STAB TRIM levers.

TASK 27-41-02-424-018

3. Install the STAB TRIM Levers

A. Equipment

- (1) Rig pin from Set A20004-XX (AMM 20-10-24/201)
  - (a) ST4 - P/N A20004-17
  - (b) ST5 - P/N A20004-17

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AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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- (2) Push-pull gage - 10lb (4.5 Kg). maximum with 2 oz (56.7 grams). increments - Commercially Available
- (3) Cable Tensiometer - Commercially Available
- B. Consumable Materials
  - (1) D00633 Grease - BMS 3-33 (Preferred)
  - (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- C. References
  - (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
  - (2) AMM 06-42-00/201, Empennage Access Doors and Panels
  - (3) AMM 20-10-24/201, Rig Pins
  - (4) AMM 24-22-00/201, Electrical Power - Control
  - (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- D. Access
  - (1) Location Zones
    - 113/114 Area Forward of the NLG Wheel Well
    - 211/212 Control Cabin
    - 311/312 Area Aft of Pressure Bulkhead to BS 1725
  - (2) Access Panels
    - 113AL Forward Equipment Bay
    - 312AR Forward Stabilizer Compartment
- E. Install the STAB TRIM Levers (Fig. 401)
  - S 434-019
    - (1) Hold the STAB TRIM levers and the shaft assembly in their correct positions and install the nut, washers, and bolts.
  - S 434-020
    - (2) Install the screws that hold the STAB TRIM levers to the airplane structure.
  - S 434-021
    - (3) Install the bolt, washer, bushing, and nut that connect the right STAB TRIM lever to the link assembly.
  - S 214-022
    - (4) Make sure cables ST1A and ST1B are correctly positioned in the lever drum grooves and in the pulleys below the control stand.
  - S 824-023
    - (5) Pull the cables tight.
  - S 434-024
    - (6) Remove the tags and connect the correct cable sections together with the turnbuckles.
  - S 414-025
    - (7) Install the access panel on the left side of the control stand.

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AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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S 414-026

(8) Install the left seal assembly.

F. STAB TRIM Levers Adjustment (Fig. 402)

S 214-027

**CAUTION:** DO NOT MOVE THE STABILIZER WITH THE RIG PINS INSTALLED. THIS CAN CAUSE DAMAGE TO THE AIRPLANE STRUCTURE.

(1) Make sure rig pins ST4 and ST5 are installed in the STCM quadrants.

S 824-028

(2) Adjust the turnbuckles in the main deck compartment ceiling (Fig. 403).

S 824-029

(3) Adjust the turnbuckles on cables ST1A and ST1B until the conditions that follow are correct:  
(a) The STAB TRIM control levers align with each other by 0.02 inch (0.51 mm) and the base of the levers are positioned within the index marks of the limit position decal.

**NOTE:** Thermal expansion of the control cables during flight can cause the difference between the levers to be more than 0.02 inch (0.51 mm) while in flight. If the difference between the levers is more than 0.25 inch (6.35 mm) while in flight, the levers can be adjusted on the ground. You can adjust the TRIM lever, forward or aft of the STAB lever, one half of the in-flight displacement to a maximum of 0.25 inch (6.35 mm).

(b) The STAB TRIM levers are in the decal for the adjustment limit position.

S 094-030

(4) Remove rig pins ST4 and ST5.

S 214-031

(5) Operate the STAB TRIM levers through one complete cycle and do the checks that follow:  
(a) Make sure the cable tension and STAB TRIM lever positions are correct.

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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- (b) Make sure that the STAB TRIM levers align correctly.
- (c) Make sure that rig pins ST4 and ST5 can be freely installed in the STCM quadrants.

S 494-032

- (6) Install lock clips on the turnbuckles.

S 624-033

- (7) Apply corrosion preventive compound to the threads that can be seen.

S 094-034

- (8) Remove rig pins ST4 and ST5.

G. STAB TRIM Levers Test

S 934-035

- (1) Put a piece of masking tape (approximately 6.70 inches (170 mm) long) on the right STAB TRIM lever decal.

S 864-036

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Pressurize the left hydraulic system (AMM 29-11-00/201).

S 864-037

- (3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - (a) 11C12, STAB TRIM SHUTOFF L

S 864-038

- (4) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel to the NORM position.

S 864-039

- (5) Pull the STAB TRIM levers slowly aft until the stabilizer starts to move and do the steps that follow:
  - (a) Make a mark on the masking tape at the aft edge of the right STAB TRIM lever at this position.

(b) Put a "1" by this mark.

S 864-040

- (6) Push the STAB TRIM levers slowly forward until the stabilizer starts to move and do the steps that follow:
- (a) Make a mark on the masking tape at the forward edge of the right STAB TRIM lever at this position.
  - (b) Put a "2" by this mark.

S 864-041

- (7) Release the STAB TRIM levers.

S 864-042

- (8) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel to the CUTOUT position.

S 864-043

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (9) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-044

- (10) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11C13, STAB TRIM SHUTOFF CENTER

S 864-045

- (11) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel to the NORM position.

S 864-046

- (12) Pull the STAB TRIM levers slowly aft until the stabilizer starts to move and do the steps that follow:
- (a) Make a mark on the masking tape at the aft edge of the right STAB TRIM lever at this position.
  - (b) Put a "3" by this mark.

S 864-047

- (13) Push the STAB TRIM levers slowly forward until the stabilizer starts to move and do the steps that follow:
- (a) Make a mark on the masking tape at the forward edge of the right STAB TRIM lever at this position.
  - (b) Put a "4" by this mark.

S 864-048

- (14) Release the STAB TRIM levers.

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AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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S 224-049

- (15) Make sure that these measured distances are between 1.15 and 1.40 inches:
- (a) The distance from the forward boundary of the white area on the decal to the farthest forward mark on the tape
  - (b) The distance from the aft boundary of the white area on the decal to the farthest aft mark on the tape.

S 864-050

- (16) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel to the NORM position.

S 864-051

- (17) Move the left STAB TRIM lever forward.
- (a) Make sure the stabilizer does not move.

S 864-052

- (18) Move the right STAB TRIM lever forward.
- (a) Make sure the stabilizer does not move.

S 864-053

- (19) Move the left STAB TRIM lever aft.
- (a) Make sure the stabilizer does not move.

S 864-054

- (20) Move the right STAB TRIM lever aft.
- (a) Make sure the stabilizer does not move.

S 864-055

- (21) Move each STAB TRIM lever through full travel in opposite directions at approximately the same rate.
- (a) Make sure the stabilizer does not move.

S 864-056

- (22) Move each STAB TRIM lever to the opposite position.

**NOTE:** Make sure the STAB TRIM levers go through the neutral position at the same time.

- (a) Make sure the stabilizer does not move.

S 864-057

- (23) Let the STAB TRIM levers go to the neutral position at approximately the same rate.
- (a) Make sure the stabilizer does not move.

S 864-058

- (24) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel to the CUTOUT position.

S 724-059

- (25) Do these steps for one STAB TRIM lever at a time:
- (a) Apply a force to the bottom of the STAB TRIM lever knob to move each lever to positions "2" and "4" on the masking tape.
  - (b) Measure the maximum force applied to each STAB TRIM lever while you move it.
  - (c) Make sure the maximum force is not larger than 9.9 pounds (44 newtons).

S 724-060

- (26) Do these steps for one STAB TRIM lever at a time:
- (a) Apply a force to the upper edge of the STAB TRIM lever knob to move each lever to positions "1" and "3" on the masking tape.
  - (b) Measure the maximum force applied to each STAB TRIM lever while you move it.
  - (c) Make sure the maximum force is not larger than 7.8 pounds (34.7 newtons).

H. Put the Airplane Back to Its Usual Condition

S 864-061

- (1) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

S 864-062

- (2) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel to the NORM position.

S 214-063

- (3) Make sure these circuit breakers on the P11 panel are closed:
- (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF R

S 414-064

- (4) Close the access door for the forward equipment bay, 113AL (AMM 06-41-00/201).

S 414-065

- (5) Close the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

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AIRPLANES WITH STAB TRIM LEVERS ON THE  
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 **BOEING**  
767  
MAINTENANCE MANUAL

- S 864-081
- (6) AIRPLANES WITH POWERED FLIGHT COMPARTMENT SEATS;  
Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:  
(a) 6H15 or 6J15, CAPT SEAT  
(b) 6J21, F/O SEAT
- S 864-066
- (7) Remove electrical power if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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ALTERNATE STABILIZER TRIM SWITCH - REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the alternate stabilizer trim switches.

TASK 27-41-03-024-001

2. Remove the Alternate Stabilizer Trim Switch (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (3) AMM 25-11-01/201, Captain's Seat.

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Prepare for the Removal

S 864-002

- (1) Remove the pressure from the left and center hydraulic systems (AMM 29-11-00/201).

S 864-003

- (2) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand, P10, to the CUTOFF position.

S 864-004

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER
  - (c) 11H11, LEFT STAB TRIM CONT
  - (d) 11H20, STAB TRIM CONT R
  - (e) 11A36, STAB TRIM ALT

S 864-029

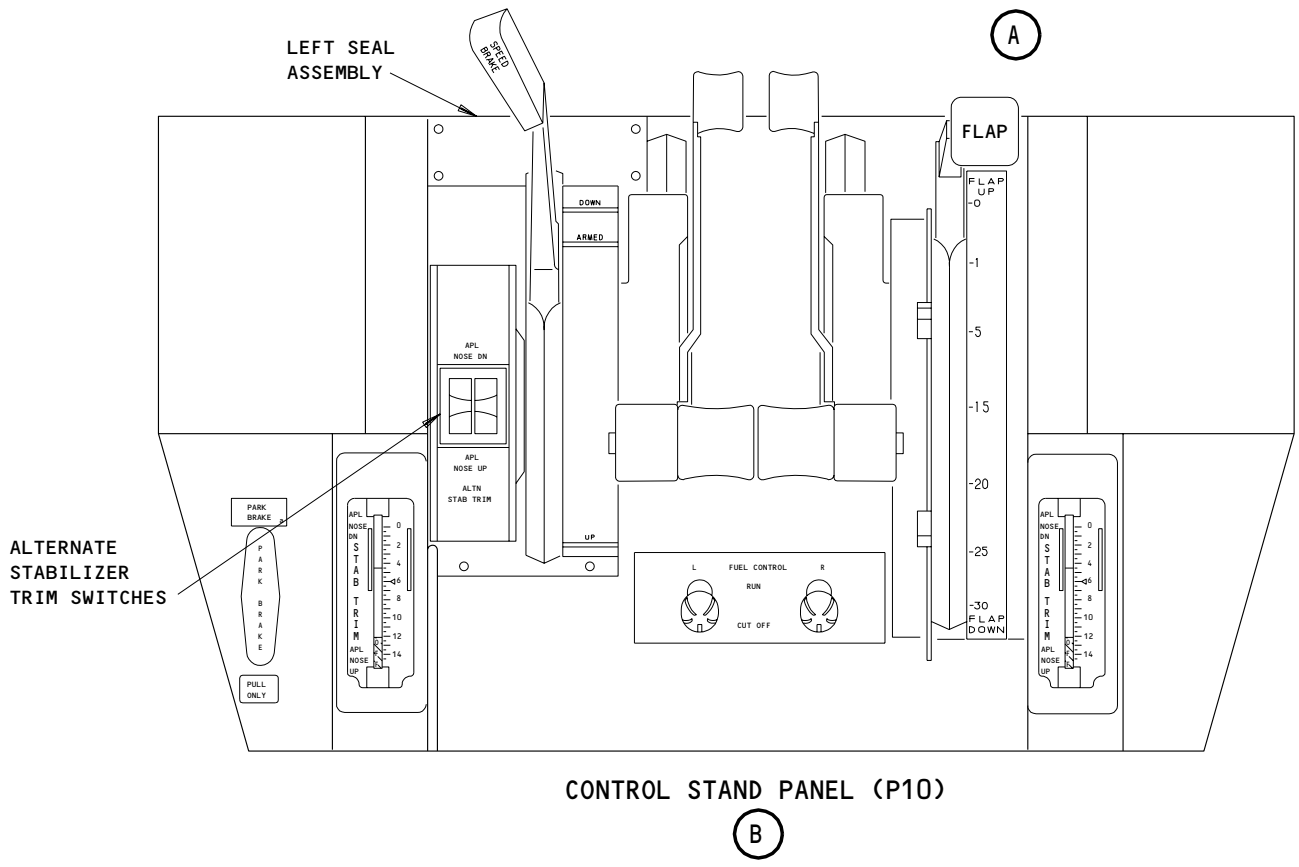
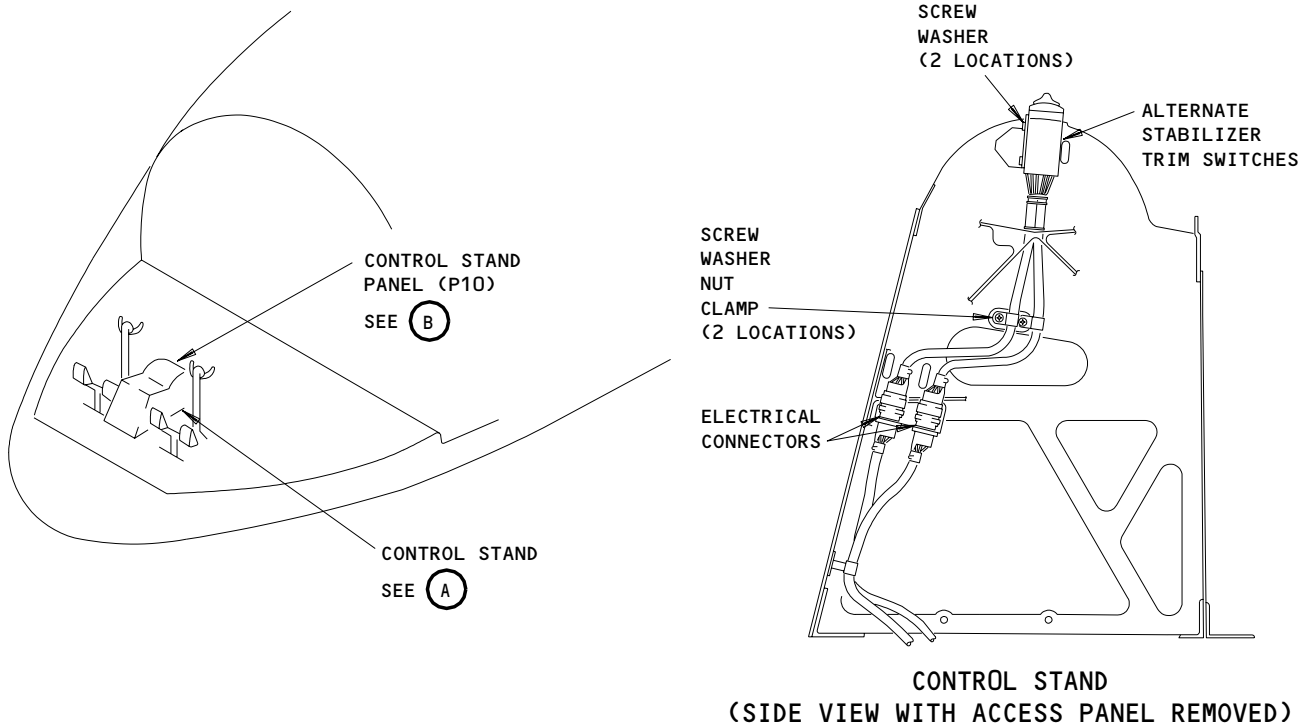
**WARNING:** REMOVE ELECTRICAL POWER FROM THE FLIGHT COMPARTMENT SEAT. THE ACCIDENTAL ELECTRICAL OPERATION OF THE FLIGHT COMPARTMENT SEAT CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) AIRPLANES WITH POWER SEATS;  
Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
  - (a) 6H15 or 6J15 CAPT SEAT

EFFECTIVITY  
ON AIRPLANES WITH ALTERNATE STAB TRIM  
SWITCHES ON THE CONTROL STAND

27-41-03





Alternate Stabilizer Trim Switches - Installation  
Figure 401

EFFECTIVITY  
ON AIRPLANES WITH ALTERNATE STAB TRIM  
SWITCHES ON THE CONTROL STAND

27-41-03

(b) 6H15 or 6J21, F/O SEAT

D. Remove the Alternate Stabilizer Trim Switch

S 014-005

- (1) Remove the left seal assembly for access to the speed brake lever and the alternate stabilizer trim switch.

S 014-006

- (2) Remove the access panel on the left side of the control stand.

S 034-007

- (3) Remove the screws that hold the clamps to the control stand.

S 034-008

- (4) Disconnect the electrical connectors for the alternate stabilizer trim switch.

S 034-009

- (5) Remove the screw and washer (2 locations) that hold the alternate stabilizer trim switch to the P10 panel.

S 024-010

- (6) Remove the alternate stabilizer trim switch.

TASK 27-41-03-424-011

3. Install the Alternate Stabilizer Trim Switch (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (3) AMM 25-11-01/201, Captain's Seat
- (4) Access
  - (a) Location Zones  
211/212 Control Cabin

B. Install the Alternate Stabilizer Trim Switch

S 424-012

- (1) Install the alternate stabilizer trim switch on the control stand panel, P10, with the screw and the washer (2 locations).

S 434-013

- (2) Connect the electrical connector for the alternate stabilizer trim switch.

S 434-014

- (3) Connect the clamp (2 locations) to the control stand with the screw, nut, and washer.

EFFECTIVITY  
ON AIRPLANES WITH ALTERNATE STAB TRIM  
SWITCHES ON THE CONTROL STAND

27-41-03

S 414-015

- (4) Install the access panel for the left side of the control stand.

S 414-016

- (5) Install the left seal assembly that you removed for access.

C. Alternate Stabilizer Trim Switch Test

S 864-017

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

S 864-018

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Supply power to the left and center hydraulic systems (AMM 29-11-00/201).

S 864-019

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER
  - (c) 11H11, LEFT STAB TRIM CONT
  - (d) 11H20, STAB TRIM CONT R
  - (e) 11A36, STAB TRIM ALT

S 864-020

- (4) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel to the NORM position.

S 864-021

- (5) Use the alternate stab trim switches to move the stabilizer to the APL NOSE UP and APL NOSE DN travel limits three to four times.

S 214-022

- (6) Make sure that the stabilizer moves as follows:
  - (a) The stabilizer leading edge moves down when the alternate stab trim switches are at the APL NOSE UP position
  - (b) The stabilizer leading edge moves up when the alternate stab trim switches are at the APL NOSE DOWN position.

D. Put the Airplane Back to Its Usual Condition

S 864-023

- (1) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

EFFECTIVITY  
ON AIRPLANES WITH ALTERNATE STAB TRIM  
SWITCHES ON THE CONTROL STAND

27-41-03

S 864-030

- (2) AIRPLANES WITH POWERED SEATS;  
Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6H15 OR 6J15 CAPT SEAT
  - (b) 6H15 OR 6J21 F/O SEAT

S 864-024

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY  
ON AIRPLANES WITH ALTERNATE STAB TRIM  
SWITCHES ON THE CONTROL STAND

27-41-03

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STABILIZER TRIM CUTOFF SWITCHES - REMOVAL/INSTALLATION

TASK 27-41-04-024-001

1. Remove the Stabilizer Trim Cutoff Switches (Fig. 401)

A. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 27-41-00/501, Horizontal Stabilizer Trim Control System

B. Access

- (1) Location Zone
  - 113 Area Forward of NLG Wheel Well (Left)
- (2) Access Panel
  - 113AL Forward Equipment Bay

C. Prepare for Removal

S 864-002

- (1) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H11, LEFT STAB TRIM CONT
  - (b) 11H20, STAB TRIM CONT R

S 014-004

- (2) Open the access door, 311AL, for the forward equipment bay (AMM 06-42-00/201).

D. Remove Stabilizer Trim Cutoff Switch

S 034-005

- (1) Remove the screws, spacers, washers, and nuts that hold the switch to the bracket.

**NOTE:** Be sure to note the location and number of each cutoff switch before removal.

S 034-006

- (2) Remove the switch guard and the spacer next to the switch.

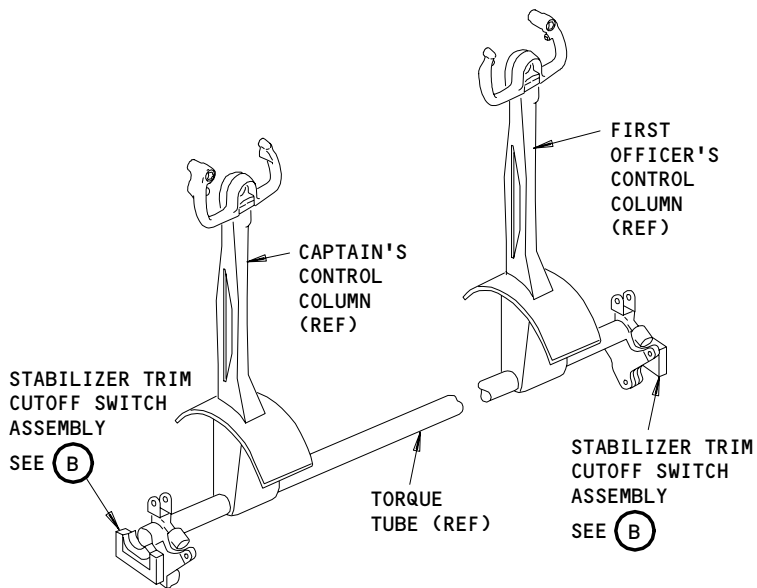
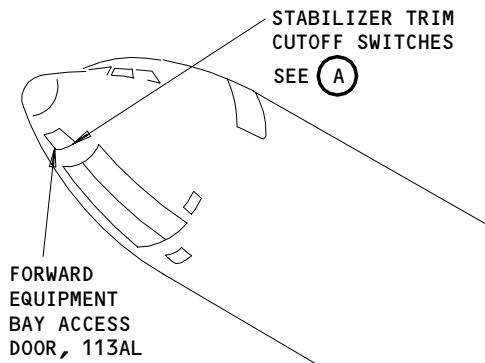
EFFECTIVITY

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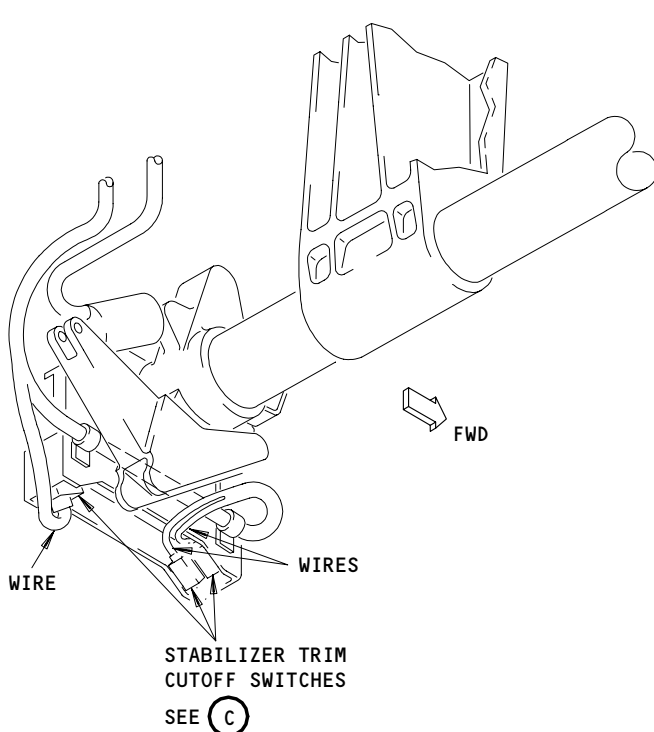
27-41-04

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Apr 22/02



STABILIZER TRIM CUTOFF SWITCHES



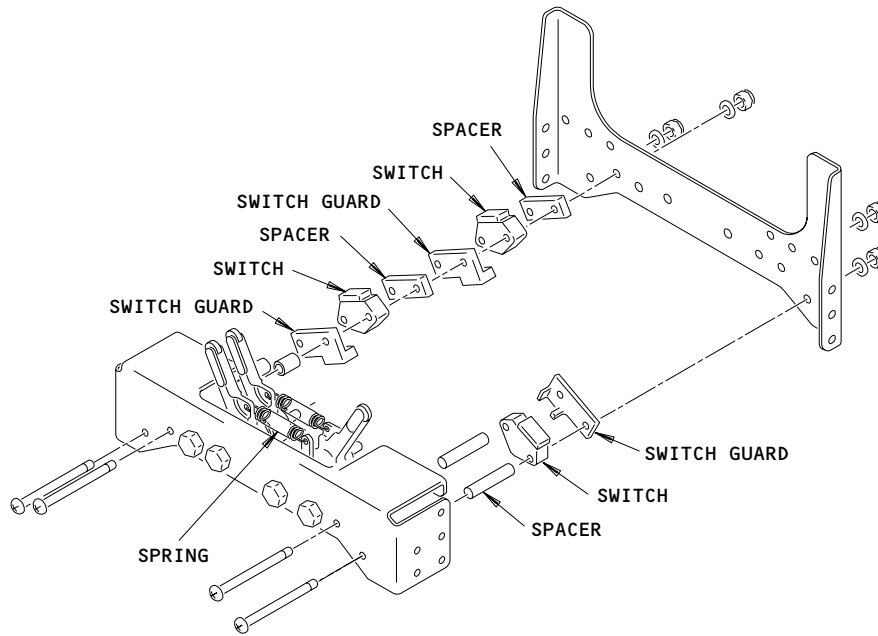
STABILIZER TRIM CUTOFF SWITCH ASSEMBLY  
(CAPTAIN'S SHOWN)

(B)

Stabilizer Trim Cutoff Switch Installation  
Figure 401 (Sheet 1)

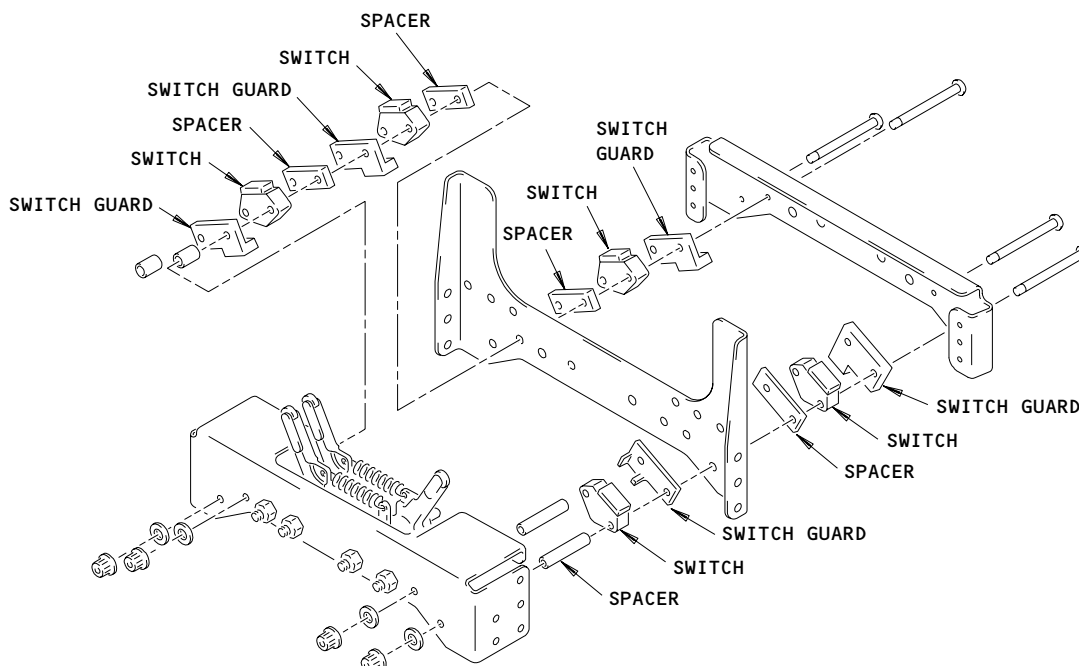
EFFECTIVITY  
767-200 AIRPLANES

27-41-04



STABILIZER TRIM CUTOFF SWITCH

(C) 1



STABILIZER TRIM CUTOFF SWITCH

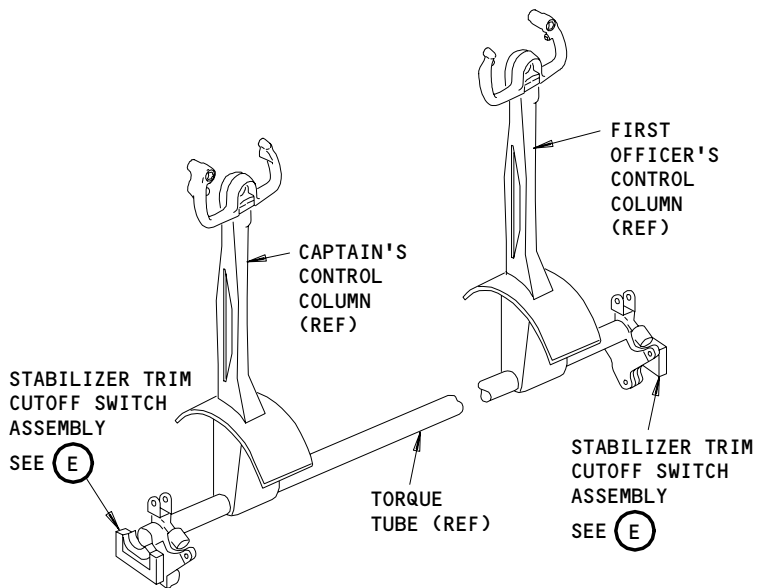
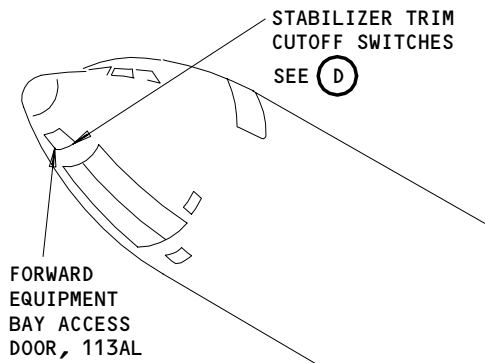
(C) 2

- 1 AIRPLANES WITH THREE SWITCHES
- 2 AIRPLANES WITH FIVE SWITCHES

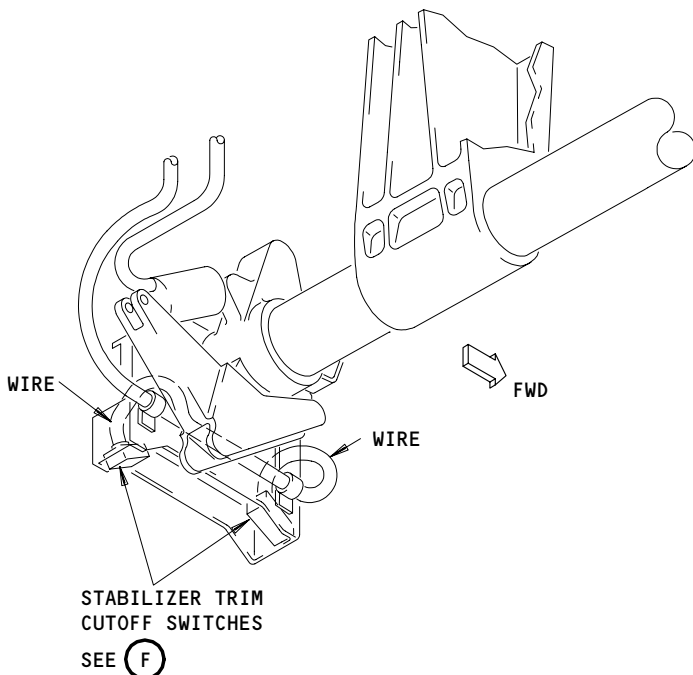
Stabilizer Trim Cutoff Switch Installation  
Figure 401 (Sheet 2)

EFFECTIVITY  
767-200 AIRPLANES

27-41-04



(D)



STABILIZER TRIM CUTOFF SWITCH ASSEMBLY  
(CAPTAIN'S SHOWN)

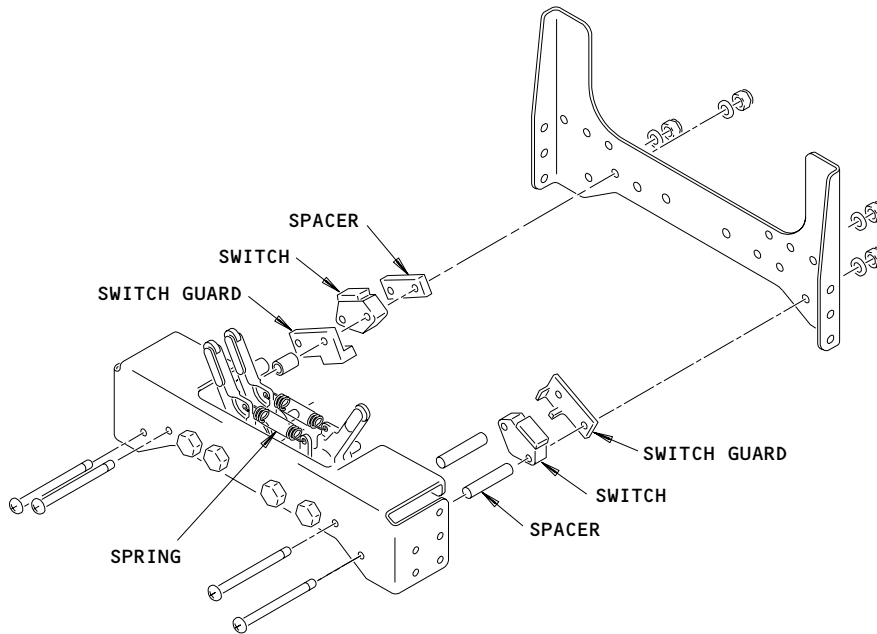
(E)

Stabilizer Trim Cutoff Switch Installation  
Figure 401 (Sheet 3)

EFFECTIVITY  
767-300 AIRPLANES

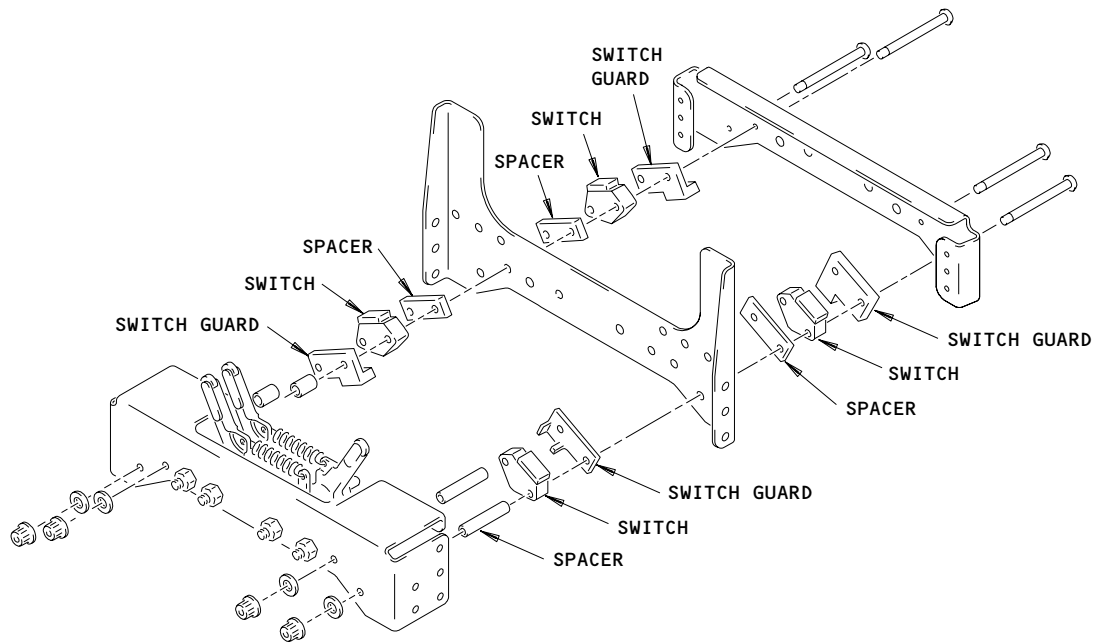
27-41-04





STABILIZER TRIM CUTOFF SWITCH

(F) 1



STABILIZER TRIM CUTOFF SWITCH

(F) 2

- 1 AIRPLANES WITH TWO SWITCHES
- 2 AIRPLANES WITH FOUR SWITCHES

Stabilizer Trim Cutoff Switch Installation  
Figure 401 (Sheet 4)

EFFECTIVITY  
767-300 AIRPLANES

27-41-04

S 934-007

- (3) Mark which wire goes to the NC terminal on the switch and which wire goes to the NO terminal on the switch.

S 024-008

- (4) Cut the wires and remove the switch.

S 034-003

- (5) Disconnect the spring that connects the switch arms.

TASK 27-41-04-424-010

2. Install the Stabilizer Trim Cutoff Switches (Fig. 401)

A. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 27-31-00/501, Elevator Control System
- (3) AMM 27-41-00/501, Horizontal Stabilizer Trim Control System

B. Access

- (1) Location Zone  
113 Area Forward of NLG Wheel Well (Left)
- (2) Access Panel  
113AL Forward Equipment Bay

C. Install Stabilizer Trim Cutoff Switch

S 434-011

- (1) Make a splice to connect the wires to the switch.

**NOTE:** Make sure the wire that was marked NC is attached to the NC terminal and the wire that was marked NO is attached to the NO terminal.

Make sure the wires have sufficient length to let the control column move through its full travel.

S 434-012

- (2) Install the switch guard and spacer.

S 434-013

- (3) Install the screws, spacers, washers, and nuts that hold the switch to the bracket.

**NOTE:** For switch locations, refer to the Horizontal Stabilizer Trim Control System - Component Location (FIM 27-41-00/101).

EFFECTIVITY

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- S 434-015
  - (4) Connect the spring that connects the switch arms.
  
  - S 824-018
  - (5) Do the adjustment for the stabilizer trim cutoff switches (AMM 27-31-00/501).
  
  - S 424-014
  - (6) Do the Stabilizer Trim Electrical Travel Limits and Column Cutoff Switches Test (AMM 27-41-00/501).
  
  - S 724-055
  - (7) SAS 050, 051, 150-166, 275-277, 279 POST-SB 27-102;  
SAS 052-149, 167-274, 278, 280-999;  
Do the Stabilizer Trim Override Capability with Split Control Columns Command Test (AMM 27-41-00/501).
- D. Put Airplane Back to Its Usual Condition
- S 864-016
  - (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
    - (a) 11H11, LEFT STAB TRIM CONT
    - (b) 11H20, STAB TRIM CONT R
  
  - S 414-017
  - (2) Close the access door, 311AL (AMM 06-42-00/201).

EFFECTIVITY

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**27-41-04**

STABILIZER TRIM CONTROL MODULE – REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the stabilizer trim control modules (STCMs).

TASK 27-41-05-024-001

2. Remove the STCM

A. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels  
(2) AMM 29-11-00/201, Main (Left, Right, Center) Hydraulic Systems

B. Access

- (1) Location Zones  
211/212 Control Cabin  
311/312 Area Aft of Pressure Bulkhead to BS 1725
- (2) Access Panels  
312AR Forward Stabilizer Compartment

C. Prepare for the Removal

S 864-002

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply power to the left hydraulic system (AMM 29-11-00/201).

S 014-003

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR AND THE CONTROLS BAY ACCESS DOOR, 313AL. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (2) Open the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

S 864-005

- (3) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
Use the STAB TRIM levers to move the stabilizer until the condition that follows is correct:  
(a) The rig pin slots in the STCM quadrant and the quadrant crank align with the slots in the support structure.

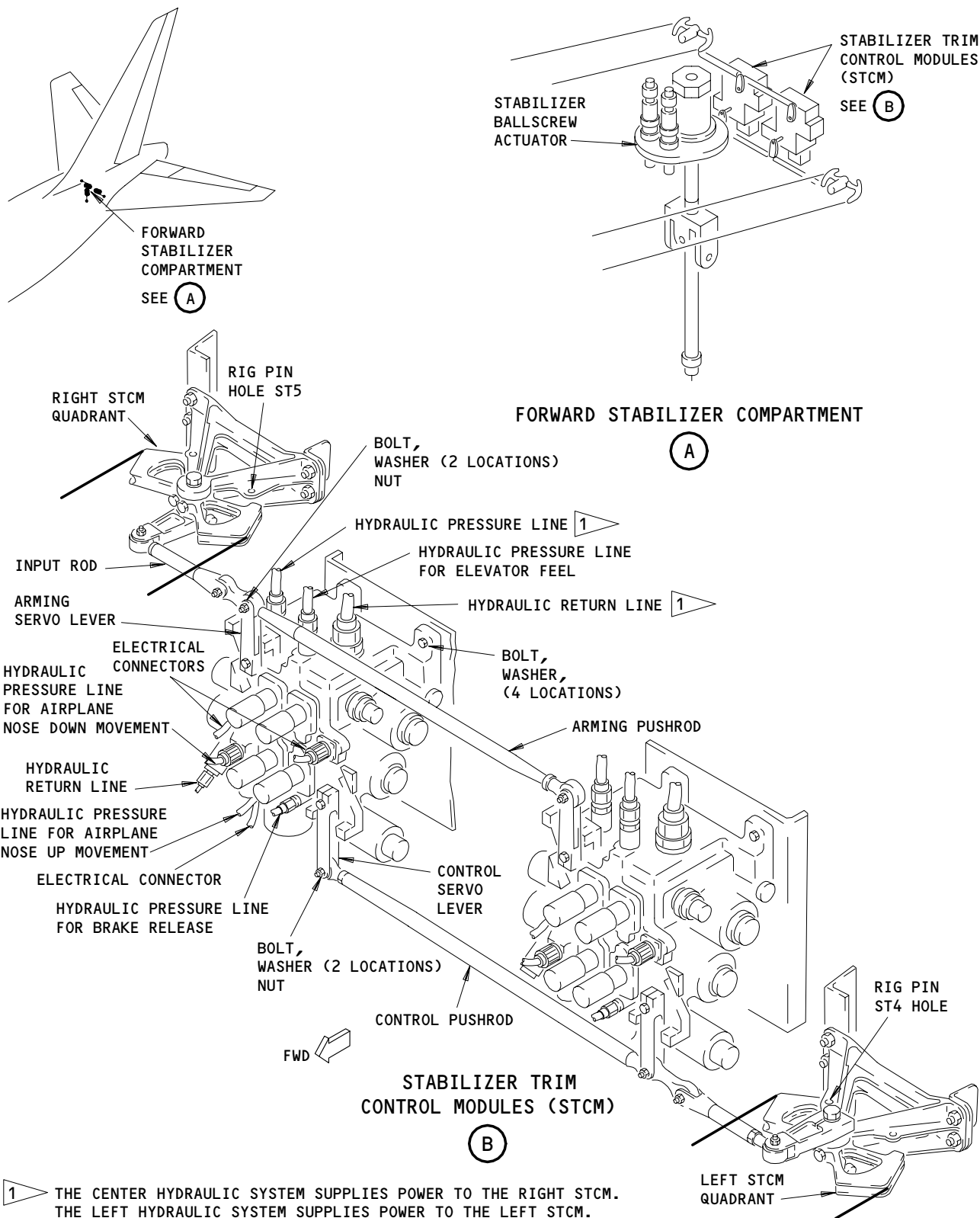
EFFECTIVITY

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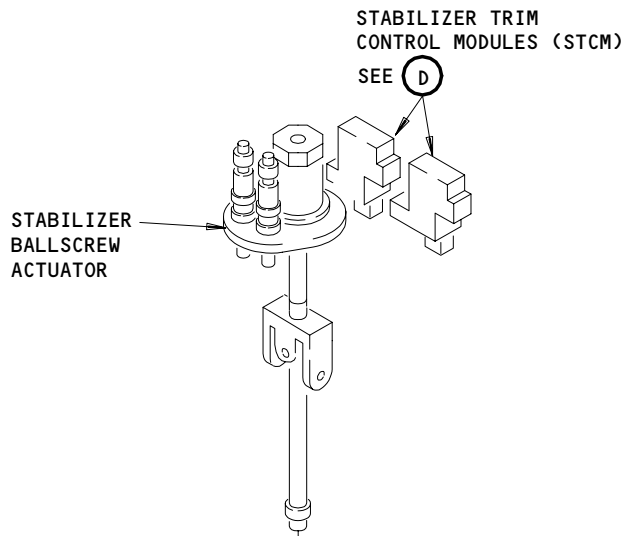
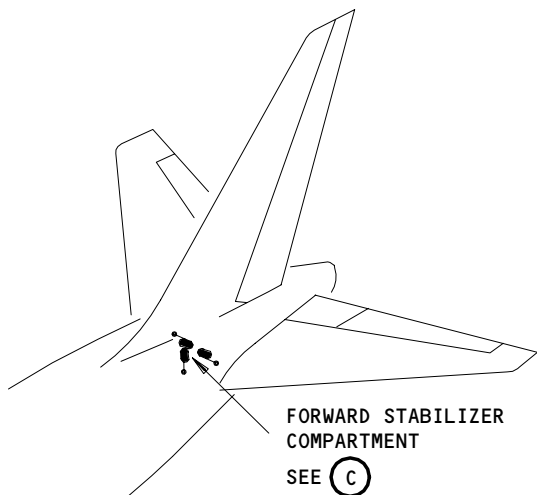
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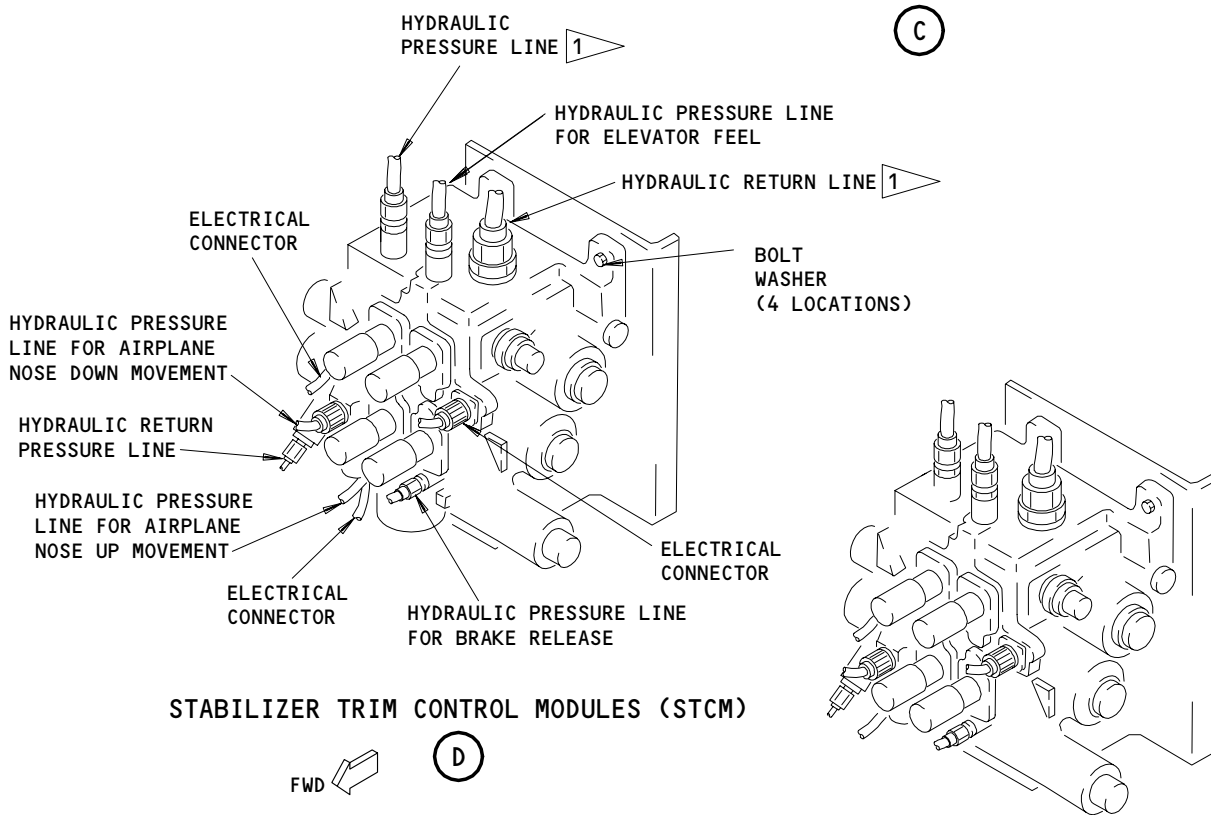
Stabilizer Trim Control Module Installation  
Figure 401 (Sheet 1)

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

27-41-05



FORWARD STABILIZER COMPARTMENT  
(C)



1 THE CENTER HYDRAULIC SYSTEM SUPPLIES POWER TO THE RIGHT STCM. THE LEFT HYDRAULIC SYSTEM SUPPLIES POWER TO THE LEFT STCM.

Stabilizer Trim Control Module Installation  
Figure 401 (Sheet 2)

EFFECTIVITY  
AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND

27-41-05

S 864-006

- (4) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
Use the alternate stab trim switches to move the stabilizer until Dimension A on the stabilizer ballscrew actuator is 3.84 +/- 0.03 inches (97.5 +/- 0.8 mm) (neutral position).

S 864-008

- (5) Remove the pressure from the left hydraulic system and make sure the center hydraulic system is not pressurized (AMM 29-11-00/201).

S 864-009

- (6) Put the LEFT and CENTER STAB TRIM SHUTOFF switches on the control stand panel, P10, to the CUTOUT position.

S 864-010

- (7) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11C12, STAB TRIM SHUTOFF L  
(b) 11C13, STAB TRIM SHUTOFF C

S 864-011

- (8) Do the steps that follow to remove pressure from the STCM and stop inputs to the STCM:

S 864-012

- (9) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
Do the steps that follow to remove pressure from the STCM and stop inputs to the STCM:  
(a) Move the STAB TRIM levers to the APL NOSE UP and APL NOSE DOWN positions 4 to 5 times to remove remaining hydraulic pressure in the STCM.  
(b) Attach a DO-NOT-OPERATE tag to the STAB TRIM levers.

S 864-013

- (10) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
Do the steps that follow to remove pressure from the STCM and stop inputs to the STCM:  
(a) Move the alternate stab trim switches to the APL NOSE UP and APL NOSE DOWN positions 4 to 5 times to remove the remaining hydraulic pressure in the STCM.  
(b) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:  
1) 11A36, STAB TRIM ALT (if installed)

D. Remove the STCM

S 034-016

- (1) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
Do the steps that follow to disconnect the input rods from the arm and control pushrods:

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- (a) Remove the bolt that connects the arm pushrod to the arm servo lever.
- (b) Hold the arm pushrod away from the STCM.
- (c) Remove the bolt that connects the control pushrod to the control servo lever.
- (d) Hold the control pushrod away from the STCM.

S 034-059

- (2) Do these steps if you remove the left STCM:

**WARNING:** CAREFULLY LOOSEN THE HYDRAULIC RETURN LINE ON THE LEFT STCM. A PRESSURE AS HIGH AS 100 PSI (689 KPA) AND A FLUID VOLUME AS MUCH AS 5 CUBIC INCHES (82 CUBIC CENTIMETERS) CAN REMAIN IN THE LINE. THIS IS CAUSED BY THE PTU SYSTEM. A SPRAY OF FLUID FROM THE CONNECTION CAN CAUSE INJURY TO A PERSON.

- (a) Slowly loosen the return line connection on the left STCM and let the pressure decrease.

S 034-038

- (3) Disconnect the electrical connectors from the STCM.

S 034-039

- (4) Disconnect the hydraulic lines from the STCM.
  - (a) Put caps on the ports and plugs in the lines.

S 034-040

- (5) Hold the STCM and remove the bolts that attach it to the airplane structure.

S 024-041

- (6) Remove the STCM.

TASK 27-41-05-424-042

### 3. Install the STCM

#### A. Consumable Materials

- (1) The lubricants that follow are permitted:
  - (a) C00174 Compound - Corrosion Preventive MIL-PRF-16173 Grade 2
  - (b) C00308 Compound - Corrosion Preventive MIL-C-11796 Class III

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 **BOEING**  
767  
MAINTENANCE MANUAL

- (c) D00633 Grease - BMS 3-33 (Preferred)
- (d) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827)  
(Alternate)

**B. References**

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-41-00/501, Horizontal Stabilizer Trim Control System
- (4) AMM 29-22-00/201, Pitch Enhancement System

**C. Access**

- (1) Location Zones
  - 211/212 Control Cabin
  - 311/312 Area Aft of Pressure Bulkhead to BS 1725
- (2) Access Panels
  - 312AR Forward Stabilizer Compartment

**D. Install the STCM**

- S 434-043
  - (1) Hold the STCM in position and install the bolts, washers, and nuts that hold it to the airplane structure.
- S 434-044
  - (2) Remove the plugs and caps, and connect the hydraulic lines to the STCM.
- S 434-045
  - (3) Connect the electrical connectors to the STCM.
- S 434-048
  - (4) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
Do the steps that follow to connect the input rods to the arm and the control pushrods:
    - (a) Install the bolt that connects the control pushrod to the control servo lever.
    - (b) Install the bolt that connects the arm pushrod to the arm servo lever.
    - (c) Lubricate the arm and control rod ends.
- S 864-049
  - (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
    - (a) 11A36, STAB TRIM ALT (if installed)

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- (b) 11C12, STAB TRIM SHUTOFF L
- (c) 11C13, STAB TRIM SHUTOFF C

S 864-050

- (6) Put the LEFT and CENTER STAB TRIM SHUTOFF switches on the control stand panel, P10, to the NORM position.

S 824-053

- (7) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
Do the steps that follow:
  - (a) Remove the DO-NOT-OPERATE tag from the STAB TRIM levers.
  - (b) Do the adjustment for the control rod for the STCM lever (AMM 27-41-00/501).

S 874-058

- (8) Do this step if you replaced the left STCM:
  - (a) Bleed the air from the return line to the PTU pump (AMM 29-22-00/201).

NOTE: A UNSCHED STAB TRIM message will appear on the EICAS display when you bleed air from the hydraulic line. This message will erase when you operate the control wheel switches in the Operational Test for the Horizontal Stabilizer Trim System.

S 714-054

- (9) Do the Operational Test for the Horizontal Stabilizer Trim System (AMM 27-41-00/501).

E. Put the Airplane Back to Its Usual Condition

S 864-055

- (1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 414-056

- (2) Close the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

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27-41-05

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STABILIZER TRIM CONTROL MODULE QUADRANT – REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the stabilizer trim control module (STCM) quadrants.
- B. The procedure to remove and install the left and right stabilizer trim control module quadrant is equivalent.

TASK 27-41-06-024-004

2. Remove the STCM Quadrant

A. Equipment

- (1) Rig pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) ST4 – P/N A20004-17
  - (b) ST5 – P/N A20004-17

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 20-10-24/201, Rig Pins
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 311/312 Area Aft of Pressure Bulkhead to BS 1725
- (2) Access Panel
  - 312AR Forward Stabilizer Compartment

D. Prepare for the Removal

S 014-005

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR AND THE CONTROLS BAY ACCESS DOOR, 313AL. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (1) Open the service access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

S 864-006

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

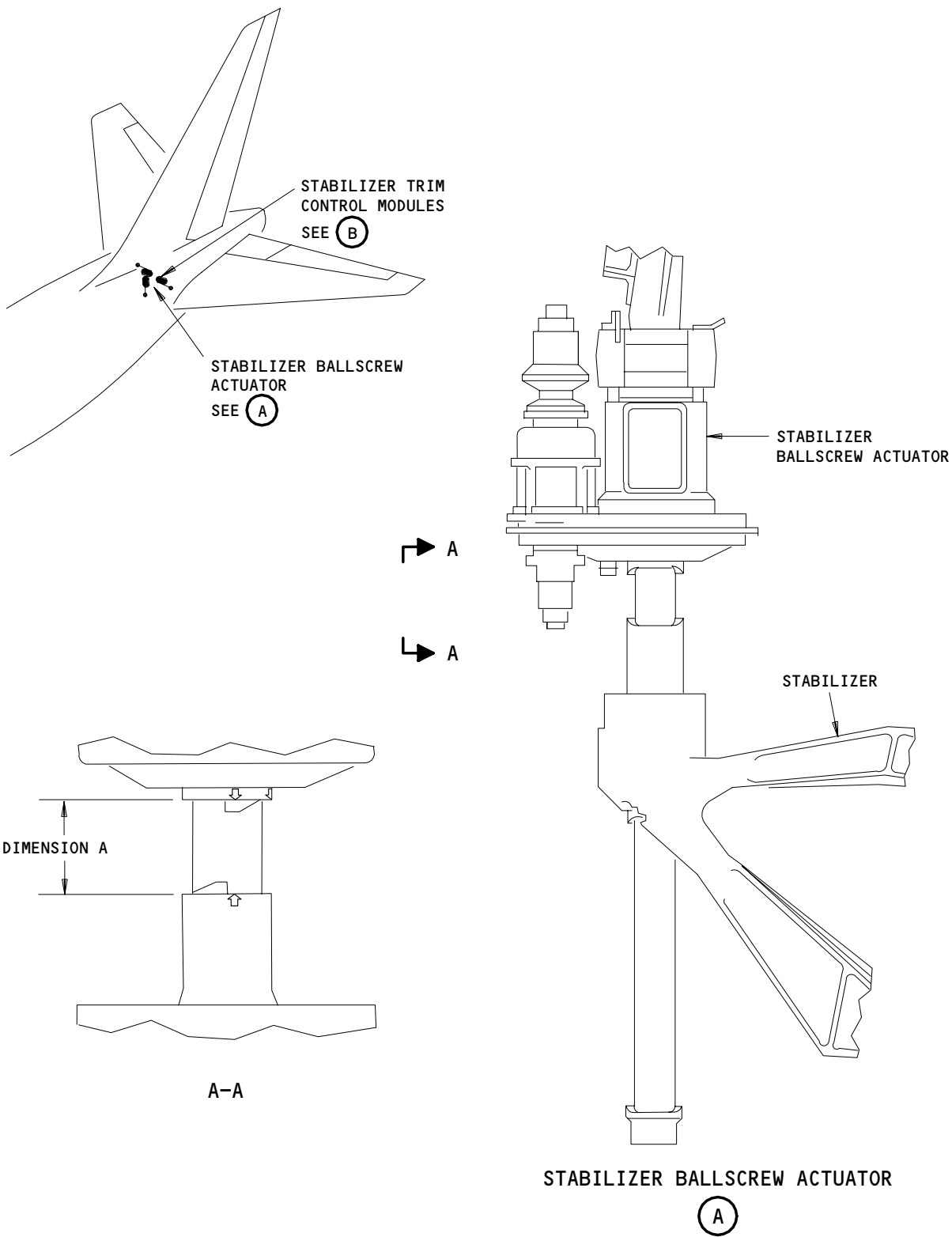
- (2) Pressurize the left and center hydraulic systems (AMM 29-11-00/201).

S 864-007

- (3) Use the alternate STAB TRIM levers to move the stabilizer until Dimension A on the stabilizer ballscrew actuator is  $3.84 \pm 0.03$  inches (97.5 +/- 0.8 millimeters) (neutral position) (Fig. 401).

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

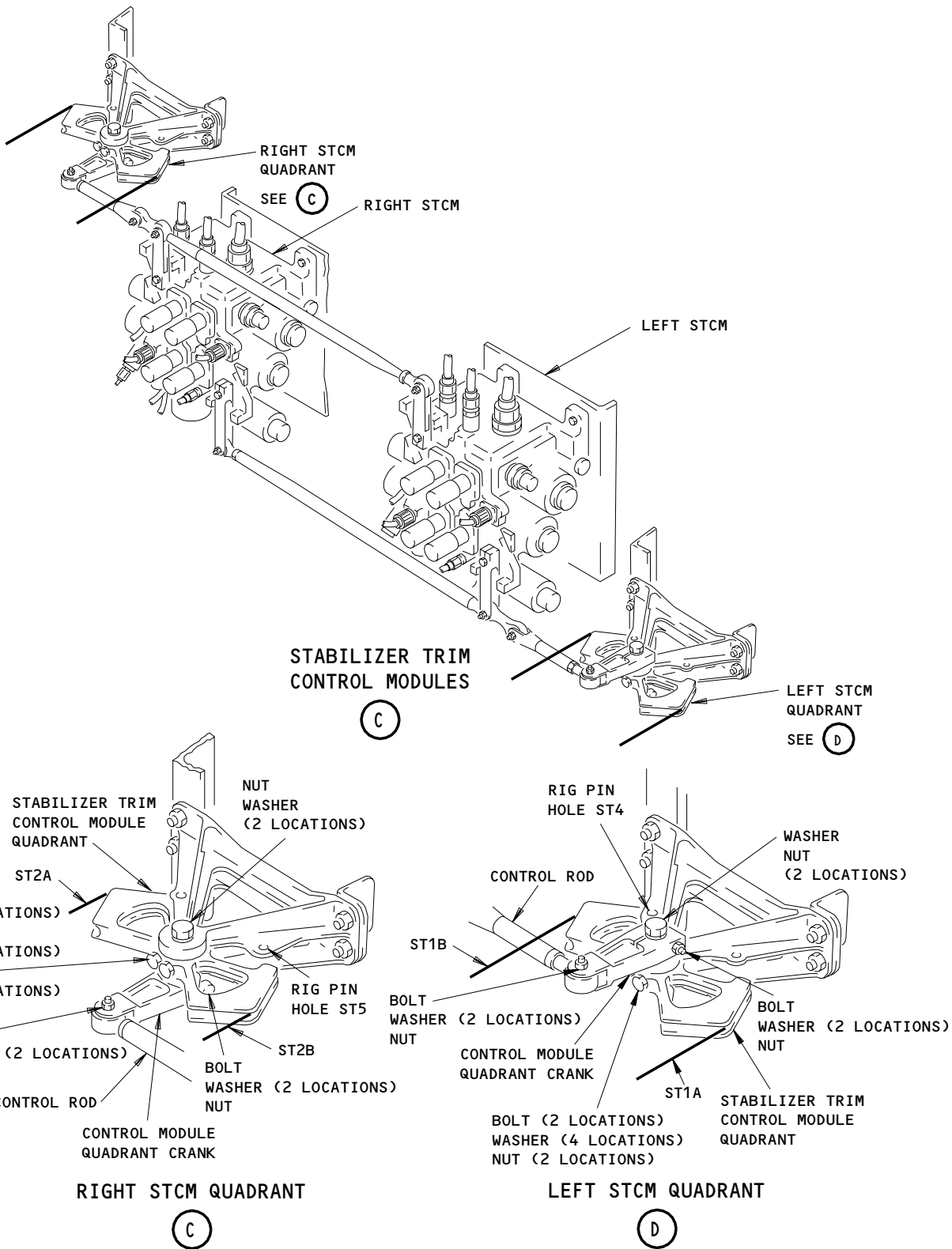
27-41-06



Stabilizer Trim Control Module (STCM) Quadrant Installation  
Figure 401 (Sheet 1)

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

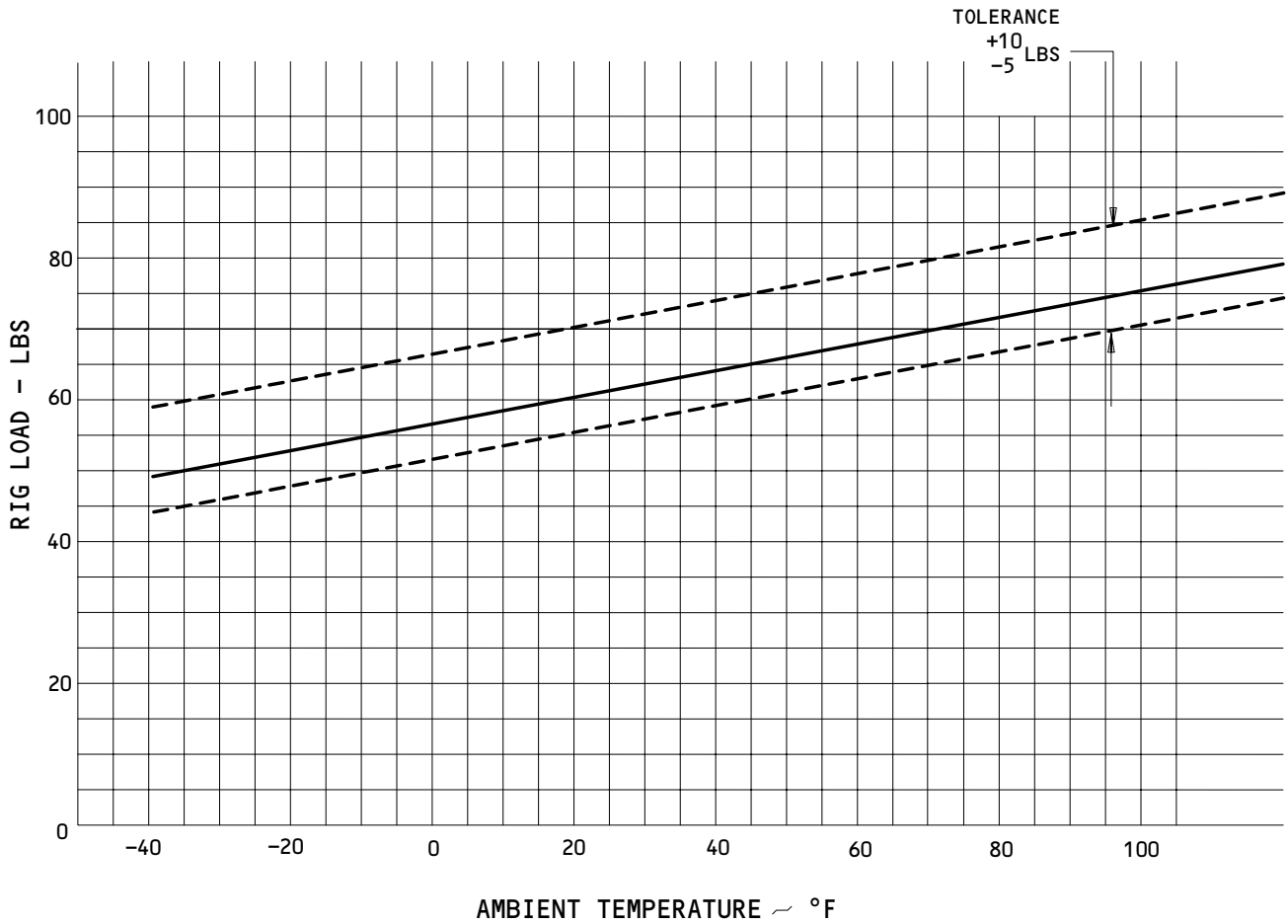
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Stabilizer Trim Control Module (STCM) Quadrant Installation  
Figure 401 (Sheet 2)

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

27-41-06



$\frac{3}{32}$  DIAMETER CABLE RIG LOAD VS TEMP

Stabilizer Body Cable Rigging  
Figure 402

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

27-41-06

02

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- S 864-008
- (4) Remove the power from the left and center hydraulic systems (AMM 29-11-00/501).
- S 864-009
- (5) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the CUTOUT position.
- S 864-010
- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER
- E. Remove the STCM Quadrant (Fig. 402)
- S 024-002
- (1) Do the steps that follow to remove the STCM quadrant:
- (a) Install rig pins ST4 and ST5.
  - (b) Loosen the tension in cables ST1A, ST1B, ST2A, and ST2B at the aft turnbuckles.
  - (c) Disconnect these cables from the STCM quadrant:
    - 1) Cables ST1A and ST1B for the left STCM quadrant.
    - 2) Cables ST2A and ST2B for the right STCM quadrant.
  - (d) Remove rig pins ST4 and ST5.
  - (e) Disconnect the rod from the STCM quadrant crank.
  - (f) Remove the bolt that connects the crank to the shaft.
  - (g) Remove the bolts that connect the STCM quadrant to the shaft.
  - (h) Remove these nuts and washers from the shaft:
    - 1) The nut and washers on the bottom of the support for the left STCM quadrant
    - 2) The nut and washers on the top of the support for the right STCM quadrant.
  - (i) Remove the STCM quadrant from the shaft.

TASK 27-41-06-424-011

3. Install the STCM Quadrant

A. Equipment

- (1) Rig pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) ST4 - P/N A20004-17
  - (b) ST5 - P/N A20004-17

- (2) Cable Tensiometer - Commercially Available

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) C00308 Compound - Corrosion Preventive MIL-C-11796

C. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 20-10-24/201, Rig Pins
- (3) AMM 24-22-00/201, Electrical Power - Control

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

27-41-06

- (4) AMM 29-11-00/201, Main (Left, Right, Center) Hydraulic Systems
- D. Access
- (1) Location Zones
- |         |  |
|---------|--|
| 211/212 | Control Cabin                            |
| 311/312 | Area Aft of Pressure Bulkhead to BS 1725 |
- (2) Access Panel
- |       |                                |
|-------|--------------------------------|
| 312AR | Forward Stabilizer Compartment |
|-------|--------------------------------|
- E. Install the STCM Quadrant (Fig. 402)
- S 424-003
- (1) Do the steps that follow to install the STCM quadrant:
- (a) Apply a layer of grease to all of the internal and external splines or threads.
  - (b) Put the STCM quadrant and the crank in their correct positions and install the shaft.
  - (c) Install the nut and washers on the shaft.
  - (d) Install the bolts to connect the STCM quadrant to the shaft.
  - (e) Install the bolt to connect the crank to the shaft.
  - (f) Apply grease to all splines, threads, and relief grooves that you can see.
  - (g) Connect the rod to the crank.
  - (h) Connect these cables to the STCM quadrant:
    - 1) The cables ST1A and ST1B for the left STCM quadrant
    - 2) The cables ST2A and ST2B for the right STCM quadrant.
  - (i) Install rig pins ST4 and ST5.
  - (j) Adjust the turnbuckles in cables ST1A, ST1B, ST2A, and ST2B until the tension is correct (Fig. 402).
  - (k) Make sure the STAB TRIM levers align within 0.020 inch (0.5 millimeter) and are in the decal for the adjustment limit position.
  - (l) Remove rig pins ST4 and ST5.
  - (m) Operate the STAB TRIM levers through one full cycle.
  - (n) Make sure the cable tension and lever position are correct.
  - (o) Install lock clips on the turnbuckles.
  - (p) Apply corrosion preventive compound to the turnbuckle threads that you can see.



F. STCM Quadrant Test

S 864-012

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

S 864-013

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on overhead panel, P11:  
(a) 11C12, STAB TRIM SHUTOFF L  
(b) 11C13, STAB TRIM SHUTOFF CENTER

S 864-015

- (3) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the NORM position.

S 864-001

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Supply power to the left and center hydraulic systems (AMM 29-11-00/201).

S 864-016

- (5) Use the STAB TRIM levers to move the stabilizer through full travel and do the check that follows:  
(a) Make sure the STCM quadrant operates smoothly through the full travel range.  
(b) Make sure the STAB TRIM levers go to the neutral position when you release them.

G. Put the Airplane Back to Its Usual Condition

S 864-017

- (1) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

27-41-06

 **BOEING**  
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MAINTENANCE MANUAL

- S 214-018
- (2) Make sure that rig pins ST4 and ST5 are removed.
- S 414-019
- (3) Close the service access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).
- S 864-020
- (4) Remove electrical power (AMM 24-22-00/201).

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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STABILIZER TRIM CONTROL MODULE BRAKE PRESSURE SWITCH - REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the brake pressure switch in the stabilizer trim control module (STCM).
- B. The steps to remove/install the brake pressure switch in the left and right stabilizer trim control modules are the same.

TASK 27-41-07-024-001

2. Remove the Brake Pressure Switch (Fig. 401)

A. Equipment

- (1) Rig pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) ST4 - P/N A20004-17
  - (b) ST5 - P/N A20004-17

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 20-10-24/201, Rig Pins
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 311/312 Area Aft of Pressure Bulkhead to BS 1725
- (2) Access Panel
  - 312AR Forward Stabilizer Compartment

D. Prepare for the Removal

S 864-002

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply power to the left hydraulic system (AMM 29-11-00/201).

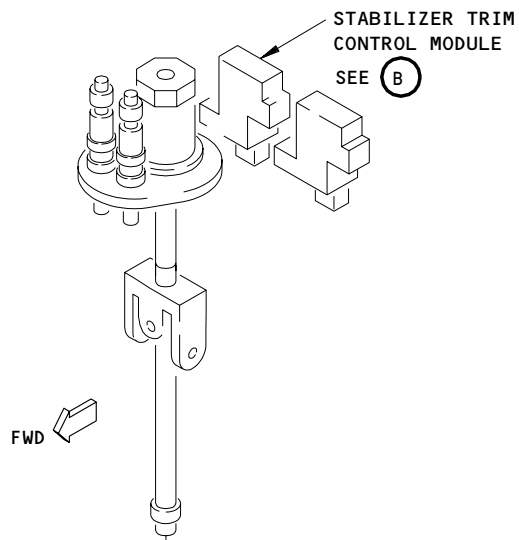
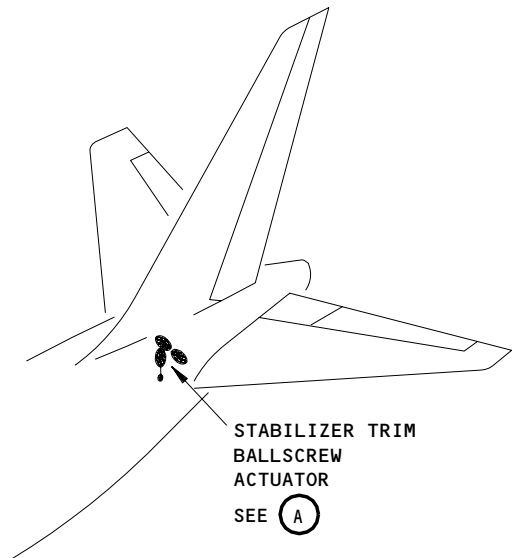
EFFECTIVITY

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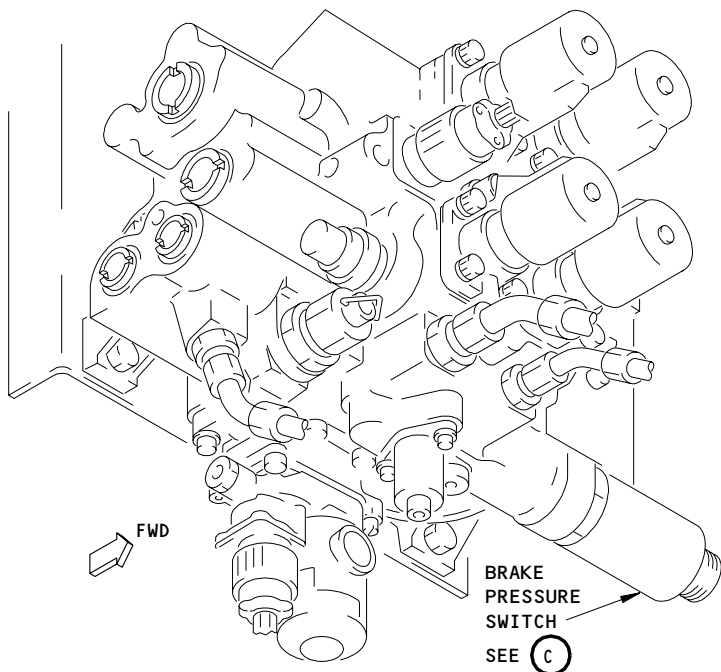
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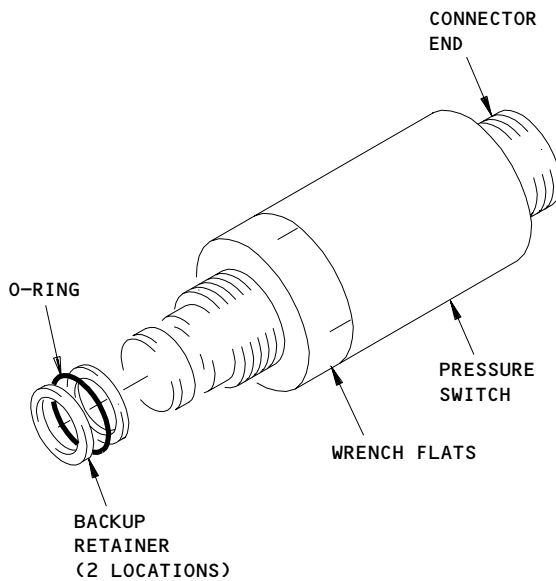
STABILIZER TRIM BALLSCREW ACTUATOR

(A)



STABILIZER TRIM CONTROL MODULE

(B)



BRAKE PRESSURE SWITCH

(C)

Stabilizer Trim Control Module Brake Pressure Switch Installation  
Figure 401

EFFECTIVITY	
	ALL

27-41-07

S 014-032

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 311AL AND THE ELEVATOR CONTROL ACCESS DOOR, 313AL. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (2) Open the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

S 864-004

- (3) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND; use the STAB TRIM levers to move the stabilizer until the condition that follows is correct:
  - (a) The rig pin slots in the crank and the rear quadrants align with the slot in the support casting.

S 864-007

- (4) Remove pressure from the left hydraulic system (AMM 29-11-00/201).

S 864-008

- (5) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the CUTOUT position.

S 864-009

- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER

S 864-010

- (7) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND; put a DO-NOT-OPERATE tag on the STAB TRIM levers.

E. Remove the Brake Pressure Switch

S 494-012

- (1) Install rig pins ST4 and ST5.

S 034-013

- (2) Disconnect the connector from the brake pressure switch.

EFFECTIVITY

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- S 024-014  
(3) Remove the brake pressure switch.
- S 034-015  
(4) Remove and discard the O-ring and the two backup retainers.
- S 434-016  
(5) Put a cap on the open port.

TASK 27-41-07-424-017

3. Install the Brake Pressure Switch (Fig. 401)

A. Equipment

- (1) Rig pins from Set A20004-XX (AMM 20-10-24/201):  
(a) ST4 - P/N A20004-17  
(b) ST5 - P/N A20004-17
- (2) 504190-4 Sizing tool - Quality Aircraft Tooling, Inc.  
1048 King Industrial Drive  
Marietta, GA 30062 USA

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels  
(2) AMM 20-10-24/201, Rig Pins  
(3) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems  
(4) FIM 27-09-00/101 Stabilizer Trim/Aileron Lockout Module (SAM) BITE Procedure

C. Access

- (1) Location Zones  
211/212 Control Cabin  
311/312 Area Aft of Pressure Bulkhead to BS 1725
- (2) Access Panel  
312AR Forward Stabilizer Compartment

D. Install the Brake Pressure Switch

- S 434-018  
(1) Use the sizing tool to install a new O-ring and two backup retainers on the pressure switch (Fig. 401).
- S 424-019  
(2) Install the pressure switch in the stabilizer trim control module.
- S 434-030  
(3) Tighten the pressure switch to 300-350 pound-inches (34.0-39.5 newton-meters) at the wrench flats.
- S 434-020  
(4) Connect the connector to the brake pressure switch.
- S 094-021  
(5) Remove rig pins ST4 and ST5.

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S 864-022

- (6) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER

S 864-023

- (7) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the NORM position.

S 864-024

- (8) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
remove the DO-NOT-OPERATE tag from the STAB TRIM levers.

S 714-026

- (9) Do the stabilizer trim/aileron lockout module (SAM) BITE procedure (FIM 27-09-00/101).
  - (a) Make sure that the STCM faultball is not yellow on the left or right SAM.

E. Put the Airplane Back to Its Usual Condition

S 414-031

- (1) Close the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

S 864-027

- (2) Remove hydraulic power, if it is not necessary (AMM 29-11-00/201).

S 864-028

- (3) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY

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**27-41-07**

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STABILIZER TRIM CONTROL MODULE SOLENOID VALVE -  
REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the solenoid valves on the stabilizer trim control modules (STCMs).
- B. There are four solenoid valves on each of the two STCMs. The procedure to remove each of the solenoid valves is the same.

TASK 27-41-08-024-001

2. Remove the Solenoid Valve

A. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

(1) Location Zones

- 211/212 Control Cabin
- 311/312 Area Aft of the Pressure Bulkhead to BS 1725

(2) Access Panel

- 312AR Forward Stabilizer Compartment

C. Prepare for the Removal

S 864-002

- (1) Put the LEFT and CENTER STAB TRIM SHUTOFF switches on the control stand panel, P10, to the CUTOUT position.

S 864-003

- (2) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11A36, ALT STAB TRIM (if installed)
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H11, LEFT STAB TRIM CONT
  - (e) 11H20, STAB TRIM CONT R

EFFECTIVITY

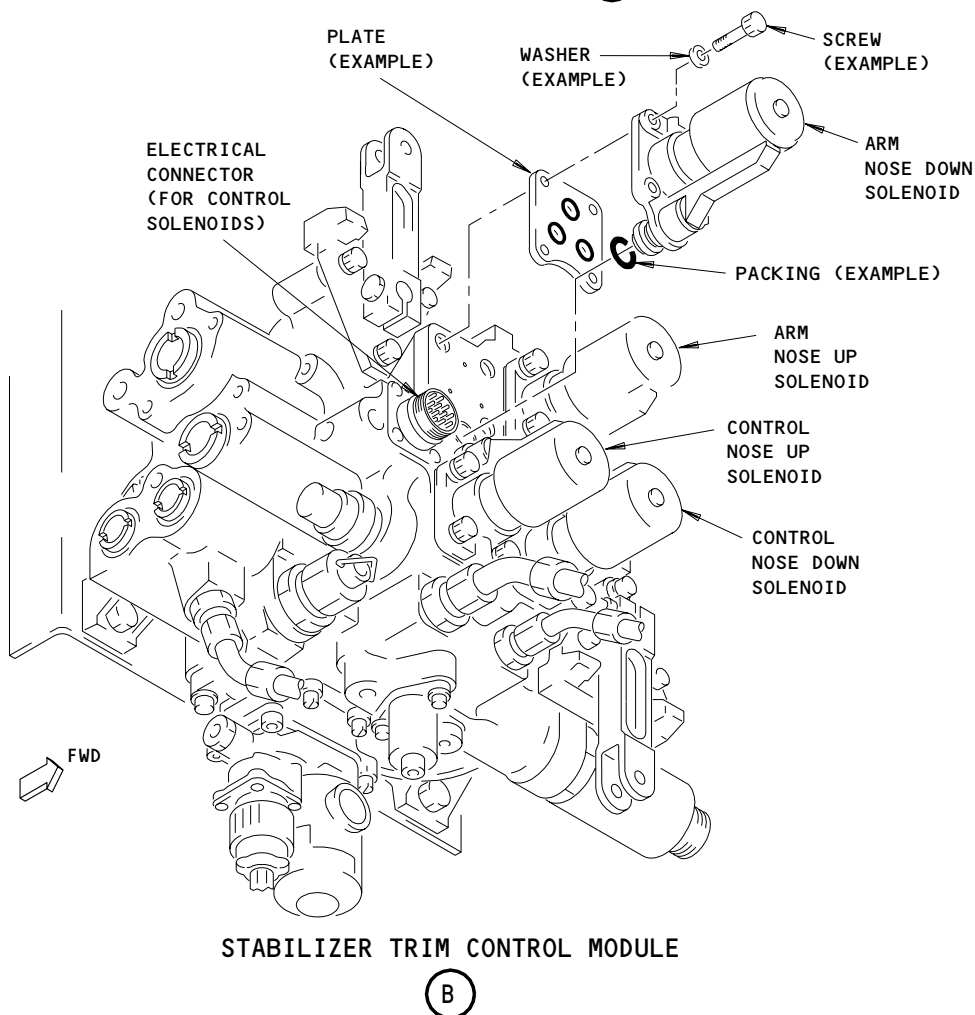
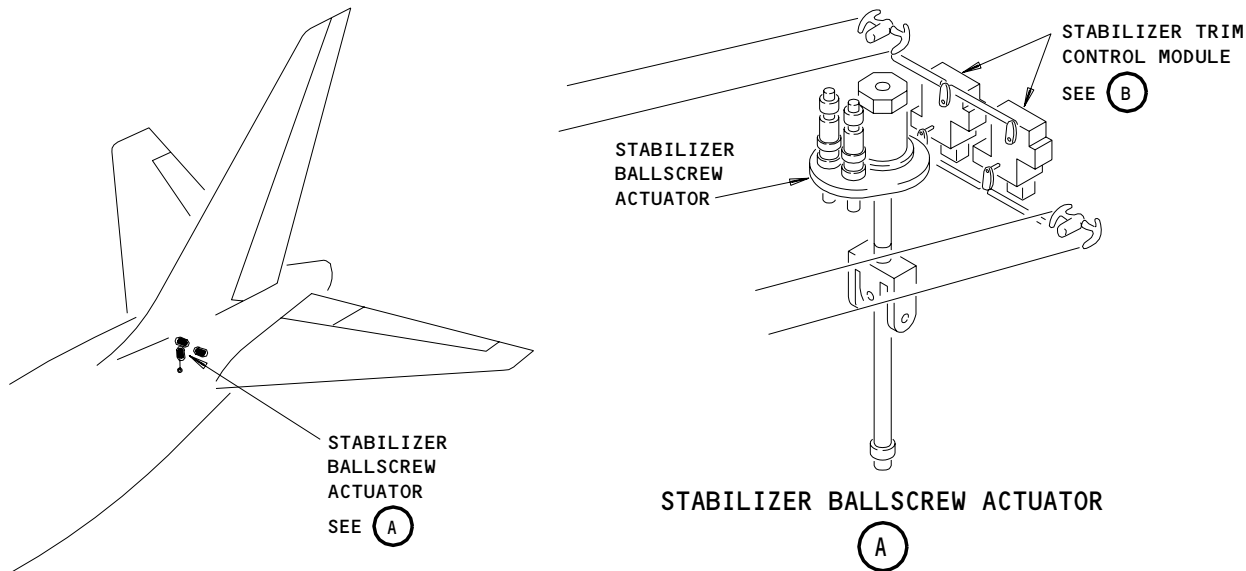
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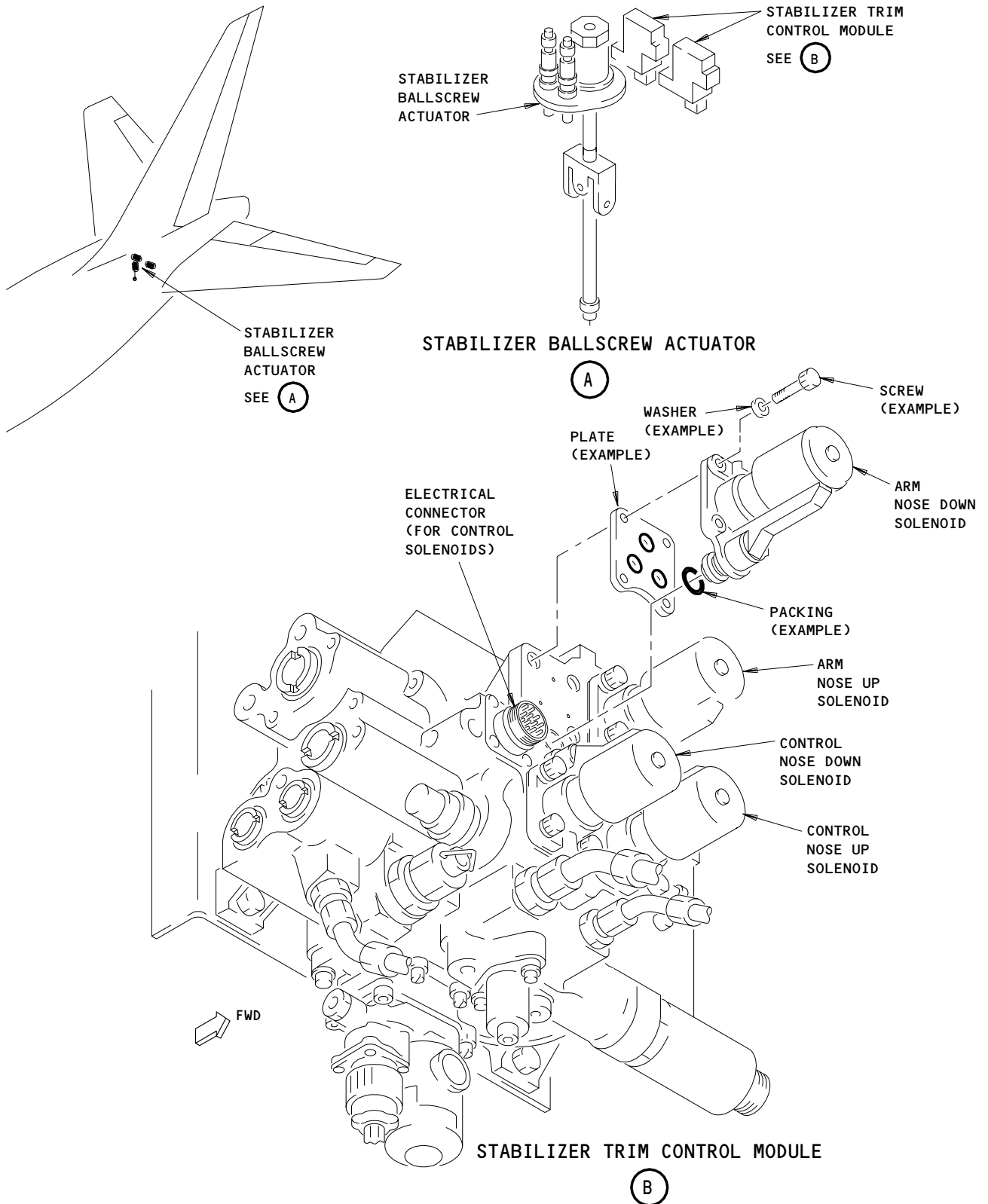




Stabilizer Trim Control Module (STCM) Solenoid Valve Installation  
Figure 401 (Sheet 1)

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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Stabilizer Trim Control Module (STCM) Solenoid Valve Installation  
Figure 401 (Sheet 2)

EFFECTIVITY  
AIRPLANES WITH ALTERNATE STAB TRIM  
SWITCHES ON THE CONTROL STAND

27-41-08

- S 864-031
- (3) Remove pressure from the left, right, and center hydraulic systems (AMM 29-11-00/201).

- S 864-032
- (4) Remove pressure from the main hydraulic system reservoir (AMM 29-11-00/201).

- S 864-023
- (5) Move the STAB TRIM levers or switches to the APL NOSE UP and APL NOSE DOWN positions many times.

**NOTE:** This will decrease any remaining pressure in the STCMs.

S 014-008

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ELEVATOR CONTROL ACCESS DOOR, 313AL. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (6) Open the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

D. Remove the Solenoid Valve

- S 024-009
- (1) Do the steps that follow to remove the solenoid valve:
- (a) Remove the screws and washers that attach the solenoid valve to the STCM.
  - (b) Remove the solenoid valve, plate, and packing from the STCM.
  - (c) Discard the plate and packing from the solenoid valve.

TASK 27-41-08-424-010

3. Install the Solenoid Valve

A. Consumable Materials

- (1) D00293 Hydraulic System Assembly Lube MCS 352B
- (2) D00153 Hydraulic Fluid, Fire Resistant - BMS 2-11

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 311/312 Area Aft of the Pressure Bulkhead to BS 1725

EFFECTIVITY

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27-41-08

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- (2) Access Panel  
312AR Forward Stabilizer Compartment

D. Install the Solenoid Valve

S 424-011

- (1) Do the steps that follow to install the solenoid valve:
  - (a) Apply a thin layer of assembly lubricant or hydraulic fluid on the sides of the new plate and packing.
  - (b) Install the packing on the solenoid valve.
  - (c) Put the plate on the STCM.
  - (d) Install the screws and washers to attach the solenoid valve to the STCM. Tighten the screws 30-35 pound-inches (3.4-4.0 newton-meters).

E. Solenoid Valve Operation Test

S 864-012

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

S 864-013

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11A36, ALT STAB TRIM (if installed)
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H11, LEFT STAB TRIM CONT
  - (e) 11H20, STAB TRIM CONT R

S 864-014

- (3) Put the LEFT and CENTER STAB TRIM SHUTOFF switches on the control stand panel, P10, to the NORM position.

S 864-015

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Pressurize the applicable hydraulic system (AMM 29-11-00/201).

**NOTE:** The left hydraulic system supplies power to the left STCM and the center hydraulic system supplies power to the right STCM. With the left and center hydraulic systems supplied with pressure, you cannot do a test for only one of the STCM solenoid valves. Only pressurize the hydraulic system for the STCM that has the new solenoid valve.

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S 714-016

- (5) Do the steps that follow to make sure the STCM solenoid valves operate correctly with the control wheel switches:
- (a) Move the captain's or first officer's control wheel switches up and then down.
  - (b) Make sure that the stabilizer leading edge moves up and then down.
  - (c) Make sure that the stabilizer stops when you release the control wheel switches.
  - (d) Make sure that there are no hydraulic leaks at the STCM solenoid valve.

S 714-021

- (6) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND; Do the steps that follow to make sure the STCM solenoid valves operate correctly with the alternate-electric stab trim switches:
- (a) Move the alternate stab trim switches up and then down.
  - (b) Make sure that the stabilizer leading edge moves up and then down.
  - (c) Make sure that the stabilizer stops when you release the alternate stab trim switches.
  - (d) Make sure that there are no hydraulic leaks at the STCM solenoid valve.

F. Put the Airplane Back to Its Usual Condition

S 864-017

- (1) Remove hydraulic power if it is not necessary (AMM 29-11-00/201).

S 864-018

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 414-019

- (3) Close the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

EFFECTIVITY

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27-41-08

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STABILIZER TRIM CONTROL MODULE MOTOR-OPERATED SHUTOFF VALVE -  
REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the motor-operated shutoff valve and the hydraulic supply shutoff valve motor.

TASK 27-41-09-024-001

2. Remove the Motor-Operated Shutoff Valve and the Hydraulic Supply Shutoff Valve Motor

A. General

- (1) This task contains two procedures: one to remove the motor-operated shutoff valve, and one to remove the hydraulic supply shutoff valve motor. Because this task contains two procedures, only the applicable group of steps must be done.
- (2) To start one of these procedures, do the "Prepare for Removal" group of steps. Then, do the group of steps that is necessary to remove the component.
- (3) The procedure to remove the motor-operated shutoff valve on the left STCM is the same as the procedure for the right STCM.

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-41-00/501, Horizontal Stabilizer Trim Control System
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 311/312 Area Aft of the Pressure Bulkhead to BS 1725
- (2) Access Panel
  - 312AR Forward Stabilizer Compartment

D. Prepare for the Removal

S 864-002

- (1) Set the L and C STAB TRIM CUTOUT switches on the control stand panel, P10, to the CUTOUT position.

S 864-003

- (2) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11A36, ALT STAB TRIM (if installed)

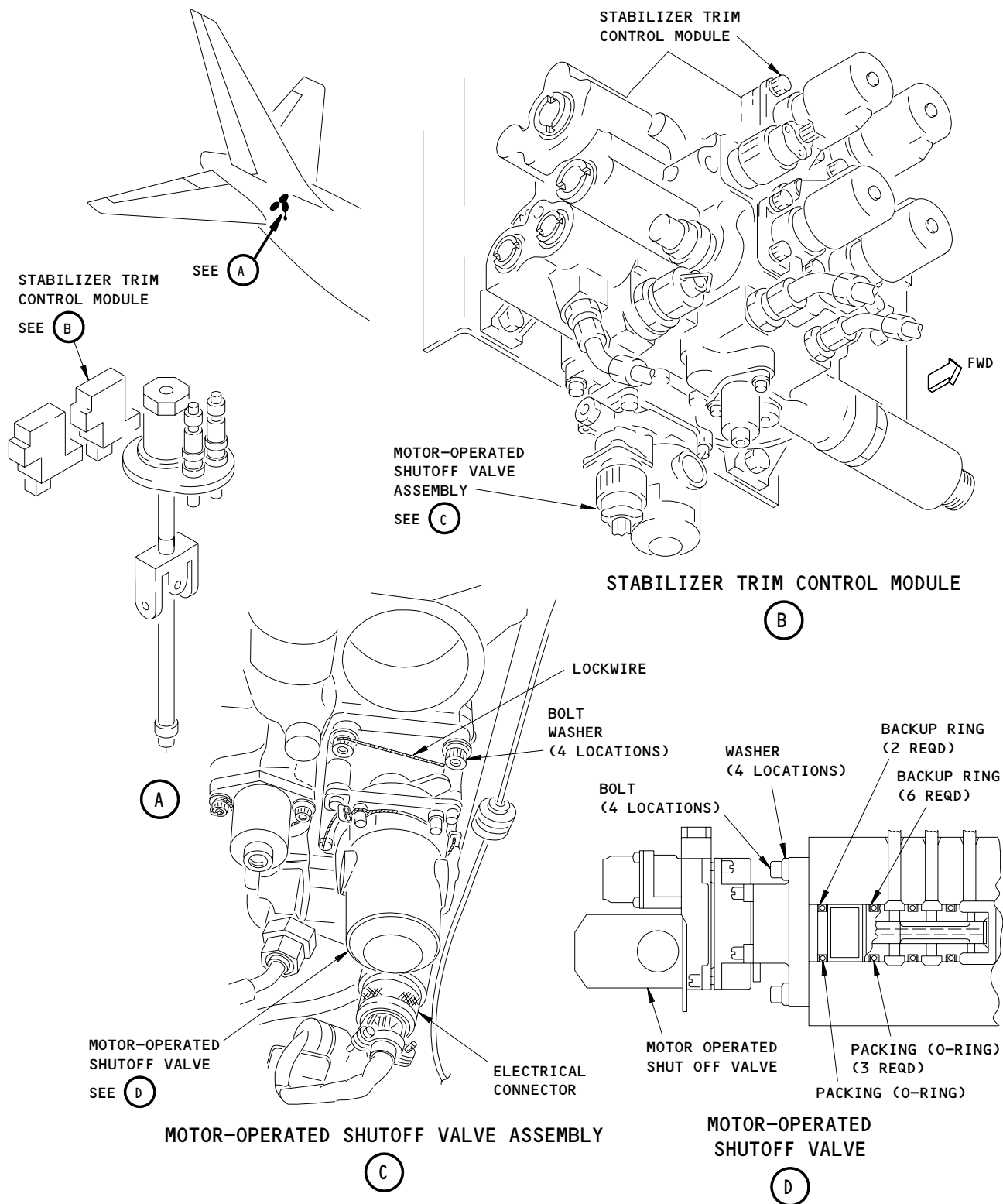
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Stabilizer Trim Control Module Motor-Operated Shutoff Valve Installation  
Figure 401

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- (b) 11C12, STAB TRIM SHUTOFF L
- (c) 11C13, STAB TRIM SHUTOFF CENTER
- (d) 11H11, LEFT STAB TRIM CONT
- (e) 11H20, STAB TRIM CONT R

S 864-047

- (3) Remove pressure from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-048

- (4) Remove pressure from the main hydraulic system reservoir (AMM 29-11-00/201).

S 864-039

- (5) Move the STAB TRIM levers or ALTN STAB TRIM switches to the APL NOSE UP and APL NOSE DOWN positions many times.

NOTE: This will decrease the remaining pressure in the STCMs.

S 864-008

- (6) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
Attach DO-NOT-OPERATE tags to the STAB TRIM levers.

S 014-010

WARNING: STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ELEVATOR CONTROL ACCESS DOOR, 313AL. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (7) Open the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

E. Remove the Motor-Operated Shutoff Valve

S 024-011

- (1) Do the steps that follow to remove the motor-operated shutoff valve:
  - (a) Disconnect the electrical connector from the motor-operated shutoff valve.
  - (b) Remove the bolts that attach the motor-operated shutoff valve to the STCM.
  - (c) Remove the motor-operated shutoff valve.
  - (d) Remove and discard the four o-rings and the eight backup retainers from the motor-operated shutoff valve.

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F. Remove the Hydraulic Supply Shutoff Valve Motor

S 864-012

- (1) Remove the pressure from the left, right and center hydraulic systems (AMM 29-11-00/201).

S 024-013

- (2) Do the steps that follow to remove the hydraulic supply shutoff valve motor:
  - (a) Disconnect the electrical connector from the valve motor.
  - (b) Move the manual override lever to position 2.
  - (c) Remove the four mounting screws which attach the valve motor to the valve.
  - (d) Remove the valve motor from the valve.
  - (e) If an identification plate is installed on the motor, remove the plate and keep it to install on the replacement motor.

TASK 27-41-09-424-014

3. Install the Motor-Operated Shutoff Valve and Hydraulic Supply Shutoff Valve Motor

A. General

- (1) This task contains two procedures: one to install the motor-operated shutoff valve, and one to install the hydraulic supply shutoff valve motor. Because this task contains two procedures, only the applicable group of steps must be done.
- (2) To start one of these procedures, do the group of steps that is necessary to install the components. Then, do the "Put the Airplane Back to Its Usual Condition" group of steps.
- (3) The procedure to install the motor-operated shutoff valve on the left STCM is the same as the procedure for the right STCM.

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-41-00/501, Horizontal Stabilizer Trim Control System
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 311/312 Area Aft of the Pressure Bulkhead to BS 1725
- (2) Access Panel
  - 312AR Forward Stabilizer Compartment

D. Install the Motor-Operated Shutoff Valve

S 434-015

- (1) Install the four O-rings and the eight backup retainers on the motor-operated shutoff valve.

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- S 424-016  
(2) Install the motor-operated shutoff valve in the STCM.
- S 424-017  
(3) Install the bolts and washers to attach the motor-operated shutoff valve to the STCM.
- S 424-018  
(4) Tighten the bolts 40-50 pound-inches (4.5-5.6 newton-meters) more than the run-on torque.
- S 434-019  
(5) Install the lockwire.
- S 434-020  
(6) Connect the electrical connector to the motor-operated shutoff valve.
- S 094-021  
(7) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
Remove the DO-NOT-OPERATE tags from the STAB TRIM levers.
- S 864-023  
(8) Supply electrical power (AMM 24-22-00/201).
- S 864-024

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (9) Pressurize the left and center hydraulic systems (AMM 29-11-00/201).
- S 864-025  
(10) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11A36, ALT STAB TRIM (if installed)
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H11, LEFT STAB TRIM CONT
  - (e) 11H20, STAB TRIM CONT R
- S 714-026  
(11) Do the horizontal stabilizer trim shutoff switches test (AMM 27-41-00/501).

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E. Install the Hydraulic Supply Shutoff Valve Motor

S 434-027

- (1) If you removed an identification plate from the replaced motor, install it on the new motor.

S 214-028

- (2) Before you install the new valve motor, make sure that the manual override lever is at position 2.

S 424-029

- (3) Put the valve motor on the valve and engage the motor drive with the valve cam.

S 434-030

- (4) Install the four mounting screws and install lockwire on the screws.

S 864-031

- (5) Move the manual override lever to position 1.

S 434-032

- (6) Install the electrical connector on the valve motor.

S 714-033

- (7) Do the Horizontal Stabilizer Trim Shutoff Switches test (AMM 27-41-00/501).

F. Put the Airplane Back to Its Usual Condition

S 864-034

- (1) Remove the power from the left and center hydraulic systems if it is not necessary (AMM 29-11-00/201).

S 864-035

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 864-036

- (3) Put the LEFT and CENTER STAB TRIM SHUTOFF switches on the P10 panel to the NORM position.

S 414-037

- (4) Close the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

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STABILIZER TRIM BALLSCREW ACTUATOR – REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove/install the stabilizer trim ballscrew actuator.

**NOTE:** If you replace a worn horizontal stabilizer actuator with a serviceable actuator that is not new or not overhauled, then you must do the ballscrew to ballnut detailed visual inspection, and ballscrew to primary brake housing freeplay check, for the replacement actuator before further flight.

TASK 27-41-10-024-001

2. Remove the Stabilizer Trim Ballscrew Actuator

A. Equipment

- (1) Hoist Equipment, Stabilizer Trim Actuator – A27006-41 (Preferred)
- (2) Hoist Equipment, Stabilizer Trim Actuator – A27006-33 (Alternate)
- (3) Lock Equipment, Horizontal Stabilizer – A55001-22 (Preferred)
- (4) Lock Equipment, Horizontal Stabilizer – A55001-19 (Alternate)
- (5) Fishpole Hoists – Customer furnished (2 required)

B. References

- (1) AMM 06-42-00/201, Empennage Access Panels and Doors
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System

C. Access

- (1) Location Zone  
312 Area Aft of Pressure Bulkhead to BS 1725 (Right)
- (2) Access Panel  
312AR Stabilizer Trim Ballscrew Actuator

D. Prepare for Removal (Fig. 402)

S 864-002

- (1) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-044

- (2) Use the STAB TRIM levers or switches to move the stabilizer to the neutral position (2 units of trim on the position indicator).

S 864-007

- (3) Remove the pressure from the center and left hydraulic systems (AMM 29-11-00/201).

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S 864-008

- (4) Set the L and C STAB TRIM shutoff switches on the control stand panel, P10, to CUTOUT.

S 864-009

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11A36, ALT STAB TRIM (if installed)
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER

S 014-010

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (6) Open the access door, 312AR, for the stabilizer trim ballscrew actuator (AMM 06-42-00/201).

S 494-011

**CAUTION:** INSTALL THE HOIST EQUIPMENT CAREFULLY. DAMAGE TO THE HOT AIR DUCT COULD OCCUR.

- (7) Do the steps that follow to install the hoist equipment for the ballscrew actuator (Fig. 404):
- (a) Install a ladder.
  - (b) Install the fishpole hoist attach beam on the bulkheads above the actuator.
  - (c) Attach the strap assembly to actuator.
  - (d) Install fishpole hoist No. 1 and 2 (Fig. 404).
  - (e) Connect the hoist cables to the strap assembly.

S 494-012

- (8) Install the horizontal stabilizer lock (Fig. 402).  
E. Remove the Stabilizer Ballscrew Actuator (Fig. 403)

S 824-013

- (1) Adjust the stabilizer lock to remove the load from the lower gimbal pins.

**NOTE:** The lower gimbal pins will not move freely during removal if the stabilizer is not in the correct position. More adjustment will be necessary to release these pins.

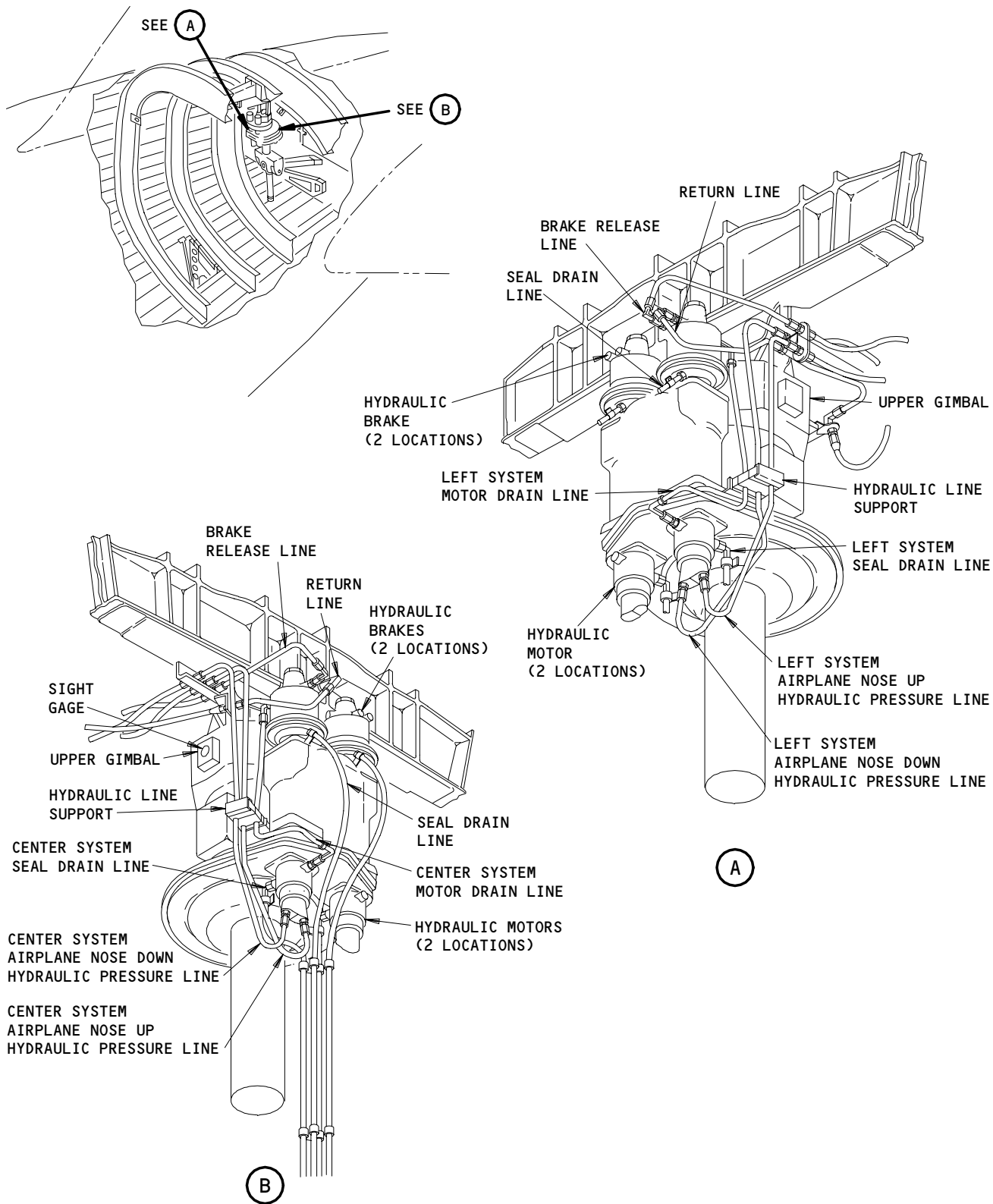
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Stabilizer Trim Ballscrew Actuator Hydraulic Connections  
Figure 401

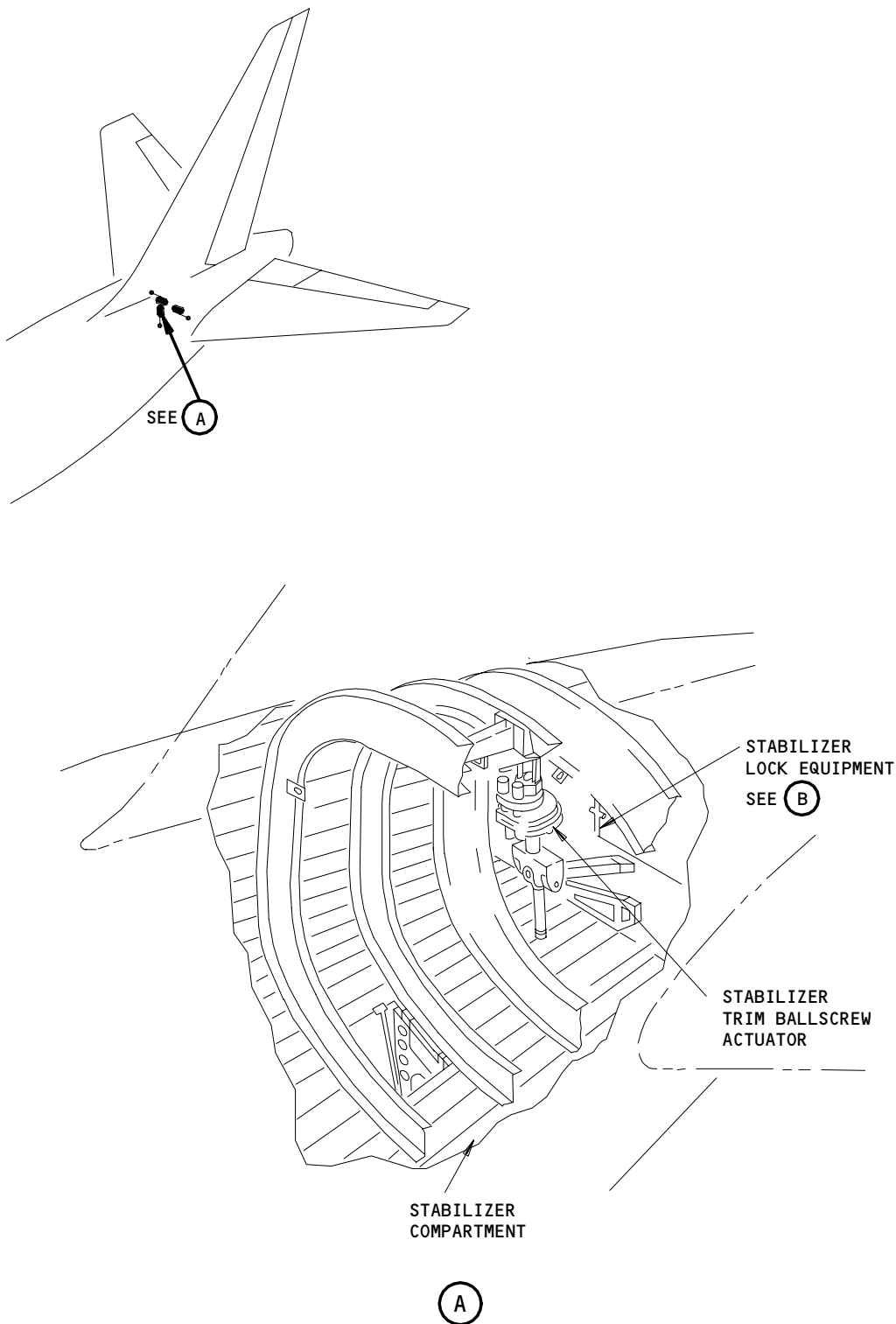
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Stabilizer Lock Equipment Installation  
Figure 402 (Sheet 1)

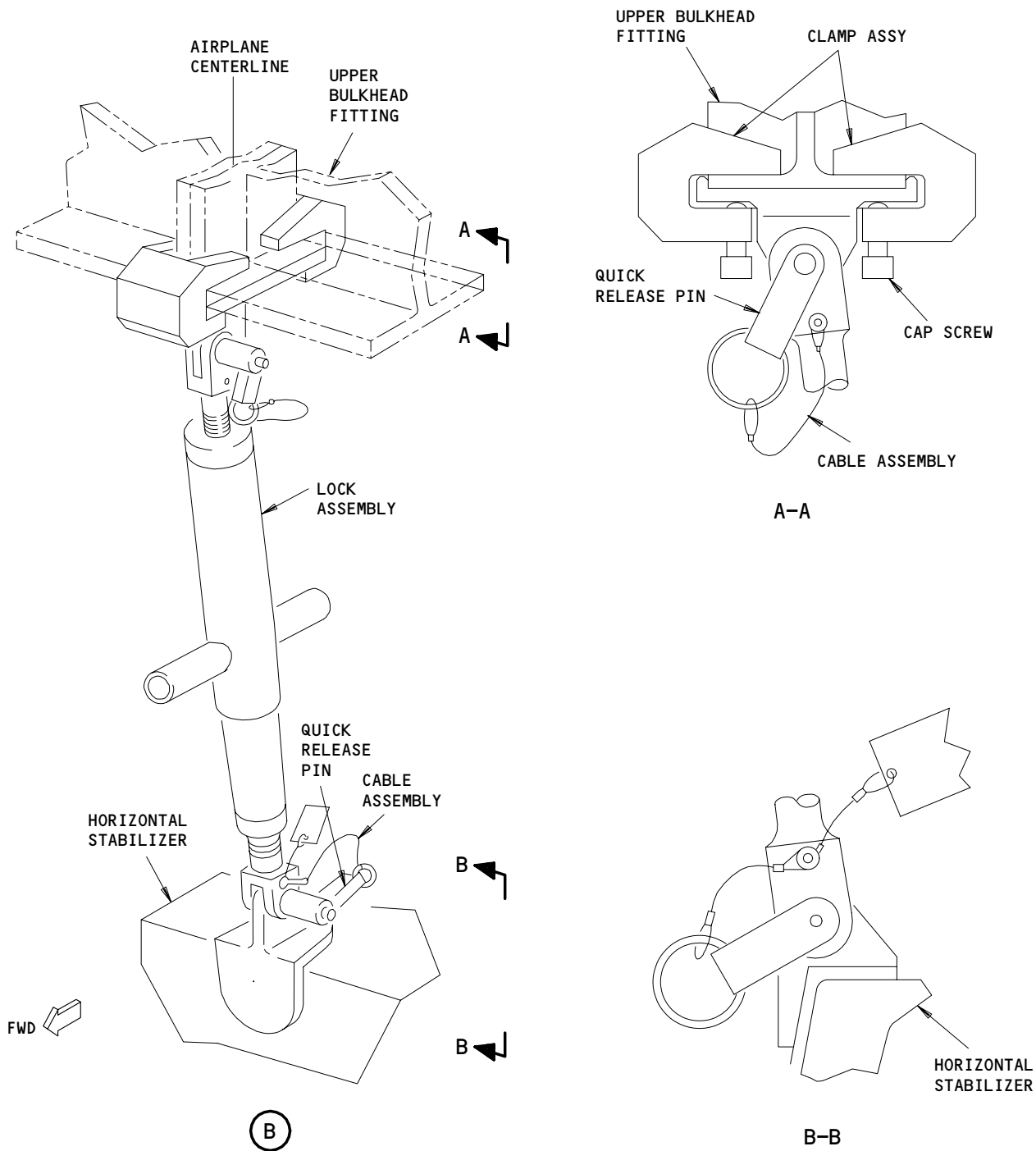
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Stabilizer Lock Equipment Installation  
Figure 402 (Sheet 2)

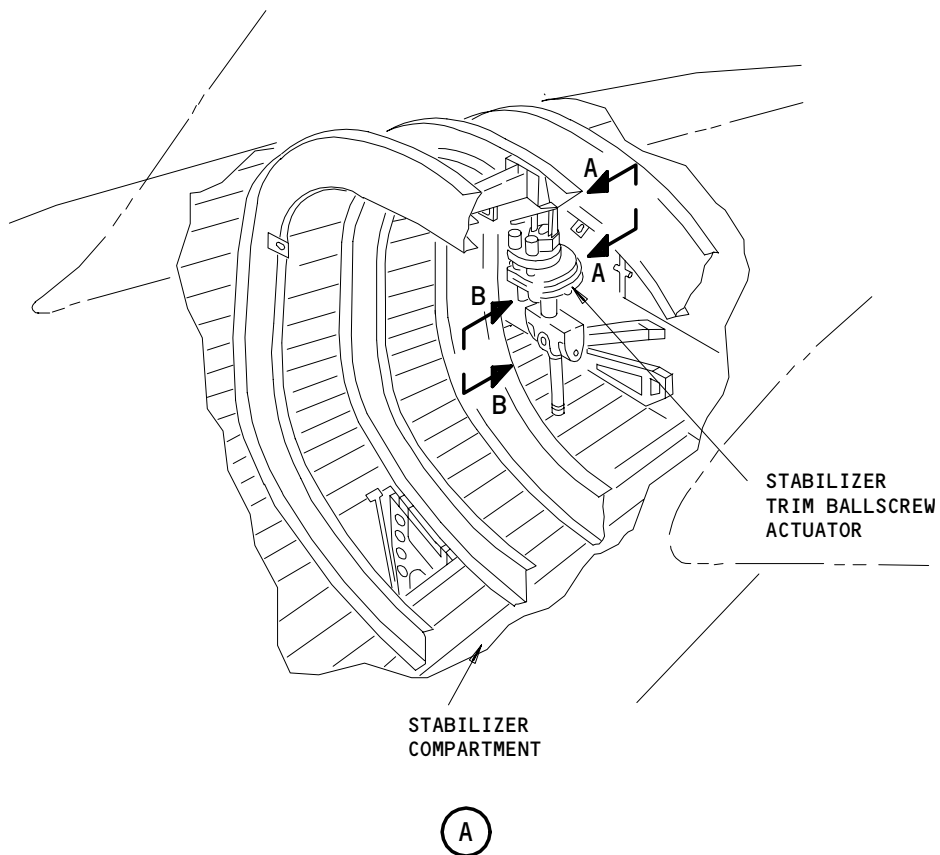
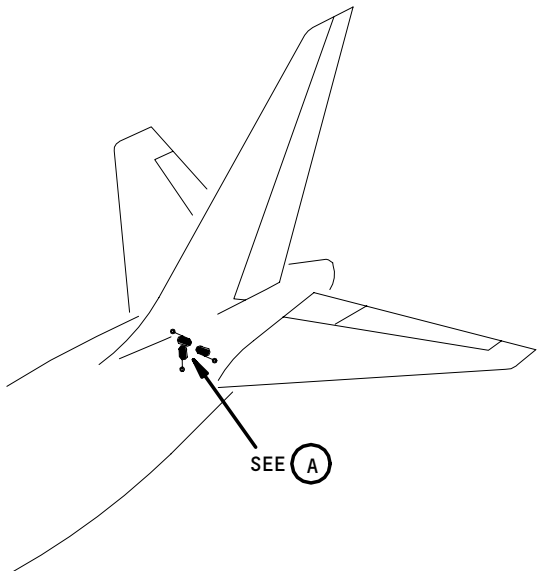
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Stabilizer Trim Ballscrew Actuator Gimbal Pins  
Figure 403 (Sheet 1)

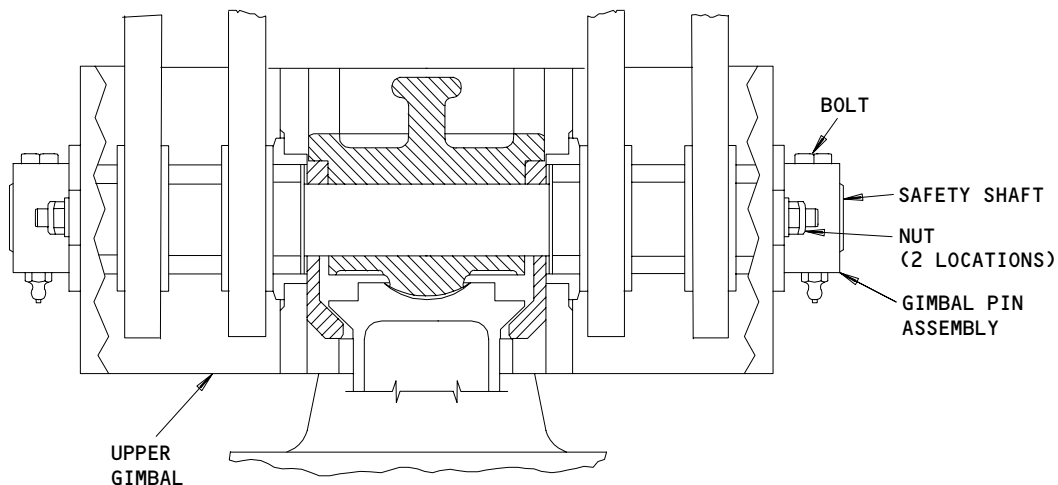
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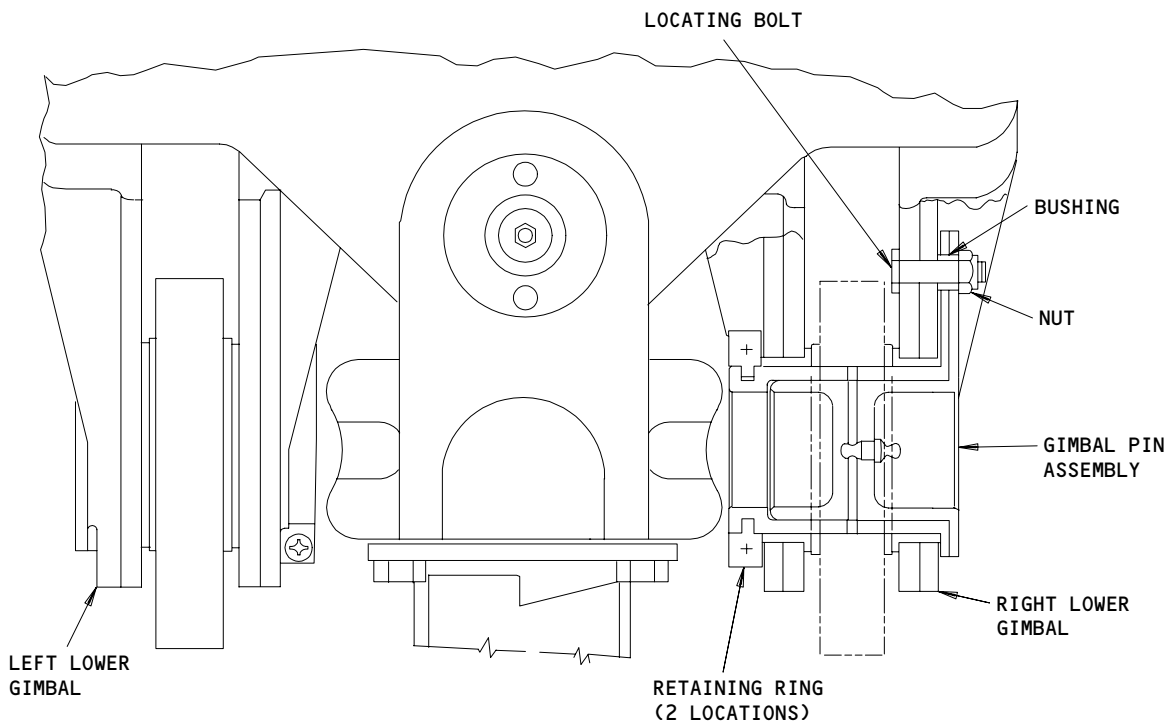
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UPPER GIMBAL  
A-A



LOWER GIMBAL  
B-B

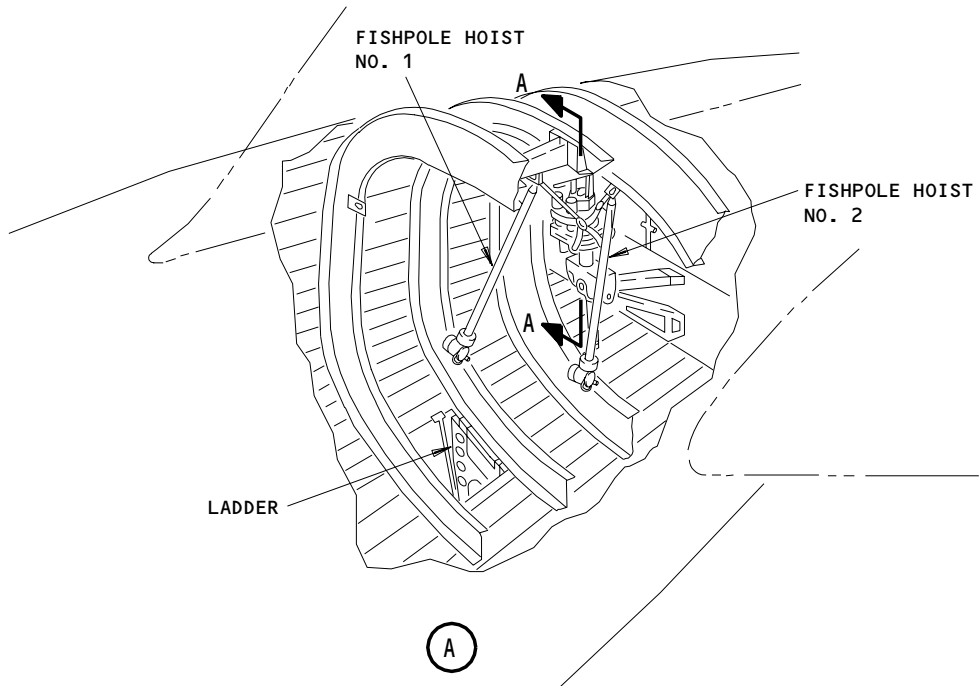
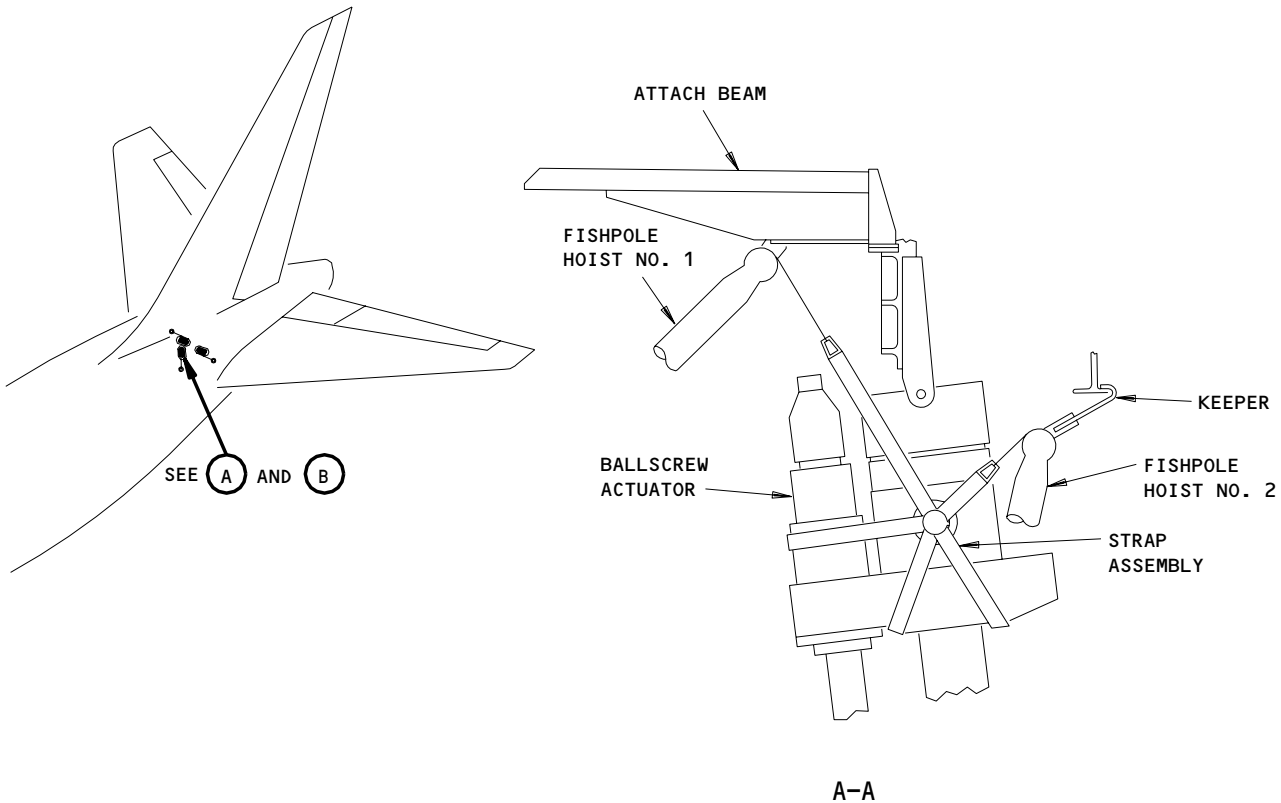
Stabilizer Trim Ballscrew Actuator Gimbal Pins  
Figure 403 (Sheet 2)

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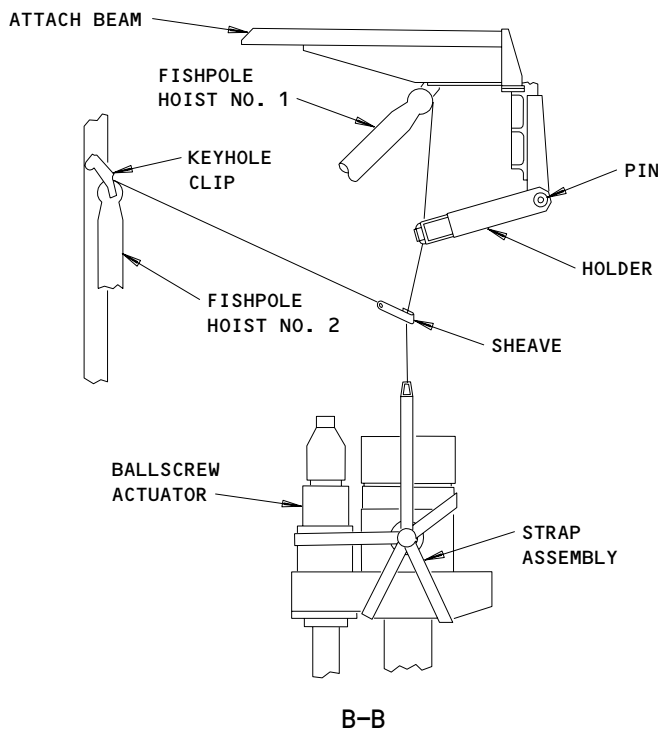
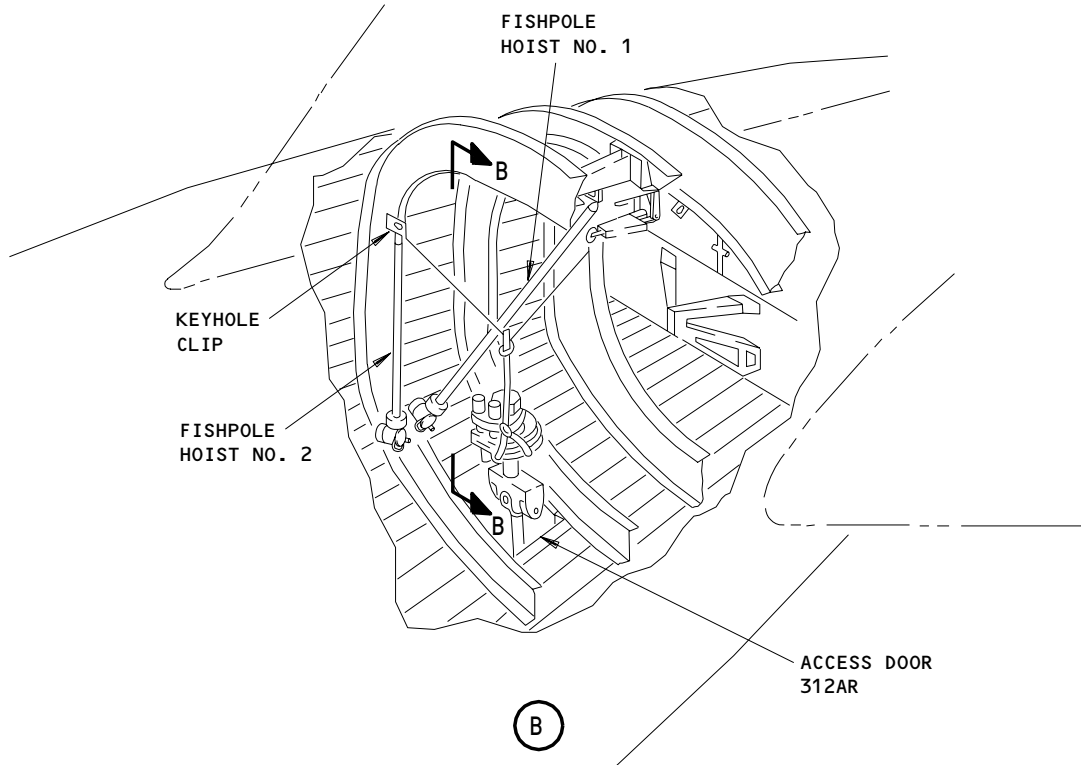
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Stabilizer Trim Ballscrew Actuator Hoist Equipment  
Figure 404 (Sheet 1)

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Stabilizer Trim Ballscrew Actuator Hoist Equipment  
Figure 404 (Sheet 2)

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S 824-014

**WARNING:** ONLY APPROVED PERSONS MUST OPERATE THE LEVER CHAIN HOISTS. DO NOT USE FORCE TO MOVE THE CONTROL LEVER OR KNOB INTO THE NEUTRAL OR THE FREE CHAIN POSITION. THIS CAN CAUSE A CHAIN HOIST WITH A LIGHT LOAD TO RELEASE ITS LOAD.

- (2) Adjust the hoist so that it holds the weight of the trim drive mechanism.

**NOTE:** The ballscrew actuator weighs approximately 316 pounds (143 kg). A hoist with too much tension will cause the gimbals pins to jam.

S 034-015

- (3) Disconnect the eight hydraulic lines from the supports above the ballscrew actuator (Fig. 401).
  - (a) Plug the lines and cap the ports.

S 034-016

- (4) Disconnect the drain lines from the ballscrew actuator.
  - (a) Plug the lines and cap the ports.

S 034-017

- (5) Disconnect the antirotation cables from the airplane structure.

**NOTE:** The cables are components of the trim drive mechanism.

S 034-018

- (6) Do the steps that follow to disconnect the lower gimbal:
  - (a) Remove the nuts and bolts that hold the left and right lower gimbal pins.
  - (b) Remove the screws from the retaining rings.
  - (c) Divide both of the split retaining rings.
  - (d) Remove both of the lower gimbal pins and the split retaining rings.
  - (e) Keep the bushing on each gimbal pin locating bolt.

S 034-019

- (7) Do the steps that follow to disconnect the upper gimbal:
  - (a) Remove the bolt from one end of the safety shaft.
  - (b) Remove the nuts that attach the upper gimbal pin assemblies.
  - (c) Remove the support brackets as necessary for the hydraulic system configuration.

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- (d) Make sure that the hoist holds the weight of the trim drive mechanism.

NOTE: The gimbal pins cannot be removed freely if there is too much tension on the hoist.

CAUTION: DO NOT USE METAL TOOLS TO REMOVE PINS. DAMAGE TO THE DRIVE MECHANISM CASING AND THE PIN FLANGES CAN OCCUR.

- (e) Make sure the ballscrew actuator is stable and then withdraw the upper gimbal pin assemblies and safety shaft.

NOTE: Use hardwood wedges under the pin flanges to start removal then use a rubber mallet to continue removal.

S 024-020

- (8) Move the ballscrew actuator away from the actuator fitting on the stabilizer and the lugs on the actuator attachment bulkhead.

S 864-042

- (9) Do the steps that follow to move the ballscrew actuator above service access door, 312AR:
- (a) Remove the pin below the attach beam and remove the load from fishpole hoist No. 2.
  - (b) Lower fishpole hoist No. 1 until the holder can be installed at the pin holes below the attach beam.
  - (c) Connect the holder to the fishpole No. 1 cable.
  - (d) Attach fishpole hoist No. 2 to the keyhole clip that is forward of access door, 312AR.
  - (e) Connect the fishpole hoist No. 2 sheave to the fishpole hoist No. 1 cable.
  - (f) Use both of the fishpole hoists to position the ballscrew actuator directly above service access door, 312AR.

S 024-021

- (10) Use fishpole hoist No. 1 to lower the actuator onto a stand.

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TASK 27-41-10-404-041

3. Install the Stabilizer Trim Ballscrew Actuator

A. Equipment

- (1) Hoist Equipment, Stabilizer Trim Actuator - A27006-41 (Preferred)
- (2) Hoist Equipment, Stabilizer Trim Actuator - A27006-33 (Alternate)
- (3) Lock Equipment, Horizontal Stabilizer - A55001-22 (Preferred)
- (4) Lock Equipment, Horizontal Stabilizer - A55001-19 (Alternate)
- (5) Fishpole Hoists - Customer furnished  
(2 Required)

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) D00015 Grease - BMS 3-24 (Alternate)

C. References

- (1) AMM 06-42-00/201, Empennage Access Panels and Doors
- (2) AMM 12-13-06/301, Stabilizer Trim Ballscrew Actuator
- (3) AMM 12-21-05/301, Horizontal Stabilizer Trim Control
- (4) AMM 24-22-00/201, Electrical Power - Control
- (5) AMM 27-41-00/501, Horizontal Stabilizer Trim Control System
- (6) AMM 27-41-10/601, Stabilizer Trim Ballscrew Actuator

D. Access

- (1) Location Zone  
312 Area Aft of Pressure Bulkhead to BS 1725 (Right)
- (2) Access Panel  
312AR Stabilizer Trim Ballscrew Actuator

E. Prepare for Installation (Fig. 402)

**NOTE:** If you replace a worn horizontal stabilizer actuator with a serviceable actuator that is not new or not overhauled, then you must do the ballscrew to ballnut detailed visual inspection, and the ballscrew to primary brake housing freeplay check, for the replacement actuator before further flight.

S 224-023

- (1) Make sure that applicable ballscrew actuator mechanism and attachment fitting locations are in allowable wear tolerances (AMM 27-41-10/601).

S 494-024

- (2) Install fishpole hoist No. 1 and 2 (Fig. 404).

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- S 424-025
- (3) Use fishpole hoist No. 1 to lift the ballscrew actuator through access door 312AR onto the empennage.
- S 034-026
- (4) Do the steps that follow to remove the lower gimbal pins:
- (a) Remove the nuts and bolts from the pin assembly.
  - (b) Remove the screws from the retaining rings, divide the halves, and remove rings.
  - (c) Remove the gimbal pins and keep the bushing that is on each gimbal pin assembly.
- S 034-027
- (5) Do the steps that follow to remove the upper gimbal safety shaft and pin assemblies:
- (a) Remove the bolt from one end of the safety shaft.
  - (b) Remove the bolts which hold the gimbal pins.
  - (c) Remove the gimbal pins and safety shaft.
- S 494-028
- (6) Install fishpole hoist No. 2 in the position shown (Fig. 404).
- S 424-029
- (7) Move fishpole hoists No. 1 and 2 to put the upper gimbal in the correct position in relation to its attachment lugs.
- F. Install Ballscrew Actuator (Fig. 403)
- S 424-030
- (1) Do the steps that follow to attach the upper gimbal:
- (a) Lightly apply grease to the bearing surfaces of the upper gimbal pin assemblies.
  - (b) Lightly apply grease to the bearing surface of safety shaft.
  - (c) Align the upper gimbal with the actuator attachment lugs and put in the gimbal pins and safety shaft.
  - (d) Install the bolts, washers, and nuts which hold the shaft.
  - (e) Tighten the nuts on the upper gimbal pin assemblies and the safety shaft bolts.
- S 424-031
- (2) Do the steps that follow to attach the lower gimbal:
- (a) Turn the lower gimbal assembly on the jackscrew to approximately align with the stabilizer lug attachments.
  - (b) Adjust the stabilizer lock and position the jackscrew to align the lower gimbal with the stabilizer actuator fitting.
  - (c) Lightly apply grease to the bearing surfaces of the lower gimbal pins.
  - (d) Put the split retaining rings in position.
  - (e) Install each lower gimbal pin such that the hole in the flange engages the bushing on the locating screw. Install the washer and nut.

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(f) Install and tighten the screws which attach the retaining ring halves.

S 424-032

(3) Attach the antirotation cables to the airplane structure.

S 434-033

(4) Connect the hydraulic lines and the plastic drain tubes (Fig. 401).

S 614-034

(5) Do the steps that follow to service the stabilizer trim ballscrew actuator:

(a) Lubricate the grease fittings (AMM 12-21-05/301).

(b) Add hydraulic oil (AMM 12-13-06/301).

S 094-035

(6) Remove the hoist equipment (Fig. 404).

S 094-051

(7) Remove the horizontal stabilizer lock (Figure 402).

S 864-040

(8) Do the steps that follow to make sure there is free movement of the ballscrew actuator:

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

(b) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead circuit breaker panel, P11:

1) 11C12, STAB TRIM SHUTOFF L

2) 11C13, STAB TRIM SHUTOFF CENTER

**WARNING:** KEEP ALL PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(c) Supply pressure to the left and center hydraulic systems (AMM 29-11-00/201).

(d) Set the L STAB TRIM shutoff switch to the NORM position.

(e) Set the C STAB TRIM shutoff switch on the control stand panel, P10 to the CUTOUT position.

(f) Put the flaps to the 5 position.

(g) Move the Captain's or the First Officer's stabilizer trim control wheel switches to the APL NOSE DN direction.

(h) Make sure the stabilizer leading edge moves up.

(i) While the stabilizer moves in the APL NOSE DN direction, release the control wheel switch.

(j) Make sure the stabilizer stops in 1 second.

(k) Continue to move the stabilizer in the APL NOSE DN direction.

(l) Make sure the stabilizer starts to move in 1 second.

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- (m) Make sure the stabilizer stops at the FLAPS NOT RETRACTED APL NOSE DN limit.
- (n) Move the Captain's or the First Officer's stabilizer trim control wheel switches to the APL NOSE UP direction.
  - 1) Make sure the stabilizer leading edge moves down.
  - 2) While the stabilizer moves in the APL NOSE UP direction, release the control wheel switch.
  - 3) Make sure the stabilizer stops in 1 second.
  - 4) Continue to move the stabilizer in the APL NOSE UP direction.
  - 5) Make sure the stabilizer starts to move in 1 second.
  - 6) Make sure the stabilizer stops at the APL NOSE UP limit.
- (o) Set the LEFT STAB TRIM shutoff switch to the CUTOFF position.
- (p) Set the C STAB TRIM shutoff switch to the NORM position.
- (q) Move the Captain's or the First Officer's stabilizer trim control wheel switches in the APL NOSE DN direction.
  - 1) Make sure the stabilizer leading edge moves up.
  - 2) While the stabilizer moves in the APL NOSE DN direction, release the control wheel switch.
  - 3) Make sure the stabilizer stops in one second.
  - 4) Continue to move the stabilizer in the the APL NOSE DN direction.
  - 5) Make sure the stabilizer starts to move in 1 second.
  - 6) Make sure the stabilizer stops at the FLAPS NOT RETRACTED APL NOSE DN limit.

G. Put the Airplane Back to Its Usual Condition

S 864-037

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
11A36, ALT STAB TRIM (if installed)
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER

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- S 864-038
- (2) Set the L and C STAB TRIM shutoff switches on the P10 panel to NORM.
- S 414-039
- (3) Close the forward stabilizer compartment access door, 312AR (AMM 06-42-00/201).

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STABILIZER BALLSCREW ACTUATOR WEAR LIMITS AND FREEPLAY - INSPECTION/CHECK

1. General

- A. This section contains illustrations and a wear limit chart for the stabilizer trim ballscrew actuator and gimbal pins, a check of the stabilizer ballscrew to ballnut freeplay and a visual inspection of the stabilizer ballscrew and ballnut for obvious signs of corrosion or wear. The tests are as follows:
- (1) Inspection of the Wear Limits for the Stabilizer Trim Ballscrew Actuator and Gimbal Pins
  - (2) Stabilizer Ballscrew to Ballnut Freeplay Check
  - (3) Stabilizer Ballscrew/Ballnut Detailed Visual Inspection
  - (4) Stabilizer Ballscrew to Primary Brake Housing Freeplay Check

TASK 27-41-10-226-001

2. Wear Limits for the Stabilizer Trim Ballscrew Actuator and Gimbal Pins (Fig. 601)

A. Equipment

- (1) Lock Equipment Horizontal Stabilizer - A55001-19

NOTE: Use the lock equipment to measure the backlash at the stabilizer ballscrew.

B. Access

- (1) Location Zones  
311/312 Area Aft of Pressure Bulkhead to BS 1725
- (2) Access Panel  
312AR Service Access Door

TASK 27-41-10-226-003

3. Stabilizer Ballscrew to Ballnut Freeplay Check (Figs. 602 & 603)

NOTE: This is a scheduled maintenance task.

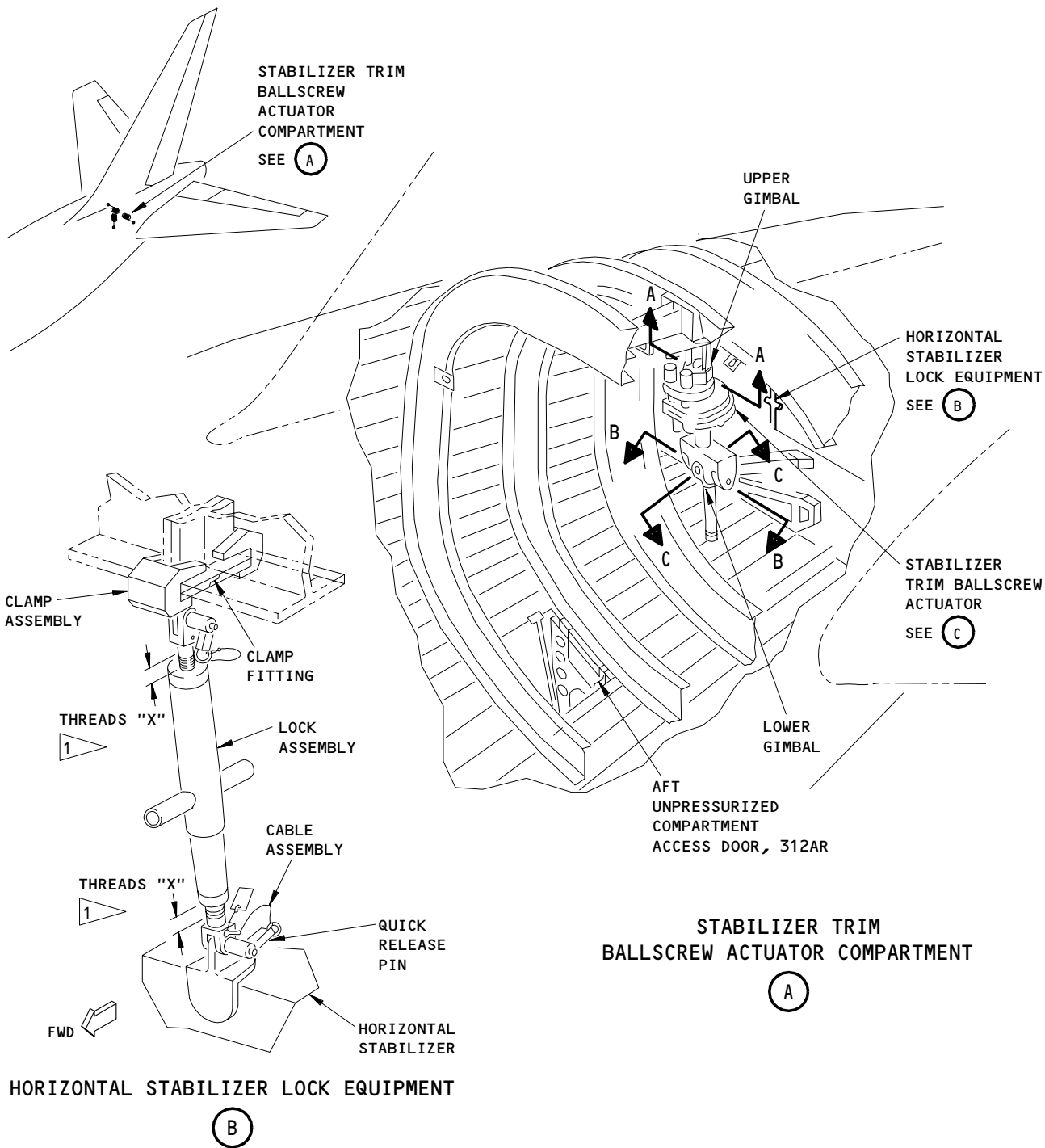
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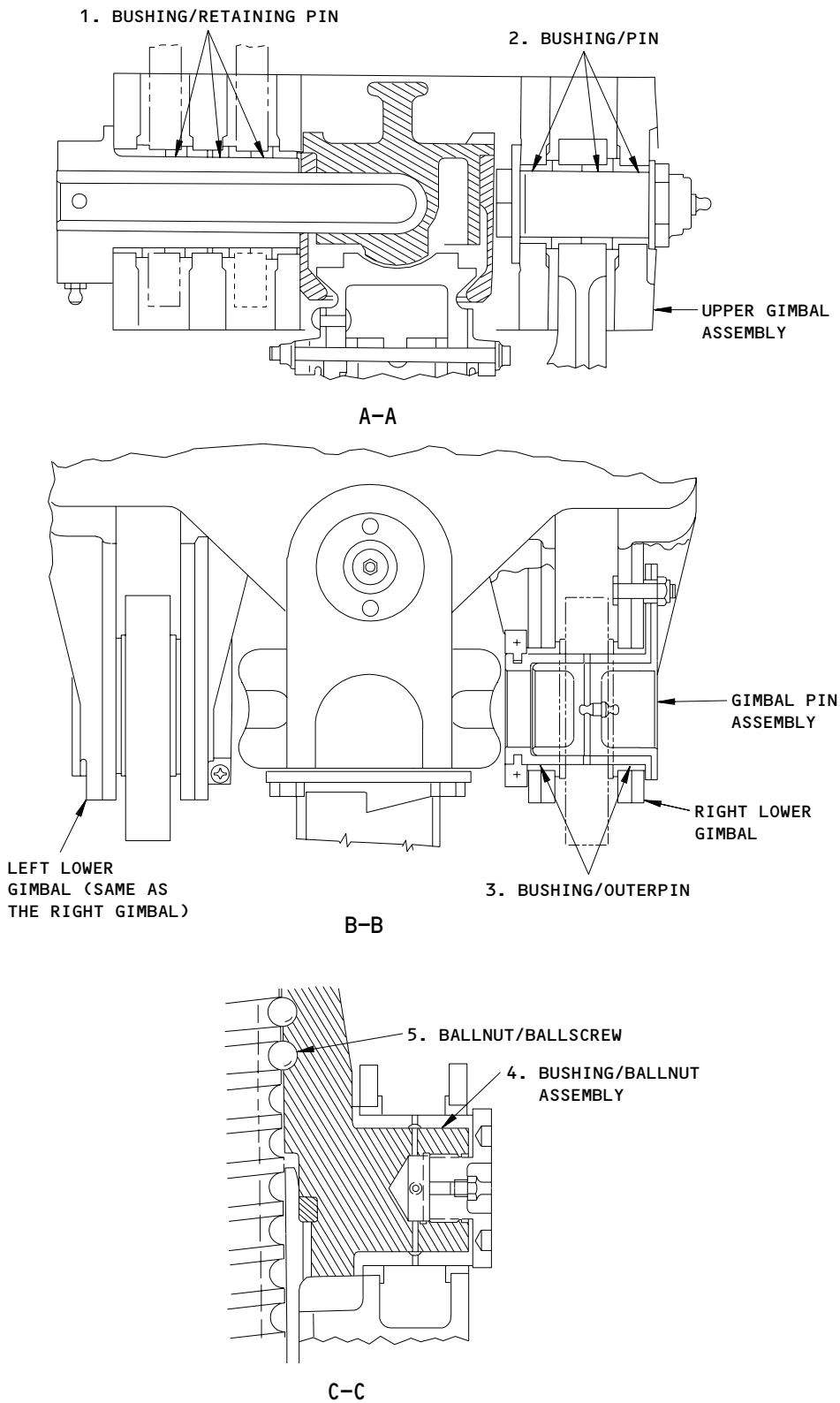


1 MAKE SURE THAT THE SAME AMOUNT OF THREADS "X" ARE EXPOSED AFTER TOOL ASSEMBLY.

Stabilizer Trim Ballscrew Actuator and Gimbal Pins Wear Limits  
Figure 601 (Sheet 1)

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Stabilizer Trim Ballscrew Actuator and Gimbal Pins Wear Limits  
Figure 601 (Sheet 2)

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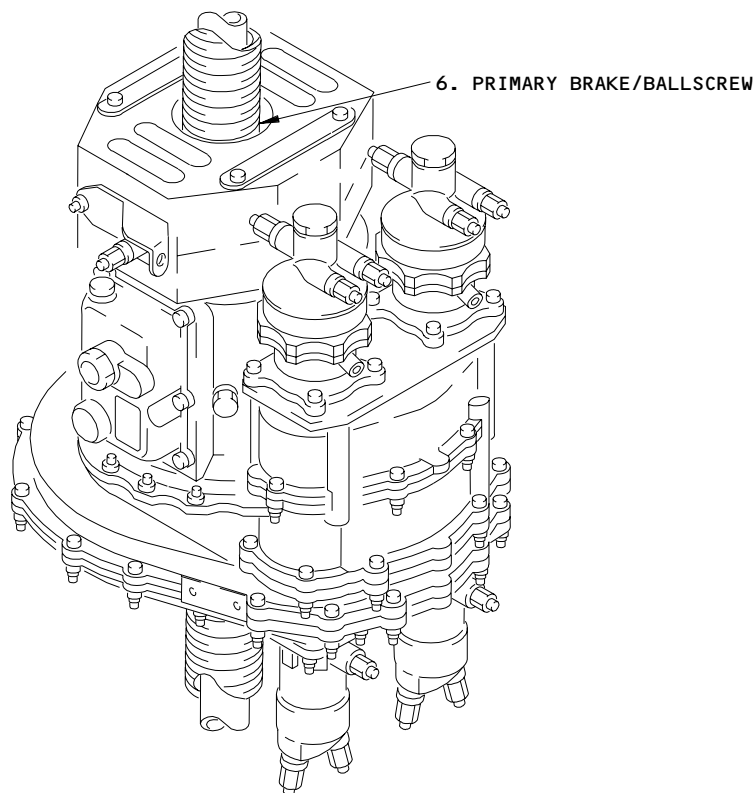
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STABILIZER TRIM BALLSCREW ACTUATOR

C

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	1.5000 (38.100)	1.5015 (38.138)	1.5085 (38.316)	0.0100 (0.254)	X		
	RETAINING PIN	OD	1.4980 (38.049)	1.4990 (38.075)	1.4910 (37.871)			X	2
2	BUSHING	ID	1.1250 (28.575)	1.1265 (28.613)	1.1335 (28.791)	0.0100 (0.254)	X		
	PIN	OD	1.1240 (28.550)	1.1245 (28.562)	1.1170 (28.372)			X	2

Stabilizer Trim Ballscrew Actuator and Gimbal Pins Wear Limits  
Figure 601 (Sheet 3)

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MAINTENANCE MANUAL

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
3	BUSHING	ID	2.3750 (60.325)	2.3765 (60.363)	2.3865 (60.617)	0.0100 (0.254)	X		
	OUTER PIN	OD	2.3709 (60.221)	2.3717 (60.241)	2.3609 (59.967)			X	2
4	BUSHING	ID	2.1610 (54.889)	2.1620 (54.915)	2.1680 (55.067)	0.0060 (0.152)	X		
	BALLNUT	OD	2.1590 (54.839)	2.1600 (54.864)	2.1530 (54.686)			X	2
5	BALLNUT	ID	---	---	---	0.0120 (0.305)		X	2
	BALLSCREW	OD	---	---	---	3		X	2
6	PRIMARY BRAKE	ID	---	---	---	0.0250 (0.635)		X	2
	BALLSCREW	OD	---	---	---	4		X	2

- 2 THIS PART CAN BE REPAIRED.
- 3 DO THE STABILIZER BALLSCREW TO BALLNUT FREEPLAY INSPECTION TO MEASURE THE BALLNUT TO BALLSCREW BACKLASH (AMM 27-41-10/601).
- 4 DO THE STABILIZER BALLSCREW TO PRIMARY BRAKE FREEPLAY INSPECTION TO MEASURE THE BALLSCREW TO PRIMARY BRAKE BACKLASH (AMM 27-41-10/601).

Stabilizer Trim Ballscrew Actuator and Gimbal Pins Wear Limits  
Figure 601 (Sheet 4)

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**NOTE:** If this task will be performed at the same time as the stabilizer ballscrew assembly detailed visual inspection (AMM 27-41-10/601), perform the detailed visual inspection first.

**A. Equipment**

- (1) Load Equipment, Horizontal Stabilizer - A55001-47  
(Recommended)
- (2) Dial Indicator with Magnetic Base -  
(Commercially Available)

**B. References**

- (1) AMM 06-42-00/201, Empennage Access Panels and Doors
- (2) AMM 27-41-10/401, Stabilizer Trim Actuator - Removal/Installation
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 12-21-05/301, Stabilizer Trim Control System - Lubrication
- (5) AMM 24-22-00/201, Electrical Power - Control.

**C. Access**

- (1) Location Zones  
311/312 Area Aft of the Pressure Bulkhead to BS 1725
- (2) Access Panel  
312AR Service Access Door

**D. Prepare for the Check**

S 866-005

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

S 866-006

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 866-007

- (3) Use the STAB TRIM levers or switches to move the stabilizer to approximately 4 units of trim, as shown on the stabilizer position indicators that are on the control stand panel.

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- S 866-008
- (4) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- S 866-009
- (5) Put the L and C STAB TRIM shutoff switches on the P10 panel to the CUTOUT position.
- S 866-010
- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11A36, ALT STAB TRIM (IF INSTALLED)
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER

- S 866-098
- (7) Remove Electrical Power (AMM 24-22-00/201).

S 016-011

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (8) Get access to the stabilizer trim actuator through the Service Access Door, 312AR (AMM 06-42-00/201).

S 496-012

- (9) Do the steps that follow to install the test equipment A55001-47, between the horizontal stabilizer and the upper fuselage structure (Fig. 602):
- (a) Install the clamp assembly, A55001-17, and clamp fitting, A55001-6, on the upper bulkhead.
  - (b) Install the test equipment A55001-47, between the stabilizer and the upper bulkhead fitting using the quick release pins.

S 866-013

- (10) Do the steps that follow to install the dial indicator between the stabilizer ballscrew and the ballnut (Fig. 603):
- (a) Install the magnetic base for the dial indicator on the ballscrew above the ballnut.
  - (b) Install the dial indicator to the magnetic base so that the tip of the dial indicator touches the flat spot on the top of the ballnut.

**NOTE:** The dial indicator is installed to measure the downward movement of the ballnut relative to the ballscrew.

#### E. Stabilizer Ballnut Freeplay Procedure (Fig. 603)

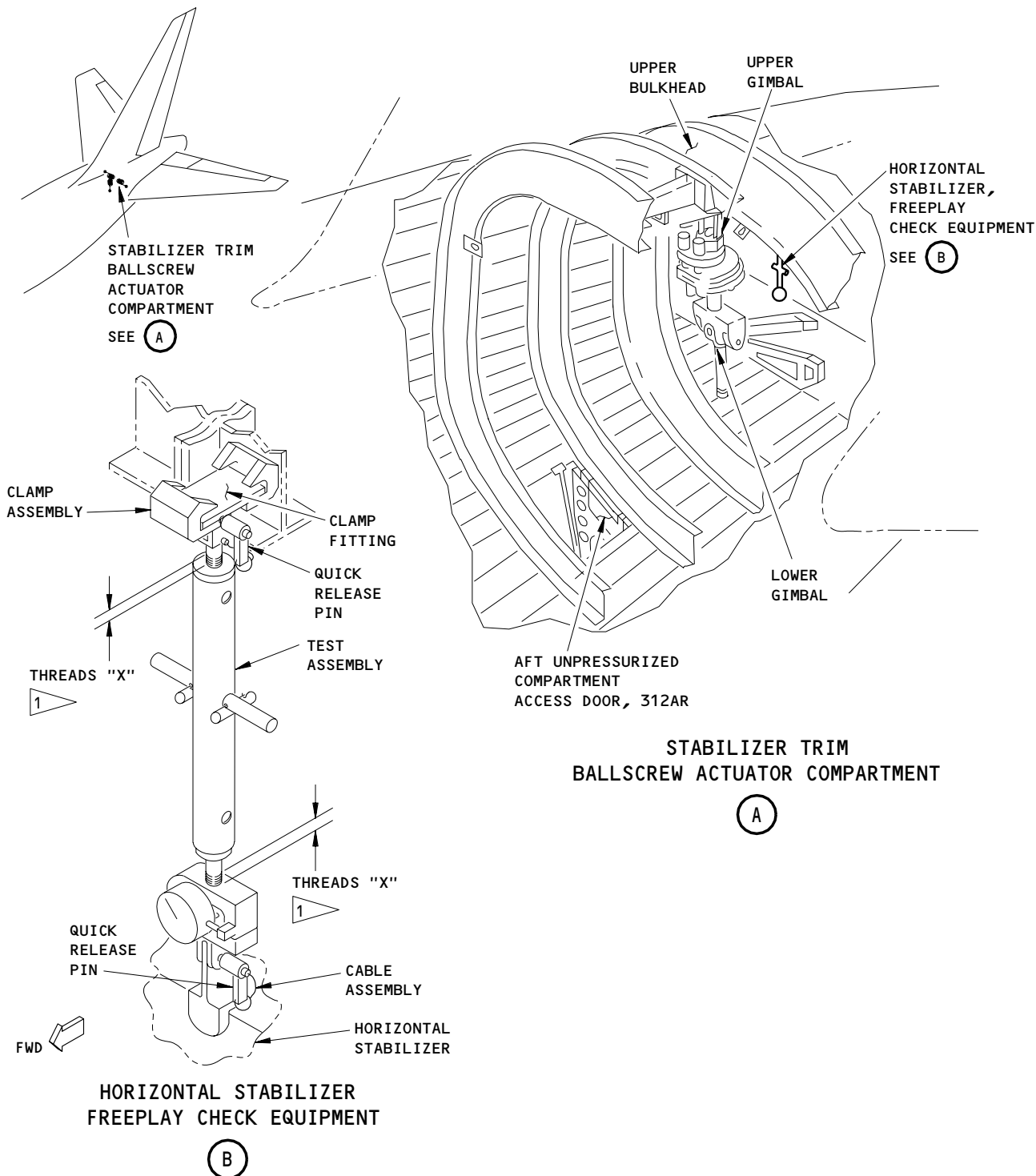
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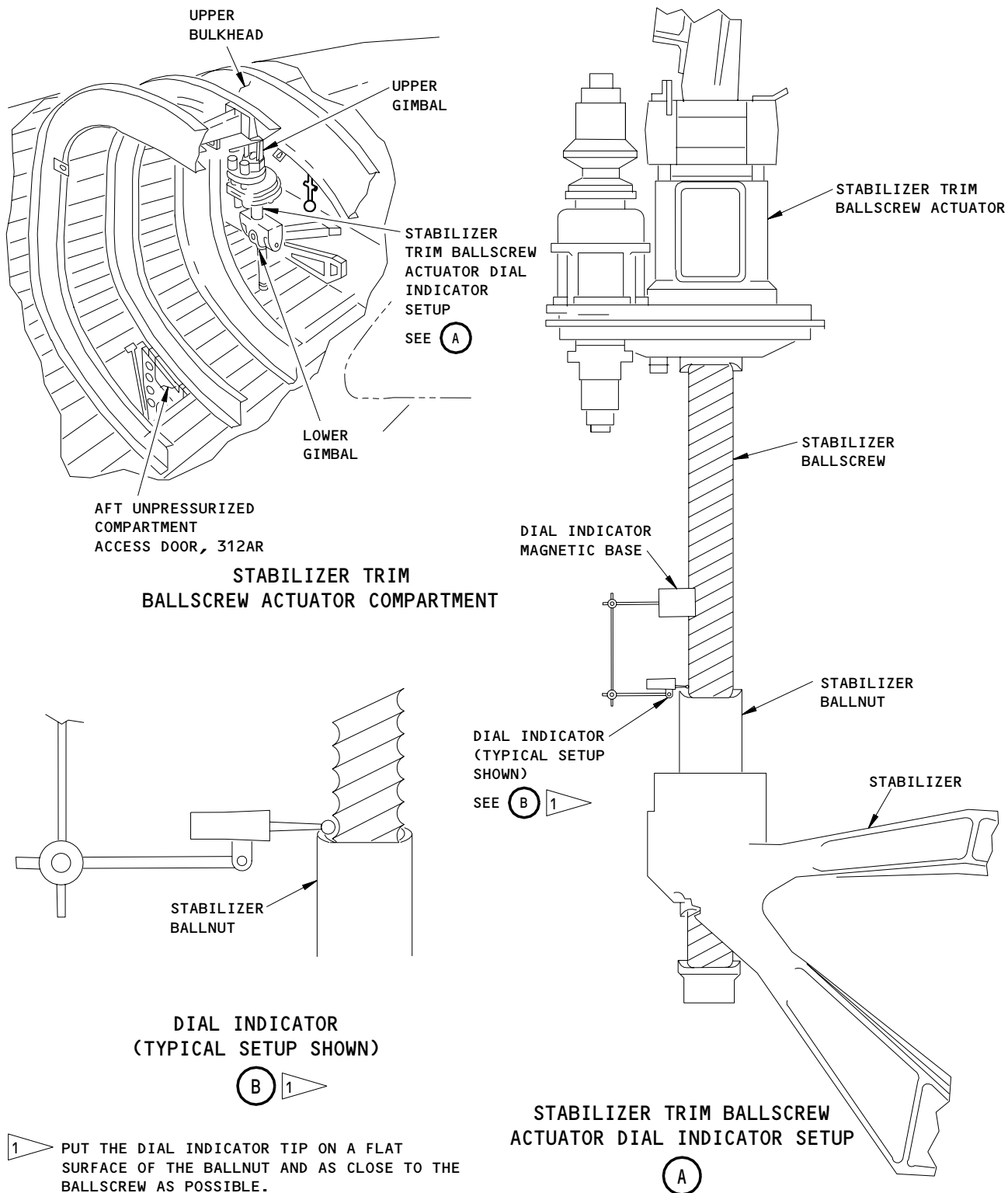


1 MAKE SURE THAT THE SAME AMOUNT OF THREADS "X" ARE EXPOSED AFTER ASSEMBLY OF TOOL.

Installation Of Horizontal Stabilizer Freeplay Check Equipment  
Figure 602

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Stabilizer Trim Ballscrew Actuator Ballscrew to Ballnut Freeplay  
Figure 603

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S 826-014

**CAUTION:** DO NOT APPLY MORE THAN THE SPECIFIED LOADS TO THE STABILIZER WHILE USING THE TEST EQUIPMENT A55001-47. DO NOT APPLY POWER TO THE STABILIZER TRIM ACTUATOR WITH THE TEST ASSEMBLY INSTALLED. IF YOU DO, DAMAGE TO THE EQUIPMENT OR AIRCRAFT CAN OCCUR.

- (1) Use the test equipment A55001-47, to slowly apply an upward force of 750 +/- 50 pounds (3340 +/- 220 newtons) to the ballscrew, as shown on the load cell.

**NOTE:** At 4 units of trim, the aft stabilizer center of gravity loads the ballscrew in the upward direction, putting the ballscrew in compression.

To apply the upward force to the ballscrew, the stabilizer tool must be turned in the direction that shortens the tool length. This will apply an upward force on the ballnut and move the leading edge of the stabilizer up, thus assuring that there is no residual system freeplay in the upward direction.

S 826-016

- (2) Zero the dial indicator.

S 826-017

- (3) Use the test equipment A55001-47, to slowly release the upward force applied in the previous step and continue adjusting the load tool to apply a downward force of 2450 +/- 50 pounds (10,900 +/- 220 newtons).

**NOTE:** To apply a downward force on the stabilizer, the tool must be turned in a direction that lengthens the tool. This will apply a downward force on the ballnut and move the leading edge of the stabilizer down.

- (a) Make a note of the quantity shown on the dial indicator.

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- S 086-096  
(4) Remove the dial indicator and the magnetic base from the ballscrew.

- S 486-097  
(5) Do the steps that follow for installation of the dial indicator between the stabilizer ballscrew and the ballnut:  
(a) Install the magnetic base for the dial indicator on the ballscrew above the ballnut 180 degrees from the position the first indication is taken.  
(b) Install the dial indicator to the magnetic base until the tip of the dial indicator touches the flat spot on the top of the ballnut (Fig. 603, View B).  
(c) Repeat steps 1 through 3.  
(d) Use the average of the two dial indicator indications that you recorded. This is the stabilizer ballscrew to ballnut free play.

- S 846-018  
(6) Use the test equipment A55001-47, to slowly release the downward force that was applied.

- S 826-019  
(7) If the ballscrew to ballnut freeplay is less than 0.001 inch (0.03 mm), then the measurement may be in error. Do the following to verify that the measurement was not made in error:  
(a) Check that the stabilizer was loaded in the correct direction for each of the previous steps.  
(b) Make sure the dial indicator is functioning properly.

- S 826-020  
(8) If the ballscrew to ballnut free play is more than or equal to 0.001 inch (0.03 mm), and less than or equal to 0.012 inch (0.30 mm), the ballscrew to ballnut free play is in the satisfactory limits.

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S 826-021

- (9) If the ballscrew to ballnut free play is more than 0.012 inch (0.30 mm), the stab trim actuator wear is more than the maximum permitted worn limits. Do the steps that follow:

NOTE: If the ballscrew to ballnut freeplay is greater than 0.035 inch (0.89 mm), the stabilizer trim actuator has excessive wear, or is damaged. Please notify The Boeing Company of any freeplay measurements beyond 0.035 inch (0.89 mm).

- (a) Remove the old stabilizer trim actuator and replace it with a known good unit (AMM 27-41-10/401).

NOTE: If you replace a worn horizontal stabilizer actuator with a serviceable actuator that is not new or not overhauled, then you must do the Ballscrew to Ballnut Detailed Visual Inspection and the Ballscrew to Primary Brake Housing Freeplay Check, for the replacement actuator before further flight.

F. Put the Airplane Back to Its Usual Condition

S 486-022

- (1) Remove the test equipment A55001-47, from the horizontal stabilizer and the upper fuselage (Fig. 602).

S 486-023

- (2) Remove the clamp fittings from the attach points on the bulkheads.

S 486-024

- (3) Remove the dial indicator and the magnetic base from the ballnut and ballscrew.

S 646-004

- (4) Lubricate the stabilizer ballscrew and ballnut (AMM 12-21-05/301).

S 416-025

- (5) Close the Service Access Door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

S 866-026

- (6) Set the C STAB TRIM shutoff switch and L STAB TRIM shutoff switch to the NORM position.

S 866-027

- (7) Remove the DO-NOT-CLOSE tags and close the following circuit breakers:

(a) 11A36, ALT STAB TRIM (IF INSTALLED)

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- (b) 11C12, STAB TRIM SHUTOFF L
- (c) 11C13, STAB TRIM SHUTOFF CENTER

TASK 27-41-10-226-028

4. Detailed Visual Inspection of the Stabilizer Ballscrew and Ballnut (Fig. 604)

NOTE: This is a scheduled maintenance task.

A. References

- (1) AMM 27-41-10/601, Stabilizer Ballscrew to Ballnut Freeplay Procedure
- (2) AMM 27-41-10/401, Stabilizer Trim Actuator - Removal/Installation

B. Access

- (1) Location Zones
  - 311/312 Area Aft of the Pressure Bulkhead to BS 1725
- (2) Access Panel
  - 312AR Service Access Door

C. Prepare for the Detailed Visual Inspection

S 866-030

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

S 866-031

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 866-032

- (3) Use the STAB TRIM levers or switches to move the stabilizer to approximately 4 units of trim, as shown on the stabilizer position indicators that are on the control stand panel.

S 866-033

- (4) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 866-034

- (5) Put the L and C STAB TRIM shutoff switches on the P10 panel to the CUTOUT position.

S 866-035

- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11A36, ALT STAB TRIM (IF INSTALLED)

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- (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
- D. Stabilizer Ballscrew/Ballnut Visual Inspection Procedure (Fig. 604)

S 016-036

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (1) Get access to the stabilizer trim actuator through the Service Access Door, 312AR (AMM 06-42-00/201).

S 216-103

- (2) Inspect the ballscrew and ballnut for signs of corrosion.
  - (a) Look for metallic dust particles on or around the ballscrew and ball nut.
  - (b) Examine the grease on the ballscrew for metal debris.

**NOTE:** Metallic debris in the grease may indicate degradation of the balls in the ballnut.

- (c) If you find metal debris or corrosion, replace the stabilizer trim ballscrew actuator (AMM 27-41-10/401).

S 216-099

- (3) Small amounts of grease may come out of the ballnut at other locations than the grease vent, or bottom seal for Umbra Ballnuts, and from the top and bottom seal on the Beaver Ballnuts.
  - (a) If more than a small amount of grease is visible at these other locations, replace the stabilizer trim ballscrew actuator (AMM 27-41-10/401).

S 216-105

- (4) Clean the ballscrew by wiping any old grease and dirt from the ballscrew threads.

**NOTE:** Use a clean, dry, non-abrasive cloth.

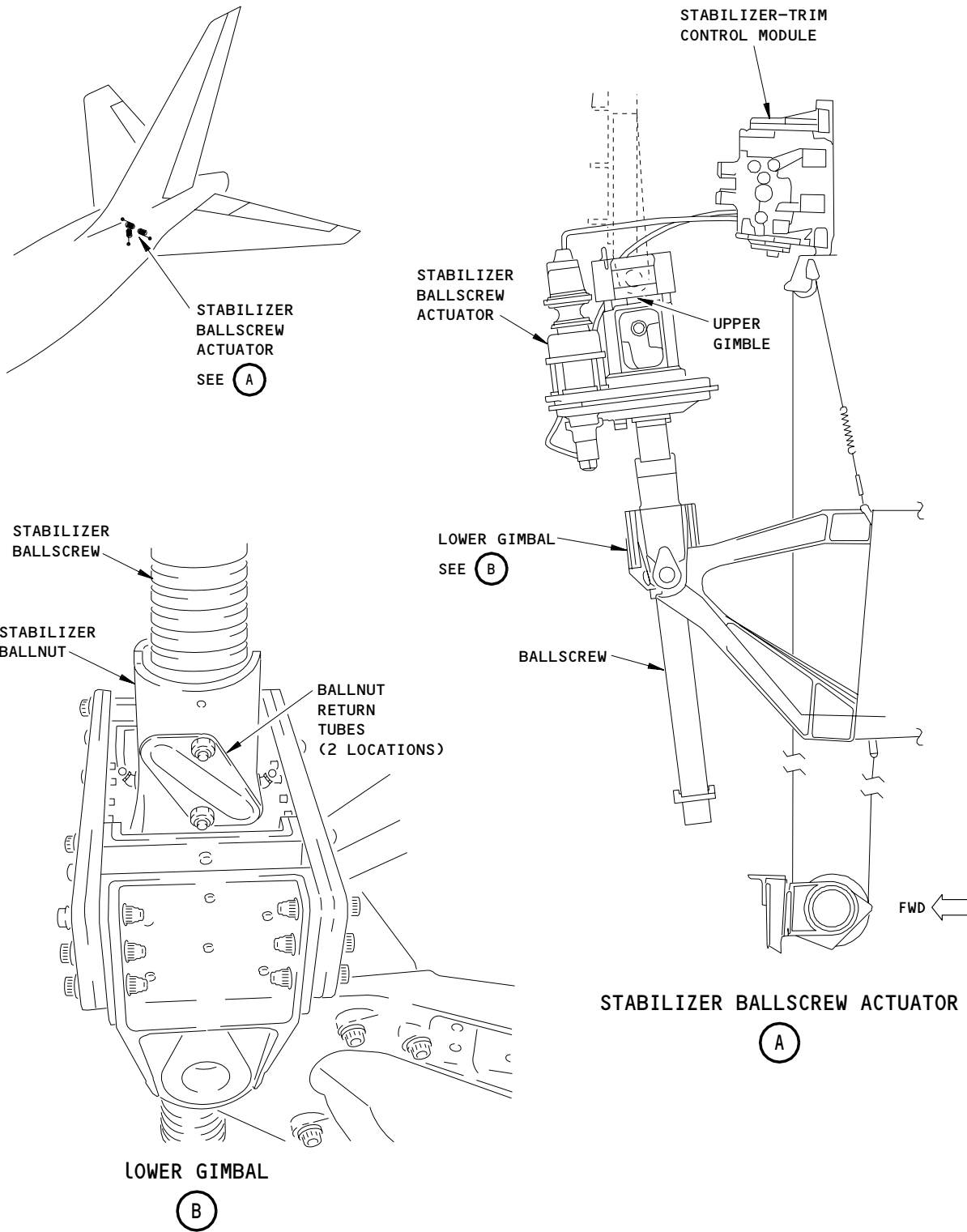
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Stabilizer Ballscrew Actuator Inspection  
Figure 604

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S 216-056

- (5) Visually inspect the stabilizer ballscrew ballnut.  
(a) If you find damage, cracking, corrosion, or obvious signs of wear, replace the stabilizer trim actuator (AMM 27-41-10/401).

S 216-100

- (6) Inspect the ballscrew for the following:  
(a) Check the ballscrew threads for cross-threading, distortion, or stripping.  
(b) Check the ballscrew threads for metal debris, pitting, gouging, corrosion, spalling, or brinelling.  
(c) Check for obvious differences in thread shape between the thread grooves in the lower, middle, and upper portions of the ballscrew.  
(d) Check the ballscrew for damage or cracking.

S 866-106

- (7) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel:  
(a) 11A36, ALT STAB TRIM (IF INSTALLED)  
(b) 11C12, STAB TRIM SHUTOFF L  
(c) 11C13, STAB TRIM SHUTOFF CENTER

S 866-108

- (8) Set the L STAB TRIM and C STAB TRIM shutoff switch to the NORM position.

S 866-107

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (9) Supply pressure to the center hydraulics system (AMM 29-11-00/201).

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S 866-109

- (10) Use the STAB TRIM levers or switches to Move the stabilizer up and down from 4 units of trim.

NOTE: This will expose the covered threads of the ballscrew.

- (a) Repeat the steps above to examine the newly exposed threads of the ballscrew.

S 866-110

- (11) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 866-111

- (12) Put the L and C STAB TRIM shutoff switches on the P10 panel to the CUTOUT position.

S 866-112

- (13) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11A36, ALT STAB TRIM (IF INSTALLED)
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) If you find any problems listed above, replace the stabilizer trim ballscrew actuator (AMM 27-41-10/401).

S 216-047

- (14) Inspect the ballnut return tubes for the following:
- (a) Visually inspect the ballnut return tubes to see if they have lifted from the ballnut or are damaged in a way that would restrict free movement of the ball bearings.
    - 1) If any of the return tubes have lifted from the ballnut, or are dented or damaged, replace the stabilizer trim ballscrew actuator (AMM 27-41-10/401).
  - (b) Check the exterior of the ballnut, stabilizer actuator, and the area below the actuator for ball bearings.

NOTE: The ball bearings used inside the ballnut are 0.375 inch (9.53 millimeters) diameter.

- 1) If any ball bearings are found, replace the stabilizer trim ballscrew actuator (AMM 27-41-10/401).

S 216-062

- (15) Visually examine the upper and lower gimbals for cracks, corrosion, and parts that are worn or loose.
- (a) If it is necessary, replace or repair the gimbals.

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E. Put the Airplane Back to Its Usual Condition

S 646-060

- (1) Unless you will immediately perform the check for stabilizer ballscrew to ballnut freeplay (AMM 27-41-10/601), lubricate the stabilizer ballscrew and ballnut (AMM 12-21-05/301).

S 416-052

- (2) Close the Service Access Door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

S 866-053

- (3) Set the C STAB TRIM shutoff switch and L STAB TRIM shutoff switch to the NORM position.

S 866-054

- (4) Remove the DO-NOT-CLOSE tags and close the following circuit breakers:
- (a) 11A36, ALT STAB TRIM (IF INSTALLED)
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER

TASK 27-41-10-226-063

5. Stabilizer Ballscrew to Primary Brake Housing Freeplay Check

A. Equipment

- (1) Load Equipment, Horizontal Stabilizer - A55001-47  
(2) Dial Indicator with Magnetic Base (Commercially Available)

B. References

- (1) AMM 06-42-00/201, Empennage Access Panels and Doors  
(2) AMM 12-21-05/301, Stabilizer Trim Control System - Lubrication  
(3) AMM 27-41-10/401, Stabilizer Trim Actuator - Removal/Installation  
(4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones  
(a) 311/312 Area Aft of the Pressure Bulkhead to BS 1725  
(2) Access Panel  
(a) 312AR Service Access Door

D. Prepare for the Check

S 646-064

- (1) Lubricate the stabilizer ballscrew (AMM 12-21-05/301).

S 866-065

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

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S 866-067

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(3) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 866-068

(4) Use the STAB TRIM levers or switches to move the stabilizer to approximately 4 units of trim, as shown on the stabilizer position indicators that are on the control stand panel.

S 866-069

(5) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 866-071

(6) Put the L and C STAB TRIM shutoff switches on the P10 panel to the CUTOUT position.

S 866-072

(7) Open the circuit breakers that follow, on the overhead panel P11. Attach DO-NOT-CLOSE tags:  
(a) 11A36, ALT STAB TRIM (IF INSTALLED)  
(b) 11C12, STAB TRIM SHUTOFF L  
(c) 11C13, STAB TRIM SHUTOFF CENTER

S 866-070

(8) Remove electrical power (AMM 24-22-00/201).

S 866-073

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

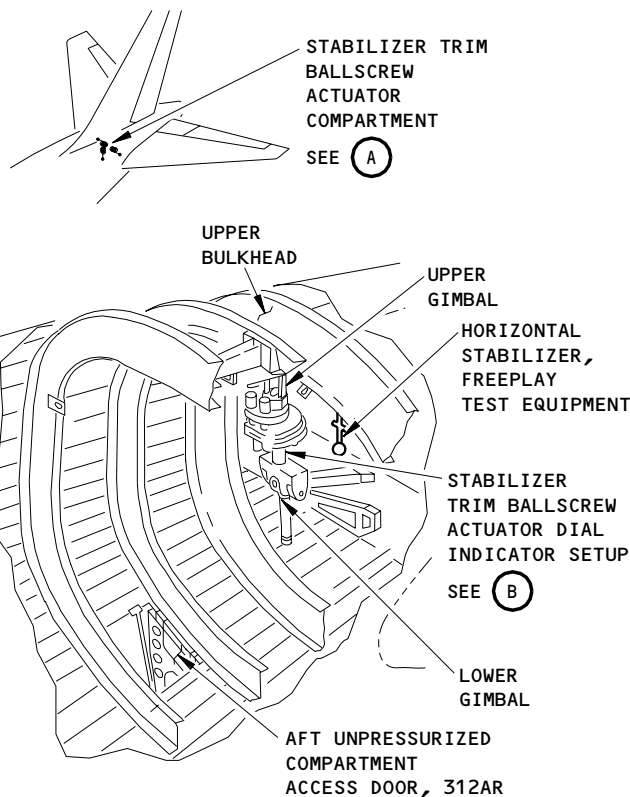
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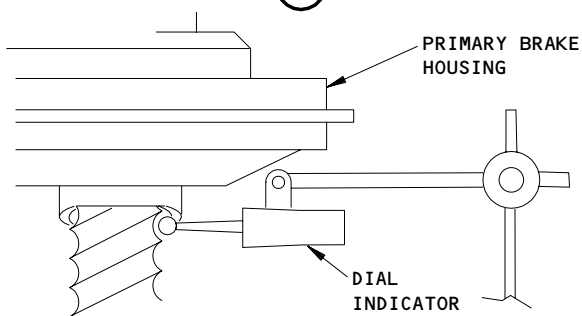
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**STABILIZER TRIM BALLSCREW ACTUATOR COMPARTMENT**

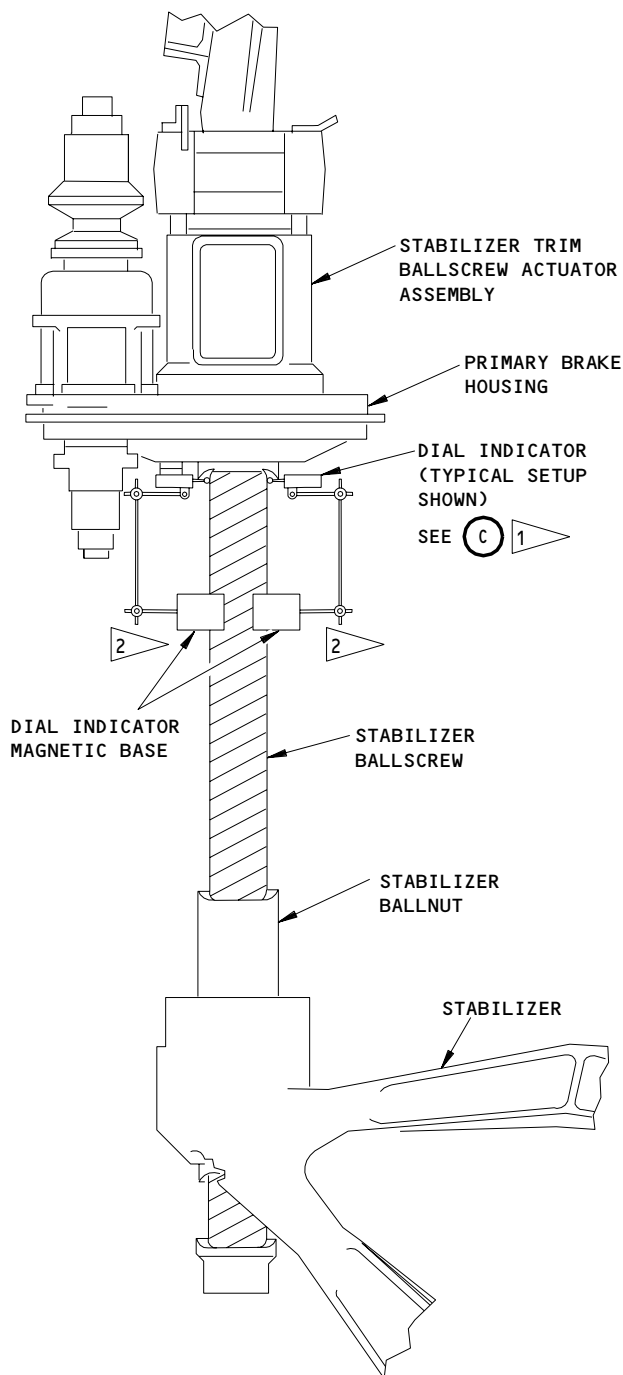
(A)



**DIAL INDICATOR (TYPICAL SETUP SHOWN)**

(C) 1

- 1 PUT THE DIAL INDICATOR TIP ON A FLAT SURFACE OF THE PRIMARY BRAKE HOUSING AND AS CLOSE TO THE BALLSCREW AS POSSIBLE
- 2 TAKE TWO MEASUREMENTS, THE SECOND MEASUREMENT 180° FROM THE POSITION OF THE FIRST MEASUREMENT



**STABILIZER TRIM BALLSCREW ACTUATOR DIAL INDICATOR SETUP**

(B)

**Stabilizer Trim Ballscrew Actuator Ballscrew to Primary Brake Housing Freeplay Figure 605**

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- (9) Get access to the stabilizer trim actuator through the Service Access Door, 312AR (AMM 06-42-00/201).

S 486-074

- (10) Do the steps that follow to install the test equipment A55001-47, between the horizontal stabilizer and the upper fuselage structure (Fig. 602):
- (a) Install the clamp assembly, A55001-17, and clamp fitting, A55001-6, on the upper bulkhead.
  - (b) Install the test equipment A55001-47, between the stabilizer and the upper bulkhead fitting using the quick release pins.

S 866-075

- (11) Do the steps that follow to install the dial indicator between the stabilizer ballscrew and the primary brake housing (Fig. 605):
- (a) Install the magnetic base for the dial indicator on the ballscrew below the primary brake housing.
  - (b) Install the dial indicator to the magnetic base until the tip of the dial indicator touches a flat hard area on the primary brake housing.

**NOTE:** The dial indicator is installed to measure the downward movement of the ballscrew relative to the primary brake housing.

E. Stabilizer Primary Brake Freeplay Procedure (Fig. 605)

S 826-076

**CAUTION:** DO NOT APPLY MORE THAN THE SPECIFIED LOADS TO THE STABILIZER WHILE USING THE TEST EQUIPMENT A55001-47. DO NOT APPLY POWER TO THE STABILIZER TRIM ACTUATOR WITH THE TEST ASSEMBLY INSTALLED. IF YOU DO, DAMAGE TO THE EQUIPMENT OR AIRCRAFT CAN OCCUR.

- (1) Use the test assembly to slowly apply an upward force of 750 +/- 50 pounds (3340 +/- 220 newtons) to the ballscrew, as shown on the load cell.

**NOTE:** At 4 units of trim, the aft stabilizer center of gravity loads the ballscrew in the upward direction, putting the ballscrew in compression.

To apply the upward force to the ballscrew, the stabilizer tool must turn the direction that decreases tool length. This will apply the upward force on the primary brake and move the leading edge of the stabilizer to the up direction. Making sure that there is no remaining system freeplay in the up direction.

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S 826-077

- (2) Zero the dial indicator.

S 826-078

- (3) Use the test equipment A55001-47, to slowly release the upward force applied in the previous step and continue adjusting the load tool to apply a downward force of 2450 +/- 50 pounds (10,900 +/- 220 newtons).

**NOTE:** To apply a down force on the stabilizer the tool must turn in a direction that increases the tool length. This will apply a down force on the primary brake and move the leading edge of the stabilizer down.

- (a) Make a note of the quantity shown on the dial indicator.

S 486-089

- (4) Remove the dial indicator and the magnetic base from the ballscrew.

S 486-080

- (5) Do the steps that follow to install the dial indicator on the ballscrew.
- (a) Install the magnetic base for the dial indicator on the ballscrew above the primary brake, 180 degrees from the position that the first reading is taken.
- (b) Install the dial indicator to the magnetic base, until the tip of the dial indicator touches a flat, hard area on the primary brake housing.

S 826-082

- (6) Use the test equipment to slowly apply an upward force of 750 +/- 50 pounds (3340 +/- 220 newtons) to the ballscrew, as shown on the load cell.

**NOTE:** At 4 units of trim, the aft stabilizer center of gravity loads the ballscrew in the upward direction, putting the ballscrew in compression.

To apply the upward force to the ballscrew, the stabilizer tool must turn the direction that decreases tool length. This will apply the upward force on the primary brake and move the leading edge of the stabilizer in the up direction. Make sure that there is no remaining system freeplay in the up direction.

S 826-083

- (7) Zero the dial indicator.

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S 826-084

- (8) Use the test equipment A55001-47, to slowly release the upward force applied in the previous step and continue adjusting the load tool to apply a downward force of 2450 +/- 50 pounds (10,900 +/- 220 newtons).

**NOTE:** To apply a down force on the stabilizer the tool must turn in a direction that increases the tool length. This will apply a down force on the primary brake and move the leading edge of the stabilizer down.

- (a) Make a note of the quantity shown on the dial indicator.  
(b) Average the two dial indicator readings. This is the stabilizer ballscrew to primary brake housing freeplay.

S 846-085

- (9) Use the test equipment A55001-47, to slowly release the down force that was applied.

S 826-095

- (10) If the ballscrew to primary brake freeplay is less than 0.001 inch (0.03 mm), then it is possible that the measurement is incorrect. Do these steps to make sure that the measurement is correct:  
(a) Make sure that the stabilizer is put in the correct direction in each of the previous steps.  
(b) Make sure that the dial indicator operates correctly.

S 826-086

- (11) If the ballscrew to primary brake freeplay is more than or equal to 0.001 inch (0.03 mm), and less than or equal to 0.0250 inch (0.635 mm), the ballscrew to primary brake freeplay is in the permitted limits.

S 826-087

- (12) If the ballscrew to primary brake freeplay is more than 0.0250 inch (0.635 mm), the stabilizer trim actuator worn area is more than the maximum in-service worn area limits. Do the steps that follow:  
(a) Remove the old stabilizer trim actuator and replace it with a known good unit (AMM 27-41-10/401).

F. Put the Airplane Back to its Usual Condition

S 486-088

- (1) Remove the test equipment A55001-47, from the horizontal stabilizer and the upper fuselage (Figure 602).

S 486-090

- (2) Remove the clamp fittings from the attach points on the bulkheads.

S 486-091

- (3) Remove the dial indicator and the magnetic base from the ballscrew.

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- S 416-092
- (4) Close the Service Access Door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).
- S 866-093
- (5) Set the L and C STAB TRIM switches on the P10 panel, to the NORM position.
- S 866-094
- (6) Remove the DO-NOT-CLOSE tags and close the circuit breakers that follow:
- (a) 11A36, ALT STAB TRIM (if installed)
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER

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STABILIZER TRIM DRIVE HYDRAULIC MOTORS – REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the hydraulic motor for the stabilizer trim drive system.

TASK 27-41-11-024-001

2. Remove the Hydraulic Motors for the Stabilizer Drive System

A. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

(1) Location Zones

- 211/212 Control Cabin
- 311/312 Area Aft of Pressure Bulkhead to BS 1725

(2) Access Panels

- 312AR Forward Stabilizer Compartment

C. Prepare for the Removal

S 864-002

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

S 864-003

- (2) Remove the pressure from the left and center hydraulic systems (AMM 29-11-00/201).

S 864-004

- (3) Put the L and C STAB TRIM shutoff valve switches on the control stand panel, P10, to the CUTOUT position.

S 864-005

- (4) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11A36, ALT STAB TRIM (if installed)

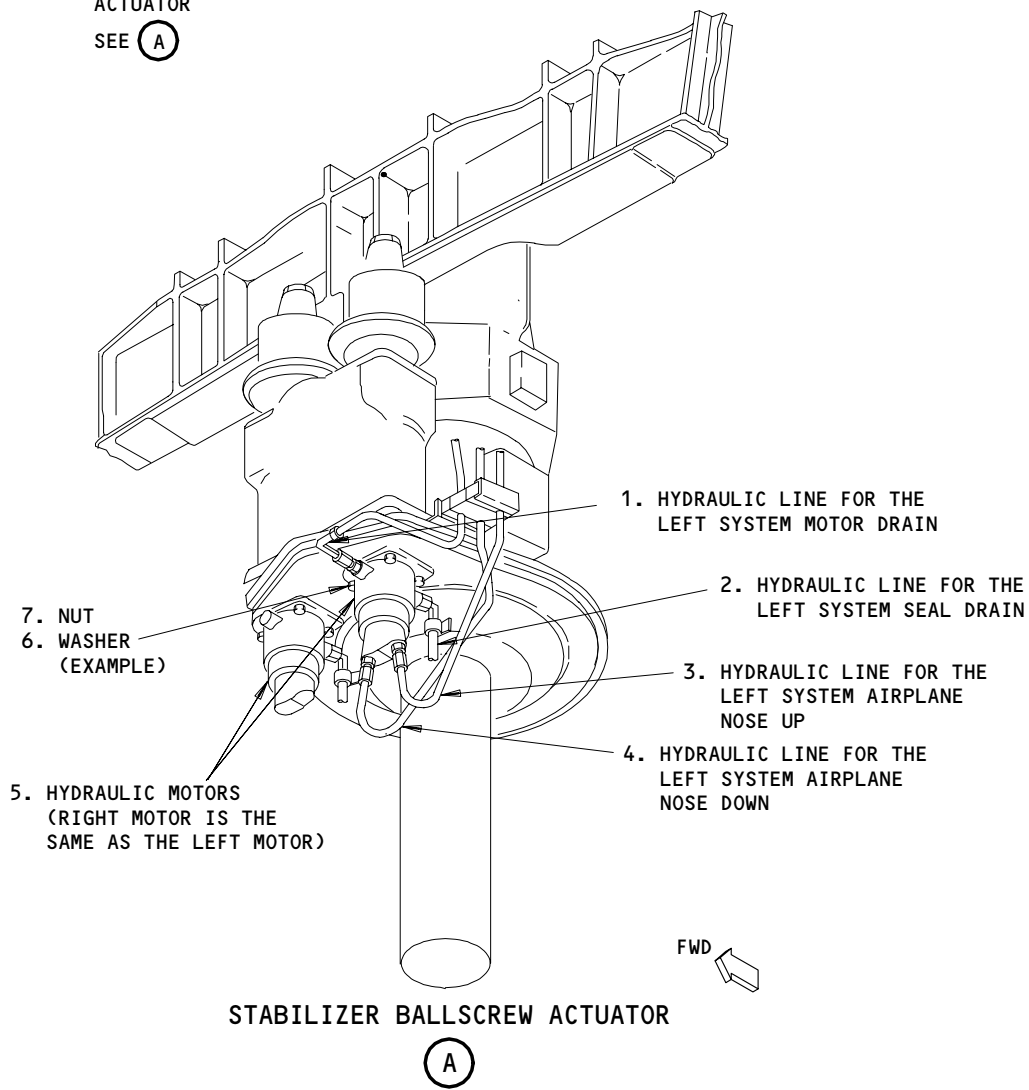
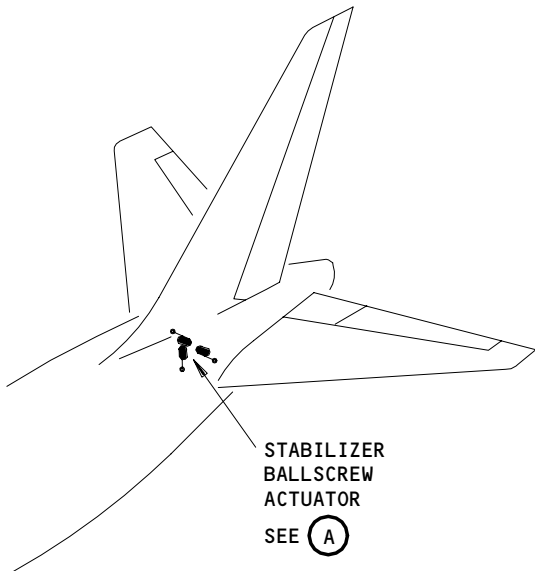
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Stabilizer Trim Drive Hydraulic Motor Installation  
Figure 401

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- (b) 11C12, STAB TRIM SHUTOFF L
- (c) 11C13, STAB TRIM SHUTOFF CENTER

S 014-006

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (5) Open the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).
- D. Remove the Hydraulic Motor for the Stabilizer Trim Drive System (Fig. 401)

S 034-007

- (1) Disconnect the hydraulic lines from the hydraulic motor.

S 494-008

- (2) Seal the hydraulic lines with caps and put plugs in the ports.

S 034-009

- (3) Hold the motor (5) and remove the nuts (7) and washers (6) that hold the hydraulic motor to the stabilizer ballscrew actuator.

S 024-010

- (4) Disengage and remove the hydraulic motor from the splined drive.

S 034-011

- (5) Remove and discard the O-ring from the differential motor shaft.

TASK 27-41-11-424-012

3. Install the Hydraulic Motor for the Stabilizer Trim Drive System

A. Consumable Materials

- (1) C00259 Primer BMS 10-11 Type I
- D00633 Grease - BMS 3-33 (Recommended)
- D00013 Grease - MIL-PRF-23827 (Alternative)

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	5	Hydraulic Motor Packing (O-ring)	27-41-10	01	50 95

C. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels

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- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

(1) Location Zones

- 211/212 Control Cabin
- 311/312 Area Aft of Pressure Bulkhead to BS 1725

(2) Access Panels

- 312AR Forward Stabilizer Compartment

E. Install the Hydraulic Motor for the Stabilizer Drive System (Fig. 401)

S 644-013

- (1) Clean and apply a large quantity of grease on the parts of the differential motor shaft that can be seen.

S 434-014

- (2) Install a new O-ring on the differential motor shaft.

S 214-015

- (3) Make sure the mating surfaces of the hydraulic motor and the differential housing are clean and have no burrs.

S 424-016

- (4) Engage the hydraulic motor shaft with the splines on the differential motor shaft.

S 434-017

- (5) Hold the hydraulic motor in position and install the nuts (7) and washers (6) that hold the motor to the differential housing.

S 094-018

- (6) Remove the plugs from the ports and the caps from the hydraulic lines and connect the lines to the motor.

S 624-019

- (7) Apply some corrosion inhibiting primer to the metal surfaces around the hydraulic motor and differential housing that can be seen.

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F. Hydraulic Motor Test

S 864-020

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:

- (a) 11A36, ALT STAB TRIM (if installed)
- (b) 11C12, STAB TRIM SHUTOFF L
- (c) 11C13, STAB TRIM SHUTOFF CENTER

S 864-021

- (2) Put the L and C STAB TRIM shutoff valve switches on the control stand panel, P10, to the NORM position.

S 864-022

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Pressurize the applicable hydraulic system, as follows (AMM 29-11-00/201):
- (a) Pressurize the left system for the left side hydraulic motor test only.
  - (b) Pressurize the center system for the right side hydraulic motor test only.

S 864-036

- (4) Use the STAB TRIM levers or switches to move the stabilizer to the APL NOSE UP and APL NOSE DOWN travel limits.
- (a) Make sure the stabilizer moves smoothly and freely through the full travel range.

S 214-031

- (5) Make sure there are no leaks at the hydraulic connections.

G. Put the Airplane Back to Its Usual Condition

S 864-032

- (1) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

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- S 864-033
- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).
- S 414-034
- (3) Close the access doors for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

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STABILIZER TRIM SECONDARY BRAKE – REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the secondary brake on the stabilizer trim system.

TASK 27-41-13-024-001

2. Remove the Secondary Brake for the Stabilizer Trim System

A. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

(1) Location Zones

- 211/212 Control Cabin
- 311/312 Area Aft of Pressure Bulkhead to BS 1725

(2) Access Panel

- 312AR Forward Stabilizer Compartment

C. Prepare for the Removal

S 864-002

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

S 864-003

- (2) Remove the pressure from the left and center hydraulic systems (AMM 29-11-00/201).

S 864-004

- (3) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the CUTOUT position.

S 864-005

- (4) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11A36, ALT STAB TRIM (if installed)

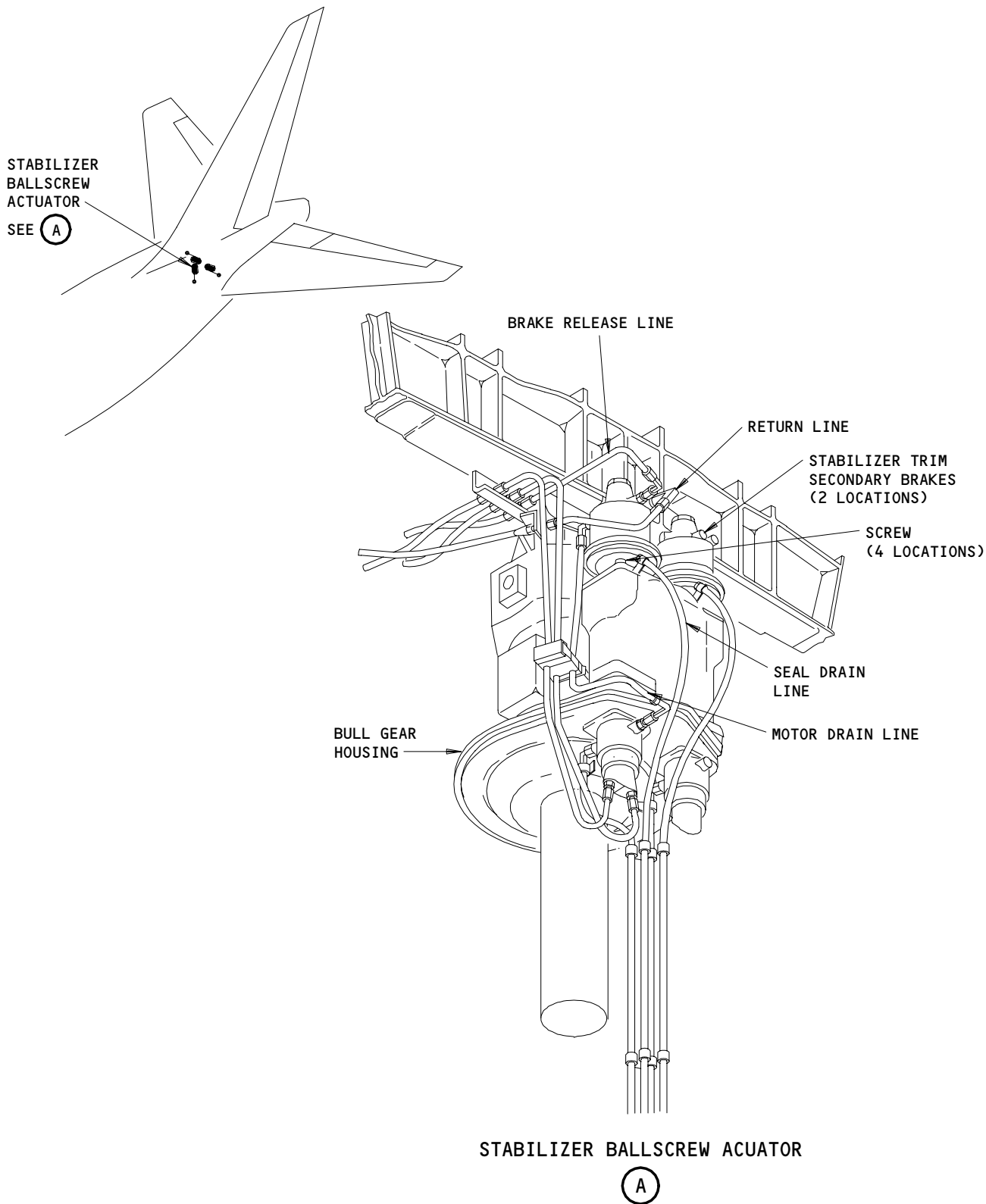
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Stabilizer Trim Secondary Brake Installation  
Figure 401

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- (b) 11C12, STAB TRIM SHUTOFF L
- (c) 11C13, STAB TRIM SHUTOFF CENTER

S 014-048

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 311AL AND THE ELEVATOR CONTROL ACCESS DOOR, 313AL. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (5) Open the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

D. Remove the Secondary Brake (Fig. 401)

S 034-007

- (1) Disconnect the hydraulic lines from the secondary brake and install plugs on the hydraulic lines and seal the ports with caps.

**NOTE:** Remove and keep the seal drain adapter if the same brake will not be installed.

S 034-008

- (2) Remove the screws that hold the secondary brake to the cover of the bull gear housing.

S 034-009

- (3) Disengage and remove the secondary brake from the brake differential shaft.

S 034-010

- (4) Remove and discard the o-ring from the brake differential shaft.

TASK 27-41-13-424-011

3. Install the Secondary Brake for the Stabilizer Trim System

A. Consumable Materials

- (1) Lubricants - The lubricants that follow are permitted:
  - (a) D00054 Lubricant - Hydraulic System MCS 352B
  - (b) D00153 Fluid - Hydraulic BMS 3-11

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- (2) D00633 Grease - BMS 3-33 (Alternate)
- (3) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (4) C00259 Primer BMS 10-11 Type I

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 311/312 Area Aft of Pressure Bulkhead to BS 1725
- (2) Access Panel
  - 312AR Forward Stabilizer Compartment

D. Install the Secondary Brake (Fig. 401)

- S 644-012
  - (1) Clean and apply a large quantity of grease to the part of the brake differential shaft that can be seen.
- S 434-013
  - (2) Install a new o-ring on the brake differential shaft.
- S 214-014
  - (3) Make sure the mating surfaces of the brake mounting flange and the cover of the bull gear housing are clean.
- S 434-015
  - (4) Engage the internal brake shaft splines with the splines on the brake differential shaft.
- S 434-016
  - (5) Align the brake mounting flange with the studs until the hydraulic ports are in the correct position.
- S 424-017
  - (6) Lower the secondary brake to the correct position.
- S 644-018
  - (7) Apply a thin layer of grease on the threads of the screws.
- S 434-019
  - (8) Install the screws and tighten them equally.
- S 434-020
  - (9) If it is necessary, install the adapter with a new washer at the seal drain port.

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S 434-021

- (10) Remove the plugs and caps and connect the hydraulic lines.

S 624-022

- (11) If necessary, put primer on the metal surfaces around the brake mounting flange.

E. Secondary Brake Test

S 944-023

- (1) Make sure the person in the control cabin can talk to the person in the forward stabilizer compartment.

S 864-024

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11A36, ALT STAB TRIM (if installed)
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER

S 864-025

- (3) Put the LEFT STAB TRIM SHUTOFF valve switch on the control stand panel, P10, to the NORM position.

S 864-026

- (4) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel to the CUTOUT position.

S 864-027

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (5) Pressurize the left and center hydraulic systems (AMM 29-11-00/201).

S 094-028

- (6) Move all workstands and equipment away from the area around the stabilizer.

S 864-029

- (7) Use the captain's or first officer's control wheel switches to move the stabilizer a minimum of three units of trim from the ends of the travel range.

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- S 864-030
- (8) Push and hold the BRAKE BYPASS valve button on the left stabilizer trim control module (STCM).

NOTE: The button is on the bottom of the STCM.

- S 864-031
- (9) Move the captain's or first officer's control wheel switches full travel (in the same direction) and hold in that position for ten seconds.

- S 214-032
- (10) Make sure that the stabilizer does not move.

- S 864-033
- (11) Release the control wheel switches and then release the BRAKE BYPASS valve button.

- S 864-034
- (12) Move the captain's or first officer's control wheel switches through full travel.

- S 214-035
- (13) Make sure that the stabilizer operates correctly.

- S 864-036
- (14) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel to the CUTOUT position.

- S 864-037
- (15) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel to the NORM position.

- S 864-038
- (16) Push and hold the BRAKE BYPASS valve button on the right STCM.

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S 864-039

- (17) Move the captain's or first officer's control wheel switches full travel (in the same direction) and hold in that position for ten seconds.

S 214-040

- (18) Make sure that the stabilizer does not move.

S 864-041

- (19) Release the control wheel switches and then release the BRAKE BYPASS valve button.

S 864-042

- (20) Move the captain's or first officer's control wheel switches through full travel.

S 214-043

- (21) Make sure that the stabilizer operates correctly.

S 864-044

- (22) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel to the NORM position.

F. Put the Airplane Back to Its Usual Condition

S 864-045

- (1) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

S 864-046

- (2) Remove electrical power (AMM 24-22-00/201).

S 414-047

- (3) Close the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

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STABILIZER TRIM STANDBY SWITCH – REMOVAL/INSTALLATION

1. General

- A. The right stabilizer trim lever turns a cam which operates the stabilizer trim standby switch, S538. The standby switch is in the control stand.

TASK 27-41-14-024-001

2. Remove the Stabilizer Trim Standby Switch

A. References

- (1) AMM 24-22-00/201, Electrical Power – Control  
(2) AMM 27-61-00/201, Spoiler/Speedbrake Control System

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Prepare for the Removal

S 864-002

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

S 864-003

- (2) Set the L and C STAB TRIM shutoff switches on the control stand panel, P10, to the CUTOUT position.

S 864-021

**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.

S 864-005

- (4) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:

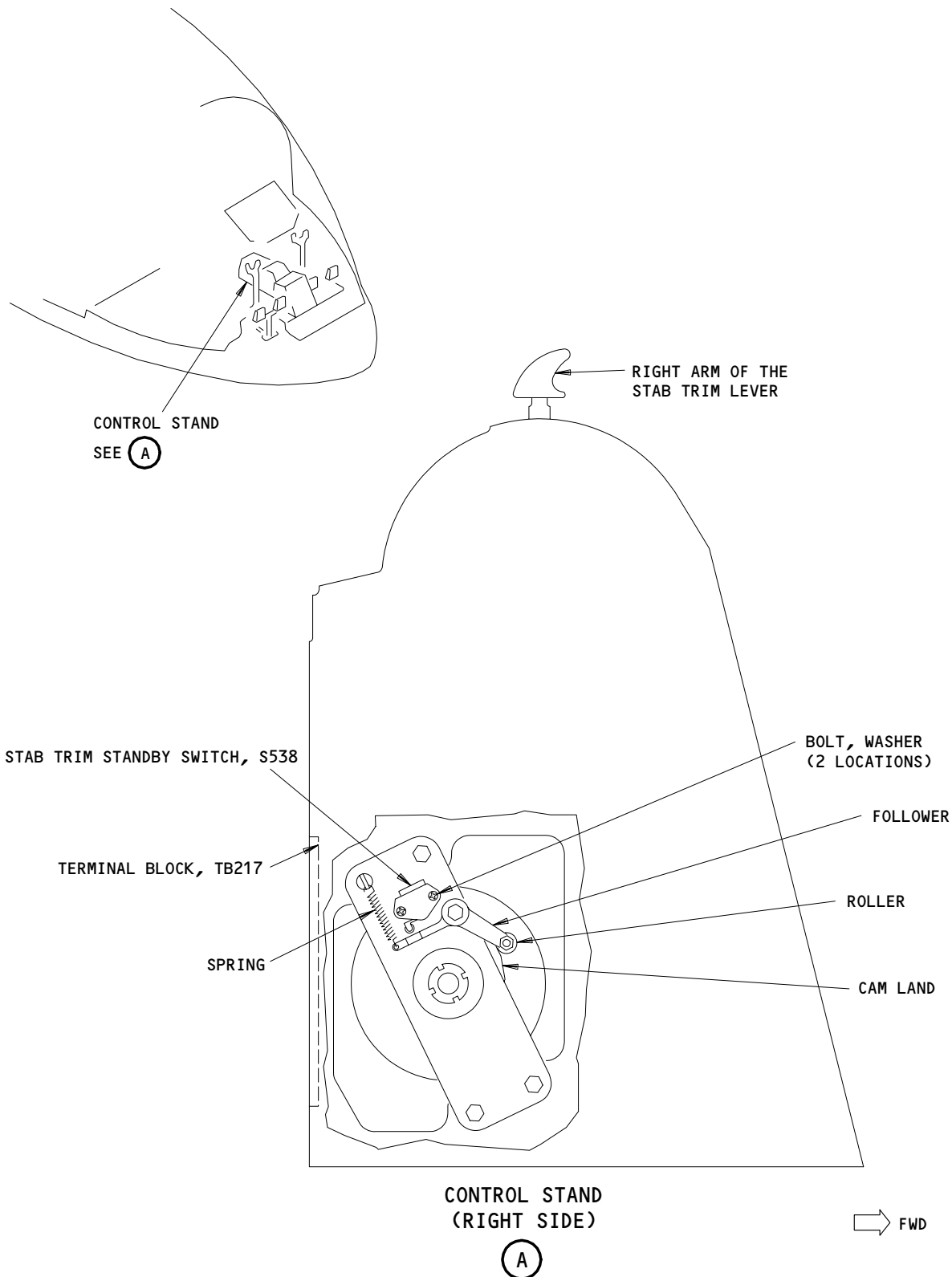
- (a) 11C6, FLT CONT ELEC 1L AC  
(b) 11C7, FLT CONT ELEC 1L DC  
(c) 11C8, FLT CONT ELEC 2L AC  
(d) 11C9, FLT CONT ELEC 2L DC  
(e) 11C12, STAB TRIM SHUTOFF L  
(f) 11C13, STAB TRIM SHUTOFF CENTER  
(g) 11G17, FLT CONT ELEC 1R AC  
(h) 11G18, FLT CONT ELEC 1R DC  
(i) 11G26, FLT CONT ELEC 2R AC  
(j) 11G27, FLT CONT ELEC 2R DC

S 014-006

- (5) Remove the access panel on the right side of the control stand.

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AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

27-41-14



Stabilizer Trim Standby Switch Installation  
Figure 401

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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D. Remove the Stabilizer Trim Standby Switch (Fig. 401)

S 034-007

- (1) Disconnect the switch wires from the terminal block, TB217, at the G1 pin and the electrical ground.

S 024-008

- (2) Remove the fasteners that hold the switch to the structure and remove the standby switch.

TASK 27-41-14-424-009

3. Install the Stabilizer Trim Standby Switch (Fig. 401)

A. Equipment

- (1) Volt-ohmmeter - Commercially Available

B. Consumable Materials

- (1) G02104 Tubing - Heat shrink

C. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-61-00/201, Spoiler/Speedbrake Control System

D. Access

- (1) Location Zones  
211/212 Control Cabin

E. Procedure

S 434-010

- (1) Put heat shrink tubing on the full length of the switch wire on the replacement switch.

**NOTE:** Do not put heat shrink tubing on the switch wire at connections.

S 424-011

- (2) Hold the switch in its correct position and install the fasteners.

S 434-012

- (3) Connect the switch wires to the terminal block, TB217, at the G1 pin and the electrical ground.

S 214-013

- (4) Make sure that the switch operates freely.

S 224-014

- (5) Make sure that the roller will move down a minimum of 0.04 inch (1.0 millimeter).

S 764-015

- (6) Make sure that there is continuity between the G1 pin on the terminal block, TB217, and the airplane electrical ground.

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AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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- S 714-022
- (7) Connect one of the volt ohmmeter wires to the G1 pin and connect the other wire to the electrical ground.
- S 214-023
- (8) Make sure that there is no continuity between the G1 pin and the electrical ground.
- S 864-024
- (9) Move and hold the right lever of the STAB TRIM levers at 10 degrees from the neutral trim position (0.70 to 0.90 inches (17.8 to 22.9 millimeters) measured on the control stand surface).
- S 214-025
- (10) Make sure that there is continuity between the G1 pin and the electrical ground.
- S 214-026
- (11) Make sure that the switch operates correctly when you move the right lever of the STAB TRIM levers as follows:
- (a) Move the lever 10 degrees forward and aft of the neutral position.
- F. Put the Airplane Back to Its Usual Condition
- S 864-016
- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C6, FLT CONT ELEC 1L AC
- (b) 11C7, FLT CONT ELEC 1L DC
- (c) 11C8, FLT CONT ELEC 2L AC
- (d) 11C9, FLT CONT ELEC 2L DC
- (e) 11C12, STAB TRIM SHUTOFF L
- (f) 11C13, STAB TRIM SHUTOFF CENTER
- (g) 11G17, FLT CONT ELEC 1R AC
- (h) 11G18, FLT CONT ELEC 1R DC
- (i) 11G26, FLT CONT ELEC 2R AC
- (j) 11G27, FLT CONT ELEC 2R DC
- S 864-017
- (2) Do the activation procedure for the spoilers if you did the deactivation procedure (AMM 27-61-00/201).
- S 864-018
- (3) Set the L and C STAB TRIM shutoff switches on the P10 panel to the NORM position.
- S 414-019
- (4) Install the access panel on the right side of the control stand.

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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- S 864-020  
(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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HORIZONTAL STABILIZER ALIGNMENT TABS – REMOVAL/INSTALLATION

1. General

- A. This section contains the procedure to install alignment tabs for the stabilizer neutral position, and the manual control upper and lower limit positions.

TASK 27-41-17-424-002

2. Install the Stabilizer Alignment Tabs

A. References

- (1) AMM 20-10-15/401, Stencil Markings – Removal/Installation
- (2) AMM 20-10-14/401, Aluminum Foil Markers
- (3) AMM 27-41-00/501, Horizontal Stabilizer Trim Control System

B. Access

- (1) Location Zones
  - 211/212 Area Aft of Pressure Bulkhead to BS 1725
  - 332 Horizontal Stabilizer Leading Edge (Left)

C. Install the Alignment Tabs

S 214-003

- (1) Find the alignment tab on the stabilizer leading edge. It is on the center of the inboard leading edge of the left stabilizer (Fig. 401).

S 424-001

- (2) If an alignment tab is not installed on the stabilizer, install an alignment tab by stencil or bonding aluminum tabs (AMM 20-10-15/401 or AMM 20-10-14/401).

S 864-004

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES BEFORE THE STABILIZER IS MOVED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (3) Move the stabilizer such that Dimension A on the stabilizer ballscrew actuator is correct for installation of the alignment tabs (Fig. 401 and 402).

**NOTE:** For the procedures to move the stabilizer and to measure Dimension A, refer to AMM 27-41-00/501.

S 934-005

- (4) Put the alignment tab on the side of the airplane such that the conditions that follow are correct:
  - (a) The alignment tab is one inch (25 millimeters) in front of the stabilizer leading edge.

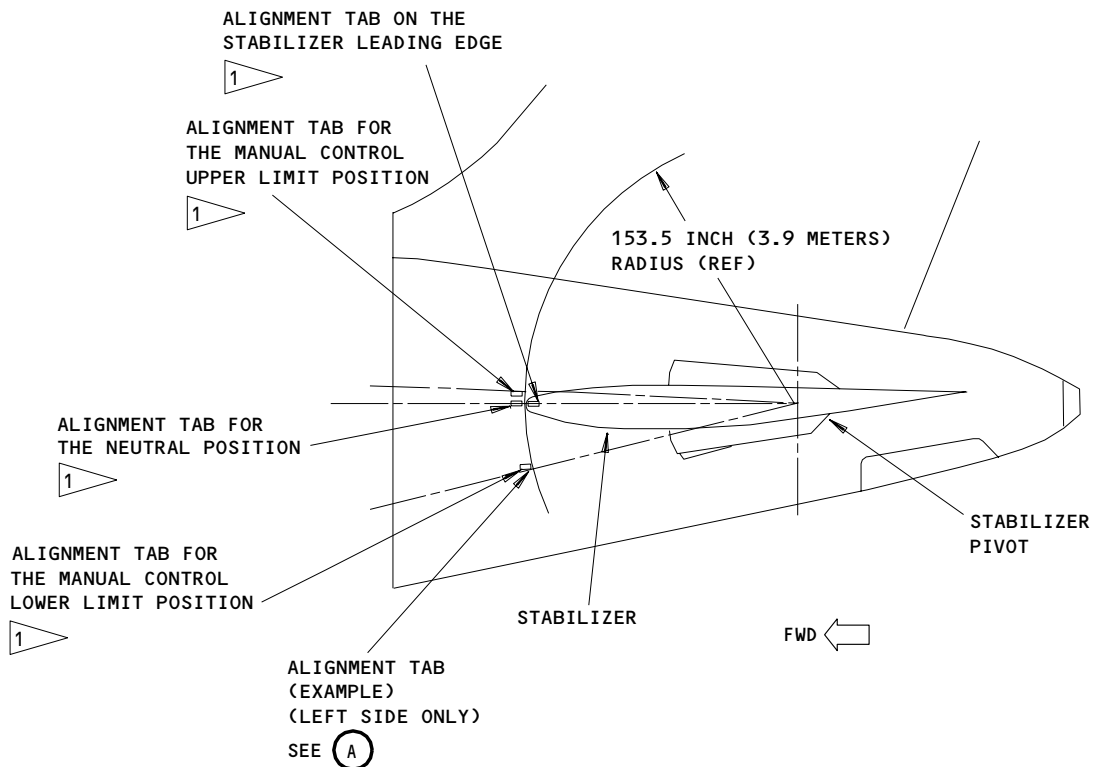
EFFECTIVITY

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1 USE THE TABLE BELOW TO SET DIMENSION A ON THE STABILIZER BALLSCREW ACTUATOR BEFORE YOU INSTALL THE ALIGNMENT TABS. THE ALIGNMENT TAB FOR EACH DIMENSION A MUST ALIGN WITH THE ALIGNMENT TAB ON THE INBOARD LEADING EDGE OF THE STABILIZER.

**ALIGNMENT TAB**  
(2.00 X 0.50 INCH (50.8 X 12.7 mm)  
BLACK PAINTED STENCIL  
OR  
CLAD 2024-0 ALUMINUM)

(A)

ALIGNMENT TAB	DIMENSION A ON BALLSCREW ACTUATOR (FIG. 402)
NEUTRAL	3.84 INCHES (97.5 mm)
MANUAL CONTROL UPPER LIMIT	0.50 INCH (12.7 mm)
MANUAL CONTROL LOWER LIMIT	24.96 INCHES (634.0 mm)

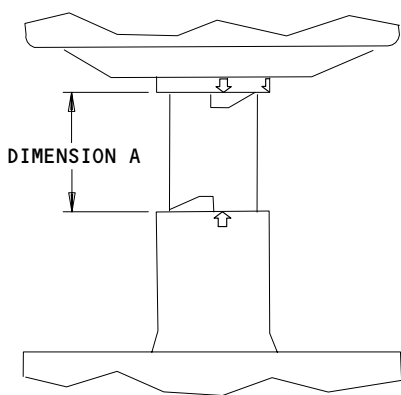
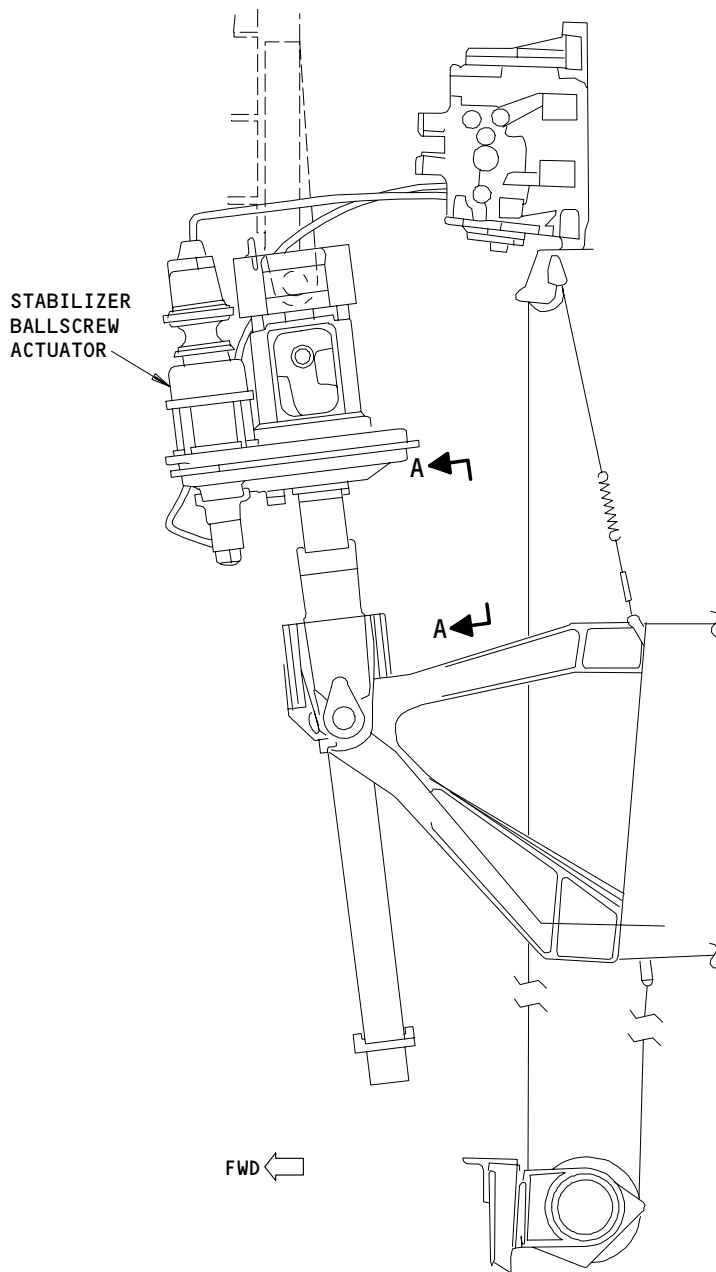
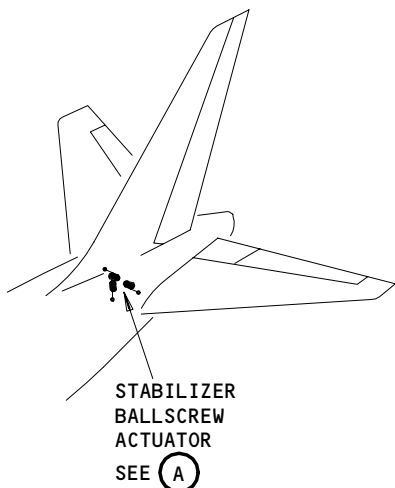
Stabilizer Trim Alignment Tabs Installation  
Figure 401

EFFECTIVITY	ALL
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A-A

STABILIZER BALLSCREW ACTUATOR

(A)

Stabilizer Trim Alignment Tabs Installation  
Figure 402

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767  
MAINTENANCE MANUAL

(b) The alignment tab aligns with the alignment tab on the stabilizer leading edge for the applicable Dimension A.

S 424-006

(5) Install the alignment tabs (AMM 20-10-15/401 or AMM 20-10-14/401).

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STABILIZER TRIM BALLSCREW ACTUATOR ICE SCRAPER – REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove/install the lower ice scraper on the stabilizer trim ballscrew actuator.

TASK 27-41-18-024-001

2. Remove the Ice Scraper (Fig. 401)

A. Equipment

- (1) Socket, Safety Rod Nut - A27062-13

B. References

- (1) AMM 06-42-00/201, Empennage Access Panels and Doors  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(3) AMM 32-71-05/401, Tail Skid Shock Strut/Actuator

C. Access

(1) Location Zone

311 Area Aft of Pressure Bulkhead to BS 1725 (Left)

(2) Access Panel

311BL Stabilizer Ballscrew Safety Rod Access Door

312AR Service Access Door

D. Prepare for the Removal

S 864-002

- (1) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-047

- (2) Use the STAB TRIM levers or switches to move the stabilizer until Dimension A on the stabilizer ballscrew actuator is  $1.73 \pm 0.05$  inches (43.9 +/- 1.3 millimeters).

S 864-007

- (3) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-008

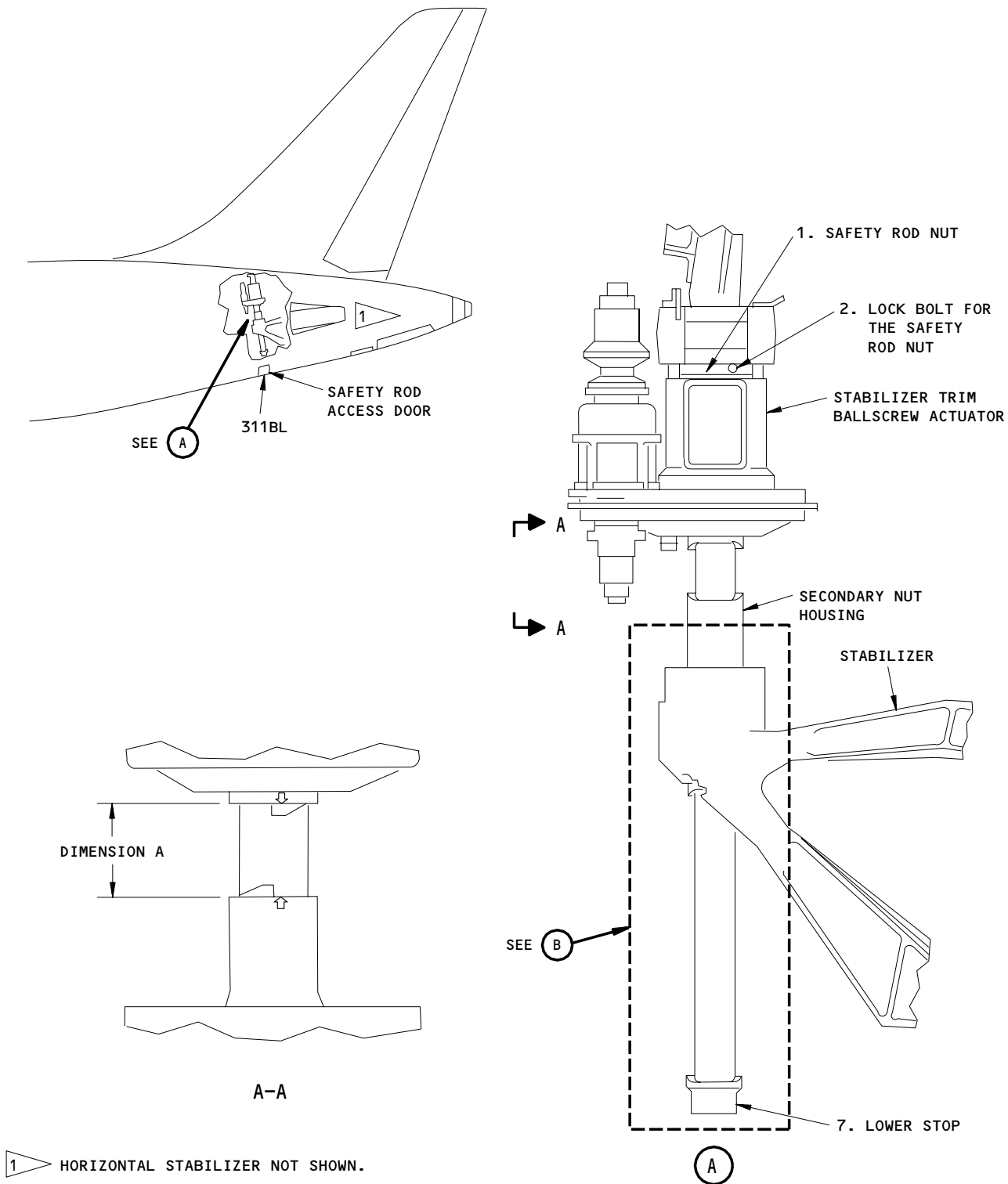
- (4) Put the C STAB TRIM shutoff valve switches on the control stand panel, P10, to CUTOUT.

S 864-009

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11C12, STAB TRIM SHUTOFF L  
(b) 11C13, STAB TRIM SHUTOFF CENTER

EFFECTIVITY  
AIRPLANES WITH THE SAFETY  
ROD ACCESS DOOR

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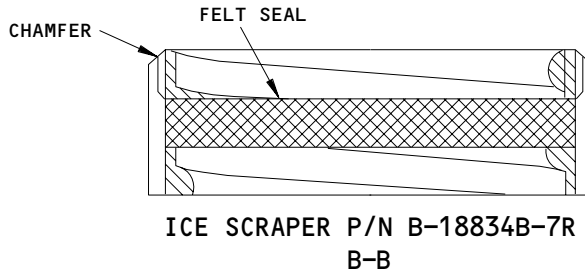
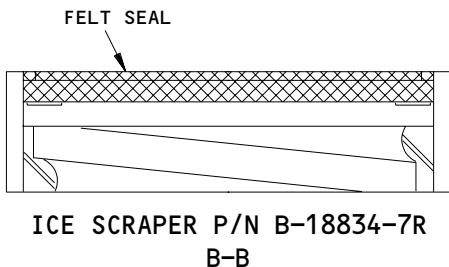
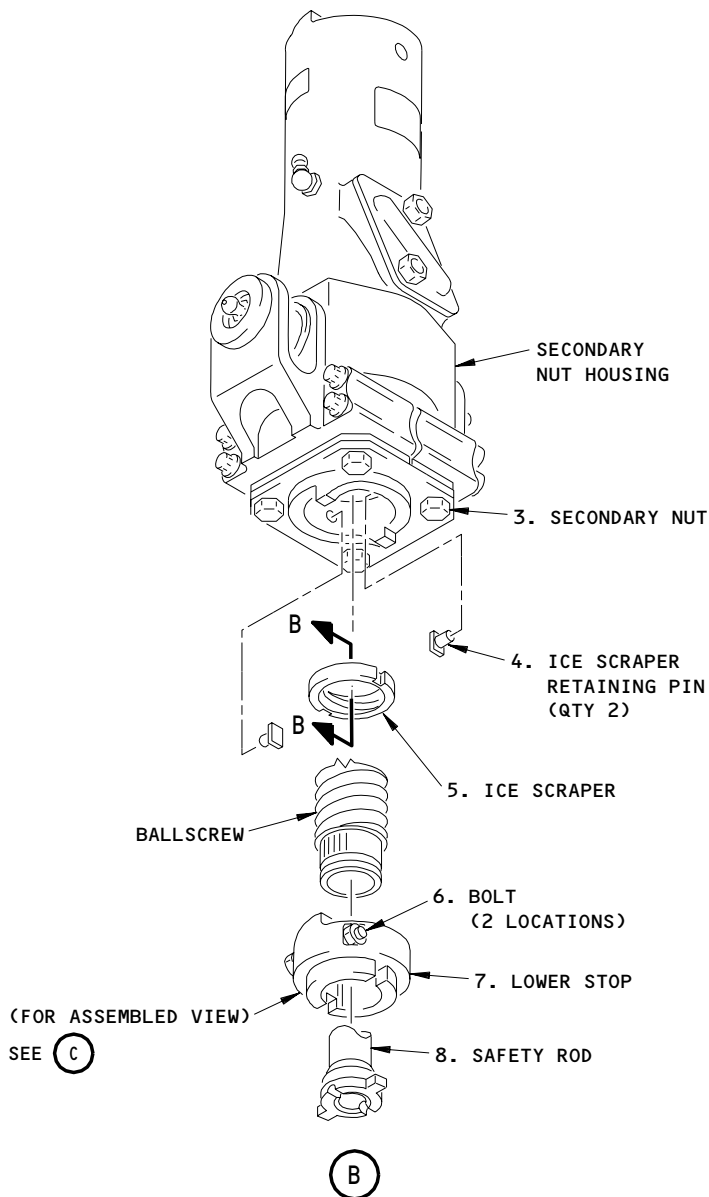
Stabilizer Trim Ballscrew Actuator Ice Scraper Installation  
Figure 401 (Sheet 1)

EFFECTIVITY  
AIRPLANES WITH THE SAFETY  
ROD ACCESS DOOR

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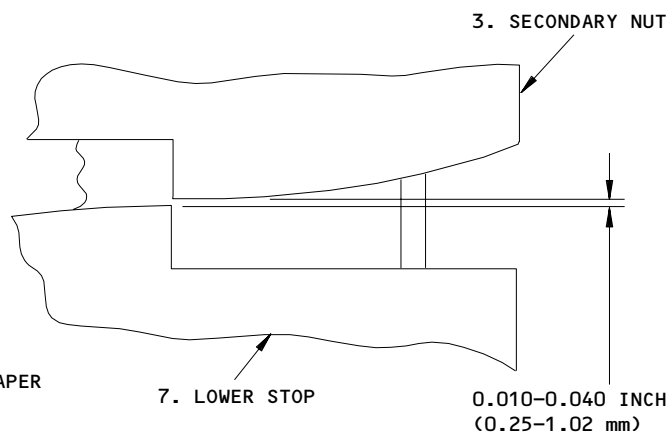
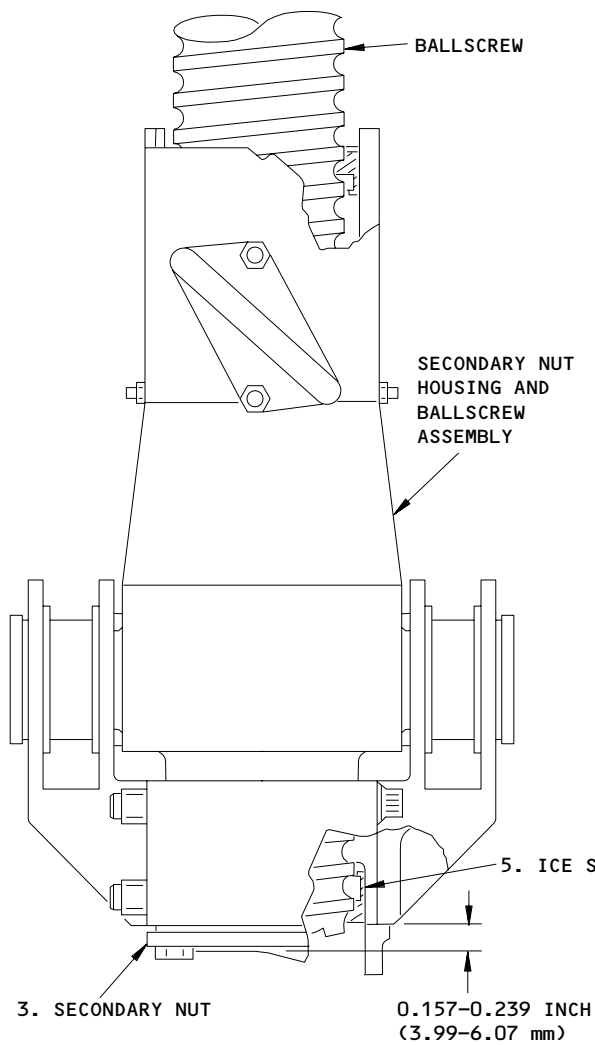
Stabilizer Trim Ballscrew Actuator Ice Scraper Installation  
Figure 401 (Sheet 2)

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AIRPLANES WITH THE SAFETY  
ROD ACCESS DOOR

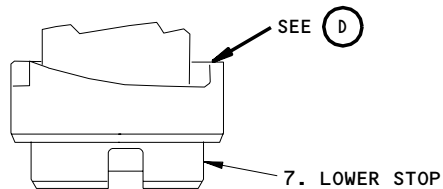
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**NOTE:** TO ENSURE MAXIMUM STOP SURFACE CONTACT, SET GAP WITH STOPS IN LINE (180° ROTATION FROM FULL STOP).



(C)

(D)

Stabilizer Trim Ballscrew Actuator Ice Scraper Installation  
Figure 401 (Sheet 3)

EFFECTIVITY  
AIRPLANES WITH THE SAFETY  
ROD ACCESS DOOR

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S 024-042

- (6) Do the tail skid shock strut/actuator removal procedure (AMM 32-71-05/401).

S 014-010

- (7) Open the stabilizer ballscrew safety rod access door, 311BL (AMM 06-42-00/201).

E. Remove the Ice Scraper

**NOTE:** If you make a mark to show where the safety rod and lower stop are aligned to the ballscrew, the installation can be easier.

S 034-011

- (1) Remove the safety rod.  
(a) Remove the retaining bolts (6) for the safety rod (8) from the lower stop (7) of the ballscrew assembly.  
(b) Remove the lock bolt (2) from the safety rod nut (1).  
(c) Using the socket A27062-13, loosen the safety rod nut (1) from the end of the safety rod (8).  
(d) Remove the safety rod (8) from the ballscrew.

S 034-012

- (2) Remove the lower stop (7) from the lower end of the ballscrew.

S 864-013

- (3) Pressurize the center hydraulic systems (AMM 29-11-00/201).

S 864-014

- (4) Put the CENTER STAB TRIM SHUTOFF valve switches on the P10 panel to NORM.

S 864-015

- (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:  
(a) 11C12, STAB TRIM SHUTOFF L  
(b) 11C13, STAB TRIM SHUTOFF CENTER

S 864-016

**WARNING:** DO NOT OPERATE THE BALLSCREW ACTUATOR SUCH THAT DIMENSION A IS LARGER THAN 26.46 INCHES (672.1 MILLIMETERS). THIS CAN CAUSE DAMAGE TO THE BALLSCREW ACTUATOR.

- (6) Slowly move the stabilizer such that Dimension A on the ballscrew actuator is  $26.41 \pm 0.05$  inches (670.8 +/- 1.3 millimeters) (Fig. 401).

S 864-017

- (7) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

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AIRPLANES WITH THE SAFETY  
ROD ACCESS DOOR

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- S 864-018
- (8) Put the C STAB TRIM shutoff valve switches on the P10 panel to CUTOUT.
- S 864-019
- (9) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER
- S 024-020
- (10) Remove the ice scraper (5) from the secondary nut housing.
- S 034-021
- (11) Remove the two ice scraper retaining pins (4).

TASK 27-41-18-424-022

3. Install the Ice Scraper (Fig. 401)

A. Equipment

- (1) Socket - A27062-13

B. References

- (1) AMM 06-42-00/201, Empennage Access Panels and Doors
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (3) AMM 32-71-05/401, Tail Skid Shock Strut/Actuator

C. Access

- (1) Location Zone
  - 311 Area Aft of Pressure Bulkhead to BS 1725 (Left)
- (2) Access Panel
  - 312BL Stabilizer Ballscrew Safety Rod Access Door
  - 312AR Service Access Door

D. Install the Ice Scraper

- S 434-023
- (1) Install the two ice scraper retaining pins (4).
- S 424-040
- (2) Install the ice scraper (5) in the secondary nut housing.
- (a) AIRPLANES WITH ICE SCRAPER P/N B-18834-7R;  
Make sure that the ice scraper (5) is installed with the felt seal toward the secondary nut housing (Fig. 401).
  - (b) AIRPLANES WITH ICE SCRAPER P/N B-18834B-7R;  
Make sure that the ice scraper (5) is installed with the chamfered end toward the secondary nut housing (Fig. 401).
  - (c) Make sure the leading edge of the scraper touches the lower edge of the threads in the secondary nut.

- S 864-024
- (3) Pressurize the center hydraulic system (AMM 29-11-00/201).
- S 864-025
- (4) Put the C STAB TRIM shutoff valve switches on the control stand panel, P10, to NORM.
- S 864-026
- (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11C12, STAB TRIM SHUTOFF
  - (b) 11C13, STAB TRIM SHUTOFF CENTER
- S 864-027
- WARNING:** DO NOT OPERATE THE BALLSCREW ACTUATOR SUCH THAT DIMENSION A IS LARGER THAN 26.46 INCHES (672.1 MILLIMETERS). THIS CAN CAUSE DAMAGE TO THE BALLSCREW ACTUATOR.
- (6) Use the STAB TRIM levers or switches to move the stabilizer until Dimension A on the stabilizer ballscrew actuator is 1.73 ±0.05 inches (43.9 +/- 1.3 millimeters).
- (a) Make sure the threads in the ice scraper engage with the ballscrew threads.
- S 864-038
- (7) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- S 864-031
- (8) Put the C STAB TRIM shutoff valve switches in the P10 panel to CUTOUT.
- S 864-032
- (9) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER
- S 224-033
- (10) Make sure the distance from the bottom of the secondary nut to the lower end of the engaged ice scraper is between 0.157 to 0.239 inches (3.99 to 6.07 millimeters) (Fig. 401, Sheet 3).
- S 434-034
- (11) Install the lower stop (7) on the ballscrew.
- (a) Install the lower stop (7) aligned with the ballscrew mark made during the removal.

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AIRPLANES WITH THE SAFETY  
ROD ACCESS DOOR

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- (b) To ensure maximum stop surface contact, set the gap between the lower stop (7) and the secondary ballnut (3) stop to 0.010 - 0.040 inches (0.25 - 1.02 millimeters) with the stops in line (180 degrees rotation from full stop engagement, as shown in Fig. 401, Sheet 3.)

S 434-035

- (12) Install the safety rod.
  - (a) Put the safety rod (8) in the ballscrew.
  - (b) Using socket A27062-13, tighten the safety rod nut onto the end of the safety rod. Torque the safety rod nut to 100 - 130 pound-inches (11.3 - 14.7 newton-meters) and back off the safety rod nut to align the hole for the lock bolt (2).
  - (c) Install the lock bolt into the safety rod nut.
  - (d) Install the retaining bolt for the safety rod (8) in the lower stop (7) of the ballscrew assembly.

S 024-044

- (13) Do the tail skid shock strut/actuator installation procedure (AMM 32-71-05/401).

E. Put the Airplane Back to Its Usual Condition

S 864-036

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER

S 864-039

- (2) Move the L and C STAB TRIM shutoff valve switch on the P10 panel to NORM.

S 414-037

- (3) Close the stabilizer ballscrew safety rod access door, 311BL (AMM 06-42-00/201).

S 014-059

- (4) Close the service access door, 312AR (AMM 06-42-00/201).

STABILIZER TRIM RELIEF VALVE – REMOVAL/INSTALLATION

1. General

- A. This procedure has two tasks. The first task removes the Stabilizer Trim Relief Valve from between the Left STCM and the elevator PCA. The other task installs the Stabilizer Trim Relief Valve.

TASK 27-41-19-004-001

2. Remove the Stabilizer Trim Relief Valve

A. General

- (1) This task contains the procedures to remove the component which follows:

(a) Stabilizer Trim Relief Valve

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels  
(2) AMM 12-12-01/301, Hydraulic Systems – Servicing  
(3) AMM 24-22-00/201, Electrical Power – Control  
(4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zone  
311/312 Area Aft of Pressure Bulkhead to BS 1725
- (2) Access Panels  
312 AR Forward Stabilizer Compartment

D. Prepare for the Removal

S 864-006

- (1) Remove the pressure from the left and center hydraulic systems (AMM 29-11-00/201).

S 864-076

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

S 864-077

- (3) Put the L and C STAB TRIM shutoff valve switches on the control stand panel, P10, to the CUTOUT position.

S 014-078

**WARNING:** STAY OFF OF THE SERVICE ACCESS DOOR, 312AR. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (4) Open the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

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S 864-002

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11A36, ALT STAB TRIM (if installed)
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER

E. Remove the Stabilizer Trim Relief Valve (Fig. 401)

S 034-007

- (1) Disconnect the hydraulic lines from the relief valve.

S 034-008

- (2) Seal the hydraulic lines with caps and put plugs in the ports of the stabilizer trim relief valve, as necessary.

S 034-079

- (3) Remove the retainer bracket screw from the retainer bracket and then remove the stabilizer trim relief valve from the retainer bracket.

F. Install the Relief Valve (Fig. 401).

S 434-062

- (1) Install the relief valve in the retainer bracket.

S 424-063

- (2) Install the retainer bracket on the airplane structure using the retainer bracket screw.

S 034-080

**CAUTION:** REMOVE ANY CAPS OR PLUGS FROM THE HYDRAULIC LINES AND THE RELIEF VALVE.

- (3) Apply hydraulic lubricant or hydraulic fluid to the threads of the relief valve.

S 434-064

- (4) Install the hydraulic lines on the relief valve.

**NOTE:** When installing the relief valve, make sure that the arrow is pointing down.

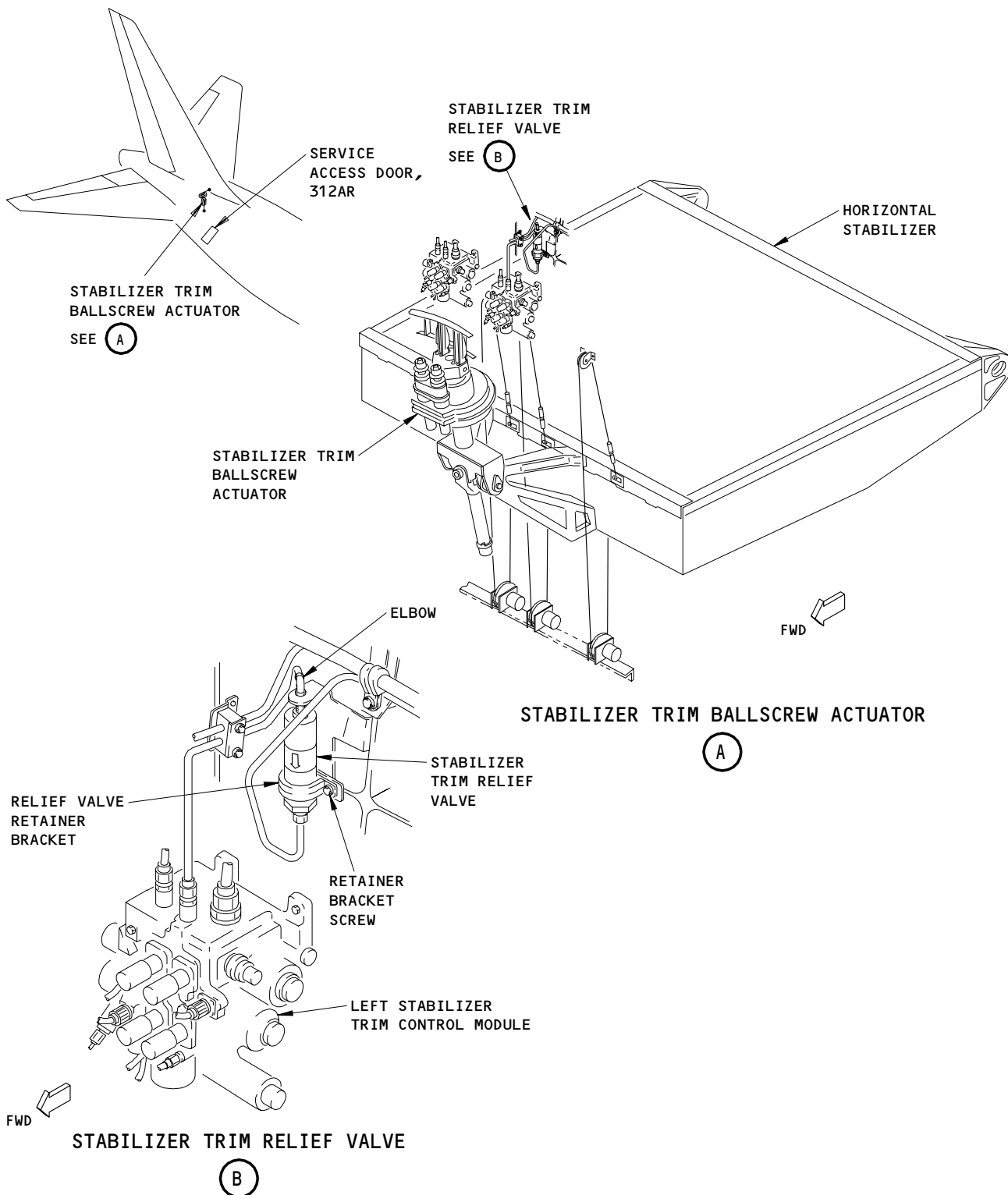
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Installation of the Stabilizer Trim Relief Valve  
Figure 401

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G. Put the Airplane Back to Its Usual Condition

S 864-067

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11A36, ALT STAB TRIM (if installed)
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER

S 864-084

- (2) Put the L and C STAB TRIM shutoff valve switches on the control stand panel, P10, to the NORM position.

S 614-068

- (3) Fill the reservoirs in the left and center hydraulic systems, as necessary (AMM 12-12-01/301).

S 864-069

- (4) Pressurize the left and center hydraulic systems (AMM 29-11-00/201).

S 794-070

- (5) Make sure there are no leaks on the relief valve connections.

S 114-071

**CAUTION:** QUICKLY CLEAN THE INSTALLATION AREA OF ALL HYDRAULIC FLUID.  
THE HYDRAULIC FLUID CAN CAUSE DAMAGE TO THE AIRPLANE EQUIPMENT.

- (6) Clean all the hydraulic fluid from the installation area (AMM 12-25-01/301).

S 864-074

- (7) Remove hydraulic power if it is not necessary (AMM 29-11-00/201).

S 864-083

- (8) Remove electrical power if not necessary (AMM 24-22-00/201).

S 864-082

- (9) Close the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

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STABILIZER TRIM BALLSCREW SAFETY ROD – REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove/install the safety rod on the stabilizer trim ballscrew actuator.

TASK 27-41-20-024-001

2. Remove the Safety Rod (Fig. 401)

A. Equipment

- (1) Socket, Safety Rod Nut – A27062-13

B. References

- (1) AMM 06-42-00/201, Empennage Access Panels and Doors  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(3) AMM 32-71-05/401, Tail Skid Shock Strut/Actuator

C. Access

(1) Location Zone

311 Area Aft of Pressure Bulkhead to BS 1725 (Left)

(2) Access Panel

311BL Stabilizer Ballscrew Safety Rod Access Door

312AR Service Access Door

D. Prepare for the Removal

S 864-002

- (1) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-005

- (2) Use the STAB TRIM levers or switches to move the stabilizer until Dimension A on the stabilizer ballscrew actuator is  $1.73 \pm 0.05$  inches (43.9 +/- 1.3 millimeters).

S 864-008

- (3) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-009

- (4) Put the C STAB TRIM shutoff valve switches on the control stand panel, P10, to CUTOUT.

S 864-011

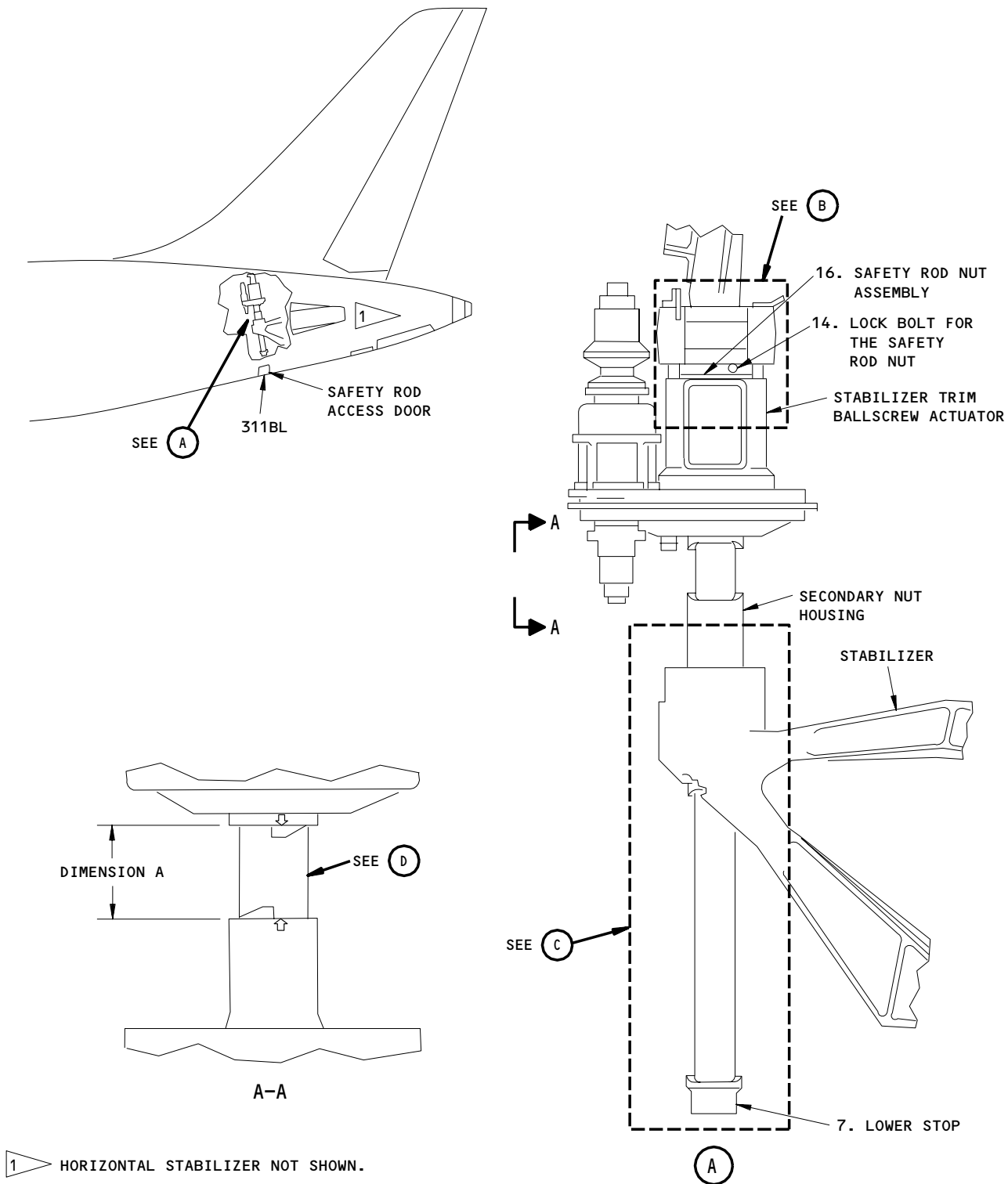
- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11C12, STAB TRIM SHUTOFF L  
(b) 11C13, STAB TRIM SHUTOFF CENTER

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AIRPLANES WITH THE SAFETY  
ROD ACCESS DOOR

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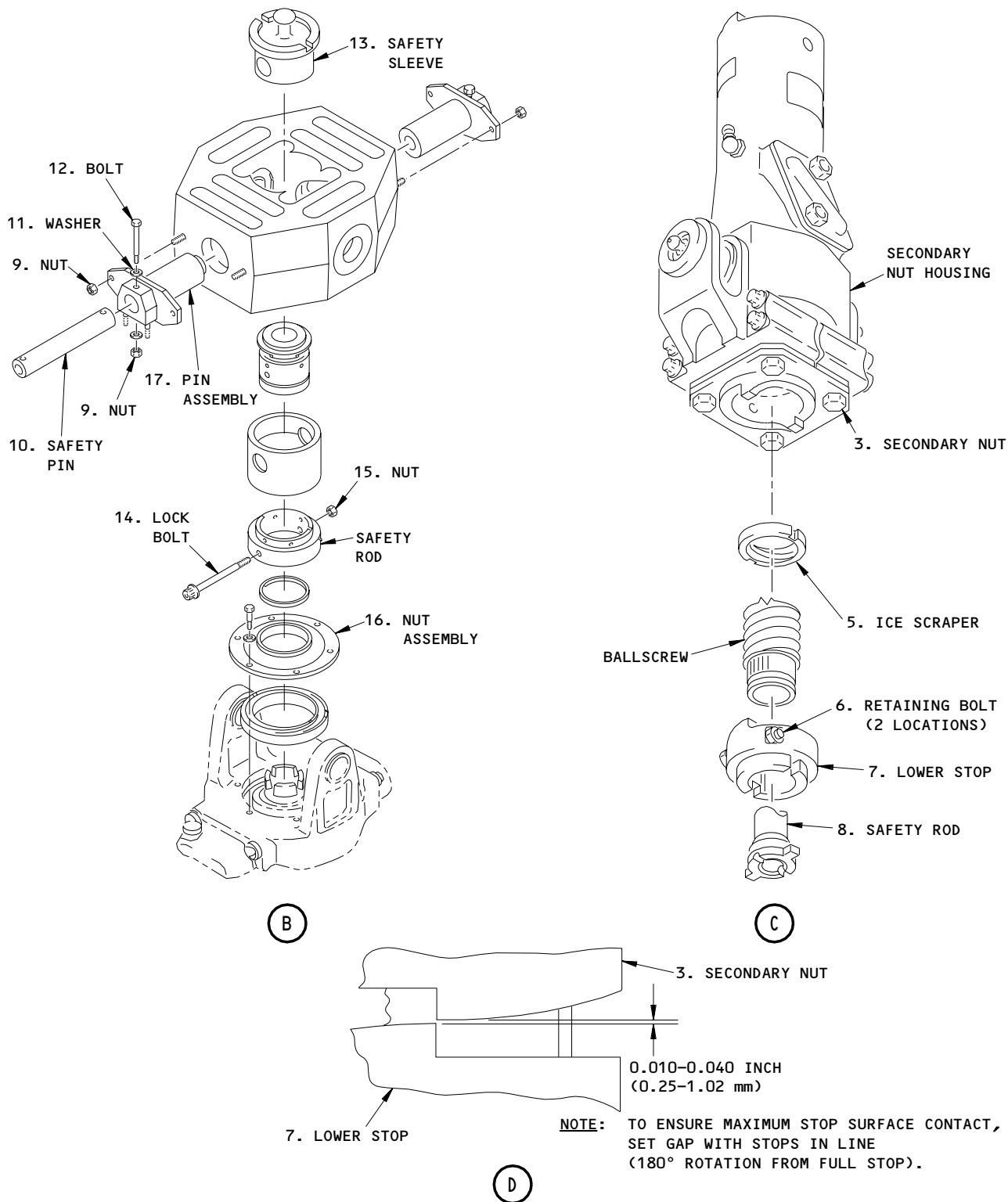
Stabilizer Trim Ballscrew Safety Rod Installation  
Figure 401 (Sheet 1)

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AIRPLANES WITH THE SAFETY  
ROD ACCESS DOOR

27-41-20

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Stabilizer Trim Ballscrew Safety Rod Installation  
Figure 401 (Sheet 2)

EFFECTIVITY  
AIRPLANES WITH THE SAFETY  
ROD ACCESS DOOR

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S 024-013

- (6) Do the tail skid shock strut/actuator removal procedure (AMM 32-71-05/401).

S 014-014

- (7) Open the stabilizer ballscrew safety rod access door, 311BL (AMM 06-42-00/201).

E. Remove the Safety Rod

**NOTE:** If you make a mark to show where the safety rod and lower stop are aligned to the ballscrew, the installation can be easier.

S 034-015

- (1) Remove the safety rod.
- (a) Remove the safety pin nuts (9), washers (11), and bolts (12).
    - 1) Remove the safety pin (10) and safety sleeve (13).
  - (b) Remove the safety rod retaining bolts (6) from the lower stop (7) of the ballscrew assembly.
  - (c) Remove the lock bolt (14) and nut (15) from the safety rod nut (16).
  - (d) Using the socket A27062-13, loosen the safety rod nut assembly (16) from the end of the safety rod (8).
  - (e) Remove the safety rod (8) from the ballscrew.

S 864-017

- (2) Pressurize the center hydraulic systems (AMM 29-11-00/201).

S 864-018

- (3) Put the CENTER STAB TRIM SHUTOFF valve switches on the P10 panel to NORM.

S 864-020

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER

S 864-021

**WARNING:** DO NOT OPERATE THE BALLSCREW ACTUATOR SUCH THAT DIMENSION A IS LARGER THAN 26.46 INCHES (672.1 MILLIMETERS). THIS CAN CAUSE DAMAGE TO THE BALLSCREW ACTUATOR.

- (5) Slowly move the stabilizer such that Dimension A on the ballscrew actuator is  $26.41 \pm 0.05$  inches (670.8 +/- 1.3 millimeters) (Fig. 401).

S 864-022

- (6) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-023

- (7) Put the C STAB TRIM shutoff valve switches on the P10 panel to CUTOUT.

S 864-025

- (8) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:  
(a) 11C12, STAB TRIM SHUTOFF L  
(b) 11C13, STAB TRIM SHUTOFF CENTER

TASK 27-41-20-424-028

3. Install the Safety Rod (Fig. 401)

A. Equipment

- (1) Socket - A27062-13

B. References

- (1) AMM 06-42-00/201, Empennage Access Panels and Doors  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(3) AMM 32-71-05/401, Tail Skid Shock Strut/Actuator

C. Access

- (1) Location Zone  
311 Area Aft of Pressure Bulkhead to BS 1725 (Left)
- (2) Access Panel  
312BL Stabilizer Ballscrew Safety Rod Access Door  
312AR Service Access Door

D. Install the Safety Rod

S 864-031

- (1) Pressurize the center hydraulic system (AMM 29-11-00/201).

EFFECTIVITY  
AIRPLANES WITH THE SAFETY  
ROD ACCESS DOOR

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S 864-032

- (2) Put the C STAB TRIM shutoff valve switches on the control stand panel, P10, to NORM.

S 864-034

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11C12, STAB TRIM SHUTOFF
  - (b) 11C13, STAB TRIM SHUTOFF CENTER

S 864-035

**WARNING:** DO NOT OPERATE THE BALLSCREW ACTUATOR SUCH THAT DIMENSION A IS LARGER THAN 26.46 INCHES (672.1 MILLIMETERS). THIS CAN CAUSE DAMAGE TO THE BALLSCREW ACTUATOR.

- (4) Use the STAB TRIM levers or switches to move the stabilizer until Dimension A on the stabilizer ballscrew actuator is  $1.73 \pm 0.05$  inches (43.9 +/- 1.3 millimeters).

S 864-036

- (5) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-037

- (6) Put the C STAB TRIM shutoff valve switches in the P10 panel to CUTOUT.

S 864-039

- (7) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER

S 434-041

- (8) Install the lower stop (7) on the ballscrew.
- (a) Install the lower stop (7) aligned with the ballscrew mark made during the removal.
  - (b) To ensure maximum stop surface contact, set the gap between the lower stop (7) and the secondary ballnut (3) stop to 0.010 - 0.040 inches (0.25 - 1.02 millimeters) with the stops in line (180 degrees rotation from full stop engagement, as shown in Fig. 401, Sheet 2.)

S 434-042

- (9) Install the safety rod.
- (a) Put the safety rod (8) in the ballscrew.
  - (b) Using socket A27062-13, tighten the safety rod nut (16) onto the end of the safety rod (8). Torque the safety rod nut to 100 - 130 pound-inches (11.3 - 14.7 newton-meters) and back off the safety rod nut (16) to align the hole for the lock bolt (14).
  - (c) Install the lock bolt (14) and lock bolt nut (15) into the safety rod nut (16).
  - (d) Install the retaining bolts (6) for the safety rod (8) in the lower stop (7) of the ballscrew assembly.
  - (e) Install the safety sleeve (13) in the safety nut assembly (16).
  - (f) Install the safety pin (10) through the pin assemblies (17) and safety sleeve (13) and secure with the bolts (12), washers (11), and nuts (9).

S 024-044

- (10) Do the tail skid shock strut/actuator installation procedure (AMM 32-71-05/401).

E. Put the Airplane Back to Its Usual Condition

S 864-045

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C12, STAB TRIM SHUTOFF L
  - (b) 11C13, STAB TRIM SHUTOFF CENTER

S 864-046

- (2) Move the L and C STAB TRIM shutoff valve switch on the P10 panel to NORM.

S 414-048

- (3) Close the stabilizer ballscrew safety rod access door, 311BL (AMM 06-42-00/201).

S 014-050

- (4) Close the service access door, 312AR (AMM 06-42-00/201).

EFFECTIVITY  
AIRPLANES WITH THE SAFETY  
ROD ACCESS DOOR

27-41-20

STABILIZER TRIM POSITION INDICATING SYSTEM -  
DESCRIPTION AND OPERATION

1. General (Fig. 1 and 2)

- A. The stabilizer trim position indicating system provides indication of stabilizer trim position and motion.
- B. There are two stabilizer position indicators on the control stand, one for the captain and one for the first officer. Both indicate stabilizer position and motion.
- C. Three Limit Switch and Position Transmitter Modules (LSTMs) provide electrical data to the indication system, and also provide the following:
  - (1) Electrical travel limits to the stabilizer trim.
  - (2) Data for takeoff configuration warning and annunciation.
  - (3) Stabilizer position data for Flap/Stabilizer Position Modules (FSPMs), Flight Control Computers (FCCs), Stabilizer Trim/Aileron Lockout Modules (SAMs), and the Flight Data Recorder.
  - (4) 767-200 AIRPLANES;  
Selection of the appropriate control column cutoff switches according to elevator neutral shift status.

NOTE: 767-300 AIRPLANES;

Elevator neutral shift is deleted and this function does not apply.

- D. Stabilizer position input to the LSTM's is provided by three cable systems, which are driven by stabilizer motion.

2. Component Details

- A. Limit Switch and Position Transmitter Modules (LSTMs) (Fig. 2)
  - (1) The three LSTMs are identical and interchangeable, but each LSTM provides different functions, as determined by its location and the airplane wiring connected to it.
  - (2) Each LSTM includes a housing with an input shaft on one end, which drives these internal components:
    - (a) Two cam-actuated stabilizer electrical travel limit switches.
      - 1) The electrical travel limit switches interrupt the trim signal from the SAMs (Stabilizer Trim/Aileron Lockout Modules) to the STCM (Stabilizer Trim Control Module) at the stabilizer up and down electrical travel limits.

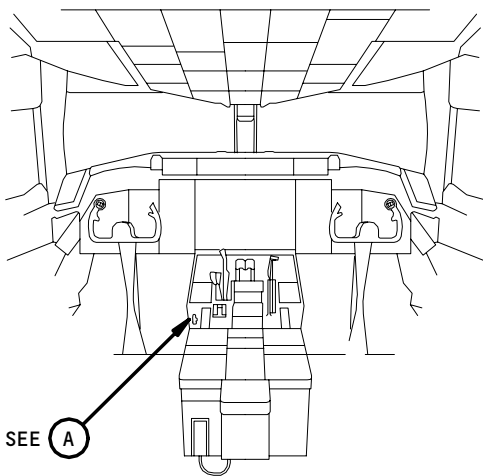
EFFECTIVITY

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27-48-00

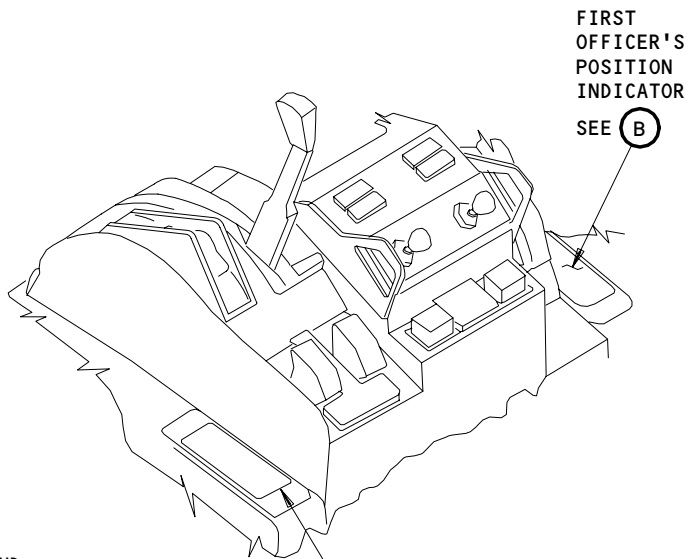
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SEE (A)

FLIGHT DECK COMPARTMENT

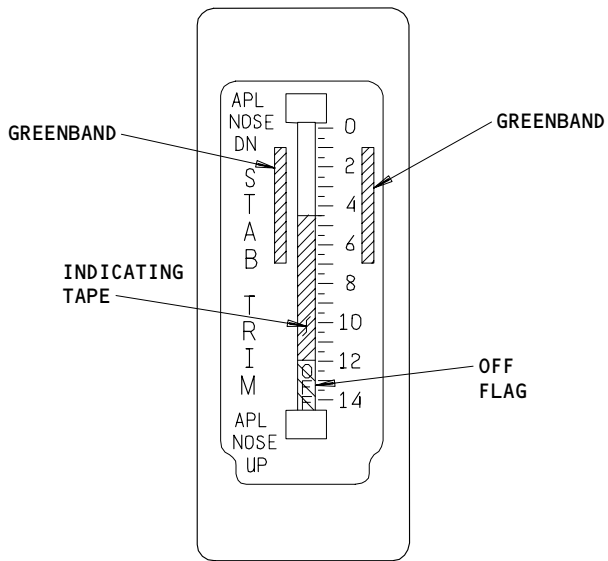


FIRST OFFICER'S POSITION INDICATOR  
SEE (B)

CAPTAIN'S POSITION INDICATOR  
SEE (B)

QUADRANT STAND (P10)

(A)



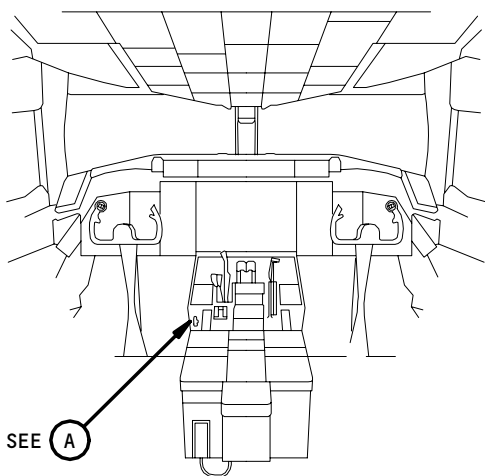
STABILIZER POSITION INDICATOR

(B)

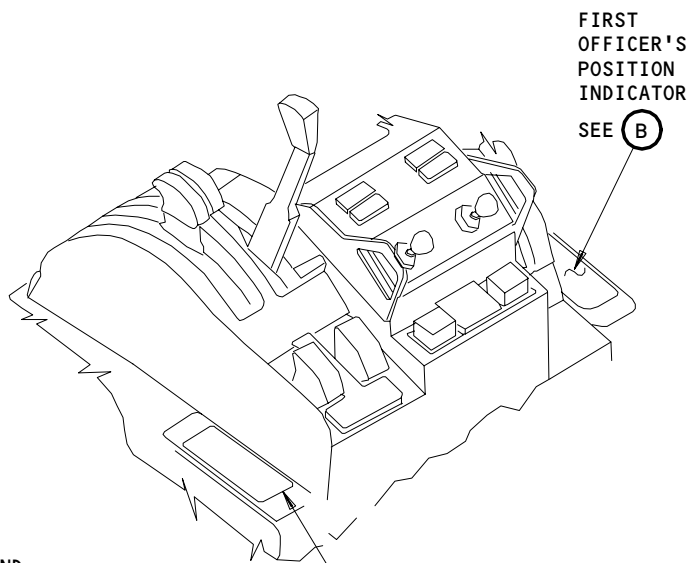
Stabilizer Position Indication  
Figure 1 (Sheet 1)

EFFECTIVITY  
AIRPLANES WITH ALT STAB TRIM  
SWITCHES ON THE CONTROL STAND

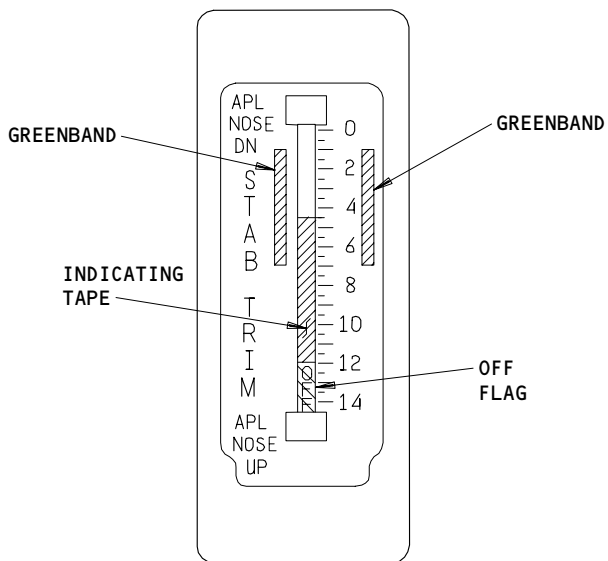
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FLIGHT DECK COMPARTMENT



QUADRANT STAND (P10)



STABILIZER POSITION INDICATOR

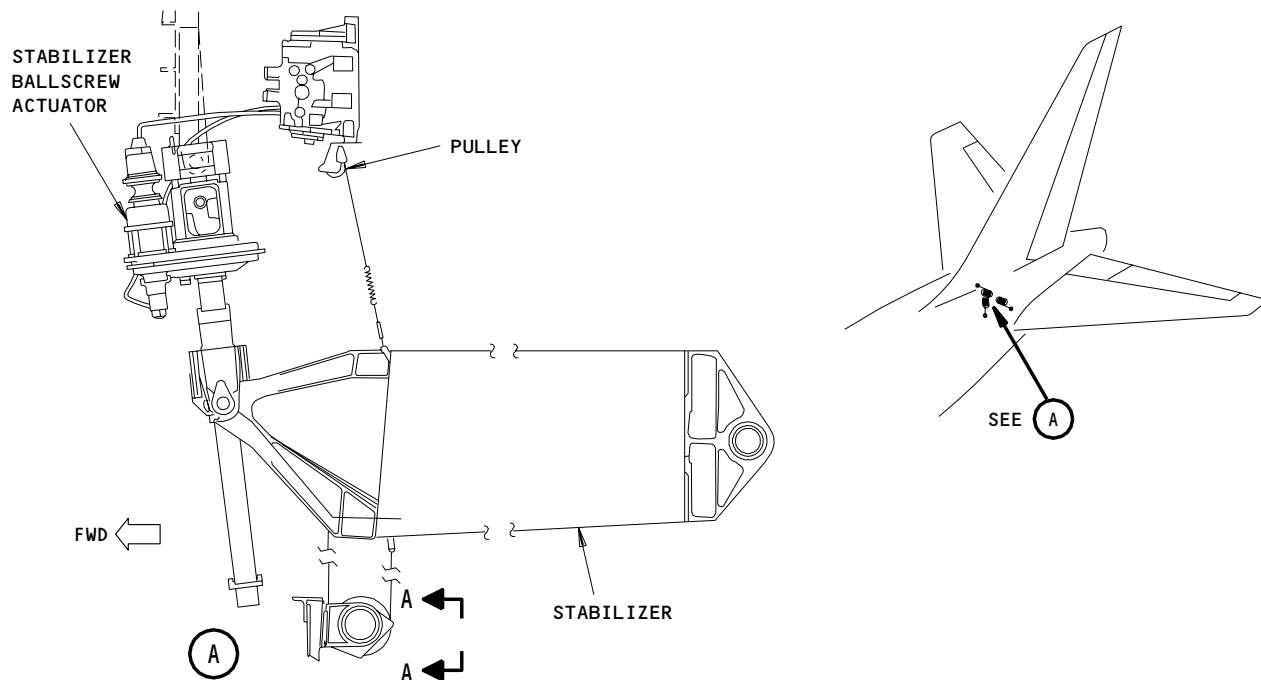
(B)

Stabilizer Position Indication  
Figure 1 (Sheet 2)

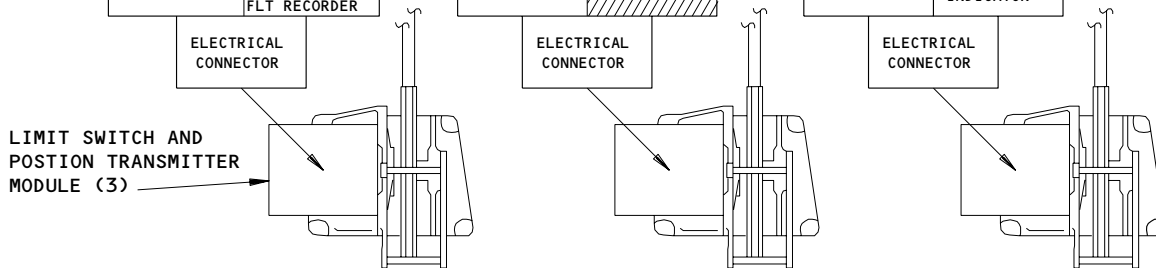
EFFECTIVITY  
AIRPLANES WITH ALT STAB TRIM  
LEVERS ON THE CONTROL STAND

679466

27-48-00



LEFT		CENTER		RIGHT	
COMPONENT	FUNCTION	COMPONENT	FUNCTION	COMPONENT	FUNCTION
SWITCH 1	UP LIMIT	SWITCH 1	UP LIMIT	SWITCH 1	UP LIMIT
SWITCH 3	DOWN LIMIT	SWITCH 3	DOWN LIMIT	SWITCH 3	DOWN LIMIT
SWITCH 4	NEUTRAL SHIFT	SWITCH 4	NEUTRAL SHIFT	SWITCH 4	NEUTRAL SHIFT
SWITCH 5	GREEN BAND	SWITCH 5	GREEN BAND	SWITCH 5	GREEN BAND
RVDT	FSPM	RVDT	FSPM	RVDT	FSPM
SYNCHRO	CAPTAIN'S INDICATOR AND FLT RECORDER	SYNCHRO	NOT USED	SYNCHRO	F/O'S INDICATOR



**LSTMS - LEFT, CENTER AND RIGHT  
(VIEW IN THE FORWARD DIRECTION)  
A-A**

**Stabilizer Trim Limit Switch and Position Transmitter Module  
Figure 2**

EFFECTIVITY	ALL
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**27-48-00**



- 2) 767-300 AIRPLANES;  
The stabilizer up electrical travel limit is controlled by two switches, according to the position of the flaps. When the flaps are not retracted, the trim limit relays will select the 0.25 units of trim limit switch. If the flaps are retracted, the trim UP limit relays will select the 1.5 units of trim UP limit switch.
  - (b) One cam-actuated neutral shift switch. (767-200 Airplanes)
    - 1) 767-200 AIRPLANES;  
A neutral shift switch selects the appropriate of two control column aft cutoff switches to be functional in the event of a runaway stabilizer. Prior to neutral shift (AMM 27-31-00/501), the 2 to 2.5 degree control column aft cutoff switch is selected. After neutral shift, the 3 to 3.5 degree control column aft cutoff switch is selected.
    - 2) 767-300 AIRPLANES;  
There is no neutral shift, and no neutral shift switch exists.
  - (c) One cam-actuated greenband switch.
    - 1) The greenband switch signals the takeoff configuration card to issue a takeoff configuration warning and annunciation if the stabilizer trim position is outside the greenband range and the airplane is in a takeoff configuration.
  - (d) A gear driven rotary variable differential transducer (RVDT).
    - 1) The gear driven RVDT signals stabilizer position to the FSPM which relays the data to FCC, SAM, and other systems.
  - (e) A gear driven position transmitter synchro.
    - 1) The gear driven position transmitter synchro drives the stabilizer position indicator and signals the flight data recorder.
  - (3) The right LSTM drives the right stabilizer position indicator and signals data to the right SAM. The left LSTM drives the left stabilizer position indicator and signals data to the left SAM.
  - (4) The center LSTM signals the takeoff configuration card and the FSPM.
  - (5) The three LSTM's are mounted just forward of and below the stabilizer. Access to the LSTM's is through the forward stabilizer compartment door.
- B. Stabilizer Trim Position Indicators (Fig. 2)
- (1) The position indicators are powered by 28 volts ac.
  - (2) The captain's indicator is driven by the left LSTM. The first officer's indicator is driven by the right LSTM.
  - (3) The indicating tape reflects stabilizer trim values in units of trim. One unit of trim is approximately one degree of stabilizer movement. The position indicator scale covers the range of 0.0 to 14.2 units of trim.
  - (4) The position indicator greenband shows the stabilizer trim limits for safe takeoff. The greenband range is 0.25 to 7 units of trim.
  - (5) The indicators can be replaced on the control stand without affecting their calibration.

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3. Operation

A. Functional Description

- (1) The LSTM quadrants are connected to the stabilizer with cables. Stabilizer movement causes the cables to turn the LSTM quadrants.
- (2) As the LSTM quadrants rotate, switches, RVDTs, and synchros within the LSTMs are actuated to drive the stabilizer position indicators, limit the stabilizer electrical trim, select the appropriate control column cutoff switches, signal the configuration warning card, and provide stabilizer position to the FSPMs, SAMs, FCCs, and flight data recorder.
- (3) The system is on whenever these circuit breakers on overhead circuit breaker panel P11 are closed:
  - (a) 11H10, LEFT STAB TRIM POS IND
  - (b) 11H19, STAB TRIM POS IND RIGHT
- (4) The indicating tapes of the stabilizer trim position indicators show stabilizer position and movement during normal operation.
- (5) Loss of input signal from an LSTM to its position indicator causes that indicating tape to be all black, but no OFF indication flag will appear.
- (6) Loss of 28V DC power to a position indicator causes the indicating tape to be all black, and an OFF indication flag will appear.

EFFECTIVITY

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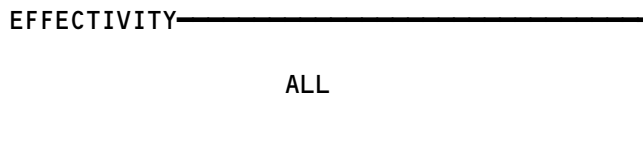

**BOEING**  
 767  
 FAULT ISOLATION/MAINT MANUAL

STABILIZER TRIM POSITION INDICATING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKER -	1		FLT COMPT, P11	
STAB TRIM POS IND L, C1002		1	11H10	*
STAB TRIM POS IND R, C1009		1	11H19	*
INDICATOR - STAB TRIM POSITION, N68,N69	1	2	FLT COMPT, P10	27-48-06
MODULE - STAB TRIM LIMIT SW AND POS XMTR, M519,M520,M521	2	3	312AR, 48 SECT STAB TRIM BALLSCREW ACTUATOR	27-48-01

\* SEE THE WDM EQUIPMENT LIST

Stabilizer Trim Position Indicating System - Component Index  
Figure 101



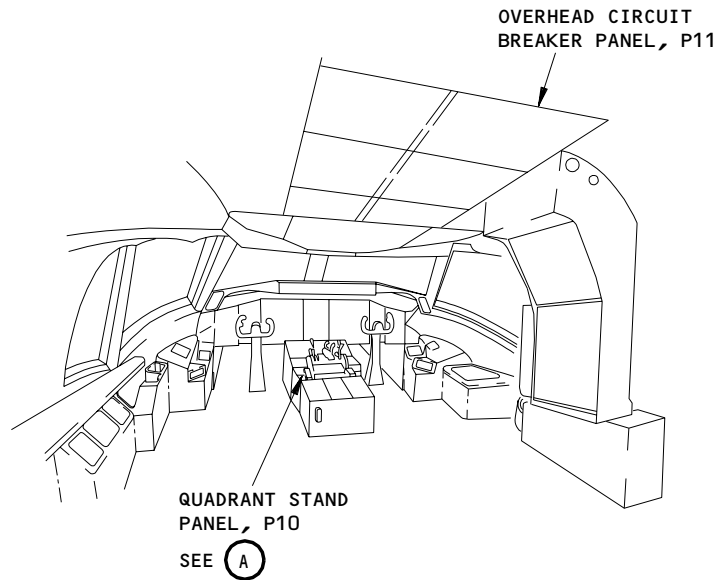
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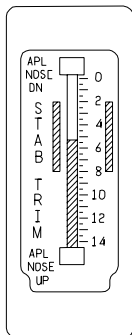
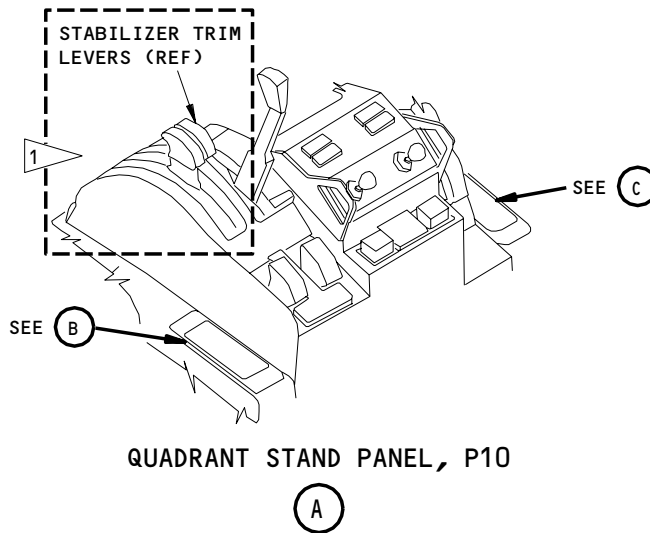
Page 101  
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767  
FAULT ISOLATION/MAINT MANUAL

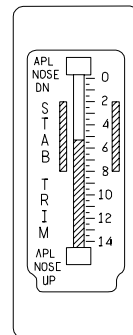


FLIGHT COMPARTMENT



CAPTAIN'S STABILIZER POSITION INDICATOR, N68

(B)



FIRST/OFFICER'S STABILIZER POSITION INDICATOR, N69

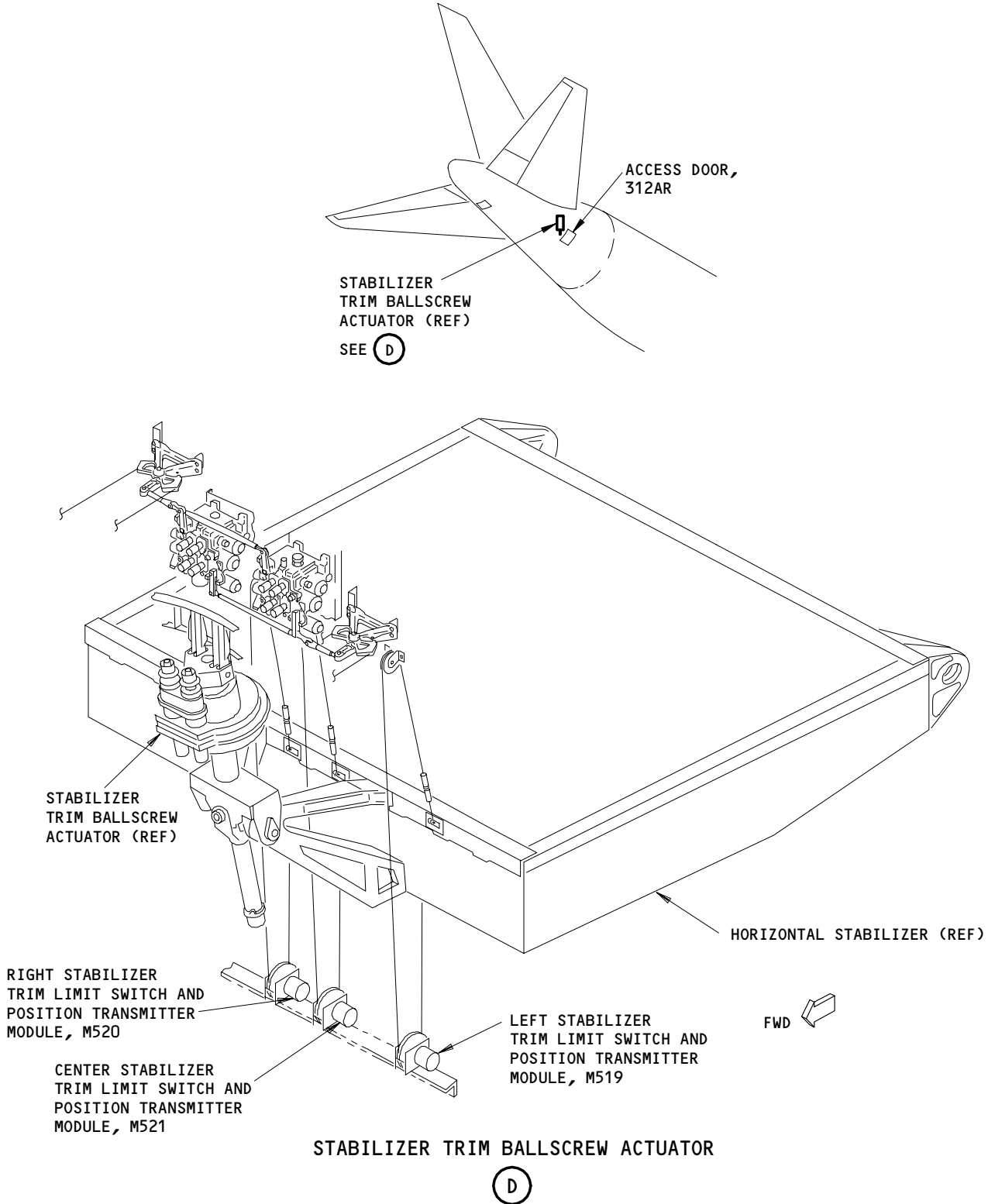
(C)

- 1 SAS 150-154
- 2 ALL MTH AIRPLANES, AND ALL EXCEPT SAS 150-154

Stabilizer Trim Position Indicating System - Component Location  
Figure 102 (Sheet 1)

EFFECTIVITY	ALL
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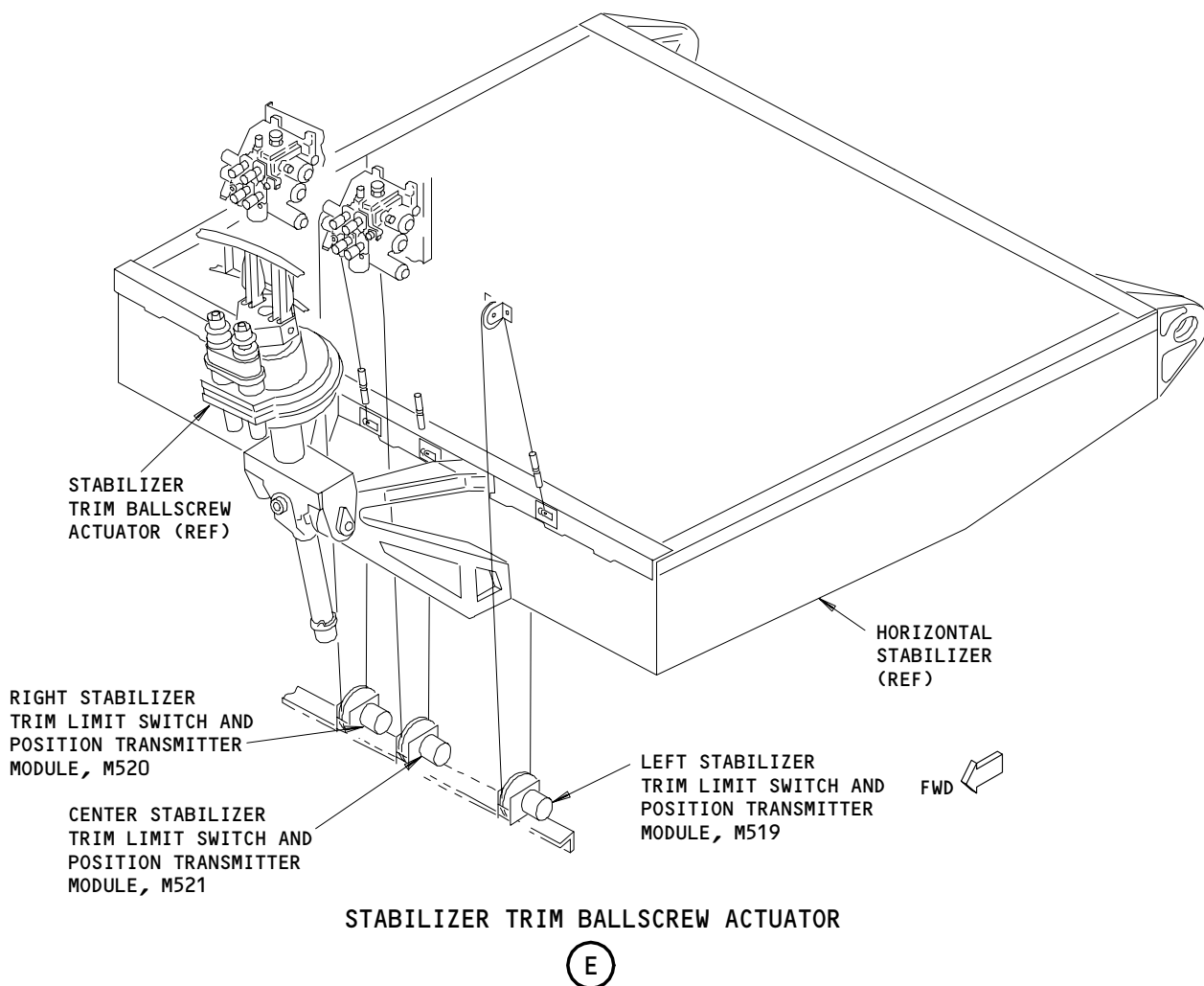
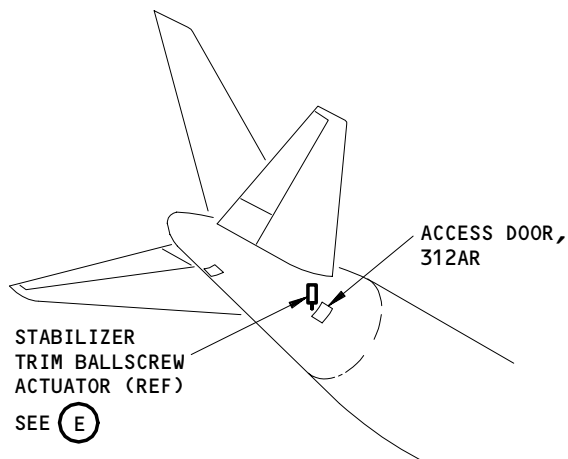
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Stabilizer Trim Position Indicating System - Component Location  
Figure 102 (Sheet 2)

EFFECTIVITY  
SAS 150-154

27-48-00



Stabilizer Trim Position Indicating System - Component Location  
Figure 102 (Sheet 3)

EFFECTIVITY  
ALL MTH AIRPLANES AND ALL EXCEPT  
SAS 150-154

27-48-00

STABILIZER TRIM POSITION INDICATING SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure refers to the position indicating system for the horizontal stabilizer trim system only.
- B. This procedure contains the operational tests, adjustment, and system tests for the position indicating system.

TASK 27-48-00-715-006

2. Operational Test – Position Indicating System

A. General

- (1) No ground support equipment is necessary to do the operational test for the position indicating system. This test lets you monitor all functions of the position indicating system to make sure it operates correctly.

B. References

- (1) AMM 24-22-00/201, Electrical Power – Control
- (2) AMM 27-41-00/501, Horizontal Stabilizer Trim Control System
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones  
211/212 Control Cabin

D. Position Indicating System – Operational Test

S 865-007

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

S 215-008

- (2) Make sure that these circuit breakers on the overhead panel, P11, are closed:
  - (a) 11A36, ALT STAB TRIM (if installed)
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H10, LEFT STAB TRIM POS IND
  - (e) 11H19, STAB TRIM POS IND R

S 215-009

- (3) Make sure the L and C STAB TRIM shutoff valve switches on the control stand panel, P10, are in the NORM position.

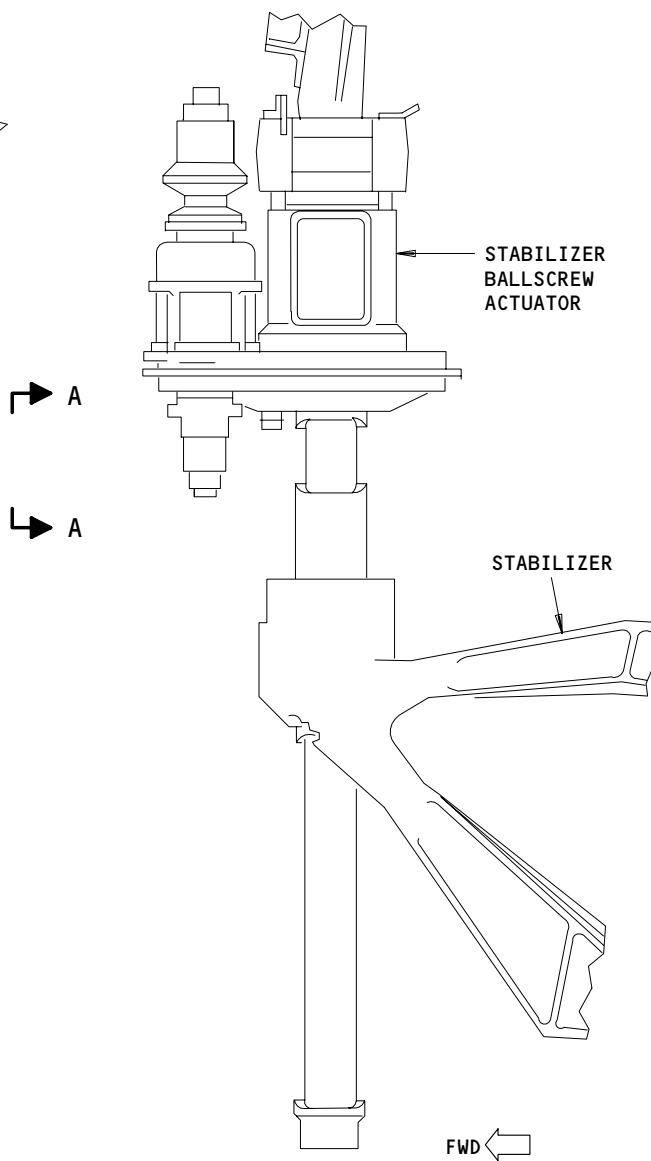
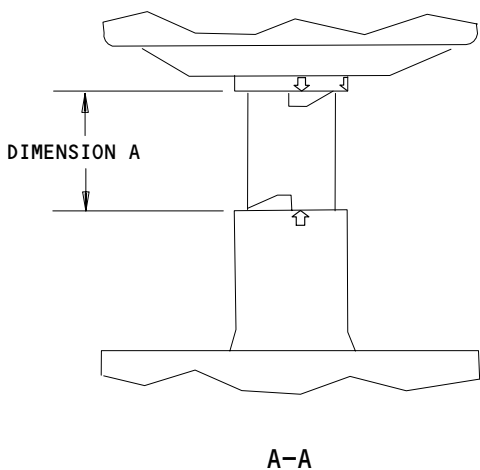
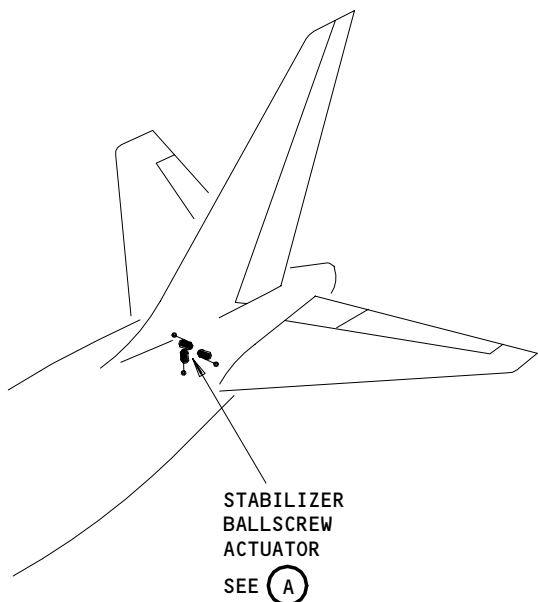
EFFECTIVITY

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STABILIZER BALLSCREW ACTUATOR

(A)

Stabilizer Trim Ballscrew Actuator  
Figure 501

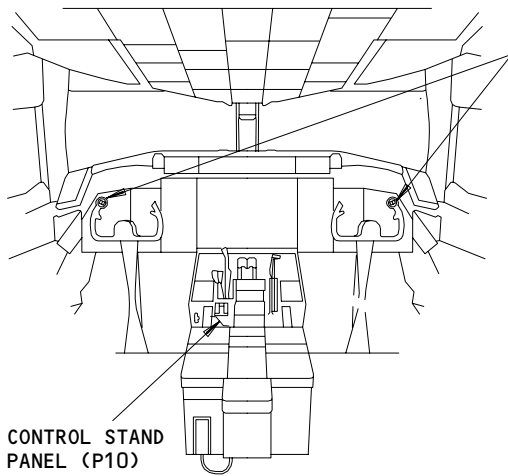
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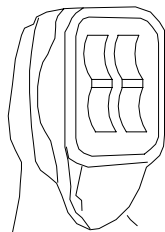




CONTROL STAND PANEL (P10)

SEE (A)

FLIGHT COMPARTMENT



CONTROL WHEEL SWITCHES  
(EXAMPLE)

(B)

CONTROL WHEEL SWITCHES

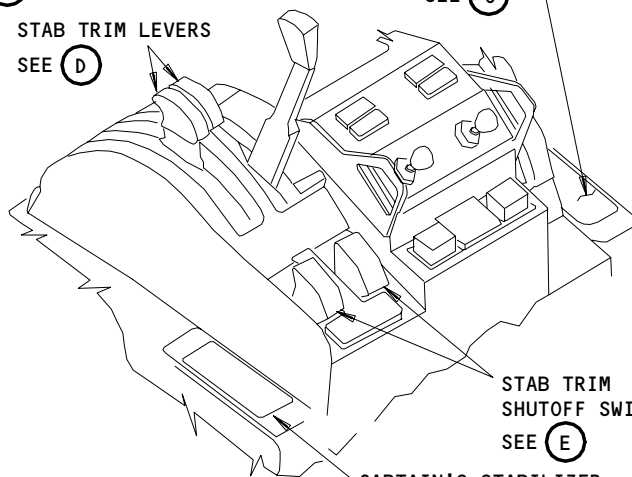
SEE (B)

STAB TRIM LEVERS

SEE (D)

FIRST OFFICER'S STABILIZER POSITION INDICATOR

SEE (C)



STAB TRIM SHUTOFF SWITCHES

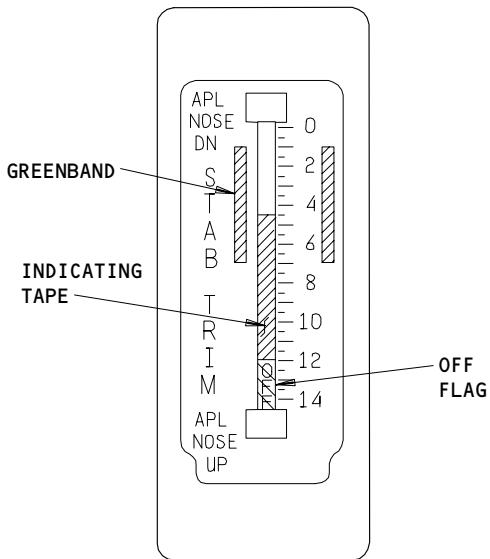
SEE (E)

CAPTAIN'S STABILIZER POSITION INDICATOR

SEE (C)

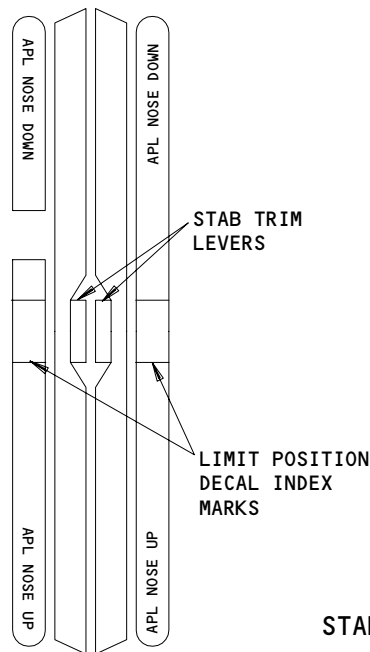
CONTROL STAND PANEL (P10)

(A)



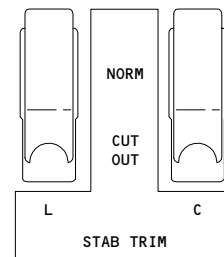
STABILIZER POSITION INDICATOR  
(EXAMPLE)

(C)



STAB TRIM LEVERS

(D)



STAB TRIM SHUTOFF SWITCHES

(E)

Stabilizer Trim Control Stand Components  
Figure 502

EFFECTIVITY

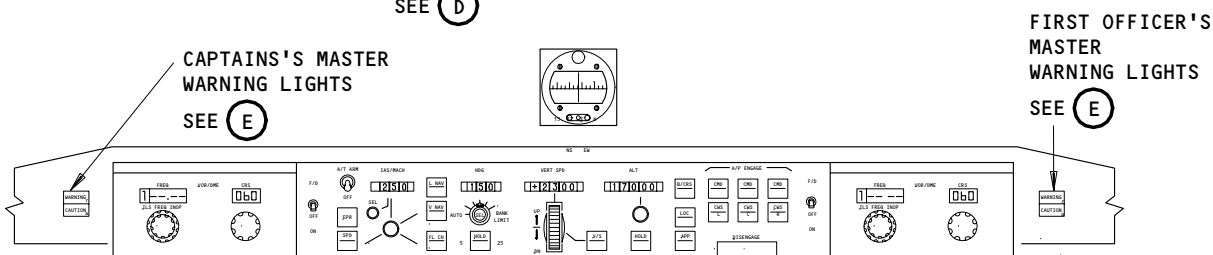
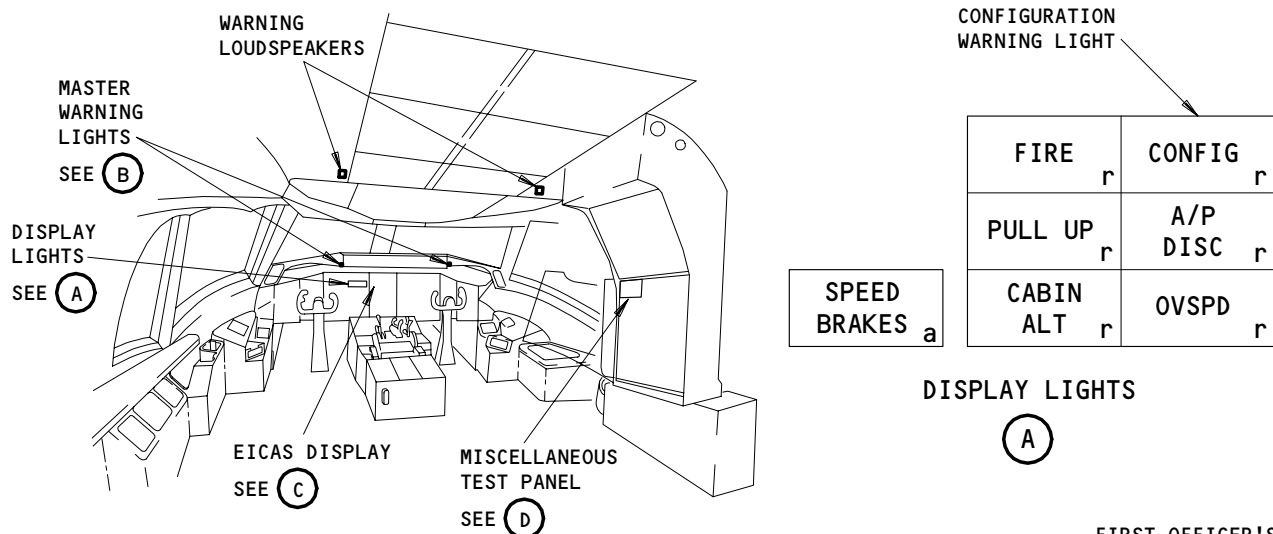
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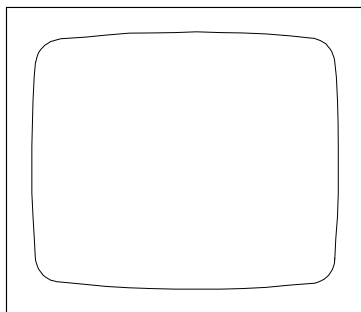
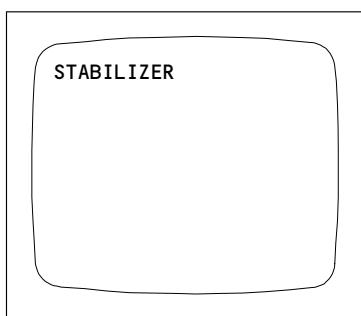
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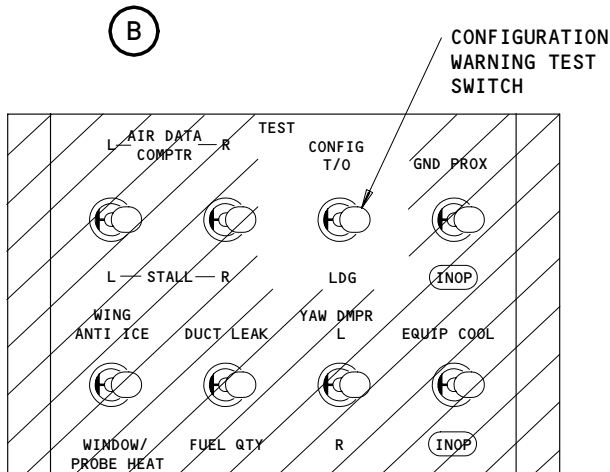


**GLARESHIELD PANEL (P7)**



**EICAS DISPLAY**

(C)



**MISCELLANEOUS TEST PANEL**

(D)



**MASTER WARNING LIGHTS  
(EXAMPLE)**

(E)

**Stabilizer Trim Takeoff Configuration Warnings  
Figure 503**

EFFECTIVITY

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S 865-010

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Pressurize the left and center hydraulic systems (AMM 29-11-00/201).

S 225-011

- (5) Make sure that Dimension A on the stabilizer ballscrew actuator is  $3.84 \pm 0.03$  inches (97.5 +/- 0.8 millimeters) (the stabilizer is at the neutral position).

S 715-012

- (6) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
Do the steps that follow to make sure the position indicating system shows stabilizer movement correctly:
- (a) Make sure that the STAB TRIM levers on the P10 panel are in the neutral position.
  - (b) Move the STAB TRIM levers full forward and hold.

**NOTE:** Do not hit the mechanical stops with the stabilizer.

- 1) Make sure that the stabilizer position indicator shows the stabilizer movement correctly.
  - 2) Make sure that the STAB TRIM levers go to the neutral position when you release them.
- (c) Move the STAB TRIM full aft and hold.

**NOTE:** Do not hit the mechanical stops with the stabilizer.

- 1) Make sure that the stabilizer position indicator shows the stabilizer movement correctly.
- 2) Make sure that the STAB TRIM levers go to the neutral position when you release them.

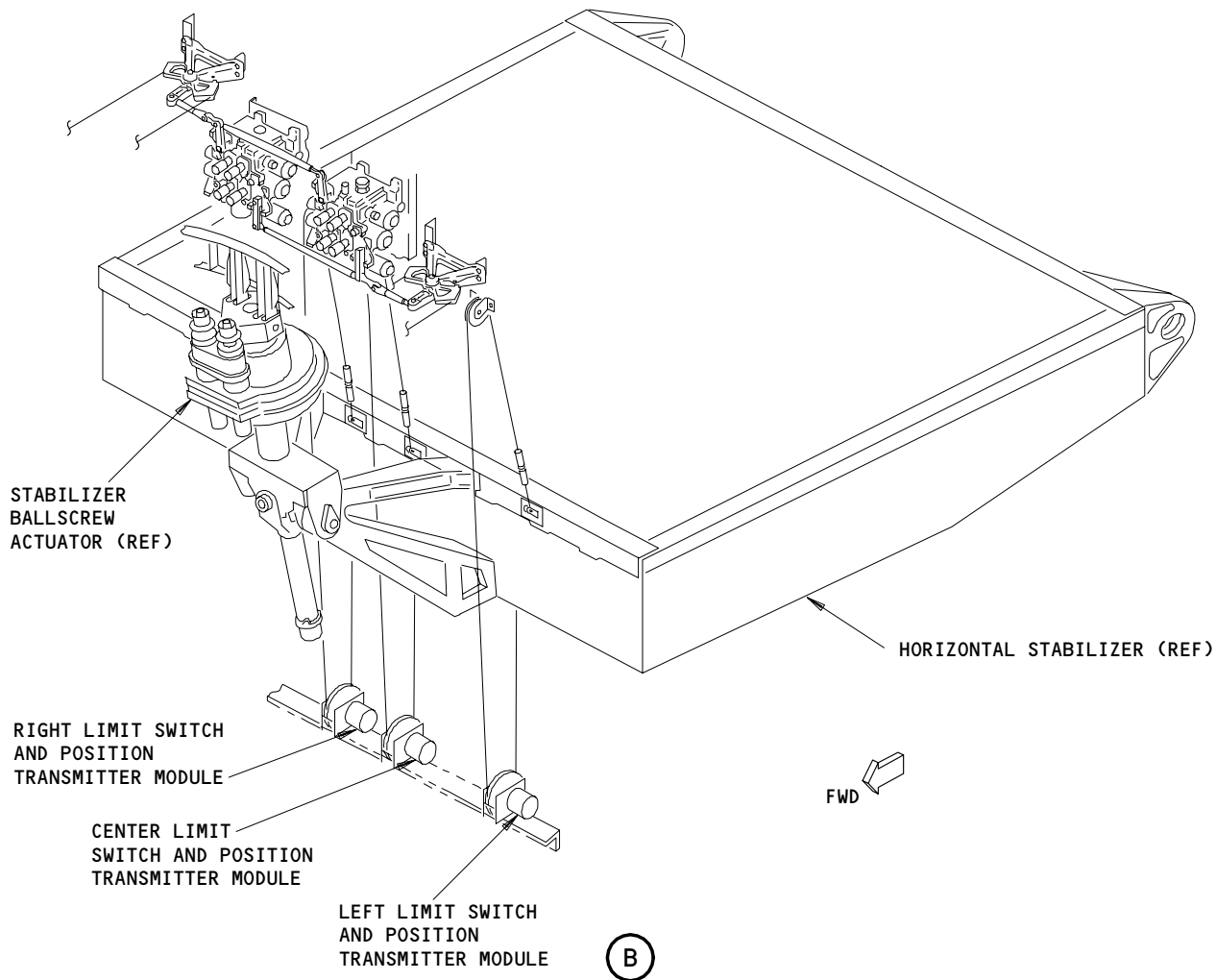
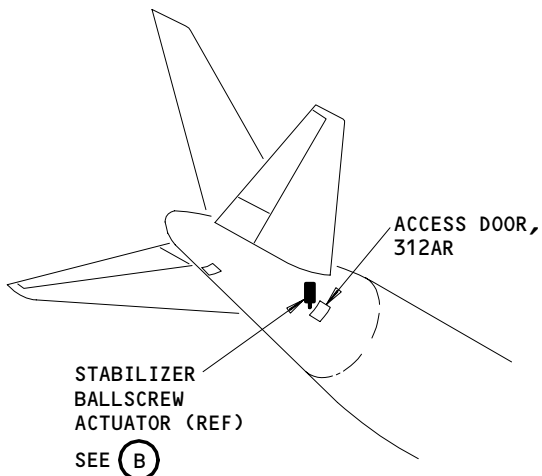
EFFECTIVITY

ALL

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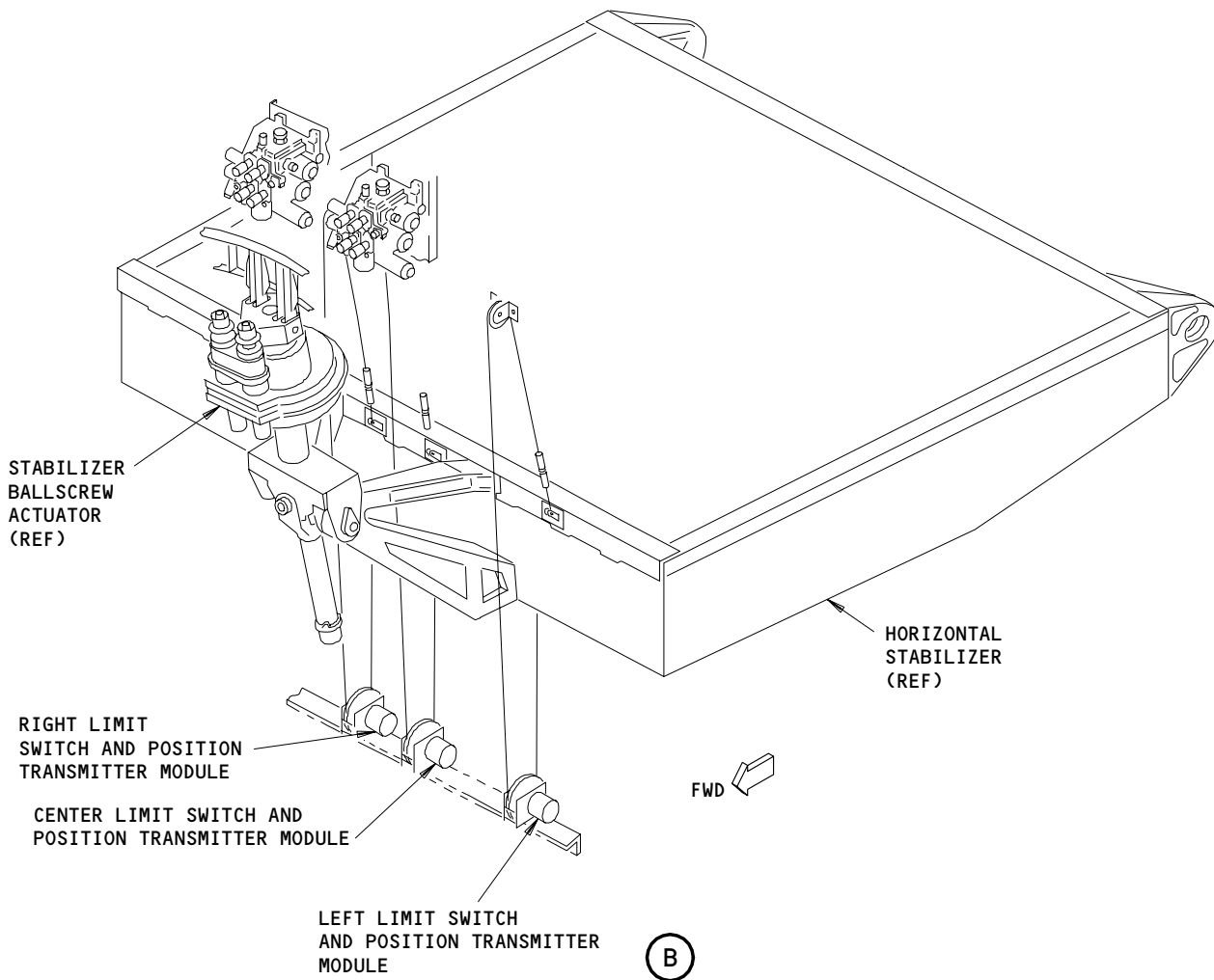
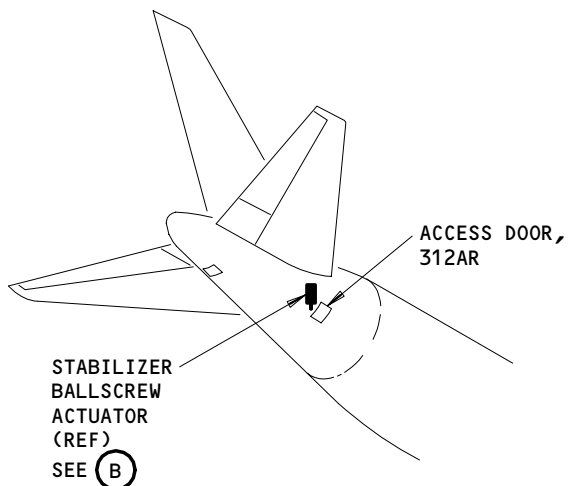
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Stabilizer Trim Limit Switch and Position Transmitter Modules  
Figure 504 (Sheet 1)

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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Stabilizer Trim Limit Switch and Position Transmitter Modules  
Figure 504 (Sheet 2)

EFFECTIVITY  
AIRPLANES WITH ALTERNATE STAB TRIM  
SWITCHES ON THE CONTROL STAND

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S 715-013

- (7) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
Do the steps that follow to make sure the position indicating system shows stabilizer movement correctly:
- Make sure that the alternate stab trim switches on the P10 panel are in the neutral position.
  - Move the alternate stab trim switches full forward and hold.

NOTE: Do not hit the mechanical stops with the stabilizer.

- Make sure that the stabilizer position indicators show the stabilizer movement correctly.
  - Make sure that the alternate stab trim switches go to the neutral position when you release them.
- (c) Move the alternate stab trim switches full aft and hold.

NOTE: Do not hit the mechanical stops with the stabilizer.

- Make sure that the stabilizer position indicators show the stabilizer movement correctly.
- Make sure that the alternate stab trim switches go to the neutral position when released.

S 865-014

- (8) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- 11H10, LEFT STAB TRIM POS IND
  - 11H19, STAB TRIM POS IND R

S 215-015

- (9) Make sure the OFF indications are on the bottom of the position indicators and the indicating tape cannot be seen.

S 035-016

- (10) Disconnect the electrical connectors from the left and right limit switch and position transmitter modules (LSTMs) (Fig. 504).

S 865-017

- (11) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- 11H10, LEFT STAB TRIM POS IND
  - 11H19, STAB TRIM POS IND R

S 215-018

- (12) Make sure that the OFF indication flag and the indicating tape go out of view on the position indicators.

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S 865-019

- (13) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11H10, LEFT STAB TRIM POS IND
  - (b) 11H19, STAB TRIM POS IND R

S 435-020

- (14) Connect the electrical connectors to the left and right LSTM's (Fig. 504).

S 865-021

- (15) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H10, LEFT STAB TRIM POS IND
  - (b) 11H19, STAB TRIM POS IND R

E. Stabilizer Takeoff Warning Test (Fig. 502)

S 865-024

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

S 865-025

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Pressurize the left hydraulic system (AMM 29-11-00/201).

S 215-026

- (3) Make sure that the speed brake lever is in the down-and-locked position.

S 215-027

- (4) Make sure that the flaps are in a takeoff position (5, 15, or 20 unit detent).

S 215-028

- (5) Make sure that the parking brakes are released.

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S 865-029

- (6) Use the control wheel switches to move the stabilizer to the greenband range shown on the position indicators.

S 865-030

- (7) Push and hold the CONFIG T/O switch on the right side panel, P61, up for the entire test (Fig. 503).

S 215-031

- (8) Make sure that these takeoff configuration warnings are not on (Fig. 503):

**NOTE:** These takeoff configuration warnings are monitored in other steps of this test.

- (a) The red CONFIG light on the EICAS display.
- (b) The captain's and first officer's master warning lights on the glare shield panel, P7
- (c) The EICAS message (STABILIZER)
- (d) The aural warning siren

**NOTE:** AIRPLANES WITH HIGH THRUST ENGINES; (52,501 pounds of thrust, or more). The takeoff configuration warnings will not come on at the upper travel limits.

S 865-041

- (9) Move the control wheel switches up (Airplane nose down).
- (a) Make sure the above takeoff configuration warnings do not come on when the stabilizer moves out of the APL NOSE DN greenband range.

S 865-043

- (10) Use the control wheel switches to move the stabilizer into the greenband range.

S 215-044

- (11) Make sure that all of the above takeoff configuration warnings go off when the stabilizer moves into the greenband range:

**NOTE:** The STABILIZER message will not go out of view for approximately 8 seconds after the stabilizer moves into the greenband range. If the stabilizer moves out of the greenband range during the 8 seconds, the message will not go off.

S 865-045

- (12) Move the control wheel switches down (Airplane nose up).

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S 215-046

- (13) Make sure all of the above takeoff configuration warnings come on when the stabilizer moves out of the greenband range upper limit.

S 865-047

- (14) Move the stabilizer into the greenband range.

S 215-048

- (15) Make sure that all of the above takeoff configuration warnings go off when the stabilizer moves into the greenband range.

S 865-049

- (16) Release the CONFIG T/O switch on the P61 panel (Fig. 503).

S 865-050

- (17) Remove the power from the left hydraulic system (AMM 29-11-00/201).

S 865-051

- (18) Remove electrical power (AMM 24-22-00/201).

TASK 27-48-00-825-052

3. Adjustment - Position Indicating System

A. Limit Switches and Position Transmitter Modules (LSTM's) Adjustment

S 825-003

- (1) Do the adjustment for the LSTM's (AMM 27-41-00/501).

TASK 27-48-00-735-053

4. System Test - Position Indicating System

A. General

- (1) The tests in this procedure make sure the position indicating system for the stabilizer operates correctly.

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels  
(2) AMM 24-22-00/201, Electrical Power - Control  
(3) AMM 27-41-00/501, Horizontal Stabilizer Trim Control System  
(4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(5) FIM 27-58-00/101, Trailing Edge Flap Position Indicating System

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C. Access

- (1) Location Zones  
211/212 Control Cabin

D. Prepare for the System Tests

S 865-054

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

S 015-055

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (2) Open the service access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

S 215-056

- (3) Make sure that these circuit breakers on the overhead panel, P11, are closed:

- (a) 11A36, ALT STAB TRIM (if installed)
- (b) 11C12, STAB TRIM SHUTOFF L
- (c) 11C13, STAB TRIM SHUTOFF CENTER
- (d) 11H10, LEFT STAB TRIM POS IND
- (e) 11H19, STAB TRIM POS IND R

S 215-057

- (4) Make sure the L and C STAB TRIM shutoff valve switches on the control stand panel, P10, are in the NORM position.

S 865-058

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (5) Pressurize the left hydraulic system (AMM 29-11-00/201).

S 865-059

- (6) Move the horizontal stabilizer until Dimension A on the stabilizer ballscrew actuator is  $3.84 \pm 0.03$  inches (97.5 +/- 0.8 millimeters) (neutral position) (Fig. 501).

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- S 215-061
- (7) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
make sure that the STAB TRIM levers are in the neutral position  
(Fig. 502).

- S 215-062
- (8) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
make sure that the alternate stab trim switches are in the neutral  
position (Fig. 502).

- S 215-064
- (9) Make sure that the position indicators show that the stabilizer is  
at the neutral position (2 units of trim) (Fig. 502).
- E. Position Indicators Test

- S 735-065
- (1) AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;  
do the steps that follow to make sure the position indicators  
operate correctly:
- (a) Move the STAB TRIM levers forward until Dimension A is  
approximately 1.0 inch (25 millimeters).

NOTE: Do not hit the mechanical stops with the stabilizer.

- (b) Make sure that the position indicators show the stabilizer  
movement correctly.
- (c) Continue to move the levers forward approximately 1 second at a  
time until the stabilizer touches the mechanical stop.
- (d) Make sure that the position indicators show  $0 \pm 1/4$  unit of  
trim.
- (e) Move the STAB TRIM levers aft until Dimension A is  
approximately 13.0 inches (330 millimeters).

NOTE: Do not hit the mechanical stops with the stabilizer.

- (f) Make sure that the position indicators show the stabilizer  
movement correctly.
- (g) Continue to move the levers aft approximately 1 second at a  
time until the stabilizer touches the mechanical stop.
- (h) Make sure that the position indicators show  $14.2 \pm 0.3$  units of  
trim.
- (i) Remove power from the left hydraulic system (AMM 29-11-00/201).
- (j) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the  
P10 panel to the CUTOUT position.
- (k) Move the STAB TRIM levers through the full travel range and  
release them.
- (l) Make sure that the stabilizer does not move.
- (m) Make sure that the position indicators show that the stabilizer  
did not move.

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S 735-066

- (2) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;  
Do the steps that follow to make sure the position indicators operate correctly:

(a) Move the alternate stab trim switches to the APL NOSE DN position until Dimension A is approximately 1.0 inch (25 millimeters).

NOTE: Do not hit the mechanical stops with the stabilizer.

- (b) Make sure that the position indicators show the stabilizer movement correctly.  
(c) Continue to move the switches to the APL NOSE DN position approximately 1 second at a time until the stabilizer touches the mechanical stops.  
(d) Make sure that the position indicators show  $0 \pm 1/4$  unit of trim.  
(e) Move the alternate stab trim switches to the APL NOSE UP position until Dimension A is approximately 13.0 inches (330 millimeters).

NOTE: Do not hit the mechanical stops with the stabilizer.

- (f) Make sure that the position indicators show the stabilizer movement correctly.  
(g) Continue to move the switches to the APL NOSE UP position approximately 1 second at a time until the stabilizer touches the mechanical stops.  
(h) Make sure that the position indicators show  $14.2 \pm 0.3$  units of trim.  
(i) Remove the power from the left hydraulic system power (AMM 29-11-00/201).  
(j) Put the L and C STAB TRIM shutoff valve switches on the P10 panel to the CUTOUT position.  
(k) Move the alternate stab trim switches through the full travel range and release them.  
(l) Make sure that the stabilizer does not move.  
(m) Make sure that the position indicators do not move.

S 865-068

- (3) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:

- (a) 11H10, LEFT STAB TRIM POS IND  
(b) 11H19, STAB TRIM POS IND R

S 215-069

- (4) Make sure the OFF indication flags are shown on the position indicators and the indicating tapes go out of view.

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- S 035-070
- (5) Disconnect the electrical connectors from the left and right limit switch and position transmitter modules (LSTM's) for the stabilizer.
- S 865-071
- (6) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H10, LEFT STAB TRIM POS IND
  - (b) 11H19, STAB TRIM POS IND R
- S 215-072
- (7) Make sure that the OFF indication flags and the indicating tapes go out of view on the indicators.
- S 865-073
- (8) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11H10, LEFT STAB TRIM POS IND
  - (b) 11H19, STAB TRIM POS IND R
- S 435-074
- (9) Connect the electrical connectors on the left and right LSTM's.
- S 865-075
- (10) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H10, LEFT STAB TRIM POS IND
  - (b) 11H19, STAB TRIM POS IND R
- S 215-076
- (11) Make sure that the indicating tapes are in view on the position indicators.
- S 865-077
- (12) Put the L and C STAB TRIM shutoff valve switches on the P10 panel to the NORM position.
- S 865-078
- (13) Remove electrical power (AMM 24-22-00/201).
- F. Stabilizer Takeoff Warning Test (Fig. 502)
- S 865-079
- (1) Supply electrical power (AMM 24-22-00/201).

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S 865-080

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(2) Pressurize the left hydraulic system (AMM 29-11-00/201).

S 215-081

(3) Make sure that the speedbrake lever is in the down-and-locked position.

S 215-082

(4) Make sure that the flaps are in a takeoff position (5, 15 or 20 unit detent).

S 215-083

(5) Make sure that the parking brakes are released.

S 865-084

(6) Use the control wheel switches to move the stabilizer into the greenband range.

S 865-085

(7) Push and hold the CONFIG T/O switch on the right side panel, P61, up for the full test (Fig. 503).

S 215-086

(8) Make sure that the takeoff configuration warnings that follow are not on (Fig. 503):

**NOTE:** These takeoff warnings are monitored in other steps of the test.

- (a) The red CONFIG light on the EICAS display.
- (b) The captain's and first officer's master warning lights on the glareshield panel, P7
- (c) The EICAS message (STABILIZER)
- (d) The aural warning siren

S 865-116

(9) Slowly move the control wheel STAB TRIM controls forward to the APL NOSE DN (0-unit) position.

(a) Make sure the takeoff configuration warnings do not come on.

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S 865-144

- (10) Use the control wheel STAB TRIM controls to move the stabilizer such that dimension A is between 5 and 12 inches (130 and 300 millimeters).
- (a) Make sure the takeoff configuration warnings are not on.

S 865-145

- (11) Slowly move the control wheel STAB TRIM controls rearward until the takeoff configuration warnings come on.
- (a) Measure dimension A on the ballscrew actuator (AMM 27-48-00/501).
- (b) Make sure dimension A is 12.75 +0.40/-0.15 inches (323.9 +10.2/-3.8 millimeters).
- (c) Make sure the STAB TRIM indicators are not more than 0.25 units out of the green band range.

S 865-146

- (12) Use the STAB TRIM controls to move the stabilizer such that dimension A is between 5 and 12 inches (130 and 300 millimeters).
- (a) Make sure the takeoff configuration warnings are not on.

S 865-147

- (13) Release the CONFIG switch.

S 215-102

- (14) Make sure that all of the takeoff configuration warnings go off as soon as the stabilizer moves into the greenband range.

S 865-103

- (15) Release the CONFIG T/O switch on the P61 panel.
- G. Flap/Stabilizer Position Module (FSPM) BITE Procedure

S 735-004

- (1) Do the flap/stabilizer position module (FSPM) BITE procedure (FIM 27-58-00/101).

H. Stabilizer Trim Electrical Travel Limits Test

S 735-005

- (1) Do the stabilizer trim electrical travel limits test (AMM 27-41-00/501).

I. Put the Airplane Back to Its Usual Condition

S 865-104

- (1) Remove the power from the left hydraulic system (AMM 29-11-00/201).

S 865-105

- (2) Remove electrical power (AMM 24-22-00/201).

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- S 415-106
- (3) Close the service access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

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STABILIZER TRIM LIMIT SWITCH AND POSITION TRANSMITTER MODULE -  
REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the limit switch and position transmitter modules for the stabilizer trim system.
- B. The removal and installation procedure for the three limit switch and position transmitter modules is the same. The tests that follow the removal and installation of each module are different.

TASK 27-48-01-024-001

2. Remove the Limit Switch and Position Transmitter Modules for the Stabilizer Trim System

A. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24):
  - (a) ST1 - P/N A20004-15
  - (b) ST2 - P/N A20004-15
  - (c) ST3 - P/N A20004-15

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 20-10-22/701, Metal Surface Cleaning
- (3) AMM 20-10-24/201, Rig Pins
- (4) AMM 22-00-02/201, Autoflight BITE
- (5) AMM 24-22-00/201, Electrical Power - Control
- (6) AMM 27-41-00/501, Horizontal Stabilizer Trim Control System
- (7) AMM 27-48-00/501, Stabilizer Trim Position Indicating System
- (8) AMM 27-58-01/401, Flap/Stabilizer Position Module
- (9) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 311/312 Area Aft of the Pressure Bulkhead to BS 1725
- (2) Access Panel
  - 312AR Forward Stabilizer Compartment

D. Prepare for the Removal

- S 864-002
- (1) Supply electrical power (AMM 24-22-00/201).
- S 864-003
- (2) Make sure that these circuit breakers on the overhead panel, P11, are closed:
  - (a) 11A36, ALT STAB TRIM

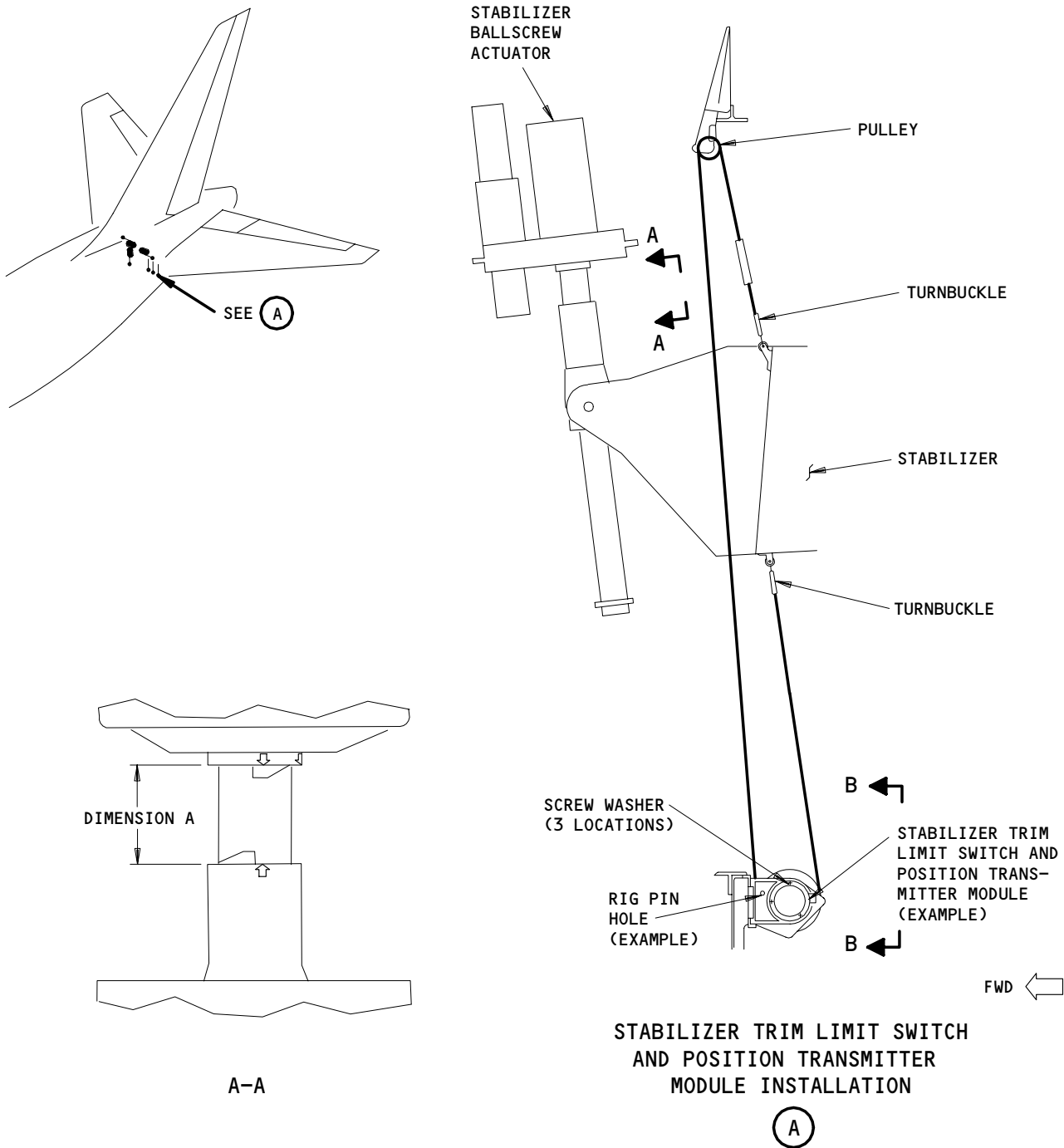
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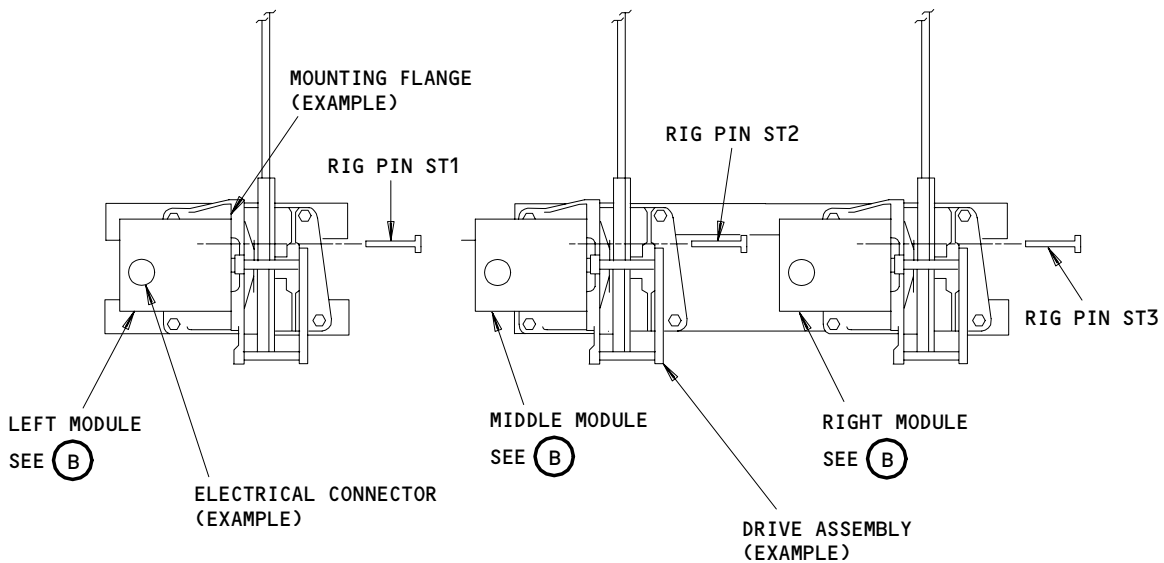
Stabilizer Trim Limit Switch and Position Transmitter Module Installation  
Figure 401 (Sheet 1)

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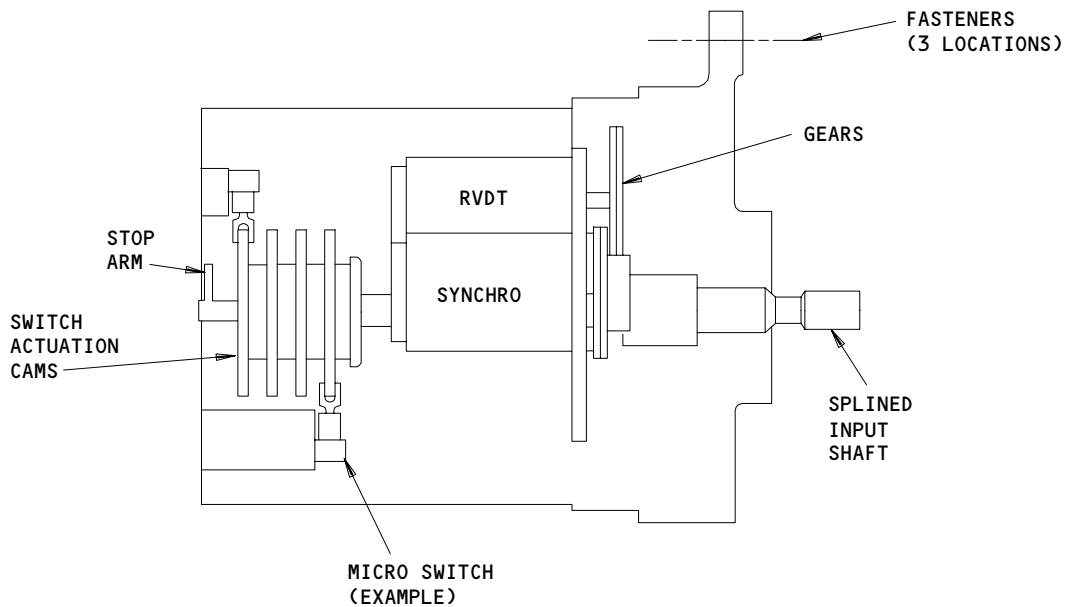
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B-B



MODULE (EXAMPLE)

(B)

Stabilizer Trim Limit Switch and Position Transmitter Module Installation  
Figure 401 (Sheet 2)

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(b) 11C13, STAB TRIM SHUTOFF CENTER

S 864-005

- (3) Make sure that the CENTER STAB TRIM SHUTOFF switch on the control stand panel, P10, is in the NORM position.

S 864-006

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 014-007

**WARNING:** STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ELEVATOR CONTROL ACCESS DOOR, 313AL. YOUR WEIGHT CAN RELEASE THE SPRING-LOADED LATCHES ON THE DOOR. IF YOU FALL THROUGH THE DOOR, INJURIES CAN OCCUR.

- (5) Open the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

S 864-070

- (6) Move the STAB TRIM levers or switches until Dimension A on the stabilizer ballscrew actuator is  $12.28 \pm 0.03$  inches (311.9 +/- 0.8 millimeters).

S 864-043

- (7) Remove the pressure from the center hydraulic system and make sure that pressure is removed from the left hydraulic system (AMM 29-11-00/201).

S 864-044

- (8) Put the LEFT and CENTER STAB TRIM SHUTOFF switches on the P10 panel to the CUTOUT position.

S 864-045

- (9) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11A36, ALT STAB TRIM (if installed)
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER

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- (d) 11H10, LEFT STAB TRIM POS IND
- (e) 11H19, STAB TRIM POS IND R

S 494-047

- (10) Adjust each set of module cables to  $50 \pm 5$  lbs (222 +/- 22 newtons) (for any ambient temperature) until rig pins ST1, ST2, and ST3 can be freely installed in the left, middle and right modules. Keep the rig pins installed (AMM 20-10-24/201).

**NOTE:** The last adjustment of the cables and modules is done after the installation is completed.

E. Remove the Limit Switch and Position Transmitter Module

**NOTE:** Be careful you do not change the rig adjustment of the cables.

S 034-048

- (1) Disconnect the electrical connector from the module.

S 034-049

- (2) Remove the mounting screws from the module mounting flange.

S 024-050

- (3) Carefully disengage the module input shaft from the drive assembly and remove the module.

TASK 27-48-01-424-051

3. Install the Limit Switch and Position Transmitter Module

A. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24):
  - (a) ST1 - P/N A20004-15
  - (b) ST2 - P/N A20004-15
  - (c) ST3 - P/N A20004-15

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 20-10-22/701, Metal Surface Cleaning
- (3) AMM 20-10-24/201, Rig Pins
- (4) AMM 22-00-02/201, Autoflight BITE
- (5) AMM 24-22-00/201, Electrical Power - Control
- (6) AMM 27-41-00/501, Horizontal Stabilizer Trim Control System
- (7) AMM 27-48-00/501, Stabilizer Trim Position Indicating System
- (8) AMM 27-58-01/401, Flap/Stabilizer Position Module
- (9) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

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C. Access

(1) Location Zones

211/212 Control Cabin  
311/312 Area Aft of the Pressure Bulkhead to BS 1725

(2) Access Panel

312AR Forward Stabilizer Compartment

D. Install the Limit Switch and Position Transmitter Module

NOTE: Be careful you do not change the rig adjustment of the cables.

S 144-052

- (1) Prepare the mating surfaces between the module and the drive assembly/mounting flange so there is a good electrical bond (AMM 20-10-21/601).

S 434-053

- (2) Carefully engage the module input shaft to the drive assembly.

NOTE: Make sure the tooth that is gone aligns with the splines on the mating part.

S 424-054

- (3) Turn the module until the mounting holes in the module flange align with the holes in the drive assembly bracket.

S 434-055

- (4) Install the mounting screws that hold the module to the mounting flange.

S 434-056

- (5) Connect the electrical connector.

S 094-057

- (6) Remove rig pins ST1, ST2, and ST3 (AMM 20-10-24/201).

S 864-058

- (7) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:

(a) 11A36, ALT STAB TRIM (if installed)

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- (b) 11C12, STAB TRIM SHUTOFF L
- (c) 11C13, STAB TRIM SHUTOFF CENTER
- (d) 11H10, LEFT STAB TRIM POS IND
- (e) 11H19, STAB TRIM POS IND R

S 824-059

- (8) If you changed the rig adjustment of the control cables, do the adjustment for the limit switch and position transmitter modules (AMM 27-41-00/501).

S 714-061

- (9) If the middle limit switch and position transmitter module was replaced, do the stabilizer takeoff warning test (AMM 27-48-00/501).

S 714-062

- (10) If you replaced the left or right limit switch and position transmitter module, do the steps that follow:
- (a) Accomplish a Bite check of the Left/right Flap/Stabilizer Position Module (FSPM) per (AMM 27-58-01/401).
  - (b) AIRPLANES WITH STAB TRIM LEVERS;  
Do the steps that follow for the travel limits test:
    - 1) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
      - a) 11C13, STAB TRIM SHUTOFF CENTER
    - 2) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
    - 3) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel to the CUTOUT position.
    - 4) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
      - a) 11C12, STAB TRIM SHUTOFF L

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- 5) If the LEFT position transmitter was replaced, pressurize only the left hydraulic system (AMM 29-11-00/201). If the RIGHT position transmitter was replaced, pressurize only the center hydraulic system (AMM 29-11-00/201).

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- 6) Move the two STAB TRIM levers to the APL NOSE DOWN position until the stabilizer is at the airplane nose down mechanical stop.

NOTE: The ballscrew mechanical stops are only used if there is a limit switch failure. Avoid operation of the stabilizer into the mechanical stops.

- 7) Make sure that the two stabilizer trim position indicators show 0.00 +/- 0.25 units of trim.
- 8) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- 9) Open this circuit breaker on the P|| panel and attach a DO-NOT-CLOSE tag:
  - a) 11C13, STAB TRIM SHUTOFF CENTER
- 10) Make sure that one set of the upper stop surfaces on the ballscrew touch.
- 11) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - a) 11C13, STAB TRIM SHUTOFF CENTER
- 12) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- 13) Move the two STAB TRIM levers to the APL NOSE UP position to move the stabilizer to the airplane nose up stop.

NOTE: The ballscrew mechanical stops are only used if there is a limit switch failure. Avoid operation of the stabilizer into the mechanical stops.

- 14) Make sure that the two stabilizer trim position indicators show 14.2 +/- 0.3 units of trim.
- 15) Put the CENTER STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- 16) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - a) 11C13, STAB TRIM SHUTOFF CENTER
- 17) Make sure that one set of the lower stop surfaces on the ballscrew touch.

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- (c) ON AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES;  
do the steps that follow for the travel limits test:
- 1) Move the alternate stab trim switches to the APL NOSE DN position to move the stabilizer to the airplane nose down stop.

NOTE: The ballscrew mechanical stops are only used if there is a limit switch failure. Avoid operation of the stabilizer into the mechanical stops.

- 2) Make sure that the two stabilizer trim position indicators show 0.00 +/- 0.25 units of trim.
- 3) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- 4) Make sure that one set of the upper stop surfaces on the ballscrew touch.
- 5) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the NORM position.
- 6) Move the alternate stab trim control switches to the APL NOSE UP position to move the stabilizer to the airplane nose up stop:

NOTE: The ballscrew mechanical stops are only used if there is a limit switch failure. Avoid operation of the stabilizer into the mechanical stops.

- 7) Make sure that the two stabilizer trim position indicators show 14.2 +/- 0.3 units of trim.
- 8) Put the LEFT STAB TRIM SHUTOFF valve switch on the P10 panel in the CUTOUT position.
- 9) Make sure that one set of the lower stop surfaces on the ballscrew touch.

- (d) Do the MCDP ground tests 65 STAB TRIM and 66 XDCR OUTPUTS (AMM 22-00-02).

E. Put the Airplane Back to Its Usual Condition

S 864-063

- (1) Make sure that the power is removed from the left and center hydraulic systems (AMM 29-11-00/201).

S 864-064

- (2) Remove electrical power (AMM 24-22-00/201).

S 414-065

- (3) Close the access door for the forward stabilizer compartment, 312AR (AMM 06-42-00/201).

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STABILIZER TRIM POSITION INDICATOR – REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the position indicator for the stabilizer trim system.
- B. The removal/installation procedures are the same for the captain's and the first officer's position indicators.

TASK 27-48-06-024-001

2. Remove the Position Indicator for the Stabilizer Trim System (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electrical Power – Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zone  
211/212 Control Cabin

C. Prepare for the Removal

S 864-004

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

S 864-005

- (2) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

S 864-006

- (3) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the CUTOUT position.

S 864-007

- (4) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11A36, ALT STAB TRIM (if installed)
  - (b) 11C12, STAB TRIM SHUTOFF L
  - (c) 11C13, STAB TRIM SHUTOFF CENTER
  - (d) 11H10, STAB TRIM POS IND R
  - (e) 11H19, LEFT STAB TRIM POS IND

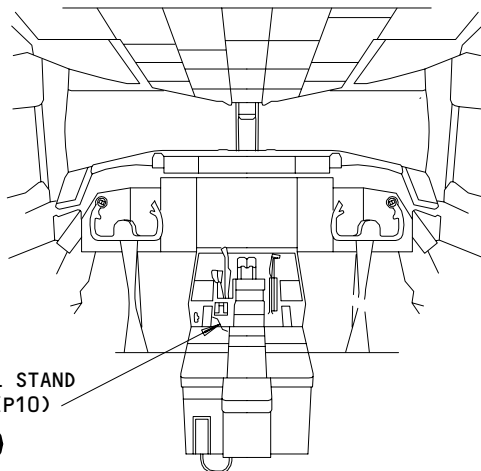
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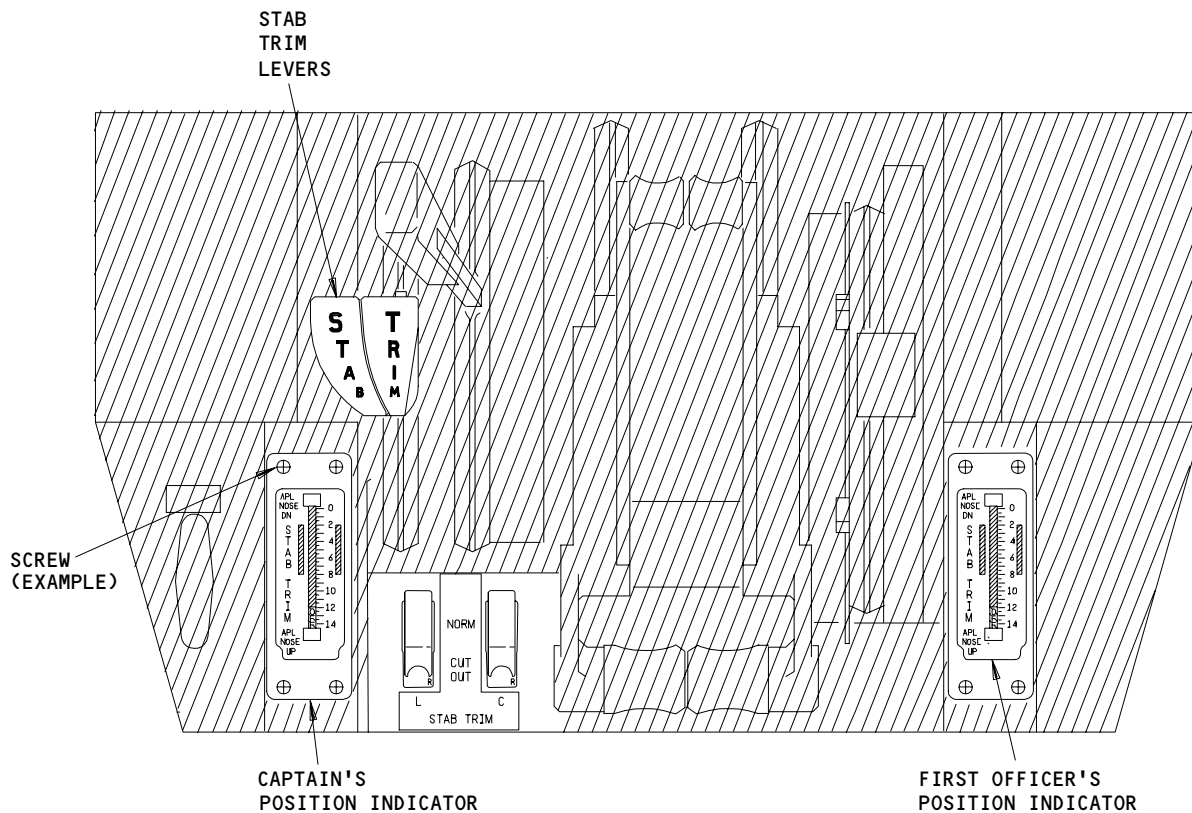
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### FLIGHT COMPARTMENT



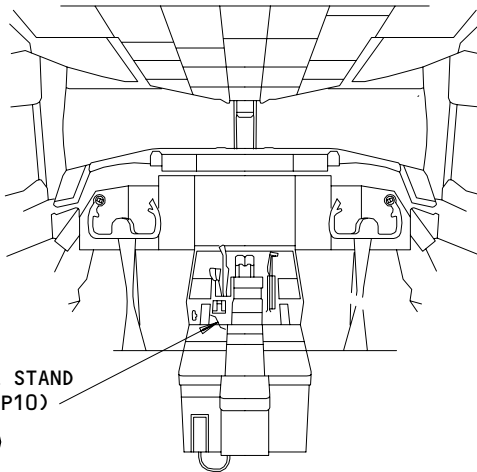
### CONTROL STAND PANEL (P10)

(A)

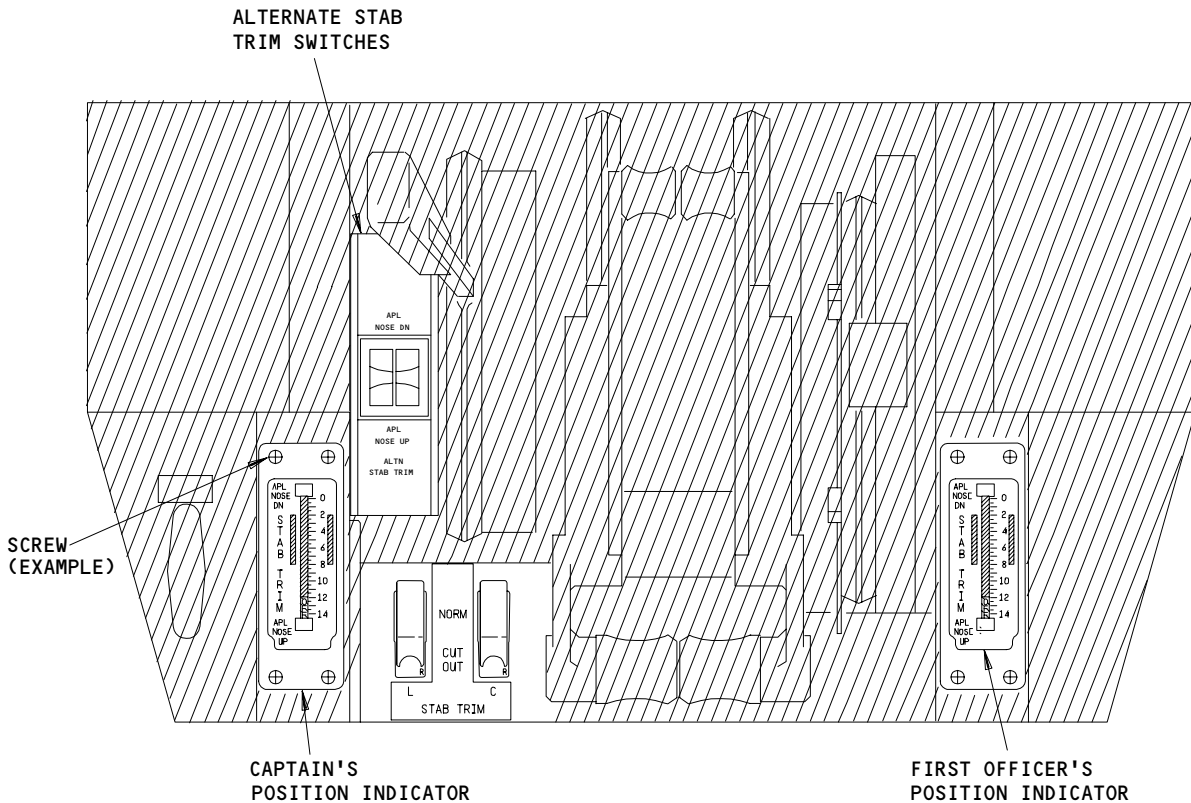
Stabilizer Trim Position Indicator Installation  
Figure 401 (Sheet 1)

EFFECTIVITY  
AIRPLANES WITH STAB TRIM LEVERS ON THE  
CONTROL STAND

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**FLIGHT COMPARTMENT**



**CONTROL STAND PANEL (P10)**

(B)

**Stabilizer Trim Position Indicator Installation  
Figure 401 (Sheet 2)**

EFFECTIVITY  
AIRPLANES WITH ALTERNATE STAB TRIM  
SWITCHES ON THE CONTROL STAND

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- (f) 11P01, AISLE STAND INST AND PNL LTS  
D. Remove the Position Indicator

S 024-008

- (1) Do the steps that follow to remove the position indicator:  
(a) Remove the access panels of the sides of the control stand.  
(b) Disconnect the electrical connector.  
(c) Remove the screws that hold the position indicator to the control stand.  
(d) Remove the position indicator from the control stand.

TASK 27-48-06-424-009

3. Install the Position Indicator for the Stabilizer Trim System (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zone  
211/212 Control Cabin

C. Install the Position Indicator

S 424-002

- (1) Do the steps that follow to install the position indicator:  
(a) Put the position indicator in the control stand.  
(b) Install the screws that hold the position indicator to the control stand.  
(c) Connect the electrical connector.  
(d) Install the access panels on the side of the control stand.

D. Position Indicator Test for the Stabilizer Trim System

S 714-003

- (1) Do the test that follows to make sure that the position indicator operates correctly:  
(a) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:

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- 1) 11A36, ALT STAB TRIM (if installed)
  - 2) 11C12, STAB TRIM SHUTOFF L
  - 3) 11C13, STAB TRIM SHUTOFF CENTER
  - 4) 11H10, STAB TRIM POS IND R
  - 5) 11H19, LEFT STAB TRIM POS IND
  - 6) 11P01, AISLE STAND INSTR AND PNL LTS
- (b) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to the NORM position.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (c) Pressurize the left and center hydraulic systems (AMM 29-11-00/201).
- (d) Move the STAB TRIM levers or switches to the APL NOSE DN and APL NOSE UP travel limits.
- 1) Make sure that the stabilizer and the position indicators move freely and smoothly through the full range of travel.
- (e) Make sure the stabilizer and the position indicators stay in their commanded positions when you release the STAB TRIM LEVERS OR SWITCHES.

E. Put the Airplane Back to Its Usual Condition

S 864-010

- (1) Remove the power from the left and center hydraulic systems (AMM 29-11-00/201).

S 864-011

- (2) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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FLAP CONTROLS – CORROSION PROTECTION

1. General

- A. Flaps are secondary controls that increases the angle of attack of the wings that results in increase lift and consists of:
  - (1) Control handle.
  - (2) Cables and Linkages.
  - (3) Actuators.
  - (4) Warning systems and Position indicators.
- B. Corrosion can occur over the entire surface of the outboard deflection control flap track.

TASK 27-50-00-642-001

2. Corrosion Prevention

- A. References
  - (1) SRM 51-10-02
  - (2) SRM 51-20-01
  - (3) AMM 27-51-00/201, TE Flap System – Maintenance Practices
- B. Access
  - (1) Location Zone
    - (a) 500/600      Left wing/Right wing
- C. Procedure
  - S 762-010
    - (1) Supply Electrical power (AMM 24-22-00/201).
  - S 702-011
    - (2) Pressurize the center hydraulic system (AMM 29-11-00/201).
  - S 202-012
    - (3) Extend flaps as necessary to gain access to area for inspection (AMM 27-51-00/201).
  - S 042-013
    - (4) Remove pressure from the center hydraulic system (AMM 29-11-00/201).

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- S 862-009
- (5) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:  
(a) 11J14, Flap Shutoff
- S 212-008
- (6) Attach a DO-NOT-OPERATE tag to the flap control lever.
- S 202-005
- (7) Inspect track mounting bolts, track stops, track rollers, flap track linkages, and flap track for signs of corrosion (evident by powdery white deposits, discoloration, and flaking).
- S 102-006
- (8) If corrosion damage is found, it may be necessary to rework the area to establish the allowable damage for repair or replacement (SRM 51-10-02).
- S 142-007
- (9) Remove all corrosion, evaluate damage, and repair or replace discrepant item. Follow up with application of protective finishes and corrosion inhibiting compounds (SRM 51-10-02/2).
- S 842-014
- (10) Put the Airplane back to its usual condition.

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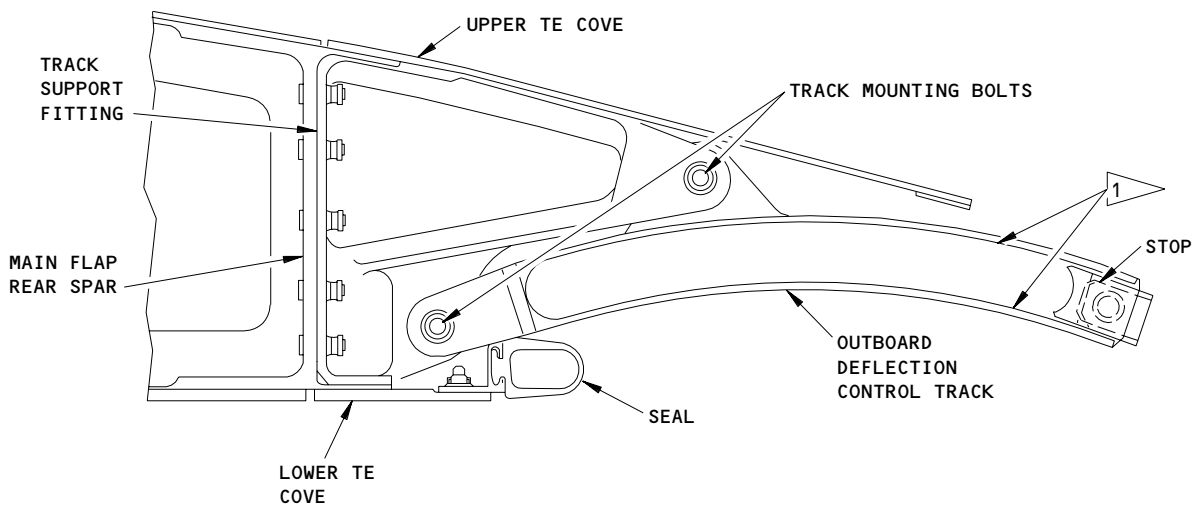
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DEFLECTION CONTROL TRACK  
(OUTBD SHOWN, INBD SIMILAR)

1 TRACK SURFACE SUSCEPTIBLE TO CHROMIUM DEPLETION AND SUBSEQUENT CORROSION

TE Flap Deflection Control Track  
Figure 201

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TRAILING EDGE FLAP SYSTEM – DESCRIPTION AND OPERATION

1. General (Fig. 1)

- A. The trailing edge flaps provide additional lift during takeoff and landing. When extended, the flaps operate in conjunction with leading edge slats to effectively increase camber and area of the wings.
- B. The trailing edge flap system drives an inboard and outboard flap on each wing. The inboard flap is made up of a main flap and an aft flap. A single flap is located at the outboard position. The flaps are faired with the wing when retracted.
- C. During normal operation the flaps are powered by the center hydraulic system. Flap operation is controlled by the flap control lever on the aisle control stand. The flap lever is connected by cables and linkages to the flap power drive unit.
- D. During alternate operation, the flaps are powered electrically. Flap operation is controlled by ALTN switches in the flight compartment. These switches control an electric motor which drives the flap power drive unit.
- E. The flap power drive unit (PDU) drives the flaps through attached drive shafts. The drive shafts rotate to power two rotary actuators on each flap. Each rotary actuator moves a drive arm which moves a linkage system, causing the flaps to extend or retract.
- F. Gearboxes are installed to allow angular changes in the drive shaft system. An aileron droop gearbox drives the inboard ailerons to a position up to 10 degrees below normal, as flaps extend between 5 and 15 degrees.
- G. A flap position indicating system shows flap position during extension and retraction.
  - (1) A combined flaps and slats dial indicator is located on the main instrument panel (P3). The dial indicator has two needles, one for left and one for right flap position indication.
  - (2) An amber TRAILING EDGE light on the center panel will illuminate when flap system failure exists.
  - (3) A red CONFIG light comes on when flap/slat position is not in commanded landing or takeoff configuration.
  - (4) Master caution/warning lights mounted on the glareshield assist in indicating flap system failures.
- H. A flap/slat electronics unit (FSEU) provides flap and slat annunciation and control. The FSEU is divided into 3 physically and functionally isolated sections.

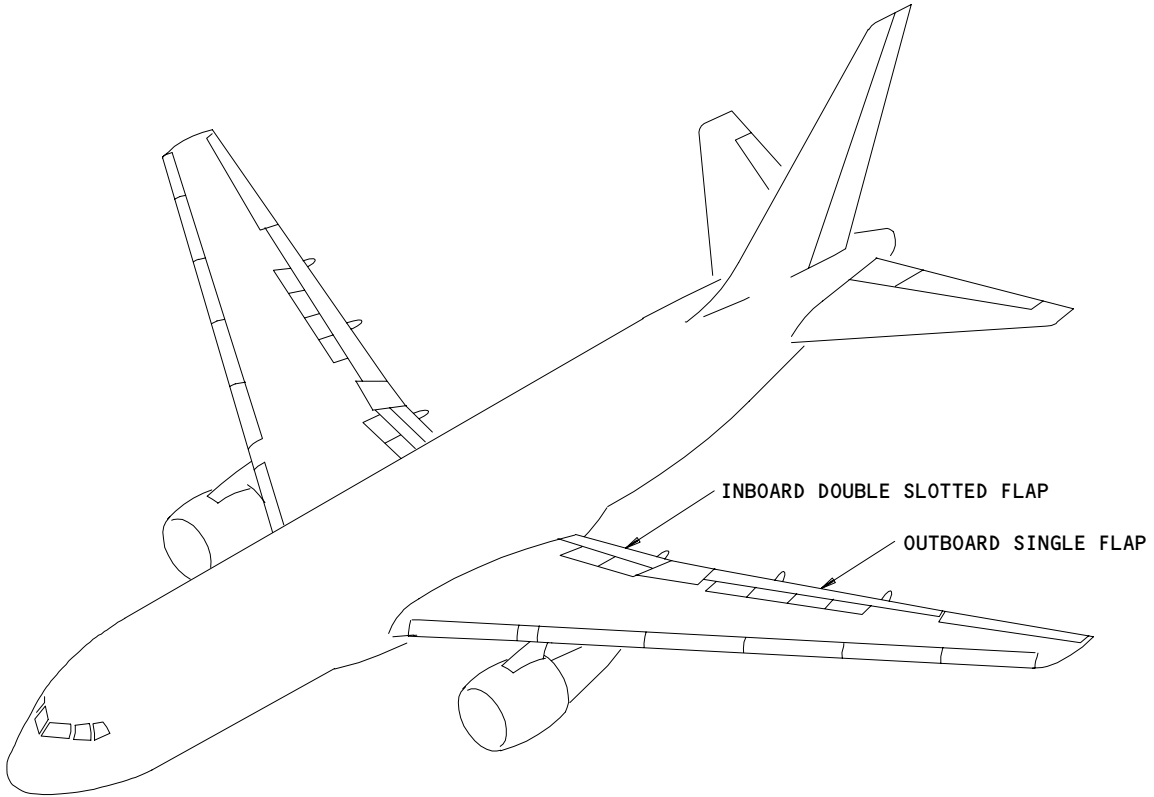
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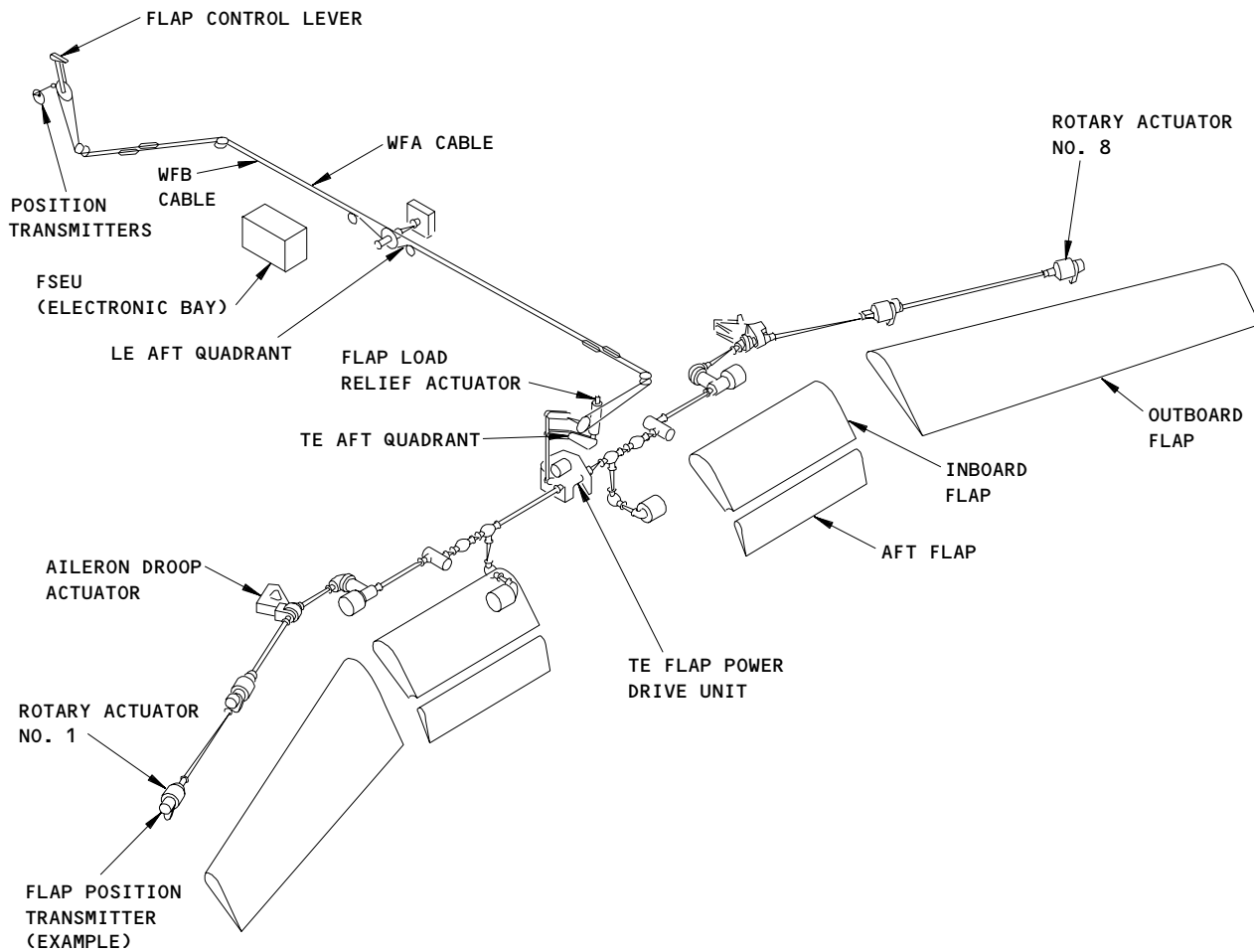
Trailing Edge Flaps  
Figure 1

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Trailing Edge Flaps  
Figure 2

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- I. 767-200 AIRPLANES;  
A flap load alleviation system reduces aerodynamic loads on the flaps. If safe airspeed is exceeded when flaps are fully extended, the flaps automatically retract to the 25-unit position.
- J. 767-300 AIRPLANES;  
A flap load alleviation system reduces aerodynamic loads on the flaps. If safe airspeed is exceeded when flaps are at the 25-unit or 30-unit position, the flaps automatically retract to the 20-unit position.
- K. The flap hydraulic drive system will automatically shut down if an asymmetry condition occurs, or if flaps move without command or opposite to command. The flaps will hold at the position where automatic shutdown occurred. The flaps can then be moved only by the alternate drive system.

2. Component Details

- A. Flap Control Lever (Fig. 4)
  - (1) The flaps are normally operated by a flap control lever located on the aisle control stand. The lever assembly consists of a spring-loaded telescoping handle bolted to a cable quadrant.
  - (2) The control stand has detents at the 0-, 1-, 5-, 15-, 20-, 25- and 30-degree positions. The spring-loaded flap control lever locks into each of these detents. Pulling the lever releases the lever from each detent to allow lever rotation.
  - (3) Gates are provided at detents 1 and 20 to prevent inadvertent movement past these position. At the 1-unit position the slats are at the intermediate (take-off) position and the flaps are fully retracted. The 20-unit gate indicates the greatest extension of flaps and slats recommended for takeoff.
  - (4) The flap control lever position is monitored by two RVDT's (rotary variable differential transformers). The RVDT's are installed in a flap control lever position sensor (RVDT) gearbox below the flap control lever. The gearbox is operated by a link from the flap control lever. The RVDT's send flap control lever position signals to the FSEU for control of system components and failure detection and protection.
  - (5) The flap control lever is attached to a cable quadrant which actuates four micro switches inside the control stand. The micro switches are operated by a spring-loaded arm and roller that follow a cam on the cable quadrant. The switches provide position signals to the following systems:
    - (a) Autopilot flight director system (AMM 22-11-00/001).
    - (b) Thrust management system (AMM 22-32-00/001).
  - (6) The flap control lever cable quadrant is connected to the flap aft quadrant by cables. Movement of the flap control lever causes rotation of the flap aft quadrant and an attached aft quadrant crank.

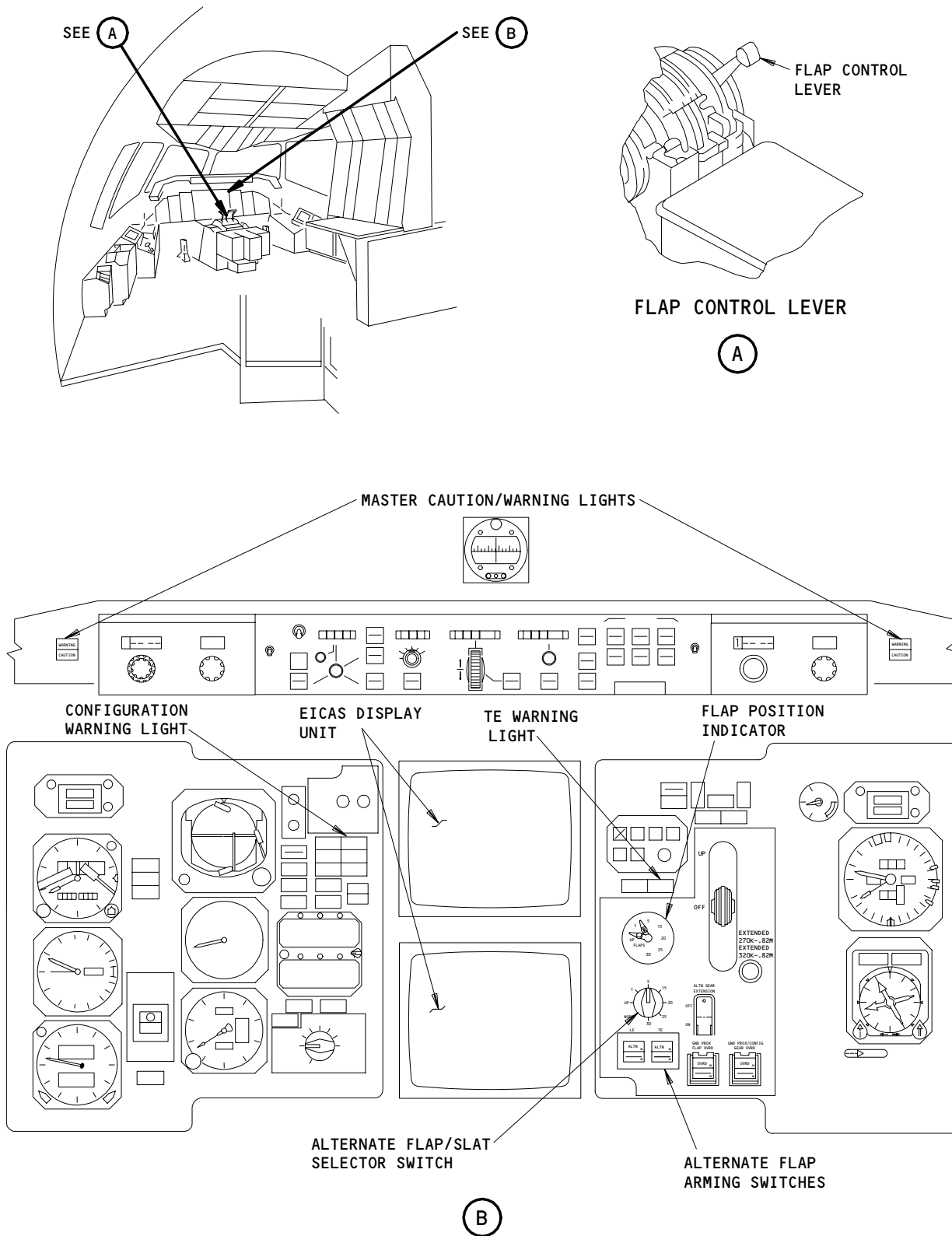
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Flap Controls and Indicators  
Figure 3

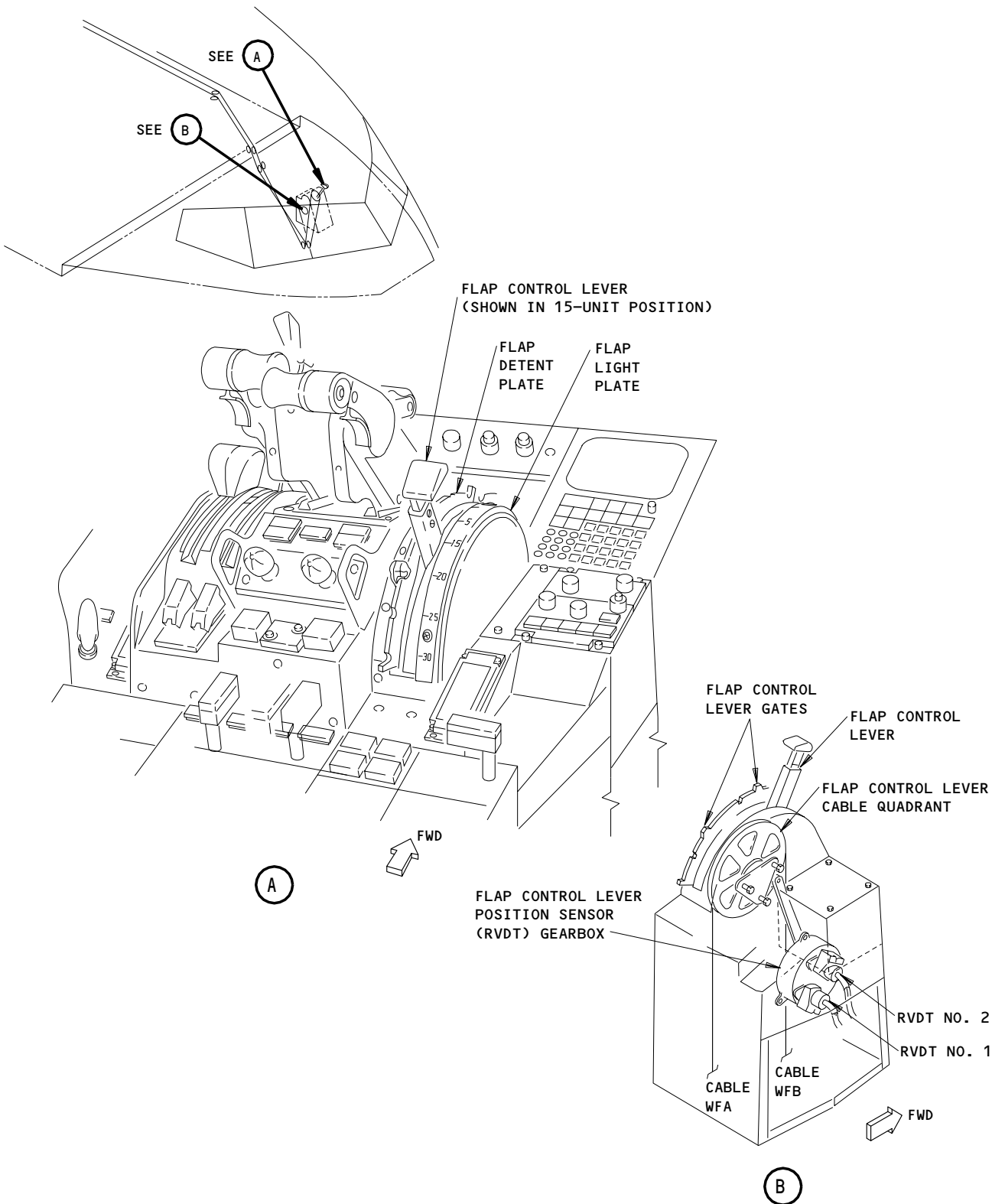
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Flap Control Lever and Position Transmitters  
Figure 4

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- (7) The aft quadrant crank is connected by rods to the flap load alleviation mechanism, and to the pilot input crank of the flap power drive unit.
- B. Flap Load Alleviation Mechanism (Fig. 5)
- (1) 767-200 AIRPLANES;  
The flap load alleviation mechanism is controlled by the FSEU to reduce aerodynamic loads on the flaps. When the flap control lever is extended beyond the 25-unit detent, and airspeed exceeds 30-unit safe airspeed, the FSEU energizes the flap load relief actuator to retract the flaps to the 25-unit position. The flap control lever will not move with the flaps, but will stay in the same selected position. The FSEU will energize the flap load relief actuator to return the flaps to the commanded position when airspeed has decreased to at least 4 knots below the 30-unit safe airspeed.
- (2) 767-300 AIRPLANES;  
The flap load alleviation mechanism is controlled by the FSEU to reduce aerodynamic loads on the flaps. When the flap control lever is in the 25-unit or 30-unit position, and airspeed exceeds safe airspeed for that flap position, the FSEU energizes the flap load relief actuator to retract the flaps to the 20-unit position. The flap control lever will not move. The FSEU will energize the flap load relief actuator to return the flaps to the 25-unit or 30-unit position, respectively, when airspeed has decreased to at least 4 knots slower than safe airspeed at those positions.
- (3) The flap load relief actuator retracts the flaps by repositioning the two rods connecting the aft quadrant crank on the flap aft quadrant to the pilot input arm on the PDU control unit. The actuator acts through a bellcrank and link mechanism. The actuator is an electric motor with internal brake, gear train, and clutch assembly. The actuator will operate in one direction until either internal retract or extend limit switch is reached. If a limit switch is inoperative, the actuator will operate until an internal mechanical stop is reached.
- C. Power Drive Unit (PDU) (Fig. 6)
- (1) The power drive unit (PDU) powers the flap drive system. It stops automatically when the selected flap position is reached. The unit is made up of 5 major components: a control unit, control valve module, gearbox, and electric and hydraulic motors. Normal operation is through the hydraulic motor. Alternate operation is through the electric motor.
- (2) The control unit is operated by command from the flap control lever. An input and follow up cam mechanism controls the direction and extent of flap travel.
- (3) The control valve module contains a control valve and a bypass valve. The control valve determines the direction of hydraulic flow through the hydraulic motor. It is controlled by an output from the control unit. The bypass valve allows the hydraulic motor to be backdriven when the alternate electric drive motor is used.

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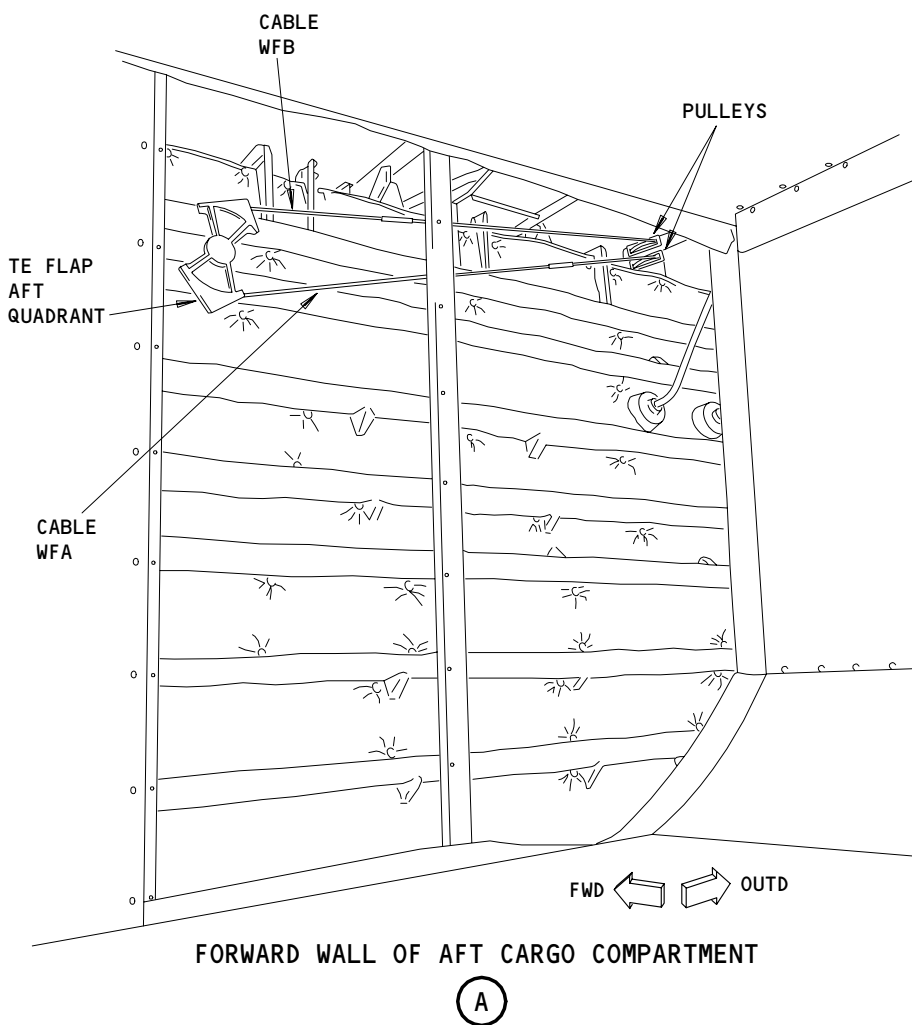
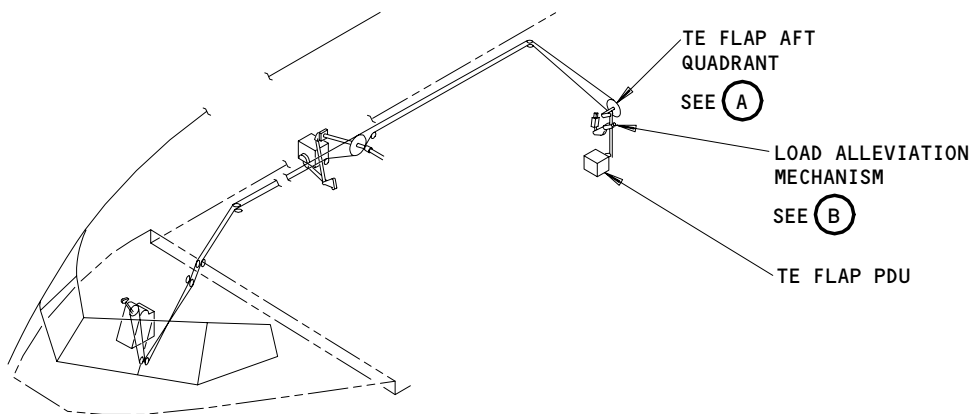
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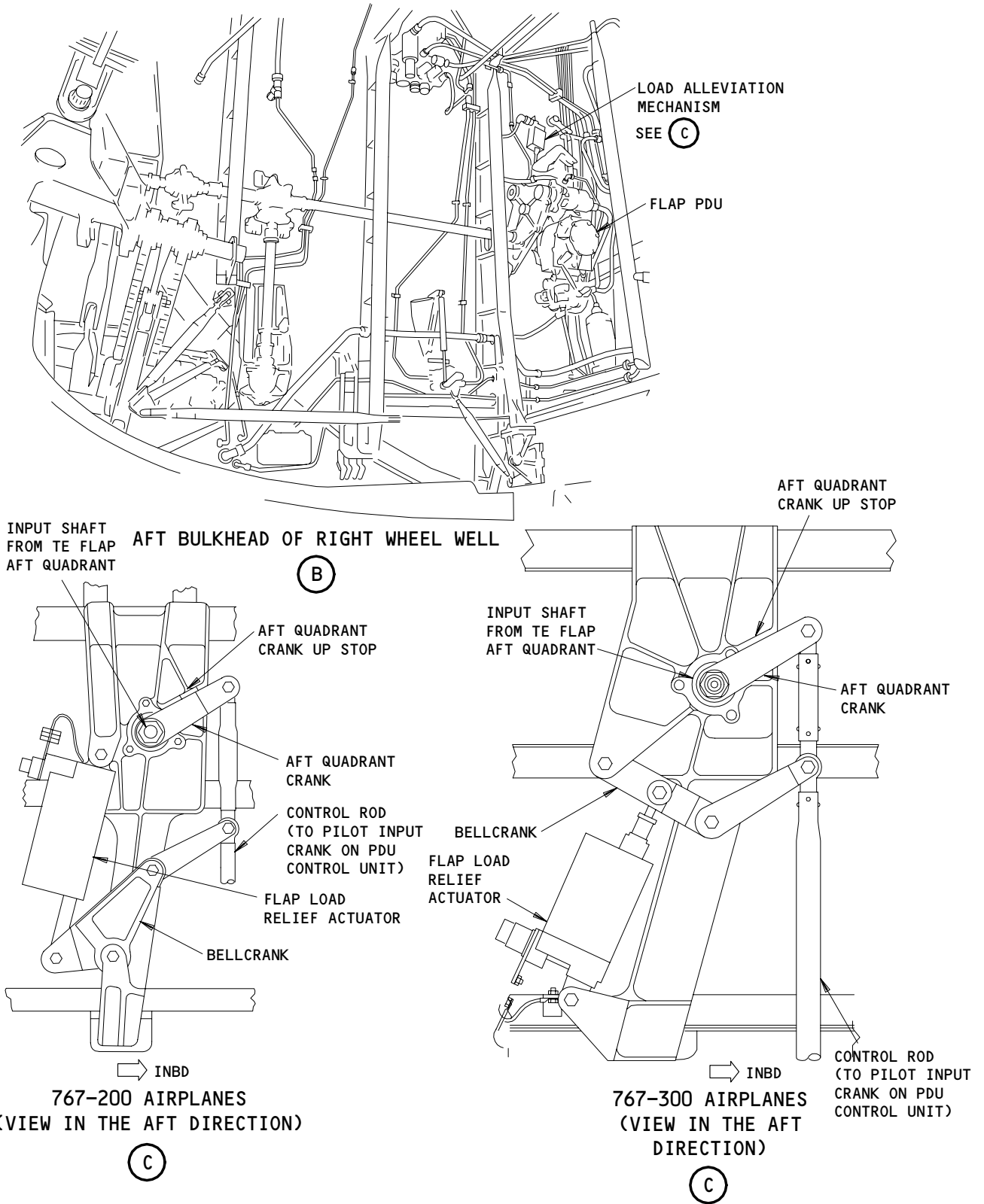




TE Flap Aft Quadrant and Load Alleviation Mechanism  
Figure 5 (Sheet 1)

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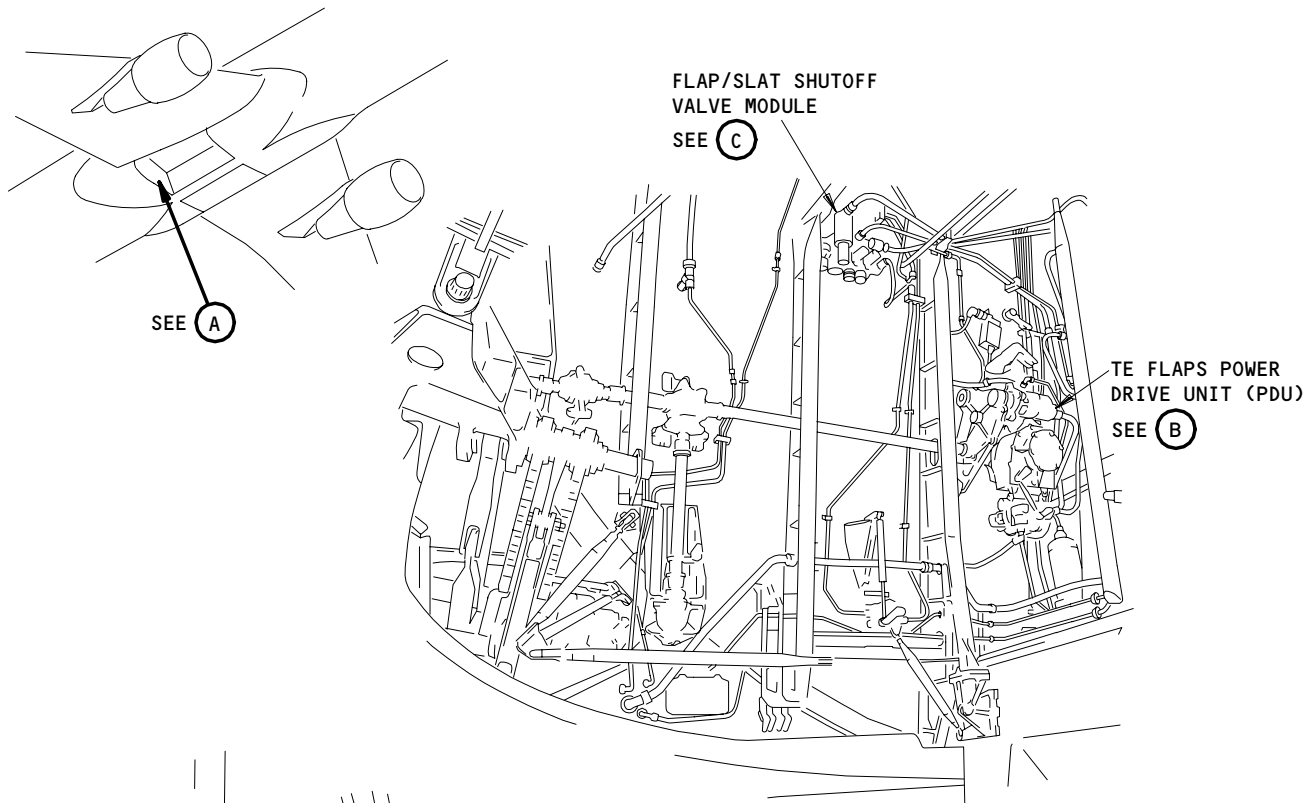
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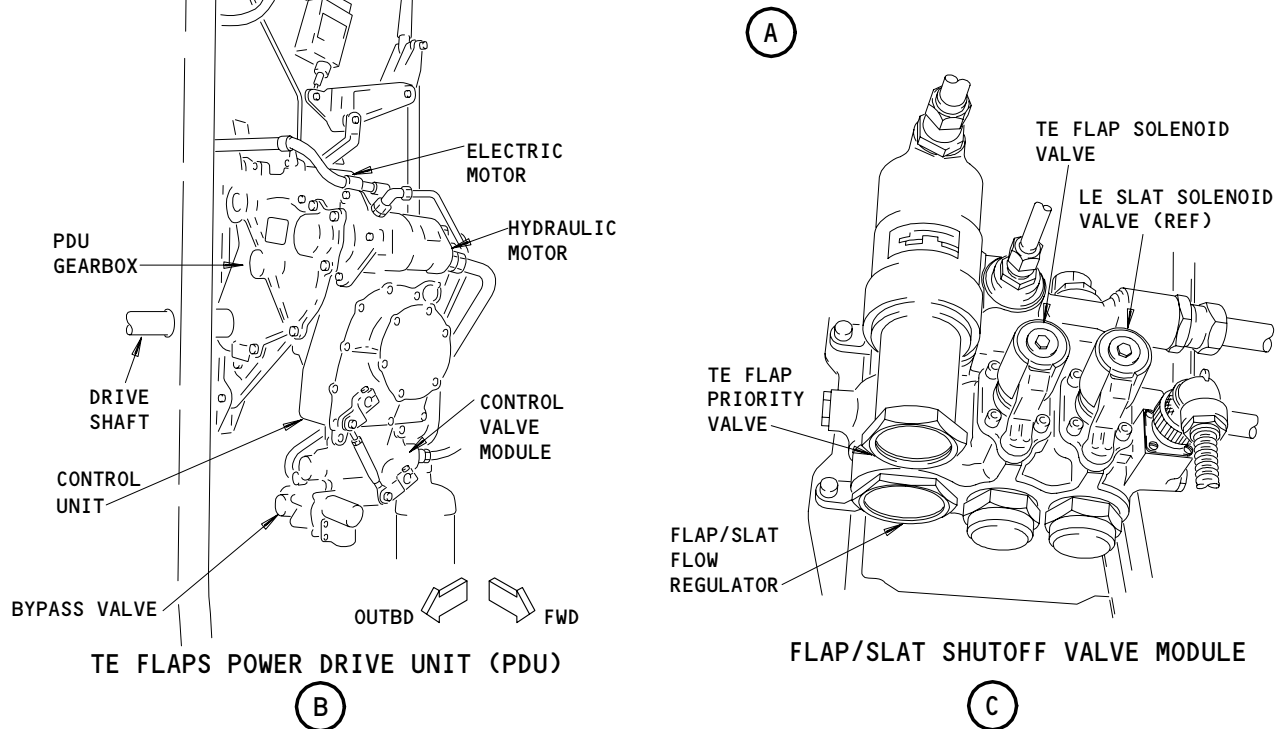
**TE Flap Aft Quadrant and Load Alleviation Mechanism  
Figure 5 (Sheet 2)**

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### AFT BULKHEAD OF RIGHT WHEEL WELL



Power Drive Unit and Shutoff Valve Module  
Figure 6

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- (4) The gearbox transmits rotary power from either hydraulic or alternate electric drive motor to the flap drive shafts. The hydraulic motor is directly geared to the gearbox output shaft. The alternate electric drive motor contains reduction gearing. The PDU gearbox is bolted to the control unit. The follow up cam, located in the control unit, is joined to the gearbox by a short splined section called a quill shaft. A worm gear on the gearbox output shaft drives the quill shaft through follow up gears. For maintenance there is provision for locking out both hydraulic and electric operation of the PDU through the gearbox.

D. Control Unit (Fig. 7)

- (1) The control unit selects flap direction, and automatically removes power to the flap drive system when the flaps reach the selected position. The pilot input crank receives flap position commands from the flap control lever to cause the control valve module input crank to select the direction of hydraulic flow through the control valve module. Hydraulic power from the control valve module operates the PDU hydraulic motor.
- (2) The control unit contains an input cam, which is operated by the pilot input crank, and a follow up cam, which is driven by the PDU gearbox as it drives the flap system. The two cams are joined by a summing lever. The summing lever has a roller inside each cam. The lever is also connected to the control valve module input crank, inside the control unit. A command from the flap lever rotates both the pilot input crank and the input cam. The summing lever rotates causing the control valve module input crank to rotate to select the direction of hydraulic flow through the control valve module. Looking aft, rotation of the pilot input crank in a clockwise direction causes the flaps to retract. Rotation in a counterclockwise direction causes the flaps to extend.

E. Hydraulic Power Drive (Fig. 8)

- (1) The trailing edge flaps are powered by the center hydraulic system. Hydraulic power is sent to the PDU control valve module from the flap/slat shutoff valve module. The flap/slat shutoff valve module is mounted in the main gear wheel well, on the aft bulkhead, outboard of the power drive unit.

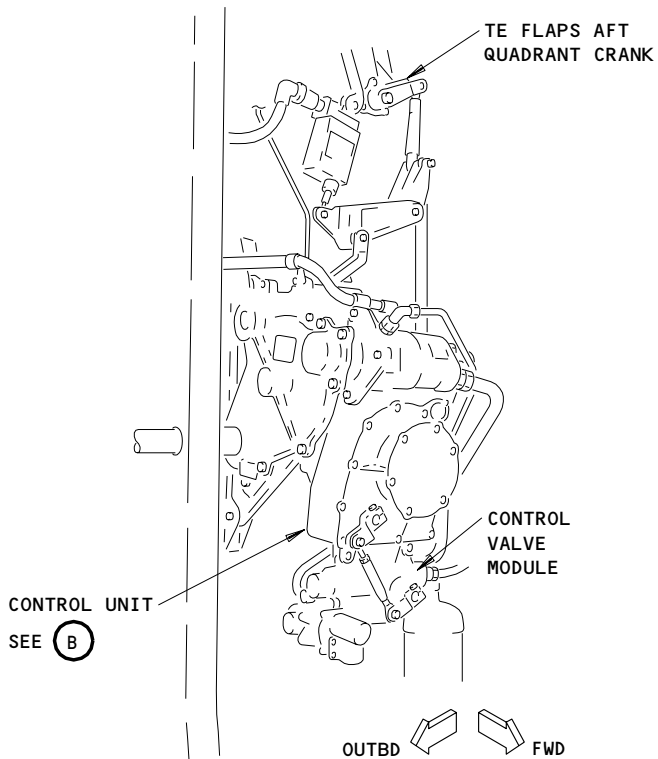
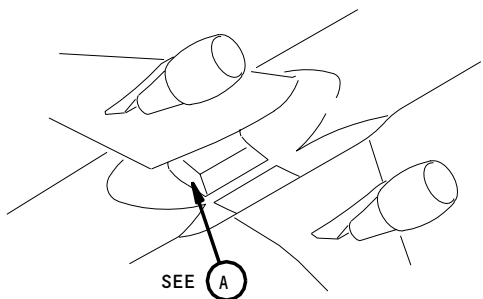
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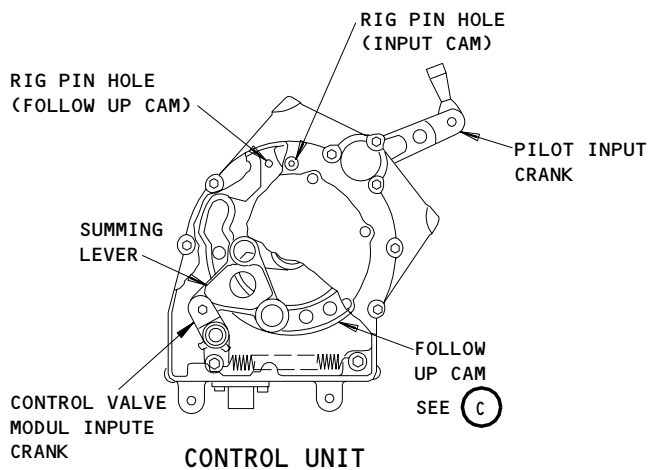
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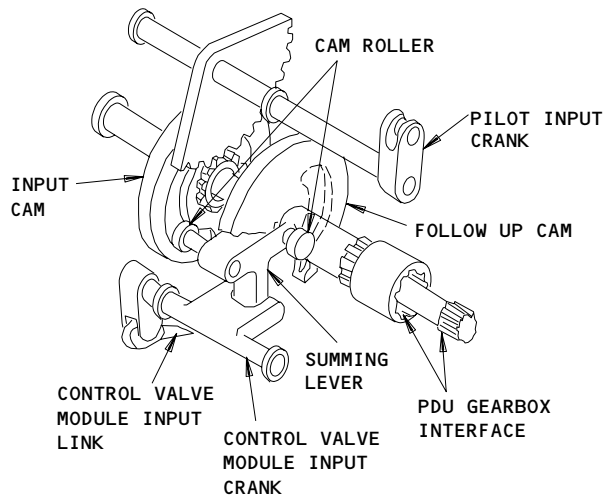


TE FLAPS POWER DRIVE UNIT

(A)



(B)



(C)

CONTROL UNIT INTERNAL SCHEMATIC

TE Flaps PDU Control Unit  
Figure 7

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- (2) The control valve module input crank selects the direction of hydraulic flow out of the control valve. When the control valve is in neutral position, fluid flow is blocked. Movement of the input crank repositions the control valve to port hydraulic pressure to one side or the other of the hydraulic motor to drive the motor. The PDU gearbox transmits rotary power from the hydraulic motor to the flap drive shafts.
  - (3) The flap/slat shutoff valve module (Fig. 8 and 21) provides center system hydraulic power to flap and slat power drive units. The flap/slat shutoff valve module consists of a priority valve, a flow limiting valve, and two solenoid-operated shutoff valves, one for flaps and one for slats.
  - (4) The priority valve permits flow only when hydraulic pressure exceeds 1200 psi. The flow limiting valve, installed downstream of the priority valve, limits hydraulic flow to the flap and slat hydraulic motors. This regulates maximum motor speed and the rate of flap and slat extension or retraction. The flow limiter permits a flow of 24 gpm.
  - (5) The shutoff valves are spring-loaded open and powered closed. The FSEU provides control logic for shutoff valve operation.
  - (6) The bypass valve is bolted to the control valve module (Fig. 8 and 9). It is operated by a 28v dc motor. The bypass valve normally allows hydraulic fluid to reach the hydraulic motor. When the valve is in bypass, fluid flow to the hydraulic motor is blocked, and hydraulic fluid is ported from one motor port to the other and to the hydraulic return line. The bypass valve can be operated manually by a lever. Normally the lever is in position two. In position one, the valve is in the bypass position.
  - (7) The hydraulic motor is a standard piston-type that operates in either direction with 3000 psi system pressure.
- F. Alternate Power Drive (Fig. 9)
- (1) The alternate power drive system provides an independent backup to the hydraulic power drive system. The alternate system is powered by an electric motor located on the power drive unit. The motor assembly consists of an electric motor, clutch, torque limiter, brake, and reduction gearing. The electric motor is a 115 volt ac, 3-phase, 400 Hz, reversible, induction motor. During normal operation, the clutch allows the power drive unit to back-drive the motor reduction gearing without rotating the motor. When the alternate power drive system energizes the clutch solenoid, the clutch engages the motor with its output shaft, so the motor can drive the flap. The torque limiter protects the motor from a jammed flap. The torque limiter restores itself to a positive connection once the load drops below the slip torque limit. An electromagnetic brake releases the motor when the motor is powered. When power is cut off, the brake stops motor rotation.

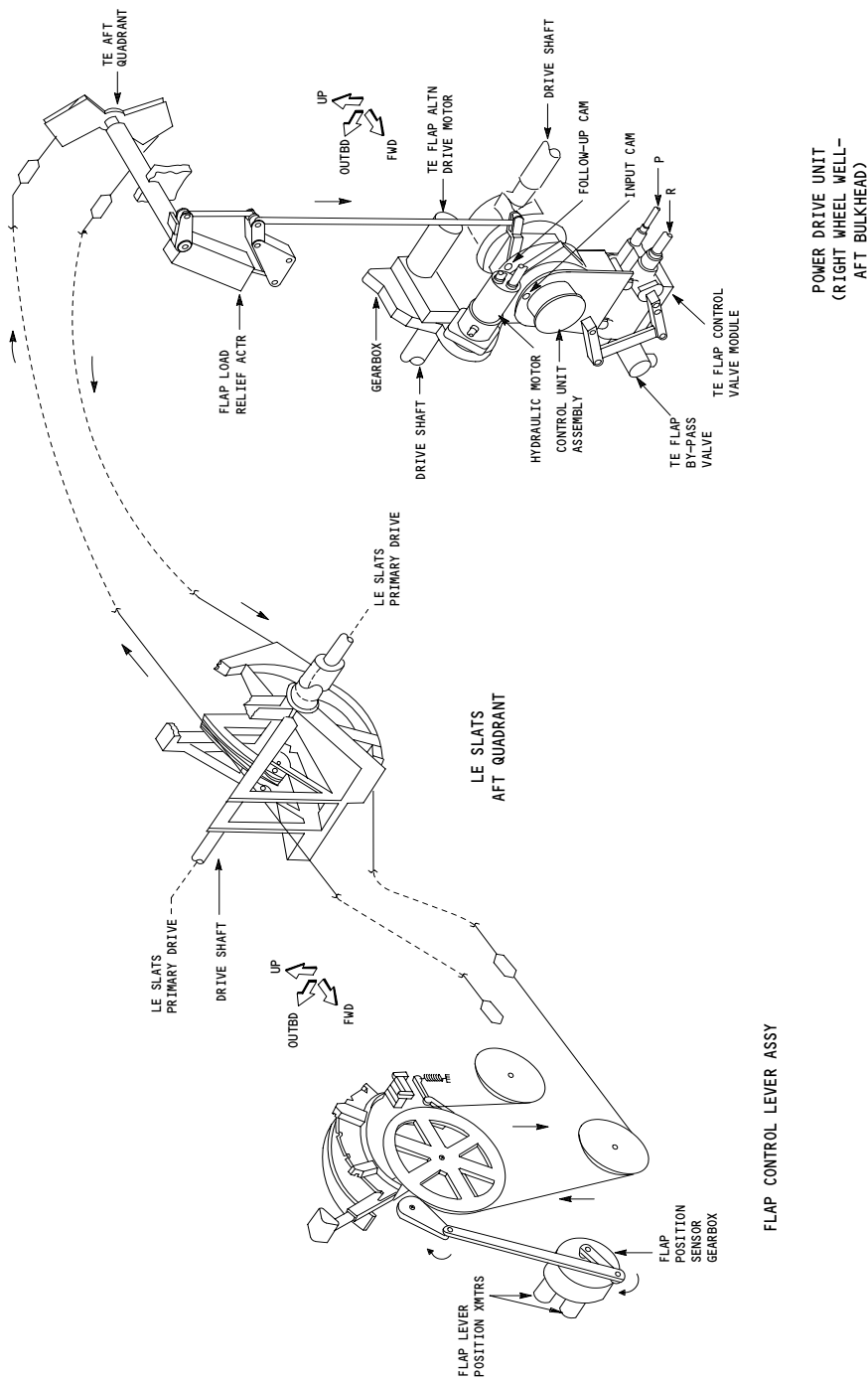
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NOTES:  
1. DIRECTIONAL ARROWS ADJACENT TO LINKAGE AND CABLES INDICATE FLAPS DOWN MOTION.

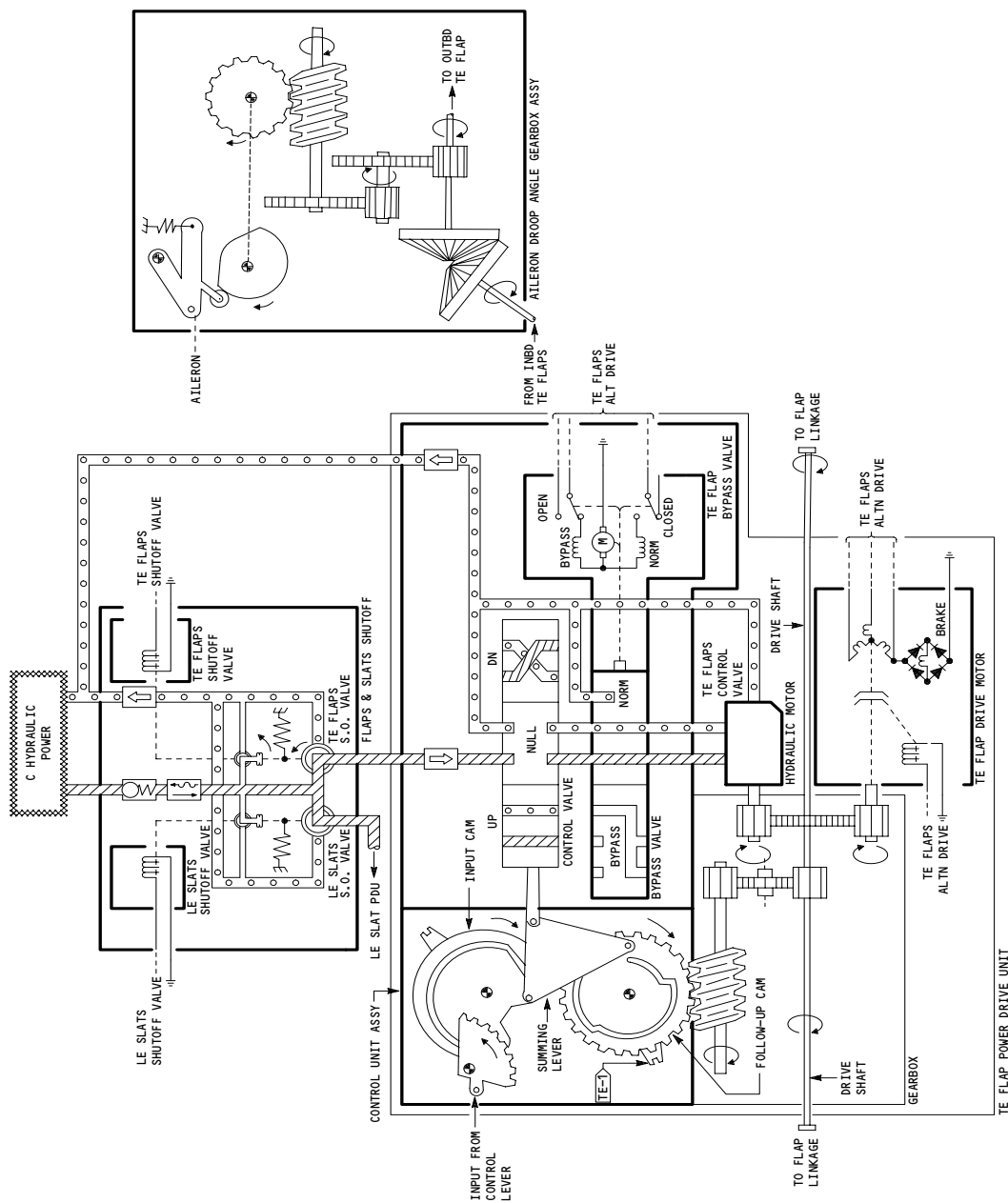
▨ PRESSURE  
○ RETURN

TE Flaps Hydraulic Operation Schematic Figure 8 (Sheet 1)

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TE Flap Normal Hydraulic Drive System Schematic  
Figure 8 (Sheet 2)

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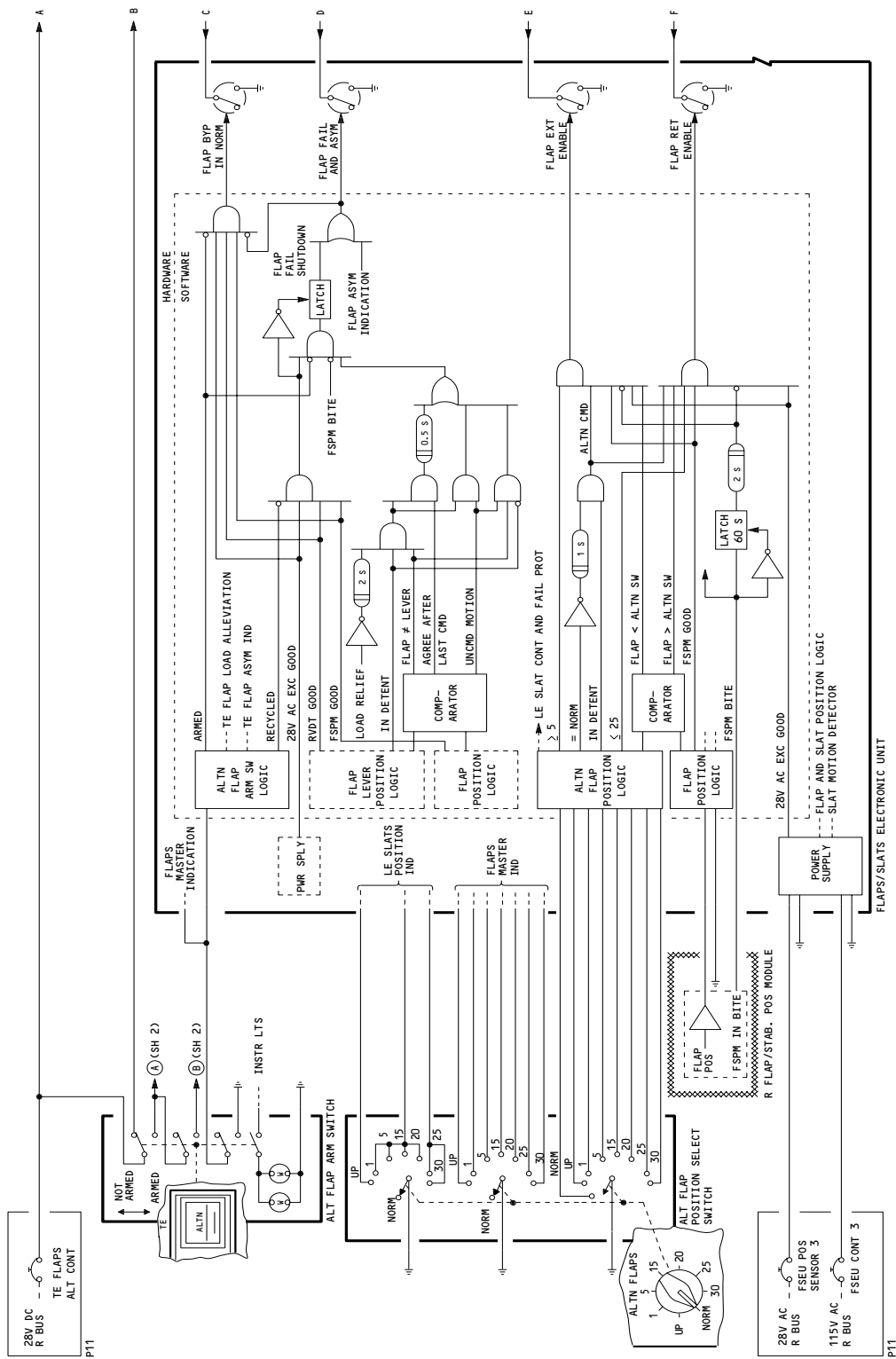
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TE Flap Alternate Electric Drive System Schematic  
Figure 9 (Sheet 1)

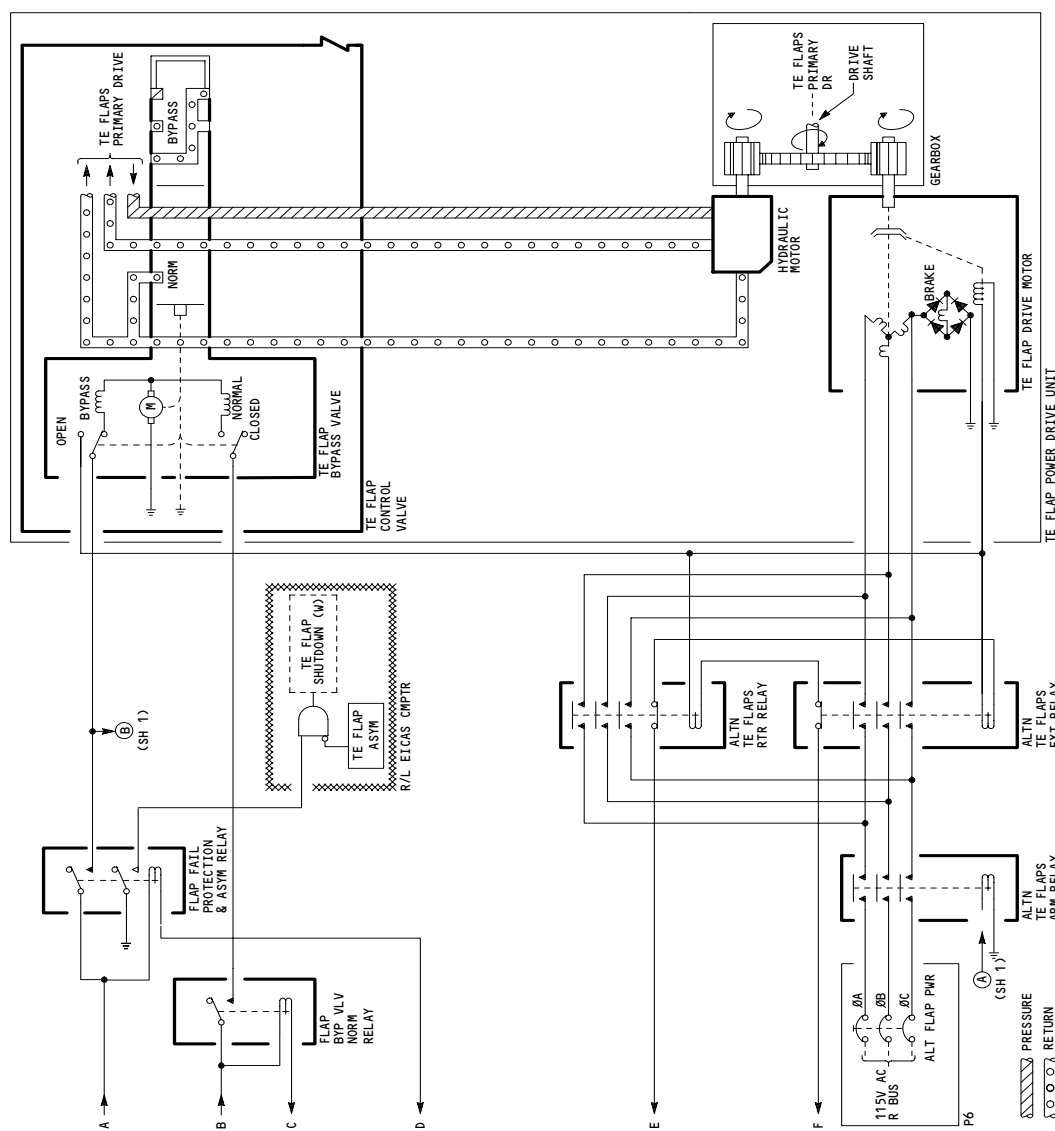
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TE Flap Alternate Electric Drive System Schematic  
Figure 9 (Sheet 2)

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- (2) The alternate power drive is operated by switches located on the flap/slat alternate control module. The module is mounted in the main instrument panel P3. The flap position is selected by a rotary switch with eight graduated position markings: NORM, UP, 1, 5, 15, 20, 25, and 30. The trailing edge arming switch activates the flap alternate drive system.

G. Flap Drive Shafts (Fig. 10)

- (1) A single drive shaft system operates 4 rotary actuators on each wing. Drive shafts from both wings are driven by a rotary output from the power drive unit gearbox. Safety straps are installed along the drive shafts. They prevent damage to surrounding structure if a drive shaft breaks. Intermediate support bearings are installed at points where two drive shafts are connected.
- (2) The system has two drive shaft types, floating and non-floating. Floating drive shafts have a spline coupling at each end. They are installed between mechanisms with internal support bearings such as a gearbox or rotary actuator. Non-floating drive shafts have an idler bearing at one end and a spline coupling at the opposite end. They provide a support bearing where two drive shafts are connected.
- (3) A lubrication point is provided at each spline coupling and support bearing.
- (4) Drive shafts are located on the main gear wheel well aft bulkhead. Power from the power drive unit is transmitted through a support bearing to the bulkhead tee gearbox which divides power between the body-mounted rotary actuator and the 3 wing-mounted actuators.
- (5) The bulkhead angle gearbox joins the bulkhead tee gearbox to the actuator input angle gearbox. A safety strap is located between the bulkhead angle gearbox and the bulkhead tee gearbox.
- (6) The side-of-body angle gearbox is driven by the bulkhead tee gearbox. It transmits power out to the three actuators mounted on the wing.
- (7) Rotary power is transmitted to the offset gearbox mounted on the main landing gear beam.
- (8) A drive shaft support bearing is located on the spoiler beam at W.S. 215.46. A safety strap, mounted on the spoiler beam, is outboard of the support bearing.

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- (9) The offset tee gearbox is bolted to the outboard actuator of the inboard flap. A drive shaft attached outboard to the offset tee gearbox extends through a hole in the spoiler beam and powers the outboard flap.
  - (10) The aileron droop angle gearbox is mounted on the wing rear spar. Its input drive shaft is covered by a vapor seal. The seal fastens to the gearbox and adjacent rib. It protects the trailing edge from possible fuel vapor leaks.
  - (11) The droop angle gearbox (Fig. 8 and 9) consists of an angle gearbox and a cam-operated crank arm mechanism. The gearbox is connected to input and output drive shafts. Rotary motion from the gearbox drives a worm and gear mechanism which is connected to a cam. A cam roller rides in the cam. The cam roller is part of a lever arm which is connected to the crank arm. The crank arm provides a rotary input to the aileron summing lever. As the cam rotates, the cam roller rides along the cam allowing the lever arm and crank arm to rotate. A timing disc on the gearbox housing provides a reference for adjusting the gearbox.
  - (12) As the flap moves from the 5 to 15-unit position, the inboard aileron droops to a maximum of 10 degrees. For a more detailed description of aileron droop, see 27-11-00.
  - (13) A drive shaft support bearing is located on the rear spar at W.S. 517.70.
  - (14) The inboard rotary actuator for the outboard flap is mounted on a rib at W.S. 616.20. The actuator transmits power from its input drive shaft, through the rib, to the output drive shaft. A safety strap is located on the inboard end of the actuator.
  - (15) A drive shaft support bearing is installed at W.S. 701.48. A safety strap is located inboard of the bearing.
  - (16) The outboard rotary actuator for the outboard flap is mounted on a rib at W.S. 798.20. A safety strap is located on the inboard end of the actuator.
- H. Rotary Actuators (Fig. 11)
- (1) The rotary actuators are driven by their flap drive shafts. Two rotary actuators drive each inboard and outboard flap. There is a total of 8 actuators, 4 on each wing.
  - (2) The rotary actuator fits over a reaction ring that is bolted to a support rib on the wing. Spline teeth inside the actuator engage the reaction ring splines. Missing teeth on both actuator and reaction ring align when correctly installed. The actuator clamps against the rib with 3 hold-down clamps.
  - (3) There are two actuator sizes. The largest is 10.5 inches in diameter and drives the outboard end of the inboard flap. The three 9.5 inch (241.3 mm) diameter actuators drive the outboard flap and the inboard end of the inboard flap.
  - (4) The rotary actuator consists of planetary reduction gearing, a no-back brake and a torque limiter. An overload trip indicator is installed on the torque limiter. The no-back brake prevents airloads from retracting the flap if a drive shaft becomes disconnected.

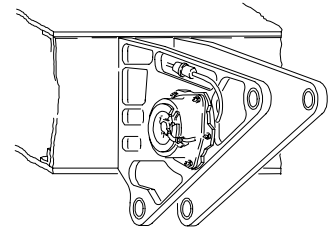
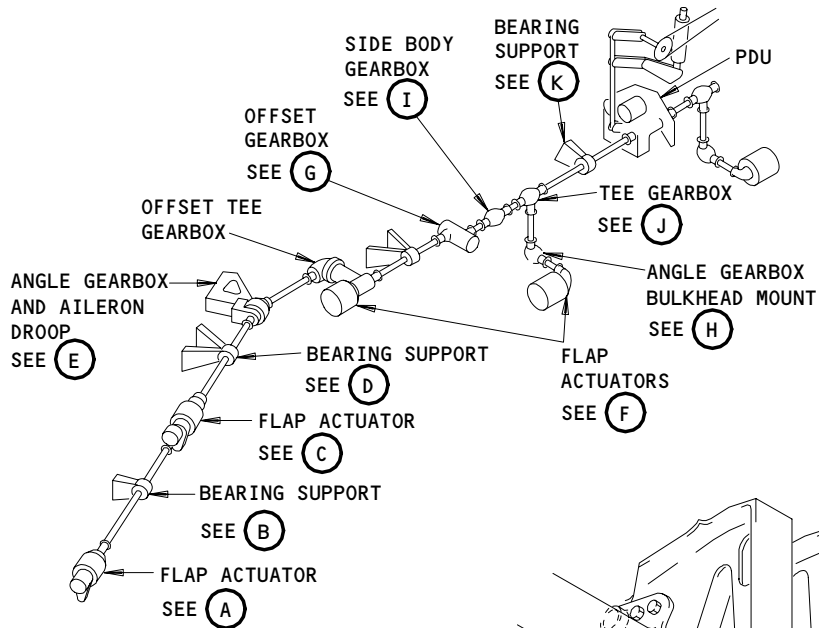
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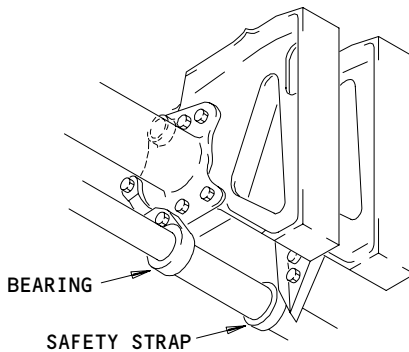
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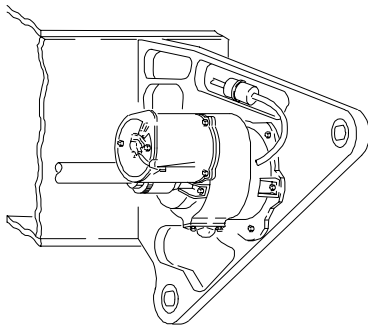
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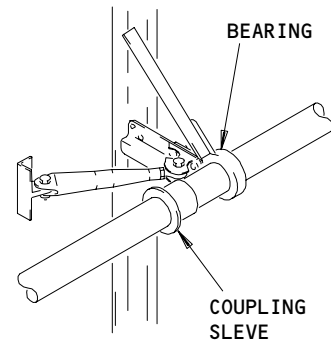
OUTBD ACTUATOR  
OUTBD FLAP  
(A)



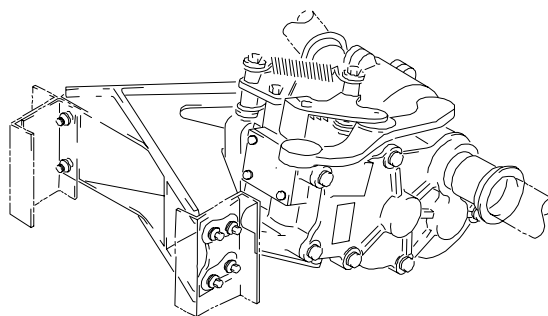
BEARING SUPPORT  
& SAFETY STRAP  
(B)



INBD ACTUATOR  
OUTBD FLAP  
(C)



BEARING SUPPORT  
(D)

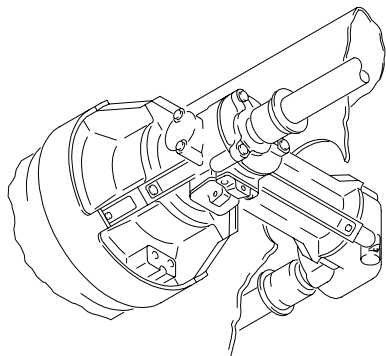


ANGLE GEARBOX  
& AILERON DROOP MECHANISM  
(E)

Flap Drive Shafts  
Figure 10 (Sheet 1)

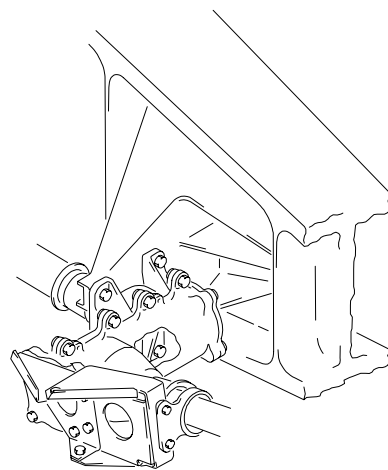
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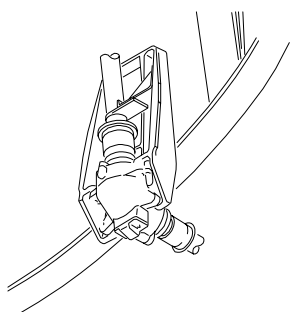
FLAP ROTARY ACTUATOR

(F)



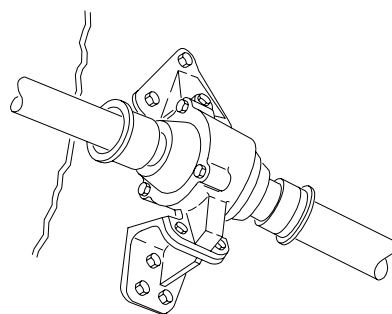
OFFSET GEARBOX

(G)



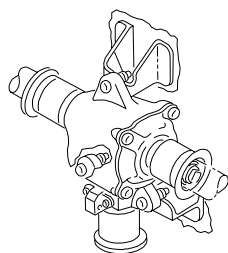
ANGLE GEARBOX

(H)



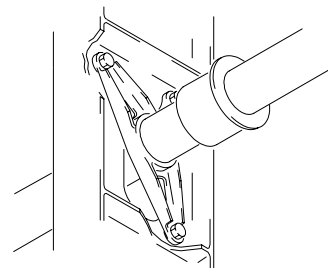
SIDE BODY GEARBOX

(I)



T-GEARBOX

(J)



BEARING SUPPORT (TYP)

(K)

Flap Drive Shafts  
Figure 10 (Sheet 2)

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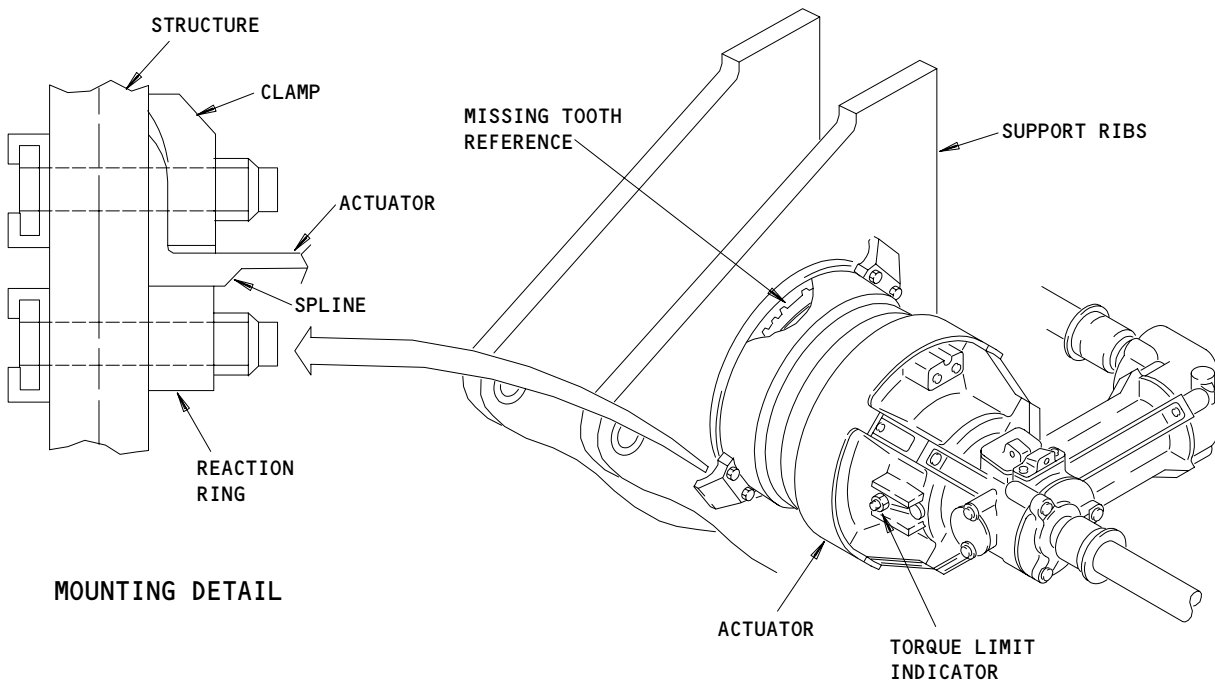
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(5) The torque limiter protects the actuator from an overload. The torque limiter is located at the outboard end of the actuator. It transmits an overload to the no-back brake output cam shaft. At the inboard end of the output cam shaft is the disc cam drive which actuates the overload indicator. A push on a tripped overload indicator will reset an indicator.

I. Inboard TE Flap (Fig. 12, 13, and 14)

(1) The inboard flap is driven by two rotary actuators. Each actuator rotates a crank arm. The crank arm drives the main flap aft and down, opening a slot at the wing trailing edge. When the flap is extended beyond the 20-unit position, a slot opens between the main and aft flaps.



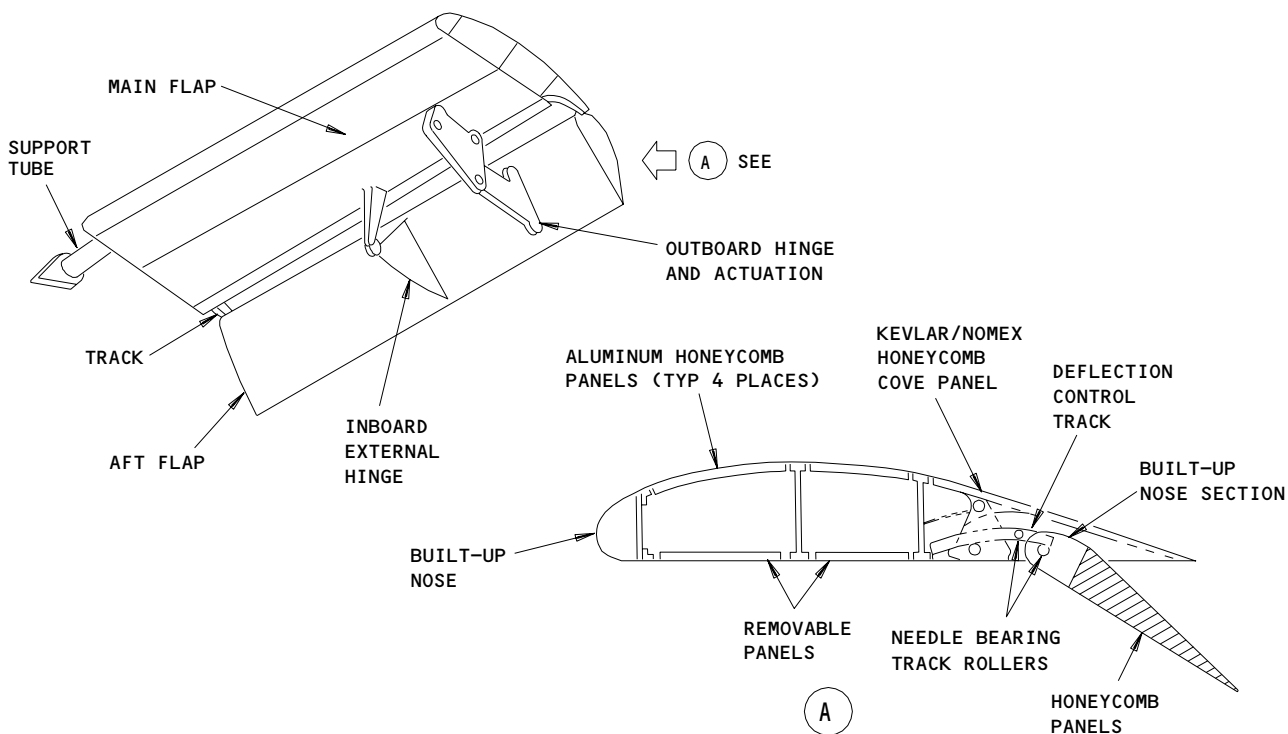
POSITION 3 AND 6 ACTUATOR INSTL (TYP)

Rotary Actuator  
Figure 11

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- (2) The inboard mechanism has an upper and lower crank arm (Fig. 13). The lower crank arm is driven by the actuator. The upper crank arm is driven by the lower crank arm through a connecting link.
- (3) The upper crank arm drives the main flap along a track through a link and support beam mechanism. The main flap rolls along the track on a carriage. The carriage is bolted to the support beam.
- (4) Overtravel extend and retract stops are located on the lower crank arm. The retract overtravel stop is formed with a recess on the forward end of the actuator support fitting. The extend overtravel stop is formed with a recess in the aft upper end of the actuator support fitting.
- (5) The lower crank arm drives the fairing door when the flap extends beyond the 10-unit position. The opening allows the main flap support tube to pass through the wing-body fairing. The door is driven by a cam mounted on the lower crank arm. A cam roller mounted on the door drive bellcrank rides inside the cam and sequences the door open and closed. The bellcrank is connected to the fairing door by a drive rod.

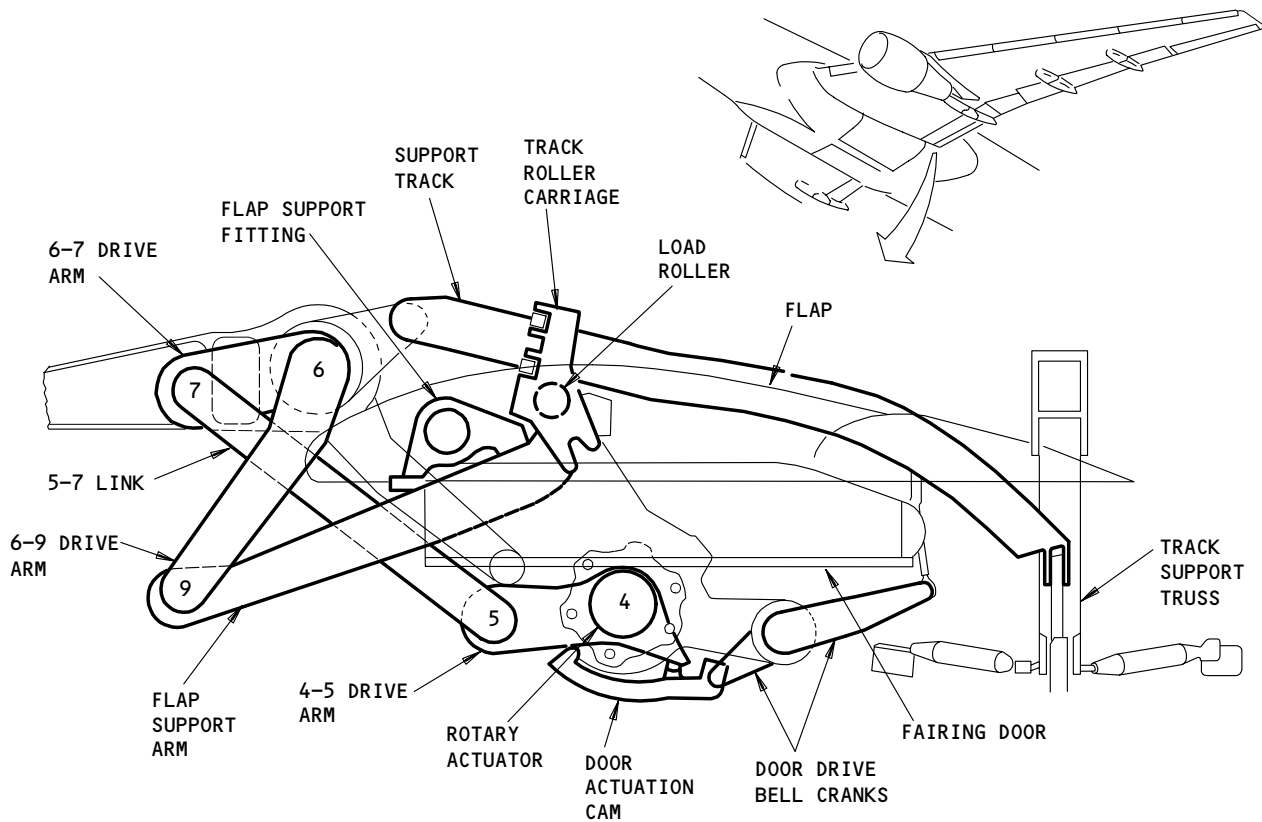


Inboard TE Flap  
Figure 12

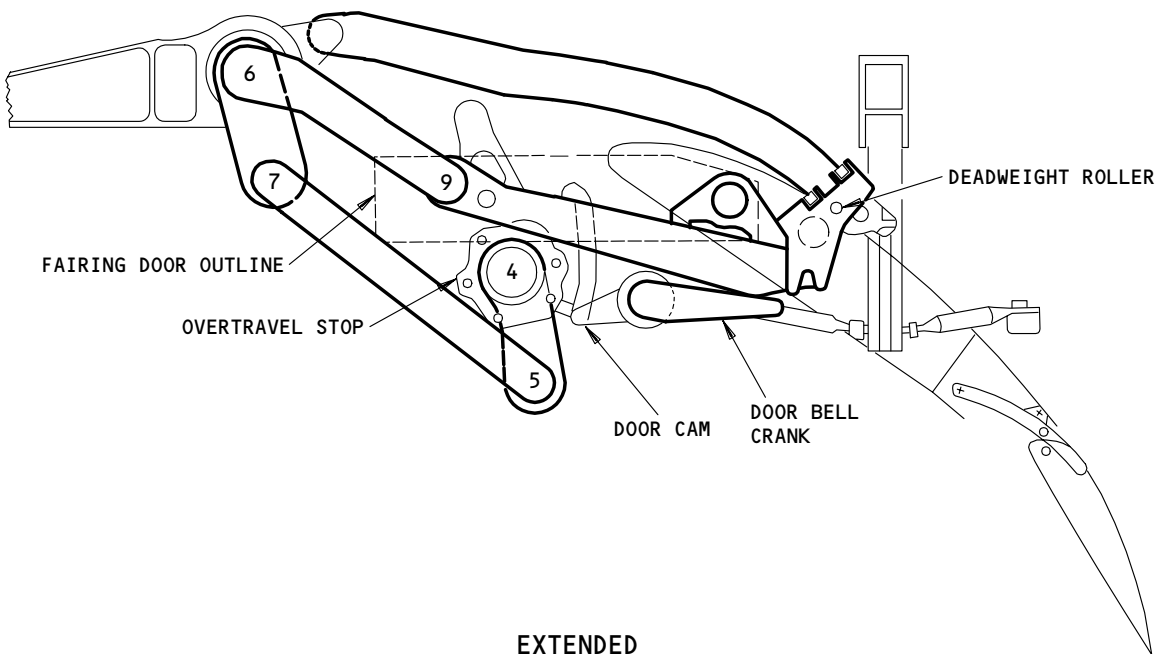
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RETRACTED



EXTENDED

Inboard Flap, Inboard Mechanism  
Figure 13

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- (6) The outboard mechanism has a single crank arm driven by a rotary actuator. The crank arm drives a linkage that operates the main flap and a separate linkage that operates the aft flap (Fig. 14).
    - (a) The crank arm is connected by a link to a four bar mechanism that drives the main flap up and down. The four bar mechanism has a support beam that bolts to the main flap rear spar and to a fitting on the main flap leading edge.
  - (7) An aerodynamic fairing covers the outboard mechanism for the inboard flap. The fairing consists of three sections. The forward section is fixed to the wing lower surface. The center fairing is movable and rotates around a hinge inside the forward fairing. The movable fairing is lowered as the flap extends. It is actuated by a linkage and rod system that connects the flap support beam to the fairing. The aft fairing is fixed to the aft flap hinge. Access panels are located in each fairing section to allow flap system adjustment.
- J. Aft Flap Mechanism (Fig. 15)
- (1) The aft flap is operated by a bellcrank and cam mechanism connected by pushrods. As the main flap moves, a pushrod connected to the actuator support rib drives the bellcrank. A pushrod from the bellcrank rotates a cam mounted on the main flap hinge fitting. Rollers mounted on the aft flap hinge fitting ride in the cam and sequence the aft flap up and down. The aft flap extends after the main flap moves beyond the 20-unit position (Figure 14).
  - (2) A slave drive mechanism is mounted on the main flap rear spar, and connects to the aft flap leading edge at 2 places. When the aft flap cam and roller system extends the aft flap, the outboard and inboard slave drive bellcranks rotate to push the aft flap out. The outboard slave bellcrank is connected by a rod to the inboard slave bellcrank, so that both rotate together.
  - (3) Overtravel extend and retract stops are located on the crank arm. The retract overtravel stop is formed with a flange on the lower aft end of the actuator support rib. The extend overtravel stop is formed by a flange on the 6-9 link.
- K. Outboard TE Flap (Fig. 16)
- (1) The outboard flap is driven by two rotary actuators. Each actuator rotates a crank arm. The crank arm drives a mechanism which moves the flap aft and down, opening a slot at the wing trailing edge. A flap deflection control track and roller are installed at the inboard and outboard ends of the flap.
  - (2) The inboard and outboard mechanisms consist of a four-bar linkage system driven by a link from each crank arm. Two links of the four-bar mechanism connect to a support beam that is bolted to the bottom of the flap (Figure 16).

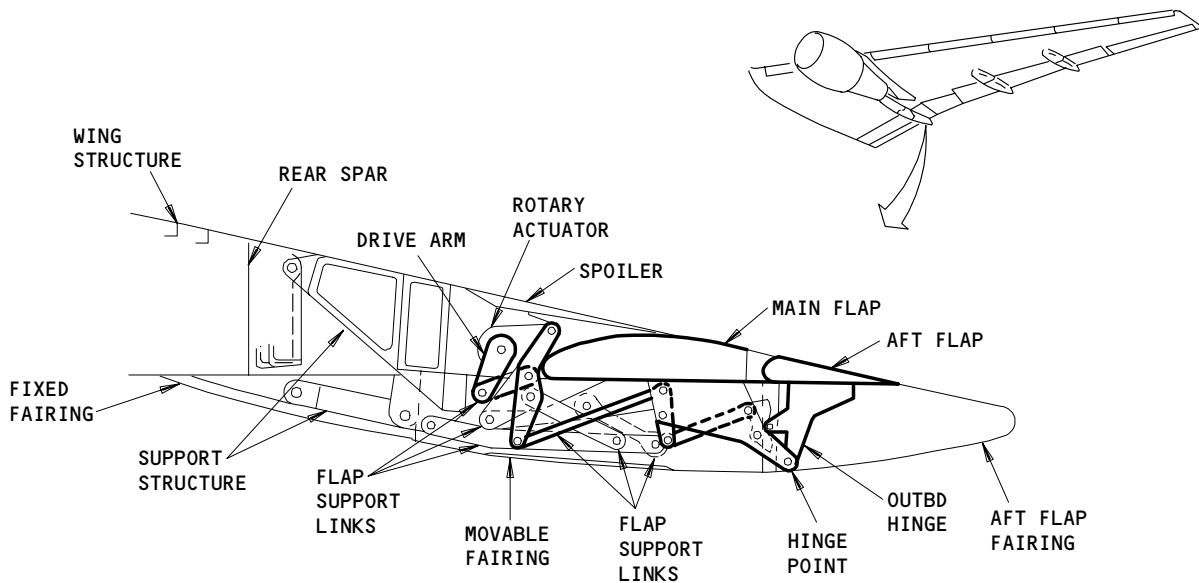
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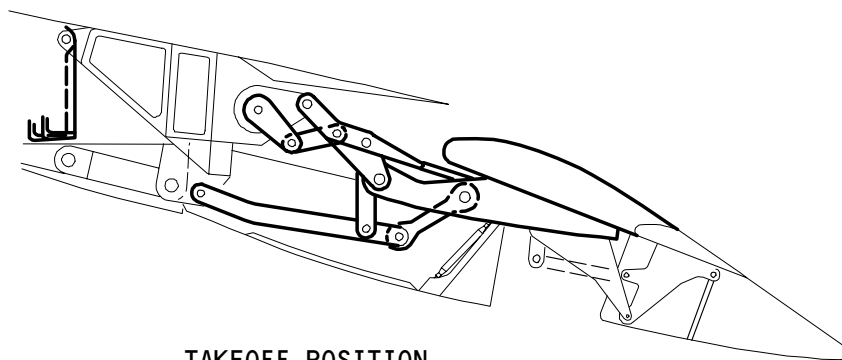
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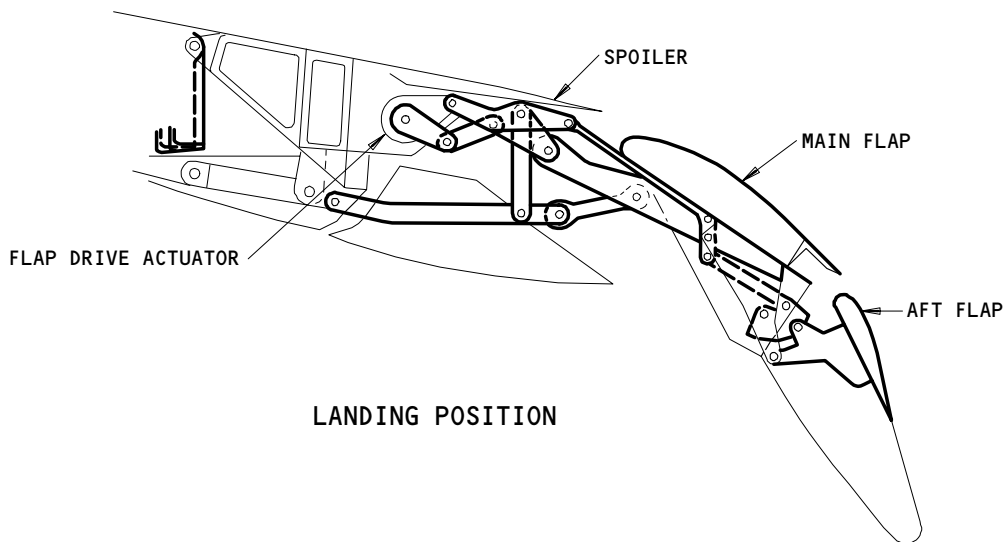
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CRUISE POSITION



TAKEOFF POSITION



LANDING POSITION

Inboard Flap, Outboard Mechanism  
Figure 14

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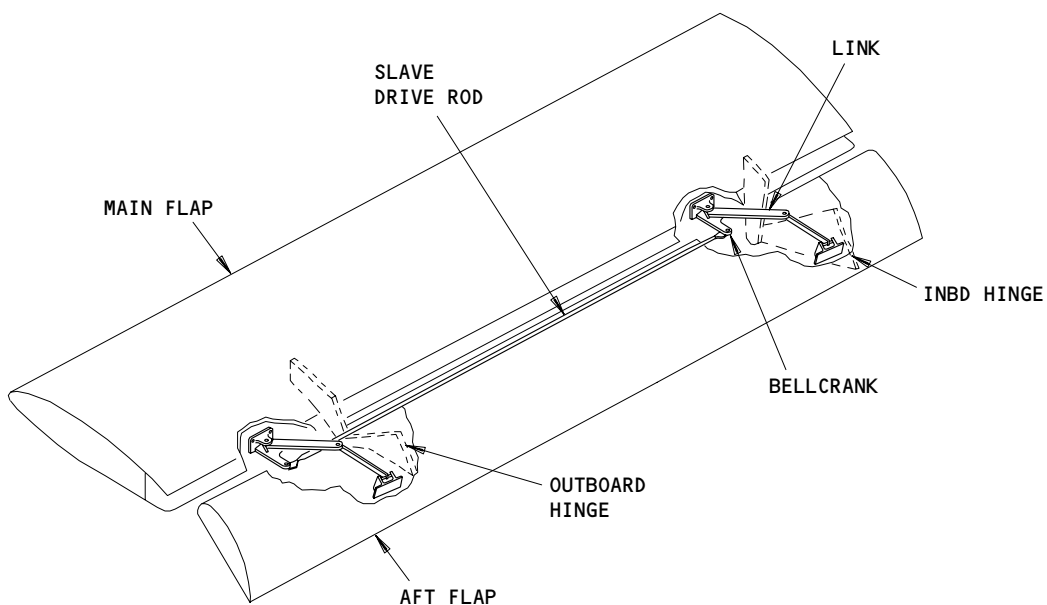
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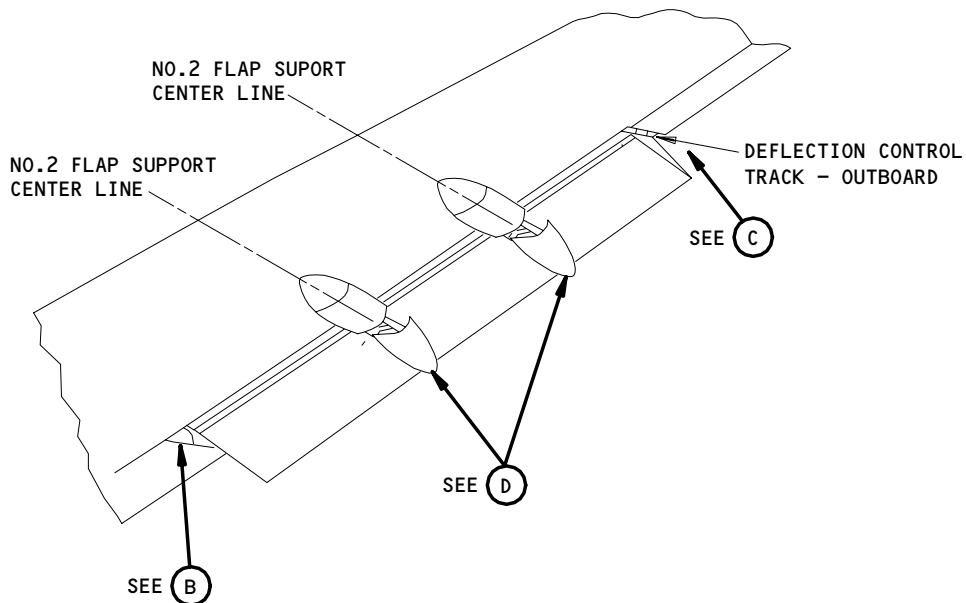
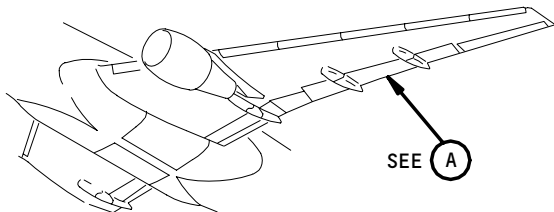
- (3) 767-200 AIRPLANES;  
Two stops are located 180 degrees apart on the exterior surface of the crank arm shaft. The overtravel stop is formed with two stops located 180 degrees apart on the inboard side of the actuator support rib. The crank arm stops contact both actuator support rib stops when the crank arm is over-rotated in either the retract or extend direction.
  - (4) 767-300 AIRPLANES;  
Overtravel extend and retract stops are located on the crank arm. The retract overtravel stop is formed with a flange on the mid forward side of the 6-9 link. The extend overtravel stop is formed by a flange on the upper forward end of the 6-9 link.
  - (5) An aerodynamic fairing covers both outboard flap mechanisms. The fairing consists of three sections. The forward section is fixed to the wing trailing edge, the aft section is fixed to the flap. The center fairing is fixed to the mechanism and moves only about one inch aft and inboard when flaps are fully extended. Access panels are located in each fairing section to allow flap system adjustment.
- L. Flap/Slat Electronic Unit (FSEU) (Fig. 17)
- (1) Refer to AMM 27-51-01/001, Flap/Slat Electronics Unit - Description and Operation, for details of FSEU related to control of flaps and slats.



AFT Flap Slave Drive Mechanism  
Figure 15

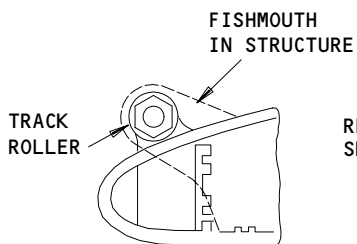
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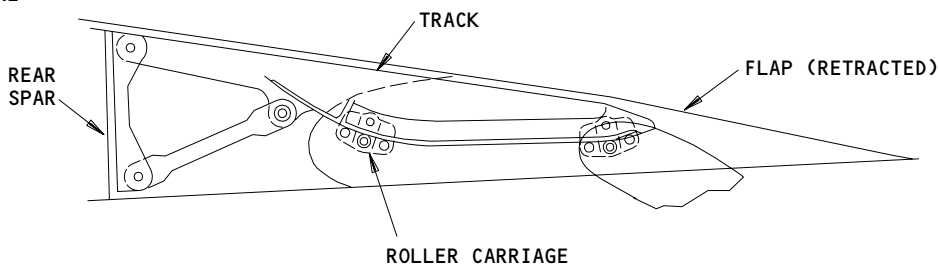
OUTBOARD FLAP (EXTENDED)

(A)



INBOARD END

(B)



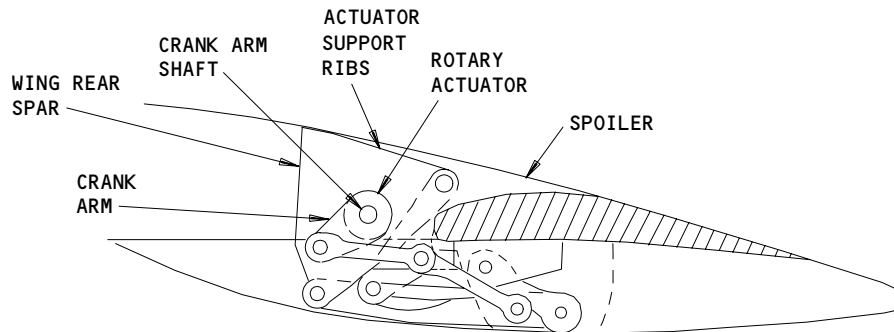
DEFLECTION CONTROL TRACK

(C)

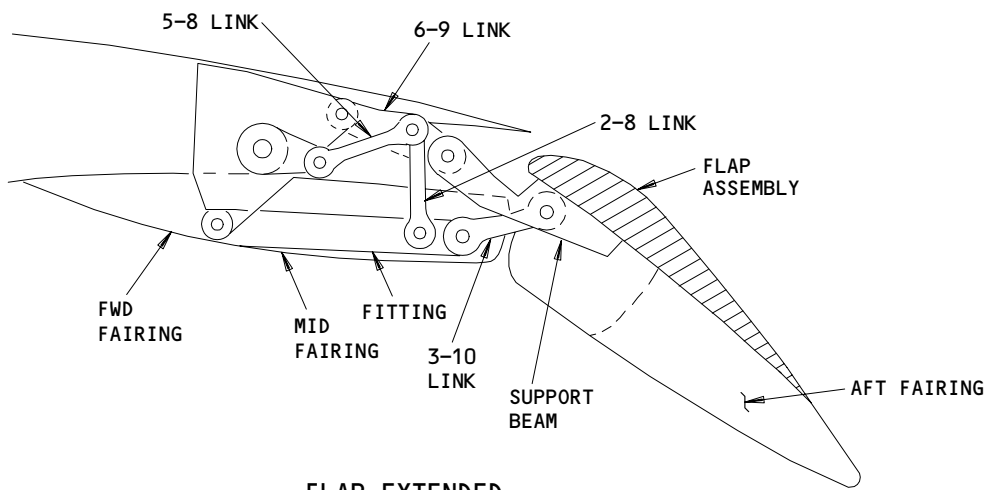
Outboard TE Flap  
Figure 16 (Sheet 1)

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FLAP RETRACTED



FLAP EXTENDED

NO. 1 SUPPORT SHOWN - NO. 2 SIMILAR

(D)

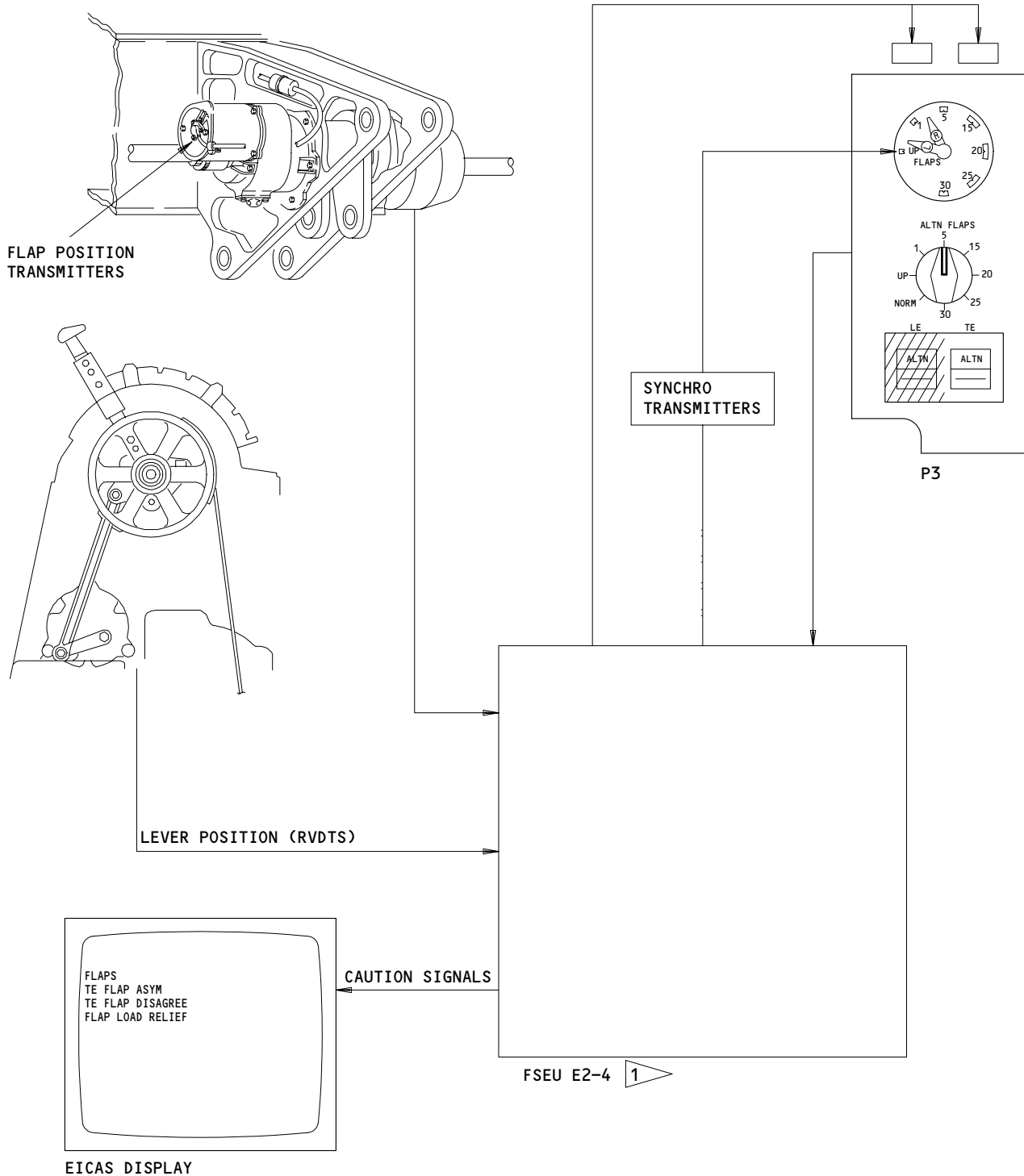
Outboard TE Flap  
Figure 16 (Sheet 2)

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1 REFER TO 27-51-01, FLAP/SLAT ELECTRONICS UNIT - DESCRIPTION AND OPERATION

Flap/Slat Electronic Unit (FSEU)  
Figure 17

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M. Position Transmitter (Fig. 18)

- (1) Position transmitters are located adjacent to the rotary actuators at positions 1, 3, 4, 5, and 8. The transmitter at positions 1, 4, 5, and 8 contain resolvers. Each resolver provides an asymmetry signal to the asymmetry detection circuit in section 1 of the FSEU. The two outboard transmitters also contain a synchro. Each synchro provides a flap position signal to the flap position indicating system. See 27-58-00 for details. RVDTs are installed in transmitters at positions 3, 4, and 5. The three RVDTs provide a flap position signal to the flap/stabilizer position module.
- (2) The transmitter mounting housing is fixed to wing structure. A drive housing fits over the mounting housing. Each drive housing has two drive tangs that engage the crank arm input shaft. As each rotary actuator drives its crank arm input shaft, each transmitter drive housing rotates.
- (3) Transmitter rig position (flaps fully extended) is established by inserting a rig pin in a hole on the face of the transmitter.
- (4) A micro adjustment fitting is located inside the cutout in the transmitter mounting housing. The adjustment fitting acts like an off center cam. As the fitting is rotated, it presses against the cutout, slightly rotating the transmitter.

N. Flap/Stabilizer Position Module (FSPM) (Fig. 19)

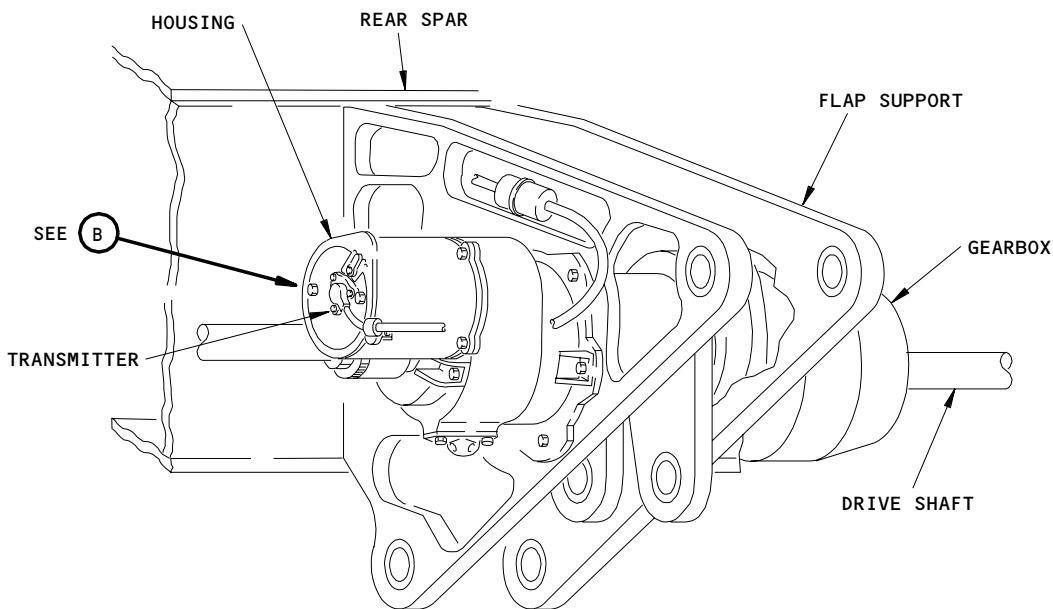
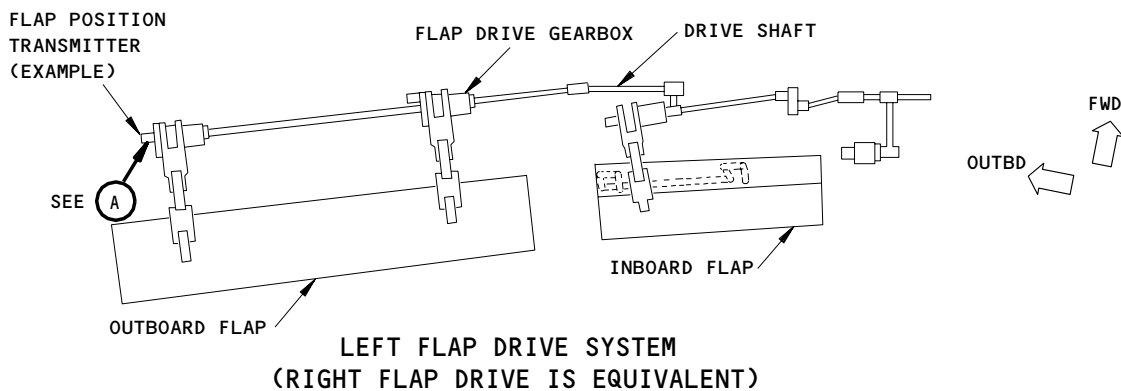
- (1) The flap/stabilizer position module provide flap and stabilizer position signals to flap and other airplane systems. Logic is contained on circuit cards located in the P50 panel card file. Separate cards make up the center, left and right flap/stab position modules. The P50 card file is mounted inside the aircraft on the right side of the nose gear wheel well.
- (2) The left FSPM receives position signals from the following:
  - (a) Horizontal stabilizer left position transmitter.
  - (b) The outboard transmitter on the inboard flap of the left wing.
- (3) The left FSPM provides signals to the following:
  - (a) TMS mode selector logic.
  - (b) AFDS pitch cruise signals, left channel.
  - (c) TE flap master indication in section 2 of the FSEU.

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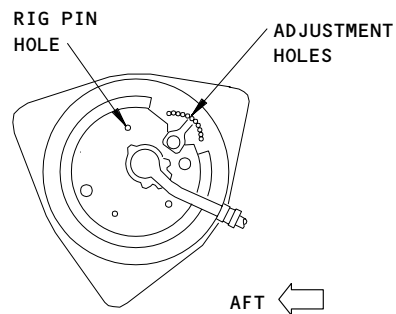
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TYPICAL POSITION INDICATOR

(A)



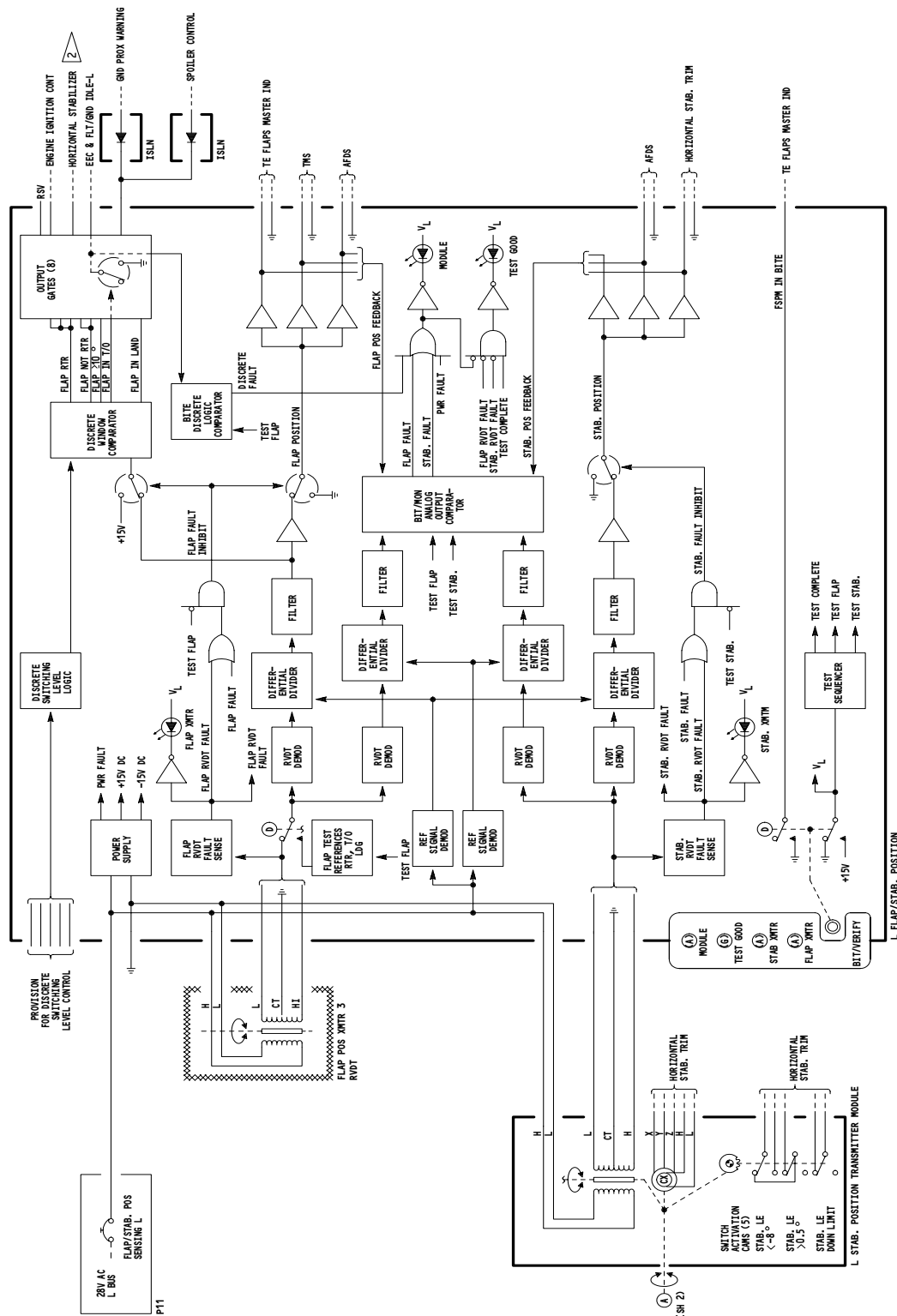
TYPICAL POSITION TRANSMITTER

(B)

Position Transmitter  
Figure 18

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Flap/Stabilizer Position Module Schematic  
Figure 19 (Sheet 1)

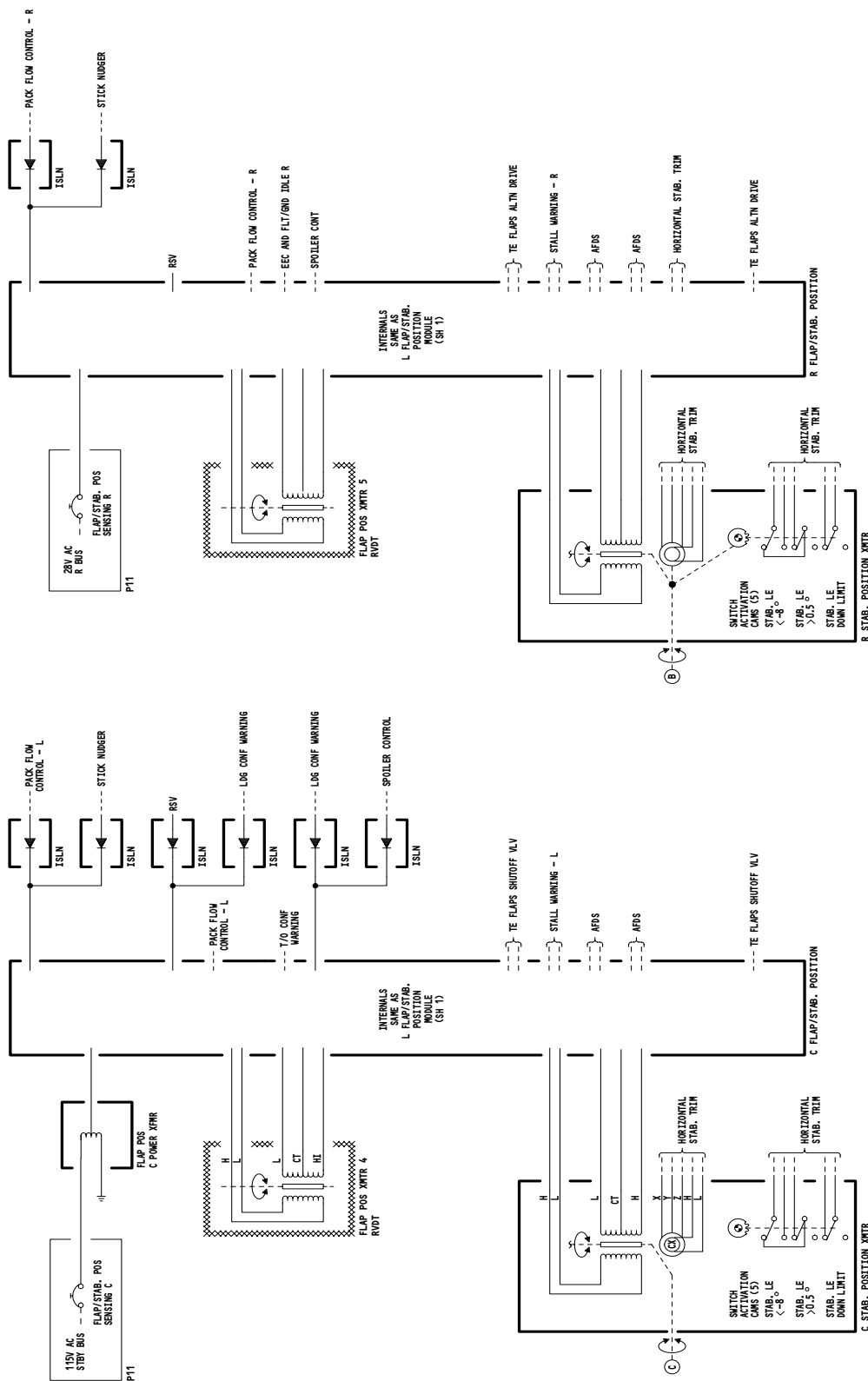
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Flap/Stabilizer Position Module (FSPM) Schematic  
Figure 19 (Sheet 2)

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- (d) Left stabilizer trim/aileron lockout module.
  - (e) Spoiler control.
  - (f) Ground proximity warning.
  - (g) Engine ignition.
  - (h) EEC and flight/ground idle.
- (4) The right FSPM receives position signals from the following:
- (a) Horizontal stabilizer right position transmitter.
  - (b) The inboard transmitter on the inboard flap of the right wing.
- (5) The right FSPM provides signals to the following:
- (a) TE flap alternate drive logic in section 3 of the FSEU.
  - (b) AFDS pitch cruise signals, right channel.
  - (c) Stall warning, right channel.
  - (d) Right pack flow control.
  - (e) Right stabilizer trim/aileron lockout module.
  - (f) Spoiler control.
  - (g) Engine ignition.
  - (h) EEC and flight/ground idle.
- (6) The center FSPM receives position signals from the following:
- (a) The inboard transmitter of the inboard flap of the left wing.
  - (b) Horizontal stabilizer center position transmitter.
- (7) The center FSPM provides signals to the following:
- (a) TE flap shutoff valve logic in section 1 of the FSEU.
  - (b) AFDS pitch cruise signals, center channel.
  - (c) Stall warning, left channel.
  - (d) Spoiler control.
  - (e) Center flight control computer.
  - (f) Configuration warning module.
  - (g) Left pack flow control.
0. Flap Indication Lights
- (1) The red configuration light is located on the P2 panel (Fig. 3). The CONFIG light comes on as part of a level A warning when flap position is not correctly set for landing or takeoff.
- (2) Master caution/warning lights are mounted on the glareshield (Fig. 3). The red lights come on as part of a level A warning when flap position is not correctly set for landing or takeoff. The amber lights come on as part of a level B warning when the flap system experiences uncommanded motion (motion without command or motion opposite to command), flap lever/flap position disagreement (no motion when commanded), or asymmetry.

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- (3) An amber TRAILING EDGE light is installed above the position indicator. The TRAILING EDGE light comes on when the flap fail protection system (Fig. 20) is activated for a flap asymmetry condition (Fig. 23), or when flap load alleviation fails (Fig. 22). The TRAILING EDGE light also comes on accompanied by the TE FLAP DISAGREE message, if the alternate flaps/slats position selector switch remains in NORM for seven seconds after the TE flap alternate drive system has been armed.

### 3. Operation

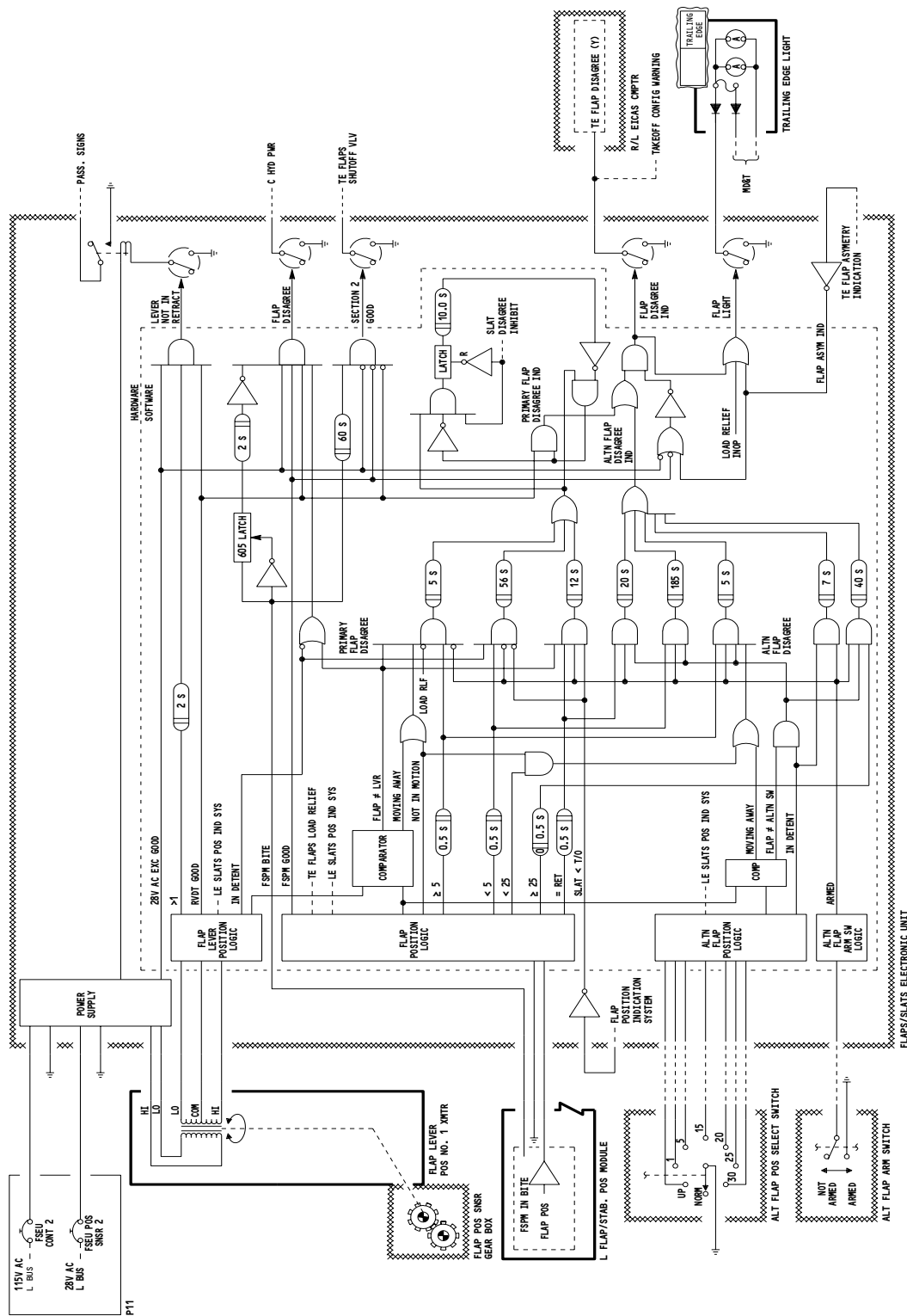
#### A. Functional Description

- (1) Hydraulic Flap Operation (Fig. 8)
- (a) The flap and slat positions are normally controlled by a manually operated flap control lever. The lever is bolted to the forward quadrant. Cables connect the forward quadrant to the slat and flap aft quadrants. Rotating the flap lever to the desired detent selects the aft quadrant position.
- (b) A crank arm from the aft quadrant is attached by connecting rods to the flap load alleviation system and to the pilot input crank on the power drive unit (PDU). The pilot input crank, located on the control unit module, receives flap position command from the aft quadrant crank. The input cam and follow up cam rotate inside the control unit module, allowing the summing lever to actuate the valve input crank. The valve input crank selects the direction of hydraulic flow out of the control valve. A clockwise rotation of the control valve crank allows hydraulic fluid to flow into one side of the hydraulic motor, which retracts the flap. A counterclockwise rotation allows hydraulic fluid to flow into the opposite side of the hydraulic motor, which extends the flap.
- (c) As the flap extends or retracts, the follow up cam is driven by its quill shaft connection to the gearbox. The follow up cam rotates until it catches up with the input cam. The summing lever then rotates back to its original position when it settles into the follow up cam detent. The valve input crank then rotates back to its null position and hydraulic flow through the control valve stops.

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TE Flap Disagreement Indication  
Figure 20

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- (d) The hydraulic motor is geared directly to the PDU gearbox. It transmits power through the PDU reduction gearing to the flap drive shafts. The hydraulic motor can fully extend or retract the flap in about half a minute.
  - (e) Rotary power from the PDU is transmitted by drive shafts and angle gearboxes to the rotary actuators.
  - (f) Two rotary actuators drive each flap. The rotary actuator drives a crank arm that extends the flap on a linkage system.
  - (g) The inboard flap consists of a main and aft flap. As the flaps extend aft and down, a slot opens between the wing and main flap. When the flap is extended beyond the 20-unit position, a slot opens between the main and aft flaps.
  - (h) The outboard flap consists of a single main flap. As the flap extends aft and down, a slot is opened between the wing and main flap, increasing wing lift.
- (2) Alternate Flap Operation (Fig. 9)
- (a) The arming switch is connected through the flap alternate arming relay (P33 panel) to the bypass valve electric motor, and to the alternate extend relay. When the switch is armed, it lights up and the alternate arming relay is activated. This energizes the bypass valve electric motor and engages the clutch on the flap PDU alternate drive electric motor. The bypass valve then interconnects the two ports of the hydraulic motor and connects these ports to the hydraulic return line. The alternate arming relay also makes power available to both ALTERNATE EXTEND and ALTERNATE RETRACT relays. However, both relays remain open until they are closed by a command from the FSEU.
  - (b) When the rotary position selector switch is in the NORM or UP position, the alternate power drive is not operated. When the selector switch is set to position 1 or greater, the signal to retract or extend the flap is sent to the FSEU. The FSEU then commands either the extend relay or the retract relay to close. This allows power from the arming relay to reach the electric motor and drive the flap. The extend and retract relays determine direction of motor rotation by reversing phases.

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- (3) TE Flap Shutoff Valve Operation (Fig. 21)
- (a) The flap/slat shutoff valve module provides power from the center hydraulic system to the control valves on the flap and slat PDUs. The flap shutoff valve is spring-loaded open and powered closed. The FSEU provides control logic for shutoff valve operation. The FSEU controls the shutoff valve through the shutoff TE FLAP relay. The FSEU powers the valve closed during normal operation when flaps are retracted. Refer to 27-81-00, Leading Edge Slat System - Description and Operation, for operation of the slat shutoff valve.
- (4) Flap Load Alleviation (Fig. 22)
- (a) 767-200 AIRPLANES;  
The flap load alleviation system automatically reduces aerodynamic loads on the flap. Section 1 of the FSEU contains logic for load alleviation. The logic receives an airspeed signal from the air data computer. A flap lever position signal is received from the No. 2 RVDT. The flap position signal is received from the flap/stabilizer position module. When the flap lever is moved beyond the 25-unit position and airspeed exceeds 30-unit flap lever detent safe airspeed, the FSEU energizes the load alleviation mechanism to retract the flap to the 25-unit position. The flap position indicator needle will move back to 25 units. The flap lever position will not change. The FSEU will automatically extend the flap to match the flap lever position when airspeed is 4 knots below 30-unit flap lever detent safe airspeed.
- (b) 767-300 AIRPLANES;  
The flap load alleviation system automatically reduces aerodynamic loads on the flap. Section 1 of the FSEU contains logic for load alleviation. The logic receives an airspeed signal from the air data computer. A flap lever position signal is received from the No. 2 RVDT. The flap position signal is received from the flap/stabilizer position module. When the flap lever is moved beyond the 20-unit position and airspeed exceeds the 25-unit or 30-unit flap lever detent safe airspeed, the FSEU energizes the load alleviation mechanism to retract the flap to the 20-unit position. The flap position indicator needle will move back to the 20-units. The flap lever position will not change. The FSEU will automatically extend the flap to match the flap lever position when airspeed is 4 knots below the 25-unit or 30-unit flap lever detent safe airspeed.
- (c) In the event of flap load alleviation failure when flaps fail to retract with airspeed above retract airspeed, a FLAP LOAD RELIEF message will be displayed on the EICAS screen and the amber TRAILING EDGE light on P3 will come on. The FLAP LOAD RELIEF message is a level C message.

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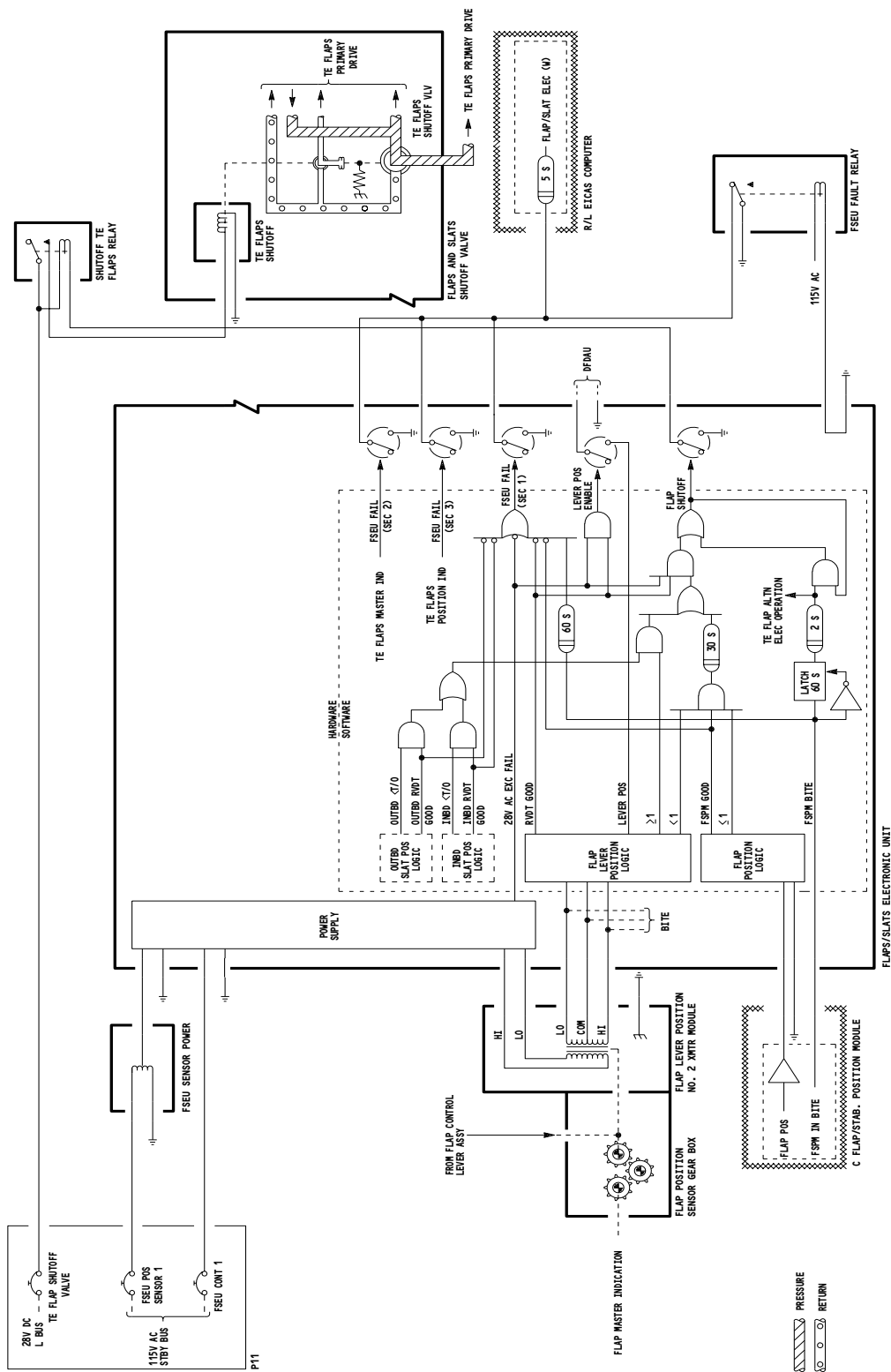
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TE Flaps Shutoff Valve Schematic  
Figure 21

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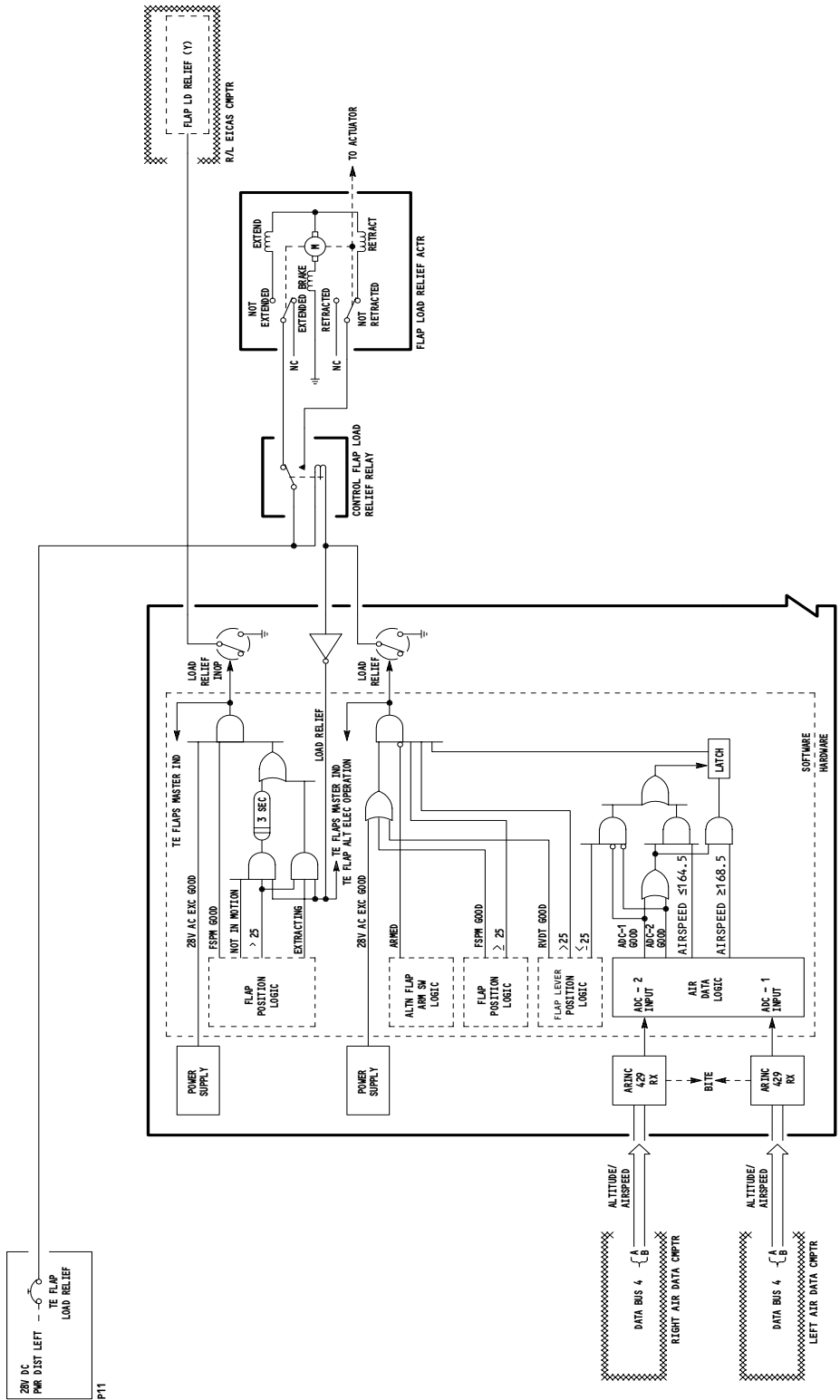
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- (d) 767-200 AIRPLANES;  
In the event that flap load alleviation has occurred with flap retraction to 25-degree position and flaps do not extend to 30-degree position when the requirement for flap load alleviation does not exist any longer, the TE FLAP DISAGREE message will appear on EICAS display and the amber TRAILING EDGE light on P3 will come on. The TE FLAP DISAGREE message is a level B message and is accompanied by aural caution and illuminated master caution lights.
- (e) 767-300 AIRPLANES;  
In the event that flap load alleviation has occurred with flap retraction to 20-degree position and flaps do not extend to 25-degree or 30-degree position when the requirement for flap load alleviation does not exist any longer, the TE FLAP DISAGREE message will appear on EICAS display and the amber TRAILING EDGE light on P3 will come on. The TE FLAP DISAGREE message is a level B message and is accompanied by aural caution and illuminated master caution lights.
- (5) Uncommanded Motion (Flap Motion With No Flap Lever Command Or Flap Motion Opposite To Flap Lever Command)
  - (a) The flap failure protection system automatically shuts down flap operation when uncommanded motion occurs. The FSEU compares the flap lever position signal with the flap position signal from the flap/stab position module. When uncommanded flap motion is detected, the FSEU sends a signal to the flap fail protection and asymmetry relay (Fig. 9). The relay energizes the PDU bypass valve to close. This blocks hydraulic flow to the hydraulic motor. Instead, hydraulic fluid is ported back to the hydraulic return line which stops hydraulic flap operation.
  - (b) If an uncommanded motion condition is detected, a TE FLAP DISAGREE message will show on the EICAS display screen and the amber TRAILING EDGE light will come on (Fig. 20). The TE FLAP DISAGREE message is a level B message and is accompanied by aural caution and illuminated master caution lights.

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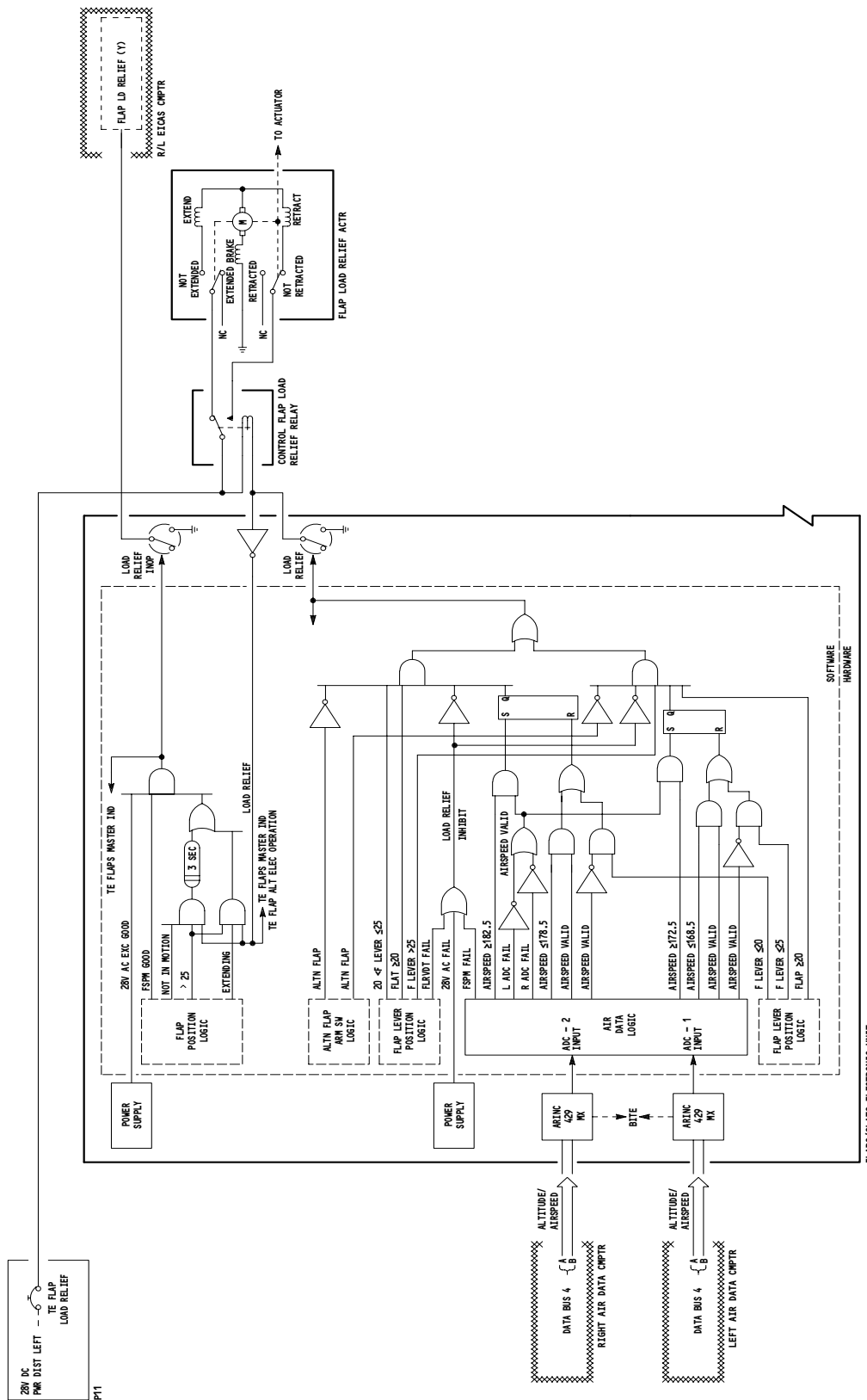
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TE Flaps Load Alleviation Schematic  
Figure 22 (Sheet 1)

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767-200ER



TE Flaps Load Alleviation Schematic  
Figure 22 (Sheet 2)

EFFECTIVITY  
767-300ER

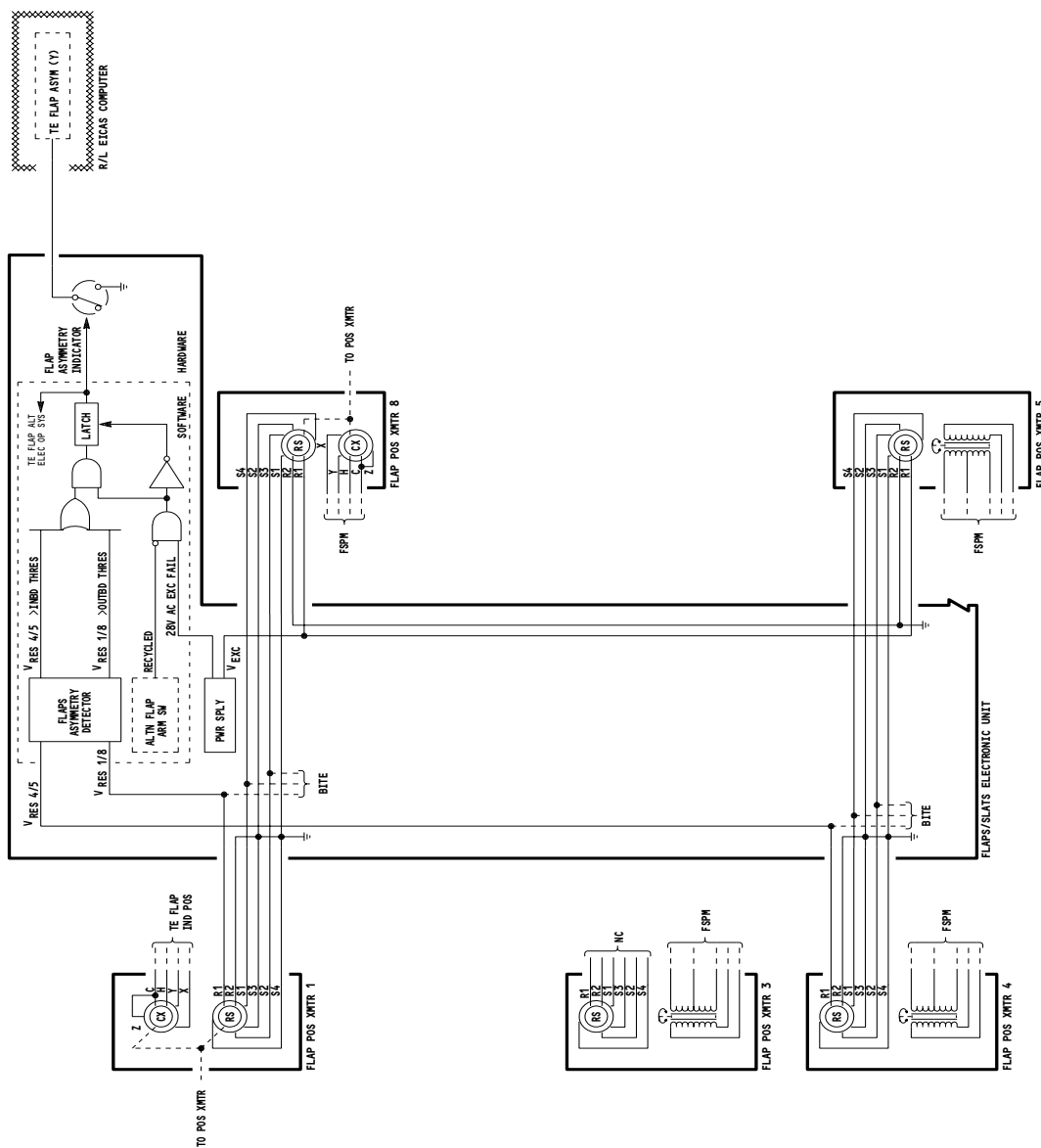
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- (c) When an uncommanded motion condition occurs, the TE FLAP DISAGREE message is accompanied by an advisory TE FLAP SHUTDOWN message to confirm that the trailing edge flap power drive unit bypass valve has moved to BYPASS.
- (d) The advisory TE FLAP SHUTDOWN message may appear by itself to indicate that the trailing edge flap power drive unit bypass valve is in BYPASS.
- (e) The advisory TE FLAP SHUTDOWN message will not appear if a TE FLAP ASYM message is present in EICAS.
- (f) The bypass valve will not return to its normally open position until the following conditions are met:
  - 1) The alternate control arming switch is turned on and then off.
  - 2) An uncommanded motion condition does not exist in the flap drive system.
- (6) Flap Lever/Flap Position Disagreement (No Flap Motion With Flap Lever Command) (Fig. 20).
  - (a) When a flap lever/flap position disagreement occurs, the TE flap PDU bypass valve remains in normal position (POS 2), and the TE FLAP DISAGREE message will appear on EICAS display and the amber TRAILING EDGE Light on P3 will come on. The TE FLAP DISAGREE message is a level B message and is accompanied by aural caution and illuminated master caution lights.
- (7) Flap Asymmetry (Fig. 23)
  - (a) The flap asymmetry system protects the flap system from an asymmetry condition.
    - 1) When an asymmetry condition is detected, the FSEU provides a ground to the TRAILING EDGE caution light and to the flap failure protection and asymmetry relay. The relay energizes the PDU bypass valve to the bypass condition, stopping hydraulic flow to the flap system. The FSEU also transmits a signal to the EICAS computer to display a TE FLAP ASYM message. The TE FLAP ASYM message is a level B message and is accompanied by aural caution and illuminated master caution lights.
- (8) Generation of FLAP/SLAT ELEC EICAS message
  - (a) For a description of the FLAP/SLAT ELEC EICAS message, refer to AMM 27-51-01/001, Flap/Slat Electronics Unit - Description and Operation.
- (9) Takeoff Configuration Warning
  - (a) If the slats and flaps are not in the takeoff position when takeoff thrust is selected on either engine, warnings will be sent to the flight deck requiring immediate action:
    - 1) The aural warning will sound.
    - 2) The red CONFIG warning light will illuminate.
    - 3) The two master warning lights on each side of the P7 panel will illuminate.
    - 4) A red EICAS FLAPS level A warning will appear on the flight compartment display screen.

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TE Flap Asymmetry Indication Schematic  
Figure 23

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(10) Control

(a) General

- 1) During maintenance, the flaps are normally operated with hydraulic power. Hydraulic power is required when rigging flap drive system components.

(b) Normal Operation

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

**WARNING:** CLEAR PERSONNEL AND EQUIPMENT FROM PATH OF FLAPS AND SLATS TO PREVENT INJURY OR DAMAGE.

**CAUTION:** BEFORE OPERATING FLAPS OR SLATS, ENSURE THAT ENGINE STRUT ACCESS DOORS, INBOARD FAN COWLING, AND THRUST REVERSER COWLING WILL NOT BE IN PATH OF SLATS, TO PREVENT DAMAGE.

- 2) Provide center system hydraulic power (AMM 29-11-00/201).
- 3) Extend the flap fully by placing the flap control lever in the 30-unit detent.

**NOTE:** It takes approximately 33-42 seconds to move the flaps from the FLAPS UP to the 30-unit position.

- 4) Retract the flap fully by placing the flap control lever in zero (FLAPS UP) detent.

**NOTE:** It takes approximately 33-42 seconds to move the flaps from the 30-unit to the FLAPS UP position.

(c) Alternate Operation

- 1) Provide electrical control power (AMM 24-22-00/201).
- 2) Press the ALTN TE arming switch to arm the alternate system. The white ALTN light will come on. After seven seconds, the TRAILING EDGE light and the TE FLAP DISAGREE message on EICAS will come on.

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**WARNING:** CLEAR PERSONNEL AND EQUIPMENT FROM THE PATH OF THE FLAPS, THE FLAP DRIVE MECHANISMS AND THE WHEEL WELL TO PREVENT INJURY OR DAMAGE.

**CAUTION:** DO NOT OPERATE THE ALTERNATE DRIVE MOTOR CONTINUOUSLY FOR MORE THAN 4 MINUTES. DO NOT OPERATE THE MOTOR AGAIN UNTIL IT IS COOL FOR AT LEAST 20 MINUTES TO PREVENT DAMAGE TO THE MOTOR.

- 3) Extend the flap fully by turning the alternate flap/slat position selector switch to the 30-unit position. The TRAILING EDGE light and the TE FLAP DISAGREE message on EICAS will go out.

**NOTE:** It takes approximately 4 minutes to move the flaps from the UP to the 30-unit position.

- 4) Retract the flap fully by turning the alternate flap/slat position selector switch to the UP position.

**NOTE:** It takes approximately 4 minutes to move the flaps from the 30-unit to the UP position.

- 5) Turn off the alternate flap system by turning the flap/slat position selector switch to the NORM position. The TRAILING EDGE light and the TE FLAP DISAGREE message on EICAS will come on after seven seconds.

- 6) Press the ALTN TE arming switch to disarm the alternate flap drive system (switch light off). The TRAILING EDGE light and the TE FLAP DISAGREE message on the EICAS will go out.

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TRAILING EDGE FLAP SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
ACTUATOR - BYPASS VALVE ROTARY	2	1	RIGHT GEAR WHEEL WELL, TE FLAP BYPASS VALVE	27-51-32
ACTUATOR - INBOARD FLAP INBOARD	4	2	195FL,195GL,195HL,195JL,195KL,196FR,196GR,196HR,196JR,196KR	27-51-05
ACTUATOR - INBOARD FLAP OUTBOARD	3	2	571EL,671EL,571ER,671ER	27-51-11
ACTUATOR - FLAP LOAD RELIEF, M576	2	1	RIGHT WHEEL WELL, AFT BULKHEAD	27-51-30
ACTUATOR - OUTBOARD FLAP	3	4	572BB,672BB,573BB,673BB	27-51-22
CIRCUIT BREAKERS	1		FLIGHT COMPARTMENT, P6	
ALTN FLAP PWR, C323		1	6D24	*
ALTN SLAT INBD PWR, C324		1	6D21	*
ALTN SLAT OUTBD PWR, C325		1	6F24	*
CIRCUIT BREAKERS	1		FLIGHT COMPARTMENT, P11	
AIR DATA AOA SENSOR L, C1		1	11A11	*
AIR DATA AOA SENSOR R, C3		1	11F31	*
AIR DATA BARO CORRECT L, C2		1	11A12	*
AIR DATA BARO CORRECT R, C4		1	11F32	*
AIR DATA CMPTR L, C625		1	11A10	*
AIR DATA CMPTR R, C626		1	11F30	*
FLAP ALTN CONT, C1027		1	11J24	*
FLAP LOAD RELIEF, C1022		1	11J13	*
FLAP POS IND L, C1008		1	11J15	*
FLAP POS IND R, C1522		1	11J16	*
FLAP SHUTOFF, C1019		1	11J14	*
FLAP SLAT ELEC UNIT 1 CONT, C1025		1	11C16	*
FLAP SLAT ELEC UNIT 2 CONT, C1521		1	11G16	*
FLAP SLAT ELEC UNIT 3 CONT, C1036		1	11G23	*
FLAP SLAT ELEC UNIT 1 SENSOR, C1037		1	11C15	*
FLAP SLAT ELEC UNIT 2 SENSOR, C1524		1	11G15	*
FLAP SLAT ELEC UNIT 3 SENSOR, C1038		1	11G22	*
FLAP/STAB POS SENSING C, C1025		1	11C14	*
FLAP/STAB POS SENSING L, C1523		1	11J17	*
FLAP/STAB POS SENSING R, C1526		1	11J26	*
FLIGHT CONTROLS FLAP/SLAT POS IND, C1021		1	11C4	*
SLAT ALTN CONT INBD, C1028		1	11H23	*
SLAT ALTN CONT OUTBD, C1024		1	11H24	*
SLAT POS IND, C1001		1	11C10	*
SLAT SHUTOFF, C1020		1	11H14	*
TEST PROX SW, C1178		1	11T36	*
COMPUTER (REF 31-41-00, FIG. 101)				
EICAS L, M10181				
EICAS R, M10182				
COMPUTER (REF 34-12-00, FIG. 101)				
AIR DATA L, M100				
AIR DATA R, M101				
DOOR - FLAP FAIRING	5	2	WING/BODY FAIRING	27-51-07
TORQUE TUBE - TE FLAP	3	--	AFT BULKHEAD LEFT AND RIGHT WHEEL WELLS. AFT OF MAIN LANDING GEAR SUPPORT BEAM, SPOILER SUPPORT BEAM, WING REAR SPAR, SEE SPECIFIC FLAP FOR ACCESS PANELS	27-51-41

\* SEE THE WDM EQUIPMENT LIST

Trailing Edge Flap System - Component Index  
Figure 101 (Sheet 1)

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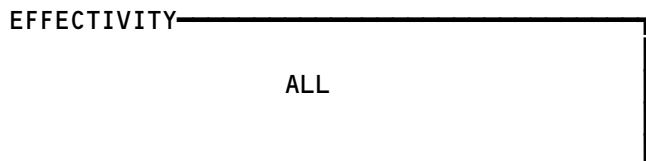
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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
FLAP - INBOARD	3	2	WING TRAILING EDGE	27-51-03
FLAP - INBOARD FLAP AFT	3	2	INBOARD FLAP TRAILING EDGE	27-51-06
FLAP - OUTBOARD	3	2	WING TRAILING EDGE	27-51-20
GEARBOX - ACTUATOR INPUT ANGLE	4	2	196FR,196GR,196HR,196JR,196KR, 195FL,195GL,195HL,195JL,195KL	27-51-42
GEARBOX - BULKHEAD ANGLE	4	2	AFT BULKHEAD MAIN WHEEL WELLS	27-51-36
GEARBOX - BULKHEAD TEE	4	2	AFT BULKHEAD MAIN WHEEL WELLS	27-51-35
GEARBOX - DROOP ANGLE, AILERON	3	2	561AB,661AB,561BB,661BB,561CB, 661CB	27-51-40
GEARBOX - FLAP LEVER POSITION TRANSMITTER	1	1	FLT COMPARTMENT, P10	27-51-26
GEARBOX - FLAP PDU	2	1	RIGHT WHEEL WELL, FLAP PDU	27-51-34
GEARBOX - OFFSET	4	2	555EB,655EB,555AB,655AB,552DB, 652DB	27-51-38
GEARBOX - OFFSET, TEE	3	2	555BB,655BB,555CB,655CB,555DB, 655DB,555EB,655EB	27-51-39
GEARBOX - SIDE OF BODY, ANGLE INDICATOR - (REF 27-58-00, FIG. 101) FLAP POSITION, N15	4	2	AFT BULKHEAD MAIN WHEEL WELL	27-51-37
LEVER - FLAP CONTROL	1	1	FLT COMPARTMENT, P10	27-51-25
LIGHT - TRAILING EDGE, L660	1	1	FLT COMPARTMENT, P3	*
MECHANISM - INBOARD FLAP	5	4	INBOARD FLAP FAIRING, 195FL, 195GL,195HL,195JL,195KL,196FR, 196GR,196HR,196JR,196KR	27-51-04
MECHANISM - OUTBOARD FLAP	6	4	OUTBOARD FLAP FAIRINGS 561KB,661KB	27-51-27
MODULE - (REF 27-58-00, FIG. 101) FLAP/STAB POS-C, M839 FLAP/STAB POS-L, M838 FLAP/STAB POS-R, M840				
MODULE - FLAP PDU CONTROL VALVE, M10182	2	1	RIGHT GEAR WHEEL WELL, BOTTOM OF FLAP PDU	27-51-32
MODULE - FLAP/SLAT SHUTOFF VALVE, V104	2	1	AFT END RIGHT GEAR WHEEL WELL	27-51-48
MOTOR - TE FLAP ELECTRIC, M547	2	1	RIGHT GEAR WHEEL WELL, FLAP PDU	27-51-34
MOTOR - TE FLAP HYDRAULIC	2	1	RIGHT GEAR WHEEL WELL, FLAP PDU	27-51-34
QUADRANT - TE FLAP AFT	2	1	FORWARD WALL AFT CARGO COMPART- MENT	27-51-30

\* SEE THE WDM EQUIPMENT LIST

Trailing Edge Flap System - Component Index  
Figure 101 (Sheet 2)



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FAULT ISOLATION/MAINT MANUAL

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
REGULATOR, FLAP/SLAT FLOW RELAYS - (31-01-33/101) ALTN TE FLAP ARM, K361 ALTN TE FLAPS EXT, K359 ALTN TE FLAPS RTR, K360 CONTROL FLAP LOAD RELIEF, K352 FLAP BYP VLV NORM, K623 FLAP FAILURE PROTECTION AND ASYM, K350 FLAP INTMD/RETRACT, K353 FLAP/REF TRANSFER, K216 RELAY - (31-01-36/101) TE FLAPS SHUTOFF, K351 RELAY - (31-01-37/101) FSEU FAULT, K730 SWITCH - ALTN FLAP ARM, S601 SWITCH - ALTN FLAP/SLAT SELECT, S598 SWITCH - SLAT HYD PRESSURE, S846 TRANSFORMER - (31-01-37/101) FSEU SENSOR, T191 TRANSMITTERS - (27-58-00/101) FLAP POSITION 1, M473 FLAP POSITION 3, M475 FLAP POSITION 4, M476 FLAP POSITION 5, M492 FLAP POSIITON 8, M489 SLATS INTMD REF SIGNAL, M606 SLATS RETRACTED REF SIGNAL, M605 TRANSMITTER - FLAP LEVER POSITION NO. 1, M604 TRANSMITTER - FLAP LEVER POSITION NO. 2, M603 UNIT - TE FLAP PDU CONTROL UNIT - FLAPS/SLATS ELEC, M545 UNIT - TE FLAP POWER DRIVE VALVE - TE FLAPS, BYPASS, V105 VALVE - TE FLAP PRIORITY VALVE - TE FLAP SOLENOID, (YB6V1)	2	1	RIGHT WHEEL WELL, FLAP/SLAT SHUTOFF VALVE MODULE	27-51-48
	1	1	FLIGHT COMPARTMENT, P3	*
	1	1	FLIGHT COMPARTMENT, P3	*
	8	1	RIGHT WHEEL WELL	27-51-48
	1	1	FLIGHT COMPARTMENT, P10, FLAP LEVER POSITION GEARBOX	27-51-26
	1	1	FLIGHT COMPARTMENT, P10, FLAP LEVER POSITION GEARBOX	27-51-26
	2	1	RIGHT WHEEL WELL, TE FLAPS PDU	27-51-34
	6	1	119AL, MAIN EQUIPMENT CENTER, E2-4	27-51-01
		1	AFT END RIGHT GEAR WHEEL WELL	27-51-33
	2	1	RIGHT GEAR WHEEL WELL, FLAP PDU CONTROL VALVE MODULE	27-51-32
	2	1	RIGHT WHEEL WELL, FLAP/SLAT SHUTOFF VALVE MODULE	27-51-48
	2	1	AFT END RIGHT GEAR WHEEL WELL. FLAP/SLAT SHUTOFF VALVE MODULE	27-51-48

\* SEE THE WDM EQUIPMENT LIST

Trailing Edge Flap System - Component Index  
Figure 101 (Sheet 3)

EFFECTIVITY

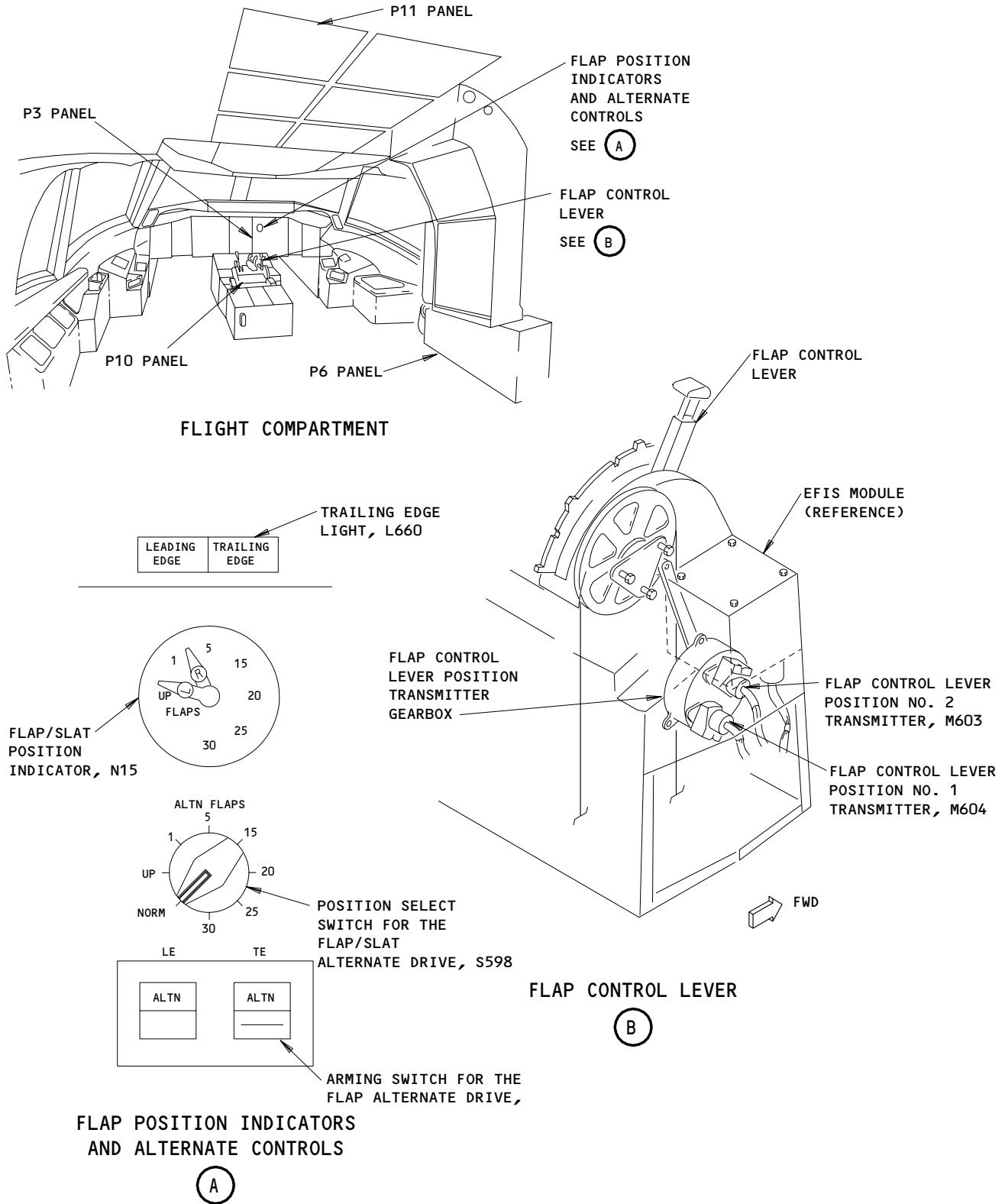
ALL

27-51-00

# BOEING

## 767

### FAULT ISOLATION/MAINT MANUAL



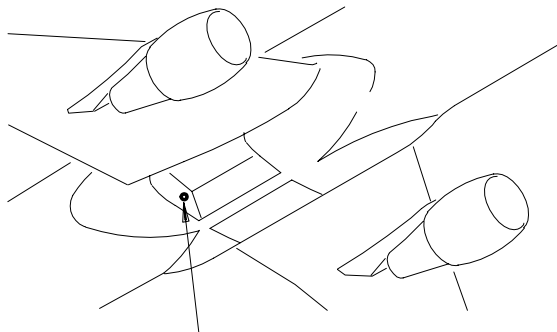
Trailing Edge Flap System - Component Location  
Figure 102 (Sheet 1)

EFFECTIVITY	
	ALL

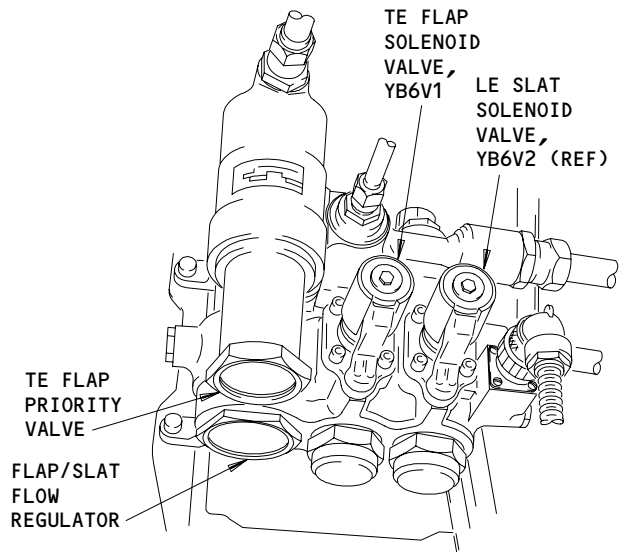
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RIGHT WHEEL WELL,  
AFT BULKHEAD  
SEE (C)



TE FLAP  
PRIORITY  
VALVE

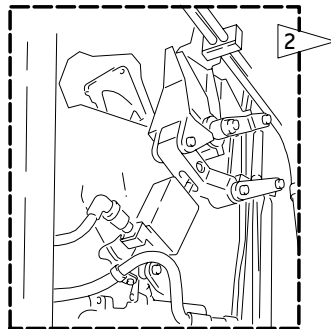
FLAP/SLAT  
FLOW  
REGULATOR

TE FLAP  
SOLENOID  
VALVE,  
YB6V1

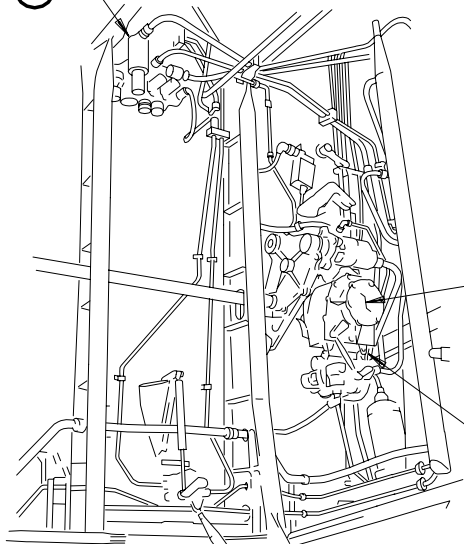
LE SLAT  
SOLENOID  
VALVE,  
YB6V2 (REF)

FLAP/SLAT SHUTOFF VALVE MODULE, V104

(D)



FLAP/SLAT SHUTOFF  
VALVE MODULE, V104  
SEE (D)

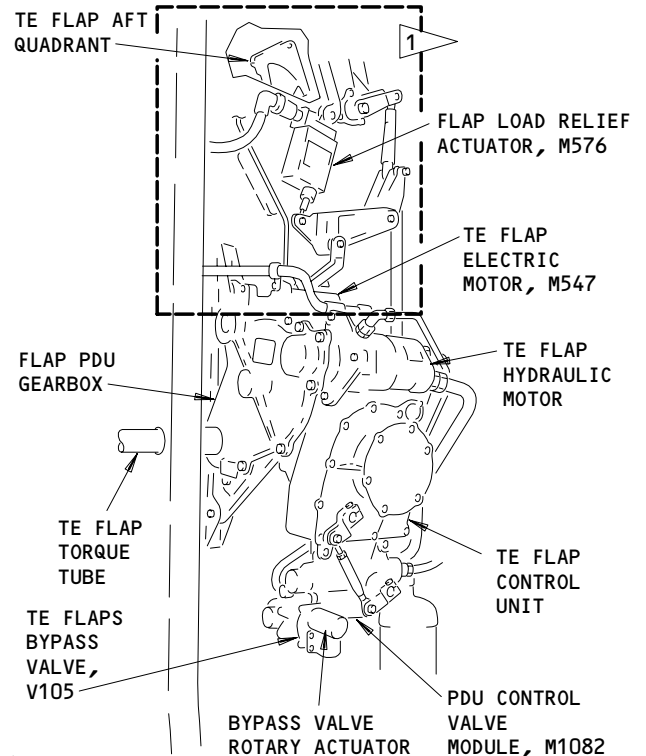


TE FLAP  
POWER DRIVE  
UNIT (PDU)  
SEE (E)

TE FLAP PDU  
COMPONENTS  
SEE (E)

RIGHT WHEEL WELL, AFT BULKHEAD

(C)



TE FLAP AFT  
QUADRANT

FLAP LOAD RELIEF  
ACTUATOR, M576

TE FLAP  
ELECTRIC  
MOTOR, M547

TE FLAP  
HYDRAULIC  
MOTOR

FLAP PDU  
GEARBOX

TE FLAP  
TORQUE  
TUBE

TE FLAPS  
BYPASS  
VALVE,  
V105

TE FLAP  
CONTROL  
UNIT

BYPASS VALVE  
ROTARY ACTUATOR

PDU CONTROL  
VALVE  
MODULE, M1082

OUTBD FWD

TE FLAP PDU COMPONENTS

(E)

- 1 767-200 AIRPLANES
- 2 767-300 AIRPLANES

Trailing Edge Flap System - Component Location  
Figure 102 (Sheet 2)

EFFECTIVITY

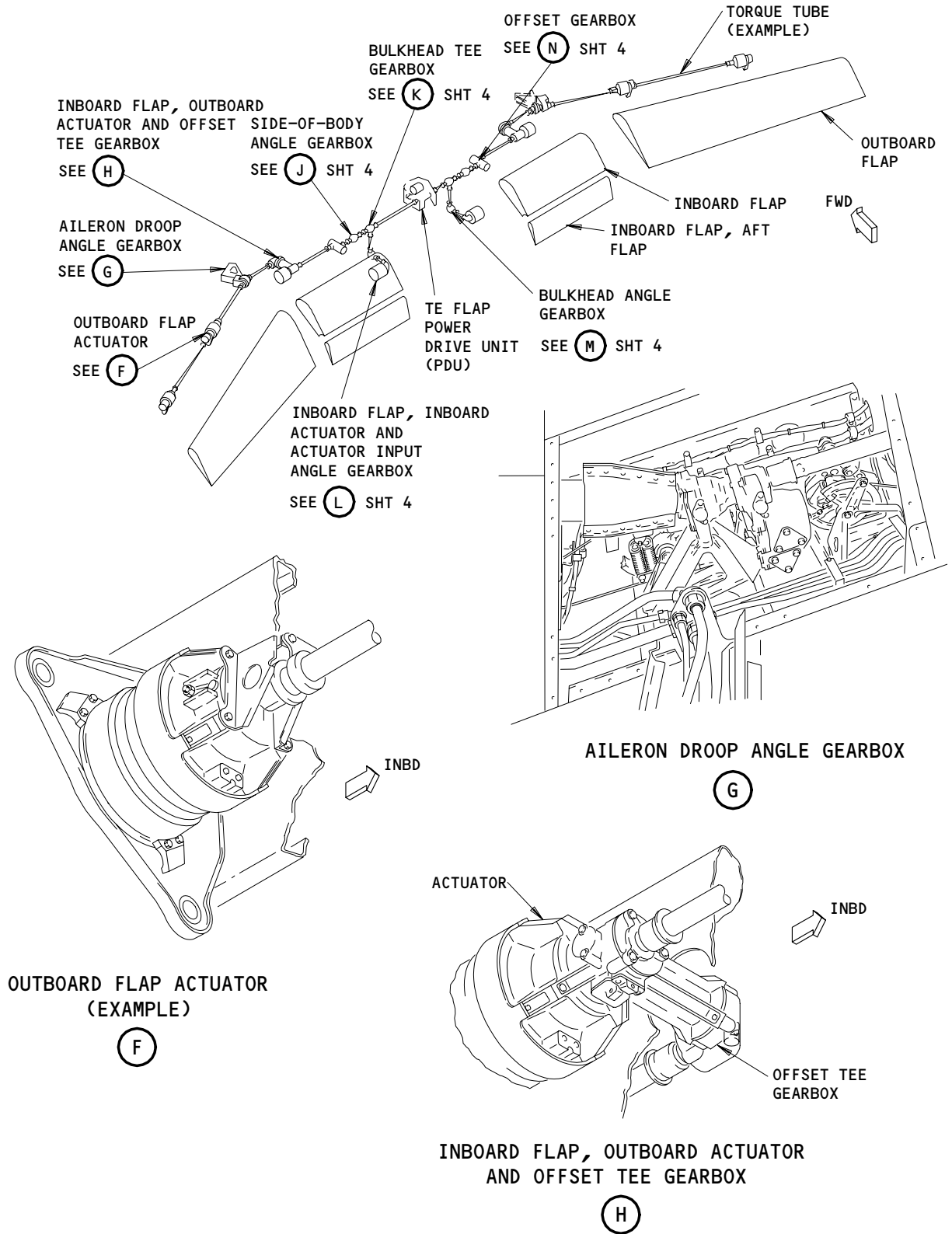
ALL

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**BOEING**  
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FAULT ISOLATION/MAINT MANUAL



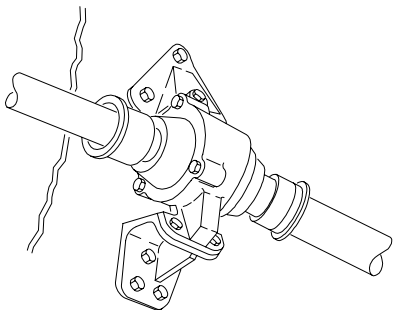
Trailing Edge Flap System - Component Location  
Figure 102 (Sheet 3)

EFFECTIVITY	ALL
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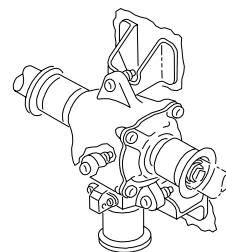
01

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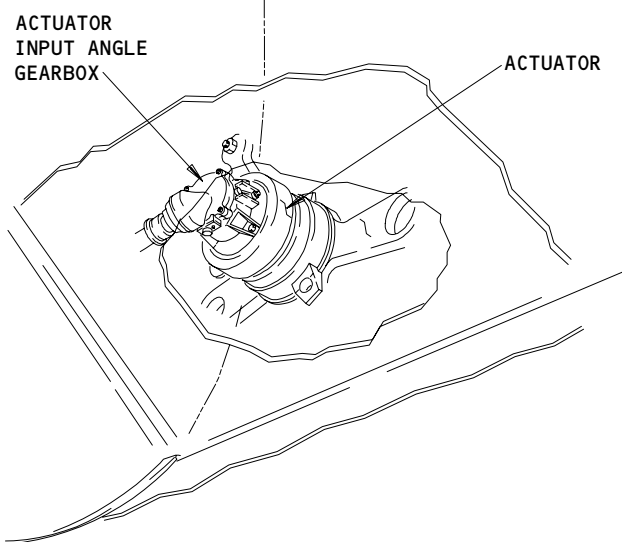
**SIDE-OF-BODY ANGLE GEARBOX**

(J)



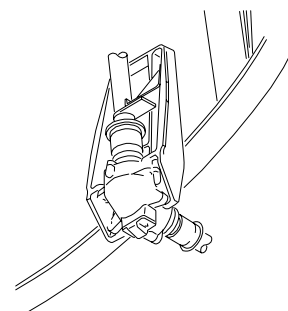
**BULKHEAD TEE GEARBOX**

(K)



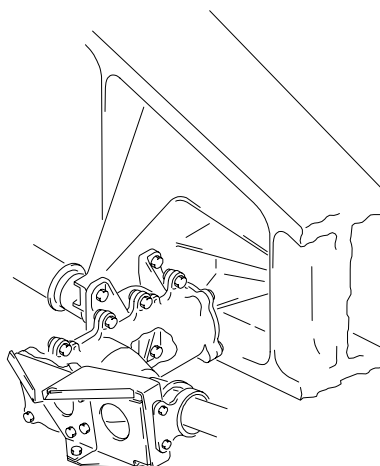
**INBOARD FLAP, INBOARD ACTUATOR AND ACTUATOR INPUT ANGLE GEARBOX**

(L)



**BULKHEAD ANGLE GEARBOX**

(M)



**OFFSET GEARBOX**

(N)

**Trailing Edge Flap System - Component Location (Details from Sht 3)  
Figure 102 (Sheet 4)**

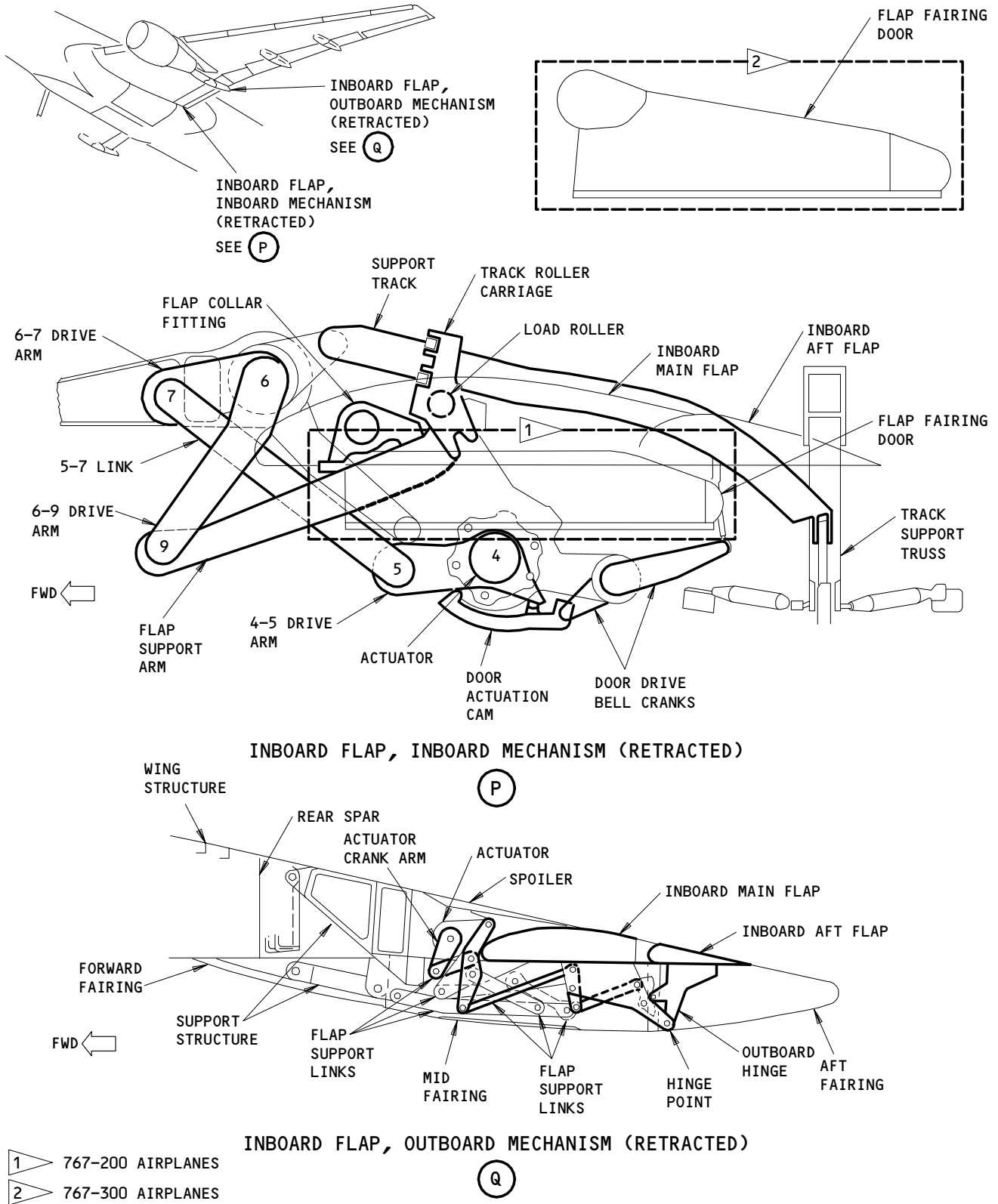
EFFECTIVITY

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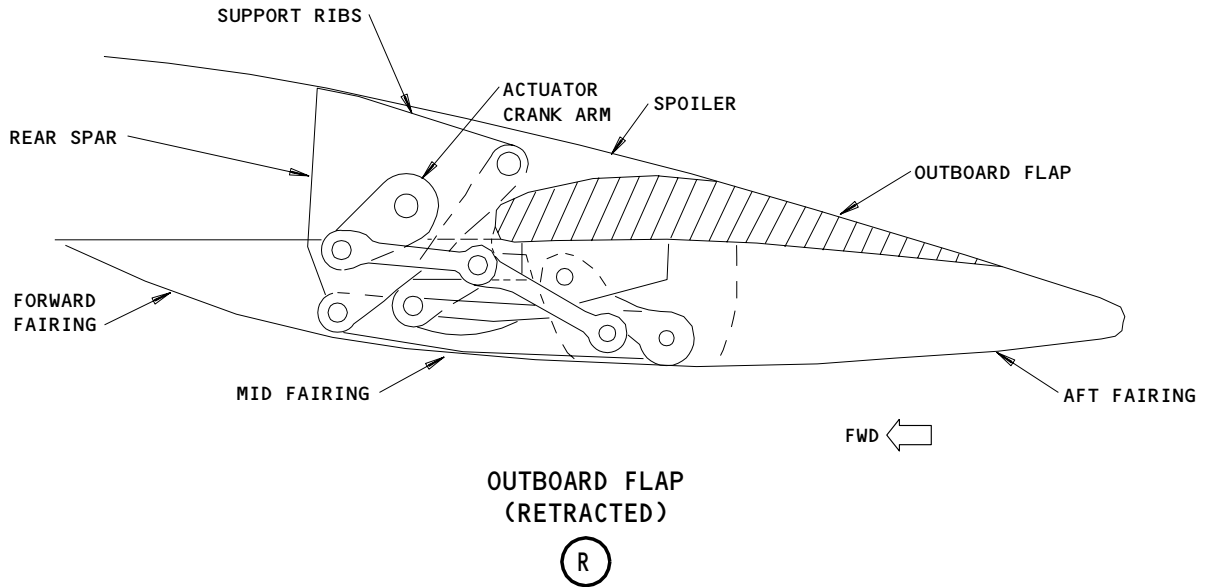
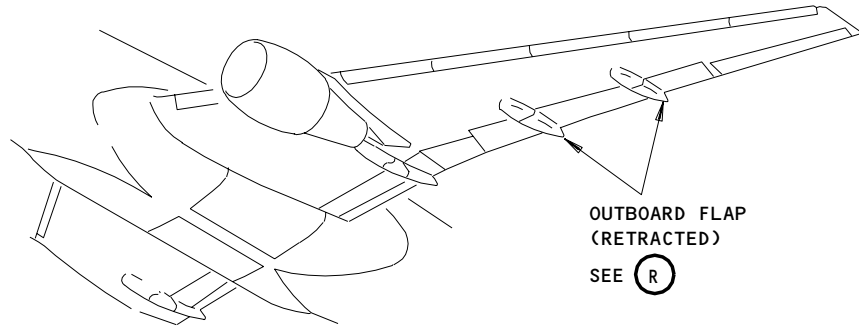


Trailing Edge Flap System - Component Location  
Figure 102 (Sheet 5)

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Trailing Edge Flap System - Component Location  
Figure 102 (Sheet 6)

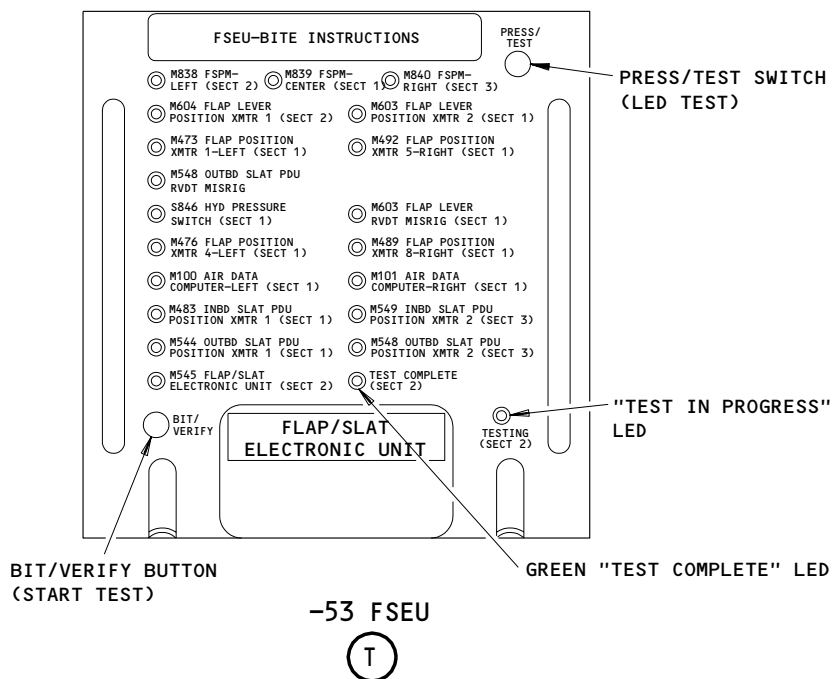
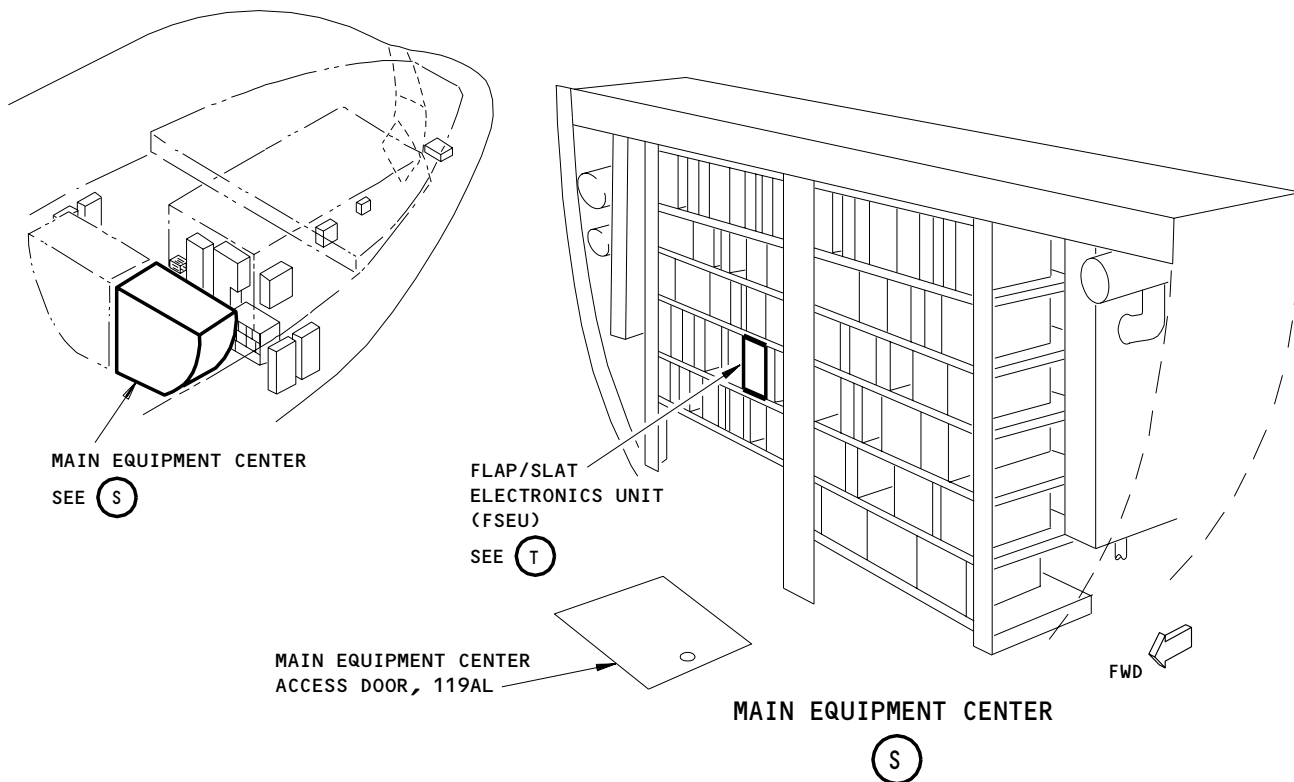
EFFECTIVITY	ALL
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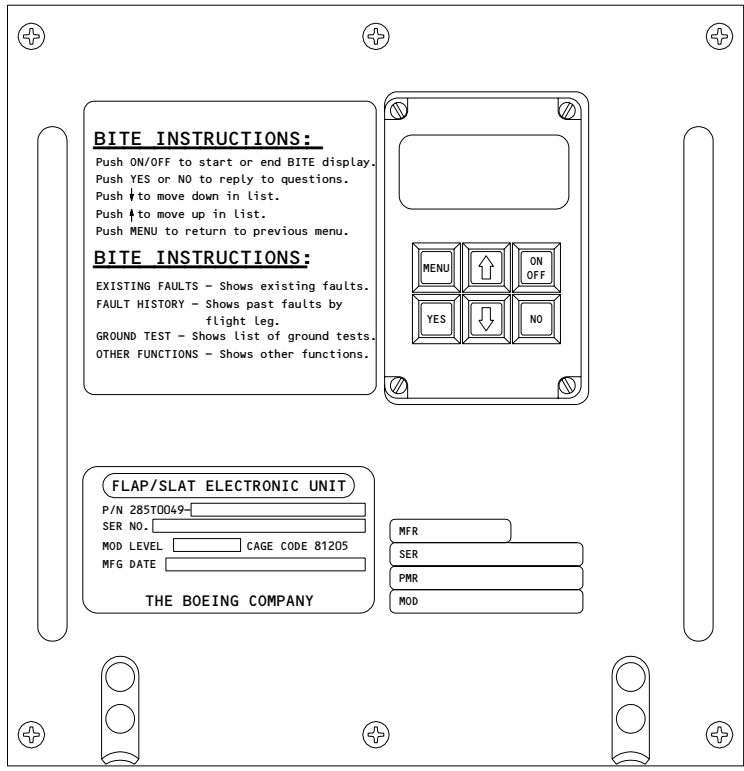
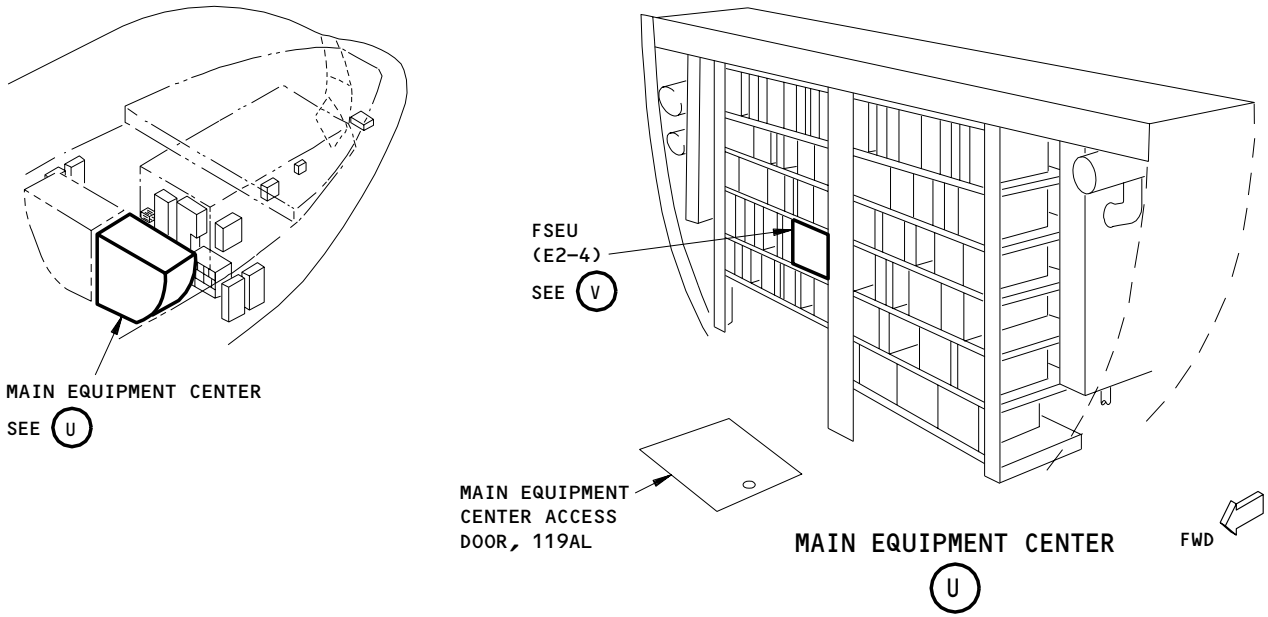
234540



Trailing Edge Flap System - Component Location  
Figure 102 (Sheet 7)

EFFECTIVITY  
AIRPLANES WITH A -53 FSEU

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(AIRPLANES WITH A -63 FSEU)

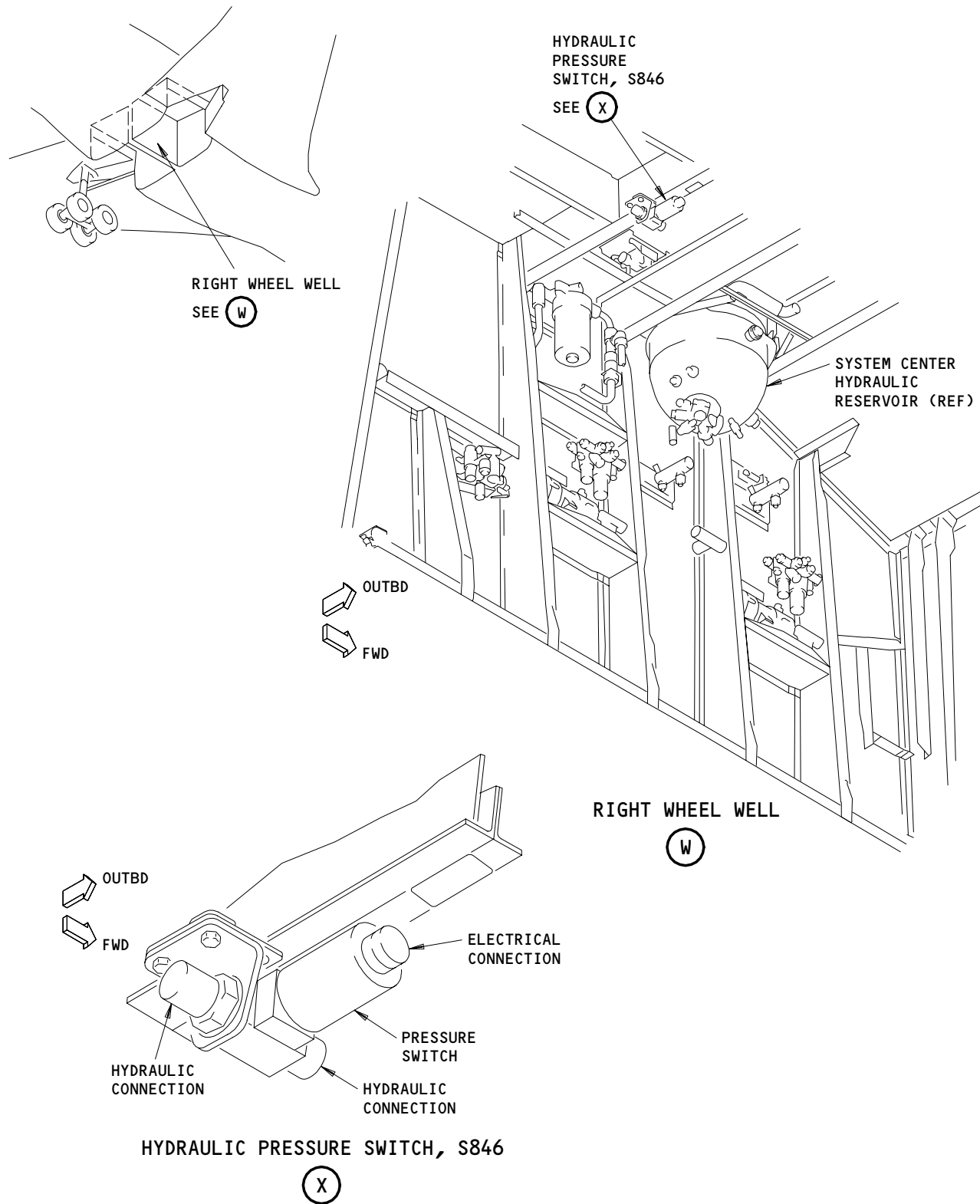
V

Trailing Edge Flap System - Component Location  
Figure 102 (Sheet 8)

EFFECTIVITY  
AIRPLANES WITH A -63 FSEU

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FAULT ISOLATION/MAINT MANUAL



Trailing Edge Flap System - Component Location  
Figure 102 (Sheet 9)

EFFECTIVITY	
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TRAILING EDGE FLAP SYSTEM – MAINTENANCE PRACTICES

1. General

A. This procedure contains six tasks:

- Trailing Edge Flap Deactivation
- Trailing Edge Flap Activation
- Extend the Trailing Edge Flaps with Primary or Alternate Power
- Retract the Trailing Edge Flaps with Primary or Alternate Power
- Manually extend and retract the TE Flaps without Airplane Power
- Operate the TE Flaps without Movement of the Leading Edge Slats.

B. If the overload indicator on the TE flap rotary actuator trips during normal operation of the flaps, reset the overload indicator and operate the flaps for one full cycle.

If the overload indicator does not trip again, the system is O.K. If the overload indicator trips again without the "TE FLAP DISAGREE" or "TE FLAP ASYM" EICAS message shown on the display in the flight compartment, the system is OK; reset the overload indicator and adjust the indicator to the correct spring tension if it is necessary (Fig. 203).

If the overload indicator trips with the "TE FLAP DISAGREE" or "TE FLAP ASYM" EICAS message shown on the display in the flight compartment, examine the flap linkages operated by the rotary actuator with the tripped indicator for damage or jammed condition. If you cannot find the cause of the problem, examine the flap drive linkages operated by the other seven rotary actuators (two for each flap) for damaged or jammed condition. Correct the problem as necessary.

TASK 27-51-00-042-002

2. Trailing Edge Flap Deactivation

A. Equipment

- (1) TE Flap PDU Lock – A27009-7
- (2) Circuit Breaker Lockout Clip, Commercially Available

B. References

- (1) AMM 24-22-00/201, Electrical Power – Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (3) AMM 32-00-15/201, Landing Gear Door Lock
- (4) AMM 32-00-20/201, Landing Gear Downlock

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C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
730/740	Main Landing Gear and Doors

D. Flap System Deactivation (Fig. 201)

S 212-003

- (1) Make sure the landing gear downlocks are installed (AMM 32-00-20/201).

S 492-004

**WARNING:** MAKE SURE THAT THE DOOR LOCKS FOR THE MAIN LANDING GEAR ARE INSTALLED. IF THE DOOR LOCKS ARE NOT INSTALLED CORRECTLY, THE DOOR CAN CLOSE QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the main gear doors and install the door locks (AMM 32-00-15/201).

S 212-005

- (3) If the flap alternate drive is armed (ALTN switch light on), make sure the position selector switch for the flap/slat alternate drive on the first officer's main instrument panel, P3, agrees with the flap position on Table 201.  
(a) Install a DO-NOT-OPERATE tag on the position selector switch.

S 212-006

- (4) If the flap alternate drive is not armed (ALTN switch light off), make sure the position on the flap control lever agrees with the flap position on Table 201.  
(a) Install a DO-NOT-OPERATE tag on the flap control lever.

S 862-007

- (5) Open these circuit breakers on the main power distribution panel, P6, and attach circuit breaker locks and DO-NOT-CLOSE tags:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6D24, ALTN FLAP PWR  
(c) 6F24, ALTN SLAT OUTBD PWR

S 862-008

- (6) Open these circuit breakers on the overhead panel, P11, and attach circuit breaker locks and DO-NOT-CLOSE tags:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD  
(c) 11J24, FLAPS ALTN CONT

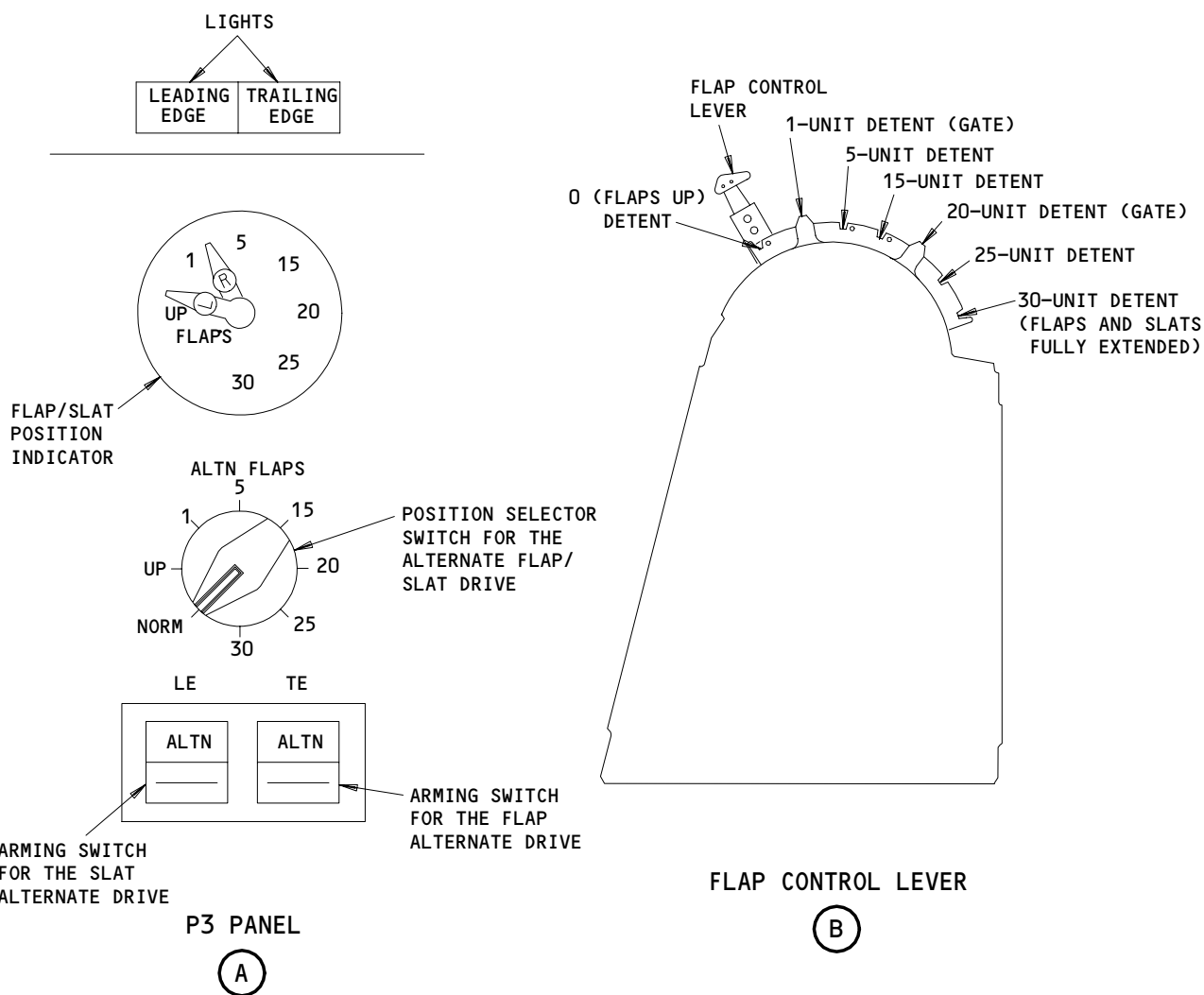
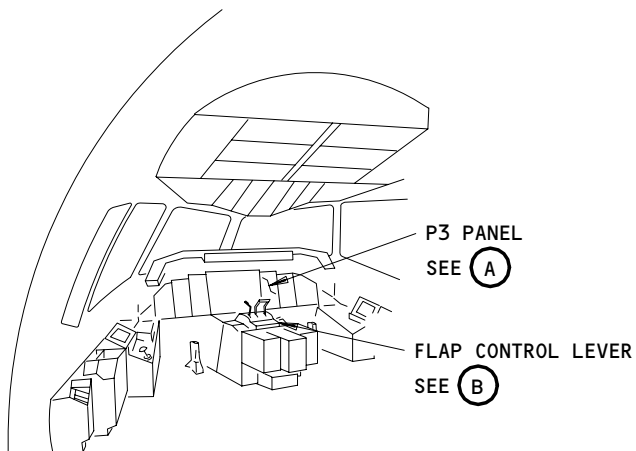
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Controls for the TE Flap  
Figure 201

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- S 862-009
- (7) Remove the power from the center hydraulic system if it is not necessary (AMM 29-11-00/201).
- S 862-109
- (8) If the power from the center hydraulic system is necessary to operate other systems, move the manual override lever on the PDU bypass valve to the No. 1 (bypass) position and attach a DO-NOT-OPERATE tag:
- S 492-010
- (9) Install the PDU lock in the TE flap PDU (Fig. 202).
- S 862-055
- (10) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-51-00-442-001

3. Trailing Edge Flap Activation

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(3) AMM 32-00-15/201, Landing Gear Door Lock

B. Access

- (1) Location Zones
- |         |                             |
|---------|-----------------------------|
| 144     | Right MLG Wheel Well        |
| 211/212 | Control Cabin               |
| 730/740 | Main Landing Gear and Doors |

C. Flap System Activation (Fig. 201)

- S 212-126
- (1) Make sure the landing gear downlocks are installed.
- S 212-127
- (2) Make sure the door locks for the main gear are installed.
- S 212-011
- (3) If the flap alternate drive is armed (ALTN switch light on), make sure the position selector switch for the flaps/slats alternate drive on the first officer's main instrument panel, P3, agrees with the flap position on Table 201.

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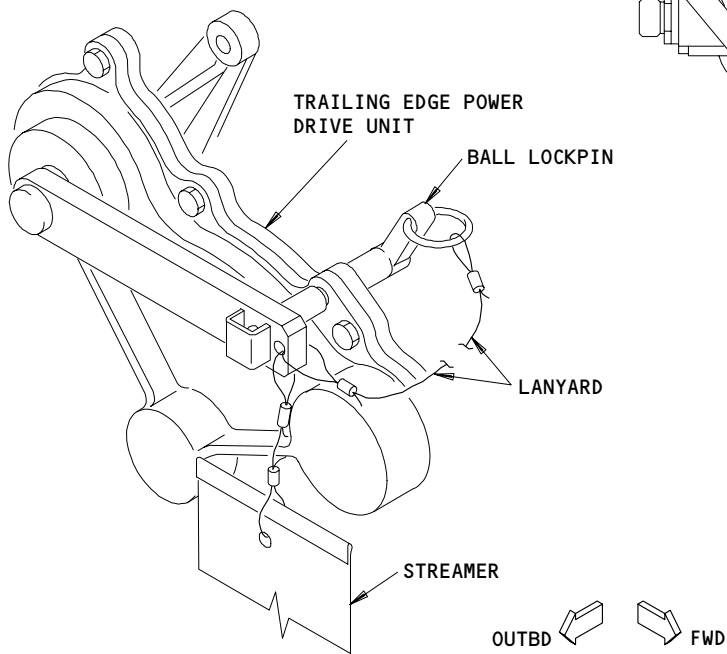
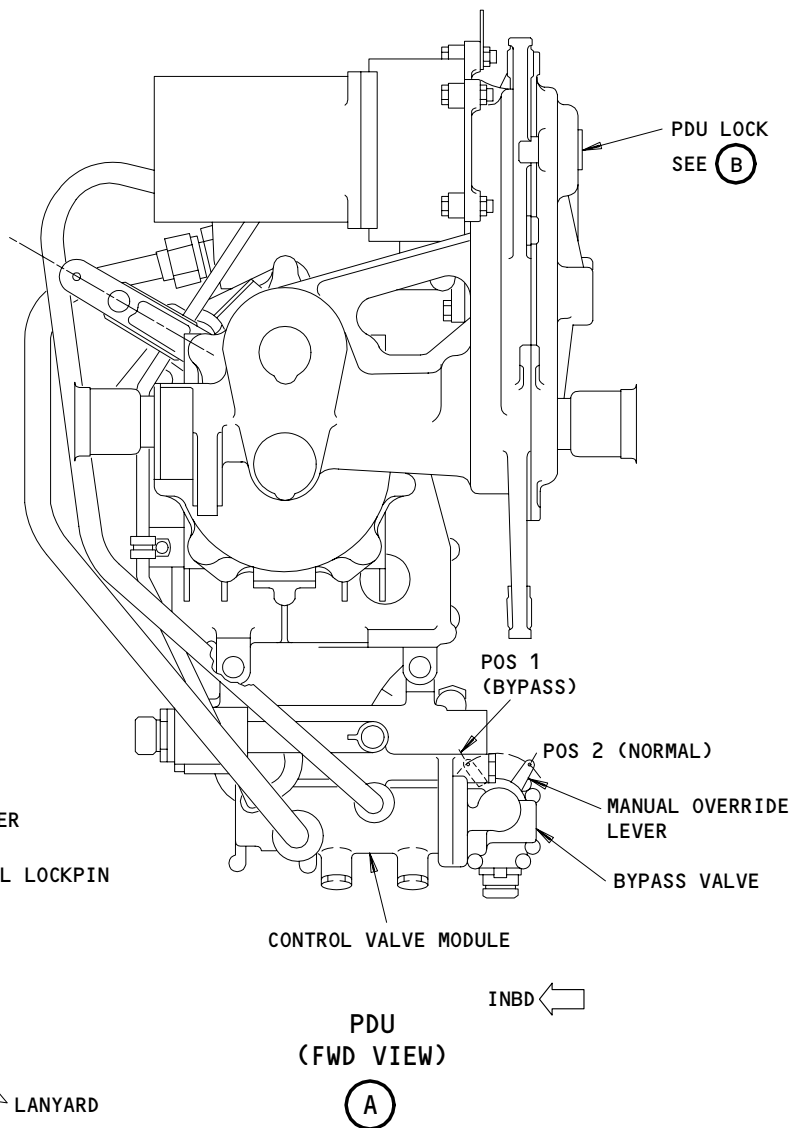
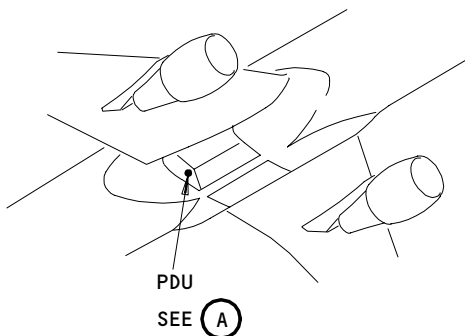
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PDU LOCK INSTALLATION

(B)

Power Drive Unit (PDU) Assembly  
Figure 202

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S 212-012

- (4) If the flap alternate drive is not armed (ALTN switch light off), make sure the position on the flap control lever agrees with the flap position on Table 201.

S 862-046

- (5) If the manual override lever on the PDU bypass valve is on the No. 1 (bypass) position, do the step that follows:  
(a) Remove the DO-NOT-OPERATE tag and turn the manual override lever to the No. 2 (normal) position.

S 092-014

- (6) Remove the PDU lock from the TE flap PDU (Fig. 202).

S 862-015

- (7) Remove the DO-NOT-CLOSE tags and the circuit breaker locks, and close these circuit breakers on the main power distribution panel, P6:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6D24, ALTN FLAP PWR  
(c) 6F24, ALTN SLAT OUTBD PWR

S 862-016

- (8) Remove the DO-NOT-CLOSE tags and the circuit breaker locks and close these circuit breakers on the overhead panel, P11:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD  
(c) 11J24, FLAPS ALTN CONT

S 092-018

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS FROM THE MAIN LANDING GEAR DOORS. THE LANDING GEAR DOORS CAN MOVE QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

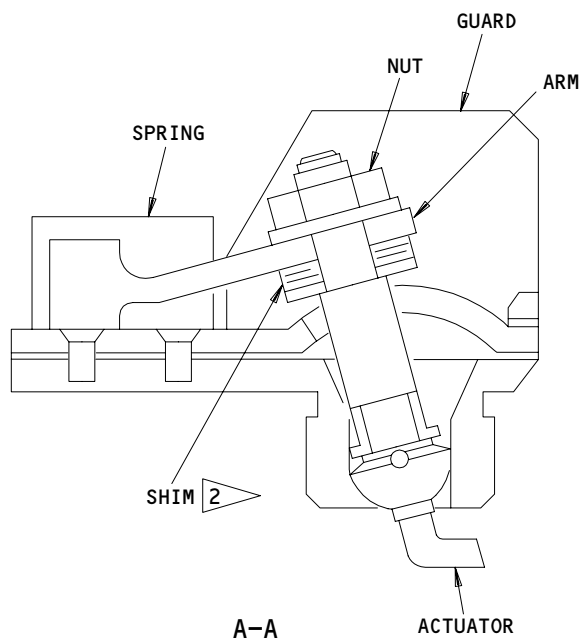
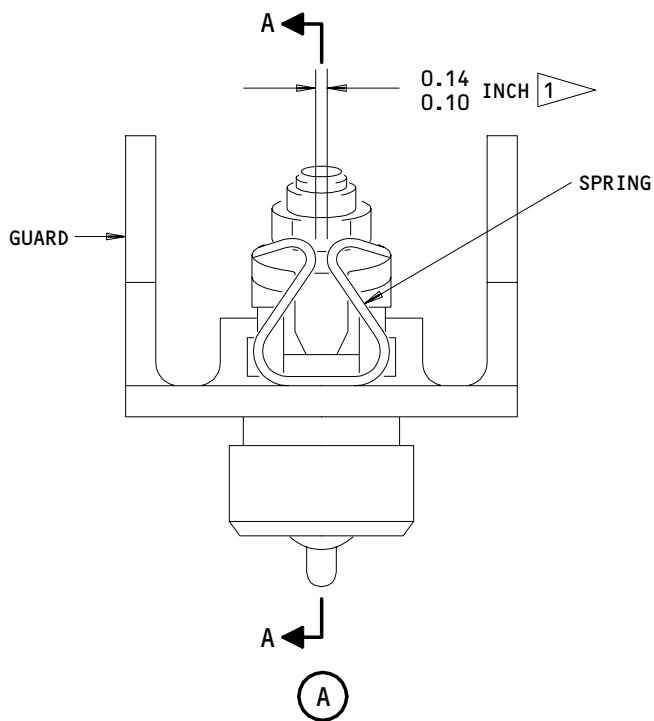
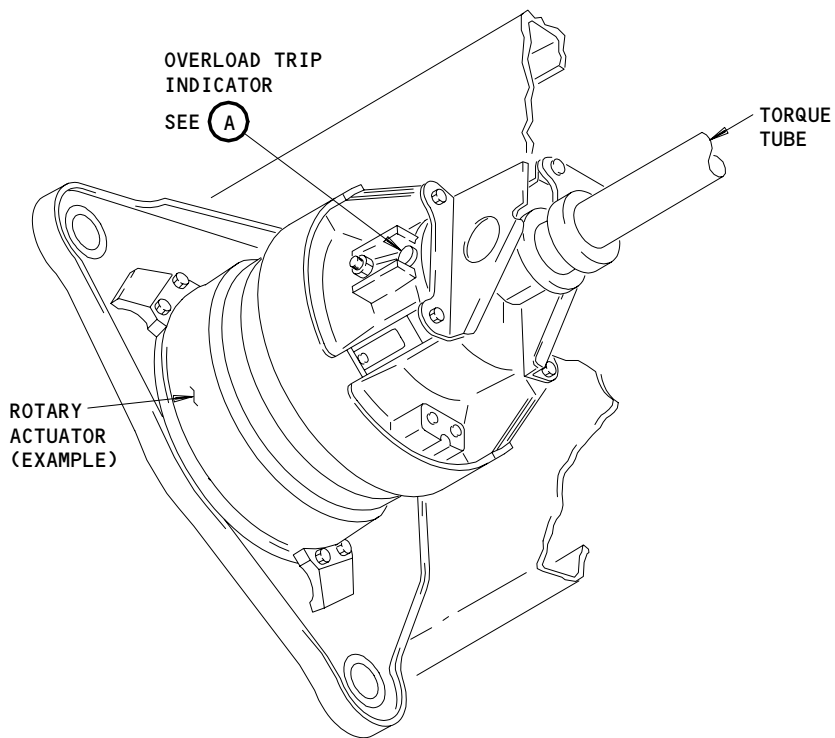
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- 1 ADJUST SPRING TO DIMENSION SHOWN
- 2 ADJUST SHIM THICKNESS SO THERE IS PRELOAD BETWEEN ARM AND SPRING

Overload Trip Indicator  
Figure 203

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MAINTENANCE MANUAL

(9) Remove the door locks and close the main landing gear doors (AMM 32-00-15/201).

S 862-019

(10) Remove the power from the center hydraulic system if it is not necessary (AMM 29-11-00/201).

S 862-020

(11) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TABLE 201			
POSITION *[1]		FLAPS POSITION	SLATS POSITION
ZERO (UP)		FULLY RETR	FULLY RETR
TAKEOFF POSITION	1 unit *[2]	FULLY RETR	INTERMEDIATE
	5 units	5 units	INTERMEDIATE
	15 units	15 units	INTERMEDIATE
	20 units	20 units	INTERMEDIATE
LANDING POSITION	25 units	25 units	FULLY EXT
	30 units	30 units	FULLY EXT

\*[1] The flap control lever (hydraulic control) or the position selector switch for the flap/slat alternate drive (electric control).

\*[2] 1-Unit is the Takeoff Position for 767-200 airplanes only.

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TASK 27-51-00-862-056

4. Extend the Trailing Edge (TE) Flaps with Primary or Alternate Power

A. General

- (1) This task contains the instructions to extend the trailing edge (TE) flaps with primary hydraulic power, or with alternate electric power (Fig. 201 and Fig. 202). Only do the steps that is applicable to your maintenance.

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones  
144 Right MLG Wheel Well  
211/212 Control Cabin

D. Extension of the TE Flaps with Primary (Hydraulic) Power (Fig. 201)

NOTE: Refer to Table 201 to do this procedure.

S 212-048

- (1) Make sure that the positions of the flaps and slats agree with the position of the flap control lever (Table 201).

S 212-049

- (2) Make sure the PDU locks for the TE flap PDU and the LE slat PDUs are not installed.

S 862-050

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

S 862-022

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

CAUTION: MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. MAKE SURE THE THRUST REVERSER HALVES ARE CLOSED. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system and reservoir (AMM 29-11-00/201).

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S 862-051

- (5) Move the flap control lever to a detent (Detail B, Fig. 201) and permit the TE flaps and the LE slats to get to the positions that you set on the flap control lever.

E. Extension of the TE Flaps with Alternate (Electric) Power (Fig. 201)

NOTE: Refer to Table 201 to do this procedure.

S 212-057

- (1) Make sure that the positions of the flaps and slats agree with the position of the flap control lever (Table 201).

S 212-058

- (2) Make sure that the positions of the flaps and slats agree with the position of the position selector switch for the flap/slat alternate drive on the first officer's main instrument panel, P3 (Table 201).

S 212-059

- (3) Make sure the PDU locks for the TE flap PDU and the LE slat PDUs are not installed.

S 212-133

- (4) Make sure these circuit breakers are closed on the overhead panel, P11:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 212-134

- (5) Make sure these circuit breakers are closed on the main power distribution panel, P6:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALT FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 212-131

- (6) Make sure these circuit breakers are closed on the overhead panel, P11:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 212-132

- (7) Make sure these circuit breakers are closed on the main power distribution panel, P6:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALT FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

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- S 862-060
- (8) Supply electrical power (AMM 24-22-00/201).
- S 212-061
- (9) Make sure the arming switches (in the flight compartment) for the flap and slat alternate drives are not in the armed position (ALTN switch lights are off).
- S 862-062
- (10) Push the TE arming switch for the flap alternate drive to arm the flap alternate drive (ALTN switch light comes on).
- S 212-063
- (11) Make sure that the TRAILING EDGE light (in the flight compartment) comes on and the EICAS display shows the "TE FLAP DISGREE" message after seven seconds.
- S 212-064
- (12) Do a check to see that the bypass valve on the TE flap PDU (in the right wheel well) moves from the No. 2 (normal) position to the No. 1 (bypass) position.
- S 862-065

**CAUTION:** DO NOT OPERATE THE ALTERNATE DRIVE MOTOR CONTINUOUSLY FOR MORE THAN 4 MINUTES. DO NOT OPERATE THE MOTOR AGAIN UNTIL IT IS COOL FOR AT LEAST 20 MINUTES TO PREVENT DAMAGE TO THE MOTOR.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. MAKE SURE THE THRUST REVERSER HALVES ARE CLOSED. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (13) Operate the position selector switch (on the P3 panel) for the flap/slat alternate drive to extend the TE flaps (Table 201). Make sure the TRAILING EDGE light goes off, and the TE FLAP DISAGREE message does not show on the EICAS display.

**NOTE:** The LE amber light will go on and the LE SLAT DISAGREE message will show on the EICAS. This is because the LE slats are not armed and thus do not move.

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S 212-136

- (14) Make sure the flap control lever is placed in the detent to agree with the selected position of the alternate flap/slat drive position selector (Figure 201).

TASK 27-51-00-862-067

5. Retract the Trailing Edge (TE) Flaps with Primary or Alternate Power

A. General

- (1) This task contains the instructions to retract the trailing edge (TE) flaps by primary hydraulic power, or by alternate electric power (Fig. 201 and Fig. 202). Only do the steps that is applicable for your maintenance.

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin

D. Retraction of the TE Flaps with Primary (Hydraulic) Power (Fig. 201)

NOTE: Refer to Table 201 to do this procedure.

S 212-069

- (1) Make sure that the positions of the flaps and slats agree with the position on the flap control lever (Table 201).

S 212-068

- (2) Make sure the PDU locks for the TE flap PDU and the LE slats PDUs are not installed.

S 362-070

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

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S 862-071

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, FLAPS, SLATS, SPOILERS, RUDDER, ELEVATORS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. MAKE SURE THE THRUST REVERSER HALVES ARE CLOSED. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system and reservoir (AMM 29-11-00/201).

S 862-072

- (5) Move the flap control lever to the zero (FLAPS UP) detent and make sure that the TE flaps and the LE slats move to the fully retracted position.

E. Retract the TE Flaps with Alternate (Electric) Power (Fig. 201)

**NOTE:** Refer to Table 201 to do this procedure.

S 212-129

- (1) Make sure that the positions of the flaps and slats agree with the position of the flap control lever (Table 201).

S 212-075

- (2) Make sure the positions of the flaps and slats agree with the position on the position selector switch for the flap/slat alternate drive on the first officer's main instrument panel, P3 (Table 201).

S 212-076

- (3) Make sure the PDU locks for the TE flap PDU and the LE slat PDUs are not installed.

S 212-083

- (4) Make sure these circuit breakers are closed on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

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S 212-084

- (5) Make sure these circuit breakers are closed on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALT FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 862-077

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

S 862-085

- (7) If the flap alternate drive is not armed (ALTN switch light off), push the TE arming switch (in the flight compartment) to arm the flap alternate drive (ALTN switch light comes on).

S 862-124

**CAUTION:** DO NOT OPERATE THE ALTERNATE DRIVE MOTOR CONTINUOUSLY FOR MORE THAN 4 MINUTES: DO NOT OPERATE THE MOTOR AGAIN UNTIL IT IS COOL FOR AT LEAST 20 MINUTES TO PREVENT DAMAGE TO THE MOTOR.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. MAKE SURE THE THRUST REVERSER HALVES ARE CLOSED. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (8) Turn the position selector switch for the flap/slat alternate drive to the UP detent, and make sure the flaps move to the fully retracted position.

**NOTE:** The flap movement is not as accurate when the flaps are retracted by the flap alternate drive. Flap movement with electrical power has a greater position tolerance than the flap movement with the use of hydraulic power. The flap position indicator should remain in the white band except at flaps 30 in alternate electric drive.

S 862-123

- (9) Turn the position selector switch to the NORM detent, and make sure the TRAILING EDGE light comes on, and the TE FLAP DISAGREE message shows on the EICAS display.

S 862-080

- (10) Push the TE arming switch for the flap alternate drive to disarm the flap alternate drive (ALTN switch light goes off).

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S 212-081

- (11) Make sure that the TRAILING EDGE light on the P3 panel is off and the TE FLAP DISAGREE message is not shown on the EICAS.

S 212-082

- (12) Do a check to see that the bypass valve on the TE flap PDU (in the right wheel well) moves from the No. 1 (bypass) position to the No. 2 (normal) position.

S 212-138

- (13) Make sure the flap control lever is placed in the flaps up detent to agree with the selected position of the alternate flap/slat drive position selector (Figure 201).

TASK 27-51-00-862-087

6. Manually Extend and Retract the Trailing Edge Flaps without Airplane Power

A. General

- (1) This task contains the instructions to manually extend and retract the inboard and/or the outboard flaps when airplane power is not available.
- (2) Follow these instructions carefully. You can manually move the flaps away from the position that is set on the flap control lever on the position selector switch. The flaps will automatically move back to the commanded position when hydraulic or electrical power is supplied.

B. Equipment

- (1) Circuit Breaker Lockout Clip Commercially Available
- (2) Adapter - Flap Drive - A27102-7
- (3) Air Motor with a 1/2-inch drive - commercially available

C. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (3) AMM 32-00-15/201, Landing Gear Door Lock
- (4) AMM 32-00-20/201, Landing Gear Downlocks
- (5) AMM 78-31-00/201, Thrust Reverser System

D. Access

- (1) Location Zones
- |         |                                    |
|---------|------------------------------------|
| 144     | Right Main Landing Gear Wheel Well |
| 211/212 | Control Cabin                      |

E. Prepare for Manual Flap Operation

S 482-088

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

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S 042-089

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 862-090

**WARNING:** MAKE SURE THE PRESSURE IS REMOVED FROM THE CENTER HYDRAULIC SYSTEM BEFORE YOU MANUALLY EXTEND OR RETRACT THE FLAPS TO PREVENT INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Make sure the pressure is removed from the center hydraulic system and reservoir (AMM 29-11-00/201).

S 862-092

- (4) Make sure the electrical power is removed (AMM 24-22-00/201).

S 862-093

- (5) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 862-094

- (6) Open these circuit breakers on the P6 panel and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 862-095

- (7) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:  
(a) 11J24, FLAPS ALTN CONT

S 862-096

- (8) Open these circuit breakers on the P11 panel and install circuit breaker locks:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD

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S 862-097

**CAUTION:** MAKE SURE YOU MOVE THE MANUAL OVERRIDE LEVER ON THE PDU BYPASS VALVE TO POSITION 1 (BYPASS) BEFORE YOU MANUALLY OPERATE THE FLAPS. IF THE BYPASS VALVE IS NOT IN POSITION 1, HYDRAULIC FLUID WILL NOT BYPASS IN THE TE FLAP PDU, AND MAY CAUSE DAMAGE TO THE PDU.

- (9) Move the manual override lever on the flaps PDU to position 1 (bypass), and install a DO-NOT-OPERATE tag on the manual override lever (Fig. 202).

F. Manually Operate the Inboard/Outboard Flaps (Fig. 204)

**NOTE:** Use the A27102-7 flap drive adapter to manually operate the flaps in this procedure.

S 422-098

- (1) To manually operate the flaps, put the flap drive adapter in the PDU drive (Detail A).

S 422-099

**CAUTION:** DO NOT USE AN AIR MOTOR WITH AN OUTPUT GREATER THAN 500 POUND-INCHES TO PREVENT DAMAGE TO THE PDU.

**CAUTION:** DO NOT PERMIT THE ROTARY ACTUATOR TO HIT THE EXTEND OR RETRACT OVERTRAVEL STOPS AT FAST SPEED, TO PREVENT DAMAGE TO THE AIRPLANE.

- (2) Attach an air motor to the flap drive adapter, and move the flaps to the necessary position.

S 022-100

- (3) Remove the flap drive adapter and the air motor from the airplane.

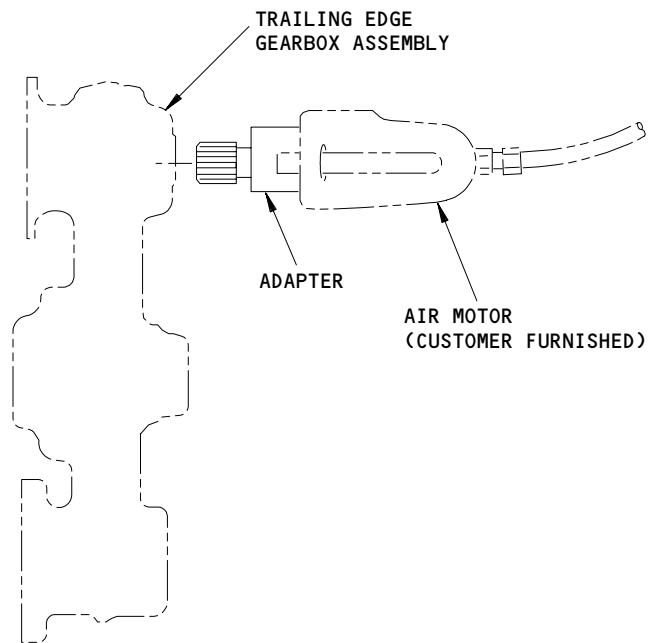
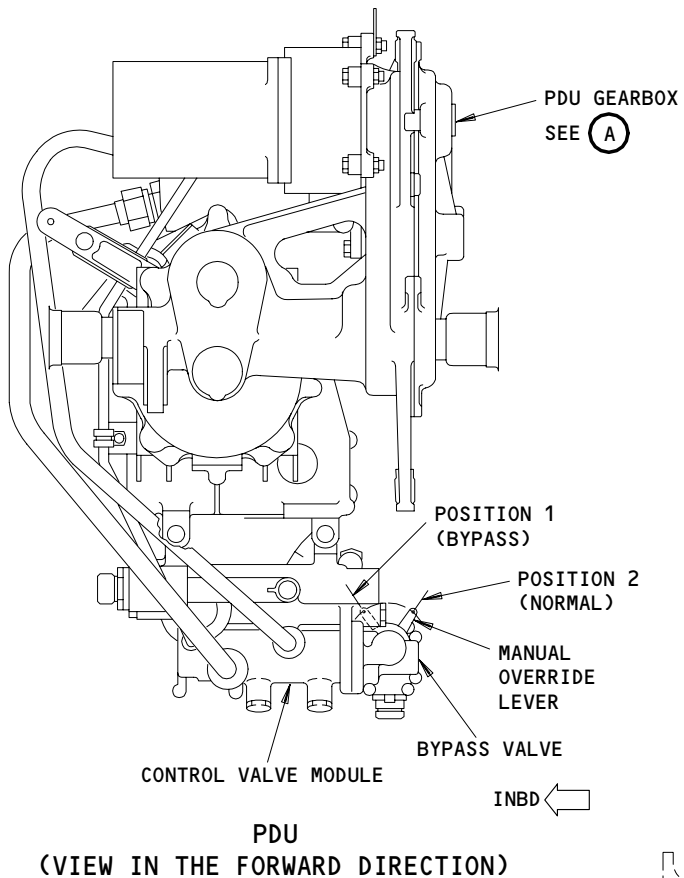
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ADAPTER - LEADING EDGE SLAT AND  
TRAILING EDGE FLAP, MANUAL DRIVE

(A)

Flap Manual Operation  
Figure 204

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G. Put the Airplane Back to its Usual Condition

S 862-101

**WARNING:** MAKE SURE THE PRESSURE IS REMOVED FROM THE CENTER HYDRAULIC SYSTEM BEFORE YOU PUT THE MANUAL OVERRIDE LEVER BACK TO THE POSITION 2 (NORMAL). THE SLATS CAN MOVE ACCIDENTALLY WHEN THE CENTER HYDRAULIC SYSTEM IS PRESSURIZED, AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Make sure the pressure is removed from the center hydraulic system and reservoir (AMM 29-11-00/201).

S 862-102

- (2) Remove the DO-NOT-OPERATE tags, and move the manual override lever on the flap PDU to position 2 (normal) (Fig. 202).

S 862-103

- (3) Remove the circuit breaker locks and DO-NOT-CLOSE TAGS, and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 862-104

- (4) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 862-105

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE FLAPS , WHEEL WELLS AND FLAP DRIVE SYSTEMS IN THE STEP THAT FOLLOWS. THE FLAPS WILL MOVE QUICKLY TO THE POSITION SET ON THE FLAP CONTROL LEVER WHEN THE CENTER HYDRAULIC SYSTEM IS PRESSURIZED. ACCIDENTAL FLAP MOVEMENT CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. MAKE SURE THE THRUST REVERSER HALVES ARE CLOSED. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (5) Pressurize the center hydraulic system (AMM 29-11-00/201), and permit the flaps to move the position set on the flap control lever.

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- S 862-106  
(6) Remove pressure from the center hydraulic system (AMM 29-11-00/201).

- S 442-107  
(7) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

TASK 27-51-00-862-026

7. Operate the Trailing Edge Flaps Without Movement of the Leading Edge Slats

A. General

- (1) This procedure contains instructions to move the trailing edge (TE) flaps when you cannot extend the leading edge (LE) slats. It is possible that you cannot extend the LE slats if the inboard fan cawling, strut access door, or the thrust reverser cawling is open.  
(2) Refer to AMM 27-81-00/201 to move the LE slats without the movement of the TE flaps.

B. Equipment

- (1) Circuit Breaker Lockout Clip, 1012LC-R  
Commercially Available

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels  
(2) AMM 24-22-00/201, Electrical Power - Control  
(3) AMM 27-81-00/201, Leading Edge Slat System  
(4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

- (1) Location Zone  
144 Right MLG Wheel Well  
211/212 Control Cabin

E. Extension and Retraction of the TE Flaps Without the Movement of the LE Slats

- S 862-032  
(1) Supply electrical power (AMM 24-22-00/201).

- S 212-027  
(2) Make sure that the position selector switch for flap alternate drive is in the normal position.

- S 862-028  
(3) Push the LE arming switch for the slat alternate drive to arm the slat alternate drive only (ALTN switch light comes on).

- S 862-029  
(4) Open these circuit breakers on the overhead panel, P11, and attach circuit breaker locks and DO-NOT-CLOSE tags:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD

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S 862-030

- (5) Open these circuit breakers on the main power distribution panel, P6, and attach circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR

S 862-031

- (6) Open this circuit breaker on the overhead panel, P11, and attach a circuit breaker lock and a DO-NOT-CLOSE tag:
- (a) 11J14, FLAP SHUTOFF

S 862-033

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. MAKE SURE THE THRUST REVERSER HALVES ARE CLOSED. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (7) Pressurize the center hydraulic system and reservoir (AMM 29-11-00/201).

S 862-034

- (8) If you want to extend the TE flaps to the 25 or 30 unit detent, first move the flap control lever to the 1-unit detent and make sure that the LE slats do not move.

S 862-108

- (9) Move the flap control lever to the necessary position. Make sure that the TE flaps move to the position in Table 201.

S 492-035

- (10) Attach DO-NOT-OPERATE tags on the flap control lever, the arming switches and the position selector switch for the flap/slat alternate drive .

S 862-036

- (11) Remove the power from the center hydraulic system if it is not necessary (AMM 29-11-00/201).

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S 042-037

- (12) Do the deactivation procedure for the TE flaps (Ref this subject) and the LE slats (AMM 27-81-00/201) when necessary.

**NOTE:** Use the PDU locks for the inboard and outboard LE slat PDUs. Do not use the "activation" or "Put the Airplane Back to Its Usual Condition" paragraph for this step.

S 862-038

- (13) Do these steps to extend and retract the LE slats to agree with the position on the flap control lever, if necessary:
- (a) Remove the PDU locks from the LE slat PDUs, if the PDU locks were installed (AMM 27-81-00/201).
  - (b) Remove the DO-NOT-CLOSE tags and the circuit breaker locks and close these circuit breakers on the P11 panel:
    - 1) 11H23, SLAT ALTN CONT INBD
    - 2) 11H24, SLAT ALTN CONT OUTBD
  - (c) Push the LE arming switch for the slat alternate drive to disarm the slat alternate drive (ALTN switch light goes off).

**WARNING:** KEEP PERSONS AND EQUIPMENT CLEAR FROM THE LEADING EDGE SLATS TO PREVENT INJURY AND DAMAGE. THE LEADING EDGE SLATS WILL MOVE WHEN THE CENTER HYDRAULIC SYSTEM IS PRESSURIZED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. MAKE SURE THE THRUST REVERSER HALVES ARE CLOSED. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (d) Pressurize the center hydraulic system (AMM 29-11-00/201) and make sure that the LE slats move to the position on the flap control lever.
  - (e) Remove the power from the center hydraulic system if it is not necessary (AMM 29-11-00/201).
- F. Put the Airplane Back to Its Usual Condition

S 442-039

- (1) Do the steps that follow to activate the LE slats and TE flaps, if necessary :
- (a) Remove the power from the center hydraulic system (AMM 29-11-00/201).
  - (b) If installed, remove the PDU locks from the inboard and outboard LE slat PDUs (AMM 27-81-00/201).
  - (c) Install the access panels (AMM 06-44-00/201).
  - (d) If installed, remove the PDU locks from the TE flap PDU.

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- (e) Remove the DO-NOT-OPERATE tag from the manual override lever, at the bypass valve of the TE flap PDU.
- (f) Move the manual override lever to the No. 2 (normal) position.

S 092-040

- (2) Remove the DO-NOT-OPERATE tags on the flap control lever and the position selector switch for the flap/slat alternate drive.

NOTE: Do not disarm the slat alternate drive when you do this step.

S 862-041

- (3) Retract the TE flaps with the flap control lever (as done before) to match the position of the LE slats (Table 201).

S 862-042

- (4) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 862-043

- (5) Push the LE arming switch for the slat alternate drive to disarm the slat alternate drive (ALTN switch light goes off).

S 862-044

- (6) Remove the DO-NOT-CLOSE tags and the circuit breaker locks and close these circuit breakers on the P11 panel:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J14, FLAP SHUTOFF

S 862-045

- (7) Remove the DO-NOT-CLOSE tags and the circuit breaker locks and close these circuit breakers on the P6 panel:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR

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TRAILING EDGE FLAP SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure contains the tasks for the adjustment and system tests for the trailing edge (TE) flap system:
- (1) Trailing Edge Flap System – Adjustment
  - (2) Flap Slat Electronics Unit (FSEU) – Test
  - (3) Flap/Stabilizer Position Module (FSPM) – Test
  - (4) Flap Control Lever Load – Test
  - (5) Flap and Slat Primary Drives and Position Indicating Systems – Test
  - (6) Flap Alternate Power and Drive – Test
  - (7) Flap Asymmetry Protection System – Test
  - (8) AIRPLANES WITH A -53 OR EARLIER FSEU;  
– Flap Load Alleviation System – Test
  - (9) Flap Failure Protection System – Test
  - (10) Electrical Power Failure – Test
  - (11) FSEU Power Failure – Test
  - (12) Flap/Slat Shutoff Valve Module – Test
  - (13) AIRPLANES WITH A -63 FSEU;  
– Flap Load Relief Actuator – Test  
– Flap Load Relief System – Test  
– Sensor Check – Test
- B. For a complete SYSTEM TEST of the TE flap system, it is necessary to do all the tests that are in this procedure.
- C. For a complete OPERATIONAL TEST of the TE flap system, it is only necessary to do these tests within this procedure:
- Flap/Slat Electronics Unit (FSEU) – Test
  - Flap/Stabilizer Position Module (FSPM) – Test
  - Flap and Slat Primary Drives and Position Indicating Systems – Test
  - Flap Alternate Power and Drive – Test
  - Flap Failure Protection System – Test
- D. The test for the flap and slat primary drives is a test of the function of these components:
- The leading edge (LE) slats
  - The krueger seal flap
  - The position indicating system for the TE flaps and LE slats
  - The flap/slat shutoff valve module.
- Thus, if you do all the steps in the flap and slat primary drive test, then it is not necessary to do the "Flap/Slat Shutoff Valve Module – Test" task at the end of this procedure.
- E. Refer to AMM 31-51-00/501, Warning System, for a system test of the TE flap takeoff warning.
- F. Refer to AMM 27-81-00/601, for a complete system check of the flap/slat inhibit system (extend and retract interlock).

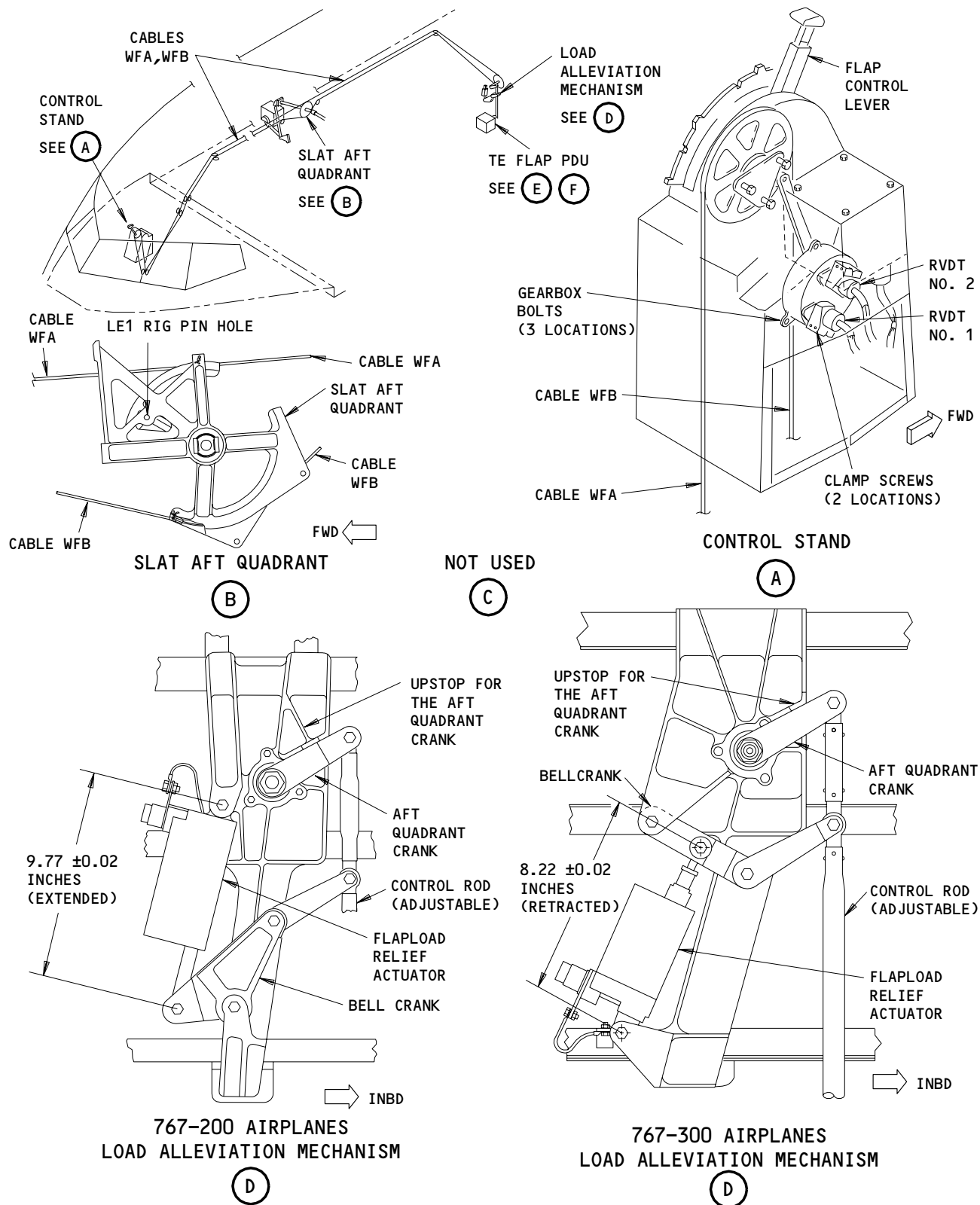
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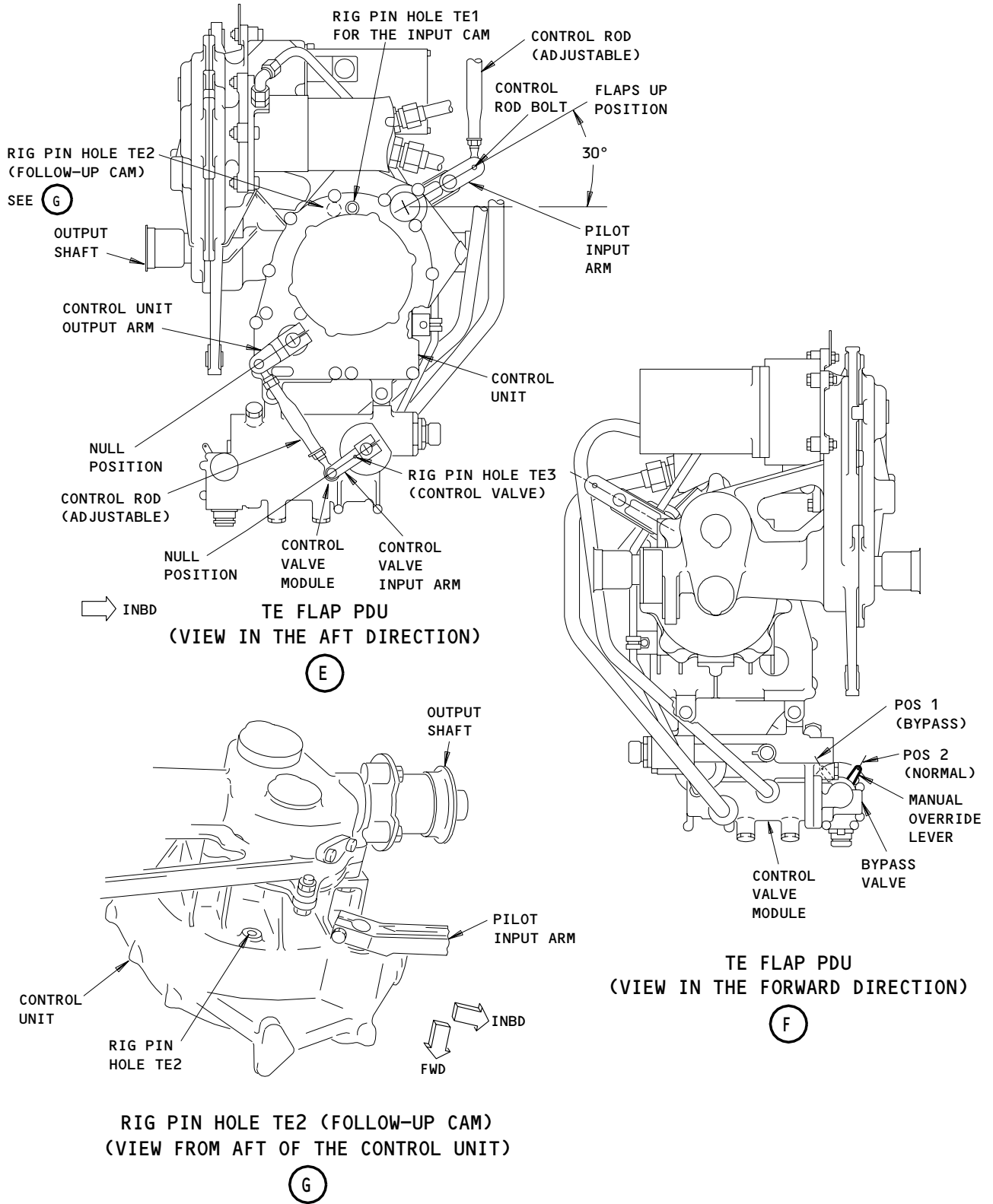
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TE Flap System Adjustment  
Figure 501 (Sheet 1)

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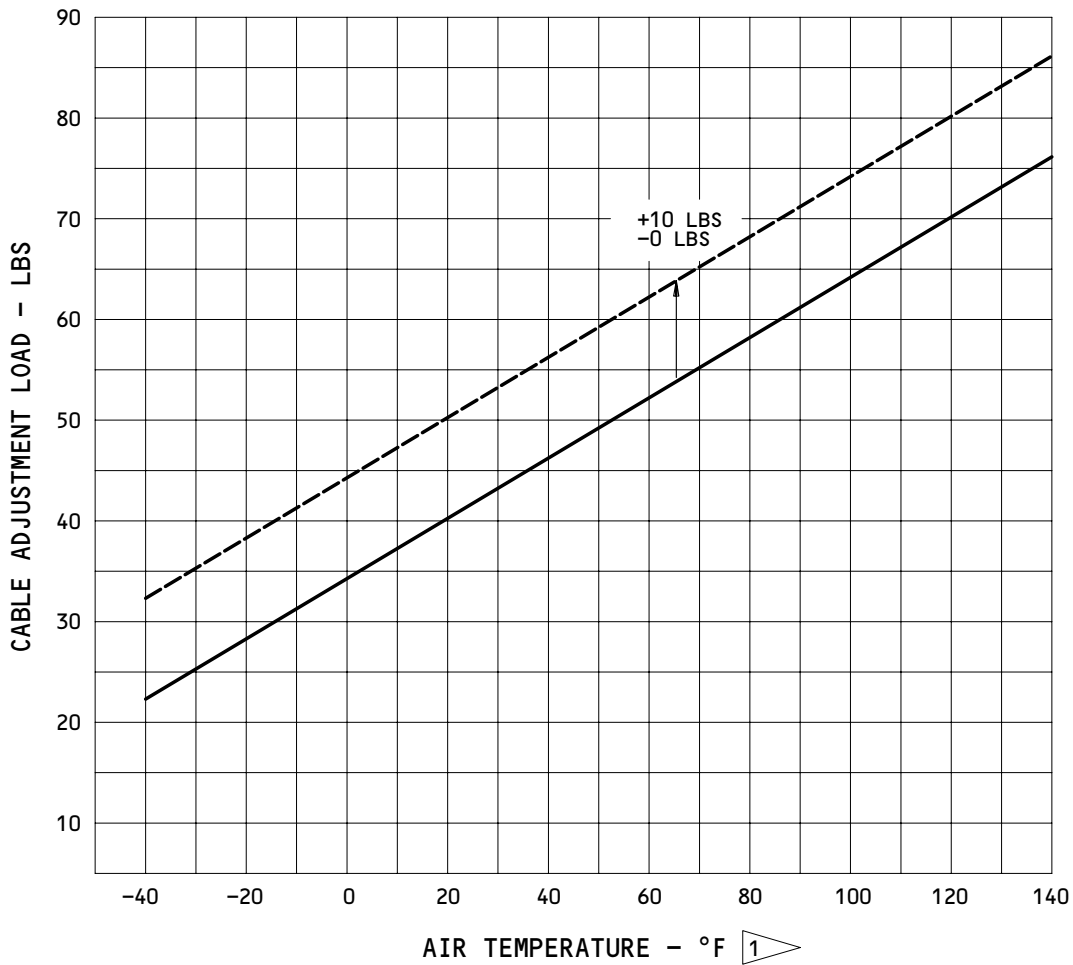


TE Flap System Adjustment  
Figure 501 (Sheet 2)

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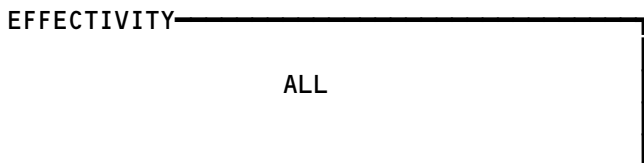
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TEMPERATURE-TENSION TABLE FOR THE CABLES WFA AND WFB



1 MAKE SURE THE TEMPERATURE DOES NOT CHANGE BY  $\pm 5^{\circ}\text{F}$  FOR AT LEAST ONE HOUR BEFORE YOU ADJUST THE CABLES. MAKE SURE THE TEMPERATURE DOES NOT CHANGE BY  $\pm 5^{\circ}\text{F}$  WHILE YOU DO THE CABLE ADJUSTMENT

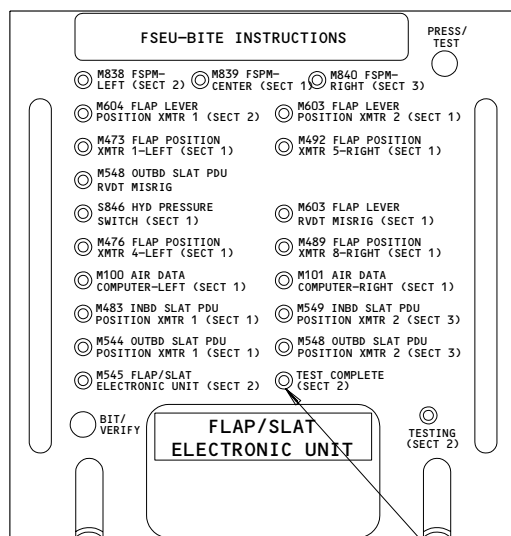
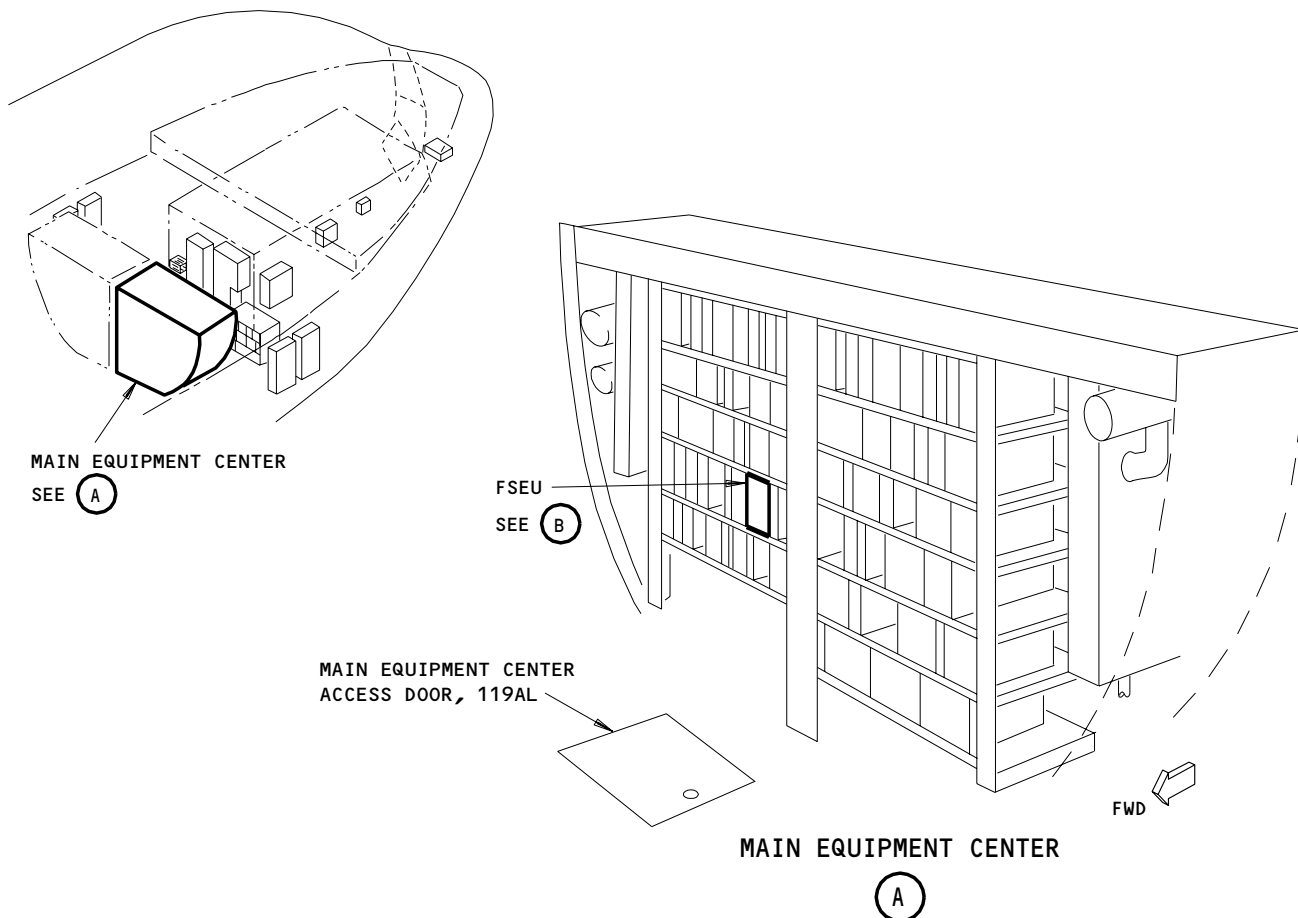
Cable Adjustment for the TE Flap System  
Figure 502



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GREEN "TEST COMPLETE" LED

FSEU

(B)

Flap/Slat Electronics Unit (FSEU)  
Figure 503 (Sheet 1)

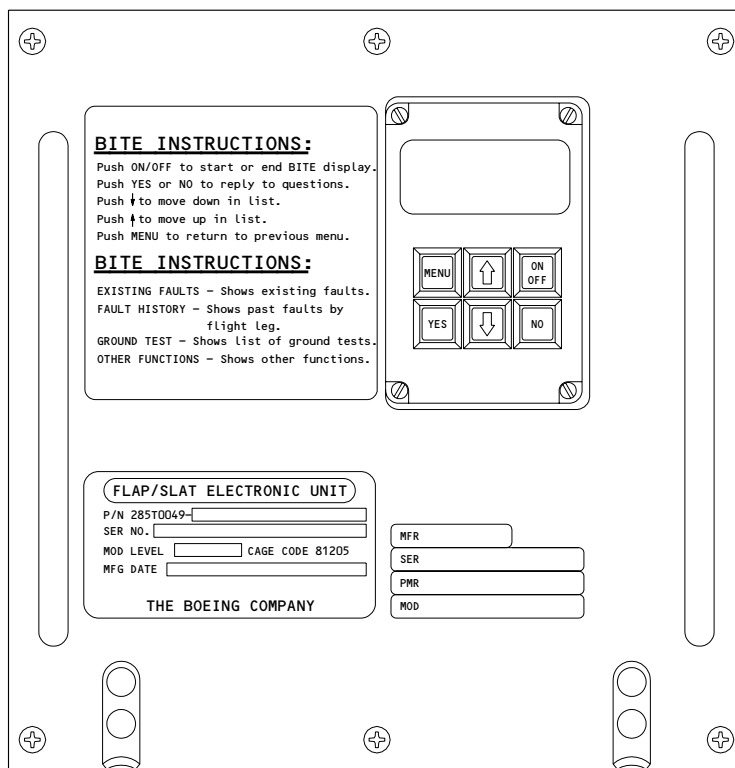
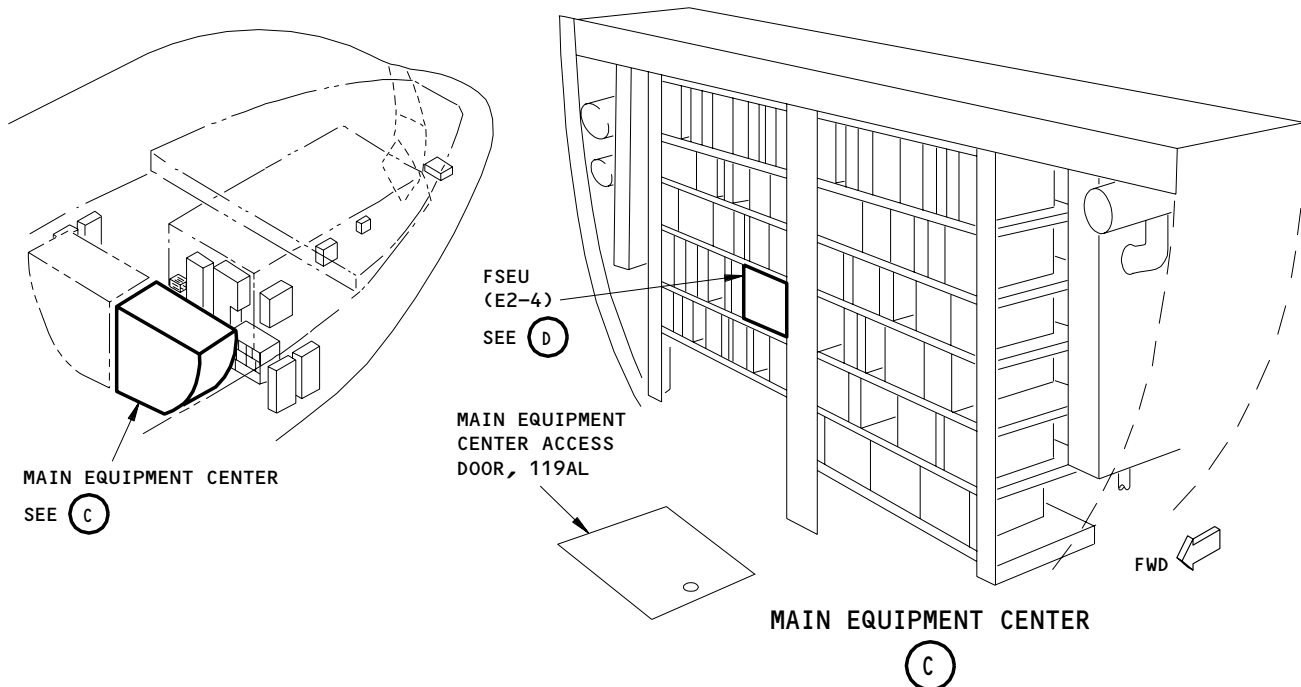
EFFECTIVITY  
AIRPLANES WITH A -53 FSEU

27-51-00



# BOEING

## 767 MAINTENANCE MANUAL



(AIRPLANES WITH A -63 FSEU)

(D)

Flap/Slat Electronics Unit (FSEU)  
Figure 503 (Sheet 2)

EFFECTIVITY  
AIRPLANES WITH A -63 FSEU

27-51-00

TASK 27-51-00-825-001

2. Trailing Edge Flap System - Adjustment

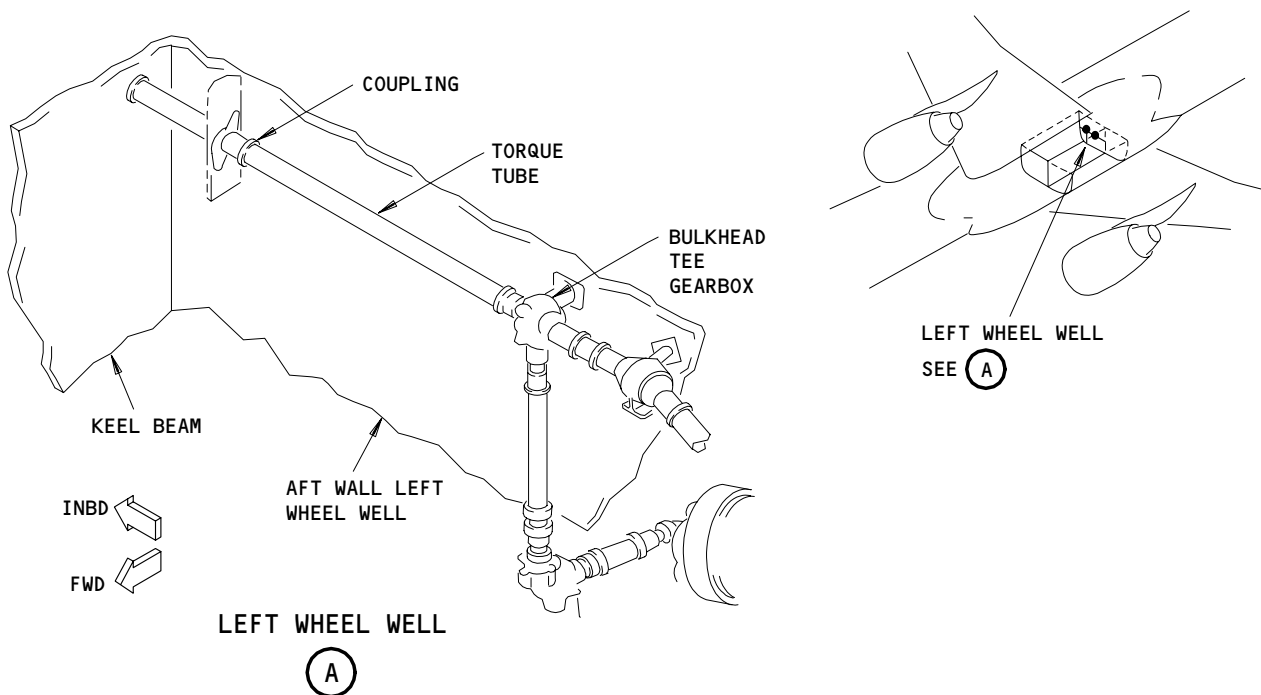
A. General

(1) This task contains the adjustment procedure for the trailing edge (TE) flap drive, which contains these topics:

- Flap Control Cables - Adjustment
- Flap PDU (Power Drive Unit) - Adjustment
- Flap Extend Overtravel Stop Clearance - Adjustment
- Flap Retract Overtravel Stop Clearance - Adjustment
- Inboard Flap Retract Overtravel Stop RIG Position - Adjustment
- Outboard Flap Retract Overtravel Stop RIG Position - Adjustment
- Flap Synchronization - Adjustment

To start one of these adjustment procedures, do the steps in the "Prepare for the Adjustment" paragraph, then do the applicable adjustment procedure. Follow the instructions in the "Put the Airplane Back to Its Usual Condition" paragraph after you completed the necessary adjustment.

(2) Refer to AMM 27-51-26/401 to adjust the RVDT for the flap control lever.

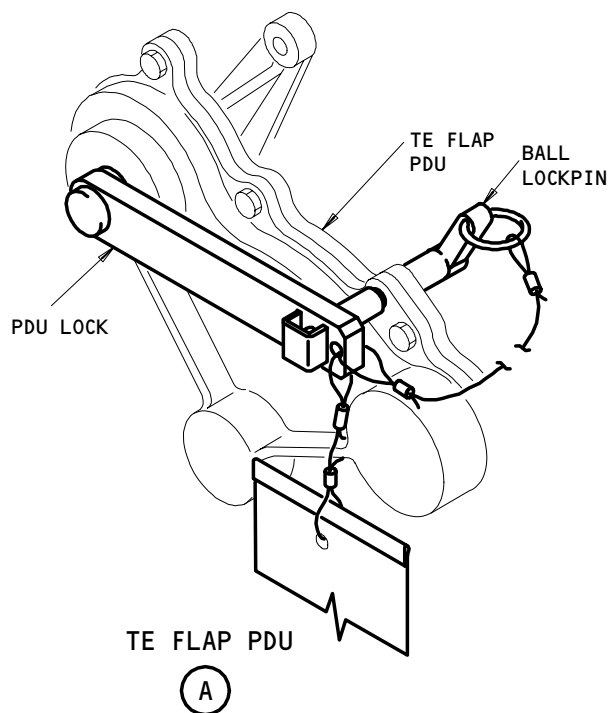
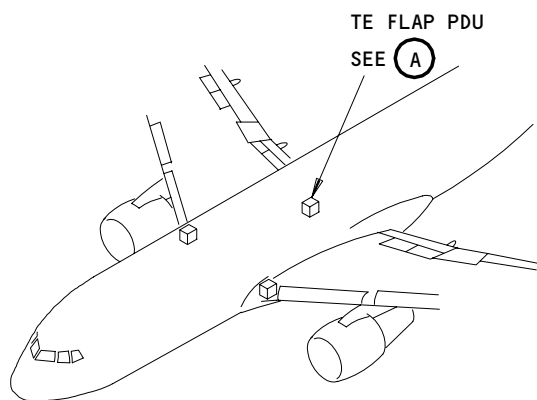


TE Flap Torque Tube (Left Wheel Well)  
Figure 504

EFFECTIVITY	ALL
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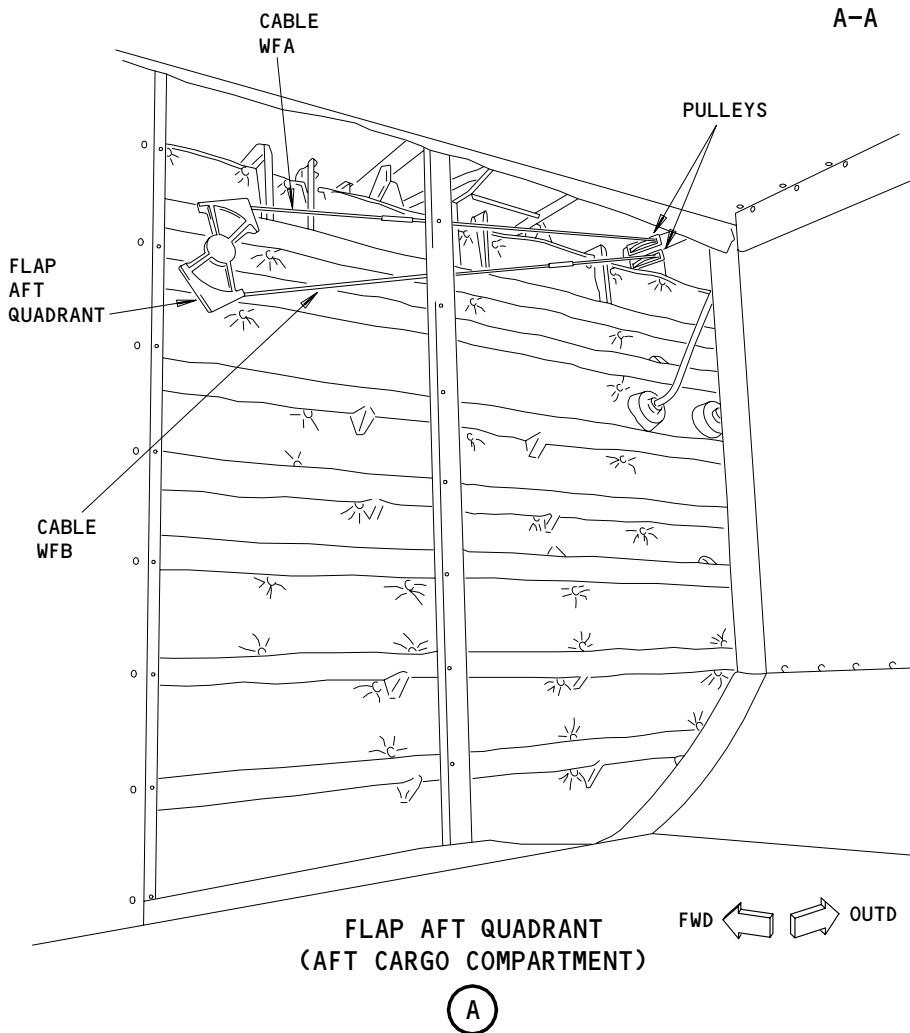
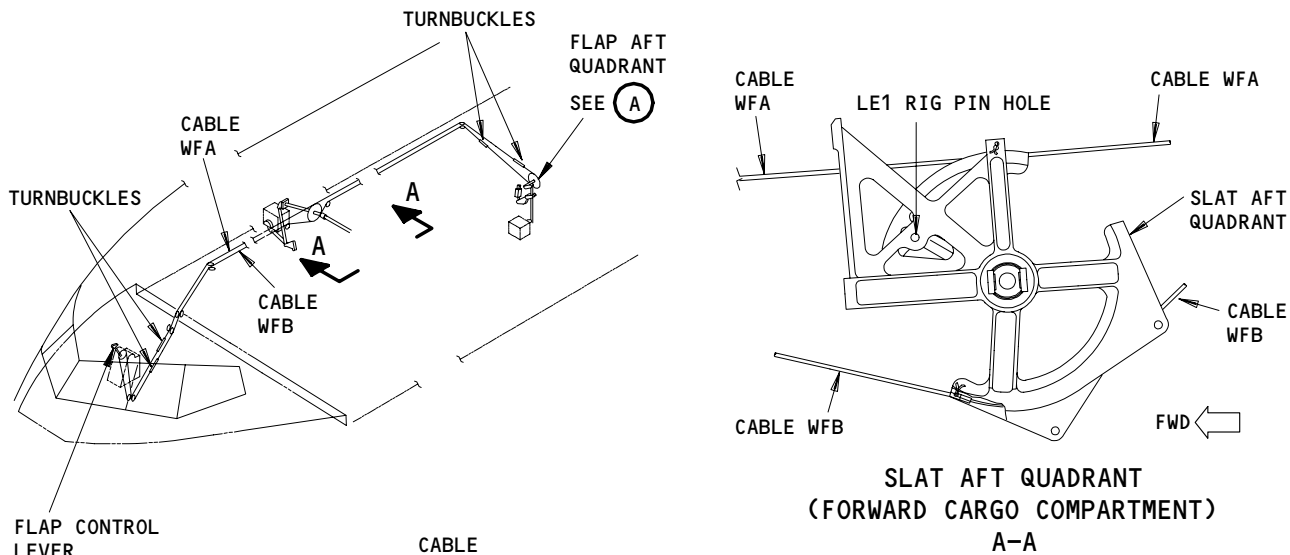
- (3) Refer to AMM 27-51-45/201 to adjust the flap position transmitters.
- (4) The flap drive system between the flap control lever and the TE flap PDU is correctly adjusted when these conditions are satisfactory:
  - (a) The cable tension is in the limits given by the temperature tension chart (Fig. 502)
  - (b) With the aft edge of the flap control level pawl set 0.15 to 0.16 inch (3.81-4.06 mm) aft of the aft upper edge of the zero (FLAPS UP) detent:
    - 1) The rig pin LE1 installs freely into the rig pin hole on the slat aft quadrant. (Detail B, Fig. 501).
    - 2) The flap aft quadrant crank is against its UP stop (Detail D, Fig. 501).
  - (c) With the flap control lever in the zero (FLAPS UP) detent and the power supplied in the center hydraulic system:
    - 1) The rig pins TE1 (Detail E, Fig. 501) and TE2 (Detail G, Fig. 501) install freely into the input and follow-up cam on the TE flap PDU.
- (5) The flap drive system between the TE flap PDU and the rotary actuators is correctly adjusted if these conditions are satisfactory:
  - (a) With the TE flaps fully retracted (zero detent on the flap control lever) by hydraulic power, the clearances for the retract overtravel stop at all eight rotary actuator crank arms must agree with:
    - 1) The clearance specified in Fig. 507 for the inboard flap



PDU Lock for the TE Flaps PDU  
Figure 505

EFFECTIVITY	
	ALL

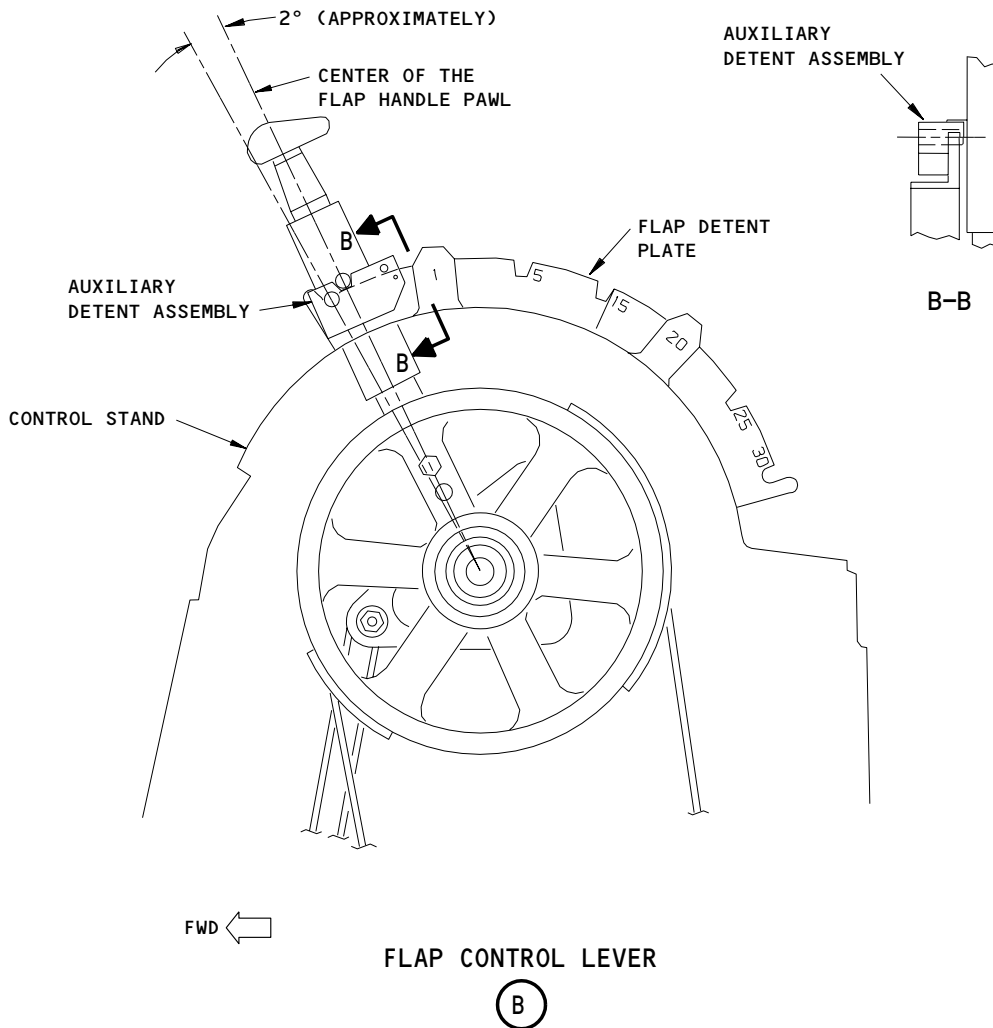
27-51-00



TE Flap Control Cable Adjustment  
Figure 506 (Sheet 1)

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TE Flap Control Cable Adjustment  
Figure 506 (Sheet 2)

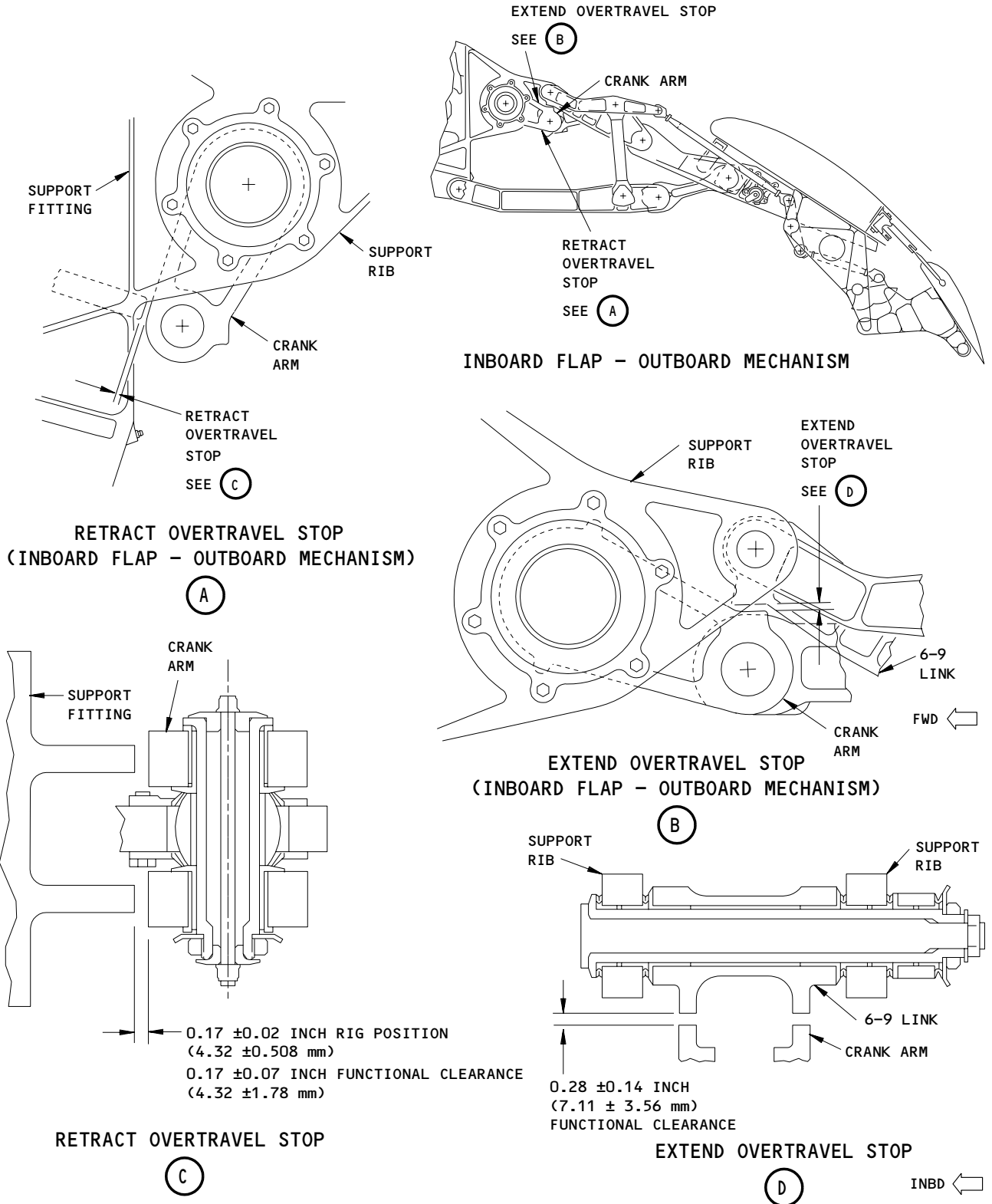
EFFECTIVITY	ALL
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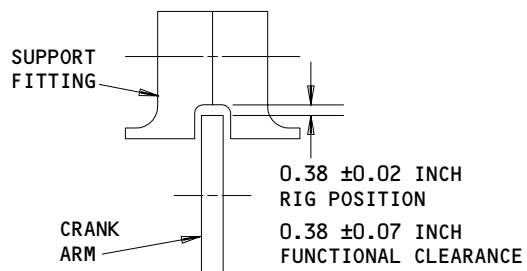
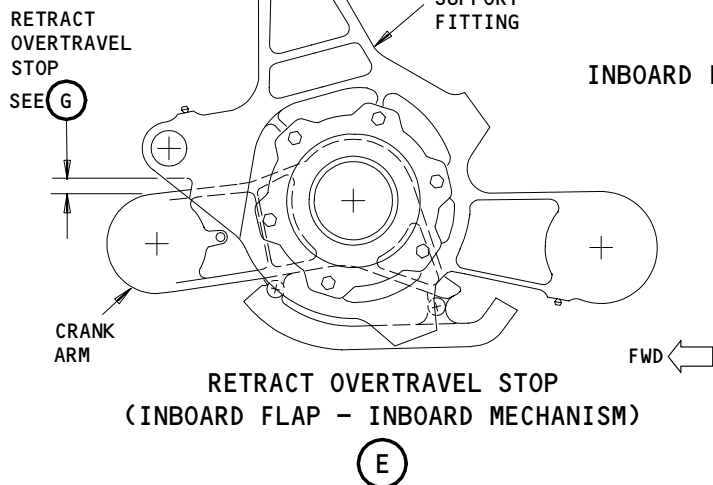
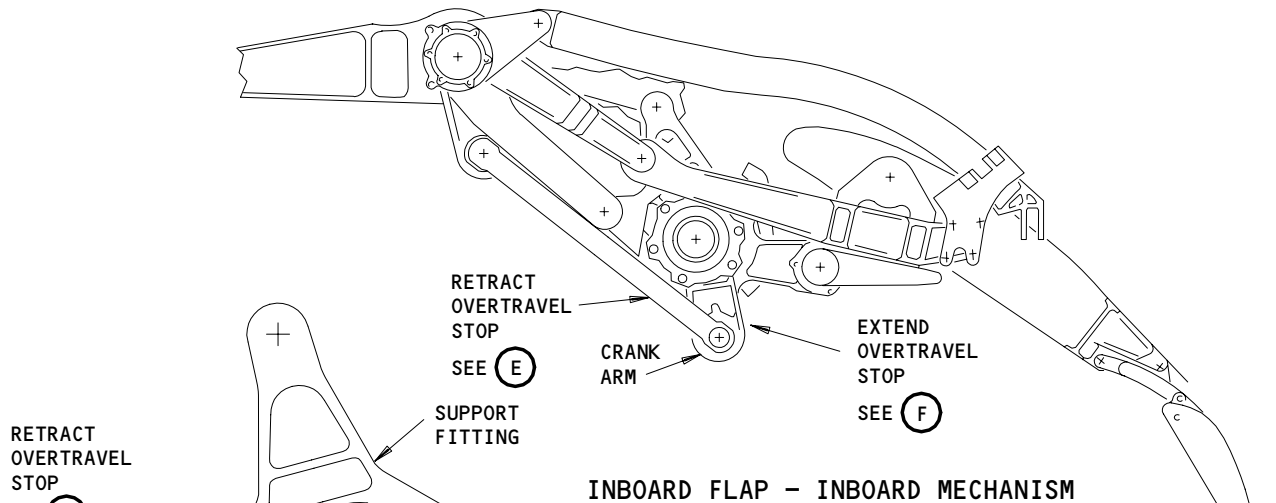
E13390



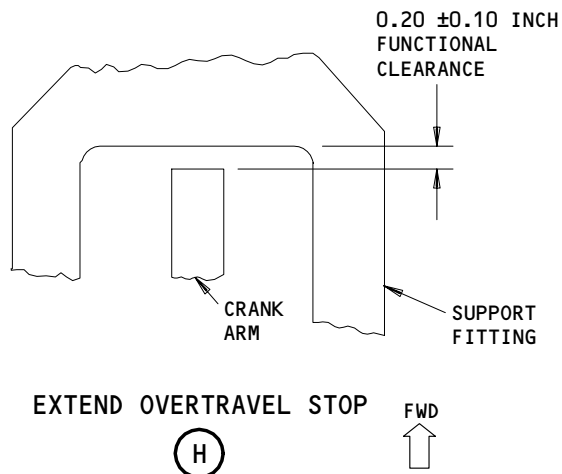
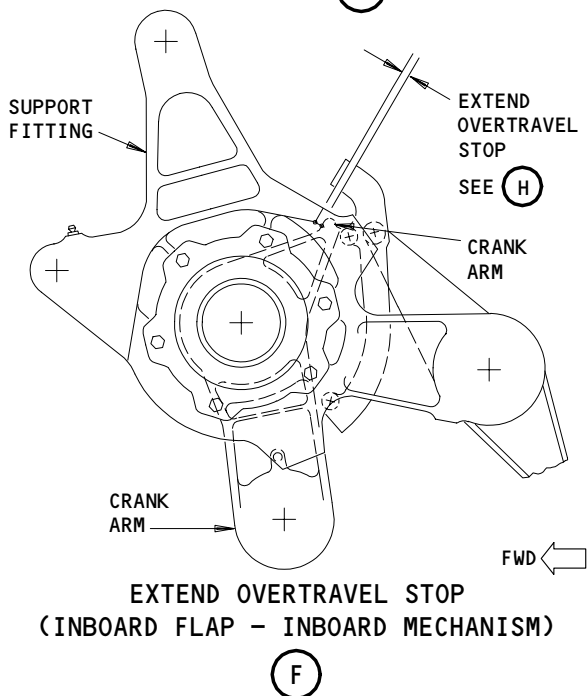
Overtravel Stop Clearances for the Inboard Flap  
Figure 507 (Sheet 1)

EFFECTIVITY	ALL
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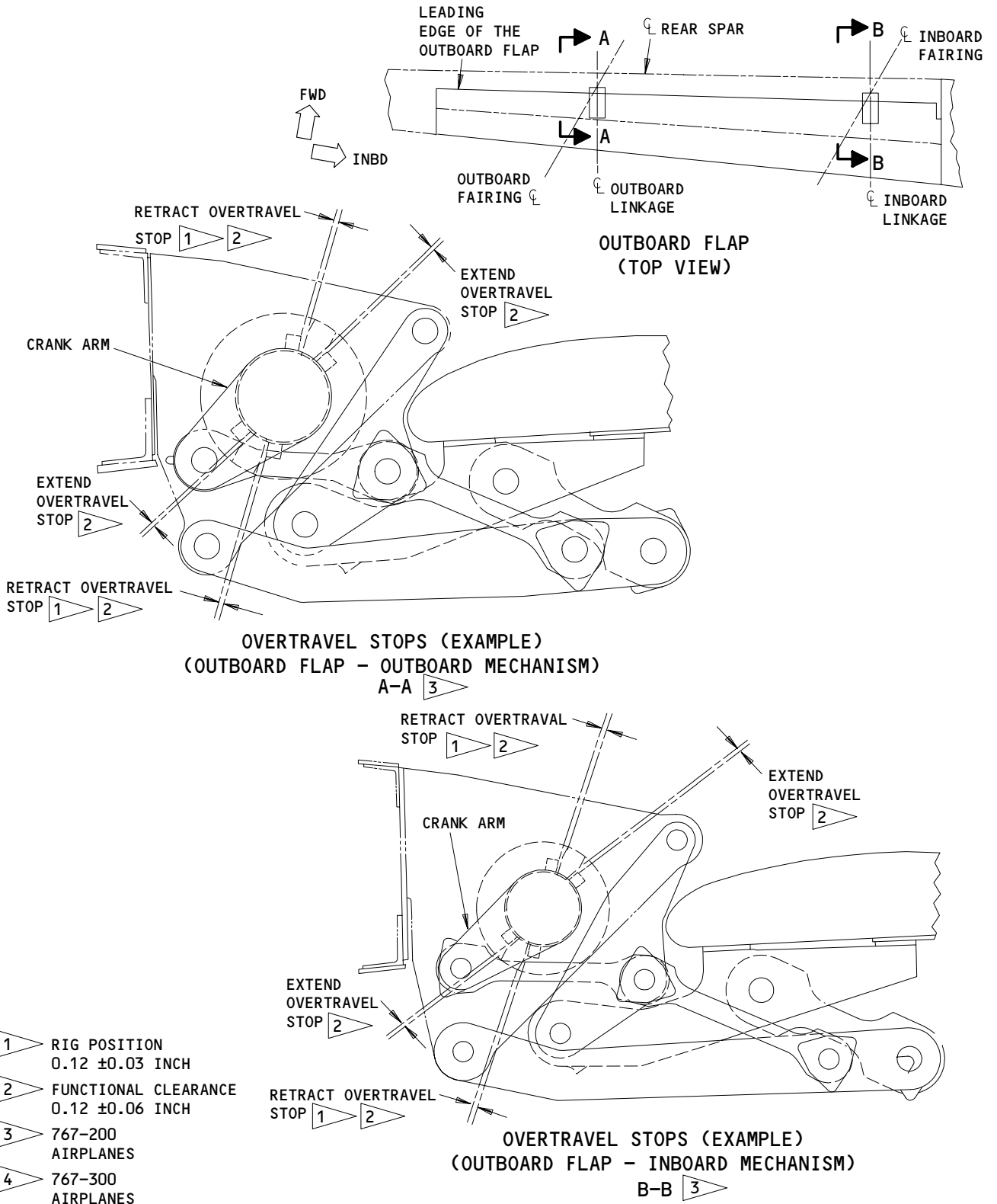
**RETRACT OVERTRAVEL STOP**  
(G)



**Overtravel Stop Clearances for the Inboard Flap**  
Figure 507 (Sheet 2)

EFFECTIVITY	ALL
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**27-51-00**



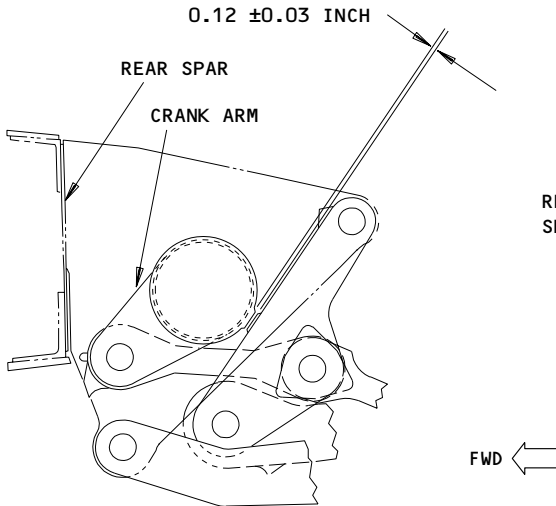
Overtravel Stop Clearances for the Outboard Flap  
 Figure 508 (Sheet 1)

EFFECTIVITY	
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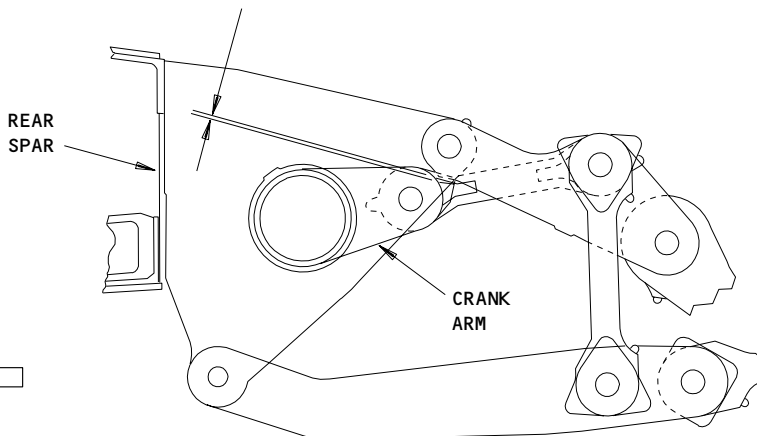
27-51-00



RETRACT OVERTRAVEL  
STOP:  
FUNCTIONAL CLEARANCE  
0.12 ±0.06 INCH  
RIG CLEARANCE  
0.12 ±0.03 INCH



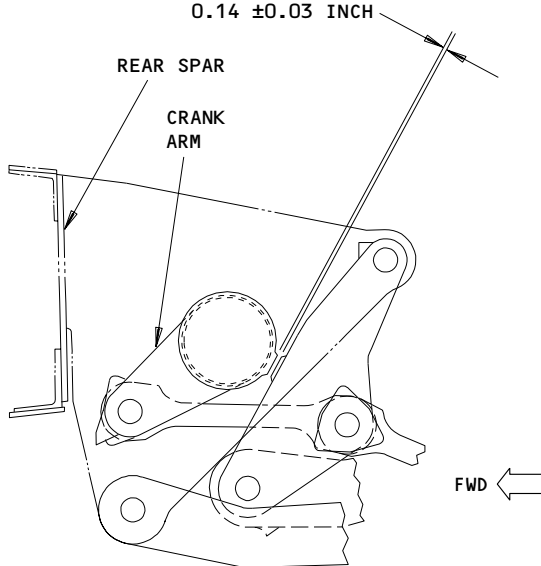
EXTEND OVERTRAVEL  
STOP:  
FUNCTIONAL CLEARANCE  
0.27 ±0.06 INCH



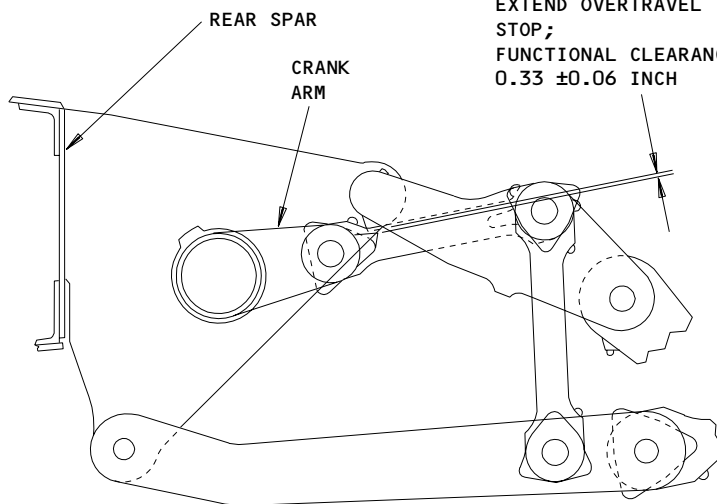
OVERTRAVEL STOPS  
(OUTBOARD FLAP - OUTBOARD MECHANISM)

A-A 4

RETRACT OVERTRAVEL  
STOP:  
FUNCTIONAL CLEARANCE  
0.14 ±0.06 INCH  
RIG CLEARANCE  
0.14 ±0.03 INCH



EXTEND OVERTRAVEL  
STOP;  
FUNCTIONAL CLEARANCE  
0.33 ±0.06 INCH



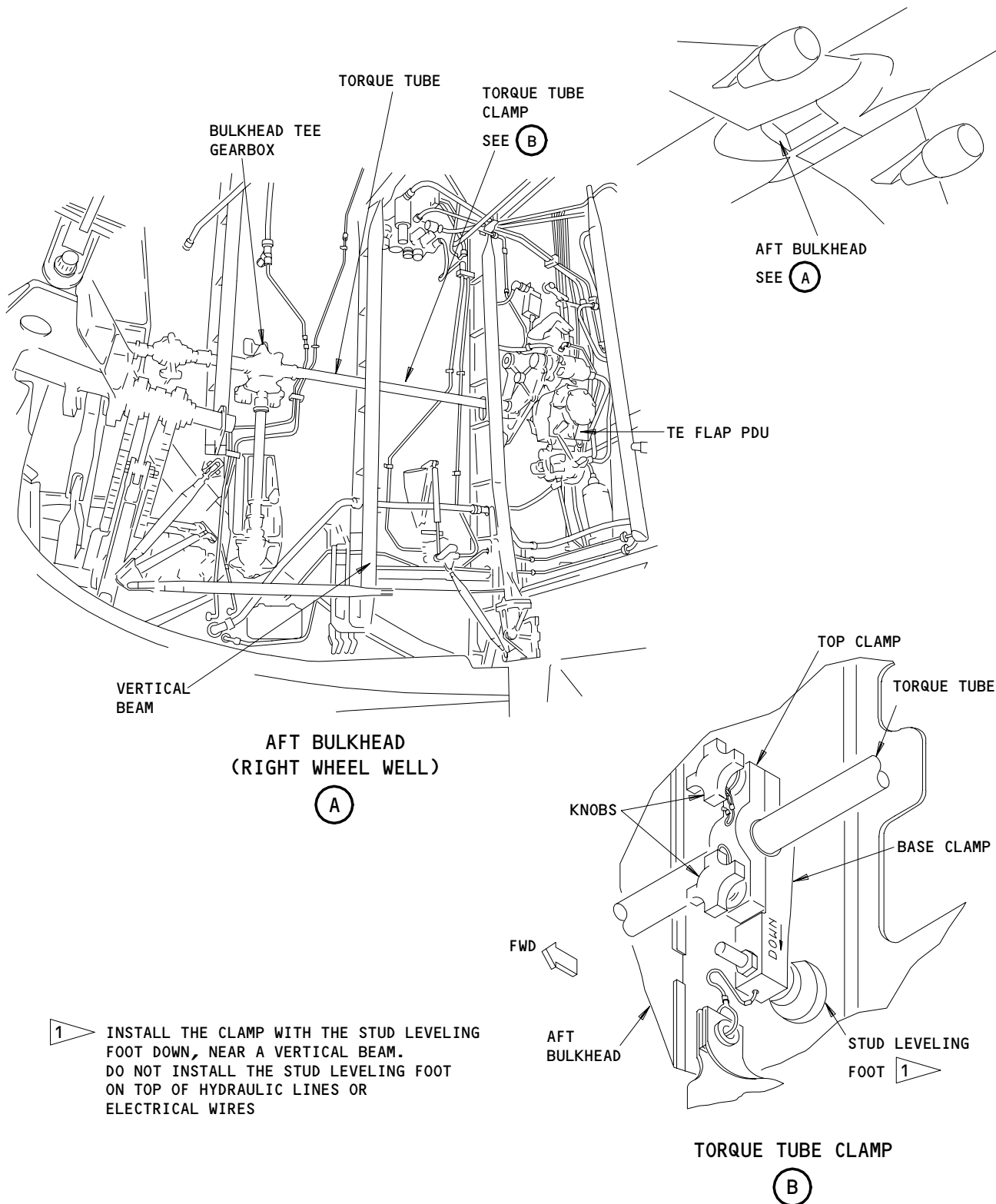
OVERTRAVEL STOPS  
(OUTBOARD FLAP - INBOARD MECHANISM)

B-B 4

Overtravel Stop Clearances for the Outboard Flap  
Figure 508 (Sheet 2)

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Torque Tube Clamp for the Trailing Edge Flap  
Figure 509

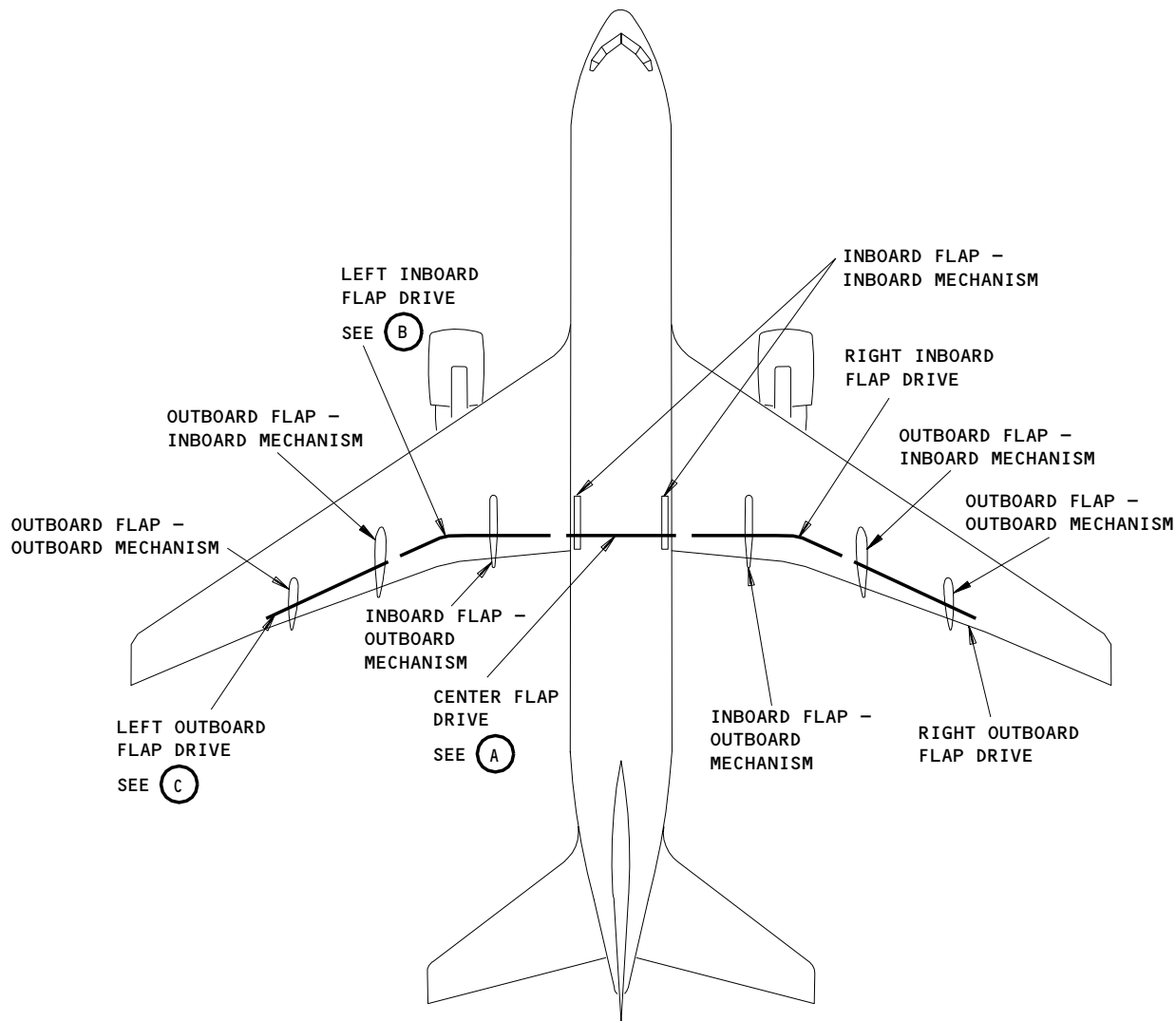
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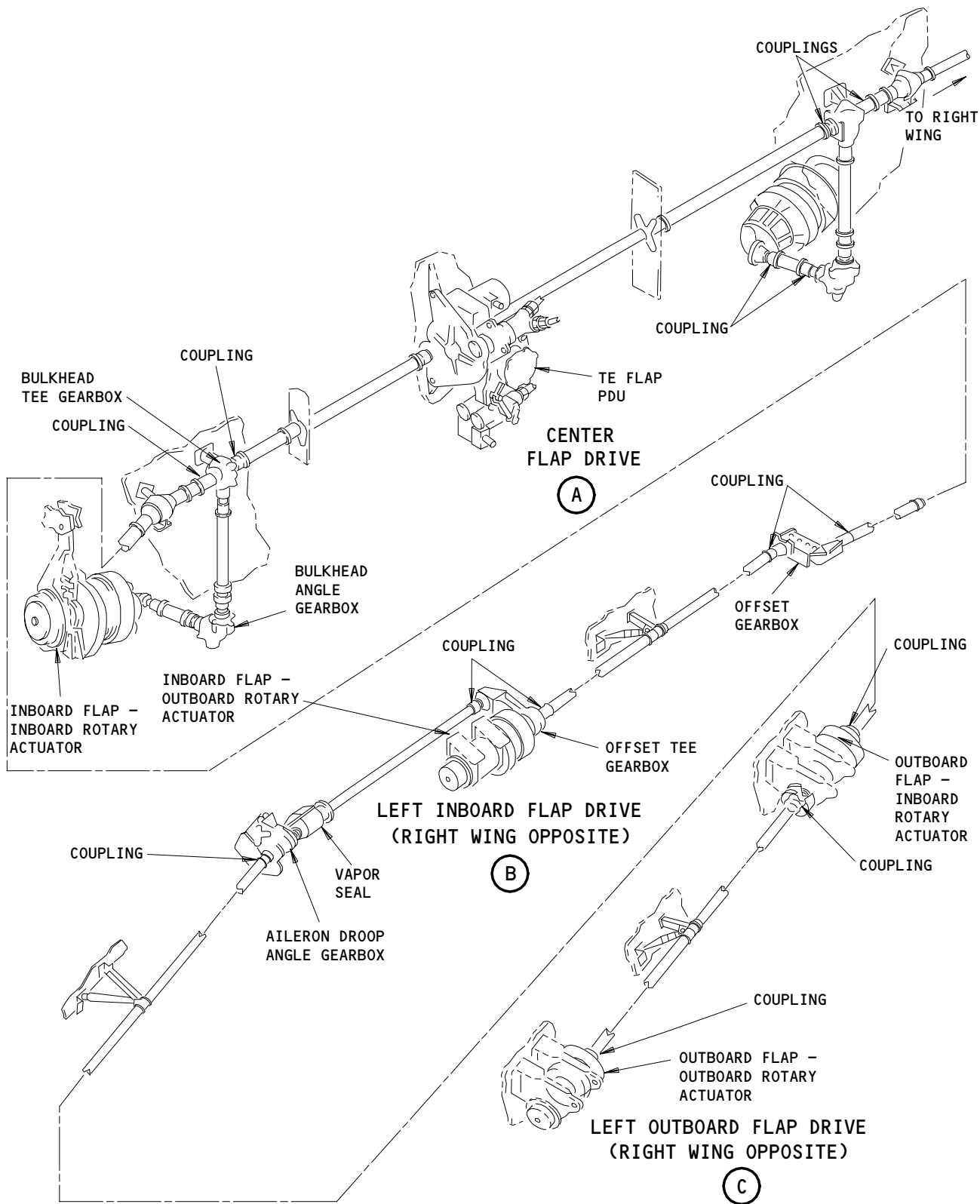
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Drive System for the TE Flap  
Figure 510 (Sheet 1)

EFFECTIVITY	ALL
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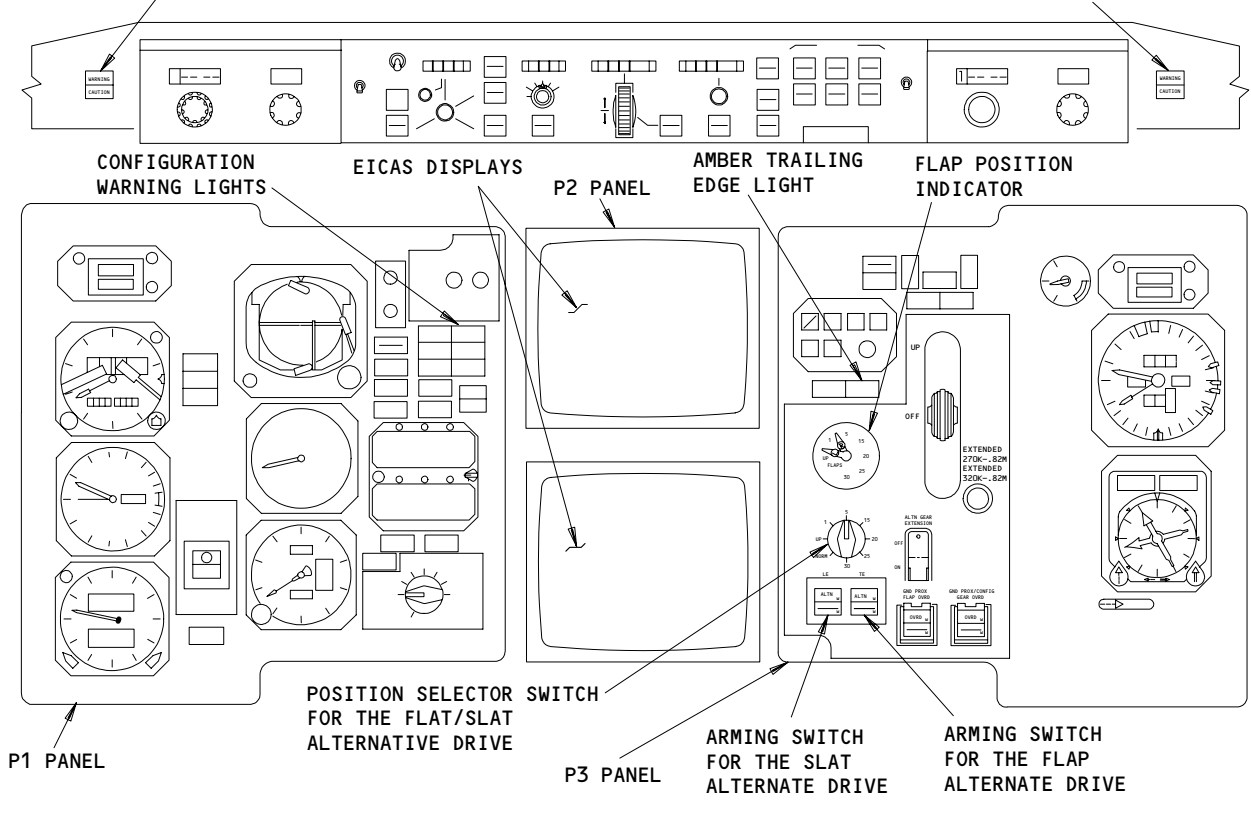
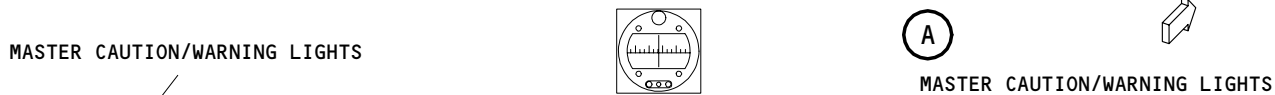
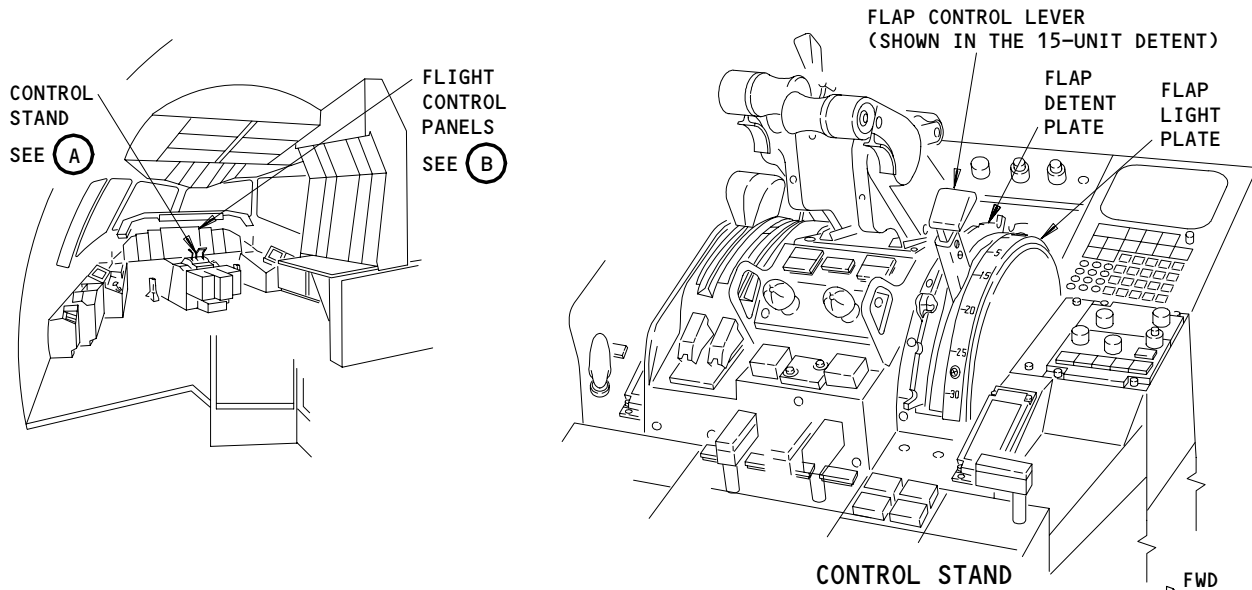
27-51-00



Drive System for the TE Flap  
Figure 510 (Sheet 2)

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### FLIGHT CONTROL PANELS

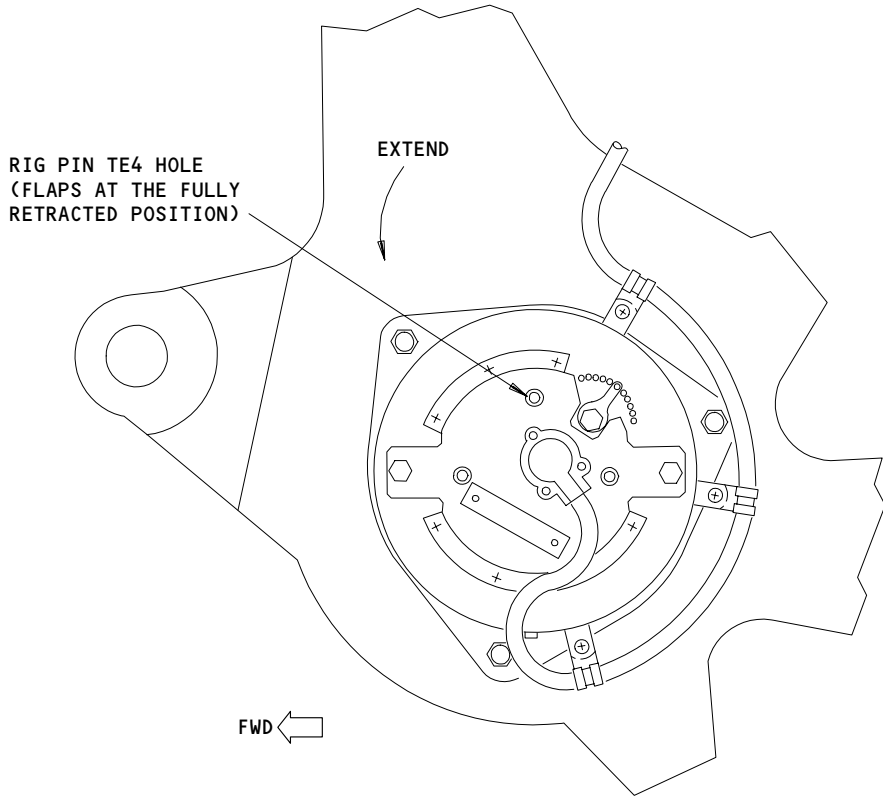
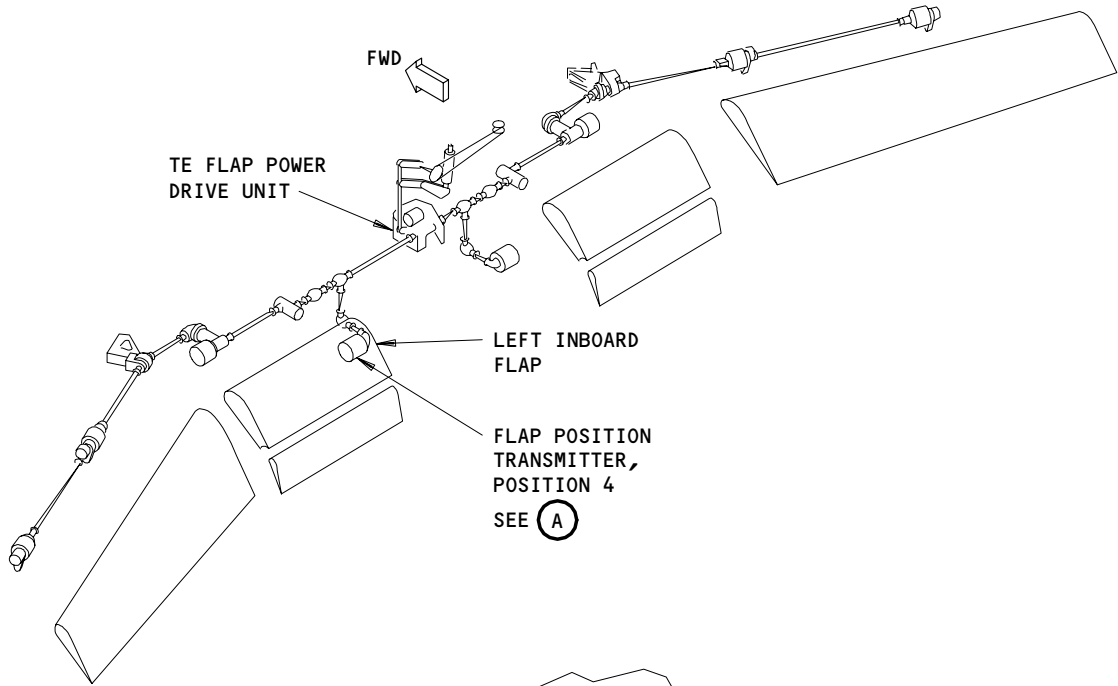
(B)

Flap Controls and Indicators  
Figure 511

EFFECTIVITY	
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FLAP POSITION TRANSMITTER, POSITION 4

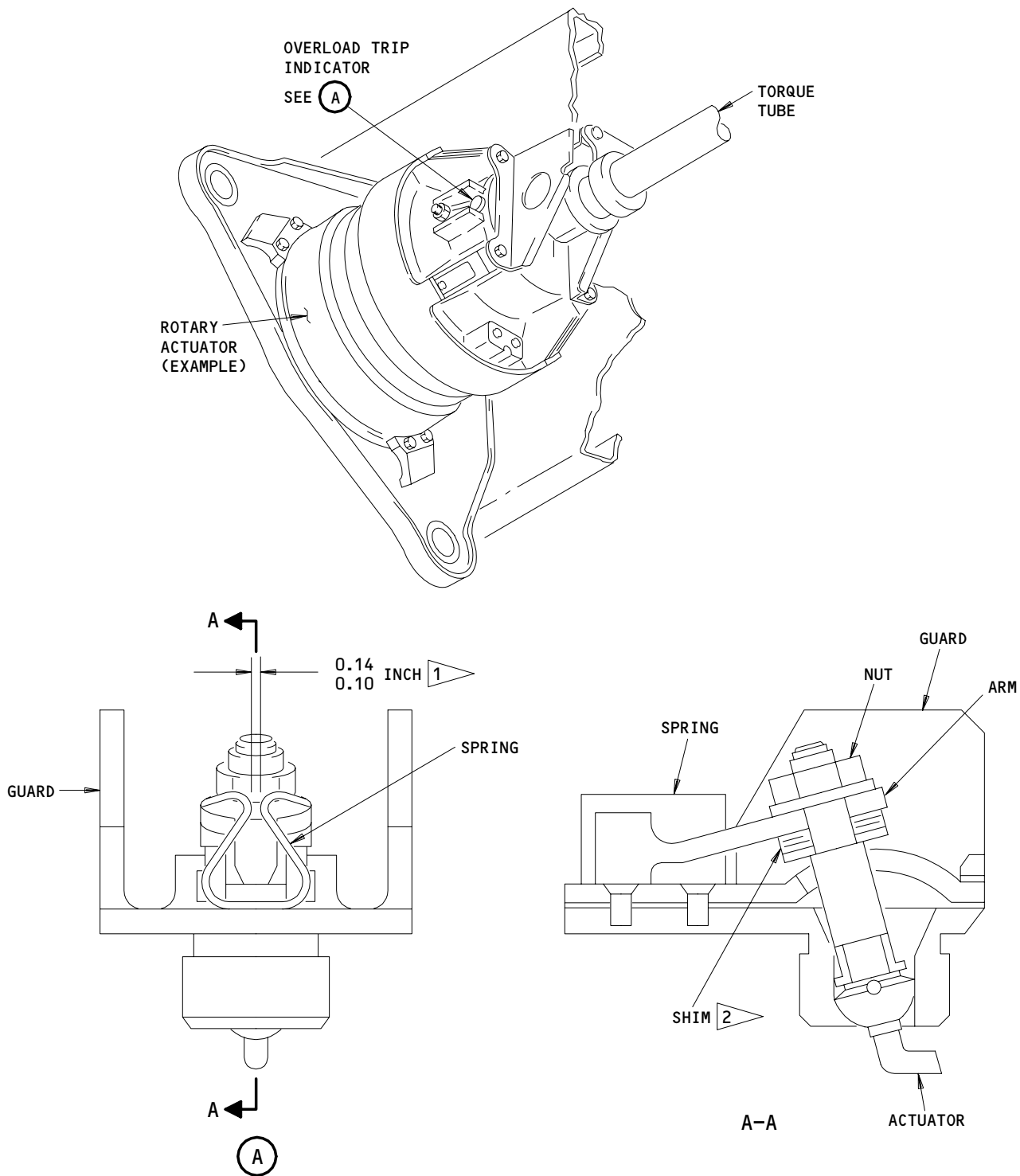
(A)

Location for Rig Pin TE4  
Figure 512

EFFECTIVITY	
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803708



- 1 ▷ ADJUST SPRING TO DIMENSION SHOWN
- 2 ▷ ADJUST SHIM THICKNESS SO THERE IS PRELOAD BETWEEN ARM AND SPRING

Overload Trip Indicator  
Figure 513

EFFECTIVITY	ALL

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- 2) The clearance specified in Fig. 508 for the outboard flap.
- (b) With the TE flaps fully extended (30 unit detent on the flap control lever) by hydraulic power, the clearance for the extent overtravel stop at all eight rotary actuator crank arms must agree with:
  - 1) The clearance specified in Fig. 507 for the inboard flap
  - 2) The clearance specified in Fig. 508 for the outboard flap.
- (6) The airplane must be on the landing gear with all the engines or engine weights installed before you can do the flap drive system adjustment.
- (7) If the overload indicator on the TE flap rotary actuator is tripped, reset the overload indicator and operate the flaps for one full cycle.

If the overload indicator does not trip again, the system is OK. If the overload indicator trips again without the "TE FLAP DISAGREE" or "TE FLAP ASYM" EICAS message shown on the EICAS, the system is OK: reset the overload indicator and adjust the indicator to the correct spring tension if it is necessary (Fig. 513).

If the overload indicator trips with the "TE FLAP DISAGREE" or "TE FLAP ASYM" message shown on the EICAS, examine the flap linkages operated by the rotary actuator with the tripped indicator for damage or jammed condition. If you cannot find the cause of the problem, examine the flap linkages operated by the other seven rotary actuators in the flap drive (two for each flap) for damaged or jammed condition. Correct the problem as necessary.

#### B. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) TE1 - P/N A20004-9
  - (b) TE2 - P/N A20004-9
  - (c) TE3 - P/N A20004-73
  - (d) TE4 - P/N A20004-7
  - (e) LE1 - P/N A20004-17
- (2) Leading Edge Slat Groundlock - A27007-1  
(2 necessary)
- (3) Circuit Breaker Lockout Clip  
Commercially Available
- (4) Circuit Breaker Lock Set (4 necessary)
- (5) TE Flap PDU Lock - A27009-7
- (6) Clamp, TE Flap Drive Shaft - A27099-1 (2 clamps in set)
- (7) Auxiliary Detent, Flap Adjustment Assy - A27105-9
- (8) Support for the Trailing Edge of the TE Flap

**NOTE:** The support must be sufficient to hold the weight of the trailing edge such that the TE flaps cannot move down while the torque tubes are disconnected from the PDU.

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- (9) Adapter - Flap Drive - F70300-1  
(Torque Tube Manual Drive Tool)
- (10) Air Motor with 1/2 inch square drive, or equivalent drive Tool

**NOTE:** A motor to turn the torque tubes to manually extend and retract the flaps.

- (11) Clamp for the Flap Control Quadrant

**NOTE:** The clamp must be sufficient to hold the control quadrant against the full upstop (Fig. 501).

C. Consumable Materials

- (1) G02020 Modeling Clay

D. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-44-00/201, Wing Access Doors and Panels
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 27-51-00/201, Trailing Edge Flap System
- (5) AMM 27-51-15/401, Inboard Trailing Edge Flap Track Fairings
- (6) AMM 27-51-16/401, Outboard Trailing Edge Flap Track Fairings
- (7) AMM 27-51-22/401, Outboard TE Flap Rotary Actuators
- (8) AMM 27-51-26/401, Flap Control Lever Position RVDT and Gearbox
- (9) AMM 27-51-35/401, TE Flap Bulkhead Tee Gearbox
- (10) AMM 27-51-39/401, TE Flap Offset Tee Gearbox
- (11) AMM 27-51-40/401, Aileron Droop Angle Gearbox
- (12) AMM 27-51-41/401, TE Flap Torque Tubes
- (13) AMM 27-51-45/201, Flap Position Transmitter and Transmitter Gearbox
- (14) AMM 27-81-00/201, Leading Edge Slat System
- (15) AMM 27-81-11/401, Leading Edge Slat Power Drive Unit Components
- (16) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (17) AMM 32-00-15/201, Landing Gear Door Locks
- (18) AMM 32-00-20/201, Landing Gear Downlocks

E. Access

- (1) Location Zones
  - 125/126 Area Aft of the Forward Cargo Compartment
  - 143/144 Left/Right MLG Wheel Well
  - 153/154 Left/Right Aft Cargo Compartment
  - 211/212 Control Cabin
  - 550/650 Wing Trailing Edge - Inboard
  - 560/660 Wing Trailing Edge - Outboard
  - 570/670 Wing Trailing Edge Flap Track Fairing
  - 710 Nose Landing Gear and Doors
  - 730/740 Left/Right Main Landing Gear and Doors

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- (2) Access panels
  - 195JL/196JR Left/Right Inboard Flap Mechanism
  - 511BB/611BB LE Slat Power Drive Units

F. Prepare for the Adjustment

S 215-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

**NOTE:** The airplane must be on the landing gear with all the engines or engine weights installed before you can do the flap drive system adjustment.

S 495-003

**WARNING:** USE PROCEDURE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 215-015

- (3) Make sure the TE flaps and the LE slats are in the fully retracted position (AMM 27-51-00/201).

S 215-016

- (4) Make sure the flap control lever is in the zero (FLAPS UP) detent (Fig. 511).

S 495-017

- (5) Install a DO-NOT-OPERATE tag on the flap control lever.

S 865-018

- (6) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 045-019

- (7) Do the deactivation procedure that follows on the TE flaps for ground maintenance:
  - (a) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
    - 1) 11H23, SLAT ALTN CONT INBD

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- 2) 11H24, SLAT ALTN CONT OUTBD
  - 3) 11J14, FLAP SHUTOFF
  - 4) 11J24, FLAPS ALTN CONT
- (b) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- 1) 6D21, ALTN SLAT INBD PWR
  - 2) 6D24, ALTN FLAP PWR
  - 3) 6F24, ALTN SLAT OUTBD PWR

G. Flap Control Cables - Adjustment

S 825-004

- (1) Do these steps before you do the final adjustment if you installed new cables (Fig. 501):
- (a) Install rig pin LE1 in slat aft quadrant (Detail B).
  - (b) Make sure the flap control lever is in the zero (FLAPS UP) detent.
  - (c) Install a clamp to hold the aft quadrant crank against its full upstop (Detail D).
  - (d) Tighten the cables WFA and WFB at the turnbuckles (Fig. 506) to approximately twice the value shown in the temperature-tension table (Fig. 502).
  - (e) Remove rig pin LE1 from the slat aft quadrant.
  - (f) Remove the clamp from the aft quadrant crank.
  - (g) Move the flap control lever 20 to 30 times through its full travel to operate the cables.
  - (h) Install the tool (auxiliary detent assembly) on the flap detent plate.
  - (i) Move the flap control lever to the auxiliary detent, which is 2 degrees aft of the zero (FLAPS UP) detent as shown in Fig. 506.

**NOTE:** Using the auxiliary detent is the same as the aft edge of the flap control lever pawl set 0.15 to 0.16 inch (3.81-4.06 mm) aft of the aft upper edge of the zero (flaps up) detent.

- (j) Install rig pin LE1 in the slat aft quadrant.

**NOTE:** Keep rig pin LE1 installed in the slat aft quadrant for the final cable adjustment.

- (k) Keep the aft quadrant crank against the upstop and decrease the tension in the cables WFA and WFB equally to the value shown in Fig. 502.

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S 825-020

- (2) Make the final cable adjustments with the steps that follow:  
(a) Make sure the flap control lever is in the auxiliary detent.

NOTE: Do not permit the flap control lever to move back to the zero detent during the final adjustments, or the adjustment will be incorrect.

- (b) If not installed, install rig pin LE1 to the slat aft quadrant (Detail B, Fig. 501) and make sure you can get these conditions to agree:

NOTE: Lightly shake the cables to remove the friction from the cables and to release the tension in the components.

- 1) Make sure the aft quadrant crank for the TE flap touches the upstop (Detail D).

NOTE: It is not necessary to apply force against the upstop.

- 2) Make sure you can turn rig pin LE1 easily in the rig pin hole on the slat aft quadrant (Detail B).

NOTE: Do not remove rig pin LE1 until you complete the adjustment.

- 3) Make sure the tension in the cables WFA and WFB at forward and aft of the slat aft quadrant agrees with the values in Fig. 502.

- (c) If you cannot get the correct tension on the cables, adjust the cables at the turnbuckle as necessary.  
(d) Install the turnbuckle lock clips if you adjusted the cables at the turnbuckles.  
(e) Remove rig pin LE1 from the slat aft quadrant.  
(f) Remove the tool (auxiliary detent assembly) from the flap detent plate.  
(g) Move the flap control lever to the zero (flaps UP) detent.

H. TE Flap PDU - Adjustment

S 215-021

- (1) Make sure the distance between the bolt hole centers of the flap load relief actuator is correct (Detail D, Fig. 501).

S 215-022

- (2) Make sure that the aft quadrant crank for the TE flap touches the upstop (Detail D).

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S 495-023

- (3) Hold the weight of the flaps at the trailing edge.

**NOTE:** A support is necessary to hold the weight of the trailing edge. The weight of the flaps can cause a disconnected torque tube to turn and move the flap drive out of the correct adjustment. This will cause the flap drive to be out of symmetry.

S 495-024

- (4) Install the clamps on the torque tubes adjacent to the TE flap PDU (Fig. 509).

S 035-025

- (5) Disconnect the torque tubes adjacent to the TE flap PDU (AMM 27-51-41/401).

**NOTE:** Make a mark on the torque tubes to identify the flaps' fully retracted position. Do not turn the disconnected torque tube.

S 035-005

- (6) Disconnect the control rod from the pilot input arm (Detail E, Fig. 501).

S 825-006

- (7) Do a hydraulic null check on the TE flap PDU with the steps that follow:
- (a) Remove the plugs from the control unit to get to rig pin hole TE1 (Detail E) for the input cam, and rig pin hole TE2 (Detail G) for the follow-up cam.
  - (b) Install rig pin TE1 in the rig pin hole on the input cam.
  - (c) Open the access panels, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (AMM 06-44-00/201).
  - (d) At the outboard and inboard slat PDUs, move the manual override lever on each PDU bypass valve to the No. 1 (bypass) position (AMM 27-81-11/401).
  - (e) Install the groundlocks in the inboard and outboard slat PDUs (AMM 27-81-00/201).
  - (f) At the TE flap PDU, make sure you can connect the adjustable control rod (Detail E) to the pilot input arm, such that the control rod bolt and rig pin TE1 can be free to turn.
  - (g) Adjust the control rod as necessary if you cannot get the step before to agree.
  - (h) If you adjusted the control rod, tighten the jamnuts on the rod and safety it with lockwires.
  - (i) Connect the adjustable control rod to the pilot input arm with the control rod bolt, washer, and nut.

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- (j) Remove rig pin TE1.
- (k) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - 1) 11J14, FLAPS SHUTOFF.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (l) Pressurize the center hydraulic system (AMM 29-11-00/201), and permit the TE flap PDU to become stable in the fully retracted position.

**NOTE:** It is usual for the output shaft to turn on the TE flap PDU when you pressurize the center hydraulic system.

- (m) Do a check to see that you can install rig pin TE2 fully and freely into the rig pin hole on the follow-up cam (Detail G, Fig. 501).
- (n) You can go directly to the "Do a check on the TE flap PDU adjustment" step if you can easily install rig pin TE2 into the follow-up cam.
- (o) You must use the instructions contained in the step that follows to adjust the PDU mechanical and hydraulic null if you cannot install rig pin TE2 easily into the follow-up cam.

S 825-007

- (8) Adjust the mechanical and hydraulic null for the TE flap PDU with the instructions that follow (Fig. 501):
  - (a) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
  - (b) Disconnect the adjustable control rod from the control unit output arm (Detail E).

**NOTE:** This will permit free movement of the output shaft for the installation of rig pin TE2.

- (c) Turn the output shaft on the TE flap PDU by small increments until you can easily install rig pin TE2 (Detail G).

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- (d) Connect the adjustable control rod to the control unit output arm.
- (e) Try to install rig pin TE3 (Detail E).
- (f) If you cannot install rig pin TE3 fully and easily, adjust the control rod between the control valve module and the control unit with these steps until you can install the rig pin.
  - 1) Loosen the jamnut at each end of the control rod.
  - 2) Turn the loose control rod to adjust the rod length.

**NOTE:** The usual length of the rod before the final adjustment is 6.56 inches (166.6 mm).

- 3) Install rig pin TE3.
  - 4) Tighten the jamnuts on the control rod, but do not install the lockwires.
- (g) Remove rig pins TE2 and TE3.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (h) Pressurize the center hydraulic system (AMM 29-11-00/201) and permit the TE flap PDU to become stable at the fully retracted position.

**NOTE:** It is usual for the output shaft to turn on the TE flap PDU when you pressurize the center hydraulic system.

**CAUTION:** DO NOT DISCONNECT THE ADJUSTABLE CONTROL ROD TO DO ROD ADJUSTMENT WHILE THE CENTER HYDRAULIC SYSTEM IS PRESSURIZED. DO NOT ADJUST THE CONTROL ROD WITH THE RIG PIN TE2 INSTALLED. ADJUST THE ROD ONLY BY SMALL INCREMENTS TO PREVENT DAMAGE TO THE TE FLAP POWER DRIVE UNIT.

- (i) Try to install rig pin TE2 into the rig pin hole for the follow-up cam (Detail G).

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- (j) If you cannot install rig pin TE2 easily, adjust the control rod between the control valve module and the control unit with the steps that follow:

NOTE: Do not adjust the control rod while rig pin TE2 is installed. Install rig pin TE2 only to make sure the rod is adjusted correctly.

- 1) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- 2) Loosen the jamnut at each end of the control rod.
- 3) Turn the loose control rod to adjust the rod length until rig pin TE2 can be easily installed.

NOTE: It is not necessary to install rig pin TE3 for this adjustment.

- (k) Tighten the jamnuts on the control rod and safety it with lockwires.
- (l) If installed, remove rig pin TE2 and install the plug in the rig pin hole.

S 215-008

- (9) Do a check on the TE flap PDU adjustment with these steps:
- (a) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
  - (b) Remove the groundlocks from the inboard and outboard slat PDUs (AMM 27-81-00/201).
  - (c) Move the manual override levers on the (inboard and outboard slat PDU) bypass valves to the No. 2 (normal) position.
  - (d) Remove the clamps from the torque tubes adjacent to the TE flap PDU (Fig. 509).

NOTE: Do not turn the disconnected torque tube if the TE flaps is in the fully retracted position.

- (e) Make sure the TE flaps are in the fully retracted position.
- (f) Do these steps if the flaps are not in the fully retracted position:
- 1) Turn the torque tubes adjacent to the TE flap PDU to retract the flaps manually, or with an air motor and adapter F70300-1. Move the flaps to the fully retracted position.
  - 2) Do a check on the clearance at the retract overtravel stops with the procedure given in the "Adjustment for the Flap Retract Overtravel Stop Clearance" paragraph.

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- (g) Connect the torque tube on each side of the TE flap PDU (AMM 27-51-41/401).

**NOTE:** If the flaps are in the fully retracted position, do not turn the torque tube. It will be necessary to adjust the flap drive again if you connected the torque tubes while the flaps are not in the fully retracted position.

- (h) Remove the support from the trailing edge.  
(i) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:  
1) 11J14, FLAPS SHUTOFF  
(j) Make sure the TE flaps and the LE slats are in the fully retracted position.  
(k) Make sure the flap control lever is in the zero (FLAPS UP) detent.  
(l) Remove the DO-NOT-OPERATE tag from the flap control lever.  
(m) Supply electrical power (AMM 24-22-00/201).

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (n) Pressurize the center hydraulic system (AMM 29-11-00/201).  
(o) Move the flap control lever to the 30-unit detent and make sure the TE flaps and the LE slats move to the fully extended position.  
(p) Move the flap control lever to the zero (FLAPS UP) detent and make sure the TE flaps and the LE slats move to the fully retracted position.  
(q) Install a DO-NOT-OPERATE tag on the flap control lever.  
(r) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).  
(s) Install the PDU lock on the TE flap PDU (Fig. 505).  
(t) Install the groundlocks on the inboard and outboard slat PDUs (AMM 27-81-00/201).  
(u) Do a check to see that rig pin TE1 installs freely in TE flap PDU.

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- (v) If you cannot freely and fully install rig pin TE1, adjust the control rod attached to the pilot input arm again as necessary, until rig pin TE1 can be easily installed.
- (w) Remove rig pin TE1 and install the plug in the rig pin hole.
- (x) Remove the PDU lock from the TE flap PDU (Fig. 505).
- (y) Remove the groundlocks from the inboard and outboard slat PDUs (AMM 27-81-00/201).

I. Flap Extended Overtravel Stop Clearance - Adjustment

S 015-026

- (1) Remove the access panels 195JL and 196JR as necessary to get access to the left and right inboard mechanisms for the inboard flap (AMM 06-41-00/201).

S 865-027

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (2) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-028

- (3) Move the flap control lever to the 15-unit detent and permit the flaps to move the to the 15-unit position.

S 865-029

- (4) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 495-030

**WARNING:** DO NOT MOVE THE FLAP CONTROL LEVER WHEN YOU APPLY THE MODELING CLAY IN THE STEP THAT FOLLOWS. MOVEMENT OF THE FLAP CONTROL LEVER DURING THIS OPERATION CAN CAUSE INJURY TO PERSONS.

- (5) Apply the modeling clay to all (eight) the EXTEND overtravel stops in the left and right wings.

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S 865-031

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(6) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-009

(7) Move the flap control lever to the 30-unit detent and permit the flaps to move to the fully extended position.

**NOTE:** After the flaps moved to the fully extended position, stop for one minute before you do the next step.

S 865-032

(8) Move the flap control lever to the 15-unit detent and permit the flaps to move to the 15-unit position.

S 865-033

(9) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 975-012

**WARNING:** DO NOT MOVE THE FLAP CONTROL LEVER WHEN YOU MEASURE THE OVERTRAVEL STOP CLEARANCES IN THE STEP THAT FOLLOWS. THE MOVEMENT OF THE FLAP CONTROL LEVER DURING THIS OPERATION CAN CAUSE INJURY TO PERSONS.

(10) Measure the thickness of the modeling clay at all eight extend overtravel stops. Make a written record of the thicknesses you measured.

**NOTE:** The thickness of the modeling clay is the extend overtravel stop clearance.

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S 225-011

- (11) Make sure the clearances for the two extend overtravel stops are correct at the inboard and outboard mechanisms of each INBOARD flap (Fig. 507).

**NOTE:** If the stop clearances is not correct, do the steps in the "Adjust the Inboard Flap Retract Overtravel Stops to the RIG Position" Paragraph.

S 225-010

- (12) Make sure the clearances for the two extend overtravel stops are correct at the inboard and outboard mechanisms of each OUTBOARD flap (Fig. 508).

**NOTE:** If the stop clearance is not correct, do the steps in the "Adjust the Outboard Flap Retract Overtravel Stops to the RIG Position" paragraph.

#### J. Flap Retracted Overtravel Stop Clearance - Adjustment

S 015-013

- (1) Remove the access panels 195JL and 196JR as necessary to get access to the left and right inboard mechanisms for the inboard flap (AMM 06-41-00/201).

S 865-014

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (2) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-034

- (3) Move the flap control lever to the 20-unit position and permit the flaps to move to the 20-unit position.

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S 865-035

- (4) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 495-036

**WARNING:** DO NOT MOVE THE FLAP CONTROL LEVER WHEN YOU APPLY THE MODELING CLAY TO THE STEP THAT FOLLOWS. THE MOVEMENT OF THE FLAP CONTROL LEVER DURING THIS OPERATION CAN CAUSE INJURY TO PERSONS.

- (5) Apply the modeling clay to all (eight) the RETRACT overtravel stops on the left and right wings.

S 865-037

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (6) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-038

- (7) Move the flap control lever to the zero (FLAPS UP) detent and permit the flaps to move to the fully retracted position.

**NOTE:** After the flaps moved to the fully retracted position, stop for one minute before you do the next step.

S 865-039

- (8) Move the flap control lever to the 20-unit detent and permit the flaps to move to the 20-unit position.

S 865-040

- (9) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

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S 975-041

**WARNING:** DO NOT MOVE THE FLAP CONTROL LEVER WHEN YOU MEASURE THE OVERTRAVEL STOP CLEARANCES IN THE STEP THAT FOLLOWS. THE MOVEMENT OF THE FLAP CONTROL LEVER DURING THIS OPERATION CAN CAUSE INJURY TO PERSONS.

- (10) Measure the thickness of the modeling clay at all eight retract overtravel stops. Make a written record of the thicknesses you measured.

**NOTE:** The thickness of the modeling clay is the retract overtravel stop clearance.

S 225-042

- (11) Make sure the clearances for the two retract overtravel stops are correct at the inboard and outboard mechanisms of each INBOARD flap (Fig. 507).

**NOTE:** If the stop clearances is not correct, do the steps in the "Adjust the Inboard Flap Retract Overtravel Stops to the RIG Position" Paragraph.

S 225-043

- (12) Make sure the clearances for the two retract overtravel stops are correct at the inboard and outboard mechanisms of each OUTBOARD flap (Fig. 508).

**NOTE:** If the stop clearance is not correct, do the steps in the "Adjust the Outboard Flap Retract Overtravel Stops to the RIG Position" paragraph.

S 225-044

- (13) Make sure that the clearance of the retract overtravel stop at each flap mechanism on one wing is the same as the symmetrical mechanism on the other wing, with a difference of no greater than  $\pm 0.06$  inch ( $\pm 1.52$  mm).

**NOTE:** If the difference of the stop clearances of the symmetrical flap mechanisms are greater than  $\pm 0.06$  inch ( $\pm 1.52$  mm), do the steps in the "Adjust the Flap Synchronization" paragraph.

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K. Inboard Flap Retract Overtravel Stop RIG Position - Adjustment

S 845-045

- (1) Make sure that you followed the procedure in the "Adjust the Flap Extend Overtravel Stop Clearance" and "Adjust the Flap Retract Overtravel Stop Clearance" paragraphs to see if this adjustment is necessary.

**NOTE:** If the clearance for the extend or the retract overtravel stop for an inboard (outboard) flap are not correct, go to the procedure to adjust the appropriate flap retract overtravel stops to the RIG position.

S 865-046

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (2) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-047

- (3) Move the flap control lever to the zero (FLAPS UP) detent and permit the flaps to move to the fully retracted position.

**NOTE:** After the flaps moved to the fully retracted position, stop for one minute before you do the next step.

S 045-048

- (4) Do the flap deactivation procedure for ground maintenance with the instructions given in the "Prepare for the Adjustment" paragraph.

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S 035-049

- (5) Use these steps to disconnect the drive to the inboard flap with the incorrect overtravel stops (Fig. 510):

(a) Disconnect the torque tube at the inboard end of the bulkhead tee gearbox (AMM 27-51-35/401).

NOTE: Do not turn the torque tube that is connected to the TE flap PDU.

(b) Install a clamp on the disconnected torque tube adjacent to the TE flap PDU.

(c) Disconnect the torque tube at the inboard end of the aileron droop angle gearbox (AMM 27-51-40/401).

S 985-050

- (6) Turn the input shaft coupling (on the inboard side of the bulkhead tee gearbox) by hand to extend the inboard flaps, until you can get access to the RETRACT overtravel stop at the outboard mechanism.

NOTE: You can turn the input shaft approximately 270 turns to extend the inboard flap to the 15-unit position.

S 495-051

- (7) Apply the modeling clay to the RETRACT overtravel stop at the outboard mechanism of the inboard flap (Detail A, Fig. 507).

S 985-052

- (8) Turn the input shaft coupling (on the inboard side of the bulkhead tee gearbox) by hand until the retract overtravel stop clearance at the inboard mechanism of the inboard flap is in the RIG position limit (Detail G, Fig. 507).

NOTE: For this and all the subsequent steps, move the crank arm to the direction of the stop to measure the RIG position. If you must move the crank arm away from the stop, move it away for more than one complete turn of the coupling, then move it back again to measure the RIG position.

Turn the coupling counterclockwise to decrease the clearance to the stop. A 1/3 turn of the coupling will change the clearance by 0.010 inch (0.25 mm).

S 985-053

- (9) Extend the flaps manually to get access to the modeling clay at the RETRACT overtravel stop (at the outboard mechanism of the inboard flap).

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S 975-054

- (10) Measure the thickness of the modeling clay at the RETRACT overtravel stop. Make a written record of the clay thickness.

S 845-055

- (11) Do the steps that follow only if the RETRACT overtravel stop clearance (the thickness of the clay) is in the RIG position limit at the outboard mechanism of the inboard flap (Detail C, Fig. 507):
- (a) Retract the flaps until the inboard mechanism of the inboard flap is in the RIG position limits (Detail G).
  - (b) Connect the torque tube to the input shaft coupling of the bulkhead tee gearbox (AMM 27-51-35/401) (Fig. 510).

NOTE: Try not to turn the input shaft coupling when you connect the torque tube. If you must turn the input shaft coupling to align the coupling screws, make no more than 1/6 of a turn in the clockwise or counterclockwise direction.

- (c) Remove the clamp from the torque tube adjacent to the TE flap PDU (Fig. 509).

S 825-056

- (12) Adjust the inboard flap drive with these steps if you cannot get the correct RETRACT overtravel stop clearances for the inboard and outboard mechanisms (of the inboard flap) at the same time (Fig. 507):
- (a) Disconnect the torque tube from the outboard coupling on the bulkhead tee gearbox (AMM 27-51-35/401) (Fig. 510).

NOTE: This will disconnect the inboard mechanism from the outboard mechanism.

- (b) Remove the center and the forward sections of the inboard flap outboard fairing (AMM 27-51-15/401) to get access to the RETRACT overtravel stop.

NOTE: The input-to-output gear ratio on the rotary actuator is 1400:1. It is necessary to see the RETRACT overtravel stops in the subsequent steps to make sure that the crank arms are correctly set against the RETRACT stops.

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- (c) Manually turn the torque tube that is connected to the outboard rotary actuator (of the inboard flap), until the outboard crank arm touches the RETRACT overtravel stop. Hold the torque tube in this position.

NOTE: Make sure that you can turn the torque tube at least one full turn before the crank arm touches the overtravel stop.

- (d) Manually turn the input shaft coupling on the inboard side of the bulkhead tee gearbox, until the inboard crank arm touches the RETRACT overtravel stop. Hold the coupling in this position.

NOTE: Make sure that you can turn the coupling at least one full turn before the crank arm touches the overtravel stop.

- (e) Connect the torque tube to the outboard side of the bulkhead tee gearbox while you keep the inboard and outboard crank arms against their RETRACT overtravel stops (Fig. 510).

NOTE: Try not to turn the input shaft coupling when you connect the torque tube. If you must turn the input shaft coupling to align the coupling screws, make no more than 1/6 of a turn in the clockwise or counterclockwise direction.

- (f) Make approximately 20 turns on the input shaft coupling (at the inboard side of the bulkhead tee gearbox) to move the crank arms away from the RETRACT overtravel stop.

- (g) Turn the input shaft coupling to move the crank arm to the direction of the stops, until the inboard and outboard crank arms are in the RIG position limits (Detail C and G, Fig. 507).

NOTE: Make sure you can turn the coupling for at least one full turn before you measure the RIG position.

- (h) Connect the torque tube to the inboard side of the bulkhead tee gearbox while you hold the coupling to keep the crank arms in the RIG position.

NOTE: Try not to turn the input shaft coupling when you connect the torque tube. If you must turn the input shaft coupling to align the coupling screws, make no more than 1/6 of a turn in the clockwise or counterclockwise direction.

- (i) Remove the lock from the torque tube adjacent to the TE flap PDU (Fig. 509).

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- (j) Install the center and the forward sections of the outboard fairing for the inboard flap (AMM 27-51-15/401).

S 435-057

- (13) Connect the torque tube to the aileron droop angle gearbox (AMM 27-51-40/401).

L. Outboard Flap Retract Overtravel Stop RIG Position - Adjustment

S 845-058

- (1) Make sure that you followed the procedure in the "Adjust the Flap Extend Overtravel Stop Clearance" and "Adjust the Flap Retract Overtravel Stop Clearance" paragraphs to see if this adjustment is necessary.

**NOTE:** If the clearance for the extend or the retract overtravel stop for an inboard (outboard) flap are not correct, go to the procedure to adjust the appropriate flap retract overtravel stops to the RIG position.

S 025-059

- (2) Remove the center and the forward sections of the outboard flap (inboard and outboard) fairings to get access to the RETRACT overtravel stops (AMM 27-51-16/401).

S 865-060

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (3) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-061

- (4) Move the flap control lever to the zero (FLAPS UP) detent and permit the TE flaps to move to the fully retracted position.

**NOTE:** After the flaps moved to the fully retracted position, stop for one minute before you do the next step.

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S 045-062

- (5) Do the flap deactivation procedure for ground maintenance with the instructions given in the "Prepare for the Adjustment" paragraph.

S 035-063

- (6) Use this step to disconnect the drive to the outboard flap with the incorrect overtravel stops (Fig. 510):
- (a) Disconnect the torque tube at the inboard side of the inboard rotary actuator for the outboard flap (AMM 27-51-22/401).

S 985-064

- (7) Turn the input shaft coupling on the inboard side of the (outboard flap) inboard rotary actuator by hand, until the retract overtravel stop clearances at the inboard and outboard mechanisms are in the RIG position limits (Fig. 508).

**NOTE:** For this and all the subsequent steps, move the crank arm to the direction of the stop to measure the RIG position. If you must move the crank arm away from the stop, move it away for more than one complete turn of the coupling, then move it back again to measure the RIG position.

Turn the coupling counterclockwise to decrease the clearance to the stop. A 1/3 turn of the coupling will change the clearance by 0.005 inch (0.127 mm).

S 845-065

- (8) Do this step only if the RETRACT overtravel stop clearances for the inboard and outboard mechanisms are in the RIG position limits:
- (a) Connect the torque tube to the input shaft coupling at the inboard side of the inboard rotary actuator (AMM 27-51-22/401) (Fig. 510).

**NOTE:** Try not to turn the input shaft coupling when you connect the torque tube. If you must turn the input shaft coupling to align the coupling screws, make no more than 1/6 of a turn in the clockwise or counterclockwise direction.

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S 825-066

- (9) Adjust the outboard flap drive with these steps only if you cannot get the correct RIG position clearances for the inboard and outboard mechanisms at the same time (Fig. 508):

(a) Disconnect the torque tube from the input shaft coupling at the inboard side of the outboard rotary actuator (outboard flap) (Fig. 510).

NOTE: This will disconnect the inboard mechanism from the outboard mechanism.

(b) Manually turn the input shaft coupling on the inboard side of the outboard rotary actuator, until the outboard crank arm touches the RETRACT overtravel stop. Hold the coupling in this position.

NOTE: Make sure that you can turn the torque tube at least one full turn before the crank arm touches the overtravel stop.

(c) Manually turn the input shaft coupling on the inboard side of the inboard rotary actuator, until the inboard crank arm touches the RETRACT overtravel stop. Hold the coupling in this position.

NOTE: Make sure you can turn the coupling at least one full turn before the crank arm touches the overtravel stop.

(d) Connect the torque tube to the inboard side of the outboard rotary actuator while you keep the inboard and outboard crank arms against their RETRACT overtravel stops (Fig. 510).

NOTE: Try not to turn the input shaft coupling when you connect the torque tube. If you must turn the input shaft coupling to align the coupling screws, make no more than 1/6 of a turn in the clockwise or counterclockwise direction.

(e) Make approximately 20 turns on the input shaft coupling (at the inboard side of the inboard rotary actuator) to move the crank arms away from the RETRACT overtravel stop.

(f) Turn the input shaft coupling to move the crank arm to the direction of the stops, until the inboard and outboard crank arms are in the RIG position limits.

NOTE: Make sure you can turn the coupling for at least one full turn before you measure the RIG position.

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- (g) Connect the torque tube to the inboard side of the inboard rotary actuator while you hold the coupling to keep the crank arms in the RIG position (Fig. 510).

NOTE: Try not to turn the input shaft coupling when you connect the torque tube. If you must turn the input shaft coupling to align the coupling screws, make no more than 1/6 of a turn in the clockwise or counterclockwise direction.

S 425-067

- (10) Install the center and forward sections of the inboard and outboard fairings for the outboard flap (AMM 27-51-16/401).

M. Flap Synchronization - Adjustment

S 845-068

- (1) Make sure that you completed the procedure in the "Adjust the Flap Retract Overtravel Stop Clearance" paragraph to make sure the FUNCTIONAL clearances are correct, and to see if this adjustment is necessary.

NOTE: It is not necessary to do this procedure if the conditions that follow are true:

- All eight retract overtravel stop clearances are in the FUNCTIONAL clearance limits,
- The overtravel stop clearances on each flap mechanism at one wing is the same as the symmetrical mechanism on the opposite wing, within  $\pm 0.06$  inch ( $\pm 1.5$  mm).

S 215-069

- (2) Make sure that the TE flaps are in the fully retracted position.

S 045-070

- (3) Do the flap deactivation procedure for ground maintenance with the instructions given in the "Prepare for the Adjustment" paragraph.

S 225-071

- (4) Identify the mechanism with the RETRACT overtravel stop clearance that does not agree with the clearance of the symmetrical mechanism on the opposite wing (a tolerance of  $\pm 0.06$  inch ( $\pm 1.52$  mm) is permitted).

S 825-072

- (5) Adjust the flap mechanisms for the inboard flap with these steps:
- (a) Install a clamp on the torque tube on the outboard side of the aileron droop angle gearbox (Fig. 509).
  - (b) Disconnect the torque tube from the inboard coupling of the aileron droop angle gearbox (AMM 27-51-40/401) (Fig. 510).

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(c) If it is necessary to adjust the crank arm on the outboard mechanism (inboard flap), follow these steps to make the adjustment:

- 1) Find the minimum number of turns (and the direction that the coupling has to turn) to make the clearance for the RETRACT overtravel stop equal to the clearance of the symmetrical stop on the opposite wing (a tolerances of  $\pm 0.06$  inch ( $\pm 1.52$  mm) is permitted).

NOTE: Turn the coupling counterclockwise to decrease (or clockwise to increase) the clearance to the stop.

A  $1/3$  turn of the coupling will change the clearance by 0.010 inch (0.25 mm).

- 2) Disconnect the torque tube from the coupling on the outboard side of the bulkhead tee gearbox (AMM 27-51-35/401) (Fig. 510).
- 3) Manually turn the disconnected torque tube for the minimum number of turns calculated in the step before.
- 4) Connect the torque tube to the coupling on the outboard side of the bulkhead tee gearbox (AMM 27-51-35/401) while you hold the coupling to keep the adjusted position.

NOTE: Try not to turn the torque tube when you connect it. If you must turn the torque tube to align the coupling screws, make no more than  $1/6$  of a turn in the clockwise or counterclockwise direction.

(d) If it is necessary to adjust the crank arm on the inboard mechanism (inboard flap), follow these steps to make the adjustment:

- 1) Find the minimum number of turns (and the direction that the coupling has to turn) to make the clearance for the RETRACT overtravel stop equal to the clearance of the symmetrical stop on the opposite wing (a tolerances of  $\pm 0.06$  inch ( $\pm 1.52$  mm) is permitted).

NOTE: Turn the coupling counterclockwise to decrease (or clockwise to increase) the clearance to the stop.

A  $1/3$  turn of the coupling will change the clearance by 0.010 inch (0.25 mm).

- 2) Disconnect the torque tube from the coupling on the inboard and outboard sides of the bulkhead tee gearbox (AMM 27-51-35/401) (Fig. 510).

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- 3) Manually turn the coupling on the inboard side of the bulkhead tee gearbox for the minimum number of turns that you calculated in the step before:

NOTE: Be careful not to turn the torque tube that is disconnected from the outboard side of the tee gearbox.

- 4) Connect the torque tube to the outboard coupling of the bulkhead tee gearbox (AMM 27-51-35/401) while you hold the coupling to keep the adjusted position.

NOTE: Try not to turn the coupling or the torque tube when you connect them together. If you must turn the coupling to align the coupling screws, make no more than 1/6 of a turn in the clockwise or counterclockwise direction.

- 5) Connect the torque tube to the inboard coupling of the bulkhead tee gearbox (AMM 27-51-35/401) while you hold the coupling to keep the adjusted position.

NOTE: Try not to turn the coupling when you connect it. If you must turn the coupling to align the coupling screws, make no more than 1/6 of a turn in the clockwise or counterclockwise direction.

- (e) Connect the torque tube to the inboard coupling of the aileron droop angle gearbox (AMM 27-51-40/401) (Fig. 510).
- (f) Remove the clamp from the torque tube at the outboard side of the aileron droop angle gearbox (Fig. 509).

S 825-073

- (6) Adjust the flap mechanisms for the outboard flap with these steps:

- (a) If it is necessary to adjust the crank arm on the outboard mechanism (outboard flap), follow these steps to make the adjustment:

- 1) Find the minimum number of turns (and the direction that the coupling has to turn) to make the clearance for the RETRACT overtravel stop equal to the clearance of the symmetrical stop on the opposite wing (a tolerances of  $\pm 0.06$  inch (1.52 mm) is permitted).

NOTE: Turn the coupling counterclockwise to decrease (or clockwise to increase) the clearance to the stop.

A 1/3 turn of the coupling will change the clearance by 0.005 inch (0.127 mm).

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- 2) Disconnect the torque tube from the coupling on the inboard side of the (outboard flap) outboard rotary actuator (AMM 27-51-22/401) (Fig. 510).
- 3) Manually turn the rotary actuator coupling for the minimum number of turns calculated in the step before.
- 4) Connect the torque tube to the coupling on the inboard side of the outboard rotary actuator (AMM 27-51-22/401) while you hold the coupling to keep the adjusted position.

NOTE: Try not to turn the coupling when you connect the torque tube. If you must turn the coupling to align the coupling screws, make no more than 1/6 of a turn in the clockwise or counterclockwise direction.

- (b) If it is necessary to adjust the crank arm on the inboard mechanism (outboard flap), follow these steps to make the adjustment:
- 1) Find the minimum number of turns (and the direction that the coupling has to turn) to make the clearance for the RETRACT overtravel stop equal to the clearance of the symmetrical stop on the opposite wing (a tolerances of  $\pm 0.06$  inch ( $\pm 1.52$  mm) is permitted).

NOTE: Turn the coupling counterclockwise to decrease (or clockwise to increase) the clearance to the stop.

A 1/3 turn of the coupling will change the clearance by 0.005 inch (0.127 mm).

- 2) Disconnect the torque tube from the coupling on the inboard and outboard sides of the (outboard flap) inboard rotary actuator (AMM 27-51-22/401) (Fig. 510).
- 3) Manually turn the rotary actuator coupling on the inboard side of the inboard rotary actuator to the minimum number of turns calculated in the step before.

NOTE: Be careful not to turn the torque tube that is disconnected from the outboard side of the rotary actuator.

- 4) Connect the torque tube to the outboard coupling of the inboard rotary actuator (AMM 27-51-22/401) while you hold the coupling to keep the adjusted position.

NOTE: Try not to turn the coupling or the torque tube when you connect them together. If you must turn the coupling to align the coupling screws, make no more than 1/6 of a turn in the clockwise or counterclockwise direction.

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- 5) Connect the torque tube to the inboard coupling of the inboard rotary actuator (AMM 27-51-22/401) while you hold the coupling to keep the adjusted position.

NOTE: Try not to turn the coupling when you connect it. If you must turn the coupling to align the coupling screws, make no more than 1/6 of a turn in the clockwise or counterclockwise direction.

S 825-253

- (7) Do a check on the flap synchronization adjustment and compare the retract stop clearances to make sure that the flaps on the left and right wing are correctly synchronized.

S 425-254

- (8) Make sure to install a lockwire on the coupling screws for all the torque tubes that you disconnected.

N. Put the Airplane Back to Its Usual Condition

S 865-074

- (1) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 865-075

- (2) Remove electrical power (AMM 24-22-00/201).

S 415-076

- (3) If removed, install the access panels, 195JL and 196JR, for the left and right inboard flap mechanism (AMM 06-41-00/201).

S 415-077

- (4) If removed, install the access panels, 511BB and 611BB, for the outboard and inboard slat PDUs (AMM 06-44-00/201).

S 865-078

- (5) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 865-079

- (6) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J14, FLAP SHUTOFF
  - (d) 11J24, FLAPS ALTN CONT

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TASK 27-51-00-735-080

3. Flap Slat Electronics Unit - Test

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
  - 120 Main Equipment Center
  - 211/212 Control Cabin
- (2) Access Panel
  - 119AL Main Equipment Center

C. Prepare for the System Test

S 865-258

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

S 865-479

- (2) Make sure the COMPUTER switch on the EICAS DISPLAY select panel, P9, is in the L position.

S 215-257

- (3) Make sure the TE flaps and the LE slats are in the fully retracted position.

S 215-259

- (4) Make sure the flap control lever is in the zero (FLAPS UP) detent (Fig. 511).

S 015-088

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

D. AIRPLANES WITH A -53 OR EARLIER FSEU;

Test the Flap/Slat Electronics Unit (FSEU) (Fig. 503)

S 745-089

- (1) Push the TEST button on the front panel of the FSEU (E2 equipment rack, main equipment center) and make sure that all the lights come on.

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S 745-090

- (2) Push the BIT/VERIFY switch and look for the TEST COMPLETE light to come on. Make sure that no fault lights come on.

E. AIRPLANES WITH A -63 FSEU;

Test the Flap/Slat Electronics Unit (FSEU) (Fig. 503)

S 745-330

- (1) Do a test of the BITE display on the FSEU:
  - (a) Push the ON/OFF button on the front panel of the FSEU to turn on the display.

NOTE: The display will show "EXISTING FAULTS?"

- (b) Push the down arrow until GROUND TESTS? shows on the display.
- (c) Push the YES button to select GROUND TESTS? on the FSEU.
- (d) Push the down arrow until DISPLAY TEST? shows on the display.
- (e) Push the YES button to perform the DISPLAY TEST? on the FSEU.
- (f) Make sure the display characters on the front panel of the FSEU turn on in groups of four for approximately 2 seconds.

S 745-326

- (2) Do a check for EXISTING FAULTS with the FSEU:

S 865-421

- (3) Push the LE ALTN and TE ALTN arming switches in the flight compartment to arm the alternate flap/slat drive system and make sure the ALTN switch lights come on.

S 865-519

- (4) Make sure the "Alternate Flaps/Slat" selector switch is turned to the "UP" position.

S 215-422

- (5) Make sure the ALTN switches are in the armed positions.

NOTE: Do not run the test if the flaps are moving. Make sure the flap control lever is in the zero (FLAPS UP) detent (Fig. 511).

- (a) Push the menu button.

NOTE: The display will show EXISTING FAULTS?

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(b) Push the YES button to select the EXISTING FAULTS? test.

NOTE: The display will show TEST IN PROGRESS.

(c) The message "NO FAULTS" should show on the display.

NOTE: If "N FLTS FOUND" shows on the FSEU BITE display, where N is the number of faults detected, make a list of all the fault messages and maintenance message numbers. You can use the up and down arrow buttons to scroll through the list of messages.

(d) Do the corrective action shown in table A, for the faults found (FIM 27-51-00/101, Fig. 104A).

F. Put the Airplane Back to Its Usual Condition

S 415-091

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

S 865-481

- (2) Make sure the alternate flap arming switches for the flap and slat alternate drives in the flight compartment are set to off (ALTN switch lights off).

S 865-252

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

TASK 27-51-00-735-232

4. Flap/Stabilizer Position Module (FSPM) - Test

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels  
(2) AMM 24-22-00/201, Electrical Power - Control  
(3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

(1) Location Zones

120	Main Equipment Center
211/212	Control Cabin

(2) Access Panel

119AL	Main Equipment Center
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C. Prepare for the System Test

S 865-263

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

S 215-266

- (2) Make sure the COMPUTER switch on the EICAS DISPLAY select panel, P9, is in the L position.

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- S 215-267
- (3) Make sure the flaps and slats are in the fully retracted position.
- S 215-268
- (4) Make sure the flap control lever is in the zero (FLAPS UP) detent (Fig. 511).
- D. Test for the Flap/Stabilizer Position Module (FSPM)

**NOTE:** You can ignore the TE FLAP DISAGREE message on the EICAS display and the flap position indicator on the First Officer's Instrument Panel, P3-1, during this test. You can also ignore the TRAILING EDGE light on P3, unless it is identified in the test.

- S 015-093
- (1) Open the access door, 119AL, to get access to the main equipment center (AMM 06-41-00/201).
- S 865-095
- (2) Push the TE arming switch for the flap alternate drive to arm the flap alternate drive (ALTN switch light comes on).
- S 745-096
- (3) Push and hold the BITE/VERIFY test switch on the FSPM M839 (P50, E3, right forward equipment center) for a minimum of 60 seconds while you do these checks:
- (a) Make sure that no amber fault lights come on.
  - (b) Make sure the green TEST GOOD light comes on.
  - (c) Make sure this EICAS message, FLAP/SLAT ELEC, shows on the bottom EICAS display (on P2).
  - (d) Move the COMPUTER switch on the EICAS DISPLAY select panel to the R position and make sure that the FLAP/SLAT ELEC message stays on the EICAS display.
  - (e) Move the COMPUTER switch on the EICAS DISPLAY select panel to the L position.
- S 745-097
- (4) Release the BITE/VERIFY test switch and make sure the green TEST GOOD light goes out, and the FLAP/SLAT ELEC message does not show on the bottom EICAS display.
- S 745-098
- (5) Do the same test procedure for the FSPM M838 and M840.
- S 865-099
- (6) Push the TE arming switch for the flap alternate drive to disarm the flap alternate drive (ALTN switch light goes off).
- S 215-100
- (7) Make sure that the amber TRAILING EDGE light goes off.

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- S 215-101
- (8) Make sure the EICAS message, TE FLAP DISAGREE, does not show on the display screen in the flight compartment.

- S 865-102
- (9) Open these circuit breakers on the overhead panel, P11, and attach D0-NOT-CLOSE tags:
- (a) 11C14, FLAP/STAB POS SENSING C
  - (b) 11J17, FLAP/STAB POS SENSING L
  - (c) 11J26, FLAP/STAB POS SENSING R

- S 745-103
- (10) Push the BIT/VERIFY switch on the FSEU (E2, main equipment center), and do this check:
- (a) Make sure the green TESTING light comes on for 10 seconds, and then only the M838, M839, and M840 (L,C,R) FSPM lights come on at the FSEU.

- S 865-104
- (11) Remove the D0-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C14, FLAP/STAB POS SENSING C
  - (b) 11J17, FLAP/STAB POS SENSING L
  - (c) 11J26, FLAP/STAB POS SENSING R

- S 415-105
- (12) Close the access door, 119AL, for the main equipment center (AMM 06-41-00/201).

E. Put the Airplane Back to Its Usual Condition

- S 865-317
- (1) Remove electrical power (AMM 24-22-00/201).

TASK 27-51-00-735-233

5. Flap Control Lever Load - Test

- A. Equipment
- (1) Force Gage (0-50 pounds (0-200 newtons))
- B. References
- (1) AMM 24-22-00/201, Electrical Power - Control
  - (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- C. Access
- (1) Location Zones  
211/212 Control Cabin
- D. Prepare for the System Test

- S 865-269
- (1) Supply electrical power (AMM 24-22-00/201).

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S 215-270

- (2) Make sure the TE flaps and the LE slats are in the fully retracted position.

S 215-271

- (3) Make sure the flap control lever is in the zero (FLAPS UP) detent (Fig. 511).

E. Test for the Flap Control Lever Load (Fig. 511)

S 865-107

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (1) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 495-108

- (2) Attach a force gage at the top of the flap control lever (at 90 degree to the flap control lever) and do the steps that follow:
  - (a) Use the force gage to move the flap control lever to each detent from zero (FLAPS UP) to 30.

**NOTE:** Stop at each detent to permit the flaps to move to the position on the flap control lever.

- (b) Make sure the force is not more than 10 pounds (40 newtons) when you move the flap control lever to each detent.

**NOTE:** The force will be different at each detent from zero (FLAPS UP) to 30. The force from 25 to 20 is larger than the force between other positions due to the load produced by the slat power drive unit. The force from 1 to zero (FLAPS UP) is also larger due to the load produced from the cable system.

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- (c) Make sure the flap control lever does not move out of a detent without force applied.

NOTE: The lever can move a short distance with no force only at the zero detent, because of the free play in the cables.

- (d) Use the force gage to move the flap control lever to each detent from 30 to zero (FLAPS UP).

NOTE: Stop at each detent to permit the flaps to the move to the position on the flap control lever.

- (e) Make sure that the force is not more than 12 pounds (53 newtons) when you move the flap control lever to each detent.

NOTE: The force will be different at each detent from zero (FLAPS UP) to 30. The force from 25 to 20 is larger than the force between other positions due to the load produced by the slat power drive unit. The force from 1 to zero (FLAPS UP) is also larger due to the load produced from the cable system.

- (f) Make sure the flap control lever does not move out of a detent without force applied.

S 865-109

- (3) Remove the power from the center hydraulic power (AMM 29-11-00/201).  
F. Put the Airplane Back to Its Usual Condition

S 865-318

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

TASK 27-51-00-735-234

6. Flap and Slat Primary Drives and Position Indicating Systems - Test

NOTE: This test will also examine the operation of the flap/slat shutoff valve module and the krueger seal flap drive.

When you read the flap position indicator, a position tolerance of 0.03 inch (0.08 centimeter) is permitted for the L and R needles.

Unless it is specified in the test, make sure the amber LEADING EDGE and TRAILING EDGE lights do not show on the first officer's panel, P3, and that no messages associated with the flaps and slats show on the EICAS display during the test.

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control

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- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- B. Access
  - (1) Location Zones
    - 211/212 Control Cabin
- C. Prepare for the System Test
  - S 865-272
  - (1) Supply electrical power (AMM 24-22-00/201).
  - S 215-275
  - (2) Make sure the COMPUTER switch on the EICAS DISPLAY select panel, P9, is in the L position.
  - S 215-276
  - (3) Make sure the TE flaps and the LE slats are in the fully retracted position.
  - S 215-277
  - (4) Make sure the flap control lever is in the zero (FLAPS UP) detent (Fig. 511).
- D. Test for the Flap and Slat Primary Drives and Position Indicating Systems (Fig. 511)
  - S 865-111

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (1) Pressurize the center hydraulic system (AMM 29-11-00/201).
- S 215-112
- (2) Move the flap control lever to the 5-unit detent and do the checks that follow:
  - (a) While the slats extend:
    - 1) Make sure the flaps stay in the fully retracted position.
    - 2) Make sure the flap position indicator moves to a position between the UP-unit and 1-unit marks.
  - (b) When the slat movement stops:
    - 1) Make sure the slats are in the intermediate position.

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- 2) Make sure the flap position indicator is at the 1-unit mark.
  - 3) Make sure the Krueger seal flaps are in the extended position.
  - 4) Make sure the flaps start to extend to the 5-unit position.
- (c) When the flaps stop at the 5-unit position, make sure the flap position indicator moves to the 5-unit mark.

S 215-113

- (3) Move the flap control lever to the 15-unit detent and do the checks that follow:
- (a) While the flaps extend, make sure the flap position indicator starts to move to the 15-unit mark.
  - (b) When the flap movement stops:
    - 1) Make sure the flaps are in the 15-unit position.
    - 2) Make sure that the flap position indicator is at the 15-unit mark.
    - 3) Make sure the slats stay in the intermediate position.

S 215-114

- (4) Move the flap control lever to the 20-unit detent and do the checks that follow:
- (a) While the flaps extend, make sure the flap position indicator starts to move to the 20-unit mark.
  - (b) When the flap movement stops:
    - 1) Make sure the flaps are in the 20-unit position.
    - 2) Make sure the flap position indicator is at the 20-unit mark.
    - 3) Make sure the slats stay in the intermediate position.

S 215-115

- (5) Move the flap control lever to the 25-unit detent and do the checks that follow:
- (a) While the flaps and slats extend, make sure the flap position indicator starts to move to the 25-unit mark.
  - (b) When the flap and slat movement stops:
    - 1) Make sure the flaps are in the 25-unit position.
    - 2) Make sure the flap position indicator is at the 25-unit mark.
    - 3) Make sure the slats are in the fully extended position.
    - 4) Make sure the Krueger seal flaps are in the same position as the slats.

S 215-116

- (6) Move the flap control lever to the 30-unit detent and do the checks that follow:
- (a) While the flaps extend, make sure the flap position indicator starts to move to the 30-unit mark.
  - (b) When the flap movement stops:
    - 1) Make sure the flaps are in the 30-unit (fully extended) position.

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- 2) Make sure the flap position indicator is at the 30-unit mark.
- 3) Make sure the slats stay in the fully extended position.

S 215-117

- (7) Move the flap control lever to the 25-unit detent and do the checks that follow:
  - (a) While the flaps retract, make sure the flap position indicator starts to move to the 25-unit mark.
  - (b) When the flap movement stops:
    - 1) Make sure the flaps are in the 25-unit position.
    - 2) Make sure the flap position indicator points to the 25-unit mark.
    - 3) Make sure the slats stay in the fully extended position.

S 215-118

- (8) Move the flap control lever to the 20-unit detent and do the checks that follow:
  - (a) While the flaps and slats retract, make sure the flap position indicator starts to move to the 20-unit mark.
  - (b) When the flap and slat movement stops:
    - 1) Make sure the flaps are in the 20-unit position.
    - 2) Make sure the flap position indicator points to the 20-unit mark.
    - 3) Make sure the slats are in the intermediate position.
    - 4) Make sure the Krueger seal flaps are in the extended position.

S 215-119

- (9) Move the flap control lever to the 15-unit detent and do the checks that follow:
  - (a) While the flaps retract, make sure the flap position indicator starts to move to the 15-unit mark.
  - (b) When the flap movement stops:
    - 1) Make sure the flaps are in the 15-unit position.
    - 2) Make sure the flap position indicator points to the 15-unit mark.
    - 3) Make sure the slats stay in the intermediate position.

S 215-120

- (10) Move the flap control lever to the 5-unit detent and do the checks that follow:
  - (a) While the flaps retract, make sure the flap position indicator starts to move to the 5-unit mark.
  - (b) When the flap movement stops:
    - 1) Make sure the flaps are in the 5-unit position.
    - 2) Make sure the flap position indicator points to the 5-unit mark.
    - 3) Make sure the slats stay in the intermediate position.

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S 215-121

- (11) Move the flap control lever to the zero (FLAPS UP) detent and do the checks that follow:

**NOTE:** The flaps will move to the fully retracted position before the slats start to retract.

- (a) While the flaps retract, make sure the flap position indicator starts to move to the 1-unit mark.
- (b) When the flap movement stops:
  - 1) Make sure the flaps are in the fully retracted position.
  - 2) Make sure the flap position indicator points to the 1-unit mark.
  - 3) Make sure the slats start to retract.
- (c) While the slats retract, make sure the flap position indicator moves to a position between the 1-unit and UP-unit marks.
- (d) When the slat movement stops:
  - 1) Make sure the slats are in the fully retracted position.
  - 2) Make sure the flap position indicator points to the UP mark.
  - 3) Make sure the Krueger seal flaps are in the fully retracted position.

**NOTE:** If the krueger seal flaps do not agree with the movement and position of the slats, adjust the krueger seal flap drive (AMM 27-81-04/201).

S 865-122

- (12) Remove the power from the center hydraulic system (AMM 29-11-00/201).

E. Put the Airplane Back to Its Usual Condition

S 865-319

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

TASK 27-51-00-735-235

7. Flap Alternate Power and Drive - Test

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 500/600 Left Wing / Right Wing

C. Prepare for the System Test

S 865-278

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

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S 215-282

- (2) Make sure the TE flaps and the LE slats are in the fully retracted position.

S 215-283

- (3) Make sure the flap control lever is in the zero (FLAPS UP) detent (Fig. 511).

D. Test for the Flap Alternate Power and Drive (Fig. 511)

S 865-124

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (1) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 215-125

- (2) Push the TE arming switch for the flap alternate drive to arm the flap alternate drive. Do the checks that follow:
  - (a) Make sure the ALTN light on the arming switch comes on immediately.
  - (b) Make sure that these conditions occur in seven seconds after you push the arming switch:
    - 1) The amber TRAILING EDGE light comes on
    - 2) The EICAS message, TE FLAP DISAGREE, shows on the top display in the flight compartment.

S 215-126

- (3) Move the flap control lever to the 5-unit detent and do the checks that follow:
  - (a) Make sure the slats extend to the intermediate position.
  - (b) Make sure the flaps do not move.

S 865-127

- (4) Move the flap control lever to the zero (FLAPS UP) detent and make sure the slats move to the fully retracted position.

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S 865-128

- (5) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 865-129

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE FLAPS WHEN YOU OPERATE THE FLAP ALTERNATE DRIVE. THE ACCIDENTAL MOVEMENT OF THE FLAPS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

**CAUTION:** DO NOT OPERATE THE ALTERNATE DRIVE MOTOR CONTINUOUSLY FOR MORE THAN 4 MINUTES. DO NOT OPERATE THE MOTOR AGAIN UNTIL IT IS COOL FOR AT LEAST 20 MINUTES TO PREVENT DAMAGE TO THE MOTOR.

- (6) Turn the position selector switch for the flap/slat alternate drive to the 5-unit detent, and do the checks that follow:

**NOTE:** The amber TRAILING EDGE light will go off immediately when you turn the position selector switch out of the NORM position. The amber TRAILING EDGE light will stay off if the flaps extend correctly by the alternate drive. If the flaps take longer than the usual time to move to the position on the switch, the amber TRAILING EDGE light will come on again. This light will stay on until the flaps move to the position shown on the switch.

- (a) Make sure the flaps move to the 5-unit position.
- (b) Make sure the flap position indicator moves to the 5-unit mark.
- (c) Make sure the EICAS message, TE FLAP DISAGREE, does not show on the top display screen in the flight compartment.
- (d) Make sure the amber TRAILING EDGE light goes off.

S 215-130

- (7) Turn the position selector switch for the flap/slat alternate drive to the 15, 20, 25, and 30-unit detents, and do the checks that follow:

**NOTE:** Stop at each detent to permit the flaps to move to the position on the switch before you turn the switch to the subsequent detent.

- (a) Make sure the flap position indicator starts to move to the position shown on the selector switch while the flaps extend.

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- (b) Make sure the flap position indicator is at the correct position when the flap movement stops.

NOTE: It is usual for the flap position indicator to stop in a position between the 25 and 30-unit marks when the position selector switch is in the 30-unit detent.

S 215-131

- (8) Turn the position selector switch to the 25, 20, 15, 5, and UP-unit detents, and do the checks that follow:

NOTE: Stop at each detent to permit the flaps to move to the position on the switch before you turn the switch to the subsequent detent.

The flaps will not be in the fully retracted position when the flap position selector switch is in the UP position.

- (a) Make sure the flap position indicator starts to move to the position shown on the selector switch while the flaps retract.
- (b) Make sure the flap position indicator is at the correct position when the flap movement stops.

S 215-132

- (9) Turn the position selector switch to the NORM detent, and make sure that these conditions occur after seven seconds:
  - (a) The TRAILING EDGE light comes on
  - (b) The EICAS message, TE FLAP DISAGREE, shows on the top display screen in the flight compartment.

S 215-133

- (10) Push the TE arming switch for the flap alternate drive to disarm the flap alternate drive (ALTN switch light goes off), and do these checks:
  - (a) The amber TRAILING EDGE light goes off
  - (b) The EICAS message, TE FLAP DISAGREE, does not show on the top display screen in the flight compartment.

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S 865-134

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(11) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-135

(12) Move the flap control lever to the 5-unit detent and make sure the flaps move to the 5-unit position after the slats move to the intermediate position.

S 865-136

(13) Move the flap control lever to the zero (FLAPS UP) detent and make sure the flaps and slats move to the fully retracted position.

E. Put the Airplane Back to Its Usual Condition

S 865-137

(1) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 865-320

(2) Remove electrical power (AMM 24-22-00/201).

TASK 27-51-00-735-236

8. Flap Asymmetry Protection System - Test

A. Equipment

- (1) Spare Flap Position Transmitter No. 4 - M476  
(The Transmitter must be locked in the retracted rig position)
- (2) Rig Pin TE4 - P/N A20004-7,  
part of Set A20004-XX (AMM 20-10-24/201)
- (3) TE Flap PDU Lock - A27009-7

B. References

- (1) AMM 20-10-24/201, Rig Pins
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 32-00-15/201, Main Gear Door Locks
- (5) AMM 32-00-20/201, Landing Gear Downlock

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C. Access

(1) Location Zones

143/144	Left/Right MLG Wheel Well
211/212	Control Cabin
500/600	Left Wing / Right Wing
730/740	Left/Right Main Landing Gear and Doors

D. Prepare for the System Test

S 865-284

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

S 215-288

- (2) Make sure the TE flaps and the LE slats are in the fully retracted position.

S 215-289

- (3) Make sure the flap control lever is in the zero (FLAPS UP) detent (Fig. 511).

S 215-139

- (4) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 495-140

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT

- (5) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 865-141

- (6) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 495-142

- (7) Install the PDU lock in the TE flap PDU (Fig. 505).

E. Test for the Flap Asymmetry Protection System

S 845-143

- (1) Use the Procedure 1 or the Procedure 2 that follows to prepare the flap drive system for the asymmetry indication test:
- (a) Procedure 1:
- 1) Disconnect the torque tube at the coupling in the left hand MLG (main landing gear) wheel well, between the keel beam and the bulkhead tee gearbox (Fig. 504).

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- 2) Make a mark on the torque tube and the adjacent structure. This is to keep a record of the adjusted position for the subsequent installation.
- (b) Procedure 2:
- 1) Open these circuit breakers on the P11 panel:
    - a) 11C14, FLAP/STAB POS SENSING C
    - b) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR
  - 2) Remove the electrical connector from the flap position transmitter, No. 4 (M476), at the inboard rotary actuator on the left inboard flap.
  - 3) Install the electrical connector on a spare flap position transmitter, No. 4 (M476).
  - 4) Lock the spare transmitter in the retracted rig position with rig pin TE4 (Fig. 512).
  - 5) Close these circuit breakers on the P11 panel:
    - a) 11C14, FLAP/STAB POS SENSING C
    - b) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR

S 845-144

- (2) Prepare to count the number of turns of a torque tube with the recommended procedure that follows:

**NOTE:** It will be necessary to count the number of turns of a torque tube for the subsequent test.

- (a) Attach a long piece of string to the torque tube with tape and permit the string to wind around the torque tube when it turns.

**NOTE:** The number of winds of the string around the torque tube is the number of turns of the torque tube. Make sure you make a mark on the torque tube to identify the direction of the string and where to start the count.

If the string come loose or breaks during this test, it will be necessary to adjust the flap overtravel stops with the instructions given in the adjustment task.

S 095-145

- (3) Remove the PDU lock from the TE flap PDU (Fig. 505).

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S 865-146

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-147

- (5) Move the flap control lever to the 1-unit detent and permit the slats to move to the intermediate position.

S 215-148

- (6) Move the flap control lever to the 5-unit detent, and do the checks that follow:
- (a) Make sure that all flap movement stops after you move the flap control lever to the 5-unit detent.
  - (b) Make sure the amber TRAILING EDGE light comes on at the P3 panel (Fig. 511).
  - (c) Make sure this EICAS message, TE FLAP ASYM, shows on the display screen in the flight compartment.
  - (d) Make sure the EICAS message, TE FLAP DISAGREE, does not show on the display screen in the flight compartment.
  - (e) Turn the COMPUTER switch on the EICAS DISPLAY select panel to the R position and make sure the TE FLAP ASYM message does not change.
  - (f) Turn the COMPUTER switch on the EICAS DISPLAY select panel back to the L position.
  - (g) Make sure the torque tube for the flap drive turned no more than 43 1/4 times before the drive system shutdown.

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S 865-522

- (7) Open the following circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:  
(a) 11G16, FLAP SLAT ELEC UNIT 2 CONT

S 215-523

- (8) Turn the alternate flap selector switch to the 5-unit detent and verify that the flaps do not move.

**NOTE:** If the flaps move, the ALTN TE FLAPS ARM (K361) relay has failed in the energized position. This relay is located in the P33 panel. Replace before continuing the test.

S 865-524

- (9) Turn the alternate flap selector switch to the NORM detent.

S 865-149

- (10) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:  
(a) 11C16, FLAP SLAT ELEC UNIT 1 CONT  
(b) 11G23, FLAP SLAT ELEC UNIT 3 CONT

S 215-150

- (11) Make sure the EICAS message, TE FLAP ASYM, does not show on the display screen in the flight compartment.

S 215-151

- (12) Make sure the amber TRAILING EDGE light goes out.

S 215-152

- (13) Make sure the manual override lever on the PDU bypass valve is in the No. 1 (bypass) position (Detail F, Fig. 501).

S 865-153

- (14) Move the flap control lever to the 1-unit detent.

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S 865-154

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE FLAPS AND SLATS IN THE SUBSEQUENT STEP. THE FLAPS CAN MOVE ACCIDENTALLY AND CAUSE INJURE TO PERSONS OR DAMAGE TO EQUIPMENT.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (15) Move the manual override lever on the PDU bypass valve to the No. 2 (NORMAL) position and do the check that follows:
- (a) Make sure the torque tube turns no more than 43 1/4 times as the flaps move to the fully retracted position.

**NOTE:** If you disconnected the torque tube (with Procedure 1), make sure that the torque tube turns back the same number of times as the flaps extended before. This is to make sure the flap drive moves back to the adjusted position.

S 865-155

- (16) Do the steps that follow when the flaps stop at the fully retracted position:
- (a) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
    - 1) 11C16, FLAP SLAT ELEC UNIT 1 CONT
    - 2) 11G16, FLAP SLAT ELEC UNIT 2 CONT
    - 3) 11G23, FLAP SLAT ELEC UNIT 3 CONT

S 865-156

- (17) Push the ALTN TE arming switch for the flap alternate drive in the flight compartment to arm the flap alternate drive, and make sure the ALTN switch light comes on.

S 865-157

- (18) Push the ALTN TE arming switch for the flap alternate drive again to disarm the flap alternate drive, and make sure the ALTN switch light goes off.

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S 865-158

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE FLAPS AND SLATS FOR THE SUBSEQUENT STEP. THE FLAPS AND SLATS CAN ACCIDENTALLY MOVE AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(19) Move the flap control lever to the zero (FLAPS UP) detent and permit the slats to move to the fully retracted position.

S 865-159

(20) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 495-160

(21) Install the PDU lock on the TE flap PDU.

S 845-161

(22) Put the flap drive system back to the usual condition with the Procedure 1 or Procedure 2:

(a) Procedure 1 (with the torque tube disconnected between the keel beam and the bulkhead tee gearbox):

1) Make sure the torque tube turns back the same number of times as the flaps extended before.

**NOTE:** If the torque tube does not turn back the same number of times, or if you turn the disconnected torque tube accidentally, it will be necessary to adjust the flap retract overtravel stops with the procedures given in the adjustment task.

2) Align the marks that you made on the torque tube and the adjacent structure, and connect the torque tube at the coupling in the left MLG wheel well (Fig. 504).

(b) Method 2 (with the spare flap position transmitter):

1) Open these circuit breakers on the P11 panel:

- a) 11C14, FLAP/STAB POS SENSING C
- b) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR

2) Remove the rig pin TE4 from the spare position transmitter, No. 4 (M476) (Fig. 512).

3) Disconnect the electrical connector from the spare position transmitter No. 4.

4) Connect the electrical connector back to the flap position transmitter on the airplane (No. 4, M476), at the inboard rotary actuator of the left inboard flap.

5) Close these circuit breakers on the P11 panel:

- a) 11C14, FLAP/STAB POS SENSING C
- b) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR

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F. Put the Airplane Back to Its Usual Condition

S 095-162

- (1) Remove the PDU Lock on the TE flap PDU.

S 095-247

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 865-221

- (3) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 865-321

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

TASK 27-51-00-735-476

9. AIRPLANES WITH A -53 OR EARLIER FSEU;

Flap Load Alleviation System - Test

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(3) AMM 34-11-00/201, Pitot-Static (Pressurization)  
(4) AMM 34-12-00/501, Air Data Computing System

B. Access

(1) Location Zones

120	Main Equipment Center
144	Right MLG Wheel Well
211/212	Control Cabin
500/600	Left Wing / Right Wing

C. Prepare for the System Test

S 865-290

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

S 215-293

- (2) Make sure the COMPUTER switch on the EICAS DISPLAY select panel, P9, is in the L position.

S 215-294

- (3) Make sure the TE flaps and the LE slats are in the fully retracted position.

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S 215-295

- (4) Make sure the flap control lever is in the zero (FLAPS UP) detent (Fig. 511).

D. Test for the Flap Load Alleviation System

**NOTE:** For this test, a tolerance of two needle widths is permitted when you read the L and R needles on the flap position indicator on P3.

S 865-165

- (1) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
  - (a) 6K14, PITOT PROBE HT CAPT PHASE A
  - (b) 6K15, PITOT PROBE HT CAPT PHASE B
  - (c) 6K16, PITOT PROBE HT R AUX PHASE B
  - (d) 6K17, PITOT PROBE HT R AUX PHASE C
  - (e) 6K20, PITOT PROBE HT L AUX PHASE C
  - (f) 6K21, PITOT PROBE HT L AUX PHASE B
  - (g) 6K22, PITOT PROBE HT F/O PHASE B
  - (h) 6K23, PITOT PROBE HT F/O PHASE A

S 865-166

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (2) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 215-223

- (3) Make sure you follow these precaution steps before you operate the pitot-static system (AMM 34-11-00/201):
  - (a) Do not apply more than 4.75 PSI gaged pressure.
  - (b) The rate that you apply or release the vacuum to a static system must be less than 5000 feet-per-minute.
  - (c) The rate that you apply or release the pressure to a pitot system must be less than 300 knots-per-minute.
  - (d) Install flow restrictors between the cutoff valve and the pitot-static system when it is necessary.

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(e) Do not decrease the absolute pressure in the auxiliary pitot systems NO.1 and NO.2 below the ambient pressure. Low pressure in the auxiliary pitot systems can cause damage to the elevator feel computer.

(f) Make sure the autopilot is off for this test.

S 865-167

(4) Pressurize the captain's PT and S1 (left) or the first officer's PT and S1 (right) pitot-static system to 140-150 knots airspeed (AMM 34-11-00/201).

S 445-168

(5) Activate the left ADC (if the captain's pitot static system is pressurized) or the right ADC (if the first officer's pitot-static system is pressurized) (AMM 34-12-00/501).

S 865-251

(6) Isolate the applicable left or right ADC:

**NOTE:** You must isolate the left or the right ADC for this test if you do not pressurize the two pitot static systems.

(a) Make sure the AIR DATA computer switches on the P1-1 and P3-3 panels are not armed in the alternate position.

(b) To isolate the left ADC,  
open this circuit breaker on the P11 panel:  
1) 11F30, AIR DATA COMPUTER R

(c) To isolate the right ADC,  
open this circuit breaker on the P11 panel:  
1) 11A10, AIR DATA COMPUTER L

S 715-169

(7) Do the operational test on the load alleviation system with the procedure that follows:

(a) Move the flap control lever to the 30-unit detent and permit the flaps and slats to move to the fully extended position.

(b) Slowly increase the pitot-static pressure to the airspeed shown in Table 501.

**NOTE:** Monitor the pitot-static pressure and keep a record of the airspeed at which the flaps retract.

1) SAS 050, 051;

Make sure these conditions occur while the airspeed increases:

a) The flaps retract to the 25-unit position.

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- b) The flap position indicator in the flight compartment moves to the 25-unit mark.
- 2) SAS 150-280;  
Make sure these conditions occur while the airspeed increases:
  - a) The flaps retract to the 20-unit position.
  - b) The L and R needles move to the 20-unit mark on the flap position indicator.

Table 501	
AIRPLANE EFFECTIVITY	PITOT-STATIC SYSTEM AIRSPEED
767-200	167-170 KNOTS
767-300	171-174 KNOTS

Table 502	
AIRPLANE EFFECTIVITY	PITOT-STATIC SYSTEM AIRSPEED
767-200	163-166 KNOTS
767-300	167-170 KNOTS

Table 503
PITOT-STATIC SYSTEM AIRSPEED
181-184 KNOTS

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Table 504
PITOT-STATIC SYSTEM AIRSPEED
177-180 KNOTS

- (c) Slowly decrease the pitot-static pressure to the airspeed shown in Table 502, and make sure these conditions occur while the airspeed decreases:

**NOTE:** Monitor the pitot-static pressure and keep a record of the airspeed at which the flaps extend.

- 1) The flaps extend to the 30-unit position.
  - 2) The L and R needles move to the 30-unit mark on the flap position indicator.
- (d) Make sure the flaps extend at a pitot-static airspeed 4 knots slower than the flaps retracted during the load relief condition.
- (e) SAS 150-280;  
Do the steps that follow:
- 1) Move the flap control lever to the 25-unit detent and permit the flaps to move to the 25-unit position.
  - 2) Increase the pitot-static pressure to the airspeed shown in Table 503, and do these checks:
    - a) Make sure the flaps retract to the 20-unit position.

**NOTE:** Monitor the pitot-static pressure and keep a record of the airspeed at which the flaps retract.

- b) Make sure that the flap position indicator moves to the 20-unit mark.
- 3) Decrease the pitot-static pressure to the airspeed shown in Table 504, and do these checks:
- a) Make sure the flaps extend to the 25-unit position.
  - b) Make sure the flap position indicator moves to the 25-unit mark.
- 4) Make sure the flaps extend at a pitot-static airspeed four knots slower than the flaps retracted during the load relief condition.
- 5) Decrease the airspeed to 140-150 knots.
- 6) Move the flap control lever to the 30-unit detent and permit the flaps to move to the fully extended position.

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S 715-170

- (8) Do a test on the load relief failure operation with the procedure that follows:
- (a) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11J13, FLAP LOAD RELIEF
  - (b) Move the flap control lever to the 30-unit detent and permit the flaps and slats to move to the fully extended position.
  - (c) Increase the pitot-static system pressure to the airspeed shown in Table 501 and do the checks that follow:
    - 1) Make sure the amber TRAILING EDGE light comes on.
    - 2) Make sure this EICAS message, FLAP LD RELIEF, shows on the top EICAS display.
    - 3) Make sure that there is no movement on the flaps.
  - (d) Turn the COMPUTER SWITCH on the EICAS DISPLAY select panel to the L position.
    - 1) Make sure the EICAS message, FLAP LD RELIEF, does not change on the EICAS display.
  - (e) Decrease the pitot-static system pressure to the airspeed shown in Table 502.
  - (f) Make sure the amber TRAILING EDGE light goes off.
  - (g) Make sure the EICAS message, FLAP LD RELIEF, does not show on the display in the flight compartment.
  - (h) SAS 150-280;  
Do the steps that follow:
    - 1) Move the flap control lever to the 25-unit detent and permit the flaps to move to the 25-unit position.
    - 2) Increase the pitot-static pressure to the airspeed shown in Table 503.
    - 3) Make sure that the amber TRAILING EDGE light comes on.
    - 4) Make sure this EICAS message, FLAP LD RELIEF, shows on the display in the flight compartment.
    - 5) Make sure the flaps do not move.
    - 6) Turn the COMPUTER SWITCH on the EICAS DISPLAY select panel, P9, to the R position.
    - 7) Decrease the pitot-static pressure to the airspeed shown in Table 504.
    - 8) Make sure the amber TRAILING EDGE Light goes off.
    - 9) Make sure the EICAS message, FLAP LD RELIEF, does not show on the top EICAS display.
  - (i) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - 1) 11J13, FLAP LOAD RELIEF
  - (j) SAS 050, 051;  
Do the steps that follow:
    - 1) Move the flap control lever to the 25-unit detent and permit the flaps to retract.
    - 2) Increase the pitot-static system pressure to the airspeed shown in Table 501.
    - 3) Make sure the flaps do not move.

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- 4) Move the flap control lever to the 20-, 15-, and 5-unit detents and permit the flaps to retract to each position.
  - 5) Make sure the movement of the flaps do not change because of the load relief signal.
- (k) SAS 150-280;
- Do the steps that follow:
- 1) Move the flap control lever to the 20-unit detent and permit the flaps to retract.
  - 2) Increase the pitot-static system pressure to the airspeed shown in Table 503.
  - 3) Make sure the movement of the flaps do not change because of the load relief signal.

S 215-224

- (9) Depressurize the captains PT and S1 (left) or the first officers PT and S1 (right) pitot-static system (AMM 34-11-00/201).

S 865-249

- (10) If you isolated the left ADC to do this test, close this circuit breaker on the P11 panel:
- (a) 11F30, AIR DATA COMPUTER R

S 865-250

- (11) If you isolated the right ADC to do this test, close this circuit breaker on the P11 panel:
- (a) 11A10, AIR DATA COMPUTER L

S 865-226

- (12) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
- (a) 6K14, PITOT PROBE HT CAPT PHASE A
  - (b) 6K15, PITOT PROBE HT CAPT PHASE B
  - (c) 6K16, PITOT PROBE HT R AUX PHASE B
  - (d) 6K17, PITOT PROBE HT R AUX PHASE C
  - (e) 6K20, PITOT PROBE HT L AUX PHASE C
  - (f) 6K21, PITOT PROBE HT L AUX PHASE B
  - (g) 6K22, PITOT PROBE HT F/O PHASE B
  - (h) 6K23, PITOT PROBE HT F/O PHASE A

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S 865-227

- (13) Move the flap control lever to the zero (FLAPS UP) detent and permit the flaps to move to the fully retracted position.

S 865-228

- (14) Turn the COMPUTER SWITCH on the EICAS DISPLAY select panel, P9, to the L position, if the switch is on the R position.

S 865-229

- (15) Remove the power from the center hydraulic system (AMM 29-11-00/201).

E. Put the Airplane Back to Its Usual Condition

S 865-322

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

TASK 27-51-00-735-238

10. Flap Failure Protection System - Test

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(3) AMM 32-00-15/201, Main Gear Door Locks  
(4) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
500/600	Left Wing / Right Wing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

C. Prepare for the System Test

S 865-296

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

S 865-485

- (2) Make sure the COMPUTER switch on the EICAS DISPLAY select panel, P9, is in the L position.

S 215-300

- (3) Make sure the TE flaps and the LE slats are in the fully retracted position.

S 215-301

- (4) Make sure the flap control lever is in the zero (FLAPS UP) detent (Fig. 511).

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S 215-173

- (5) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 495-174

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT

- (6) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

D. Test for the Flap Failure Protection System

S 865-175

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (1) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-176

- (2) Move the flap control lever to the 1-unit detent to move the slats to intermediate position while you keep the flap in the fully retracted position.

S 485-255

- (3) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-177

- (4) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 035-178

- (5) Remove the nut and washer from the bolt that attaches the control rod to the pilot input arm on the TE flap PDU (Detail E, Fig. 501).

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S 865-179

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(6) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 035-180

(7) Remove the bolt that attaches the control rod to the pilot input arm, but do not move the pilot input arm.

S 865-181

(8) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:  
(a) 11J14, FLAP SHUTOFF

S 985-182

(9) Move the pilot input arm to the extend direction, clockwise (View E, Fig. 501) approximately 15-20 degrees, and do these checks:  
(a) Make sure the flap movement stops when you move the pilot input arm.  
(b) Make sure the manual override lever moves to the No. 1 position (bypass) on the PDU bypass valve (Detail F, Fig. 501).  
(c) Make sure this EICAS message, TE FLAP SHUTDOWN, shows on the display in the flight compartment.  
(d) Turn the COMPUTER switch on the EICAS DISPLAY select panel, P9, to the R position.  
(e) Make sure this EICAS message, TE FLAP SHUTDOWN, stays on the display in the flight compartment.  
(f) Turn the COMPUTER switch on the EICAS DISPLAY select panel back to the L position.

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- (g) Make sure the flap position indicator stopped in an area between the 1-unit and 5-unit marks.

S 435-183

- (10) Move the pilot input arm back to the initial position and connect the control rod.

S 865-184

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE FLAPS AND SLATS IN THE SUBSEQUENT STEP. ACCIDENTAL MOVEMENT OF THE SLATS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (11) Remove the DO-NOT-OPERATE tag and move the flap control lever to the 5-unit detent, and do these checks:
  - (a) Make sure the amber TRAILING EDGE light comes on.

**NOTE:** This light and the TE FLAP DISAGREE message may already be on, otherwise they will show up in less than one minute.

- (b) Make sure this EICAS message, TE FLAP DISAGREE, shows on the display screen in the flight compartment.

S 865-185

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE FLAPS WHEN YOU OPERATE THE FLAP ALTERNATE DRIVE. ACCIDENTAL MOVEMENT OF THE FLAPS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (12) Push the TE arming switch for the flap alternate drive to arm the flap alternate drive (ALTN switch light comes on).

S 215-186

- (13) Push the TE arming switch for the flap alternate drive again to disarm the flap alternate drive (ALTN switch light goes off), and do these checks:
  - (a) Make sure the EICAS message, TE FLAP DISAGREE, does not show on the display screen in the flight compartment.
  - (b) Make sure the amber TRAILING EDGE light goes off when the flaps move to the 5-unit position.
  - (c) Make sure the EICAS message, TE FLAP SHUTDOWN, does not show on the display screen in the flight compartment.

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S 865-187

- (14) Move the flap control lever to the zero (FLAPS UP) detent and permit the flaps and the slats to move to the fully retracted position.

S 865-188

- (15) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 865-189

- (16) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:  
(a) 11J14, FLAP SHUTOFF

E. Put the Airplane Back to Its Usual Condition

S 095-221

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOORLOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 865-323

- (2) Remove electrical power (AMM 24-22-00/201).

TASK 27-51-00-735-239

11. Electrical Power Failure - Test

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 27-61-00/201, Spoiler/Speedbrake Control System  
(3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones  
211/212 Control Cabin  
500/600 Left Wing / Right Wing

C. Prepare for the System Test

S 865-302

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

S 215-303

- (2) Make sure the TE flaps and the LE slats are in the fully retracted position.

S 215-304

- (3) Make sure the flap control lever is in the zero (FLAPS UP) detent (Fig. 511).

D. Electrical Power Failure Test

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S 865-191

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (1) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 045-192

**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.

- (2) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 865-193

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

S 865-194

- (4) Move the flap control lever to the 5-unit detent and permit the slats to move to the intermediate position, and the flaps to move to the 5-unit position.

S 865-195

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

S 215-196

- (6) Make sure the position indicator points to the 5-unit mark.

S 865-197

- (7) Move the flap control lever to the zero (FLAPS UP) detent, and permit the flaps and slats to move to the fully retracted position.

S 865-198

- (8) Remove the power from the center hydraulic system (AMM 29-11-00/201).

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E. Put the Airplane Back to Its Usual Condition

S 865-248

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

TASK 27-51-00-735-240

12. FSEU Power Failure - Test

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Prepare for the System Test

S 865-305

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

S 215-308

- (2) Make sure the COMPUTER switch on the EICAS DISPLAY select panel, P9, is in the L position.

S 215-309

- (3) Make sure the TE flaps and the LE slats are in the fully retracted position.

S 215-310

- (4) Make sure the flap control lever is in the zero (FLAPS UP) detent (Fig. 511).

D. FSEU Power Failure Test

S 865-200

- (1) Open this circuit breaker on the P11 panel:
  - (a) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR

S 215-201

- (2) Make sure this EICAS message, FLAP/SLAT ELEC, shows on the display screen in the flight compartment.

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- S 865-202
- (3) Turn the COMPUTER switch on the EICAS DISPLAY select panel, P9, to the R position.
- S 215-203
- (4) Make sure the EICAS message, FLAP/SLAT ELEC, stays on the display screen in the flight compartment.
- S 865-204
- (5) Turn the COMPUTER switch on the EICAS DISPLAY select panel back to the L position.
- S 865-205
- (6) Close this circuit breaker on the P11 panel:  
(a) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR
- S 215-206
- (7) Make sure the EICAS message, FLAP/SLAT ELEC, does not show on the display screen in the flight compartment.
- S 865-207
- (8) Open this circuit breaker on the P11 panel:  
(a) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR
- S 215-208
- (9) Make sure this EICAS message, FLAP/SLAT ELEC, shows on the display screen in the flight compartment.
- S 865-209
- (10) Turn the COMPUTER switch on the EICAS DISPLAY select panel to the R position.
- S 215-210
- (11) Make sure the EICAS message, FLAP/SLAT ELEC, stays on the display screen in the flight compartment.

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S 865-211

- (12) Turn the COMPUTER switch on the EICAS DISPLAY select panel back to the L position.

S 865-212

- (13) Close this circuit breaker on the P11 panel:  
(a) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR

S 215-213

- (14) Make sure the EICAS message, FLAP/SLAT ELEC, does not show on the display screen in the flight compartment.

S 865-214

- (15) Open this circuit breaker on the P11 panel:  
(a) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR

S 215-215

- (16) Make sure this EICAS message, FLAP/SLAT ELEC, shows on the display screen in the flight compartment.

S 865-216

- (17) Turn the COMPUTER switch on the EICAS DISPLAY select panel to the R position.

S 215-217

- (18) Make sure the EICAS message, FLAP/SLAT ELEC, stays on the display screen in the flight compartment.

S 865-218

- (19) Turn the COMPUTER switch on the EICAS DISPLAY select panel back to the L position.

S 865-219

- (20) Close this circuit breaker on the P11 panel:  
(a) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR

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S 215-220

(21) Make sure the EICAS message, FLAP/SLAT ELEC, does not show on the display screen in the flight compartment.

E. Put the Airplane Back to Its Usual Condition

S 865-256

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

TASK 27-51-00-715-241

13. Flap/Slat Shutoff Valve - Test

NOTE: The data given in this task is necessary only for scheduled maintenance .

For this test, the flap degree-position refers to the inboard main flap. The outboard main flap will move approximately to the same degree position as the inboard main flap. When you read the flap position indicator, a position tolerance of 1/32 of an inch is permitted for the L and R needles.

During this test, make sure the amber LEADING EDGE and TRAILING EDGE lights on the first officer's main instrument panel, P3, do not show, and that there are no messages on the EICAS display.

A. References

(1) AMM 24-22-00/201, Electrical Power - Control

(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

(1) Location Zones

211/212 Control Cabin

500/600 Left Wing / Right Wing

C. Prepare for the System Test

S 865-311

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

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S 865-473

- (2) Make sure the COMPUTER switch on the EICAS DISPLAY select panel, P9, is in the L position.

S 215-315

- (3) Make sure the TE flaps and the LE slats are in the fully retracted position.

S 215-316

- (4) Make sure the flap control lever is in the zero (FLAPS UP) detent (Fig. 511).

D. Operational Test for the Flap/Slat Shutoff Valve Module

S 865-244

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (1) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 215-245

- (2) Move the flap control lever to the 5-unit detent and do the checks that follow:
  - (a) While the slats extend:
    - 1) Make sure the flaps stay in the fully retracted position.

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- 2) Make sure the flap position indicator moves to a position between the UP-unit and 1-unit marks.
- (b) When the slat movement stops:
  - 1) Make sure the slats are in the intermediate position.
  - 2) Make sure the flap position indicator is at the 1-unit mark.
  - 3) Make sure the flaps start to extend to the 5-unit position.
- (c) When the flaps stop at the 5-unit position, make sure the flap position indicator moves to the 5-unit mark.

S 215-246

- (3) Move the flap control lever to the zero (FLAPS UP) detent and do the checks that follow:

**NOTE:** The flaps will move to the fully retracted position before the slats start to retract.

- (a) While the flaps retract, make sure the flap position indicator starts to move to the 1-unit mark.
- (b) When the flap movement stops:
  - 1) Make sure the flaps are in the fully retracted position.
  - 2) Make sure the flap position indicator points to the 1-unit mark.
  - 3) Make sure the slats start to retract.
- (c) While the slats retract, make sure the flap position indicator moves to a position between the 1-unit and UP-unit marks.
- (d) When the slat movement stops:
  - 1) Make sure the slats are in the fully retracted position.
  - 2) Make sure the flap position indicator points to the UP mark.

E. Put the Airplane Back to Its Usual Condition

S 865-242

- (1) Remove the power from the center hydraulic system (AMM 29-11-00/201).

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S 865-243

- (2) Remove electrical power (AMM 24-22-00/201).

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14. AIRPLANES WITH A -63 FSEU;

Sensor Check BITE - Test

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) FIM 27-51-00/101 Trailing Edge Flap System - Fault Isolation Manual

B. Access

- (1) Location Zones
  - 120 Main Equipment Center
  - 211/212 Control Cabin

- (2) Access Panel

- 119AL Main Equipment Center

C. Prepare for the Sensor Check BITE Test

S 865-404

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

S 865-405

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 015-411

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

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D. Test the Sensor Check BITE with the FSEU (Fig. 503)

S 745-412

- (1) Push the ON/OFF button on the front panel of the FSEU to turn on the display.

NOTE: The display will show "EXISTING FAULTS?"

S 745-413

- (2) Push the NO button until GROUND TESTS? shows on the display.

S 745-414

- (3) Push the YES button to select GROUND TESTS? on the FSEU.

NOTE: LD RELIEF ACTR? will show on the display.

S 745-415

- (4) Push the NO button until "SENSOR CHECK?" shows on the display.

S 745-416

- (5) Push the YES button to perform the Sensor Check BITE test.

NOTE: TEST IN PROGRESS will show on the display.

S 745-417

- (6) If TEST PASSED shows on the display, the test is complete.

S 745-418

- (7) If "N FAULTS FOUND" shows on the display, do a check for EXISTING FAULTS with the FSEU:

NOTE: N is the number of faults detected during the Load Relief System Test. N is a number between 1 to 999.

- (a) Make a list of all the fault messages and maintenance message numbers.

NOTE: You can use the up and down arrow buttons to scroll through the list of messages.

- (b) Record the message number that shows.

NOTE: "FAULT DETAILS?" will show between each fault message.

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- (c) Push the YES button to select "MORE DETAILS?". The maintenance message number will show. Use the down arrow button to find the flight deck effect, type and status for the message.

NOTE: If you push the YES button with a maintenance message displayed, "SWITCH INACTIVE" will show and then the message name will show again.

- (d) Do the corrective action for the faults shown (FIM 27-51-00/101, Fig. 104, Table A).

E. Put the Airplane Back to Its Usual Condition

S 865-409

- (1) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 865-408

- (2) Remove electrical power (AMM 24-22-00/201).

S 415-410

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

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FLAP/SLAT ELECTRONICS UNIT – DESCRIPTION AND OPERATION

1. TE Flap and LE Slat Control

A. General

- (1) Flap/Slat Electronics Unit (FSEU) (Fig. 1)
  - (a) The FSEU is a microprocessor controlled unit designed to provide primary system sequencing, interlock, and protection circuits for the trailing edge flap and leading edge slat systems. It also provides for indication of flap and slat position and for system failure indication through EICAS messages. Flap and slat operation are controlled by the FSEU in alternate drive.
  - (b) The unit monitors the position and direction of motion of flaps and slats, and the position of the flap lever and the alternate position select switch. The microprocessor determines validity of the commands and of the movement of the surfaces. Output commands or fault indications are produced accordingly.
  - (c) The FSEU is divided into three sections, each with its own power supply and specific functions. Some crossfeed of data is used but the sections are primarily independent.
  - (d) Section 1 functions:
    - 1) Hydraulic system interlock
    - 2) Flap and slat asymmetry protection and indication
    - 3) Flap and slat failure (uncommanded motion) protection
    - 4) Flap load relief
  - (e) Section 2 functions:
    - 1) Flap and slat disagreement indications
    - 2) Flap load relief failure indication
    - 3) TE and LE light indications
  - (f) Section 3 functions:
    - 1) Flap and slat alternate drive control
  - (g) The 285T0049-53 and subsequent FSEUs have a different connector key arrangement than the 285T0049-50 and earlier FSEUs. The -53 FSEU can replace a -50 but a -50 cannot replace a -53 FSEU for installation in the E2 rack.

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- (h) The 285T0049-63 and subsequent FSEUs have a different connector key arrangement than the 285T0049-53 and earlier FSEUs. The -63 FSEU can replace a -53 but a -53 cannot replace a -63 FSEU for installation in the E2 rack.
- (i) ON AIRPLANES WITH FSEU POWER INPUT FILTERS;  
three power input filters are installed on the 28v ac power inputs to the FSEU to decrease high frequency noise and to give cleaner 28v ac inputs to the FSEU. If any of these filters becomes faulty, high frequency noise is transmitted by the 28v ac power inputs to the FSEU and the FLAP/SLAT ELEC message can be shown on the EICAS computer.

B. Control

- (1) Electrical Components Relating to the FSEU (refer to AMM 27-51-00/001, AMM 27-58-00/001, AMM 27-81-00/001, AMM 27-88-00/001, Description and Operation, for component illustrations)
  - (a) Flap Lever Position Transmitters (2) (Fig. 2)
    - 1) Two RVDTs (Rotary Variable Differential Transformers) located on the flap control lever position gearbox sense the position of the flap lever. RVDT #1 sends flap position to section 2 of the FSEU for use in flap disagree logic and flap load relief failure indication logic. RVDT #2 sends flap position to section 1 of FSEU for flap load relief, flap failure and flap asymmetry logic.
    - 2) The 28v ac excitation voltage for RVDTs #1 and #2 comes from FSEU section 2 and section 1 power supplies respectively.
  - (b) Flap Position Transmitters (Fig. 2)
    - 1) Five position transmitters provide inputs to the FSEU and FSPM (Flap Stabilizer Position Module) for flap asymmetry, flap position, and flap position needle indications. Transmitters are located at positions 1, 3, 4, 5, and 8.
    - 2) The transmitters at positions 1, 4, 5, and 8 contain resolvers for flap asymmetry detection. Each resolver has 28v ac applied independently to the rotor windings. A voltage is induced in both pairs of stator windings which is proportional to the angular displacement of the flap system. The induced stator voltages of each resolver are read by the FSEU which compares the signals of #1 to #8 and #4 to #5. The voltage difference of the resolvers being compared is seen by the FSEU as asymmetry.

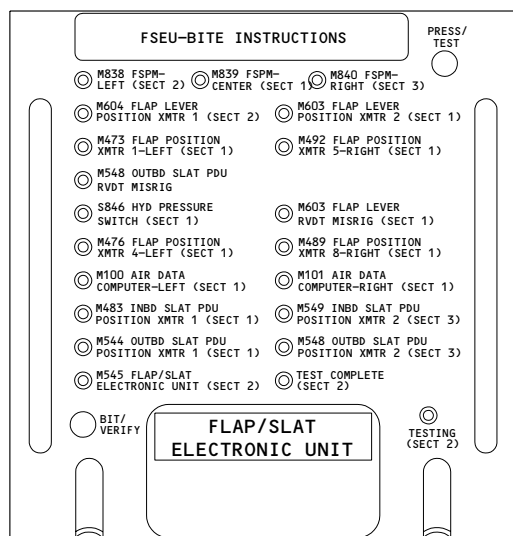
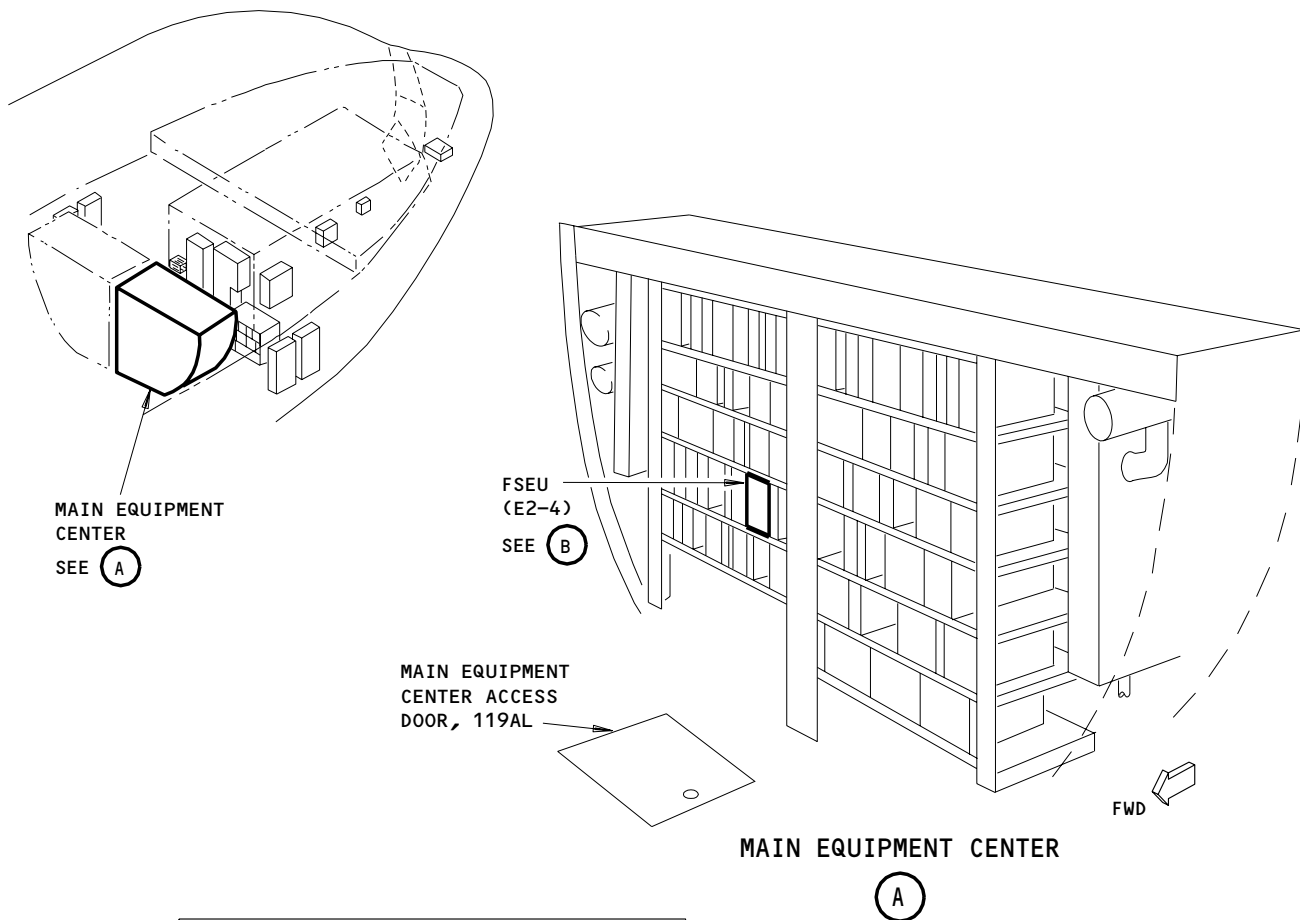
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FSEU

(B)

Flap/Slat Electronics Unit (FSEU)  
Figure 1 (Sheet 1)

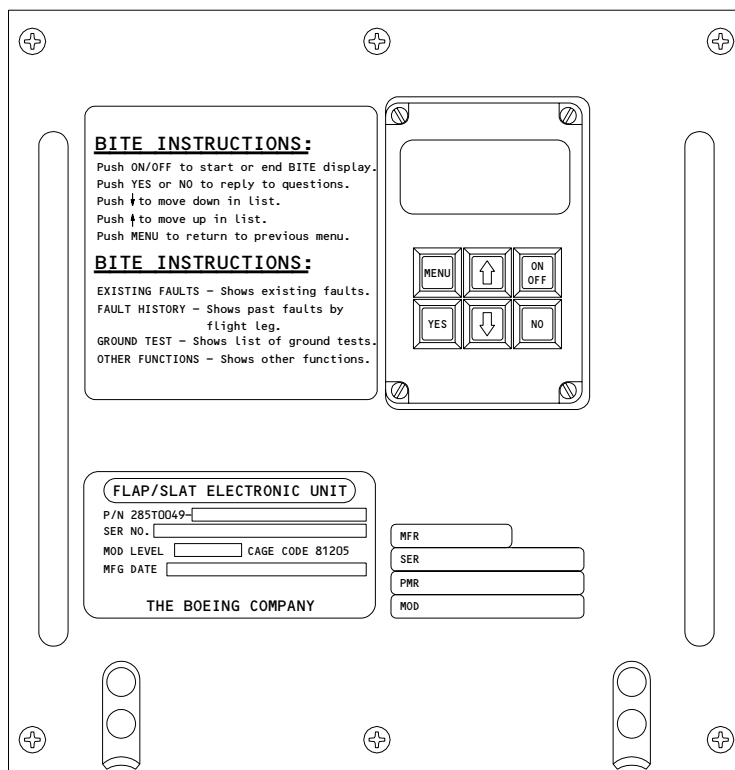
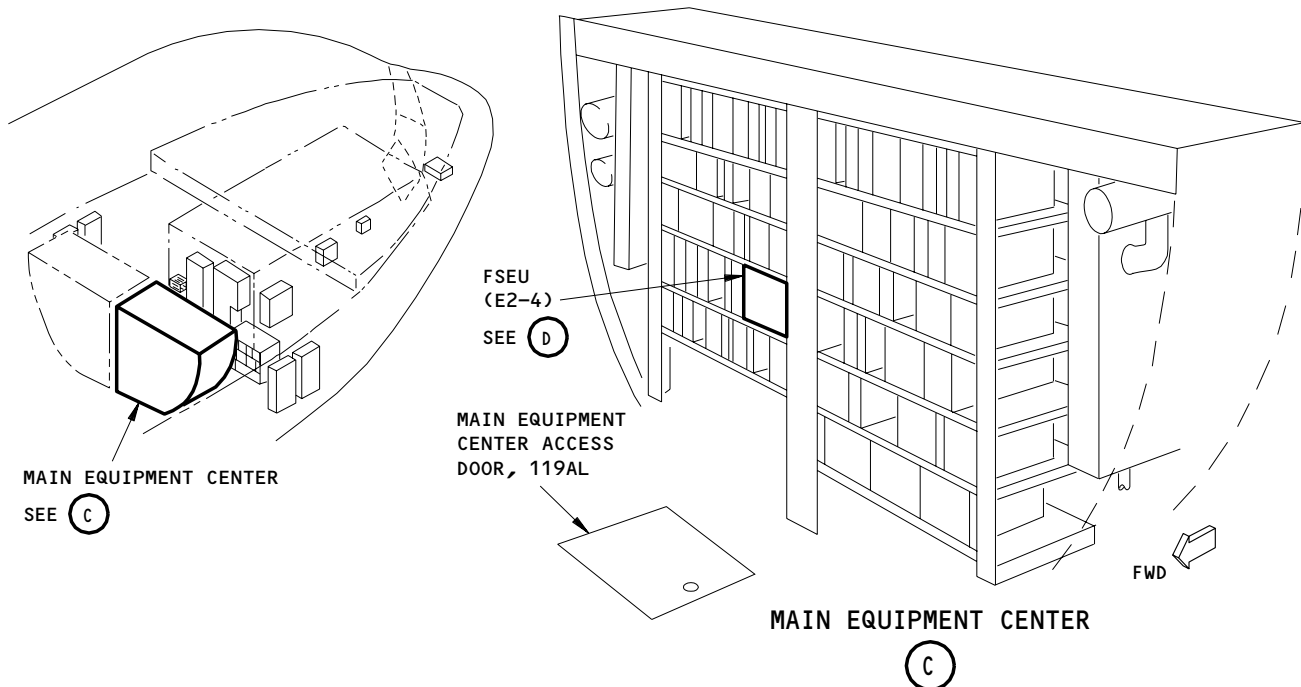
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AIRPLANES WITH A -53 FSEU

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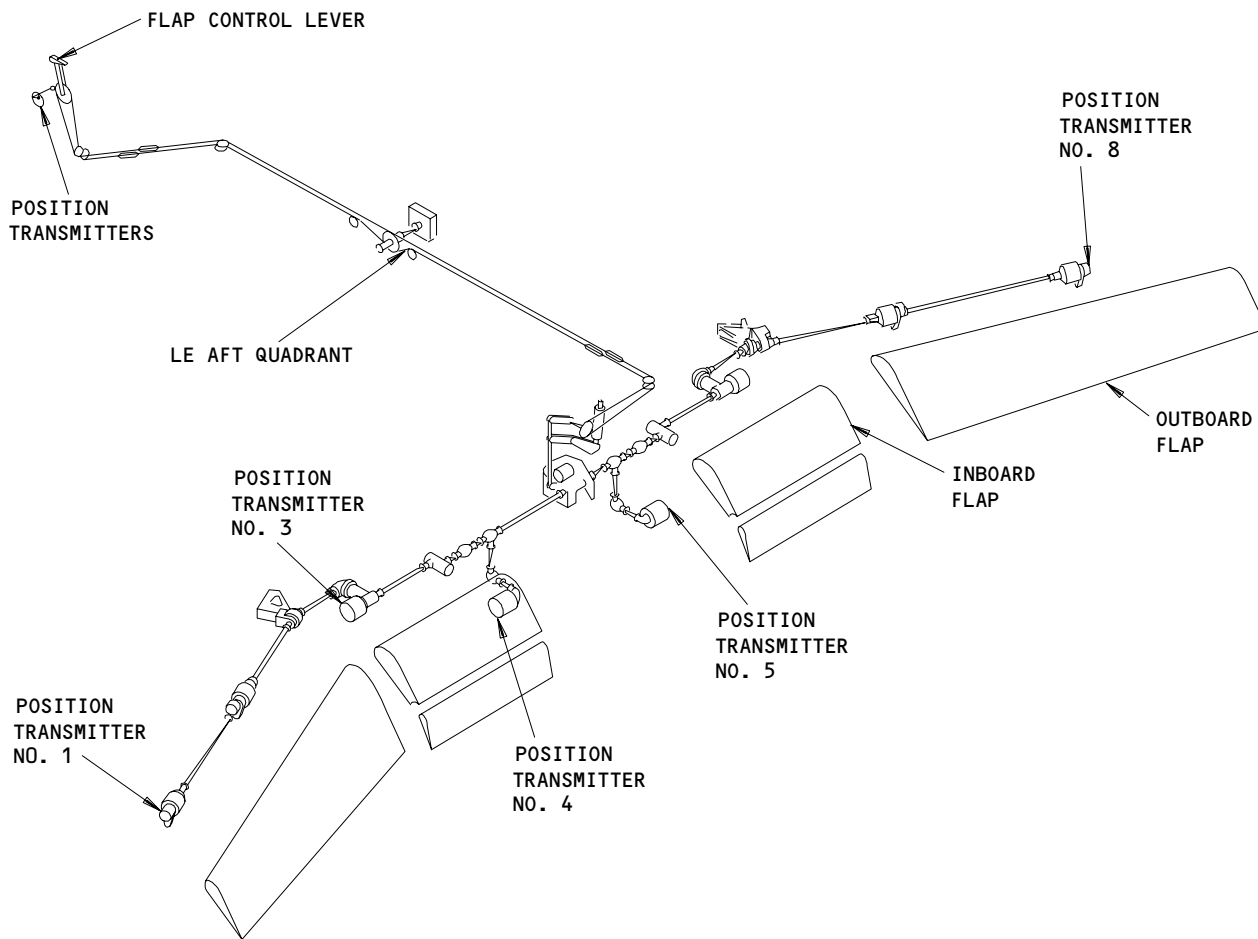
(AIRPLANES WITH A -63 FSEU)

(D)

Flap/Slat Electronics Unit (FSEU)  
Figure 1 (Sheet 2)

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AIRPLANES WITH A -63 FSEU

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TE Flap System Position Transmitters  
Figure 2

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- 3) Position transmitters 1 and 8 contain synchro windings in addition to the resolver. These windings are connected to the flap position indicator needles to show left and right flap position between 1 and 30. These signals do not pass through the FSEU. Power for the synchros comes from separate circuit breakers.
  - 4) Since there is no flap motion between "0" and "1", and no synchros monitoring slat position, motion from "0" to "1" is simulated by two synchros with fixed position indicating "1/2" or "0". The FSEU selects between flap synchros and reference synchros via relay based on flap and slat positions. The PSEU selects between "1/2" and "0" indication based on slat position.
  - 5) Transmitters 3 thru 5 have rotary variable differential transformers (RVDTs). Transmitters 3, 4, and 5 provide flap position information to the FSPMs (L, C, and R respectively) which changes the AC signal to DC and sends it to the FSEU (sections 2, 1, and 3 respectively).
- (c) Slat Power Drive Unit Position Transmitters (4)
- 1) Two position transmitters (RVDTs) are located on the outboard slat PDU and two on the inboard slat PDU. The #1 inboard and outboard RVDTs receive 28v ac excitation from FSEU section #1. Position data is returned for use in the LE slats shutoff valve logic and L stall warning logic.
  - 2) The #2 RVDTs receive 28v ac excitation from and provide position data to FSEU section 3. This is used in LE Slat Alternate Drive logic and R Stall Warning Logic.
- (d) Flap/Slat Alternate Drive Switches
- 1) Two pushbutton switch/lights are provided on the P3-1 panel, one for LE slats and one for TE flaps. A rotary switch, ALTN FLAPS, selects flap and/or slat position, in alternate drive mode, instead of the flap lever.
  - 2) The alternate arm switches drive the slat or flap bypass valves to bypass and arm external relays. Arm switches interface with the FSEU.

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- 3) AIRPLANES WITH A -63 OR SUBSEQUENT FSEU;  
The rotary switch position is monitored by sections two and three of the FSEU and is used whenever flap lever position would be used during primary drive. Flap position logic and alternate switch position are used to develop flap extend or retract commands. Slat extend or retract commands are developed from alternate switch position logic and inboard and outboard slat PDU position logic.
- (2) Electro-Mechanical Components Relating to the FSEU (refer to AMM 27-51-00/001, AMM 27-58-00/001, AMM 27-81-00/001, AMM 27-88-00/001, Description and Operation, for component illustrations)
  - (a) Power Drive Units (3)
    - 1) Three power drive units (PDUs) provide the power to extend and retract flaps and slats. One PDU each is provided for flaps, inboard slats, and outboard slats. Each PDU includes a hydraulic motor, electric motor and bypass valve. The slat PDUs also have position transmitters mentioned above.
    - 2) In Alternate Drive, three phase power is applied to the electric drive motors through relays which are controlled by the FSEU logic. Flap position and alternate switch position determine which direction the motor should turn. Reversal is achieved by swapping 2 phases of the input power. The motor stops when position logic shows the flaps and alternate switch position are equal.
  - (b) Shutoff Valves (2)
    - 1) Solenoid operated hydraulic shutoff valves, one for the slats and one for the flaps, are controlled by the FSEU through relays. The FSEU closes these valves, under certain conditions, to protect hydraulic devices and PDUs against erosion due to high pressure for long periods and to guard against undesirable aerodynamic configurations between flaps and slats. The slat shutoff valve also operates under FSEU control to shut down an uncommanded motion or asymmetry.

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- (c) Bypass Valves (3)
  - 1) One motor operated bypass valve is located on each PDU. In the NORM position, the valve allows normal operation of the PDU. In the BYPASS position, hydraulic fluid is routed around the valve. This occurs whenever an uncommanded motion or asymmetry is detected by the FSEU or when alternate drive is selected. The bypass valve is driven by the FSEU via relays for protection function and by the alternate arm switch when alternate drive is selected.
- (d) Load Relief Actuator
  - 1) ON 767-200 AIRPLANES;  
The motor-operated load relief actuator is located at the control cable input to the flap PDU. It is activated by the FSEU via relay when airspeed exceeds 30-unit flap lever detent safe airspeed and flap position is greater than 25. When activated, the load relief actuator retracts the flaps to 25 position. Flaps are extended again if airspeed drops to 4 knots below 30-unit flap lever detent safe airspeed.
  - 2) ON 767-300 AIRPLANES;  
The motor-operated load relief actuator is located at the control cable input to the flap PDU. It is activated by the FSEU via a relay when airspeed exceeds 25-unit or 30-unit flap lever detent safe airspeed and flap position is greater than 20 or 25 respectively. When activated, the load relief actuator retracts the flaps to 20-unit position. Flaps are extended again if airspeed drops to 4 knots below 25-unit or 30-unit flap lever detent safe airspeed.
- (3) Electronic Components Relating to the FSEU (refer to AMM 27-51-00/001, AMM 27-58-00/001, AMM 27-81-00/001, AMM 27-88-00/001, Description and Operation, for component illustration)
  - (a) Flap/Stabilizer Position Module (FSPM) (3)
    - 1) The left, center, and right FSPMs receive flap position information from the RVDT portions of flap position transmitter 3, 4, and 5 respectively. The RVDT excitation voltage (28v ac) comes from the applicable FSPM. This AC voltage is converted to a DC voltage by the FSPM and sent to the FSEU sections 2, 1, and 3 respectively.

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- (b) Proximity Switch Electronics Unit (PSEU)
  - 1) The PSEU senses slat position from proximity switch configuration and receives slat position commands (retracted, takeoff, landing) from the FSEU. These are compared by PSEU using proximity switch inputs and agreement or disagreement signals sent back to the FSEU. Inboard and outboard slat asymmetry signals are also sent to the FSEU from the PSEU. The PSEU controls the flap indicator needle, via relays and reference transmitters, in the intermediate (1/2 indication) and full up (0 indication) position.
- (c) Air Data Computer (ADC) (2)
  - 1) Both right and left air data computers (ADC) provide airspeed information to the FSEU for use in load relief command logic. Left ADC is primary. FSEU selects right ADC if left is invalid.
- (d) EICAS Display
  - 1) The FSEU logic provides grounds to the EICAS computers to display fault messages. The leading edge or trailing edge light (as applicable) on P3-1 panel is illuminated to alert the pilot to the EICAS message.
  - 2) EICAS Messages
    - a) ON 767-200 AIRPLANES;  
FLAP LD RELIEF - Displayed when load relief is commanded but flaps do not move to 25 position.
    - b) ON 767-300 AIRPLANES;  
FLAP LD RELIEF - Displayed when load relief is commanded but flaps do not move to 20-unit position from 25-unit position, or to 20-unit position from 30-unit position.
    - c) TE FLAP ASYM - Displayed if flaps reach an undesirably asymmetric condition.
    - d) TE FLAP DISAGREE - Displayed if flaps are not in commanded position and are not moving toward the commanded position.

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- e) LE SLAT ASYM - Displayed when asymmetry exists for more than 4 seconds in primary or 10 seconds in alternate drive. Also displayed when slats are shut down due to an asymmetry condition.
- f) LE SLAT DISAGREE - Displayed if slats are not in the commanded position and not moving toward the commanded position.
- g) FLAP/SLAT ELEC - Displayed whenever an RVDT , resolver, or FSPM fails, any FSPM is in BITE, or any section of the FSEU loses its 28V AC excitation voltage. The FLAP/SLAT ELEC message will also appear if one or more of these conditions occur:
  - Flap control lever RVDT misrig
  - Outboard LE slat PDU No.1 or No. 2 RVDT misrig
  - Inboard LE slat PDU No.1 RVDT No. 2 misrig
  - Slat shutoff valve failed, detected by the slat hydraulic pressure switch. - Slat hydraulic pressure switch failed.

NOTE: Misrig detection checks are active at altitude above 20,000 feet or when airspeed exceeds 270 knots.

Faults because of the slat shutoff valve failure, and slat hydraulic pressure switch failure are not latched.

Faults because of failures of the flap Lever RVDT No. 2 and inboard slat No. 2 are not latched.

- h) TE FLAP SHUTDOWN - Displayed whenever FSEU section 1 protection logic makes the TE flap PDU bypass valve move to BYPASS, except inhibited when a TE FLAP ASYM message is present in EICAS.
- i) LE SLAT SHUTDOWN - Displayed whenever FSEU section 1 protection logic makes either inboard or outboard LE slat PDU bypass valve move to BYPASS, except inhibited when a LE SLAT ASYM message is present in EICAS.

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- j) AIRPLANES WITH -603 AND SUBSEQUENT EICAS COMPUTERS;  
SLAT ISLN VAL - Displayed when the hydraulic pressure downstream of the slat shutoff valve is high while the slat shutoff valve is being commanded closed. This message detects a problem with the slat solenoid valve in the flap/slat shutoff valve module.

NOTE: The Signal Consolidation Card (SCC) must be installed for the EICAS computer to show this message.

- 3) Messages a) thru e) above are yellow caution messages and are displayed on the upper EICAS display; f) thru i) are white advisory messages and appear on the lower display. The following table lists these messages, except flap and slat advisory shutdown messages, and indicates the section of the FSEU responsible for generating the message.

FLAP/SLAT EICAS MESSAGE CHART

EICAS MESSAGE	FSEU SECT	FAULT	COMMENT
TE FLAP ASYM	1	FLAP ASYMMETRY	DISPLAYED IF FLAPS REACH AN UNDESIRABLY ASYMMETRIC CONFIGURATION.
TE FLAP DISAGREE	2	FLAP DISAGREEMENT	DISPLAYED IF FLAPS ARE NOT IN COMMANDED POSITION AND ARE NOT MOVING TO THAT POSITION.
ON 767-200 AIRPLANES, FLAP LD RELIEF	2	LOAD RELIEF INOP	DISPLAYED WHEN LOAD RELIEF IS COMMANDED BUT FLAPS DO NOT RETRACT TO 25 POSITION.

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ON 767-300 AIRPLANES, FLAP LD RELIEF	2	LOAD RELIEF INOP	DISPLAYED WHEN LOAD RELIEF IS COMMANDED BUT FLAPS DO NOT RETRACT TO 20 POSITION FROM 25 POSITION OR TO 20 POSITION FROM 30 POSITION.
LE SLAT ASYM	1	SLAT ASYMMETRY	DISPLAYED WHEN ASYMMETRY EXISTS FOR MORE THAN 4 SECONDS IN PRIMARY OR 10 SECONDS IN ALTERNATE DRIVE. ALSO DISPLAYED WHEN SLATS ARE SHUT DOWN DUE TO AN ASYMMETRIC CONDITION.
LE SLAT DISAGREE	2	SLAT DISAGREEMENT	DISPLAYED IF SLATS ARE NOT IN THE COMMANDED POSITION AND ARE NOT MOVING TOWARD THAT POSITION.

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FLAP/SLAT ELEC	1	INBOARD SLAT RVDT #1 FAIL OUTBOARD SLAT RVDT #1 FAIL FLAP LEVER RVDT #2 FAIL CENTER FSPM FAIL CENTER FSPM IN BITE LOSS OF 28V AC EXCITATION	ANY FAULT LISTED AT LEFT CAN GENERATE THE MESSAGE. EACH SECTION OF FSEU IS RESPONSIBLE FOR SPECIFIC FAULTS.
		AIRPLANES WITH A -32 AND ON FSEU; FLAP XMTR RESOLVER FAIL	
		AIRPLANES WITH A -53 AND ON FSEU; SLAT SHUTOFF VALVE OUTPUT FAIL SLAT HYD PRESSURE SWITCH FAIL FLAP LEVER RVDT NO. 2 MISRIG INBOARD SLAT RVDT NO. 1 MISRIG OUTBOARD SLAT RVDT NO. 1 MISRIG	

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FLAP/SLAT ELEC	1	INBOARD SLAT RVDT #1 FAIL OUTBOARD SLAT RVDT #1 FAIL FLAP LEVER RVDT #2 FAIL CENTER FSPM FAIL CENTER FSPM IN BITE LOSS OF 28V AC EXCITATION FLAP XMTR RESOLVER FAIL SLAT SHUTOFF VALVE OUTPUT FAIL SLAT HYD PRESSURE SWITCH FAIL FLAP LEVER RVDT NO. 2 MISRIG INBOARD SLAT RVDT NO. 1 MISRIG OUTBOARD SLAT RVDT NO. 1 MISRIG	ANY FAULT LISTED AT LEFT CAN GENERATE THE MESSAGE. EACH SECTION OF FSEU IS RESPONSIBLE FOR SPECIFIC FAULTS.
	2	FLAP LEVER RVDT #1 FAIL LEFT FSPM FAIL LEFT FSPM IN BITE LOSS OF 28V AC EXCITATION	
	3	INBOARD SLAT RVDT #2 FAIL OUTBOARD SLAT RVDT #2 FAIL RIGHT FSPM FAIL RIGHT FSPM IN BITE LOSS OF 28V AC EXCITATION OUTBD SLAT PDU RVDT NO. 2 MISRIG	

(4) FSEU Logic Description (refer to AMM 27-51-00/001, AMM 27-58-00/001, AMM 27-81-00/001, AMM 27-88-00/001, Description and Operation, for schematics with logic diagrams).

(a) TE Flaps Shutoff Valve Logic

- 1) Flap shutoff logic is generated whenever the flaps and flap lever have been in the full UP position for more than 30 seconds. This does not apply to lever position "1" although it is considered a "flaps up" detent.

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- 2) Shutoff logic is also generated when the flap lever is moved out of the UP position (to extend flaps) and the inboard or outboard slats have not reached takeoff position.
  - 3) Shutoff logic will not be generated under the above condition if the C FSPM fails (cond 1) or slat PDU RVDTs fail (cond 2). The logic will not be generated if Lever RVDT #2 fails or 28v ac excitation to FSEU (section 1) fails.
  - 4) AIRPLANES WITH A -63 OR SUBSEQUENT FSEU;  
Shutoff logic is generated as a redundant shutdown of flap asymmetry or uncommanded motion.
- (b) Flap Load Relief Logic
- 1) ON 767-200 AIRPLANES;  
Flap load relief logic is generated when the flap lever is greater than 25, the flaps are equal to or greater than 25 and airspeed is greater than 30-unit flap lever detent safe airspeed.
  - 2) ON 767-300 AIRPLANES;  
Flap load relief logic is generated when the flap lever is greater than 25, the flaps are equal to or greater than 20 and airspeed is greater than 30-unit flap lever detent safe airspeed. Or when the flap lever is 25, the flaps are equal to or greater than 20 and airspeed is greater than 25-unit flap lever detent safe airspeed.
  - 3) Load relief logic will not be commanded if data from both ADCs is bad. If already generated when ADCs malfunction, load relief logic will remain until the flap lever is moved.
  - 4) Load relief logic will not be generated if the C FSPM, lever RVDT #2 or 28v ac excitation to FSEU (section 1) fails or when the alternate flap drive system is armed. If one of these conditions occur after load relief logic is generated, the logic will be removed.
- (c) Load Relief Inop Indication Logic
- 1) ON 767-200 AIRPLANES;  
The load relief inop indication logic initiates the EICAS message FLAP LD RELIEF. The logic is generated when load relief is commanded and flaps are greater than 25 and are either extending or not moving.
  - 2) ON 767-300 AIRPLANES;  
The load relief inop indication logic initiates the EICAS message FLAP LD RELIEF. The logic is generated when load relief is commanded and flaps are greater than 20 and are either extending or not moving.
  - 3) Load relief inop logic is inhibited if the L FSPM or 28v ac excitation to FSEU (section 2) fails.

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- (d) Flap Asymmetry Indication Logic
- 1) The flap asymmetry indication logic initiates the EICAS message TE FLAP ASYM. The logic is generated when output voltage of any pair of resolvers exceeds the prescribed value. The logic is reset by cycling the TE alternate drive arm switch or by retracting the TE flaps. If asymmetry still exists, logic and EICAS message will be regenerated.
  - 2) Flap asymmetry indication logic will not be generated if 28v ac excitation to FSEU (section 1) has failed or the FSEU has failed.
  - 3) AIRPLANES WITH A -63 OR SUBSEQUENT FSEU; the FSEU will not generate the flap asymmetry indication logic if exactly one resolver on the left, right, or both wings is failed.
- (e) Flap Failure and Asymmetry Protection Logic
- 1) The bypass valve on the flap PDU is controlled by two logic signals from the FSEU. Flap fail and asymmetry logic is generated to drive the valve into the bypass position when an uncommanded motion is detected or asymmetry occurs. Flap bypass in norm logic is generated whenever the fail and asymmetry logic is zero.
  - 2) Asymmetry is detected by resolvers and monitored by flap asymmetry and indication logic (above).
  - 3) Uncommanded motion, or motion away from commanded position, is detected in two ways:
    - a) When flaps and lever agree, a flag is set. (The flag is reset if flap lever is moved.) If a disagree condition is detected and lever position has not changed, the protection logic is generated and PDU is bypassed.
    - b) If flap lever is moved and motion of flaps is in the wrong direction, protection logic is generated and PDU is bypassed.
  - 4) If neither logic signal is generated, external relays latch the bypass valve into its current position.
  - 5) Both logic signals are inhibited if the C FSPM, lever RVDT #2, or 28v ac excitation to FSEU (section 1) have failed or when the alternate flap system is armed.
- (f) Flap and Slat Position Indication Logic
- 1) The FSEU generates reference transmitter select logic when flaps are retracted and inboard or outboard slats are less than takeoff position. Needle indication is at "1/2". This logic is not generated if 28v ac excitation to FSEU (section 3) or R FSPM fails.
  - 2) The PSEU generates all slats retracted logic to select "0" indication, via relay, from the fixed synchro when slats are in fully retracted position.

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- (g) Flap Disagree Indication Logic
  - 1) Flap disagree indication logic initiates the EICAS message TE FLAP DISAGREE when the flaps are not in the commanded position and not moving toward that position.
  - 2) Flap position cannot be detected between "UP" and "5" so time delays are employed under the following conditions before logic is produced. Time delays differ for type of drive.
    - a) Flaps remain in "UP" position for too long (12 sec, primary; 20 sec, altn) and flap lever or alternate select switch is in some other position.
    - b) Flaps remain between "UP" and "5", or in "UP", for too long (45 sec, primary; 150 sec, alternate) and Lever or alternate select switch is in some other position.
  - 3) Flap disagree indication logic and EICAS message are also generated in alternate flap drive if the alternate select switch is in "NORM" or more than one switch position is grounded for more than 7 seconds.
  - 4) Flap disagree logic and TE FLAP DISAGREE message are inhibited if L FSPM, program pins, the FSEU, or 28v ac excitation to FSEU (section 2) have failed or when the EICAS message TE FLAP ASYM is displayed. In primary mode, the disagree logic is inhibited if the flap lever #1 RVDT is failed. The disagree logic and message are also inhibited when flaps are commanded to extend and the slats have not reached takeoff position. (Slats must deploy first so disagreement in flaps and commanded position is not considered significant at that point.)
- (h) Trailing Edge Light Logic
  - 1) Flap light logic provides a ground to the TE LIGHT to alert the crew to any of the following EICAS messages.
    - a) TE FLAP DISAGREE
    - b) TE FLAP ASYM
    - c) FLAP LD RELIEF
- (i) Flap Alternate Drive Logic
  - 1) Flap extend enable logic or flap retract enable logic is generated in alternate drive when FSPM voltage representing flap position is outside the range for detent selected by the alternate position select switch. The logic signal grounds the alternate flaps extend or alternate flaps retract relay. When one relay is energized the other is locked out.

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- 2) No drive logic can be generated until alternate position switch has been out of NORM for one second. Logic is also inhibited if the FSEU, R FSPM or 28v ac excitation to FSEU (section 3) has failed, or if the R FSPM is in BITE, or if more than one switch position is grounded.
- (j) LE Slat Shutoff Valve Logic
- 1) Slat shutoff logic is generated whenever the slats and flap lever have been in the same position for 30 seconds.
  - 2) Logic is generated when flap lever is moved from "1" to "UP" and flaps are not fully retracted. Shutoff prevents slats from moving until flaps are full up.
  - 3) Shutoff logic is also generated when slats and lever are in a takeoff position other than "1". This prevents slats from moving slightly when flap lever is moved to "UP" position and valve has not closed yet due to condition 2) above. (If movement of slats were to occur under these conditions, an uncommanded motion shutdown would occur using bypass valve. Such a shutdown in this case would be unjustified.)
  - 4) AIRPLANES WITH A -63 OR SUBSEQUENT FSEU;  
Shutoff logic is also generated as a redundant shutdown of slat asymmetry or uncommanded motion.
  - 5) Shutoff valve logic will not be generated in conditions 2) and 3) if C FSPM fails. If Lever RVDT #1, slat PDU RVDTs or 28v ac excitation to FSEU (section 1) fails, shutoff valve logic will not be generated.
- (k) Slat Asymmetry Indication Logic
- 1) Slat asymmetry indication logic initiates EICAS message LE SLAT ASYM. The logic is generated whenever an asymmetry condition exists, as detected by the proximity switches, for more than 4 seconds in primary or 10 seconds in alternate drive. An asymmetry indication does not result in shutdown until the lever is subsequently moved.
  - 2) The logic is inhibited if 28v ac excitation voltage to FSEU (section 1) fails.

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- (L) Slat Failure and Asymmetry Protection Logic
- 1) Inboard and outboard slats are driven by separate PDUs, but logic signals and operation of bypass valves is the same for both. Therefore both will be covered together.
  - 2) The bypass valve on the slat PDU is controlled by two logic signals from the FSEU. Inbd (outbd) fail and asymmetry logic is generated to drive the valve into the bypass position when an uncommanded motion is detected or asymmetry occurs. Inbd (outbd) bypass valve in norm logic is generated whenever the fail and asymmetry logic is zero.
  - 3) Asymmetry is detected by the PSEU from proximity switches and passed to FSEU every time a slat position is left or entered. To avoid shutting down the slats under these conditions, a flag is set when slats and flap lever agree and an asymmetry exists (reset when asymmetry is gone). If the flag is still set when flap lever is moved again, the slats are shut down (inbd (outbd) fail and asymmetry logic is generated).
  - 4) Uncommanded motion is related to shutdown of slats as follows:
    - a) Motion for two seconds, away from commanded position is interpreted as uncommanded motion by the FSEU and causes shutdown of slats.
    - b) When flaps have been commanded to UP by flap lever in zero (FLAPS UP) detent, slats will not retract from takeoff position (slat position signal from outboard slats) until flaps are fully retracted, due to closure of slat shutoff valve. If slat shutoff valve fails to close and inboard and outboard slat motion occurs, an uncommanded motion condition exists, but the FSEU will not recognize this and the FSEU will not generate logic to close the bypass valve on the inboard slat PDU and the outboard slat PDU.
  - 5) If neither logic signal is generated, external relays latch the bypass valve into its current position. This would occur when in alternate drive or one of the failures below has occurred.

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- 6) Both logic signals are inhibited if the FSEU, flap Lever RVDT #2, inbd (outbd) PDU RVDT or 28v ac excitation to FSEU (section 1) has failed. Failure of FSPM also inhibits case b) of uncommanded motion (above).
- (m) Slat Disagree Indication Logic
- 1) Slat disagree indication logic initiates the EICAS message LE SLAT DISAGREE when slats are not in the commanded position and are not moving toward that position.
  - 2) Three slat command outputs (retract, takeoff, landing) from FSEU (section 1) tell the PSEU where the slats should be. The PSEU returns a signal to FSEU (section 2) to indicate agreement/disagreement. The FSEU also determines whether the slat PDUs are at or moving toward the commanded position. The FSEU (section 2) uses this information to enable or inhibit disagree logic and EICAS message as applicable.
  - 3) The slat disagree indication logic and EICAS disagree message are also generated in alternate slat drive if the alternate position switch is in "NORM" or more than one switch position is grounded for more than 7 seconds.
  - 4) The logic and message are inhibited under various conditions:
    - a) When slats are commanded to retract and flaps are not yet fully up.
    - b) When both inboard and outboard slats are moving toward the command, or when one is at the position and the other is still moving (but not when RVDTs indicate both are in commanded position). This allows final agreement determination to rest with the proximity switches.
    - c) When flap lever RVDT #1 or 28v ac excitation to FSEU (section 2) has failed or section 2 excitation has failed in primary or section 3 excitation has failed in alternate.
    - d) When inboard slat PDU RVDT #1 or outboard slat PDU RVDT #1 has failed.

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- (n) Slat Alternate Drive Logic
  - 1) Inboard and outboard slats are driven by separate PDUs but logic signals and operation of alternate drive system is the same for both. Therefore, both will be covered together.
  - 2) Slat extend enable logic or slat retract enable logic is generated in alternate drive when slat PDU RVDT #2 voltage is outside the range for the detent selected by the alternate position switch and continues until voltage is at or past the center of that range. The logic grounds the alternate slat extend or alternate slat retract relay. When one relay is energized, the other is locked out.
  - 3) No drive logic can be generated until alternate position switch has been out of NORM for one second. Logic is also inhibited if command position is "UP" and flaps have not fully retracted. Slat PDU RVDT #2 failure, loss of 28v ac excitation to FSEU (section 3), or more than one alternate switch position grounded will inhibit slat alternate drive logic.
- (o) Leading Edge Light Logic
  - 1) Slat light logic provides a ground to the LE LIGHT to alert the crew to the following EICAS messages.
    - a) LE SLAT DISAGREE
    - b) LE SLAT ASYM
- (p) FSEU Fail Logic
  - 1) Each section of the FSEU can generate the FSEU fail logic which initiates the FLAP/SLAT ELEC message on EICAS. Each section produces the logic for different reasons.
  - 2) Section 1 produces fail logic for any of the following faults.
    - a) Inboard slat RVDT #1 fail
    - b) Outboard slat RVDT #1 fail
    - c) Flap lever RVDT #2 fail
    - d) Center FSPM fail
    - e) Center FSPM in BITE
    - f) Loss of 28v ac excitation
    - g) AIRPLANES WITH A -32 OR SUBSEQUENT FSEU;  
Flap control lever resolver fail
    - h) Flap control lever resolver fail
    - i) Shutoff valve output fail
    - j) Slat hydraulic pressure switch fail

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k) Flap control lever RVDT No. 2 misrig

NOTE: Misrig detection checks are active at altitude above 20,000 feet or when airspeed exceeds 270 knots.

Faults because of the slat shutoff valve failure and slat hydraulic pressure switch failure are not latched.

Faults because of misrigs of the flap lever RVDT No. 2 are latched.

3) Section 2 produces fail logic for any of the following faults.

- a) Left FSPM fail
- b) Left FSPM in BITE
- c) Flap lever RVDT #1 fail
- d) Loss of 28v ac excitation

4) Section 3 produces fail logic for any of the following faults.

- a) Inboard slat RVDT #2 fail
- b) Outboard slat RVDT #2 fail
- c) Right FSPM fail
- d) Right FSPM in BITE
- e) Loss of 28v ac excitation
- f) Outboard slat PDU RVDT No. 2 misrig (RVDT rig check is enabled by in Section 1, the enabling signal is transmitted internally to Section 3 of the FSEU).

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FLAP/SLAT ELECTRONICS UNIT – REMOVAL/INSTALLATION

1. General

- A. This procedure gives the data for the removal and installation of the Flap/Slat Electronics Unit.
- B. The Flap/Slat Electronics Unit (FSEU) is found on the E2 equipment rack.
- C. AIRPLANES WITH FSEU POWER INPUT FILTERS;  
This procedure also gives the data for the removal and installation of the FSEU Power Input Filter.

TASK 27-51-01-024-001

2. Remove the Flap/Slat Electronics Unit (FSEU)

A. References

- (1) AMM 20-10-01/401, E/E Rack Mounted Components – Boxes and Cards
- (2) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems

B. Access

- (1) Location Zone  
120 Main Equipment Center (Right)
- (2) Access Panel  
119AL Main Equipment Center

C. Remove the FSEU

S 214-002

- (1) Make sure that the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position.

S 214-003

- (2) Make sure that the flap control lever is in zero (FLAPS UP) detent.

S 494-004

- (3) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 864-005

- (4) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 864-006

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR
  - (b) 11C16, FLAP SLAT ELEC UNIT 1 CONT
  - (c) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR
  - (d) 11G16, FLAP SLAT ELEC UNIT 2 CONT
  - (e) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR
  - (f) 11G23, FLAP SLAT ELEC UNIT 3 CONT

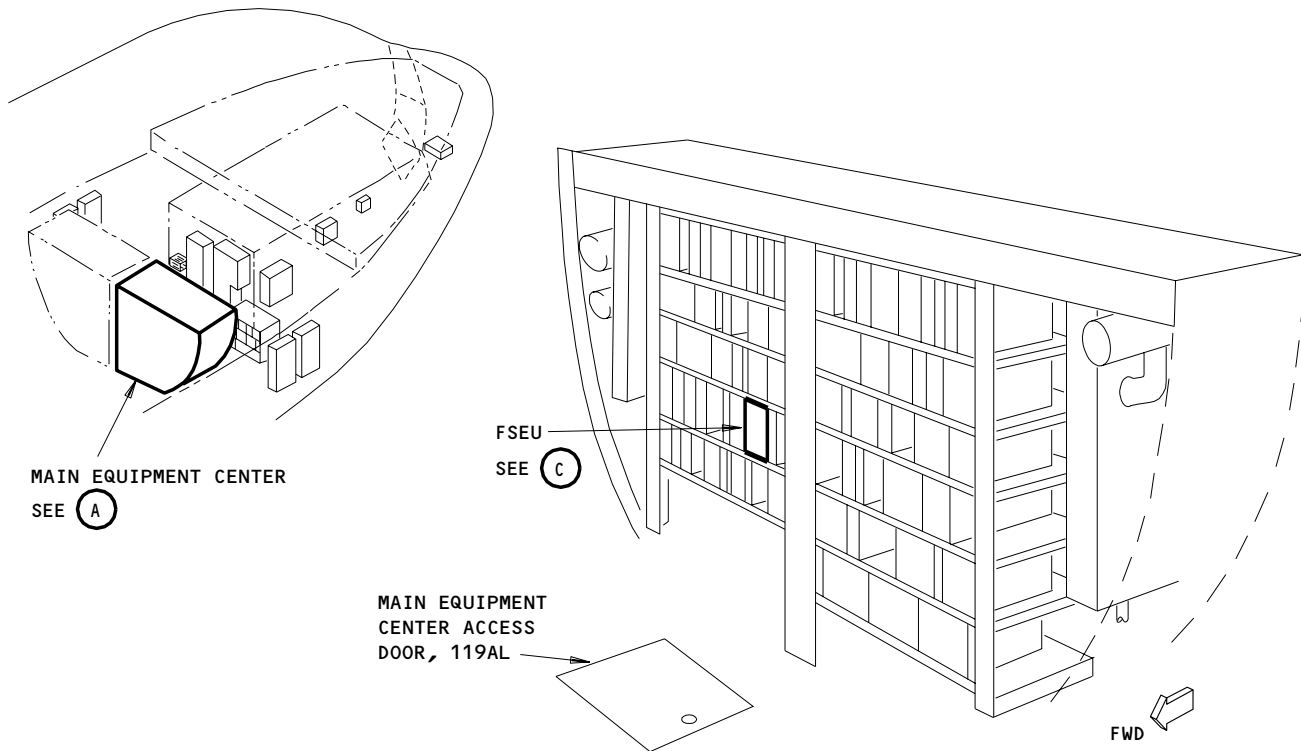
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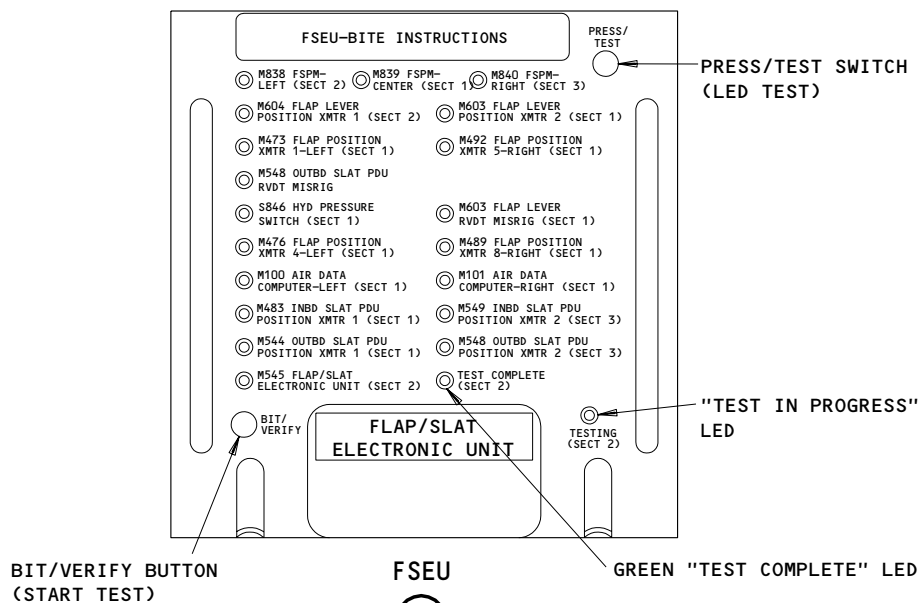
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MAIN EQUIPMENT CENTER

(A)

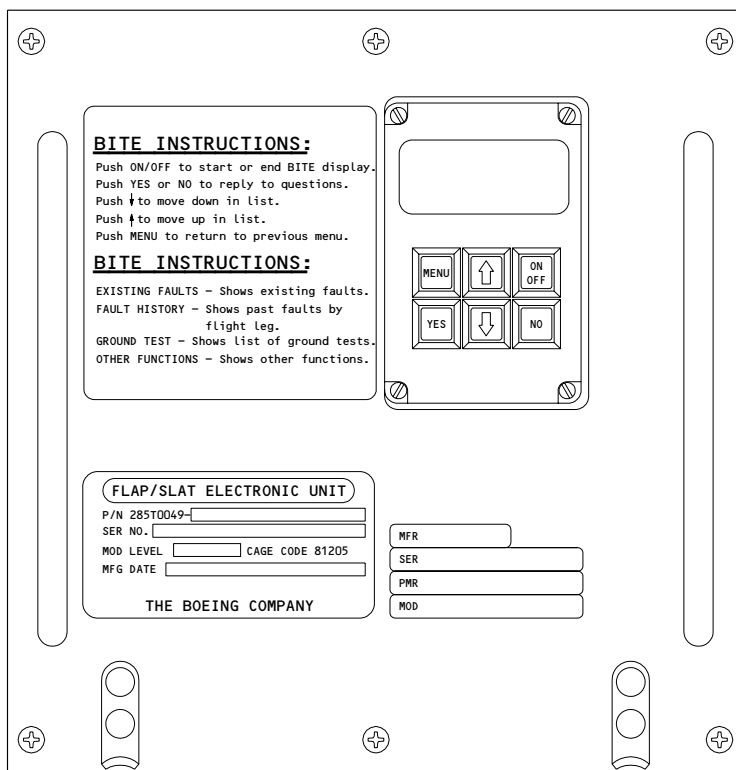
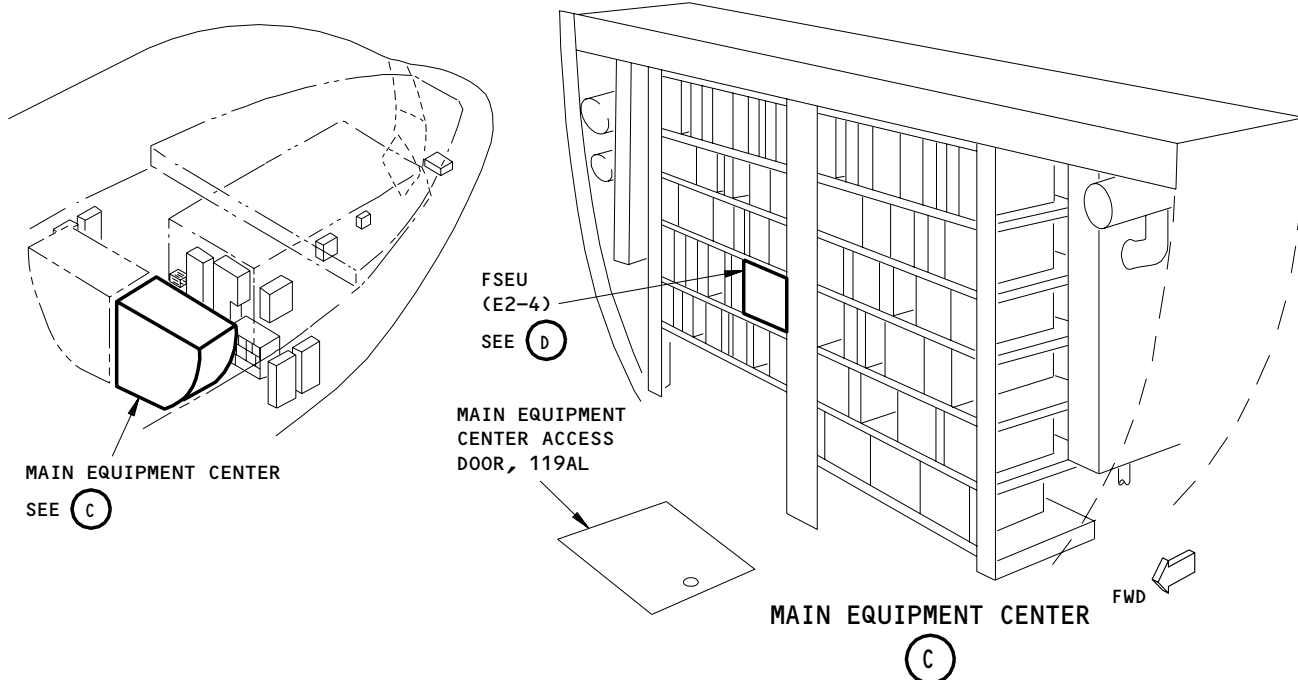


(B)

Flap/Slat Electronics Unit (FSEU)  
Figure 401 (Sheet 1)

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AIRPLANES WITH A -53 FSEU

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(AIRPLANES WITH A -63 FSEU)

(D)

Flap/Slat Electronics Unit (FSEU)  
Figure 401 (Sheet 2)

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AIRPLANES WITH A -63 FSEU

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- S 864-118
- (6) Open the Main Equipment Center Door, 119AL, to get access to the main equipment center.

- S 034-007
- (7) Remove the hold down extractors from the front of the FSEU.

- S 024-008
- (8) Remove the FSEU from the rack (AMM 20-10-01/401).

TASK 27-51-01-404-110

3. Install the Flap/Slat Electronics Unit (FSEU)

NOTE: A 285T0049-50 or earlier FSEU is not interchangeable with a 285T0049-53 or subsequent FSEU. A 285T0049-63 FSEU can replace a 285T0049-53 FSEU. A 285T0049-53 FSEU can only replace a 285T0049-63 FSEU on airplanes delivered with a 285T0049-53 FSEU.

A. References

- (1) AMM 20-10-01/401, E/E Rack Mounted Components - Boxes and Cards  
(2) AMM 24-22-00/201, Electrical Power - Control  
(3) AMM 27-51-45/201, Flap Position Transmitter  
(4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zone  
120 Main Equipment Center (Right)
- (2) Access Panel  
119AL Main Equipment Center

C. Install the Flap/Slat Electronics Unit

- S 214-011
- (1) Make sure that the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position.
- S 214-005
- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.
- S 424-012
- (3) Install the FSEU in the E2 rack and attach it into position with the hold down extractors (AMM 20-10-01/401).
- S 864-013
- (4) Remove DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR  
(b) 11C16, FLAP SLAT ELEC UNIT 1 CONT  
(c) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR

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- (d) 11G16, FLAP SLAT ELEC UNIT 2 CONT
- (e) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR
- (f) 11G23, FLAP SLAT ELEC UNIT 3 CONT

S 864-012

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

S 744-122

- (6) AIRPLANES WITH -53 OR EARLIER FSEU;

Do these steps to test the FSEU:

- (a) Push the TEST button on the front panel of the FSEU and make sure all the lights come on.
- (b) Push the BIT/VERIFY button and wait for the test complete light to come on.

NOTE: Make sure that no fault lights come on.

S 744-124

- (7) AIRPLANES WITH -63 FSEU;

Do these tasks to test the FSEU and flap position transmitters:

- (a) Do the BITE test of the FSEU (AMM 27-51-00/501).
- (b) Do the flap position transmitter adjustment check (AMM 27-51-45/201).

NOTE: This check makes sure the flap position transmitters are calibrated to the FSEU within correct limits.

S 214-014

- (8) Make sure the arming switches for the flap and slat alternate drives are not in the armed position (switch lights off).

S 214-015

- (9) Make sure the position selector switch for the flap/slat alternate drive is in the NORM position.

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S 864-015

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(10) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 214-016

(11) Make sure that the amber TRAILING EDGE and LEADING EDGE lights on the P3 panel are off.

S 214-017

(12) Make sure there are no flap/slat messages shown on the EICAS display.

S 214-018

(13) Make sure the flap position indicators are in the UP position.

S 864-019

(14) Push the arming switches for the flap and slat alternate drive to arm the flap/slat alternate drives (the light on each switch comes on).

S 214-020

(15) Make sure that the Flaps/Slats position selector switch is in the NORM position for more than seven seconds and see that:  
(a) The amber TRAILING EDGE and LEADING EDGE lights come on.  
(b) The TE FLAP DISAGREE and LE SLAT DISAGREE EICAS messages show on the flight compartment display.

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S 864-016

**CAUTION:** DO NOT OPERATE THE ALTERNATE DRIVE MOTOR CONTINUOUSLY FOR MORE THAN 4 MINUTES. DO NOT OPERATE THE MOTOR AGAIN UNTIL IT IS COOL FOR AT LEAST 20 MINUTES TO PREVENT DAMAGE TO THE MOTOR.

- (16) Turn the position selector switch for the flap/slat alternate drive to the 30-unit detent and do the checks that follow:
- (a) Make sure the TE flaps and the LE slats move to the fully extended position.
  - (b) Make sure the amber TRAILING EDGE and LEADING EDGE lights go off and no flap/slat EICAS messages show on the display.
  - (c) Make sure the flap position indicator moves to the 30-unit position.

S 864-023

- (17) Remove the DO-NOT-OPERATE tag from the flap control lever and move the flap control lever to the 30-unit detent.

S 864-017

- (18) Do the steps that follow to disarm the flap and slat alternate drive:
- (a) Push the arming switches for the flap and slat alternate drive to disarm the flap and slat alternate drive (the light in each switch goes off).
  - (b) In less than seven seconds, turn the position selector switch for the flap/slat alternate drive to the NORM position.

S 214-025

- (19) Make sure that the amber TRAILING EDGE and LEADING EDGE lights are off.

S 214-026

- (20) Make sure there are no flap/slat messages shown on the EICAS display.

S 864-027

- (21) Move the flap control lever to the zero (FLAPS UP) detent and do the checks that follow:
- (a) Make sure the TE flaps and LE slats move to the fully retracted position.
  - (b) Make sure the amber TRAILING EDGE and LEADING EDGE lights are off.
  - (c) Make sure that there are no flap/slat messages on the EICAS display.
  - (d) Make sure the flap position indicator moves to the UP position.

S 864-030

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

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S 864-031

- (23) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 864-119

- (24) Close the Main Equipment Center Door, 119AL, for the main equipment center.

TASK 27-51-01-004-101

4. FSEU Power Input Filter Removal and Installation

A. General

- (1) AIRPLANES WITH FSEU POWER INPUT FILTER;  
Three FSEU Power Input Filters are installed on the three 28 v ac inputs to the sections 1, 2, and 3 of the FSEU.

B. References

- (1) AMM 25-52-01/401, Cargo Compartment Sidewall-Ceiling Lining R/I  
(2) SWPM 20-20-00, Standard Wiring Practices Manual

C. Equipment and Materials

- (1) Filter RF14934  
RFI Corporation  
100 Pine Aire Drive  
Bay Shore, Long Island, New York 11706

D. Access

- (1) Location Zone  
(a) 120 Main Equipment Center (Right)  
(2) Access Panel  
(a) 119AL Main Equipment Center

E. Remove the FSEU Power Input Filter

S 864-102

- (1) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR  
(b) 11C16, FLAP SLAT ELEC UNIT 1 CONT  
(c) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR  
(d) 11G16, FLAP SLAT ELEC UNIT 2 CONT  
(e) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR  
(f) 11G23, FLAP SLAT ELEC UNIT 3 CONT

S 014-103

- (2) Remove the forward wall of the forward cargo compartment for access to the rear of the E2 equipment rack in the Main Equipment Center (AMM 25-52-01/401).

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S 034-104

- (3) Remove filter from the bracket on stanchion AE306 in the Main Equipment Center.

**NOTE:** Be careful with the electrical terminals on the filter. The terminals are hollow and can be easily twisted off.

F. Install the FSEU Power Input Filter

S 114-104

- (1) Clean mating surfaces on the bracket and filter and apply faying surface bond (SWPM 20-20-00).

S 414-105

- (2) Install the filter on the bracket with the washer and nut.

S 434-121

**CAUTION:** DO NOT OVER-TIGHTEN THE TERMINAL LUG NUT THAT HOLDS THE FILTER IN PLACE. DAMAGE TO THE FILTER CAN OCCUR.

- (3) Tighten the terminal lug nut on the electrical terminals of the filter with a torque range of 12-14 pound-inches (1.35-1.58 newton-meters).

S 764-107

- (4) Measure the bonding resistance between the filter and the bracket assembly which can not exceed 0.0005 ohm (SWPM 20-20-00).

S 414-108

- (5) Install the forward wall of the forward cargo compartment at the E2 rack in the Main Equipment Center (AMM 25-52-01/401).

S 864-104

- (6) Remove the DO-NOT-CLOSE tags and close the circuit breakers on the overhead panel, P11:
  - (a) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR
  - (b) 11C16, FLAP SLAT ELEC UNIT 1 CONT
  - (c) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR
  - (d) 11G16, FLAP SLAT ELEC UNIT 2 CONT
  - (e) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR
  - (f) 11G23, FLAP SLAT ELEC UNIT 3 CONT
  - (g) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR
  - (h) 11C16, FLAP SLAT ELEC UNIT 1 CONT
  - (i) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR
  - (j) 11G16, FLAP SLAT ELEC UNIT 2 CONT
  - (k) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR
  - (l) 11G23, FLAP SLAT ELEC UNIT 3 CONT

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- S 864-105
- (7) Supply electrical power (AMM 24-22-00/201).
- S 864-106
- (8) Push the TEST button on the front panel of the FSEU and make sure all the lights come on.
- S 864-107
- (9) Push the BIT/VERIFY button and wait for the test complete light to come on.

NOTE: Make sure that no fault lights come on.

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TE FLAPS FUSE PINS – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the inboard and outboard flap fuse pins.

TASK 27-51-02-004-001

2. Remove the Fuse Pin for the Inboard and Outboard Flaps

A. Equipment

- (1) Lock Set – Inboard and Outboard Trailing-Edge Flap Linkage –  
A27074-128 (Optional)  
A27074-146 (Recommended)

B. References

- (1) AMM 24-22-00/201, Electrical Power – Control  
(2) AMM 27-51-00/201, Trailing Edge Flap System  
(3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(4) AMM 32-00-15/201, Landing Gear Door Lock  
(5) AMM 32-00-20/201, Landing Gear Downlock

C. Access

- (1) Location Zones  
555/565 Inboard Trailing-Edge Flap  
566/666 Outboard Trailing-Edge Flap

D. Prepare for Removal

S 214-011

- (1) Make sure the downlock is installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-012

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-013

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

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S 864-002

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE ALL CONTROL SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system and reservoir (AMM 29-11-00/201).

S 864-014

- (5) Move the flap control lever to the 30-unit detent.

S 864-004

- (6) Permit the flap to travel to the fully extended position.

**NOTE:** Make sure that the center fairing is clear of all blockage during flap movement.

S 044-015

- (7) Do the deactivation procedure for the TE flap system (AMM 27-51-00/201).

E. Remove the Fuse Pin for the Inboard Flap (Fig. 401)

S 984-016

- (1) Install a support to hold the weight of the inboard main flap, and to release the load on the outboard support linkage for the No. 3 (Left) or No. 6 (Right) rib.

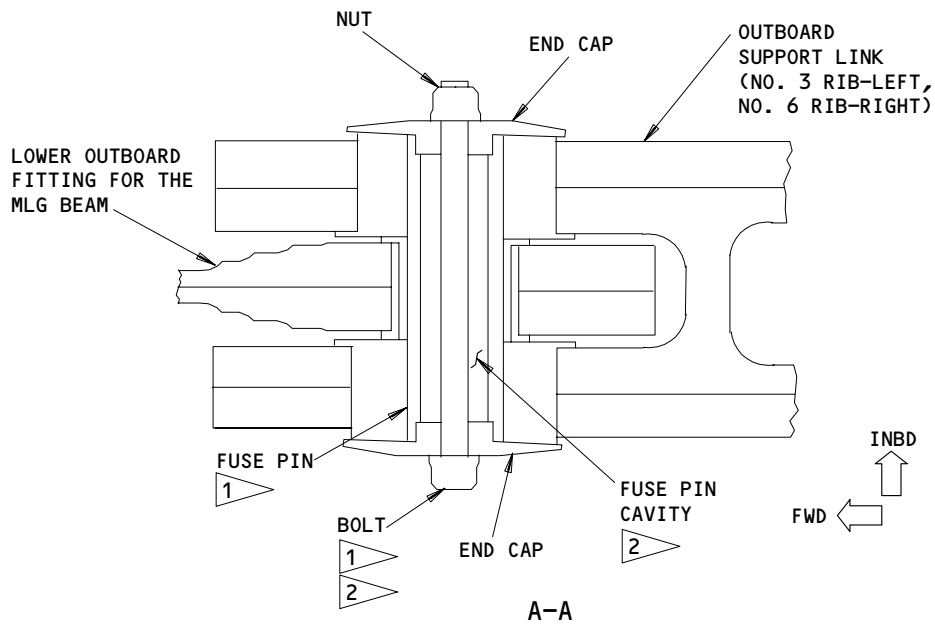
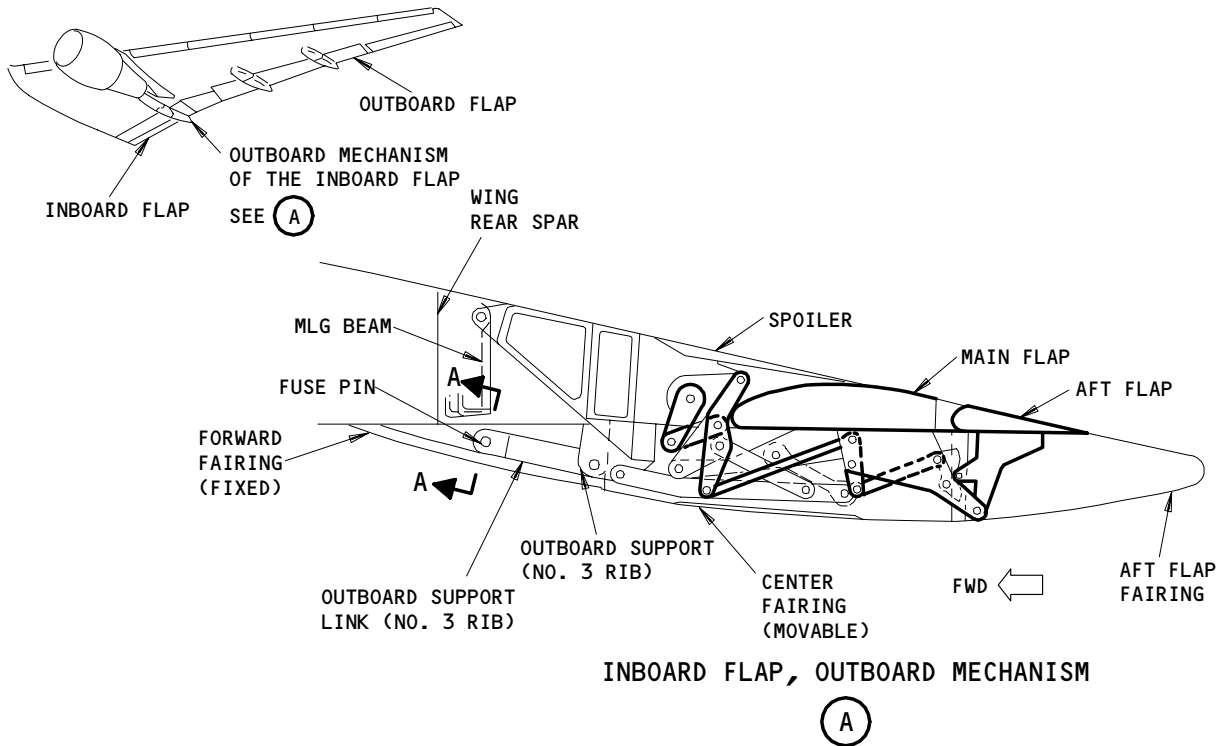
EFFECTIVITY

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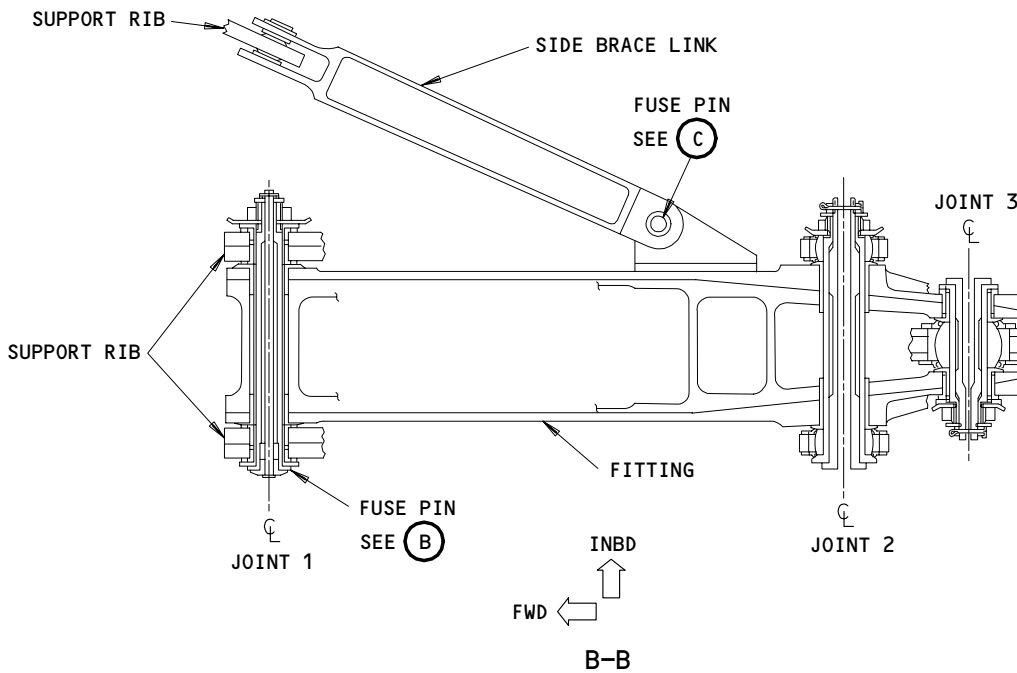
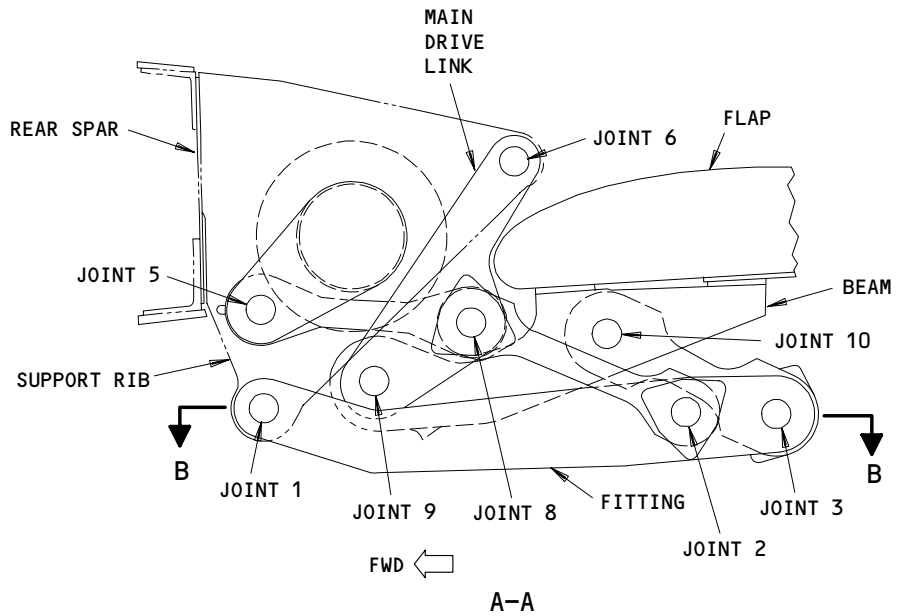
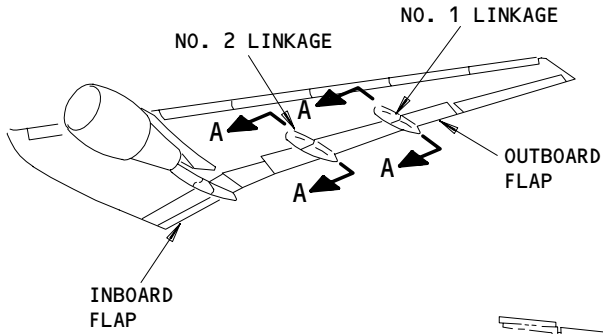
- 1 APPLY A LIGHT FILM OF GREASE BEFORE INSTALLATION
- 2 FILL THE FUSE PIN CAVITY WITH GREASE BEFORE BOLT INSTALLATION

Fuse Pin for the Inboard Flap  
Figure 401

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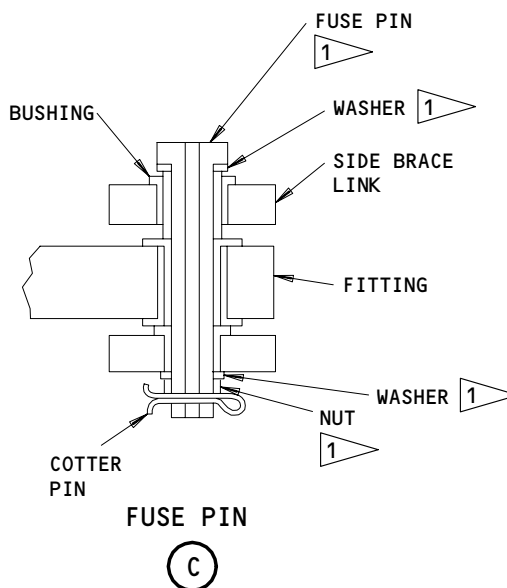
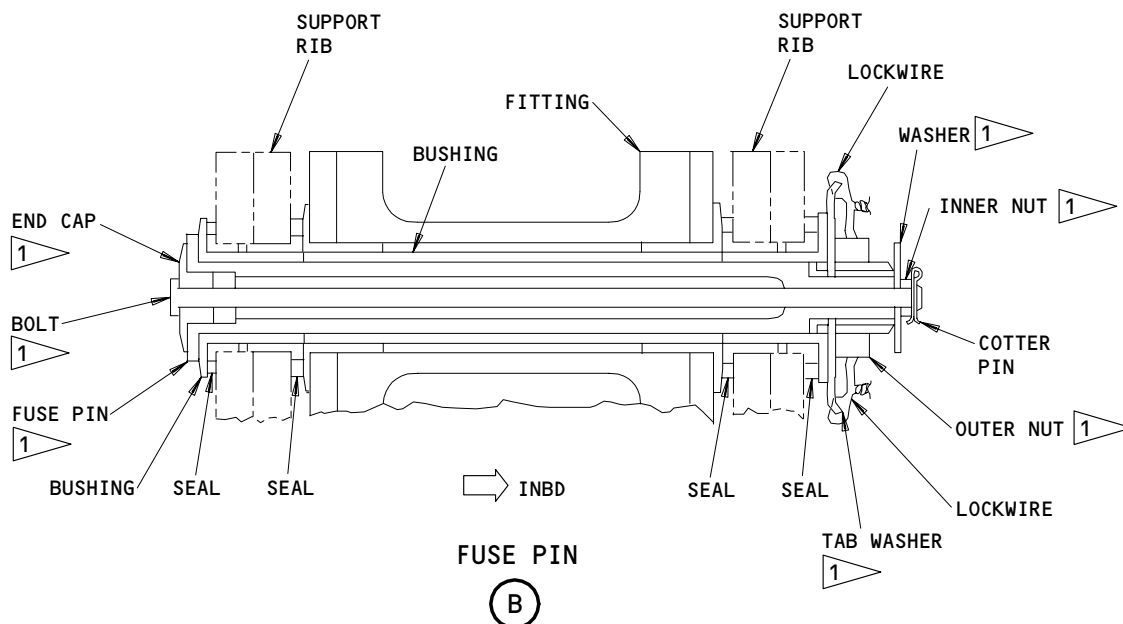
Fuse Pins for the Outboard Flap  
Figure 402 (Sheet 1)

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1 APPLY A LIGHT FILM OF GREASE BEFORE INSTALLATION

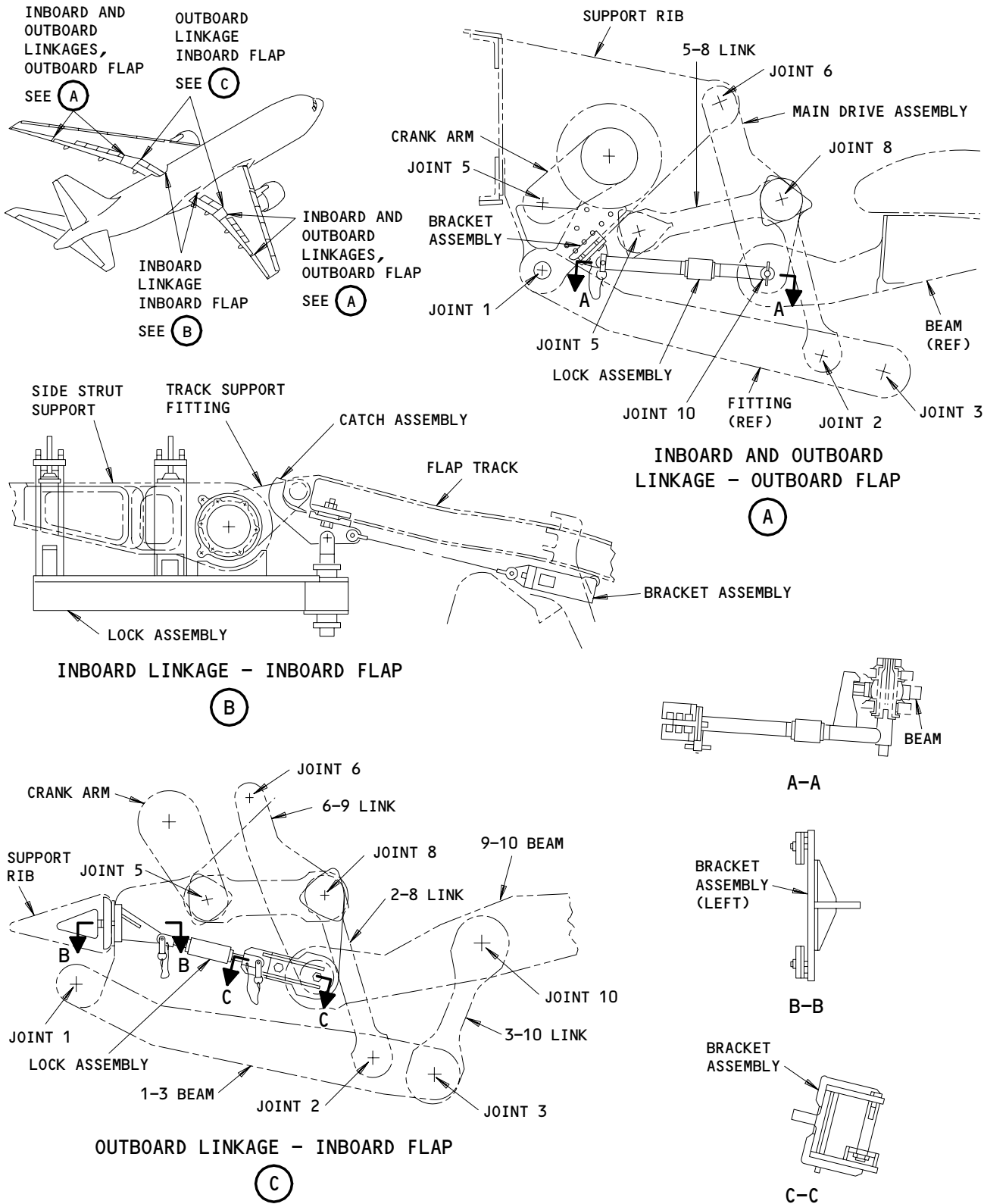
Fuse Pins for the Outboard Flap  
Figure 402 (Sheet 2)

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Linkage Lock Set for the Inboard and Outboard Flap  
Figure 403

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- S 984-005
- (2) Install the lock sets for the flap linkage if necessary (Fig. 403).
  
- S 034-017
- (3) Remove the nut, bolt, end caps, and fuse pin from the outboard lower fitting on the main landing-gear beam (View A-A, Fig. 401).
- F. Remove the Fuse Pins for the Outboard Flap (Fig. 402)
  
- S 984-024
- (1) Install a support to hold the weight of the outboard flap, and to release the load on the side brace link and the fitting.
  
- S 984-006
- (2) Install the lock set for the flap linkage if necessary (Fig. 403).
  
- S 034-025
- (3) Remove the cotter pin, nut, washers, and fuse pin at the aft end of the side brace link connection (Detail C, Fig. 402).
  
- S 024-030
- (4) Do these steps at the forward end of the fitting (Detail B):
  - (a) Remove the cotter pin, inner nut, washer, bolt, and end cap.
  - (b) Cut the lockwires and remove the outer nut, tab washer and fuse pin.

TASK 27-51-02-404-007

3. Install the Fuse Pin for the Inboard and Outboard Flaps

- A. Consumable Materials
  - (1) D00633 Grease - BMS 3-33 (Preferred)
  - (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- B. References
  - (1) AMM 24-22-00/201, Electrical Power - Control
  - (2) AMM 27-51-00/201, Trailing Edge Flap System
  - (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- C. Access
  - (1) Location Zones
    - 555/565 Inboard Trailing-Edge Flap
    - 566/666 Outboard Trailing-Edge Flap
- D. Install the Fuse Pin for the Inboard Flap (Fig. 401)
  - S 644-018
  - (1) Fill the inside cavity of the fuse pin with grease.
  
  - S 644-019
  - (2) Apply a layer of grease to the outer surface of the fuse pin.
  
  - S 824-020
  - (3) Align the hole in the outboard support link to the hole on the lower outboard fitting of the MLG beam.

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- S 434-021
- (4) Install the fuse pin through the hole.
- S 434-022
- (5) Install the end caps, bolt, and nut.
- S 434-023
- (6) Tighten the nut to 220-410 inch-pounds (25-46 N-m).
- S 084-032
- (7) If installed, remove the lock sets from the flap linkage (Fig. 403).
- S 084-033
- (8) Remove the support from the inboard flap.
- E. Install the Fuse Pins for the Outboard Flap (Fig. 402)
- S 644-026
- (1) Apply a layer of grease to the fuse pins, bolt, end cap, nuts, and washers.
- S 824-027
- (2) At the forward end of the fitting, align the fitting hole to the hole on the support rib and do these steps (Detail B):
- (a) Install the fuse pin, tab washer, and outer nut.
  - (b) For the outboard linkage, tighten the outer nut to 500-600 pound-inches (56-68 N-m).
  - (c) For the inboard linkage, tighten the outer nut to 350-450 pound-inches (40-51 N-m).
  - (d) Install the bolt, end cap, washer, and inner nut.
  - (e) Tighten the inner nut to 50-75 inch-pounds (5.6-8.5 N-m).
  - (f) Install the cotter pin.
  - (g) Connect the lockwires between the tab washer and the outer nut on the fuse pin at two locations.
- S 824-028
- (3) At the aft end of the side brace link, align the hole to the fitting hole, and do the steps that follow:
- (a) Install the fuse pin, washers, and nut.
  - (b) For the outboard linkage, tighten the nut to 150-200 pound-inches (17-23 N-m).
  - (c) For the inboard linkage, tighten the nut to 370-690 pound-inches (42-78 N-m).
  - (d) Install the cotter pin to the fuse pin.

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S 084-034

- (4) If installed, remove the lock sets from the flap linkage (Fig. 403).

S 084-035

- (5) Remove the support from the outboard flap.
- F. Put the Airplane Back to Its Usual Condition

S 444-029

- (1) Put the airplane back to its usual condition with the steps given in the TE Flap Deactivation procedure (AMM 27-51-00/201).

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INBOARD FLAP - REMOVAL/INSTALLATION

1. General

A. This procedure contains these four tasks:

- Remove the Inboard Flap with the Aft Flap Attached to the Main Flap
- Install the Inboard Flap with the Aft Flap Attached to the Main Flap
- Remove the Inboard Main Flap with the Aft Flap Disconnected
- Install the Inboard Main Flap with the Aft Flap Disconnected.

B. Refer to AMM 27-51-06/201 for the procedure to remove and install the inboard aft flap.

C. The airplane must be on the landing gear with all the engines attached before you can adjust the flap drive system to the rig position.

D. The adjustment procedure for the inboard flap contains the procedure to adjust the fit and fair of the inboard flaps.

TASK 27-51-03-024-001

2. Inboard Flap - Removal

A. General

- (1) This task contains the procedure to remove the inboard main and aft flap, together as a unit.

B. Equipment

- (1) Circuit Breaker Lockout Clip - 1012LC-R  
Commercially Available
- (2) Restraint, Aft Flap to Inboard Flap - A27019-8
- (3) Sling Equipment, Inboard TE Flap - A27016-27
- (4) TE Flaps PDU Lock - A27009-7
- (5) Shackles, 3/8 inch (9.525 mm) Diameter - Commercially Available.

C. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-51-07/401, Flap Fairing Door
- (3) AMM 27-51-15/401, Inboard TE Flap Track Fairings
- (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 32-00-15/201, Landing Gear Door Lock
- (7) AMM 32-00-20/201, Landing Gear Downlock

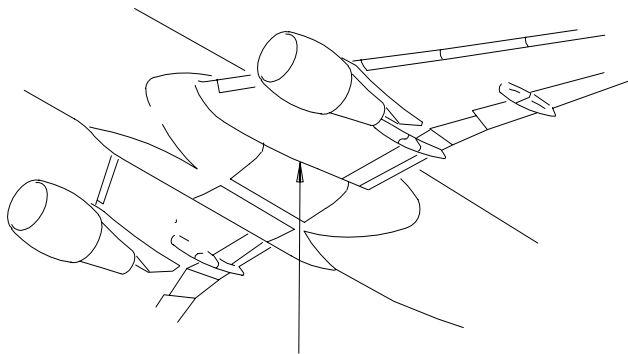
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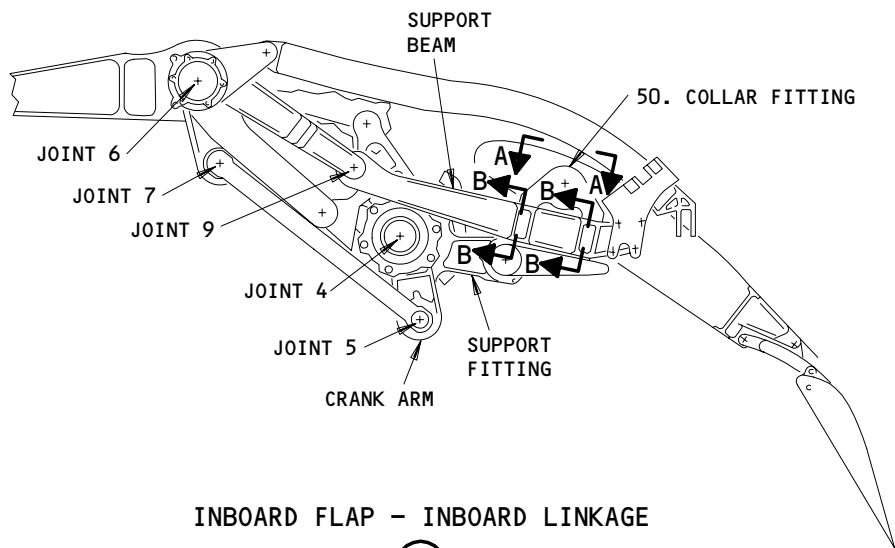
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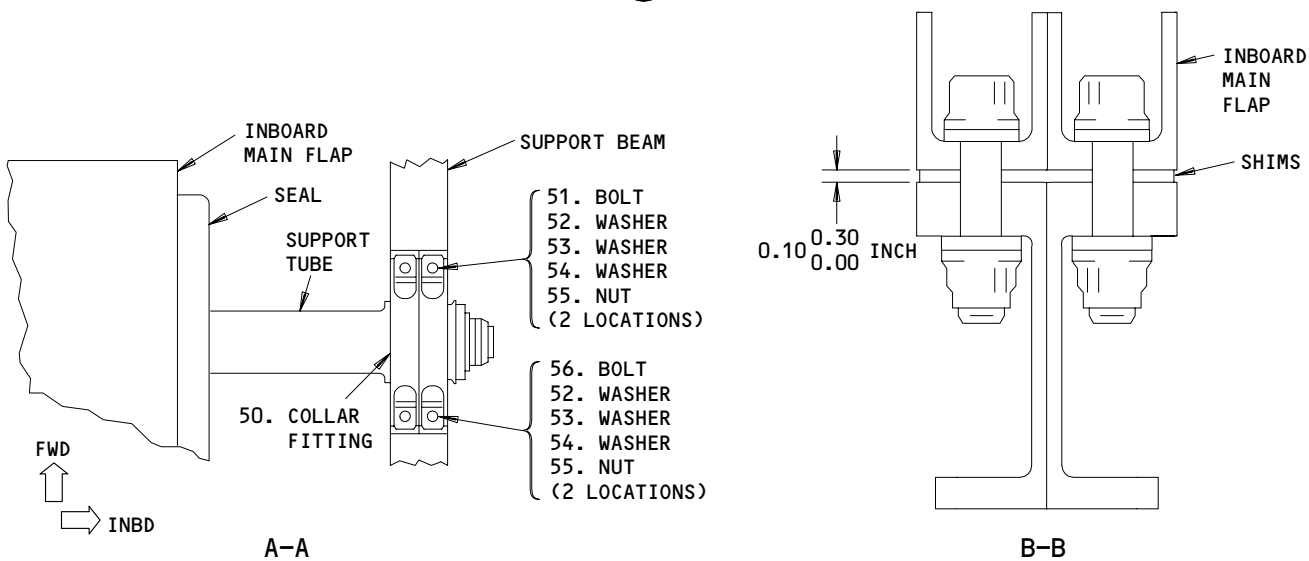
INBOARD FLAP - INBOARD LINKAGE

SEE (A)



INBOARD FLAP - INBOARD LINKAGE

(A)



Inboard Flap - Inboard Linkage  
Figure 401

EFFECTIVITY

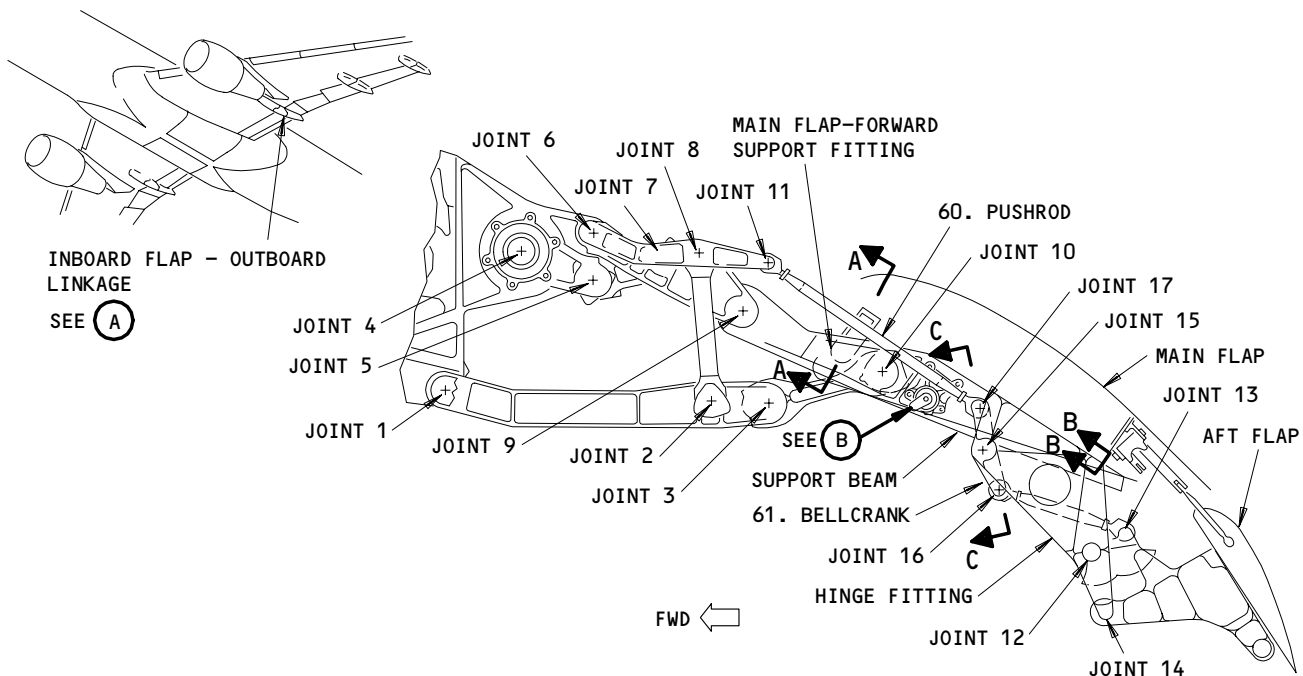
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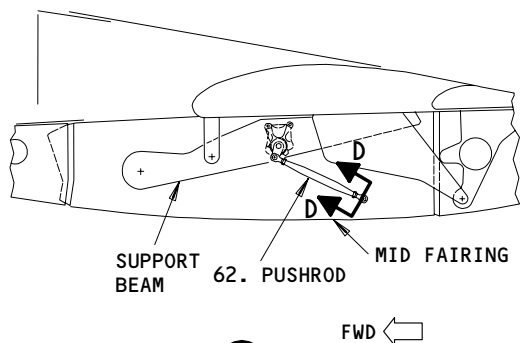
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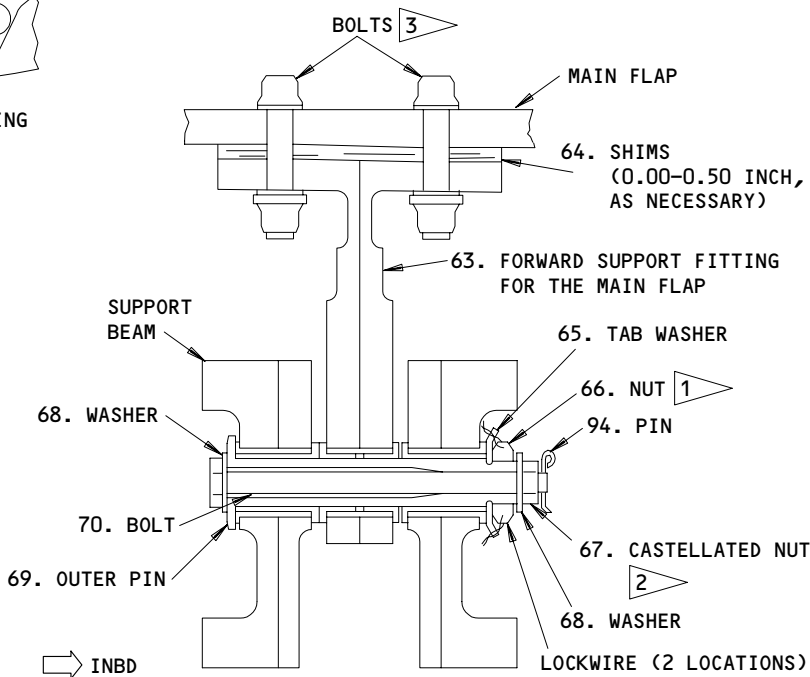


INBOARD FLAP - OUTBOARD LINKAGE

(A)



(B)



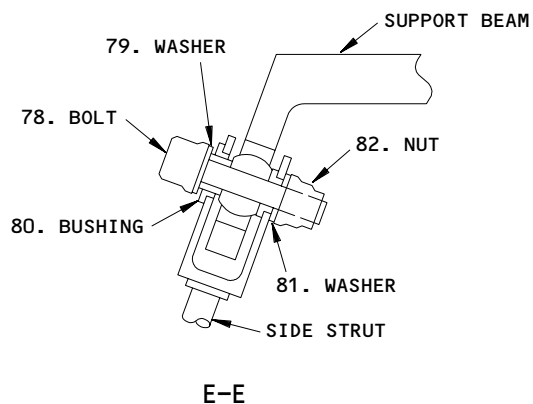
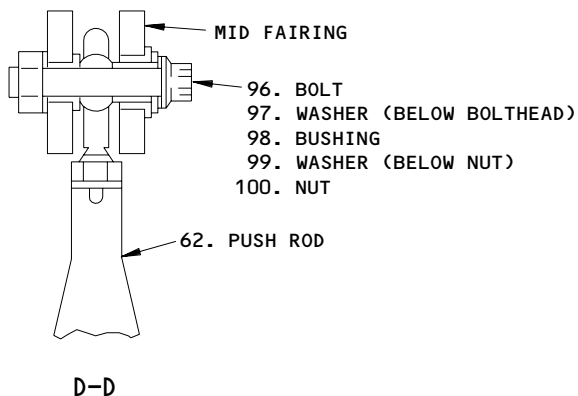
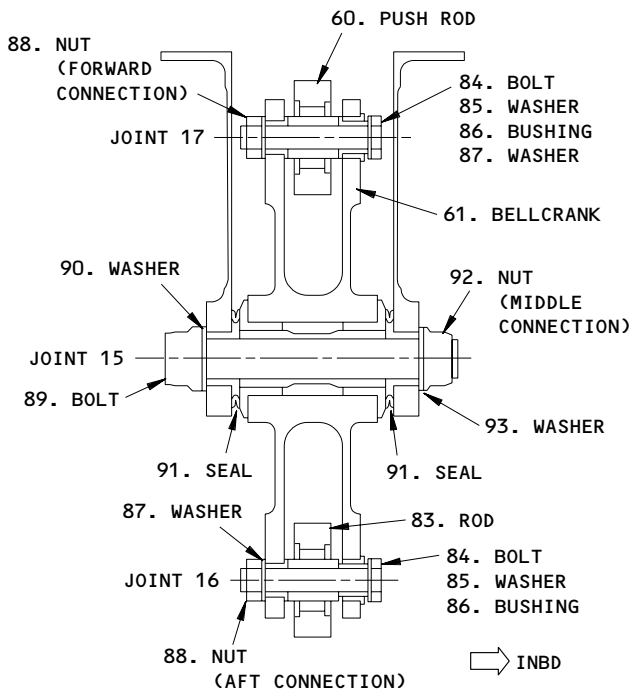
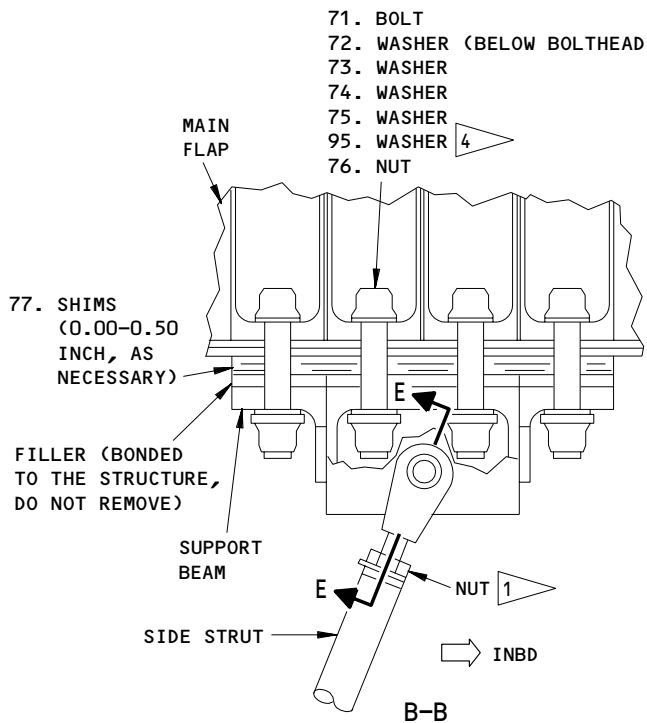
FORWARD CONNECTION OF THE MAIN FLAP

A-A

Inboard Flap - Outboard Linkage  
Figure 402 (Sheet 1)

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- 1 INSTALL LOCKWIRE WITH THE DOUBLE TWIST PROCEDURE (REF 20-10-23/201)
- 2 INSTALL RETAINING PIN
- 3 DO NOT REMOVE THESE BOLTS DURING THE FLAP REMOVAL/INSTALLATION (IF THE BOLTS ARE REMOVED, THE CORRECT TORQUE IS 970-1170 INCH-POUNDS.)
- 4 ADD WASHERS AS NECESSARY TO KEEP THE NUT TIGHT

Inboard Flap - Outboard Linkage  
Figure 402 (Sheet 2)

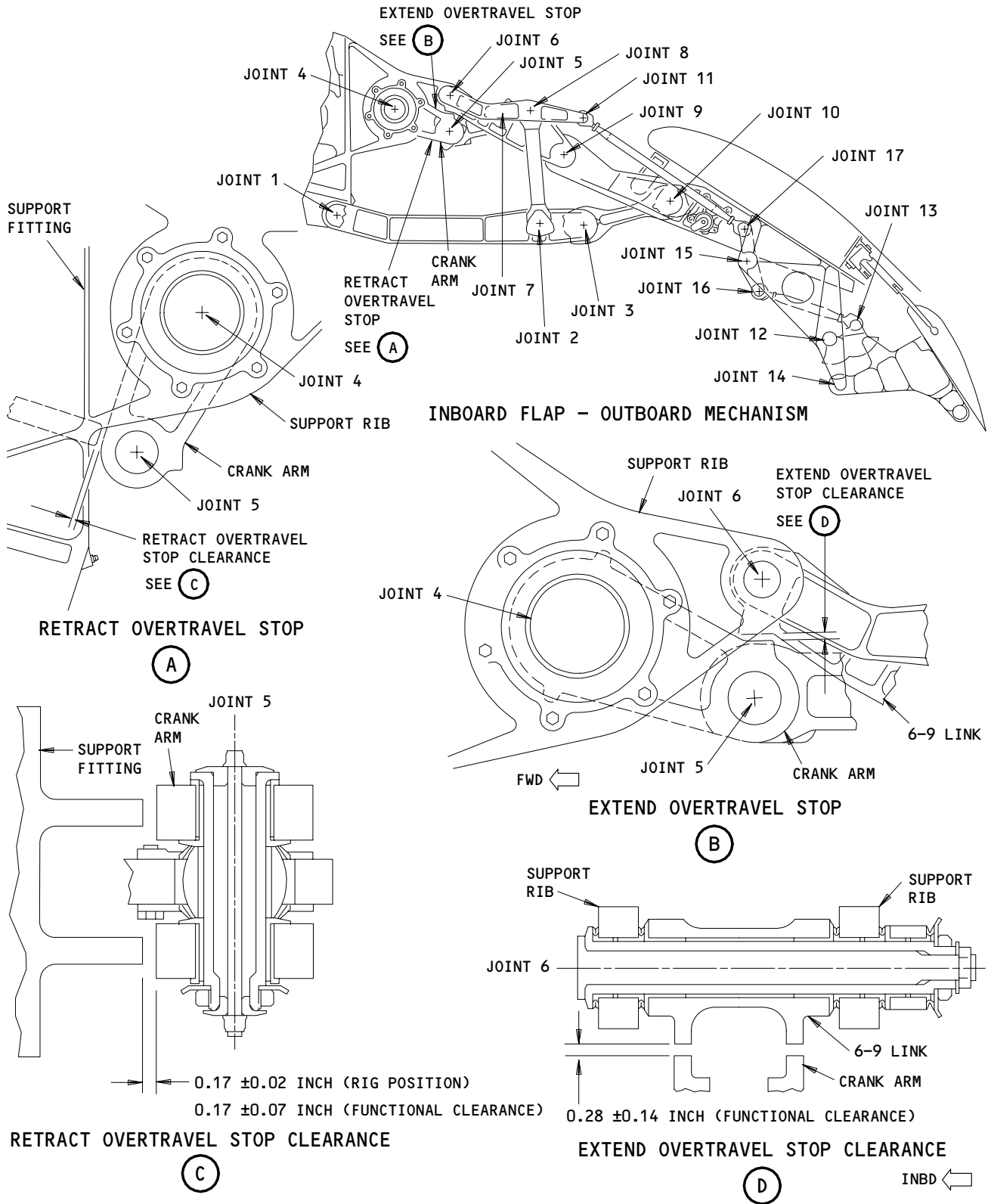
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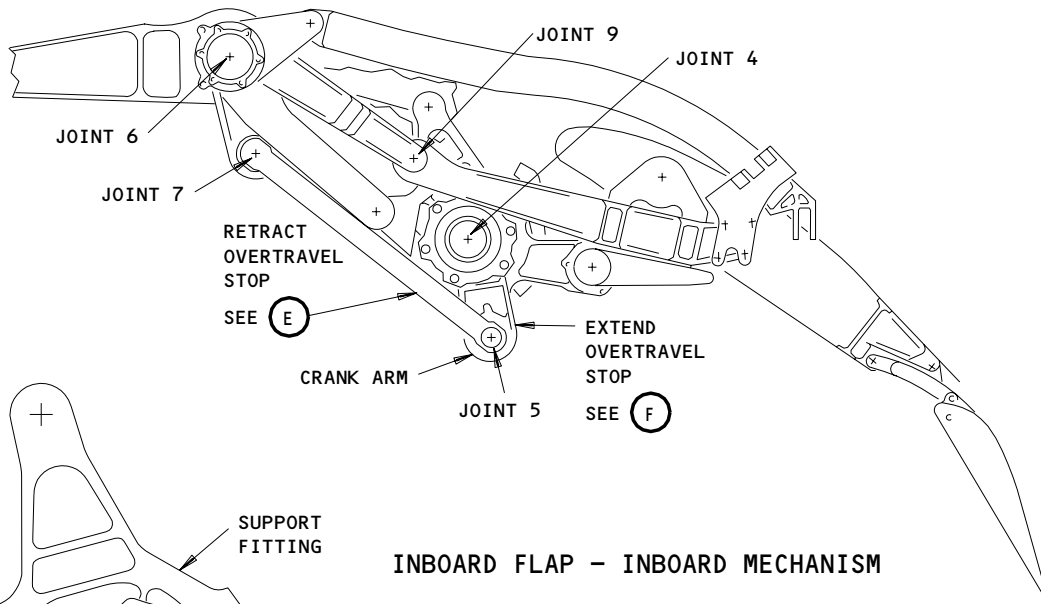
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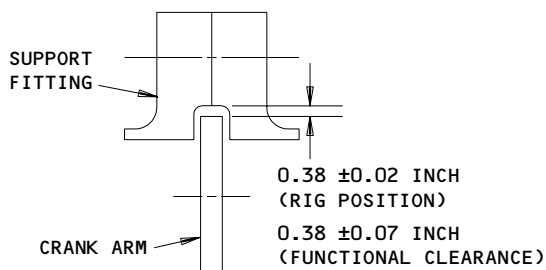
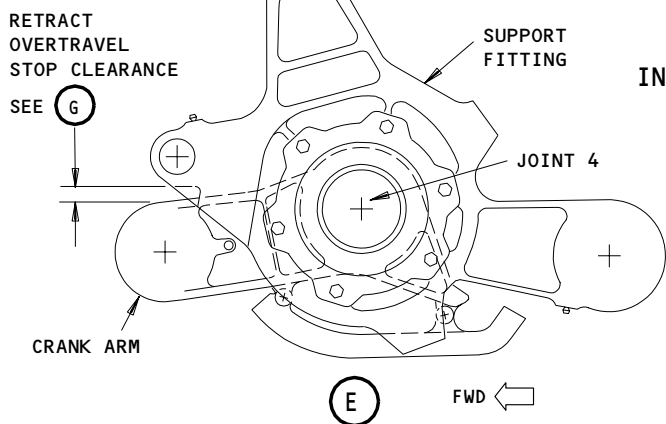
Overtravel Stop Clearances for the Inboard Flap  
Figure 403 (Sheet 1)

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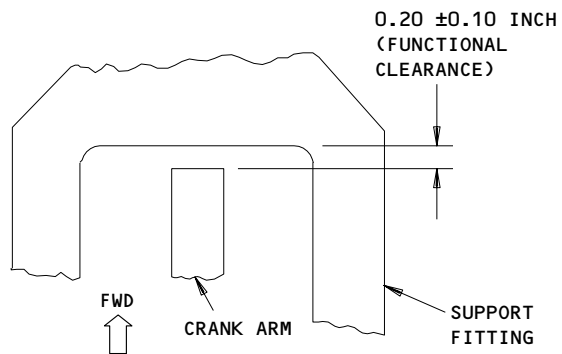
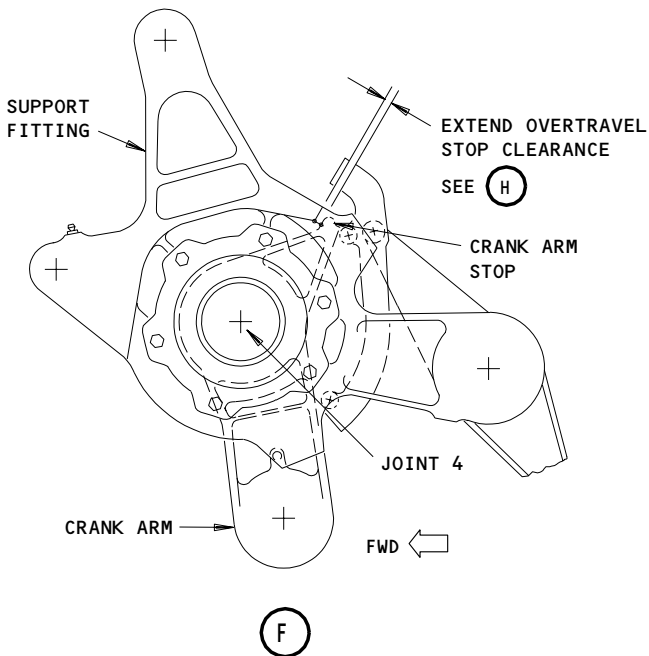
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**INBOARD FLAP - INBOARD MECHANISM**



**RETRACT OVERTRAVEL STOP CLEARANCE**

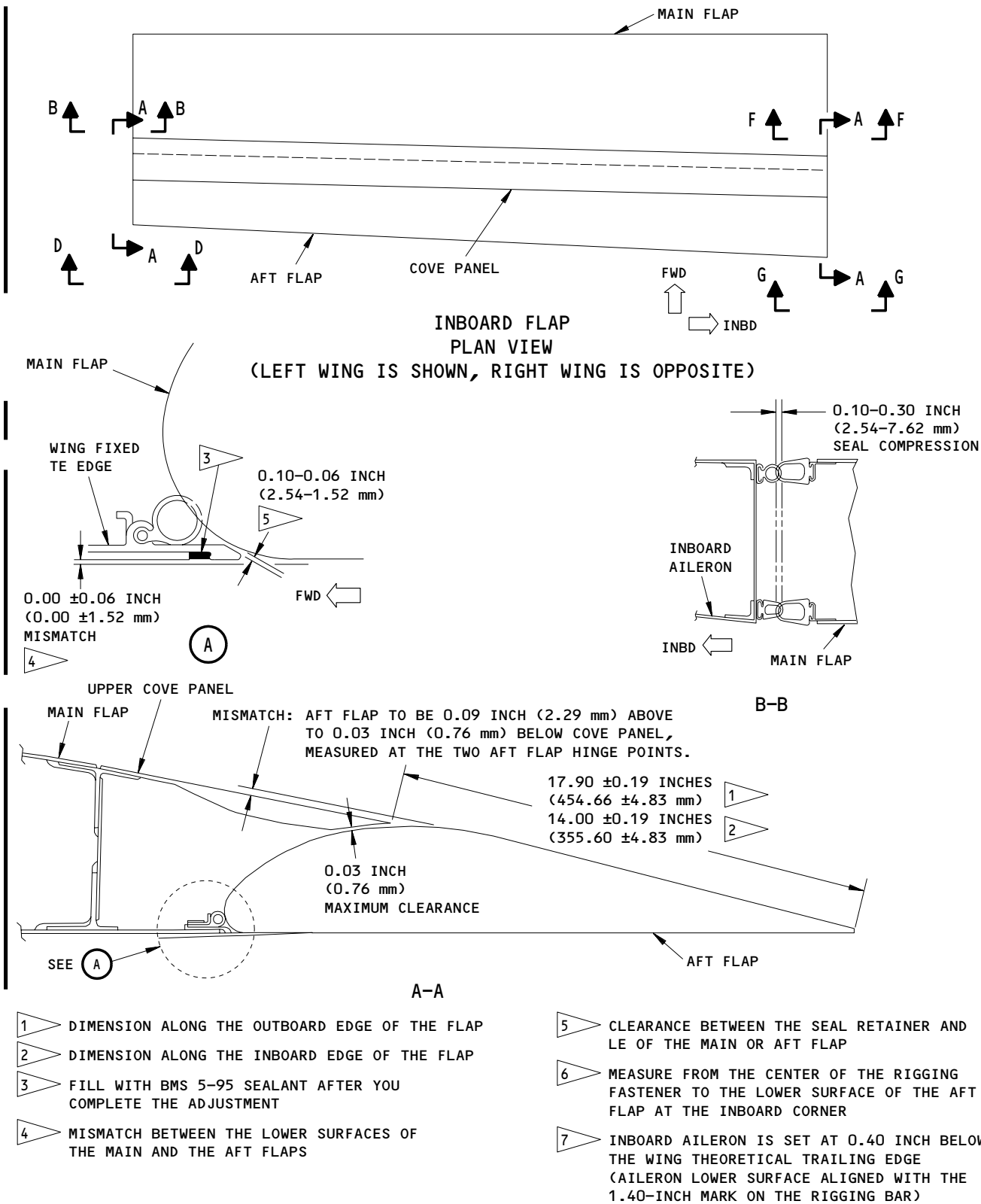


**EXTEND OVERTRAVEL STOP CLEARANCE**

Overtravel Stop Clearances for the Inboard Flap  
Figure 403 (Sheet 2)

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Inboard Flap Fit and Fair  
Figure 404 (Sheet 1)

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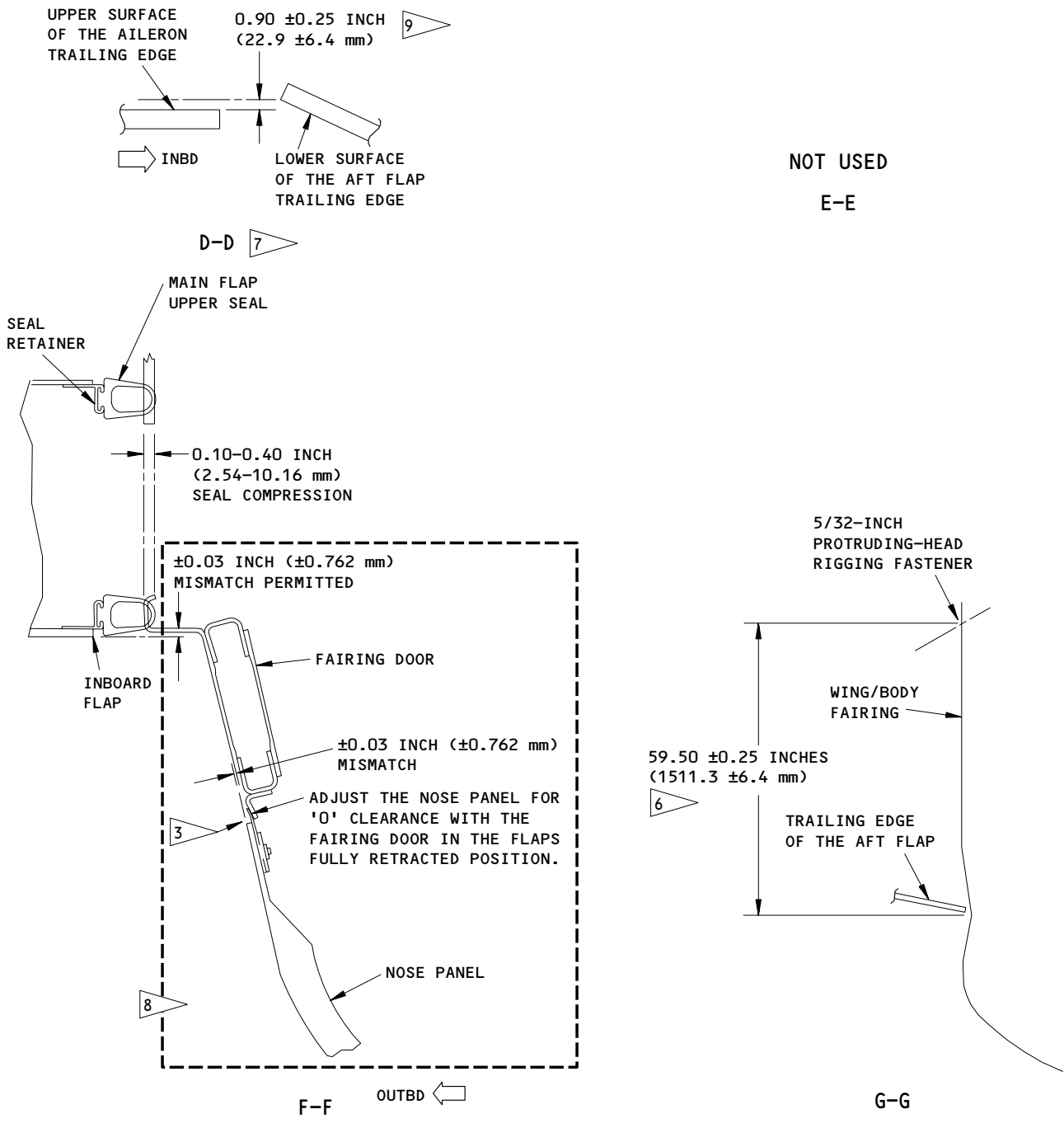
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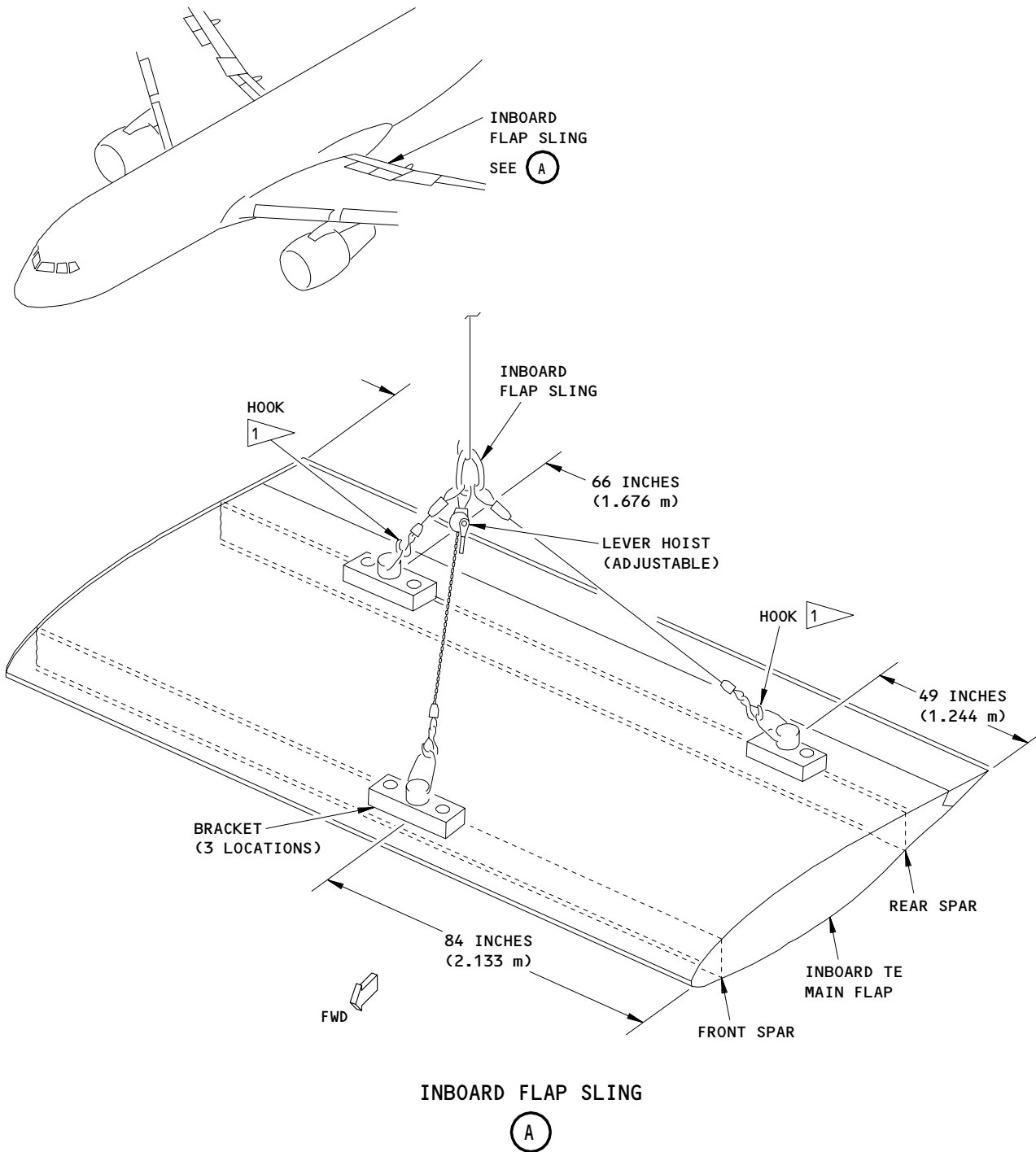
8 767-200 AIRPLANES ONLY  
NOTE: 767-300 AIRPLANES;  
IT IS NOT NECESSARY TO ADJUST THE NOSE PANEL.

9 DIMENSION MEASURED ON THE LEFT WING MUST BE SYMMETRICAL,  
WITHIN 0.10 INCH (2.5 mm), TO THE DIMENSION MEASURED ON THE RIGHT WING.

Inboard Flap Fit and Fair  
Figure 404 (Sheet 2)

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1 ATTACH ADDITIONAL 0.375-INCH (9.525-mm) OR LARGER DIAMETER SHACKLES TO GET THE PITCH UP ATTITUDE OF THE INBOARD FLAP, AT THE 30-DEGREE POSITION.

Inboard Flap Sling  
Figure 405

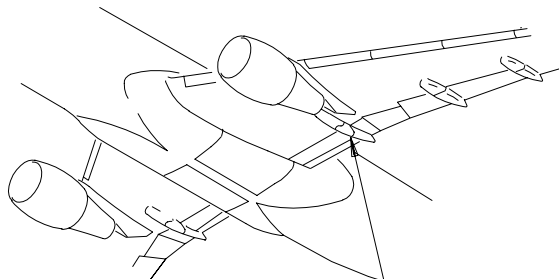
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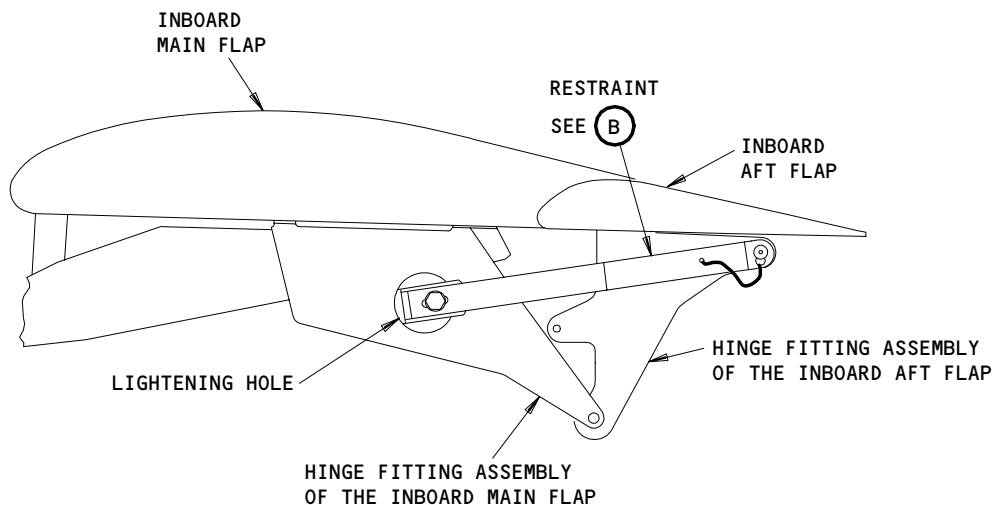
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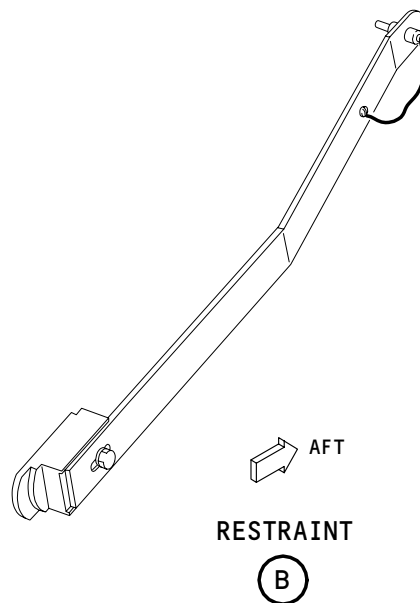
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OUTBOARD LINKAGE - INBOARD FLAP  
SEE (A)



OUTBOARD LINKAGE - INBOARD FLAP  
(A)

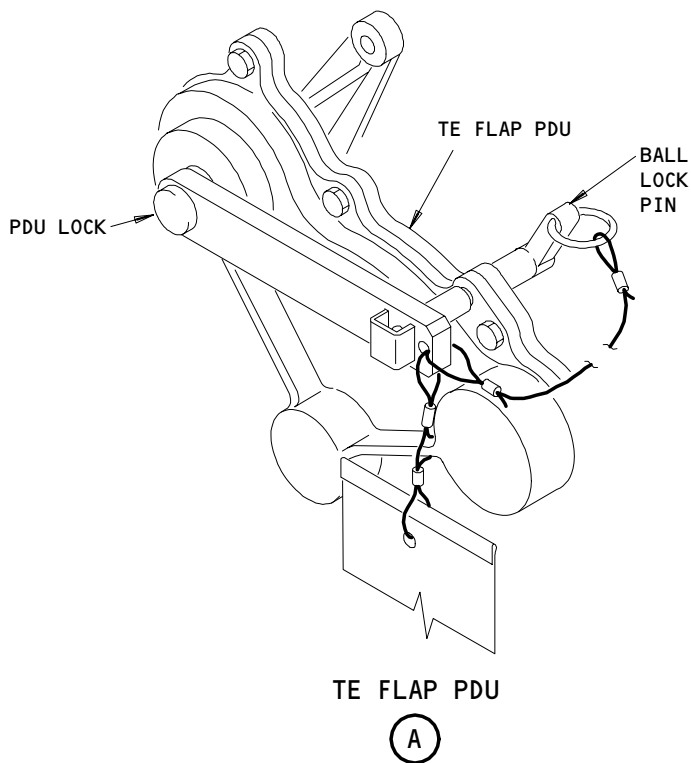
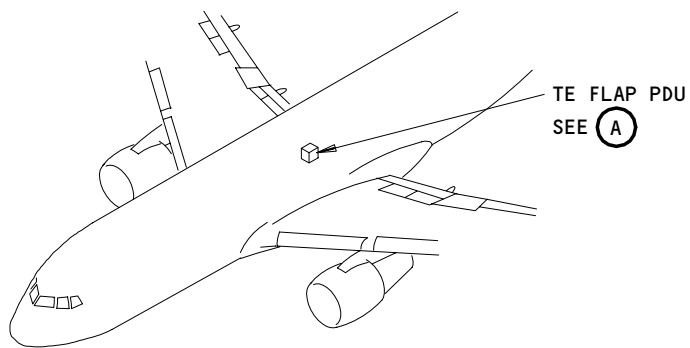


Inboard Aft Flap to Inboard Main Flap Restraint  
Figure 406

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PDU Lock for the TE Flap PDU  
Figure 407

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D. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
550/650	Wing Trailing Edge - Inboard
571/671	Left/Right Inboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

E. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 024-004

- (3) Remove the flap fairing door (AMM 27-51-07/401).

S 864-005

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

S 864-006

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (5) Pressurize the center hydraulic system (AMM 29-11-00/201).

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- S 824-205
- (6) If an aileron rigging bar is not available, do the steps as follows:
- (a) Move the flap control lever to the zero detent to retract the flaps.
  - (b) Make sure the ailerons are approximately in the neutral position.
  - (c) Measure the aileron-to-flaps trailing edge mismatch and keep the dimension to use for the installation.
  - (d) Make sure the ailerons do not move during the flap removal/installation.
- S 864-007
- (7) Move the flap control lever to the 30-unit detent, and permit the flaps to extend.
- S 864-008
- (8) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- S 864-009
- (9) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:
- (a) 6D24, ALTN FLAP PWR
- S 864-010
- (10) Open these circuit breakers on the P6 panel and install circuit breaker locks:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR
- S 864-011
- (11) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11J24, FLAPS ALTN CONT
- S 864-012
- (12) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
- S 494-013
- (13) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 407).

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F. Remove the Inboard Flap

S 024-014

- (1) Remove the aft section of the flap fairing on the inboard flap (AMM 27-51-15/401).

**NOTE:** You can keep the flaps at the fully extended position to remove the aft fairing.

S 024-234

- (2) Remove aft flap outboard linkage as follows:
  - (a) Hold the aft flap in position with a support.
  - (b) At the outboard linkage, disconnect the pushrod (60) from the top of the bellcrank (61) (View C-C, Figure 402).
  - (c) Attach the restraint between the aft flap and the main flap (Figure 406).
  - (d) Remove the support from the aft flap.

S 034-018

- (3) At the outboard linkage, disconnect the pushrod (62) from the mid fairing and remove the nut (100), bolt (96), washers (97, 99) and bushing (98) (View D-D, Fig. 402).

**NOTE:** Identify the parts for the subsequent installation.

S 494-019

- (4) Extend the inboard spoilers 5 and 6 (left wing) or 7 and 8 (right wing) as applicable, and install the locks on the spoiler actuators (AMM 27-61-00/201).

S 494-020

- (5) Install the flap sling at the three attach points on the upper surface of the main flap (Fig. 405).

**NOTE:** It is necessary to hold the flap at the 30-unit pitch up attitude to remove the flap from the wing.

Add 3/8-inch diameter shackles to the two aft cables of the flap sling, as necessary, to get the flap pitch up attitude in the 30-unit position.

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S 494-021

- (6) Connect the overhead hoist to the flap sling.

**NOTE:** Make sure the hoist can hold the weight of the flap with the aft flap attached. The total weight is approximately 470 pounds.

S 034-022

- (7) At the inboard end of the flap, remove the bolts (51, 56), nuts (55), and washers (52, 53, 54) and disconnect the collar fitting (50) from the support beam (View A-A, Fig. 401).

**NOTE:** Make a record of the shim thickness and keep the shim for the subsequent installation.

S 034-023

- (8) At the outboard linkage, disconnect the forward support fitting (63) from the support beam with these steps (View A-A, Fig. 402):
- (a) Remove the pin (94) from the bolt (70) adjacent to the castellated nut (67).
  - (b) Remove the castellated nut (67), bolt (70), and washers (68).
  - (c) Remove the lockwire between the tab washer (65) and the nut (66).
  - (d) Remove the nut (66), tab washer (65), and outer pin (69).

S 034-024

- (9) At the outboard linkage, disconnect the main flap from the support beam with this step (View B-B, Fig. 402):
- (a) Disconnect the four bolts (71), nuts (76), and washers (72, 73, 74, 75, 95).

**NOTE:** Make a record of the shim thickness and keep the shims (77) for the subsequent installation.

S 034-025

- (10) Disconnect the side strut from the support beam and remove the nut (82), bolt (78), washers (79, 81), and bushing (80) (View E-E, Fig. 402).

**NOTE:** Identify these parts with labels for the subsequent installation.

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S 024-026

- (11) Remove the inboard flap from the airplane with these steps:
- Lift the inboard aileron to get more clearance to remove the flap if it is necessary.
  - Lift the outboard end of the inboard flap until the forward support fitting (63) is clear from the support beam (View A-A, Fig. 402).
  - Move the flap to the outboard direction until the flap support tube and the collar fitting (50) is clear from the wing-to-body fairing.
  - Lower the flap from the airplane.
  - Remove the sling from the main flap.

**NOTE:** Keep a record of the quantity and location of the shackles that you added to the flap sling for the subsequent installation.

TASK 27-51-03-424-027

3. Inboard Flap - Installation

A. General

- This task contains the procedure to install the inboard main and aft flap to the wing, together as a unit.
- You can use the instructions given in this task to adjust the fit and fair of the inboard flap after the installation.

B. Equipment

- TE Flap PDU Lock - A27009-7
- Restraint, Aft Flap to Inboard Flap - A27019-8
- Sling Equipment, Inboard TE Flap - A27016-27
- Inboard Aileron Rigging Bar - A27024-47 (Recommended); -2 (Optional)
- Shackles, 3/8 inch (9.525 mm) Diameter - Commercially Available.

C. Consumable Materials

- D00633 Grease - BMS 3-33 (recommended)
- D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- A00247 Sealant - BMS 5-95

D. Parts

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AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
402	94	Inboard TE Flap (LH)	27-51-03	02	170
		Inboard TE Flap (RH)			175
		Pin	27-51-03	10	63
			27-51-03	10A	65

**E. References**

- (1) AMM 20-10-23/401, Lockwires
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-51-00/501, Trailing Edge Flap System
- (4) AMM 27-51-07/401, Flap Fairing Door
- (5) AMM 27-51-15/401, Inboard TE Flap Track Fairings
- (6) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (7) AMM 27-61-00/501, Spoiler/Speed Brake Control System
- (8) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (9) AMM 32-00-15/201, Landing Gear Door Lock
- (10) AMM 57-51-10/501, Trailing Edge Panel

**F. Access**

- (1) Location Zones
  - 144 Right MLG Wheel Well
  - 211/212 Control Cabin
  - 550/650 Wing Trailing Edge - Inboard
  - 571/671 Left/Right Inboard Flap Outboard Fairing
  - 710 Nose Landing Gear and Doors
  - 730/740 Left/Right Main Landing Gear and Doors

**G. Install the Inboard Flap**

S 214-028

- (1) Make sure the aft flap is held stable to the main flap with the restraint (Fig. 406).

S 494-029

- (2) Add the 3/8-inch diameter shackles, to the two aft cables of the flap sling, to get the flap attitude in the 30-unit position as you did during the flap removal.

**NOTE:** Use the same quantity of shackles for this installation as you did for the flap removal.

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S 494-030

- (3) Install the sling to the three attach points on the upper surface of the inboard flap (Fig. 405).

**NOTE:** The flap sling must hold the flap in a pitch-up attitude and align the bottom surface of the flap to the upper surface of the outboard support beam. This will permit you to connect the forward support fitting to the forward end of the main flap (Detail A, Fig. 402).

S 494-031

- (4) Connect the overhead hoist to the sling.

**NOTE:** Make sure the hoist can hold the weight of the flap with the aft flap attached. The total weight is approximately 470 pounds.

S 984-032

- (5) Lift the flap up to its position on the wing.

S 984-033

- (6) Lift the inboard aileron to get more clearance to install the flap if it is necessary.

S 984-034

- (7) Lift the outboard end of the flap up, until the forward support fitting (63) is clear from the support beam (View A-A, Fig. 402).

S 824-035

- (8) Move the flap to the inboard direction and align the collar fitting (50) to the mounting holes on the support beam (View A-A, Fig. 401).

S 984-036

- (9) Lower the outboard end of the flap and put the forward support fitting into the support beam.

S 644-037

- (10) Apply a light layer of grease to all the pins, washers, nuts, bushings, and spacers before each installation.

S 644-038

- (11) Apply grease at the lube points until you can see fresh grease come out at the exit.

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S 434-039

- (12) At the inboard end of the flap, connect the collar fitting (50) to the support beam with four temporary slave bolts (51, 56), nuts (55), and washers (52, 53, 54).  
(a) Tighten the nuts (55) to 200-250 pound-inches (22.6-28.2 Nm).

S 434-040

- (13) At the outboard linkage, connect the forward support fitting (63) to the support beam with these steps (View A-A, Fig. 402):  
(a) Install the outer pin (69), tab washer (65), and nut (66). Tighten the nut to 290-510 pound-inches (33-58 N-m).  
(b) Install a lockwire between the nut and the tab washer with the double twist procedure (AMM 20-10-23/401).  
(c) Install the bolt (70) through the outer pin (69) with washers (68) and a castellated nut (67). Tighten the castellated nut to 30-50 pound-inches (3.4-5.6 N-m).  
(d) Install the pin (94) through the bolt (70) adjacent to the castellated nut.

S 094-043

- (14) Hold the aft flap in position and remove the restraint between the aft flap and the main flap.

S 434-224

- (15) At the outboard linkage, connect the main flap to the support beam with shims (77), four temporary slave bolts (71), washers (72, 73, 74, 95, 75), and nuts (76). Tighten the nuts (76) to 200-250 pound-inches (22.6-28.2 N-m) (View B-B, Fig. 402).

**NOTE:** Use the shims that you removed before, or install new shims with the same thickness.

**NOTE:** Make sure there is no gap between the nut or shim and the structure with a 0.010 inch (0.254 mm) feeler gauge.

S 094-042

- (16) Remove the sling from the main flap.

S 984-044

- (17) Release the weight and slowly lower the aft flap to the extended position.

S 434-045

- (18) At the outboard linkage, do these steps to connect the pushrods (Fig. 402):  
(a) Connect the pushrod (60) to the top of the bellcrank (61) with a bolt (84), washers (85, 87), bushing (86), and nut (88) (View C-C).

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- (b) Tighten the nut to 290-510 pound-inches (33-58 N-m).
- (c) Connect the pushrod (62) to the mid fairing with a bolt (96), washers (97, 99), bushing (98), and nut (100) (View D-D). Tighten the nut.

S 434-046

- (19) Connect the side strut to the support beam with these steps (View E-E, Fig. 402):
  - (a) Remove the lockwire and adjust the length of the side strut as necessary to connect the strut to the support beam.
  - (b) If you adjusted the side strut, install a lockwire to the jamnut with the double twist procedure (AMM 20-10-23/401).
  - (c) Connect the side strut to the support beam with the bolt (78), bushing (80), washer (79, 81), and nut (82).
  - (d) Tighten the nut to 90-125 pound-inches (10.2-14.1 N-m).

S 094-047

- (20) Remove the PDU lock from the TE flap power drive unit (PDU) (Fig. 407).

S 864-048

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELL WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

**CAUTION:** SECURE TRAILING EDGE FLAP FAIRING DOOR ASSEMBLY TO PREVENT CONTACT WITH THE FLAP TORQUE TUBE DURING FLAP RETRACTION.

- (21) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-049

- (22) Move the flap control lever to the zero (FLAPS UP) detent and permit the flaps and slats to move to the fully retracted position.

S 864-050

- (23) Retract the inboard spoilers (AMM 27-61-00/201).

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S 864-051

- (24) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 494-052

- (25) Install the PDU lock in the TE flap PDU (Fig. 407).

S 424-053

- (26) Install the flap fairing door (AMM 27-51-07/401).

S 094-054

- (27) Remove the PDU lock from the TE flap PDU (Fig. 407).

S 224-055

- (28) Do these checks on the inboard flap clearances (AMM 27-51-00/501):

**NOTE:** These checks will make sure that the flap drive system did not get out of the correct adjustment during the flap removal and installation.

- (a) Make sure the extended overtravel stop clearance is correct at the inboard and outboard mechanisms (Details D and H, Fig. 403).  
(b) Make sure the retracted overtravel stop clearance is correct at the inboard and outboard mechanisms (Details C and G, Fig. 403).

S 824-056

- (29) Adjust the fit and fair of the inboard flap with the instruction given in this task.

S 424-057

- (30) Install the aft fairing to the inboard flap (AMM 27-51-15/401).  
H. Adjust the Fit and Fair of the Inboard Flap (Fig. 404).

S 494-058

- (1) Install the PDU lock in the TE flap PDU (Fig. 407).

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S 224-059

- (2) Do the step that follows to set the trailing edge of the inboard aileron 0.40 inch (10.16 mm) below the wing theoretical trailing edge, and measure the aileron-to-flap mismatch (View D-D, Fig. 404):
- (a) If you use an aileron rigging bar, align the aileron lower surface to the 1.40 inch (3.56 cm) mark on the rigging bar.

**NOTE:** Hold the aileron in this position to measure the aileron-to-flap trailing edge mismatch. Do not adjust the rig position of the aileron.

This measurement will tell you if it is necessary to adjust the flap position.

- (b) If you do not use an aileron rigging bar, measure the aileron-to-flap trailing edge mismatch.
- 1) Compare this to the mismatch dimension you measured before you removed the flaps.

S 824-206

- (3) Make sure the outboard trailing edge of the left flap is symmetrical to the opposite location on the right flap within 0.100 inch (2.5 mm).

**NOTE:** Use the inboard aileron as a reference point.

S 824-086

- (4) If the aileron-to-flap mismatch or the flap symmetry requirement is not within the limit, adjust the outboard mechanism with these steps (Fig. 402):
- (a) Remove the nut (82), bolt (78), washers (79, 81), and bushing (80), and disconnect the side strut from the support beam (View E-E).

**NOTE:** Identify the parts with labels for the subsequent installation.

- (b) Adjust the shims at the outboard mechanism (View A-A and B-B) as necessary to get the aileron and flap trailing edge to align correctly.
- (c) Remove the lockwire and adjust the length of the side strut if it is necessary, until you can easily connect the strut to the support beam (View B-B).
- (d) If you adjusted the side strut, install a lockwire to the jamnut with the double twist procedure (AMM 20-10-23/401).
- (e) Connect the side strut back to the support beam with the bolt (78), bushing (80), washers (79 and 81), and nut (82). Tighten the nut to 90-125 pound-inches (10.2-14.1 N-m) (View E-E).

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- S 224-087
- (5) At the inboard trailing edge of the flap, do these checks:
- (a) Make sure the distance between the flap trailing edge to the rigging fastener on the wing/body fairing is within the limit (View G-G, Fig. 404).
- S 824-088
- (6) Adjust the shims at the inboard mechanism if it is necessary to get the correct dimension requirement (View B-B, Fig. 401).
- S 224-089
- (7) Make sure the clearance between the main flap and the inboard aileron is correct (View B-B, Fig. 404).
- S 224-095
- (8) 767-200 AIRPLANES;  
Make sure the clearance between the main flap and the fairing door is below the limit (View F-F, Fig. 404). Adjust the fairing door if it is necessary (AMM 27-51-07/401).
- S 224-096
- (9) Make sure the clearance and the mismatch between the upper surface of the aft flap and the cove panel are below the limits (View C-C, Fig. 404).
- S 824-097
- (10) Adjust the bull nose fairing mismatch (AMM 27-51-07/401).
- S 824-098
- (11) Adjust the nose panel mismatch (AMM 27-51-07/401).
- S 824-099
- (12) Measure and adjust the spoiler-to-flap clearances (AMM 27-61-00/501, Adjust Spoiler Control Actuators).
- S 824-100
- (13) Adjust the vertical mismatch between the inboard main flap and the lower trailing edge panel (AMM 57-51-10/501).
- S 394-101
- (14) Apply sealant to the shims at the inboard mechanism of the inboard flap (View B-B, Fig. 401).
- S 394-102
- (15) Apply sealant to the shims at the outboard mechanism of the inboard flap (View A-A and B-B, Fig. 402).
- S 094-227
- (16) Remove the PDU lock from the TE flap PDU (Fig. 407).

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S 864-228

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELL WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(17) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-229

(18) Move the flap control lever to the 25-unit position and permit the flaps to move to the 25-unit position.

S 864-230

(19) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 824-231

- (20) Measure the distance that the upper seal of the main flap touches the side of the body fairing panel.
- (a) Adjust the seal retainer (Fig. 404) if the forward part of the seal does not touch in the limit of  $12.0 \pm 4.0$  inches ( $30.5 \pm 10.1$  centimeters).
  - (b) Make sure that the distance the seal touches on the opposite flap is symmetrical in  $\pm 1$  inch ( $\pm 25.4$  mm).

I. Install Final Bolts to Flaps

S 024-319

(1) Remove the flap fairing door (AMM 27-51-07/401).

S 024-320

(2) Remove the temporary slave bolts (51, 56, 71) and shims (77).

NOTE: Remove and install the slave bolts one at a time.

S 394-283

(3) Fay surface seal the top and bottom shim interfaces on the support beam with PR-1405G or BMS 5-95 sealant. Coverage thickness shall be such that the stacked shim edges are not visible.

S 424-284

(4) Reinstall temporary slave bolts (51, 56, 71) and shims (77) at the noted locations, and retorquing nuts to 200-250 pound-inches (22.6-28.2 newton-meters).

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S 024-285

- (5) Remove the temporary slave bolts (51, 56) from the inboard linkage and replace with the final bolts (51, 56), one at a time.

**NOTE:** Make sure the bolts have the correct bolt grip length.  
Bolt grip length is dependent on the number of shims used.

- (a) Before insertion of the final bolts, coat the inside of the hole to its full depth with PR-1405G or BMS 5-95 sealant.  
(b) Insert the final bolts (51, 56) into the carrier beam at the inboard linkage wet with PR-1405G or BMS 5-95 per BAC 5000, method 3. After the bolts have been inserted, remove any excess sealant from the bolt threads and surrounding surface of the support beam.

**NOTE:** Use a dry wiper. Do not use solvents.

S 424-286

- (6) Initially tighten the nuts (55) to the lower value of the torque range of 970-1170 pound-inches (109-133 newton-meters).

S 424-287

- (7) Re-tighten the nuts (55) 20 minutes or more after installation to within torque range of 970-1170 pound-inches (109-133 newton-meters).

**NOTE:** Final torque must be applied before the squeeze out life of the sealant expires.

S 424-288

- (8) Remove the temporary slave bolts (71) from the aft end of the support beam and replace with the final bolts (71), one at a time.

**NOTE:** Make sure the bolts have the correct bolt grip length. Bolt grip length is dependent on the number of shims used.

- (a) Before insertion of the final bolts, coat the inside of the hole to its full depth with PR-1405G or BMS 5-95 sealant.  
(b) Insert the final bolts (71) into the aft end of the support beam wet with PR-1405G or BMS 5-95 per BAC 5000, method 3. After the bolts have been inserted, remove any excess sealant from the bolt threads and surrounding surface of the support beam.

**NOTE:** Use a dry wiper. Do not use solvents.

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S 424-289

- (9) Initially tighten the nuts (76) to the lower value of the torque range of 250-300 pound-inches (28.2-33.9 newton-meters).

S 424-303

- (10) Re-tighten the nuts (76) 20 minutes or more after installation to within torque range of 250-300 pound-inches (28.2-33.9 newton-meters).

NOTE: Final torque must be applied before the squeeze out life of the sealant expires.

S 394-317

- (11) Following final torque of all flap attach bolts, fillet seal around shims with PR-1405G or BMS 5-95 per BAC 5000. Option: brush coat application is acceptable. Coverage thickness shall be such that stacked shim edges are not visible.

J. Put the Airplane Back to Its Usual Condition

S 424-339

- (1) Install the flap fairing door (AMM 27-51-07/401).

S 094-103

- (2) Remove the PDU lock from the TE flap PDU (Fig. 407).

S 864-104

- (3) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-105

- (4) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 094-106

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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TASK 27-51-03-024-107

4. Inboard Main Flap - Removal

A. General

- (1) This task contains the procedure to remove the inboard main flap, with the aft flap disconnected from the main flap.

B. Equipment

- (1) Circuit Breaker Lockout Clip - 1012LC-R  
Commercially Available  
(2) Sling Equipment, Inboard TE Flap - A27016-27  
(3) TE Flap PDU Lock - A27009-7  
(4) Shackles 3/8-inch Diameter - Commercially Available.

C. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 27-51-06/201, Inboard Flap, Aft Flap  
(3) AMM 27-51-07/401, Flap Fairing Door  
(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 32-00-15/201, Landing Gear Door Lock  
(7) AMM 32-00-20/201, Landing Gear Downlock

D. Access

- (1) Location Zones
- |         |  |
|---------|--|
| 144     | Right MLG Wheel Well                     |
| 211/212 | Control Cabin                            |
| 550/650 | Wing Trailing Edge - Inboard             |
| 571/671 | Left/Right Inboard Flap Outboard Fairing |
| 710     | Nose Landing Gear and Doors              |
| 730/740 | Left/Right Main Landing Gear and Doors   |

E. Prepare for the Removal

S 214-108

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-109

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 034-110

- (3) Remove the flap fairing door (AMM 27-51-07/401).

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S 024-111

**CAUTION:** MAKE SURE THE DRIVE ROD FOR THE FAIRING DOOR IS CLEAR FROM THE MOVEMENT OF THE INBOARD FLAP MECHANISM BEFORE YOU EXTEND THE FLAP TO REMOVE THE AFT FLAP. IF THE MOVEMENT OF THE MECHANISM IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(4) Remove the inboard aft flap (AMM 27-51-06/201).

**NOTE:** Keep the flaps in the fully extended position after you remove the aft flap.

F. Remove the Inboard Main Flap

S 034-112

(1) At the outboard linkage, disconnect the pushrod (62) from the mid fairing and remove the nut (100), bolt (96), washers (97, 99) and bushing (98) (View D-D, Fig. 402).

**NOTE:** Identify the parts for the subsequent installation.

S 034-113

(2) At the outboard linkage, disconnect the pushrod (60) from the top of the bellcrank (61) (View C-C, Fig. 402).

**NOTE:** Identify the sleeve and bushing (86) with a label for the subsequent installation.

S 494-114

(3) Extend the inboard spoilers 5 and 6 (left wing) or 7 and 8 (right wing) as applicable, and install the locks on the spoiler actuators (AMM 27-61-00/201).

S 494-115

(4) Install the flap sling at the three attach points on the upper surface of the main flap (Fig. 405).

**NOTE:** It is necessary to hold the flap at the 30-unit pitch up attitude to remove the flap from the wing.

Add 3/8-inch diameter shackles to the two aft cables of the flap sling, as necessary, to get the flap pitch up attitude in the 30-unit position.

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S 494-116

- (5) Connect the overhead hoist to the flap sling.

**NOTE:** Make sure the hoist can hold the weight of the main flap. The weight of the main flap is approximately 370 pounds (170 kg).

S 034-117

- (6) At the inboard end of the flap, remove the bolts (51, 56), nuts (55), and washers (52, 53, 54) and disconnect the collar fitting (50) from the support beam (View A-A, Fig. 401).

**NOTE:** Make a record of the shim thickness and keep the shim for the subsequent installation.

S 034-118

- (7) At the outboard linkage, disconnect the forward support fitting (63) from the support beam with these steps (View A-A, Fig. 402):
- (a) Remove the pin (94) from the bolt (70) adjacent to the castellated nut (67).
  - (b) Remove the castellated nut (67), bolt (70), and washers (68).
  - (c) Remove the lockwire between the tab washer (65) and the nut (66).
  - (d) Remove the nut (66), tab washer (65), and outer pin (69).

S 034-119

- (8) At the outboard linkage, disconnect the main flap from the support beam with this step (View B-B, Fig. 402):
- (a) Disconnect the four bolts (71), nuts (76), and washers (72, 73, 74, 75, 95).

**NOTE:** Make a record of the shim thickness and keep the shims (77) for the subsequent installation.

S 034-120

- (9) Disconnect the side strut from the support beam and remove the nut (82), bolt (78), washers (79 and 81), and bushing (80) (View E-E, Fig. 402).

**NOTE:** Identify these parts with labels for the subsequent installation.

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S 024-121

- (10) Remove the inboard main flap from the airplane with these steps:
- (a) Lift the inboard aileron to get more clearance to remove the main flap if it is necessary.
  - (b) Lift the outboard end of the main flap until the forward support fitting (63) is clear from the support beam (View A-A, Fig. 402).
  - (c) Move the flap to the outboard direction until the flap support tube and the collar fitting (50) is clear from the wing-to-body fairing.
  - (d) Lower the flap from the airplane.
  - (e) Remove the sling from the main flap.

**NOTE:** Keep a record of the quantity and location of the shackles that you added to flap sling for the subsequent installation.

TASK 27-51-03-424-122

5. Inboard Main Flap - Installation

A. General

- (1) This task contains the procedure to install the inboard main flap with the aft flap disconnected from the main flap.
- (2) Follow the instruction given in this task to adjust the fit and fair of the inboard flap after the installation.

B. Equipment

- (1) Sling Equipment, Inboard TE Flap - A27016-27
- (2) Inboard Aileron Rigging Bar - A27024-47 (Recommended); -2 (Optional)
- (3) TE Flap PDU Lock - A27009-7
- (4) Shackles 3/8-inch Diameter - Commercially Available.

C. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (recommended)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) A00247 Sealant - BMS 5-95

D. Parts

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AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
402		Inboard TE Main Flap	27-51-03	10	205,206, 207,208, 209,220, 221,222
			27-51-03	10A	236,237, 238,239, 242,243, 244
	94	Pin	27-51-03	10	63
			27-51-03	10A	65

**E. References**

- (1) AMM 20-10-23/401, Lockwires
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-51-00/501, Trailing Edge Flap System
- (4) AMM 27-51-06/201, Inboard Flap, Aft Flap
- (5) AMM 27-51-07/401, Flap Fairing Door
- (6) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (7) AMM 27-61-00/501, Spoiler/Speed Brake Control System
- (8) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (9) AMM 32-00-15/201, Landing Gear Door Lock
- (10) AMM 57-51-10/501, Trailing Edge Panel

**F. Access**

- (1) Location Zones
  - 144 Right MLG Wheel Well
  - 211/212 Control Cabin
  - 550/650 Wing Trailing Edge - Inboard
  - 571/671 Left/Right Inboard Flap Outboard Fairing
  - 710 Nose Landing Gear and Doors
  - 730/740 Left/Right Main Landing Gear and Doors

**G. Install the Inboard Main Flap**

S 494-123

- (1) Add the 3/8-inch diameter shackles, to the two aft cables of the flap sling, to get the flap attitude in the 30-unit position as you did during the flap removal.

**NOTE:** Use the same quantity of shackles for this installation as you did for the flap removal.

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S 494-124

- (2) Install the sling to the three attach points on the upper surface of the inboard flap (Fig. 405).

**NOTE:** The flap sling must hold the flap in a pitch-up attitude and align the bottom surface of the flap to the upper surface of the outboard support beam. This will permit you to connect the forward support fitting to the forward end of the main flap (Detail A, Fig. 402).

S 494-125

- (3) Connect the overhead hoist to the sling.

**NOTE:** Make sure the hoist can hold the weight of the main flap. The weight of the main flap is approximately 370 pounds (170 kg).

S 984-126

- (4) Lift the main flap up to its position on the wing.

S 984-127

- (5) Lift the inboard aileron to get more clearance to install the flap if it is necessary.

S 984-128

- (6) Lift the outboard end of the main flap up, until the forward support fitting (63) is clear from the support beam (View A-A, Fig. 402).

S 824-129

- (7) Move the flap to the inboard direction and align the collar fitting (50) to the mounting holes on the support beam (View A-A, Fig. 401).

S 984-130

- (8) Lower the outboard end of the main flap and put the forward support fitting into the support beam.

S 644-131

- (9) Apply a light layer of grease to all the pins, washers, nuts, bushings, and spacers before each installation.

S 644-132

- (10) Apply grease at the lube points until you can see fresh grease come out at the exit.

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S 434-223

- (11) At the inboard end of the flap, connect the collar fitting (50) to the support beam with four temporary slave bolts (51, 56), nuts (55), and washers (52, 53, 54). Torque the nuts (55) to 200-250 pound-inches (22.6-28.2 N-m) (View A-A, Fig. 401).

S 434-134

- (12) At the outboard linkage, connect the forward support fitting (63) to the support beam with these steps (View A-A, Fig. 402):
- (a) Install the outer pin (69), tab washer (65), and nut (66). Tighten the nut to 290-510 pound-inches (32.8-57.6 N-m).
  - (b) Install a lockwire between the nut and the tab washer with the double twist procedure (AMM 20-10-23/401).
  - (c) Install the bolt (70) through the outer pin (69) with washers (68) and a castellated nut (67). Tighten the castellated nut to 30-50 pound-inches (3.4-5.6 N-m).
  - (d) Install the pin (94) through the bolt (70) adjacent to the castellated nut.

S 434-135

- (13) At the outboard linkage, connect the main flap to the support beam with shims (77), four temporary slave bolts (71), washers (72, 73, 74, 95, 75), and nuts (76). Tighten the nuts (76) to 200-250 pound-inches (22.6-28.2 N-m) (View B-B, Fig. 402).

**NOTE:** Use the shims that you removed before, or install new shims with the same thickness.

**NOTE:** Make sure there is no gap between the nut or shim and the structure with a 0.010 inch (0.254 mm) feeler gauge.

S 094-136

- (14) Remove the sling from the main flap.

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S 434-137

- (15) At the outboard linkage, do these steps to connect the pushrods (Fig. 402):
- (a) Connect the pushrod (60) to the top of the bellcrank (61) with a bolt (84), washers (85, 87), bushing (86), and nut (88) (View C-C).
  - (b) Tighten the nut to 290-510 pound-inches.
  - (c) Connect the pushrod (62) to the mid fairing with a bolt (96), washers (97, 99), bushing (98), and nut (100) (View D-D). Tighten the nut.

S 434-138

- (16) Connect the side strut to the support beam with these steps (View E-E, Fig. 402):
- (a) Remove the lockwire and adjust the length of the side strut as necessary to connect the strut to the support beam.
  - (b) If you adjusted the side strut, install a lockwire to the jamnut with the double twist procedure (AMM 20-10-23/401).
  - (c) Connect the side strut to the support beam with the bolt (78), bushing (80), washer (79, 81), and nut (82).
  - (d) Tighten the nut to 90-125 pound-inches (10.2-14.1 N-m).

S 424-139

**CAUTION:** MAKE SURE THE DISCONNECTED DRIVE ROD FOR THE FAIRING DOOR IS CLEAR FROM THE MOVEMENT OF THE INBOARD FLAP MECHANISM BEFORE YOU EXTEND OR RETRACT THE FLAPS TO INSTALL THE AFT FLAP. IF THE MOVEMENT OF THE MECHANISM IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (17) Install the inboard aft flap (AMM 27-51-06/201), but DO NOT close these circuit breakers:
- (a) On the P6 panel:
    - 1) 6D21, ALTN SLAT INBD PWR
    - 2) 6D24, ALTN FLAP PWR
    - 3) 6F24, ALTN SLAT OUTBD PWR
  - (b) On the P11 panel:
    - 1) 11H23, SLAT ALTN CONT INBD
    - 2) 11H24, SLAT ALTN CONT OUTBD
    - 3) 11J24, FLAPS ALTN CONT

S 494-140

- (18) Install the PDU lock in the TE flap PDU (Fig. 407).

S 864-142

- (19) Retract the inboard spoilers (AMM 27-61-00/201).

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S 864-143

- (20) Lower the inboard aileron to its usual position.

S 094-144

- (21) Remove the PDU lock from the TE flap PDU (Fig. 407).

S 224-145

- (22) Do these checks on the inboard flap clearances (AMM 27-51-00/501):

**NOTE:** These checks will make sure that the flap drive system did not get out of the correct adjustment during the flap removal and installation.

- (a) Make sure the extended overtravel stop clearance is correct at the inboard and outboard mechanism (Details D and H, Fig. 403).
- (b) Make sure the retracted overtravel stop clearance is correct at the inboard and outboard mechanism (Details C and G, Fig. 403).

S 824-146

- (23) Adjust the fit and fair of the inboard flap with the instruction given in this task.

H. Adjust the Fit and Fair of the Inboard Flap (Fig. 404).

S 494-147

- (1) Install the PDU lock in the TE flap PDU (Fig. 407).

S 224-148

- (2) Do the step that follows to set the trailing edge of the inboard aileron 0.40 inch (10.2 mm) below the wing theoretical trailing edge, and measure the aileron-to-flap mismatch (View D-D, Fig. 404):
- (a) Use the aileron rigging bar and align the aileron lower surface to the 1.40 inch (35.56 mm) mark on the rigging bar.

**NOTE:** Hold the aileron in this position to measure the aileron-to-flap trailing edge mismatch. Do not adjust the rig position of the aileron.

This measurement will tell you if it is necessary to adjust the flap position.

S 824-207

- (3) Make sure the outboard trailing edge of the left flap is symmetrical to the opposite location on the right flap within 0.100 inch (2.5 mm).

**NOTE:** Use the inboard aileron as a reference point.

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S 824-175

- (4) If the aileron-to-flap mismatch or the flap symmetry requirement is not within the limit, adjust the outboard mechanism with these steps (Fig. 402):

(a) Remove the nut (82), bolt (78), washers (79, 81), and bushing (80), and disconnect the side strut from the support beam (View E-E).

NOTE: Identify the parts with labels for the subsequent installation.

- (b) Adjust the shims at the outboard mechanism (View A-A and B-B), as necessary, to get the aileron and flap trailing edge to align correctly.
- (c) Remove the lockwire and adjust the length of the side strut if it is necessary, until you can easily connect the strut to the support beam (View B-B).
- (d) If you adjusted the side strut, install a lockwire to the jamnut with the double twist procedure (AMM 20-10-23/401).
- (e) Connect the side strut to the support beam with the bolt (78), bushing (80), washers (79, 81), and nut (82). Tighten the nut to 90-125 pound-inches (10.16-14.12 newton-meters) (View E-E).

S 224-176

- (5) At the inboard edge of the flap, do these checks:
- (a) Make sure the distance between the flap trailing edge to the rigging fastener on the wing/body fairing is correct (View G-G, Fig. 404).

S 824-177

- (6) Adjust the shims at the inboard mechanism if it is necessary to get the correct dimension requirement (View B-B, Fig. 401).

S 224-178

- (7) Make sure the clearance between the main flap and the inboard aileron is correct (View B-B, Fig. 404).

S 224-184

- (8) 767-200 AIRPLANES;  
Make sure the clearance between the main flap and the fairing door is below the limit (View F-F, Fig. 404). Adjust the fairing door if it is necessary (AMM 27-51-07/401).

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- S 224-185
- (9) Make sure the clearance and the mismatch between the upper surface of the aft flap and the cove panel are below the limits (View C-C, Fig. 404).
- S 824-186
- (10) Adjust the Bull Nose fairing mismatch (AMM 27-51-07/401).
- S 824-187
- (11) Adjust the Nose Panel mismatch (AMM 27-51-07/401).
- S 824-188
- (12) Measure and adjust the spoiler-to-flap clearances (AMM 27-61-00/501, Adjust Spoiler Control Actuators).
- S 824-189
- (13) Adjust the vertical mismatch between the inboard main flap and the lower trailing edge panel (AMM 57-51-10/501).
- S 394-190
- (14) Apply sealant to the shims at the inboard mechanism of the inboard flap (View B-B, Fig. 401).
- S 394-191
- (15) Apply sealant to the shims at the outboard mechanism of the inboard flap (View A-A and B-B, Fig. 402).
- S 094-192
- (16) Remove the PDU lock from the TE flap PDU (Fig. 407).
- S 864-199

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELL WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (17) Pressurize the center hydraulic system (AMM 29-11-00/201).
- S 864-201
- (18) Move the flap control lever to the 25-unit position and permit the flaps to move to the 25-unit position.
- S 864-202
- (19) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

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S 824-204

- (20) Measure the distance that the upper seal of the main flap touches the side of the body fairing panel.
- (a) Adjust the seal retainer (Fig. 404) if the forward part of the seal does not touch in the limit of 12.0 ±4.0 inches (30.5 +/- 10.1 centimeters).
  - (b) Make sure that the distance the seal touches on the opposite flap is symmetrical in ± 1 inch (+/- 25.4 mm).

S 864-197

- (21) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-203

- (22) Move the flap control lever to the zero (FLAPS UP) detent and permit the flaps to move to the fully retracted position.

I. Install Final Bolts to Flaps

S 024-237

- (1) Remove temporary slave bolts (51, 56, 71) and shims (77), noting the location of each bolt and shim.

S 394-238

- (2) Fay surface seal the top and bottom shim interfaces on the support beam with PR-1405G or BMS 5-95 sealant. Coverage thickness shall be such that the stacked shim edges are not visible.

S 424-239

- (3) Reinstall temporary slave bolts (51, 56, 71) and shims (77) at the noted locations, and retorque nuts to 200-250 pound-inches (22.6-28.2 newton-meters).

S 024-240

- (4) Remove the temporary slave bolts (51, 56) from the inboard linkage and replace with the final bolts (51, 56), one at a time.

**NOTE:** Make sure the bolts have the correct bolt grip length.  
Bolt grip length is dependent on the number of shims used.

- (a) Before you put in the final bolts, coat the hole to its full depth with PR-1405G or BMS 5-95 sealant.
- (b) Put the final bolts (51, 56) into the carrier beam at the inboard linkage (wet with PR-1405G or BMS 5-95 per BAC 5000, method 3). After you put in the bolts, remove the sealant from the bolt threads and surface of the support beam.

**NOTE:** Use a dry wiper. Do not use solvents.

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S 424-241

- (5) Initially tighten the nuts (55) to the lower value of the torque range of 970-1170 pound-inches (109-133 newton-meters).

S 424-242

- (6) Re-tighten the nuts (55) 20 minutes or more after installation to within torque range of 970-1170 pound-inches (109-133 newton-meters).

NOTE: Final torque must be applied before the squeeze out life of the sealant expires.

S 424-243

- (7) Remove the temporary slave bolts (71) from the aft end of the support beam and replace with the final bolts (71), one at a time.

NOTE: Make sure the bolts have the correct bolt grip length. Bolt grip length is dependent on the number of shims used.

- (a) Before insertion of the final bolts, coat the inside of the hole to its full depth with PR-1405G or BMS 5-95 sealant.  
(b) Insert the final bolts (71) into the aft end of the support beam wet with PR-1405G or BMS 5-95 per BAC 5000, method 3. After the bolts have been inserted, remove any excess sealant from the bolt threads and surrounding surface of the support beam.

NOTE: Use a dry wiper. Do not use solvents.

S 424-244

- (8) Initially tighten the nuts (76) to the lower value of the torque range of 250-300 pound-inches (28.2-33.9 newton-meters).

S 424-258

- (9) Re-tighten the nuts (76) 20 minutes or more after installation to within torque range of 250-300 pound-inches (28.2-33.9 newton-meters).

NOTE: Final torque must be applied before the squeeze out life of the sealant expires.

S 394-272

- (10) Following final torque of all flap attach bolts, fillet seal around shims with PR-1405G or BMS 5-95 per BAC 5000. Option: brush coat application is acceptable. Coverage thickness shall be such that stacked shim edges are not visible.

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J. Put the Airplane Back to Its Usual Condition

S 424-338

- (1) Install the flap fairing door (AMM 27-51-07/401).

S 864-193

- (2) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-194

- (3) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 094-195

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 864-198

- (5) Remove hydraulic power (AMM 29-11-00/201).

S 864-196

- (6) Remove electrical power (AMM 24-22-00/201).

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INBOARD FLAP MECHANISM – MAINTENANCE PRACTICES

1. General

- A. This procedure contains five tasks. The first task is the removal of the Actuator Crank Arm and the Inboard 6-7 and 6-9 Drive Arms. The second task is the installation of the Actuator Crank Arm and the Inboard 6-7 and 6-9 Drive Arms. The third task is the removal of the 3-10 link. The fourth task is the installation of the 3-10 link. The fifth task contains approved repairs for the Reaction Link Support on the inboard flap drive.

TASK 27-51-04-002-134

2. Remove the Actuator Crank Arm and Inboard 6-7 and 6-9 Drive Arms

A. General

- (1) This task gives information for the removal of the Actuator Crank Arm and the Inboard 6-7 and 6-9 Drive Arms. Because this task contains two procedures, do only the applicable group of steps.
- (2) To start one of these procedures, do the "Prepare for Removal" group of steps. Then, do the group of steps that is necessary to remove the component.

B. Equipment

- (1) Adapter – Flap Drive – F70300-1  
(Torque Tube Manual Drive Tool)
- (2) Air Motor with 1/2 inch square drive  
(Commercially Available)

NOTE: A motor to turn the torque tubes to manually extend and retract the flaps.

- (3) TE Flap PDU Lock – A27009-7
- (4) Circuit Breaker Lockout Clip – 1012LC-4  
Commercially Available
- (5) Locks, Inboard Flap, Left and Right Inboard Linkages from Inboard and Outboard TE Flap Lock Set – A27074-128
- (a) Lock, Inboard Linkage, Left Inboard Flap – A27074-123
- (b) Lock, Inboard Linkage, Right Inboard Flap – A27074-124
- (c) Lock, Outboard Linkage, Inboard Flaps – A27074-6

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-44-00/201, Wing Access Doors and Panels
- (3) AMM 24-22-00/201, Electrical Power – Control
- (4) AMM 27-51-00/501, TE Flap System
- (5) AMM 27-51-05/401, Inboard TE Flap, Inboard Rotary Actuator
- (6) AMM 27-51-07/401, Flap Fairing Door
- (7) AMM 27-51-11/401, Inboard TE Flap, Outboard Rotary Actuator
- (8) AMM 27-51-41/401, TE Flap Torque Tube
- (9) AMM 27-51-45/201, Flap Position Transmitters
- (10) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

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- (11) AMM 32-00-15/201, Landing Gear Door Lock
- (12) AMM 32-00-20/201, Landing Gear Downlock

D. Access

- (1) Location Zones
  - 555/655 Inboard Trailing Edge Flap
- (2) Access Panels
  - 195JL Inboard TE Flap Mechanism
  - 196JR Inboard TE Flap Mechanism
  - 552FB Spoiler Beam, Flap Installation
  - 652FB Spoiler Beam, Flap Installation

E. Prepare for Removal

S 492-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 492-003

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 862-004

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

S 862-001

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELL WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Supply the power to the center hydraulic system (AMM 29-11-00/201).

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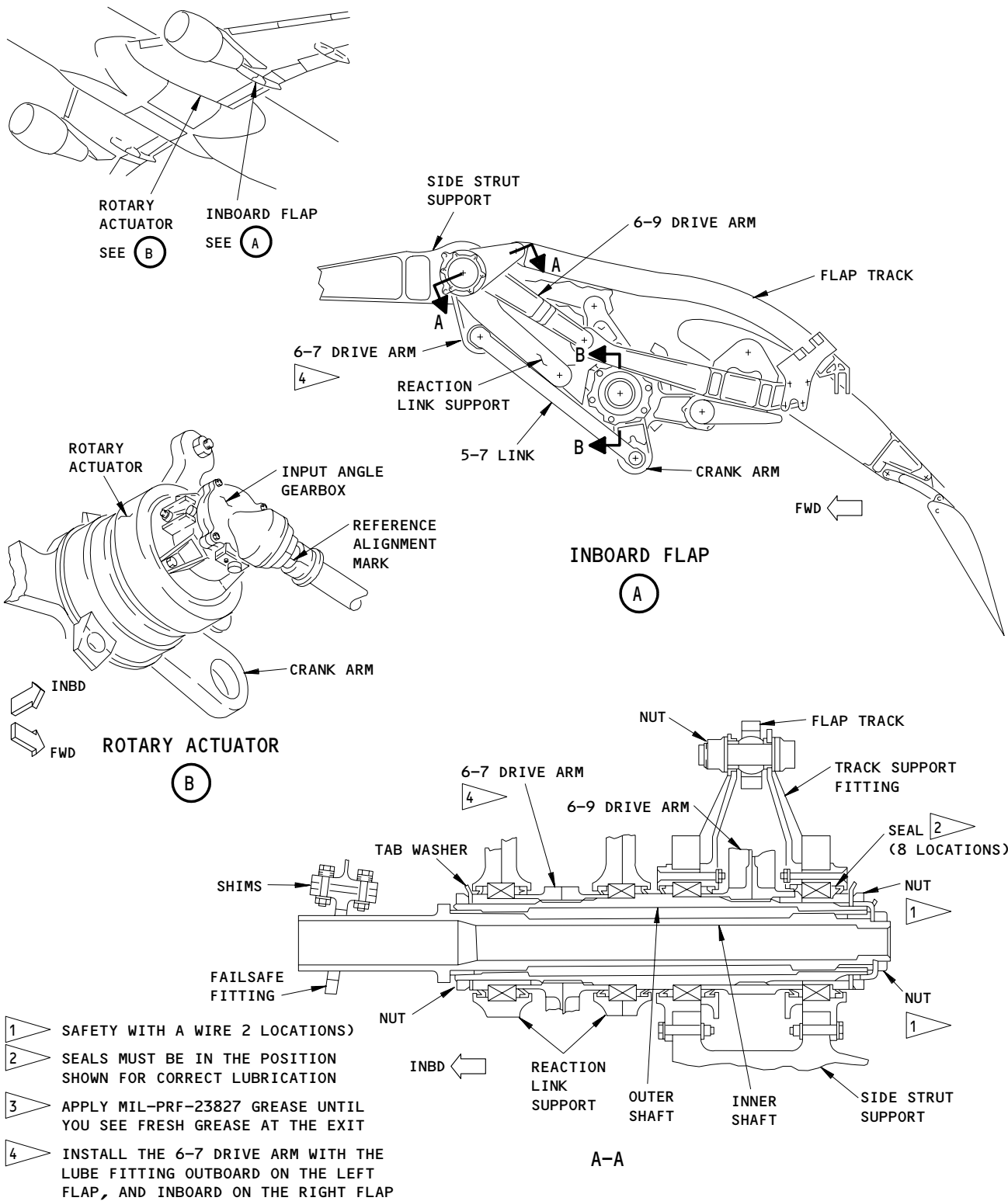
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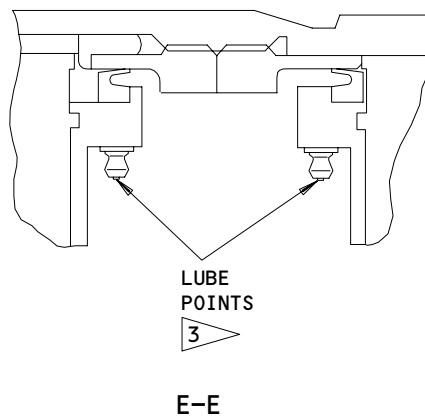
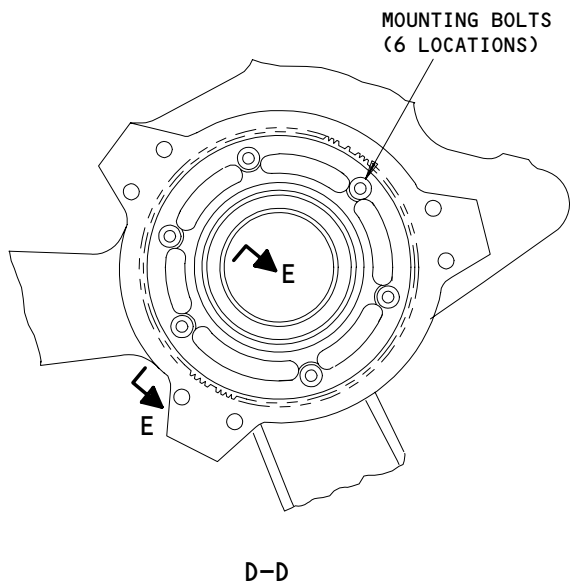
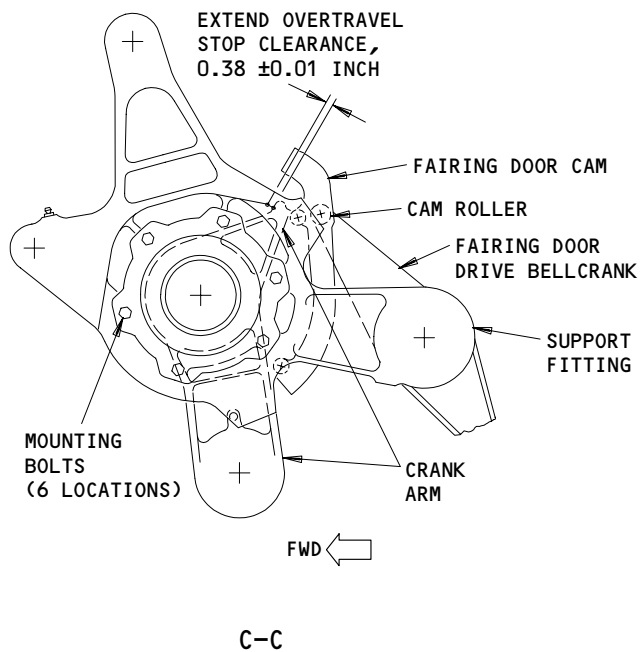
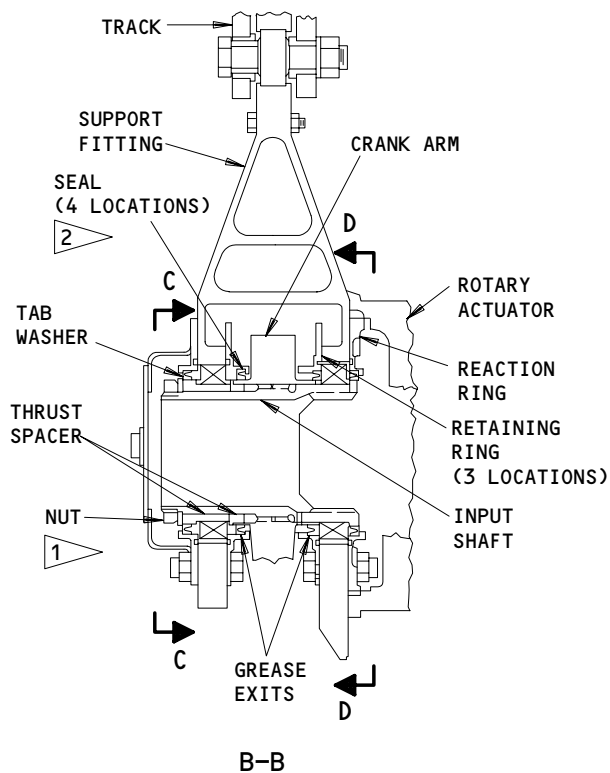
- 1 SAFETY WITH A WIRE (2 LOCATIONS)
- 2 SEALS MUST BE IN THE POSITION SHOWN FOR CORRECT LUBRICATION
- 3 APPLY MIL-PRF-23827 GREASE UNTIL YOU SEE FRESH GREASE AT THE EXIT
- 4 INSTALL THE 6-7 DRIVE ARM WITH THE LUBE FITTING OUTBOARD ON THE LEFT FLAP, AND INBOARD ON THE RIGHT FLAP

Inboard Flap-Inboard Crank and Drive Arms  
Figure 201 (Sheet 1)

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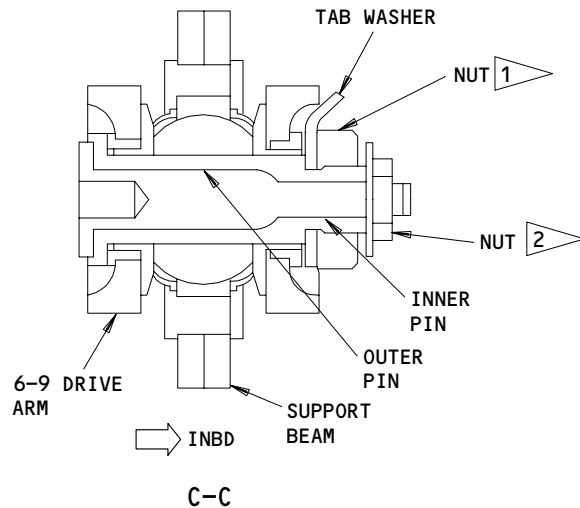
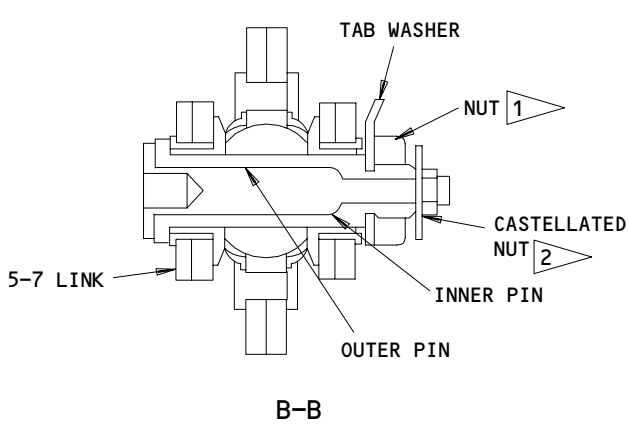
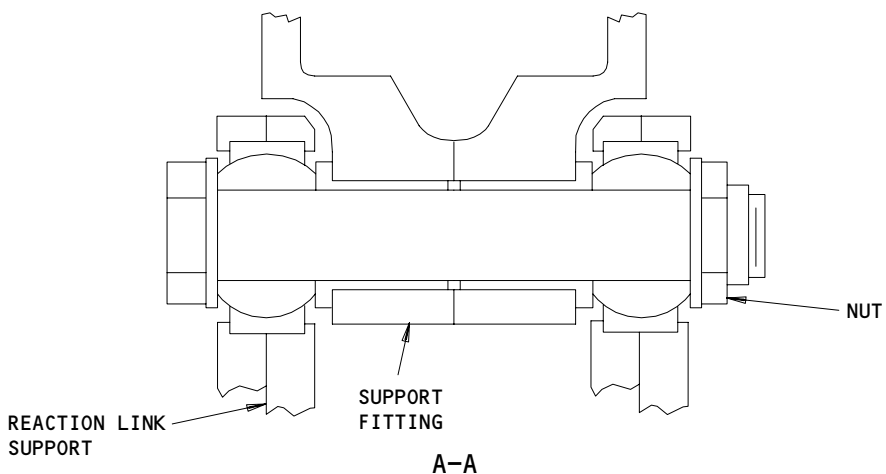
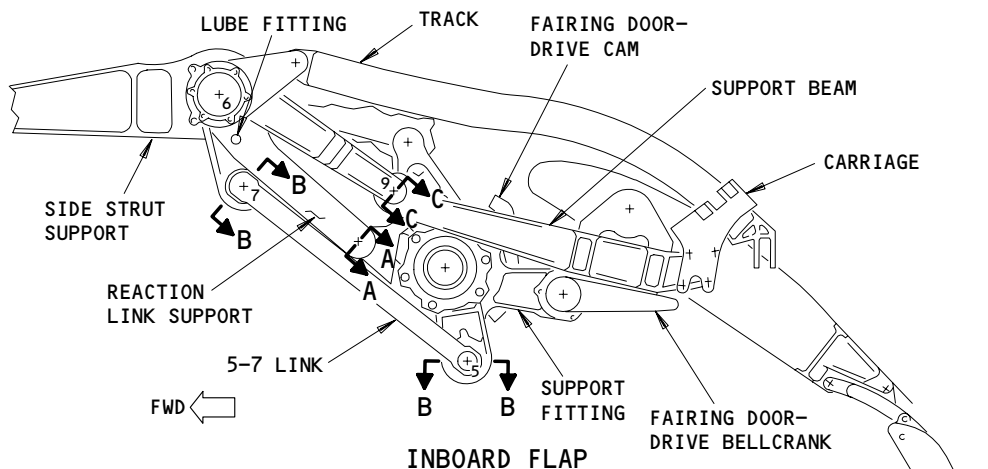
13098



Inboard Flap-Inboard Crank and Drive Arms  
Figure 201 (Sheet 2)

EFFECTIVITY	
	ALL

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- 1 SAFETY WITH A WIRE
- 2 INSTALL RETAINING PIN AND SAFETY WITH A WIRE

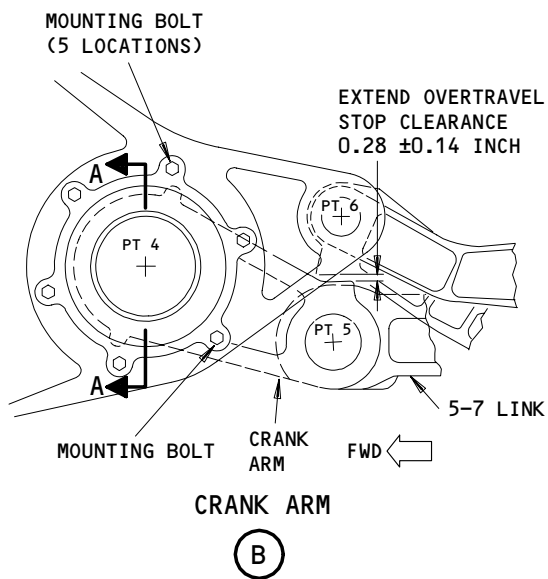
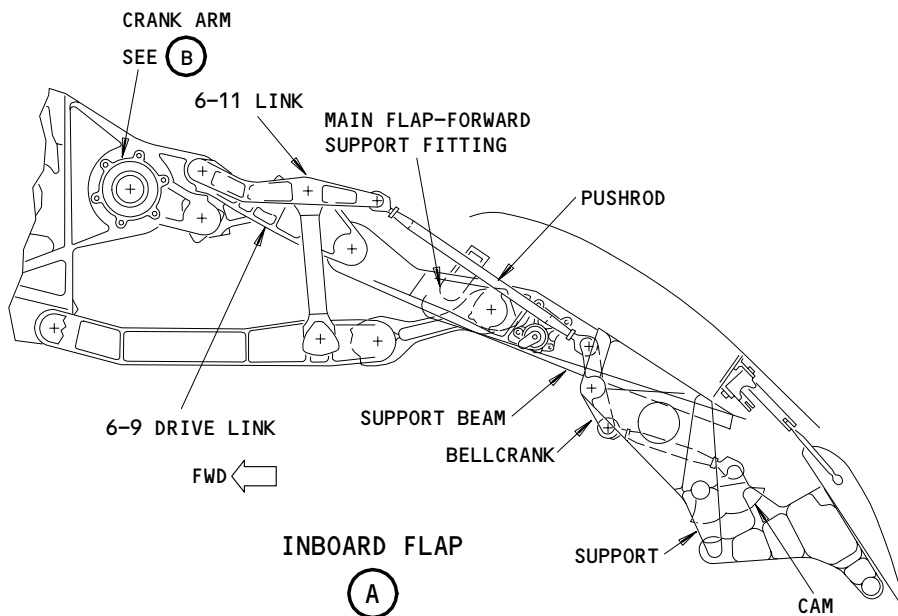
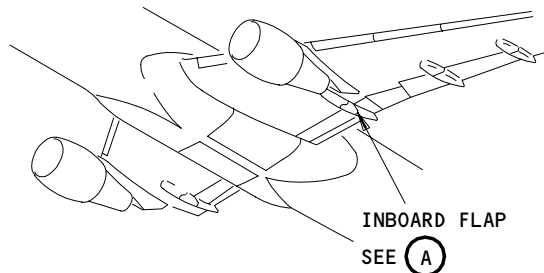
**Inboard Flap-Inboard Linkages  
Figure 202**

EFFECTIVITY	ALL
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# BOEING

## 767 MAINTENANCE MANUAL



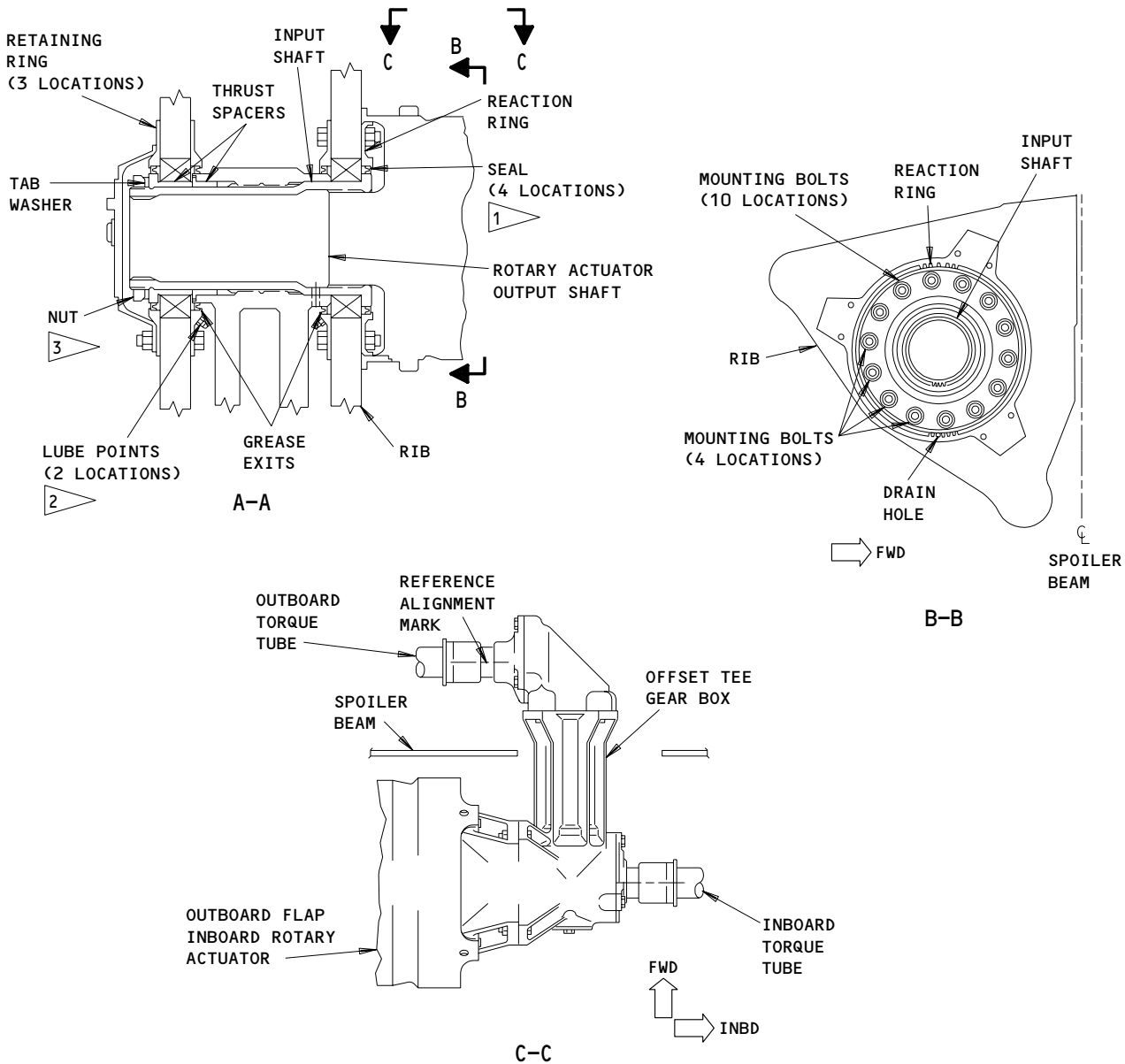
Inboard Flap-Outboard Crank Arm  
Figure 203 (Sheet 1)

EFFECTIVITY	
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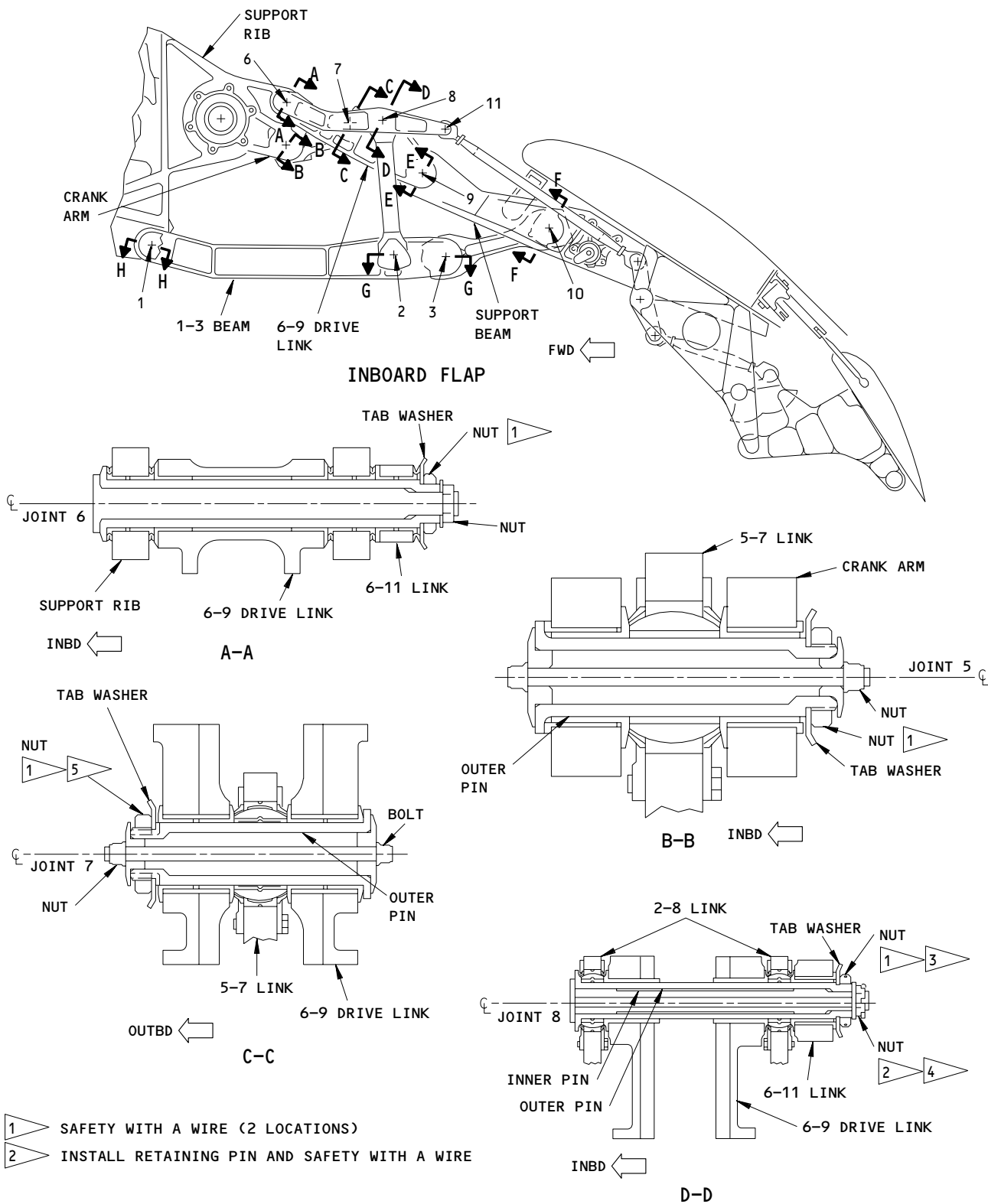
- 1 SEAL MUST BE IN THE POSITION SHOWN FOR CORRECT LUBRICATION
- 2 APPLY BMS 3-33 GREASE UNTIL YOU SEE FRESH GREASE AT THE EXIT
- 3 SAFETY WITH A WIRE (2 LOCATIONS)

Inboard Flap-Outboard Crank Arm  
Figure 203 (Sheet 2)

EFFECTIVITY

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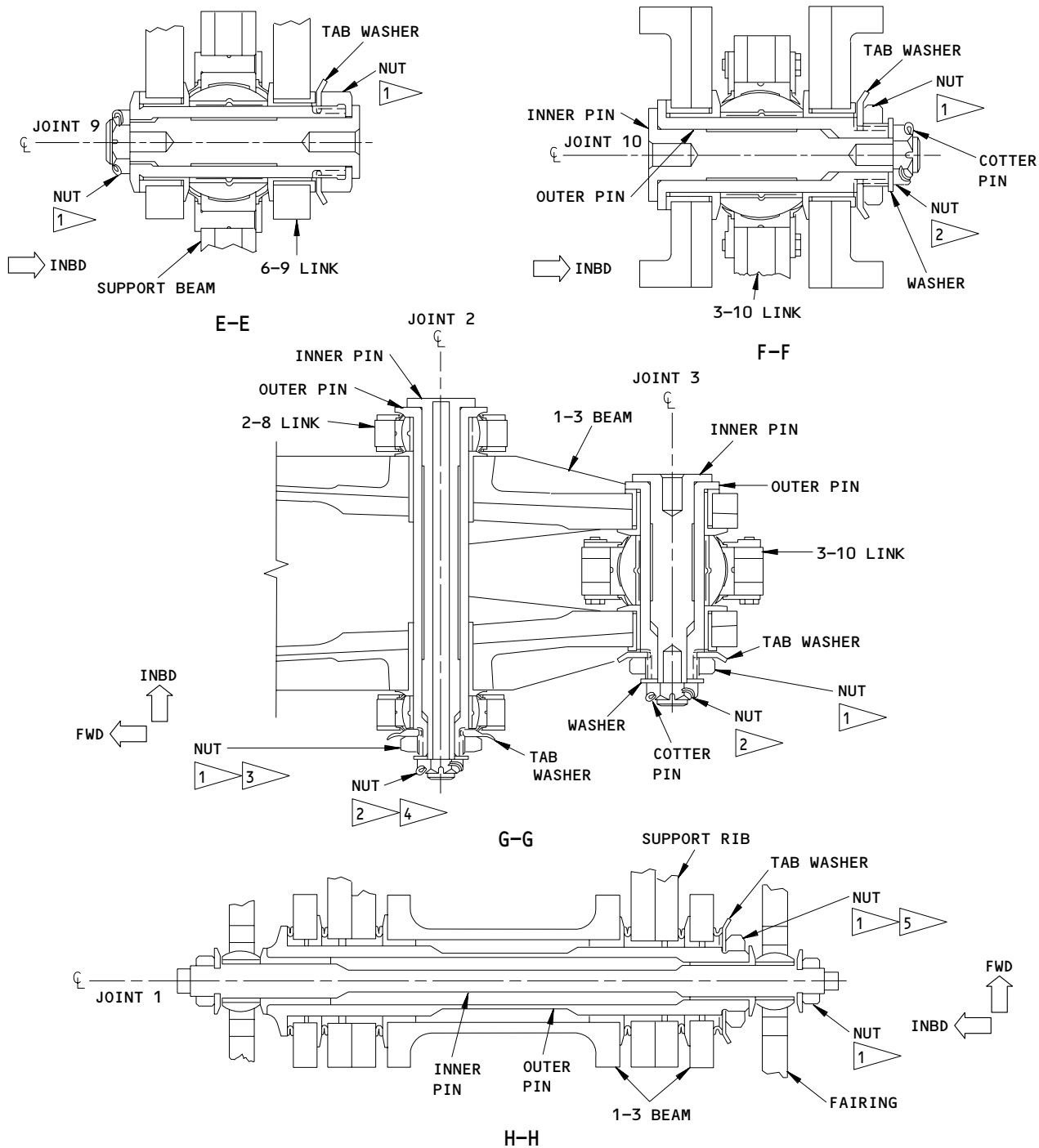


- 1 SAFETY WITH A WIRE (2 LOCATIONS)
- 2 INSTALL RETAINING PIN AND SAFETY WITH A WIRE

Inboard Flap-Outboard Linkages  
Figure 204 (Sheet 1)

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- 3 TIGHTEN INDICATED NUT WITHIN TORQUE RANGE OF 1500-2000 POUND-INCHES
- 4 TIGHTEN INDICATED NUT WITHIN TORQUE RANGE OF 600-1000 POUND-INCHES
- 5 TIGHTEN INDICATED NUT WITHIN TORQUE RANGE OF 2000-3000 POUND-INCHES

**Inboard Flap-Outboard Linkages  
Figure 204 (Sheet 2)**

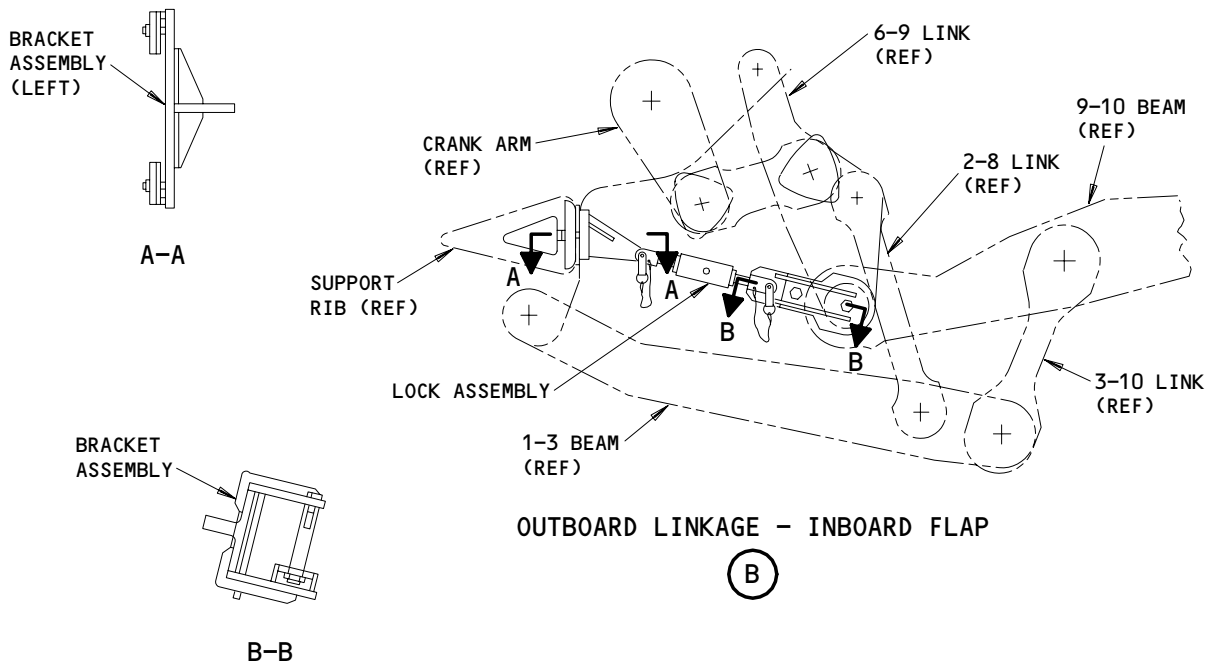
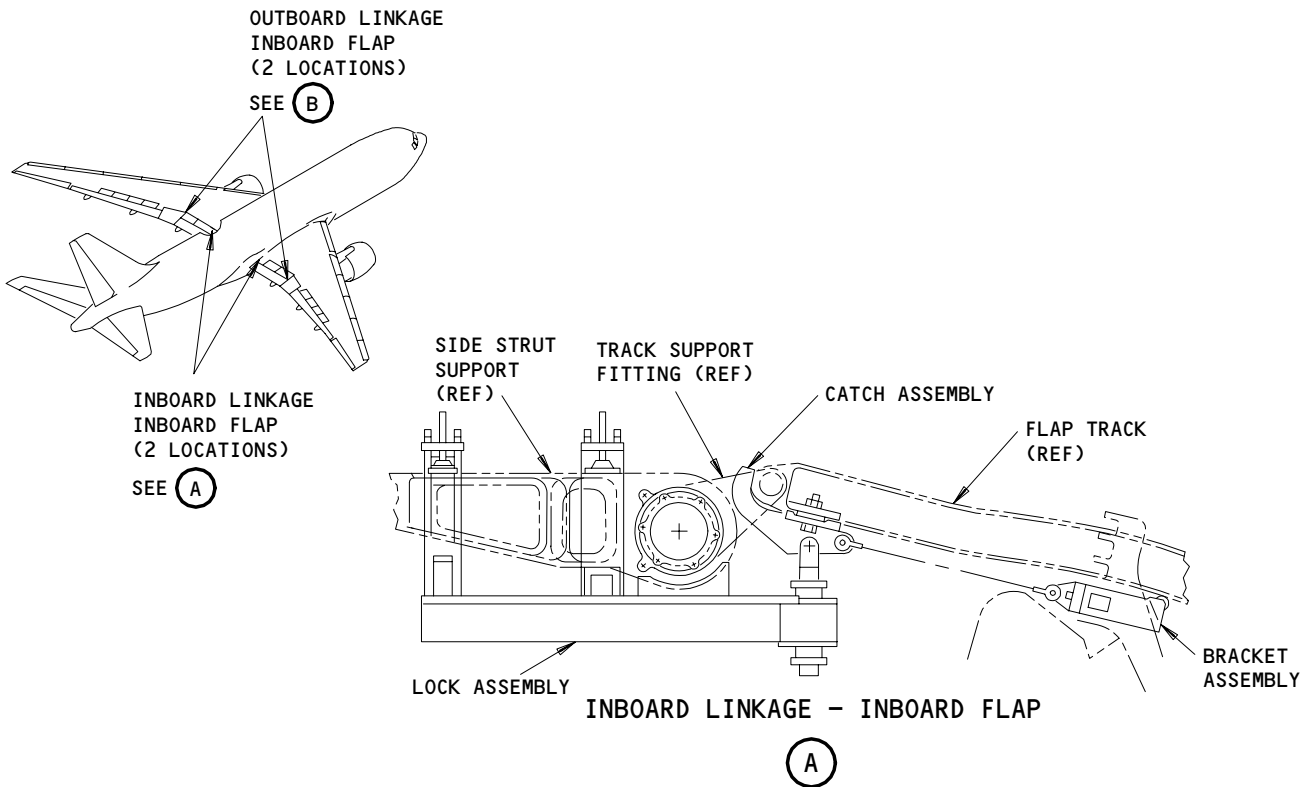
EFFECTIVITY

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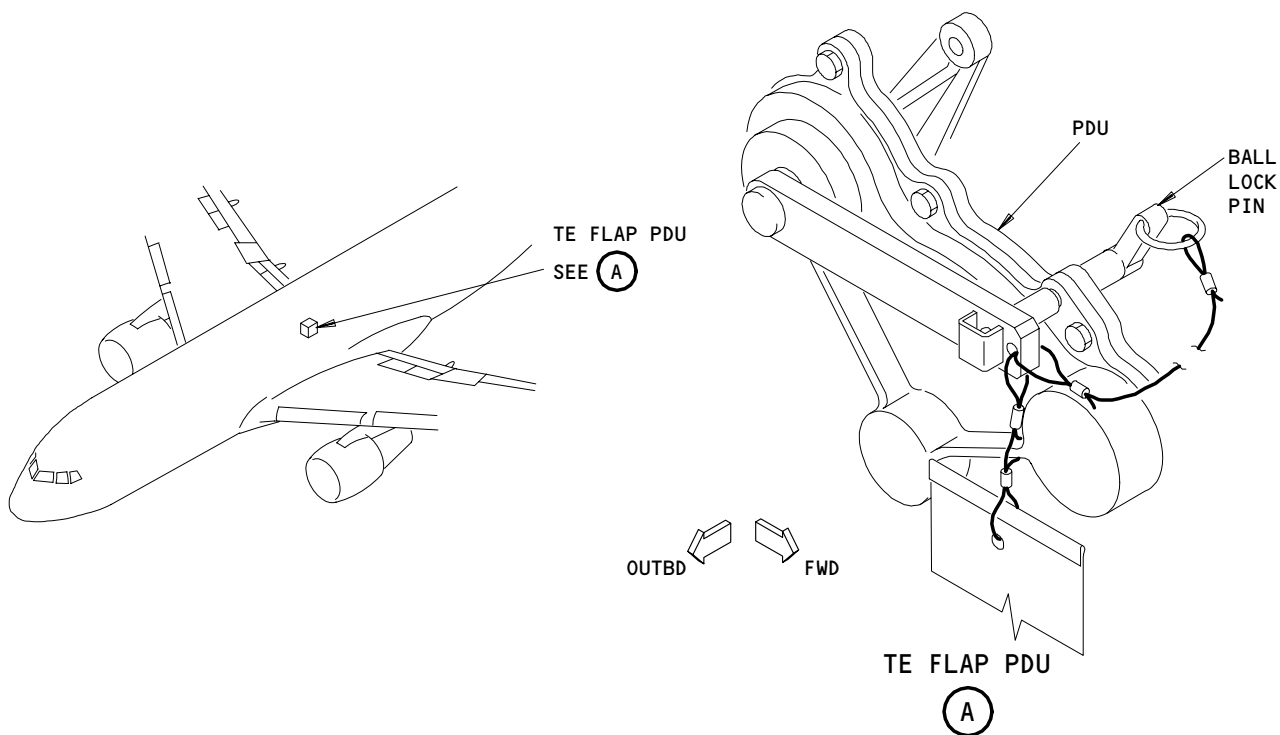
Inboard TE Flap Linkage Lock Set  
Figure 205

EFFECTIVITY	
	ALL

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- S 862-005
- (5) Move the flap control lever to the 30-unit detent and let the flaps move to the fully extended position.
- S 862-006
- (6) Remove power from the center hydraulic system (AMM 29-11-00/201).
- S 862-139
- (7) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:
- (a) 6D24, ALTN FLAP PWR



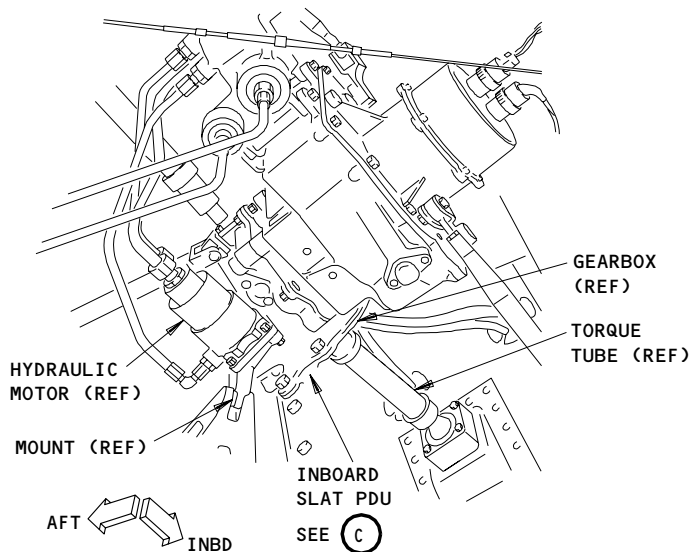
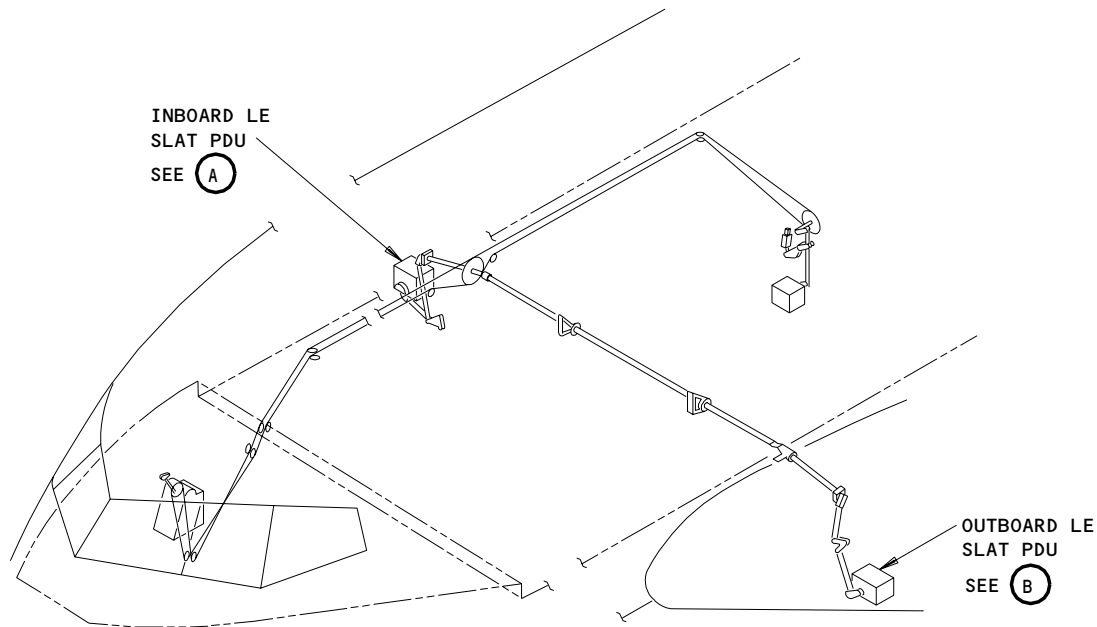
TE Flaps PDU Lock Assembly  
Figure 206

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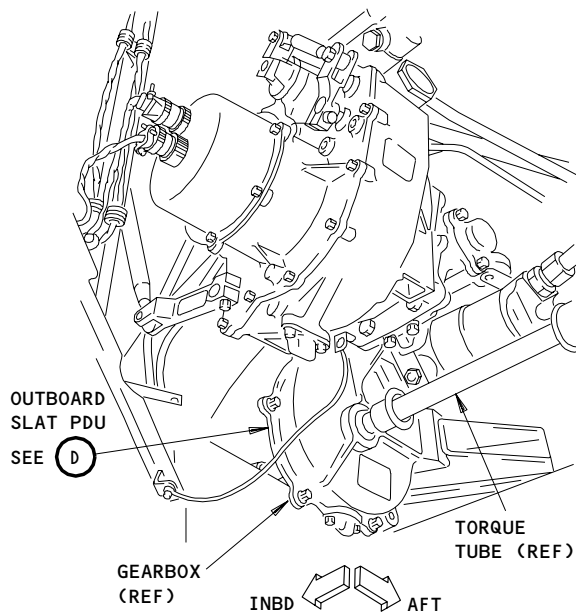
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INBOARD LE SLAT PDU  
(BOTTOM VIEW)

(A)



OUTBOARD LE SLAT PDU

(B)

LE Slats PDU Groundlock  
Figure 207 (Sheet 1)

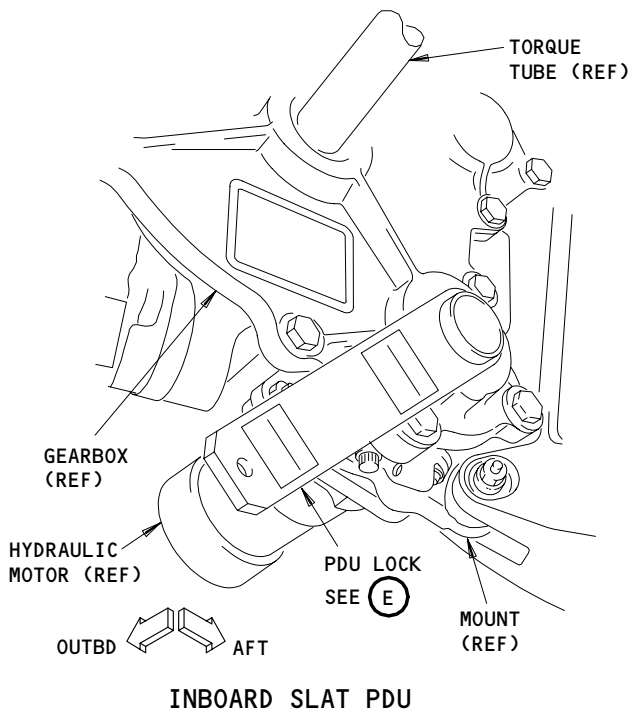
EFFECTIVITY

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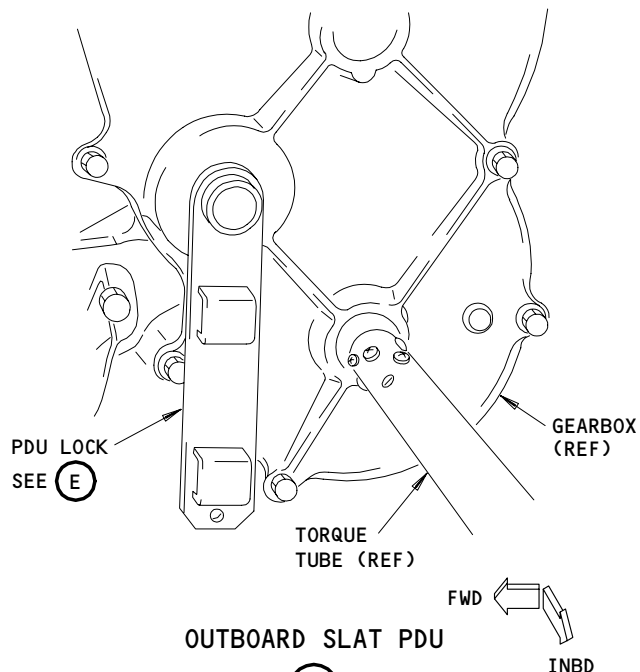
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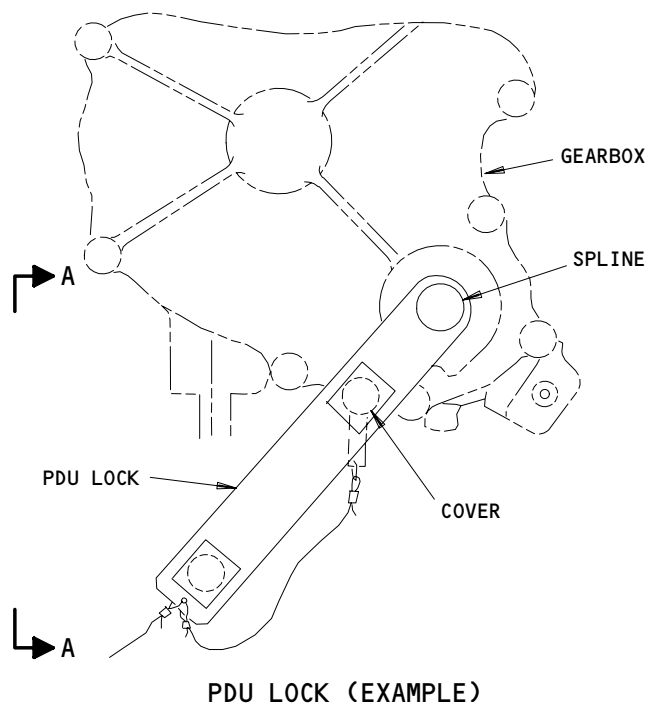
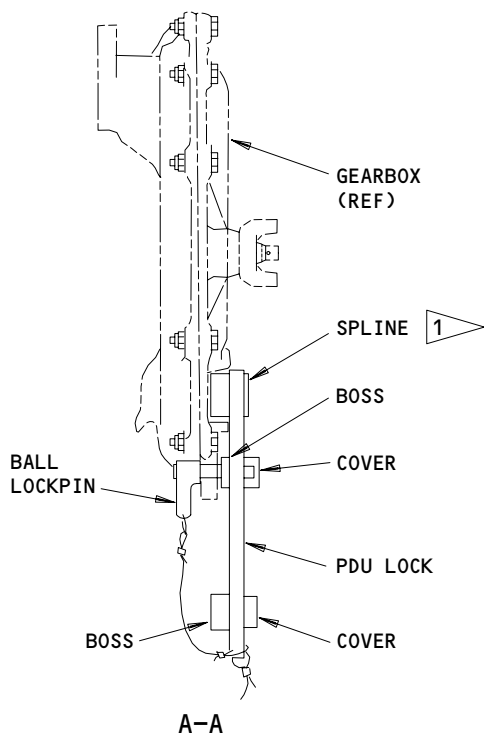
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(C)



(D)



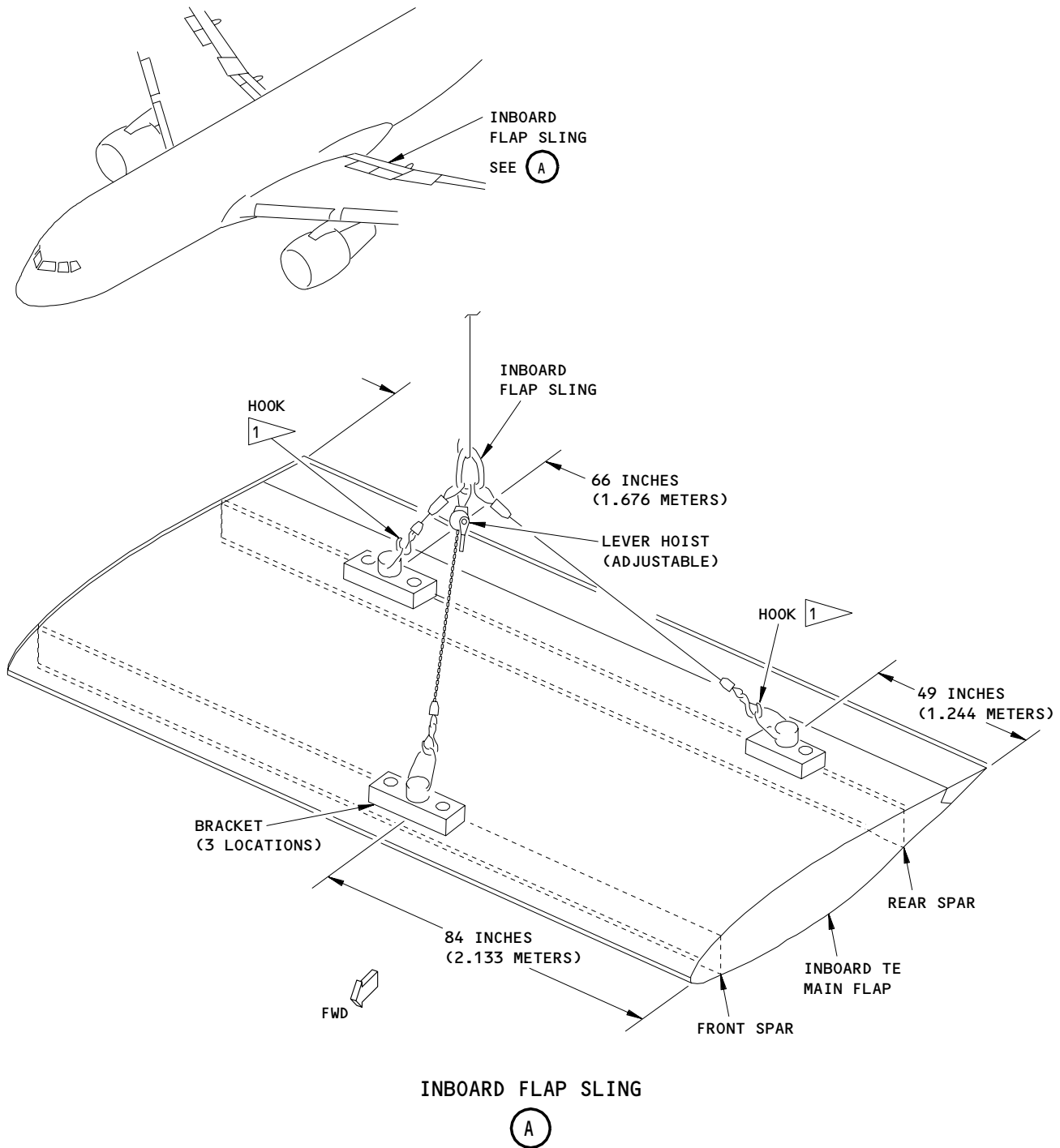
(E)

1 THE SPLINE ATTACHES TO THE GEARBOX, THE BALL LOCKPIN INSTALLED THROUGH THE BOSS AND GEARBOX

LE Slats PDU Groundlock  
Figure 207 (Sheet 2)

EFFECTIVITY	
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INBOARD FLAP SLING

(A)

1 ATTACH ADDITIONAL 0.375-INCH (9.525-mm) OR LARGER DIAMETER SHACKLES TO GET THE PITCH UP ATTITUDE OF THE INBOARD FLAP, AT THE 30-DEGREE POSITION.

Inboard Flap Sling  
Figure 208

EFFECTIVITY	ALL
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- S 862-150
- (8) Open these circuit breakers on P6 and install circuit breaker locks:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR

- S 862-151
- (9) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11J24, FLAPS ALTN CONT

- S 862-142
- (10) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

- S 492-011
- (11) Install the PDU lock on the TE Flap Power Drive Unit (PDU) (Fig. 206).

- S 012-012
- (12) For access to the inboard flap mechanism, remove the aft wing/body panel (195JL left flap or 195JR right flap) below the fairing door (AMM 06-41-00/201).

- S 012-013
- (13) For access to the outboard flap mechanism, remove the fixed TE panel (552FB left flap or 652FB right flap) below the offset tee gearbox (AMM 06-44-00/201).

- S 032-014
- (14) Disconnect the torque tube which connects the PDU to the bulkhead tee gearbox (AMM 27-51-41/401).

- S 032-015
- (15) Disconnect the outboard torque tube from the offset tee gearbox (View C-C, Fig. 203) (AMM 27-51-41/401).

NOTE: Do not turn the torque tubes. It is necessary to adjust the flap drive system if you turn the torque tube while it is disconnected (AMM 27-51-00/501).

- S 982-016
- (16) Turn the gearbox couplings in the retract direction until the main flap lower surface is parallel to the ground.

- S 862-017
- (17) Hold the weight of the main flap to decrease the load on the linkages.

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S 492-018

- (18) If the actuator crank arm is removed, install the flap linkage lock sets when necessary (Fig. 205).

S 032-019

- (19) Remove the locknut, washer and bolt to disconnect the fairing door drive rod from the aft hinge fitting (AMM 27-51-07/401).

F. Remove the Actuator Crank Arm

S 022-020

- (1) Remove the applicable rotary actuator (AMM 27-51-05/401) inboard or (AMM 27-51-11/401) outboard.

S 022-021

- (2) Remove the flap position transmitter (AMM 27-51-45/201).

S 032-022

- (3) Do the steps that follow to disconnect the inboard actuator crank arm from the 5-7 link (Fig. 202):
- (a) Disconnect the retaining pin and remove the castellated nut and washer to remove the inner pin.
  - (b) Remove the wire, nut and tab washer from the outer pin.
  - (c) Hold the 5-7 link and remove the outer pin.

S 032-023

- (4) Do the steps that follow to disconnect the outboard actuator crank arm from the 5-7 link (Fig. 204):
- (a) Remove the locknut, bolt, and both end caps.
  - (b) Remove the wire, nut and tab washer from outer pin.
  - (c) Hold the 5-7 link and remove the outer pin.

S 032-024

- (5) Do the steps that follow at the outboard actuator location (Fig. 203):
- (a) Remove the six bolts which attach the transmitter housing and the inner and outer retaining rings on the outboard support rib.
  - (b) Remove the 14 bolts which attach the inner retaining ring and the outer reaction ring to the inboard support rib.
  - (c) Remove the transmitter housing with the outer retaining ring.
  - (d) Remove the reaction ring.

NOTE: The inner retaining rings are removed with the crank arm.

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S 022-025

- (6) Do the steps that follow at the inboard actuator location (Fig. 201):
- (a) Remove the six bolts which attach the transmitter housing and the inner and outer retaining rings on the outboard support rib.
  - (b) Remove the six bolts which attach the inner retaining ring and the outer reaction ring to the inboard support rib.
  - (c) Remove the transmitter housing retaining ring.

NOTE: The inner retaining rings are removed with the crank arm.

- (d) Remove the reaction ring.

S 032-026

- (7) At the applicable location inboard (Fig. 201) or outboard (Fig. 203), loosen and remove the input shaft nut and the tab washer.

S 032-027

- (8) Hold the crank arm and inner retaining rings and move the input shaft inboard to remove it.

S 022-028

- (9) Remove the crank arm and retaining rings from the airplane.  
G. Remove the 6-7 and 6-9 Drive Arm from the Inboard Linkage (Fig. 201)

S 032-045

- (1) Do the steps that follow to disconnect the 6-7 drive arm from the 5-7 link (Fig. 202):
- (a) Disconnect the retaining pin and remove the castellated nut and washer, and remove the inner pin.
  - (b) Remove the wire, nut and tab washer from the outer pin.
  - (c) Hold the 5-7 link and remove the outer pin.

S 032-046

- (2) Do the steps that follow to disconnect the 6-9 drive arm from the support beam (Fig. 202):
- (a) Disconnect the retaining pin and remove the castellated nut and washer, and remove the inner pin.
  - (b) Remove the wire, nut and tab washer from the outer pin.
  - (c) Remove the outer pin.

S 032-047

- (3) Do these steps to remove the failsafe fitting (View A-A):
- (a) Disconnect the four locknuts, bolts, and washers.
  - (b) Write the shim thickness dimension and save the shims for installation.

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- S 032-048
- (4) Do this step to remove the nut from the outboard end of the inner shaft:
- (a) Disconnect the wire between the nut and the tab washer, and remove the nut and the tab washer.
- S 032-049
- (5) Move the inner shaft inboard and remove it from the airplane.
- S 032-050
- (6) Remove the bushings from the inboard and the outboard ends of the outer shaft.
- S 032-051
- (7) Disconnect the nut, remove the bolt, and disconnect the inboard and the outboard reaction link support from the support fitting.
- S 032-052
- (8) At the inboard and the outboard ends of the outer shaft, disconnect the wire between the nut and the tab washer.
- (a) Remove the nuts and tab washers.
- S 022-053
- (9) Slide the inboard reaction link support and bushing off the outer shaft.
- S 022-054
- (10) Slide the 6-7 drive arm off the outer shaft.
- S 032-055
- (11) Slide the outboard reaction link support off the outer shaft.
- S 032-056
- (12) Remove the nut, bolt, clampup bushing, and the washers and disconnect the flap track from the track support fitting.
- S 032-057
- (13) Do this step to remove the inboard and the outboard bearing retainers from the side support strut:
- (a) Disconnect and remove the eight nuts, bolts, and washers.
- S 022-058
- (14) Hold the 6-9 drive arm and slide the outer shaft inboard, and remove it from the airplane.
- S 022-059
- (15) Remove the 6-9 drive arm with the track support fittings from the airplane.

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TASK 27-51-04-402-135

3. Install the Actuator Crank Arm and Inboard 6-7 and 6-9 Drive Arms

A. General

- (1) This task contains two procedures, one to install the actuator crank arm and one to install the 6-7 and 6-9 drive arms. Because this task contains two procedures, only the applicable group of steps must be done.
- (2) To start one of these procedures, do the group of steps that is necessary to install the components. Then do the "Put the Flaps to the Adjusted Position" and "Put the Airplane Back to Its Usual Condition" groups of steps.

B. Equipment

- (1) Adapter - Flap Drive - F70300-1  
(Torque Tube Manual Drive Tool)
- (2) Air Motor with 1/2 inch square drive  
(Commercially Available)

**NOTE:** A motor to turn the torque tubes to manually extend and retract the flaps.

- (3) TE Flap PDU Lock - A27009-7

C. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Alternate)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) D00015 Grease - BMS 3-24 (Alternate)
- (4) C00174 Corrosion Preventive Compound -  
MIL-C-16173, Grade 2
- (5) G02020 Modeling Clay

D. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-44-00/201, Wing Access Doors and Panels
- (3) AMM 27-51-00/501, TE Flap System
- (4) AMM 27-51-04/601, Inboard Flap Mechanism
- (5) AMM 27-51-05/401, Inboard TE Flap, Inboard Rotary Actuator
- (6) AMM 27-51-07/401, Flap Fairing Door
- (7) AMM 27-51-11/401, Inboard TE Flap, Outboard Rotary Actuator
- (8) AMM 27-51-41/401, TE Flap Torque Tube
- (9) AMM 27-51-45/201, Flap Position Transmitters
- (10) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (11) AMM 32-00-15/201, Landing Gear Door Lock

E. Access

- (1) Location Zones
 

555/655	Inboard Trailing Edge Flap
---------	----------------------------
- (2) Access Panels
 

195JL	Inboard TE Flap Mechanism
196JR	Inboard TE Flap Mechanism
552FB	Spoiler Beam, Flap Installation
652FB	Spoiler Beam, Flap Installation

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F. Install the Actuator Crank Arm (Fig. 201)

NOTE: Examine the Actuator Crank Arm for permitted wear (AMM 27-51-04/601).

S 622-029

- (1) Apply corrosion preventive compound to the outer diameter of the inner thrust spacer and install it in the crank arm.

S 622-030

- (2) Apply corrosion preventive compound to the outer thrust spacer and install it in the outboard support rib bearing.

S 622-031

- (3) Apply corrosion preventive compound to the inner and outer surfaces of the input shaft, and to the cavities and splines between the input shaft and the crank arm.

S 422-032

- (4) Install new seals in the inner retaining rings.

NOTE: Make sure you install the seals such that you can correctly lubricate the bearings (Fig. 203).

S 422-033

- (5) Install the inner retaining rings over the crank arm.

S 862-034

- (6) Position the crank arm assembly between the support ribs.

S 422-035

- (7) Install the input shaft.

S 422-036

- (8) Install the new seals in the outboard retaining ring and the reaction ring.

NOTE: Make sure you install the seals such that you can correctly lubricate the bearings.

S 422-037

- (9) At the inboard and outboard (Fig. 203) locations, install a tab washer and nut on the input shaft. Safety the nut to the tab washer with wire at two places.

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S 422-038

- (10) At the outboard actuator location, do these steps (Fig. 203):
- (a) Put the outer retaining ring and the transmitter housing on the outboard support rib.
  - (b) Apply a layer of BMS 3-24 grease to the six bolts and washers.
  - (c) Install the six bolts with washers under the head and attach the six washers with nuts. Tighten the nuts to 150-250 pound-inches (17-28 newton-meters).
  - (d) Put the reaction ring on the inboard support rib.
  - (e) Apply a coat of BMS 3-24 to 14 attach bolts and washers.
  - (f) Install the 14 bolts with washers under the head and attach the 14 nuts with washers.
  - (g) Tighten the nuts at 4 locations to 260-425 pound-inches (29-48 newton-meters) and at 10 locations to 290-510 pound-inches (33-58 newton-meters).

S 422-039

- (11) At the inboard actuator location, do these steps (Fig. 201):
- (a) Put the outer retaining ring and the transmitter housing on the outboard support rib.
  - (b) Apply a coat of BMS 3-24 grease to the six attach bolts and washers.
  - (c) Install the six bolts with washers under the head and attach the six nuts with washers (View C-C).
  - (d) Put the reaction ring on the inboard support rib.
  - (e) Apply a coat of BMS 3-24 grease to six attach bolts with washers.
  - (f) Install the six bolts with washers under the head and attach the six nuts with washers (View D-D).

S 422-040

- (12) Do these steps to connect the outboard actuator crank arm to the 5-7 link (Fig. 204):
- (a) Put the crank arm in the 5-7 link and install the outer pin (View B-B).
  - (b) Install the tab washer and nut on the outer pin.
  - (c) Tighten the nut to 3000-3700 pound-inches (339-418 newton-meter).
  - (d) Safety the nut to the tab washer with a wire.
  - (e) Install the end caps, bolt and nut. Tighten the nut to 150-250 pound-inches (17-28 newton-meters).

S 422-136

- (13) Do these steps to connect the inboard actuator crank arm to the 5-7 link (Fig. 202):
- (a) Put the crank arm in the 5-7 link and install the outer pin (View B-B).
  - (b) Install the tab washer and the nut on the outer pin.
  - (c) Tighten the nut to 800-1500 pound-inches (90-169 newton-meters).

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- (d) Safety the nut to the tab washer with a wire.
- (e) Install the inner pin with a washer and a castellated nut.
- (f) Put the retaining pin through the castellated nut and bolt, and safety the retaining pin with a wire.

S 642-041

- (14) Lubricate the crank arm input shaft with BMS 3-33 grease (no alternatives permitted). Apply until you see fresh grease at the grease exit.

NOTE: Lubricate the crank arm before you install the rotary actuator to make sure the seal is correctly installed for lubrication.

S 422-042

- (15) Install the rotary actuator (AMM 27-51-05/401) inboard or (AMM 27-51-11/401) outboard.

S 422-043

- (16) For the inboard mechanism, install the drive shaft which connects the actuator input angle gearbox to the bulkhead angle gearbox (AMM 27-51-41/401).

S 422-044

- (17) For the outboard mechanism, install the drive shaft which connects the inboard and outboard actuators (AMM 27-51-41/401).

- G. Install the 6-7 and 6-9 Drive Arm on the Inboard Linkage (View A-A, Fig. 201)

NOTE: Examine the 6-7 and 6-9 drive arm for permitted wear (Ref 27-51-04).

S 622-060

- (1) Apply corrosion preventive compound to the inner and outer surfaces of the 6-7 drive arm, outer shaft, inner shaft, and the 6-9 drive arm.

S 642-061

- (2) Assemble all the pins, washers, nuts, bushings, and spacers with a thin layer of BMS 3-33 grease on all of the surfaces before installation.

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- S 642-062
- (3) Apply BMS 3-33 grease to all of the lube points until you see fresh grease at the exit.
- S 432-063
- (4) Install new seals in the reaction links, the flap track support fittings, and the bearing retainers.
- NOTE:** Make sure you install the seals such that you can correctly lubricate the bearings.
- S 422-064
- (5) Install the flap track support fittings over the 6-9 drive arm.
- S 422-065
- (6) Move the 6-9 drive arm with the track support fittings between side support struts.
- S 422-066
- (7) Put the outer shaft in the side support struts. Align the missing spline on the outer shaft with the missing spline in the 6-9 drive arm.
- S 432-067
- (8) Connect the inboard and outboard bearing retainers and the flap track support fitting to the side support strut with eight bolts and locknuts.
- S 422-124
- (9) Install a washer under all the bolts and nuts that come out of the side support strut.
- S 432-068
- (10) Connect the flap track support fitting to the flap track.

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S 422-125

- (11) Install a bolt with a washer under the head, bushing, and a nut with a washer. Tighten nut to 2400-2600 pound-inches (271-294 newton-meters).

S 432-069

- (12) Move the outboard reaction link on the outer shaft.

S 432-070

- (13) Move the 6-7 drive arm onto the outer shaft.

**CAUTION:** MAKE SURE TO INSTALL THE DRIVE ARM CORRECTLY. INCORRECT INSTALLATION CAN CAUSE DAMAGE TO THE FORE FLAP LEADING EDGE.

- (a) Make sure that you install the drive arm with the lube fitting pointed outboard on the left flap and pointed inboard on the right flap.

S 822-126

- (14) Align the missing spline on the outer shaft with the missing spline in the 6-7 drive arm.

S 422-071

- (15) Install a bushing in the inboard reaction link and move the reaction link onto the outer shaft.

S 432-072

- (16) Connect the inboard and outboard reaction link to the support fitting (Fig. 202, View A-A).

S 422-127

- (17) Install a bolt with a washer under the head, and a nut with a washer. Tighten the nut to 3200-3500 pound-inches (362-395 newton-meters).

S 432-073

- (18) At the inboard and outboard ends of the outer shaft, install a nut and tab washer (Fig. 201, View A-A). Tighten the nut to 2500-3000 pound-inches (280-340 newton-meters).

S 432-128

- (19) Safety the tab washer and the nut with a wire.

S 432-074

- (20) Put the bushings in the outboard and inboard ends of the outer shaft.

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S 432-075

- (21) Move the inner shaft into the outer shaft and install a tab washer and nut at the outboard end.

S 432-129

- (22) Tighten the nut to 3000-3700 pound-inches (340-420 newton-meters). Install the safety wire on the tab washer and the nut.

S 432-076

- (23) Install the failsafe fitting and shims.

S 432-130

- (24) Install the four mounting bolts with a sufficient number of washers so that the nuts do not turn to the end of the threads on the mounting bolts. Install the safety wire.

S 432-077

- (25) Do the steps that follow to connect the 6-9 drive arm to the support beam (Fig. 202, View C-C):
- (a) Put the outer pin and install a tab washer and a nut. Tighten nut to 800-1500 pound-inches (90.4-169.4 newton-meters). Safety the tab washer to the nut with wire.
  - (b) Put the inner pin into the outer pin and install a castellated nut. Safety the nut with the retaining pin.

S 432-078

- (26) Connect the 6-7 drive arm to the 5-7 link as follows (Fig. 202, View B-B):
- (a) Install the outer pin and install the tab washer and nut. Tighten nut to 800-1500 pound-inches (90-169 newton-meters). Safety the tab washer to the nut with a wire.
  - (b) Install the inner pin and the castellated nut. Safety the nut with the retaining pin.

H. Put the Flap Back to the Adjusted Position

S 862-079

- (1) Remove the main flap supports and, if installed, the flap linkage lock sets (Fig. 205).

S 862-080

- (2) Apply clay to the retract overtravel stops.

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S 822-131

- (3) Turn the torque tube with an air motor and adapter F70300-1, or use your hand to retract the inboard flap at the tee gearbox/torque tube coupling to the retract stops.

S 032-081

- (4) Disconnect the torque tube at the offset tee gearbox and adjust the inboard stop dimension.

**NOTE:** 1/3 torque tube turn = 0.010 inch (0.25 mm) travel at the inboard stop.

S 432-082

- (5) Connect the torque tube at the offset tee gearbox.

S 862-083

- (6) Turn the torque tube with an air motor and adapter F70300-1, or use your hand to extend the inboard flap until the outboard overtravel stop makes contact, then retract for 5 turns on the torque tube.

S 432-084

- (7) Connect the torque tube to the outboard coupling of the offset tee gearbox (Fig. 203, View C-C) and install the torque tube which connects the power drive unit (PDU) to the bulkhead tee gearbox (AMM 27-51-41/401).

S 862-085

- (8) Make sure that the flap control lever is in the 30-unit detent and agrees with the flap position.

S 092-086

- (9) Remove the TE flap PDU lock (Fig. 206).

S 862-138

**WARNING:** WHEN THE FLAP AND THE SLAT ARE POWERED BY THE CENTER HYDRAULIC SYSTEM, THE AILERON, SPOILER, RUDDER, ELEVATOR, AND STABILIZER ARE ALSO POWERED. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. KEEP PERSONS AND EQUIPMENT CLEAR OF ALL CONTROL SURFACES AND THE WHEEL WELL TO PREVENT INJURY AND EQUIPMENT DAMAGE.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (10) Supply power to the center hydraulic system (AMM 29-11-00/201).

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- S 862-088  
(11) Retract the flaps to the 20-unit detent position.
- S 862-089  
(12) Remove power from the center hydraulic system (AMM 29-11-00/201).
- S 492-090  
(13) Install the PDU lock (Fig. 206).
- S 422-091  
(14) Install the position transmitter (AMM 27-51-45/201).
- S 862-092  
(15) Apply clay to all eight retract overtravel stops for the left and the right wings.
- S 022-093  
(16) Remove the PDU lock (Fig. 206).
- S 862-148

**WARNING:** WHEN THE FLAP AND SLAT ARE POWERED BY CENTER HYDRAULIC SYSTEM, THE AILERON, SPOILER, RUDDER, ELEVATOR, AND STABILIZER ARE ALSO POWERED. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. KEEP PERSONS AND EQUIPMENT CLEAR OF ALL CONTROL SURFACES AND THE WHEEL WELLS TO PREVENT INJURY AND EQUIPMENT DAMAGE.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (17) Supply power to the center hydraulic system (AMM 29-11-00/201).
- S 862-095  
(18) Retract the flap to the flaps UP position. When the flap movement stops and after a minimum of one minute, extend the flaps to the 20-unit position.
- S 842-096  
(19) Remove power from the center hydraulic system (AMM 29-11-00/201).
- S 722-097  
(20) Measure and write the clay thickness at each retract overtravel stop. Make sure that the dimensions are less than the clearance requirements for each location (AMM 27-51-00/501). If not, adjust the overtravel stop clearance to adjust the dimension (AMM 27-51-00/501).

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S 862-149

**WARNING:** WHEN THE FLAP AND THE SLAT ARE POWERED BY THE CENTER HYDRAULIC SYSTEM, THE AILERON, SPOILER, RUDDER, ELEVATOR, AND STABILIZER ARE ALSO POWERED. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. KEEP PERSONS AND EQUIPMENT CLEAR OF ALL CONTROL SURFACES AND THE WHEEL WELLS TO PREVENT INJURY AND EQUIPMENT DAMAGE.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(21) Supply power to the center hydraulic system (AMM 29-11-00/201).

S 862-099

(22) Put the flap control lever in the 0 detent (FLAPS UP) and permit the flaps to fully travel.

S 842-100

(23) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 412-101

(24) Do the steps that follow to close access to the inboard flap mechanism:

- (a) Connect the fairing door drive rod and adjust the length (AMM 27-51-07/401).
- (b) Install the aft wing/body panel (195JL or 195JR) located below the fairing door (AMM 06-41-00/201).

S 412-102

(25) Do the steps that follow to close the access to the outboard flap mechanism:

- (a) Install the fixed TE panel (552FB left flap or 652FB right flap) located below the offset tee gearbox (AMM 06-44-00/201).
- (b) Install the fixed TE panel forward of the spoiler beam (AMM 06-44-00/201).

I. Put the Airplane Back to Its Usual Condition

S 862-103

(1) Remove the DO-NOT-CLOSE tags and circuit breaker locks and close these circuit breakers on the P6 panel:

- (a) 6D21, ALTN SLAT INBD PWR
- (b) 6D24, ALTN FLAP PWR
- (c) 6F24, ALTN SLAT OUTBD PWR

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S 862-104

- (2) Remove the DO-NOT-CLOSE tags and circuit breaker locks and close these circuit breakers on the P11 panel:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 862-105

- (3) Remove the hydraulic power from the center hydraulic system (AMM 29-11-00/201).

S 092-132

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

TASK 27-51-04-002-175

4. Inboard Flap Outboard Mechanism 3-10 Link - Removal

A. General

- (1) This task contains the procedure to remove the inboard flap outboard No. 3 and No. 6 mechanism, 3-10 link (Fig. 204).

B. Equipment

- (1) Circuit Breaker Lockout Clip - 1012LC-R  
Commercially Available
- (2) Sling Equipment, Inboard TE Flap - A27016-27
- (3) TE Flaps PDU Lock - A27009-7
- (4) Shackles, 3/8 inch (9.525 mm) Diameter - Commercially Available.

C. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-51-15/401, Inboard TE Flap Track Fairings
- (3) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

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- (5) AMM 32-00-15/201, Landing Gear Door Lock
- (6) AMM 32-00-20/201, Landing Gear Downlock

D. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
550/650	Wing Trailing Edge - Inboard
571/671	Left/Right Inboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

E. Prepare for the Removal

S 412-160

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 412-188

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 862-163

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

S 862-195

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

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- S 862-166
- (5) Move the flap control lever to the 25-unit detent to extend the flaps.
- S 862-167
- (6) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- S 862-168
- (7) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:
- (a) 6D24, ALTN FLAP PWR
- S 862-169
- (8) Open these circuit breakers on the P6 panel and install circuit breaker locks:
- (a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR
- S 862-189
- (9) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11J24, FLAPS ALTN CONT
- S 862-170
- (10) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD
- S 422-171
- (11) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 206).
- S 422-172
- (12) Install the flap sling at the three attach points on the upper surface of the main flap (Fig. 208).

**NOTE:** It is necessary to hold the flap at the 25-unit pitch up attitude to secure the flap at the three attach points.

Add 3/8-inch diameter shackles to the two aft cables of the flap sling, as necessary, to get the flap pitch up attitude in the 25-unit position.

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S 422-173

- (13) Connect the overhead hoist to the flap sling and make sure all of the cables are in tension.

**NOTE:** Make sure the hoist can hold the weight of the flap with the aft flap attached. The total weight is approximately 470 pounds.

F. Remove the Inboard Flap Outboard Mechanism 3-10 Link

S 022-155

- (1) Remove the mid section of the flap fairing on the inboard flap (AMM 27-51-15/401).

S 022-154

- (2) Disconnect the 3-10 link from the 1-3 beam at the No. 3 joint (Fig. 204, View G-G):

**NOTE:** Identify the parts that you will remove in this task for subsequent installation.

- (a) Remove the cotter pin, inner nut, washer and inner pin.
- (b) Cut and remove the lockwires between the outer nut and the tab washer.
- (c) Remove the outer nut and tab washer from the outer pin.
- (d) Hold the 3-10 link and remove the outer pin.

S 022-153

- (3) Disconnect the 3-10 link from the 9-10 support beam at the No. 10 joint (Fig. 204, View F-F):
  - (a) Remove the cotter pin, inner nut and washer from the inner pin.
  - (b) Cut and remove the lockwires between the outer nut and the tab washer.
  - (c) Remove the outer nut and tab washer from the outer pin.
  - (d) Remove the outer pin to remove the 3-10 link from the main beam fitting assembly.

TASK 27-51-04-402-174

5. Inboard Flap Outboard Mechanism 3-10 Link - Installation

A. General

- (1) This task contains the steps to install the inboard flap outboard No. 3 and No. 6 mechanism, 3-10 link (Fig. 204).

B. Equipment

- (1) Sling Equipment, Inboard TE Flap - A27016-27
- (2) TE Flaps PDU Lock - A27009-7
- (3) Shackles, 3/8 inch (9.525 mm) Diameter - Commercially Available.

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C. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) A00247 Sealant - BMS 5-95

D. References

- (1) AMM 12-21-09/301, Trailing Edge Flap - Lubrication
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-51-15/401, Inboard TE Flap Track Fairings
- (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 32-00-15/201, Landing Gear Door Lock
- (7) AMM 32-00-20/201, Landing Gear Downlock

E. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
550/650	Wing Trailing Edge - Inboard
571/671	Left/Right Inboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

F. Install the Inboard Flap Outboard Mechanism 3-10 Link

S 862-177

- (1) Make sure the power is removed from the center hydraulic system (AMM 29-11-00/201).

S 422-178

- (2) Make sure the PDU lock is installed in the TE flap PDU (Fig. 206).

S 422-179

- (3) Make sure the inboard flap sling is attached to the hoist and is installed in tension at the three flap attach points.

S 422-156

- (4) Install the 3-10 link to the 1-3 beam and support beam (Fig. 204):
  - (a) Put the 3-10 link in its location on the 1-3 beam and support beam.
  - (b) Install the outer pins that attach the 3-10 link to the 1-3 beam and the support beam.
  - (c) Install the tab washer and nut on the outer pin.
  - (d) Tighten the outer nut to 2000-3000 inch-pounds (226-339 newton-meters).
  - (e) Install lockwires between the outer nut and tab washer at two locations (AMM 20-10-23/401).
  - (f) Install the inner pin in the outer pin with the washer and inner nut.

**NOTE:** Use a maximum of three washers.

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- (g) Tighten the inner nut to 800-1500 inch-pounds (90-169 newton-meters) and install the cotter pin.

S 842-157

- (5) Remove the sling from the main flap and install the bolts to the flap with sealant.

S 642-158

- (6) Lubricate the 3-10 link (AMM 12-21-09/301).

S 422-180

- (7) Install the mid section of the flap fairing (AMM 27-51-15/401).

S 842-181

- (8) Remove the PDU lock from the TE flap PDU (Fig. 206).

G. Put the Airplane Back to Its Usual Condition

S 022-192

- (1) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 022-193

- (2) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 022-194

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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TASK 27-51-04-352-137

6. Inboard Drive Reaction Link Support – Approved Repairs (Fig. 202)

A. General

- (1) This procedure gives approved repairs if a reaction link support moves apart in the area of the bearing hub after you lubricate the hub.

B. Equipment

- (1) Leading Edge Slats Groundlock – A27007-1  
(2 Necessary)
- (2) TE Flap PDU Lock – A27009-7
- (3) Circuit Breaker Lockout Clip – 1012LC-4  
Commercially Available

C. Consumable Materials

- (1) A00247 Sealant – BMS 5-95

D. References

- (1) AMM 24-22-00/201, Electrical Power – Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System
- (3) AMM 32-00-15/201, Landing Gear Door Locks
- (4) AMM 32-00-20/201, Landing Gear Downlocks

E. Access

- (1) Location Zones  
555/655 Inboard Trailing Edge Flap

F. Prepare for Repair

S 862-106

- (1) Make sure that the trailing edge flaps and the leading edge slats are in fully retracted position, and that the flap lever is in the zero (FLAPS UP) detent.

S 492-107

- (2) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 492-108

- (3) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

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S 482-139

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 862-110

- (5) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 492-123

- (6) Install the locks in the trailing edge flap power drive unit (PDU) (Fig. 206) and the inboard and outboard leading edge slat PDU (Fig. 207).

S 862-143

- (7) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 862-144

- (8) Open these circuit breakers on P6 and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 862-145

- (9) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:  
(a) 11J24, FLAPS ALTN CONT

S 862-146

- (10) Open these circuit breakers on the P11 panel and install circuit breaker locks:  
(a) 11H23, SLAT ALTN CONT INBD

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(b) 11H24, SLAT ALTN CONT OUTBD

G. Repair the Reaction Link Support

S 032-111

- (1) Remove the lube fitting (Fig. 202).

S 492-112

- (2) Use a C-clamp or equivalent to connect the link support halves together.

S 162-113

- (3) Clean the outside surface of the link support in the area of the separation.

S 392-114

- (4) Fillet seal the link support in the area of the separation.

S 422-115

- (5) Install the lube fitting.

S 092-116

- (6) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 092-117

- (7) Remove the locks from the trailing edge flap, inboard leading edge slat, and the outboard leading edge slat power drive units.

H. Put the Airplane Back to Its Usual Condition

S 092-133

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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S 862-121

- (2) Remove the locks and DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 862-122

- (3) Remove the locks and DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 862-119

- (4) Remove hydraulic power if it is not necessary (AMM 29-11-00/201).

S 862-120

- (5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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INBOARD FLAP MECHANISM – INSPECTION/CHECK

1. General

- A. This document has illustrations and wear limit charts. This section gives no procedure to get access, to remove, or to replace the components during inspection for wear. Refer to Inboard Flap Mechanism – Maintenance Practices for this information.

TASK 27-51-04-726-001

2. Inboard Flap Inboard Mechanism Wear Limits (Fig. 601)

A. Access

- (1) Location Zones  
555/655 Inboard Trailing Edge Flap

B. Procedure

S 226-004

- (1) Use the supplied data (Fig. 601) to examine the inboard flap inboard mechanism for too much wear.

TASK 27-51-04-726-002

3. Inboard Flap Outboard Mechanism Wear Limits (Fig. 602).

A. Access

- (1) Location Zones  
555/655 Inboard Trailing Edge Flap

B. Procedure

S 226-005

- (1) Use the supplied data (Fig. 602) to examine the inboard flap outboard mechanism for too much wear.

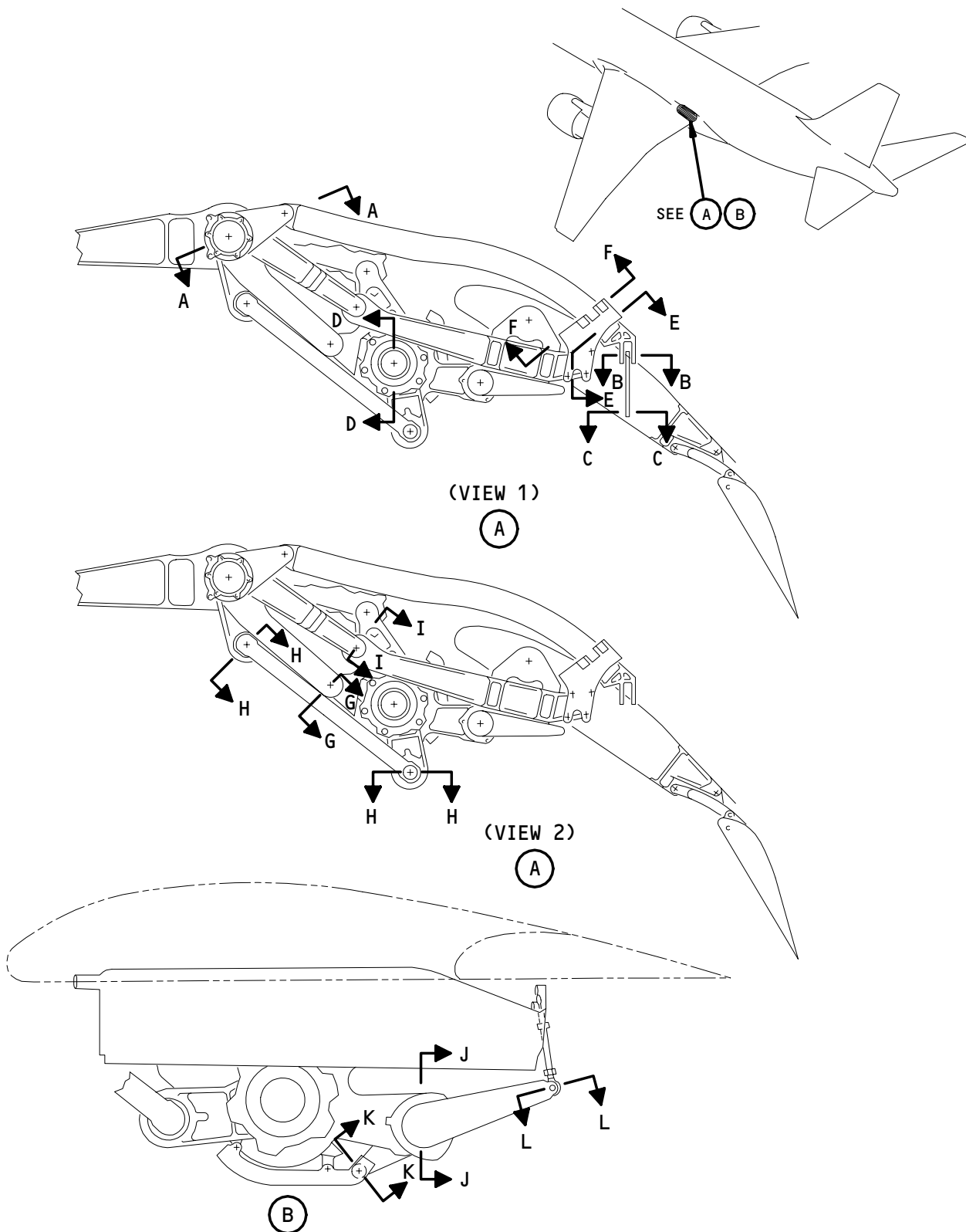
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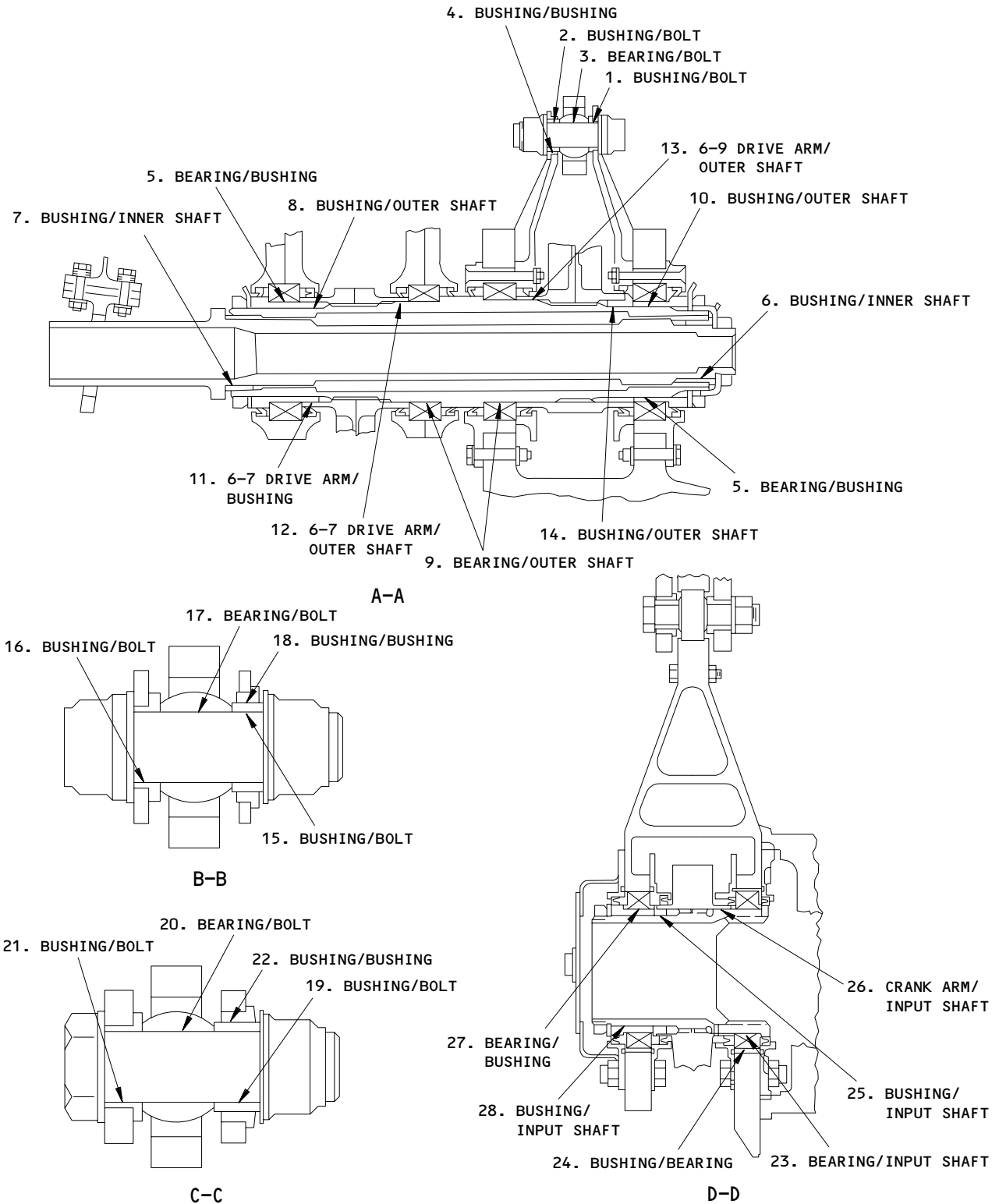
Inboard Flap Inboard Mechanism Wear Limits  
Figure 601 (Sheet 1)

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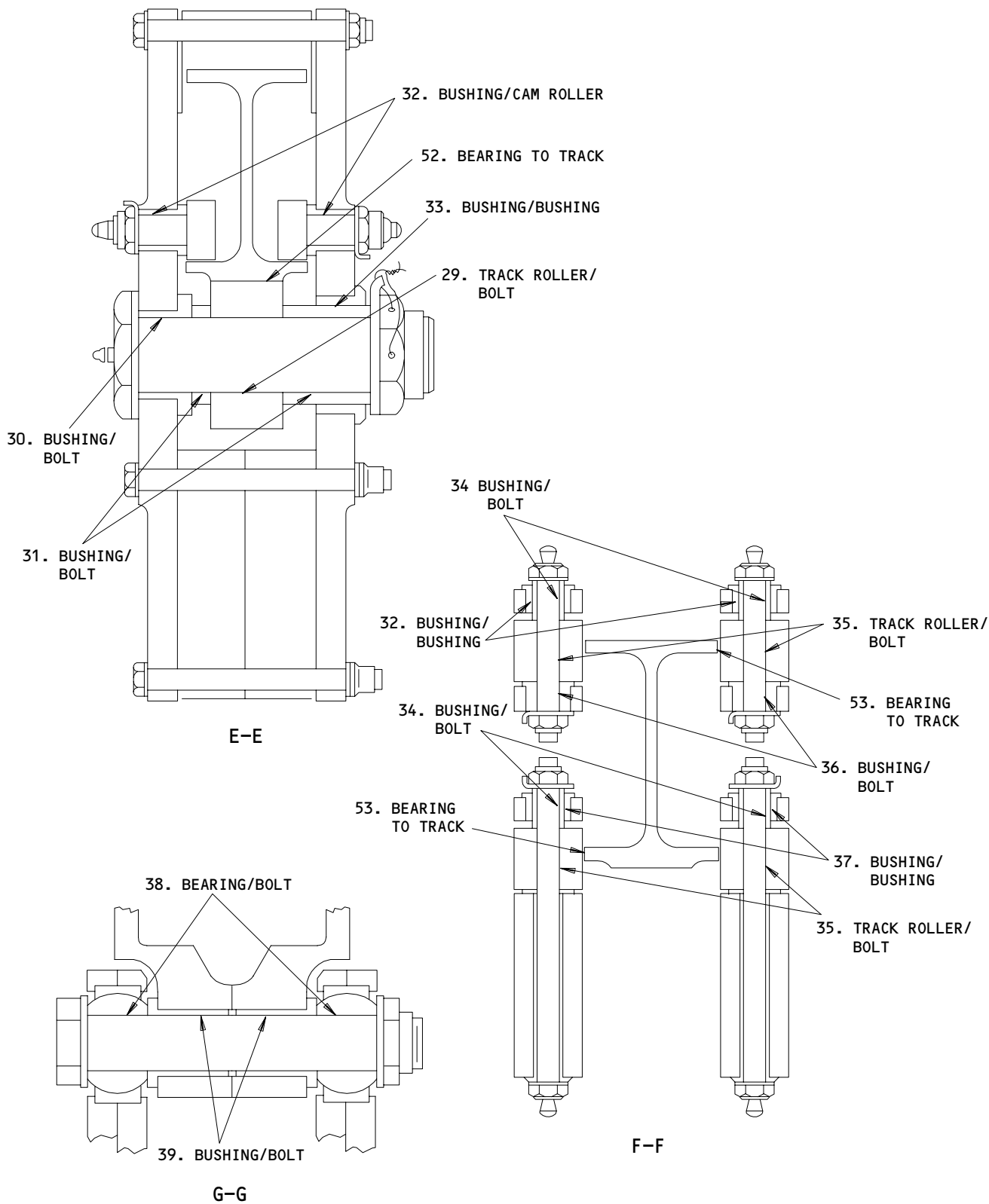
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**Inboard Flap Inboard Mechanism Wear Limits  
(Figure 601 (Sheet 2))**

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Inboard Flap Inboard Mechanism Wear Limits  
Figure 601 (Sheet 3)

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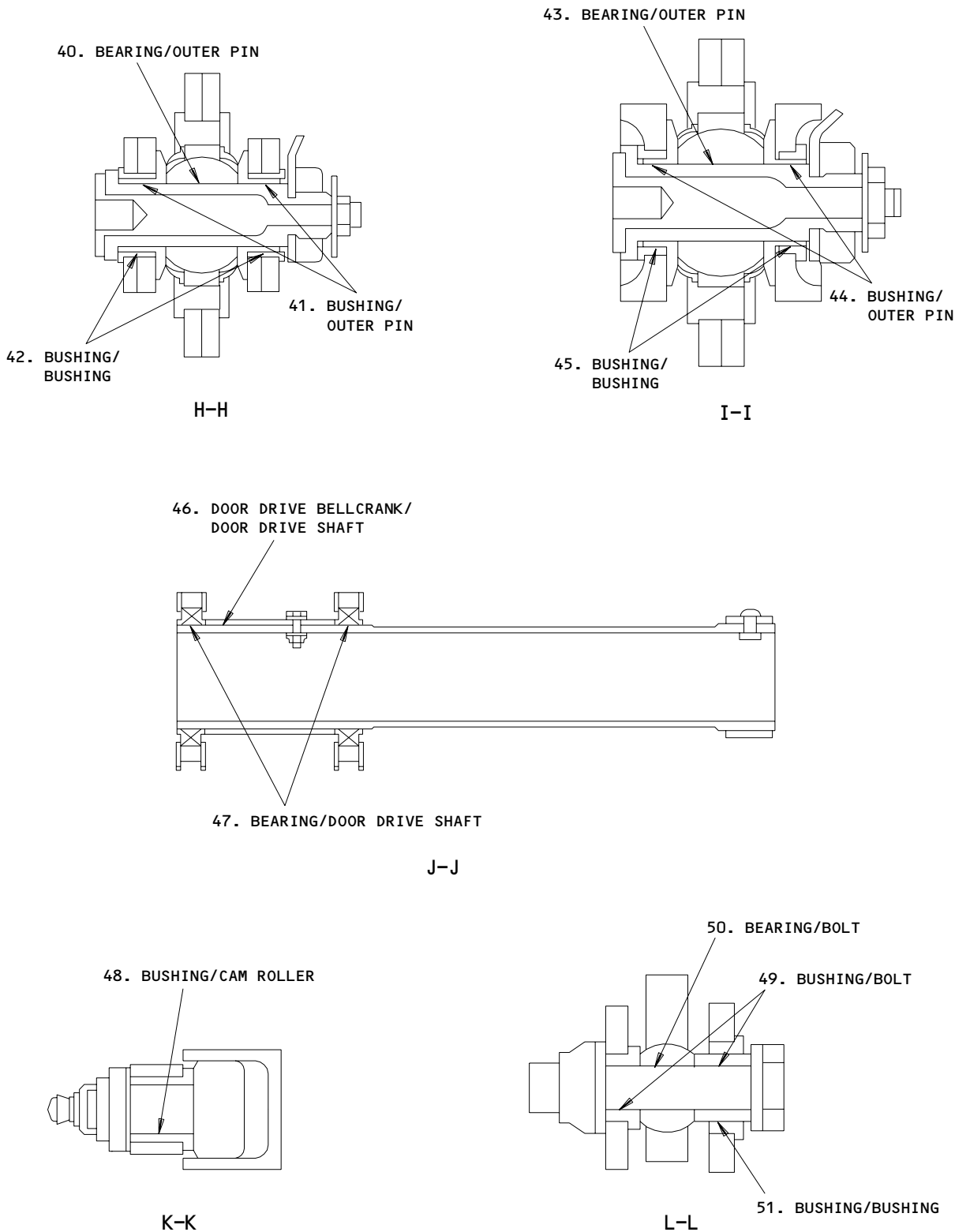
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Inboard Flap Inboard Mechanism Wear Limits  
Figure 601 (Sheet 4)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.8770 (22.276)	0.8780 (22.301)	0.8796 (22.342)	0.0056 (0.142)	X		
	BOLT	OD	0.8735 (22.187)	0.8740 (22.200)	0.8724 (22.159)		X	X	1
2	BUSHING	ID	0.8745 (22.212)	0.8750 (22.225)	0.8796 (22.342)	0.0056 (0.142)	X		
	BOLT	OD	0.8735 (22.187)	0.8740 (22.200)	0.8694 (22.083)		X	X	1
3	BEARING	ID	0.8750 (22.225)	0.8755 (22.238)	0.8796 (22.342)	0.0056 (0.142)	X		
	BOLT	OD	0.8745 (22.212)	0.8740 (22.200)	0.8699 (22.095)		X	X	1
4	BUSHING	ID	1.1870 (30.150)	1.1878 (30.170)	1.1925 (30.290)	0.0060 (0.152)	X		
	BUSHING	OD	1.1855 (30.112)	1.1865 (30.137)	1.1818 (30.018)		X		
5	BEARING	ID	3.4799 (88.389)	3.5004 (88.910)	3.5134 (89.240)	0.0150 (0.381)	X		
	BUSHING	OD	3.4974 (88.834)	3.4984 (88.859)	3.4854 (88.529)		X		
6	BUSHING	ID	1.9119 (48.562)	1.9139 (48.613)	1.9229 (48.842)	0.0120 (0.305)	X		
	INNER SHAFT	OD	1.9100 (48.514)	1.9107 (48.532)	1.9019 (48.308)			X	1
7	BUSHING	ID	2.4020 (61.011)	2.4040 (61.062)	2.4130 (61.290)	0.0122 (0.310)	X		
	INNER SHAFT	OD	2.4000 (60.960)	2.4010 (60.985)	2.3918 (60.752)			X	1
8	BUSHING	ID	3.1415 (79.794)	3.1525 (80.074)	3.1560 (80.162)	0.0150 (0.381)	X		
	OUTER SHAFT	OD	3.1400 (79.756)	3.1410 (79.781)	3.1275 (79.439)			X	1
9	BEARING	ID	3.4989 (88.872)	3.5004 (88.910)	3.5134 (89.240)	0.0150 (0.381)	X		
	OUTER SHAFT	OD	3.4974 (88.834)	3.4984 (88.859)	3.4854 (88.529)			X	1
10	BUSHING	ID	3.1514 (80.046)	3.1425 (79.820)	3.1560 (80.162)	0.0150 (0.381)	X		
	OUTER SHAFT	OD	3.1400 (79.756)	3.1410 (79.781)	3.1275 (79.439)			X	1

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			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	6-7 DRIVE ARM	ID	3.4976 (88.839)	3.4986 (88.864)	3.5134 (89.240)	0.0150 (0.381)	X		
	BUSHING	OD	3.4974 (88.834)	3.4984 (88.859)	3.4836 (88.483)		X		
12	6-7 DRIVE ARM	ID	3.4976 (88.839)	3.4986 (88.864)	3.5134 (89.240)	0.0150 (0.381)	X		
	OUTER SHAFT	OD	3.4974 (88.834)	3.4984 (88.859)	3.4836 (88.483)		X		
13	6-7 DRIVE ARM	ID	3.4989 (88.872)	3.5000 (88.900)	3.5134 (89.240)	0.0150 (0.381)	X		
	OUTER SHAFT	OD	3.4974 (88.834)	3.4984 (88.859)	3.4850 (88.519)		X		
14	BUSHING	ID	3.1415 (79.794)	3.1425 (79.820)	3.1560 (80.162)	0.0150 (0.381)	X		
	OUTER SHAFT	OD	3.1400 (79.756)	3.1410 (79.781)	3.1275 (79.439)			X	1
15	BUSHING	ID	0.8745 (22.212)	0.8750 (22.225)	0.8796 (22.342)	0.0056 (0.142)	X		
	BOLT	OD	0.8735 (22.187)	0.8740 (22.200)	0.8694 (22.083)			X	1
16	BUSHING	ID	0.8745 (22.212)	0.8755 (22.238)	0.8796 (22.342)	0.0056 (0.142)	X		
	BOLT	OD	0.8735 (22.187)	0.8740 (22.200)	0.8699 (22.095)			X	1
17	BEARING	ID	0.8750 (22.225)	0.8755 (22.238)	0.8796 (22.342)	0.0056 (0.142)	X		
	BOLT	OD	0.8735 (22.187)	0.8740 (22.200)	0.8699 (22.095)			X	1
18	BUSHING	ID	1.1870 (30.150)	1.1880 (30.175)	1.1925 (30.290)	0.0060 (0.152)	X		
	BUSHING	OD	1.1855 (30.112)	1.1865 (30.137)	1.1820 (30.023)		X		
19	BUSHING	ID	0.8745 (22.212)	0.8750 (22.225)	0.8798 (22.347)	0.0058 (0.147)	X		
	BOLT	OD	0.8730 (22.174)	0.8740 (22.200)	0.8692 (22.078)			X	1
20	BEARING	ID	0.8750 (22.225)	0.8755 (22.238)	0.8798 (22.347)	0.0058 (0.147)	X		
	BOLT	OD	0.8730 (22.174)	0.8740 (22.200)	0.8696 (22.088)			X	1

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			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
21	BUSHING	ID	0.8745 (22.212)	0.8753 (22.233)	0.8798 (22.347)	0.0058 (0.147)	X		
	BOLT	OD	0.8730 (22.174)	0.8740 (22.200)	0.8695 (22.085)			X	1
22	BUSHING	ID	1.1870 (30.150)	1.1878 (30.170)	1.1935 (30.315)	0.0070 (0.178)	X		
	BUSHING	OD	1.1855 (30.112)	1.1865 (30.137)	1.1808 (29.992)		X		
23	BEARING	ID	4.4988 (114.270)	4.5004 (114.310)	4.5133 (114.638)	0.0150 (0.381)	X		
	INPUT SHAFT	OD	4.4973 (114.231)	4.4983 (114.257)	4.4854 (113.929)			X	1
24	BUSHING	ID	5.6255 (142.888)	5.6270 (142.926)	5.6400 (143.256)	0.0150 (0.381)	X		
	BEARING	OD	5.6238 (142.845)	5.6250 (142.875)	5.6212 (142.778)		X		
25	BUSHING	ID	4.1111 (104.422)	4.1121 (104.447)	4.1256 (104.790)	0.0150 (0.381)	X		
	INPUT SHAFT	OD	4.1100 (104.394)	4.1106 (104.409)	4.0971 (104.066)			X	1
26	CRANK ARM	ID	4.4990 (114.275)	4.5000 (114.300)	4.5133 (114.638)	0.0150 (0.381)	X		
	INPUT SHAFT	OD	4.4973 (114.231)	4.4983 (114.257)	4.4850 (113.919)		X		
27	BEARING	ID	4.4988 (114.270)	4.5004 (114.310)	4.5133 (114.638)	0.0150 (0.381)	X		
	BUSHING	OD	4.4973 (114.231)	4.4983 (114.257)	4.4850 (113.919)		X		
28	BUSHING	ID	4.1111 (104.422)	4.1121 (104.447)	4.1256 (104.790)	0.0150 (0.381)	X		
	INPUT SHAFT	OD	4.1100 (104.394)	4.1106 (104.409)	4.0971 (104.066)			X	1
29	TRACK ROLLER	ID	1.2493 (31.732)	1.2500 (31.750)	---	0.0075 (0.191)	X		
	BOLT	OD	1.2480 (31.699)	1.2490 (31.725)	1.2425 (31.560)			X	1
30	BUSHING	ID	1.2500 (31.750)	1.2515 (31.788)	1.2565 (31.915)	0.0075 (0.191)	X		
	BOLT	OD	1.2480 (31.699)	1.2490 (31.725)	1.2425 (31.560)			X	1

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			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
31	BUSHING	ID	1.2495 (31.737)	1.2500 (31.750)	1.2565 (31.915)	0.0075 (0.191)	X		
	BOLT	OD	1.2480 (31.699)	1.2490 (31.725)	1.2425 (31.560)			X	1
32	BUSHING	ID	0.5005 (12.713)	0.5015 (12.738)	0.5050 (12.827)	0.0050 (0.127)	X		
	CAM ROLLER	OD	0.4985 (12.662)	0.5000 (12.700)	0.4965 (12.611)		X		
33	BUSHING	ID	1.6870 (42.850)	1.6885 (42.888)	1.6737 (42.512)	0.0072 (0.183)	X		
	BUSHING	OD	1.6850 (42.799)	1.6865 (42.837)	1.6813 (42.705)		X		
34	BUSHING	ID	0.3750 (9.525)	0.3755 (9.538)	0.3795 (9.639)	0.0050 (0.127)	X		
	BOLT	OD	0.3740 (9.500)	0.3745 (9.512)	0.3710 (9.423)			X	1
35	TRACK ROLLER	ID	0.3743 (9.507)	0.3750 (9.525)	---	0.0050 (0.127)	X		
	BOLT	OD	0.3740 (9.500)	0.3745 (9.512)	0.3700 (9.398)			X	1
36	BUSHING	ID	0.3750 (9.525)	0.3760 (9.550)	0.3795 (9.639)	0.0050 (0.127)	X		
	BOLT	OD	0.3740 (9.500)	0.3745 (9.512)	0.3710 (9.423)			X	1
37	BUSHING	ID	0.5620 (14.275)	0.5630 (14.300)	0.5665 (14.389)	0.0050 (0.127)	X		
	BUSHING	OD	0.5610 (14.249)	0.5615 (14.262)	0.5580 (14.173)		X		
38	BEARING	ID	1.1250 (28.575)	1.1255 (28.588)	1.1318 (28.748)	0.0078 (0.198)	X		
	BOLT	OD	1.1230 (28.524)	1.1240 (28.550)	1.1177 (28.390)		X		
39	BUSHING	ID	1.1250 (28.575)	1.1257 (28.593)	1.1318 (28.748)	0.0078 (0.198)	X		
	BOLT	OD	1.1230 (28.524)	1.1240 (28.550)	1.1179 (28.395)		X		
40	BEARING	ID	1.0000 (25.400)	1.0006 (25.415)	1.0052 (25.532)	0.0062 (0.157)	X		
	OUTER PIN	OD	0.9984 (25.359)	0.9990 (25.375)	0.9944 (25.258)			X	1

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			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
41	BUSHING	ID	0.9995 (25.387)	1.0003 (25.408)	1.0052 (25.532)	0.0062 (0.157)	X		
	OUTER PIN	OD	0.9984 (25.359)	0.9990 (25.375)	0.9941 (25.250)			X	1
42	BUSHING	ID	1.1200 (28.448)	1.1207 (28.466)	---	---	X		
	BUSHING	OD	1.1215 (28.486)	1.1222 (28.504)	---			X	
43	BEARING	ID	1.0000 (25.400)	1.0006 (25.415)	1.0052 (25.532)	0.0062 (0.157)	X		
	OUTER PIN	OD	0.9984 (25.359)	0.9990 (25.375)	0.9944 (25.258)			X	1
44	BUSHING	ID	0.9995 (25.387)	1.0030 (25.476)	1.0052 (25.532)	0.0062 (0.157)	X		
	OUTER PIN	OD	0.9984 (25.359)	0.9990 (25.375)	0.9941 (25.250)			X	1
45	BUSHING	ID	1.1200 (28.448)	1.1207 (28.466)	---	---	X		
	BUSHING	OD	1.1213 (28.481)	1.1221 (28.501)	---			X	
46	DOOR DRIVE BELLCRANK	ID	2.9359 (74.572)	2.9370 (74.600)	2.9504 (74.940)	0.0145 (0.368)	X		
	DOOR DRIVE SHAFT	OD	2.9349 (74.546)	2.9359 (74.572)	2.9225 (74.232)			X	
47	BEARING	ID	2.9359 (74.572)	2.9374 (74.610)	2.9504 (74.940)	0.0145 (0.368)	X		
	DOOR DRIVE SHAFT	OD	2.9349 (74.546)	2.9359 (74.572)	2.9229 (74.242)			X	
48	BUSHING	ID	0.5000 (12.700)	0.5006 (12.715)	0.5050 (12.827)	0.0050 (0.127)	X		
	CAM ROLLER	OD	0.4985 (12.662)	0.5000 (12.700)	0.4956 (12.588)			X	
49	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2546 (6.467)	0.0050 (0.127)	X		
	BOLT	OD	0.2490 (6.325)	0.2496 (6.340)	0.2455 (6.236)			X	
50	BEARING	ID	0.2500 (6.350)	0.2504 (6.360)	0.2546 (6.467)	0.0050 (0.127)	X		
	BOLT	OD	0.2490 (6.325)	0.2496 (6.340)	0.2454 (6.233)			X	

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			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
51	BUSHING	ID	0.3750 (9.525)	0.3756 (9.540)	0.3795 (9.639)	0.0050 (0.127)	X		
	BUSHING	OD	0.3740 (9.500)	0.3745 (9.512)	0.3706 (9.413)		X		
52	BEARING TO TRACK	---	---	---	---	0.0750 (1.905)	X		
							X		
53	BEARING TO TRACK	---	---	---	---	0.1055 (2.680)	X		
							X		

1 THIS PART CAN BE REPAIRED.

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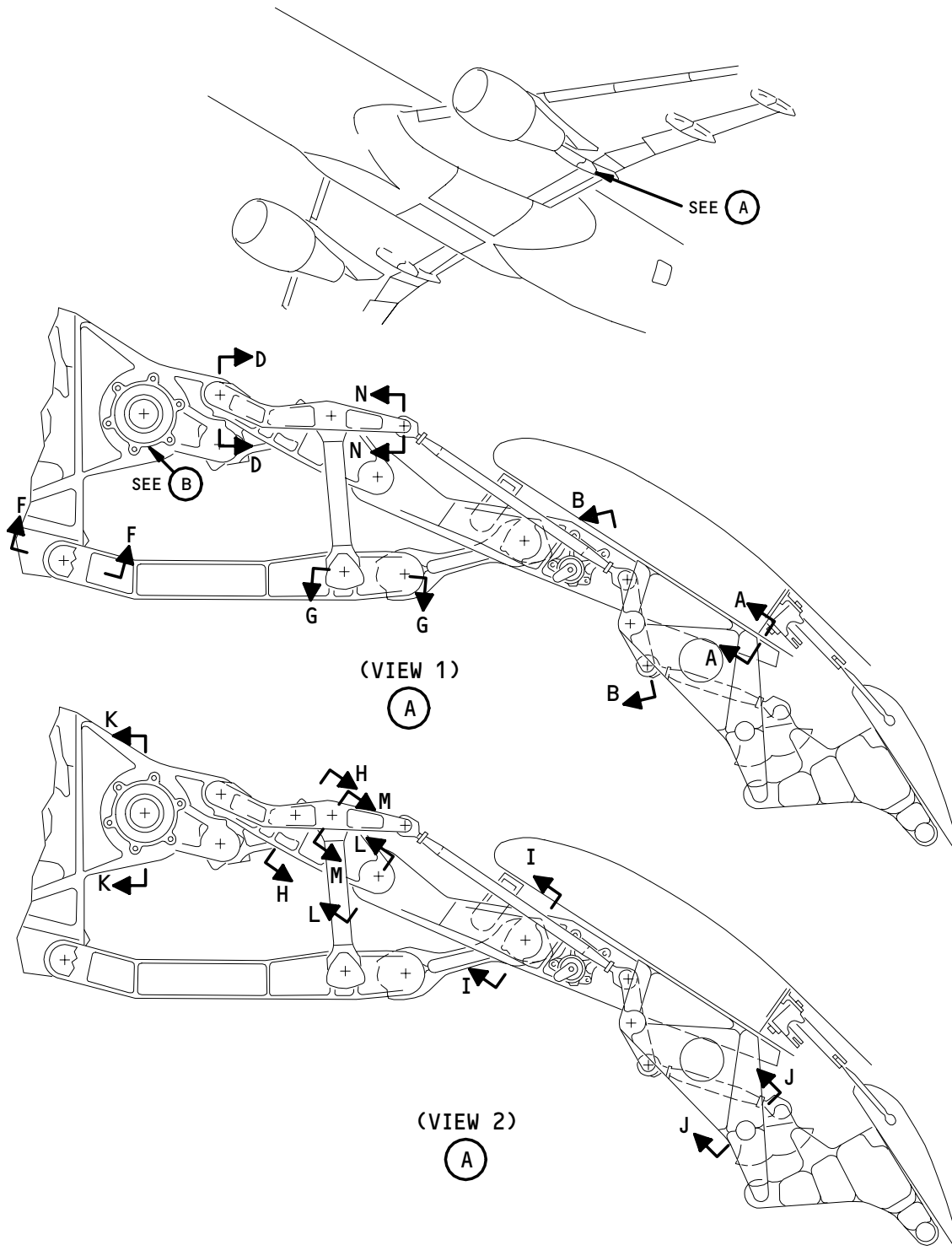
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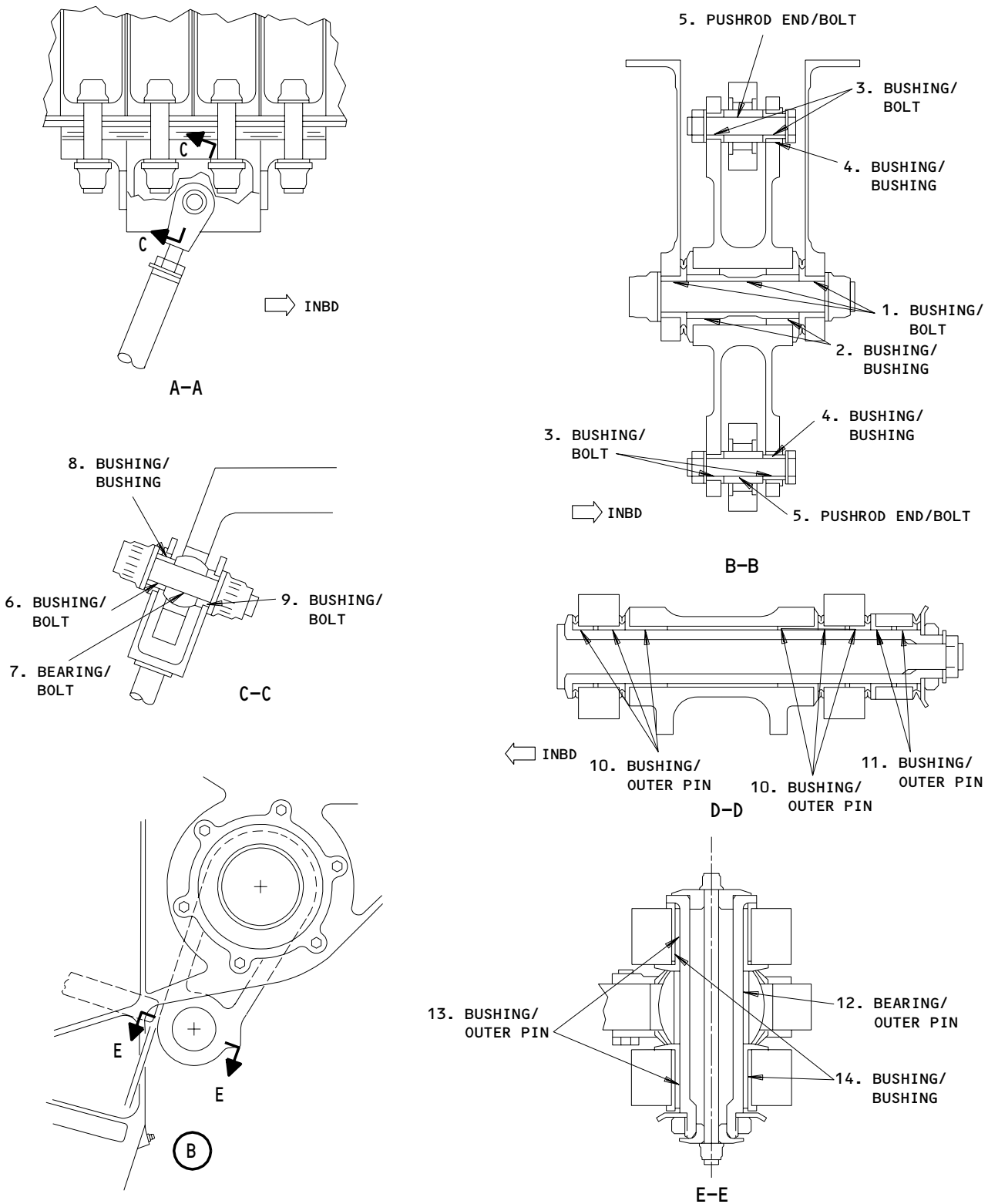
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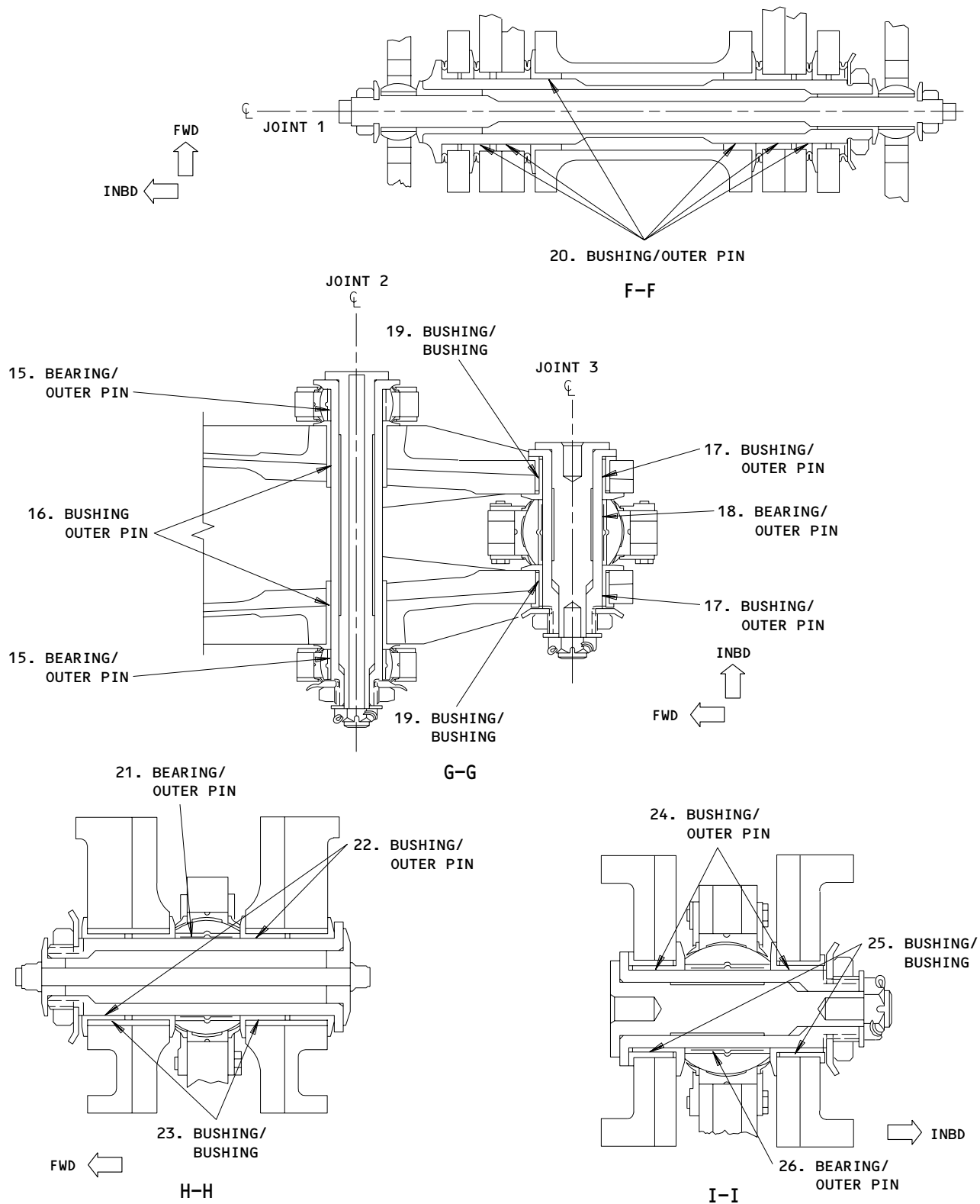
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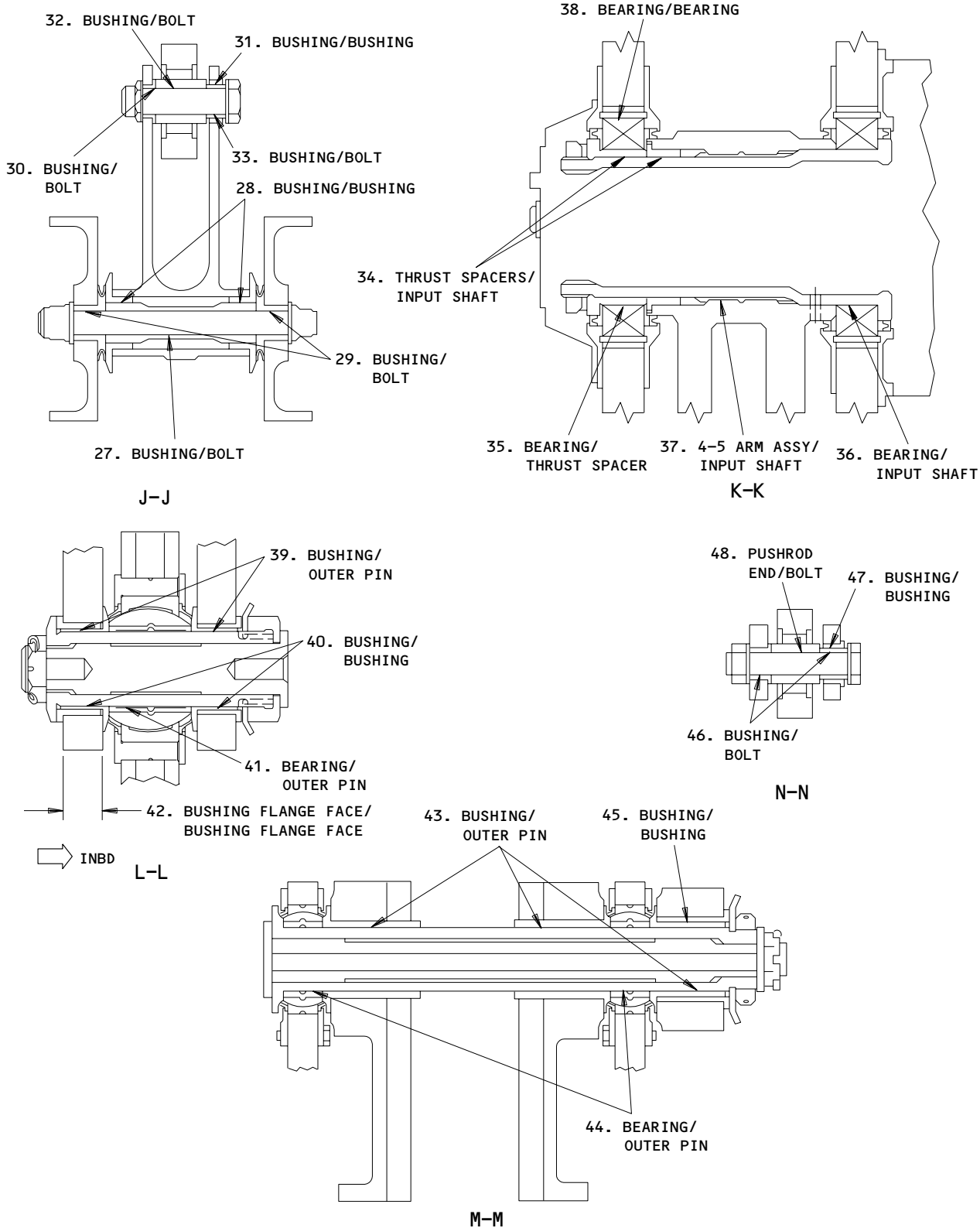
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			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.7495 (19.037)	0.7503 (19.058)	0.7543 (19.159)	0.0053 (0.135)	X		
	BOLT	OD	0.7485 (19.012)	0.7490 (19.025)	0.7450 (18.923)		X		
2	BUSHING	ID	1.1245 (28.562)	1.1253 (28.583)	1.1308 (28.722)	0.0068 (0.173)	X		
	BUSHING	OD	1.1230 (28.524)	1.1240 (28.550)	1.1185 (28.410)		X		
3	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4955 (12.586)		X		
4	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6917 (17.569)	0.0052 (0.132)	X		
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6825 (17.336)		X		
5	PUSHROD END	ID	0.4995 (12.687)	0.5000 (12.700)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4950 (12.573)		X		
6	BUSHING	ID	0.3125 (7.938)	0.3130 (7.950)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3115 (7.912)	0.3120 (7.925)	0.3080 (7.823)		X		
7	BEARING	ID	0.3125 (7.938)	0.3129 (7.948)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3115 (7.912)	0.3120 (7.925)	0.3079 (7.821)		X		
8	BUSHING	ID	0.4375 (11.113)	0.4381 (11.128)	0.4420 (11.227)	0.0050 (0.127)	X		
	BUSHING	OD	0.4365 (11.087)	0.4370 (11.100)	0.4331 (11.001)		X		
9	BUSHING	ID	0.3125 (7.938)	0.3131 (7.953)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3115 (7.912)	0.3120 (7.925)	0.3081 (7.826)		X		
10	BUSHING	ID	1.4996 (38.090)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4984 (38.059)	1.4990 (38.075)	1.4922 (37.902)			X	1

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BUSHING	ID	1.4995 (38.087)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4984 (38.059)	1.4990 (38.075)	1.4922 (37.902)			X	▷
12	BEARING	ID	1.7500 (44.450)	1.7506 (44.465)	1.7585 (44.666)	0.0095 (0.241)	X		
	OUTER PIN	OD	1.7484 (44.409)	1.7490 (44.425)	1.7411 (44.224)			X	▷
13	BUSHING	ID	1.7495 (44.437)	1.7506 (44.465)	1.7585 (44.666)	0.0095 (0.241)	X		
	OUTER PIN	OD	1.7484 (44.409)	1.7490 (44.425)	1.7411 (44.224)			X	▷
14	BUSHING	ID	1.9229 (48.842)	1.9238 (48.865)	---	---	X		
	BUSHING	OD	1.9250 (48.895)	1.9259 (48.918)	---			X	
15	BEARING	ID	1.5000 (38.100)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4984 (38.059)	1.4990 (38.075)	1.4922 (37.902)			X	▷
16	BUSHING	ID	1.4495 (36.817)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4984 (38.059)	1.4990 (38.075)	1.4922 (37.902)			X	▷
17	BUSHING	ID	1.7496 (44.440)	1.7506 (44.465)	1.7585 (44.666)	0.0095 (0.241)	X		
	OUTER PIN	OD	1.7484 (44.409)	1.7490 (44.425)	1.7411 (44.224)			X	▷
18	BEARING	ID	1.7500 (44.450)	1.7511 (44.477)	1.7585 (44.666)	0.0095 (0.241)	X		
	OUTER PIN	OD	1.7484 (44.409)	1.7490 (44.425)	1.7411 (44.224)			X	▷
19	BUSHING	ID	1.9229 (48.842)	1.9238 (48.865)	---	---	X		
	BUSHING	OD	1.9250 (48.895)	1.9259 (48.918)	---			X	
20	BUSHING	ID	1.6245 (41.262)	1.6256 (41.290)	1.6329 (41.476)	0.0089 (0.226)	X		
	OUTER PIN	OD	1.6234 (41.234)	1.6240 (41.250)	1.6167 (41.064)			X	▷

Inboard Flap Outboard Mechanism Wear Limits  
Figure 602 (Sheet 6)

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# BOEING

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
21	BEARING	ID	1.7500 (44.450)	1.7506 (44.465)	1.7585 (44.666)	0.0095 (0.241)	X		
	OUTER PIN	OD	1.7484 (44.409)	1.7490 (44.425)	1.7411 (44.224)			X	1
22	BUSHING	ID	1.7495 (44.437)	1.7506 (44.465)	1.7585 (44.666)	0.0095 (0.241)	X		
	OUTER PIN	OD	1.7484 (44.409)	1.7490 (44.425)	1.7411 (44.224)			X	1
23	BUSHING	ID	1.9229 (48.842)	1.9238 (48.865)	---	---	X		
	BUSHING	OD	1.9250 (48.895)	1.9259 (48.918)	---			X	
24	BUSHING	ID	1.7495 (44.437)	1.7506 (44.465)	1.7585 (44.666)	0.0095 (0.241)	X		
	OUTER PIN	OD	1.7484 (44.409)	1.7490 (44.425)	1.7411 (44.224)			X	1
25	BUSHING	ID	1.9229 (48.842)	1.9238 (48.865)	---	---	X		
	BUSHING	OD	1.9250 (48.895)	1.9259 (48.918)	---			X	
26	BEARING	ID	1.7500 (44.450)	1.7506 (44.465)	1.7585 (44.666)	0.0095 (0.241)	X		
	OUTER PIN	OD	1.7484 (44.409)	1.7490 (44.425)	1.7411 (44.224)			X	1
27	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)		X	1
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4957 (12.591)			X	
28	BUSHING	ID	0.8745 (22.212)	0.8753 (22.233)	0.8798 (22.347)	0.0006 (0.015)	X		
	BUSHING	OD	0.8735 (22.187)	0.8740 (22.200)	0.8695 (22.085)			X	1
29	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4957 (12.591)			X	
30	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4957 (12.591)			X	

Inboard Flap Outboard Mechanism Wear Limits  
Figure 602 (Sheet 7)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
31	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6917 (17.569)	0.0052 (0.132)	X		
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6825 (17.336)		X		
32	BUSHING	ID	0.4995 (12.687)	0.5000 (12.700)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4950 (12.573)		X		
33	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4955 (12.586)		X		
34	THRUST SPACER	ID	4.3515 (110.528)	4.3525 (110.554)	4.3660 (110.896)	0.0150 (0.381)	X		
	INPUT SHAFT	OD	4.3500 (110.490)	4.3510 (110.515)	4.3375 (110.173)			X	1
35	BEARING	ID	4.7488 (120.620)	4.7504 (120.660)	4.7533 (120.734)	0.0150 (0.381)	X		
	THRUST SPACER	OD	4.7473 (120.581)	4.7483 (120.607)	4.7354 (120.279)		X		
36	BEARING	ID	4.7488 (120.620)	4.7504 (120.660)	4.7533 (120.734)	0.0150 (0.381)	X		
	INPUT SHAFT	OD	4.7475 (120.587)	4.7485 (120.612)	4.7354 (120.279)			X	1
37	4-5 ARM ASSY	ID	4.7490 (120.625)	4.7500 (120.650)	4.7635 (120.993)	0.0150 (0.381)	X		
	INPUT SHAFT	OD	4.7475 (120.587)	4.7485 (120.612)	4.7350 (120.269)			X	1
38	BEARING	ID	6.3445 (161.150)	6.3460 (161.188)	6.3590 (161.519)	0.0150 (0.381)	X		
	BEARING	OD	6.3428 (161.107)	6.3440 (161.138)	6.3310 (160.807)		X		
39	BUSHING	ID	1.6245 (41.262)	1.6256 (41.290)	1.6329 (41.476)	0.0089 (0.226)	X		
	OUTER PIN	OD	1.6234 (41.234)	1.6140 (40.996)	1.6167 (41.064)			X	1
40	BUSHING	ID	1.7856 (45.354)	1.7865 (45.377)	---	---	X		
	BUSHING	OD	1.7875 (45.403)	1.7884 (45.425)	---		X		

Inboard Flap Outboard Mechanism Wear Limits  
Figure 602 (Sheet 8)

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## 767 MAINTENANCE MANUAL

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
41	BEARING	ID	1.6250 (41.275)	1.6256 (41.290)	1.6329 (41.476)	0.0089 (0.226)	X		
	OUTER PIN	OD	1.6234 (41.234)	1.6240 (41.250)	1.6167 (41.064)			X	1
42	BUSHING FLANGE FACE	---	---	1.8160 (46.126)	1.8460 (46.888)	---	X		
	BUSHING FLANGE FACE						X		
43	BUSHING	ID	1.4995 (38.087)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4984 (38.059)	1.4990 (38.075)	1.4906 (37.861)			X	1
44	BEARING	ID	1.5000 (38.100)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4984 (38.059)	1.4990 (38.075)	1.4906 (37.861)			X	1
45	BUSHING	ID	1.6481 (41.862)	1.6490 (41.885)	---	---	X		
	BUSHING	OD	1.6500 (41.910)	1.6509 (41.933)	---			X	
46	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4955 (12.586)			X	
47	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6917 (17.569)	0.0052 (0.132)	X		
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6825 (17.336)			X	
48	PUSHROD END	ID	0.4995 (12.687)	0.5000 (12.700)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4950 (12.573)			X	

1 THIS PART CAN BE REPAIRED.

Inboard Flap Outboard Mechanism Wear Limits  
Figure 602 (Sheet 9)

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INBOARD TE FLAP, INBOARD ROTARY ACTUATOR – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the inboard rotary actuator of the inboard flap.

TASK 27-51-05-024-001

2. Inboard Flap Inboard Rotary Actuator – Removal

A. Equipment

- (1) TE Flap PDU Lock – A27009-7

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels  
(2) AMM 24-22-00/201, Electrical Power – Control  
(3) AMM 27-51-00/501, Trailing Edge Flap System  
(4) AMM 27-51-41/401, TE Flap Drive Shafts  
(5) AMM 27-51-42/401, Actuator Input Angle Gearbox  
(6) AMM 29-11-00/201, Main Hydraulic Systems  
(7) AMM 32-00-15/201, Landing Gear Door Locks  
(8) AMM 32-00-20/201, Landing Gear Downlock

C. Access

(1) Location Zones

- |         |  |
|---------|--|
| 143/144 | Left/Right MLG Wheel Well              |
| 211/212 | Control Cabin                          |
| 710     | Nose Landing Gear and Doors            |
| 730/740 | Left/Right Main Landing Gear and Doors |

(2) Access Panels

- |             |                                   |
|-------------|-----------------------------------|
| 195JL/196JR | Left/Right Inboard Flap Mechanism |
|-------------|-----------------------------------|

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-004

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

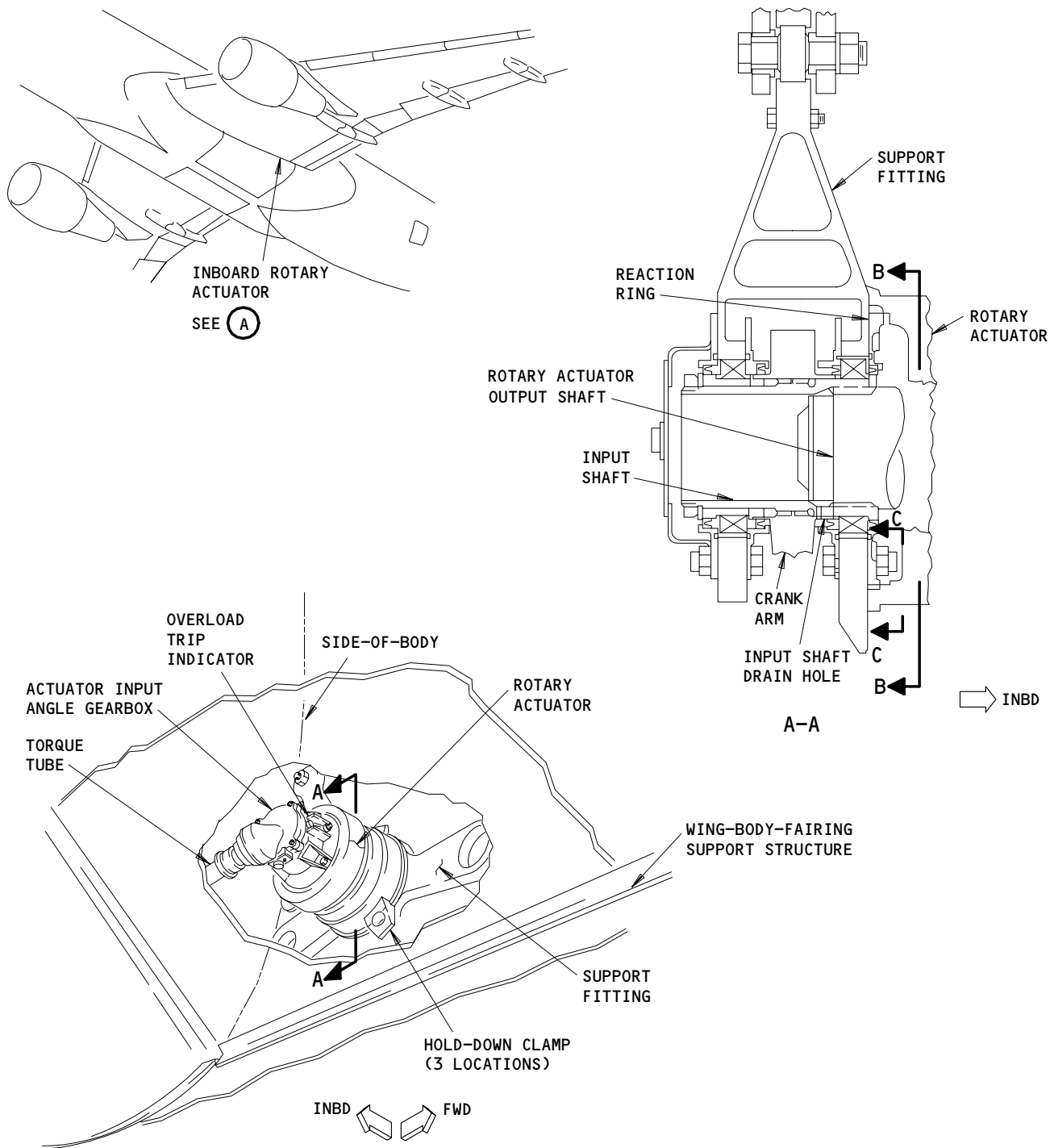
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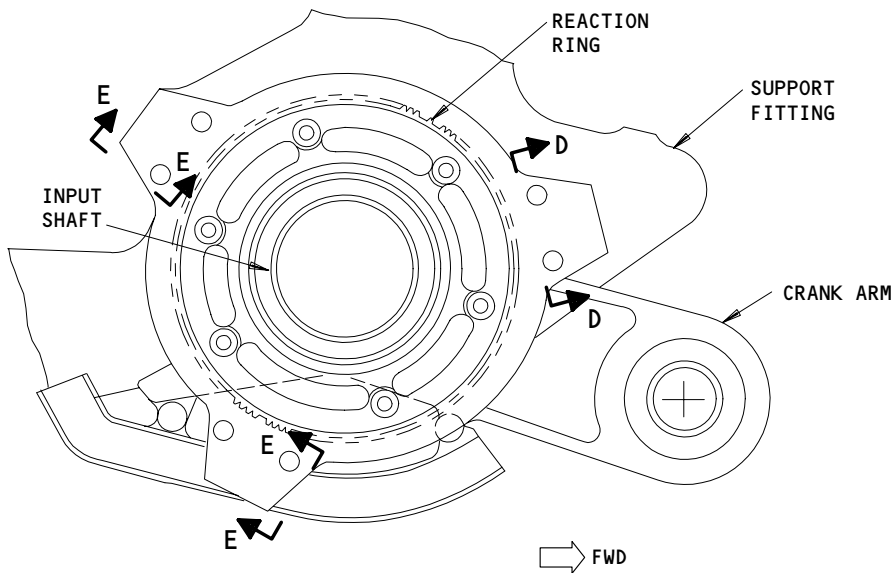
**INBOARD ROTARY ACTUATOR  
(LEFT WING SHOWN, RIGHT WING OPPOSITE)**

**(A)**

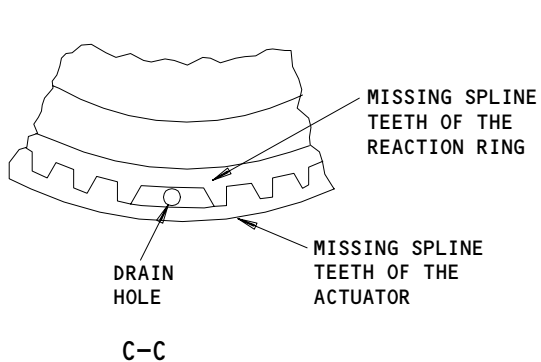
**Inboard Flap, Inboard Rotary Actuator  
Figure 401 (Sheet 1)**

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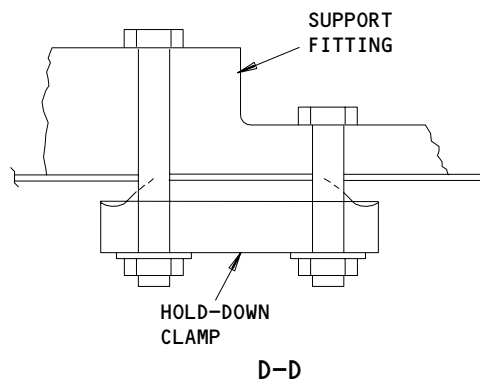
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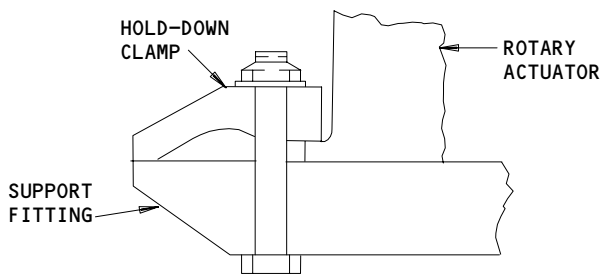
B-B



C-C



D-D



E-E

Inboard Flap, Inboard Rotary Actuator  
Figure 401 (Sheet 2)

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S 864-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-006

(5) Move the flap control lever to the zero unit detent (flaps up), and permit the flaps to move to the fully retracted position.

S 864-007

(6) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-008

(7) Open these circuit breakers on the main power distribution panel and attach DO-NOT-CLOSE tags:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6D24, ALTN FLAP PWR  
(c) 6F24, ALTN SLAT OUTBD PWR

S 864-009

(8) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD  
(c) 11J24, FLAP ALTN CONT

S 014-010

(9) Remove the aft wing-to-body access panel, 195JL (left side) or 196JR (right side), below the flap fairing door (AMM 06-41-00/201).

S 494-011

(10) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 404).

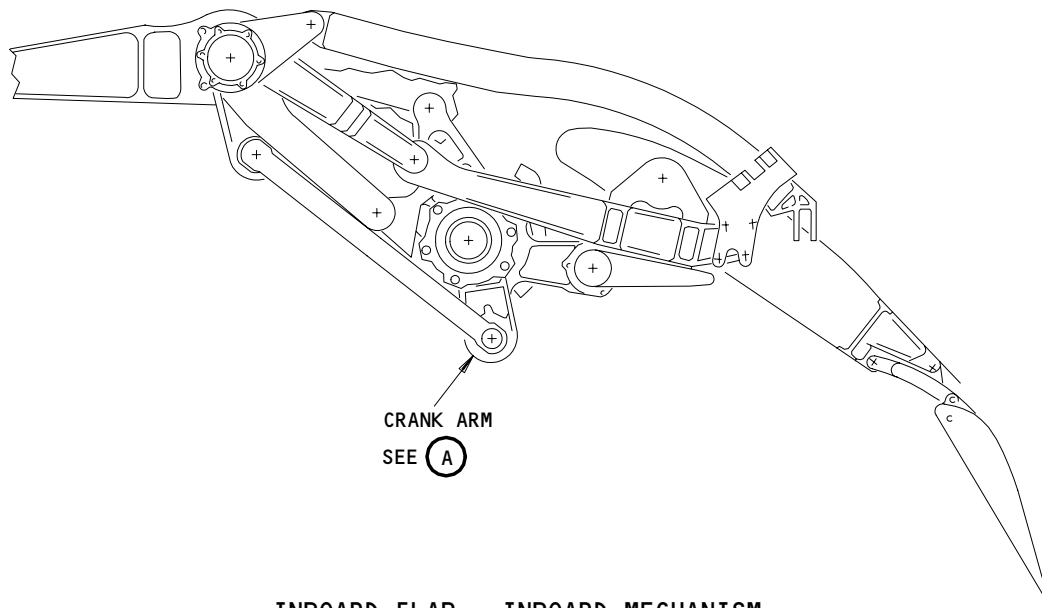
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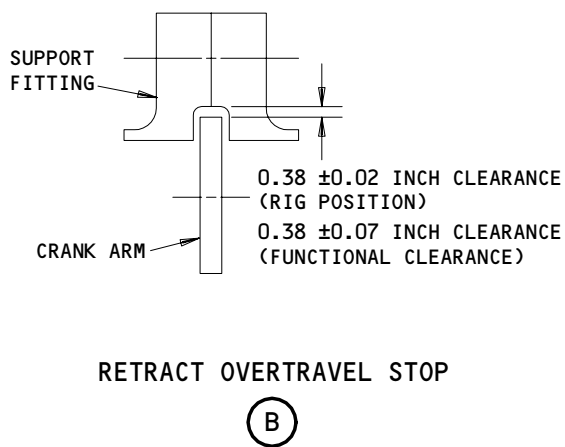
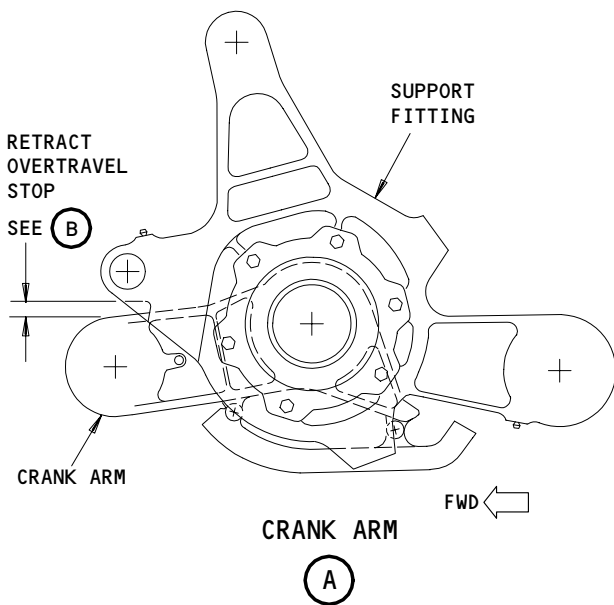
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INBOARD FLAP - INBOARD MECHANISM



Overtravel Stop Clearances for the Inboard Flap  
Figure 402 (Sheet 1)

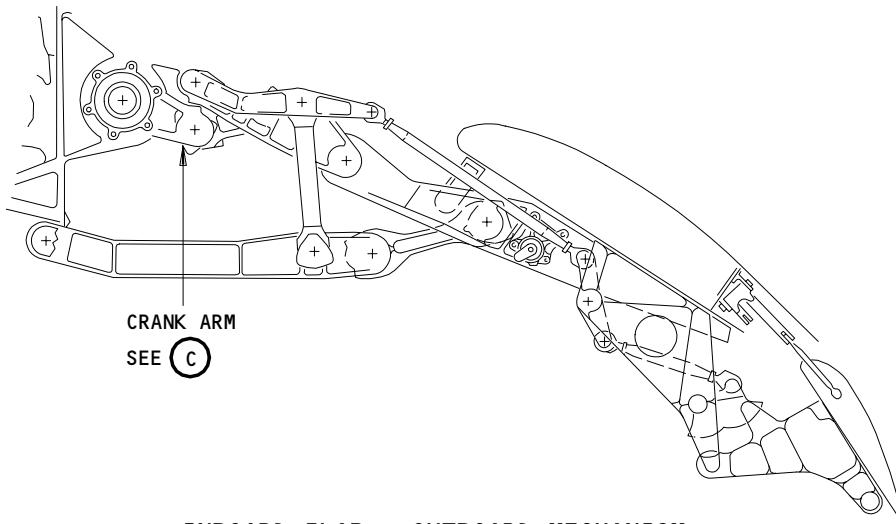
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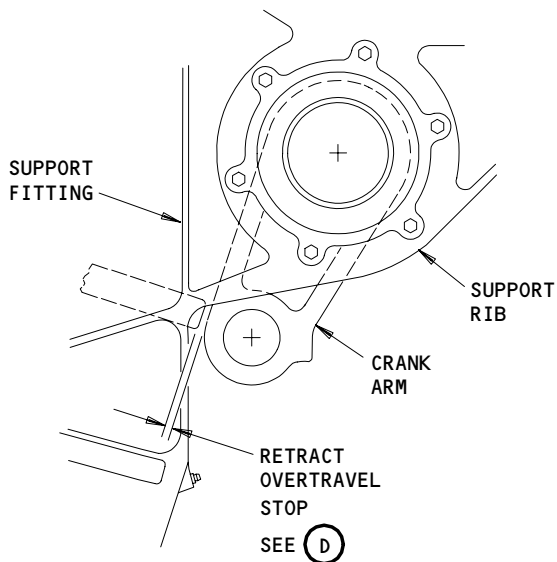
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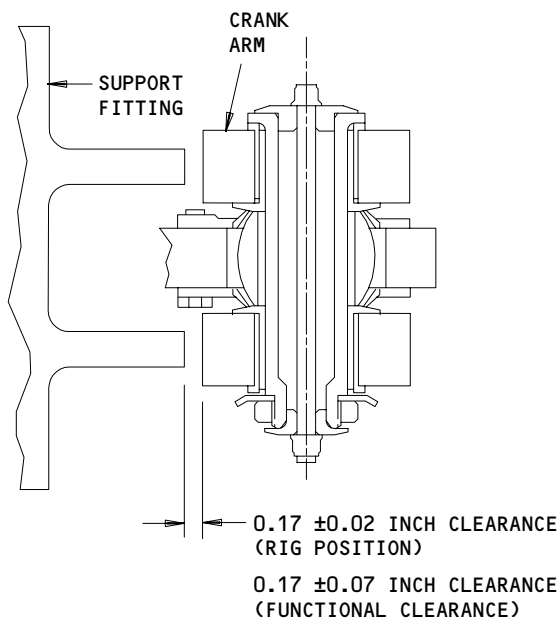
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INBOARD FLAP - OUTBOARD MECHANISM



CRANK ARM  
(C)

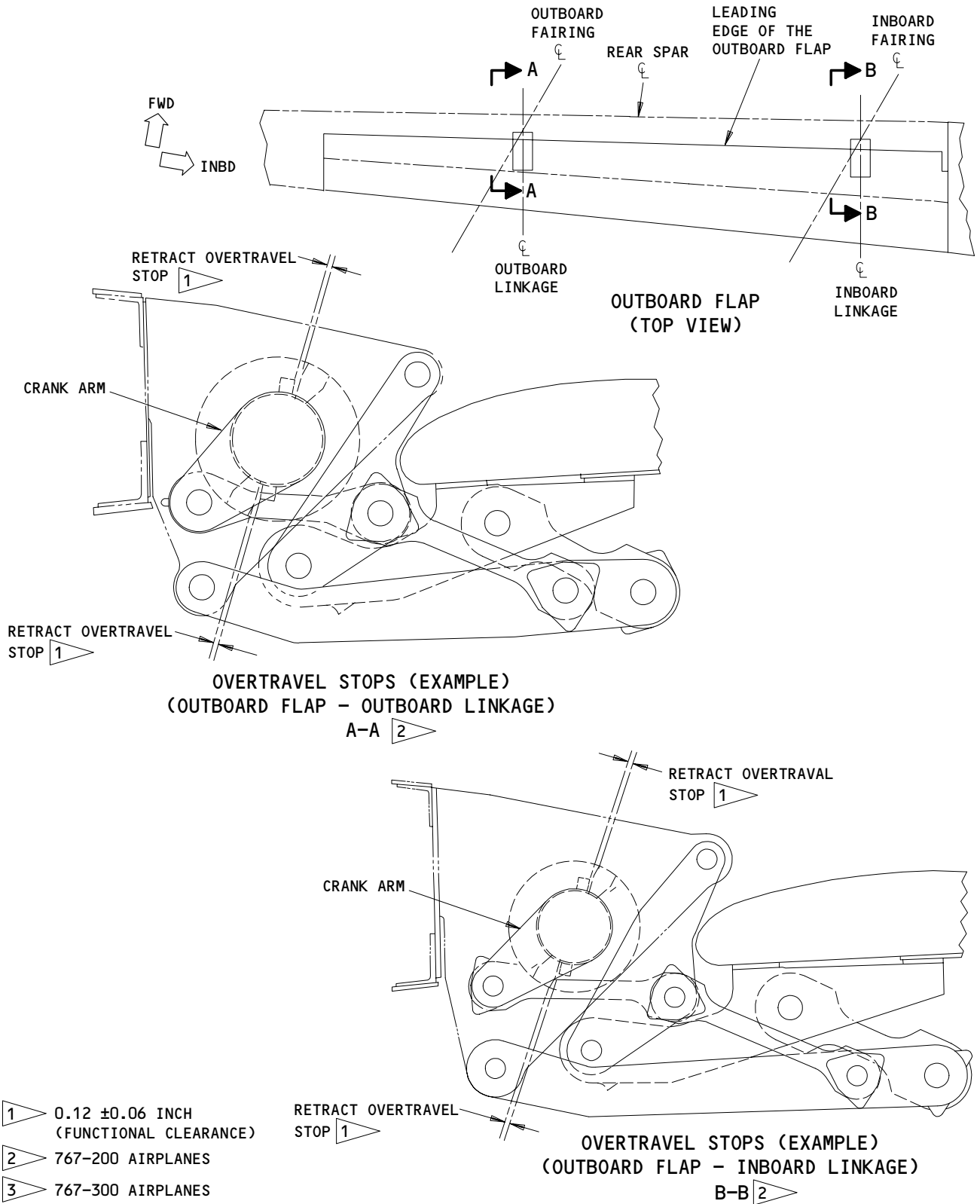


RETRACT OVERTRAVEL STOP  
(D)

Overtravel Stop Clearances for the Inboard Flap  
Figure 402 (Sheet 2)

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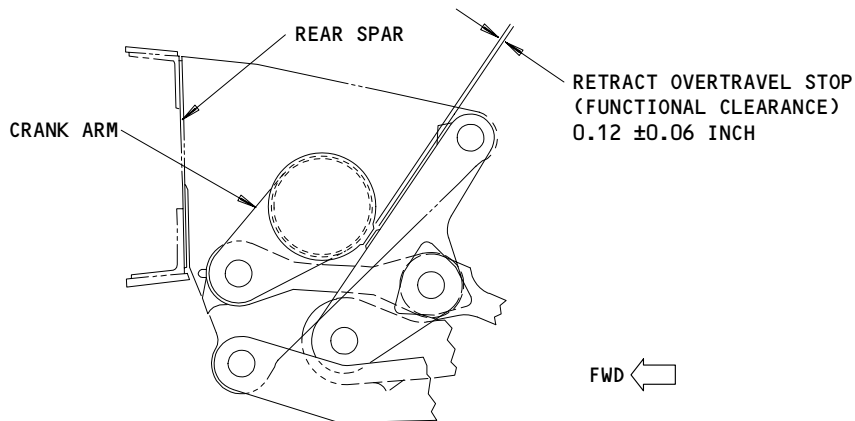
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**Overtravel Stop Clearances for the Outboard Flap  
Figure 403 (Sheet 1)**

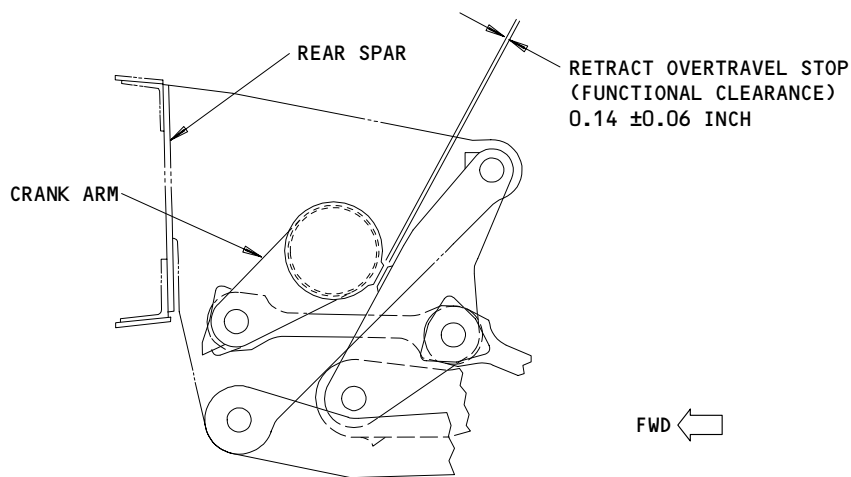
<b>EFFECTIVITY</b>	<b>ALL</b>
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OVERTRAVEL STOPS  
(OUTBOARD FLAP - OUTBOARD LINKAGE)

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OVERTRAVEL STOPS  
(OUTBOARD FLAP - INBOARD LINKAGE)

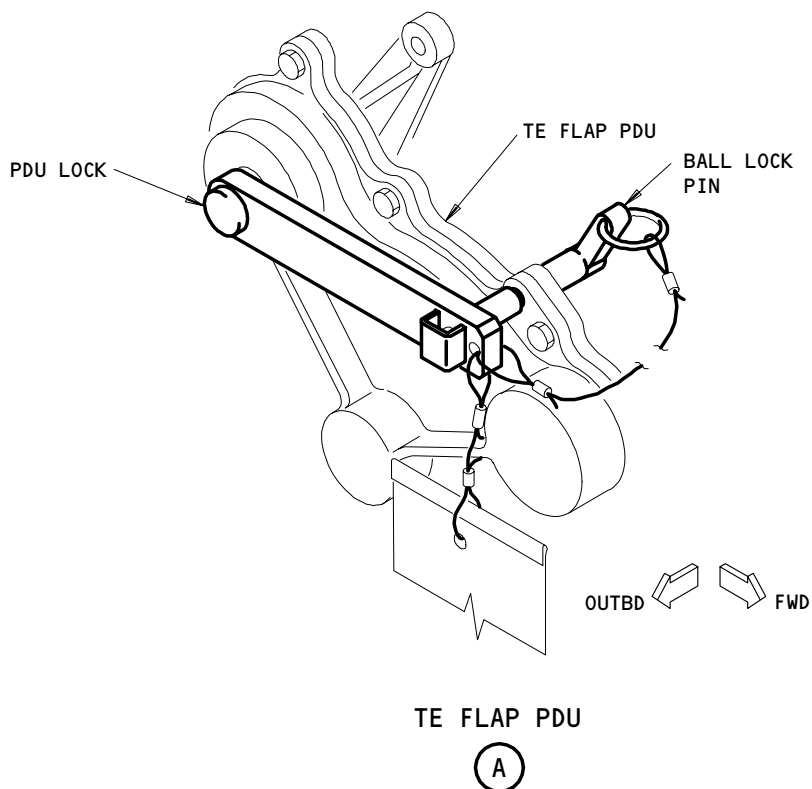
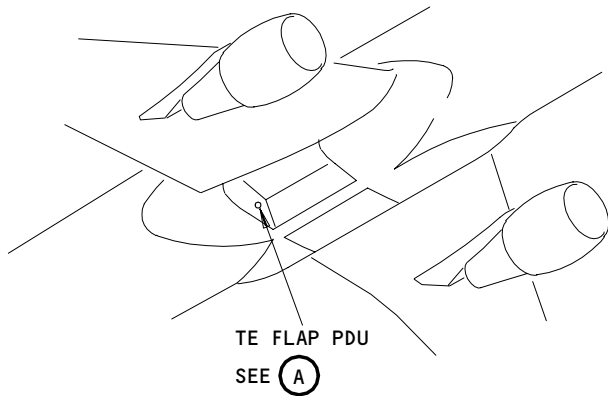
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Overtravel Stop Clearances for the Outboard Flap  
Figure 403 (Sheet 2)

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PDU Lock for the TE Flap PDU  
Figure 404

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E. Remove the Inboard Rotary Actuator

S 864-052

- (1) Hold the flaps in the fully retracted position (you can use devices like a tripod and rubber blocks to keep the flaps up).

**NOTE:** Flaps may roll down by the force of gravity after the removal of the rotary actuator.

S 034-012

- (2) Disconnect the torque tube from the actuator input angle gearbox (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tube. It will be necessary to adjust the flap drive if you turn the torque tube while it is disconnected (AMM 27-51-00/501).

S 984-013

- (3) Manually turn the gearbox coupling, in the retract direction, until the actuator crank arm touches the retract overtravel stop (View A, Fig. 402). Keep a count of the number of turns of the coupling for installation.

**NOTE:** Stop the turns when the crank arm touches the overtravel stop to prevent preload. Preload on the actuator will make the actuator difficult to remove.

When you look to the outboard direction, the retract direction is clockwise for the left wing, and counterclockwise for the right wing.

S 024-014

- (4) Remove the input angle gearbox from the actuator (AMM 27-51-42/401).

S 034-015

- (5) Remove the six nuts at the three hold-down clamps that hold the actuator to the support fitting (View D-D and E-E, Fig. 401).

**NOTE:** A channel washer below each bolthead prevents the bolt to turn.

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S 034-016

- (6) Remove the three hold-down clamps.

**NOTE:** Keep the bolts in the support fitting when you remove the clamps.

S 034-017

**WARNING:** BE CAREFUL WHEN YOU REMOVE THE ROTARY ACTUATOR. BECAUSE THE ACTUATOR WEIGHS 56 POUNDS (25.4 Kg), INJURY CAN OCCUR.

- (7) Hold the weight of the rotary actuator and pull the actuator 2.5 inches out from the support fitting to disengage the splines.

S 024-018

- (8) Remove the rotary actuator from the airplane.

TASK 27-51-05-424-019

3. Inboard Flap Inboard Rotary Actuator - Installation

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Recommended)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) G02020 Modeling Clay

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 12-21-09/301, Lubrication
- (3) AMM 20-10-23/401, Lockwires
- (4) AMM 24-22-00/201, Electrical Power - Control
- (5) AMM 27-51-00/501, Trailing Edge Flap System
- (6) AMM 27-51-41/401, TE Flap Drive Shafts
- (7) AMM 27-51-42/401, Actuator Input Angle Gearbox
- (8) AMM 29-11-00/201, Main Hydraulic Systems
- (9) AMM 32-00-15/201, Landing Gear Door Locks

C. Access

- (1) Location Zones
  - 143/144 Left/Right MLG Wheel Well
  - 211/212 Control Cabin
  - 710 Nose Landing Gear and Doors
  - 730/740 Left/Right Main Landing Gear and Doors
- (2) Access Panels
  - 195JL/196JR Left/Right Inboard Flap Mechanism

D. Install the Inboard Rotary Actuator (Fig. 401)

S 644-020

- (1) Apply a layer of grease to the splines and the mating surfaces on the rotary actuator.

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S 214-021

- (2) Make sure the overload trip indicator on the actuator is pushed in (Detail A).

S 104-022

- (3) Clean the input shaft, the reaction ring, and the actuator spline drain holes (View A-A) and remove unwanted grease or dirt.

S 434-023

**WARNING:** BE CAREFUL WHEN YOU INSTALL THE ROTARY ACTUATOR. BECAUSE THE ACTUATOR WEIGHS 56 POUNDS (25.4 Kg), INJURY CAN OCCUR.

- (4) Put the actuator output shaft into the input shaft, and align the missing spline tooth on the actuator rim to the missing spline tooth on the reaction ring (View C-C).

S 434-024

- (5) Move the actuator on to the reaction ring.

**NOTE:** Turn the actuator input shaft if it is necessary to engage the actuator to the reaction ring splines.

S 434-025

- (6) Install the three hold-down clamps with washers and locknuts (View D-D and E-E).

S 214-026

- (7) Make sure the actuator crank arm touches the retract overtravel stop (View A, Fig. 402).

S 424-027

- (8) Install the input angle gearbox on the actuator (AMM 27-51-42/401).

S 984-028

- (9) Turn the gearbox coupling in the extend direction the same number of turns that you made during the actuator removal procedure.

**NOTE:** If you did not write the number of turns that you made during the removal procedure, turn the gearbox coupling five full turns in the extend direction and adjust the retract overtravel stop clearance to the RIG position (AMM 27-51-00/501).

When you look to the outboard direction, the extend direction is counterclockwise for the left wing, and clockwise for the right wing.

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S 434-029

- (10) Connect the torque tube to the actuator input angle gearbox (AMM 27-51-41/401).

**NOTE:** Do not turn the gearbox coupling while you connect the torque tube. It will be necessary to adjust the flap drive if you turn the coupling or the torque tube.

S 644-030

- (11) Fill the gearbox coupling with grease.

S 094-031

- (12) Remove the PDU lock from the TE flap power drive unit (PDU) (Fig. 404).

S 214-032

- (13) Make sure the flap control lever is in the zero-unit (flaps up) detent.

S 084-053

- (14) Remove the devices used to hold the flaps up (tripod and rubber blocks).

S 864-033

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (15) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-034

- (16) Move the flap control lever to the 20-unit detent, and make sure the flaps move to the 20-degree position.

S 864-035

- (17) Remove power from the center hydraulic system (AMM 29-11-00/201).

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S 494-036

**WARNING:** DO NOT MOVE THE FLAP CONTROL LEVER WHEN YOU APPLY THE MODELING CLAY IN THE STEP THAT FOLLOWS. MOVEMENT OF THE FLAP CONTROL LEVER DURING THIS OPERATION CAN CAUSE INJURY TO PERSONS.

(18) Apply modeling clay to all eight retract overtravel stops in the left and right wings.

S 864-037

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(19) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-038

(20) Move the flap control lever to the zero (FLAPS UP) detent and permit the flaps to move to the fully retracted position.

**NOTE:** After the flaps moved to the fully retracted position, stop for one minute before you do the subsequent step.

S 864-039

(21) Move the flap control lever to the 20-unit detent.

S 864-040

(22) Remove power from the center hydraulic system (AMM 29-11-00/201).

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S 094-041

**WARNING:** DO NOT MOVE THE FLAP CONTROL LEVER WHEN YOU MEASURE THE OVERTRAVEL STOP CLEARANCES IN THE STEP THAT FOLLOWS. THE MOVEMENT OF THE FLAP CONTROL LEVER DURING THIS OPERATION CAN CAUSE INJURY TO PERSONS.

- (23) Remove the clay from each retract overtravel stop, measure the clay thickness, and do these checks:
- (a) Make sure each clay thickness agrees with the correct retract overtravel clearance as shown for the inboard flap (Fig. 402).
  - (b) Make sure each clay thickness agrees with the correct retract overtravel clearance as shown for the outboard flap (Fig. 403).

S 824-042

- (24) If the retract overtravel clearance is not correct, adjust the retract overtravel clearance to the RIG position (AMM 27-51-00/501).

S 434-043

- (25) Make sure you install a lockwire to the coupling screws on each coupling with the double twist procedure (AMM 20-10-23/401).

S 864-044

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (26) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-045

- (27) Operate the flap control lever through a full cycle and make sure the flaps operate correctly.

E. Put the Airplane Back to Its Usual Condition

S 414-046

- (1) Install the aft wing-to-body access panels, 195JL and 196JR, below the flap fairing door (AMM 06-41-00/201).

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S 864-047

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-048

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 094-049

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 864-050

- (5) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 864-051

- (6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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INBOARD FLAP, AFT FLAP – MAINTENANCE PRACTICES

1. General

A. This procedure contains these tasks:

- Aft Flap Slave Drive Bellcrank Removal
- Aft Flap Slave Drive Bellcrank Installation
- Aft Flap Removal
- Aft Flap Installation
- Aft Flap Drive Bellcrank Removal
- Aft Flap Drive Bellcrank Installation
- Aft Flap Adjustment.

TASK 27-51-06-022-001

2. Aft Flap Slave Drive Bellcrank – Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip – 10121C-R,  
Commercially Available
- (2) Sling Set, Inboard TE Flap – A27016-27
- (3) TE Flap PDU Lock – A27009-7
- (4) Inboard Aileron Rigging Bar – A27024-47  
(recommended); -2 (optional)

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 27-51-03/401, Inboard Flap
- (4) AMM 27-51-15/401, Inboard Trailing Edge Flap Track Fairing
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) AMM 32-00-15/201, Landing Gear Door Lock
- (7) AMM 32-00-20/201, Landing Gear Downlock

C. Access

(1) Location Zones

- |         |  |
|---------|--|
| 143/144 | Left/Right MLG Wheel Well              |
| 211/212 | Control Cabin                          |
| 555/655 | Inboard Trailing Edge Flap             |
| 710     | Nose Landing Gear and Doors            |
| 730/740 | Left/Right Main Landing Gear and Doors |

(2) Access Panels

- |             |  |
|-------------|--|
| 555FB/655FB | Main Spar Inspar Structure               |
| 555HB/655HB | Area Aft of Main Flap Mid Spar Structure |

D. Prepare for the Removal

S 212-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

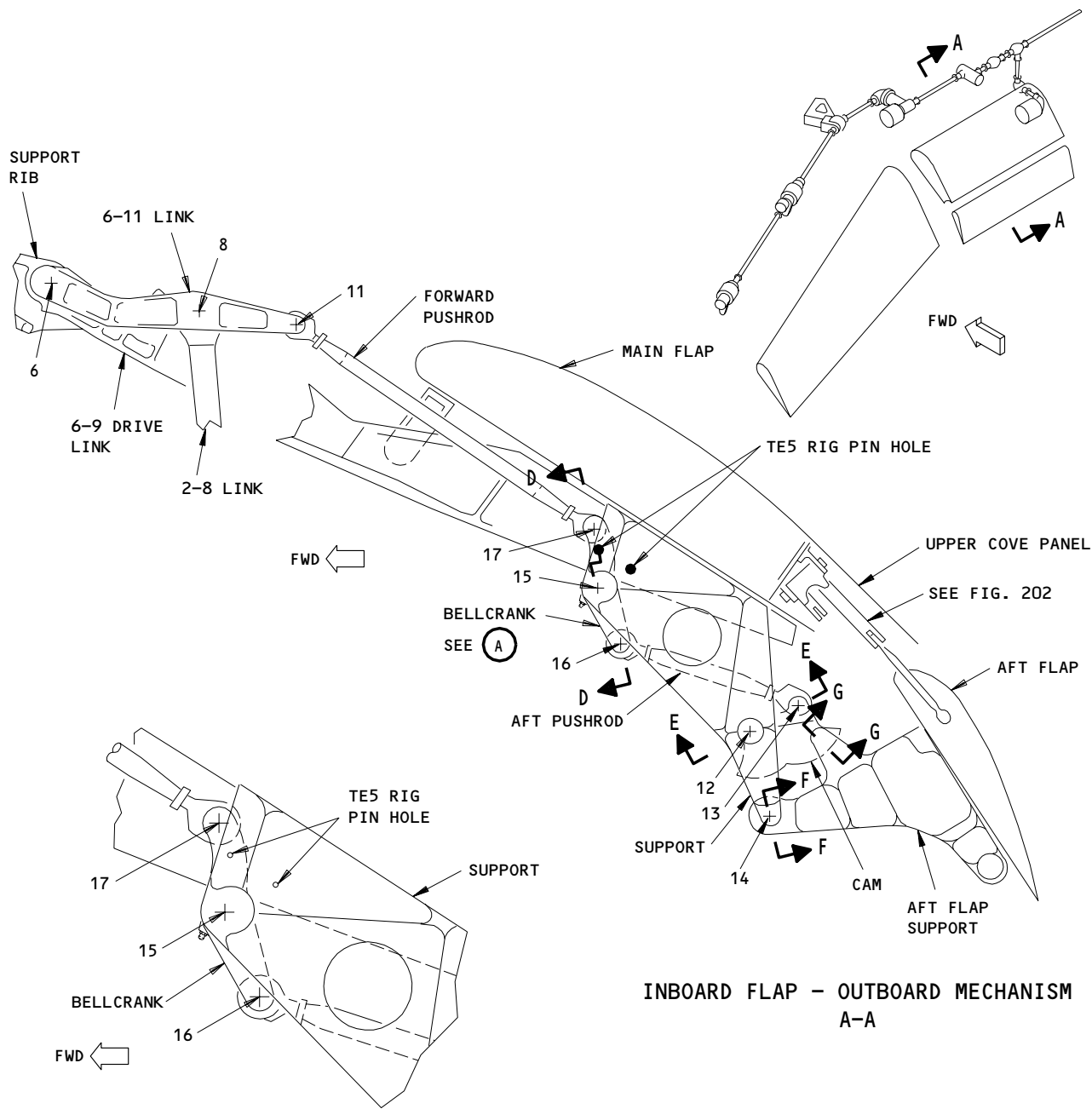
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INBOARD FLAP - OUTBOARD MECHANISM  
A-A

NOT USED  
B-B

- 1 INSTALL A COTTER PIN AT TWO LOCATIONS.
- 2 INSTALL A RETAINING PIN WITH A LOCKWIRE.
- 7 MAKE SURE THE BELLCRANK IS INSTALLED IN THE DIRECTION AS SHOWN, WITH THE TE5 RIG PIN HOLE ABOVE JOINT 15.

Flap Drive Mechanism for the Aft Flap  
Figure 201 (Sheet 1)

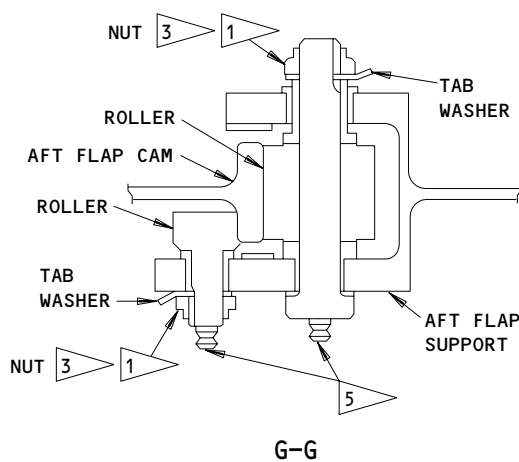
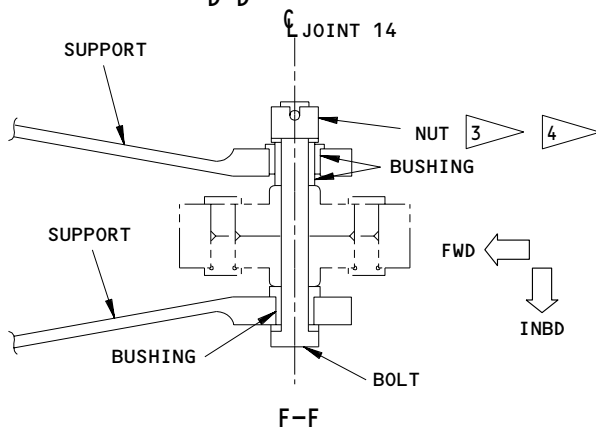
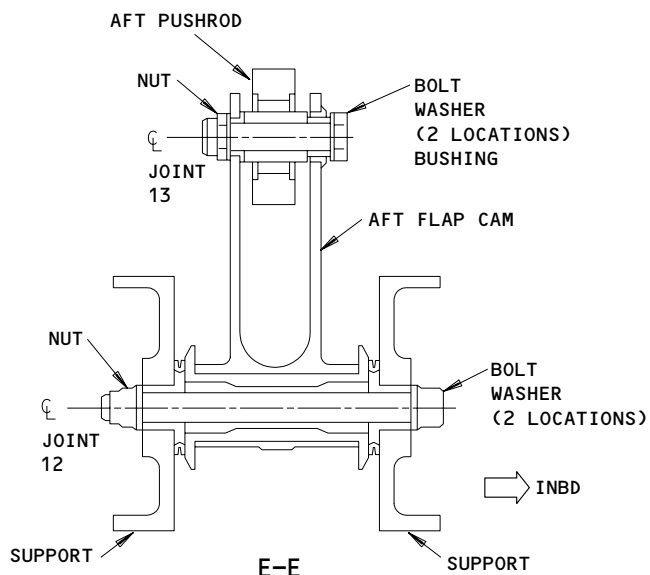
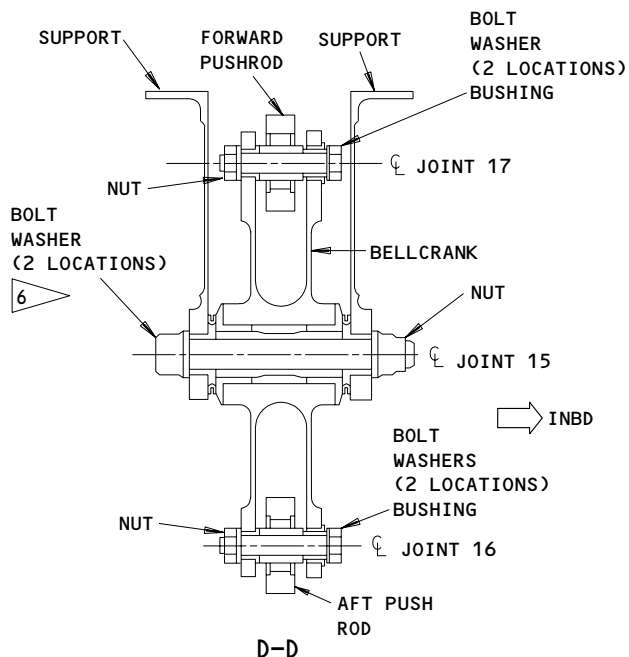
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NOT USED  
C-C



- 3 LUBRICATE THE BOLT THREADS WITH GREASE BEFORE INSTALLATION.
- 4 APPLY WATER-RESISTANT GREASE TO ALL MATING SURFACES.
- 5 LUBRICATE WITH GREASE AT THE FITTINGS
- 6 MAKE SURE YOU INSTALL THE BOLT WITH THE BOLT HEAD POINTED TO THE OUTBOARD DIRECTION, TO PREVENT POSSIBLE INTERFERENCE WITH THE FLAP FAIRING.

Flap Drive Mechanism for the Aft Flap  
Figure 201 (Sheet 2)

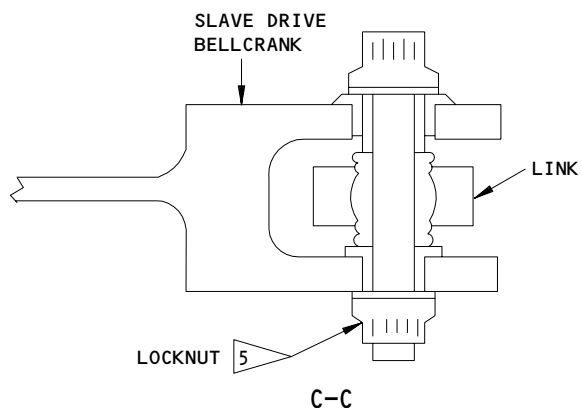
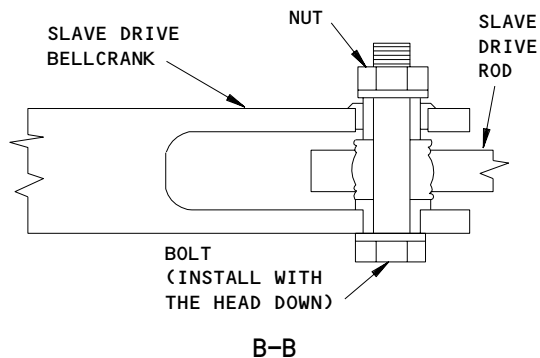
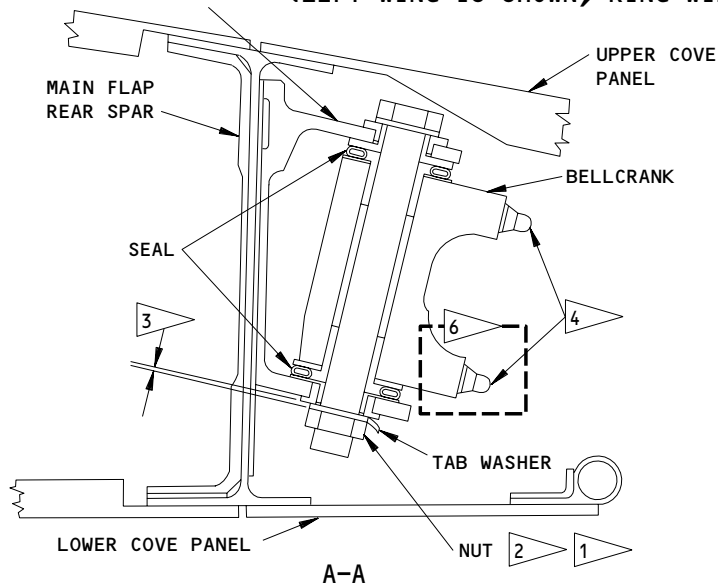
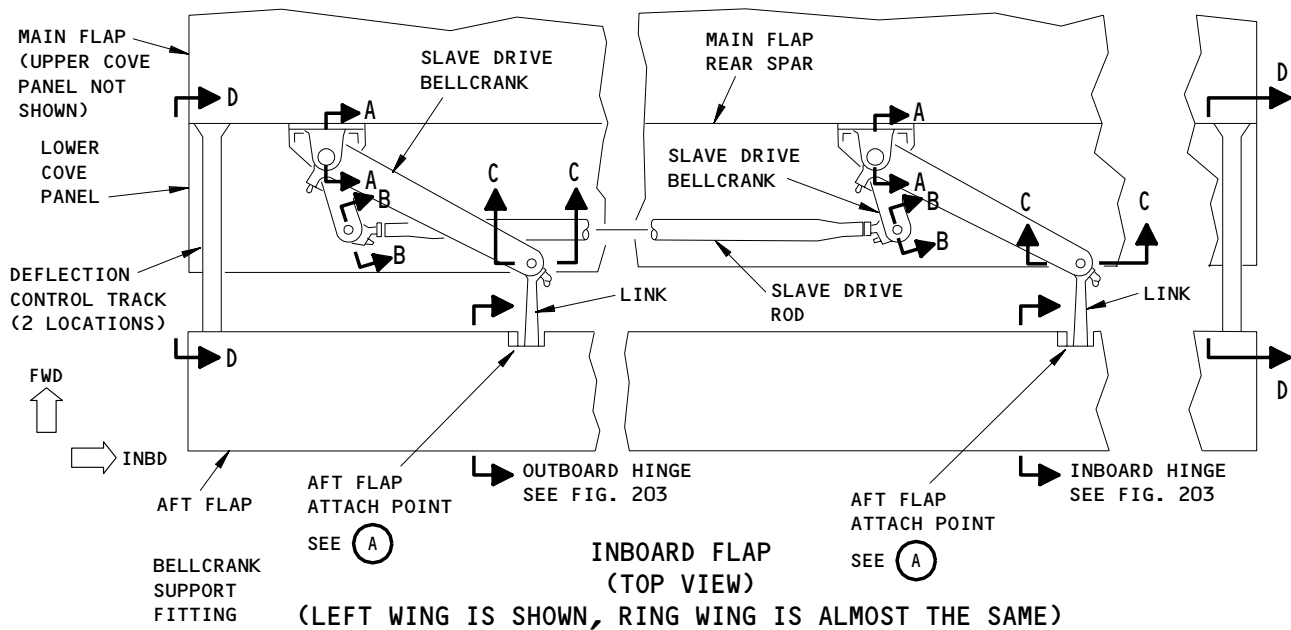
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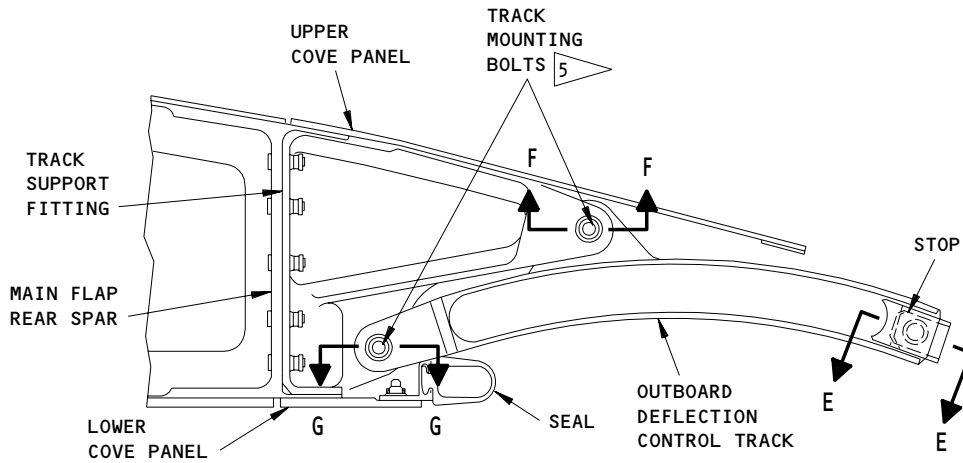


- 1 INSTALL LOCKWIRE WITH THE DOUBLE TWIST PROCEDURE (AMM 20-10-23/401).
- 2 LUBRICATE THE 1401 BOLT THREADS WITH GREASE BEFORE INSTALLATION.
- 3 KEEP 0.005 INCH (0.127 mm) MINIMUM CLEARANCE BETWEEN THE WASHER AND THE BUSHING
- 4 LUBRICATE WITH GREASE
- 5 APPLY GREASE TO ALL MATING SURFACES, DO NOT PUT GREASE ON THE BOLT THREADS.
- 6 767-200 AIRPLANES

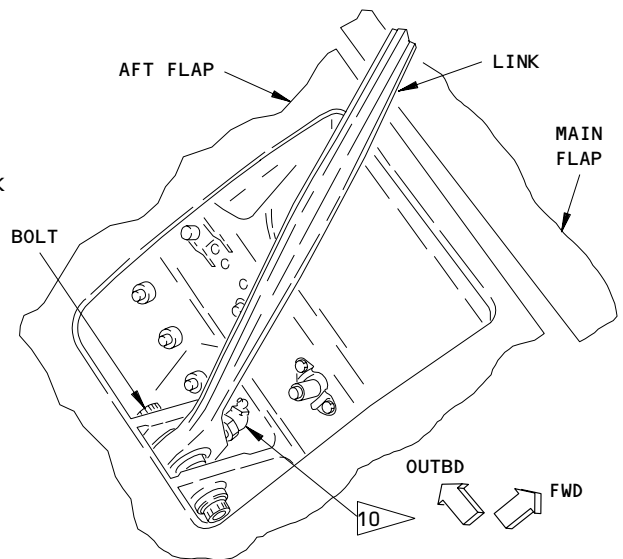
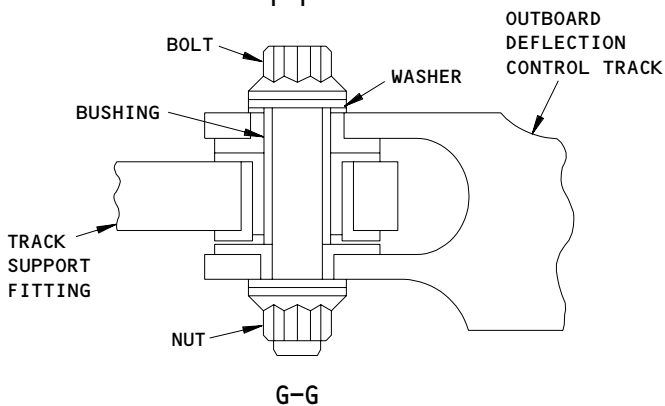
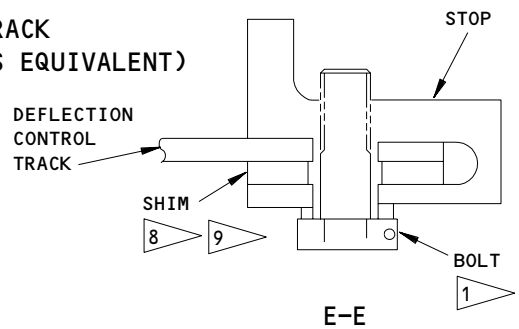
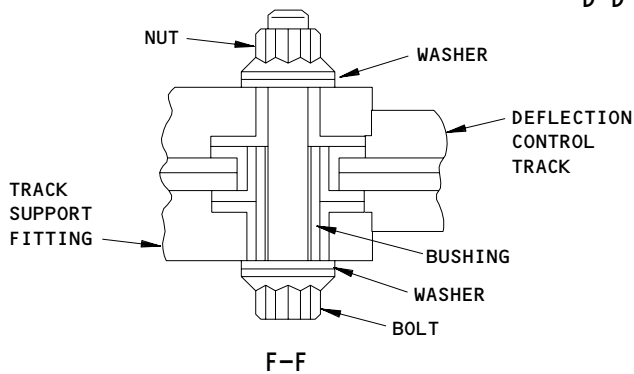
Slave Drive Mechanism for the Aft Flap  
Figure 202 (Sheet 1)

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**DEFLECTION CONTROL TRACK  
(OUTBOARD IS SHOWN, INBOARD IS EQUIVALENT)  
D-D**



**AFT FLAP ATTACH POINT  
(EXAMPLE, 2 LOCATIONS)  
(TOP VIEW)**

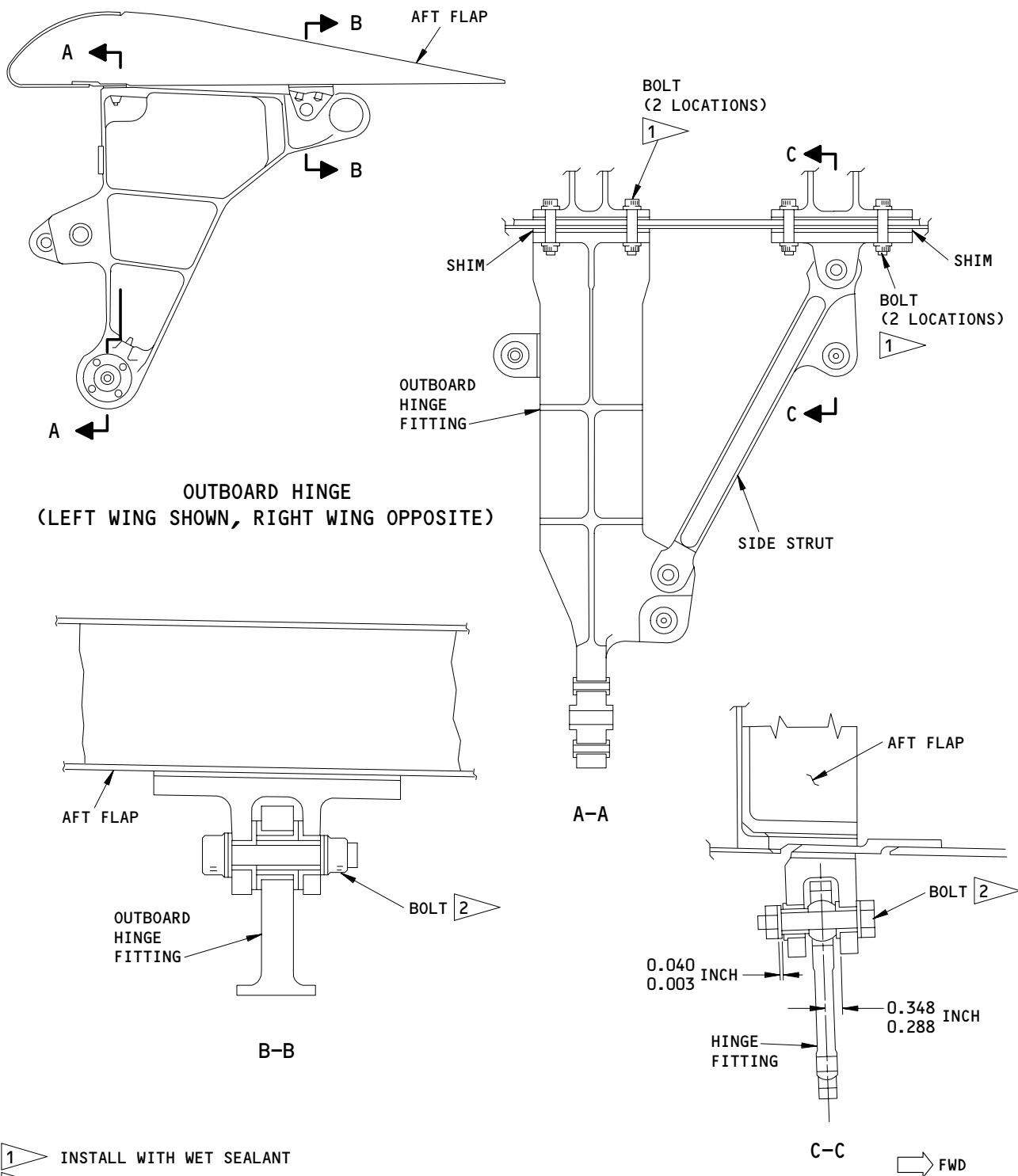


- 8 BOND THE SHIM TO THE TRACK WITH BMS 5-95 SEALANT
- 9 MAKE SURE THE CLEARANCE IS NO MORE THAN 0.005 INCH (0.127 mm) BEFORE YOU INSTALL THE FASTENER. APPLY BMS 10-11 TYPE 1 PRIMER AFTER INSTALLATION.
- 10 INSTALL THE LINK WITH ZERK FITTING POINTED DOWN.

Slave Drive Mechanism for the Aft Flap  
Figure 202 (Sheet 2)

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OUTBOARD HINGE  
(LEFT WING SHOWN, RIGHT WING OPPOSITE)

- 1 INSTALL WITH WET SEALANT
- 2 APPLY GREASE TO ALL MATING SURFACES.  
DO NOT PUT GREASE ON THE BOLT THREADS.

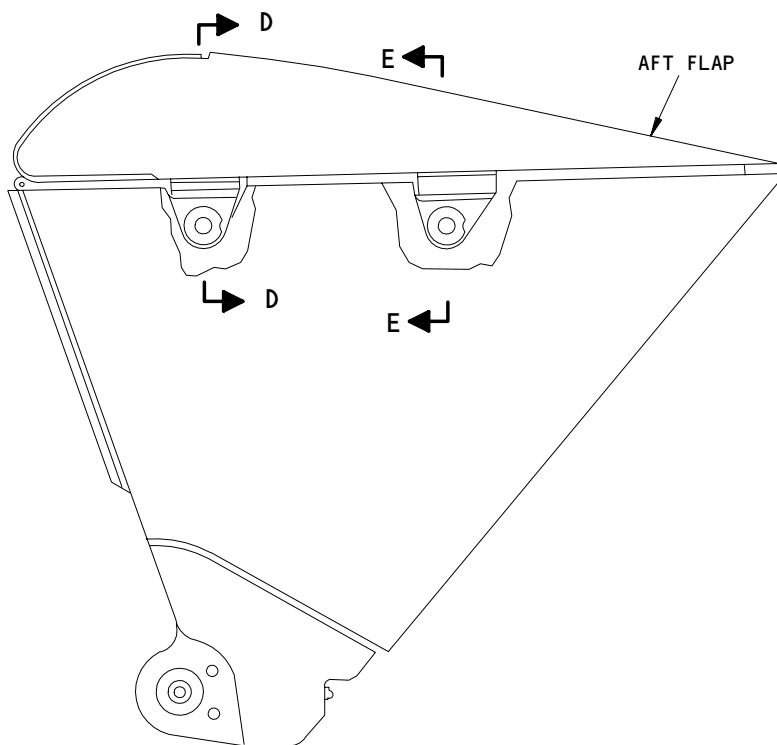
Aft Flap Hinge Support  
Figure 203 (Sheet 1)

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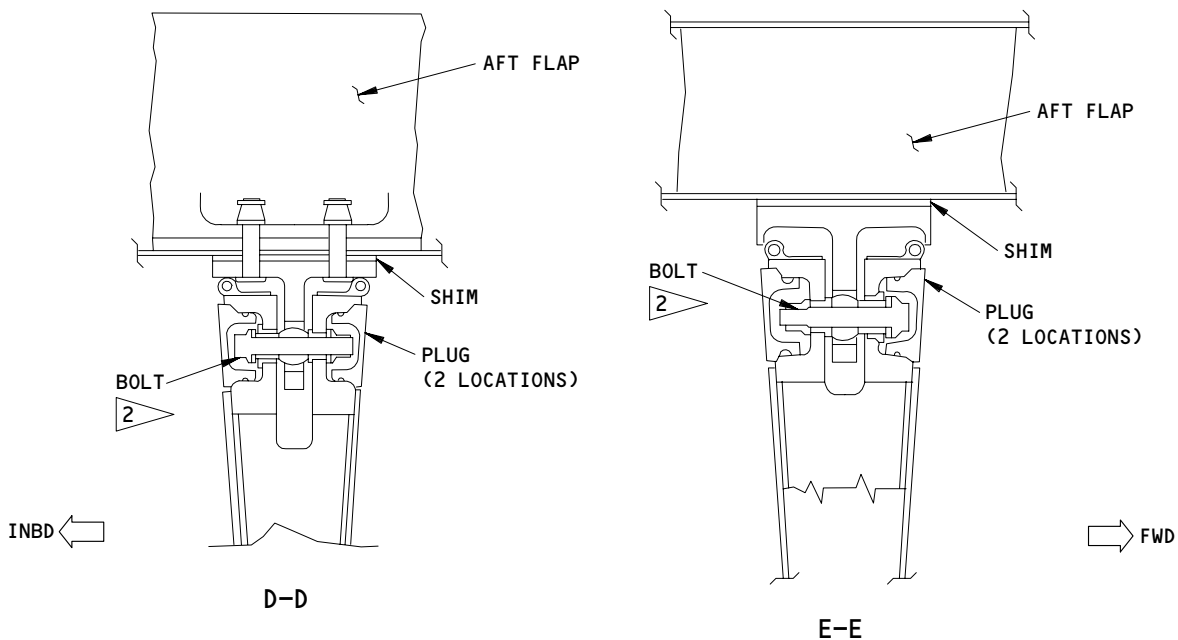
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**INBOARD HINGE  
(LEFT WING SHOWN, RIGHT WING OPPOSITE)**



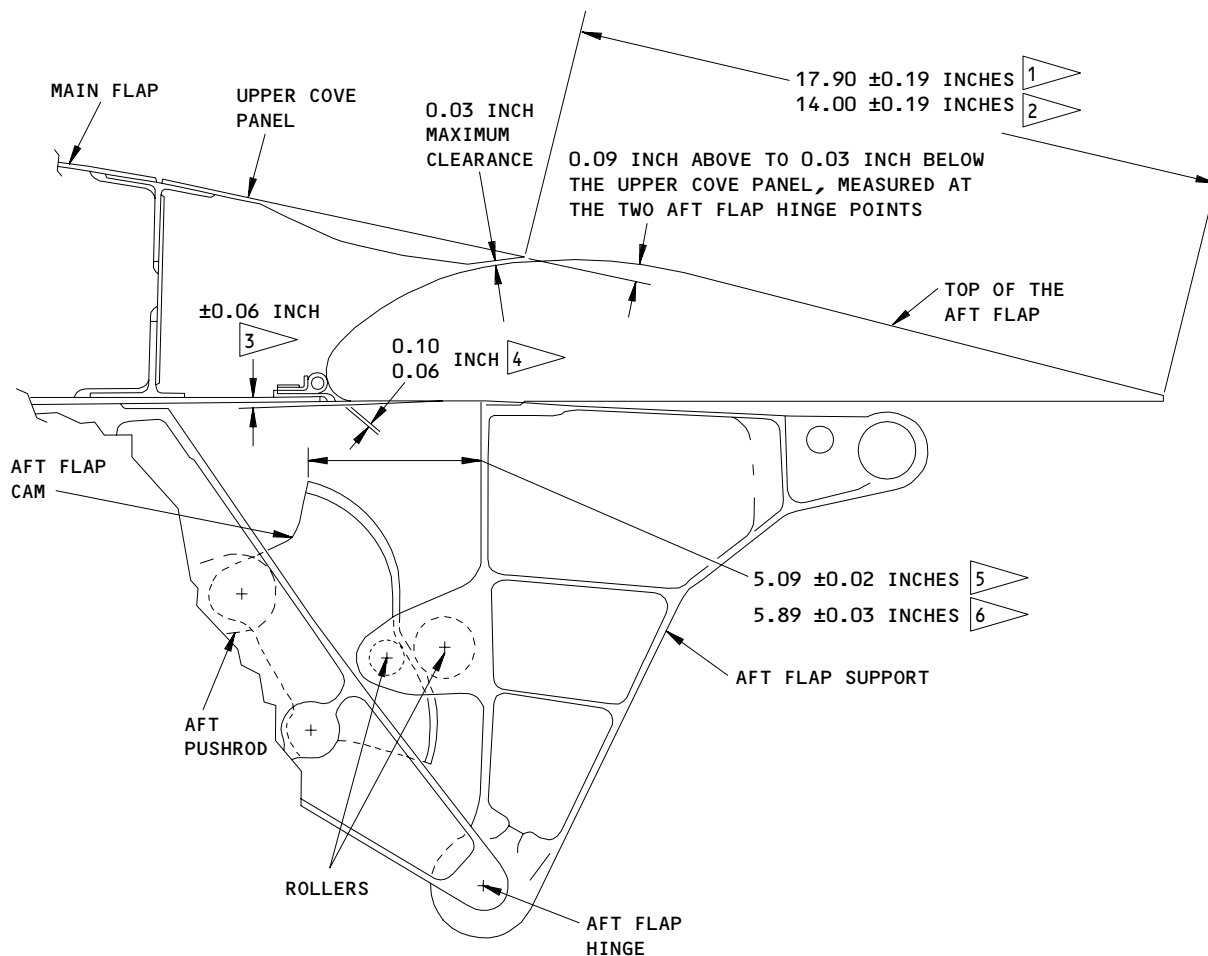
**Aft Flap Hinge Support  
Figure 203 (Sheet 2)**

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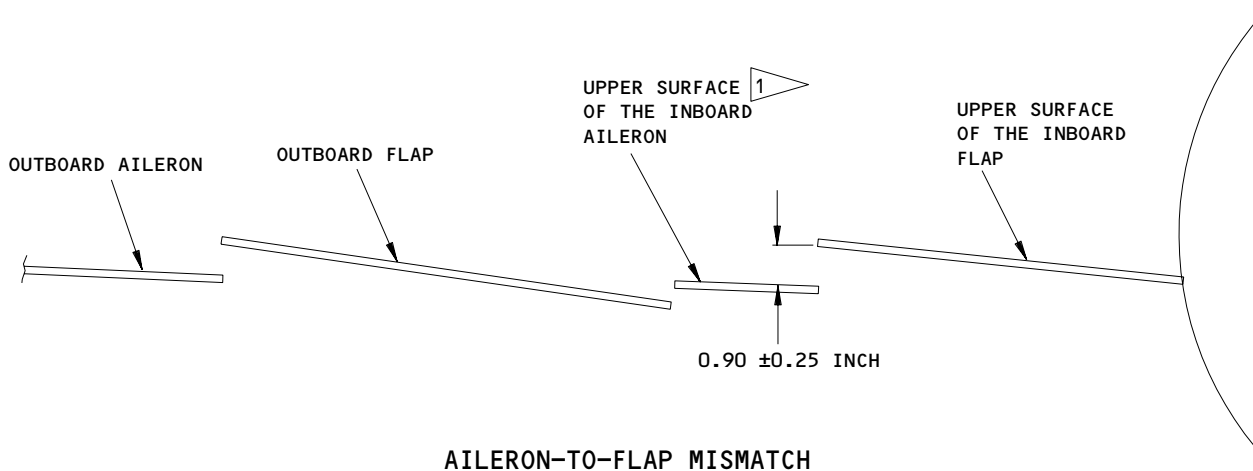
- 1 DIMENSION MEASURED AT THE OUTBOARD EDGE OF THE FLAP
- 2 DIMENSION MEASURED IN THE INBOARD EDGE OF THE FLAP
- 3 MISMATCH BETWEEN THE LOWER SURFACES OF THE MAIN AND THE AFT FLAPS
- 4 CLEARANCE BETWEEN THE SEAL RETAINER AND THE LEADING EDGE OF THE AFT FLAP
- 5 767-200 AIRPLANES
- 6 767-300 AIRPLANES

Aft Flap Adjustment  
Figure 204

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**NOTE:** HOLD THE AILERON IN THE POSITION SHOWN TO MEASURE THE AILERON-TO-FLAP TRAILING EDGE MISMATCH. DO NOT ADJUST THE RIG POSITION OF THE AILERONS.

**1** SET THE INBOARD AILERON 0.40 INCH BELOW THE WING THEORETICAL TRAILING EDGE. USE THE AILERON RIGGING BAR AND ALIGN THE AILERON LOWER SURFACE WITH THE 1.40-INCH ON THE RIGGING BAR.

Aileron-to-Flap Trailing Edge Mismatch  
Figure 205

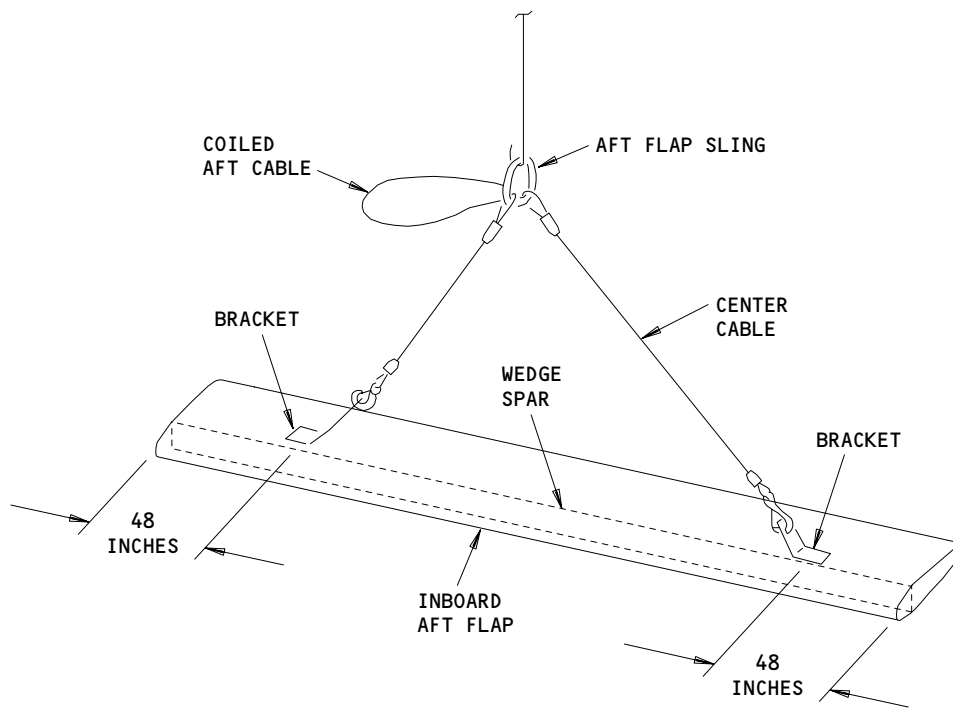
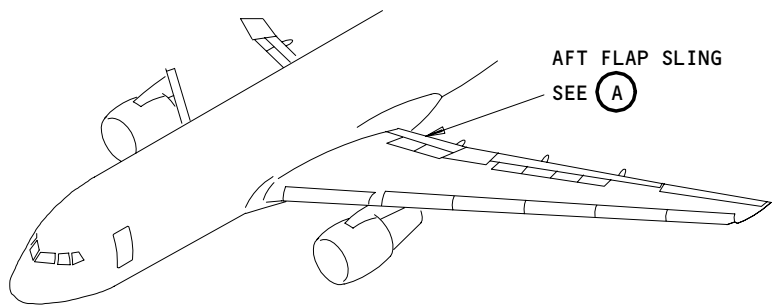
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AFT FLAP SLING

(A)

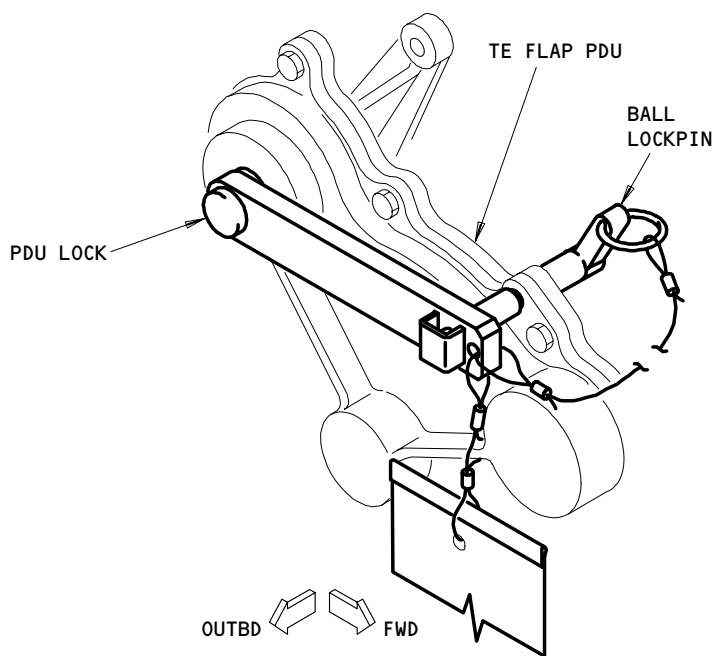
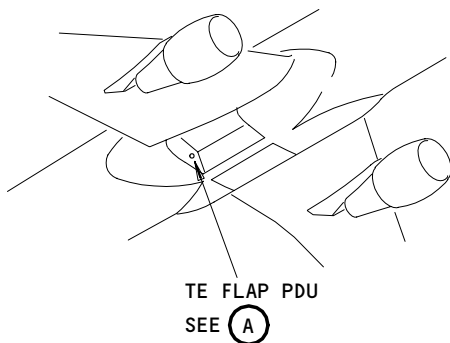
Aft Flap Sling  
Figure 206

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TE FLAP PDU

(A)

PDU Lock for the TE Flap PDU  
Figure 207

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272109

S 492-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 862-004

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

S 862-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 862-177

- (5) If an aileron rigging bar is not available, do the steps as follows:
  - (a) Move the flap control lever to the zero detent to retract the flaps.
  - (b) Make sure the ailerons are approximately in the neutral position.

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- (c) Measure the aileron-to-flap trailing edge mismatch and keep the dimension to use for the installation.
- (d) Make sure the ailerons do not move during the flap removal/installation.

S 862-006

- (6) Move the flap control lever to the 30-unit detent and permit the flaps to move to the fully extended position.

S 862-007

- (7) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 862-008

- (8) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:
  - (a) 6D24, ALTN FLAP PWR

S 862-009

- (9) Open these circuit breakers on the P6 panel and install circuit breaker locks:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR

S 862-010

- (10) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
  - (a) 11J24, FLAPS ALTN CONT

S 862-011

- (11) Open these circuit breakers on the P11 panel and install circuit breaker locks:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

S 492-012

- (12) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 207).

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S 022-196

- (13) Do the removal of the aft flap with the instructions given in the "Aft Flap - Removal" task, if necessary.

E. Remove the Slave Drive Bellcrank (Fig. 202)

S 032-013

- (1) Remove the locknut, bolt, washers, and clampup bushing, and disconnect the link from the slave drive bellcrank (View C-C).

S 012-199

- (2) Remove the bolts, strap, seal and seal retainers from the lower cove panel of the inboard main flap assembly.

S 032-014

- (3) Remove the locknut, bolt, washers, and clampup bushing and disconnect the slave drive rod from the bellcrank (View B-B).

S 012-015

- (4) To remove the inboard bellcrank, open the access panel, 555HB (left wing) or 655HB (right wing), at the lower surface of the main flap to get access to the four bolts that attach the inboard bellcrank support fitting to the rear spar (AMM 06-44-00/201).

S 012-016

- (5) To remove the outboard bellcrank, open the access panel, 555FB (left wing) or 655FB (right wing), to get access to the four bolts that attach the outboard bellcrank support fitting to the rear spar (AMM 06-44-00/201).

S 032-017

- (6) Remove the four bolts, locknuts, and washers to disconnect the bellcrank support fitting from the rear spar.

TASK 27-51-06-422-018

3. Aft Flap Slave Drive Bellcrank - Installation

A. Equipment

- (1) Sling Set, Inboard TE Flap - A27016-27  
(2) Inboard Aileron Rigging Bar - A27024-47 (recommended); -2 (optional)

B. Consumable Materials

- (1) C00259 Primer - BMS 10-11, Type 1

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- (2) D00633 Grease - BMS 3-33 (Recommended)
- (3) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (4) A00247 Sealant - BMS 5-95

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 20-10-23/401, Lockwires
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 27-51-03/401, Inboard Flap
- (5) AMM 27-51-15/401, Inboard Trailing Edge Flap Track Fairing
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) AMM 32-00-15/201, Landing Gear Door Lock

D. Access

(1) Location Zones

143/144	Left/Right MLG Wheel Well
211/212	Control Cabin
555/655	Inboard Trailing Edge Flap
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

555FB/655FB	Main Spar Inspar Structure
555HB/655HB	Area Aft of Main Flap Mid Spar Structure

E. Install the Slave Drive Bellcrank (Fig. 202)

S 432-019

- (1) Connect the bellcrank support fitting to the main flap rear spar with four bolts, washers, and locknuts. Install the bolts with wet sealant.

S 642-020

- (2) Lubricate the bellcrank with grease at the location shown (View A-A).

S 432-021

- (3) Connect the slave drive rod to the bellcrank with these steps (View B-B):
  - (a) Install the bolts with washers, clampup bushing, and nut.
  - (b) Install the cotter pin in the nut.

S 412-198

- (4) Install the bolts, strap, seal and seal retainers on the lower cove panel of the inboard main flap assembly.

S 422-197

- (5) Do the installation of the aft flap with the instructions given in the "Aft Flap - Installation" task, if necessary.

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S 432-022

- (6) Connect the link to the slave drive bellcrank with these steps (View C-C):
- Apply grease to the mating surfaces between the bolt and the bushing.
  - Install the bolt with washers, clampup bushing, and nut.

**NOTE:** Remove unwanted grease on the bolt threads before you install the nut.

S 412-023

- (7) Install the access panels, 555FB and 555HB (left wing) or 655FB and 655HB (right wing), at the lower surface of the main flap (AMM 06-44-00/201).

S 092-024

- (8) Remove the PDU lock from the TE flap power drive unit (PDU) (Fig. 207).

S 862-025

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (9) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 862-026

- (10) Move the flap control lever to the zero (FLAPS UP) detent and permit the flaps to move to the fully retracted position.

S 862-027

- (11) Remove power from the center hydraulic system (AMM 29-11-00/201).

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S 222-192

- (12) Do a check at the lower surfaces of the main and aft flap and make sure the mismatch dimension is correct (Fig. 204).

NOTE: If the mismatch dimension is out of tolerance, add or remove shims at the front and rear fittings between the aft flap and the aft flap hinges support (Fig. 203).

S 222-028

- (13) Do a check, at the inboard and outboard ends, of the inboard aft flap and make sure the distance between the upper cove panel to the trailing edge (TE) of the aft flap is correct (Fig. 204).

S 822-029

- (14) If the dimension is not correct, adjust the slave drive rod for the aft flap (Fig. 202).

S 222-030

- (15) Make sure the aileron-to-flap TE mismatch is within the limit as shown (Fig. 205).

S 222-178

- (16) If you do not use an aileron rigging bar, measure the aileron-to-flap trailing edge mismatch.  
(a) Compare this to the mismatch dimension you measured before you removed the flap.

S 822-031

- (17) If the aileron-to-flap TE mismatch is not correct, adjust the fit and fair of the inboard flap (AMM 27-51-03/401).

F. Put the Airplane Back to Its Usual Condition

S 862-032

- (1) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6D24, ALTN FLAP PWR  
(c) 6F24, ALTN SLAT OUTBD PWR

S 862-033

- (2) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD  
(c) 11J24, FLAPS ALTN CONT

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S 092-034

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

TASK 27-51-06-022-035

4. Aft Flap - Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip, 1012LC-R  
Commercially Available
- (2) Sling Set, Inboard TE Flap - A27016-27
- (3) TE Flap PDU Lock - A27009-7

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-51-03/401, Inboard Flap
- (4) AMM 27-51-15/401, Inboard Trailing Edge Flap Track Fairing
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) AMM 32-00-15/201, Landing Gear Door Lock
- (7) AMM 32-00-20/201, Landing Gear Downlock

C. Access

(1) Location Zones

143/144	Left/Right MLG Wheel Well
211/212	Control Cabin
555/655	Inboard Trailing Edge Flap
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

D. Prepare for the Removal

S 212-036

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 492-037

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 862-038

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

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S 862-039

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 862-040

(5) Move the flap control lever to the 30-unit detent and permit the flaps to move to the fully extended position.

S 862-041

(6) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 862-042

(7) Open these circuit breakers on the P6 panel and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 862-043

(8) Open this circuit breaker on the overhead panel, P11, and attach attach a DO-NOT-CLOSE tag:  
(a) 11J24, FLAPS ALTN CONT

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S 862-044

- (9) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

S 862-045

- (10) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 492-046

- (11) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 207).

E. Remove the Aft Flap

S 492-047

- (1) Install the sling set at the two attach points on the upper surface of the aft flap (Fig. 206).

S 492-048

- (2) Connect the overhead hoist to the aft flap sling.

**NOTE:** Make sure the hoist can hold the weight of the aft flap. The aft flap weighs approximately 99 pounds (44.9 Kg).

S 032-049

- (3) Remove the bolt, washers, and clampup bushing to disconnect the inboard and outboard links from the aft flap attach points (Detail A, Fig. 202).

S 032-050

- (4) Remove the stop from the aft end of the inboard deflection control track (View E-E, Fig. 202).

S 032-051

- (5) Disengage the aft flap from the outboard deflection control track (View D-D, Fig. 202) with these steps:

**NOTE:** It is easier to disengage the aft flap from the outboard deflection control track by the steps that follow, without the removal of the stop on the outboard track.

- (a) Remove the track bolts to disconnect the outboard deflection control track from the track support fitting (View F-F and G-G, Fig. 202).

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- (b) Turn the outboard deflection control track to disengage the track from the rollers on the aft flap.

NOTE: Turn and move the track forward and aft as necessary to disengage the track from the rollers.

- (c) Remove the outboard deflection control track from the airplane.

S 022-052

- (6) Remove the aft fairing (AMM 27-51-15/401).

NOTE: You can keep the flaps at the 30-unit position to remove the aft fairing.

S 032-053

- (7) Remove the nut, clampup bushing, sleeve, washers, and bolt to disconnect the aft pushrod from the aft flap cam (Joint 13) (View E-E, Fig. 201).

NOTE: Hold the aft flap in position while you disconnect the pushrod.

S 982-054

- (8) Lower the aft flap to the extend direction until the rollers disengage from the inboard deflection control track (View D-D, Fig. 202).

S 032-055

- (9) Turn the aft flap to disengage the rollers from the aft flap cam at the outboard hinge (View G-G, Fig. 201).

S 032-056

- (10) Disconnect the aft flap from the main flap at the inboard and outboard hinge points (Joint 14) with these steps (View F-F, Fig.201):
  - (a) Remove the plug from the hinge.
  - (b) Remove the cotter pin, nut, clamp-up bushing, and bolt from the hinge.

S 022-057

- (11) Lower the aft flap from the airplane.

S 092-058

- (12) Remove the sling from the aft flap.

TASK 27-51-06-422-059

## 5. Aft Flap - Installation

### A. Equipment

- (1) Sling Set, Inboard TE Flap - A27016-27

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B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (recommended)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) A00247 Sealant - BMS 5-95

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 20-10-23/401, Lockwires
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 27-51-03/401, Inboard Flap
- (5) AMM 27-51-15/401, Inboard Trailing Edge Flap Track Fairings
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) AMM 32-00-15/201, Landing Gear Door Lock

D. Access

- (1) Location Zones
  - 143/144 Left/Right MLG Wheel Well
  - 211/212 Control Cabin
  - 555/655 Inboard Trailing Edge Flap
  - 710 Nose Landing Gear and Doors
  - 730/740 Left/Right Main Landing Gear and Doors

E. Install the Aft Flap

S 492-060

- (1) Install the aft flap sling to the two attach points on the upper surface of the aft flap (Fig. 206).

S 492-061

- (2) Connect the overhead hoist to the aft flap sling and lift the aft flap up to the wing.

**NOTE:** Make sure the hoist can hold the weight of the aft flap. The aft flap weighs approximately 99 pounds (44.9 Kg).

S 432-062

- (3) Connect the aft flap to the main flap at the inboard and outboard hinge points (Joint 14) with these steps (View F-F, Fig. 201):
  - (a) Connect each hinge with the bolt, washers, clamp-up bushing, nut and cotter pin.
  - (b) Tighten the nut to 85-140 pound-inches (9.6-15.8 newton-meters).
  - (c) Install the plug.

S 432-063

- (4) Turn the aft flap to engage the rollers in the aft flap cam at outboard hinge (View G-G, Fig.201).

S 432-064

- (5) At the inboard end of the aft flap, engage the rollers to the deflection control track (View D-D, Fig. 202).

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S 422-065

- (6) Hold the aft flap into position while you install the outboard deflection control track with these steps:
- (a) Engage the outboard deflection control track to the rollers at the outboard end of the aft flap.

NOTE: Turn and move the track forward and aft as necessary to engage the rollers to the track.

- (b) Connect the deflection control track to the track support fitting with the bolts, washers, bushings, and nuts (View F-F and G-G, Fig. 202).

S 432-066

- (7) Connect the aft pushrod to the aft flap cam (Joint 13) with these steps (View E-E, Fig. 201):
- (a) Lubricate the mating surfaces of the bolt and the bushings with grease before the installation.
  - (b) Install the bolt, washers, clampup bushing, and nut.

NOTE: Remove unwanted grease on the bolt threads before you install the nut.

- (c) Tighten the nut to 290-510 pound-inches (32.8-57.6 newton meters).

S 432-067

- (8) Install the stop at the end of the inboard deflection control track with these steps (View E-E, Fig. 202):
- (a) Install the stop with a bolt, washer, and shim.

NOTE: Apply wet sealant to the shim.

- (b) Install a lockwire with the double twist procedure (AMM 20-10-23/401).

S 422-201

CAUTION: MAKE SURE THAT YOU INSTALL THE DRIVE LINKS ONTO THE AFT FLAP WITH THE AFT LUBRICATION FITTINGS POINTED DOWN. IF THE LUBRICATION FITTINGS ARE POINTED UP, THEY CAN CONTACT THE ACCESS PLATE AND CAUSE DAMAGE TO THE AIRPLANE.

- (9) Connect the inboard and outboard drive links to the aft attach points with these steps (Detail A, Fig. 202):
- (a) Apply grease on the mating surfaces between the bolt and the bushing.

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- (b) Install the bolt, washers, clampup bushing, and nut. Tighten the nut.

**NOTE:** Remove unwanted grease from the bolt threads before you install the nut.

S 092-069

- (10) Remove the sling from the aft flap.

S 422-070

- (11) Install the aft flap fairing (AMM 27-51-15/401).

S 092-071

- (12) Remove the PDU lock from the TE flap power drive unit (PDU) (Fig. 207).

S 862-072

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (13) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 862-073

- (14) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps move to the fully retracted position.

S 862-074

- (15) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 222-193

- (16) Do a check at the lower surfaces of the main and aft flap and make sure the mismatch dimension is correct (Fig. 204).

**NOTE:** If the mismatch dimension is out of tolerance, add or remove shims at the front and rear fittings between the aft flap and the aft flap hinges support (Fig. 203).

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S 222-075

- (17) Do a check, at the inboard and outboard ends, of the inboard aft flap and make sure the distance between the upper cove panel to the trailing edge (TE) of the aft flap is correct (Fig. 204).

S 822-076

- (18) If the dimension is not correct, adjust the slave drive rod for the aft flap (Fig. 202).

S 222-077

- (19) Make sure the aileron-to-flap TE mismatch is below the limit as shown (Fig. 205).

S 822-078

- (20) If the aileron-to-flap TE mismatch is not correct, adjust the fit and fair of the inboard flap (AMM 27-51-03/401).

S 822-079

- (21) Do the adjustment for the aft flap with the instruction given in the "Aft Flap - Adjustment" task if necessary.

F. Put the Airplane Back to Its Usual Condition

S 862-080

- (1) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6D24, ALTN FLAP PWR  
(c) 6F24, ALTN SLAT OUTBD PWR

S 862-081

- (2) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD  
(c) 11J24, FLAPS ALTN CONT

S 092-082

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

TASK 27-51-06-022-131

6. Aft Flap Drive Bellcrank - Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip, 1012LC-R  
Commercially Available

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(2) TE Flap PDU Lock - A27009-7

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-51-15/401, Inboard Trailing Edge Flap Track Fairings
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 32-00-15/201, Landing Gear Door Lock
- (5) AMM 32-00-20/201, Landing Gear Downlock

C. Access

(1) Location Zones

143/144	Left/Right MLG Wheel Well
211/212	Control Cabin
555/655	Inboard Trailing Edge Flap
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

D. Prepare for the Removal

S 212-132

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 492-133

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 862-134

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

S 862-135

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

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- S 862-136
- (5) Move the flap control lever to the 30-unit detent and permit the flaps to move to the fully extended position.
- S 492-166
- (6) Attach a DO-NOT-OPERATE tag to the flap control lever.
- S 862-137
- (7) Remove the power from the center hydraulic system (AMM 29-11-00/201).
- S 862-138
- (8) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:
- (a) 6D24, ALTN FLAP PWR
- S 862-139
- (9) Open these circuit breakers on the P6 panel and install circuit breaker locks:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR
- S 862-140
- (10) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11J24, FLAPS ALTN CONT
- S 862-141
- (11) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
- S 492-142
- (12) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 207).
- S 032-167
- (13) Remove the aft and middle sections of the outboard fairing on the inboard flap (AMM 27-51-15/401).
- E. Bellcrank Removal (Fig. 201)
- S 032-144
- (1) Hold the weight of the aft flap and disconnect the forward pushrod from the top of the bellcrank at Joint 17 (View D-D).

**NOTE:** Slowly release the weight of the aft flap after you disconnect the pushrod.

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S 032-145

- (2) Disconnect the aft pushrod from the bottom of the bellcrank at Joint 16 (View D-D).

**NOTE:** Identify the bolt, nut, washers, and bushing for subsequent installation.

S 032-146

- (3) Disconnect the bellcrank from the main flap support at Joint 15 (View D-D).

**NOTE:** Identify the bolt, nut, and washers for subsequent installation.

S 022-147

- (4) Remove the bellcrank from the airplane.

TASK 27-51-06-422-148

7. Aft Flap Drive Bellcrank - Installation

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-51-15/401, Inboard Trailing Edge Flap Track Fairings
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 32-00-15/201, Landing Gear Door Lock

B. Access

(1) Location Zones

143/144	Left/Right MLG Wheel Well
211/212	Control Cabin
555/655	Inboard Trailing Edge Flap
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

C. Bellcrank Installation (Fig. 201)

S 212-165

- (1) Make sure the power is removed from the center hydraulic system (AMM 29-11-00/201).

S 422-149

- (2) Install the bellcrank between the main flap support (Joint 15) with these steps:
  - (a) Put the bellcrank into the position shown (Detail A) and install the bolt, washers, and nut.
  - (b) Tighten the nut to 650-1000 pound-inches (73.5-112.9 newton-meters), and make sure the bellcrank is free to turn.

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S 432-150

- (3) Connect the aft pushrod to the bottom of the bellcrank (Joint 16) with the bolt, bushing, washers, and nut (View D-D). Tighten the nut to 290-510 pound-inches (32.8-57.6 newton-meters).

S 092-169

- (4) Remove the PDU lock from the TE flap PDU (Fig. 207).

S 862-168

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (5) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 862-170

- (6) Move the flap control lever to the zero (FLAPS UP) detent.

**NOTE:** Keep the disconnected forward pushrod away from the movement of the flaps linkages. Keep the DO-NOT-OPERATE tag attached to the flap control lever.

S 862-172

- (7) Remove the power from the center hydraulic system (AMM 29-11-00/201).

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- S 492-171
- (8) Install the PDU lock in the TE flap PDU (Fig. 207).
- S 492-173
- (9) Manually lift the aft flap into the fully retracted position, and install rig pin TE5 through the aft flap support and bellcrank (View A-A, Fig. 201).
- S 432-151
- (10) Connect the forward pushrod to the top of the bellcrank (Joint 17) with the bolt, bushing, washers, and nut (View D-D, Fig. 201). Tighten the nut to 290-510 pound-inches (32.8-57.6 newton-meters).

**NOTE:** Adjust the length of the forward pushrod if it is necessary, until you can easily remove and install rig pin TE5.

- S 222-194
- (11) Do a check at the lower surfaces of the main and aft flap and make sure the mismatch dimension is correct (Fig. 204).

**NOTE:** If the mismatch dimension is out of tolerance, add or remove shims at the front and rear fittings between the aft flap and the aft flap hinges support (Fig. 203).

- S 222-157
- (12) Do a check at the inboard and outboard ends of the inboard aft flap, and make sure the distance between the upper cove panel to the trailing edge (TE) of the aft flap is correct (Fig. 204).

- S 822-158
- (13) If the dimension is not correct, adjust the slave drive rod for the aft flap (Fig. 202).

- S 222-159
- (14) Make sure the aileron-to-flap TE mismatch is below the limit as shown (Fig. 205).

- S 822-160
- (15) If the aileron-to-flap TE mismatch is not correct, adjust the fit and fair of the inboard flap (AMM 27-51-03/401).

- S 822-161
- (16) If necessary, do the adjustment for the aft flap with the instruction given in the "Aft Flap - Adjustment" task.

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D. Put the Airplane Back to Its Usual Condition

S 092-174

- (1) Remove the PDU lock from the TE flap PDU (Fig. 207).

S 432-175

- (2) Install the middle and aft sections of the outboard fairing on the inboard flap (AMM 27-51-15/401).

S 092-176

- (3) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-162

- (4) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6D24, ALTN FLAP PWR  
(c) 6F24, ALTN SLAT OUTBD PWR

S 862-163

- (5) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD  
(c) 11J24, FLAPS ALTN CONT

S 092-164

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (6) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

TASK 27-51-06-822-083

8. Aft Flap - Adjustment

A. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):  
(a) TE5 - P/N A20004-11

B. References

- (1) AMM 20-10-23/401, Lockwires  
(2) AMM 20-10-24/201, Rig Pins  
(3) AMM 24-22-00/201, Electrical Power - Control  
(4) AMM 27-51-00/501, Trailing Edge Flap System  
(5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(6) AMM 32-00-20/201, Landing Gear Downlock

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C. Access

(1) Location Zones

143/144	Left/Right MLG Wheel Well
211/212	Control Cabin
555/655	Inboard Trailing Edge Flap
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

D. Prepare for the Adjustment

S 212-084

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 212-085

- (2) Make sure the flaps and slats are in the fully retracted position.

S 212-086

- (3) Make sure the flap control lever is in the zero detent.

S 862-087

- (4) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 862-088

- (5) Open these circuit breakers on the P6 panel and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 862-089

- (6) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:  
(a) 11J24, FLAPS ALTN CONT

S 862-090

- (7) Open these circuit breakers on the P11 panel and install circuit breaker locks:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD

S 212-091

- (8) Make sure the power is removed from the center hydraulic system (AMM 29-11-00/201).

E. Adjust the Aft Flap

S 822-092

- (1) Adjust the retract overtravel stop clearance to the RIG Position (AMM 27-51-00/501).

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S 032-093

- (2) Disconnect the forward pushrod from the top of the bellcrank (View D-D, Fig. 201).

**NOTE:** Hold the aft flap into position while you disconnect the pushrod.

S 492-094

- (3) Install rig pin TE5 into the bellcrank (View A-A, Fig. 201):
  - (a) 767-200 AIRPLANES WITH 2 RIG PIN HOLES;  
Install the rig pin TE5 into the top rig pin hole in the bellcrank.
  - (b) 767-300 AIRPLANES WITH 2 RIG PIN HOLES;  
Install the rig pin TE5 into the bottom rig pin hole in the bellcrank.

S 822-095

- (4) Remove the lockwire and adjust the length of the forward pushrod until you can easily connect the pushrod to the top of the bellcrank.

S 432-096

- (5) Tighten the jamnut on the pushrod and install a lockwire with the double twist procedure (AMM 20-10-23/401).

S 432-097

- (6) Connect the forward pushrod to the top of the bellcrank (View D-D, Fig. 201), and tighten the nut to 290-510 pound-inches (32.8-57.6 newton-meters).

S 822-105

- (7) Adjust the length of the aft pushrod (View A-A, Fig. 201) until the dimension between the aft flap cam and the aft flap support is correct as shown in Fig. 204.

S 222-106

- (8) Make sure the aileron-to-flap trailing edge mismatch is below the limit (Fig. 205).

S 822-122

- (9) If the aileron-to-flap mismatch is not correct, do the adjustment that follows:
  - (a) Remove rig pin TE5 from the bellcrank (View A-A, Fig. 201).
  - (b) Get access to the slave drive rod (Fig. 202).
  - (c) Adjust the length of the slave drive rod until you can get the trailing edge, between the inboard aileron and the aft flap, to align below the limit (Fig. 205).
  - (d) Install rig pin TE5 and make sure it installs easily in the rig pin hole.

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- (e) If the aileron-to-flap TE mismatch is still not correct, adjust the fit and fair of the inboard flap (AMM 27-51-03/401).

S 092-123

- (10) If installed, make sure you remove rig pin TE5 from the bellcrank before you operate the flap drive.

S 862-124

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

S 862-125

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (12) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 862-126

- (13) Operate the flaps with the flap control lever through a complete cycle, and make sure that the flaps can move freely.

F. Put the Airplane Back to Its Usual Condition

S 862-127

- (1) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 862-128

- (2) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 862-129

- (3) Remove power from the center hydraulic system (AMM 29-11-00/201).

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- S 862-130  
(4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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FLAP FAIRING DOOR – REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

- (1) The removal of the flap fairing door.
- (2) The installation of the flap fairing door.

TASK 27-51-07-904-036-001

2. Flap Fairing Door – Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip, 1012LC-R  
Commercially Available
- (2) TE Flap PDU Lock – A27009-7

B. Consumable Materials

- (1) D00633 Grease – BMS 3-33 (Preferred)
- (2) D00013 Grease – MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) A00247 Sealant – BMS 5-95

C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Fairing Door	27-51-03	01	5, 10

D. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (3) 32-00-15/201, Landing Gear Door Lock
- (4) 32-00-20/201, Landing Gear Downlock

E. Access

- (1) Location Zones
  - 144 Right MLG Wheel Well
  - 211/212 Control Cabin
  - 570/670 Wing Trailing Edge Flap Track Fairings – Inboard
  - 730/740 Left/Right Main Landing Gear and Doors

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- (2) Access Panels
  - 195JL Left Inboard Flap Mechanism
  - 196JR Right Inboard Flap Mechanism

F. Prepare for Removal

S 214-002-001

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 494-034-001

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (Ref 32-00-15).

S 214-003-001

- (3) Make sure that the TE flaps and LE slats are in the fully retracted position.

S 214-004-001

- (4) Make sure that the flap control lever is in the UP detent.

S 214-005-001

- (5) Make sure that the power is removed from the center hydraulic system (Ref 29-11-00).

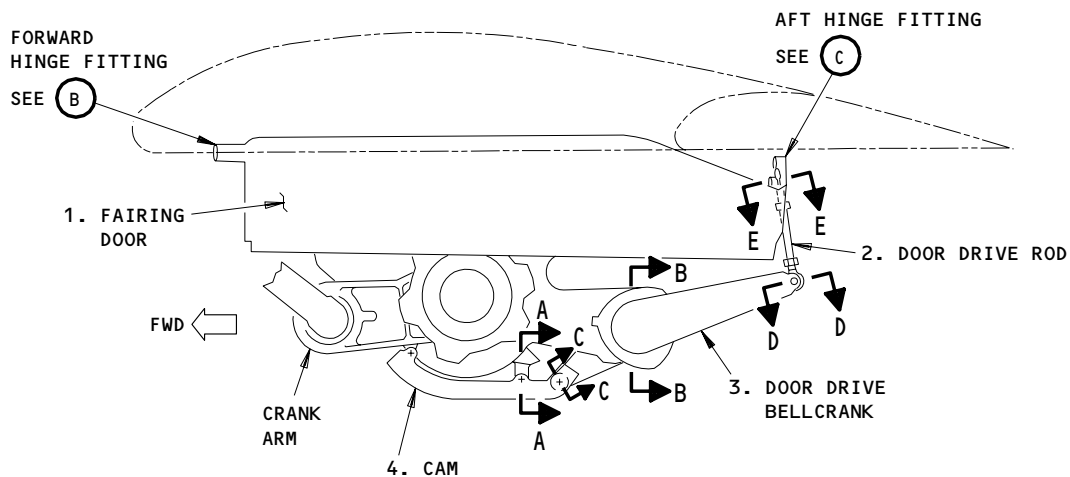
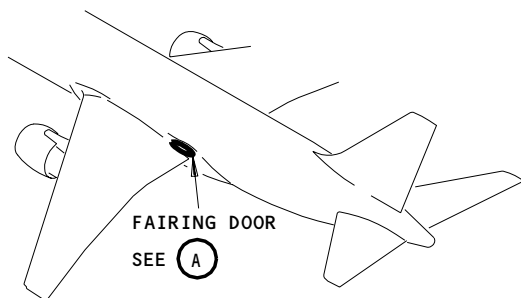
S 864-006-001

- (6) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:
  - (a) 6D24, ALTN FLAP PWR

S 864-007-001

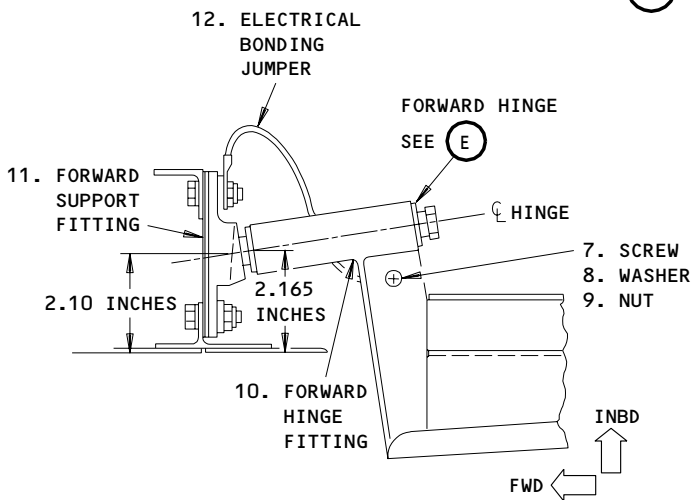
- (7) Open these circuit breakers on the P6 panel and attach circuit breaker locks and DO-NOT-CLOSE tags:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTB PWR

- S 864-008-001
- (8) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11J24, FLAPS ALTN CONT
- S 864-009-001
- (9) Open these circuit breakers on the P11 panel and attach circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
- (b) 11H24, SLAT ALTN CONT OUTBD
- S 494-010-001
- (10) Install the PDU lock on the TE flap PDU (Fig. 403).
- S 014-011-001
- (11) Remove the 195JL and 196JR panels below the fairing doors (AMM 06-41-00/201).
- G. Fairing Door Removal (Fig. 401)
- S 034-012-001
- (1) Disconnect the electrical bonding jumper (12) from the forward hinge fitting (10).
- S 034-013-001
- (2) Disconnect the door drive rod (2) from the aft hinge fitting (6).
- S 034-014-001
- (3) Remove the bolt (23) that connects the aft hinge fitting (6) to the aft support fitting (5).
- S 034-015-001
- (4) Hold the aft end of the fairing door (1), and disconnect the forward hinge fitting (10) from the forward support fitting (11).
- S 024-016-001
- (5) Remove the fairing door (1) from the airplane.



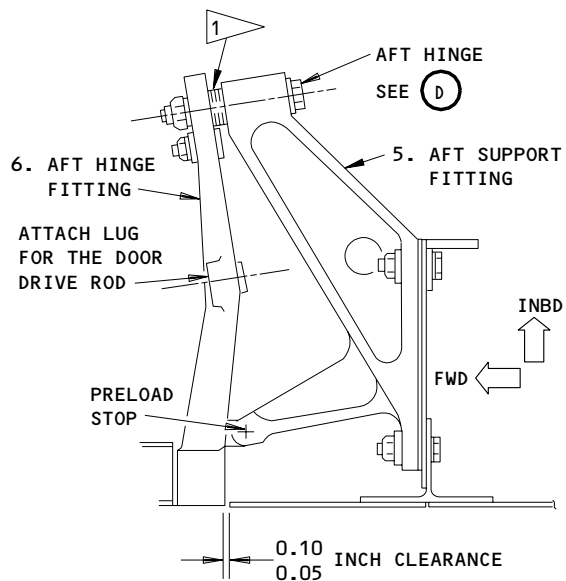
FAIRING DOOR

(A)



FORWARD HINGE FITTING

(B)



AFT HINGE FITTING

(E)

1 DO NOT USE MORE THAN SIX AN960-616 WASHERS TO OBTAIN END GAP OF 0.05-0.10 INCH.

Inboard Flap Fairing Door  
Figure 401 (Sheet 1)

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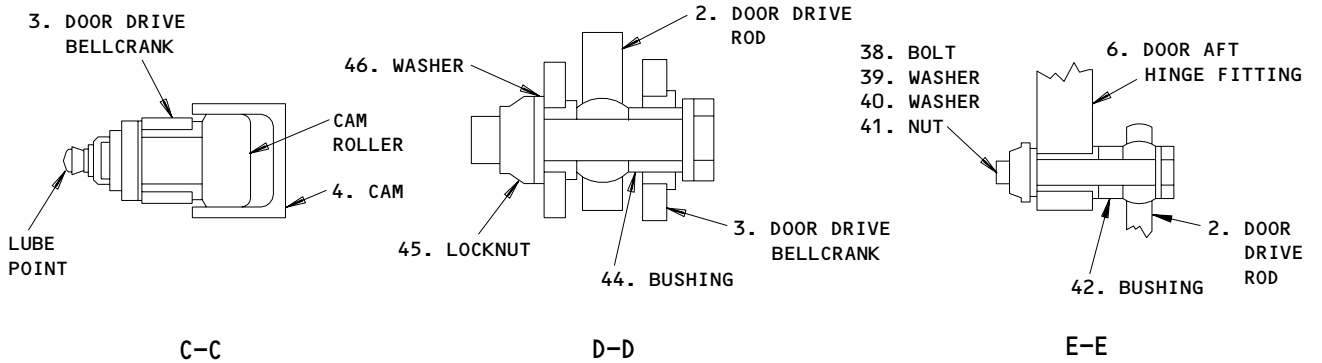
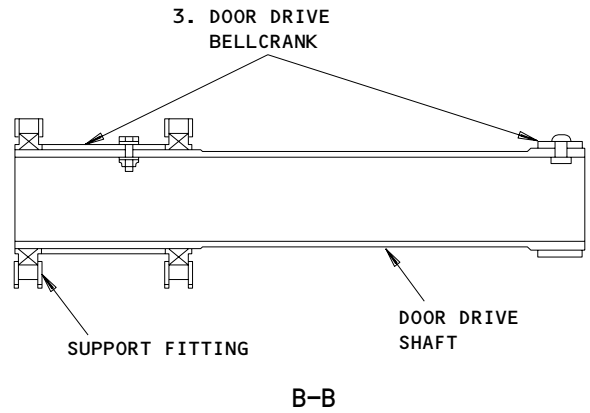
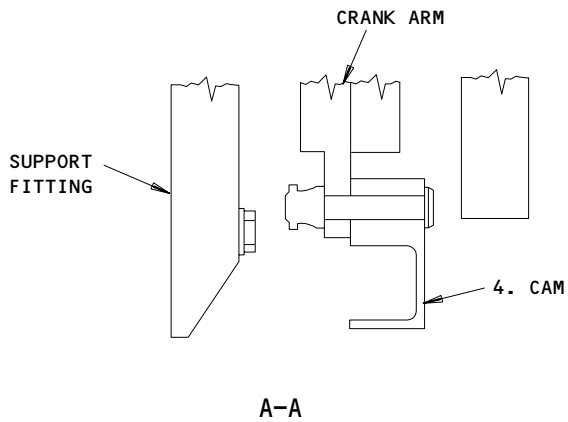
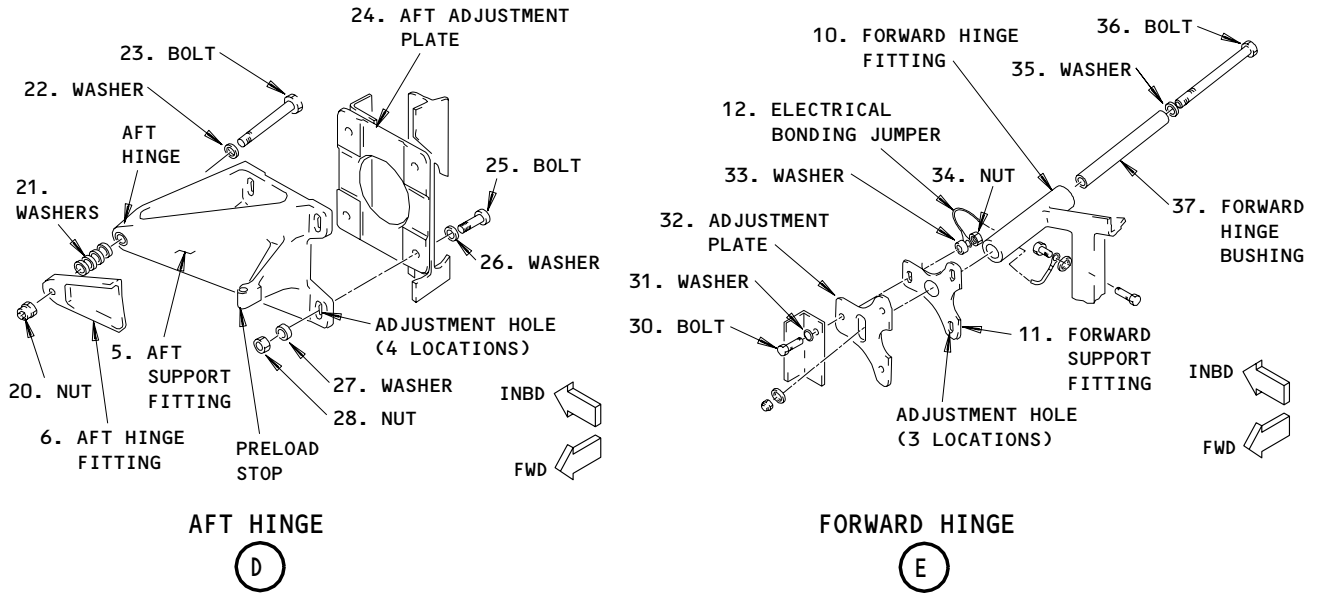
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Inboard Flap Fairing Door  
Figure 401 (Sheet 2)

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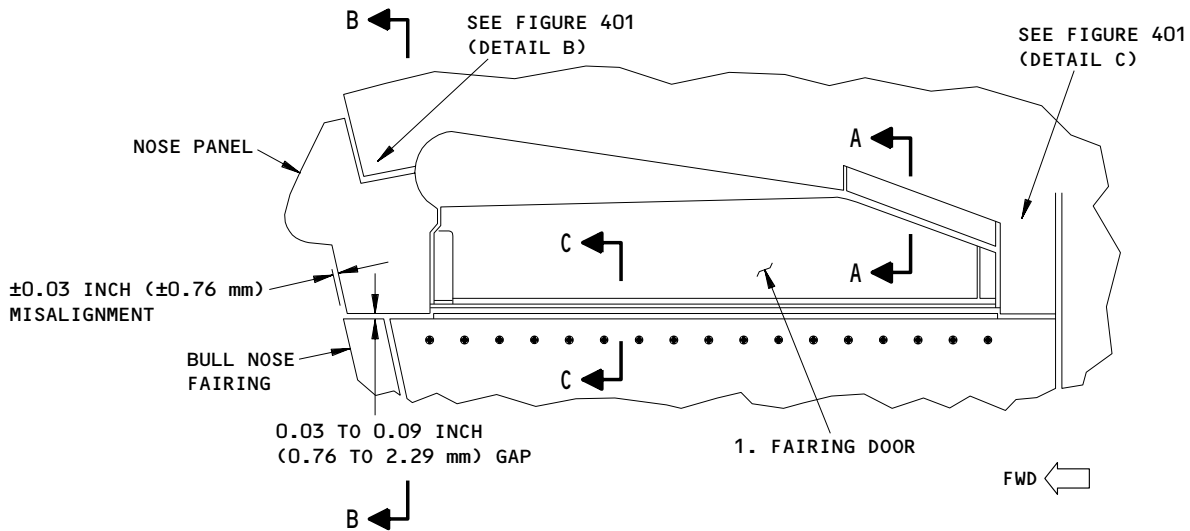
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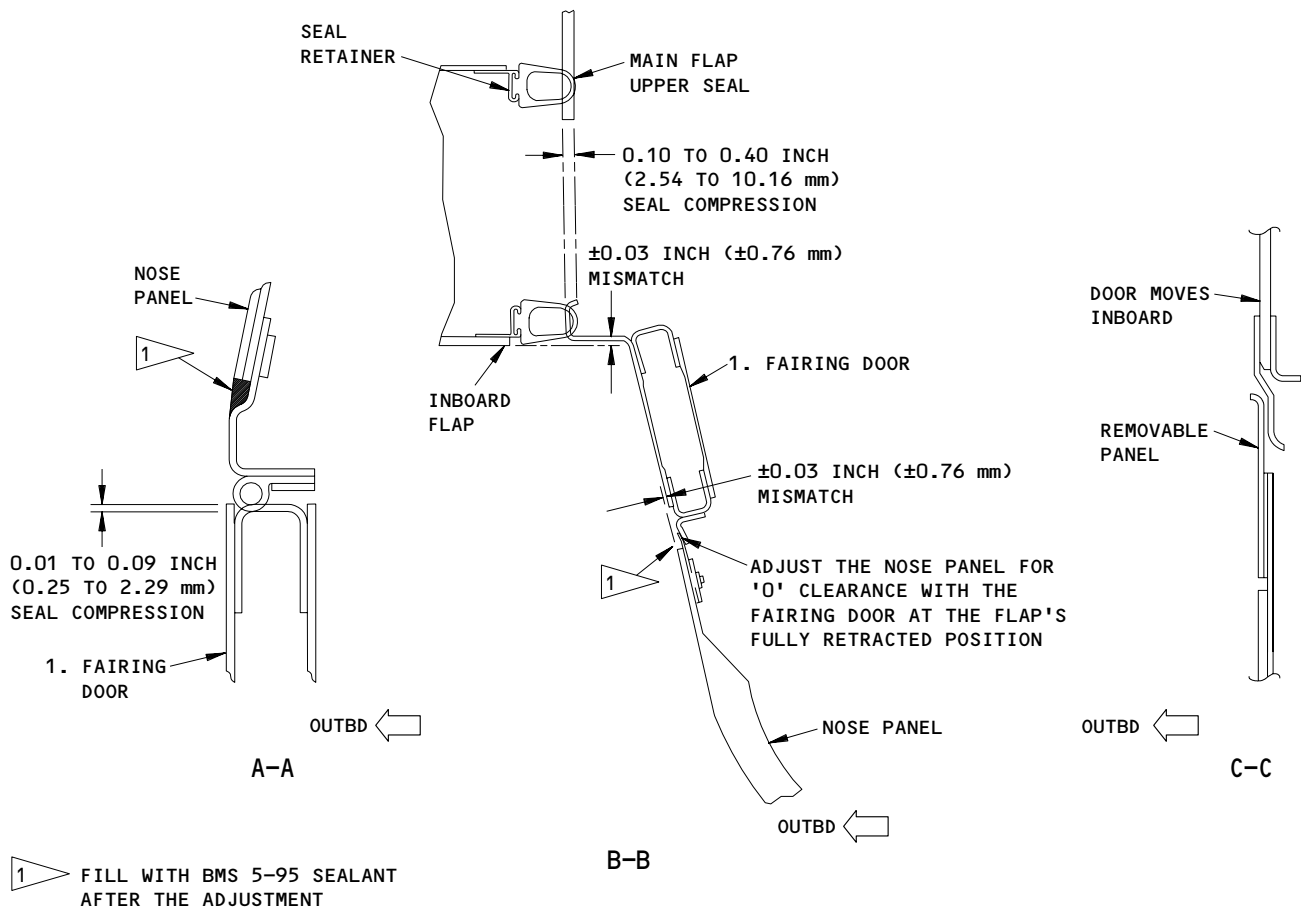


# BOEING

## 767 MAINTENANCE MANUAL



**FAIRING DOOR**  
(LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE)



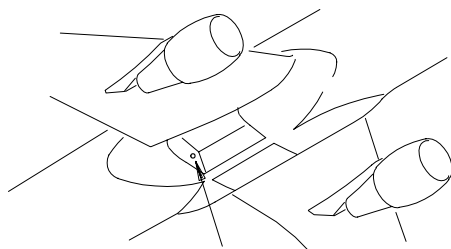
Adjustment for the Inboard Flap Fairing Door  
Figure 402

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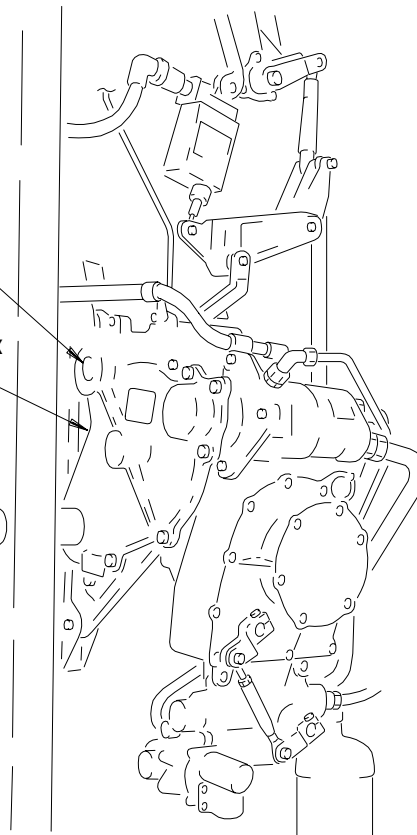


TE FLAP PDU  
SEE (A)

PDU LOCK  
SEE (B)

PDU GEARBOX  
ASSEMBLY

TORQUE TUBE  
(REF)

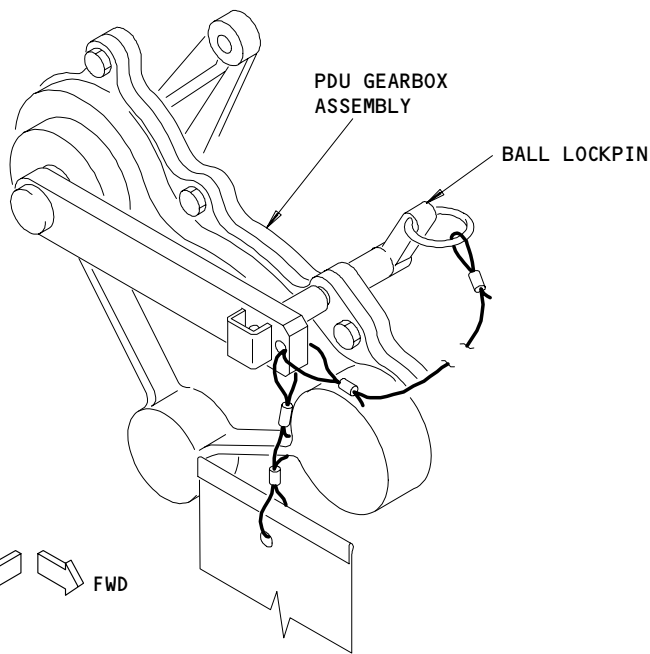


OUTBD

FWD

TE FLAP PDU

(A)



OUTBD

FWD

PDU LOCK

(B)

TE Flap PDU Lock  
Figure 403

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TASK 27-51-07-404-037-001

3. Flap Fairing Door - Installation

A. Equipment

- (1) Circuit Breaker Lockout Clip, 1012LC-R  
Commercially Available
- (2) TE Flap PDU Lock - A27009-7

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) A00247 Sealant - BMS 5-95

C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Fairing Door	27-51-03	01	5, 10

D. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (3) 32-00-15/201, Landing Gear Door Lock
- (4) 32-00-20/201, Landing Gear Downlock

E. Access

(1) Location Zones

- 144 Right MLG Wheel Well
- 211/212 Control Cabin
- 570/670 Wing Trailing Edge Flap Track Fairings - Inboard
- 730/740 Left/Right Main Landing Gear and Doors

(2) Access Panels

- 195JL Left Inboard Flap Mechanism
- 196JR Right Inboard Flap Mechanism

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F. Procedure

S 644-017-001

- (1) Apply a layer of grease to all pins, washers, nuts, bushings and spacers before installation.

S 434-018-001

- (2) Hold and connect the fairing door (1) to the forward support fitting (11).

NOTE: Do not tighten the locknut at this time.

S 434-019-001

- (3) Connect the fairing door (1) to the aft support fitting (5).

NOTE: Do not tighten the locknut at this time.

S 224-020-001

- (4) Do a check on the gaps for the aft hinge fitting (Detail C).

S 434-021-001

- (5) Install washers (21) as necessary to adjust the gaps shown in Detail C.

S 434-022-001

- (6) Tighten the locknuts at the forward and aft hinge fittings (10, 6).

S 424-023-001

- (7) Install the door drive rod (2) to the aft hinge fitting (6) with a bolt (38), two washers (39, 40), and a locknut (41) (Section E-E).

NOTE: The preload stops must touch the fairing door.

S 824-024-001

- (8) Adjust the length of the drive rod (2) until you get a clearance of 0.003 inch (0.076 mm) between the preload stop and the fairing door.

S 824-025-001

- (9) Make one turn (+/- 0.25 turn) to the drive rod adjustment to move the fairing door against the preload stop.

S 224-026-001

- (10) Do a check on the fairing door (1) clearances (Fig. 402).

S 824-027-001

- (11) Adjust the fairing door clearance if necessary, with the steps that follow:

- (a) Disconnect the door drive rod (2) from the fairing door (1).
- (b) Loosen the bolts (25, 30) that attaches the forward (10) and aft (6) hinge fittings to the airplane structure (Fig. 401).
- (c) Adjust the hinge fittings as necessary to get the correct door clearance.

NOTE: The fairing door must touch the preload stops when you make the adjustment.

- (d) Connect the door drive rod (2) to the fairing door (1).
- (e) Adjust the length of the drive rod (2) until you get a 0.003 inch (0.076 mm) gap between the preload stop and fairing door.
- (f) Make one turn on the drive rod adjustment (+/-0.25 turn) to move the fairing doors against the preload stop.
- (g) Make sure that there is no gap between the nose panel and fairing door (1) (Section B-B, Fig. 402).
- (h) Adjust the nose panel as necessary.
- (i) Make sure that the bullnose fairing clearance is below the limits (Fig. 402).

(j) Adjust the bullnose fairing clearance if necessary.

S 434-028-001

- (12) Connect the electrical bonding jumper (12) between the fairing door (1) and the forward hinge fitting (10).

G. Put the Airplane back to Its Usual Condition

S 414-029-001

- (1) Install the 195JL and 196JR panels below the fairing door (AMM 06-41-00/201).

**NOTE:** Make sure that the upper edge of the fairing panel is located outboard of the lower edge of the fairing door when you install the panel (Fig. 402, View C-C).

S 214-038-001

**CAUTION:** MAKE SURE THAT THE GUIDE FOR THE FAIRING DOOR IS IN THE CORRECT POSITION WITH THE INBOARD END OF THE BODY PANEL. THIS WILL PREVENT DAMAGE TO THE FAIRING DOOR OR BODY PANEL.

- (2) Make sure that the guide for the fairing door is in the correct position (Fig. 402, View C-C)

S 094-030-001

- (3) Remove the PDU lock from the TE flap PDU (Fig. 403).

S 094-031-001

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

S 864-032-001

- (5) Remove the DO-NOT-CLOSE tags and circuit breaker locks and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-033-001

- (6) Remove the DO-NOT-CLOSE tags and circuit breaker locks and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT

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(c) 11J24, FLAPS ALTN CONT

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FLAP FAIRING DOOR – REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

- (1) The removal of the flap fairing door.
- (2) The installation of the flap fairing door.

TASK 27-51-07-904-001-002

2. Flap Fairing Door – Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip, 1012LC-R  
Commercially Available
- (2) TE Flap PDU – A27009-7

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System
- (3) AMM 32-00-15/201, Landing Gear Door Lock
- (4) AMM 32-00-20/201, Landing Gear Downlock

C. Access

(1) Location Zones

- 144 Right MLG Wheel Well
- 211/212 Control Cabin
- 410 No. 1 Power Plant
- 420 No. 2 Power Plant
- 570/670 Wing Trailing Edge Flap Track Fairing – Inboard
- 730/740 Left/Right Main Landing Gear and Doors

(2) Access Panel

- 195JL Left Inboard Flap Mechanism
- 196JR Right Inboard Flap Mechanism

D. Prepare for Removal

S 484-080-002

**WARNING:** MAKE SURE THE DOWNLOCKS ARE INSTALLED ON ALL THE LANDING GEAR (BEFORE YOU MOVE THE CONTROL LEVER). WITHOUT THE DOWNLOCKS, THE LANDING GEAR COULD RETRACT AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20).



S 014-075-002

**WARNING:** OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15).

S 214-052-002

- (3) Make sure that the TE flaps and LE slats are in the fully extended position.

S 214-053-002

- (4) Make sure that the flap control lever is in the 30-unit detent.

S 214-054-002

- (5) Make sure that the power is removed from the center hydraulic system (AMM 29-11-00).

S 864-055-002

- (6) Open these circuit breakers and attach DO-NOT-CLOSE tags:
  - (a) On the main power distribution panel, P6,
    - 1) 6D24, ALTN FLAP PWR
  - (b) On the overhead panel, P11,
    - 1) 11J24, FLAPS ALTN CONT

S 864-056-002

- (7) Open these circuit breakers and attach circuit breaker locks and DO-NOT-CLOSE tags:
  - (a) On the main power distribution panel, P6,
    - 1) 6D21, ALTN SLAT INBD PWR
    - 2) 6F24, ALTN SLAT OUTBD PWR
  - (b) On the overhead panel, P11,
    - 1) 11H23, SLAT ALTN CONT INBD
    - 2) 11H24, SLAT ALTN CONT OUTBD

S 494-057-002

- (8) Install the PDU lock on the TE flap PDU (Fig. 403).

S 014-058-002

- (9) Remove the 195JL or 196JR panels below the fairing doors (AMM 06-41-00/201).

E. Fairing Door Removal (Fig. 401)

S 024-059-002

- (1) Disconnect the electrical bonding jumper (14) from the forward hinge fitting (15) of the mid fairing door.

- S 024-060-002
- (2) Disconnect the door drive rod (29) from the aft arm assembly of the mid fairing door.
- S 024-061-002
- (3) Disconnect the drive rod for the forward/aft fairing door (30) from the aft arm assembly of the mid fairing door.
- S 024-062-002
- (4) Remove the bolt (28) that connects the aft hinge fitting of the mid fairing door (24) to the aft arm assembly of the mid fairing door.
- S 024-063-002
- (5) Hold the aft end of the mid fairing door (13) and disconnect the forward hinge fitting of the mid fairing door (15) from the forward arm assembly.
- S 024-064-002
- (6) Remove the mid fairing door (13).
- S 024-065-002
- (7) Remove the bolt (20) that connects the forward/aft fairing door (1) to the aft hinge fitting (19).
- S 024-066-002
- (8) Hold the after end of the forward/aft fairing door (1), and disconnect the door from the forward hinge fitting (16).
- S 024-067-002
- (9) Remove the forward/aft fairing door (1).

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3. The Fairing Door Installation (Fig. 401)

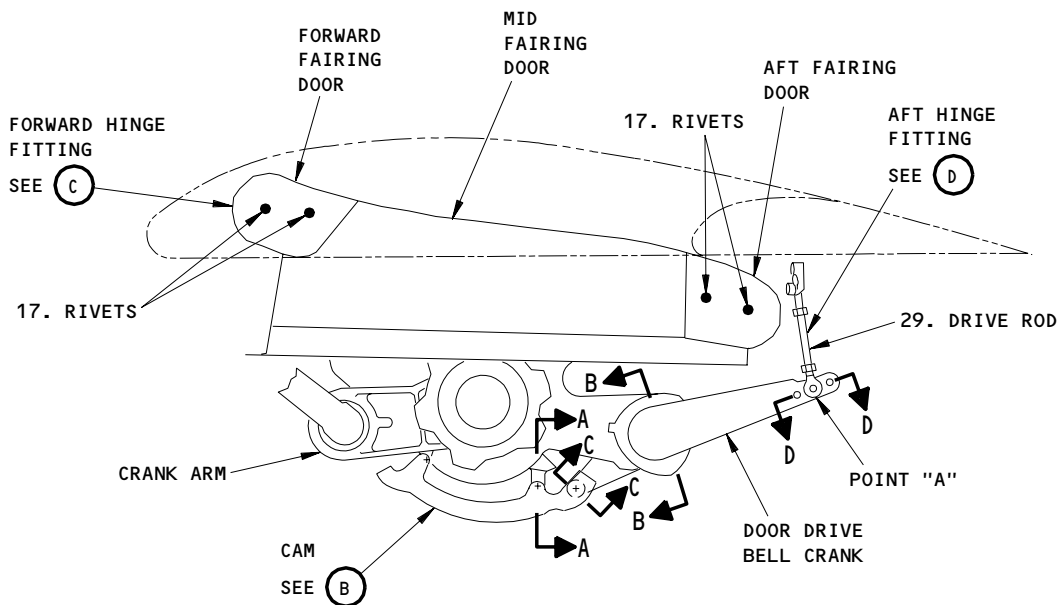
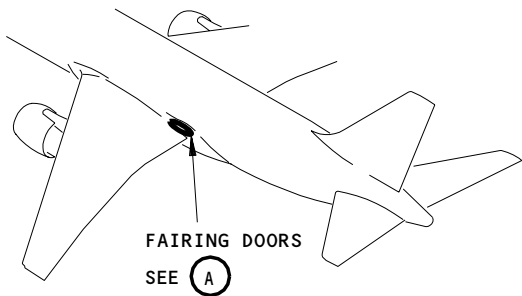
A. Equipment

- (1) Circuit Breaker Lockout Clip - 1012LC-R  
Sesame Technologies, 832 Green Ridge Drive,  
Raleigh, NC 27609

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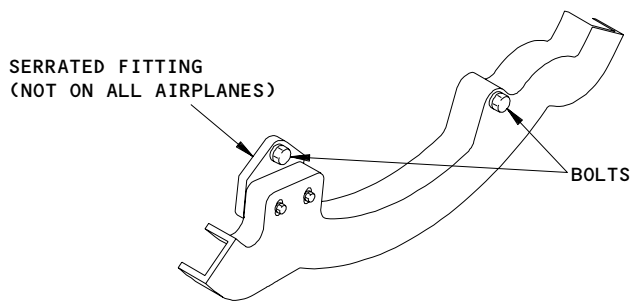
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FAIRING DOORS

(A)



ADJUSTABLE CAM ASSEMBLY

(B)

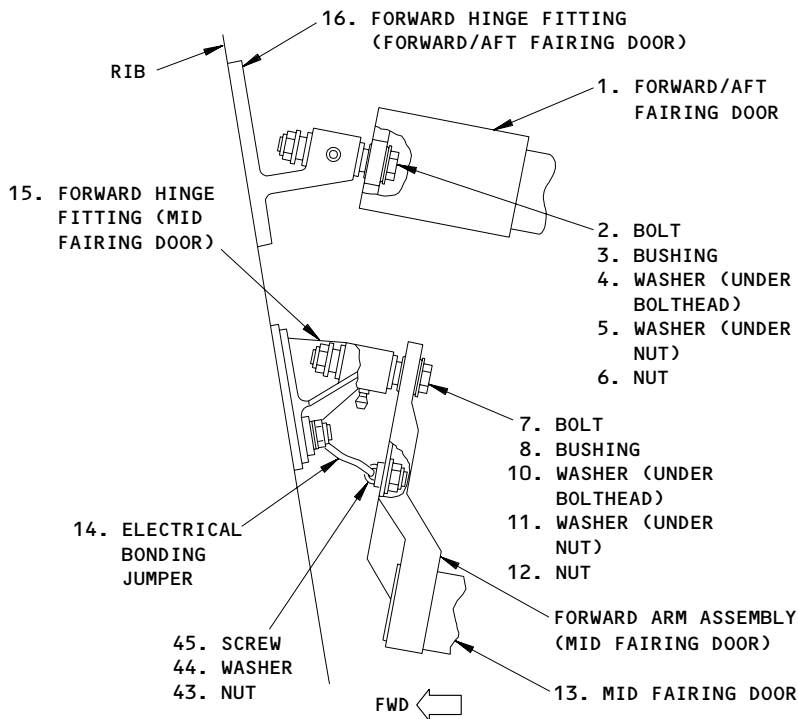
Inboard Flap Fairing Door  
Figure 401 (Sheet 1)

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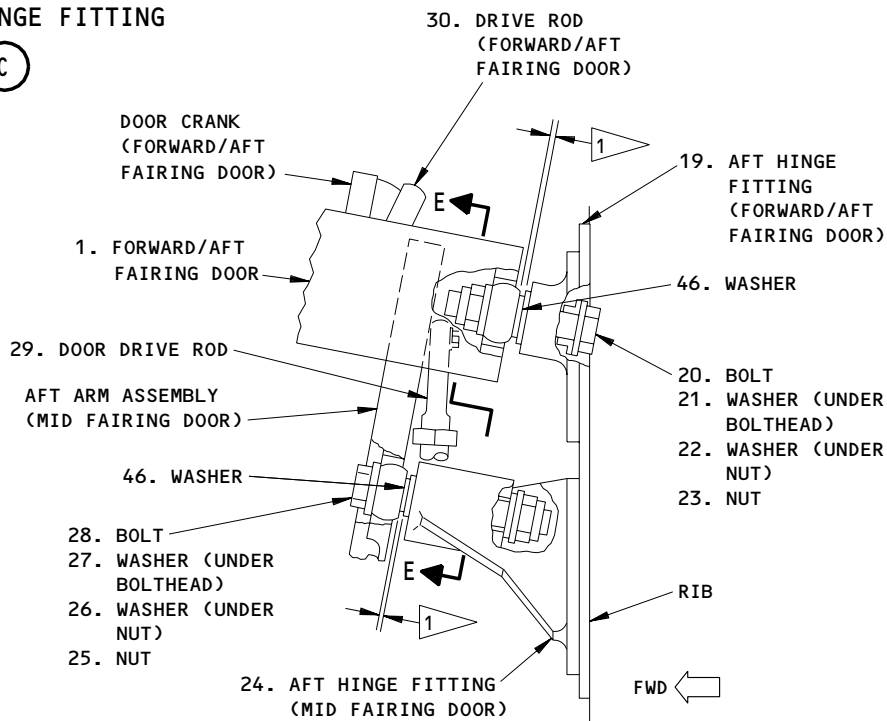
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FORWARD HINGE FITTING

(C)



AFT HINGE FITTING

(D)

1 INSTALL AN960-516 WASHERS AS NECESSARY TO GET THE GAP SHOWN IN VIEW B FIG. 402. WASHER THICKNESS MUST NOT BE GREATER THAN 0.25 INCH

Inboard Flap Fairing Door  
Figure 401 (Sheet 2)

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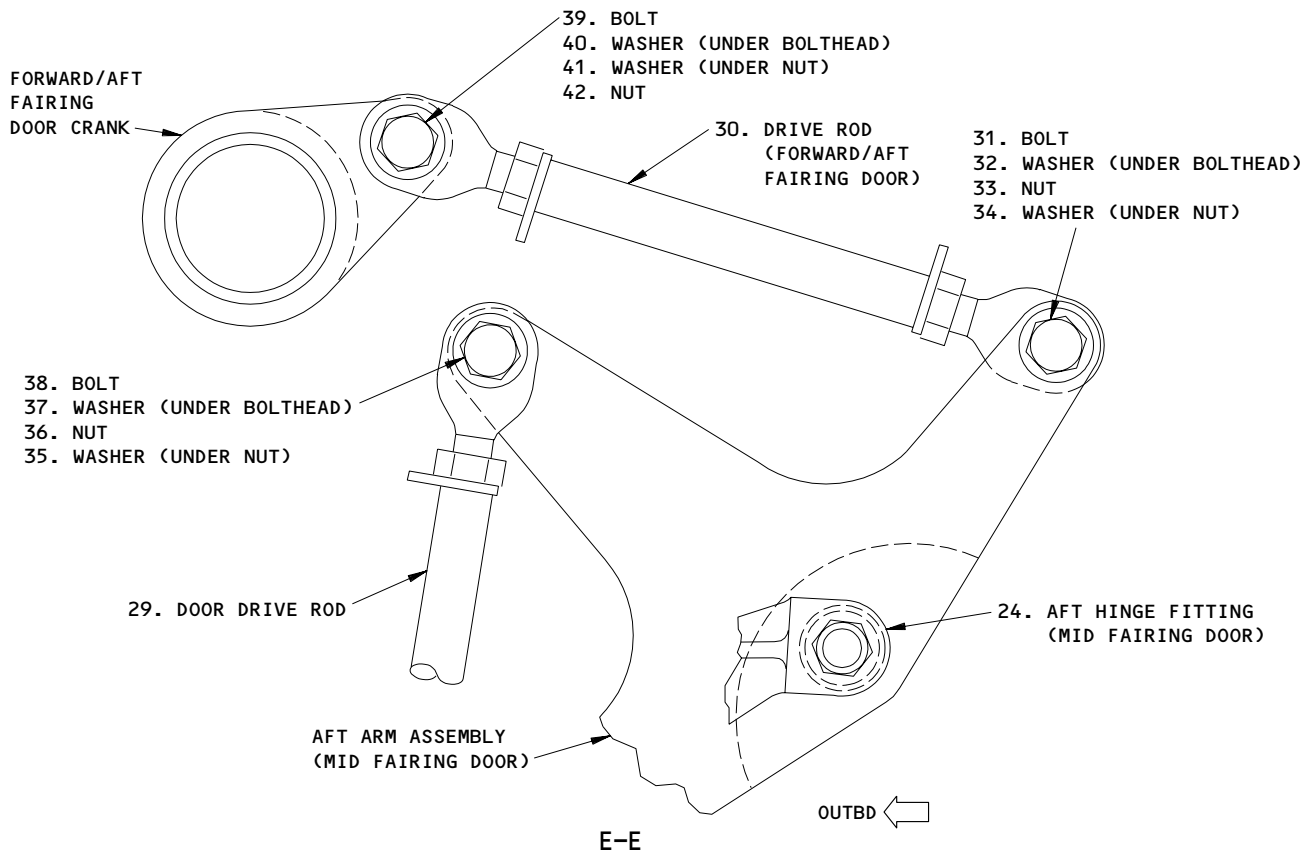
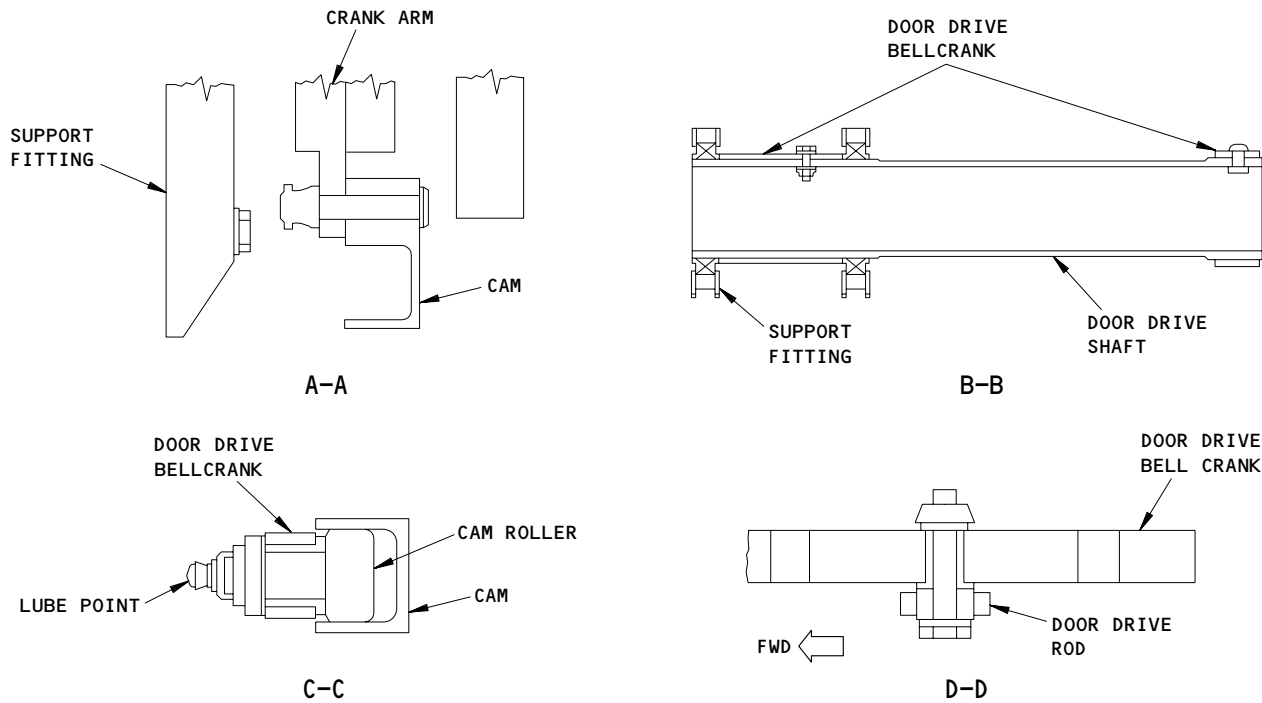
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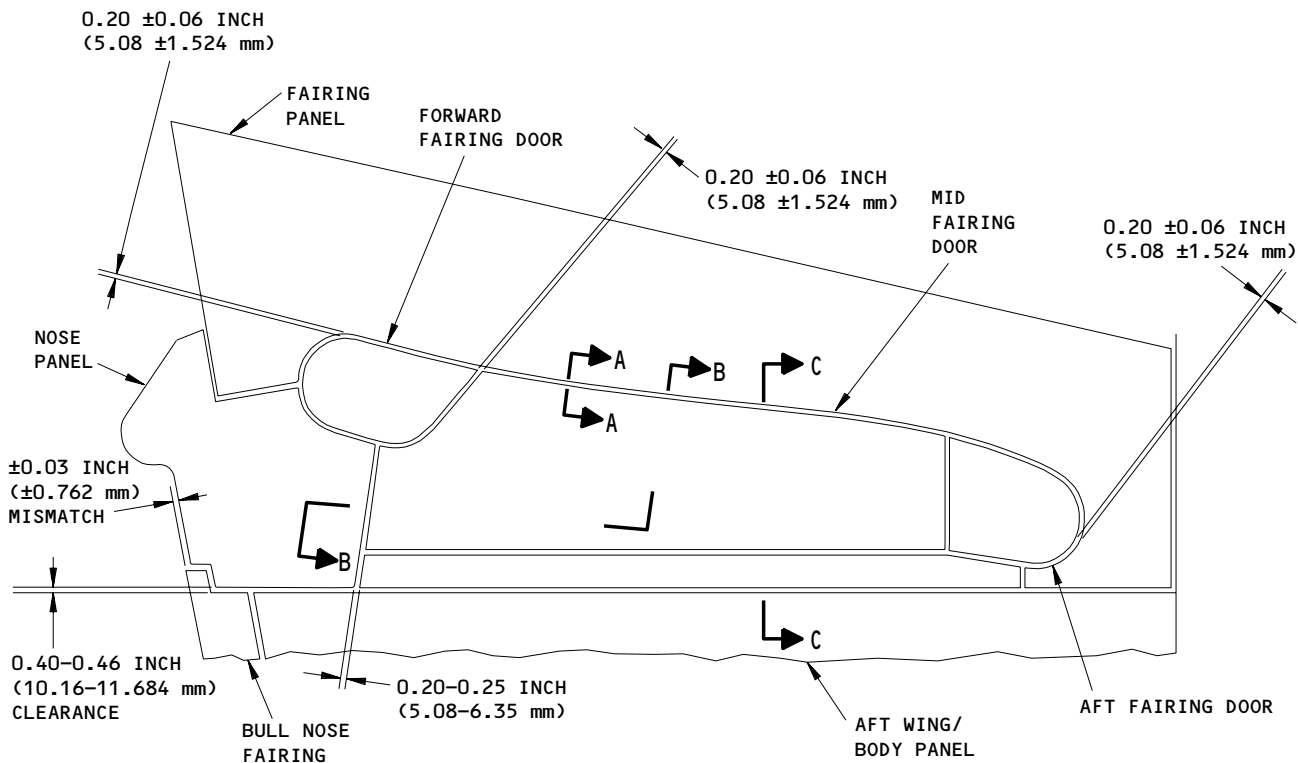
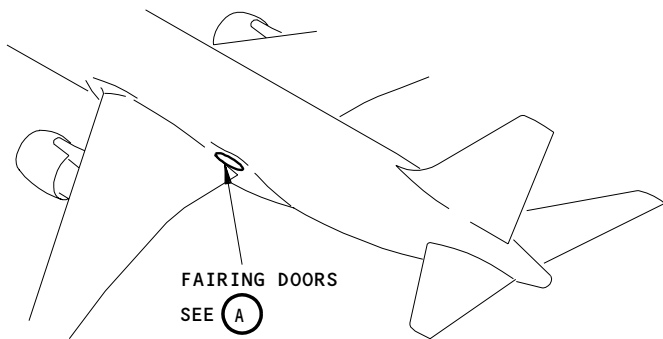
Inboard Flap Fairing Door  
Figure 401 (Sheet 3)

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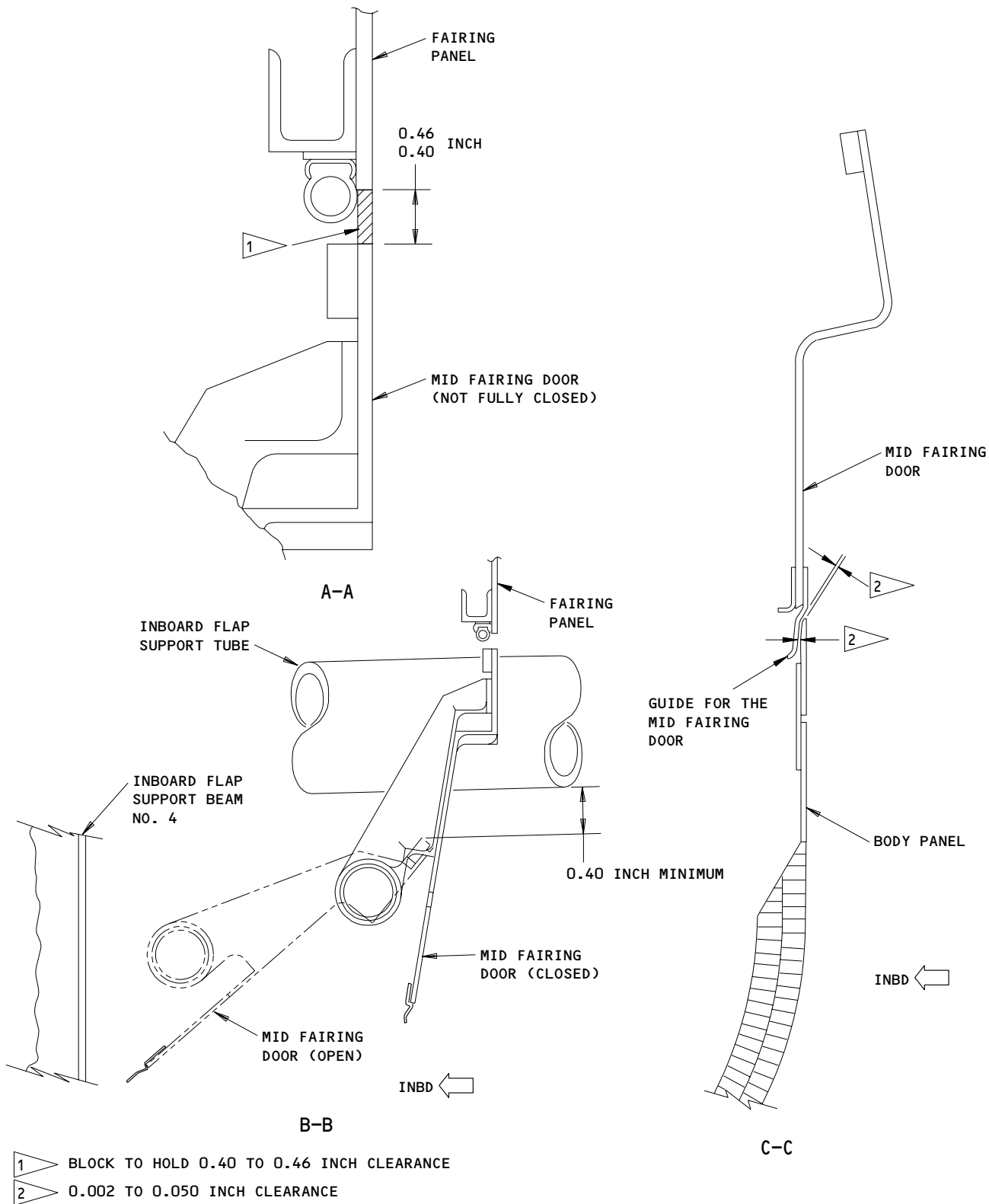
Adjustment for the Inboard Fairing Door  
Figure 402 (Sheet 1)

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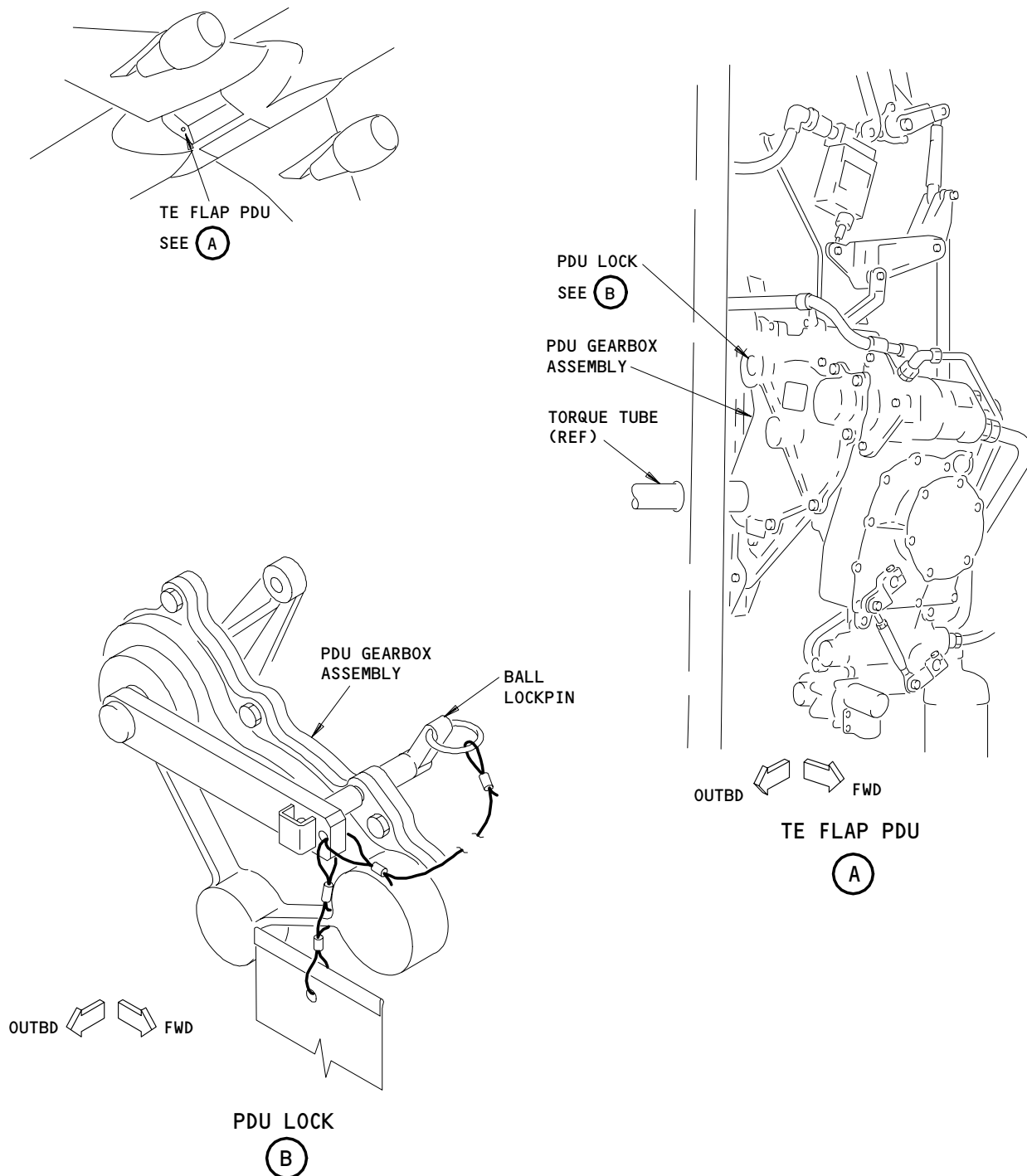
Adjustment for the Inboard Fairing Door  
Figure 402 (Sheet 2)

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TE Flap PDU Lock  
Figure 403

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- (2) TE Flap PDU - A27009-7
- B. Consumable Materials
  - (1) D00633 Grease - BMS 3-33 (Preferred)
  - (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Forward/Aft Fairing Door	27-51-03	20	215,220
	13	Mid Fairing Door	27-51-03	21	210,215
			27-51-03	20	390,395
			27-51-03	21	485,490

D. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 32-00-15/201, Landing Gear Door Lock
- (4) AMM 32-00-20/201, Landing Gear Downlock

E. Access

(1) Location Zones

- 144 Right MLG Wheel Well
- 211/212 Control Cabin
- 410 No. 1 Power Plant
- 420 No. 2 Power Plant
- 570/670 Wing Trailing Edge Flap Track Fairing - Inboard
- 730/740 Left/Right Main Landing Gear and Doors

(2) Access Panels

- 195JL Left Inboard Flap Mechanism
- 196JR Right Inboard Flap Mechanism

F. Procedure

S 824-092-002

- (1) Prepare to adjust the serrated fitting on the cam assembly (Fig. 401, View A).

**NOTE:** Measure the relative position of point "A" at the flaps down and flaps up position. The relative waterline difference of these two measurements is not to exceed 0.05 inches. Clamp a pointer to an adjacent frame as an aid to measure the relative waterline difference.

(a) Extend the TE flap with electrical power:

- 1) Make sure that the position selector switch for the flap/slat alternate drive (on the first officer instrument panel, P3) is in the NORM position.

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- 2) Remove the PDU lock from the TE flap PDU.
- 3) Remove the DO-NOT-CLOSE tag, and close these circuit breakers:
  - a) On the main power distribution panel, P6.  
6D24, ALTN FLAP PWR
  - b) On the overhead panel, P11  
11J24, FLAPS ALTN CONT
- 4) Remove the DO-NOT-CLOSE tag, and close this circuit breaker on the P11 panel:
  - a) 11J24, FLAPS ALTN CONT
- 5) Supply electrical power (AMM 24-22-00/201).
- 6) Make sure that the arming switches for the flap and slat alternate drive (on the P3 panel) are not in the armed position (switch lights off).
- 7) Push the arming switch for the flap alternate drive to arm the flap alternate drive (switch light on).
- 8) Make sure that the TRAILING EDGE light on the P3 panel comes on.

**CAUTION:** MAKE SURE THE ALTERNATE (ELECTRIC) DRIVE MOTOR IS LIMITED TO 4 MINUTES OPERATION AND 20 MINUTES OFF. FAILURE TO DO THIS CAN CAUSE DAMAGE TO THE MOTOR.

- 9) To extend the TE flaps, turn the position selector switch for the flap/slat alternate drive to the 30-unit position.
- 10) Make sure the TE flaps are extended fully.
- (b) Record the vertical distance from point "A" to the pointer.
  - 1) Retract the TE flaps with electrical power with the steps that follow:
    - a) Move the position selector switch for the flap/slat alternate drive to the UP position.
    - b) Make sure that the TE flaps move to the fully retracted position.
    - c) Move the position selector switch to the NORM position.
- (c) Record the vertical distance from point "A" to the pointer.

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- (d) Compare the recorded value of the location of point "A" with the flaps at the UP position and at the 30-unit position.

NOTE: The relative waterline difference between the measurements cannot exceed 0.05 inches (1.27 mm).

- (e) Do the deactivation procedure with the steps that follow:
- 1) Push the arming switch for the flap alternate drive to disarm the flap alternate drive (switch light goes off).
  - 2) Make sure that the TRAILING EDGE light goes off, and that the TE FLAP DISAGREE message does not show on the EICAS.
  - 3) Remove electrical power if it is not necessary (AMM 24-22-00/201).
  - 4) Open these circuit breakers and attach DO-NOT-CLOSE tags:
    - a) On the main power distribution panel, P6, 6D24, ALTN FLAP PWR
    - b) On the overhead panel, P11, 11J24, FLAP ALTN CONT
  - 5) Install the PDU lock on the TE flap PDU.
- (f) If the relative waterline difference between the two measurements is greater than 0.05 inches (1.27 mm), adjust the cam assembly as follows:
- 1) Loosen the two bolts that connect the cam assembly to the crank arm and the two bolts that connect the serrated fitting to the cam.
  - 2) Adjust the serrated fitting as required.

NOTE: Each serration of adjustment away from the crank arm will move the uprig point "A" down and the downrig point "A" up. This will result in a change of relative position of point "A" of 0.08 inches (2.03 mm) .

- 3) Tighten the four bolts.
- (g) Repeat the above steps to cycle the flaps and recheck the relative waterline position of point "A" at the flaps UP position and at the 30-unit position.

(h) Repeat the cam adjustment if required.

S 644-051-002

- (2) Apply a layer of grease to all pins, washers, nuts, bushings and spacers before installation.

S 424-052-002

- (3) Connect the forward/aft fairing door (1) to the forward hinge fitting (16), and the aft hinge fitting (19).

S 424-053-002

- (4) Hold the mid fairing door (13) and do the steps that follow:  
(a) Connect the forward arm assembly to the forward hinge fitting (15).  
(b) Connect the aft arm assembly to the aft hinge fitting (24).

S 224-054-002

- (5) Do a check on the clearances around the mid fairing door (Detail A, Fig. 402).

NOTE: The clearance between the mid fairing door and the lower body panel (194JL or 194JR) is not to be measured since the body panel is removed.

S 824-055-002

- (6) If necessary, adjust the clearances around the mid fairing door with the steps that follow:  
(a) Add washers (27) at the aft hinge fitting of the mid fairing door (24) and forward/aft fairing door (19) as necessary (Detail D, Fig. 401).

NOTE: Make sure that the total washer thickness is not more than 0.25 inch (6.35 mm).

S 424-056-002

- (7) Tighten the nuts (12.6) at the forward hinge fittings (15,16) of the mid and forward/aft fairing doors.

S 224-057-002

- (8) Make sure clearance for the forward fairing door is in tolerance (Detail A, Fig. 402).

S 824-058-002

- (9) Use the slotted fastener holes on the pivot arm of the forward fairing door to adjust the clearance around the forward fairing door.

NOTE: The aft fairing door is not adjusted at this time.

S 424-059-002

- (10) Tighten the nuts (25,23) at the aft hinge fittings of the mid and forward/aft fairing door hinges (24,19).

S 214-060-002

- (11) Make sure that the forward fairing door can turn freely through 90 degrees of movement.

S 214-061-002

- (12) Make sure that the mid fairing door can turn freely through 40 degrees of movement.

S 424-062-002

- (13) Install the drive rod (30) for the forward/aft fairing door with the steps that follow:
- (a) Hold the forward fairing door closed.
  - (b) Open the mid fairing door and hold a 0.40-0.46 inch (10.16-11.68 mm) clearance between the fairing panel and the mid fairing door (View A-A, Fig. 402).

NOTE: To aid in holding the clearance, make and install a 0.40-0.46 inch (10.16-11.68 mm) block between the mid fairing door and the mid fairing panel. The block will hold the mid door on the correct position while adjusting the drive rod (30).

- (c) Install and adjust the drive rod (30) for the forward/aft fairing door as necessary to allow free installation of the (31 and 39) drive rod bolts (View E-E, Fig. 401).

NOTE: This step will supply the necessary preload for the forward/aft fairing doors.

- (d) Remove the 0.40-0.46 inch (10.16-11.68 mm) block.

S 424-063-002

- (14) Connect the door drive rod (29) to the aft arm assembly of the mid fairing door.

S 824-083-002

(15) Fairing door drive rod adjustment:

- (a) Make sure the lower bolt on the door drive rod (29) is in the center bolt hole on the door drive bellcrank.

NOTE: If you install the drive rod (29) into the forward hole of the door drive crank, it will decrease the range of travel. If you install the drive rod (29) into the aft hole of the door drive crank, it will increase the range of travel.

- (b) Hold the forward fairing door rod closed and adjust the door drive rod (29) to get 0.20 ±0.06 inch (5.0 +/- 1.5 mm) clearance between the top of the mid fairing door and the fairing panel.

S 824-084-002

(16) Do a check on the clearance around the aft fairing door.

- (a) Apply upward hand pressure to the aft fairing door to counteract the spring load and make sure that the door can be moved to give a minimum of 0.4 inch (10.16 mm) clearance.
- (b) If more clearance is necessary, lengthen the drive rod (30) (Fig. 401).

NOTE: Make sure the forward fairing door will fully close.

S 414-065-002

(17) Install the 195JL or 196JR panel (AMM 06-41-00/201).

NOTE: Make sure that the upper edge of the fairing panel is located outboard of the lower edge of the mid door when you install the panel (Fig. 402, View C-C).

S 864-077-002

CAUTION: MAKE SURE THAT THE GUIDE FOR THE MID FAIRING DOOR IS IN THE CORRECT POSITION WITH THE INBOARD END OF THE BODY PANEL. THIS WILL PREVENT DAMAGE TO THE MID FAIRING DOOR OR BODY PANEL.

(18) Make sure that the guide for the mid fairing door is in the correct position (View C-C, Fig. 402).

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S 224-066-002

- (19) Make sure the clearance between the lower body panel (194JL or 194JR) and the mid fairing door is in tolerance.
- (a) Keep a clearance of 0.002-0.050 inch (0.050-1.27 mm) between the lower body panel and the formed fairing strip on the mid fairing door (View C-C, Fig. 402).

S 824-067-002

- (20) If the clearance is not in tolerance, adjust as follows:

S 014-089-002

- (21) Remove the lower body panel, 195JL or 196JR (AMM 06-41-00/201).
- (a) Adjust the door drive rod (29) to decrease its length.

**NOTE:** If the rod adjustment is not sufficient to get the required clearance, the rod (29) may be machined shorter by a maximum of 0.25 inch (6.35 mm).

- (b) Install the 195JL or 196JR panel (AMM 06-41-00/201).

**CAUTION:** MAKE SURE THAT THE GUIDE FOR THE MID FAIRING DOOR IS IN THE CORRECT POSITION WITH THE INBOARD END OF THE BODY PANEL. THIS WILL PREVENT DAMAGE TO THE MID FAIRING DOOR OR BODY PANEL.

- (c) Make sure that the guide for the mid fairing door is in the correct position (View C-C, Fig. 402).
- (d) Make sure the clearance between the lower body panel (195JL or 196JR) and the mid fairing door is in tolerance.
- 1) Keep a clearance of 0.002-0.050 inch (0.050-1.27 mm) between the lower body panel and the formed fairing strip on the mid fairing door (View C-C, Fig. 402).

S 864-078-002

**WARNING:** MAKE SURE THAT THE LOWER EDGE OF THE MID FAIRING DOOR IS LOOSE AND IS NOT PRELOADED TIGHTLY AGAINST THE FAIRING PANEL. A TIGHT DOOR AT THIS LOCATION CAN SLOW THE DOOR MECHANISM AND THIS CAN CAUSE THE DOOR TO INTERFERE WITH THE FLAP SUPPORT TUBE.

- (22) Do a check on the movement of the aft fairing door with the steps that follow:
- (a) Make sure that the position selector switch for the flap/slat alternate drive (on the first officer instrument panel, P3) is in the NORM position.

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- (b) Remove the PDU lock from the TE flap PDU.
- (c) Remove the DO-NOT-CLOSE tag, and close these circuit breakers:
  - 1) On the main power distribution panel, P6:  
6D24, ALTN FLAP PWR
  - 2) On the overhead panel, P11.  
11J24, FLAPS ALTN CONT
- (d) Remove the DO-NOT-CLOSE tag, and close this circuit breaker on the P11 panel:
  - 1) 11J24, FLAPS ALTN CONT
- (e) Supply electrical power (AMM 24-22-00/201).
- (f) Use alternate electric power to retract the inboard TE flap to a position 5.5-7.0 inches (140-177 mm) away from the fully retracted position.
- (g) Make sure that the edge of the mid fairing door is 0.40 inch (10.16 mm) minimum away from the inboard flap support tube (View B-B, Fig. 402).

NOTE: The forward/aft fairing door will ride on the flap support tube when the inboard flap is near the limit of travel.

S 824-090-002

- (23) If the clearance is not in tolerance, change the travel of the door drive bellcrank:
  - (a) Supply electrical power (AMM 24-22-00/201).
  - (b) Push the arming switch for the flap alternate drive, to arm the flap alternate drive (switch light on).
  - (c) Make sure the TRAILING EDGE light on the P3 panel comes on.

CAUTION: MAKE SURE THE ALTERNATE (ELECTRIC) DRIVE MOTOR IS LIMITED TO 4 MINUTES OPERATION AND 20 MINUTES OFF. FAILURE TO DO THIS CAN CAUSE DAMAGE TO THE MOTOR.

CAUTION: MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (d) To extend the TE flaps, turn the position selector switch for the flap/slat alternate drive to the 30-unit position.

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- (e) Remove electrical power (AMM 24-22-00/201).
- (f) Open these circuit breakers and attach DO-NOT-CLOSE tags:
  - 1) On the main power distribution panel, P6,
    - a) 6D24, ALTN FLAP PWR
  - 2) On the overhead panel, P11,
    - a) 11J24, FLAPS ALTN CONT
- (g) Open these circuit breakers and attach circuit breaker locks and DO-NOT-CLOSE tags:
  - 1) On the main power distribution panel, P6,
    - a) 6D21, ALTN SLAT INBD PWR
    - b) 6F24, ALTN SLAT OUTBD PWR
  - 2) On the overhead panel, P11,
    - a) 11H23, SLAT ALTN CONT INBD
    - b) 11H24, SLAT ALTN CONT OUTBD
- (h) Install the PDU lock on the TE flap PDU (Fig. 403)
- (i) Install the lower bolt of the drive rod (29) into the aft hole of the door drive bellcrank to increase the travel, or the forward hole to decrease the travel.

NOTE: You will have to adjust the drive rod to install the bolt.

- (j) Return to the "Fairing door drive rod adjustment" steps and do the drive rod adjustment steps again.

S 844-082-002

- (24) Extend the TE flap with electrical power:
  - (a) Make sure that the position selector switch for the flap/slat alternate drive (on the first officer instrument panel, P3) is in the NORM position.
  - (b) Remove the PDU lock from the TE flap PDU.
  - (c) Remove the DO-NOT-CLOSE tag, and close these circuit breakers:
    - 1) On the main power distribution panel, P6.
      - 6D24, ALTN FLAP PWR
    - 2) On the overhead panel, P11
      - 11J24, FLAPS ALTN CONT

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- (d) Remove the DO-NOT-CLOSE tag, and close this circuit breaker on the P11 panel:
  - 1) 11J24, FLAPS ALTN CONT
- (e) Supply electrical power (AMM 24-22-00/201).
- (f) Make sure that the arming switches for the flap and slat alternate drive (on the P3 panel) are not in the armed position (switch lights off).
- (g) Push the arming switch for the flap alternate drive to arm the flap alternate drive (switch light on).
- (h) Make sure that the TRAILING EDGE light on the P3 panel comes on.

**CAUTION:** MAKE SURE THE ALTERNATE (ELECTRIC) DRIVE MOTOR IS LIMITED TO 4 MINUTES OPERATION AND 20 MINUTES OFF. FAILURE TO DO THIS CAN CAUSE DAMAGE TO THE MOTOR.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (i) To extend the TE flaps, turn the position selector switch for the flap/slat alternate drive to the 30-unit position.
- (j) Make sure the TE flaps are extended fully.
- (k) Make sure that the forward fairing door turns freely through 90 degrees of movement as the TE flaps extend.
- (l) Do a check on the clearance around the forward fairing door. If necessary, adjust this clearance by using the slotted fastener holes on the pivot arm of the forward fairing door.
- (m) Retract the TE flaps with electrical power with the steps that follow:
  - 1) Move the position selector switch for the flap/slat alternate drive to the UP position.
  - 2) Make sure that the TE flaps move to the fully retracted position.

- 3) Do a check on the clearance around the forward fairing door.
  - a) Apply upward hand pressure to the forward fairing door to counteract the spring load and make sure the door can be moved to give a minimum of 0.4 inch (10.16 mm) clearance.
- 4) Move the position selector switch to the NORM position.

S 224-087-002

- (25) Make sure the forward/aft and mid fairing door clearances are correct during the complete flap cycle (Detail A, Fig. 402).

NOTE: Make sure that the mid door does not touch the upper fairing panel when the flaps are in the fully retracted position.

S 824-086-002

- (26) If the mid door does touch the upper fairing panel, adjust the length of the drive rod so the door does not touch the panel.

S 224-085-002

- (27) Cycle the flaps again and make sure clearance exists between the mid fairing door and the upper fairing panel.

S 824-088-002

- (28) Do the deactivation procedure with the steps that follow:
  - (a) Push the arming switch for the flap alternate drive to disarm the flap alternate drive (switch light goes off).
  - (b) Make sure that the TRAILING EDGE light goes off, and that the TE FLAP DISAGREE message does not show on the EICAS.
  - (c) Remove electrical power if it is not necessary (AMM 24-22-00/201).
  - (d) Open these circuit breakers and attach DO-NOT-CLOSE tags:
  - (e) On the main power distribution panel, P6,  
6D24, ALTN FLAP PWR
  - (f) On the overhead panel, P11,  
11J24, FLAP ALTN CONT
  - (g) Install the PDU lock on the TE flap PDU.

S 224-068-002

- (29) Make sure the forward/aft and mid fairing door clearances are correct during the complete flap cycle (Detail A, Fig. 402).

S 424-069-002

- (30) Install the countersunk rivets (17) on the forward and aft fairing doors (2 on each door) to the pivot arms (Detail A, Fig. 401).

S 824-070-002

- (31) Make adjustments to the bullnose fairing when necessary.

S 424-071-002

- (32) Connect the electrical bonding jumper to the forward hinge fitting of the mid fairing door (Fig. 401).

G. Put the Airplane Back to Its Usual Condition

S 084-072-002

- (1) Remove the PDU lock from the TE flap PDU.

S 084-079-002

**WARNING:** OBEY THE REMOVAL PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (2) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15).

S 864-073-002

- (3) Remove the DO-NOT-CLOSE tags and circuit breaker locks, and close these circuit breakers:

- (a) On the main power distribution panel, P6,  
1) 6D21, ALTN SLAT INBD PWR  
2) 6D24, ALTN FLAP PWR  
3) 6F24, ALTN SLAT OUTBD PWR  
(b) On the overhead panel, P11,  
1) 11H23, SLAT ALTN CONT INBD  
2) 11H24, SLAT ALTN CONT OUTBD  
3) 11J24, FLAPS ALTN CONT

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INBOARD TE FLAP, OUTBOARD ROTARY ACTUATOR – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the outboard rotary actuator of the inboard flap.

TASK 27-51-11-024-001

2. Inboard Flap Outboard Rotary Actuator – Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip – 1012LC-4  
Commercially Available  
(2) TE Flap PDU Lock – A27009-7

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels  
(2) AMM 24-22-00/201, Electrical Power – Control  
(3) AMM 27-51-39/401, TE Flap Offset Tee Gearbox  
(4) AMM 27-51-41/401, TE Flap Torque Tubes  
(5) AMM 29-11-00/201, Main Hydraulic Systems  
(6) AMM 32-00-15/201, Landing Gear Door Locks  
(7) AMM 32-00-20/201, Landing Gear Downlock

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
550/650	Wing Trailing Edge – Inboard
571/671	Inboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

552FB/652FB	Spoiler Beam, Flap Installation
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D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

**CAUTION:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-004

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

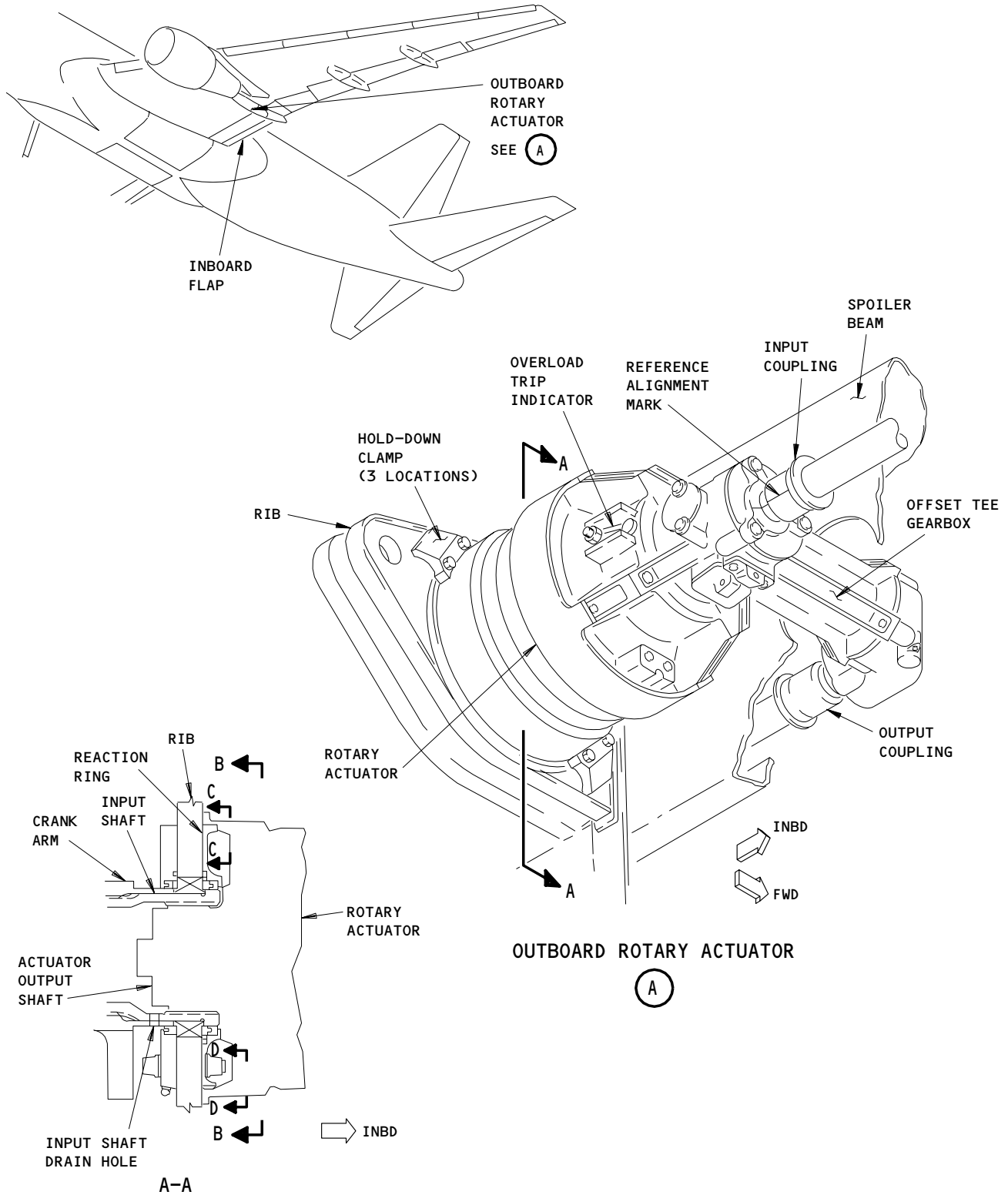
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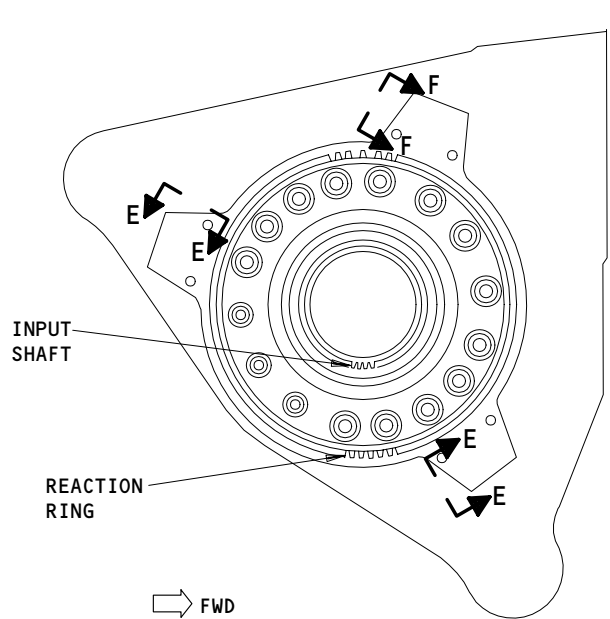
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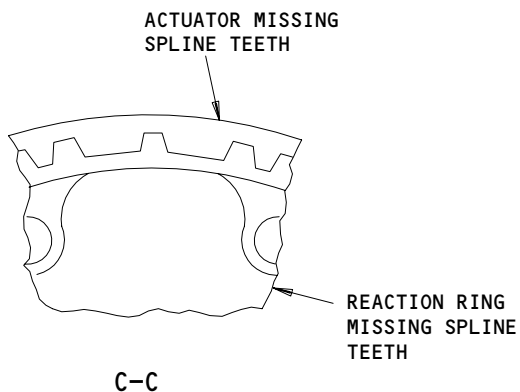
Inboard Flap, Outboard Rotary Actuator  
Figure 401 (Sheet 1)

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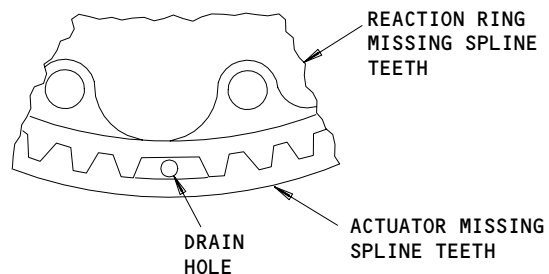
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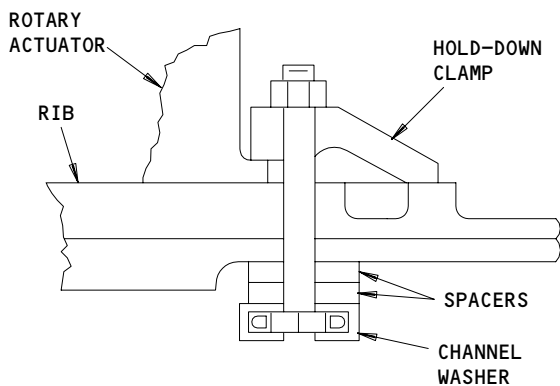
B-B



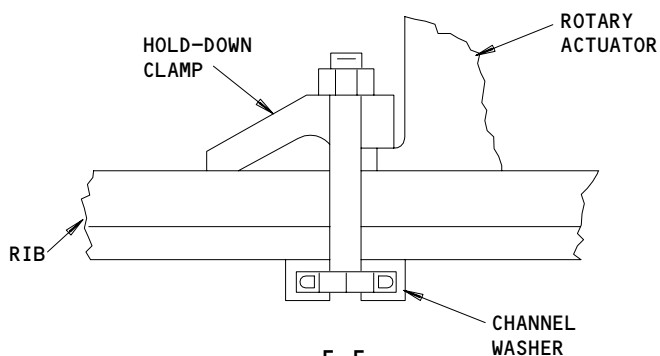
C-C



D-D



E-E



F-F

Inboard Flap, Outboard Rotary Actuator  
Figure 401 (Sheet 2)

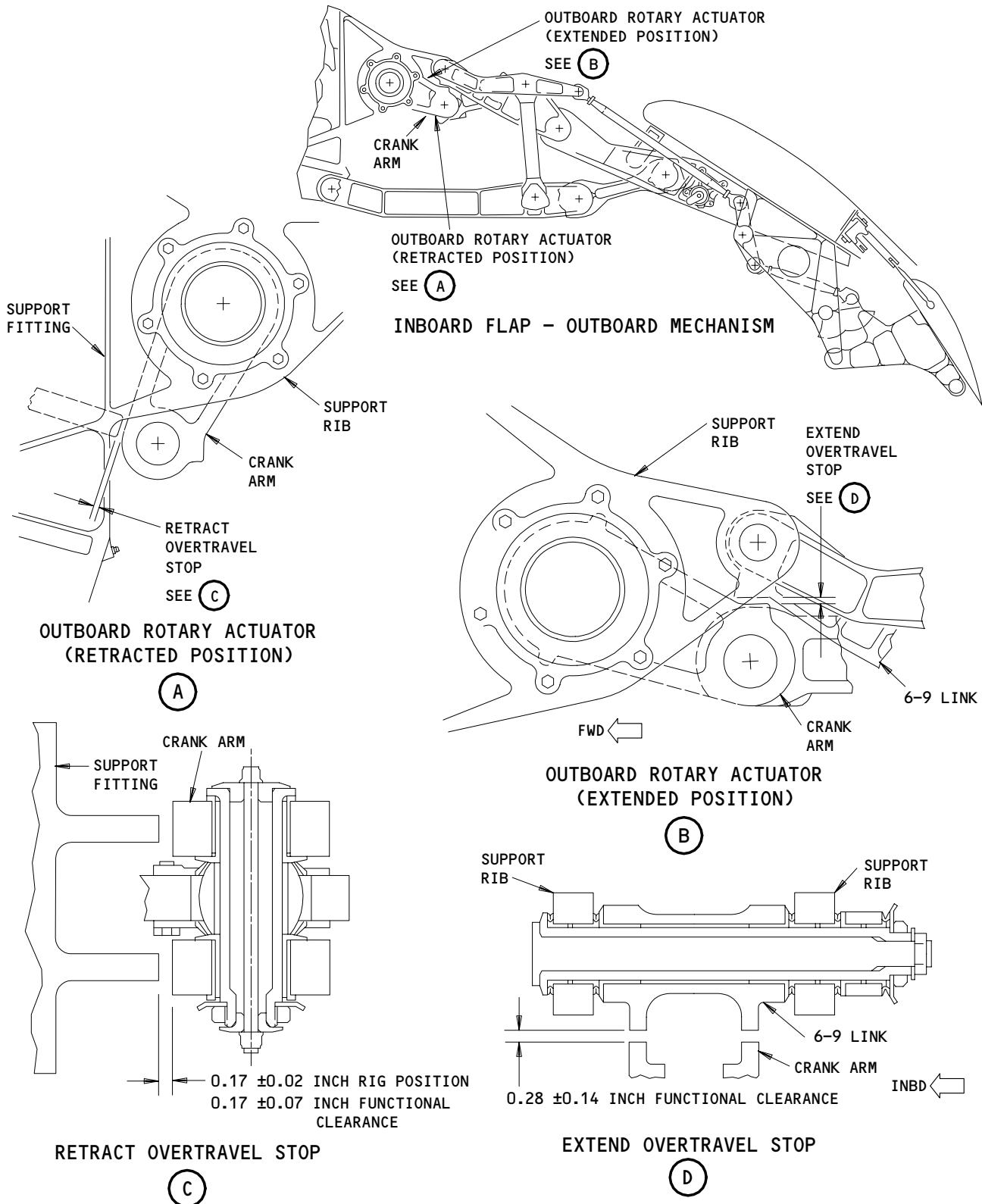
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Overtravel Stop Clearances for the Inboard Flap  
Figure 402

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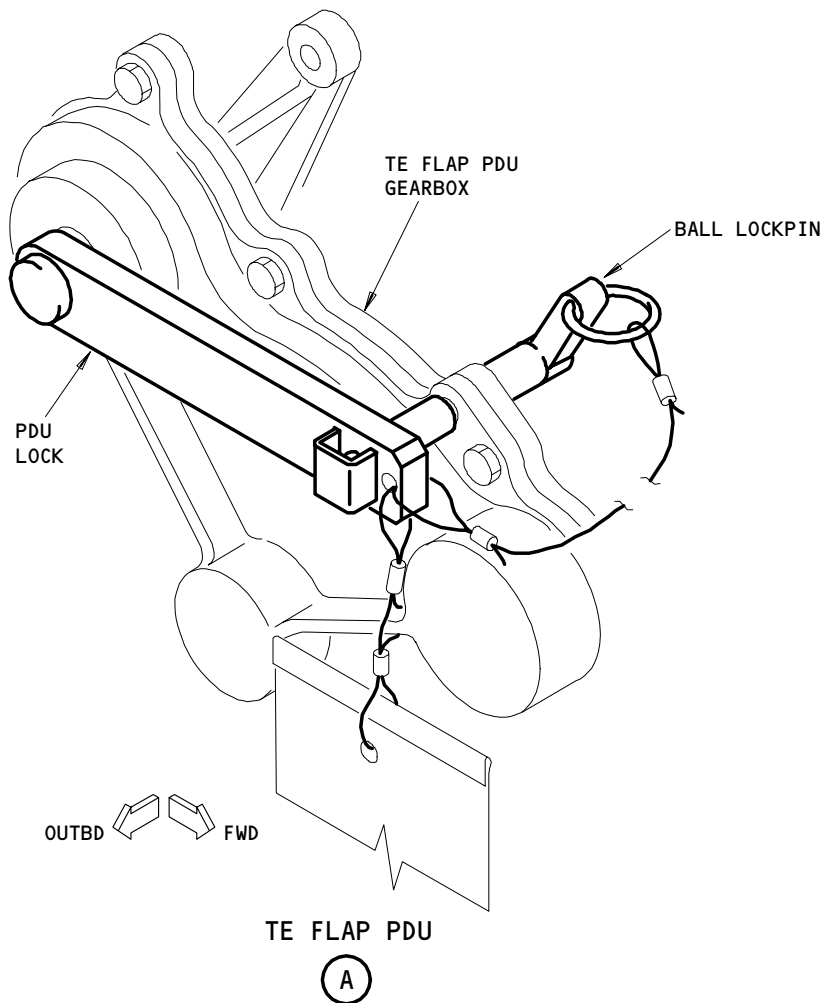
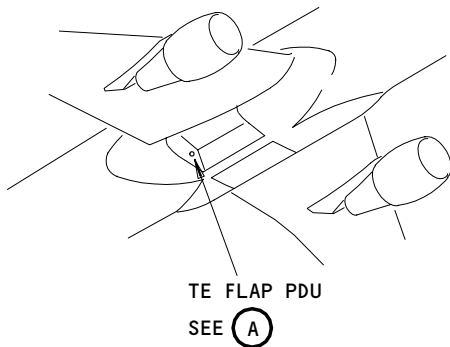
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PDU Lock for the TE Flap PDU  
Figure 403

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S 864-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(4) Pressurize the center system hydraulic (AMM 29-11-00/201).

S 864-006

(5) Move the flap control lever to the 30-unit detent and permit the flaps to move to the fully extended position.

S 864-007

(6) Remove pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-008

(7) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 864-009

(8) Open these circuit breakers on the P6 panel and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 864-010

(9) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:  
(a) 11J24, FLAP ALTN CONT

S 864-011

(10) Open these circuit breakers on the P11 panel and install circuit breaker locks:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD

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S 014-012

- (11) Remove the access panel, 552FB (left wing) or 652FB (right wing), at the inboard side of the flap fairing to get access to the rotary actuator (AMM 06-44-00/201).

S 494-013

- (12) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 403).

E. Remove the Rotary Actuator

S 034-014

- (1) Disconnect the torque tubes from the input and output couplings on the offset tee gearbox (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tube. It will be necessary to adjust the flap drive if you turn the torque tube while it is disconnected.

S 944-015

- (2) Make a mark on the gearbox coupling and the offset tee gearbox, and prepare to count the number of turns you will make on the coupling in the subsequent step.

S 984-016

- (3) Manually turn the gearbox coupling in the extend direction until the crank arm on the rotary actuator touches the extend overtravel stop (Detail B, Fig. 402). Keep a count on the number of turns for the subsequent installation.

**NOTE:** Stop the turns when the crank arm touches the extend overtravel stop to prevent preload. Preload on the actuator spline will make the actuator not easy to remove.

When you look to the outboard direction, the extend direction is counterclockwise for the left wing, and clockwise for the right wing.

S 024-017

- (4) Remove the offset tee gearbox (AMM 27-51-39/401).

S 034-018

- (5) Remove the six nuts on the hold-down clamps that hold the rotary actuator to the structure (View E-E and F-F, Fig. 401).

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S 034-019

- (6) Remove the three hold-down clamps.

**NOTE:** Keep the bolts in the structure and rotary actuator when you remove the clamps.

S 034-020

**WARNING:** BE CAREFUL WHEN YOU REMOVE THE ROTARY ACTUATOR. BECAUSE THE ACTUATOR WEIGHS 82 POUNDS (37.2 Kg), INJURY CAN OCCUR.

- (7) Hold the weight of the rotary actuator and pull the actuator 2.5 inches away from the structure to disengage the spline.

S 024-021

- (8) Remove the rotary actuator from the airplane.

TASK 27-51-11-424-022

3. Inboard Flap Outboard Rotary Actuator - Installation

A. Equipment

- (1) TE Flap PDU Lock - A27009-7

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)  
(2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)  
(3) G02020 Modeling Clay

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels  
(2) AMM 12-21-09/301, Lubrication  
(3) AMM 20-10-23/401, Lockwires  
(4) AMM 24-22-00/201, Electrical Power - Control  
(5) AMM 27-51-00/501, Trailing Edge Flap System  
(6) AMM 27-51-39/401, TE Flap Offset Tee Gearbox  
(7) AMM 27-51-41/401, TE Flap Torque Tubes  
(8) AMM 29-11-00/201, Main Hydraulic Systems  
(9) AMM 32-00-15/201, Landing Gear Door Locks

D. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
550/650	Wing Trailing Edge - Inboard
571/671	Inboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

552FB/652FB	Spoiler Beam, Flap Installation
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E. Install the Rotary Actuator

S 644-023

- (1) Apply a layer of BMS 3-33 grease to the splines and mating surfaces of the rotary actuator.

S 214-024

- (2) Make sure the overload trip indicator is pushed in (Detail A, Fig. 401).

S 104-025

- (3) Clean the input shaft, the reaction ring, and the actuator spline drain holes (Section A-A, Fig. 401) and remove unwanted grease or dirt.

S 824-052

**WARNING:** BE CAREFUL WHEN YOU INSTALL THE ROTARY ACTUATOR. BECAUSE THE ACTUATOR WEIGHS 82 POUNDS (37.2 Kg), INJURY CAN OCCUR.

- (4) Put the rotary actuator output shaft into the input shaft, and align the missing spline tooth on the actuator rim to the missing spline tooth on the reaction ring (View A-A and C-C, Fig. 401).

S 434-027

- (5) Move the actuator on to the reaction ring.

**NOTE:** Turn the actuator input shaft if it is necessary to engage the actuator to the reaction ring splines.

S 434-028

- (6) Install the three hold-down clamps with the spacers and locknuts (View E-E and View F-F, Fig. 401). Tighten the nuts.

S 424-029

- (7) Install the offset tee gearbox (AMM 27-51-39/401).

S 214-030

- (8) Make sure the actuator crank arm touches the extend overtravel stop (Detail B, Fig. 402).

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S 984-031

- (9) Turn the gearbox coupling in the retract direction the same number of turns you made during the actuator removal procedure.

**NOTE:** If you did not write down the number of turns that you made during the removal procedure, turn the coupling five full turns in the retract direction and adjust the extend overtravel stop clearance to the RIG position (AMM 27-51-00/501).

When you look to the outboard direction, the retract direction is clockwise for the left wing, and counterclockwise for the right wing.

S 434-032

- (10) Connect the torque tubes to the input and output couplings of the offset tee gearbox (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tube while you connect the torque tube. It will be necessary to adjust the flap drive if you turn the torque tube.

S 224-053

- (11) Make sure the torque tubes can move from end to end, and that the end clearances are satisfactory (AMM 27-51-41/401).

S 644-054

- (12) Fill the gearbox coupling with BMS 3-33 grease.

S 094-033

- (13) Remove the PDU lock from the TE flap PDU (Fig. 403).

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S 864-034

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(14) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-035

(15) Move the flap control lever to the 20-unit detent, and make sure the flaps move to the 20-degree position.

S 864-036

(16) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 494-037

**WARNING:** DO NOT MOVE THE FLAP CONTROL LEVER WHEN YOU APPLY THE MODELING CLAY IN THE STEP THAT FOLLOWS. MOVEMENT OF THE FLAP CONTROL LEVER DURING THIS OPERATION CAN CAUSE INJURY TO PERSONS.

(17) Apply modeling clay to all eight retract overtravel stops in the left and right wings.

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S 864-038

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(18) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-039

(19) Move the flap control lever to the zero (FLAPS UP) detent and permit the flaps to move to the fully retracted position.

**NOTE:** After the flaps moved to the fully retracted position, stop for one minute before you do the subsequent step.

S 864-040

(20) Move the flap control lever to the 20-unit detent.

S 864-041

(21) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 974-042

**WARNING:** DO NOT MOVE THE FLAP CONTROL LEVER WHEN YOU MEASURE THE OVERTRAVEL STOP CLEARANCES IN THE STEP THAT FOLLOWS. THE MOVEMENT OF THE FLAP CONTROL LEVER DURING THIS OPERATION CAN CAUSE INJURY TO PERSONS.

(22) Remove the clay and measure its thickness at each retract overtravel stop. Make sure each clay thickness agrees with the correct retract overtravel clearance (Fig. 402).

S 824-043

(23) If the retract overtravel clearance is not correct, adjust the retract overtravel clearance to the RIG position (AMM 27-51-00/501).

S 424-055

(24) Make sure you install a lockwire to the coupling screws on each coupling with the double twist procedure (AMM 20-10-23/401).

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S 864-044

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(25) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-045

(26) Operate the flap control lever through a full cycle and make sure the flaps operate correctly.

F. Put the Airplane Back to Its Usual Condition

S 414-046

(1) Close the access panels, 552FB and 652FB, for the rotary actuator (AMM 06-44-00/201).

S 864-047

(2) Remove the DO-NOT-CLOSE tags and circuit breaker locks and close these circuit breakers on the main power distribution panel, P6:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6D24, ALTN FLAP PWR  
(c) 6F24, ALTN SLAT OUTBD PWR

S 864-048

(3) Remove the DO-NOT-CLOSE tags and circuit breaker locks and close these circuit breakers on the overhead panel, P11:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD  
(c) 11J24, FLAPS ALTN CONT

S 094-049

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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- S 864-050
- (5) Remove power from the center hydraulic system (AMM 29-11-00/201).
- S 864-051
- (6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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INBOARD TRAILING EDGE FLAP TRACK FAIRINGS – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the outboard fairing of the inboard trailing edge (TE) flap. The installation task also contains the adjustment/test steps for the fairing installation.
- B. The outboard fairing contains a forward, mid, and aft section.
- C. Refer to AMM 27-51-16/401 for the removal and the installation procedures for the fairings on the Outboard TE flap.

TASK 27-51-15-024-001

2. Inboard Flap Outboard Fairing – Removal

A. Equipment

- (1) TE Flap PDU Lock – A27009-7

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 32-00-15/201, Landing Gear Door Locks
- (5) AMM 32-00-20/201, Landing Gear Downlock

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
555/655	Inboard Trailing Edge Flap
571/671	Inboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

571CL/671CL	Flap Fairing Forward Adjustment
571CR/671CR	Flap Fairing Forward Adjustment
571EL/671EL	Flap Fairing Mid Adjustment
571ER/671ER	Flap Fairing Mid Adjustment
571GL/671GL	Flap Aft Adjustment
571GR/671GR	Flap Aft Adjustment

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-15/201).

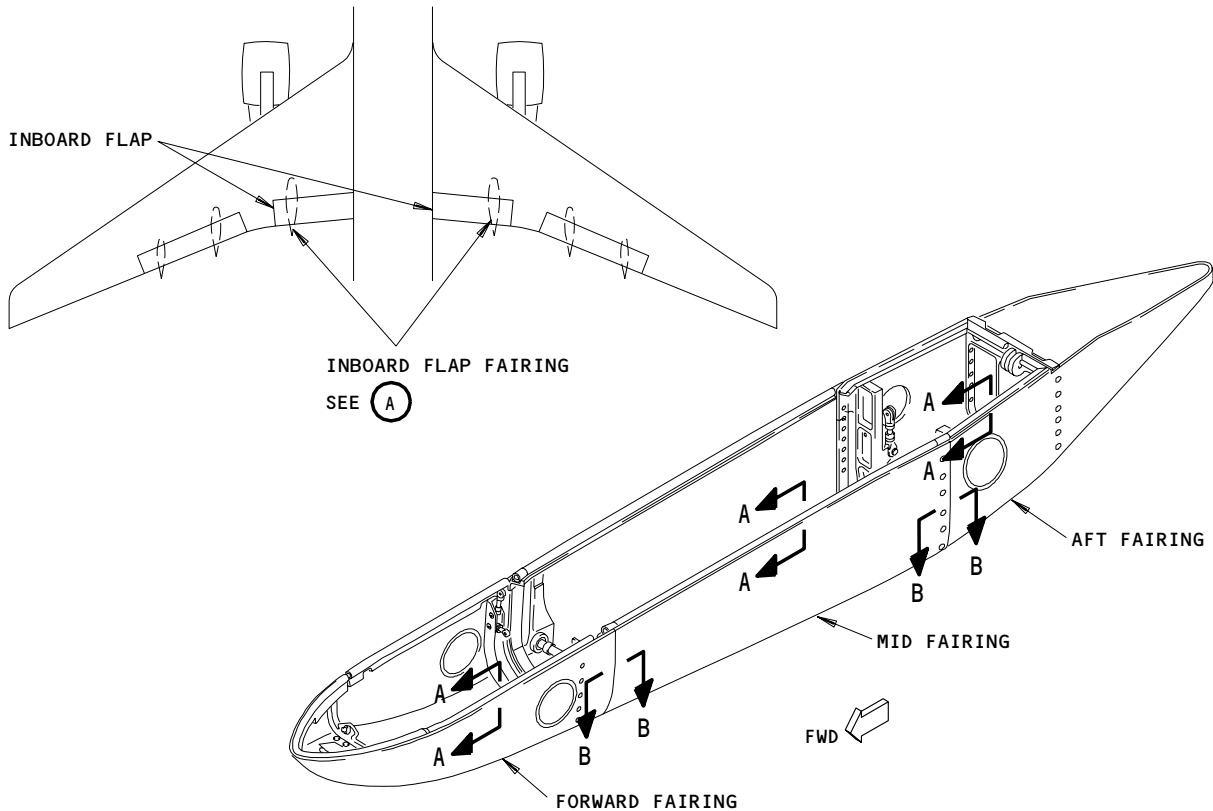
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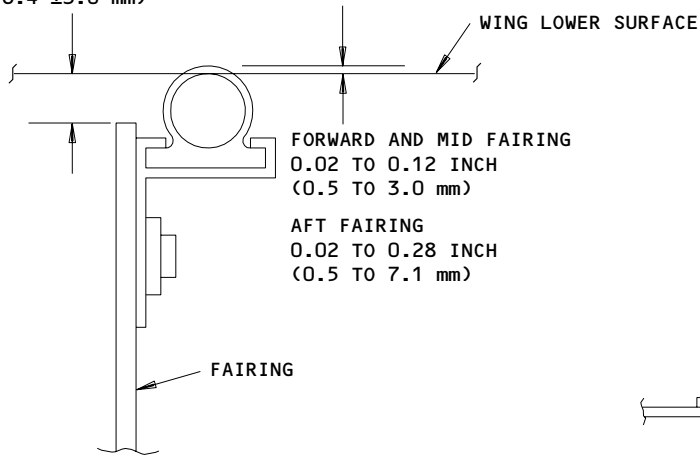
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**INBOARD FLAP FAIRING**

(A)

0.25 ±0.12 INCH  
(6.4 ±3.0 mm)



**FAIRING TO WING SEAL**

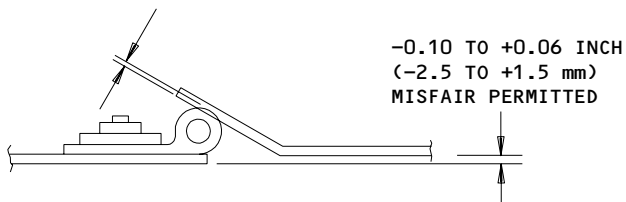
A-A

FORWARD AND MID FAIRING  
0.02 TO 0.12 INCH  
(0.5 TO 3.0 mm)

AFT FAIRING  
0.02 TO 0.28 INCH  
(0.5 TO 7.1 mm)

FORWARD TO MID FAIRING SEAL  
0.01 TO 0.06 INCH  
(0.3 TO 1.5 mm)

MID TO AFT FAIRING SEAL  
0.03 TO 0.10 INCH  
(0.8 TO 2.5 mm)



**FAIRING SECTION-TO-SECTION SEALS**

B-B

-0.10 TO +0.06 INCH  
(-2.5 TO +1.5 mm)  
MISFAIR PERMITTED

**Inboard Flap Fairings and Seals**  
Figure 401

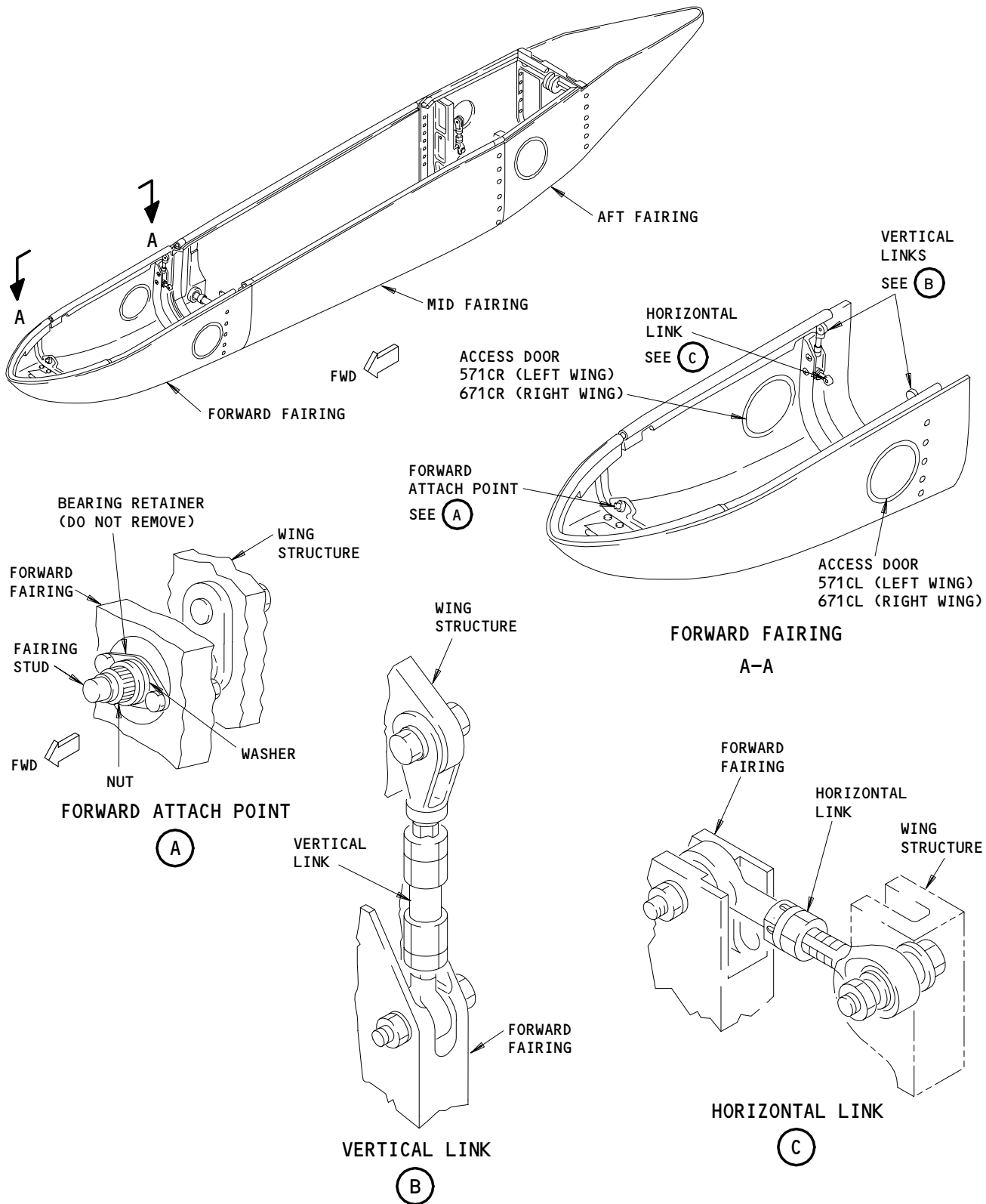
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Inboard Flap Forward Fairing  
Figure 402

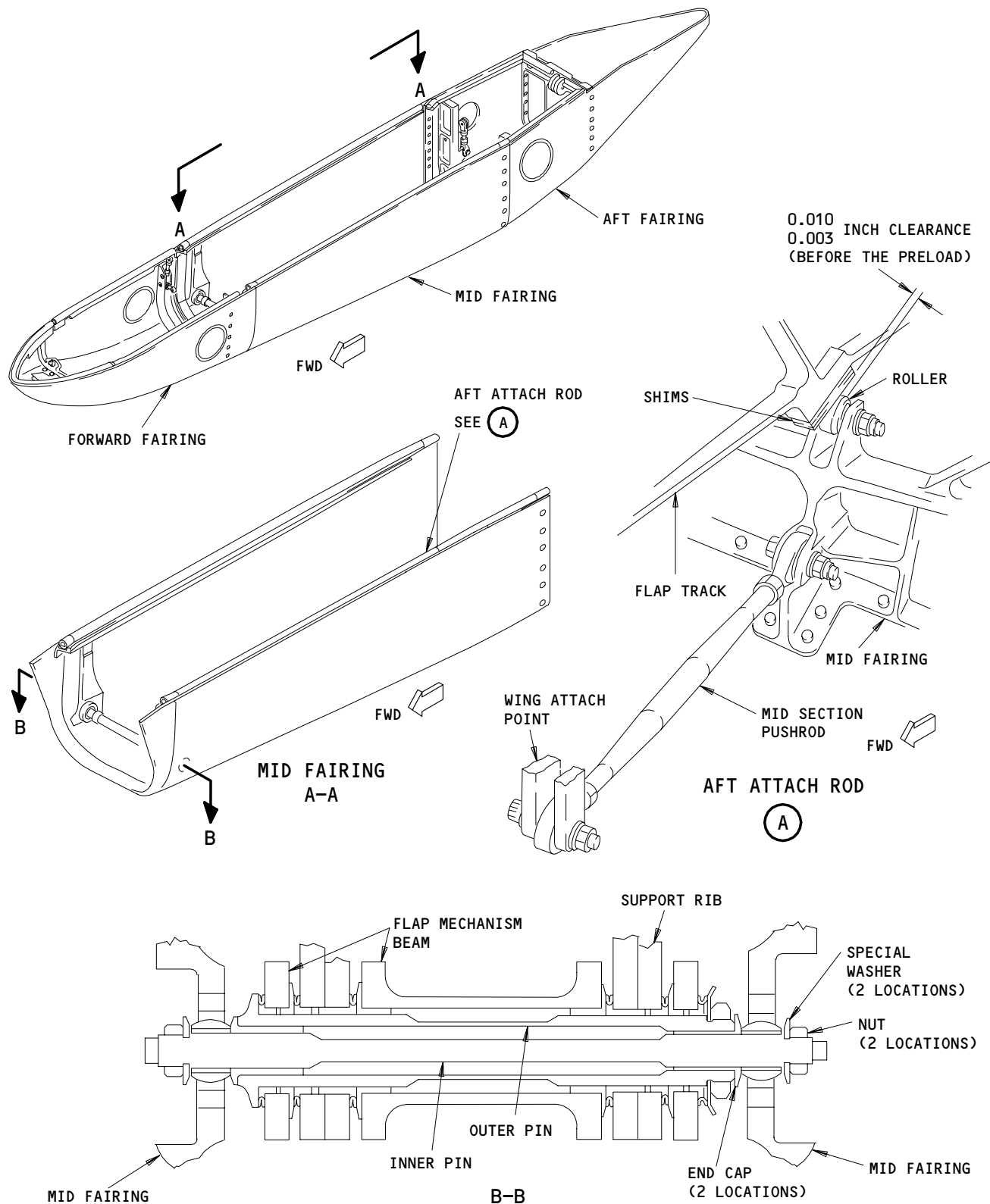
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**BOEING**  
767  
MAINTENANCE MANUAL



Inboard Flap Mid Fairing  
Figure 403

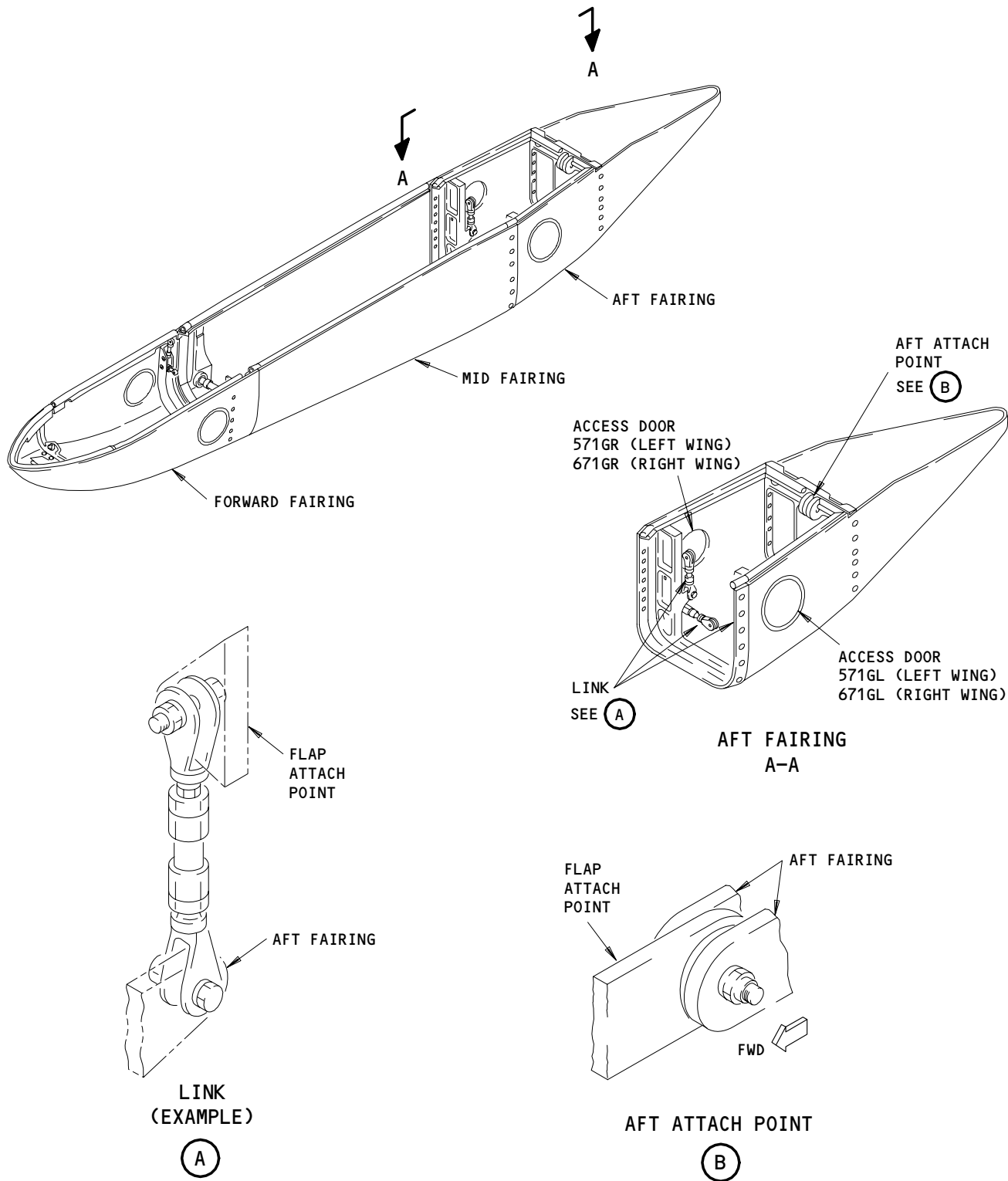
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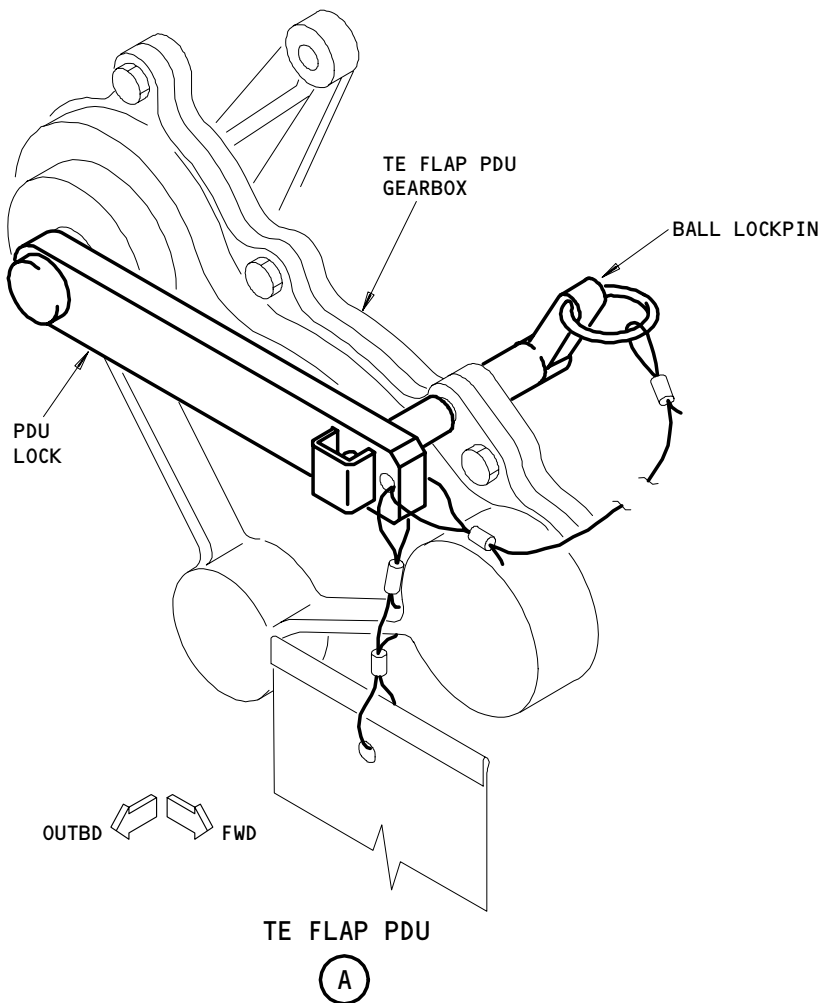
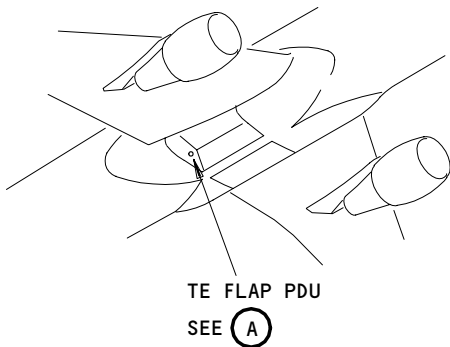
Inboard Flap Aft Fairing  
Figure 404

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PDU Lock for the TE Flap PDU  
Figure 405

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S 494-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-004

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

S 864-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-006

- (5) Move the flap control lever to the 25-unit detent and permit the trailing edge (TE) flaps to move to the 25-degree position.

S 494-007

- (6) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 864-008

- (7) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 864-009

- (8) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

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S 864-010

- (9) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 494-011

- (10) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 405).

E. Fairing Removal - Aft Section (Fig. 404)

S 014-012

- (1) Remove the access panels 571GL and 571GR (left wing), or 671GL and 671GR (right wing), on the aft fairing (AMM 06-44-00/201).

S 494-013

- (2) Hold the weight of the aft fairing to release the load on the fairing attach points.

S 034-014

- (3) Remove the bolt that connects the horizontal link to the aft fairing (Detail A).

NOTE: Do not change the adjustment on the horizontal link.

S 034-015

- (4) Remove the bolt at the aft attach point (Detail B).

S 034-016

- (5) Remove the bolts that attach the two vertical links (Detail A), and remove the aft fairing.

NOTE: Do not change the adjustment on the vertical links.

F. Fairing Removal - Mid Section (Fig. 403)

S 014-017

- (1) Remove the access panels, 571EL and 571ER (left wing), or 671EL and 671ER (right wing), on the mid fairing (AMM 06-44-00/201).

S 494-018

- (2) Hold the weight of the mid fairing to release the load on the fairing connection points.

S 034-019

- (3) Remove the bolt that connects the pushrod to the mid fairing (Detail A).

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S 034-020

- (4) Remove the nut and special washer from each end of the inner pin, at the forward end of the mid fairing (Section B-B).

S 034-021

- (5) Pull the inner pin out from the mid fairing.

S 024-022

- (6) Remove the mid fairing.

G. Fairing Removal - Forward Section (Fig. 402)

S 014-023

- (1) Remove the access panels, 571BB, 571CL and 571CR (left wing), or 671BB, 671CL and 671CR (right wing), on the forward fairing (Section A-A) (AMM 06-44-00/201).

S 494-024

- (2) Hold the weight of the forward fairing to release the load on the fairing attach points.

S 034-025

- (3) Remove the bolt that connects the horizontal link to the forward fairing (Detail C).

NOTE: Do not change the adjustment on the horizontal link.

S 034-026

- (4) Remove the bolts that connect the vertical links to the forward fairing (Detail B).

NOTE: Do not change the adjustment on the vertical links.

S 034-027

- (5) Remove the nut and washer on the fairing stud, at the forward end of the fairing (Detail A).

S 024-028

- (6) Pull the fairing away from the fairing stud and remove the forward fairing.

NOTE: Be careful not to cause damage to the threads on the fairing stud.

TASK 27-51-15-424-029

3. Inboard Flap Outboard Fairing - Installation

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)

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B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 20-10-23/401, Lockwires
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Landing Gear Door Locks

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
555/655	Inboard Trailing Edge Flap
571/671	Inboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

571BB/671BB	Flap Fairing Forward Attachment
571CL/671CL	Flap Fairing Forward Adjustment
571CR/671CR	Flap Fairing Forward Adjustment
571EL/671EL	Flap Fairing Mid Adjustment
571ER/671ER	Flap Fairing Mid Adjustment
571GL/671GL	Flap Aft Adjustment
571GR/671GR	Flap Aft Adjustment

D. Fairing Installation - Mid Section (Fig. 403)

S 214-030

- (1) Make sure the flaps are in the 25-degree position, and that the flap control lever is in the 25-unit detent.

S 034-031

- (2) Remove the end caps from the outer pin (Section B-B).

S 644-032

- (3) Clean the end caps and apply a light layer of grease to the inner and outer diameters.

S 434-033

- (4) Install the end caps at each end of the outer pin.

S 644-034

- (5) Apply a light layer of grease to the inner pin, special washers, and nuts.

S 434-035

- (6) Put the forward end of the mid fairing into its position and install the inner pin.

S 434-036

- (7) Install the special washers and nuts on each end of the inner pin.

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S 434-037

- (8) Tighten the nut on each end of the inner pin to 660-980 pound-inches, and install a lockwire with the double twist procedure (AMM 20-10-23/401).

S 644-038

- (9) Apply a layer of grease to the bolt for the push rod.

S 434-039

- (10) Lift the aft end of the mid fairing into its position, and attach the push rod to the fairing with the bolt. Tighten the nut.

S 824-040

- (11) Do the adjustment for the mid fairing:

NOTE: If you installed the same fairing that you removed, subsequent adjustment is not necessary if the fairing was correctly adjusted before the removal.

S 714-041

- (12) Do a test on the fairing installation.

E. Fairing Adjustment - Mid Section (Fig. 403).

NOTE: It is necessary to remove the aft fairing to get access to adjust the mid fairing.

S 094-042

- (1) Remove the PDU lock from the TE flap PDU (Fig. 405).

S 864-043

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

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S 864-044

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (3) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-045

**CAUTION:** MONITOR THE MOVEMENT OF THE FAIRING WHEN THE FLAPS MOVE. COMPONENTS THAT ARE INCORRECTLY INSTALLED CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Remove the DO-NOT-OPERATE tag from the flap control lever and move the lever to the zero (FLAPS UP) detent.

S 214-046

- (5) Make sure the flaps move to the fully retracted position.

S 864-047

- (6) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 494-048

- (7) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 224-049

- (8) Make sure the clearance between the mid fairing and the lower surface of the wing is correct as shown (Section A-A, Fig. 401).

S 824-050

- (9) If the clearance is not correct, remove the lockwire and adjust the pushrod to get the correct clearance.

S 224-051

- (10) Make sure the clearance between the mid fairing roller and the shims on the flap track is correct as shown (Detail A, Fig. 403).

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S 824-052

- (11) If the clearance is not correct, add or remove the shims to get the correct clearance.

S 824-053

- (12) Turn the rod end three full turns to the direction that will apply a load to the mid fairing rollers.

S 434-054

- (13) Tighten the jamnut and install a lockwire with the double twist procedure (AMM 20-10-23/401).

S 434-055

- (14) Tighten the bolt that attaches the push rod to the fairing.

F. Fairing Installation - Forward Section (Fig. 402)

S 214-056

- (1) Make sure the flaps are in the 25-degree position, and that the flap control lever is in the 25-unit detent.

S 014-057

- (2) Open the access panel, 571BB or 671BB, on the forward fairing to get access to the forward attach point (AMM 06-44-00/201).

S 424-058

- (3) Put the forward fairing on the fairing stud at the forward end of the fairing (Detail A).

S 434-059

- (4) Install the washer and nut to the stud. Tighten the nut.

S 644-060

- (5) Apply a light layer of grease to the bolts, washers, bushings, and nuts for the horizontal and vertical links.

S 434-061

- (6) Connect the vertical links (Detail B) and the horizontal link (Detail C) to the fairing with the bolts, washers, and nuts. Tighten the nut.

S 824-062

- (7) Adjust the vertical and horizontal links if it is necessary to connect the fairing.

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S 824-063

- (8) Do the adjustment on the forward fairing.

**NOTE:** If you installed the same fairing that you removed, subsequent adjustment is not necessary if the fairing was correctly adjusted before the removal.

S 714-064

- (9) Do a test on the fairing installation.

G. Fairing Adjustment - Forward Section (Fig. 402)

S 034-065

- (1) Loosen the bolts that attach the vertical and horizontal links to the fairing.

S 094-066

- (2) Remove the PDU lock from the TE flap PDU (Fig. 405).

S 864-067

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

S 864-068

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-069

**CAUTION:** MONITOR THE MOVEMENT OF THE FAIRING WHEN THE FLAPS MOVE. COMPONENTS THAT ARE INCORRECTLY INSTALLED CAN CAUSE DAMAGE TO THE AIRPLANE.

- (5) Remove the DO-NOT-OPERATE tag from the flap control lever and move the lever to the zero (FLAPS UP) detent.

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- S 214-070
- (6) Make sure the flaps move to the fully retracted position.
- S 864-071
- (7) Remove power from the center hydraulic system (AMM 29-11-00/201).
- S 494-072
- (8) Attach a DO-NOT-OPERATE tag to the flap control lever.
- S 224-073
- (9) Make sure the forward fairing aligns correctly with the mid fairing (Section B-B, Fig. 401).
- S 824-074
- (10) Remove the lockwire and adjust the horizontal and vertical links if it is necessary, until you can get the forward fairing to align correctly (Section B-B, Fig. 401).
- S 214-075
- (11) Make sure the forward fairing seal touches the lower surface of the wing at all locations (View A-A, Fig. 401).
- S 434-076
- (12) Tighten the jamnut and install a lockwire to the jamnut on the horizontal and vertical links, after you completed the adjustment (AMM 20-10-23/401).
- S 434-077
- (13) Make sure all the nuts are tighten at the links and the fairing stud.

H. Fairing Installation - Aft Section (Fig. 404)

**NOTE:** Do all the necessary adjustments for the mid fairing before you install the aft fairing.

- S 214-078
- (1) Make sure the flaps are in the 25-degree position, and that the flap control lever is in the 25-unit detent.
- S 984-079
- (2) Lift the aft fairing into its position for installation.
- S 644-080
- (3) Apply a light layer of grease to all the bolts.
- S 434-081
- (4) Attach the two vertical links (Detail A).

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S 434-082  
(5) Install the bolt at the aft attach point (Detail B).

S 434-083  
(6) Attach the horizontal link (Detail A).

S 434-084  
(7) Install the horizontal brace.

S 434-085  
(8) Tighten all the nuts.

S 824-086  
(9) Do the adjustment for the aft fairing.

**NOTE:** If you installed the same fairing that you removed, subsequent adjustment is not necessary if the fairing was correctly adjusted before the removal.

S 714-087  
(10) Do a test on the fairing installation.  
I. Fairing Adjustment - Aft Section (Fig. 404)

S 034-088  
(1) Loosen the bolts on vertical and horizontal links (Detail A).

S 094-089  
(2) Remove the PDU lock from the TE flap PDU (Fig. 405).

S 864-090  
(3) Supply electrical power (AMM 24-22-00/201).

S 864-091

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(4) Pressurize the center hydraulic system (AMM 29-11-00/201).

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S 864-092

**CAUTION:** MONITOR THE MOVEMENT OF THE FAIRING WHEN THE FLAPS MOVE. COMPONENTS THAT ARE INCORRECTLY INSTALLED CAN CAUSE DAMAGE TO THE AIRPLANE.

- (5) Remove the DO-NOT-OPERATE tag from the flap control lever, and move the lever to the zero (FLAPS UP) detent.

S 214-093

- (6) Make sure the flaps move to the fully retracted position.

S 864-094

- (7) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 494-095

- (8) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 224-096

- (9) Make sure the aft fairing aligns with the mid fairing correctly (View B-B, Fig. 401).

S 224-097

- (10) Make sure the clearance is correct between the aft fairing and the inboard flap (View A-A, Fig. 401).

S 824-098

- (11) Remove the lockwire and adjust the horizontal and vertical links if it is necessary, until you can get the aft fairing to align correctly.

S 434-099

- (12) Tighten the jamnut and install a lockwire to the jamnut on the horizontal and vertical links, after you completed the adjustment (AMM 20-10-23/401).

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S 434-100

- (13) Make sure all the nuts are tighten at the links and at the aft attach point.

J. Test for the Fairing Installation

S 094-101

- (1) Remove the PDU lock from the TE flap PDU (Fig. 405).

S 864-102

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-103

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-104

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

S 864-105

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (5) Pressurize the center hydraulic system (AMM 29-11-00/201).

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S 094-106

- (6) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 864-107

**CAUTION:** MONITOR THE MOVEMENT OF THE FAIRING WHEN THE FLAPS MOVE. COMPONENTS THAT ARE INCORRECTLY INSTALLED CAN CAUSE DAMAGE TO THE AIRPLANE.

- (7) Move the flap control lever from the zero (FLAPS UP) detent to the 30-unit detent, and then back to the zero detent while you do these checks:
- (a) Make sure the fairings do not rub against other components.
  - (b) Make sure the seals move back to the adjusted position when you move the flaps back to the fully retracted position.

- K. Put the Airplane Back to Its Usual Condition

S 094-108

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 864-109

- (2) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 864-110

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

S 414-111

- (4) Install all access panels on the forward, mid, and aft fairings (AMM 06-44-00/201).

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OUTBOARD TRAILING EDGE FLAP TRACK FAIRINGS – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the outboard trailing edge (TE) flap fairings. The installation task also contains the steps for the fairing adjustment, and the test for the fairing installation.
- B. The outboard flap has an inboard and an outboard fairing. Each inboard and outboard fairing contains a forward, a mid, and an aft section.
- C. Refer to AMM 27-51-15/401 for the removal and the installation procedures for the inboard flap fairing.

TASK 27-51-16-024-001

2. Outboard Flap Fairings – Removal

A. Equipment

- (1) TE Flap PDU Lock – A27009-7

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 20-10-21/401, Bonding Jumpers and Ground Leads
- (3) AMM 24-22-00/201, Electrical Power – Control
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Landing Gear Door Locks
- (6) AMM 32-00-20/201, Landing Gear Downlock

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
566/666	Outboard Trailing Edge Flap
572/672	Outboard Flap Inboard Fairing
573/673	Outboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

572CB/672CB	Flap Mechanism
572DB/672DB	Flap Adjustment
572EB/672EB	Flap Adjustment
572FB/672FB	Flap Adjustment
573AB/673AB	Flap Mechanism
573CB/673CB	Flap Mechanism
573DB/673DB	Flap Adjustment
573EB/673EB	Flap Adjustment

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

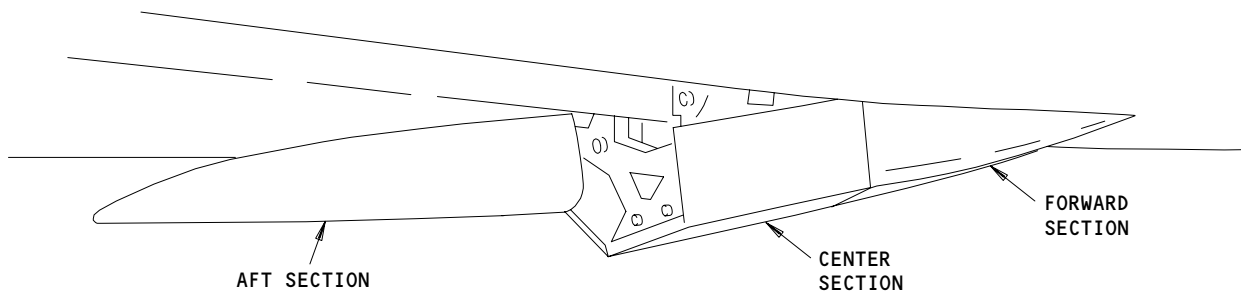
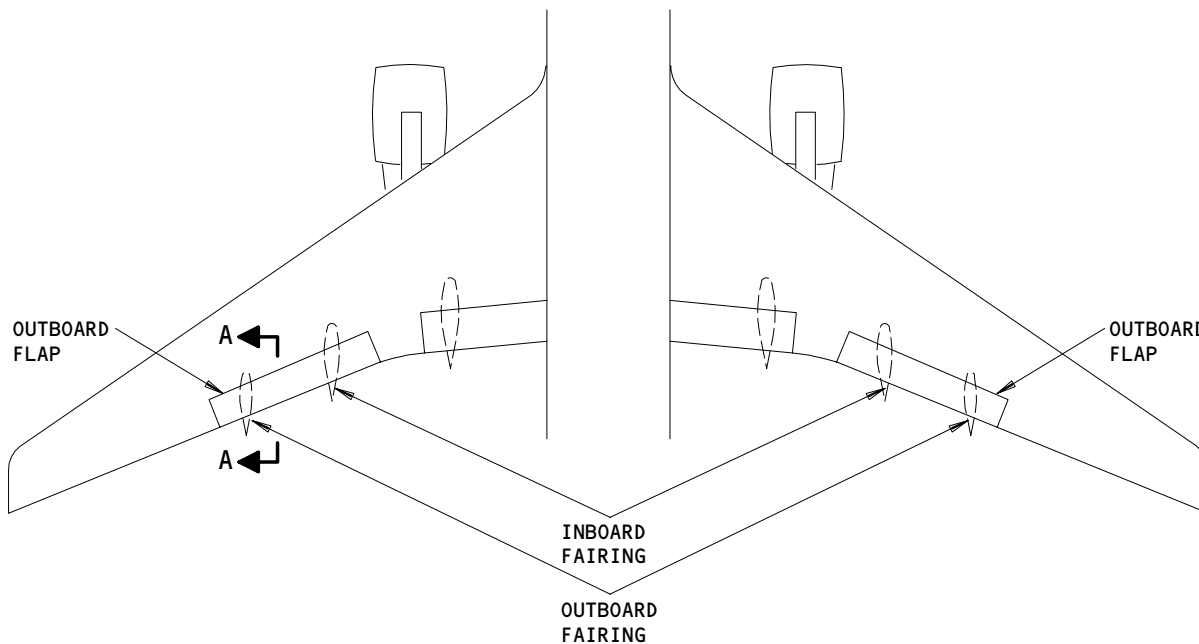
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OUTBOARD FLAP FAIRING  
(EXAMPLE, NOT FULLY EXTENDED)  
A-A

Outboard Flap Fairings  
Figure 401

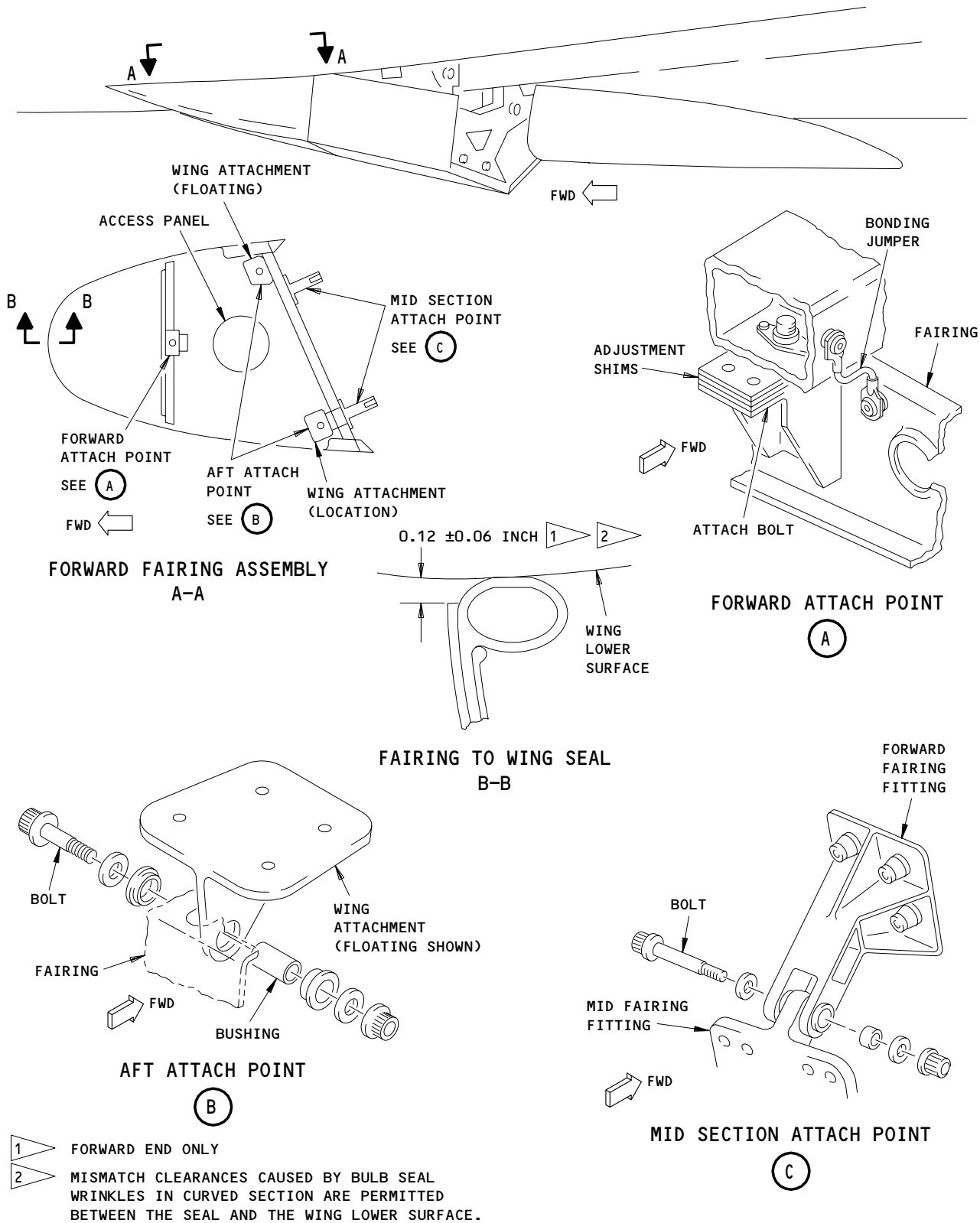
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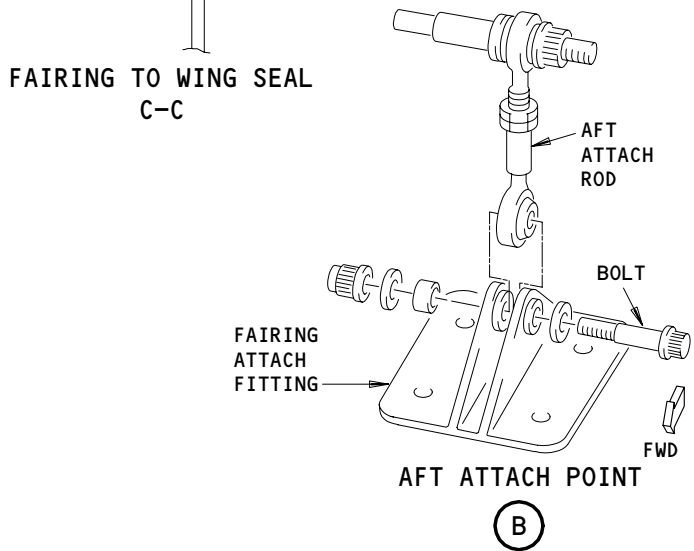
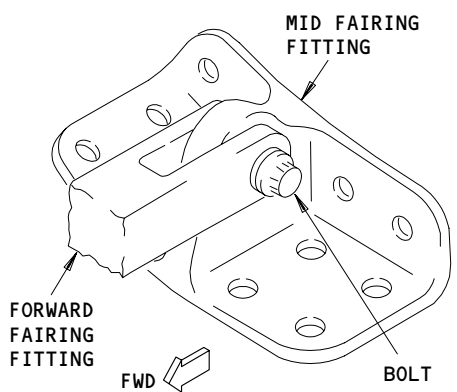
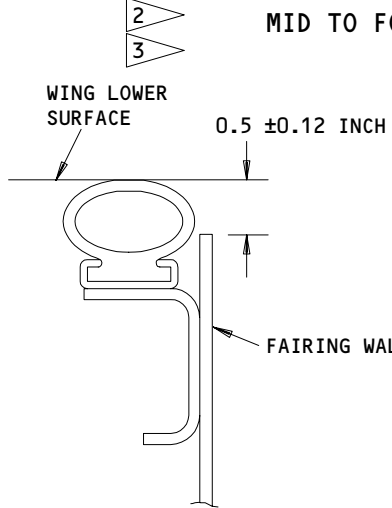
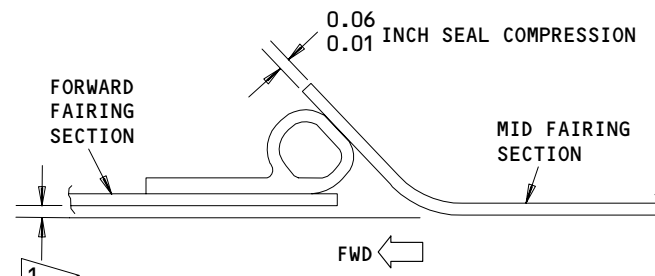
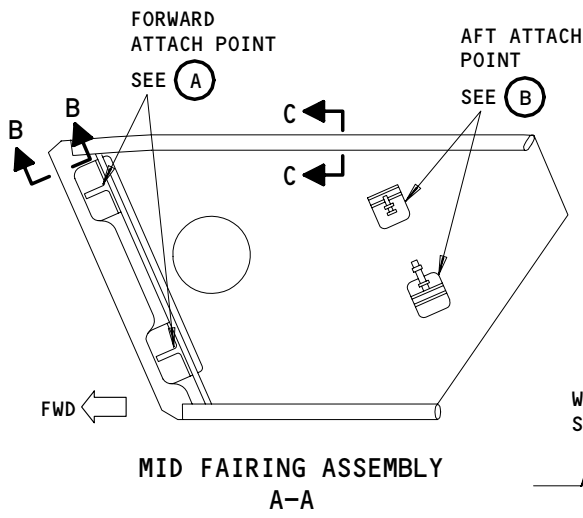
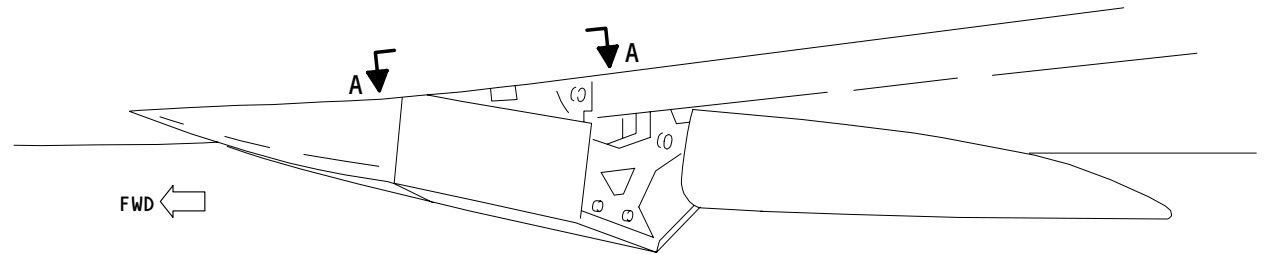


Outboard Flap Forward Fairings  
Figure 402

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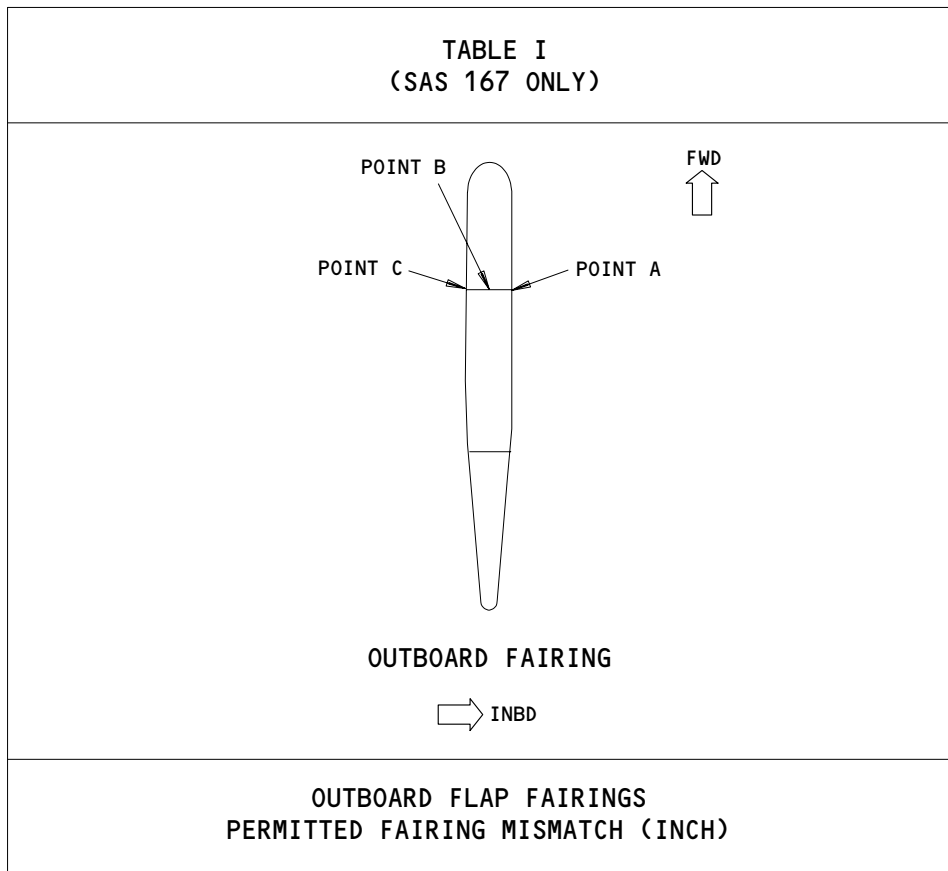
- 1 ALL EXCEPT SAS 167,280;  
±0.06 INCH MISMATCH PERMITTED
- 2 SAS 167;  
SEE TABLE I
- 3 SAS 280;  
SEE TABLE II

Outboard Flap Mid Fairings  
Figure 403 (Sheet 1)

EFFECTIVITY	ALL
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A36025

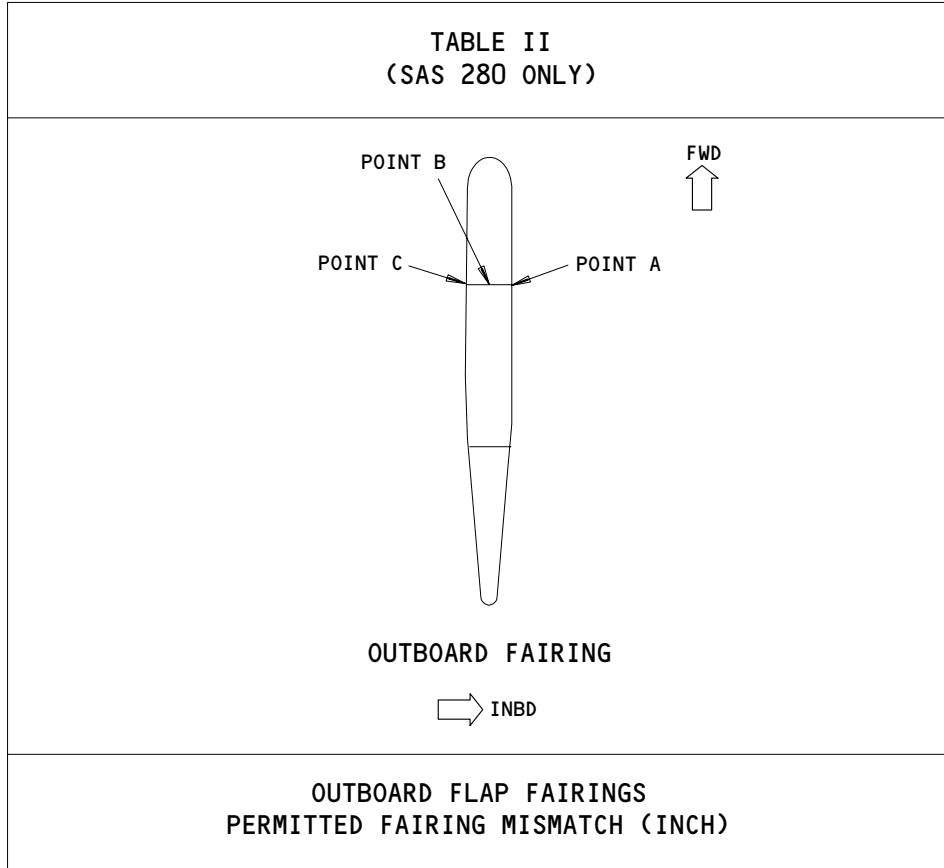


POINT LOCATION	NO. 1 FAIRING (LEFT OUTBOARD)	NO. 2 FAIRING (LEFT INBOARD)	NO. 7 FAIRING (RIGHT INBOARD)	NO. 8 FAIRING (RIGHT OUTBOARD)
A	-0.16 TO +0.06	-0.06 TO +0.06	-0.06 TO +0.06	-0.06 TO +0.06
B	-0.10 TO +0.06	-0.06 TO +0.06	-0.06 TO +0.06	-0.06 TO +0.06
C	-0.06 TO +0.06	-0.08 TO +0.06	-0.12 TO +0.06	-0.06 TO +0.06

Outboard Flap Mid Fairings  
Figure 403 (Sheet 2)

EFFECTIVITY  
SAS 167

**27-51-16**

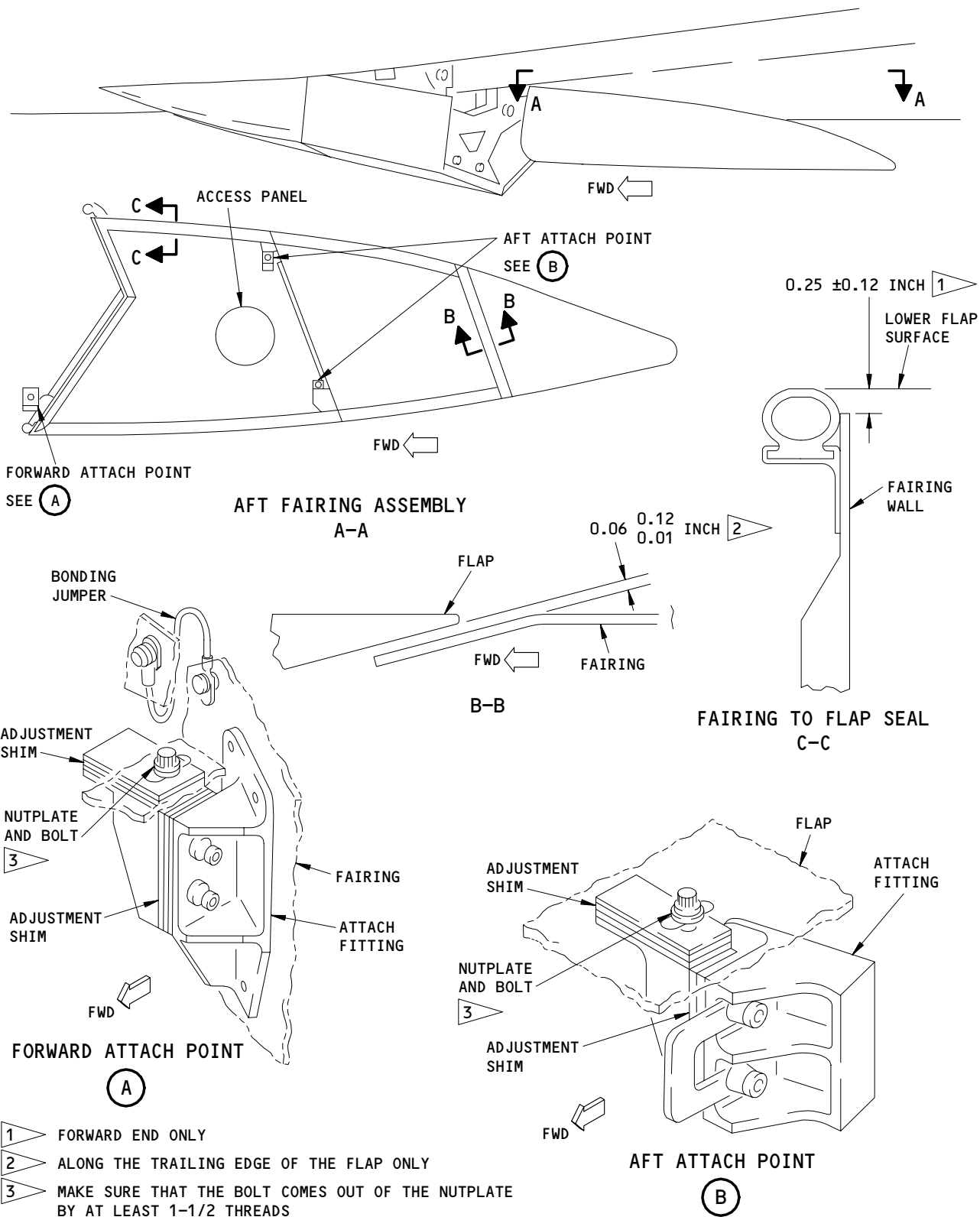


POINT LOCATION	NO. 1 FAIRING (LEFT OUTBOARD)	NO. 2 FAIRING (LEFT INBOARD)	NO. 7 FAIRING (RIGHT INBOARD)	NO. 8 FAIRING (RIGHT OUTBOARD)
A	-0.14 TO +0.06	-0.06 TO +0.06	-0.06 TO +0.06	-0.06 TO +0.06
B	-0.06 TO +0.06	-0.06 TO +0.06	-0.06 TO +0.06	-0.06 TO +0.06
C	-0.06 TO +0.06	-0.06 TO +0.06	-0.06 TO +0.06	-0.06 TO +0.06

Outboard Flap Mid Fairings  
Figure 403 (Sheet 3)

EFFECTIVITY  
SAS 280

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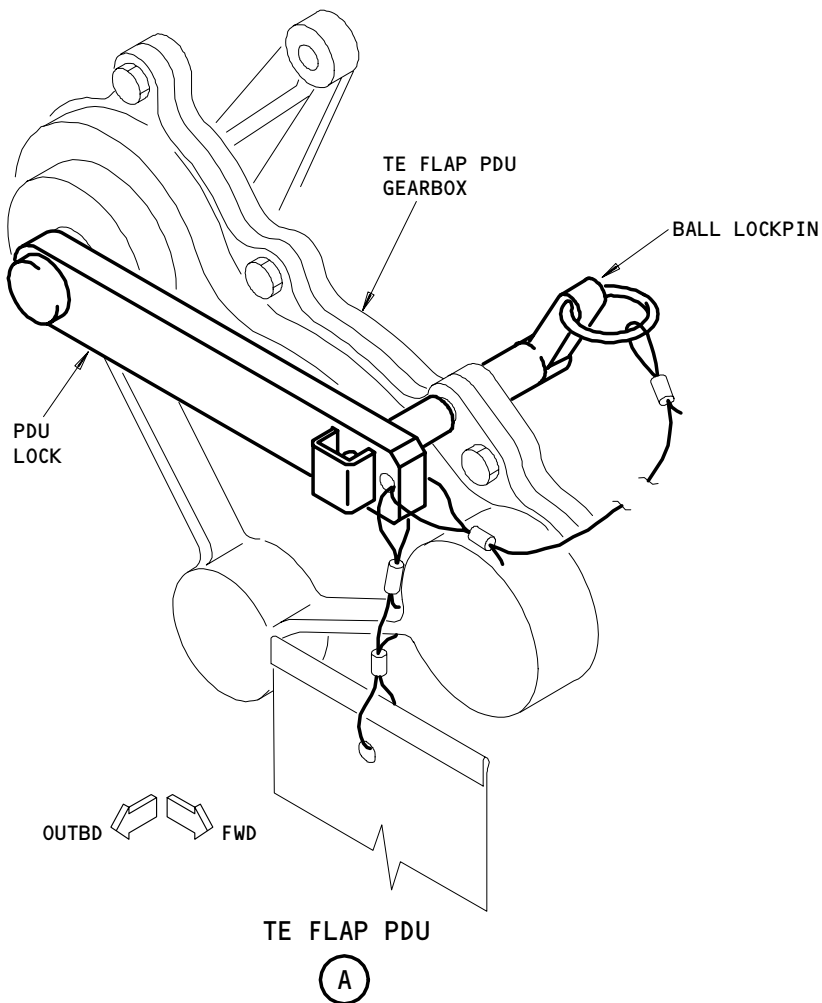
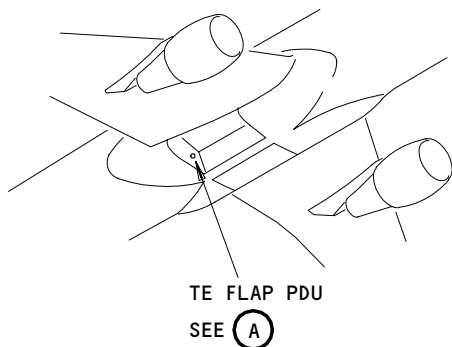
Outboard Flap Aft Fairings  
Figure 404

EFFECTIVITY	
	ALL

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PDU Lock for the TE Flap PDU  
Figure 405

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244123

S 494-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-004

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (3) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-005

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

S 864-006

- (5) Move the flap control lever to the 25-unit detent and permit the flaps to move to the 25-degree position.

S 494-007

- (6) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 864-008

- (7) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 864-009

- (8) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

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S 864-010

- (9) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 494-011

- (10) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 405).

S 014-012

- (11) Open the access panels on the inboard and outboard fairings of the outboard flap when it is necessary (AMM 06-44-00/201).

E. Fairing Removal - Aft Section (Fig. 404)

S 494-013

- (1) Hold the weight of the aft fairing to remove the load on the fairing attach bolts.

S 034-014

- (2) Remove the bolts at the aft attach points (Detail B).

S 034-015

- (3) Remove the bolt at the forward attach point (Detail A).

S 034-016

- (4) Remove the bonding jumper wire (Detail A).

S 024-017

- (5) Remove the aft fairing.

F. Fairing Removal - Mid Section (Fig. 403)

S 494-018

- (1) Hold the weight of the mid fairing to remove the load from the fairing attach bolts.

S 034-019

- (2) Remove the bolts from the aft attach points at the aft end of the mid fairing (Detail B).

S 014-020

- (3) Lower the aft end of the mid fairing to get access to the forward attach point.

S 034-021

- (4) Remove the bolts from the forward attach points (Detail A).

S 034-022

- (5) Remove the bonding jumper wires.

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S 024-023

(6) Remove the mid fairing.

G. Fairing Removal - Forward Section (Fig. 402)

**NOTE:** It is necessary to remove the mid fairing to get access to remove the forward fairing.

S 494-024

(1) Hold the weight of the forward fairing to remove the load from the fairing attach points.

S 034-025

(2) Remove the bolt at the forward attach point (Detail A).

S 034-026

(3) Remove the bonding jumper wire from the forward attach point.

S 034-027

(4) Remove the bolts at the two aft attach points (Detail B).

S 024-028

(5) Remove the forward fairing

TASK 27-51-16-424-029

3. Outboard Flap Fairings - Installation

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) D00015 Grease - BMS 3-24 (Alternate)

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 20-10-21/401, Bonding Jumpers and Ground Leads
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Landing Gear Door Locks

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
566/666	Outboard Trailing Edge Flap
572/672	Outboard Flap Inboard Fairing
573/673	Outboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

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- (2) Access Panels
  - 572CB/672CB Flap Mechanism
  - 572DB/672DB Flap Adjustment
  - 572EB/672EB Flap Adjustment
  - 572FB/672FB Flap Adjustment
  - 573AB/673AB Flap Mechanism
  - 573CB/673CB Flap Mechanism
  - 573DB/673DB Flap Adjustment
  - 573EB/673EB Flap Adjustment

D. Fairing Installation - Forward Section (Fig. 402)

S 214-030

- (1) Make sure the flaps are in the 25-degree position, and that the flap control lever is in the 25-unit detent.

S 984-031

- (2) Put the fairing into its position for installation.

S 434-032

- (3) Install the bolts at the aft attach points.

**NOTE:** The bushing in the floating wing attachment assembly is longer than the bushing in the location wing attachment assembly.

S 434-033

- (4) Install the bolt at the forward attach point.

S 824-034

- (5) Do the adjustment for the Forward Fairing.

**NOTE:** If you installed the same fairing that you removed, subsequent adjustment is not necessary if the fairing was correctly adjusted before the removal.

S 434-035

- (6) If no fairing adjustment is necessary, do these steps:
  - (a) Tighten the nuts at the aft attach points to 90-125 pound-inches.

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(b) Tighten the bolt at the forward attach point to 110-140 pound-inches.

S 434-036

(7) Install the bonding jumper wire (AMM 20-10-21/401).

S 714-037

(8) Do a test on the fairing installation.

E. Fairing Adjustment - Forward Section (Fig. 402)

S 094-038

(1) Remove the PDU lock from the TE flap PDU (Fig. 405).

S 864-039

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

S 864-040

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(3) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-041

**CAUTION:** MONITOR THE MOVEMENT OF THE FAIRING WHEN THE FLAPS MOVE. COMPONENTS THAT ARE INCORRECTLY INSTALLED CAN CAUSE DAMAGE TO THE AIRPLANE.

(4) Remove the DO-NOT-OPERATE tag from the flap control lever and move the lever to the zero (FLAPS UP) detent.

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- S 214-042
- (5) Make sure the flaps move to the fully retracted position.
- S 864-043
- (6) Remove power from the center hydraulic system (AMM 29-11-00/201).
- S 494-044
- (7) Attach a DO-NOT-OPERATE tag to the flap control lever.
- S 224-098
- (8) Make sure the clearance is correct between the forward fairing and the wing lower surface (View B-B).
- S 214-097
- (9) Make sure the fairing seal touches the lower surface of the wing at all locations.
- S 824-047
- (10) If it is necessary, add or remove shims at the forward attach point to adjust the fairing vertically.
- S 824-048
- (11) If it is necessary, add or remove shims at the inboard aft attach point in the forward fairing.

**NOTE:** This adjustment applies only to the outboard fairing of the outboard flap.

F. Fairing Installation - Mid Section (Fig. 403)

- S 214-049
- (1) Make sure the flaps are in the 25-degree position, and that the flap control lever is in the 25-unit detent.
- S 644-050
- (2) Apply the grease to the forward attach points.
- S 434-051
- (3) Put the forward end of the mid fairing into its position and attach the bolts at the forward attach points.
- S 434-052
- (4) Lift the aft end of the mid fairing into its position and install the two aft attach rods with bolts.

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S 824-053

- (5) Do the adjustment for the mid fairing

**NOTE:** If you installed the same fairing that you removed, subsequent adjustment is not necessary if the fairing was correctly adjusted before the removal.

S 434-054

- (6) If no adjustment is necessary, tighten the nuts at all the fairing attach points with these steps:
- (a) Tighten the nuts at the forward attach points to 90-125 pound-inches.
  - (b) Tighten the nuts that connect the aft attach rods to 90-125 pound-inches.

S 434-055

- (7) Install the bonding jumper wire (AMM 20-10-21/401).

S 714-083

- (8) Do a test on the fairing installation.

G. Fairing Adjustment - Mid Section (Fig. 403)

S 094-056

- (1) Remove the PDU lock from the TE flap PDU (Fig. 405).

S 864-057

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

S 864-058

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (3) Pressurize the center hydraulic system (AMM 29-11-00/201).

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S 864-059

**CAUTION:** MONITOR THE MOVEMENT OF THE FAIRING WHEN THE FLAPS MOVE. COMPONENTS THAT ARE INCORRECTLY INSTALLED CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Remove the DO-NOT-OPERATE tag from the flap control lever and move the lever to the zero (FLAPS UP) detent.

S 214-060

- (5) Make sure the flaps move to the fully retracted position.

S 864-061

- (6) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 494-062

- (7) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 224-063

- (8) Make sure the clearance between the mid fairing and the wing lower surface is correct (View C-C).

S 214-064

- (9) Make sure the seal on the upper edge of the mid fairing touches the lower wing surface at all locations.

S 224-065

- (10) Make sure the seal on the forward fairing is compressed against the mid fairing correctly as shown (View B-B).

S 824-066

- (11) If it is necessary, adjust the aft attach rod to get the correct clearance and seal compression for the mid fairing.

#### H. Fairing Installation - Aft Section (Fig. 404)

S 214-067

- (1) Make sure the flaps are in the 25-degree position, and that the flap control lever is in the 25-unit detent.

S 984-068

- (2) Lift the fairing into its position for installation.

S 434-069

- (3) Install the bolt at the forward attach point (Detail A).

S 434-070

- (4) Install the bolts at the two aft attach points (Detail B).

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S 824-071

- (5) Do the adjustment for the aft fairing.

**NOTE:** If you installed the same fairing that you removed, subsequent adjustment is not necessary if the fairing was correctly adjusted before the removal.

S 434-072

- (6) If no fairing adjustment is necessary, do these steps:  
(a) Tighten the bolt at the forward attach point to 110-140 pound-inches.  
(b) Tighten the bolts at the aft attach points to 110-140 pound-inches.

S 434-073

- (7) Install the bonding jumper wire (AMM 20-10-21/401).

S 714-084

- (8) Do a test on the fairing installation.

I. Fairing Adjustment - Aft Section (Fig. 404)

S 094-074

- (1) Remove the PDU lock from the TE flap PDU (Fig. 405).

S 864-075

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

S 864-076

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (3) Pressurize the center hydraulic system (AMM 29-11-00/201).

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S 864-077

**CAUTION:** MONITOR THE MOVEMENT OF THE FAIRING WHEN THE FLAPS MOVE. COMPONENTS THAT ARE INCORRECTLY INSTALLED CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Remove the DO-NOT-OPERATE tag from the flap control lever and move the lever to the zero (FLAPS UP) detent.

S 214-078

- (5) Make sure the flaps move to the fully retracted position.

S 864-079

- (6) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 494-080

- (7) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 224-081

- (8) Make sure the clearance between the aft fairing and the lower surface of the flap is correct (View B-B and View C-C).

S 824-082

- (9) If it is necessary, add or remove shims at the forward and aft attach points to make horizontal and vertical adjustments on the aft fairing.

J. Test for the Fairing Installation

S 094-085

- (1) Remove the PDU lock from the TE flap PDU (Fig. 405).

S 864-086

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-087

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-088

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

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S 864-089

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(5) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 094-090

(6) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 864-091

**CAUTION:** MONITOR THE MOVEMENT OF THE FAIRING WHEN THE FLAPS MOVE. COMPONENTS THAT ARE INCORRECTLY INSTALLED CAN CAUSE DAMAGE TO THE AIRPLANE.

(7) Move the flap control lever from the zero (FLAPS UP) detent to the 30-unit detent, and then back to the zero detent while you do these checks:

(a) Make sure the fairings do not rub against other components.

(b) Make sure the seals move back to the adjusted position when you move the flaps to the fully retracted position.

K. Put the Airplane Back to Its Usual Condition

S 094-092

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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MAINTENANCE MANUAL

- S 864-093
- (2) Remove power from the center hydraulic system (AMM 29-11-00/201).
- S 864-094
- (3) Remove electrical power (AMM 24-22-00/201).
- S 414-095
- (4) Install the access panels on the inboard and outboard fairings of the outboard flap (AMM 06-44-00/201).

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OUTBOARD FLAP - REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the outboard flap. The installation task also contains the steps to adjust the fit and fair of the outboard flap after the installation.

TASK 27-51-20-024-001

2. Outboard Flap - Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip - 1012LC-R  
Commercially Available
- (2) Sling Equipment, Outboard TE Flap (Alternate) -  
A27027-53
- (3) Sling Equipment, Outboard TE Flap (Alternate) -  
A27027-54
- (4) TE Flap PDU Lock - A27009-7
- (5) Shackles, 3/8 inch (9.53 millimeters) Diameter - Commercially  
Available

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-51-00/201, Trailing Edge Flap System
- (4) AMM 27-51-16/401, Outboard Trailing Edge Flap Track Fairings
- (5) AMM 27-51-41/401, TE Flap Torque Tubes
- (6) AMM 27-61-00/201, Spoiler/Speed Brake Control System
- (7) AMM 27-61-02/401, Spoiler Power Control Actuator
- (8) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (9) AMM 32-00-15/201, Landing Gear Door Lock
- (10) AMM 32-00-20/201, Landing Gear Downlock

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
560/660	Wing Trailing Edge - Outboard
572/672	Outboard Flap Inboard Fairing
573/673	Outboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

566BT/666BT	LE of Outboard Flap
566DT/666DT	LE of Outboard Flap
566GT/666GT	LE of Outboard Flap Structure - Aft of Front Spar
566HT/666HT	LE of Outboard Flap Structure - Aft of Front Spar
566NT/666NT	LE of Outboard Flap Structure - Aft of Front Spar
566PT/666PT	LE of Outboard Flap Structure - Aft of Front Spar

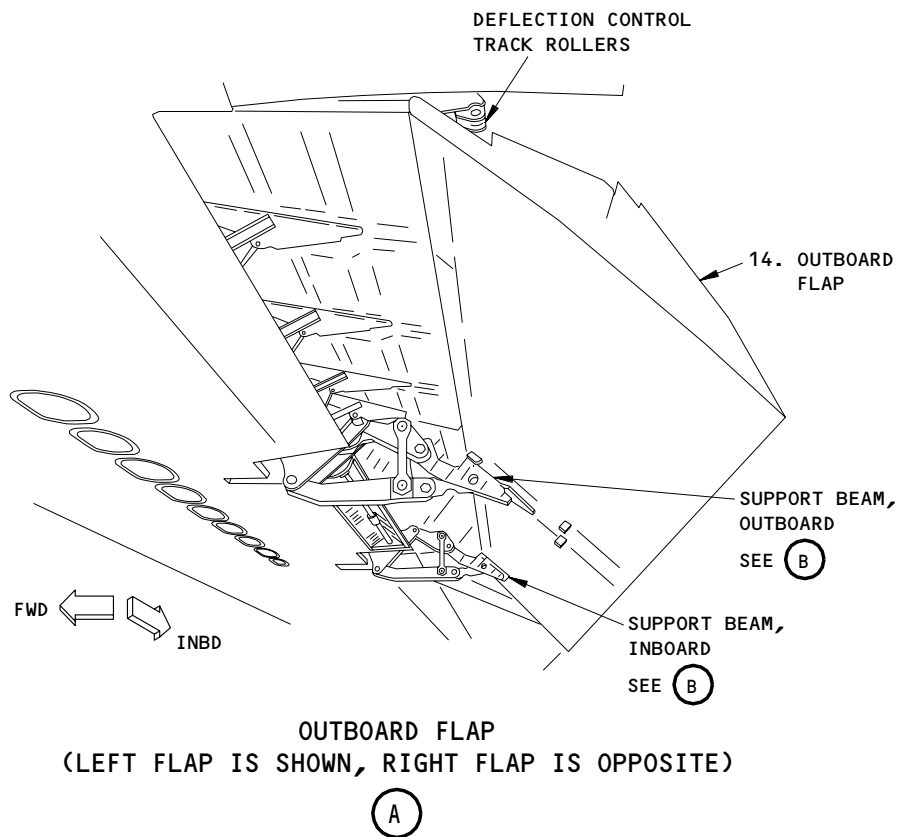
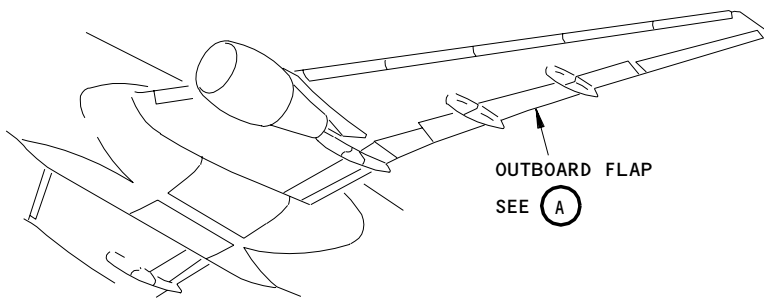
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NOTE: FAIRINGS NOT SHOWN.

Outboard Flap  
Figure 401 (Sheet 1)

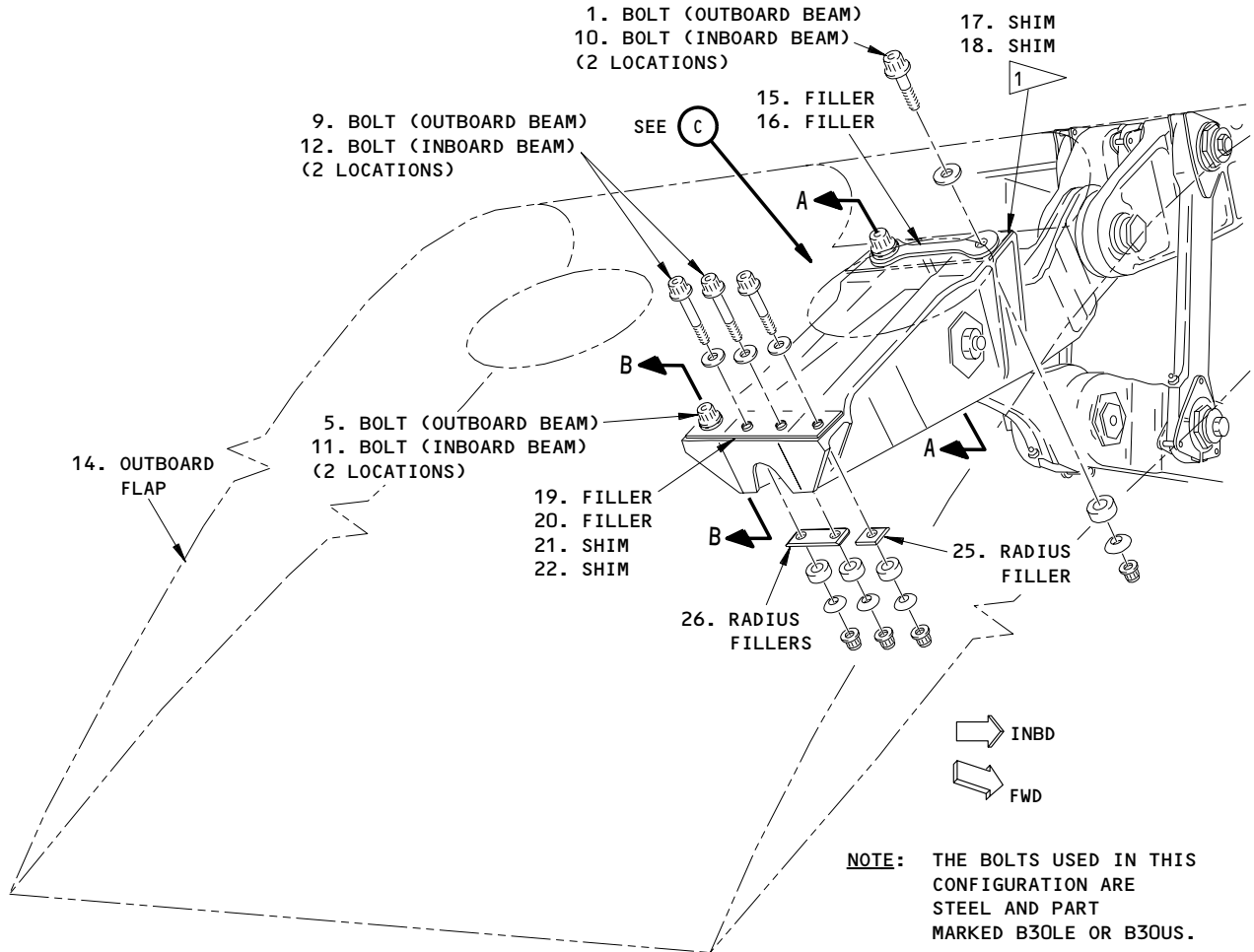
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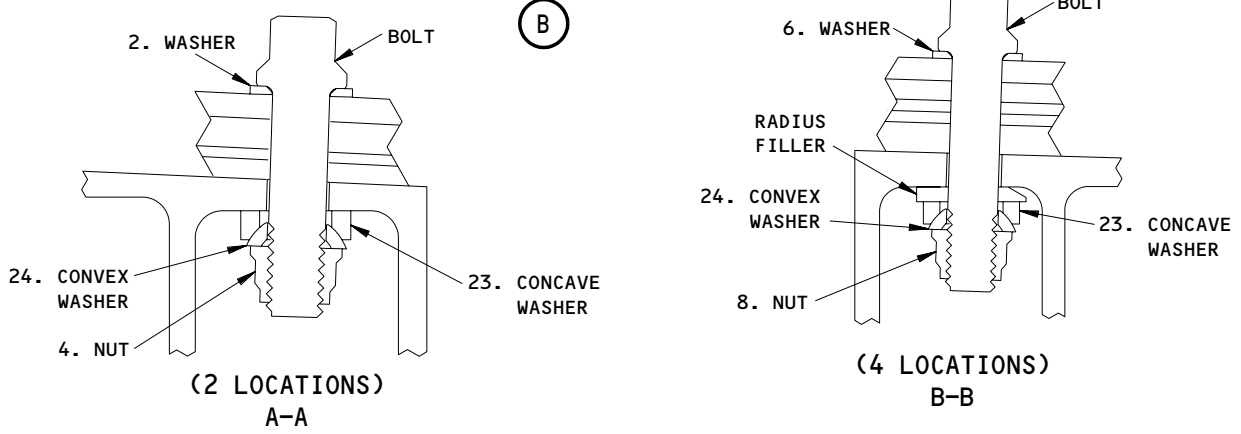
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271981



**NOTE:** THE BOLTS USED IN THIS CONFIGURATION ARE STEEL AND PART MARKED B30LE OR B30US.

**SUPPORT BEAM  
(LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE)**



1 SHIM ±0.25 INCH (±6.35 mm) NOMINAL

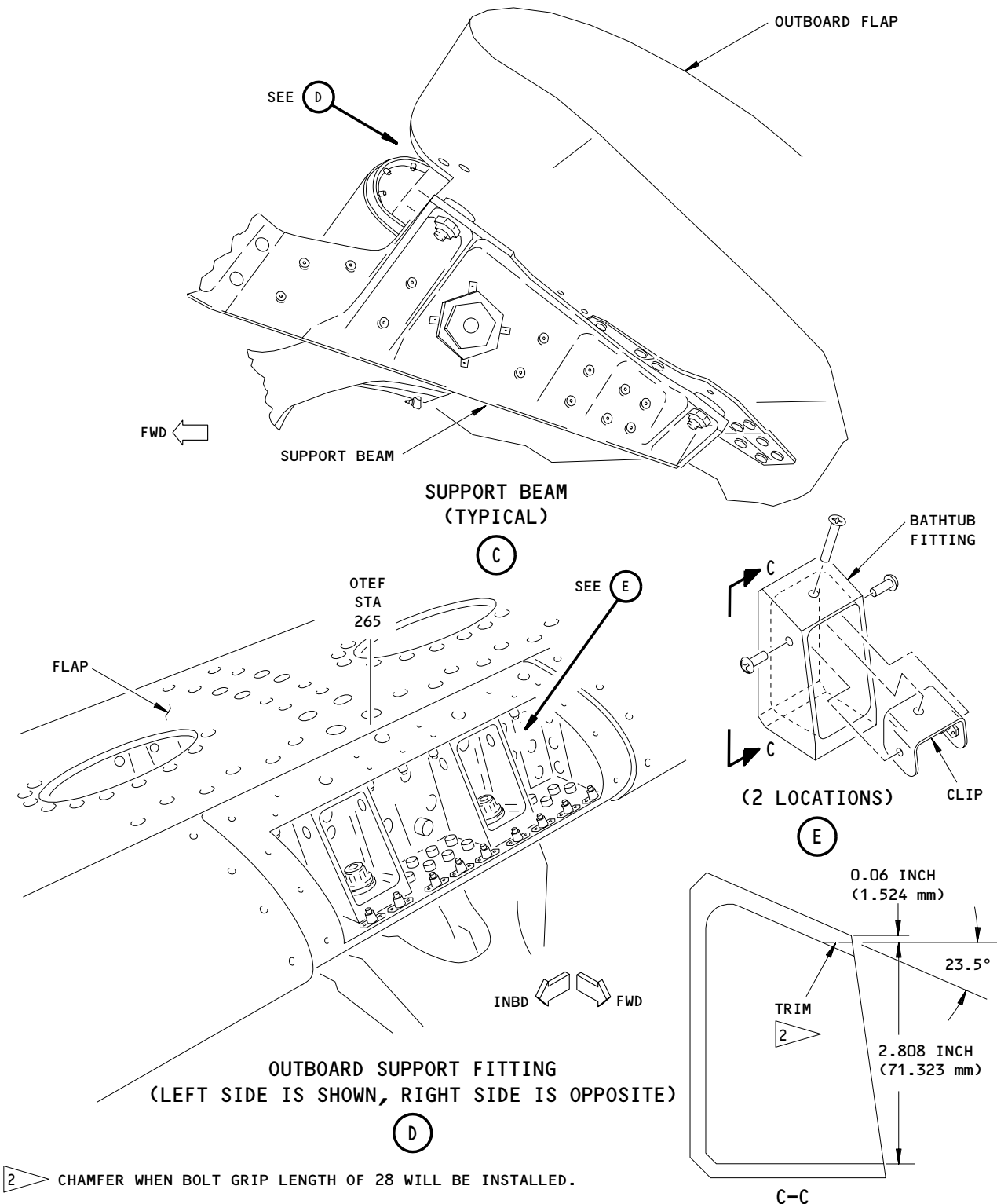
**Outboard Flap  
Figure 401 (Sheet 2)**

EFFECTIVITY	
	ALL

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**BOEING**  
767  
MAINTENANCE MANUAL



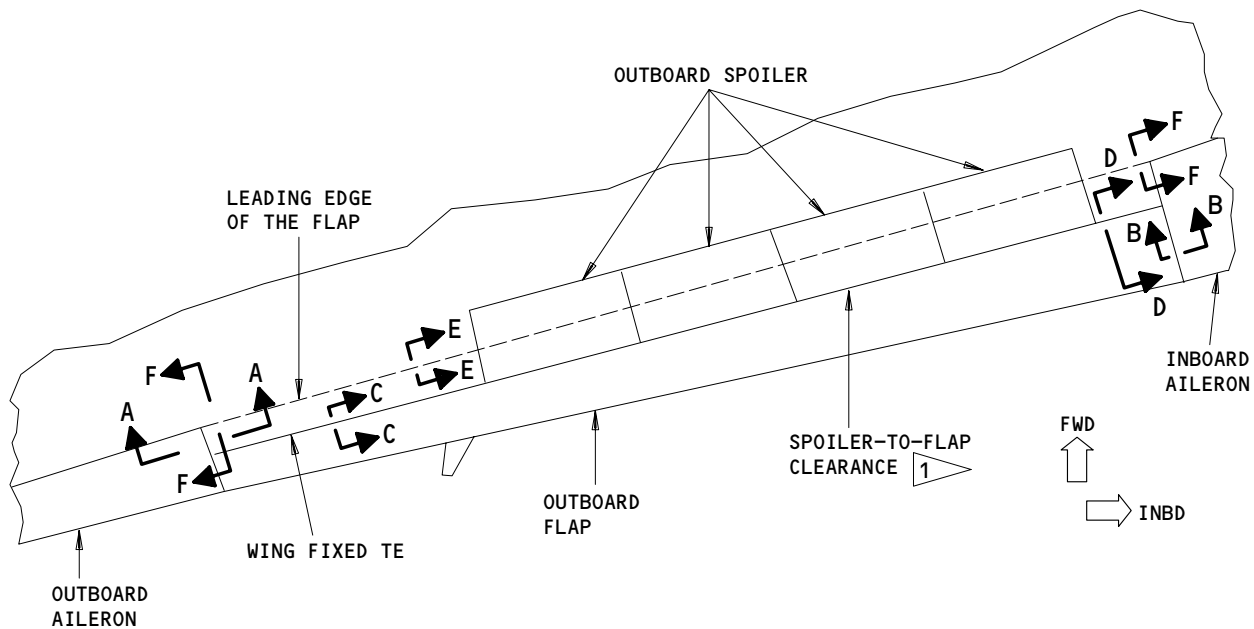
Outboard Flap  
Figure 401 (Sheet 3)

EFFECTIVITY	
	ALL

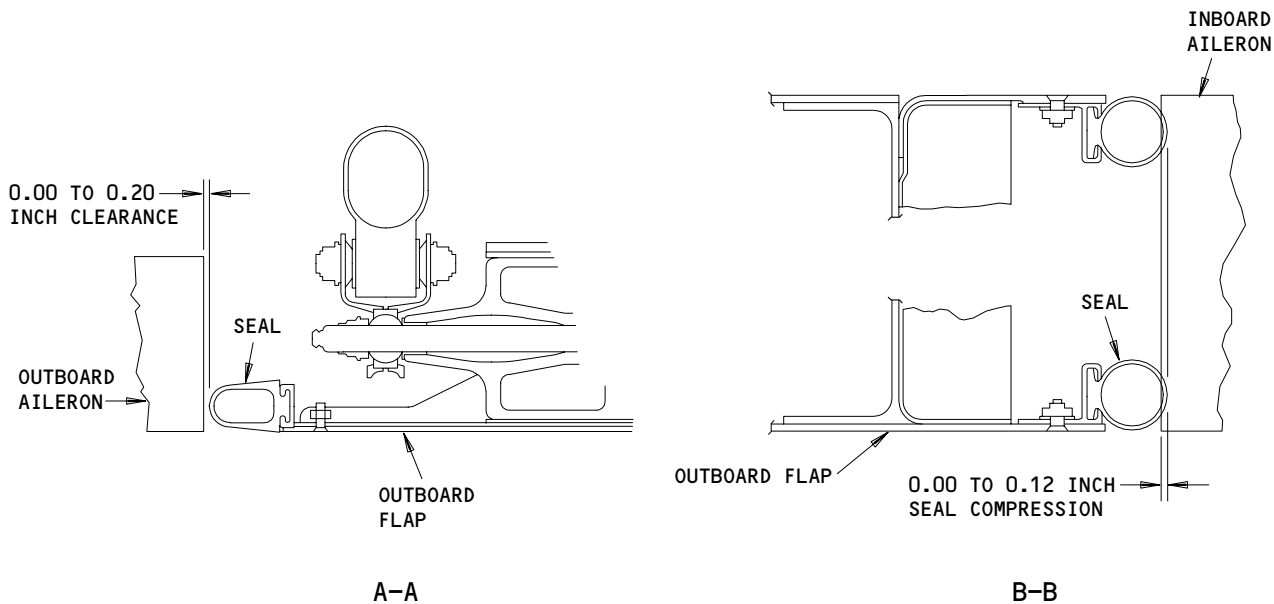
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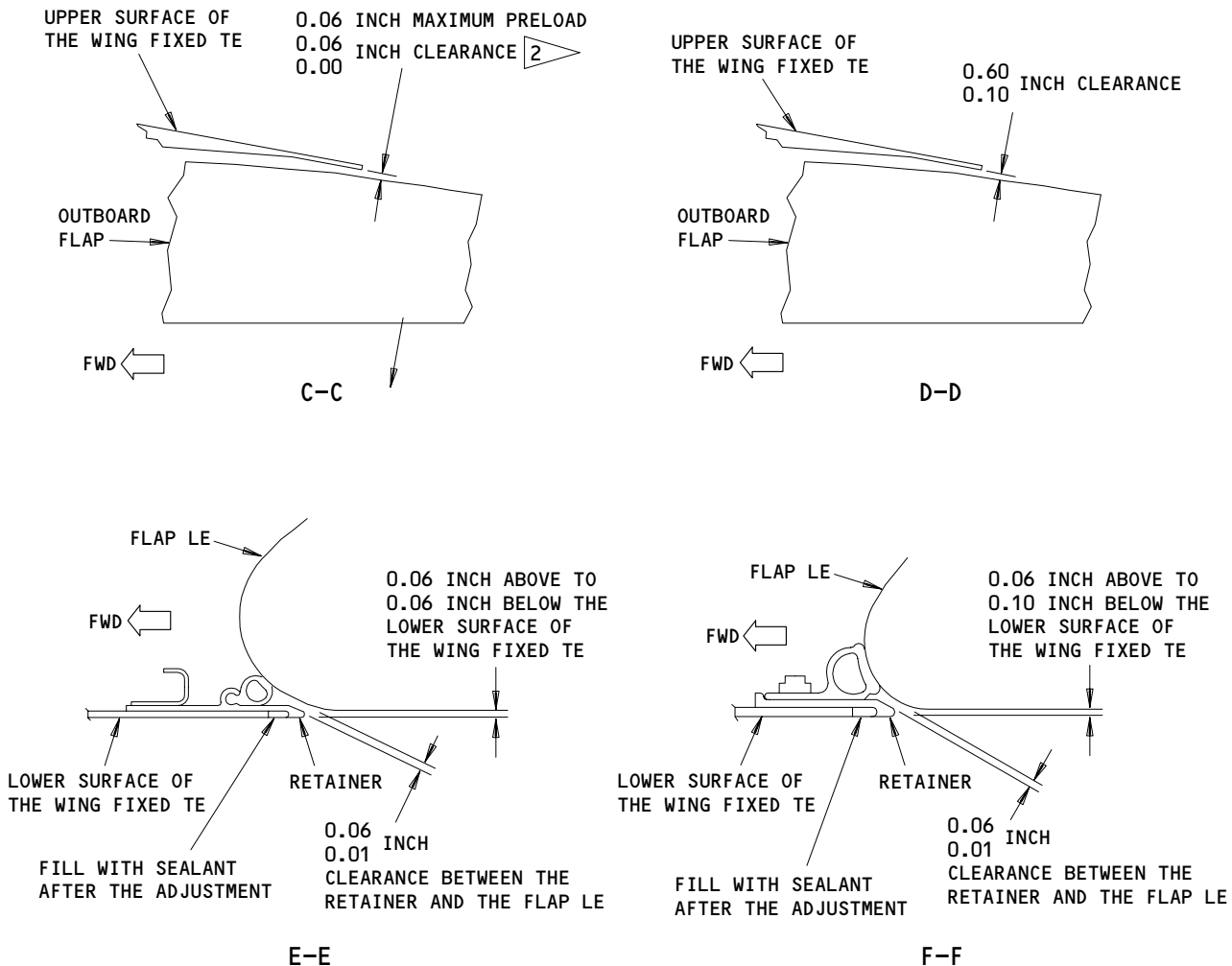
OUTBOARD FLAPS  
(TOP VIEW)  
(LEFT WING SHOWN, RIGHT SIDE OPPOSITE)



Fit and Fair Clearances for the Outboard Flap  
Figure 402 (Sheet 1)

EFFECTIVITY	ALL
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<sup>1</sup> REFER TO AMM 27-61-00/501, SPOILER POWER CONTROL ACTUATOR ADJUSTMENT, TO ADJUST THE SPOILER-TO-FLAP CLEARANCES.

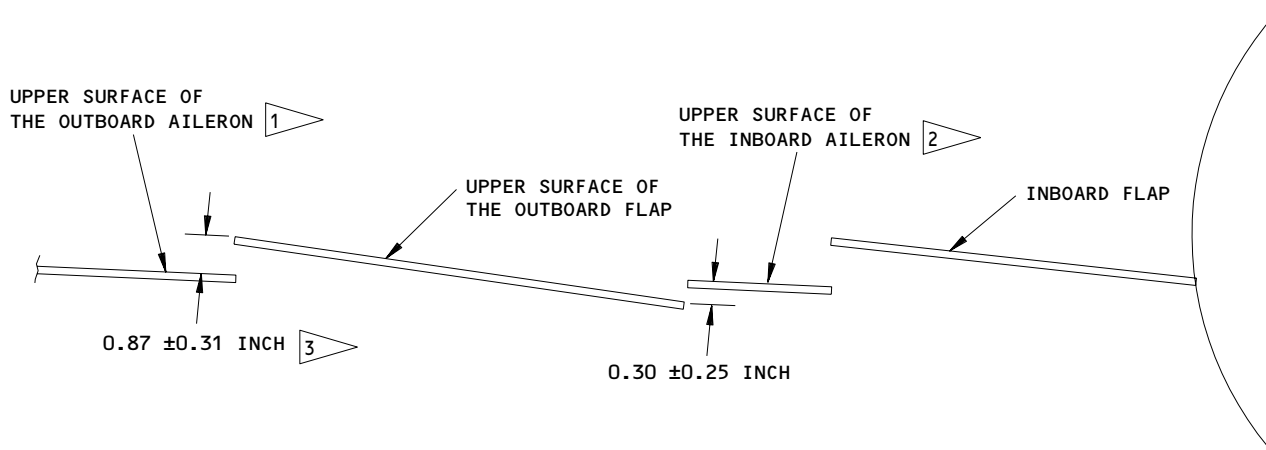
**NOTE:** DO THE SPOILER-TO-FLAP CLEARANCE ADJUSTMENT AFTER YOU COMPLETED ALL OTHER ADJUSTMENTS.

<sup>2</sup> A MAXIMUM OF 0.19 INCH CLEARANCE IS PERMITTED FOR 25 PERCENT OF THE SPAN.

Fit and Fair Clearances for the Outboard Flap  
Figure 402 (Sheet 2)

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**NOTE:** HOLD THE AILERONS IN THE POSITIONS SHOWN TO MEASURE THE AILERON-TO-FLAP TRAILING EDGE MISMATCH. DO NOT ADJUST THE RIG POSITION OF THE AILERONS.

- 1 SET THE OUTBOARD AILERON 0.87 INCH BELOW THE WING THEORETICAL TRAILING EDGE. USE THE AILERON RIGGING BAR AND ALIGN THE AILERON LOWER SURFACE WITH THE 1.87 INCH MARK ON THE A27024-29 RIGGING BAR, OR THE 0.87 INCH MARK ON THE A27024-31 RIGGING BAR.
- 2 SET THE INBOARD AILERON 0.40 INCH BELOW THE WING THEORETICAL TRAILING EDGE. USE THE AILERON RIGGING BAR AND ALIGN THE AILERON LOWER SURFACE WITH THE 1.40 INCH MARK ON THE RIGGING BAR.
- 3 DIMENSION MEASURED ON THE LEFT WING MUST BE SYMMETRICAL, WITHIN 0.06 INCH, TO THE DIMENSION MEASURED ON THE RIGHT WING.

Aileron-to-Flap Trailing Edge Mismatch  
Figure 403

EFFECTIVITY — ALL

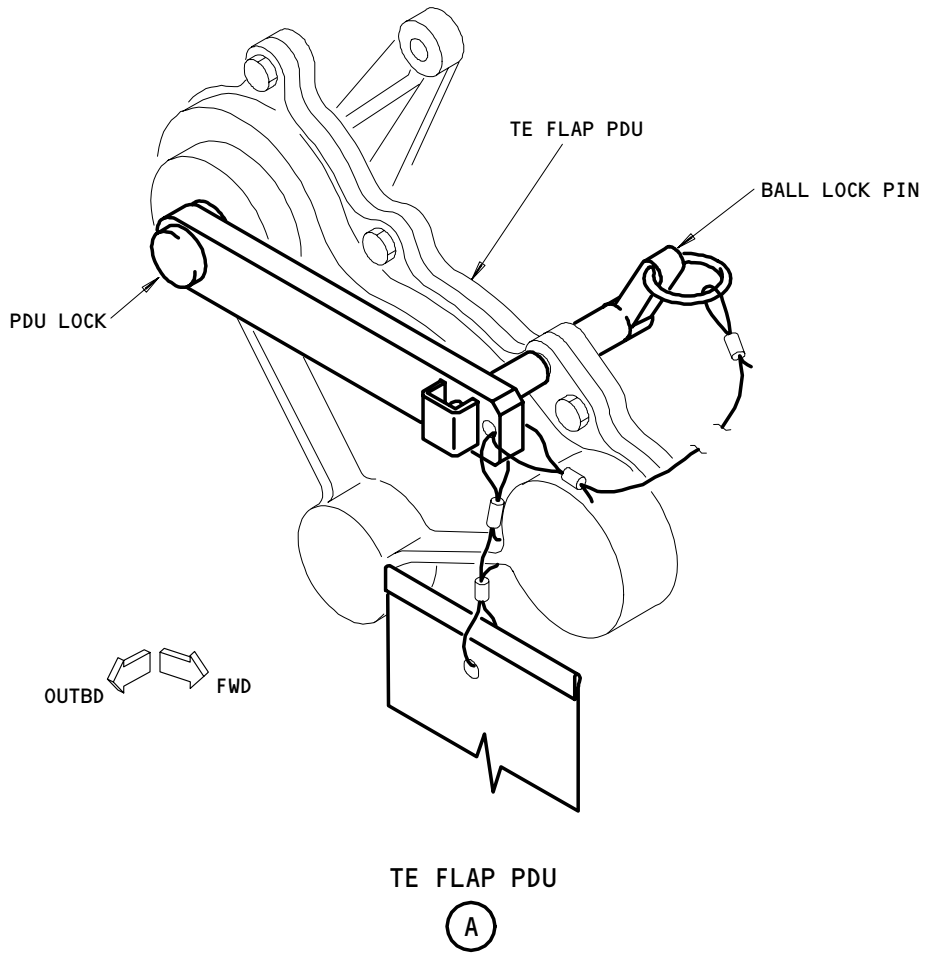
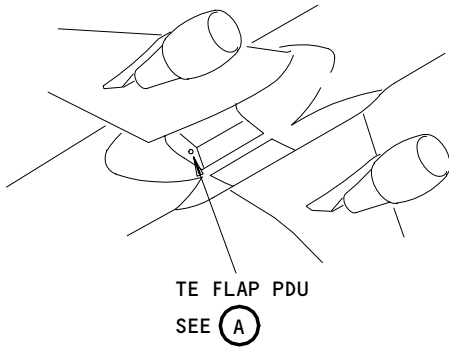
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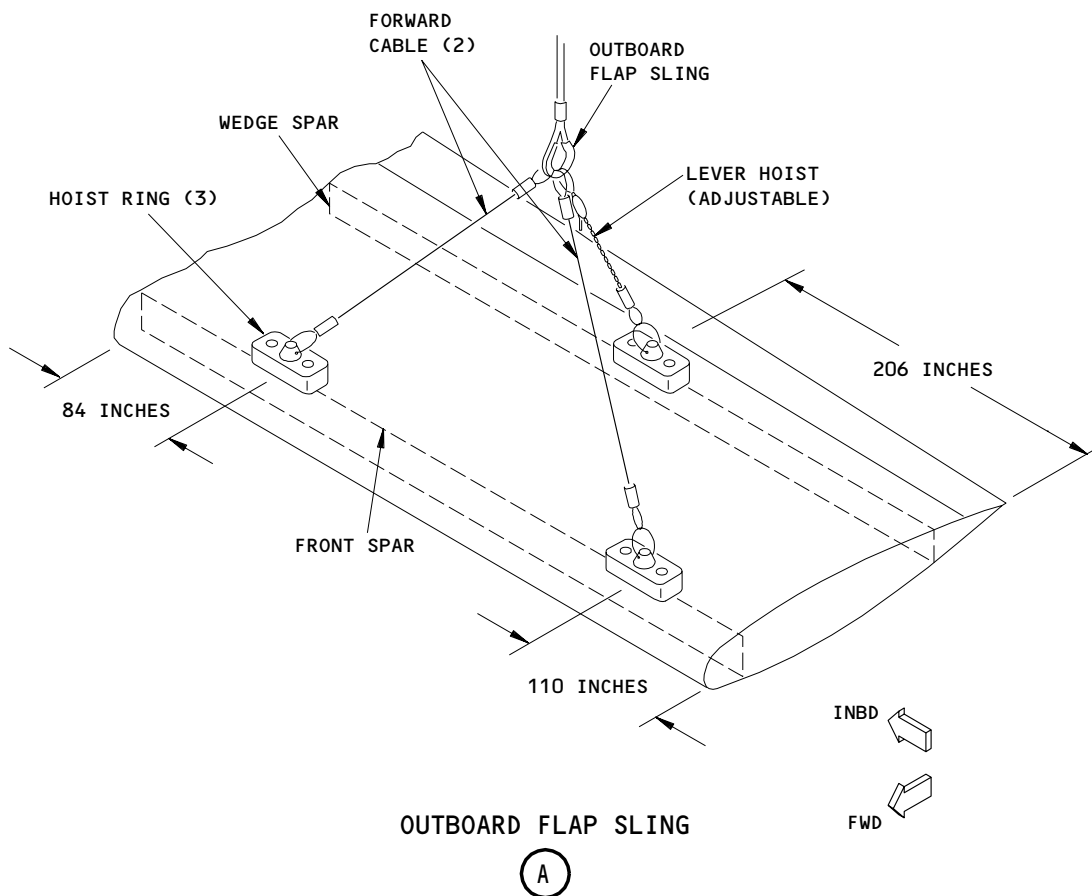
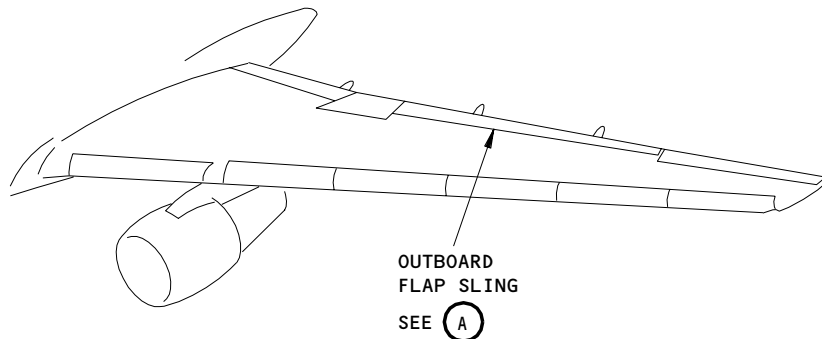
PDU Lock for the TE Flap PDU  
Figure 404

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Outboard Flap Sling  
Figure 405

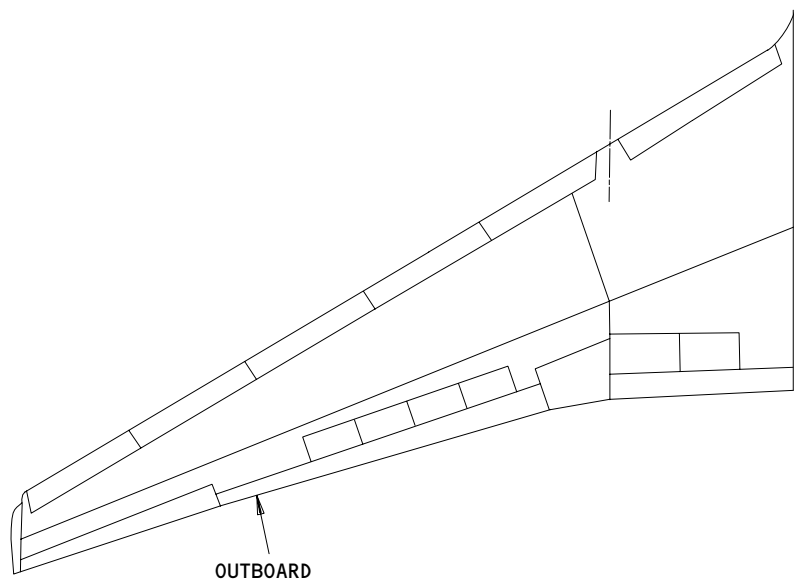
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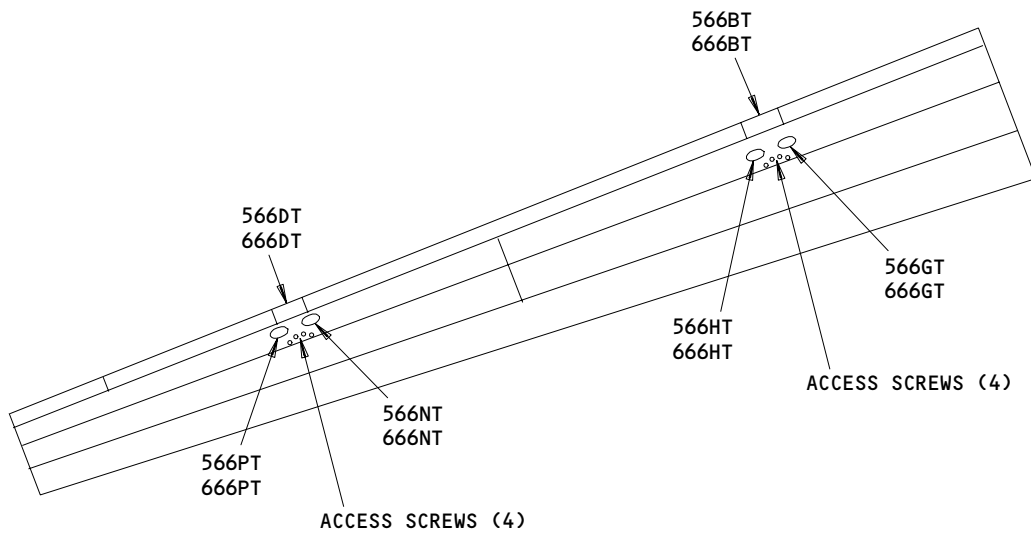
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OUTBOARD  
FLAP ACCESS  
SEE (A)

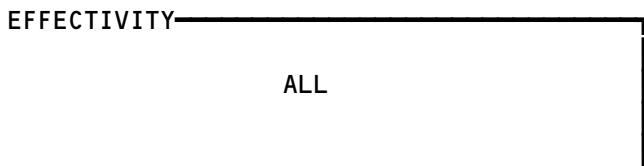


OUTBOARD FLAP ACCESS  
TOP VIEW  
(LEFT WING SHOWN, RIGHT WING OPPOSITE)

(A)

**NOTE:** 500-SERIES PANEL NUMBERS REFER TO LEFT WING.  
600-SERIES PANEL NUMBERS REFER TO RIGHT WING.

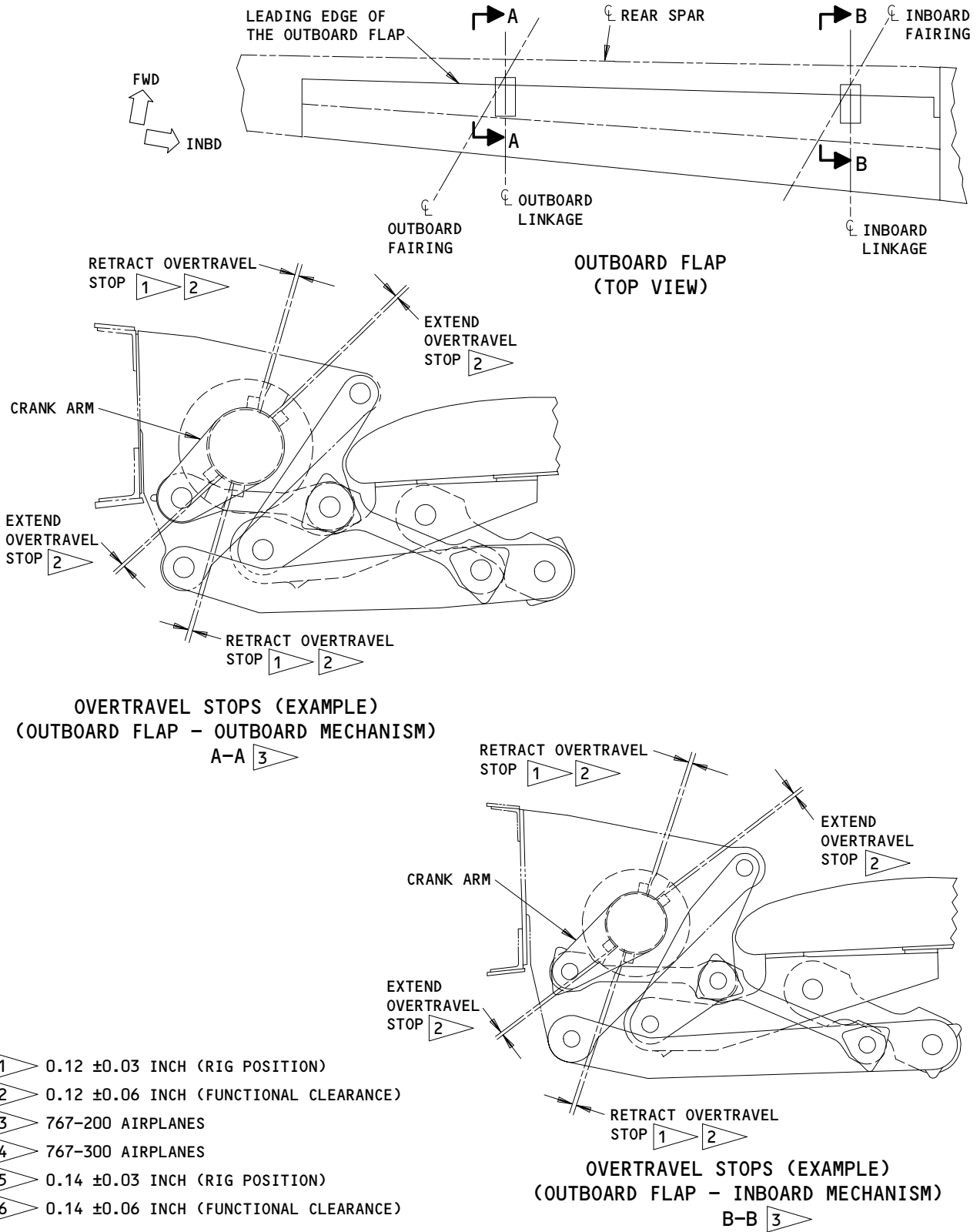
Access Panels  
Figure 406



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02

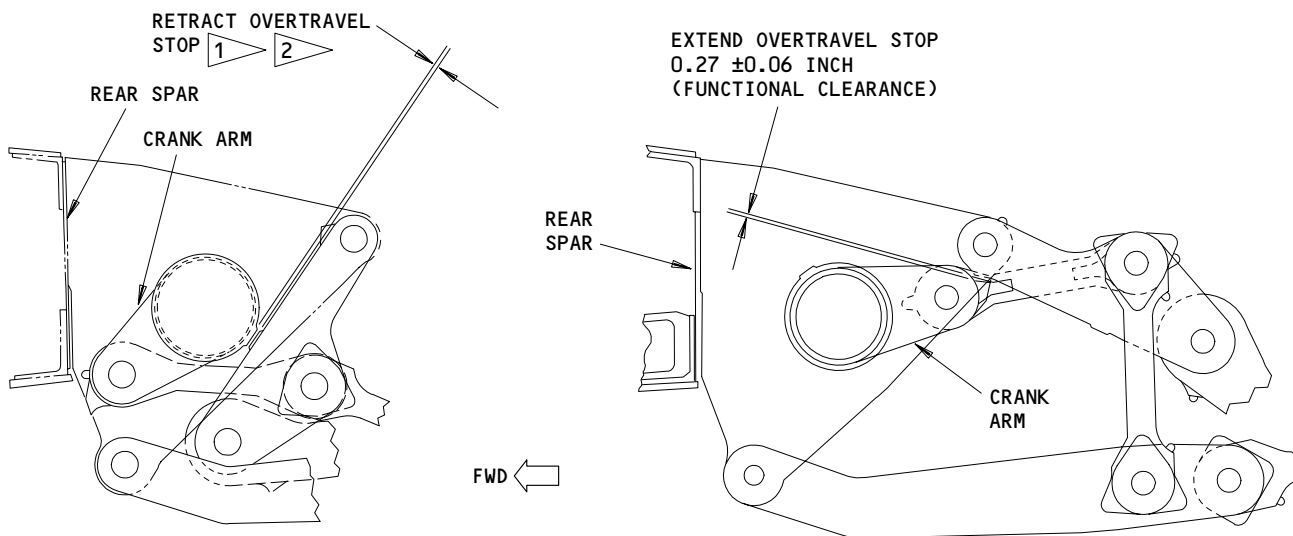
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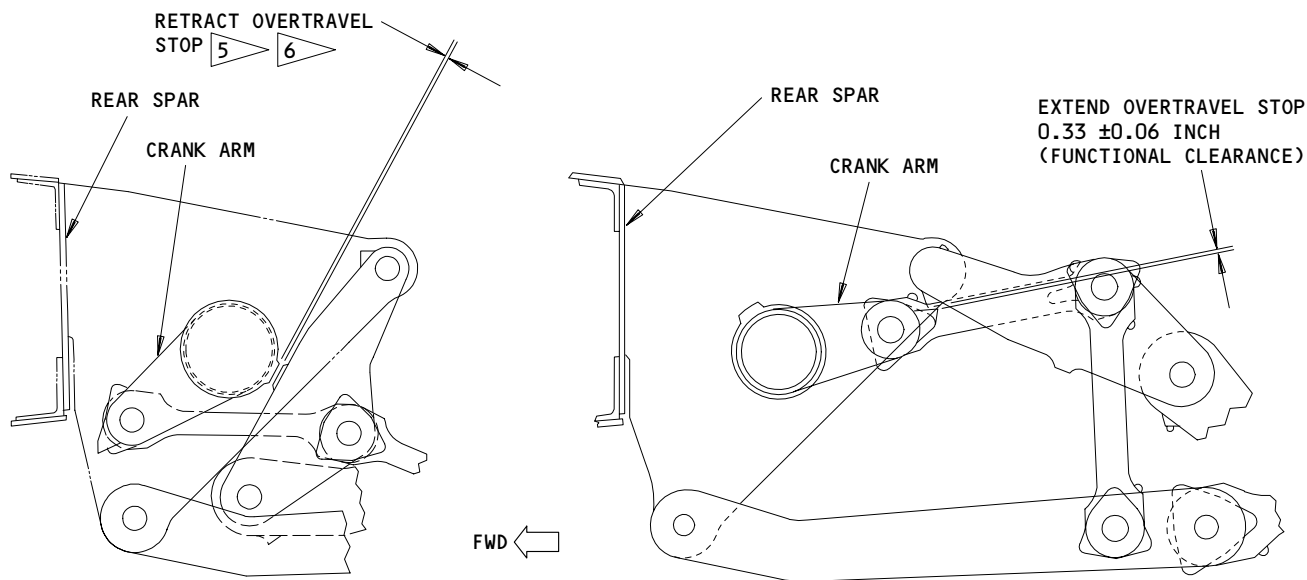
**Overtravel Stop Clearances for the Outboard Flap  
Figure 407 (Sheet 1)**

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OVERTRAVEL STOPS  
(OUTBOARD FLAP - OUTBOARD MECHANISM)  
A-A 4



OVERTRAVEL STOPS  
(OUTBOARD FLAP - INBOARD MECHANISM)  
B-B 4

Overtravel Stop Clearances for the Outboard Flap  
Figure 407 (Sheet 2)

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D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-004

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

S 864-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 824-084

- (5) If an aileron rigging bar is not available, do the steps as follows:
  - (a) Move the flap control lever to the zero detent to retract the flaps.
  - (b) Make sure the ailerons are approximately in the neutral position.
  - (c) Measure the aileron-to-flap trailing edge mismatch and keep the dimension to use for the installation.
  - (d) Make sure the ailerons do not move during the flap removal/installation.

S 864-006

- (6) Move the flap control lever to the 30-unit detent, and permit the flaps and slats to extend to the fully extended position.

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- S 864-007
- (7) Remove pressure from the center hydraulic system (AMM 29-11-00/201).
- S 864-008
- (8) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:
- (a) 6D24, ALTN FLAP PWR
- S 864-009
- (9) Open these circuit breakers on the P6 panel and install circuit breaker locks:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR
- S 864-010
- (10) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11J24, FLAPS ALTN CONT
- S 864-011
- (11) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
- S 494-012
- (12) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 404).
- S 014-013
- (13) Remove the access panels on the upper surface of the outboard flap (AMM 06-44-00/201).
- S 014-014
- (14) Remove the eight access screws from the upper surface of the outboard flap (Fig. 406).
- S 494-015
- (15) Extend the outboard spoilers 1 thru 4 (left wing) or 9 thru 12 (right wing) as applicable, and install the locks on the spoiler actuators (AMM 27-61-00/201).

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E. Remove the Outboard Flap

S 494-016

- (1) Install the flap sling at the three attach points on flap upper surface (Fig. 405).

**NOTE:** Adjust the center strap of the sling as necessary to get the flap pitch up attitude in the 30-unit position. Add 3/8-inch diameter (9.53 millimeters) shackles to the forward inboard cable on the flap sling as necessary to get the flap dihedral attitude in the 30-unit position.

- (a) If necessary, remove the vortex generator near the outboard attach point to install the sling (AMM 57-53-01/401).

S 494-017

- (2) Connect the overhead hoist to the flap sling.

**NOTE:** Make sure the hoist can hold the weight of the outboard flap. The flap weighs approximately 422 pounds (191.4 Kg).

S 014-018

- (3) Get access to the bolts that connect the outboard flap to the inboard and outboard support beams, from the top surface of the flap (Detail A, Fig. 401).

S 024-096

- (4) Remove the bolts, washers, nuts (1 thru 6 and 8 thru 12), shims and fillers (15 thru 22 and 25, 26) and washers (23 and 24) that connect the flap to the support beams ( Fig. 401, Sheet 2, View B).

**NOTE:** Keep a record of the length and location of each bolt for the subsequent installation. Also make a record of the shim thickness at each location, and keep the shims and fillers for the subsequent installation.

**NOTE:** Forward attachment bolts may be required for installation on replacement flaps. To remove bolts, it may be necessary to retain the bathtub fitting and clip (Fig. 401, View D).

S 034-020

- (5) Move the flap to the aft and down direction to disengage the deflection control track rollers from the track at the outboard end of the flap (Detail A, Fig. 401).

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S 024-021

- (6) Lower the flap from the airplane.

**NOTE:** The inboard and outboard fairings will stay attached to the flap during and after the removal. Put the flap on stable support. Be careful not to cause damage to the fairing and flap surfaces.

S 094-022

- (7) Remove the sling from the outboard flap.

**NOTE:** Keep a record of the quantity and location of the shackles that you added to the flap sling for the subsequent installation.

TASK 27-51-20-424-023

3. Outboard Flap - Installation

A. Equipment

- (1) Circuit Breaker Lockout Clip - 1012LC-R  
Commercially Available
- (2) Sling Equipment, Outboard TE Flap - A27027-53
- (3) Inboard Aileron Rigging Bar - A27024-47
- (4) Outboard Aileron Rigging Bar - A27024-31  
(Recommended); A27024-29 (Optional)
- (5) TE Flap PDU Lock - A27009-7
- (6) Shackles, 3/8 inch (9.53 millimeters) Diameter - Commercially Available

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (recommended)
- (2) D00013 Grease - MIL-PRF-23827  
(Supersedes MIL-G-23827) (Alternate)
- (3) A00247 Sealant - BMS 5-95
- (4) C00259 Primer - BMS 10-11 Type 1

C. Parts

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AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	14	Left Outboard Flap	27-51-21	01	720,721, 722,735, 745,746 725,726, 727,740, 750,751
	14	Right Outboard Flap			

D. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-51-00/201, Trailing Edge Flap System
- (4) AMM 27-51-00/501, Trailing Edge Flap System
- (5) AMM 27-51-16/401, Outboard Trailing Edge Flap Track Fairings
- (6) AMM 27-51-41/401, TE Flap Torque Tubes
- (7) AMM 27-61-00/201, Spoiler/Speed Brake Control System
- (8) AMM 27-61-00/501, Spoiler/Speed Brake Control System
- (9) AMM 27-61-02/401, Spoiler Power Control Actuator
- (10) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (11) AMM 32-00-15/201, Landing Gear Door Lock

E. Access

- (1) Location Zones
  - 144 Right MLG Wheel Well
  - 211/212 Control Cabin
  - 560/660 Wing Trailing Edge - Outboard
  - 572/672 Outboard Flap Inboard Fairing
  - 573/673 Outboard Flap Outboard Fairing
  - 710 Nose Landing Gear and Doors
  - 730/740 Left/Right Main Landing Gear and Doors

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- (2) Access Panels
- |             |   |
|-------------|---|
| 566BT/666BT | LE of Outboard Flap                               |
| 566DT/666DT | LE of Outboard Flap                               |
| 566GT/666GT | LE of Outboard Flap Structure - Aft of Front Spar |
| 566HT/666HT | LE of Outboard Flap Structure - Aft of Front Spar |
| 566NT/666NT | LE of Outboard Flap Structure - Aft of Front Spar |
| 566PT/666PT | LE of Outboard Flap Structure - Aft of Front Spar |

F. Install the Outboard Flap

S 214-024

- (1) Make sure the PDU lock is installed on the TE flap PDU (Fig. 404).

S 214-025

- (2) Make sure access panels and the eight access screws are removed from the upper surface of the flap (Fig. 406).

S 494-026

- (3) Add the 3/8-inch (9.53 millimeters) diameter shackles to the forward inboard cable of the flap sling to get the flap dihedral attitude in the 30-unit position as you did during the flap removal.

S 494-027

- (4) Install the flap sling at the three attach points on the flap upper surface (Fig. 405).

**NOTE:** Adjust the center strap of the sling as necessary to get the flap pitch-up attitude in the 30-unit position.

S 494-028

- (5) Connect the overhead hoist to the sling.

**NOTE:** Make sure the hoist can hold the weight of the outboard flap. The flap weighs approximately 422 pounds (191.4 Kg).

S 984-029

- (6) Lift the outboard flap (14) to the wing, above the inboard and outboard support beams (Detail A, Fig. 401).

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S 424-094

- (7) Apply BMS10-11, Type 1 primer in the bolt hole to all bare metal surfaces to restore the finish.

S 244-092

- (8) Install the washers (2) in the temporary slave bolts (1, 10) and put the bolts through the flap, from the flap upper surface (View B, Fig. 401).

S 354-103

- (9) Chamfer bathtub fitting as required to permit installation of temporary slave bolts (1, 10) (View D, Fig. 401).

S 434-031

- (10) Put the shims and fillers (15, 16, 17, 18) over the bolts at the bottom surface of the flap and hold them into position.

NOTE: Use the old shims, or new shims with the same thickness.

S 424-097

- (11) Install the flap onto the support beams (Fig. 401, Sht. 2).

NOTE: Bolts part marked B30LE and B30US can be used in combination with each other in a support beam.

- (a) Hold the shims and fillers (15, 16, 17, 18) against the flap bottom surface and lower the flap onto the support beams.

NOTE: Align the bolts (1,10) at the forward end of the flap flap with the holes on the support beams.

- (b) At the inboard support beam, install the washers (23, 24) and nuts (4) on the temporary slave bolts (10) below the support beam. Hand-tighten the nuts.
- (c) Engage the rollers into the deflection control track (Detail A, Fig. 401).
- (d) At the outboard support beam, install the washers (23, 24) and nuts (4) on the temporary slave bolts (1) below the support beam. Hand-tighten the nuts.

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- (e) Use the center adjustable strap on the sling to lift the aft end of the flap to get access to install the aft shims (19 thru 22) (View B, Fig. 401).
- (f) Install the shims and fillers (19 thru 22) between the flap and the support beams. Align the holes in shims with holes in support beams.

NOTE: Use the old shims, or new shims with the same thickness.

- (g) Put the washers (6) on the temporary slave bolts (5, 9, 11, 12) and put the bolts through the flap, shims, and support beams.
- (h) Install the nuts (8) with washers (23 and 24) and radius fillers (25 and 26) on the temporary slave bolts (5, 9, 11, 12). Hand-tighten the nuts (View B, Fig. 401).
- (i) Tighten the nuts (4) to 200–250 pound-inches (22.6–28.2 newton-meters).

NOTE: Make sure the bolts have the correct bolt grip length.

- (j) Tighten the nuts (8) to 200–250 pound-inches (22.6–28.2 newton-meters).

NOTE: Make sure the bolts have the correct bolt grip length.

- (k) Disconnect the sling from the flap (Fig. 405).

S 414-043

- (12) Install the access doors and the eight access screws to the upper surface of the outboard flap.

S 824-044

- (13) Adjust the fit and fair of the outboard flap with the instructions given in this task.

G. Adjust the Fit and Fair of the Outboard Flap

S 094-045

- (1) Remove the PDU lock from the TE flap PDU (Fig. 404).

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S 864-046

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (2) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-047

- (3) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-048

- (4) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J14, FLAP ALTN CONT

S 864-049

**CAUTION:** USE THE ALTERNATE (ELECTRICAL) POWER FOR THE FIRST TIME YOU OPERATE THE FLAPS AFTER THE FLAP INSTALLATION. THE ALTERNATE DRIVE WILL MOVE THE FLAPS SLOWER THAN THE PRIMARY (HYDRAULIC) DRIVE. YOU CAN CAUSE DAMAGE TO THE AIRPLANE IF THE FLAPS RETRACT WITHOUT SUFFICIENT CLEARANCE TO THE ADJACENT STRUCTURE.

- (5) Retract the flaps to the zero detent with alternate (electrical) power (AMM 27-51-00/201).

**NOTE:** Monitor the flaps while they retract and make sure the flaps retract freely, and that they do not hit the adjacent structure.

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S 864-050

- (6) Extend the flaps to the 15-unit detent with alternate (electrical) power (AMM 27-51-00/201).

S 864-051

- (7) Retract the flaps to the zero (FLAPS UP) detent with primary (hydraulic) power (AMM 27-51-00/201).

**NOTE:** It is necessary to retract the flaps with hydraulic power to do the fit-and-fair adjustment. The alternate power does not retract the flaps as accurate as with the primary power.

S 864-052

- (8) After the flaps move to the fully retracted position, stop for one minute before you continue to the subsequent steps.

S 864-053

- (9) Remove pressure from the center hydraulic system (AMM 29-11-00/201).

S 494-054

- (10) Install the PDU lock in the TE flap PDU (Fig. 404).

S 864-055

- (11) Open these circuit breakers on the P6 panel and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 864-056

- (12) Open this circuit breaker on the P6 panel and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 864-057

- (13) Open these circuit breakers on the P11 panel and install circuit breaker locks:  
(a) 11H23, SLAT ALTN CONT INBD

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(b) 11H24, SLAT ALTN CONT OUTBD

S 864-058

(14) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:

(a) 11J24, FLAPS ALTN CONT

S 224-059

(15) Make sure the clearance between the flap and the upper surface of the wing fixed trailing edge (TE) is correct (View C-C and D-D, Fig. 402).

S 224-060

(16) Make sure the flap aligns correctly with the lower surface of the wing fixed TE (View E-E and F-F).

S 824-061

(17) If the clearance between the flap and the wing fixed TE is not correct, or if the surfaces are not aligned, adjust the shims (15 thru 22) to correct the clearance and align the surfaces (View A-A, Fig. 401).

**NOTE:** Adjust the forward shims (15 thru 18) to change the height of the flap leading edge. Make sure the thickness of the forward shim does not exceed 0.50 inch (1.27 cm). Adjust the aft shims (19 thru 22) to correct the aileron-to-flap trailing edge mismatch.

S 974-062

(18) If you use an aileron rigging bar, measure the aileron-to-flap trailing edge mismatch (Fig. 403).

**NOTE:** Set and hold the ailerons in the position shown in Fig. 403 to measure the aileron-to-flap trailing edge mismatch. Do not adjust the rig position of the ailerons.

This measurement will tell if it is necessary to adjust the flap position.

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S 824-085

- (19) If you do not use an aileron rigging bar, measure the aileron-to-flap trailing edge mismatch.
- (a) Compare this to the mismatch dimension you measured before you removed the flap.

S 224-083

- (20) Make sure the trailing edge of the left flap is symmetrical to the trailing edge of the right flap, within 0.06 inch (1.5 mm).

**NOTE:** Use the inboard and outboard ailerons as a reference point.

If you used the flaps to make a lateral trim correction, it is not necessary for the trailing edges of the outboard flaps to be symmetric.

S 824-063

- (21) If the aileron-to-flap trailing edge mismatch or the flap symmetry requirement is not within the limit, adjust the shims (15 thru 22, View B, Fig. 401) to get the correct fit-and-fair.

**NOTE:** Do not adjust the rig position of the ailerons to correct the aileron-to-flap mismatch or flap symmetry. Hold the ailerons in the positions shown in (Fig. 403), and adjust the shims (15 thru 22) to change the position of the flap.

Adjust the forward shims (15 thru 18) to change the height of the flap leading edge. Make sure the thickness of the forward shim does not exceed 0.50 inch (1.27 cm). Adjust the aft shims (19 thru 22) to correct the aileron-to-flap trailing edge mismatch.

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S 824-064

- (22) If you cannot get the correct fit-and-fair dimensions with the shims, adjust the clearance between the retract overtravel stops and the rotary actuator crank arms with these steps:

**NOTE:** If you decrease the retract overtravel stop clearance at the outboard linkage, the outboard end of the flap will move forward and up, and the inboard end of the flap will move aft and down. The opposite result will occur if you increase the clearance.

- (a) Remove the aft, mid, and forward sections of the inboard and outboard flap fairing on the outboard flap (AMM 27-51-16/401).

**NOTE:** You can remove the fairings at the flaps fully retracted position. Remove the aft fairing first.

- (b) Disconnect the torque tube from the inboard coupling of the outboard rotary actuator (AMM 27-51-41/401).

**NOTE:** This will disconnect the inboard mechanism from the outboard mechanism.

- (c) Disconnect the torque tube from the inboard coupling of the inboard rotary actuator (AMM 27-51-41/401).

**NOTE:** This will disconnect the outboard flap drive from the inboard flap drive.

- (d) To get the correct flap LE mismatch and clearances (Fig. 402), turn the actuator input shaft to adjust the rig position of the retract overtravel stops at the inboard and outboard flap linkages (Fig. 407).

**NOTE:** Do not adjust the overtravel stop clearance out of the rig position limits (Fig. 407).

Always move the crank arm to the direction of the stop to measure the RIG position. If you must move the crank arm away from the stop, move it away from more than one complete turn of the coupling, then move it back again to measure the RIG position.

Turn the coupling counterclockwise to decrease the clearance to the stop. A 1/3 turn of the coupling will change the clearance by 0.005 inch (0.127 mm).

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- (e) Connect the torque tube to the inboard side of the outboard rotary actuator.

NOTE: Try not to turn the coupling or torque tube when you connect the torque tube. If you must turn the coupling to align the coupling screws, make no more than 1/6 of a turn in the clockwise or counterclockwise direction.

- (f) Connect the torque tube to the inboard side of the inboard rotary actuator.

NOTE: Try not to turn the coupling or torque tube when you connect the torque tube. If you must turn the coupling to align the coupling screws, make no more than 1/6 of a turn in the clockwise or counterclockwise direction.

S 224-065

- (23) Do a check on the flap fit and fair dimensions again to make sure all the dimensions are below the limits (Fig. 402).

S 224-066

- (24) Measure the aileron-to-flap mismatch again and make sure that the trailing edges align (Fig. 403).

NOTE: Hold the ailerons in the positions shown in Fig. 403 to measure the aileron-to-flap trailing edge mismatch. Do not adjust the rig position of the ailerons.

S 824-067

- (25) Measure the clearance between the seal retainers and the leading edge of the flap. Adjust the seal retainers if the clearance is not correct (View E-E and F-F, Fig. 402).

S 224-068

- (26) Make sure that the clearances between the flap and the inboard and outboard ailerons are correct (View A-A and B-B, Fig. 402). Adjust the seal retainers as necessary by loosening the fasteners and using the slotted holes to obtain the correct clearances.

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S 094-069

- (27) Remove the PDU lock on the TE flap PDU (Fig. 404).

S 094-071

- (28) Remove the locks on the spoiler actuators and retract the outboard spoilers 1 thru 4 (left wing) or 9 thru 12 (right wing) (AMM 27-61-00/201).

S 824-072

- (29) Measure and adjust the spoiler-to-flap clearances (AMM 27-61-00/501, Adjust Spoiler Control Actuators).

S 864-073

- (30) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-074

- (31) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-075

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (32) Pressurize the center hydraulic system (AMM 29-11-00/201).

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S 864-076

- (33) Move the flap control lever to the 30-unit detent, and make sure the flaps move to the fully extended position easily.

S 864-077

- (34) Move the flap control lever to the zero detent and make sure the flaps move to the fully retracted position.

S 214-078

- (35) Make sure there is no damage to the fixed wing structure adjacent to the outboard flaps.

H. Install Final Bolts to Flaps

S 024-375

- (1) Remove temporary slave bolts (1, 5, 9, 10, 11, 12) and shims (17, 18, 21, 22), noting the location of each shim and bolt.

S 394-382

- (2) Fay surface seal the top and bottom shim interfaces only at the forward and aft locations on the support beam with PR-1405G or BMS 5-95 sealant. Coverage thickness shall be such that the stacked shim edges are not visible.

S 424-389

- (3) Reinstall temporary slave bolts (1, 5, 9, 10, 11, 12) and shims (17, 18, 21, 22) at the noted locations, and retorquing nuts to 200-250 pound-inches (22.6-28.2 newton-meters).

S 424-410

- (4) Remove the temporary slave bolts (5, 9, 11, 12) from the aft end of the support beam and replace with the final bolts (5, 9, 11, 12), one bolt at a time.

**NOTE:** Make sure the bolts have the correct grip length. Bolt grip length is dependent on the number of shims used.

- (a) Before insertion of the final bolt, coat the inside of the hole to its full depth with PR-1405G or BMS 5-95 sealant.

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- (b) Insert the final bolts (5, 9, 11, 12) into the aft end of the carrier support beam wet with PR-1405G or BMS 5-95 per BAC 5000, method 2. After the bolt has been inserted, remove any excess sealant from the bolt threads and surrounding surface of the support beam.

NOTE: Use a dry wiper. Do not use solvents.

S 424-424

- (5) Initially tighten the nuts (8) to the lower value of the torque range of 475-525 pound-inches (53.7-59.3 newton-meters).

S 424-431

- (6) Re-tighten the nuts (8) 20 minutes or more after installation to within torque range of 475-525 pound-inches (53.7-59.3 newton-meters).

NOTE: Final torque must be applied before the squeeze out life of the sealant expires.

S 424-438

- (7) Remove the temporary slave bolts (1, 10) from the carrier beam and replace with the final bolts (1, 10) one bolt at a time.

NOTE: Make sure the bolts have the correct grip length. Bolt grip length is dependent on the number of shims used.

- (a) Before insertion of the final bolt, coat the inside of the hole to its full depth with PR-1405G or BMS 5-95 sealant.  
(b) Insert the final bolts (1, 10) into the carrier beam wet with PR-1405G or BMS 5-95 per BAC 5000, method 2. After the bolt has been inserted, remove any excess sealant from the bolt threads and surrounding surface of the swivel plate.

NOTE: Use a dry wiper. Do not use solvents.

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S 424-452

- (8) Initially tighten the nuts (4) to the lower value of the torque range of 750-850 pound-inches (85.0-96.0 newton-meters).

S 424-459

- (9) Re-tighten the nuts (4) 20 minutes or more after installation to within torque range of 750-850 pound-inches (85.0-96.0 newton-meters).

**NOTE:** Final torque must be applied before the squeeze out life of the sealant expires.

S 394-344

- (10) Following final torque of all flap attach bolts, fillet seal around shims with PR-1405G or BMS 5-95 per BAC 5000. Option: brush coat application is acceptable. Coverage thickness to be such that stacked shim edges are not visible.

S 414-351

- (11) Install the access doors and the eight access screws to the upper surface of the outboard flap (14).

S 414-466

- (12) If removed, install the vortex generator near the outboard attach point for the sling (AMM 57-53-01/401).

I. Put the Airplane Back to Its Usual Position

S 424-079

- (1) If removed, install the inboard and outboard flap fairings for the outboard flap (AMM 27-51-16/401).

S 094-080

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 864-081

- (3) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 864-082

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

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OUTBOARD FLAP - INSPECTION/CHECK

1. General

- A. There are two tasks in this procedure. The torque check and retorquing of the support beam bolts for the outboard flaps.

TASK 27-51-20-026-001

2. Outboard Flap - Torque Check

A. Equipment

- (1) Circuit Breaker Lockout Clip - 1012LC-R  
Commercially Available
- (2) TE Flap PDU Lock - A27009-7

B. Consumable Materials

- (1) A00247 Sealant - BMS 5-95
- (2) C00259 Primer - BMS 10-11 Type 1

C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
601	13	Radius Filler	27-51-21	01	620
	15	Filler			635
	16	Filler			640
	17	Shim			642
	18	Shim			643
	19	Filler			625
	20	Filler			630
	21	Shim			632
	22	Shim			633
	25	Radius Filler			644
	26	Radius Filler			623

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D. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-51-00/201, Trailing Edge Flap System
- (4) AMM 27-51-16/401, Outboard Trailing Edge Flap Track Fairings
- (5) AMM 27-61-00/201, Spoiler/Speed Brake Control System
- (6) AMM 27-61-02/401, Spoiler Power Control Actuator
- (7) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (8) AMM 32-00-15/201, Landing Gear Door Lock
- (9) AMM 32-00-20/201, Landing Gear Downlock

E. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
560/660	Wing Trailing Edge - Outboard
572/672	Outboard Flap Inboard Fairing
573/673	Outboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

566BT/666BT	LE of Outboard Flap
566DT/666DT	LE of Outboard Flap
566GT/666GT	LE of Outboard Flap Structure - Aft of Front Spar
566HT/666HT	LE of Outboard Flap Structure - Aft of Front Spar
566NT/666NT	LE of Outboard Flap Structure - Aft of Front Spar
566PT/666PT	LE of Outboard Flap Structure - Aft of Front Spar

F. Prepare for the Torque Check

S 216-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 496-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

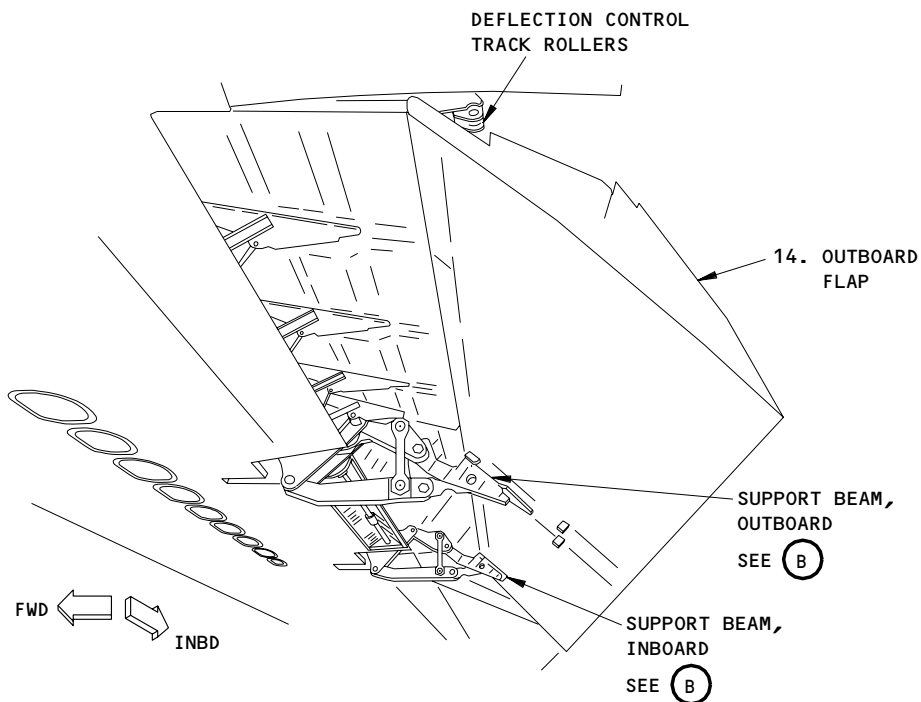
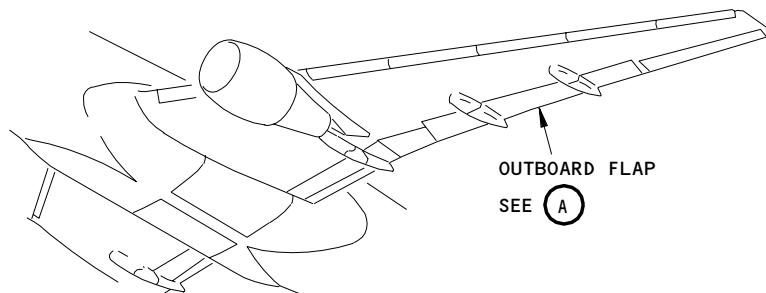
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OUTBOARD FLAP  
(LEFT FLAP IS SHOWN, RIGHT FLAP IS OPPOSITE)

(A)

NOTE: FAIRINGS NOT SHOWN.

Outboard Flap  
Figure 601 (Sheet 1)

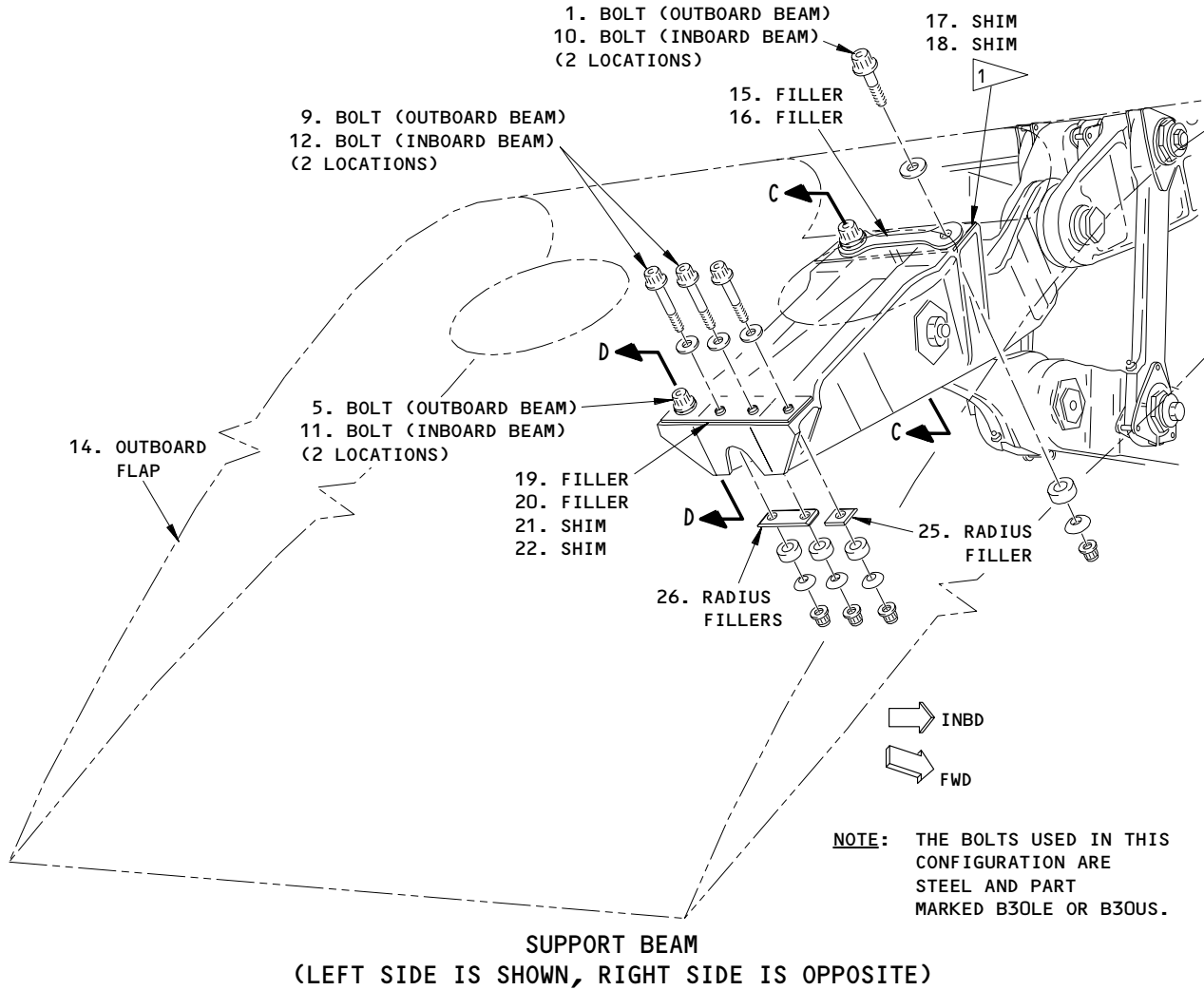
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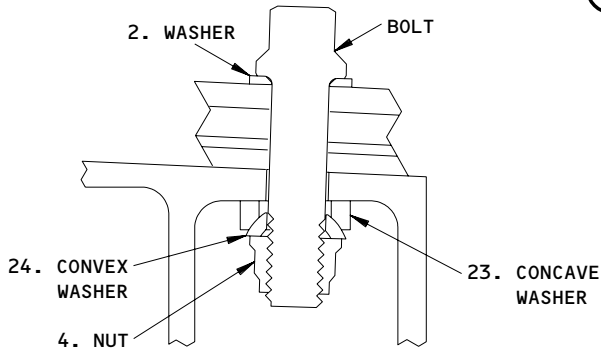
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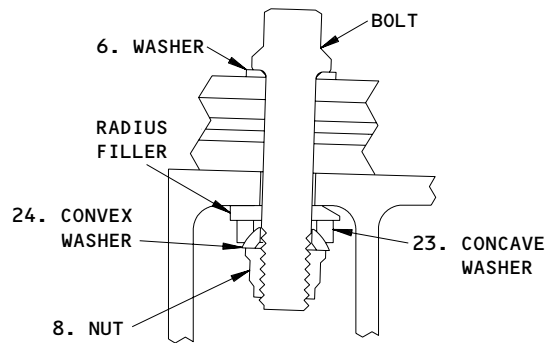
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(B)



(2 LOCATIONS)  
C-C



(4 LOCATIONS)  
D-D

1 SHIM  $\pm 0.25$  INCH ( $\pm 6.35$  mm) NOMINAL.

Outboard Flap  
Figure 601 (Sheet 2)

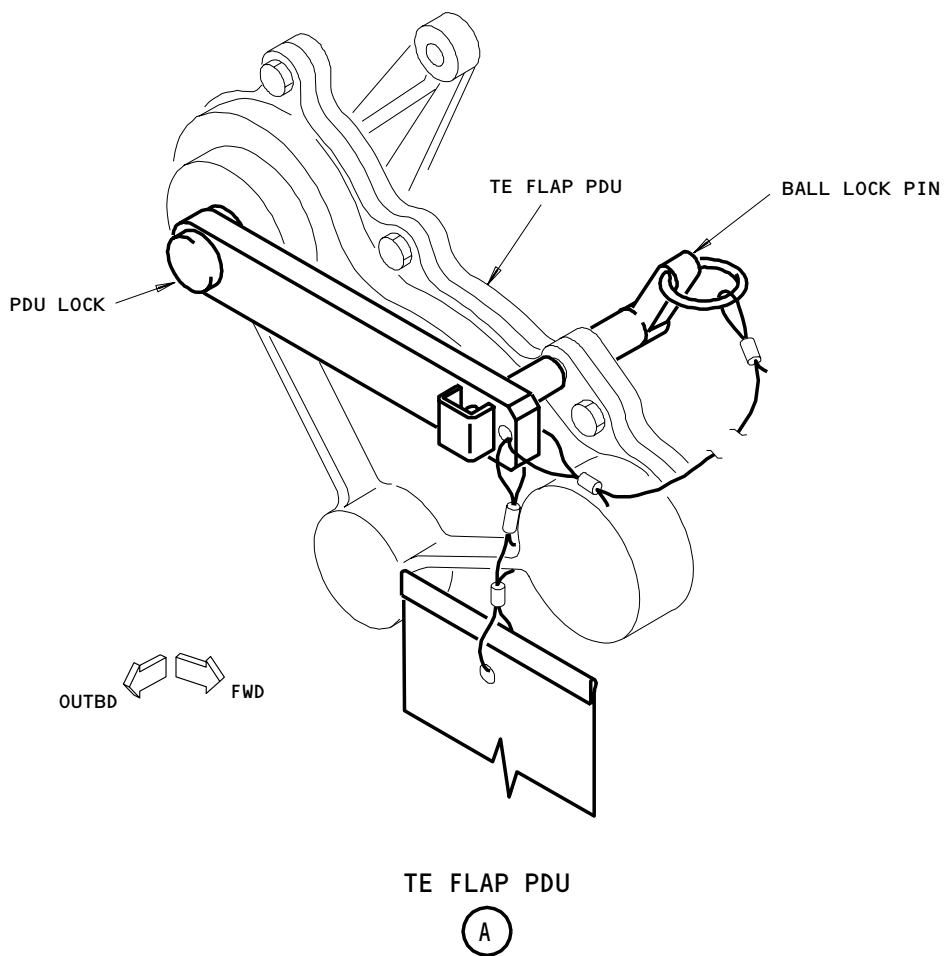
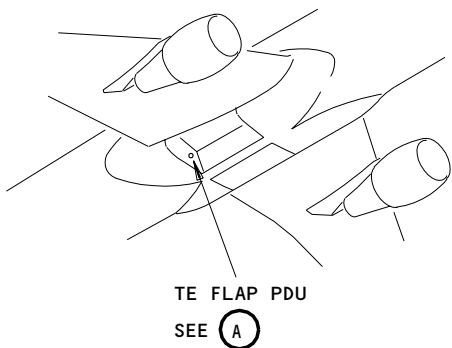
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PDU Lock for the TE Flap PDU  
Figure 602

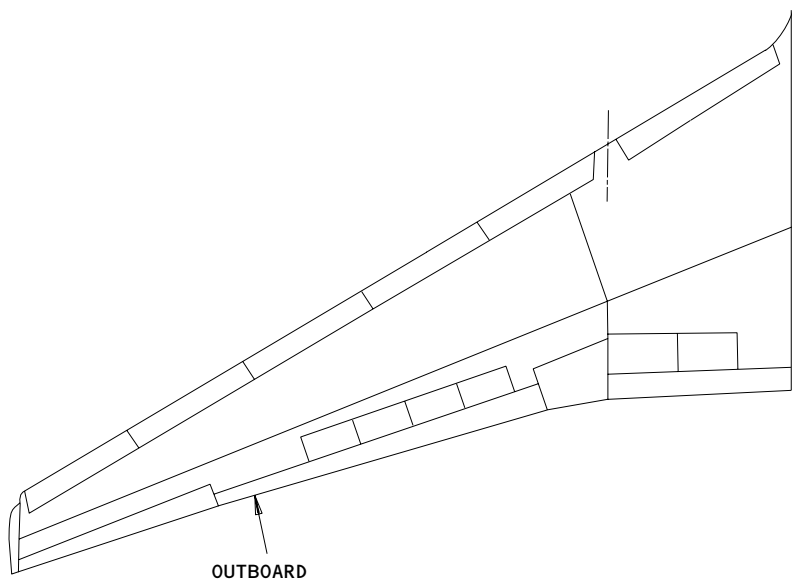
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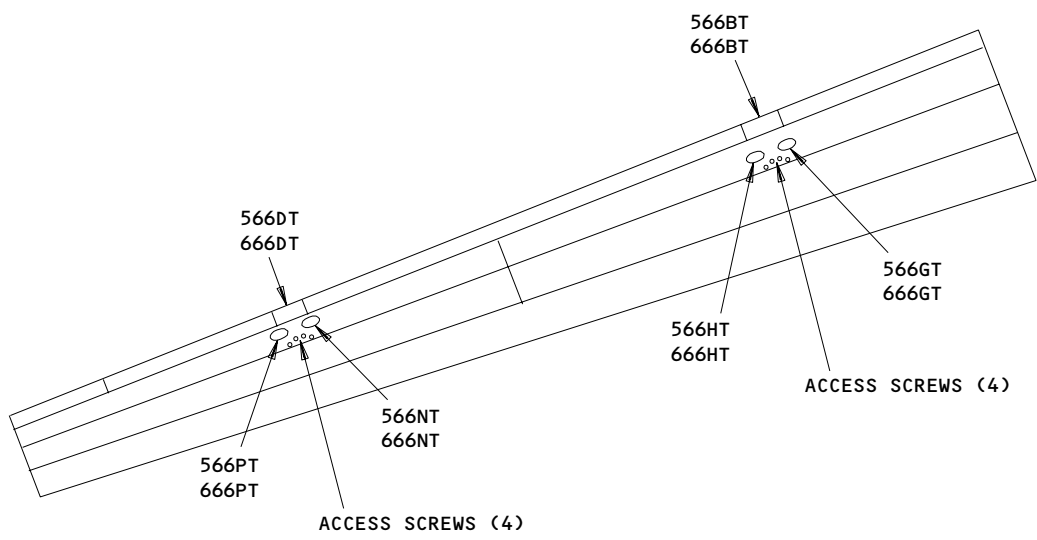
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OUTBOARD  
FLAP ACCESS  
SEE (A)



OUTBOARD FLAP ACCESS  
TOP VIEW  
(LEFT WING SHOWN, RIGHT WING OPPOSITE)

(A)

**NOTE:** 500-SERIES PANEL NUMBERS REFER TO LEFT WING.  
600-SERIES PANEL NUMBERS REFER TO RIGHT WING.

Access Panels  
Figure 603

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S 866-004

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

S 866-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THAT THE SLATS WILL NOT HIT THE ACCESS DOOR ON THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING. THE SLATS CAN CAUSE DAMAGE TO THESE COMPONENTS.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 866-007

- (5) Move the flap control lever to the 30-unit detent, and permit the flaps and slats to extend to the fully extended position.

S 866-008

- (6) Remove pressure from the center hydraulic system (AMM 29-11-00/201).

S 866-009

- (7) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 866-010

- (8) Open these circuit breakers on the P6 panel and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR

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- (b) 6F24, ALTN SLAT OUTBD PWR
- S 866-011
- (9) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
  - (a) 11J24, FLAPS ALTN CONT
- S 866-012
- (10) Open these circuit breakers on the P11 panel and install circuit breaker locks:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
- S 496-013
- (11) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 602).
- S 016-014
- (12) Remove the access panels on the upper surface of the outboard flap (Fig. 603) (AMM 06-44-00/201).
- S 016-015
- (13) Remove the eight access screws from the upper surface of the outboard flap (Fig. 603).
- S 496-016
- (14) Extend the outboard spoilers 1 thru 4 (left wing) or 9 thru 12 (right wing) as applicable, and install the locks on the spoiler actuators (AMM 27-61-00/201).
- S 016-019
- (15) Get access to the bolts that connect the outboard flap to the inboard and outboard support beams, from the top surface of the flap (Fig. 603).
- G. Inspect the Torque of all Bolts that attach the Outboard Flap to the Support Beam (Fig. 601)

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S 286-083

**CAUTION:** IF AN EXTENSION BAR IS USED WITH THE TORQUE WRENCH MAKE SURE YOU DO NOT OVER TIGHTEN THE NUT. ADJUST THE WRENCH SETTING TO GET THE CORRECT TORQUE. IF YOU OVER TIGHTEN THE NUTS, DAMAGE TO HARDWARE COULD OCCUR.

- (1) Apply a torque of 375.0 pound-inches (42.0 newton-meters) to the bolt (1 and 10) at the forward location of the beam without using a wrench on the nut (4) (Fig. 601, View B).

**NOTE:** Watch the nut (4) to see if it moves.

S 216-086

- (2) If a nut moves, put a tag on the nut/bolt combination for identification.

S 426-155

- (3) Apply a torque of 237.5 pound-inches (26.8 newton-meters) to the bolt (5, 9, 11 and 12) at the aft location of the beam without using a wrench on the nut (8) (Fig. 601, View B).

**NOTE:** Watch the nut (8) to see if it moves.

S 216-089

- (4) If a nut moves, put a tag on the nut/bolt combination for identification.

S 216-090

- (5) If a nut moved when you applied the required torque to the bolt, do the following visual inspection:

**WARNING:** MAKE SURE NO MORE THAN TWO BOLTS ARE REMOVED AT THE SAME TIME FROM THE SAME SUPPORT BEAM. DO NOT REMOVE BOTH FORWARD BOLTS FROM A SUPPORT BEAM AT THE SAME TIME. IF YOU REMOVE MORE THAN TWO BOLTS OR BOTH FORWARD BOLTS, INJURY TO PERSONS OR DAMAGE TO HARDWARE COULD OCCUR.

- (a) Remove the nut that moved and the bolt.

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- (b) Clean all bolt surfaces with a soft bristle brush to remove tough material from the bolt shank and threads.
- (c) Visually inspect all surfaces of the bolt with 10X magnification or greater.
- (d) If a bolt was removed and no evidence of cracking is found on the bolt shank or threads, then reinstall the bolt as follows (View B, Fig. 601):

NOTE: If a bolt was removed and evidence of cracking was found, then replace the bolt with an authorized steel bolt with the correct grip length. Reinstall the bolt as follows.

- 1) Install the (6) washer onto the (5, 9, 11 or 12) aft bolt and apply BMS 5-95 sealant to the bolt shanks only. Install the bolt wet into the hole.

NOTE: Do not use solvent to remove excess sealant from the bolt threads. Remove excess sealant from the bolt threads with a dry wiper.

- 2) Install the nut (8) with washers (23 and 24) and radius fillers (25 and 26) on the bolt (5, 9, 11 or 12). Hand-tighten the nuts.
- 3) Install the (2) washer onto the (1 or 10) fwd bolt and apply BMS 5-95 sealant per BAC 5000, method 2, to the bolt shanks only. Install the bolt wet into the hole.

NOTE: Do not use solvent to remove excess sealant from the bolt threads. Remove excess sealant from the bolt threads with a dry wiper.

- 4) Install the nut (4) with washers (23 and 24) on the bolt (1 or 10). Hand-tighten the nut.
- 5) Initially tighten the nut (4) at the forward end of the flap to the lower value of the torque range of 750-850 pound-inches (84.7-96.0 newton-meters).

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- 6) Initially tighten the nut (8) at the aft end of the flap to the lower value of the torque range of 475-525 pound-inches (53.7-59.3 newton-meters).
- 7) Tighten the nut (4) at the forward end of the flap to 750-850 pound-inches (84.7-96.0 newton-meters).

NOTE: Make sure the bolts have the correct grip length.

- 8) Tighten the nut (8) at the aft end of the flap to 475-525 pound-inches (53.7-59.3 newton-meters).

NOTE: Make sure the bolts have the correct grip length.

S 426-251

CAUTION: IF AN EXTENSION BAR IS USED WITH THE TORQUE WRENCH, MAKE SURE YOU DO NOT OVER TIGHTEN THE NUT. ADJUST THE WRENCH SETTING TO GET THE CORRECT TORQUE. IF YOU OVER TIGHTEN THE NUTS, DAMAGE TO HARDWARE COULD OCCUR.

- (6) If the nut did not move when you applied the torque, then re-torque the nut as follows (View B, Fig. 601):
  - (a) Tighten the nuts (4) at the forward end of the flap to at least the middle of the 750-850 pound-inches (84.7-96.0 newton-meters) torque range.
  - (b) Tighten the nuts (8) at the aft end of the flap to at least the middle of the 475-525 pound-inches (53.7-59.3 newton-meters) torque range.

S 416-042

- (7) Install the access doors and the eight access screws to the upper surface of the outboard flap.

H. Put the Airplane Back to Its Usual Position

S 426-079

- (1) If removed, install the inboard and outboard flap fairings for the outboard flap (AMM 27-51-16/401).

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S 846-098

- (2) Remove the PDU lock on the TE flap PDU (Fig. 602).

S 846-099

- (3) Remove the locks on the spoiler actuators and retract the outboard spoilers 1 thru 4 (left wing) or 9 thru 12 (right wing) (AMM 27-61-00/201).

S 866-100

- (4) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 866-101

- (5) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H23, SLAT ALTN CONT INBD
  - (c) 11H24, SLAT ALTN CONT OUTBD
  - (d) 11J24, FLAPS ALTN CONT

S 096-080

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (6) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 866-081

- (7) Remove power from the center hydraulic system (AMM 29-11-00/201).

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- S 866-082  
(8) Remove electrical power (AMM 24-22-00/201).

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OUTBOARD FLAP ACTUATOR CRANK ARM MECHANISM – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the actuator crank arms in the outboard flap.
- B. Each outboard flap contains two crank arms, one on the inboard linkage, and one on the outboard linkage. You can remove and install each crank arm independently.
- C. Refer to AMM 27-51-27/401 for the removal and installation procedure for the outboard flap linkage assembly.

TASK 27-51-21-024-001

2. Outboard Flap Actuator Crank Arm Mechanism – Removal

A. Equipment

- (1) TE Flap PDU Lock – A27009-7
- (2) Circuit Breaker Lockout Clip – 1012LC-R  
(5 Necessary) Commercially Available
- (3) Locks from the Inboard and Outboard TE Flap Lock Set – A27074-128
  - (a) Lock, Outbd Linkage, Outbd Flap – A27074-2
  - (b) Lock, Inbd Linkage, Outbd Flap – A27074-3
  - (c) Bracket Assy, Outbd Linkage, Outbd Flap – A27074-7
  - (d) Bracket Assy, Inbd Linkage, Outbd Flap – A27074-8

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 27-51-20/401, Outboard Flap
- (4) AMM 27-51-22/401, Outboard TE Flap Rotary Actuators
- (5) AMM 27-51-41/401, TE Flap Torque Tubes
- (6) AMM 27-51-45/201, Flap Position Transmitter and Transmitter Gearbox
- (7) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (8) AMM 32-00-15/201, Landing Gear Door Lock
- (9) AMM 32-00-20/201, Landing Gear Downlock

C. Access

- (1) Location Zones
 

144	Right MLG Wheel Well
211/212	Control Cabin
560/660	Wing Trailing Edge – Outboard
572/672	Outboard Flap Inboard Fairing
573/673	Outboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

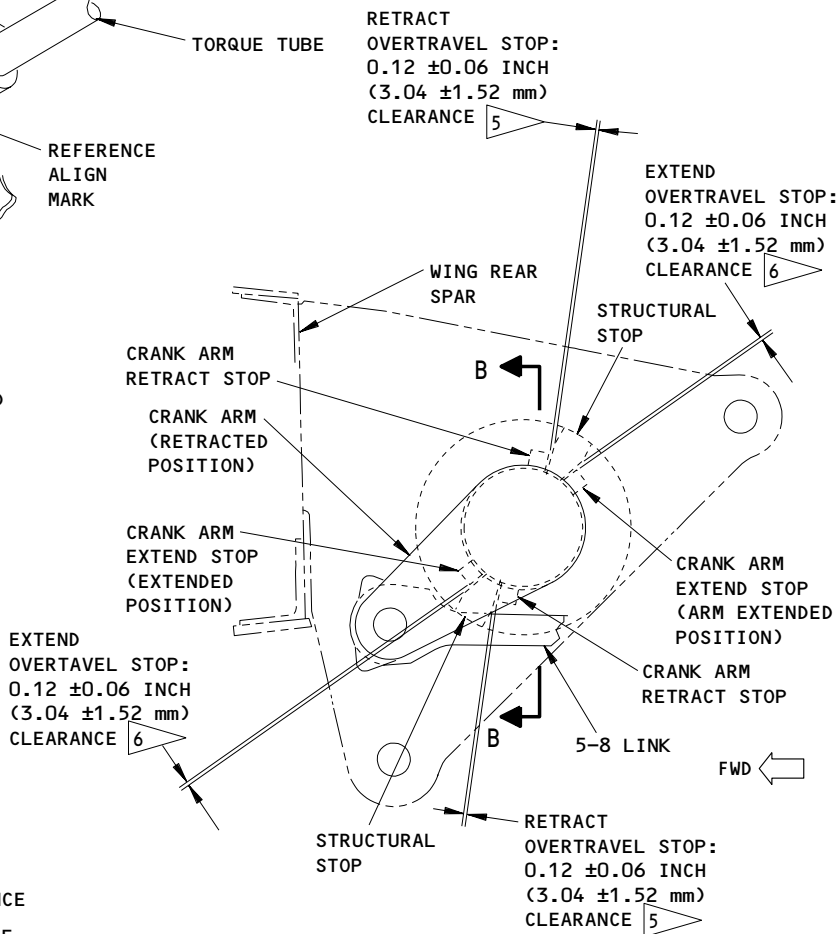
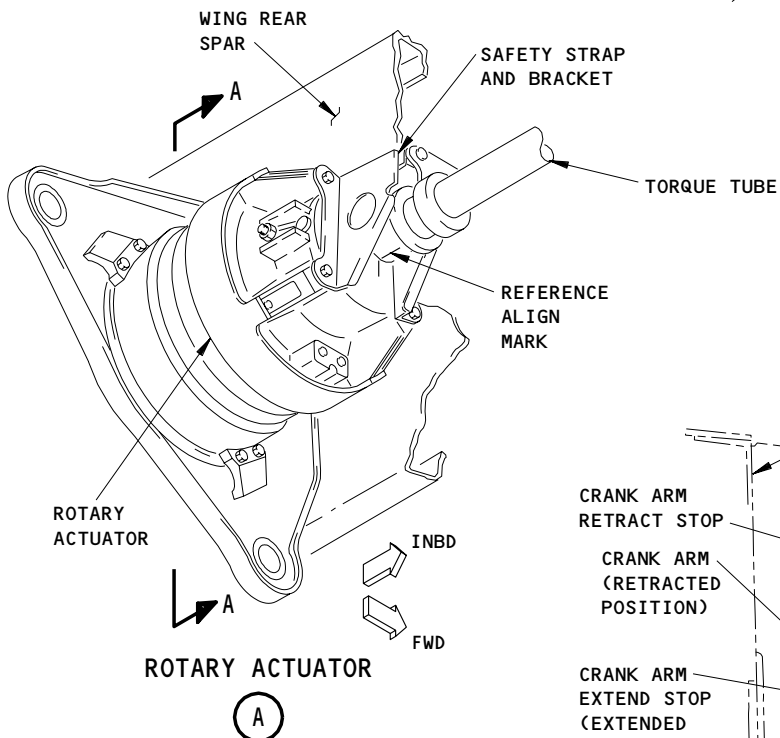
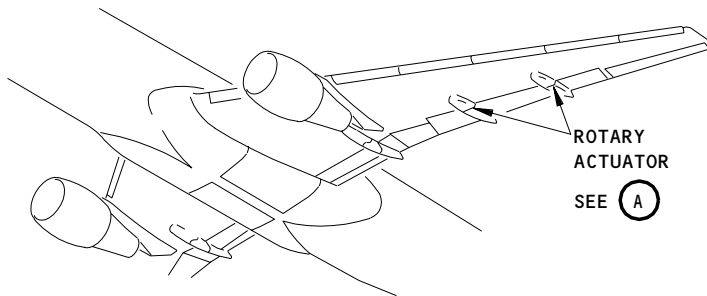
EFFECTIVITY

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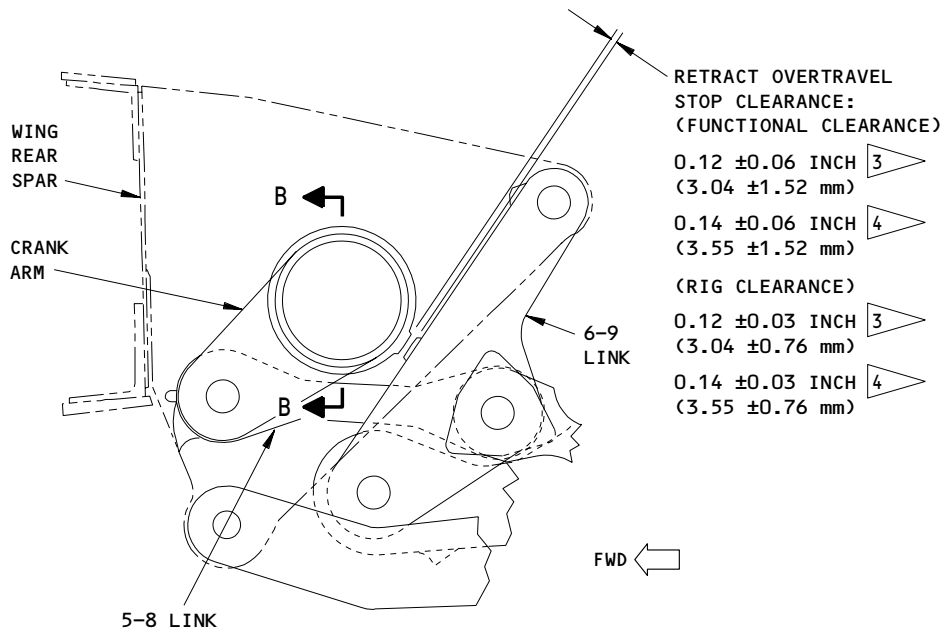
EXTEND AND RETRACT OVERTRAVEL STOPS  
A-A 1

- 1 767-200 AIRPLANES
- 2 767-300 AIRPLANES
- 3 OUTBOARD LINKAGE
- 4 INBOARD LINKAGE
- 5 RETRACT OVERTRAVEL STOP CLEARANCE
- 6 EXTEND OVERTRAVEL STOP CLEARANCE
- 7 APPLY GREASE, BMS 3-33, UNTIL YOU SEE GREASE COME OUT AT THE GREASE EXIT
- 8 INSTALL LOCKWIRE (2 LOCATIONS) (AMM 20-10-23/401)
- 9 INSTALL THE FOUR SEALS IN THE POSITION SHOWN TO PERMIT CORRECT LUBRICATION.

Actuator Crank Arm Mechanism for the Outboard Flap  
Figure 401 (Sheet 1)

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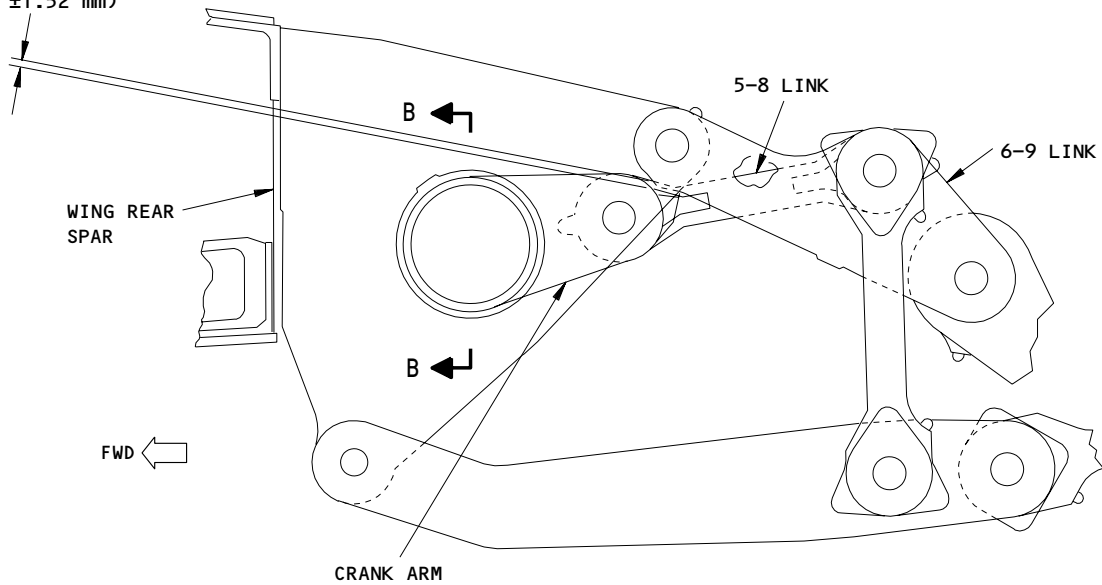
RETRACT OVERTRAVEL STOP

A-A 2

EXTEND OVERTRAVEL STOP  
(FUNCTIONAL CLEARANCE)

0.27 ±0.06 INCH (6.85 ±1.52 mm) 3

0.33 ±0.06 INCH (8.38 ±1.52 mm) 4



EXTEND OVERTRAVEL STOP

A-A 2

Actuator Crank Arm Mechanism for the Outboard Flap  
Figure 401 (Sheet 2)

EFFECTIVITY

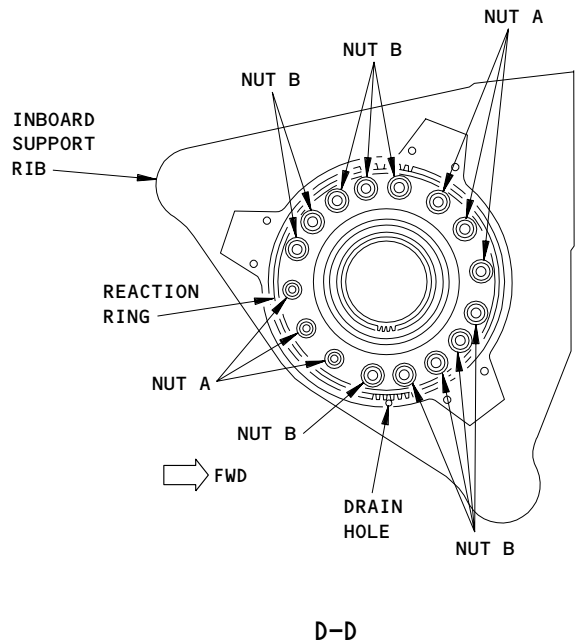
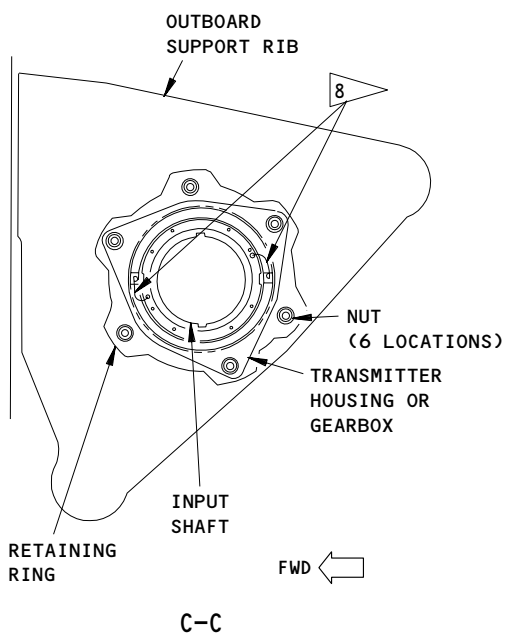
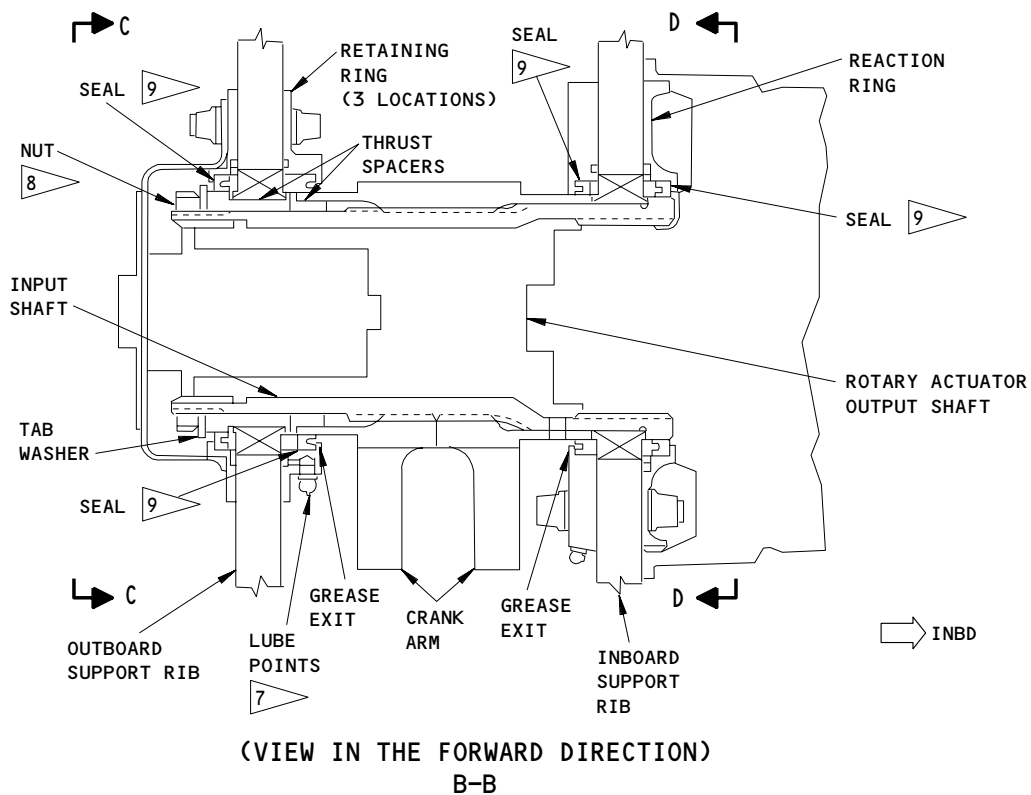
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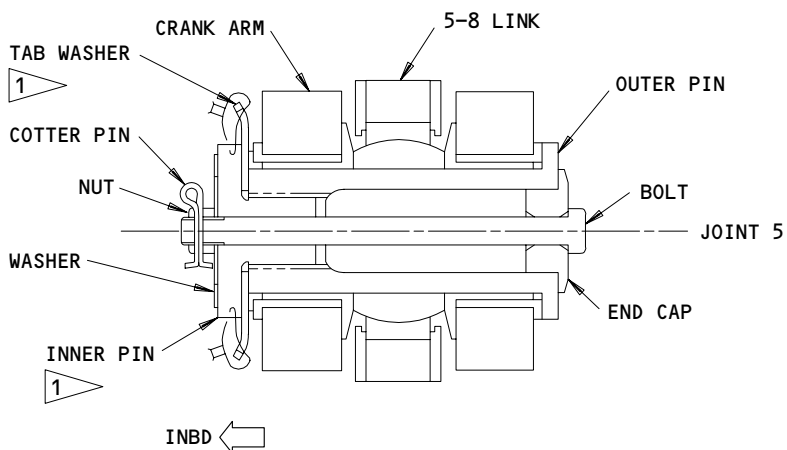
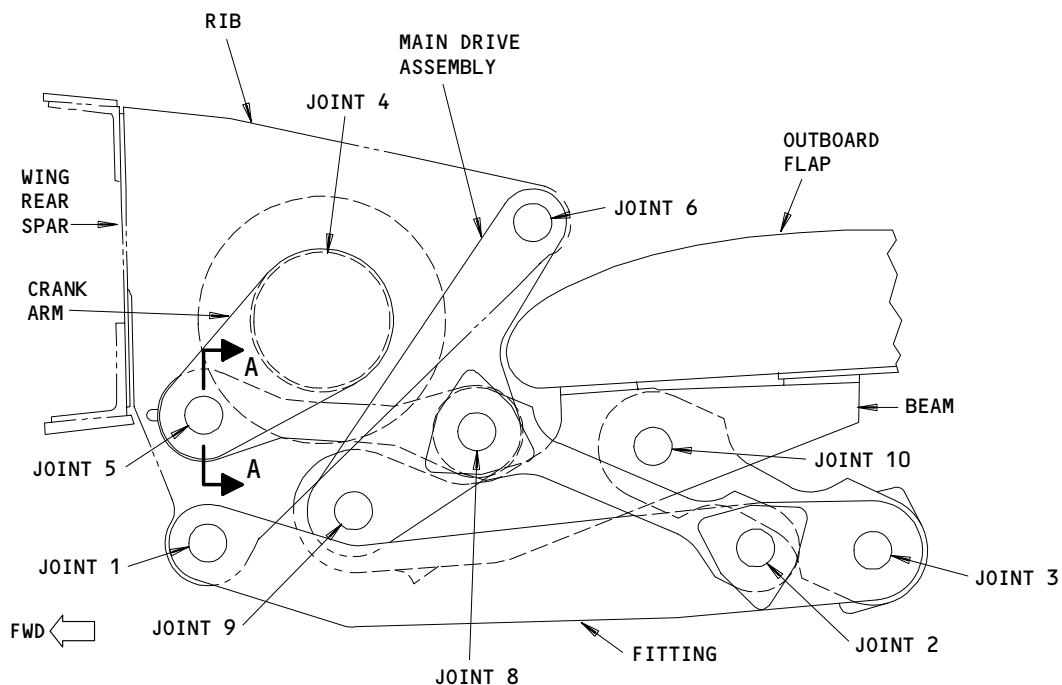


Actuator Crank Arm Mechanism for the Outboard Flap  
Figure 401 (Sheet 3)

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A-A

1 INSTALL LOCKWIRE  
(2 LOCATIONS)  
(AMM 20-10-23/401)

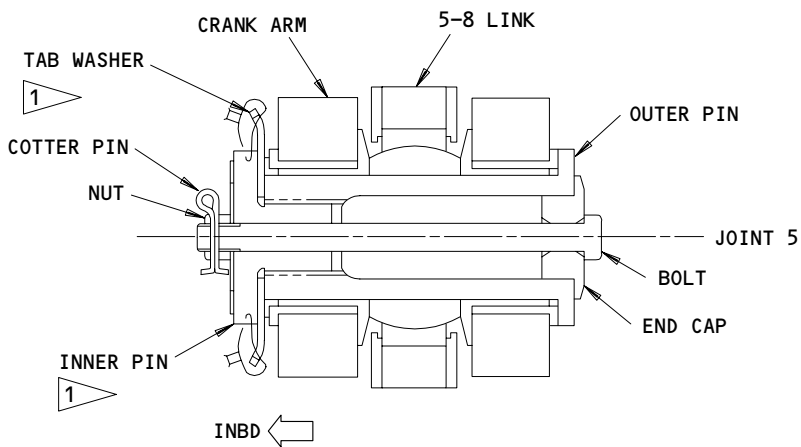
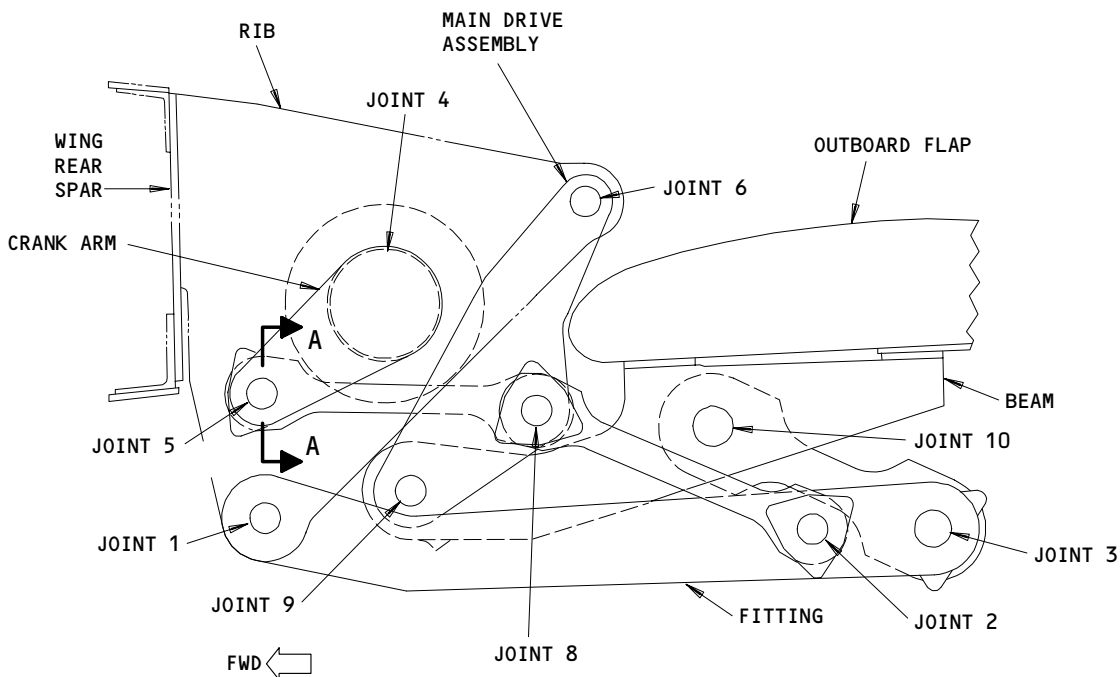
Outboard Linkage and Actuator Crank Arm for the Outboard Flap  
Figure 402

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A-A

1 INSTALL LOCKWIRE  
(2 LOCATIONS)  
(AMM 20-10-23/401)

Inboard Linkage and Actuator Crank Arm for the Outboard Flap  
Figure 403

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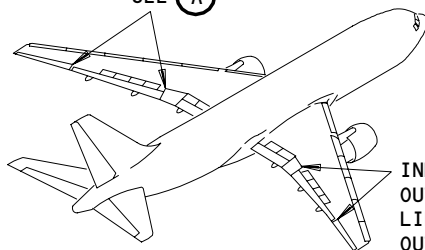
27-51-21

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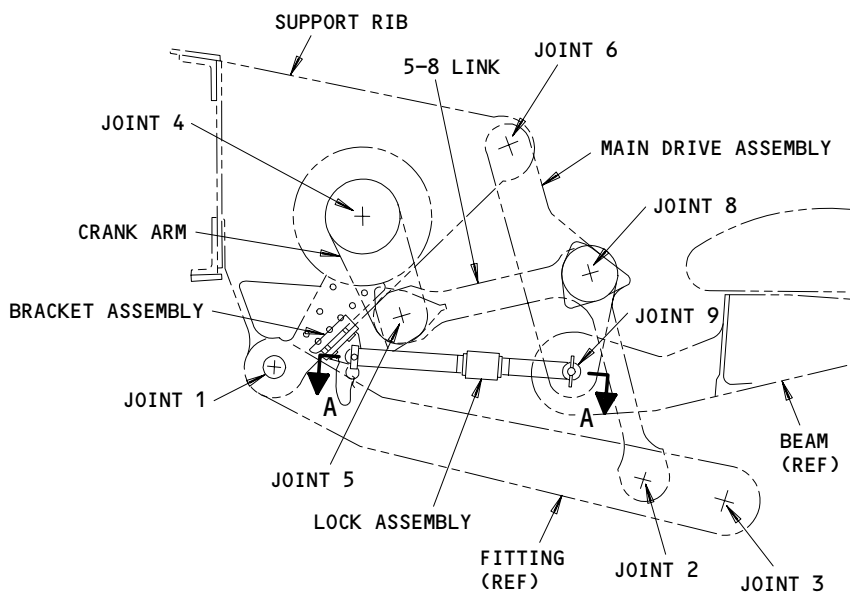
INBOARD AND  
OUTBOARD  
LINKAGES,  
OUTBOARD FLAP

SEE (A)



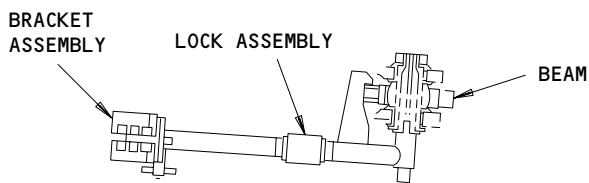
INBOARD AND  
OUTBOARD  
LINKAGES,  
OUTBOARD FLAP

SEE (A)



INBOARD AND OUTBOARD  
LINKAGE - OUTBOARD FLAP

(A)



A-A

Linkage Lock Set for the Outboard Flap  
Figure 404

EFFECTIVITY

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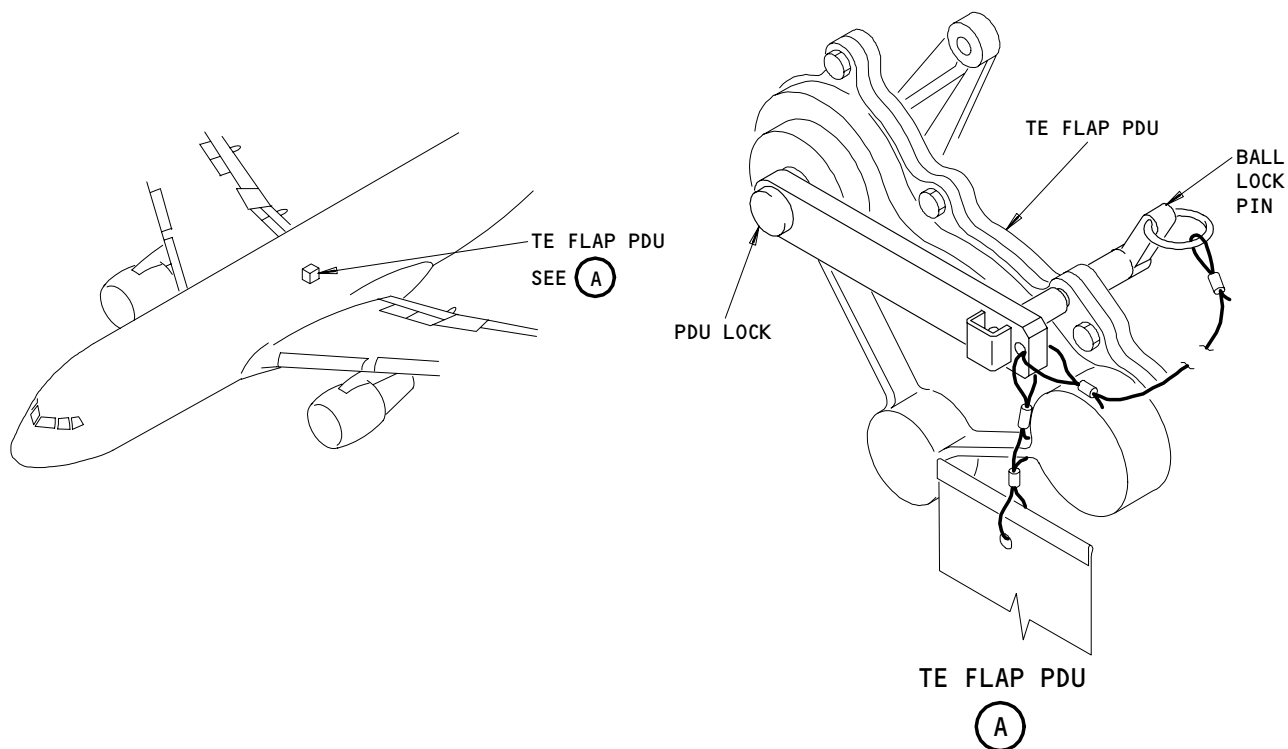
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(2) Access Panels

561EB/661EB	Wing TE Structure, Outboard Flap Installation
561FB/661FB	Wing TE Structure, Outboard Flap Installation
561GB/661GB	Wing TE Structure, Outboard Flap Installation
561HB/661HB	Wing TE Structure, Outboard Flap Installation
561JB/661JB	Wing TE Structure, Outboard Flap Installation
572BB/672BB	Flap Mechanism - No. 2 (LH) and No. 7 (RH)
573BB/673BB	Flap Mechanism - No. 1 (LH) and No. 8 (RH)



PDU Lock for the TE Flap PDU  
Figure 405

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D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

**WARNING:** USE PROCEDURE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-004

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

S 864-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-006

- (5) Move the flap control lever to the 30-unit detent and permit the flaps to move to the fully extended position.

S 864-007

- (6) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 494-008

- (7) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 864-009

- (8) Open these circuit breakers on the main power distribution panel, P6, and install the circuit breaker locks and DO-NOT-CLOSE tags:

(a) 6D21, ALTN SLAT INBD PWR

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- (b) 6D24, ALTN FLAP PWR
- (c) 6F24, ALTN SLAT OUTBD PWR

S 864-010

- (9) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 494-011

- (10) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 405).

S 014-012

- (11) Remove these access panels from the lower surface of the wing trailing edge that is applicable (AMM 06-44-00/201):
  - (a) For the inboard actuator crank arm, remove access panels 561EB, 561FB, 561GB, and 572BB (left wing) or access panels 661EB, 661FB, 661GB, and 672BB (right wing).
  - (b) For outboard actuator crank arm, remove access panels 561JB, 561HG, 561GB, and 573BB (left wing) or access panels 661JB, 661HB, 661GB, and 673BB (right wing).

E. Remove the Rotary Actuator Crank Arm

S 034-013

- (1) Disconnect the four bolts that attach the safety strap bracket to the actuator (Detail A, Fig. 401), and remove the safety strap.

S 934-014

- (2) Make a reference mark between the coupling on the inboard rotary actuator and the torque tube on the inboard side of the actuator.

S 034-015

- (3) Disconnect the inboard torque tube from the inboard rotary actuator (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tube. It will be necessary to adjust the flap drive if you turn the torque tube while it is disconnected.

S 984-016

- (4) Manually turn the coupling on the inboard rotary actuator in the extend direction, until the inboard actuator crank arm touches the extend overtravel stop (View A-A, Fig. 401).

**NOTE:** Count and keep a record on the number of turns of the coupling from the reference mark.

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S 984-017

- (5) Manually turn the actuator coupling in the retract direction, until the flap lower surface is parallel to the ground.

S 494-018

- (6) Hold the weight of the main flap to release the load on the linkages with the flap linkage lock set (Fig. 404).

S 024-019

- (7) Remove the applicable rotary actuator (AMM 27-51-22/401).

NOTE: Keep the actuator attach bolts in the retainers.

S 034-020

- (8) Remove the position transmitter (AMM 27-51-45/201).

S 034-021

- (9) Do these steps to disconnect the actuator crank arm from the 5-8 link (Fig. 402 and Fig. 403):
- (a) At joint 5,  
remove the cotter pin, nut, washer, bolt, and end cap.
  - (b) Cut the lockwires and remove the inner pin and tab washer from the outer pin.
  - (c) Hold the 5-8 link and remove the outer pin.

S 024-025

- (10) For the inboard linkage,  
remove the transmitter housing cover.

S 024-023

- (11) For the outboard linkage,  
remove the transmitter housing (AMM 27-51-45/201).

S 034-026

- (12) Disconnect the nuts and remove the retaining ring on the outboard side of the outboard support rib (View C-C, Fig. 401).

NOTE: You will remove the inner retaining ring at the outboard support rib when you remove the crank arm.

NOTE: Make a note or write down location of removed washers and nuts. During installation, the washers and nuts should be placed in their original locations to prevent any damage.

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S 034-027

- (13) Disconnect the nuts and remove the reaction ring at the inboard side of the inboard support rib (View D-D, Fig. 401).

**NOTE:** You will remove the inner retaining ring at the inboard support rib when you remove the crank arm.

S 034-028

- (14) Remove the nut and tab washer on the input shaft.

S 034-029

- (15) Hold the crank arm and the two inner retaining rings, and move the input shaft to the inboard direction, out of the support ribs.

S 024-030

- (16) Lower the crank arm and the two inner retaining rings from the airplane.

S 034-031

- (17) Remove and clean the thrust spacers in the crank arm and the outboard support rib if it is necessary.

TASK 27-51-21-424-032

3. Outboard Flap Actuator Crank Arm Mechanism - Installation

A. Equipment

- (1) TE Flap PDU Lock - A27009-7

B. Consumable Materials

- (1) A00247 Sealant, Chromate Type - BMS 5-95  
(2) D00633 Grease - BMS 3-33 (recommended)  
(3) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)  
(4) D00015 Grease, Corrosion Preventive - BMS 3-24  
(5) C00174 Corrosion Preventive Compound -  
MIL-C-16173, Grade 2  
(6) C00259 Primer - BMS 10-11, Type 1  
(7) G02020 Modeling Clay

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels  
(2) AMM 20-10-23/401, Lockwires  
(3) AMM 24-22-00/201, Electrical Power - Control  
(4) AMM 27-51-00/501, Trailing Edge Flap System  
(5) AMM 27-51-20/401, Outboard Flap  
(6) AMM 27-51-22/401, Outboard TE Flap Rotary Actuators  
(7) AMM 27-51-41/401, TE Flap Torque Tubes  
(8) AMM 27-51-45/201, Flap Position Transmitter and Transmitter Gearbox

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- (9) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (10) AMM 32-00-15/201, Landing Gear Door Lock

D. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
560/660	Wing Trailing Edge - Outboard
572/672	Outboard Flap Inboard Fairing
573/673	Outboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

561EB/661EB	Wing TE Structure, Outboard Flap Installation
561FB/661FB	Wing TE Structure, Outboard Flap Installation
561GB/661GB	Wing TE Structure, Outboard Flap Installation
561HB/661HB	Wing TE Structure, Outboard Flap Installation
561JB/661JB	Wing TE Structure, Outboard Flap Installation
572BB/672BB	Flap Mechanism - No. 2 (LH) and No. 7 (RH)
573BB/673BB	Flap Mechanism - No. 1 (LH) and No. 8 (RH)

E. Install the Rotary Actuator Crank Arm (Fig. 401)

**NOTE:** Refer to AMM 27-51-21/601 for data on the wear limit inspection for the components used in this installation.

S 624-033

- (1) Apply corrosion preventive compound to the inner thrust spacer, and install the spacer in the crank arm (View B-B, Fig. 401).

S 624-034

- (2) Apply corrosion preventive compound to the outer thrust spacer, and install the spacer in the outboard support rib bearing.

S 624-035

- (3) Apply corrosion preventive compound to the inner and outer surfaces of the input shaft.

**NOTE:** Make sure the compound gets into the cavities and splines between the input shaft and the crank arm.

S 434-036

- (4) Install new seals in the two inner retaining rings with wet primer (View B-B, Fig. 401).

**NOTE:** Make sure you install the seals in the positions shown to permit correct lubrication to the bearings.

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- S 434-037  
(5) Install the two inner retaining rings on each side of the crank arm.

- S 434-038  
(6) Put the crank arm assembly between the inboard and outboard support ribs.

- S 434-039  
(7) Put the input shaft through the inboard support rib, the crank arm assembly, and the outboard support rib.

- S 434-040  
(8) Install new seals in the outer retaining ring and the reaction ring with wet primer (View B-B, Fig. 401).

**NOTE:** Make sure you install the seal in the position shown to permit correct lubrication to the bearing.

- S 434-041  
(9) Install the tab washer and the nut to the outboard end of the input shaft (View B-B, Fig. 401).

- S 434-042  
(10) Tighten the nut on the input shaft to 2000-3500 pound-inches, and install lockwires at two locations (AMM 20-10-23/401).

- S 644-043  
(11) Apply BMS 3-24 grease to the bolts, nuts, and washers for the installation of the retaining rings.

- S 434-044  
(12) For the outboard linkage of the outboard flap, put the outer retaining ring and the transmitter housing on the outboard support rib and install the six bolts and nuts, with a washer below each bolt and each nut (View C-C, Fig. 401).

**NOTE:** Install washers in their original location. Washers vary and if installed in incorrect location, damage can occur to unit.

- S 434-045  
(13) For the inboard linkage of the outboard flap, put the outer retaining ring and the transmitter housing cover on the outboard support rib and install the six bolts and nuts, with a washer below each bolt and each nut (View C-C, Fig. 401).

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S 434-048

- (14) Tighten the nuts (6 locations) on the retaining ring to 220-240 pound-inches (25-27 newton-meters).

**NOTE:** The same torque value applies to the inboard or outboard linkages of the outboard flap.

S 434-049

- (15) Put the reaction ring on the inboard side of the inboard support rib and install the 16 bolts and nuts, with a washer below each bolt and each nut.

S 434-050

- (16) Tighten the nuts on the reaction ring to these values (View D-D, Fig. 401).  
Nut A, 220-410 pound-inches (25-46 newton-meters)  
Nut B, 370-690 pound-inches (42-79 newton-meters)

S 434-051

- (17) Do these steps to connect the 5-8 link to the actuator crank arm (Fig. 402 and Fig. 403):  
(a) Align the 5-8 link in the crank arm and install the outer pin.  
(b) Install the tab washer and the inner pin on the outer pin.  
(c) Tighten the inner pin to 800-1500 pound-inches (90-170 newton-meters), and install two lockwires between the inner pin and tab washer with the double twist procedure (AMM 20-10-23/401).  
(d) Install the end cap, bolt, and the inner nut.  
(e) Tighten the inner nut to 150-200 pound-inches (17-23 newton-meters) and install the cotter pin.

S 644-052

- (18) Lubricate the input shaft of the crank arm with BMS 3-33 grease at the fitting, until you see grease come out at the grease exit.

**NOTE:** Lubricate the input shaft before the rotary actuator installation to make sure the seals are installed correctly. Do not use an alternative grease.

S 424-053

- (19) Install the rotary actuator (AMM 27-51-22/401).

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S 434-054

- (20) Connect the torque tube between the inboard and outboard rotary actuators of the outboard flap (AMM 27-51-41/401).

**NOTE:** Keep the torque tube disconnected at the inboard side of the inboard rotary actuator for the subsequent adjustments.

S 094-055

- (21) If installed, remove the flap linkage lock sets from the flap linkages (Fig. 404).

S 984-056

- (22) Turn the actuator coupling to extend the outboard flap, until the two crank arms touch the extend overtravel stops (View A-A, Fig. 401).

**NOTE:** If you cannot get the inboard and outboard crank arms to touch the extend overtravel stops at the same time, disconnect the torque tube between the actuators. Then turn each coupling independently until each crank arm touches the stop, and connect the torque tube between the two actuators.

S 984-057

- (23) Turn the inboard actuator coupling in the retract direction for the same number of turns that you did during the removal procedure, and align the reference mark that you made between the coupling and torque tube.

**NOTE:** If you did not keep a record on the number of turns you made during the removal procedure, turn the coupling back 5-1/2 turns and adjust the retract overtravel stop clearance to the RIG dimension (AMM 27-51-00/501, "Outboard Flap Retract Overtravel Stop RIG Position - Adjustment").

S 434-058

- (24) Connect the torque tube to the inboard side of the inboard rotary actuator (AMM 27-51-41/401).

S 434-059

- (25) Install the safety strap bracket with the four attach bolts (Fig. 401).

S 424-060

- (26) Install the flap position transmitters (AMM 27-51-45/201).

S 094-061

- (27) Remove the PDU lock from the TE flap PDU (Fig. 405).

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S 214-062

- (28) Make sure the flap control lever is in the 30-unit detent, and remove the DO-NOT-OPERATE tag from the flap control lever.

S 864-063

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (29) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-064

- (30) Move the flap control lever to the 20-unit detent, and make sure the flaps move to the 20-degree position.

S 864-065

- (31) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 494-066

- (32) Install the PDU lock in the TE flap PDU (Fig. 405).

S 494-067

- (33) Apply modeling clay to all the retract overtravel stops for the outboard flap, in the left and right wings.

**NOTE:** If it is necessary, put a piece of tape on the retract stop so that it will be easier to remove the clay.

S 094-068

- (34) Remove the PDU lock in the TE flap PDU (Fig. 405).

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S 864-069

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(35) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-070

(36) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted position.

**NOTE:** After the flaps moved to the fully retracted position, stop for one minute before you continue to the subsequent step.

S 864-071

(37) Move the flap control lever to the 20-unit detent, and make sure the flaps move to the 20-degree position.

S 864-072

(38) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 494-073

(39) Install the PDU lock in the TE flap PDU (Fig. 405).

S 094-074

(40) Carefully remove the clay from each retract overtravel stop.

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S 224-075

- (41) Measure and make a record of the clay thickness at each retract overtravel stop, and make sure each overtravel stop clearance (the clay thickness) is correct as shown (View A-A, Fig. 401).

S 824-076

- (42) If the overtravel stop clearance is not correct, adjust the overtravel stop clearance to the RIG position (AMM 27-51-00/501, "Outboard Flap Retract Overtravel Stops RIG Position - Adjustment").

S 434-077

- (43) Make sure you install a lockwire with the double twist procedure to each coupling, for the torque tubes that you connected (AMM 20-10-23/401).

S 094-078

- (44) Remove the PDU lock from the TE flap PDU (Fig. 405).

S 864-079

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (45) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-080

- (46) Move the flap control lever to the zero (FLAPS UP) detent, and permit the flaps and slats to move to the fully retracted position.

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F. Put the Airplane Back to Its Usual Condition

S 414-081

- (1) Install the access panels at the lower surface of the wing trailing edge (AMM 06-44-00/201).

S 864-082

- (2) Remove the DO-NOT-CLOSE tags and circuit breaker locks and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-083

- (3) Remove the DO-NOT-CLOSE tags and circuit breaker locks and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 094-084

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 864-085

- (5) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 864-086

- (6) Remove electrical power (AMM 24-22-00/201).

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OUTBOARD FLAP ACTUATOR CRANK ARM MECHANISM – INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and wear limit tables, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Outboard Flap – Removal/Installation for procedures to do these tasks.

TASK 27-51-21-226-001

2. Wear Limits for the Outboard Flap Outboard Linkage (Fig. 601)

A. Access

- (1) Location Zone  
560/660 Left/Right Wing Trailing Edge – Outboard

B. Procedure

S 226-004

- (1) Use the supplied data (Fig. 601) to examine the outboard flap outboard linkage for too much wear.

TASK 27-51-21-226-002

3. Wear Limits for the Outboard Flap Inboard Linkage (Fig. 602)

A. Access

- (1) Location Zone  
560/660 Left/Right Wing Trailing Edge – Outboard

B. Procedure

S 226-005

- (1) Use the supplied data (Fig. 602) to examine the outboard flap inboard linkage for too much wear.

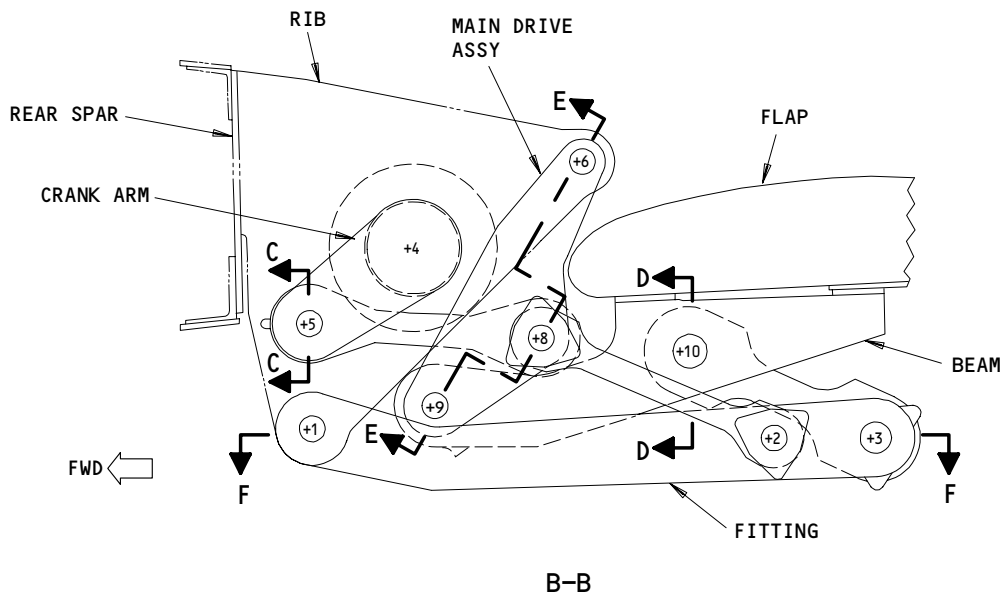
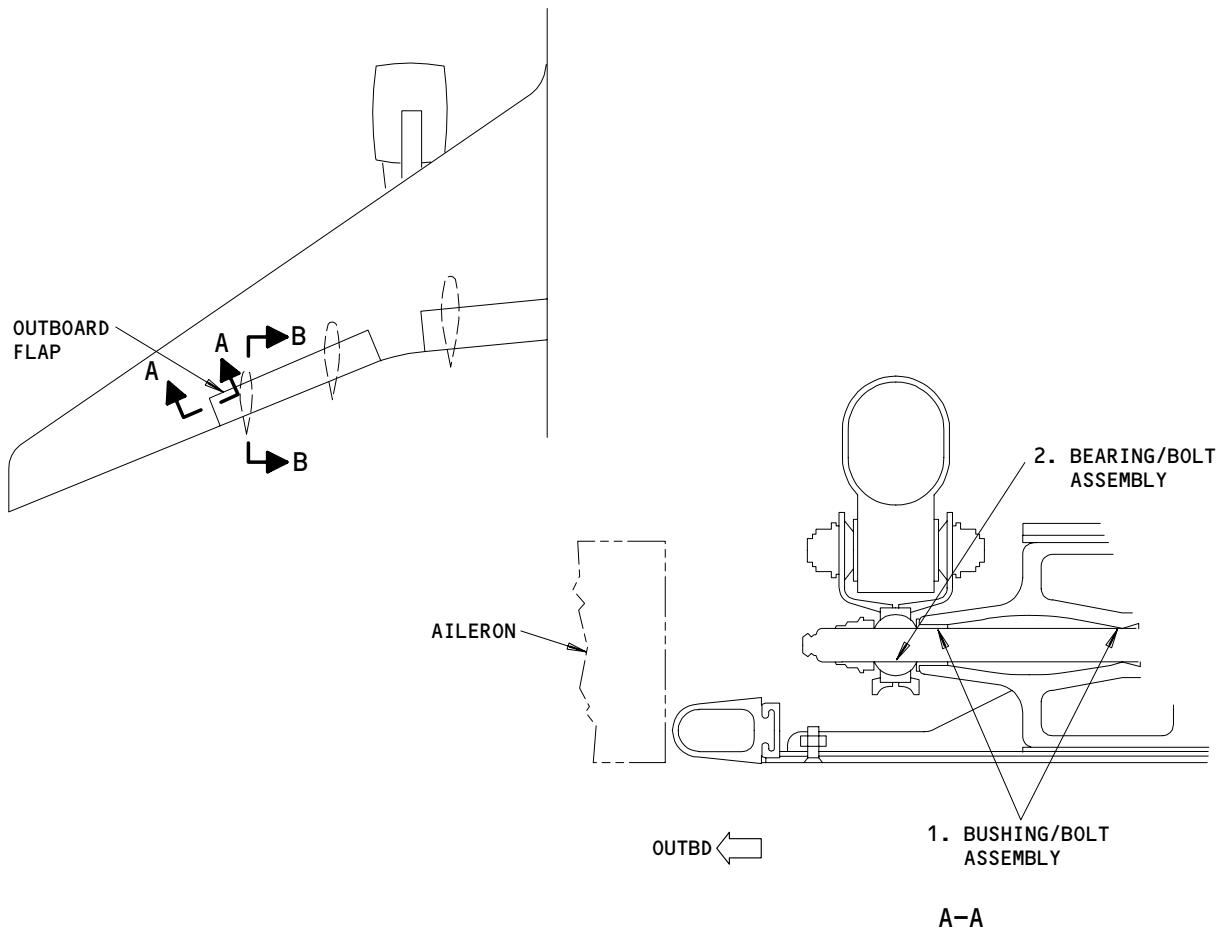
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Wear Limits for the Outboard Linkage of the Outboard Flap  
Figure 601 (Sheet 1)

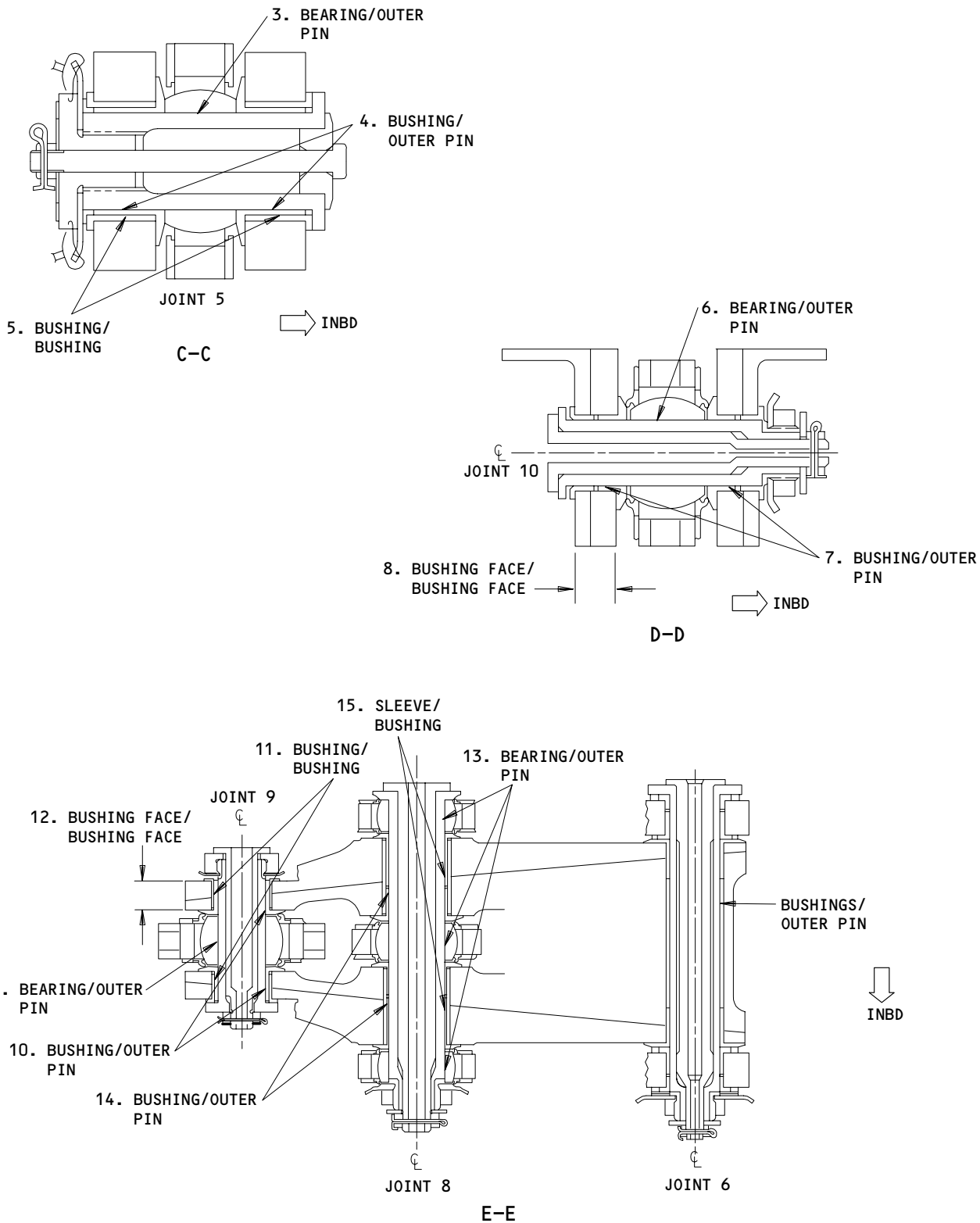
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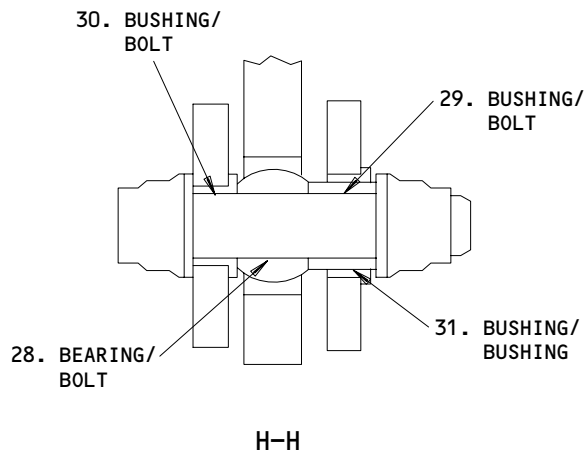
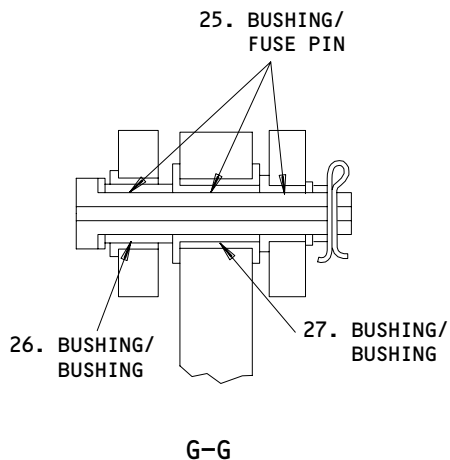
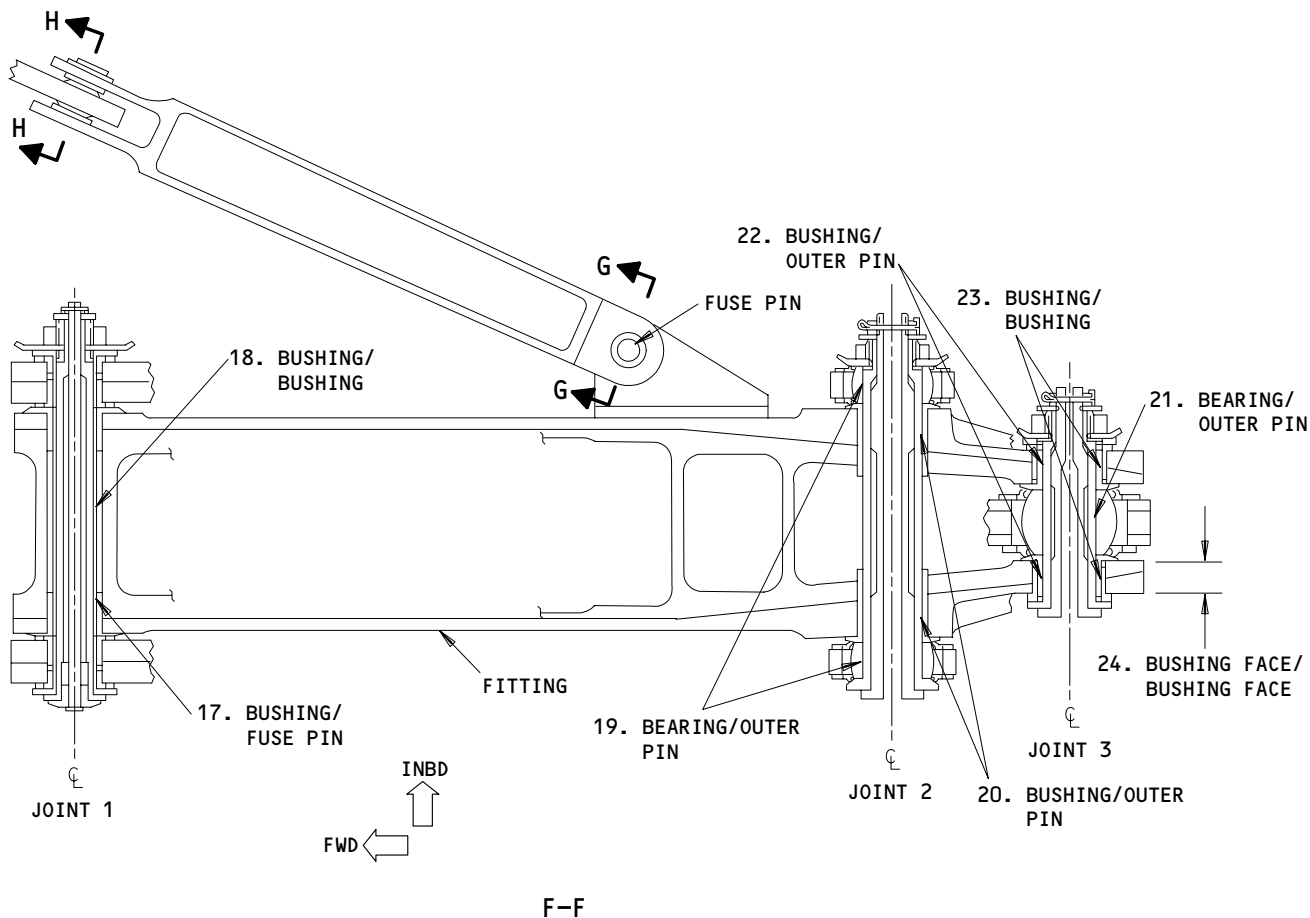
Wear Limits for the Outboard Linkage of the Outboard Flap  
Figure 601 (Sheet 2)

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Wear Limits for the Outboard Linkage of the Outboard Flap  
Figure 601 (Sheet 3)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT ASSY	OD	0.4985 (12.662)	0.4995 (12.687)	0.4954 (12.583)		X		
2	BEARING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT ASSY	OD	0.4985 (12.662)	0.4995 (12.687)	0.4958 (12.594)		X		
3	BEARING	ID	1.5000 (38.100)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4984 (38.059)	1.4990 (38.075)	1.4922 (37.902)			X	1
4	BUSHING	ID	1.4995 (38.087)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4984 (38.059)	1.4990 (38.075)	1.4922 (37.902)			X	1
5	BUSHING	ID	1.6484 (41.869)	1.6492 (41.890)	---	---	X		
	BUSHING	OD	1.6500 (41.910)	1.6508 (41.930)	---		X		
6	BEARING	ID	1.3750 (34.925)	1.3756 (34.940)	1.3818 (35.098)	0.0078 (0.198)	X		
	OUTER PIN	OD	1.3734 (34.884)	1.3740 (34.900)	1.3678 (34.742)			X	1
7	BUSHING	ID	1.3745 (34.912)	1.3756 (34.940)	1.3818 (35.098)	0.0078 (0.198)	X		
	OUTER PIN	OD	1.3734 (34.884)	1.3740 (34.900)	1.3678 (34.742)			X	1
8	BUSHING FACE	---	---	1.6300 (41.402)	1.6600 (42.164)	---	X		
	BUSHING FACE								
9	BEARING	ID	1.3125 (33.338)	1.3131 (33.353)	1.3190 (33.503)	0.0075 (0.191)	X		
	OUTER PIN	OD	1.3109 (33.297)	1.3115 (33.312)	1.3056 (33.162)			X	1
10	BUSHING	ID	1.3120 (33.325)	1.3131 (33.353)	1.3190 (33.503)	0.0075 (0.191)	X		
	OUTER PIN	OD	1.3109 (33.297)	1.3115 (33.312)	1.3056 (33.162)			X	1

1 THIS PART CAN BE REPAIRED.

Wear Limits for the Outboard Linkage of the Outboard Flap  
Figure 601 (Sheet 4)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BUSHING	ID	1.4422 (36.632)	1.4430 (36.652)	---	---	X		
	BUSHING	OD	1.4438 (36.673)	1.4446 (36.693)	---		X		
12	BUSHING FACE	---	---	1.4110 (35.839)	1.4410 (36.601)	---	X		
	BUSHING FACE								
13	BEARING	ID	1.5000 (38.100)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4985 (38.062)	1.4990 (38.075)	1.4922 (37.902)			X	1
14	BUSHING	ID	1.4995 (38.087)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4985 (38.062)	1.4990 (38.075)	1.4922 (37.902)			X	1
15	SLEEVE	ID	1.6482 (41.864)	1.6490 (41.885)	---	---	X		
	BUSHING	OD	1.6500 (41.910)	1.6509 (41.933)	---		X		
16	BUSHING	ID	1.3750 (34.925)	1.3756 (34.940)	1.3818 (35.098)	0.0078 (0.198)	X		
	OUTER PIN	OD	1.3734 (34.884)	1.3740 (34.900)	1.3678 (34.742)			X	1
17	BUSHING	ID	0.9856 (25.034)	0.9866 (25.060)	0.9912 (25.176)	0.0062 (0.157)	X		
	FUSE PIN	OD	0.9844 (25.004)	0.9850 (25.019)	0.9804 (24.902)		X		
18	BUSHING	ID	1.2510 (31.775)	1.2520 (31.801)	1.2579 (31.951)	0.0075 (0.191)	X		
	BUSHING	OD	1.2498 (31.745)	1.2504 (31.760)	1.2445 (31.610)		X		
19	BEARING	ID	1.5000 (38.100)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4985 (38.062)	1.4990 (38.075)	1.4922 (37.902)			X	1
20	BUSHING	ID	1.5000 (38.100)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4985 (38.062)	1.4990 (38.075)	1.4922 (37.902)			X	1

Wear Limits for the Outboard Linkage of the Outboard Flap  
Figure 601 (Sheet 5)

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

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
21	BEARING	ID	1.3750 (34.925)	1.3756 (34.940)	1.3818 (35.098)	0.0078 (0.198)	X		
	OUTER PIN	OD	1.3750 (34.884)	1.3740 (34.900)	1.3678 (34.742)			X	
22	BUSHING	ID	1.3750 (34.925)	1.3756 (34.940)	1.3818 (35.098)	0.0078 (0.198)	X		
	OUTER PIN	OD	1.3750 (34.884)	1.3740 (34.900)	1.3678 (34.742)			X	
23	BUSHING	ID	1.5108 (38.374)	1.5116 (38.395)	---	---	X		
	BUSHING	OD	1.5125 (38.418)	1.3770 (34.976)	---			X	
24	BUSHING FACE	---	---	1.3770 (34.976)	1.4070 (35.738)	---	X		
	BUSHING FACE						X		
25	BUSHING	ID	0.3735 (9.487)	0.3755 (9.538)	0.3795 (9.639)	0.0050 (0.127)	X		
	FUSE PIN	OD	0.3735 (9.487)	0.3745 (9.512)	0.3705 (9.411)			X	
26	BUSHING	ID	0.5620 (14.275)	0.5630 (14.300)	0.5665 (14.389)	0.0050 (0.127)	X		
	BUSHING	OD	0.5610 (14.249)	0.5615 (14.262)	0.5580 (14.173)			X	
27	BUSHING	ID	0.5000 (12.700)	0.5006 (12.715)	---	---	X		
	BUSHING	OD	0.5010 (12.725)	0.5016 (12.741)	---			X	
28	BEARING	ID	0.6250 (15.875)	0.6255 (15.888)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6235 (15.837)	0.6240 (15.850)	0.6205 (15.761)			X	
29	BUSHING	ID	0.6245 (15.862)	0.6250 (15.875)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6235 (15.837)	0.6240 (15.850)	0.6200 (15.748)			X	
30	BUSHING	ID	0.6250 (15.875)	0.6256 (15.890)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6235 (15.837)	0.6240 (15.850)	0.6206 (15.763)			X	

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Figure 601 (Sheet 6)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
31	BUSHING	ID	0.8745 (22.212)	0.8755 (22.238)	0.8798 (22.347)	0.0058 (0.147)	X		
	BUSHING	OD	0.8735 (22.187)	0.8740 (22.200)	0.8697 (22.090)		X		

Wear Limits for the Outboard Linkage of the Outboard Flap  
Figure 601 (Sheet 7)

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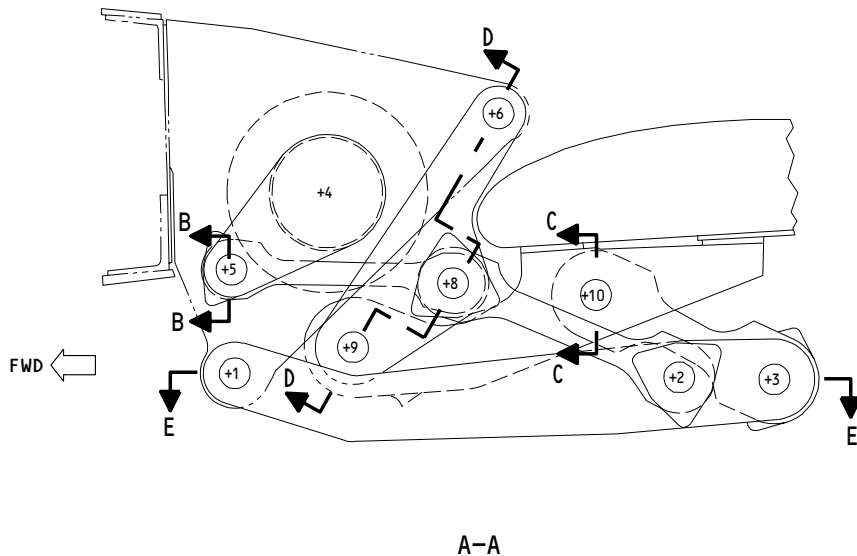
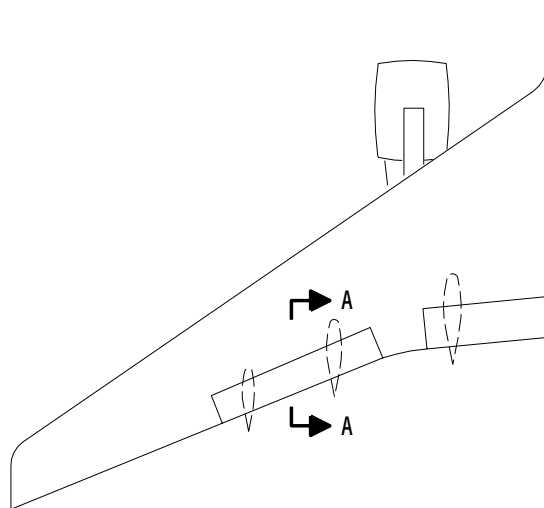
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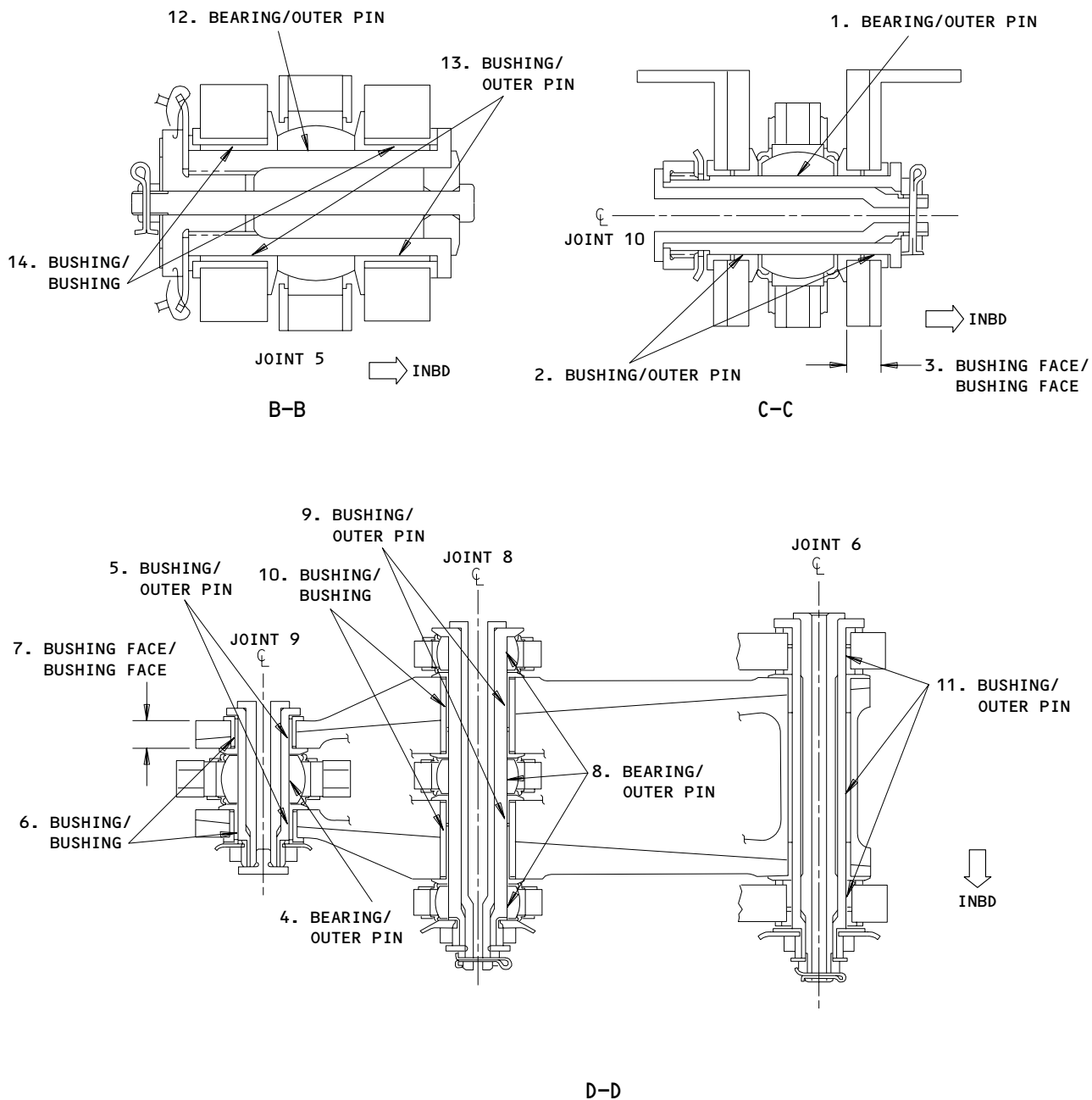
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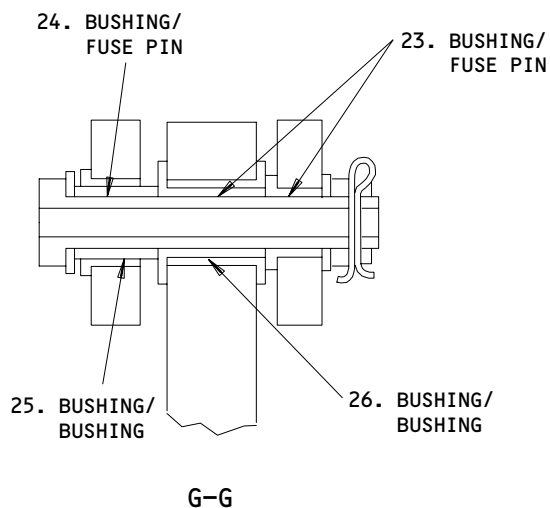
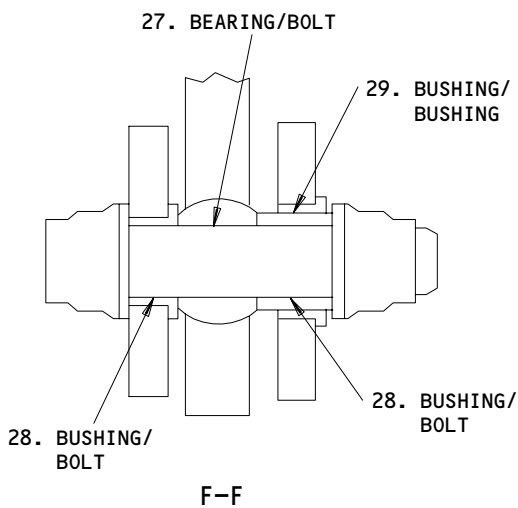
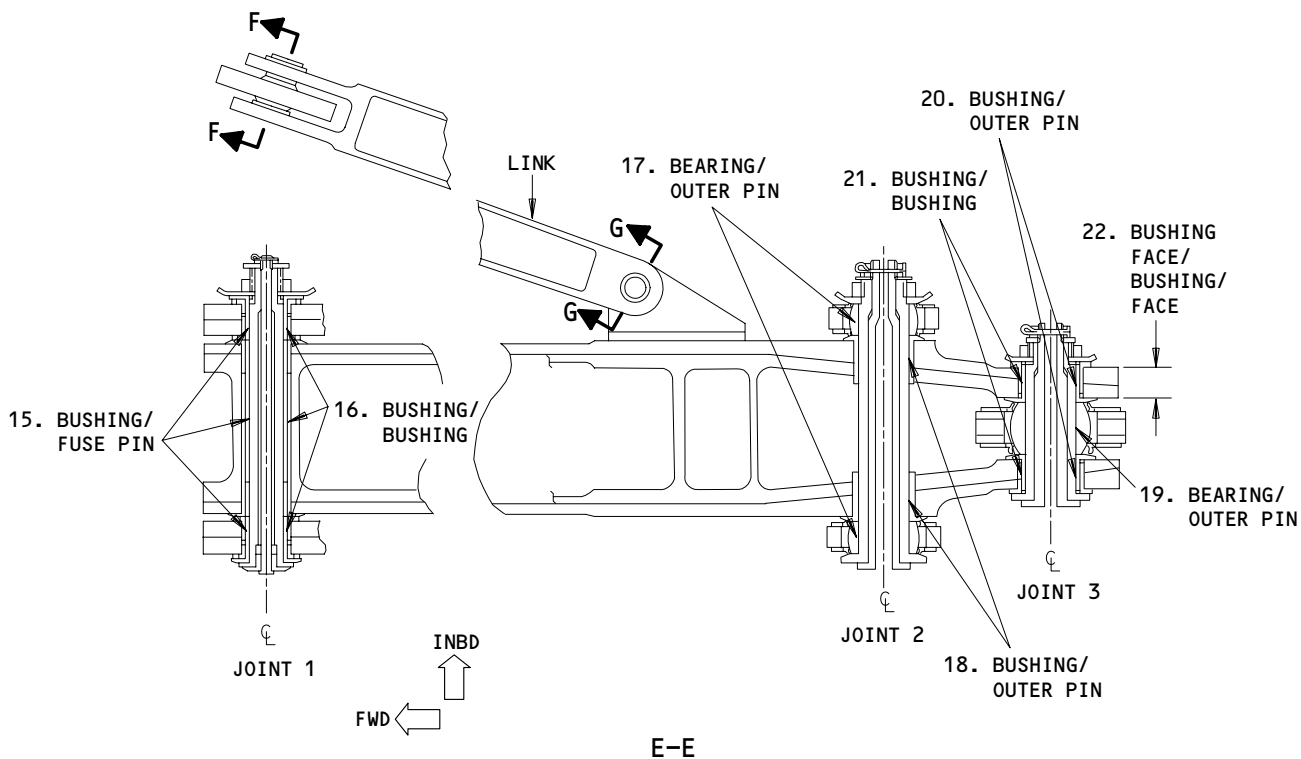
Wear Limits for the Inboard Linkage of the Outboard Flap  
Figure 602 (Sheet 2)

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Wear Limits for the Inboard Linkage of the Outboard Flap  
Figure 602 (Sheet 3)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BEARING	ID	1.6250 (41.275)	1.6256 (41.290)	1.6330 (41.478)	0.0090 (0.229)	X		
	OUTER PIN	OD	1.6234 (41.234)	1.6240 (41.250)	1.6166 (41.062)			X	1
2	BUSHING	ID	1.6245 (41.262)	1.6256 (41.290)	1.6330 (41.478)	0.0090 (0.229)	X		
	OUTER PIN	OD	1.6234 (41.234)	1.6240 (41.250)	1.6166 (41.062)			X	1
3	BUSHING FACE	---	---	1.4760 (37.490)	1.5060 (38.252)	---	X		
	BUSHING FACE								
4	BEARING	ID	1.5000 (38.100)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4984 (38.059)	1.4990 (38.075)	1.4922 (37.902)			X	1
5	BUSHING	ID	1.4995 (38.087)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4984 (38.059)	1.4990 (38.075)	1.4922 (37.902)			X	1
6	BUSHING	ID	1.6482 (41.864)	1.9490 (49.505)	---	---	X		
	BUSHING	OD	1.6500 (41.910)	1.6509 (41.933)	---			X	
7	BUSHING FACE	---	---	1.4110 (35.839)	1.4410 (36.601)	---	X		
	BUSHING FACE								
8	BEARING	ID	1.6250 (41.275)	1.6256 (41.290)	1.6330 (41.478)	0.0090 (0.229)	X		
	OUTER PIN	OD	1.6234 (41.234)	1.6240 (41.250)	1.6166 (41.062)			X	1
9	BUSHING	ID	1.6245 (41.262)	1.6256 (41.290)	1.6330 (41.478)	0.0090 (0.229)	X		
	OUTER PIN	OD	1.6234 (41.234)	1.6240 (41.250)	1.6166 (41.062)			X	1
10	BUSHING	ID	1.7856 (45.354)	1.7865 (45.377)	---	---	X		
	BUSHING	OD	1.7875 (45.403)	1.7883 (45.423)	---			X	

1 THIS PART CAN BE REPAIRED.

Wear Limits for the Inboard Linkage of the Outboard Flap  
Figure 602 (Sheet 4)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BUSHING	ID	1.4995 (38.087)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4984 (38.059)	1.4990 (38.075)	1.4922 (37.902)			X	1
12	BEARING	ID	1.5000 (38.100)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4984 (38.059)	1.4990 (38.075)	1.4922 (37.902)			X	1
13	BUSHING	ID	1.4995 (38.087)	1.5006 (38.115)	1.5074 (38.288)	0.0084 (0.213)	X		
	OUTER PIN	OD	1.4984 (38.059)	1.4990 (38.075)	1.4922 (37.902)			X	
14	BUSHING	ID	1.6484 (41.869)	1.6492 (41.890)	---	---	X		
	BUSHING	OD	1.6500 (41.910)	1.6508 (41.930)	---			X	
15	BUSHING	ID	0.9856 (25.034)	0.9866 (25.060)	0.9912 (25.176)	0.0062 (0.157)	X		
	FUSE PIN	OD	0.9844 (25.004)	0.9850 (25.019)	0.9804 (24.902)			X	
16	BUSHING	ID	1.2510 (31.775)	1.2520 (31.801)	1.2579 (31.951)	0.0075 (0.191)	X		
	BUSHING	OD	1.2498 (31.745)	1.2504 (31.760)	1.2445 (31.610)			X	
17	BEARING	ID	1.6250 (41.275)	1.6256 (41.290)	1.6330 (41.478)	0.0090 (0.229)	X		
	OUTER PIN	OD	1.6234 (41.234)	1.3240 (33.630)	1.6166 (41.062)			X	1
18	BUSHING	ID	1.6245 (41.262)	1.6255 (41.288)	1.6330 (41.478)	0.0090 (0.229)	X		
	OUTER PIN	OD	1.6234 (41.234)	1.6240 (41.250)	1.6165 (41.059)			X	1
19	BEARING	ID	1.6250 (41.275)	1.6256 (41.290)	1.6330 (41.478)	0.0090 (0.229)	X		
	OUTER PIN	OD	1.6234 (41.234)	1.6240 (41.250)	1.6166 (41.062)			X	1
20	BUSHING	ID	1.6245 (41.262)	1.6256 (41.290)	1.6330 (41.478)	0.0090 (0.229)	X		
	OUTER PIN	OD	1.6234 (41.234)	1.6240 (41.250)	1.6166 (41.062)			X	

Wear Limits for the Inboard Linkage of the Outboard Flap  
Figure 602 (Sheet 5)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
21	BUSHING	ID	1.7855 (45.352)	1.7865 (45.377)	---	---	X		
	BUSHING	OD	1.7875 (45.403)	1.7883 (45.423)	---		X		
22	BUSHING FACE	---	---	1.6170 (41.072)	1.6470 (41.834)	---	X		
	BUSHING FACE						X		
23	BUSHING	ID	0.5000 (12.700)	0.5100 (12.954)	0.5050 (12.827)	0.0050 (0.127)	X		
	FUSE PIN	OD	0.4985 (12.662)	0.4995 (12.687)	0.5045 (12.814)		X		
24	BUSHING	ID	0.5000 (12.700)	0.5100 (12.954)	0.5045 (12.814)	0.0050 (0.127)	X		
	FUSE PIN	OD	0.4985 (12.662)	0.4995 (12.687)	0.4955 (12.586)		X		
25	BUSHING	ID	0.6870 (17.450)	0.6880 (17.475)	0.6917 (17.569)	0.0052 (0.132)	X		
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6828 (17.343)		X		
26	BUSHING	ID	0.6250 (15.875)	0.6256 (15.890)	---	---	X		
	BUSHING	OD	0.6261 (15.903)	0.6267 (15.918)	---		X		
27	BEARING	ID	0.7500 (19.050)	0.7505 (19.063)	0.7542 (19.157)	0.0052 (0.132)	X		
	BOLT	OD	0.7485 (19.012)	0.7490 (19.025)	0.7453 (18.931)		X		
28	BUSHING	ID	0.7495 (19.037)	0.7505 (19.063)	0.7542 (19.157)	0.0052 (0.132)	X		
	BOLT	OD	0.7485 (19.012)	0.7490 (19.025)	0.7453 (18.931)		X		
29	BUSHING	ID	0.7495 (19.037)	0.7500 (19.050)	0.7542 (19.157)	0.0052 (0.132)	X		
	BOLT	OD	0.7485 (19.012)	0.7490 (19.025)	0.7448 (18.918)		X		

Wear Limits for the Inboard Linkage of the Outboard Flap  
Figure 602 (Sheet 6)

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OUTBOARD TE FLAP ROTARY ACTUATORS – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the rotary actuators on the outboard flap.
- B. Each outboard flap contains two rotary actuators, one on the inboard linkage, and one on the outboard linkage. You can remove and install each rotary actuator independently.

TASK 27-51-22-024-001

2. Outboard Flap Rotary Actuator – Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip – 1012LC-R  
Commercially Available
- (2) Spoiler Actuator Lock – A27108-13
- (3) TE Flap PDU Lock – A27009-7
- (4) Spanner Wrench F72959-33 (recommended), -3 (optional)

B. References

- (1) AMM 06-44-00/201, Wing Access Door and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 27-51-41/401, TE Flap Torque Tubes
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (5) AMM 29-11-00/201, Main Hydraulic Systems
- (6) AMM 32-00-15/201, Landing Gear Door Locks
- (7) AMM 32-00-20/201, Landing Gear Downlock

C. Access

(1) Location Zones

- |         |  |
|---------|--|
| 144     | Right MLG Wheel Well                   |
| 211/212 | Control Cabin                          |
| 560/660 | Wing Trailing Edge – Outboard          |
| 572/672 | Outboard Flap Inboard Fairing          |
| 573/673 | Outboard Flap Outboard Fairing         |
| 710     | Nose Landing Gear and Doors            |
| 730/740 | Left/Right Main Landing Gear and Doors |

(2) Access Panels

- |             |   |
|-------------|---|
| 561EB/661EB | Wing TE Structure, Outboard Flap Installation |
| 561HB/661HB | Wing TE Structure, Outboard Flap Installation |
| 572BB/672BB | Flap Mechanism – No. 2 (LH) and No. 7 (RH)    |
| 573BB/673BB | Flap Mechanism – No. 1 (LH) and No. 8 (RH)    |

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

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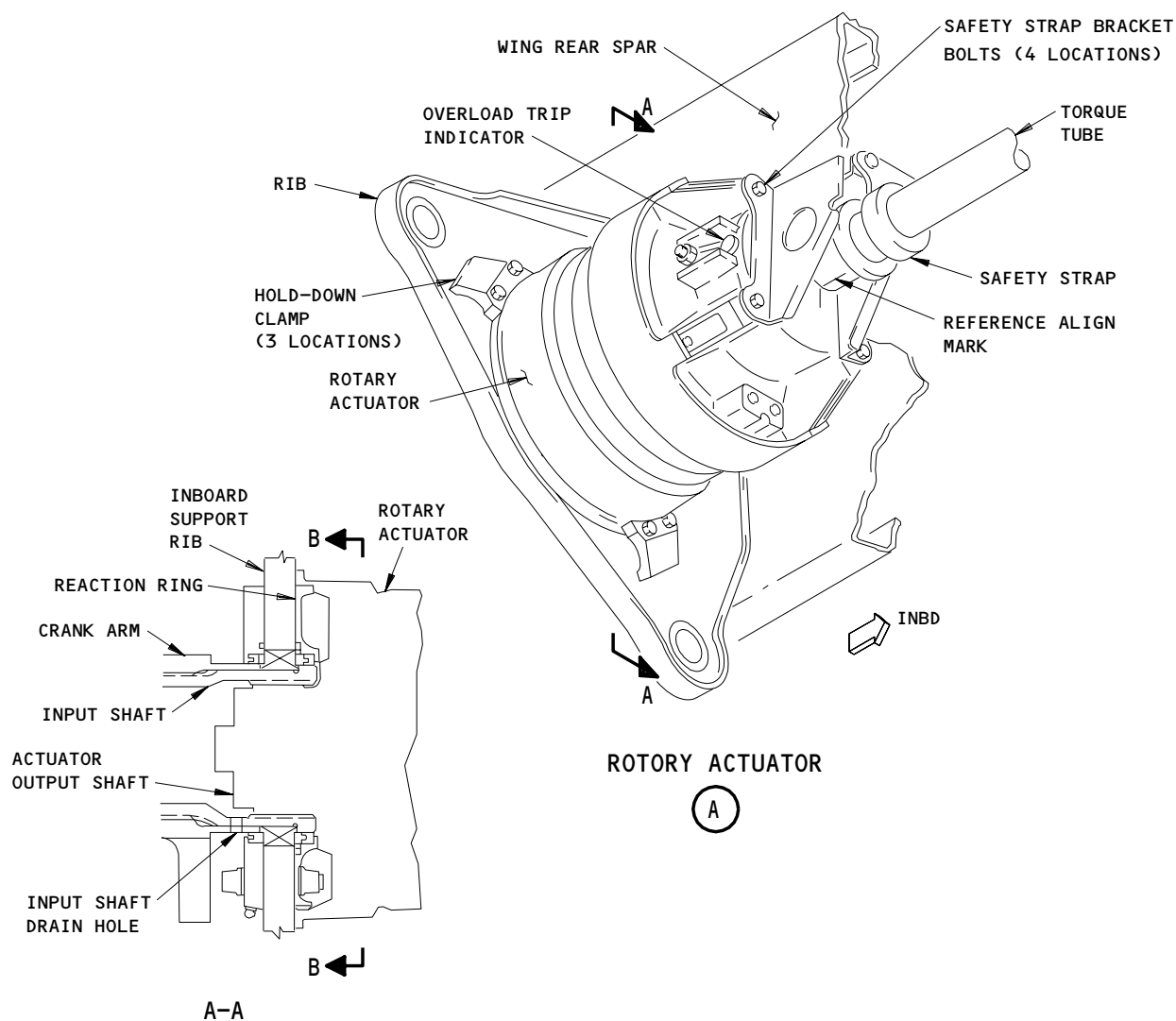
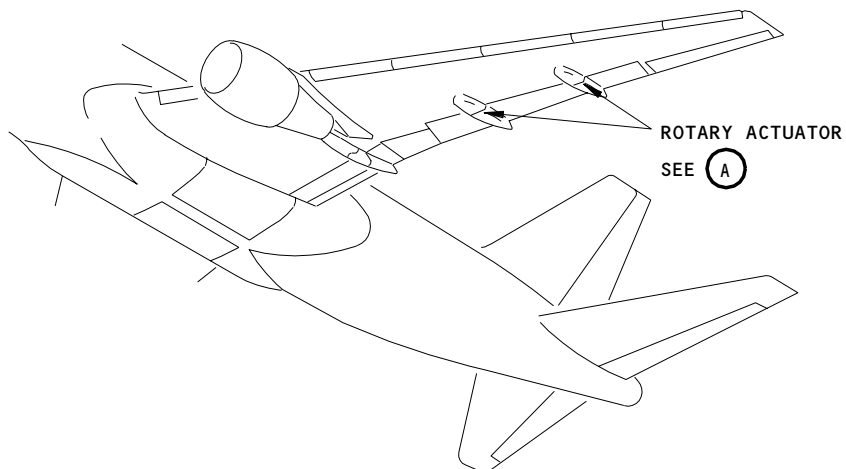
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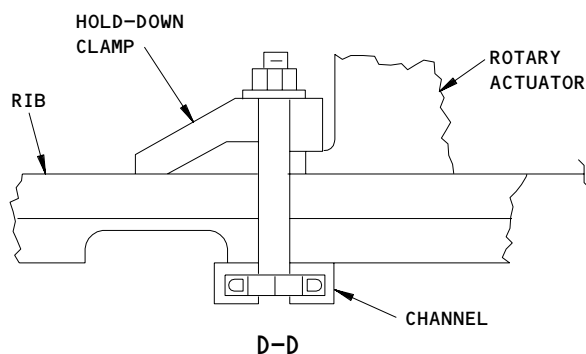
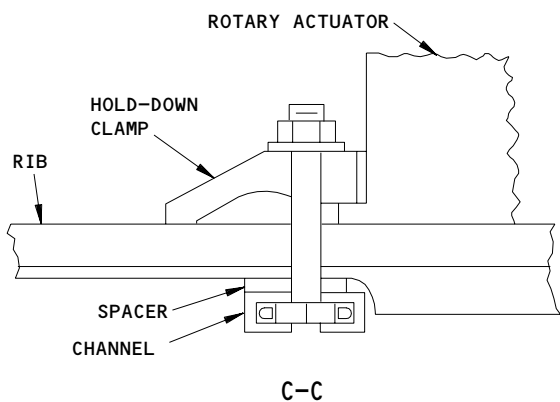
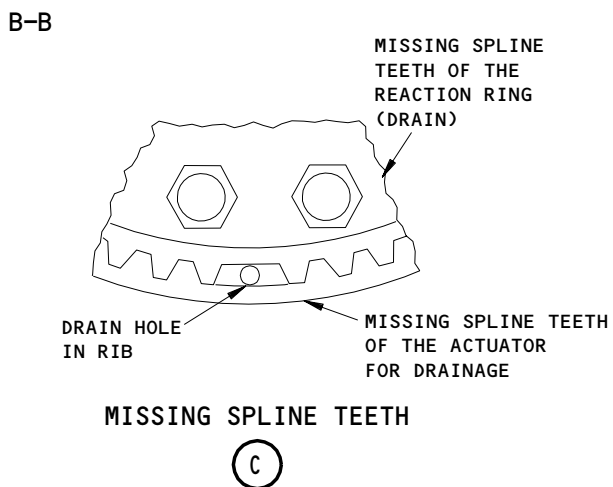
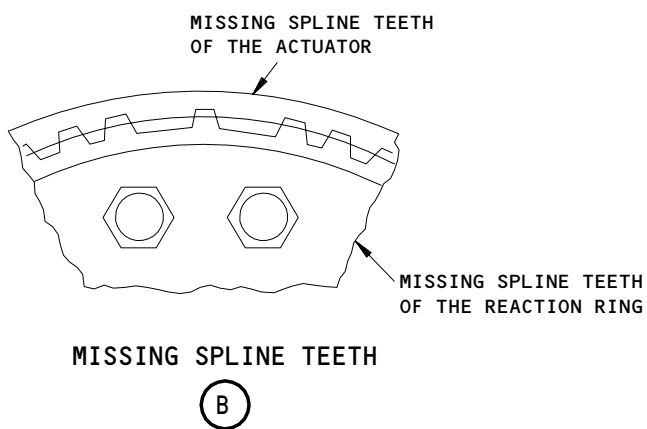
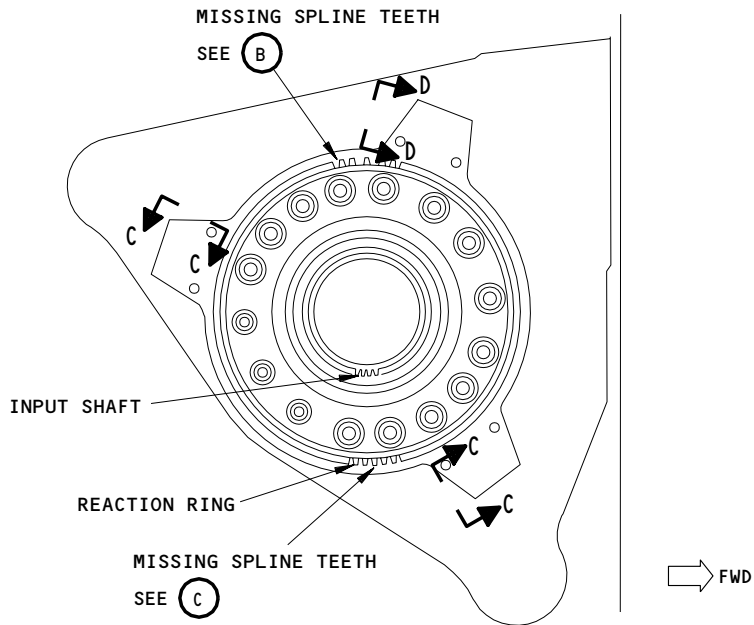




Rotary Actuators for the Outboard Flap  
Figure 401 (Sheet 1)

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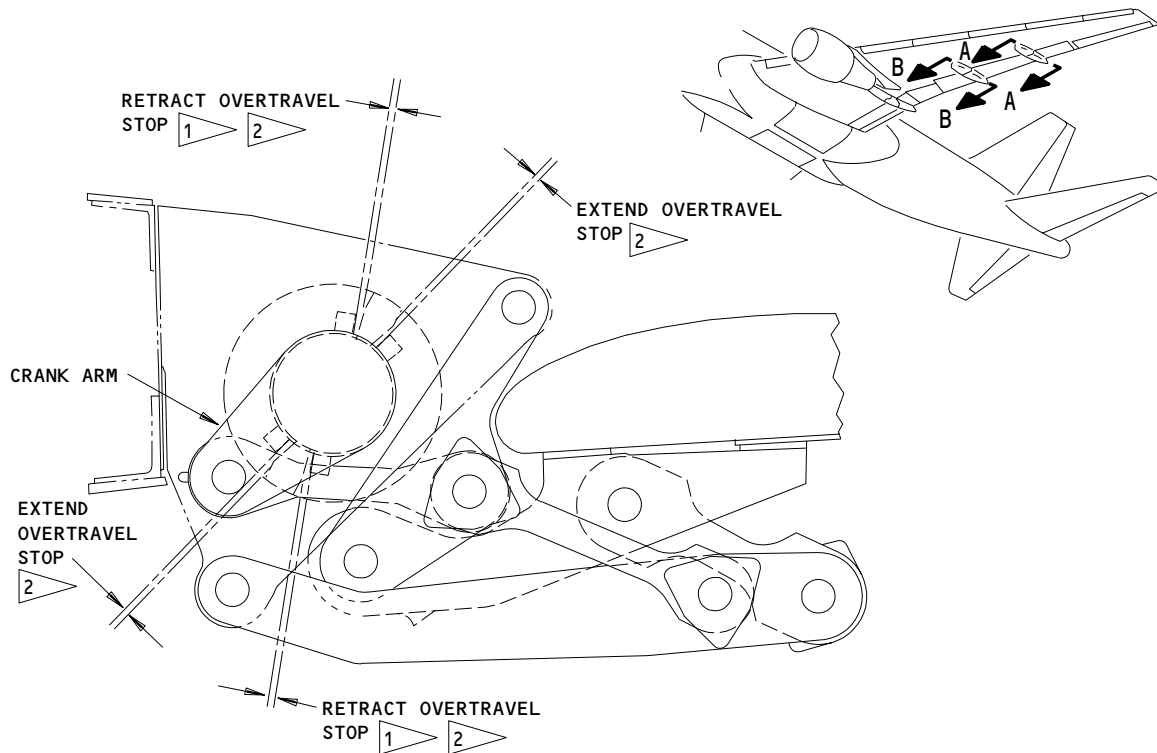
27-51-22



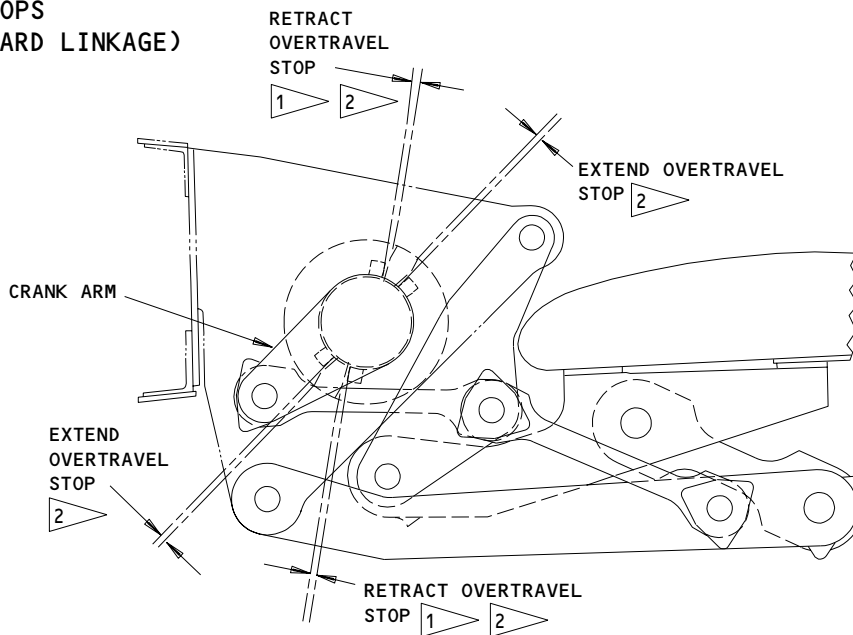
Rotary Actuators for the Outboard Flap  
Figure 401 (Sheet 2)

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OVERTRAVEL STOPS  
(OUTBOARD FLAP - OUTBOARD LINKAGE)  
A-A



OVERTRAVEL STOPS  
(OUTBOARD FLAP - INBOARD LINKAGE)  
B-B

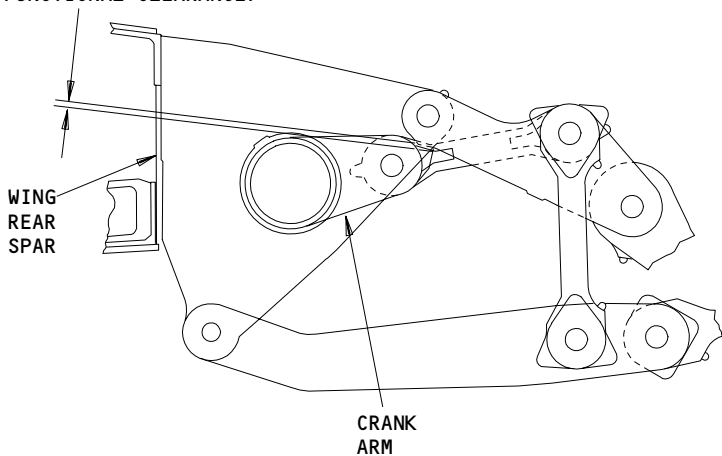
- 1 0.12 ±0.03 INCH  
(RIG POSITION)
- 2 0.12 ±0.06 INCH  
(FUNCTIONAL CLEARANCE)

Overtravel Stop Clearances for the Outboard Flap  
Figure 402 (Sheet 1)

EFFECTIVITY  
767-200 AIRPLANES

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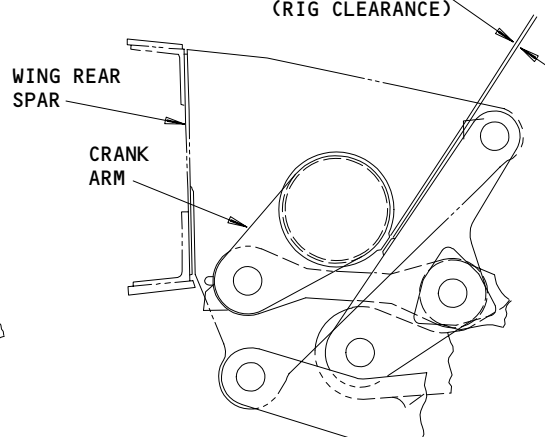
EXTEND OVERTRAVEL STOP:  
0.27 ±0.06 INCH  
(FUNCTIONAL CLEARANCE)



FLAPS EXTENDED

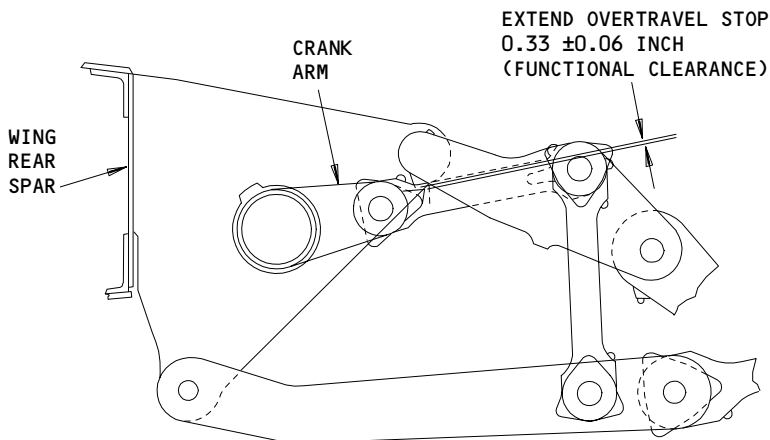
FWD ←

RETRACT OVERTRAVEL STOP:  
0.12 ±0.06 INCH;  
(FUNCTIONAL CLEARANCE)  
0.12 ±0.03 INCH  
(RIG CLEARANCE)



FLAPS RETRACTED

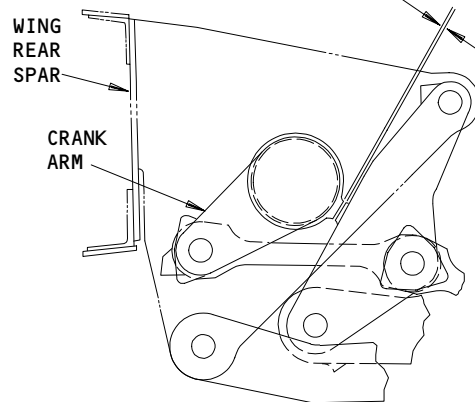
OVERTRAVEL STOPS  
(OUTBOARD FLAP - OUTBOARD LINKAGE)  
A-A



FLAPS EXTENDED

FWD ←

RETRACT OVERTRAVEL STOP:  
0.14 ±0.06 INCH;  
(FUNCTIONAL CLEARANCE)  
0.14 ±0.03 INCH  
(RIG CLEARANCE IS)



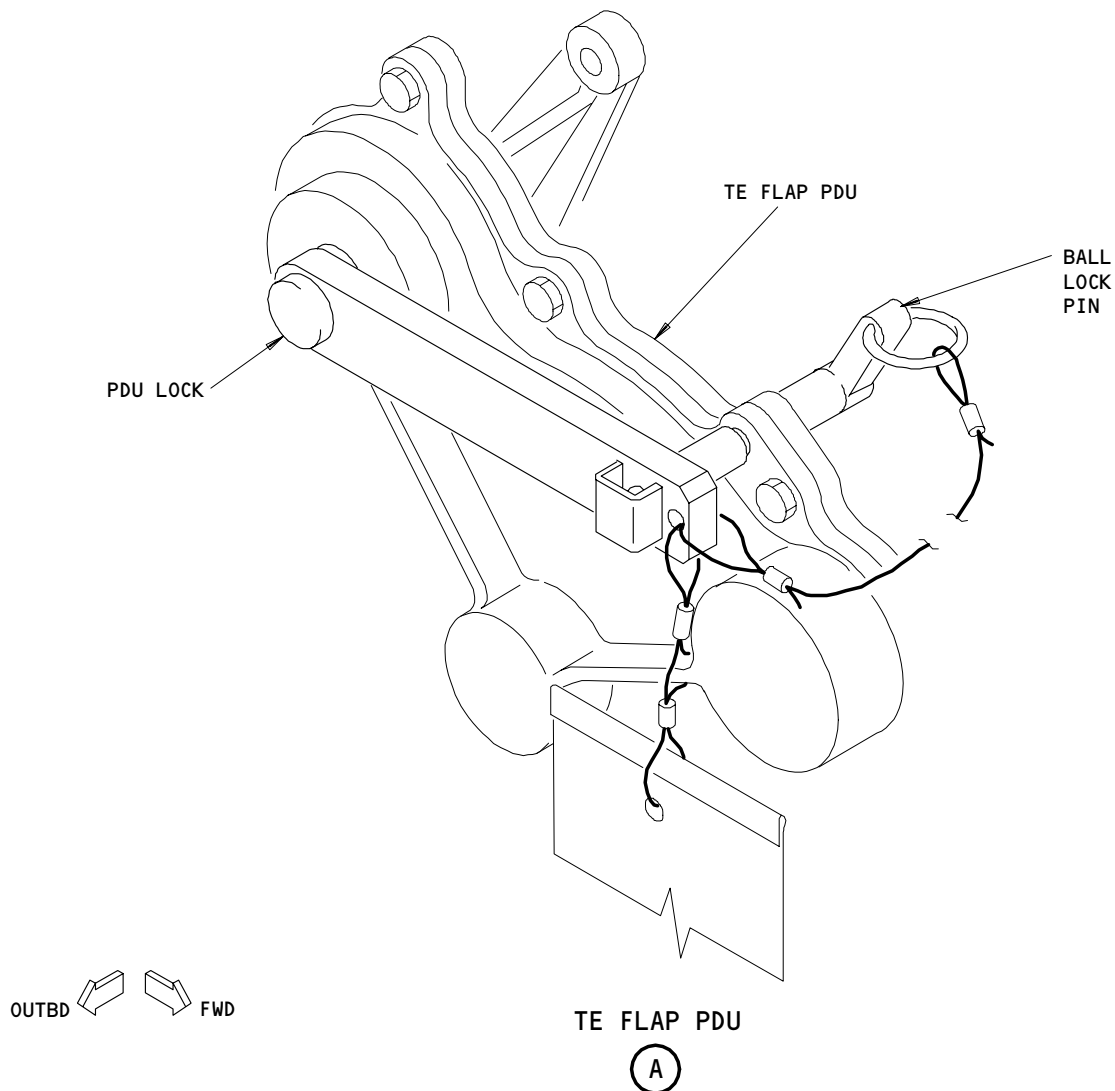
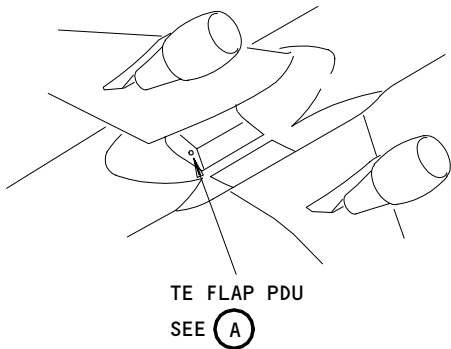
FLAPS RETRACTED

OVERTRAVEL STOPS  
(OUTBOARD FLAP - INBOARD LINKAGE)  
B-B

Overtravel Stop Clearances for the Outboard Flap  
Figure 402 (Sheet 2)

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767-300 AIRPLANES

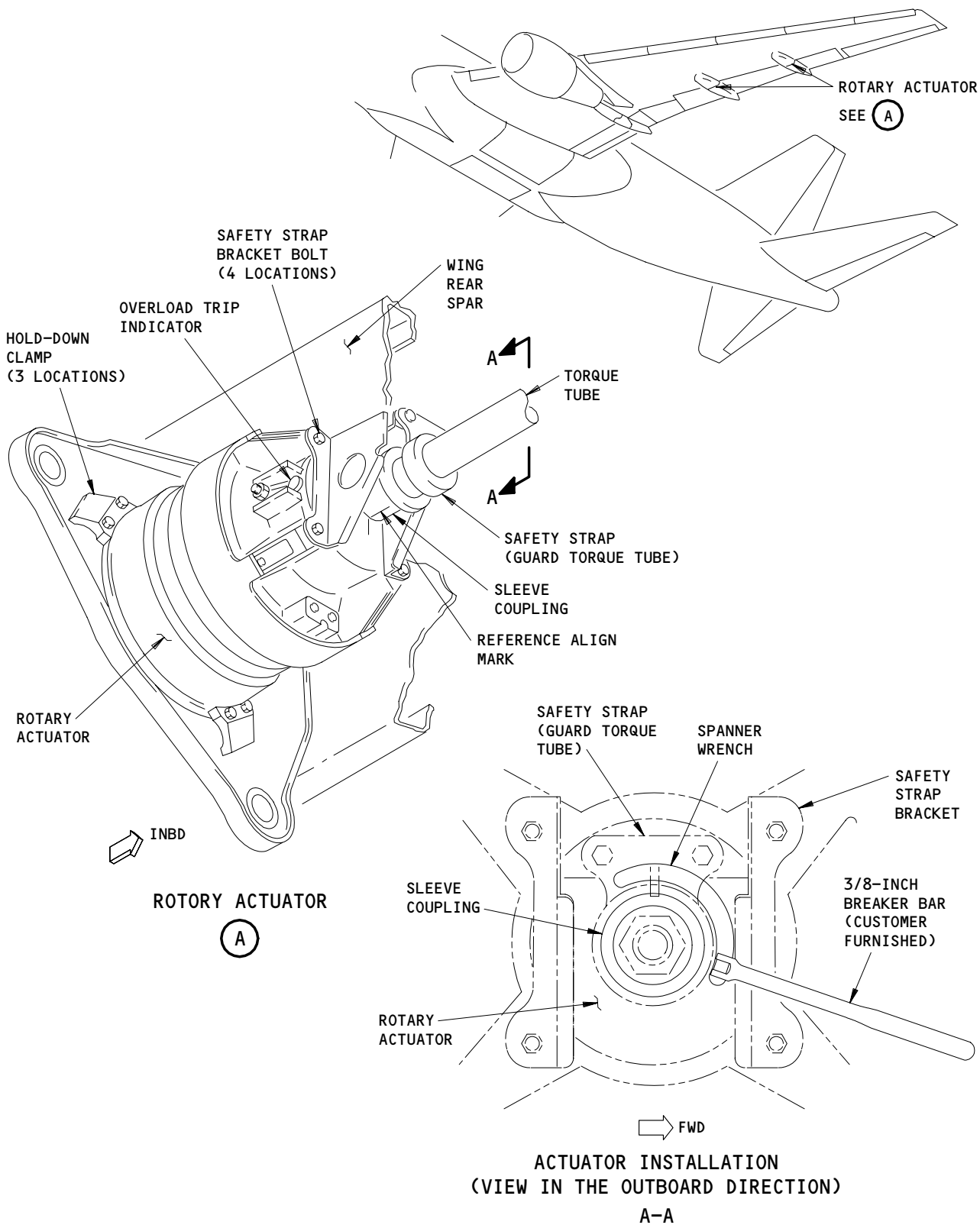
27-51-22



PDU Lock for the TE Flap PDU  
Figure 403

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Spanner Wrench Installation on Rotary Actuators  
Figure 404

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S 494-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-004

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

S 864-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-006

- (5) Move the flap control lever to the 30-unit detent and permit the flaps to move to the fully extended position.

S 864-007

- (6) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 494-008

- (7) Attach a DO-NOT-OPERATE tag to the flap control lever.

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- S 494-014
- (8) Install the PDU lock on the TE flap PDU (Fig. 403).
- S 864-009
- (9) Open this circuit breaker on the main power distribution panel, P6, and install a DO-NOT-CLOSE tag:
- (a) 6D24, ALTN FLAP PWR
- S 864-010
- (10) Open these circuit breakers on the P6 panel and install circuit breaker locks:
- (a) 6D21, ALTN SLAT INBD PWR
- (b) 6F24, ALTN SLAT OUTBD PWR
- S 864-011
- (11) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11J24, FLAPS ALTN CONT
- S 864-012
- (12) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
- (b) 11H24, SLAT ALTN CONT OUTBD
- S 014-013
- (13) Remove these access panels from the lower surface of the wing trailing edge that is applicable (AMM 06-44-00/201):
- (a) For the rotary actuator on the outboard linkage, remove the access panels 561HB, and 573BB (left wing) or access panels 661BB and 673BB (right wing).
- (b) For the rotary actuator on the inboard linkage, remove the access panels 561EB and 572BB (left wing) or access panels 661EB and 672BB (right wing).

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S 484-160

- (14) Do the spoiler actuator lock installation procedure (AMM 27-61-00/201).

E. Remove the Rotary Actuator (Fig. 401)

S 034-015

- (1) Disconnect the four bolts that attach the safety strap bracket to the actuator and remove the safety strap.

S 034-019

- (2) 767-200 AIRPLANES;  
Disconnect the torque tube from the inboard side of the inboard rotary actuator in the outboard flap (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tube while you disconnect it from the rotary actuator.

S 034-022

- (3) 767-300 AIRPLANES;  
Disconnect the torque tubes at the inboard side of the inboard and outboard rotary actuators in the outboard flap (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tubes while you disconnect them from the rotary actuators.

S 984-027

- (4) 767-200 AIRPLANES;  
Manually turn the actuator coupling in the extend direction, until the crank arm touches the extend overtravel stop (Fig. 402). Count and keep a record of the number of turns of the actuator coupling.

**NOTE:** Approximately  $6 \pm 3$  turns will be sufficient to close the  $0.12 \pm 0.06$  clearance at the extend overtravel stop. Stop the turns when the crank arm touches the overtravel stop to prevent preload. Preload on the actuator will make the actuator difficult to remove.

When you look to the outboard direction, the extend direction is counterclockwise for the left wing, and clockwise for the right wing.

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S 984-030

- (5) 767-300 AIRPLANES;

At the actuator that you will remove, manually turn the actuator coupling in the extend direction, until the crank arm touches the extend overtravel stop (Fig. 402). Count and keep a record of the number of turns of the actuator coupling.

**NOTE:** For the outboard linkage, approximately  $16\text{-}1/2 \pm 3$  turns will close the  $0.33 \pm 0.21$  inch ( $8.4 \pm 5.3$  mm) clearance at the overtravel stop. For the inboard linkage, approximately  $19\text{-}1/2 \pm 3$  turns will close the  $0.39 \pm 0.27$  inch ( $9.9 \pm 6.8$  mm) clearance at the overtravel stop. When you look to the outboard direction, the extend direction is counterclockwise for the left wing, and clockwise for the right wing.

S 034-035

- (6) 767-200 AIRPLANES;

Disconnect the torque tube between the inboard and the outboard rotary actuator (AMM 27-51-41/401).

S 034-036

- (7) Remove the six nuts at the three hold-down clamps that hold the rotary actuator to the rib (View B-B, Fig. 401).

**NOTE:** A channel washer on the opposite side of the rib prevents the bolthead to turn.

S 034-037

- (8) Remove the three hold down clamps.

**NOTE:** Do not remove the bolts from the rib when you remove the hold-down clamps.

S 034-038

**WARNING:** BE CAREFUL WHEN YOU REMOVE THE ROTARY ACTUATOR. BECAUSE THE ACTUATOR WEIGHS 56 POUNDS (25.4 Kg), INJURY CAN OCCUR.

- (9) Hold the weight of the rotary actuator and pull the actuator 2.5 inches out from the support fitting to disengage the splines.

S 024-039

- (10) Remove the rotary actuator from the airplane.

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S 034-131

(11) If you will replace the rotary actuator, remove the torque tube coupling:

(a) Remove the retaining nut and washer from the shaft on the rotary actuator.

**NOTE:** Use the spanner wrench (with 3/8 drive breaker bar) to hold the sleeve coupling (Fig. 404).

(b) Remove the splined coupling, torque tube coupling, spacer-splined, and the sleeve from the rotary actuator.

TASK 27-51-22-424-040

3. Outboard Flap Rotary Actuator - Installation

A. Equipment

(1) Spanner Wrench F72959-33 (recommended), -3 (optional)

B. Consumable Materials

(1) D00633 Grease - BMS 3-33 (Preferred)

(2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)

(3) G02020 Modeling Clay

C. References

(1) AMM 06-44-00/201, Wing Access Door and Panels

(2) AMM 12-21-09/301, Lubrication

(3) AMM 20-10-23/401, Lockwires

(4) AMM 24-22-00/201, Electrical Power - Control

(5) FIM 27-51-00/101, Trailing Edge Flaps System Fault Isolation

(6) AMM 27-51-00/501, Trailing Edge Flap System

(7) AMM 27-51-41/401, TE Flap Torque Tubes

(8) AMM 27-61-00/201, Spoiler/Speedbrake Control System

(9) AMM 29-11-00/201, Main Hydraulic Systems

(10) AMM 32-00-15/201, Landing Gear Door Locks

D. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
560/660	Wing Trailing Edge - Outboard
572/672	Outboard Flap Inboard Fairing
573/673	Outboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

561EB/661EB	Wing TE Structure, Outboard Flap Installation
561HB/661HB	Wing TE Structure, Outboard Flap Installation
572BB/672BB	Flap Mechanism - No. 2 (LH) and No. 7 (RH)
573BB/673BB	Flap Mechanism - No. 1 (LH) and No. 8 (RH)

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E. Install the Rotary Actuator (Fig. 401)

S 644-041

- (1) Apply grease to all the splines and mating surfaces of the rotary actuator.

S 434-132

- (2) Install the torque tube coupling on the rotary actuator if it is necessary:
- (a) Install the sleeve, torque tube coupling, spacer-splined, and the splined coupling on the rotary actuator.
  - (b) Install the retaining nut and washer on the rotary actuator.

**NOTE:** Use the spanner wrench (with 3/8 drive breaker bar) to hold the sleeve coupling (Fig. 404).

- (c) Tighten the nut to 400-480 pound-inches (45.2-54.2 Nm).

S 214-042

- (3) Make sure the overload trip indicator on the actuator is pushed in (Detail A).

S 104-043

- (4) Clean the input shaft, the reaction ring, and the actuator spline drain holes (View A-A) and remove unwanted grease or dirt.

S 434-044

**WARNING:** BE CAREFUL WHEN YOU INSTALL THE ROTARY ACTUATOR. BECAUSE THE ACTUATOR WEIGHS 56 POUNDS (25.4 Kg), INJURY CAN OCCUR.

- (5) Put the actuator output shaft into the input shaft, and align the missing spline teeth on the actuator rim to the missing spline teeth on the reaction ring (View B-B).

S 434-045

- (6) Put the actuator on to the reaction ring.

**NOTE:** Turn the actuator input shaft if it is necessary to engage the actuator splines to the reaction ring splines.

S 434-046

- (7) Install the three hold-down clamps with washers and locknuts (View C-C and D-D).

S 214-083

- (8) Make sure the crank arm touches the extend overtravel stop at the rotary actuator that you installed (Fig. 402).

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- S 434-087  
(9) 767-200 AIRPLANES;  
Connect the torque tube between the inboard and the outboard rotary actuators.

- S 984-091  
(10) 767-200 AIRPLANES;  
Turn the coupling in the retract direction for the same number of turns that you made during the actuator removal procedure.

**NOTE:** If you did not write the number of turns that you made during the removal procedure, turn the coupling for 5 1/2 turns and adjust the retract overtravel stop clearance to the RIG dimension (Fig. 402).

When you look to the outboard direction, the retract direction is clockwise for the left wing, and counterclockwise for the right wing.

- S 984-094  
(11) 767-300 AIRPLANES;  
Turn the coupling in the retract direction for the same number of turns that you made during the actuator removal procedures.

**NOTE:** If you did not write the number of turns that you made during the removal procedure, turn the coupling for 16 turns for the inboard linkage, or 19 turns for the outboard linkage, and adjust the overtravel stop clearance to the RIG dimension (Fig. 402).

When you look to the outboard direction, the retract direction is clockwise for the left wing, and counterclockwise for the right wing.

- S 434-098  
(12) 767-300 AIRPLANES;  
Connect the torque tube to the inboard end of the outboard rotary actuator (AMM 27-51-41/401).

- S 424-133  
(13) Connect the torque tube to the inboard side of the inboard rotary actuator (AMM 27-51-41/401).

- S 434-100  
(14) Install the safety strap bracket with the four attach bolts (Detail A, Fig. 401).

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S 094-101

- (15) Remove the PDU lock from the TE flap PDU (Fig. 403).

S 024-161

- (16) Do the Spoiler Actuator Lock Removal procedure (AMM 27-61-00/201).

S 094-102

- (17) Make sure the flap control lever is in the 30-unit detent, and remove the DO-NOT-OPERATE tag from the flap control lever.

S 864-103

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (18) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-104

- (19) Move the flap control lever to the 20-unit detent and permit the flaps to move to the 20-degree position.

S 864-105

- (20) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 494-106

- (21) Install the PDU lock in the TE flap PDU (Fig. 403).

S 494-107

- (22) Apply modeling clay to the retract overtravel stops at the inboard and outboard rotary actuators in the outboard flap, at the wing where the maintenance was done (Fig. 402).

**NOTE:** If it is necessary, put a piece of tape on the retract stop so that it will be easier to remove the clay.

S 094-108

- (23) Remove the PDU lock from the TE flap PDU (Fig. 403).

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S 864-109

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(24) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-110

(25) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps move to the fully retracted position.

**NOTE:** After the flaps moved to the fully retracted position, stop for one minute before you continue to the subsequent step.

S 864-111

(26) Move the flap control lever to the 20-unit detent, and permit the flaps to move to the 20-degree position.

S 864-112

(27) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 494-113

(28) Install the PDU lock in the TE flap PDU (Fig. 403).

S 094-114

(29) Carefully remove the clay from each retract overtravel stop.

S 224-115

(30) Measure and make a record of the clay thickness at each retract overtravel stop, and make sure each overtravel stop clearance (the clay thickness) is correct as shown (Fig. 402).

S 824-116

(31) If the overtravel stop clearance is not correct, adjust the overtravel stop clearance to the RIG position (AMM 27-51-00/501, "Adjust the Outboard Flap Retract Overtravel Stops to the RIG Position").

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S 434-117

- (32) Make sure you install a lockwire with the double twist procedure for the couplings on the torque tubes that you connected (AMM 20-10-23/401).

S 094-118

- (33) Remove the PDU lock from the TE flap PDU (Fig. 403).

S 864-119

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (34) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-120

- (35) Move the flap control lever to the zero (FLAPS UP) detent, and permit the flaps to move to the fully retracted position.

S 864-121

- (36) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-122

- (37) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

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S 714-123

- (38) Operate the flap control lever through a full cycle, and make sure the flaps move correctly.

**NOTE:** Do the necessary trouble-shooting steps if EICAS messages come on, or if a flap system shutdown occurs during the flap operation (FIM 27-51-00/101).

F. Put the Airplane Back to Its Usual Condition

S 414-124

- (1) Install the access panels at the lower surface of the wing trailing edge (AMM 06-44-00/201).

S 094-125

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 864-126

- (3) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 864-127

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

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OUTBOARD TE FLAP DEFLECTION CONTROL TRACK – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the outboard flap deflection control track.

TASK 27-51-23-024-001

2. Outboard Flap Deflection Control Track – Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip – 1012LC-R  
Commercially Available  
(2) TE Flap PDU Lock – A27009-7

B. References

- (1) AMM 24-22-00/201, Electrical Power – Control  
(2) AMM 27-51-24/401, Outboard TE Flap Deflection Control Carriage  
(3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(4) AMM 32-00-15/201, Landing Gear Door Lock  
(5) AMM 32-00-20/201, Landing Gear Downlock

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
566/666	Outboard Trailing Edge Flap
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

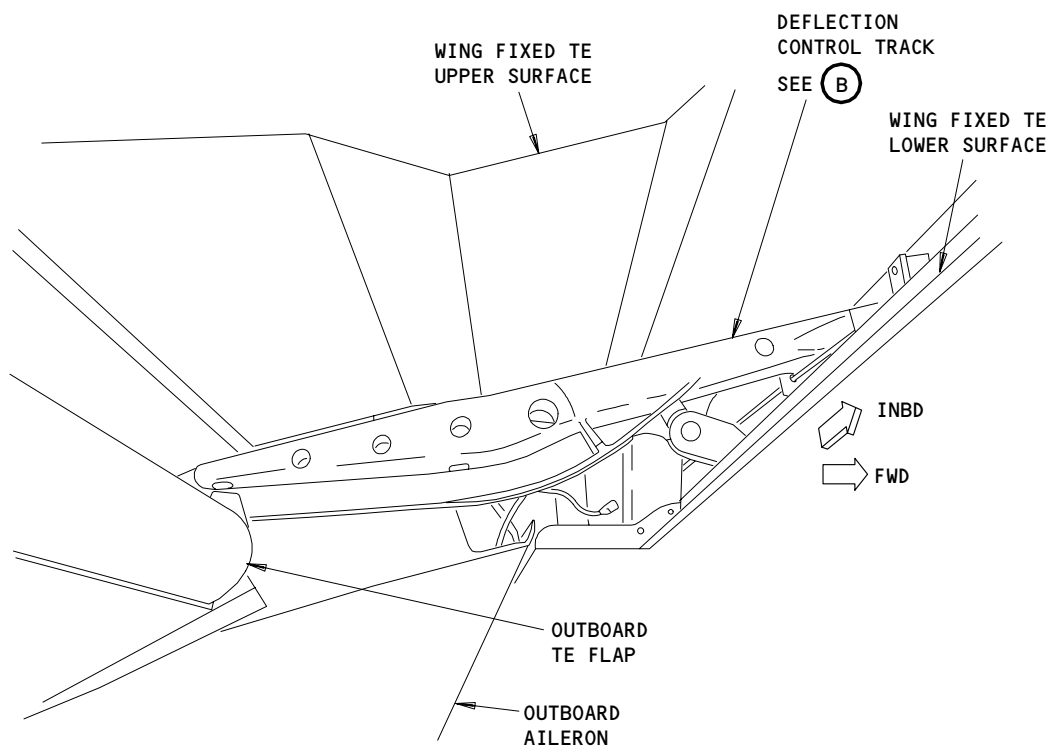
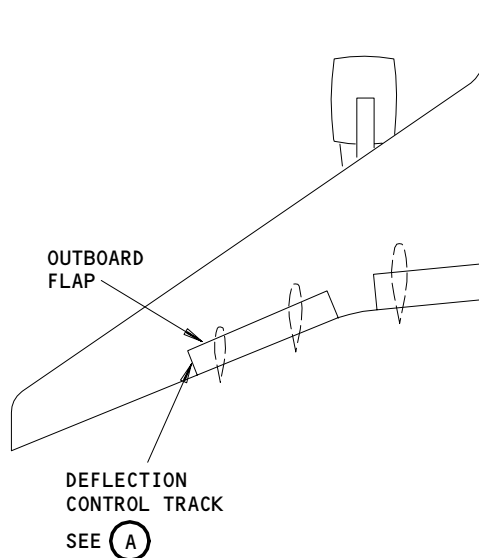
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DEFLECTION CONTROL TRACK  
(INBOARD VIEW, FLAPS EXTENDED)

(A)

Outboard Flap Deflection Control Track  
Figure 401 (Sheet 1)

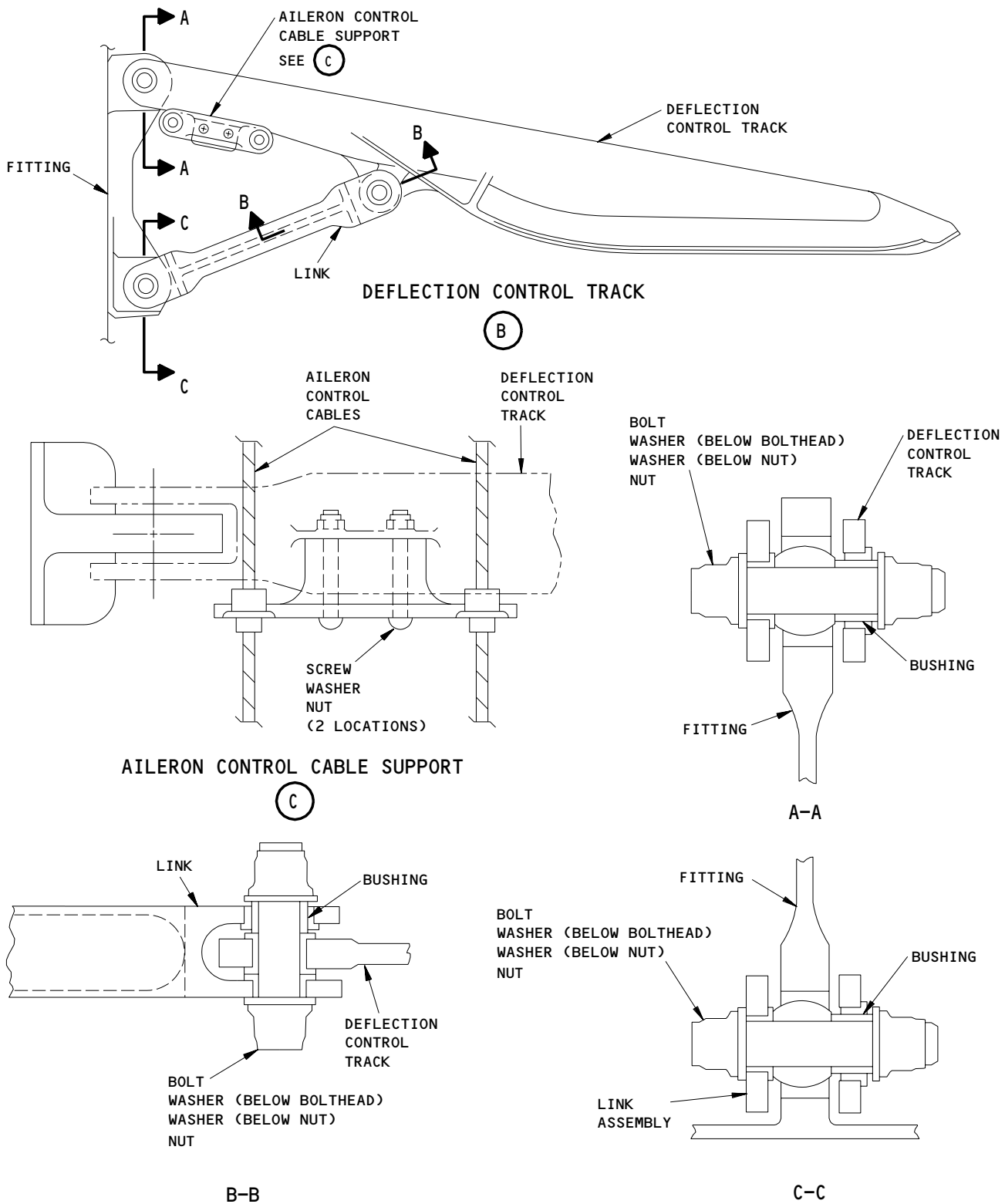
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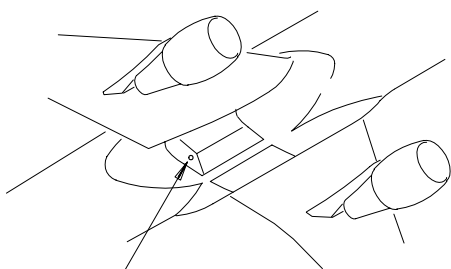
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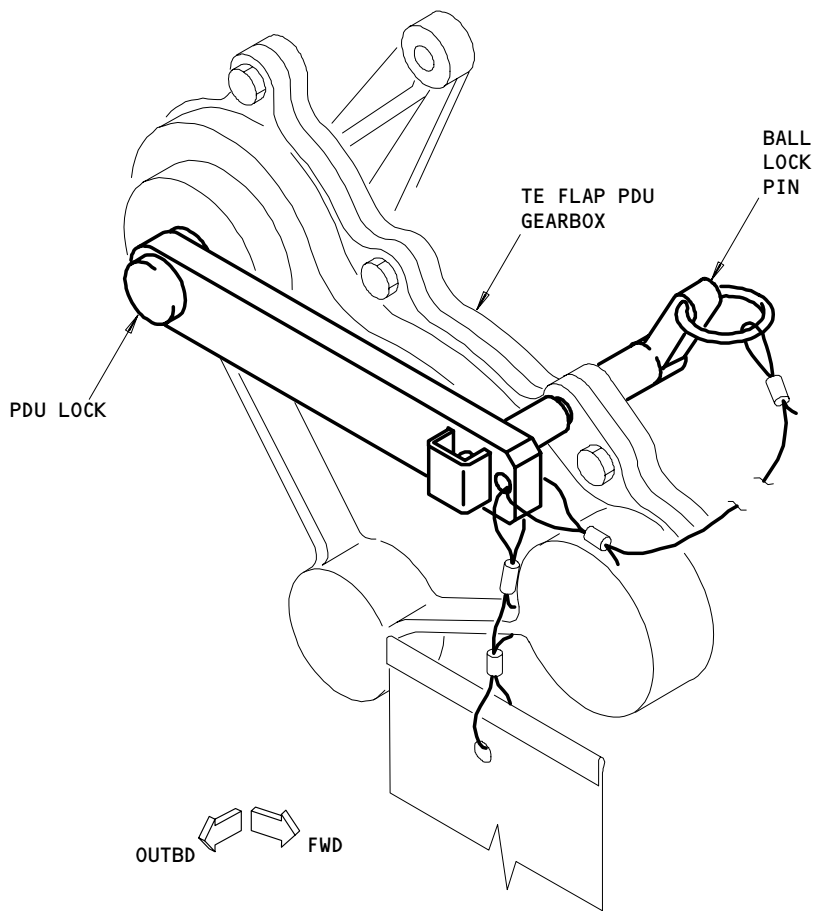
Outboard Flap Deflection Control Track  
Figure 401 (Sheet 2)

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TE FLAP PDU  
SEE (A)



TE FLAP PDU

(A)

PDU Lock for the TE Flap PDU  
Figure 402

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- S 864-005  
(3) Supply electrical power (AMM 24-22-00/201).

S 864-004

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-006

- (5) Move the flap control lever to the 30-unit detent and permit the flaps to move to the fully extended position.

S 864-007

- (6) Remove pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-008

- (7) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 864-009

- (8) Open these circuit breakers on the P6 panel and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 864-010

- (9) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:  
(a) 11J24, FLAPS ALTN CONT

S 864-011

- (10) Open these circuit breakers on the P11 panel and install circuit breaker locks:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD

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S 494-012

(11) Install the PDU lock in the TE flap PDU (Fig. 402).

E. Remove the Deflection Control Track (Fig. 401)

S 034-013

(1) Disconnect and move the aileron control cable support away from the deflection control track (Detail C).

S 024-014

(2) Remove the deflection control carriage from the outboard flap (AMM 27-51-24/401).

S 034-015

(3) Disconnect the link from the deflection control track (View B-B).

S 034-016

(4) Hold the weight of the deflection control track while you disconnect the fitting from the deflection control track (View A-A).

S 024-017

(5) Remove the deflection control track from airplane.

S 014-033

(6) If it is necessary, remove the link from the fitting (View C-C).

TASK 27-51-23-424-018

3. Outboard Flap Deflection Control Track - Installation

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-51-24/401, Outboard TE Flap Deflection Control Carriage
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 32-00-15/201, Landing Gear Downlock

B. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
566/666	Outboard Trailing Edge Flap
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

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C. Install the Deflection Control Track (Fig. 401)

S 434-019

- (1) Connect the deflection control track to the fitting (View A-A) with the bolt, two washers, bushing and nut.
  - (a) AIRPLANES WITH BACB30UU BOLTS;  
tighten the nuts to 290 - 510 pound-inches  
(33 - 58 newton-meters).
  - (b) AIRPLANES WITHOUT BACB30UU BOLTS;  
tighten the nuts to 300 - 360 pound-inches  
(34 - 41 newton-meters).

S 414-034

- (2) If it was removed, connect the link to the fitting (View C-C) with the bolt, two washers, bushing and nut.
  - (a) AIRPLANES WITH BACB30LT BOLTS OR BACB30UU BOLTS;  
tighten the nuts to 480 - 850 pound-inches  
(54 - 96 newton-meters).
  - (b) AIRPLANES WITHOUT BACB30LT BOLTS OR BACB30UU BOLTS;  
tighten the nuts to 300 - 360 pound-inches  
(34 - 41 newton-meters).

S 434-020

- (3) Connect the link to the deflection control track (View B-B) with the bolt, two washers, bushing and nut.
  - (a) AIRPLANES WITH BACB30UU BOLTS;  
tighten the nuts to 290 - 510 pound-inches  
(33 - 58 newton-meters).
  - (b) AIRPLANES WITHOUT BACB30UU BOLTS;  
tighten the nuts to 300 - 360 pound-inches.  
(34 - 41 newton-meters).

S 424-021

- (4) Install the deflection control carriage to the outboard flap (AMM 27-51-24/401).

S 434-022

- (5) Connect the aileron control cable support to the deflection control track (Detail C) with two screws, washers, and nuts.

S 214-023

- (6) Make sure the aileron control cables can move freely in the aileron control cable support.

D. Test for the Deflection Control Track Installation

S 094-024

- (1) Remove the PDU lock from the TE flap PDU (Fig. 402).

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S 864-025

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(2) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 214-026

(3) Operate the flap control lever to move the flaps through three or four cycles, and make sure the carriage moves easily on the deflection control track.

E. Put the Airplane Back to Its Usual Position

S 864-027

(1) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD  
(c) 11J24, FLAPS ALTN CONT

S 864-028

(2) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR  
(c) 6D24, ALTN FLAP PWR

S 094-029

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 864-030

(4) Remove power from the center hydraulic system (AMM 29-11-00/201).

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S 864-031

- (5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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OUTBOARD FLAP DEFLECTION CONTROL TRACK – INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and a wear limit table, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Outboard Flap Deflection Control Track – Removal/Installation for procedures to do these steps.

TASK 27-51-23-226-001

2. Wear Limits for the Outboard Flap Deflection Control Track (Fig. 601)

A. Access

- (1) Location Zones

560/660 Left/Right Wing Trailing Edge – Outboard

B. Procedure

S 226-003

- (1) Use the supplied data (Fig. 601) to examine the outboard flap deflection control track for too much wear.

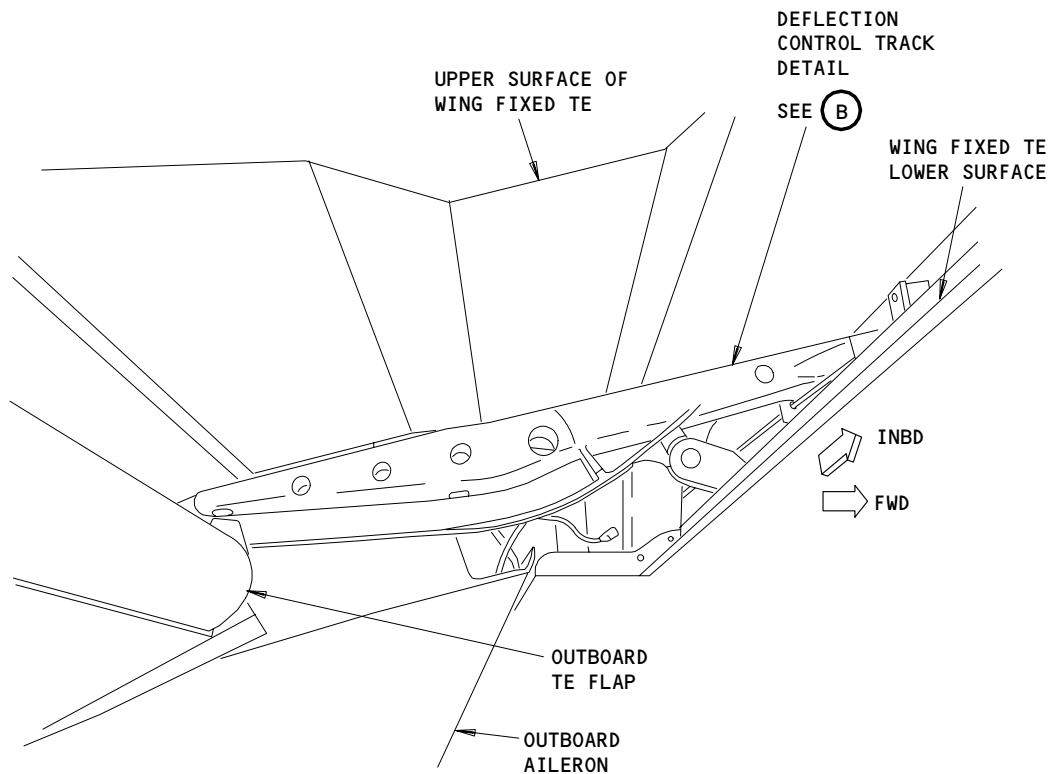
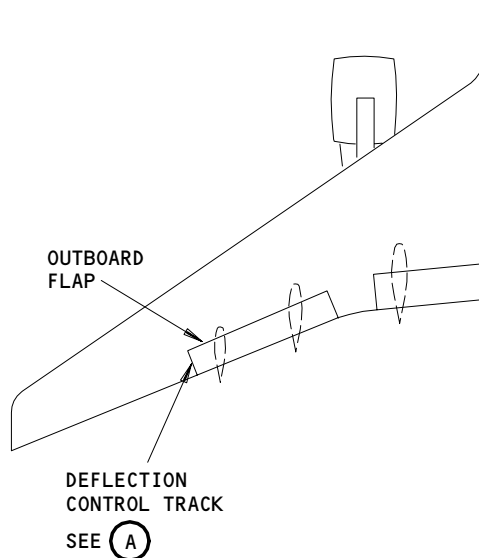
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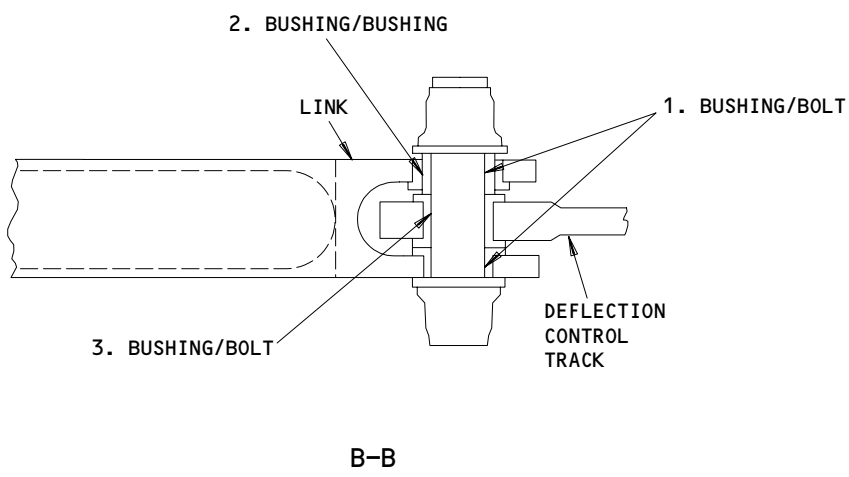
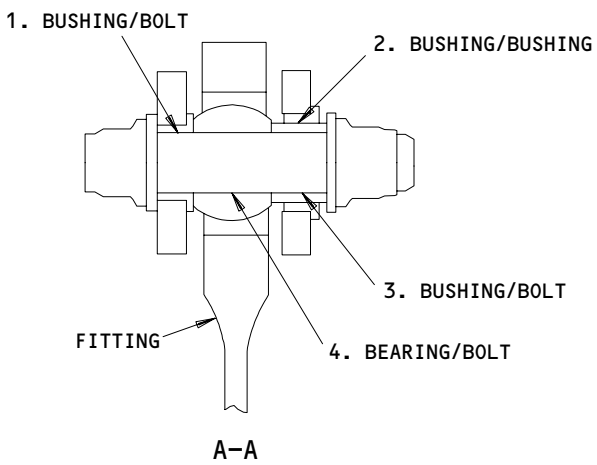
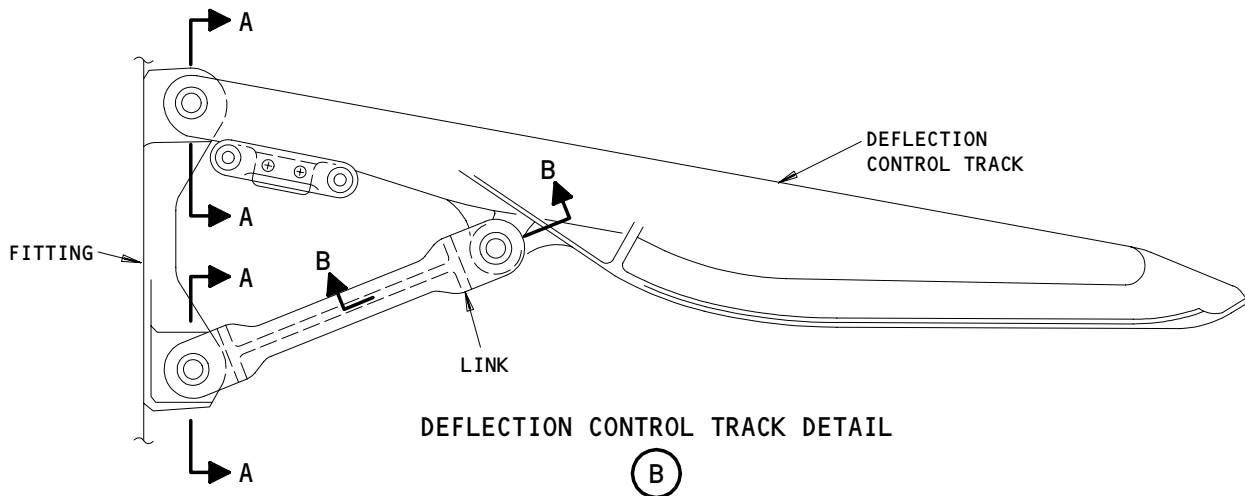
DEFLECTION CONTROL TRACK  
(FLAPS EXTENDED)

(A)

Wear Limits for the Deflection Control Track of the Outboard Flap  
Figure 601 (Sheet 1)

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Wear Limits for the Deflection Control Track of the Outboard Flap  
Figure 601 (Sheet 2)

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**BOEING**  
767  
MAINTENANCE MANUAL

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4957 (12.591)		X		
2	BUSHING	ID	0.6870 (17.450)	0.6875 (17.463)	0.6917 (17.569)	0.0050 (0.127)	X		
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6823 (17.330)		X		
3	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4955 (12.586)		X		
4	BEARING	ID	0.5000 (12.700)	0.5004 (12.710)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4954 (12.583)		X		

Wear Limits for the Deflection Control Track of the Outboard Flap  
Figure 601 (Sheet 3)

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OUTBOARD TE FLAP DEFLECTION CONTROL CARRIAGE – REMOVAL/INSTALLATION

1. General

- A. This document contains data for the removal and installation of the outboard TE flap Deflection Control Carriage.

TASK 27-51-24-004-019

2. Remove the Outboard Trailing Edge Flap Deflection Control Carriage  
(Fig. 401)

A. Equipment

- (1) Circuit Breaker Lockout Clip – 1012LC-R  
Commercially Available  
(2) TE Flap PDU Lock – A27009-7

B. References

- (1) AMM 24-22-00/201, Electrical Power – Control  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(3) AMM 32-00-20/201, Landing Gear Downlock

C. Access

- (1) Location Zone  
566/666 Outboard Trailing Edge Flap (Left)/(Right)

D. Prepare for Removal

S 214-002

- (1) Make sure that the landing gear downlocks are installed (AMM 32-00-20/201).

S 844-003

- (2) Put the flaps in the 30-unit position, as follows:

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN THE CENTER HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE ALL FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN THE CENTER HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** TO PREVENT EQUIPMENT DAMAGE, MAKE SURE THAT THE ENGINE STRUT ACCESS DOORS, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE NOT IN THE PATH OF SLATS BEFORE THE FLAPS OR SLATS ARE OPERATED.

- (a) Pressurize the center hydraulic system (AMM 29-11-00/201).  
(b) Supply electrical power (AMM 24-22-00/201).  
(c) Put the flap control lever in the 30-unit detent, and let the flaps extend.

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S 034-004

- (3) Remove the power to the flap system for maintenance, as follows:
  - (a) Remove the power from the center hydraulic system (AMM 29-11-00/201).
  - (b) Open this circuit breaker on the main power distribution panel, P6, and attach DO-NOT-CLOSE tag:
    - 1) 6D24, ALTN FLAP PWR
  - (c) Open these circuit breakers on the P6 panel and install circuit breaker locks:
    - 1) 6D21, ALTN SLAT INBD PWR
    - 2) 6F24, ALTN SLAT OUTBD PWR
  - (d) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
    - 1) 11J24, FLAPS ALTN CONT
  - (e) Open these circuit breakers on the P11 panel and install circuit breaker locks:
    - 1) 11H23, SLAT ALTN CONT INBD
    - 2) 11H24, SLAT ALTN CONT OUTBD
  - (f) Install the PDU lock (Fig. 402).

S 024-005

- (4) Remove the access panel on the flap (Fig. 403).
- E. Remove Outboard Flap Deflection Control Carriage (Fig. 401)

S 034-006

- (1) Remove bolt, washers, and nut and identify the parts with a label for installation.

S 024-022

- (2) Move the deflection control carriage aft and down to disengage the carriage from deflection control track.

S 024-024

- (3) If rub blocks require replacement, continue.
  - (a) Remove the nuts and bolts from the rub block and deflection control carriage.

EFFECTIVITY

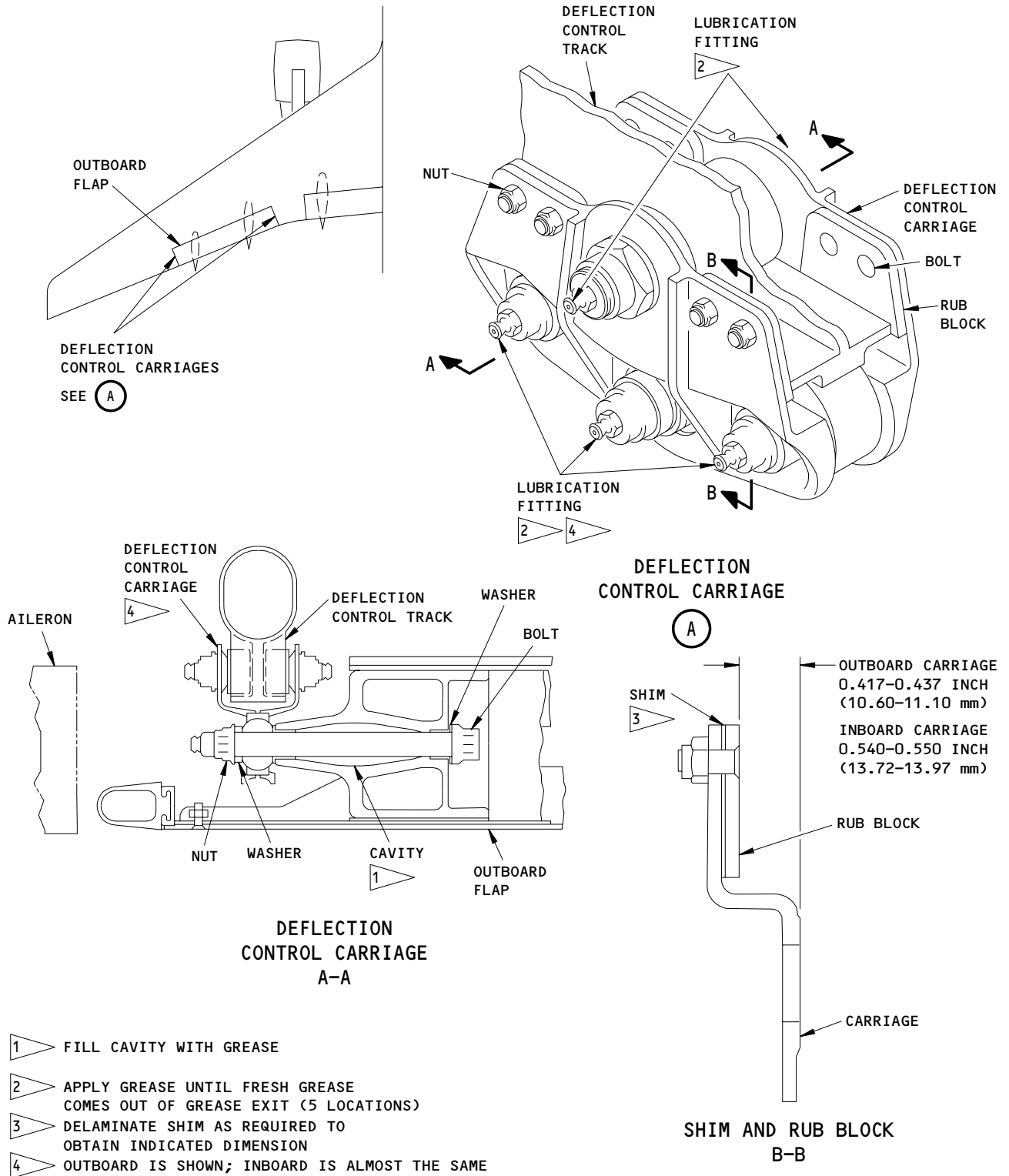
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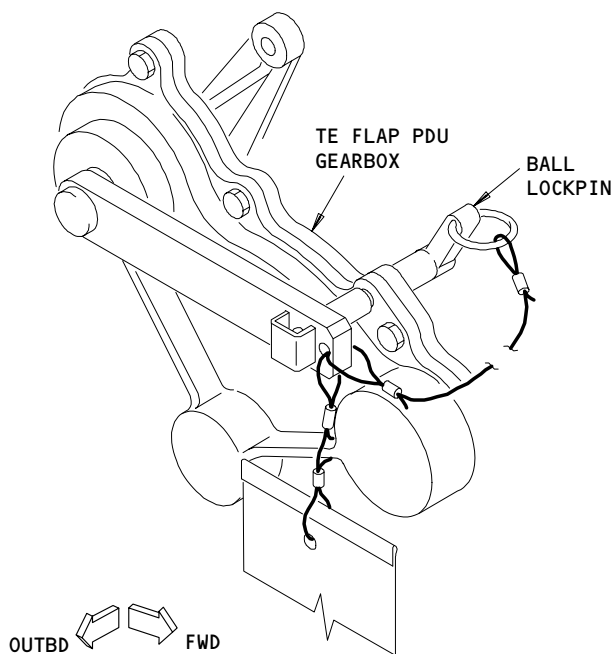
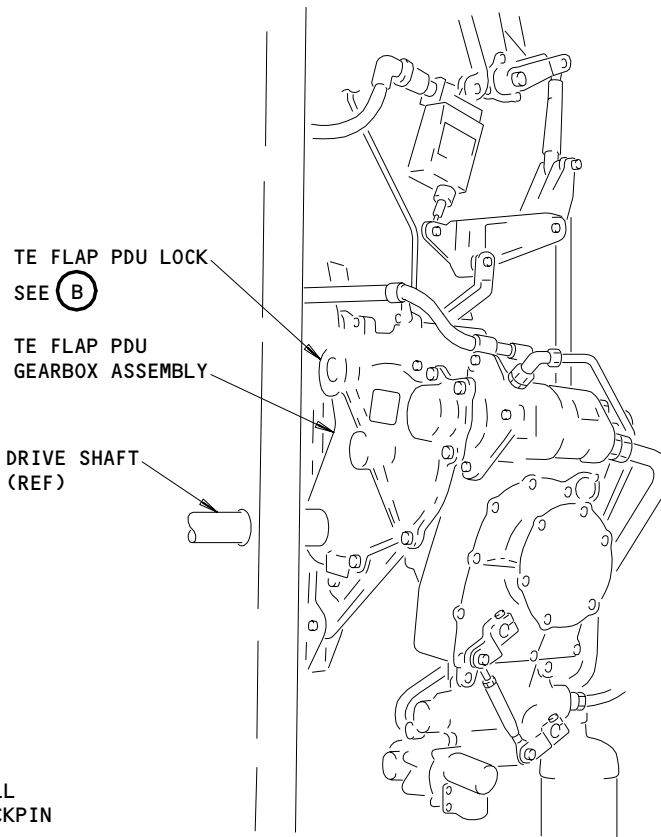
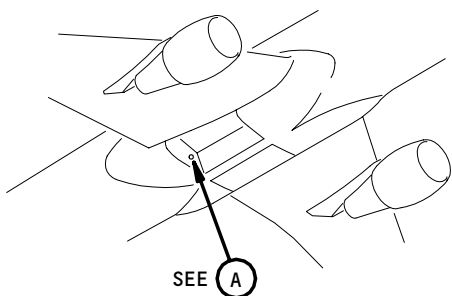




**Outboard TE Flap Deflection Control Carriage Installation  
Figure 401**

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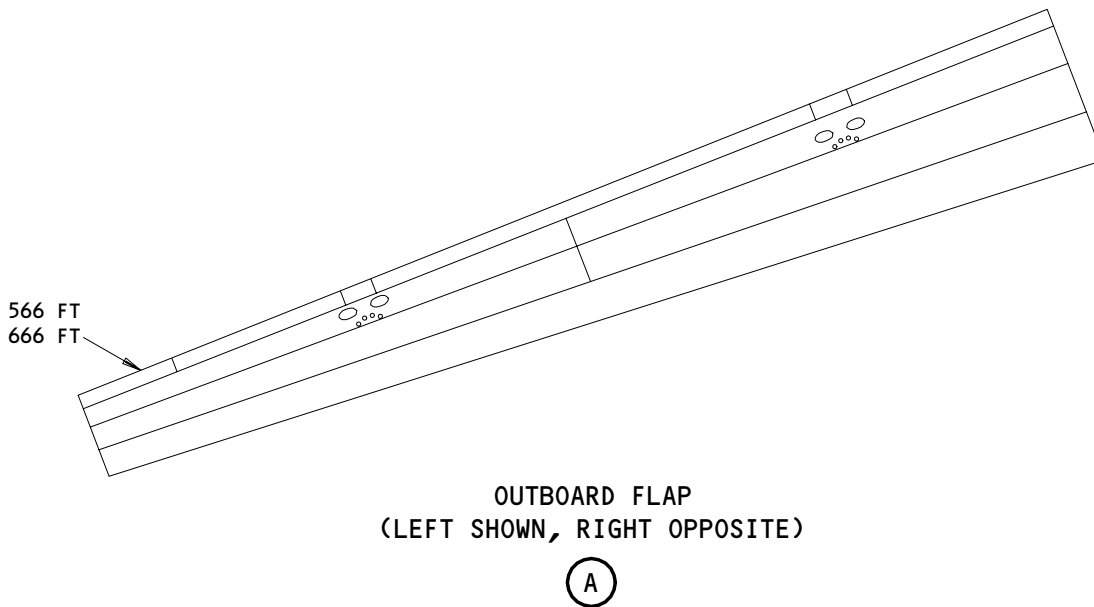
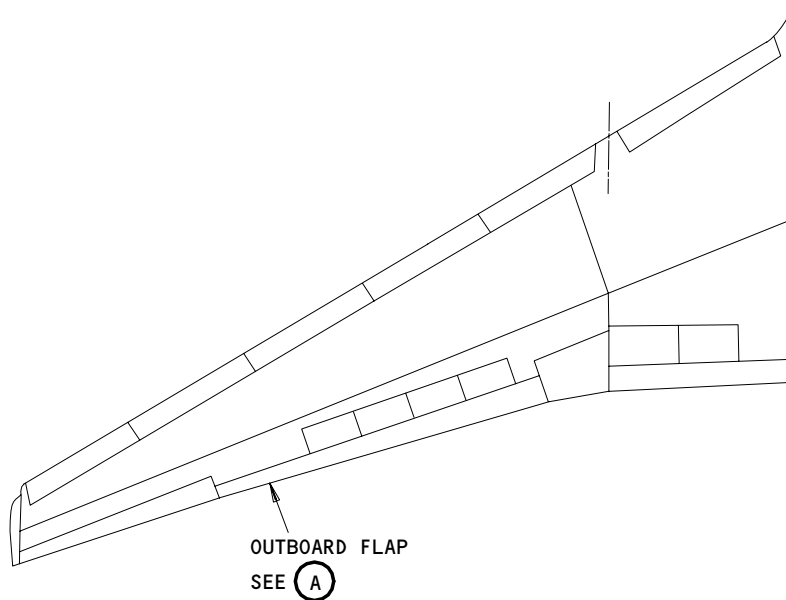
OUTBD FWD  
**TE FLAP PDU INSTALLATION**  
(A)

OUTBD FWD  
**TE FLAP PDU LOCK**  
(B)

**TE Flap PDU Lock Assembly**  
Figure 402

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**27-51-24**



**NOTE:** 500-SERIES PANEL NUMBERS REFER TO LEFT WING.  
600-SERIES PANEL NUMBERS REFER TO RIGHT WING.

Access Panels  
Figure 403

EFFECTIVITY	ALL
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316358

- (b) Remove the rub block and shims from deflection control carriage.

TASK 27-51-24-404-020

3. Install the Outboard Flap Deflection Control Carriage

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Recommended)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) C00259 Primer - BMS 10-11, Type 1

B. References

- (1) AMM 24-22-00/201, Electrical Power-Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zone  
566/666 Outboard Forward Flap

D. Install the Outboard Flap Deflection Control Carriage (Fig. 401)

S 424-025

- (1) If rub blocks require installation, do these steps.
  - (a) Position shims and rub block on deflection control carriage.
  - (b) Remove laminations to obtain required dimension (Fig. 401).
  - (c) Apply primer to shims after delamination.
  - (d) Install shims and rub block on deflection control carriage with bolts and nuts.

S 424-007

- (2) Put the deflection control carriage on the deflection control track.

S 394-008

- (3) Fill the cavity with grease.

S 424-009

- (4) Move the deflection control carriage to install the bolt.

**NOTE:** It may require a preload on the flap and/or track to make the carriage fitting and flap fitting holes line up to install the carriage bolt.

S 434-010

- (5) Place the washer onto the bolt and insert the bolt through the holes in the outboard flap and the deflection control carriage.

S 164-001

- (6) Remove any excess grease from the bolt.

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- S 434-011
- (7) For the outboard carriage, install the washer and the nut on the bolt, and tighten the nut to 510-840 pound-inches (57.6-94.9 Nm).
- S 434-026
- (8) For the inboard carriage, install the washer and the nut on the bolt, and tighten the nut to 1800 - 2200 pound-inches (203.4 - 248.6 Nm).
- S 394-012
- (9) Apply the grease through the lubrication fitting until fresh grease comes out the grease exit.
- E. Put the Airplane Back to its Usual Condition
- S 414-013
- (1) Install the access panel on the flap (Fig. 403).
- S 084-021
- (2) Remove the PDU lock (Fig. 402).
- S 864-014
- (3) Remove the circuit breaker locks and close these overhead circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
- S 864-015
- (4) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11J24, FLAPS ALTN CONT
- S 864-016
- (5) Remove the circuit breaker locks and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR
- S 864-017
- (6) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P6 panel:
- (a) 6D24, ALTN FLAP PWR
- S 714-018
- (7) Do these steps to do a check of the flaps operation:

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN THE CENTER HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE ALL FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN THE CENTER HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** TO PREVENT EQUIPMENT DAMAGE, MAKE SURE THAT THE ENGINE STRUT ACCESS DOORS, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE NOT IN THE PATH OF SLATS BEFORE THE FLAPS OR SLATS ARE OPERATED.

- (a) Pressurize the center hydraulic system (AMM 29-11-00/201).
- (b) Move the flap control lever through 4 cycles and make sure the carriage rolls easily on the track without binding.
- (c) Remove the power from the center hydraulic system (AMM 29-11-00/201).
- (d) If it is not necessary, remove electrical power (AMM 24-22-00/201).

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FLAP CONTROL LEVER – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task removes the flap control lever for the trailing edge (TE) flap and leading edge (LE) slat systems. The second task installs the flap control lever.

TASK 27-51-25-024-001

2. Remove the Flap Control Lever

A. Equipment

- (1) Circuit Breaker Lockout Clip – 1012LC-R  
(6/necessary) Commercially Available

B. References

- (1) AMM 27-48-06/401, Stabilizer Trim Position Indicator  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(3) AMM 32-00-15/201, Landing Gear Door Locks  
(4) AMM 32-00-20/201, Landing Gear Downlock  
(5) AMM 34-22-02/201, EFIS Control Panel

C. Access

- (1) Location Zones  
211/212 Control Cabin  
710 Nose Landing Gear and Doors  
730/740 Main Landing Gear and Doors

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 014-003

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 214-004

- (3) Make sure the TE flaps and LE slats are fully retracted and the flap control lever is in the zero (FLAPS UP) detent.

S 864-005

- (4) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

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S 864-006

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11C15, FLAP SLAT ELEC UNIT SENSOR 1
  - (b) 11C16, FLAP SLAT ELEC UNIT CONT 1
  - (c) 11F4, TMC AC
  - (d) 11F15, TMC DC
  - (e) 11F16, TMC SERVO
  - (f) 11G15, FLAP SLAT ELEC UNIT SENSOR 2
  - (g) 11G16, FLAP SLAT ELEC UNIT CONT 2

S 864-007

- (6) Open these circuit breakers on the P11 panel, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-008

- (7) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-009

**WARNING:** REMOVE ELECTRICAL POWER FROM THE FLIGHT COMPARTMENT SEAT. THE ACCIDENTAL ELECTRICAL OPERATION OF THE FLIGHT COMPARTMENT SEAT CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (8) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
- (a) 6H15, CAPT SEAT
  - (b) 6J21, F/O SEAT

E. Remove the Flap Control Lever (Fig. 401)

S 034-010

- (1) Remove the lower access panel on the right side of the control stand.

S 014-012

- (2) Remove the EFIS module (AMM 34-22-02/201).

S 034-013

- (3) Remove the position indicator for the right stabilizer trim system (AMM 27-48-06/401).

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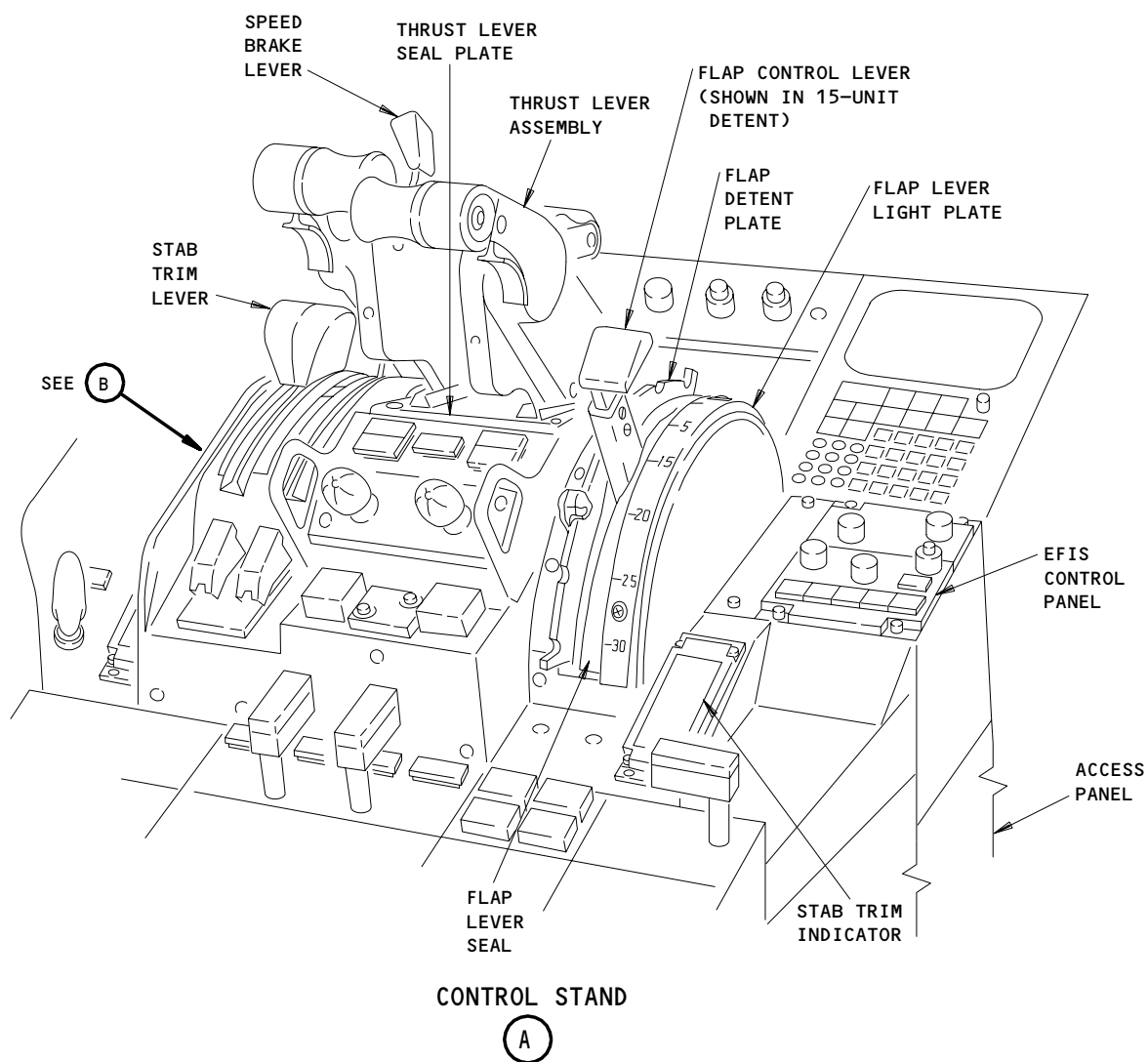
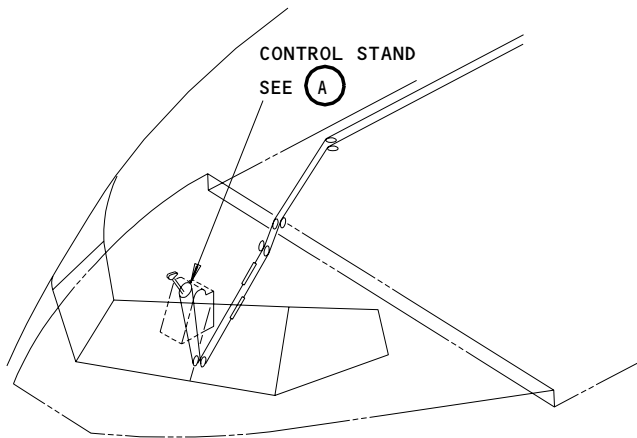
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Flap Control Lever Installation  
Figure 401 (Sheet 1)

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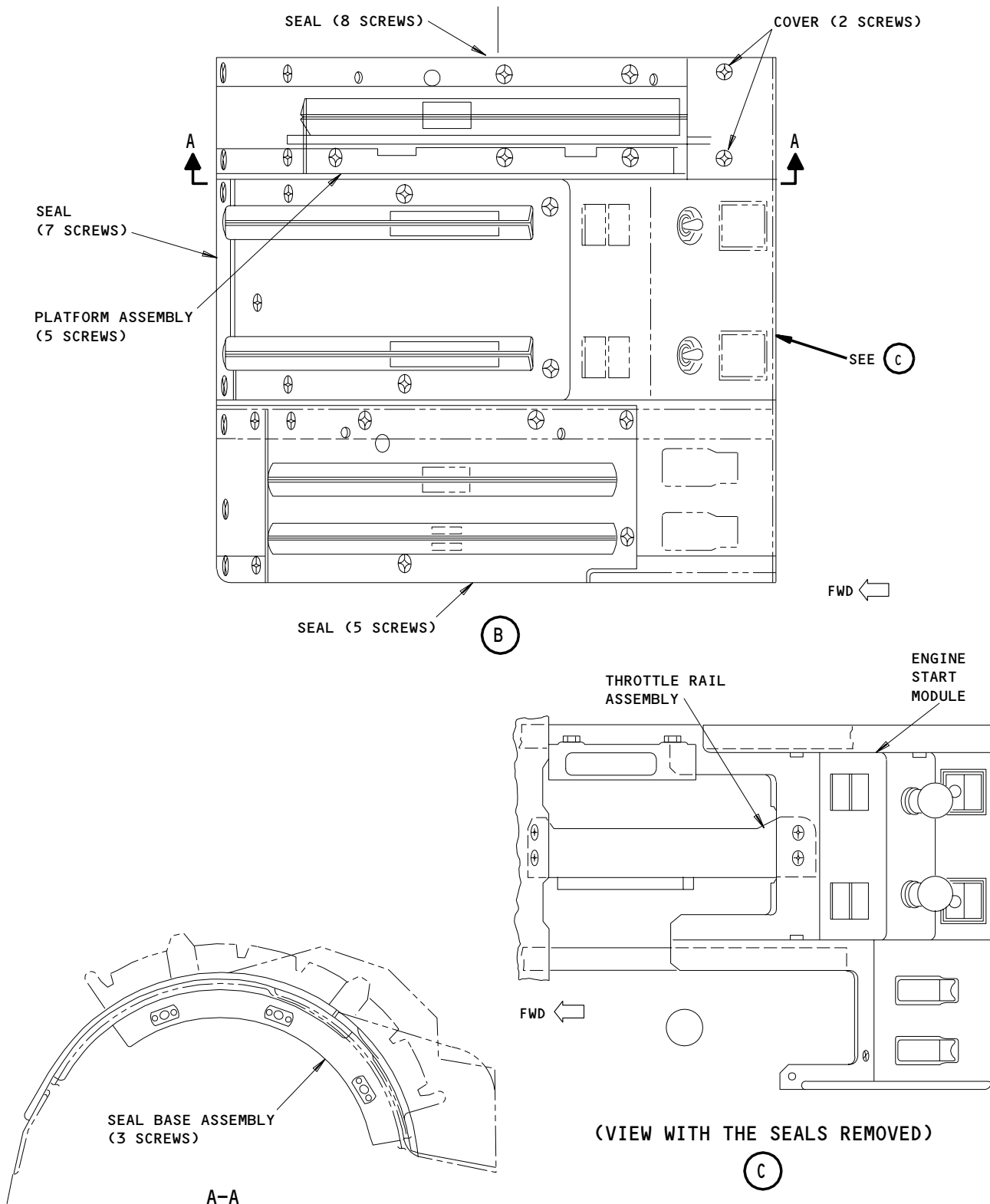
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Flap Control Lever Installation  
Figure 401 (Sheet 2)

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- S 034-014
- (4) Cut the wire ties that hold the loose wire for the flap control lever and the speedbrake lever lightplates.
- S 034-015
- (5) Remove the screws to remove the cover aft of the flap detent plate.
- S 034-016
- (6) Remove the screws that attach the flap lever lightplate.
- S 034-017
- (7) Pull the lightplate up from the control stand and put it to one side.
- S 034-018
- (8) Remove the screws that attach the speedbrake lightplate.
- S 034-019
- (9) Pull the lightplate up from the control stand and put it to one side.
- S 034-020
- (10) Remove the four seals from the control stand.
- S 034-021
- (11) Remove the screws at the aft end of the throttle rail assembly.
- S 034-022
- (12) Remove the screws that hold the engine start module in its position.
- S 024-023
- (13) Pull the engine start module out of the control stand.
- S 024-056
- (14) Move the engine start module away from the control stand so you can remove the flap detent plate and the seal base.
- S 034-024
- (15) Remove the flap detent plate.
- S 034-025
- (16) Remove the seal base.
- S 034-026
- (17) Disconnect the WFA and WFB cables at the STA 213 and STA 238 turnbuckles (Fig. 402).
- S 494-027
- (18) Install a tag on the cables to help identify them for the subsequent installation.

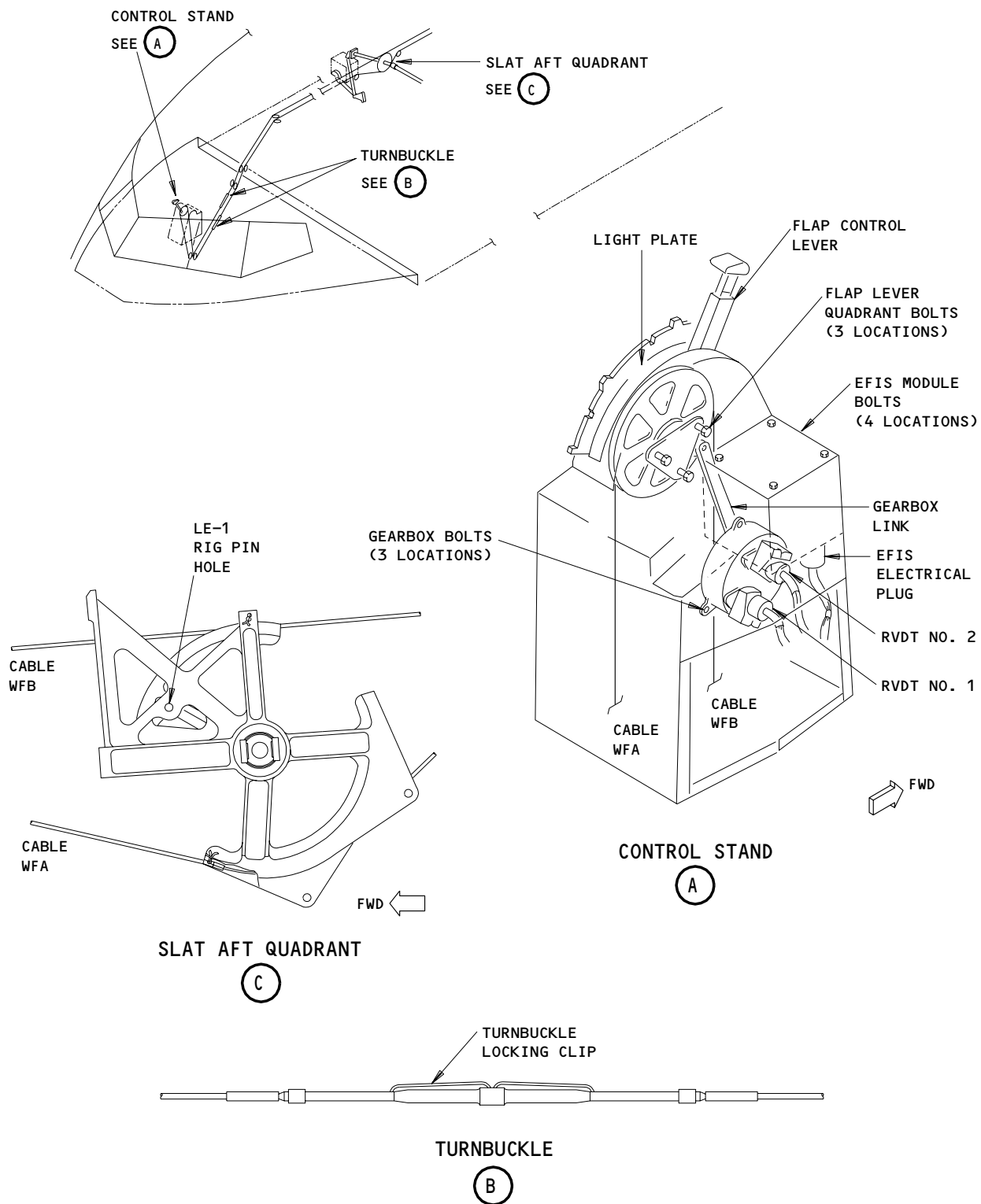
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Flap Control Lever Rigging  
Figure 402 (Sheet 1)

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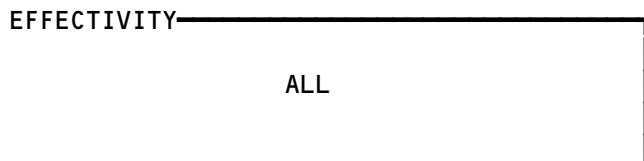
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TEMPERATURE-TENSION TABLE	
AMBIENT AIR TEMPERATURE (°F) 1	CABLE RIGGING LOAD FOR CABLES WFA AND WFB +10/-0 POUNDS 2
110	67
90	61
70	55
50	49
30	43
10	37
-10	31
-30	25
-40	22

- 1 MAKE SURE THE TEMPERATURE DOES NOT CHANGE BY  $\pm 5^{\circ}\text{F}$  FOR AT LEAST ONE HOUR BEFORE YOU ADJUST THE CABLES. MAKE SURE THE TEMPERATURE DOES NOT CHANGE BY  $\pm 5^{\circ}\text{F}$  WHILE YOU DO THE CABLE ADJUSTMENT.
- 2 ADJUST THE CABLES WHEN THE CABLE TENSION IS MORE THAN  $\pm 10$  POUNDS AWAY FROM THE LOAD SHOWN IN THE TEMPERATURE-TENSION TABLE.

Flap Control Lever Rigging  
 Figure 402 (Sheet 2)



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- S 494-028
- (19) Hold the loose cables with a light tension to keep the cables on the pulleys.
- S 034-029
- (20) Remove the cotter pins that attach the cable to the flap lever quadrant.
- S 034-030
- (21) Move the cable off of the flap lever quadrant.
- S 034-031
- (22) Disconnect the bolt, locknut, and washer that connect the link to the quadrant plate.
- S 034-032
- (23) Remove the three bolts, locknuts, and washers that connect the flap control lever and quadrant to the control stand.
- S 024-033
- (24) Lift the flap control lever and the quadrant away from the control stand.

TASK 27-51-25-424-034

3. Install the Flap Control Lever

NOTE: The wear limits for these components are given in 27-51-25/601, Flap Control Lever.

A. Equipment

- (1) Rig Pin from Set A20004-XX (AMM 20-10-24/201):  
(a) LE1 - P/N A20004-17

B. References

- (1) AMM 20-10-24/201, Rig Pins  
(2) AMM 27-48-06/401, Stabilizer Trim Position Indicator  
(3) AMM 27-51-00/501, Trailing Edge Flap System  
(4) AMM 27-51-25/601, Flap Control Lever  
(5) AMM 32-00-15/201, Landing Gear Door Locks  
(6) AMM 34-22-02/201, EFIS Control Panel

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C. Access

(1) Location Zones

211/212	Control Cabin
710	Nose Landing Gear and Doors
730/740	Main Landing Gear and Doors

D. Install the Flap Control Lever

S 014-035

- (1) Move the gearbox link in the aft direction until it is out of the area to install the flap control lever (Fig. 402).

S 424-036

- (2) Install the flap control lever and quadrant into the control stand with the three bolts, locknuts, and washers.

S 434-037

- (3) Connect the gearbox link to the quadrant plate with a bolt, locknut, and a washer.

S 434-038

- (4) Install the cable on the quadrant and hold it in its position with two cotter pins (Fig. 402).

S 434-039

- (5) Do these steps to connect and adjust the WFA and WFB cables (Fig. 402):
- (a) Remove the tag you installed to identify the cables.
  - (b) Move the flap control lever two degrees aft of the zero (FLAPS UP) detent and hold the lever in this position (approximately 0.15 to 0.16 inches (3.81-4.06 mm) from the zero detent).
  - (c) Install rig pin LE1 in the slat aft quadrant.
  - (d) Connect the WFA and WFB cables at the turnbuckles and tighten to approximately two times the load in the temperature-tension table.
  - (e) Make sure rig pin LE1 can easily turn in the rig pin hole.
  - (f) Remove rig pin LE1 from the slat aft quadrant.
  - (g) Move the flap control lever 20 to 30 times through its full travel to operate the cables.
  - (h) Move the flap control lever back to the position two degrees aft of the zero (FLAPS UP) detent and hold it in this position (approximately 0.15 to 0.16 inches (3.81-4.06 mm) aft of the zero detent).
  - (i) Install rig pin LE1 in the slat aft quadrant.
  - (j) Adjust the cable tension to the loads shown in the temperature-tension table.
  - (k) Make sure rig pin LE1 can easily be removed and installed in the slat aft quadrant.

**NOTE:** Keep the rig pin installed in the slat aft quadrant.

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(l) Lightly shake the WFA and WFB cables to remove the friction from the cables and to release the tension in the components, and do this check:

- 1) Make sure the flap control lever is 0.15 to 0.16 inches (3.81-4.06 mm) aft of the zero (FLAPS UP) detent on the control stand lightplate.

NOTE: This is approximately 2 degrees aft of the zero (FLAPS UP) detent.

- (m) Install the turnbuckle locking clips.
- (n) Make sure rig pin LE1 can easily turn in the rig pin hole.
- (o) Remove rig pin LE1 from the slat aft quadrant.
- (p) Move the flap control lever back to the zero (FLAPS UP) detent.

S 424-040

- (6) Install the engine start module with seven screws (Fig. 401).

S 434-041

- (7) Attach the aft end of the throttle rail assembly to the engine start module with two screws.

S 434-042

- (8) Install the four seals.

S 434-043

- (9) Install the flap lever lightplate with two screws.
  - (a) Connect the wires at the terminal block.

S 434-044

- (10) Install the speedbrake lightplate with two screws.
  - (a) Connect the wires at the terminal block.

S 414-045

- (11) Install the cover aft of the flap detent plate with two screws.

S 414-046

- (12) Install the EFIS module (AMM 34-22-02/201).

S 424-047

- (13) Install the position indicator for the right stabilizer trim system (AMM 27-48-06/401).

S 414-048

- (14) Install the access panel on the right side of the control stand.

S 704-049

- (15) Do a test on the flap lever load (AMM 27-51-00/501).

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E. Put the Airplane Back to Its Usual Condition

S 864-050

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11C15, FLAP SLAT ELEC UNIT SENSOR 1
  - (b) 11C16, FLAP SLAT ELEC UNIT CONT 1
  - (c) 11F14, TMC AC
  - (d) 11F15, TMC DC
  - (e) 11F16, TMC SERVO
  - (f) 11G15, FLAP SLAT ELEC UNIT SENSOR 2
  - (g) 11G16, FLAP SLAT ELEC UNIT CONT 2

S 864-051

- (2) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-052

- (3) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-054

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
- (a) 6H15, CAPT SEAT
  - (b) 6J21, F/O SEAT

S 414-055

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOORS LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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FLAP CONTROL LEVER – INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Flap Control Lever – Removal/Installation for procedures to do these tasks.

TASK 27-51-25-226-001

2. Wear Limits for the Flap Control Lever (Fig. 601)

A. Access

- (1) Location Zones  
211/212 Control Cabin

B. Procedure

S 226-003

- (1) Use the supplied data (Fig. 601) to examine the flap control lever for too much wear.

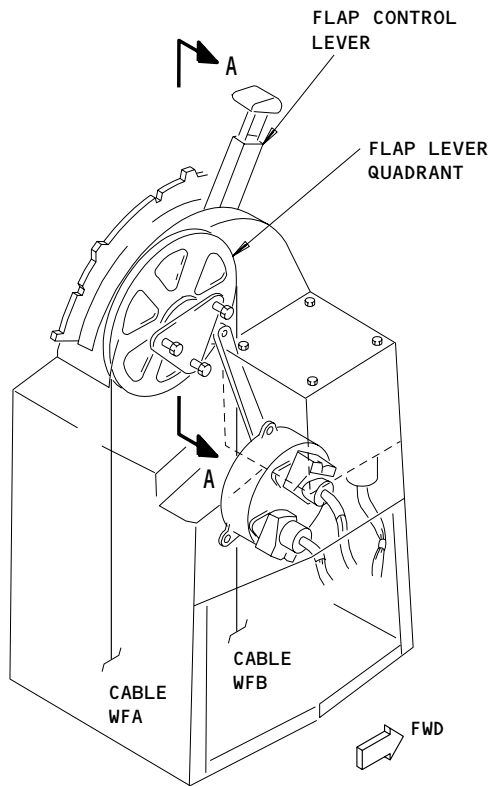
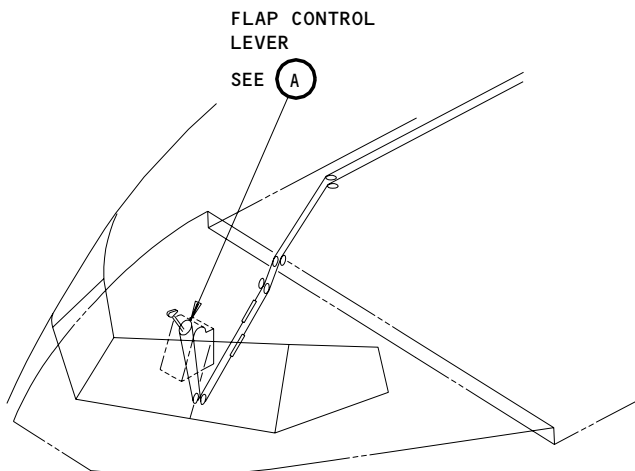
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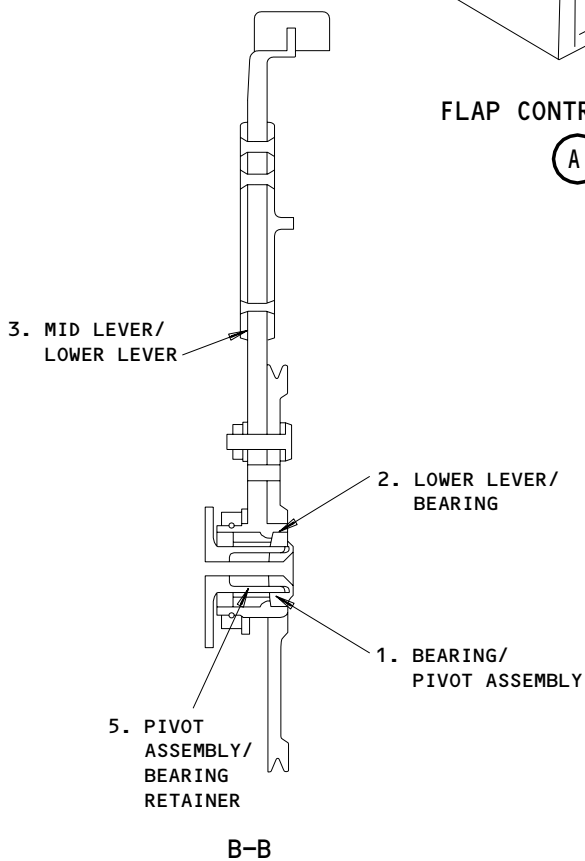
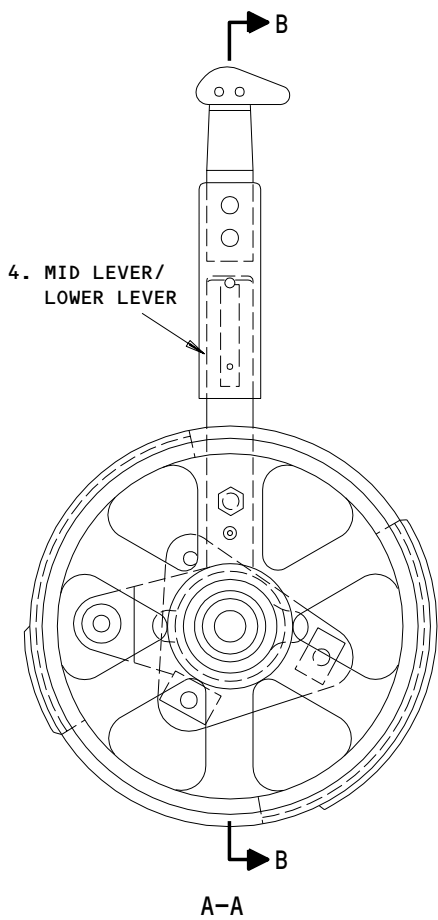
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FLAP CONTROL LEVER  
A



Wear Limits for the Flap Control Lever  
Figure 601 (Sheet 1)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BEARING	ID	0.7495 (19.037)	0.7500 (19.050)	---	0.0050 (0.127)	X		
	PIVOT ASSEMBLY	OD	0.7463 (18.956)	0.7473 (18.981)	0.7450 (18.923)			X	1
2	LOWER LEVER	ID	1.1870 (30.150)	1.1880 (30.175)	1.1890 (30.201)	0.0020 (0.051)		X	1
	BEARING	OD	1.1870 (30.150)	1.1875 (30.163)	---		X		
3	MID LEVER	2	0.6140 (15.596)	0.6180 (15.697)	0.3190 (8.103)	0.0200 (0.508)		X	1
	LOWER LEVER		0.3080 (7.823)	0.3120 (7.925)	0.2990 (7.595)			X	1
4	MID LEVER	3	0.7220 (18.339)	0.7260 (18.440)	0.7300 (18.542)	0.0200 (0.508)		X	1
	LOWER LEVER		0.7160 (18.186)	0.7200 (18.288)	0.7100 (18.034)			X	1
5	PIVOT ASSEMBLY	ID	0.5620 (14.275)	0.5670 (14.402)	0.5770 (14.656)	0.0200 (0.508)		X	1
	BEARING RETAINER	OD	0.5590 (14.199)	0.5600 (14.224)	0.5570 (14.148)			X	1

- 1 THIS PART CAN BE REPAIRED.
- 2 LEVER THICKNESS
- 3 LEVER DEPTH

Wear Limits for the Flap Control Lever  
Figure 601 (Sheet 2)

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FLAP CONTROL LEVER POSITION RVDT AND GEARBOX – REMOVAL/INSTALLATION

1. General

- A. This procedure contains steps to remove and install the position RVDT and the position gearbox for the flap control lever.

TASK 27-51-26-024-001

2. Remove the Position RVDT and the Position Gearbox for the Flap Control Lever

A. General

- (1) This task contains two procedures, one to remove the position RVDT and one to remove the position gearbox. Because this task contains two procedures, only the applicable group of steps must be done.

To start one of these procedures, do the "Prepare for the Removal" group of steps. Then, do the group of steps that is necessary to remove the component.

B. Equipment

- (1) Circuit Breaker Lockout Clip – 1012LC-R  
Commercially available

C. References

- (1) AMM 24-22-00/201, Electrical Power – Control  
(2) FIM 27-51-00/101, Fault Isolation Manual  
(3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(4) AMM 32-00-20/201, Landing Gear Downlock

D. Access

- (1) Location Zones
- |         |                             |
|---------|-----------------------------|
| 120     | Main Equipment Center       |
| 211/212 | Control Cabin               |
| 710     | Nose Landing Gear and Doors |
| 730/740 | Main Landing Gear and Doors |

E. Prepare for the Removal (Fig. 401)

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 214-003

- (2) Make sure the trailing edge (TE) flaps and leading edge (LE) slats are in the fully retracted position, with the flap control lever in the zero (FLAPS UP) detent.

S 494-004

- (3) Install a DO-NOT-OPERATE tag on the flap control lever.

S 864-005

- (4) Remove pressure from the center hydraulic system (AMM 29-11-00/201).

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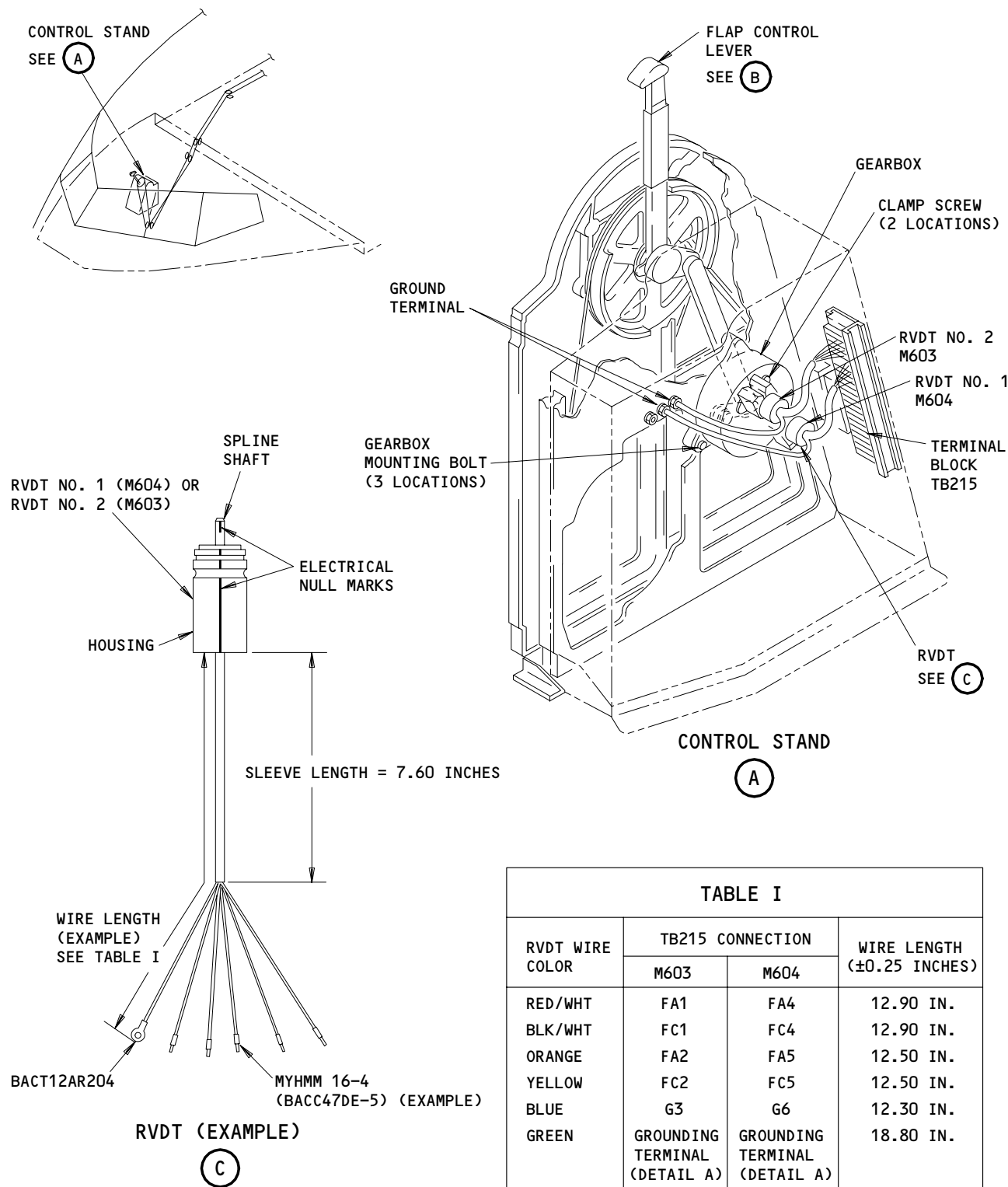
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# BOEING

## 767 MAINTENANCE MANUAL

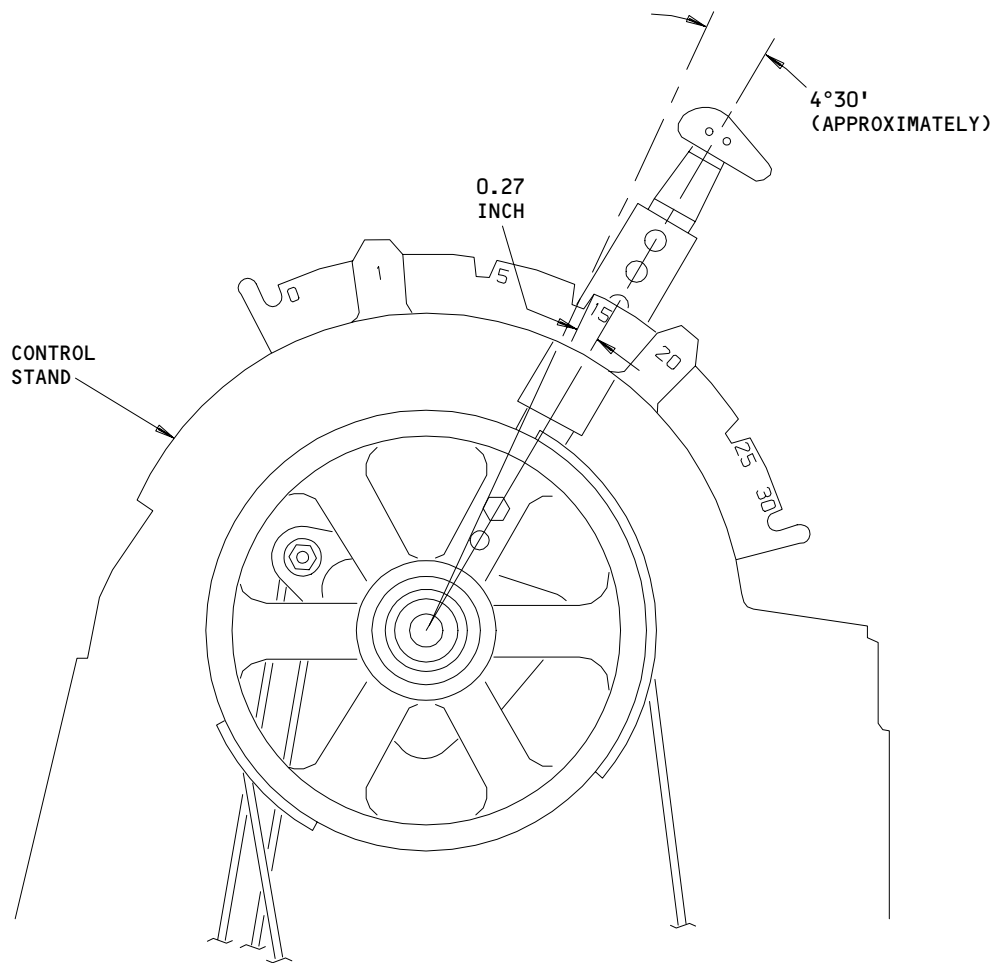


Position RVDT and Gearbox for the Flap Control Lever  
Figure 401 (Sheet 1)

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FLAP CONTROL LEVER

(B)

Position RVDT and Gearbox for the Flap Control Lever  
Figure 401 (Sheet 2)

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S 864-006

- (5) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:
- (a) 6D24, ALTN FLAP PWR

S 864-007

- (6) Open these circuit breakers on the P6 panel, and install circuit breaker locks:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR

S 864-008

- (7) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR
  - (b) 11C16, FLAP SLAT ELEC UNIT 1 CONT
  - (c) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR
  - (d) 11G16, FLAP SLAT ELEC UNIT 2 CONT
  - (e) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR
  - (f) 11G23, FLAP SLAT ELEC UNIT 3 CONT
  - (g) 11J24, FLAP ALTN CONT

S 864-009

- (8) Open these circuit breakers on the P11 panel, and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

S 864-010

**WARNING:** REMOVE ELECTRICAL POWER FROM THE FLIGHT COMPARTMENT SEAT. THE ACCIDENTAL OPERATION OF THE FLIGHT COMPARTMENT SEAT CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (9) Open these circuit breakers on the P6 panel, and attach DO-NOT-CLOSE tags:
- (a) 6H15 or 6J15, CAPT SEAT
  - (b) 6J21, F/O SEAT

S 014-011

- (10) Remove the access panel on the lower right side of the control stand.

F. Remove the Position RVDT (Fig. 401).

S 034-012

- (1) Disconnect the RVDT wires from terminal block TB215 and the ground terminal (Detail A).

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- S 934-013
- (2) Identify each RVDT wire by color and the TB215 terminal block or the ground terminal connection (Table I).
- S 034-014
- (3) Loosen the two clamp screws and remove the clamp screw adjacent to the gearbox.
- S 024-015
- (4) Move the position RVDT out of the clamp.
- G. Remove the Position Gearbox
- S 024-016
- (1) Remove the two position RVDTs as shown in the Remove the Position RVDT.
- S 034-017
- (2) Disconnect the bolt, locknut, and washer that attach the gearbox link to the gearbox lever.
- S 034-018
- (3) Remove the three mount bolts, locknuts, and washers that attach the gearbox to the control stand.
- S 024-019
- (4) Remove the position gearbox.

TASK 27-51-26-424-020

3. Install the Position RVDT and the Position Gearbox for the Flap Control Lever

A. General

- (1) This task contains four procedures, one to install the position RVDT, one to install the position gearbox, one to adjust the position RVDT, and one to do a test on the position RVDT installation. Because this task contains four procedures, only the applicable group of steps must be done.

To start one of these components, do the group of steps that is necessary to install the components. Then, do the group of steps that is necessary to adjust and to do a test on the installation. Then, do the "Put the Airplane Back to Its Usual Condition" group of steps.

B. Equipment

- (1) Digital Voltmeter (4-1/2 Digit Meter) - Fluke Models 8060A or 8062A, or equivalent

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- (2) Terminal - BACT12AR204
- C. Consumable Materials
  - (1) D50180 Grease - BMS 3-33 (Preferred)
  - (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)
- D. References
  - (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
  - (2) AMM 24-22-00/201, Electrical Power - Control
  - (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- E. Access
  - (1) Location Zones
    - 120 Main Equipment Center
    - 211/212 Control Cabin
    - 710 Nose Landing Gear and Doors
    - 730/740 Main Landing Gear and Doors
  - (2) Access Panel
    - 119AL Main Equipment Center
- F. Install the Position Gearbox (Fig. 401)
  - S 214-021
    - (1) Make sure the TE flaps and LE slats are in the fully retracted position with the flap control lever in the zero (FLAPS UP) detent.
  - S 214-022
    - (2) Make sure the pressure is removed from the center hydraulic system (AMM 29-11-00/201).
  - S 214-023
    - (3) Make sure the flap and slat alternate drives are off.
  - S 424-024
    - (4) Put the gearbox in the position to install it.
  - S 434-025
    - (5) Install the three mount bolts, locknuts, and washers that attach the position gearbox to the control stand.
  - S 434-026
    - (6) Install the bolt, locknut, and washer that attach the gearbox link to the gearbox lever.
  - S 424-027
    - (7) Do the steps to install and adjust the two position RVDTs as shown in the Install the Position RVDT.
- G. Install the Position RVDT (Fig. 401)
  - S 214-028
    - (1) Make sure the TE flaps and LE slats are in the fully retracted position with the flap control lever in the zero (FLAPS UP) detent.

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- S 214-029
- (2) Make sure the pressure is removed from the center hydraulic system (AMM 29-11-00/201).
- S 214-030
- (3) Make sure the flap and slat alternate drives are off.
- S 424-031
- (4) Find the correct lengths of the RVDT wires and install the terminals on the wires (Detail C and Table I).
- S 824-032
- (5) Align the electrical null marks on the RVDT housing and the spline shaft ( $\pm 2^\circ$ ).
- S 644-033
- (6) Apply grease to the spline shaft.
- S 094-034
- (7) Remove the DO-NOT-OPERATE tag from the flap control lever.
- S 864-035
- (8) Move the flap control lever aft of the 15-unit detent (Detail B).
- S 424-036
- (9) Install the RVDT into the clamp.
- S 434-037
- (10) Install the clamp screw adjacent to the gearbox and tighten the two clamp screws.
- S 434-038
- (11) Connect the RVDT wires to terminal block TB215 or the ground terminal (Detail A).
- H. Adjust the Position RVDTs
- S 864-039
- (1) Move the flap control lever back to the zero (FLAPS UP) detent.
- S 864-040
- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR
  - (b) 11C16, FLAP SLAT ELEC UNIT 1 CONT
  - (c) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR
  - (d) 11G16, FLAP SLAT ELEC UNIT 2 CONT
  - (e) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR
  - (f) 11G23, FLAP SLAT ELEC UNIT 3 CONT

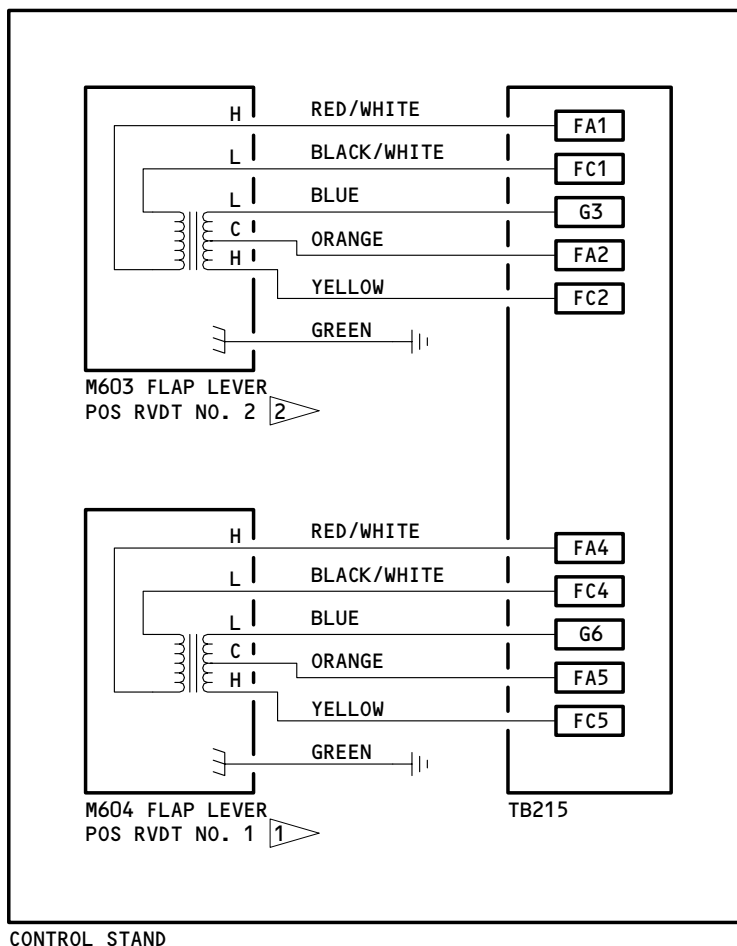
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**RVDT WIRE SCHEMATIC**

- 1 READ VOLTAGE BETWEEN CONNECTIONS:  
 V1 = FA4 AND FC4 (EXCITATION VOLTAGE)  
 V2 = G6 AND FC5 (SIGNAL VOLTAGE)  
 V3 = FA5 AND FC5  
 V4 = G6 AND FA5
- 2 READ VOLTAGE BETWEEN CONNECTIONS:  
 V1 = FA1 AND FC1 (EXCITATION VOLTAGE)  
 V2 = G3 AND FC2 (SIGNAL VOLTAGE)  
 V3 = FA2 AND FC2  
 V4 = G3 AND FA2

RVDT Adjustment  
Figure 402 (Sheet 1)

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EXCITATION VOLTAGE V1 (V AC)	SIGNAL VOLTAGE V2 (V AC) ±250 MV	EXCITATION VOLTAGE V1 (V AC)	SIGNAL VOLTAGE V2 (V AC) ±250 MV
27.00	10.850	28.60	11.490
27.10	10.894	28.70	11.537
27.20	10.930	28.80	11.570
27.30	10.974	28.90	11.618
27.40	11.010	29.00	11.650
27.50	11.055	29.10	11.698
27.60	11.090	29.20	11.740
27.70	11.135	29.30	11.779
27.80	11.170	29.40	11.820
27.90	11.216	29.50	11.859
28.00	11.250	29.60	11.900
28.10	11.296	29.70	11.939
28.20	11.330	29.80	11.980
28.30	11.377	29.90	12.020
28.40	11.410	30.00	12.060
28.50	11.457		

RVDT ADJUST VOLTAGE 3  
TABLE 1

3 VOLTAGE READINGS (EXCITATION AND SIGNAL) WITH THE FLAP CONTROL LEVER IN THE ZERO (FLAPS UP) DETENT V2 IS IN PHASE WITH V1. IF V1 IS NOT SHOWN IN TABLE 1, USE THIS EQUATION TO FIND V2:  
 $V2 = (0.402)(V1)$

EXCITATION VOLTAGE V1 (V AC)	SIGNAL VOLTAGE V2 (V AC) ± 250 MV IN REFERENCE TO THE FLAP CONTROL LEVER POSITION (0,1,5,15,20,25, OR 30)						
	0	1	5	15	20	25	30
27.00	10.850	7.330	4.120	0.890	2.310	5.480	8.420
27.20	10.930	7.380	4.150	0.900	2.330	5.520	8.480
27.40	11.010	7.440	4.180	0.900	2.350	5.560	8.540
27.60	11.090	7.490	4.210	0.910	2.370	5.600	8.610
27.80	11.170	7.550	4.240	0.910	2.380	5.640	8.670
28.00	11.250	7.600	4.270	0.920	2.400	5.680	8.730
28.20	11.330	7.650	4.300	0.930	2.420	5.720	8.790
28.40	11.410	7.710	4.330	0.930	2.430	5.760	8.850
28.60	11.490	7.760	4.360	0.940	2.450	5.800	8.920
28.80	11.570	7.820	4.390	0.950	2.470	5.840	8.980
29.00	11.650	7.870	4.420	0.950	2.490	5.880	9.040
29.20	11.740	7.910	4.470	0.960	2.510	5.930	9.110
29.40	11.820	7.970	4.500	0.970	2.530	5.970	9.170
29.60	11.900	8.020	4.530	0.980	2.550	6.010	9.240
29.80	11.980	8.070	4.560	0.980	2.560	6.050	9.300
30.00	12.060	8.130	4.590	0.990	2.580	6.090	9.360

RVDT VOLTAGE 4  
TABLE 2

4 IF V1 IS NOT SHOWN IN TABLE 2, USE THIS EQUATION TO FIND V2:  $V2 = (A)(V1)$

FLAP LEVER POS	0	1	5	15	20	25	30
A	0.402	0.271	0.153	0.033	0.086	0.203	0.312

RVDT Adjustment  
Figure 402 (Sheet 2)

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S 864-041

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

S 824-042

- (4) (Voltmeter Method) Do these steps to adjust RVDT No. 1 (M604):
- Make sure the flap control lever is in the zero (FLAPS UP) detent and the TE flaps and LE slats are fully retracted.
  - Read the excitation voltage, V1, with a voltmeter between connections FA4 and FC4 on terminal block TB215 (Fig. 402).

NOTE: Select a range on the voltmeter with three digits displayed after the decimal point.

- (c) Read the signal voltage, V2, between connections G6 and FC5 on terminal block TB215 (Fig. 402).
- Make sure the signal voltage, V2, is in the tolerance range as shown in Table 1 (Fig. 402).
  - If the signal voltage, V2, is out of the tolerance range, loosen the two clamp screws slowly and turn the RVDT until the signal voltage, V2, is in the tolerance range.

NOTE: To possibly avoid nuisance indication, adjust the RVDT as high as possible toward the upper end of the tolerance band.

- 3) Tighten the two clamp screws.

NOTE: The RVDT position is in direct relationship to the voltage readings. To make sure the voltage V2 stays in the tolerance range, monitor the voltage setting as you tighten the clamp screws.

- (d) Read the voltage, V3, between connections FA5 and FC5 and voltage V4 between connections FA5 and G6.
- Make sure that voltage V3 is more than voltage V4.

NOTE: This will make sure that the phase on the voltages are correct.

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- 2) If voltage V3 is not more than voltage V4, do the removal and installation procedure of the RVDT again.
- (e) Move the flap control lever from the zero (FLAPS UP) detent to the 30-unit detent and from the 30-unit detent back to the zero (FLAPS UP) detent.
- (f) Stop in each detent and make sure the signal voltage, V2, is as shown in reference to the excitation voltage, V1, for all of the positions of the flap control lever per Table 2 (Fig. 402).
  - 1) If a signal voltage V2 is out of the tolerance, adjust the RVDT with the flap control lever in that particular position.

NOTE: If there is more than one voltage readings out of the tolerance range, adjust the RVDT that has a larger "out of tolerance" first.

- 2) Make sure you tighten the RVDT clamp screws before you check the voltage readings at other flap lever positions.
- 3) Continue to adjust the RVDT, if it is necessary.

S 824-088

- (5) (FSEU Method) Do these steps to adjust RVDT No. 1 (M604):
  - (a) Place the flap control lever in the 15 detent.
  - (b) Turn the FSEU display on and navigate through the menus to monitor analog inputs to be able to read the RVDT voltage values on the FSEU BITE display.
  - (c) Press the down arrow until the screen displays the RVDT you want to check and push the YES key to display the RVDT reading.

NOTE: The display will turn off in 5 minutes if no further keys are pressed. To keep the screen active, press the YES key periodically to reset the 5-minute limit.

- (d) Read the voltage displayed on the FSEU.
  - 1) Make sure the voltage is in the tolerance range as shown below.
  - 2) If the voltage is out of the tolerance range, loosen the two clamp screws slowly and turn the RVDT until the voltage is in the tolerance range.

NOTE: To possibly avoid nuisance indication, adjust the RVDT as high as possible toward the upper end of the tolerance band.

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3) Tighten the two clamp screws.

NOTE: The RVDT position is in direct relationship to the voltage readings. To make sure the voltage stays in the tolerance range, monitor the voltage as you tighten the clamp screws.

- (e) Move the flap control lever from the zero (FLAPS UP) detent to the 30-unit detent and back to zero.
- (f) Stop in each detent and make sure that the voltages are in the tolerance ranges shown below.
- (g) Repeat adjustments as necessary to make sure the voltage is in the tolerance range for each position.

Detent	Funct Min	Rig Min	Nominal Vrms	Rig Max	Funct Max
Up	10.88	N/A	11.160	N/A	11.75
1	7.183	N/A	7.593	N/A	8.003
5	3.877	N/A	4.287	N/A	4.697
15	0.525	0.610	0.935	1.260	1.345
20	-2.82	N/A	-2.407	N/A	-2.00
25	-6.069	N/A	-5.659	N/A	-5.249
30	-9.202	N/A	-8.717	N/A	-8.307

S 824-043

- (6) Do this step to adjust RVDT No. 2 (M603):
  - (a) Adjust RVDT No. 2 with the same procedure as you did for RVDT No. 1.
  - (b) If you used the voltmeter method, measure the voltages at these connections (Fig. 402):
 

FA1 and FC1 = V1	FC2 and G3 = V2
FA2 and FC2 = V3	FA2 and G3 = V4

I. Test of the Position RVDT Installation

S 214-044

- (1) Make sure the flap control lever is in the zero (FLAPS UP) detent and the TE flaps and LE slats are fully retracted.

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- S 014-045
- (2) Open the access door, 119AL, to get access to the main equipment center (AMM 06-41-00/201).
- S 744-081
- (3) AIRPLANES WITH A -53 OR EARLIER FSEU;  
Do these steps to do the FSEU BITE:
- (a) Push the TEST button on the front panel of the FSEU (E2 equipment rack in the main equipment center) and make sure that all the lights come on.
  - (b) Push the BIT/VERIFY button.
    - 1) Stop and let the test complete light come on.
    - 2) Make sure that no lights come on.
      - a) If the M603 FLAP LEVER MISRIG (SECT 1) light comes on, adjust the RVDT again as necessary.
      - b) If other than the M603 FLAP LEVER MISRIG (SECT 1) light comes on, do the procedure in FIM 27-51-00/101.

- S 744-082
- (4) AIRPLANES WITH A -63 FSEU;  
Do a test of the BITE display on the FSEU:
- (a) Push the ON/OFF button on the front panel of the FSEU to turn on the display.

NOTE: The display will show "EXISTING FAULTS?"
  - (b) Push the down arrow until GROUND TESTS? shows on the display.
  - (c) Push the YES button to select GROUND TESTS? on the FSEU.
  - (d) Push the down arrow until DISPLAY TEST? shows on the display.
  - (e) Push the YES button to perform the DISPLAY TEST? on the FSEU.
  - (f) Make sure the display characters on the front panel of the FSEU turn on in groups of four for approximately 2 seconds.

- S 744-083
- (5) AIRPLANES WITH A -63 FSEU;  
Do a check for EXISTING FAULTS with the FSEU:
- (a) Push the menu button.

NOTE: The display will show EXISTING FAULTS?
  - (b) Push the YES button to select the EXISTING FAULTS? test.

NOTE: The display will show TEST IN PROGRESS.

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(c) The message "NO FAULTS" should show on the display.

NOTE: If "N FLTS FOUND" shows on the FSEU BITE display, where N is the number of faults detected, make a list of all the fault messages and maintenance message numbers. You can use the up and down arrow buttons to scroll through the list of messages.

(d) Do the corrective action for the faults found (FIM 27-51-00/101, Fig. 104, Table A).

S 864-049

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

CAUTION: MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(6) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-050

(7) Move the flap control lever from the zero (FLAPS UP) detent to the 30-unit detent and from the 30-unit detent back to the zero (FLAPS UP) detent.

S 214-051

- (8) Stop in each detent and do these checks:
- (a) Make sure no EICAS messages show on the display screen in the flight compartment.
  - (b) Make sure the amber TRAILING EDGE and LEADING EDGE lights, on the first officer's main instrument panel, P3, do not come on.

J. Put the Airplane Back to Its Usual Condition

S 864-052

(1) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 864-053

(2) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

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S 864-054

- (3) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-055

- (4) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-056

- (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
- (a) 6H15 or 6J15, CAPT SEAT
  - (b) 6J21, F/O SEAT

S 414-060

- (6) Close the access door, 119AL, to the main equipment center (AMM 06-41-00/201).

S 414-058

- (7) Install the access panel on the lower right side of the control stand.

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OUTBOARD FLAP MECHANISM – REMOVAL/INSTALLATION

1. General

- A. This procedure contains four tasks. The first task is the removal of the outboard flap mechanisms (linkages). The second task is the installation of the outboard flap mechanisms (linkages). The third task is the removal of the 2-8 and 3-10 links. The fourth task is the installation of the 2-8 and 3-10 links.
- B. Each outboard flap is moved by an inboard linkage and an outboard linkage.
- C. Refer to AMM 27-51-21/601 for wear limit inspection of the joints in the outboard flap linkages.
- D. Refer to AMM 27-51-21/401 to replace the actuator crank arm.
- E. It is not necessary to remove the outboard flap linkage assembly to remove the fuse pins at joint 1 of the linkage assembly, and the connection to the side brace link. Refer to AMM 27-51-02/401 to replace the fuse pins.
- F. It is not necessary to remove the outboard flaps to remove the 2-8 and 3-10 flap mechanism links.

TASK 27-51-27-024-001

2. Outboard Flap Linkage – Removal

A. General

- (1) This task is applicable to outboard flap mechanisms No. 1, No. 2, No. 7 and No. 8.

B. Equipment

- (1) TE Flap PDU Lock – A27009-7
- (2) Circuit Breaker Lockout Clip – 1012LC-R  
Commercially Available

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 27-51-02/401, TE Flap Fuse Pins
- (4) AMM 27-51-20/401, Outboard Flap
- (5) AMM 27-51-21/601, Outboard Flap Actuator Crank Arm Mechanism
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) AMM 32-00-15/201, Landing Gear Door Lock
- (8) AMM 32-00-20/201, Landing Gear Downlock

D. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
560/660	Wing Trailing Edge – Outboard
572/672	Outboard Flap Inboard Fairing
573/673	Outboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

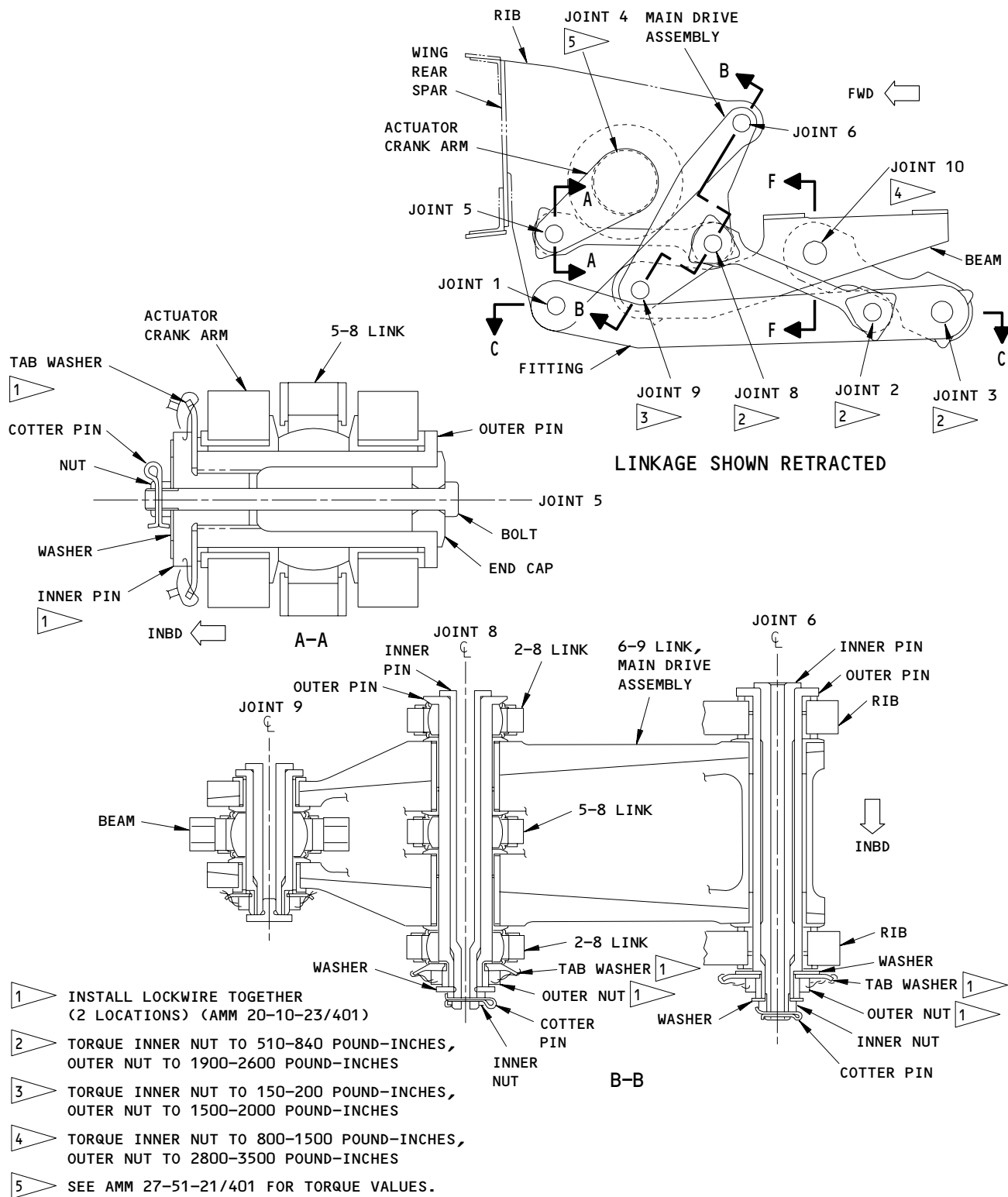
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Inboard Linkage for the Outboard Flap  
Figure 401 (Sheet 1)

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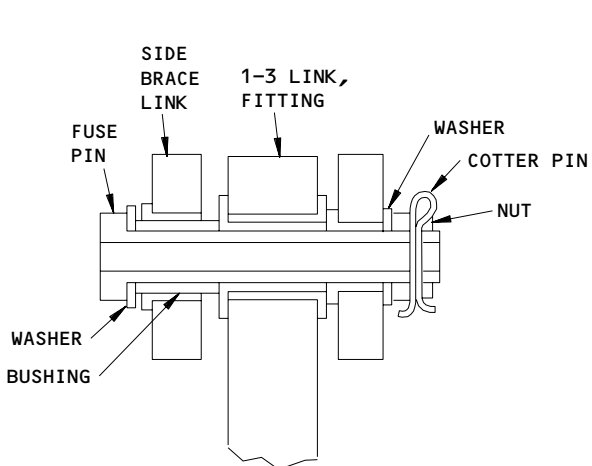
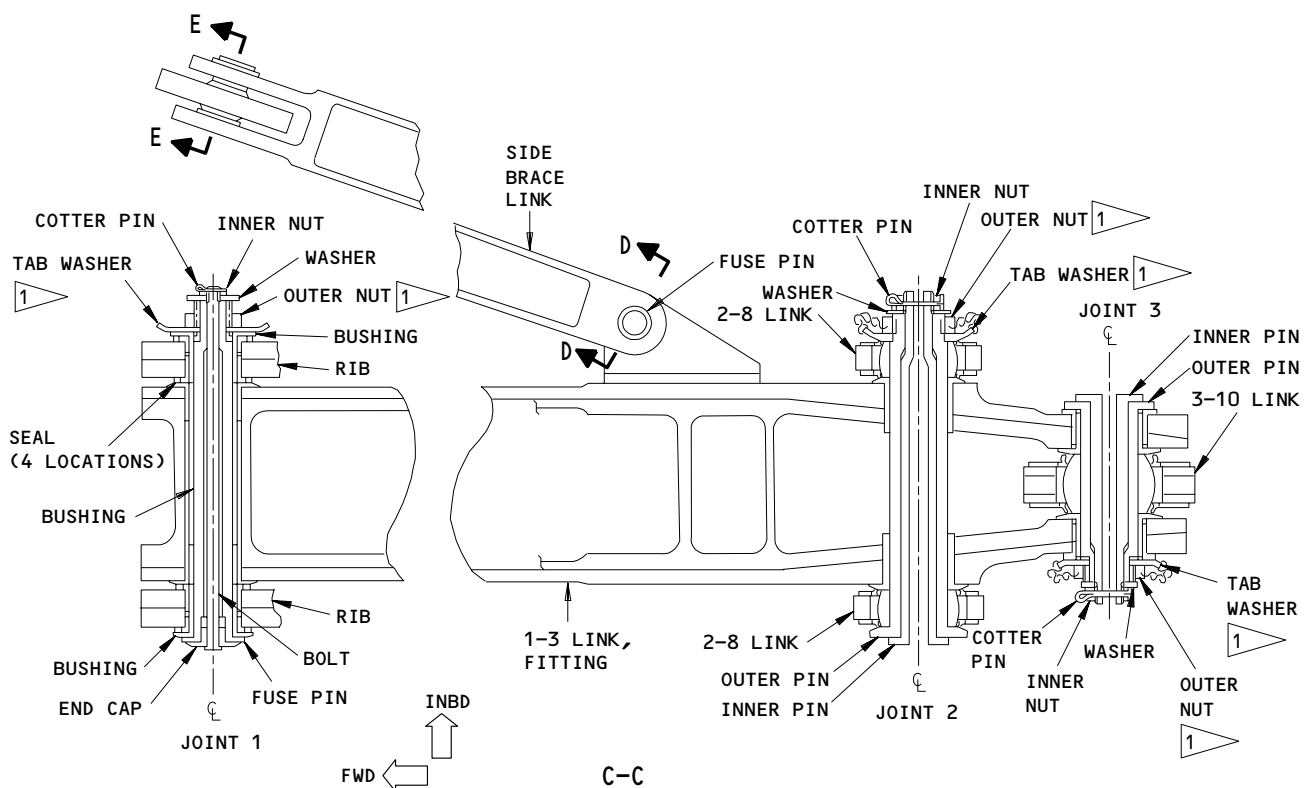
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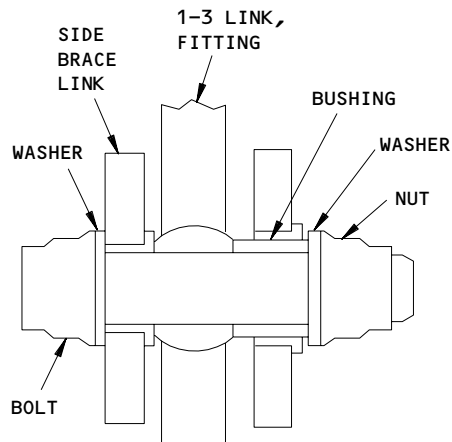
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Inboard Linkage for the Outboard Flap  
Figure 401 (Sheet 2)

EFFECTIVITY

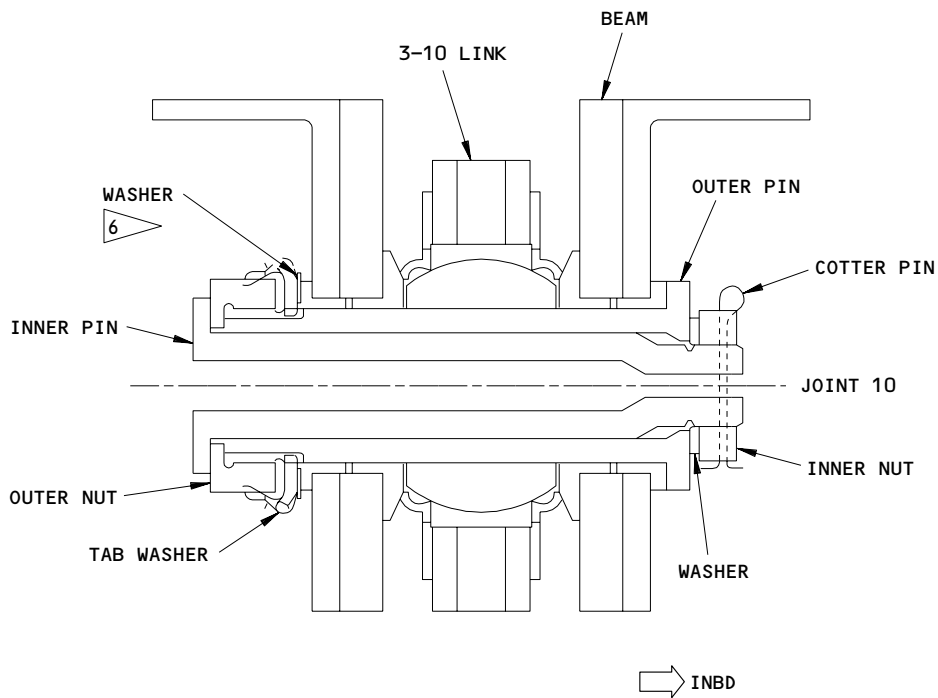
ALL

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16443



F-F

**6** INSTALL UP TO THREE WASHERS TO MAKE A 0.005-0.090 INCH (0.13-2.3 mm) GAP.

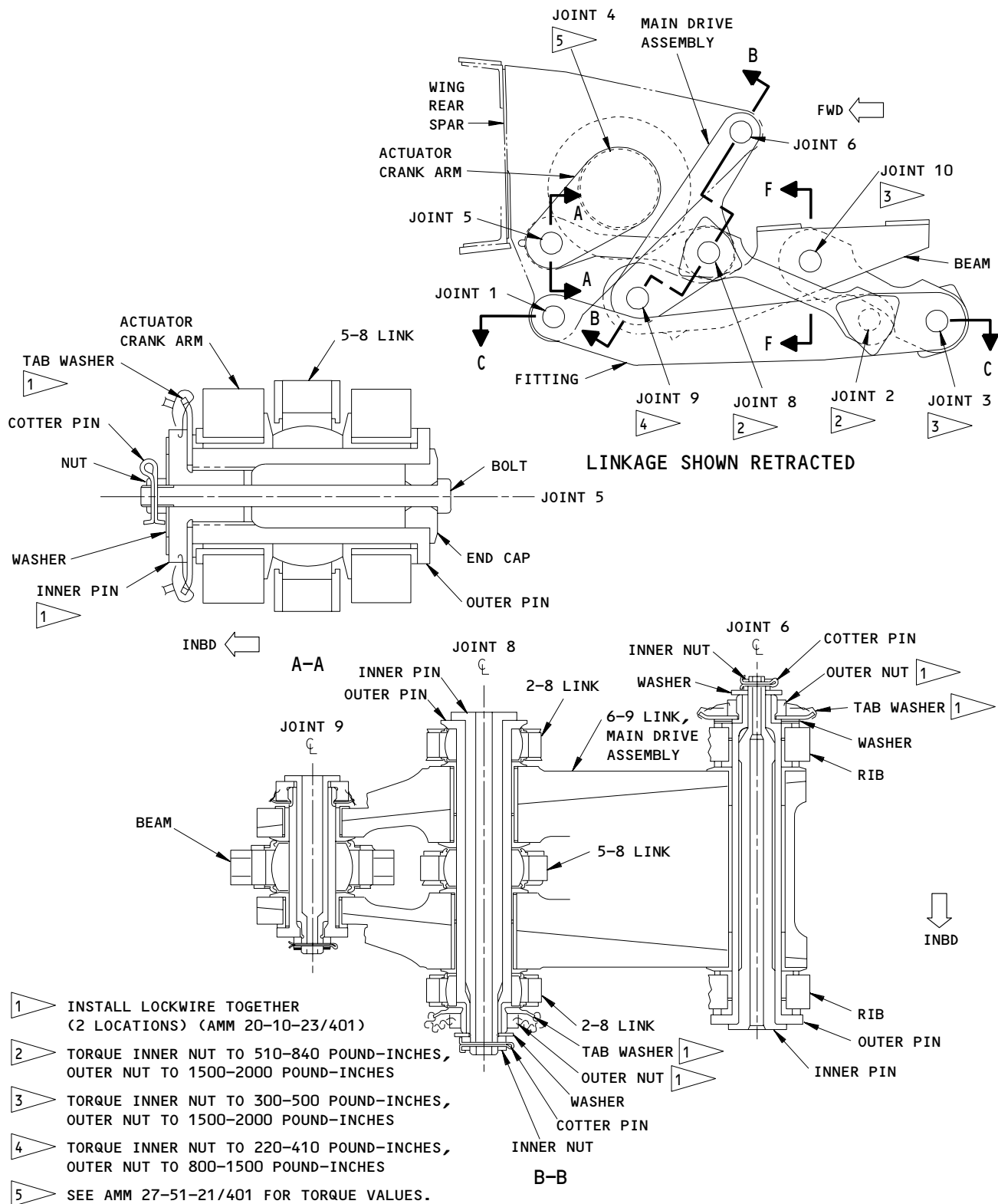
Inboard Linkage for the Outboard Flap  
Figure 401 (Sheet 3)

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Outboard Linkage for the Outboard Flap  
Figure 402 (Sheet 1)

EFFECTIVITY

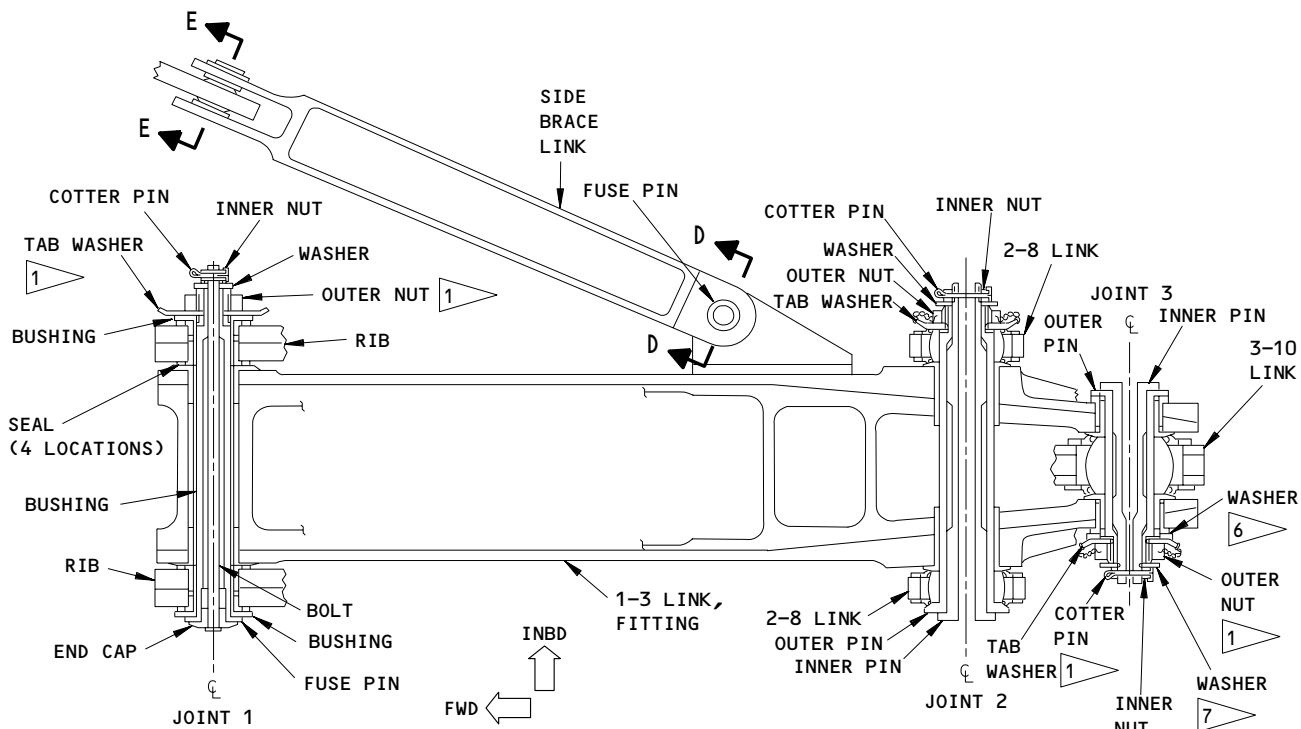
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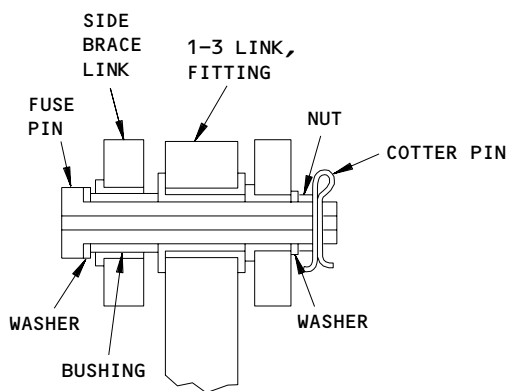
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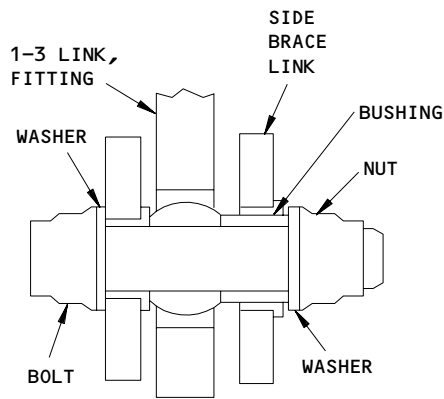




C-C



D-D



E-E

**6** INSTALL UP TO THREE WASHERS TO MAKE A 0.005-0.090 INCH (0.13-2.3 mm) GAP.

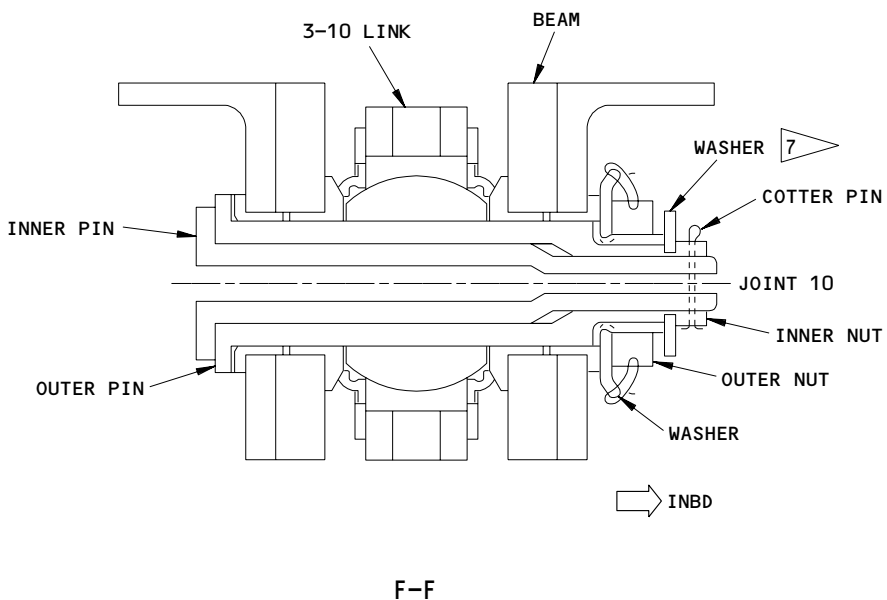
Outboard Linkage for the Outboard Flap  
Figure 402 (Sheet 2)

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7 INSTALL UP TO THREE WASHERS.

Outboard Linkage for the Outboard Flap  
Figure 402 (Sheet 3)

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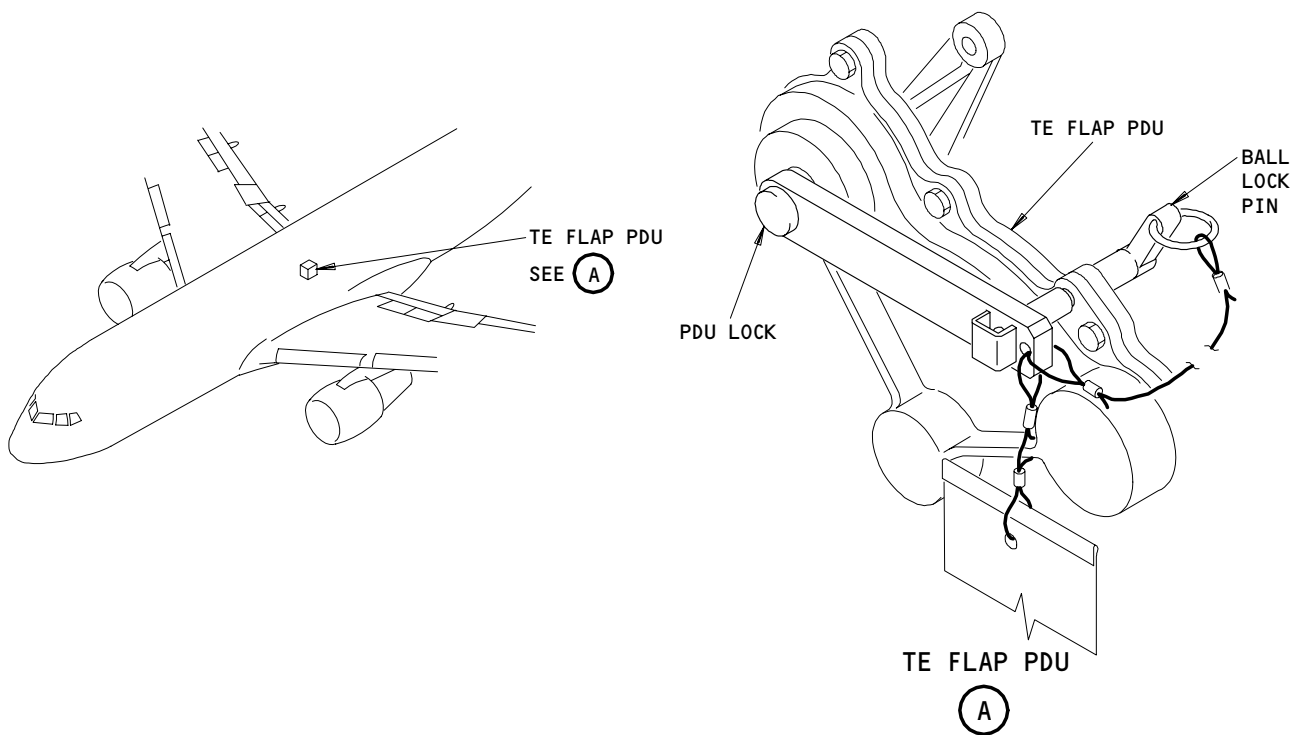
(2) Access Panels

561EB/661EB	Wing TE Structure, Outboard Flap Installation
561FB/661FB	Wing TE Structure, Outboard Flap Installation
561GB/661GB	Wing TE Structure, Outboard Flap Installation
561HB/661HB	Wing TE Structure, Outboard Flap Installation
561JB/661JB	Wing TE Structure, Outboard Flap Installation
572BB/672BB	Flap Mechanism - No. 2 (LH) and No. 7 (RH)
573BB/673BB	Flap Mechanism - No. 1 (LH) and No. 8 (RH)

E. Prepare for the Removal

S 214-002

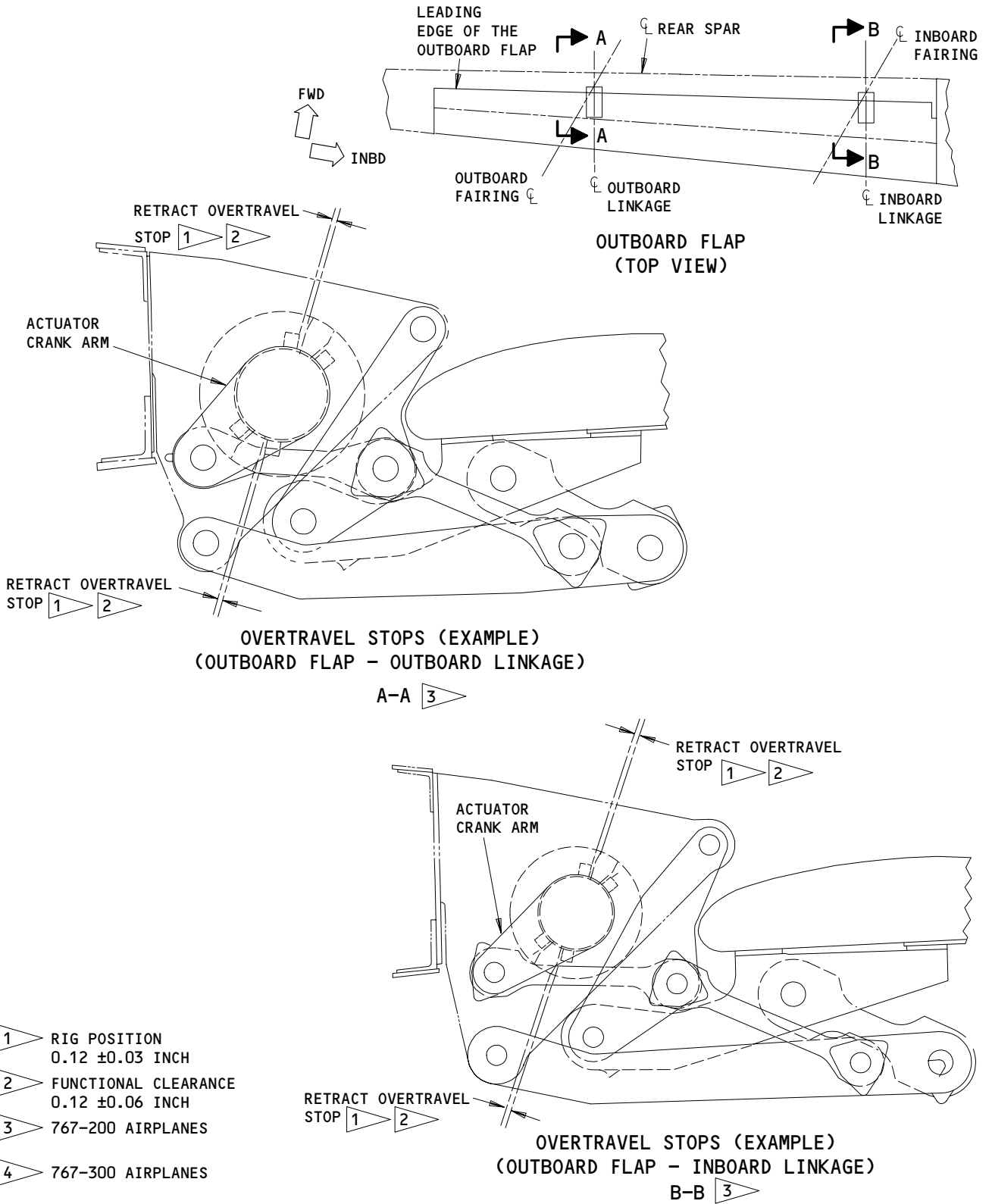
- (1) Make sure the downlock is installed on the nose and main landing gear (AMM 32-00-20/201).



PDU Lock for the TE Flap PDU  
Figure 403

EFFECTIVITY	
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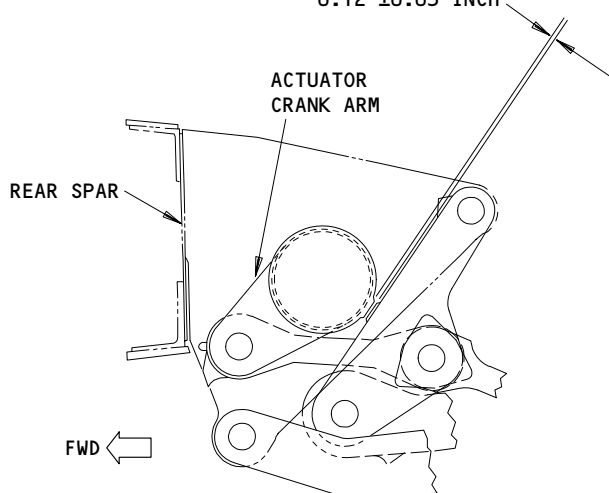


Overtravel Stop Clearance for the Outboard Flap  
 Figure 404 (Sheet 1)

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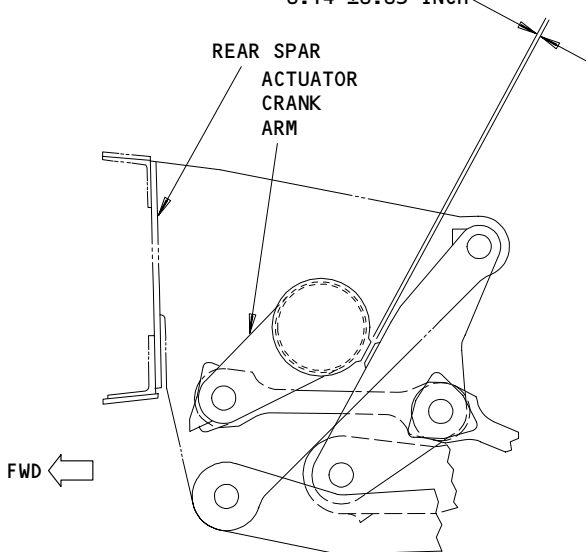
RETRACT OVERTRAVEL STOP:  
FUNCTIONAL CLEARANCE  
0.12 ±0.06 INCH  
RIG CLEARANCE  
0.12 ±0.03 INCH



RETRACT OVERTRAVEL STOP  
(OUTBOARD FLAP - OUTBOARD LINKAGE)

A-A 4

RETRACT OVERTRAVEL STOP:  
FUNCTIONAL CLEARANCE  
0.14 ±0.06 INCH  
RIG CLEARANCE  
0.14 ±0.03 INCH



RETRACT OVERTRAVEL STOP  
(OUTBOARD FLAP - INBOARD LINKAGE)

B-B 4

Overtravel Stop Clearance for the Outboard Flap  
Figure 404 (Sheet 2)

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S 494-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-004

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

S 864-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-006

- (5) Move the flap control lever to the 30-unit detent, and permit the flaps and slats to move to the fully extended position.

S 864-007

- (6) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 494-008

- (7) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 864-009

- (8) Open these circuit breakers on the main power distribution panel, P6, and install the circuit breaker locks and DO-NOT-CLOSE tags:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

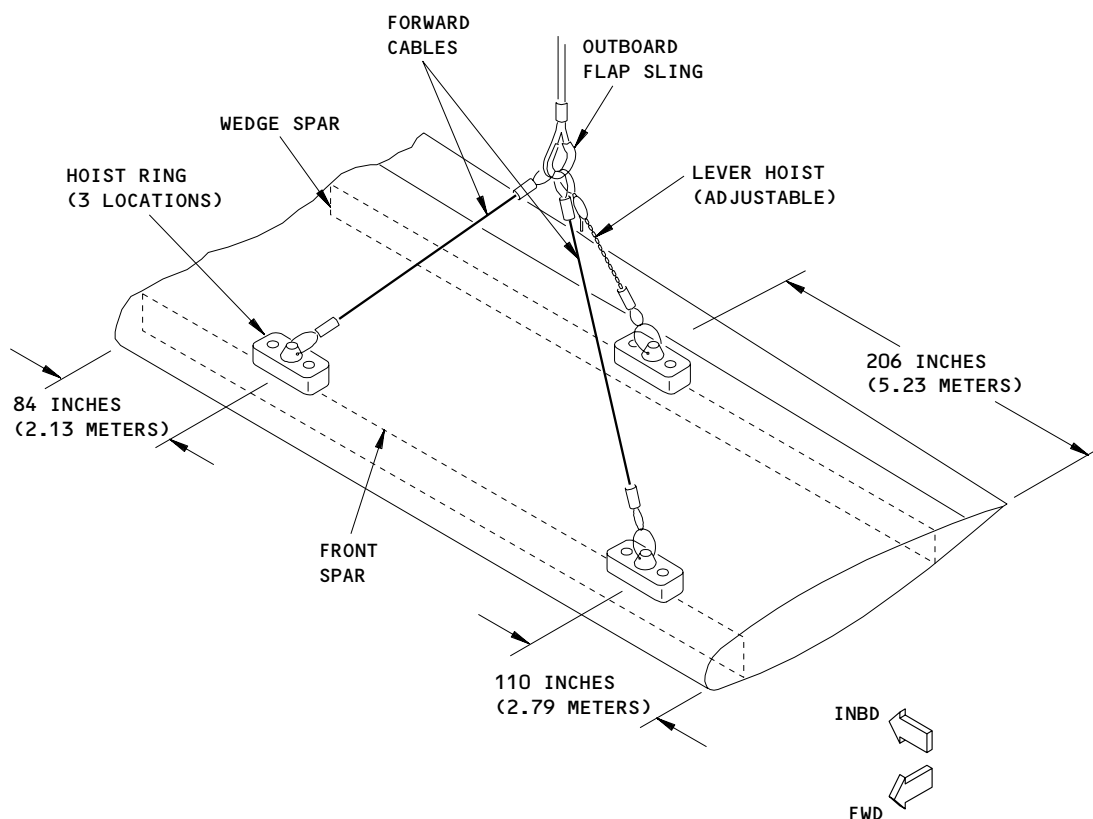
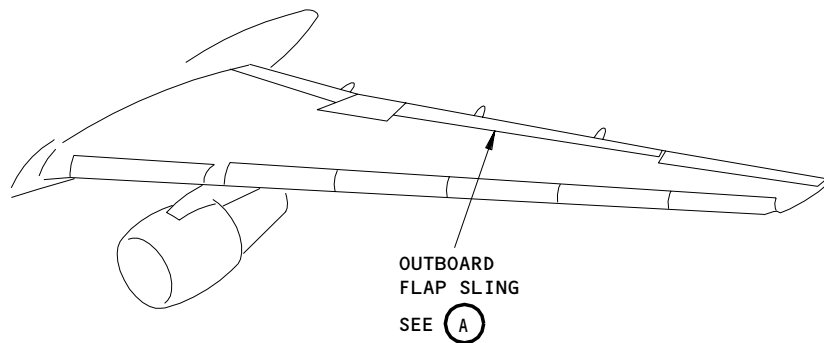
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OUTBOARD FLAP SLING

(A)

Outboard Flap Sling  
Figure 405

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S 864-010

- (9) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 494-011

- (10) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 403).

S 014-012

- (11) Remove the wing lower trailing edge access panels as necessary to get access to the linkages (AMM 06-44-00/201).

F. Remove the Outboard Flap Linkages

**NOTE:** Refer to Fig. 401 for the inboard linkage removal.  
Refer to Fig. 402 for the outboard linkage removal.

Identify the parts that you will remove in this procedure for the subsequent installation.

S 024-013

- (1) Remove the outboard flap from the airplane (AMM 27-51-20/401).

S 494-014

- (2) Put a support below the flap linkage assembly that you will remove, to hold the weight of the linkage assembly.

S 034-015

- (3) Disconnect the actuator crank arm from the 5-8 link at Joint 5 with these steps:
- (a) Remove the cotter pin, nut, washer, bolt, and end cap (View A-A).
  - (b) Cut the lockwires and remove the inner pin and tab washer from the outer pin.
  - (c) Hold the 5-8 link and remove the outer pin.

S 024-016

- (4) Remove the side brace link with these steps (View C-C):
- (a) Remove the cotter pin, nut, washers, and fuse pin at the aft connection, between the side brace link and the 1-3 link (fitting) (View D-D).
  - (b) Remove the nut, washers, bushing, and bolt at the forward connection, between the side brace link and the wing structure (View E-E).

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S 034-017

- (5) Disconnect the 1-3 link from the rib structure at joint 1 with these steps (View C-C):

**NOTE:** Hold the weight of the 1-3 link during these steps.

- (a) Remove the cotter pin, inner nut, washer, bolt, and end cap.
- (b) Cut and remove the lockwires between the outer nut and the tab washer.
- (c) Remove the outer nut, tab washer, and fuse pin.

S 034-018

- (6) Disconnect the 6-9 link (main drive assembly) from the rib structure at joint 6 with these steps (View B-B):

- (a) Remove the cotter pin, inner nut, washer, and inner pin.
- (b) Cut and remove the lockwires between the outer nut and the tab washer.
- (c) Remove the outer nut, tab washer, washer, and outer pin.

S 024-019

- (7) Remove the flap linkage assembly from the airplane.

TASK 27-51-27-424-021

### 3. Outboard Flap Linkages - Installation

**NOTE:** Refer to AMM 27-51-21/601 for data on the wear limit inspection of the components installed in this procedure.

#### A. General

- (1) This task is applicable to outboard flap mechanisms No. 1, No. 2, No. 7 and No. 8.
- (2) To install the 2-8 or 3-10 link, it is only necessary to connect the applicable joints on the outboard flap mechanisms (linkages).

#### B. Equipment

- (1) TE Flap PDU Lock - A27009-7

#### C. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) D00015 Grease - BMS 3-24 (Alternate)
- (4) G02020 Modeling Clay

#### D. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 20-10-23/401, Lockwires
- (3) AMM 24-22-00/201, Electrical Power - Control

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- (4) AMM 27-51-00/501, Trailing Edge Flap System
- (5) AMM 27-51-20/401, Outboard Flap
- (6) AMM 27-51-21/601, Outboard Flap Actuator Crank Arm Mechanism
- (7) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (8) AMM 32-00-15/201, Landing Gear Door Lock

E. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
560/660	Wing Trailing Edge - Outboard
572/672	Outboard Flap Inboard Fairing
573/673	Outboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

561EB/661EB	Wing TE Structure, Outboard Flap Installation
561FB/661FB	Wing TE Structure, Outboard Flap Installation
561GB/661GB	Wing TE Structure, Outboard Flap Installation
561HB/661HB	Wing TE Structure, Outboard Flap Installation
561JB/661JB	Wing TE Structure, Outboard Flap Installation
572BB/672BB	Flap Mechanism - No. 2 (LH) and No. 7 (RH)
573BB/673BB	Flap Mechanism - No. 1 (LH) and No. 8 (RH)

F. Install the Outboard Flap Linkages

**NOTE:** Refer to Fig. 401 for the inboard linkage installation.  
 Refer to Fig. 402 for the outboard linkage installation.

S 214-022

- (1) Make sure the power is removed from the center hydraulic system (AMM 29-11-00/201).

S 214-023

- (2) Make sure the PDU lock is installed in the TE flap PDU (Fig. 403).

S 434-024

- (3) Connect the linkage assembly to the structure at joint 6 with these steps (View B-B):
  - (a) Put joint 6 of the 6-9 link between the structural ribs.
  - (b) Align the hole in the link to the holes in the ribs and install the outer pin, with a washer, tab washer, and outer nut.
  - (c) Tighten the outer nut (inboard or outboard linkage) to 1500 to 2000 pound-inches (169.5-225.9 newton-meters) and install a lockwire between the nut and the tab washer at two locations (AMM 20-10-23/401).
  - (d) Install the inner pin in the outer pin with the washer and inner nut.

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- (e) Tighten the inner nut (inboard linkage) to 510–840 pound-inches (57.7–94.9 newton-meters), or to 220–410 pounds-inches (24.9–46.3 newton-meters) (outboard linkage), and install the cotter pin.

S 434-025

- (4) Connect the link assembly to the structural rib at joint 1 with these steps (View C-C):
  - (a) Put joint 1 of the 1-3 link between the structural ribs.
  - (b) Align the hole in the link to the holes in the ribs and install the fuse pin, with a tab washer and outer nut.

NOTE: Make sure the bushings are installed in the link and the ribs.

- (c) For the inboard linkage, tighten the outer nut to 350–450 pound-inches (39.6–50.8 newton-meters).
- (d) For the outboard linkage, tighten the outer nut to 500–600 pound-inches (56.5–67.7 newton-meters).
- (e) Install lockwires between the outer nut and the tab washer at two locations (AMM 20-10-23/401).
- (f) Install the bolt in the fuse pin, with the end cap, washer and inner nut.
- (g) Tighten the inner nut (inboard or outboard linkage) to 50–75 pound-inches (5.7–8.4 newton-meters) and install the cotter pin.

S 424-026

- (5) Install the side brace link with these steps (View C-C):
  - (a) Connect the side brace link to the wing structure with the bolt, washers, bushing, and nut (View E-E).
  - (b) For the inboard linkage, tighten the nut to 800–1500 pound-inches (90.4–169.4 newton-meters).
  - (c) For the outboard linkage, tighten the nut to 510–840 pound-inches (57.7–94.9 newton-meters).
  - (d) Connect the side brace link to the 1-3 link with the fuse pin, washers, bushing, and nut (View D-D).
  - (e) For the inboard linkage, tighten the nut to 370–690 pound-inches (41.8–77.9 newton-meters) and install the cotter pin.
  - (f) For the outboard linkage, tighten the nut to 150–200 pound-inches (17.0–22.5 newton-meters) and install the cotter pin.

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S 434-027

- (6) Connect the linkage to the actuator crank arm at joint 5 with these steps (View A-A):
- (a) Put the 5-8 link between the actuator crank arm.
  - (b) Align the hole in the link to the holes in the crank arm and install the outer pin, with the tab washer and inner pin.
  - (c) Tighten the inner pin (inboard or outboard linkage) to 800-1500 pound-inches, and install lockwires between the inner pin and the tab washer at two locations (AMM 20-10-23/401).
  - (d) Install the end cap, bolt, washer, and nut.
  - (e) Tighten the nut (inboard or outboard linkage) to 150-200 pound-inches (17.0-22.5 newton-meters), and install the cotter pin.

S 424-028

- (7) Install the outboard flap (AMM 27-51-20/401).

S 094-029

- (8) Remove the PDU lock from the TE flap PDU (Fig. 403).

S 214-030

- (9) Make sure the flap control lever is in the 30-unit detent, and remove the DO-NOT-OPERATE tag from the flap control lever.

S 864-031

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (10) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-032

- (11) Move the flap control lever to the 20-unit detent, and make sure the flaps move to the 20-degree position.

S 864-033

- (12) Remove the power from the center hydraulic system (AMM 29-11-00/201).

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S 494-034

- (13) Install the PDU lock in the TE flap PDU (Fig. 403).

S 494-035

- (14) Apply modeling clay to the two retract overtravel stops in the outboard flap in which the linkage was installed (Fig. 404).

**NOTE:** If it is necessary, put a piece of tape on the retract stop so that it will be easier to remove the clay.

S 094-036

- (15) Remove the PDU lock from the TE flap PDU (Fig. 403).

S 864-037

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (16) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-038

- (17) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted position.

**NOTE:** Stop for one minute before you continue to the subsequent step.

S 864-039

- (18) Move the flap control lever to the 20-unit detent, and make sure the flaps move to the 20-degree position.

S 864-040

- (19) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 494-041

- (20) Install the PDU lock in the TE flap PDU (Fig. 403).

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S 094-042

- (21) Carefully remove the clay from each retract overtravel stop.

S 224-043

- (22) Measure and make a record of the clay thickness at each retract overtravel stop, and make sure each overtravel stop clearance (the clay thickness) is correct as shown (Fig. 404).

S 824-044

- (23) If the overtravel stop clearance is not correct, adjust the overtravel stop clearance to the RIG position (AMM 27-51-00/501, "Outboard Flap Retract Overtravel Stop RIG Position - Adjustment").

S 094-045

- (24) Remove the PDU lock from the TE flap PDU (Fig. 403).

S 864-046

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (25) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-047

- (26) Move the flap control lever to the zero (FLAPS UP) detent, and permit the flaps and slats to move to the fully retracted position.

G. Put the Airplane Back to Its Usual Condition

S 414-048

- (1) Install the access panels at the lower surface of the wing trailing edge (AMM 06-44-00/201).

S 864-049

- (2) Remove the DO-NOT-CLOSE tags and circuit breaker locks and close these circuit breakers on the main power distribution panel, P6:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6D24, ALTN FLAP PWR  
(c) 6F24, ALTN SLAT OUTBD PWR

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S 864-050

- (3) Remove the DO-NOT-CLOSE tags and circuit breaker locks and close these circuit breakers on the overhead panel, P11:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 094-051

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 864-052

- (5) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 864-053

- (6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-51-27-024-071

4. Outboard Flap 2-8 and 3-10 link - Removal

A. General

- (1) To remove the 2-8 or 3-10 link, it is only necessary to disconnect the applicable joints on the outboard flap mechanisms (linkages) (Fig. 401 and 402).

B. Equipment

- (1) TE Flap PDU Lock - A27009-7
- (2) Circuit Breaker Lockout Clip - 1012LC-R  
Commercially Available
- (3) Sling Equipment, Outboard TE Flap - A27027-53

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(4) Shackles, 3/8 inch (9.525 mm) Diameter - Commercially Available.

C. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-51-16/401, Outboard TE Flap Track Fairings
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 32-00-15/201, Landing Gear Door Lock
- (5) AMM 32-00-20/201, Landing Gear Downlock

D. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
560/660	Wing Trailing Edge - Outboard
572/672	Outboard Flap Inboard Fairing
573/673	Outboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

E. Prepare for the Removal

S 214-059

- (1) Make sure the downlock is installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-060

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-061

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

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S 864-062

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-063

(5) Move the flap control lever to the 30-unit detent, and permit the flaps and slats to move to the fully extended position.

S 864-064

(6) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 494-065

(7) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 494-072

(8) Open these circuit breakers on the main power distribution panel, P6, and install the circuit breaker locks and DO-NOT-CLOSE tags:

- (a) 6D21, ALTN SLAT INBD PWR
- (b) 6D24, ALTN FLAP PWR
- (c) 6F24, ALTN SLAT OUTBD PWR

S 494-073

(9) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:

- (a) 11H23, SLAT ALTN CONT INBD
- (b) 11H24, SLAT ALTN CONT OUTBD
- (c) 11J24, FLAPS ALTN CONT

S 494-074

(10) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 403).

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S 844-092

- (11) Remove the mid section of the flap fairing (AMM 27-51-16/401).

S 494-075

- (12) Install the flap sling at the three attach points on the upper surface of the main outboard flap (Fig. 405).

**NOTE:** It is necessary to hold the flap at the 30-unit pitch up attitude to secure the flap at the three attach points.

Add 3/8-inch diameter shackles to the two aft cables of the flap sling, as necessary, to get the flap pitch up attitude in the 30-unit position.

S 424-076

- (13) Connect the overhead hoist to the flap sling and make sure all of the cables are in tension.

**NOTE:** Make sure the hoist can hold the weight of the flap with the aft flap attached. The total weight is approximately 422 pounds (191 kg).

S 014-067

- (14) Disconnect the 3-10 link from the structure with these steps:

**NOTE:** The 3-10 link connects the flap carrier beam to the 1-3 main beam fitting assembly.

**WARNING:** MAKE SURE YOU HOLD THE AFT END OF THE FLAP CARRIER BEAM WHEN YOU DISCONNECT THE 3-10 LINK. THE AFT END OF THE FLAP CARRIER BEAM WILL MOVE DOWN WHEN YOU DISCONNECT THE 3-10 LINK. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (a) Remove the 3-10 link from the flap carrier beam (View F-F):
- 1) Remove the cotter pin, inner nut, washer and the inner pin.
  - 2) Cut and remove the lockwires between the outer nut and the tab washer.
  - 3) Remove the outer nut and tab washer from the outer pin.
  - 4) Hold the 3-10 link and remove the outer pin.
- (b) Remove the 3-10 link from the 1-3 main beam fitting assembly:
- 1) Remove the cotter pin, inner nut, washer and the inner pin.
  - 2) Cut and remove the lockwires between the outer nut and the tab washer.
  - 3) Remove the outer nut and tab washer from the outer pin.
  - 4) Remove the outer pin to remove the 3-10 link from the 1-3 main beam fitting assembly.

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S 024-078

(15) Disconnect the 2-8 link from the structure with these steps:

**NOTE:** The 2-8 link connects the 6-9 link, main drive assembly, to the 1-3 main beam fitting assembly.

**WARNING:** PUT A WOOD BLOCK BETWEEN THE FORWARD END OF THE FLAP CARRIER BEAM AND THE 1-3 MAIN BEAM FITTING ASSEMBLY. THE FLAP CARRIER BEAM CAN MOVE DOWN, CAUSING INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

**WARNING:** MAKE SURE YOU HOLD THE AFT END OF THE FLAP CARRIER BEAM WHEN YOU DISCONNECT THE 2-8 LINK. THE AFT END OF THE FLAP CARRIER BEAM WILL MOVE DOWN WHEN YOU DISCONNECT THE 2-8 LINK. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (a) Disconnect the 2-8 link from the main beam fitting assembly at joint 2 with these steps (View C-C):
  - 1) Remove the cotter pin, inner nut, washer, and inner pin.
  - 2) Cut and remove the lockwires between the outer nut and the tab washer.
  - 3) Remove the outer nut, tab washer, washer, and outer pin.
- (b) Disconnect the 2-8 link from the 6-9 link, main drive assembly, at joint 8 with these steps (View B-B):
  - 1) Remove the cotter pin, inner nut, washer, and inner pin.
  - 2) Cut and remove the lockwires between the outer nut and the tab washer.
  - 3) Hold the inboard 2-8 link that is at the threaded end of the outer pin.
  - 4) Pull the outer pin only until you can remove the inboard 2-8 link near the threaded end of the pin.
  - 5) Hold the 5-8 link that is between the crank arm assembly and the 6-9 link, main drive assembly.
  - 6) Pull the outer pin only until you can remove the 5-8 link from the middle of the 6-9 link, main drive assembly.
  - 7) Hold the outboard 2-8 link and remove the outer pin.

TASK 27-51-27-424-079

5. Outboard Flap 2-8 and 3-10 Link - Installation

A. General

- (1) This task contains the steps to install the outboard flap 2-8 and 3-10 links (Fig. 401 and 402).

B. Equipment

- (1) Sling Equipment, Outboard TE Flap - A27027-53
- (2) TE Flaps PDU Lock - A27009-7
- (3) Shackles, 3/8 inch (9.525 mm) Diameter - Commercially Available.

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C. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) A00247 Sealant - BMS 5-95

D. References

- (1) AMM 12-21-09/301, Trailing Edge Flap - Lubrication
- (2) AMM 20-10-23/401, Lockwire
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 27-51-16/401, Outboard TE Flap Track Fairings
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) AMM 32-00-15/201, Landing Gear Door Lock

E. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
560/660	Wing Trailing Edge - Outboard
572/672	Outboard Flap Inboard Fairing
573/673	Outboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

F. Install the Outboard Flap 2-8 and 3-10 Link

S 864-080

- (1) Make sure the power is removed from the center hydraulic system (AMM 29-11-00/201).

S 844-081

- (2) Make sure the PDU lock is installed in the TE flap PDU (Fig. 403).

S 844-082

- (3) Make sure the outboard flap sling is attached to the hoist and is installed in tension at the three flap attach points.

S 414-069

- (4) Connect the 3-10 link to the structure with these steps:

**NOTE:** The 3-10 link connects the flap carrier beam to the 1-3 main beam fitting assembly.

- (a) Put the 3-10 link in its location on the 1-3 main beam fitting assembly (View C-C):

- 1) Install the outer pin that attaches the 3-10 link to the 1-3 main beam fitting assembly.

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- 2) Install the washer, tab washer and outer nut on the outer pin.

NOTE: ON THE OUTBOARD LINKAGE;  
Use a maximum of 3 washers to get the necessary clearance (Fig. 402, sht. 2, f/n 6 and 7).

- 3) Tighten the outer nut to 1900–2600 pound-inches (214.6–293.7 newton-meters) on the inboard linkage or 1500–2000 pound-inches (169.4–226.0 newton-meters) on the outboard linkage and install a lockwire between the nut and the tab washer at two locations (AMM 20-10-23/401).
  - 4) Install the inner pin in the outer pin with the washer and inner nut.
  - 5) Tighten the inner nut to 510–840 pound-inches (57.7–94.9 newton-meters) on the inboard linkage or to 300–500 pound-inches (33.9–56.4 newton-meters) on the outboard linkage, and install the cotter pin.
- (b) Put the 3-10 link in its location on the flap carrier beam (View F-F):
- 1) Install the outer pin that attaches the 3-10 link to the flap carrier beam.
  - 2) ON THE INBOARD LINKAGE;  
Install the washer, tab washer and outer nut on the outer pin.

NOTE: Use a maximum of 3 washers to get the necessary clearance (Fig. 401, sht. 3, f/n 6).

- 3) ON THE OUTBOARD LINKAGE;  
Install the tab washer and outer nut on the outer pin.
- 4) Tighten the outer nut to 2800–3500 pound-inches (316.5–395 newton-meters) on the inboard linkage or to 1500–2000 pound-inches (170.0–225.9 newton-meters) on the outboard linkage.
- 5) Install lockwires between the outer nut and the tab washer at two locations (AMM 20-10-23/401).
- 6) Install the inner pin in the outer pin with the washer and inner nut.

NOTE: ON THE OUTBOARD LINKAGE;  
Use a maximum of 3 washers (Fig. 402, sht. 3, f/n 7).

- 7) Tighten the inner nut to 800–1500 pound-inches (90.4–169.4 newton-meters) on the inboard linkage, or to 300–500 pound-inches (33.9–56.4 newton-meters) on the outboard linkage, and install the cotter pin.

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S 414-070

- (5) Connect the 2-8 link to the structure with these steps:

**NOTE:** The 2-8 link connects the 6-9 link, main drive assembly, to the 1-3 main beam fitting assembly.

- (a) Put the outboard 2-8 link in its location on the 6-9 link, main drive assembly (View B-B):
- 1) Install the outer pin through the 2-8 link, but not fully through the 6-9 link, main drive assembly.
  - 2) Put the outboard 5-8 link in its location on the 6-9 link, main drive assembly (View B-B).
  - 3) Push the outer pin through the 5-8 link, and fully through the 6-9 link, main drive assembly.
- (b) Put the inboard 2-8 link in its location on the outer pin on the 6-9 link, main drive assembly (View B-B):
- 1) Install the tab washer and nut on the outer pin.
  - 2) Tighten the outer nut to 1500-2000 pound-inches (169.5-225.9 newton-meters) on the outer linkage or to 1900-2600 pound-inches (214.7-293.7 newton-meters) on the inner linkage and install the lockwire between the nut and the tab washer at two locations (AMM 20-10-23/401).
  - 3) Install the inner pin in the outer pin with the washer and inner nut.
  - 4) Tighten the inner nut to 510-840 pound-inches (57.7-94.9 newton-meters) (inboard and outboard linkages) and install the cotter pin.
- (c) Put the inboard and outboard 2-8 links in their locations on the 1-3 main beam fitting assembly (View C-C):
- 1) Push the outer pin through the outboard 2-8 link, the 1-3 main beam fitting assembly and the inboard 2-8 link.
  - 2) Install the tab washer and nut on the outer pin.
  - 3) Tighten the outer nut to 1500-2000 pound-inches (169.5-225.9 newton-meters) on the outer linkage or to 1900-2600 pound-inches (214.7-293.8 newton-meters) on the inner linkage and install the lockwire between the nut and the tab washer at two locations (AMM 20-10-23/401).
  - 4) Install the inner pin in the outer pin with the washer and inner nut.
  - 5) Tighten the inner nut to 510-840 pound-inches (57.7-94.9 newton-meters) (inboard and outboard linkages) and install the cotter pin.

S 844-083

- (6) Remove the sling from the main flap and install the bolts to the flap with sealant.

S 644-084

- (7) Lubricate the 3-10 link (AMM 12-21-09/301).

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- S 644-085  
(8) Lubricate the 2-8 link (AMM 12-21-09/301).
- S 424-086  
(9) Install the mid section of the flap fairing (AMM 27-51-16/401).
- S 024-087  
(10) Remove the PDU lock from the TE flap PDU (Fig. 403).
- G. Put the Airplane Back to Its Usual Condition
- S 024-088  
(1) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6D24, ALTN FLAP PWR  
(c) 6F24, ALTN SLAT OUTBD PWR
- S 024-089  
(2) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD  
(c) 11J24, FLAPS ALTN CONT
- S 024-090  
(3) Remove the DO-NOT-OPERATE tag from the flap control lever.
- S 024-091

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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 **BOEING**  
767  
MAINTENANCE MANUAL

S 864-093

- (5) If it is not necessary, remove electrical power (AMM 24-22-00/201).

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03

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TE FLAP AFT QUADRANT AND LOAD ALLEVIATION ACTUATOR - REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the load alleviation actuator and the flap aft quadrant.

TASK 27-51-30-024-001

2. The Flap Load Relief Actuator and the Flap Aft Quadrant - Removal

A. General

- (1) This task contains the removal procedure for the flap load relief actuator and the flap aft quadrant. Because this task contains two procedures, only do the applicable procedure to remove the component.

To start one of these procedures, do the steps in the "Prepare for the Removal" topic, then do the applicable group of steps to remove the component.

B. Equipment

- (1) Circuit Breaker Lockout Clip - 1012LC-R  
Commercially Available  
(2) LE Slat Groundlock - A27007-1 (2 Necessary)  
(3) TE Flap PDU Lock - A27009-7

C. References

- (1) AMM 06-44-00/201, Wing 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 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(5) AMM 32-00-15/201, Landing Gear Door Lock  
(6) AMM 32-00-20/201, Landing Gear Downlock

D. Access

- (1) Location Zones
- |         |  |
|---------|--|
| 144     | Right MLG Wheel Well                   |
| 153/154 | Left/Right Aft Cargo Compartment       |
| 211/212 | Control Cabin                          |
| 510/610 | Wing Leading Edge - Inboard            |
| 550/650 | Wing Trailing Edge - Inboard           |
| 560/660 | Wing Trailing Edge - Outboard          |
| 710     | Nose Landing Gear and Doors            |
| 730/740 | Left/Right Main Landing Gear and Doors |

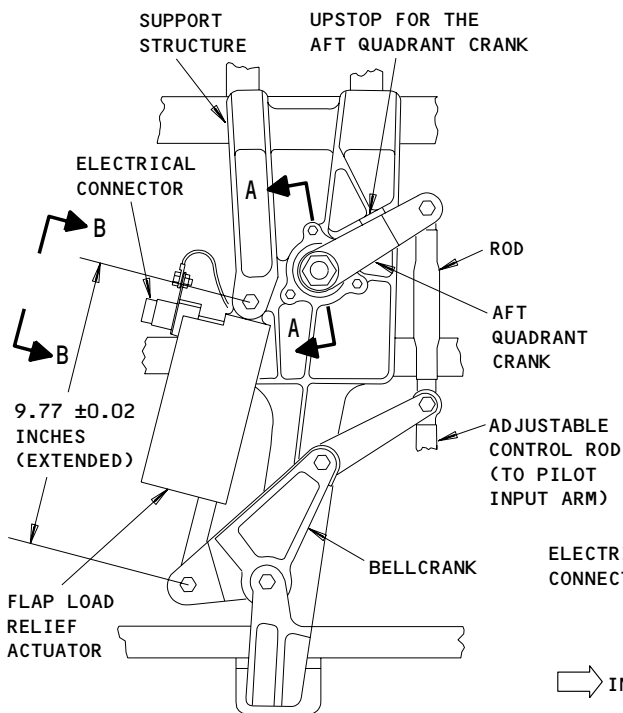
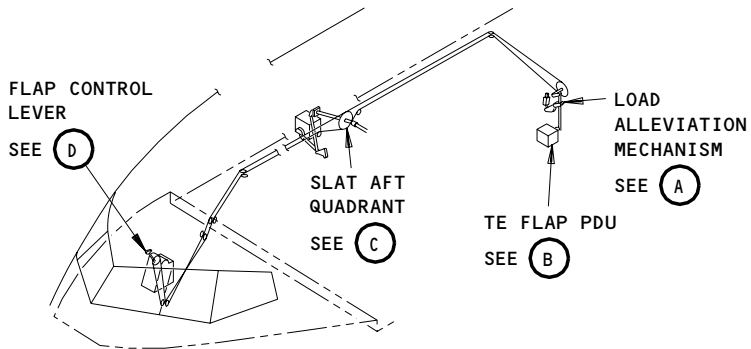
EFFECTIVITY

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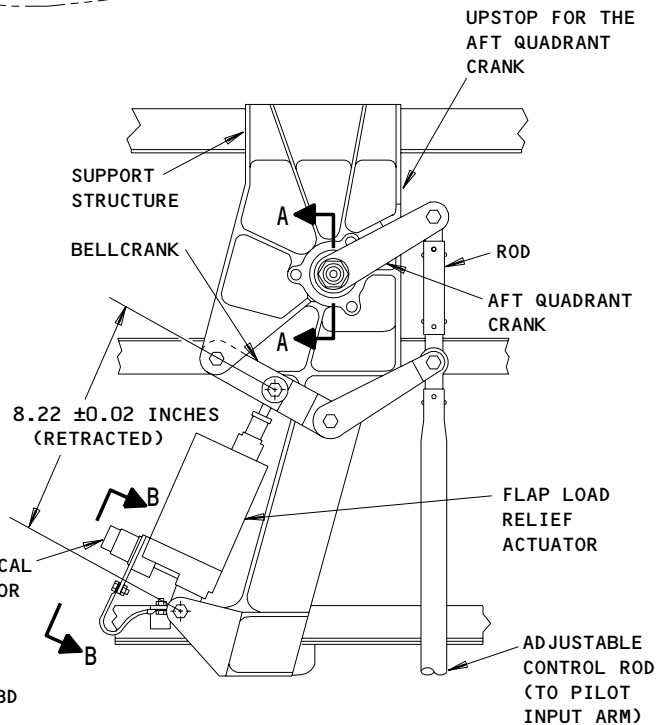
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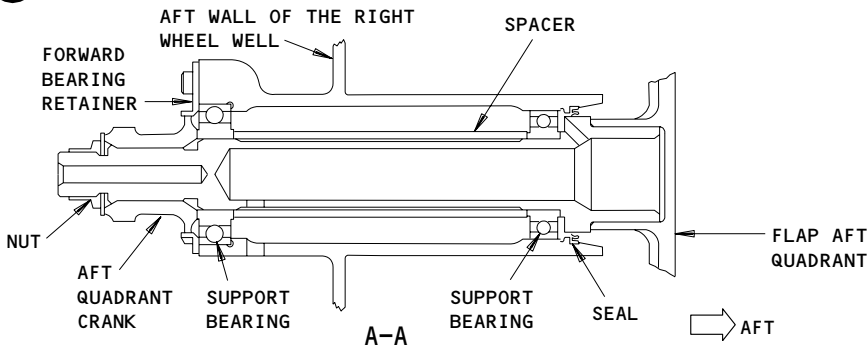
767-200 AIRPLANES  
LOAD ALLEVIATION MECHANISM  
(FRONT VIEW)

(A)



767-300 AIRPLANES  
LOAD ALLEVIATION MECHANISM  
(FRONT VIEW)

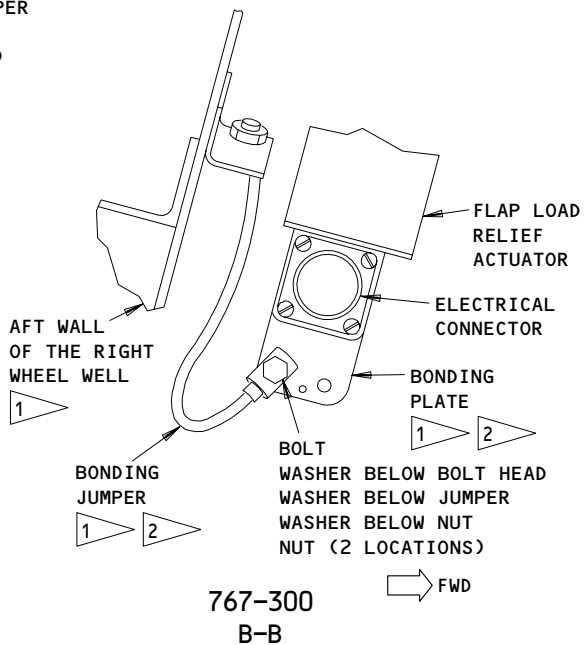
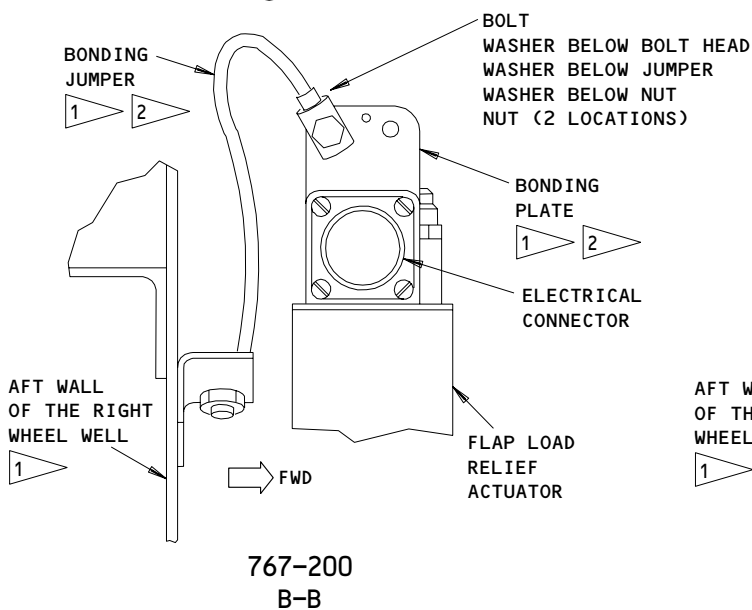
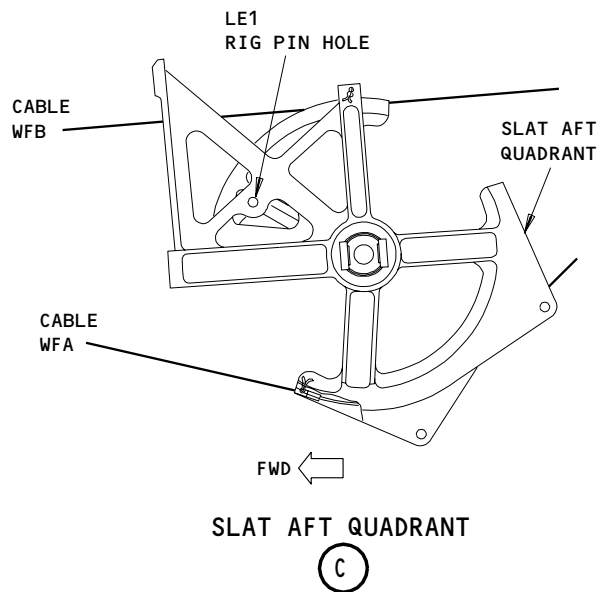
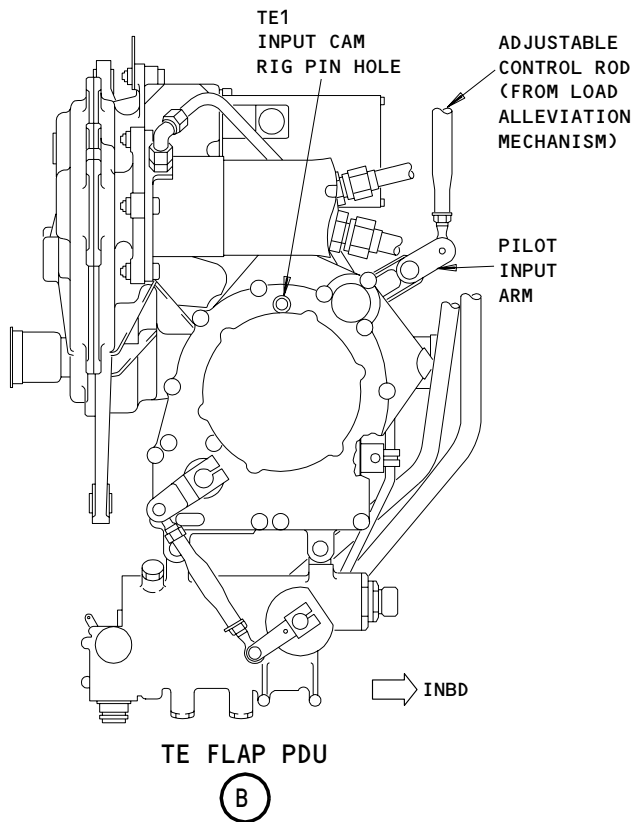
(A)



TE Flap Quadrant and Flap Load Relief Actuator  
Figure 401 (Sheet 1)

EFFECTIVITY	ALL
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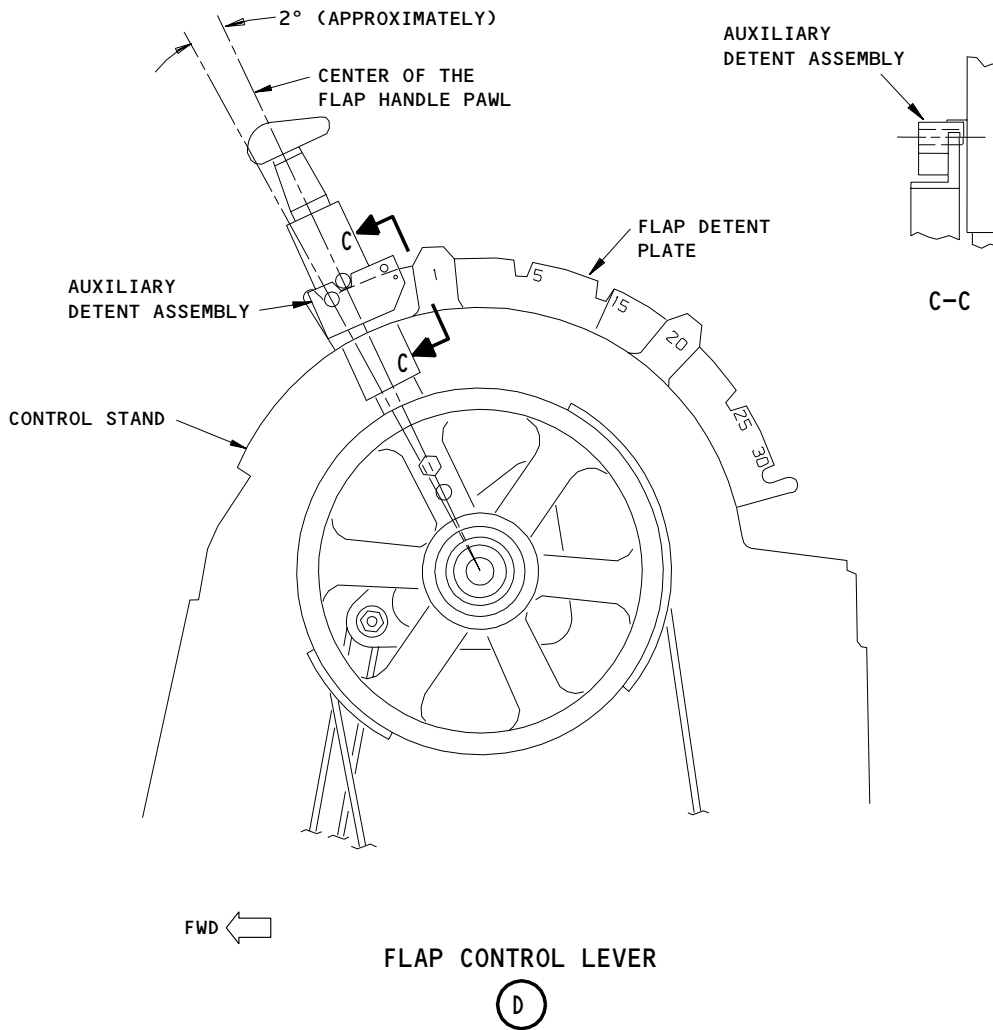


- 1 MAXIMUM RESISTANCE IS 0.005 OHMS FROM THE BONDING PLATE TO THE STRUCTURE
- 2 NOT ON ALL ACTUATORS

TE Flap Quadrant and Flap Load Relief Actuator  
Figure 401 (Sheet 2)

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TE Flap Quadrant and Flap Load Relief Actuator  
Figure 401 (Sheet 3)

EFFECTIVITY	ALL
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27-51-30

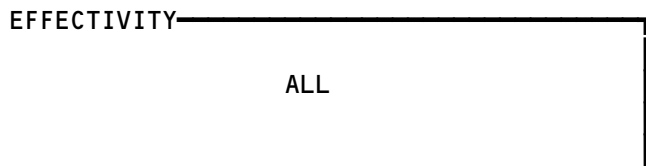
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TEMPERATURE-TENSION TABLE	
AMBIENT AIR TEMPERATURE (°F) 1	CABLE RIGGING LOAD FOR CABLES WFA AND WFB +10/-0 POUNDS 2
110	67
90	61
70	55
50	49
30	43
10	37
-10	31
-30	25
-40	22

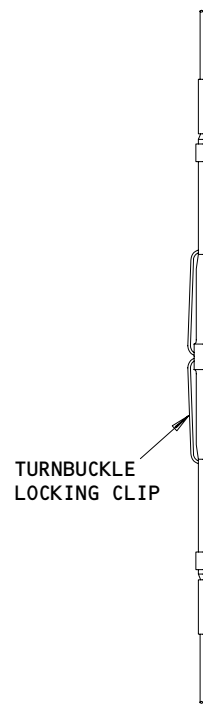
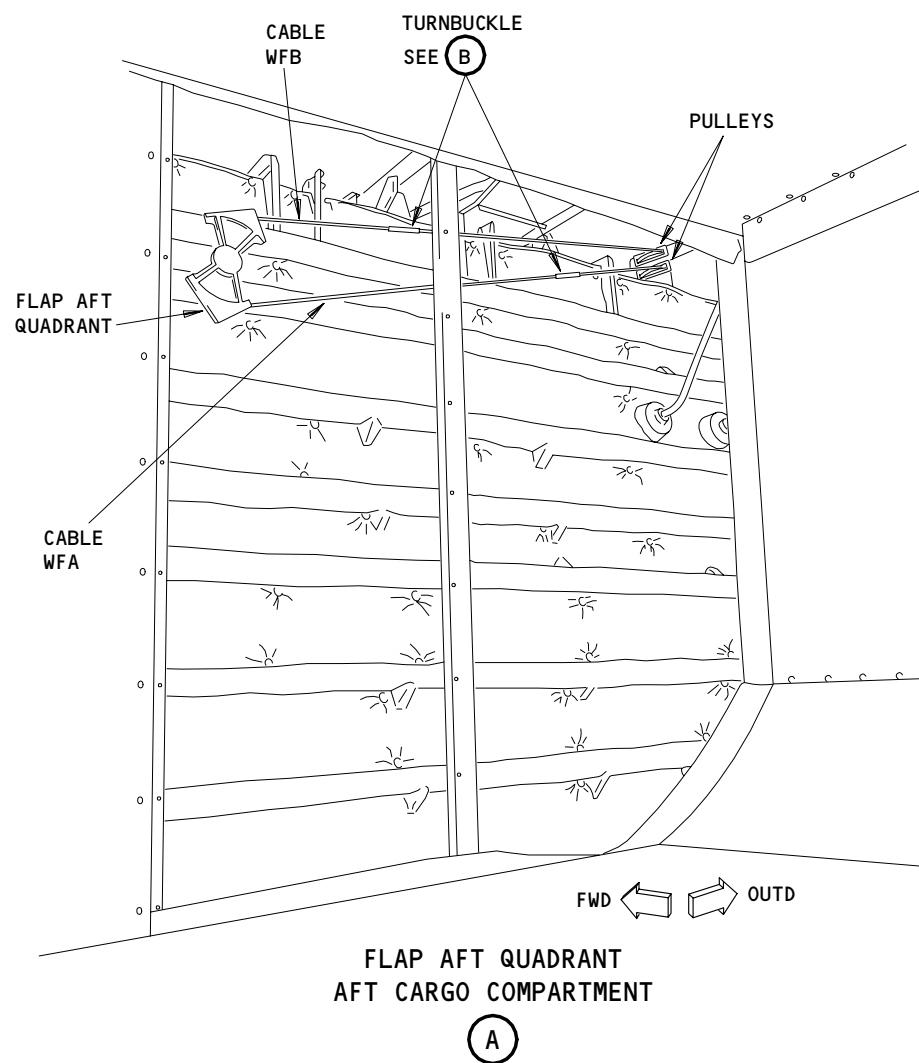
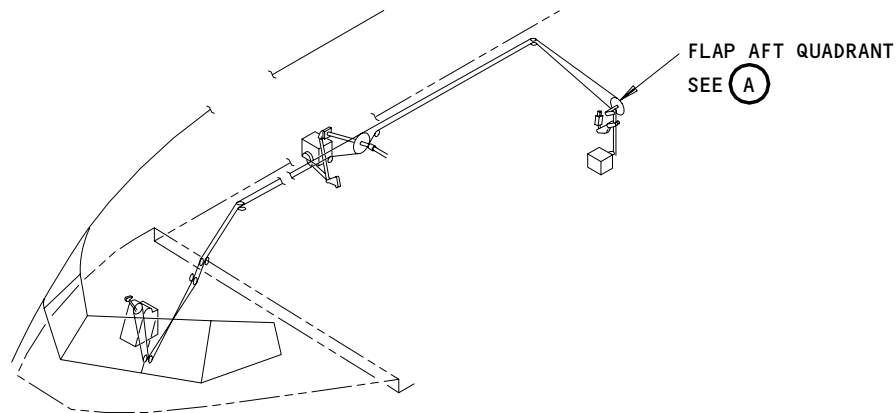
- 1 MAKE SURE THE TEMPERATURE DOES NOT CHANGE BY  $\pm 5^{\circ}\text{F}$  FOR AT LEAST ONE HOUR BEFORE YOU ADJUST THE CABLES. MAKE SURE THE TEMPERATURE DOES NOT CHANGE BY  $\pm 5^{\circ}\text{F}$  WHILE YOU DO THE CABLE ADJUSTMENT.
- 2 ADJUST THE CABLES WHEN THE CABLE TENSION IS MORE THAN  $\pm 10$  POUNDS AWAY FROM THE LOAD SHOWN IN THE TEMPERATURE-TENSION TABLE.

Aft Quadrant Control Cable  
Figure 402



14949

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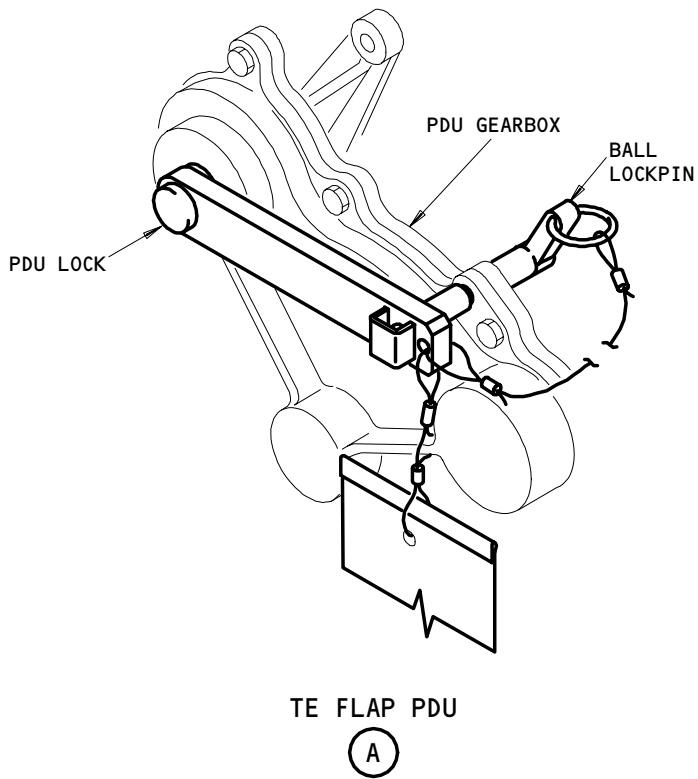
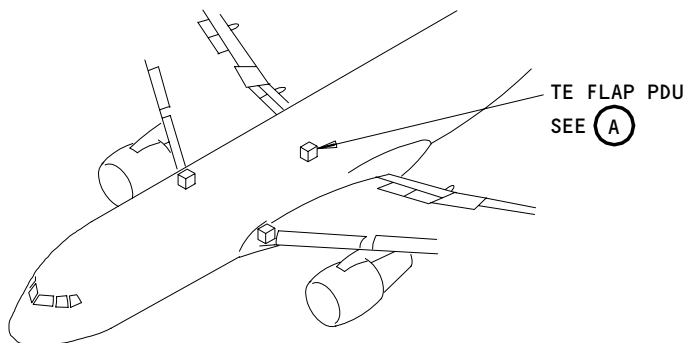


TURNBUCKLE  
(EXAMPLE)  
B

Flap Quadrant Cables  
Figure 403

EFFECTIVITY	ALL
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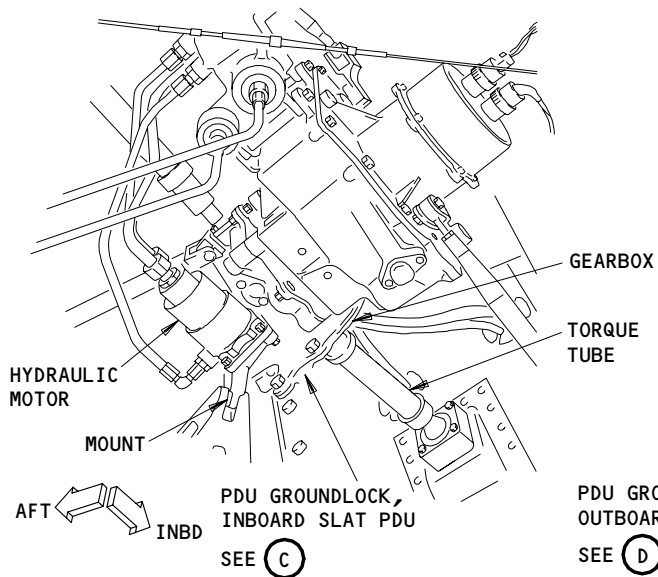
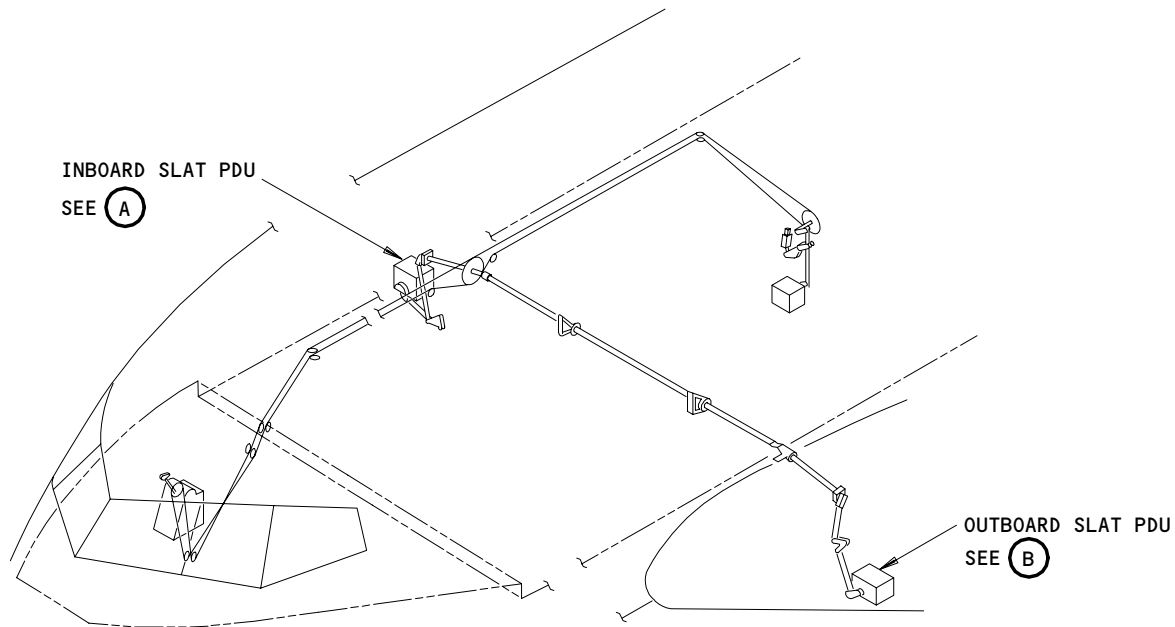
PDU Lock for the TE Flap PDU  
Fig 404

EFFECTIVITY	
	ALL

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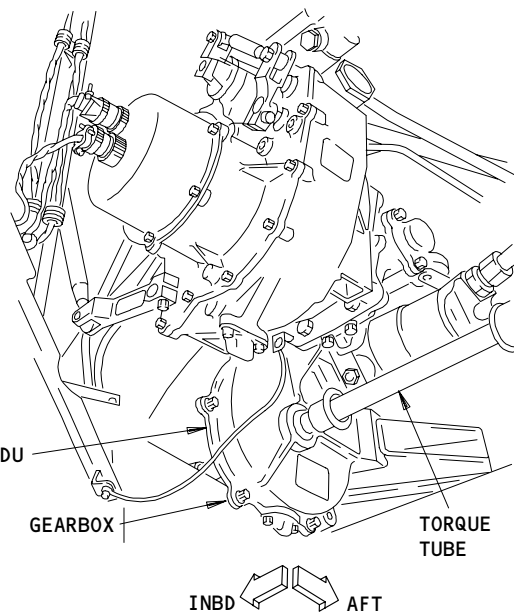
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INBOARD SLAT PDU  
(BOTTOM VIEW)

(A)



OUTBOARD LE SLAT PDU

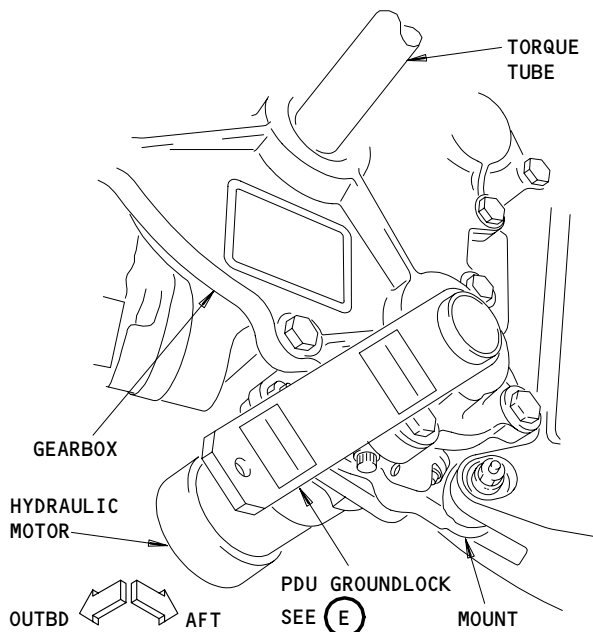
(B)

Slat PDU Groundlock  
Figure 405 (Sheet 1)

EFFECTIVITY	
	ALL

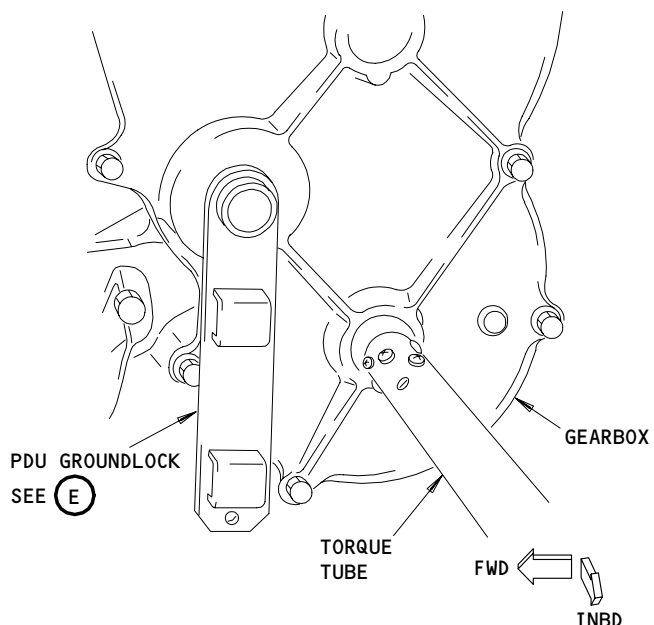
27-51-30





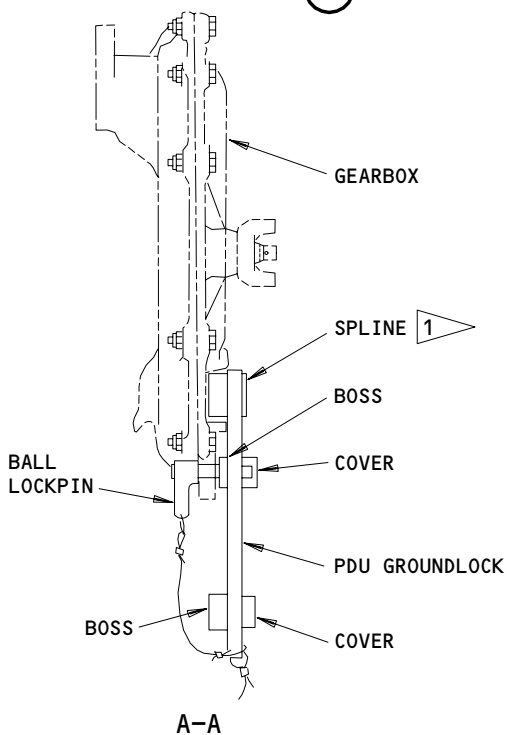
PDU GROUNDLOCK,  
INBOARD SLAT PDU

(C)

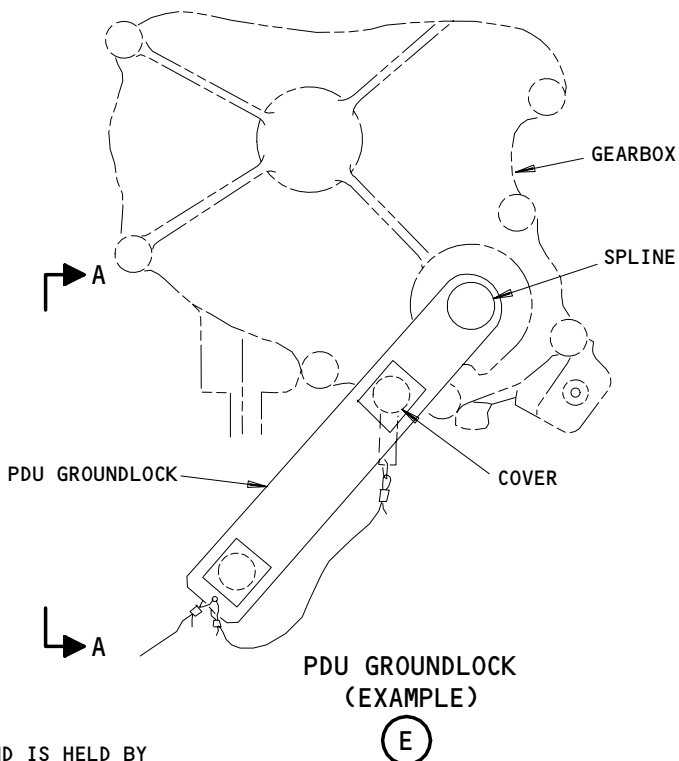


PDU GROUNDLOCK,  
OUTBOARD SLAT PDU

(D)



A-A



PDU GROUNDLOCK  
(EXAMPLE)

(E)

1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN INSERTED THROUGH THE BOSS AND GEARBOX

Slat PDU Groundlock  
Figure 405 (Sheet 2)

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244791

- (2) Access Panels
  - 511BB LE Slat Power Drive Unit - Outboard (Left)
  - 611BB LE Slat Power Drive Unit - Inboard (Right)

E. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-004

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

S 214-005

- (4) Make sure the flaps and slats are in the fully retracted position.

S 214-006

- (5) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 494-007

- (6) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 864-008

- (7) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 494-009

- (8) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 404).

S 014-010

- (9) Open the access doors, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (AMM 06-44-00/201).

S 494-011

- (10) Install the groundlocks in the inboard and outboard slats PDUs (Fig. 405).

S 864-012

- (11) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:
  - (a) 6D24, ALTN FLAP PWR

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S 864-013

- (12) Open these circuit breakers on the P6 panel and install circuit breaker locks:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR

S 864-014

- (13) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11J13, FLAP LOAD RELIEF
  - (b) 11J24, FLAPS ALTN CONT

S 864-015

- (14) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

F. Remove the Flap Load Relief Actuator (Fig. 401)

S 034-016

- (1) Disconnect the electrical connector on the flap load relief actuator.

S 034-017

- (2) Disconnect the bonding jumper (if installed) from the flap load relief actuator.

S 034-018

- (3) Disconnect the bolts that connect the actuator to the bellcrank and the support structure (Detail A).

S 024-019

- (4) Remove the flap load relief actuator from the airplane.

G. Remove the Flap Aft Quadrant

S 014-020

- (1) Remove the access panels on the forward wall of the aft cargo compartment (AMM 25-52-01/401).

S 034-021

- (2) Loosen the WFA and WFB cables at the STA 1072 and STA 1069 turnbuckles, at the forward wall of the aft cargo compartment (Fig. 403).

**NOTE:** Install an identification tag to each cable. Apply tension to the cables if it is necessary to keep them engaged on the pulleys.

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- S 034-022
- (3) Remove the two quadrant cotter pins, and disconnect the cables from the flap aft quadrant.
- S 034-023
- (4) At the aft wall of the right MLG wheel well, disconnect the bolt that connects the rod to the aft quadrant crank (Detail A, Fig. 401).
- S 034-024
- (5) Remove the nut and washer that hold the aft quadrant crank to the aft quadrant shaft (View A-A).
- S 034-025
- (6) Remove the crank from the quadrant shaft.
- S 034-026
- (7) Disconnect the three screws and washers and remove the forward bearing retainer.
- S 034-027
- (8) In the aft cargo compartment, move the flap aft quadrant to the aft direction, and out of the support bearings.
- S 024-028
- (9) Remove the flap aft quadrant from the airplane.
- S 034-029
- (10) Remove the bearings, seal, and spacer if it is necessary.

TASK 27-51-30-424-030

3. The Flap Load Relief Actuator and the Flap Aft Quadrant - Installation

A. General

- (1) This task contains the installation procedure for the flap load relief actuator and the flap aft quadrant. Because this task contains two different installation procedures, only do the applicable procedure to install the component.

To start one of these procedures, do the applicable group of steps to install the component. Then do the applicable tests and the "Put the Airplane Back to Its Usual Condition" group of steps.

B. Equipment

- (1) LE Slat Groundlock - A27007-1 (2 Necessary)
- (2) TE Flap PDU Lock - A27009-7
- (3) Auxiliary Detent, Flap Adjustment Assy - A27105-9
- (4) Rig Pins from Set A20004-XX (Ref 20-10-24):
- (a) LE1 - P/N A20004-17
  - (b) TE1 - P/N A20004-9

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- (5) Bonding Meter (Microhm Bridge, Type 2 Bonding Meter) – 477W Avtron Model or Equivalent  
Avtron Manufacturing Inc.  
Cleveland, Ohio
- (6) Cable Tensionmeter – Commercially Available
- (7) C-Clamp or Equivalent – Commercially Available
- C. Consumable Materials
  - (1) D00633 Grease – BMS 3-33 (Preferred)
  - (2) D00013 Grease – MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
  - (3) C00308 Compound – Corrosion Preventive MIL-C-11796, Class 3
  - (4) A00247 Sealant – BMS 5-95
  - (5) A02315 Sealant – BMS 5-142
- D. References
  - (1) AMM 06-44-00/201, Wing Access Doors and Panels
  - (2) AMM 20-10-21/601, Electrical Bonding
  - (3) AMM 20-10-23/401, Lockwires
  - (4) AMM 20-10-24/201, Rig Pins
  - (5) AMM 24-22-00/201, Electrical Power – Control
  - (6) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
  - (7) AMM 27-51-00/501, Trailing Edge Flap System
  - (8) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
  - (9) AMM 32-00-15/201, Landing Gear Door Lock
- E. Access
  - (1) Location Zones
 

144	Right MLG Wheel Well
153/154	Left/Right Aft Cargo Compartment
211/212	Control Cabin
510/610	Wing Leading Edge – Inboard
550/650	Wing Trailing Edge – Inboard
560/660	Wing Trailing Edge – Outboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors
  - (2) Access Panels
 

511BB	LE Slat Power Drive Unit – Outboard (Left)
611BB	LE Slat Power Drive Unit – Inboard (Right)
- F. Install the Flap Load relief Actuator (Fig. 401)
  - S 214-031
    - (1) Make sure the flaps and slats are in the fully retracted position, and that the flap control lever is in the zero (FLAPS UP) detent.
  - S 214-032
    - (2) Make sure the flap and slat primary (hydraulic) and alternate (electric) drives are off.

**NOTE:** Refer to the "Prepare for the Removal" paragraph for instruction if it is necessary.

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- S 214-033
- (3) Make sure the power is removed from the center hydraulic system (AMM 29-11-00/201).
- S 494-034
- (4) Remove the plug from the input cam rig pin hole in the TE flap power drive unit (PDU), and install rig pin TE1 (Detail B).
- S 224-035
- (5) Make sure the distance between the centers of the actuator bolt holes is correct as shown (Detail A).
- NOTE: Do not adjust the length of the actuator rod end.
- S 434-036
- (6) Connect the actuator to the support structure with the bolt, washer, and locknut. Tighten the nut.
- S 214-037
- (7) Make sure you can freely install the bolt that connects the actuator to the bellcrank.
- S 434-038
- (8) If you cannot easily install the bolt that connects the actuator to the bellcrank, do these steps:
- (a) Disconnect the adjustable control rod from the pilot input arm on the TE flap PDU.
  - (b) Turn the bell crank as necessary to connect the actuator to the bellcrank.
- S 434-039
- (9) Connect the actuator to the bellcrank with the bolt, locknut, and washer.
- S 434-040
- (10) If the adjustable control rod was disconnected from the pilot input arm, connect the control rod to the arm with these steps:
- (a) Make sure that rig pin TE1 is installed in the TE flap PDU (Detail B).
  - (b) Adjust the length of the adjustable control rod until you can easily connect the rod to the pilot input arm with the bolt.
  - (c) Connect the adjustable control rod to the pilot input arm.
  - (d) Tighten the jamnut on the adjustable rod and install a lockwire with the double twist procedure (AMM 20-10-23/401).
- S 094-041
- (11) Remove rig pin TE1 from the TE flap PDU.

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S 434-042

- (12) Connect the electrical connector to the flap load relief actuator.

S 434-043

- (13) Install the bonding jumper to the actuator bonding plate (if installed). See View B-B on Figure 401. Seal bonding jumper terminal and fastener with BMS 5-142 or BMS 5-95.

NOTE: If the actuator to be installed does not have a bonding plate, remove the jumper (if installed) or secure the free end so as to prevent contact with adjacent structure.

NOTE: Make sure the electrical resistance is not more than 0.005 ohms from the bonding plate to the structure (AMM 20-10-21/601).

S 864-044

- (14) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-045

- (15) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J13, FLAP LOAD RELIEF
  - (d) 11J24, FLAPS ALTN CONT

S 864-046

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

S 224-047

- (17) Make sure the dimension between the centers of the actuator attachment bolts is correct as shown (Detail A, Fig. 401).

S 964-048

- (18) If the dimension between the two bolts is more than the permitted tolerance, replace the flap load relief actuator.

S 214-049

- (19) Make sure you can easily remove and install rig pin TE1 in the rig pin hole on the TE flap PDU (Detail B, Fig. 401).

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S 824-050

- (20) If you cannot easily remove and install rig pin TE1, adjust the length of the adjustable control rod connected to the pilot input arm.

S 094-051

- (21) Remove rig pin TE1 and install the plug in the input cam rig pin hole on the TE flap PDU.

S 094-052

- (22) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 724-053

- (23) Do the installation test for the flap load relief actuator with the instructions in the "Installation Test" topic.

S 734-054

- (24) Do the system test for the flap load Alleviation System (AMM 27-51-00/501, "Test for the Flap Load Alleviation System").

G. Install the Flap Aft Quadrant (Fig. 401)

S 214-055

- (1) Make sure the flaps and slats are in the fully retracted position, and that the flap control lever is in the zero (FLAPS UP) detent.

S 214-056

- (2) Make sure the flap and slat primary (hydraulic) and alternate (electric) drives are off.

NOTE: Refer to the "Prepare for the Removal" paragraph for instruction if it is necessary.

S 214-057

- (3) Make sure the power is removed from the center hydraulic system (AMM 29-11-00/201).

S 224-058

- (4) Make sure the distance between the centers of the actuator bolt holes is correct as shown (Detail A).

NOTE: Do not adjust the length of the actuator rod end.

S 644-059

- (5) Apply grease to the inner and outer diameters of the aft support bearing, and install the bearing in the fitting at the forward wall of the aft cargo compartment (View A-A).

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- S 434-060
- (6) Install the seal in the fitting.
- S 434-061
- (7) Put the aft quadrant shaft through the seal and the support bearings, from the aft cargo compartment side.
- S 434-062
- (8) Install the spacer around the aft quadrant shaft in the fitting , from the aft wall of the right MLG wheel well.
- S 214-063
- (9) Make sure the seal is in the correct position (View A-A).
- S 644-064
- (10) Apply grease to the inner and outer diameters of forward support bearing, and put the bearing around the aft quadrant shaft in the fitting.
- S 434-065
- (11) Install the forward bearing retainer with three screws and washers. Tighten the screws.
- S 644-066
- (12) Apply grease to the splines on the aft quadrant shaft.
- S 434-067
- (13) Engage the aft quadrant crank in the shaft splines, and install the nut and washer to the shaft. Tighten the nut.
- S 434-068
- (14) Connect the rod to the aft quadrant crank with the bolt, locknut, and washer (Detail A). Tighten the locknut.
- S 034-070
- (15) Remove the bolt, nut, and washer that connect the adjustable control rod to the pilot input arm on the TE flap PDU (Detail B).
- NOTE:** This is necessary for the subsequent adjustment.
- S 434-069
- (16) Remove the identification tags and connect the WFA and WFB cables to the aft quadrant with the two cotter pins (Fig. 403).
- S 094-071
- (17) Remove the DO-NOT-OPERATE tag from the flap control lever.

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S 484-112

- (18) Install the tool (auxiliary detent assembly) on the flap detent plate.

S 864-114

- (19) Move the flap control lever to the auxiliary detent, which is 2 degrees aft of the zero (FLAPS UP) detent.

**NOTE:** Using the auxiliary detent is the same as the aft edge of the flap control lever pawl set 0.15 to 0.16 inch (3.81-4.06 mm) aft of the aft upper edge of the zero (flaps up) detent.

S 494-073

- (20) Install rig pin LE1 in the slat aft quadrant (Detail C, Fig. 401).

S 494-074

- (21) Install a clamp to hold the flap aft quadrant crank against the upstop (Detail A, Fig. 401).

**NOTE:** Make sure the upstop is clean before you install the clamp.

S 824-075

- (22) Use a tensiometer and adjust the WFA and WFB cables to the rigging loads given in temperature-tension table (Fig. 402).

S 094-076

- (23) Remove the clamp on the upstop of the aft quadrant crank (Detail A, Fig. 401).

S 094-077

- (24) Remove rig pin LE1 from the slat aft quadrant (Detail C, Fig. 401).

S 084-113

- (25) Remove the tool (auxiliary detent assembly) from the flap detent plate.

S 984-078

- (26) Lightly shake the WFA and WFB cables to remove the friction from the cables and to release the tension in the components, and do these checks:

- (a) Make sure the flap control lever stays at 0.15 to 0.16 inch (3.81-4.06 mm) aft of the zero detent, measured on the control stand lightplate.  
(b) Make sure the flap aft quadrant crank touches the upstop

**NOTE:** It is not necessary to apply force against the upstop.

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- S 434-079
- (27) Install the turnbuckle locking clips and apply corrosion preventive compound (Fig. 403), after you completed the cable adjustment that is necessary.
- S 864-080
- (28) Move the flap control lever to the zero (FLAPS UP) detent.
- S 494-081
- (29) Remove the plug from the rig pin hole for the input cam, and install rig pin TE1 in the TE flap PDU (Detail B, Fig. 401).
- S 434-082
- (30) Connect the adjustable control rod to the pilot input arm with the bolt, nut, and washer.
- NOTE:** Adjust the length of the adjustable control rod if it is necessary, until you can easily install the bolt.
- S 094-083
- (31) Remove rig pin TE1 from the TE flap PDU.
- S 864-084
- (32) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR
- S 864-085
- (33) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J13, FLAP LOAD RELIEF
  - (d) 11J24, FLAPS ALTN CONT
- S 864-086
- (34) Supply electrical power (AMM 24-22-00/201).
- S 224-087
- (35) Make sure the dimension between the centers of the actuator attachment bolts is correct as shown (Detail A, Fig. 401).
- S 964-088
- (36) If the dimension between the two bolts is more than the permitted tolerance, replace the flap load relief actuator.

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S 214-089

- (37) Make sure you can easily remove and install rig pin TE1 in the rig pin hole on the TE flap PDU (Detail B, Fig. 401).

S 824-090

- (38) If you cannot easily remove and install rig pin TE1, adjust the length of the adjustable control rod connected to the pilot input arm.

S 094-091

- (39) Remove rig pin TE1 and install a plug in the rig pin hole on the TE flap PDU.

S 724-092

- (40) Do the installation test for the flap aft quadrant with the instructions in the "Installation Test" topic.

S 734-093

- (41) Do the test on the flap control lever Load (AMM 27-51-00/501, "Test for the Flap Control Lever Load")

#### H. Installation Test

**NOTE:** During this test, make sure there are no messages shown on the EICAS display for the flap drive system, and that the amber TRAILING EDGE and LEADING EDGE lights on the first officer's main instrument panel, P3, do not come on.

S 094-094

- (1) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 405).

S 094-095

- (2) Remove the PDU lock from the TE flap PDU (Fig. 404).

S 214-096

- (3) Make sure the flaps and slats are in the fully retracted position.

S 214-097

- (4) Make sure the flap control lever is in the zero detent.

S 864-100

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

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S 864-101

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(6) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-102

(7) Move the flap control lever to the 20-unit detent and make sure the flaps move to the 20-degree position, and the slats move to the intermediate position.

S 864-103

(8) Move the flap control lever to the 30-unit detent, and make sure the flaps and slats move to the fully extended position.

S 864-104

(9) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted position.

S 414-105

(10) Install the access panels on the forward wall of aft cargo compartment (AMM 25-52-01/401).

I. Put the Airplane Back to Its Usual Condition

S 414-106

(1) Install the access panels, 511BB and 611BB, for the outboard and inboard slat PDUs (AMM 06-44-00/201).

S 094-107

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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- S 864-108
- (3) Remove power from the center hydraulic system (AMM 29-11-00/201).
- S 864-109
- (4) Remove electrical power (AMM 24-22-00/201).

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TE FLAP PDU CONTROL VALVE MODULE AND BYPASS VALVE – MAINTENANCE PRACTICES

1. General

- A. This procedure contains the removal and the installation tasks for the components on the trailing edge (TE) flap power drive unit (PDU).

TASK 27-51-32-022-001

2. Remove the Components for the TE Flap PDU

A. General

- (1) This task contains the removal procedure for these components on the TE flap PDU:

- the Control Valve Module
- the Bypass Valve
- the Rotary Actuator for the Bypass Valve.

Because this task contains three procedures, do the steps in the "Prepare for the Removal", then do the applicable group of steps to remove the component.

B. Equipment

- (1) Circuit Breaker Lockout Clip – 1012LC-R  
Commercially available
- (2) Rig pins from Set A20004-XX (AMM 20-10-24/201):
- (a) TE1 – P/N A20004-9
  - (b) TE2 – P/N A20004-9

C. References

- (1) AMM 20-10-24/201, Rig Pins
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (3) AMM 32-00-15/201, Landing Gear Door Locks
- (4) AMM 32-00-20/201, Landing Gear Downlocks

D. Access

- (1) Location Zones
- |         |                             |
|---------|-----------------------------|
| 144     | MLG Wheel Well (Right)      |
| 211/212 | Control Cabin               |
| 710     | Nose Landing Gear and Doors |
| 730/740 | Main Landing Gear and Doors |

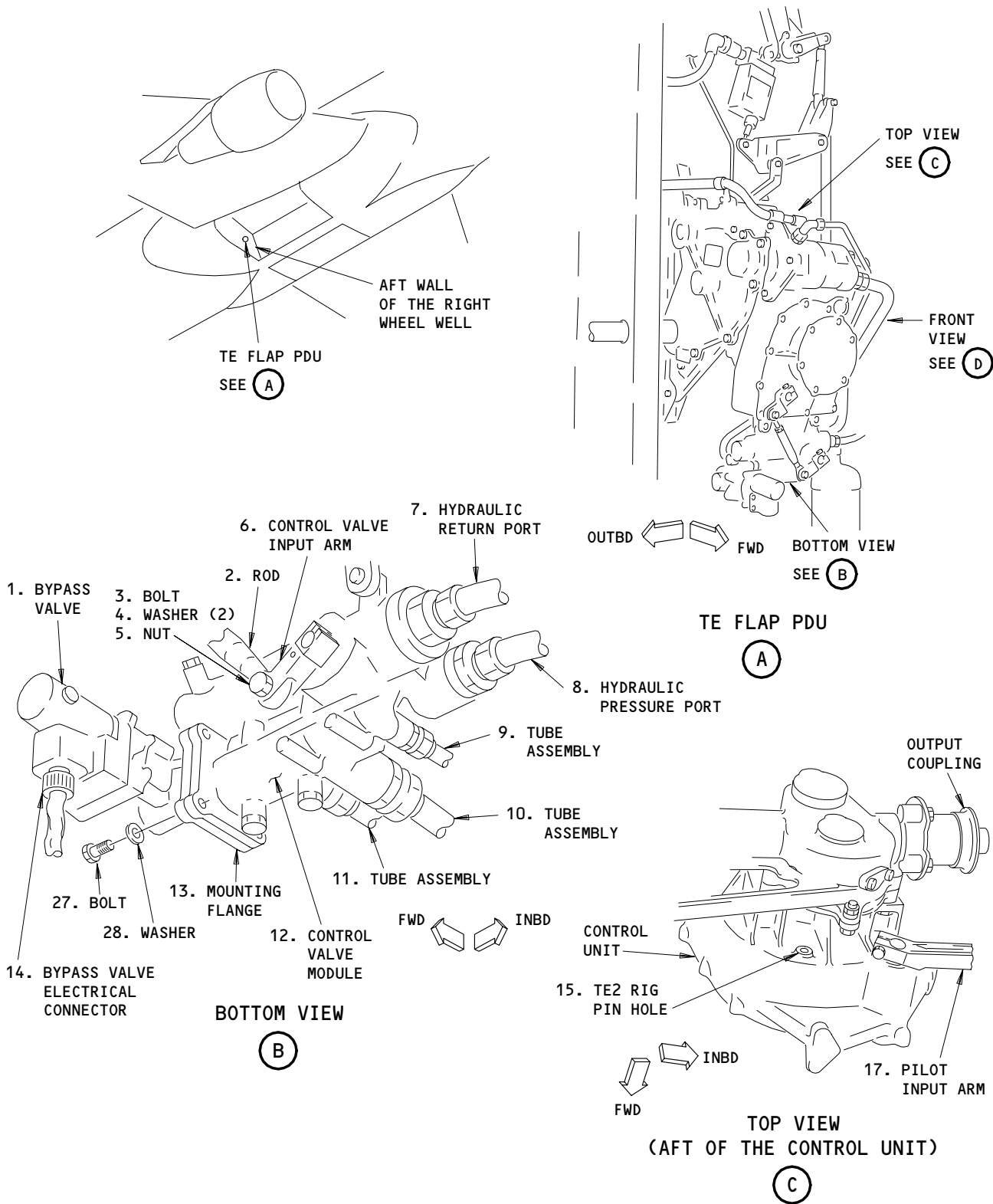
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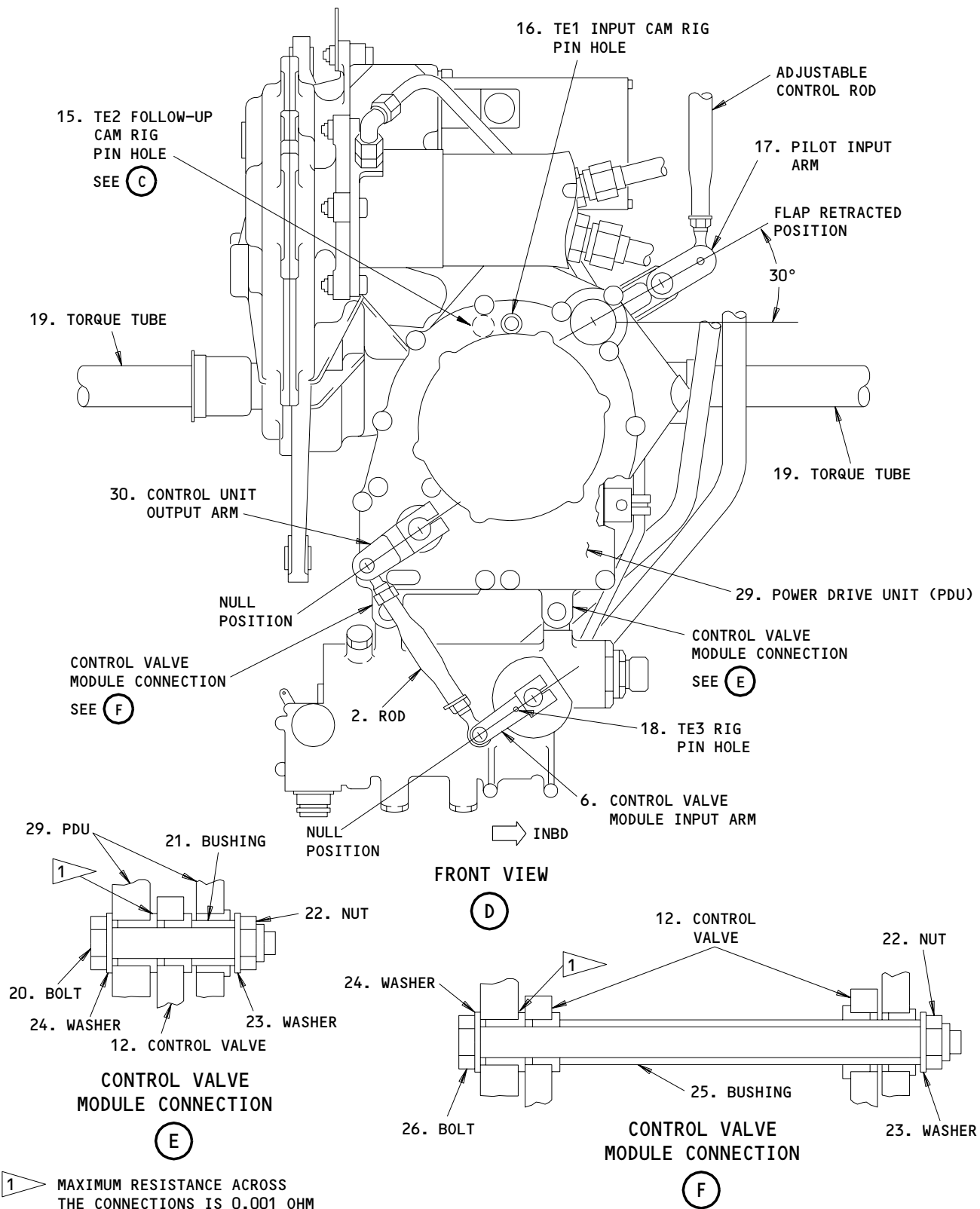


PDU Control Valve Module  
Figure 201 (Sheet 1)

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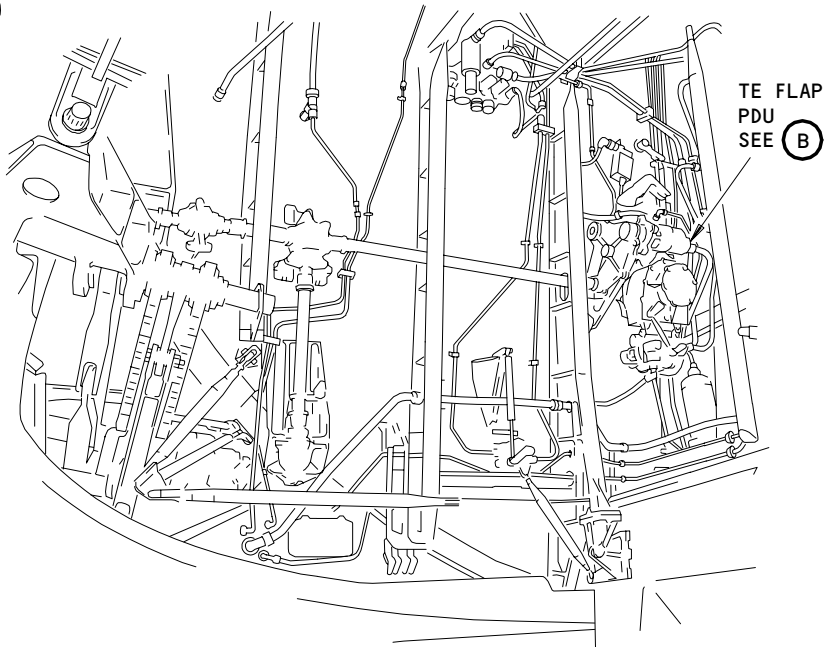
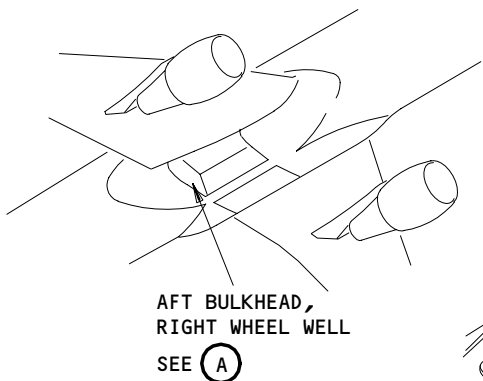




PDU Control Valve Module  
Figure 201 (Sheet 2)

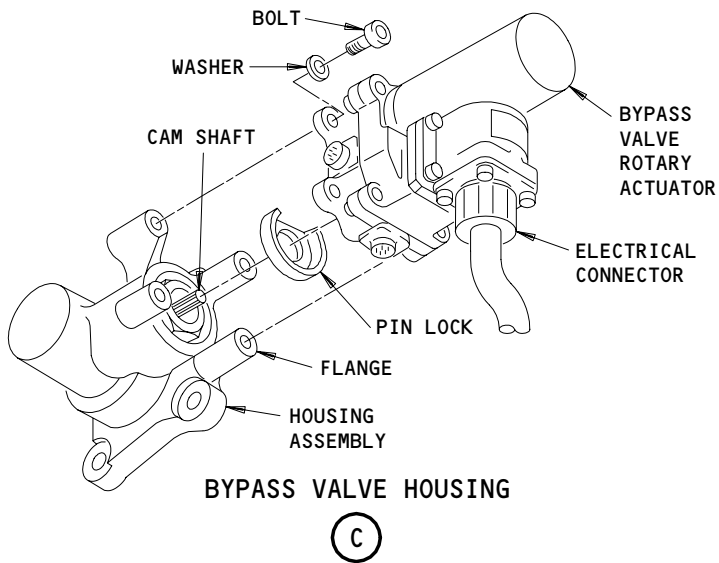
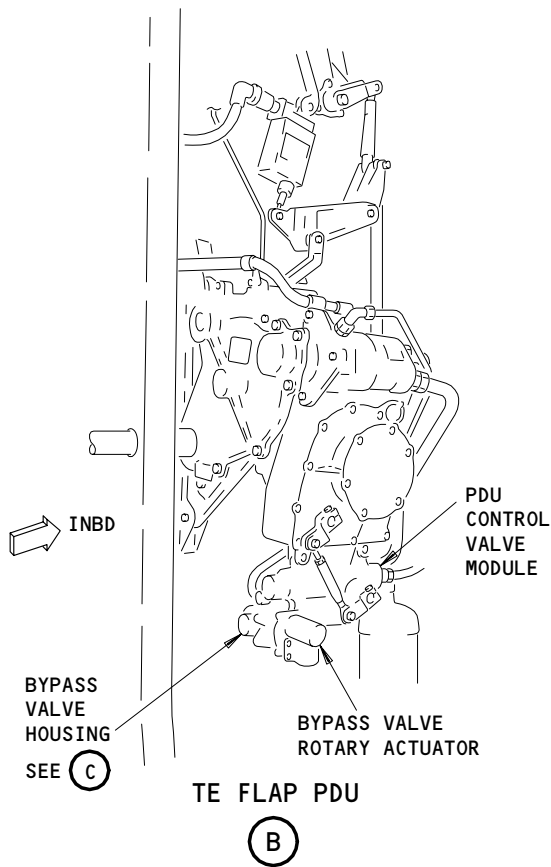
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AFT BULKHEAD  
(RIGHT WHEEL WELL)

(A)



Bypass Valve  
Figure 202

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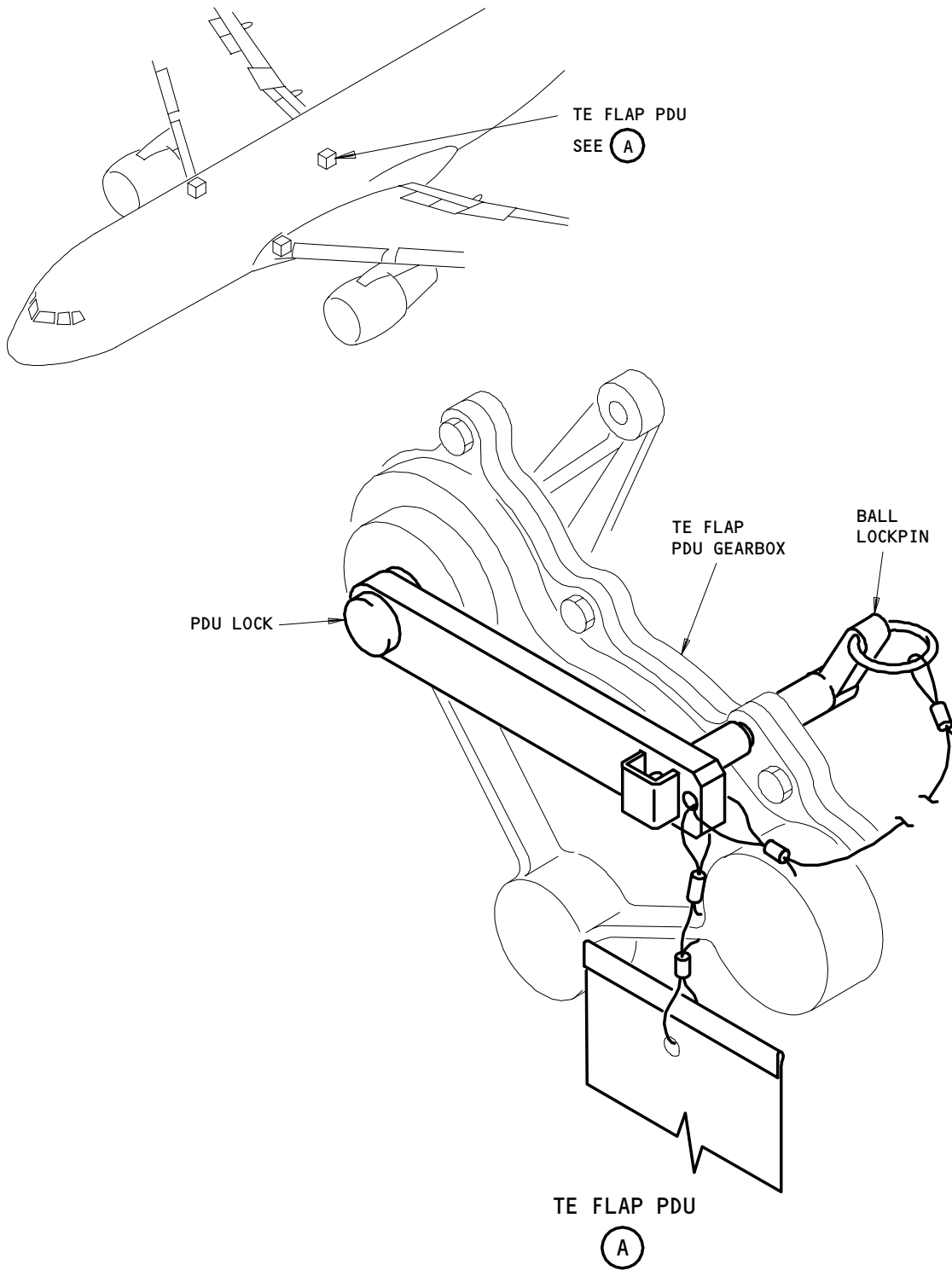
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232901



PDU Lock for the TE Flap PDU  
Figure 203

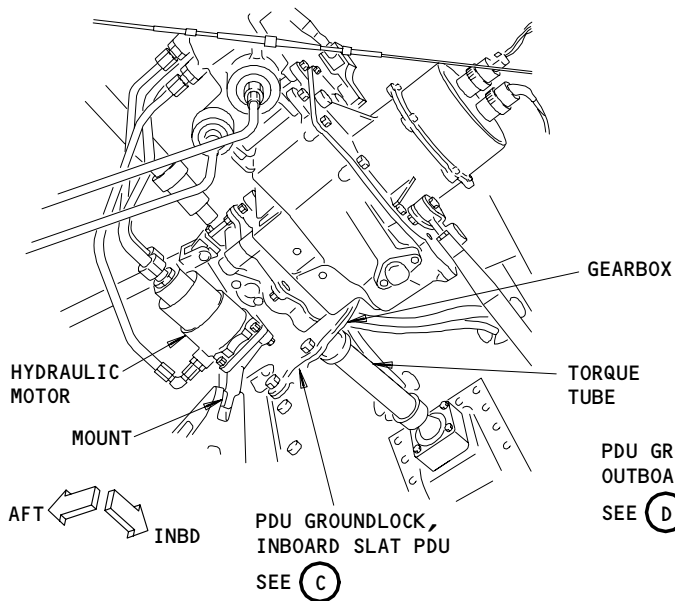
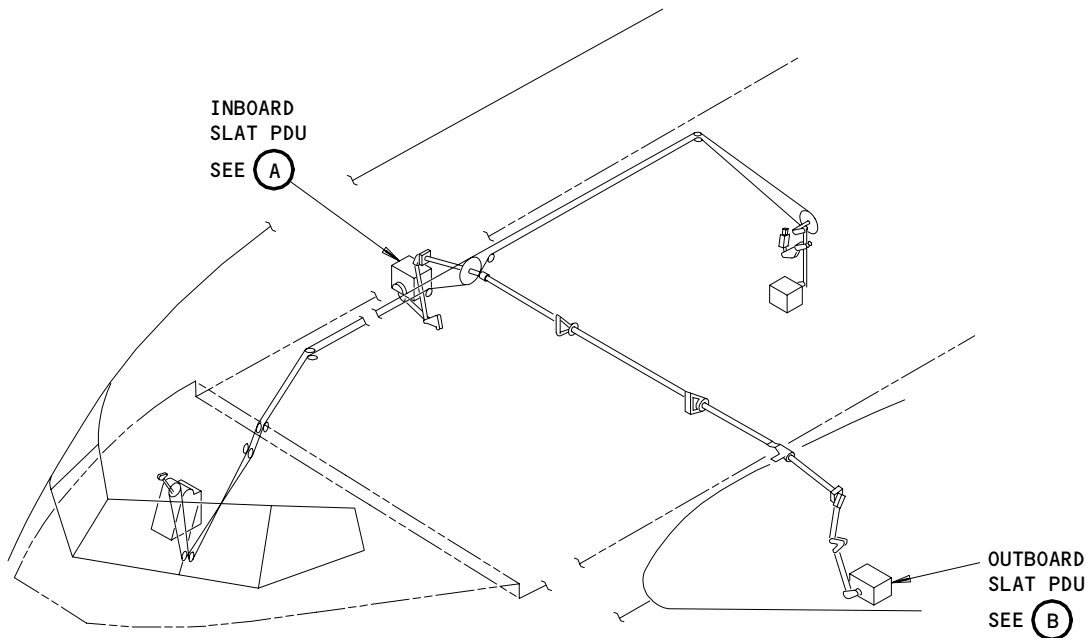
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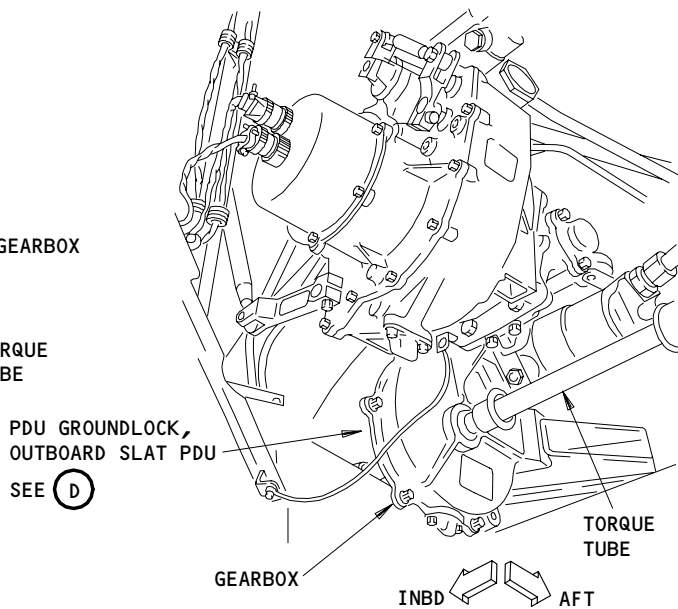
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INBOARD SLAT PDU (BOTTOM VIEW)

(A)



OUTBOARD SLAT PDU

(B)

Slat PDU Groundlock  
Figure 204 (Sheet 1)

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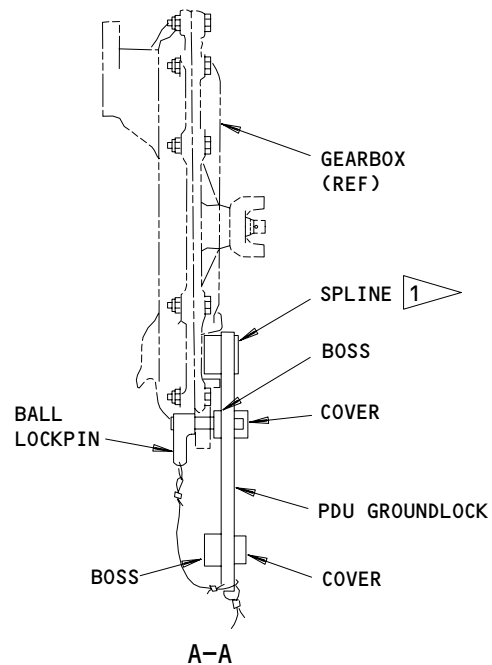
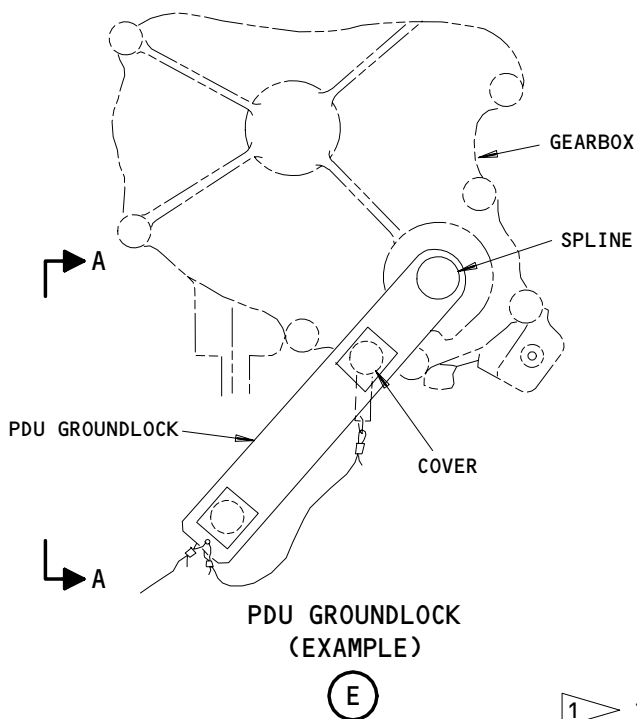
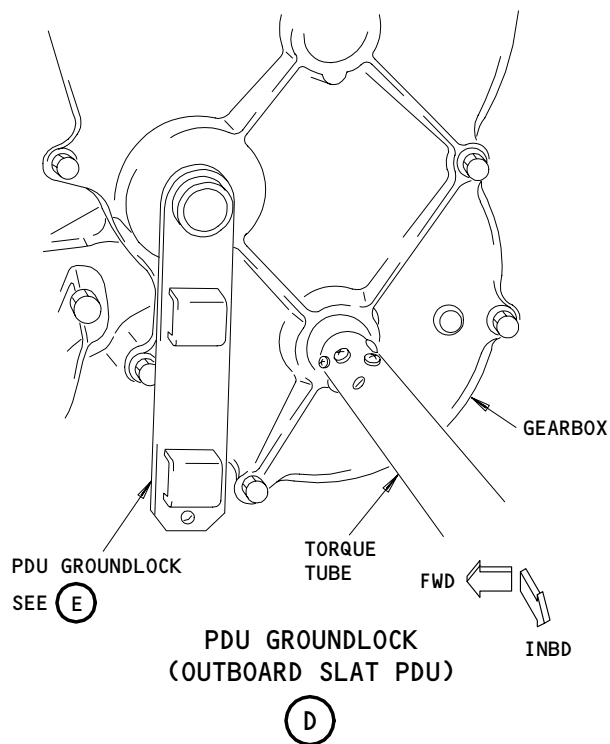
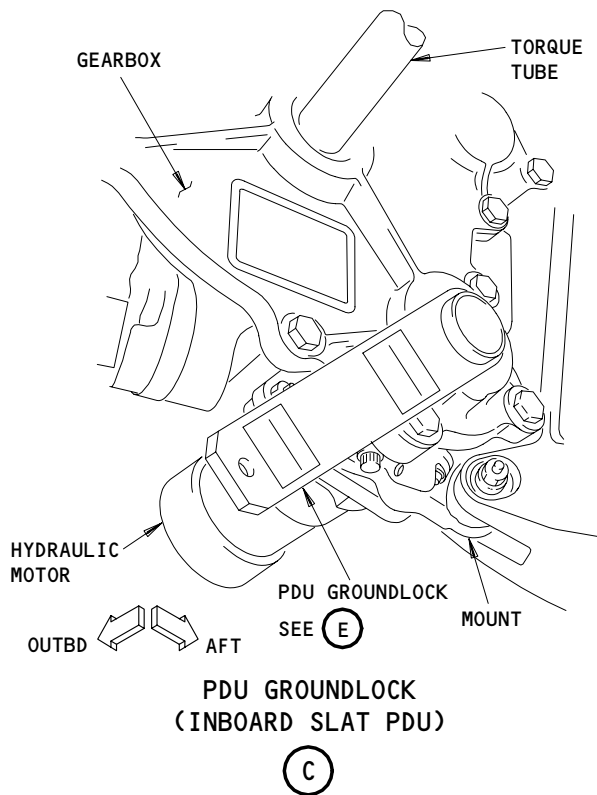
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1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN INSTALLED THROUGH BOSS AND GEARBOX

Slat PDU Groundlock  
Figure 204 (Sheet 2)

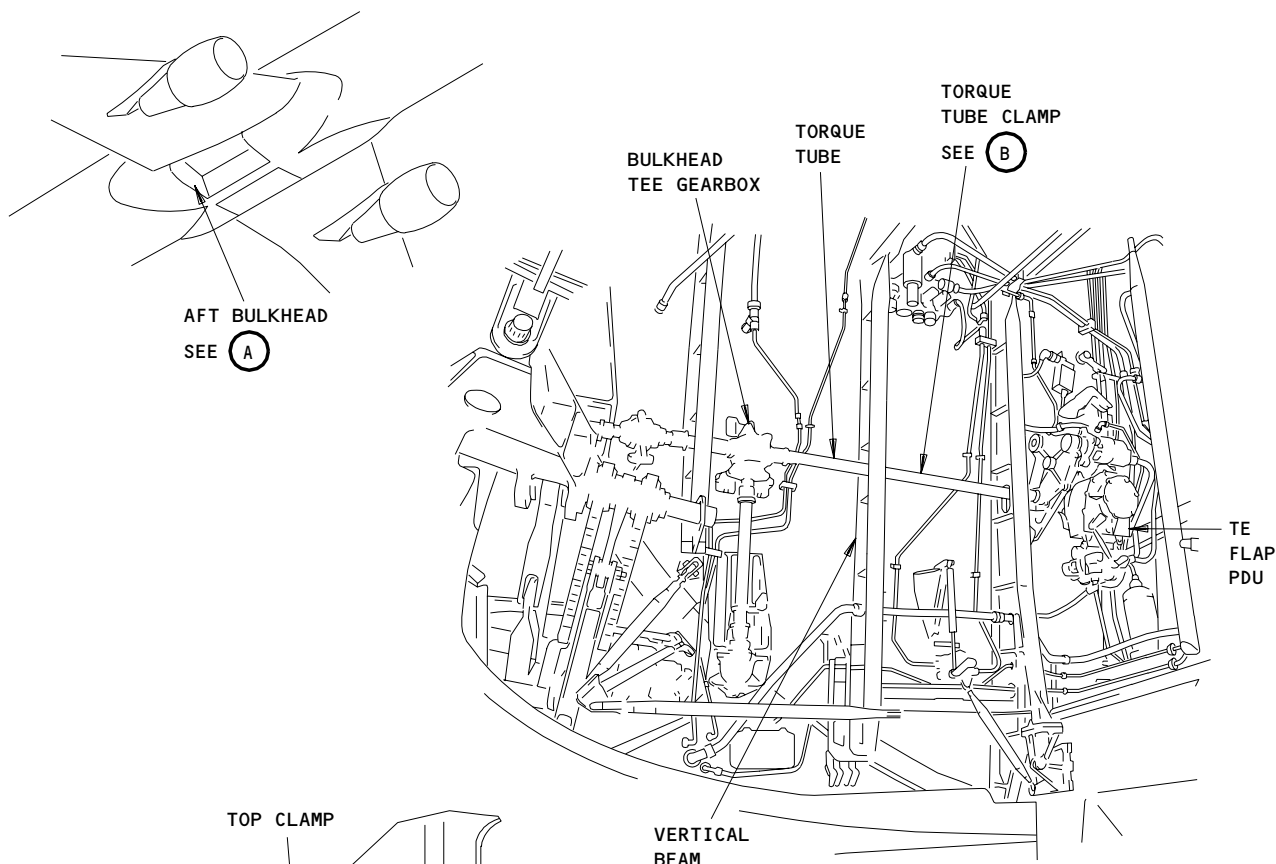
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244310

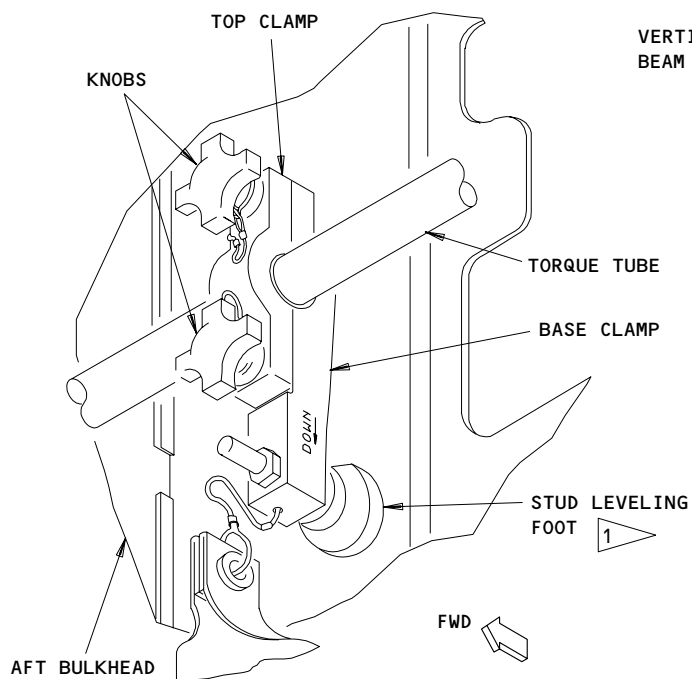
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AFT BULKHEAD (RIGHT WHEEL WELL)



TORQUE TUBE CLAMP

(B)

1 INSTALL THE CLAMP WITH THE STUD LEVELING FOOT DOWN, NEAR A VERTICAL BEAM. DO NOT INSTALL THE STUD LEVELING FOOT ON TOP OF HYDRAULIC TUBING OR ELECTRICAL WIRES.

Torque Tube Clamp for the Trailing Edge Flap  
Figure 205

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E. Prepare for the Removal

S 212-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 492-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Install the door locks on the landing gear doors (AMM 32-00-15/201).

S 212-004

- (3) Make sure the TE flaps and LE slats are fully retracted and the flap control lever is in the zero (FLAPS UP) detent.

S 492-005

- (4) Install a DO-NOT-OPERATE tag on the flap control lever.

S 862-006

- (5) Remove the pressure from the center hydraulic system and reservoir (AMM 29-11-00/201).

S 862-007

- (6) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 862-008

- (7) Open these circuit breakers on the P6 panel and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

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- S 862-009
- (8) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11J24, FLAPS ALTN CONT
- S 862-010
- (9) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
- (b) 11H24, SLAT ALTN CONT OUTBD
- F. Remove the Control Valve Module (Fig. 201)
- S 032-011
- (1) Remove the button plugs (press fit) from the rig pin holes (use a screwdriver or any handtool to pry off plugs).
- S 492-116
- (2) Install the rig pins TE1 (16) and TE2 (15).
- S 032-012
- (3) Disconnect the electrical connector (14) from the control valve module (12) at the bypass valve (1).
- S 032-013
- (4) Disconnect the rod (2) from the control valve input arm (6).
- S 032-014
- (5) Disconnect the hydraulic lines (7) and (8) from the control valve module (12).
- S 032-015
- (6) Disconnect the three tube assemblies (9, 10, and 11) from the control valve module (12).
- S 492-016
- (7) Install plugs in the hydraulic lines and caps in the open ports of the control valve module (12).

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S 022-017

- (8) Remove the bolts (20 and 26), and remove the control valve module (12).

G. Remove the Bypass Valve (Fig. 201)

S 492-018

- (1) Remove the button plugs from the rig pin holes (you can use a screwdriver or any handtool to pry off plugs).

S 492-115

- (2) Install the rig pins TE1 (16) and TE2 (15).

S 032-019

- (3) Disconnect the electrical connector (14) from the bypass valve (1).

S 032-020

- (4) Remove the four bolts and washers (27 and 28) from the mounting flange (13).

S 022-021

- (5) Remove the bypass valve (1).

S 492-022

- (6) Install a cover on the mounting surfaces of the control valve module (12) and the bypass valve (1).

H. Remove the Rotary Actuator for the Bypass Valve (Fig. 202)

S 032-023

- (1) Disconnect the electrical connector from the rotary actuator.

S 032-024

- (2) Remove the four bolts.

S 022-025

- (3) Remove the rotary actuator and the pin lock.

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S 492-026

- (4) Install a cover on the mounting surfaces of the housing assembly and the rotary actuator.

TASK 27-51-32-422-027

3. Install the Components for the TE Flap PDU

A. General

- (1) This task contains the installation procedure for these components:

- the Control Valve Module
- the Bypass Valve
- the Rotary Actuator for the Bypass Valve.

Because this task contains three procedures, do the steps in the "Prepare for the Installation" before you do the applicable group of steps to install the component. Then do the "Put the Airplane Back to Its Usual Condition" group of steps.

B. Equipment

- (1) LE Slat PDU Locks - A27007-1 (2 Necessary)
- (2) TE Flap Torque Tube Clamp - A27099-1 (2 clamps in set)
- (3) Rig pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) TE1 - P/N A20004-9
  - (b) TE2 - P/N A20004-9
  - (c) TE3 - P/N A20004-73
- (4) Rotary Stainless Steel Brush

**NOTE:** Do not use for heavy oxide particles on aluminum.

C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
201	1 12	Bypass Valve Control Valve	27-51-33	01	117 90

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D. Consumable Materials

- (1) D00054 Skydrol Assembly Lube - MCS 352B
- (2) D00153 Hydraulic Fluid Fire Resistant -  
BMS 3-11
- (3) A00251 Sealant - BMS 5-26 Type II Class B-2 or  
MIL-S-8802 Polysulfide
- (4) D50180 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (5) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)
- (6) C00308 Corrosion Preventive Compound -  
MIL-C-11796, Class 3

E. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 20-10-24/201, Rig Pins
- (3) AMM 27-51-00/501, Trailing Edge Flap System
- (4) AMM 27-81-11/401, Leading Edge Slat Power Drive Unit Components
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

F. Access

(1) Location Zones

144	MLG Wheel Well (Right)
211/212	Control Cabin
510/610	Wing Leading Edge
710	Nose Landing Gear and Doors
730/740	Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

G. Prepare for the Installation

S 212-028

- (1) Make sure the pressure is removed from the center hydraulic system (AMM 29-11-00/201).

S 212-030

- (2) Make sure the flap and slat alternate drives are off.

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S 212-029

- (3) Make sure the TE flaps and LE slats are fully retracted and the flap control lever is in the zero (FLAPS UP) detent.

H. Install the Control Valve Module (Fig. 201)

S 032-031

- (1) Remove the button plugs (press fit) from the rig pin holes (use a screwdriver or any handtool to pry off plugs).

S 492-114

- (2) Install the rig pins TE1 (16) in the input cam rig pin hole and TE2 (15) in the follow up-cam rig pin hole (Fig. 201).

S 102-033

- (3) Clean the grounding points on the control valve module with a rotary stainless steel brush.

S 642-034

- (4) Apply a thin layer of grease to all surfaces of the bolts (20 and 26) and bushings (21 and 25).

S 212-035

- (5) Make sure the electric bonding points stay clean and free of grease.

S 422-036

- (6) Install the control valve module (12) on the TE flap PDU (29).
  - (a) Align the connection points for the control valve module (12).
  - (b) Install a bolt (20), washer (24), bushing (21), washer (23) and nut (22).
  - (c) Install a bolt (26), washer (24), bushing (25), washer (23) and nut (22).

S 092-037

- (7) Remove the caps from the ports of the control valve module (12) and the plugs from the hydraulic lines.

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- S 212-038
- (8) Make sure the control valve module (12) is filled with hydraulic fluid.
- S 432-039
- (9) Connect the tube assemblies (9, 10, and 11) and the hydraulic lines (7 and 8) to the control valve module (12).
- S 642-040
- (10) Lightly apply Skydrol assembly lube or hydraulic fluid to the packing O-rings and fittings before you install them.
- S 432-041
- (11) Connect the electrical connector (14) to the bypass valve (1).
- S 432-042
- (12) Connect the rod (2) to the control valve input arm (6).
- S 932-043
- (13) Make marks on the torque tubes (19) and the adjacent airplane structure, to align the torque tubes with the adjacent structure, on each side of the TE flap PDU (29).

**NOTE:** These marks will show if the torque tube moved away from the retracted position after the torque tubes are disconnected.

- S 492-044
- (14) Use a support on the TE flaps at the trailing edge, and install a clamp on the torque tubes adjacent to the TE flap PDU (Fig. 205).

**NOTE:** A support is necessary to hold the weight of the flap's trailing edge. The weight of the flaps can cause the disconnected torque tubes to turn and cause flap asymmetry or disagreement problems.

- S 032-045
- (15) Disconnect the torque tubes (19) from each side of the TE flap PDU (29).

**NOTE:** Do not turn the torque tubes. It will be necessary to adjust the flap drive system if you turn the torque tube while disconnected.

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S 822-046

- (16) Adjust the TE flap PDU to a hydraulic null, with these steps:
- (a) Remove the access panels, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (AMM 06-44-00/201).
  - (b) Move the manual override lever on the bypass valves of the inboard and outboard LE slat PDUs to the No. 1 (bypass) position (AMM 27-81-11/401).
  - (c) Install a DO-NOT-OPERATE tag on the manual override levers.
  - (d) Install groundlocks in the inboard and outboard LE slat PDUs (Fig. 204).
  - (e) At the TE flap PDU, make sure you can connect the adjustable control rod to the pilot input arm (17), such that the bolt and rig pin TE1 (16) get in easily in the holes.
  - (f) Adjust the control rod if it is necessary.
  - (g) Tighten the jamnuts on the adjustable control rod and safety them with a wire.
  - (h) Connect the adjustable control rod to the pilot input arm (17) with a bolt, washer, and nut.
  - (i) Remove rig pin TE1 (16).
  - (j) Install the button plug in the rig pin hole.
  - (k) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
    - 1) 11J14, FLAPS SHUTOFF

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (L) Pressurize the center hydraulic system (AMM 29-11-00/201), and permit the TE flap PDU to become stable in the retracted position.

**NOTE:** It is usual for the output shaft on the PDU to turn when you pressurize the center hydraulic system.

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- (m) Make sure that rig pin TE2 (15) gets in easily in the follow-up cam rig pin hole (FIG. 201).
- (n) Do these steps, to adjust the PDU to a mechanical and hydraulic null, only if you cannot install rig pin TE2 (15) easily into the rig pin hole:
  - 1) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
  - 2) Disconnect the rod (2) from the control unit output arm (30).

NOTE: You will release the fluid pressure lock in the control valve when you disconnect the rod from the output arm. This will permit you to turn the output shaft to find the rig pin hole for rig pin TE2.

- 3) Turn the output shaft on the PDU by small increments, until the rig pin TE2 (15) gets in easily in the cam rig pin hole (FIG. 201).
- 4) Connect the rod (2) to the control unit output arm (30).
- 5) Try to install rig pin TE3 (18) in the rig pin hole on the control valve module input arm (6).
- 6) If you cannot install rig pin TE3 fully and easily, adjust the length of the rod (2) with these steps:
  - a) Loosen the jamnuts at each end of the rod (2).
  - b) Turn the rod to adjust the rod length, until you can easily install rig pin TE3 (18).

NOTE: The usual length of the rod before the last adjustment is 6.56 inches (166.62 mm).

- c) Tighten the jamnuts on the rod (2), but do not safety with a lockwire at this time.

NOTE: It is possible that you will adjust the rod again during the hydraulic null adjustment.

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7) Remove rig pins TE2 (15) and TE3 (18).

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

8) Pressurize the center hydraulic system (AMM 29-11-00/201) and permit the PDU to become stable in the fully retracted position.

**NOTE:** It is usual for the output shaft to turn when you pressurize the center hydraulic system.

**CAUTION:** DO NOT DISCONNECT THE ROD (2) TO DO THE ROD ADJUSTMENT WHILE THE CENTER HYDRAULIC SYSTEM IS PRESSURIZED. DO NOT TURN THE ROD (2) WITH RIG PIN TE2 (15) INSTALLED. ADJUST THE ROD (2) ONLY BY SMALL INCREMENTS TO PREVENT DAMAGE TO THE TE FLAP PDU.

9) Try to install rig pin TE2 (15) in the follow-up cam rig pin hole.

10) If rig pin TE2 (15) can not get in easily in the rig pin hole, adjust the rod (2) with these steps:

**NOTE:** Do not adjust the rod (2) while rig pin TE2 (15) is installed. Have rig pin TE2 (15) installed only to make sure that the rod (2) is adjusted correctly.

11) Loosen the jamnut at each end of the rod (2).

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- 12) Turn the rod (2) to adjust the length until you can easily install rig pin TE2 (15).

NOTE: It is not necessary to install rig pin TE3 (18) for this adjustment.

- 13) Tighten the jamnut on each end of the rod (2).
- 14) Safety the jamnuts on the rod (2) with lockwires.

S 862-047

- (17) Remove pressure from the center hydraulic system (AMM 29-11-00/201).

S 092-108

- (18) Remove rig pin TE2 (15).

S 492-113

- (19) Install the button plug in the rig pin hole.

S 092-048

- (20) Remove the groundlocks from the inboard and outboard LE slat PDUs (Fig. 204).

S 862-049

- (21) Move the manual override levers on the bypass valves on the inboard and outboard LE slat PDUs to the No. 2 (normal) position.

S 212-051

- (22) Examine the marks that you made between the torque tubes (19) and the adjacent airplane structure, and do these checks:

- (a) If the marks align, remove the clamps from the torque tubes (19) and connect them to the PDU (29).

NOTE: Do not turn the torque tubes (19) more than 1/2 spline tooth to connect them to the PDU (29). If the torque tubes turn too much, TE flap disagree and asymmetry problems can occur. The flap mechanism can move very slowly when the torque tubes are disconnected from the PDU. Connect the torque tubes quickly when the torque tube clamps are removed.

- (b) If the marks do not align or do not show, do these steps:
  - 1) Remove the torque tube clamps from the torque tubes (19).
  - 2) Move the torque tubes (19) on each side of the PDU (29) manually, or with an air motor, to the fully retracted position.
  - 3) Do a check on the retract overtravel stop clearance at the rotary actuator crank arms (AMM 27-51-00/501).

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- 4) Connect the torque tubes (19) to the PDU (29).

NOTE: Do not turn the torque tubes (19) more than 1/2 spline tooth to connect them to the PDU (29). If the torque tubes turn too much, TE flap disagree and asymmetry problems can occur. The flap mechanism can move very slowly when the torque tubes are disconnected from the PDU. Connect the torque tubes quickly when the torque tube clamps are removed.

S 092-052

- (23) Remove the supports from the trailing edges of the TE flap.

S 862-053

- (24) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead panel, P11:  
(a) 11J14, FLAPS SHUTOFF

S 822-054

- (25) Adjust the PDU (29) with the instruction given in the "Adjustment and Test of the TE Flap PDU" task.

S 702-055

- (26) Do a test on the PDU (29) as shown in the "Adjustment and Test of the TE Flap PDU" task.

I. Install the Bypass Valve (Fig. 201)

S 642-057

- (1) Lightly lubricate the packing O-rings and the backup rings with Skydrol assembly lube or hydraulic fluid.

S 092-058

- (2) Remove the covers from the control valve module (12) and the bypass valve (1).

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- S 212-059
- (3) Make sure the mounting surfaces are clean and free of grease.
- S 642-060
- (4) Apply grease to the threads of the bolts (27).
- S 422-061
- (5) Put the bypass valve (1) in its position on the control valve module (12).
- S 432-062
- (6) Install four bolts (27) and washers (28), and safety them with a lockwire.
- S 622-063
- (7) Apply a bead of polysulfide sealant around the mounting flange (13).
- S 212-064
- (8) Make sure the control valve module (12) is filled with hydraulic fluid.
- S 432-065
- (9) Connect the electrical connector (14) to the bypass valve (1).
- S 702-067
- (10) Do a test on the PDU as shown in the "Adjustment and Test of the TE Flap PDU" task.
- J. Install the Rotary Actuator for the Bypass Valve (Fig. 202)
- S 092-068
- (1) Remove the covers from the mounting surfaces of the housing assembly and the rotary actuator.
- S 212-069
- (2) Make sure the mounting surfaces are clean and free of grease.
- S 432-070
- (3) Install a pin lock on the rotary actuator.
- S 622-071
- (4) Apply corrosion preventive compound to the bolt threads.
- S 822-072
- (5) Align the spline index of the rotary actuator with the spline index of the cam shaft.

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- S 432-073
- (6) Align the bolt holes in the housing assembly and the rotary actuator, and install the bolts and washers.
- S 432-074
- (7) Tighten the bolts to 22-28 pound-inches (2.49-3.16 newtons).
- S 622-075
- (8) Apply a bead of sealant around the mounting flange.
- S 432-076
- (9) Connect the electrical connector to the rotary actuator.
- S 702-077
- (10) Do a test on the PDU (29) as shown in the Adjustment and Test of the TE Flap PDU.

TASK 27-51-32-822-078

4. Adjustment and Test of the TE Flap PDU

A. Equipment

- (1) TE Flap PDU Lock - A27009-7  
(2) LE Slat Groundlock - A27007-1 (2 Necessary)  
(3) Rig Pin from Set - A20004-XX (Ref 20-10-24):  
(a) TE1 - P/N A20004-9

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels  
(2) AMM 12-12-01/301, Hydraulic Systems - Servicing  
(3) AMM 20-10-24/201, Rig Pins  
(4) AMM 24-22-00/201, Electrical Power - Control  
(5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(6) AMM 32-00-15/201, Landing Gear Door Locks

C. Access

(1) Location Zones

119	Main Equipment Center (Left)
144	MLG Wheel Well (Right)
211/212	Control Cabin
510/610	Wing Leading Edge
710	Nose Landing Gear and Doors
730/740	Main Landing Gear and Doors

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- (2) Access Panels
  - 119AL Main Equipment Center
  - 511BB LE Slat Power Drive Unit - Outboard (Left)
  - 611BB LE Slat Power Drive Unit - Inboard (Right)

D. Adjust the TE Flap PDU

S 212-079

- (1) Make sure the TE flaps and LE slats are in the fully retracted position, and the flap control lever is in the zero (FLAPS UP) detent.

S 092-080

- (2) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-081

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

S 862-082

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 862-083

- (5) Move the flap control lever to the 30-unit detent, and make sure the TE flaps and LE slats move to the fully extended position.

S 862-084

- (6) Move the flap control lever back to the zero (FLAPS UP) detent, and make sure the TE flaps and LE slats move to the fully retracted position.

S 492-085

- (7) Install a DO-NOT-OPERATE tag on the flap control lever.

S 862-086

- (8) Remove power from the center hydraulic system (AMM 29-11-00/201).

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- S 492-087
- (9) Install a PDU lock in the TE flap PDU (Fig. 203).
- S 492-088
- (10) Install groundlocks in the inboard and outboard slat PDUs (Fig. 204).
- S 822-089
- (11) If it is necessary, adjust the control rod attached to the pilot input arm (17), until you can easily install rig pin TE1 (16) in the rig pin hole for the PDU input cam.
- S 092-090
- (12) Remove rig pin TE1 (16) and install a plug in the rig pin hole.
- E. Test of the TE Flap PDU
- S 092-091
- (1) If it is installed, remove the DO-NOT-OPERATE tag from the flap control lever.
- S 092-092
- (2) If it is installed, remove the PDU lock from the TE flap PDU (Fig. 203).
- S 092-093
- (3) If they are installed, remove the groundlocks from the inboard and outboard slat PDUs (Fig. 204).
- S 862-094
- (4) Remove the circuit breaker locks and the DO-NOT-CLOSE tags, and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR
- S 862-095
- (5) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD

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- (b) 11H24, SLAT ALTN CONT OUTBD
- (c) 11J24, FLAPS ALTN CONT

S 862-096

- (6) Make sure the position selector switch for the flap and slat alternate drive is in the NORM detent.

S 862-097

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

S 862-101

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOLLERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (8) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 702-102

- (9) Do these steps to do a test of the TE Flap PDU:
  - (a) Make sure that no messages show on the EICAS display.
  - (b) Make sure the amber TRAILING EDGE light, on the P3 panel, is not on.
  - (c) Move the flap control lever to the 20-unit detent and do these checks:
    - 1) Make sure the LE slats move to the intermediate position.
    - 2) Make sure the TE flaps move to the 20-degree position.
    - 3) Make sure no messages show on the EICAS display.
    - 4) Make sure the amber TRAILING EDGE light, on the P3 panel, does not come on.
  - (d) Move the flap control lever to the 30-unit detent and do these checks:
    - 1) Make sure the TE flaps and LE slats move to the fully extended position.
    - 2) Make sure no messages show on the EICAS display.

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- 3) Make sure the amber TRAILING EDGE light, on the P3 panel, does not come on.
- (e) Move the flap control lever to the zero (FLAPS UP) detent and do these checks:
  - 1) Make sure the TE flaps and LE slats move to the fully retracted position.
  - 2) Make sure no messages show on the EICAS display.
  - 3) Make sure the amber TRAILING EDGE light, on the P3 panel, does not come on.
- (f) Make sure the position selector switch for the flap/slat alternate drive on the first officer's main instrument panel, is in the NORM detent.
- (g) Push the arming switch for the flap alternate drive, in the flight compartment, to arm the flap alternate drive (ALTN switch light comes on), and do these checks:
  - 1) Make sure the amber TRAILING EDGE light, on the P3 panel, comes on after approximately seven seconds.
  - 2) Make sure the TE FLAP DISAGREE message comes on the EICAS display after seven seconds.
- (h) Move the flap control lever to the 20-unit detent, and do these checks:
  - 1) Make sure the TE flaps stay in the fully retracted position.
  - 2) Make sure the LE slats move to the intermediate position.
- (i) Move the flap control lever to the zero (FLAPS UP) detent, and do this check:
  - 1) Make sure the LE slats move to the fully retracted position.
- (j) Push the arming switch for the flap alternate drive to disarm the flap alternate drive (ALTN switch light goes off), and do these checks:
  - 1) Make sure the amber TRAILING EDGE light, on the P3 panel, goes off.
  - 2) Make sure the TE FLAP DISAGREE message does not show on the EICAS display.
- (k) Move the flap control lever to the 20-unit detent, and do these checks:
  - 1) Make sure the LE slats move to the intermediate position.
  - 2) Make sure the TE flaps move to the 20-degree position.

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(L) Move the flap control lever to the zero (FLAPS UP) detent, and do this check:

- 1) Make sure the TE flaps and LE slats move to the fully retracted position.

S 212-109

- (10) Make sure there are no leaks at the hydraulic connections to the TE flap PDU.

S 012-110

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

S 742-111

- (12) Operate the test switch on the front panel of the flap/slat electronics unit (FSEU) at the E2 equipment rack, and look for a no-fault indication.

F. Put the Airplane Back to Its Usual Condition

S 092-112

- (1) If installed, remove the PDU lock from the TE flap PDU (Fig. 203).

S 092-115

- (2) If installed, remove the groundlocks from the inboard and outboard slat PDUs (Fig. 204).

S 862-103

- (3) Remove pressure from the center hydraulic system (AMM 29-11-00/201).

S 862-104

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

S 412-114

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

S 412-105

- (6) Install the access panels, 511BB and 611BB, to close the access to the outboard and inboard slat PDUs (AMM 06-44-00/201).

S 612-106

- (7) Do the servicing steps to the reservoir of the center hydraulic system (AMM 12-12-01/301).

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S 412-107

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS.  
THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURIES TO  
PERSONS OR DAMAGE TO EQUIPMENT.

- (8) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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TE FLAP PDU CONTROL VALVE MODULE AND BYPASS VALVE - INSPECTION/CHECK

1. General

A. This procedure has these tasks:

- (1) A functional check of the trailing edge flap bypass valve.

TASK 27-51-32-866-002

2. Trailing Edge Flap Bypass Valve Check

A. References

- (1) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (2) AMM 32-00-15/201, Landing Gear Door Locks
- (3) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zones
  - 144 MLG Wheel Well (Right)
  - 710 Nose Landing Gear and Doors

C. Do the Trailing Edge Flap Bypass Check

S 866-005

- (1) Do the step that follows to use electrical power to extend the flaps:

- (a) Do this task: Extend the trailing edge flaps with alternate power (AMM 27-51-00/201).

NOTE: Alternate power is electrical power.

S 866-006

- (2) Do the step that follows to use electrical power to retract the flaps:

- (a) Retract the trailing edge flaps using alternate power (AMM 27-51-00/201).

NOTE: Alternate power is electrical power.

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TE FLAP POWER DRIVE UNIT – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task removes the power drive unit (PDU) for the trailing edge (TE) flap system. The second task installs the PDU.

TASK 27-51-33-024-001

2. Remove the TE Flap Power Drive Unit (PDU)

A. Equipment

- (1) PF-51 Hoist, Fishpole  
P.F. Industries  
9320 15th Ave. So.  
Seattle, WA 98108  
(Alternative)

Minilift Hoist Fishpole  
Didsbury Engineering Co. Ltd.  
Manchester M19 3 EJ  
(Alternative)

Hoist , Fishpole – Commercially Available  
(Alternative)

- (2) Hoist Bracket – A27026-7  
(3) TE Flap Torque Tube Clamp – A27099-1  
(2 clamps in set)  
(4) Circuit Breaker Lockout Clip – 1012LC-R  
Commercially available

B. References

- (1) AMM 27-51-41/401, TE Flap Torque Tubes  
(2) AMM 27-81-00/501, Trailing Edge Flap System  
(3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(4) AMM 32-00-15/201, Landing Gear Door Locks  
(5) AMM 32-00-20/201, Landing Gear Downlock

C. Access

- (1) Location Zones  
144 MLG Wheel Well (Right)  
211/212 Control Cabin  
710 Nose Landing Gear and Doors  
730/740 Main Landing Gear and Doors

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

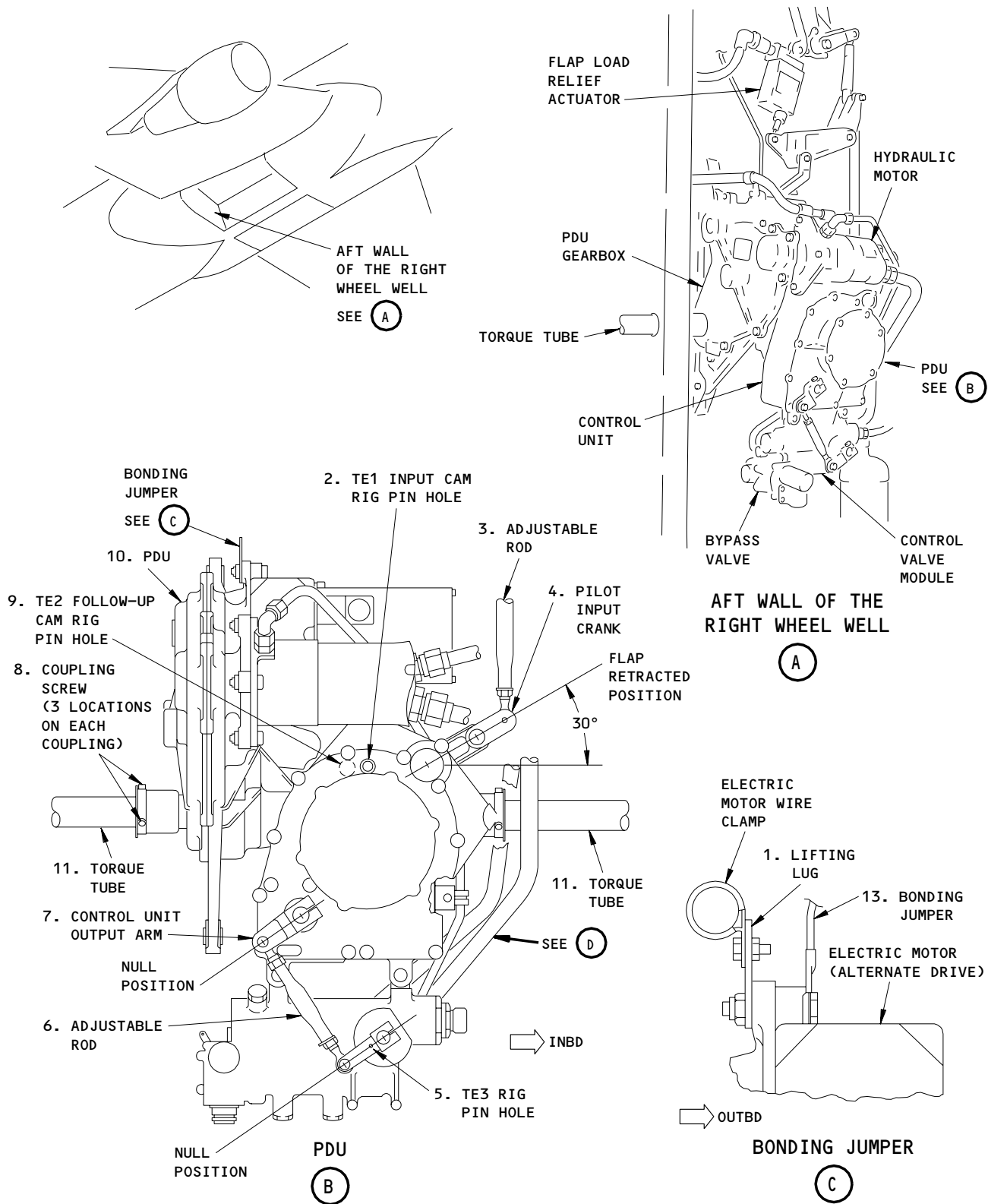
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TE Flap Power Drive Unit (PDU)  
Figure 401 (Sheet 1)

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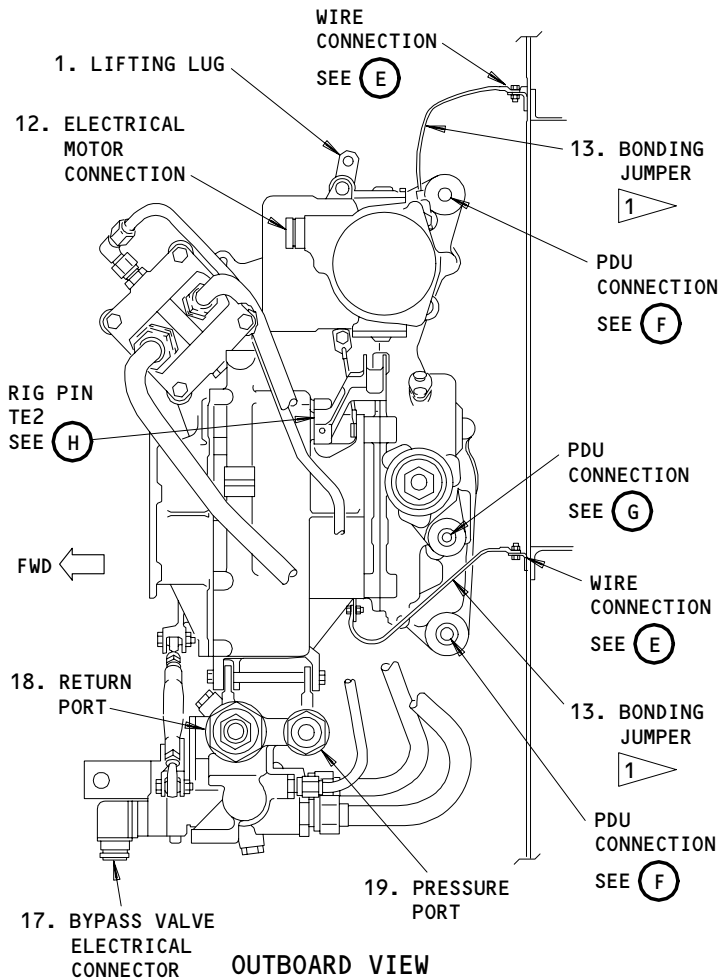
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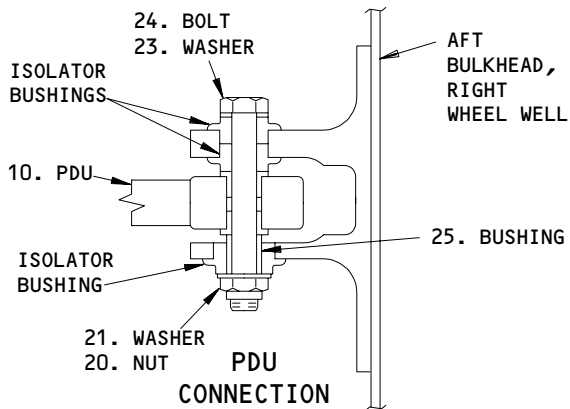
Page 402  
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7311



OUTBOARD VIEW

(D)

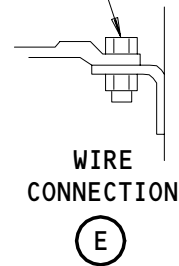


PDU CONNECTION

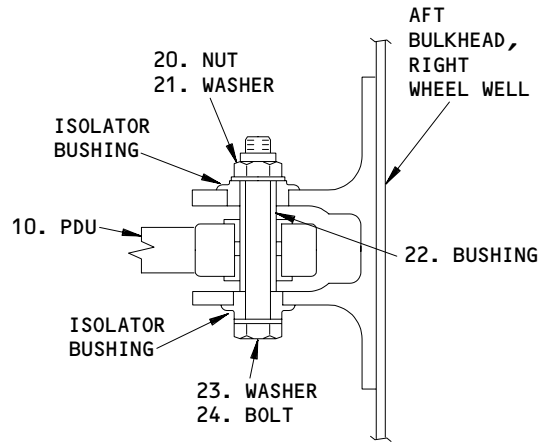
(G)

1 MAXIMUM RESISTANCE ACROSS THE CONNECTION IS 0.001 OHMS

- 14. SCREW
- 15. WASHER (QTY 3)
- 16. NUT

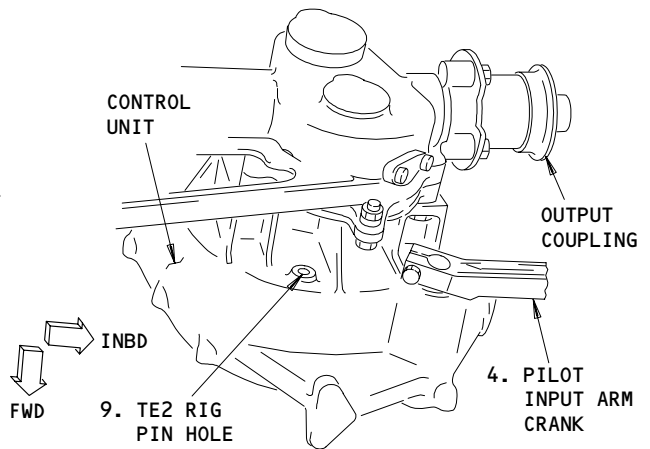


(E)



PDU CONNECTION (EXAMPLE)

(F)



RIG PIN TE2 TOP VIEW (AFT OF THE CONTROL UNIT)

(H)

TE Flap Power Drive Unit (PDU)  
Figure 401 (Sheet 2)

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S 014-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 214-004

- (3) Make sure the TE flaps and LE slats are fully retracted and the flap control lever is in the zero (FLAPS UP) detent.

S 494-005

- (4) Install a DO-NOT-OPERATE tag on the flap control lever.

S 864-006

- (5) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 864-007

- (6) Remove the pressure from the reservoir for the center hydraulic system (AMM 29-11-00/201).

S 864-008

- (7) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 864-009

- (8) Open these circuit breakers on the P6 panel, and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 864-010

- (9) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:  
(a) 11J24, FLAPS ALTN CONT

S 864-011

- (10) Open these circuit breakers on the P11 panel, and install circuit breaker locks:  
(a) 11H23, SLAT ALTN CONT INBD

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(b) 11H24, SLAT ALTN CONT OUTBD

E. Remove the TE Flap PDU (Fig. 401)

S 034-012

- (1) Disconnect the electrical connectors (17, 12) from the bypass valve and the electric motor.

S 034-013

- (2) Remove the wire clamp for the electric motor from the lifting lug (1).

S 034-014

- (3) Disconnect the bonding jumpers (13) from the aft wall of the wheel well.

S 034-015

- (4) Disconnect the hydraulic lines from the pressure and return ports (18, 19) on the control valve module.

S 494-016

- (5) Install the plugs in the hydraulic lines and caps on the open ports on the control valve module.

S 034-017

- (6) Disconnect the adjustable rod (3) from the pilot input crank (4).

S 934-018

- (7) Make marks on the torque tubes (11) and the adjacent airplane structure, to align the torque tubes with the adjacent structure, on each side of the TE flap PDU (10).

NOTE: These marks will show if the torque tube moved away from the retracted position after the torque tubes are disconnected.

S 494-019

- (8) Use a support on the TE flaps at the trailing edge, and install a clamp on the torque tubes on each side of the PDU (Fig. 403).

NOTE: A support is necessary to hold the weight of the flap's trailing edge. The weight of the flaps can cause the disconnected torque tubes to turn and cause flap asymmetry or disagreement problems.

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S 034-089

**CAUTION:** DO NOT OPERATE THE ELECTRIC MOTOR WHEN THE TORQUE TUBES ARE DISCONNECTED FROM THE TE FLAP PDU. DAMAGE CAN OCCUR TO THE QUILL SHAFT IF YOU OPERATE THE ELECTRIC MOTOR WITH THE TORQUE TUBES DISCONNECTED.

- (9) Remove the torque tubes (11) on each side of the PDU (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tube while it is disconnected. It will be necessary to adjust the flap drive if you turn the torque tube (AMM 27-81-00/501).

S 494-022

- (10) Attach the fishpole hoist to the hinge support beam on the aft bulkhead in the main wheel well and connect the hoist to the lifting lug (1) on the PDU (10) (Fig. 402).

S 034-023

- (11) Remove the bolts (24), washers (21, 23), nuts (20), and bushings (22, 25) from the PDU connection points (View F and G, Fig. 401).

**NOTE:** Identify the bushings for the subsequent installation.

S 024-086

**WARNING:** BE CAREFUL WHEN YOU MOVE THE TE FLAP PDU, BECAUSE THE PDU WEIGHS 90 POUNDS (41 KG), INJURY CAN OCCUR.

- (12) Lower the PDU from the airplane.

**NOTE:** The TE flap PDU weighs approximately 90 pounds (40.8 Kg).

TASK 27-51-33-424-025

3. Install the TE Flap PDU

**NOTE:** Do not mix a 767-200 power drive unit (PDU) with a 767-300 PDU, because the follow-up cams are different. Although you can install a 767-200 PDU on a 767-300 airplane, or a 767-300 PDU on a 767-200 airplane. To prevent a mix, the adjustable rod (3) and the pilot input arm (4) are not interchangeable between the 767-200 and 767-300.

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A. Equipment

- (1) PF-51 Hoist, Fishpole  
P.F. Industries  
9320 15th Ave. So.  
Seattle, WA 98108  
(Alternative)

Minilift Hoist Fishpole  
Didsbury Engineering Co. Ltd.  
Manchester M19 3 EJ  
(Alternative)

Hoist , Fishpole - Commercially Available  
(Alternative)

- (2) Hoist Bracket - A27026-7
- (3) Bonding Meter (Microhm Bridge, Type 2 Bonding Meter) - 477W Avtron Model or Equivalent  
Avtron Manufacturing Inc.,  
Cleveland, Ohio
- (4) LE Slat Groundlock - A27007-1 (2 Necessary)
- (5) TE Flap PDU Lock - A27009-7
- (6) Rig Pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) TE1 - P/N A20004-9
  - (b) TE2 - P/N A20004-9
  - (c) TE3 - P/N A20004-73

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	10	Power Drive Unit	27-51-33	01	50

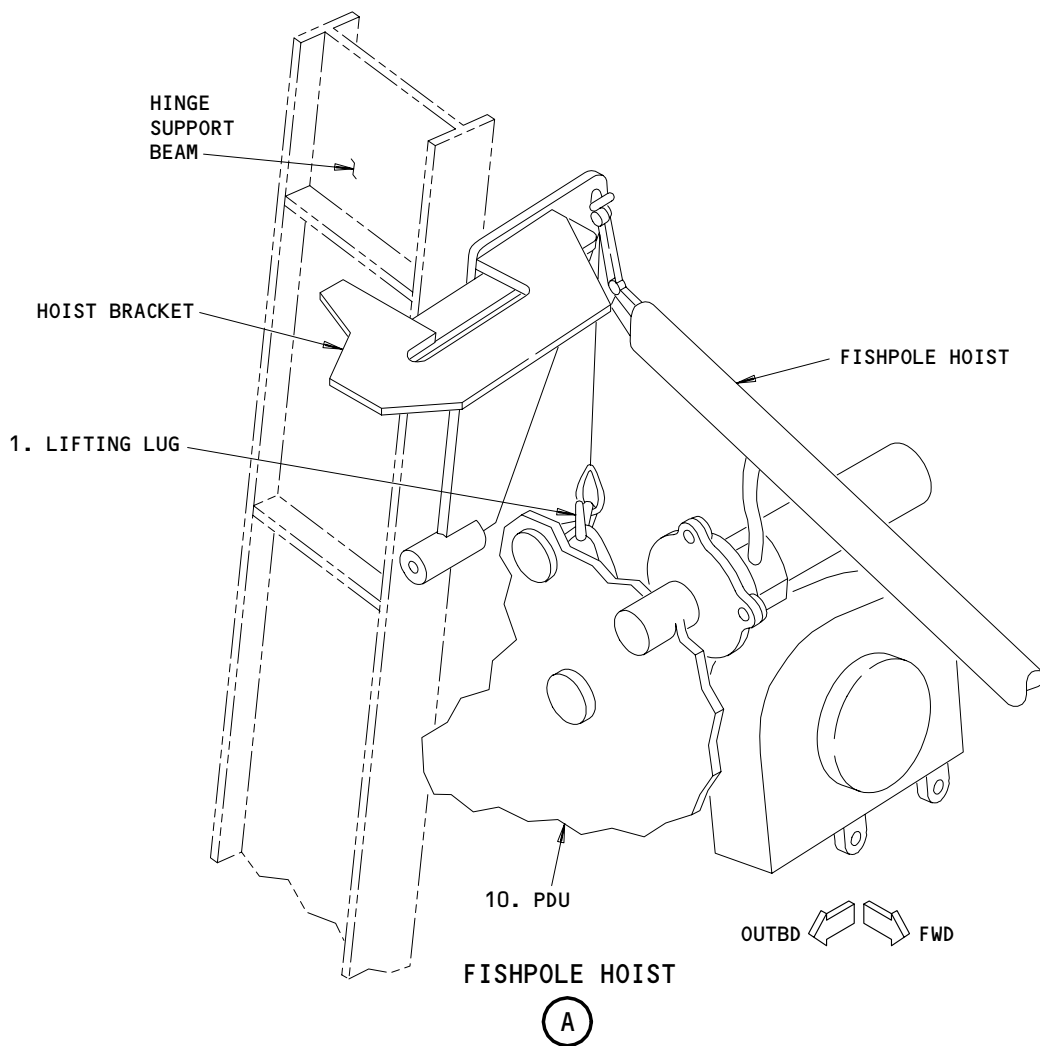
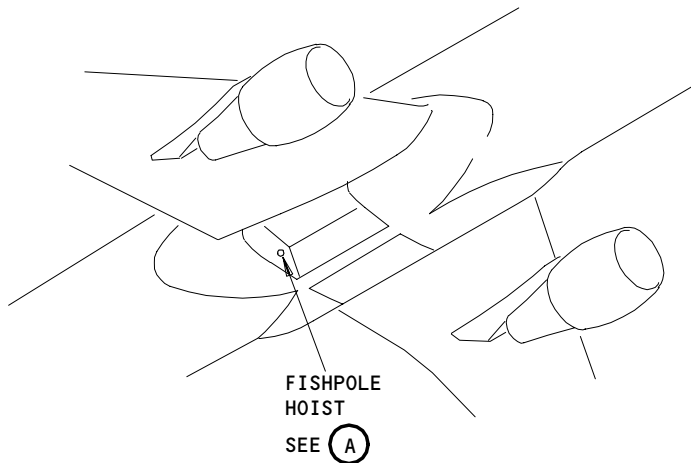
C. Consumable Materials

- (1) D00054 Skydrol Assembly Lube - MCS 352B
- (2) D00153 Hydraulic Fluid, Fire Resistant -  
BMS 3-11

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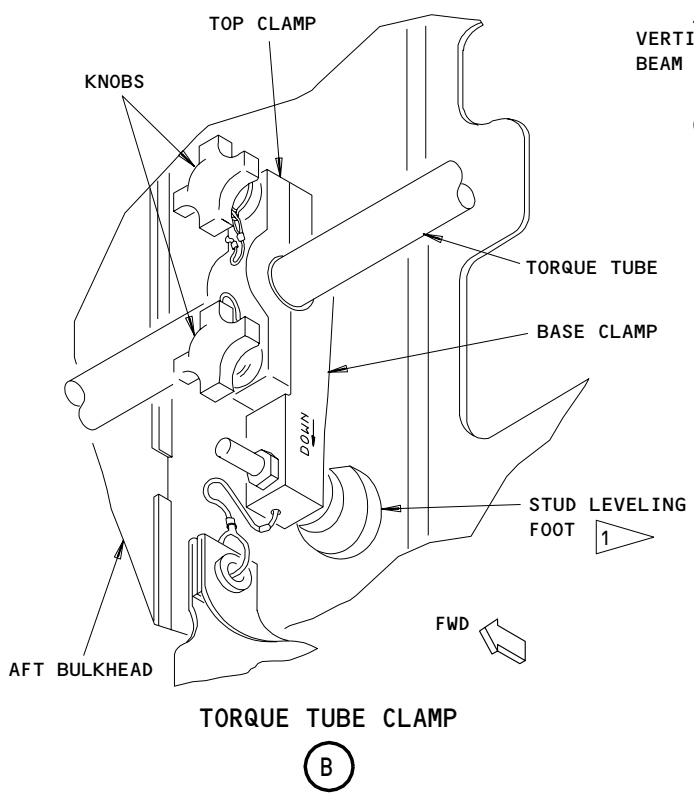
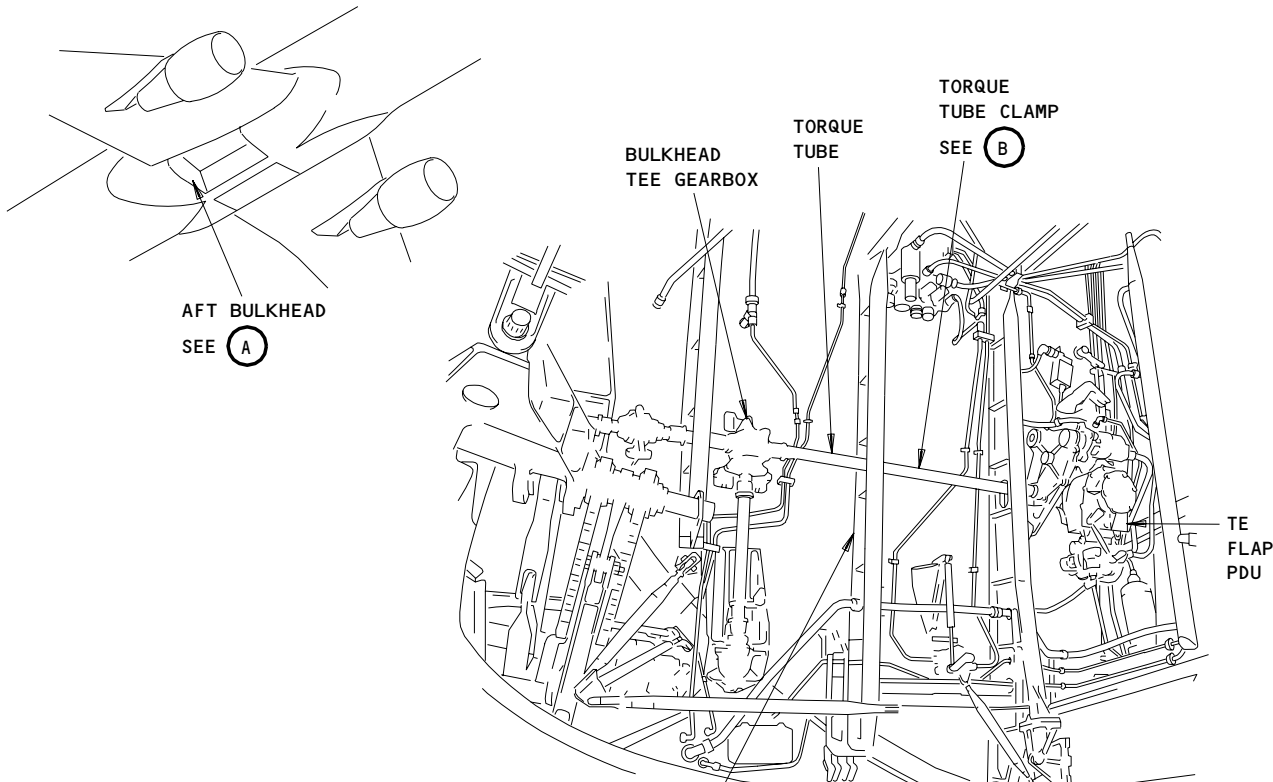
Fishpole Hoist and Hoist Bracket  
Figure 402

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VERTICAL BEAM

AFT BULKHEAD  
(RIGHT WHEEL WELL)  
(A)

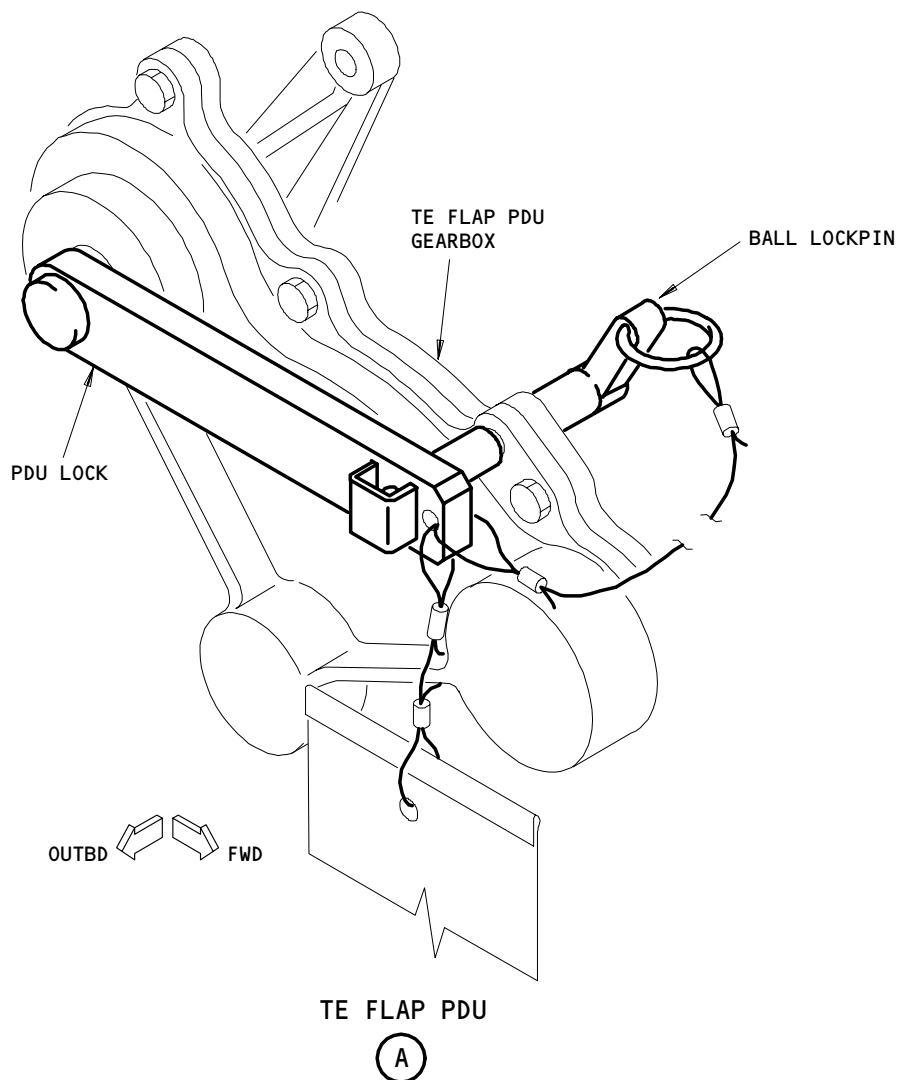
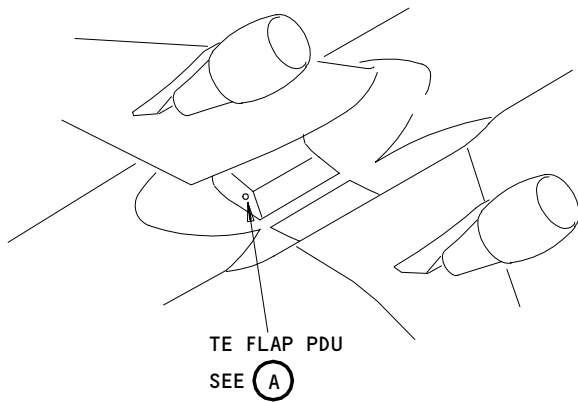
1 INSTALL THE CLAMP WITH THE STUD LEVELING FOOT DOWN, NEAR A VERTICAL BEAM. DO NOT INSTALL THE STUD LEVELING FOOT ON TOP OF HYDRAULIC TUBING OR ELECTRICAL WIRES.

Torque Tube Clamp for the Trailing Edge Flap  
Figure 403

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PDU Lock for the TE Flap PDU  
Figure 404

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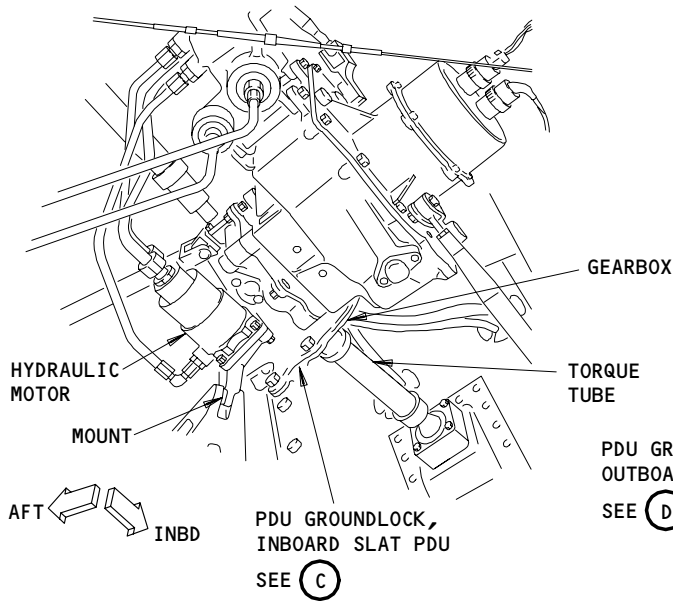
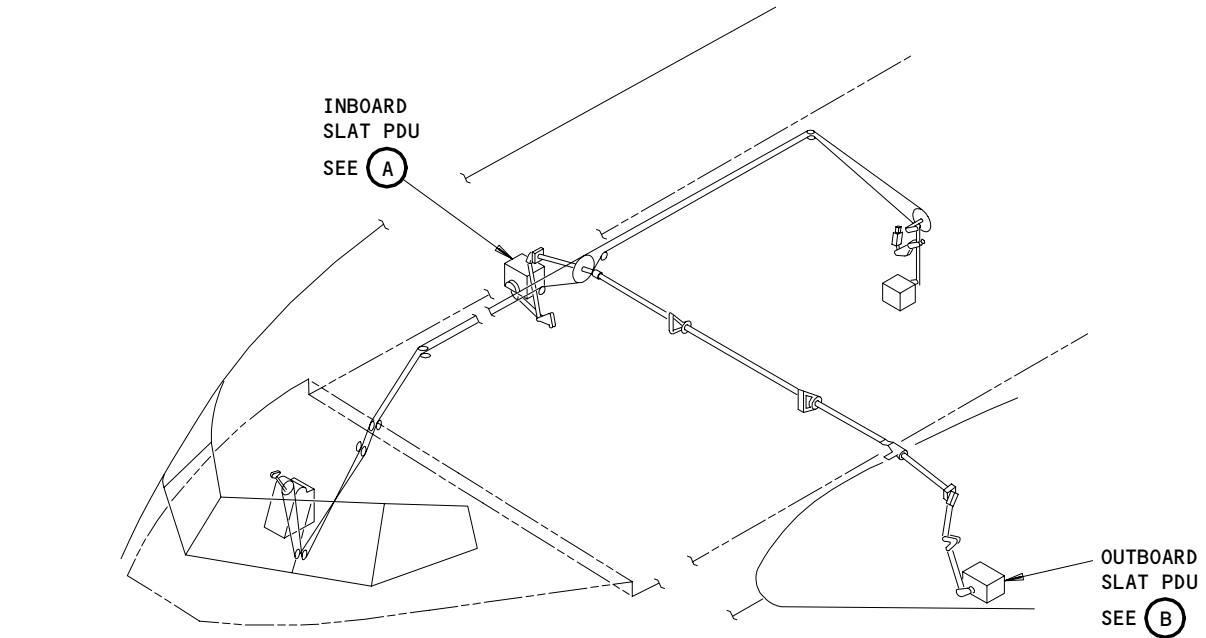
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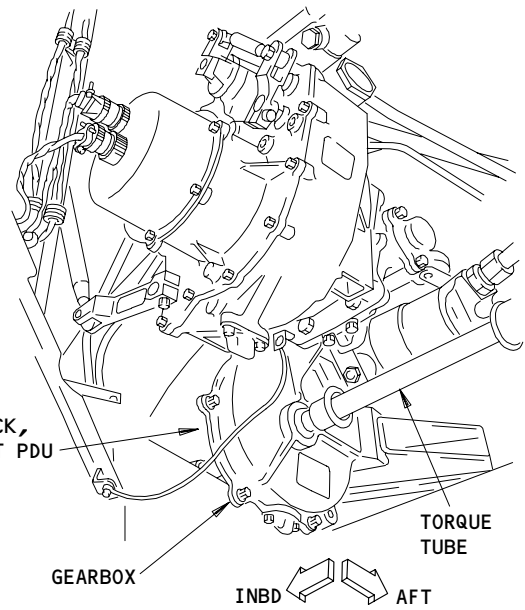
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INBOARD SLAT PDU  
(BOTTOM VIEW)

(A)



OUTBOARD SLAT PDU

(B)

Slat PDU Groundlock  
Figure 405 (Sheet 1)

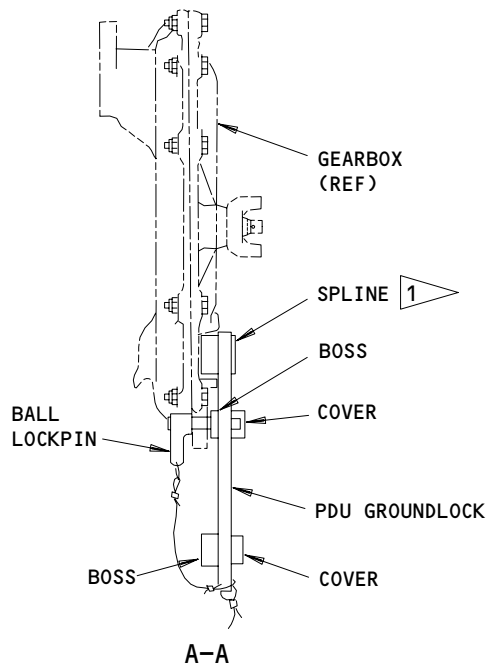
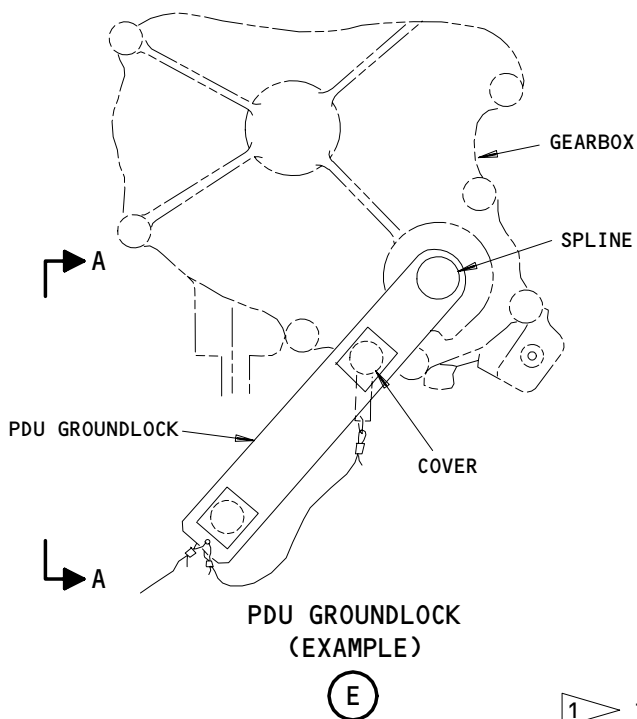
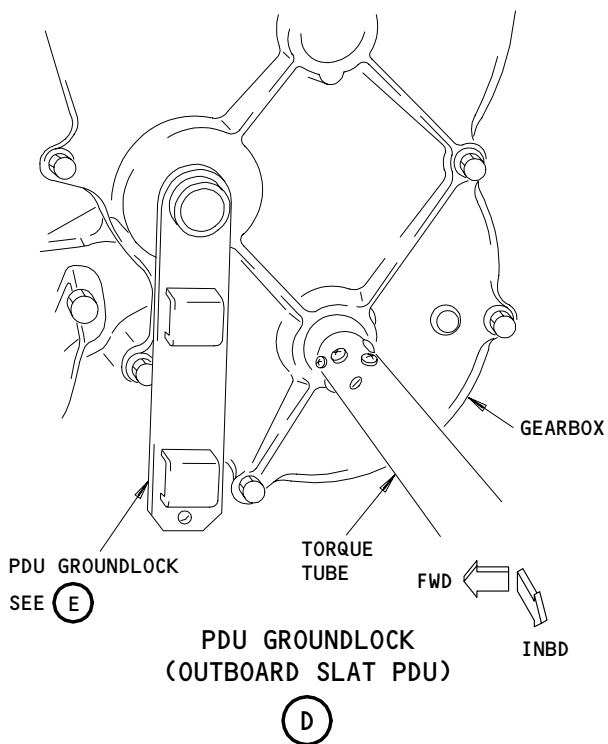
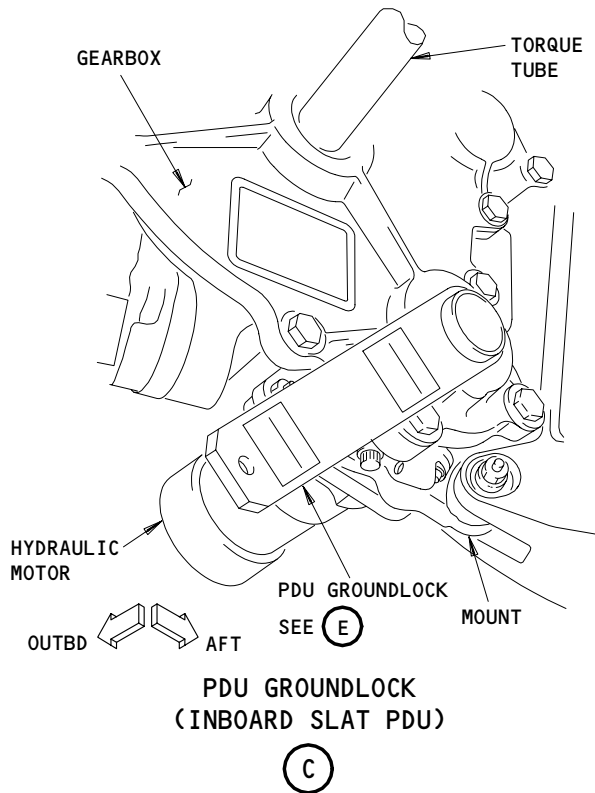
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1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN INSTALLED THROUGH BOSS AND GEARBOX

Slat PDU Groundlock  
Figure 405 (Sheet 2)

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- (3) D50180 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (4) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

D. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-44-00/201, Wing Access Doors and Panels
- (3) AMM 12-12-01/301, Hydraulic Systems - Servicing
- (4) AMM 20-10-21/601, Electrical Bonding
- (5) AMM 20-10-22/701, Metal Surfaces Cleaning
- (6) AMM 20-10-24/201, Rig Pins
- (7) AMM 24-22-00/201, Electrical Power - Control
- (8) AMM 27-51-00/501, Trailing Edge Flap System
- (9) AMM 27-51-41/401, TE Flap Torque Tubes
- (10) AMM 27-81-11/401, Leading Edge Slat Power Drive Unit Components
- (11) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (12) AMM 32-00-15/201, Landing Gear Door Locks

E. Access

(1) Location Zones

144	MLG Wheel Well
211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
710	Nose Landing Gear and Doors
730/740	Main Landing Gear and Doors

(2) Access Panels

119AL	Main Equipment Center
511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

F. Install the TE Flap PDU (Fig. 401)

S 214-026

- (1) Make sure the pressure is removed from the center hydraulic system (AMM 29-11-00/201).

S 214-027

- (2) Make sure the flap and slat alternate drives are off.

S 214-028

- (3) Make sure the TE flaps and LE slats are fully retracted and the flap control lever is in the zero (FLAPS UP) detent.

S 494-029

- (4) Attach the hoist bracket to the aft bulkhead of the right wheel well, and attach the fishpole hoist to the lifting lug (1) on the PDU (10) (Fig. 402).

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S 424-087

**WARNING:** BE CAREFUL WHEN YOU MOVE THE TE FLAP PDU, BECAUSE THE PDU WEIGHS 90 POUNDS (41 KG), INJURY CAN OCCUR.

- (5) Lift the PDU (10) into its position (Fig. 401).

**NOTE:** The TE flap PDU weighs approximately 90 pounds (40.8 Kg).

S 624-031

- (6) Apply grease to all surfaces of the bolts and bushings.

S 434-032

- (7) Install the bolts (24), washers (21, 23), bushings (22), and nuts (20) (2 locations) (Detail F, Fig. 401).  
(a) Tighten the nuts.

S 434-033

- (8) Install the bolt (24), washers (21, 23), bushing (25), and nut (20) (Detail G, Fig. 401).  
(a) Tighten the nut.

S 094-034

- (9) Disconnect the fishpole hoist and the hoist bracket from the PDU and the aft bulkhead of the right wheel well.

S 104-035

- (10) Clean the bonding jumper connections (13) on the electric motor and the control unit for a good electrical bond (AMM 20-10-22/701).

S 434-036

- (11) Connect the two bonding jumpers (13) to the aft bulkhead of the right wheel well with these steps:

**NOTE:** Add or remove washers as necessary, until the height of the washer is the same height as the adjacent structure, or is above the adjacent structure for no more than one washer thickness.

- (a) Install the screw (14) through the bulkhead with a washer (15) below the head of the screw.  
(b) Install the washer (15), bonding jumper (13), washer (15), and nut (16).  
(c) Tighten the nut.  
(d) Make sure the total resistance across the bond is no more than 0.001 ohm (AMM 20-10-21/601).

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S 094-039

- (12) Remove the plugs from the hydraulic lines and the caps from the ports on the control valve module.

S 644-040

- (13) Lightly apply Skydrol assembly lube or hydraulic fluid to O-rings and fittings before you install them.

S 434-041

- (14) Connect the hydraulic lines to the pressure and return ports (18, 19) on the control valve module.

S 434-088

**CAUTION:** DO NOT OPERATE THE ELECTRIC MOTOR WHEN THE TORQUE TUBES ARE DISCONNECTED FROM THE TE FLAP PDU. DAMAGE CAN OCCUR TO THE QUILL SHAFT IF YOU OPERATE THE ELECTRIC MOTOR WITH THE TORQUE TUBES DISCONNECTED.

- (15) Connect the electrical connectors (17, 12) to the bypass valve and the electric motor.

S 424-093

- (16) Attach the wire clamp for the electric motor to the lifting lug.

S 214-043

- (17) Make sure the manual override lever on the bypass valve for the TE flap PDU is in the No. 2 (normal) position.

S 824-044

- (18) Do a check for hydraulic null on the PDU as follows:
- (a) Remove the plugs from the PDU to show the TE1 input cam rig pin hole (2) and the TE2 follow-up cam rig pin hole (9).
  - (b) Install rig pin TE1 in the input cam rig pin hole (2).
  - (c) Remove the access panels, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (AMM 06-44-00/201).
  - (d) Move the manual override levers on the bypass valves for the inboard and outboard slat PDUs to the No. 1 (bypass) position (AMM 27-81-11/401).
  - (e) Install a DO-NOT-OPERATE tag on the manual override levers.
  - (f) Install groundlocks in the inboard and outboard slat PDUs (Fig. 405).
  - (g) At the TE flap PDU, make sure you can connect the adjustable rod (3) to the pilot input crank (4) such that the attachment bolt and rig pin TE1 can be installed freely.
    - 1) Adjust the rod if it is necessary.
    - 2) Tighten the jamnuts on the adjustable rod and safety them with a wire.

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- (h) Connect the adjustable rod (3) to the pilot input crank (4) with a bolt, washer and a nut.
- (i) Remove rig pin TE1.
- (j) Open this circuit breaker on the overhead panel, and attach a DO-NOT-CLOSE tag:
  - 1) 11J14, FLAPS SHUTOFF

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (k) Pressurize the center hydraulic system (AMM 29-11-00/201) and permit the PDU to become stable in the retracted position.

**NOTE:** It is usual for the output shaft on the PDU to turn when you pressurize the center hydraulic system.

- (l) Make sure that you can easily install and remove rig pin TE2 in the follow-up cam rig pin hole (9).
- (m) Do these steps to adjust the PDU to a mechanical and hydraulic null only if you can not install rig pin TE2 easily into the rig pin hole:
  - 1) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
  - 2) Disconnect the adjustable rod (6) from the control unit output arm (7).

**NOTE:** You will release the fluid pressure lock in the control valve when you disconnect the rod from the output arm. This will permit you to turn the output shaft to find the rig pin hole for rig pin TE2.

- 3) Turn the output shaft of the PDU by small increments until you can install rig pin TE2 freely.
- 4) Connect the adjustable rod (6) to the control unit output arm (7).
- 5) Try to install rig pin TE3 in the rig pin hole (5) on the control valve module input arm.

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- 6) If you cannot install rig pin TE3 fully and easily, adjust the length of the rod (6) with these steps:
- Loosen the jamnuts at each end of the rod (6).
  - Turn the rod to adjust the rod length, until you can easily install rig pin TE3.

NOTE: The usual length of the rod before the last adjustment is 6.56 inches (166.62 mm).

- c) Tighten the jamnuts on the rod (6), but do not safety with a lockwire at this time.

NOTE: It is possible that you will adjust the rod again during the hydraulic null adjustment.

- 7) Remove rig pins TE2 and TE3.

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

CAUTION: MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- 8) Pressurize the center hydraulic system (AMM 29-11-00/201) and permit the PDU to become stable in the retracted position.

NOTE: It is usual for the output shaft of the PDU to turn when you pressurize the center hydraulic system.

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**CAUTION:** DO NOT DISCONNECT THE ADJUSTABLE ROD (6) WHEN YOU ADJUST THE PDU WITH THE CENTER HYDRAULIC SYSTEM PRESSURIZED. DO NOT TURN THE ADJUSTABLE ROD (6) WITH RIG PIN TE2 INSTALLED. ADJUST THE ROD (6) ONLY BY SMALL INCREMENTS TO PREVENT DAMAGE TO THE TE FLAP PDU.

- 9) Try to install rig pin TE2 in the follow-up cam rig pin hole (9).
- 10) If you can not install rig pin TE2 easily, adjust the rod (6) with these steps:

**NOTE:** Do not adjust the rod (6) while rig pin TE2 is installed. Install rig pin TE2 only to make sure that the rod (6) is adjusted correctly.

- a) Loosen the jamnuts at each end of the rod (6).
- b) Turn the rod (6) to adjust the length until you can easily install rig pin TE2.

**NOTE:** It is not necessary to install rig pin TE3 for this adjustment.

- c) Tighten the jamnut on each end of the rod (6).
- d) Safety the jamnuts on the rod (6) with lockwires.

S 864-045

- (19) Remove pressure from the center hydraulic system (AMM 29-11-00/201).

S 094-048

- (20) Remove rig pin TE2 and install a plug in the rig pin hole.

S 094-046

- (21) Remove the groundlocks from the inboard and outboard LE slat PDUs (Fig. 405).

S 864-047

- (22) Move the manual override levers on the bypass valves for the inboard and outboard LE slat PDUs to the No. 2 (normal) position.

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S 214-049

- (23) At the TE flap PDU, examine the marks you made between the torque tubes (11) and the adjacent airplane structure, and do these checks:
- (a) If the marks do align, remove the clamps from the torque tubes (11) and connect them to the PDU.

NOTE: Do not turn the torque tubes (11) more than 1/2 spline tooth to connect them to the PDU. If the torque tubes turn too much, TE flap disagree and asymmetry problems can occur. The flap mechanism can move very slowly when the torque tubes are disconnected from the PDU. Connect the torque tubes quickly after you remove the torque tube clamps.

- (b) If the marks do not align or do not show, do these steps:
- 1) Remove the torque tube clamps from the torque tubes (11) (Fig. 403).
  - 2) Move the torque tubes (11) on each side of the PDU manually, or with an air motor, to the fully retracted position.
  - 3) Do a check on the retract overtravel stop clearances (AMM 27-51-00/501).
  - 4) Connect the torque tubes (11) to the PDU (AMM 27-51-41/401).

NOTE: Do not turn the torque tubes (11) more than 1/2 spline tooth to connect them to the PDU. If the torque tubes turn too much, TE flap disagree and asymmetry problems can occur. The flap mechanism can move very slowly when the torque tubes are disconnected from the PDU. Connect the torque tubes quickly when the torque tube clamps are removed.

S 094-050

- (24) Remove the supports from the trailing edge of the TE flap.

S 864-051

- (25) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead panel, P11:
- (a) 11J14, FLAPS SHUTOFF

S 824-052

- (26) Do the "Adjust the TE Flap PDU" procedure that follows.

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G. Adjust the TE Flap PDU

S 214-053

- (1) Make sure the TE flaps and LE slats are in the fully retracted position and the flap control lever is in the zero (FLAPS UP) detent.

S 094-054

- (2) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 864-055

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

S 864-056

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-057

- (5) Move the flap control lever to the 30-unit detent, and make sure the TE flaps and LE slats move to the fully extended position.

S 864-058

- (6) Move the flap control lever back to the zero (FLAPS UP) detent, and make sure the TE flaps and LE slats move to the fully retracted position.

S 094-059

- (7) Install a DO-NOT-OPERATE tag on the flap control lever.

S 864-060

- (8) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 494-061

- (9) Install a PDU lock in the TE flap PDU (Fig. 404).

S 494-062

- (10) Install groundlocks in the inboard and outboard slat PDUs (Fig. 405).

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S 824-063

- (11) If it is necessary, adjust the rod (3) that is attached to the pilot input arm (4) until you can easily install rig pin TE1 in the rig pin hole for the PDU input cam.

S 094-064

- (12) Remove rig pin TE1 and install a plug in the rig pin hole.

S 704-065

- (13) Do the "Test of the TE Flap PDU" procedure that follows.

H. Test of the TE Flap PDU

S 094-066

- (1) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 094-067

- (2) Remove the PDU lock from the TE flap PDU (Fig. 404).

S 094-068

- (3) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 405).

S 864-069

- (4) Remove the circuit breaker locks and the DO-NOT-CLOSE tags, and close these circuit breakers on the overhead panel, P11:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-070

- (5) Remove the circuit breaker locks and the DO-NOT-CLOSE tags, and close these circuit breakers on the main power distribution panel, P6:
  - (a) 6D21, ALTN SLAT INBD PWR

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- (b) 6D24, ALTN FLAP PWR
- (c) 6F24, ALTN SLAT OUTBD PWR

S 214-071

- (6) Make sure the position selector switch for the flap/slat alternate drive, on the first officer's main instrument panel, P3, is in the NORM detent.

S 864-072

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

S 864-075

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (8) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 704-076

- (9) Do these steps to do a test of the TE Flap PDU:
  - (a) Make sure that no messages show on the EICAS display.
  - (b) Make sure the amber TRAILING EDGE light, on the P3 panel, is not on.
  - (c) Move the flap control lever to the 20-unit detent, and do these checks:
    - 1) Make sure the LE slats move to the intermediate position.
    - 2) Make sure the TE flaps move to the 20-degree position.

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- 3) Make sure no messages show on the EICAS display.
  - 4) Make sure the amber TRAILING EDGE light, on the P3 panel, does not come on.
- (d) Move the flap control lever to the 30-unit detent and do these checks:
- 1) Make sure the TE flaps and LE slats move to the fully extended position.
  - 2) Make sure no messages show on the EICAS display.
  - 3) Make sure the amber TRAILING EDGE light, on the P3 panel, does not come on.
- (e) Move the flap control lever to the zero (FLAPS UP) detent and do these checks:
- 1) Make sure the TE flaps and LE slats move to the fully retracted position.
  - 2) Make sure no messages show on the EICAS display.
  - 3) Make sure the amber TRAILING EDGE light, on the P3 panel, does not come on.
- (f) Make sure the position selector switch for the flap/slat alternate drive on the first officer's main instrument panel, is in the NORM detent.
- (g) Push the arming switch for the flap alternate drive, in the flight compartment, to arm the flap alternate drive (ALTN switch light comes on), and do these checks:
- 1) Make sure the amber TRAILING EDGE light, on the P3 panel, comes on approximately after seven seconds.
  - 2) Make sure the TE FLAP DISAGREE message comes on the EICAS display after seven seconds.
- (h) Move the flap control lever to the 20-unit detent and do these checks:
- 1) Make sure the TE flaps stay in the fully retracted position.
  - 2) Make sure the LE slats move to the intermediate position.
- (i) Move the flap control lever to the zero (FLAPS UP) detent and do this check:
- 1) Make sure the LE slats move to the fully retracted position.
- (j) Move the position selector switch for the flap/slat alternate drive, in the flight compartment, to the UP detent and do these checks:
- 1) Make sure the amber TRAILING EDGE light, on the P3 panel, goes off.
  - 2) Make sure no messages show on the EICAS display.

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- (k) Move the position selector switch for the flap/slat alternate drive, in the flight compartment, to the 20-unit detent and do these checks:
  - 1) Make sure the TE flaps move to the 20-degree position.
  - 2) Make sure the amber TRAILING EDGE light, on the P3 panel, does not come on.
  - 3) Make sure that the LE SLAT DISAGREE message shows on the EICAS display.
- (l) Move the position selector switch for the flap/slat alternate drive, in the flight compartment, to the UP detent and do these checks:
  - 1) Make sure the TE flaps move to the fully retracted position.
  - 2) Make sure the amber TRAILING EDGE light, on the P3 panel, does not come on.
  - 3) Make sure no messages show on the EICAS display.
- (m) Move the position selector switch for the flap/slat alternate drive, in the flight compartment, to the NORM detent and do these checks:
  - 1) Make sure the amber TRAILING EDGE light, on the P3 panel, comes on.
  - 2) Make sure the TE FLAP DISAGREE message shows on the EICAS display.
- (n) Push the arming switch for the flap alternate drive, in the flight compartment, to disarm the flap alternate drive (ALTN switch light goes off) and do these checks:
  - 1) Make sure the amber TRAILING EDGE light, on the P3 panel, goes off.
  - 2) Make sure the TE FLAP DISAGREE message is not on the EICAS display.
- (o) Move the flap control lever to the 20-unit detent and do these checks:
  - 1) Make sure the LE slats move to the intermediate position.
  - 2) Make sure the TE flaps move to the 20-degree position.
- (p) Move the flap control lever to the zero (FLAPS UP) detent and do this check:
  - 1) Make sure the TE flaps and LE slats move to the fully retracted position.

S 214-077

- (10) Make sure there are no leaks at the hydraulic connections to the TE Flap PDU.

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S 014-078

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

S 704-079

- (12) Operate the test switch on the panel of the flap/slat electronics unit (FSEU) at the E2 equipment rack, and look for a no-fault indication.

S 414-080

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

I. Put the Airplane Back to Its Usual Condition

S 864-081

- (1) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 864-082

- (2) Remove the electrical power (AMM 24-22-00/201).

S 414-083

- (3) Install the access panels, 511BB and 611BB, to close the access to the outboard and inboard slat PDUs (AMM 06-44-00/201).

S 614-084

- (4) Do the servicing steps to the reservoir of the center hydraulic system (AMM 12-12-01/301).

S 414-085

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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TE FLAP POWER DRIVE UNIT COMPONENTS – MAINTENANCE PRACTICES

1. General

- A. This procedure contains the removal and the installation procedures for the components on the trailing edge (TE) flap power drive unit (PDU).

TASK 27-51-34-022-001

2. Trailing Edge Flap Power Drive Unit (PDU) Components – Removal

A. General

- (1) This task contains the removal procedure for these components on the PDU:
- the Control Unit
  - the Hydraulic Motor
  - the Electric Motor
  - the Flap PDU Gearbox.

Because this task contains four procedures, only do the applicable procedure to remove the component.

To start one of these procedures, do the steps in the "Prepare for the Removal" topic, then do the applicable group of steps to remove the component.

B. Equipment

- (1) TE Flap Torque Tube Clamp – A27099-1  
(2 clamps in set)
- (2) Rig Pins from Set A20004-XX (AMM 20-10-24/201):
- (a) TE1 – P/N A20004-9.
  - (b) TE2 – P/N A20004-9
- (3) PF-51 Hoist, Fishpole  
P.F. Industries  
9320 15th Ave. So.  
Seattle, WA 98108  
(Alternative)

Minilift Hoist Fishpole  
Didsbury Engineering Co. Ltd.  
Manchester M19 3 EJ  
(Alternative)

Hoist , Fishpole – Commercially Available  
(Alternative)

- (4) Hoist Bracket – A27026-7

C. References

- (1) AMM 20-10-24/201, Rig Pins
- (2) AMM 27-51-32/201, TE Flap PDU Control Valve Module and Bypass Valve
- (3) AMM 27-51-33/401, TE Flap Power Drive Unit
- (4) AMM 27-51-41/401, TE Flap Torque Tubes
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) AMM 32-00-15/201, Landing Gear Door Locks

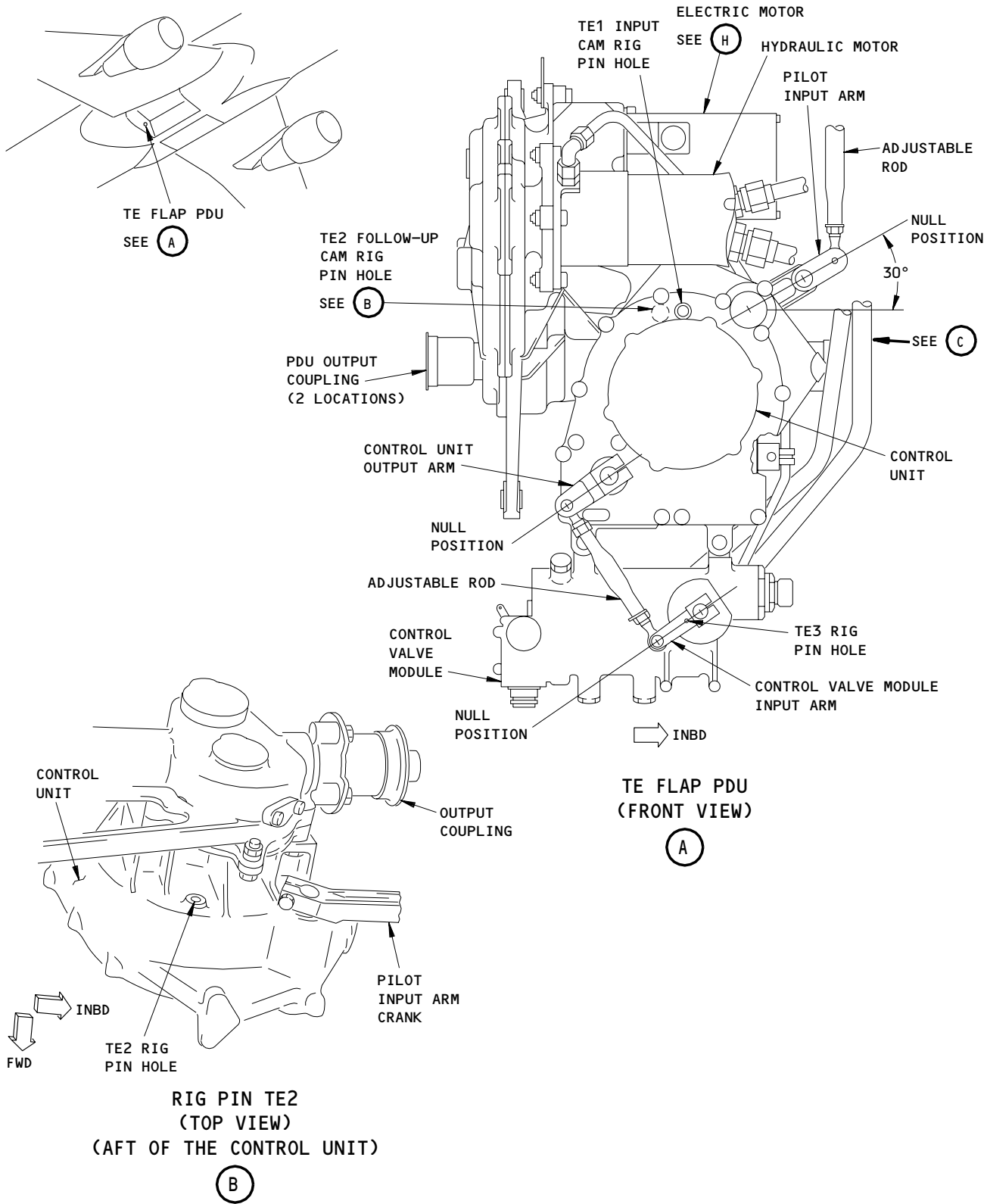
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TE Flap PDU Components  
Figure 201 (Sheet 1)

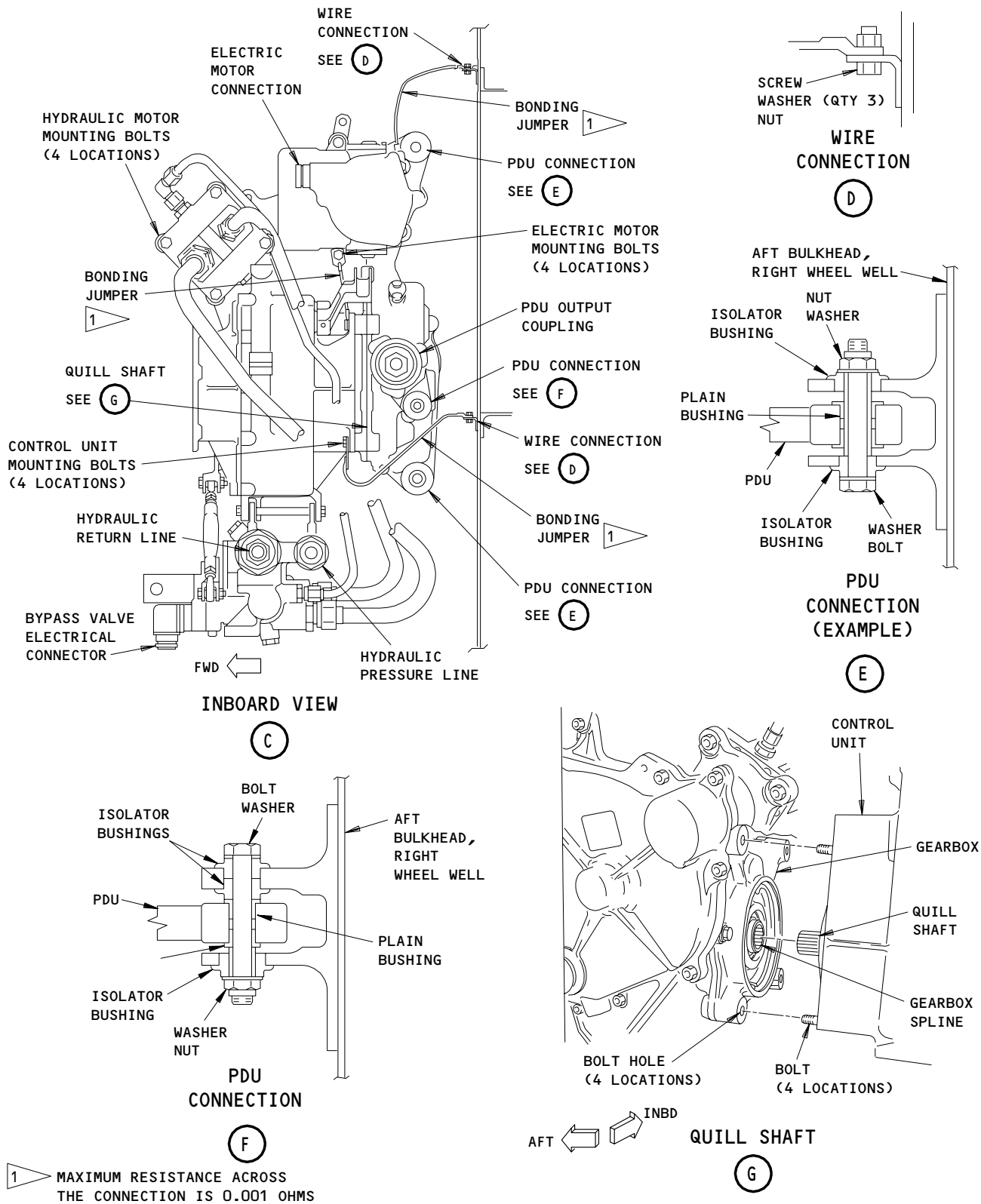
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TE Flap PDU Components  
Figure 201 (Sheet 2)

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(7) AMM 32-00-20/201, Landing Gear Downlocks

D. Access

(1) Location Zones

144	MLG Wheel Well (Right)
211/212	Control Cabin
710	Nose Landing Gear and Doors
730/740	Main Landing Gear and Doors

E. Prepare for the Removal

S 212-002

(1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 012-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 212-004

(3) Make sure the TE flaps and leading edge (LE) slats are fully retracted and the flap control lever is in the zero (FLAPS UP) detent.

S 492-005

(4) Install a DO-NOT-OPERATE tag on the flap control lever.

S 862-006

(5) Remove the pressure from the center hydraulic system and reservoir (AMM 29-11-00/201).

S 862-007

(6) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 862-008

(7) Open these circuit breakers on the P6 panel, and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 862-009

(8) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:  
(a) 11J24, FLAPS ALTN CONT

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S 862-010

(9) Open these circuit breakers on the P11 panel, and install circuit breaker locks:

- (a) 11H23, SLAT ALTN CONT INBD
- (b) 11H24, SLAT ALTN CONT OUTBD

F. Remove the Control Unit (Fig. 201)

**NOTE:** You can remove the control unit with the flap PDU on or off the airplane. It is easier to remove the control unit with the PDU off the airplane. This procedure gives instructions to remove the control unit with or without the PDU on the airplane.

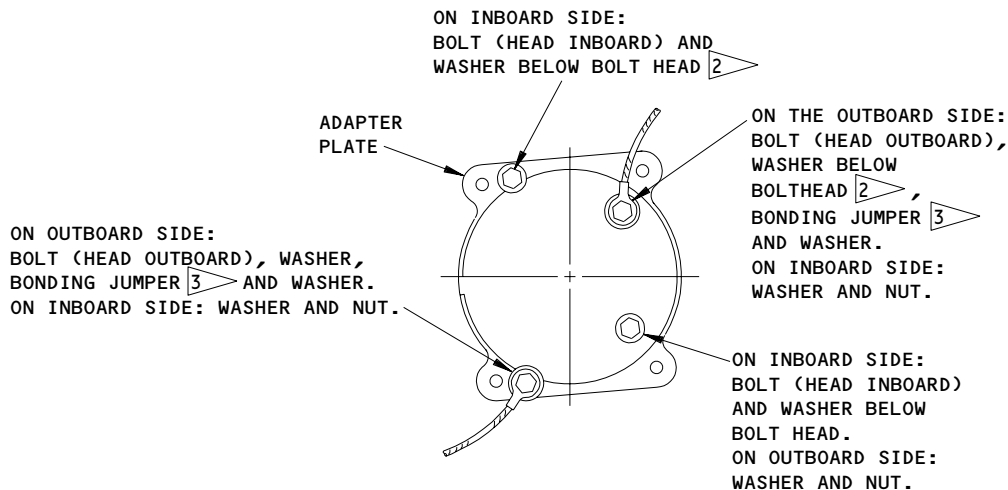
S 022-011

(1) If you want to remove the control unit with the PDU off the airplane, remove the PDU (AMM 27-51-33/401).

S 032-014

(2) If you want to remove the control unit with the PDU on the airplane, do these steps:

- (a) Disconnect the adjustable rod from the pilot input arm.
- (b) Disconnect the bonding jumper that is attached to the control unit from the aft wall of the wheel well.



ELECTRIC MOTOR WITH ADAPTER PLATE



- 2 APPLY BMS 3-24 GREASE TO ALL THE SURFACES BEFORE INSTALLATION
- 3 CLEAN THE BONDING SURFACES WITH A ROTARY STAINLESS STEEL BRUSH. MAKE SURE THE TOTAL RESISTANCE BETWEEN THE BOND IS NOT MORE THAN 0.001 OHM

TE Flap PDU Components  
Figure 201 (Sheet 3)

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S 032-013

- (3) Disconnect the adjustable rod (between the control unit and the control valve module) from the control unit output arm.

S 032-012

- (4) Remove the control valve module (AMM 27-51-32/201).

S 022-016

- (5) Disconnect the four mounting bolts and remove the control unit from the gearbox.

**NOTE:** Keep the quill shaft for the subsequent installation. You will disconnect the bonding jumper between the control unit and the electric motor when you remove the mounting bolts.

S 492-017

- (6) Put a cover on the mating surface of the control unit and the PDU gearbox to prevent contamination.

G. Remove the Hydraulic Motor (Fig. 201)

S 032-018

- (1) Disconnect the hydraulic lines from the pressure, case drain and return ports on the hydraulic motor.

S 492-019

- (2) Install plugs in the hydraulic lines and caps on the open ports.

S 032-020

- (3) Disconnect the four mounting bolts and remove the hydraulic motor from the gearbox.

S 492-021

- (4) Put a cover on the gearbox to prevent contamination.

H. Remove the Electric Motor (Fig. 201)

S 032-022

- (1) Disconnect the electrical connector from the electric motor.

S 032-023

- (2) Remove the four mounting bolts.

S 032-024

- (3) Remove the lifting lug, and identify it for subsequent installation.

S 032-025

- (4) Disconnect the bonding jumpers to the bulkhead structure and the control unit.

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S 022-026

- (5) Remove the electric motor from the gearbox.
  - (a) Use a cover on the gearbox to prevent contamination.
  - (b) Remove the adapter plate, if installed.

**NOTE:** If the replacement motor is the same as the motor that you removed, it is not necessary to remove the adapter plate.

I. Remove the Flap PDU Gearbox (Fig. 201)

**NOTE:** To remove the flap PDU gearbox from the airplane, you must first remove the PDU, and then disconnect the components from the PDU to get to the gearbox.

S 022-029

- (1) Do these steps to remove the PDU:
  - (a) Remove the plugs from the rig pin holes, and install rig pin TE1 in the input cam rig pin hole, and TE2 in the follow up cam rig pin hole.
  - (b) Disconnect the electrical connectors from the bypass valve and the electric motor.
  - (c) Remove the wire clamp for the electric motor from the lifting lug.
  - (d) Disconnect the bonding jumpers from the aft wall of the wheel well.
  - (e) Disconnect the hydraulic lines from the pressure and return ports on the control valve module.
  - (f) Install plugs in the hydraulic lines and caps on the open ports.
  - (g) Disconnect the adjustable rod from the pilot input arm.
  - (h) Make marks on the torque tubes and the adjacent airplane structure, to align the torque tubes with the adjacent structure, on each side of the TE flap PDU.

**NOTE:** These marks will show if the torque tube moved away from the retracted position after the torque tubes are disconnected.

- (i) Use a support on the TE flaps at the trailing edge, and install a clamp on the torque tubes (Fig. 203) adjacent to the TE flap PDU.

**NOTE:** A support is necessary to hold the weight of the flap's trailing edge. The weight of the flaps can cause the disconnected torque tubes to turn and cause flap asymmetry or disagreement problems.

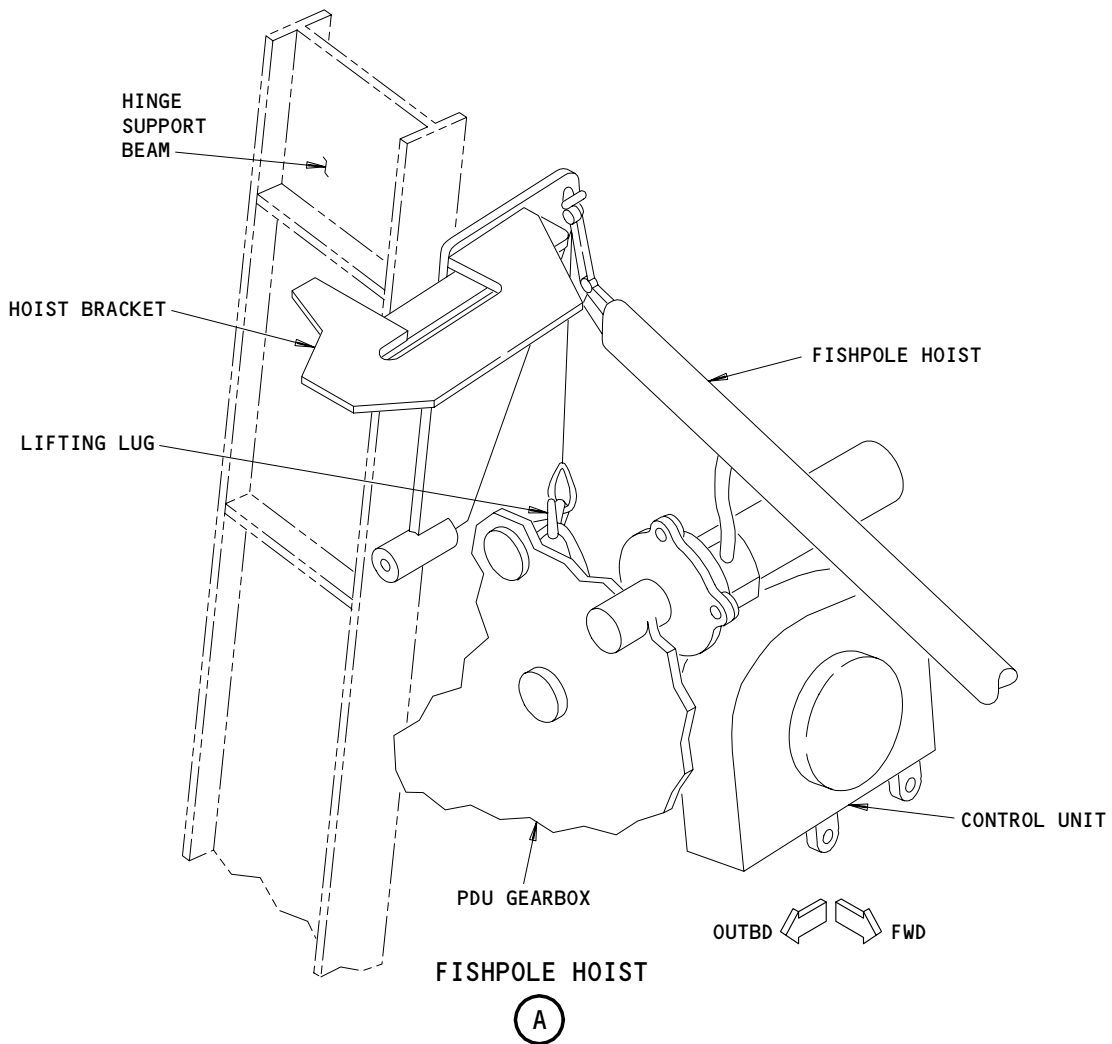
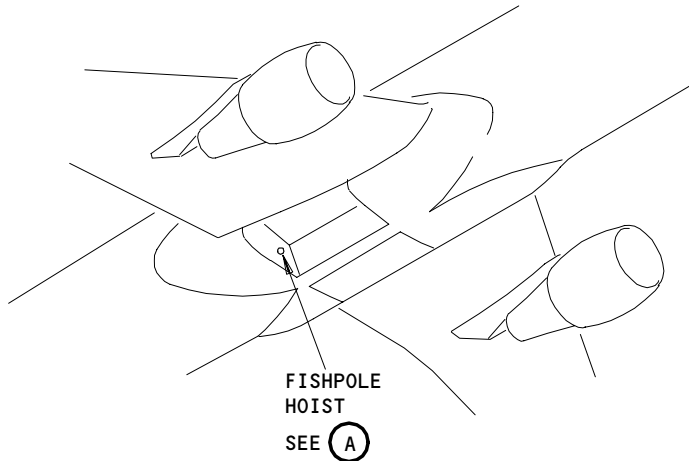
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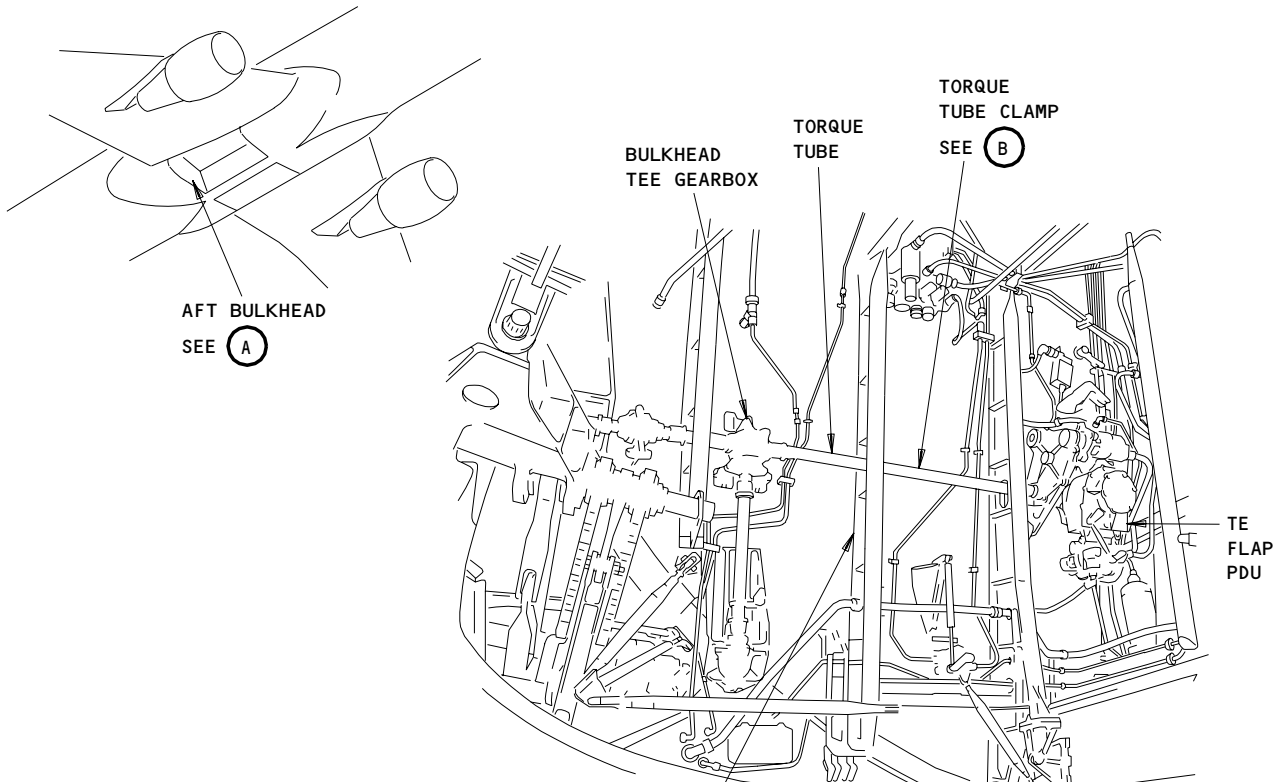
Fishpole Hoist and Hoist Bracket  
Figure 202

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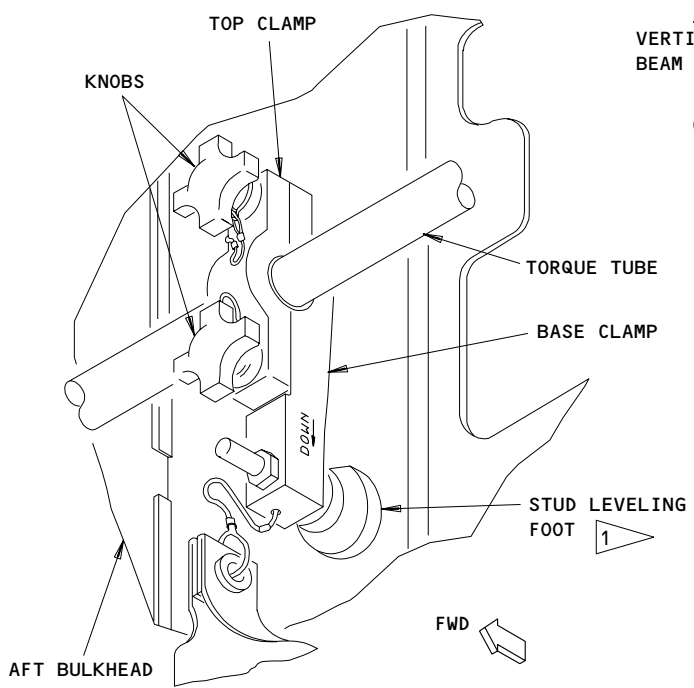
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AFT BULKHEAD  
(RIGHT WHEEL WELL)

(A)



1 INSTALL THE CLAMP WITH THE STUD LEVELING FOOT DOWN, NEAR A VERTICAL BEAM. DO NOT INSTALL THE STUD LEVELING FOOT ON TOP OF HYDRAULIC TUBING OR ELECTRICAL WIRES.

TORQUE TUBE CLAMP

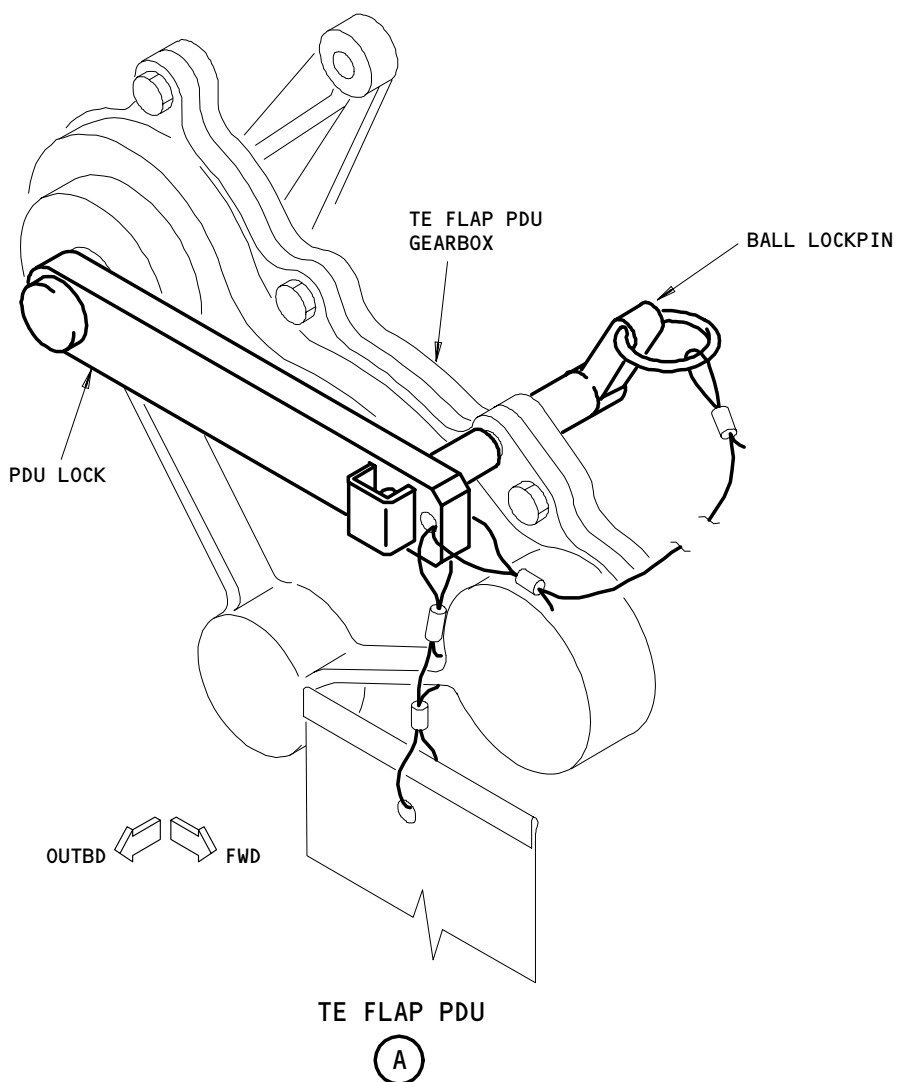
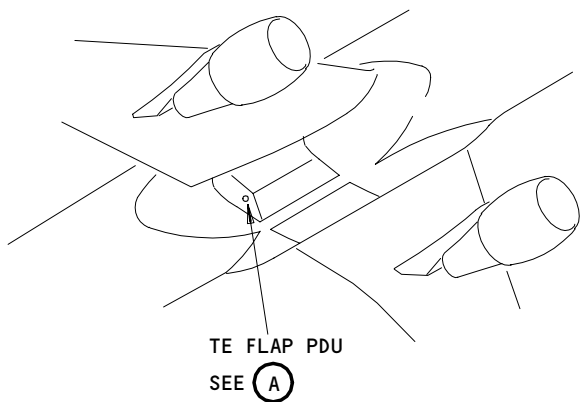
(B)

Torque Tube Clamp for the Trailing Edge Flap  
Figure 203

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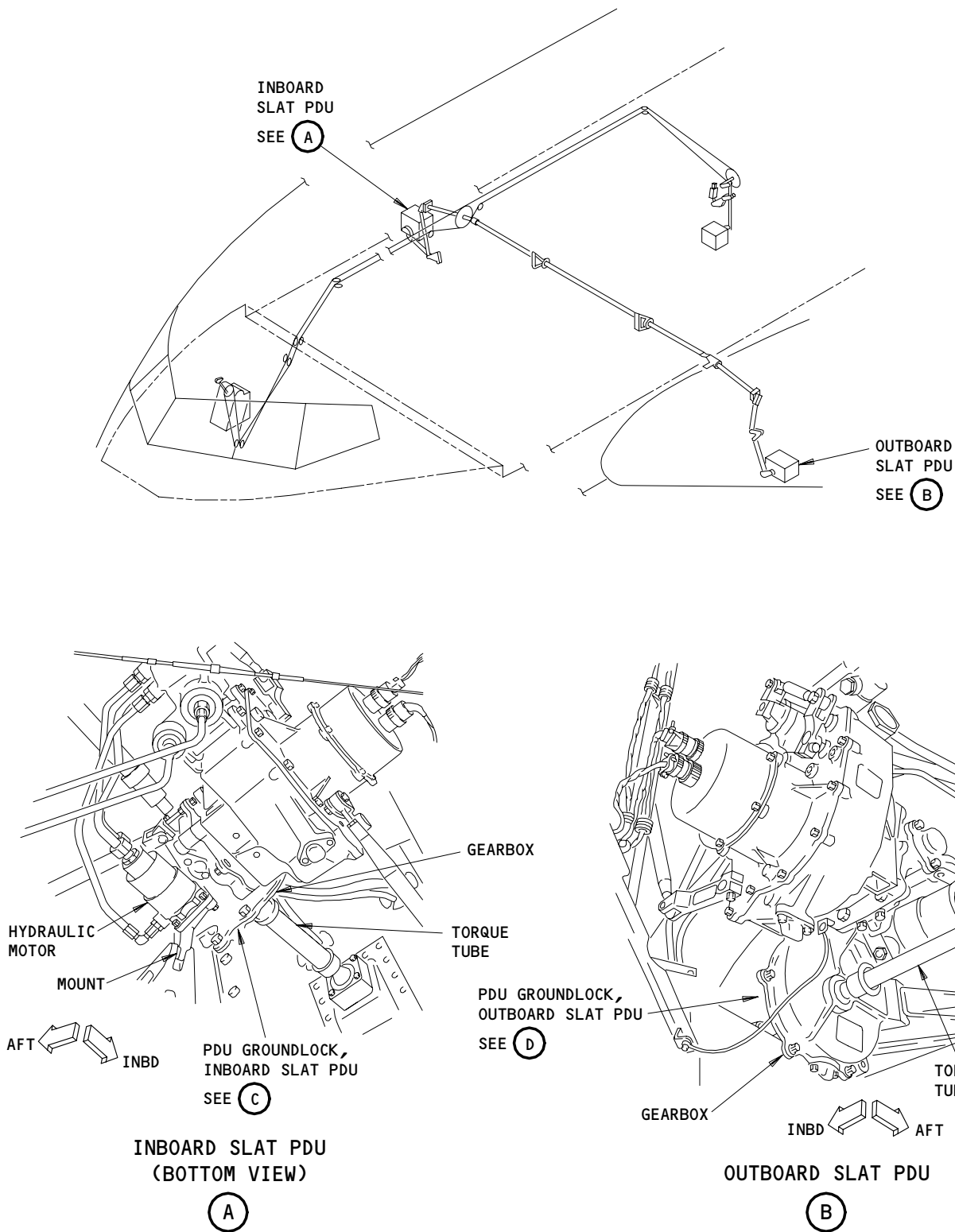
PDU Lock for the TE Flap PDU  
Figure 204

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Slat PDU Groundlock  
Figure 205 (Sheet 1)

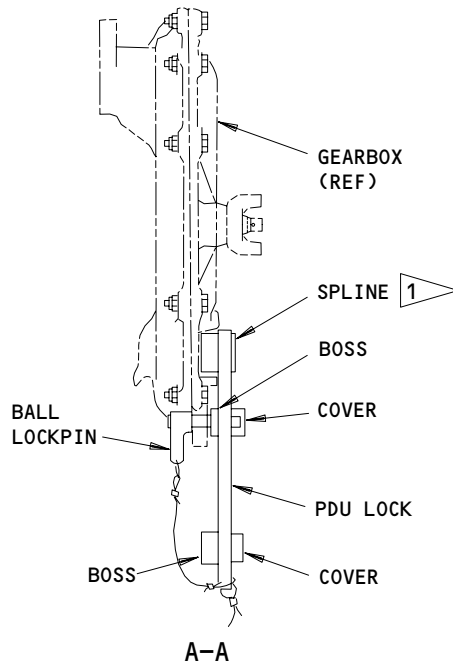
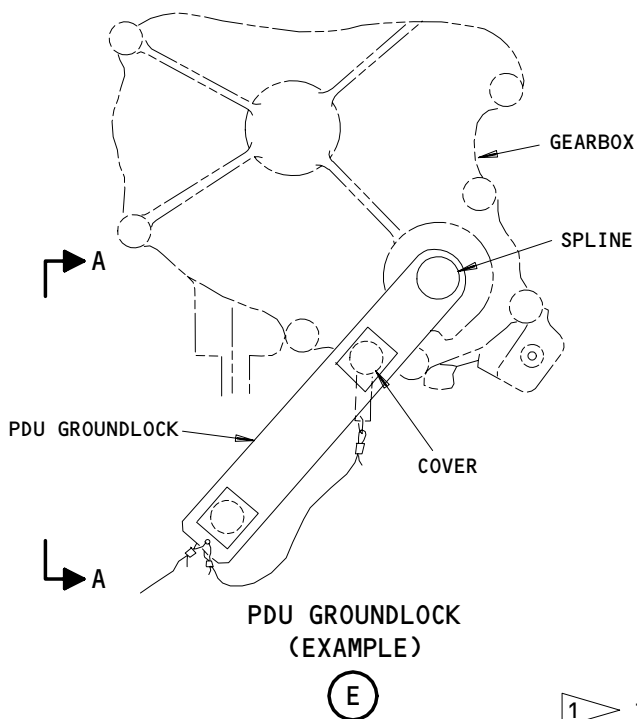
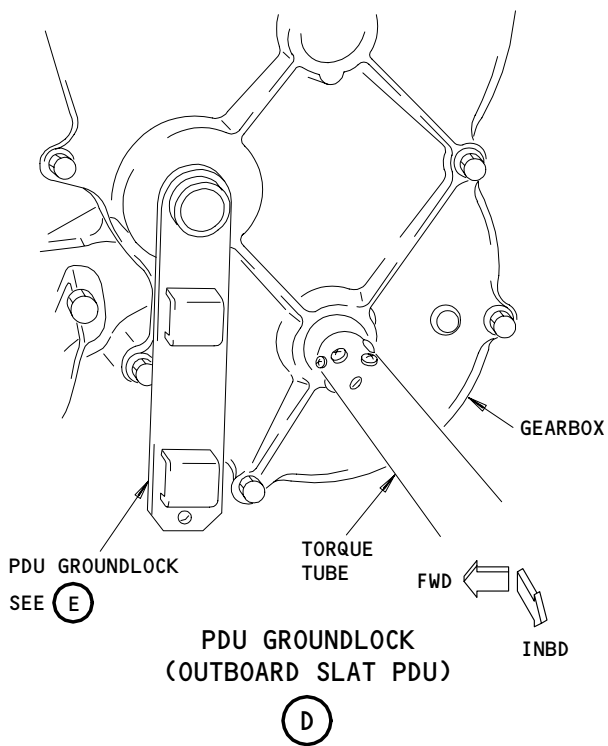
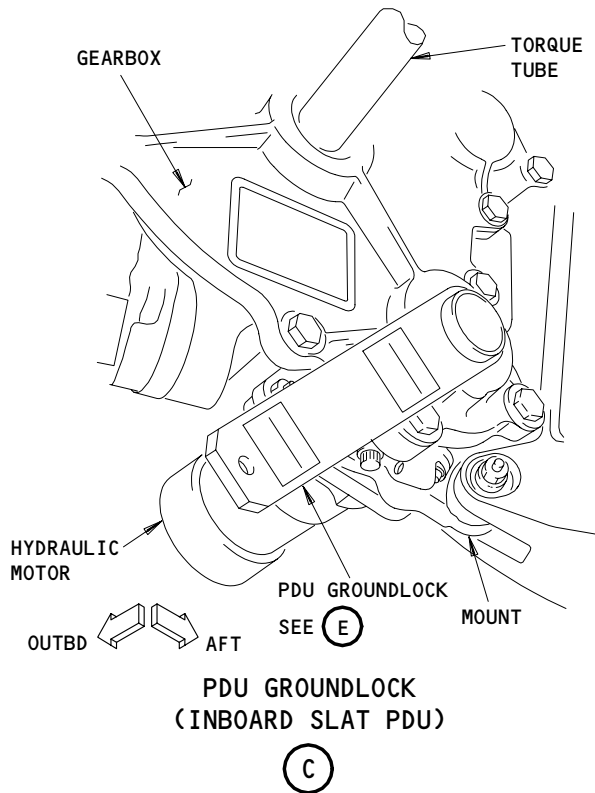
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1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN INSTALLED THROUGH BOSS AND GEARBOX

Slat PDU Groundlock  
Figure 205 (Sheet 2)

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- (j) Disconnect the torque tubes from each side of the TE flap PDU (AMM 27-51-41/401).

NOTE: Do not turn the adjacent torque tubes. It will be necessary to adjust the flap drive if you turn the torque tube while it is disconnected.

- (k) Attach the fishpole hoist to the hinge support beam, on the aft bulkhead of the right main wheel well, and connect the hoist to the lifting lug on the PDU (Fig. 202).  
(l) Remove the bolt, washers, nut, and bushing at the inboard PDU connection (Detail F, Fig. 201).

NOTE: Identify the bushing for the subsequent installation.

- (m) Remove the bolts, washers, nuts and bushings at the two outboard PDU connections (Detail E, Fig. 201).

NOTE: Identify the bushings for the subsequent installation.

WARNING: BE CAREFUL WHEN YOU MOVE THE TE FLAP PDU, BECAUSE THE PDU WEIGHS 90 POUNDS (41 KG), INJURY CAN OCCUR.

- (n) Lower the PDU from the airplane.

NOTE: The TE flap PDU weighs approximately 90 pounds (40.8 Kg).

S 032-032

- (2) Do these steps to remove the hydraulic motor from the PDU:  
(a) Disconnect the hydraulic lines from the pressure, case drain, and return ports on the hydraulic motor.  
(b) Install caps on the open ports and plugs in the hydraulic lines.  
(c) Disconnect the four mounting bolts, and remove the hydraulic motor from the gearbox.  
(d) Put a cover on the mating surface of the hydraulic motor to prevent contamination.

S 032-031

- (3) Do these steps to remove the electric motor from the PDU:  
(a) Remove the four mounting bolts that hold the electric motor to the PDU gearbox.

NOTE: You will disconnect the bonding jumper between the electric motor and the control unit when you remove the bolts.

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- (b) Remove the lifting lug, and identify it for the subsequent installation.
- (c) Remove the electric motor from the gearbox.
- (d) Put a cover on the mating surface of the electric motor to prevent contamination.

S 032-033

- (4) Do these steps to remove the control unit from the PDU:
  - (a) Disconnect the four mounting bolts, and remove the control unit from the gearbox.

NOTE: Keep the quill shaft for the subsequent installation.

- (b) Put a cover on the mating surfaces of the control unit and the PDU gearbox to prevent contamination.

TASK 27-51-34-422-034

### 3. Trailing Edge Flap Power Drive Unit (PDU) Components - Installation

#### A. General

- (1) This task contains the installation procedures for these components on the PDU:
  - the Control Unit
  - the Hydraulic Motor
  - the Electric Motor
  - the Flap PDU Gearbox.

Because this task contains four procedures, only do the applicable procedure to install the component.

To start one of these procedures, do the steps to install the component. Then, do the group of steps to adjust or to do a test on the TE flap PDU.

#### B. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) TE1 - P/N A20004-9.
  - (b) TE2 - P/N A20004-9
  - (c) TE3 - P/N A20004-73
- (2) Bonding Meter, Microhm Bridge Type 2 Bonding Meter - 477W Avtron Meter  
Avtron Manufacturing Inc.  
Cleveland, Ohio
- (3) LE Slat Groundlock - A27007-1 (2 Necessary)
- (4) TE Flap Torque Tube Clamp - A27099-1 (2 Necessary)
- (5) Stainless Steel Rotary Brush

NOTE: Do not use for heavy oxide particles on aluminum.

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- (6) PF-51 Hoist, Fishpole  
P.F. Industries  
9320 15th Ave. So.  
Seattle, WA 98108  
(Alternative)

Minilift Hoist Fishpole  
Didsbury Engineering Co. Ltd.  
Manchester M19 3 EJ  
(Alternative)

Hoist , Fishpole - Commercially Available  
(Alternative)

- (7) Hoist Bracket - A27026-7

C. Consumable Materials

- (1) A00250 Sealant BMS 5-26, CLB - 1/2
- (2) D00054 Skydrol Assembly Lube - MCS 352B
- (3) D00153 Hydraulic Fluid, Fire Resistant -  
BMS 3-11
- (4) D00633 Grease - BMS 3-33 (recommended)
- (5) D00013 Grease - MIL-G-23827 (alternative)
- (6) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

D. References

- (1) AMM 20-10-21/601, Electrical Bonding
- (2) AMM 20-10-24/201, Rig Pins
- (3) AMM 27-51-00/501, TE Flap System
- (4) AMM 27-51-32/201, TE Flap Power Drive Control Valve Module
- (5) AMM 27-51-33/401, TE Flap Power Drive Unit
- (6) AMM 27-51-34/601, TE Flaps PDU Gearbox.
- (7) AMM 27-51-41/401, TE Flap Drive Shafts
- (8) AMM 27-81-11/401, LE Slat PDU Components
- (9) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

E. Access

(1) Location Zones

144	MLG Wheel Well (Right)
211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
710	Nose Landing Gear and Doors
730/740	Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

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F. Install the Control Unit (Fig. 201)

**NOTE:** You can install the control unit with the PDU on or off the airplane. It is easier to install the control unit with the PDU off the airplane. This procedure has instruction to install the control unit with the PDU on or off the airplane.

S 092-035

- (1) Remove the covers from the control unit and the gearbox.

S 642-036

- (2) Apply grease, BMS 3-33, to the quill shaft splines, and install the quill shaft into the control unit splines.

S 822-037

- (3) Do these steps to adjust the control unit before you install it on the gearbox:
- (a) Turn the pilot input arm to the position shown and install rig pin TE1 in the input cam rig pin hole (Detail A).

**NOTE:** Make sure you can easily install rig pin TE1 in the rig pin hole.

- (b) Turn the quill shaft until the control unit output arm is in the approximate position shown (Detail A), and install rig pin TE2 in the follow-up cam rig pin hole.

**NOTE:** Make sure you can easily install rig pin TE2 in the rig pin hole.

S 622-038

- (4) Apply grease, BMS 3-24, to the control unit mounting bolts.

S 102-039

- (5) Clean the mating surfaces between the control unit and the bonding jumper connections with a rotary stainless steel brush.

S 432-149

- (6) With rig pins TE1 and TE2 installed, put the control unit adjacent to the gearbox and engage the quill shaft. Try to align the bolt holes between the control unit and the PDU gearbox.

**NOTE:** Be careful not to damage the quill shaft when you engage the gearbox splines.

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S 022-041

- (7) If the mounting bolt holes on the control unit and the gearbox align, do these steps:
- (a) Install four mounting bolts, washers, and bonding jumpers.

NOTE: Use the support at one mounting bolt location for the bonding jumper connection.

- (b) Add or remove washers, at the mounting bolt with the bonding jumper connection, such that the washer height is the same as or is less than one washer thickness above the control unit surface.
- (c) Safety the bolts with a wire.

S 022-042

- (8) If the mounting bolt holes on the control unit and the gearbox do not align, do these steps:

- (a) Do these steps only if you will install the control unit with the PDU on the airplane:
  - 1) Make marks on the torque tubes and the adjacent airplane structure, to align the torque tubes with the adjacent structure, on each side of the TE flap PDU.

NOTE: These marks will show if the torque tube moved away from the retracted position after the torque tubes are disconnected.

- 2) Use a support on the TE flaps at the trailing edge, and install a clamp on the torque tubes (Fig. 203) adjacent to the TE flap PDU.

NOTE: A support is necessary to hold the weight of the flap's trailing edge. The weight of the flaps can cause the disconnected torque tubes to turn and cause flap asymmetry or disagreement problems.

- 3) Disconnect the torque tubes from the output coupling on each side of the PDU (AMM 27-51-41/401).
- (b) Turn the output shaft on the PDU until the mounting bolt holes on the control unit and the gearbox align.
- (c) Install four mounting bolts, washers and bonding jumpers.

NOTE: Use the support at one mounting bolt location for the bonding jumper location.

- (d) Add or remove washers, at the mounting bolt with the bonding jumper, such that the washer height is the same as or is less than one washer thickness above the control unit surface.
- (e) Safety the bolts with a wire.

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- S 622-044
- (9) Fillet seal the mating surface between the gearbox and the control unit.

- S 032-045
- (10) If you removed the control unit with the PDU on the airplane, do these steps:
- (a) Connect the adjustable rod to the pilot input arm with a bolt, washer, and a nut.
  - (b) Adjust the rod length such that rig pin TE1 can easily be installed in the input cam rig pin hole.

- S 412-048
- (11) Install the control valve module (AMM 27-51-32/201).

- S 032-046
- (12) Connect the adjustable rod to the control unit output arm with a bolt, washers, and a nut.

NOTE: Put one washer below the bolthead and the other below the nut.

- S 822-049
- (13) If you removed the control unit with the PDU on the airplane, do these steps to adjust the PDU to a mechanical and hydraulic null:
- (a) With rig pins TE1 and TE2 installed, install rig pin TE3 in the control valve module rig pin hole.
  - (b) If you cannot easily install rig pin TE3, adjust the rod between the control unit and the control valve module until you can install the rig pin.
    - 1) To adjust the rod, loosen the jamnut at each end of the rod and turn the rod body.

NOTE: The correct length of the rod is 6.56 inches (166.6 mm), before the last adjustment.

- 2) Tighten the jamnuts.

NOTE: Do not safety the jamnuts with a wire at this time.

- (c) Remove rig pins TE1, TE2, and TE3.
- (d) Make marks on the torque tubes and the adjacent airplane structure, to align the torque tubes with the adjacent structure, on each side of the TE flap PDU.

NOTE: These marks will show if the torque tube moved away from the retracted position after the torque tubes are disconnected.

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- (e) Use a support on the TE flaps at the trailing edge, and install a clamp on the torque tubes (Fig. 203) adjacent to the TE flap PDU.

**NOTE:** A support is necessary to hold the weight of the flap's trailing edge. The weight of the flaps can cause the disconnected torque tubes to turn and cause flap asymmetry or disagreement problems.

- (f) Disconnect the torque tubes from the output couplings on each side of the TE flap PDU (AMM 27-51-41/401).
- (g) Open the access doors, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (AMM 06-44-00/201).
- (h) Move the manual override lever on the bypass valves of the inboard and outboard slat PDUs to the No. 1 (bypass) position (AMM 27-81-11/401).
- (i) Attach DO-NOT-OPERATE tags on the manual override levers.
- (j) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 205).

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (k) Pressurize the center hydraulic system (AMM 29-11-00/201), and permit the TE flap PDU to become stable.

**NOTE:** It is usual for the output shaft on the PDU to turn when you pressurize the center hydraulic system.

- (l) Install rig pin TE1 in the TE flap PDU.

**CAUTION:** DO NOT DISCONNECT THE CONTROL ROD BETWEEN THE CONTROL UNIT AND THE CONTROL VALVE MODULE TO DO THE ROD ADJUSTMENT WHILE THE CENTER HYDRAULIC SYSTEM IS PRESSURIZED. DO NOT ADJUST THE CONTROL ROD WITH RIG PIN TE2 INSTALLED. ADJUST THE ROD ONLY BY SMALL INCREMENTS TO PREVENT DAMAGE TO THE TE FLAP PDU.

- (m) Try to install rig pin TE2 in the follow-up cam rig pin hole.

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- (n) If you can not install rig pin TE2 easily, adjust the rod between the control unit and the control valve module with these steps:
- 1) Loosen the jamnut at each end of the rod.
  - 2) Turn the rod to adjust the length until you can easily install rig pin TE2.

NOTE: It is not necessary to install rig pin TE3 for this adjustment.

- 3) Tighten the jamnut on each end of the rod.
  - 4) Safety the jamnuts on the rod with lockwires.
- (o) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- (p) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 205).
- (q) Remove the DO-NOT-OPERATE tags and move manual override levers on the bypass valves for the inboard and outboard slat PDUs to the No. 2 (normal) position.
- (r) Examine the marks you made, between the torque tubes and the adjacent airplane structure, and do these checks:
- 1) If the marks align, remove the clamps from the torque tubes and connect them to the PDU (AMM 27-51-41/401).

NOTE: Do not turn the torque tubes more than 1/2 spline tooth to connect them to the PDU. If the torque tubes turn too much, TE flap disagree and asymmetry problems can occur. The flap mechanism will move very slowly when the torque tubes are disconnected from the PDU. Connect the torque tubes quickly when the torque tube clamps are removed.

- 2) If the marks do not align, or do not show, do these steps:
  - a) Remove the torque tube clamps from the torque tubes (Fig. 203).
  - b) Move the torque tubes on each side of the PDU manually, or with an air motor, to the fully retracted position.
  - c) Do a check on the retract overtravel stop clearances (AMM 27-51-00/501).

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d) Connect the torque tubes to the PDU (AMM 27-51-41/401).

NOTE: Do not turn the torque tubes more than 1/2 spline tooth to connect them to the PDU. If the torque tubes turn too much, TE flap disagree and asymmetry problems can occur. The flap mechanism can move very slowly when the torque tubes are disconnected from the PDU. Connect the torque tubes quickly when the torque tube clamps are removed.

- (s) Remove the supports from the trailing edges of the TE flap.
- (t) Remove the rig pins TE1 and TE2 and install a plug in the rig pin hole for TE2.

S 422-056

- (14) If you removed the control unit with the PDU off the airplane, install the PDU (AMM 27-51-33/401).

S 822-057

- (15) Adjust the PDU as shown in the "Trailing Edge Flap Power Drive Unit (PDU) - Adjustment/Test".

S 702-058

- (16) Do a test on the PDU as shown in the "Trailing Edge Flap Power Drive Unit (PDU) - Adjustment/Test".

G. Install the Hydraulic Motor (Fig. 201)

S 212-059

- (1) Make sure the pressure is removed from the center hydraulic system (AMM 29-11-00/201).

S 212-060

- (2) Make sure the flap and slat alternate drives are off.

S 092-061

- (3) Remove the caps from the ports on the hydraulic motor.

S 642-062

- (4) Lightly lubricate the backup rings and the O-rings with hydraulic fluid or Skydrol assembly lube.

S 432-070

- (5) Install the backup rings, the O-rings, the reducers, and the elbows in the hydraulic motor.

S 642-064

- (6) Apply grease, BMS 3-33, to the external spline of the hydraulic motor.

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- S 422-071
- (7) Remove the cover from the gearbox and engage the hydraulic motor spline.
- S 622-067
- (8) Apply grease, BMS 3-24, to the four mounting bolts.
- S 432-072
- (9) Install the mounting bolts.
- S 432-069
- (10) Remove the plugs from the hydraulic lines and connect the pressure, case drain and return lines to the hydraulic motor.
- S 212-073
- (11) Make sure the motor is filled with hydraulic fluid.
- S 702-074
- (12) Do a test on the PDU as shown in the "Trailing Edge Flap Power Drive Unit (PDU) - Adjustment/Test".
- H. Install the Electric Motor (Fig. 201)
- S 212-075
- (1) Make sure the pressure is removed from the center hydraulic system (AMM 29-11-00/201).
- S 212-076
- (2) Make sure the flap and slat alternate drives are off.
- S 102-077
- (3) Clean the mating surfaces between the electric motor and bonding jumper connections with a rotary stainless steel brush.
- S 422-078
- (4) Do these steps to install the electric motor.
- (a) If it is necessary, install the adapter plate on the PDU housing.
- NOTE: Some motor comes with an adapter plate.
- (b) Apply grease, BMS 3-33, to the electric motor spline.
- (c) Remove the cover from the gearbox and engage the spline of the electric motor.
- (d) Apply grease, BMS 3-24, to the mounting bolts.
- (e) Install the motor with the mounting bolts, and the lifting lug.
- (f) Connect the two bonding jumpers.
- (g) Make sure the total resistance across the bond is not more than 0.001 ohm (AMM 20-10-21/601).
- (h) Connect the electrical plug to the motor.

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S 702-085

- (5) Do a test on the PDU as shown in the "Trailing Edge Flap Power Drive Unit (PDU) - Adjustment/Test".

I. Install the Flap PDU Gearbox (Fig. 201)

**NOTE:** To install the PDU gearbox, you must first assemble the control unit, hydraulic motor, electric motor, and control valve module to the PDU gearbox, then install the PDU assembly on the airplane.

The wear limits for the TE flap PDU gearbox are given in AMM 27-51-34/601.

S 432-086

- (1) Do these steps to install the control unit to the gearbox:

**NOTE:** Do not mix a 767-200 power drive unit (PDU) with a 767-300 PDU, because the follow-up cams are different. Although you can install a 767-200 control unit on a 767-300 airplane, or a 767-300 control unit on a 767-200 airplane. To prevent a mix, the adjustable rod and the pilot input arm are not interchangeable between the 767-200 and 767-300 airplanes.

- (a) Apply grease, BMS 3-33, to the quill shaft splines.
- (b) Install the quill shaft into the control unit splines.
- (c) Apply grease, BMS 3-24, to the control unit mounting bolts.
- (d) Clean the mating surfaces between the control unit and the bonding jumper connections with a rotary stainless steel brush.
- (e) Install rig pins TE1 and TE2 in the control unit.
- (f) Put the control unit adjacent to the gearbox and engage the quill shaft. Try to align the bolt holes between the control unit and the gearbox.

**NOTE:** Be careful not to damage the quill shaft when you install it into the gearbox splines.

- (g) If mounting bolt holes on the control unit and the gearbox align, do these steps:
  - 1) Install the mounting bolts, washers, and bonding jumpers.

**NOTE:** Use the supports at two mounting bolt locations for the bonding jumper connections.

- 2) Add or remove washers, at the mounting bolt with the bonding jumper, such that the washer height is the same as or is no more than one washer thickness above the control unit surface.
- 3) Make sure the total resistance across the bond is no more than 0.001 ohm (AMM 20-10-21/601).

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- 4) Safety the bolts with lockwires.
- (h) If the mounting bolt holes on the control unit and gearbox do not align, do these steps:
  - 1) Turn the output shaft on the gearbox until the mounting bolt holes on the control unit and the gearbox align.
  - 2) Install the mounting bolts, washers, and bonding jumpers.

NOTE: Use the supports at two mounting bolt locations for the bonding jumper connections.

- 3) Add or remove washers, at the mounting bolt with the bonding jumper, such that the washer height is the same as or is no more than one washer thickness above the control unit surface.
- 4) Make sure the total resistance across the bond is no more than 0.001 ohm (AMM 20-10-21/601).
- 5) Safety the bolts with a wire.

S 432-087

- (2) Do these steps to install the electric motor to the gearbox:
  - (a) Clean the mating surfaces between the electric motor and the bonding jumper connections with a rotary stainless steel brush.
  - (b) Apply grease, BMS 3-33, to the electric motor spline.
  - (c) Engage the electric motor splines to the PDU gearbox.
  - (d) Apply grease, BMS 3-24, to the electric motor mounting bolts.
  - (e) Install the four mounting bolts and the lifting lug.
  - (f) Connect the two bonding jumpers.
  - (g) Make sure the total resistance across the bond is no more than 0.001 ohm (AMM 20-10-21/601).

S 432-088

- (3) Do these steps to install the hydraulic motor to the gearbox:
  - (a) Remove the caps from the hydraulic motor ports.
  - (b) Lightly lubricate the backup rings and O-rings with hydraulic fluid or Skydrol assembly lube.
  - (c) Install the backup rings, O-rings, reducers, and elbows in the hydraulic motor.
  - (d) Apply grease, BMS 3-33, to the external spline of the hydraulic motor.
  - (e) Engage the hydraulic motor splines to the PDU gearbox.
  - (f) Apply grease, BMS 3-24, to four mounting bolts, and install the mounting bolts.
  - (g) Remove the plugs from the hydraulic lines and the caps from the ports, and connect the pressure, case drain, and return lines to the hydraulic motor.
  - (h) Make sure the motor is filled with hydraulic fluid.

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S 422-089

- (4) Do these steps to install the TE flap PDU assembly in the airplane:

**NOTE:** Do not mix a 767-200 power drive unit (PDU) with a 767-300 PDU, because the follow-up cams are different. Although you can install a 767-200 PDU on a 767-300 airplane, or a 767-300 PDU on a 767-200 airplane. To prevent a mix, the adjustable rod and the pilot input arm are not interchangeable between the 767-200 and 767-300 airplanes.

- (a) Make sure the TE flaps and LE slats are in the fully retracted position and the flap control lever is in the zero (FLAPS UP) detent.
- (b) Make sure the pressure is removed from the center hydraulic system (AMM 29-11-00/201).
- (c) Make sure the flap and slat alternate drives are off.
- (d) Attach the hoist bracket to the aft wall of the right wheel well (Fig. 202).
- (e) Attach the fishpole hoist to the lifting lug on the PDU.

**WARNING:** BE CAREFUL WHEN YOU MOVE THE TE FLAP PDU, BECAUSE THE PDU WEIGHS 90 POUNDS (41 KG), INJURY CAN OCCUR.

- (f) Lift the PDU into its position.

**NOTE:** The TE flap PDU weighs approximately 90 pounds (40.8 Kg).

- (g) Apply grease, BMS 3-24, to all surfaces of the mounting bolts and bushings.
- (h) Install the bolts, washers, bushings, and nuts (Detail E and F, Fig. 201).
  - 1) Tighten the nuts.
- (i) Remove the fishpole hoist and the hoist bracket from the wheel well.
- (j) Connect the two bonding jumpers to the aft wall of the wheel well.
- (k) Add or remove washers, at the spotface surface, such that the washer height is the same as or is no more than one washer thickness above the adjacent surface.
- (l) Make sure the total resistance across the bond is no more than 0.001 ohm (AMM 20-10-21/601).
- (m) Remove the plugs and caps from the hydraulic lines and ports.
- (n) Lightly apply Skydrol assembly lube or hydraulic fluid to the packing O-rings and fittings.
- (o) Connect the hydraulic pressure and return lines to the control valve module.
- (p) Connect the electrical connectors to the bypass valve and the electric motor.

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- (q) Make sure the manual override lever on the bypass valve for the TE flap PDU is in the No. 2 (normal) position.
- (r) Attach the wire clamp for the electric motor to the lifting lug.

S 822-090

- (5) Do these steps to do a check for hydraulic null on the PDU:
  - (a) Open the access door, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (AMM 06-44-00/201).
  - (b) Move the manual override lever on the bypass valves for the inboard and outboard slat PDUs to the No. 1 (bypass) position (AMM 27-81-11/401).
  - (c) Install a DO-NOT-OPERATE tag on the manual override levers.
  - (d) Install groundlocks in the inboard and outboard slat PDUs (Fig. 205).
  - (e) At the TE flap PDU, make sure you can connect the adjustable rod to the pilot input arm such that the attachment bolt and rig pin TE1 can be easily installed.
    - 1) Adjust the rod if it is necessary.
    - 2) Tighten the jamnuts on the adjustable rod and safety them with a lockwire.
  - (f) Connect the adjustable rod to the pilot input arm with a bolt, washer, and a nut.
  - (g) Remove rig pins TE1 and TE2.
  - (h) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
    - 1) 11J14, FLAPS SHUTOFF

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (i) Pressurize the center hydraulic system (AMM 29-11-00/201), and permit the PDU to become stable in the retracted position.

**NOTE:** It is usual for the output shaft on the PDU to turn when you pressurize the center hydraulic system.

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- (j) Make sure that rig pin TE2 can easily be installed and removed in the follow-up cam rig pin hole.
- (k) Do these steps to adjust the TE flap PDU to a mechanical and hydraulic null only if you cannot install rig pin TE2 easily into the rig pin hole:
  - 1) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
  - 2) Disconnect the adjustable rod from the control unit output arm.

NOTE: You will release the fluid pressure lock in the control valve when you disconnect the rod from the output arm. This will permit you to turn the output shaft to find the rig pin hole for rig pin TE2.

- 3) Turn the output shaft of the PDU by small increments until you can install rig pin TE2 freely.
- 4) Connect the adjustable rod to the control unit output arm.
- 5) Try to install rig pin TE3 in the rig pin hole on the control valve module input arm.
- 6) If you cannot install rig pin TE3 fully and easily, adjust the length of the rod with these steps:
  - a) Loosen the jamnuts at each end of the rod.
  - b) Turn the rod to adjust the length, until you can easily install rig pin TE3.

NOTE: The usual length of the rod before the last adjustment is 6.56 inches (166.6 mm).

- c) Tighten the jamnuts on the rod, but do not safety with a lockwire at this time.

NOTE: It is possible that you will adjust the rod again during the hydraulic null adjustment.

- 7) Remove rig pins TE2 and TE3.

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- 8) Pressurize the center hydraulic system (AMM 29-11-00/201) and permit the PDU to become stable in the retracted position.

**NOTE:** It is usual for the output shaft of the PDU to turn when you pressurize the center hydraulic system.

**CAUTION:** DO NOT DISCONNECT THE ADJUSTABLE ROD WHEN YOU ADJUST THE PDU WITH THE CENTER HYDRAULIC SYSTEM PRESSURIZED. DO NOT TURN THE ADJUSTABLE ROD WITH RIG PIN TE2 INSTALLED. ADJUST THE ROD ONLY BY SMALL INCREMENTS TO PREVENT DAMAGE TO THE TE FLAP PDU.

- 9) Try to install rig pin TE2 in the follow-up cam rig pin hole.
- 10) If you can not install rig pin TE2 easily, adjust the rod with these steps:

**NOTE:** Do not adjust the rod while rig pin TE2 is installed. Install rig pin TE2 only to make sure that the rod is adjusted correctly.

- a) Loosen the jamnuts at each end of the rod.
- b) Turn the rod to adjust the length until you can easily install rig pin TE2.

**NOTE:** It is not necessary to install rig pin TE3 for this adjustment.

- c) Tighten the jamnut on each end of the rod.
- d) Safety the jamnuts on the rod with lockwires.

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- S 862-091
- (6) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- S 092-094
- (7) Remove rig pin TE2 and install the plug in the rig pin hole.
- S 092-092
- (8) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 205).
- S 862-093
- (9) Move the manual override levers on the bypass valves for the inboard and outboard slat PDUs to the No. 2 (normal) position.
- S 212-095
- (10) At the TE flap PDU,  
examine the marks you made between the torque tubes and the adjacent airplane structure, and do these checks:
- (a) If the marks do align,  
remove the clamps from the torque tubes and connect them to the PDU.

NOTE: Do not turn the torque tubes more than 1/2 spline tooth to connect them to the PDU. If the torque tubes turn too much, TE flap disagree and asymmetry problems can occur. The flap mechanism can move very slowly when the torque tubes are disconnected from the PDU. Connect the torque tubes quickly after you remove the torque tube clamps.

- (b) If the marks do not align or do not show,  
do these steps:
- 1) Remove the torque tube clamps from the torque tubes (Fig. 203).
  - 2) Move the torque tubes on each side of the PDU manually, or with an air motor, to the fully retracted position.
  - 3) Examine the clearances at the flap overtravel stops (AMM 27-51-00/501).
  - 4) Connect the torque tubes to the PDU.

NOTE: Do not turn the torque tubes more than 1/2 spline tooth to connect them to the PDU. If the torque tubes turn too much, TE flap disagree and asymmetry problems can occur. The flap mechanism can move very slowly when the torque tubes are disconnected from the PDU. Connect the torque tubes quickly after you remove the torque tube clamps.

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- S 092-096
- (11) Remove the supports from the trailing edge of the TE flap.
- S 862-097
- (12) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11J14, FLAPS SHUTOFF
- S 822-098
- (13) Adjust the PDU with the instructions in the "Trailing Edge Flap Power Drive Unit (PDU) - Adjustment/Test".
- S 702-099
- (14) Do a test on the PDU installation with the instructions in the "Trailing Edge Flap Power Drive Unit (PDU) - Adjustment/Test".

TASK 27-51-34-822-100

4. Trailing Edge Flap Power Drive Unit (PDU) - Adjustment/Test

A. General

- (1) This task contains two procedures, one to adjust the power drive unit (PDU) for the trailing edge flap system, and one to do a test on the installation of the PDU. Because this task contains two procedures, only the applicable group of steps must be done.

To start one of these procedures, do the group of steps that is necessary to adjust or to do a test on the PDU. Then, do the "Put the Airplane Back to Its Usual Condition" group of steps.

B. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):
- (a) TE1 - P/N A20004-9.
- (2) LE Slat Groundlock - A27007-1 (2 Necessary)
- (3) TE Flap PDU Lock - A27009-7

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-44-00/201, Wing Access Doors and Panels
- (3) AMM 12-12-01/301, Hydraulic Systems - Servicing
- (4) AMM 20-10-24/201, Rig Pins
- (5) AMM 24-22-00/201, Electrical Power - Control
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) AMM 32-00-15/201, Landing Gear Door Locks

D. Access

- (1) Location Zones
- |         |                              |
|---------|------------------------------|
| 119     | Main Equipment Center (Left) |
| 144     | MLG Wheel Well (Right)       |
| 211/212 | Control Cabin                |
| 510/610 | Wing Leading Edge - Inboard  |
| 710     | Nose Landing Gear and Doors  |
| 730/740 | Main Landing Gear and Doors  |

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- (2) Access Panels
  - 119AL Main Equipment Center
  - 511BB LE Slat Power Drive Unit - Outboard (Left)
  - 611BB LE Slat Power Drive Unit - Inboard (Right)

E. Adjust the TE Flap PDU

S 212-101

- (1) Make sure the TE flaps and LE slats are in the fully retracted position and the flap control lever is in the zero (FLAPS UP) detent.

S 092-102

- (2) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-103

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

S 862-104

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 862-105

- (5) Move the flap control lever to the 30-unit detent and make sure the TE flaps and LE slats move to the fully extended position.

S 862-106

- (6) Move the flap control lever back to the zero (FLAPS UP) detent and make sure the TE flaps and LE slats move to the fully retracted position.

S 492-107

- (7) Install a DO-NOT-OPERATE tag on the flap control lever.

S 862-108

- (8) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 492-109

- (9) Install a PDU lock in the TE flap PDU (Fig. 204).

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S 492-110

- (10) Install groundlocks in the inboard and outboard slat PDUs (Fig. 205).

S 822-111

- (11) If it is necessary, adjust the control rod that is attached to the pilot input arm, until you can easily install rig pin TE1 in the rig pin hole for the PDU input cam.

S 092-112

- (12) Remove rig pin TE1 and install the plug in the rig pin hole.

F. Test of the Power Drive Unit

S 092-113

- (1) If installed, remove the DO-NOT-OPERATE tag from the flap control lever.

S 092-114

- (2) If installed, remove the PDU lock from the TE flap PDU (Fig. 204).

S 092-115

- (3) If installed, remove the groundlocks from the inboard and outboard slat PDUs (Fig. 205).

S 862-116

- (4) Remove the circuit breaker locks and the DO-NOT-CLOSE tags, and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 862-117

- (5) Remove the circuit breaker locks and the DO-NOT-CLOSE tags, and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 212-118

- (6) Make sure the position selector switch for the flap/slat alternate drive, in the flight compartment, is in the NORM detent.

S 862-119

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

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S 862-122

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(8) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 212-123

(9) Make sure no messages show on the EICAS display and that the amber TRAILING EDGE light, on the P3 panel, is not on.

S 862-124

(10) Move the flap control lever to the 20-unit detent, and do these checks:

- (a) Make sure the LE slats move to the intermediate position.
- (b) Make sure the TE flaps move to the 20-degree position.
- (c) Make sure no messages show on the EICAS display.
- (d) Make sure the amber TRAILING EDGE light, on the P3 panel, does not come on.

S 862-125

(11) Move the flap control lever to the 30-unit detent, and do these checks:

- (a) Make sure the TE flaps and LE slats move to the fully extended position.
- (b) Make sure no messages show on the EICAS display.
- (c) Make sure the amber TRAILING EDGE light, on the P3 panel, does not come on.

S 862-126

(12) Move the flap control lever to the zero (FLAPS UP) detent, and do these checks:

- (a) Make sure the TE flaps and LE slats move to the fully retracted position.
- (b) Make sure no messages show on the EICAS display.
- (c) Make sure the amber TRAILING EDGE light, on the P3 panel, does not come on.

S 212-150

(13) Make sure the position selector switch for the flap/slat alternate drive is in the NORM detent.

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S 862-127

- (14) Push the arming switch for the flap alternate drive, in the flight compartment, to arm the flap alternate drive (ALTN switch light comes on) and do these checks:
- (a) Make sure the amber TRAILING EDGE light, on the P3 panel, comes on approximately after seven seconds.
  - (b) Make sure the TE FLAP DISAGREE message shows on the EICAS display approximately after seven seconds.

S 862-128

- (15) Move the flap control lever to the 20-unit detent, and do these checks:
- (a) Make sure the TE flaps stay at the fully retracted position.
  - (b) Make sure the LE slats move to the intermediate position.

S 862-129

- (16) Move the flap control lever to the zero (FLAPS UP) detent, and do this check:
- (a) Make sure the LE slats move to the fully retracted position.

S 862-130

- (17) Move the position selector switch for the flap/slat alternate drive, on the P3 panel, to the UP detent, and do these checks:
- (a) Make sure no messages show on the EICAS display.
  - (b) Make sure the amber TRAILING EDGE light, on the P3 panel, goes off.

S 862-131

- (18) Move the position selector switch for the flap/slat alternate drive, in the flight compartment, to the 20-unit detent and do these checks:
- (a) Make sure the TE flaps move to the 20-degree position.
  - (b) Make sure no messages show on the EICAS display.
  - (c) Make sure the amber TRAILING EDGE light, on the P3 panel, does not come on.

S 862-132

- (19) Move the position selector switch for the flap/slat alternate drive, in the flight compartment, to the UP detent and do these checks:
- (a) Make sure the TE flaps move to the fully retracted position.
  - (b) Make sure no messages show on the EICAS display.
  - (c) Make sure the amber TRAILING EDGE light, on the P3 panel, does not come on.

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S 862-133

- (20) Move the position selector switch for the flap/slat alternate drive, in the flight compartment, to the NORM detent, and do these checks:
- (a) Make sure the amber TRAILING EDGE light, on the P3 panel, comes on.
  - (b) Make sure the TE FLAP DISAGREE message shows on the EICAS display.

S 862-134

- (21) Push the arming switch for the flap alternate drive, in the flight compartment, to disarm the flap alternate drive (ALTN switch light will go off), and do these checks:
- (a) Make sure the amber TRAILING EDGE light, on the P3 panel, goes off.
  - (b) Make sure the TE FLAP DISAGREE message does not show on the EICAS display.

S 862-135

- (22) Move the flap control lever to the 20-unit detent, and do these checks:
- (a) Make sure the LE slats move to the intermediate position.
  - (b) Make sure the TE flaps move to the 20-degree position.

S 862-136

- (23) Move the flap control lever to the zero (FLAPS UP) detent, and do this check:
- (a) Make sure the TE flaps and LE slats move to the fully retracted position.

S 792-141

- (24) Make sure there are no leaks at the hydraulic connections to the TE flap PDU.

S 012-138

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

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S 742-139

- (26) AIRPLANES WITH A -53 OR EARLIER FSEU;  
Operate the test switch on the panel of the flap/slat electronics unit (FSEU) at the E2 equipment rack, and look for a no-fault indication.

S 742-153

- (27) AIRPLANES WITH A -63 OR SUBSEQUENT FSEU;  
Do a check for EXISTING FAULTS with the FSEU:  
(a) Push the menu button.

NOTE: The display will show EXISTING FAULTS?

- (b) Push the YES button to select the EXISTING FAULTS? test.

NOTE: The display will show TEST IN PROGRESS.

- (c) The message "NO FAULTS" should show on the display.

G. Put the Airplane Back to Its Usual Condition

S 092-147

- (1) Remove the PDU lock from the TE flap PDU (Fig. 204).

S 412-146

WARNING: USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 862-142

- (3) Remove power from the center hydraulic system (AMM 29-11-00/201).

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- S 612-145
- (4) Do the servicing steps to the reservoir of the center hydraulic system (AMM 12-12-01/301).
- S 862-143
- (5) Remove the electrical power if it is not necessary (AMM 24-22-00/201).
- S 092-148
- (6) Remove the groundlocks from the inboard and outboard slat PDUs (Fig.205).
- S 412-140
- (7) Close the access door, 119AL, for the main equipment center (AMM 06-41-00/201).
- S 412-144
- (8) Install the access doors, 511BB and 611BB, to close the access to the outboard and inboard slat PDUs (AMM 06-44-00/201).

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TE FLAP PDU COMPONENTS – INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the TE Flap PDU Components – Maintenance Practices for procedures to do these tasks.

TASK 27-51-34-226-001

2. Wear limits for the TE Flap PDU Gearbox (Fig. 601)

A. Access

- (1) Location Zone  
144 Right MLG Wheel Well

B. Procedure

S 226-003

- (1) Use the supplied data (Fig. 601) to examine the TE flap PDU gearbox for too much wear.

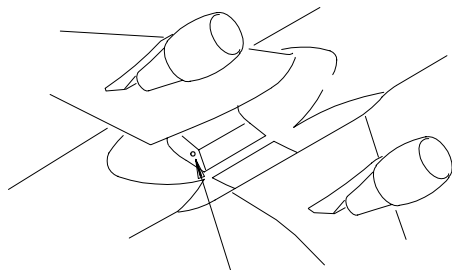
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02

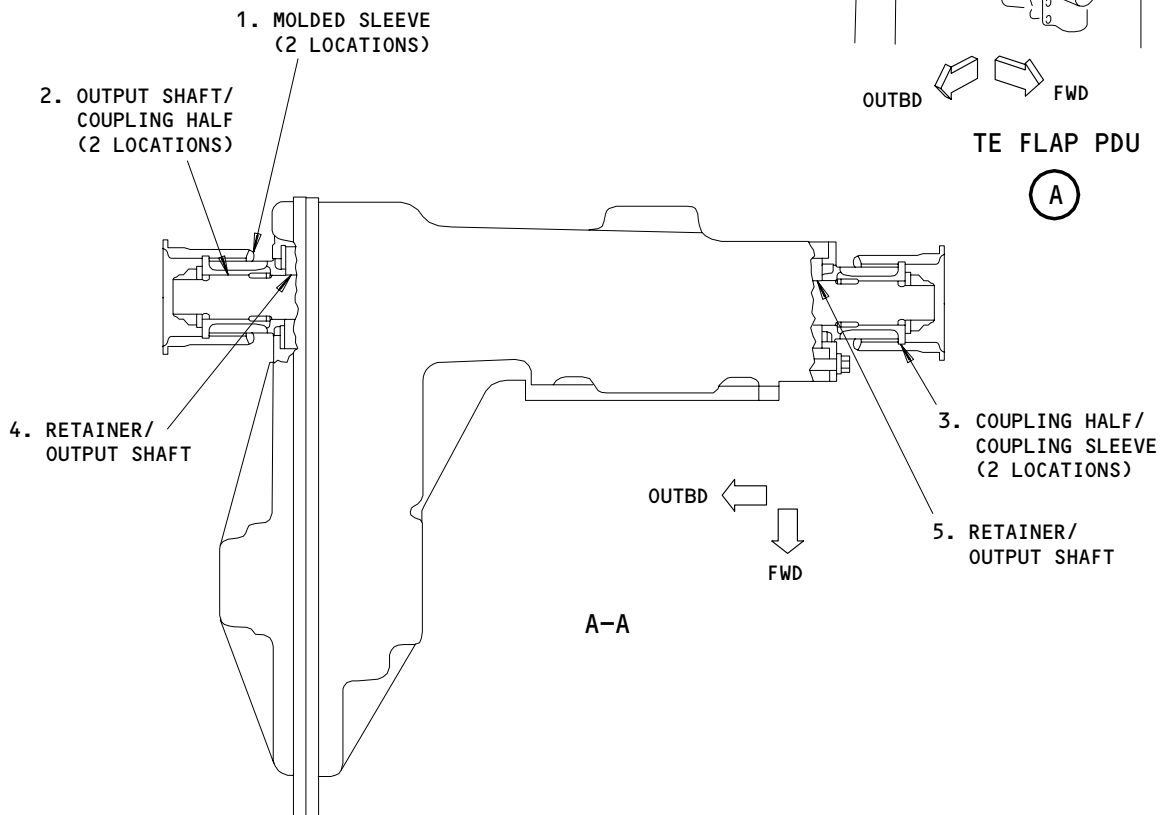
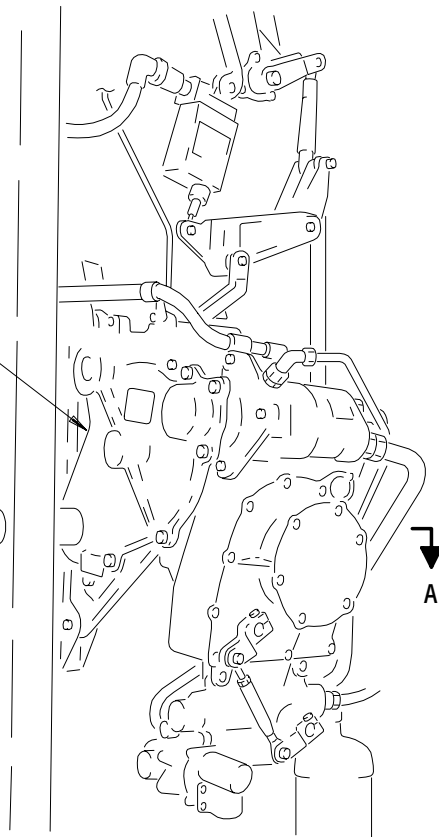
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TE FLAP PDU  
SEE (A)

GEARBOX ASSEMBLY  
FOR TE FLAP PDU

TORQUE TUBE  
(EXAMPLE)



Wear Limits for the TE Flap PDU Gearbox  
Figure 601 (Sheet 1)

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


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 **BOEING**  
767  
MAINTENANCE MANUAL

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	MOLDED SLEEVE	OD							
2	OUTPUT SHAFT	EXT SPL							
	COUPLING HALF	INT SPL							
3	COUPLING HALF	EXT SPL							
	COUPLING SLEEVE	INT SPL							
4	RETAINER	ID	0.9850 (25.019)	0.9860 (25.044)	0.9877 (25.088)	0.0030 (0.076)	X		
	OUTPUT SHAFT	OD	0.9844 (25.004)	0.9847 (25.011)	0.9830 (24.968)		X		
5	RETAINER	ID	0.9850 (25.019)	0.9860 (25.044)	0.9870 (25.070)	0.0030 (0.076)	X		
	OUTPUT SHAFT	OD	0.9835 (24.981)	0.9840 (24.994)	0.9830 (24.968)		X		



REPLACE THE MOLDED SLEEVE IF THE DACRON COVER IS DAMAGED OR WORN



DO THE CHECKS THAT FOLLOW ON THE COUPLING HALVES AND COUPLING SLEEVES:  
 • VISUALLY EXAMINE (USE MAGNIFICATION IF POSSIBLE) ALL BEARING SURFACES ON THE SPLINES FOR WEAR.

**NOTE:** REPLACE THE COUPLING IF YOU ARE NOT SURE ABOUT THE WEAR

- IF YOU CANNOT FIND WEAR ON THE SPLINES, REPAIR THE FINISH AND ASSEMBLE THE COUPLING HALVES AND COUPLING SLEEVES
- IF YOU FIND WEAR ON THE SPLINES, REPLACE THE TWO COUPLING HALVES

Wear Limits for the TE Flap PDU Gearbox  
Figure 601 (Sheet 2)

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TE FLAP BULKHEAD TEE GEARBOX - REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the trailing edge (TE) flap bulkhead tee gearbox.

TASK 27-51-35-024-001

2. TE Flap Bulkhead Tee Gearbox - Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip - 1012LC-R  
Commercially available  
(2) TE Flap PDU Lock - A27009-7

B. References

- (1) AMM 27-51-41/401, TE Flap Torque Tubes  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(3) AMM 32-00-15/201, Landing Gear Door Locks  
(4) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

- (1) Location Zones
- |         |  |
|---------|--|
| 143/144 | Left/Right MLG Wheel Well              |
| 211/212 | Control Cabin                          |
| 710     | Nose Landing Gear and Doors            |
| 730/740 | Left/Right Main Landing Gear and Doors |

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 864-004

- (3) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-005

- (4) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

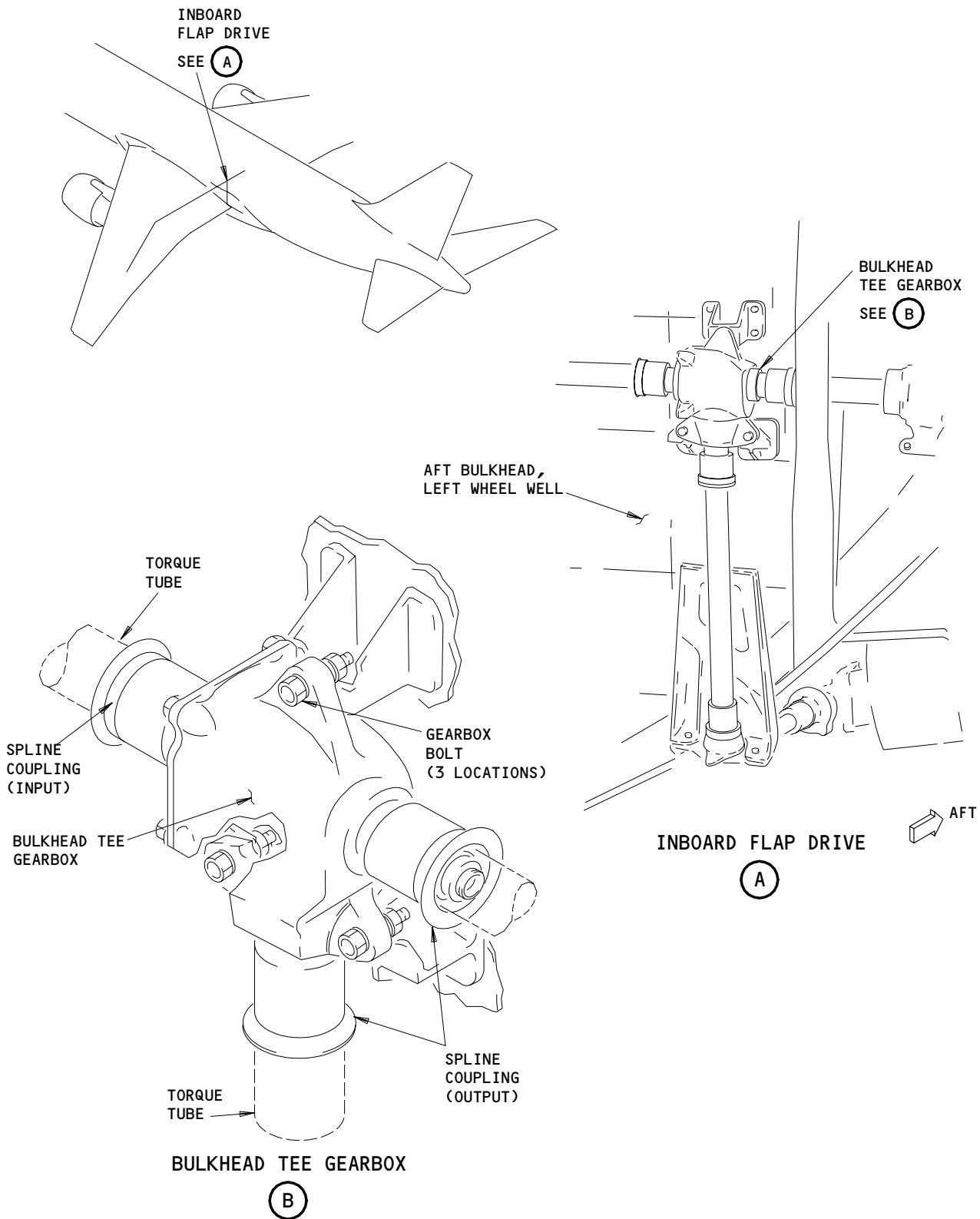
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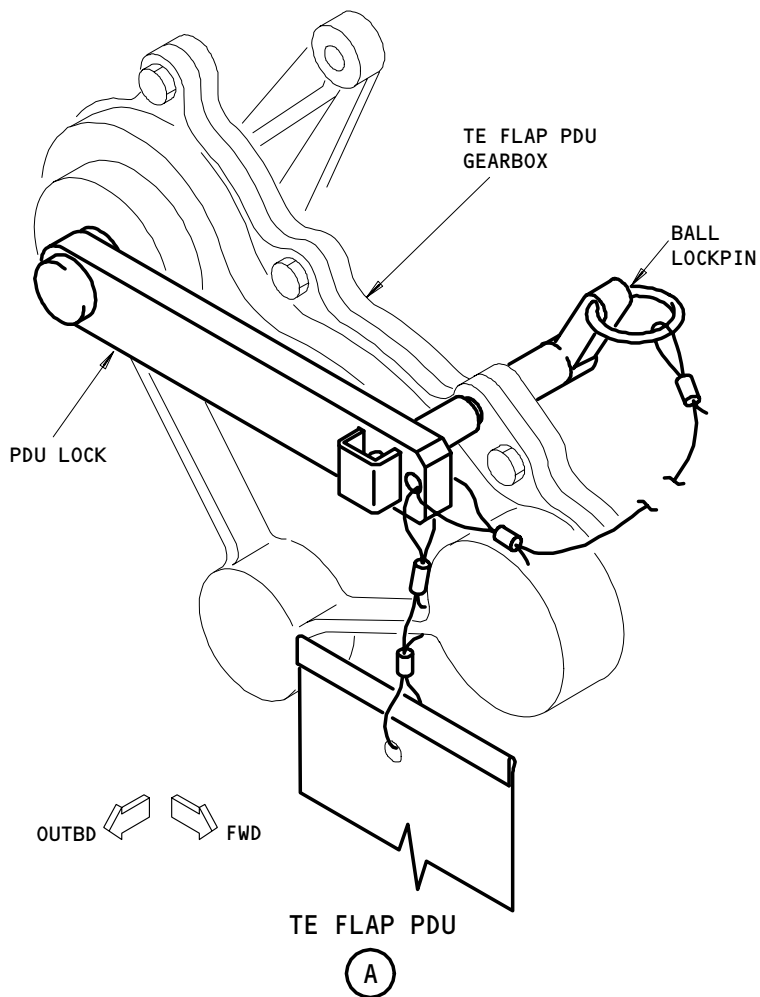
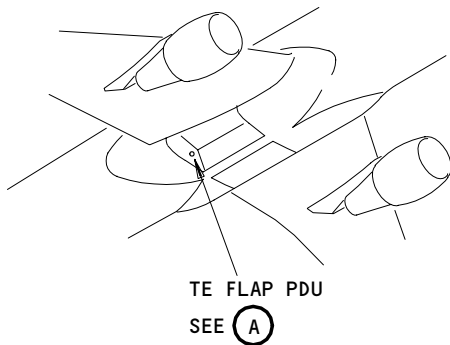
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Bulkhead TEE Gearbox  
Figure 401

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PDU Lock for the TE Flap PDU  
Figure 402

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- S 864-006
- (5) Open these circuit breakers on the P6 panel and install circuit breaker locks:
- (a) 6F24, ALTN SLAT OUTBD PWR
  - (b) 6D21, ALTN SLAT INBD PWR
- S 864-007
- (6) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11J24, FLAPS ALTN CONT
- S 864-008
- (7) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
- S 494-009
- (8) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 402).
- E. Remove the Bulkhead Tee Gearbox (Fig. 401)
- S 034-010
- (1) Disconnect the three torque tubes that are connect to the bulkhead tee gearbox (AMM 27-51-41/401).
- NOTE:** Do not turn the torque tubes. It will be necessary to adjust the flap drive if you turn the torque tube while it is disconnected.
- S 034-011
- (2) Disconnect the three gearbox bolts.
- S 024-012
- (3) Remove the gearbox from the airplane.

TASK 27-51-35-424-013

3. TE Flap Bulkhead Tee Gearbox - Installation

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)

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- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) D00015 Grease - BMS 3-24 (Alternate)

B. References

- (1) AMM 20-10-23/401, Lockwires
- (2) AMM 27-51-00/501, Trailing Edge Flap System
- (3) AMM 27-51-41/401, TE Flap Torque Tubes
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Landing Gear Door Locks

C. Access

- (1) Location Zones
  - 143/144 Left/Right MLG Wheel Well
  - 211/212 Control Cabin
  - 710 Nose Landing Gear and Doors
  - 730/740 Left/Right Main Landing Gear and Doors

D. Install the Bulkhead Tee Gearbox

S 214-014

- (1) Make sure the power is removed from the center hydraulic system (AMM 29-11-00/201).

S 644-015

- (2) Apply a thin layer of BMS 3-24 grease to the gearbox bolts.

S 434-016

- (3) Put the gearbox into its position and install the three gearbox bolts, washers, and locknuts.

NOTE: Install one washer below each bolt head.

S 434-017

- (4) Connect the three torque tubes (AMM 27-51-41/401).

NOTE: Do not turn the torque tube during the installation. It will be necessary to adjust the flap drive if you turn the torque tube.

S 224-018

- (5) Make sure the torque tubes can move from end to end, and that the end clearances are satisfactory (AMM 27-51-41/401).

S 644-019

- (6) Fill the gearbox coupling with BMS 3-33 grease.

S 434-020

- (7) Make sure you install a lockwire to the coupling screws on each coupling with the double twist procedure (AMM 20-10-23/401).

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S 094-021

- (8) Remove the PDU lock from the TE flap power drive unit (PDU) (Fig. 402).

S 224-025

- (9) Do a check on the retract overtravel stop clearances if it is necessary (AMM 27-51-00/501).

E. Put the Airplane Back to Its Usual Condition

S 864-022

- (1) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D24, ALTN FLAP PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR
  - (c) 6D21, ALTN SLAT INBD PWR

S 864-023

- (2) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11J24, FLAPS ALTN CONT
  - (b) 11H23, SLAT ALTN CONT INBD
  - (c) 11H24, SLAT ALTN CONT OUTBD

S 094-024

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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TE FLAP BULKHEAD TEE GEARBOX – INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and a wear limit table, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the TE Flap Bulkhead TEE Gearbox – Removal/Installation for procedures to do these tasks.

TASK 27-51-35-226-001

2. Wear Limits for the TE Flap Bulkhead TEE Gearbox (Fig. 601)

NOTE: Wear limits for other components that are connected to the TEE gearbox on the TE flap bulkhead are in other Inspection/Check Sections of the Maintenance Manual.

A. Access

(1) Location Zones

- |     |                      |
|-----|----------------------|
| 143 | Left MLG Wheel Well  |
| 144 | Right MLG Wheel Well |

B. Procedure

S 226-003

- (1) Use the supplied data (Fig. 601) to examine the TE flap bulkhead tee gearbox for too much wear.

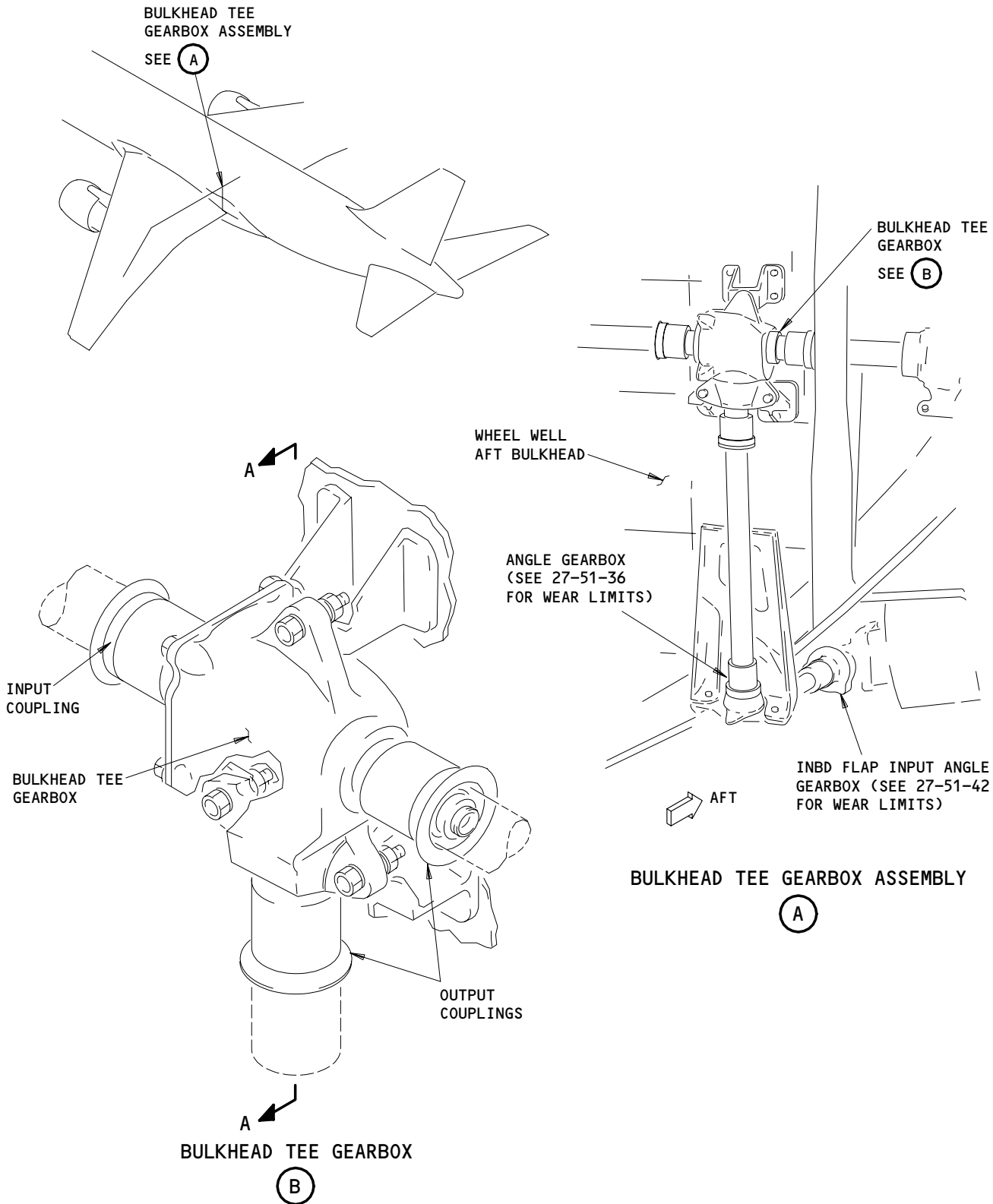
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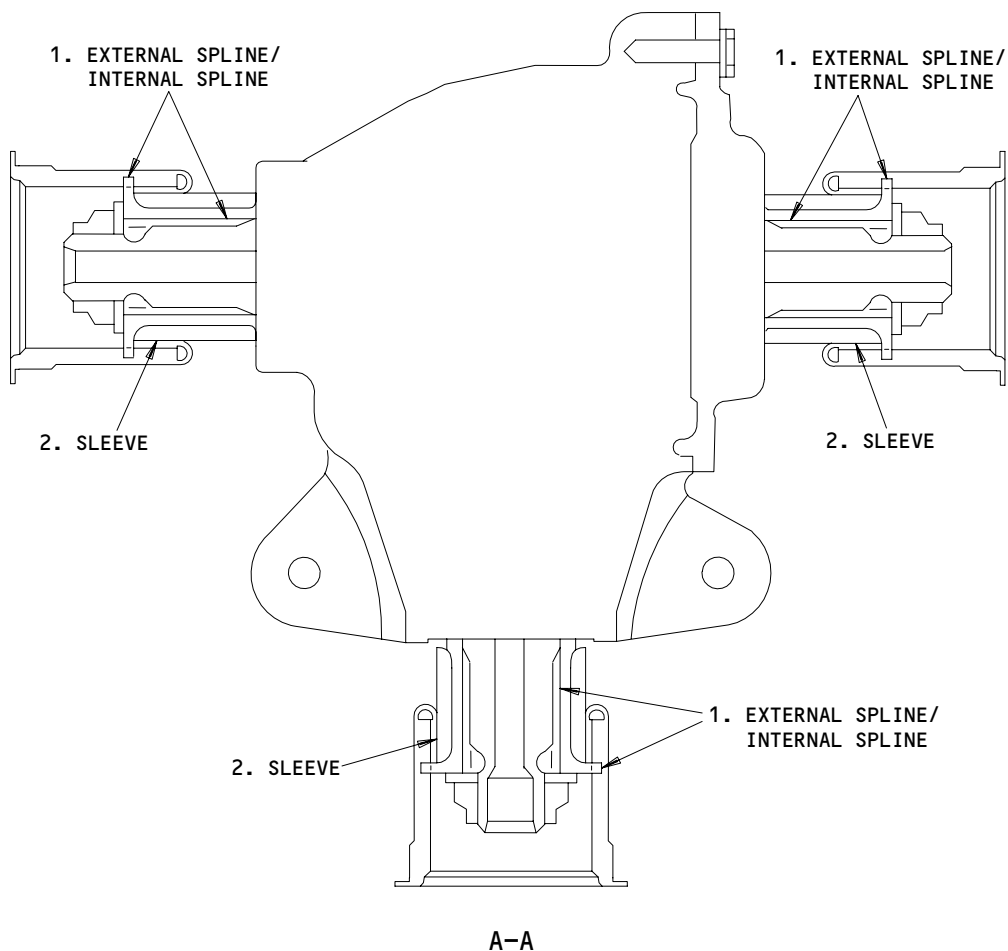
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Wear Limits for the TE Flap Bulkhead Tee Gearbox  
Figure 601 (Sheet 1)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR.
			DIAMETER		PERMITTED WEAR DIM.	MAX DIAM CLEAR-ANCE			
			MIN	MAX					
1	EXTERNAL SPLINE		---	---	---	1	---	---	
	INTERNAL SPLINE		---	---	---		---	---	
2	SLEEVE		---	---	---	2	---	---	

1 VISUALLY EXAMINE (USE MAGNIFICATION IF NECESSARY) ALL THE BEARING SURFACES ON THE SPLINES FOR ANY WEAR

**NOTE:** REPLACE THE COUPLING IF YOU ARE NOT SURE ABOUT THE WEAR

2 REPLACE THE RUBBER SEAL IF DACRON COVER ON THE SLEEVE IS WORN OR DAMAGED

Wear Limits for the TE Flap Bulkhead Tee Gearbox  
Figure 601 (Sheet 2)

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TE FLAP BULKHEAD ANGLE GEARBOX – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the trailing edge (TE) flap bulkhead angle gearbox.

TASK 27-51-36-024-001

2. TE flap Bulkhead Angle Gearbox – Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip – 1012LC-R  
Commercially Available  
(2) TE Flap PDU Lock – A27009-7

B. References

- (1) AMM 27-51-41/401, TE Flap Torque Tubes  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(3) AMM 32-00-15/201, Landing Gear Door Locks  
(4) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

- (1) Location Zones
- |         |  |
|---------|--|
| 143/144 | Left/Right MLG Wheel Well              |
| 211/212 | Control Cabin                          |
| 710     | Nose Landing Gear and Doors            |
| 730/740 | Left/Right Main Landing Gear and Doors |

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 214-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-004

- (3) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-005

- (4) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

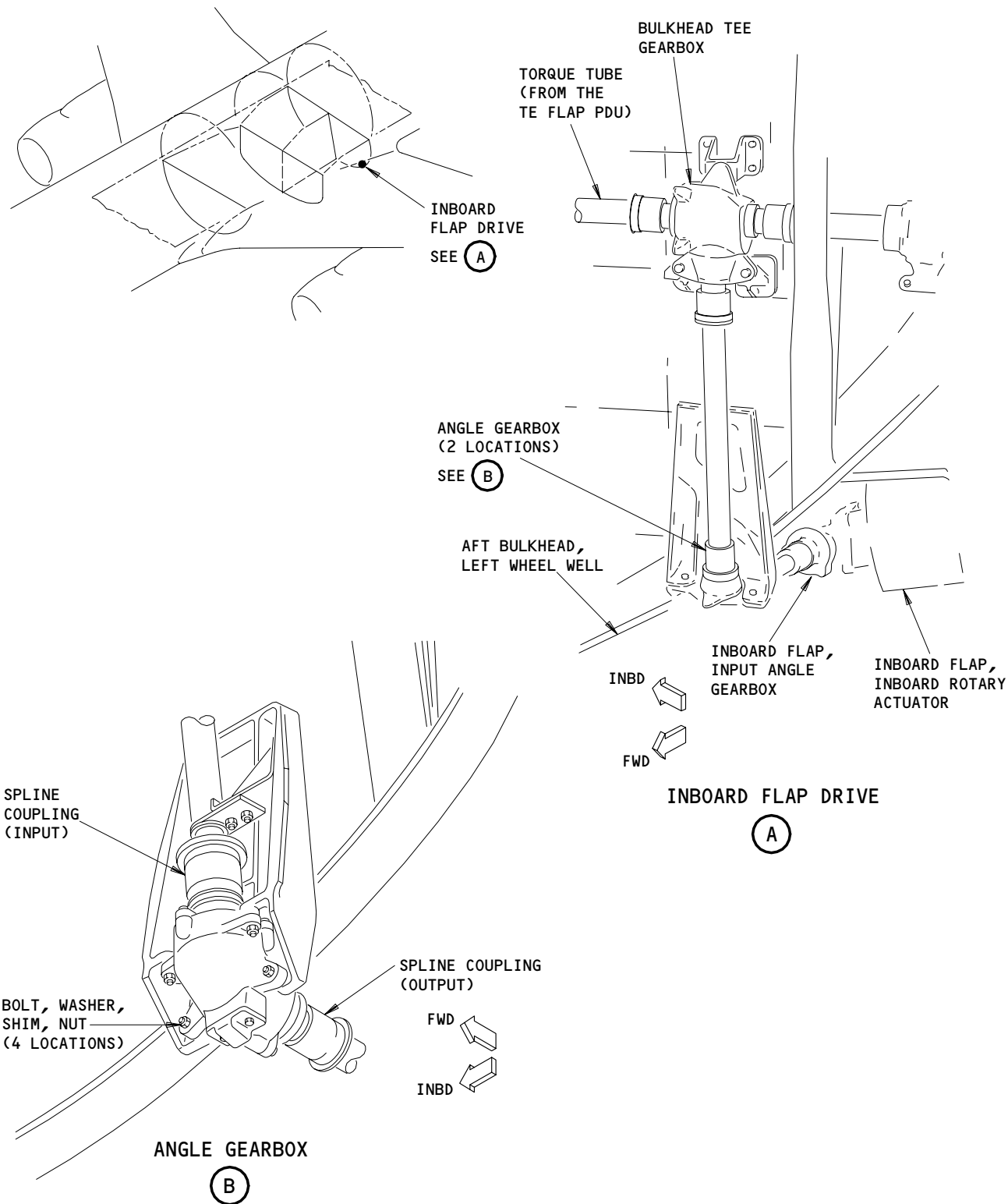
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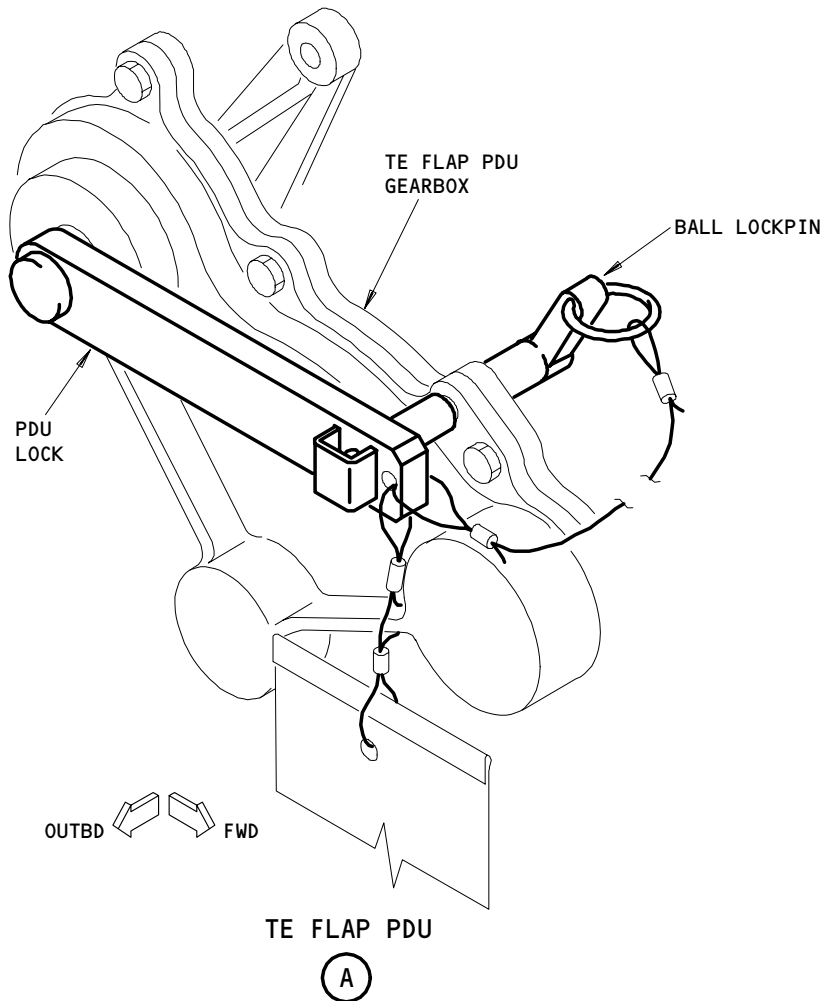
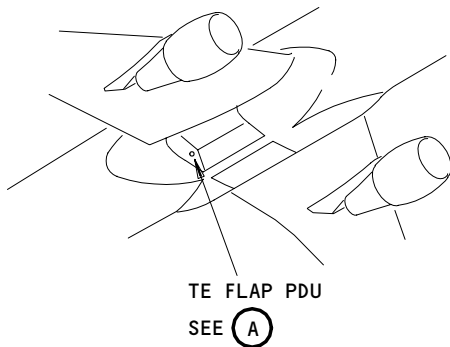
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Bulkhead Angle Gearbox  
Figure 401

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PDU Lock for the TE Flap PDU  
Figure 402

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- S 864-006
- (5) Open these circuit breakers on the P6 panel and install circuit breaker locks:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR
- S 864-007
- (6) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11J24, FLAPS ALTN CONT
- S 864-008
- (7) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
- S 494-009
- (8) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 402).
- E. Remove Bulkhead Angle Gearbox (Fig. 401)

- S 034-010
- (1) Disconnect the two torque tubes from the bulkhead angle gearbox (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tube. It will be necessary to adjust the flap drive if you turn the torque tube while it is disconnected.

- S 034-011
- (2) Disconnect the four gearbox bolts.

- S 024-012
- (3) Remove the gearbox and the shims.

**NOTE:** Make a record of the shim thickness and keep the shims for the subsequent installation if you will install the same gearbox that you removed.

TASK 27-51-36-404-025

3. TE flap Bulkhead Angle Gearbox - Installation

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)

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- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) D00015 Grease - BMS 3-24 (Alternate)

B. References

- (1) AMM 20-10-23/401, Lockwires
- (2) AMM 27-51-00/501, Trailing Edge Flap System
- (3) AMM 27-51-41/401, TE Flap Torque Tubes
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Landing Gear Door Locks

C. Access

- (1) Location Zones
  - 143/144 Left/Right MLG Wheel Well
  - 211/212 Control Cabin
  - 710 Nose Landing Gear and Doors
  - 730/740 Left/Right Main Landing Gear and Doors

D. Install the Bulkhead Angle Gearbox (Fig. 401)

S 644-013

- (1) Apply a light layer of BMS 3-24 grease to the gearbox bolts.

S 424-014

- (2) Do this step to install the gearbox if you kept the old shims for installation, and you know the shim thickness that is necessary:
  - (a) Install the gearbox with the gearbox bolts, shims, washers, and nuts. Tighten the nuts to 100-150 pound-inches (11.3-16.9 newton-meters).

S 424-015

- (3) If you will install the gearbox with new shims, determine the shim thickness and install the gearbox with these steps:
  - (a) Install the gearbox bolts into the two upper lugs without the shims, and tighten the nuts to 100 to 150 pound-inches (11.3-16.9 newton-meters).
  - (b) Measure the clearance at the lower lugs to determine the shim thickness that is necessary.
  - (c) Remove the gearbox bolts at the upper lugs.
  - (d) Install the two lower bolts with the new shims and tighten the bolts to 100-150 pound-inches (11.3-16.9 newton-meters).
  - (e) Measure the clearance at the upper lugs to determine the thickness of shims that is necessary.
  - (f) Add shims to fill the clearance at the upper lugs and install the gearbox bolts. Tighten the bolts to 100-150 pound-inches (11.3-16.9 newton-meters).

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S 434-016

- (4) Connect the input and output torque tubes to the gearbox (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tube during the installation. It will be necessary to adjust the flap drive if you turn the torque tube.

S 224-017

- (5) Make sure the torque tubes can move from end to end, and that the end clearances are satisfactory (AMM 27-51-41/401).

S 644-018

- (6) Fill the gearbox coupling with BMS 3-33 grease.

S 434-019

- (7) Make sure you install a lockwire to the coupling screws on each coupling with the double twist procedure (AMM 20-10-23/401).

S 094-021

- (8) Remove the PDU lock from the TE flap power drive unit (PDU) (Fig. 402).

S 224-020

- (9) Do a check on the retract overtravel stop clearances if it is necessary (AMM 27-51-00/501).

E. Put the Airplane Back to Its Usual Condition

S 864-022

- (1) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-023

- (2) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

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S 094-024

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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TE FLAP BULKHEAD ANGLE GEARBOX – INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and a wear limit table, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the TE Flap Bulkhead Angle Gearbox – Removal/Installation for procedures to do these tasks.

TASK 27-51-36-226-001

2. Wear Limits for the TE Flap Bulkhead Angle Gearbox (Fig. 601)

NOTE: Wear limits for other components that are connected to the TE flap bulkhead are in other Inspection/Check Sections of the Maintenance Manual.

A. Access

(1) Location Zones

- |     |                      |
|-----|----------------------|
| 143 | Left MLG Wheel Well  |
| 144 | Right MLG Wheel Well |

B. Procedure

S 226-003

- (1) Use the supplied data (Fig. 601) to examine the TE flap bulkhead angle gearbox for too much wear.

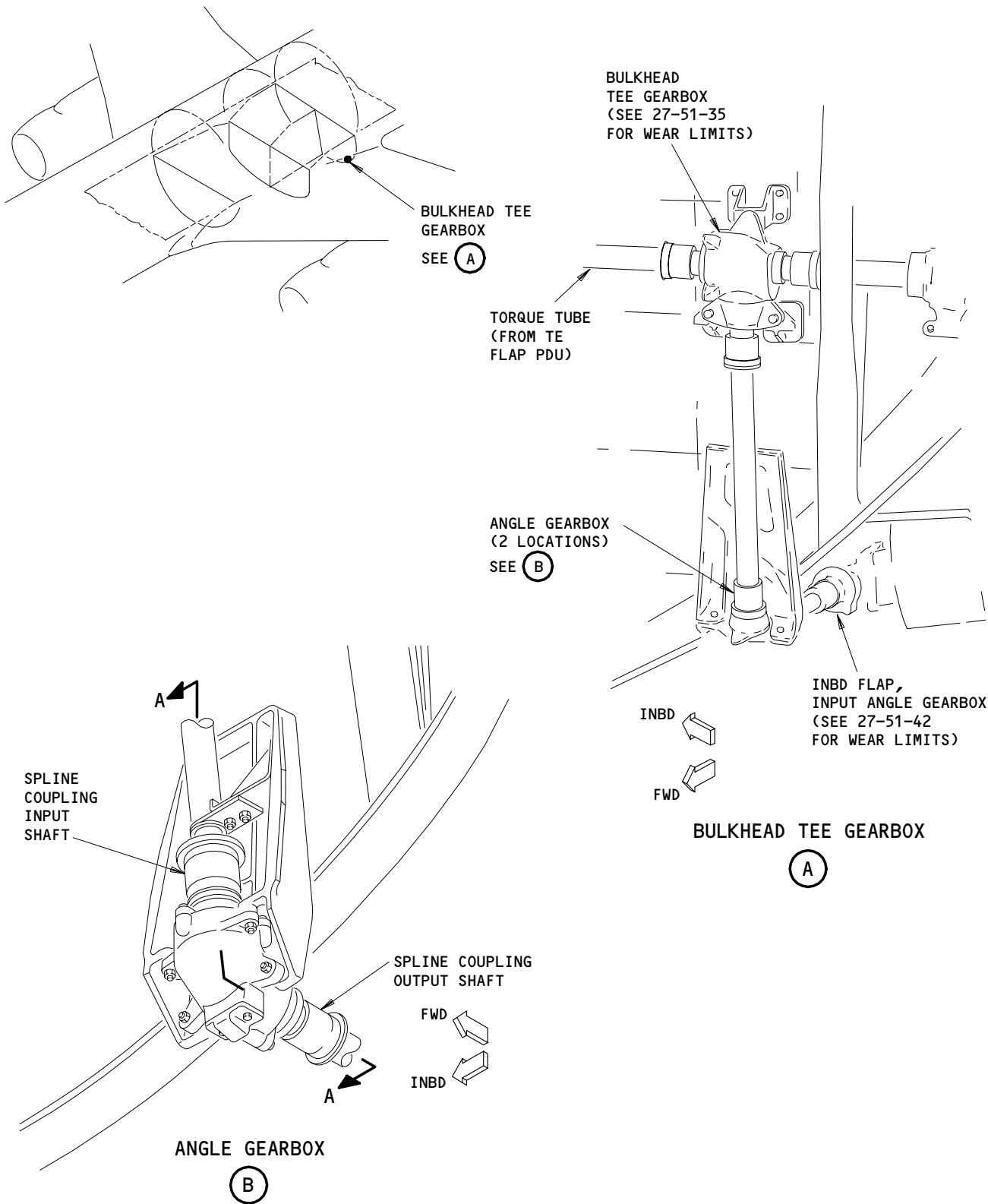
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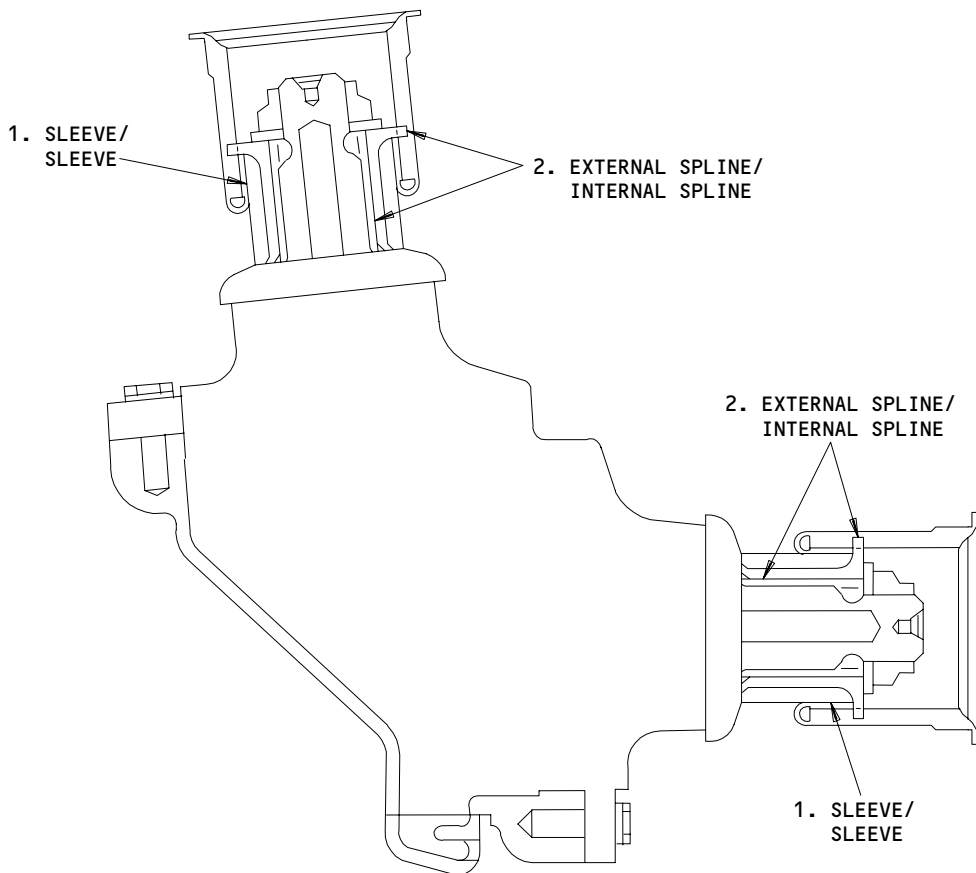
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Wear Limits for the TE Flap Bulkhead Angle Gearbox  
Figure 601 (Sheet 1)

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A-A

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR.
			DIAMETER		PERMITTED WEAR DIM.	MAX DIAM CLEAR-ANCE			
			MIN	MAX					
1	SLEEVE		---	---	---	1	---	---	
2	EXTERNAL SPLINE		---	---	---	2	---	---	
	INTERNAL SPLINE		---	---	---		---	---	

- 1 REPLACE THE RUBBER SEAL IF DACRON COVER ON THE SLEEVE IS WORN OR DAMAGED
- 2 VISUALLY EXAMINE (USE MAGNIFICATION IF NECESSARY) ALL THE BEARING SURFACES ON THE SPLINES FOR ANY WEAR

**NOTE:** REPLACE THE COUPLING IF YOU ARE NOT SURE ABOUT THE WEAR

Wear Limits for the TE Flap Bulkhead Angle Gearbox  
Figure 601 (Sheet 2)

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TE FLAP SIDE-OF-BODY ANGLE GEARBOX – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the TE flap Side-of-Body Angle Gearbox.

TASK 27-51-37-024-001

2. TE Flap Side-of-Body Angle Gearbox – Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip – 1012LC-R  
Commercially Available  
(2) TE Flap PDU Lock – A27009-7

B. References

- (1) AMM 27-51-41/401, TE Flap Torque Tubes  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(3) AMM 32-00-15/201, Landing Gear Door Locks  
(4) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

- (1) Location Zone
- |         |  |
|---------|--|
| 143/144 | Left/Right MLG Wheel Well              |
| 211/212 | Control Cabin                          |
| 710     | Nose Landing Gear and Doors            |
| 730/740 | Left/Right Main Landing Gear and Doors |

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-004

- (3) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-005

- (4) Open this circuit breaker on the main power distribution panel, P6 and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 864-006

- (5) Open these circuit breakers on the P6 panel and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR

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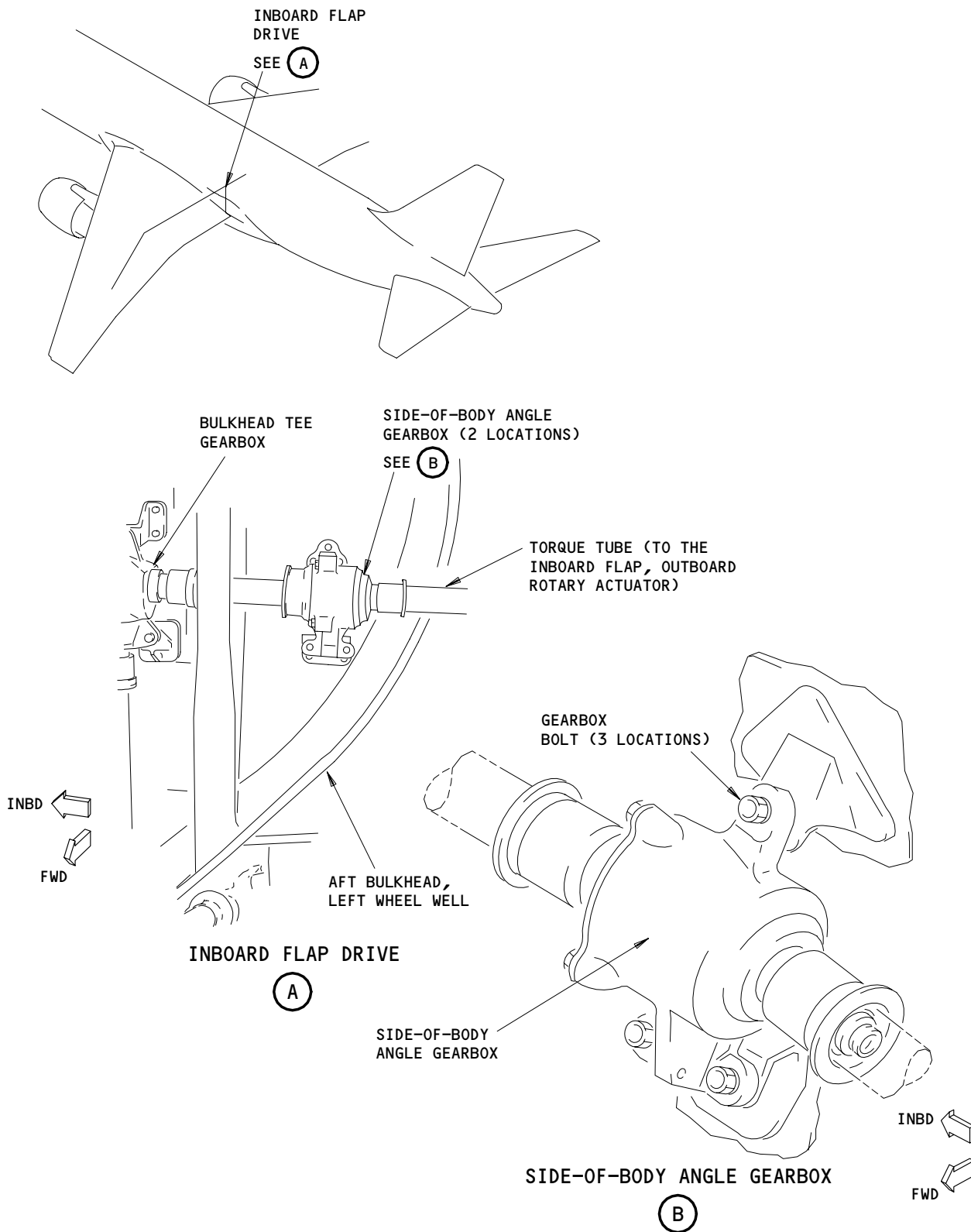
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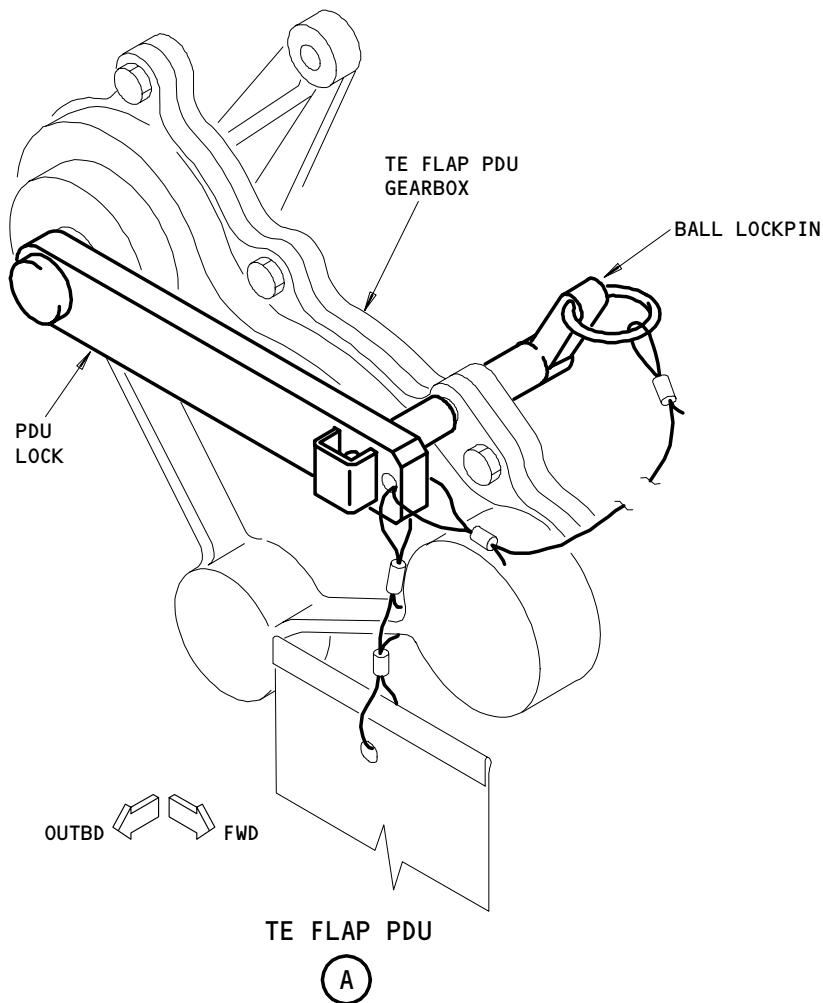
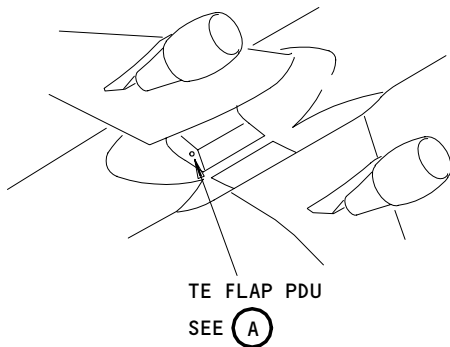




Side-of-Body Angle Gearbox  
Figure 401

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PDU Lock for the TE Flap PDU  
Figure 402

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(b) 6F24, ALTN SLAT OUTBD PWR

S 864-007

(6) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:

(a) 11J24, FLAPS ALTN CONT

S 864-008

(7) Open these circuit breakers on the P11 panel and install circuit breaker locks:

(a) 11H23, SLAT ALTN CONT INBD

(b) 11H24, SLAT ALTN CONT OUTBD

S 494-009

(8) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 402).

E. Remove the Side-of-Body Angle Gearbox (Fig. 401)

S 034-010

(1) Disconnect the torque tubes on each side of the gearbox (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tube. It will be necessary to adjust the flap drive if you turn the torque tube while it is disconnected.

S 034-011

(2) Disconnect the three gearbox bolts.

S 024-012

(3) Remove the Side-of-Body angle gearbox from the airplane.

TASK 27-51-37-424-024

3. TE Flap Side-of-Body Angle Gearbox - Installation

A. Consumable Materials

(1) D00633 Grease - BMS 3-33 (Preferred)

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- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) D00015 Grease - BMS 3-24 (Alternate)

B. References

- (1) AMM 20-10-23/401, Lockwire
- (2) AMM 27-51-00/501, Trailing Edge Flap System
- (3) AMM 27-51-41/401, TE Flap Torque Tubes
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Landing Gear Door Locks

C. Access

- (1) Location Zone
  - 143/144 Left/Right MLG Wheel Well
  - 211/212 Control Cabin
  - 710 Nose Landing Gear and Doors
  - 730/740 Left/Right Main Landing Gear and Doors

D. Install the Side-of-Body Angle Gearbox (Fig. 401)

S 644-013

- (1) Apply a thin layer of the grease to the gearbox bolts.

S 424-014

- (2) Install the side-of-body gearbox with three gearbox bolts, washers and locknuts. Tighten the nuts.

S 434-015

- (3) Connect the torque tubes at each side of the gearbox.

**NOTE:** Do not turn the torque tube during the installation. It will be necessary to adjust the flap drive if you turn the torque tube.

S 224-016

- (4) Make sure the torque tubes can move from end to end, and that the end clearances are satisfactory (AMM 27-51-41/401).

S 644-017

- (5) Fill the gearbox coupling with BMS 3-33 grease.

S 434-018

- (6) Make sure you install a lockwire to the coupling screws on each coupling with the double twist procedure (AMM 20-10-23/401).

S 094-019

- (7) Remove the PDU lock from the TE flap power drive unit (PDU) (Fig. 402).

S 224-020

- (8) Do a check on the retract overtravel stop clearances if it is necessary (AMM 27-51-00/501).

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E. Put the Airplane Back to Its Usual Condition

S 864-021

- (1) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-022

- (2) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 094-023

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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TE FLAP SIDE-OF-BODY ANGLE GEARBOX – INSPECTION/CHECK

1. General

A. This procedure only has illustrations and a wear limit table, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the TE Flap Side-of-Body Angle Gearbox – Removal/Installation for procedures to do these tasks.

TASK 27-51-37-226-001

2. Wear Limits for the TE Flap Side-of-Body Angle Gearbox (Fig. 601)

NOTE: Wear limits for other components that are connected to the side-of-body angle gearbox are in other Inspection/Check sections of the Maintenance Manual.

A. Access

(1) Location Zones

143	Left MLG Wheel Well
144	Right MLG Wheel Well

B. Procedure

S 226-003

(1) Use the supplied data (Fig. 601) to examine the TE flap side-of-body angle gearbox for too much wear.

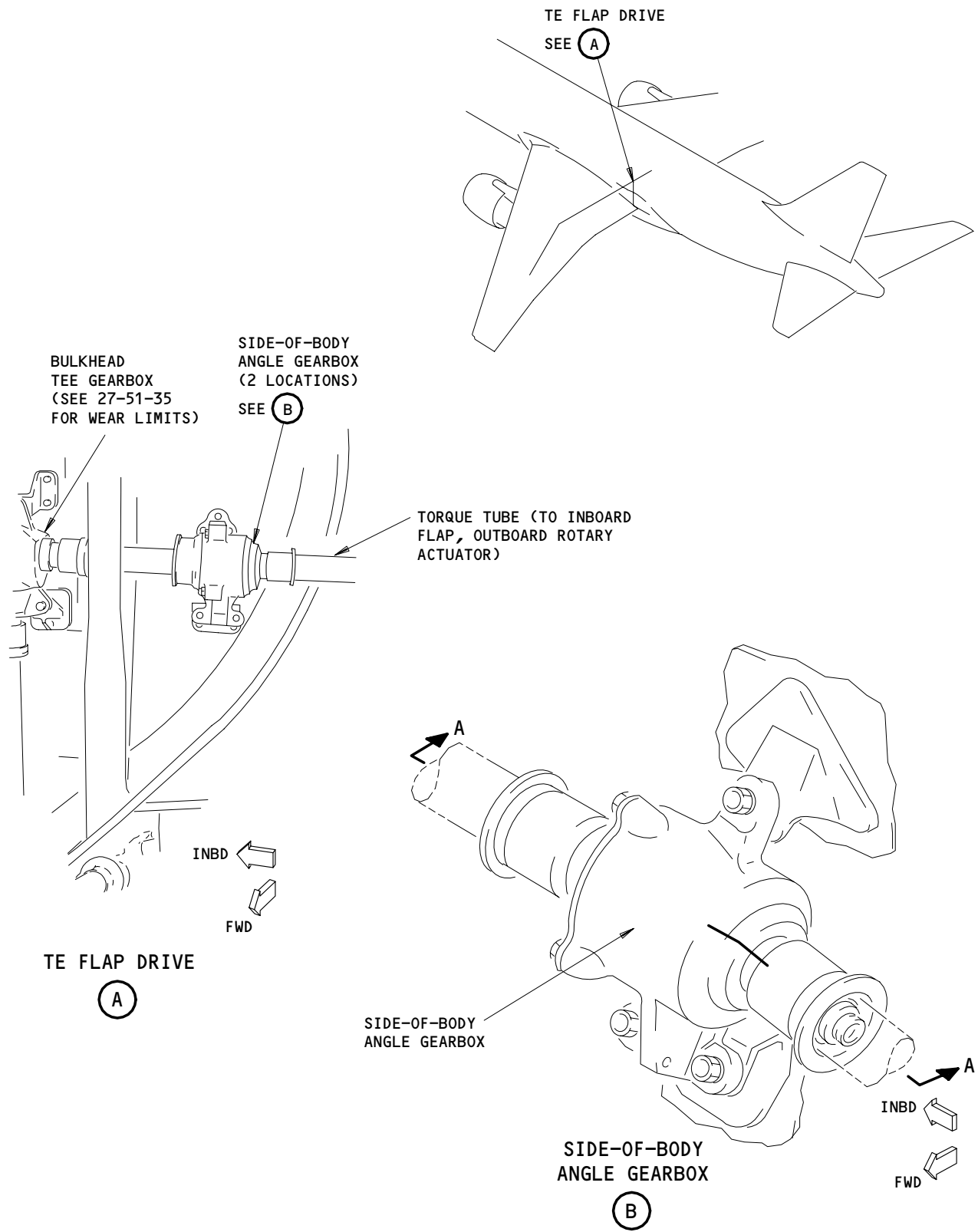
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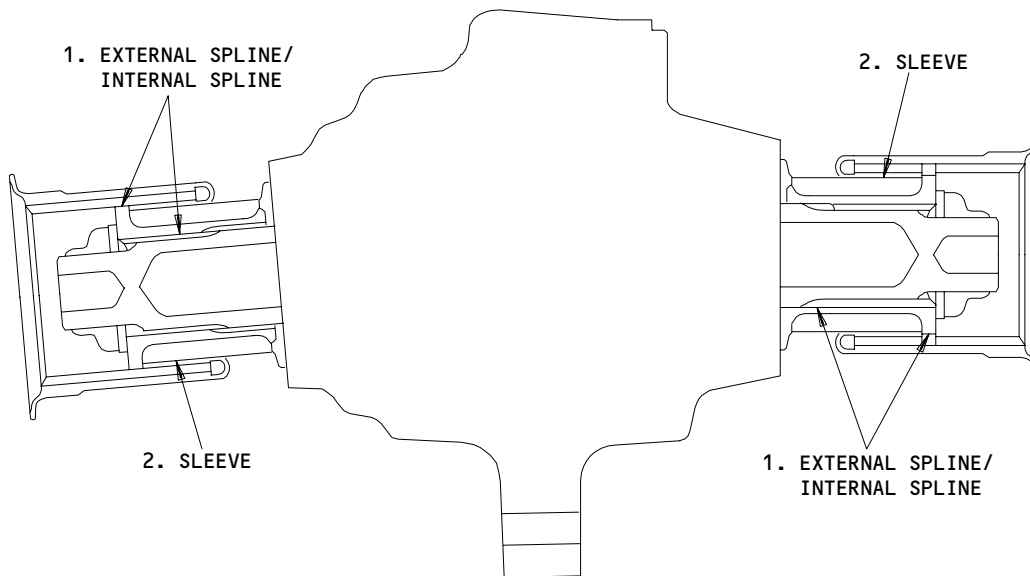
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Wear Limits for the TE Flap Side-of-Body Angle Gearbox  
Figure 601 (Sheet 1)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR.
			DIAMETER		PERMITTED WEAR DIM.	MAX DIAM CLEAR-ANCE			
			MIN	MAX					
1	EXTERNAL SPLINE		---	---	---	1	---	---	
	INTERNAL SPLINE		---	---	---		---	---	
2	SLEEVE		---	---	---	2	---	---	

1 VISUALLY EXAMINE (USE MAGNIFICATION IF NECESSARY) ALL THE BEARING SURFACES ON THE SPLINES FOR ANY WEAR

NOTE: REPLACE THE COUPLING IF YOU ARE NOT SURE ABOUT THE WEAR

2 REPLACE THE RUBBER SEAL IF DACRON COVER ON THE SLEEVE IS WORN OR DAMAGED

Wear Limits for the TE Flap Side-of-Body Angle Gearbox  
Figure 601 (Sheet 2)

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TE FLAP OFFSET GEARBOX – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the TE flap offset gearbox.

TASK 27-51-38-024-001

2. TE Flap Offset Gearbox – Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip – 1012LC-R  
Commercially Available
- (2) TE Flap PDU Lock – A27009-7

B. References

- (1) AMM 24-22-00/201, Electrical Power – Control
- (2) AMM 27-51-00/501, Trailing Edge Flap System
- (3) AMM 27-51-41/401, TE Flap Torque Tubes
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Landing Gear Door Locks
- (6) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
550/650	Wing Trailing Edge – Inboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-004

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

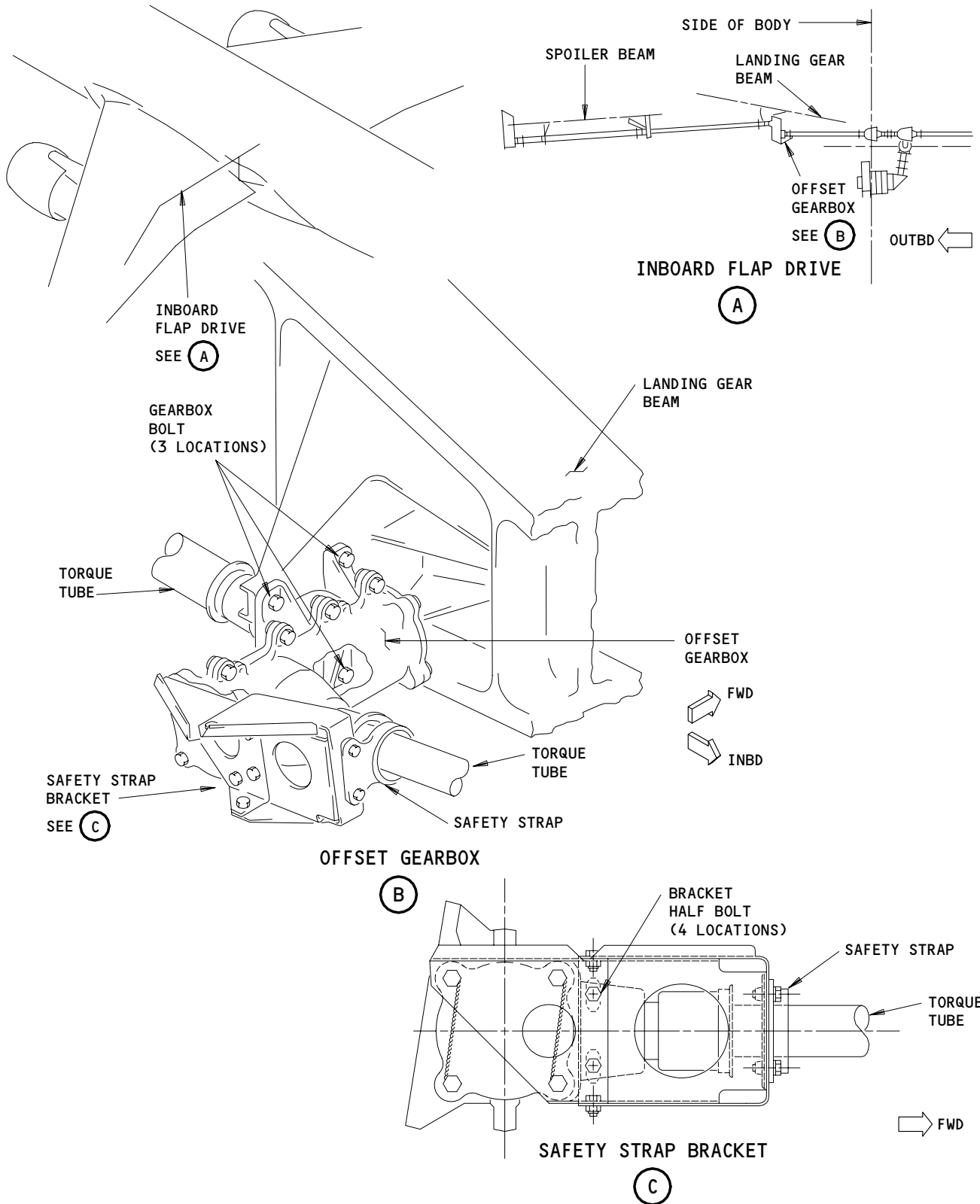
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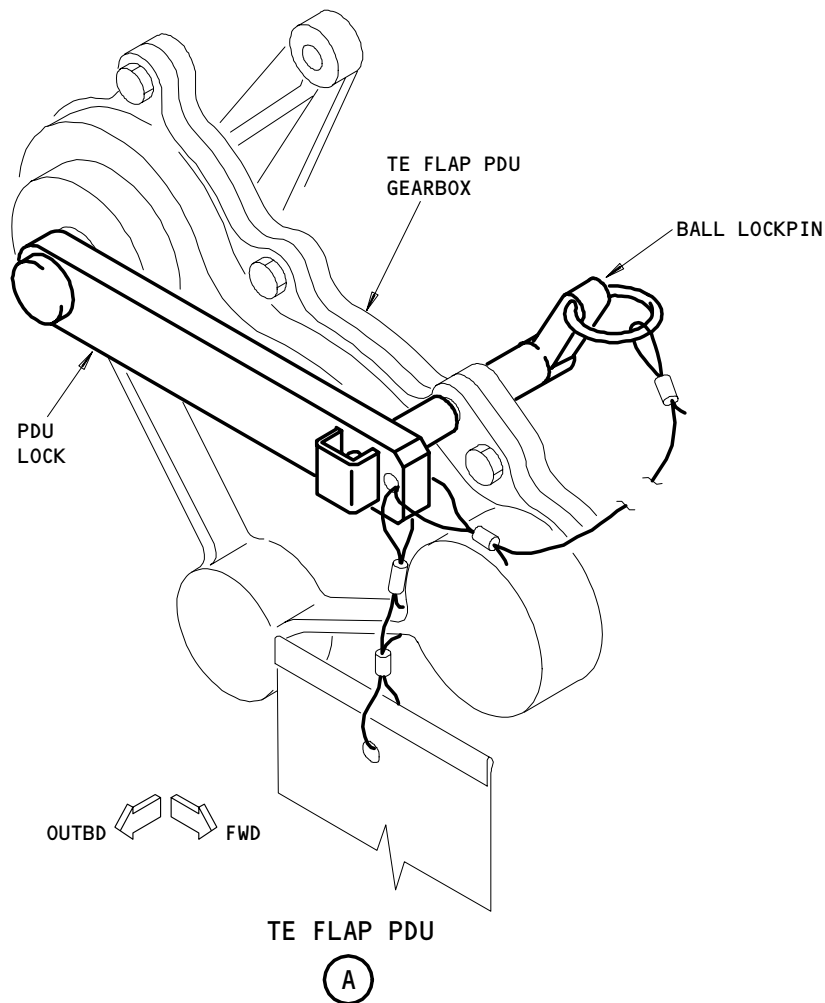
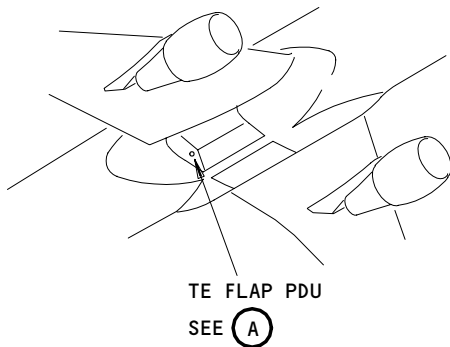
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Offset Gearbox  
Figure 401

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PDU Lock for the TE Flap PDU  
Figure 402

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S 864-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-006

(5) Move the flap control lever to the 30-unit detent and permit the flaps to move to the fully extended position.

S 864-007

(6) Remove pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-008

(7) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:

(a) 6D24, ALTN FLAP PWR

S 864-009

(8) Open these circuit breakers on the P6 panel and install circuit breaker locks:

(a) 6D21, ALTN SLAT INBD PWR

(b) 6F24, ALTN SLAT OUTBD PWR

S 864-010

(9) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:

(a) 11J24, FLAPS ALTN CONT

S 864-011

(10) Open these circuit breakers on the P11 panel and install circuit breaker locks:

(a) 11H23, SLAT ALTN CONT INBD

(b) 11H24, SLAT ALTN CONT OUTBD

S 494-012

(11) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 402).

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E. Remove the Offset Gearbox (Fig. 401)

S 034-013

- (1) Disconnect the four bolts that attach the safety strap bracket half to the gearbox bracket half.

**NOTE:** Do not remove the four lockwired bolts that is attached to to the offset gearbox.

S 034-014

- (2) Move the safety strap bracket along the torque tube and away from the offset gearbox.

S 034-015

- (3) Disconnect the two torque tubes on the offset gearbox (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tube. It will be necessary to adjust the flap drive if you turn the torque tube while it is disconnected.

S 034-016

- (4) Remove the three gearbox bolts that connect the offset gearbox to the landing gear beam.

S 024-017

- (5) Remove the offset gearbox from the airplane.

TASK 27-51-38-424-018

3. TE Flap Offset Gearbox - Installation

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) D00015 Grease - BMS 3-24 (Alternate)

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B. References

- (1) AMM 20-10-23/401, Lockwire
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-51-00/501, Trailing Edge Flap System
- (4) AMM 27-51-41/401, TE Flap Torque Tubes
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) AMM 32-00-15/201, Landing Gear Door Locks

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
550/650	Wing Trailing Edge - Inboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

D. Install the Offset Gearbox (Fig. 401)

S 644-019

- (1) Apply a thin layer of the grease to the three gearbox bolts.

S 434-020

- (2) Put the offset gearbox into its position and attach it with three bolts, washers, and locknuts.

S 434-021

- (3) Connect the two torque tubes to the offset gearbox (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tube during the installation. It will be necessary to adjust the flap drive if you turn the torque tube.

S 224-022

- (4) Make sure the torque tube on the inboard side of the offset gearbox can move from end to end, and that the end clearances are satisfactory (AMM 27-51-41/401).

S 644-023

- (5) Fill the gearbox coupling with BMS 3-33 grease.

S 434-024

- (6) Make sure you install a lockwire to the coupling screws at each coupling with the double twist procedure (AMM 20-10-23/401).

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S 434-025

- (7) Apply grease to four bracket half bolts, and install the bracket half with safety strap to the gearbox bracket half.

**NOTE:** Make sure the safety strap clears the torque tube by a minimum of 0.10 inch (2.54 mm).

S 094-026

- (8) Remove the PDU lock from the TE flap PDU (Fig. 402).

S 224-027

- (9) Do a check on the retract overtravel stop clearances for the inboard flap if it is necessary (AMM 27-51-00/501).

E. Put the Airplane Back to Its Usual Condition

S 864-028

- (1) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the main power distribution panel, P6:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6D24, ALTN FLAP PWR  
(c) 6F24, ALTN SLAT OUTBD PWR

S 864-029

- (2) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD  
(c) 11J24, FLAPS ALTN CONT

S 864-030

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

S 864-031

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

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S 864-032

- (5) Move the flap control lever to the zero (FLAPS UP) detent and permit the flaps to move to the fully retracted position.

S 094-033

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (6) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 864-034

- (7) Remove power from the center hydraulic system (AMM 29-11-00/201).

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TE FLAP OFFSET GEARBOX – INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and a wear limit table, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the TE Flap Offset Gearbox – Removal/Installation for procedures to do these tasks.

TASK 27-51-38-226-001

2. Wear Limits for the TE Flap Offset Gearbox (Fig. 601)

A. Access

- (1) Location Zones

570/670 Left/Right Wing Trailing Edge – Inboard

B. Procedure

S 226-003

- (1) Use the supplied data (Fig. 601) to examine the TE flap offset gearbox for too much wear.

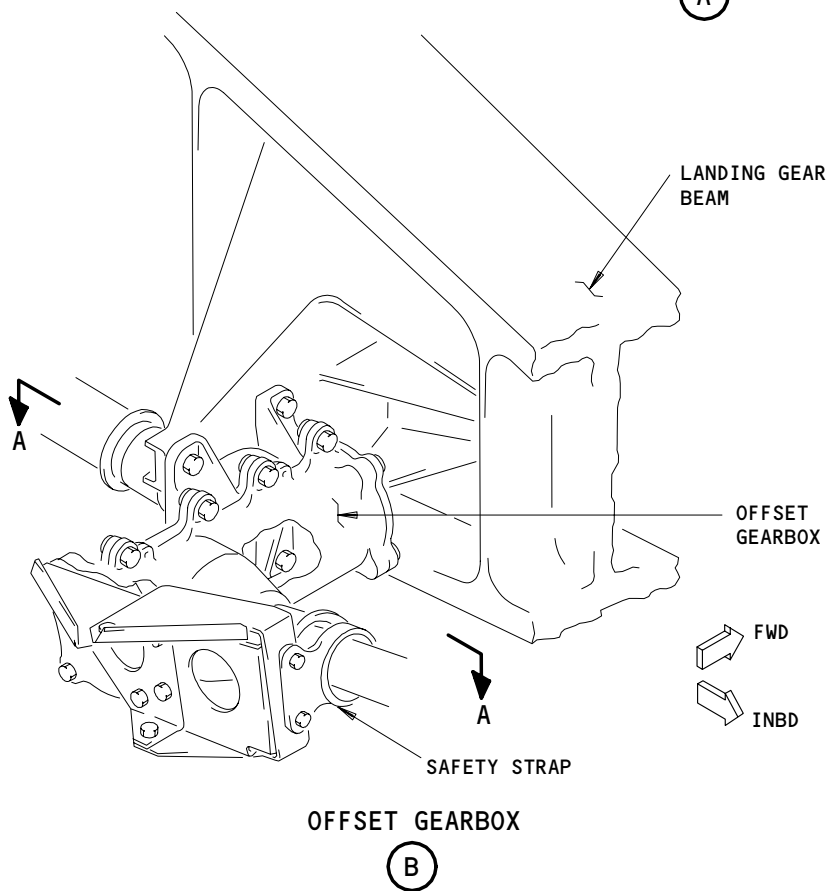
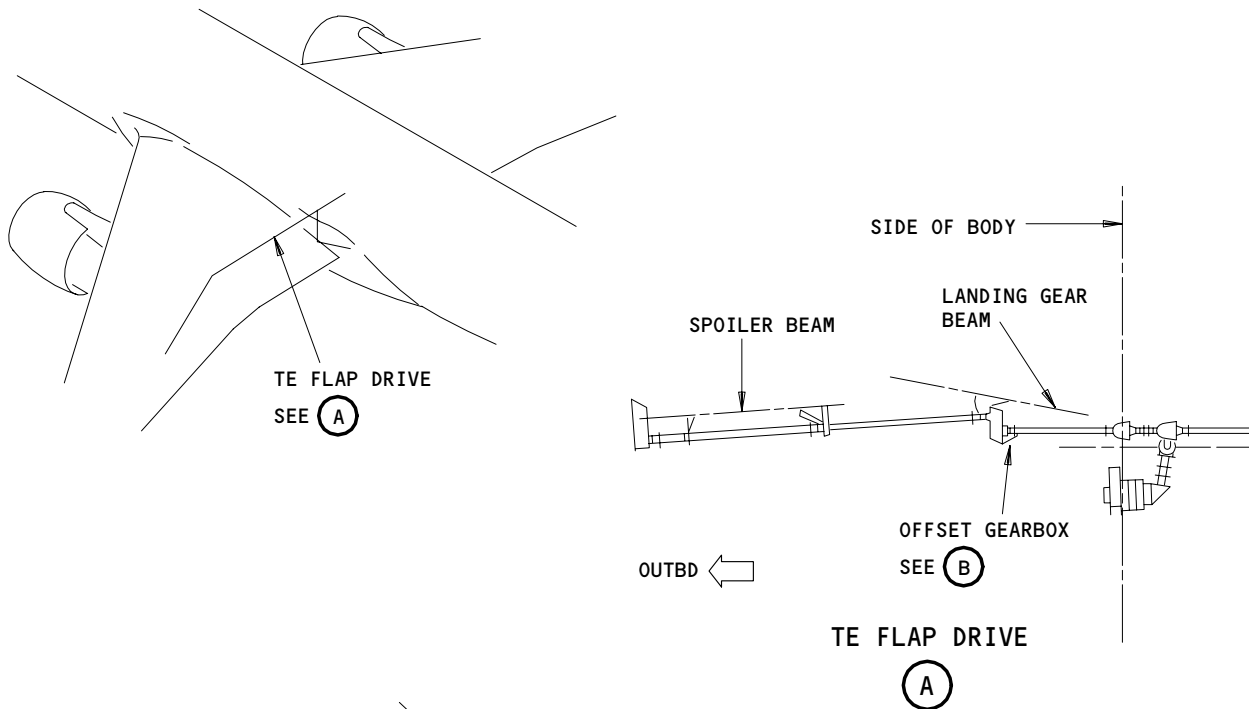
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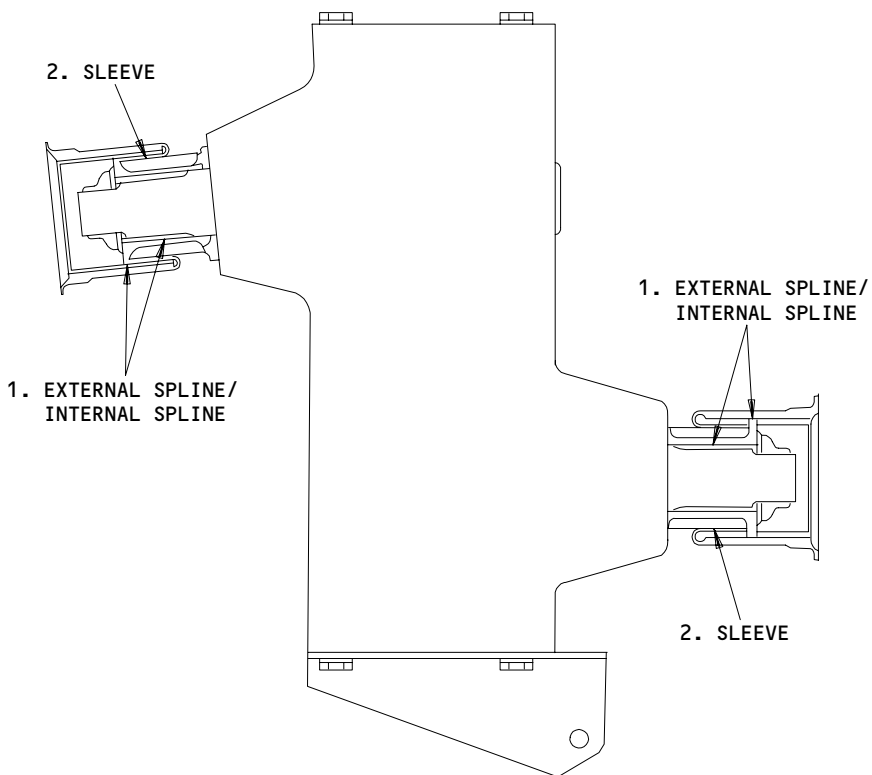
Wear Limits for the TE Flap Offset Gearbox  
Figure 601 (Sheet 1)

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A-A

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR.
			DIAMETER		PERMITTED WEAR DIM.	MAX DIAM CLEAR-ANCE			
			MIN	MAX					
1	EXTERNAL SPLINE		---	---	---	1	---	---	
	INTERNAL SPLINE		---	---	---		---	---	
2	SLEEVE		---	---	---	2	---	---	

1 VISUALLY EXAMINE (USE MAGNIFICATION IF NECESSARY) ALL THE BEARING SURFACES ON THE SPLINES FOR ANY WEAR

NOTE: REPLACE THE COUPLING IF YOU ARE NOT SURE ABOUT THE WEAR

2 REPLACE THE RUBBER SEAL IF THE DACRON COVER ON THE SLEEVE IS WORN OR DAMAGED

Wear Limits for the TE Flap Offset Gearbox  
Figure 601 (Sheet 2)

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TE FLAP OFFSET TEE GEARBOX – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the trailing edge (TE) flap offset tee gearbox.

TASK 27-51-39-024-001

2. TE Flap Offset Tee Gearbox – Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip – 1012LC-R  
Commercially Available  
(2) TE Flap PDU Lock – A27009-7

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels  
(2) AMM 24-22-00/201, Electrical Power – Control  
(3) AMM 27-51-00/501, Trailing Edge Flap System  
(4) AMM 27-51-41/401, TE Flap Torque Tubes  
(5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(6) AMM 32-00-15/201, Landing Gear Door Locks  
(7) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
550/650	Wing Trailing Edge – Inboard
571/671	Inboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

552FB/652FB	Spoiler Beam, Flap Installation
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D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-004

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

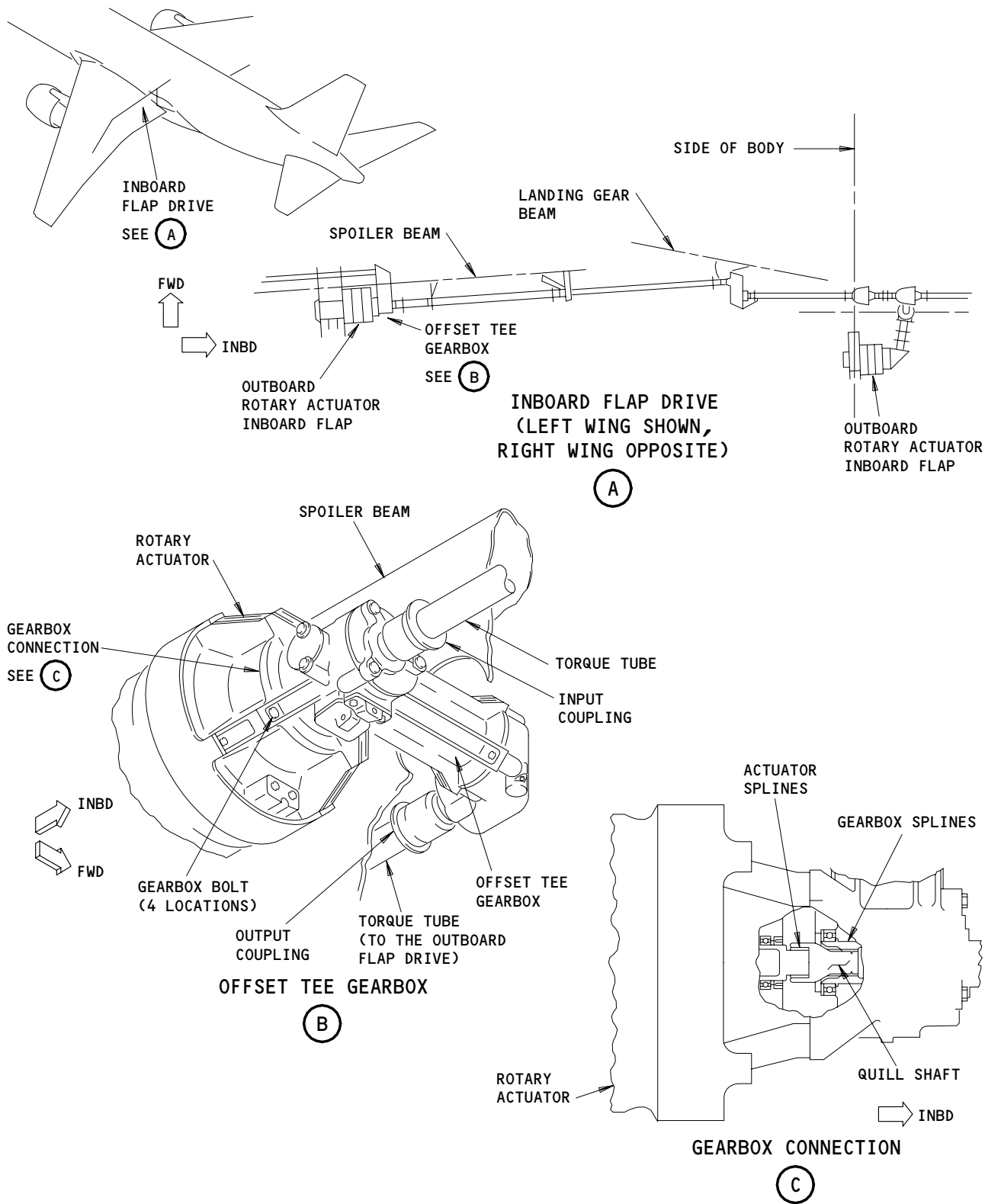
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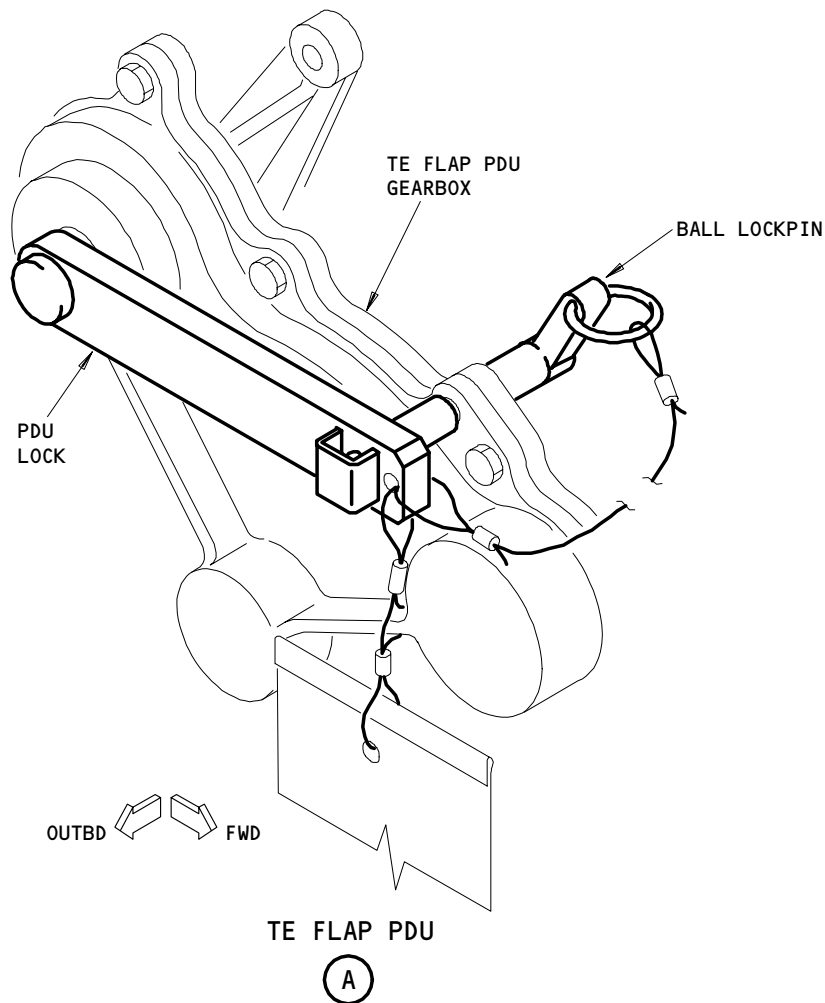
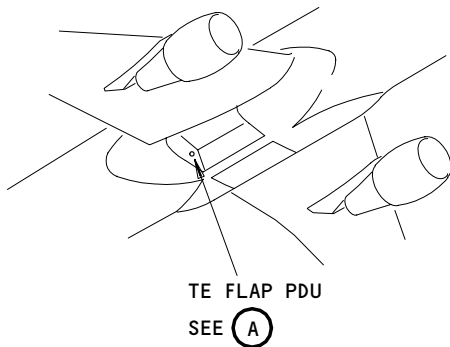
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Offset Tee Gearbox  
Figure 401

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PDU Lock for the TE Flap PDU  
Figure 402

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S 864-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-006

(5) Move the flap control lever to the 30-unit detent and permit the flaps to move to the fully extended position.

S 864-007

(6) Remove pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-008

(7) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 864-009

(8) Open these circuit breakers on the P6 panel and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 864-010

(9) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:  
(a) 11J24, FLAPS ALTN CONT

S 864-011

(10) Open these circuit breakers on the P11 panel and install circuit breaker locks:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD

S 494-012

(11) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 402).

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S 014-013

- (12) Remove the access panel, 552FB (left wing) or 652FB (right wing), to get access to the offset tee gearbox, in front of the spoiler beam (AMM 06-44-00/201).

E. Remove the Offset Tee Gearbox (Fig. 401)

S 034-014

- (1) Disconnect the torque tubes from the input and output couplings on the offset tee gearbox (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tube. It will be necessary to adjust the flap drive if you turn the torque tube while it is disconnected.

S 844-015

- (2) Move the torque tubes away from the gearbox.

S 034-016

- (3) Disconnect the four gearbox bolts and pull the gearbox away from the rotary actuator.

S 034-017

- (4) Remove the quill shaft between the gearbox and the rotary actuator.

**NOTE:** Make sure there is no damage on the quill shaft or the mating splines.

S 024-018

- (5) To remove the offset tee gearbox, turn the gearbox 180 degrees and pull it out from the spoiler beam hole.

TASK 27-51-39-424-019

3. TE Flap Offset Tee Gearbox - Installation

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)

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- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) D00015 Grease - BMS 3-24 (Alternate)

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 20-10-23/401, Lockwires
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 27-51-00/501, Trailing Edge Flap System
- (5) AMM 27-51-41/401, TE Flap Torque Tubes
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) AMM 32-00-15/201, Landing Gear Door Locks

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
550/650	Wing Trailing Edge - Inboard
571/671	Inboard Flap Outboard Fairing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

552FB/652FB	Spoiler Beam, Flap Installation
-------------	---------------------------------

D. Install the Offset Tee Gearbox (Fig. 401)

S 644-020

- (1) Apply BMS 3-33 grease to the quill shaft and the mating splines on the offset tee gearbox.

S 434-021

- (2) Put the quill shaft in the gearbox mating splines.

S 644-022

- (3) Apply BMS 3-33 grease to the actuator splines and the mating surfaces.

S 984-023

- (4) Point the gearbox bolt holes in the inboard direction and put the output end of the gearbox through the spoiler beam hole.

S 984-024

- (5) Turn the gearbox 180 degrees to align the gearbox bolt holes with the attach holes on the rotary actuator.

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- S 824-025
- (6) Turn the quill shaft to align with the rotary actuator splines, and engage the gearbox to the rotary actuator.
- S 644-026
- (7) Apply a light layer of grease to the four gearbox bolts.
- S 434-027
- (8) Install the four gearbox bolts to the offset tee gearbox, and tighten the bolts.
- S 434-028
- (9) Connect the torque tubes to the offset tee gearbox (AMM 27-51-41/401).

**NOTE:** Do not turn the coupling or the torque tube during the installation. It will be necessary to adjust the flap drive if you turn the torque tube or the coupling.

- S 224-029
- (10) Make sure the torque tubes can move from end to end, and that the end clearances are satisfactory (AMM 27-51-41/401).
- S 644-030
- (11) Fill the input and output couplings with BMS 3-33 grease.
- S 434-031
- (12) Make sure you install a lockwire to the coupling screws on each coupling with the double twist procedure (AMM 20-10-23/401).
- S 094-032
- (13) Remove the PDU lock from the TE flap power drive unit (PDU) (Fig. 402).
- S 224-033
- (14) Do a check on the retract overtravel stop clearances if it is necessary (AMM 27-51-00/501).

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E. Put the Airplane Back to Its Usual Condition

S 414-034

- (1) Close the access panels, 552FB and 652FB, for the access to the offset tee gearbox (AMM 06-44-00/201).

S 864-035

- (2) Remove the circuit breakers locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-036

- (3) Remove these circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-037

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

S 864-038

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (5) Pressurize the center hydraulic system (AMM 29-11-00/201).

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S 864-039

- (6) Move the flap control lever to the zero (FLAPS UP) detent and permit the flaps to move to the fully retracted position.

S 094-040

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (7) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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OFFSET TEE GEARBOX – INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and a wear limit table, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Offset Tee Gearbox – Removal/Installation for procedures to do these tasks.

TASK 27-51-39-226-001

2. Wear Limits for the Offset Tee Gearbox (Fig. 601)

A. Access

(1) Location Zones

570/670 Left/Right Wing Trailing Edge – Inboard

B. Procedure

S 226-003

- (1) Use the supplied data (Fig. 601) to examine the offset tee gearbox for too much wear.

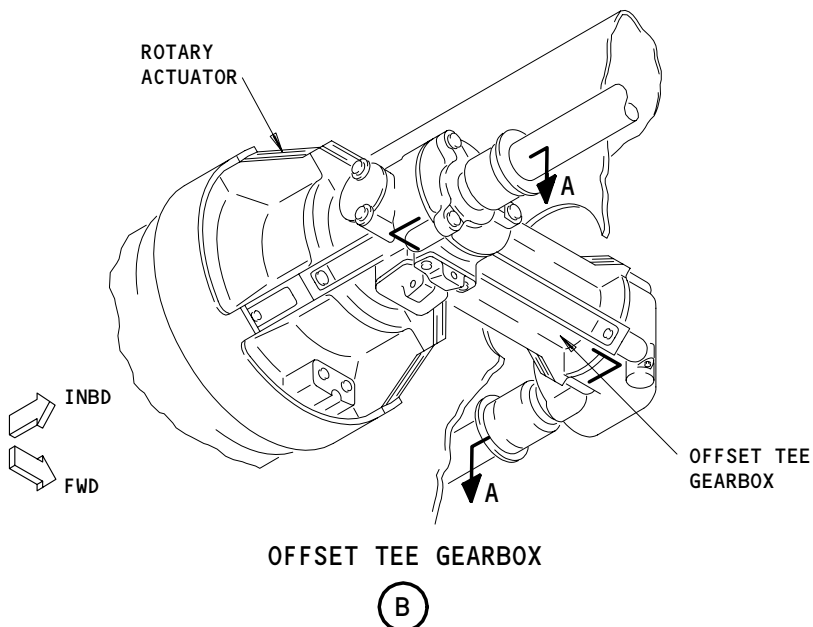
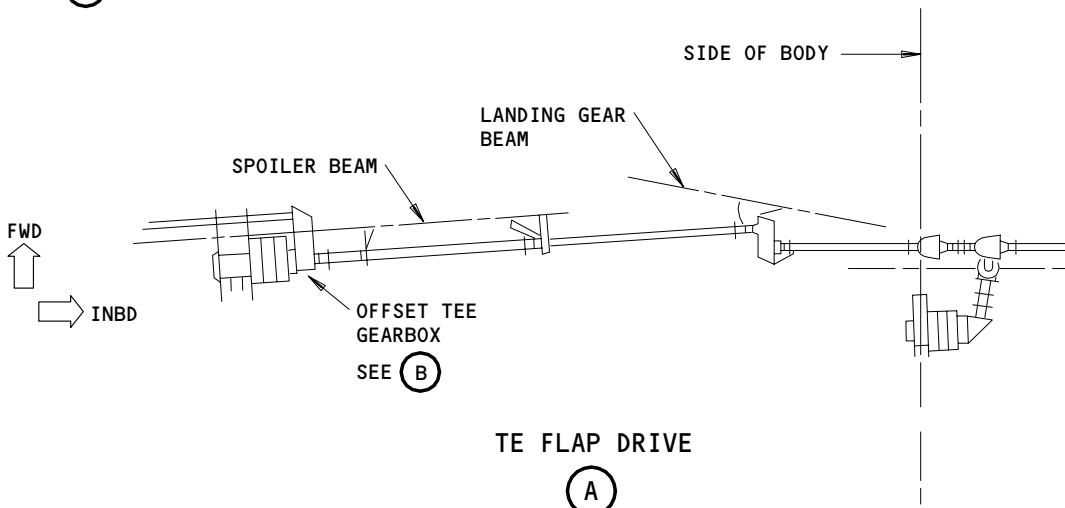
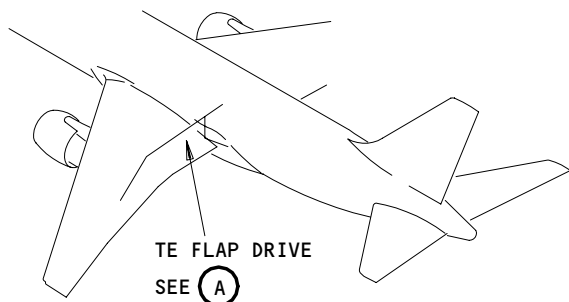
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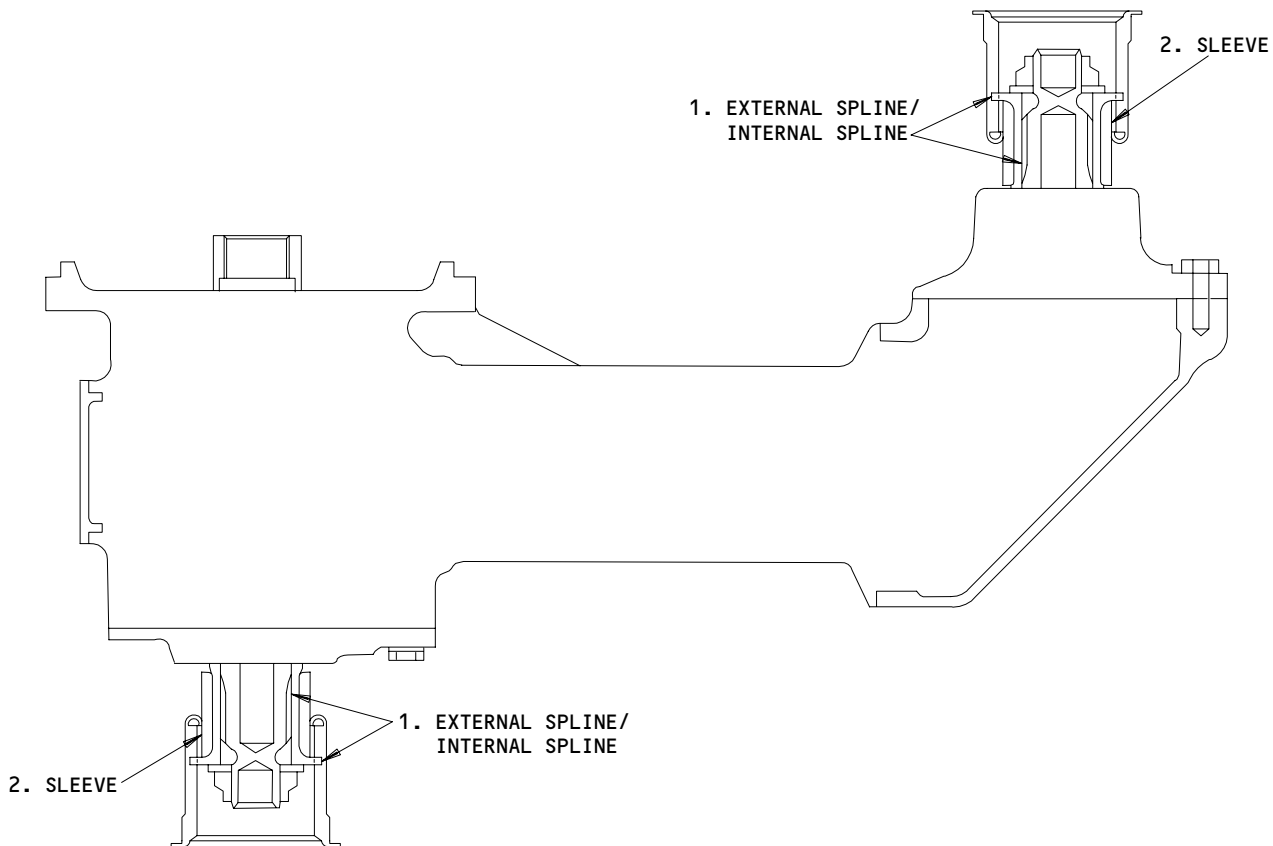
Wear Limits for the Offset Tee Gearbox  
Figure 601 (Sheet 1)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR.
			DIAMETER		PERMITTED WEAR DIM.	MAX DIAM CLEAR-ANCE			
			MIN	MAX					
1	EXTERNAL SPLINE		---	---	---	1	---	---	
	INTERNAL SPLINE		---	---	---		---	---	
2	SLEEVE		---	---	---	2	---	---	

1 VISUALLY EXAMINE (USE MAGNIFICATION IF NECESSARY) ALL THE BEARING SURFACES ON THE SPLINES FOR ANY WEAR

NOTE: REPLACE THE COUPLING IF YOU ARE NOT SURE ABOUT THE WEAR

2 REPLACE THE RUBBER SEAL IF THE DACRON COVER ON THE SLEEVE IS WORN OR DAMAGED

Wear Limits for the Offset Tee Gearbox  
Figure 601 (Sheet 2)

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AILERON DROOP ANGLE GEARBOX – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the left and right aileron droop angle gearboxes.
- B. The left and right aileron droop angle gearboxes are different, and are not interchangeable.

TASK 27-51-40-024-001

2. Aileron Droop Angle Gearbox – Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip – 1012LC-R  
Commercially Available
- (2) TE Flap PDU Lock – A27009-7

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 27-51-41/401, TE Flap Torque Tubes
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 32-00-15/201, Landing Gear Door Locks
- (5) AMM 32-00-20/201, Landing Gear Downlocks
- (6) AMM 54-52-01/401, Strut Fairings

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
550/650	Wing Trailing Edge – Inboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

561AB/661AB	Left/Right Wing TE Structure, Aileron Controls
-------------	--

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

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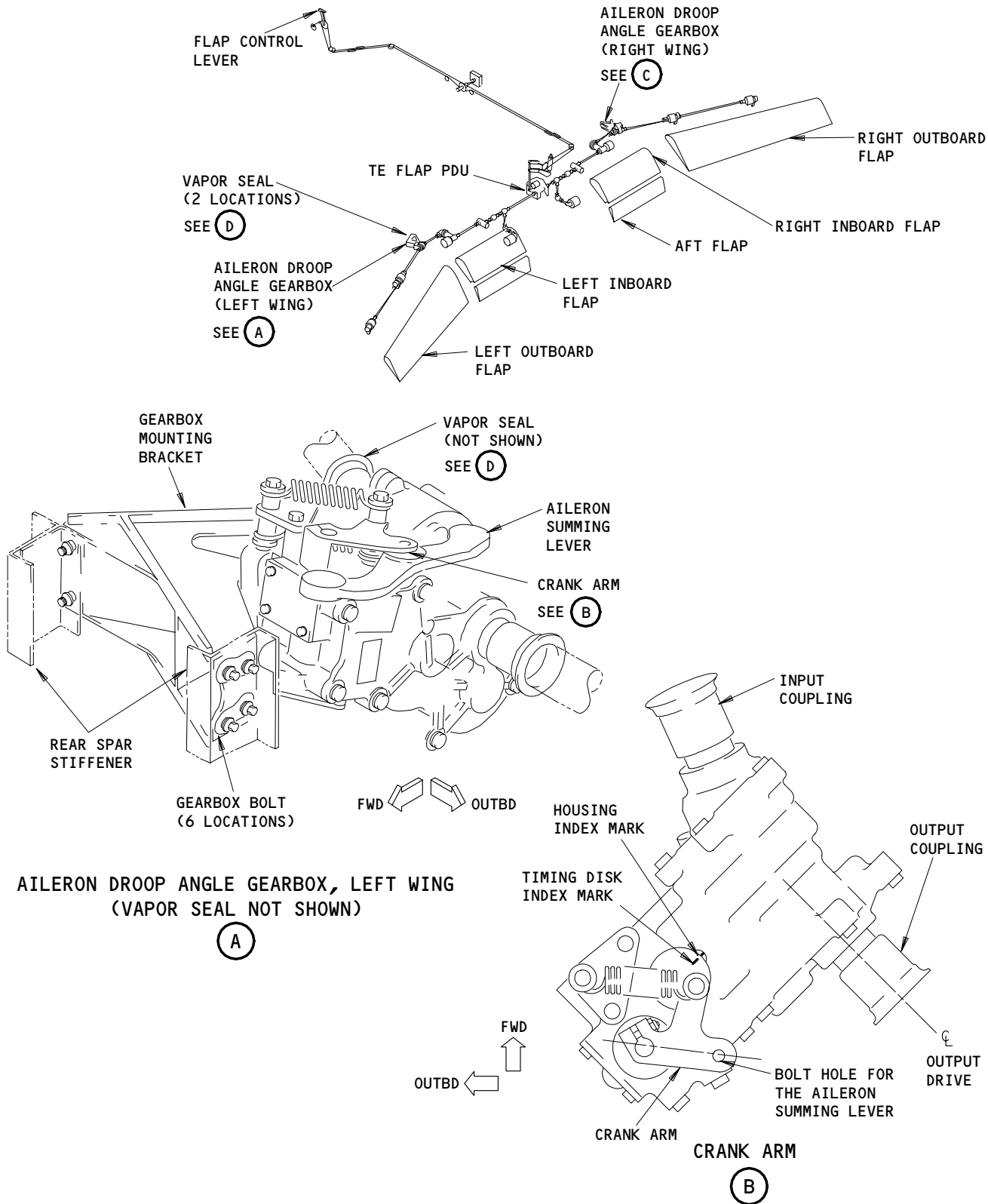
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# BOEING

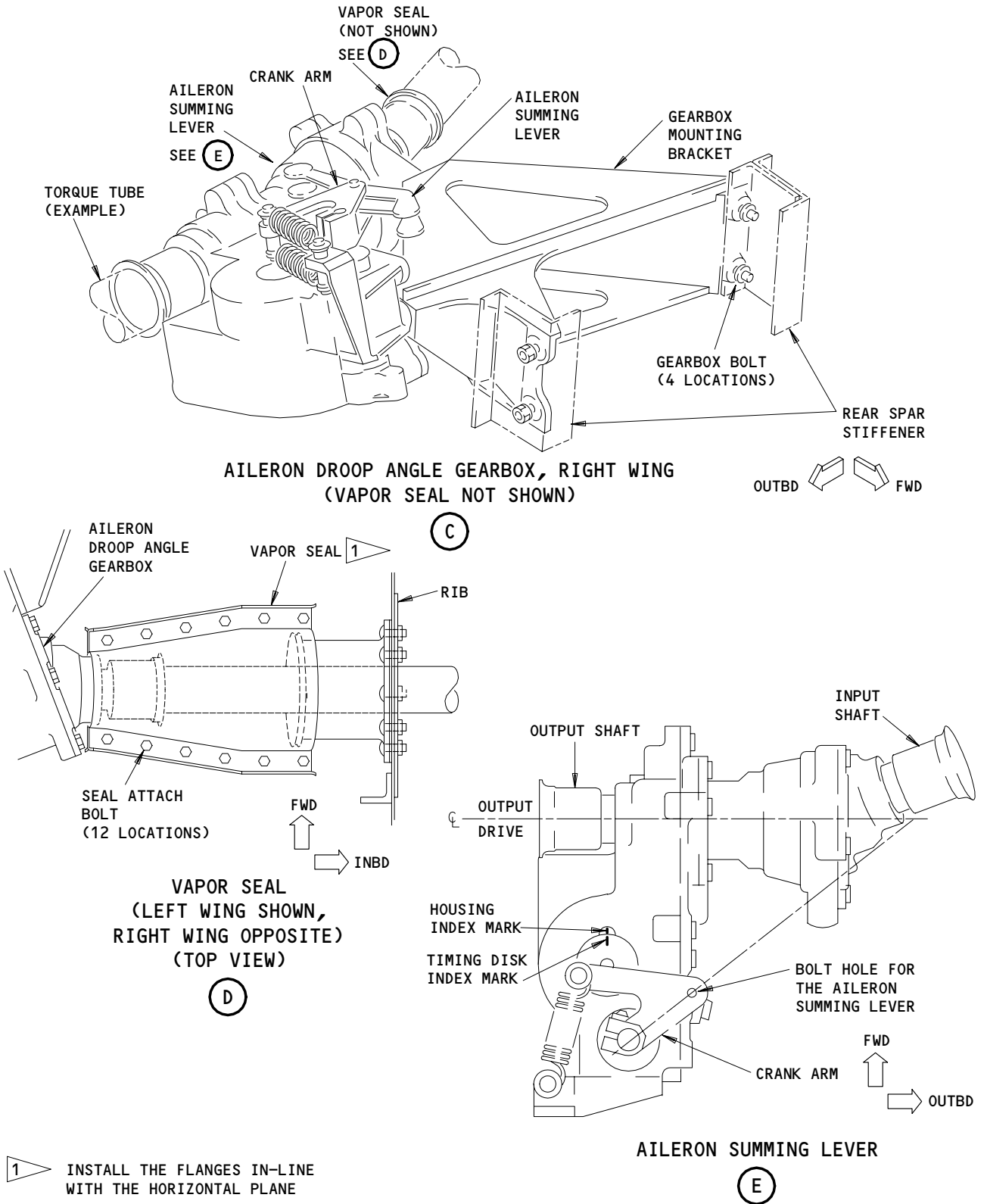
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Aileron Droop Angle Gearbox  
Figure 401 (Sheet 1)

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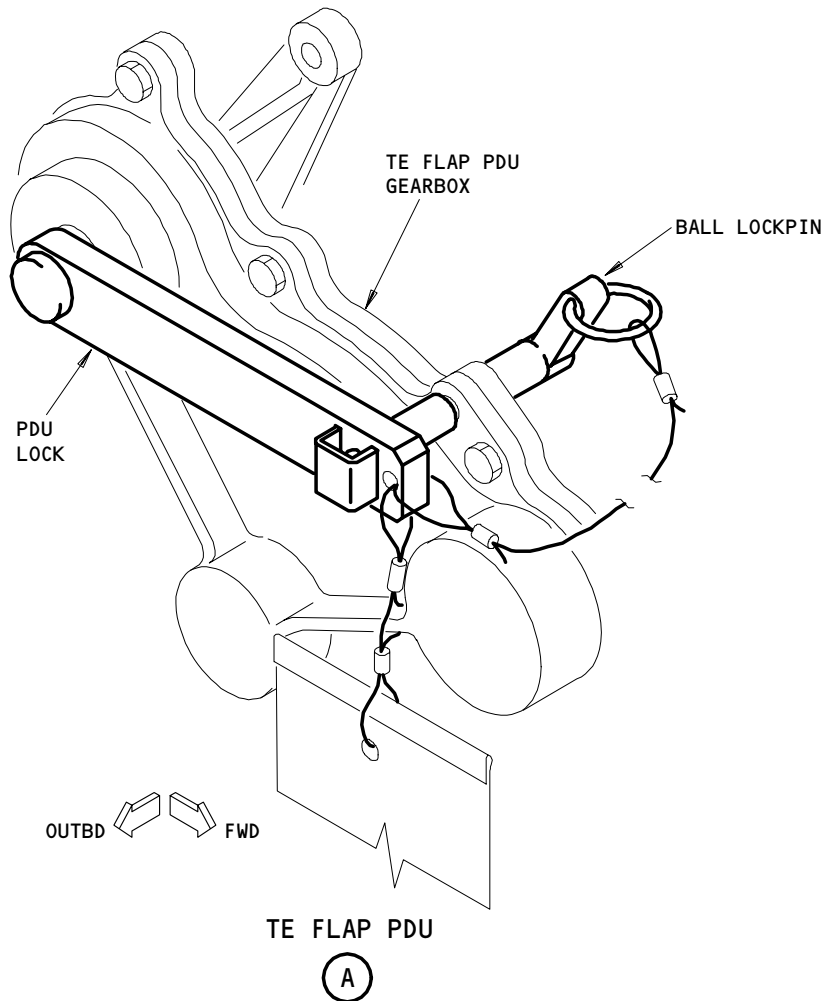
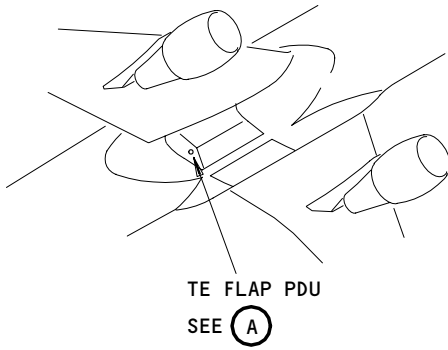
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Aileron Droop Angle Gearbox  
Figure 401 (Sheet 2)

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PDU Lock for the TE Flap PDU  
Figure 402

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- S 214-005
- (3) Make sure the flaps and slats are in the fully retracted position.
- S 214-004
- (4) Make sure the flap control lever is in the zero (FLAPS UP) detent.
- S 494-043
- (5) Attach a DO-NOT-OPERATE tag to the flap control lever.
- S 864-006
- (6) Remove the power from the center hydraulic system (AMM 29-11-00/201).
- S 864-007
- (7) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:
- (a) 6D24, ALTN FLAP PWR
- S 864-008
- (8) Open these circuit breakers on the P6 panel and install circuit breaker locks:
- (a) 6D21, ALTN SLAT INBD PWR
- (b) 6F24, ALTN SLAT OUTBD PWR
- S 864-009
- (9) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11J24, FLAPS ALTN CONT
- S 864-010
- (10) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
- (b) 11H24, SLAT ALTN CONT OUTBD
- S 494-011
- (11) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 402).
- S 024-012
- (12) Remove the trailing edge fairing on the engine strut (AMM 54-52-01/401).
- S 014-013
- (13) Remove the wing access panel, 561AB (left wing) or 661AB (right wing), above the trailing edge fairing of the engine strut (AMM 06-44-00/201).

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E. Remove the Aileron Droop Angle Gearbox (Fig. 401)

S 034-014

- (1) Disconnect the torque tubes on the aileron droop angle gearbox, at the input and output couplings.
  - (a) At the coupling end of each torque tube, disconnect the lockwire and remove the coupling screws.

NOTE: Do not turn the torque tubes. It will be necessary to adjust the flap drive and check the retract overtravel stop clearances if you turn the torque tubes while they are disconnected.

S 034-015

- (2) Disconnect the center bolt that attaches the aileron summing lever to the crank arm (Detail B for the left gearbox, or Detail E for the right gearbox).

S 984-016

- (3) Move the aileron summing lever away from the crank arm.

S 034-017

- (4) Disconnect the twelve bolts, washers, and nuts on the vapor seal, and remove the vapor seal (Detail D).

S 034-018

- (5) For the left gearbox, disconnect the six gearbox bolts at the rear spar stiffeners (Detail A).

S 034-019

- (6) For the right gearbox, disconnect the four gearbox bolts at the rear spar stiffeners (Detail C).

S 024-020

- (7) Remove the gearbox from the airplane with the gearbox mounting bracket attached.

TASK 27-51-40-424-021

3. Aileron Droop Angle Gearbox - Installation

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)

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- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) D00015 Grease - BMS 3-24 (Alternate)

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 20-10-23/401, Lockwires
- (3) AMM 27-51-00/501, Trailing Edge Flap System
- (4) AMM 27-51-41/401, TE Flap Torque Tubes
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) AMM 32-00-15/201, Landing Gear Door Locks
- (7) AMM 54-52-01/401, Strut Fairings

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
550/650	Wing Trailing Edge - Inboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

561AB/661AB	Left/Right Wing TE Structure, Aileron Controls
-------------	--

D. Install the Aileron Droop Angle Gearbox (Fig. 401)

S 824-022

- (1) For the left gearbox,  
do this step to adjust the crank arm to the flaps fully retracted position (with no aileron droop):
  - (a) Turn the input shaft coupling until the crank arm moves to the position shown (Detail B), and that the index mark on the timing disc aligns with the index mark on the housing.

S 824-023

- (2) For the right gearbox,  
do this step to adjust the crank arm to the flaps fully retracted position (with no aileron droop):
  - (a) Turn the input coupling until the crank arm moves to the position shown (Detail E), and that the index mark on the timing disc aligns with the index mark on the housing.

S 644-024

- (3) Apply a layer of the grease to the gearbox bolts.

S 434-025

- (4) For the left gearbox,  
attach the gearbox to the rear spar stiffeners with six gearbox bolts.

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- S 434-026
- (5) For the right gearbox,  
attach the gearbox to the rear spar stiffeners with four gearbox  
bolts.

- S 644-027
- (6) Apply grease to the center bolt for the aileron summing lever.

- S 434-028
- (7) Put the aileron summing lever in the crank arm and attach it with  
the center bolt, washer, and locknut. Tighten the locknut.

- S 434-029
- (8) Connect the torque tubes to the gearbox at the input and output  
couplings (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tube during the installation. It will  
be necessary to adjust the flap drive and check the retract  
overtravel stop clearances if you turn the torque tube.

- S 224-030
- (9) Make sure the torque tube at the inboard side of the gearbox can  
move from end to end, and that the end clearances are satisfactory  
(AMM 27-51-41/401).

- S 644-031
- (10) Fill the gearbox coupling with BMS 3-33 grease.

- S 434-032
- (11) Make sure you install a lockwire to the coupling screws on each  
coupling with the double twist procedure (AMM 20-10-23/401).

- S 644-033
- (12) Apply a thin layer of grease to twelve bolts for the vapor seal.

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S 434-034

**CAUTION:** MAKE SURE YOU INSTALL THE VAPOR SEAL WITH THE FLANGE ALIGNED IN THE DIRECTION OF THE HORIZONTAL PLANE. INCORRECTLY INSTALLED VAPOR SEAL CAN CATCH THE MOVEMENT OF THE AILERON AND CAUSE DAMAGE TO THE AIRPLANE.

- (13) Install the vapor seal around the inboard torque tube with the twelve fasteners, washers, and nuts (Detail D).

**NOTE:** Make sure the flange on the vapor seal aligns with the horizontal plane.

S 094-035

- (14) Remove the PDU lock from the TE flap power drive unit (PDU) (Fig. 402).

S 224-036

- (15) Do a check on the retract overtravel stop clearances if the torque tube has been rotated while disassembled. (AMM 27-51-00/501).

E. Put the Airplane Back to Its Usual Condition

S 414-039

- (1) Install the wing access panels, 561AB (left wing) and 661AB (right wing), above the trailing edge fairing of the engine strut (AMM 06-44-00/201).

S 424-040

- (2) Install the trailing edge fairing for the engine strut (AMM 54-52-01/401).

S 864-037

- (3) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6D24, ALTN FLAP PWR  
(c) 6F24, ALTN SLAT OUTBD PWR

S 864-038

- (4) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD  
(c) 11J24, FLAPS ALTN CONT

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S 094-041

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(5) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 864-042

(6) Remove the power from the center hydraulic system (AMM 29-11-00/201).

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AILERON DROOP ANGLE GEARBOX – INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and a wear limit table, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Aileron Droop Angle Gearbox – Removal/Installation for procedures to do these tasks.

TASK 27-51-40-226-001

2. Wear Limits for the Aileron Droop Angle Gearbox (Fig. 601)

NOTE: Wear limits for other components that are connected to the TE flap aileron droop angle gearbox are in other Inspection/Check sections of the Maintenance Manual.

A. Access

(1) Location Zones

550/650 Left/Right Wing Trailing Edge – Inboard of Outboard  
TE Flap

B. Procedure

S 226-003

- (1) Use the supplied data (Fig. 601) to examine the aileron droop angle gearbox for too much wear.

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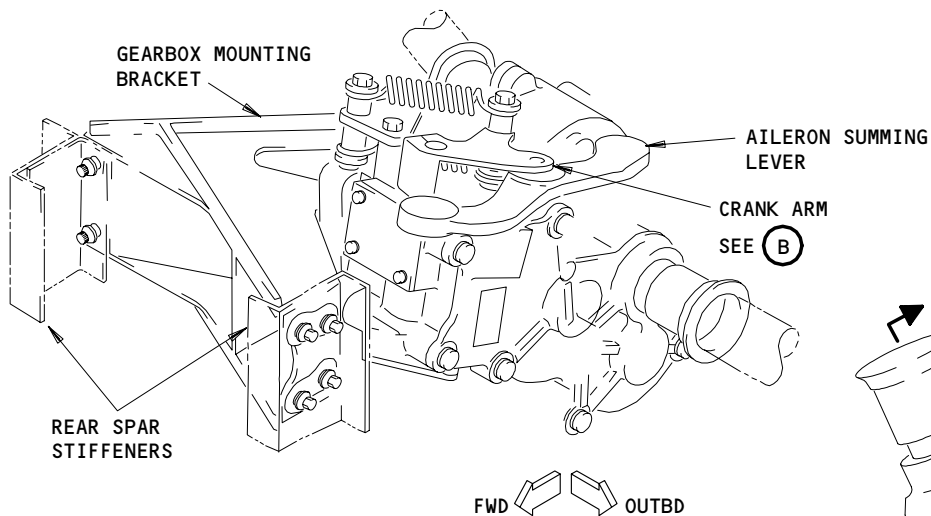
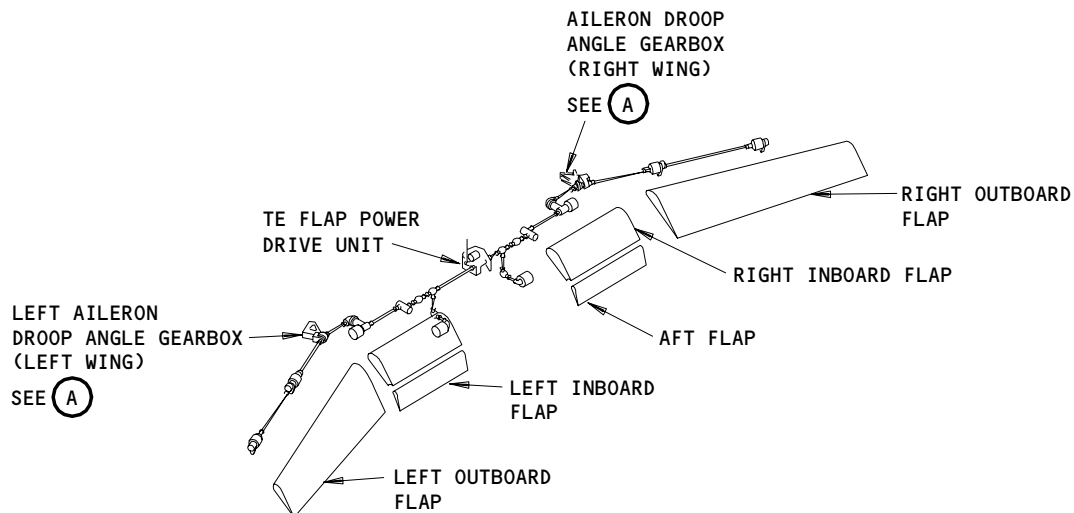
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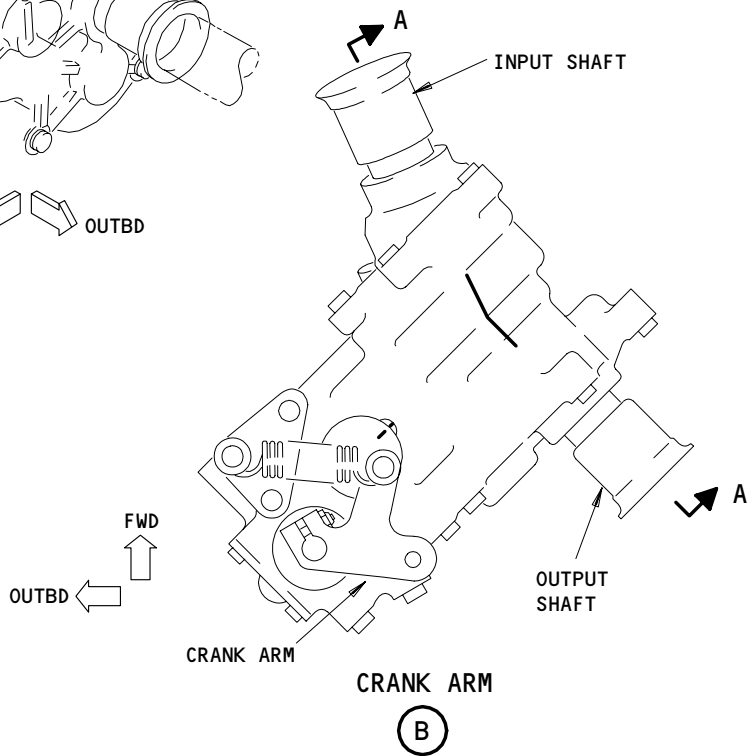
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AILERON DROOP ANGLE GEARBOX  
LEFT WING SHOWN  
(VAPOR SEAL NOT SHOWN)

(A)



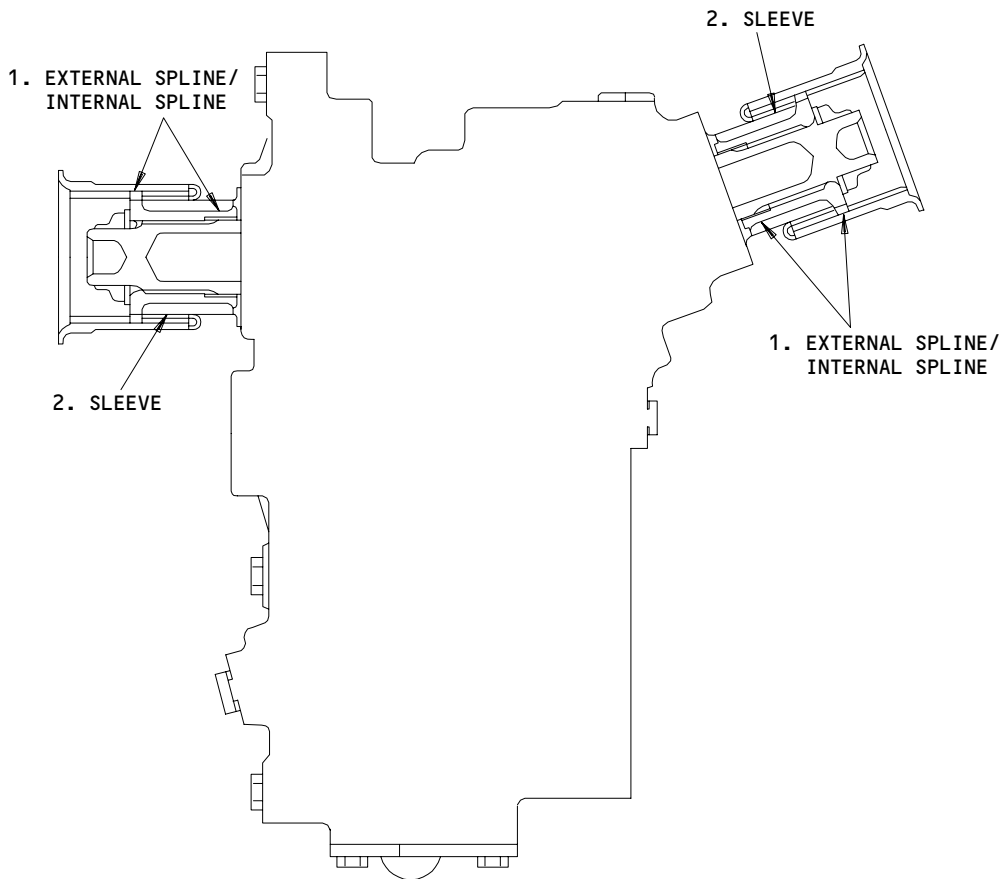
Wear Limits for the Aileron Droop Angle Gearbox  
Figure 601 (Sheet 1)

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A-A

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR.
			DIAMETER		PERMITTED WEAR DIM.	MAX DIAM CLEAR-ANCE			
			MIN	MAX					
1	EXTERNAL SPLINE		---	---	---	1	---	---	
	INTERNAL SPLINE		---	---	---		---	---	
2	SLEEVE		---	---	---	2	---	---	

1 VISUALLY EXAMINE (USE MAGNIFICATION IF NECESSARY) ALL THE BEARING SURFACES ON THE SPLINES FOR ANY WEAR

NOTE: REPLACE THE COUPLING IF YOU ARE NOT SURE ABOUT THE WEAR

2 REPLACE THE RUBBER SEAL IF THE DACRON COVER IN THE SLEEVE IS WORN OR DAMAGED

Wear Limits for the Aileron Droop Angle Gearbox  
Figure 601 (Sheet 2)

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TE FLAP TORQUE TUBE – REMOVAL/INSTALLATION

TASK 27-51-41-904-005

1. TE Flap Torque Tube Removal and Installation

A. General

- (1) This task contains the procedure for the removal and installation of the trailing edge (TE) flap torque tube.

B. Equipment

- (1) Circuit Breaker Lockout Clip - 1012LC-R  
Commercially Available  
(2) TE Flap PDU Lock - A27009-7

C. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)  
(2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)  
(3) D00015 Grease - BMS 3-24 (Alternate)

D. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels  
(2) AMM 24-22-00/201, Electrical Power - Control  
(3) AMM 27-51-00/501, Trailing Edge Flap System  
(4) AMM 27-51-20/401, Outboard Flap  
(5) AMM 27-51-41/601, TE Flap Torque Tubes  
(6) AMM 29-11-00/201, Pressure/Depressurize Main Hydraulic System  
(7) AMM 32-00-15/201, Landing Gear Door Locks  
(8) AMM 32-00-20/201, Landing Gear Downlocks

E. Access

(1) Location Zones

143/144	Left/Right MLG Wheel Well
211/212	Control Cabin
550/650	Left/Right Wing Trailing Edge, Inboard
560/660	Left/Right Wing Trailing Edge, Outboard
730/740	Left/Right Main Landing Gear and Doors

F. Prepare for Removal

S 214-001

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-002

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-006

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

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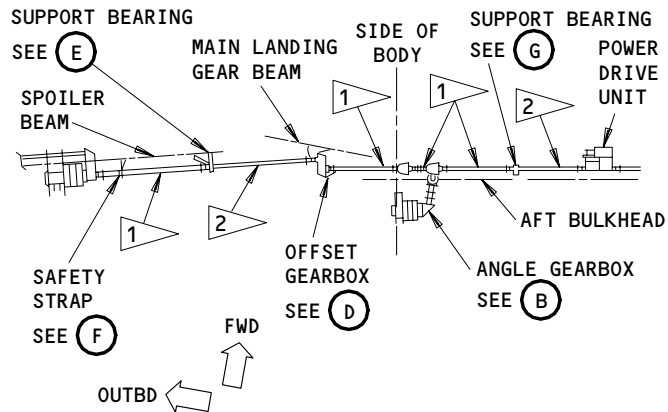
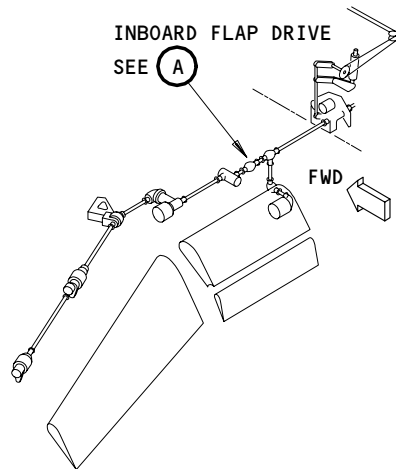
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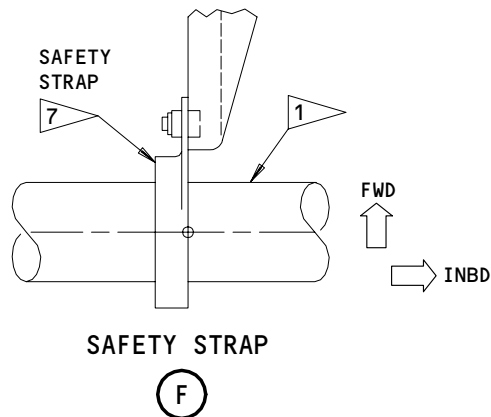
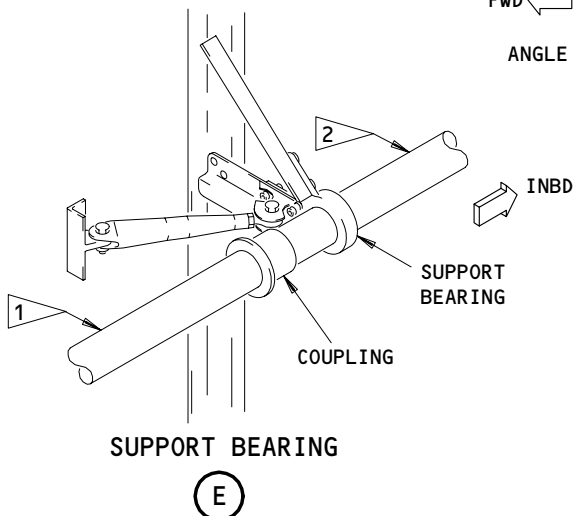
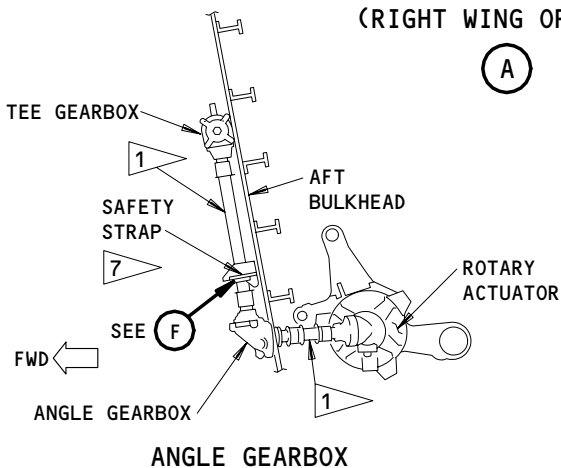
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# BOEING

## 767 MAINTENANCE MANUAL



INBOARD FLAP DRIVE  
LEFT SHOWN  
(RIGHT WING OPPOSITE)

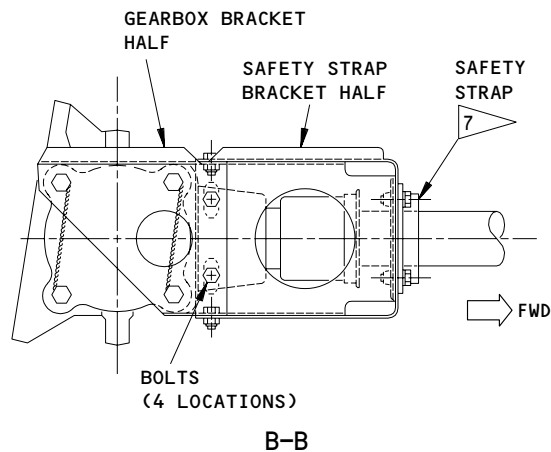
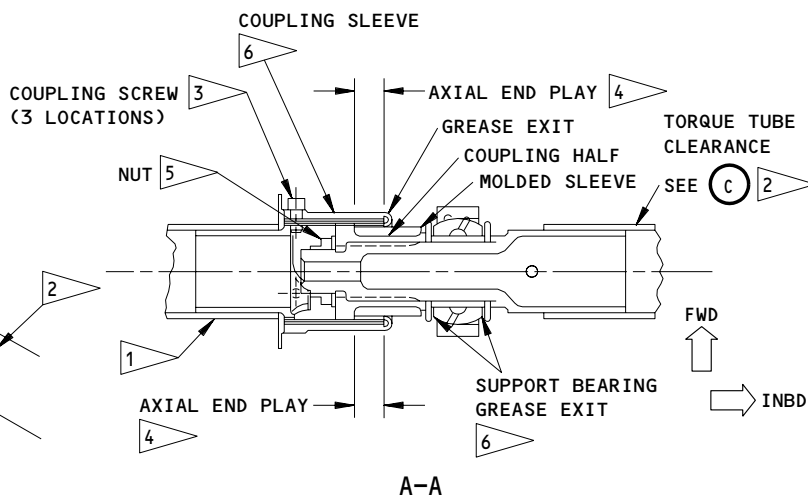
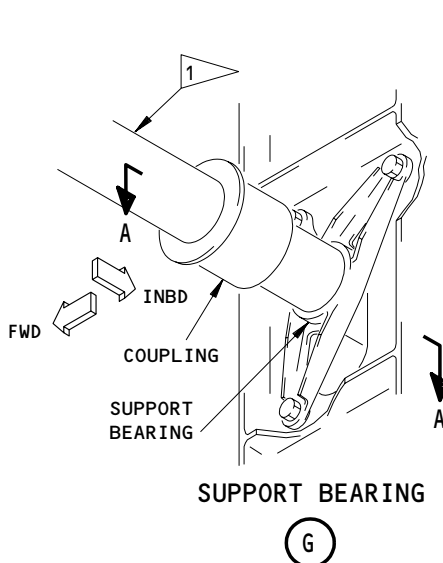
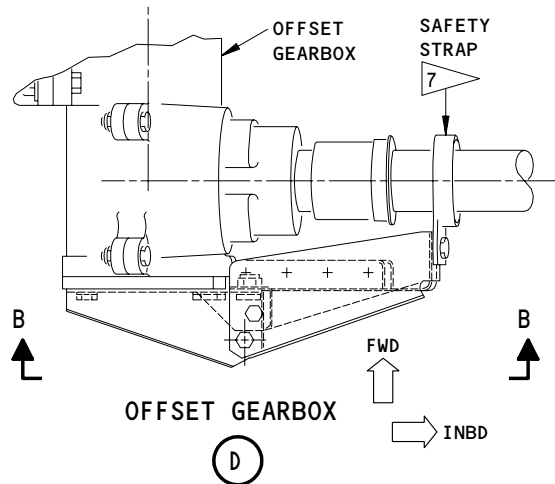
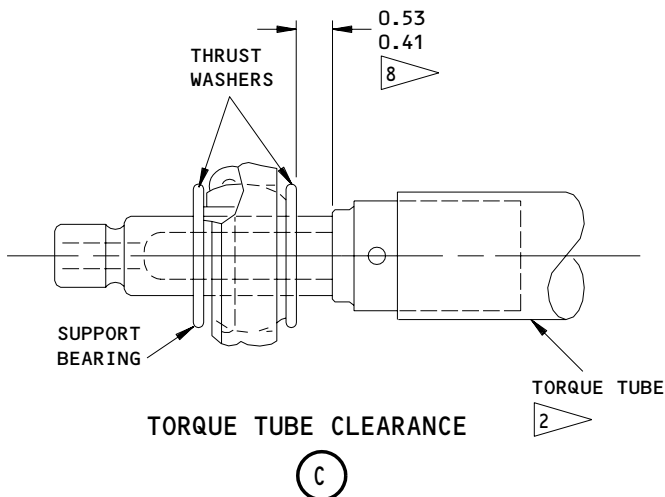


- 1 FLOATING TORQUE TUBE
- 2 NONFLOATING TORQUE TUBE
- 7 THE MINIMUM CLEARANCE BETWEEN THE TORQUE TUBE AND THE SAFETY STRAP IS 0.15 INCH

Inboard TE Flap Torque Tube  
Figure 401 (Sheet 1)

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- 3 INSTALL LOCKWIRE (2 LOCATIONS)
- 4 THE TOTAL AXIAL END PLAY AT THE END OF A FLOATING TORQUE TUBE (AFTER THE INSTALLATION OF THREE COUPLING SCREWS) IS 0.94 ±0.12 INCH
- 5 INSTALL WITH A LAYER OF BMS 3-33 (PREFERRED) OR BMS 3-24 (ALTERNATE) GREASE
- 6 FILL AT THE COUPLING SLEEVES AND SUPPORT BEARING HOUSINGS WITH BMS 3-33 (PREFERRED) OR BMS 3-24 (ALTERNATE) GREASE, UNTIL GREASE COMES OUT OF THE EXIT
- 8 THE TOTAL AXIAL END PLAY OF A NONFLOATING TORQUE TUBE, WHEN A COUPLING IS INSTALLED AT THE OPPOSITE END OF THE TORQUE TUBE

Inboard TE Flap Torque Tube  
Figure 401 (Sheet 2)

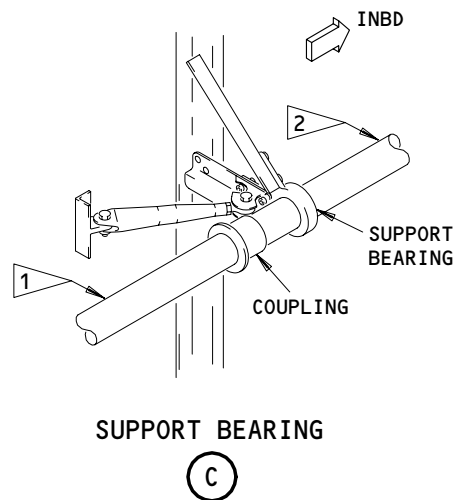
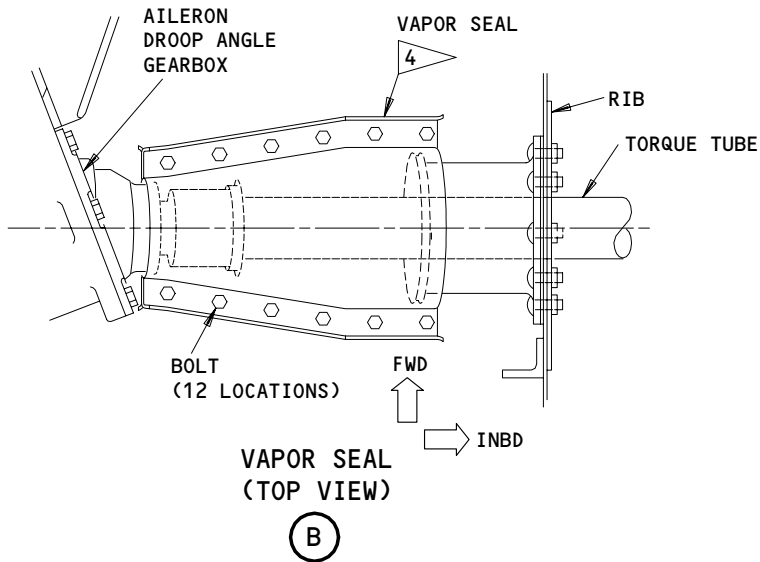
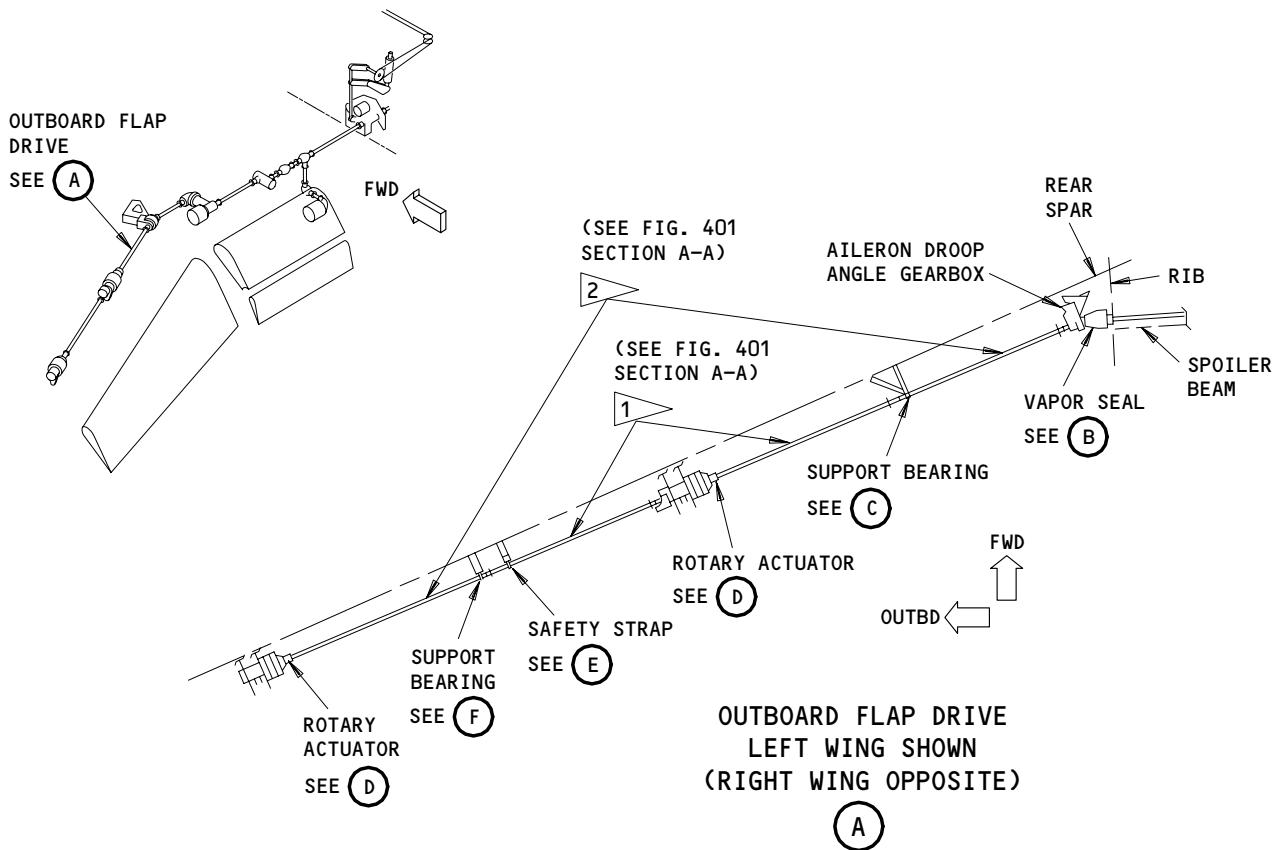
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- 1 FLOATING TORQUE TUBE
- 2 NONFLOATING TORQUE TUBE
- 4 THE FLANGES OF THE VAPOR SEAL IS IN A HORIZONTAL PLANE

Outboard TE Flap Torque Tubes  
Figure 402 (Sheet 1)

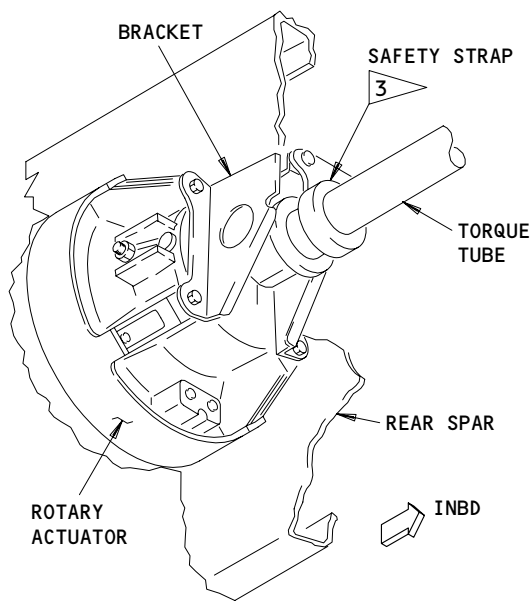
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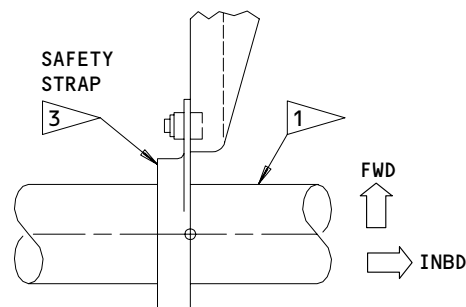
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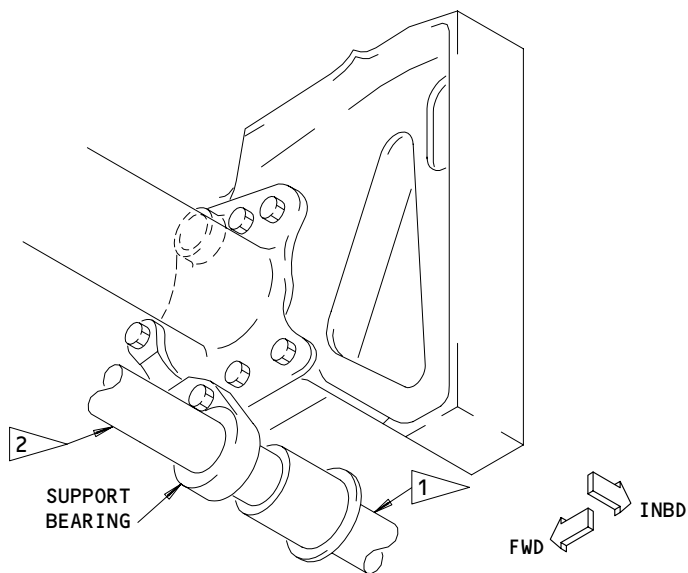
ROTARY ACTUATOR

(D)



SAFETY STRAP

(E)



SUPPORT BEARING

(F)

3 THE MINIMUM CLEARANCE BETWEEN THE TORQUE TUBE AND THE SAFETY STRAP IS 0.15 INCH

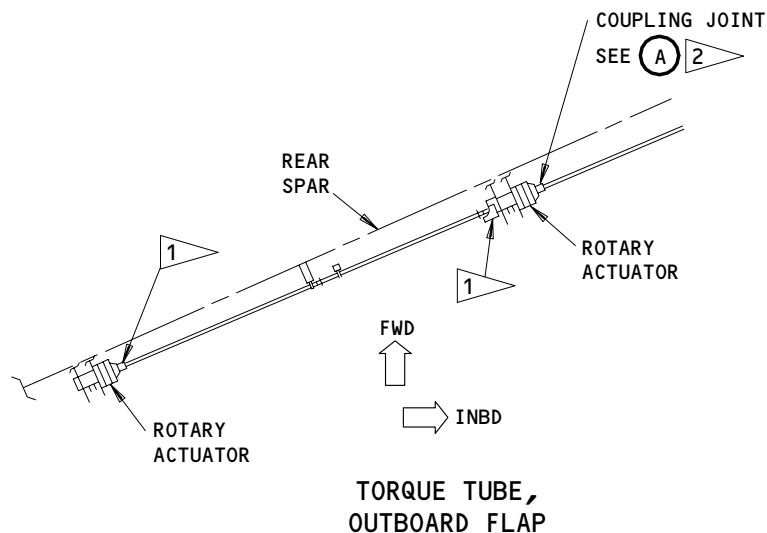
Outboard TE Flap Torque Tubes  
Figure 402 (Sheet 2)

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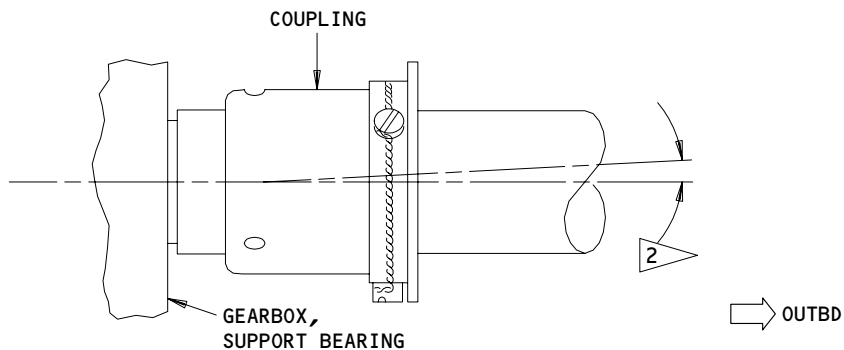
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THE MINIMUM CLEARANCE BETWEEN THE TORQUE TUBES AND THE ADJACENT STRUCTURE IS 0.38 INCH. WHERE A NYLON RUBSTRIP IS INSTALLED, THE MINIMUM CLEARANCE IS 0.12 INCH. NYLON MUST EXTEND A MINIMUM OF 0.09 INCH OVER THE ADJACENT STRUCTURE.



**COUPLING JOINT (EXAMPLE)  
(FOR INBOARD OR OUTBOARD FLAP)**

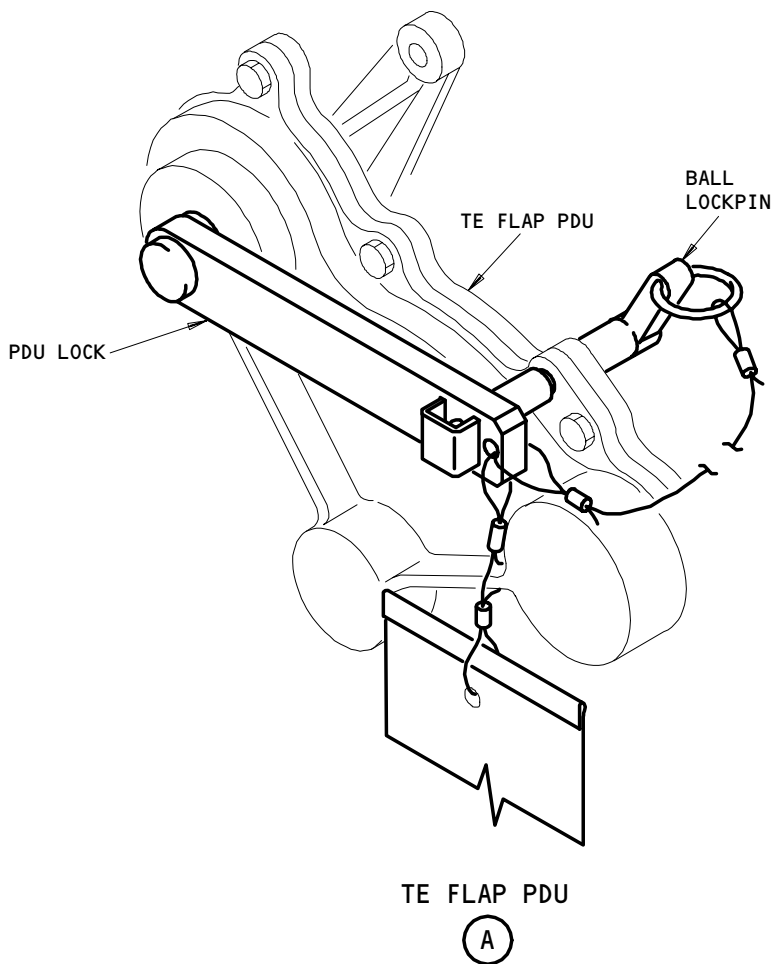
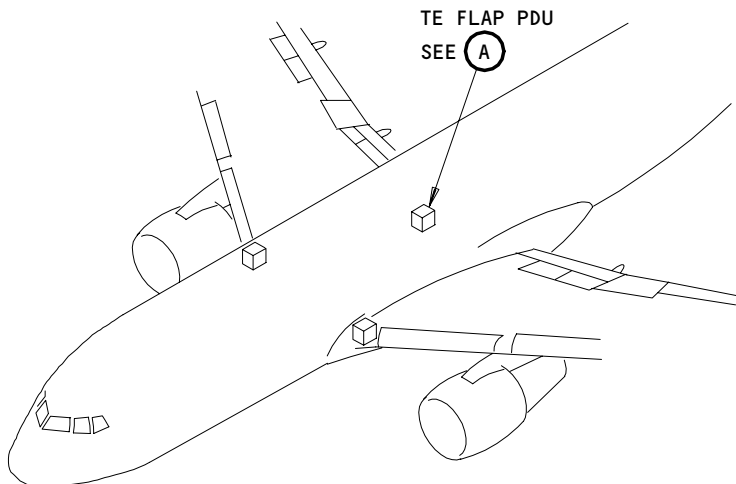
(A)

- 1 THE TORQUE TUBE MUST ALIGN WITH THE CENTER AXIS OF THE ADJACENT GEARBOX OR BEARING SHAFT DURING THE INSTALLATION, WITH A TOLERANCE OF LESS THAN 1 DEGREE IN THE HORIZONTAL AND VERTICAL PLANES. YOU CAN ALIGN THE TORQUE TUBE WITH A TOLERANCE OF LESS THAN 1.25 DEGREE, IF THE AIRPLANE IS ON THE GROUND WITH FUEL IN THE WING.
- 2 EXCEPT THOSE INDICATED BY 1, ALL TORQUE TUBES MUST ALIGN WITH THE CENTER AXIS OF THE ADJACENT GEARBOX OR BEARING SHAFT DURING INSTALLATION, WITH TOLERANCE OF LESS THAN 0.75 DEGREE IN THE HORIZONTAL AND VERTICAL PLANES. YOU CAN ALIGN THE TORQUE TUBE WITH A TOLERANCE OF LESS THAN 1 DEGREE, IF THE AIRPLANE IS ON THE GROUND WITH FUEL IN THE WING.

**Alignment for the TE Flap Torque Tube  
Figure 403**

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PDU Lock for the TE Flap PDU  
Figure 404

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S 864-007

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-008

(5) Move the flap control lever to the 30-unit detent and permit the TE flaps to move to the fully extended position.

S 864-009

(6) Remove pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-010

(7) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:

(a) 6D24, ALTN FLAP PWR

S 864-011

(8) Open these circuit breakers on the P6 panel and install circuit breaker locks and DO-NOT-CLOSE tags:

(a) 6D21, ALTN SLAT INBD PWR

(b) 6F24, ALTN SLAT OUTBD PWR

S 864-012

(9) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:

(a) 11J24, FLAPS ALTN CONT

S 864-013

(10) Open these circuit breakers on the P11 panel and attach circuit breaker locks and DO-NOT-CLOSE tags:

(a) 11H23, SLAT ALTN CONT INBD

(b) 11H24, LAT ALTN CONT OUTBD

S 494-014

(11) Install the PDU lock on the TE flap PDU (Fig. 404).

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S 014-015

- (12) Remove the access panels for the trailing edge as necessary to get access to the torque tubes (AMM 06-44-00/201).

G. TE Flap Torque Tubes Removal Procedure

S 034-016

- (1) Disconnect the safety straps from the torque tubes at the inboard flap drive (Fig. 401).

S 034-017

- (2) Disconnect the safety straps from the torque tubes at the outboard flap drive (Fig. 402).

S 034-018

- (3) At the aileron droop angle gearbox, disconnect the twelve bolts, washers, and locknuts and remove the inboard vapor seal (Fig. 402).

S 034-019

- (4) At the offset gearbox, disconnect the four bolts that attach the safety strap bracket half to the gearbox bracket half (Fig. 401).

**NOTE:** Do not move the four lockwired bolts that is attached to the offset gearbox.

S 024-020

- (5) Do the steps that follow to remove a floating torque tube (Fig. 401, Section A-A):

**NOTE:** A floating torque tube has a coupling sleeve at each end of the torque tube.

- (a) At each end of the torque tube, disconnect the lockwire and remove the coupling screws.
- (b) Move the coupling sleeve along the torque tube and off the coupling half.

**NOTE:** Do not turn the torque tube. It will be necessary to adjust the flap drive if you turn the torque tube while the coupling is loose.

- (c) Remove the floating torque tube from the airplane.

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S 024-042

- (6) Do the steps that follow to remove a nonfloating torque tube (Fig. 401, Section A-A):

NOTE: A nonfloating torque tube has a coupling at one end and a support bearing at the opposite end.

- (a) At the coupling end, disconnect the lockwire and remove the coupling screws.
- (b) Move the coupling sleeve along the torque tube and off the coupling half.

NOTE: Do not turn the torque tube. It will be necessary to adjust the flap drive if you turn the torque tube while the coupling is loose.

- (c) At the torque tube end with the support bearing, disconnect the adjacent coupling (at the far side of the support bearing).
- (d) Move the torque tube away from the support bearing.
- (e) Loosen the nut that holds the coupling half to the support bearing.
- (f) Remove the nut, washer, and the coupling half.
- (g) Move the torque tube away from the support bearing and remove it from the airplane.

#### H. TE Flap Torque Tube Installation Procedure

NOTE: Wear Limits for the components identified in this procedure are in AMM 27-51-41/601, TE Flap Torque tubes.

S 864-021

- (1) Move the safety straps into position on the torque tube.

S 644-022

- (2) Apply a layer of BMS 3-33 grease to the spline teeth before the installation.

S 824-023

- (3) Refer to Fig. 403 to align the torque tubes during the installation.

S 424-024

- (4) Do the steps that follow to install a floating torque tube (Fig. 401):

NOTE: A floating torque tube has a coupling sleeve at each end of the torque tube

- (a) Put the torque tube into position in the wing.

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- (b) Put the ends of the torque tube in the adjacent coupling halves.

**NOTE:** Do not turn the torque tube during installation. It will be necessary to adjust the flap drive if you turn the torque tube.

- (c) Move the coupling sleeves over the coupling halves.
- (d) Install the three coupling screws with lockwires at both ends of the torque tubes.
- (e) Do a check on the axial end play as follows:
  - 1) Move the torque tube fully to the inboard direction.
  - 2) At the outboard end of the torque tube, move the coupling fully to the outboard direction.
  - 3) Measure and write the distance between the coupling and the support bearing.
  - 4) Move the torque tube fully to the outboard direction.
  - 5) At the outboard end of the torque tube, move the coupling fully to the outboard direction.
  - 6) Again, measure and write (from the same points) the distance between the coupling and the support bearing.
  - 7) Make sure that the difference between the two distances that you measured agrees with the dimension in Fig. 401, Section A-A.

S 424-025

- (5) Do the steps that follow to install a nonfloating torque tube (Fig. 401):

**NOTE:** A nonfloating torque tube has a coupling at one end and a support bearing at the opposite end.

- (a) Apply a layer of BMS 3-33 grease to the these items:
  - 1) The support bearing housing and bore.
  - 2) The external surface of the torque tube where it engages the support bearing.
- (b) Install a thrust washer on the torque tube.
- (c) Put the torque tube through the support bearing.
- (d) Install the second thrust washer through the torque tube.
- (e) Move the torque tube away from the support bearing until the opposite end connects with the adjacent coupling half.

**NOTE:** Do not turn the torque tube during the installation. It will be necessary to adjust the flap drive if you turn the torque tube.

- (f) At the coupling end of the torque tube, move the coupling sleeve over the coupling half.
- (g) Install the three coupling screws with lockwire.

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- (h) At the support bearing end of the torque tube, do the checks that follow on the axial end play:

**NOTE:** Do these checks before you install the nut on the torque tube at the support bearing.

- 1) Move the torque tube fully away from the support bearing.
  - 2) Measure and write the distance between the torque tube and the support bearing.
  - 3) Move the torque tube fully to the direction of the support bearing and measure the distance from the same points as you did before.
  - 4) Make sure that the difference between the two distances that you measured agrees with the dimension in Fig. 401, Detail C.
- (i) Install the coupling half, molded sleeve, washer, and nut on the torque tube spline.

**NOTE:** Apply BMS 3-33 (preferred) or BMS 3-24 (alternate) grease to the nut before installation.

- (j) Tighten the nut with a torque value of 400 - 480 pound-inches (45.2-54.2 newton-meters).
- (k) Install the coupling sleeve from the adjacent torque tube over the coupling half.

**CAUTION:** MAKE SURE YOU INSTALL LOCKWIRE ON THE COUPLING SCREWS. IF THE COUPLING SCREWS COME OFF, THE TORQUE TUBE COUPLING WILL DISCONNECT AND CAUSE DAMAGE TO THE AIRPLANE.

- (l) Attach the three coupling screws with lockwire to the coupling sleeve.

S 644-026

- (6) Fill all the coupling sleeves with BMS 3-33 grease until grease comes out at the side opposite to the flange.

S 644-027

- (7) Fill the support bearing with grease until grease comes out at either side of the bearing housing.

S 434-028

- (8) Connect the safety strap to the wing structure.

**NOTE:** Make sure that the clearance between the safety strap and the torque tube is at least 0.15 inch (3.81 mm).

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S 434-029

- (9) At the offset gearbox, install the safety strap and bracket half to the gearbox bracket half with four bolts, washers, and locknuts.

**NOTE:** Make sure that the clearance between the safety strap and the torque tube is at least 0.15 inch (3.81 mm).

S 434-043

**CAUTION:** MAKE SURE YOU INSTALL THE VAPOR SEAL WITH THE FLANGE ALIGNED IN THE DIRECTION OF THE HORIZONTAL PLANE. INCORRECTLY INSTALLED VAPOR SEAL CAN CATCH THE MOVEMENT OF THE AILERON AND CAUSE DAMAGE TO THE AIRPLANE.

- (10) At the aileron droop angle gearbox, install the vapor seal with the twelve bolts, washers, and locknuts (Fig. 402).

S 824-031

- (11) Make sure the torque tube is aligned with the center axis of the adjacent gearbox or bearing shaft, as shown in Fig. 403.

S 094-032

- (12) Remove the PDU lock from the TE flap PDU (Fig. 404).

S 864-033

- (13) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-034

- (14) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers from the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

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S 864-035

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(15) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 214-036

(16) Extend and retract the TE flaps with the flap control lever and monitor the operation of the torque tubes.

S 224-037

(17) Make sure that the clearance between the parts that turn and the closest structure is at least 0.38 inch (9.65 mm).

**NOTE:** The clearance must be at least 0.12 inch (3.04 mm) at the locations where a nylon rubstrip is installed. The nylon strip must extend a minimum of 0.09 inch (2.28 mm) over the structure.

S 214-038

(18) Do a check on the flap overtravel stop clearance (AMM 27-51-00/501).

I. Put the Airplane Back to its Usual Condition

S 414-039

(1) Install the access panels for the trailing edge, if removed (AMM 06-44-00/201).

S 864-040

(2) Remove power from the center hydraulic system (AMM 29-11-00/201).

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S 094-041

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS.  
THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO  
PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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TE FLAP TORQUE TUBES – INSPECTION/CHECK

TASK 27-51-41-206-025

1. The Wear Limit Inspection for the TE Flap Torque Tubes

A. Equipment

- (1) Circuit Breaker Lockout Clip – 1012LC-R  
Commercially Available
- (2) TE Flap PDU Lock – A27009-7

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 27-51-41/401, Trailing Edge Flap Torque Tubes
- (4) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Landing Gear Door Locks
- (6) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

- (1) Location Zones
  - 144 Right MLG Wheel Well
  - 211/212 Control Cabin
  - 555/655 Inboard Trailing Edge Flap
  - 566/666 Outboard Trailing Edge Flap
  - 730/740 Left/Right Main Landing Gear and Doors

D. Prepare for Inspection

S 216-001

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 496-002

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 866-003

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

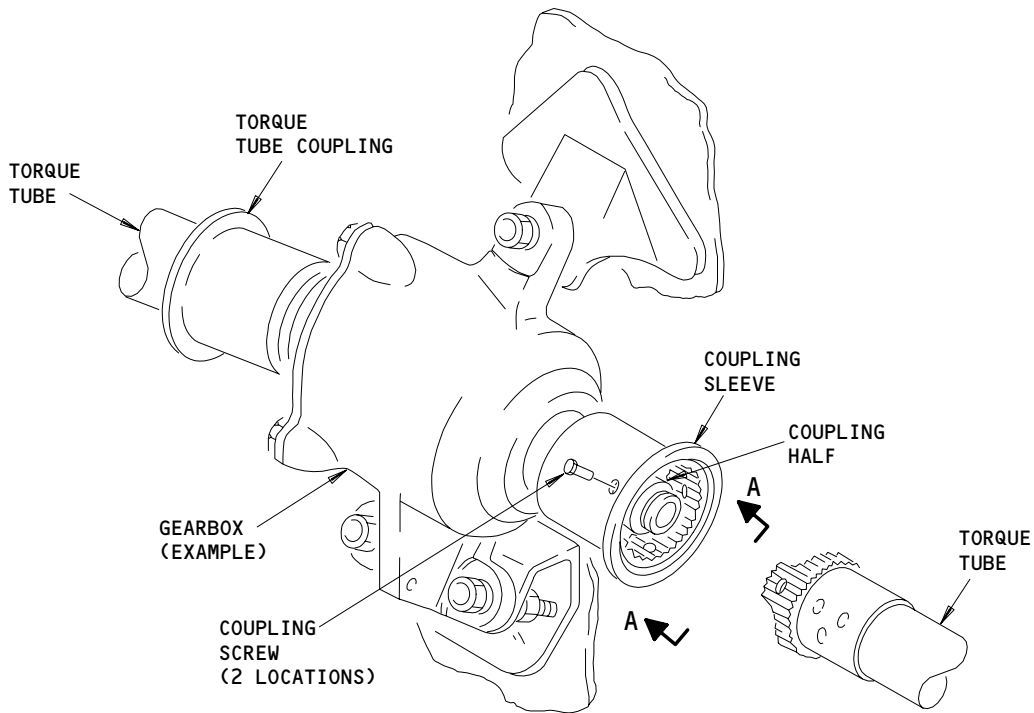
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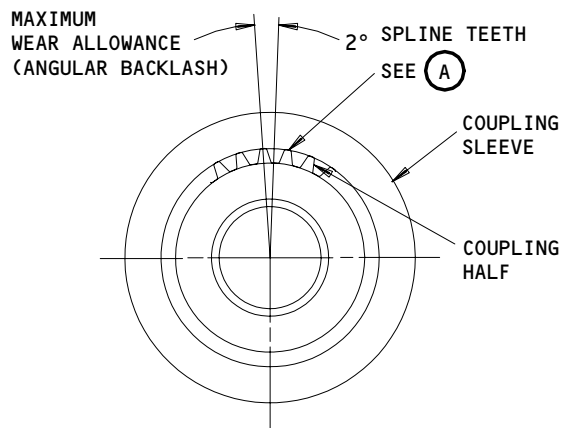
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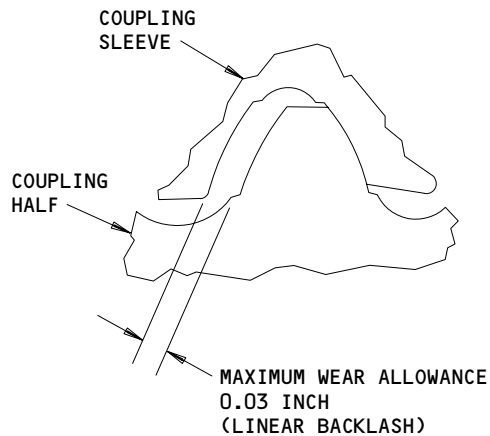
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TORQUE TUBE INSTALLATION (EXAMPLE)



A-A



SPLINE TEETH (EXAMPLE)  
(LARGER VIEW)

(A)

Wear Limits for the TE Flap Torque Tube Coupling  
Figure 601

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147868

S 866-004

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Supply power to the center hydraulic system (AMM 29-11-00/201).

S 866-005

- (5) Move the flap control lever to the 30-unit detent and permit the TE flaps to move to the fully extended position.

S 866-006

- (6) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 866-007

- (7) Open this circuit breaker on the main power distribution panel, P6, and attach DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 866-008

- (8) Open these circuit breakers on the P6 panel and attach circuit breaker locks and DO-NOT-CLOSE tags:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 866-009

- (9) Open this circuit breaker on the overhead panel, P11, and attach DO-NOT-CLOSE tag:  
(a) 11J24, FLAPS ALTN CONT

S 866-010

- (10) Open these circuit breakers on the P11 panel and attach circuit breaker locks and DO-NOT-CLOSE tags:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD

S 496-011

- (11) Install the power drive unit (PDU) lock on TE flap PDU.

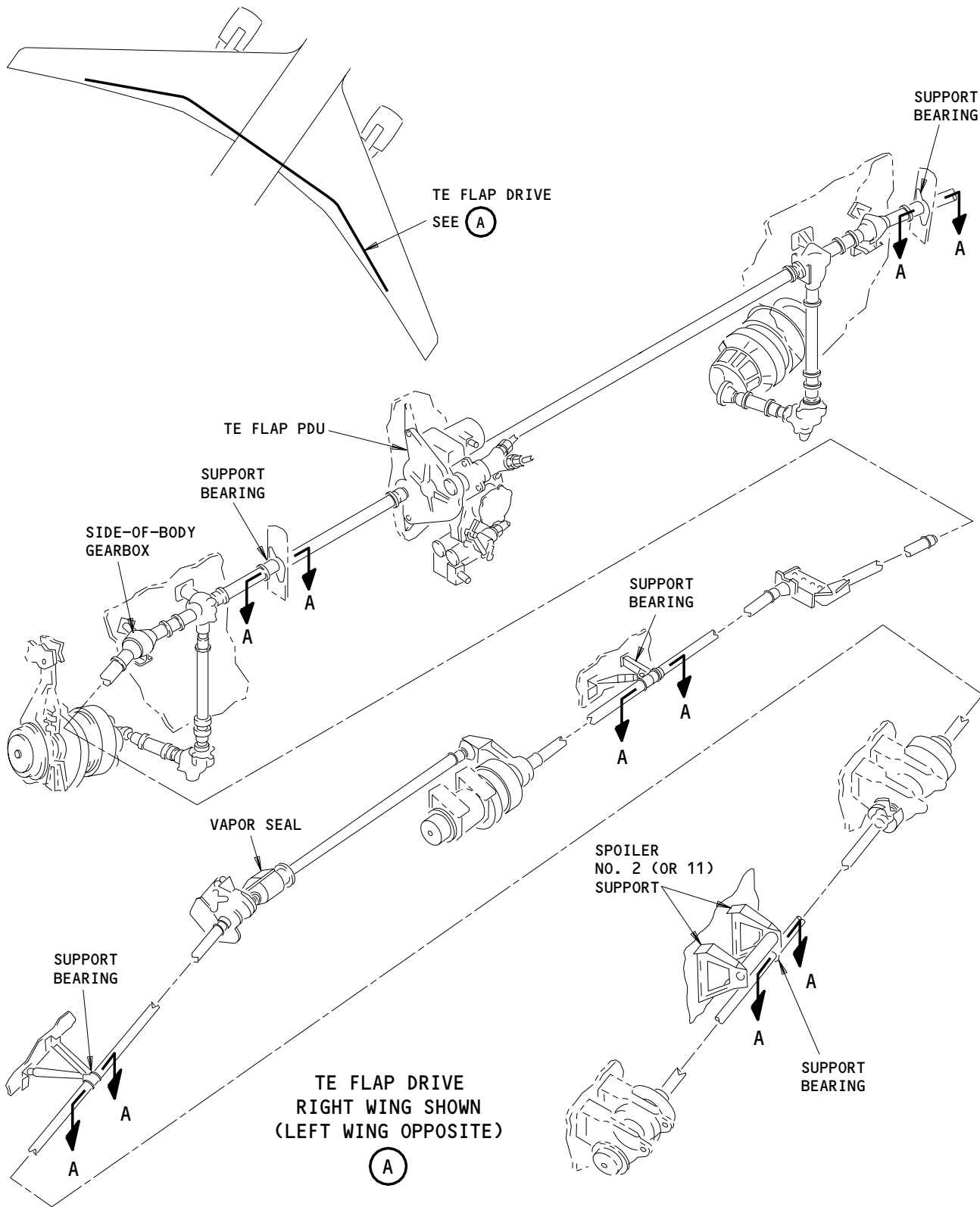
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Wear Limits for the Torque Tube Support Bearing of the TE Flap  
Figure 602 (Sheet 1)

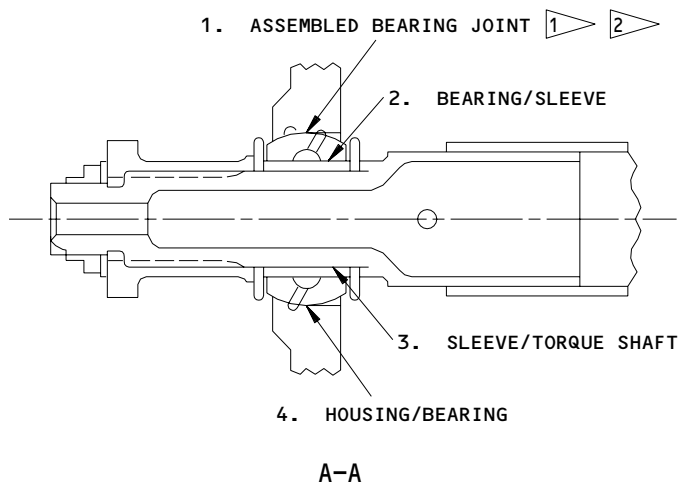
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MAINTENANCE MANUAL



INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	ASSEMBLED BEARING JOINT		---	---	---	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 2px;">1</div> <div style="margin-bottom: 2px;">2</div> </div>	X		
2	BEARING	ID	1.1880 (30.175)	1.1900 (30.226)	1.2000 (30.480)	0.0200 (0.508)	X		
	SLEEVE	OD	1.1850 (30.099)	1.1860 (30.124)	1.1750 (29.845)			X	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">3</div> </div>
3	SLEEVE	ID	0.9700 (24.638)	0.9800 (24.892)	1.0000 (25.400)	0.0100 (0.254)	X		
	TORQUE TUBE	OD	0.9658 (24.531)	0.9688 (24.608)	0.9458 (24.023)		X		
4	HOUSING	ID	0.8620 (21.895)	0.8640 (21.946)	0.8740 (22.200)	0.0100 (0.254)	X		
	BEARING	OD	0.8590 (21.819)	0.8610 (21.869)	0.8490 (21.565)		<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">4</div> </div>	X	

- 1 THE 0.020 INCH (0.508 mm) MAXIMUM AXIAL PLAY IS PERMITTED FOR THE ASSEMBLED BEARING JOINT
- 2 THE RADIAL PLAY OF THE ASSEMBLED BEARING JOINT CAN NOT BE MORE THAN 0.04 INCH (1.016 mm)
- 3 THIS PART CAN BE REPAIRED.
- 4 SPHERICAL CLEARANCE

Wear Limits for the Torque Tube Support Bearing of the TE Flap  
Figure 602 (Sheet 2)

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S 016-012

- (12) Remove the TE fixed lower panels as necessary to get to the torque tubes (AMM 06-44-00/201).

E. Wear Limits for the TE Flap Torque Tube Coupling (Fig. 601)

S 036-013

- (1) Disconnect one end of the torque tube opposite to the end that you will examine (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tube. The flap drive will be out of adjustment if you turn the torque tube while it is disconnected.

S 226-014

- (2) Measure the angular backlash (Fig. 601) and the spline wear. If the backlash or spline wear is more than the permitted wear limit, replace the coupling sleeve and the coupling half at this connection (AMM 27-51-41/401).

**NOTE:** Move the torque tube axially through the length of the splined sleeve to find the maximum backlash.

S 436-015

- (3) Connect the torque tube at the opposite end (AMM 27-51-41/401).

F. Wear Limits for the Torque Tube Support Bearing of the TE Flap

S 226-016

- (1) Examine the wear on the torque tube support bearing (Fig. 602).

G. Put the Airplane Back to its Usual Condition

S 096-017

- (1) Remove the PDU lock from the TE flap PDU.

S 416-018

- (2) Install the TE fixed lower panels (AMM 06-44-00/201)

S 866-019

- (3) Remove the DO-NOT-CLOSE tags and locks and close these circuit breakers on the P6 panel:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 866-020

- (4) Remove the DO-NOT-CLOSE tags and locks and close these circuit breakers on the P11 panel:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

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(c) 11J24, FLAPS ALTN CONT

S 866-024

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(5) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 866-021

(6) Move the flap control lever to the zero detent.

S 866-022

(7) Remove the power from the center hydraulic system if it is not necessary (AMM 29-11-00/201).

S 866-023

(8) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TRAILING EDGE FLAP TORQUE TUBE - APPROVED REPAIRS

TASK 27-51-41-168-009

1. Approved Repairs for the Trailing Edge Flap Torque Tube

A. General

- (1) This procedure gives instructions for the repair of damaged torque tubes caused by wear on the outer diameter. This procedure does not give instructions to remove or install the torque tube.

B. Consumable Materials

- (1) C00064 Alodine 1200S
- (2) C00699 Primer - BMS 10-11, Type 1
- (3) C00032 Enamel BMS 10-60, Type I, Boeing color 707

C. References

- (1) 27-51-41/401, Trailing Edge Flap Torque Tubes
- (2) 51-21-04/701, Alodine Coating
- (3) 51-21-10/701, Decorative Exterior Finishes

D. Access

- (1) Location Zones
  - 550/650 Wing Trailing Edge - Inboard
  - 560/660 Wing Trailing Edge - Outboard

E. Examine the Torque Tube for Repair or Replacement

S 228-001

- (1) You must replace the torque tube if one or more of these conditions is true (Ref 27-51-41):
  - (a) The full diameter surface at the worn area of the torque tube was repaired before.
  - (b) The worn area is adjacent to the end fitting fasteners.
  - (c) The depth of the repair done before is larger than the repair limits given by the table that follows.

S 228-002

- (2) You can repair the torque tube if the repair is less than the limits given by the table that follows:

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OUTER DIAMETER OF THE TORQUE TUBE	AREA OF THE REPAIR *[1]	PERMITTED DEPTH OF THE REPAIR *[1]
1.50 INCH	less than 30% of the torque tube circumference and less than 3 inches long	0.020 inch
	more than 30% of the torque tube circumference or more than 3 inches long	0.010 inch
*[1] THE REPAIR LIMITS ARE THE TOTAL OF THE REPAIR THAT YOU WILL DO, AND THE REPAIR DONE BEFORE.		

S 228-003

- (3) If there are more than two defects on the torque tube, you can repair the torque tube only if the defects are at least 2.25 inches (57.15 mm) apart.

F. Repair the Torque Tube

S 328-004

- (1) Machine the worn area. Use a minimum machined radius of 1.00 inch (25.4 mm). The surface finish of a repaired area must be 63 microinches (1.60 micrometers) or less. The torque tube is structurally satisfactory if the depth of the repair (include the repair done before) is not more than the repair limits given by the table.

S 238-005

- (2) Do a penetrant inspection of the repaired area.

S 378-006

- (3) Apply Alodine to the repaired surface (Ref 51-21-04).

S 378-007

- (4) Apply one layer of primer to the repaired surface (Ref 51-21-10).

S 378-008

- (5) Apply one layer of enamel to the repaired surface (Ref 51-21-10).

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ACTUATOR INPUT ANGLE GEARBOX – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the actuator input angle gearbox.

TASK 27-51-42-024-001

2. Actuator Input Angle Gearbox – Removal

A. Equipment

- (1) TE Flap PDU Lock – A27009-7
- (2) Circuit Breaker Lockout Clip – 1012LC-R  
Commercially Available

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 27-51-00/501, Trailing Edge Flap System
- (4) AMM 27-51-41/401, TE Flap Torque Tubes
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) AMM 32-00-15/201, Landing Gear Door Lock
- (7) AMM 32-00-20/201, Landing Gear Downlock

C. Access

(1) Location Zones

- 143/144 Left/Right MLG Wheel Well
- 211/212 Control Cabin
- 710 Nose Landing Gear and Doors
- 730/740 Left/Right Main Landing Gear and Doors

(2) Access Panels

- 195JL/196JR Left/Right Inboard Flap Mechanism

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-004

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

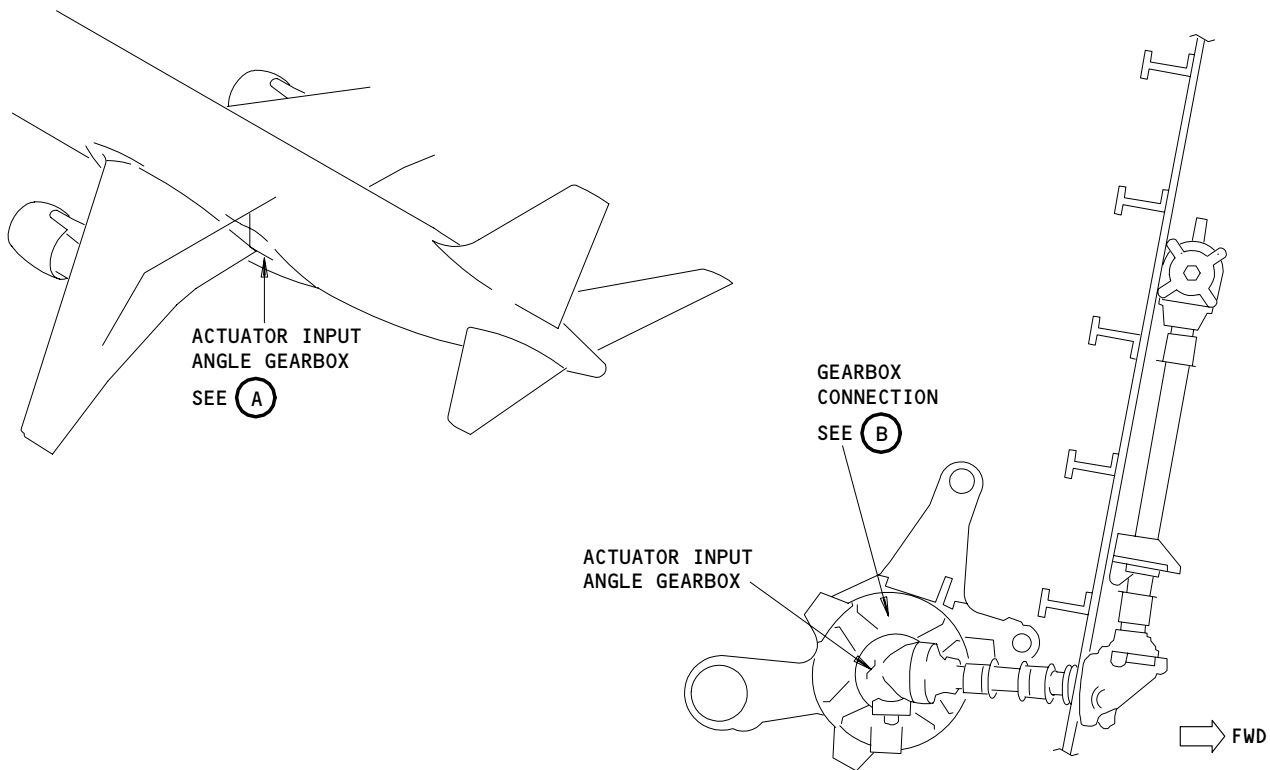
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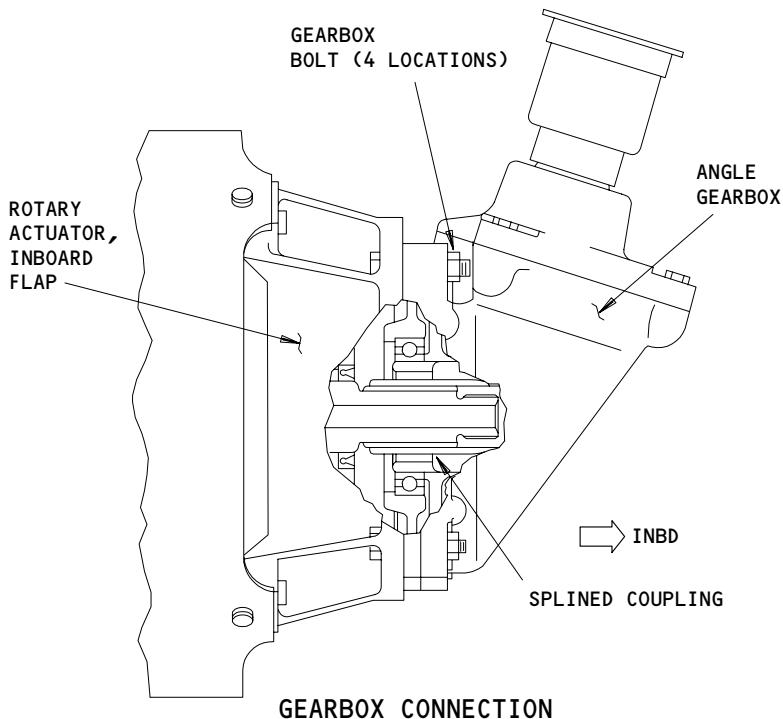
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ACTUATOR INPUT ANGLE GEARBOX

(A)

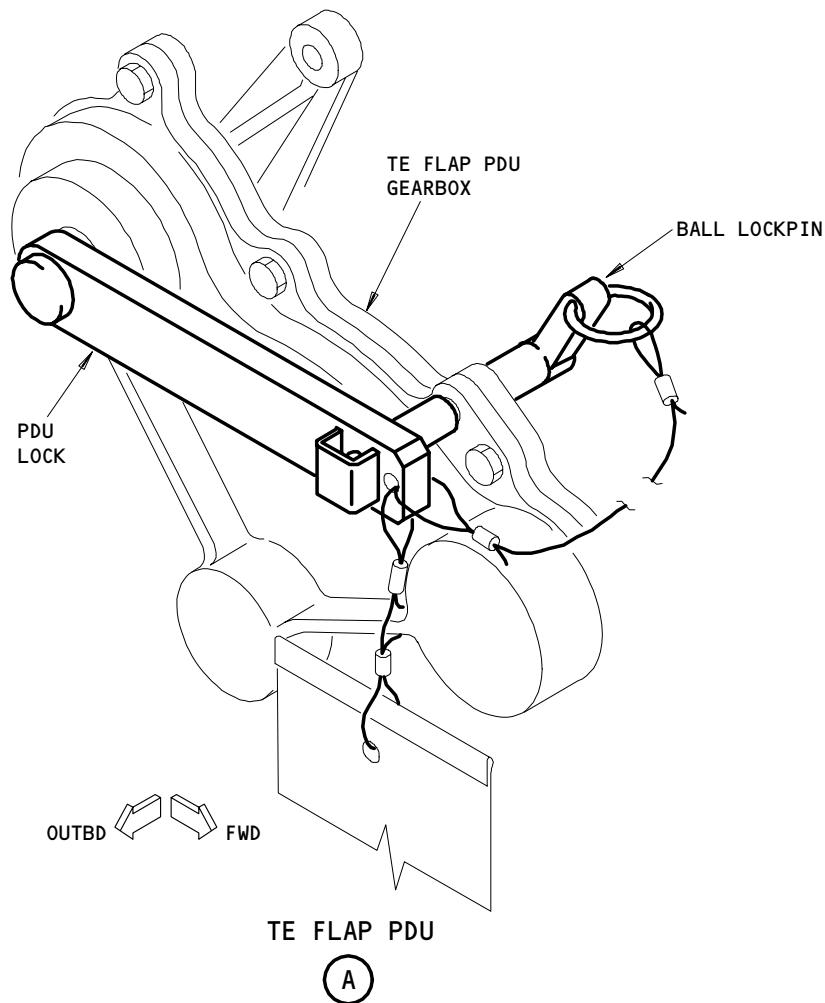
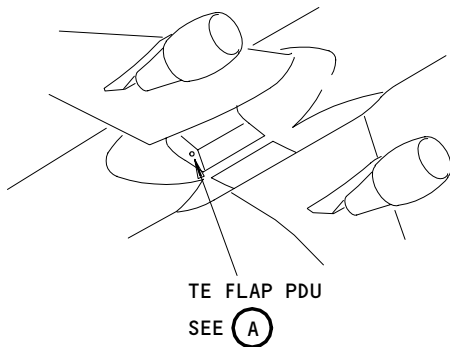


(B)

Actuator Input Angle Gearbox  
Figure 401

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PDU Lock for the TE Flap PDU  
Figure 402

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S 864-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-006

(5) Move the flap control lever to the 30-unit detent and permit the flap to move to the fully extended position.

S 864-007

(6) Remove pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-008

(7) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 864-009

(8) Open these circuit breakers on the P6 panel and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 864-010

(9) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:  
(a) 11J24, FLAPS ALTN CONT

S 864-011

(10) Open these circuit breakers on the P11 panel and install circuit breaker locks:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD

S 494-012

(11) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 402).

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S 014-013

- (12) Remove the access panels, 195JL and 196JR, to get access to the inboard flap mechanism (AMM 06-41-00/201).

E. Remove the Actuator Input Angle Gearbox (Fig. 401)

S 034-014

- (1) Disconnect the torque tube from the gearbox (AMM 27-51-41/401).

**NOTE:** Do not turn the torque tube. It will be necessary to adjust the flap drive if you turn the torque tube while it is disconnected.

S 034-015

- (2) Remove the four gearbox bolts that attach the gearbox to the actuator.

S 024-016

- (3) Remove the gearbox from the airplane.

**NOTE:** Keep the splined coupling with the gearbox.

TASK 27-51-42-424-017

3. Actuator Input Angle Gearbox - Installation

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-23/401, Lockwires
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 27-51-00/501, Trailing Edge Flap System
- (5) AMM 27-51-41/401, TE Flap Torque Tubes
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) AMM 32-00-15/201, Landing Gear Door Lock

C. Access

(1) Location Zones

143/144	Left/Right MLG Wheel Well
211/212	Control Cabin
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

195JL/196JR	Left/Right Inboard Flap Mechanism
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D. Install the Actuator Input Angle Gearbox (Fig. 401)

S 644-018

- (1) Apply a light layer of BMS 3-33 grease to the gearbox spline teeth and the gearbox mating surfaces.

S 214-019

- (2) Make sure the splined coupling is on the gearbox.

S 434-020

- (3) Put the gearbox splines into the splines of the rotary actuator.

S 434-021

- (4) Connect the gearbox to the rotary actuator with the four bolts, washers, and locknuts.

S 434-022

- (5) Connect the torque tube to the gearbox (AMM 27-51-41/401).

**NOTE:** Do not turn the coupling or the torque tube during the installation. It will be necessary to adjust the flap drive if you turn the torque tube or the splined coupling.

S 224-023

- (6) Make sure the torque tube can move from end to end, and that the end clearances are satisfactory (AMM 27-51-41/401).

S 644-024

- (7) Fill the splined coupling with BMS 3-33 grease.

S 424-035

- (8) Make sure you install a lockwire to the coupling screws on each coupling with the double twist procedure (AMM 20-10-23/401).

S 094-025

- (9) Remove the PDU lock in the TE flap PDU (Fig. 402).

S 224-026

- (10) Do a check on the retract overtravel stop clearances for the inboard flap, if it is necessary (AMM 27-51-00/501).

E. Put the Airplane Back to Its Usual Condition

S 414-027

- (1) Close the access panels, 195JL and 196JR, for the inboard flap mechanism (AMM 06-41-00/201).

S 864-028

- (2) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:  
(a) 6D21, ALTN SLAT INBD PWR

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- (b) 6D24, ALTN FLAP PWR
- (c) 6F24, ALTN SLAT OUTBD PWR

S 864-029

- (3) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-030

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

S 864-031

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (5) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-032

- (6) Move the flap control lever to the zero (FLAPS UP) detent and permit the flaps to move to the fully retracted position.

S 094-033

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (7) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 864-034

- (8) Remove power from the center hydraulic system (AMM 29-11-00/201).

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ACTUATOR INPUT ANGLE GEARBOX – INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and a wear limit table, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Actuator Input Angle Gearbox – Removal/Installation for procedures to do these tasks.

TASK 27-51-42-226-001

2. Wear Limits for the Actuator Input Angle Gearbox (Fig. 601)

NOTE: Wear limits for other components that are connected to the actuator input angle gearbox are in other Inspection/Check sections of the Maintenance Manual.

A. Access

(1) Location Zones

- |     |                      |
|-----|----------------------|
| 143 | Left MLG Wheel Well  |
| 144 | Right MLG Wheel Well |

B. Procedure

S 226-003

- (1) Use the supplied data (Fig. 601) to examine the actuator input angle gearbox for too much wear.

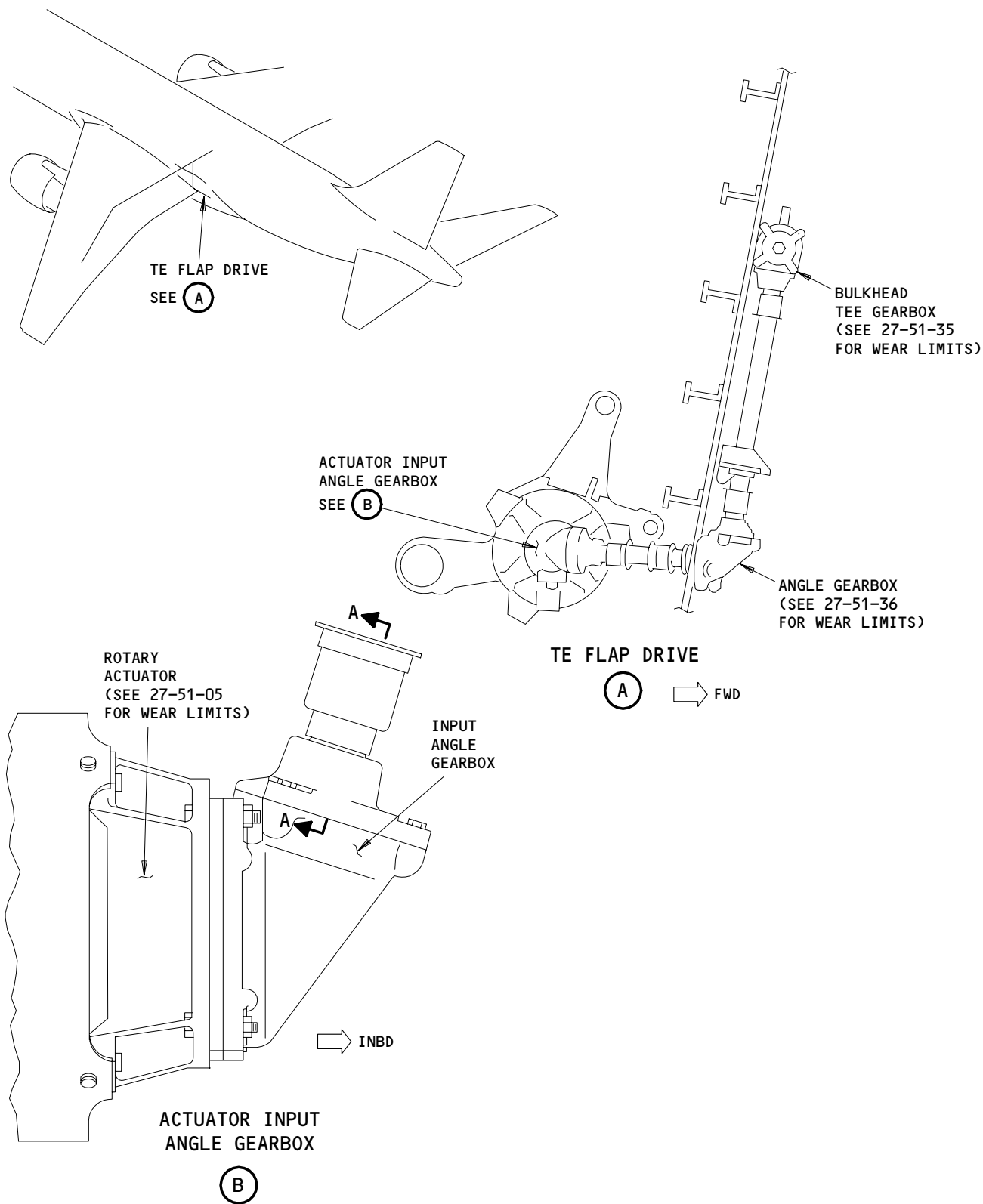
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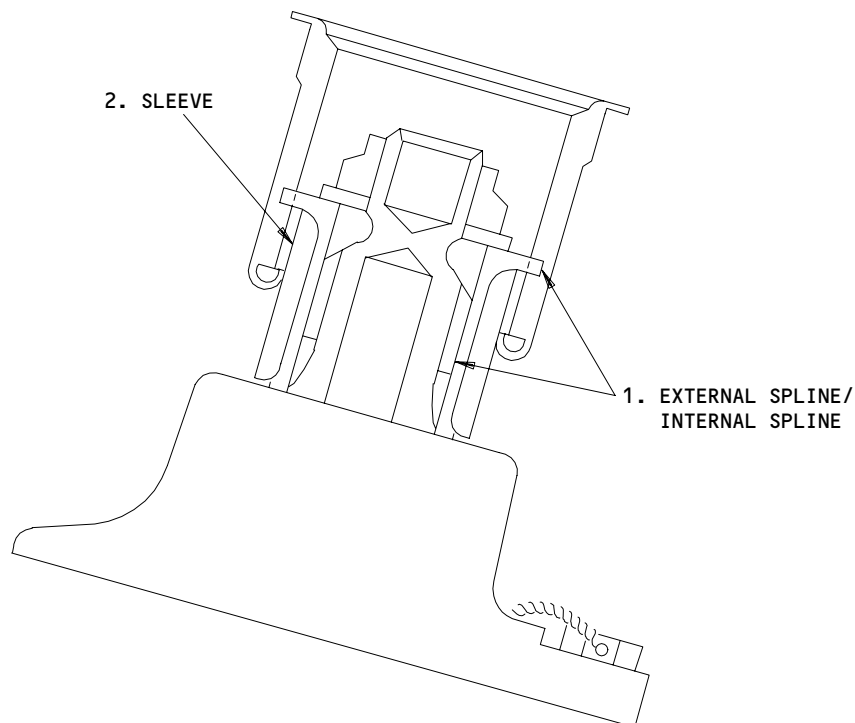
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Wear Limits for the Actuator Input Angle Gearbox  
Figure 601 (Sheet 1)

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A-A

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR.
			DIAMETER		PERMITTED WEAR DIM.	MAX DIAM CLEAR-ANCE			
			MIN	MAX					
1	EXTERNAL SPLINE		---	---	---	1	---	---	
	INTERNAL SPLINE		---	---	---		---	---	
2	SLEEVE		---	---	---	2	---	---	

1 VISUALLY EXAMINE (USE MAGNIFICATION IF NECESSARY) ALL THE BEARING SURFACES ON THE SPLINES FOR ANY WEAR

NOTE: REPLACE THE COUPLING IF YOU ARE NOT SURE ABOUT THE WEAR

2 REPLACE THE RUBBER SEAL IF THE DACRON COVER ON THE SLEEVE IS WORN OR DAMAGED

Wear Limits for the Actuator Input Angle Gearbox  
Figure 601 (Sheet 2)

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FLAP POSITION TRANSMITTER AND TRANSMITTER GEARBOX –  
MAINTENANCE PRACTICES

1. General

- A. This procedure contains the removal and the installation tasks for the flap position transmitter. The installation task also contains the instructions for the adjustment and test of the position transmitters.

TASK 27-51-45-022-002

2. Flap Position Transmitter – Removal

A. Equipment

- (1) TE Flap PDU Lock – A27009-7
- (2) Circuit Breaker Lockout Clip – 1012LC-R  
Commercially Available

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 32-00-15/201, Landing Gear Door Locks
- (5) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

(1) Location Zone

144	Right MLG Wheel Well
211/212	Control Cabin
550/650	Wing Trailing Edge – Inboard
560/660	Wing Trailing Edge – Outboard
570/670	Wing Trailing Edge Flap Track Fairings
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

195JL/196JR	Left/Right Inboard Flap Mechanism
-------------	-----------------------------------

D. Prepare for the Removal

S 212-003

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 492-004

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 862-005

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

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S 862-006

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS . IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system and reservoir (AMM 29-11-00/201).

S 862-007

- (5) Move the flap control lever to the 30-unit detent and permit the flaps and slats to move to the fully extended position.

S 862-008

- (6) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 492-010

- (7) Install the PDU lock on the trailing edge (TE) flap power drive unit (PDU) (Fig. 203).

S 492-011

- (8) Install a DO-NOT-OPERATE tag on the flap control lever.

S 862-012

- (9) Open this circuit breaker on the main power distribution panel, P6, and attach DO-NOT-CLOSE tag:  
(a) 6D24, ALTN FLAP PWR

S 862-013

- (10) Open these circuit breakers on the P6 panel and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 862-014

- (11) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11C16, FLAP SLAT ELEC UNIT 1 CONT  
(b) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR  
(c) 11J15, FLAP POS IND L

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- (d) 11J16, FLAP POS IND R
- (e) 11J24, FLAPS ALTN CONT

S 862-015

- (12) Open these circuit breakers on the P11 panel and install circuit breaker locks:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

E. Remove the Flap Position Transmitter (Fig. 201)

S 012-016

- (1) Remove the access panel, 195JL and 196JR, below the fairing door to get access to the flap position transmitters, position 4 and 5 (AMM 06-41-00/201).

S 032-017

- (2) Disconnect the electrical connector from the transmitter receptacle.

S 032-018

- (3) Disconnect the wire clamps that attach the transmitter wire to the transmitter housing.

S 032-019

- (4) Remove the two transmitter bolts that connect the position transmitter to the transmitter housing.

S 022-020

- (5) Pull the position transmitter out of the transmitter housing.

TASK 27-51-45-422-030

3. Flap Position Transmitter - Installation

A. Equipment

- (1) Rig pin TE4 - P/N A20004-7, part of Set A20004-XX (AMM 20-10-24/201)
- (2) Test Equipment, TE Flap Asymmetry Fault Isolation - A27093-27

NOTE: Use the A27093-27 test cable for airplanes with a -53 FSEU.

- (3) Digital Voltmeter, Fluke Model 8020A or Equivalent

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (recommended)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

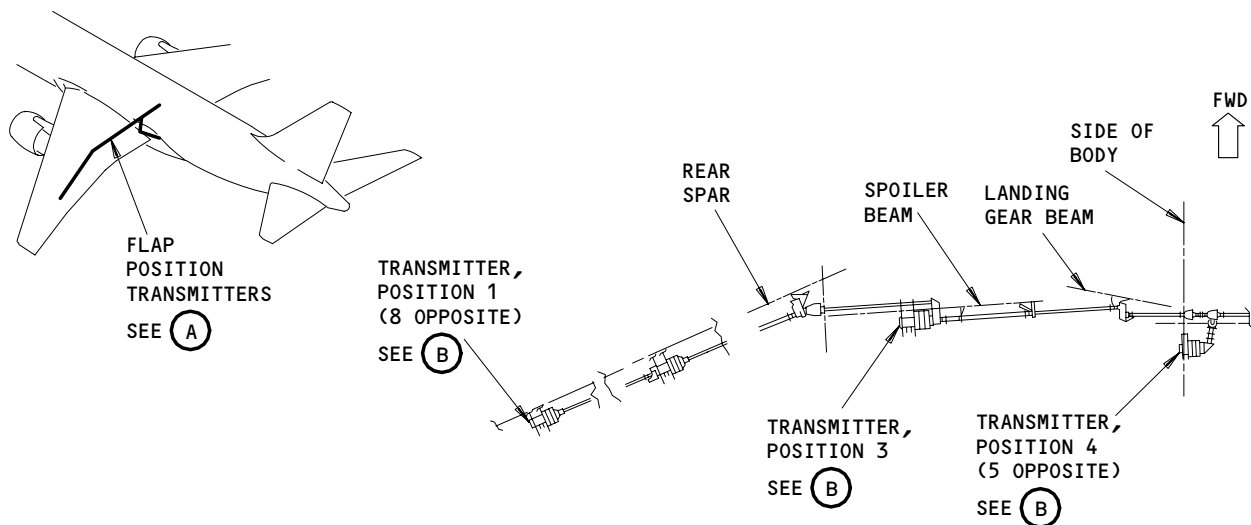
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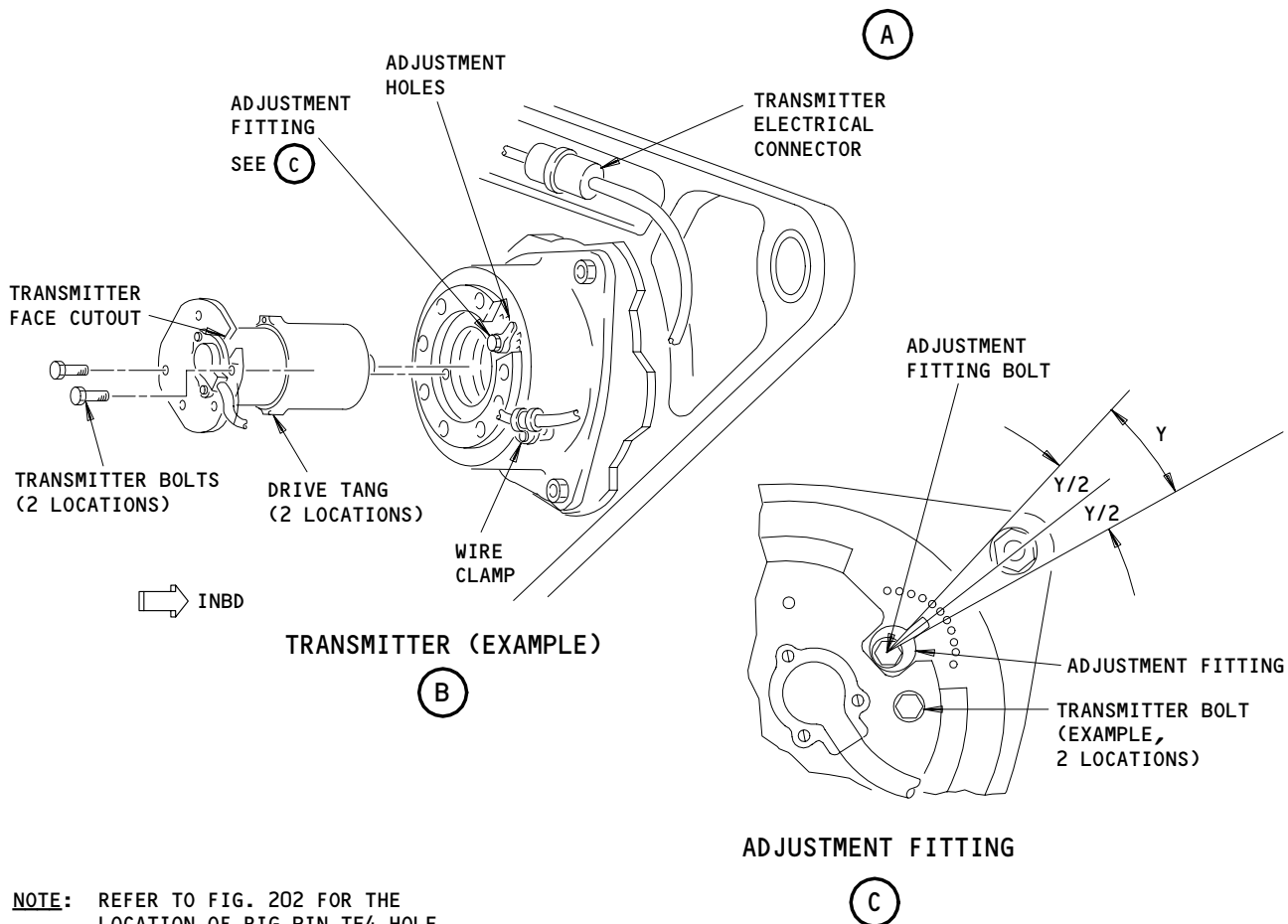
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FLAP POSITION TRANSMITTERS  
PLAN VIEW, LEFT WING, (RIGHT WING OPPOSITE)



**NOTE:** REFER TO FIG. 202 FOR THE LOCATION OF RIG PIN TE4 HOLE WITH THE FLAPS IN THE FULLY EXTENDED POSITION.

Flap Position Transmitters  
Figure 201

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- (2) AMM 20-10-24/201, Rig Pins
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Landing Gear Door Locks

D. Access

- (1) Location Zone
  - 144 Right MLG Wheel Well
  - 211/212 Control Cabin
  - 500/600 Left Wing / Right Wing
  - 710 Nose Landing Gear and Doors
  - 730/740 Left/Right Main Landing Gear and Doors
- (2) Access Panels
  - 195JL/196JR Left/Right Inboard Flap Mechanism

E. Install the Flap Position Transmitter (Fig. 201)

- S 212-044
  - (1) Make sure you get the transmitter with the correct bolt hole location for the subsequent installation.
- S 642-045
  - (2) Apply grease to the drive tangs on the transmitter and the two machined slots in the input shaft, behind the transmitter housing.
- S 822-046
  - (3) Put the transmitter into the transmitter housing so that the larger tang is in position with the larger machined slot.
- S 822-047
  - (4) Turn the transmitter face to the direction permitted by the internal stops until you get the adjustment fitting to set into the transmitter face cutout.
- S 432-048
  - (5) Install the two transmitter bolts and tighten the bolts to 40-50 pound-inches (4.5 - 5.6 Nm).
- S 822-087
  - (6) Do the mechanical adjustment on the flap position transmitter at positions 1, 3, and 8, with these steps:
    - (a) Loosen the transmitter bolts and the adjustment fitting bolt (Fig. 201).

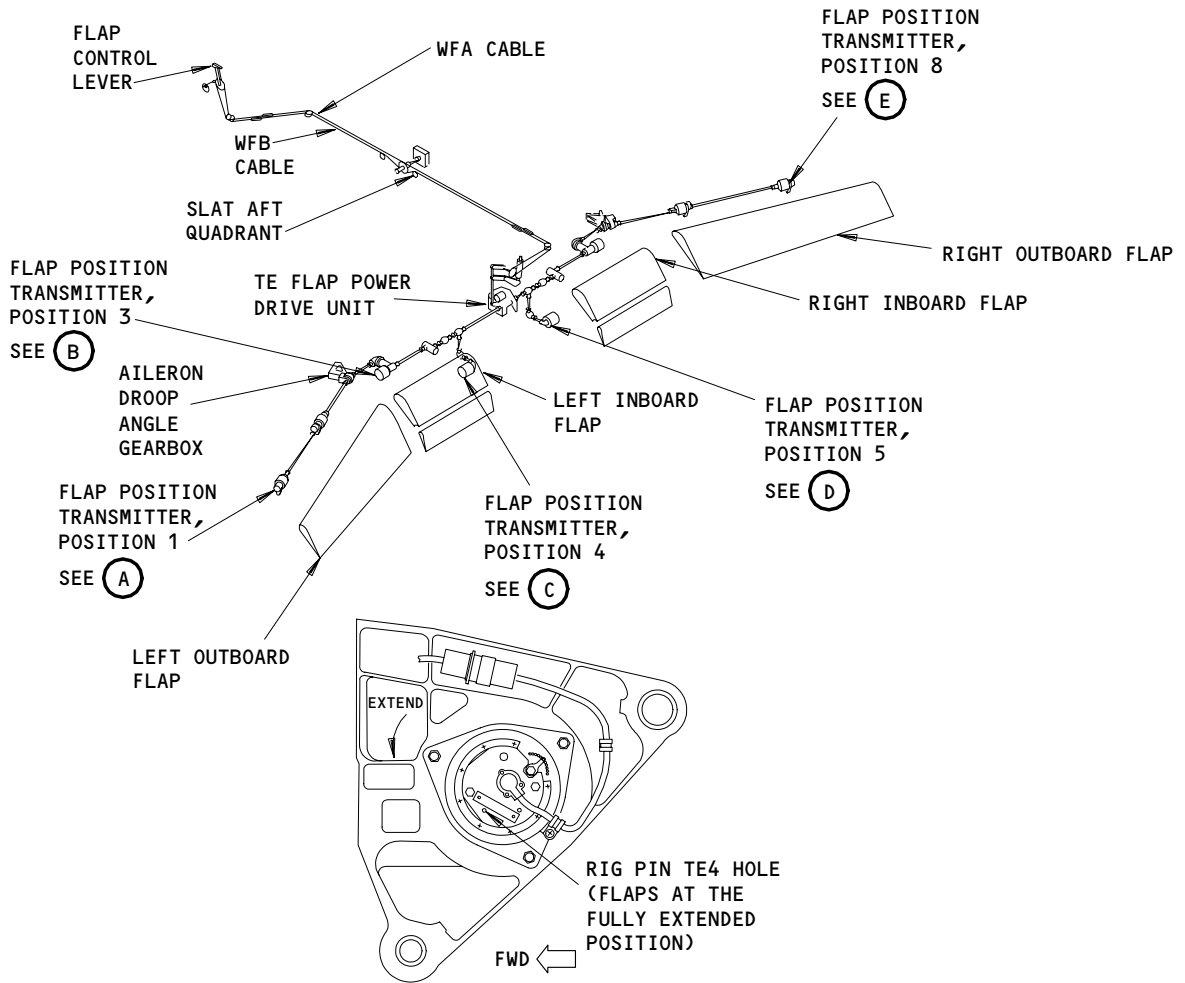
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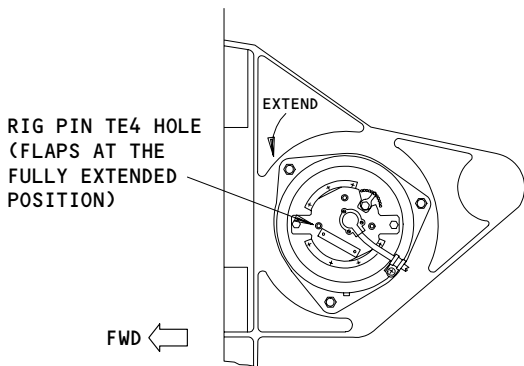
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**FLAP POSITION TRANSMITTER,  
POSITION 1 (OUTBOARD VIEW)**

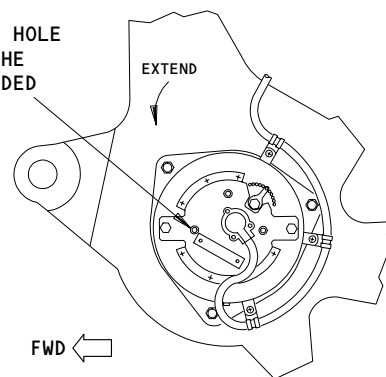
(A)



**FLAP POSITION TRANSMITTER,  
POSITION 3 (OUTBOARD VIEW)**

(B)

RIG PIN TE4 HOLE (FLAPS AT THE FULLY EXTENDED POSITION)



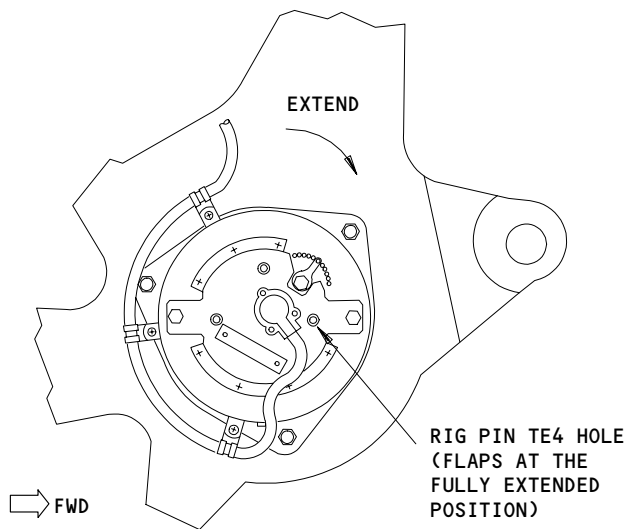
**FLAP POSITION TRANSMITTER,  
POSITION 4 (OUTBOARD VIEW)**

(C)

Location for the Rig Pin TE4  
Figure 202 (Sheet 1)

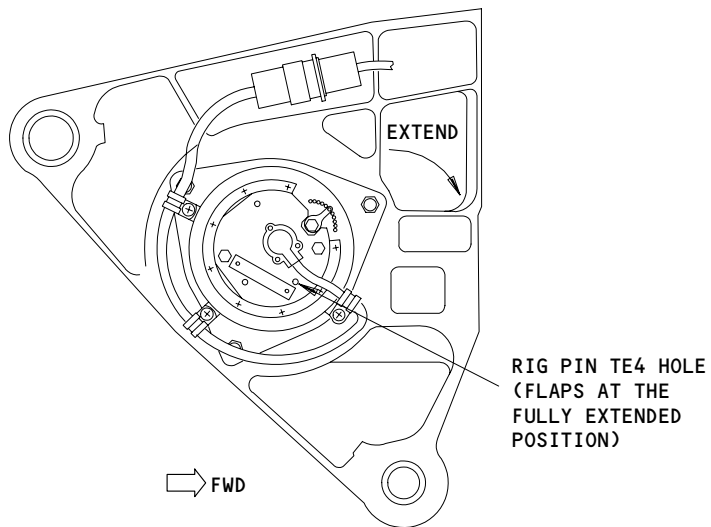
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FLAP POSITION TRANSMITTER,  
POSITION 5 (OUTBOARD VIEW)

(D)



FLAP POSITION TRANSMITTER,  
POSITION 8 (OUTBOARD VIEW)

(E)

Location for the Rig Pin TE4  
Figure 202 (Sheet 2)

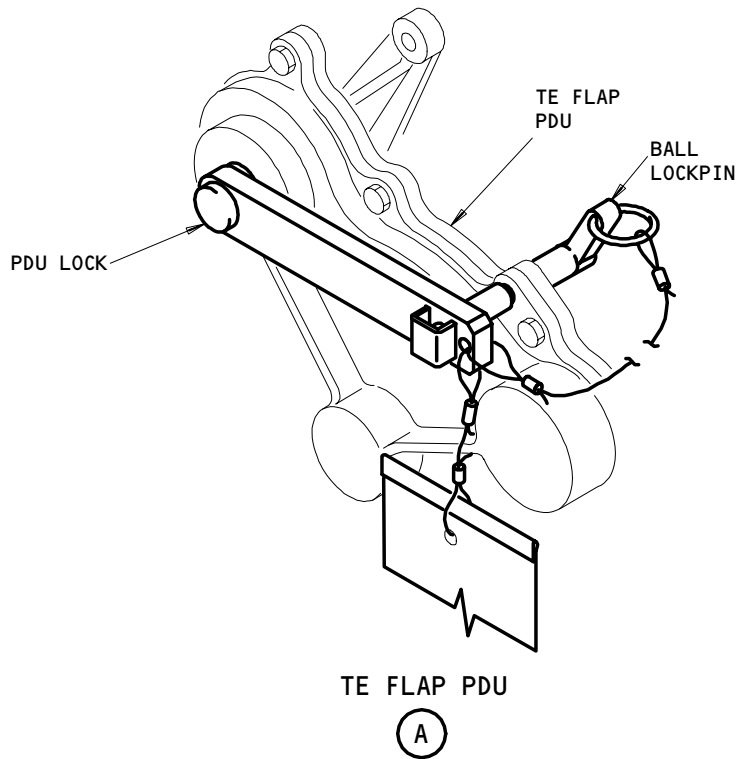
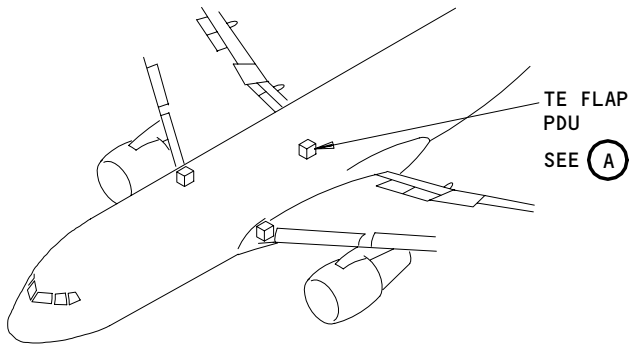
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PDU Lock for the TE Flap PDU  
Figure 203

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- (b) Make sure the adjustment fitting can turn freely, and can move the full limit of travel.

NOTE: Remove and clean the adjustment fitting if necessary.

- (c) Install rig pin TE4 in the rig pin hole location shown (Fig. 202 or Fig. 203). Turn the adjustment fitting when necessary to install the rig pin.

NOTE: On some airplanes the rig pin holes are identified by placards on the transmitter housing.

- (d) Turn the adjustment fitting to the left direction until rig pin TE4 is held tight against the rig pin hole. Make a mark on the centerline position of the adjustment fitting (Fig. 201).
- (e) Turn the adjustment fitting to the opposite direction until rig pin TE4 is held tight against the rig pin hole. Make a mark on the centerline position of the adjustment fitting.

NOTE: If you cannot remove the freeplay on rig pin TE4 when the adjustment fitting is at each limit of travel, then do a check of the drive system overtravel stop clearances (AMM 27-51-00/501). If the overtravel stop clearances are correct, then replace the flap position transmitter.

- (f) Turn the adjustment fitting to one-half the distance (Y/2) between the two centerline marks that you found in the steps before.

NOTE: This will put the adjustment fitting to the center of the total freeplay range (Y).

- (g) Tighten the transmitter bolts and the adjustment fitting bolt to 40-50 pound-inches (4.5 - 5.6 Nm).
- (h) Remove rig pin TE4.

S 822-088

- (7) Do the mechanical adjustments on the flap position transmitters at positions 4 and 5 with these steps:
  - (a) Remove the transmitter bolts (Fig. 201).
  - (b) Remove the flap position transmitter.
  - (c) Do a check in the transmitter housing to see if the adjustment fitting bolt (Detail C) is attached with a nut, or with a nutplate.
  - (d) Do these steps if a nutplate is used to attach the adjustment fitting bolt:
    - 1) Install the position transmitter back into the housing with the transmitter bolts, but do not tighten the bolts.

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- 2) Adjust the transmitters (position 4 and 5) with the same instructions used for the transmitters at the other positions.
- (e) If a nut is used to attach the adjustment fitting bolt, loosen the adjustment fitting nut and do these steps to adjust the position transmitter (position 4 and 5):
  - 1) Make sure the adjustment fitting can turn freely and can move the full limit of travel.

NOTE: Remove and clean the adjustment fitting if necessary.

- 2) Install the position transmitter back into the housing with the transmitter bolts, but do not tighten the bolts.
- 3) Install rig pin TE4 in the rig pin hole location shown (Fig. 202 or Fig. 203). Turn the adjustment fitting when necessary to install the rig pin.

NOTE: On some airplanes the rig pin holes are identified by placards on the transmitter housing.

- 4) Turn the adjustment fitting to the left direction until rig pin TE4 is held tight against the rig pin hole. Make a mark on the centerline position of the adjustment fitting (Fig. 201).
- 5) Turn the adjustment fitting to the opposite direction until rig pin TE4 is held tight against the rig pin hole. Make a mark on the centerline position of the adjustment fitting.

NOTE: If you cannot remove the freeplay on rig pin TE4 when the adjustment fitting is at each limit of travel, then do a check of the drive system overtravel stop clearances (AMM 27-51-00/501). If the overtravel stop clearances are correct, then replace the flap position transmitter.

- 6) Turn the adjustment fitting to one-half the distance ( $Y/2$ ) between the two centerline marks that you found in the steps before.

NOTE: This will put the adjustment fitting to the center of the total freeplay range ( $Y$ ).

- 7) Make a mark at the center of the total freeplay range of the adjustment fitting.
- 8) Remove the transmitter bolts.
- 9) Remove rig pin TE4.
- 10) Remove the position transmitter from the transmitter housing.

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- 11) Tighten the adjustment fitting to 40-50 pound-inches (4.5 - 5.6 Nm), at the center position mark of the freeplay range that you found before.
- 12) Install the position transmitter back into the housing.
- 13) Tighten the transmitter bolts to 40-50 pound-inches (4.5 - 5.6 Nm).

S 762-107

- (8) AIRPLANES WITH A -32 TO -53 FSEU;  
Do a check on the transmitter electrical voltage with these steps after you completed the mechanical adjustment:

NOTE: The voltage check is done by these pairs of transmitters:  
1 and 8, 4 and 5.

NOTE: There are two test cables that can be used to do this test. The following steps give instructions to use either the A27093-27 test equipment (Fig. 205) or the "Test Cable" shown in Fig. 204.

- (a) Make sure the TE flaps are extended to the 30-unit detent.
- (b) Disconnect the airplane electrical connector from the transmitter electrical connector for the transmitter that you adjusted.
- (c) To check voltage with the TE Flap Asymmetry Fault Isolation Test Equipment - A27093-27 (Fig. 205), do these steps:
  - 1) Supply electrical power (AMM 24-22-00/201).
  - 2) Install the A27093-28 test cable between the transmitter electrical connector, the airplane electrical connector and the A27093-34 test box.
  - 3) Connect the voltmeter to the A27093-34 test box and make a written record of the voltage measurement.
  - 4) Repeat the voltage measurement with the test equipment on the other transmitter of the transmitter pair (on the opposite wing).

NOTE: Transmitter no. 4 and 5 are a pair and transmitter no. 1 and 8 are a pair.

- 5) Remove electrical power (AMM 24-22-00/201).
- (d) To check voltage with the "Test Cable" (Fig. 204), do these steps:
  - 1) Install the test cable between the transmitter connector and the airplane wiring.

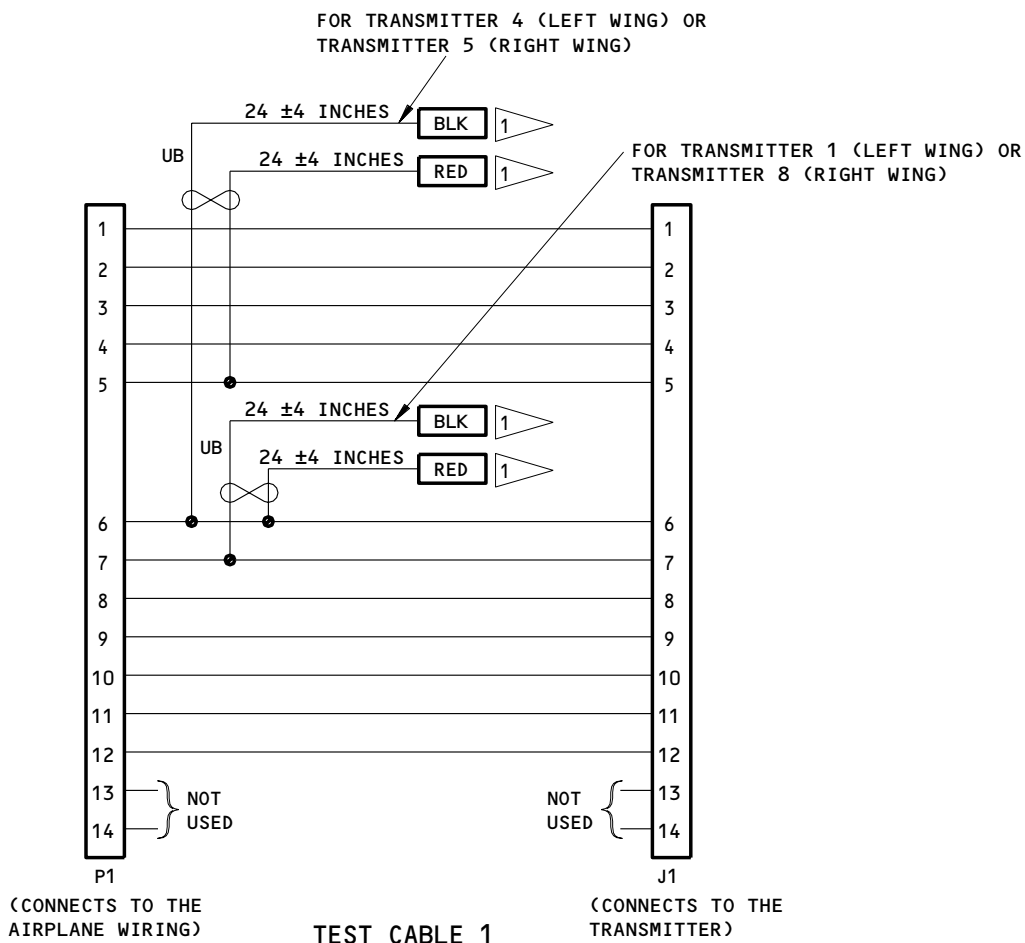
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**NOTE:** UNLESS IDENTIFIED, WIRE TYPE IS UA,  
AND WIRE LENGTH IS  $8 \pm 1$  INCHES.  
P1 P/N BACC45FS18C14P  
J1 P/N BACC45FM18C14S

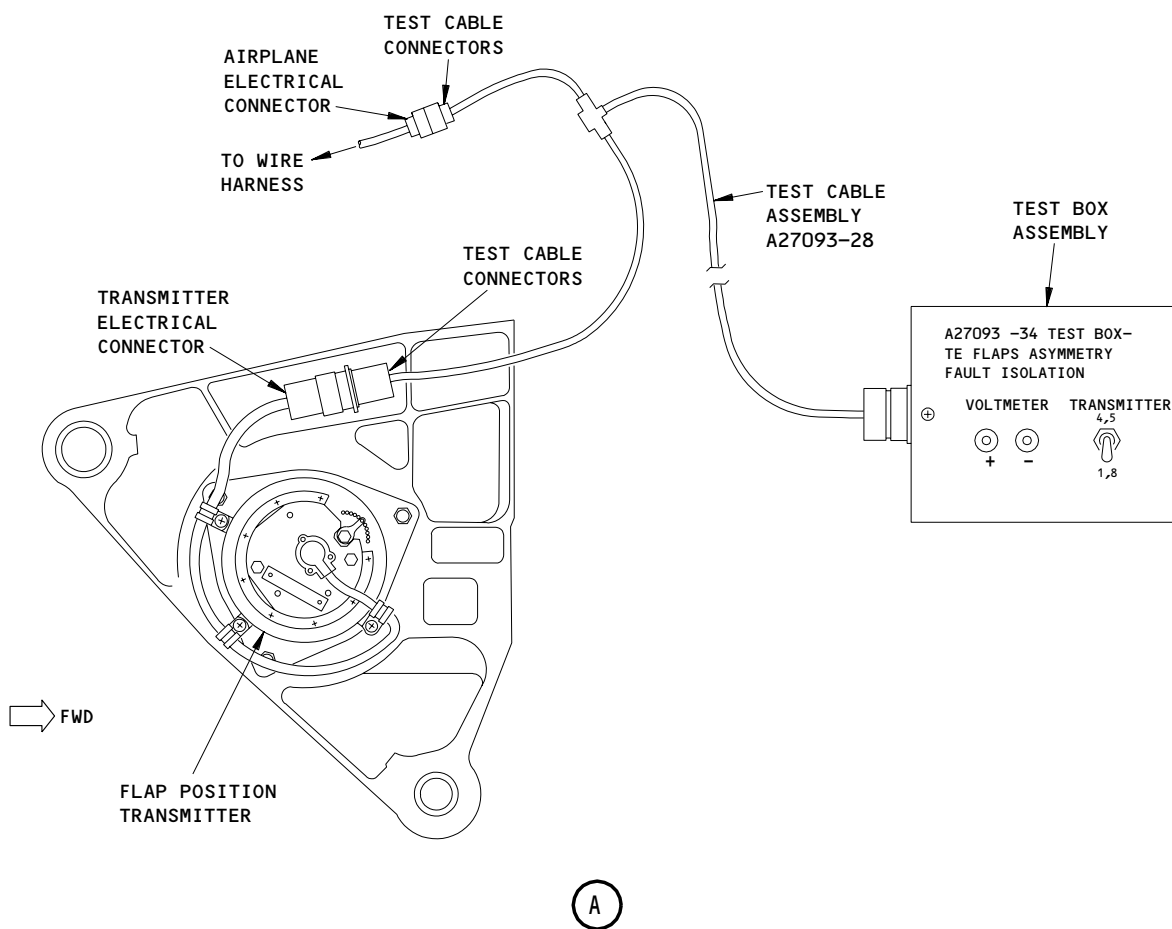
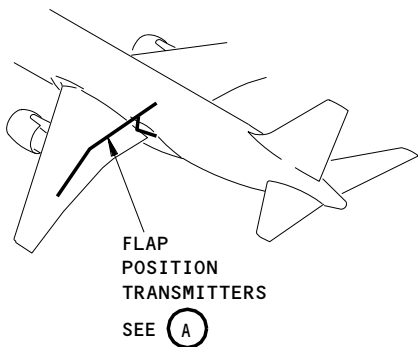
BANANA JACKS, CONNECTED TO THE VOLTMETER

Transmitter Test Wire Installation  
Figure 204

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Assymetry Fault Isolation Test Equipment Installation  
Figure 205

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AIRPLANES WITH A -53 FSEU

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- 2) Supply electrical power (AMM 24-22-00/201).
  - 3) Connect the voltmeter as shown, and make a written record of the voltage measurement.
  - 4) Repeat the voltage measurement with the test cable and voltmeter on the other transmitter of the transmitter pair (on the opposite wing).
  - 5) Remove electrical power (AMM 24-22-00/201).
- (e) Make sure that the difference between the two voltage measurements is not more than +/- 0.7 VAC.
- (f) If the voltage difference is greater than +/- 0.7 VAC, adjust or replace each transmitter of the transmitter pair until you get this voltage condition to agree.

S 762-124

- (9) AIRPLANES WITH A -63 FSEU;  
Check the flap position transmitter adjustment:

**NOTE:** The following steps will be used to display and record the no. 1 through no. 8 sensor resolver angles using the Bite Display panel on the FSEU (M545).

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (a) Pressurize the center hydraulic system (AMM 29-11-00/201).
- (b) Move the flap control lever to the 30-unit detent, and extend the flaps to the 30-unit position.
- (c) Move the flap control lever to the 20-unit detent, and retract the flaps to the 20-unit position.

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- (d) Install a DO-NOT-OPERATE tag on the flap control lever.
- (e) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- (f) Press the ON/OFF switch on the FSEU to display "EXISTING FAULTS?" (Fig. 206).
- (g) Press the down arrow until "OTHER FUNCTNS?" is displayed, and select YES.
- (h) Press the down arrow until "I/O Monitor?" is displayed, and select YES.
- (i) Press the YES button in response to "Analog Inputs?".
- (j) Press the down arrow until "FLP RES1 M473?" is displayed, and select YES.
- (k) Record the value displayed.
- (l) Press the down arrow to display the next sensor, and select YES.

**NOTE:** If the FSEU does not display a resolver number that is in the table, the resolver is not installed on the airplane.

- (m) Repeat the above FSEU steps for "FLP RES2 M474?" through "FLP RES8 M489?".
- (n) Verify that the recorded values are greater than the lower limit and less than the upper limit shown in the table.

767-200			
LOWER LIMIT (DEG.)	MEASURED VALUE (DEG.)	UPPER LIMIT (DEG.)	APPROXIMATE TARGET VALUES (DEG.)
288.44 <	#1 (M473) = _____	< 289.74	289.09
70.12 <	#2 (M474) = _____	< 71.42	70.77
288.66 <	#3 (M475) = _____	< 290.66	289.66
288.66 <	#4 (M476) = _____	< 290.66	289.66
69.34 <	#5 (M492) = _____	< 71.34	70.34
69.34 <	#6 (M491) = _____	< 71.34	70.34
288.58 <	#7 (M490) = _____	< 289.88	289.23
70.26 <	#8 (M489) = _____	< 71.56	70.91

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767-300			
LOWER LIMIT (DEG.)	MEASURED VALUE (DEG.)	UPPER LIMIT (DEG.)	APPROXIMATE TARGET VALUES (DEG.)
311.78 <	#1 (M473) = _____	< 313.08	312.43
46.78 <	#2 (M474) = _____	< 48.08	47.43
312.05 <	#3 (M475) = _____	< 314.05	313.05
312.21 <	#4 (M476) = _____	< 314.21	313.21
45.79 <	#5 (M492) = _____	< 47.79	46.79
45.95 <	#6 (M491) = _____	< 47.95	46.95
311.92 <	#7 (M490) = _____	< 313.22	312.57
46.92 <	#8 (M489) = _____	< 48.22	47.57

- (o) If the transmitters are outside of the range in the table, adjust or replace each transmitter of the transmitter pair until the measured values are within the limits in the table.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (p) Pressurize the center hydraulic system (AMM 29-11-00/201).

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- (q) Move the flap control lever to the 5-unit detent and retract the flaps to the 5-unit position.

NOTE: The DO-NOT-OPERATE tag can remain on the flap control lever during these operations.

- (r) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- (s) Press the "ON/OFF" switch on the FSEU to display the "EXISTING FAULTS?" message.
- (t) Press the down arrow until "I/O Monitor?" is displayed, and select YES.
- (u) Press the YES button in response to "Analog Inputs?".
- (v) Press the down arrow until "FLP RES1 M473?" is displayed and select YES.
- (w) Record the value displayed.
- (x) Press the down arrow to display the next sensor, and select YES.
- (y) Repeat the above FSEU steps for "FLP RES2 M474?" through "FLP RES8 M489?".
- (z) Add the sensor values recorded as shown in the following table.
- (aa) Verify that the added values are greater than the lower limit and less than the upper limit shown in the table.

LOWER LIMIT (DEG.)	MEASURED VALUE (DEG.)	UPPER LIMIT (DEG.)
357 <	#1 (M473) + #8 (M489) = _____	< 363
357 <	#2 (M474) + #7 (M490) = _____	< 363
356 <	#3 (M475) + #6 (M491) = _____	< 364
356 <	#4 (M476) + #5 (M492) = _____	< 364

- (ab) If the measured values for the transmitters are not in the limits in the table, do the flap position sensor check again.

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F. Test for the Trailing Edge Flap Drive

S 862-096

- (1) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the main power distribution panel, P6:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 862-097

- (2) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the overhead panel, P11:
  - (a) 11C16, FLAP SLAT ELEC UNIT 1 CONT
  - (b) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR
  - (c) 11H23, SLAT ALTN CONT INBD
  - (d) 11H24, SLAT ALTN CONT OUTBD
  - (e) 11J15, FLAP POS IND L
  - (f) 11J16, FLAP POS IND R
  - (g) 11J24, FLAPS ALTN CONT

S 092-099

- (3) Remove the PDU lock from the TE flap PDU (Fig. 203).

S 862-100

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

S 862-101

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (5) Pressurize the center hydraulic system (AMM 29-11-00/201).

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- S 092-102
- (6) Remove the DO-NOT-OPERATE tag from the flap control lever.
- S 862-103
- (7) Move the flap control lever to the zero (FLAPS UP) detent and permit the flaps to move to the fully retracted position.
- S 722-104
- (8) Do a test on the Trailing Edge Flap Drive with the steps that follow:

**NOTE:** During this test, make sure the amber LEADING EDGE and TRAILING EDGE lights on P3 (first officer instrument panel) are off, and that there are no flap or slat messages on the EICAS display.

- (a) Move the flap control lever to the 5-unit detent and do these checks:
- 1) Do these checks while the slats extend:
    - a) Make sure the flaps stays in the fully retracted position.
    - b) Make sure the flap position indicator, in the flight compartment, moves to a position between the UP-unit and 1-unit mark.
  - 2) Do these checks after the slat movement stops:
    - a) Make sure the slats are in the intermediate position.
    - b) Make sure the flap position indicator is at the 1-unit mark.
    - c) Make sure the flaps start to extend to the 5-degree position.
  - 3) After the flaps stop at the 5-degree position, make sure the flap position indicator is at the 5-unit mark.
- (b) Move the flap control lever to the 20-unit detent and do these checks:
- 1) While the flaps extend, make sure the flap position indicator starts to move to the 20-unit mark.

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- 2) Do these checks after the flap movement stops:
  - a) Make sure the flaps are in the 20-degree position.
  - b) Make sure the flap position indicator points to the 20-unit mark.
  - c) Make sure the slats stay in the intermediate position.
- (c) Move the flap control lever to the 30-unit detent and do these checks:
  - 1) While the flaps extend, make sure the flap position indicator starts to move to the 30-unit mark.
  - 2) Do these checks after the flap movement stops:
    - a) Make sure the flaps are in the fully extended position.
    - b) Make sure the flap position indicator is at the 30-unit mark.
    - c) Make sure the slats are in the fully extended position.
- (d) Move the flap control lever to the 5-unit detent and do the checks that follow:
  - 1) While the flaps retract, make sure the flap position indicator starts to move to the 5-unit mark.
  - 2) Do these checks after the flap movement stops:
    - a) Make sure the flaps are in the 5-degree position.
    - b) Make sure the flap position indicator points to the 5-unit mark.
    - c) Make sure the slats moved into the intermediate position.
- (e) Move the flap control lever to the zero (FLAPS UP) detent and do these checks:

NOTE: The flaps will move to the fully retracted position before the slats will start to retract.

- 1) While the flaps retract, make sure the flap position indicator starts to move to the 1-unit mark.
- 2) Do these checks after the flap movement stops:
  - a) Make sure the flaps are in the fully retracted position.

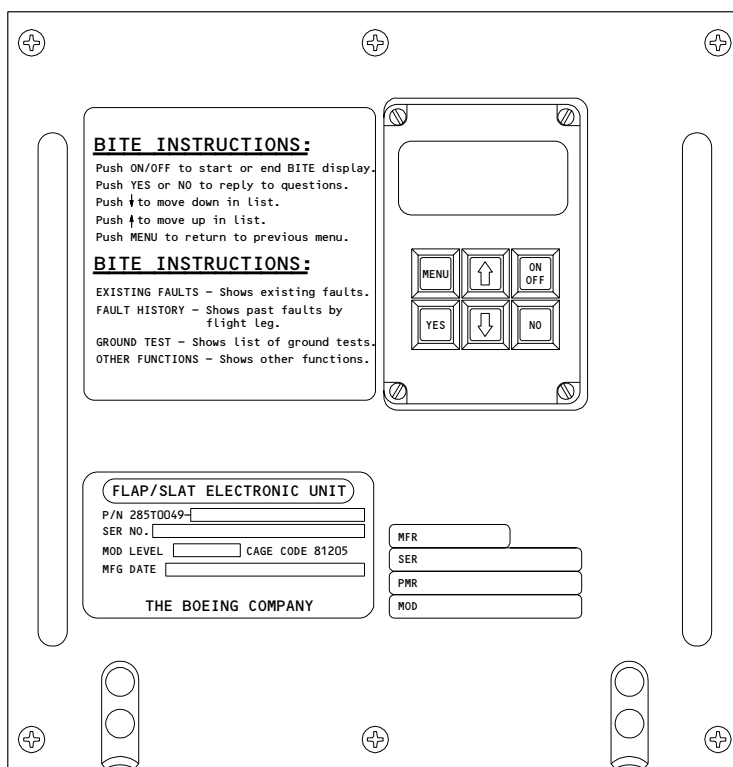
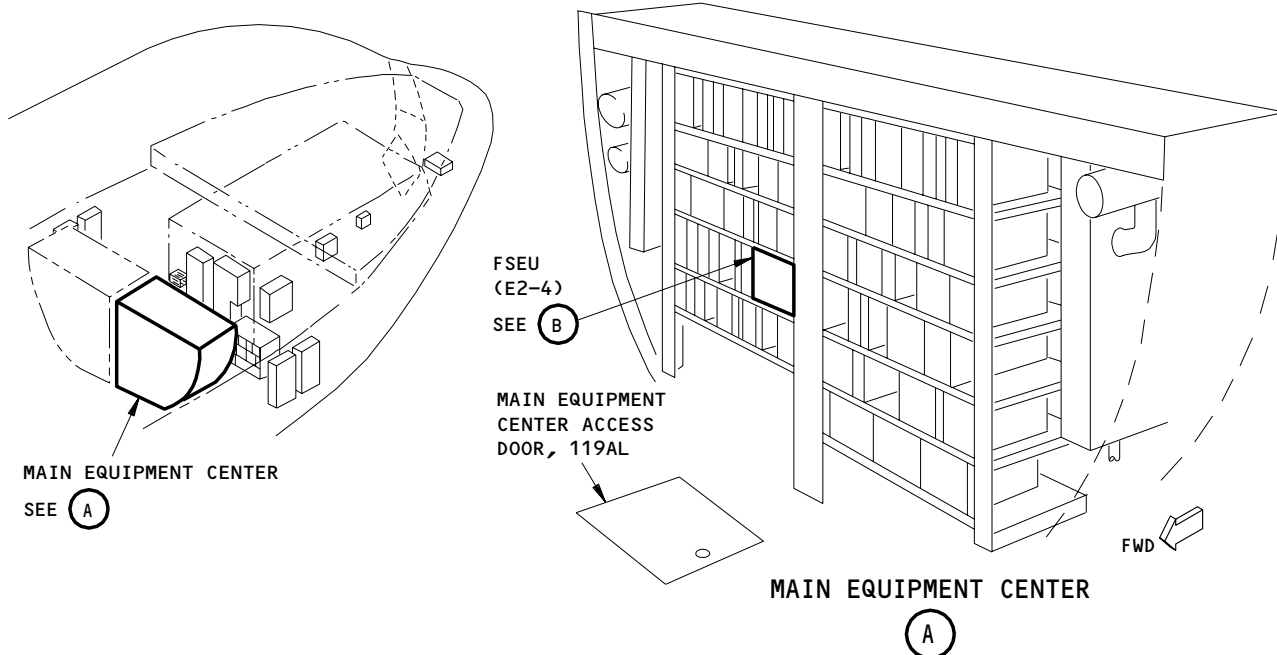
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(AIRPLANES WITH A -63 FSEU)

(B)

Flap/Slat Electronics Unit (FSEU)  
Figure 206

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AIRPLANES WITH A -63 FSEU

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- b) Make sure the flap position indicator points to the 1-unit mark.
  - 3) After the flaps moved to the fully retracted position, make sure the slats start to retract.
  - 4) While the slats retract, make sure the flap position indicator moves to a position between the 1-unit and UP-unit marks.
  - 5) Do these checks after the slat movement stops:
    - a) Make sure the slats are in the fully retracted position.
    - b) Make sure the flap position indicator points to the UP mark.
- G. Put the Airplane Back to Its Usual Condition

S 092-092

**WARNING:** USE THE TASK IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 862-093

- (2) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 862-094

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

S 412-095

- (4) Install the access panels, 195JL and 196JR, for the inboard flap mechanisms (AMM 06-41-00/201).

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FLAP/SLAT SHUTOFF VALVE MODULE AND COMPONENTS – MAINTENANCE PRACTICES

1. General

A. This procedure contains these tasks:

- Flap/Slat Shutoff Valve Module and Components – Removal
- Flap/Slat Shutoff Valve Module and Components – Installation
- Slat Hydraulic Pressure Switch – Replacement
- Flap/Slat Shutoff Valve Module – Test

TASK 27-51-48-022-001

2. Flap/Slat Shutoff Valve Module and Components – Removal

A. Equipment

- (1) Circuit Breaker Lockout Clip – 1012LC-R  
(2 necessary) Commercially Available

B. References

- (1) AMM 24-22-00/201, Electrical Power – Control  
(2) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems  
(3) AMM 32-00-15/201, Landing Gear Door Locks  
(4) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

- (1) Location Zone
- |         |  |
|---------|--|
| 144     | Right MLG Wheel Well                   |
| 211/212 | Control Cabin                          |
| 730/740 | Left/Right Main Landing Gear and Doors |

D. Prepare for Removal

S 212-023

- (1) Make sure the down locks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 492-086

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

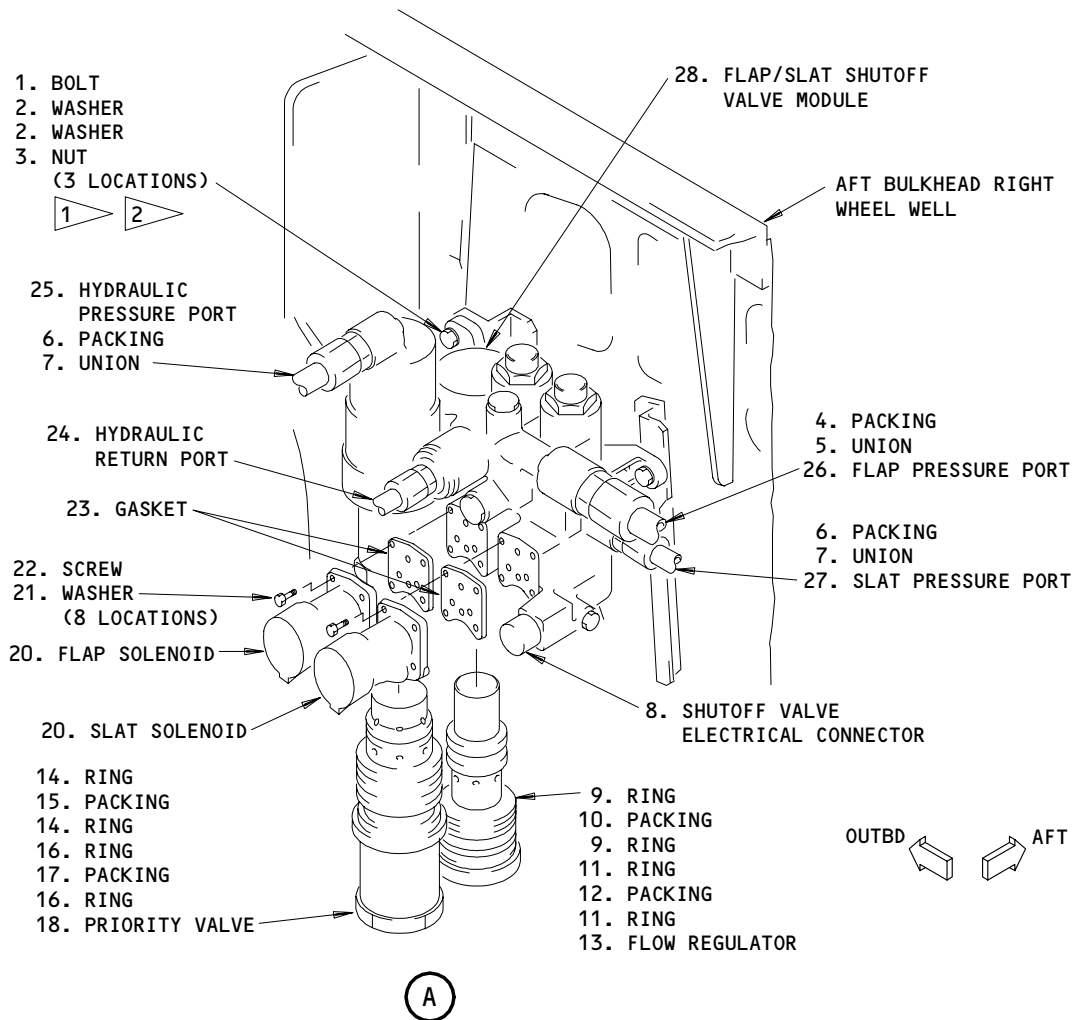
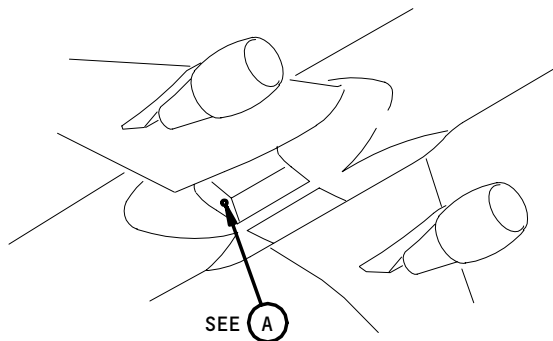
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1 RESISTANCE ACROSS CONNECTIONS MAX 0.001 OHM

2 ON AIRPLANES WITH NUTPLATE, DO NOT USE NUT AND SECOND WASHER

Flap/Slat Shutoff Valve Module  
Figure 201

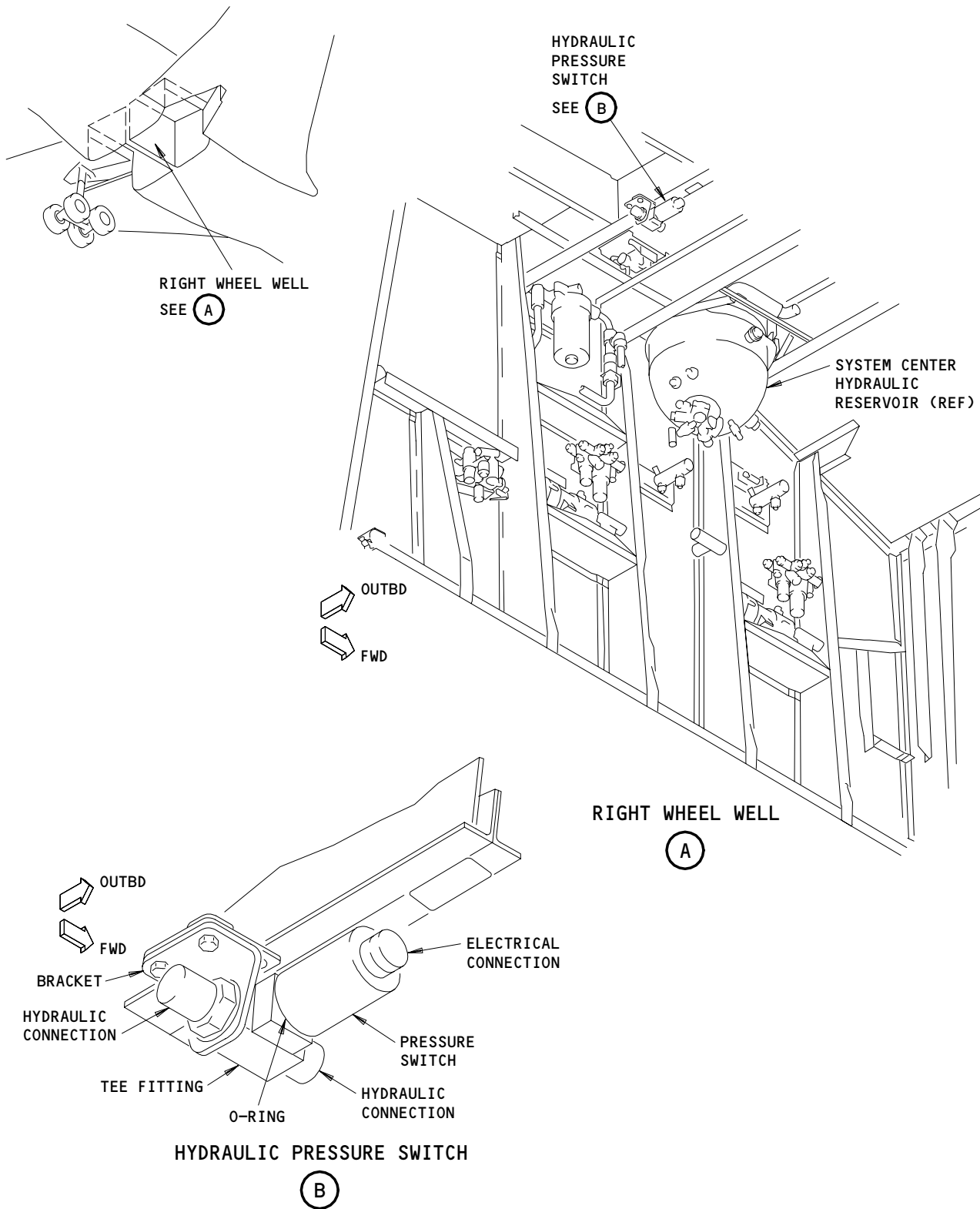
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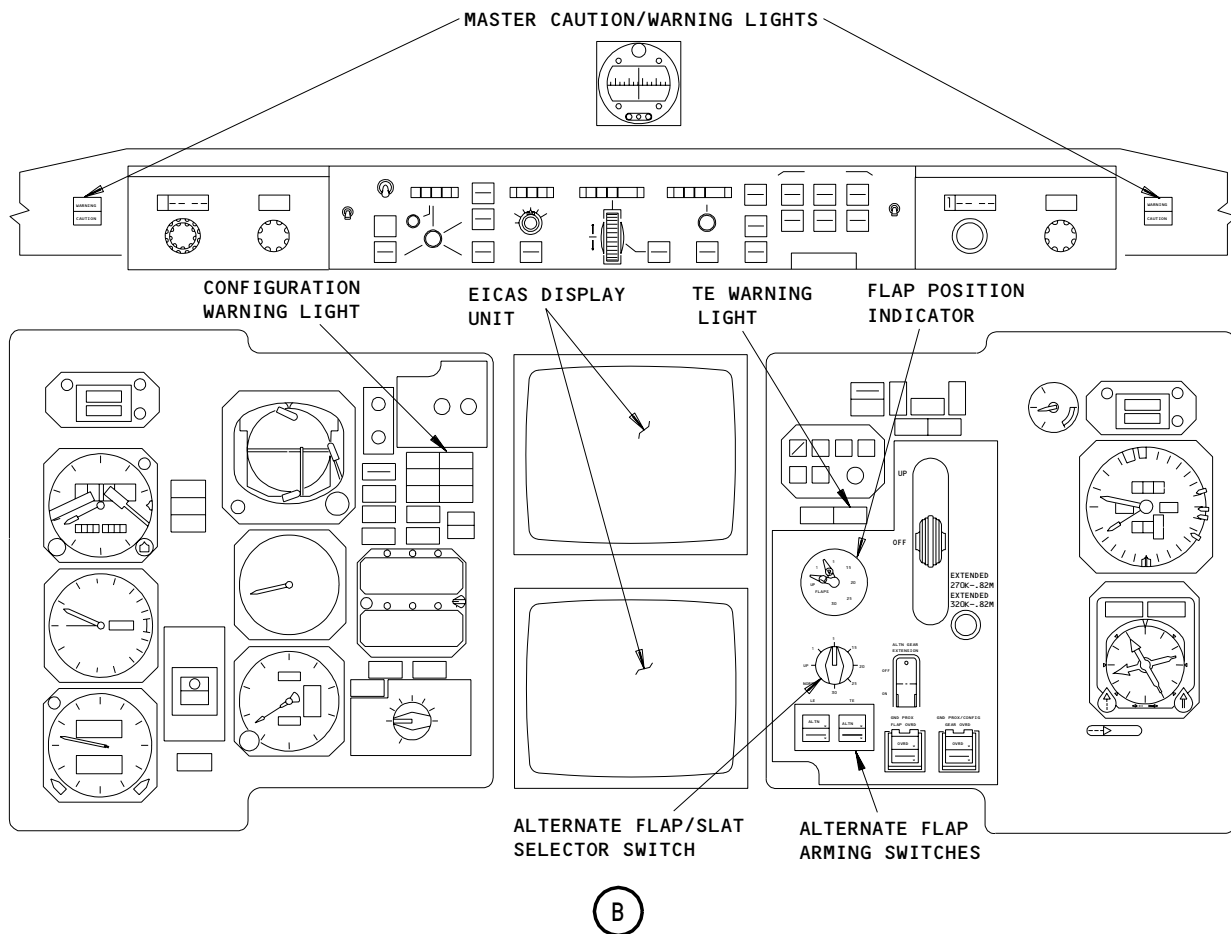
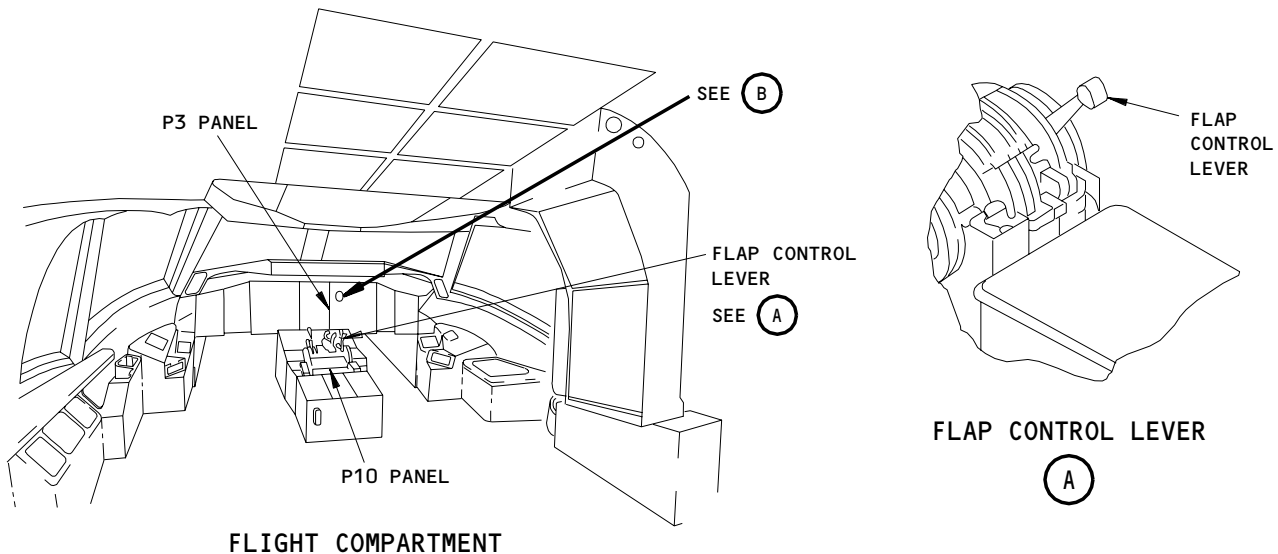
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Slat Hydraulic Pressure Switch  
Figure 202

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Controls for the TE Flaps  
Figure 203

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- S 212-025
- (3) Make sure the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position, and the flap control lever is in the zero (FLAPS UP) detent.
- S 492-087
- (4) Attach a DO-NOT-OPERATE tag to the flap control lever.
- S 862-026
- (5) Remove the pressure from the center hydraulic system and reservoir (AMM 29-11-00/201).
- S 862-027
- (6) Open this circuit breaker on the power distribution panel, P6, and attach a DO-NOT-CLOSE tag:
- (a) 6D24, ALTN FLAP PWR
- S 862-088
- (7) Open these circuit breakers on the P6 panel and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR
- S 862-089
- (8) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11H14, SLAT SHUTOFF  
(b) 11J14, FLAP SHUTOFF  
(c) 11J24, FLAPS ALTN CONT
- S 862-028
- (9) Open these circuit breakers on the P11 panel and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD
- E. Remove the Shutoff Valve Module (Fig. 201)
- S 032-029
- (1) Disconnect the electric connector (8) from the module (28).
- S 032-030
- (2) Disconnect the hydraulic lines from the hydraulic pressure port (25) and the hydraulic return port (24).
- S 032-031
- (3) Disconnect the hydraulic lines from the flap pressure port (26) and the slat pressure port (27).
- S 492-033
- (4) Install plugs in the hydraulic lines and caps in the open ports.

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S 032-034

- (5) Disconnect the three mounting bolts (1) on the shutoff valve module (28).

S 022-035

- (6) Remove the shutoff valve module (28) from the bulkhead.

F. Remove the Flow Regulator (Fig. 201)

S 032-002

- (1) Disconnect the electrical connector (8) from the shutoff valve module (28).

S 032-003

- (2) Remove the lockwire and loosen the flow regulator (13).

S 022-004

- (3) Remove the flow regulator (13), packing (10) (12) and rings (9) (11) from the housing.

S 492-005

- (4) Put a cover on the shutoff valve module (28) to prevent any contamination.

G. Remove the Solenoid Valve (Fig. 201)

S 032-006

- (1) Disconnect the electrical connector (8) from the shutoff valve module (28).

S 032-007

- (2) remove the lockwire and the four mounting screws (22).

S 022-008

- (3) Remove the flap solenoid (20) and the gasket from the shutoff valve module (28).

S 492-009

- (4) Put a cover on the shutoff valve module (28) to prevent any contamination.

H. Remove the Priority Valve (Fig. 201)

S 032-010

- (1) Disconnect the electrical connector (8) from the shutoff valve module (28).

S 032-011

- (2) Remove the lockwire and loosen the priority valve (18) on the shutoff valve module (28).

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S 022-012

- (3) Remove the priority valve (18), rings (14) (16), and packing (15) (17) from the shutoff valve module (28).

TASK 27-51-48-422-036

3. Flap/Slat Shutoff Valve Module - Installation

A. Equipment

- (1) Bonding Meter - Microhm Bridge, Type 2 Bonding Meter, 477W Avtron Model, Avtron Manufacturing Inc., Cleveland Ohio  
(2) Stainless steel rotary brush

B. Consumable Materials

- (1) D00054 Skydrol assembly lube - MCS 352B (Fire resistant hydraulic fluid - BMS 3-11 optional)  
(2) D00153 Fire resistant hydraulic fluid - BMS 3-11 (Skydrol assembly lube - MCS 352B optional)  
(3) D50180 Grease - BMS 3-33 (Preferred)  
(4) D00015 Grease - BMS 3-24 (Alternate)  
(5) C00308 Corrosion Preventive Compound - MIL-C-11797, Class 3  
(6) A00251 Sealant - BMS 5-26, Type II, Class B-2

C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
201	4	Packing	27-51-48	01	35
	6	Packing			40
	9	Ring			95
	10	Packing			100
	11	Ring			105
	12	Packing			110
	13	Flow Regulator			90
	14	Ring			70
	15	Packing			75
	16	Ring			80
	17	Packing			85
	18	Priority Valve			65
	20	Solenoid			50
	23	Gasket			58
	28	Shutoff Valve Module			45

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D. References

- (1) AMM 24-22-00/201, Electrical Power – Control
- (2) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems

E. Access

- (1) Location Zone
  - 144 Right Wheel Well
  - 211/212 Control Cabin

F. Install the Shutoff Valve Module (Fig. 201)

S 862-038

- (1) Remove the pressure from the center hydraulic system and reservoir (AMM 29-11-00/201).

S 212-065

- (2) Make sure the arming switches for the flap and slat alternate drives in the flight compartment are set to off (ALTN switch lights off) (Fig. 203).

S 212-014

- (3) Make sure the flaps and slats are in the fully retracted position and the flap control lever is in the zero (FLAPS UP) detent.

S 122-039

**CAUTION:** DO NOT USE THE STAINLESS STEEL BRUSH ON ALUMINUM SURFACES WITH HEAVY OXIDE DEPOSITS TO PREVENT DAMAGE TO THE AIRPLANE.

- (4) Clean the ground points on the shutoff valve module with a rotary stainless steel brush.

S 642-039

- (5) Apply grease to the mounting bolts (1).

S 422-040

- (6) Set the shutoff valve module (28) into position and attach it with mounting bolts (1), washers (2), and nuts (3) at three locations.

S 092-041

- (7) Remove the caps from the ports and the plugs from the hydraulic lines.

S 642-042

- (8) Lightly lubricate the backup rings and the O-rings with hydraulic fluid or Skydrol assembly lubrication.

S 432-043

- (9) Install the backup rings and the O-rings in the module ports.

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- S 212-085
- (10) Make sure the shutoff valve module is filled with hydraulic fluid.
- S 432-064
- (11) Install the packing (6) and the union (7) into the hydraulic pressure port (25).
- S 432-044
- (12) Connect the hydraulic lines to the hydraulic pressure port (25) and the hydraulic return port (24).
- S 432-045
- (13) Install the packing (4) and the union (5) into flap pressure port (26).
- S 432-104
- (14) Connect the hydraulic line to the flap pressure port (26).
- S 432-047
- (15) Install the packing (6) and the union (7) into the slat pressure port (27).
- S 432-048
- (16) Connect the hydraulic line to the slat pressure port (27).
- S 432-049
- (17) Install the electrical connector (8) to the shutoff valve module (28).
- S 712-050
- (18) Do a test on the shutoff valve module with the instruction given in the Flap/Slat Shutoff Valve Module Test paragraph.
- G. Install the Flow Regulator (Fig. 201)
- S 862-051
- (1) Remove the pressure from the center hydraulic system and reservoir (AMM 29-11-00/201).
- S 212-013
- (2) Make sure the arming switches for the flap and slat alternate drives in the flight compartment, are set to off (ALTN switch lights off).
- S 212-102
- (3) Make sure that the flaps and slats are in the fully retracted position and the flap control lever is in the zero (FLAPS UP) detent.

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- S 642-052
- (4) Lubricate the threads on the flow regulator (13) and packings (10) (12) with hydraulic fluid or Skydrol assembly lube.
- S 432-053
- (5) Install the rings (9) (11) and the packings (10) (12) to the flow regulator in the sequence that follows:
- (a) Ring (11)
  - (b) Packing (12)
  - (c) Ring (11)
  - (d) Ring (9)
  - (e) Package (10)
  - (f) Ring (9).
- S 092-054
- (6) Remove the cover from the shutoff valve module (28).
- S 422-055
- (7) Attach the flow regulator (13) into the shutoff valve module (24).
- S 432-040
- (8) Tighten the flow regulator (13) to 400-500 pound-inches (45-56 N-m) and safety it with a lockwire.
- S 432-056
- (9) Connect the electrical connector (8) to the shutoff valve module (28).
- S 712-057
- (10) Do a test on the shutoff valve module with the instructions given in the Flap/Slat Shutoff Valve Module Test paragraph.
- H. Install the Solenoid Valve (Fig. 201)
- S 862-058
- (1) Remove the pressure from the center hydraulic system and reservoir (AMM 29-11-00/201).
- S 212-055
- (2) Make sure the arming switches for the flap and slat alternate drives (on F/O instrument panel, P3) are set to off (ALTN switch lights off).
- S 212-016
- (3) Make sure the flaps and slats are in the fully retracted position and the flap control lever is in the zero (FLAPS UP) detent.
- S 642-059
- (4) Lightly lubricate the solenoid gasket (23) and the packing (19) with hydraulic fluid or Skydrol assembly lube.

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- S 432-060
- (5) Install the gasket (23) on the solenoid valve (20).
- S 092-061
- (6) Remove the cover from the shutoff valve module (28).
- S 622-062
- (7) Apply corrosion preventive compound to the mounting screw threads (22).
- S 432-063
- (8) Install the four mounting screws (22) and washers (21) and tighten the mounting screws to 67-83 pound-inches (7.6-9.4 N-m).
- S 432-041
- (9) Safety the solenoid valve (20) with a lockwire.
- S 392-018
- (10) Seal the mounting screws (22) and the surface between the solenoid valve (20) and the shutoff valve module (28) with BMS 5-26 sealant.
- S 212-064
- (11) Make sure the solenoid valve (20) is filled with hydraulic fluid.
- S 432-065
- (12) Connect the electrical connector (8) to the shutoff valve module (28).
- S 722-066
- (13) Do a test on the shutoff valve module with the instructions given by the Flap/Slat Shutoff Valve Module Test paragraph.
- I. Install the Priority Valve (Fig. 201)
- S 862-067
- (1) Remove the pressure from the center hydraulic system and reservoir (AMM 29-11-00/201).
- S 212-019
- (2) Make sure the alternate flap arming switches for the flap and slat alternate drives in the flight compartment are set to off (ALTN switch lights off).
- S 212-020
- (3) Make sure the flaps and the slats are in the fully retracted position and the flap control lever is in the zero (FLAPS UP) detent.
- S 642-068
- (4) Lubricate the packings (15) (17) and the threads on the priority valve (18) with hydraulic fluid or Skydrol assembly lubrication.

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- S 432-069
- (5) Install the rings (14) (16) and the packings (15) (17) on the priority valve (18) in the sequence that follows:
- (a) Ring (16)
  - (b) Packing (17)
  - (c) Ring (16)
  - (d) Ring (14)
  - (e) Packing (15)
  - (f) Ring (14).
- S 092-070
- (6) Remove the cover from the shutoff valve module (28).
- S 422-071
- (7) Attach the priority valve (18) into the shutoff valve module.
- S 432-042
- (8) Tighten the priority valve (18) to 400-500 pound-inches (45-56 N-m) and safety it with a lock wire.
- S 432-072
- (9) Attach the electrical connector (8) to the shutoff valve module (28).
- S 712-073
- (10) Do a test on the shutoff valve module with the instructions given by the Flap/Slat Shutoff Valve Module Test paragraph.

TASK 27-51-48-962-063

4. Slat Hydraulic Pressure Switch - Replacement

A. Equipment

- (1) Circuit Breaker Lockout Clip - 1012LC-R  
(2 necessary) Commercially Available

B. Consumable Materials

- (1) D00054 Skydrol assembly lube - MCS 352B  
(Fire resistant hydraulic fluid - BMS 3-11 optional)

C. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
 (2) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems  
 (3) AMM 32-00-15/201, Landing Gear Door Locks  
 (4) AMM 32-00-20/201, Landing Gear Downlocks

D. Access

- (1) Location Zone
- |         |  |
|---------|--|
| 144     | Right MLG Wheel Well                   |
| 211/212 | Control Cabin                          |
| 730/740 | Left/Right Main Landing Gear and Doors |

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E. Prepare for the Removal

S 212-050

- (1) Make sure the down locks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 492-051

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 212-052

- (3) Make sure the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position, and the flap control lever is in the zero (FLAPS UP) detent.

S 492-053

- (4) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-054

- (5) Remove the pressure from the center hydraulic system and reservoir (AMM 29-11-00/201).

S 862-055

- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11H14, SLAT SHUTOFF
  - (b) 11J14, FLAP SHUTOFF

F. Remove the Slat Pressure Switch (Fig. 202)

S 032-043

- (1) Disconnect the electrical connector from the switch.

S 032-044

- (2) Turn the switch to loosen the switch from the tee fitting.

S 022-045

- (3) Remove the switch and the O-ring from the airplane.

G. Install the Slat Pressure Switch (Fig. 202)

S 432-105

- (1) Install the O-ring on the pressure switch mating surface with Skydrol assembly lube.

S 422-047

- (2) Turn the switch onto the tee fitting to install the switch, and tighten the switch to the tee fitting.

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S 862-048

- (3) Remove the DO-NOT-OPERATE tags and close these circuit breakers on the P11 panel:
- (a) 11H14, SLAT SHUTOFF
  - (b) 11J14, FLAP SHUTOFF

S 862-056

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-057

- (5) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 212-058

- (6) Move the flap control lever to the 5-unit detent and do these checks:
- (a) Make sure the slats extend to the intermediate position before the flaps begin to extend.
  - (b) Make sure the flaps extend to the 5-degree position after the slats move to the intermediate position.

S 212-060

- (7) Move the flap control lever to the zero (FLAPS UP) detent and do these checks:
- (a) Make sure the flaps retract to the fully retracted position before the slats begin to retract.
  - (b) Make sure the slats retract to the fully retracted position after the flaps fully retract.

S 212-059

- (8) Do a check at the area around the switch and make sure there is no leakage of hydraulic fluid.

H. Put the Airplane Back to Its Usual Condition

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S 092-062

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Remove the door locks and close the main landing gear doors (AMM 32-00-15/201).

S 862-060

- (2) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 862-061

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-51-48-712-074

5. Flap/Slat Shutoff Valve Module - Test

A. References

- (1) AMM 12-12-01/301, Hydraulic Systems - Servicing
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems

B. Access

- (1) Location Zone

144	Right Wheel Well
211/212	Control Cabin
730/740	Left/Right Main Landing Gear and Doors

C. Flap/Slat Shutoff Valve Module Test

S 212-075

- (1) Make sure that the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position.

S 212-021

- (2) Make sure that the flap control lever is in the zero (FLAPS UP) detent.

S 092-022

- (3) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-076

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

S 862-077

- (5) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the power distribution panel, P6:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

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S 862-078

- (6) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H14, SLAT SHUTOFF
  - (b) 11H23, SLAT ALTN CONT INBD
  - (c) 11H24, SLAT ALTN CONT OUTBD
  - (d) 11J14, FLAP SHUTOFF
  - (e) 11J24, FLAPS ALTN CONT

S 862-079

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES TO PREVENT INJURY AND DAMAGE. THE TRAILING EDGE FLAPS AND LEADING EDGE SLATS ARE SUPPLIED WITH POWER. THE MOVEMENT OF THE FLAPS AND SLATS DOES NOT ALWAYS OCCUR AT THE SAME TIME. THE FLAP MOVEMENT BETWEEN THE 5-UNIT AND 15-UNIT DETENTS CAN CAUSE THE INBOARD AILERONS TO MOVE. THE AILERONS, SPOILERS, RUDDER, ELEVATOR, AND STABILIZER SURFACES ARE ALSO SUPPLIED WITH POWER.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (7) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 212-079

- (8) Move the flap control lever to the 5-unit detent, and do a check on these steps in the sequence that follow:
- (a) Make sure that the LE slats move to the intermediate position.
  - (b) Make sure the flap position indicators in the flight compartment, move to the 1-unit position.
  - (c) Make sure the TE flaps move to the 5-degree position after the LE slats move to the intermediate position.
  - (d) Make sure the flap position indicators in the flight compartment, move to the 5-unit position.

S 212-080

- (9) Move the flap control lever to the zero (FLAPS UP) detent and do a check on these steps in the sequence that follow:
- (a) Make sure the TE flaps move to the fully retracted position.
  - (b) Make sure the flap position indicators in the flight compartment, move to the 1-unit position.
  - (c) Make sure the LE slats move to the fully retracted position after the TE flaps move to the fully retracted position.
  - (d) Make sure the flap position indicators in the flight compartment, move to the UP position.

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S 792-080

- (10) Make sure that there is no leakage of hydraulic fluid at the hydraulic components on the shutoff valve module.

S 782-081

- (11) Examine the hydraulic system reservoir and do the servicing steps if necessary (AMM 12-12-01/301).

S 862-082

- (12) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 862-083

- (13) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TRAILING EDGE FLAP POSITION INDICATING SYSTEM -  
DESCRIPTION AND OPERATION

1. General

- A. The trailing edge flap position indicating system provides flap position and flap system failure information to the flight deck.
- B. Flap position is indicated by a dial indicator with needles for indicating right and left wing flap and slat position.
- C. The flap position indicator needles are normally driven by the outboard position transmitters in each wing.
- D. An amber TRAILING EDGE caution light will come on for flap system fault indication.
- E. The Engine Indicating and Crew Alerting System (EICAS) will display flap system fault messages for detected faults.
- F. Position data from position transmitters located outboard of rotary actuators 1, 3, 4, 5 and 8 is monitored by the Flap/Slat Electronic Unit (FSEU). Position data is used by the FSEU for asymmetry detection and protection, uncommanded motion detection and protection, position indication, control in the alternate mode, and flap/slat information to the other systems.
- G. Three Flap/Stabilizer Position Modules (FSPMs) process data from the flap and the stabilizer position transmitters to control the operation of various airplane systems. The three FSPMs installed on 767-200 airplanes are different than those installed on 767 airplanes with low speed landing capability. The FSPMs are not interchangeable between these airplane configurations.
- H. Position indication is identical for both normal and alternate control.

2. Component Details

- A. Flap/slat Position Indicator (Fig. 1)
  - (1) The primary source of flap and slat position information is the flap/slat position indicator located on the P3 panel.
  - (2) The position indicator uses two needles, "L" and "R" to indicate flap and slat position between the 1-unit and the 30-unit positions.
  - (3) The position indicator shows operation of the slats between the UP and the takeoff position.
    - (a) When any slat leaves the retracted position the position indicator needles move halfway to the 1-unit mark.
    - (b) When the slats reach the takeoff position the needles move to the 1-unit position.
- B. Trailing Edge Light
  - (1) The amber TRAILING EDGE light is described in 27-51-00, Trailing Edge Flap System - Description and Operation.

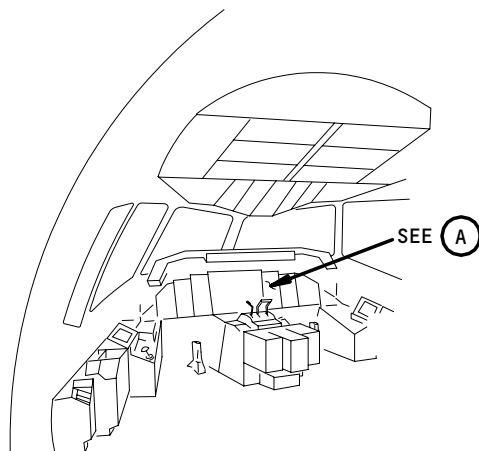
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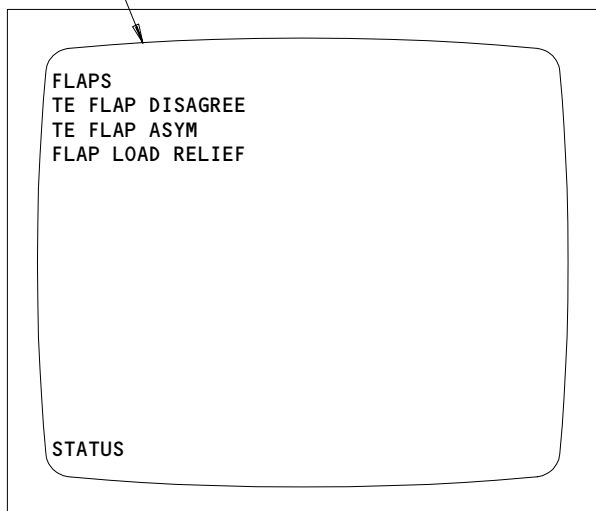
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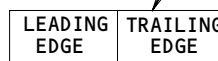
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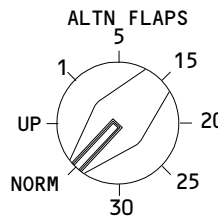
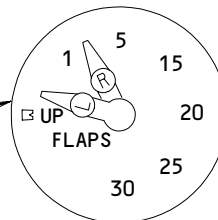
EICAS DISPLAY SCREEN



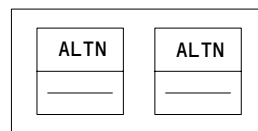
TRAILING EDGE LIGHT (AMBER)



FLAP/SLAT POSITION INDICATOR



LE    TE



(A)

Flap Position Indication  
Figure 1

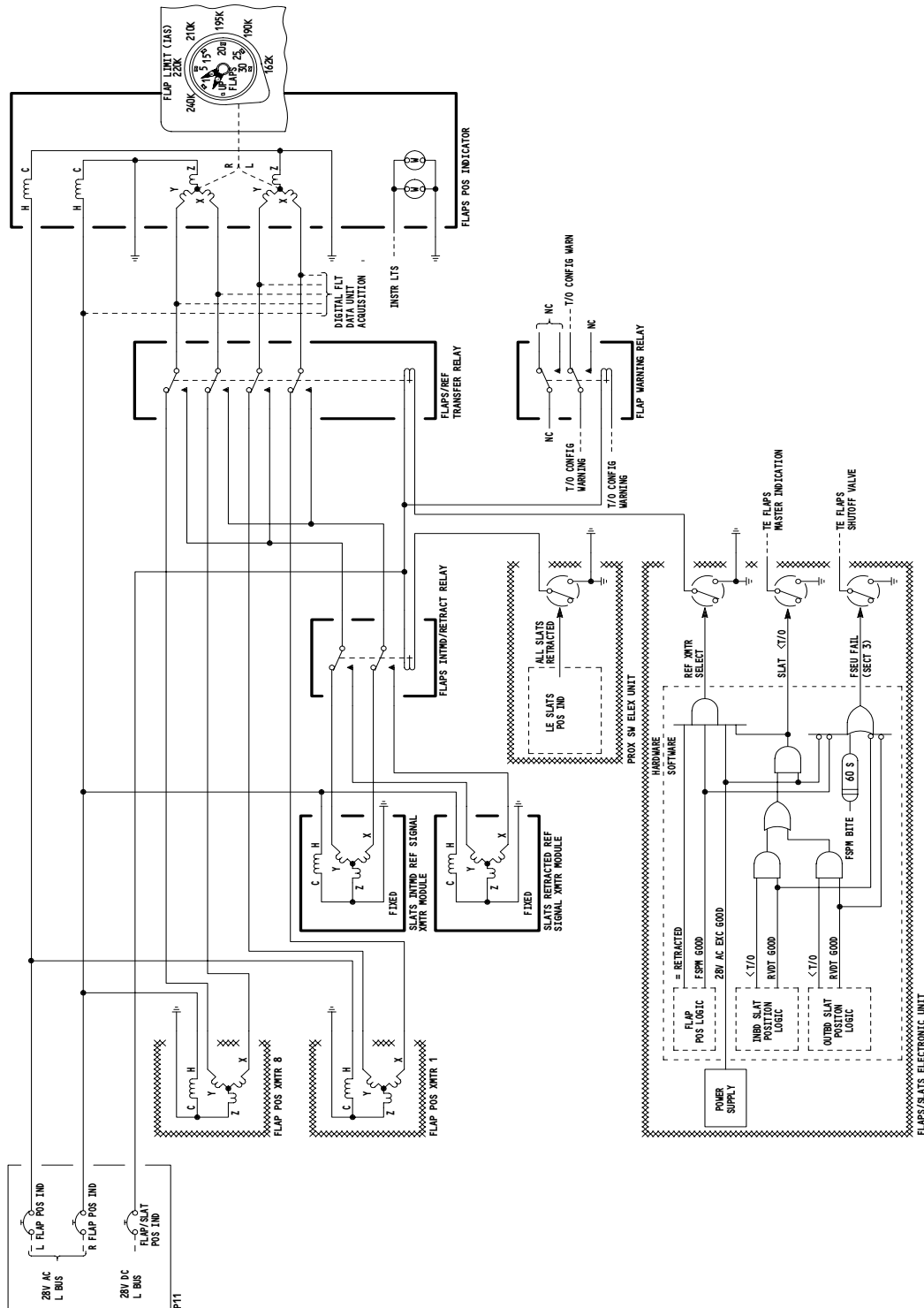
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Flap Position Indication System Schematic  
Figure 2

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C. Position Transmitters

- (1) Position transmitters are located at rotary actuators 1, 3, 4, 5, and 8. Transmitters 1, 4, 5, and 8 contain resolvers which provide position signals to the asymmetry detection circuits in the FSEU.
  - (a) The nominal voltage outputs from the transmitters to the FSEU are given in the following table.

NOMINAL VOLTAGE (VAC ± 0.70 VAC)							
		Detent					
	Transmitter P/N Dash #	30	25	20	15	5	1
767-200	-9, -12, -15	0.30	9.70	12.03	12.66	5.83	0.00
	-11, -13, -16	0.11	9.59	11.99	12.67	5.93	0.00
767-300	-9, -12, -15	0.30	9.70	12.03	12.50	10.87	0.00
	-11, -13, -16	0.11	9.59	11.98	12.53	10.94	0.00
	-17	5.89	1.19	9.43	12.03	12.50	0.00
	-19, -20	6.08	1.00	9.32	11.98	12.53	0.00

- (2) The two outboard transmitters contain synchros. Each synchro drives a needle in the flap position indicator.
- (3) A rotary variable differential transformer (RVDT) is installed in both transmitters on the left inboard flap. An RVDT is also installed in the inboard transmitter on the right wing. The three RVDT's provide flap position signals to the flap/stabilizer position module.

D. Flap/Stabilizer Position Module (FSPM)

- (1) Three flap/stabilizer position modules (FSPMs) provide flap and stabilizer position signals to flap and other airplane systems. Logic is contained on circuit cards located in the P50 panel card file. Separate cards make up the center, left and right flap/stab position modules. The P50 card file is mounted inside the airplane on the right side of the nose gear wheel well.
- (2) The FSPMs have a built-in test, which performs a self-test of the FSPM and of interfacing flap and stabilizer position transmitters.
- (3) The left FSPM receives position signals from the following:
  - (a) Horizontal stabilizer left position transmitter
  - (b) The outboard transmitter on the inboard flap of the left wing
- (4) The left FSPM provides signals to the following:
  - (a) TMS mode selector logic
  - (b) AFDS pitch cruise signals, left channel
  - (c) TE flap master indication in section 2 of the FSEU
  - (d) Left stabilizer trim/aileron lockout module

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- (e) Spoiler control
- (f) Ground proximity warning
- (g) Engine ignition
- (h) EEC and flight/ground idle
- (5) The right FSPM receives position signals from the following:
  - (a) Horizontal stabilizer right position transmitter
  - (b) The inboard transmitter of the inboard flap of the right wing
- (6) The right FSPM provides signals to the following:
  - (a) TE flap alternate drive logic in section 3 of the FSEU
  - (b) AFDS pitch cruise signals, right channel
  - (c) Stall warning, right channel
  - (d) Right pack flow control
  - (e) Right stabilizer trim/aileron lockout module
  - (f) Spoiler control
  - (g) Engine ignition
  - (h) EEC and flight/ground idle
- (7) The center FSPM receives position signals from the following:
  - (a) The inboard transmitter of the inboard flap of the left wing
  - (b) Horizontal stabilizer center position transmitter
- (8) The center FSPM provides signals to the following:
  - (a) TE flap shutoff valve logic in section 1 of the FSEU
  - (b) AFDS pitch cruise signals, center channel
  - (c) Stall warning, left channel
  - (d) Spoiler control
  - (e) Center flight control computer
  - (f) Configuration warning module
  - (g) Left pack flow control
- E. Flap/Slat Electronic Unit (FSEU)
  - (1) The FSEU processes information from the high lift system and provides indications and data for display and warning when crew alerting or warning is required. For detailed description of FSEU control of flap and slat systems, refer to 27-51-01, Flap/Slat Electronics Unit - Description and Operation.
  - (2) The FSEU monitors output voltages of flap system resolvers, synchros, and RVDTs to obtain flap system position information. Position data is used by the FSEU for asymmetry detection and protection, uncommanded motion detection and protection, indication, control in the alternate mode, and flap/slat position information to other systems.
  - (3) The FSEU has a built-in test equipment system which performs a self test of the FSEU and interfacing hardware.
- F. Engine Indicating and Crew Alerting System (EICAS)
  - (1) Refer to 27-51-00, Trailing Edge Flap System - Description and Operation, for a description of TE flap system EICAS messages.

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3. Operation

A. During normal flap operation the flap/slat position indicator is the only source of flap and slat position information. Under hydraulic or electric power the position indicator needles follow flap and slat position:

LEVER OR SWITCH COMMAND	NORMAL IN-TRANSIT INDICATION	NORMAL STEADY STATE INDICATION
"UP"	-----	NEEDLES AT "UP"
"1"	NEEDLES MOVE HALFWAY TO "1" WHEN ANY SLAT LEAVES RETRACT POSITION	NEEDLES AT "1" WHEN LAST SLAT REACHES POSITION
"5"	NEEDLES MOVE TO "5" AS T. E. FLAPS EXTEND	NEEDLES AT "5"
"15"	NEEDLES MOVE TO "15" AS T. E. FLAPS EXTEND	NEEDLES AT "15"
"20"	NEEDLES MOVE TO "20" AS T. E. FLAPS EXTEND	NEEDLES AT "20"

(1) 767-200 AIRPLANES;  
Use the table that follows:

LEVER OR SWITCH COMMAND	NORMAL IN-TRANSIT INDICATION	NORMAL STEADY STATE INDICATION
"25"	NEEDLES MOVE TO "25" AS L. E. SLATS AND T. E. FLAPS EXTEND	NEEDLES AT "25"
"30"	NO LD RELIEF NEEDLES MOVE TO "30" AS T. E. FLAPS EXTEND	NEEDLES AT "30"
	LD RELIEF NEEDLES MOVE TO "25" AS FLAPS RETRACT	NEEDLES AT "25"

(2) 767-300 AIRPLANES;  
Use the table that follows:

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LEVER OR SWITCH COMMAND		NORMAL IN-TRANSIT INDICATION	NORMAL STEADY STATE INDICATION
"25"	NO LD RELIEF	NEEDLES MOVE TO "25" AS L. E. SLATS AND T. E. FLAPS EXTEND	NEEDLES AT "25"
	LD RELIEF	NEEDLES MOVE TO "20" AS FLAPS RETRACT	NEEDLES AT "20"
"30"	NO LD RELIEF	NEEDLES MOVE TO "30" AS T. E. FLAPS EXTEND	NEEDLES AT "30"
	LD RELIEF	NEEDLES MOVE TO "20" AS FLAPS RETRACT	NEEDLES AT "20"

- B. The flap position shows on the Maintenance Control Display Panel, MCDP (M168) in the Main Equipment Center (AMM 22-00-02/201). The MCDP truncates the flap angle value to the nearest tenth of a degree rather than round it off. The following tables show the nominal and typical flap angles as well as the minimum and maximum flap angles:

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767-200 LEFT FLAP					
FLAP DETENT	MINIMUM DEGREES	TYPICAL DEGREES	NOMINAL DEGREES	TYPICAL DEGREES	MAXIMUM DEGREES
1	-1.1	-0.9	0.1	0.4	1.1
5	4.0	4.3	4.9	5.6	5.9
15	13.9	14.3	14.9	15.6	15.9
20	18.8	19.2	19.8	20.5	20.8
25	23.8	24.3	24.8	25.5	25.8
30	34.7	35.4	35.8	36.2	37.3

767-200 CENTER AND RIGHT FLAP					
FLAP DETENT	MINIMUM DEGREES	TYPICAL DEGREES	NOMINAL DEGREES	TYPICAL DEGREES	MAXIMUM DEGREES
1	-1.1	-0.1	0.1	0.4	1.1
5	3.7	4.3	4.9	5.6	6.4
15	13.4	14.3	14.9	15.6	16.4
20	18.3	19.2	19.8	20.5	21.3
25	23.3	24.3	24.8	25.5	26.3
30	34.3	35.4	35.8	36.2	37.3

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**BOEING**  
767  
MAINTENANCE MANUAL

767-300B LEFT FLAP					
FLAP DETENT	MINIMUM DEGREES	TYPICAL DEGREES	NOMINAL DEGREES	TYPICAL DEGREES	MAXIMUM DEGREES
1	-1.1	-0.1	0.1	0.4	1.1
5	8.4	9.2	9.8	10.5	10.8
15	12.7	13.1	13.7	14.3	14.7
20	18.8	19.3	19.8	20.5	20.8
25	23.8	24.3	24.8	25.5	25.8
30	34.5	35.4	35.8	36.2	37.3

767-300B CENTER AND RIGHT FLAP					
FLAP DETENT	MINIMUM DEGREES	TYPICAL DEGREES	NOMINAL DEGREES	TYPICAL DEGREES	MAXIMUM DEGREES
1	-1.1	-1.0	0.1	0.4	1.1
5	8.3	9.2	9.8	10.5	11.3
15	12.2	13.1	13.7	14.3	15.2
20	18.3	19.3	19.8	20.5	21.3
25	23.3	24.3	24.8	25.5	26.3
30	34.3	35.4	35.8	36.2	37.3

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767-300ER LEFT FLAP					
FLAP DETENT	MINIMUM DEGREES	TYPICAL DEGREES	NOMINAL DEGREES	TYPICAL DEGREES	MAXIMUM DEGREES
1	-1.2	-0.2	0.1	0.5	1.2
5	13.3	13.8	14.5	15.3	16.2
15	19.8	20.3	21.0	21.7	22.7
20	25.6	26.0	26.7	27.5	28.4
25	35.6	36.0	36.7	37.5	38.4
30	40.0	40.7	41.2	41.7	42.9

767-300ER CENTER AND RIGHT FLAP					
FLAP DETENT	MINIMUM DEGREES	TYPICAL DEGREES	NOMINAL DEGREES	TYPICAL DEGREES	MAXIMUM DEGREES
1	-1.2	-0.2	0.1	0.5	1.2
5	12.8	13.8	14.5	15.3	16.2
15	19.2	20.3	21.0	21.7	22.7
20	25.0	26.0	26.7	27.5	28.4
25	35.0	36.0	36.7	37.5	38.4
30	39.4	40.7	41.2	41.7	42.9

- C. Flap load relief, flap asymmetry, flap uncommanded motion, flap lever/flap position disagreement, and takeoff configuration warning are described in Trailing Edge Flap System - Description and Operation.

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TRAILING EDGE FLAP POSITION INDICATING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
CIRCUIT BREAKERS	1		FLT COMPT, P11	
FLAP/STAB POS SENSING C, C1525		1	11C14	*
FLAP/STAB POS SENSING L, C1523		1	11J17	*
FLAP/STAB POS SENSING R, C1526		1	11J26	*
FLAP/SLAT POS IND, C1021		1	11C4	*
FLAP POS IND L, C1008		1	11J15	*
FLAP POS IND R, C1522		1	11J16	*
INDICATOR - FLAP/SLAT POSITION, N15 MODULE	1	1	FLT COMPT, P3	*
L FLAP/STAB POS, M838	2	1	119AL, MAIN EQUIP CTR, P50	27-58-01
C FLAP/STAB POS, M839	2	1	119AL, MAIN EQUIP CTR, P50	27-58-01
R FLAP/STAB POS, M840	2	1	119AL, MAIN EQUIP CTR, P50	27-58-01
RELAY - (REF 31-01-33, FIG. 101)				
FLAPS INTMD/RETRACT, K353				
FLAPS/REF TRANSFER, K216				
TRANSFORMER - (REF 31-01-36, FIG. 101)				
FLAP POSITION C POWER, T153				
TRANSMITTER				
FLAP POSITION 1, M473	1	1	WING TRAILING EDGE, FLAP ACTUATOR	27-51-45
FLAP POSITION 3, M475	1	1	WING TRAILING EDGE, FLAP ACTUATOR	27-51-45
FLAP POSITION 4, M476	1	1	195JL, L WING BODY FAIRING	27-51-45
FLAP POSITION 5, M492	1	1	196JR, R WING BODY FAIRING	27-51-45
FLAP POSITION 8, M489	1	1	WING TRAILING EDGE, FLAP ACTUATOR	27-51-45
TRANSMITTER - (REF 31-01-33, FIG. 101)				
SLATS INTMD REF SIGNAL, M606				
SLATS RETRACTED REF SIGNAL, M605				
TRANSMITTER - (REF 27-48-00, FIG. 101)				
STAB POSITION - C, M521				
STAB POSITION - L, M519				
STAB POSITION - R, M520				
UNIT - (REF 27-51-00, FIG. 101)				
FLAPS/SLATS ELEC, M545				
UNIT - (REF 32-09-03, FIG. 101)				
PROX SW ELEC, M162				

\* SEE THE WDM EQUIPMENT LIST

Trailing Edge Flap Position Indicating System - Component Index  
Figure 101

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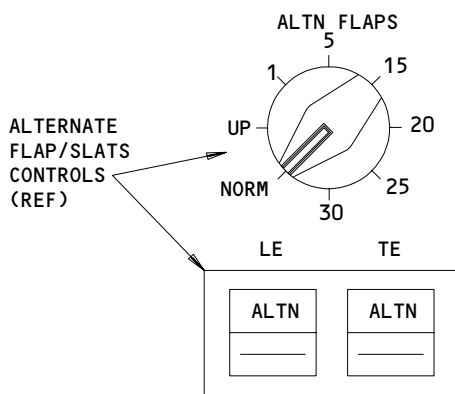
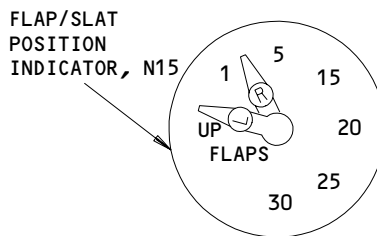
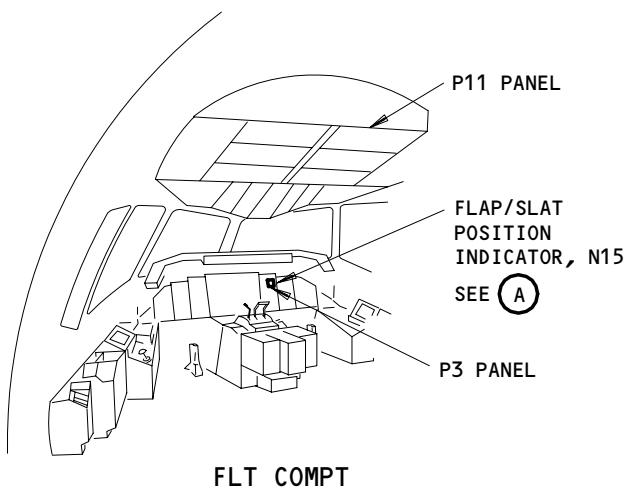


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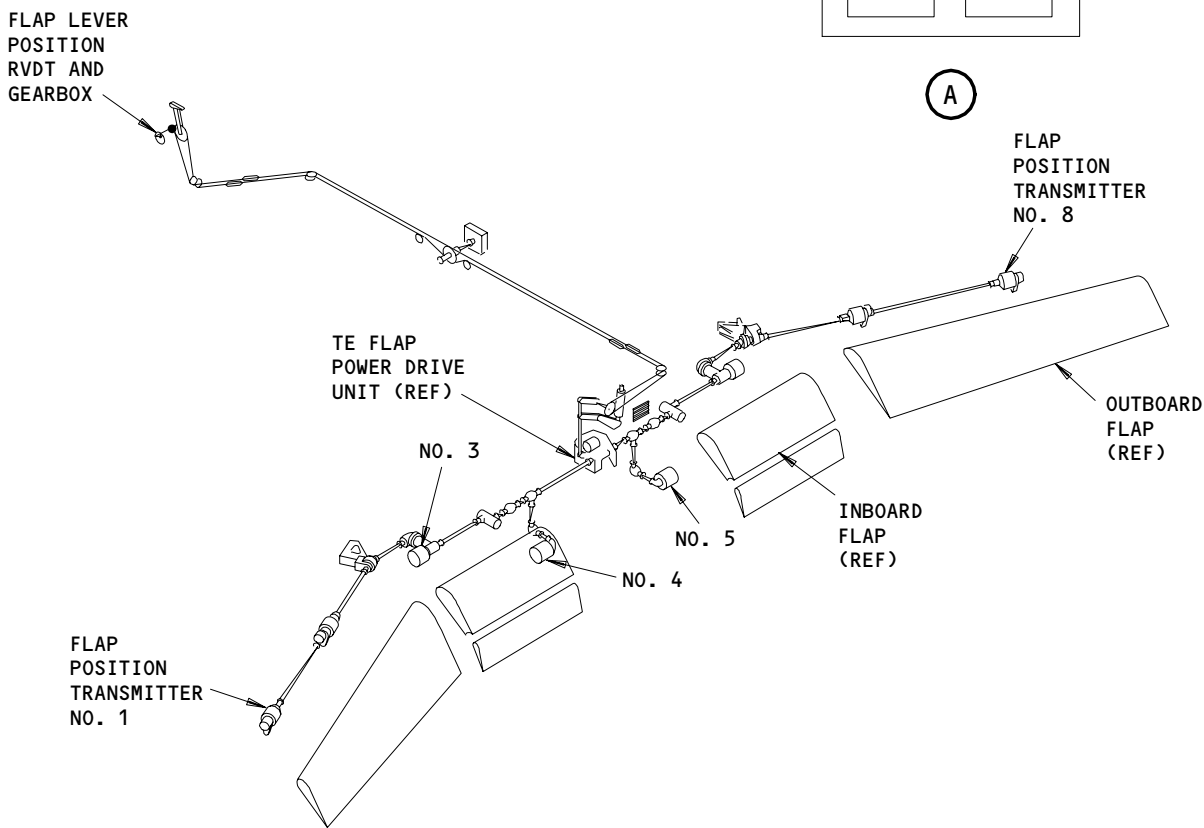
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### FAULT ISOLATION/MAINT MANUAL

LEADING EDGE	TRAILING EDGE
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(A)

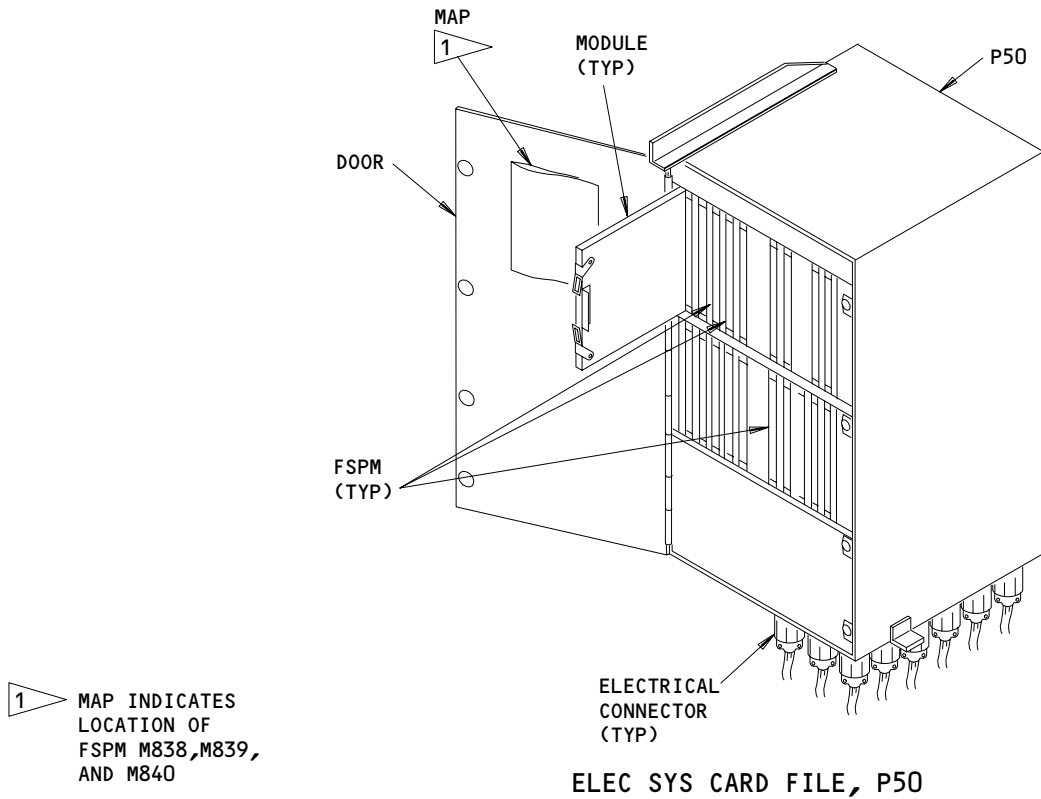
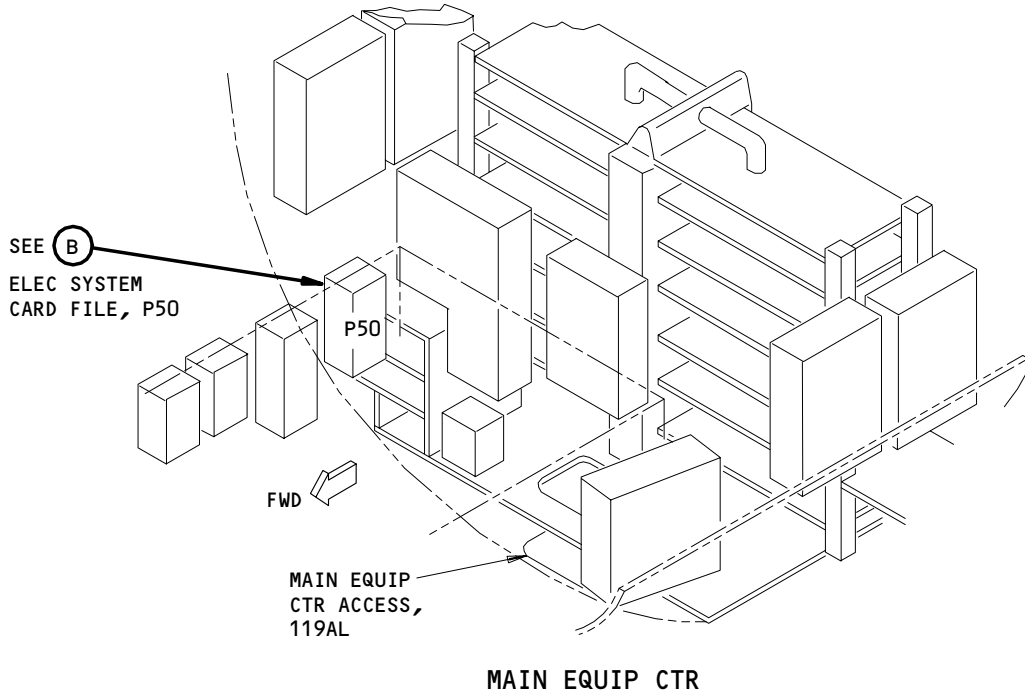


Component Location  
Figure 102 (Sheet 1)

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(B)

Component Location  
Figure 102 (Sheet 2)

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TRAILING EDGE FLAP POSITION INDICATING SYSTEM – ADJUSTMENT/TEST

TASK 27-58-00-715-001

1. Operational Test for the Trailing Edge Flap Position Indicating System

NOTE: Refer to 31-51-00, Warning System, for a test of the trailing edge flap takeoff warning.

A. References

- (1) 24-22-00/201, Electrical Power – Control
- (2) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (3) 31-51-00/501, Warning System

B. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 500/600 Left Wing / Right Wing

C. Prepare for the Test

S 215-002

- (1) Make sure the trailing edge (TE) flaps and leading edge (LE) slats are in the fully retracted position.

S 215-003

- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 865-004

- (3) Supply electrical power (Ref 24-22-00).

S 865-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

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D. Operational Test for the TE Flap Position Indicating System (Fig. 501)

S 215-006

- (1) With the flap control lever in the zero (FLAPS UP) detent, make sure that the L and R needles on the flap position indicator (First Officer's Instrument Panel, P3) point to the UP mark.

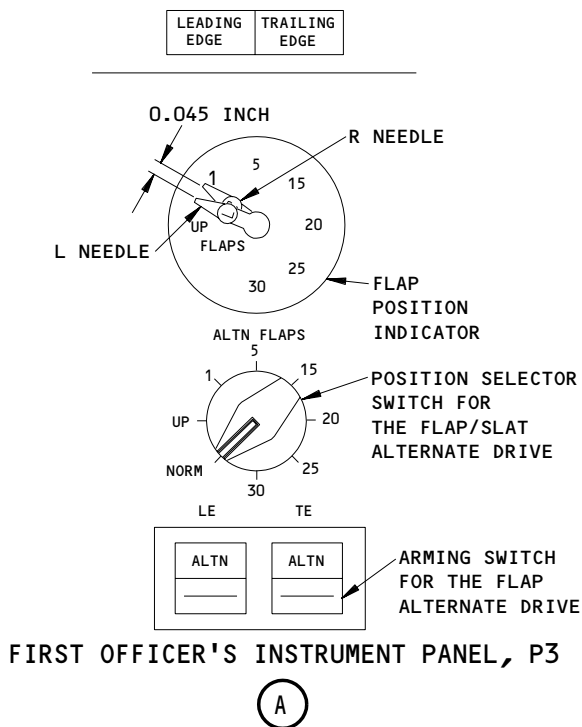
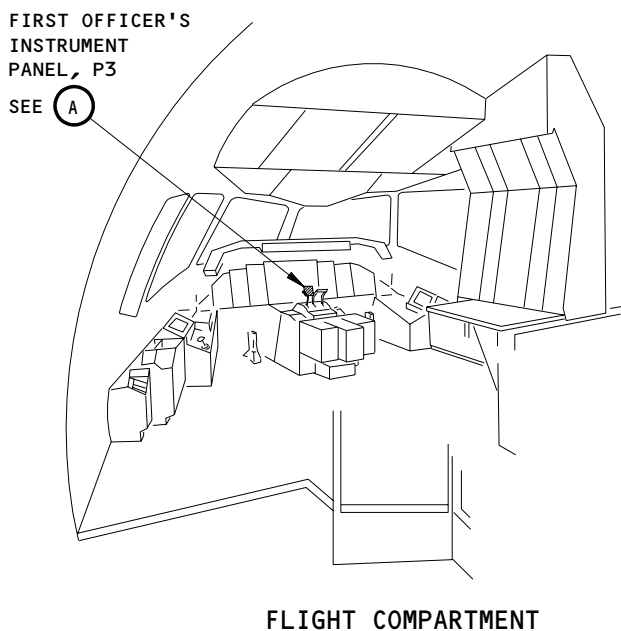
S 865-007

- (2) Move the flap control lever to the 1-unit detent and do these checks:
  - (a) During the movement of the LE slats, make sure the L and R needles on the flap position indicator move to one-half of the distance between the UP and 1-unit mark.
  - (b) When the slats stop at the intermediate position, make sure the L and R needles point to the 1-unit mark.

S 865-009

- (3) Move the flap control lever to the 5, 15, 20, 25, and 30-unit detents.

**NOTE:** Stop at each detent to make sure the L and R indicator needles are within 0.045 inch (0.11 centimeter) tolerance of each other at the flap position indicator at the related detent.



Position Indicating System for the Trailing Edge Flap  
Figure 501

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S 865-008

- (4) Move the flap control lever to the 25, 20, 15, 5, and 1-unit detents.

NOTE: Stop at each detent to make sure the L and R indicator needles are within 0.045 inch (0.11 centimeter) tolerance of each other on the flap position indicator at the related detent.

S 215-010

- (5) Move the flap control lever to the zero (FLAPS UP) detent and do these checks:
- (a) During the movement of the slats, make sure the L and R needles move to one-half the distance between the 1-unit and the UP mark on the flap position indicator.
  - (b) With the flap control lever in the FLAP UP detent, check the flap position indicator. The tips of the indicator pointers must both point into the UP area on the indicator dial. Check that the pointer tips for the left and right needles are within 0.045 inch (0.11 centimeters) of each other.

NOTE: Tap the indicator with fingers to remove friction error.

E. Put the Airplane Back to Its Usual Condition

S 865-011

- (1) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 865-012

- (2) Remove electrical power (Ref 24-22-00).

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FLAP/STABILIZER POSITION MODULE – REMOVAL/INSTALLATION

TASK 27-58-01-904-001

1. Flap/Stabilizer Position Module Replacement

A. General

- (1) This task contains the procedure for the removal, installation, and test of the flap/stabilizer position module (FSPM).

The three FSPMs are installed in the electrical systems card file, P50. The FSPM modules are given the numbers M838, M839, and M840. Each module has two cards, attached together with bolts. The module is removed and installed in the P50 as a unit. Each FSPM module contains a BITE panel.

B. References

- (1) AMM 20-10-01/401, E/E Rack Mounted Components – Boxes and Cards  
(2) AMM 20-41-01/201, Electrostatic Discharge Sensitive Device  
(3) AMM 22-00-02/201, Autoflight BITE Maintenance Practices  
(4) AMM 24-22-00/201, Electrical Power – Control

C. Access

- (1) Location Zones  
120 Main Equipment Center  
211/212 Control Cabin

- (2) Access Panel  
119AL Main Equipment Center

D. Remove the FSPM

S 864-002

- (1) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11C14, FLAP/STAB POS SENSING C  
(b) 11J17, FLAP/STAB POS SENSING L  
(c) 11J26, FLAP/STAB POS SENSING R

S 844-003

**CAUTION:** DO NOT TOUCH THE FLAP/STABILIZER POSITION MODULE BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE FLAP/STABILIZER POSITION MODULE (AMM 20-41-01/201).

- (2) Do the precautionary procedure for the devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

S 024-004

- (3) Open the door on the P50 card file and remove the FSPM (AMM 20-10-01/401).

E. Install the FSPM

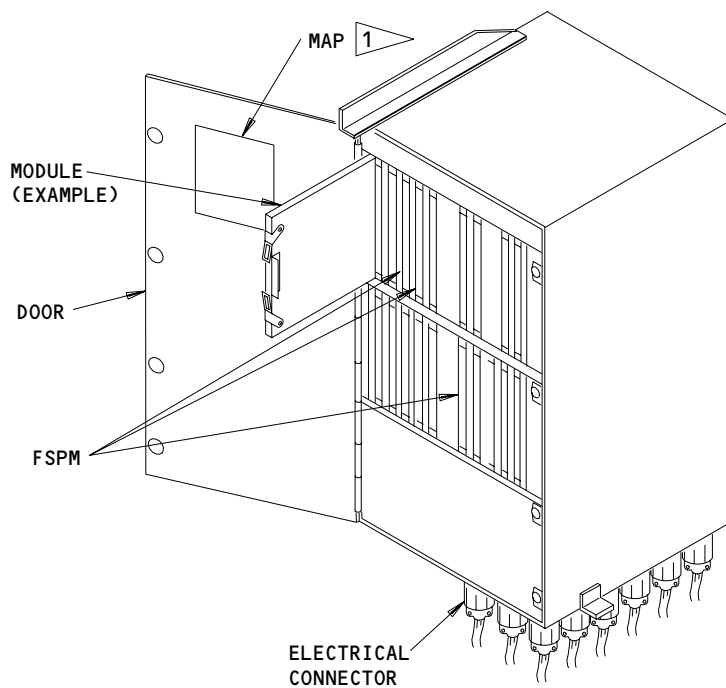
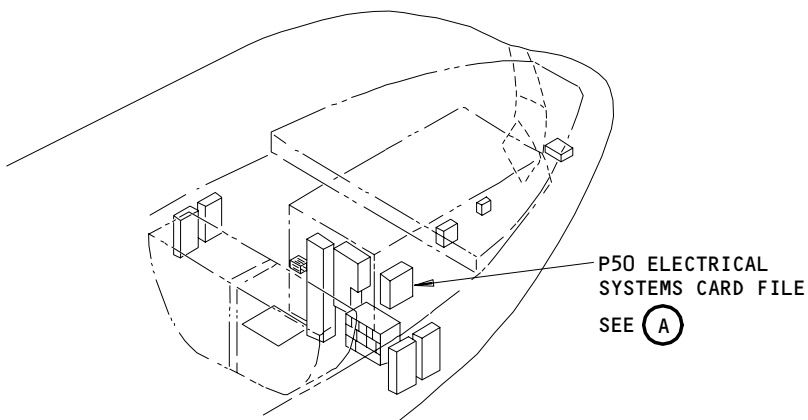
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P50 ELECTRICAL SYSTEMS CARD FILE

(A)

1 MAP IDENTIFIES POSITION OF FSPM  
M838, M839, AND M840

FSPM Installation  
Figure 401

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S 844-005

**CAUTION:** DO NOT TOUCH THE FLAP/STABILIZER POSITION MODULE BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE FLAP/STABILIZER POSITION MODULE (AMM 20-41-01/201).

- (1) Do the precautionary procedure for the devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

S 424-035

**WARNING:** MAKE SURE YOU INSTALL THE CORRECT FSPM. THE FSPM'S ARE NOT INTERCHANGEABLE BETWEEN DIFFERENT 767 MODELS. IF YOU INSTALL AN INCORRECT FSPM, YOU COULD CAUSE THE GPWS SYSTEM OR THE TAKEOFF WARNING SYSTEM TO NOT OPERATE CORRECTLY.

- (2) Install the FSPM.

S 864-018

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11C14, FLAP/STAB POS SENSING C
  - (b) 11J17, FLAP/STAB POS SENSING L
  - (c) 11J26, FLAP/STAB POS SENSING R

S 744-022

- (4) Do a test on the FSPM.
- F. Test for the FSPM

**NOTE:** This test is done on each FSPM that you replaced. During this test, you can ignore the L and R needles on the flap position indicator, at the first officer instrument panel, P3.

S 864-021

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

S 214-023

- (2) Make sure the flaps and slats are in the fully retracted position.

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- S 214-024
- (3) Make sure the flap control lever is in the zero detent.
- S 864-027
- (4) Push the arming switch for the flap alternate drive in the flight compartment, to arm the flap alternate drive (ALTN switch light comes on under the TE side).
- S 214-028
- (5) Make sure these conditions occur seven seconds after you pushed the arming switch for the flap alternate drive:
- (a) Make sure the amber TRAILING EDGE light (on the P3 panel) comes on.
  - (b) Make sure this message, TE FLAP DISAGREE, shows on the top EICAS display.
- S 744-029
- (6) In the P50 card file, push and hold the BITE/VERIFY test switch on the FSPM for a minimum of 60 seconds, and make sure these condition occur while you hold the switch:
- (a) Make sure the amber fault lights do not come on.
  - (b) Make sure the green TEST good light comes on.
  - (c) Make sure this message, FLAP/SLAT ELEC, shows on the bottom EICAS display.
- S 214-030
- (7) Release the BITE/VERIFY test switch and do a check for these conditions:
- (a) Make sure the green TEST GOOD light goes off.
  - (b) Make sure the message, FLAP/SLAT ELEC, does not show on the bottom EICAS display.
- S 864-031
- (8) Push the arming switch for the flap alternate drive to disarm the flap alternate drive (ALTN switch light goes off), and do a check for these conditions:
- (a) Make sure the amber TRAILING EDGE light goes off.
  - (b) Make sure the message, TE FLAP DISAGREE, does not show on the top EICAS display.

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- S 414-032
- (9) Close the door for the P50 card file.
- S 724-033
- (10) Do the Maintenance Control Display Panel tests #64 (SLAT SW/FLAP XDCR) and #65 (STAB TRIM) to make sure the interface for the Autopilot/Flight Director and Thrust Management System will operate correctly (AMM 22-00-02/201).
- S 864-034
- (11) Remove electrical power (AMM 24-22-00/201).

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TRAILING EDGE FLAP POSITION INDICATOR – REMOVAL/INSTALLATION

1. General

- A. There are two tasks in this procedure. There is a task for the removal and a task for the installation of the position indicator for the trailing edge flap system. The trailing edge flap position indicator is installed on the center instrument panel P3.

TASK 27-58-02-274-002

2. Position Indicator Removal

A. Access

- (1) Location Zones  
211/212 Control Cabin

B. Procedure

S 864-011

- (1) Open these circuit breakers on the overhead panel, P11 and attach DO-NOT-CLOSE tags:  
(a) 11J15, L FLAP POS IND  
(b) 11J16, R FLAP POS IND

S 014-010

- (2) Remove the indicator from the P3 panel.  
(a) Turn the adjustment screw to loosen the clamp.  
(b) Remove the indicator from the front of the panel.  
(c) Disconnect the electrical connector from the flap position indicator.

TASK 27-58-02-274-001

3. Position Indicator Installation

A. References

- (1) AMM 24-22-00/201, Manual Control  
(2) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems  
(3) AMM 27-58-00/501, Trailing Edge Flap Position Indicating System

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Procedure

S 414-008

- (1) Install the flap position indicator in the P3 panel:  
(a) Connect the electrical connector to the flap position indicator.  
(b) Put the flap position indicator in its position in the panel.

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767  
MAINTENANCE MANUAL

- (c) Tighten the adjustment screw on the clamp to hold the flap position indicator.
- S 864-009
- (2) Supply the electrical power (AMM 24-22-00/201).
- S 864-007
- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11J15, L FLAP POS IND
  - (b) 11J16, R FLAP POS IND
- S 864-004
- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).
- S 864-005
- (5) Put the flap control lever in the UP detent to retract the flaps.
- S 864-003
- (6) Remove pressure from the center hydraulic system (AMM 29-11-00/201).
- S 714-006
- (7) Do the test of the trailing edge flap position indicating system (AMM 27-58-00/501).

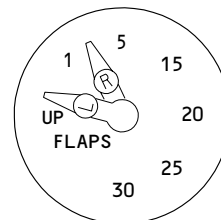
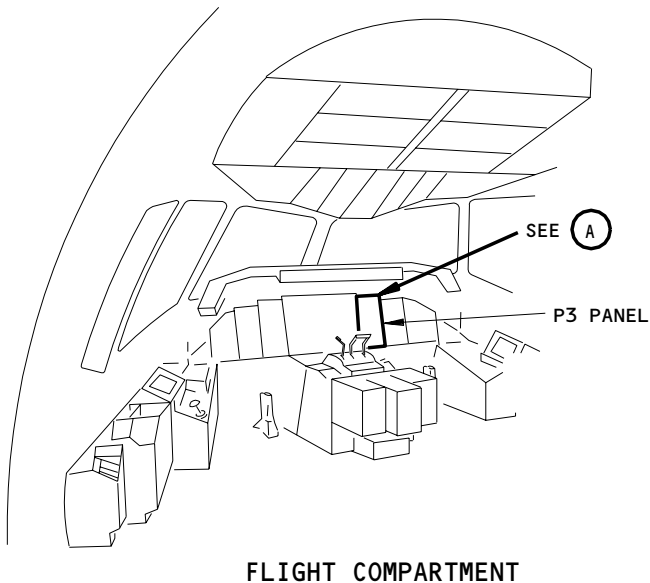
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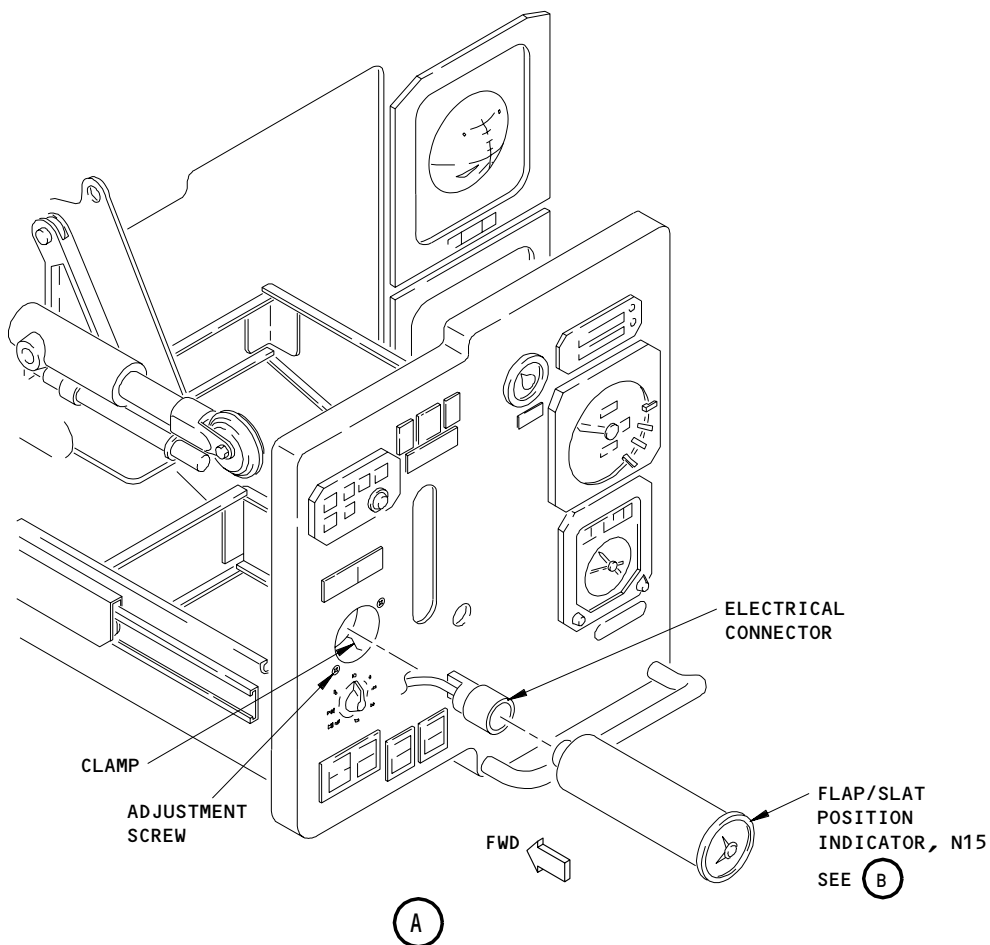
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FLAP/SLAT POSITION INDICATOR, N15



Flap Position Indicator Installation  
Figure 401

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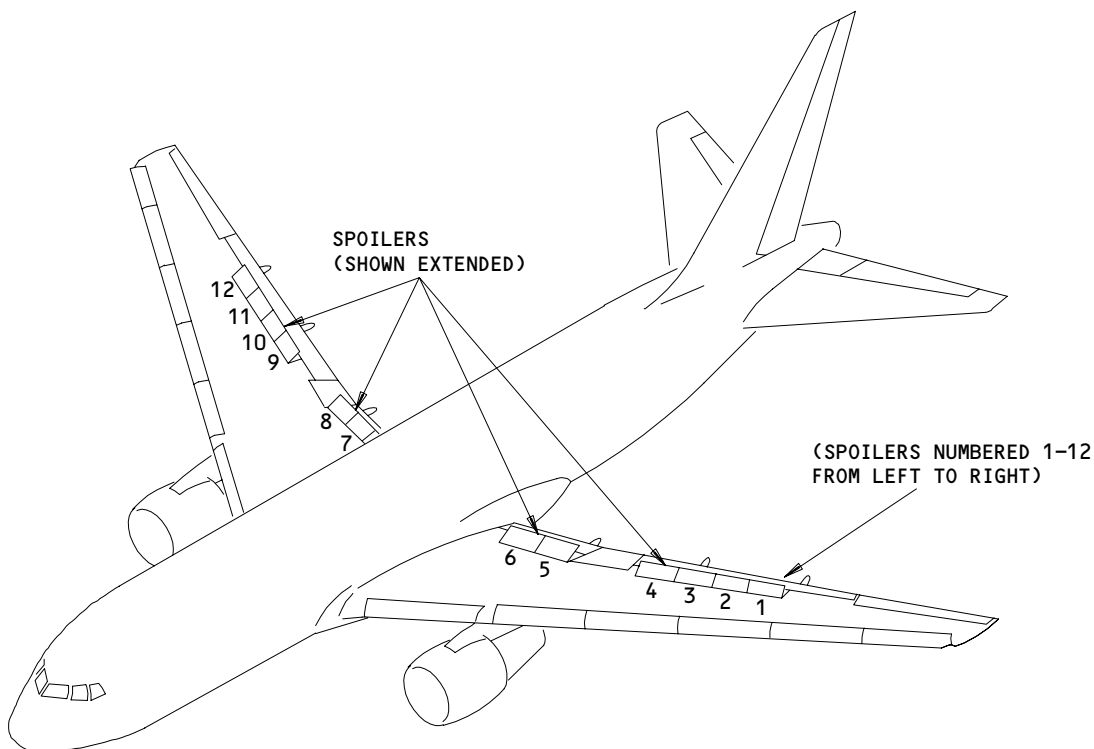
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SPOILER/SPEEDBRAKE CONTROL SYSTEM – DESCRIPTION AND OPERATION

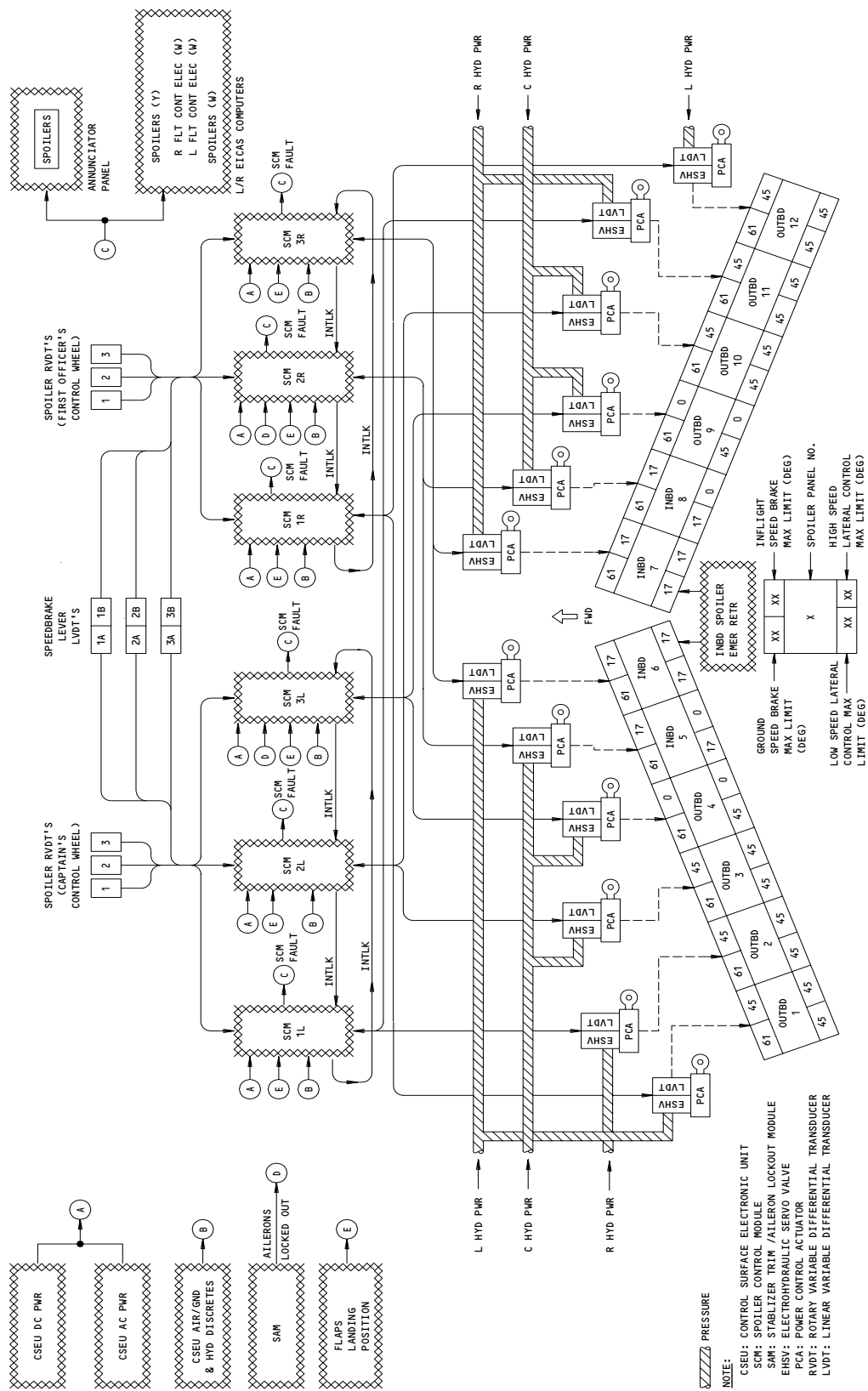
1. General (Figs. 1 and 2)
  - A. The spoiler/speedbrake system uses the same flight control surfaces to perform two functions. The system operates the surfaces as spoilers to provide lateral control of the airplane in conjunction with the ailerons. The system also operates the surfaces as speedbrakes to increase drag and reduce lift in flight and during landing (AMM 27-62-00/001, Description and Operation).
  - B. The spoiler/speedbrake system is electrically controlled and hydraulically powered. Separate power control actuators (PCAs) operate the twelve spoiler/speedbrake surfaces.
  - C. Description and operation of the spoiler control modules (SCMs) is covered in this section. Removal and installation of the modules is covered in AMM 27-09-00/201.
  - D. The warning system provides an amber light and level B EICAS caution message should the spoiler/speedbrake surfaces be extended at altitudes less than 800 feet. The amber SPEED BRAKES light is located on the pilot's main panel, P1. The yellow EICAS caution message reads SPEED BRAKES EXT. Refer to 31-51-00, Warning System – Description and Operation, for more information.



Spoiler/Speedbrakes  
Figure 1

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Spoiler/Speedbrake Control Simplified Schematic  
Figure 2

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2. Component Details

A. Rotary Variable Differential Transducers (RVDTs) (Fig. 3)

- (1) Control wheel inputs are monitored by rotary variable displacement transducers (RVDTs). The RVDTs convert inputs into electrical signals and supply these signals to the spoiler control modules (SCMs).
- (2) The RVDT units are can-shaped; each contain three RVDTs which are driven by a center shaft and gears. The center shaft extends below the RVDT unit into the lateral control drum assembly splines. The unit is mounted to the upper drum support bracket, above the drum assembly. The drum assemblies are accessible from the left and right crawlways outboard of the nose gear wheel well. Enter through door 119AL into the main equipment center to access the crawlways.
- (3) The RVDTs work through the total range of control wheel movement of  $\pm 65^\circ$ .  $65^\circ$  of control wheel movement is equivalent to  $41.5^\circ$  movement at the RVDTs. RVDT output voltage is nulled with the control wheel centered. A null adjustment screw on the mounting flange of each RVDT unit allows minor adjustments.

B. Spoiler Control Modules (SCMs) (Fig. 4)

- (1) Six SCMs control the 12 spoiler surfaces. Each SCM operates two spoiler panels that are symmetrically located on the wings. The SCMs receive signals from the spoiler RVDTs and the speedbrake LVDTs. These signals are processed by logic cards in the module. A command signal is sent to the PCAs at each of the spoiler panels controlled by the module.
- (2) The SCMs are located on the top row of the E1 and E2 shelves in the main equipment center. The modules are identified on the shelf below the module.

C. Power Control Actuators (PCAs) (Fig. 5)

- (1) The inboard PCA is trunnion-mounted to the spoiler beam, with the piston rod attached to the spoiler surface. Each inboard PCA has a line replaceable electrohydraulic servo valve (EHSV). The outboard PCAs are identical to the inboard PCAs except for installation (Fig. 4). Outboard PCAs are cylinder-end mounted to the wing rear spar. Inboard PCAs are accessible through wing lower surface access panels. Outboard PCAs are accessible when the trailing edge flaps are fully extended.
- (2) The PCA cylinder contains a dual acting piston and a LVDT mounted to the piston. The cylinder extends or retracts as commanded to raise or lower the spoiler surface. The LVDT sends an electrical feedback signal to the SCM. This signal cancels out the input signal to the EHSV when the actuator reaches the commanded position.

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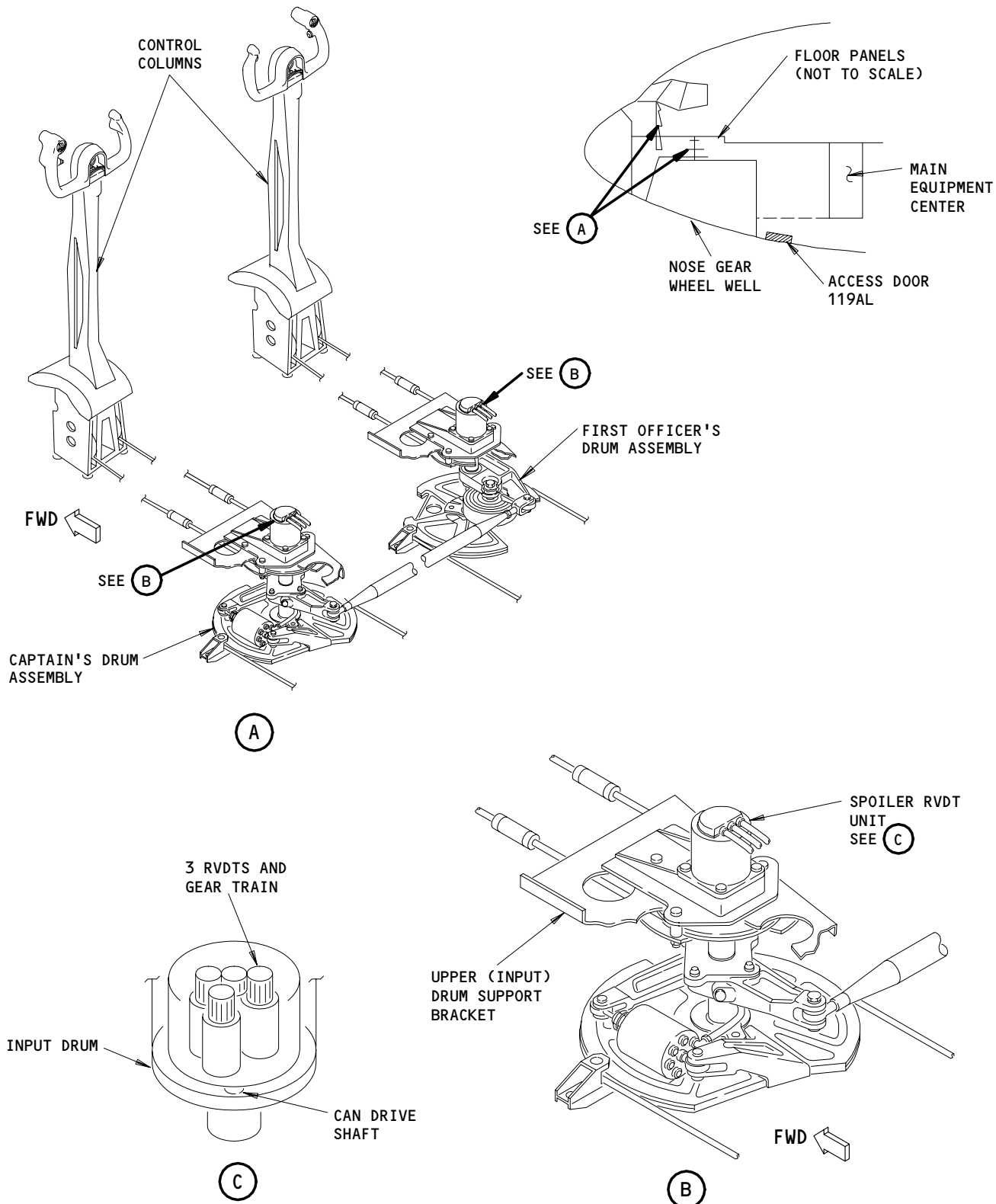
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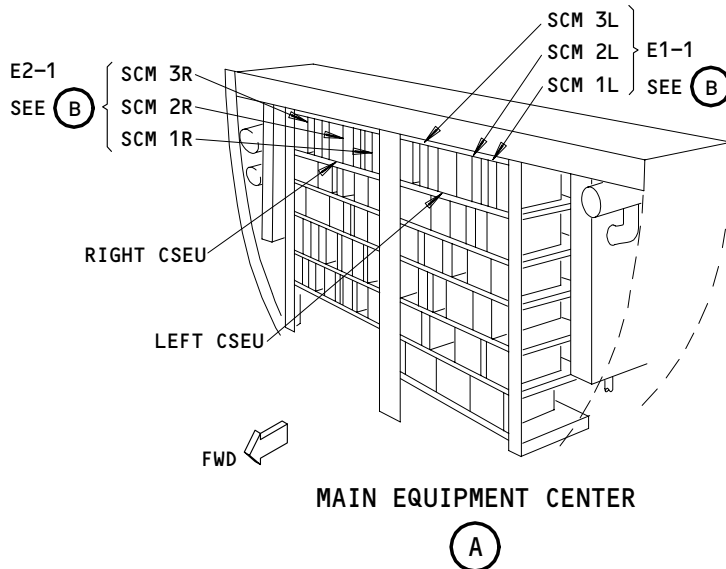
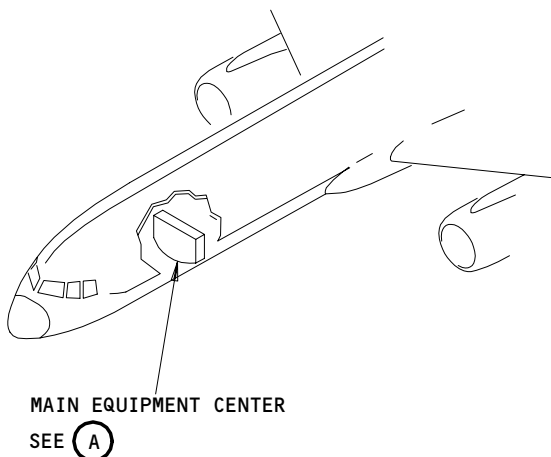
Rotary Variable Differential Transducers  
Figure 3

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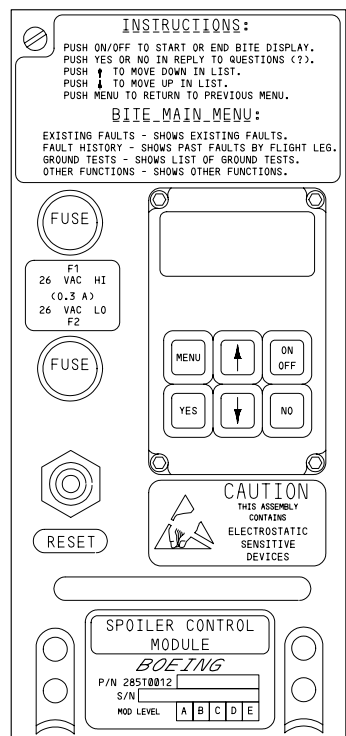
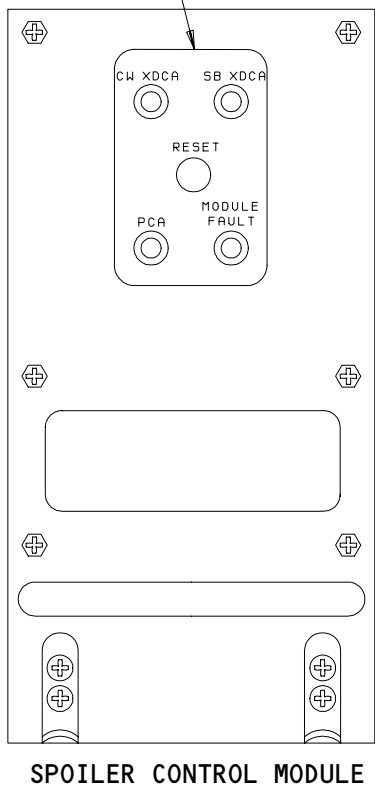
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FAULT BALLS  
(4 LOCATIONS)



- 1 -100 SERIES SCMs
- 2 -200 SERIES SCMs

(B) 1

(B) 2

Spoiler Control Modules  
Figure 4

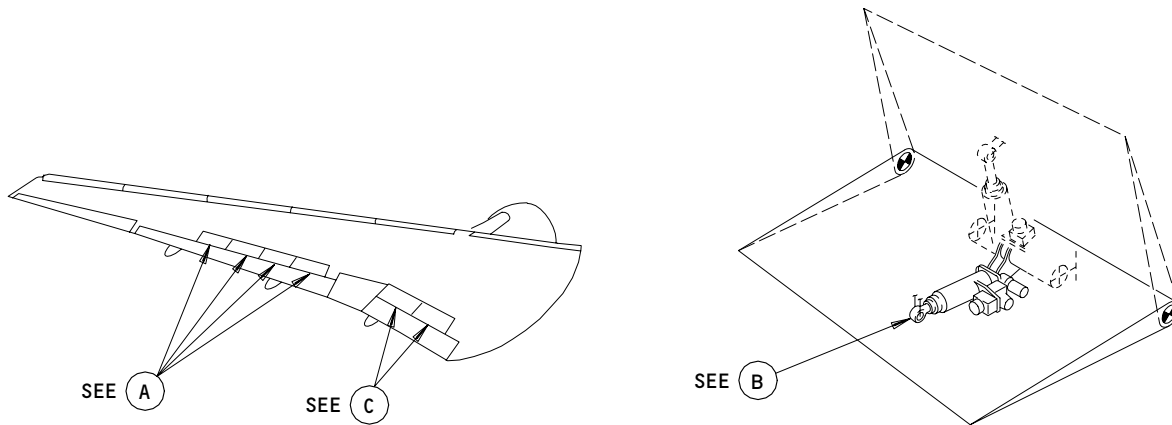
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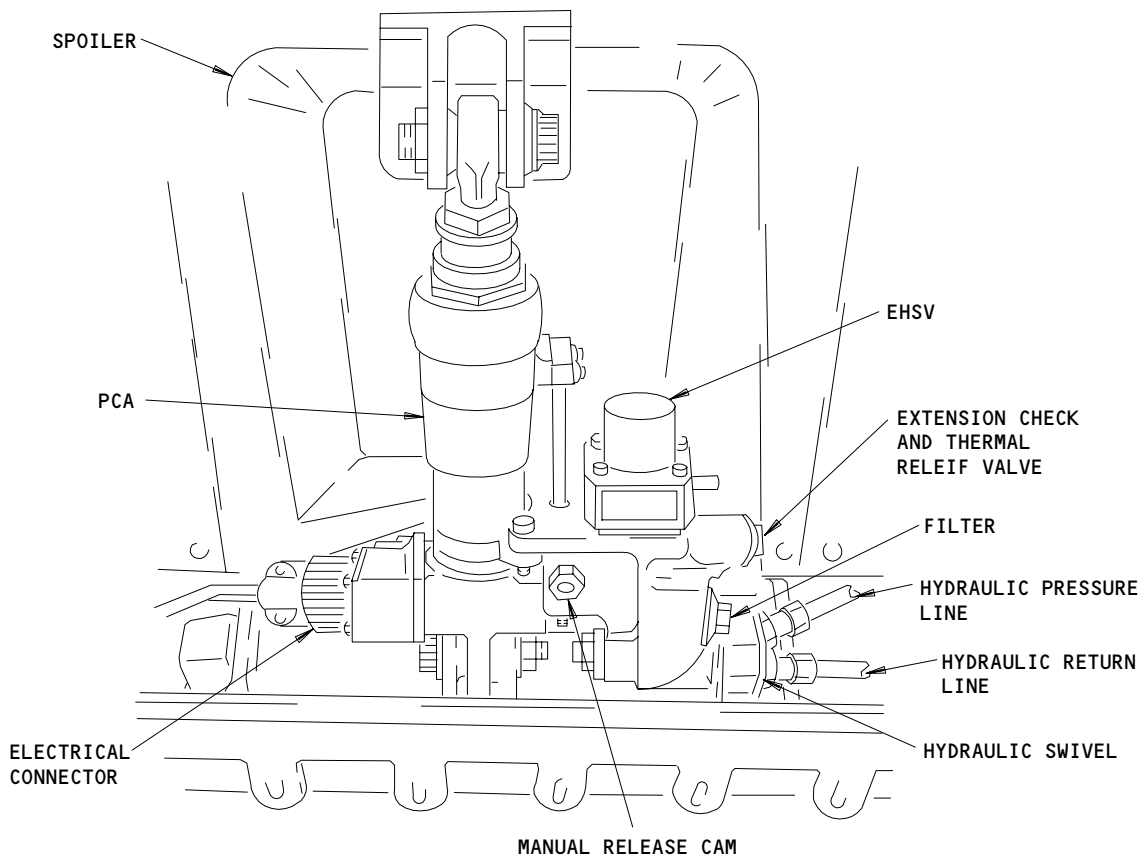
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OUTBOARD SPOILER  
(TYPICAL 4 PLACES  
ON EACH WING)

(A)



OUTBOARD SPOILER PCA

(B)

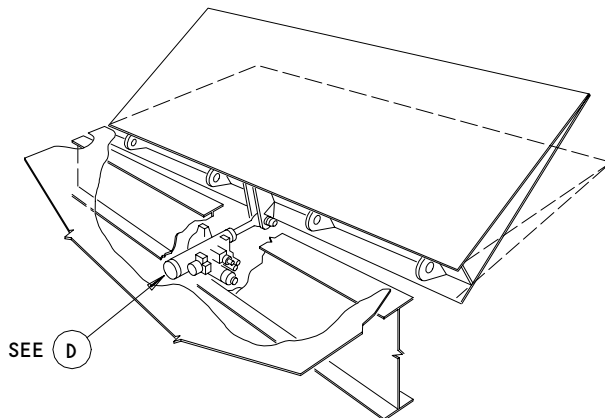
Spoiler Power Control Actuators  
Figure 5 (Sheet 1)

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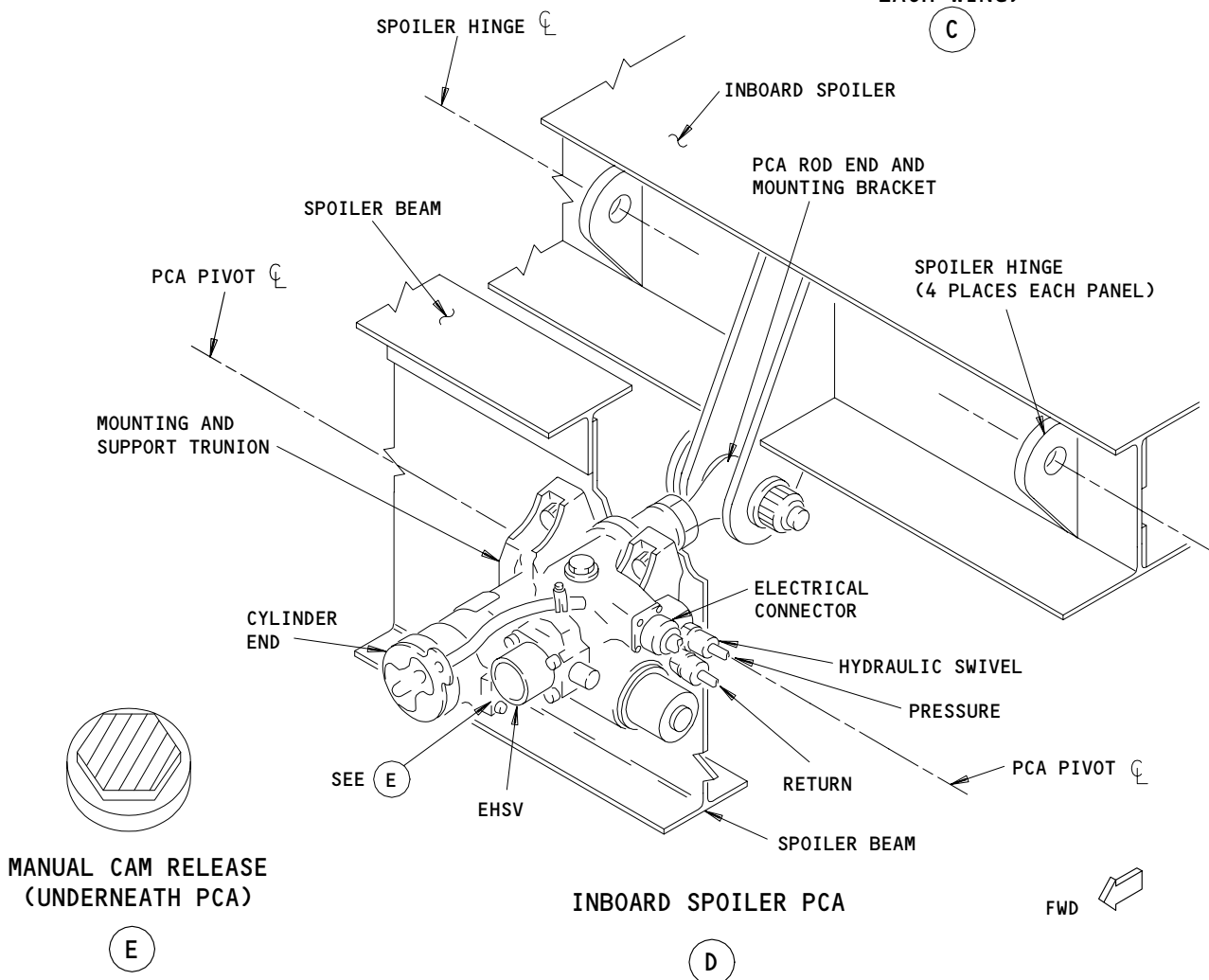
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**INBOARD SPOILER  
(TYPICAL 2 PLACES  
EACH WING)**

(C)



**MANUAL CAM RELEASE  
(UNDERNEATH PCA)**

(E)

**INBOARD SPOILER PCA**

(D)

**Spoiler Power Control Actuators  
Figure 5 (Sheet 2)**

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- (3) Each PCA has a manual release cam which is accessible from underneath the PCA. The manual release cam opens the PCA thermal relief valve to release trapped hydraulic fluid after the hydraulic system is depressurized. Releasing trapped fluid is necessary to raise the spoiler panel for maintenance. The manual release cam cannot be used to raise a spoiler panel when power is available to its PCA. Also a spoiler panel which was raised using the manual release cam when hydraulic power was removed will immediately retract if hydraulic power is reapplied. Therefore, the manual release cam should be used with caution, and only when it is certain hydraulic power will not be applied when the panel is raised.
- (4) Hydraulic fluid enters the PCA through a swivel port that allows the actuator to pivot during operation. The fluid is then filtered before entering the EHSV. After the fluid leaves the EHSV it passes through an extension check and thermal relief valve. The valve prevents the spoilers from floating if hydraulic pressure is lost. The valve also protects the actuator from damage due to fluid expansion. When fluid arrives at the actuator cylinder, it passes through a snubber check valve. This valve prevents hydraulic lock of the actuator when the spoilers are in the full down position.

D. Electrohydraulic Servo Valve (EHSV) (Fig. 6)

- (1) The EHSV controls the flow of hydraulic fluid in the PCA in response to command signals from the SCM. The signals operate a jet pipe that supplies hydraulic fluid to the EHSV control bobbin. The EHSV is magnetically biased in the retract position if there is no input command. This allows the spoiler panel to retract if hydraulic power is lost.
- (2) When the control wheels are in the neutral position and the speedbrake lever is in the down position, the SCM commands magnetically position the jet pipe to port hydraulic fluid to the retract side of the control bobbin. When the EHSV receives a command from the SCM to extend the actuator, the magnetic polarity is reversed and the jet pipe deflects to the extend side of the control bobbin. The hydraulic fluid moves the control bobbin, allowing the fluid to flow to the extend side of the PCA piston. If hydraulic pressure is lost while the control bobbin is in the extend position, the bobbin is spring-loaded to return to the retract position.

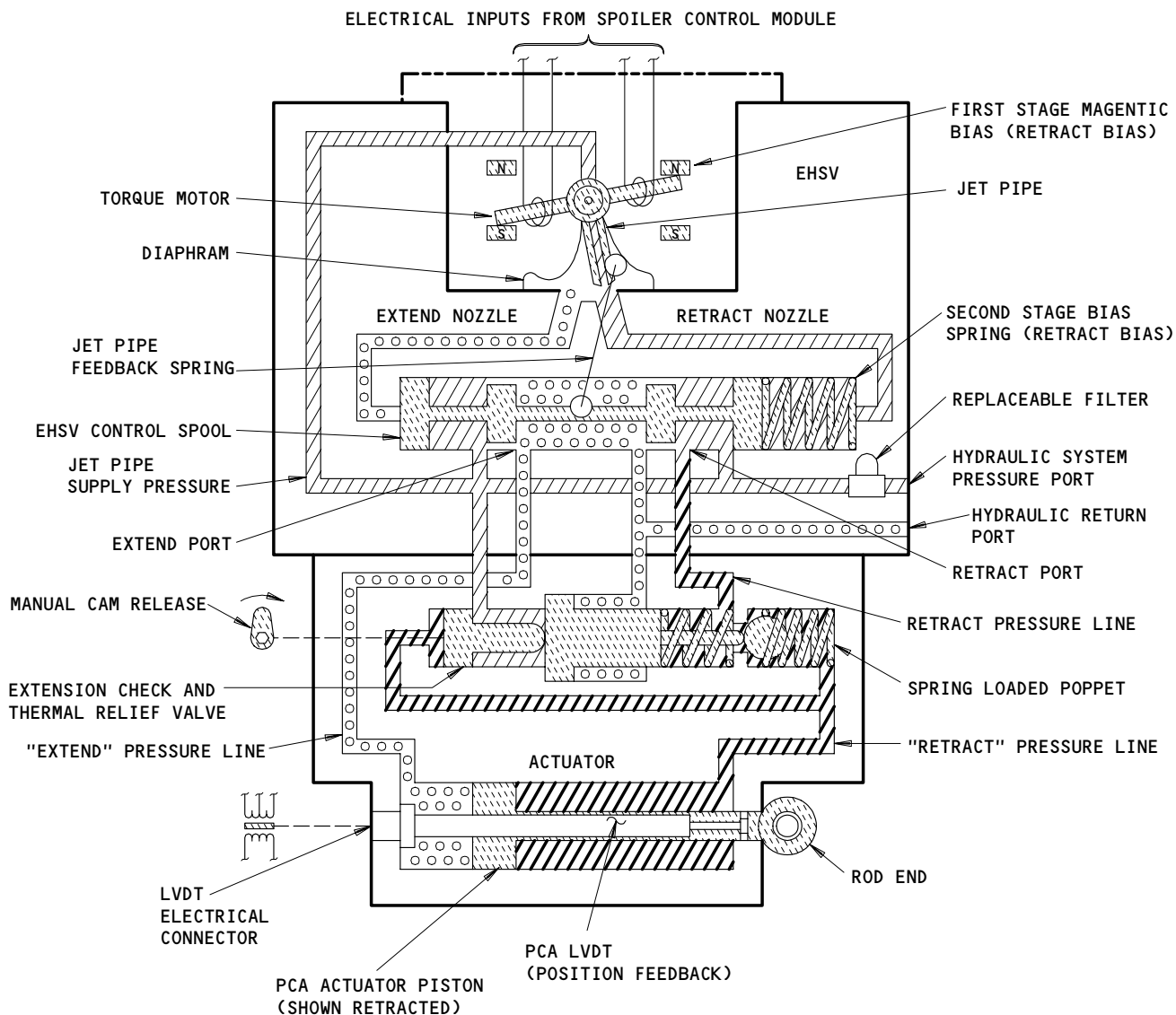
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SPOILER PCA AND EHSV  
(TYPICAL RETRACT COMMAND)

LEGEND

- PRESSURE
- METERED PRESS.
- RETURN

Spoiler PCA and EHSV  
Figure 6

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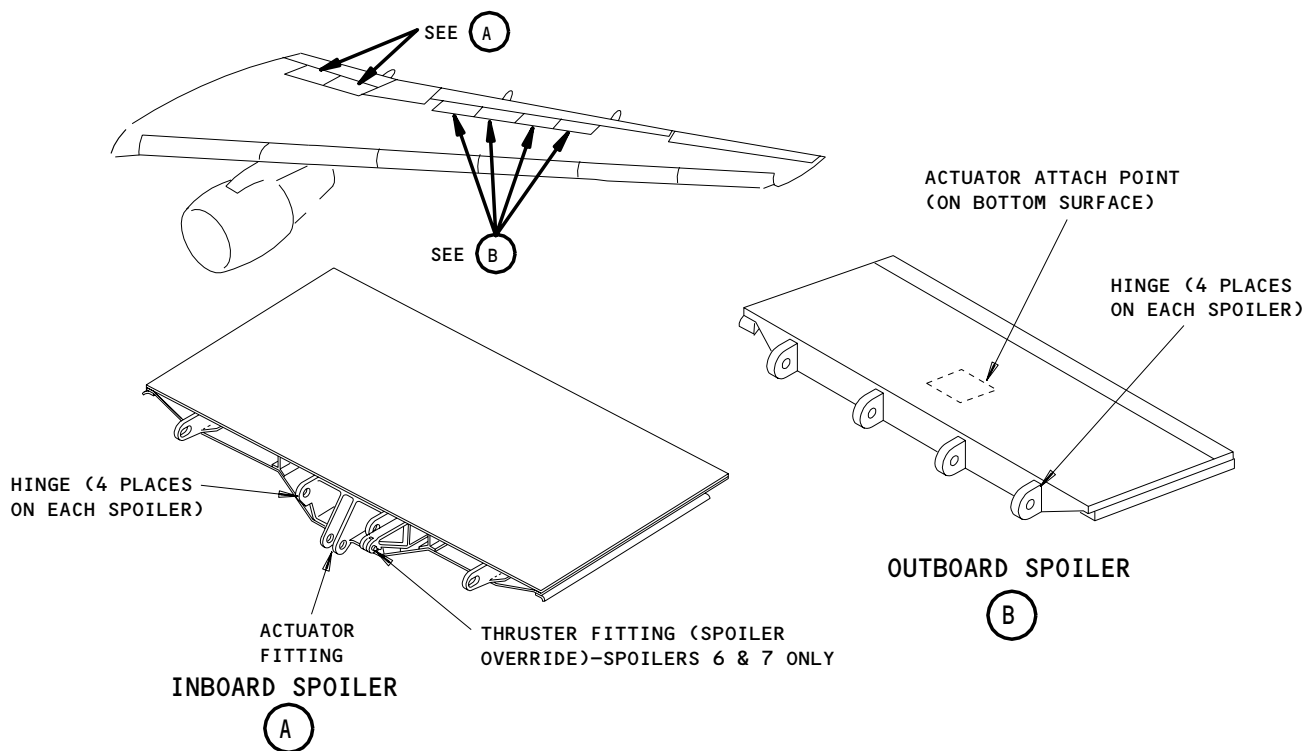
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E. Spoiler Panels (Fig. 7)

(1) Each wing has 6 spoiler panels. The four outboard panels on each wing are identical as are the two inboard panels. Each panel has four hinge points. The inboard panels are hinged to the spoiler beam. The outboard panels are hinged to the wing rear spar. The PCAs are attached at the center of each panel. To gain access to the hinges, the flaps must be partially extended.

F. Speedbrake Lever and Linear Variable Differential Transducers (LVDTs) (Fig. 8)

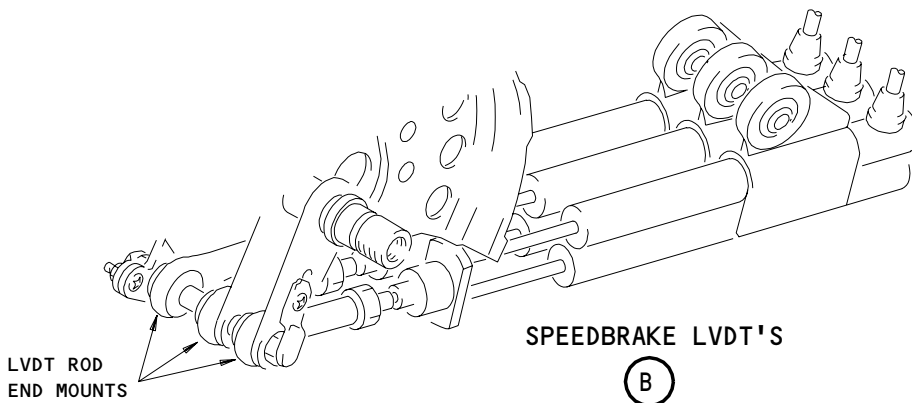
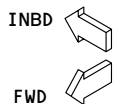
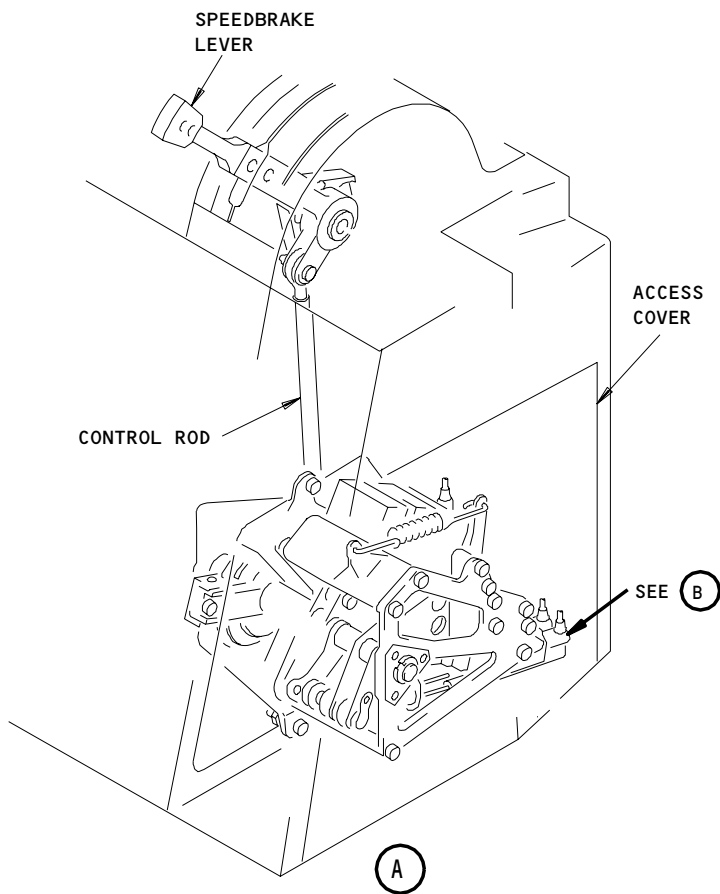
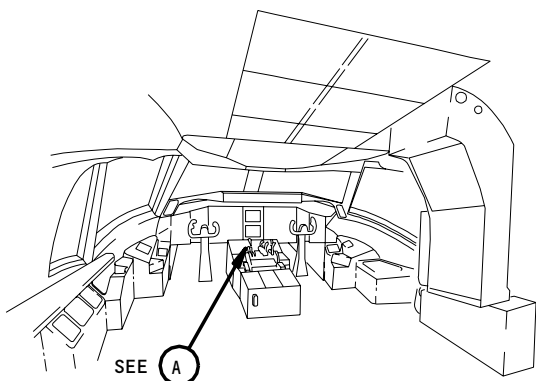
(1) The speedbrake lever is located on the center control stand between the stabilizer trim levers and the engine thrust levers. The lever is attached to the speedbrake mechanism located in the control stand by an adjustable control rod.



Spoiler Panels  
Figure 7

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Speedbrake Lever and LVDTs  
Figure 8

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- (2) Three pairs of speedbrake LVDTs are attached to the speedbrake mechanism at a common point. The speedbrake mechanism is accessible through a panel on the captain's side of the control stand.
  - (3) The speedbrake lever has three marked travel positions. In the DOWN position, the spoiler surfaces are retracted. Pulling up on the speedbrake lever and moving it aft places the lever in the ARMED position. This prepares the speedbrake system for automatic operation (AMM 27-62-00). Pulling the lever all the way back to the UP position will raise the spoilers to full extension. The spoilers may be raised to intermediate positions during flight.
3. Inboard Spoiler Override Actuator (Fig. 9)
- A. The spoiler override actuator is a pyrotechnic device which forces the spoiler to retract for emergency escape slide deployment (AMM 25-65-00). The override actuator is located just on the spoiler beam outboard of spoiler 6 and 7 PCAs. The override actuator must be deactivated before maintenance on the inboard spoilers or PCAs.
4. Spoiler/Speedbrake Fault Indications (Fig. 10)
- A. Flight deck indicators alert the flight crew to failures in the spoiler/speedbrake system. An amber SPOILERS light on the pilot's overhead panel P5 or a yellow SPOILERS message on the EICAS display unit indicates a "second failure". "Second failures" result from any of the following:
    - (1) Failure of a PCA.
    - (2) Failure of two subchannels in an SCM.
    - (3) Failure of two power supplies in either the left or right CSEU rack.
    - (4) Removal of a control module.
    - (5) Grounding of any SCM output to an EHSV.
    - (6) Loss of two inputs to a control module from either the control wheel RVDTs or speedbrake lever LVDTs.
  - B. A failure in the auto-speedbrake system will light an amber AUTO SPDBRK light and display a yellow AUTO SPEEDBRAKE message on the EICAS display unit (Ref 27-62-00).
  - C. "First" failures inflight are stored as maintenance messages in the EICAS computer. Maintenance messages are displayed on the EICAS display unit when the ECS/MSG button on right side panel P61 is pressed. These messages are available to the ground crew only.
  - D. A white SPOILERS message indicates a first failure in the spoiler/speedbrake. A L or R FLT CONT ELEC message indicates a single power supply module failure.
  - E. The standby bus must be on for spoiler control system maintenance message display.

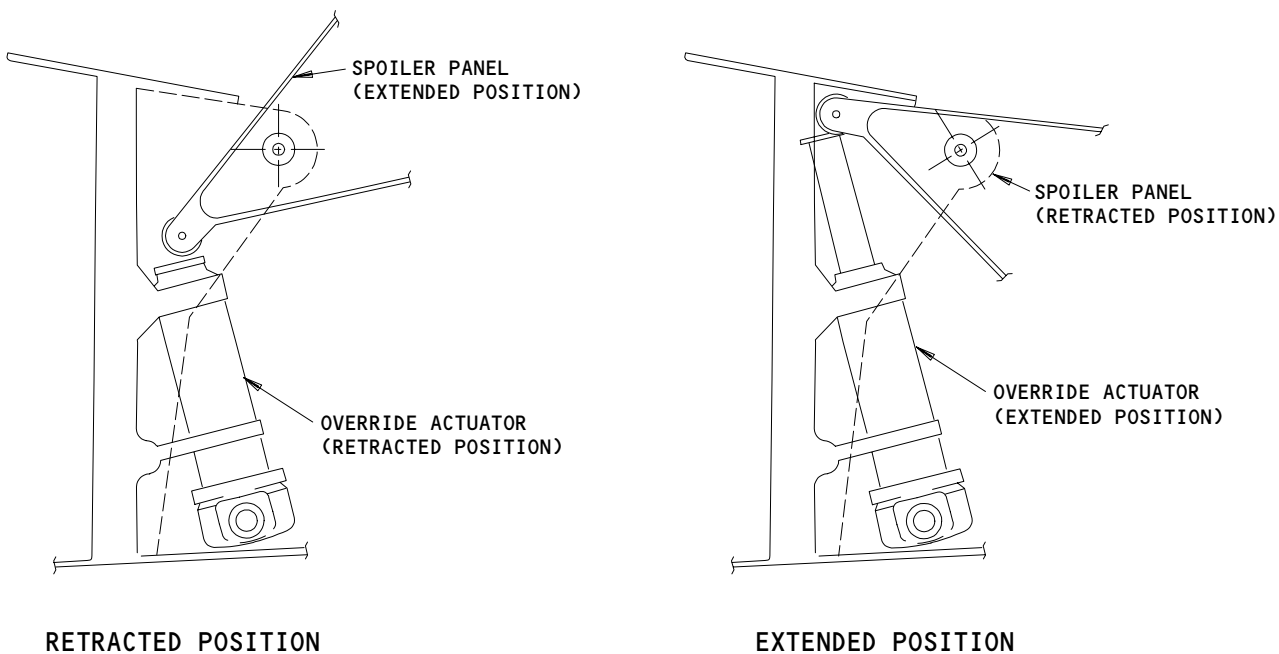
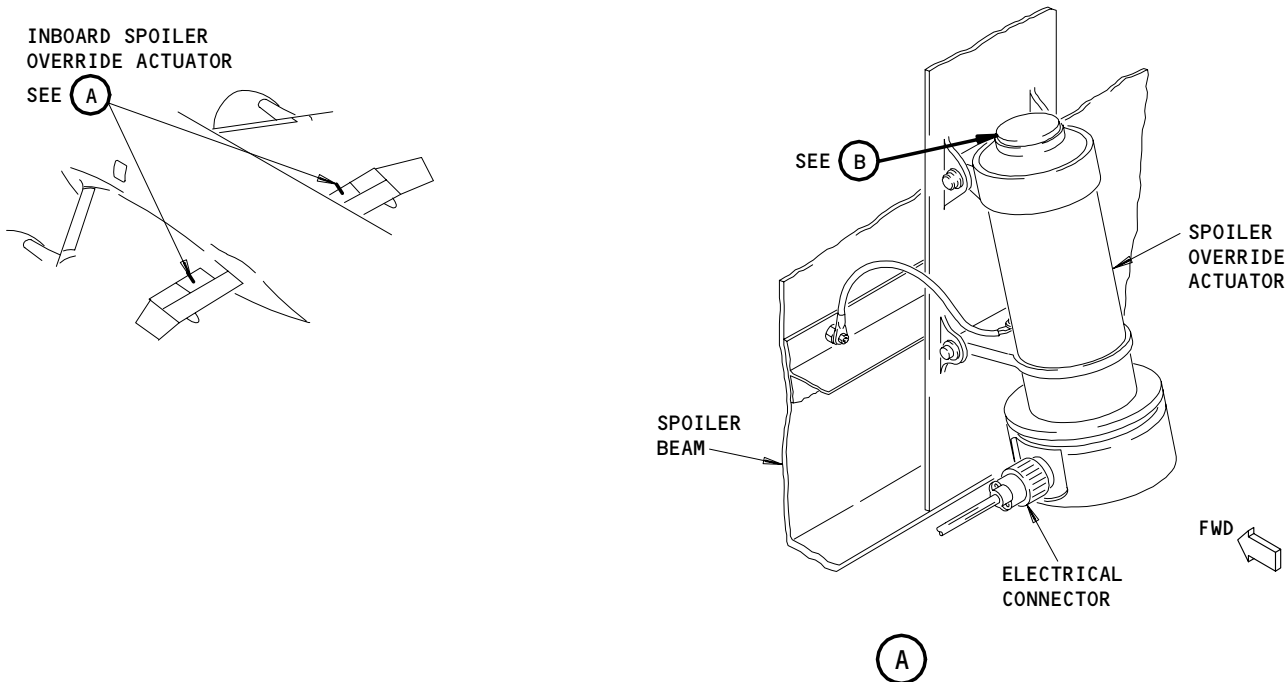
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(B)

Inboard Spoiler Override Actuator  
Figure 9

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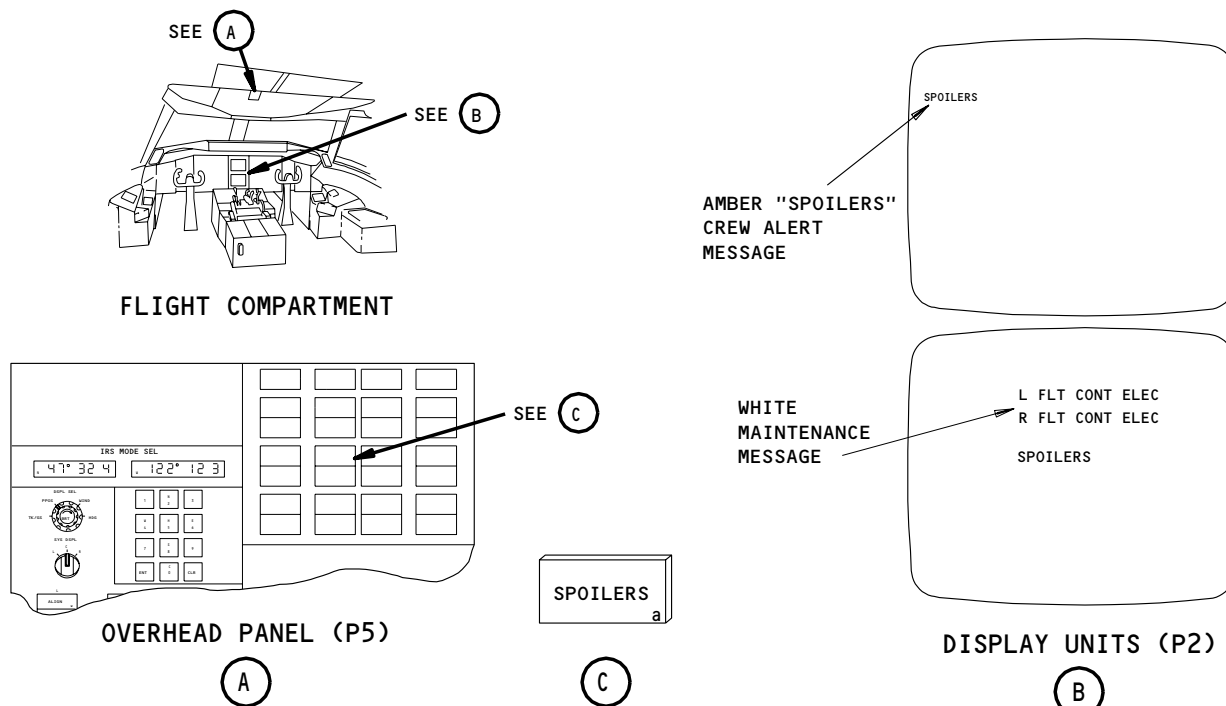
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5. Operation

A. Functional Description

(1) Spoiler Command and Feedback Signals (Fig. 11)

- (a) The spoiler RVDTs are mechanically driven by the upper drum of the aileron drum assemblies. Cables connect the drum assemblies to the control wheels. An adjustable bus rod links the drum assemblies. All the RVDTs move any time either control wheel is rotated. The RVDTs sense control wheel position and send a proportional signal to the SCMs. Each module processes and mixes signals from three RVDTs and sends out command signals to a left and/or right PCA. The SCM command signal is received by the electrohydraulic servo valve that controls the direction of fluid flow to the PCA cylinder. As the spoiler panel moves to the commanded position, the LVDT inside the actuator feeds a signal back to the SCM. This signal is compared with the input command. When the two signals agree, spoiler movement is stopped.
- (b) When there is input from both spoiler RVDTs and speedbrake LVDTs, the SCMs combine the two signals. The resultant output to the PCAs is a summation of the two signals.



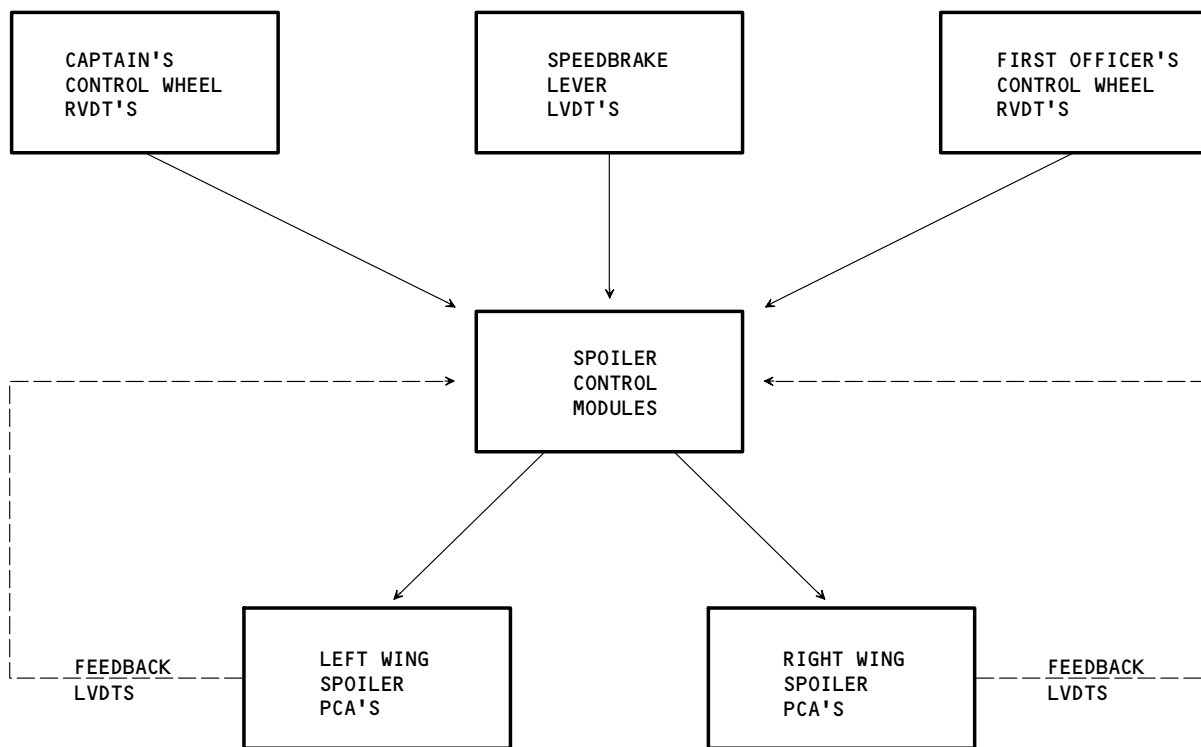
Flight Deck Indications  
Figure 10

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(2) Spoiler Control Module (SCM)

- (a) The spoiler control module contains a redundancy management card, a relay switch card, a maintenance logic card, and three physically, electrically, and functionally isolated sub-channel cards (Fig. 12). The three sub-channel cards are called active (A), standby (B), and model (C). The active sub-channels operate the spoiler panels during normal operation. The standby sub-channel acts as a backup. The model sub-channel, which cannot operate the spoilers, is used to test the active and the standby sub-channels.
- (b) Each sub-channel card receives input from a spoiler RVDT, a speedbrake LVDT, an air/ground relay, a flap/stab position module, a right wing PCA LVDT, and a left wing PCA LVDT. The sub-channels demodulate, process, and mix these inputs to generate command signals. The active sub-channel compares its input command signal to the PCA LVDT feedback signal. The difference between the two signals is sent to the PCA servo valve as a control signal. The standby and model sub-channels send their command signals to the redundancy management card.



Spoiler Command and Feedback Signals

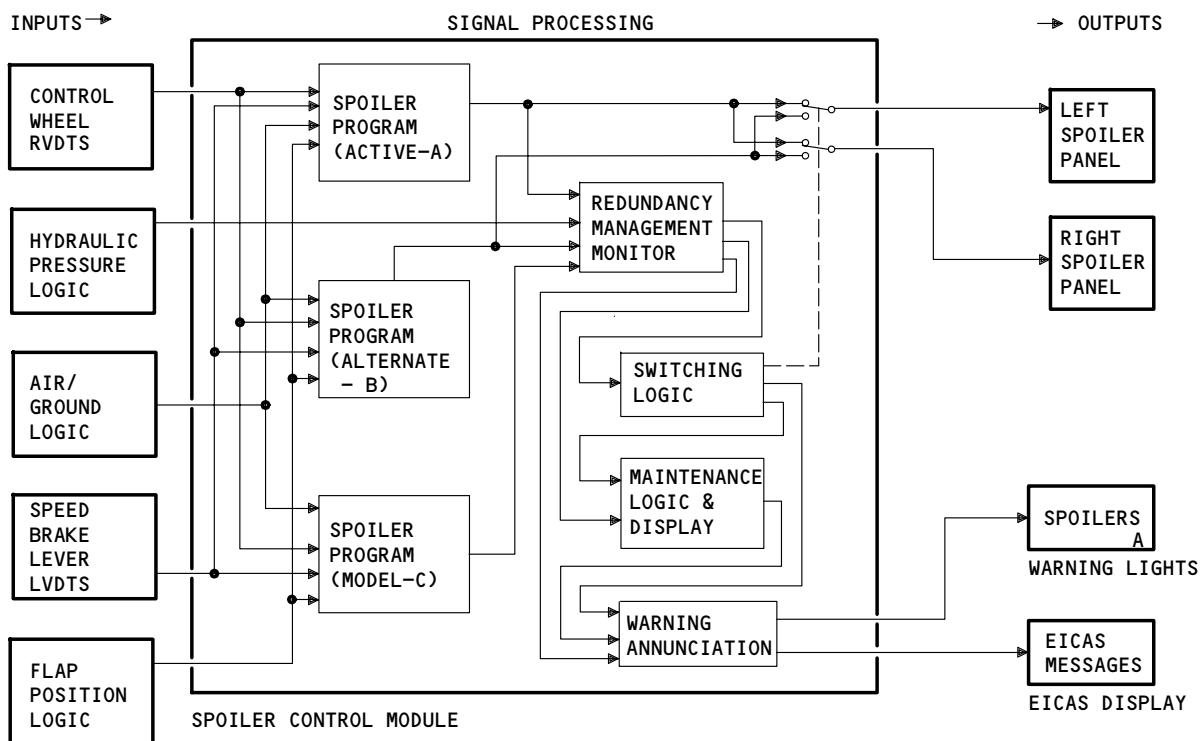
Figure 11

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- (c) A decision to switch control from the active sub-channel to the standby sub-channel is made on the redundancy management card. A switch decision involves three tests. The first test is made on the servo amplifiers in the standby sub-channel to detect a failed amplifier. If a failed amplifier is detected, the redundancy management card is prevented from switching control from the active sub-channel to the standby sub-channel. The second test is made on the command signal from the standby sub-channel and the active sub-channel PCA LVDT feedback signal. The standby sub-channel threshold monitors check the two signals for disagreement. The third test is made on the command signal from the model sub-channel and the active sub-channel PCA LVDT feedback signal. The model sub-channel threshold monitors check the two signals for disagreement. If the second and third tests indicate disagreement at the same time, the redundancy management card switches control from the active sub-channel to the standby sub-channel.



Spoiler Control Module  
Figure 12

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- (d) The SCMs will show you when failures in the spoiler/speedbrake system occur.
    - 1) The -100 series SCMs have small windows (called fault balls) on the front of them that show yellow when a failure occurs. The yellow fault ball identifies the failure. You can push the reset button on the SCM to make the fault ball black. Refer to 27-09-00/001 for more information.
    - 2) The -200 series SCMs have a display to show failures. The failures are shown as words on the display. Refer to AMM 27-09-00/001 for more information.
  - (e) The maintenance logic card monitors the spoiler RVDTs, speedbrake LVDTs, and the PCAs. If any of these units fail, the maintenance logic card causes a fault to show on the front of the SCM. The maintenance logic card also sends a signal to the redundancy management card to store an EICAS maintenance message. The maintenance logic card will cause a fault to show if the redundancy management card finds a failure in one of the SCM channels. The SCM monitors the LVDT input signals to detect a failed LVDT.
- (3) Spoiler/Speedbrake System Schematic (Fig. 13)
- (a) Each of the SCMs receive input from three spoiler RVDTs. The three SCMs in the left main equipment rack receive inputs from the RVDT unit on the captain's drum assembly. The three SCMs in the right main equipment rack receive inputs from the RVDT unit on the first officer's drum assembly. Each module also receives inputs from three speedbrake LVDTs and feedback signals from two power control actuator (PCA) LVDTs. The SCMs process and mix these signals. The resultant output is sent as a command to the PCAs to position the spoiler panels. The spoiler panels are hydraulically powered by the three main hydraulic systems.
  - (b) All twelve spoilers respond to control wheel inputs. At cruise speeds, four spoilers (4, 5, 8, 9) are inhibited from responding to control wheel commands. The outboard spoilers extend to 45° with full control wheel movement. Spoilers 5 through 8 extend to 17° with full control wheel movement.
  - (c) The speedbrake lever is located on the center control stand next to the engine thrust levers. The speedbrake lever is a two-piece, spring-loaded mechanism. Pulling up on the handle lifts a lug on the lever out of a detented plate inside the control stand. The lever can then be placed in the ARMED detent or moved to the full UP stop.

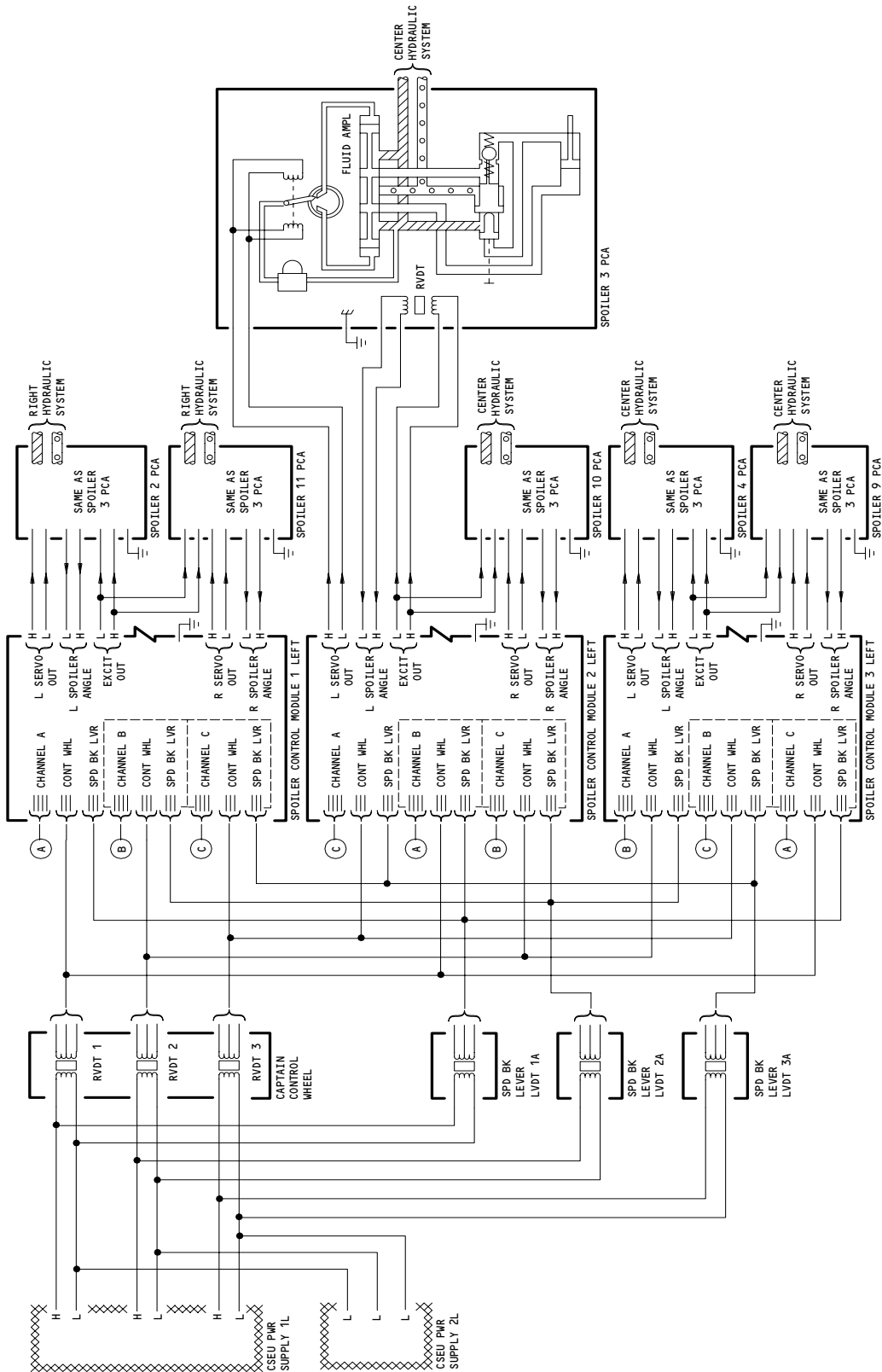
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Spoiler Control Simplified Schematic  
Figure 13 (Sheet 1)

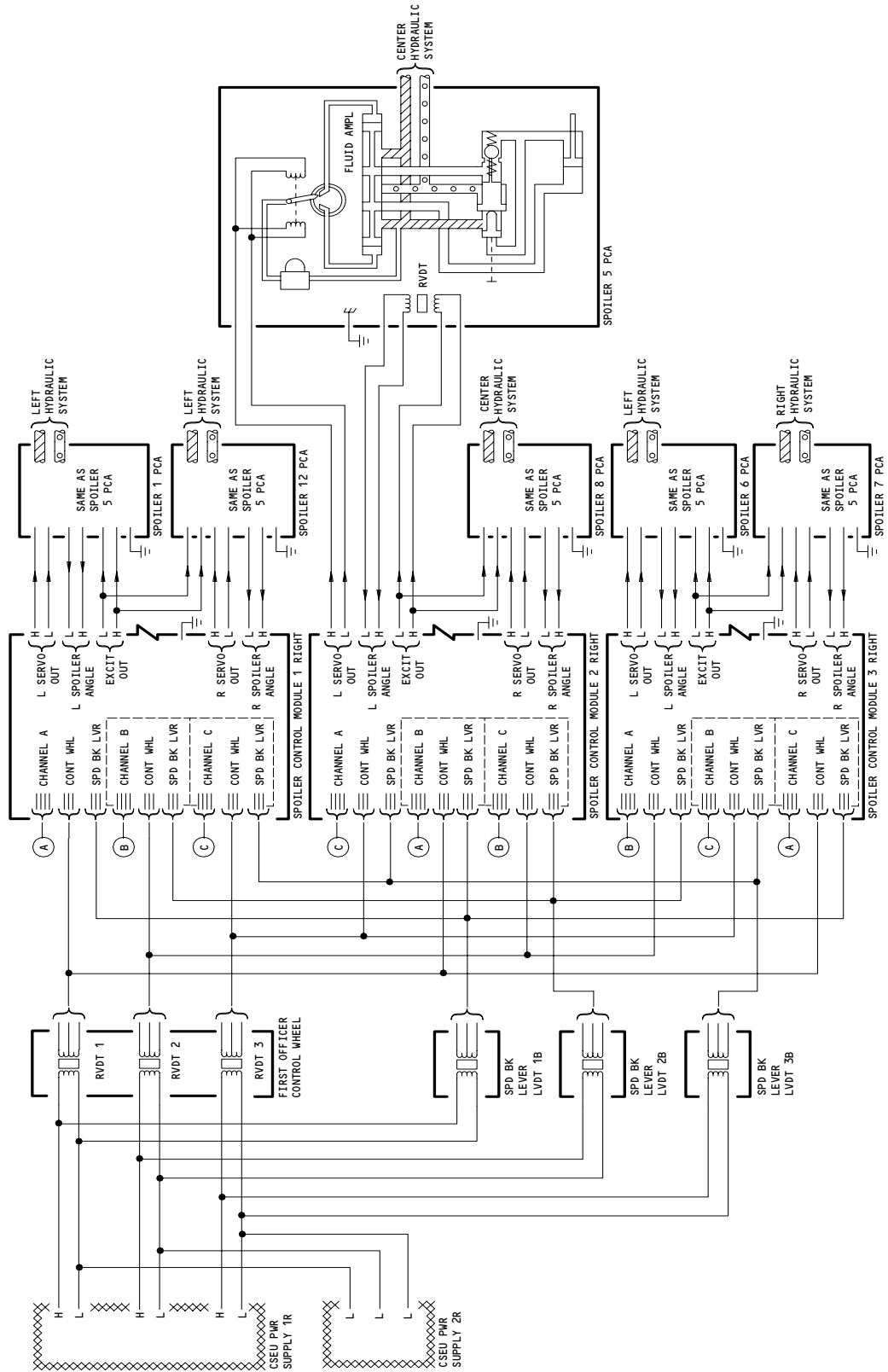
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Spoiler Control Simplified Schematic  
Figure 13 (Sheet 2)

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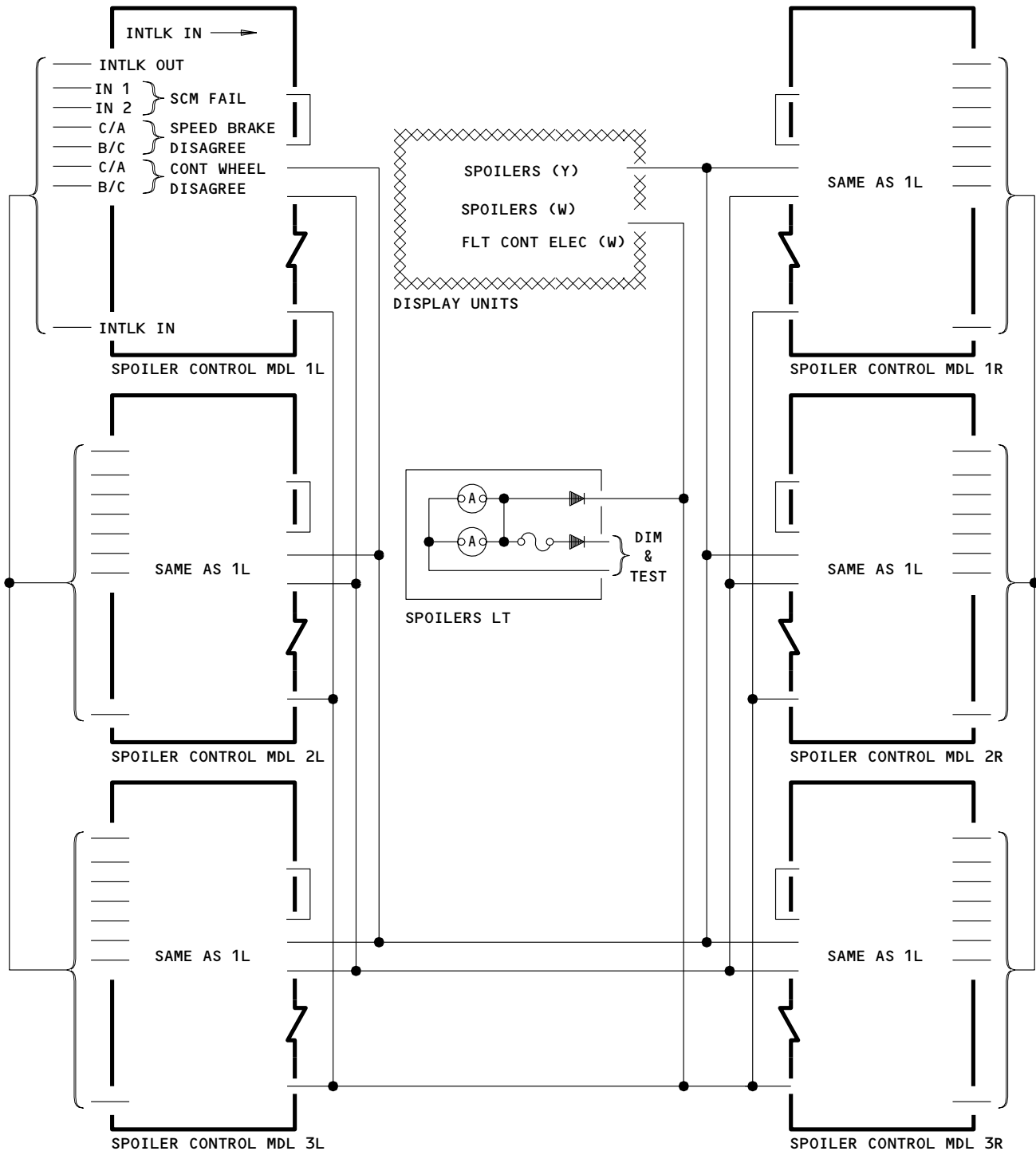
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Spoiler Control Simplified  
Figure 13 (Sheet 3)

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- (d) The speedbrake lever has three positions. In the DOWN position, the spoiler surfaces are retracted. Pulling up on the speedbrake lever and moving it 9° aft places the lever in the ARMED detent. This prepares the speedbrake system for automatic operation. Pulling the lever all the way back to the full UP stop will raise the spoilers to full extension.
  - (e) Ten spoiler panels respond to speedbrake commands in flight. The four inboard panels will extend to 20° when the speedbrake lever is moved to the UP position. Panels 1 through 3 and 10 through 12 will extend to 45° with the lever in the UP position.
  - (f) At touchdown and during ground operations, all spoilers will extend to 60° when the speedbrake lever is in the full UP stop.
- (4) Speedbrake Command (Fig. 13)
- (a) Manual operation of the speedbrakes begins when the speedbrake lever is moved to the ARMED detent. There is no speedbrake panel movement when the lever is moved from the DOWN position to the ARMED position (detent). Moving the speedbrake lever to the ARMED detent activates the auto-speedbrake actuator arming switch. This prepares the speedbrake system for automatic operation during landings. When a touchdown is sensed by the auto-speedbrake relay panel, the auto-speedbrake actuator will move the speedbrake lever to the full UP stop. A clutch in the speedbrake mechanism allows the flight crew to move the speedbrake lever and override the auto-speedbrake actuator (AMM 27-62-00).
  - (b) During a refused takeoff, operation of the reverse thrust levers will lift the speedbrake lever out of the DOWN detent. The auto-speedbrake control circuit will then be armed and the auto-speedbrake actuator will move the speedbrake lever to the UP position.
  - (c) Inputs to the SCMs for the speedbrake system come from the speedbrake LVDT pairs. Speedbrake lever movement is transferred to the LVDTs through a linkage and the speedbrake mechanism. One LVDT in each pair sends a signal to one of the three SCMs in the left main equipment rack and the other LVDT in each pair sends a signal to one of the three SCMs in the right main equipment rack.
  - (d) The SCMs take the input signals from the speedbrake LVDTs and feedback signals from the spoiler PCA LVDTs and combine them according to programs in the modules. The resultant output is sent as a command to the PCA to position the spoiler panels. Speedbrake commands from the SCMs cause opposite spoiler panels to respond symmetrically.

B. Control

- (1) Provide electrical power (Ref 24-22-00).

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**WARNING:** TO PREVENT INJURY OR DAMAGE, CLEAR PERSONNEL AND EQUIPMENT FROM CONTROL SURFACES BEFORE PROVIDING HYDRAULIC POWER. ISOLATE ANY SYSTEM NOT INTENDED FOR OPERATION.

- (2) Provide left, center, and right hydraulic system power (Ref 29-11-00).
- (3) Spoiler operation (aileron control wheel).
  - (a) Place speedbrake lever in the DOWN position.
  - (b) Rotate either aileron control wheel fully clockwise or counterclockwise to raise the right or left wing spoilers.
  - (c) Return control wheel to the neutral position to lower the spoilers.
- (4) Spoiler operation (speedbrake lever).
  - (a) Place aileron control wheels in the neutral position.
  - (b) Move speedbrake lever to the full UP stop to raise the spoilers.
  - (c) Place speedbrake lever in the DOWN position to lower the spoilers.
  - (d) Remove hydraulic power (AMM 29-11-00/201).
  - (e) Remove electrical power if no longer required (AMM 24-22-00/201) .

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SPOILER/SPEEDBRAKE CONTROL SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ACTUATOR - (FIM 25-65-00/101) OFF-WING ESCAPE SPOILER OVERRIDE				
ACTUATOR - SPOILER POWER CONTROL (PCA)				
1, M306	3	1	LIFT SPOILER, EXTEND FLAPS	27-61-02
2, M307	3	1	LIFT SPOILER, EXTEND FLAPS	27-61-02
3, M308	3	1	LIFT SPOILER, EXTEND FLAPS	27-61-02
4, M309	3	1	LIFT SPOILER, EXTEND FLAPS	27-61-02
5, M310	3	1	552GB AND LIFT SPOILER	27-61-02
6, M311	3	1	552BB AND LIFT SPOILER	27-61-02
7, M312	3	1	652BB AND LIFT SPOILER	27-61-02
8, M313	3	1	652GB AND LIFT SPOILER	27-61-02
9, M314	3	1	LIFT SPOILER, EXTEND FLAPS	27-61-02
10, M315	3	1	LIFT SPOILER, EXTEND FLAPS	27-61-02
11, M316	3	1	LIFT SPOILER, EXTEND FLAPS	27-61-02
12, M317	3	1	LIFT SPOILER, EXTEND FLAPS	27-61-02
CIRCUIT BREAKERS				
FLT CONT ELEC 1L AC, C1538		1	FLT COMPT, P11	
FLT CONT ELEC 1L DC, C1534		1	11C6	*
FLT CONT ELEC 1R AC, C1536		1	11C7	*
FLT CONT ELEC 1R DC, C1531		1	11G17	*
FLT CONT ELEC 2L AC, C1537		1	11G18	*
FLT CONT ELEC 2L DC, C1533		1	11C8	*
FLT CONT ELEC 2R AC, C1535		1	11C9	*
FLT CONT ELEC 2R DC, C1532		1	11G26	*
		1	11G27	*
COMPUTER - (FIM 31-41-00/101)				
EICAS L, M10181				
EICAS R, M10182				
FILTER - SPOILER PCA			(SEE SPOILER PCA ACCESS)	27-61-02
LEVER - SPEEDBRAKE CONTROL	1	1	FLT COMPT, P10	27-61-08
LIGHT - SPOILERS, YDLL14	1	1	FLT COMPT, P5, ANNUN PANEL M10394	*
MECHANISM - SPEEDBRAKE CONTROL	1	1	FLT COMPT, P10	
MODULE - (FIM 27-09-00/101)				
SPOILER CONTROL (SCM) 1L, M530				
SPOILER CONTROL (SCM) 2L, M531				
SPOILER CONTROL (SCM) 3L, M532				
SPOILER CONTROL (SCM) 1R, M533				
SPOILER CONTROL (SCM) 2R, M534				
SPOILER CONTROL (SCM) 3R, M535				
SPOILER - INBOARD	3	4	WING TRAILING EDGE	27-61-01
SPOILER - OUTBOARD	3	8	WING TRAILING EDGE	27-61-01
TRANSDUCER -				
SPEEDBRAKE (LVDT) 1, TS35	1	1	FLT COMPT, P10	27-61-10
SPEEDBRAKE (LVDT) 2, TS36	1	1	FLT COMPT, P10	27-61-10
SPEEDBRAKE (LVDT) 3, TS37	1	1	FLT COMPT, P10	27-61-10
TRANSDUCER -				
CAPTAIN'S SPOILER (RVDT), TS5081	2	1	119AL, BELOW FLT COMPT FLOOR	27-61-04
FIRST OFFICER'S SPOILER (RVDT), TS5082	2	1	119AL, BELOW FLT COMPT FLOOR	27-61-04
VALVE - INBOARD PCA ELECTROHYDRAULIC SERVO (EHSV)	3	4	552BB, 552GB, LEFT WING, 652BB, 652GB, RIGHT WING	27-61-02
VALVE - OUTBOARD PCA ELECTROHYDRAULIC SERVO (EHSV)	3	8	EXTEND TRAILING EDGE FLAPS	27-61-02

\* SEE THE WDM EQUIPMENT LIST

Spoiler/Speedbrake Control System - Component Index  
 Figure 101

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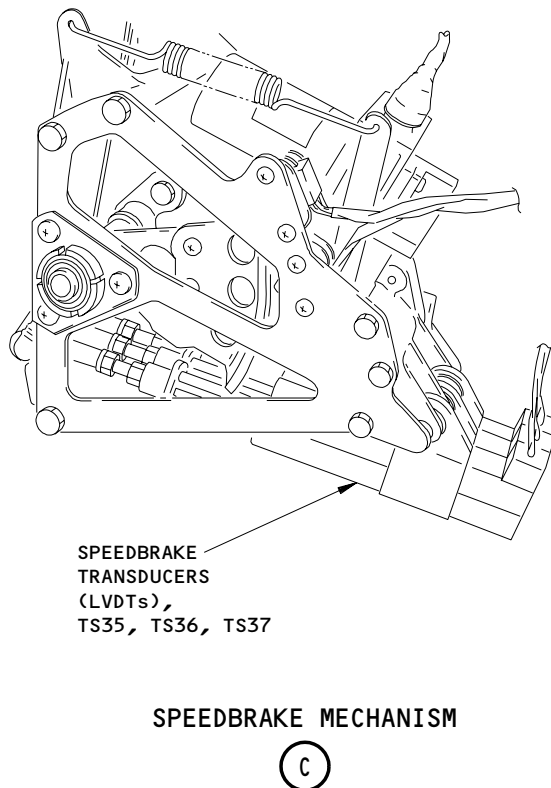
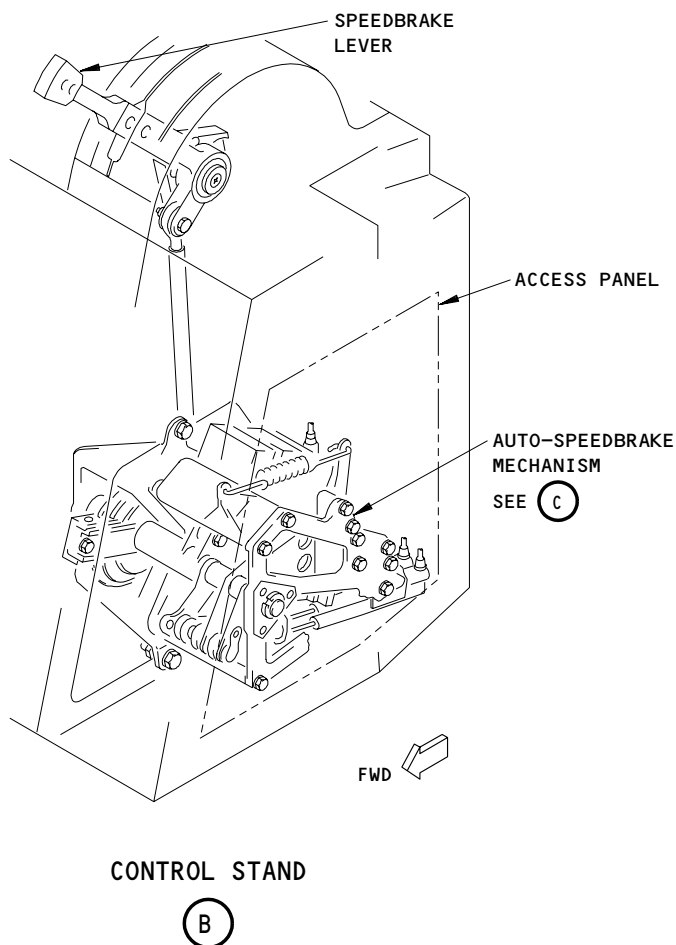
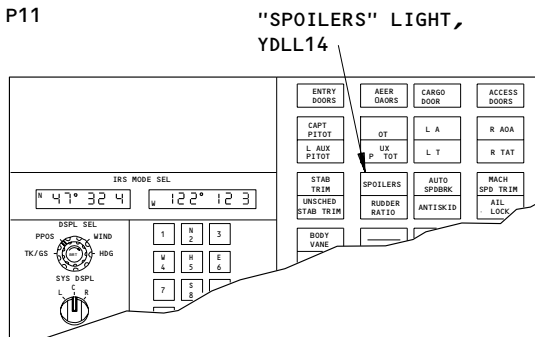
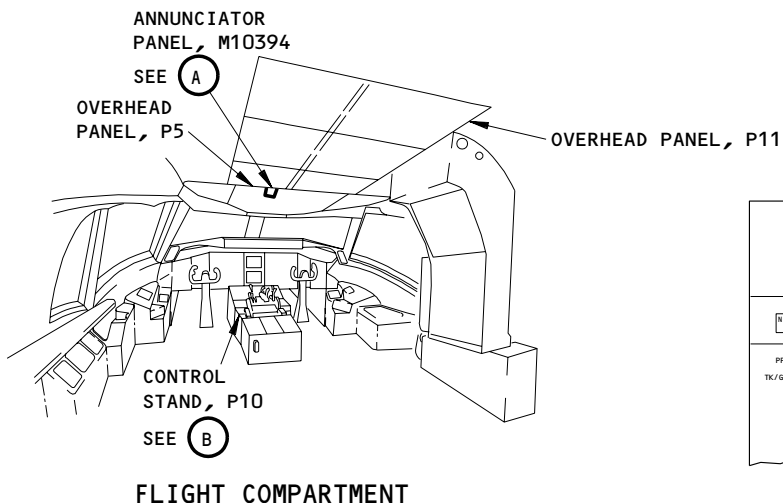
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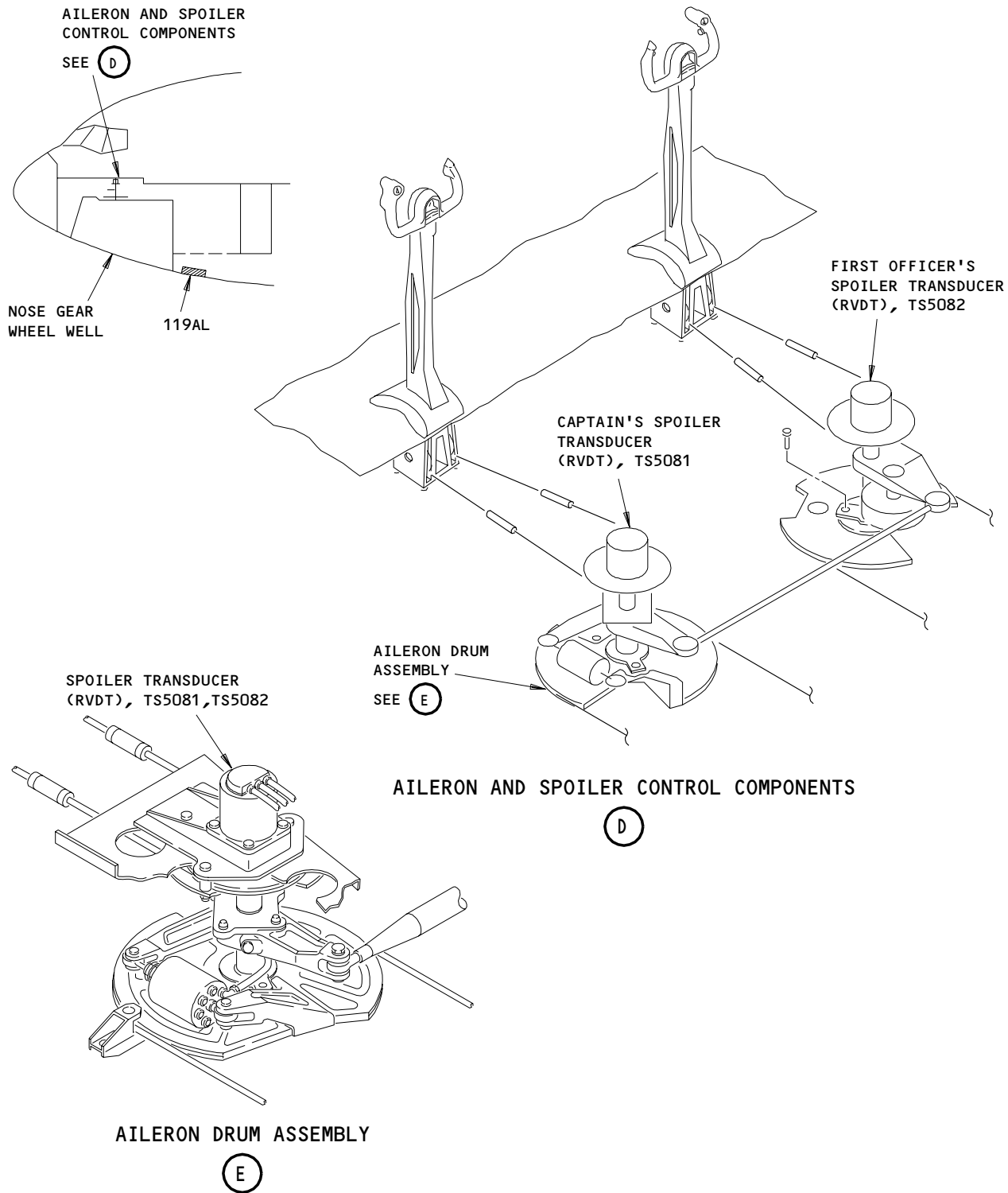
### FAULT ISOLATION/MAINT MANUAL



Spoiler/Speedbrake Control System - Component Location  
Figure 102 (Sheet 1)

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Spoiler/Speedbrake Control System - Component Location  
Figure 102 (Sheet 2)

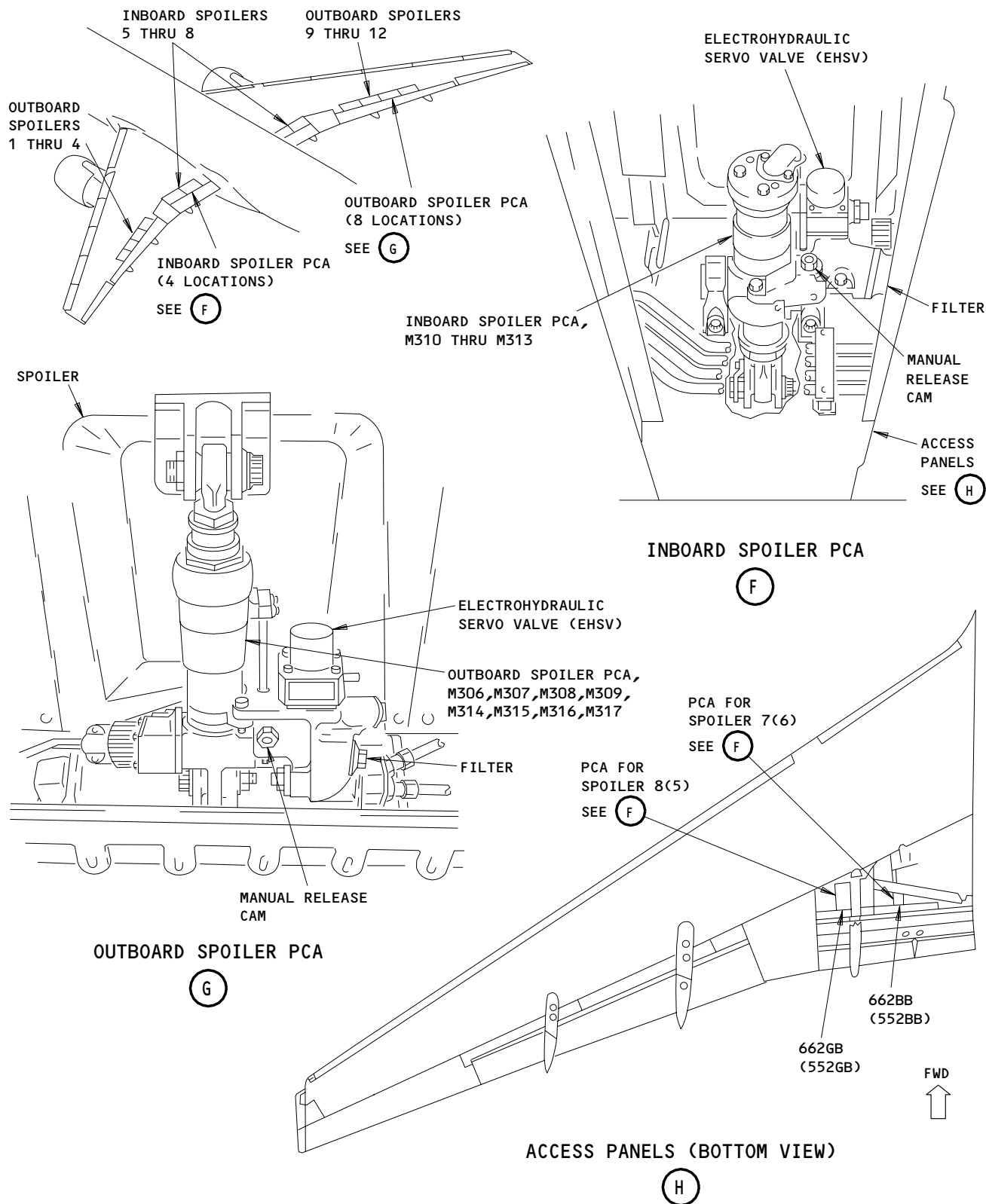
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**Spoiler/Speedbrake Control System – Component Location**  
Figure 102 (Sheet 3)

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SPOILER/SPEEDBRAKE CONTROL SYSTEM – MAINTENANCE PRACTICES

1. General

- A. This procedure contains the deactivation and activation tasks for the spoiler/speedbrake control system. These tasks are used to prevent accidental movement of the spoilers during maintenance.
- B. This procedure also contains the scheduled maintenance tasks to raise and retract the spoilers (tasks 2 and 3).
- C. The procedure also contains the removal and installation of the spoiler actuator lock (tasks 4 and 5).

TASK 27-61-00-042-003

2. Spoiler/Speedbrake Deactivation

A. General

- (1) Use these procedures when you do maintenance near the spoilers or when you do maintenance that can cause the spoilers to operate.
- (2) The spoiler/speedbrake system uses hydraulic power and is electrically controlled. Each of the twelve spoilers is moved by a power control actuator (PCA) that gets power from one of the three main hydraulic systems.
- (3) The spoiler control modules (SCMs) control the spoiler movement and are connected to many airplane systems. If you do maintenance on other systems, it is possible for the spoilers to move accidentally. Be very careful, because the spoilers move very quickly and can cause injury to persons or damage to equipment.
- (4) The spoilers are numbered 1 thru 12 from the outboard left wing spoiler to the outboard right wing spoiler.
- (5) These are the Possible Dangers and the Applicable Spoiler/Speedbrake Deactivation Procedures:
  - (a) The installation of PCA locks is the recommended procedure for spoiler deactivation. In some maintenance procedures you cannot install the PCA locks and you must use a different deactivation procedure. The data that follows will tell you how the spoilers operate and when to use a different deactivation procedure.
  - (b) The spoilers will extend when you operate the reverse thrust levers if these conditions are satisfactory:
    - The speedbrake lever is in its down-and-locked position
    - Electrical power is on
    - Hydraulic power is on.

To prevent injury to persons or damage to equipment, do the "Install the PCA Locks to Deactivate the Spoiler/Speedbrakes" or the "Deactivate the Spoiler/Speedbrakes for Operation of the Forward or Reverse Thrust Levers" group of steps.

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(c) The spoilers will extend when you move the forward thrust levers to less than 10 degrees of total thrust lever movement if these conditions are satisfactory:

- The speedbrake lever is in its ARMED detent position
- Electrical power is on
- Hydraulic power is on.

To prevent injury to persons or damage to equipment, do the "Install the PCA Locks to Deactivate the Spoiler/Speedbrakes" or the "Deactivate the Spoiler/Speedbrakes for Operation of the Forward or Reverse Thrust Levers" group of steps.

(d) The spoilers will retract when you move the forward thrust levers to more than 11.5 degrees of total thrust lever movement if these conditions are satisfactory:

- The speedbrake lever is in its UP detent position
- Electrical power is on
- Hydraulic power is on.

To prevent injury to persons or damage to equipment, do the "Install the PCA Locks to Deactivate the Spoiler/Speedbrakes" or the "Deactivate the Spoiler/Speedbrakes for Operation of the Forward or Reverse Thrust Levers" group of steps.

(e) Spoilers 4 and 9 will retract and the other spoilers will move down if you open an air/ground circuit breaker or simulate the air mode when these conditions are satisfactory:

- The speedbrake lever is in its UP detent position
- Electrical power is on
- Hydraulic power is on.

To prevent injury to persons or damage to equipment, do the "Install the PCA locks to Deactivate the Spoiler/Speedbrakes" or the "Spoiler/Speedbrake Deactivation When You Will Open the Air/Ground Circuit Breakers or Simulate the Air Mode" group of steps.

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(f) Spoilers 4 and 9 will move to their full up positions and the other spoilers will move up if you close the AIR/GND circuit breakers when these conditions are satisfactory:

- The speedbrake lever is in its UP detent position
- Electrical power is on
- Hydraulic power is on
- LANDING GEAR POSITION AIR/GND SYS 1 and SYS 2 are open.

To prevent injury to persons or damage to equipment, do the "Install the PCA locks to Deactivate the Spoiler/Speedbrakes" or the "Spoiler/Speedbrake Deactivation When you Will Open the Air/Ground Circuit Breakers or Simulate the Air Mode" group of steps.

(g) The spoilers will retract when you open the FLT CONT ELEC circuit breakers or remove electrical power when these conditions are satisfactory:

- The speedbrake lever is in its UP detent position
- Electrical power is on
- Hydraulic power is on.

To prevent injury to persons or damage to equipment, do the "Install the PCA Locks to Deactivate the Spoiler/Speedbrakes" or the "Spoiler/Speedbrake Deactivation When You Will Open the FLT CONT ELEC Circuit Breakers or Remove Electrical Power" group of steps.

(h) The spoilers will retract if you disconnect the electrical connector from a spoiler PCA when these conditions are satisfactory:

- The speedbrake lever is in its UP detent position
- Electrical power is on
- Hydraulic power is on

To prevent injury to persons or damage to equipment, do the "Install the PCA Locks to Deactivate the Spoiler/Speedbrakes" or the "Deactivate the Spoiler/Speedbrakes When You Will Disconnect the Electrical Connector From a PCA" group of steps.

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B. Equipment

- (1) Spoiler Actuator Lock Set - A27108-13

C. References

- (1) AMM 06-44-00/201, Wing Access Door and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 25-65-00/201, Off-Wing Escape System
- (4) AMM 27-51-00/201, Trailing Edge Flap System
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) AMM 32-00-15/201, Landing Gear Door Locks
- (7) AMM 32-00-20/201, Landing Gear Downlocks

D. Access

- (1) Location Zones

553/653	Spoiler Number 6 and 7
554/654	Spoiler Number 5 and 8
562/662	Spoiler Number 4 and 9
563/663	Spoiler Number 3 and 10
564/664	Spoiler Number 2 and 11
565/665	Spoiler Number 1 and 12

E. Install the PCA Locks to Deactivate the Spoiler/Speedbrakes

**NOTE:** This task puts the spoilers in their up position and holds them there during maintenance.

S 862-134

**WARNING:** BE VERY CAREFUL WHEN YOU DO MAINTENANCE NEAR THE SPOILERS. THE SPOILERS WILL MOVE THROUGH THEIR FULL TRAVEL RANGE IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

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

S 862-005

- (2) Extend the trailing edge flaps (AMM 27-51-00/201).

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S 042-006

- (3) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 012-007

- (4) Open the applicable access panels (AMM 06-44-00/201):
- (a) 552BB (for spoiler number 6)
  - (b) 552GB (for spoiler number 5)
  - (c) 652BB (for spoiler number 7)
  - (d) 652GB (for spoiler number 8).

S 042-008

**WARNING:** REFER TO AMM 25-65-00/201 FOR THE PROCEDURE TO DISARM THE OFF-WING ESCAPE SYSTEM. IF YOU INCORRECTLY DISARM THE OFF-WING ESCAPE SYSTEM, THE ESCAPE SLIDE CAN ACCIDENTALLY INFLATE AND CAUSE INJURY OR DAMAGE.

- (5) Disarm the off-wing escape system (AMM 25-65-00/201).

S 862-009

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (6) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 862-010

- (7) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11G11, AUTO SPEED BRAKE

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S 212-011

- (8) Make sure these circuit breakers on the P11 panel are closed:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G17, FLT CONT ELEC 1R AC
  - (f) 11G18, FLT CONT ELEC 1R DC
  - (g) 11G26, FLT CONT ELEC 2R AC
  - (h) 11G27, FLT CONT ELEC 2R DC
  - (i) 11C30, LANDING GEAR POSITION AIR/GND SYS 1
  - (j) 11U23, POS AIR/GND SYS 2

S 212-012

- (9) Make sure the control wheels are in their neutral positions.

S 862-013

- (10) Move the speedbrake lever to its full up position and attach a DO-NOT-OPERATE tag.

**NOTE:** The speedbrake lever must stay fully up during this procedure.

S 862-014

- (11) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 042-116

- (12) Do these steps for the deactivation of the shutoff valves:

**NOTE:** It is not necessary for you to do this procedure if you use the A27108-13 spoiler actuator locks on the spoilers.

- (a) Move the FLT CONTROL SHUTOFF WING L, C and R switches on the P61 panel to OFF and attach DO-NOT-OPERATE tags.

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- (b) Open these circuit breakers and attach DO-NOT-CLOSE tags:
- 1) P11 Circuit Breaker Panel
    - a) 11H15, FLT CONT SHUTOFF WING L
    - b) 11H16, FLT CONT SHUTOFF WING C
    - c) 11H26, FLT CONT SHUTOFF WING R

S 492-015

**WARNING:** MAKE SURE HYDRAULIC POWER IS NOT SUPPLIED TO THE SPOILER PCAS DURING THE PCA LOCK INSTALLATION. THE SPOILERS WILL RETRACT IN LESS THAN 1 SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

STOP AIRPLANE MAINTENANCE DURING THE SPOILER PCA LOCK INSTALLATION. DO NOT MOVE THE SPEEDBRAKE LEVER OR ENGINE THRUST LEVERS. THE SPOILERS WILL RETRACT IN LESS THAN 1 SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (13) Be careful, and do the "Spoiler Actuator Lock Installation" , at the end of this procedure, to install the spoiler actuator locks on all twelve spoiler PCAs.

**NOTE:** After you remove hydraulic power, the spoilers can move down a small distance. If it is necessary, use a 5/32 inch allen wrench to operate the manual release cam (to release unwanted hydraulic pressure) and lift the spoilers to install the PCA locks.

S 862-016

**WARNING:** MAKE SURE ALL TWELVE SPOILER LOCKS ARE INSTALLED ON THE TWELVE SPOILER PCAS. MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE AWAY FROM THE SPOILERS BEFORE YOU CONTINUE THIS PROCEDURE. ACCIDENTAL SPOILER MOVEMENT CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (14) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 862-017

- (15) If it is necessary for maintenance, reactivate and retract the trailing edge flaps (AMM 27-51-00/201).

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S 862-018

- (16) Remove hydraulic power if it is necessary for maintenance (AMM 29-11-00/201).

S 862-019

**CAUTION:** MAKE SURE YOU REMOVE HYDRAULIC POWER BEFORE YOU REMOVE ELECTRICAL POWER OR OPEN ONE OF THE CIRCUIT BREAKERS SHOWN ABOVE. SPOILERS WITH HYDRAULIC POWER WILL TRY TO RETRACT AND CAN CAUSE DAMAGE TO THE SPOILERS.

- (17) Remove electrical power if it is necessary for maintenance.

**NOTE:** EICAS will store a maintenance message when you remove electrical power.

- F. Deactivate the Spoiler/Speedbrakes for Operation of the Forward or Reverse Thrust Levers

**NOTE:** Use this procedure to prevent spoiler movement when you move the forward or reverse thrust levers.

S 862-020

**WARNING:** MAKE SURE THE SPEEDBRAKE LEVER IS IN ITS DOWN-AND-LOCKED POSITION AND THE SPEEDBRAKE CIRCUIT BREAKER IS OPEN BEFORE YOU OPERATE THE THRUST LEVERS. ACCIDENTAL SPOILER MOVEMENT CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Move the speedbrake lever to its down-and-locked position.

S 862-021

- (2) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:  
(a) 11G11, AUTO SPEED BRAKE

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S 212-022

- (3) Make sure all persons and equipment are away from the spoilers.

S 862-023

- (4) Move the forward thrust levers if it is necessary for maintenance.

S 862-024

- (5) Move the reverse thrust levers if it is necessary for maintenance.

G. Spoiler/Speedbrake Deactivation When You Will Open the FLT CONT ELEC Circuit Breakers or Remove Electrical Power

**NOTE:** This procedure makes sure the spoilers do not retract when you remove electrical power or open the FLT CONT ELEC circuit breakers.

S 862-025

**WARNING:** MAKE SURE THE SPEEDBRAKE LEVER IS IN ITS DOWN-AND-LOCKED POSITION BEFORE YOU OPEN THE FLT CONT ELEC CIRCUIT BREAKERS OR REMOVE ELECTRICAL POWER. THE SPOILERS WILL RETRACT IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Move the speedbrake lever to its down-and-locked position.

S 862-026

- (2) If it is necessary for maintenance, open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G17, FLT CONT ELEC 1R AC

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- (f) 11G18, FLT CONT ELEC 1R DC
- (g) 11G26, FLT CONT ELEC 2R AC
- (h) 11G27, FLT CONT ELEC 2R DC

S 862-027

- (3) Remove electrical power if it is necessary for maintenance (AMM 24-22-00/201).

H. Spoiler/Speedbrake Deactivation when you will open the Air/Ground Circuit Breakers or Simulate the Air Mode

**NOTE:** This procedure prevents spoiler movement when you change the air/ground logic system.

S 862-028

**WARNING:** MAKE SURE THE SPEEDBRAKE LEVER IS IN ITS DOWN-AND-LOCKED POSITION BEFORE YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS OR SIMULATE THE AIR MODE. ACCIDENTAL SPOILER MOVEMENT CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Move the speedbrake lever to its down-and-locked detent position.

S 862-029

- (2) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
  - (a) 11G11, AUTO SPEED BRAKE

S 862-030

- (3) Simulate the air mode if it is necessary for maintenance (AMM 32-09-02/201).

I. Deactivate the Spoiler/Speedbrakes When You Will Disconnect the Electrical Connector From a PCA

**NOTE:** This procedure prevents spoiler retraction when an electrical connector is disconnected from a spoiler PCA.

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S 862-031

**WARNING:** MAKE SURE THE SPEEDBRAKE LEVER IS IN ITS DOWN-AND-LOCKED POSITION BEFORE YOU DISCONNECT AN ELECTRICAL CONNECTOR FROM A SPOILER PCA. THE SPOILERS WILL RETRACT IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Move the speedbrake lever to its down-and-locked position.

S 862-032

- (2) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G17, FLT CONT ELEC 1R AC
  - (f) 11G18, FLT CONT ELEC 1R DC
  - (g) 11G26, FLT CONT ELEC 2R AC
  - (h) 11G27, FLT CONT ELEC 2R DC

S 862-033

- (3) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 032-034

- (4) Disconnect the spoiler PCA electrical connectors if it is necessary for maintenance.

TASK 27-61-00-442-035

### 3. Spoiler/Speedbrake Activation

#### A. General

- (1) This task contains procedures to activate the spoilers after you have done the applicable deactivation procedure and the necessary airplane maintenance.

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- (2) Use these procedures when you do maintenance near the spoilers or when you do maintenance that can cause the spoilers to operate.
- (3) The spoiler/speedbrake system uses hydraulic power and is electrically controlled. Each of the twelve spoilers is moved by a power control actuator (PCA) that gets power from one of the three main hydraulic systems.
- (4) The spoiler control modules (SCMs) control the spoiler movement and are connected to many airplane systems. If you do maintenance on other systems, it is possible for the spoilers to move accidentally. Be very careful, because the spoilers move very quickly and can cause injury to persons or damage to equipment.
- (5) The spoilers are numbered 1 thru 12 from the outboard left wing spoiler to the outboard right wing spoiler.

**B. Equipment**

- (1) Spoiler Actuator Lock A27108-13

**C. References**

- (1) AMM 06-44-00/201, Wing Access Door and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-13-04/401, Lateral Control Shutoff Valve
- (4) AMM 27-51-00/201, Trailing Edge Flap System
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) AMM 32-00-15/201, Landing Gear Door Locks
- (7) AMM 32-00-20/201, Landing Gear Downlocks
- (8) AMM 32-09-02/201, Air/Ground Relays

**D. Access**

- (1) Location Zones

553/653	Spoiler Number 6 and 7
554/654	Spoiler Number 5 and 8
562/662	Spoiler Number 4 and 9
563/663	Spoiler Number 3 and 10
564/664	Spoiler Number 2 and 11
565/665	Spoiler Number 1 and 12

**E. Remove the PCA Locks to Activate the Spoiler/Speedbrakes**

**NOTE:** Do these steps if you did the "Install the PCA Locks to Deactivate the Spoiler/Speedbrakes" group of steps to deactivate the spoilers.

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S 862-135

**WARNING:** BE VERY CAREFUL WHEN YOU DO MAINTENANCE NEAR THE SPOILERS. THE SPOILERS WILL MOVE THROUGH THEIR FULL TRAVEL RANGE IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

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

S 862-037

- (2) Move the STBY POWER switch on the overhead panel, P5, to the AUTO position.

S 212-039

- (3) Make sure these circuit breakers on the overhead panel, P11, are closed:

- (a) 11C6, FLT CONT ELEC 1L AC
- (b) 11C7, FLT CONT ELEC 1L DC
- (c) 11C8, FLT CONT ELEC 2L AC
- (d) 11C9, FLT CONT ELEC 2L DC
- (e) 11G17, FLT CONT ELEC 1R AC
- (f) 11G18, FLT CONT ELEC 1R DC
- (g) 11G26, FLT CONT ELEC 2R AC
- (h) 11G27, FLT CONT ELEC 2R DC
- (i) 11C30, LANDING GEAR POSITION AIR/GND SYS 1
- (j) 11U23, POS AIR/GND SYS 2

S 042-128

**WARNING:** REFER TO AMM 25-65-00/201 FOR THE PROCEDURE TO DISARM THE OFF-WING ESCAPE SYSTEM. IF YOU INCORRECTLY DISARM THE OFF-WING ESCAPE SYSTEM, THE ESCAPE SLIDE CAN ACCIDENTALLY INFLATE AND CAUSE INJURY OR DAMAGE.

- (4) Make sure the off-wing escape system is disarmed (AMM 25-65-00/201).

S 212-001

- (5) Make sure the speedbrake lever is fully up.

S 212-002

- (6) Make sure the control wheels are in their neutral positions.

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S 862-042

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRUALIC POWER IS SUPPLIED.

- (7) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 862-043

- (8) Extend the trailing edge flaps (AMM 27-51-00/201).

S 042-044

- (9) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 862-045

- (10) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 092-046

**WARNING:** MAKE SURE HYDRAULIC POWER IS NOT SUPPLIED TO THE SPOILER PCAS DURING THE PCA LOCK REMOVAL. THE SPOILERS WILL RETRACT IN LESS THAN 1 SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

STOP AIRPLANE MAINTENANCE DURING THE SPOILER PCA LOCK REMOVAL. DO NOT MOVE THE SPEEDBRAKE LEVER OR ENGINE THRUST LEVERS, OR OPEN THE CIRCUIT BREAKERS SHOWN ABOVE. THE SPOILERS WILL RETRACT IN LESS THAN 1 SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (11) Be careful, and do the "Spoiler Actuator Lock Removal", at the end of this procedure, to remove the spoiler actuator locks from all twelve spoiler PCAs.

**NOTE:** When you remove hydraulic power, the spoilers can move down a small distance. If it is necessary, use a 5/32 inch allen wrench to operate the manual release cam to lift the spoiler and remove the PCA lock.

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S 442-117

(12) Do these steps for the activation of the shutoff valves:

**NOTE:** You do not need to do this procedure if you did not do the deactivation procedure of the shutoff valves before the spoiler actuator lock installation.

- (a) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
  - 1) P11 Circuit Breaker Panel
    - a) 11H15, FLT CONT SHUTOFF WING L
    - b) 11H16, FLT CONT SHUTOFF WING C
    - c) 11H26, FLT CONT SHUTOFF WING R
- (b) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C and R switches on the P61 panel to ON.

S 862-047

**WARNING:** MAKE SURE ALL PERSONS AND EQUIPMENT ARE AWAY FROM THE SPOILERS BEFORE YOU CONTINUE THIS PROCEDURE. ACCIDENTAL SPOILER MOVEMENT CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(13) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 862-048

(14) Move the speedbrake lever to its down-and-locked position.

S 862-049

(15) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 442-050

(16) Do these steps to activate the off-wing escape slide system:

**WARNING:** REFER TO AMM 25-65-00/201 FOR THE PROCEDURE TO ARM THE OFF-WING ESCAPE SYSTEM. IF YOU INCORRECTLY ARM THE OFF-WING ESCAPE SYSTEM, THE ESCAPE SLIDE CAN ACCIDENTALLY INFLATE AND CAUSE INJURY OR DAMAGE.

- (a) Arm the off-wing escape system (AMM 25-65-00/201).
  - 1) Push the TEST 2 switch on the SQUIB TEST panel located on the right side panel, P61.

S 412-053

(17) Close access panels 552GB, 652GB, 552BB and 652BB (AMM 06-44-00/201).

S 862-054

(18) Retract the trailing edge flaps (AMM 27-51-00/201).

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S 862-055

- (19) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:  
(a) 11G11, AUTO SPEED BRAKE

S 862-056

- (20) Remove electrical power if it is not necessary (AMM 24-22-00/201).  
F. Activate the Spoiler/Speedbrakes After Operation of the Forward or Reverse Thrust Levers

NOTE: Do these steps if you did the "Deactivate the Spoiler/Speedbrakes for Operation of the Forward or Reverse Thrust Levers" group of steps to deactivate the spoilers.

S 862-057

- (1) Move the forward thrust levers to their IDLE thrust positions.

S 862-058

- (2) Move the reverse thrust levers to their OFF positions.

S 212-059

- (3) Make sure the speedbrake lever is in its down-and-locked position.

S 862-060

- (4) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead panel, P11:  
(a) 11G11, AUTO SPEED BRAKE  
G. Spoiler/Speedbrake Activation After You Open the FLT CONT ELEC Circuit Breakers or Remove Electrical Power

NOTE: Do these steps if you did the "Spoiler/Speedbrake Deactivation When You Will Open the FLT CONT ELEC Circuit Breakers or Remove Electrical Power" group of steps to deactivate the spoilers.

S 862-061

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

S 862-062

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:  
(a) 11C6, FLT CONT ELEC 1L AC

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- (b) 11C7, FLT CONT ELEC 1L DC
- (c) 11C8, FLT CONT ELEC 2L AC
- (d) 11C9, FLT CONT ELEC 2L DC
- (e) 11G17, FLT CONT ELEC 1R AC
- (f) 11G18, FLT CONT ELEC 1R DC
- (g) 11G26, FLT CONT ELEC 2R AC
- (h) 11G27, FLT CONT ELEC 2R DC

H. Spoiler/Speedbrake Activation After You Open the Air/Ground Circuit Breakers or Simulate the Air Mode

**NOTE:** Do these steps if you did the "Spoiler/Speedbrake Deactivation When You Will Open the Air/Ground Circuit Breakers or Simulate the Air Mode" group of steps to deactivate the spoilers.

S 212-063

- (1) Make sure the speedbrake lever is in its down-and-locked position.

S 862-064

- (2) Remove the air mode simulation (AMM 32-09-02/201).

S 862-065

- (3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead panel, P11:

- (a) 11G11, AUTO SPEED BRAKE

I. Spoiler/Speedbrake Activation After You Disconnect an Electrical Connector From a Spoiler PCA

**NOTE:** Do these steps if you did the "Deactivate the Spoiler/Speedbrakes When You Will Disconnect the Electrical Connector From a PCA" group of steps to deactivate the spoilers.

S 212-066

- (1) Make sure the power is removed from the left, right, and center hydraulic systems (AMM 29-11-00/201).

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- S 212-067
- (2) Make sure the FLT CONT ELEC circuit breakers on the overhead panel, P11, are open.
- S 432-068
- (3) Connect the electrical connector to the PCA.
- S 212-069
- (4) Make sure the spoiler and its PCA are retracted.
- S 212-070
- (5) Make sure the speedbrake lever is in its down-and-locked position.
- S 862-071
- (6) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G17, FLT CONT ELEC 1R AC
  - (f) 11G18, FLT CONT ELEC 1R DC
  - (g) 11G26, FLT CONT ELEC 2R AC
  - (h) 11G27, FLT CONT ELEC 2R DC

TASK 27-61-00-002-109

4. Spoiler Actuator Lock Removal (Fig. 201)

A. General

- (1) Use these procedures when you do maintenance near the spoilers or when you do maintenance that can cause the spoilers to operate.
- (2) The spoiler/speedbrake system uses hydraulic power and is electrically controlled. Each of the twelve spoilers is moved by a power control actuator (PCA) that gets power from one of the three main hydraulic systems.

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- (3) The spoiler control modules (SCMs) control the spoiler movement and are connected to many airplane systems. If you do maintenance on other systems, it is possible for the spoilers to move accidentally. Be very careful, because the spoilers move very quickly and can cause injury to persons or damage to equipment.
- (4) The spoilers are numbered 1 thru 12 from the outboard left wing spoiler to the outboard right wing spoiler.

B. Equipment

- (1) A27108-13 Spoiler Actuator Lock

C. Access

- (1) Location Zones

553/653	Spoiler Number 6 and 7
554/654	Spoiler Number 5 and 8
562/662	Spoiler Number 4 and 9
563/663	Spoiler Number 3 and 10
564/664	Spoiler Number 2 and 11
565/665	Spoiler Number 1 and 12

D. Procedure

S 082-111

- (1) Remove the spoiler lock actuator:

**NOTE:** If you remove hydraulic power, the spoilers can move down a small distance. If it is necessary, use a 5/32 inch allen wrench to operate the manual release cam to lift the spoiler to remove the spoiler actuator lock.

**WARNING:** BE VERY CAREFUL WHEN YOU DO MAINTENANCE NEAR THE SPOILERS. THE SPOILERS WILL MOVE THROUGH THEIR FULL TRAVEL RANGE IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) Hold the inner half of the lock and turn the outer half to retract the lock.
- (b) Turn the two halves of the lock until they align and remove the lock from the actuator.

TASK 27-61-00-402-110

5. Spoiler Actuator Lock Installation (Fig. 201)

A. General

- (1) Use these procedures when you do maintenance near the spoilers or when you do maintenance that can cause the spoilers to operate.

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- (2) The spoiler/speedbrake system uses hydraulic power and is electrically controlled. Each of the twelve spoilers is moved by a power control actuator (PCA) that gets power from one of the three main hydraulic systems.
- (3) The spoiler control modules (SCMs) control the spoiler movement and are connected to many airplane systems. If you do maintenance on other systems, it is possible for the spoilers to move accidentally. Be very careful, because the spoilers move very quickly and can cause injury to persons or damage to equipment.
- (4) The spoilers are numbered 1 thru 12 from the outboard left wing spoiler to the outboard right wing spoiler.

B. Equipment

- (1) A27108-13 Spoiler Actuator Lock

C. Access

- (1) Location Zones

553/653	Spoiler Number 6 and 7
554/654	Spoiler Number 5 and 8
562/662	Spoiler Number 4 and 9
563/663	Spoiler Number 3 and 10
564/664	Spoiler Number 2 and 11
565/665	Spoiler Number 1 and 12

D. Procedure

S 862-113

- (1) Make sure the spoilers are in the full up position.

**NOTE:** If you remove hydraulic power, the spoilers can move down a small distance. If it is necessary, use a 5/32 inch (3.969 mm) allen wrench to operate the manual release cam and lift the spoilers to install the spoiler actuator locks.

S 482-112

- (2) Install the spoiler actuator lock:
  - (a) Make sure the inner and outer halves of the lock are threaded together to decrease the length of the lock assembly.

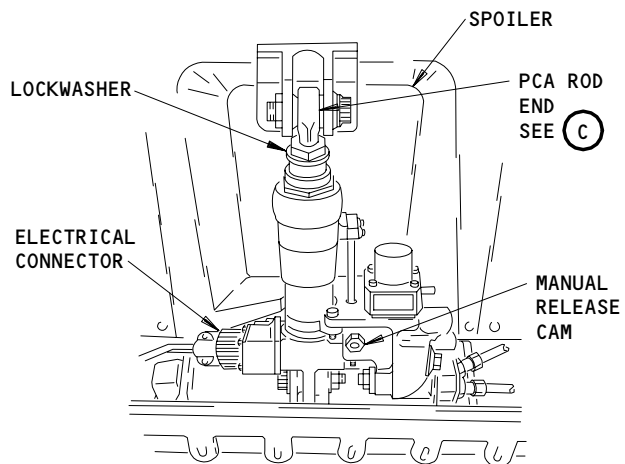
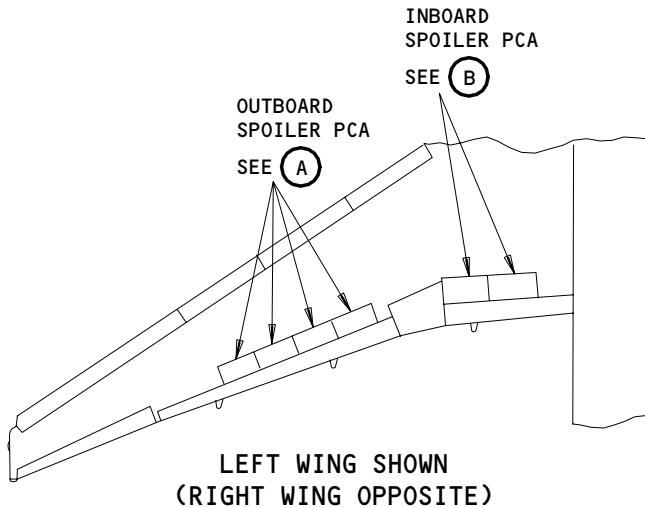
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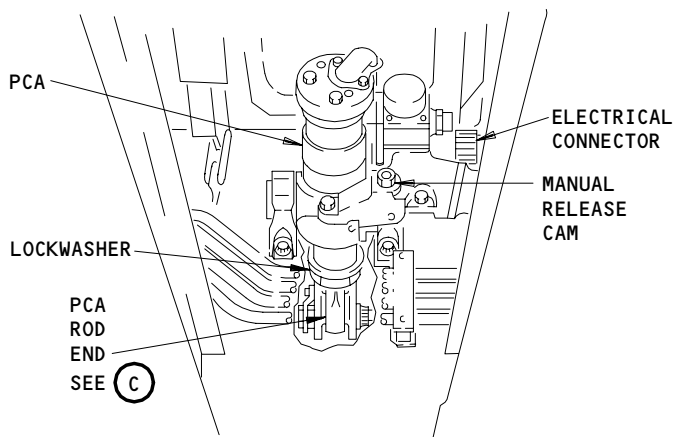
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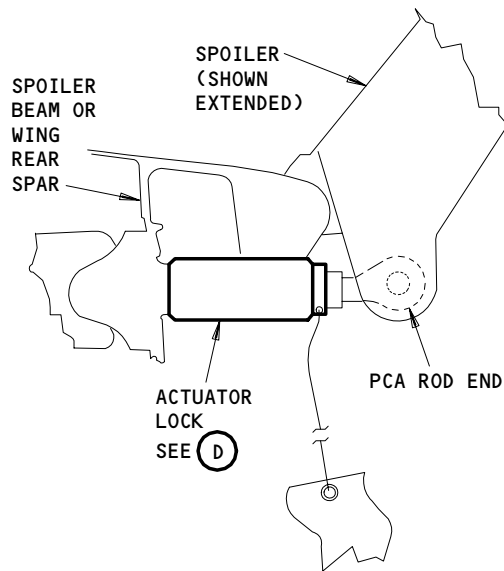
OUTBOARD SPOILER PCA

(A)



INBOARD SPOILER PCA

(B)



PCA ROD END

(C)

Spoiler Actuator Lock Installation  
Figure 201 (Sheet 1)

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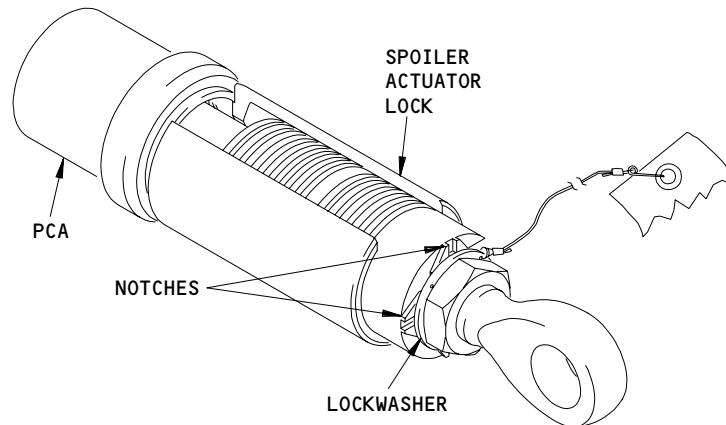
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- (b) Align the openings of the two halves of the lock to install the lock on the piston.
  - 1) Make sure the outer half of the lock is nearest to the actuator housing.
- (c) Turn the notch end of the inner half until the notches fit over the tabs on the lock washer.
- (d) Hold the inner half in place against the lock washer and turn the outer half to extend the lock until it touches the actuator housing.

**NOTE:** The slots on the inner and outer halves do not have to be in a special position for the lock to be serviceable.



SPOILER ACTUATOR LOCK

(D)

Spoiler Actuator Lock Installation  
Figure 201 (Sheet 2)

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SPOILER/SPEEDBRAKE CONTROL SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure contains the operational test, adjustment, and system test tasks for the spoiler/speedbrake control system. Refer to 27-62-00/501 for adjustment and test data that is applicable to the auto-speedbrake system.

TASK 27-61-00-715-001

2. Operational Test – Spoiler/Speedbrake Control System

A. General

- (1) The spoilers are numbered 1 thru 12, from the outboard left wing spoiler to the outboard right wing spoiler.

B. References

- (1) AMM 24-22-00/201, Electrical Power – Control  
(2) AMM 27-09-00/201, Flight Control System Electronics Unit  
(3) AMM 27-51-00/201, Trailing Edge Flap System  
(4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(5) AMM 32-09-02/201, Air/Ground Relays

C. Access

- (1) Location Zones
- |         |                    |
|---------|--------------------|
| 211/212 | Control Cabin      |
| 550/650 | Wing Trailing Edge |
| 560/660 | Wing Trailing Edge |

D. Prepare for the Test

S 865-002

- (1) Supply electrical power (Ref 24-22-00).

S 865-003

- (2) Move the STBY POWER switch on the overhead panel, P5, to the AUTO position.

S 865-005

- (3) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:  
(a) 11G11, AUTO SPEEDBRK

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S 865-007

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Supply pressure to the left, right, and center hydraulic systems (Ref 29-11-00).

S 865-008

- (5) Retract the trailing edge flaps (Ref 27-51-00).

S 865-009

- (6) Move the speedbrake lever to its ARMED position.

S 865-010

- (7) Do these steps three times:  
(a) Slowly move the speedbrake lever aft to a position that is approximately one-half of full travel.  
(b) Slowly move the speedbrake lever back to its ARMED position.

S 865-011

- (8) Do these steps three times:  
(a) Slowly move the speedbrake lever to its full upstop position.  
(b) Slowly move the speedbrake lever back to its ARMED position.

S 215-012

- (9) Move the speedbrake lever to its down-and-locked detent position and do these steps:  
(a) Make sure the SPOILERS light on the P5 panel is off.  
(b) Push the ECS/MSG switch on the right side panel, P61.  
(c) Push the AUTOREAD switch on the P61 panel and do this check:  
1) Make sure the white EICAS message SPOILERS does not show on the display.

**NOTE:** Stop for 11 seconds to let the EICAS message show.

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E. Do a test of the Spoiler Control Modules.

S 865-013

- (1) Push the RESET switch on each of the six spoiler control modules (SCMs).

NOTE: You can find the SCMs on the E1-1 and E2-2 equipment shelves in the main equipment center.

S 865-014

- (2) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:  
(a) 11C7, FLT CONT ELEC 1L DC  
(b) 11C9, FLT CONT ELEC 2L DC

S 215-142

- (3) Do these checks:  
(a) Make sure the white EICAS message SPOILERS shows on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

- (b) Make sure the amber SPOILERS light on the P5 panel is off.  
(c) Make sure the amber EICAS message SPOILERS does not show on the display.

S 865-015

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:  
(a) 11C7, FLT CONT ELEC 1L DC  
(b) 11C9, FLT CONT ELEC 2L DC

S 215-016

- (5) Do this check:  
(a) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

S 865-017

- (6) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:  
(a) 11G18, FLT CONT ELEC 1R DC  
(b) 11G27, FLT CONT ELEC 2R DC

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S 215-018

(7) Do these checks:

(a) Make sure the white EICAS message SPOILERS shows on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

(b) Make sure the amber SPOILERS light on the P5 panel is off.

(c) Make sure the amber EICAS message SPOILERS does not show on the display.

S 865-019

(8) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

(a) 11G18, FLT CONT ELEC 1R DC

(b) 11G27, FLT CONT ELEC 2R DC

S 215-020

(9) Do this check:

(a) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

S 865-021

(10) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:

(a) 11C6, FLT CONT ELEC 1L AC

(b) 11C8, FLT CONT ELEC 2L AC

S 215-022

(11) Do these checks:

(a) Make sure the amber SPOILERS light on the P5 panel is on.

(b) Make sure the amber EICAS message SPOILERS shows on the display.

S 865-023

(12) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

(a) 11C6, FLT CONT ELEC 1L AC

(b) 11C8, FLT CONT ELEC 2L AC

S 215-024

(13) Do these checks:

(a) Make sure the amber SPOILERS light goes off.

(b) Make sure the amber EICAS message SPOILERS message does not show on the display.

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S 865-025

- (14) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC

S 215-026

- (15) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is on.
  - (b) Make sure the amber EICAS message SPOILERS shows on the display.

S 215-027

- (16) Move the EICAS computer select switch on the display select panel, P9, to L and do this check:
- (a) Make sure the amber EICAS message SPOILERS shows on the display.

S 215-028

- (17) Move the EICAS computer select switch on the P9 panel to R and do this check:
- (a) Make sure the amber EICAS message SPOILERS shows on the display.

S 865-029

- (18) Move the computer select switch on the P9 panel to its AUTO position.

S 865-030

- (19) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC

S 215-031

- (20) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel goes off.
  - (b) Make sure the amber EICAS message SPOILERS does not show on the display.
  - (c) Make sure none of the six spoiler control modules (SCMs) have a fault.

NOTE: The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- 1) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.

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- 2) FOR -200 SERIES SCMs;  
Make sure there are no faults in the EXISTING FAULTS.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- The display will show NO FAULTS if there are no faults.

S 945-420

- (21) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11G17, FLT CONT ELEC 1R AC

S 205-421

- (22) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is off.
  - (b) Make sure the amber SPOILERS message does not show on the top EICAS display.
  - (c) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

- (d) Make sure none of the six spoiler control modules (SCMs) have a fault.

NOTE: The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- 1) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.
- 2) FOR -200 SERIES SCMs;  
Make sure the PSM 1 FAULT is displayed.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- The display will show NO FAULTS if there are no faults.

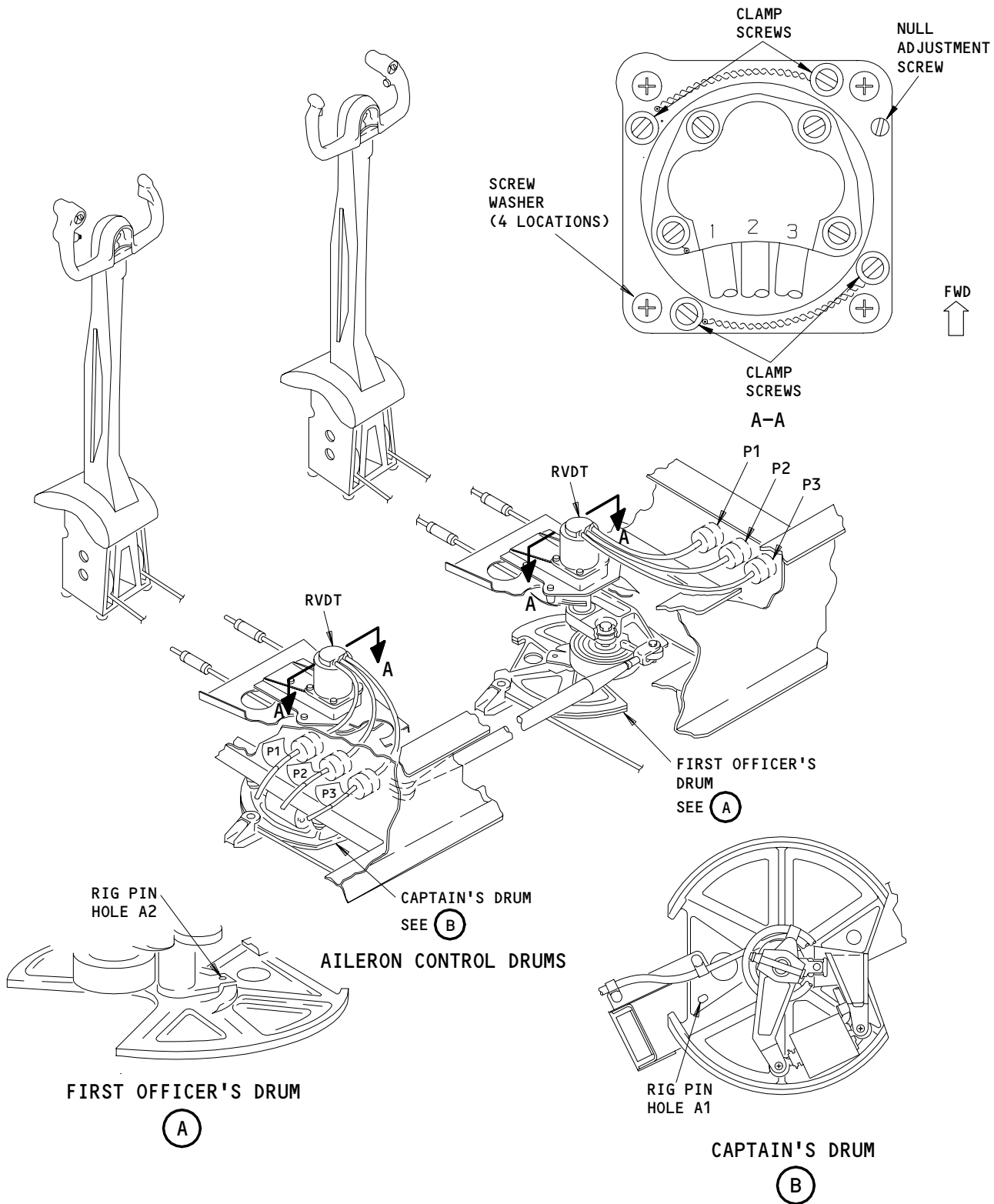
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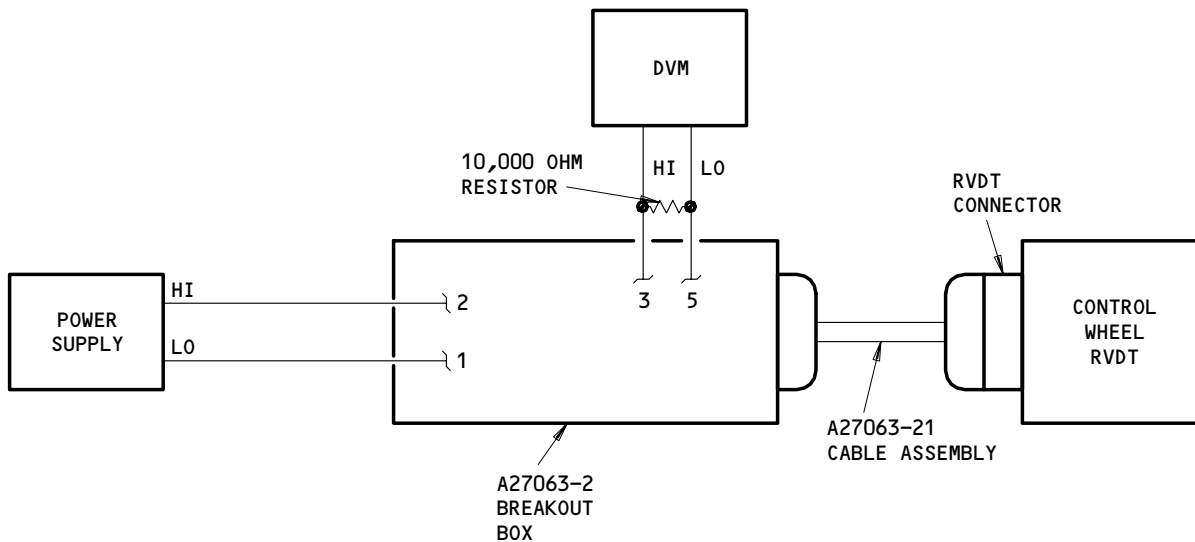


Control Wheel Spoiler RVDTs Adjustment  
Figure 501 (Sheet 1)

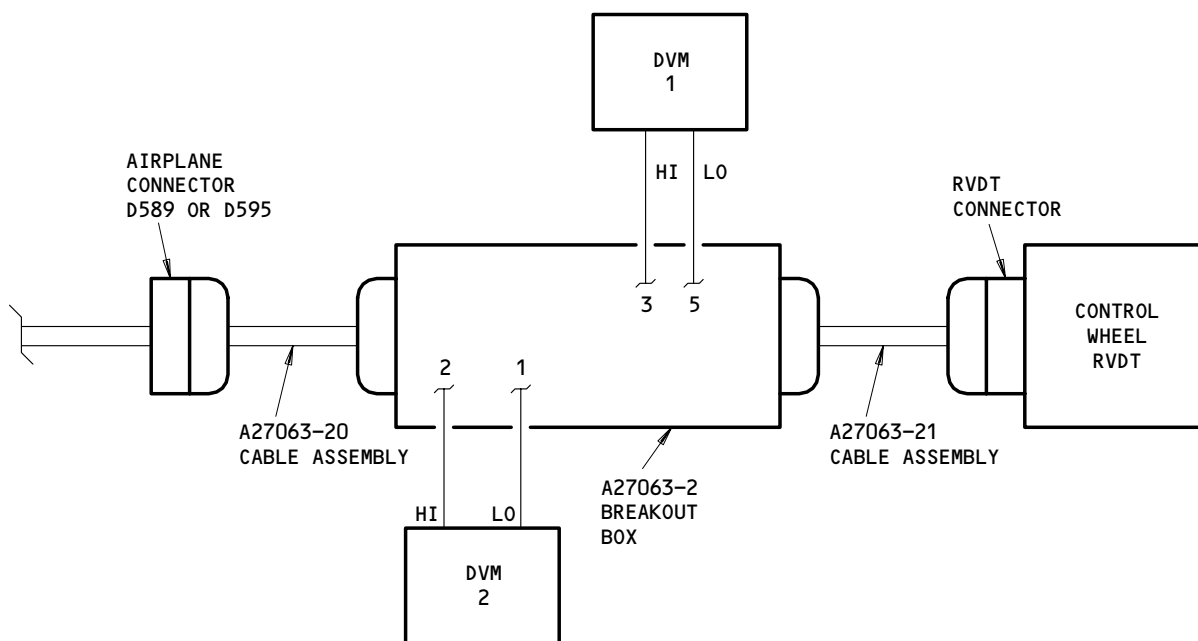
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MAINTENANCE MANUAL



**PROCEDURE 1**



**PROCEDURE 2**

**LEGEND**

DVM - DIGITAL VOLTMETER

**NOTE:** IF ONLY ONE DVM IS USED, MONITOR THE AIRPLANE POWER AS SHOWN (DVM 2). THEN, CONNECT IT TO THE BREAKOUT BOX AS SHOWN (DVM 1) TO DO THE ADJUSTMENT.

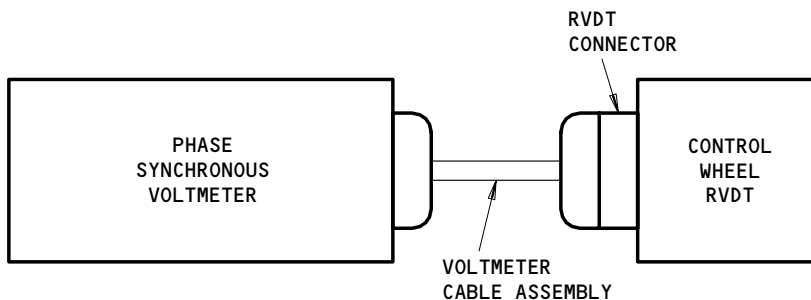
Control Wheel Spoiler RVDTs Adjustment  
Figure 501 (Sheet 2)

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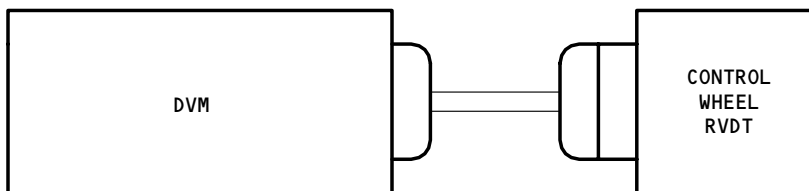
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PROCEDURE 3



PROCEDURE 4

LEGEND

DVM - DIGITAL VOLTMETER

Control Wheel Spoiler RVDTs Adjustment  
Figure 501 (Sheet 3)

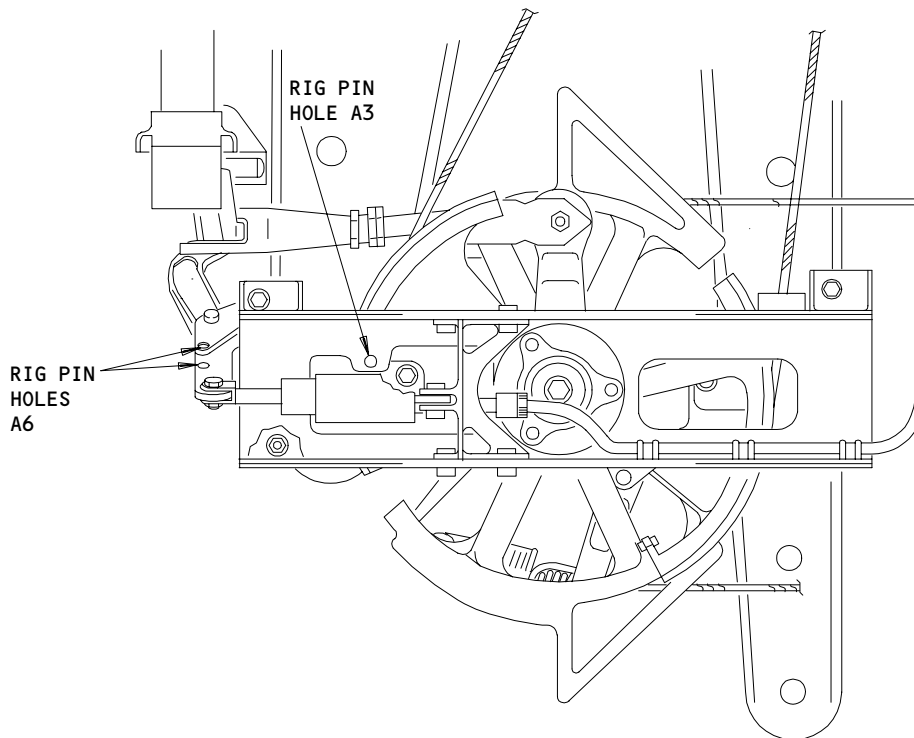
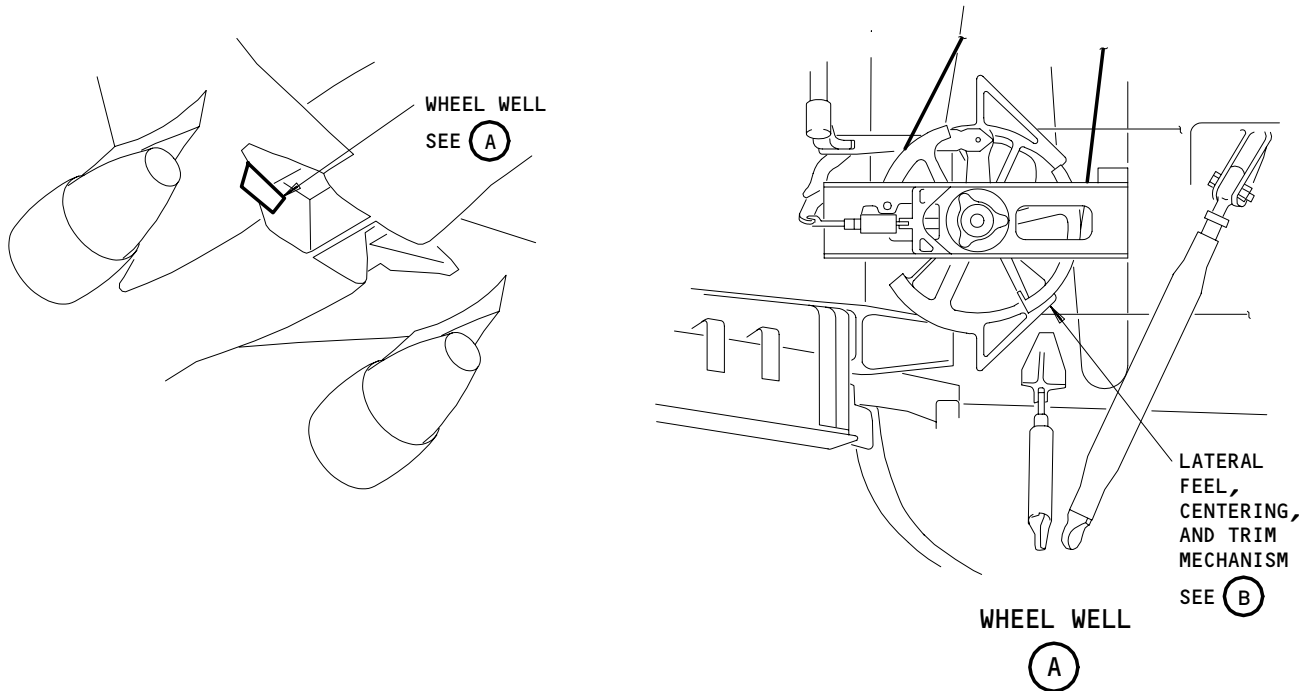
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LATERAL FEEL, CENTERING, AND TRIM MECHANISM

(B)

Rig Pin Locations  
Figure 502

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S 845-422

- (23) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11G17, FLT CONT ELEC 1R AC

S 845-423

- (24) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11C8, FLT CONT ELEC 2L AC
  - (b) 11G26, FLT CONT ELEC 2R AC

S 205-424

- (25) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is off.
  - (b) Make sure the amber EICAS message SPOILERS does not show on the display.
  - (c) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

- (d) Make sure none of the six spoiler control modules (SCMs) have a fault.

NOTE: The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- 1) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.
- 2) FOR -200 SERIES SCMs;  
Make sure the PSM 2 FAULT is displayed.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- The display will show NO FAULTS if there are no faults.

S 845-425

- (26) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC

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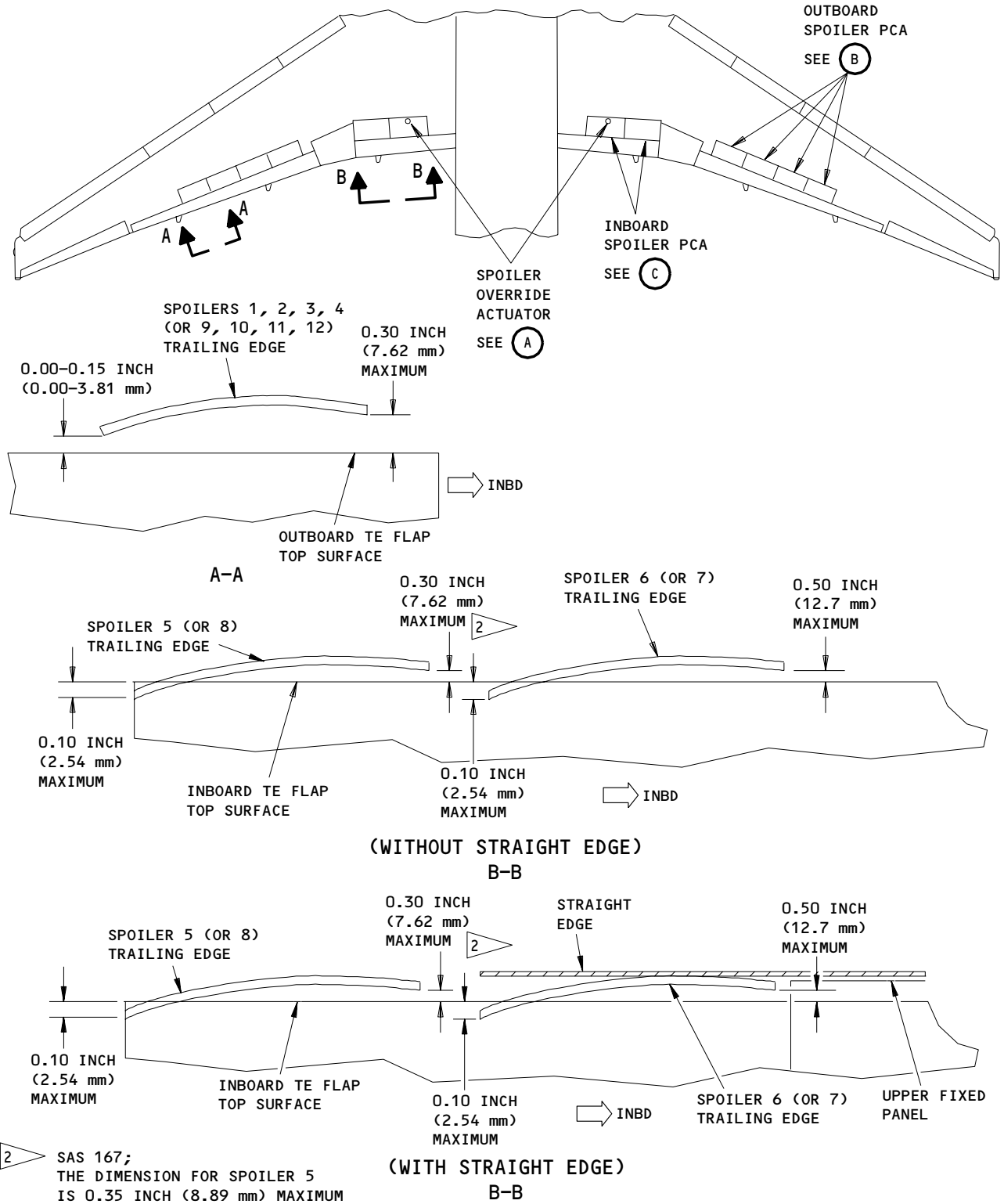
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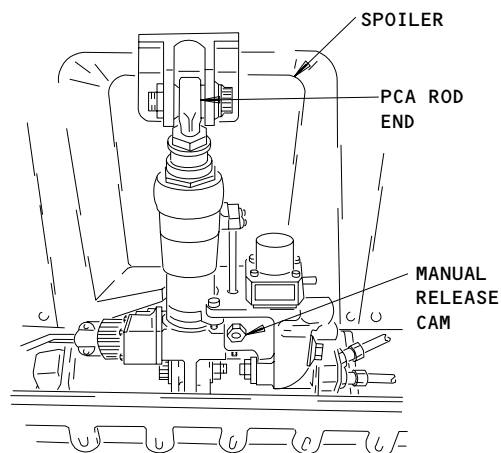
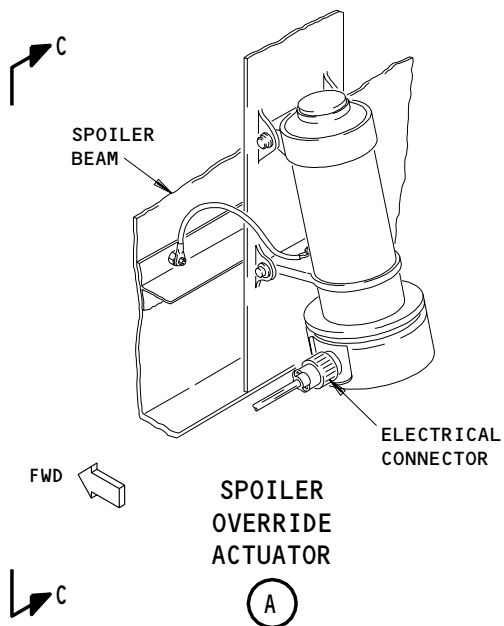




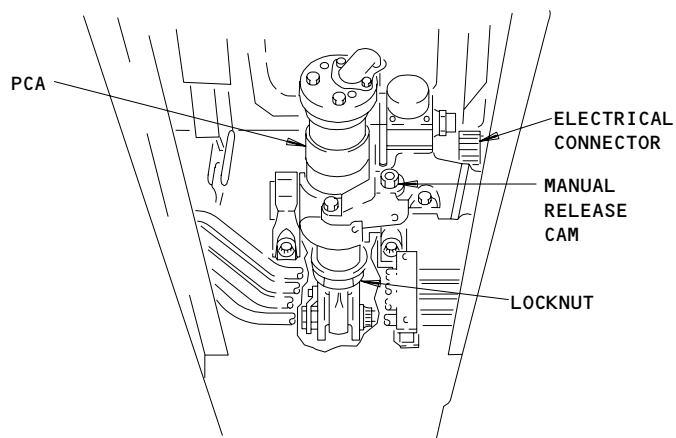
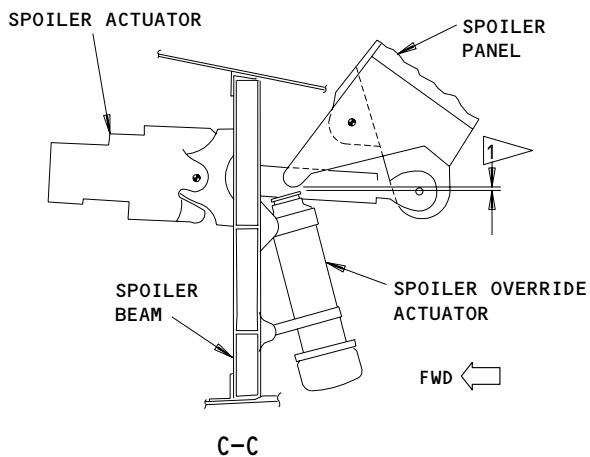
Spoiler PCA Adjustment  
Figure 503 (Sheet 1)

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OUTBOARD SPOILER PCA



INBOARD SPOILER PCA

1 0.03 INCH CLEARANCE MINIMUM AFTER SPOILERS 6 OR 7 ARE ADJUSTED

Spoiler PCA Adjustment  
Figure 503 (Sheet 2)

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50551

- (c) 11C7, FLT CONT ELEC 1L DC
- (d) 11C9, FLT CONT ELEC 2L DC

S 025-426

- (27) Remove the 1L SCM (AMM 27-09-00/201).

S 845-533

- (28) Remove the DO-NOT-CLOSE TAGS and close these circuit breakers on the P11 panel:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC
  - (c) 11C7, FLT CONT ELEC 1L DC
  - (d) 11C9, FLT CONT ELEC 2L DC

S 205-427

- (29) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is on.
  - (b) Make sure the amber EICAS message SPOILERS shows on the display.

S 845-534

- (30) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC
  - (c) 11C7, FLT CONT ELEC 1L DC
  - (d) 11C9, FLT CONT ELEC 2L DC

S 845-428

- (31) Install the 1L SCM (AMM 27-09-00/201).

S 845-535

- (32) Remove the DO-NOT-CLOSE TAGS and close these circuit breakers on the P11 panel:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC
  - (c) 11C7, FLT CONT ELEC 1L DC
  - (d) 11C9, FLT CONT ELEC 2L DC

S 205-429

- (33) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is off.
  - (b) Make sure the amber EICAS message SPOILERS does not show on the display.

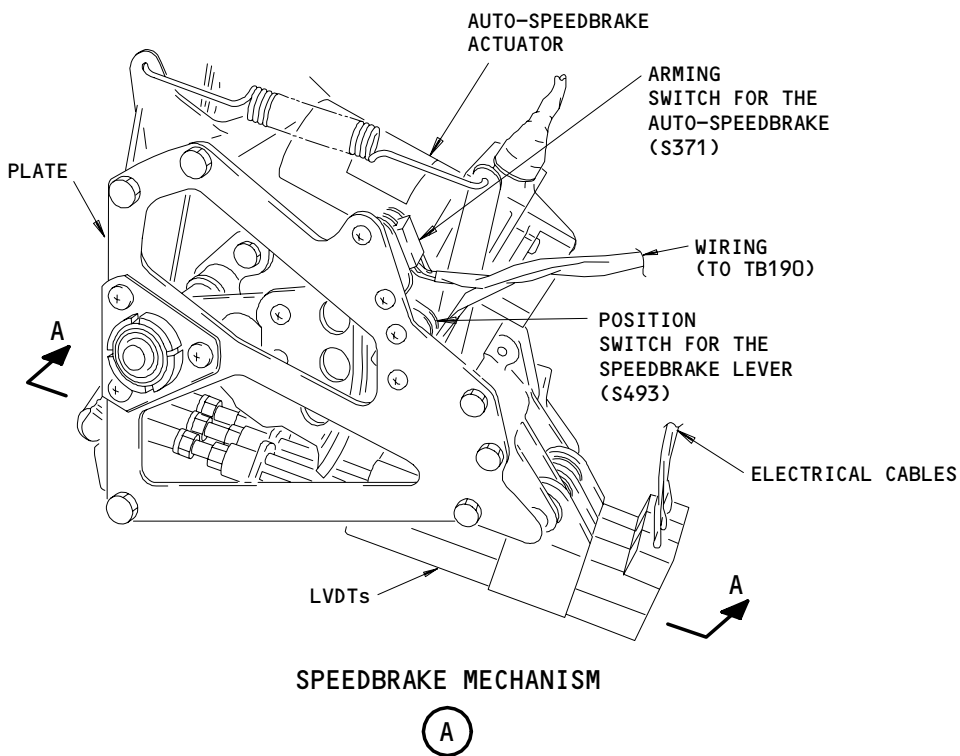
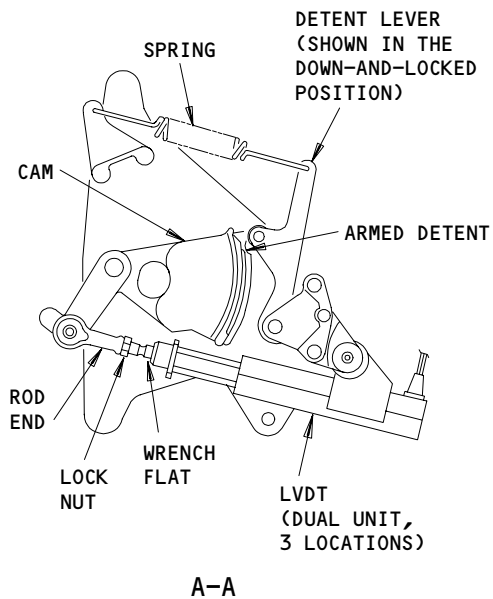
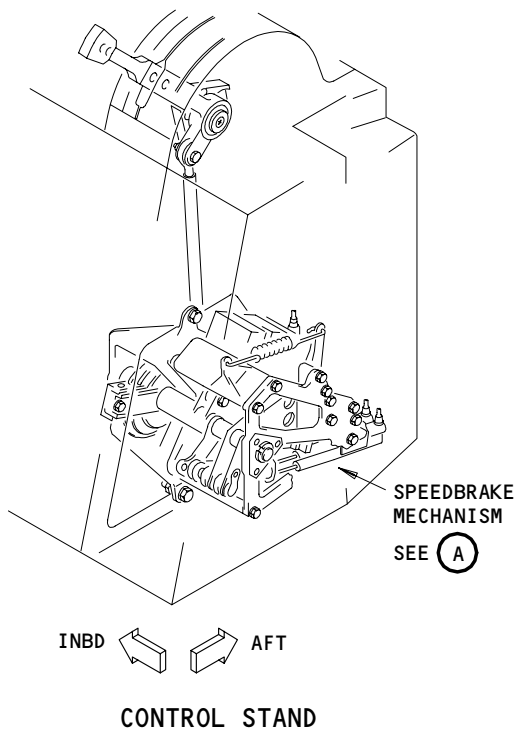
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Speedbrake LVDTs Adjustment  
Figure 504 (Sheet 1)

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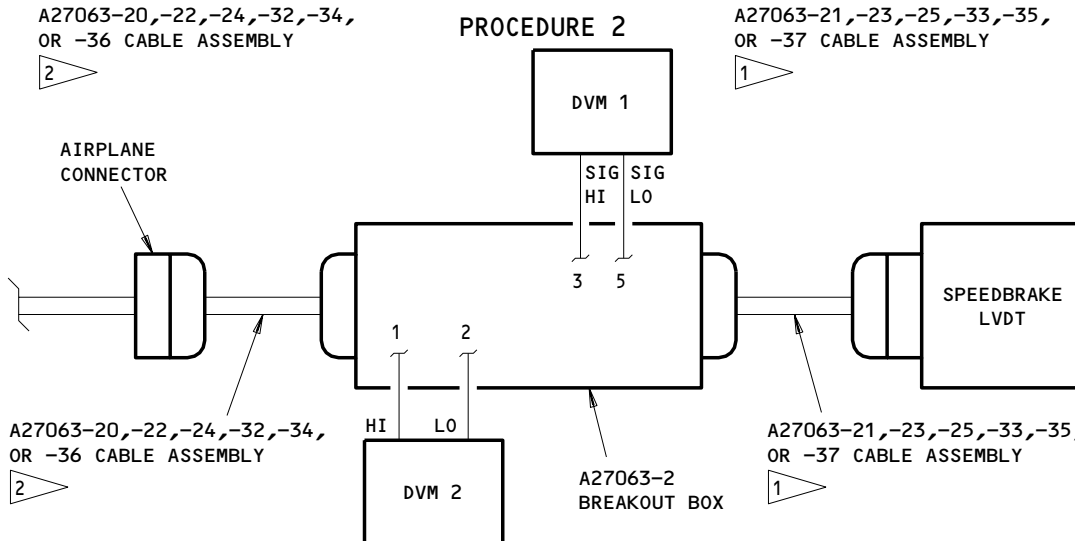
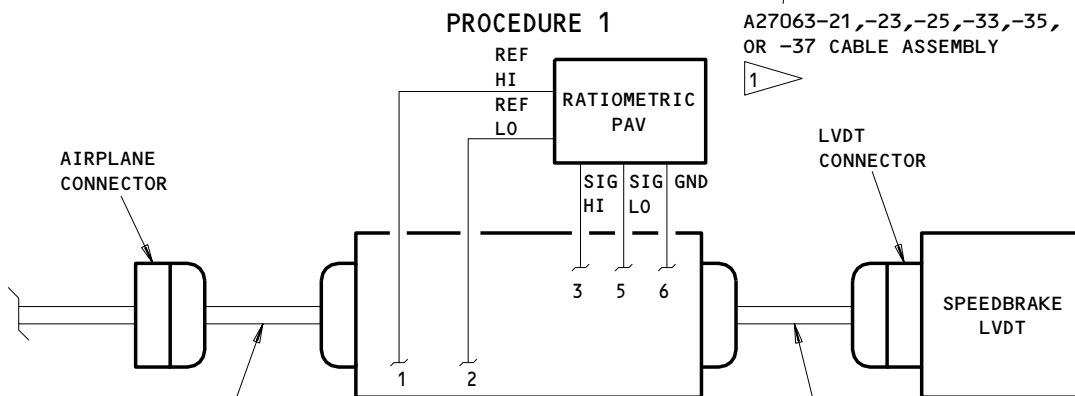
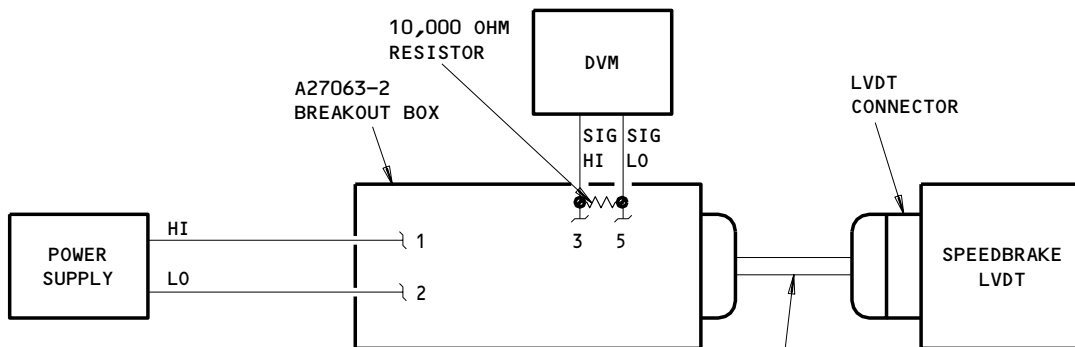
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# BOEING

## 767 MAINTENANCE MANUAL



$$\frac{7.10}{26.00} \times V \text{ AT DVM 2} = \text{NECESSARY V AT DVM 1}$$

**LEGEND**

DVM - DIGITAL VOLTMETER  
 RATIOMETRIC PAV - RATIOMETRIC DIGITAL PHASE ANGLE VOLTMETER

**NOTE:** IF ONLY ONE DVM IS USED, MONITOR THE AIRPLANE POWER AS SHOWN (DVM 2). THEN, CONNECT IT TO THE BREAKOUT BOX AS SHOWN (DVM 1) TO DO THE ADJUSTMENT.

- 1 LVDT 1 -21,-33; LVDT 2 -23,-35; LVDT 3 -25,-37
- 2 LVDT 1 -20,-32; LVDT 2 -22,-34; LVDT 3 -24,-36

**Speedbrake LVDTs Adjustment  
Figure 504 (Sheet 2)**

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S 845-536

(34) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:

- (a) 11C6, FLT CONT ELEC 1L AC
- (b) 11C8, FLT CONT ELEC 2L AC
- (c) 11C7, FLT CONT ELEC 1L DC
- (d) 11C9, FLT CONT ELEC 2L DC

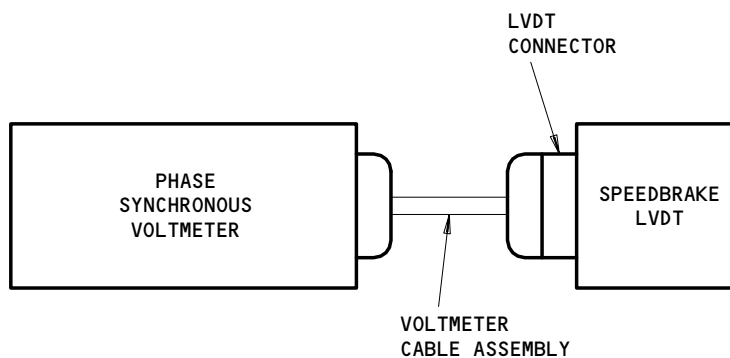
S 845-430

(35) Remove the 2L SCM (AMM 27-09-00/201).

S 845-537

(36) Remove the DO-NOT-CLOSE TAGS and close these circuit breakers on the P11 panel:

- (a) 11C6, FLT CONT ELEC 1L AC
- (b) 11C8, FLT CONT ELEC 2L AC



PROCEDURE 4

Speedbrake LVDTs Adjustment  
Figure 504 (Sheet 3)

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- (c) 11C7, FLT CONT ELEC 1L DC
- (d) 11C9, FLT CONT ELEC 2L DC

S 205-431

- (37) Do these checks:
  - (a) Make sure the amber SPOILERS light on the P5 panel is on.
  - (b) Make sure the amber EICAS message SPOILERS shows on the display.

S 845-538

- (38) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC
  - (c) 11C7, FLT CONT ELEC 1L DC
  - (d) 11C9, FLT CONT ELEC 2L DC

S 845-432

- (39) Install the 2L SCM (AMM 27-09-00/201).

S 845-539

- (40) Remove the DO-NOT-CLOSE TAGS and close these circuit breakers on the P11 panel:
  - (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC
  - (c) 11C7, FLT CONT ELEC 1L DC
  - (d) 11C9, FLT CONT ELEC 2L DC

S 205-433

- (41) Do these checks:
  - (a) Make sure the amber SPOILERS light on the P5 panel is off.
  - (b) Make sure the amber EICAS message SPOILERS does not show on the display.

S 845-540

- (42) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC
  - (c) 11C7, FLT CONT ELEC 1L DC
  - (d) 11C9, FLT CONT ELEC 2L DC

S 845-434

- (43) Remove the 3L SCM (AMM 27-09-00/201).

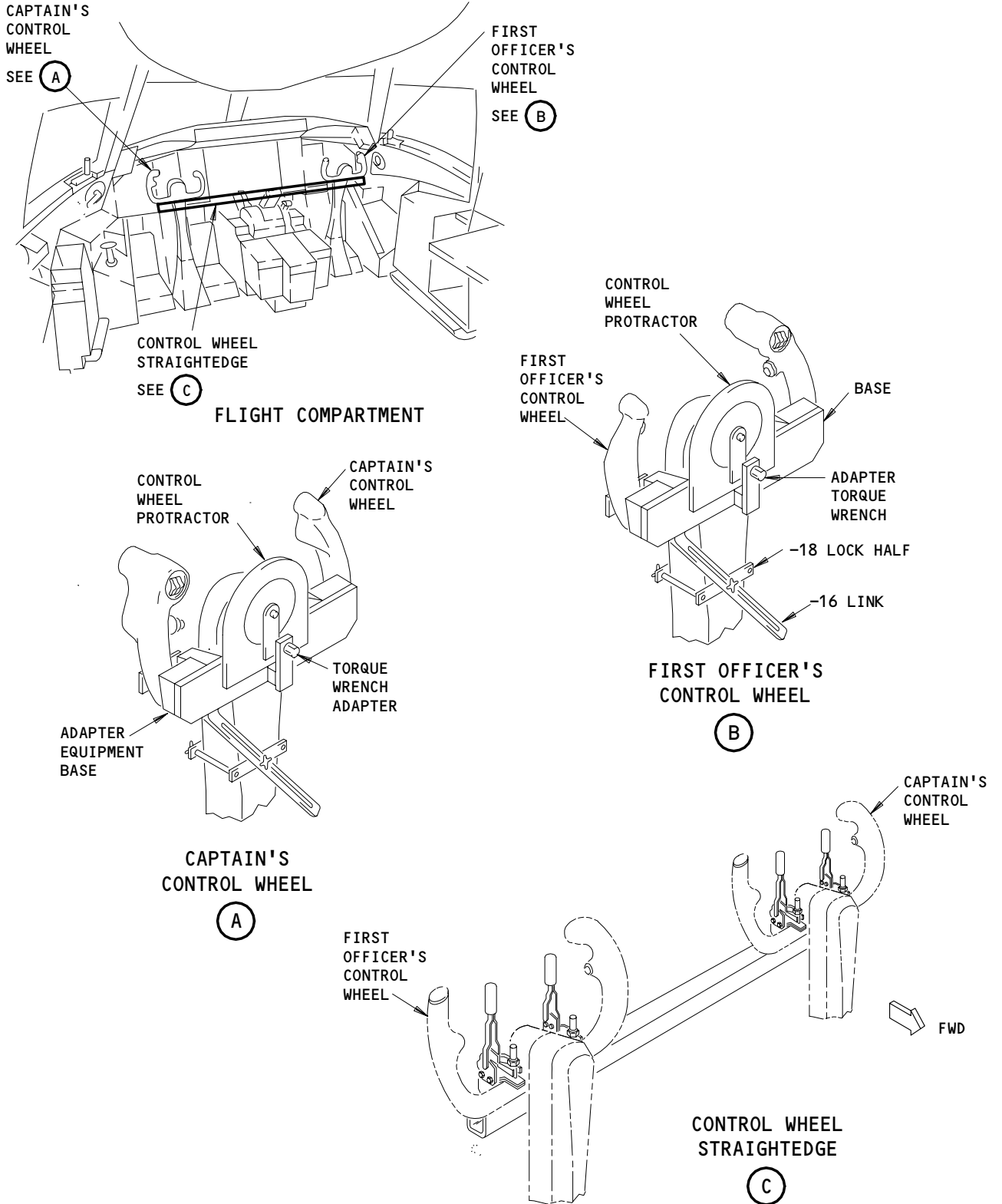
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Spoiler Adjustment/Test Equipment  
Figure 505

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S 845-541

- (44) Remove the D0-NOT-CLOSE TAGS and close these circuit breakers on the P11 panel:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC
  - (c) 11C7, FLT CONT ELEC 1L DC
  - (d) 11C9, FLT CONT ELEC 2L DC

S 205-435

- (45) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is on.
  - (b) Make sure the amber EICAS message SPOILERS shows on the display.

S 845-542

- (46) Open these circuit breakers on the P11 panel and attach D0-NOT-CLOSE tags:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC
  - (c) 11C7, FLT CONT ELEC 1L DC
  - (d) 11C9, FLT CONT ELEC 2L DC

S 845-436

- (47) Install the 3L SCM (AMM 27-09-00/201).

S 845-543

- (48) Remove the D0-NOT-CLOSE TAGS and close these circuit breakers on the P11 panel:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC
  - (c) 11C7, FLT CONT ELEC 1L DC
  - (d) 11C9, FLT CONT ELEC 2L DC

S 205-437

- (49) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is off.
  - (b) Make sure the amber EICAS message SPOILERS does not show on the display.

S 845-544

- (50) Open these circuit breakers on the P11 panel and attach D0-NOT-CLOSE tags:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC

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- (c) 11G18, FLT CONT ELEC 1R DC
- (d) 11G27, FLT CONT ELEC 2R DC

S 845-438

- (51) Remove the 1R SCM (AMM 27-09-00/201).

S 845-545

- (52) Remove the DO-NOT-CLOSE TAGS and close these circuit breakers on the P11 panel:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC
  - (c) 11G18, FLT CONT ELEC 1R DC
  - (d) 11G27, FLT CONT ELEC 2R DC

S 205-439

- (53) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is on.
  - (b) Make sure the amber EICAS message SPOILERS shows on the display.

S 845-546

- (54) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC
  - (c) 11G18, FLT CONT ELEC 1R DC
  - (d) 11G27, FLT CONT ELEC 2R DC

S 845-440

- (55) Install the 1R SCM (AMM 27-09-00/201).

S 845-547

- (56) Remove the DO-NOT-CLOSE TAGS and close these circuit breakers on the P11 panel:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC
  - (c) 11G18, FLT CONT ELEC 1R DC
  - (d) 11G27, FLT CONT ELEC 2R DC

S 205-441

- (57) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is off.
  - (b) Make sure the amber EICAS message SPOILERS does not show on the display.

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S 845-548

- (58) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC
  - (c) 11G18, FLT CONT ELEC 1R DC
  - (d) 11G27, FLT CONT ELEC 2R DC

S 845-442

- (59) Remove the 2R SCM (AMM 27-09-00/201).

S 845-549

- (60) Remove the DO-NOT-CLOSE TAGS and close these circuit breakers on the P11 panel:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC
  - (c) 11G18, FLT CONT ELEC 1R DC
  - (d) 11G27, FLT CONT ELEC 2R DC

S 205-443

- (61) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is on.
  - (b) Make sure the amber EICAS message SPOILERS shows on the display.

S 845-550

- (62) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC
  - (c) 11G18, FLT CONT ELEC 1R DC
  - (d) 11G27, FLT CONT ELEC 2R DC

S 845-444

- (63) Install the 2R SCM (AMM 27-09-00/201).

S 845-551

- (64) Remove the DO-NOT-CLOSE TAGS and close these circuit breakers on the P11 panel:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC

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- (c) 11G18, FLT CONT ELEC 1R DC
- (d) 11G27, FLT CONT ELEC 2R DC

S 205-445

- (65) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is off.
  - (b) Make sure the amber EICAS message SPOILERS does not show on the display.

S 845-552

- (66) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC
  - (c) 11G18, FLT CONT ELEC 1R DC
  - (d) 11G27, FLT CONT ELEC 2R DC

S 845-446

- (67) Remove the 3R SCM (AMM 27-09-00/201).

S 845-553

- (68) Remove the DO-NOT-CLOSE TAGS and close these circuit breakers on the P11 panel:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC
  - (c) 11G18, FLT CONT ELEC 1R DC
  - (d) 11G27, FLT CONT ELEC 2R DC

S 205-447

- (69) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is on.
  - (b) Make sure the amber EICAS message SPOILERS message shows on the display.

S 845-554

- (70) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC
  - (c) 11G18, FLT CONT ELEC 1R DC
  - (d) 11G27, FLT CONT ELEC 2R DC

S 845-448

- (71) Install the 3R SCM (AMM 27-09-00/201).

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S 845-555

- (72) Remove the DO-NOT-CLOSE TAGS and close these circuit breakers on the P11 panel:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC
  - (c) 11G18, FLT CONT ELEC 1R DC
  - (d) 11G27, FLT CONT ELEC 2R DC

S 205-449

- (73) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is off.
  - (b) Make sure the amber EICAS message SPOILERS does not show on the display.

S 845-450

- (74) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC
  - (c) 11C7, FLT CONT ELEC 1L DC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G17, FLT CONT ELEC 1R AC
  - (f) 11G26, FLT CONT ELEC 2R AC
  - (g) 11G18, FLT CONT ELEC 1R DC
  - (h) 11G27, FLT CONT ELEC 2R DC

S 845-451

- (75) Remove the 1L and 1R PSM's (AMM 27-09-00/201).

S 845-452

- (76) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C9, FLT CONT ELEC 2L DC
  - (b) 11C8, FLT CONT ELEC 2L AC
  - (c) 11G27, FLT CONT ELEC 2R DC
  - (d) 11G26, FLT CONT ELEC 2R AC

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S 205-453

(77) Do these checks:

- (a) Make sure the amber EICAS message SPOILERS shows on the display.
- (b) Make sure the white L FLT CONT ELEC and R FLT CONT ELEC EICAS messages show on the display.

NOTE: Stop for 11 seconds to let the EICAS messages show.

- (c) Make sure that the 2L and 2R PSM's display module faults.
  - 1) FOR -100 SERIES PSMs;  
Make sure the faultballs are yellow.
  - 2) FOR -200 SERIES PSMs;  
Make sure the fault light is on.

S 845-454

(78) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:

- (a) 11C9, FLT CONT ELEC 2L DC
- (b) 11C8, FLT CONT ELEC 2L AC
- (c) 11G27, FLT CONT ELEC 2R DC
- (d) 11G26, FLT CONT ELEC 2R AC

S 735-494

(79) Do these checks:

- (a) Make sure the amber SPOILERS light on the P5 panel is on.
- (b) Make sure the amber EICAS message SPOILERS shows on the display.
- (c) Make sure the white EICAS message SPOILERS shows on the display.

NOTE: Stop for 11 seconds to let the EICAS messages show.

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- (d) Make sure the white L FLT CONT ELEC and R FLT CONT ELEC EICAS messages do not show on the display.

S 845-456

- (80) Install the 1L and 1R PSM's (AMM 27-09-00/201).

S 845-457

- (81) Remove the 2L and 2R PSM's (AMM 27-09-00/201).

S 845-458

- (82) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11C7, FLT CONT ELEC 1L DC
  - (b) 11C6, FLT CONT ELEC 1L AC
  - (c) 11G18, FLT CONT ELEC 1R DC
  - (d) 11G17, FLT CONT ELEC 1R AC

S 205-459

- (83) Do these checks:

- (a) Make sure the EICAS messages L FLT CONT ELEC and R FLT CONT ELEC show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

- (b) Make sure that the 1L and 1R PSM's display module faults.
  - 1) FOR -100 SERIES PSMs;  
Make sure the faultballs are yellow.
  - 2) FOR -200 SERIES PSMs;  
Make sure the fault light is on.

S 845-460

- (84) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - (a) 11C7, FLT CONT ELEC 1L DC
  - (b) 11C6, FLT CONT ELEC 1L AC
  - (c) 11G18, FLT CONT ELEC 1R DC
  - (d) 11G17, FLT CONT ELEC 1R AC

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S 735-572

- (85) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 is on.
  - (b) Make sure the white EICAS message SPOILERS shows on the display.

NOTE: Stop for 11 seconds to let the EICAS messages show.

S 205-461

- (86) Make sure the EICAS messages L FLT CONT ELEC and R FLT CONT ELEC do not show on the display.

S 845-462

- (87) Install the 2L and 2R PSM's (AMM 27-09-00/201).

S 845-463

- (88) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC
  - (c) 11C7, FLT CONT ELEC 1L DC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G17, FLT CONT ELEC 1R AC
  - (f) 11G26, FLT CONT ELEC 2R AC
  - (g) 11G18, FLT CONT ELEC 1R DC
  - (h) 11G27, FLT CONT ELEC 2R DC

S 845-464

- (89) Reset the 1L, 1R, 2L, and 2R PSM's using the reset switches on the front panel of the modules.

S 205-465

- (90) Make sure that the 1L, 1R, 2L and 2R PSM's do not show module faults.
- (a) FOR -100 SERIES PSMs;  
Make sure all the faultballs are black.
  - (b) FOR -200 SERIES PSMs;  
Make sure the fault light is off.

F. Speedbrake Lever Inputs and Spoiler Operation in the Ground Mode - Test

S 215-032

- (1) Make sure the control wheels are in their neutral positions.

S 215-033

- (2) Move the speedbrake lever to its ARMED position and do this check:
- (a) Make sure all the spoilers are in their full down positions.

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- S 215-034
- (3) Slowly move the speedbrake lever to its full upstop position and do this check:
- (a) Make sure all the spoilers move smoothly to their full up positions.

- S 215-035
- (4) Slowly move the speedbrake lever to its ARMED position and do this check:
- (a) Make sure all the spoilers move smoothly to their full down positions.

- S 215-036
- (5) Move the speedbrake lever to its down-and-locked detent position and do these steps:
- (a) Make sure the SPOILERS light on the P5 panel is off.
- (b) Push the ECS/MSG switch on the P61 panel and do these checks:
- 1) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

- 2) Make sure none of the six spoiler control modules (SCMs) have a fault.

NOTE: The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- a) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.
- b) FOR -200 SERIES SCMs;  
Make sure there are no faults in the EXISTING FAULTS.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- The display will show NO FAULTS if there are no faults.

G. Control Wheel Inputs and Spoiler Operation in the Air Mode - Test

- S 215-037
- (1) Make sure the speedbrake lever is in its down-and-locked detent position.

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S 865-143

**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.

- (2) Do the Flight Mode Simulation procedure for the No. 1 and No. 2 air/ground systems (Ref 32-09-02).

S 215-039

- (3) Turn the control wheel fully counterclockwise and do these checks:
- (a) Make sure spoilers 1 thru 4 are in their full up positions (approximately 45 degrees).
  - (b) Make sure spoilers 5 and 6 are in their full up positions (approximately 20 degrees).
  - (c) Make sure spoilers 7 thru 12 are in their full down positions.

S 215-040

- (4) Move the control wheel back to its neutral position and do this check:
- (a) Make sure all the spoilers are in their full down positions.

S 215-041

- (5) Turn the control wheel fully clockwise and do these checks:
- (a) Make sure spoilers 9 thru 12 are in their full up positions (approximately 45 degrees).
  - (b) Make sure spoilers 7 and 8 are in their full up positions (approximately 20 degrees).
  - (c) Make sure spoilers 1 thru 6 are in their full down positions.

S 215-042

- (6) Move the control wheel back to its neutral position and do these steps:
- (a) Make sure all the spoilers are in their full down positions.
  - (b) Make sure the SPOILERS light on the P5 panel is off.
  - (c) Push the ECS/MSG switch on the P61 panel and do this check:
    - 1) Make sure the white EICAS message SPOILERS does not show on the display.

**NOTE:** Stop for 11 seconds to let the EICAS message show.

- (d) Make sure none of the six spoiler control modules (SCMs) have a fault.

**NOTE:** The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- 1) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.

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- 2) FOR -200 SERIES SCMs;  
Make sure there are no faults in the EXISTING FAULTS.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- The display will show NO FAULTS if there are no faults.

H. Control Wheel and Speedbrake Lever Inputs and Spoiler Operation in the Air Mode - Test

S 215-043

- (1) Slowly move the speedbrake lever to its full upstop position and do this check:
- (a) Make sure spoilers 1 thru 3, 5 thru 8, and 10 thru 12 move up smoothly.

S 215-044

- (2) Slowly turn the control wheel fully clockwise and do these checks:
- (a) Make sure the left wing spoilers move down smoothly and the right wing spoilers stay up.
  - (b) Make sure spoiler 9 moves up.

S 215-045

- (3) Slowly move the control wheel back to its neutral position and do these checks:
- (a) Make sure the left wing spoilers move up smoothly.
  - (b) Make sure spoiler 9 moves down.

S 215-046

- (4) Slowly turn the control wheel fully counterclockwise and do these checks:
- (a) Make sure the right wing spoilers move down smoothly and the left wing spoilers stay up.

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(b) Make sure spoiler 4 moves up.

S 215-047

(5) Slowly move the control wheel back to its neutral position and do these checks:

(a) Make sure the right wing spoilers move up smoothly.

(b) Make sure spoiler 4 moves down.

S 215-048

(6) Move the speedbrake lever back to its down-and-locked detent position and do these steps:

(a) Make sure the SPOILERS light on the P5 panel is off.

(b) Push the ECS/MSG switch on the P61 panel and do this check:

1) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

S 215-144

(7) Make sure none of the six spoiler control modules (SCMs) have a fault.

NOTE: The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

(a) FOR -100 SERIES SCMs;

Make sure all the faultballs are black.

(b) FOR -200 SERIES SCMs;

Make sure there are no faults in the EXISTING FAULTS.

NOTE: To look for faults do these steps:

- Push the ON/OFF key

- If the display shows SCM IN POS XX: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times

- When the display shows EXISTING FAULTS push YES

- The display will show NO FAULTS if there are no faults.

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S 865-145

(8) Put the airplane back in the ground mode (Ref 32-09-02).

I. Hydraulic Pressure Failure and Spoiler Operation - Test

S 215-049

(1) Make sure the control wheels are in their neutral positions.

S 215-050

(2) Make sure the speedbrake lever is in its down-and-locked detent position.

S 865-051

(3) Remove the power from the left hydraulic system (Ref 29-11-00).

S 215-052

(4) Move the speedbrake lever to its full upstop position and do these steps:

(a) Stop for 11 seconds.

(b) Make sure the amber SPOILERS light on the P5 panel is on.

(c) Make sure spoilers 1, 6, and 12 are in their full down positions.

(d) Make sure spoilers 2 thru 5, and 8 thru 11 are up.

(e) Make sure spoiler 7 moves up and then down.

S 865-053

(5) Move the speedbrake lever to its down-and-locked detent position.

S 865-054

(6) Supply pressure to the left hydraulic system (Ref 29-11-00) and do these steps:

(a) Stop for 3 seconds.

(b) Make sure the amber SPOILERS light on the P5 panel is off.

S 865-055

(7) Remove the power from the right hydraulic system (Ref 29-11-00).

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- S 215-056
- (8) Move the speedbrake lever to its full upstop position and do these steps:
- (a) Stop for 11 seconds.
  - (b) Make sure the amber SPOILERS light on the P5 panel is on.
  - (c) Make sure spoilers 2, 7, and 11 are in their full down positions.
  - (d) Make sure spoilers 1, 3 thru 5, 8 thru 10, and 12 are up.
  - (e) Make sure spoiler 6 moves up and then down.
- S 865-057
- (9) Move the speedbrake lever to its down-and-locked detent position.
- S 865-058
- (10) Supply pressure to the right hydraulic system (Ref 29-11-00) and do these steps:
- (a) Stop for 3 seconds.
  - (b) Make sure the amber SPOILERS light on the P5 panel is off.
- S 865-059
- (11) Remove the power from the center hydraulic system (Ref 29-11-00).
- S 215-060
- (12) Move the speedbrake lever to its full upstop position and do these steps:
- (a) Stop for 11 seconds.
  - (b) Make sure the amber SPOILERS light on the P5 panel is on.
  - (c) Make sure spoilers 3, 4, 5, 8, 9 and 10 are in their full down positions.
  - (d) Make sure spoilers 1, 2, 6, 7, 11 and 12 are up.
- S 865-061
- (13) Move the speedbrake lever to its down-and-locked detent position.
- S 865-062
- (14) Supply pressure to the center hydraulic system (Ref 29-11-00) and do these steps:
- (a) Stop for 3 seconds.

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- (b) Make sure the amber SPOILERS light on the P5 panel is off.
- (c) Make sure none of the six spoiler control modules (SCMs) have a fault.

NOTE: The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- 1) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.
- 2) FOR -200 SERIES SCMs;  
Make sure there are no faults in the EXISTING FAULTS.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- The display will show NO FAULTS if there are no faults.

- (d) Push the ECS/MSG switch on the P61 panel and do this check:
  - 1) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

J. Spoiler Inhibit - Test

S 215-063

- (1) Make sure the SAM and ADC faultballs on the left and right stabilizer trim/aileron lockout modules (SAMs) are black.

S 215-064

- (2) Make sure the speedbrake lever is in its down-and-locked detent position.

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- S 215-146
- (3) Turn the control wheel to its full counterclockwise position and do these checks:
- (a) Make sure spoilers 1 thru 6 are up.
  - (b) Make sure spoilers 7 thru 12 stay down.
- S 215-065
- (4) Move the AIR DATA CMPTR test switch on the P61 panel to its L position and hold it there for 2 seconds. Do these checks:
- (a) Make sure spoilers 4 and 5 move to their full down positions and then back to their up positions in less than 45 seconds.
  - (b) Make sure spoilers 1 thru 6 are up.
  - (c) Make sure spoilers 7 thru 12 stay down.
- S 215-066
- (5) Turn the control wheel to its full clockwise position and do these checks:
- (a) Make sure spoilers 1 thru 6 stay down.
  - (b) Make sure spoilers 7 thru 12 are up.
- S 215-067
- (6) Move the AIR DATA CMPTR test switch on the P61 panel to its L position and hold it there for 2 seconds. Do these checks:
- (a) Make sure spoilers 8 and 9 move to their full down positions and then back to their up positions in less than 45 seconds.
  - (b) Make sure spoilers 1 thru 6 stay down.
  - (c) Make sure spoilers 7 thru 12 are up.
- S 215-068
- (7) Move the control wheel back to its neutral position and do these steps:
- (a) Make sure none of the six spoiler control modules (SCMs) have a fault.
- NOTE:** The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.
- 1) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.

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- 2) FOR -200 SERIES SCMs;  
Make sure there are no faults in the EXISTING FAULTS.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- The display will show NO FAULTS if there are no faults.

- (b) Make sure the amber SPOILERS light on the P5 panel is off.
- (c) Push the ECS/MSG switch on the P61 panel and do this check:
  - 1) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

K. Put the Airplane Back to Its Usual Condition

S 865-069

- (1) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).

S 865-070

- (2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - (a) 11G11, AUTO SPEEDBRK

S 865-071

- (3) Remove electrical power if it is not necessary (Ref 24-22-00).

TASK 27-61-00-825-072

3. Adjustment - Spoiler/Speedbrake Control System

A. General

- (1) Before you adjust the spoiler control system, make sure the trailing edge flaps are adjusted correctly. Refer to 27-51-00/501 for the applicable adjustment data.

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- (2) Before you adjust the speedbrake LVDTs, make sure the speedbrake lever is adjusted correctly. Refer to 27-62-00/501 for the applicable adjustment data.
- (3) Adjust the spoiler PCAs with the airplane on its landing gear and the engines (or equivalent weights) installed on the struts. For other adjustments to the spoiler/speedbrake system, the airplane can be on jacks or its landing gear.

**B. Equipment**

- (1) Breakout Box, Cables - A27063-91 (Preferred)  
Position Transmitter Tester - PTTS-892B  
(Alternate)  
Phase Synchronous Voltmeter - 101-AC5/6/7/8  
(Alternate)
- (2) 10,000 ohm Resistor, Commercially Available
- (3) Power Supply - Powertron Model 5900 (control wheel RVDT adjustment PROCEDURE 1, speedbrake LVDT adjustment PROCEDURE 1), Industrial Test Equipment Corp., Port Washington, New York
- (4) Ratiometric Digital Phase Angle Voltmeter - North Atlantic Model 225-400-400R30 (speedbrake LVDT adjustment PROCEDURE 2), North Atlantic Industries Inc., Hauppauge, New York
- (5) Digital Multimeter - (Commercially Available) (control wheel RVDT adjustment PROCEDURE 1, 2 and 4)(speedbrake LVDT adjustment PROCEDURE 1 or 3).
- (6) Phase Synchronous Voltmeter - Model 101A Electronic Aviation Systems, Renton, Washington (control wheel RVDT adjustment PROCEDURE 3, speedbrake LVDT adjustment PROCEDURE 4)
- (7) Rig Pins from Set A20004-XX (Ref 20-10-24):
  - (a) A1 - P/N A20004-15
  - (b) A2 - P/N A20004-17
- (8) Control Wheel Straightedge - A27020-1

**C. References**

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-44-00/201, Wing Access Doors and Panels
- (3) AMM 24-22-00/201, Electrical Power - Control

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- (4) AMM 25-11-01/201, Captain's/First Officer's Seat
- (5) AMM 25-65-00/201, Off-Wing Escape System
- (6) AMM 27-09-00/201, Flight Control System Electronics Unit (CSEU)
- (7) AMM 27-11-00/501, Aileron and Aileron Trim Control System
- (8) AMM 27-51-00/201, Trailing Edge Flap System
- (9) AMM 27-62-00/501, Auto-Speedbrake Control System
- (10) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (11) AMM 32-00-15/201, Landing Gear Door Locks
- (12) AMM 32-00-20/201, Landing Gear Downlocks

D. Access

(1) Location Zones

211/212	Control Cabin
550/650	Wing Trailing Edge
560/660	Wing Trailing Edge

(2) Access Panels

113AL	Forward Equipment Bay
119AL	Main Equipment Center
552/652BB	Landing Gear Support Beam
552/652GB	Area Aft of the Main Flap Mid Spar Structure

E. Prepare for the Adjustment

S 215-073

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 865-074

- (2) Supply electrical power (Ref 24-22-00).

S 865-075

- (3) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
  - (a) 11G11, AUTO SPEEDBRK

S 215-076

- (4) Make sure the speedbrake lever is in its down-and-locked detent position.

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F. Adjust the Captain's (First Officer's) Control Wheel RVDTs (Fig. 501)

**NOTE:** Four procedures are supplied to adjust the control wheel RVDTs.

PROCEDURE 1 - uses a commercially available power supply, a resistor, a digital voltmeter (DVM), and the breakout box equipment.

PROCEDURE 2 - uses airplane power and a DVM with the breakout box equipment.

PROCEDURE 3 - uses a phase synchronous voltmeter only.

PROCEDURE 4 - uses a DVM without the breakout box equipment.

S 015-078

- (1) Open access door 119AL to get access to the aileron drum assemblies (Ref 06-41-00).

S 495-077

- (2) Operate the aileron trim switches on the aft electronic control panel, P8, until you can install these rig pins:
  - (a) A1 (for the captain's drum assembly)
  - (b) A2 (for the first officer's drum assembly)

S 495-079

- (3) Attach the control wheel straightedge across the bottom of the control wheels.

**NOTE:** It is permitted for one surface rest to be 0.03 inch (0.76 mm) away from the straightedge. If it is necessary, refer to 27-11-00 for the applicable adjustment data.

S 865-080

**WARNING:** MAKE SURE THE SPOILERS ARE IN THEIR DOWN POSITIONS BEFORE YOU OPEN THE FLT CONT ELEC CIRCUIT BREAKERS. THE SPOILERS WILL RETRACT IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Open the circuit breakers on the overhead panel, P11, that are shown in Table 501 and attach DO-NOT-CLOSE tags.

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TABLE 501	
11C6,	FLT CONT ELEC 1L AC
11C7,	FLT CONT ELEC 1L DC
11C8,	FLT CONT ELEC 2L AC
11C9,	FLT CONT ELEC 2L DC
11G17,	FLT CONT ELEC 1R AC
11G18,	FLT CONT ELEC 1R DC
11G26,	FLT CONT ELEC 2R AC
11G27,	FLT CONT ELEC 2R DC

S 825-081

- (5) Adjust the Control Wheel RVDTs (PROCEDURE 1)
- (a) Disconnect the RVDT connector, P1, from the airplane connector.
  - (b) Do these steps to connect the breakout box equipment:
    - 1) Connect the breakout box and the -21 cable assembly to the RVDT connector P1.
    - 2) Connect the digital voltmeter (DVM) to the breakout box at pins 3 (SIG HI) and 5 (SIG LO).
    - 3) Connect the power supply to the breakout box at pins 1 (LO) and 2 (HI).
    - 4) Connect the resistor between pins 3 and 5.
    - 5) Adjust the power supply to  $26 \pm 0.02$  volts ac RMS.
  - (c) Loosen the four clamp screws on the bottom of the RVDT.
  - (d) Adjust the null adjustment screw until the output voltage is  $0 \pm 0.050$  volts ac RMS at the DVM.
  - (e) Tighten the clamp screws and do this check:
    - 1) Make sure the output voltage is  $0 \pm 0.050$  volts ac RMS at the DVM.
  - (f) Lock the clamp screws with a wire.
  - (g) Disconnect the RVDT connectors P2 and P3 from the airplane connectors and do this check:
    - 1) Make sure the output voltage for connectors P2 and P3 is  $0 \pm 0.050$  volts ac RMS at the DVM.
  - (h) Do these steps to disconnect the breakout box equipment:
    - 1) Disconnect the power supply, the resistor, and the DVM from the breakout box.
    - 2) Disconnect the breakout box and the -21 cable assembly from the RVDT connector.
  - (i) Connect the airplane connectors to the RVDT.
  - (j) Remove the DO-NOT-CLOSE tags and close the circuit breakers on the P11 panel that are shown in Table 501.

S 825-082

- (6) Adjust the Control Wheel RVDTs (PROCEDURE 2)
- (a) Disconnect the RVDT connector, P1, from the airplane connector.

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- (b) Do these steps to connect the breakout box equipment:
  - 1) Connect the breakout box and the -21 cable assembly to the RVDT connector P1.
  - 2) Connect the DVM to the breakout box at pins 3 (SIG HI) and 5 (SIG LO).
  - 3) Connect the breakout box and the -20 cable assembly to the airplane electrical connector.
  - 4) Connect DVM 2 to the breakout box at pins 1 (LO) and 2 (HI) to monitor the airplane power.
- (c) Remove DO-NOT-CLOSE tags and close the circuit breakers on the P11 panel that are shown in Table 501.
- (d) Make sure the airplane input voltage is between 24 and 30 volts ac RMS at DVM 2.
- (e) Loosen the four clamp screws on the bottom of the RVDT.
- (f) Adjust the null adjustment screw until the output voltage is  $0 \pm 0.050$  volts ac RMS at DVM 1.
- (g) Tighten the clamp screws and do this check:
  - 1) Make sure the output voltage is  $0 \pm 0.050$  volts ac RMS at DVM 1.
- (h) Open the circuit breakers on the P11 panel that are shown in Table 501.
- (i) Disconnect the RVDT connectors P2 and P3 from the airplane connectors.
- (j) Connect the breakout box equipment between the RVDT connector P2 and the airplane connector and do these steps:
  - 1) Close the circuit breakers on the P11 panel that are shown in Table 501.
  - 2) Make sure the airplane input voltage is between 24 and 30 volts ac RMS at DVM 2.
  - 3) Make sure the output voltage is  $0 \pm 0.050$  volts ac RMS at DVM 1.
  - 4) Open the circuit breakers on the P11 panel that are shown in Table 501 and attach DO-NOT-CLOSE tags.
- (k) Do the above step again for RVDT connector P3.
- (l) Lock the clamp screws with a wire.
- (m) Do these steps to remove the breakout box equipment:
  - 1) Disconnect the DVMs from the breakout box.
  - 2) Disconnect the breakout box and the -20 cable assembly from the airplane connector.
  - 3) Disconnect the breakout box and the -21 cable assembly from the RVDT connector.
- (n) Connect the airplane connectors to the RVDT.
- (o) Remove the DO-NOT-CLOSE tags and close the circuit breakers on the P11 panel that are shown in Table 501.

S 825-083

- (7) Adjust the Control Wheel RVDTs (PROCEDURE 3)
  - (a) Disconnect the RVDT connector, P1, from the airplane connector.
  - (b) Use the data supplied with the tool to prepare the phase synchronous voltmeter for use.

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- (c) Connect the applicable cable assembly between the voltmeter and the RVDT connector P1.
- (d) Loosen the four clamp screws on the bottom of the RVDT.
- (e) Adjust the null adjustment screw until the voltmeter shows 0 ±0.050 volts.
- (f) Tighten the clamp screws and do this check:
  - 1) Make sure the voltage is 0 ±0.050 volts.
- (g) Lock the clamp screws with a wire.
- (h) Disconnect the RVDT connectors P2 and P3 from the airplane connectors and do this check:
  - 1) Make sure the output voltage for connectors P2 and P3 is 0 ±0.050 volts on the voltmeter.
- (i) Disconnect the voltmeter and its cable assembly from the RVDT connector.
- (j) Connect the airplane connectors to the RVDT.
- (k) Remove the DO-NOT-CLOSE tags and close the circuit breakers on the P11 panel that are shown in Table 501.

S 825-084

- (8) Adjust the Control Wheel RVDTs (PROCEDURE 4)
  - (a) Do these steps to adjust the captain's control wheel RVDT:
    - 1) Remove the spoiler control module (SCM), 1L, from the E1-1 equipment shelf (Ref 27-09-00).
    - 2) Remove the DO-NOT-CLOSE tags and close the circuit breakers on the P11 panel that are shown in Table 501.
    - 3) Use a DVM to measure the RVDT output voltages at these pins on the E1-1 equipment shelf:

<u>CONNECTOR</u>	<u>PINS</u>
D825A	J3 and J4
D825B	J4 and J5
	J12 and J13

- 4) Loosen the four clamp screws on the bottom of the captain's RVDT.
- 5) Turn the null adjustment screw until the output voltage is 0 ±0.050v ac RMS at the DVM.
- 6) Tighten the clamp screws and do this check:
  - a) Make sure the three output voltages are 0 ±0.050v ac RMS at the DVM.
- 7) Lock the clamp screws with a wire.
- 8) Open the circuit breakers on the P11 panel that are shown in Table 501 and attach DO-NOT-CLOSE tags.
- 9) Install SCM 1L (Ref 27-09-00).
- (b) Do these steps to adjust the first officer's control wheel RVDT:
  - 1) Remove SCM 1R from the E2-1 equipment shelf (Ref 27-09-00).
  - 2) Remove the DO-NOT-CLOSE tags and close the circuit breakers on the P11 panel that are shown in Table 501.

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- 3) Use a DVM to measure the output voltages at these pins on the E2-1 equipment shelf:

<u>CONNECTOR</u>	<u>PINS</u>
D831A	J3 and J4
D831B	J4 and J5
	J12 and J13

- 4) Loosen the four clamp screws on the first officer's RVDT.  
5) Turn the null adjustment screw until the output voltage is  $0 \pm 0.050\text{v}$  ac RMS at the DVM.  
6) Tighten the clamp screws and do this check:  
a) Make sure the three output voltages are  $0 \pm 0.050\text{v}$  ac RMS at the DVM.  
7) Lock the clamp screws with a wire.  
8) Open the circuit breakers on the P11 panel that are shown in Table 501 and attach D0-NOT-CLOSE tags:  
9) Install SCM 1R (Ref 27-09-00).  
(c) Remove the D0-NOT-CLOSE tags and close the circuit breakers on the P11 panel that are shown in Table 501.

S 095-149

- (9) Remove the control wheel straightedge.

S 095-150

- (10) Remove rig pins A1 and A2.

G. Adjust the Spoiler Power Control Actuators (PCAs) (Fig. 503)

**NOTE:** This procedure is applicable to all of the spoiler PCAs. Before you do this procedure, make sure the airplane is on its landing gear with the engines (or equivalent weights) installed on the struts.

S 865-085

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply pressure to the left, right, and center hydraulic systems (Ref 29-11-00).

S 865-086

- (2) Use hydraulic power and retract the trailing edge flaps (Ref 27-51-00).

S 865-087

- (3) Stop for at least one minute.

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- S 045-151
- (4) Do the deactivation procedure for the trailing edge flaps (Ref 27-51-00).
- S 215-088
- (5) Make sure the speedbrake lever is in its down-and-locked detent position.
- S 865-089
- (6) Operate the aileron trim switches on the aft electronic control panel, P8, until this condition is satisfactory:
- (a) The trim indicators on the control wheels show zero units of trim.
- S 215-090
- (7) Make sure all the spoilers are in their full down positions.
- S 865-152
- (8) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).
- S 865-153
- (9) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.
- S 865-154
- (10) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11H15, FLT CONT SHUTOFF WING LEFT
- (b) 11H16, FLT CONT SHUTOFF WING CTR
- (c) 11H26, FLT CONT SHUTOFF WING RIGHT
- S 045-091
- (11) FOR ADJUSTMENTS TO SPOILERS 5, 6, 7, AND 8;  
Do these steps:
- NOTE:** Spoilers are numbered 1 thru 12 from the outboard left wing spoiler to the outboard right wing spoiler.
- (a) Open the applicable access panels (Ref 06-44-00):
- 1) 552BB (for spoiler number 6)
- 2) 552GB (for spoiler number 5)
- 3) 652BB (for spoiler number 7)
- 4) 652GB (for spoiler number 8).

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**WARNING:** MAKE SURE THE OFF-WING ESCAPE SYSTEM CANNOT OPERATE WHEN YOU DO MAINTENANCE ON THE INBOARD SPOILERS. ACCIDENTAL ESCAPE SLIDE OPERATION WILL CAUSE QUICK SPOILER MOVEMENT AND INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

**WARNING:** REFER TO AMM 25-65-00/201 FOR THE PROCEDURE TO DISARM THE OFF-WING ESCAPE SYSTEM. IF YOU INCORRECTLY DISARM THE OFF-WING ESCAPE SYSTEM, THE ESCAPE SLIDE CAN ACCIDENTALLY INFLATE AND CAUSE INJURY OR DAMAGE.

(b) Disarm the off-wing escape system (AMM 25-65-00/201).

S 865-349

**WARNING:** MAKE SURE THE SPOILERS ARE IN THEIR DOWN POSITIONS BEFORE YOU OPEN THE FLT CONT ELEC CIRCUIT BREAKERS. THE SPOILERS WILL RETRACT IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(12) Open the circuit breakers on the P11 panel that are shown in Table 502 and attach DO-NOT-CLOSE tags.

TABLE 502	
11C6,	FLT CONT ELEC 1L AC
11C7,	FLT CONT ELEC 1L DC
11C8,	FLT CONT ELEC 2L AC
11C9,	FLT CONT ELEC 2L DC
11G17,	FLT CONT ELEC 1R AC
11G18,	FLT CONT ELEC 1R DC
11G26,	FLT CONT ELEC 2R AC
11G27,	FLT CONT ELEC 2R DC

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S 865-646

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (13) Supply pressure to the left, center, and right hydraulic systems (AMM 29-11-00/201).

S 225-094

- (14) Measure and record the clearance between the spoiler and flap for each of the spoilers (View A-A and B-B). Make sure the clearance is correct.

S 865-645

- (15) Remove pressure from the left, center, and right hydraulic systems (AMM 29-11-00/201).

S 205-466

- (16) Do these steps to find the spoiler to trailing edge flap preload (View B-B ):

S 865-647

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (17) Supply pressure to the left, right and center hydraulic systems (AMM 29-11-00/201).
- (a) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to ON.
  - (b) Move the speed brake lever fully up.
  - (c) Retract the trailing edge flaps (AMM 27-51-00/201).
  - (d) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).
  - (e) Make sure the speedbrake lever is in its down and locked position.
    - 1) Make sure the spoilers are fully down.

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (f) Make sure the left, right, and center hydraulics systems are pressurized (AMM 29-11-00/201).
- (g) Measure and record the gap between the lower trailing edge of the spoiler and the upper surface of the inboard flap (View B-B).
- (h) Remove the power from the left, right, and center hydraulics systems (AMM 29-11-00/201).
- (i) The PCA piston can be rotated to raise or lower the spoiler trailing edge. For the inboard spoilers, rotating the piston through one lock washer serration will result in 0.054 inch (1.37 mm) of adjustment. From the gap measurement, calculate the number of lock washer serrations the PCA piston must be rotated to raise or lower the spoiler trailing edge to achieve the preload (-.10 inch maximum, at the outboard side of the inboard spoilers). Make sure the measurements on the inboard side of the inboard spoilers (View B-B) are still within the limits .

**NOTE:** Since a negative preload cannot be physically measured between the lower trailing edge of the inboard spoilers and the upper surface of the inboard flap, a starting point gap may be necessary between the spoiler and flap. From the positive measurement taken, you can determine how many serrations of the lock washer the PCA piston must be turned to achieve a negative value on the outboard side of the spoiler (-.10 inch maximum).

S 825-095

- (18) If it is necessary, do these steps to adjust the spoiler to flap clearance (View A-A, View B-B):
  - (a) Extend the trailing edge flaps (AMM 27-51-00/201).
  - (b) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).
  - (c) Disconnect the electrical connector from the spoiler PCA.
  - (d) Use a 5/32 allen wrench to operate the manual release cam and lift the spoiler.
  - (e) Hold the spoiler in the up position.
  - (f) Loosen the locknut at the rod end of the spoiler PCA.

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- (g) Turn the PCA piston to increase or decrease the PCA length.

**NOTE:** FOR THE OUTBOARD SPOILERS,  
an adjustment that is equal to one lock washer serration  
will lift or lower the spoiler trailing edge 0.037 inch  
(0.94 mm).  
FOR THE INBOARD SPOILERS,  
an adjustment that is equal to one lockwasher slot will  
lift or lower the spoiler trailing edge 0.054 inch  
(1.37 mm).

- (h) FOR THE INBOARD SPOILERS;  
Tighten the locknut to 1560–1860 pound-inches  
(176.3–210.2 newton-meters).  
(i) FOR THE OUTBOARD SPOILERS;  
Tighten the locknut to 900–1140 pound-inches  
(101.8–128.8 newton-meters).  
(j) Lower the spoiler.  
(k) Connect the electrical connector to the PCA.

S 865-096

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (19) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-155

- (20) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:  
(a) 11H15, FLT CONT SHUTOFF WING LEFT  
(b) 11H16, FLT CONT SHUTOFF WING CTR  
(c) 11H26, FLT CONT SHUTOFF WING RIGHT

S 865-156

- (21) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the P61 panel to ON.

S 865-097

- (22) Remove the DO-NOT-CLOSE tags and close the circuit breakers on the P11 panel that are shown in Table 502.

S 865-098

- (23) Move the speedbrake lever to its full upstop position.

S 865-099

- (24) Retract the trailing edge flaps (AMM 27-51-00/201).

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S 045-100

- (25) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 865-101

- (26) Move the speedbrake lever back to its down-and-locked detent position.

S 865-157

- (27) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).

S 865-102

- (28) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the P61 panel to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 865-158

- (29) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT

S 865-350

**WARNING:** MAKE SURE THE SPOILERS ARE IN THEIR DOWN POSITIONS BEFORE YOU OPEN THE FLT CONT ELEC CIRCUIT BREAKERS. THE SPOILERS WILL RETRACT IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (30) Open the circuit breakers on the P11 panel that are shown in Table 502 and attach DO-NOT-CLOSE tags.

S 225-161

- (31) Make sure the spoiler to flap clearances are correct for all the spoilers (View A-A or B-B).

S 825-162

- (32) If the clearance is not correct, do the adjustment procedure again.

S 865-163

- (33) Extend the trailing edge flaps (Ref 27-51-00).

S 045-164

- (34) Do the deactivation procedure for the trailing edge flaps (Ref 27-51-00).

S 435-165

- (35) Safety the locknut with a wire.

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S 435-166

- (36) Safety the manual release cam with a wire.

S 225-167

- (37) Make sure the clearance between spoilers 6 or 7 and the override actuator is correct (View C-C).

S 865-168

- (38) Remove the DO-NOT-CLOSE tags and close the P11 panel circuit breakers that are shown in Table 502.

S 445-169

- (39) FOR SPOILERS 5, 6, 7, AND 8;  
Do these steps:

**WARNING:** REFER TO AMM 25-65-00/201 FOR THE PROCEDURE TO ARM THE OFF-WING ESCAPE SYSTEM. IF YOU INCORRECTLY ARM THE OFF-WING ESCAPE SYSTEM, THE ESCAPE SLIDE CAN ACCIDENTALLY INFLATE AND CAUSE INJURY OR DAMAGE.

- (a) Arm the off-wing escape system (AMM 25-65-00/201).

S 865-352

- (40) Retract the trailing edge flaps (AMM 27-51-00/201).

S 045-353

- (41) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

H. Adjust the Speedbrake LVDTs (PROCEDURE 1) (Fig. 504)

**NOTE:** Four procedures are supplied to adjust the speedbrake LVDTs.

PROCEDURE 1 - uses a commercially available power supply, a resistor, a digital voltmeter (DVM) and the breakout box equipment.

PROCEDURE 2 - uses airplane power and a ratiometric digital phase angle voltmeter (ratiometric PAV) with the breakout box equipment.

PROCEDURE 3 - uses airplane power and a DVM. The ratio calculation is done manually.

PROCEDURE 4 - uses a phase synchronous voltmeter only.

S 215-103

- (1) Make sure the power is removed from the left, right, and center hydraulic systems (AMM 29-11-00/201).

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S 025-104

- (2) Remove the captain's seat (AMM 25-11-01/201).

S 865-354

**WARNING:** MAKE SURE THE SPOILERS ARE IN THEIR DOWN POSITIONS BEFORE YOU OPEN THE FLT CONT ELEC CIRCUIT BREAKERS. THE SPOILERS WILL RETRACT IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the circuit breakers on the P11 panel that are shown in Table 503 and attach DO-NOT-CLOSE tags.

TABLE 503	
11C6,	FLT CONT ELEC 1L AC
11C7,	FLT CONT ELEC 1L DC
11C8,	FLT CONT ELEC 2L AC
11C9,	FLT CONT ELEC 2L DC
11G17,	FLT CONT ELEC 1R AC
11G18,	FLT CONT ELEC 1R DC
11G26,	FLT CONT ELEC 2R AC
11G27,	FLT CONT ELEC 2R DC

S 035-105

- (4) Disconnect the electrical connectors from the speedbrake LVDTs and keep a record of the connectors.

**NOTE:** The connectors are found under the flight deck floor. Get access through access door 113AL (Ref 06-41-00).

S 495-106

- (5) Do these steps to connect the breakout box equipment:
- (a) Connect the breakout box and a -21, -23, -25, -33, -35, or -37 cable assembly to one of the LVDT connectors.
  - (b) Connect a digital voltmeter (DVM) to the breakout box at pins 3 (SIG HI) and 5 (SIG LO).
  - (c) Connect the power supply to the breakout box at pins 1 (HI) and 2 (LO).
  - (d) Connect the resistor between pins 3 and 5.
  - (e) Adjust the power supply to 26 ±0.02 volts ac RMS.

S 865-107

- (6) Move the speedbrake lever from its down-and-locked detent position to its full upstop position.

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- S 865-108
- (7) Move the speedbrake lever back to its down-and-locked detent position.
- S 215-109
- (8) Move the speedbrake lever to its ARMED position and do this check:
- (a) Make sure the cam roller for the detent lever is in its armed position.
- S 825-110
- (9) Do these steps to adjust the speedbrake LVDT:
- (a) Loosen the LVDT locknut.
- (b) Turn the LVDT at the wrench flat until the output voltage is  $0 \pm 0.05$  volts ac RMS at the DVM.
- (c) Tighten the locknut and do this check:
- 1) Make sure the output voltage is  $0 \pm 0.05$  volts ac RMS at the DVM.
- (d) Move the speedbrake lever to its full upstop position and do this check:
- 1) Make sure the LVDT output voltage is  $7.40 \pm 0.30$  volts ac RMS at the DVM.
- (e) Move the speedbrake lever back to its ARMED position.
- (f) Disconnect the breakout box and the cable assembly from the LVDT.
- (g) Connect the breakout box and cable assembly to the other connector for the dual LVDT unit.
- (h) Loosen the LVDT locknut.
- (i) Turn the LVDT at the wrench flat until the output voltage is  $0 \pm 0.05$  volts ac RMS at the DVM.
- (j) Tighten the locknut and do this check:
- 1) Make sure the output voltage is  $0 \pm 0.05$  volts ac RMS at the DVM.
- (k) Move the speedbrake lever to its full upstop position and do this check:
- 1) Make sure the LVDT output voltage is  $7.40 \pm 0.30$  volts ac RMS at the DVM.

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- (l) Move the speedbrake lever back to its ARMED position.
- (m) Disconnect the breakout box and the cable assembly from the LVDT.

S 825-111

- (10) Do the above step again for the other two dual LVDT units.

S 435-112

- (11) Connect the airplane electrical connectors to the LVDTs.

S 865-172

- (12) Remove the DO-NOT-CLOSE tags and close the circuit breakers on the P11 panel that are shown in Table 503.

S 095-113

- (13) Disconnect the power supply, resistor, and the DVM from the breakout box.

S 425-173

- (14) Install the captain's seat (Ref 25-11-01).

I. Adjust the Speedbrake LVDTs (PROCEDURE 2)

S 215-114

- (1) Make sure the power is removed from the left, right, and center hydraulic systems (Ref 29-11-00).

S 025-115

- (2) Remove the captain's seat (Ref 25-11-01).

S 865-355

**WARNING:** MAKE SURE THE SPOILERS ARE IN THEIR DOWN POSITIONS BEFORE YOU OPEN THE FLT CONT ELEC CIRCUIT BREAKERS. THE SPOILERS WILL RETRACT IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the circuit breakers on the P11 panel that are shown in Table 503 and attach DO-NOT-CLOSE tags.

S 035-116

- (4) Disconnect the electrical connectors from the LVDTs.

**NOTE:** The connectors are found under the flight deck floor. Get access through access door 113AL (Ref 06-41-00).

S 495-117

- (5) Do these steps to connect the breakout box equipment:
  - (a) Connect the breakout box and a -21, -23, -25, -33, -35, or -37 cable assembly to one of the LVDT connectors.

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- (b) Connect the ratiometric digital phase angle voltmeter (ratiometric PAV) to the breakout box at pins 3 (SIG HI), 5 (SIG LO), and 6 (GND).
- (c) Connect the breakout box and a -20, -22, -24, -32, -34, or -36 cable assembly to the airplane connector that mates with the LVDT connector.
- (d) Connect the REF pins for the ratiometric PAV to the breakout box at pins 1 (HI) and 2 (LO).

S 215-118

- (6) Remove the DO-NOT-CLOSE tags and close the circuit breakers on the P11 panel that are shown in Table 503.

S 865-119

- (7) Move the speedbrake lever from its down-and-locked detent position to its full upstop position.

S 865-120

- (8) Move the speedbrake lever back to its down-and-locked detent position.

S 215-121

- (9) Move the speedbrake lever to its ARMED position and do this check:
  - (a) Make sure you can feel the cam roller for the detent lever move into its ARMED position.

S 825-122

- (10) Do these steps to adjust the speedbrake LVDT:
  - (a) Loosen the LVDT locknut.
  - (b) Turn the LVDT at the wrench flat until the output voltage is  $0 \pm 0.05$  volts ac RMS at the ratiometric PAV.
  - (c) Tighten the locknut and do this check:
    - 1) Make sure the output voltage is  $0 \pm 0.05$  volts ac RMS at the ratiometric PAV.
  - (d) Move the speedbrake lever to its full upstop position and do this check:
    - 1) Make sure the ratiometric PAV value is between 0.2731 and 0.2962.

NOTE: Use the ratio function on the ratiometric PAV.

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- (e) Move the speedbrake lever back to its ARMED position.
- (f) Open the circuit breakers on the P11 panel that are shown in Table 503.
- (g) Disconnect the breakout box and the cable assemblies from the LVDT and the airplane connector.
- (h) Connect the breakout box and cable assemblies between the other connector for the dual LVDT unit and the applicable airplane connector.
- (i) Close the circuit breakers on the P11 panel that are shown in Table 503.
- (j) Loosen the LVDT locknut.
- (k) Turn the LVDT at the wrench flat until the output voltage is  $0 \pm 0.05$  volts ac RMS at the ratiometric PAV.
- (l) Tighten the locknut and do this check:
  - 1) Make sure the output voltage is  $0 \pm 0.05$  volts ac RMS at the ratiometric PAV.
- (m) Move the speedbrake lever to its full upstop position and do this check:
  - 1) Make sure the ratiometric PAV value is between 0.2731 and 0.2962.

NOTE: Use the ratio function on the ratiometric PAV.

- (n) Move the speedbrake lever back to its ARMED position.
- (o) Open the circuit breakers on the P11 panel that are shown in Table 503 and attach DO-NOT-CLOSE tags.
- (p) Disconnect the breakout box and the cable assemblies from the LVDT and the applicable airplane connector.

S 825-123

- (11) Do the above step again for the other two dual LVDT units.

S 435-124

- (12) Connect the airplane electrical connectors to the LVDTs.

S 865-175

- (13) Remove the DO-NOT-CLOSE tags and close the circuit breakers on the P11 panel that are shown in Table 503.

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S 095-125

- (14) Disconnect the ratiometric PAV and the cable assemblies from the breakout box.

S 425-176

- (15) Install the captain's seat (Ref 25-11-01).

J. Adjust the Speedbrake LVDTs (PROCEDURE 3)

S 215-126

- (1) Make sure the power is removed from the left, right, and center hydraulic systems (Ref 29-11-00).

S 025-127

- (2) Remove the captain's seat (Ref 25-11-01).

S 865-356

**WARNING:** MAKE SURE THE SPOILERS ARE IN THEIR DOWN POSITIONS BEFORE YOU OPEN THE FLT CONT ELEC CIRCUIT BREAKERS. THE SPOILERS WILL RETRACT IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the circuit breakers on the P11 panel that are shown in Table 504 and attach DO-NOT-CLOSE tags.

TABLE 504	
11C6,	FLT CONT ELEC 1L AC
11C7,	FLT CONT ELEC 1L DC
11C8,	FLT CONT ELEC 2L AC
11C9,	FLT CONT ELEC 2L DC
11G17,	FLT CONT ELEC 1R AC
11G18,	FLT CONT ELEC 1R DC
11G26,	FLT CONT ELEC 2R AC
11G27,	FLT CONT ELEC 2R DC

S 035-128

- (4) Disconnect the electrical connectors from the LVDTs.

**NOTE:** The connectors are located under the flight deck floor. Get access through access door 113AL (Ref 06-41-00).

S 495-129

- (5) Do these steps to connect the breakout box equipment:  
 (a) Connect the -21, -23, -25, -33, -35, or -37 cable assembly between the speedbrake LVDT and the breakout box.

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- (b) Connect the -20, -22, -24, -32, -34, or -36 cable assembly between the applicable airplane connector and the breakout box.
- (c) Connect DVM 1 to the breakout box at pins 3 (SIG HI) and 5 (SIG LO).
- (d) Connect DVM 2 to the breakout box at pins 1 (HI) and 2 (LO) to monitor the airplane power.
- (e) Remove the DO-NOT-CLOSE tags and close the circuit breakers on the P11 panel that are shown in Table 504.

S 865-130

- (6) Move the speedbrake lever from its down-and-locked detent position to its full upstop position.

S 865-131

- (7) Move the speedbrake lever back to its down-and-locked detent position.

S 215-132

- (8) Move the speedbrake lever to its ARMED position and do this check:
  - (a) Make sure you can feel the cam roller for the detent lever is in its ARMED position.

S 825-133

- (9) Do these steps to adjust the speedbrake LVDT:
  - (a) Make sure the airplane input voltage is between 24 and 30 volts ac RMS at DVM 2.
  - (b) Loosen the LVDT locknut.
  - (c) Turn the LVDT at the wrench flat until the output voltage is  $0 \pm 0.05$  volts ac RMS at DVM 1.
  - (d) Tighten the locknut and do this check:
    - 1) Make sure the output voltage is  $0 \pm 0.05$  volts ac RMS at DVM 1.
  - (e) Move the speedbrake lever to its full upstop position and do these steps:
    - 1) Use this equation to calculate the minimum LVDT output voltage.

$$\frac{\text{NOMINAL OUTPUT} \times \text{actual input}}{\text{NOMINAL INPUT}} = \text{minimum LVDT output}$$

(DVM 2 voltage)                      (Vmin at DVM 1)

$$\frac{7.10}{26.00} \times V \text{ at DVM 2} = V_{\text{min at DVM 1}}$$

where V = voltage

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2) Use this equation to calculate the maximum LVDT output voltage.

$$V_{\min} \text{ at DVM 1} \times 1.0845 = V_{\max} \text{ at DVM 1}$$

3) Make sure the LVDT output voltage at DVM 1 is between  $V_{\min}$  and  $V_{\max}$ .

- (f) Move the speedbrake lever back to its ARMED position.
- (g) Open the circuit breakers on the P11 panel that are shown in Table 504.
- (h) Disconnect the breakout box and the cable assemblies from the LVDT and the airplane connector.
- (i) Connect the breakout box and the cable assemblies between the other connector for the dual LVDT unit and the applicable airplane connector.
- (j) Close the circuit breakers on the P11 panel that are shown in Table 504.
- (k) Loosen the LVDT locknut.
- (l) Turn the LVDT at the wrench flat until the output voltage is  $0 \pm 0.05$  volts ac RMS at DVM 1.
- (m) Tighten the locknut and do this check:
  - 1) Make sure the output voltage is  $0 \pm 0.05$  volts ac RMS at DVM 1.
- (n) Move the speedbrake lever to its full upstop position and do these steps:
  - 1) Use this equation to calculate the minimum LVDT output voltage.

$$\frac{\text{NOMINAL OUTPUT} \times \text{actual input}}{\text{NOMINAL INPUT}} = \text{minimum LVDT output}$$

(DVM 2 voltage)                      ( $V_{\min}$  at DVM 1)

$$\frac{7.10}{26.00} \times V \text{ at DVM 2} = V_{\min} \text{ at DVM 1}$$

where  $V$  = voltage

2) Use this equation to calculate the maximum LVDT output voltage.

$$V_{\min} \text{ at DVM 1} \times 1.0845 = V_{\max} \text{ at DVM 1}$$

3) Make sure the LVDT output voltage at DVM 1 is between  $V_{\min}$  and  $V_{\max}$ .

- (o) Move the speedbrake lever back to its ARMED position.
- (p) Open the circuit breakers on the P11 panel that are shown in Table 504 and attach DO-NOT-CLOSE tags.

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(q) Disconnect the breakout box and the cable assemblies from the LVDT and the airplane connectors.

S 825-134

(10) Do the above step again for the other two dual LVDT units.

S 435-135

(11) Connect the airplane electrical connectors to the LVDTs.

S 865-178

(12) Remove the DO-NOT-CLOSE tags and close the circuit breakers on the P11 panel that are shown in Table 504.

S 035-136

(13) Disconnect the two DVMS from the breakout box.

S 425-180

(14) Install the captain's seat (Ref 25-11-01).

K. Adjust the Speedbrake LVDTs (PROCEDURE 4)

S 215-137

(1) Make sure the power is removed from the left, right, and center hydraulic systems (Ref 29-11-00).

S 025-138

(2) Remove the captain's seat (Ref 25-11-01).

S 865-357

**WARNING:** MAKE SURE THE SPOILERS ARE IN THEIR DOWN POSITIONS BEFORE YOU OPEN THE FLT CONT ELEC CIRCUIT BREAKERS. THE SPOILERS WILL RETRACT IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Open the circuit breakers on the P11 panel that are shown in Table 504 and attach DO-NOT-CLOSE tags.

S 035-139

(4) Disconnect the electrical connectors from the LVDTs.

**NOTE:** The connectors are located under the flight deck floor. Get access through access door 113AL (Ref 06-41-00).

S 865-140

(5) Use the data supplied with the phase synchronous voltmeter to prepare it for use.

S 495-141

(6) Connect the applicable cable assembly from the voltmeter to one of the connectors in the dual LVDT assembly.

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- S 865-182
- (7) Move the speedbrake lever from its down-and-locked detent position to its full upstop position.
- S 865-183
- (8) Move the speedbrake lever back to its down-and-locked detent position.
- S 215-184
- (9) Move the speedbrake lever to its ARMED position and do this check:
- (a) Make sure you can feel that the cam roller for the detent lever is in its ARMED position.
- S 825-364
- (10) Do these steps to adjust the speedbrake LVDT:
- (a) Loosen the LVDT locknut.
  - (b) Turn the LVDT at the wrench flat until the output voltage is  $0 \pm 0.05$  volts ac RMS at the voltmeter.
  - (c) Tighten the locknut and do this check:
    - 1) Make sure the output voltage is  $0 \pm 0.05$  volts ac RMS at the voltmeter.
  - (d) Move the speedbrake lever to its full upstop position and do this check:
    - 1) Make sure the LVDT output voltage is  $7.40 \pm 0.30$  volts ac RMS at the voltmeter.
  - (e) Move the speedbrake lever back to its ARMED position.
  - (f) Disconnect the voltmeter and its cable assembly from the LVDT.
  - (g) Connect the voltmeter and its cable assembly to the other connector for the dual LVDT unit.
  - (h) Loosen the LVDT locknut.
  - (i) Turn the LVDT at the wrench flat until the output voltage is  $0 \pm 0.05$  volts ac RMS at the voltmeter.
  - (j) Tighten the locknut and do this check:
    - 1) Make sure the output voltage is  $0 \pm 0.05$  volts ac RMS at the voltmeter.
  - (k) Move the speedbrake lever to its full upstop position and do this check:
    - 1) Make sure the LVDT output voltage is  $7.40 \pm 0.30$  volts ac RMS at the voltmeter.
  - (l) Move the speedbrake lever back to its ARMED position.
  - (m) Disconnect the voltmeter and its cable assembly from the LVDT.
- S 825-365
- (11) Do the above step again for the other two dual LVDT units.
- S 435-366
- (12) Connect the airplane electrical connectors to the LVDTs.

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- S 425-185  
(13) Install the captain's seat (Ref 25-11-01).
- S 865-186  
(14) Remove the DO-NOT-CLOSE tags and close the circuit breakers on the P11 panel that are shown in Table 504.
- L. Put the Airplane Back to Its Usual Condition
- S 865-187  
(1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:  
(a) 11H15, FLT CONT SHUTOFF WING LEFT  
(b) 11H16, FLT CONT SHUTOFF WING CTR  
(c) 11H26, FLT CONT SHUTOFF WING RIGHT  
(d) 11H11, AUTO SPEEDBRK
- S 865-188  
(2) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the P61 panel to ON.
- S 865-189  
(3) Remove electrical power if it is not necessary (Ref 24-22-00).
- S 415-190  
(4) Close access panels 113AL and 119AL (Ref 06-41-00).

TASK 27-61-00-735-191

4. System Test - Spoiler/Speedbrake Control System

A. General

- (1) Do these steps to measure the spoiler movement:

**NOTE:** The spoilers are numbered 1 thru 12, from the outboard left wing spoiler to the outboard right wing spoiler.

- (a) Measure the vertical distance from the trailing edge of spoilers 1, 4, 6, 7, 9, and 12 to the trailing edge of the nearest wing structure.
- (b) Measure the distance between the trailing edges of 2 and 1, 3 and 4, 5 and 6, 8 and 7, 10 and 9, 11 and 12 with the spoilers in their full down positions.
- (c) Add or subtract the distances in step (b) from those in step (a) to get the linear measurements for the spoilers from the faired neutral position.
- (2) During this procedure, make sure the airplane is on its main landing gear or the main gear is in its NOT TILT position.

B. Equipment

- (1) Control Wheel Straightedge - A27020-1

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- (2) Control Wheel Adapter Equipment -  
A27021-96 or -98
- (3) Protractor - 1 each A27021-30 (from the  
A27021-29 Kit) or 4MIT65B80307-1
- (4) Bubble Protractor or Equivalent - Commercially  
Available
- (5) Stopwatch, accurate to +/- 0.01 second -  
Commercially Available
- (6) Proximity Switch Actuator - 1.5 x 0.75 x 0.05 inches (38.1 x 19.05 x  
1.27 mm) , make from 4130, 15-5 PH or 17-4 PH steel with a layer of  
0.03 inch plastic (0.76 mm).

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-09-00/201, Flight Control Systems Electronics Unit
- (4) AMM 27-51-00/201, Trailing Edge Flap System
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) AMM 29-21-00/501, Ram Air Turbine (RAT) System
- (7) AMM 32-09-02/201, Air/Ground Relays

D. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 550/650 Wing Trailing Edge
  - 560/660 Wing Trailing Edge

E. Prepare for the Test

- S 865-192
  - (1) Supply electrical power (Ref 24-22-00).
- S 865-193
  - (2) Move the STBY POWER switch on the overhead panel, P5, to the AUTO  
position.
- S 025-589
  - (3) Remove the stab/trim aileron lockout modules (SAMs) from the E1-1  
and E2-1 equipment shelves (AMM 27-09-00/201).
- S 025-591
  - (4) Remove the yaw damper modules from the E1-1 and E2-1 equipment  
shelves (AMM 27-09-00/201).
- S 025-593
  - (5) Remove the rudder ratio changer modules (RRCMs) from the E1-1 and  
E2-1 equipment shelves (AMM 27-09-00/201).

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- S 865-199
- (6) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11G11, AUTO SPEEDBRK

- S 865-574
- (7) Supply hydraulic pressure for flaps (AMM 29-11-00/201).

- S 865-202
- (8) Extend the trailing edge flaps (AMM 27-51-00/201).

- S 045-203
- (9) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

- S 215-358
- (10) Make sure the power is removed from the left, right, and center hydraulic systems (AMM 29-11-00/201).

- S 855-575
- (11) Do the disarm procedure for the off wing escape system (AMM 25-65-00/201).

S 865-201

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (12) Supply hydraulic pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

F. Spoiler/Speedbrake Control System-Test

- S 865-205
- (1) Move the speedbrake lever to its ARMED position.

- S 865-206
- (2) Do these steps three times:
- (a) Slowly move the speedbrake lever aft to a position that is approximately one-half of full travel.

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(b) Slowly move the speedbrake lever back to its ARMED position.

S 865-208

- (3) Do these steps three times:
- (a) Slowly move the speedbrake lever to its full upstop position.
  - (b) Slowly move the speedbrake lever back to its ARMED position.

S 215-207

- (4) Move the speedbrake lever to its down-and-locked detent position and do these steps:
- (a) Make sure the SPOILERS light on the P5 panel is off.
  - (b) Push the ECS/MSG switch on the right side panel, P61.
  - (c) Push the AUTOREAD switch on the P61 panel and do this check:
    - 1) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

S 865-209

- (5) Push the RESET switch on each of the six spoiler control modules (SCMs).

NOTE: You can find the SCMs on the E1-1 and E2-2 equipment shelves in the main equipment center.

S 865-210

- (6) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11C7, FLT CONT ELEC 1L DC
  - (b) 11C9, FLT CONT ELEC 2L DC

S 215-147

- (7) Do these checks:
- (a) Make sure the white EICAS message SPOILERS shows on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

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- (b) Make sure the amber SPOILERS light on the P5 panel is off.
- (c) Make sure the amber EICAS message SPOILERS does not show on the display.

S 865-211

- (8) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11C7, FLT CONT ELEC 1L DC
  - (b) 11C9, FLT CONT ELEC 2L DC

S 215-212

- (9) Do this check:
  - (a) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

S 865-213

- (10) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - (a) 11G18, FLT CONT ELEC 1R DC
  - (b) 11G27, FLT CONT ELEC 2R DC

S 215-148

- (11) Do these checks:
  - (a) Make sure the white EICAS message SPOILERS shows on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

- (b) Make sure the amber SPOILERS light on the P5 panel is off.
- (c) Make sure the amber EICAS message SPOILERS does not show on the display.

S 865-214

- (12) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11G18, FLT CONT ELEC 1R DC
  - (b) 11G27, FLT CONT ELEC 2R DC

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S 215-215

- (13) Do this check:
- (a) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

S 865-216

- (14) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC

S 215-217

- (15) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is on.
  - (b) Make sure the amber EICAS message SPOILERS shows on the display.

S 865-218

- (16) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C8, FLT CONT ELEC 2L AC

S 215-219

- (17) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel goes off.
  - (b) Make sure the amber EICAS message SPOILERS does not show on the display.

S 865-220

- (18) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC

S 215-221

- (19) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is on.
  - (b) Make sure the amber EICAS message SPOILERS shows on the display.

S 215-222

- (20) Move the EICAS computer select switch on the display select panel, P9, to L and do this check:
- (a) Make sure the amber EICAS message SPOILERS shows on the display.

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S 215-223

- (21) Move the EICAS computer select switch on the P9 panel to R and do this check:
- (a) Make sure the amber EICAS message SPOILERS shows on the display.

S 865-224

- (22) Move the computer select switch on the P9 panel to its AUTO position.

S 865-225

- (23) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G26, FLT CONT ELEC 2R AC

S 215-226

- (24) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel goes off.
  - (b) Make sure the amber EICAS message SPOILERS does not show on the display.
  - (c) Make sure none of the six spoiler control modules (SCMs) have a fault.

NOTE: The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- 1) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.
- 2) FOR -200 SERIES SCMs;  
Make sure there are no faults in the EXISTING FAULTS.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- The display will show NO FAULTS if there are no faults.

G. Speedbrake Lever Inputs and Spoiler Operation in the Ground Mode - Test

S 215-227

- (1) Make sure the control wheels are in their neutral positions.

S 215-228

- (2) Move the speedbrake lever to its ARMED position and do this check:
- (a) Make sure all the spoilers are in their full down positions.

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S 225-229

- (3) Move the speedbrake lever in the aft direction until all the spoilers start to move up and do this check:
- (a) Make sure the speedbrake lever is not more than 0.40 inch (10.16 mm) away from its ARMED position.

S 225-230

- (4) Slowly move the speedbrake lever to its full upstop position and do these checks:
- (a) Make sure the spoilers move up smoothly to a position that is  $60.31 \pm 0.78$  degrees away from their neutral positions.

NOTE: Use a bubble protractor to measure the spoiler movement.

- (b) Make sure spoilers 1, 2, 3, 4, 9, 10, 11, and 12 move up  $29.33 \pm 0.29$  inches (745.0 +/- 7.36 mm) and spoilers 5, 6, 7 and 8 move up  $38.12 \pm 0.37$  inches (968.2 +/- 9.4 mm).

S 215-231

- (5) Slowly move the speedbrake lever to its ARMED position and do this check:
- (a) Make sure all the spoilers move smoothly to their full down positions.

S 215-232

- (6) Move the speedbrake lever to its down-and-locked detent position and do these steps:
- (a) Make sure the SPOILERS light on the P5 panel is off.
  - (b) Push the ECS/MSG switch on the P61 panel.
  - (c) Push the AUTOREAD switch on the P61 panel and do this check:
    - 1) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

- (d) Make sure none of the six spoiler control modules (SCMs) have a fault.

NOTE: The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- 1) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.

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- 2) FOR -200 SERIES SCMs;  
Make sure there are no faults in the EXISTING FAULTS.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- The display will show NO FAULTS if there are no faults.

H. Control Wheel Inputs and Spoiler Operation, Flaps Up, Airplane-in-Air Mode - Test

S 865-576

- (1) Make sure flaps are fully retracted and do the deactivation procedure (AMM 27-51-00/201).

S 215-233

- (2) Make sure the speedbrake lever is in its down-and-locked detent position.

S 865-234

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.

- (3) Do the Flight Mode Simulation procedure for the No. 1 and No. 2 air/ground systems (Ref 32-09-02).

S 025-648

- (4) Remove the medallions and chart holders from the control wheels.  
(a) Remove the two screws from the bottom of the medallion.

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(b) Remove the medallion and chart holder.

S 495-235

- (5) Install the control wheel adapter equipment and protractor on the control wheel.

S 225-236

- (6) Turn the control wheel counterclockwise to the positions shown in Table 505 and do these checks:

NOTE: Use the sequence, from top to bottom, shown in Table 505 when you move the control wheel.

- (a) Make sure the right wing spoilers stay in their full down positions.
- (b) Make sure the other spoilers move to the positions shown in Table 505.
- (c) Make sure the amber SPOILERS light on the P5 panel is off.

S 225-237

- (7) Turn the control wheel clockwise to the positions shown in Table 505 and do these checks:

NOTE: Use the sequence, from top to bottom, shown in Table 505 when you move the control wheel.

- (a) Make sure the left wing spoilers stay in their full down positions.
- (b) Make sure the other spoilers move to the positions shown in Table 505.
- (c) Make sure the amber SPOILERS light on the P5 panel is off.

S 865-478

- (8) Put the airplane back in the ground mode (AMM 32-09-02/201).

S 865-238

- (9) Push the ECS/MSG switch on the P61 panel.

S 215-239

- (10) Push the AUTOREAD switch on the P61 panel and do these checks:  
(a) Make sure the EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

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(b) Make sure none of the six spoiler control modules (SCMs) have a fault.

**NOTE:** The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- 1) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.
- 2) FOR -200 SERIES SCMs;  
Make sure there are no faults in the EXISTING FAULTS.

**NOTE:** To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- The display will show NO FAULTS if there are no faults.

S 995-384  
(11) 767-200 AIRPLANES;  
Use the table that follows:

TABLE 505			
SPOILER RESPONSE TO CONTROL WHEEL INPUT - FLAPS UP, AIRPLANE-IN-AIR MODE			
WHEEL POSITION (Degrees)	INBOARD SPOILER DISPLACEMENT (NO. 5, 6 OR 7, 8)		OUTBOARD SPOILER DISPLACEMENT (NO. 1, 2, 3, 4 or 9, 10, 11, 12)
7.38 ±1.48			Breakout
8.77 ±2.88	Breakout		
45.00 ±0.25	7.41 ±0.64(in) 11.23 ±0.98(deg)	12.27 ±0.79(in) 24.22 ±1.59(deg)	
MAX. TRAVEL	11.19 ±0.35(in) 16.99 ±0.53(deg)	22.38 ±0.39(in) 44.99 ±0.83(deg)	
8.77 ±2.88	Full Down		
7.38 ±1.48			Full Down

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S 995-389  
(12) 767-300 AIRPLANES;  
Use the table that follows:

TABLE 505			
SPOILER RESPONSE TO CONTROL WHEEL INPUT - FLAPS UP, AIRPLANE-IN-AIR MODE			
WHEEL POSITION (Degrees)	INBOARD SPOILER DISPLACEMENT (NO. 5, 6 OR 7, 8)		OUTBOARD SPOILER DISPLACEMENT (NO. 1, 2, 3, 4 or 9, 10, 11, 12)
7.38 ±1.48			Breakout
8.77 ±2.88	Breakout		
45.00 ±0.25	7.62 ±0.64(in) 11.23 ±0.98(deg)	12.27 ±0.79(in) 24.22 ±1.59(deg)	
MAX. TRAVEL	11.52 ±0.35(in) 16.99 ±0.53(deg)	22.38 ±0.39(in) 44.99 ±0.83(deg)	
8.77 ±2.88	Full Down		
7.38 ±1.48			Full Down

I. Control Wheel Inputs and Spoiler Operation, Flaps Down, Airplane-in-Air Mode - Test

S 445-240

- (1) Do the activation procedure for the trailing edge flaps (Ref 27-51-00).

S 865-241

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. MAKE SURE THAT NO LOCKING TOOLS ARE INSTALLED ON THE POWER DRIVE UNITS.

- (2) Do the Flight Mode Simulation procedure for the No. 1 and No. 2 air/ground systems (AMM 32-09-02/201).

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- S 865-477
- (3) Move the flap lever to its 25 unit detent position and do this check:
- (a) Make sure the flaps move to their extended position.

- S 215-242
- (4) Make sure the speedbrake lever is in its down-and-locked detent position.

- S 225-243
- (5) Turn the control wheel counterclockwise to the positions shown in Table 506 and do these checks:

**NOTE:** Use the sequence, from top to bottom, shown in Table 506 when you move the control wheel.

- (a) Make sure the right wing spoilers stay in their full down positions.
- (b) Make sure the other spoilers move to the positions shown in Table 506.
- (c) Make sure the amber SPOILERS light on the P5 panel is off.

- S 225-244
- (6) Turn the control wheel clockwise to the positions shown in Table 506 and do these checks:

**NOTE:** Use the sequence, from top to bottom, shown in Table 506 when you move the control wheel.

- (a) Make sure the left wing spoilers stay in their full down positions.
- (b) Make sure the other spoilers move to the positions shown in Table 506.
- (c) Make sure the amber SPOILERS light on the P5 panel is off.

- S 865-479
- (7) Put the airplane back in the ground mode (AMM 32-09-02/201).

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S 865-245

- (8) Push the ECS/MSG switch on the P61 panel.

S 215-246

- (9) Push the AUTOREAD switch on the P61 panel and do these checks:  
(a) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

- (b) Make sure none of the six spoiler control modules (SCMs) have a fault.

NOTE: The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- 1) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.
- 2) FOR -200 SERIES SCMs;  
Make sure there are no faults in the EXISTING FAULTS.

NOTE: To look for faults do these steps:  
- Push the ON/OFF key  
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times  
- When the display shows EXISTING FAULTS push YES  
- The display will show NO FAULTS if there are no faults.

S 995-399

- (10) 767-200 AIRPLANES;  
Use the table that follows:

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TABLE 506		
SPOILER RESPONSE TO CONTROL WHEEL INPUT - FLAPS DOWN, AIRPLANE-IN-AIR MODE		
WHEEL POSITION (Degrees)	INBOARD SPOILER DISPLACEMENT (NO. 5, 6 OR 7, 8)	OUTBOARD SPOILER DISPLACEMENT (NO. 1, 2, 3, 4 or 9, 10, 11, 12)
4.58 ±1.87		Breakout
6.46 ±3.76	Breakout	
45.00 ±0.25	3.87 ±0.89(in) 5.85 ±1.35(deg)	6.69 ±1.14(in) 13.13 ±2.24(deg)
MAX. TRAVEL	11.19 ±0.35(in) 16.99 ±0.53(deg)	22.38 ±0.39(in) 44.99 ±0.83(deg)
6.46 ±3.76	Full Down	
4.58 ±1.87		Full Down

S 995-404  
(11) 767-300 AIRPLANES;  
Use the table that follows:

TABLE 506		
SPOILER RESPONSE TO CONTROL WHEEL INPUT - FLAPS DOWN, AIRPLANE-IN-AIR MODE		
WHEEL POSITION (Degrees)	INBOARD SPOILER DISPLACEMENT (NO. 5, 6 OR 7, 8)	OUTBOARD SPOILER DISPLACEMENT (NO. 1, 2, 3, 4 or 9, 10, 11, 12)
4.58 ±1.87		Breakout
6.46 ±3.76	Breakout	
45.00 ±0.25	3.98 ±0.89(in) 5.85 ±1.35(deg)	6.69 ±1.14(in) 13.13 ±2.24(deg)
MAX. TRAVEL	11.52 ±0.35(in) 16.99 ±0.53(deg)	22.38 ±0.39(in) 44.99 ±0.83(deg)
6.46 ±3.76	Full Down	
4.58 ±1.87		Full Down

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S 215-247

- (12) Move the flap lever to its UP detent position and do this check:  
(a) Make sure the flaps retract.

J. Control Wheel and Speedbrake Lever Inputs and Spoiler Operation,  
Airplane-in-Air Mode - Test

S 215-248

- (1) Make sure the flaps are in their fully retracted position.

S 865-480

- (2) Do the Flight Mode Simulation procedure for the No. 1 and No. 2 air/ground systems (AMM 32-09-02/201).

S 215-249

- (3) Move the speedbrake lever to its ARMED position and do this check:  
(a) Make sure the spoilers are in their full down positions.

S 215-597

- (4) Move the speedbrake lever in the aft direction 0.40 inch (10.16 mm) or less and do these checks:  
(a) Make sure spoilers 1 thru 3, 5 thru 8, and 10 thru 12 start to move up.  
(b) Make sure spoilers 4 and 9 stay down (a small movement of these spoilers is permitted).

S 225-251

- (5) Slowly move the speedbrake lever to its full upstop position and do these checks:  
(a) Make sure spoilers 1 thru 3, 5 thru 8, and 10 thru 12 move smoothly up.  
(b) Make sure spoilers 5 thru 8 move up  $11.19 \pm 0.35$  inches (284.2 +/- 8.9 mm) ( $16.99 \pm 0.53$  degrees) and spoilers 1 thru 3, and 10 thru 12 move up  $22.38 \pm 0.39$  inches (568.4 +/- 9.9 mm) ( $44.99 \pm 0.83$  degrees).

S 225-253

- (6) Turn the control wheel clockwise to the positions shown in Table 507 and do these checks:

**NOTE:** Use the sequence, from top to bottom, shown in Table 507 when you move the control wheel.

- (a) Make sure the spoilers move to the positions shown in Table 507.  
(b) Make sure all the right wing spoilers stay in their full up positions.

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S 225-254

- (7) Turn the control wheel counterclockwise to the positions shown in Table 507 and do these checks:

**NOTE:** Use the sequence, from top to bottom, shown in Table 507 when you move the control wheel.

- (a) Make sure the spoilers move to the positions shown in Table 507.
- (b) Make sure all the left wing spoilers stay in their full up positions.

S 995-414

- (8) 767-200 AIRPLANES;  
Use the table that follows:

TABLE 507			
SPOILER RESPONSE TO MIXED CONTROL WHEEL AND SPEEDBRAKE LEVER INPUTS – AIRPLANE-IN-AIR MODE			
WHEEL POSITION (0.25 Degrees)	INBOARD SPOILER DISPLACEMENT (NO. 5, 6 OR 7, 8)		OUTBOARD SPOILER DISPLACEMENT (NO. 1, 2, 3, 4, OR 9, 10, 11, 12)
0.0	11.19 ±0.35(in)	16.99 ±0.53(deg)	22.38 ±0.39(in) 44.99 ±0.83(deg)
MAX. TRAVEL	Full Down	Full Down	0.45 ±0.45(in) 0.88 ±0.88(deg)
5.90	11.19 ±0.35(in)	16.99 ±0.53(deg)	22.38 ±0.39(in) 44.99 ±0.83(deg)

S 995-419

- (9) 767-300 AIRPLANES;  
Use the table that follows:

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TABLE 507			
SPOILER RESPONSE TO MIXED CONTROL WHEEL AND SPEEDBRAKE LEVER INPUTS – AIRPLANE-IN-AIR MODE			
WHEEL POSITION (0.25 Degrees)	INBOARD SPOILER DISPLACEMENT (NO. 5, 6 OR 7, 8)		OUTBOARD SPOILER DISPLACEMENT (NO. 1, 2, 3, 4, OR 9, 10, 11, 12)
0.0	11.52 ±0.35(in)	16.99 ±0.53(deg)	22.38 ±0.39(in) 44.99 ±0.83(deg)
MAX. TRAVEL	Full Down	Full Down	0.45 ±0.45(in) 0.88 ±0.88(deg)
5.90	11.52 ±0.35(in)	16.99 ±0.53(deg)	22.38 ±0.39(in) 44.99 ±0.83(deg)

S 865-255

- (10) Move the control wheel back to its neutral position.

S 215-256

- (11) Slowly move the speedbrake lever back to its ARMED position and do this check:  
 (a) Make sure the spoilers move smoothly to their full down positions.

S 865-481

- (12) Put the airplane back in the ground mode (AMM 32-09-02/201).

S 215-257

- (13) Move the speedbrake lever to its down-and-locked detent position and do these steps:  
 (a) Make sure the SPOILERS light on the P5 panel is off.  
 (b) Push the ECS/MSG switch on the P61 panel.  
 (c) Push the AUTOREAD switch on the P61 panel and do this check:  
 1) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

- 2) Make sure none of the six spoiler control modules (SCMs) have a fault.

NOTE: The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- a) FOR -100 SERIES SCMs;  
 Make sure all the faultballs are black.

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- b) FOR -200 SERIES SCMs;  
Make sure there are no faults in the EXISTING FAULTS.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- The display will show NO FAULTS if there are no faults.

S 085-649

- (14) Remove the control wheel adapter equipment.

S 425-650

- (15) Install the medallions and chart holders on the control wheels.  
(a) Put the medallion and chart holder in place and install the two screws in the bottom of the medallion.

K. Spoiler Operation Time, Airplane-in-Ground Mode - Test

S 865-258

- (1) Make sure the airplane is in the ground mode (AMM 32-09-02/201).

S 215-259

- (2) Make sure the control wheels are in their neutral positions.

S 865-260

- (3) Move the speedbrake lever to its ARMED position.

S 225-261

- (4) Move the speedbrake lever from its ARMED position to its full upstop position in less than one second and do this check:  
(a) Make sure all the spoilers move from their full down positions to their full up positions in less than one second.

S 225-262

- (5) Move the speedbrake lever from its full upstop position to its ARMED position in less than one second and do this check:  
(a) Make sure all the spoilers move from their full up positions to their full down positions in less than one second.

S 865-263

- (6) Move the speedbrake lever to its down-and-locked detent position.

L. Control Wheel RVDT and Speedbrake LVDT Failure Indication - Test

S 865-264

- (1) Move the speedbrake lever to its ARMED position.

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S 215-265

- (2) Make sure the control wheels are in their neutral positions.

S 865-266

**WARNING:** MAKE SURE THE SPOILERS ARE IN THEIR DOWN POSITIONS BEFORE YOU OPEN THE FLT CONT ELEC CIRCUIT BREAKERS. THE SPOILERS WILL RETRACT IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC

S 865-359

- (4) Push the ECS/MSG switch on the P61 panel.

S 215-267

- (5) Push the AUTOREAD switch on the P61 panel and do these checks:
- (a) Make sure the white EICAS message SPOILERS does not show on the display.

**NOTE:** Stop for 11 seconds to let the EICAS message show.

- (b) Make sure the amber SPOILERS light on the P5 panel is off.
- (c) Make sure that none of the six spoiler control modules (SCMs) have a fault not shown.

**NOTE:** The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- 1) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.
- 2) FOR -200 SERIES SCMs;  
Make sure that there are only left side PSM faults in the EXISTING FAULTS.

**NOTE:** To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- The display will show NO FAULTS if there are no faults.

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S 215-268

- (6) Disconnect the control wheel XDCR and speedbrake XDCR connector D5131 on the E1-1 equipment shelf and do these steps:
- (a) Turn the control wheel clockwise and move the speedbrake lever at the same time to its full upstop position in less than 1.5 seconds. Do these checks:
- 1) FOR -100 SERIES SCMs;  
Do the steps that follow:
- a) Make sure the CW XDCR and SB XDCR faultballs on SCM 1L are yellow.

NOTE: Ignore the MODULE FAULT faultball.

- b) Make sure all the other faultballs on the left SCMs are black.
- 2) FOR -200 SERIES SCMs;  
Make sure the CW RVDT FAULT and the S/B LVDT FAULT are in the EXISTING FAULTS of the three left SCMs (L1, L2, and L3).
- (b) Move the control wheel to its neutral position.  
(c) Move the speedbrake lever back to its ARMED position.  
(d) Connect connector D5131 to SCM 1L.  
(e) Push the RESET switch on SCM 1L.  
(f) FOR -100 SERIES SCMs;  
Make sure the MODULE FAULT faultballs on SCMS 2L and 3L are yellow.  
(g) Push the RESET switch for SCM 2L and SCM 3L.

S 215-269

- (7) Do the above step again for connector D5135 and SCM 2L.

S 215-270

- (8) Do the above step again for connector D5133 and SCM 3L.

S 865-271

- (9) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C6, FLT CONT ELEC 1L AC  
(b) 11C7, FLT CONT ELEC 1L DC

S 865-272

WARNING: MAKE SURE THE SPOILERS ARE IN THEIR DOWN POSITIONS BEFORE YOU OPEN THE FLT CONT ELEC CIRCUIT BREAKERS. THE SPOILERS WILL RETRACT IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (10) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11G17, FLT CONT ELEC 1R AC

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(b) 11G18, FLT CONT ELEC 1R DC

S 865-273

(11) Push the ECS/MSG switch on the P61 panel.

S 215-274

(12) Push the AUTOREAD switch on the P61 panel and do these steps:  
(a) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the EICAS message show.

(b) Make sure the amber SPOILERS light on the P5 panel is off.  
(c) Make sure that none of the six spoiler control modules (SCMs) have a fault not shown.

NOTE: The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- 1) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.
- 2) FOR -200 SERIES SCMs;  
Make sure there are only right side PSM faults in the EXISTING FAULTS.

NOTE: To look for faults do these steps:  
- Push the ON/OFF key  
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times  
- When the display shows EXISTING FAULTS push YES  
- The display will show NO FAULTS if there are no faults.

S 215-275

(13) Disconnect electrical connector D5137 on the E2-1 shelf and do these steps:

(a) Turn the control wheel clockwise and move the speedbrake lever at the same time to its full upstop position in less than 1.5 seconds. Do these checks:  
1) FOR -100 SERIES SCMs;  
Do the steps that follow:  
a) Make sure the CW XDCR and SB XDCR faultballs on SCM 1R are yellow.

NOTE: Ignore the MODULE FAULT faultball.

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- b) Make sure all the other faultballs on the right SCMs are black.
- 2) FOR -200 SERIES SCMs;  
Make sure the CW RVDT FAULT and the S/B LVDT FAULT are in the EXISTING FAULTS of the three right SCMs (R1, R2, and R3).
  - (b) Move the control wheel to its neutral position.
  - (c) Move the speedbrake lever to its ARMED position.
  - (d) Connect connector D5137 to SCM 1R.
  - (e) Push the RESET switch on SCM 1R.
  - (f) FOR -100 SERIES SCMs;  
Make sure the MODULE FAULT faultballs on SCMS 2R and 3R are yellow.
  - (g) Push the RESET switch for SCM 2R and SCM 3R.

S 215-276

- (14) Do the above step again for connector D5141 and SCM 2R.

S 215-277

- (15) Do the above step again for connector D5139 and SCM 3R.

S 865-278

- (16) Move the speedbrake lever to its down-and-locked detent position.

S 865-279

- (17) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11G17, FLT CONT ELEC 1R AC
  - (b) 11G18, FLT CONT ELEC 1R DC

M. Spoiler Power Control Actuator (PCA) Failure - Test

S 215-280

- (1) Make sure the control wheels are in their neutral positions.

S 215-281

- (2) Make sure the speedbrake lever is in its down-and-locked detent position.

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S 215-282

- (3) Make sure none of the six spoiler control modules (SCMs) have a fault.

NOTE: The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- (a) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.
- (b) FOR -200 SERIES SCMs;  
Make sure there are no faults in the EXISTING FAULTS.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- The display will show NO FAULTS if there are no faults.

S 865-283

- (4) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11C8, FLT CONT ELEC 2L AC
- (b) 11C9, FLT CONT ELEC 2L DC

S 215-284

- (5) Do these checks:
- (a) Make sure the amber SPOILERS light on the P5 panel is off.
- (b) Push the ECS/MSG switch on the P61 panel.
- (c) Push the AUTOREAD switch on the P61 panel and do this check:
- 1) Make sure the white SPOILERS message does not show on the bottom EICAS display.

NOTE: Stop for 11 seconds to let the EICAS message show.

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S 215-285

- (6) Disconnect electrical connector D5411 (for SCM 1L) on the E1-1 shelf and do these steps:
- (a) Make sure the amber SPOILERS light on the P5 panel is on.
  - (b) Push the ECS/MSG switch on the P61 panel.
  - (c) Push the AUTOREAD switch on the P61 panel and do this check:
    - 1) Make sure the white SPOILERS message shows on the bottom EICAS display.

NOTE: Stop for 11 seconds to let the EICAS message show.

- (d) Move the speedbrake lever to its full upstop position and do these checks:
  - 1) FOR SCM 1L;  
Make sure spoilers 2 and 11 are in their full down positions.
  - 2) Make sure all the other spoilers are up.
- (e) Move the speedbrake lever to its down-and-locked detent position.
- (f) Connect electrical connector D5411 on the E1 equipment shelf and do these checks:
  - 1) FOR -100 SERIES SCMs;  
Do these steps:
    - a) Make sure the PCA faultball on SCM 1L is yellow.

NOTE: Ignore the MODULE FAULT faultball.

- b) Make sure all the other faultballs on the left SCMs are black.
- 2) FOR -200 SERIES SCMs;  
Do these steps:
  - a) Make sure the PCA X FAULT (X=2 for SCM 1L, X=3 for SCM 2L, X=4 for SCM 3L) is in the EXISTING FAULTS of SCM 1L.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- Push one of the arrow keys to move through the faults.

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- b) Make sure no PCA faults are in the EXISTING FAULTS of SCMs 2L and 3L.
- (g) Push the RESET switch on SCM 1L.
- (h) Move the speedbrake lever to its full upstop position and do these checks:
  - 1) FOR SCM 2L;  
Make sure spoilers 3 and 10 are in their full down positions.
  - 2) Make sure all the other spoilers are up.
- (i) Move the speedbrake lever to its down-and-locked detent position.
- (j) Connect electrical connector D5405 on the E1 equipment shelf and do these checks:
  - 1) FOR -100 SERIES SCMs;  
Do these steps:
    - a) Make sure the PCA faultball on SCM 2L is yellow.

NOTE: Ignore the MODULE FAULT faultball.

- b) Make sure all the other faultballs on the left SCMs are black.
- 2) FOR -200 SERIES SCMs;  
Do these steps:
  - a) Make sure the PCA X FAULT (X=2 for SCM 1L, X=3 for SCM 2L, X=4 for SCM 3L) is in the EXISTING FAULTS of SCM 2L.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- Push one of the arrow keys to move through the faults.

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- b) Make sure no PCA faults are in the EXISTING FAULTS of SCMs 1L and 3L.
- (k) Push the RESET switch on SCM 2L.
- (l) Move the speedbrake lever to its full upstop position and do these checks:
  - 1) FOR SCM 3L;  
Make sure spoilers 4 and 9 are in their full down positions.
  - 2) Make sure all the other spoilers are up.
- (m) Move the speedbrake lever to its down-and-locked detent position.
- (n) Connect electrical connector D5403 on the E1 equipment shelf and do these checks:
  - 1) FOR -100 SERIES SCMs;  
Do these steps:
    - a) Make sure the PCA faultball on SCM 3L is yellow.

NOTE: Ignore the MODULE FAULT faultball.

- b) Make sure all the other faultballs on the left SCMs are black.
- 2) FOR -200 SERIES SCMs;  
Do these steps:
  - a) Make sure the PCA X FAULT (X=2 for SCM 1L, X=3 for SCM 2L, X=4 for SCM 3L) is in the EXISTING FAULTS of SCM 3L.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- Push one of the arrow keys to move through the faults.

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- b) Make sure no PCA faults are in the EXISTING FAULTS of SCMs 1L and 2L.
- (o) Push the RESET switch on SCM 3L.

S 865-288

- (7) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11C8, FLT CONT ELEC 2L AC
  - (b) 11C9, FLT CONT ELEC 2L DC

S 865-289

**WARNING:** MAKE SURE THE SPOILERS ARE IN THEIR DOWN POSITIONS BEFORE YOU OPEN THE FLT CONT ELEC CIRCUIT BREAKERS. THE SPOILERS WILL RETRACT IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (8) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - (a) 11G26, FLT CONT ELEC 2R AC
  - (b) 11G27, FLT CONT ELEC 2R DC

S 215-290

- (9) Disconnect electrical connector D5483 (for SCM 1R) on the E2-1 shelf and do these steps:
  - (a) Make sure the amber SPOILERS light on the P5 panel is on.
  - (b) Push the ECS/MSG switch on the P61 panel.
  - (c) Push the AUTOREAD switch on the P61 panel and do this check:
    - 1) Make sure the white EICAS message SPOILERS shows on the display.

**NOTE:** Stop for 11 seconds to let the EICAS message show.

- (d) Move the speedbrake lever to its full upstop position and do these checks:
  - 1) FOR SCM 1R;  
Make sure spoilers 1 and 12 are in their full down positions.
  - 2) Make sure all the other spoilers are up.
- (e) Move the speedbrake lever to its down-and-locked detent position.
- (f) Connect electrical connector D5483 on the E2 equipment shelf and do these checks:
  - 1) FOR -100 SERIES SCMs;  
Do the steps that follow:
    - a) Make sure the PCA faultball on SCM 1R is yellow.

**NOTE:** Ignore the MODULE FAULT faultball.

- b) Make sure all the other faultballs on the right SCMs are black.

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- 2) FOR -200 SERIES SCMs;  
Do the steps that follow:  
a) Make sure the PCA X FAULT (X=1 for SCM 1R, X=5 for SCM 2R, X=6 for SCM 3R) is in the EXISTING FAULTS of SCM 1L.

NOTE: To look for faults do these steps:  
- Push the ON/OFF key  
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times  
- When the display shows EXISTING FAULTS push YES  
- Push one of the arrow keys to move through the faults.

- b) Make sure no PCA faults are in the EXISTING FAULTS of SCMs 2R and 3R.
- (g) Push the RESET switch on SCM 1R.
- (h) Move the speedbrake lever to its full upstop position and do these checks:  
1) FOR SCM 2R;  
Make sure spoilers 5 and 8 are in their full down positions.  
2) Make sure all the other spoilers are up.
- (i) Move the speedbrake lever to its down-and-locked detent position.
- (j) Connect electrical connector D5485 on the E2 equipment shelf and do these checks:  
1) FOR -100 SERIES SCMs;  
Do the steps that follow:  
a) Make sure the PCA faultball on SCM 2R is yellow.

NOTE: Ignore the MODULE FAULT faultball.

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- b) Make sure all the other faultballs on the right SCMs are black.
- 2) FOR -200 SERIES SCMs;  
Do the steps that follow:
- a) Make sure the PCA X FAULT (X=1 for SCM 1R, X=5 for SCM 2R, X=6 for SCM 3R) is in the EXISTING FAULTS of SCM 2R.
- NOTE: To look for faults do these steps:
- Push the ON/OFF key
  - If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
  - When the display shows EXISTING FAULTS push YES
  - Push one of the arrow keys to move through the faults.
- b) Make sure no PCA faults are in the EXISTING FAULTS of SCMs 1R and 3R.
- (k) Push the RESET switch on SCM 2R.
- (l) Move the speedbrake lever to its full upstop position and do these checks:
- 1) FOR SCM 3R;  
Make sure spoilers 6 and 7 are in their full down positions.
- 2) Make sure all the other spoilers are up.
- (m) Move the speedbrake lever to its down-and-locked detent position.
- (n) Connect electrical connector D5487 on the E2 equipment shelf and do these checks:
- 1) FOR -100 SERIES SCMs;  
Do the steps that follow:
- a) Make sure the PCA faultball on SCM 3R is yellow.

NOTE: Ignore the MODULE FAULT faultball.

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- b) Make sure all the other faultballs on the right SCMs are black.
- 2) FOR -200 SERIES SCMs;  
Do the steps that follow:
  - a) Make sure the PCA X FAULT (X=1 for SCM 1R, X=5 for SCM 2R, X=6 for SCM 3R) is in the EXISTING FAULTS of SCM 3R.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- Push one of the arrow keys to move through the faults.

- b) Make sure no PCA faults are in the EXISTING FAULTS of SCMs 1R and 2R.
- (o) Push the RESET switch on SCM 3R.

S 865-293

- (10) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11G26, FLT CONT ELEC 2R AC
  - (b) 11G27, FLT CONT ELEC 2R DC

N. Hydraulic Pressure Failure and Spoiler Operation - Test

S 215-294

- (1) Make sure the control wheels are in their neutral positions.

S 215-295

- (2) Make sure the speedbrake lever is in its down-and-locked detent position.

S 865-296

- (3) Remove the power from the left hydraulic system (Ref 29-11-00).

S 215-297

- (4) Move the speedbrake lever to its full upstop position and do these steps:
  - (a) Stop for 11 seconds.
  - (b) Make sure the amber SPOILERS light on the P5 panel is on.
  - (c) Make sure spoilers 1, 6, and 12 are in their full down positions.
  - (d) Make sure spoilers 2 thru 5, and 8 thru 11 are up.
  - (e) Make sure spoiler 7 moves up and then down.

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- S 865-298
- (5) Move the speedbrake lever to its down-and-locked detent position.
- S 215-299
- (6) Supply pressure to the left hydraulic system (Ref 29-11-00) and do these steps:
- (a) Stop for 3 seconds.
  - (b) Make sure the amber SPOILERS light on the P5 panel is off.
- S 865-300
- (7) Remove the power from the right hydraulic system (Ref 29-11-00).
- S 215-301
- (8) Move the speedbrake lever to its full upstop position and do these steps:
- (a) Stop for 11 seconds.
  - (b) Make sure the amber SPOILERS light on the P5 panel is on.
  - (c) Make sure spoilers 2, 7, and 11 are in their full down positions.
  - (d) Make sure spoilers 1, 3 thru 5, 8 thru 10, and 12 are up.
  - (e) Make sure spoiler 6 moves up and then down.
- S 865-302
- (9) Move the speedbrake lever to its down-and-locked detent position.
- S 215-303
- (10) Supply pressure to the right hydraulic system (Ref 29-11-00) and do these steps:
- (a) Stop for 3 seconds.
  - (b) Make sure the amber SPOILERS light on the P5 panel is off.
- S 865-304
- (11) Remove the power from the center hydraulic system (Ref 29-11-00).
- S 215-305
- (12) Move the speedbrake lever to its full upstop position and do these steps:
- (a) Stop for 11 seconds.
  - (b) Make sure the amber SPOILERS light on the P5 panel is on.
  - (c) Make sure spoilers 3, 4, 5, 8, 9 and 10 are in their full down positions.
  - (d) Make sure spoilers 1, 2, 6, 7, 11, 12 are up.
- S 865-306
- (13) Move the speedbrake lever to its down-and-locked detent position.
- S 215-307
- (14) Supply pressure to the center hydraulic system (Ref 29-11-00) and do these steps:
- (a) Stop for 3 seconds.

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- (b) Make sure the amber SPOILERS light on the P5 panel is off.
- (c) Make sure none of the six spoiler control modules (SCMs) have a fault.

NOTE: The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- 1) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.
- 2) FOR -200 SERIES SCMs;  
Make sure there are no faults in the EXISTING FAULTS.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- The display will show NO FAULTS if there are no faults.

- (d) Push the ECS/MSG switch on the P61 panel.
- (e) Push the AUTOREAD switch on the P61 panel and do this check:
  - 1) Make sure the white SPOILERS message does not show on the bottom EICAS display.

NOTE: Stop for 11 seconds to let the EICAS message show.

S 215-319

- (15) Do these steps to do a check of the ram air turbine (RAT) system/spoiler interface:
  - (a) Remove the power from the center hydraulic system (Ref 29-11-00).
  - (b) Make sure these circuit breakers on the P11 panel are closed:
    - 1) 11C7, FLT CONT ELEC 1L DC

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- 2) 11C9, FLT CONT ELEC 2L DC
- (c) Disconnect electrical connector D2358 from the RAT hydraulic pressure switch in the right wheel well.
- (d) Install a wire between pins 1 and 2 on electrical connector D2358 and do this check:
- 1) Make sure the green PRESS light on the RAT manual select switch on the P5 panel is on.
- (e) Move the speedbrake lever to its full upstop position and do these checks:
- 1) Make sure spoilers 3, 4, 5, 8, 9, and 10 stay in their full down positions.
  - 2) Make sure the amber SPOILERS light on the P5 panel is on.
  - 3) Make sure a PCA fault shows on SCM's 2L, 3L, and 2R.

NOTE: The SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- a) FOR -100 SERIES SCMs;  
Make sure the PCA faultballs are yellow.
- b) FOR -200 SERIES SCMs;  
Make sure a PCA X FAULT (where X = 1 to 12) shows in the EXISTING FAULTS.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- Push one of the arrow keys to move through the faults.

- (f) Move the speedbrake lever to its down-and-locked detent position.
- (g) Push the RESET switches on SCM's 2L, 3L, and 2R on the E1-1 and E2-1 equipment shelves and do these checks:
- 1) Make sure SCM's 2L, 3L, and 2R do not have a PCA fault.
    - a) FOR -100 SERIES SCMs;  
Make sure the PCA faultballs are black.

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- b) FOR -200 SERIES SCMs;  
Make sure a PCA X FAULT (where X = 1 to 12) does not show in the EXISTING FAULTS.
  - 2) Make sure the amber SPOILERS light on the P5 panel is off.
  - (h) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
    - 1) 11C7, FLT CONT ELEC 1L DC
  - (i) Move the speedbrake lever to its full upstop position and do these checks:
    - 1) Make sure spoilers 3, 4, 5, 8, 9, and 10 stay in their full down positions.
    - 2) Make sure the amber SPOILERS light on the P5 panel is on.
    - 3) Make sure SCM's 2L, 3L, and 2R do not have a PCA fault.
      - a) FOR -100 SERIES SCMs;  
Make sure the PCA faultballs are black.
      - b) FOR -200 SERIES SCMs;  
Make sure a PCA X FAULT (where X = 1 to 12) does not show in the EXISTING FAULTS.
  - (j) Move the speedbrake lever to its down-and-locked detent position.
  - (k) Supply pressure to the center hydraulic system (Ref 29-11-00) and do this check:
    - 1) Make sure the amber SPOILERS light on the P5 panel is off.
  - (l) Move the speedbrake lever to its full upstop position and do these checks:
    - 1) Make sure spoilers 3, 4, 5, 8, 9, and 10 move to their full up positions.
    - 2) Make sure SCM's 2L, 3L, and 2R do not have a PCA fault.
      - a) FOR -100 SERIES SCMs;  
Make sure the PCA faultballs are black.
      - b) FOR -200 SERIES SCMs;  
Make sure a PCA X FAULT (where X = 1 to 12) does not show in the EXISTING FAULTS.
  - (m) Remove the wire you installed between pins 1 and 2 on electrical connector D2358.
  - (n) Connect electrical connector D2358 to the RAT pressure switch in the right wheel well and do this check:
    - 1) Make sure the green PRESS light on the RAT manual select switch on the P5 panel is off.
  - (o) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - 1) 11C7, FLT CONT ELEC 1L DC
  - (p) Do a test of the RAT Hydraulic Pump System (Ref 29-21-00).
0. Spoiler Inhibit - Test

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S 865-360

**WARNING:** MAKE SURE THE SPOILERS ARE IN THEIR DOWN POSITIONS BEFORE YOU OPEN THE FLT CONT ELEC CIRCUIT BREAKERS. THE SPOILERS WILL RETRACT IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Open the circuit breakers on the P11 panel that are shown in Table 508 and attach DO-NOT-CLOSE tags.

TABLE 508	
11C6,	FLT CONT ELEC 1L AC
11C7,	FLT CONT ELEC 1L DC
11C8,	FLT CONT ELEC 2L AC
11C9,	FLT CONT ELEC 2L DC
11G17,	FLT CONT ELEC 1R AC
11G18,	FLT CONT ELEC 1R DC
11G26,	FLT CONT ELEC 2R AC
11G27,	FLT CONT ELEC 2R DC

S 425-321

- (2) Install the left and right stabilizer trim/aileron lockout modules (SAMs) on the E1-1 and E2-1 shelves (Ref 27-09-00).

S 865-322

- (3) Remove the DO-NOT-CLOSE tags and close the circuit breakers on the P11 panel that are shown in Table 508.

S 215-323

- (4) Make sure the SAM and ADC faultballs on the left and right SAMs are black.

S 215-324

- (5) Make sure the speedbrake lever is in its down-and-locked detent position.

S 215-325

- (6) Turn the control wheel fully counterclockwise and do these checks:  
 (a) Make sure spoilers 1 thru 6 are up.  
 (b) Make sure spoilers 7 thru 12 stay down.

S 215-326

- (7) Move the AIR DATA CMPTR test switch on the P61 panel to its L position and hold it there for 2 seconds. Do these checks:  
 (a) Make sure spoilers 4 and 5 move to their full down positions and then back to their up positions in less than 45 seconds.

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- (b) Make sure spoilers 1 thru 6 are up.
- (c) Make sure spoilers 7 thru 12 stay down.

S 215-327

- (8) Turn the control wheel fully clockwise and do these checks:
  - (a) Make sure spoilers 1 thru 6 stay down.
  - (b) Make sure spoilers 7 thru 12 are up.

S 215-328

- (9) Move the AIR DATA CMPTR test switch on the P61 panel to its L position and hold it there for 2 seconds. Do these checks:
  - (a) Make sure spoilers 8 and 9 move to their full down positions and then back to their up positions in less than 45 seconds.
  - (b) Make sure spoilers 1 thru 6 stay down.
  - (c) Make sure spoilers 7 thru 12 are up.

S 215-329

- (10) Move the control wheel back to its neutral position and do these steps:
  - (a) Make sure none of the six spoiler control modules (SCMs) have a fault.

NOTE: The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- 1) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.
- 2) FOR -200 SERIES SCMs;  
Make sure there are no faults in the EXISTING FAULTS.

NOTE: To look for faults do these steps:

- Push the ON/OFF key
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times
- When the display shows EXISTING FAULTS push YES
- The display will show NO FAULTS if there are no faults.

- (b) Make sure the amber SPOILERS light on the P5 panel is off.
- (c) Push the ECS/MSG switch on the P61 panel.

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- (d) Push the AUTOREAD switch on the P61 panel and do this check:  
1) Make sure the white SPOILERS message does not show on the bottom EICAS display.

NOTE: Stop for 11 seconds to let the EICAS message show.

P. Panel Position Monitor - Test

S 215-330

- (1) Make sure these circuit breakers on the P11 panel are closed:  
(a) 11C30, LANDING GEAR POSITION AIR/GND SYS 1  
(b) 11U15, AIR/GND SYS 1  
(c) 11U23, POS AIR/GND SYS 2

S 865-331

- (2) Move the control wheel to its neutral position.

S 215-332

- (3) Move the speedbrake lever to its full upstop position and do this check:  
(a) Make sure all the spoilers move to their full up positions.

S 215-333

- (4) Put an actuator against the proximity sensor (S245) on the left landing gear to operate it (AMM 32-09-02/201). Do these checks:  
(a) Make sure spoilers 5 and 8 move to their full down positions.  
(b) Make sure the other spoilers stay in their up positions.

S 095-334

- (5) Remove the switch actuator from the proximity sensor (S245) on the left landing gear.

S 215-335

- (6) Push the RESET switch on all the SCM's and do this check:  
(a) Make sure spoilers 5 and 8 move to their full up positions.

S 215-336

- (7) Put a switch actuator against the proximity sensor (S267) on the left landing gear to operate it (Ref 32-09-02). Do these checks:  
(a) Make sure spoilers 6 and 7 move to their full down positions.  
(b) Make sure all the other spoilers stay in their up positions.

NOTE: Spoilers 4 and 9 can temporarily move to their full down positions and then go back to their full up positions.

S 095-337

- (8) Remove the switch actuator from the proximity sensor (S267) on the left landing gear.

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S 215-338

- (9) Push the RESET switch on all the SCM's and do this check:  
(a) Make sure spoilers 6 and 7 go to their full up positions.

S 215-339

- (10) Move the speedbrake lever to its down-and-locked detent position and do these checks:  
(a) Make sure the amber SPOILERS light on the P5 panel is off.  
(b) Make sure none of the six spoiler control modules (SCMs) have a fault.

NOTE: The six SCMs are found on the E1-1 and the E2-1 shelves in the main equipment center.

- 1) FOR -100 SERIES SCMs;  
Make sure all the faultballs are black.
- 2) FOR -200 SERIES SCMs;  
Make sure there are no faults in the EXISTING FAULTS.

NOTE: To look for faults do these steps:  
- Push the ON/OFF key  
- If the display shows SCM IN POS XX?: Push an arrow key (if it is necessary) until the correct position for the SCM is shown and then Push YES two times  
- When the display shows EXISTING FAULTS push YES  
- The display will show NO FAULTS if there are no faults.

- (c) Make sure the white EICAS message SPOILERS does not show on the display.

NOTE: Stop for 11 seconds to let the message show.

Q. Put the Airplane Back to Its Usual Condition

S 425-340

- (1) Install the yaw damper modules and the rudder ratio changer modules (Ref 27-09-00).

S 865-341

- (2) Extend the trailing edge flaps (AMM 27-51-00).

S 045-493

- (3) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

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S 865-509

**WARNING:** REFER TO AMM 25-65-00/201, FOR THE PROCEDURE TO ARM THE ESCAPE SYSTEM. IF YOU INCORRECTLY ARM THE OFF-WING ESCAPE SYSTEM, THE ESCAPE SLIDE CAN ACCIDENTALLY INFLATE AND CAUSE INJURY OR DAMAGE.

- (4) Do the steps that follow:
- (a) Arm the off-wing escape system (AMM 25-65-00/201).
  - (b) Close the EXIT sign panel above the overwing escape hatch.

S 865-345

- (5) Retract the trailing edge flaps (AMM 27-51-00).

S 865-346

- (6) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00).

S 865-347

- (7) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11G11, AUTO SPEEDBRK

S 865-348

- (8) Remove electrical power if it is not necessary (AMM 24-22-00).

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INBOARD AND OUTBOARD SPOILERS - REMOVAL/INSTALLATION

1. General

- A. This task contains the removal and installation tasks for the inboard and outboard spoilers.
- B. The 8 outboard spoilers are interchangeable. However, the four inboard spoilers (5, 6, 7, and 8) are not interchangeable.
- C. The spoilers are numbered 1 thru 12 from the outboard left wing spoiler to the outboard right wing spoiler.

TASK 27-61-01-024-001

2. Spoilers - Removal

A. General

- (1) This task contains these procedures:

- Outboard Spoiler - Removal
- Inboard Spoiler - Removal.

Because this task contains more than one procedure, do only the applicable groups of steps.

To start one of these procedures do the "Prepare for the Removal" group of steps. Then, do the group of steps that is necessary to remove the component.

B. Equipment

- (1) A27108-13 Spoiler Actuator Lock

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-44-00/201, Wing Access Doors and Panels
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 27-51-00/201, Trailing Edge Flap System
- (5) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 550/650 Wing Trailing Edge
  - 560/660 Wing Trailing Edge

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- (2) Access Panels
  - 552/652BB Landing Gear Support Beam
  - 552/652GB Area Aft of the Main Flap Mid-Spar Structure

E. Prepare for the Removal

S 864-002

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

S 214-003

- (2) Make sure the speedbrake lever is in its down-and-locked detent position.

S 864-004

- (3) Extend the trailing edge flaps.

S 044-005

- (4) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 864-006

- (5) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-007

- (6) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 864-008

- (7) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:

- (a) 11C6, FLT CONT ELEC 1L AC
- (b) 11C7, FLT CONT ELEC 1L DC
- (c) 11C8, FLT CONT ELEC 2L AC
- (d) 11C9, FLT CONT ELEC 2L DC
- (e) 11G11, AUTO SPEEDBRK
- (f) 11G17, FLT CONT ELEC 1R AC
- (g) 11G18, FLT CONT ELEC 1R DC
- (h) 11G26, FLT CONT ELEC 2R AC
- (i) 11G27, FLT CONT ELEC 2R DC
- (j) 11H15, FLT CONT SHUTOFF WING LEFT
- (k) 11H16, FLT CONT SHUTOFF WING CTR
- (l) 11H26, FLT CONT SHUTOFF WING RIGHT

S 864-009

- (8) Use a 5/32 allen wrench to operate the manual release cam (27 or 35) and lift the spoiler (1 or 5).

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S 494-010

(9) Install the spoiler actuator lock on the PCA (AMM 27-61-00/201).

F. Outboard Spoiler - Removal (Fig. 401)

S 034-011

- (1) Disconnect these components from the spoiler (1):  
(a) The bonding jumper (15)  
(b) The rod end of the PCA (24).

S 034-012

- (2) Remove the four hinge bolts (11, 3, 3, and 11).

S 024-013

- (3) Remove the outboard spoiler (1).

G. Inboard Spoiler - Removal (Fig. 403)

S 014-014

- (1) Open the applicable access panels (AMM 06-44-00/201):  
(a) 552BB (for spoiler number 6)  
(b) 552GB (for spoiler number 5)  
(c) 652BB (for spoiler number 7)  
(d) 652GB (for spoiler number 8).

S 044-066

**WARNING:** REFER TO AMM 25-65-00/201 FOR THE PROCEDURE TO DISARM THE OFF-WING ESCAPE SYSTEM. IF YOU INCORRECTLY DISARM THE OFF-WING ESCAPE SYSTEM, THE ESCAPE SLIDE CAN ACCIDENTALLY INFLATE AND CAUSE INJURY OR DAMAGE.

- (2) Disarm the off-wing escape system (AMM 25-65-00/201).

S 034-016

- (3) Disconnect these components from the spoiler (5):  
(a) The bonding jumper (15)  
(b) The rod end of the PCA (30).

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S 034-017

- (4) Remove the four hinge bolts (16, 17, 17, and 16).

S 024-018

- (5) Remove the inboard spoiler (5).

TASK 27-61-01-424-019

3. Spoilers - Installation

A. General

- (1) This task contains these procedures:

- Outboard Spoiler - Installation
- Inboard Spoiler - Installation
- Inboard/Outboard Spoilers - Adjustment.

Because this task contains more than one procedure, do only the applicable groups of steps.

To start one of these procedures, do the group of steps necessary to install the component. Then, do the "Inboard/Outboard Spoilers - Adjustment" group of steps. And last, do the "Put the Airplane Back to Its Usual Condition" group of steps.

B. Equipment

- (1) A27108-13 Spoiler Actuator Lock  
(2) Milliohmmeter - 0 to 0.1 ohms range

C. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)  
(2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)

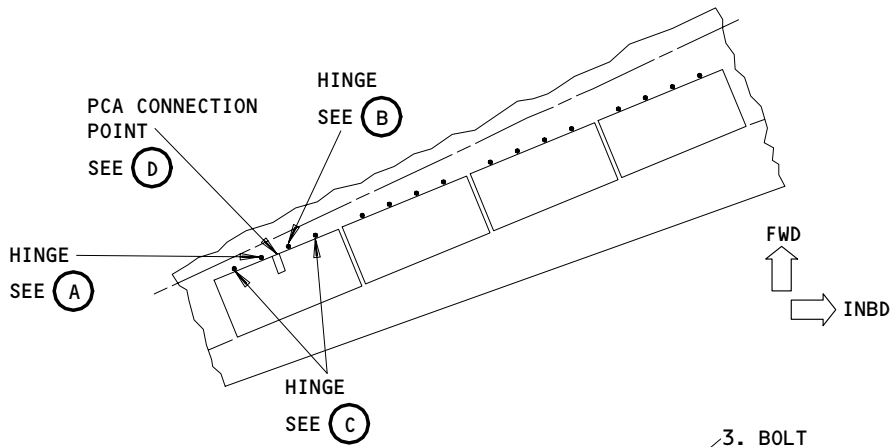
EFFECTIVITY

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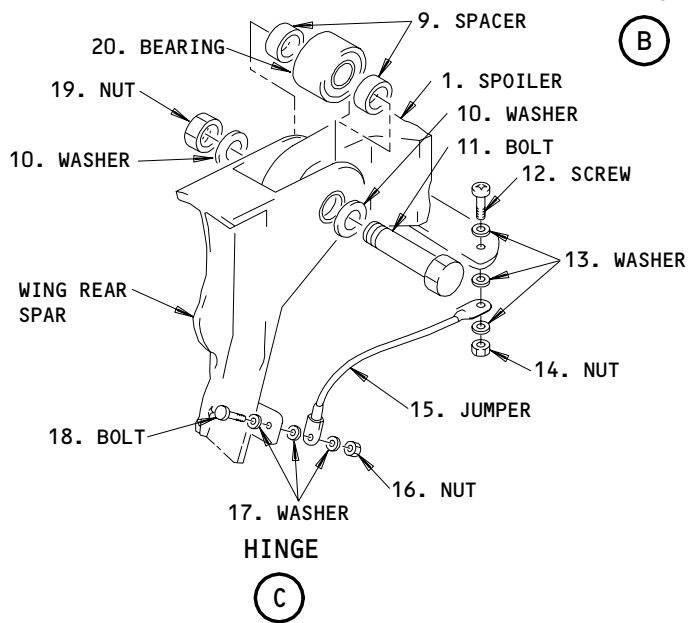
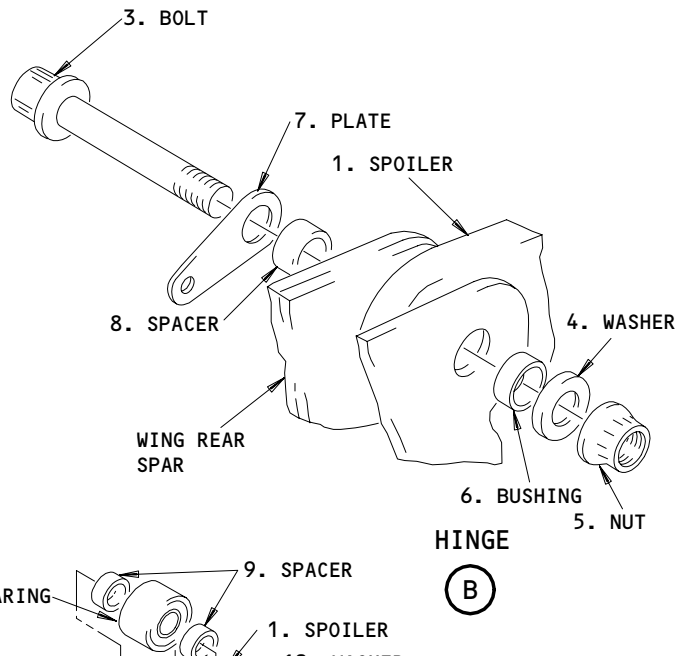
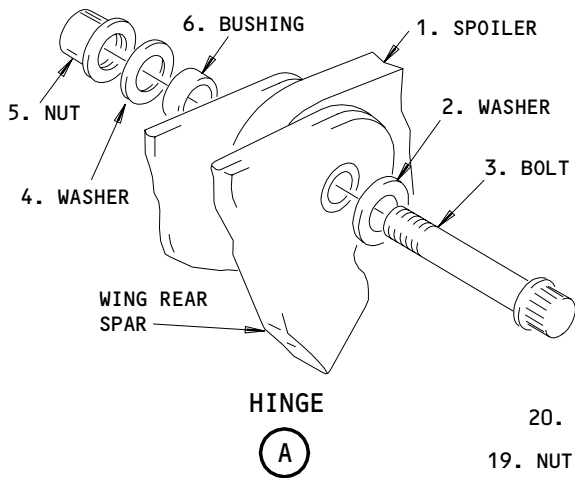
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**OUTBOARD SPOILERS  
(LEFT WING SHOWN,  
RIGHT WING OPPOSITE)**



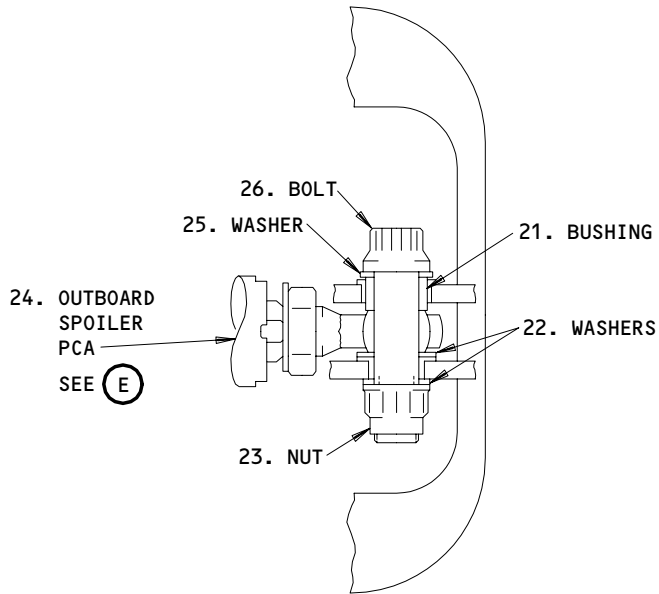
**Outboard Spoiler Installation  
Figure 401 (Sheet 1)**

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**27-61-01**

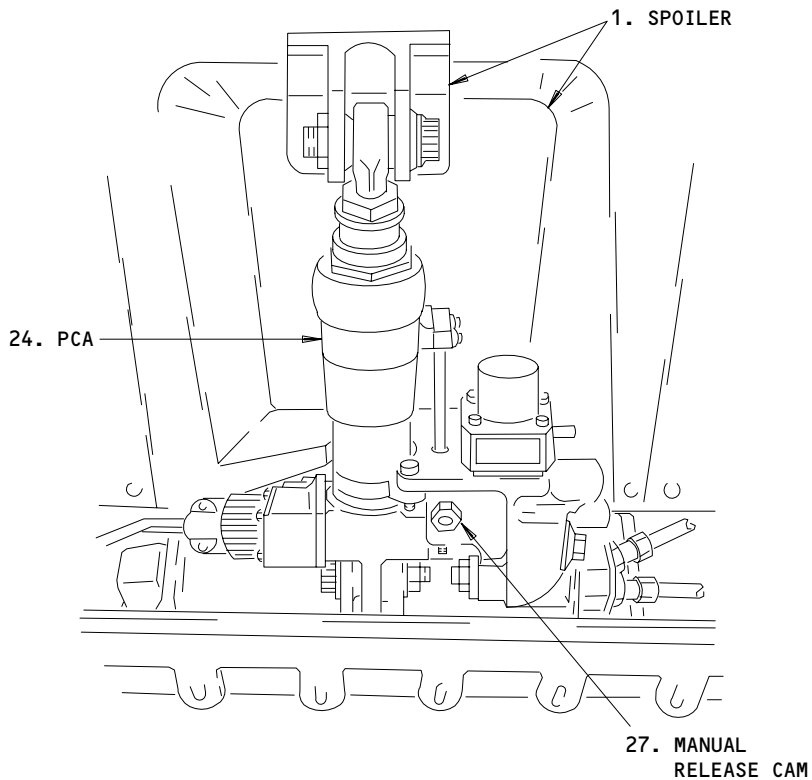
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PCA CONNECTION POINT

(D)



OUTBOARD SPOILER PCA

(E)

Outboard Spoiler Installation  
Figure 401 (Sheet 2)

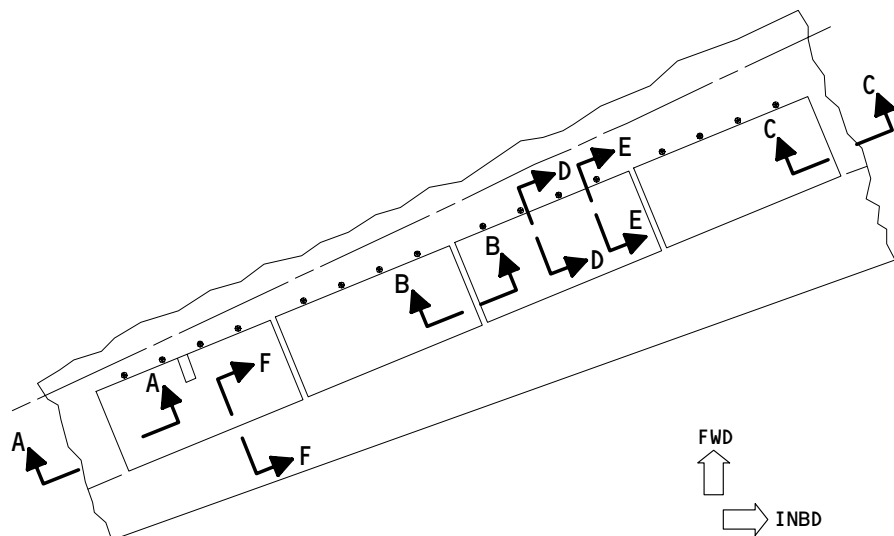
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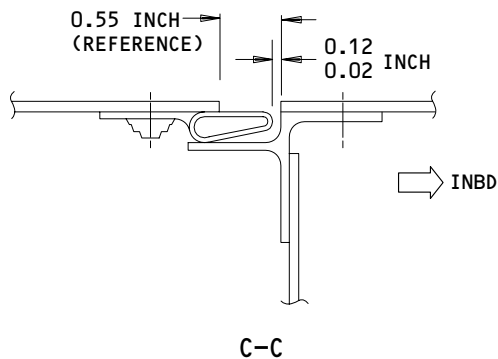
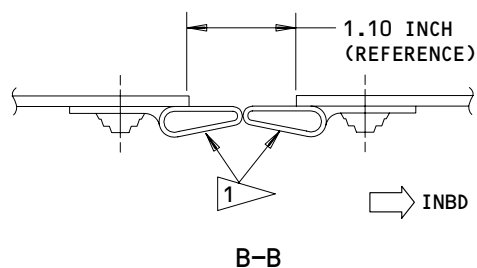
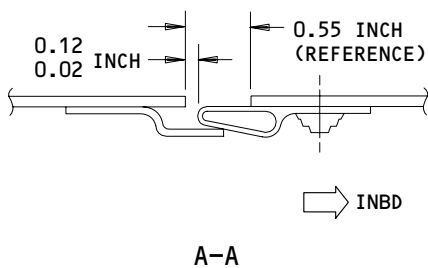
27-61-01

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OUTBOARD SPOILERS LEFT WING SHOWN  
(RIGHT WING OPPOSITE)



- 1 ADJUST THE ADJACENT SEALS TO 0.05-0.10 INCH COMPRESSION AND TIGHTEN THE RETAINER FASTENERS.
- 2 REFER TO AMM 27-61-00/501 FOR THE DATA NECESSARY TO ADJUST THE SPOILER-TO-FLAP CLEARANCE.

Outboard Spoiler Clearances  
Figure 402 (Sheet 1)

EFFECTIVITY	ALL
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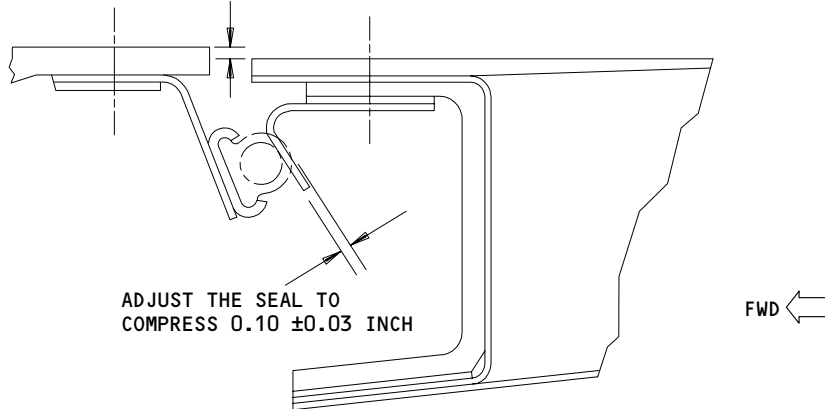
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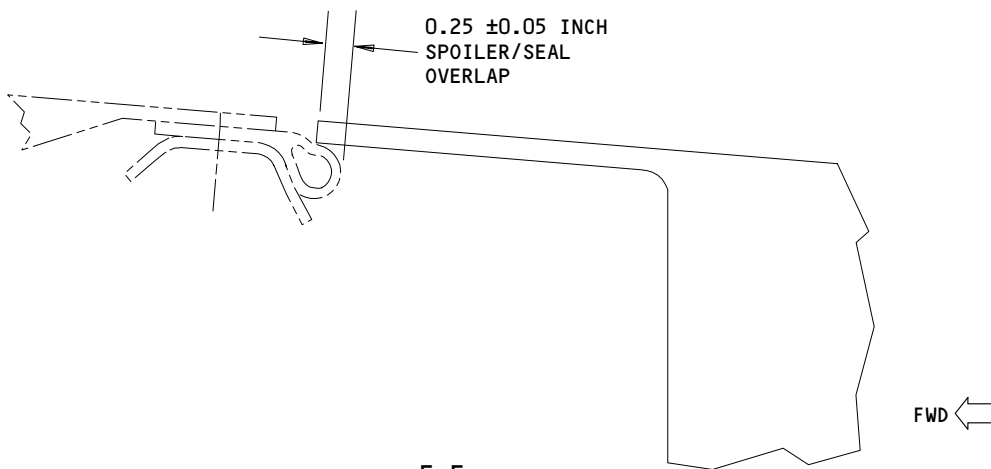


+0.05 PERMITTED MISFAIR FOR 70% OF THE SPAN  
-0.08

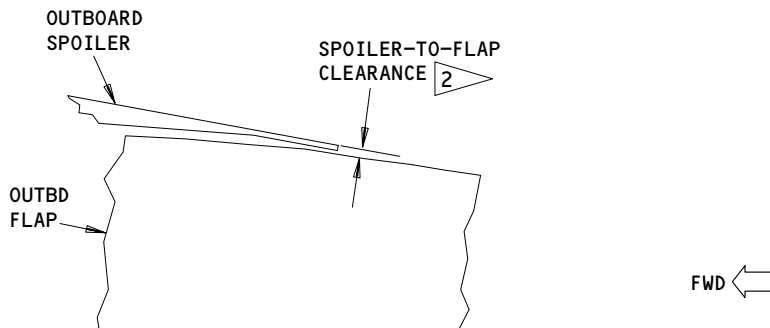
+0.08 PERMITTED MISFAIR FOR 30% OF THE SPAN  
-0.10



D-D



E-E



(FOR ALL OUTBOARD SPOILERS)

F-F

Outboard Spoiler Clearances  
Figure 402 (Sheet 2)

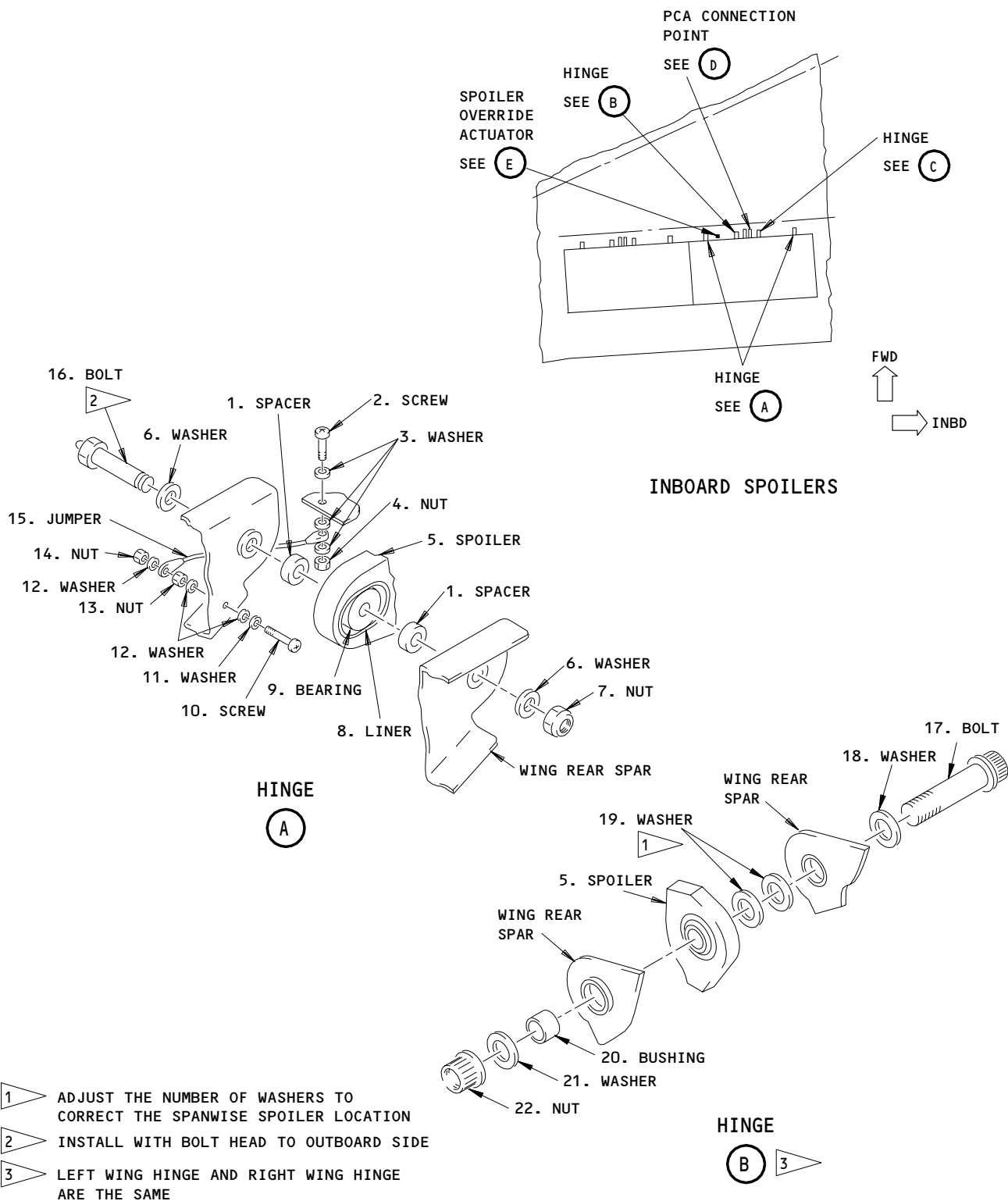
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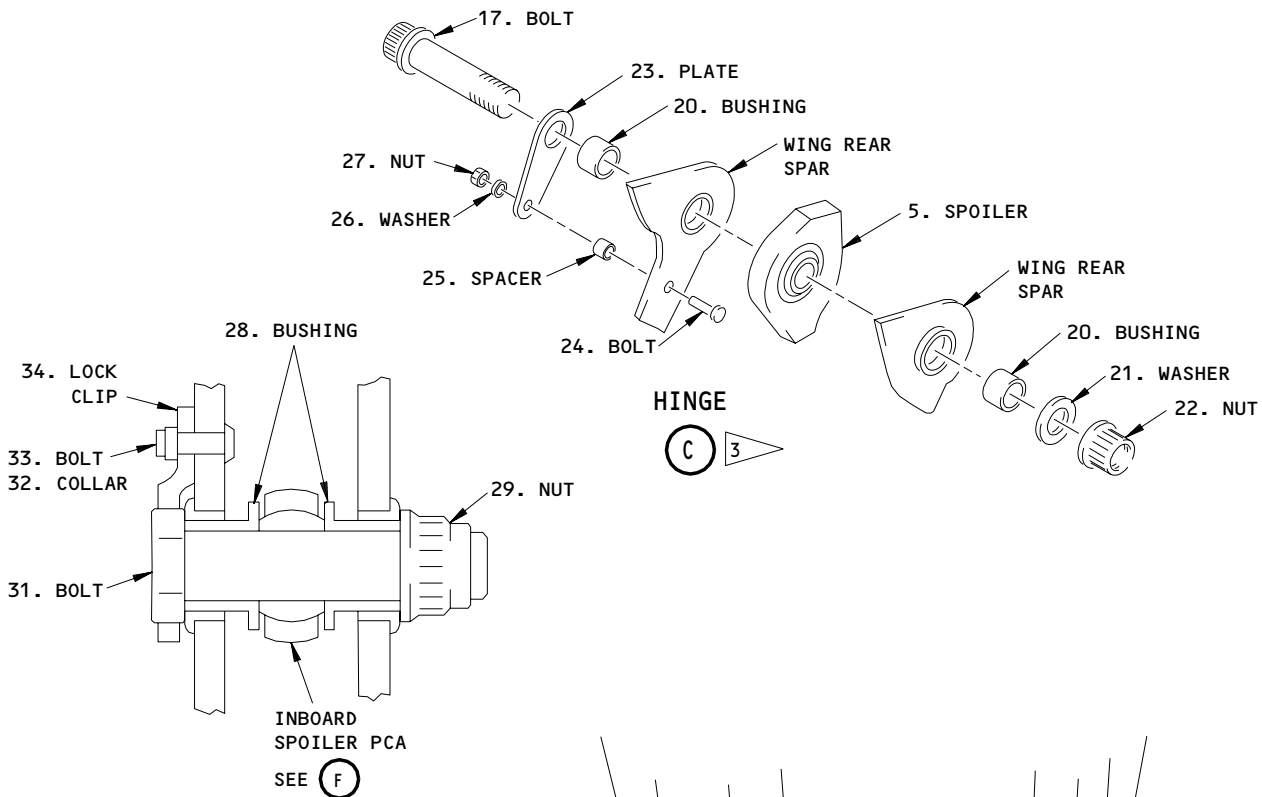
Inboard Spoiler Installation  
Figure 403 (Sheet 1)

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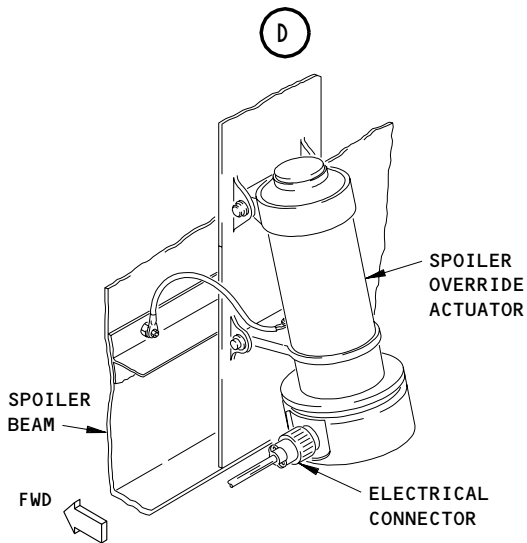
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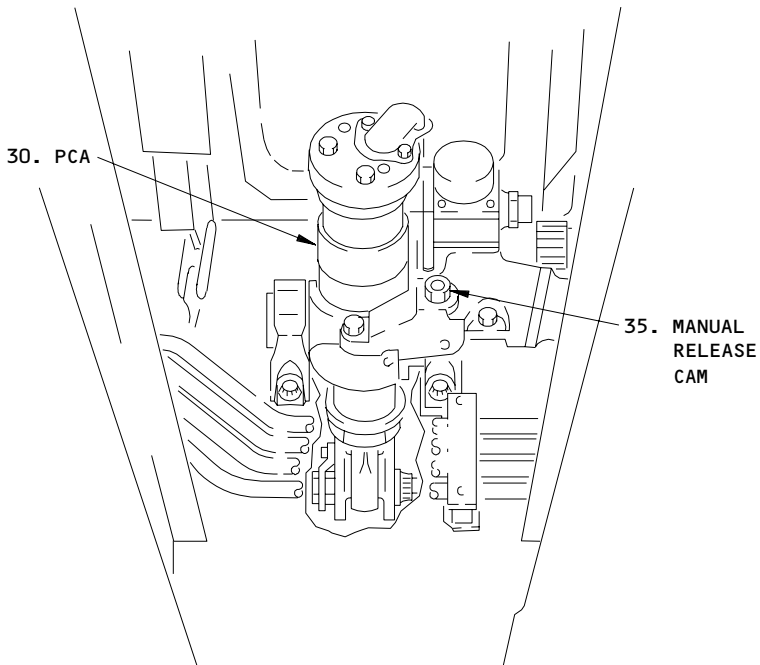
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PCA CONNECTION POINT



SPOILER OVERRIDE ACTUATOR

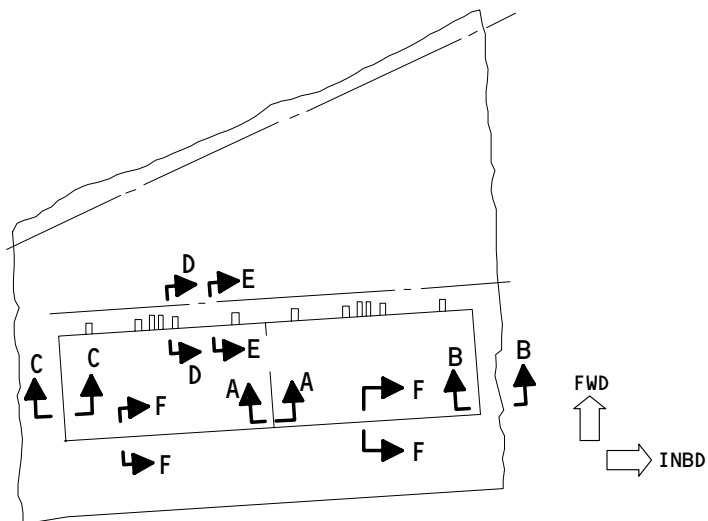


INBOARD SPOILER PCA

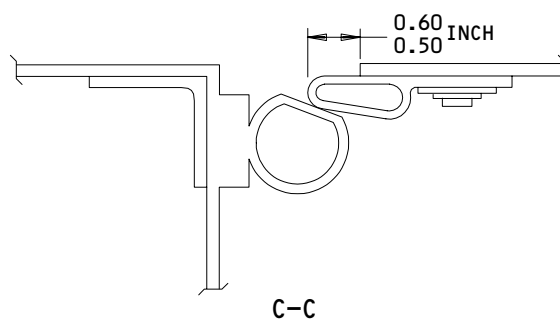
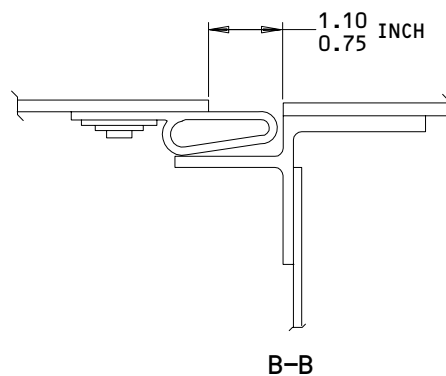
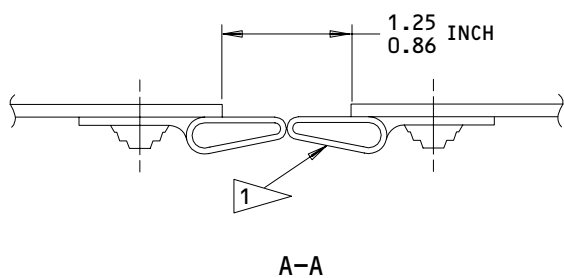
Inboard Spoiler Installation  
Figure 403 (Sheet 2)

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INBOARD SPOILERS LEFT WING SHOWN  
(RIGHT WING OPPOSITE)



- 1 ADJUST THE SEALS UNTIL THEY ARE COMPRESSED 10 TO 20 PERCENT AND TIGHTEN THE RETAINER FASTENERS
- 2 REFER TO 27-61-00/501 FOR THE DATA NECESSARY TO ADJUST THE SPOILER-TO-FLAP CLEARANCE.

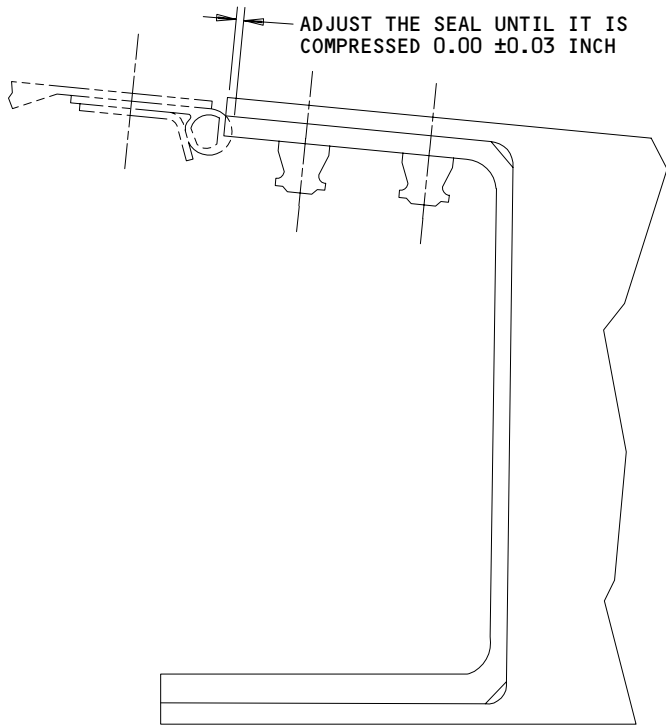
Inboard Spoiler Clearances  
Figure 404 (Sheet 1)

EFFECTIVITY	ALL
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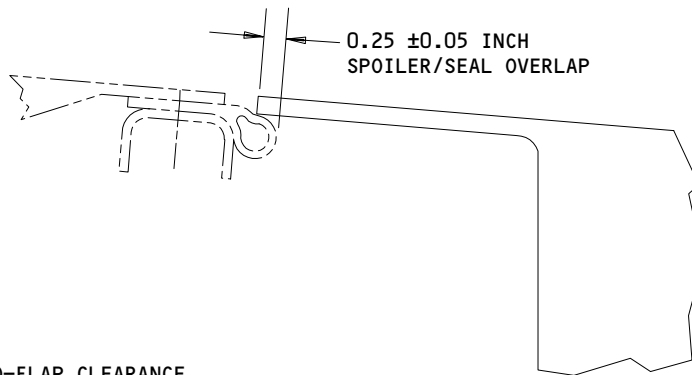
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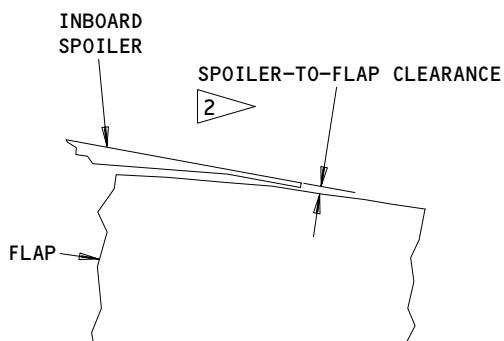
FWD ←

D-D



FWD ←

E-E



FWD ←

F-F

Inboard Spoiler Clearances  
Figure 404 (Sheet 2)

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D. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Spoiler	27-61-01	01	105
	2	Washer			60
	3	Bolt			50
	4	Washer			65
	5	Nut			95
	6	Bushing			80
	7	Plate			70
	8	Spacer			85
	9	Spacer			75
	10	Washer			55
	11	Bolt			45
	12	Screw			30
	13	Washer			35
	14	Nut			40
	15	Jumper			10
	16	Nut			25
	17	Washer			20
	18	Bolt			12,15
	19	Nut			90
	20	Bearing			100

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**BOEING**  
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 MAINTENANCE MANUAL

MM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	21	Bushing	27-61-02	01	60
	22	Washer			40
	23	Nut			50
	24	PCA			65
	25	Washer			35
	26	Bolt			32
403	1	Spacer	27-61-01	05	115
	2	Screw			20
	3	Washer			35
	4	Nut			50
	5	Spoiler			140,145
					150,151
					155,156
	6	Washer			75
	7	Nut			100
	8	Liner			180
	9	Bearing			130
	10	Screw			15
	11	Washer			25
	12	Washer			30
	13	Nut			40
	14	Nut			45
	15	Jumper			55
	16	Bolt			60
	17	Bolt			65
	18	Washer			85
	19	Washer			82
	20	Bushing			135
	21	Washer			90
	22	Nut			105
	23	Plate			125
	24	Bolt			70
	25	Spacer			120
26	Washer	95			
27	Nut	110			

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AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
403	28	Bushing	27-61-02	05	30
	29	Nut			25
	30	PCA			35
	31	Bolt			20
	32	Collar			10
	33	Bolt			5
	34	Lock Clip			15

E. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-51-00/201, Trailing Edge Flap System
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (5) AMM 27-61-00/501, Spoiler/Speedbrake Control System
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

F. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 550/650 Wing Trailing Edge
  - 560/660 Wing Trailing Edge
- (2) Access Panels
  - 552/652BB Landing Gear Support Beam
  - 552/652GB Area Aft of the Main Flap Mid-Spar Structure

G. Outboard Spoiler - Installation (Fig. 401)

S 644-020

- (1) Apply some of the grease to the nuts, bolts, washers, outboard hinge spacers, bearings and hinges before you install them.

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- S 424-070
- (2) Place the outboard hinge spacers (9) and bearings (20) in position on the spoiler hinge halves.
- S 864-021
- (3) Put the spoiler (1) in its correct position.
- S 434-022
- (4) Do these steps to connect the outboard inner hinge (View A):
- (a) Install the bolt (3), washers (2, 4) and bushing (6).
  - (b) Install the nut (5) and tighten it to 2400-3250 pound-inches (271.2-367.2 newton-meters).
- S 434-023
- (5) Do these steps to connect the inboard inner hinge (View B):
- (a) Install the bolt (3), plate (7), spacer (8), bushing (6), and washer (4).
  - (b) Install the bolt that connects the plate (7) to the wing rear spar.
  - (c) Install the nut (5) and tighten it to 2400-3250 pound-inches (271.2-367.2 newton-meters).
- S 434-072
- (6) Do these steps to connect the inboard inner hinge (View A):
- (a) Install the bolt (3), washers (2, 4) and bushing (6).
  - (b) Install the nut (5) and tighten it to 2400-3250 pound-inches (271.2-367.2 newton-meters).
- S 434-073
- (7) Do these steps to connect the outboard inner hinge (View B):
- (a) Install the bolt (3), plate (7), spacer (8), bushing (6), and washer (4).
  - (b) Install the bolt that connects the plate (7) to the wing rear spar.
  - (c) Install the nut (5) and tighten it to 2400-3250 pound-inches (271.2-367.2 newton-meters).
- S 434-024
- (8) Do these steps to connect the two outer hinges (View C):
- (a) Install the bolt (11), washer (10).
  - (b) Install the nut (19) and tighten it to 150-250 pound-inches (17.0-28.2 newton-meters).
  - (c) Connect the bonding jumper (15) to the spoiler (1):
    - 1) Clean the mating surfaces of the bonding jumper (15).
    - 2) Use the milliohmmeter to make sure the resistance of the bonding jumper (15) connection is less than 0.50 ohms.

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S 214-025

- (9) Manually move the spoiler through its full travel range and do this check:
- (a) Make sure the spoiler moves freely.

S 434-026

- (10) Do these steps to connect the rod end of the PCA (24) to the spoiler (1):
- (a) Install the bushing (21), washers (22, 25), and the bolt (26).
  - (b) Install the nut (23) and tighten it to 1000-1200 pound-inches (113.0-135.5 newton-meters).

S 644-027

- (11) Lubricate the grease fittings.

S 094-028

- (12) Remove the spoiler actuator lock (AMM 27-61-00/201).

S 864-029

- (13) Lower the spoiler (1).

H. Inboard Spoiler - Installation (Fig. 403)

S 644-030

- (1) Apply some of the grease to the nuts, bolts, washers, and hinges before you install them.

S 864-031

- (2) Put the spoiler (5) in its correct position.

S 434-032

- (3) Do these steps to connect the two outer hinges (View A):
- (a) Install the bolt (16), washers (6), and spacers (1).
  - (b) Install the nut (7) and tighten it to 150-250 pound-inches (17-28.2 newton-meters).
  - (c) Connect the bonding jumper (15) to the spoiler (5):
    - 1) Clean the mating surfaces for the bonding jumper (15).
    - 2) Use the milliohmmeter to make sure the resistance of the bonding jumper (15) connection is less than 0.010 ohms.

S 434-033

- (4) Do these steps to connect the outboard inner hinge (View B):
- (a) Install the bolt (17), washers (18, 19, 21), and bushing (20).
  - (b) Install the nut (22) and tighten it to 2400-3250 pound-inches (271.2-367.2 newton-meters).

S 434-034

- (5) Do these steps to connect the inboard inner hinge (View C):
- (a) Install the bolt (17), plate (23), bushings (20), and washer (21).

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- (b) Install the bolt that connects the plate (23) to the wing rear spar.
- (c) Install the nut (22) and tighten it to 2400–3250 pound-inches (271.2–367.2 newton-meters).

S 214-035

- (6) Manually move the spoiler through its full travel range and do this check:
  - (a) Make sure the spoiler moves freely.

S 434-036

- (7) Do these steps to connect the rod end of the PCA (30) to the spoiler (5):
  - (a) Install the bushing (28) and the bolt (31).
  - (b) Install the nut (29) and tighten it to 1700–2150 pound-inches (192.07–242.9 newton-meters).
  - (c) Install the bolt (33) and collar (32) that connect the clip lock (34) to the spoiler clevis.

S 644-037

- (8) Lubricate the grease fittings.

S 094-038

- (9) Remove the spoiler actuator lock (AMM 27-61-00/201).

S 864-039

- (10) Lower the spoiler (5).

I. Inboard or Outboard Spoilers - Adjustment

S 864-040

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-041

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G17, FLT CONT ELEC 1R AC
  - (f) 11G18, FLT CONT ELEC 1R DC
  - (g) 11G26, FLT CONT ELEC 2R AC
  - (h) 11G27, FLT CONT ELEC 2R DC

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- (i) 11H15, FLT CONT SHUTOFF WING LEFT
- (j) 11H16, FLT CONT SHUTOFF WING CTR
- (k) 11H26, FLT CONT SHUTOFF WING RIGHT

S 864-042

- (3) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to ON.

S 864-043

- (4) Move the speedbrake lever fully up.

S 864-044

- (5) Retract the trailing edge flaps.

S 044-045

- (6) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 214-046

- (7) Move the speedbrake lever to its down-and-locked position.
  - (a) Make sure the spoilers are fully down.

S 824-047

- (8) FOR THE OUTBOARD SPOILERS;  
Do these steps to examine and adjust the spoiler-to-flap clearance (Fig. 402):
  - (a) Examine the clearance between the spoilers (View B-B) and adjust the seal if necessary.
  - (b) Examine the clearance between the spoiler and the adjacent structure (Views A-A and C-C) and adjust the seals if necessary.
  - (c) Examine the clearance between the leading edge of the spoiler and the aft wing structure (Views D-D and E-E). Adjust the seals if necessary.
  - (d) Examine the spoiler-to-flap clearance (AMM 27-61-00/201, Adjust Spoiler Power Control Actuators) and adjust the PCA if necessary.

S 824-048

- (9) FOR THE INBOARD SPOILERS;  
Do these steps to examine and adjust the spoiler-to-flap clearance (Fig. 404):
  - (a) Examine the clearance between the spoilers (View A-A) and adjust the seal if necessary.

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- (b) Examine the clearance between the spoiler and the adjacent structure (Views B-B and C-C) and adjust the seals if necessary.
- (c) Examine the clearance between the leading edge of the spoiler and the aft wing structure (Views D-D and E-E). Adjust the seals if necessary.
- (d) Examine the spoiler-to-flap clearance (AMM 27-61-00/201, Adjust Spoiler Power Control Actuator) and adjust the PCA if necessary.

S 444-071

**WARNING:** REFER TO AMM 25-65-00/201 FOR THE PROCEDURE TO ARM THE OFF-WING ESCAPE SYSTEM. IF YOU INCORRECTLY ARM THE OFF-WING ESCAPE SYSTEM, THE ESCAPE SLIDE CAN ACCIDENTALLY INFLATE AND CAUSE INJURY OR DAMAGE.

(10) For the inboard spoilers, arm the off-wing escape system (AMM 25-65-00/201).

J. Put the Airplane Back to Its Usual Condition

S 864-050

- (1) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - (a) 11G11, AUTO SPEEDBRK

S 864-051

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-052

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 414-053

- (4) Close the applicable access panels that follow:
  - (a) 552BB (for spoiler number 6)

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- (b) 552GB (for spoiler number 5)
- (c) 652BB (for spoiler number 7)
- (d) 652GB (for spoiler number 8)

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INBOARD AND OUTBOARD SPOILER - INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and wear limit tables which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to Outboard or Inboard Spoiler - Removal/Installation for procedures to do these tasks.

TASK 27-61-01-206-001

2. Spoilers - Wear Limits

A. Procedure

S 226-002

- (1) Use the supplied data (Fig. 601) to examine the spoilers for too much wear.

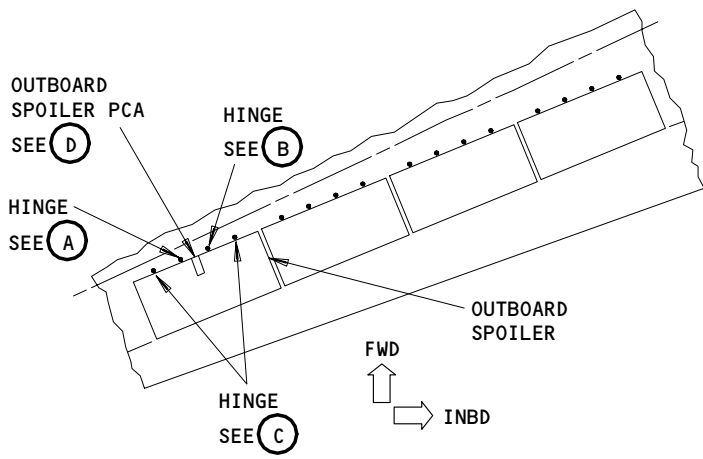
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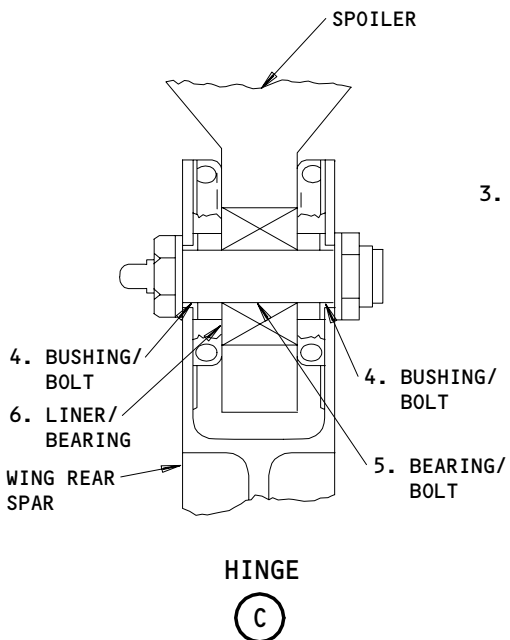
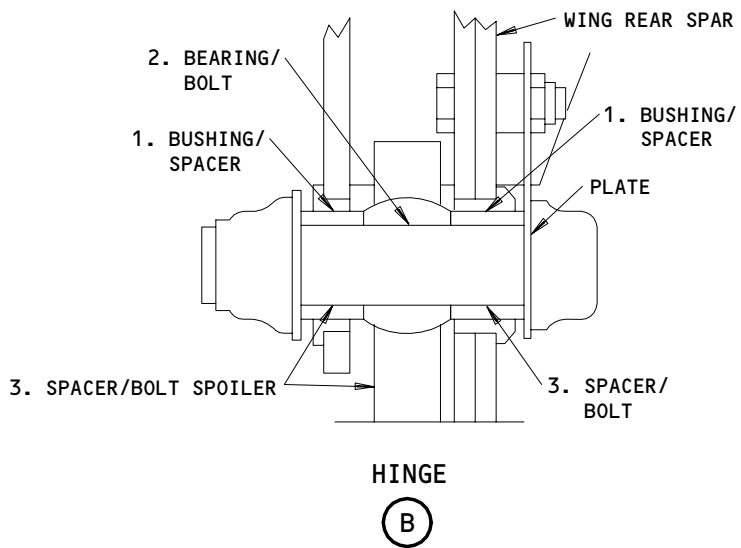
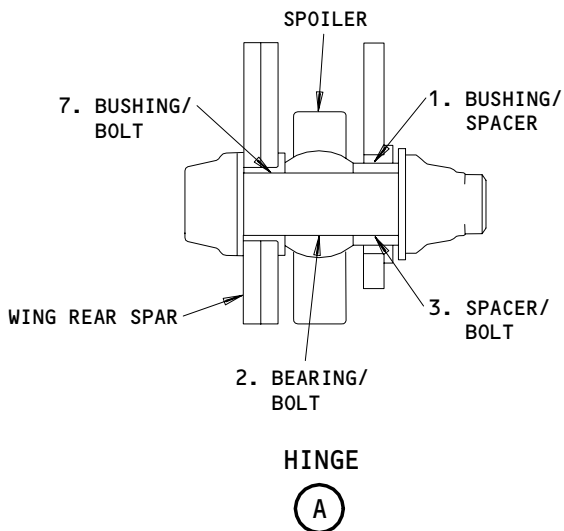
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**OUTBOARD SPOILERS**

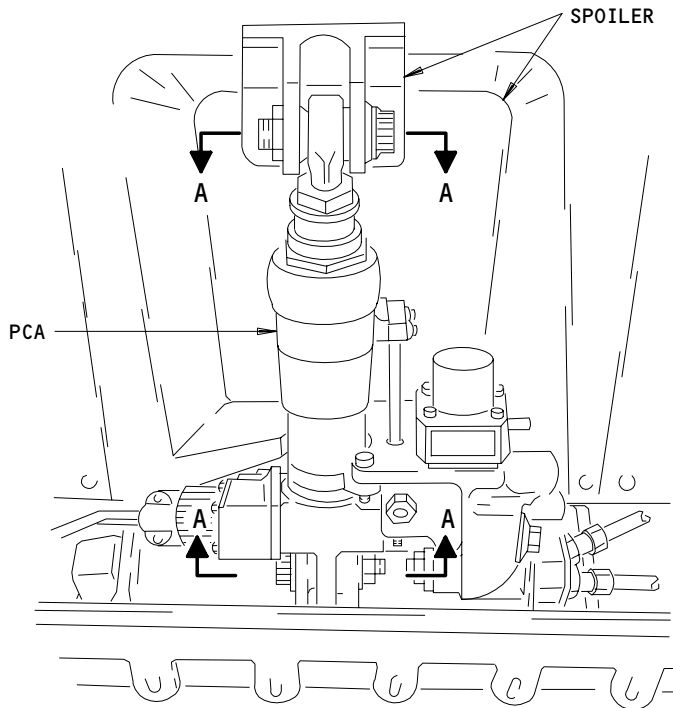


Spoiler Wear Limits  
Figure 601 (Sheet 1)

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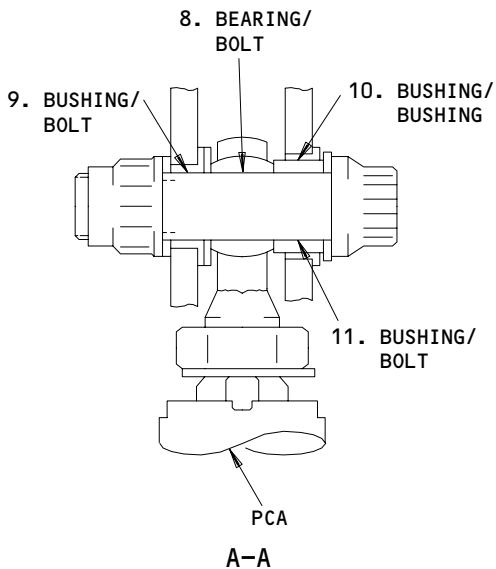
**27-61-01**





OUTBOARD SPOILER PCA

(D)



Spoiler Wear Limits  
Figure 601 (Sheet 2)

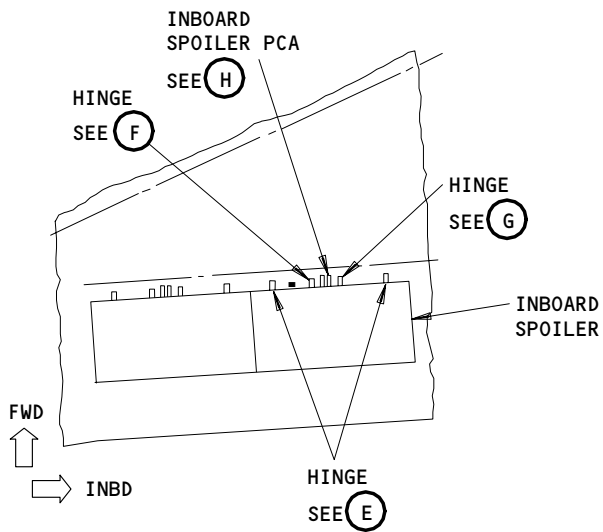
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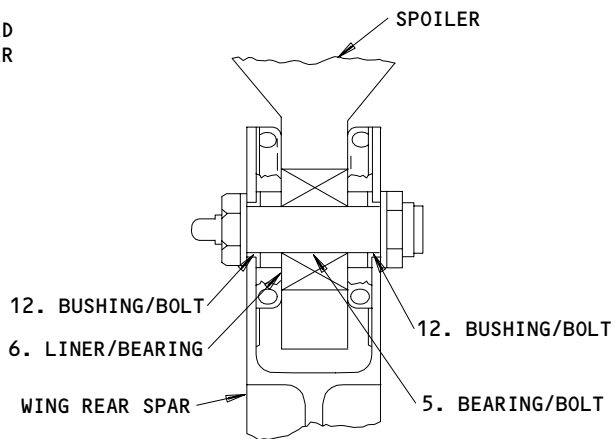
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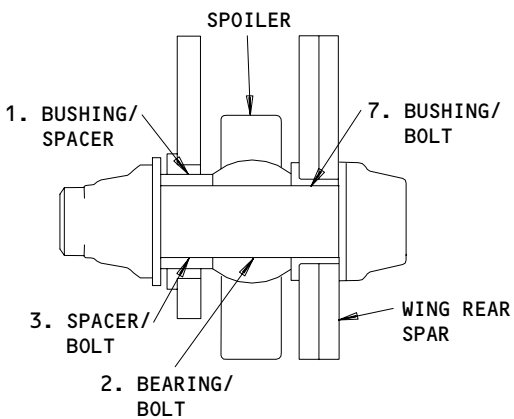


**INBOARD SPOILERS**



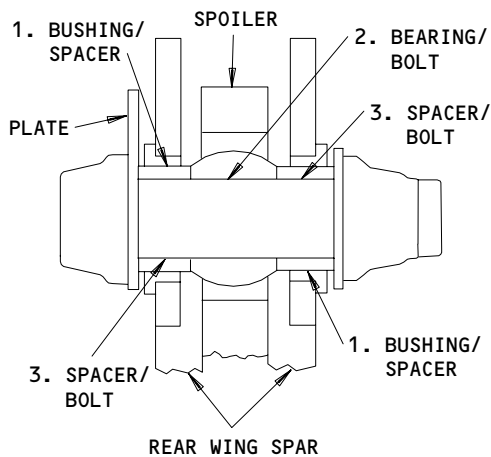
**HINGE**

(E)



**HINGE**

(F)



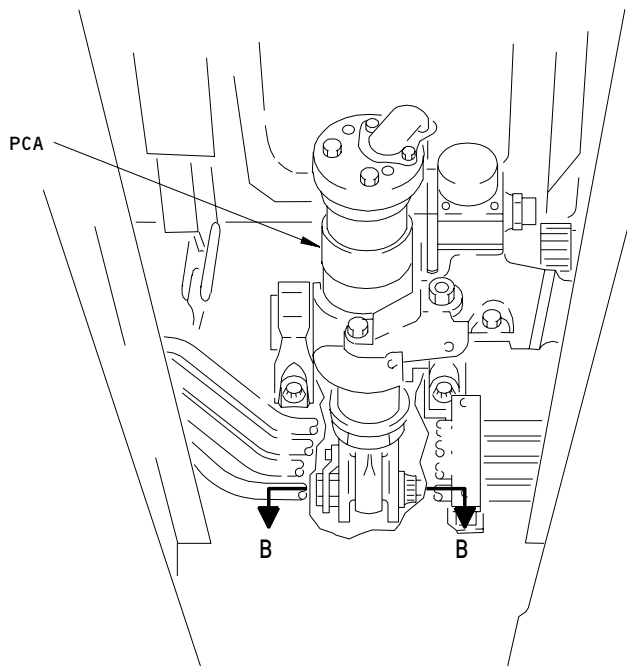
**HINGE**

(G)

Spoiler Wear Limits  
Figure 601 (Sheet 3)

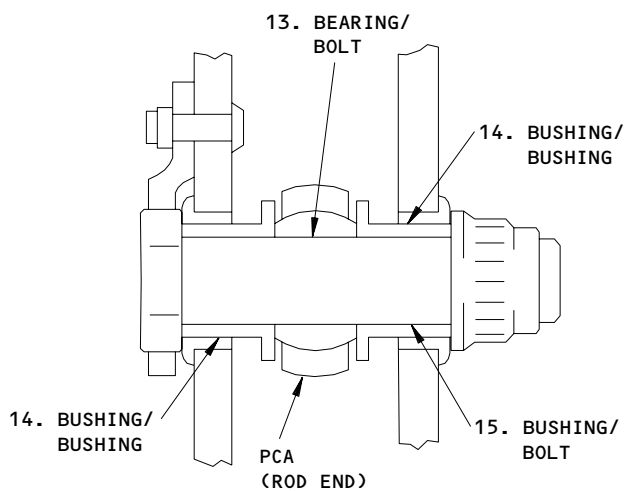
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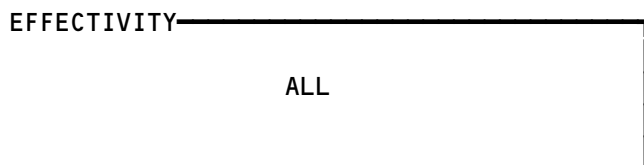
INBOARD SPOILER PCA

(H)



B-B

Spoiler Wear Limits  
Figure 601 (Sheet 4)



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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	1.0617 (26.967)	1.0627 (26.993)	1.0685 (27.140)	0.0070 (0.178)	X		
	SPACER	OD	1.0605 (26.937)	1.0615 (26.962)	1.0557 (26.815)		X		
2	BEARING	ID	0.7500 (19.050)	0.7504 (19.060)	0.7580 (19.253)	0.0090 (0.229)	X		
	BOLT	OD	0.7480 (18.999)	0.7490 (19.025)	0.7414 (18.832)		X		
3	SPACER	ID	0.7495 (19.037)	0.9500 (24.130)	0.7580 (19.253)	0.0090 (0.229)	X		
	BOLT	OD	0.7480 (18.999)	0.7490 (19.025)	0.7410 (18.821)		X		
4	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5055 (12.840)	0.0060 (0.152)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4947 (12.565)		X		
5	BEARING	ID	0.4993 (12.682)	0.5000 (12.700)	0.5055 (12.840)	0.0060 (0.152)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4940 (12.548)		X		
6	LINER	ID	1.3130 (33.350)	1.3140 (33.376)	1.3193 (33.510)	0.0058 (0.147)	X		
	BEARING	OD	1.3115 (33.312)	1.3135 (33.363)	1.3082 (33.228)		X		
7	BUSHING	ID	0.7495 (19.037)	0.7505 (19.063)	0.7580 (19.253)	0.0090 (0.229)	X		
	BOLT	OD	0.7480 (18.999)	0.7490 (19.025)	0.7415 (18.834)		X		
8	BEARING	ID	0.7495 (19.037)	0.7500 (19.050)	0.7520 (19.101)	0.0030 (0.076)	X		
	BOLT	OD	0.7480 (18.999)	0.7490 (19.025)	0.7470 (18.974)		X		
9	BUSHING	ID	0.7495 (19.037)	0.7500 (19.050)	0.7520 (19.101)	0.0030 (0.076)	X		
	BOLT	OD	0.7480 (18.999)	0.7490 (19.025)	0.7470 (18.974)		X		
10	BUSHING	ID	1.031 (26.187)	1.051 (26.695)	1.0645 (27.038)	0.0030 (0.076)	X		
	BUSHING	OD	1.0605 (26.937)	1.0615 (26.962)	1.0597 (26.916)		X		

Spoiler Wear Limits  
Figure 601 (Sheet 5)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BUSHING	ID	0.7495 (19.037)	0.7505 (19.063)	0.7525 (19.114)	0.0035 (0.089)	X		
	BOLT	OD	0.7480 (18.999)	0.7490 (19.025)	0.7470 (18.974)		X		
12	BUSHING	ID	0.5000 (12.700)	0.5015 (12.738)	0.5055 (12.840)	0.0060 (0.152)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4955 (12.586)		X		
13	BEARING	ID	0.8745 (22.212)	0.8750 (22.225)	0.8760 (22.250)	0.0030 (0.076)	X		
	BOLT	OD	0.8730 (22.174)	0.8740 (22.200)	0.8730 (22.174)		X		
14	BUSHING	ID	1.1867 (30.142)	1.1877 (30.168)	1.1935 (30.315)	0.0070 (0.178)	X		
	BUSHING	OD	1.1855 (30.112)	1.1865 (30.137)	1.1797 (29.964)		X		
15	BUSHING	ID	0.8745 (22.212)	0.8750 (22.225)	0.8770 (22.276)	0.0030 (0.076)	X		
	BOLT	OD	0.8730 (22.174)	0.8740 (22.200)	0.8720 (22.149)		X		

Spoiler Wear Limits  
Figure 601 (Sheet 6)

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SPOILER POWER CONTROL ACTUATOR (PCA) – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and installation tasks for the spoiler power control actuators (PCA) and their components.
- B. The PCAs for spoilers 1 thru 4 and 9 thru 12 (the outboard spoilers) are the same. The PCAs for spoilers 5 thru 8 are not the same as the PCAs for the outboard spoilers. These procedures are applicable to the two different types of spoiler PCAs.

TASK 27-61-02-024-001

2. Spoiler PCA and Its Components – Removal

A. General

- (1) This task contains these procedures:

- Outboard Spoiler PCA – Removal
- Inboard Spoiler PCA – Removal
- Spoiler PCA Filter – Removal
- Spoiler PCA Electro-Hydraulic Servo Valve (EHSV) – Removal
- Outboard Spoiler PCA Manifold Seal – Removal

- (2) Because this procedure contains more than one procedure, do only the applicable groups of steps.
- (3) To start one of these procedures, do the "Prepare for the Removal" group of steps. Then, do the group of steps that is necessary to remove the component.

B. Equipment

- (1) A27108-13 Spoiler Actuator Lock

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-44-00/201, Wing Access Doors and Panels
- (3) AMM 24-22-00/201, Electrical Power – Control
- (4) AMM 25-65-00/201, Off-Wing Escape System
- (5) AMM 27-51-00/201, Trailing Edge Flap System
- (6) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (7) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 550/650 Wing Trailing Edge
  - 560/660 Wing Trailing Edge

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- (2) Access Panels
  - 552/652BB Landing Gear Support Beam
  - 552/652GB Area Aft of the Main Flap Mid Spar Structure

E. Prepare for the Removal

S 864-002

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

S 864-003

**WARNING:** MAKE SURE THE SPEEDBRAKE LEVER IS IN ITS DOWN-AND-LOCKED POSITION BEFORE YOU OPEN THE CIRCUIT BREAKERS BELOW. THE SPOILERS WILL RETRACT IN LESS THAN ONE SECOND AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G11, AUTO SPEEDBRK
  - (f) 11G17, FLT CONT ELEC 1R AC
  - (g) 11G18, FLT CONT ELEC 1R DC
  - (h) 11G26, FLT CONT ELEC 2R AC
  - (i) 11G27, FLT CONT ELEC 2R DC

S 864-004

- (3) Extend the trailing edge flaps.

S 044-005

- (4) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 864-006

- (5) Remove the pressure from the hydraulic system that supplies the PCA you will repair (AMM 29-11-00/201).

**NOTE:** The left hydraulic system supplies power to the PCAs for spoilers 1, 6, and 12.

The center hydraulic system supplies power to the PCAs for spoilers 3, 4, 5, 8, 9, and 10.

The right hydraulic system supplies power to the PCAs for spoilers 2, 7, and 11.

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S 864-007

- (6) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 864-008

- (7) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT

S 044-088

- (8) Before you do maintenance on spoilers 5, 6, 7, or 8, do these steps:

**NOTE:** Spoilers are numbered 1 thru 12 from the outboard left wing spoiler to the outboard right wing spoiler.

- (a) Open the applicable access panels that follow (AMM 06-44-00/201):
- 1) 552BB (for spoiler number 6)
  - 2) 552GB (for spoiler number 5)
  - 3) 652BB (for spoiler number 7)
  - 4) 652GB (for spoiler number 8).

**WARNING:** REFER TO AMM 25-65-00/201 FOR THE PROCEDURE TO DISARM THE OFF-WING ESCAPE SYSTEM. IF YOU INCORRECTLY DISARM THE OFF-WING ESCAPE SYSTEM, THE ESCAPE SLIDE CAN ACCIDENTALLY INFLATE AND CAUSE INJURY OR DAMAGE.

- (b) Disarm the off-wing escape system (AMM 25-65-00/201).

F. Outboard Spoiler PCA - Removal (Fig. 401)

S 864-009

- (1) Use a 5/32 allen wrench to operate the manual release cam (9) and lift the spoiler (4).

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S 034-010

- (2) Disconnect these components:
- (a) The hydraulic lines (8) from the PCA (1)
    - 1) Install caps on the hydraulic lines (8) and the PCA ports (1).
  - (b) The electrical connector (10) from the PCA (1)
  - (c) The anti-rotation plate (28) from the torque tube (25), if it is necessary
  - (d) The rod end of the PCA (1) from the spoiler (4).

NOTE: The PCA can fall when you remove the bolt. Hold the PCA during this step to prevent an accident.

S 024-011

- (3) Disconnect the PCA (1) at the torque tube (25) and remove it from the airplane.

G. Inboard Spoiler PCA - Removal (Fig. 402)

S 864-012

- (1) Use a 5/32 allen wrench to operate the manual release cam (6) and lift the spoiler (14).

S 034-013

- (2) Disconnect these components:
- (a) The hydraulic lines (21) from the PCA (1)
    - 1) Install caps on the hydraulic lines (21) and the PCA ports (1).
  - (b) The electrical connector (5) from the PCA (1)
  - (c) The rod end of the PCA (1) from the spoiler (14).

NOTE: The PCA can fall when you remove the bolt. Hold the PCA during this step to prevent an accident.

S 024-014

- (3) Remove the four bolts (7) that connect the PCA (1) to the spoiler beam and remove the PCA.

H. Spoiler PCA Filter - Removal

S 864-015

- (1) Use a 5/32 allen wrench to operate the manual release cam (9 or 6) and lift the spoiler (4 or 14).

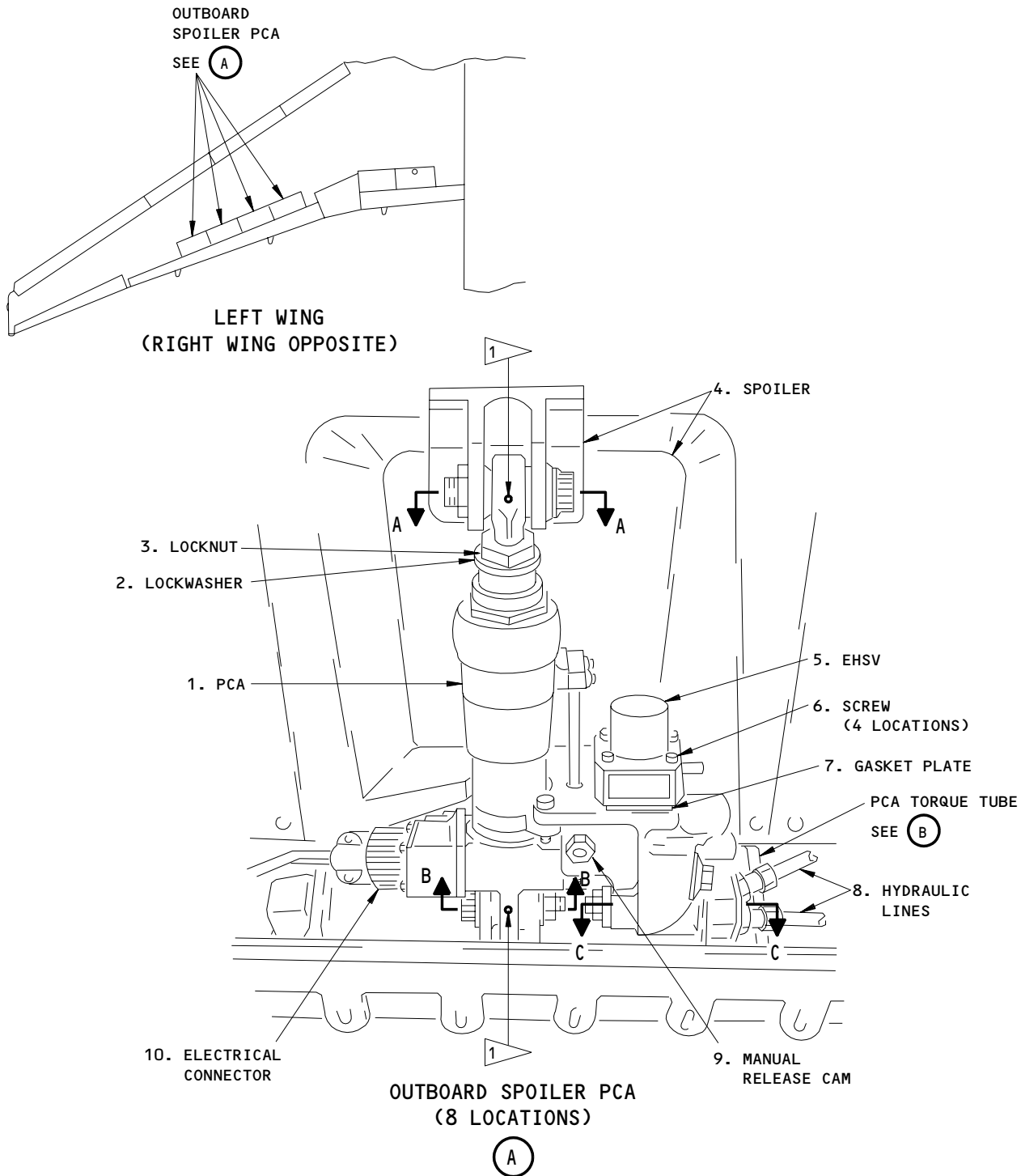
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1. LUBRICATE WITH BMS 3-33 GREASE (PREFERRED) OR MIL-PRF-23827 GREASE (ALTERNATE) AFTER THE INSTALLATION.
2. LUBRICATE THE BOLT AND BUSHINGS WITH BMS 3-33 GREASE (PREFERRED) OR MIL-PRF-23827 GREASE (ALTERNATE) BEFORE YOU INSTALL THEM.

Outboard Spoiler Power Control Actuator  
Figure 401 (Sheet 1)

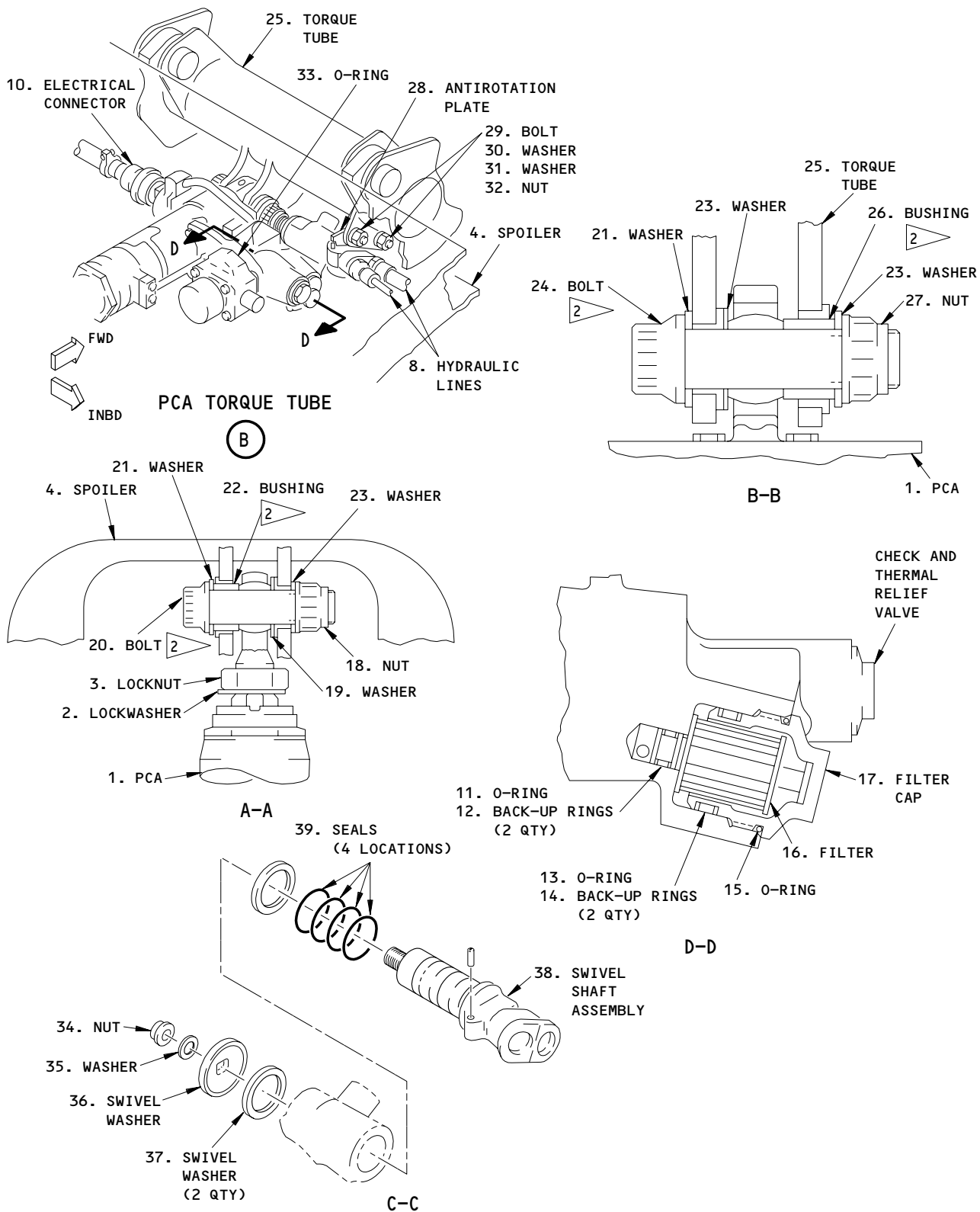
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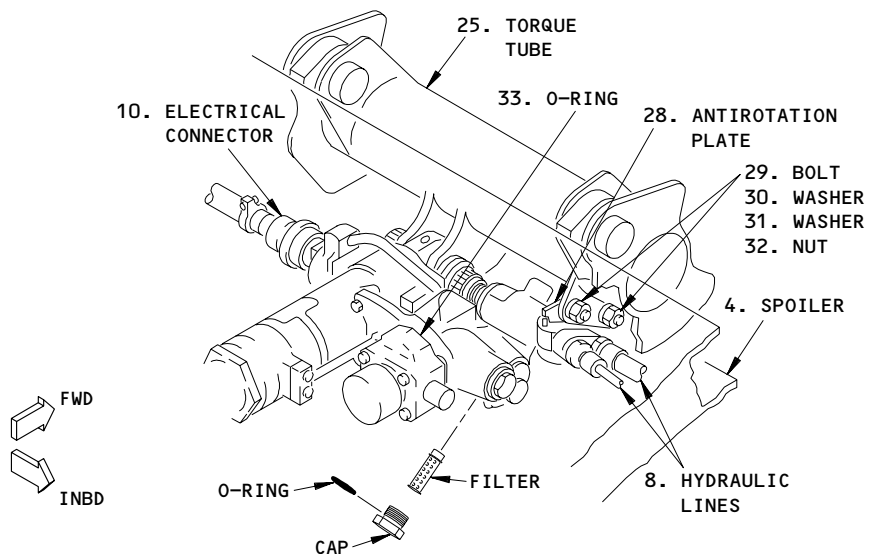
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Outboard Spoiler Power Control Actuator  
Figure 401 (Sheet 2)

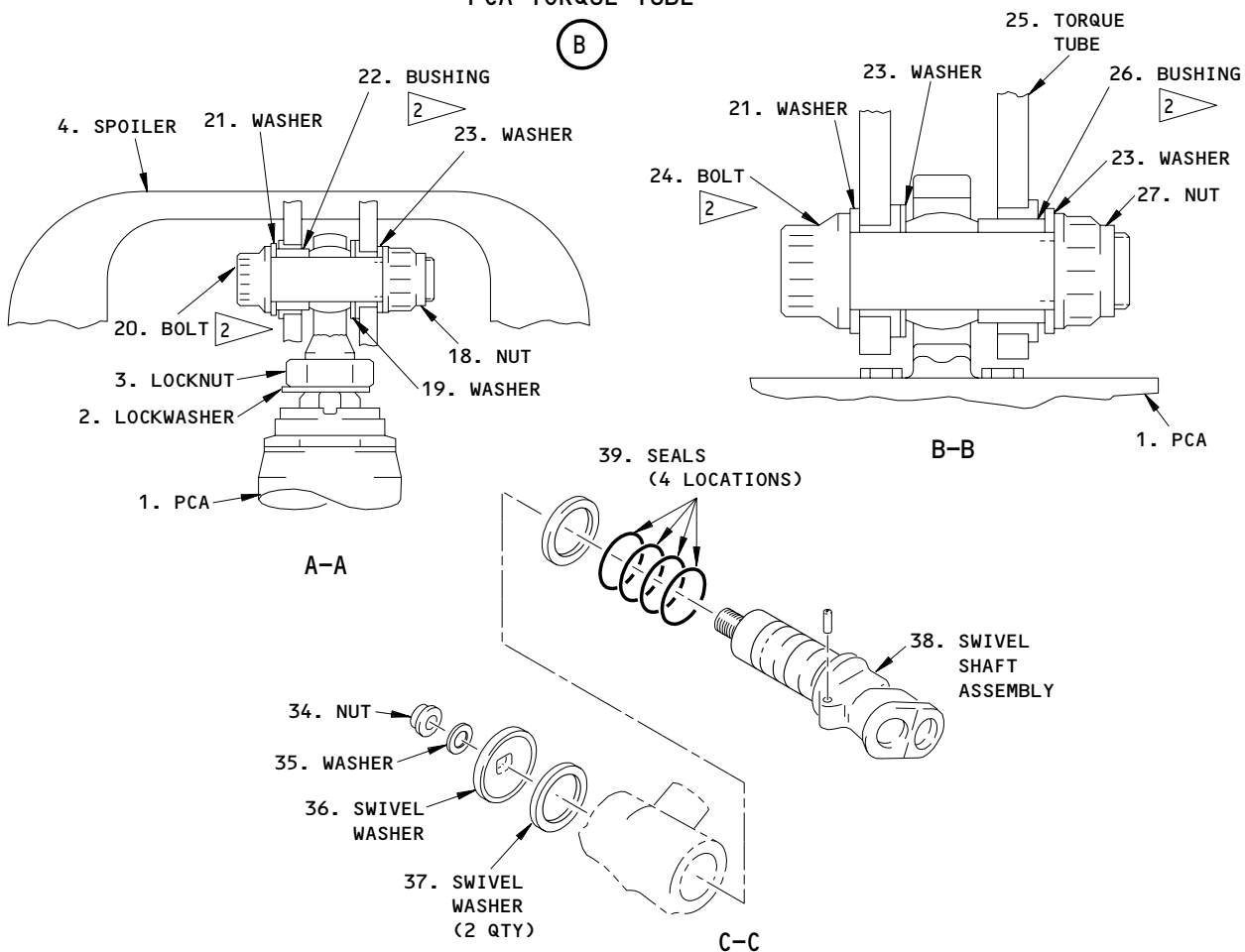
EFFECTIVITY  
ON AIRPLANES WITH  
PCA P/N 252T1401

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PCA TORQUE TUBE

(B)



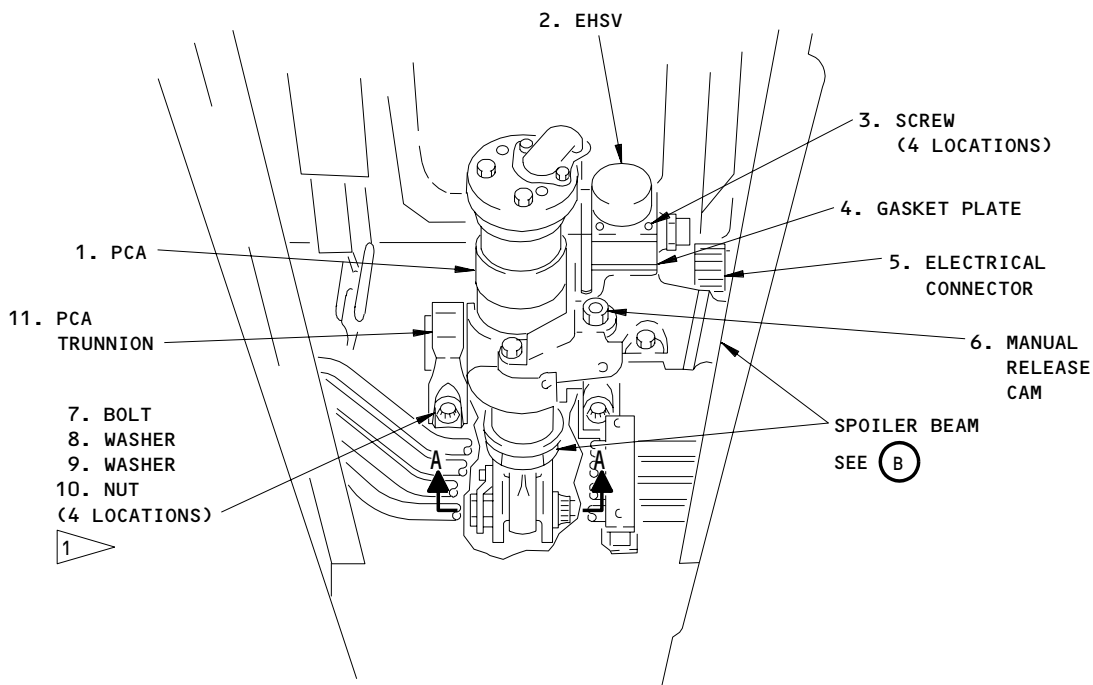
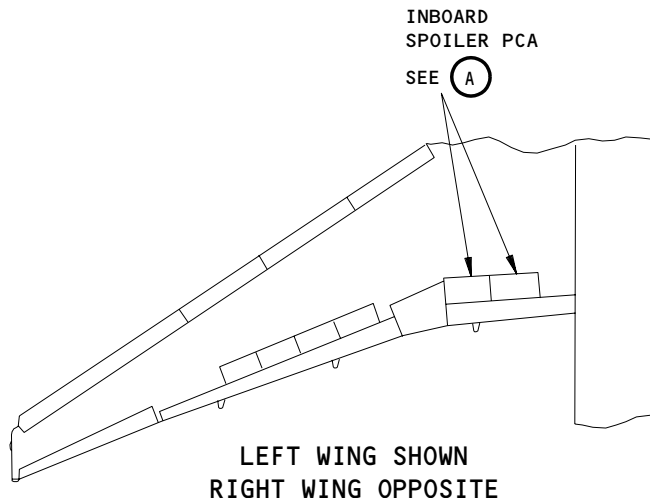
Outboard Spoiler Power Control Actuator  
Figure 401 (Sheet 3)

EFFECTIVITY  
ON AIRPLANES WITH  
PCA P/N 1542600

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INBOARD SPOILER PCA

(A)

- 1 FILLET SEAL WITH BMS 5-95.  
DO NOT COVER THE LUBRICATION POINTS WITH THE SEALANT.
- 2 LUBRICATE WITH BMS 3-33 GREASE (PREFERRED) OR MIL-PRF-23827 GREASE (ALTERNATE) AFTER THE INSTALLATION.
- 3 LUBRICATE THE BOLTS AND BUSHINGS WITH BMS 3-33 GREASE (PREFERRED) OR MIL-PRF-23827 GREASE (ALTERNATE) BEFORE YOU INSTALL THEM.

Inboard Spoiler Power Control Actuator  
Figure 402 (Sheet 1)

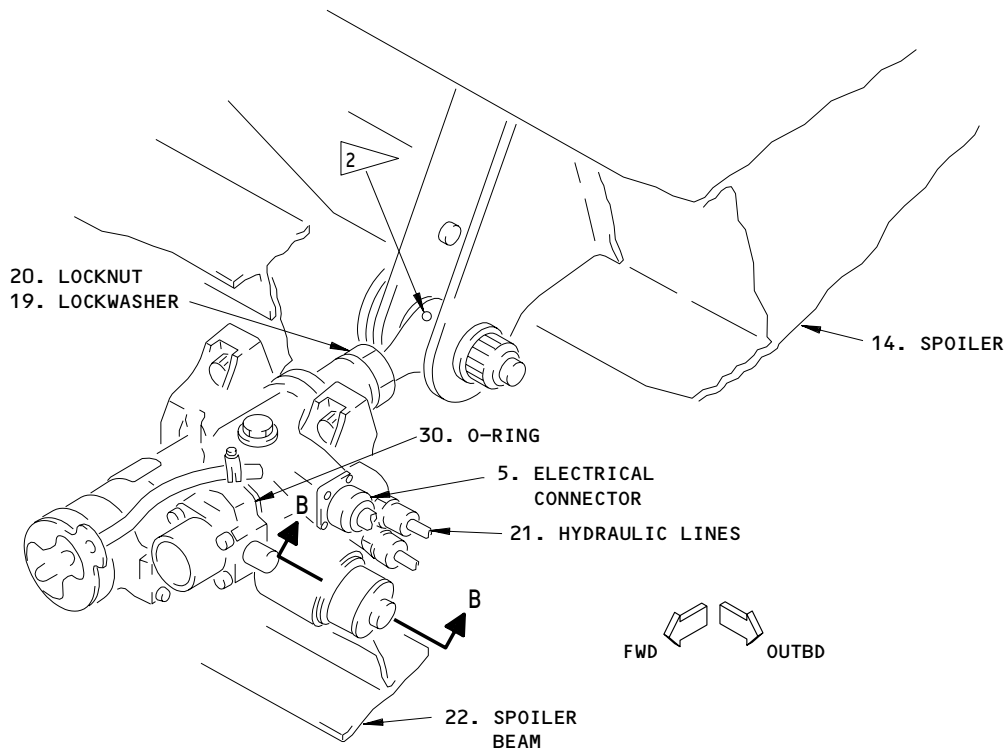
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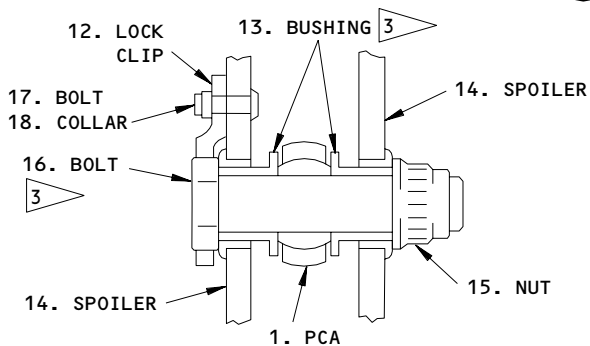
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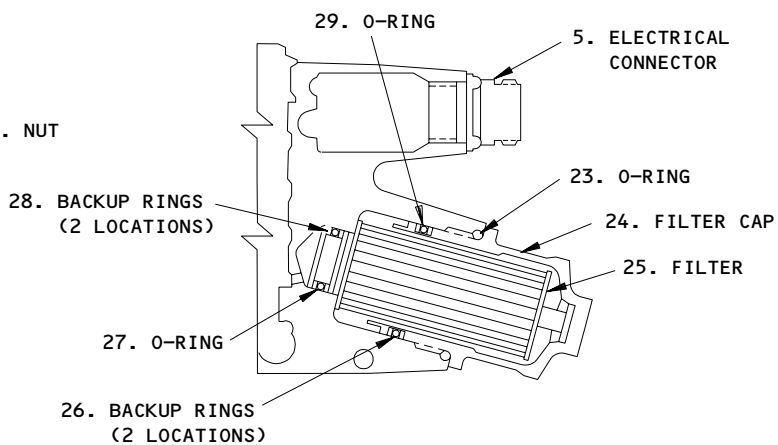


**SPOILER BEAM**

**B**



**A-A**



**B-B**

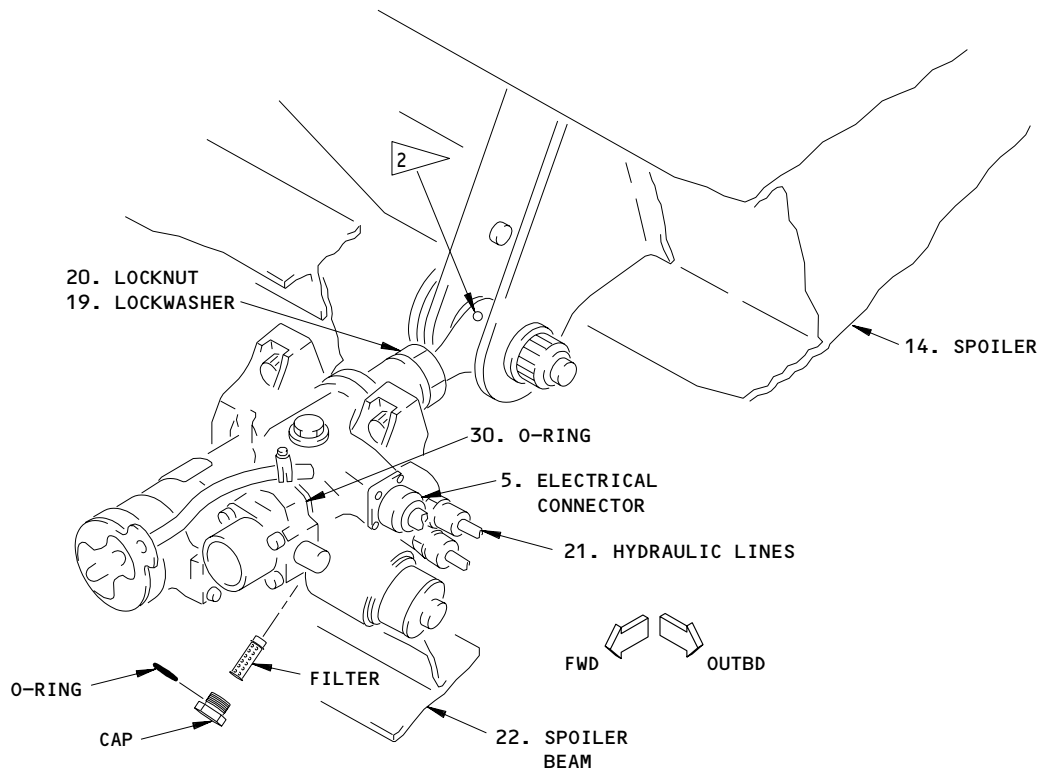
**Inboard Spoiler Power Control Actuator  
Figure 402 (Sheet 2)**

EFFECTIVITY  
ON AIRPLANES WITH  
PCA P/N 252T1301

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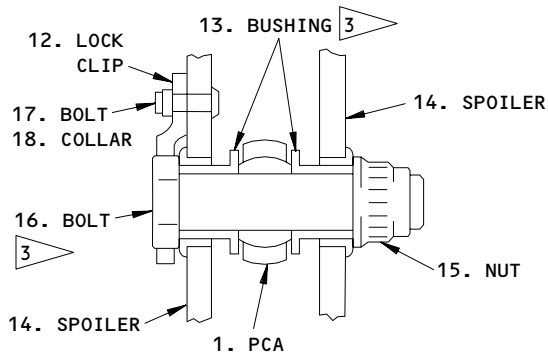
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SPOILER BEAM

(B)



A-A

Inboard Spoiler Power Control Actuator  
Figure 402 (Sheet 3)

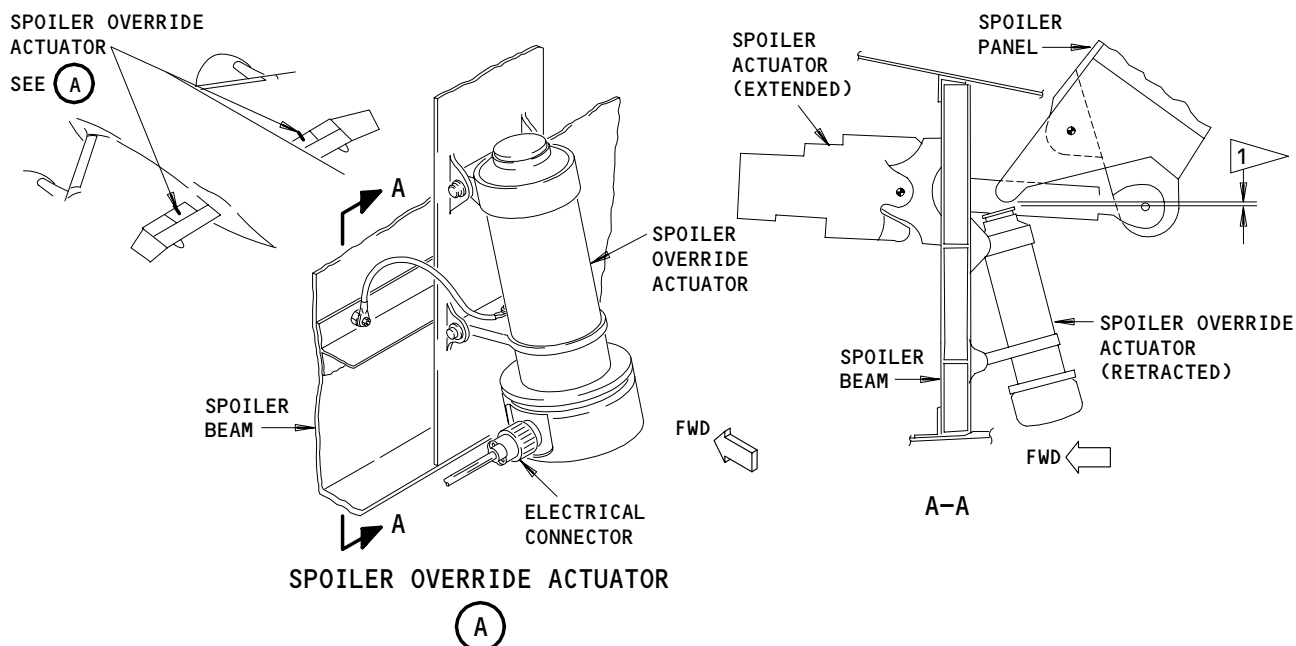
EFFECTIVITY  
ON AIRPLANES WITH  
PCA P/N 1542500

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- S 494-016  
(2) Install the actuator lock on the PCA (1) (AMM 27-61-00/201).
- S 034-017  
(3) OUTBOARD SPOILER PCAs P/N 252T1401;  
Remove these components (Fig. 401):  
(a) The PCA filter cap (17)  
(b) The filter (16).



1 MAKE SURE THE CLEARANCE IS AT LEAST 0.06 INCH AFTER YOU ADJUST SPOILERS 6 OR 7.

Inboard Spoiler Override Actuator  
Figure 403

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S 034-097

- (4) OUTBOARD SPOILER PCAs P/N 1542600;  
Remove these components (Fig. 401):  
(a) PCA filter cap.  
(b) PCA filter.

S 034-018

- (5) INBOARD SPOILER PCAs P/N 252T1301;  
Remove these components (Fig. 402):  
(a) The PCA filter cap (24)  
(b) The filter (25).

S 034-098

- (6) INBOARD SPOILER PCAs P/N 1542500;  
Remove these components (Fig. 402):  
(a) PCA filter cap.  
(b) PCA filter.

I. Spoiler PCA Electro-Hydraulic Servo Valve (EHSV) - Removal

S 864-019

- (1) Use a 5/32 allen wrench to operate the manual release cam (9 or 6) and lift the spoiler (4 or 14).

S 494-020

- (2) Install the actuator lock on the PCA (1) (AMM 27-61-00/201).

S 034-021

- (3) Remove the four screws (6 or 3) that connect the EHSV (5 or 2) to the PCA.

S 024-022

- (4) Remove the EHSV.

J. Outboard Spoiler PCA Manifold Seal - Removal

S 344-091

- (1) Remove nut (34), washer (35), swivel washers (36, 37) and pull the swivel shaft assembly (38) out of the manifold.

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S 344-092

- (2) Remove the four seals (39) and swivel washer (37) from the swivel shaft.

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3. Spoiler PCA and Its Components - Installation

A. Equipment

- (1) A27108-13 Spoiler Actuator Lock

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)  
 (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)  
 (3) D00015 Grease - BMS 3-24 (Alternate)  
 (4) A00247 Sealant - BMS 5-95

C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Outboard Spoiler PCA	27-61-02	01	65
			27-61-02	01A	70,80
	5	Electro Hydr Servo Valve	27-61-02	01	265
			27-61-02	01A	465
	7	Gasket Plate	27-61-02	01	270
			27-61-02	01A	475
	11	Packing (O-ring)	27-61-02	01	135
			27-61-02	01A	195
	12	Retainer (Back-up Ring)	27-61-02	01	130
			27-61-02	01A	190
	13	Packing (O-ring)	27-61-02	01	116
			27-61-02	01A	175
	14	Retainer (Back-up Ring)	27-61-02	01	119
			27-61-02	01A	180
	15	Packing (O-ring)	27-61-02	01	113
		27-61-02	01A	170	
16	Filter	27-61-02	01	125	
		27-61-02	01A	185	
33	Packing (O-ring)	27-61-02	01	275	
		27-61-02	01A	485	
39	Seal	27-61-02	01	262	
		27-61-02	01A	455	
		32-21-13	10	85,90	

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AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
402	1	Inboard Spoiler PCA	27-61-02	05	35,75, 295
			27-61-02	05B	35,60, 110
	2	Electro Hydr Servo Valve	27-61-02	05	235
			27-61-02	05B	290
	4	Gasket Plate	27-61-02	05	282
			27-61-02	05B	345
	23	Packing (O-ring)	27-61-02	05	221
			27-61-02	05B	260
	25	Filter	27-61-02	05	220
			27-61-02	05B	225
	26	Back-Up Ring	27-61-02	05	223
			27-61-02	05B	270
	27	Packing (O-ring)	27-61-02	05	225
			27-61-02	05B	275
28	Retainer (Back-up Ring)	27-61-02	05	230	
		27-61-02	05B	280	
29	Packing (O-ring)	27-61-02	05	222	
		27-61-02	05B	265	
30	Packing (O-ring)	27-61-02	05	281	
		27-61-02	05B	340	

**D. References**

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-44-00/201, Wing Access Doors and Panels
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 27-51-00/201, Trailing Edge Flap System
- (5) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) AMM 27-61-00/501, Spoiler/Speedbrake Control System

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E. Access

(1) Location Zones

211/212	Control Cabin
550/650	Wing Trailing Edge
560/660	Wing Trailing Edge

(2) Access Panels

552/652BB	Landing Gear Support Beam
552/652GB	Area Aft of the Main Flap Mid Spar Structure

F. Outboard Spoiler PCA - Installation

S 214-024

**CAUTION:** EACH END OF THE PCA HAS A SPLIT BEARING. THE INNER RACE CAN BE ACCIDENTALLY REMOVED FROM THE OUTER RACE DURING HANDLING. MAKE SURE THE SERIAL NUMBERS ARE THE SAME AND THE INDEX MARKS ALIGN ON THE TWO HALVES OF THE INNER BEARING RACE. DAMAGE TO THE PCA OR THE AIRPLANE CAN OCCUR IF THE SERIAL NUMBERS ARE NOT THE SAME OR IF THE INDEX MARKS DO NOT ALIGN.

- (1) Make sure the serial numbers are the same and the index marks align on the two halves of the inner bearing race.

S 644-025

- (2) Apply some grease to the bolts and bushings before you install them.

S 434-026

- (3) Do these steps to connect the PCA (1) to the torque tube (25):
- (a) Install the bolt (24), washers (21, 23), and bushing (26).
  - (b) Put the nut (27) on the bolt (24).
  - (c) Tighten the nut to 1000-1200 pound-inches (113.0-135.5 newton-meters).

S 434-027

- (4) Do these steps to connect the PCA (1) to the spoiler (4):
- (a) Install the bolt (20), washers (19, 21, 23), and the bushing (22).
  - (b) Put the nut (18) on the bolt (20).
  - (c) Make sure the torque necessary to turn the nut before it touches the spoiler panel actuator fitting is 90-400 pound-inches (10.2-45.1 newton-meters).
  - (d) Tighten the nut to 1000-1200 pound-inches (113.0-135.5 newton-meters).

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S 434-028

- (5) Connect the electrical connector (10) to the PCA (1).

S 434-029

- (6) Do this step to connect the anti-rotation plate (28) to the torque tube (25):  
(a) Install the bolt (29), washers (30, 31), and nut (32) (2 locations).

S 034-030

- (7) Remove the caps from the hydraulic lines (8) and the PCA ports.

S 434-031

- (8) Connect the hydraulic lines (8) to the PCA (1).

S 644-112

- (9) Apply grease at the PCA lubrication fittings (AMM 12-21-10/301).

S 864-032

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (10) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-033

- (11) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to ON.

S 864-034

- (12) Remove the DO-NOT-CLOSE tags and close the circuit breakers shown in Table 401.

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Overhead Equipment Panel, P11 Table 401	
11C6, FLT CONT ELEC 1L AC	11G27, FLT CONT ELEC 2R AC
11C7, FLT CONT ELEC 1L DC	11G26, FLT CONT ELEC 2R AC
11C8, FLT CONT ELEC 2L AC	11H15, FLT CONT SHUTOFF WING LEFT
11C9, FLT CONT ELEC 2L DC	11H16, FLT CONT SHUTOFF WING CTR
11G17, FLT CONT ELEC 1R AC	11H26, FLT CONT SHUTOFF WING RIGHT
11G18, FLT CONT ELEC 1R DC	11G11, AUTO SPEEDBRAKE

S 214-035

- (13) Move the speedbrake lever fully up and do these checks:

**NOTE:** Keep the spoilers up to make sure the trailing edge flaps do not hit the spoilers when they retract.

- (a) Make sure there are no hydraulic leaks near the PCA (1).
- (b) Make sure the control wheels are in their neutral positions.

S 864-036

- (14) Retract the trailing edge flaps (AMM 27-51-00/201).

**NOTE:** Make sure you fully retract the flaps with hydraulic power. Keep the flaps fully retracted with full hydraulic power for one minute before you adjust the spoiler-to-flap clearance.

S 864-037

- (15) Move the speedbrake lever to its down-and-locked position.

S 044-038

- (16) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 864-039

- (17) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 864-040

- (18) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:

- (a) 11H15, FLT CONT SHUTOFF WING LEFT

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- (b) 11H16, FLT CONT SHUTOFF WING CTR
- (c) 11H26, FLT CONT SHUTOFF WING RIGHT

S 824-041

- (19) Examine the spoiler-to-flap clearances and adjust them if it is necessary (AMM 27-61-00/501).

G. Inboard Spoiler PCA - Installation (Fig. 402)

S 214-043

**CAUTION:** THE ROD END OF EACH PCA HAS A SPLIT BEARING. THE INNER RACE CAN BE ACCIDENTALLY REMOVED FROM THE OUTER RACE DURING HANDLING. MAKE SURE THE SERIAL NUMBERS ARE THE SAME AND THE INDEX MARKS ALIGN ON THE TWO HALVES OF THE INNER BEARING RACE. DAMAGE TO THE PCA OR THE AIRPLANE CAN OCCUR IF THE SERIAL NUMBERS ARE NOT THE SAME OR IF THE INDEX MARKS DO NOT ALIGN.

- (1) Make sure the serial numbers are the same and the index marks align on the two halves of the inner bearing race.

S 644-111

- (2) Apply grease to the bolt and bushings before you install them.

S 434-044

- (3) Do these steps to connect the PCA trunnion (11) to the spoiler beam (22):
  - (a) Install the bolts (7) and washers (8, 9).
  - (b) Install the nuts (10) and tighten them to 500-550 pound-inches (56.5-62.1 newton-meters).
  - (c) Apply the sealant to the nuts and bolts.

S 434-045

- (4) Do these steps to connect the PCA (1) to the spoiler (14):
  - (a) Install the bolt (16) and bushings (13).
  - (b) Install the nut (15) and tighten it to 1700-2150 pound-inches (192.1-242.9 newton-meters).
  - (c) Install the lock clip (12), bolt (17), and collar (18).

S 434-046

- (5) Connect the electrical connector (5) to the PCA (1).

S 034-047

- (6) Remove the caps from the hydraulic lines (21) and the PCA ports.

S 434-048

- (7) Connect the hydraulic lines (21) to the PCA (1).

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S 644-110

- (8) Apply grease at the PCA lubrication fittings (AMM 12-21-10/301).

S 864-049

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (9) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-050

- (10) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the P61 panel to ON.

S 864-051

- (11) Remove the DO-NOT-CLOSE tags and close the circuit breakers shown in Table 401.

S 214-052

- (12) Move the speedbrake lever fully up and do these checks:

**NOTE:** Keep the spoilers up to make sure the trailing edge flaps do not hit the spoilers when they retract.

- (a) Make sure there are no hydraulic leaks near the PCA (1).  
(b) Make sure the control wheels are in their neutral positions.

S 864-053

- (13) Retract the trailing edge flaps (AMM 27-51-00/201).

**NOTE:** Make sure you fully retract the flaps with hydraulic power. Keep the flaps fully retracted with full hydraulic power for one minute before you adjust the spoiler-to-flap clearance.

S 864-054

- (14) Move the speedbrake lever to the down-and-locked position.

S 044-055

- (15) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

S 864-056

- (16) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

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S 864-057

- (17) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT

S 824-058

- (18) Examine the spoiler-to-flap clearances and adjust them if it is necessary (AMM 27-61-00/501).

S 434-059

- (19) After the adjustment, tighten the locknut (20) to 1560-1860 pound-inches(176.3-210.2Nm) and install the lockwire.

#### H. Spoiler PCA Filter - Installation

S 434-060

- (1) OUTBOARD SPOILER PCAs P/N 252T1401;  
Install these components (Fig. 401):
- (a) The O-rings (11, 13), retainer back-up rings (12, 14), and the O-ring (15)
  - (b) The filter (16)
  - (c) The filter cap and tighten it to 200-250 pound-inches (22.6-28.2 newton-meters).
  - (d) Lockwire the valve cap to the filter cap (Lockwire P/N MS20995NC20).

S 434-101

- (2) OUTBOARD SPOILER PCAs P/N 1542600;  
Install these components (Fig. 401):
- (a) The filter and o-ring.
  - (b) The filter cap.
    - 1) If the filter cap is aluminum (P/N 1542615), tighten the cap to 340-380 pound-inches (38.4-42.9 newton-meters).
      - a) Lockwire the filter cap to the check and thermal relief valve cap (lockwire P/N MS20995C20).
    - 2) If the filter cap is stainless steel (P/N 1542661), tighten the filter cap to 440-460 pound-inches (49.7-52.0 newton-meters).
      - a) Lockwire the filter cap to the check and thermal relief valve cap (lockwire P/N MS20995C32).

S 434-061

- (3) INBOARD SPOILER PCAs P/N 252T1301;  
Install these components (Fig. 402):
- (a) The O-ring (27, 29), retainer back-up rings (26, 28) and the O-ring (23)
  - (b) The filter (25)
  - (c) The filter cap (24) and tighten it to 200-250 pound-inches (22.6-28.2 newton-meters).

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(d) Lockwire the filter cap to the manifold (lockwire P/N MS20995NC32).

S 434-100

(4) INBOARD SPOILER PCAs P/N 1542500;  
Install these components (Fig. 402):

(a) The filter and o-ring.

(b) The filter cap.

1) If the filter cap is aluminum (P/N 1542615), tighten the cap to 340-380 pound-inches (38.4-42.9 newton-meters).

a) Lockwire the filter cap to the cam retainer (lockwire P/N MS20995C20).

2) If the filter cap is stainless steel (P/N 1542661), tighten the filter cap to 440-460 pound-inches (49.7-52.0 newton-meters).

a) Lockwire the filter cap to the cam retainer (lockwire P/N MS20995C32).

S 094-062

(5) Remove the actuator lock from the PCA (1) (AMM 27-61-00/201).

S 864-063

(6) Lower the spoiler (4 or 14).

S 864-064

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(7) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-065

(8) Remove the DO-NOT-CLOSE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the P61 panel to ON.

S 864-066

(9) Remove the DO-NOT-CLOSE tags and close the circuit breakers shown in Table 401.

S 864-067

(10) Do these steps three times:

(a) Move the speedbrake lever fully up.

(b) Move the speedbrake lever to its down-and-locked position.

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S 214-068

- (11) Move the speedbrake lever fully up and do this check:  
(a) Make sure there are no hydraulic leaks near the PCA filter (16 or 25).

I. Spoiler PCA Electro-Hydraulic Servo Valve (EHSV) - Installation

S 434-069

- (1) Install these components:  
(a) A new gasket plate (7 or 4)  
(b) A new O-ring (33 or 30)

S 434-070

- (2) Install the four screws (6 or 3) that connect the EHSV (5 or 2) to the PCA.

S 434-071

- (3) Install the lockwire.

S 094-072

- (4) Remove the actuator lock from the PCA (1) (AMM 27-61-00/201).

S 864-073

- (5) Lower the spoiler (4 or 14).

S 864-074

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (6) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-075

- (7) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the P61 panel to ON.

S 864-076

- (8) Remove the DO-NOT-CLOSE tags and close the circuit breakers shown in Table 401.

S 864-077

- (9) Do these steps three times:  
(a) Move the speedbrake lever fully up.  
(b) Move the speedbrake lever to its down-and-locked position.

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S 214-078

- (10) Move the speedbrake lever fully up and do this check:
  - (a) Make sure there are no hydraulic leaks near the EHSV (5 or 22).

J. Outboard Spoiler PCA Manifold Seal – Installation

S 344-093

- (1) Install the swivel washer (37) and seals (39) on the swivel shaft assembly (38).

S 344-094

- (2) Install the swivel shaft assembly (38) on the manifold and secure with the swivel washer (36, 37), washer (35), and nut (34).

K. Put the Airplane Back to Its Usual Condition

S 444-089

- (1) SPOILERS 5, 6, 7, AND 8;  
Do these steps:

**WARNING:** REFER TO AMM 25-65-00/201 FOR THE PROCEDURE TO ARM THE OFF-WING ESCAPE SYSTEM. IF YOU INCORRECTLY ARM THE OFF-WING ESCAPE SYSTEM, THE ESCAPE SLIDE CAN ACCIDENTALLY INFLATE AND CAUSE INJURY OR DAMAGE.

- (a) Arm the off-wing escape system (AMM 25-65-00/201).
  - 1) Remove the shorting cap from the spoiler override actuator.
- (b) Close access panels 552GB, 652GB, 552BB, or 652BB (AMM 06-44-00/201).

S 864-079

- (2) Retract the trailing edge flaps (AMM 27-51-00/201).

S 864-080

- (3) Move the speedbrake lever to its down-and-locked position.

S 864-081

- (4) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - (a) 11G11, AUTO SPEEDBRK

S 864-082

- (5) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-083

- (6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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SPOILER RVDT UNIT – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and installation tasks for the captain's and first officer's spoiler RVDT units.

TASK 27-61-04-024-001

2. Spoiler Rotary Variable Differential Transducer (RVDT) Unit – Removal

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

- (1) Location Zones  
211/212 Control Cabin
  
- (2) Access Panel  
119AL Main Equipment Center

C. Prepare for the Removal

S 864-002

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

S 214-003

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 214-004

- (3) Make sure the speedbrake lever is in its down-and-locked detent position.

S 214-005

- (4) Make sure the control wheels are in their neutral positions.

S 864-006

- (5) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position legend lights come on.

S 864-007

- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11C6, FLT CONT ELEC 1L AC

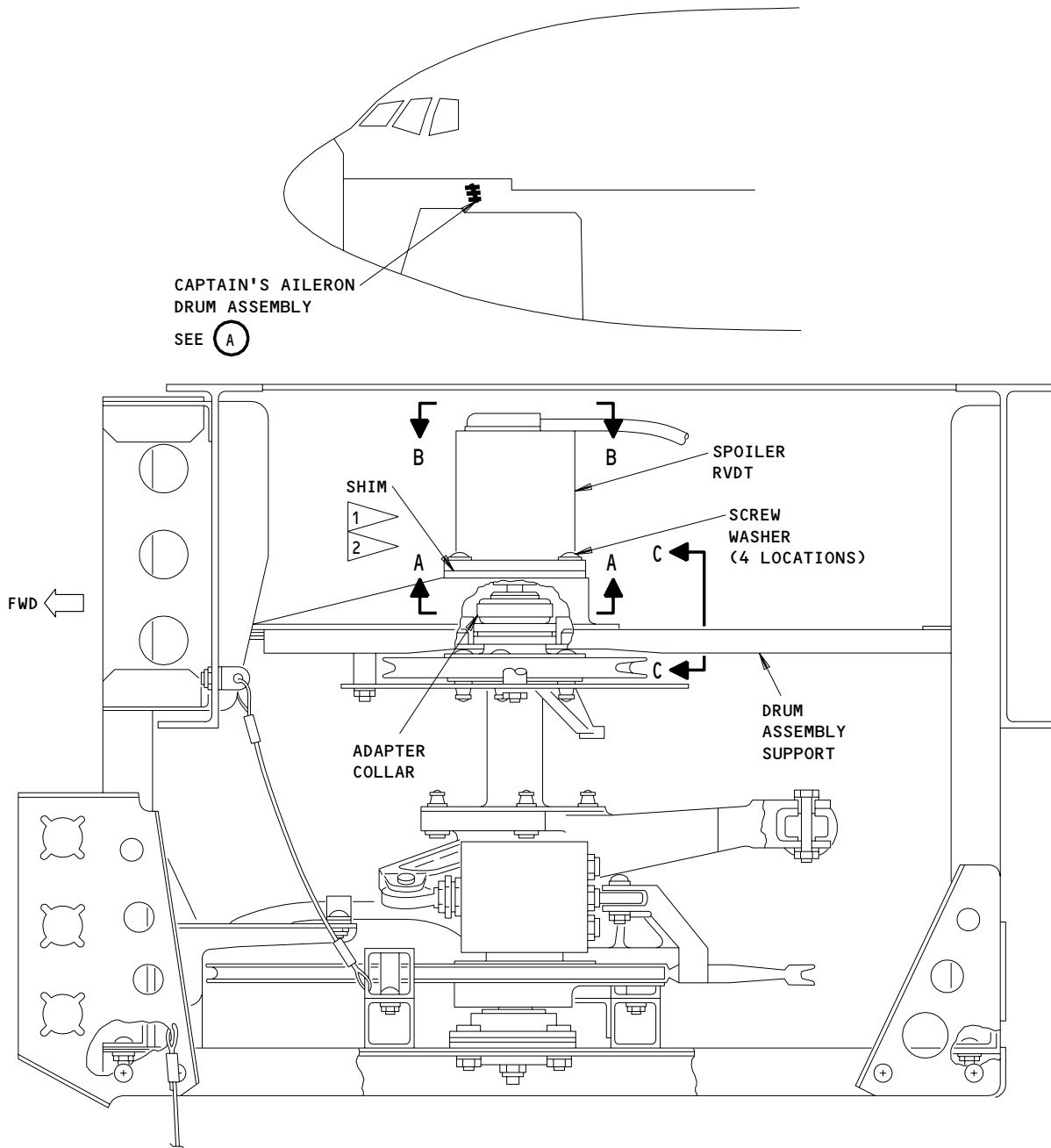
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CAPTAIN'S AILERON DRUM ASSEMBLY

(A)

- 1 AIRPLANES WITH SHIMS.
- 2 IF INSTALLED, DO NOT REMOVE THE SHIMS THAT ARE BONDED TO THE STRUCTURE AT THIS LOCATION.
- 3 DISTANCE BETWEEN THE TOP OF THE SPLINED INSERT AND THE TOP OF THE SHIM (OR THE SUPPORT). ADD OR REMOVE SHIMS UNTIL THIS DIMENSION IS CORRECT.

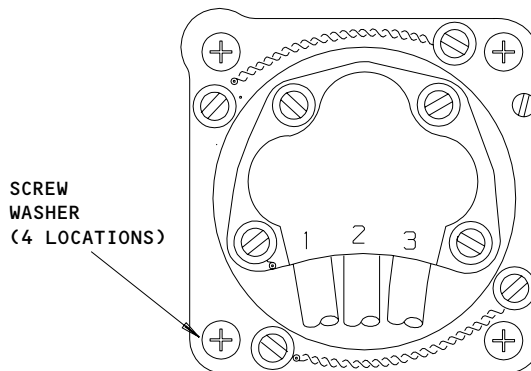
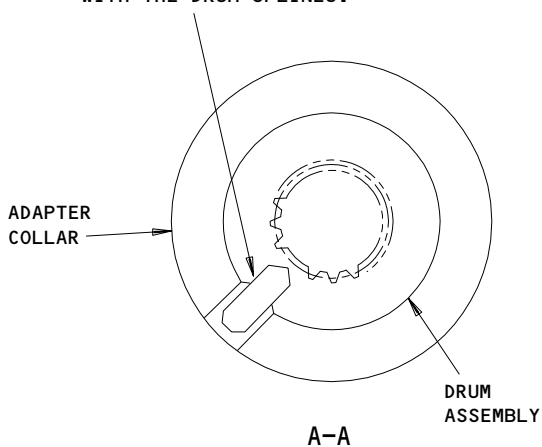
**NOTE:** SHIMS ARE NOT NECESSARY IF THE SPLINED INSERT IS NOT INSTALLED.

Spoiler RVDT Unit Installation  
Figure 401 (Sheet 1)

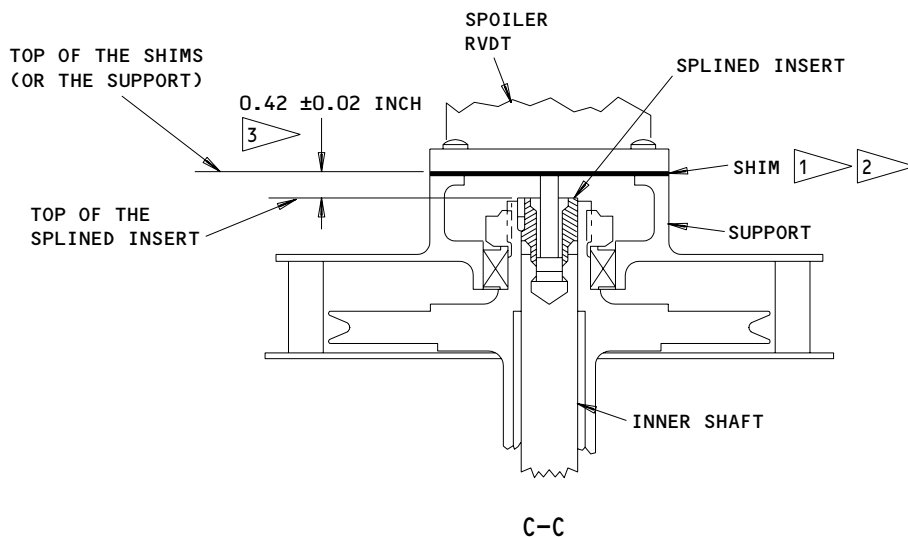
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**NOTE:** ALIGN THE MISSING TOOTH IN THE RVDT WITH THE PIN THAT CONNECTS THE ADAPTER COLLAR TO THE DRUM ASSEMBLY TO MATE WITH THE DRUM SPLINES.



B-B



Spoiler RVDT Unit Installation  
Figure 401 (Sheet 2)

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- (b) 11C7, FLT CONT ELEC 1L DC
- (c) 11C8, FLT CONT ELEC 2L AC
- (d) 11C9, FLT CONT ELEC 2L DC
- (e) 11G17, FLT CONT ELEC 1R AC
- (f) 11G18, FLT CONT ELEC 1R DC
- (g) 11G26, FLT CONT ELEC 2R AC
- (h) 11G27, FLT CONT ELEC 2R DC
- (i) 11H15, FLT CONT SHUTOFF WING LEFT
- (j) 11H16, FLT CONT SHUTOFF WING CTR
- (k) 11H26, FLT CONT SHUTOFF WING RIGHT

S 014-008

- (7) Open the access panels in the flight deck floor (aft of the captain's or the first officer's chair) to get access to the spoiler RVDT units.

S 014-009

- (8) If it is necessary, open access door 119AL and crawl forward to get access to the spoiler RVDT units (AMM 06-41-00/201).

D. Spoiler RVDT Unit - Removal (Fig. 401)

S 034-010

- (1) Disconnect the electrical connectors for the RVDT units.

S 224-011

- (2) Do these steps if shims are installed between the RVDT units and the support:
  - (a) Measure and keep a record of the shim thickness.

NOTE: The shims are bonded to the support.

- (b) Do not remove the shims from the top support.
- (c) If you accidentally removed or damaged the shims, bond new shims with a thickness equal to the old shims to the support.

NOTE: Install the new RVDT while the adhesive is wet.

If you do not know the necessary shim thickness, add or remove shims to get the dimension shown in View C-C.

S 024-012

- (3) Do these steps to remove the RVDT unit:
  - (a) Remove the four screws and washers that connect the RVDT unit to the support.
  - (b) Lift the RVDT unit from the top support.
  - (c) Keep a record of the position of the missing tooth on the RVDT shaft.

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TASK 27-61-04-424-013

3. Spoiler Rotary Variable Differential Transducer (RVDT) Unit - Installation

A. Consumable Materials

- (1) D00128 Lubricant - Petrolatum VV-P-236
- (2) A00181 Adhesive, BMS 5-92 Type I

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-61-00/501, Spoiler/Speedbrake Control System
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones  
211/212 Control Cabin
- (2) Access Panel  
119AL Main Equipment Center

D. Spoiler RVDT Unit - Installation

S 864-014

- (1) Align the missing tooth in the RVDT shaft with the pin that holds the adapter collar to the drum assembly.

S 644-015

- (2) Apply some lubricant to the RVDT shaft.

**NOTE:** To prevent damage to the RVDT, do not turn the RVDT shaft before you install it. Do not bend the RVDT shaft during the installation.

S 434-016

**CAUTION:** MAKE SURE YOU ALIGN THE MATING SPLINES CORRECTLY. DO NOT USE TOO MUCH FORCE DURING THE RVDT INSTALLATION. TOO MUCH FORCE CAN DAMAGE THE SPLINES.

- (3) Engage the RVDT shaft with the splines in the drum assembly.

S 434-017

- (4) Install the screws and washers through the RVDT and tighten them.

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S 824-018

- (5) Do the adjustment procedure for the control wheel RVDTs (AMM 27-61-00/501).

E. Spoiler RVDT Unit - Test

S 864-019

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-020

- (2) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to ON.

S 864-021

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

- (a) 11C6, FLT CONT ELEC 1L AC
- (b) 11C7, FLT CONT ELEC 1L DC
- (c) 11C8, FLT CONT ELEC 2L AC
- (d) 11C9, FLT CONT ELEC 2L DC
- (e) 11G17, FLT CONT ELEC 1R AC
- (f) 11G18, FLT CONT ELEC 1R DC
- (g) 11G26, FLT CONT ELEC 2R AC
- (h) 11G27, FLT CONT ELEC 2R DC
- (i) 11H15, FLT CONT SHUTOFF WING LEFT
- (j) 11H16, FLT CONT SHUTOFF WING CTR
- (k) 11H26, FLT CONT SHUTOFF WING RIGHT

S 214-022

- (4) Examine the spoiler control modules (SCMs) for CW XDCR faultballs and do this step:

**NOTE:** SCMs on the E1 shelf get inputs from the RVDTs on the captain's drum assembly. SCMs on the E2 shelf get inputs from the RVDTs on the first officer's drum assembly.

- (a) Push the RESET switch on the SCMs if it is necessary.

S 714-023

- (5) Do the "Control Wheel Inputs and Spoiler Operation in the Air Mode - Test" group of steps in the operational test for the spoilers (AMM 27-61-00/501).

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F. Put the Airplane Back to Its Usual Condition

S 864-024

- (1) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-025

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 414-026

- (3) Close access door 119AL (AMM 06-41-00/201).

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**27-61-04**

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SPEEDBRAKE CONTROL LEVER – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and installation procedures for the speedbrake lever.

TASK 27-61-08-024-001

2. Speedbrake Lever – Removal (Fig. 401)

A. Equipment

- (1) Wrench, Speedbrake Control Lever – A27087-1

B. References

- (1) AMM 24-22-00/201, Electrical Power – Control  
(2) AMM 27-41-02/401, Stabilizer Trim Lever  
(3) AMM 27-41-03/401, Alternate Stabilizer Trim Switch

C. Access

- (1) Location Zones  
211/212 Control Cabin

D. Prepare for the Removal

S 864-002

- (1) Supply electrical power (Ref 24-22-00).

S 214-003

- (2) Make sure the speedbrake lever is in its down-and-locked position.

S 864-004

- (3) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 864-005

- (4) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:

- (a) 11C6, FLT CONT ELEC 1L AC  
(b) 11C7, FLT CONT ELEC 1L DC  
(c) 11C8, FLT CONT ELEC 2L AC  
(d) 11C9, FLT CONT ELEC 2L DC  
(e) 11G11, AUTO SPEEDBRK  
(f) 11G17, FLT CONT ELEC 1R AC  
(g) 11G18, FLT CONT ELEC 1R DC  
(h) 11G26, FLT CONT ELEC 2R AC  
(i) 11G27, FLT CONT ELEC 2R DC  
(j) 11H15, FLT CONT SHUTOFF WING LEFT  
(k) 11H16, FLT CONT SHUTOFF WING CTR  
(l) 11H26, FLT CONT SHUTOFF WING RIGHT

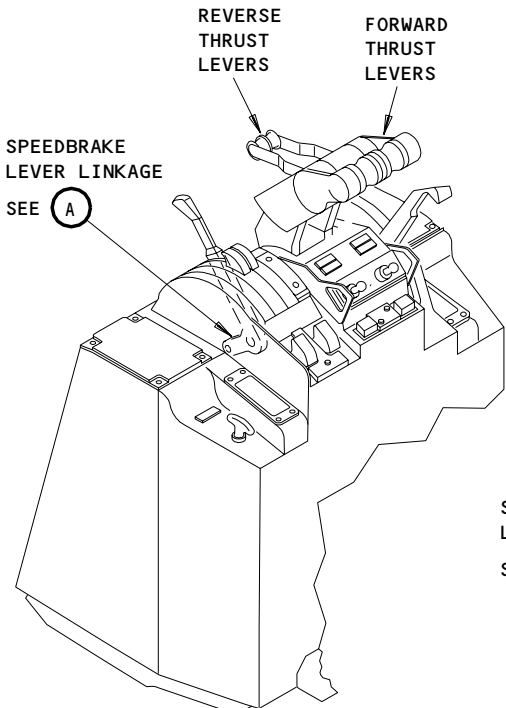
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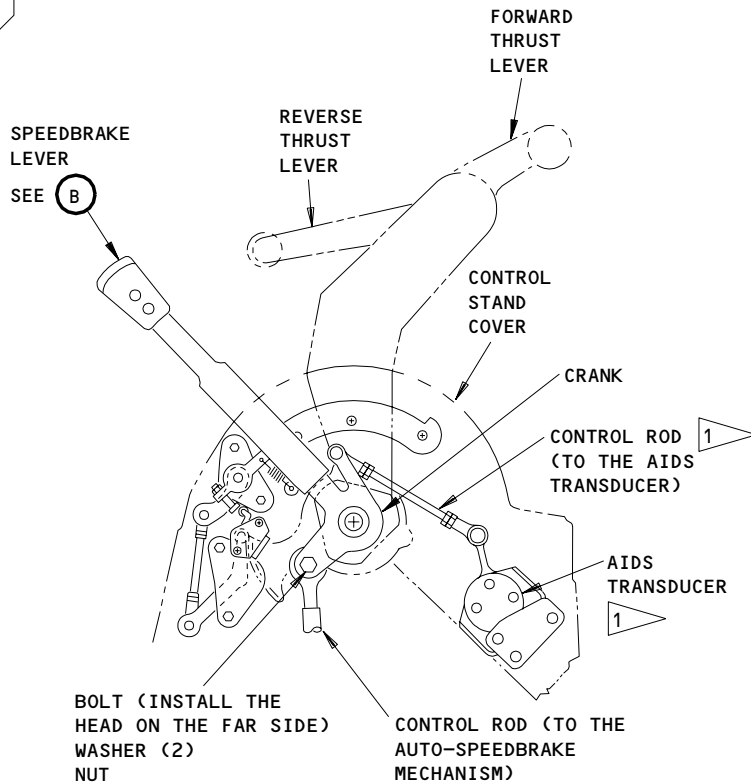
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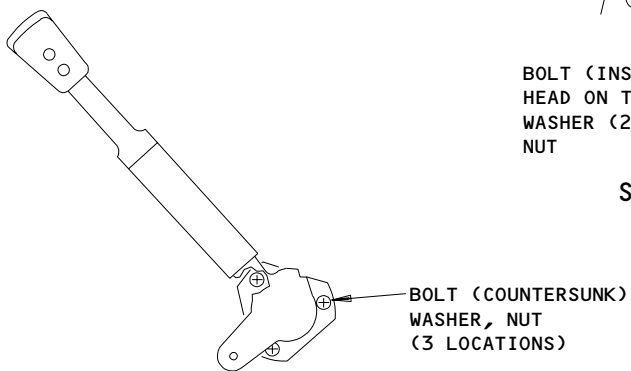
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CONTROL STAND



SPEEDBRAKE LEVER LINKAGE



SPEEDBRAKE LEVER

1 NOT ON ALL AIRPLANES

Speedbrake Lever Installation  
Figure 401

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27-61-08

S 044-006

**WARNING:** DO THE DEACTIVATION PROCEDURE FOR THE FLIGHT COMPARTMENT SEAT. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE SEAT MOVES ACCIDENTALLY.

- (5) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
  - (a) 6H15, CAPT SEAT
  - (b) 6J21, F/O SEAT

S 014-007

- (6) Remove the access panel from the left side of the control stand to get access to the lightplate wires.
- E. Speedbrake Lever - Removal

S 034-008

**CAUTION:** BE VERY CAREFUL WHEN YOU DO MAINTENANCE IN THE CONTROL STAND. DAMAGE TO THE SWITCHES, LIGHTS, OR MECHANISMS CAN OCCUR.

- (1) Cut the ties that hold the wires for the speedbrake lightplate.

S 034-009

- (2) Remove these components:
  - (a) The screw (2 locations) that connects the speedbrake lightplate to the control stand panel, P10, and do this step:
    - 1) Lift the lightplate from the control stand and move it to the side.
  - (b) The seal assemblies for the speed brake lever and the stabilizer trim levers.

S 034-053

- (3) Remove the stabilizer trim levers (AMM 27-41-02/401) or switches (AMM 27-41-03/401).

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S 034-011

- (4) Disconnect the top of the control rod from the speedbrake lever crank.

NOTE: Do not change the length of the control rod.

S 034-044

- (5) AIRPLANES WITH AIDS TRANSDUCER;  
Disconnect the control rod to the AIDS transducer from the speedbrake lever.

S 034-016

- (6) Remove the bolts (3 locations) that connect the speedbrake lever to the airplane structure.

S 024-017

- (7) Remove the speedbrake lever.

TASK 27-61-08-424-018

3. Speedbrake Lever - Installation (Fig. 401)

A. Equipment

- (1) Wrench, Speedbrake Control Lever - A27087-1

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-41-02/401, Stabilizer Trim Lever
- (3) AMM 27-41-03/401, Alternate Stabilizer Trim Switch
- (4) AMM 27-62-00/501, Auto-Speedbrake Control System
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones  
211/212 Control Cabin

D. Speedbrake Lever - Installation

S 434-019

- (1) Put the lever in its correct position and install the bolts that connect it to the airplane structure (3 locations).

S 214-020

- (2) Make sure the auto-speedbrake mechanism is in its DOWN position.

S 434-021

- (3) Connect the top of the control rod to the speedbrake lever.

NOTE: Do not change the length of the control rod.

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- S 434-068
- (4) AIRPLANES WITH AIDS TRANSDUCER;  
Use the bolt, washer, and nut to connect the control rod for the AIDS transducer to the crank.
- S 024-056
- (5) Install the stabilizer trim levers (AMM 27-41-02/401) or switches (AMM 27-41-03/401).
- S 434-027
- (6) Install the seal assembly for the speedbrake lever and the stabilizer trim levers.
- S 434-028
- (7) Install the screws that connect the speedbrake lightplate to the control stand panel, P10 (2 locations).
- S 434-029
- (8) Move the wires and install the ties that hold them in their correct positions.
- S 824-030
- (9) Adjust the speedbrake lever (Ref 27-62-00).
- S 414-031
- (10) Install the access panel on the left side of the control stand.
- S 864-033
- (11) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6H15, CAPT SEAT
  - (b) 6J21, F/O SEAT
- E. Speedbrake Lever Operation - Test

S 864-034

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply pressure to the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-035

- (2) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to ON.

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S 864-036

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G17, FLT CONT ELEC 1R AC
  - (f) 11G18, FLT CONT ELEC 1R DC
  - (g) 11G26, FLT CONT ELEC 2R AC
  - (h) 11G27, FLT CONT ELEC 2R DC
  - (i) 11H15, FLT CONT SHUTOFF WING LEFT
  - (j) 11H16, FLT CONT SHUTOFF WING CTR
  - (k) 11H26, FLT CONT SHUTOFF WING RIGHT

S 864-037

- (4) Move the control wheels to their neutral positions.

S 214-038

- (5) Move the speedbrake lever to its down-and-locked position and do this check:
- (a) Make sure all the spoilers are fully down.

S 214-039

- (6) Move the speedbrake lever fully up and do this check:
- (a) Make sure all the spoilers are fully up.

S 864-040

- (7) Move the speedbrake lever back to its down-and-locked position.  
F. Put the Airplane Back to Its Usual Condition

S 864-041

- (1) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11G11, AUTO SPEEDBRK

S 864-042

- (2) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-043

- (3) Remove electrical power if it is not necessary (Ref 24-22-00).

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SPEEDBRAKE TRANSDUCER (LVDT) – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and installation tasks for the speedbrake linear variable differential transducers (LVDT).

TASK 27-61-10-024-001

2. Speedbrake Linear Variable Differential Transducer (LVDT) – Removal (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 24-22-00/201, Electrical Power – Control
- (3) 27-62-04/201, Auto-Speedbrake Mechanism

B. Access

- (1) Location Zones  
211/212 Control Cabin
- (2) Access Panel  
113AL Forward Equipment Bay

C. Prepare for the Removal

S 864-002

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

S 214-003

- (2) Make sure the speedbrake lever is in its down-and-locked detent position.

S 864-004

- (3) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 864-005

- (4) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G11, AUTO SPEEDBRAKE
  - (f) 11G17, FLT CONT ELEC 1R AC
  - (g) 11G18, FLT CONT ELEC 1R DC
  - (h) 11G26, FLT CONT ELEC 2R AC
  - (i) 11G27, FLT CONT ELEC 2R DC
  - (j) 11H15, FLT CONT SHUTOFF WING LEFT
  - (k) 11H16, FLT CONT SHUTOFF WING CTR
  - (l) 11H26, FLT CONT SHUTOFF WING RIGHT

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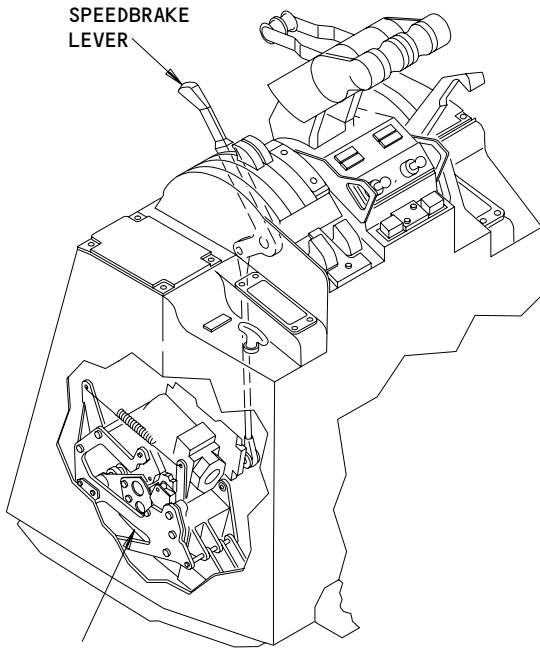
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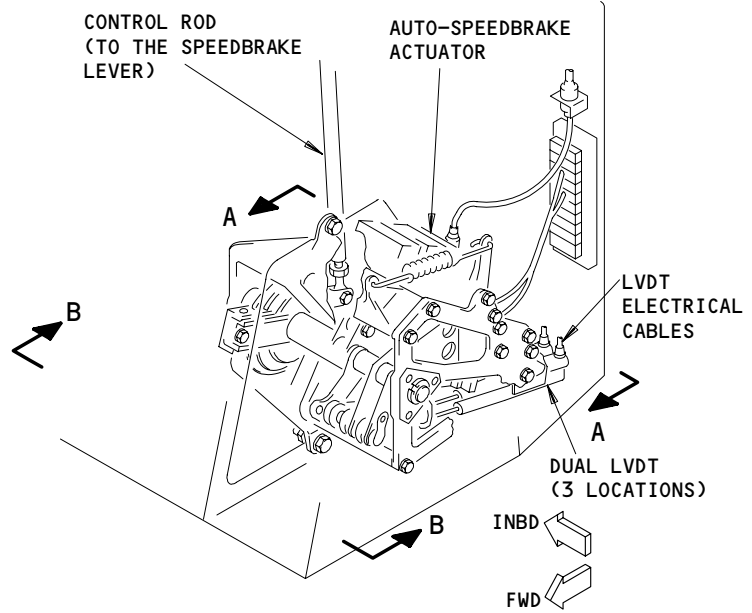
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AUTO-SPEEDBRAKE MECHANISM

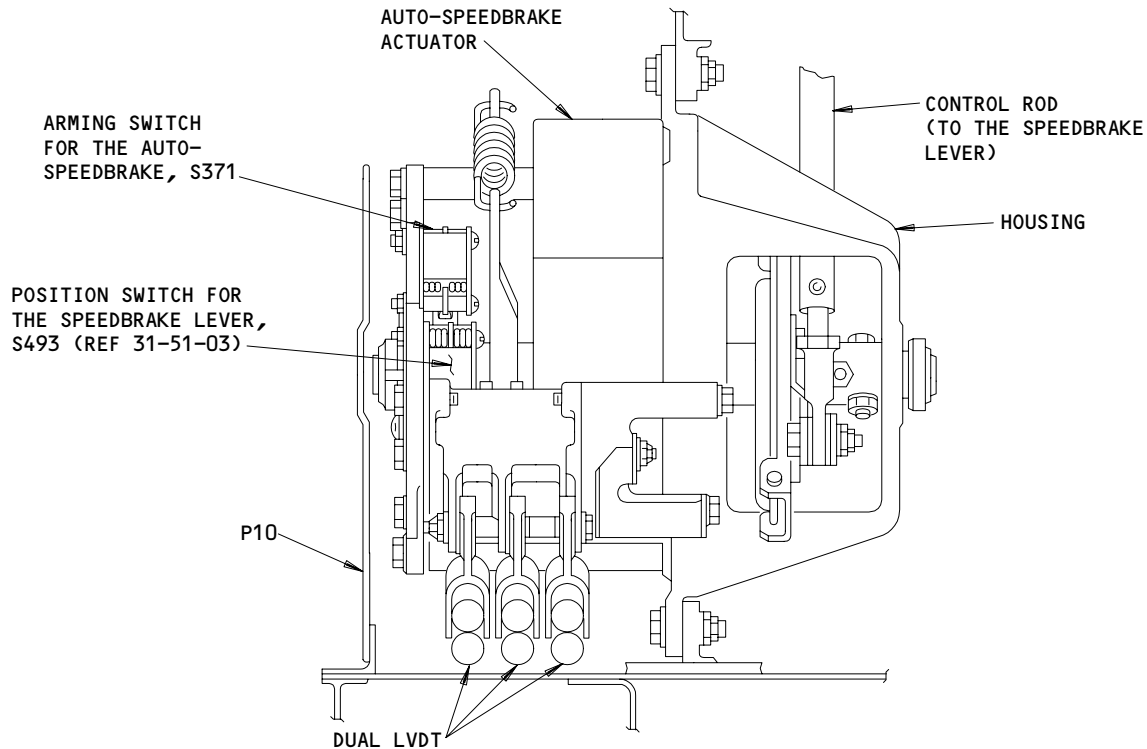
SEE (A)

CONTROL STAND



AUTO-SPEEDBRAKE MECHANISM

(A)



A-A

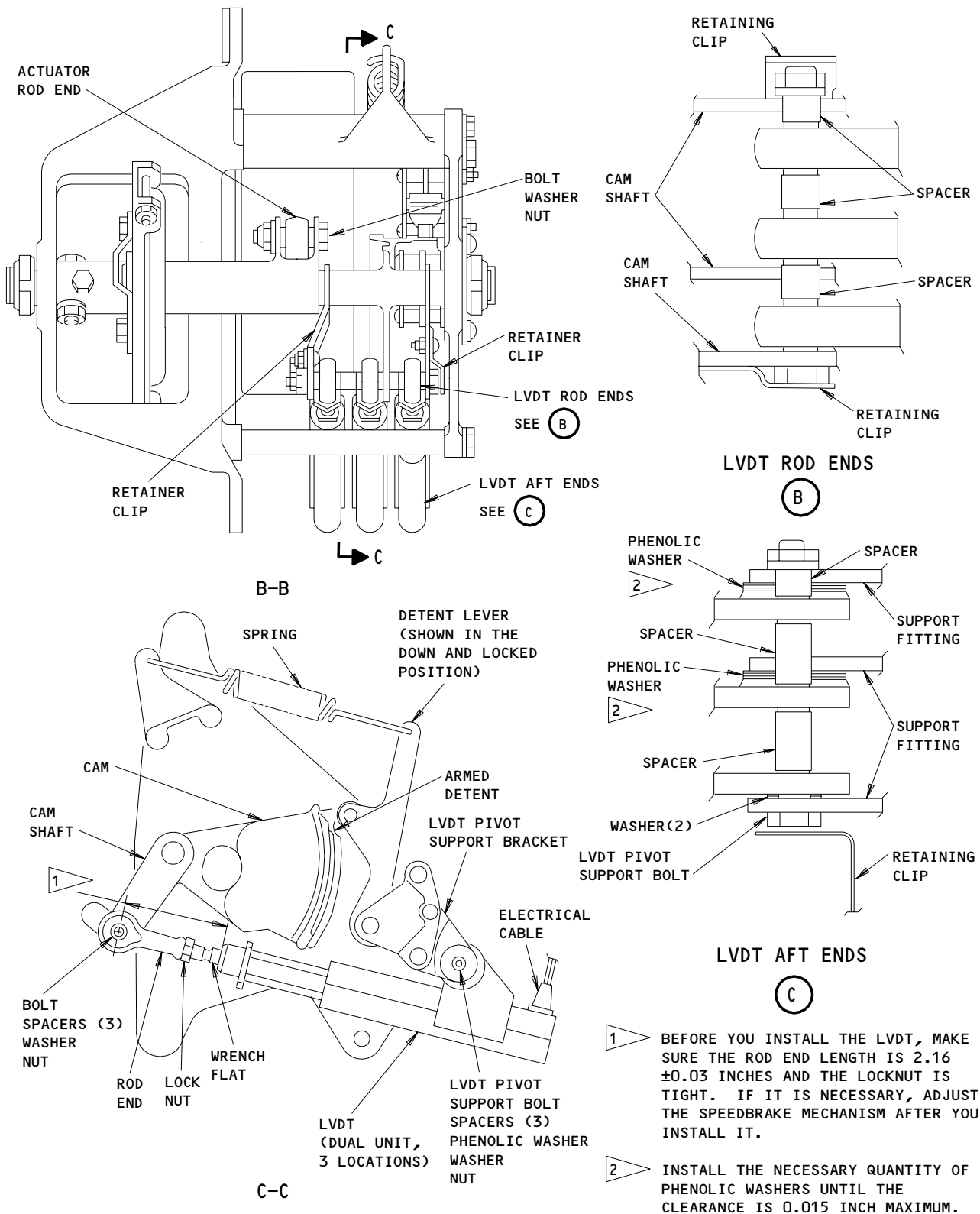
Speedbrake LVDT Installation  
Figure 401 (Sheet 1)

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- 1 BEFORE YOU INSTALL THE LVDT, MAKE SURE THE ROD END LENGTH IS 2.16 ±0.03 INCHES AND THE LOCKNUT IS TIGHT. IF IT IS NECESSARY, ADJUST THE SPEEDBRAKE MECHANISM AFTER YOU INSTALL IT.
- 2 INSTALL THE NECESSARY QUANTITY OF PHENOLIC WASHERS UNTIL THE CLEARANCE IS 0.015 INCH MAXIMUM.

Speedbrake LVDT Installation  
Figure 401 (Sheet 2)

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S 014-006

- (5) Open access door 113AL to get access to the LVDT electrical connectors (AMM 06-41-00/201).

D. Speedbrake LVDTs - Removal

S 034-007

- (1) Disconnect the LVDT electrical connectors.

**NOTE:** You can find the electrical connectors below the flight deck floor.

S 034-008

- (2) Remove the auto-speedbrake mechanism (AMM 27-62-04/201).

S 034-009

- (3) Remove these components:

**NOTE:** Do not remove the LVDT sliding rod from its housing. The LVDT sliding rod and its housing are calibrated together as a pair. If you put a different sliding rod into the LVDT housing, the LVDT will not operate correctly.

- (a) The screw and nut that hold the retainer clips at the rod end of the LVDTs (2 locations).
- (b) The bolt, nut, washer, and the three spacers that connect the LVDT rod ends to the auto-speedbrake mechanism.
- (c) The bolts, nuts, and washers that hold the retaining clip over the LVDT pivot support bolt.
- (d) The bolt, nut, washers, and spacers that connect the LVDT pivot support bracket to the auto-speedbrake mechanism.

S 024-010

- (4) Remove the speedbrake LVDTs.

TASK 27-61-10-424-011

3. Speedbrake Linear Variable Differential Transducer (LVDT) - Installation (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control

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- (3) 27-62-00/501, Spoiler/Speedbrake Control System
- (4) 27-62-04/201, Auto-Speedbrake Mechanism
- (5) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones  
211/212 Control Cabin
- (2) Access Panel  
113AL Forward Equipment Bay

C. Speedbrake LVDT - Installation

S 434-012

- (1) Do these steps to install the LVDTs:

**NOTE:** Do not remove the LVDT sliding rod from its housing. The LVDT sliding rod and its housing are calibrated together as a pair. If you put a different sliding rod into the LVDT housing, the LVDT will not operate correctly.

- (a) Adjust the fully retracted length of the speedbrake LVDT to the dimension shown (View C-C).
- (b) Put the LVDTs in their correct position in the auto-speedbrake mechanism.
- (c) Install the bolt, nut, washers (with the anti-rotation washers), and spacers that connect the aft end of the LVDTs to the auto-speedbrake mechanism.
- (d) Install the retaining clip over the LVDT pivot support bolt.
- (e) Install the bolt, nut, washer, and spacers that connect the LVDT rod ends to the auto-speedbrake mechanism.
- (f) Install the retaining clips over the bolt that connects the LVDT rod ends to the auto-speedbrake mechanism.

S 434-013

- (2) Install the auto-speedbrake mechanism (AMM 27-62-04/201).

**NOTE:** Do not connect the electrical connectors to the LVDTs.

S 824-014

- (3) Do the adjustment procedure for the speedbrake LVDTs (AMM 27-61-00).

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S 434-015

- (4) Connect the airplane connectors to the LVDT electrical connectors.  
D. Speedbrake LVDTs - Test

S 864-016

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11G11, AUTO SPEEDBRAKE
  - (f) 11G17, FLT CONT ELEC 1R AC
  - (g) 11G18, FLT CONT ELEC 1R DC
  - (h) 11G26, FLT CONT ELEC 2R AC
  - (i) 11G27, FLT CONT ELEC 2R DC

S 864-017

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-018

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT

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- S 864-019
- (4) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to ON.
- S 864-020
- (5) Push the RESET switch on the six spoiler control modules (SCMs) in the main equipment center.
- S 214-021
- (6) Move the speedbrake lever from its down-and-locked position to its ARMED position and do this check:
- (a) Make sure the spoilers are fully down.
- S 214-022
- (7) Move the speedbrake lever slowly to its full UP position and do this check:
- (a) Make sure all the spoilers move up.
- S 214-023
- (8) Move the speedbrake lever back to its down-and-locked position and do these checks:
- (a) Make sure all the spoilers move down.
- (b) Make sure there are no faults in the SCMs.
- E. Put the Airplane Back to Its Usual Condition
- S 864-024
- (1) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).
- S 864-025
- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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AUTO-SPEEDBRAKE CONTROL SYSTEM – DESCRIPTION AND OPERATION

1. General

- A. The auto-speedbrake system automatically deploys the spoilers at touchdown and during a refused takeoff. The system also automatically retracts the spoilers when a go-around is initiated after touchdown.
- B. The warning system provides an amber light and level B EICAS caution message should the speedbrakes be extended at altitudes less than 800 feet. The amber SPEED BRAKES light is located on the pilot's main panel P1. The amber EICAS caution message reads SPEED BRAKES EXT. Refer to 31-51-00, Warning System – Description and Operation, for more information.

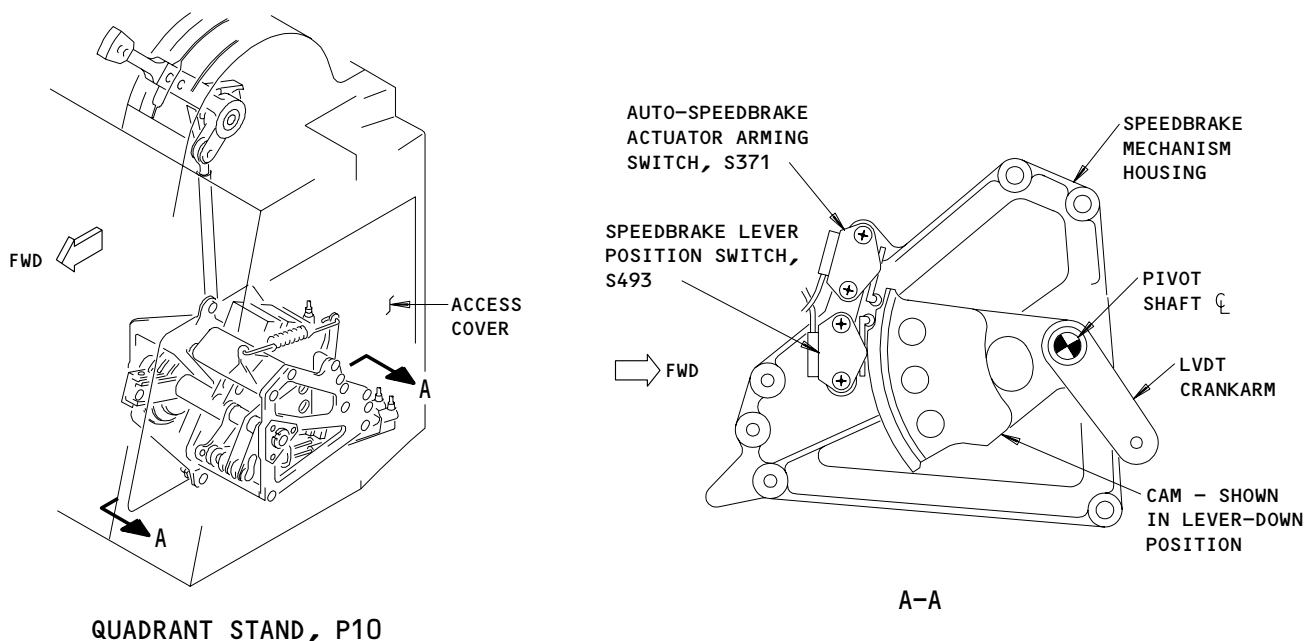
2. Component Details

A. Auto-Speedbrake Arming Switch (Fig. 1)

- (1) The auto-speedbrake arming switch is activated when the speedbrake lever is placed in the ARMED detent. The auto-speedbrake actuator circuit is then ready to operate the automatic speedbrake system. The arming switch is located inside the quadrant control stand. It is attached to the speedbrake mechanism support.

B. Auto-Speedbrake Actuator (Fig. 2)

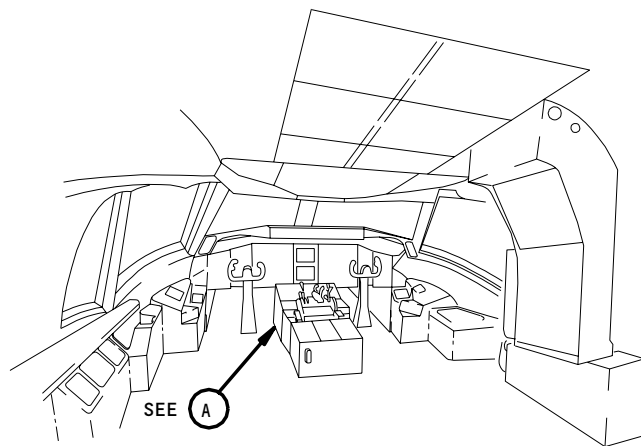
- (1) The auto-speedbrake actuator drives the speedbrake lever and the speedbrake LVDTs through a no-back clutch. The clutch allows the flight crew to move the speedbrake lever without moving the actuator output shaft. Access to the actuator is through a side panel in the captain's side of the control stand.



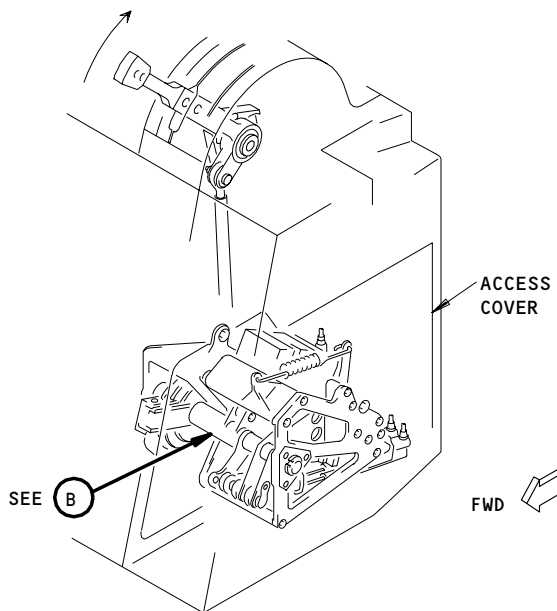
Auto-Speedbrake Arming Switch  
Figure 1

EFFECTIVITY	
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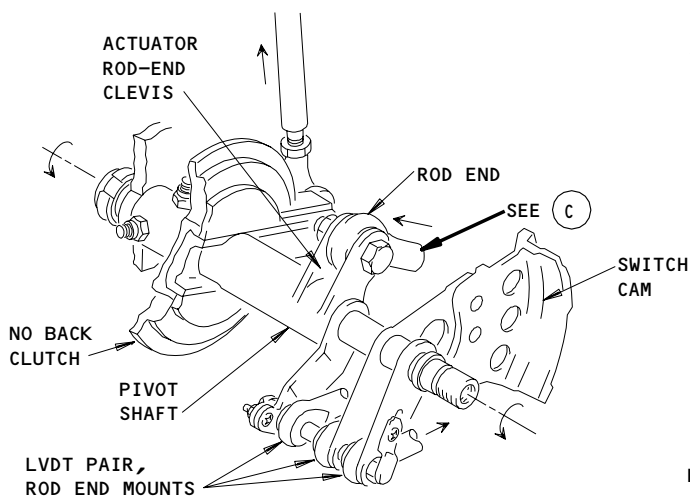
27-62-00



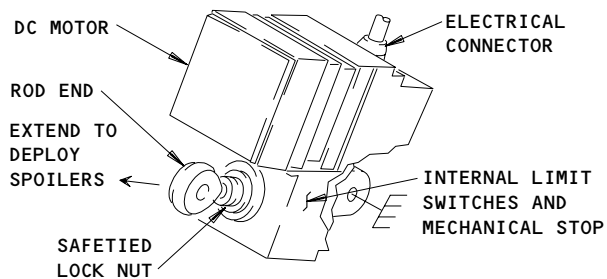
FLIGHT COMPARTMENT



QUADRANT STAND, P10



(B)



AUTO-SPEEDBRAKE ACTUATOR

(C)

**NOTE:** DIRECTIONAL ARROWS SHOW AN "EXTEND" INPUT.

Auto-Speedbrake Actuator  
Figure 2

EFFECTIVITY	
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C. Speed Brake Retract Switches (Fig. 3)

- (1) The speed brake retract switches are located under the flight deck floor in the microswitch pack. The switches are electrically connected to the speedbrake relay panel. If the switches are activated at any time when the auto-speedbrake actuator is extended, the actuator will retract and the speedbrake lever will return to the DOWN position.

3. Operation

A. Functional Description

(1) Refused Takeoff Override (Fig. 4)

- (a) The spoilers are automatically deployed during a refused takeoff. The reverse thrust levers (RTLs) mechanically lift the speedbrake lever from the down-and-locked position and actuate the reverse thrust lever position switch. Pulling the RTL's aft rotates two cams connected to the lever. The cams slide against a shaft that is connected by rod to a lever arm. The lever arm lifts the speedbrake lever detent lug out of the down-and-locked position. The lever arm also depresses the RTL position switch. When the RTL position switch is actuated, it engages the auto-speedbrake logic system. The auto-speedbrake logic system will deploy the spoilers if the airplane is on the ground.

(2) Auto-Speedbrake Relay Panels (Fig. 5)

- (a) The auto-speedbrake relay panels contain relays and switches that control the operation of the auto-speedbrake system. The panels use 28 volt dc power from the left bus.
- (b) The logic system allows the auto-speedbrake system to operate the spoilers in one of the three sequences below.
  - 1) During a normal landing, the flight crew arms the system by moving the speedbrake lever from the down-and locked position to the ARMED detent. When the following conditions are met, the speedbrake lever is moved to the UP position by the auto-speedbrake actuator.
    - a) Both engine forward thrust levers are set at less than 50 percent engine thrust.

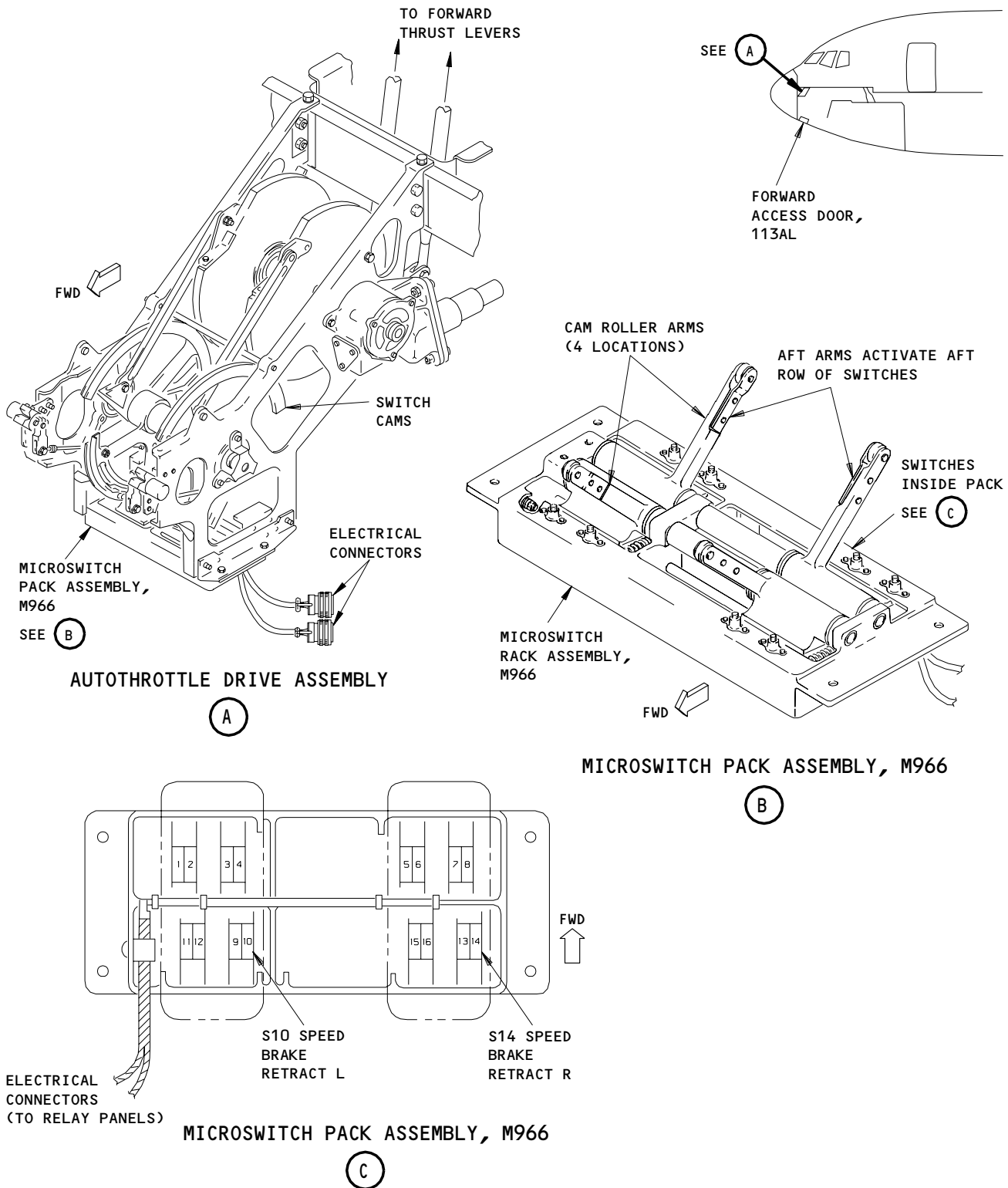
EFFECTIVITY

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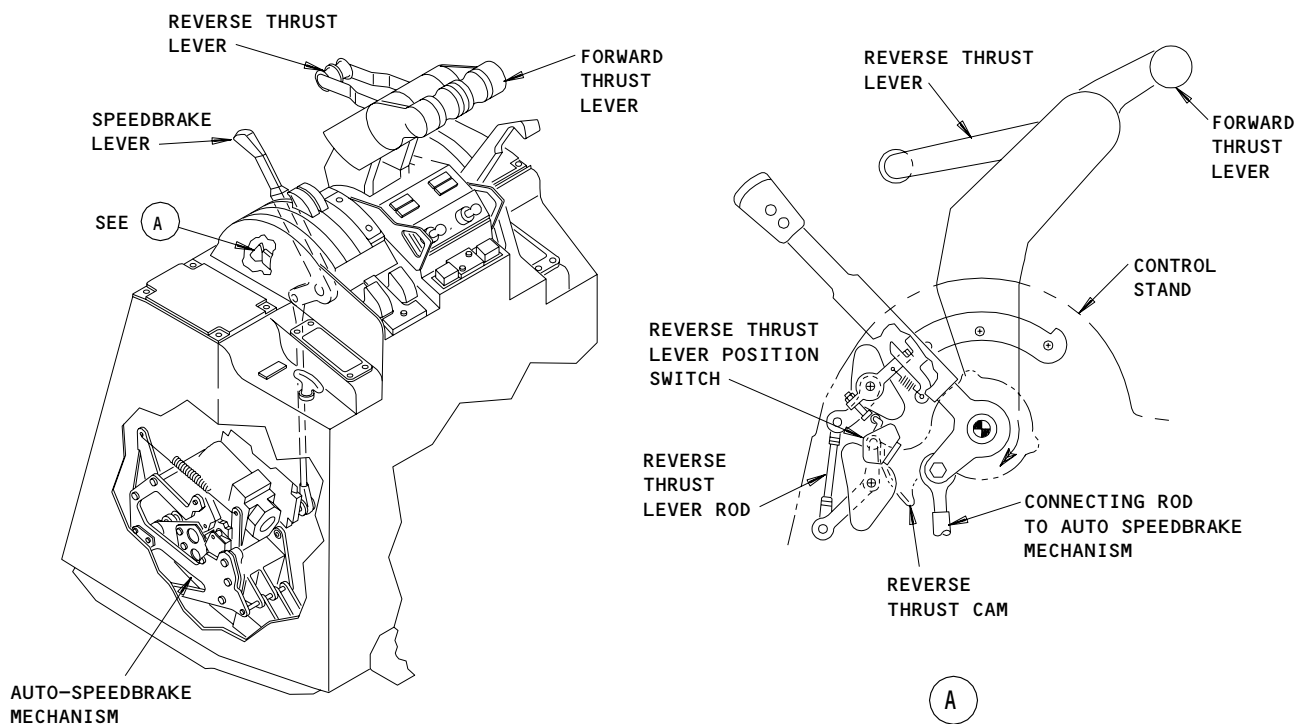


Speed Brake Retract Switches  
Figure 3

EFFECTIVITY	
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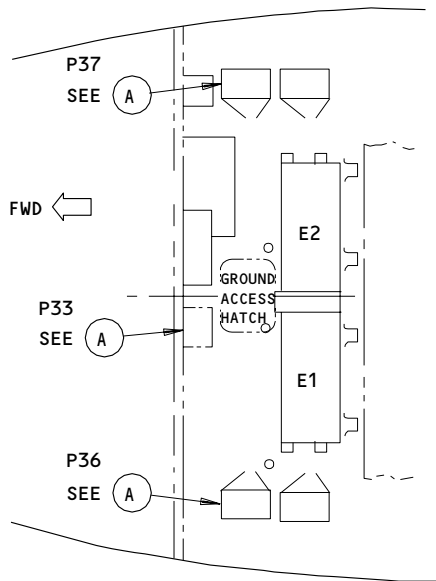
- b) Both truck tilt position actuator hydraulic inlet pressure switches signal high pressure.
  - c) All truck tilt air/ground proximity switches signal that the landing gear is not tilted.
- 2) After a normal landing sequence described above, the auto-speedbrake system will retract the spoilers during a go-around when either of the forward thrust levers is placed at greater than 50 percent thrust.
- 3) During an emergency landing or refused takeoff with the system unarmed, the spoilers will extend when the reverse thrust levers are applied. Operating the reverse thrust levers mechanically releases the speedbrake lever from the down-and-locked position. When the following conditions are met, the speedbrake lever is moved to the full UP stop by the auto-speedbrake actuator.
- a) Both truck tilt position actuator hydraulic inlet pressure switches signal high pressure.



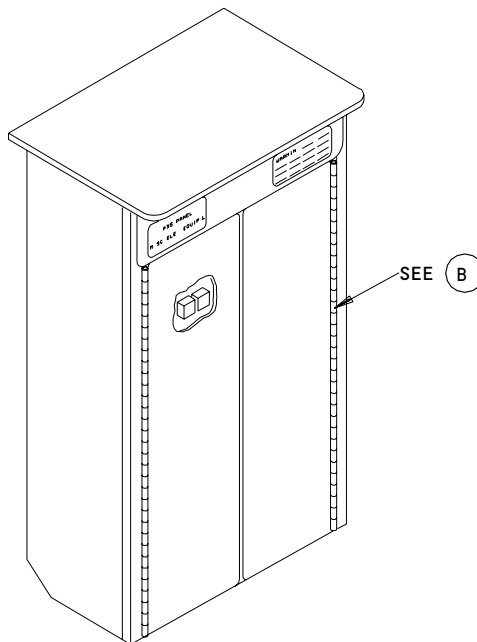
Refused Take-off Override  
Figure 4

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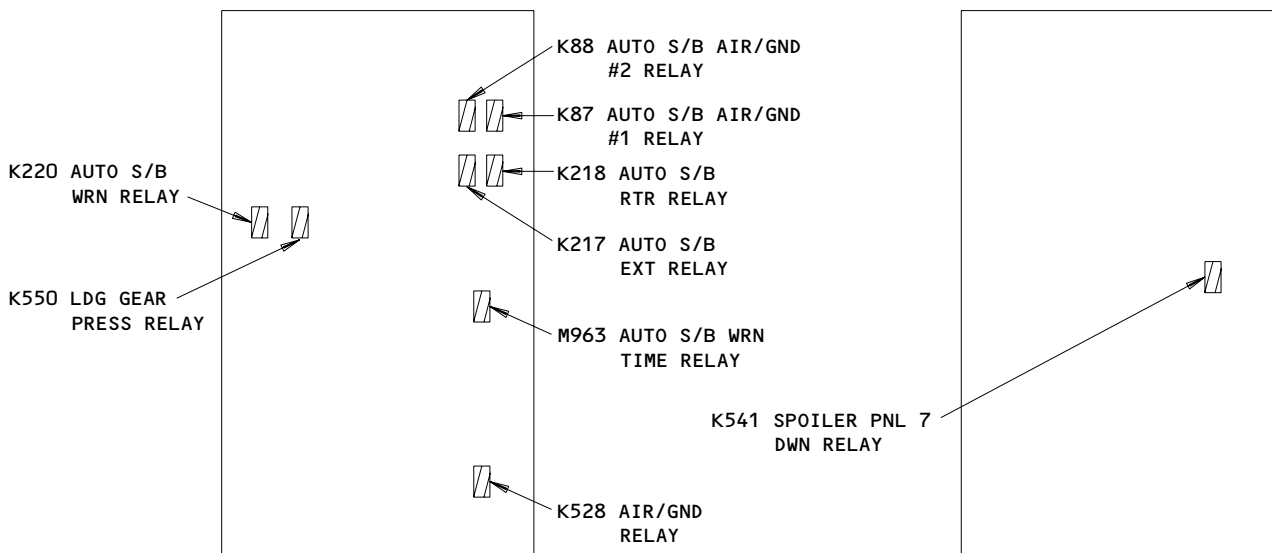


MAIN EQUIPMENT CENTER



RELAY PANEL-TYPICAL  
(P-33,P-36,P-37)

(A)



SPEED BRAKE RELAY (P33)

SPEED BRAKE RELAY (P37)

SPEED BRAKE RELAYS

(B)

Auto-Speedbrake Relay Panel  
Figure 5

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- b) All truck tilt air/ground proximity switches signal that the landing gear is not tilted.
- (c) An amber AUTO SPDBRK light on the pilot's overhead panel P5 comes on when the speedbrake lever is in the ARMED detent and any of the following occurs. The upper EICAS screen will also display an amber AUTO SPEEDBRAKE message (Fig. 6).
  - 1) One (and only one) truck tilt position actuator hydraulic inlet pressure switch signals low pressure.
  - 2) The truck tilt air/ground proximity switches disagree.
  - 3) Either landing gear trucks are in the not tilt position.
- (3) Auto-Speedbrake System Schematic (Fig. 7)
  - (a) The auto-speedbrake system moves the speedbrake lever to the full UP stop or DOWN position in response to inputs into the system. The inputs are from the reverse thrust levers, speed brake retract switches, proximity switch electronics unit (PSEU), and the truck tilt position actuator hydraulic inlet pressure switches.
  - (b) The auto-speedbrake system operates after the airplane has landed. Touchdown is sensed by the PSEU through gear tilt proximity switches on the main landing gear. A signal from the PSEU closes two relays in the auto-speedbrake relay panel. Two truck tilt position actuator hydraulic inlet pressure switches act as a check on the PSEU input. If pressure is lost in the center hydraulic system before touchdown, the main gear will become untilted. In this case, the PSEU would send a false signal to the auto-speedbrake relay panel. The actuator pressure switches monitor the pressure in the center hydraulic system. If the pressure drops below 1800 psi, the switches open relays in the auto-speedbrake relay panel. The auto-speedbrake actuator will not operate with either of the relays open.
  - (c) Placing the speedbrake lever in the ARMED detent actuates the auto-speedbrake actuator arming switch. The arming switch arms the auto-speedbrake system for operation when a touchdown is sensed by the PSEU and the forward thrust levers are moved to less than 10 degrees of total thrust lever movement.

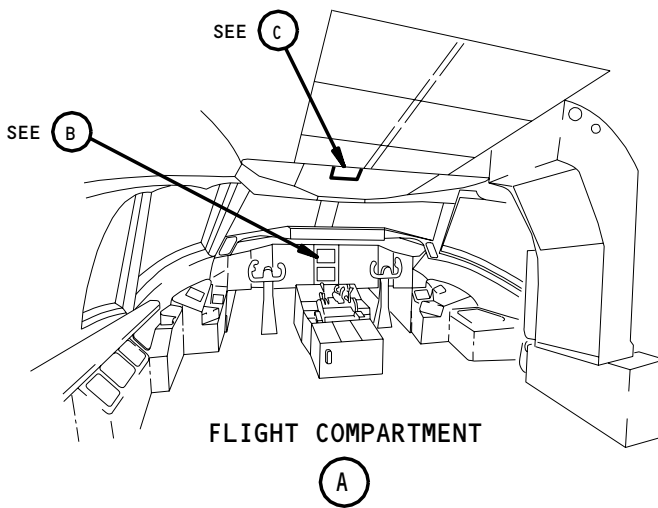
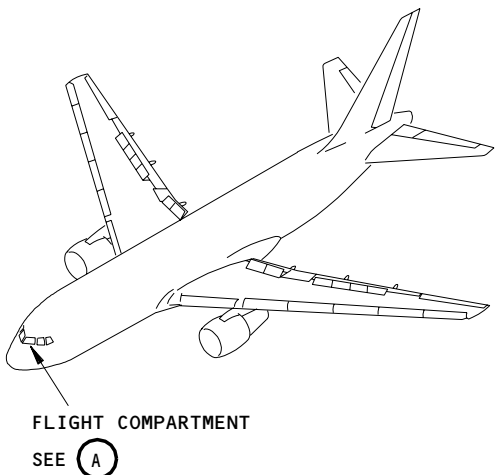
EFFECTIVITY

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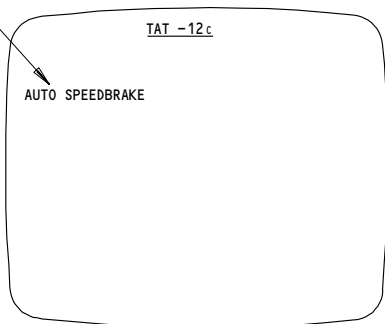
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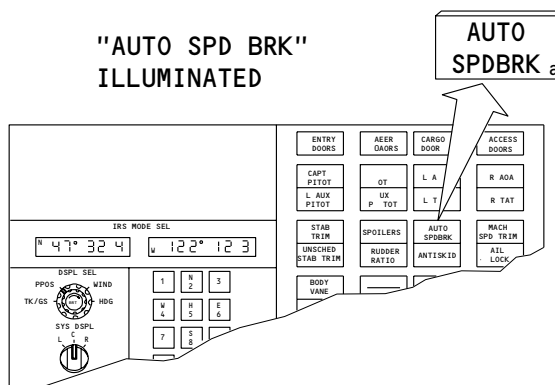
"AUTO SPEEDBRAKE"  
AMBER CREW ALERT  
MESSAGE



DISPLAY UNIT (P2)  
(EXAMPLE)

(B)

"AUTO SPD BRK"  
ILLUMINATED



OVERHEAD PANEL (P5)

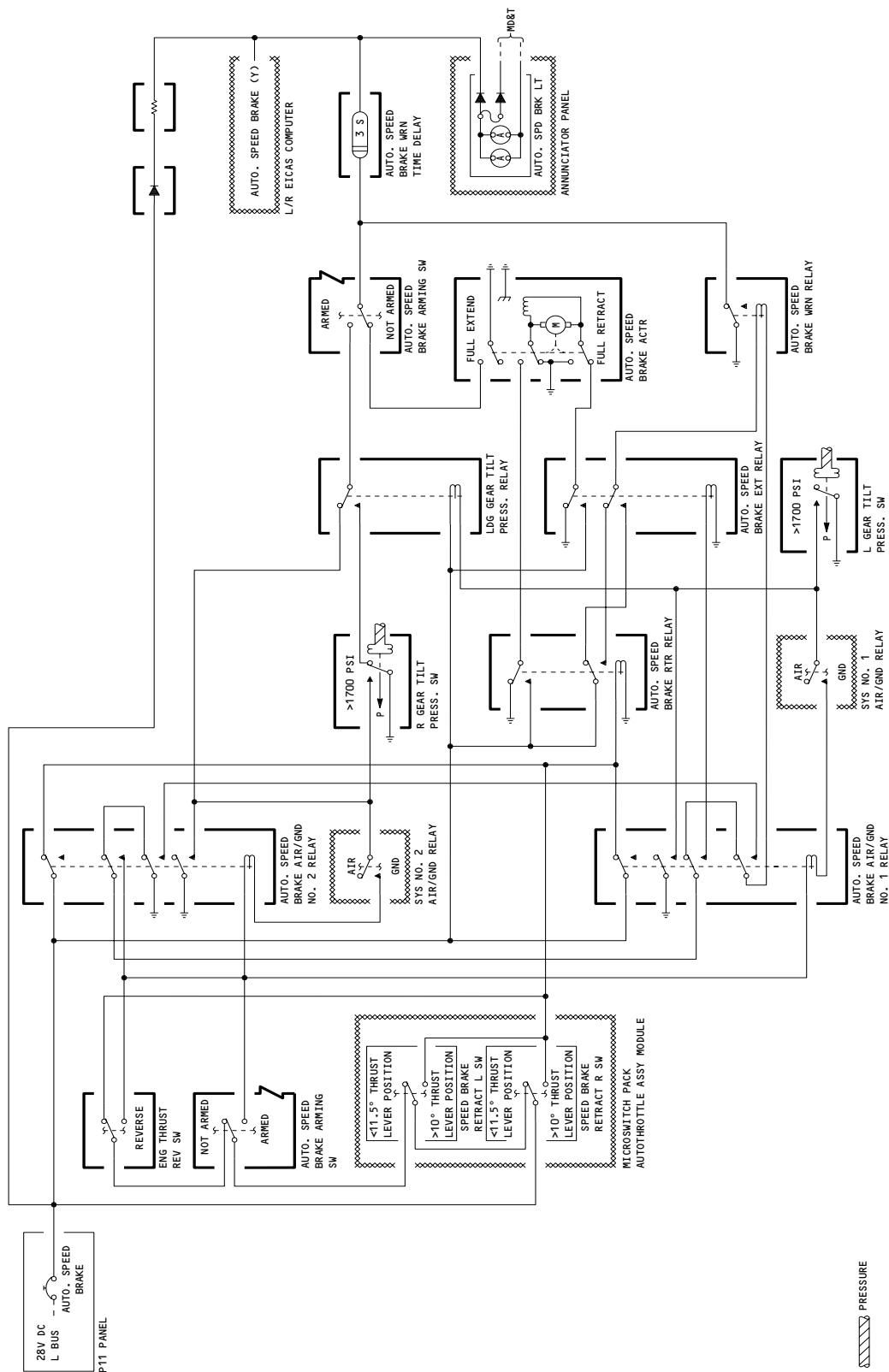
(C)

Speedbrake Fault Indications  
Figure 6

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Auto-Speedbrake Control System  
Figure 7

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- (d) Both forward thrust levers must be at less than 10 degrees of total thrust lever movement before the spoilers will deploy. If either forward thrust lever is moved past 11.5 degrees of total thrust lever movement, the spoilers will retract. A switch on each lever signals the relay panel when the levers are placed at less than 10 degrees of total thrust lever movement.
- (e) If the speedbrake lever is in the ARMED detent, the PSEU senses a touchdown, and the actuator pressure switches sense high pressure, the auto-speedbrake actuator will move the speedbrake lever to the full UP stop.
- (f) When the airplane is on the ground, operating either reverse thrust lever to command reverse thrust will lift the speedbrake lever from the down-and-locked position. The auto-speedbrake actuator will then move the speedbrake lever to the full UP stop.

B. Control

- (1) Provide electrical power (Ref 24-22-00).

**WARNING:** TO PREVENT INJURY OR DAMAGE, CLEAR PERSONNEL AND EQUIPMENT FROM CONTROL SURFACES AND THRUST REVERSERS BEFORE PROVIDING HYDRAULIC POWER. ISOLATE ANY SYSTEM NOT INTENDED FOR OPERATION.

- (2) Provide left, center, and right hydraulic system power (Ref 29-11-00).
- (3) Place control wheels in the neutral position.
- (4) Speedbrake operation (speedbrake lever).
  - (a) Move speedbrake lever to the full UP stop. All of the spoilers will extend to the 60 degree position.
  - (b) Return speedbrake lever to the down-and-locked position. All of the spoilers will return to the faired position.
- (5) Speedbrake operation (auto-speedbrake).
  - (a) Place forward thrust levers at greater than 11.5 degrees of total thrust lever movement.
  - (b) Move speedbrake lever to the ARMED detent.

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- (c) Place forward thrust levers at less than 10 degrees of total thrust lever movement. The speedbrake lever will move to the full UP stop. All of the spoilers will extend to the 60 degree position.
  - (d) Place forward thrust levers at greater than 11.5 degrees of total thrust lever movement. All of the spoilers will return to the faired position. Check that speedbrake lever moves to the DOWN position.
  - (e) Place the reverse thrust levers in the reverse idle thrust position. The speedbrake lever will move to the full UP stop. The spoilers will extend to the 60 degree position.
  - (f) Place reverse thrust levers to the OFF (stowed) position. The speedbrake lever will remain at the full UP stop. The spoilers will remain extended.
  - (g) Return speedbrake lever to the down-and-locked position. The spoilers will return to the faired position.
- (6) Remove hydraulic power (AMM 29-11-00/201).
  - (7) Remove electrical power (AMM 24-22-00/201).

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AUTO-SPEEDBRAKE CONTROL SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ACTUATOR - (FIM 27-61-00/101) SPOILER PCA, M306 THRU M317				
ACTUATOR - AUTO SPEEDBRAKE, M577	1	1	FLT COMPT, P10	27-62-04
ASSEMBLY - (FIM 22-32-00/101) MICROSWITCH PACK				
CIRCUIT BREAKER AUTO SPEEDBRK, C1023		1	FLT COMPT, P11 11G11	*
CLUTCH - AUTO SPEEDBRAKE NO-BACK	2	1	FLT COMPT, P10	27-62-04
DIODE - (FIM 31-01-33/101) AUTO SPEEDBRAKE, R244				
LIGHT - "AUTO SPDBK", YDLL15	1	1	FLT COMPT, P5, ANNUNCIATOR PNL M10394	*
MECHANISM - (FIM 27-61-00/101) SPEEDBRAKE CONTROL				
MODULE - (FIM 27-09-00/101) SPOILER CONTROL (SCM) 1L, M530 SPOILER CONTROL (SCM) 2L, M531 SPOILER CONTROL (SCM) 3L, M532 SPOILER CONTROL (SCM) 1R, M533 SPOILER CONTROL (SCM) 2R, M534 SPOILER CONTROL (SCM) 3R, M535				
PANEL - (FIM 30-31-00/101) ANNUNCIATOR, M10394				
RELAYS - (FIM 31-01-33/101) AUTO-SPEEDBRAKE AIR/GND 1, K87 AUTO-SPEEDBRAKE AIR/GND 2, K88 AUTO-SPEEDBRAKE EXTEND, K217 AUTO-SPEEDBRAKE RETRACT, K218 AUTO-SPEEDBRAKE WARNING, K220 LANDING GEAR TILT PRESSURE, K550				
RELAYS - (FIM 32-09-00/101) SYS NO. 1 AIR/GND, K552 SYS NO. 2 AIR/GND, K518				
SPOILERS 1 THRU 12 - (FIM 27-61-00/101)				
SWITCH - AUTO SPEEDBRAKE ARMING, S371	1	1	FLT COMPT, P10	27-62-06
SWITCH - SPEED BRAKE RETRACT L, S10	1	1	AUTOTHROTTLE DRIVE ASSY, MICRO- SWITCH PACK ASSY, M966	27-62-07
SWITCH - SPEED BRAKE RETRACT R, S14	1	1	AUTOTHROTTLE DRIVE ASSY, MICRO- SWITCH PACK ASSY, M966	27-62-07
SWITCH - L GEAR TILT PRESS, S452	2	1	551TB, LEFT WING	27-62-10
SWITCH - R GEAR TILT PRESS, S453	2	1	651TB, RIGHT WING	27-62-10
SWITCH - REVERSE THRUST LVR POS, S375	1	1	FLT COMPT, P10	27-62-08
TIME DELAY - (FIM 31-01-33/101) AUTO SPEEDBRAKE WARNING, M963				
TRANSDUCER - (FIM 27-61-00/101) SPEEDBRAKE (LVDT), TS35 SPEEDBRAKE (LVDT), TS36 SPEEDBRAKE (LVDT), TS37				

\* SEE WDM EQUIPMENT LIST

Auto-Speedbrake Control System - Component Index  
Figure 101

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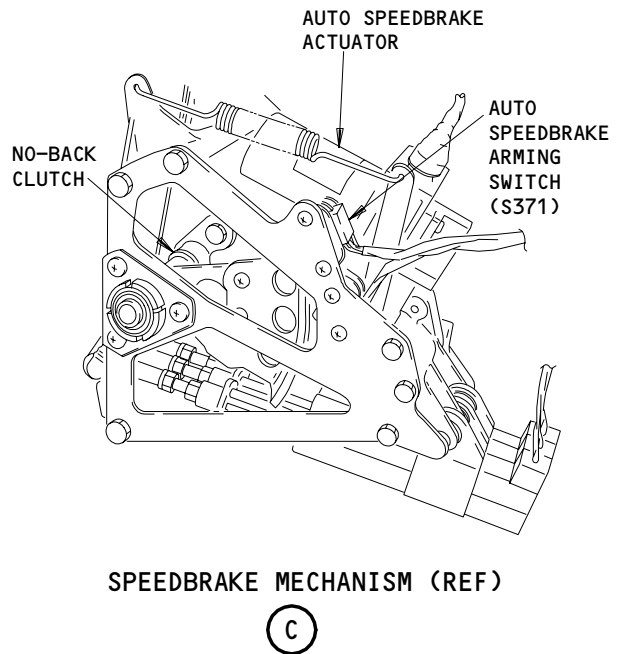
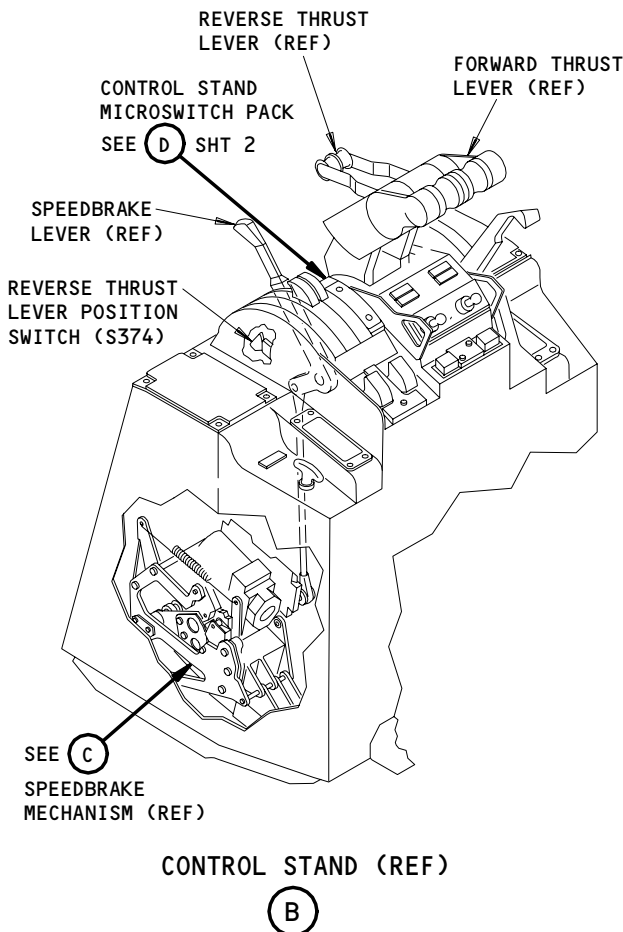
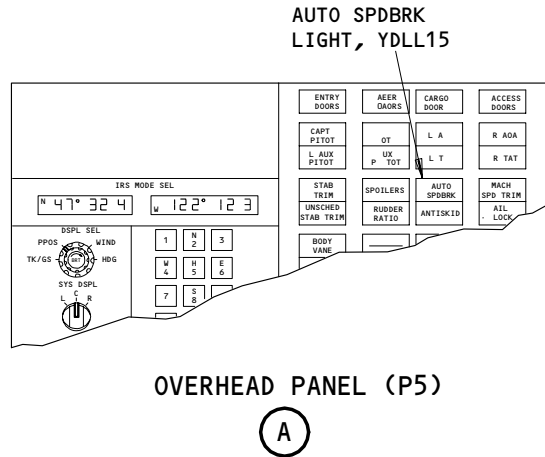
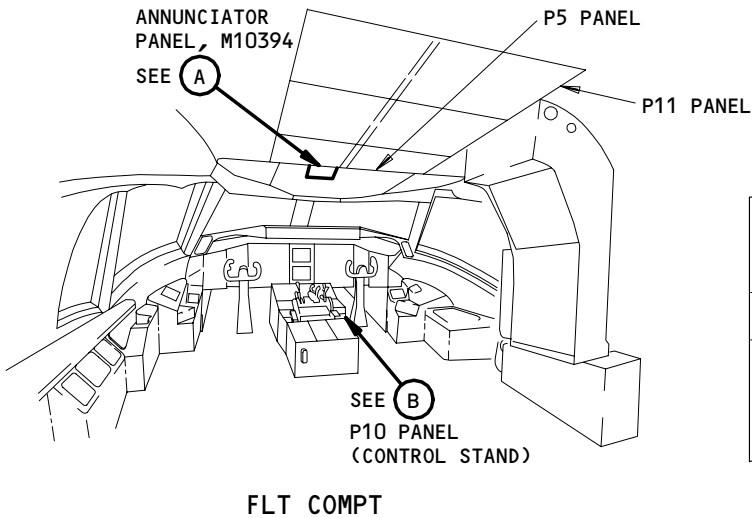
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### FAULT ISOLATION/MAINT MANUAL



Component Location  
Figure 102 (Sheet 1)

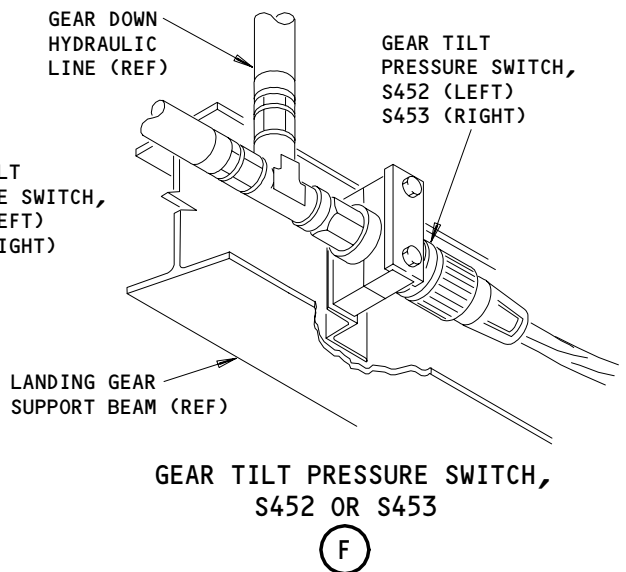
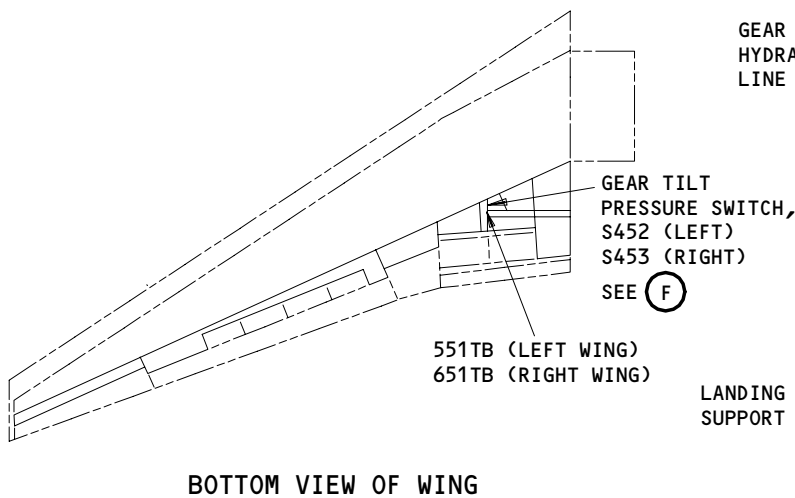
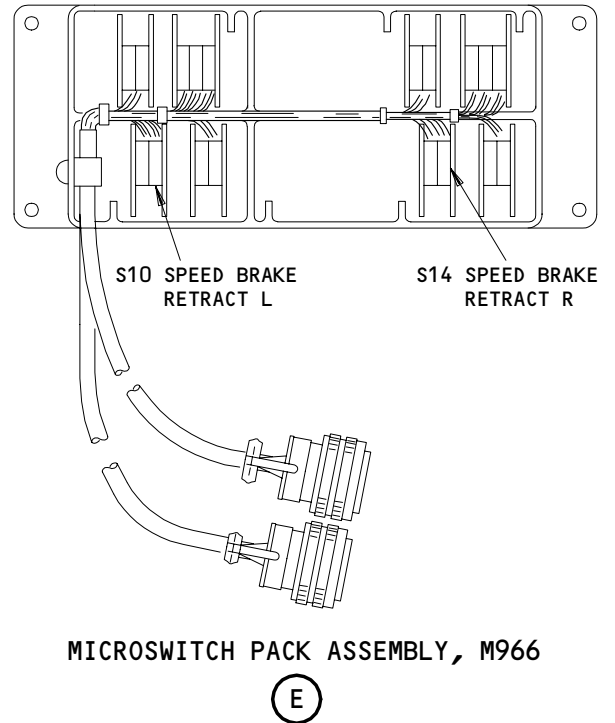
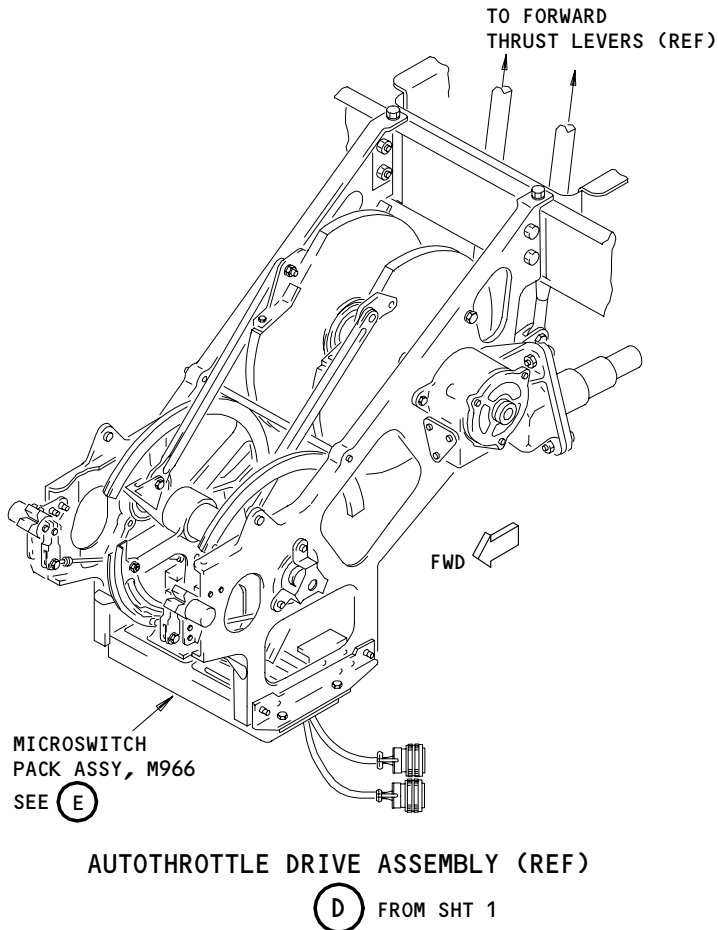
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Component Location  
Figure 102 (Sheet 2)

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AUTO-SPEEDBRAKE CONTROL SYSTEM - ADJUSTMENT/TEST

1. General

A. This procedure contains these tasks:

- Auto-speedbrake - Operational Test
- Auto-speedbrake - Adjustment
- Auto-speedbrake - System Test

If it is necessary, refer to 27-61-00/5 to get adjustment and test data for the spoilers.

TASK 27-62-00-715-002

2. Auto-Speedbrake - Operational Test

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Prepare for the Test

S 215-003

- (1) Make sure the speedbrake lever is in its down-and-locked detent.

S 865-301

- (2) Make sure the landing gear lever is in the down position.

S 865-004

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

S 865-005

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND ENGINE THURST REVERSERS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

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- S 865-290
- (5) Make sure the left, right and center WING FLT CONTROL shutoff valve switches on the P61 HYD/GEN FIELD CONT panel are in the ON position.
- S 865-006
- (6) Move the FUEL CONTROL switches on the control stand panel, P10, to CUTOFF and attach DO-NOT-OPERATE tags.
- S 865-007
- (7) Make sure this circuit breaker on the overhead panel, P11, is closed:
- (a) 11G11, AUTO SPEEDBRK
- S 865-008
- (8) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11L6 or 11D14, LEFT ENGINE T/R CONT
- (b) AIRPLANES WITH HYDRAULIC MOTOR GENERATOR;  
11D4 or 11D5, T/R CONT - ALTN L ENG
- (c) 11L33, RIGHT ENGINE T/R CONT
- (d) 11D33, RIGHT ENGINE T/R CONT ALTN
- S 865-009
- (9) Operate the aileron trim switches until the aileron trim indicator shows zero units of trim.
- D. Auto-Speedbrake - Operational Test
- S 865-010
- (1) Move the forward thrust levers forward until they are a minimum of 15° away from the idle stop.
- S 865-011
- (2) Move the speedbrake lever to its ARMED detent.
- S 215-012
- (3) Move the forward thrust levers rearward until they are less than 8° away from the idle stop.
- (a) Make sure the speedbrake lever moves fully up.
- (b) Make sure all the spoilers move up.
- S 215-013
- (4) Move the forward thrust levers forward until they are a minimum of 15° away from the idle stop.
- (a) Make sure the speedbrake lever moves to its down-and-locked detent.

EFFECTIVITY

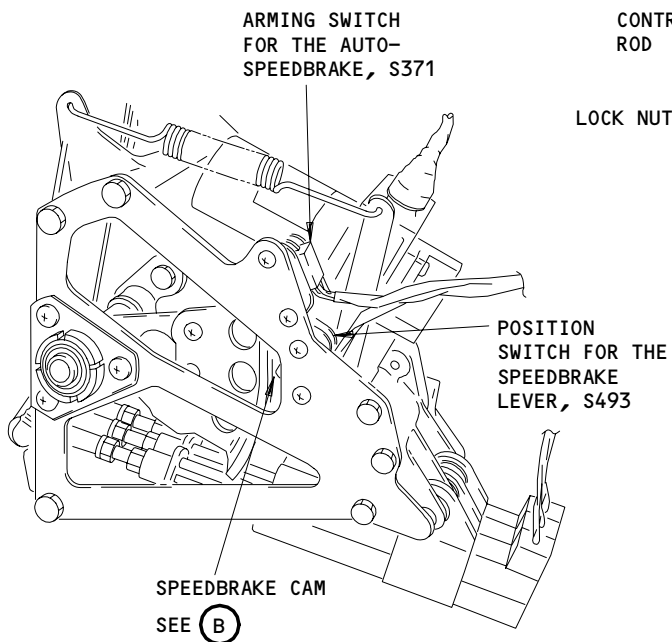
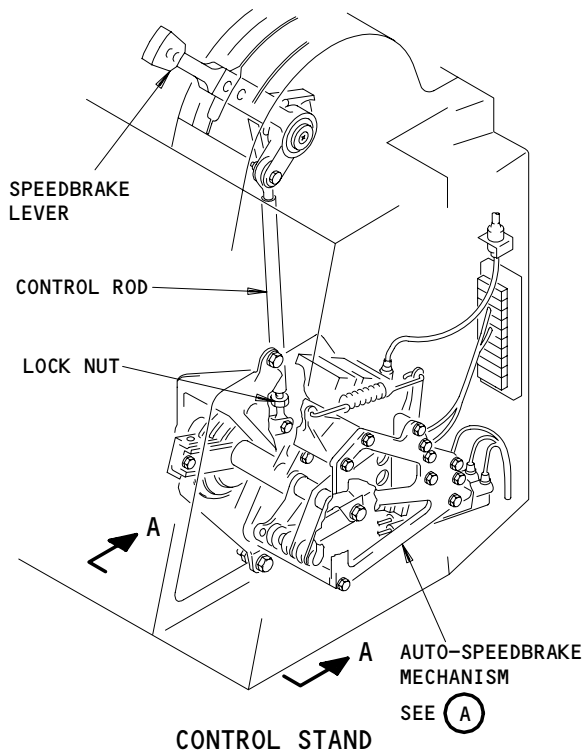
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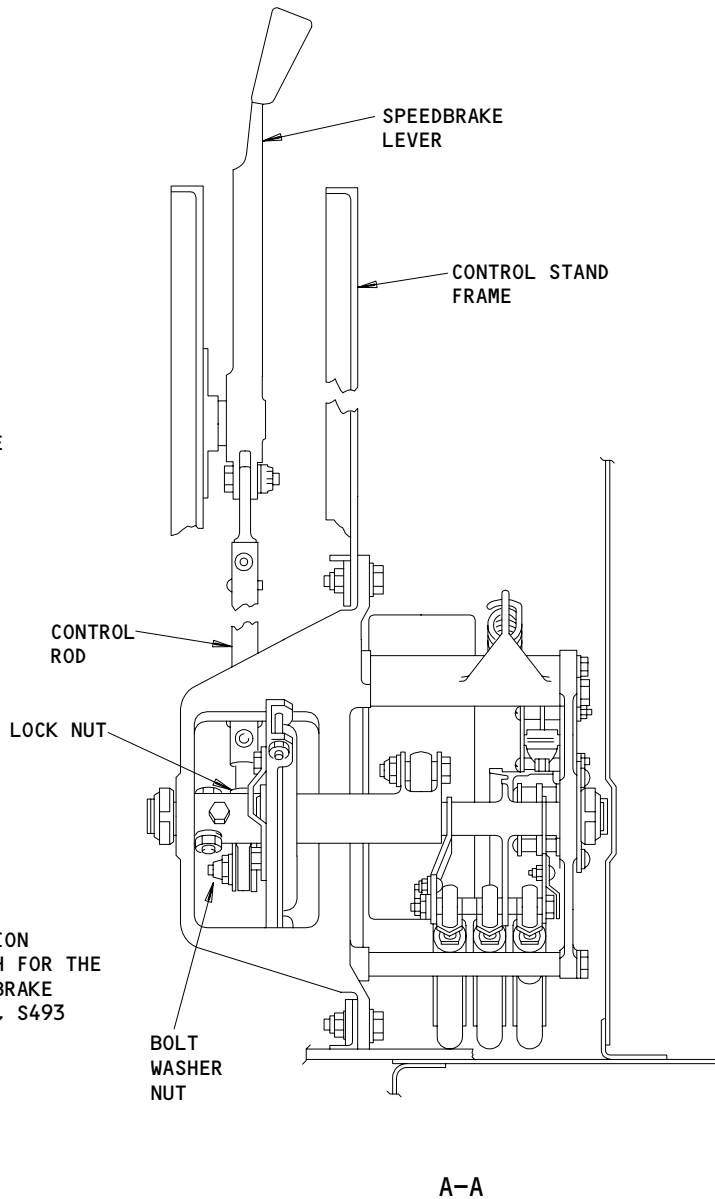
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AUTO-SPEEDBRAKE MECHANISM

(A)



Auto-Speedbrake System Adjustment  
Figure 501 (Sheet 1)

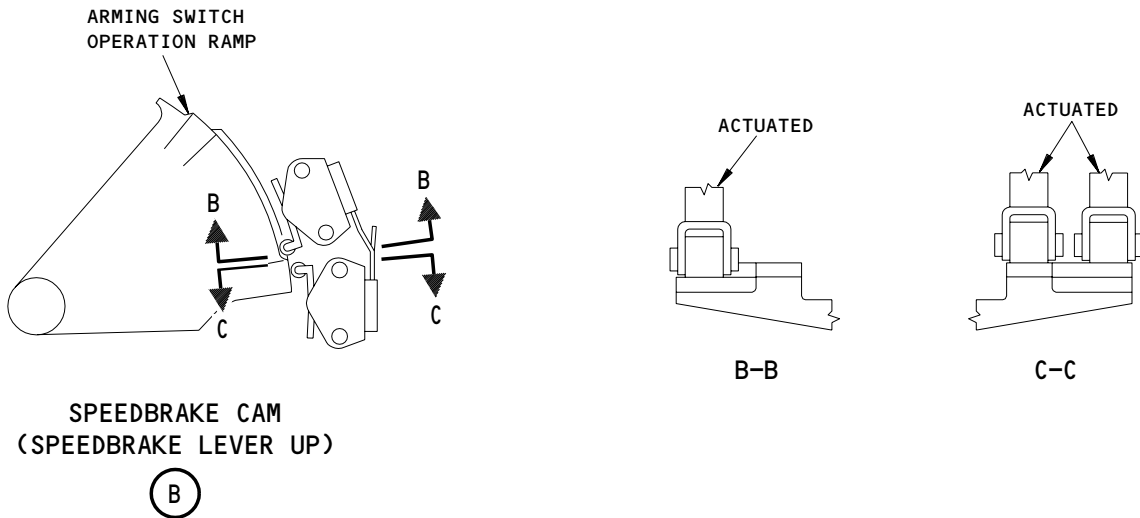
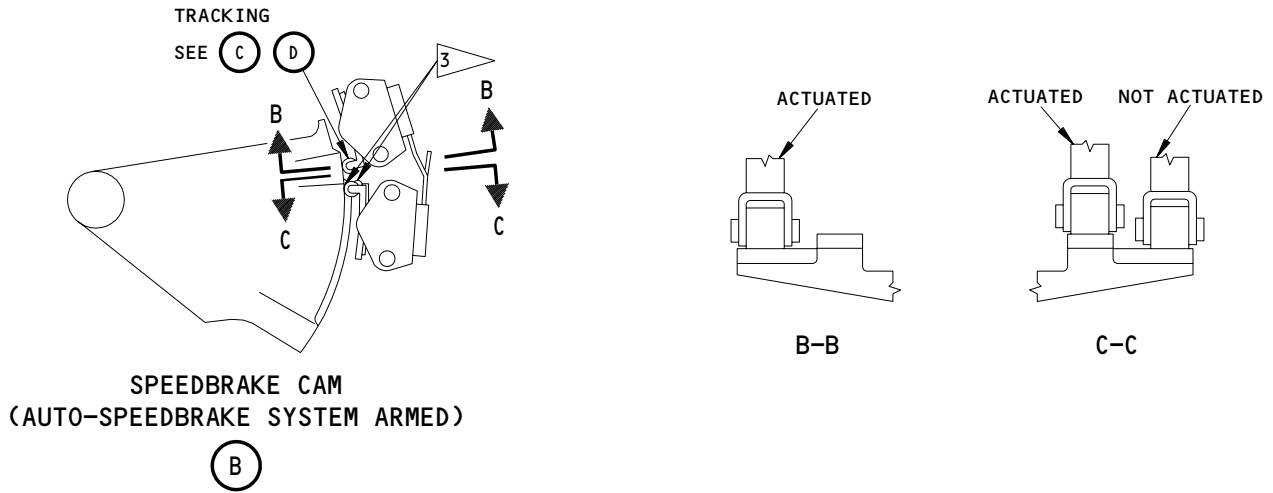
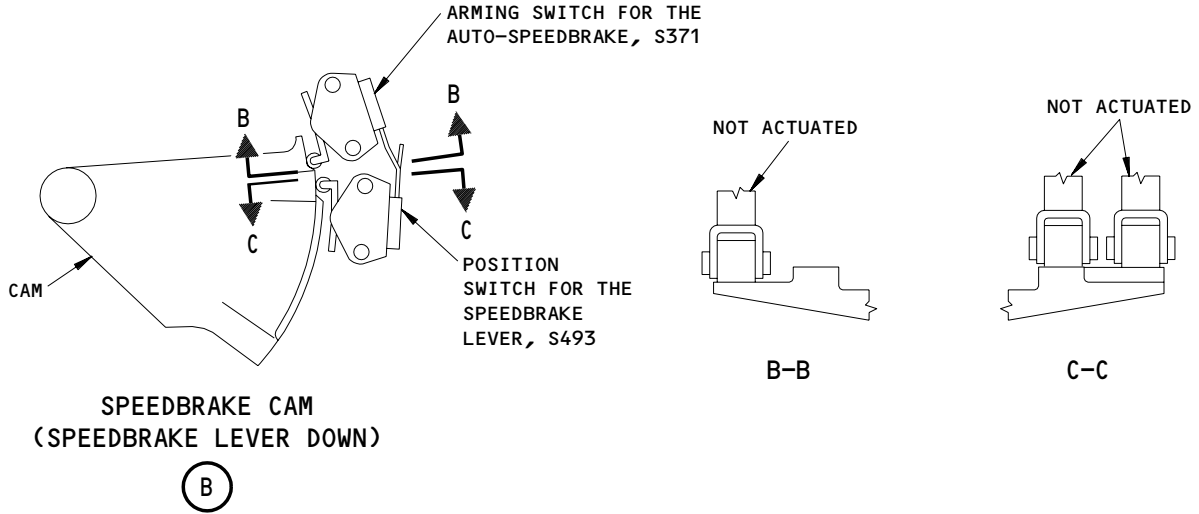
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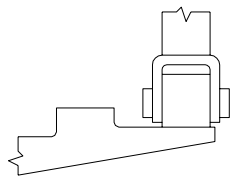
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Auto-Speedbrake System Adjustment  
Figure 501 (Sheet 2)

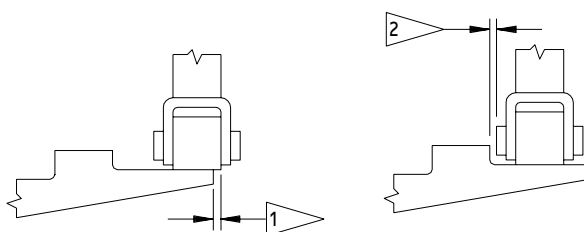
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NORMAL TRACKING

(C)

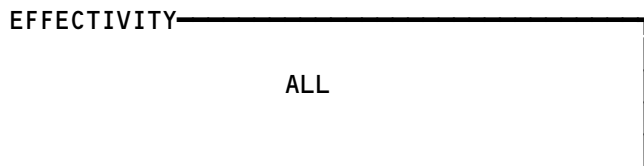


TRACKING LIMITS

(D)

- 1 0.03 INCH (0.76 mm) MAXIMUM OVER THE FULL TRACK
- 2 0.002 INCH (0.050 mm) MINIMUM CLEARANCE OVER THE FULL TRACK.
- 3 THE S493 SWITCH HAS TWO ROLLERS THAT CAUSE THE SWITCH TO OPEN AND CLOSE AT DIFFERENT POINTS ALONG THE CAM.

Auto-Speedbrake System Adjustment  
Figure 501 (Sheet 3)



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(b) Make sure all the spoilers move fully down.

NOTE: The spoilers will move fully down when the forward thrust levers are approximately 11° away from the idle stop.

S 865-014

(5) Move the forward thrust levers rearward to the idle stop.

S 215-015

(6) Move the reverse thrust levers rearward to the reverse idle detent.  
(a) Make sure the speedbrake lever moves fully up.  
(b) Make sure all the spoilers move up.

S 865-016

(7) Move the reverse thrust levers fully forward and down.

S 865-017

(8) Move the speedbrake lever to its down-and-locked detent.

E. Put the Airplane Back to Its Usual Condition

S 865-018

(1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:  
(a) 11L6 or 11D14, LEFT ENGINE T/R CONT  
(b) AIRPLANES WITH HYDRAULIC MOTOR GENERATOR;  
11D4 or 11D5, T/R CONT - ALTN L ENG  
(c) 11L33, RIGHT ENGINE T/R CONT  
(d) 11D33, RIGHT ENGINE T/R CONT ALTN

S 865-019

(2) Remove the DO-NOT-OPERATE tags from the FUEL CONTROL switches on the P10 panel.

S 865-020

(3) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-021

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

TASK 27-62-00-825-022

3. Auto-Speedbrake - Adjustment

A. General

(1) Make sure you adjust the speedbrake LVDTs after you adjust the speedbrake lever. Refer to AMM 27-61-00/501 for the LVDT adjustment procedure.

B. References

(1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 27-61-00/501, Spoiler/Speedbrake Control System

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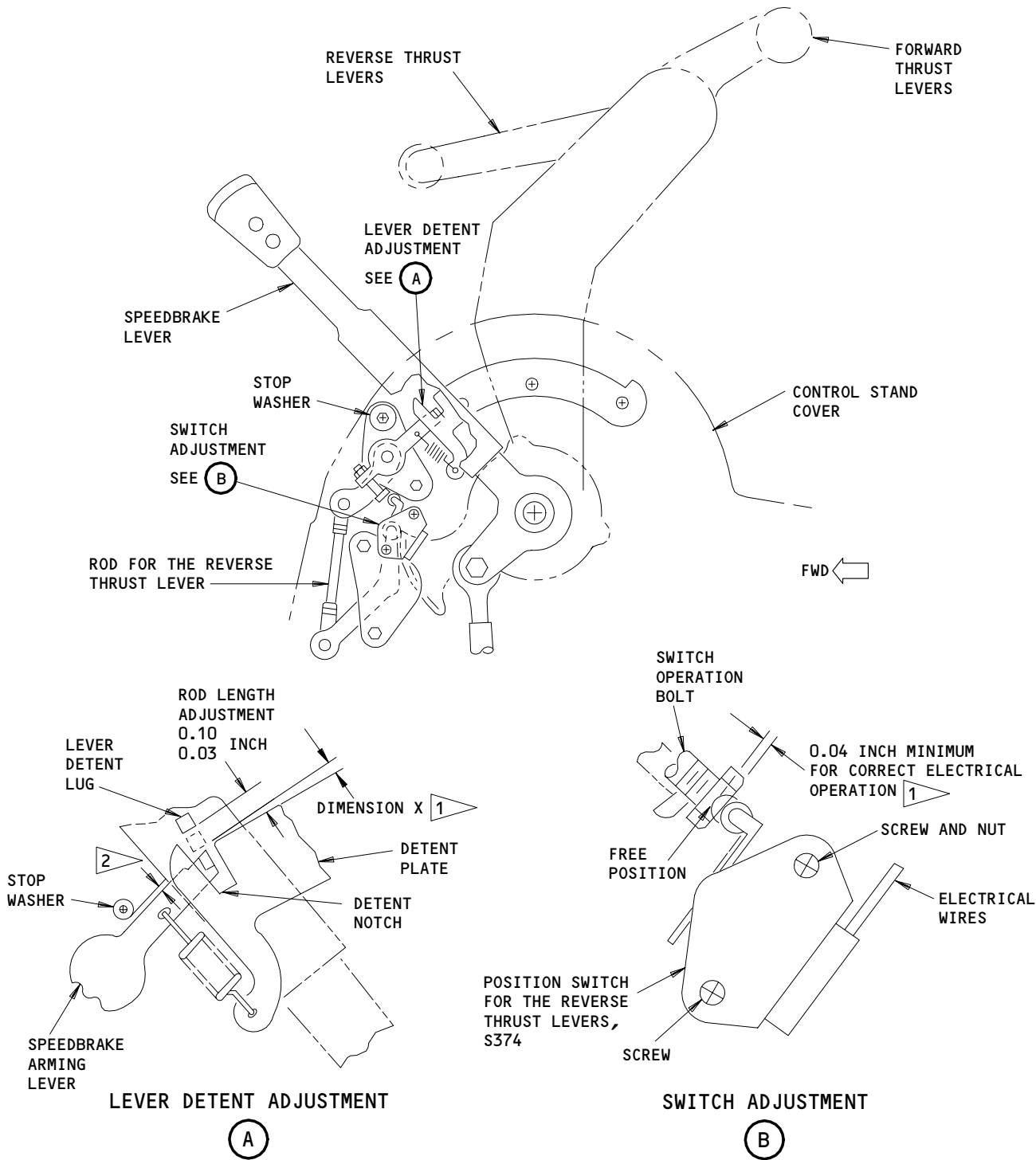
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- (3) AMM 27-62-00/501, Auto-Speedbrake Control System
- C. Access
- (1) Location Zone  
211/212 Control Cabin
- (2) Access Panel  
113AL Flight/Landing Gear/Engine Control Components
- D. Prepare for the Adjustment
- S 865-023
- (1) Supply electrical power (AMM 24-22-00/201).
- S 865-024
- (2) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.
- S 865-026
- (3) Move the FUEL CONTROL switches on the control stand panel, P10, to CUTOFF and attach DO-NOT-OPERATE tags.
- S 215-028
- (4) Make sure the speedbrake lever is in its down-and-locked detent.
- S 865-027
- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11L6 or 11D14 LEFT ENGINE T/R CONT
  - (f) 11L33, RIGHT ENGINE T/R CONT
  - (g) 11D33, RIGHT ENGINE T/R CONT ALTN
- S 045-030
- WARNING:** DO THE DEACTIVATION PROCEDURE FOR THE FLIGHT COMPARTMENT SEAT. INJURY TO A PERSON OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE SEAT MOVES ACCIDENTALLY.
- (6) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
- (a) 6H15, CAPT SEAT
  - (b) 6J21, F/O SEAT

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1 THE CLEARANCE (DIMENSION X) MUST BE 0.01-0.03 INCH WHEN THE POSITION SWITCH FOR THE REVERSE THRUST LEVER IS OPERATED.

2 ON AIRPLANES WITH A STOP WASHER, THERE MUST BE A CLEARANCE OF AT LEAST 0.01 INCH BETWEEN THE STOP WASHER AND THE SPEEDBRAKE ARMING LEVER.

Position Switch for the Reverse Thrust Lever - Adjustment  
Figure 502

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S 015-031

- (7) Remove the access panel from the left side of the control stand.

**NOTE:** You can get access to the control rod for the speedbrake lever from below the flight compartment. Go into the forward equipment bay and get access through the openings in the flight compartment floor.

E. Speedbrake Lever - Adjustment (Fig. 501)

S 985-032

- (1) Move the speedbrake lever until the detent lever roller is in the armed detent on the cam.  
(a) Make sure the aft face of the speedbrake lever aligns with the ARMED mark on the lightplate.

S 825-133

- (2) If the speedbrake lever does not align correctly, adjust the control rod.

S 825-189

- (3) Do these steps to adjust the control rod for the speedbrake lever:

**NOTE:** You can get access to the control rod from below the flight deck. There is an opening in the flight deck floor below the control stand.

- (a) Put the speedbrake lever in it's DOWN, ARMED, and UP positions and do this check:  
1) Make sure the arming switch (S371) and the position switch (S493) rollers are in their correct positions on the cam (Fig. 501).  
(b) If it is necessary, adjust the control rod until the switch rollers are in their correct positions (AMM 27-62-00/501).  
(c) Tighten the control rod lock nut.

S 435-190

- (4) Tighten the nut for the bolt that connects the control rod to the mechanism.

S 215-191

- (5) Make sure you can see control rod threads in at least one-half of the control rod inspection hole.

S 435-192

- (6) Connect these components:  
(a) The electrical connector for the auto-speedbrake actuator.  
(b) The wires for the arming switch (S371).  
(c) The wires for the position switch (S493) in the control stand.

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- S 825-193
- (7) Do the adjustment procedure for the speedbrake LVDTs (AMM 27-61-00/501).

- S 435-194
- (8) Connect the electrical connectors to the LVDTs.

- S 225-001
- (9) Do a check of the speedbrake lever adjustment:
- (a) Operate the speedbrake lever through its full travel range.
    - 1) Move the speedbrake lever to its ARMED detent.
    - 2) Make sure the switch rollers for S371 and S493 are in the locations shown (View B, Fig. 501, Auto-Speedbrake System Armed).
    - 3) Move the speedbrake lever to its down-and-locked detent.
    - 4) Make sure the switch rollers for S371 and S493 are in the locations shown (View B, Fig. 501, Speedbrake Lever Down).
  - (b) Move the speedbrake lever fully up.
    - 1) Make sure the switch roller for S493 is in the location shown (View B, Fig. 501, Speedbrake Lever Up).
  - (c) Make sure you can see threads in not less than one half of the inspection hole for the control rod.

- S 865-034
- (10) Move the speedbrake lever to its down-and-locked detent.
- F. Position Switch for the Reverse Thrust Lever - Adjustment (Fig. 502)

S 825-035

**WARNING:** MAKE SURE THE AUTO-SPEEDBRAKE CIRCUIT BREAKER IS OPEN AND THE SPEEDBRAKE LEVER IS IN ITS DOWN-AND-LOCKED DETENT. THE OPERATION OF THE ENGINE THRUST LEVERS CAN CAUSE ACCIDENTAL SPOILER MOVEMENT AND INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Do these steps to adjust the reverse thrust levers:
- (a) Move the left reverse thrust lever rearward to the reverse idle detent.
  - (b) Adjust the control rod for the reverse thrust lever until this condition is satisfactory:
    - 1) The detent lug for the speedbrake lever is out of its detent notch to a Dimension X of 0.03-0.10 inch (0.8-2.5 mm) (View A, Fig. 502).
  - (c) Move the left reverse thrust lever fully forward and down.
  - (d) Move the right reverse thrust lever rearward to its reverse idle detent.
    - 1) Make sure the detent lug moves out of the detent notch to a Dimension X of 0.01-0.03 inch (0.254-0.762 mm) (View A, Fig. 502).
  - (e) Move the two reverse thrust levers to their reverse idle detent.

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- (f) Make sure the clearance between the speedbrake arming lever and the stop washer is a minimum of 0.01 inch (0.25 mm) (View A, Fig. 502).
  - (g) Move the reverse thrust levers fully forward and down.
- G. Put the Airplane Back to Its Usual Condition

S 865-038

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
  - (a) 6H15, CAPT SEAT
  - (b) 6J21, F/O SEAT

S 865-039

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11C6, FLT CONT ELEC 1L AC
  - (b) 11C7, FLT CONT ELEC 1L DC
  - (c) 11C8, FLT CONT ELEC 2L AC
  - (d) 11C9, FLT CONT ELEC 2L DC
  - (e) 11L6 or 11D14, LEFT ENGINE T/R CONT
  - (f) 11L33, RIGHT ENGINE T/R CONT
  - (g) 11D33, RIGHT ENGINE T/R CONT ALTN
  - (h) 11G11, AUTO SPEEDBRK
  - (i) 11G17, FLT CONT ELEC 1R AC
  - (j) 11G18, FLT CONT ELEC 1R DC
  - (k) 11G26, FLT CONT ELEC 2R AC
  - (l) 11G27, FLT CONT ELEC 2R DC
  - (m) 11H15, FLT CONT SHUTOFF WING LEFT
  - (n) 11H16, FLT CONT SHUTOFF WING CTR
  - (o) 11H26, FLT CONT SHUTOFF WING RIGHT

S 865-040

- (3) Remove the DO-NOT-OPERATE tags from the FUEL CONTROL switches on the P10 panel.

S 865-041

- (4) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the P61 panel to ON.

S 865-042

- (5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-62-00-735-043

4. Auto-Speedbrake - System Test

A. General

- (1) Before you do this procedure, make sure the landing gear is not in the tilt mode.

B. Equipment

- (1) Stop watch, accurate to  $\pm 0.01$  second, Commercially Available

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C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic System
- (4) AMM 32-09-02/201, Air/Ground Relays

D. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 551 Rear Spar to MLG Support Beam
- (2) Access Panel
  - 551TB Lower Wing Structure

E. Prepare for the Test

- S 865-045
- (1) Supply electrical power (AMM 24-22-00/201).
- S 865-046
- (2) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.
- S 865-048
- (3) Move the FUEL CONTROL switches on the control stand panel, P10, to CUTOFF and attach DO-NOT-OPERATE tags.
- S 865-049
- (4) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
    - (a) 11L6 or 11D14, LEFT ENGINE T/R CONT
    - (b) 11L33, RIGHT ENGINE T/R CONT
    - (c) 11D33, RIGHT ENGINE T/R CONT ALTN
    - (d) 11H15, FLT CONT SHUTOFF WING LEFT
    - (e) 11H16, FLT CONT SHUTOFF WING CTR
    - (f) 11H26, FLT CONT SHUTOFF WING RIGHT
    - (g) 11T36, PROX SW TEST

F. Truck Tilt Pressure Switch Failure - Test

S 045-052

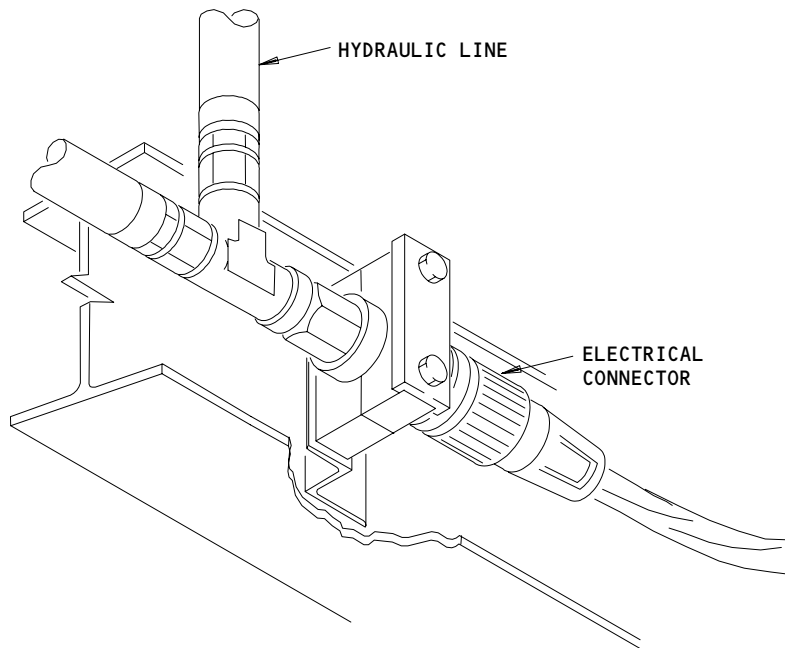
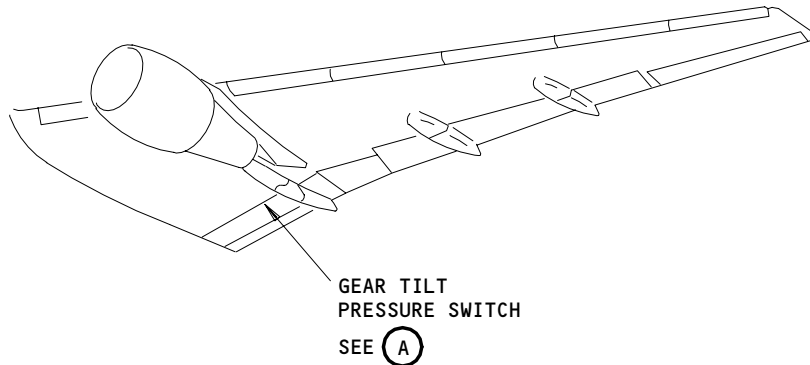
**WARNING:** MAKE SURE YOU DO THE FLIGHT MODE DEACTIVATION PROCEDURE CORRECTLY. THE AIRPLANE WILL BE IN THE FLIGHT MODE WHEN YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. WITH THE AIRPLANE IN THE FLIGHT MODE, MANY OF THE AIRPLANE SYSTEMS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Do the deactivation procedure for flight mode simulation (AMM 32-09-02/201).

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GEAR TILT PRESSURE SWITCH  
(LEFT SWITCH SHOWN, RIGHT SWITCH OPPOSITE)

(A)

Truck Tilt Pressure Switch Failure Test  
Figure 503

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S 865-053

- (2) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) if installed,  
11C29 or 11E19, LANDING GEAR POSITION AIR/GND SYS 2 ALT
  - (b) 11U15, AIR/GND SYS 1
  - (c) 11U23, LDG GR POS AIR/GND SYS 2

S 865-054

- (3) Make sure these conditions are satisfactory:
- (a) The speedbrake lever is in its down-and-locked detent.
  - (b) The forward thrust levers are at their idle stops.
  - (c) The reverse thrust levers are fully forward and down.

S 015-056

- (4) Open the access panel, 551TB, to get access to the gear tilt pressure switch (AMM 06-44-00/201).

S 035-134

- (5) Disconnect the electrical connector, D2264, from the left gear tilt pressure switch, S452.

NOTE: You will find the pressure switch on the rear spar for the left wing.

S 495-057

- (6) Connect a jumper wire between pins 1 and 2 on the connector, D2264.

S 215-137

- (7) Make sure the center hydraulic system does not have power (AMM 29-11-00/201).

S 215-059

- (8) Make sure the amber AUTO SPDBRK light on the pilots' overhead panel, P5, is off.

S 215-060

- (9) Move the speedbrake lever to its ARMED detent and do these checks:
- (a) Make sure the speedbrake lever stays in its ARMED detent.
  - (b) Make sure the amber AUTO SPDBRK light on the P5 panel comes on.

NOTE: An allowance of 3 seconds is permitted to let the light come on.

S 095-062

- (10) Remove the jumper wire from the connector, D2264.

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S 865-064

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(11) Supply pressure to the center hydraulic system (AMM 29-11-00/201).

S 215-135

(12) Make sure the amber AUTO SPDBRK light on the P5 panel comes on.

**NOTE:** An allowance of 3 seconds is permitted to let the light come on.

G. Air/Ground Switch Failure - Test

S 865-302

(1) Make sure the center hydraulic system is pressurized (AMM 29-11-00/201).

S 435-069

(2) Connect the electrical connector, D2264, to the left gear tilt pressure switch, S452, and do these checks:  
(a) Make sure the speedbrake lever stays in its ARMED detent.  
(b) Make sure the amber AUTO SPDBRK light on the P5 panel is on.

S 415-070

(3) Close the access panel, 551TB.

S 865-074

(4) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:  
(a) 11U15, AIR/GND SYS 1

S 215-075

(5) Make sure the amber AUTO SPDBRK light on the P5 panel comes on.

**NOTE:** An allowance of 3 seconds is permitted to let the light come on.

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S 865-138

**WARNING:** MAKE SURE YOU DID THE FLIGHT MODE DEACTIVATION PROCEDURE CORRECTLY. THE AIRPLANE WILL BE IN THE FLIGHT MODE WHEN YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. WITH THE AIRPLANE IN THE FLIGHT MODE, MANY OF THE AIRPLANE SYSTEMS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (6) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:  
(a) 11U15, AIR/GND SYS 1

S 865-078

- (7) if opened,  
remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:  
(a) 11C29 or 11E19, LANDING GEAR POSITION AIR/GND SYS 2 ALT  
(b) 11U23, LDG GR POS AIR/GND SYS 2

S 215-079

- (8) Make sure the amber AUTO SPDBRK light on the P5 panel is on.

**NOTE:** An allowance of 3 seconds is permitted to let the light come on.

#### H. Truck Tilt Pressure Valid Hold - Test

S 865-080

- (1) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:  
(a) 11U15, AIR/GND SYS 1

S 215-081

- (2) Make sure the speedbrake lever moves fully up.

S 215-082

- (3) Make sure the amber AUTO SPDBRK light on the P5 panel is off.

S 865-083

- (4) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 215-087

- (5) Make sure the amber AUTO SPDBRK light on the P5 panel is on.

**NOTE:** An allowance of 3 seconds is permitted to let the light come on.

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S 215-088

- (6) Make sure the speedbrake lever stays up.

I. Go-Around After Touchdown - Test

S 215-089

- (1) Move the left forward thrust lever to a position that is approximately half the distance between idle and full thrust.  
(a) Make sure the speedbrake lever moves to its down-and-locked detent.

NOTE: The speedbrake lever will move to its down-and-locked detent when the forward thrust levers are approximately 11° away from idle.

- (b) Make sure the amber AUTO SPDBRK light on the P5 panel is off.

S 865-090

- (2) Move the left forward thrust lever rearward to the idle stop.

S 215-091

- (3) Move the speedbrake lever to its ARMED detent and do this check:  
(a) Make sure the speedbrake lever stays in its ARMED detent.

S 865-136

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (4) Supply pressure to the center hydraulic system (AMM 29-11-00/201).

S 215-139

- (5) Make sure the speedbrake lever moves fully up.

S 215-095

- (6) Move the right forward thrust lever to a position that is approximately half the distance between idle and full thrust.  
(a) Make sure the speedbrake lever moves to its down-and-locked detent.

S 865-096

- (7) Move the right forward thrust lever rearward to the idle stop.

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J. Refused Takeoff – Test

S 215-097

- (1) Move the left reverse thrust lever toward deploy to the reverse idle detent and do this check:
  - (a) Make sure the speedbrake lever moves to its full upstop position.

S 215-158

- (2) Move the left reverse thrust lever back to the stow position.

S 215-159

- (3) Move the speed brake lever back to its down and locked position.

S 215-160

- (4) Move the right reverse thrust lever toward deploy to the reverse idle detent and do this check:
  - (a) Make sure the speedbrake lever moves to its full upstop position.

S 215-161

- (5) Move the right reverse thrust lever back to the stow position.

S 215-162

- (6) Move the speedbrake lever back to its down-and-locked position.

S 215-310

- (7) Move the left and right reverse thrust levers toward deploy to the reverse idle detent and do this check:
  - (a) Make sure the speedbrake lever moves to its full upstop position.

S 215-098

- (8) Move the speedbrake lever forward to the full down stop position.

NOTE: The speedbrake lever will not go in the lock position.

- (a) Make sure the amber AUTO SPDBRK light on the P5 panel comes on.

NOTE: An allowance of 3 seconds is permitted to let the light come on.

S 215-099

- (9) Move the left and right reverse thrust levers to the stow position.
  - (a) Make sure the amber AUTO SPDBRK light on the P5 panel is off.
  - (b) Make sure the speedbrake lever goes into its down-and-locked detent.

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K. Auto-Speedbrake Warning - Test

S 865-101

- (1) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - (a) 11G11, AUTO SPEEDBRK

S 215-102

- (2) Make sure the amber AUTO SPDBRK light on the P5 panel comes on.

NOTE: An allowance of 3 seconds is permitted to let the light come on.

S 215-129

- (3) Make sure the EICAS message, AUTO SPEEDBRAKE, shows on the EICAS display.

S 865-100

- (4) Move the EICAS select switch on the pilot's display select panel, P9, to L and do this check:
  - (a) Make sure the EICAS message, AUTO SPEEDBRAKE, shows on the display.

S 215-140

- (5) Move the EICAS select switch on the P9 panel to R and do this check:
  - (a) Make sure the EICAS message, AUTO SPEEDBRAKE, shows on the display.

S 865-103

- (6) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - (a) 11G11, AUTO SPEEDBRK

S 215-104

- (7) Make sure the amber AUTO SPDBRK light on the P5 panel is off.

S 215-150

- (8) Make sure the EICAS message, AUTO SPEEDBRAKE, does not show on the display.

L. Master Dim and Its Interface With the Auto-Speedbrake Warning System - Test

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S 865-141

**WARNING:** MAKE SURE YOU DID THE FLIGHT MODE DEACTIVATION PROCEDURE CORRECTLY. THE AIRPLANE WILL BE IN THE FLIGHT MODE WHEN YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. WITH THE AIRPLANE IN THE FLIGHT MODE, MANY OF THE AIRPLANE SYSTEMS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
  - (a) 11U15, AIR/GND SYS 1

S 215-142

- (2) Move the speedbrake lever to its ARMED detent and do these checks:
  - (a) Make sure the amber AUTO SPDBRK light on the P5 panel comes on.

**NOTE:** An allowance of 3 seconds is permitted to let the light come on.

- (b) Make sure the EICAS message, AUTO SPEEDBRAKE, shows on the display.

S 865-143

- (3) Move the master dim and test switch on the P5 panel from BRT to DIM.

S 215-144

- (4) Move the master dim and test switch on the P5 panel from DIM to BRT and do these checks:
  - (a) Make sure the amber AUTO SPDBRK light on the P5 panel stays on.
  - (b) Make sure the EICAS message, AUTO SPEEDBRAKE, continues to show on the display.

S 865-145

- (5) Move the speedbrake lever to its down-and-locked detent.

S 865-146

- (6) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - (a) 11U15, AIR/GND SYS 1

S 215-147

- (7) Make sure the amber AUTO SPDBRK light on the P5 panel is off.

S 215-148

- (8) Make sure the EICAS message, AUTO SPEEDBRAKE, does not show on the display.

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M. Auto-Speedbrake Operation Time - Test

S 865-114

- (1) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11T36, PROX SW TEST

S 865-152

- (2) Make sure this circuit breaker on the P11 panel is closed:
- (a) 11P11, EQUIPMENT COOLING SUPPLY FAN 1

S 865-118

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-119

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H15, FLT CONT SHUTOFF WING LEFT
  - (b) 11H16, FLT CONT SHUTOFF WING CTR
  - (c) 11H26, FLT CONT SHUTOFF WING RIGHT

S 865-120

- (5) Remove the DO-NOT-OPERATE tags and move the FLT CONT SHUTOFF WING L, R, and C switches on the P61 panel to ON.

S 045-115

**WARNING:** MAKE SURE YOU DID THE FLIGHT MODE DEACTIVATION PROCEDURE CORRECTLY. THE AIRPLANE WILL BE IN THE FLIGHT MODE WHEN YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. WITH THE AIRPLANE IN THE FLIGHT MODE, MANY OF THE AIRPLANE SYSTEMS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (6) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
- (a) 11U15, AIR/GND SYS 1

S 865-117

- (7) Move the speedbrake lever to its ARMED detent.

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- S 865-121
- (8) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11U15, AIR/GND SYS 1
- S 225-122
- (9) Make sure the speedbrake lever moves fully up in less than 1.6 seconds.
- S 215-149
- (10) Make sure all the spoilers move fully up in less than 1.6 seconds.
- S 225-123
- (11) Move the left forward thrust lever to a position that is approximately half the distance between idle and full thrust.
- (a) Make sure all the spoilers move fully down in less than 1.6 seconds.
- (b) Make sure the speedbrake lever moves to its down-and-locked detent.
- S 865-124
- (12) Move the left forward thrust lever rearward to the idle stop.
- N. Put the Airplane Back to Its Usual Condition
- S 865-127
- (1) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).
- S 865-125
- (2) Remove the DO-NOT-OPERATE tags from the FUEL CONTROL switches on the P10 panel.
- S 865-126
- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11L6 or 11D14, LEFT ENGINE T/R CONT

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767  
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- (b) 11L33, RIGHT ENGINE T/R CONT
- (c) 11D33, RIGHT ENGINE T/R CONT ALTN

S 865-128

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

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SPEEDBRAKE MECHANISM – MAINTENANCE PRACTICES

1. General

- A. This procedure contains these tasks:
  - (1) Speedbrake Mechanism and Its Components – Removal
  - (2) Auto-Speedbrake Actuator – Removal
  - (3) Speedbrake Mechanism and Its Components – Installation
  - (4) Auto-Speedbrake Actuator – Installation.
- B. There are two tasks for the removal of the auto-speedbrake actuator. For the first task, you must remove the auto-speedbrake mechanism. For the second task, you can remove the actuator with the auto-speedbrake mechanism installed in the airplane.

TASK 27-62-04-002-114

2. Speedbrake Mechanism and Its Components – Removal

- A. General
  - (1) This task contains these procedures:
    - (a) Auto-speedbrake Mechanism – Removal
    - (b) Auto-speedbrake Actuator – Removal
    - (c) No-Back Clutch – Removal.
  - (2) For these procedures, you must remove the auto-speedbrake mechanism first. Then, you can remove the auto-speedbrake actuator or the no-back clutch.
  - (3) There is a different procedure to remove the auto-speedbrake actuator with the auto-speedbrake mechanism installed. Refer to the other "Auto-speedbrake Actuator – Removal" task below for the necessary data.
- B. References
  - (1) AMM 24-22-00/201, Electrical Power – Control
  - (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- C. Equipment
  - (1) Special tool
    - (a) ST2580-267-10 Spanner wrench adaptor for BACN10RF-nuts
- D. Access
  - (1) Location Zones
    - 211/212      Control Cabin

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E. Prepare for the Removal

S 862-117

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

S 862-003

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDREAULIC POWER IS SUPPLIED.

- (2) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 212-004

- (3) Make sure these conditions are satisfactory:  
(a) The control wheels are in their neutral positions.  
(b) The speedbrake lever is in its down-and-locked position.

S 862-005

- (4) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 862-006

- (5) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 862-007

- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11B18, WARN ELEX B
  - (b) 11C6, FLT CONT ELEC 1L AC
  - (c) 11C7, FLT CONT ELEC 1L DC
  - (d) 11C8, FLT CONT ELEC 2L AC
  - (e) 11C9, FLT CONT ELEC 2L DC
  - (f) 11G11, AUTO SPEEDBRK
  - (g) 11G17, FLT CONT ELEC 1R AC
  - (h) 11G18, FLT CONT ELEC 1R DC
  - (i) 11G26, FLT CONT ELEC 2R AC
  - (j) 11G27, FLT CONT ELEC 2R DC
  - (k) 11H15, FLT CONT SHUTOFF WING LEFT

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- (l) 11H16, FLT CONT SHUTOFF WING CTR
- (m) 11H26, FLT CONT SHUTOFF WING RIGHT
- (n) 11J34, WARN ELEX A

S 862-008

- (7) Move the FUEL CONTROL switches on the control stand panel, P10, to their CUTOFF positions and attach DO-NOT-OPERATE tags.

S 862-009

- (8) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
  - (a) 11L6 or 11D14, LEFT ENGINE T/R CONT
  - (b) 11L33, RIGHT ENGINE T/R CONT
  - (c) 11D33, RIGHT ENGINE T/R CONT ALTN

S 042-010

**WARNING:** DO THE DEACTIVATION PROCEDURE FOR THE FLIGHT COMPARTMENT SEAT. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE SEAT MOVES ACCIDENTALLY.

- (9) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
  - (a) 6H15, CAPT SEAT
  - (b) 6J21, F/O SEAT

S 012-011

- (10) Open the access panel on the left side of the control stand to get access to the auto-speedbrake mechanism.
- F. Auto-Speedbrake Mechanism - Removal (Fig. 201)

S 032-012

- (1) Disconnect these components:
  - (a) The wires for arming switch, S371. Use a tag for identification of the wires.
  - (b) The wires for the position switch, S493. Use a tag for identification of the wires.
  - (c) The electrical connector for the auto-speedbrake actuator from the control stand wires.
  - (d) The electrical connectors from the speedbrake LVDTs and use a tag for identification.

S 032-013

- (2) Disconnect the control rod for the speedbrake lever from the clutch in the auto-speedbrake mechanism.

S 032-014

- (3) Remove the bolts and washers at the housing connection points for the auto-speedbrake mechanism.

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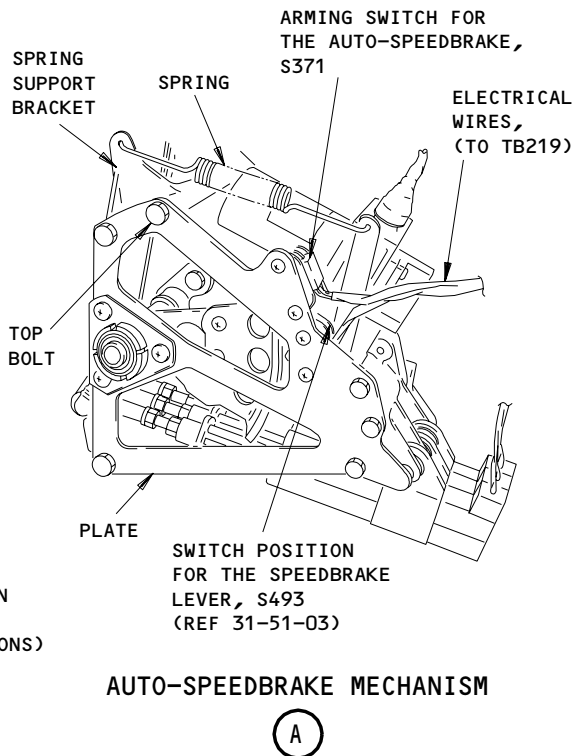
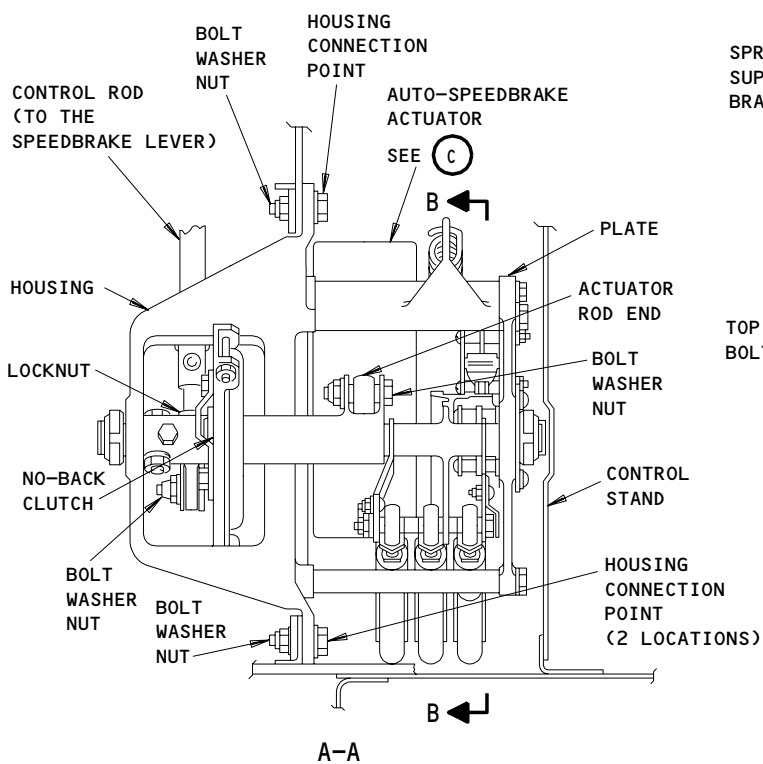
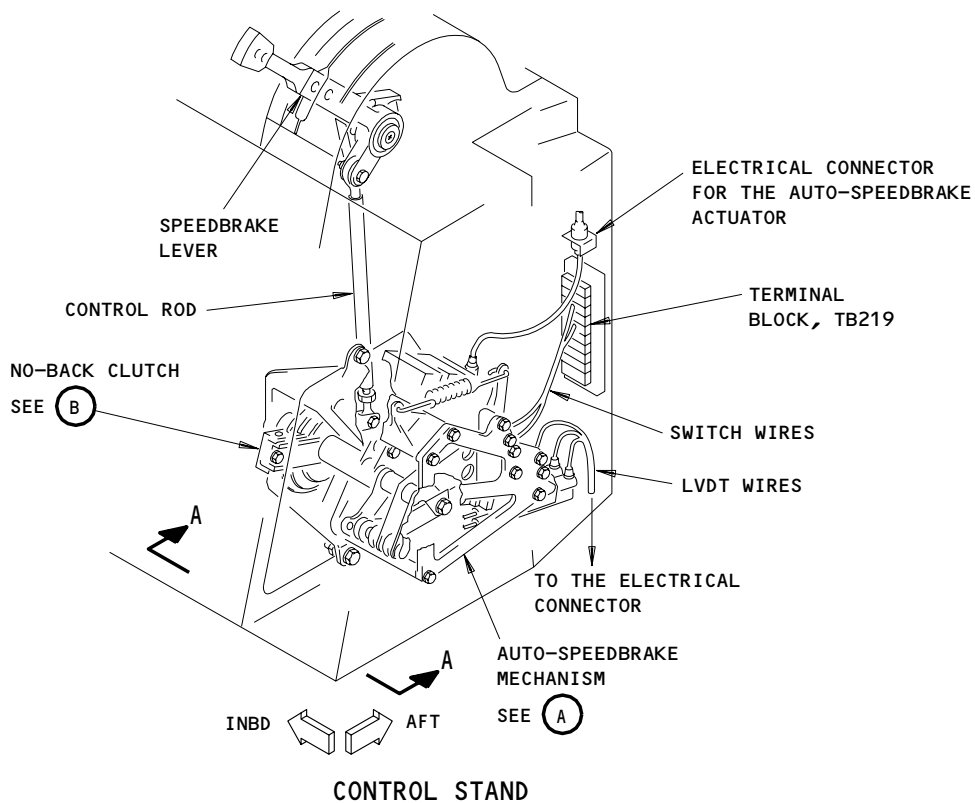
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Speedbrake Mechanism Installation  
Figure 201 (Sheet 1)

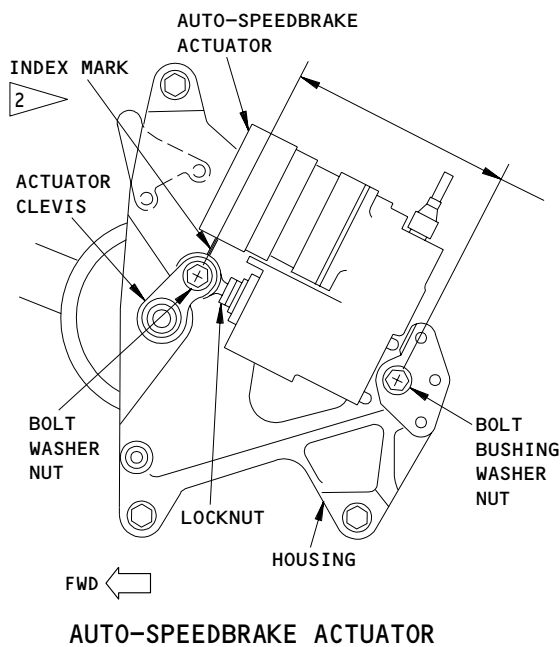
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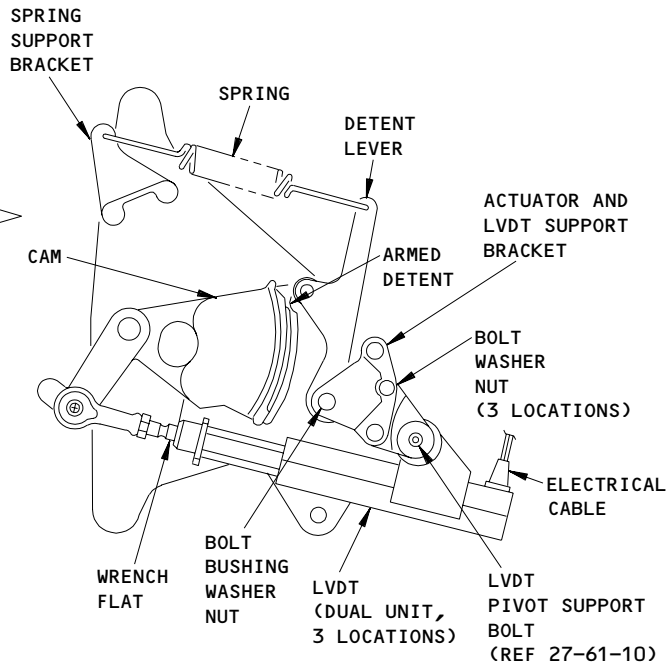
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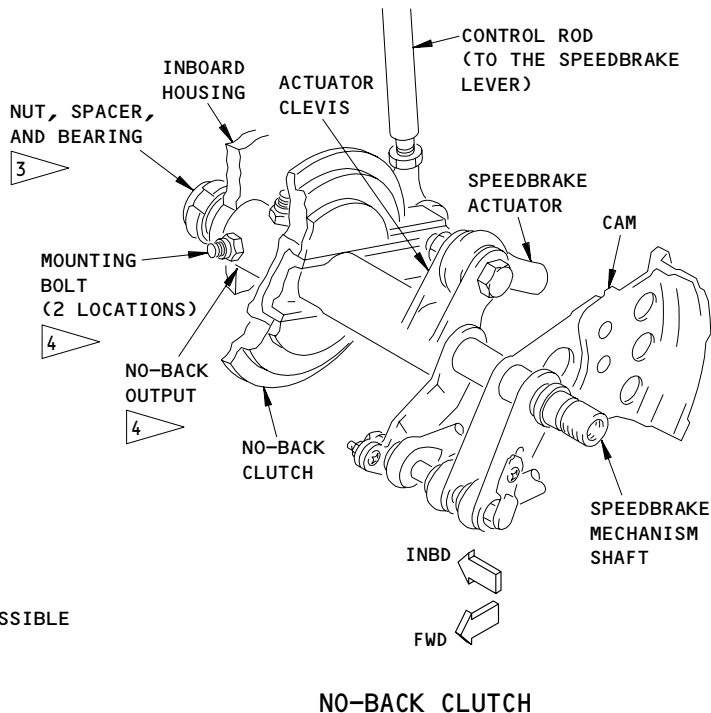
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(C)



B-B



(B)

- 1 BEFORE YOU INSTALL THE ACTUATOR, MAKE SURE IT IS FULLY RETRACTED. MAKE SURE THE DISTANCE BETWEEN THE PIN CENTERS IS APPROXIMATELY 4.43 ±0.15 INCHES.
- 2 MAKE SURE THE CENTER OF THE ROD END IS ALIGNED WITH THE MARK ON THE HOUSING. IF IT IS NECESSARY, ADJUST THE ROD END AND TIGHTEN THE LOCKNUT.
- 3 APPLY GREASE TO THE BEARING. IT IS PERMISSIBLE TO USE WET BMS 10-11 TYPE I PRIMER.
- 4 DO NOT REMOVE THE OUTPUT END OF THE NO-BACK ASSEMBLY. THE TWO HOLES IN THE NO-BACK OUTPUT MUST BE ACCURATELY ALIGNED WITH THE HOLES IN THE SHAFT.

Speedbrake Mechanism Installation  
Figure 201 (Sheet 2)

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S 022-015

(4) Remove the auto-speedbrake mechanism.

G. Auto-Speedbrake Actuator - Removal (Fig. 201)

**NOTE:** This procedure is for use after you remove the auto-speedbrake mechanism. Refer to the "Auto-Speedbrake Actuator - Removal" task below for the data necessary to remove the actuator with the auto-speedbrake mechanism installed.

S 032-016

(1) Remove the top bolt that connects the spring support bracket to the auto-speedbrake mechanism (View A).

S 022-017

- (2) Do these steps if the head of the actuator connection bolt points into the auto-speedbrake mechanism:
- (a) Turn the spring support bracket in the aft direction and remove the spring.
  - (b) Remove the LVDT pivot support bolt (View B-B).
  - (c) Remove the bolt and bushing that connect the actuator and LVDT support bracket to the detent lever (View B-B).
  - (d) Remove the three bolts that connect the actuator and LVDT support bracket to the auto-speedbrake mechanism.
  - (e) Lift the bracket and the actuator up and forward.

**NOTE:** Be careful to prevent damage to the LVDT rod ends.

- (f) Remove the bolt that connects the auto-speedbrake actuator to the actuator input clevis.
- (g) Remove the auto-speedbrake actuator.
- (h) Remove the bolt that connects the auto-speedbrake actuator to the actuator and LVDT support bracket.

S 022-018

- (3) Do these steps if the head of the aft actuator connection bolt points away from the auto-speedbrake mechanism:
- (a) Turn the spring support bracket in the aft direction and remove the spring.
  - (b) Remove the bolts that connect the actuator to the speedbrake mechanism (2 locations) (View C).

**NOTE:** Move the cam if it is necessary to remove the auto-speedbrake actuator.

- (c) Remove the auto-speedbrake actuator.

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H. No-Back Clutch - Removal (Fig. 201)

S 032-019

- (1) Remove these components:
  - (a) The nut and spacer from the inboard end of the shaft (View B).
  - (b) The bolts that hold the two parts of the housing assembly together.
  - (c) The inboard half of the housing from the auto-speedbrake mechanism.

S 032-020

- (2) Make a mark for the position of the no-back output and do this step:
  - (a) Remove the two mounting bolts from the no-back clutch output.

S 032-021

- (3) Remove the no-back clutch from the auto-speedbrake mechanism shaft.

S 022-022

- (4) Remove the clutch assembly and keep the no-back output.

**NOTE:** The holes in the auto-speedbrake shaft must align with the holes in the no-back output. To make sure the holes align during the installation, keep the no-back output.

TASK 27-62-04-422-023

3. Auto-Speedbrake Mechanism and Its Components - Installation

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (3) AMM 27-61-00/501, Spoiler/Speedbrake Control System
- (4) AMM 27-62-00/501, Auto-speedbrake Control System
- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Equipment

- (1) Special tool
  - (a) ST2580-267-10 Spanner wrench adaptor for BACN10RF nuts

C. Access

- (1) Location Zones  
211/212 Control Cabin

D. No-Back Clutch - Installation (Fig. 201)

S 432-118

- (1) Use the no-back output you removed and assemble the no-back clutch.

S 422-025

- (2) Do these steps to connect the no-back clutch to the speedbrake shaft:
  - (a) Put the no-back clutch in its correct position on the speedbrake shaft.

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(b) Install the two bolts that connect the clutch to the speedbrake shaft.

S 432-026

(3) Install the bolts that connect the inboard half of the speedbrake housing to the speedbrake mechanism.

**NOTE:** Do not try to adjust the no-back clutch during the installation, there is no adjustment.

S 432-027

(4) Install the spacer, bearing, and nut on the inboard end of the shaft.

S 432-134

(5) Tighten the nut with the special tool to 250-300 inch-pounds (28.24-33.89 Nm).

E. Auto-Speedbrake Actuator - Installation (Fig. 201)

S 212-028

(1) Make sure the auto-speedbrake actuator is fully retracted and has the correct length (View C) before you install it.

(a) Do these steps to retract the actuator:

- 1) Connect a 28 VDC power source to pin 6 of the actuator electrical connector and ground pins 8 and 10.
- 2) After the actuator is retracted, remove the 28 VDC power source and the ground wires from the actuator connector pins.

S 422-029

(2) Do these steps if the head of the bolt at the aft actuator connection point initially pointed into the auto-speedbrake mechanism (Fig. 202):

(a) Install the bolt that connects the auto-speedbrake actuator to the actuator and LVDT support bracket (View C).

**NOTE:** Make sure the head of the bolt points away from the auto-speedbrake mechanism.

(b) Install the bolt that connects the rod end of the auto-speedbrake actuator to its clevis.

(c) Turn the actuator down until the actuator and LVDT support bracket is in its correct position.

**NOTE:** Be careful to prevent damage to the speedbrake LVDTs.

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- (d) Use the LVDT pivot support bolt to hold the actuator in the correct position.

**NOTE:** You will complete the bolt installation in a subsequent step.

- (e) Use the index mark on the auto-speedbrake housing to adjust the retracted length of the auto-speedbrake actuator (View C).
- (f) Install the bolt, bushing, washer, and nut that connect the actuator and LVDT support bracket to the detent lever (View B-B).
- (g) Install the bolt, washer, and nut that connect the actuator and LVDT support bracket to the auto-speedbrake mechanism (3 locations).
- (h) Install the LVDT pivot support bolt (View B-B).
- (i) Connect the spring to the spring support bracket.
- (j) Turn the spring support bracket forward and install the bolt that connects the bracket to the auto-speedbrake mechanism (View A).

S 422-030

- (3) Do these steps if the head of the aft actuator connection bolt initially pointed away from the auto-speedbrake mechanism (Fig. 202):

- (a) Put the detent lever in the position shown (View B-B).

**CAUTION:** DO NOT LET THE CAM TURN DOWN AND DAMAGE THE LVDTs. THE LVDTs CAN BECOME DAMAGED IF THE CAM TOUCHES THE LVDTs.

- (b) Hold the actuator clevis and manually turn the speedbrake lever (input) side of the no-back clutch until these conditions are satisfactory:

**NOTE:** Make sure the detent lever roller touches the cam face at all times during the adjustment.

- 1) The detent lever roller is in its armed detent position.
- 2) The actuator clevis is aligned with the rod end of the auto-speedbrake actuator.

- (c) Connect the rod end of the auto-speedbrake to the actuator clevis.
- (d) Turn the auto-speedbrake actuator down until the actuator aft connection points are aligned.

**NOTE:** Be careful to prevent damage to the LVDTs.

- (e) Install the aft actuator connection bolt.

**NOTE:** Make sure the head of the bolt points away from the auto-speedbrake mechanism.

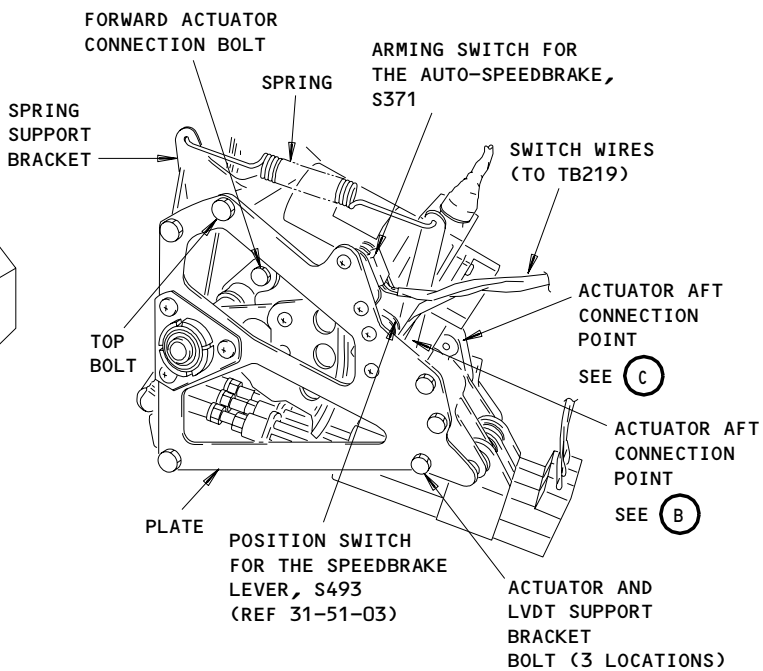
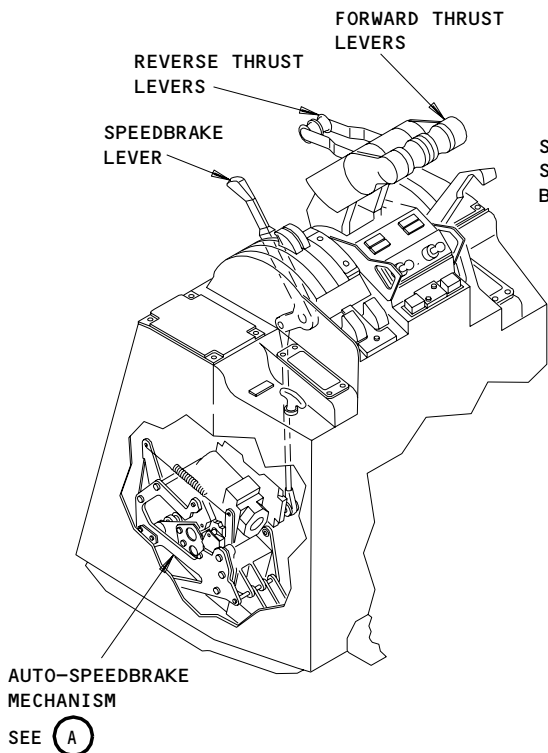
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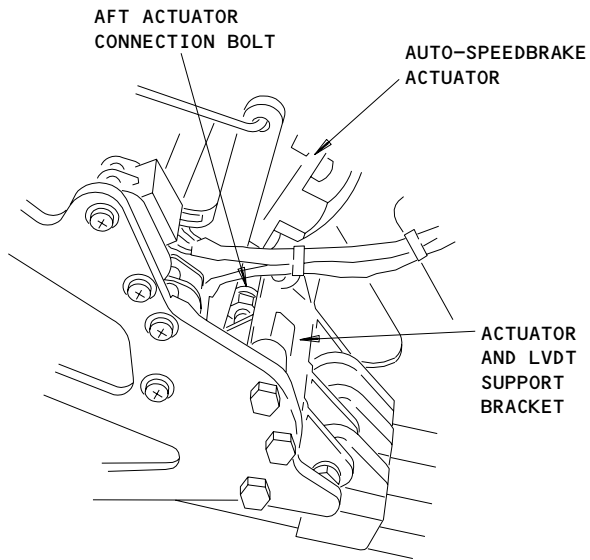
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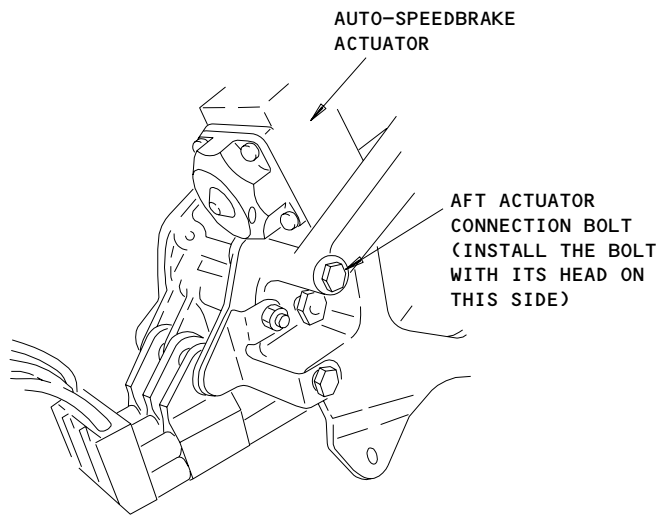
AUTO-SPEEDBRAKE MECHANISM

(A)



ACTUATOR AFT CONNECTION POINT

(B)



ACTUATOR AFT CONNECTION POINT

(C)

Auto-speedbrake Actuator Aft Connection Point  
Figure 202

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- (f) Connect the spring to the spring support bracket.
- (g) Turn the spring support bracket forward and install the bolt that connects the bracket to the auto-speedbrake mechanism (View A).

F. Speedbrake Mechanism - Installation (Fig. 201)

S 862-031

- (1) Put the speedbrake mechanism in its correct position in the control stand.

S 432-032

- (2) Install the bolts, washers, and nuts that connect the speedbrake mechanism to the airplane.

S 432-033

- (3) Manually turn the clutch until you can connect the control rod for the speedbrake lever).

NOTE: Do not tighten the nut.

S 822-034

- (4) Do these steps to adjust the control rod for the speedbrake lever:

NOTE: You can get access to the control rod from below the flight deck. There is an opening in the flight deck floor below the control stand.

- (a) Put the speedbrake lever in its DOWN, ARMED, and UP positions and do this check:
  - 1) Make sure the arming switch (S371) and the position switch (S493) rollers are in their correct positions on the cam (Fig. 203).
- (b) If it is necessary, adjust the control rod until the switch rollers are in their correct positions (AMM 27-62-00/501).
- (c) Tighten the control rod lock nut.

S 432-035

- (5) Tighten the nut for the bolt that connects the control rod to the mechanism.

S 212-036

- (6) Make sure you can see control rod threads in at least one-half of the control rod inspection hole.

S 432-037

- (7) Connect these components:
  - (a) The electrical connector for the auto-speedbrake actuator
  - (b) The wires for the arming switch (S371).
  - (c) The wires for the position switch (S493) in the control stand.

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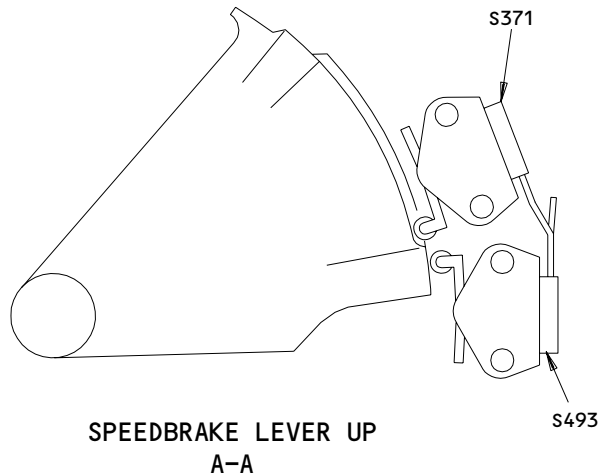
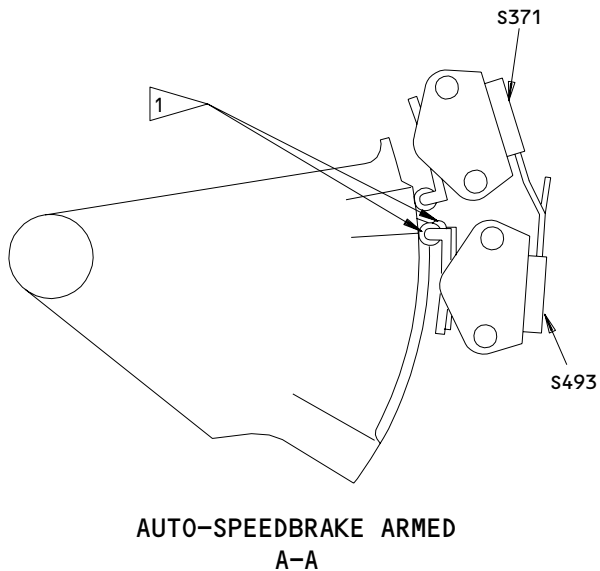
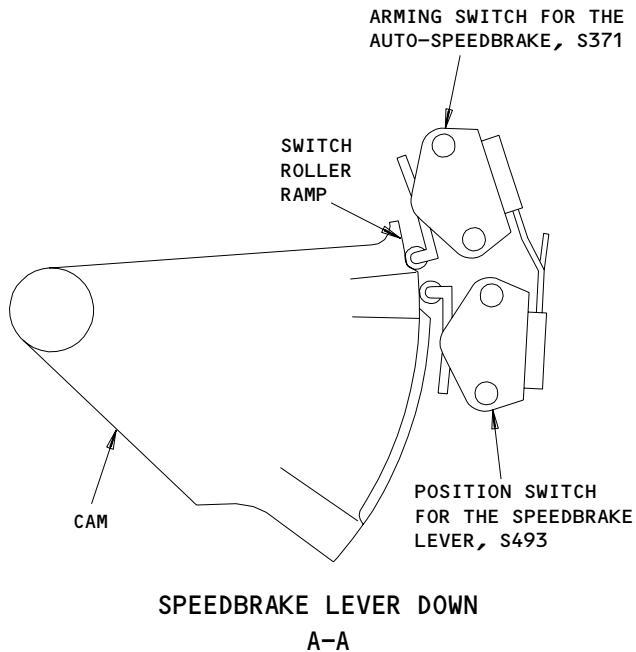
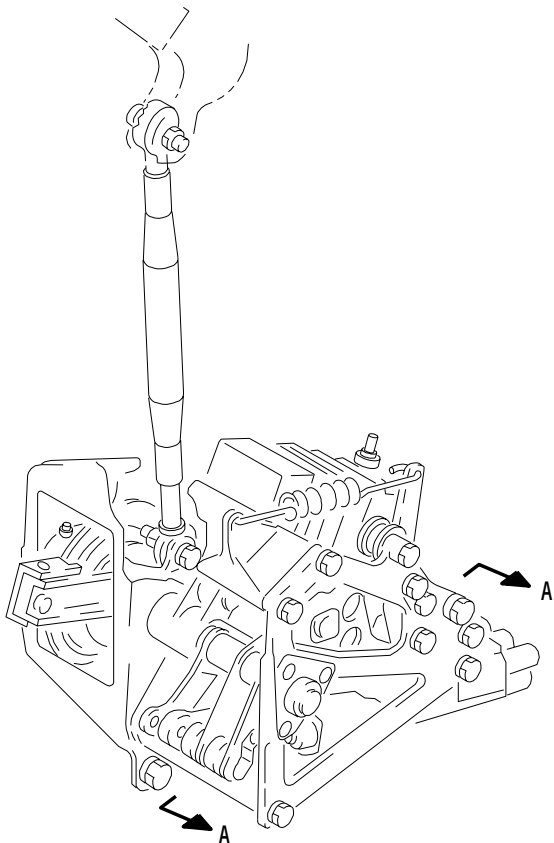
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1 THE S493 SWITCH HAS TWO ROLLERS THAT CAUSE THE SWITCH TO OPEN AND CLOSE AT DIFFERENT POINTS ALONG THE CAM.

Auto-Speedbrake Arming and Lever Position Switches  
Figure 203

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S 822-095

- (8) Do the adjustment procedure for the speedbrake LVDTs (AMM 27-61-00/501).

S 432-096

- (9) Connect the electrical connectors to the LVDTs.  
G. Auto-Speedbrake Mechanism - Test

S 712-038

- (1) Do these steps to do an operational test for the speedbrake Lever switches:

**NOTE:** This test makes sure the take-off warning configuration system gets the correct inputs from the switches.

**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 (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (b) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

- (c) Make sure these circuit breakers on the overhead panel, P11, are closed:

- 1) 11B18, WARN ELEX B
- 2) 11C6, FLT CONT ELEC 1L AC
- 3) 11C7, FLT CONT ELEC 1L DC
- 4) 11C8, FLT CONT ELEC 2L AC
- 5) 11C9, FLT CONT ELEC 2L DC
- 6) 11G17, FLT CONT ELEC 1R AC
- 7) 11G18, FLT CONT ELEC 1R DC
- 8) 11G26, FLT CONT ELEC 2R AC
- 9) 11G27, FLT CONT ELEC 2R DC
- 10) 11H15, FLT CONT SHUTOFF WING LEFT
- 11) 11H16, FLT CONT SHUTOFF WING CTR
- 12) 11H26, FLT CONT SHUTOFF WING RIGHT
- 13) 11J34, WARN ELEX A

- (d) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to ON.

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- (e) Make sure this circuit breaker on the P11 panel is closed:
  - 1) 11U23, LANDING GEAR POSITION AIR/GND SYS 2
- (f) Make sure the red EICAS message, SPOILERS, does not show on the display.
- (g) Move the speedbrake lever to the DOWN position.
- (h) Move the CONFIG TEST switch to the T/O position and hold it there.
- (i) Move the EICAS select switch to L and do this check:
  - 1) Make sure the red EICAS message, SPOILERS, does not show on the display.
- (j) Move the EICAS select switch to R and do this check:
  - 1) Make sure the red EICAS message, SPOILERS, does not show on the display.
- (k) Release the CONFIG TEST switch.
- (l) Move the speedbrake lever fully up.
- (m) Move the CONFIG TEST switch to the T/O position and hold it there.
- (n) Move the EICAS select switch to L and do this check:
  - 1) Make sure the red EICAS message, SPOILERS, shows on the display.
- (o) Move the EICAS select switch to R and do this check:
  - 1) Make sure the red EICAS message, SPOILERS, shows on the display.
- (p) Move the speedbrake lever to its down-and-locked detent.
- (q) Release the CONFIG TEST switch.

S 212-039

- (2) Make sure these circuit breakers on the P11 panel are closed:
  - (a) 11G11, AUTO SPEEDBRK
  - (b) 11L9, LEFT ENGINE OIL PRESS
  - (c) 11L36, RIGHT ENGINE OIL PRESS

S 862-040

- (3) Move the forward thrust levers to a position that is at least 15° away from IDLE.

S 212-041

- (4) Move the speedbrake lever to its ARMED position and do these checks:
  - (a) Make sure the AUTO SPDBRK light on the overhead panel, P5, is off.
  - (b) Make sure the EICAS message, AUTO SPEEDBRAKE, does not show on the display.

S 212-042

- (5) Move the forward thrust levers to a position that is less than 8° away from IDLE and do these checks:
  - (a) Make sure the speedbrake lever moves to its UP position.
  - (b) Make sure the speedbrakes move to their full up positions.
  - (c) Make sure the AUTO SPDBRK light on the P5 panel is off.
  - (d) Make sure the EICAS message, AUTO SPEEDBRAKE, does not show on the display.

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S 212-043

- (6) Move the forward thrust levers to a position that is at least 15° away from IDLE and do these checks:
- (a) Make sure the speedbrake lever moves to its down-and-locked detent position.
  - (b) Make sure the speedbrakes move to their full down positions.

NOTE: The speedbrakes will move to full down when the thrust levers are approximately 11 degrees away from the IDLE position.

- (c) Make sure the AUTO SPDBRK light on the P5 panel is off.
- (d) Make sure the EICAS message, AUTO SPEEDBRAKE, does not show on the display.

S 212-044

- (7) Move the speedbrake lever fully up and do these checks:
- (a) Make sure the force necessary to move the speedbrake lever up is between 2.5 and 6 lbs (1.13–2.72 Kg).

NOTE: The force necessary to move the lever out of the detent position can be more.

- (b) Make sure the speedbrake lever moves smoothly and freely.
- (c) Make sure the speedbrake lever moves to the full UP position.

S 212-045

- (8) Move the speedbrake lever to its DOWN position and do these checks:
- (a) Make sure the force necessary to move the speedbrake lever up is between 2.5 and 6 lbs (1.13–2.72 Kg).

NOTE: The force necessary to move the lever out of the detent position can be more.

- (b) Make sure the speedbrake lever moves smoothly and freely.
- (c) Make sure the speedbrakes move fully down.

H. Put the Airplane Back to Its Usual Condition

S 862-046

- (1) Move the forward thrust levers to their IDLE positions.

S 862-048

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6H15, CAPT SEAT
  - (b) 6J21, F/O SEAT

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S 862-049

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11L6 or 11D14, ENGINE T/R CONT L
  - (b) 11L33, RIGHT ENGINE T/R CONT
  - (c) 11D33, RIGHT ENGINE T/R CONT ALTN

S 862-050

- (4) Remove the DO-NOT-OPERATE tags from the FUEL CONTROL switches on the control stand panel, P10.

S 862-051

- (5) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 862-052

- (6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 27-62-04-002-115

4. Auto-Speedbrake Actuator - Removal

A. General

- (1) You can do this procedure only if the head of the aft actuator connection bolt points away from the auto-speedbrake mechanism.
- (2) Use this procedure to remove the auto-speedbrake actuator with the auto-speedbrake mechanism installed. Refer to the "Auto-speedbrake Mechanism and Its Components - Removal" task for the other auto-speedbrake actuator removal procedure.

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones  
211/212 Control Cabin

D. Prepare for the Removal

S 862-054

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

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S 862-055

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (2) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 212-056

- (3) Make sure these conditions are satisfactory:  
(a) The control wheels are in their neutral positions.  
(b) The speedbrake lever is in its down-and-locked position.

S 862-057

- (4) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 862-058

- (5) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 862-059

- (6) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11B18, WARN ELEX B
  - (b) 11C6, FLT CONT ELEC 1L AC
  - (c) 11C7, FLT CONT ELEC 1L DC
  - (d) 11C8, FLT CONT ELEC 2L AC
  - (e) 11C9, FLT CONT ELEC 2L DC
  - (f) 11G11, AUTO SPEEDBRK
  - (g) 11G17, FLT CONT ELEC 1R AC
  - (h) 11G18, FLT CONT ELEC 1R DC
  - (i) 11G26, FLT CONT ELEC 2R AC
  - (j) 11G27, FLT CONT ELEC 2R DC
  - (k) 11H15, FLT CONT SHUTOFF WING LEFT
  - (l) 11H16, FLT CONT SHUTOFF WING CTR
  - (m) 11H26, FLT CONT SHUTOFF WING RIGHT
  - (n) 11J34, WARN ELEX A

S 862-060

- (7) Move the FUEL CONTROL switches on the control stand panel, P10, to their CUTOFF positions and attach DO-NOT-OPERATE tags.

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S 862-061

- (8) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
- (a) 11L6 or 11D14, LEFT ENGINE T/R CONT
  - (b) 11L33, RIGHT ENGINE T/R CONT
  - (c) 11D33, RIGHT ENGINE T/R CONT ALTN

S 042-062

**WARNING:** DO THE DEACTIVATION PROCEDURE FOR THE FLIGHT COMPARTMENT SEAT. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE SEAT MOVES ACCIDENTALLY.

- (9) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
- (a) 6H15, CAPT SEAT
  - (b) 6J21, F/O SEAT

S 012-063

- (10) Open the access panel on the left side of the control stand to get access to the auto-speedbrake mechanism.
- E. Auto-Speedbrake Actuator - Removal (Fig. 201)

S 032-064

- (1) Remove the top bolt that connects the spring support bracket to the auto-speedbrake mechanism (View A).

S 032-065

- (2) Turn the spring support bracket in the aft direction and remove the spring.

S 032-066

- (3) Remove the bolts that connect the actuator to the speedbrake mechanism (2 locations) (View C).

**NOTE:** Move the cam if it is necessary to remove the auto-speedbrake actuator.

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S 022-068

- (4) Remove the auto-speedbrake actuator.

TASK 27-62-04-402-116

5. Auto-Speedbrake Actuator - Installation

A. General

- (1) Use this procedure to install the auto-speedbrake actuator after you removed it with the auto-speedbrake mechanism installed in the airplane.

B. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (3) AMM 27-62-00/501, Auto-Speedbrake Control System
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zones  
211/212 Control Cabin

D. Install Auto-Speedbrake Actuator (Fig. 201)

S 212-070

- (1) Make sure the auto-speedbrake actuator is fully retracted and has the correct length (View C) before you install it.
  - (a) Do these steps to retract the actuator:
    - 1) Connect a 28 VDC power source to pin 6 of the actuator electrical connector and ground pins 8 and 10.
    - 2) After the actuator is retracted, remove the 28 VDC power source and the ground wires from the actuator connector pins.

S 862-071

- (2) Put the detent lever in the position shown (View B-B).

S 822-072

**CAUTION:** DO NOT LET THE CAM TURN DOWN AND DAMAGE THE LVDTs. THE LVDTs CAN BECOME DAMAGED IF THE CAM TOUCHES THE LVDTs.

- (3) Hold the actuator clevis and manually turn the speedbrake lever (input) side of the no-back clutch until these conditions are satisfactory:

**NOTE:** Make sure the detent lever roller touches the cam face at all times during the adjustment.

- (a) The detent lever roller is in its armed detent position.

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(b) The actuator clevis is aligned with the rod end of the auto-speedbrake actuator.

S 432-073

(4) Connect the rod end of the auto-speedbrake to the actuator clevis.

S 822-074

(5) Turn the auto-speedbrake actuator down until the actuator aft connection points are aligned.

**NOTE:** Be careful to prevent damage to the LVDTs.

S 432-075

(6) Install the aft actuator connection bolt.

**NOTE:** Make sure the head of the bolt points away from the auto-speedbrake mechanism.

S 432-076

(7) Connect the spring to the spring support bracket.

S 432-077

(8) Turn the spring support bracket forward and install the bolt that connects the bracket to the auto-speedbrake mechanism (View A).

S 432-133

(9) Install the bolt, washer, and nut that connect the rod end of the auto-speedbrake actuator to its clevis.

E. Auto-Speedbrake Mechanism - Test

S 712-078

(1) Do these steps to do an operational test for the speedbrake lever switches:

**NOTE:** This test makes sure the take-off warning configuration system gets the correct inputs from the switches.

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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 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.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (b) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).
- (c) Make sure these circuit breakers on the overhead panel, P11, are closed:
- 1) 11B18, WARN ELEX B
  - 2) 11C6, FLT CONT ELEC 1L AC
  - 3) 11C7, FLT CONT ELEC 1L DC
  - 4) 11C8, FLT CONT ELEC 2L AC
  - 5) 11C9, FLT CONT ELEC 2L DC
  - 6) 11G17, FLT CONT ELEC 1R AC
  - 7) 11G18, FLT CONT ELEC 1R DC
  - 8) 11G26, FLT CONT ELEC 2R AC
  - 9) 11G27, FLT CONT ELEC 2R DC
  - 10) 11H15, FLT CONT SHUTOFF WING LEFT
  - 11) 11H16, FLT CONT SHUTOFF WING CTR
  - 12) 11H26, FLT CONT SHUTOFF WING RIGHT
  - 13) 11J34, WARN ELEX A
- (d) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to ON.
- (e) Move the left and right engine throttles to the T/O position.
- (f) Make sure this circuit breaker on the P11 panel is closed:
- 1) 11U23, LANDING GEAR POSITION AIR/GND SYS 2
- (g) Make sure the red EICAS message, SPOILERS, does not show on the display.
- (h) Move the speedbrake lever to the DOWN position.
- (i) Move the CONFIG TEST switch to the T/O position.
- (j) Move the EICAS select switch to L and do this check:
- 1) Make sure the red EICAS message, SPOILERS, does not show on the display.
- (k) Move the EICAS select switch to R and do this check:
- 1) Make sure the red EICAS message, SPOILERS, does not show on the display.
- (l) Move the speedbrake lever to its UP position.
- (m) Move the CONFIG TEST switch to the T/O position.

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- (n) Move the EICAS select switch to L and do this check:
  - 1) Make sure the red EICAS message, SPOILERS, shows on the display.
- (o) Move the EICAS select switch to R and do this check:
  - 1) Make sure the red EICAS message, SPOILERS, shows on the display.
- (p) Move the speedbrake lever to the DOWN position.
- (q) Release the CONFIG TEST switch.

S 212-079

- (2) Make sure these circuit breakers on the P11 panel are closed:
  - (a) 11G11, AUTO SPEEDBRK
  - (b) 11L9, LEFT ENGINE OIL PRESS
  - (c) 11L36, RIGHT ENGINE OIL PRESS

S 862-080

- (3) Move the forward thrust levers to a position that is at least 15° away from IDLE.

S 212-081

- (4) Move the speedbrake lever to its ARMED position and do these checks:
  - (a) Make sure the AUTO SPDBRK light on the overhead panel, P5, is off.
  - (b) Make sure the EICAS message, AUTO SPEEDBRAKE, does not show on the display.

S 212-082

- (5) Move the forward thrust levers to a position that is less than 8° away from IDLE and do these checks:
  - (a) Make sure the speedbrake lever moves to its UP position.
  - (b) Make sure the speedbrakes move to their full up positions.
  - (c) Make sure the AUTO SPDBRK light on the P5 panel is off.
  - (d) Make sure the EICAS message, AUTO SPEEDBRAKE, does not show on the display.

S 212-083

- (6) Move the forward thrust levers to a position that is at least 15° away from IDLE and do these checks:
  - (a) Make sure the speedbrake lever moves to its down-and-locked detent position.

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(b) Make sure the speedbrakes move to their full down positions.

NOTE: The speedbrakes will move to full down when the thrust levers are approximately 11 degrees away from the IDLE position.

(c) Make sure the AUTO SPDBRK light on the P5 panel is off.

(d) Make sure the EICAS message, AUTO SPEEDBRAKE, does not show on the display.

S 212-084

(7) Move the speedbrake lever fully up and do these checks:

(a) Make sure the force necessary to move the speedbrake lever up is between 2.5 and 6 lbs (1.13-2.72 Kg).

NOTE: The force necessary to move the lever out of the detent position can be more.

(b) Make sure the speedbrake lever moves smoothly and freely.

(c) Make sure the speedbrake lever moves to the full UP position.

S 212-085

(8) Move the speedbrake lever to its DOWN position and do these checks:

(a) Make sure the force necessary to move the speedbrake lever up is between 2.5 and 6 lbs (1.13-2.72 Kg).

NOTE: The force necessary to move the lever out of the detent position can be more.

(b) Make sure the speedbrake lever moves smoothly and freely.

(c) Make sure the speedbrakes move fully down.

F. Put the Airplane Back to Its Usual Condition

S 862-086

(1) Move the forward thrust levers to their IDLE positions.

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S 862-088

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6H15, CAPT SEAT
  - (b) 6J21, F/O SEAT

S 862-089

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11L6 or 11D14, ENGINE T/R CONT L
  - (b) 11L33, RIGHT ENGINE T/R CONT
  - (c) 11D33, RIGHT ENGINE T/R CONT ALTN

S 862-090

- (4) Remove the DO-NOT-OPERATE tags from the FUEL CONTROL switches on the control stand panel, P10.

S 862-091

- (5) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 862-092

- (6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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AUTO-SPEEDBRAKE ACTUATOR ARMING SWITCH - MAINTENANCE PRACTICES

1. General

- A. This procedure contains the removal and installation tasks for the arming switch for the auto-speedbrake (S371).

TASK 27-62-06-022-001

2. Arming Switch for the Auto-Speedbrake - Removal

A. References

- (1) AMM 27-62-00/501, Auto-Speedbrake Control System

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Prepare for the Removal

S 862-002

- (1) Move the FUEL CONTROL switches on the control stand panel, P10, to their CUTOFF positions and attach DO-NOT-OPERATE tags.

S 862-003

**WARNING:** DO THE DEACTIVATION PROCEDURE FOR THE FLIGHT COMPARTMENT SEAT. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE SEAT MOVES ACCIDENTALLY.

- (2) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:  
(a) 6H15, CAPT SEAT  
(b) 6J21, F/O SEAT

S 012-004

- (3) Remove the access panel from the left side of the control stand.

S 862-005

- (4) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:  
(a) 11G11, AUTO SPEEDBRK

D. Arming Switch for the Auto-Speedbrake - Removal (Fig. 201)

S 032-007

- (1) Disconnect the electrical connections for the arming switch (S371) and attach an identification tag.

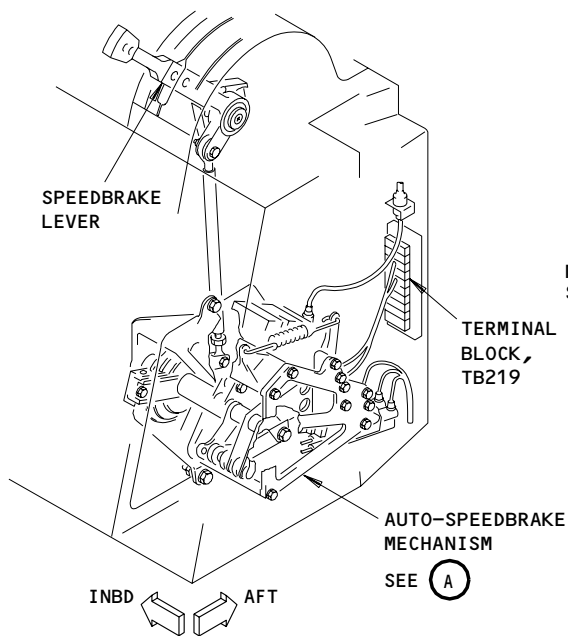
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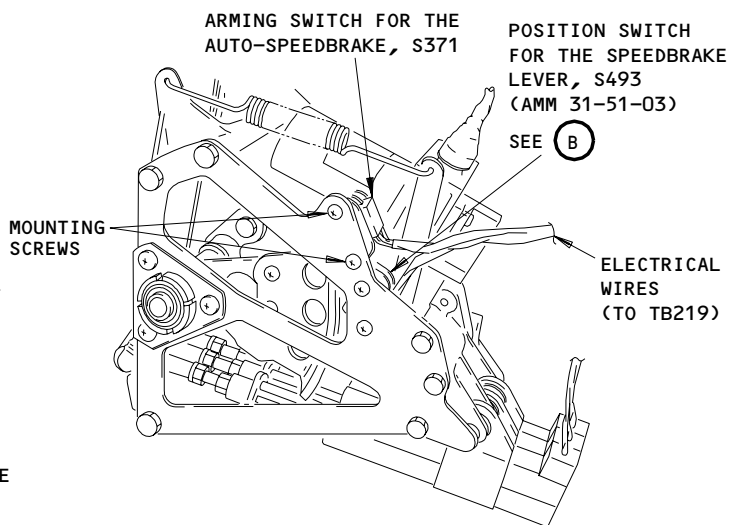
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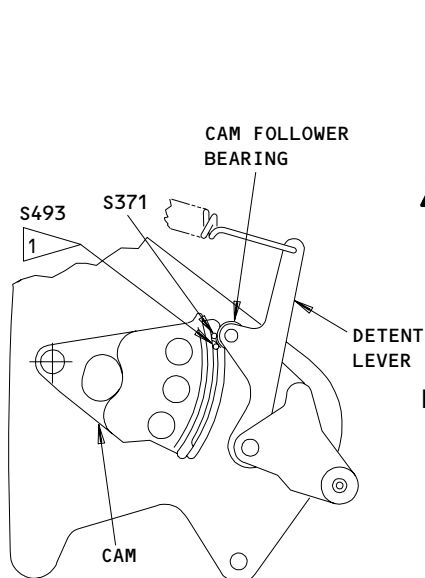


CONTROL STAND



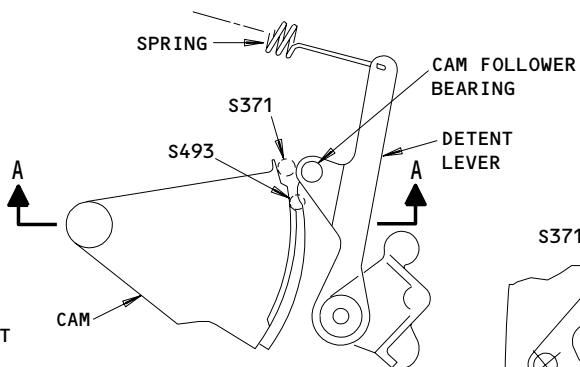
AUTO-SPEEDBRAKE MECHANISM

(A)



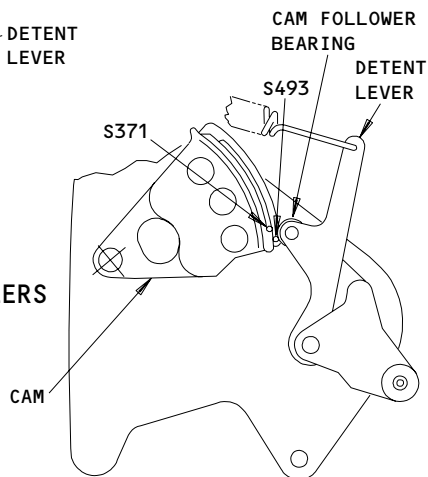
DETENT LEVER AND SWITCH ROLLERS (AUTO-SPEEDBRAKE SYSTEM ARMED)

(B)



DETENT LEVER AND SWITCH ROLLERS (SPEEDBRAKE LEVER DOWN)

(B)



DETENT LEVER AND SWITCH ROLLERS (AUTO-SPEEDBRAKE SYSTEM FULL UP)

(B)

1 THE S493 SWITCH HAS TWO ROLLERS THAT CAUSE THE SWITCH TO OPEN AND CLOSE AT DIFFERENT POINTS ALONG THE CAM.

Arming Switch for the Auto-Speedbrake Actuator  
Figure 201 (Sheet 1)

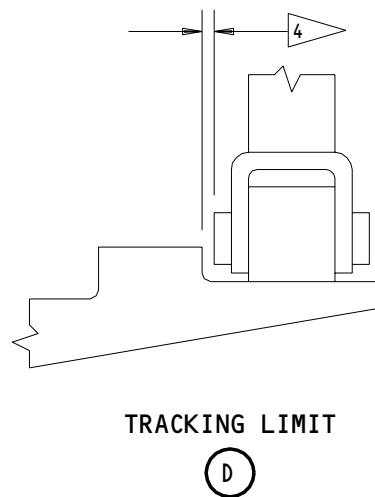
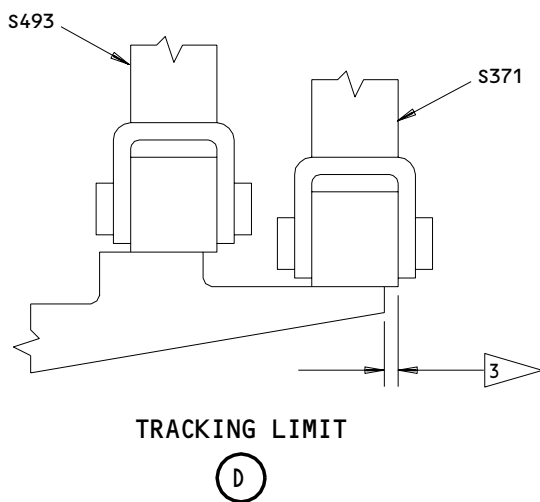
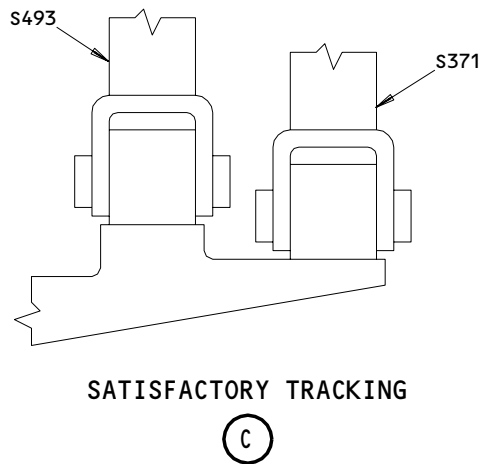
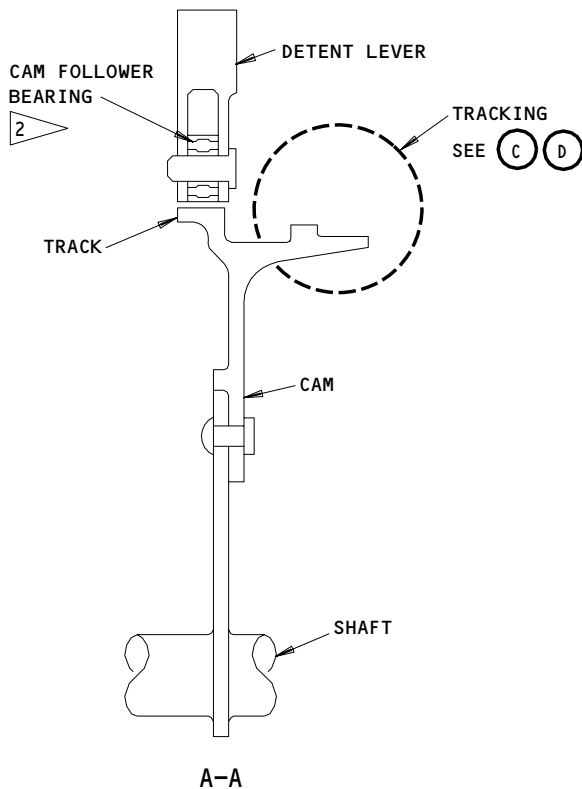
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- 2 THE OUTER RACE OF THE BEARING OR ROLLER MUST NOT EXTEND FARTHER THAN THE EDGE OF THE TRACK FOR THE FULL RANGE OF THE CAM.
- 3 0.03 INCH (0.76 mm) MAXIMUM FOR THE FULL TRACK (EACH SIDE).
- 4 0.002 INCH (0.050 mm) MINIMUM CLEARANCE FOR THE FULL TRACK.

Arming Switch for the Auto-Speedbrake Actuator  
Figure 201 (Sheet 2)

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S 032-008

- (2) Remove the screws, washers, and nuts (2 locations) that connect the switch to the plate.

S 022-009

- (3) Remove the switch.

TASK 27-62-06-422-010

3. Arming Switch for the Auto-Speedbrake - Installation

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-62-00/501, Auto-Speedbrake Control System
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Arming Switch for the Auto-Speedbrake - Installation

S 862-011

- (1) Put the arming switch (S371) in its correct position.

S 432-012

- (2) Install the screws, washers and nuts that connect the switch to the auto-speedbrake mechanism.

S 212-039

- (3) Make sure the tracking of the switch roller on the cam is correct (View C and D, Fig. 201).

S 432-014

- (4) Connect the switch to the electrical connectors labeled above.

D. Arming Switch for the Auto-Speedbrake - Test

S 212-038

- (1) Do these steps to do a check of the speedbrake lever adjustment:
  - (a) Move the speedbrake lever to its DOWN detent.
  - (b) Make sure the switch rollers for switches S371 and S493 are in their correct positions ( Fig. 201).
  - (c) If the switch rollers are not in their correct positions, adjust the control rod for the speedbrake lever (AMM 27-62-00/501).
  - (d) Move the speedbrake lever to its ARMED detent.
  - (e) Make sure the aft face of the speedbrake lever aligns with the ARMED mark on the light plate.
  - (f) If the lever is not aligned correctly, adjust the control rod for the speedbrake lever (AMM 27-62-00/501).

S 862-015

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

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S 862-016

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11L6 or 11D14, LEFT ENGINE T/R CONT
  - (b) 11L33, RIGHT ENGINE T/R CONT
  - (c) 11D33, RIGHT ENGINE T/R CONT ALTN

S 862-018

- (4) Move the forward thrust levers to a position that is more than 15 degrees.

S 862-019

- (5) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11G11, AUTO SPEEDBRK

S 862-042

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (6) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 212-020

- (7) Move the speedbrake lever to its ARMED detent and do these checks:
- (a) Make sure the AUTO SPDBRK light on the overhead panel, P5, is off.
  - (b) Make sure the EICAS message, AUTO SPEEDBRAKE, does not show on the display.

S 212-021

- (8) Move the forward thrust levers to IDLE and do these checks:
- (a) Make sure the speedbrake lever moves to its full upstop position.
  - (b) Make sure the AUTO SPDBRK light on the P5 panel is off.
  - (c) Make sure the EICAS message, AUTO SPEEDBRAKE, does not show on the display.

S 212-022

- (9) Move the forward thrust levers to a position that is at least 15° away from IDLE and do these checks:
- (a) Make sure the speedbrake lever moves to its DOWN position.
  - (b) Make sure the AUTO SPDBRK light on the P5 panel is off.
  - (c) Make sure the EICAS message, AUTO SPEEDBRAKE, does not show on the display.

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S 862-023

(10) Move the forward thrust levers to the IDLE position.

E. Put the Airplane Back to Its Usual Condition

S 862-024

(1) Remove the DO-NOT-OPERATE tags from the FUEL CONTROL switches on the P10 panel.

S 862-026

(2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:

(a) 6H15, CAPT SEAT

(b) 6J21, F/O SEAT

S 862-027

(3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:

(a) 11L6 or 11D14, LEFT ENGINE T/R CONT

(b) 11L33, RIGHT ENGINE T/R CONT

(c) 11D33, RIGHT ENGINE T/R CONT ALTN

S 862-043

(4) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 862-028

(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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SPEED BRAKE RETRACT SWITCHES – ADJUSTMENT/TEST

1. General

- A. This procedure contains the operational test for the S10 and S14 position switches. Switch S10 is the left SPEEDBRAKE RETRACT switch and S14 is the right SPEEDBRAKE RETRACT switch.
- B. The speedbrake retract switches and some autothrottle switches are found in the microswitch pack assembly. All the switches in the microswitch pack use soldered wire connections and are installed on one of the two shafts. Refer to 22-32-04 for the applicable removal, installation, and adjustment procedures.
- C. Make sure to examine all the switches in the microswitch pack assembly for correct adjustment after you install it. To adjust the switches, push down on the locking bar to release the adjustment bolt. Then, turn the bolt to adjust the switch.  
After the adjustment, make sure the adjustment bolts are aligned with the locking bar. Make sure the bar moves up and engages the bolts.

TASK 27-62-07-715-002

2. Speedbrake Retract Switch – Operational Test

- A. References
  - (1) AMM 22-32-04/201, Microswitch Pack
  - (2) AMM 24-22-00/201, Electrical Power – Control
  - (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- B. Access
  - (1) Location Zone  
211/212 Control Cabin
- C. Prepare for the Test
  - S 865-003
  - (1) Supply electrical power (AMM 24-22-00/201).
  - S 865-004
  - (2) Move the FUEL CONTROL switches on the control stand panel, P10, to their CUTOFF positions and attach DO-NOT-OPERATE tags.

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S 865-001

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

D. Procedure (Fig. 501)

S 865-006

- (1) Move the forward thrust levers to a position that is more than 50 percent of full travel.

S 865-007

- (2) Move the control wheels to their neutral positions.

S 215-008

- (3) Move the speedbrake lever to its ARMED position and do these checks:
  - (a) Make sure the AUTO SPDBRK light on the overhead panel, P5, is off.
  - (b) Make sure the AUTO SPEEDBRAKE message does not show on the top EICAS display.

S 215-009

- (4) Move the forward thrust levers to the idle position and do these checks:
  - (a) Make sure the speedbrake lever moves to its full upstop position.
  - (b) Make sure the spoilers are in their full up positions.
  - (c) Make sure the AUTO SPDBRK light on the P5 panel is off.
  - (d) Make sure the AUTO SPEEDBRAKE message does not show on the top EICAS display.

S 215-010

- (5) Move the forward thrust levers to a position that is approximately 15° forward of the idle stop and do these checks:
  - (a) Make sure the speedbrake handle moves to its down and locked position.
  - (b) Make sure the spoilers move to their full down positions.
  - (c) Make sure the AUTO SPDBRK light on the P5 panel is off.

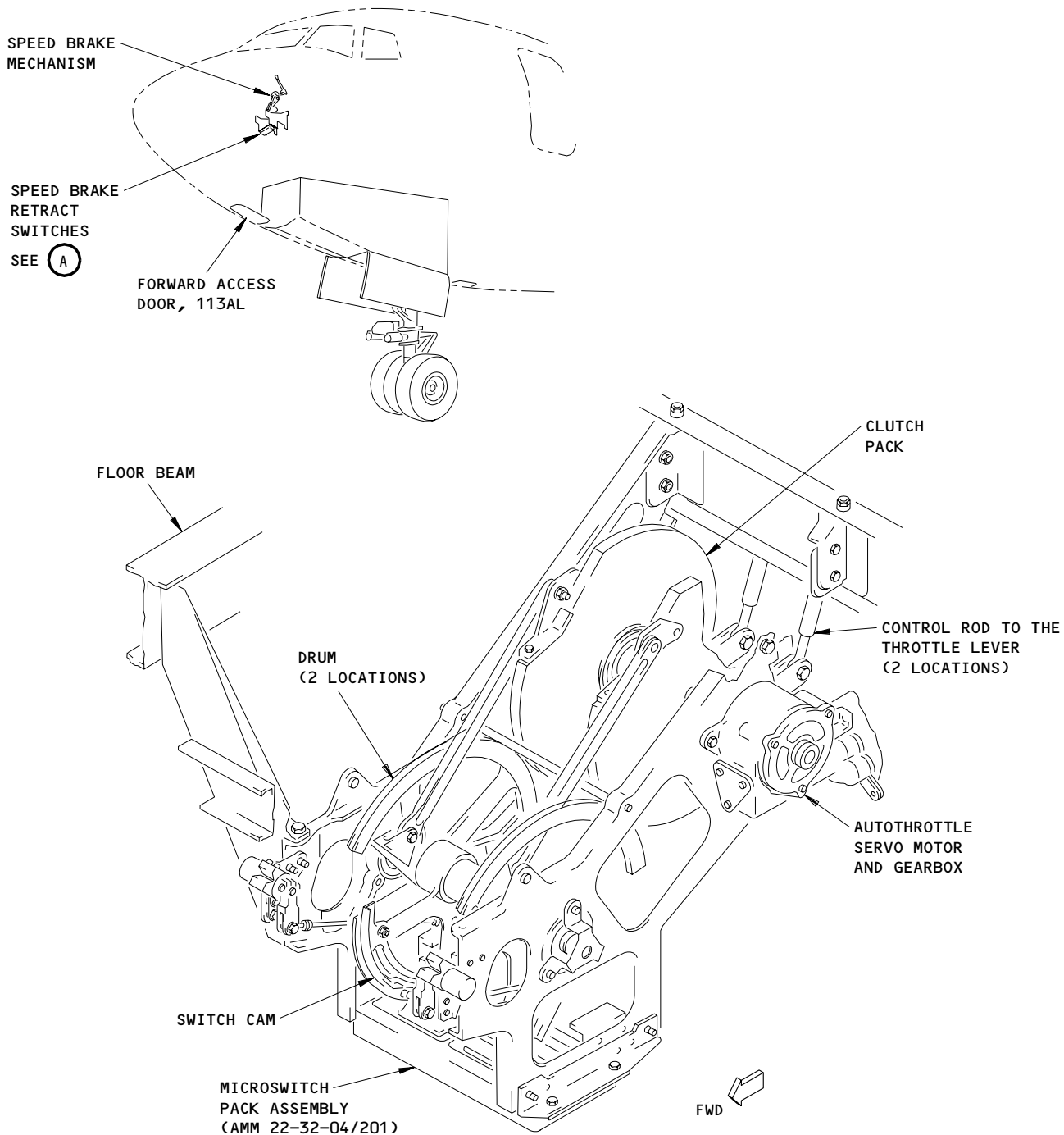
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MICROSWITCH PACK LOCATION

(A)

Speed Brake Retract Switches - Adjustment/Test  
Figure 501

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(d) Make sure the AUTO SPEEDBRAKE message does not show on the top EICAS display.

S 865-011

(6) Move the forward thrust levers back to their idle positions.

S 215-012

(7) Make sure the speedbrake lever is in its down-and-locked detent position.

E. Put the Airplane Back to Its Usual Condition

S 865-013

(1) Remove the DO-NOT-OPERATE tags from the FUEL CONTROL switches on the P10 panel.

S 865-014

(2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 865-015

(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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REVERSE THRUST LEVER POSITION SWITCH – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and installation tasks for the position switch for the reverse thrust levers.

TASK 27-62-08-024-001

2. Position Switch for the Reverse Thrust Levers – Removal

A. References

- (1) AMM 24-22-00/201, Electrical Power – Control

B. Access

- (1) Location Zones  
211/212 Control Cabin

C. Prepare for the Removal

S 214-002

- (1) Make sure the speedbrake lever is in its down-and-locked detent position.

S 864-003

- (2) Move the FUEL CONTROL switches on the control stand panel, P10, to their CUTOFF positions and attach DO-NOT-OPERATE tags.

S 864-004

- (3) Move the FLT CONTROL SHUTOFF WING L, R, and C switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 864-005

- (4) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11L6 or 11D14, LEFT ENGINE T/R CONT  
(b) 11L33, RIGHT ENGINE T/R CONT  
(c) 11D33, RIGHT ENGINE T/R CONT ALTN  
(d) 11G11, AUTO SPEEDBRK

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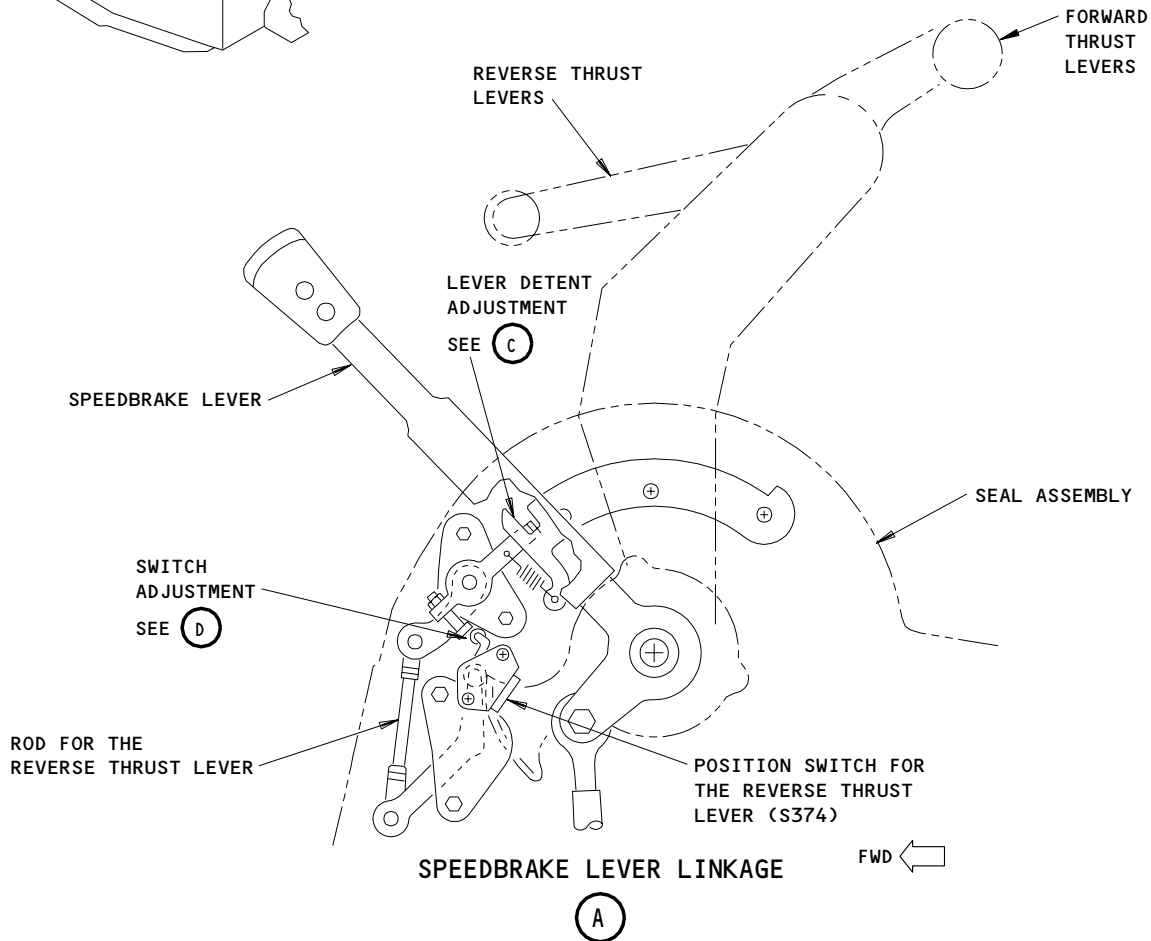
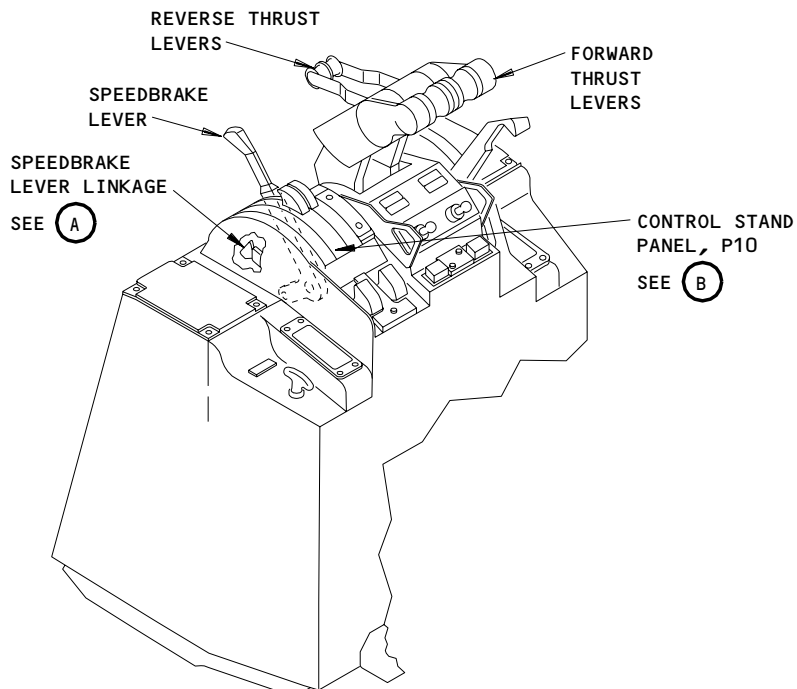
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**BOEING**  
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MAINTENANCE MANUAL



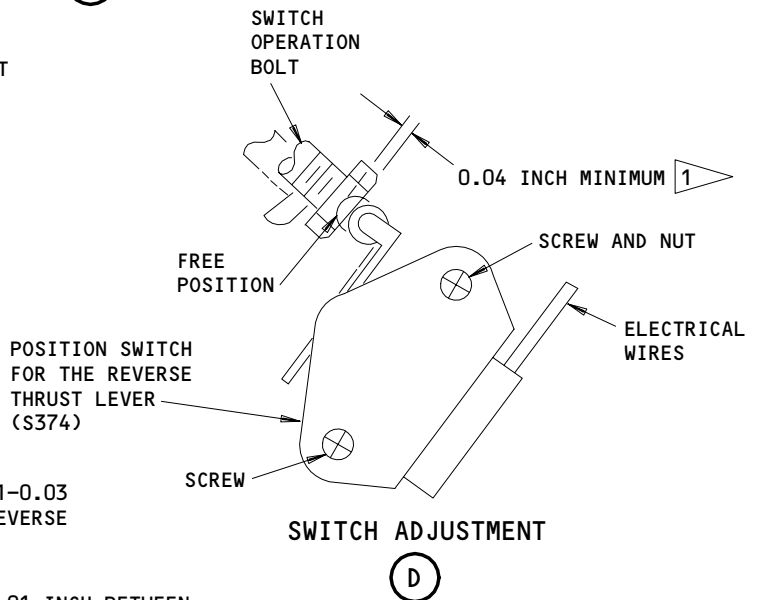
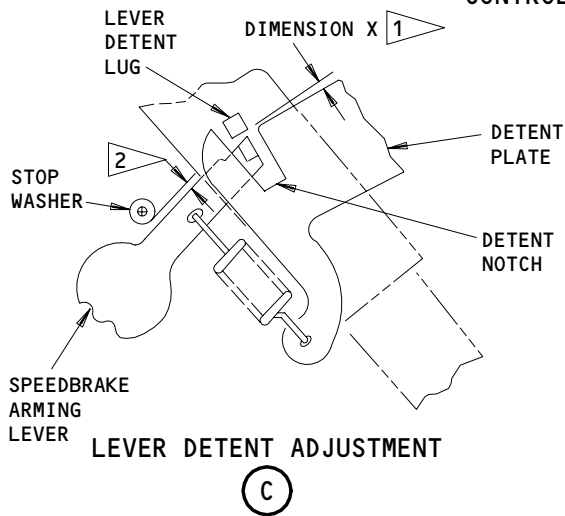
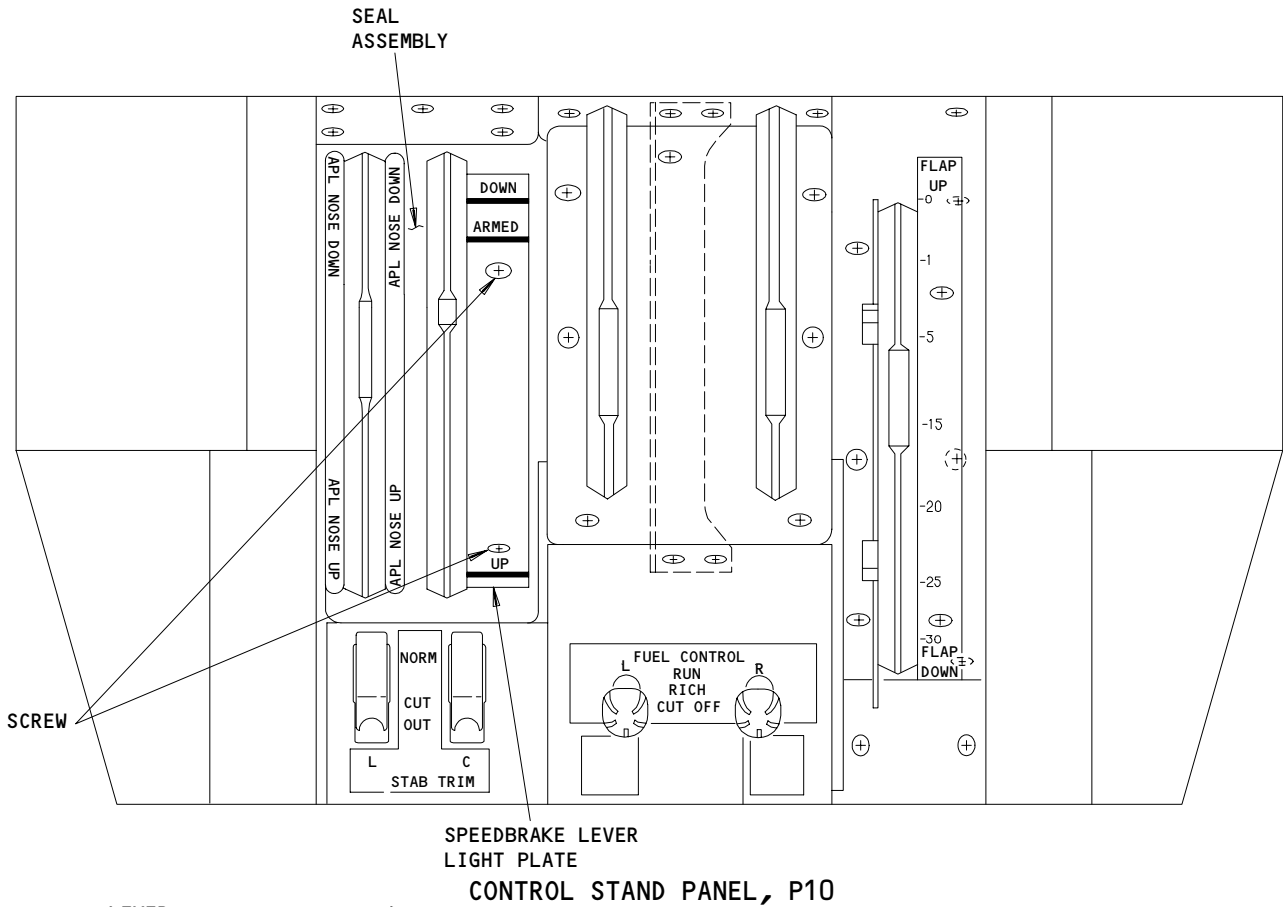
Position Switch for the Reverse Thrust Lever Installation  
Figure 401 (Sheet 1)

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- 1 THE CLEARANCE (DIMENSION X) MUST BE 0.01-0.03 INCH WHEN THE POSITION SWITCH FOR THE REVERSE THRUST LEVER IS OPERATED.
- 2 AIRPLANES WITH A STOP WASHER; THERE MUST BE A CLEARANCE OF AT LEAST 0.01 INCH BETWEEN THE STOP WASHER AND THE SPEEDBRAKE ARMING LEVER.

Position Switch for the Reverse Thrust Lever Installation  
Figure 401 (Sheet 2)

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- (e) 11H15, FLT CONT SHUTOFF WING LEFT
- (f) 11H16, FLT CONT SHUTOFF WING CTR
- (g) 11H26, FLT CONT SHUTOFF WING RIGHT

S 214-006

- (5) Make sure the reverse thrust levers are in their OFF (idle) positions.

S 864-040

**WARNING:** DO THE DEACTIVATION PROCEDURE FOR THE FLIGHT COMPARTMENT SEAT. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE SEAT MOVES ACCIDENTALLY.

- (6) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
  - (a) 6H15, CAPT SEAT
  - (b) 6J21, F/O SEAT

D. Remove the Position Switch for the Reverse Thrust Lever (Fig. 401)

S 014-007

- (1) Remove the access panel from the right side of the control stand to get access to the wires for the switch.

S 034-008

**CAUTION:** BE VERY CAREFUL WHEN YOU DO MAINTENANCE IN THE CONTROL STAND. DAMAGE TO THE SWITCHES, LIGHTS, OR MECHANISMS CAN OCCUR.

- (2) Do these steps to move the speedbrake lightplate away from the control stand:
  - (a) Cut the ties that hold the wires for the speedbrake lightplate.
  - (b) Remove the screws (2 locations) that connect the lightplate to the control stand.
  - (c) Lift the lightplate up and away from the control stand.

S 034-009

- (3) Remove the seal assemblies for the stabilizer trim levers and the speedbrake lever.

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S 034-010

- (4) Disconnect the wires for the position switch from terminal block, TB215.

NOTE: Keep a record of the wire connection points.

S 024-011

- (5) Do these steps to remove the position switch for the reverse thrust levers:
  - (a) Remove the screws, nut, washer, and shim.
  - (b) Remove the position switch for the reverse thrust levers.

TASK 27-62-08-424-012

### 3. Position Switch for the Reverse Thrust Levers - Installation

#### A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (3) AMM 78-31-00/201, Thrust Reverser System

#### B. Access

- (1) Location Zones  
211/212 Control Cabin

#### C. Install the Position Switch for the Reverse Thrust Levers (Fig. 401)

S 424-013

- (1) Do these steps to install the position switch:
  - (a) Put the position switch in its correct position.
  - (b) Install the screws, shim, washer, and nut that hold the switch in the control stand.
  - (c) Connect the wires for the switch to the above recorded position in the airplane wiring.

S 824-014

- (2) Do these steps to adjust the position switch:
  - (a) Make sure the thrust levers are in their idle positions.
  - (b) Move the left reverse thrust lever to its full reverse thrust position.
  - (c) Adjust the length of the rod for the reverse thrust lever until this condition is satisfactory:
    - 1) The detent lug is pushed out of the down detent notch to a Dimension X of 0.03-0.10 inch (0.762-2.54 mm) (View C).
  - (d) Adjust the switch operation bolt until the position switch roller is in the position shown (View D) and do these steps:
    - 1) Make sure the position switch operates.
    - 2) Tighten the jamnuts on the bolt.
  - (e) Move the left reverse thrust lever to its OFF (idle) position.

S 824-015

- (3) Do the above step again for the right reverse thrust lever.

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- S 214-054
- (4) AIRPLANES WITH A STOP WASHER;  
Do these steps to examine the stop washer clearance:
- (a) Move the two reverse thrust levers to their full reverse thrust positions.
  - (b) Make sure the clearance between the stop washer and the speedbrake arming lever is at least 0.01 inch (0.254 mm) (View C).
- S 214-018
- (5) Move the left reverse thrust lever to its full reverse thrust position and then back to its OFF position. Do these checks:
- (a) Make sure the detent lug goes back to its full down position.
  - (b) Make sure the position switch goes to its free position.
- S 214-019
- (6) Do the above step again for the right reverse thrust lever.
- S 434-020
- (7) Install the seal assembly for the speedbrake and stabilizer trim levers.
- S 434-021
- (8) Install the screws (2 locations) that connect the speedbrake lightplate to the control stand panel, P10.
- S 434-022
- (9) Use ties to hold the loose wires in their correct positions.
- S 414-023
- (10) Install the access panel on the right side of the control stand.
- D. Position Switch for the Reverse Thrust Levers - Test
- S 214-024
- (1) Make sure the reverse thrust levers are in their OFF (idle) positions.
- S 214-025
- (2) Make sure the speedbrake lever is in its down-and-locked detent position.
- S 864-026
- (3) Supply electrical power (Ref 24-22-00).

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S 044-028

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO YOU OR DAMAGE TO EQUIPMENT.

- (4) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (Ref 78-31-00).

S 864-029

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (5) Supply pressure to the left, right, and center hydraulic systems (Ref 29-11-00).

S 864-030

- (6) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11G11, AUTO SPEEDBRK
  - (b) 11H15, FLT CONT SHUTOFF WING LEFT
  - (c) 11H16, FLT CONT SHUTOFF WING CTR
  - (d) 11H26, FLT CONT SHUTOFF WING RIGHT

S 864-031

- (7) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, R, and C switches on right side panel, P61, to ON.

S 214-032

- (8) Move the left and right reverse thrust levers to their deployment interlock stops and do these checks:
- (a) Make sure the speedbrake lever moves to its full upstop position.
  - (b) Make sure the spoilers move to their full up positions.
  - (c) Make sure the AUTO SPDBRK light on the overhead panel, P5, is off.
  - (d) Make sure the AUTO SPEEDBRAKE message does not show on the display.

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S 214-033

- (9) Move the speedbrake lever to its full downstop position (the lever will not go into the locked detent) and do these checks:
- (a) Make sure the AUTO SPDBRK light on the P5 panel is on.
  - (b) Make sure the spoilers move to their full down positions.

S 214-034

- (10) Move the left and right reverse thrust levers to their OFF (idle) positions and do these checks:
- (a) Make sure the AUTO SPDBRK light on the P5 panel is off.
  - (b) Make sure the speedbrake lever is in its down-and-locked detent position.

E. Put the Airplane Back to Its Usual Condition

S 864-035

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11L6 OR 11D14, LEFT ENGINE T/R CONT
  - (b) 11L33, RIGHT ENGINE T/R CONT
  - (c) 11D33, RIGHT ENGINE T/R CONT ALTN

S 864-042

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main distribution panel, P6:
- (a) 6H15, CAPT SEAT
  - (b) 6J21, F/O SEAT

S 864-036

- (3) Remove the DO-NOT-OPERATE tags from the FUEL CONTROL switches on the P10 panel.

S 864-037

- (4) Remove the power from the left, right, and center hydraulic systems (Ref 29-11-00).

S 444-038

- (5) Do the activation procedure for the thrust reversers (Ref 78-31-00).

S 864-039

- (6) Remove electrical power if it is not necessary (Ref 24-22-00).

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GEAR TILT PRESSURE SWITCH - REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and installation tasks for the gear tilt pressure switch.

TASK 27-62-10-024-002

2. Gear Tilt Pressure Switch - Removal

A. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zone  
551/651 Rear Spar to Trailing Edge
- (2) Access Panels  
551TB/651TB Gear Tilt Pressure Switch

C. Prepare for the Removal

- S 864-003
- (1) Supply electrical power (AMM 24-22-00/201).
- S 864-004
- (2) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- S 864-005
- (3) Move the FLT CONTROL SHUTOFF WING switches L, R, and C on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.
- S 864-006
- (4) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
  - (a) 11G11, AUTO SPEEDBRK
  - (b) 11H15, FLT CONT SHUTOFF WING LEFT
  - (c) 11H16, FLT CONT SHUTOFF WING CTR
  - (d) 11H26, FLT CONT SHUTOFF WING RIGHT
- S 864-007
- (5) Move the FUEL CONTROL switches on the control stand panel, P10, to their CUTOFF positions and attach DO-NOT-OPERATE tags.
- S 014-008
- (6) Open these access panels (AMM 06-44-00/201):
  - (a) 551TB (for the left pressure switch)
  - (b) 651TB (for the right pressure switch).

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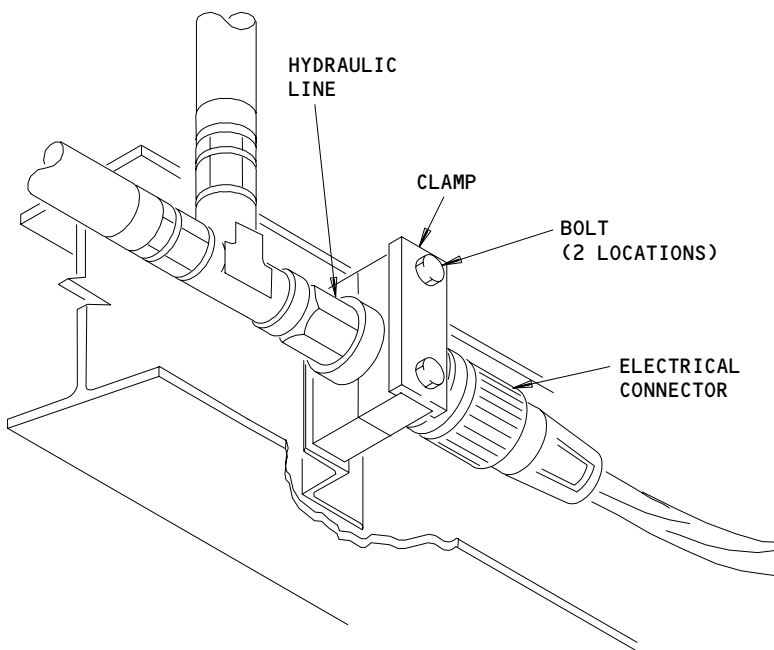
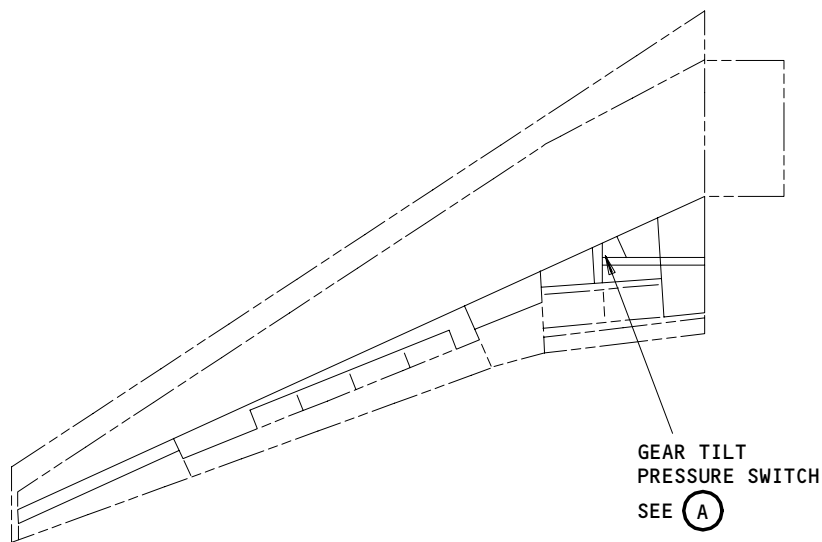
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GEAR TILT PRESSURE SWITCH  
(LEFT SWITCH SHOWN, RIGHT SWITCH IS ALMOST THE SAME)

(A)

Gear Tilt Pressure Switch Installation  
Figure 401

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D. Procedure (Fig. 401)

S 034-009

- (1) Disconnect the electrical connector from the switch.

S 034-010

- (2) Disconnect the hydraulic line from the switch and do this step:  
(a) Put a cap on the hydraulic line and the switch port.

S 034-011

- (3) Remove the bolt, clamp, and spacers that connect the switch to the airplane.

S 024-012

- (4) Remove the switch.

TASK 27-62-10-424-013

3. Gear Tilt Pressure Switch - Installation

A. Consumable Materials

- (1) D00054 Lubricant - Hydraulic System O-Rings,  
Backup Rings, Fittings, MCS 352B

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels  
(2) AMM 24-22-00/201, Electrical Power - Control  
(3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

C. Access

- (1) Location Zone  
551/651 Rear Spar to Trailing Edge
- (2) Access Panels  
551TB/651TB Gear Tilt Pressure Switch

D. Procedure (Fig. 401)

S 434-014

- (1) Put the pressure switch in its bracket and do this step:  
(a) Install the spacers, bolts, and clamp that connect the switch to the airplane.

S 434-015

- (2) Connect the electrical connector to the switch.

S 644-016

- (3) Apply a thin layer of lubricant to the packing, O-rings, and fittings before you install them.

S 434-017

- (4) Connect the hydraulic line to the switch.

E. Gear Tilt Pressure Switch - Test

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S 864-001

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (1) Supply pressure to the left, right, and center hydraulic systems (AMM 29-11-00/201).

S 864-018

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
  - (a) 11G11, AUTO SPEEDBRK
  - (b) 11H15, FLT CONT SHUTOFF WING LEFT
  - (c) 11H16, FLT CONT SHUTOFF WING CTR
  - (d) 11H26, FLT CONT SHUTOFF WING RIGHT

S 864-019

- (3) Remove the DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING switches L, R, and C on the right side panel, P61, to ON.

S 214-020

- (4) Make sure these circuit breakers on the P11 panel are closed:
  - (a) EICAS (6 or 7 locations)
  - (b) 11L9, LEFT ENGINE OIL PRESS EICAS
  - (c) 11L36, RIGHT ENGINE OIL PRESS EICAS

S 214-021

- (5) Make sure there are no hydraulic leaks near the pressure switch.

S 864-022

- (6) Move the forward thrust levers to a position that is more than 15° away from their IDLE positions.

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S 214-023

- (7) Move the speedbrake lever to its ARMED position and do these checks:
- (a) Make sure the AUTO SPDBRK light on the overhead panel, P5, is off.
  - (b) Make sure the amber EICAS message AUTO SPEEDBRAKE does not show on the display.

S 214-030

- (8) Move the forward thrust levers to a position that is less than 8° away from their IDLE positions and do these checks:
- (a) Make sure the speedbrake lever moves to its full upstop position.
  - (b) Make sure the AUTO SPDBRK light on the P5 panel is off.
  - (c) Make sure the amber EICAS message AUTO SPEEDBRAKE does not show on the display.
  - (d) Make sure the spoilers are in their full up positions.

S 214-025

- (9) Move the forward thrust levers to positions that are more than 15° away from their IDLE positions and do these checks:
- (a) Make sure the spoilers move to their full down positions.

NOTE: The spoilers will move to their full down positions when the forward thrust levers are approximately 11° away from their IDLE positions.

- (b) Make sure the speedbrake lever moves to its down-and-locked detent position.

F. Put the Airplane Back to Its Usual Condition

S 864-026

- (1) Remove the DO-NOT-OPERATE tags from the FUEL CONTROL switches on the control stand panel, P10.

S 864-027

- (2) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

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- S 864-028
- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).
- S 414-029
- (4) Close these access panels (AMM 06-44-00/201):
- (a) 551TB (for the left pressure switch)
  - (b) 651TB (for the right pressure switch).

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LEADING EDGE SLATS - CORROSION PROTECTION

1. General

- A. Lift augmenting devices consists of flaps and slats and other similar auxiliary devices used to increase aerodynamic lift.
- B. Corrosion can occur:
  - (1) On the leading edge slat tracks.
  - (2) On the outboard leading edge slat control rods at the bracket and clamp assemblies.
  - (3) On the offset gearbox no-brake spring washer of the outboard LE slat and internal gear assemblies.
  - (4) In the core of the leading edge slats because of moisture.

TASK 27-80-00-642-001

2. Corrosion Prevention

- A. Equipment
  - (1) Circuit Breaker Lockout Clip, Commercially Available
- B. References
  - (1) 06-44-00/201, Wing Access Doors and Panels
  - (2) 24-22-00/201, Electrical Power - Control
- C. Access
  - (1) Location Zones
    - 211/212 Control Cabin
    - 510/610 Wing Leading Edge - Inboard
    - 520/620 Wing Leading Edge - Outboard
- D. Procedure

S 862-012

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

S 862-029

- (2) Use the alternate flaps/slats position selector on the first officer's main instrument panel P3 to move the LE slats to 30 units.
  - (a) Make sure that the TE flaps and LE slats are in the fully retracted position.
  - (b) Make sure that the flap lever is in the zero (FLAPS UP) detent.

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- (c) Make sure the alternate flaps/slats position selector switch on first officer's main instrument panel P3 is in NORM detent.
- (d) Push the LE slat alternate drive arming switch on P3 to arm inboard and outboard slat alternate drives (ALTN light comes on immediately. The amber LEADING EDGE light on P3, and LE SLAT DISAGREE message come on after seven seconds).

S 202-005

- (3) Do a check of the leading edge slat tracks, inboard and outboard slat PDU mounts, torque tubes, gearbox coupling, and fasteners for corrosion (SRM 51-10-02/1).
  - (a) Make sure that you do not see white deposits, discoloration, or flakes (these are indications of corrosion).

S 102-006

- (4) For corrosion damage, it is necessary to do rework to the damaged area before you can establish it as allowable damage or damage requiring repair or replacement.

S 142-007

- (5) Remove all corrosion, evaluate damage, and repair or replace discrepant area or item. Follow up with an application of protective finishes and corrosion inhibiting compounds (SRM 51-10-02/2).

S 862-008

- (6) Close these circuit breakers on the overhead panel, P11, and install DO-NOT-CLOSE identifiers:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

S 862-009

- (7) Close these circuit breakers on the main power distribution panel, P6, and install DO-NOT-CLOSE identifiers:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR

S 862-018

- (8) Remove the DO-NOT-OPERATE tag to the LE slat alternate drive arming switch on the P3.

S 862-024

- (9) Push the LE slat alternate drive arming switch on P3 to arm inboard and outboard slat alternate drives (ALTN light comes on immediately. The amber LEADING EDGE light on P3 and LE SLAT DISAGREE message come on after seven seconds).

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S 862-025

- (10) Set the alternate flaps/slats position selector switch in the UP detent.  
(a) Make sure that the LE slats move to fully retracted position.

S 862-021

- (11) Set the alternate flaps/slats position selector switch in NORM detent (amber LEADING EDGE light and LE SLAT DISAGREE message come on).

S 862-022

- (12) Push the LE slat alternate drive arming switch to disarm inboard and outboard slat alternate drives (switch light off, amber LEADING EDGE light and LE SLAT DISAGREE message off).

S 862-023

- (13) Remove electrical power (AMM 24-22-00/201).

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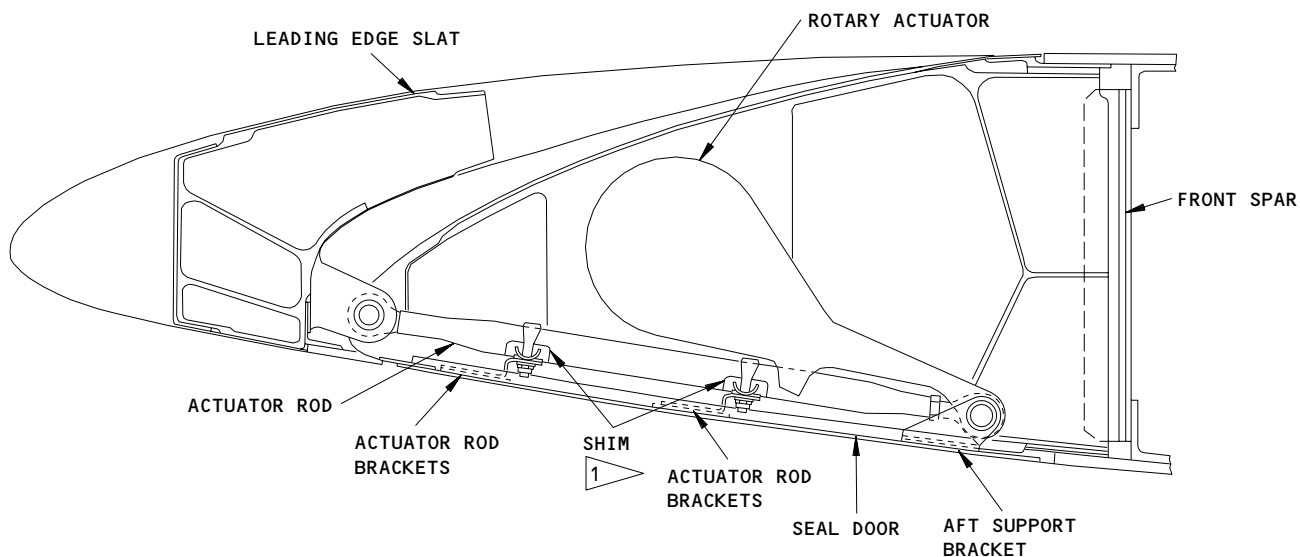
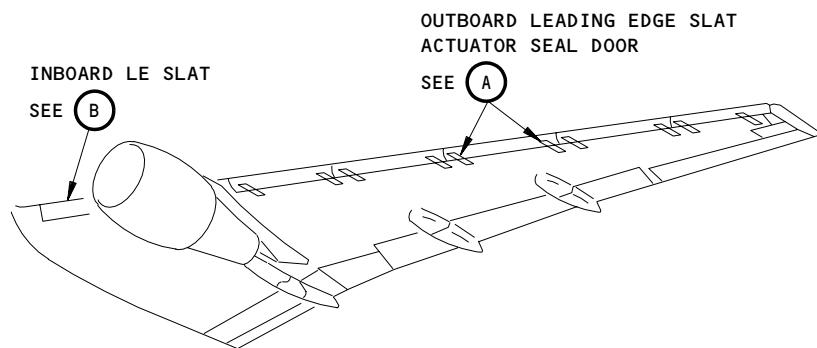
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OUTBOARD LEADING EDGE SLAT ACTUATOR SEAL DOOR

(A)

1 APPLY BMS 5-95 SEALANT TO  
OUTER SURFACE AS NECESSARY

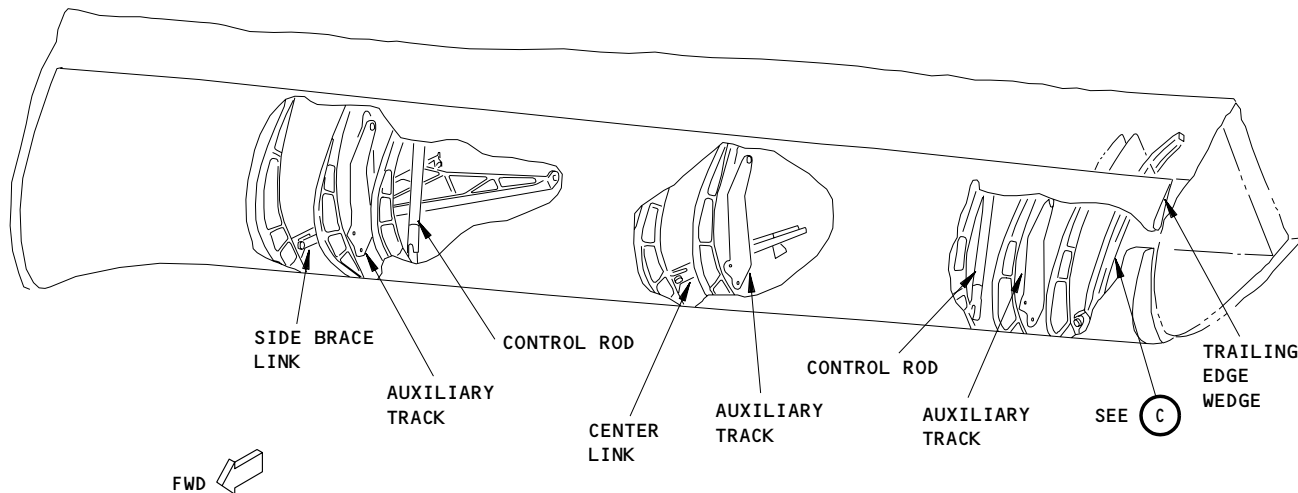
Leading Edge and Leading Edge Devices  
Figure 201 (Sheet 1)

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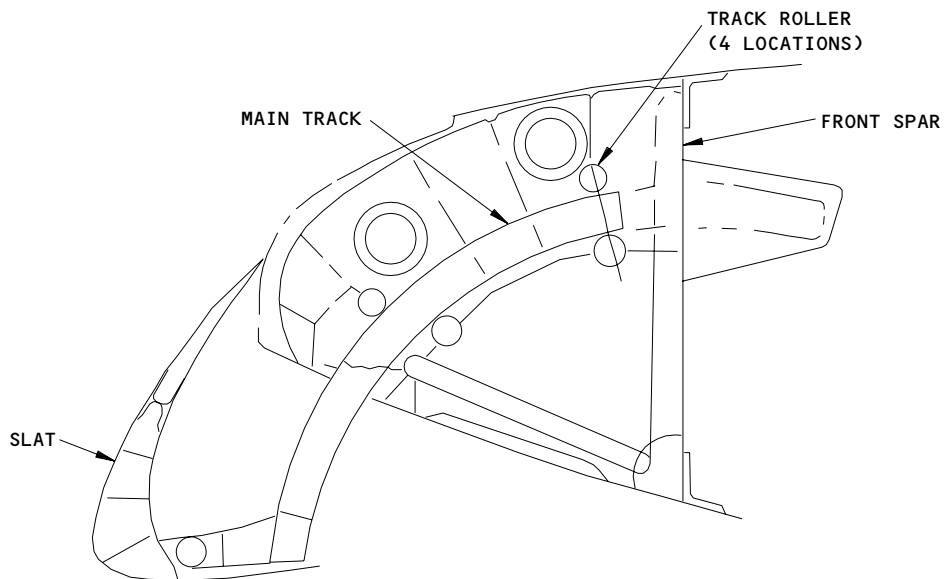
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LEFT INBOARD SLAT NO. 6  
(RIGHT INBOARD SLAT NO. 7 OPPOSITE)

(B)



MAIN TRACK

(C)

Leading Edge and Leading Edge Devices  
Figure 201 (Sheet 2)

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LEADING EDGE SLAT SYSTEM – DESCRIPTION AND OPERATION

1. General

A. Introduction

- (1) The inboard and outboard leading edge slats are extended during takeoff and landing for increased airplane lift.
- (2) The flap lever on the control stand operates the leading edge slats by a cable system from the flap lever to a quadrant with linkage connected to the slats power drive units. The slats are driven on primary or alternate power by the slat power drive units. There is one power drive unit for the inboard slats and one power drive unit for the outboard slats. The slat power drive units are operated on primary power through a set of drive shafts and cranks rotated by a quadrant in the flap cable system. The slat power drive units are operated on alternate power by a position selector switch. The selector switch also controls trailing edge flaps. The selector switch is operational after arming has been completed.
- (3) The slat power drive units rotate drive shafts. The drive shafts operate rotary actuators to extend or retract the slats.
- (4) Primary power to rotate the slat drive shafts is hydraulic. Alternate power is electrical.
- (5) Slat position indication is covered in AMM 27-88-00/001, Leading Edge Slat Position Indicating System – Description and Operation.

B. L.E. Slat System Purpose

- (1) The slats and the flaps increase airplane lift by increasing the wing surface and the effective curvature. Increased wing surface lowers airplane stall speeds.
- (2) Lower airplane stall speeds allow lower takeoff and landing speeds. This reduces ground roll, increases wheel and brake life, improves climb-out performance, and creates safer operating conditions.
- (3) There are twelve slats, six in each wing. The slats are numbered No. 1 through No. 12, from left to right. The slats are separated into five outboard slats and one inboard slat per wing. The inboard and outboard slats are driven by two separate power drive units.

C. General Description

- (1) L.E. Slat Primary Control (Fig. 1)
  - (a) The flap lever on the control stand operates the flaps by a cable system from the flap lever to the flap aft quadrant. The quadrant is linked to the flap power drive unit.
  - (b) The flap lever and the flap cables will also rotate the slat aft quadrant. The quadrant is in the aft end of the forward cargo compartment.
  - (c) The slat aft quadrant is connected by drive shafts, control rods, and cranks to the inboard slat power drive unit and to the outboard slat power drive unit.
  - (d) Operation of the flap lever will provide a controlled input to the hydraulic control valve on the flap power drive unit, to the hydraulic control valve on the inboard slat power drive unit, and to the hydraulic control valve on the outboard slat power drive unit.

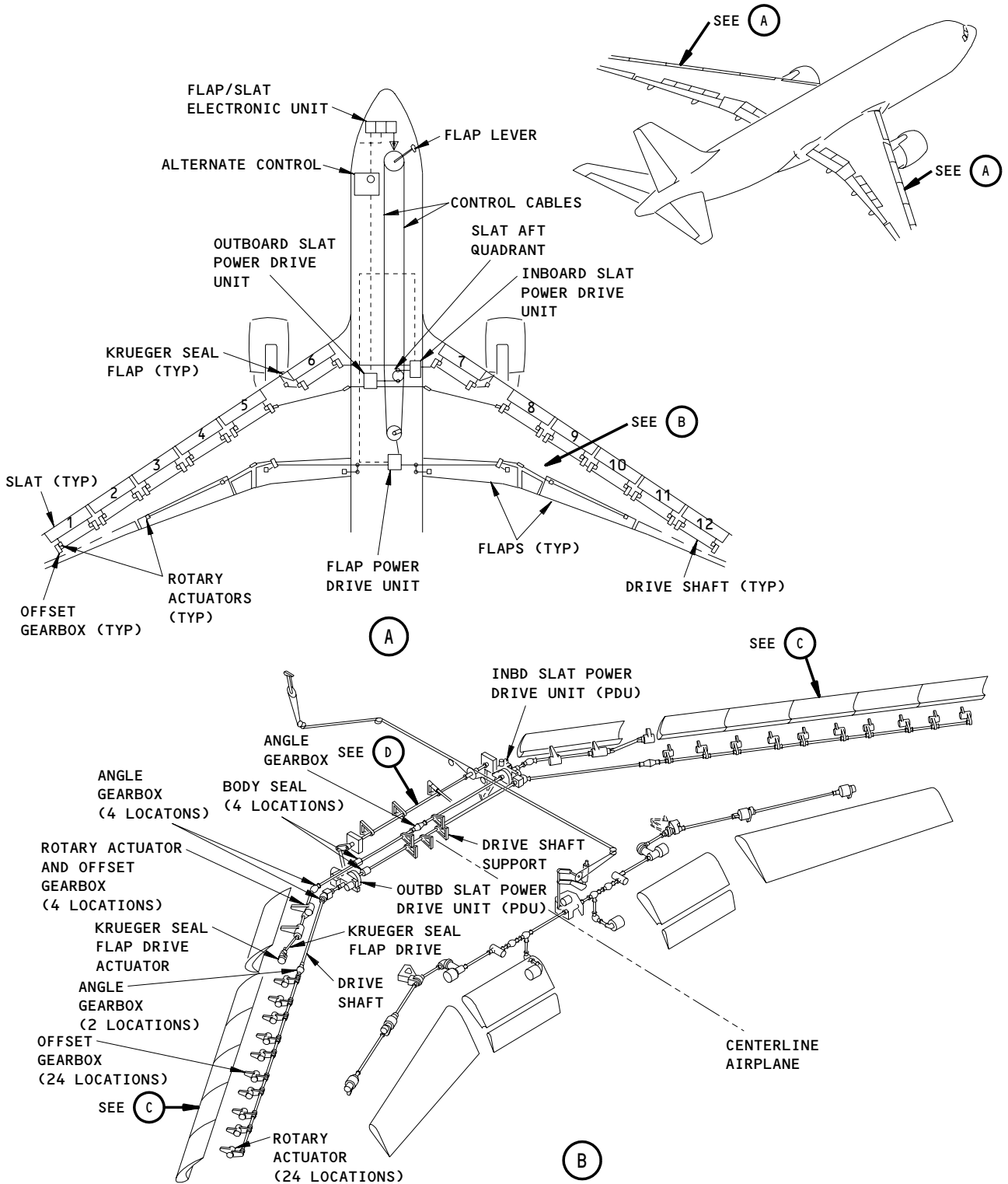
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Leading Edge Slat System Components  
Figure 1 (Sheet 1)

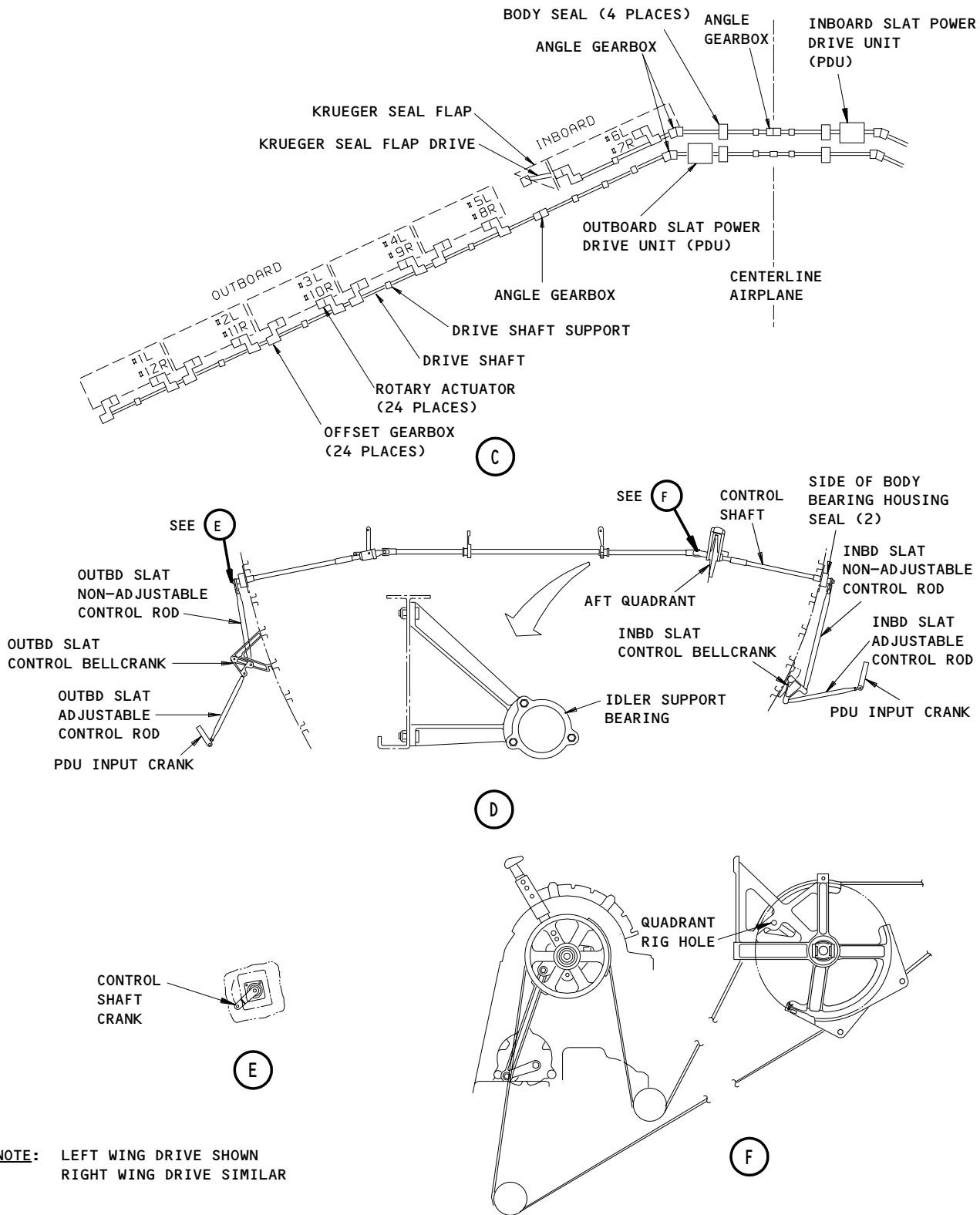
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Leading Edge Slat System Components  
Figure 1 (Sheet 2)

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- (e) The Krueger seal flaps are operated by the inboard slat drive.
- (2) L.E. Slat Alternate Control (Fig. 2)
  - (a) Back-up operation of the slats is done with the flap/slat alternate drive control module, the flap/slat electronic unit (FSEU), an electric circuit, the hydraulic bypass valves, and the electric motors.
  - (b) The flap/slat alternate drive control module provides arming and control signals. There is one slat arming switch and one flap arming switch on the module. One position selector switch on the module controls positioning of flaps, inboard slats, and outboard slats.
  - (c) Inboard Leading Edge Slats Alternate Drive
    - 1) The slat arming signal powers the inboard slat PDU hydraulic bypass valve to bypass (closed) and causes the inboard slat PDU electric motor clutch to engage. The control signal from the position selector switch is monitored by the FSEU. The FSEU generates extend or retract signals to activate power to drive the inboard slat PDU electric motor.
  - (d) Outboard Leading Edge Slats Alternate Drive
    - 1) The signal path is the same as for inboard slats alternate drive.
- (3) Primary Power (Fig. 1)
  - (a) The inboard slat drive and the outboard slat drive primary power is from the center hydraulic system. Hydraulic pressure drives the hydraulic motor on the inboard slat power drive unit and the hydraulic motor on the outboard slat power drive unit.
  - (b) One hydraulic control valve module and one control unit are mounted on each slat power drive unit.
  - (c) The hydraulic motor is controlled by the hydraulic control valve module, containing a hydraulic control valve and a hydraulic bypass valve, and by the control unit. The control unit has an input cam rotated by input from the flap lever. The input cam regulates the hydraulic control valve by power drive unit linkage. The follow-up cam returns the hydraulic control valve to null.
- (4) Alternate Power (Fig. 1)
  - (a) The inboard slat drive and the outboard slat drive alternate power is electric. Electric power controlled by switches on the flap/slat alternate drive control module drives two electric motors. The inboard slat power drive unit and the outboard slat power drive unit each have one motor.
  - (b) Each motor has an electromagnetic brake, a torque limiter, and a solenoid actuated clutch. The brake disengages when the motor is energized. The torque limiter protects against system overload.
  - (c) The motor clutch is de-energized during normal hydraulic operation. The clutch engages the motor to the output shaft when the solenoid is energized by arming the alternate drive.

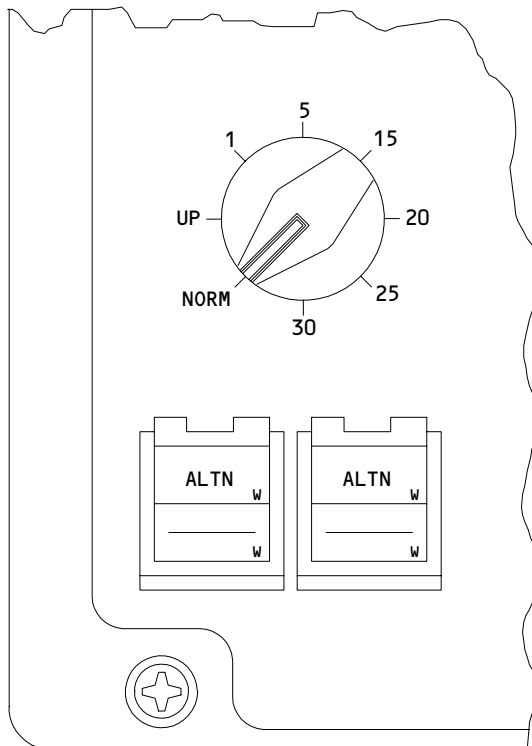
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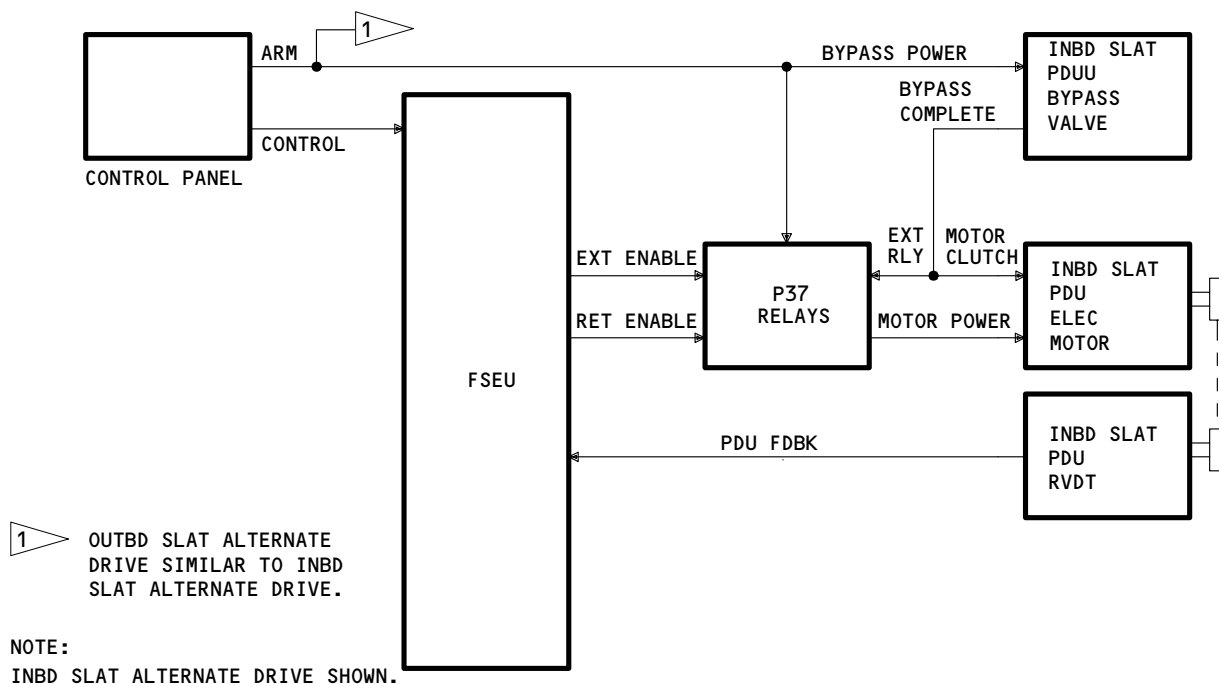
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FIRST OFFICER'S MAIN INSTRUMENT PANEL (P3)



Leading Edge Slat Alternate Control  
Figure 2

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- (5) Drive System (Fig. 1)
  - (a) The inboard and outboard slats are powered by independent power drive units and actuated by independent drives. The drives consist of hollow aluminum drive shafts with couplings or fixed bearing supports at each junction. Offset and angle gearboxes are used to transmit drive shaft rotary power. The offset gearboxes drive two rotary actuators per slat.
  - (b) The Krueger seal flap drive is connected to the outboard rotary actuator for each of the inboard slats.
- (6) FSEU (Fig. 3)
  - (a) The flap/slat electronic unit (FSEU) is on electronic shelf E2 in the main equipment center. The FSEU consists of three physically isolated sections. Replacement of FSEU components is on a failure basis rather than a scheduled or time-controlled basis. No adjustment of the FSEU is required.
  - (b) The FSEU assists in control of leading edge slat functions. For a detailed description of FSEU control of following leading edge slat functions, refer to AMM 27-51-01/001, Flap/Slat Electronics Unit - Description and Operation.
    - 1) Slat position indication on flap/slat position indicator.
    - 2) Slat asymmetry detection, indication and hydraulic shutdown.
    - 3) Slat uncommanded motion (motion without command or motion opposite to command) detection, indication, and hydraulic shutdown.
    - 4) Detection and indication of slat condition when slats do not move when commanded.
    - 5) Slat alternate drive (separate electric motors on inboard and outboard slat PDU's).
    - 6) Slat shutoff valve (in flap/slat shutoff valve module) opening and closure.
  - (c) When an uncommanded motion condition occurs, the LE SLAT DISAGREE message is accompanied by an advisory LE SLAT SHUTDOWN message to confirm that either the inboard or the outboard leading edge slat power drive unit bypass valve has moved to BYPASS.
  - (d) The advisory LE SLAT SHUTDOWN message may appear by itself to indicate that either the inboard or the outboard leading edge slat power drive unit bypass valve is in BYPASS.
  - (e) The advisory LE SLAT SHUTDOWN EICAS message will not appear if an LE SLAT ASYM EICAS message is present.
  - (f) The LE SLAT DISAGREE and LE SLAT ASYM messages are level B EICAS messages and are accompanied by aural caution and illumination of master caution lights.

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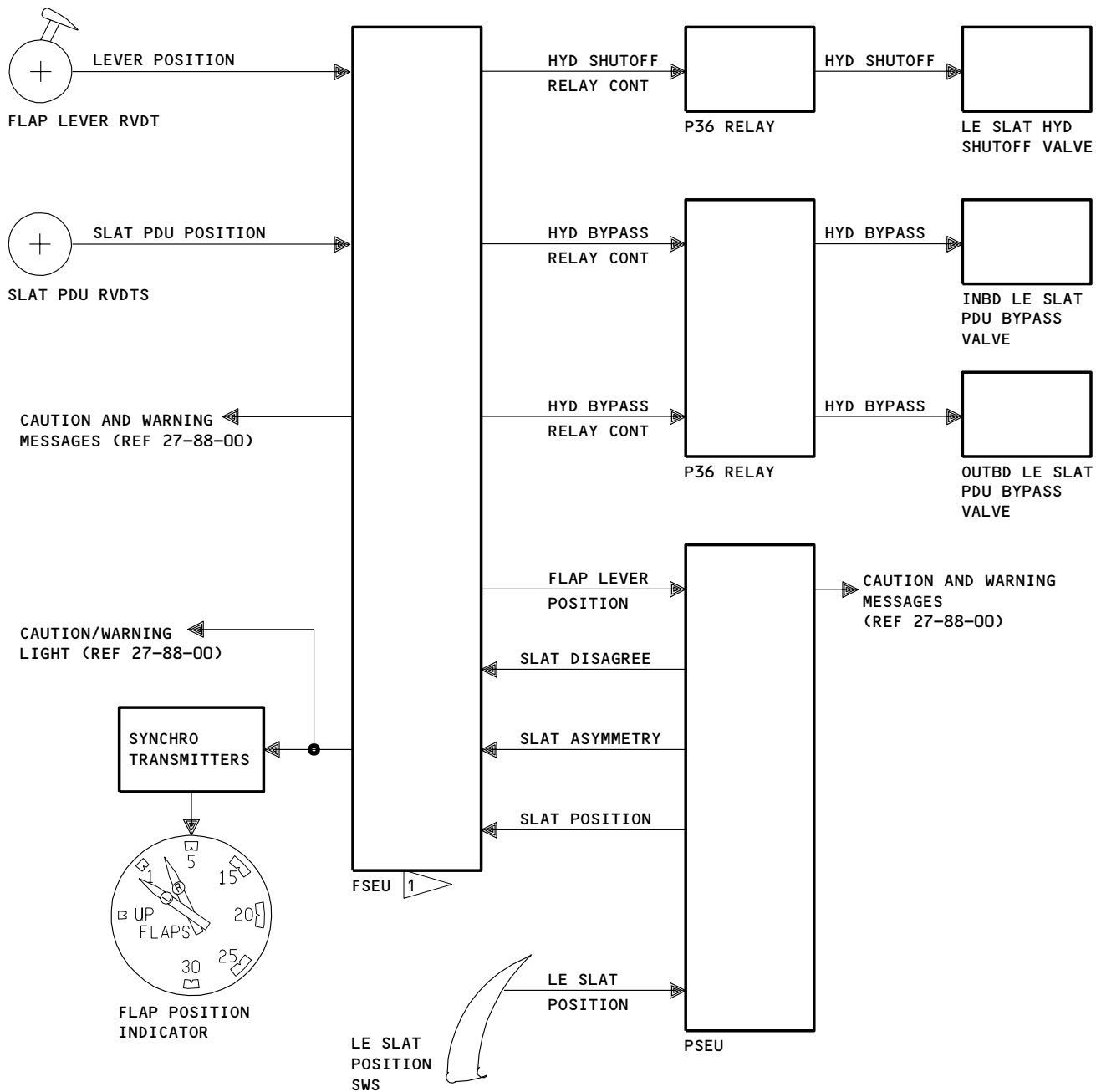
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1 REFER TO 27-51-01, FLAP/SLAT ELECTRONICS UNIT - DESCRIPTION AND OPERATION

Flap/Slat Electronic Unit Schematic  
Figure 3

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## 2. Component Details

### A. Aft Quadrant and Control Components (Fig. 1)

- (1) The slat aft control quadrant serves as the mechanical interface between the flap lever cables and the slat power drive units. The aft quadrant is located on the right side of the fuselage under the main deck compartment floor and just inboard from the inboard slat power drive unit. The aft quadrant can be reached from the aft end of the forward cargo compartment.
- (2) The aft quadrant consists of a dual-grooved pulley. The quadrant has a rig pin hole for rigging of the flap lever cables.
- (3) Inboard Leading Edge Slat Power Drive Unit Input
  - (a) A hollow aluminum drive shaft connected to the slat aft quadrant transmits rotary motion through the side-of-body bearing housing seal to a crank on the outside of the fuselage. The crank transmits linear motion to a non-adjustable control rod, a bellcrank, and an adjustable control rod attached to the pilot input crank on the inboard leading edge slat power drive unit.
- (4) Outboard Leading Edge Slat Power Drive Unit Input
  - (a) Input to the outboard slat power drive unit is the same as input to the inboard slat power drive unit, except that four drive shafts are used to transmit rotary motion from the slat aft quadrant.

### B. PDU and Components (Fig. 4)

- (1) The inboard slat power drive unit (PDU) drives inboard slats No. 6 and 7. The outboard slat power drive unit drives outboard slats No. 1-5 and No. 8-12. The inboard slat power drive unit is located aft of the right wing strakelet and is mounted to the right wing front spar. The outboard slat power drive unit is located aft of the left wing strakelet and is mounted to the left wing front spar. Access to both power drive units is through access panels.
- (2) Each power drive unit consists of a control unit, a hydraulic control valve module with a control valve and a bypass valve, a primary power hydraulic motor, an alternate power electric motor, and a gearbox (Fig. 5). The two power drive units are functionally similar, but not interchangeable.
- (3) Three rig pins are used during maintenance, one in the power drive unit input cam, one in the power drive unit follow-up cam, and one in the input crank to the hydraulic control valve module. Plugs protect the rig pin holes in the input and follow-up cam rig pin holes.
- (4) Power output from either power drive unit may be blocked by installing a ground lock in the gearbox.

### C. PDU Control Units and Components (Fig. 4)

- (1) A control unit is mounted on each power drive unit gearbox. It consists of a pilot input crank and an output crank, input and follow-up cams, cam followers (rollers), and two rotary variable differential transformers (RVDTs) and an RVDT drive from the gearbox.

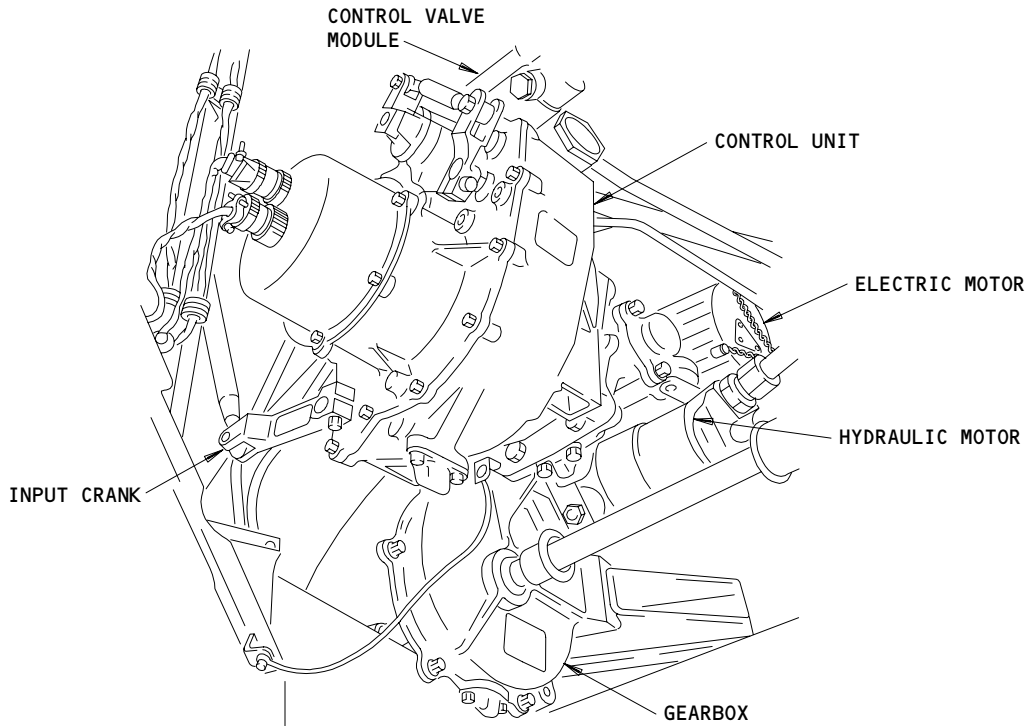
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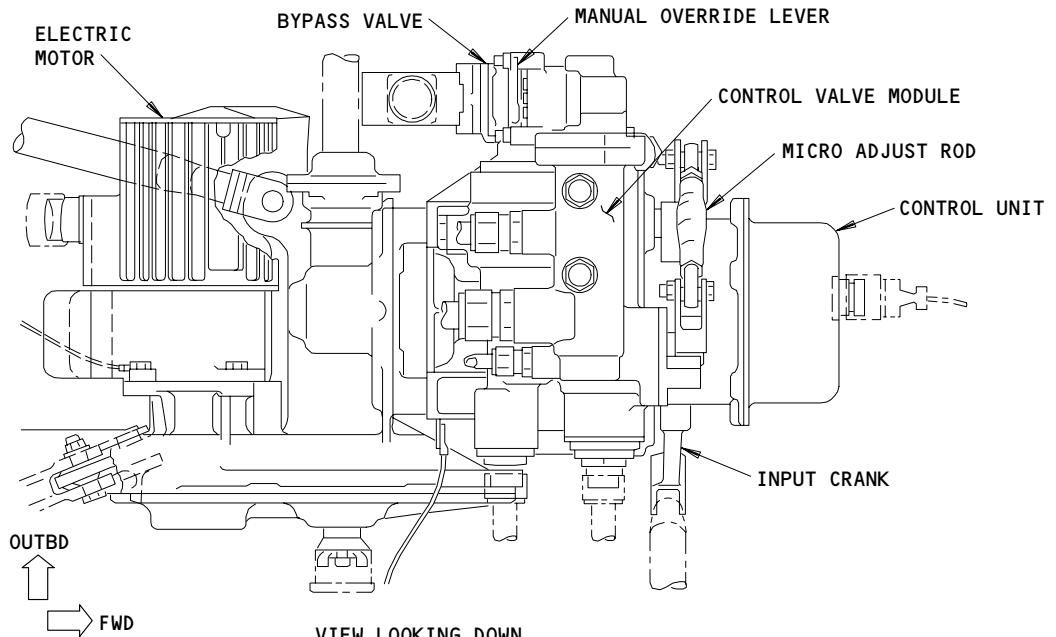
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**OUTBOARD SLAT PDU  
(VIEW LOOKING UP AND INBOARD)**



VIEW LOOKING DOWN  
PARALLEL TO INBD FRONT SPAR

**OUTBOARD LE SLAT POWER DRIVE UNIT**

**LE Slit Power Drive Unit and Components  
Figure 4 (Sheet 1)**

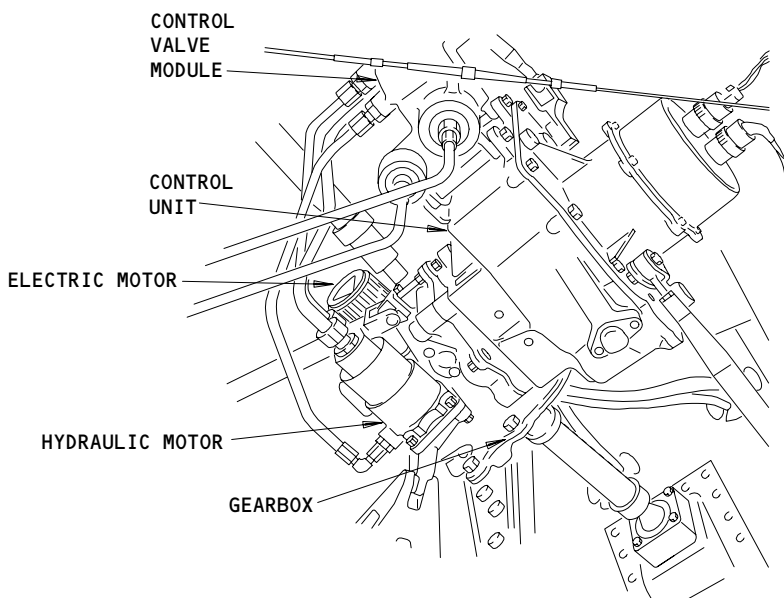
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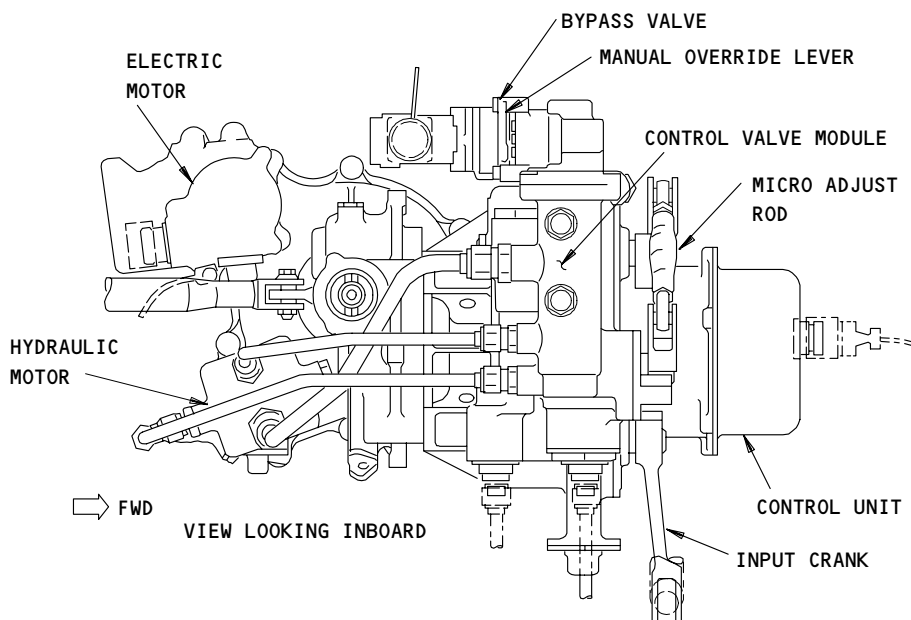
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INBOARD SLAT PDU  
(VIEW LOOKING UP AND INBOARD)



INBOARD LE SLAT POWER DRIVE UNIT

LE Slit Power Drive Unit and Components  
Figure 4 (Sheet 2)

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- (2) The control unit provides the mechanical input to the hydraulic control valve in the hydraulic control valve module, performs mechanical follow-up of the hydraulic control valve, and allows mounting of the RVDTs. An input cam and a follow-up cam rig pin hole with plugs provide rigging capability of the control unit.
- D. PDU Hydraulic Control Valve Module (Fig. 4 and Fig. 12)
- (1) A hydraulic control valve module is mounted on each power drive unit control unit. The control valve module performs the power drive unit hydraulic control functions. Each control valve module consists of a flow regulator, a control valve, and a bypass valve. The center hydraulic system is the source of hydraulic power.
  - (2) The flow regulator maintains a design flow rate to the control valve to ensure a desired leading edge slat rate of travel.
  - (3) The control valve controls the direction of rotation of the hydraulic motor according to input at the control unit pilot input crank. The control valve will shut off hydraulic flow when the slats arrive at their selected position as determined by the control unit follow-up cam.
  - (4) The bypass valve is electric-motor operated and serves to bypass hydraulic power when the slats alternate drive is armed and when slat asymmetry or slat uncommanded motion occurs. The bypass valve can also be operated manually by a lever. The bypass mode of the valve is indicated by Position 1. The normal mode is indicated by Position 2.
- E. PDU Hydraulic Motor (Fig. 4 and Fig. 12)
- (1) A hydraulic motor is installed on the gearbox of each slat power drive unit for primary power to drive the slats.
  - (2) Operation of the hydraulic motor will turn the gears in the gearbox and rotate the drive shafts to the slats. Direction of rotation of the hydraulic motor is controlled by the control valve in the hydraulic control valve module.
  - (3) The inboard and outboard slat power drive unit hydraulic motors require 6 GPM at 2620 RPM and 14 GPM at 2080 RPM respectively.
- F. PDU Electric Motor (Fig. 4 and Fig. 13)
- (1) An electric motor is installed on the gearbox of each slat power drive unit. The motor is for alternate power to drive the slats.
  - (2) Operation of the motor turns the gears in the gearbox. The gearbox rotates the drive shafts to the slats. Direction of rotation of the motor is controlled by the flap/slat position selector switch. The switch is on the flap/slat alternate drive control module.
  - (3) Each motor operates from 115-vac, 3-phase, 400-Hz power. Motor speed is 275 RPM.
  - (4) Each motor has the following: an electromagnetic brake (disengages when the motor is energized), a torque limiter (for protection against system overload), and a solenoid actuated clutch (de-energized during normal hydraulic operation). The clutch engages the motor to the output shaft when the solenoid is energized by a circuit activation through a switch in the hydraulic bypass valve. The switch is closed when the alternate drive is armed.

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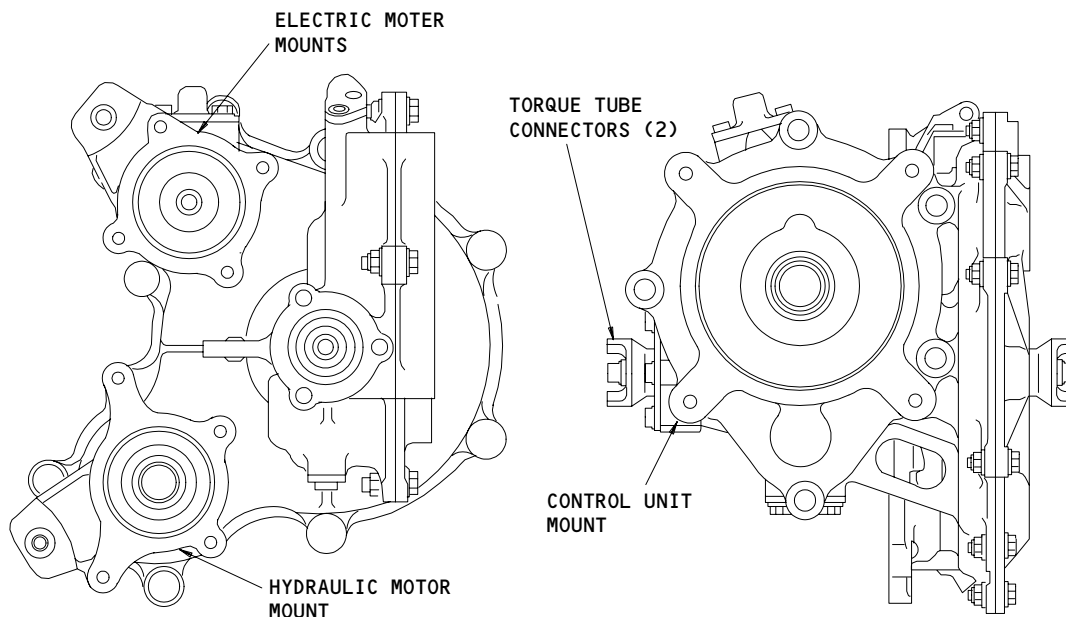
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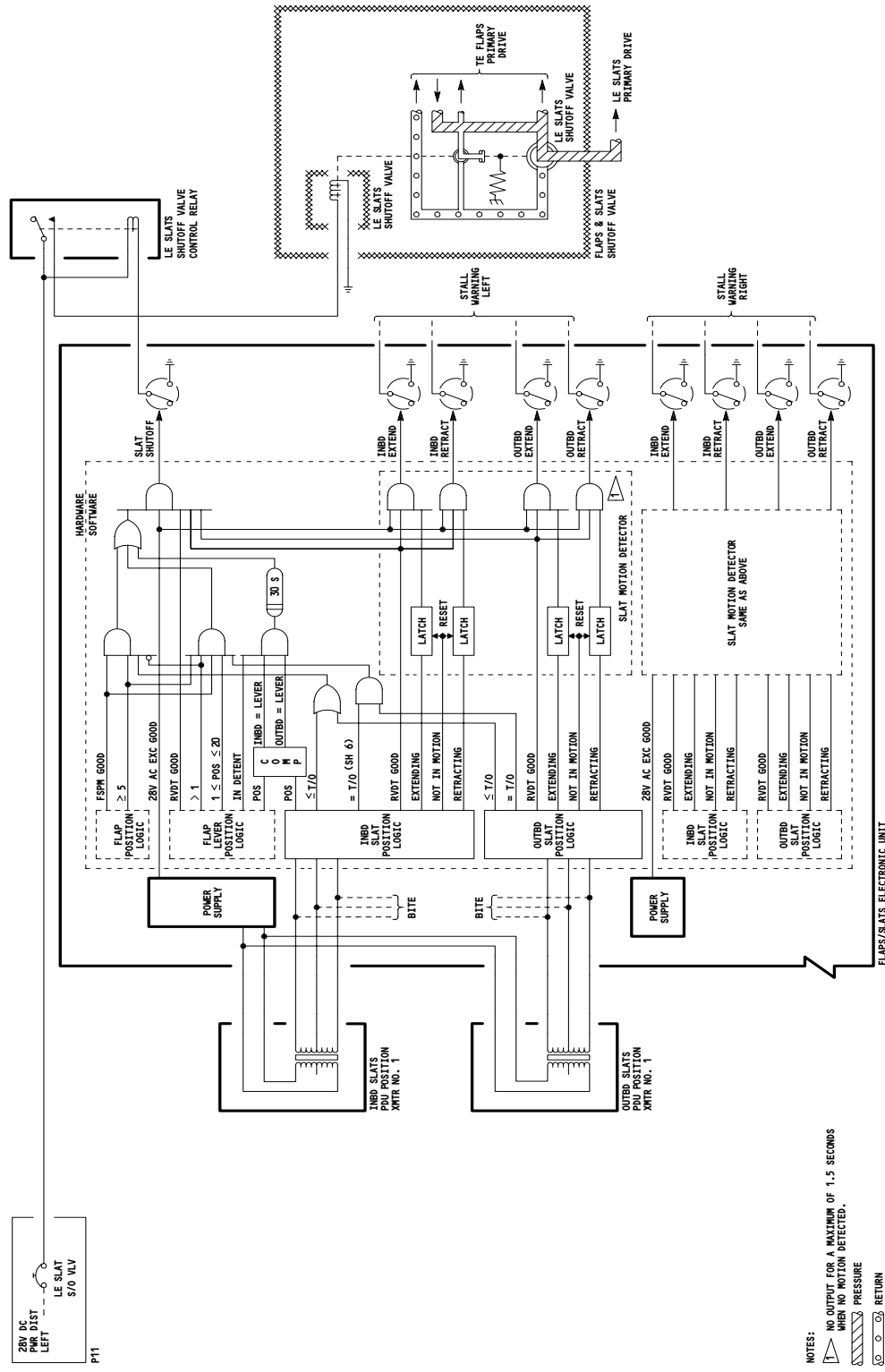
- (5) The clutch circuit must be activated before electric motor drive power is available.
- G. PDU Mechanical Drive (Fig. 5)
- (1) Hydraulic or electric power is converted to mechanical power by the gearbox on each slat power drive unit.
  - (2) On each slat power drive unit the hydraulic motor, the electric motor, and the control unit are mounted directly on the gearbox. The gearbox rotates the drive shafts to the slats.
  - (3) The gearbox output drives the rotary variable differential transformers (RVDTs) in the control unit on each slat power drive unit.
- H. Flaps/Slats Hydraulic Shutoff Valve Module (Fig. 6)
- (1) The flaps/slats hydraulic shutoff valve module is on the aft wall of the right main gear wheel well. Center hydraulic system power flows through the module. The main elements of the module are: A priority valve, a flow regulator, a shutoff valve for the flaps, and a shutoff valve for the slats. The priority valve is hydraulic pressure-operated.
  - (2) The solenoid-operated shutoff valves are energized closed. The slat valve closes when the slats are at their commanded position. The slat valve will also close if the flaps are not fully retracted when the flap lever is positioned from the 1-unit detent to the zero (FLAPS UP) detent. The solenoid gets its control signals from the flap/slat electronic unit (FSEU).



Leading Edge Slat Power Drive Unit Gearbox  
Figure 5

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NOTES:  
 NO OUTPUT FOR A MAXIMUM OF 1.5 SECONDS WHEN NO MOTION DETECTED.  
 PRESSURE  
 RETURN

LE Slat System Shutoff Valve Schematic Figure 6

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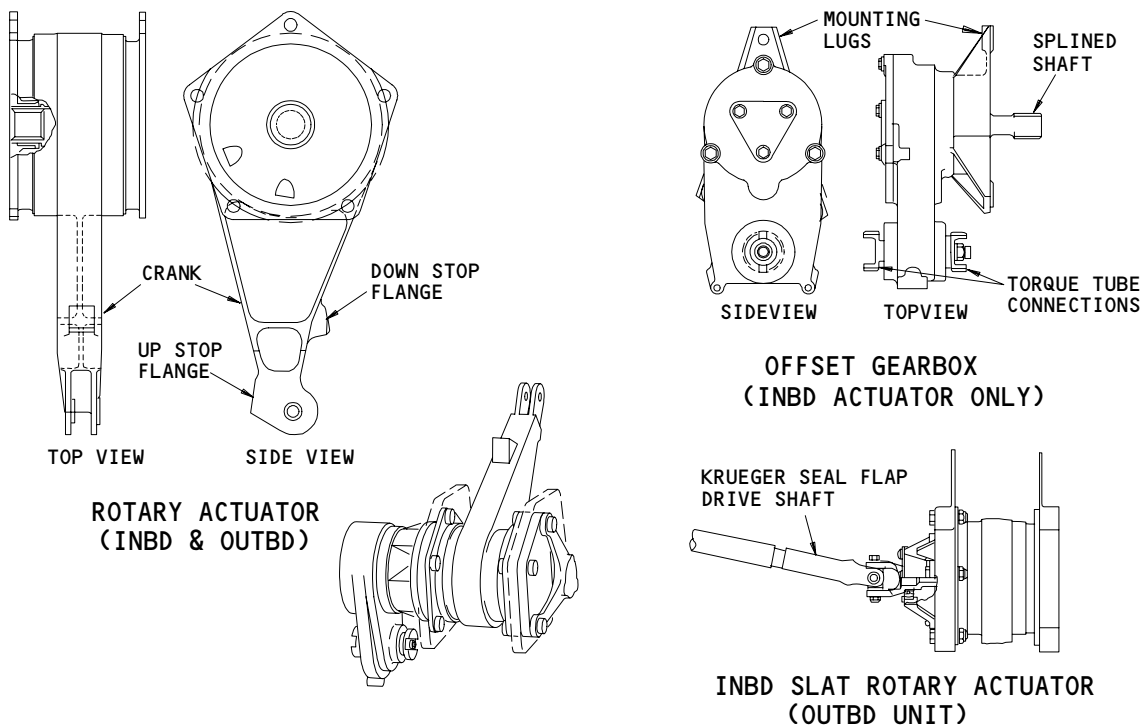
- (3) The solenoid operated shutoff valves are spring-loaded to open. The valves open when electrical power is removed.
- (4) A slat pressure switch is installed downstream of the slat hydraulic shutoff valve. The switch monitors the status of the slat shutoff valve, and provides feedback to the FSEU.

**I. Drive Components (Fig. 1)**

- (1) The slats drive and components extend left and right from the inboard and outboard slat power drive units along the leading edge of both wings. The drive is directly forward of the wing front spar and is mounted to it. The drive components consist of drive shafts, angle gearboxes, offset gearboxes, and rotary actuators which operate the slats by control rods.

**J. Inbd. L.E. Slat Gearboxes and Rotary Actuators (Fig. 7)**

- (1) Angle gearboxes are used in the inboard slat drive. The angle gearboxes change drive shaft alignment. Alignment is changed through bevel gears. Input to the gearboxes is by shafts. The shafts mate with splined couplings. The body angle gearbox has a drain cover. The side-of-body angle gearboxes have an inspection hole cover.



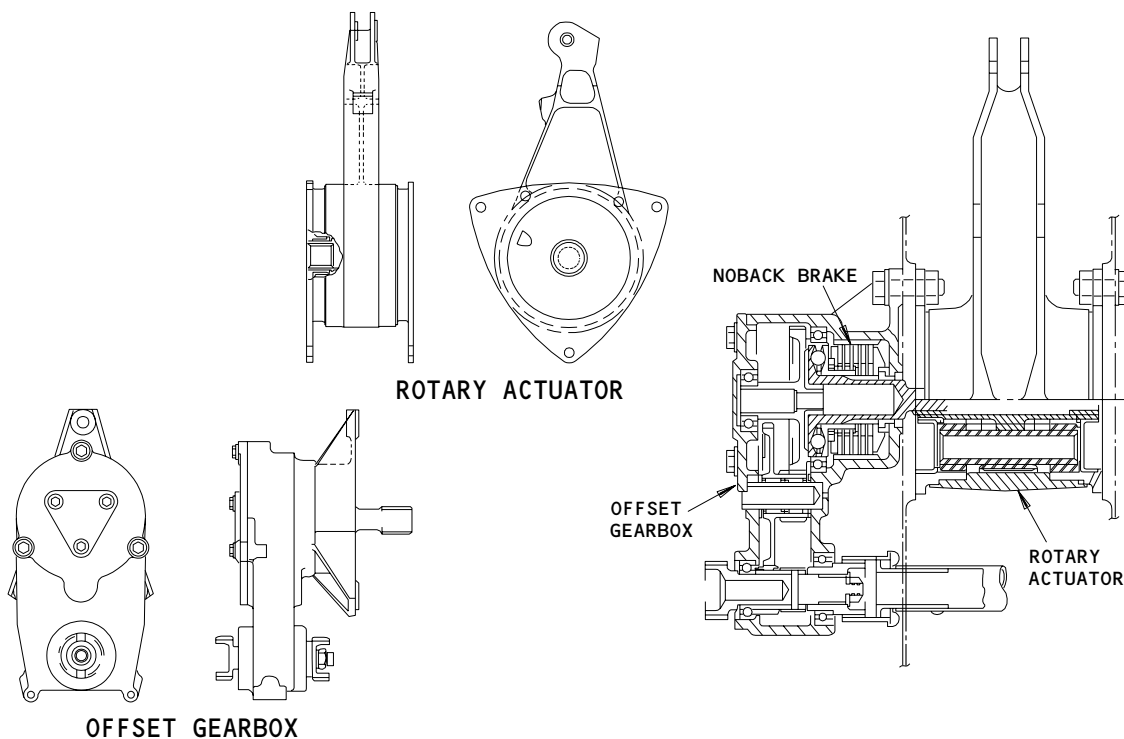
**Inboard Leading Edge Slat Offset Gearboxes and Rotary Actuators  
Figure 7**

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- (2) Each inboard slat uses two offset gearbox/rotary actuator units. The units drive the slat. Torque is amplified through reduction gearing. The irreversible units will hold the slat in position with the input disconnected for an indefinite period. Input to the offset gearbox is at either end by a through shaft. The shaft mates with splined couplings. The offset gearbox no-back brake prevents air loads and system overloads from driving the system.
  - (3) Offset gearbox/rotary actuator output is a crank arm. The crank arm is on the rotary actuator. Output rotation is opposite to input rotation. An open shield vent is in the lower section of the rotary actuator.
  - (4) The static and dynamic joints of the angle gearboxes, the offset gearboxes, and the rotary actuators have seals. The seals help to keep in lubricant and to prevent entry by contaminants.
- K. Outbd. L.E. Slat Gearboxes and Rotary Actuators (Fig. 8)
- (1) Angle gearboxes are used in the outboard slat drive. The angle gearboxes change drive shaft alignment. Alignment is changed through bevel gears. Input to the gearboxes is by shafts. The shafts mate with splined couplings. The outboard angle gearbox has a drain cover. The side-of-body angle gearboxes have an inspection hole cover.



Offset Gearbox  
Rotary Actuator  
Outboard Leading Edge Slat Offset Gearboxes and Rotary Actuators  
Figure 8

EFFECTIVITY	
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- (2) Each outboard slat uses two offset gearbox/rotary actuator units. The units drive the slat. Torque is amplified through reduction gearing. The irreversible units will hold the slat in position with the input disconnected for an indefinite period. Input to the offset gearbox is at either end by a through shaft. The shaft mates with splined couplings. The offset gearbox no-back brake prevents air loads and system overloads from driving the system.
  - (3) Offset gearbox/rotary actuator output is a crank arm. The crank arm is on the rotary actuator. Output rotation is opposite to input rotation. An open shield vent is in the lower section of the rotary actuator.
  - (4) The static and dynamic joints of the angle gearboxes, the offset gearboxes, and the rotary actuators have seals. The seals help to keep in lubricant and to prevent entry by contaminants.
- L. Inbd. L.E. Slat Control Surface Drive and Tracks (Fig. 9)
- (1) The drive shafts extending left and right from the inboard slat power drive unit are of hollow aluminum construction. The shafts are held in place by idler bearings. Three types of shafts are used:
    - (a) Drive shafts with splined couplings at both ends.
    - (b) Drive shafts with a splined coupling at one end and a fixed bearing support at the other end.
    - (c) Drive shafts with fixed bearing supports at both ends.
  - (2) Safety straps for the drive shafts are used throughout the slat drive.
  - (3) Ribs attached to the wing front spar provide structural support for the offset gearbox/rotary actuator units and for an extend stop and a retract stop. Each rotary actuator arm drives an adjustable control rod attached to the slat. Each slat is driven by two rotary actuators.

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (4) The main tracks and the auxiliary tracks provide the cam programming for the main track rollers and the auxiliary track rollers.
  - (5) Each slat is supplied with an alignment fitting.
- M. Outbd. L.E. Slat Control Surface Drive and Tracks (Fig. 10)
- (1) The drive shafts extending left and right from the outboard slat power drive unit are of hollow aluminum construction. The shafts are held in place by idler bearings. Three types of shafts are used:
    - (a) Drive shafts with splined couplings at both ends.
    - (b) Drive shafts with a splined coupling at one end and a fixed bearing support at the other end.
    - (c) Drive shafts with fixed bearing supports at both ends.

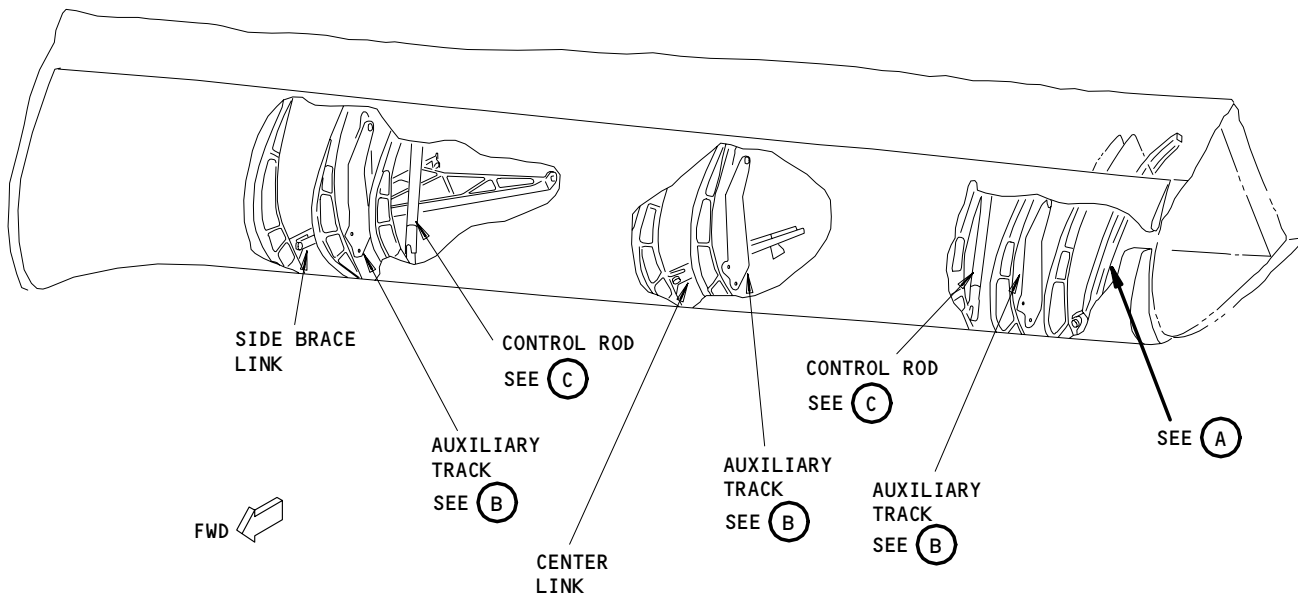
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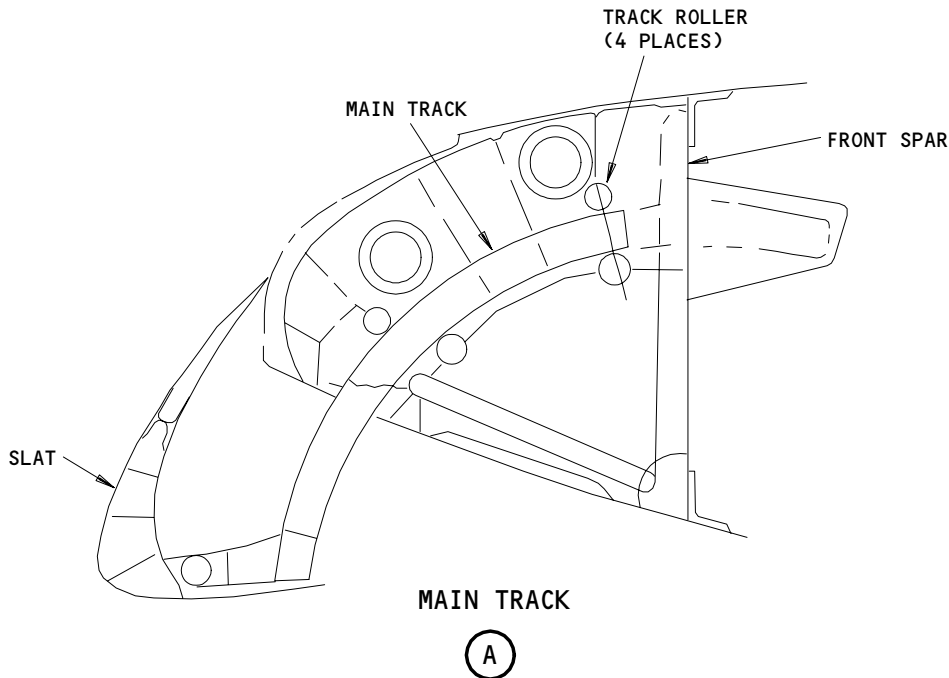
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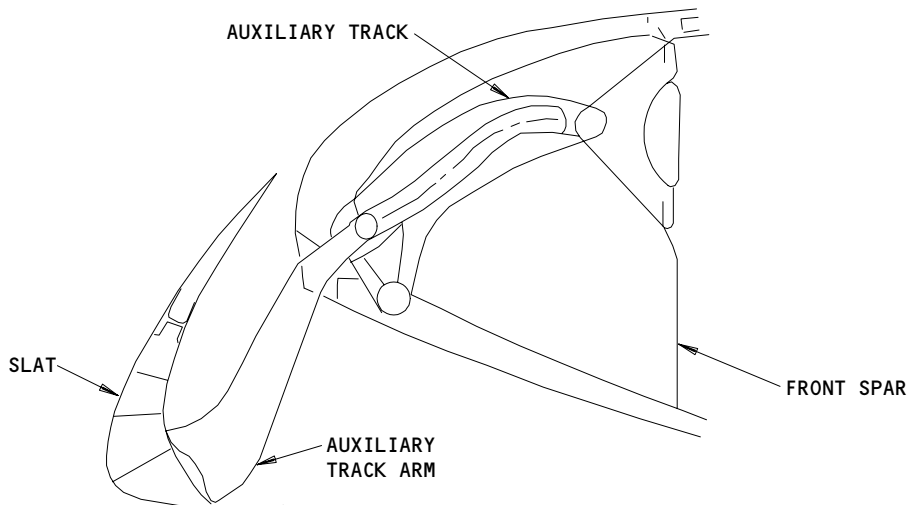
LEFT INBOARD SLAT NO. 6  
(RIGHT INBOARD SLAT NO. 7 OPPOSITE)



Inboard LE Slat Control Surface Drive and Tracks  
Figure 9 (Sheet 1)

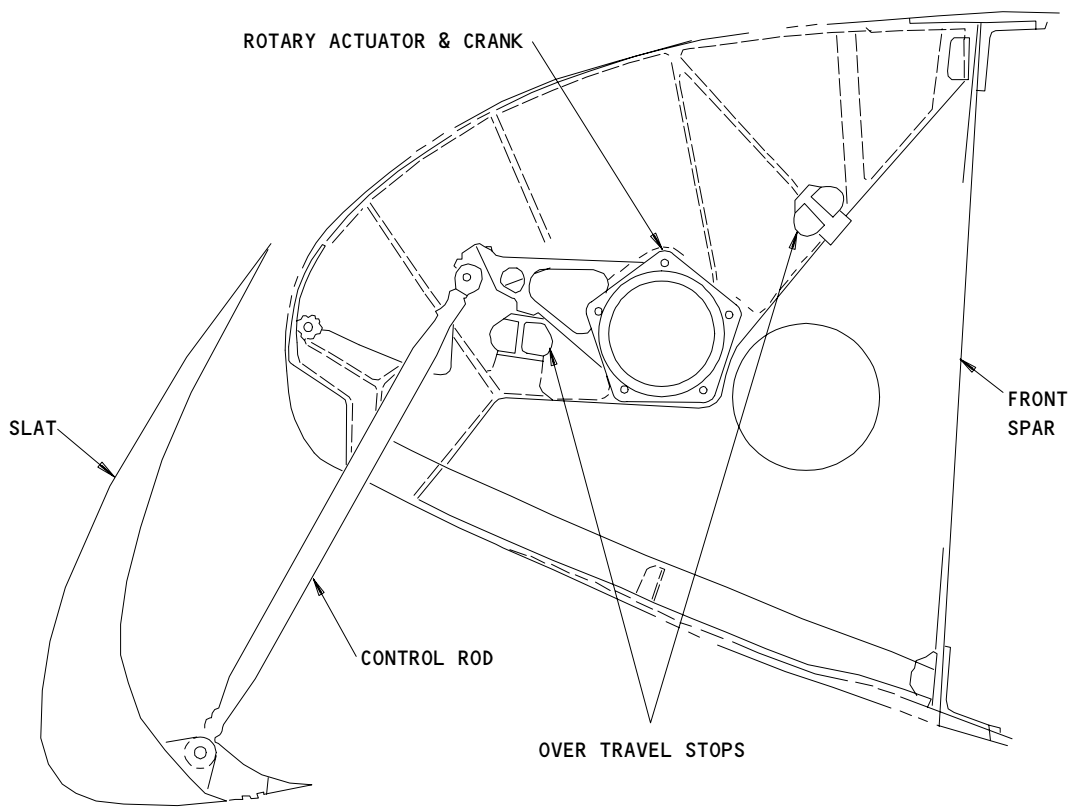
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AUXILIARY TRACK (THREE PLACES)

(B)



ROTARY ACTUATOR DRIVE (TWO PLACES)

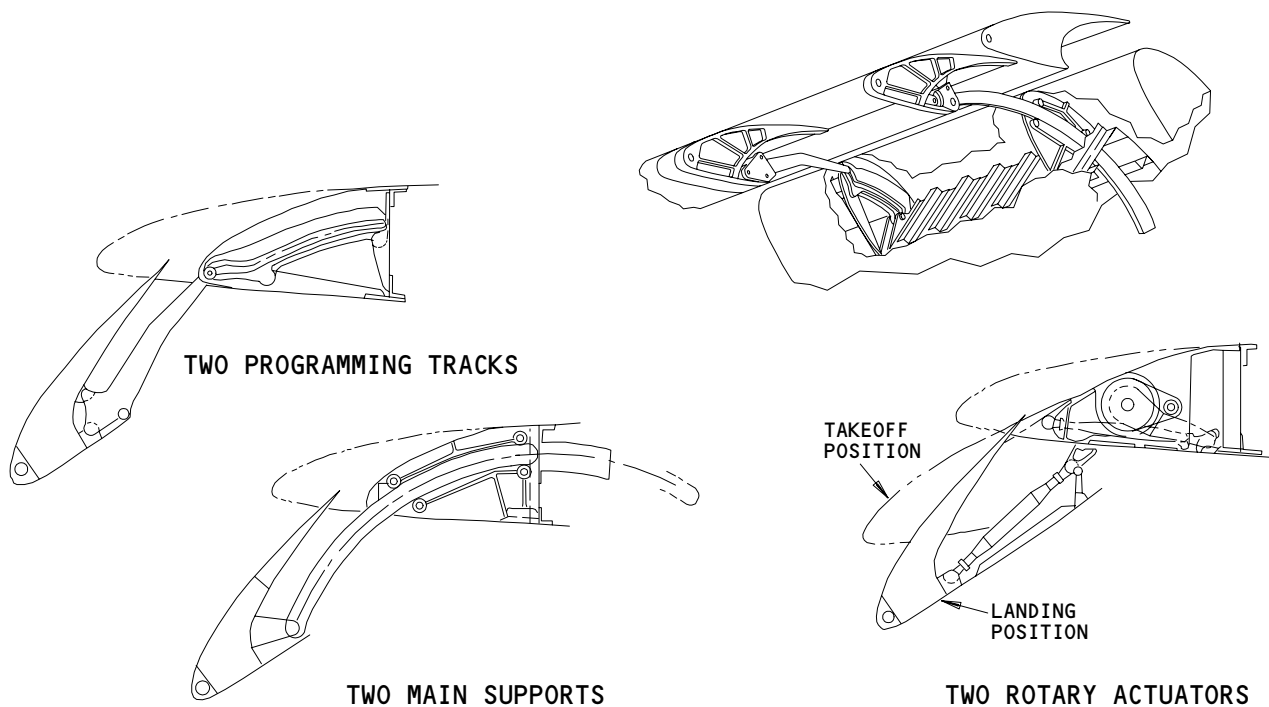
(C)

Inboard LE Slat Control Surface drive and Tracks  
Figure 9 (Sheet 2)

EFFECTIVITY	
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- (2) Safety straps for the drive shafts are used throughout the slat drive.
  - (3) Ribs attached to the wing front spar provide structural support for the offset gearbox/rotary actuator units and for an extend stop and a retract stop. Each rotary actuator arm drives an adjustable control rod attached to the slat. Each slat is driven by two rotary actuators.
  - (4) The main tracks and the auxiliary tracks provide the cam programming for the main track rollers and the auxiliary track rollers. One rig pin is used during maintenance at each auxiliary track to check slat preload.
  - (5) Each slat is supplied with an alignment fitting.
- N. Slat Seals
- (1) Aerodynamic seals are provided to reduce drag.
- O. Krueger Seal Flap Drive (Fig. 11)
- (1) The Krueger seal flap consists of a seal door and a bull nose. During extension of the flap, the seal door drives the bull nose by a separate linkage between the seal door and the bull nose. The flap seals the inboard slat to the nacelle and reduces interference drag.



Outboard Leading Edge Slat Control Surface Drive and Tracks  
Figure 10

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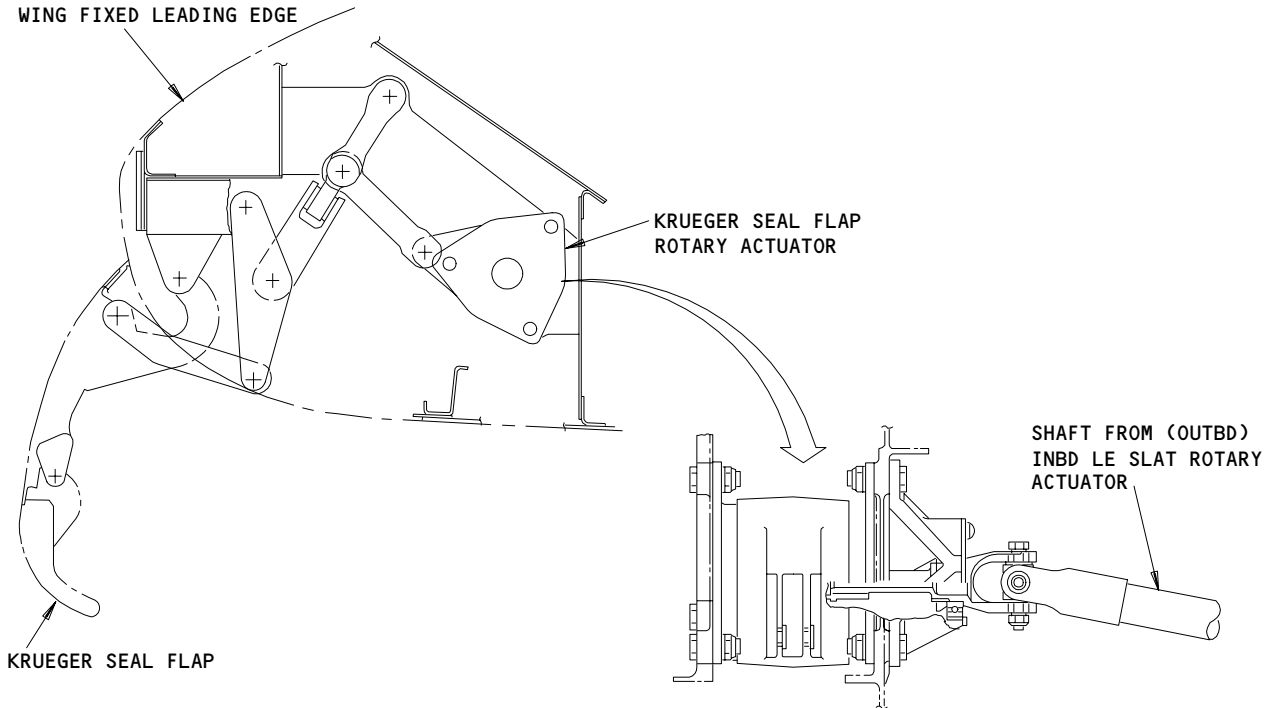
- (2) The Krueger seal flap drive consists of linkage and a rotary actuator between the outboard rotary actuator of the inboard slat and the flap seal door.
- (3) The outboard rotary actuator of the inboard leading edge slat turns a drive shaft with universal joints at both ends. Rotation of the drive shaft drives the Krueger seal flap rotary actuator. The rotary actuator output arm drives a set of linkages connected to the flap.

3. Operation

A. Functional Description

(1) Primary Function (Fig. 12)

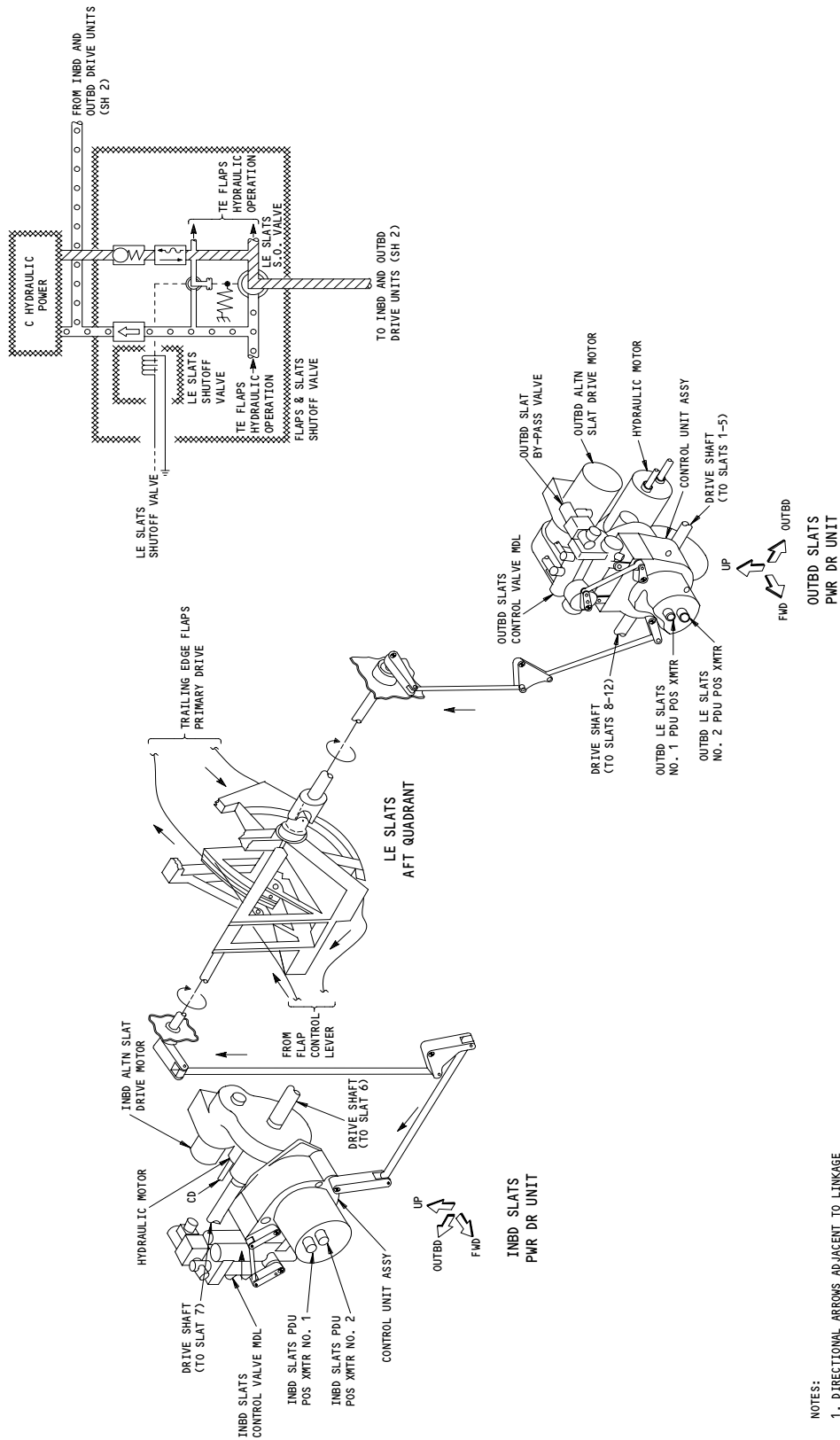
- (a) The flap lever on the control stand positions the flap cables. The slat aft quadrant is connected to the flap cables. When the flap lever is moved, the flap cables move and the slat aft quadrant rotates. The slat aft quadrant rotates a set of drive shafts on both sides of the quadrant.



Krueger Seal Flap and Krueger Seal Flap Drive  
Figure 11

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NOTES:  
 1. DIRECTIONAL ARROWS ADJACENT TO LINKAGE AND CABLES INDICATE SLATS DOWN MOTION.

PRESSURE  
 RETURN

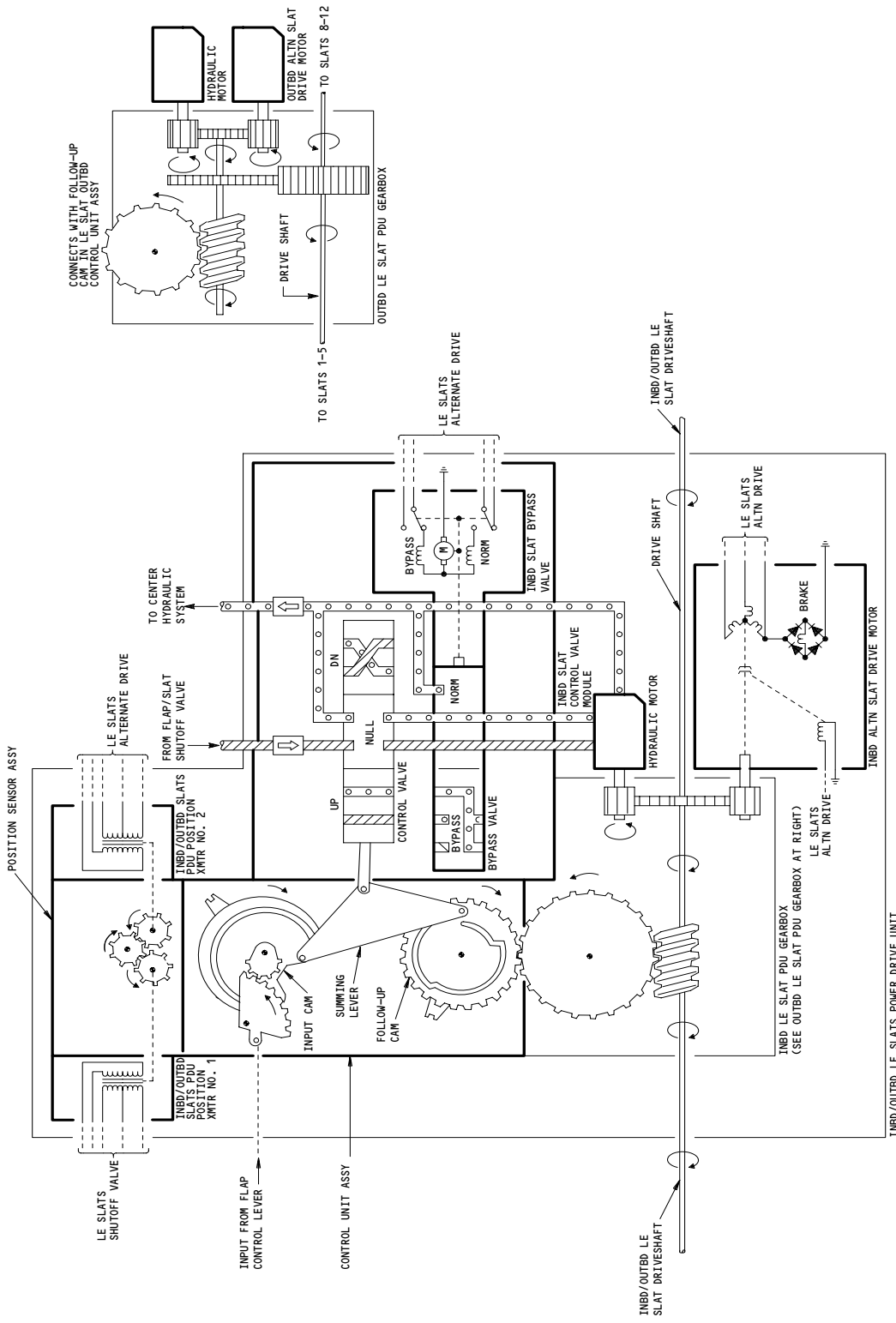
LE Slat System Primary Drive Schematic  
 Figure 12 (Sheet 1)

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LE Slat System Primary Drive Schematic  
Figure 12 (Sheet 2)

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- (b) Inboard Leading Edge Slat Power Drive Unit (PDU)
  - 1) Drive shaft rotation on the right side of the slat aft quadrant is translated to linear motion by means of a crank, a non-adjustable control rod, a bell crank, and an adjustable control rod.
  - 2) The adjustable control rod rotates the pilot input crank on the PDU. An input cam in the PDU control unit is linked to the hydraulic control valve in the hydraulic control valve module.
  - 3) The hydraulic control valve responds to a pilot input and transmits center hydraulic system power to the hydraulic motor. The hydraulic control valve is closed by summing action of the follow-up cam in the PDU control unit.
- (c) Outboard Leading Edge Slat Power Drive Unit (PDU)
  - 1) Control of the outboard slat PDU is the same as the inboard slat PDU. The drive shafts on the left side of the slat aft quadrant control the outboard slat PDU.
- (d) Leading Edge Slat Hydraulic Shutoff Valve
  - 1) Slat position signals from the PDU RVDTs and a flap lever detent signal are sent to the flap/slat electronic unit (FSEU). When there is disagreement present within the FSEU, the FSEU responds by opening the slat hydraulic shutoff valve power circuit. This opens the spring-loaded valve. When there is agreement present within the FSEU for 30 seconds or more, the FSEU responds by closing the slat hydraulic shutoff valve power circuit. This closes the solenoid-operated valve.
  - 2) FSEU control logic will also close the slat hydraulic shutoff valve if the flaps are not fully retracted when the flap lever is in the 1-unit detent or is positioned from the 1-unit detent to the zero (FLAPS UP) detent and the flaps are not fully retracted.
- (2) Alternate Function-Inbd. and Outbd. Slats (Fig. 13)
  - (a) The inboard and outboard PDU electric motors operate on 115 vac, 3-phase, 400 Hz power. The arming and control circuits operate on 28vdc power.
  - (b) Pressing the slat alternate drive arming switch arms the inboard and outboard slat alternate drives (switch lights up ALTN) as follows:
    - 1) The alternate inboard and outboard slat circuits are activated to make electric motor drive power available.
    - 2) The bypass valve in the inboard and outboard PDU control valve modules go to bypass (closed), shutting off center hydraulic system power supply to the inboard and outboard PDU hydraulic motors.
    - 3) The inboard and outboard PDU electric motor clutch solenoids are activated. This engages the motors and the output shafts.

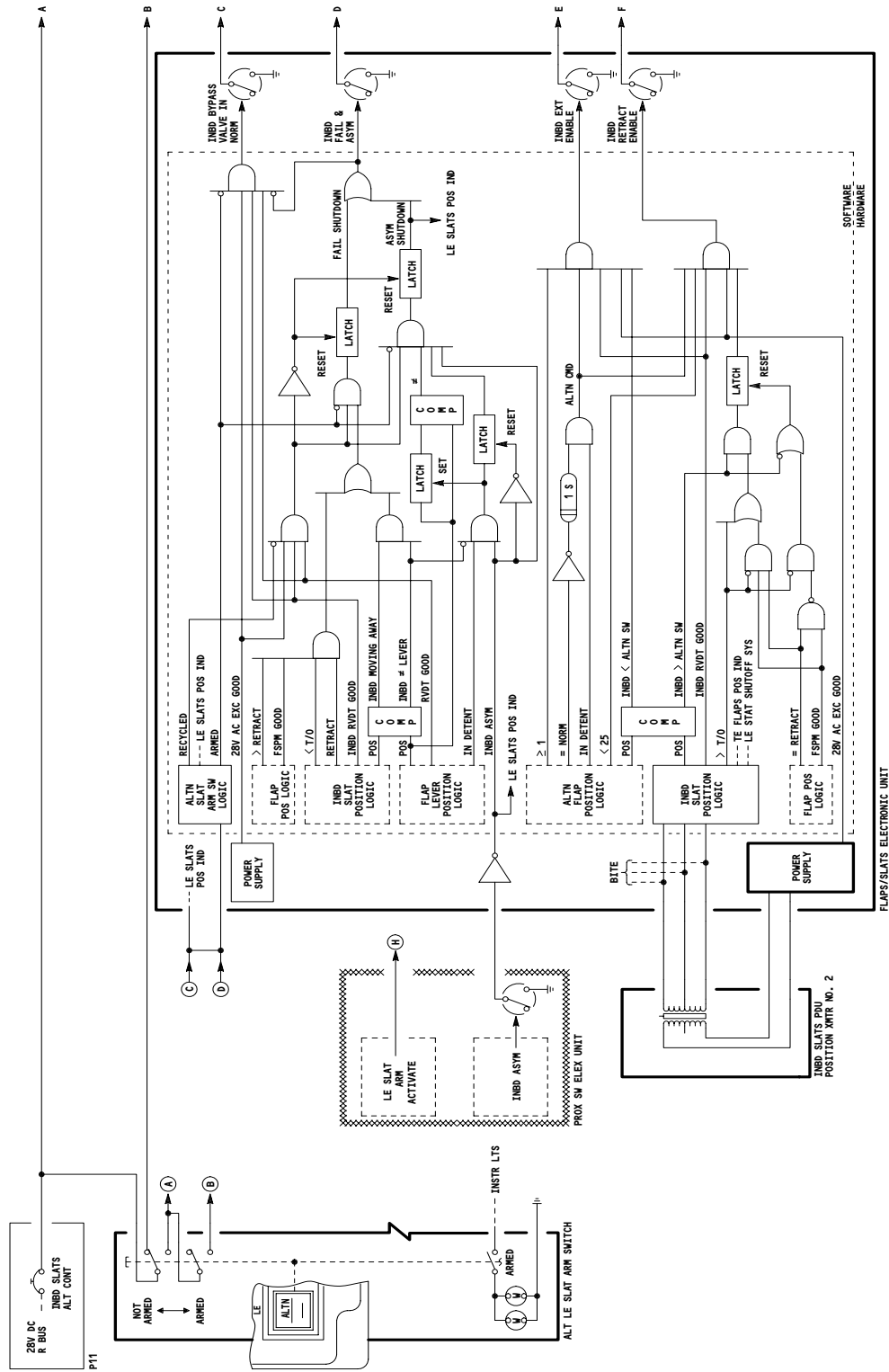
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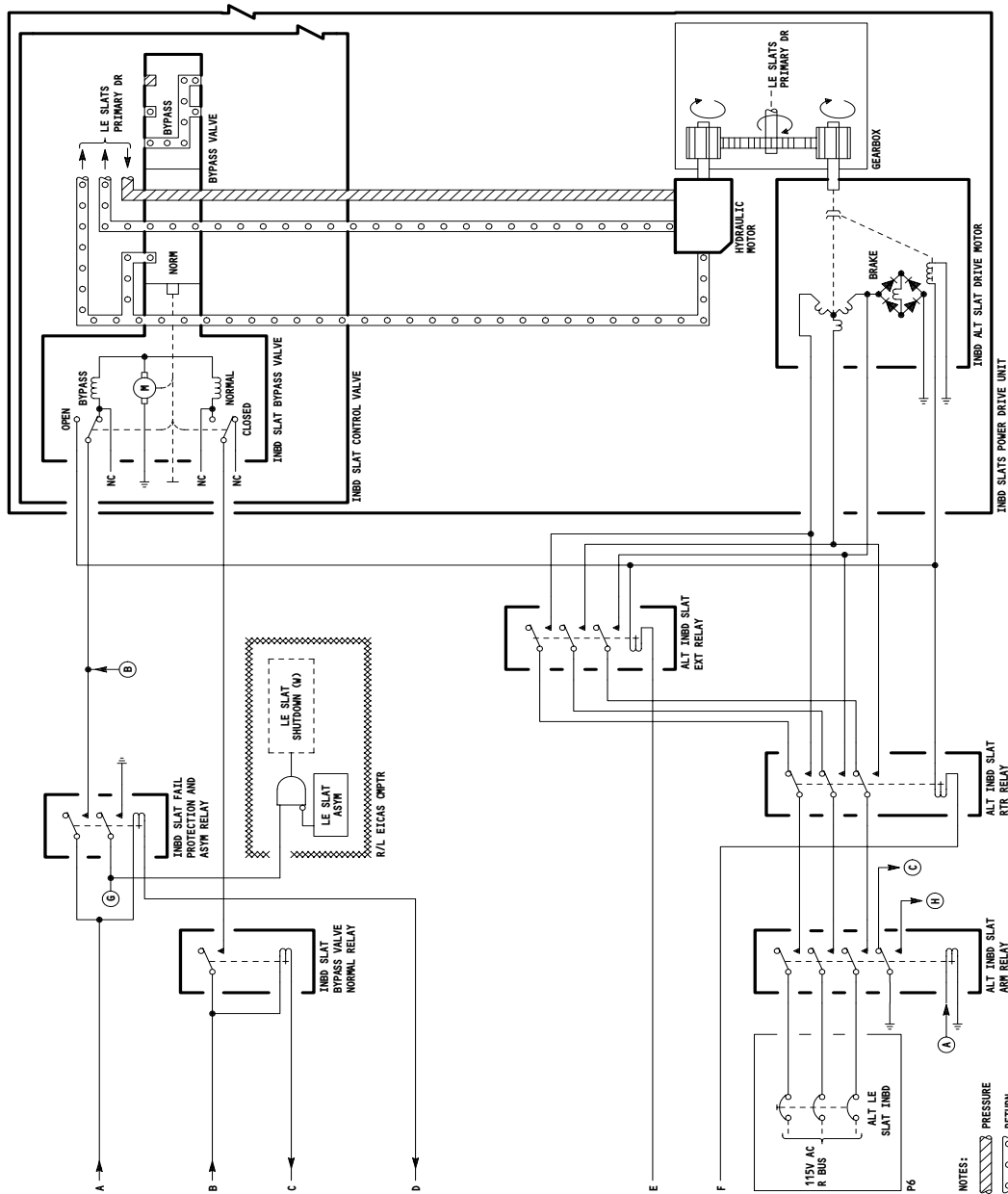
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Leading Edge Slat Alternate Control Function and Failure Protection  
Figure 13 (Sheet 1)

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Leading Edge Slat Alternate Control Function and Failure Protection  
Figure 13 (Sheet 2)

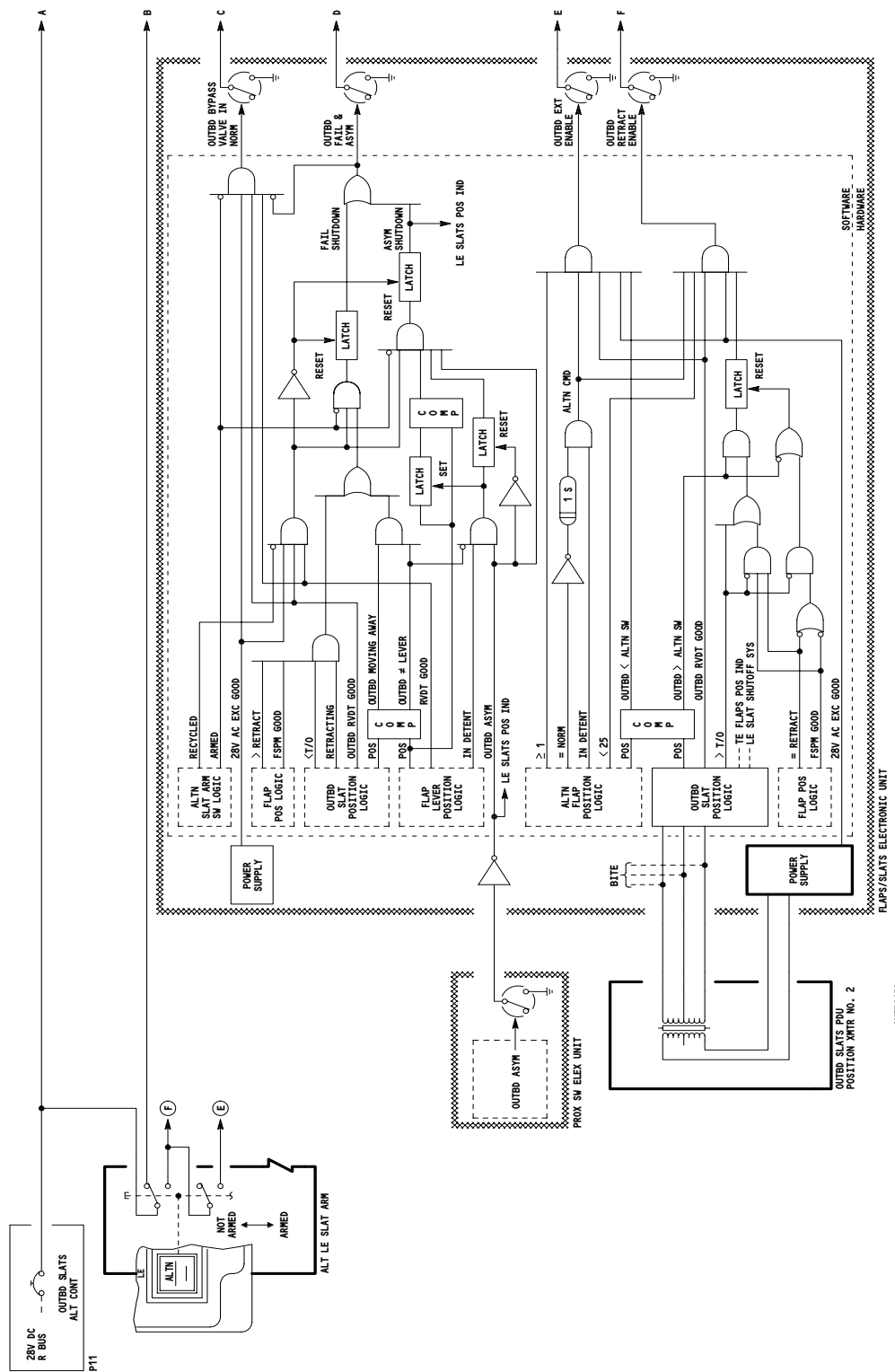
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Leading Edge Slat Alternate Control Function and Failure Protection  
Figure 13 (Sheet 3)

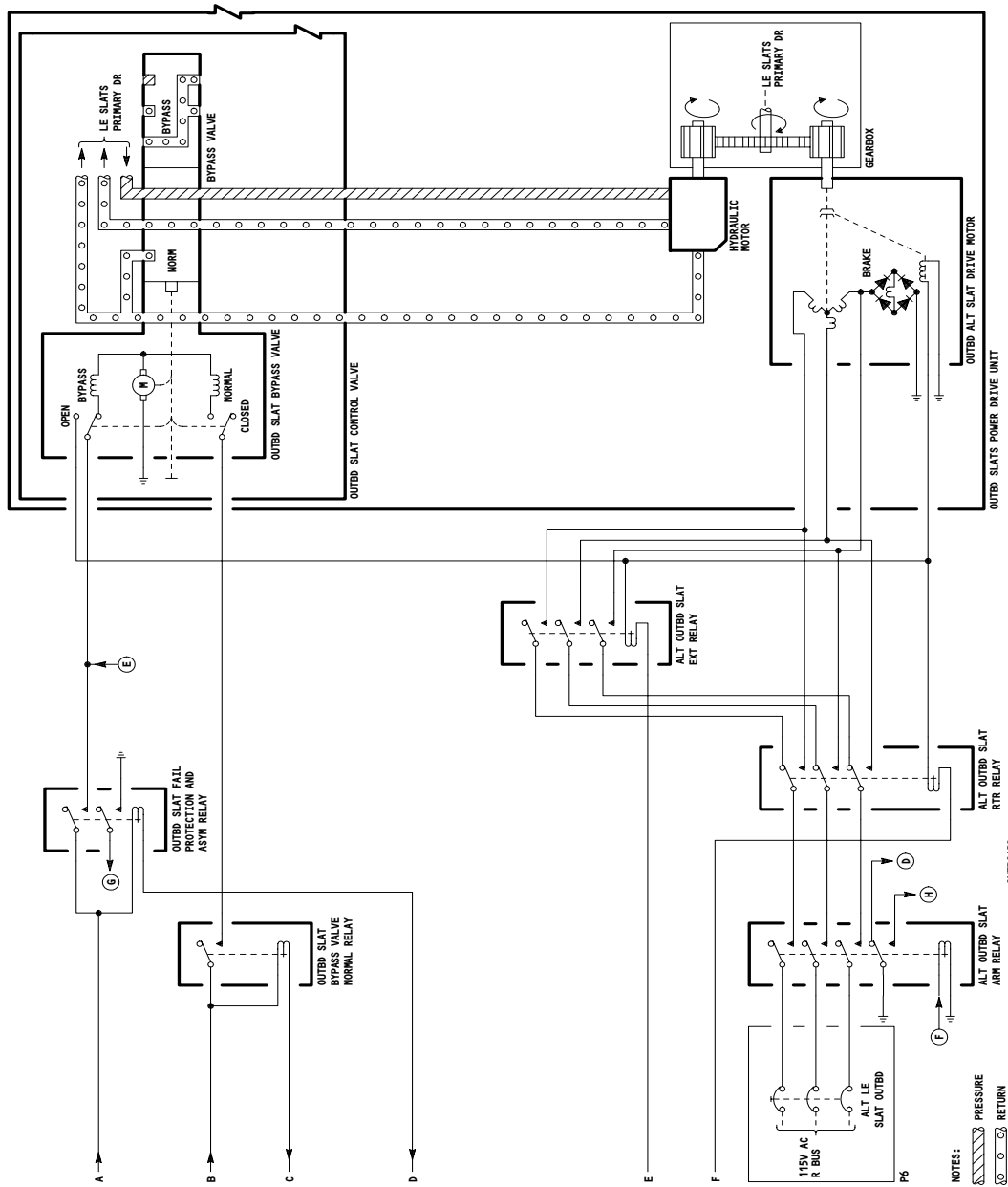
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Leading Edge Slat Alternate Control Function and Failure Protection  
Figure 13 (Sheet 4)

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- 4) The amber LEADING EDGE light on P3 and the LE SLAT DISAGREE message in EICAS display come on if the alternate flaps/slats position selector switch is left in the NORM position for more than seven seconds.
- (c) An extend signal to the inboard and outboard slats is given by placing the alternate flaps/slats position selector switch (P3) out of the NORM and UP detents. Placing the selector switch out of NORM causes the amber LEADING EDGE light and LE SLAT DISAGREE message to go out. The extend signal is sent to the flap/slat electronic unit. FSEU logic powers the alternate inboard and outboard slat circuits to allow electric motor drive power to drive the inboard and outboard PDU motors after brake is released. When the inboard and outboard slats are in the commanded position as determined by the No. 2 RVDTs on the inboard and outboard leading edge slat power drive units, the FSEU logic shuts off electric motor drive power in the alternate inboard and outboard slat circuits. The inboard and outboard PDU electric motors are turned off and brake is applied.
- (d) When the alternate flaps/slats position selector switch is selected to retract the inboard and outboard slats, the circuits operate the same as for extension. The FSEU retract logic and the alternate inboard and outboard slat retract circuits are used in this case. Placing the selector switch in NORM causes the amber LEADING EDGE light and LE SLAT DISAGREE message to come on.
- (e) The slat alternate drive arming switch is pressed to disarm the inboard and outboard slat alternate drives (switch light, amber LEADING EDGE light and LE SLAT DISAGREE message go out). Then the inboard and outboard PDU electric motor clutches are disengaged and the inboard and outboard PDU bypass valves open. This makes center hydraulic system power available to the inboard and outboard PDU hydraulic motors.
- (3) L.E. Slat Drive - Inbd. (Fig. 1)
- (a) The gearbox on the inboard slat power drive unit is driven by the hydraulic motor or the electric motor. Drive shafts extend from the left and right sides of the gearbox. The drive shafts are rotated by the gearbox.
- (b) Rotation of the drive shafts on the right side is transmitted through a side-of-body angle gearbox to two offset gearboxes. Each offset gearbox drives a rotary actuator. The arm on each rotary actuator connects to a control rod. The control rods drive slat No. 7.
- (c) Rotation of the drive shafts on the left side is transmitted through the right-side body seal, an angle gearbox, the left-side body seal, a side-of-body angle gearbox to two offset gearboxes. Each offset gearbox drives a rotary actuator. The arm on each rotary actuator is connected to a control rod. The control rods drive slat No. 6.

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- (4) L.E. Slat Drive - Outbd. (Fig. 1)
  - (a) The outboard slat drive function is similar to the inboard slat drive function. The outboard slat drive operates from the outboard slat power drive unit. The outboard slats are No. 1-5 on the left side and No. 8-12 on the right side.
- (5) Krueger Seal Flap Drive (Fig. 1)
  - (a) The left Krueger seal flap is driven by a rotary actuator and linkage from the outboard rotary actuator of slat No. 6. The right Krueger seal flap is driven the same way from slat No. 7.
- (6) Failure Protection System (Fig. 13)
  - (a) The flap/slat electronic unit (FSEU) generates signals for visual and aural indication of slat faults such as: Asymmetry, uncommanded motion (UCM), and disagreement between flap lever command and slat position (slats do not move when commanded). For a detailed description of FSEU slat control, refer to AMM 27-51-01/001, Flap/Slat Electronics Unit - Description and Operation.
- (7) Built-In-Test Equipment (BITE)
  - (a) The flap/slat electronic unit (FSEU) has BITE for the flap and slat systems. The FSEU BITE control and display panel has a BITE initiate switch, fault indicators, and an indication for successful test completion. Failures are shown by LRU number. In the slat system, failure of any RVDT in the inboard and outboard slat power drive unit and of either of the flap lever RVDT's is shown on the BITE panel. The FSEU contains circuits to check failure within itself.

B. Control

- (1) Primary Control
  - (a) Check that TE flaps and LE slats are in fully retracted position.
  - (b) Check that flap lever is in zero (FLAPS UP) detent.
  - (c) Provide electrical power (AMM 24-22-00).

**WARNING:** KEEP PERSONNEL AND EQUIPMENT CLEAR OF ALL CONTROL SURFACES TO PREVENT INJURY AND DAMAGE. ALL TE FLAPS AND LE SLATS WILL BE POWERED IN PREPARATION FOR CHANGE OF POSITION. FLAP MOVEMENT BETWEEN 5-UNIT AND 15-UNIT FLAP LEVER DETENTS CAUSES INBOARD AILERON MOVEMENT. AILERON, SPOILER, RUDDER, ELEVATOR, AND STABILIZER CONTROL SURFACES WILL ALSO BE POWERED.

**CAUTION:** BEFORE OPERATING FLAPS OR SLATS, ENSURE THAT ENGINE STRUT ACCESS DOORS, INBOARD FAN COWLING, AND THRUST REVERSER COWLING WILL NOT BE IN THE PATH OF SLATS, TO PREVENT DAMAGE.

- (d) Pressurize center hydraulic system (AMM 29-11-00).

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- (e) Place flap lever in 1-unit detent. Check that LE slats extend to intermediate position, and that TE flaps remain in fully retracted position.
  - (f) Place flap lever in 20-unit detent. Check that TE flaps extend to intermediate position.
  - (g) Place flap lever in 30-unit detent. Check that TE flaps and LE slats move to fully extended position.
  - (h) Place flap lever in 20-unit detent. Check that TE flaps and LE slats retract to intermediate position.
  - (i) Place flap lever in 5-unit detent. Check that TE flaps retract to 5-unit detent position and that LE slats remain in intermediate position.
  - (j) Place flap lever in zero (FLAPS UP) detent. Check that TE flaps move to fully retracted position. After TE flaps have moved to fully retracted position, check that LE slats move to fully retracted position.
  - (k) Remove hydraulic power (AMM 29-11-00).
  - (l) Remove electrical power (AMM 24-22-00).
- (2) Alternate Control
- (a) Check that TE flaps and LE slats are in fully retracted position.
  - (b) Check that flap lever is in zero (FLAPS UP) detent.
  - (c) Provide electrical power (Ref 24-22-00).
  - (d) Check that alternate flaps/slats position selector switch on first officer's main instrument panel P3 is in NORM detent.
  - (e) Press LE slat alternate drive arming switch on P3 to arm inboard and outboard slat alternate drives (switch lights up ALTN immediately and amber LEADING EDGE light on P3 and LE SLAT DISAGREE message come on after seven seconds).

**WARNING:** KEEP PERSONNEL AND EQUIPMENT CLEAR OF LEADING EDGE SLATS TO PREVENT INJURY AND DAMAGE. LEADING EDGE SLATS WILL CHANGE POSITION.

**CAUTION:** BEFORE OPERATING FLAPS OR SLATS, ENSURE THAT ENGINE STRUT ACCESS DOORS, INBOARD FAN COWLING, AND THRUST REVERSER COWLING WILL NOT BE IN THE PATH OF SLATS, TO PREVENT DAMAGE.

**CAUTION:** DO NOT RUN ELECTRIC MOTORS FOR LONGER THAN FOUR MINUTES AT A TIME TO PREVENT OVERHEATING. ALLOW MOTORS TO COOL OFF FOR AT LEAST 20 MINUTES.

- (f) Position alternate flaps/slats position selector switch in 20-unit detent (amber LEADING EDGE light and LE SLAT DISAGREE message go out). Check that LE slats extend to intermediate position.

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- (g) Position alternate flaps/slats position selector switch in 30-unit detent. Check that LE slats move to fully extended position.
- (h) Position alternate flaps/slats position selector switch in UP detent. Check that LE slats move to fully retracted position.
- (i) Position alternate flaps/slats position selector switch in NORM detent (amber LEADING EDGE light and LE SLAT DISAGREE message come on).
- (j) Press LE slat alternate drive arming switch to disarm inboard and outboard slat alternate drives (switch light off, amber LEADING EDGE light and LE SLAT DISAGREE message off).
- (k) Remove electrical power (AMM 24-22-00).

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LEADING EDGE SLAT SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ACTUATOR - BYPASS VALVE ROTARY (LE SLAT PDU)	7	2	511BB,611BB, LE WING ROOT	27-81-12
ACTUATOR - KRUEGER SEAL FLAP (LEFT & RIGHT)	2	2	511QB,511RB,611QB,611RB, WING LE	27-81-19
ACTUATOR - LE SLAT NO. 1 INBD DRIVE ROTARY	3	1	521AEB,521AFB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 1 OUTBD DRIVE ROTARY	3	1	521AFB,521ALB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 2 INBD DRIVE ROTARY	3	1	521YB,521ZB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 2 OUTBD DRIVE ROTARY	3	1	521ZB,521AEB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 3 INBD DRIVE ROTARY	3	1	521RB,521TB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 3 OUTBD DRIVE ROTARY	3	1	521TB,521YB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 4 INBD DRIVE ROTARY	3	1	521HB,521JB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 4 OUTBD DRIVE ROTARY	3	1	521JB,521PB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 5 INBD DRIVE ROTARY	3	1	521AB,521BB,521EB,521AMB,521ANB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 5 OUTBD DRIVE ROTARY	3	1	521EB,521HB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 6 INBD DRIVE ROTARY	2	1	521EB,511FB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 6 OUTBD DRIVE ROTARY	2	1	511GB,511JB,511KB,511LB,511NB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 7 INBD DRIVE ROTARY	2	1	611EB,611FB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 7 OUTBD DRIVE ROTARY	2	1	611GB,611JB,611KB,611LB,611NB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 8 INBD DRIVE ROTARY	3	1	611AB,621BB,621EB,621AMB,621ANB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 8 OUTBD DRIVE ROTARY	3	1	621EB,621HB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 9 INBD DRIVE ROTARY	3	1	621HB,621JB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 9 OUTBD DRIVE ROTARY	3	1	621JB,621SB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 10 INBD DRIVE ROTARY	3	1	621SB,621TB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 10 OUTBD DRIVE ROTARY	3	1	621TB,621YB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 11 INBD DRIVE ROTARY	3	1	621YB,621ZB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 11 OUTBD DRIVE ROTARY	3	1	621AEB,621AZB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 12 INBD DRIVE ROTARY	3	1	621AEB,621AFB, WING LE	27-81-20
ACTUATOR - LE SLAT NO. 12 OUTBD DRIVE ROTARY	3	1	621AFB,621ALB, WING LE	27-81-20
CIRCUIT BREAKERS -	1		FLT COMPT, P6	
ALTN SLAT INBD PWR, C324		1	6D21	*
ALTN SLAT OUTBD PWR, C325		1	6F24	*
CIRCUIT BREAKERS -	1		FLT COMPT, P11	
FLAP ALTN CONT, C1027		1	11J24	*
FLAP POS IND L, C1008		1	11J15	*
FLAP POS IND R, C1522		1	11J16	*
FLAP SHUTOFF, C1019		1	11J14	*
FLAP/SLAT POS IND, C1021		1	11C4 OR 11J11	*
FSEU-1 CONT, C1025		1	11C16	*
FSEU-1 SENSOR, C1037		1	11C15	*
FSEU-2 CONT, C1521		1	11G16	*
FSEU-2 SENSOR, C1524		1	11G15	*
FSEU-3 CONT, C1036		1	11G23	*
FSEU-3 SENSOR, C1038		1	11G22	*
FLAP STAB POS SENSING CENTER, C1525		1	11C14	*
FLAP/STAB POS SENSING L, C1523		1	11J17	*

\* SEE THE WDM EQUIPMENT LIST

Leading Edge Slat System - Component Index  
Figure 101 (Sheet 1)

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
FLAP/STAB POS SENSING R, C1526		1	11J26	*
PROX SW TEST, C1178		1	11T36	*
SLAT ALTN CONT INBD, C1028		1	11H23	*
SLAT ALTN CONT OUTBD, C1029		1	11H24	*
SLAT POS IND, C1001		1	11C10	*
SLAT SHUTOFF, C1020		1	11H14	*
COMPUTER - (FIM 31-41-00/101)				
EICAS L, M10181				
EICAS R, M10182				
DRIVE - KRUEGER SEAL FLAP (LEFT & RIGHT)	2	2	511QB,511RB,611QB,611RB, WING LE	27-81-04
GEARBOX - LE SLAT DRIVE BODY ANGLE	2	1	AFT END OF FWD CARGO COMPARTMENT	27-81-15
GEARBOX - LE SLAT DRIVE OUTBD ANGLE	2	2	511PT,511ST,611PT,611ST, WING LE	27-81-17
GEARBOX - LE SLAT DRIVE SIDE-OF-BODY ANGLE	2	4	511BB,611BB, WING LE	27-81-16
GEARBOX - LE SLAT NO. 1 INBD DRIVE OFFSET	3	1	521AEB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 1 OUTBD DRIVE OFFSET	3	1	521ALB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 2 INBD DRIVE OFFSET	3	1	521AEB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 2 OUTBD DRIVE OFFSET	3	1	521YB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 3 INBD DRIVE OFFSET	3	1	521QB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 3 OUTBD DRIVE OFFSET	3	1	521YB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 4 INBD DRIVE OFFSET	3	1	521HB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 4 OUTBD DRIVE OFFSET	3	1	521PB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 5 INBD DRIVE OFFSET	3	1	521AB,521AMB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 5 OUTBD DRIVE OFFSET	3	1	521HB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 6 INBD DRIVE OFFSET	2	1	511EB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 6 OUTBD DRIVE OFFSET	2	1	511LB,511NB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 7 INBD DRIVE OFFSET	2	1	611EB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 7 OUTBD DRIVE OFFSET	2	1	611LB,611NB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 8 INBD DRIVE OFFSET	3	1	621AB,621AMB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 8 OUTBD DRIVE OFFSET	3	1	621HB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 9 INBD DRIVE OFFSET	3	1	621HB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 9 OUTBD DRIVE OFFSET	3	1	621PB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 10 INBD DRIVE OFFSET	3	1	621RB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 10 OUTBD DRIVE OFFSET	3	1	621YB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 11 INBD DRIVE OFFSET	3	1	621YB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 11 OUTBD DRIVE OFFSET	3	1	621AEB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 12 INBD DRIVE OFFSET	3	1	621AEB, WING LE	27-81-20
GEARBOX - LE SLAT NO. 12 OUTBD DRIVE OFFSET	3	1	621AEB, WING LE	27-81-20
INDICATOR - FLAP/SLAT POSITION, N15	1	1	FLT COMPT, P3	27-81-00
LEVER - (FIM 27-51-00/101), FLAP				
MODULE - (FIM 27-51-00/101)				
FLAP/SLAT SHUTOFF VALVE, V104				
MODULE - LE SLAT CONTROL VALVE	7			
INBD SLAT PDU, M1080		1	611BB, LE WING ROOT	27-81-12
OUTBD SLAT PDU, M1081		1	511BB, LE WING ROOT	27-81-12

\* SEE THE WDM EQUIPMENT LIST

SOME AIRPLANES DO NOT HAVE PANELS 511LB/611LB  
COMBINED WITH PANELS 511NB/611NB (AMM 6-44-00/201).

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
MOTOR - ALTERNATE ELECTRIC	7			
INBD SLAT PDU, M494		1	611BB, LE WING ROOT	27-81-11
OUTBD SLAT PDU, M469		1	511BB, LE WING ROOT	27-81-11
MOTOR - PRIMARY HYDRAULIC	7			
INBD SLAT PDU		1	611BB, LE WING ROOT	27-81-11
OUTBD SLAT PDU		1	511BB, LE WING ROOT	27-81-11
QUADRANT - LE SLAT AFT	11	1	FWD CARGO COMPT (AFT END)	27-81-05
RELAY - (FIM 31-01-37/101)				
ALT INBD SLAT ARM, K226				
ALT INBD SLAT EXT, K224				
ALT INBD SLAT RETR, K225				
ALT OUTBD SLAT ARM, K223				
ALT OUTBD SLAT EXT, K221				
ALT OUTBD SLAT RETR, K222				
INBD SLAT BYPASS VALVE NORMAL, K624				
INBD SLAT FAIL PROTECTION, K648				
OUTBD SLAT BYPASS VALVE NORMAL, K625				
OUTBD SLAT FAIL PROTECTION, K349				
SHAFT - LE SLAT DRIVE	2	--	REF SPECIFIC SLAT AND AFT END OF FWD CARGO COMPARTMENT	27-81-24
SLAT - INBOARD LE				
SLAT NO. 6	2	1	LEFT WING LE	27-81-01
SLAT NO. 7	2	1	RIGHT WING LE	27-81-01
SLAT - OUTBOARD LE				
SLAT NO. 1 THRU 5	2	5	LEFT WING LE	27-81-02
SLAT NO. 8 THRU 12	2	5	RIGHT WING LE	27-81-02
SWITCH - ALTERNATE SLAT ARM, S602	1	1	FLT COMPT, P3	*
SWITCH - SLAT HYD PRESSURE, S846	12	1	RIGHT WHEEL WELL	27-51-48
TRACK - LE SLAT INBD AUXILIARY	9	6	INBD LE SLATS	27-81-32
TRACK - LE SLAT INBD MAIN	9	2	INBD LE SLATS	27-81-34
TRACK - LE SLAT OUTBD AUXILIARY	10	20	OUTBD LE SLATS	27-81-32
TRACK - LE SLAT OUTBD MAIN	10	20	OUTBD LE SLATS	27-81-34
TRANSFORMER - (FIM 27-51-00/101)				
FLAP LEVER RVDT NO. 1, M604				
FLAP LEVER RVDT NO. 2, M603				
TRANSFORMERS - ROTARY VARIABLE DIFFERENTIAL	7			
INBD SLAT PDU RVDT NO. 1, M483		1	611BB, LE WING ROOT	27-81-11
INBD SLAT PDU RVDT NO. 2, M549		1	611BB, LE WING ROOT	27-81-11
OUTBD SLAT PDU RVDT NO. 1, M544		1	511BB, LE WING ROOT	27-81-11
OUTBD SLAT PDU RVDT NO. 2, M548		1	511BB, LE WING ROOT	27-81-11
UNIT - (FIM 27-51-00/101)				
FLAP/SLAT ELECTRONIC (FSEU)				
UNIT - (FIM 32-09-03/101)				
PROX SW ELEC, M162				
UNIT - INBD LE SLAT POWER DRIVE	7	1	611BB, LE WING ROOT	27-81-11
UNIT - OUTBD LE SLAT POWER DRIVE	7	1	511BB, LE WING ROOT	27-81-11
VALVE - (FIM 27-51-00/101)				
SLATS SHUTOFF, V2				
VALVE - BYPASS	7			
INBD SLATS PDU, V56		1	611BB, LE WING ROOT	27-81-12
OUTBD SLATS PDU, V51		1	511BB, LE WING ROOT	27-81-12
* SEE THE WDM EQUIPMENT LIST				

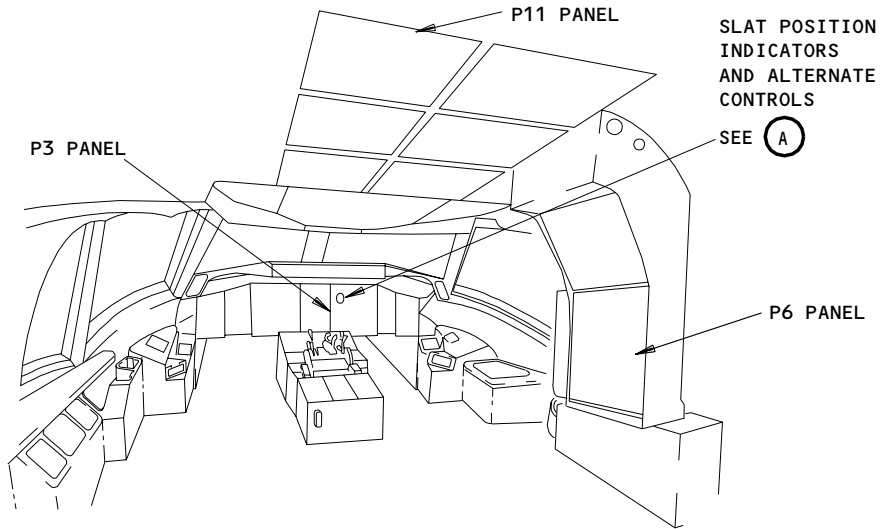
Leading Edge Slat System - Component Index  
Figure 101 (Sheet 3)

EFFECTIVITY

ALL

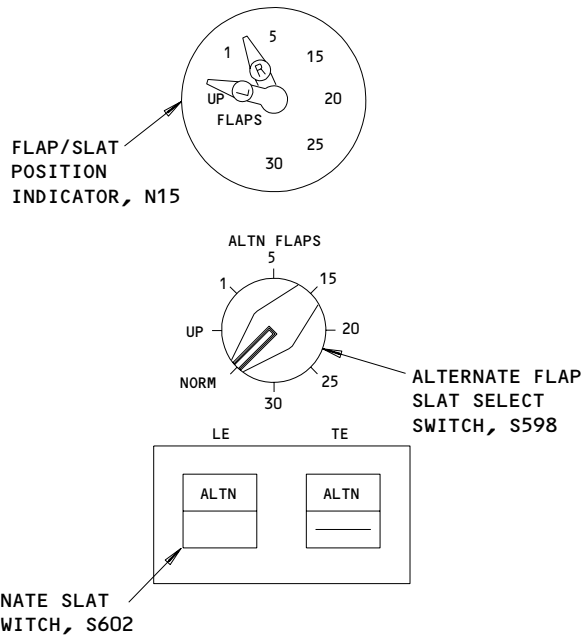
27-81-00

**BOEING**  
767  
FAULT ISOLATION/MAINT MANUAL



**FLIGHT COMPARTMENT**

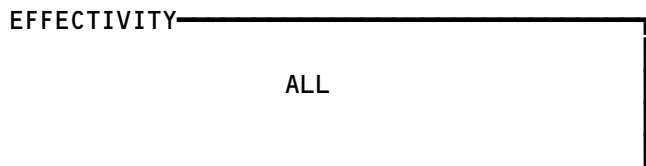
LEADING EDGE	TRAILING EDGE
-----------------	------------------



**SLAT POSITION INDICATORS  
AND ALTERNATE CONTROLS**

(A)

Leading Edge Slat System - Component Location  
Figure 102 (Sheet 1)

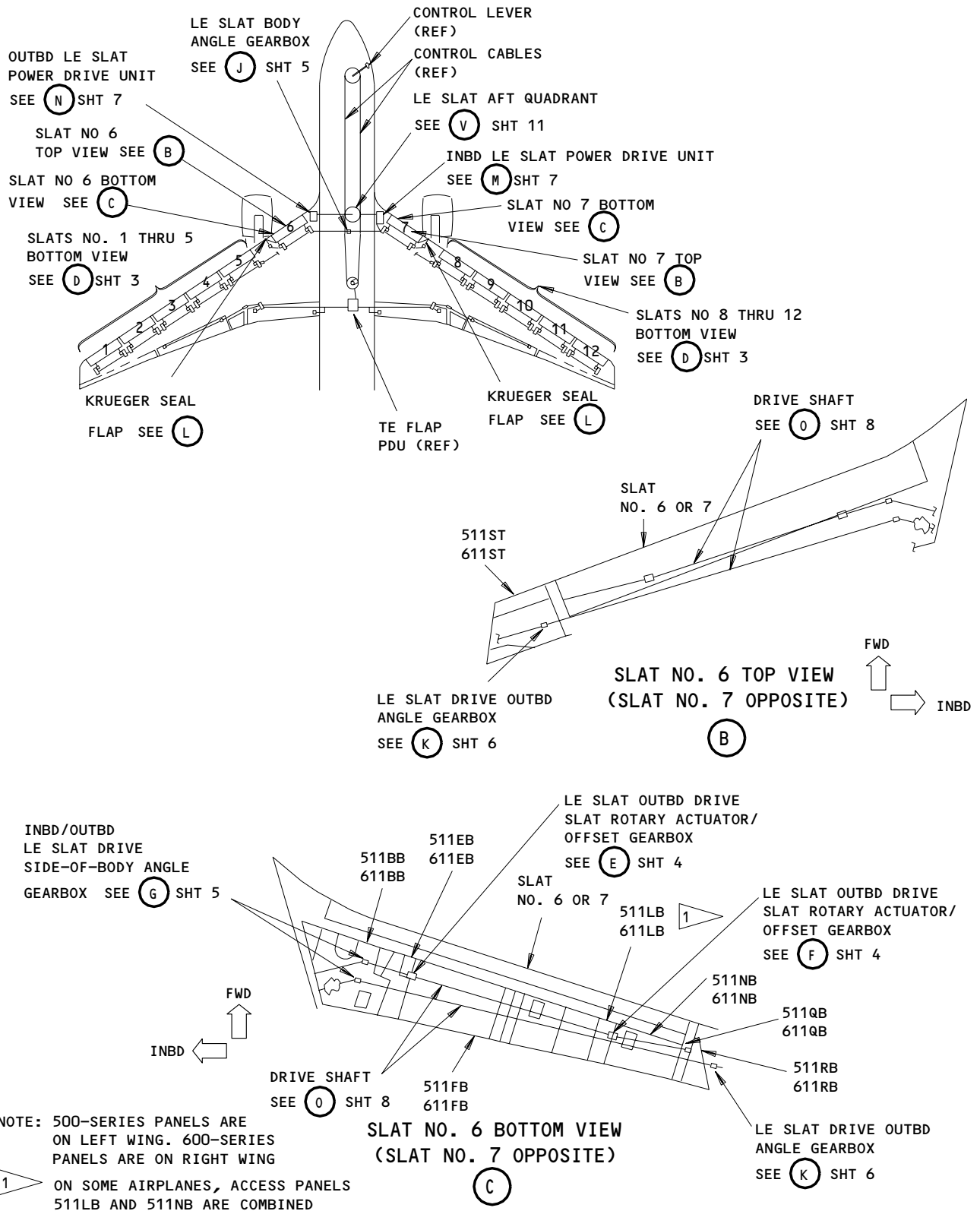


**27-81-00**

# BOEING

## 767

### FAULT ISOLATION/MAINT MANUAL



Leading Edge Slat System - Component Location  
Figure 102 (Sheet 2)

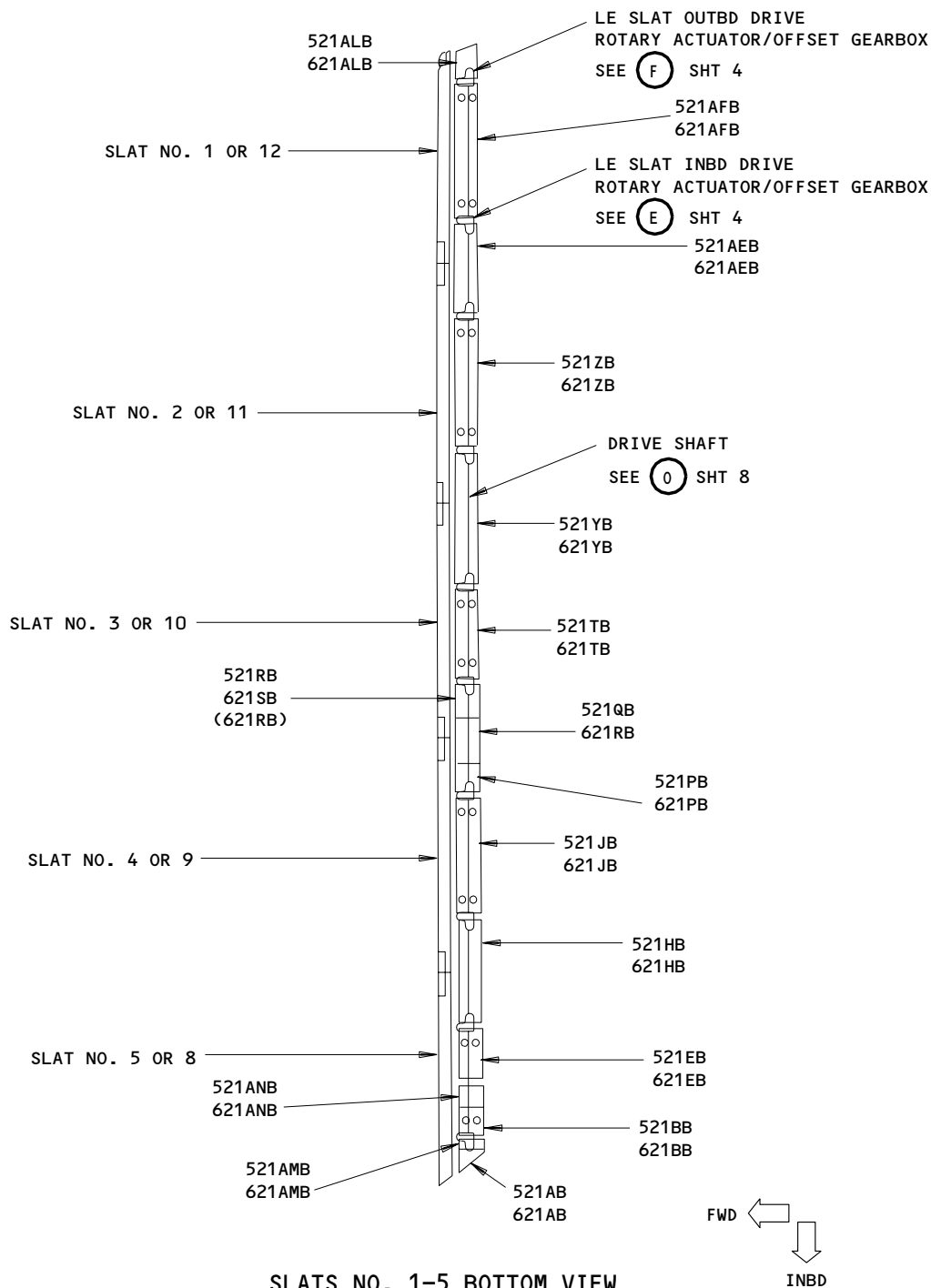
EFFECTIVITY	ALL
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27-81-00

02

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**BOEING**  
767  
FAULT ISOLATION/MAINT MANUAL



SLATS NO. 1-5 BOTTOM VIEW  
(SLATS NO. 8-12 OPPOSITE)

D FROM SHT 2

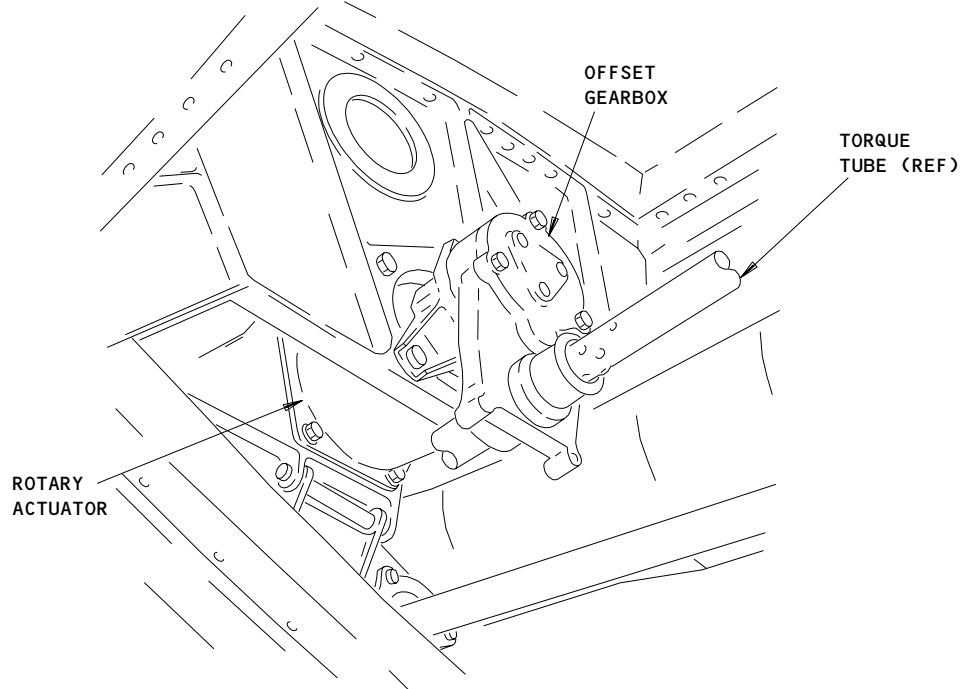
Leading Edge Slat System - Component Location  
Figure 102 (Sheet 3)

EFFECTIVITY	ALL
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27-81-00

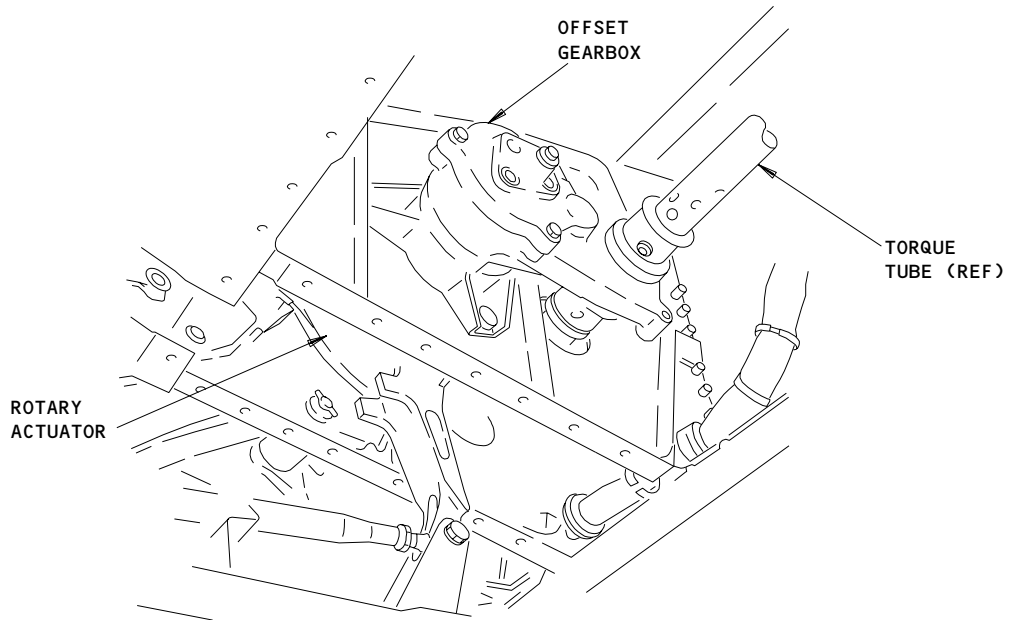
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LE SLAT INBD DRIVE SLAT  
ROTARY ACTUATOR / OFFSET GEARBOX

(E) FROM SHT 2 AND 3



LE SLAT OUTBD DRIVE SLAT  
ROTARY ACTUATOR/OFFSET GEARBOX

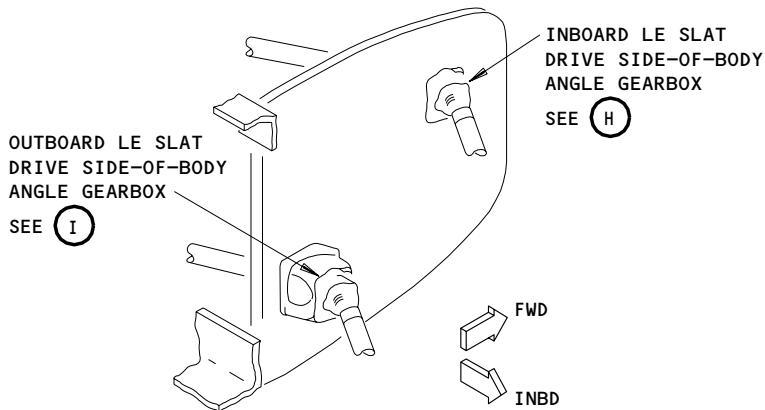
(F) FROM SHT 2 AND 3

Leading Edge Slat System - Component Location  
Figure 102 (Sheet 4)

EFFECTIVITY	
	ALL

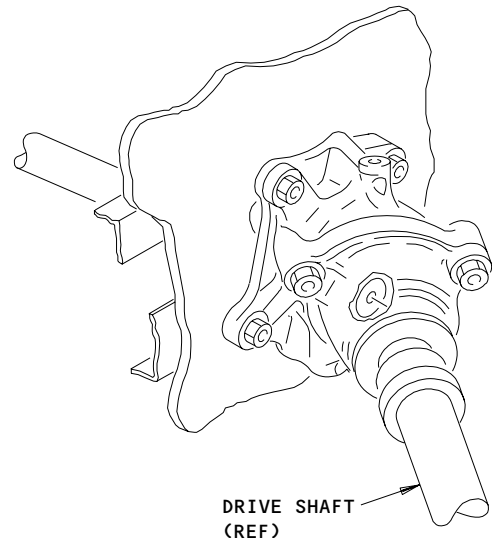
27-81-00





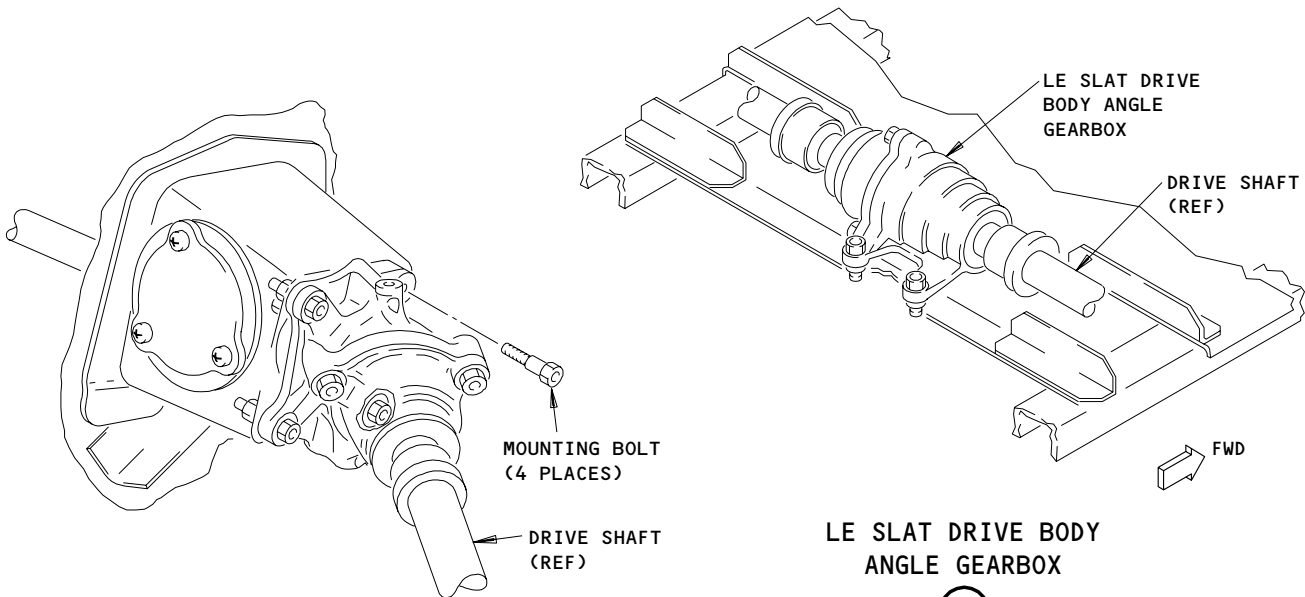
INBOARD/OUTBOARD LE SLAT DRIVE  
SIDE-OF-BODY ANGLE GEARBOX  
(LEFT SHOWN, RIGHT SIMILAR)

(G) FROM SHT 2



INBOARD LE SLAT DRIVE  
SIDE-OF-BODY ANGLE GEARBOX

(H)



OUTBOARD LE SLAT DRIVE  
SIDE-OF-BODY ANGLE GEARBOX

(I)

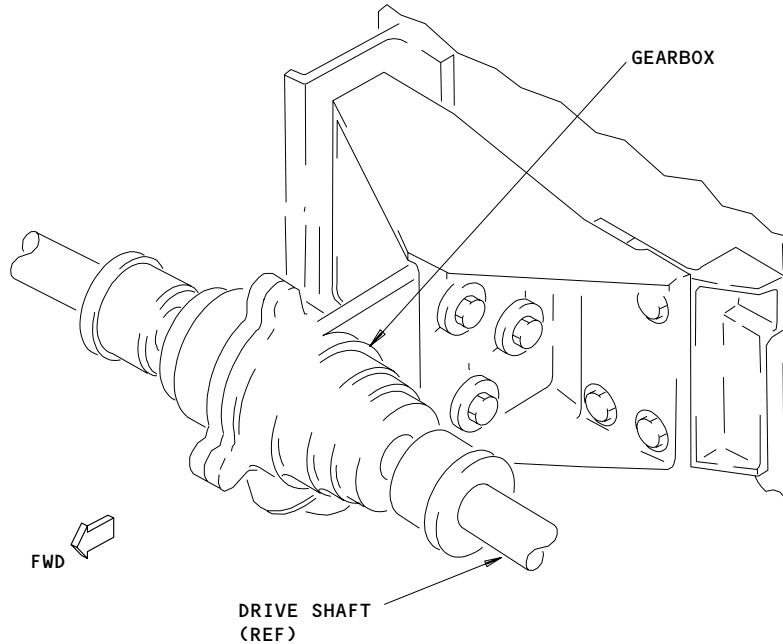
LE SLAT DRIVE BODY  
ANGLE GEARBOX

(J)

Leading Edge Slat System - Component Location  
Figure 102 (Sheet 5)

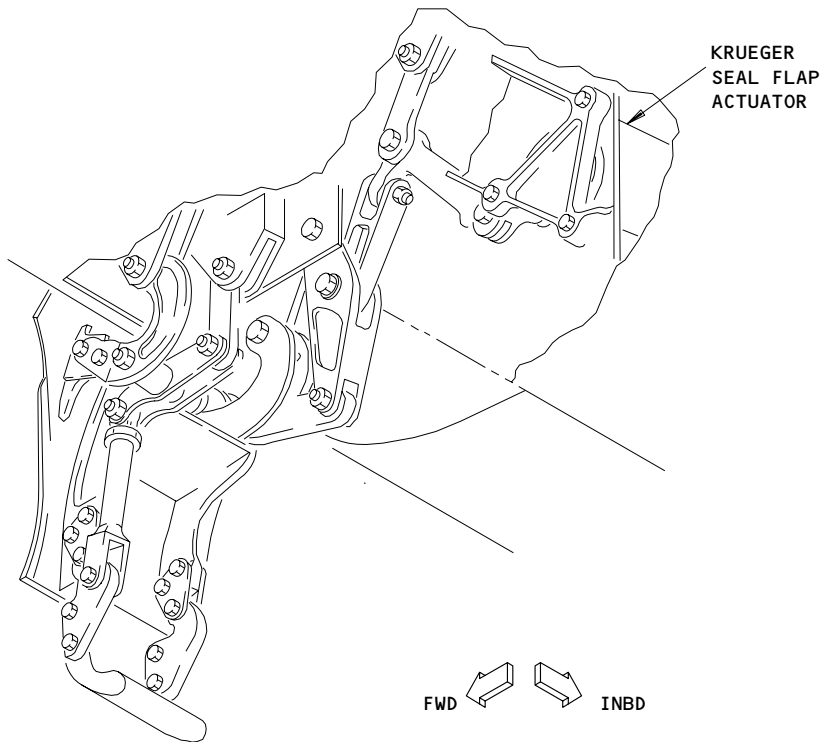
EFFECTIVITY	
	ALL

27-81-00



LE SLAT OUTBOARD ANGLE GEARBOX

(K) FROM SHT 2



KRUEGER SEAL FLAP

(L) FROM SHT 2

Leading Edge Slat System - Component Location  
Figure 102 (Sheet 6)

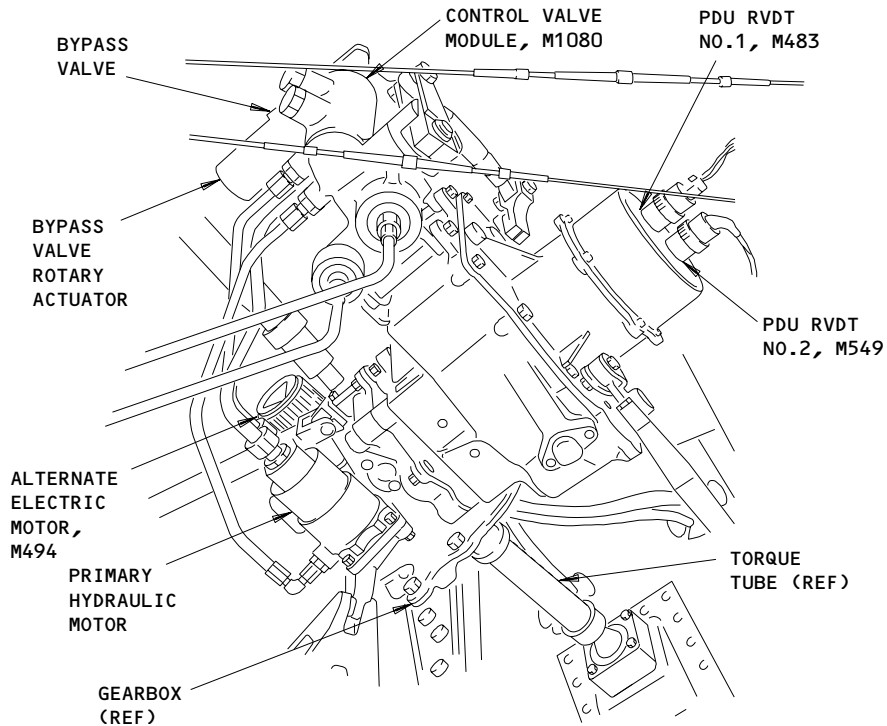
EFFECTIVITY	
	ALL

27-81-00

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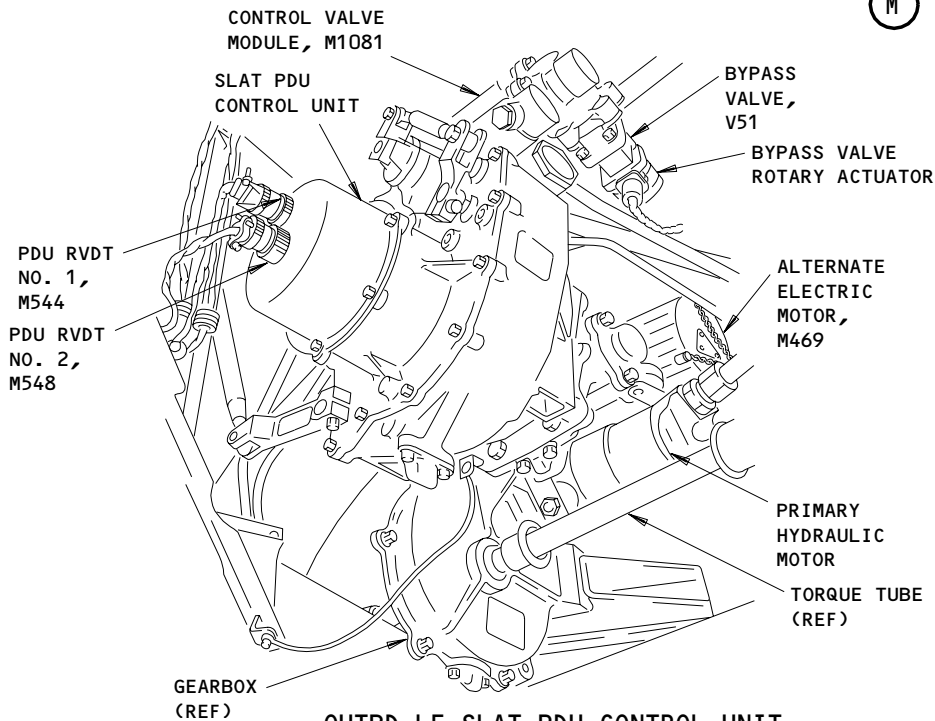
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INBD LE SLAT PDU CONTROL UNIT

(M) FROM SHT 2



OUTBD LE SLAT PDU CONTROL UNIT

(N) FROM SHT 2

Leading Edge Slat System - Component Location  
Figure 102 (Sheet 7)

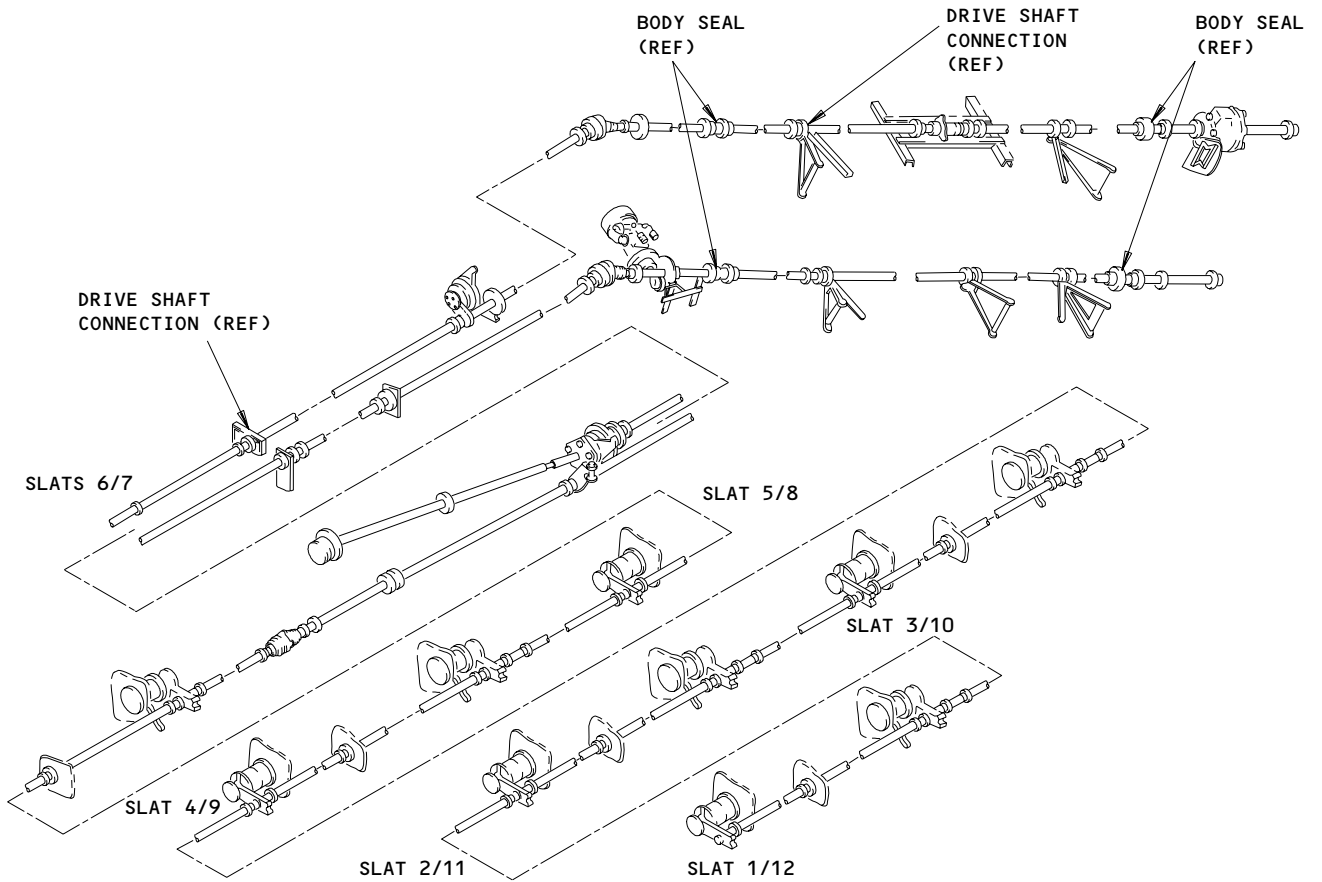
EFFECTIVITY

ALL

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DRIVE SHAFT  
(LEFT WING SHOWN; RIGHT WING SIMILAR)

0 FROM SHT 2 AND 3

Leading Edge Slat System - Component Location  
Figure 102 (Sheet 8)

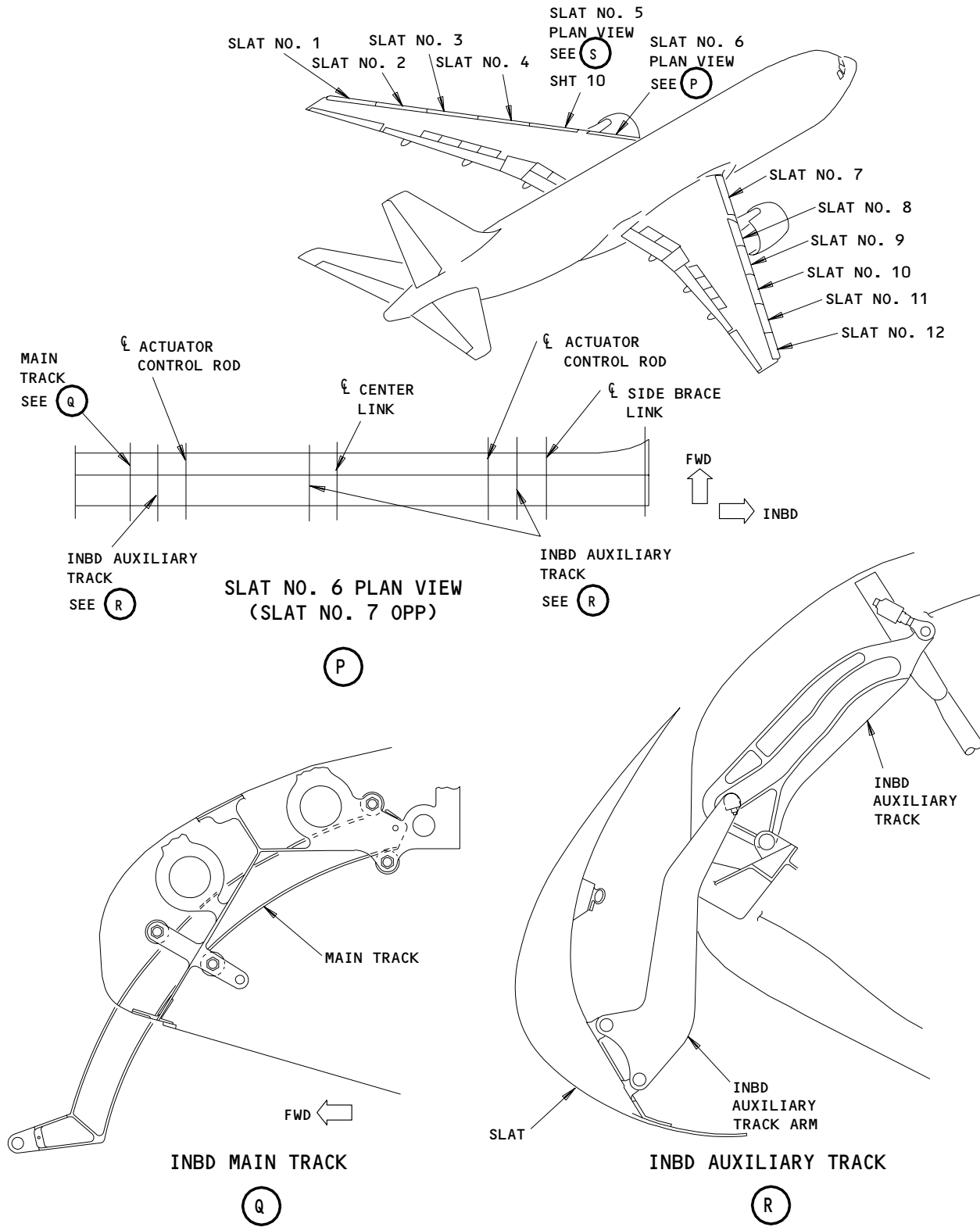
EFFECTIVITY	
	ALL

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**BOEING**  
767  
FAULT ISOLATION/MAINT MANUAL

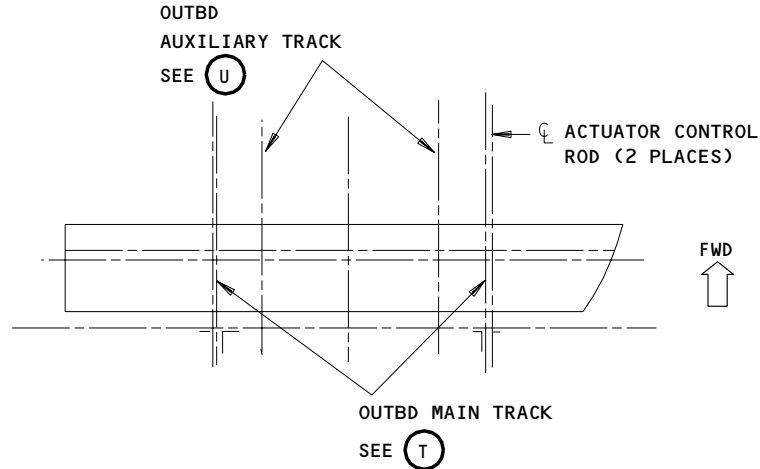


Leading Edge Slat System - Component Location  
Figure 102 (Sheet 9)

EFFECTIVITY	ALL
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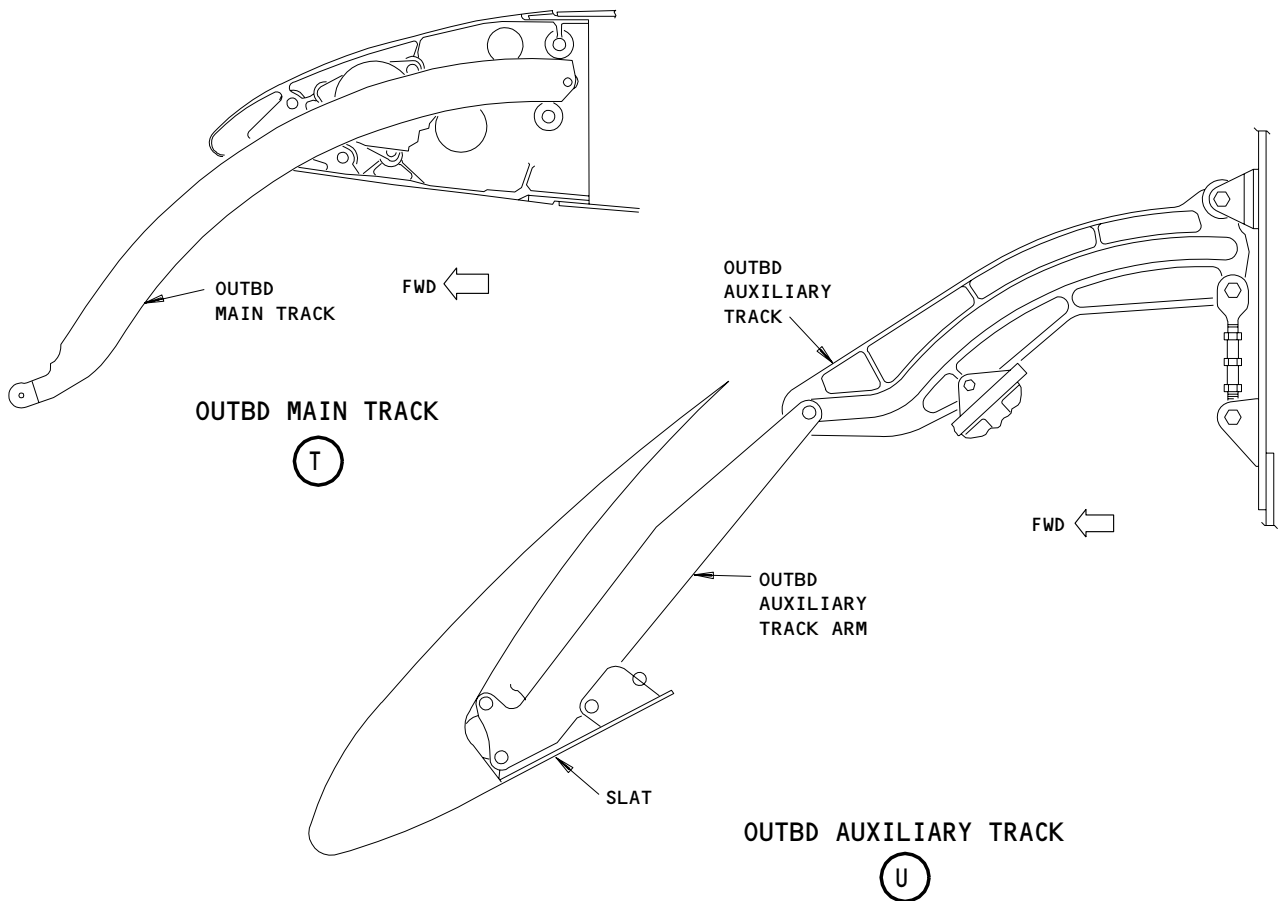
**27-81-00**

**BOEING**  
767  
FAULT ISOLATION/MAINT MANUAL



OUTBOARD SLAT NO. 5  
PLAN VIEW  
(TYP SLATS NO. 1-4 AND NO. 8-12)

(S) FROM SHT 9



Leading Edge Slat System - Component Location  
Figure 102 (Sheet 10)

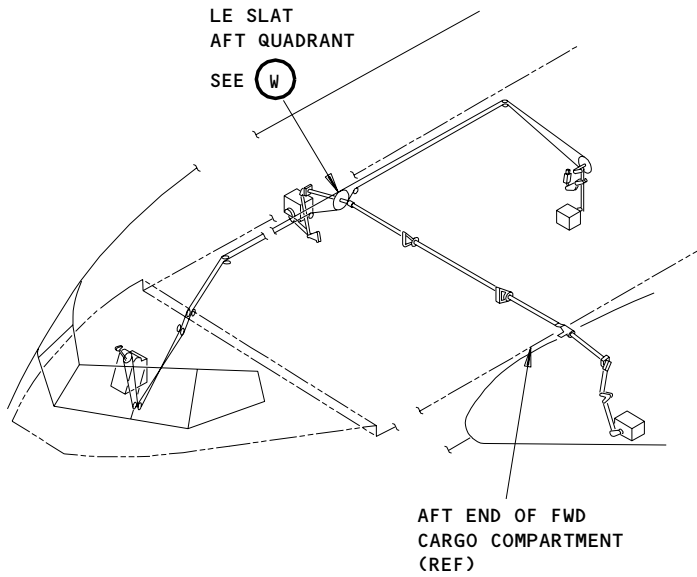
EFFECTIVITY	ALL
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27-81-00

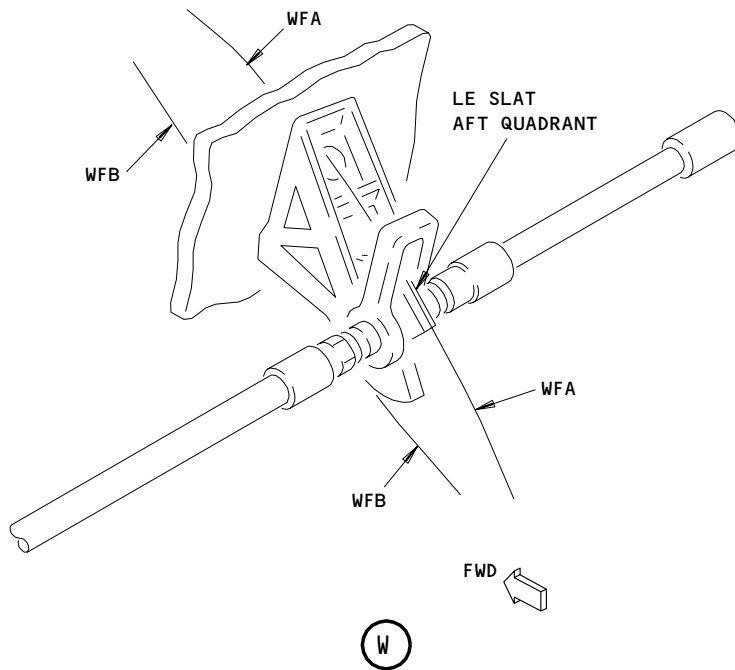
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272210



(V) FROM SHT 2



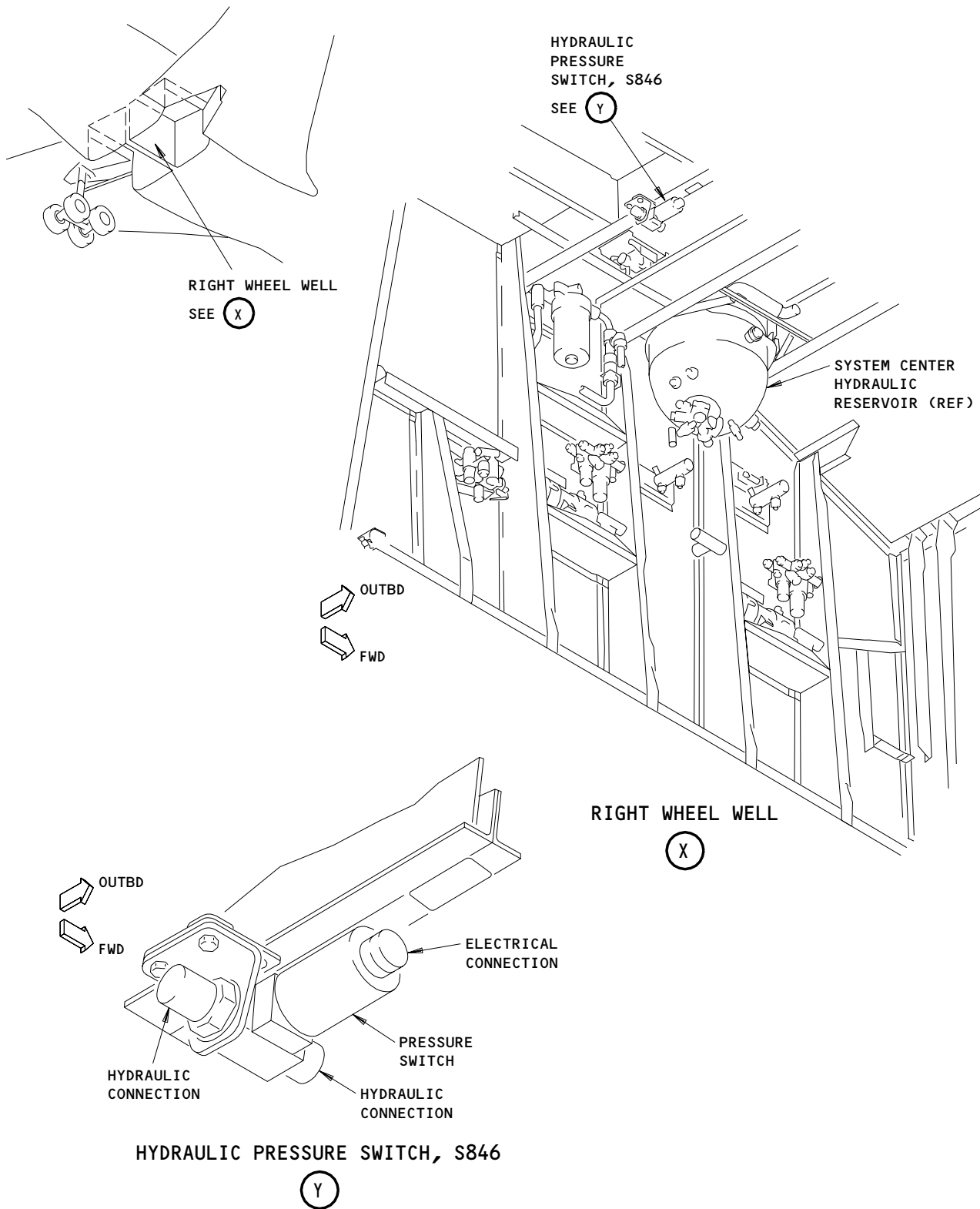
Leading Edge Slat System – Component Location  
 Figure 102 (Sheet 11)

EFFECTIVITY	ALL

**27-81-00**

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Aug 10/92

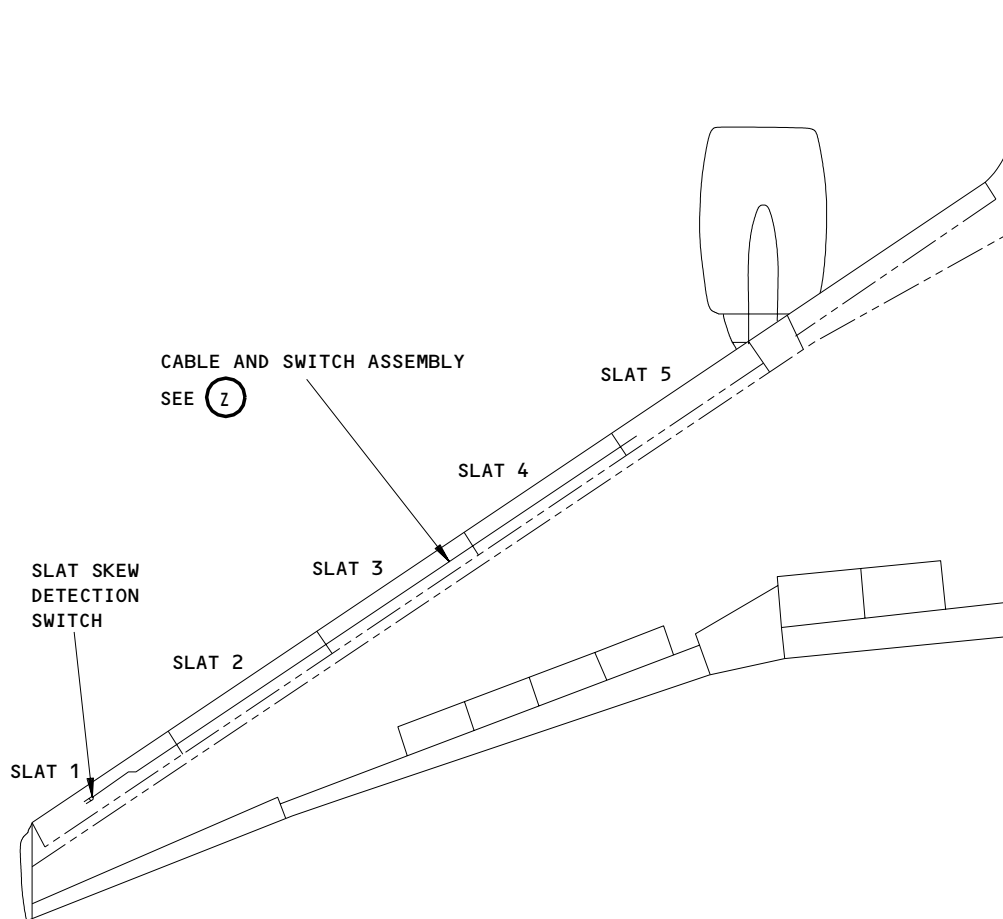


Leading Edge Slat System - Component Location  
Figure 102 (Sheet 12)

EFFECTIVITY	
	ALL

27-81-00





Leading Edge Slat System – Component Location  
 Figure 102 (Sheet 13)

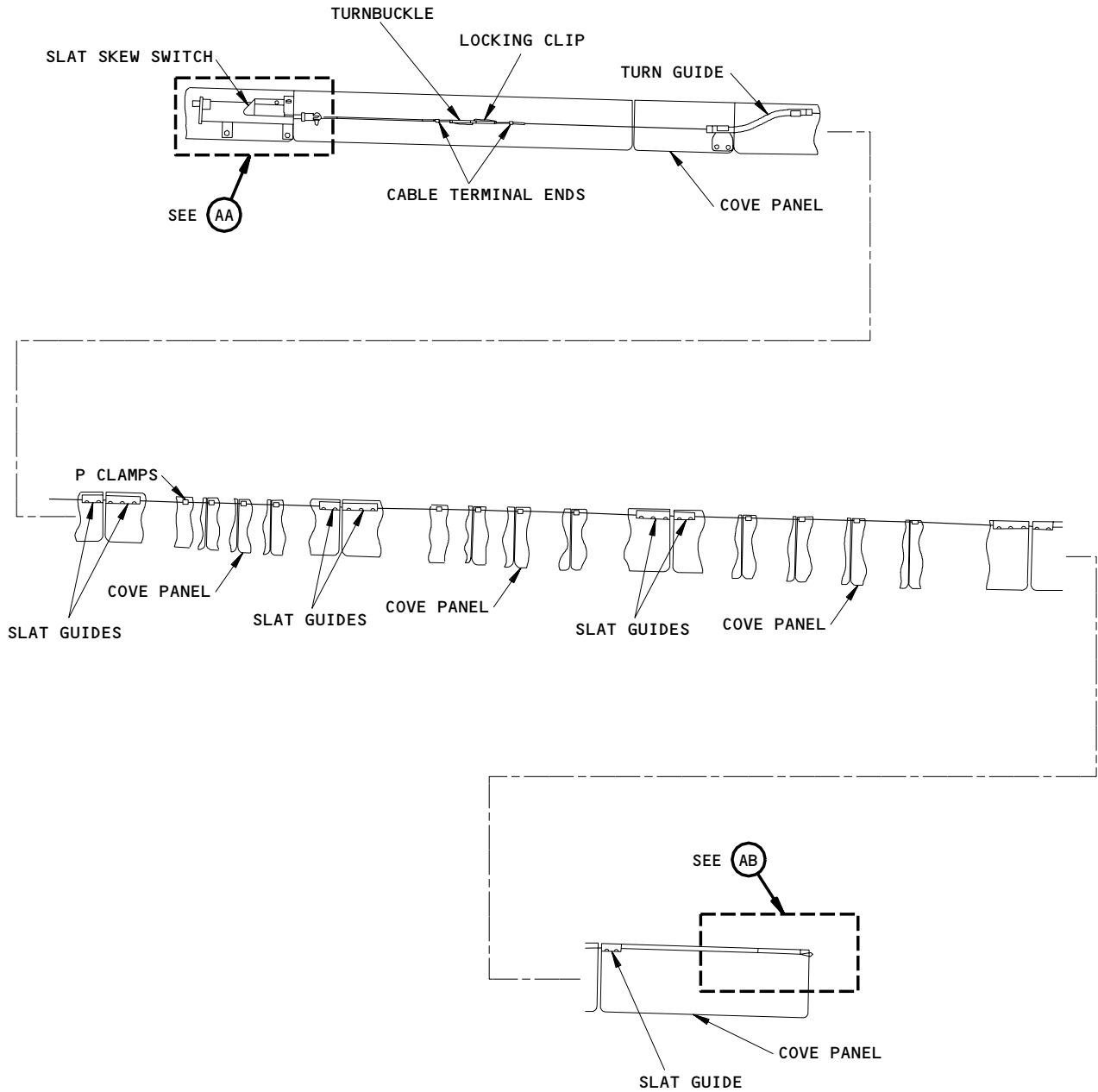
EFFECTIVITY	ALL
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CABLE AND SWITCH ASSEMBLY

(Z)

Leading Edge Slat System - Component Location  
Figure 102 (Sheet 14)

EFFECTIVITY	ALL
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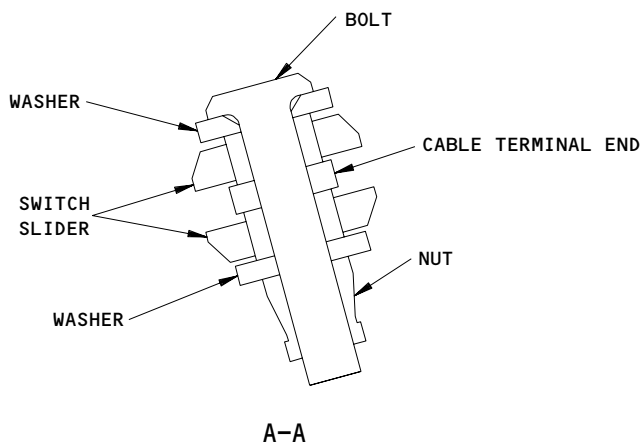
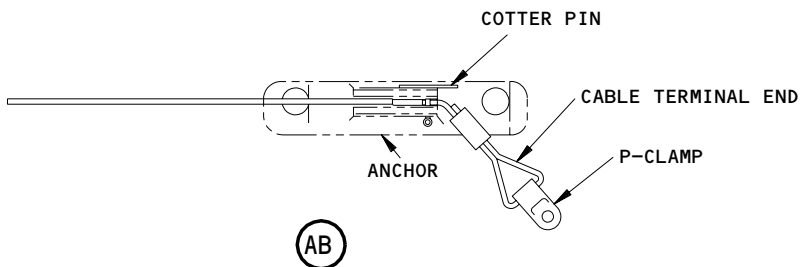
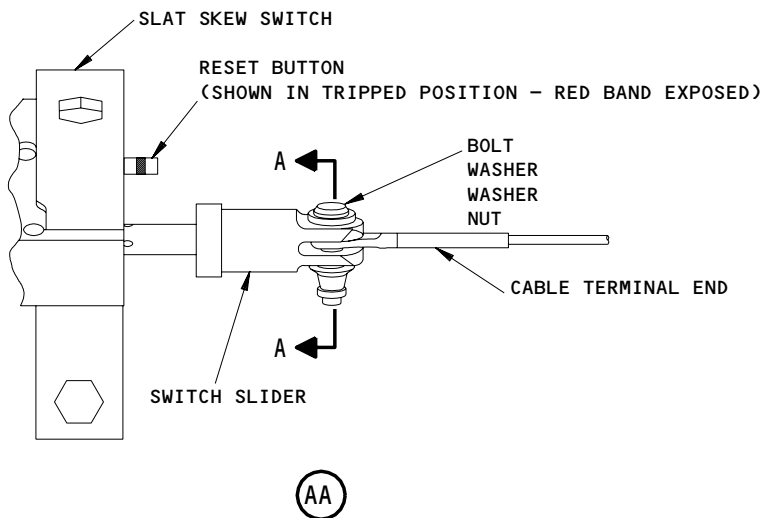
**27-81-00**

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**BOEING**  
767  
FAULT ISOLATION/MAINT MANUAL



Leading Edge Slat System - Component Location  
Figure 102 (Sheet 15)

EFFECTIVITY	
	ALL

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LEADING EDGE SLAT SYSTEM – MAINTENANCE PRACTICES

1. General

- A. This procedure contains nine maintenance practice tasks for the leading edge (LE) slats:
- "Put the Airplane Back to Its usual condition" task (included in each task below)
  - Leading Edge Slat Deactivation
  - Extend the Leading Edge Slats with Primary (Hydraulic) Power
  - Extend the Leading Edge Slats with Alternate (Electrical) Power
  - Retract the Leading Edge Slats with Primary (Hydraulic) Power
  - Retract the Leading Edge Slats with Alternate (Electrical) Power
  - Manually Extend and Retract the Leading Edge Slats without Airplane Power
  - Operate the Outboard Slats without Movement of the Inboard Slats
  - Extend and Retract the Slats without Movement of the Flaps
  - Remove and Install the fixed lower access panels for the leading edge.
- B. The LE slats are given the numbers 1 thru 12, from the left wing to the right wing. Slats No. 1 to 5 and 8 to 12 are outboard slats. Slats No. 6 and 7 are inboard slats.

TASK 27-81-00-042-001

2. Leading Edge Slat Deactivation

A. Equipment

- (1) Circuit Breaker Lockout Clip,  
(4 necessary) Commercially Available
- (2) Leading Edge Slat Groundlock – A27007-1  
(2 Necessary)

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power – Control
- (3) 29-11-00/201, Main (Left, Right, and Center Hydraulic Systems
- (4) 32-00-15/201, Landing Gear Door Locks
- (5) 32-00-20/201, Landing Gear Down Locks

EFFECTIVITY

ALL

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C. Access

(1) Location Zones

211/212 Control Cabin  
510/610 Wing Leading Edge - Inboard  
520/620 Wing Leading Edge - Outboard  
710 Nose Landing Gear and Doors  
730/740 Left/Right Main Landing Gear Doors

(2) Access Panel

511BB LE Slat Power Drive Unit - Outboard (left)  
611BB LE Slat Power Drive Unit - Inboard (right)  
511QB/511RB LE Krueger Flap Rotary Actuator (left)  
611QB/611RB LE Krueger Flap Rotary Actuator (right)

D. Slat Deactivation Procedure

S 212-246

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 492-247

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (Ref 32-00-15).

S 212-248

- (3) Make sure the position of the high-lift control surfaces agree with the commanded position as shown in Table 201.

**NOTE:** The commanded position is set by one of these controls:  
- the flap control lever for the flap/slat primary drive, on the quadrant stand, P10  
- the position selector switch for the flap/slat alternate drive, on the first officer's main instrument panel, P3.

S 492-249

- (4) Attach a DO-NOT-OPERATE tag to flap control lever or the position selector switch as applicable.

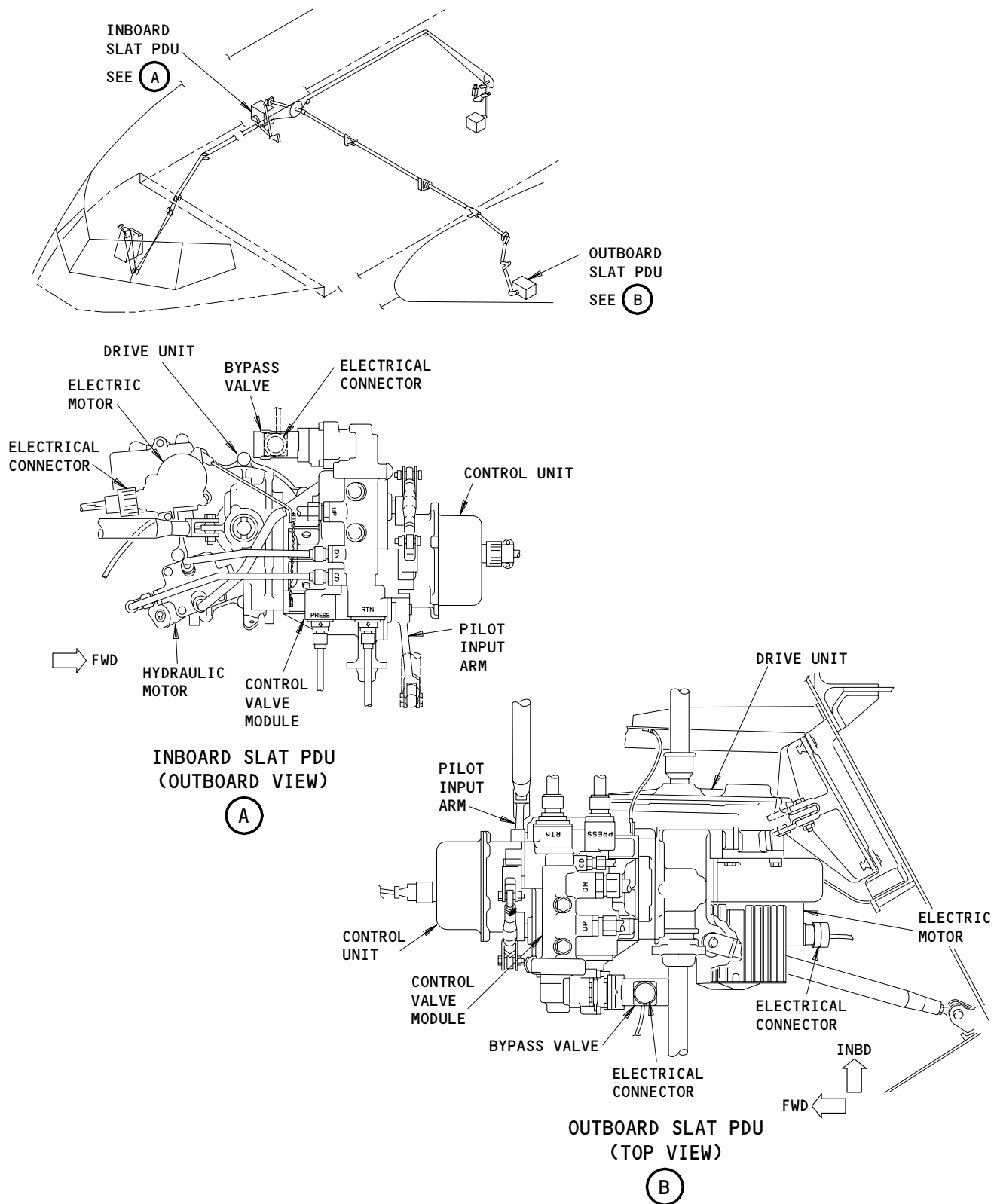
EFFECTIVITY

ALL

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Inboard and Outboard Slat Power Drive Units (PDU)  
Figure 201

EFFECTIVITY	
	ALL

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TABLE 201			
COMMANDED POSITION (SOURCE *[1])		CONTROL SURFACE POSITION	
		FLAPS	SLATS
ZERO (FLAPS UP)		FULLY RETRACTED	FULLY RETRACTED
TAKEOFF POSITION	1 unit *[2]	FULLY RETRACTED	INTERMEDIATE
	5 units	5°	INTERMEDIATE
	15 units	15°	INTERMEDIATE
	20 units	20°	INTERMEDIATE
LANDING POSITION	25 units	25°	FULLY EXTENDED
	30 units	30°	FULLY EXTENDED

\*[1] Flap control lever for the primary (hydraulic) control, and position selector switch for the alternate (electric) control.

\*[1] 1-unit is the takeoff position for 767-200 airplane only.

S 862-250

- (5) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

S 862-251

- (6) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks:
- (a) 6D21, ALTN SLAT INBD PWR

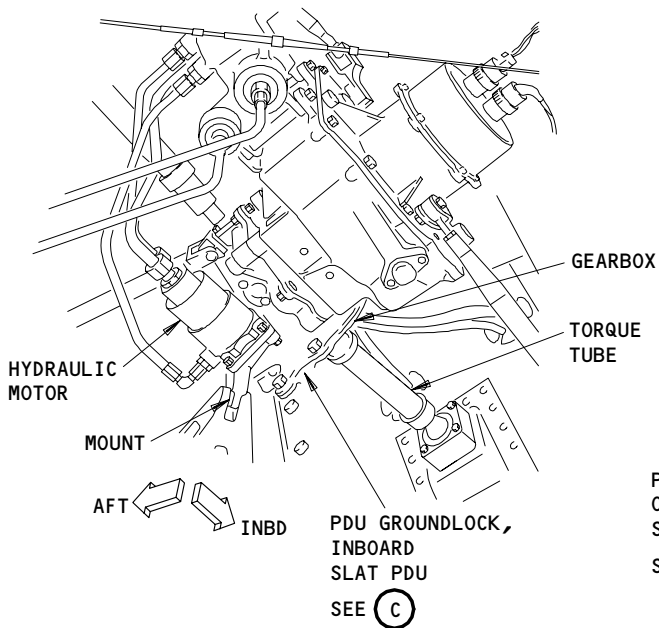
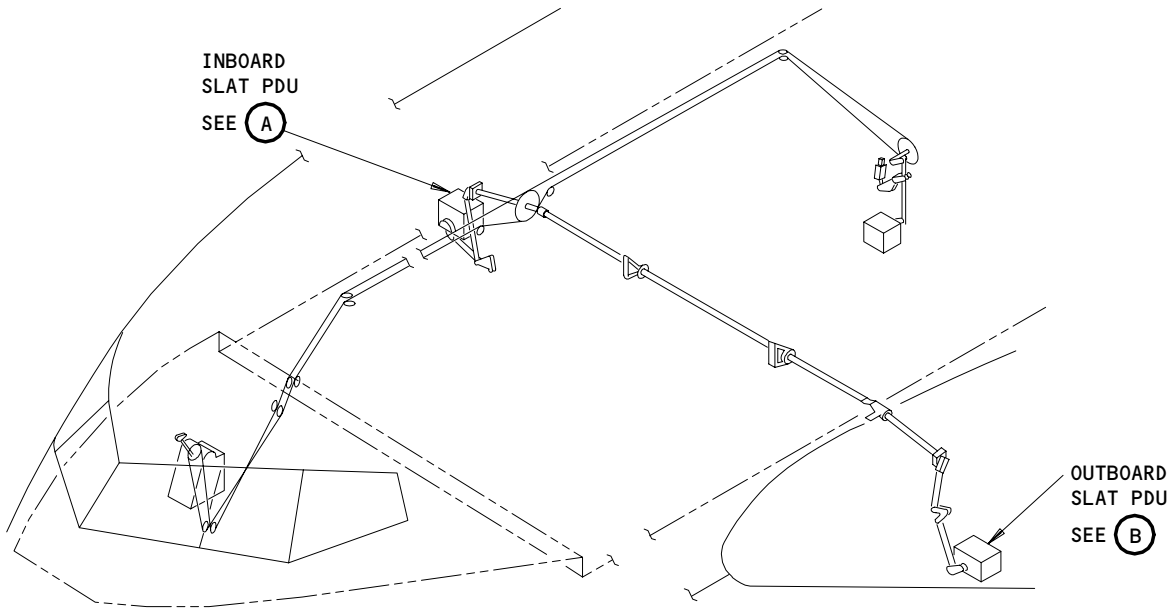
EFFECTIVITY

ALL

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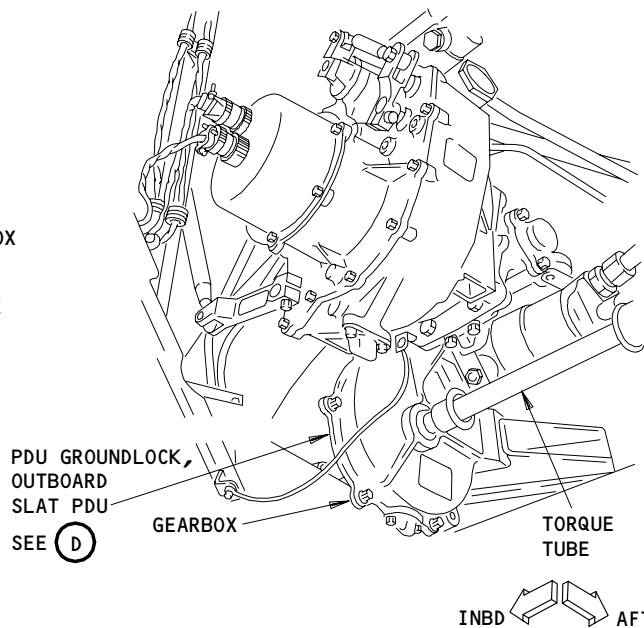
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May 10/96



INBOARD SLAT PDU  
(BOTTOM VIEW)

(A)



OUTBOARD SLAT PDU

(B)

Slat PDU Groundlock  
Figure 202 (Sheet 1)

EFFECTIVITY

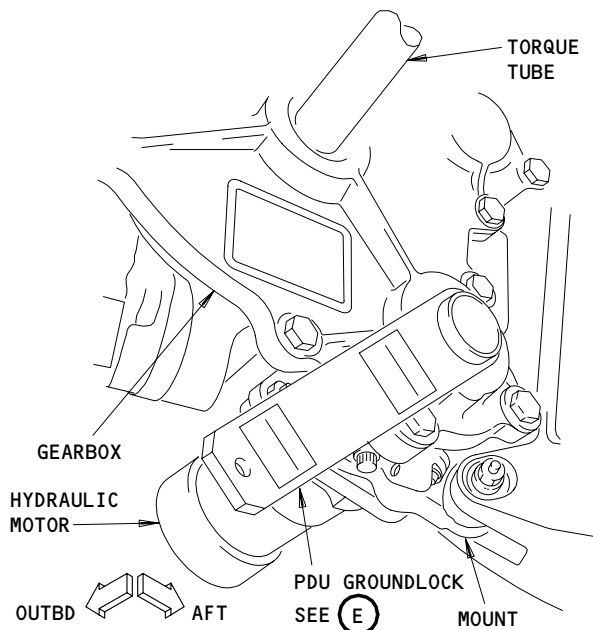
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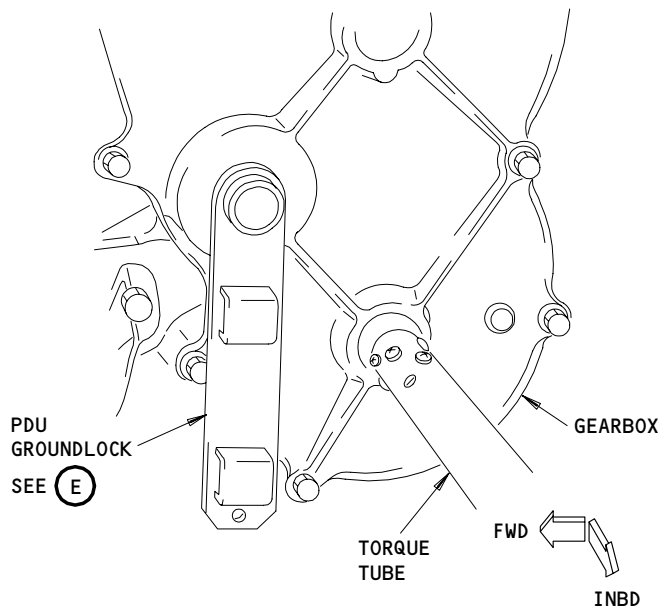
Page 205  
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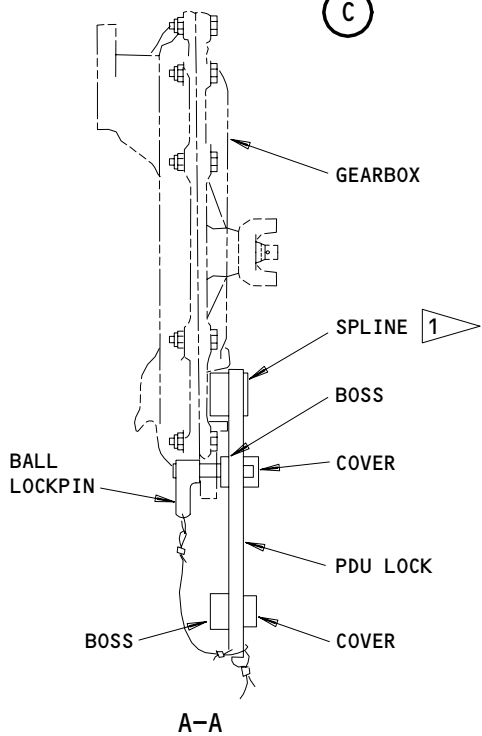
PDU GROUNDLOCK,  
INBOARD SLAT PDU

(C)

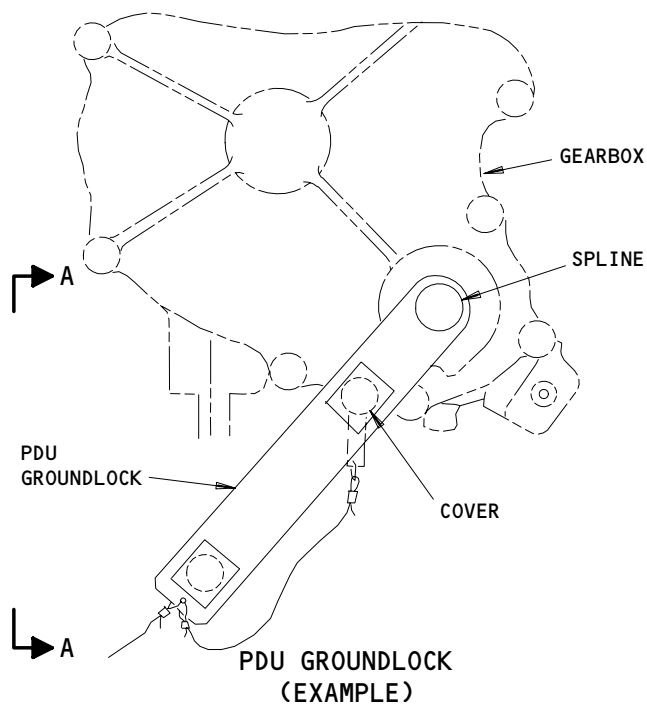


PDU GROUNDLOCK,  
OUTBOARD SLAT PDU

(D)



1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN, INSTALLED THROUGH THE BOSS AND GEARBOX



PDU GROUNDLOCK  
(EXAMPLE)

(E)

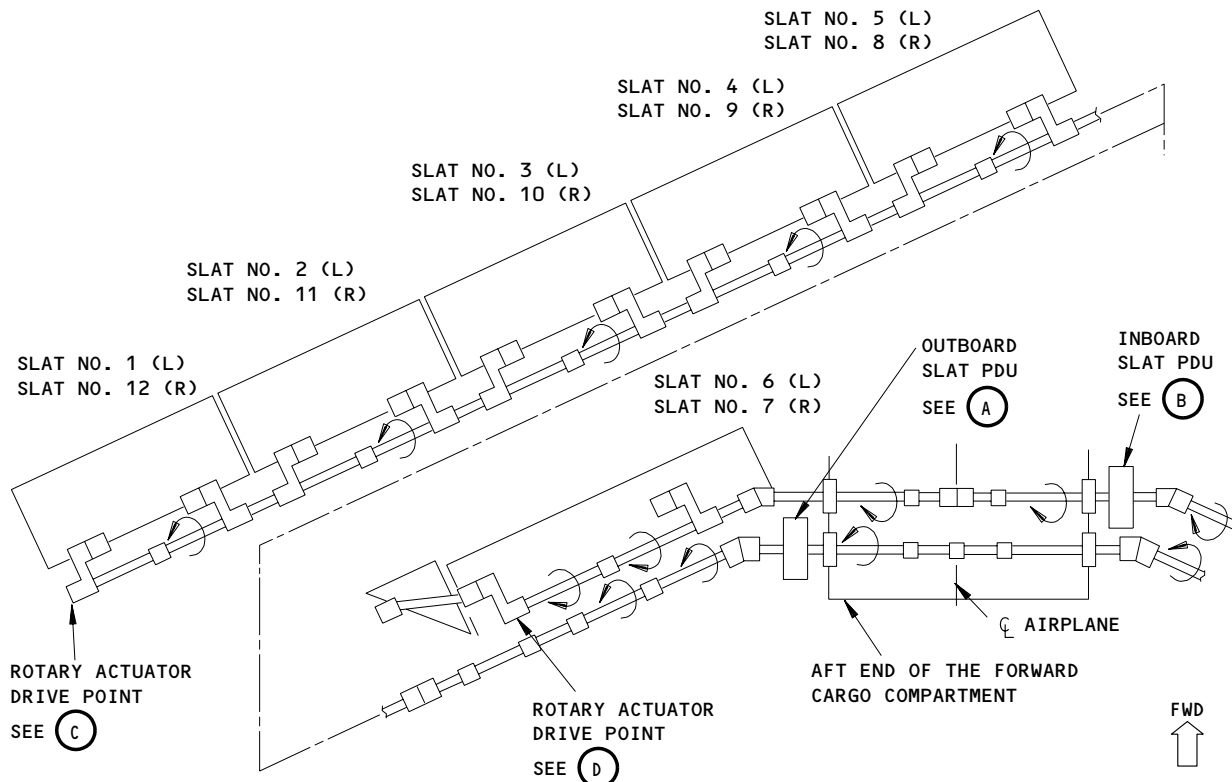
Slat PDU Groundlock  
Figure 202 (Sheet 2)

EFFECTIVITY	
	ALL

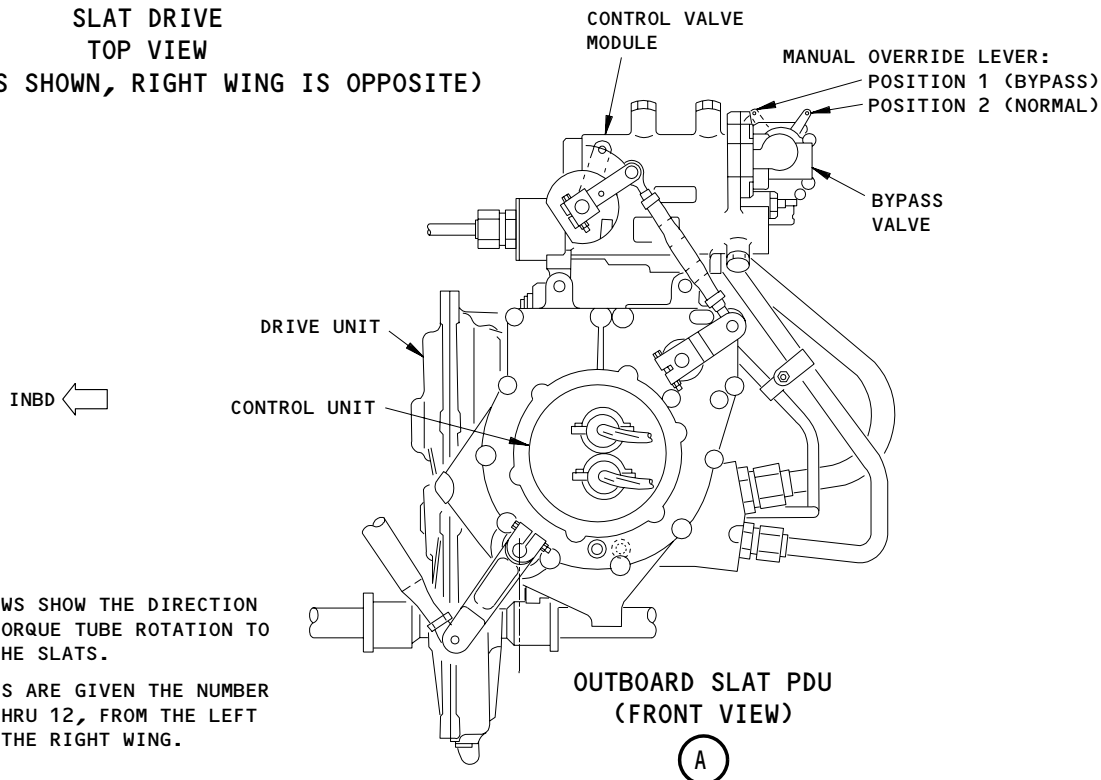
27-81-00

# BOEING

## 767 MAINTENANCE MANUAL



**SLAT DRIVE  
TOP VIEW  
(LEFT WING IS SHOWN, RIGHT WING IS OPPOSITE)**



**NOTE:** THE ARROWS SHOW THE DIRECTION OF THE TORQUE TUBE ROTATION TO EXTEND THE SLATS.

THE SLATS ARE GIVEN THE NUMBER FROM 1 THRU 12, FROM THE LEFT WING TO THE RIGHT WING.

**Slat Manual Operation  
(from the End of the Slat Drive)  
Figure 203 (Sheet 1)**

EFFECTIVITY

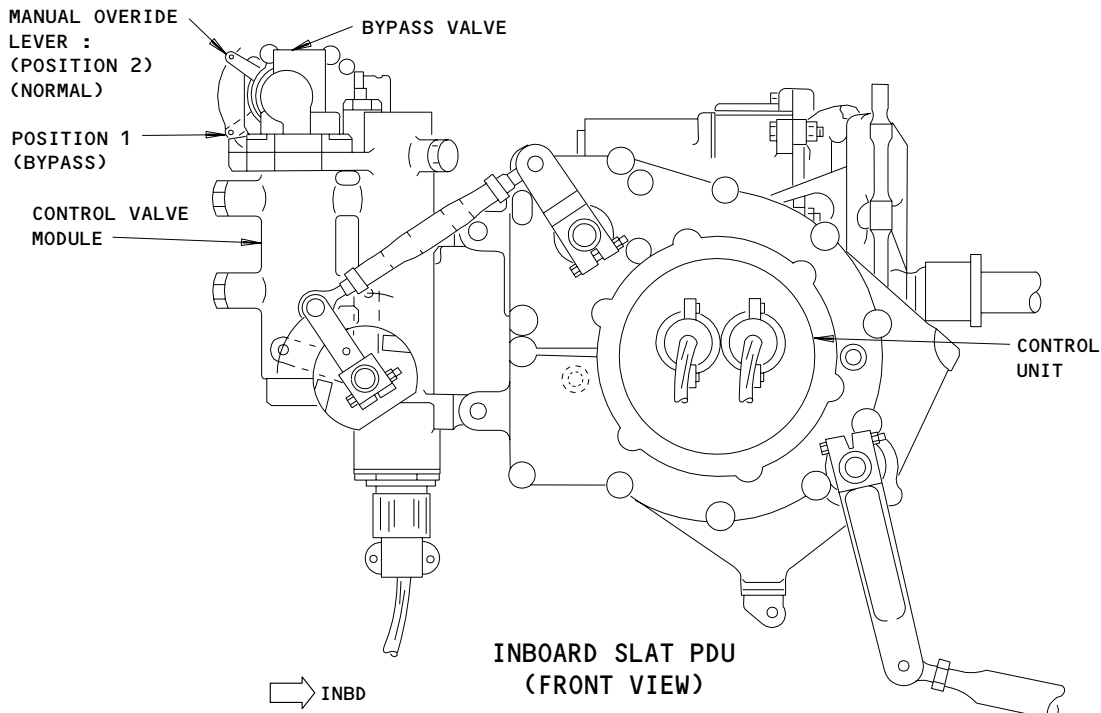
ALL

**27-81-00**

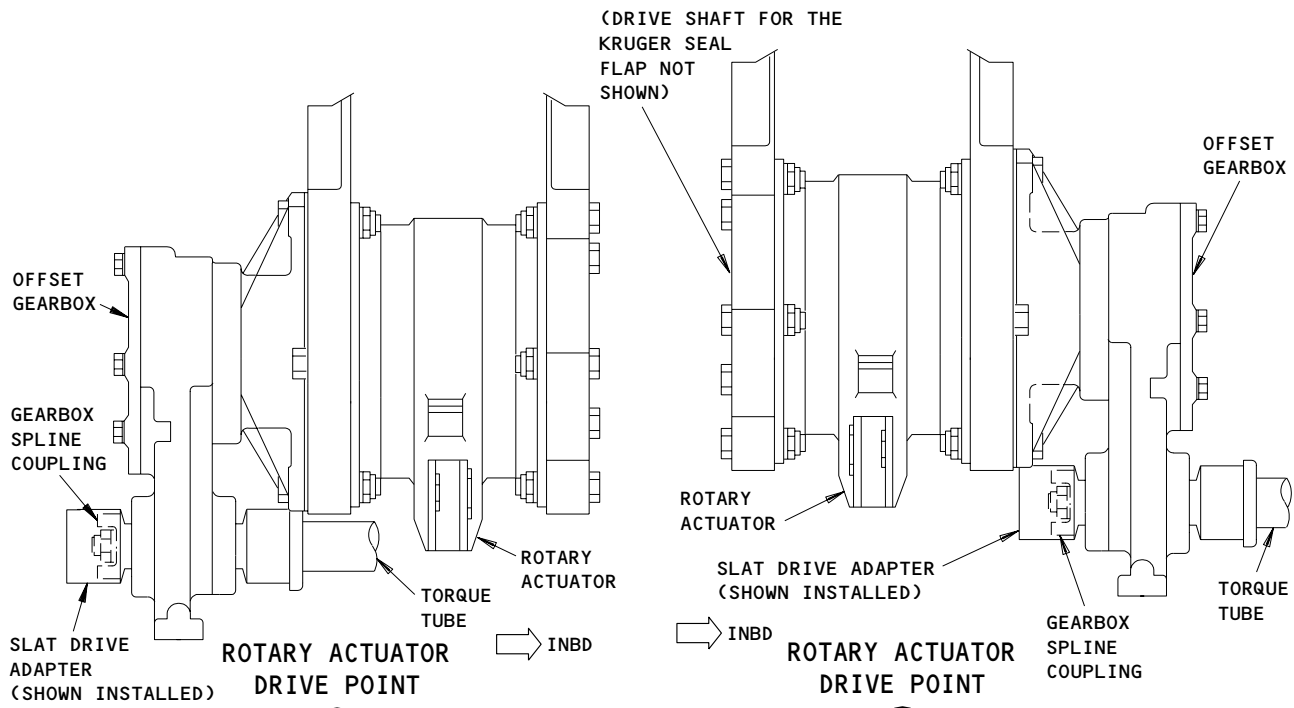
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316294



(B)



(C)

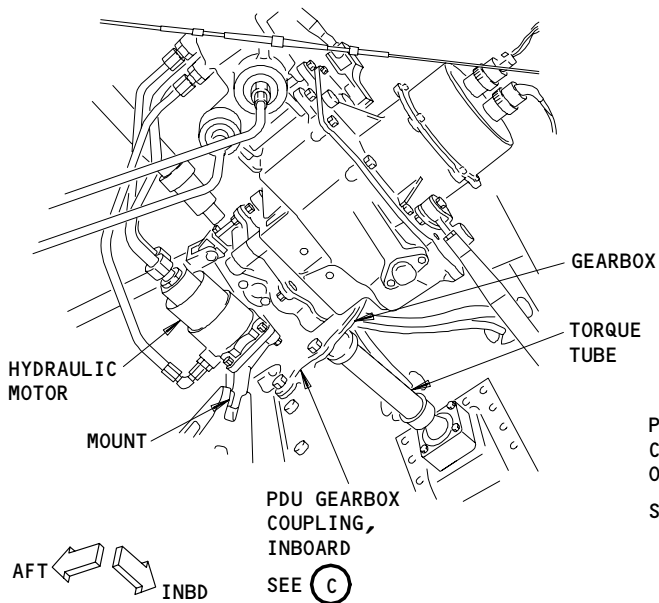
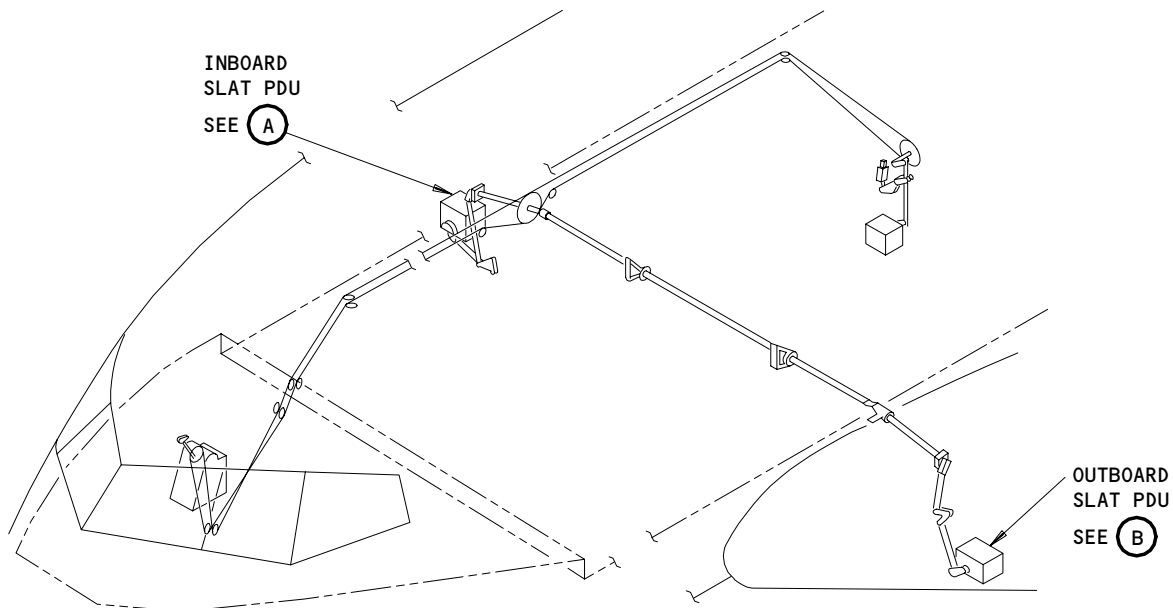
(D)

Slat Manual Operation  
(from the End of the Slat Drive)  
Figure 203 (Sheet 2)

EFFECTIVITY	
ALL	

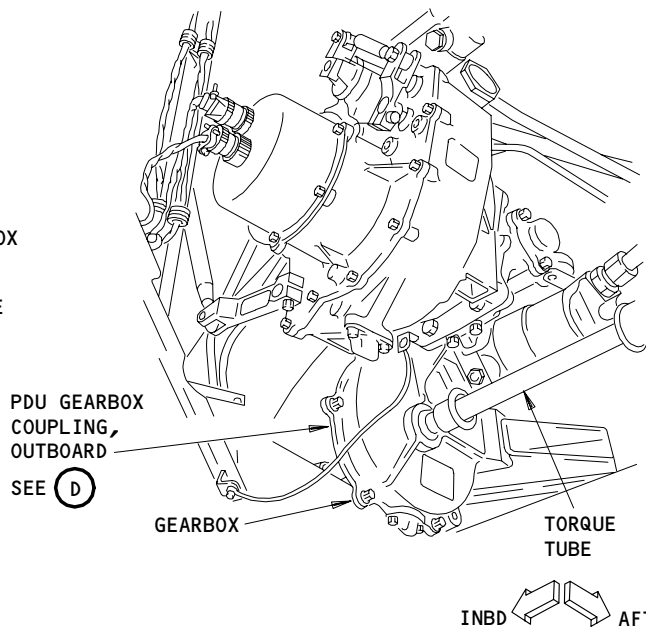
27-81-00

316298



INBOARD SLAT PDU  
(BOTTOM VIEW)

(A)



OUTBOARD SLAT PDU

(B)

Slat Manual Operation  
(from the Inboard and Outboard Slat PDUs)  
Figure 204 (Sheet 1)

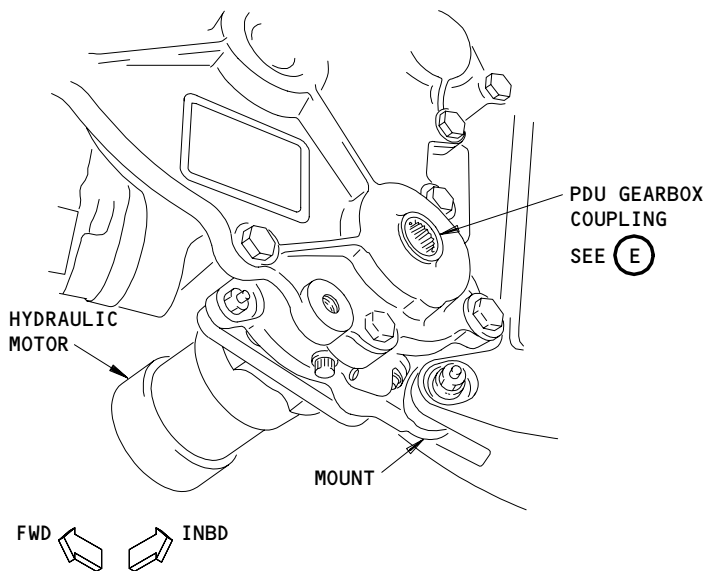
EFFECTIVITY

ALL

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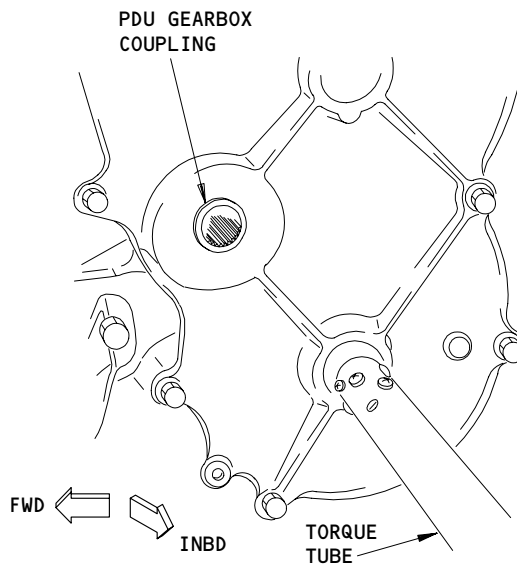
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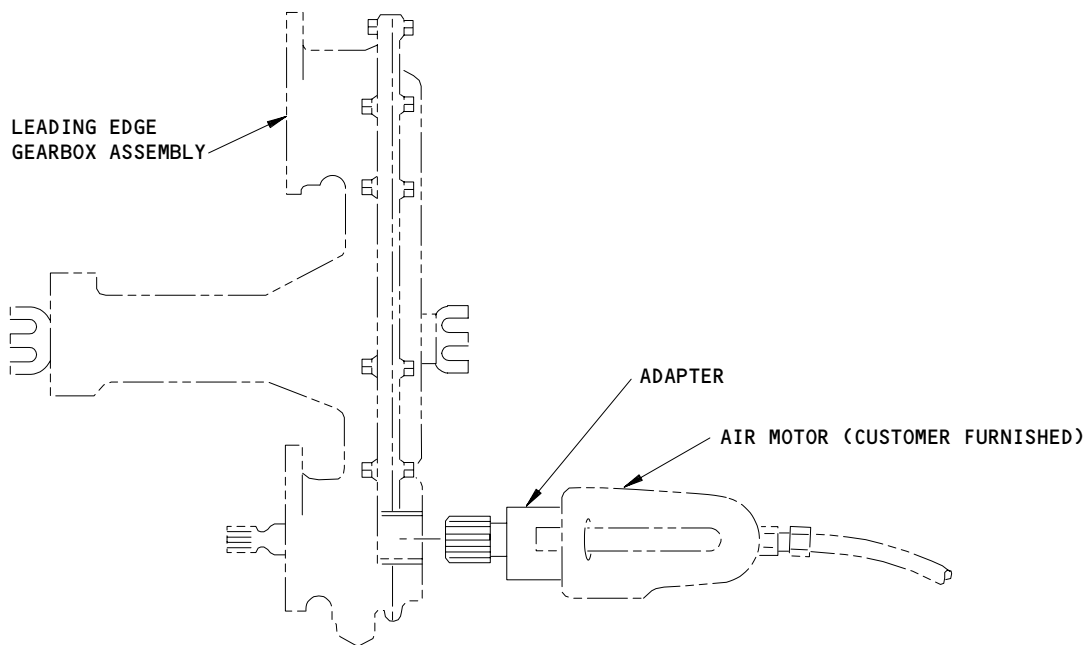
PDU GEARBOX COUPLING, INBOARD

(C)



PDU GEARBOX COUPLING, OUTBOARD

(D)



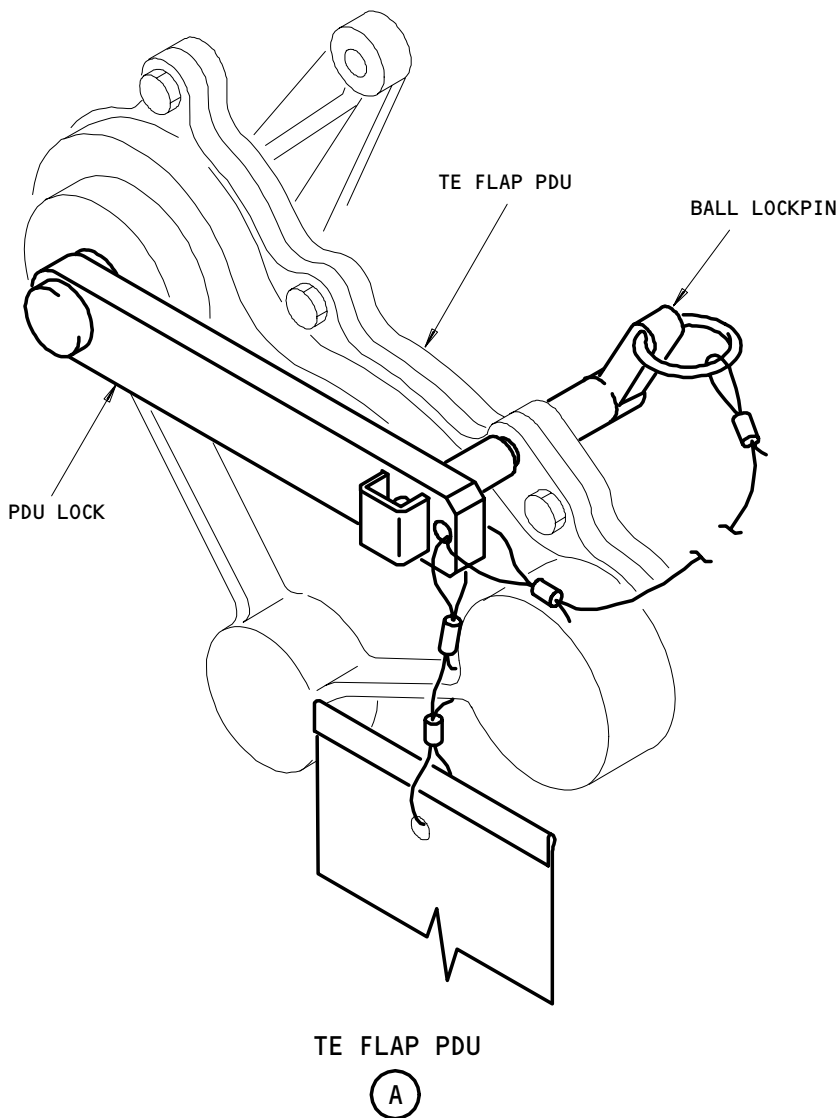
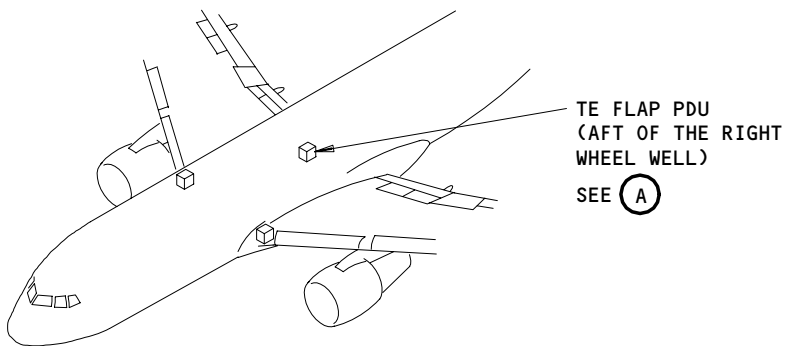
ADAPTER - LEADING EDGE SLAT AND TRAILING EDGE FLAP, MANUAL DRIVE

(E)

Slat Manual Operation  
(from the Inboard and Outboard Slat PDUs)  
Figure 204 (Sheet 2)

EFFECTIVITY	ALL
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PDU Lock for the TE Flap PDU  
Figure 205

EFFECTIVITY	
	ALL

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(b) 6F24, ALTN SLAT OUTBD PWR

S 862-252

(7) Remove the power from the center hydraulic system (Ref 29-11-00).

S 012-253

(8) Open the access panels, 511BB, and 611BB, to get access to the inboard and outboard slat power drive units (PDU) (Ref 06-44-00).

S 982-254

(9) Turn the manual override lever on the bypass valve at the inboard and outboard slat PDUs to the No. 1 (bypass) position (Fig. 201).

S 492-255

(10) Attach a DO-NOT-OPERATE tag to each manual override lever.

S 492-256

(11) Install the groundlocks on the inboard and outboard slat PDUs (Fig. 202).

S 012-257

(12) If it is necessary to get access to the LE slat and krueger seal flap drive, remove the applicable fixed lower access panels (511QB/511RB - Left Wing or 611QB/611RB - Right Wing) at the leading edge of the wing (AMM 06-44-00/201).

S 862-258

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(13) Pressurize the center hydraulic system only if it is necessary for maintenance (Ref 29-11-00).

S 842-259

(14) Put the airplane back to its usual condition after you complete the maintenance in which the slat deactivation was necessary.

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E. Put the Airplane Back to Its Usual Condition

S 212-260

- (1) Make sure the position of the high-lift control surfaces agree with the commanded position as shown in Table 201.

NOTE: The commanded position is set by one of these controls:  
- the flap control lever for the flap/slat primary drive, on the P10 quadrant stand.  
- the position selector switch for the flap/slat alternate drive, on the P3 panel.

S 092-261

- (2) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 202).

S 092-262

- (3) Remove the DO-NOT-OPERATE tag from the manual override lever at the inboard and outboard slat PDU.

S 982-263

- (4) Turn each manual override lever to the No. 2 (normal) position.

S 412-264

- (5) If removed, install the fixed lower access panels (511QB/511RB - Left Wing or 611QB/611RB - Right Wing) at the leading edge of the wing (AMM 06-44-00/201).

S 412-265

- (6) Install the access panels, 511BB and 611BB, to close the access for the inboard and outboard slat PDUs (Ref 06-44-00/201).

S 862-266

- (7) Remove the circuit breaker locks and close these circuit breakers on the P11 panel:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD

S 862-267

- (8) Remove the circuit breaker locks and close these circuit breakers on the P6 panel:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 092-268

- (9) If installed, remove the DO-NOT-OPERATE tag on the flap control lever or the position selector switch.

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S 092-269

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(10) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

S 862-270

(11) Remove the power from the center hydraulic system (Ref 29-11-00).

S 862-271

(12) Remove electrical power, if it is not necessary (Ref 24-22-00).

TASK 27-81-00-862-272

3. Extend the Leading Edge Slats with Primary (Hydraulic) Power

A. References

- (1) 24-22-00/201, Electrical Power - Control
- (2) 27-51-00/201, Trailing Edge Flap System
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 510/610 Wing Leading Edge - Inboard
  - 520/620 Wing Leading Edge - Outboard

C. Extend the Leading Edge Slats

**NOTE:** Refer to Table 201 to extend the slat in this procedure.

S 212-273

(1) Make sure the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position.

S 212-274

(2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 212-275

(3) Make sure the groundlocks are not installed on the inboard and outboard slat PDUs.

S 862-276

(4) Supply electrical power (Ref 24-22-00).

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S 862-277

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

**CAUTION:** WHILE USING THE ALTERNATE OR THE PRIMARY METHOD TO OPERATE THE LEADING EDGE SLAT DRIVE SYSTEM, MAKE SURE THE SAME METHOD IS USED UNTIL THE CYCLE IS COMPLETED. QUICK TRANSITION OF THE LEADING EDGE SLAT DRIVE SYSTEM FROM THE ALTERNATE MODE TO THE PRIMARY MODE CAN CAUSE INTERNAL FAILURE OF THE ALTERNATE DRIVE MOTOR.

(5) Pressurize the center hydraulic system (Ref 29-11-00).

S 862-278

(6) Move the flap control lever to one of the positions shown in Table 201, and make sure the flaps and slats move to the correct position.

S 862-279

(7) Remove the power from the center hydraulic system, if it is not necessary (Ref 29-11-00).

S 042-280

(8) Do the deactivation procedure for the slats if it is necessary for maintenance.

S 042-281

(9) Do the deactivation procedure for the flaps if it is necessary for maintenance (Ref 27-51-00).

TASK 27-81-00-862-282

4. Retract the Leading Edge Slats with Primary (Hydraulic) Power

A. References

- (1) 24-22-00/201, Electrical Power - Control
- (2) 27-51-00/201, Trailing Edge Flap System
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

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B. Access

(1) Location Zones

211/212 Control Cabin  
510/610 Wing Leading Edge - Inboard  
520/620 Wing Leading Edge - Outboard

C. Retract the Leading Edge Slats

**NOTE:** Refer to Table 201 to retract the slats in this procedure.

S 212-283

- (1) Make sure the position of the flaps and the slats agree with the position of the flap control lever as shown in Table 201.

S 212-284

- (2) Make sure the groundlocks are not installed on the inboard and outboard slat PDUs.

S 862-285

- (3) Supply electrical power (Ref 24-22-00).

S 862-286

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

**CAUTION:** WHILE USING THE ALTERNATE OR THE PRIMARY METHOD TO OPERATE THE LEADING EDGE SLAT DRIVE SYSTEM, MAKE SURE THE SAME METHOD IS USED UNTIL THE CYCLE IS COMPLETED. QUICK TRANSITION OF THE LEADING EDGE SLAT DRIVE SYSTEM FROM THE ALTERNATE MODE TO THE PRIMARY MODE CAN CAUSE INTERNAL FAILURE OF THE ALTERNATE DRIVE MOTOR.

- (4) Pressurize the center hydraulic system (Ref 29-11-00).

S 862-287

- (5) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted position.

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- S 862-288  
(6) Remove electrical power if it is not necessary (Ref 24-22-00).

- S 862-289  
(7) Remove the power from the center hydraulic system, if it is not necessary (Ref 29-11-00).

TASK 27-81-00-862-290

5. Extend the Leading Edge Slats with Alternate (Electric) Power

A. References

- (1) 24-22-00/201, Electrical Power - Control
- (2) 27-51-00/201, Trailing Edge Flap System
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 510/610 Wing Leading Edge - Inboard
  - 520/620 Wing Leading Edge - Outboard

C. Extend the Leading Edge Slats

- S 212-291  
(1) Make sure the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position.
- S 212-292  
(2) Make sure the flap control lever is in the zero (FLAPS UP) detent.
- S 212-293  
(3) Make sure the position selector switch for the flap/slat alternate drive (on the first officer's main instrument panel, P3) is in the NORM detent.
- S 862-294  
(4) Supply electrical power (Ref 24-22-00).
- S 212-295  
(5) Make sure the arming switches for the flap and slat alternate drives (on the P3 panel) are not in the armed position (ALTN switch lights are off).
- S 212-296  
(6) Make sure the amber TRAILING EDGE and LEADING EDGE lights (on the P3 panel) are off.
- S 862-297  
(7) Push the LE arming switch for the slat alternate drive to arm the slat alternate drive for the inboard and outboard slats (ALTN switch light comes on).

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S 212-298

- (8) Make sure the amber LEADING EDGE light comes on.

S 212-299

- (9) Make sure this message, LE SLAT DISAGREE, shows on the top EICAS display.

S 862-300

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE SLATS WHEN YOU OPERATE THE SLAT ALTERNATE DRIVE. ACCIDENTAL MOVEMENT OF THE SLATS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

**CAUTION:** DO NOT OPERATE THE ALTERNATE DRIVE MOTOR CONTINUOUSLY FOR MORE THAN 4 MINUTES. DO NOT OPERATE THE MOTOR AGAIN UNTIL IT IS COOL FOR AT LEAST 20 MINUTES TO PREVENT DAMAGE TO THE MOTOR.

**CAUTION:** WHILE USING THE ALTERNATE OR THE PRIMARY METHOD TO OPERATE THE LEADING EDGE SLAT DRIVE SYSTEM, MAKE SURE THE SAME METHOD IS USED UNTIL THE CYCLE IS COMPLETED. QUICK TRANSITION OF THE LEADING EDGE SLAT DRIVE SYSTEM FROM THE ALTERNATE MODE TO THE PRIMARY MODE CAN CAUSE INTERNAL FAILURE OF THE ALTERNATE DRIVE MOTOR.

- (10) Turn the position selector switch for the flap/slat alternate drive to a position shown in Table 201, and make sure the slats move to the correct position.

S 212-301

- (11) Make sure the amber LEADING EDGE light goes off when you turn the switch out of the NORM detent.

S 212-302

- (12) Make sure the message, LE SLAT DISAGREE, does not show on the top EICAS display.

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S 862-303  
(13) Remove electrical power if it is not necessary (Ref 24-22-00).

S 042-304  
(14) Do the deactivation procedure for the slats if it is necessary for maintenance.

S 042-305  
(15) Do the deactivation procedure for the flaps if it is necessary (Ref 27-51-00).

TASK 27-81-00-602-306

6. Retract the Leading Edge Slats with Alternate (Electric) Power

A. References

- (1) 24-22-00/201, Electrical Power - Control
- (2) 27-51-00/201, Trailing Edge Flap System
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 510/610 Wing Leading Edge - Inboard
  - 520/620 Wing Leading Edge - Outboard

C. Retract the Leading Edge Slats

S 212-307  
(1) Make sure the position of the flaps and slats agree with the position on the position selector switch (on the P3 panel), as shown in Table 201.

S 862-308  
(2) Supply electrical power (Ref 24-22-00).

S 212-309  
(3) Make sure the LE arming switch for the slat alternate drive (on the P3 panel) is in the armed position (ALTN switch light on).

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S 862-310

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE SLATS WHEN YOU OPERATE THE SLAT ALTERNATE DRIVE. ACCIDENTAL MOVEMENT OF THE SLATS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

**CAUTION:** DO NOT OPERATE THE ALTERNATE DRIVE MOTOR CONTINUOUSLY FOR MORE THAN 4 MINUTES. DO NOT OPERATE THE MOTOR AGAIN UNTIL IT IS COOL FOR AT LEAST 20 MINUTES TO PREVENT DAMAGE TO THE MOTOR.

**CAUTION:** WHILE USING THE ALTERNATE OR THE PRIMARY METHOD TO OPERATE THE LEADING EDGE SLAT DRIVE SYSTEM, MAKE SURE THE SAME METHOD IS USED UNTIL THE CYCLE IS COMPLETED. QUICK TRANSITION OF THE LEADING EDGE SLAT DRIVE SYSTEM FROM THE ALTERNATE MODE TO THE PRIMARY MODE CAN CAUSE INTERNAL FAILURE OF THE ALTERNATE DRIVE MOTOR.

- (4) Turn the position selector switch to the UP detent, and make sure the inboard and outboard slats move to the fully retracted position.

**NOTE:** The slat movement is not as accurate when the slats are retracted by the slat alternate drive. Slat movement with electrical power has a larger position tolerance than the movement with the use of hydraulic power.

S 862-311

- (5) Turn the position selector switch to the NORM detent and make sure these conditions occur:
- (a) The amber LEADING EDGE light comes on.
  - (b) This message, LE SLAT DISAGREE, shows on the top EICAS display.

S 862-312

- (6) Push the LE arming switch for the slat alternate drive to disarm the slat alternate drive for the inboard and outboard slats (ALTN switch light goes off).

S 212-313

- (7) Make sure the amber LEADING EDGE light goes off.

S 212-314

- (8) Make sure the message, LE SLAT DISAGREE, does not show on the top EICAS display.

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S 862-315

- (9) Remove electrical power if it is not necessary (Ref 24-22-00).

TASK 27-81-00-982-316

7. Manually Extend and Retract the Leading Edge Slats without Airplane Power

A. General

- (1) Use this procedure to manually extend and retract the inboard and/or the outboard slats when airplane power is not available.
- (2) In this task, there are two different procedures to manually operate the slats. You can manually extend or retract the slats from the end of the inboard and outboard slat drives, or from the inboard and outboard slat PDUs.

Because there are two different procedures to operate the slats, only do the steps that are applicable to your procedure. Do the steps in the "Prepare for Manual Operation" topic before you start each procedure.

- (3) Follow these procedures carefully. You can manually move the slats away from the position that is set on the flap control lever, or the position selector switch. The slats will automatically move back to the commanded position when hydraulic or electrical power is supplied.

B. Equipment

- (1) Circuit Breaker Lockout Clip,  
(2 necessary) Commercially Available
- (2) Adapter - Leading Edge Slat Drive - A27077-1

NOTE: Use this adapter only if you operate the slats from the end of the slat drivers.

- (3) Adapter - Leading Edge Slat Drive - A27102-7

NOTE: Use this adapter only if you operate the slats from the inboard and outboard slat PDUs.

- (4) Air Motor with a 1/2 inch Drive -  
Commercially Available

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C. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) 32-00-20/201, Landing Gear Downlocks
- (5) 78-31-00/201, Thrust Reverser System

D. Access

(1) Location Zones

211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	Le Slat Power Drive Unit - Inboard (Right)
521ALB	Outboard Slat Mechanism (Left)
621ALB	Outboard Slat Mechanism (Right)
511NB	Lower LE Structure, Slat Mechanism (Left)
611NB	Lower LE SStructure, Slat Mechanism (Right)

E. Prepare for Manual Slat Operation

S 212-317

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 042-318

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 212-319

**WARNING:** MAKE SURE THE PRESSURE IS REMOVED FROM THE CENTER HYDRAULIC SYSTEM BEFORE YOU MANUALLY EXTEND OR RETRACT THE SLATS TO PREVENT INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Make sure the pressure is removed from the center hydraulic system. (Ref 29-11-00).

S 212-320

- (4) Make sure the electrical power is removed (Ref 24-22-00).

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- S 862-321
- (5) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:
- (a) 6D24, ALT FLAP PWR
- S 862-322
- (6) Open these circuit breakers on the P6 panel and install circuit breaker locks:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR
- S 862-323
- (7) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11J24, FLAPS ALTN CONT
- S 862-324
- (8) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
- S 012-325
- (9) Remove the access panels, 511BB and 611BB, to get access to the outboard and inboard slat power drive units (PDUs) (Ref 06-44-00).

S 982-326

**CAUTION:** MAKE SURE YOU MOVE THE MANUAL OVERRIDE LEVER ON THE PDU BYPASS VALVE TO POSITION 1 (BYPASS) BEFORE YOU MANUALLY OPERATE THE SLATS. IF THE BYPASS VALVE IS NOT IN POSITION 1, HYDRAULIC FLUID WILL NOT BYPASS IN THE LE SLAT PDU, AND CAUSE DAMAGE TO THE PDU.

- (10) Move the manual override lever on the inboard and outboard slat PDU to position 1 (bypass), and install a DO-NOT-OPERATE tag on each manual override lever (Fig. 203).

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- F. Manually Operate the Inboard/Outboard Slats from the End of the Slat Drives (Fig. 203).

**NOTE:** Use the A27077 slat drive adapter to manually operate the slats in this procedure.

S 012-327

- (1) If it is necessary to operate the outboard slats, remove the access panel 521ALB (Slat No. 1 - Left Wing) or 621ALB (Slat No. 12 - Right Wing) to get access to the outboard offset gearboxes. (AMM 06-44-00/201).

**NOTE:** It is necessary to get access to one of the two gearboxes only to manually operate all of the outboard slats.

S 012-328

- (2) If it is necessary to operate the inboard slats, remove the access panel 511NB (Slat No. 6 - Left Wing) or 611NB (Slat No. 7 - Right Wing) to get access to the outboard offset gearboxes (AMM 06-44-00/201).

**NOTE:** It is necessary to get access to one of the two gearboxes only to manually operate all of the inboard slats.

S 492-329

- (3) To manually operate the outboard slats, put the slat drive adapter on the outboard offset gearbox of slat No. 1 or No. 12 (Detail C).

S 492-437

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) To manually operate the inboard slats, put the slat drive adapter on the outboard offset gearbox of slat No. 6 or No. 7 (Details D and E).

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S 492-331

**CAUTION:** DO NOT USE AN AIR MOTOR WITH AN OUTPUT GREATER THAN 500 POUND-INCHES TO PREVENT DAMAGE TO THE PDU.

**CAUTION:** DO NOT PERMIT THE ROTARY ACTUATOR ARMS HIT THE EXTEND OR RETRACT OVERTRAVEL STOPS AT FAST SPEED. 150-200 RPM IS RECOMMENDED TO PREVENT DAMAGE TO THE AIRPLANE.

(5) Attach an air motor to the slat drive adapter, and move the slats to the necessary position. The direction to turn the slat drive is shown in Table 202.

**NOTE:** The inboard and outboard slat drive system can turn approximately 120 turns from the fully retracted position to the fully extended position.

TABLE 202			
DIRECTION TO TURN THE SLAT DRIVE TO OPERATE THE SLATS *[1]			
SLAT SET	OUTBOARD GEARBOX LOCATION	TO EXTEND SLATS:	TO RETRACT SLATS:
OUTBOARD SLATS	SLAT No. 1	COUNTERCLOCKWISE	CLOCKWISE
	SLAT No. 12	CLOCKWISE	COUNTERCLOCKWISE
INBOARD SLATS	SLAT No. 6	CLOCKWISE	COUNTERCLOCKWISE
	SLAT No. 7	COUNTERCLOCKWISE	CLOCKWISE
*[1] LOOK FROM THE OUTBOARD TO THE INBOARD			

S 092-332

(6) Remove the adapter and the air motor from the airplane.

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- G. Manually Operate the Inboard Outboard Slats from the Inboard and Outboard Slat PDUs (Fig. 204)

NOTE: Use the A27102-7 slat drive adapter to manually operate the slats in this procedure.

S 492-333

- (1) To manually operate the outboard slats, put the slat drive adapter in the PDU gearbox coupling on the outboard slat PDU (Details D and E).

S 492-438

CAUTION: MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (2) To manually operate the inboard slats, put the slat drive adapter in the PDU gearbox coupling for the inboard slat PDU (Details C and E).

S 492-335

CAUTION: DO NOT USE AN AIR MOTOR WITH AN OUTPUT GREATER THAN 500 POUND-INCHES TO PREVENT DAMAGE TO THE PDU.

CAUTION: DO NOT PERMIT THE ROTARY ACTUATOR ARMS HIT THE EXTEND OR RETRACT OVERTRAVEL STOPS AT FAST SPEED, TO PREVENT DAMAGE TO THE AIRPLANE.

- (3) Attach an air motor to the slat drive adapter, and move the slats to the necessary position.

NOTE: The inboard and outboard slat drive system can turn approximately 120 turns from the fully retracted position to the fully extended position.

S 092-336

- (4) Remove the slat drive adapter and the air motor from the airplane.  
H. Put the Airplane Back to Its Usual Condition

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S 212-337

**WARNING:** MAKE SURE THE PRESSURE IS REMOVED FROM THE CENTER HYDRAULIC SYSTEM BEFORE YOU PUT THE MANUAL OVERRIDE LEVER BACK TO THE POSITION 2 (NORMAL). THE SLATS CAN MOVE ACCIDENTALLY WHEN THE CENTER HYDRAULIC SYSTEM IS PRESSURIZED, AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Make sure the pressure is removed from the center hydraulic system (Ref 29-11-00).

S 982-338

- (2) Remove the DO-NOT-OPERATE tags and move the manual override levers on the inboard and outboard slat PDUs to position 2 (normal) (Fig. 203).

S 412-339

- (3) Install the access panels, 511BB or 611BB, for the inboard and outboard slat PDUs (AMM 06-44-00/201).

S 412-340

- (4) If removed, install the access panels 511NB or 611NB for the inboard slat drive (Ref 06-44-00).

S 412-341

- (5) If removed, install the access panels 521ALB or 621ALB for the outboard slat drive (Ref 06-44-00).

S 862-342

- (6) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 862-343

- (7) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

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S 862-344

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE SLATS IN THE STEP THAT FOLLOWS. THE SLATS WILL MOVE TO THE POSITION SET ON THE FLAP CONTROL LEVER WHEN THE CENTER HYDRAULIC SYSTEM IS PRESSURIZED. ACCIDENTAL SLAT MOVEMENT CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (8) Pressurize the center hydraulic system (Ref 29-11-00), and permit the slats to move to the position set on the flap control lever.

S 862-345

- (9) Remove the pressure from the center hydraulic system (Ref 29-11-00).

S 442-346

- (10) Do the activation procedure for the thrust reverser (Ref 78-31-00).

TASK 27-81-00-862-352

8. Operate the Outboard Slats without Movement of the Inboard Slats

A. General

- (1) Use this procedure to operate the outboard slats without movement of the inboard slats. You can operate the outboard slats with primary (hydraulic) power, or with alternate (electric) power. Only do the operation applicable to your maintenance.
- (2) The inboard slats (No. 6 and 7) are deactivated in the fully retracted position. Before you activate the inboard slats, make sure the flap control lever and the position selector switch agree with the position of the inboard slats. The slats can accidentally move to the commanded position when hydraulic or electrical power is supplied.

B. Equipment

- (1) Circuit Breaker Lockout Clip  
(2 necessary) Commercially Available
- (2) Leading Edge Slat Groundlock - A27007-1

C. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

- (1) Location Zones

211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard

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- (2) Access Panel  
611BB LE Slat Power Drive Unit - Inboard (Right)

E. Deactivate the Inboard Slat Drive

- S 212-353  
(1) Make sure the flaps and slats are in the fully retracted position.
- S 212-354  
(2) Make sure the flap control lever is in the zero (FLAPS UP) detent, and attach a DO-NOT-OPERATE tag to the lever.
- S 212-355  
(3) Make sure the position selector switch for the flap/slat alternate drives on the first officer's main instrument panel, P3, is in the NORM detent and attach a DO-NOT-OPERATE tag to the switch.
- S 212-356  
(4) Make sure the LE arming switch for the slat alternate drive, on the P3 panel, is not armed (ALTN switch light is off).
- S 862-357  
(5) Remove the power from the center hydraulic system (Ref 29-11-00/201).
- S 862-358  
(6) Open this circuit breaker on the main power distribution panel, P6, and install a circuit breaker lock and a DO-NOT-CLOSE tag:  
(a) 6D21, ALTN SLAT INBD PWR
- S 862-359  
(7) Open this circuit breaker on the overhead panel, P11 and install a circuit breaker lock and a DO-NOT-CLOSE tag:  
(a) 11H23, SLAT ALTN CONT INBD
- S 012-360  
(8) Remove the access panel, 611BB, below the right wing, to get access to the inboard slat power drive unit (PDU) (Ref 06-44-00/201).
- S 982-361  
(9) Turn the manual override lever on the inboard slat PDU bypass valve to the No. 1 (bypass) position, and attach a DO-NOT-OPERATE tag to the lever.
- S 032-362  
(10) Remove the electrical connector from the electric (alternate drive) motor on the inboard slat PDU (Fig. 201).
- S 032-363  
(11) Remove the electrical connector from the PDU bypass valve (Fig. 201).

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S 492-364

- (12) Install caps to the wire plugs and sockets.

S 492-365

- (13) Install the groundlock in the inboard slat PDU (Fig. 202).

F. Operate the Outboard Slats

**NOTE:** You can operate the outboard slats with primary (hydraulic) or with alternate (electric) power. Only do the steps applicable for your maintenance.

S 862-366

- (1) Do these steps to operate the outboard slats with primary (hydraulic) power:  
(a) Supply electrical power (Ref 24-22-00/201).

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (b) Pressurize the center hydraulic system (Ref 29-11-00/201).  
(c) Remove the DO-NOT-OPERATE tag from the flap control lever, and move the lever to the applicable position shown in Table 201.  
(d) Make sure the outboard slats move to the correct position that you selected.

**NOTE:** The inboard slats will not move.

- (e) After you completed the necessary maintenance, move the flap control lever back to the zero (FLAPS UP) detent to fully retract the outboard slats.

S 862-367

- (2) Do these steps to operate the outboard slats with alternate (electric) power:  
(a) Supply electrical power (Ref 24-22-00/201).  
(b) Push the LE arming switch for the slat alternate drive, on the P3 panel, to arm the slat alternate drive (ALTN switch light comes on).

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- (c) Remove the DO-NOT-OPERATE tag from the position selector switch, on the P3 panel, and turn the switch to the applicable position shown in Table 201.
- (d) Make sure the outboard slats move to the correct position that you selected.

NOTE: The inboard slats will not move.

- (e) After you completed the necessary maintenance, turn the position selector switch back to the UP detent to fully retract the outboard slats.
- (f) Turn the position selector switch to the NORM detent.
- (g) Push the LE arming switch for the slat alternate drive to disarm the slat alternate drive (ALTN switch light goes off).

G. Put the Airplane Back to Its Usual Condition

S 212-368

- (1) Make sure the inboard and outboard slats are in the fully retracted position.

S 212-369

- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 212-370

- (3) Make sure the position selector switch for the flap/slat alternate drives, on the P3 panel, is in the NORM detent.

S 212-371

- (4) Make sure the LE arming switch for the slat alternate drive, on the P3 panel, is not armed (ALTN switch light off).

S 862-372

- (5) Remove the power from the center hydraulic system (Ref 29-11-00/201).

S 092-373

- (6) Remove the groundlock from the inboard slat PDU in the right wing (Fig. 202).

S 092-374

- (7) Remove the caps from the wire plugs and sockets at the inboard slat PDU.

S 432-375

- (8) Connect the electrical connector to the bypass valve on the inboard slat PDU (Fig. 201).

S 432-376

- (9) Connect the electrical connector to the electric (alternate drive) motor on the inboard slat PDU (Fig. 201).

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S 982-377

- (10) Remove the DO-NOT-OPERATE tag from the PDU bypass valve, and turn the bypass valve to the No. 2 (normal) position.

S 412-378

- (11) Install the access panel, 611BB, to close the access to the inboard slat PDU (Ref 06-44-00/201).

S 862-379

- (12) Remove the circuit breaker lock and DO-NOT-CLOSE tag, and close this circuit breaker on the P11 panel:
  - (a) 11H23, SLAT ALTN CONT INBD

S 862-380

- (13) Remove the circuit breaker lock and DO-NOT-CLOSE tag, and close this circuit breaker on the P6 panel:
  - (a) 6D21, ALTN SLAT INBD PWR

S 092-381

- (14) If installed, remove the DO-NOT-OPERATE tag from the flap control lever or the position selector switch.

TASK 27-81-00-862-382

9. Extend and Retract the Slats without Movement of the Flaps

A. General

- (1) Use this procedure to operate the leading edge (LE) slats without the movement of the trailing edge (TE) flaps.
- (2) Refer to 27-51-00, Trailing Edge Flap System, to move the TE flaps without the movement of the LE slats.

B. Equipment

- (1) Circuit Breaker Lockout Clip  
(5 necessary) Commercially Available
- (2) TE Flap PDU Lock - A27009-7

C. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 27-51-00/201, Trailing Edge Flap System
- (4) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) 32-00-15/201, Landing Gear Door Locks
- (6) 32-00-20/201, Landing Gear Downlocks

D. Extend and Retract the Slats without Flap Movement

S 212-383

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

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S 492-384

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (Ref 32-00-15).

S 212-385

- (3) Make sure the position selector switch for the flap/slat alternate drive is in the NORM detent.

S 862-386

- (4) Supply electrical power (Ref 24-22-00).

S 862-387

- (5) Push the arming switch for the flap alternate drive (on the first officer's instrument panel, P3) to arm the flap alternate drive only (ALTN switch light comes on under the TE side).

S 212-388

- (6) Make sure the amber TRAILING EDGE light comes on.

S 212-420

- (7) Make sure the TE FLAP DISAGREE message shows on the EICAS display.

S 862-389

- (8) Open this circuit breaker on the overhead panel, P11 and install a circuit breaker lock and a DO-NOT-CLOSE tag:  
(a) 11J24, FLAPS ALTN CONT

S 862-390

- (9) Open this circuit breaker on the main power distribution panel, P6, and install a circuit breaker lock and a DO-NOT-CLOSE tag:  
(a) 6D24, ALT FLAP PWR

S 862-391

- (10) Open these circuit breakers on the P11 panel and install circuit breaker locks:  
(a) 11H14, SLAT SHUTOFF  
(b) 11H23, SLAT ALTN CONT INBD  
(c) 11H24, SLAT ALTN CONT OUTBD

S 492-392

- (11) Install the PDU lock in the TE flap PDU (Fig. 205).

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S 862-393

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(12) Pressurize the center hydraulic system (Ref 29-11-00).

S 862-394

(13) Move the flap control lever to the necessary position.

S 212-395

(14) Make sure the slats move to the correct position as shown in Table 201, and that the flaps do not move.

S 492-396

(15) Attach a DO-NOT-OPERATE tag to the flap control lever, the arming switch and the position selector switch for the flap alternate drive.

S 862-397

(16) Remove the power from the center hydraulic system if it is not necessary (Ref 29-11-00).

S 042-398

(17) Do the deactivation procedure for the slats if it is necessary for maintenance.

E. Put the Airplane Back to Its Usual Condition

S 862-399

(1) Remove the power from the center hydraulic system (Ref 29-11-00).

S 442-400

(2) Do these steps if you did the deactivation procedure for the slats:

(a) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 202).

(b) Remove the DO-NOT-OPERATE tags and move the manual override levers on the inboard and outboard slat PDUs to position 2 (normal).

(c) Install the access panels, 611BB and 511BB, for the inboard and outboard slat PDUs (Ref 06-44-00).

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S 092-401

- (3) Remove the PDU lock from the TE flap PDU (Fig. 205).

S 092-402

- (4) Remove the DO-NOT-OPERATE tags from the flap control lever, the arming switch, and the position selector switch for the flap alternate drive.

S 862-403

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (5) Pressurize the center hydraulic system (Ref 29-11-00).

S 862-404

- (6) Move the flap control lever to the zero (FLAPS UP) detent and make sure the slats move the fully retracted position.

**NOTE:** Keep the flap alternate drive armed during this step and the steps before (ALTN switch light on).

S 862-405

- (7) Remove the power from the center hydraulic system (Ref 29-11-00).

S 862-406

- (8) Push the arming switch for the flap alternate drive to disarm to flap alternate drive (ALTN switch goes off under the TE side).

S 212-407

- (9) Make sure the amber TRAILING EDGE light goes off.

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S 212-423

- (10) Make sure the TE FLAP DISAGREE message does not show on the EICAS display.

S 862-408

- (11) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the P11 panel:
- (a) 11H14, SLAT SHUTOFF
  - (b) 11H23, SLAT ALTN CONT INBD
  - (c) 11H24, SLAT ALTN CONT OUTBD
  - (d) 11J24, FLAPS ALTN CONT

S 862-409

- (12) Remove the circuit breaker lock and DO-NOT-CLOSE tag and close this circuit breaker on the P6 panel:
- (a) 6D24, ALTN FLAP PWR

S 092-410

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (13) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

S 862-411

- (14) Remove electrical power if it is not necessary (Ref 24-22-00).

TASK 27-81-00-902-157

10. Removal/Installation for the Fixed Lower Access Panels at the Leading Edge

A. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 500/600 Left Wing / Right Wing

C. Removal and Installation Procedure for the Fixed Lower Access Panels

S 862-158

- (1) Extend the flaps and slats to the fully extended position with the instructions given in the "Extend and Retract the Leading Edge Slats with Primary Power" task.

S 862-159

- (2) Remove the pressure from the center hydraulic system (Ref 29-11-00).

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- S 902-163
- (3) Remove or install the fixed lower access panel as necessary (Ref 06-44-00).
- S 862-161
- (4) Retract the flaps and slats to the fully retracted position with the instruction given in the "Extend and Retract the Leading Edge Slats with Primary Power" task.
- S 862-162
- (5) Remove the power from the center hydraulic system if it is not necessary (Ref 29-11-00).

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LEADING EDGE SLAT SYSTEM - ADJUSTMENT/TEST

1. General

- A. This procedure contains tasks for the adjustment and tests of the leading edge (LE) slat system:
- Leading Edge Slat System - Adjustment
  - Slat Alternate Power and Drive System - Test
  - Slat Asymmetry Protection System - Test
  - Slat Failure Protection System - Test
- B. For a complete SYSTEM TEST of the LE Slat System, it is necessary to do all the tests that are in this procedure. If you will do all the tests, it is not necessary to repeat the same steps in the "Prepare for the Test" paragraph. Put the airplane back to its usual condition after you completed all the necessary tests.
- C. For a complete OPERATIONAL TEST of the leading edge slat system, it is necessary to do these tests:
- Flap and Slat Primary Drives and Position Indicating System - Test (Ref 27-51-00/501)
  - Slat Alternate Power and Drive System - Test
  - Slat Failure Protection System - Test
- D. The slats are identified by the number 1 through 12, from the left wing to the right wing (Fig. 501).
- (1) The left and right inboard slats are identified by the number 6 and 7, and are moved by the inboard slat power drive unit (PDU) and drive.
  - (2) The outboard slats are identified by the numbers 1 through 5 for the left wing, and 8 through 12 for the right wing. All the outboard slats are moved by the outboard slat PDU and drive.
- E. During the extension of the inboard slats, all the torque tubes in the inboard slat drive turn clockwise as seen from the left side. The rotary actuator arms turn in the direction opposite to the torque tubes. The torque tubes are connected to the offset gearboxes for the inboard slat drive.

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- F. During the extension of the outboard slats, all the torque tubes for the outboard slat drive turn counterclockwise as seen from the left side. The rotary actuator arms turn in the direction opposite to the torque tubes. The torque tubes are connected to the offset gearboxes for the outboard slat drive.
- G. These systems must operate correctly before the LE slat system can operate correctly:
  - LE Slat Position Indicating System
  - TE Flap System
  - TE Flap Position Indicating System
  - Proximity Switch Electronic Unit (PSEU)
  - Flap/Slat Electronic Unit (FSEU).
- H. For a test of the primary LE slat drive and the krueger seal flap drive, refer to the "Flap and Slat Primary Drives and Position Indicating Systems - Test" task in the Trailing Edge Flap System, AMM 27-51-00/501, procedure.
- I. The flaps and slats operate in a controlled sequence. The movement of the flaps and slats do not always occur at the same time. Refer to the system tests in AMM 27-51-00/501 to examine the flap movement and the flap position indicating system.
- J. Refer to AMM 27-88-00/501 for the system test of the slat sensor switches.
- K. Refer to AMM 31-51-00/501 for the system test of the slat takeoff warning system.
- L. Refer to AMM 27-81-00/601 for a system test of the flap/slat inhibit system (extend and retract interlock).

TASK 27-81-00-825-437

2. Leading Edge Slat System - Adjustment

A. General

- (1) This task contains the adjustment procedure for the leading edge (LE) slat drive system, which contains these topics:
  - Inboard Slat PDU
  - Outboard Slat PDU
  - Inboard Slat Drive
  - Outboard Slat Drive
  - Krueger Seal Flap Drive
- (2) To start one of these procedures, follow the instructions in the "Prepare for the Adjustment" topic before you do the applicable procedure to adjust the component. Follow the instructions in the "Put the Airplane Back to Its Usual Condition" topic after you completed the necessary adjustment procedures.

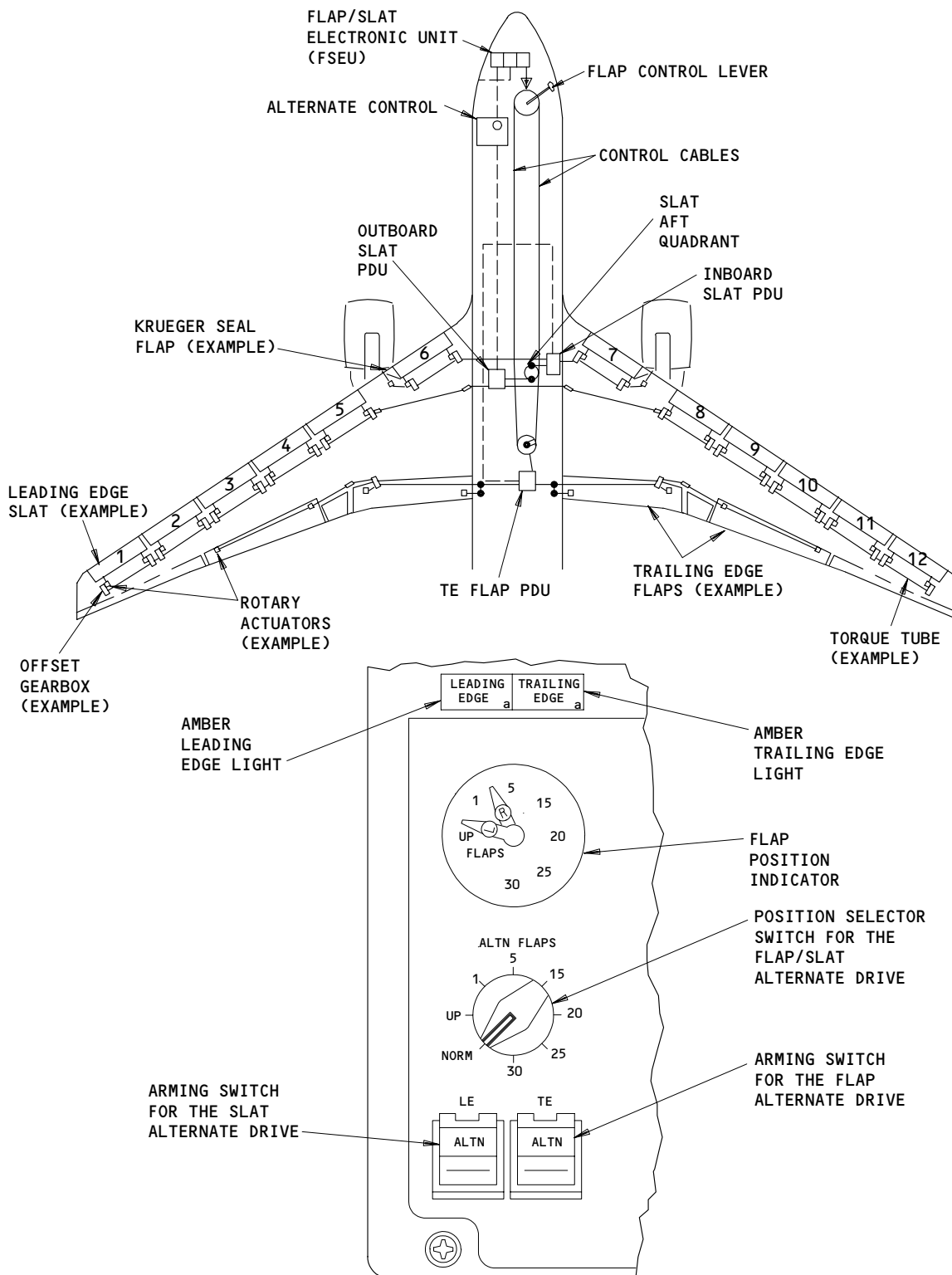
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FIRST OFFICER MAIN INSTRUMENT PANEL (P3)

Leading Edge Slats and Trailing Edge Flaps  
Figure 501

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- (3) These conditions must be satisfactory before you can adjust the LE slat system in this procedure:
  - (a) The trailing edge (TE) flap system, the flap position transmitters, and the RVDTs on the flap control lever must be correctly adjusted (AMM 27-51-00/501).
  - (b) The LE slat sensor switches must be correctly adjusted (AMM 27-88-00/501).
- (4) The inboard slat drive must be correctly adjusted before you can adjust the Krueger seal flap drive on the left and the right wing.
- (5) It is necessary to adjust the two RVDTs in the inboard slat power drive unit (PDU) after you adjust the inboard slat PDU for the mechanical and hydraulic null.
- (6) It is necessary to adjust the two RVDTs in the outboard slat power drive unit (PDU) after you adjust the outboard slat PDU for the mechanical and hydraulic null.
- (7) To adjust the two RVDTs in the control unit of the inboard and outboard slat PDUs, it is necessary to remove the RVDTs (AMM 27-81-11/401).
- (8) Refer to AMM 27-81-01/401 to adjust the inboard slats for fit-and-fair and preload.
- (9) Refer to AMM 27-81-02/501 to adjust the outboard slats for fit-and-fair and preload.
- (10) Refer to AMM 27-81-04/201 for Krueger seal flap adjustment.
- (11) The inboard and outboard slat systems are adjusted correctly when all of these conditions agree:
  - (a) At the inboard slat PDU:
    - 1) You can install rig pin LE5 freely into the rig pin hole on the input cam after the slats are moved to the fully retracted position with hydraulic power (Detail C, Fig. 502).
    - 2) You can install rig pin LE6 freely into the rig pin hole on the follow-up cam after the slats are moved to the fully retracted position with hydraulic power (Detail D, Fig. 502).
  - (b) At the outboard slat PDU:
    - 1) You can install rig pin LE2 freely into the rig pin hole for the input cam after the slats are moved to the fully retracted position with hydraulic power (Detail B, Fig. 503). It is necessary to apply a 15-20 pound load to the pilot input arm in the direction of the input control rod to examine the fit of rig pin LE2.

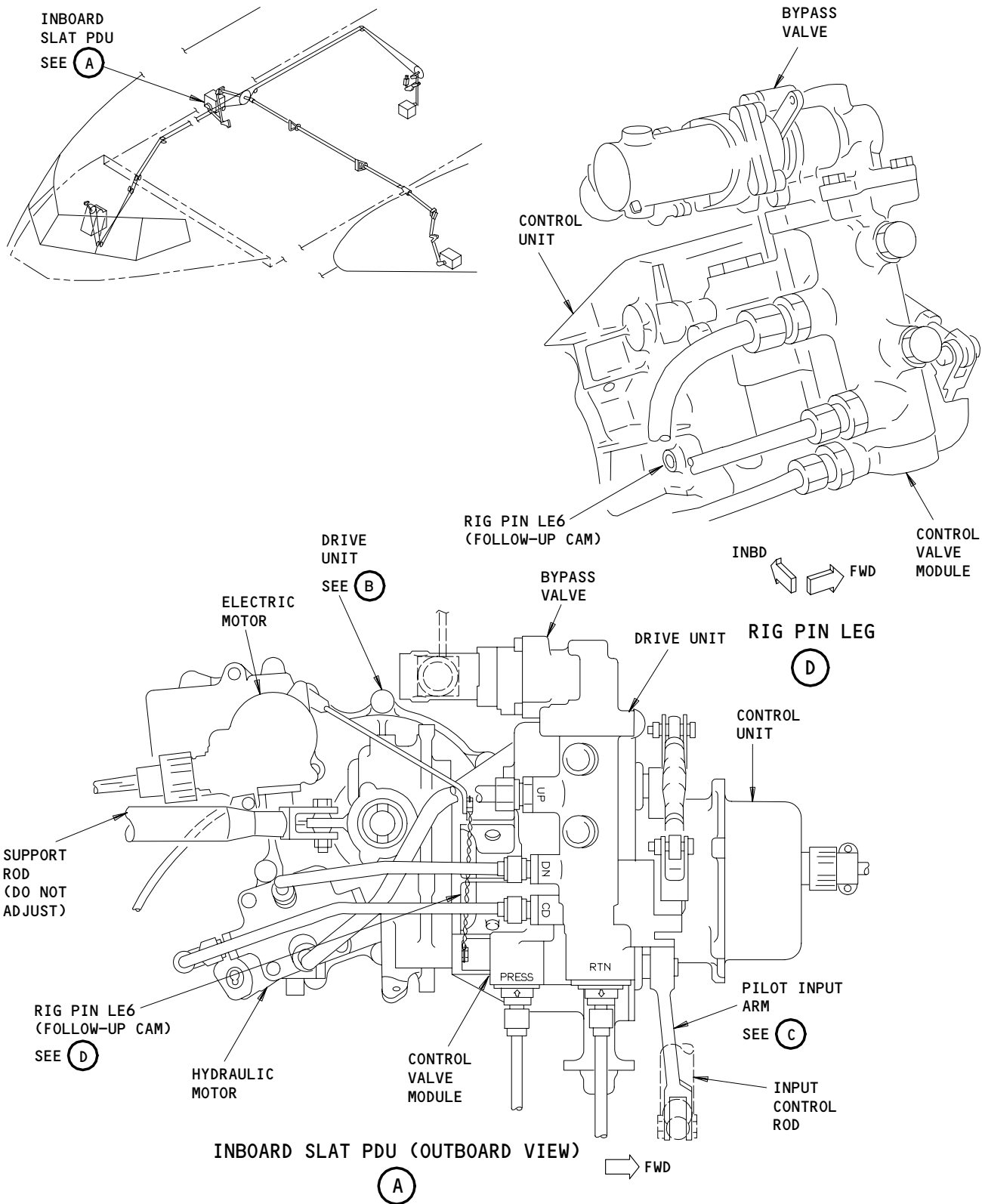
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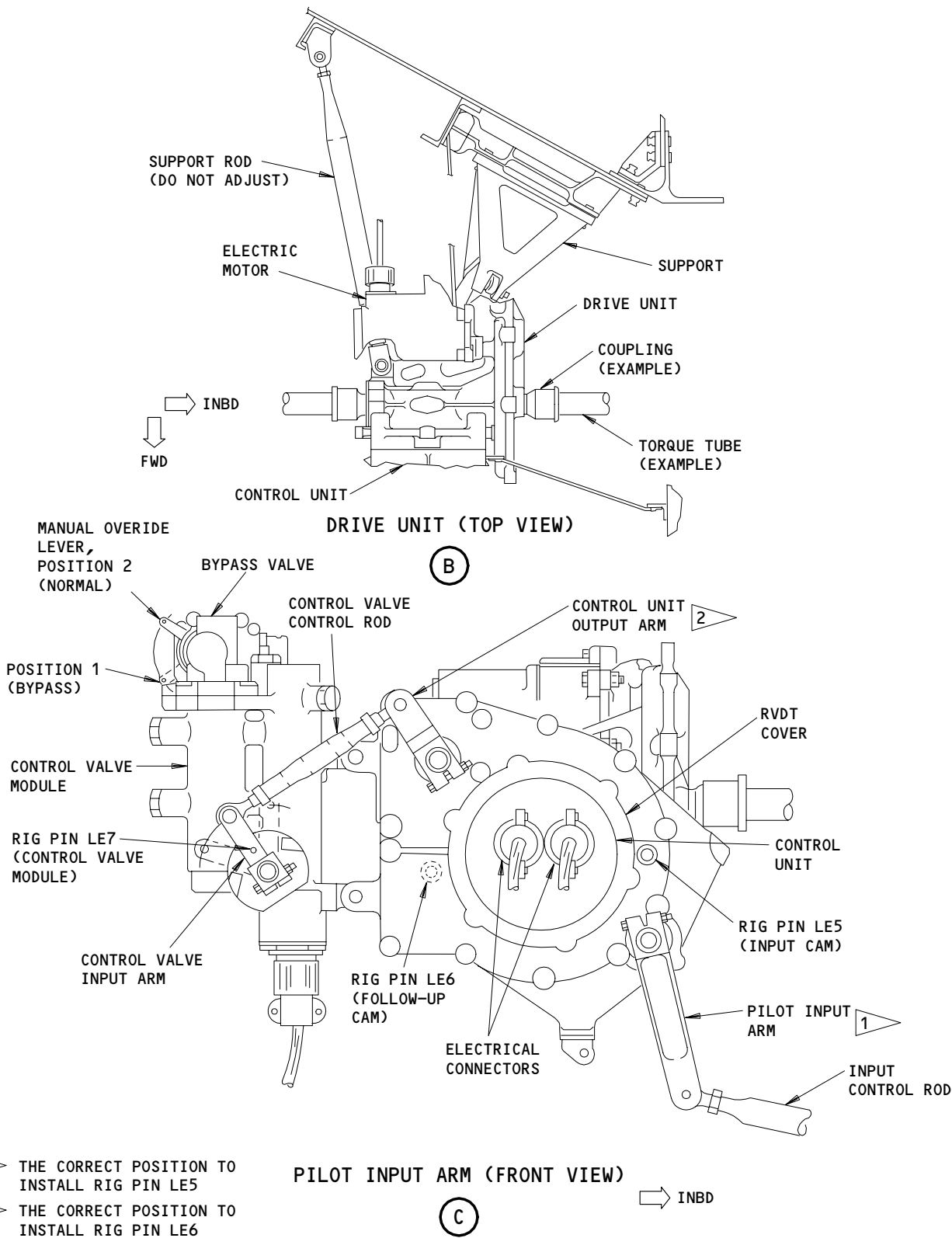
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Inboard Slat Power Drive Unit (PDU) Adjustment  
Figure 502 (Sheet 1)

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Inboard Slat Power Drive Unit (PDU) Adjustment  
Figure 502 (Sheet 2)

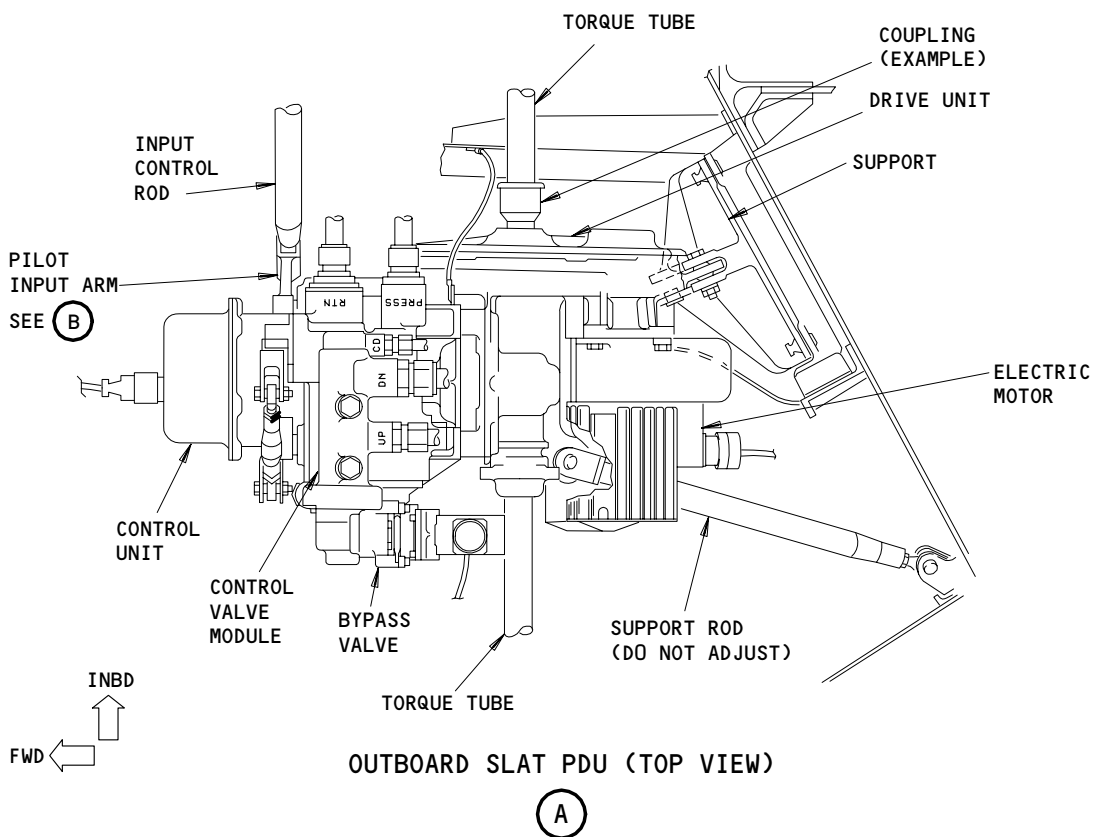
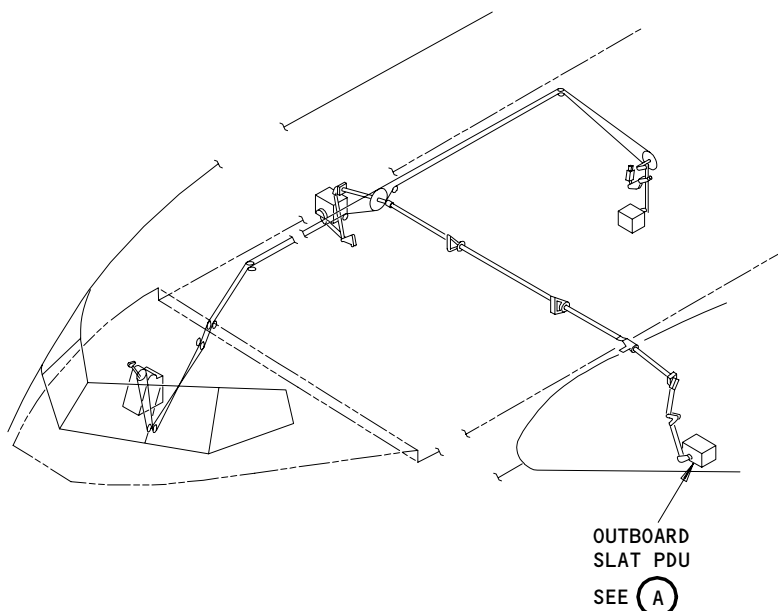
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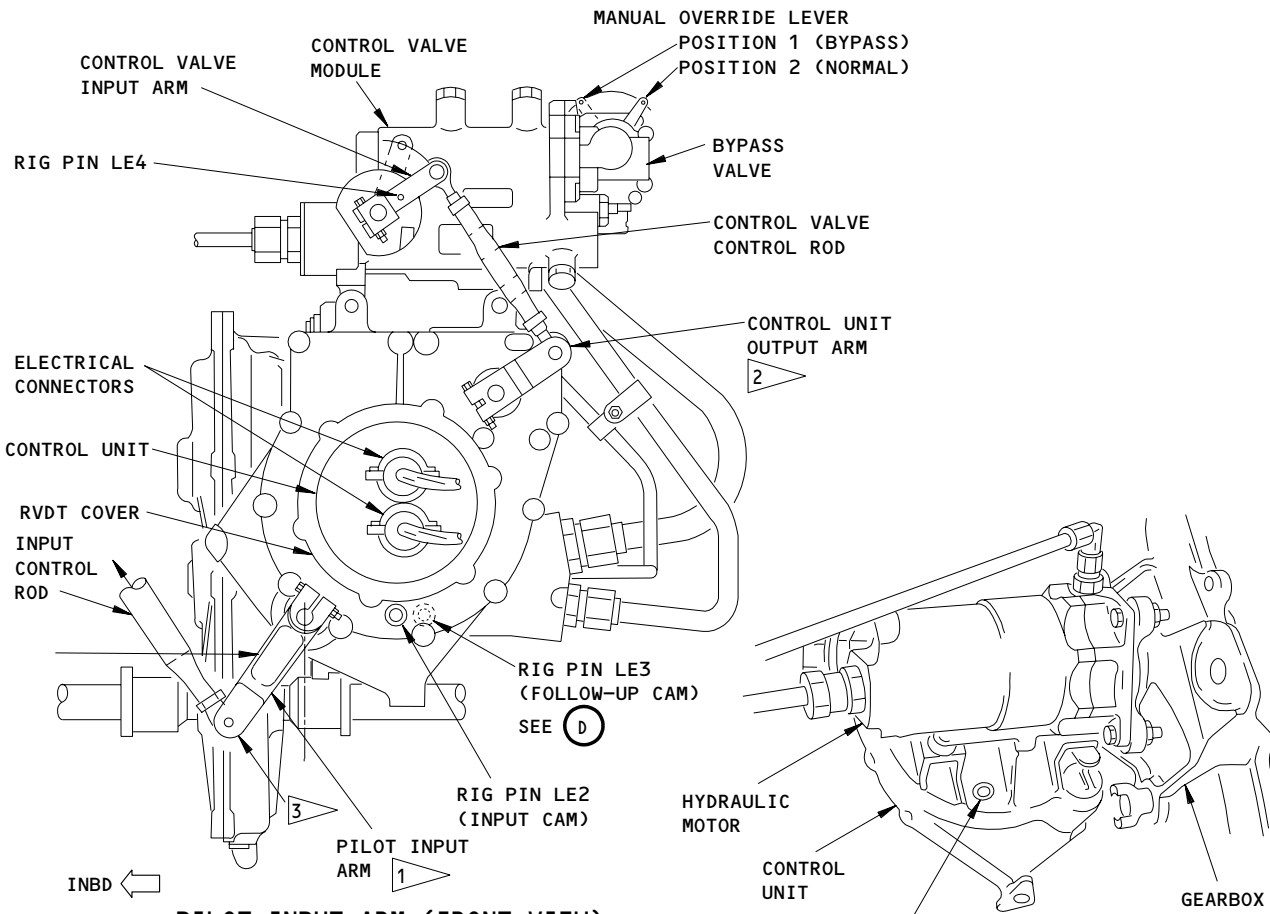
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Outboard Slat Power Drive Unit (PDU) Adjustment  
Figure 503 (Sheet 1)

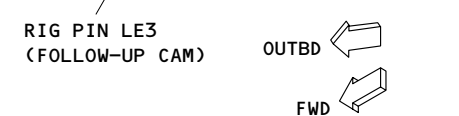
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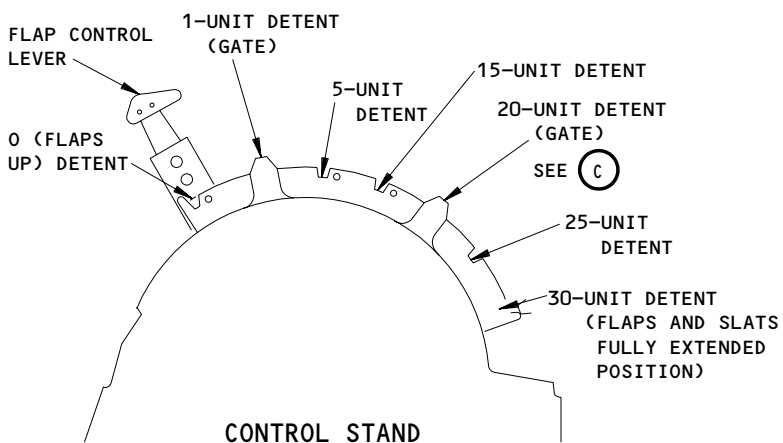
**PILOT INPUT ARM (FRONT VIEW)**

(B)

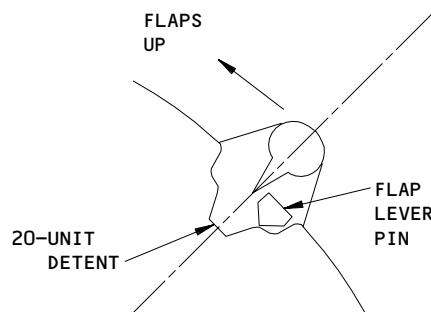


**RIG PIN LE3**

(D)



**CONTROL STAND**



**20 UNIT DETENT**

(C)

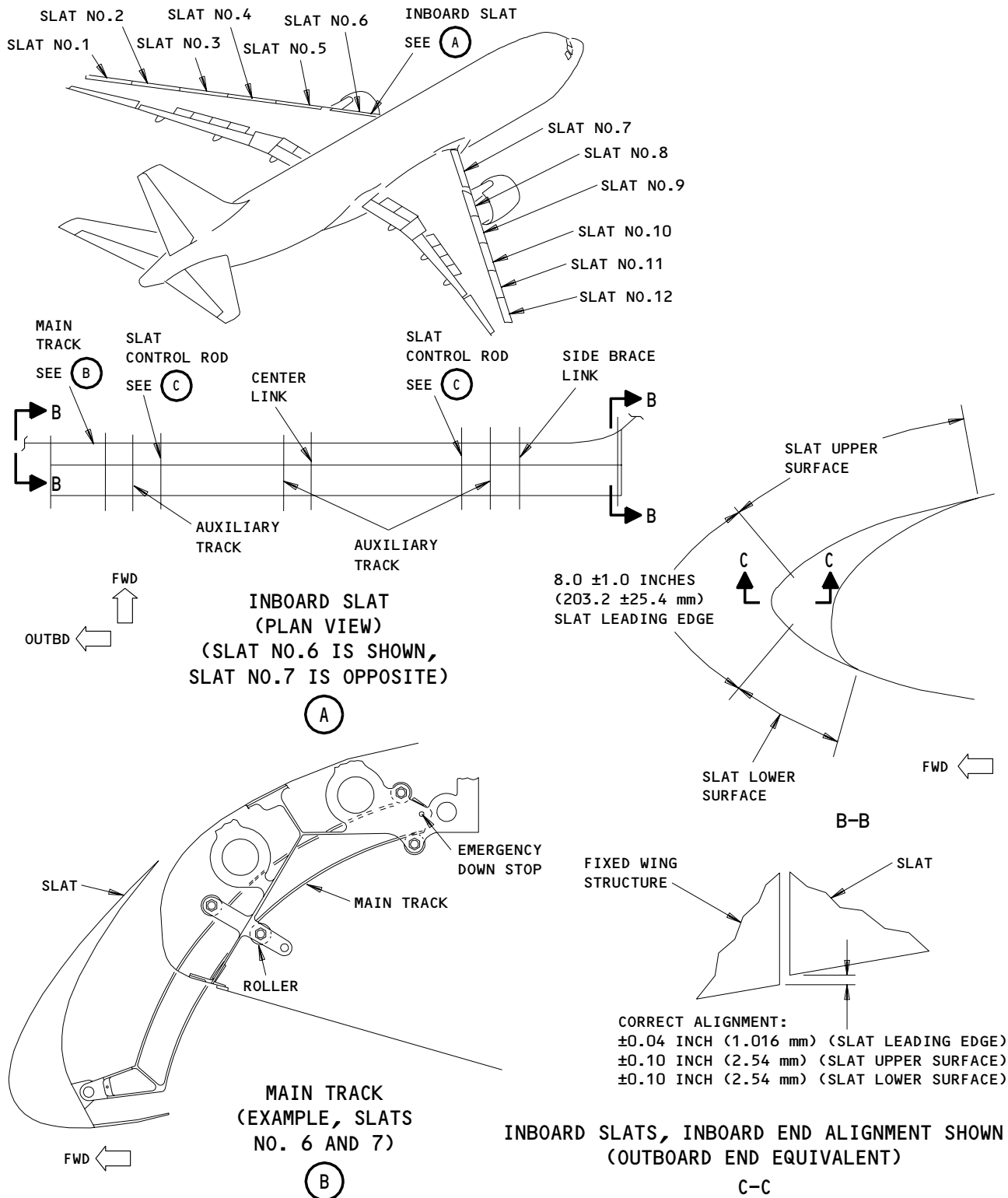
- 1 THE CORRECT POSITION TO INSTALL RIG PIN LE2
- 2 THE CORRECT POSITION TO INSTALL RIG PIN LE3
- 3 APPLY 15-20 POUND FORCE ALONG THIS LINE.

**Outboard Slat Power Drive Unit (PDU) Adjustment  
Figure 503 (Sheet 2)**

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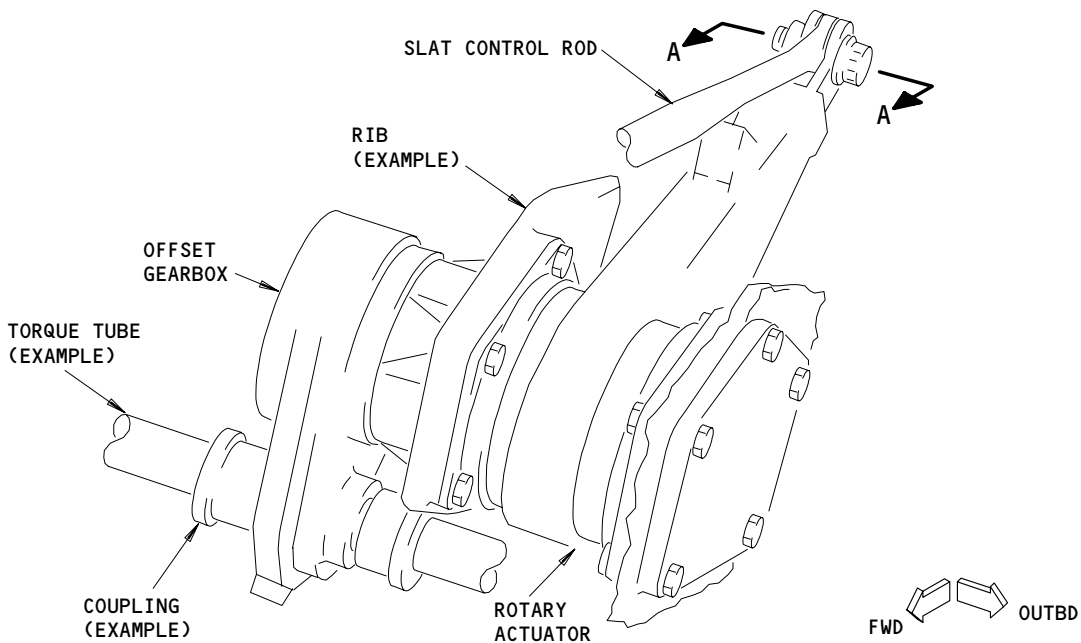




Inboard Leading Edge Slat Adjustment  
Figure 504 (Sheet 1)

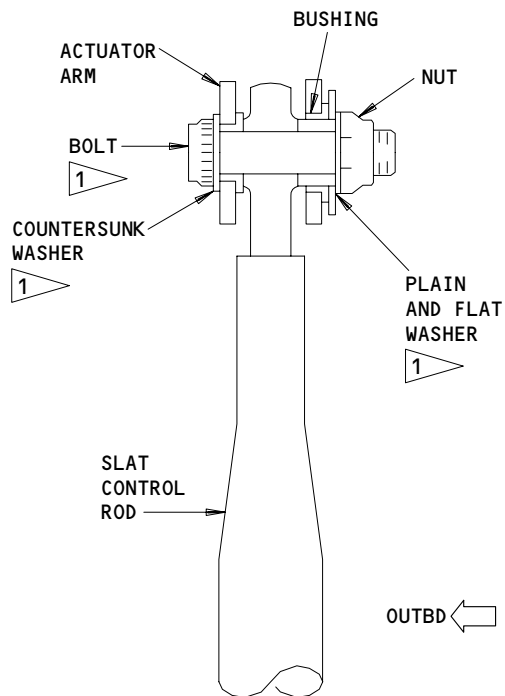
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SLAT CONTROL ROD  
(EXAMPLE, SLATS NO. 6 AND 7)

(C)



(LEFT WING - REAR VIEW)  
A-A

1 INSTALL BOLT HEAD OUTBOARD ON BOTH WINGS. USE ONE COUNTERSUNK WASHER UNDER THE BOLT HEAD, ONE PLAIN WASHER UNDER THE NUT. ON THE LEFT WING ADD FLAT WASHERS UNDER THE PLAIN WASHER AND ON THE RIGHT WING ADD FLAT WASHERS UNDER THE COUNTERSUNK WASHER UNTIL YOU GET A 0.01-0.03 INCH CLEARANCE.

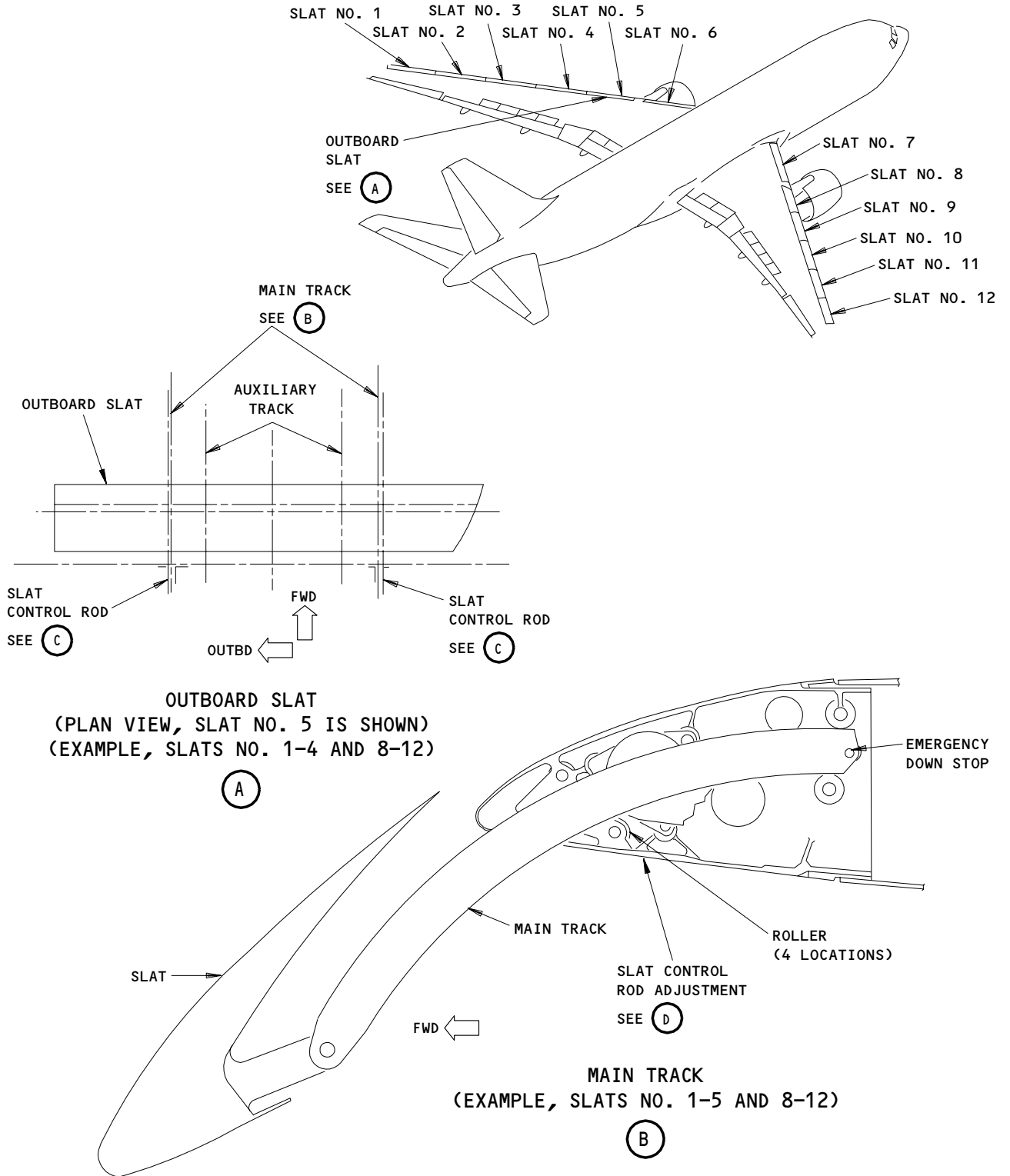
Inboard Leading Edge Slat Adjustment  
Figure 504 (Sheet 2)

EFFECTIVITY	ALL
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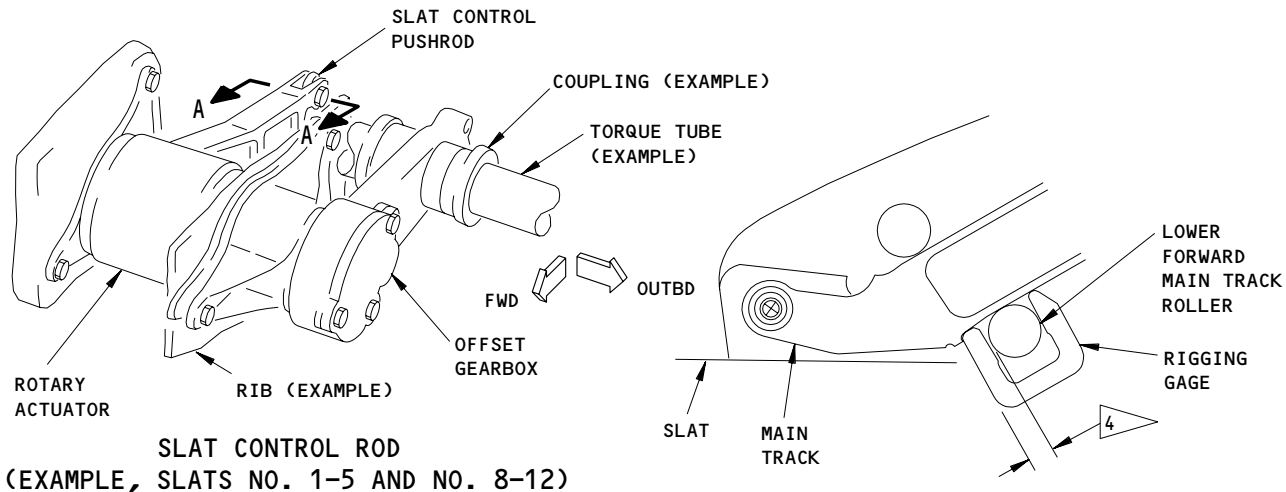
Outboard Leading Edge Slat Adjustment  
Figure 505 (Sheet 1)

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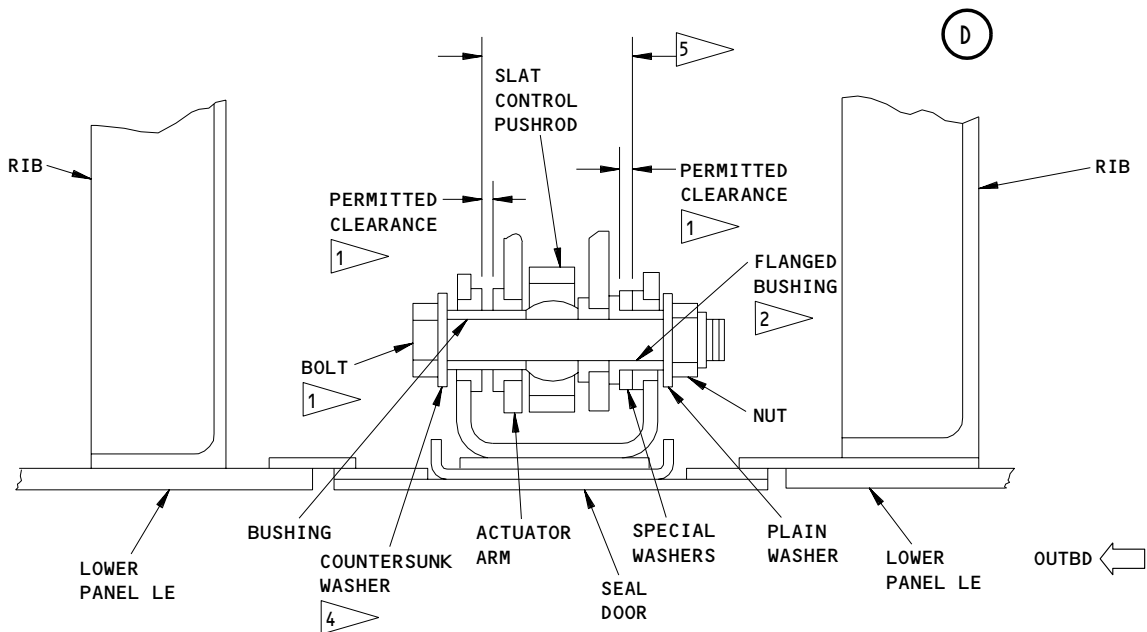
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## 767 MAINTENANCE MANUAL



(C)

**SLAT CONTROL ROD ADJUSTMENT  
(SLAT SHOWN IN THE FULLY RETRACTED POSITION)**



(D)

**(LEFT WING - REAR VIEW)**

A-A

- |   |   |
|---|---|
| <p>1 INSTALL BOLT HEAD OUTBOARD ON BOTH WINGS. USE ONE COUNTERSUNK WASHER UNDER THE BOLT HEAD, ONE PLAIN WASHER UNDER THE NUT, AND ADD SPECIAL WASHERS UNTIL YOU GET A 0.001-0.025 INCH CLEARANCE.</p> <p>2 INSTALL THE FLANGE BUSHING AS SHOWN. YOU CAN CAUSE DAMAGE IF THE FLANGE BUSHING IS INCORRECTLY INSTALLED.</p> <p>3 YOU CAN INSTALL TWO WASHERS UNDER THE BOLT HEAD TO INCREASE BOLT END CLEARANCE WHEN IN MOTION.</p> | <p>4 0.480 TO 0.580 INCH RIGGING CLEARANCE WHEN USING THE TOOLKIT A27089-9 (-2 GAGE). 0.610 TO 0.710 INCH RIGGING CLEARANCE WHEN USING THE TOOLKIT A27089-9 (-11 GAGE). BEFORE TRACK REPLACEMENT USE THE TOOL KIT A27089-9 (-2 GAGE) FOR SLATS 1 THRU 5 AND 8 THRU 12. AFTER TRACK REPLACEMENT USE THE TOOLKIT A27089-9 (-11 GAGE) FOR SLATS 2 THRU 5 AND 8 THRU 11. USE THE TOOLKIT A27089-9 (-2 GAGE) FOR SLATS 1 AND 12.</p> <p>5 BRACKET INTERNAL OPENING</p> |
|---|---|

**Outboard Leading Edge Slat Adjustment  
Figure 505 (Sheet 2)**

EFFECTIVITY

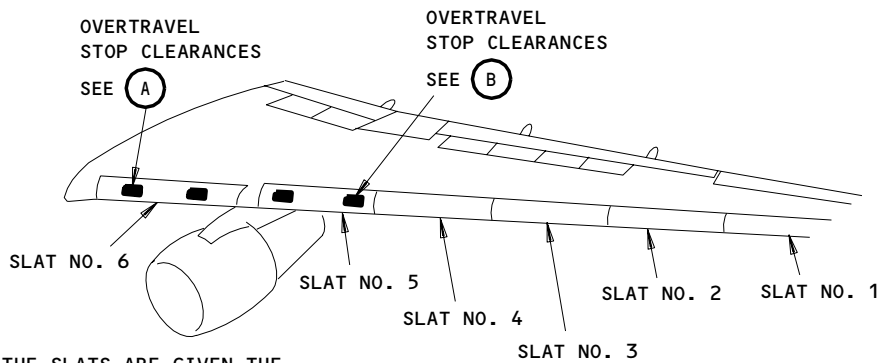
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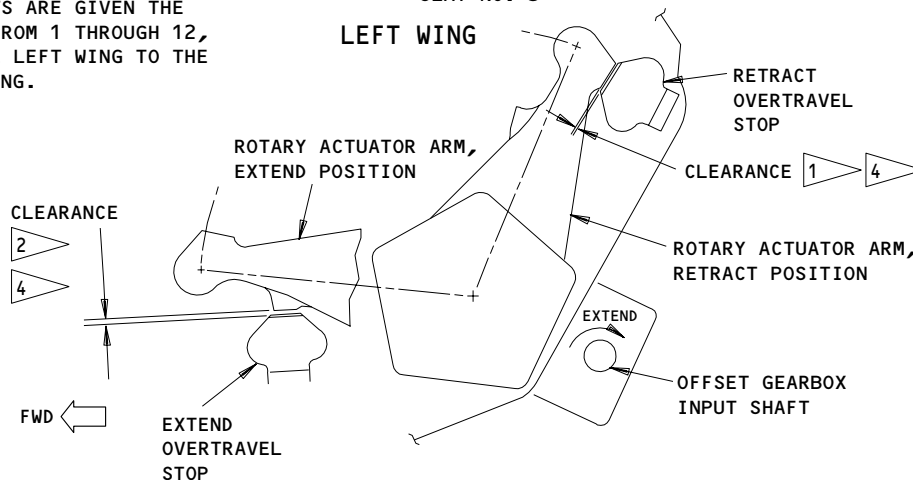
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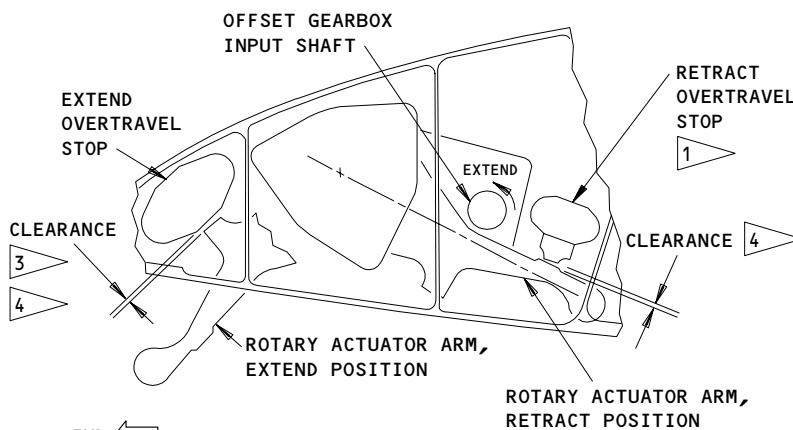


**NOTE:** THE SLATS ARE GIVEN THE NUMBER FROM 1 THROUGH 12, FROM THE LEFT WING TO THE RIGHT WING.



**OVERTRAVEL STOP CLEARANCE  
(EXAMPLE, SLATS NO. 6 AND 7)**

(A)



**OVERTRAVEL STOP CLEARANCE  
(EXAMPLE, SLATS NO. 1-5 AND 8-12)**

(B)

- 1 RETRACT WITH HYDRAULIC POWER: 0.05 TO 0.10 INCH (1.3 TO 2.5 mm) CLEARANCE
- 2 EXTEND WITH HYDRAULIC POWER: NOT LESS THAN 0.03 INCH (0.8 mm) CLEARANCE
- 3 EXTEND WITH HYDRAULIC POWER: NOT LESS THAN 0.03 INCH (0.8 mm) CLEARANCE
- 4 RETRACT OR EXTEND WITH ELECTRIC POWER: NOT LESS THAN 0.03 INCH (0.8 mm) CLEARANCE

**Retract and Extend Overtravel Stop Clearances for the Leading Edge Slat  
Figure 506**

EFFECTIVITY

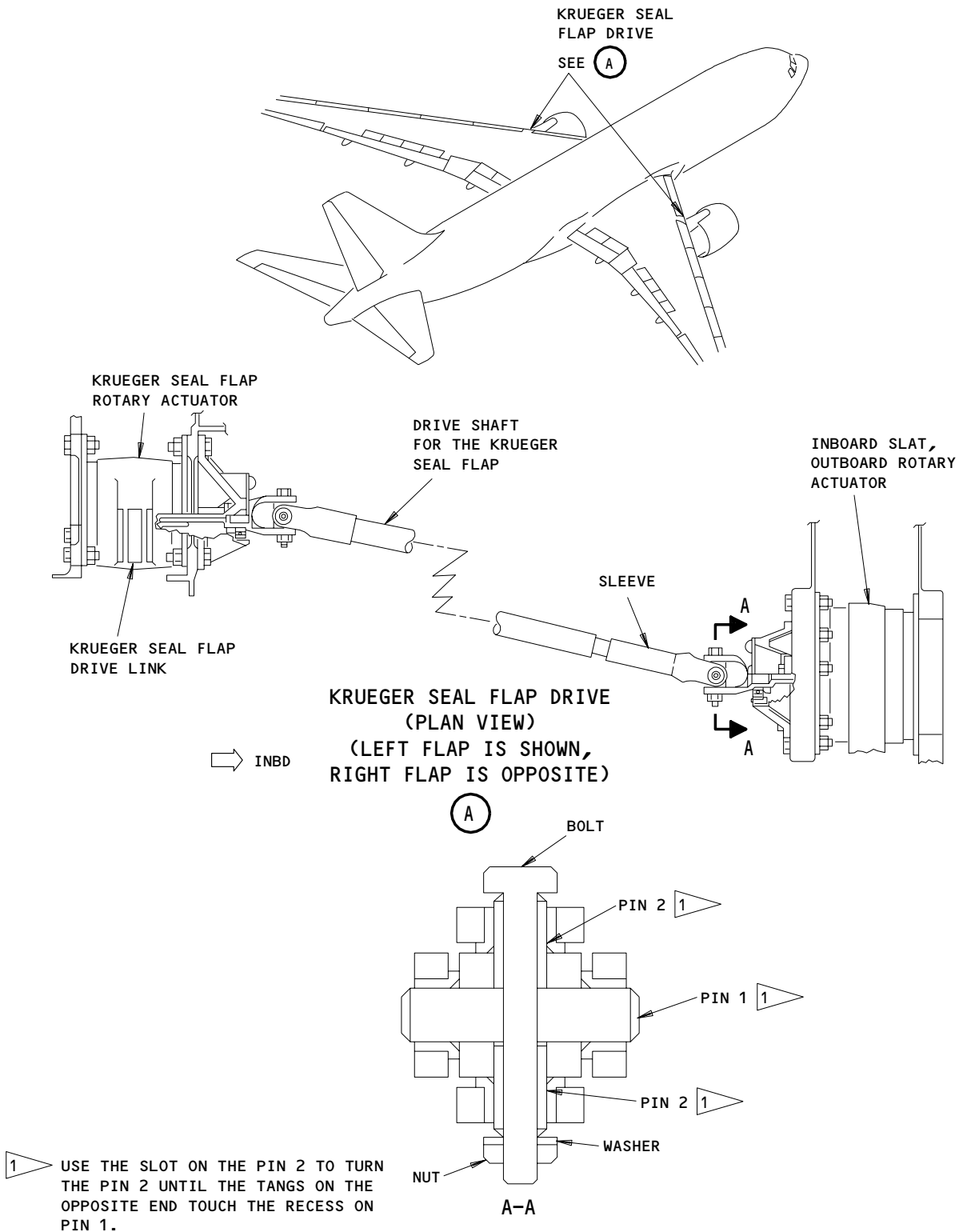
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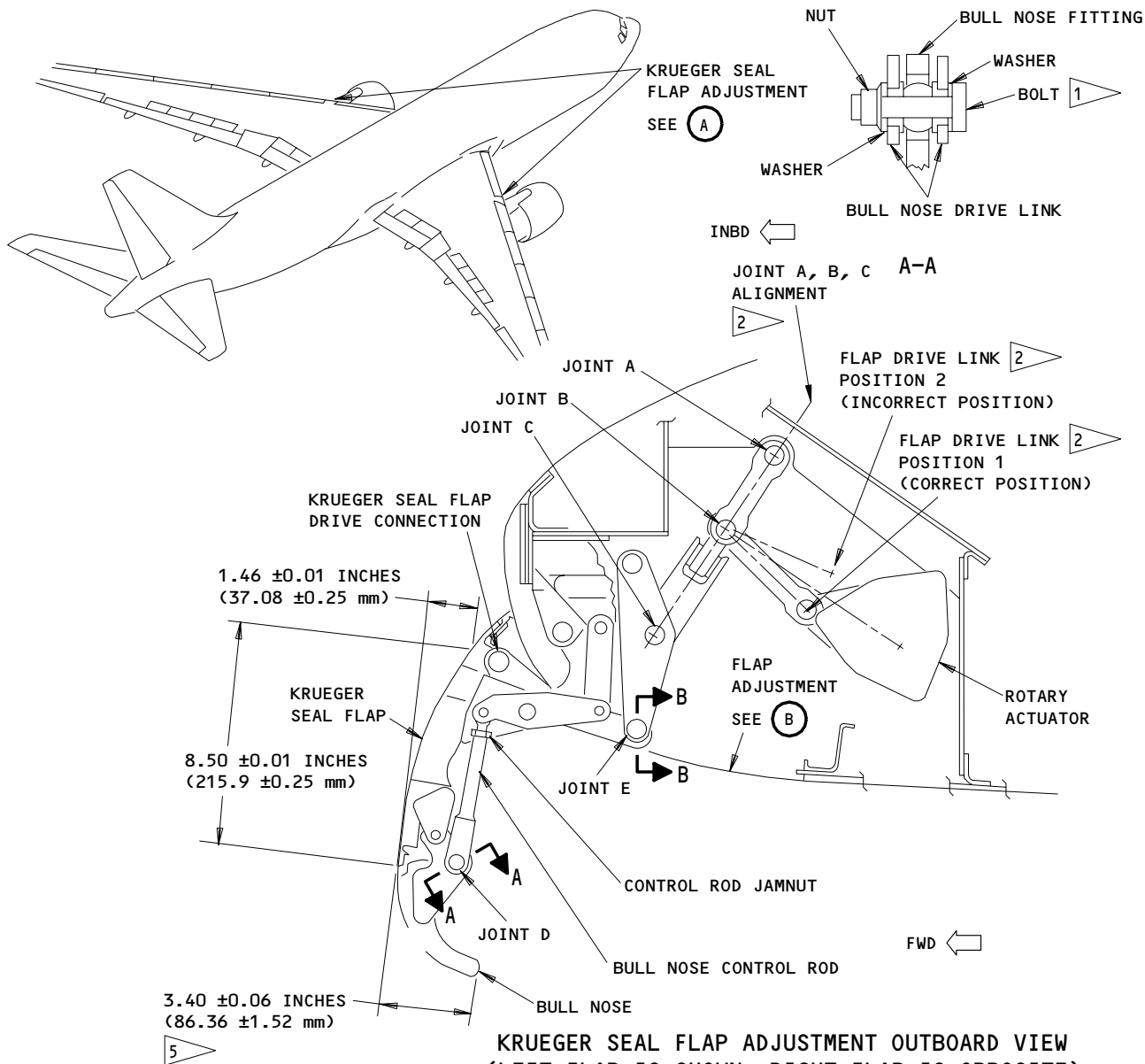
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Krueger Seal Flap Drive  
Figure 507

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**KRUEGER SEAL FLAP ADJUSTMENT OUTBOARD VIEW  
(LEFT FLAP IS SHOWN, RIGHT FLAP IS OPPOSITE)**

- 1 APPLY A LIGHT LAYER OF GREASE BEFORE THE INSTALLATION.
- 2 JOINTS A, B AND C MUST BE STRAIGHT WHEN YOU CONNECT THE DRIVE SHAFT TO THE ROTARY ACTUATOR. THE JOINTS ARE ALIGNED WHEN THE FLAP DRIVE LINK IS IN POSITION 1 OR 2, BUT ONLY POSITION 1 IS THE CORRECT POSITION. YOU HAVE SET POSITION 1 CORRECTLY WHEN THE FLAP DRIVE LINK AND ROTARY ACTUATOR ARE FULLY DOWN AND JOINTS A, B AND C ARE ALIGNED.
- 3 INSTALL A LOCKWIRE TO THE JAM NUT WITH THE DOUBLE TWIST PROCEDURE (AMM 20-10-23).
- 5 ADJUST THE BULL NOSE CONTROL ROD TO GET THIS DIMENSION TO AGREE.

(A)

**Krueger Seal Flap Drive Adjustment  
Figure 508 (Sheet 1)**

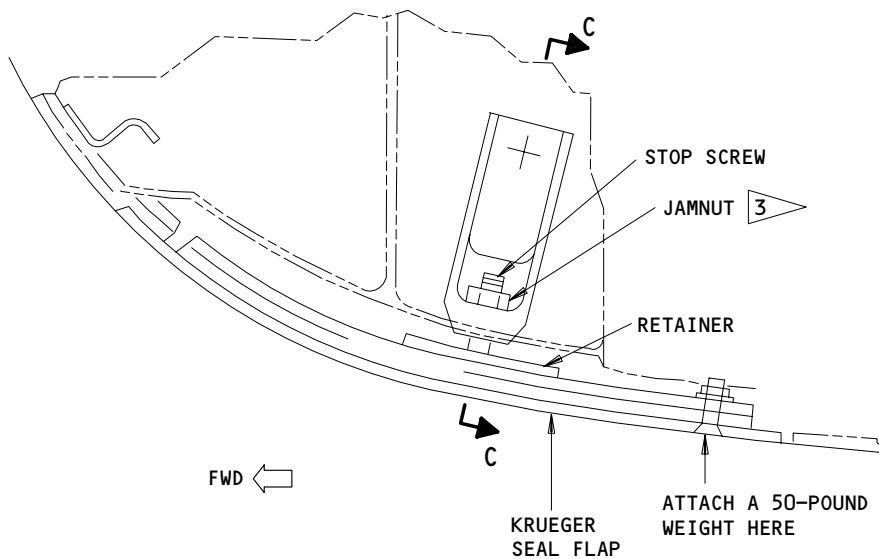
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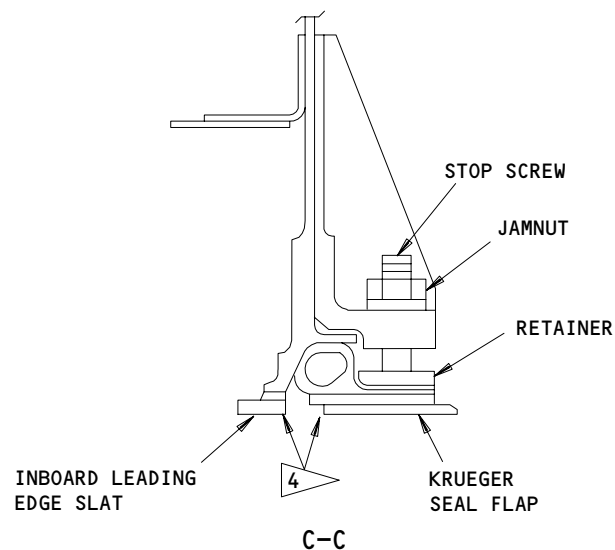
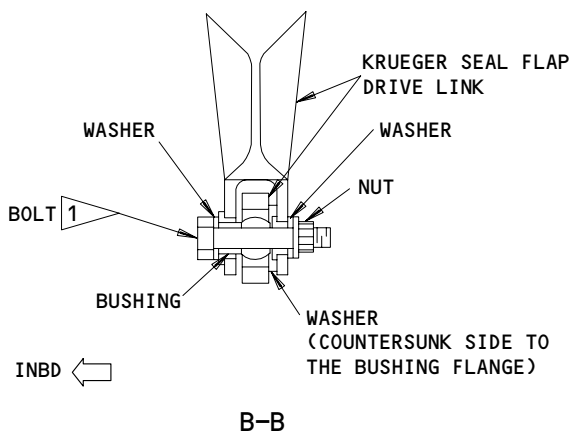
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FLAP ADJUSTMENT

(B)



4 THE SURFACE MUST ALIGN BY  $\pm 0.02$  INCH FOR AT LEAST 25% OF ANY EDGE, AND BY  $\pm 0.04$  INCH FOR A DISTANCE OF NO MORE THAN 25% OF ANY EDGE

Krueger Seal Flap Drive Adjustment  
Figure 508 (Sheet 2)

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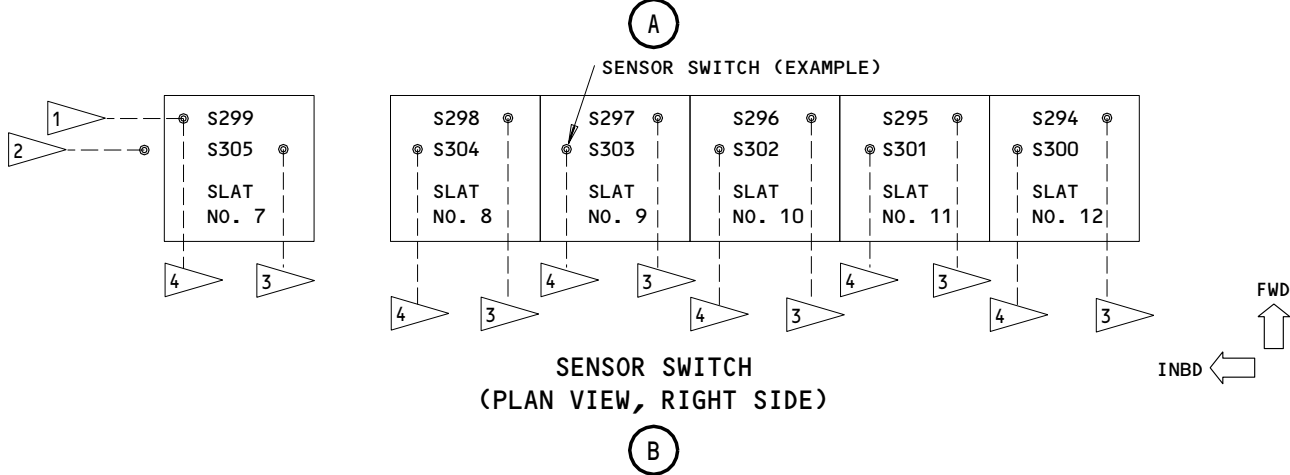
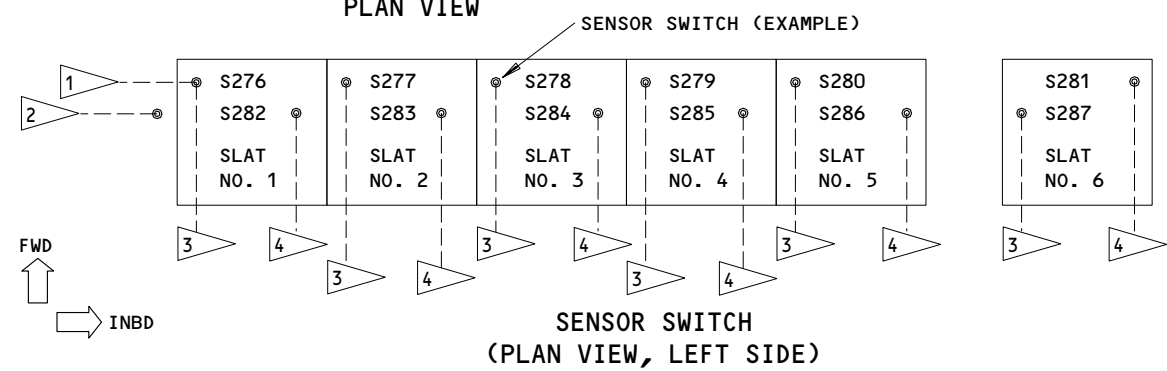
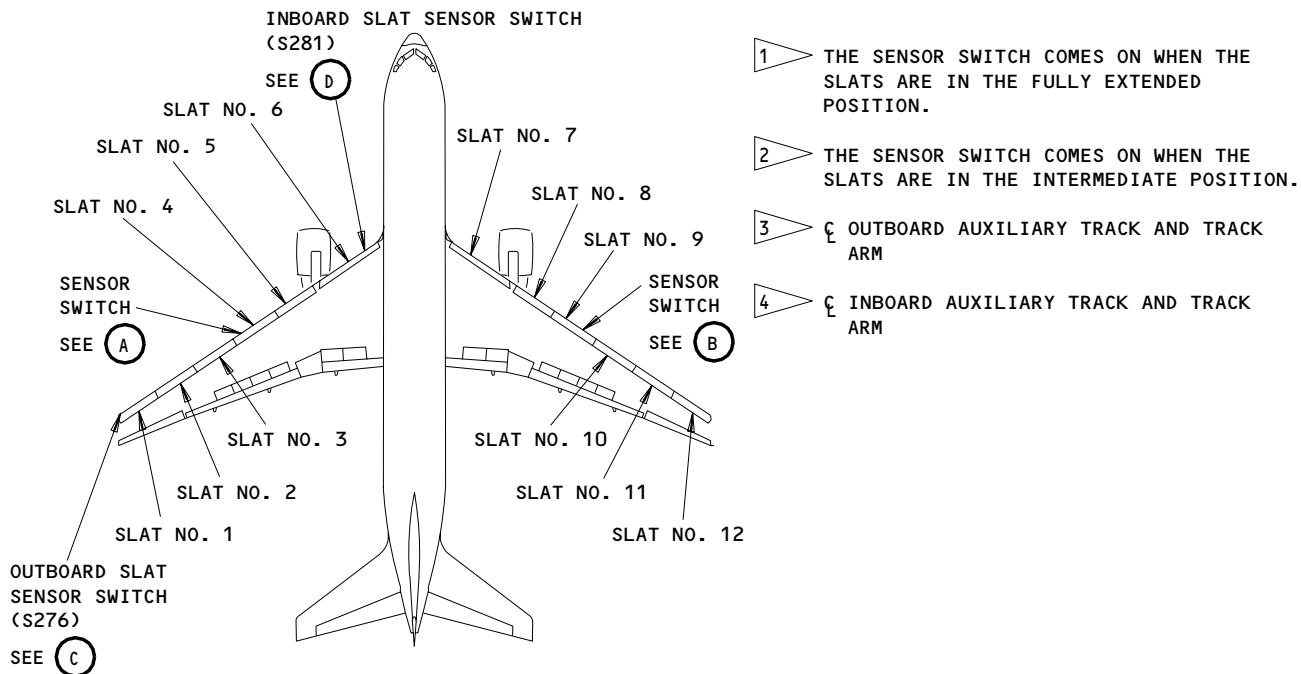
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Leading Edge Slat Sensor Switches  
Figure 509 (Sheet 1)

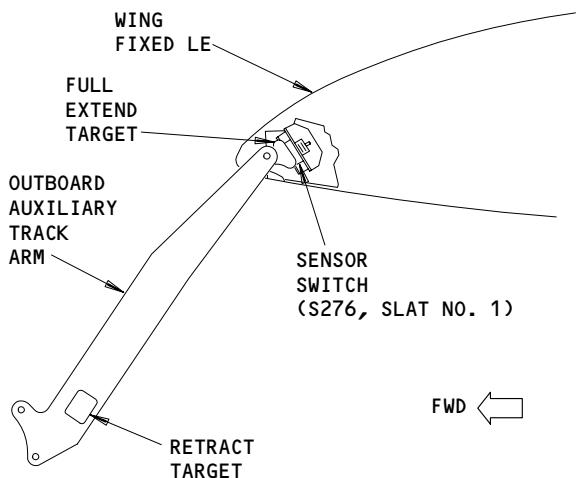
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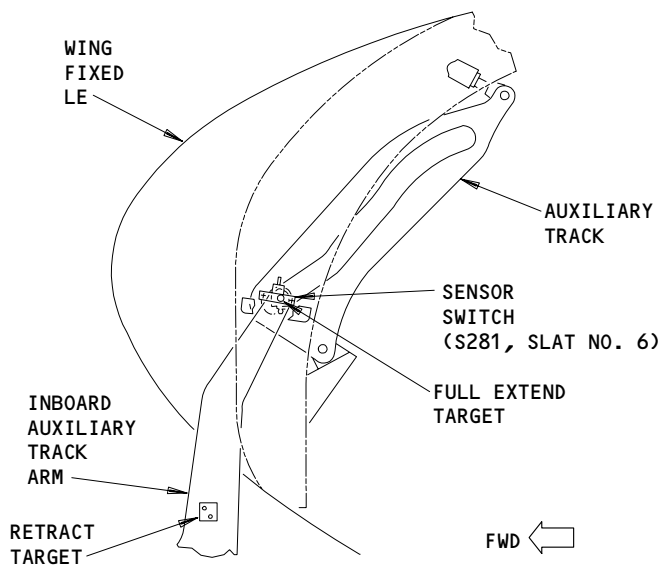
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- 2) You can install rig pin LE3 freely into the rig pin hole for the follow-up cam after the slats are moved to the fully retracted position with hydraulic power (Detail D, Fig. 503).
- (c) When the inboard and outboard slats are retracted with hydraulic power to the fully retracted position:
    - 1) The clearances between the actuator arm and the retract overtravel stop is correct as shown (Fig. 506), at the inboard rotary actuator of the slats No. 6 and 7 (inboard slats), and at the inboard rotary actuator of the slats No. 5 and 8 (outboard slats).
  - (d) When the inboard and outboard slats are extended with hydraulic power to the fully extended position:
    - 1) The clearance between the actuator arm and the extend overtravel stop is correct as shown (Fig. 506), at the inboard rotary actuator of the slats No. 6 and 7 (inboard slats), and at the inboard rotary actuator of the slats No. 5 and 8 (outboard slats).
  - (e) When the inboard and outboard slats are retracted with electrical power to the fully retracted position:
    - 1) The clearance between the actuator arm and the retract overtravel stop is correct as shown (Fig. 506), at the inboard rotary actuator of the slats No. 6 and 7, and at the inboard rotary actuator of the slats No. 5 and 8.



OUTBOARD SLAT SENSOR SWITCH, SLAT NO. 1  
(OUTBOARD VIEW, SLAT NOT SHOWN)

C



INBOARD SLAT SENSOR SWITCH, SLAT NO. 6  
(OUTBOARD VIEW, SLAT NOT SHOWN)

D

Leading Edge Slat Sensor Switches  
Figure 509 (Sheet 2)

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- (f) When the inboard and outboard slats are extended with electrical power to the fully extended position:
  - 1) The clearance between the actuator arm and the extend overtravel stop is correct as shown (Fig. 506), at the inboard rotary actuator of the slats No. 6 and 7, and at the inboard rotary actuator of the slats No. 5 and 8.
- (g) When the krueger seal flaps are retracted with hydraulic power to the fully retracted position:
  - 1) The stop screw touches the krueger seal flap as shown (Fig. 508).
- (h) When the krueger seal flaps are extended with hydraulic power to the fully extended position:
  - 1) The links A, B, and C are aligned in a straight line as shown (Fig. 508).

**NOTE:** There are two possible positions to get the links A, B, and C to align. Make sure the links are aligned in position 1 (krueger seal flap fully extended), which is the correct position.

- (12) The airplane must be on the landing gear with all the engines or engine weights installed before you can do the flap drive system adjustment.

**B. Equipment**

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) LE2 - P/N A20004-9  
(for the outboard slat PDU adjustment)
  - (b) LE3 - P/N A20004-9  
(for the outboard slat PDU adjustment)
  - (c) LE4 - P/N A20004-73  
(for the outboard slat PDU adjustment)
  - (d) LE5 - P/N A20004-9  
(for the inboard slat PDU adjustment)
  - (e) LE6 - P/N A20004-9  
(for the inboard slat PDU adjustment)
- (2) Leading Edge Slat Groundlock - A27007-1  
(2 necessary)
- (3) Air Motor with a 1/2-inch Drive -  
Commercially Available
- (4) Adapter - Leading Edge Slat Drive - A27077-1
- (5) Shim: 0.075 ±0.003-inch thick (2 Necessary)
- (6) 50-Pound Weight
- (7) Force Gage (0-25 pounds)(0-111 newtons)
- (8) Rigging Gage (Outboard Leading Edge Slats) -  
A27089-9 (Recommended)
- (9) Circuit Breaker Lockout Clip  
(4 necessary) Commercially Available
- (10) TE Flap PDU Lock - A27009-7

**C. Consumable Materials**

- (1) D00013 Grease - MIL-PRF-23827  
(Supersedes MIL-G-23827) (Alternate)

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D. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 20-10-23/401, Lockwires
- (3) AMM 20-10-24/201, Rig Pins
- (4) AMM 24-22-00/201, Electrical Power - Control
- (5) AMM 27-51-00/501, Trailing Edge Flap System
- (6) AMM 27-81-00/201, Leading Edge Slat System
- (7) AMM 27-81-01/401, Inboard Leading Edge Slat
- (8) AMM 27-81-02/501, Outboard Leading Edge Slat
- (9) AMM 27-81-11/401, Leading Edge Slat Power Drive Unit Components
- (10) AMM 27-81-24/401, Leading Edge Slat Drive Shaft
- (11) AMM 27-88-00/501, Leading Edge Slat Position Indicating System
- (12) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (13) AMM 32-00-15/201, Landing Gear Door Locks
- (14) AMM 32-00-20/201, Landing Gear Downlocks
- (15) AMM 78-31-00/201, Thrust Reverser System

E. Access

(1) Location Zones

- 144 Right MLG Wheel Well
- 211/212 Control Cabin
- 410 No.1 Power Plant
- 420 No.2 Power Plant
- 510/610 Wing Leading Edge - Inboard
- 520/620 Wing Leading Edge - Outboard
- 710 Nose Landing Gear and Doors
- 730/740 Left/Right Main Landing Gear and Doors

(2) Access Panels

- 511BB LE Slat Power Drive Unit - Outboard (Left)
- 611BB LE Slat Power Drive Unit - Inboard (Right)

F. Prepare for the Adjustment

S 215-001

- (1) Make sure the TE flap system, the flap position transmitters, the RVDTs on the flap control lever is correctly adjusted (AMM 27-51-00/501).

S 215-002

- (2) Make sure the slat sensor switches is correctly adjusted before you start this procedure (AMM 27-88-00/501).

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S 215-003

- (3) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 495-004

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 045-005

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 215-006

- (6) Make sure the TE flaps and the LE slats are in the fully retracted position.

S 215-007

- (7) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 495-008

- (8) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-009

- (9) Remove the power from the center hydraulic system (AMM 29-11-00/201).

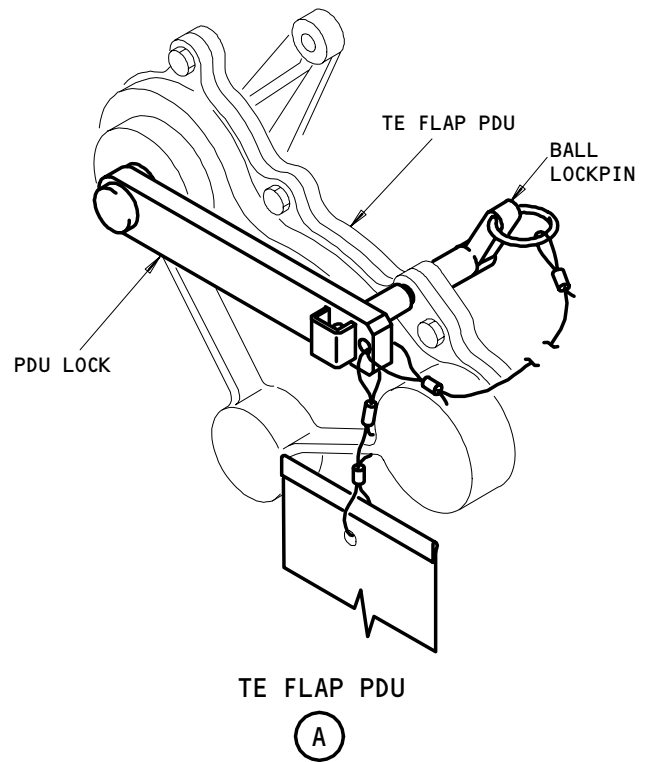
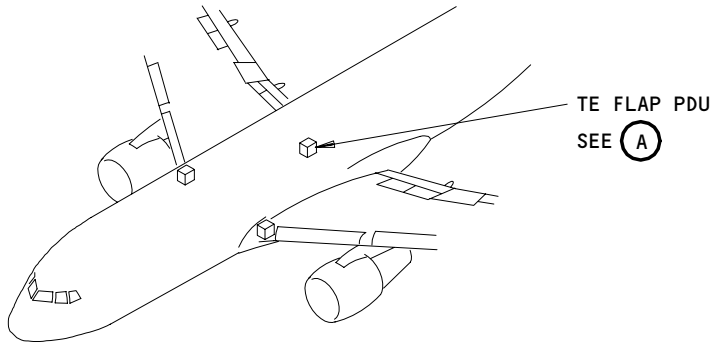
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PDU Lock for the TE Flap PDU  
Fig 510

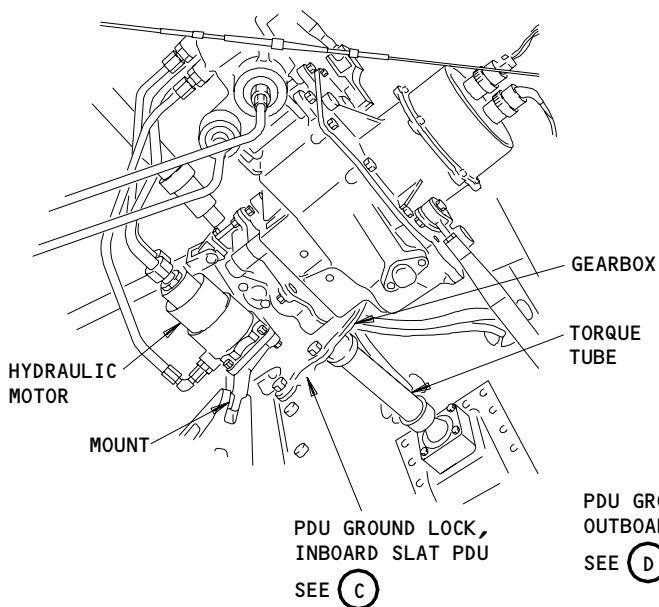
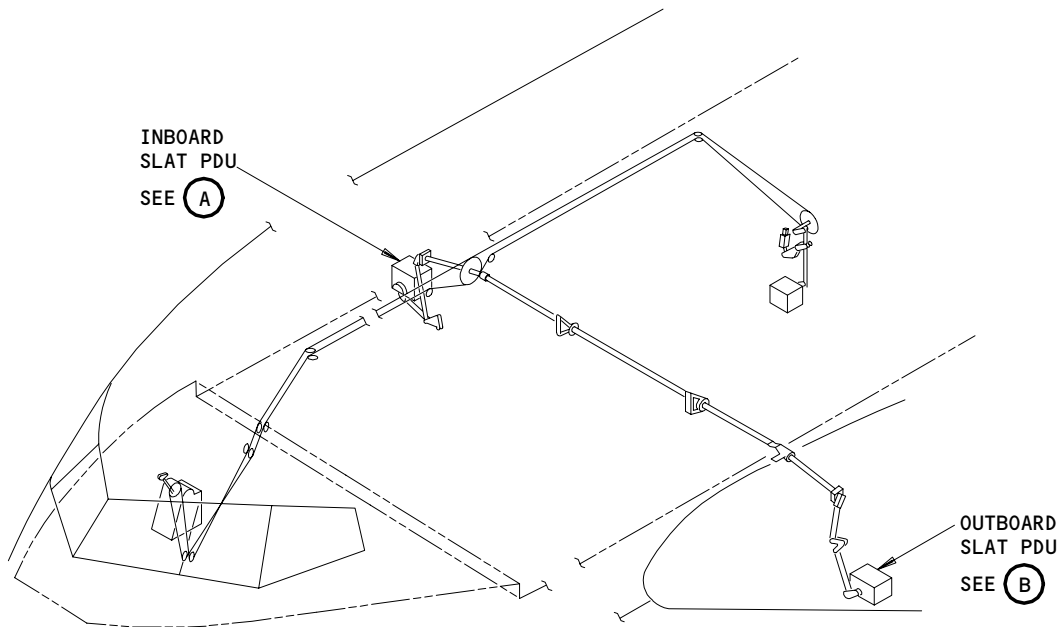
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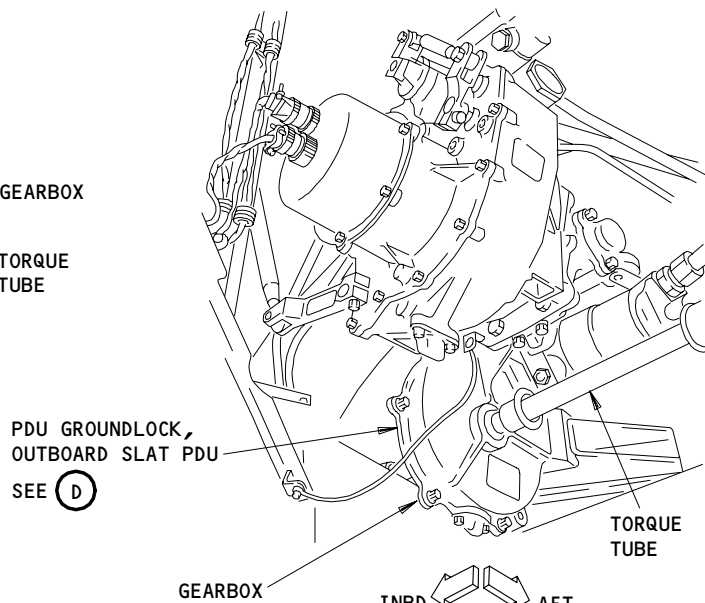
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AFT INBD

INBOARD SLAT PDU  
(BOTTOM VIEW)

(A)



GEARBOX INBD AFT

OUTBOARD SLAT PDU  
(BOTTOM VIEW)

(B)

Slat PDU Groundlock  
Figure 511 (Sheet 1)

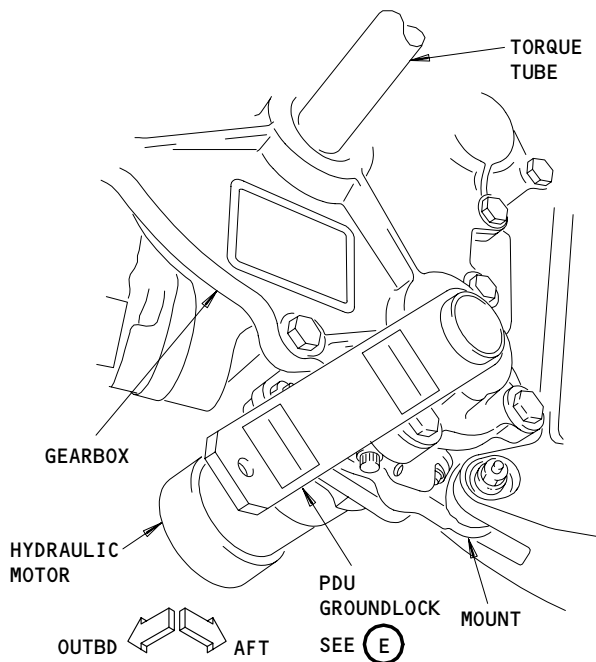
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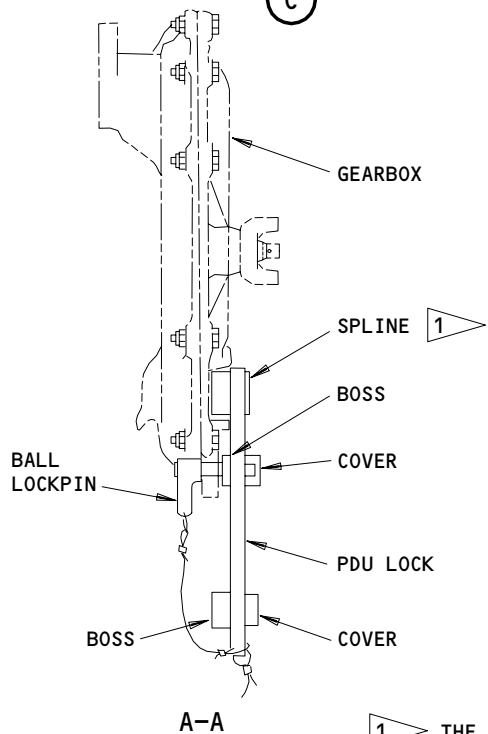
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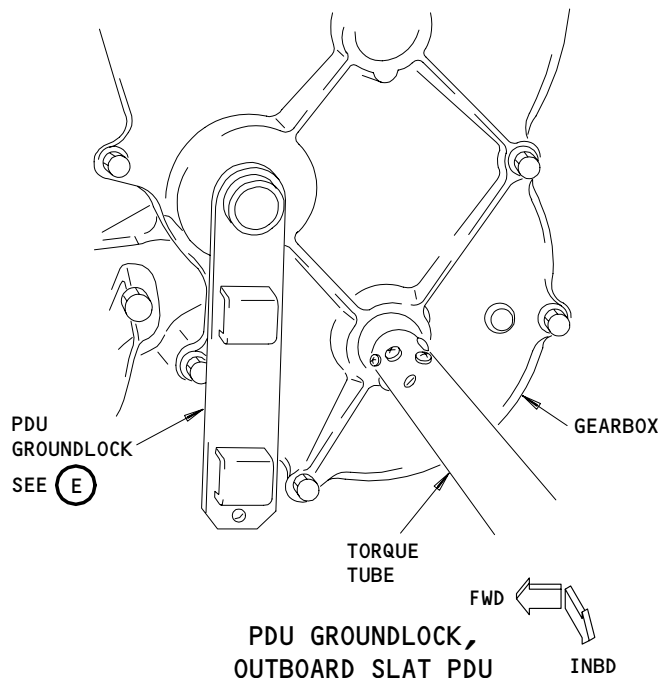
PDU GROUNDLOCK,  
INBOARD SLAT PDU

(C)



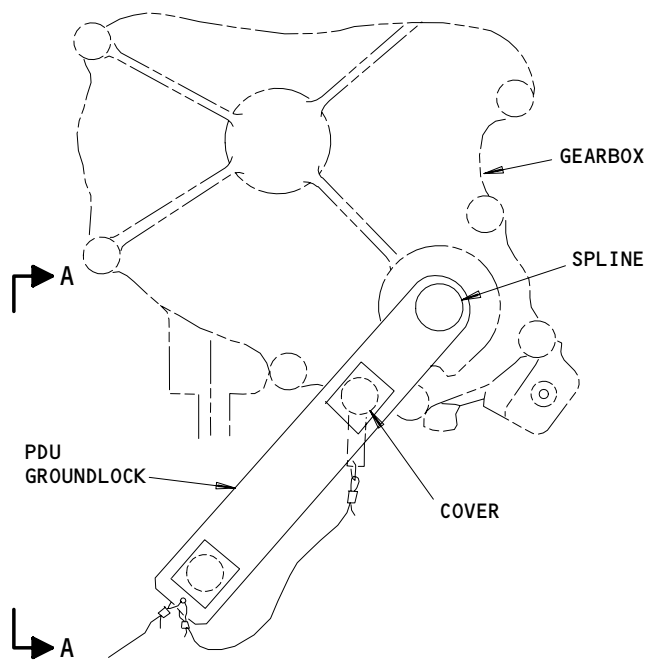
A-A

1 THE SPLINE FITS INTO THE GEARBOX AND IS HELD IN POSITION BY A BALL LOCKPIN INSTALLED THROUGH THE BOSS AND GEARBOX



PDU GROUNDLOCK,  
OUTBOARD SLAT PDU

(D)



PDU GROUNDLOCK,  
(EXAMPLE)

(E)

Slat PDU Groundlock  
Figure 511 (Sheet 2)

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S 495-010

- (10) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 510).

S 865-011

- (11) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H14, SLAT SHUTOFF
  - (b) 11H23, SLAT ALTN CONT INBD
  - (c) 11H24, SLAT ALTN CONT OUTBD
  - (d) 11J24, FLAPS ALTN CONT

S 865-012

- (12) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 865-013

- (13) At the right main landing gear (MLG) wheel well, turn the manual override lever on the bypass valve for the TE flap PDU to the No. 1 (bypass) position.

S 495-014

- (14) Attach a DO-NOT-OPERATE tag to the manual override lever.

S 015-015

- (15) Remove the access panels, 511BB and 611BB, to get access to the inboard and outboard slat PDUs (AMM 06-44-00/201).

S 015-016

- (16) Remove the lower access panels for the leading edge when it is necessary to get access to the rotary actuators (AMM 06-44-00/201).

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S 295-624

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

(17) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

G. Inboard Slat PDU Adjustment (Fig. 502)

S 495-017

(1) Hold the weight of each inboard slat with a support to prevent movement of the slats when you disconnect the torque tubes for the inboard slat drive.

**NOTE:** This is to keep the inboard slats in the adjusted position after you disconnect the torque tubes from the inboard slat PDU. It will be necessary to adjust the inboard slat drive if the inboard slats moved while the torque tubes are disconnected.

S 035-018

(2) Disconnect the torque tube on each side of the inboard slat PDU, (Detail B).

**NOTE:** Do not turn the torque tubes while it is disconnected. It will be necessary to adjust the inboard slat drive if you turn the torque tubes.

S 865-019

(3) At the outboard slat PDU, move the manual override lever on the bypass valve to the No. 1 (bypass) position (Detail B, Fig. 503).

S 495-020

(4) Install a DO-NOT-OPERATE tag to the manual override lever.

S 495-021

(5) Install the groundlock on the outboard slat PDU (Fig. 511).

S 035-022

(6) Remove the plugs from the inboard slat PDU to get access to the rig pin holes for the input cam (LE5) and the follow-up cam (LE6). (Details C and D, Fig. 502).

S 495-023

(7) Install rig pin LE5 in the input cam (Detail C, Fig. 502).

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S 215-024

- (8) Make sure the adjustable end of the input control rod is attached to the pilot input arm (Detail C, Fig. 502).

NOTE: You can remove and install the input control rod to get the correct configuration if necessary.

S 035-025

- (9) Loosen the bolt that connects the input control rod to the pilot input arm, but do not remove the nut or bolt.

S 215-026

- (10) Do a check to see if you can turn the bolt easily with your hand.

S 435-027

- (11) If you can turn the bolt easily with your hand, tighten the nut.

S 825-028

- (12) If you cannot turn the bolt easily, do these steps to adjust the input control rod:
- (a) Remove the lockwire and loosen the jamnut on the input control rod.
  - (b) Turn the rod body to adjust the length of the input control rod, until you can turn the bolt freely in the pilot input arm.
  - (c) Make sure that you can see the threads at the adjustable end of the input control rod through the inspection hole.
  - (d) Tighten the control rod jamnut and install a lockwire.
  - (e) Connect the input control rod back to the pilot input arm with the bolt, washer, and nut, and tighten the nut.

S 095-029

- (13) Remove the rig pin LE5.

S 865-030

- (14) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
- (a) 11H14, SLATS SHUTOFF VALVE

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S 865-031

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (15) Pressurize the center hydraulic system (AMM 29-11-00/201) and permit the inboard slat PDU to become stable in the fully retracted position.

**NOTE:** It is usual for the output shaft to turn in the inboard slat PDU when you pressurize the center hydraulic system.

S 215-622

**CAUTION:** DO NOT FORCE THE RIG PIN LE6 INTO PLACE. ANY MOVEMENT OF THE FOLLOW-UP CAM CAN RESULT IN PDU MOVEMENT AND DAMAGE TO THE RVDT QUILL SHAFT WILL OCCUR, IF THE RIG PIN LE3 IS IN PLACE.

- (16) Do a check to see that you can install rig pin LE6 easily into the rig pin hole on the follow-up cam (Detail D, Fig. 502).

S 825-033

- (17) Adjust the inboard slat PDU for the mechanical and hydraulic null only if you cannot install rig pin LE6 easily into the rig pin hole.

S 825-034

- (18) Adjust the inboard slat PDU for mechanical null with these steps if necessary (Fig. 502):
- (a) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
  - (b) Disconnect the control valve control rod from the control unit output arm (Detail C).

**NOTE:** You will release the fluid pressure lock in the control valve when you disconnect the control valve control rod from the output arm. This will permit you to turn the PDU output shafts to align the rig pin hole for rig pin LE6.

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- (c) Turn the output shaft for the inboard slat PDU by small increments, until you can install rig pin LE6 freely.
- (d) After you install rig pin LE6, connect the control valve control rod to the control unit output arm.
- (e) Try to install rig pin LE7 in the control valve input arm (Detail C).
- (f) If you cannot install rig pin LE7 fully and easily, adjust the length of the control valve control rod with these steps:
  - 1) Remove the lockwire and loosen the jamnut at each end of the control rod.
  - 2) Turn the control rod body to adjust the rod length, until you can easily install rig pin LE7.

**NOTE:** The usual length of the rod before the final adjustment is 6.56 inches (166.6 mm).

- 3) Tighten the jamnuts on the control rod, but do not install the lockwires.

**NOTE:** It is possible that you will adjust the control valve control rod again during the hydraulic null adjustment.

- (g) Remove rig pins LE6 and LE7.

S 825-035

- (19) Adjust the inboard slat PDU for hydraulic null with these steps after you adjusted the PDU for mechanical null (Fig. 502):

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**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (a) Pressurize the center hydraulic system (AMM 29-11-00/201) and permit the inboard slat PDU to become stable in the fully retracted position.

**NOTE:** It is usual for the output shaft to turn in the inboard slat PDU when you pressurize the center hydraulic system.

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**CAUTION:** DO NOT DISCONNECT THE CONTROL VALVE CONTROL ROD TO DO THE ROD ADJUSTMENT WHILE THE CENTER HYDRAULIC SYSTEM IS PRESSURIZED. DO NOT ADJUST THE CONTROL ROD WITH THE RIG PIN LE6 INSTALLED. ADJUST THE CONTROL ROD ONLY BY SMALL INCREMENTS TO AVOID DAMAGE TO THE INBOARD SLAT PDU.

**CAUTION:** DO NOT FORCE THE RIG PIN LE6 INTO PLACE. ANY MOVEMENT OF THE FOLLOW-UP CAM CAN RESULT IN PDU MOVEMENT AND DAMAGE TO THE RVDT QUILL SHAFT WILL OCCUR, IF THE RIG PIN LE3 IS IN PLACE.

- (b) Try to install rig pin LE6 into the rig pin hole for the follow-up cam (Detail D).
- (c) If you cannot install rig pin LE6 easily, adjust the control valve control rod with these steps:

**NOTE:** Do not adjust the control rod while rig pin LE6 is installed. Install rig pin LE6 only to make sure that the control rod is adjusted correctly.

- 1) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- 2) Loosen the jamnut at each end of the control valve control rod.
- 3) Turn the control rod to adjust the rod length until you can easily install rig pin LE6.

**NOTE:** It is not necessary to install rig pin LE7 (or LE4) for this adjustment.

- 4) Tighten the jamnut at each end of the control rod.
- 5) Install lockwires to the jamnuts with the double twist procedure (AMM 20-10-23/401).

S 095-036

- (20) If installed, remove rig pin LE6 and install the plug in the rig pin hole.

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S 865-037

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(21) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-038

(22) Remove the DO-NOT-OPERATE tag from the flap control lever, and move the lever to the 1-unit detent.

S 865-039

(23) Permit the inboard slat PDU to operate until it stops.

S 865-040

(24) Move the flap control lever to the zero (FLAPS UP) detent, and permit the inboard slat PDU to operate until it stops.

S 495-041

(25) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 825-042

(26) If it is necessary to adjust the inboard slat drive, you can go directly to the "Inboard Slat Drive Adjustment" paragraph from this step. Continue with the subsequent steps only if the inboard slat drive adjustment is correct.

S 865-043

(27) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 095-044

(28) Remove the groundlock from the outboard slat PDU (Fig. 511).

S 095-045

(29) Remove the PDU lock from the TE flap PDU (Fig. 510).

S 865-046

(30) Remove the DO-NOT-OPERATE tag from manual override lever on the TE flap PDU and move the override lever to the No. 2 (normal) position.

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S 865-047

- (31) Remove the DO-NOT-OPERATE tag from the manual override lever on the outboard slat PDU, and move the override lever to the No. 2 (normal) position (Detail B, Fig. 503).

S 215-048

- (32) Make sure the inboard slats are in the fully retracted position.

S 825-049

- (33) Do these steps if the inboard slats are not in the fully retracted position, or have accidentally moved during the PDU adjustment:
- (a) Turn the torque tubes adjacent to inboard slat PDU to retract the inboard slats to the fully retracted position, with one of the two procedures that follow:
- 1) PROCEDURE A: Turn the torque tube by hand.
  - 2) PROCEDURE B: Turn the torque tube with an air motor and adapter A27077 (AMM 27-81-00/201).

NOTE: It is not necessary to move the manual override lever to the bypass position (No. 1) on the inboard slat PDU when you do this step.

S 225-050

- (34) At the inboard rotary actuator of the slats No. 6 and 7, do a check on the retract overtravel stop clearances and make sure the clearances are correct as shown (Detail A, Fig. 506).

S 825-051

- (35) If the clearance is not correct, adjust the inboard slat drive with the instructions given in the "Inboard Slat Drive Adjustment" paragraph.

S 435-052

- (36) Hold the torque tubes in the adjusted position while you connect them to each side of the inboard slat PDU (AMM 27-81-24/401).

NOTE: Try not to turn the torque tubes while you connect them to the PDU. It will be necessary to adjust the inboard slat drive if you turn the torque tube out of the correct adjustment.

S 095-053

- (37) If installed, remove the supports for the inboard slats.

S 825-054

- (38) Adjust the RVDTs in the control unit of the inboard slat PDU if you adjusted the PDU for mechanical or hydraulic null (AMM 27-81-11/401).

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S 865-055

(39) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:

(a) 11H14, SLATS SHUTOFF VALVE

H. Outboard Slat PDU Adjustment (Fig. 503)

S 295-625

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

(1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 495-056

(2) Hold the weight of the outboard slats on the left and right wing with some supports to prevent movement of the slats after you disconnect the torque tube.

**NOTE:** This is to keep the outboard slats in the adjusted position after you disconnect the torque tubes from the outboard slat PDU. It will be necessary to adjust the outboard slat drive if the outboard slats moved while the torque tubes are disconnected.

S 035-057

(3) Disconnect the torque tube on each side of the outboard slat PDU (Detail A).

S 865-058

(4) At the inboard slat PDU, move the manual override lever on the bypass valve to the No. 1 (bypass) position (Detail C, Fig. 502).

S 495-059

(5) Attach a DO-NOT-OPERATE tag to the manual override lever.

S 495-060

(6) Install the groundlock on the inboard slat PDU (Fig. 511).

S 035-061

(7) Remove the plugs on the outboard slat PDU to get access to the rig pin holes for the input cam (LE2) and the follow-up cam (LE3) (Detail B and D, Fig. 503).

S 035-063

(8) Loosen the bolt that connects the input control rod to the pilot input arm, but do not remove the nut or bolt (Detail B, Fig. 503).

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S 495-064

- (9) Use a force gage to apply 15-20 pound (66.7-88.9 newton) load to the input control rod along the centerline of the rod, to the inboard direction (to remove backlash).

S 215-065

- (10) Make sure that you can easily turn the bolt that connects the input control rod to the pilot input arm while you apply the load to the input control rod.

S 495-062

- (11) With the load applied in the previous steps, install rig pin LE2 into the rig pin hole on the input cam.

S 825-066

**CAUTION:** DO NOT ADJUST THE SUPPORTS FOR THE OUTBOARD SLAT PDU TO MAKE ALLOWANCE FOR THE SHORT LENGTH OF THE INPUT CONTROL ROD. THE TORQUE TUBES WILL NOT ALIGN CORRECTLY AND CAUSE SLAT ASYMMETRY, WHICH WILL INCREASE TORQUE TUBE WEAR IF YOU CHANGE THE ADJUSTMENT ON THE PDU SUPPORTS.

- (12) If you cannot turn the bolt easily or to install rig pin LE2 freely, do these steps to adjust the input control rod:
- (a) If the input control rod is adjustable at one end only, make sure that you can see the threads at the adjustable end through the inspection hole.
  - (b) Do these steps only if the input control rod is adjustable at the two ends of the rod:
    - 1) Make sure the adjustable end without the lockwire is connected to the pilot input arm.
    - 2) If it is necessary to adjust the rod end with the lockwire (away from the pilot input arm), remove the lockwire and loosen the jamnut to adjust the rod.

**NOTE:** Do not adjust the control rod shorter than 1.25 inches between the centerline of the rod end bolt hole and the nearest end of the control rod barrel.

- 3) Make sure that you can see the threads through the inspection holes at the two adjustable ends of the control rod.
- (c) Tighten the jamnut at the end(s) of the control rod that you adjusted.
- (d) Safety the jamnut with a lockwire at the rod end that is away from the pilot input arm.

S 435-067

- (13) Connect the input control rod back to the pilot input arm with the bolt, washer, and nut. Tighten the nut.

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S 095-068

- (14) Remove rig pin LE2 from the input cam.

S 865-069

- (15) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:  
(a) 11H14, SLATS SHUTOFF VALVE

S 215-070

- (16) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 865-071

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (17) Pressurize the center hydraulic system (AMM 29-11-00/201) and permit the outboard slat PDU to become stable in the fully retracted position.

**NOTE:** It is usual for the output shaft to turn in the outboard slat PDU when you pressurize the center hydraulic system.

S 215-623

**CAUTION:** DO NOT FORCE THE RIG PIN LE3 INTO PLACE. ANY MOVEMENT OF THE FOLLOW-UP CAM CAN RESULT IN PDU MOVEMENT AND DAMAGE TO THE RVDT QUILL SHAFT WILL OCCUR, IF THE RIG PIN LE3 IS IN PLACE.

- (18) Do a check to see that you can install rig pin LE3 easily into the rig pin hole on the follow-up cam (Detail D, Fig. 503).

S 825-073

- (19) Adjust the outboard slat PDU for mechanical and hydraulic null only if you cannot install rig pin LE3 easily into the rig pin hole.

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S 825-074

(20) Adjust the outboard slat PDU for mechanical null with these steps if necessary (Fig. 503):

- (a) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- (b) Disconnect the control valve control rod from the control unit output arm (Detail B).

NOTE: You will release the fluid pressure lock in the control valve when you disconnect the control valve control rod from the output arm. This will permit you to turn the PDU output shafts to align the rig pin hole for rig pin LE3.

- (c) Turn the output shaft on the outboard slat PDU by small increments, until you can install rig pin LE3 freely.
- (d) After you install rig pin LE3, connect the control valve control rod back to the control unit output arm.
- (e) Try to install rig pin LE4 in the control valve input arm (Detail B).
- (f) If you cannot install rig pin LE4 fully and easily, adjust the length of the control valve control rod with these steps:
  - 1) Remove the lockwire and loosen the jamnut at each end of the control rod.
  - 2) Turn the control rod body to adjust the rod length, until you can easily install rig pin LE4.

NOTE: The usual length of the rod before the final adjustment is 6.56 inches (166.6 mm).

- 3) Tighten the jamnuts on the control rod, but do not install the lockwires.

NOTE: It is possible that you will adjust the control valve control rod again during the hydraulic null adjustment.

- (g) Remove rig pins LE3 and LE4.

S 825-075

(21) Adjust the outboard slat PDU for hydraulic null with these steps after you adjusted the PDU for mechanical null (Fig. 503):

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (a) Pressurize the center hydraulic system (AMM 29-11-00/201) and permit the outboard slat PDU to become stable in the fully retracted position.

**NOTE:** It is usual for the output shaft to turn in the outboard slat PDU when you pressurize the center hydraulic system.

**CAUTION:** DO NOT DISCONNECT THE CONTROL VALVE CONTROL ROD TO DO THE ROD ADJUSTMENT WHILE THE CENTER HYDRAULIC SYSTEM IS PRESSURIZED. DO NOT ADJUST THE CONTROL ROD WITH THE RIG PIN LE3 INSTALLED. ADJUST THE CONTROL ROD ONLY BY SMALL INCREMENTS TO AVOID DAMAGE TO THE OUTBOARD SLAT PDU.

**CAUTION:** DO NOT FORCE THE RIG PIN LE3 INTO PLACE. ANY MOVEMENT OF THE FOLLOW-UP CAM CAN RESULT IN PDU MOVEMENT AND DAMAGE TO THE RVDT QUILL SHAFT WILL OCCUR, IF THE RIG PIN LE3 IS IN PLACE.

- (b) Try to install rig pin LE3 into the rig pin hole for the follow-up cam (Detail D).  
(c) If you cannot install rig pin LE3 easily, adjust the control valve control rod with these steps:

**NOTE:** Do not adjust the control rod while rig pin LE3 is installed. Install rig pin LE3 only to make sure that the control rod is adjusted correctly.

- 1) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- 2) Loosen the jamnut at each end of the control valve control rod.

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- 3) Turn the control rod to adjust the rod length until you can easily install rig pin LE3.

**NOTE:** It is not necessary to install rig pin LE4 for this adjustment.

- 4) Tighten the jamnut on each end of the control rod.
- 5) Install lockwires to the jamnuts with the double twist procedure (AMM 20-10-23/401).

S 095-076

- (22) If installed, remove rig pin LE3 and install the plug in the rig pin hole.

S 865-077

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (23) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-078

- (24) Remove the DO-NOT-OPERATE tag from the flap control lever and move the lever to the 25-unit detent.

S 865-079

- (25) Permit the outboard slat PDU to operate until it stops.

S 865-080

- (26) Move the flap control lever to a position near the 20-unit detent as shown (Detail C, Fig. 503). Do not move the lever over this detent position.

S 865-081

- (27) Permit the outboard slat PDU to operate until it stops.

S 865-082

- (28) Move the flap control lever to the zero (FLAPS UP) detent and permit the outboard slat PDU to operate until it stops.

S 495-083

- (29) Attach a DO-NOT-OPERATE tag to the flap control lever.

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S 825-084

- (30) If it is necessary to adjust the outboard slat drive, you can go directly to the "Outboard Slat Drive Adjustment" paragraph from this step. Continue with the subsequent steps only if the outboard slat drive adjustment is correct.

S 865-085

- (31) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 095-086

- (32) Remove the groundlock from the inboard slat PDU (Fig. 511).

S 095-087

- (33) Remove the PDU lock from the TE flap PDU (Fig. 510).

S 865-088

- (34) Remove the DO-NOT-OPERATE tag from manual override lever on the TE flap PDU, and move the override lever to the No. 2 (normal) position.

S 865-089

- (35) Remove the DO-NOT-OPERATE tag from the manual override lever on the inboard slat PDU, and move the override lever to the No. 2 (normal) position (Detail C, Fig. 502).

S 215-090

- (36) Make sure the outboard slats are in the fully retracted position.

S 825-091

- (37) Do these steps if the outboard slats are not in the fully retracted position, or have accidentally moved during the PDU adjustment:
- (a) Turn the torque tubes adjacent to the outboard slat PDU to retract the outboard slats to the fully retracted position, with one of the two procedures that follow:
    - 1) PROCEDURE A: Turn the torque tube by hand.
    - 2) PROCEDURE B: Turn the torque tube with an air motor and adapter A27077 (AMM 27-81-00/201).

NOTE: It is not necessary to move the manual override lever to the bypass position (No. 1) on the outboard slat PDU when you do this step.

S 225-092

- (38) At the inboard rotary actuator of the slats No. 5 and 8, do a check on the retract overtravel stop clearances and make sure the clearances are correct as shown (Detail B, Fig. 506).

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S 825-093

- (39) If the clearance is not correct, adjust the outboard slat drive with the instructions given in the "Outboard Slat Drive Adjustment" paragraph.

S 435-094

- (40) Hold the torque tubes in the adjusted position while you connect them to each side of the outboard slat PDU (AMM 27-81-24/401).

**NOTE:** Try not to turn the torque tubes while you connect them to the PDU. It will be necessary to adjust the outboard slat drive if you turn the torque tube out of the correct adjustment.

S 095-095

- (41) If installed, remove the supports for the outboard slats.

S 825-096

- (42) Adjust the RVDTs in the control unit of the outboard slat PDU if you adjusted the PDU for mechanical or hydraulic null (AMM 27-81-11/401).

S 865-097

- (43) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:

(a) 11H14, SLATS SHUTOFF VALVE

I. Inboard Slat Drive Adjustment (Slats No. 6 and 7) (Fig. 504)

S 295-626

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 825-098

- (2) Make sure the inboard slat PDU is correctly adjusted before you start this procedure.

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S 035-099

- (3) Disconnect the slat control rod from the actuator arm at the two rotary actuators on slats No. 6 and 7 (left and right inboard slats).

NOTE: Do not change the length of the control rods during or after you disconnect the control rods.

S 985-100

- (4) Move each inboard slat (left and right) forward to extend the slats along its tracks, until the slats stop against the emergency down stops.

S 495-101

- (5) Use rope to hold the slat control rods to the inboard slat, and to clear away from the movement of the rotary actuator arms.

NOTE: Each actuator arm must be free to move between the retract and the extend positions.

S 035-102

- (6) Disconnect the torque tube from each side of the inboard slat PDU (Fig. 502).

S 035-103

- (7) Disconnect the torque tube from the outboard side of the inboard offset gearbox for the left and right inboard slats (AMM 27-81-24/401).

NOTE: This will permit you to manually turn each torque tube independently to adjust the inboard slat drive.

S 035-104

- (8) Disconnect the drive shaft for the krueger seal flap drive at each (left and right) outboard rotary actuator of the inboard slat (Fig. 507).

S 035-105

- (9) Remove the sleeve from each drive shaft.

S 865-106

- (10) Permit the krueger seal flaps to move forward against the stops.

S 985-107

- (11) Keep the disconnected drive shafts for the krueger seal flaps away from the movement of the inboard slats when you extend and retract the slats.

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S 985-108

- (12) Turn the input shaft on each offset gearbox by hand until the rotary actuator arm touches the retract overtravel stop (Fig. 506).

S 435-109

- (13) At each rotary actuator on the inboard slats, keep the actuator arm against the retract overtravel stop and connect the torque tube back to the outboard side of the inboard offset gearbox (AMM 27-81-24/401). Do the steps that follow:
- (a) Apply 10 to 15 pound-inches (1.1-1.7 newton-meters) torque to the offset gearbox to remove the gearbox freeplay and keep the actuator arm against the retract stop.
  - (b) Turn the torque tube to the nearest distance possible to align the spline teeth on the coupling when you connect the torque tube ( $\pm 1/2$  tooth).

S 985-110

- (14) Turn the disconnected torque tubes nearest to the inboard slat PDU to the extend direction, until you can get access to the retract overtravel stops for the inboard slats (approximately 25-30 turns).

S 495-111

- (15) Put a shim of 0.075 +/- 0.003 inch (1.90 +/- 0.0762 mm) thick between the retract overtravel stop and the actuator arm (Detail A, Fig. 506), at each inboard rotary actuator of slats No. 6 and 7.

S 985-112

- (16) Turn the disconnect torque tube on each side of the inboard slat PDU to the retract direction, until the shim is held tightly between the actuator arm and the retract overtravel stop.

**NOTE:** Do not apply more than 50 pound-inches (5.65 newton-meters) of torque to the torque tube.

S 495-113

- (17) Install the groundlock to the outboard slat PDU (Fig. 511).

S 865-114

- (18) Move the manual override lever on the outboard slat PDU to the No. 1 (bypass) position (Detail B, Fig. 503).

S 495-115

- (19) Attach a DO-NOT-OPERATE tag to the manual override lever.

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S 865-116

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(20) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 095-117

(21) Remove the the DO-NOT-OPERATE tag from the flap control lever.

S 865-118

(22) Move the flap control lever to the 1-unit detent, and permit the inboard slat PDU to operate until it stops.

S 865-119

(23) Move the flap control lever to the zero (FLAPS UP) detent, and permit the inboard slat PDU to operate until it stops.

**NOTE:** Stop for one minute before you do the next step.

S 495-120

(24) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-121

(25) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 495-122

(26) Install the groundlock in the inboard slat PDU (Fig. 511).

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S 435-123

- (27) Install the torque tubes to each side of the inboard slat PDU as shown in Fig. 502 (AMM 27-81-24/401).

**NOTE:** Make sure the shim is held tightly between the actuator arm and the retract overtravel stop at the two inboard rotary actuators while you connect the torque tubes.

Turn each torque tube to the nearest distance possible to align the spline teeth on the coupling when you connect the torque tubes ( $\pm 1/2$  tooth).

S 095-124

- (28) Remove the groundlock from the inboard slat PDU (Fig. 511).

S 865-125

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (29) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 095-127

- (30) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 865-128

- (31) Move the flap control lever to the 25-unit detent, and make sure the actuator arms in the inboard slats move to the fully extended position.

S 495-129

- (32) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-130

- (33) Remove the power from the center hydraulic system (Ref 29-11-00).

S 495-131

- (34) Install the groundlock in the inboard slat PDU (Fig. 511).

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S 095-132

- (35) Remove the shim at each inboard rotary actuator on the inboard slats.

S 095-133

- (36) Remove the groundlock from the inboard slat PDU (Fig. 511).

S 865-134

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (37) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 095-135

- (38) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 895-136

- (39) Move the flap control lever from the zero (FLAPS UP) detent to the 25-unit detent, and then back to the zero (FLAPS UP) detent.

**NOTE:** Permit the actuator arms to turn each time you move the flap control lever. Stop for one minute after the actuator arms move back to the fully retracted position.

S 495-137

- (40) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-138

- (41) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 495-139

- (42) Install the groundlock in the inboard slat PDU (Fig. 511).

S 225-140

- (43) Make sure the clearance between each actuator arm and retract overtravel stop is correct as shown (Detail A, Fig. 506) at each inboard slat.

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S 825-141

- (44) If the clearance is not correct, adjust the inboard slat drive again.

S 095-142

- (45) Remove the groundlock from the inboard slat PDU (Fig. 511).

S 865-143

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (46) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 095-144

- (47) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 865-145

- (48) Move the flap control lever to the 25-unit detent, and make sure the actuator arms on the inboard slats move to the fully extended position.

**NOTE:** Stop for one minute before you do the next step.

S 865-146

- (49) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 495-147

- (50) Install the groundlock in the inboard slat PDU (Fig. 511).

S 225-148

- (51) Make sure the clearance between each actuator arm and extend overtravel stop is correct as shown (Detail A, Fig. 506) at each inboard slat.

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S 435-149

- (52) Connect the slat control rod to the actuator arm at the two rotary actuators on each inboard slat (View A-A, Fig. 504). Tighten the nut to 270-300 pound-inches (30.5-33.9 newton-meters).

NOTE: Do not change the length of the slat control rods.

S 095-150

- (53) Remove the groundlock from the inboard slat PDU (Fig. 511).

S 865-151

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

CAUTION: MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (54) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 095-152

- (55) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 865-153

- (56) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the inboard slats move to the fully retracted position.

S 495-154

- (57) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-155

- (58) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 495-156

- (59) Install the groundlock to the inboard slat PDU (Fig. 511).

S 225-157

- (60) Make sure the inboard and outboard ends of the inboard slats are aligned with the adjacent fixed structure as shown (Sections B-B and C-C, Fig. 504).

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S 825-158

- (61) Adjust the length of the slat control rod if you cannot get inboard slats to align with the structure.

S 865-159

- (62) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 511).

S 865-160

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (63) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-161

- (64) Remove the DO-NOT-OPERATE tag from the manual override lever at the outboard slat PDU, and move the manual override lever to the No. 2 position (Detail B, Fig. 503).

S 825-163

- (65) Adjust the krueger seal flap drive with the instructions given in the "Krueger Seal Flap Drive Adjustment" paragraph.

S 845-164

- (66) Put the airplane back to the usual condition if you completed all the necessary adjustments.

S 735-165

- (67) Do a test of the leading edge slat system with the instructions given in the "System Test - Leading Edge Slat System" task.

J. Outboard Slat Drive Adjustment (Slats No. 1-5 and No. 8-12) (Fig. 505)

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S 295-627

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 825-166

- (2) Make sure the outboard slat PDU is correctly adjusted before you start this procedure.

S 035-167

- (3) Disconnect the slat control rod from the rotary actuator arm at the two rotary actuator locations on each outboard slat (View A-A, Fig. 505).

**NOTE:** Do not change the length of slat control rods during or after you disconnect them.

S 425-628

**CAUTION:** MAKE SURE THAT THE DOWNSTOP BUSHINGS ARE INSTALLED CORRECTLY AND THE NUT HAS THE CORRECT TORQUE. IF THEY ARE NOT, THE MAIN TRACK/STRUCTURE JOINT CAN BECOME LOOSE. THE DOWNSTOP PARTS CAN DISCONNECT AND CAN CAUSE DAMAGE TO THE SLAT TRACK HOUSING.

- (4) Make sure the parts of the downstop assembly are installed correctly and the nut has the correct torque.

S 985-168

- (5) Manually move all the outboard slats forward until each slat stops against the emergency down stops on the main track.

S 495-169

- (6) Use rope to hold the slat control rods to the outboard slats, and to clear away from the movement of the rotary actuator arms.

**NOTE:** Each actuator arm must be free to move between the retract and the extend positions.

S 035-170

- (7) Disconnect the torque tube at each side of the outboard slat PDU (Detail B, Fig. 503).

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S 035-171

- (8) Disconnect at least one torque tube between each offset gearbox in the outboard slat drive.

NOTE: This will permit you to manually turn each torque tube independently to the adjust the outboard slat drive.

S 985-172

- (9) Turn the input shaft on each offset gearbox by hand until the actuator arm touches the retract overtravel stop (Detail B, Fig. 506).

S 435-173

- (10) Start from the outboard (slats No. 1 and 12) to the inboard direction, connect the torque tubes back to each offset gearbox for the outboard slats drive while you keep the actuator arms against the retract overtravel stops (AMM 27-81-24/401). Do the steps that follow:
- (a) Apply 10 to 15 pound-inches torque (1.12-1.69 newton-meters) to each offset gearbox to remove the gearbox freeplay and to keep each actuator arm against the retract stop.
  - (b) Turn the torque tube to the nearest distance possible to align the spline teeth on the coupling when you connect the torque tube ( $\pm 1/2$  tooth).

S 985-174

- (11) Turn the disconnected torque tube nearest to the outboard slat PDU to the extend direction, until you can get access to the retract overtravel stops at slats No. 5 and 8 (approximately 25-30 turns).

S 495-175

- (12) Put a shim of 0.075  $\pm$ 0.003 inch (1.905  $\pm$  0.0762 mm) thick between the retract overtravel stop and the actuator arm (Detail B, Fig. 506), at each inboard rotary actuator on slats No. 5 and 8.

S 985-176

- (13) Turn the disconnected torque tube on each side of the inboard slat PDU to the retract direction, until each shim is held tightly between the inboard actuator arm and the retract overtravel stop.

NOTE: Do not apply more than 50 pound-inches (5.65 newton-meters) of torque to the torque tubes.

S 495-177

- (14) Install the groundlock to the inboard slat PDU (Fig. 511).

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S 865-178

- (15) Move the manual override lever on the inboard slat PDU to the No. 1 (bypass) position (Detail C, Fig. 502).

S 495-179

- (16) Attach a DO-NOT-OPERATE tag to the manual override lever on the inboard slat PDU.

S 865-180

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (17) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 095-181

- (18) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 865-182

- (19) Move the flap control lever to the 1-unit detent, and permit the outboard slat PDU to operate until it stops.

S 865-183

- (20) Move the flap control lever to the zero (FLAPS UP) detent, and permit the outboard slat PDU to operation until it stops.

**NOTE:** Stop for one minute before you do the next step.

S 495-184

- (21) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-185

- (22) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 495-186

- (23) Install the groundlock in the outboard slat PDU (Fig. 511).

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S 435-187

- (24) Install the torque tubes to each side of the outboard slat PDU as shown in Fig. 503 (AMM 27-81-24/401).

**NOTE:** Make sure the shim is held tightly between the actuator arm and the retract overtravel stop while you connect the torque tubes to the outboard slat PDU.

Turn each torque tube to the nearest distance possible to align the spline teeth on the coupling when you connect the torque tubes ( $\pm 1/2$  tooth).

S 095-188

- (25) Remove the groundlock from the outboard slat PDU (Fig. 511).

S 865-189

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**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (26) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 095-190

- (27) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 865-191

- (28) Move the flap control lever to the 25-unit detent, and make sure the actuator arms in the outboard slats move to the fully extended position.

S 865-192

- (29) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 495-193

- (30) Install the groundlock to the outboard slat PDU (Fig. 511).

S 095-194

- (31) Remove the shim from each inboard rotary actuator on slats No. 5 and 8.

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S 095-195

(32) Remove the groundlock from the outboard slat PDU (Fig. 511).

S 865-196

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(33) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 095-197

(34) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 865-198

(35) Move the flap control lever from the zero (FLAPS UP) detent to the 25-unit detent, and then back to the zero (FLAPS UP) detent.

**NOTE:** Permit the actuator arms to turn each time you move the flap control lever. Stop for one minute after the actuator arms move back to the fully retracted position.

S 495-199

(36) Attach a DO-NOT-OPERATE tag on the flap control lever.

S 865-200

(37) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 495-201

(38) Install the groundlock in the outboard slat PDU (Fig. 511).

S 225-202

(39) Make sure the clearance between each actuator arm and retract overtravel stop is correct as shown (Detail B, Fig. 506) at each outboard slat.

S 825-203

(40) If the clearance is not correct, adjust the outboard slat drive again.

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S 095-204

(41) Remove the groundlock from the outboard slat PDU (Fig. 511).

S 865-205

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**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(42) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 095-206

(43) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 865-207

(44) Move the flap control lever to the 25-unit detent, and make sure the actuator arms on the outboard slats move to the fully extended position.

**NOTE:** Stop for one minute before you do the next step.

S 495-208

(45) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-209

(46) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 495-210

(47) Install the groundlock on the outboard slat PDU (Fig. 511).

S 225-211

(48) Make sure the clearance between each actuator arm and extend overtravel stop is correct as shown for slats No. 5 and 8 (Detail B, Fig. 506).

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S 495-212

- (49) Connect the slat control rod to the actuator arm at the two rotary actuator locations on each outboard slat (View A-A, Fig. 505). Tighten the nut to 130-200 pound-inches (14.68-22.59 newton-meters).

**NOTE:** Do not change the length of the slat control rods.

S 095-213

- (50) Remove the groundlock from the outboard slat PDU (Fig. 511).

S 295-629

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (51) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 865-214

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (52) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 095-219

- (53) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 865-220

- (54) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the outboard slats move to the fully retracted position.

S 495-221

- (55) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-222

- (56) Remove the power from the center hydraulic system (AMM 29-11-00/201).

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- S 495-223  
(57) Install the groundlock on the outboard slat PDU (Fig. 511).
- S 215-224  
(58) Use a rigging gage to make sure the position of each outboard slat is correct (Detail D, Fig. 505).
- S 825-225  
(59) Adjust the length of the slat control rod if the position of the outboard slat is not correct.
- S 095-226  
(60) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 511).
- S 865-227  
(61) Remove the DO-NOT-OPERATE tag from the manual override lever at the inboard slat PDU , and move the lever to the No. 2 (normal) position (Detail C, Fig. 502).
- S 845-229  
(62) Put the airplane back to the usual condition after you completed all the necessary adjustments.
- S 735-230  
(63) Do a test of the leading edge slat system with the instructions given in the "System Test - Leading Edge Slat System" task.
- K. Krueger Seal Flap Drive Adjustment (at Slat No. 6 or 7)
- S 825-231  
(1) Make sure the inboard slat PDU and the inboard slat drive are correctly adjusted before you start this procedure.
- S 495-232  
(2) Install the groundlock in the outboard slat PDU (Fig. 511).
- S 865-233  
(3) Move the manual override lever on the outboard slat PDU to the No. 1 (bypass) position.
- S 495-234  
(4) Attach a DO-NOT-OPERATE tag to the manual override lever.

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S 865-235

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(5) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 095-236

(6) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 865-237

(7) Move the flap control lever to the 30-unit detent, and make sure the inboard slats move to the fully extended position.

S 495-238

(8) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-239

(9) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 495-240

(10) Install the groundlock in the inboard slat PDU (Fig. 511).

S 035-241

(11) If not done before, disconnect the drive shaft for the krueger seal flap drive at the universal joint, adjacent to the outboard rotary actuator of slats No. 6 and 7 (left and right inboard slats) (View A-A, Fig. 507).

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S 035-242

- (12) Remove the sleeve from the drive shaft.

S 825-243

**CAUTION:** MAKE SURE THE KRUEGER SEAL FLAP IS FULLY EXTENDED, AND THAT THE JOINTS A, B, AND C IS STRAIGHT WHILE THE FLAP DRIVE LINK IS IN POSITION 1, AS SHOWN IN FIG. 508. YOU CAN CAUSE DAMAGE TO THE KRUEGER SEAL FLAP DRIVE IF YOU ADJUST THE KRUEGER SEAL FLAP WHEN THE FLAP DRIVE LINK IS IN POSITION 2.

- (13) Move the krueger flap drive mechanism to align joints A, B, and C to a straight line while you move the flap drive link to position 1. Keep this position while you do the adjustments that follow (Detail A, Fig. 508):

**NOTE:** The position 1 is the correct position for maximum flap extension.

- (a) Disconnect the bull nose control rod at joint D (View A-A).
- (b) Remove the lockwire on the jamnut and adjust the length of the bull nose control rod to get the correct dimension as shown (Detail A).
- (c) Tighten control rod jamnut to 90-125 pouzd-inches (10.2-14.1 newton-meters), and install a lockwire with the double twist procedure (AMM 20-10-23/401).
- (d) Apply a light layer of MIL-PRF-23827 grease to the bolt for the bull nose control rod.
- (e) Connect the bull nose control rod at joint D with the bolt, washers, and nut. Tighten the nut to 50-75 pound-inches (5.65-8.47 newton-meters).

S 035-244

- (14) Disconnect joint E in the krueger seal flap mechanism (View B-B, Fig. 508).

**NOTE:** This will permit you to manually close the krueger seal flap.

S 825-245

- (15) Adjust the stop screw to get the flap to align with the fixed leading edge while the stop screw touches the retainer as shown (Detail B and View C-C, Fig. 508).

**NOTE:** Align the surface by  $\pm 0.02$  inch ( $\pm 0.50$  mm) for at least 25% of any edge, and by  $\pm 0.04$  inch ( $\pm 1.0$  mm) for a distance of no more than 25% of any edge.

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S 435-246

- (16) Tighten the stop screw jamnut to 100-140 pound-inches (11.3-15.8 newton-meters) and install a lockwire with the double twist procedure (AMM 20-10-23/401).

S 435-247

- (17) Connect joint E (Section B-B, Fig. 508), and tighten the nut to 50-75 pound-inches (5.65-8.47 newton-meters).

S 985-248

- (18) Keep the krueger flap drive shaft away from the movement of each inboard slat when you retract the inboard slats in the subsequent steps.

S 095-249

- (19) Remove the groundlock from the inboard slat PDU (Fig. 511).

S 865-250

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (20) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 095-251

- (21) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 865-252

- (22) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the inboard slats move to the fully retracted position.

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- S 495-253
- (23) Attach a DO-NOT-OPERATE tag to the flap control lever.
- S 865-254
- (24) Remove the power from the center hydraulic system (AMM 29-11-00/201).
- S 495-255
- (25) Install the groundlock in the inboard slat PDU (Fig. 511).
- S 495-256
- (26) Remove the fastener at the lower inboard corner of the krueger seal flap and attach a 50-pound weight to the flap.
- S 985-257
- (27) Manually turn the drive shaft to retract the krueger seal flap until the flap touches the stop screw.
- NOTE:** Make sure the flap does not touch the stop screw if you turn the drive shaft by a small increment in the opposite direction.
- S 435-258
- (28) Install the sleeve on the drive shaft.
- S 435-259
- (29) Connect the drive shaft to each outboard rotary actuator (for the inboard slats) at the universal joint (View A-A, Fig. 507) while you keep the krueger seal flap against the stop screw.
- NOTE:** Increase the flap contact load on the stop screw by no more than one spline when you engage the splines between the sleeve and the drive shaft.

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- S 095-260
- (30) Remove the 50-pound weight from the flap and install the fastener.
- S 095-261
- (31) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 511).
- S 865-262
- (32) Remove the DO-NOT-OPERATE tag from the manual override lever on the outboard slat PDU, and move the override lever to the No. 2 (normal) position (Detail B, Fig. 503).
- S 845-263
- (33) Put the airplane back to its usual condition.
- S 735-264
- (34) Do a test on the leading edge slat system with the instructions given in the "System Test - Leading Edge Slat System" task.
- L. Put the Airplane Back to Its Usual Condition

S 295-630

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 215-265

- (2) Make sure the flaps and slats are in the fully retracted position.

S 215-266

- (3) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 095-267

- (4) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 865-268

- (5) Make sure that you remove the power from the center hydraulic system (AMM 29-11-00/201).

S 095-269

- (6) Remove the PDU lock from the TE flap PDU (Fig. 510), in the aft wall of the right main landing gear wheel well.

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S 865-270

- (7) Remove the DO-NOT-OPERATE tag from the manual override lever on the TE flap PDU, and move the override lever to the No. 2 (normal) position.

S 865-271

- (8) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H14, SLAT SHUTOFF
  - (b) 11H23, SLAT ALTN CONT INBD
  - (c) 11H24, SLAT ALTN CONT OUTBD
  - (d) 11J24, FLAPS ALTN CONT

S 865-272

- (9) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 415-273

- (10) Install the lower access panels for the leading edge if it is not necessary to keep access open to the slat drive (AMM 06-44-00/201).

S 415-274

- (11) Install the access panels, 511BB and 611BB, if it is not necessary to access open to the inboard and outboard slat PDUs (AMM 06-44-00/201).

S 095-275

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (12) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 445-276

- (13) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

TASK 27-81-00-735-277

3. Slat Alternate Power and Drive System - Test

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (3) AMM 78-31-00/201, Thrust Reverser System

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B. Access

(1) Location Zones

211/212	Control Cabin
410	No.1 Power Plant
420	No.2 Power Plant
500/600	Left Wing/Right Wing

C. Prepare for the Test

S 045-485

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 215-480

- (2) Make sure the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position.

S 215-489

- (3) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 215-281

- (4) Do these checks to make sure the flap and the slat alternate drives are disarmed (Fig. 501):

(a) Make sure the position selector switch for the flap/slat alternate drive on the first officer instrument panel, P3, is in the NORM detent.

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

(c) Make sure the arming switches for the flap and the slat alternate drives (on P3) are not in the armed position (ALTN switch lights are off).

(d) Make sure the amber TRAILING EDGE and LEADING EDGE lights (on P3) are off.

S 215-577

- (5) Make sure you close these circuit breakers on the main power distribution panel (P6):

(a) 6D21, ALTN SLAT INBD PWR

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- (b) 6D24, ALTN FLAP PWR
- (c) 6F24, ALTN SLAT OUTBD PWR

S 215-481

- (6) Make sure you close these circuit breakers on the P11 Overhead Panel:

- (a) 11C10, SLAT POS IND
- (b) 11C14, FLAP/STAB POS SENSING C
- (c) 11C15, FSEU POS SENSOR 1
- (d) 11C16, FLAP SLAT ELEC UNIT 1 CONT, or  
FSEU CONT 1
- (e) 11C29, 11E19, 11C21 or 11C27, LDG GR POS AIR/GND SYS 2 ALT
- (f) 11G16, FLAP SLAT ELEC UNIT 2 CONT, or  
FSEU CONT 2
- (g) 11G23, FLAP SLAT ELEC UNIT 3 CONT, or  
FSEU CONT 3
- (h) 11G15 or 11S14, FSEU POS SENSOR 2
- (i) 11G22, FSEU POS SENSOR 3
- (j) 11H14, LE SLAT SHUTOFF
- (k) 11H23, SLAT ALTN CONT INBD
- (l) 11H24, SLAT ALTN CONT OUTBD
- (m) 11J13, LOAD RELIEF
- (n) 11J14, TE FLAP SHUTOFF
- (o) 11J17, FLAP/STAB POS SENSING L
- (p) 11J24, TE FLAPS ALTN CONT
- (q) 11J26, FLAP/STAB POS SENSING R
- (r) 11T36, PROX SW TEST
- (s) 11U23 or 11U24, LDG GR POS AIR/GND SYS 2

S 215-517

- (7) Make sure you close these circuit breakers on the P11 Overhead Panel:

- (a) 11J02, EICAS CMPTR L
- (b) 11J03, EICAS UPPER DISPL
- (c) 11J11, FLAP/SLAT POS IND
- (d) 11J15, L FLAP POS IND
- (e) 11J16, R FLAP POS IND
- (f) 11J29, EICAS CMPTR R
- (g) 11J30, EICAS LOWER DSPL
- (h) 11J31, EICAS DSPL SW
- (i) 11J32, EICAS PILOT DISPLAY, or  
DISPLAY SELECT

S 215-484

- (8) Make sure the COMPUTER switch on the EICAS DISPLAY select panel is in the L position.

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D. Test for the Slat Alternate Power and Drive System (Fig. 501)

**NOTE:** When you read the flap position indicator, a tolerance of 1/32 of an inch is permitted on the L and R needle positions.

S 865-604

- (1) Make sure the EICAS messages on the EICAS display and the amber LEADING EDGE light on P3 come on only when it is shown in the test instruction.

S 865-601

**CAUTION:** DO NOT OPERATE THE ALTERNATE DRIVE MOTOR CONTINUOUSLY FOR MORE THAN 4 MINUTES. DO NOT OPERATE THE MOTOR AGAIN UNTIL IT IS COOL FOR AT LEAST 20 MINUTES TO PREVENT DAMAGE TO THE MOTOR.

**CAUTION:** WHILE USING THE ALTERNATE OR THE PRIMARY METHOD TO OPERATE THE LEADING EDGE SLAT DRIVE SYSTEM, MAKE SURE THE SAME METHOD IS USED UNTIL THE CYCLE IS COMPLETED. QUICK TRANSITION OF THE LEADING EDGE SLAT DRIVE SYSTEM FROM THE ALTERNATE MODE TO THE PRIMARY MODE CAN CAUSE INTERNAL FAILURE OF THE ALTERNATE DRIVE MOTOR.

- (2) Get visual assistance from another person to make sure the alternate drive motors shut off when the slats stop moving.

S 865-286

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (3) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-287

- (4) Push the arming switch for the slat alternate drive to arm the slat alternate drive (ALTN switch light comes on at the LE side).

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S 215-288

- (5) Make sure that these conditions occur in seven seconds after you push the arming switch:
- (a) The amber LEADING EDGE light (on P3) comes on.
  - (b) This EICAS message, LE SLAT DISAGREE, shows on the EICAS display.

S 865-289

- (6) Move the flap control lever to the 1-unit detent, and make sure the inboard and outboard slats do not move.

S 865-290

- (7) Move the flap control lever to the zero (FLAPS UP) detent.

S 865-291

- (8) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 865-292

**CAUTION:** DO NOT OPERATE THE ALTERNATE DRIVE MOTOR CONTINUOUSLY FOR MORE THAN 4 MINUTES. DO NOT OPERATE THE MOTOR AGAIN UNTIL IT IS COOL FOR AT LEAST 20 MINUTES TO PREVENT DAMAGE TO THE MOTOR.

**CAUTION:** WHILE USING THE ALTERNATE OR THE PRIMARY METHOD TO OPERATE THE LEADING EDGE SLAT DRIVE SYSTEM, MAKE SURE THE SAME METHOD IS USED UNTIL THE CYCLE IS COMPLETED. QUICK TRANSITION OF THE LEADING EDGE SLAT DRIVE SYSTEM FROM THE ALTERNATE MODE TO THE PRIMARY MODE CAN CAUSE INTERNAL FAILURE OF THE ALTERNATE DRIVE MOTOR.

- (9) Turn the position selector switch for the flap/slat alternate drive to the 1-unit detent and do these checks:
- (a) Make sure the amber LEADING EDGE light goes off.
  - (b) Make sure the EICAS message, LE SLAT DISAGREE, does not show on the EICAS display.
  - (c) While the slats move, make sure the L and R needles on the flap position indicator (on P3) move to a position between the UP and 1-unit marks.
  - (d) After the slats stop at the intermediate position, make sure the L and R needles point to the 1-unit mark on the flap position indicator.

S 865-294

- (10) Turn the position selector switch for the flap/slat alternate drive to the 5, 15, and 20-unit detents. Stop at each detent to make sure the slats do not move.

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S 865-295

- (11) Turn the position selector switch to the 25-unit detent, and make sure the slats move to the fully extended position.

S 865-296

- (12) Turn the position selector switch to the 30-unit detent, and make sure the slats stay in the fully extended position.

S 865-297

- (13) Turn the position selector switch to the 20-unit detent, and make sure the slats move to the intermediate position.

S 865-298

- (14) Turn the position selector switch to the 15, 5, and 1-unit detents. Stop at each detent to make sure the slats do not move.

S 865-299

- (15) Turn the position selector switch to the UP detent to move the slats to the fully retracted position, and do these checks:
- (a) While the slats move, make sure the L and R needles on the flap position indicator move to a position between the UP and 1-unit marks.
  - (b) When the slats stop at the fully retracted position, make sure the L and R needles point to the UP mark on the flap position indicator.

NOTE: The slat movement will not be as accurate when the slats are retracted with the alternate electric power.

S 865-303

- (16) Turn the rotary position selector switch for the slat alternate drive to the NORM detent, and make sure these conditions occur after 7 seconds:
- (a) The amber LEADING EDGE light (on P3) comes on.

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(b) This EICAS message, LE SLAT DISAGREE, shows on the EICAS display.

S 865-304

(17) Push the arming switch for the slat alternate drive to disarm the alternate drive (ALTN switch light off).

S 215-305

(18) Make sure the amber LEADING EDGE light is off.

S 215-306

(19) Make sure the EICAS message, LE SLAT DISAGREE, does not show on the EICAS display.

E. Put the Airplane Back to Its Usual Condition

S 865-501

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

S 415-502

(2) Install the access panels, 511BB and 611BB, if it is no longer necessary to access open to the outboard and inboard slat PDU (AMM 06-44-00/201).

S 445-503

(3) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

TASK 27-81-00-735-424

4. Slat Asymmetry Protection System - Test

A. Equipment

- (1) Proximity Sensor Actuator/Deactuator Set - A27092-106 (optional to the Aluminum Shim):
  - (a) Deactuator - P/N A27092-62 (1 necessary)
- (2) Aluminum Shim (1 Necessary, optional to tool A27092) (size: approximately 1.50 x .75, 0.025-0.030 inch (38.1 x 19.05, 0.635-0.762 mm) thick)
- (3) Leading Edge Slats Groundlock - A27007-1 (2 Necessary)

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B. Consumable Materials

- (1) G00347 Tape, Double Back - Permacel 55

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels  
(2) AMM 24-22-00/201, Electrical Power - Control  
(3) AMM 27-88-00/501, Leading Edge Slat Position Indicating System  
(4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(5) AMM 31-51-00/501, Warning Systems  
(6) AMM 78-31-00/201, Thrust Reverser System

D. Access

(1) Location Zones

211/212	Control Cabin
410	No.1 Power Plant
420	No.2 Power Plant
500/600	Left Wing/Right Wing

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
511FB	Lower LE Structure, Slat Mechanism (Left)
521AFB	Outboard Slat Mechanism (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

E. Prepare for the Test

S 045-427

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 215-428

- (2) Make sure the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position.

S 215-429

- (3) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 865-425

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

S 215-426

- (5) Make sure the arming switches for the flap and the slat alternate drives, on the first officer's main instrument panel, P3, are not in the armed position (ALTN switch lights are off).

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S 215-617

- (6) Make sure you close these circuit breakers on the main power distribution panel (P6):
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 215-618

- (7) Make sure you close these circuit breakers on the P11 Overhead Panel.
- (a) 11C10, SLAT POS IND
  - (b) 11C14, FLAP/STAB POS SENSING C
  - (c) 11C15, FSEU POS SENSOR 1
  - (d) 11C16, FLAP SLAT ELEC UNIT 1 CONT, or  
FSEU CONT 1
  - (e) 11C29, 11E19, 11C21 or 11C27, LDG GR POS AIR/GND SYS 2 ALT
  - (f) 11G15 or 11S14, FSEU POS SENSOR 2
  - (g) 11G16, FLAP SLAT ELEC UNIT 2 CONT, or  
FSEU CONT 2
  - (h) 11G22, FSEU POS SENSOR 3
  - (i) 11G23, FLAP SLAT ELEC UNIT 3 CONT, or  
FSEU CONT 3
  - (j) 11H14, LE SLAT SHUTOFF
  - (k) 11H23, SLAT ALTN CONT INBD
  - (l) 11H24, SLAT ALTN CONT OUTBD
  - (m) 11J13, LOAD RELIEF
  - (n) 11J14, TE FLAP SHUTOFF
  - (o) 11J17, FLAP/STAB POS SENSING L
  - (p) 11J24, TE FLAPS ALTN CONT
  - (q) 11J26, FLAP/STAB POS SENSING R
  - (r) 11T36, PROX SW TEST
  - (s) 11U23 or 11U24, LDG GR POS AIR/GND SYS 2

S 215-619

- (8) Make sure you close these circuit breakers on the P11 Overhead Panel:
- (a) 11J02, EICAS CMPTR L
  - (b) 11J03, EICAS UPPER DISPL
  - (c) 11J11, FLAP/SLAT POS IND
  - (d) 11J15, L FLAP POS IND
  - (e) 11J16, R FLAP POS IND
  - (f) 11J29, EICAS CMPTR R
  - (g) 11J30, EICAS LOWER DSPL
  - (h) 11J31, EICAS DSPL SW
  - (i) 11J32, EICAS PILOT DISPLAY, or  
DISPLAY SELECT

S 215-432

- (9) Make sure the COMPUTER switch on the EICAS DISPLAY select panel is in the L position.

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F. Test for the Inboard Slat Asymmetry Protection (Fig. 509)

S 865-307

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (1) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-308

- (2) Move the flap control lever to the 25-unit detent and permit the slats to move to the fully extended position.

S 495-309

- (3) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-310

- (4) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 015-311

- (5) Remove the access panels, 511BB and 611BB, to get access to the outboard and inboard slat power drive units (PDUs) (AMM 06-44-00/201).

S 495-312

- (6) Install the groundlocks on the inboard and outboard slat PDUs (Fig. 511).

S 495-314

- (7) Do one of the two steps that follow to isolate the sensor switch (S281) from the retract target:
- (a) Remove the access panel (Ref 06-44-00), 511FB, to get access to the sensor switch, S281, on slat No. 6 (Detail D, Fig. 509). Attach the deactuator tool (or the aluminum shim) to the sensor switch (S281).

**NOTE:** You can use double-sided tape to attach the deactuator to the sensor switch.

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- (b) Attach the deactuator tool (or the aluminum shim) to the face of the retract target on the inboard auxiliary arm of slat No. 6 (Detail D, Fig. 509).

NOTE: You can use double sided tape to attach the deactuator to the retract target.

S 095-315

- (8) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 511).

S 865-316

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

CAUTION: MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (9) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 095-317

- (10) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 865-318

- (11) Move the flap control lever to the zero (FLAPS UP) detent and do these checks:

NOTE: If you removed the access panel, 511 FB, to get access to the sensor switch, S281, on slat No. 6 and attached the deactuator tool or the aluminum shim to the sensor switch (S281), then the lights and messages called out in the next steps will already be on. The slats move or do not move to the retracted position.

- (a) Make sure the amber LEADING EDGE light (on P3) comes on (Fig. 501).  
(b) Make sure this EICAS message, LE SLAT ASYM, shows on the EICAS display.

S 865-319

- (12) Turn the COMPUTER switch on the EICAS DISPLAY select panel to the R position and make sure the LE SLAT ASYM message shows on the EICAS display.

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S 865-320

- (13) Turn the COMPUTER switch back to the L position and stop for 10 seconds before you continue with the subsequent step.

S 865-321

- (14) Move the flap control lever to the 1-unit detent and do these checks:

NOTE: The outboard slats move (if a -53 or older FSEU is installed) or not move (if a -63 or newer FSEU is installed) to the intermediate position.

- (a) Make sure the inboard slats (No. 6 and 7) do not move.

NOTE: It is normal that the inboard slats move slightly. This is due to the transition of the bypass valve in the power drive unit.

S 865-608

- (15) Move the alternate flap selector switch to the 1-unit position and make sure the inboard slats do not move toward the 1-unit position.

NOTE: If the inboard slats move toward the 1-unit position, it is an indication that the arming relay K226 is failing in the energized state and needs replacement.

S 865-609

- (16) Move the alternate flap selector switch to the NORM position.

S 865-610

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM THE OUTBOARD SLATS IN THE SUBSEQUENT STEP. THE OUTBOARD SLATS CAN MOVE TO THE INTERMEDIATE POSITION AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (17) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:

- (a) 11C16, FLAP SLAT ELEC UNIT 1 CONT

S 215-325

- (18) Make sure the manual override lever on the inboard slat PDU is in the No. 1 (bypass) position (Detail C, Fig. 502).

S 215-326

- (19) Make sure the manual override lever on the outboard slat PDU is in the No. 2 (normal) position (Detail B, Fig. 503).

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S 865-327

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE SLATS IN THE SUBSEQUENT STEP. THE SLATS CAN MOVE ACCIDENTALLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(20) Move the manual override lever on the inboard slat PDU to the No. 2 (normal) position, and make sure the inboard slats move to the intermediate position.

S 865-328

(21) Move the flap control lever to the 25-unit detent to move the slats to the fully extended position.

S 495-329

(22) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-330

(23) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 095-331

(24) Remove the deactuator (or the aluminum shim) from the sensor switch or the retract target.

S 865-333

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(25) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 095-334

(26) Remove the DO-NOT-OPERATE tag from the flap control lever.

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S 865-335

- (27) Move the flap control lever to the zero (FLAPS UP) detent to move the slats to the fully retracted position.

S 865-336

- (28) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:  
(a) 11C16, FLAP SLAT ELEC UNIT 1 CONT

S 215-337

- (29) Make sure the amber LEADING EDGE light (on P3) is off.

S 215-338

- (30) Make sure the EICAS message, LE SLAT ASYM, does not show on the EICAS display.

S 215-339

- (31) Make sure the L and R needles point to the UP mark on the flap position indicator.

S 415-342

- (32) If removed, install the access panel, 511FB, at the slat No. 6 location (AMM 06-44-00/201).

G. Test for the Outboard Slat Asymmetry Protection (Fig. 509)

S 865-343

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (1) Make sure the center hydraulic system is pressurized (AMM 29-11-00/201).

S 865-344

- (2) Move the flap control lever to the 25-unit detent to move the slats to the fully extended position.

S 495-345

- (3) Attach a DO-NOT-OPERATE tag to the flap control lever.

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- S 865-346
- (4) Remove the power from the center hydraulic system (AMM 29-11-00/201).
- S 015-347
- (5) Remove the access panels, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (AMM 06-44-00/201).
- S 495-348
- (6) Install the groundlocks on the inboard and outboard slat PDUs (Fig. 511).
- S 495-350
- (7) Do one of the two steps that follow to isolate the sensor switch (S276) from the retract target:
- (a) Remove the access panel (AMM 06-44-00/201), 521AFB, to get access to the sensor switch, S276, on slat No. 1 (Detail C, Fig. 509). Attach the deactuator assembly (or the aluminum shim) to the sensor switch (S276).
- NOTE:** You can use double-sided tape to attach the deactuator to the sensor switch.
- (b) Attach the deactuator assembly (or the aluminum shim) to the face of the retract target on the outboard auxiliary arm of slat No. 1 (Detail C, Fig. 509).
- NOTE:** You can use double sided tape to attach the deactuator to the retract target.
- S 095-351
- (8) Remove the groundlocks from the inboard and outboard slat PDUs.
- S 865-352

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (9) Pressurize the center hydraulic system (AMM 29-11-00/201).

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S 095-353

- (10) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 865-611

- (11) Move the flap control lever to the zero (FLAPS UP) detent and do these checks:

**NOTE:** If you removed the access panel, 521AFB, to get access to the sensor switch, S276, on slat No. 1 and attached the deactuator tool or the aluminum shim to the sensor switch (S276), then the lights and messages called out in the next steps will already be on. The slats move or do not move to the retracted position.

- (a) Make sure the amber LEADING EDGE light (on P3) comes on (Fig. 501).  
(b) Make sure this EICAS message, LE SLAT ASYM, shows on the EICAS display.

S 865-355

- (12) Turn the COMPUTER switch on the EICAS DISPLAY select panel to the R position and make sure the LE SLAT ASYM message shows on the EICAS display.

S 865-356

- (13) Turn the COMPUTER switch back to the L position and stop for 10 seconds before you continue with the subsequent step.

S 865-357

- (14) Move the flap control lever to the 1-unit detent and do these checks:

**NOTE:** The inboard slats move (if a -53 or older FSEU is installed) or not move (if a -63 or newer FSEU is installed) to the intermediate position.

- (a) Make sure the outboard slats (No. 1-5 and 8-12) do not move.

**NOTE:** It is normal that the outboard slats move lightly. This is due to the transition of the bypass valve in the power drive unit.

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S 865-606

- (15) Move the alternate flap selector switch to the 1-unit position and make sure the outboard slats do not move toward the 1-unit position.

**NOTE:** If the outboard slats move toward the 1-unit position, it is an indication that the arming relay K223 is failing in the energized state and needs replacement.

S 865-607

- (16) Move the alternate flap selector switch to the NORM position.

S 865-612

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE INBOARD SLATS IN THE SUBSEQUENT STEP. THE INBOARD SLATS CAN MOVE TO THE INTERMEDIATE POSITION AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (17) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:  
(a) 11C16, FLAP SLAT ELEC UNIT 1 CONT

S 215-361

- (18) Make sure the manual override lever on the outboard slat PDU is in the No. 1 (bypass) position (Detail B, Fig. 503).

S 215-362

- (19) Make sure the manual override lever on the inboard slat PDU is in the No. 2 (normal) position (Detail C, Fig. 502).

S 865-363

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE SLATS IN THE SUBSEQUENT STEP. THE SLATS CAN MOVE ACCIDENTALLY AND CAUSE INJURE TO PERSONS OR DAMAGE TO EQUIPMENT.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (20) Move the manual override lever on the outboard slat PDU to the No. 2 (normal) position, and make sure the outboard slats move to the intermediate position.

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S 865-631

- (21) Move the flap control lever to the 25-unit detent to move the slats to the fully extended position.

S 495-632

- (22) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-364

- (23) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 095-365

- (24) Remove the deactuator (or the aluminum shim) from the sensor switch or the retract target.

S 865-367

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (25) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 865-368

- (26) Move the flap control lever to the zero (FLAPS UP) detent.

S 865-369

- (27) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:  
(a) 11C16, FLAP SLAT ELEC UNIT 1 CONT

S 215-370

- (28) Make sure the amber LEADING EDGE light is off.

S 215-371

- (29) Make sure the EICAS message, LE SLAT ASYM, does not show on the EICAS display.

S 215-372

- (30) Make sure the L and R needles point to the UP mark on the flap position indicator.

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S 415-375

- (31) If removed, install the access panel, 521AFB, at the slat No. 1 location (AMM 06-44-00/201).

H. Put the Airplane Back to Its Usual Condition

S 865-490

- (1) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 865-491

- (2) Remove electrical power (AMM 24-22-00/201).

S 415-492

- (3) Install the access panels, 511BB and 611BB, if not necessary to keep access open to the outboard and inboard slat PDU (AMM 06-44-00/201).

S 445-493

- (4) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

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5. Slat Failure Protection System - Test

A. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-81-00/601, Leading Edge Slat System
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 31-41-00/201, EICAS
- (6) AMM 31-51-00/501, Warning Systems
- (7) AMM 78-31-00/201, Thrust Reverser System

B. Access

(1) Location Zones

211/212	Control Cabin
410	No.1 Power Plant
420	No.2 Power Plant
500/600	Left Wing/Right Wing

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

C. Prepare for the Test

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S 045-495

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 215-496

- (2) Make sure the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position.

S 215-497

- (3) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 865-434

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

S 215-435

- (5) Make sure the arming switches for the flap and the slat alternate drives, on the P3 panel, are not in the armed position (ALTN switch lights are off).

S 215-579

- (6) Make sure you close these circuit breakers on the main power distribution panel (P6):
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 215-498

- (7) Make sure you close these circuit breakers on the P11 Overhead Panel.
- (a) 11C10, SLAT POS IND
  - (b) 11C14, FLAP/STAB POS SENSING C
  - (c) 11C15, FSEU POS SENSOR 1
  - (d) 11C16, FLAP SLAT ELEC UNIT 1 CONT, or FSEU CONT 1
  - (e) 11C29, 11E19, 11C21 or 11C27, LDG GR POS AIR/GND SYS 2 ALT
  - (f) 11G15 or 11S14, FSEU POS SENSOR 2
  - (g) 11G16, FLAP SLAT ELEC UNIT 2 CONT, or FSEU CONT 2
  - (h) 11G22, FSEU POS SENSOR 3
  - (i) 11G23, FLAP SLAT ELEC UNIT 3 CONT, or FSEU CONT 3
  - (j) 11H14, LE SLAT SHUTOFF
  - (k) 11H23, SLAT ALTN CONT INBD
  - (l) 11H24, SLAT ALTN CONT OUTBD

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- (m) 11J13, LOAD RELIEF
- (n) 11J14, TE FLAP SHUTOFF
- (o) 11J17, FLAP/STAB POS SENSING L
- (p) 11J24, TE FLAPS ALTN CONT
- (q) 11J26, FLAP/STAB POS SENSING R
- (r) 11T36, PROX SW TEST
- (s) 11U23 or 11U24, LDG GR POS AIR/GND SYS 2

S 215-527

- (8) Make sure you close these circuit breakers on the P11 Overhead Panel:

- (a) 11J02, EICAS CMPTR L
- (b) 11J03, EICAS UPPER DISPL
- (c) 11J11, FLAP/SLAT POS IND
- (d) 11J15, L FLAP POS IND
- (e) 11J16, R FLAP POS IND
- (f) 11J29, EICAS CMPTR R
- (g) 11J30, EICAS LOWER DSPL
- (h) 11J31, EICAS DSPL SW
- (i) 11J32, EICAS PILOT DISPLAY, or  
DISPLAY SELECT

S 215-499

- (9) Make sure the COMPUTER switch on the EICAS DISPLAY select panel is in the L position.

D. Test for the Inboard Slat Failure Protection (Fig. 502)

S 215-376

- (1) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 495-377

- (2) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-378

- (3) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 015-379

- (4) If installed, remove the access panel, 611BB, to get access to the inboard slat PDU (AMM 06-44-00/201).

S 035-380

- (5) Remove the nut and washer from the bolt that connects the input control rod to the pilot input arm, at the inboard slat PDU (Detail C, Fig. 502). Do not remove the bolt.

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S 865-381

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(6) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 035-382

(7) Hold the pilot input arm in position and remove the bolt from the arm. Do not move the arm or change the length of the input control rod.

S 985-383

(8) Standing forward of the inboard slat PDU and looking aft, move the pilot input arm clockwise to the extend direction (Detail C, Fig. 502) to approximately 15-20 degrees.

S 215-509

(9) Make sure the slats do not move.

S 865-384

(10) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:

**NOTE:** Prepare to do the subsequent steps before you open the circuit breaker in this step.

(a) 11H14, SLAT SHUTOFF

S 215-385

(11) Make sure these conditions occur after you open the circuit breaker:

- (a) The inboard slats start to move, and then stop in less than 4 seconds.
- (b) The manual override lever on the inboard slat PDU is in the No. 1 (bypass) position (Detail C, Fig. 502).
- (c) The amber LEADING EDGE light (on P3) is on (Fig. 501).
- (d) The L and R needles point to a position between the UP and 1-unit marks on the flap position indicator.
- (e) The EICAS message, LE SLAT DISAGREE, shows on the EICAS display.

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- (f) When the LE SLAT DISAGREE message shows on the EICAS display, do the steps that follow:
- 1) Push the STAT button on the engine display panel located on the center aisle stand to show status messages on the bottom EICAS display.

NOTE: The FLAP/SLAT ELEC and SLAT ISLN VAL messages are possibly shown on the bottom EICAS display because the circuit breaker SLAT SHUTOFF VALVE is open.

- 2) Make sure that the LE SLAT SHUTDOWN message shows on the bottom EICAS display.
- 3) Turn the COMPUTER switch on the EICAS DISPLAY select panel to the R position, and make sure the EICAS messages stay on the EICAS display.

S 435-386

- (12) Move the pilot input arm back to the initial position and connect the input control rod to the pilot input arm with the bolt, washer, and nut (Detail C, Fig. 502).

NOTE: Do not change the length of the input control rod. Keep the the flap control lever in the zero (FLAPS UP) detent when you install the bolt.

S 095-387

- (13) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 865-388

- (14) Move the flap control lever to the 1-unit detent, and make sure the outboard slats move to the intermediate position.

S 865-389

- (15) Push the arming switch (on P3) for the slat alternate drive to arm the slat alternate drive (ALTN switch light comes on at the LE side) (Fig. 501).

S 865-390

- (16) Push the arming switch again to disarm the slat alternate drive (ALTN switch lights goes off), and make sure the inboard slats move to the intermediate position.

S 865-394

- (17) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11H14, SLAT SHUTOFF

S 865-546

- (18) Erase the SLAT ISLN VAL maintenance message because this message is latched (AMM 31-41-00/201).

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S 215-391

- (19) Do these checks after the inboard slats stop at the intermediate position:
- (a) Make sure the amber LEADING EDGE light goes off.
  - (b) Make sure there are no messages on the EICAS display for the slats.

S 865-392

- (20) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the slats move to the fully retracted position.

S 865-393

- (21) Remove power from the center hydraulic system (AMM 29-11-00/201).  
E. Test for the Outboard Slat Failure Protection (Fig. 503)

S 215-395

- (1) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 495-396

- (2) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-397

- (3) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 015-398

- (4) If installed, remove the access panel, 511BB, to get access to the outboard slat PDU (AMM 06-44-00/201).

S 035-399

- (5) Remove the nut and washer from the bolt that connects the input control rod to the pilot input arm, at the outboard slat PDU (Detail B, Fig. 503). Do not remove the bolt.

S 865-400

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (6) Pressurize the center hydraulic system (AMM 29-11-00/201).

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S 865-508

- (7) Do these steps to make sure the messages show on the EICAS display.
- (a) Open this circuit breaker on P11 Overhead Panel:
    - 1) 11H14, SLAT SHUTOFF
  - (b) Approximately 10 seconds after you open the circuit breaker, look for these messages on the EICAS display:
    - 1) FLAP/SLAT ELEC

NOTE: This message shows on both the status and maintenance pages on EICAS.

- 2) AIRPLANES WITH -603 AND SUBSEQUENT EICAS COMPUTERS;  
SLAT ISLN VAL

NOTE: The Signal Consolidation Card (SCC) needs to be installed on the airplane to display this message. This message is shown on the EICAS maintenance page only.

- (c) Turn the COMPUTER switch on the EICAS DISPLAY select panel to the R position, and make sure the EICAS messages stay on the EICAS display.
- (d) Turn the COMPUTER switch back to the L position.
- (e) Close this circuit breaker on the P11 panel:
  - 1) 11H14, SLAT SHUTOFF

S 035-401

- (8) Hold the pilot input arm in position and remove the bolt from the arm. Do not move the arm or change the length of the input control rod.

S 985-402

- (9) Standing forward of the outboard slat PDU and looking aft, move the pilot input arm clockwise to the extend direction (Detail B, Fig. 503) to approximately 15-20 degrees.

S 215-510

- (10) Make sure the slats do not move.

S 865-403

- (11) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:

NOTE: Prepare to do the subsequent steps before you open the circuit breaker in this step.

- (a) 11H14, SLAT SHUTOFF

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S 215-404

- (12) Make sure these conditions occur after you open the circuit breaker:
- (a) The outboard slats start to move, and then stop in less than 4 seconds.
  - (b) The manual override lever on the outboard slat PDU is in the No. 1 (bypass) position (Detail B, Fig. 503).
  - (c) The amber LEADING EDGE light (on P3) goes on (Fig. 501).
  - (d) The L and R needles point to a position between the UP and 1-unit marks on the flap position indicator.
  - (e) The EICAS message, LE SLAT DISAGREE shows on the EICAS display.
  - (f) Turn the COMPUTER switch on the EICAS DISPLAY select panel to the R position, and make sure the EICAS message does not change, then turn the switch back to the L position.
  - (g) When the LE SLAT DISAGREE message shows on the EICAS display, do the steps that follow:
    - 1) Push the STAT button on the engine display panel located on the center aisle stand to show status messages on the bottom EICAS display.

NOTE: The FLAP/SLAT ELEC and SLAT ISLN VAL messages are possibly shown on the bottom EICAS display because the circuit breaker SLAT SHUTOFF VALVE is open.

- 2) Make sure that the LE SLAT SHUTDOWN message shows on the bottom EICAS display.
- 3) Turn the COMPUTER switch on the EICAS DISPLAY select panel to the R position, and make sure the EICAS messages stay on the EICAS display.
- 4) Turn the COMPUTER switch back to the L position.

S 435-405

- (13) Move the pilot input arm back to the initial position and connect the input control rod to the pilot input arm with the bolt, washer, and nut (Detail B, Fig. 503).

NOTE: Do not change the length of the input control rod. Keep the the flap control lever in the zero (FLAPS UP) detent when you install the bolt.

S 095-406

- (14) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 865-407

- (15) Move the flap control lever to the 1-unit detent, and make sure the inboard slats move to the intermediate position.

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S 865-408

- (16) Push the arming switch (on P3) for the slat alternate drive to arm the slat alternate drive (ALTN switch light comes on at the LE side) (Fig. 501).

S 865-409

- (17) Push the arming switch again to disarm the slat alternate drive (ALTN switch light goes off), and make sure the outboard slats move to the intermediate position.

S 865-551

- (18) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:  
(a) 11H14, SLAT SHUTOFF

S 865-602

- (19) Erase the SLAT ISLN VAL maintenance message because this message is latched (AMM 31-41-00/201).

S 215-410

- (20) Do these checks after the outboard slats stop at the intermediate position:  
(a) Make sure the amber LEADING EDGE light goes off.  
(b) Make sure there are no messages on the EICAS display for the slats with the steps that follow:  
1) Push the STAT button on the engine display panel located on the center aisle stand to show status messages on the bottom EICAS display.

S 865-411

- (21) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the slats move to the fully retracted position.

F. Put the Airplane Back to Its Usual Condition

S 865-482

- (1) Remove power from the center hydraulic system (AMM 29-11-00/201).

S 865-483

- (2) Remove electrical power (AMM 24-22-00/201).

S 415-488

- (3) Install the access panels, 511BB and 611BB, for the outboard and inboard slat PDU (AMM 06-44-00/201).

S 445-486

- (4) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

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LEADING EDGE SLAT SYSTEM – INSPECTION/CHECK

1. General

- A. The "Test for the Retract Inhibit System with Alternate Electrical Power" has been removed from here since it is entirely a function of software in the FSEU and it is unnecessary to test it. The "Test for the Extend/Retract Inhibit System with Normal Hydraulic Power" has been removed from here because it is a duplication of the "Flap/Slat Shutoff Valve Module Test" shown in AMM 27-51-48/201.

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INBOARD LEADING EDGE SLAT - REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the inboard leading edge (LE) slats. The installation task also contains the steps for the adjustment and test for the inboard slats. The LE slat adjustment is done in production with the airplane in the "rigging position", that is on jigs. This position, with no engines installed and no weight to account for fuel load, best represents the in-flight configuration of the wing. This "unloaded" configuration is the best on the "ground" configuration for setting the fair of the slats. However, it is also acceptable to do the slat adjustment with the airplane in the loaded condition (with fuel and engines installed) since the weight factor has no effect on the slat adjustment.
- B. The slats are given the numbers from No. 1 through No. 12, from the left wing to the right wing. This procedure contains the adjustment and test steps only for slat No. 6 and No. 7, the inboard slats.

TASK 27-81-01-024-001

2. Inboard Leading Edge Slats - Removal

A. Equipment

- (1) Sling Equipment, Leading Edge Slats - A27017-41:
  - (a) Outboard Sling Arm Assembly, Inboard Slat - P/N A27017-4
  - (b) Inboard Sling Arm Assembly, Inboard Slat - P/N A27017-5
- (2) LE Slats Groundlock - A27007-1  
(2 Necessary)
- (3) TE Flap PDU Lock - A27009-7
- (4) Circuit Breaker Lockout Clip Commercially available.

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-81-00/201, Leading Edge Slat System
- (4) AMM 27-81-24/401, Leading Edge Slat Torque Tube
- (5) AMM 27-88-01/201 Leading Edge Slat Sensor Switches
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) AMM 32-00-15/201, Landing Gear Door Locks
- (8) AMM 32-00-20/201, Landing Gear Downlocks
- (9) AMM 57-41-59/401, Inboard Leading Edge Support Link Doors
- (10) AMM 78-31-00/201, Thrust Reverser System

C. Access

- (1) Location Zones
 

211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge - Inboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

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- (2) Access Panels
  - 511BB LE Slat Power Drive Unit - Outboard (Left)
  - 611BB LE Slat Power Drive Unit - Inboard (Right)

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 494-003

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (Ref 32-00-15).

S 044-004

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 864-005

- (4) Remove the pressure from the center hydraulic system (Ref 29-11-00).

S 214-006

- (5) Make sure the position selector switch for the flap/slat alternate drive on the first officer's main instrument panel, P3, is in the NORM detent.

S 494-007

- (6) Attach a DO-NOT-OPERATE tag to the position selector switch.

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- S 864-126
- (7) Push the arming switch, on the P3 panel, for the slat alternate drive, to arm the slat alternate drive (ALTN switch light comes on at the LE side).
- S 214-008
- (8) Make sure the amber LEADING EDGE light comes on the P3 panel and the "LE SLAT DISAGREE" EICAS message does show on the EICAS display.
- S 864-009
- (9) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
- S 864-010
- (10) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR
- S 014-011
- (11) Remove the access panels, 511BB and 611BB, to get access to the outboard and inboard slat power drive units (PDUs) (Ref 06-44-00).
- S 494-012
- (12) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 406).
- S 494-013
- (13) Install the PDU lock in the TE flap PDU (Fig. 405).
- S 034-014
- (14) To remove the inboard slat on the left wing (slat No. 6), disconnect the torque tube on the left side of the inboard slat PDU (Ref 27-81-24).
- S 034-015
- (15) To remove the inboard slat on the right wing (slat No. 7), disconnect the torque tube on the right side of the inboard slat PDU (Ref 27-81-24).

**NOTE:** Do not disconnect the torque tubes on the left and right side of the slat PDU at the same time. It will be necessary to adjust the slat drive system if you disconnect the two torque tubes.

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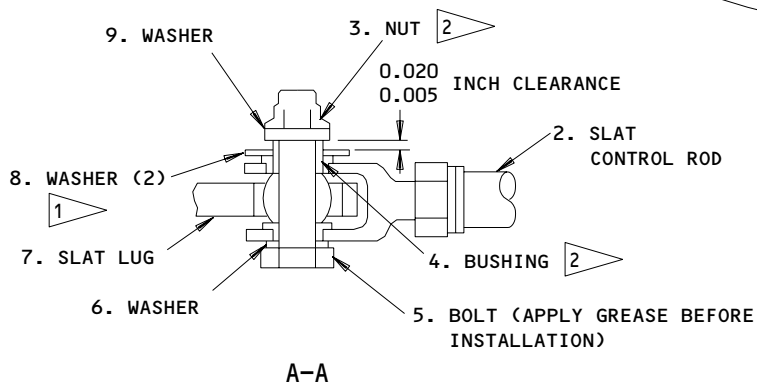
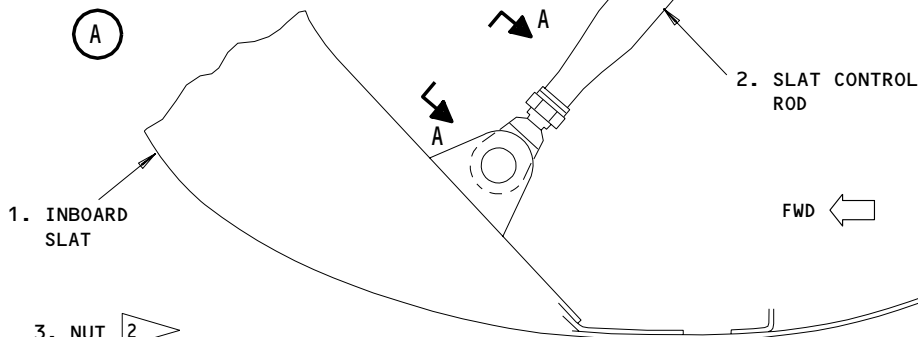
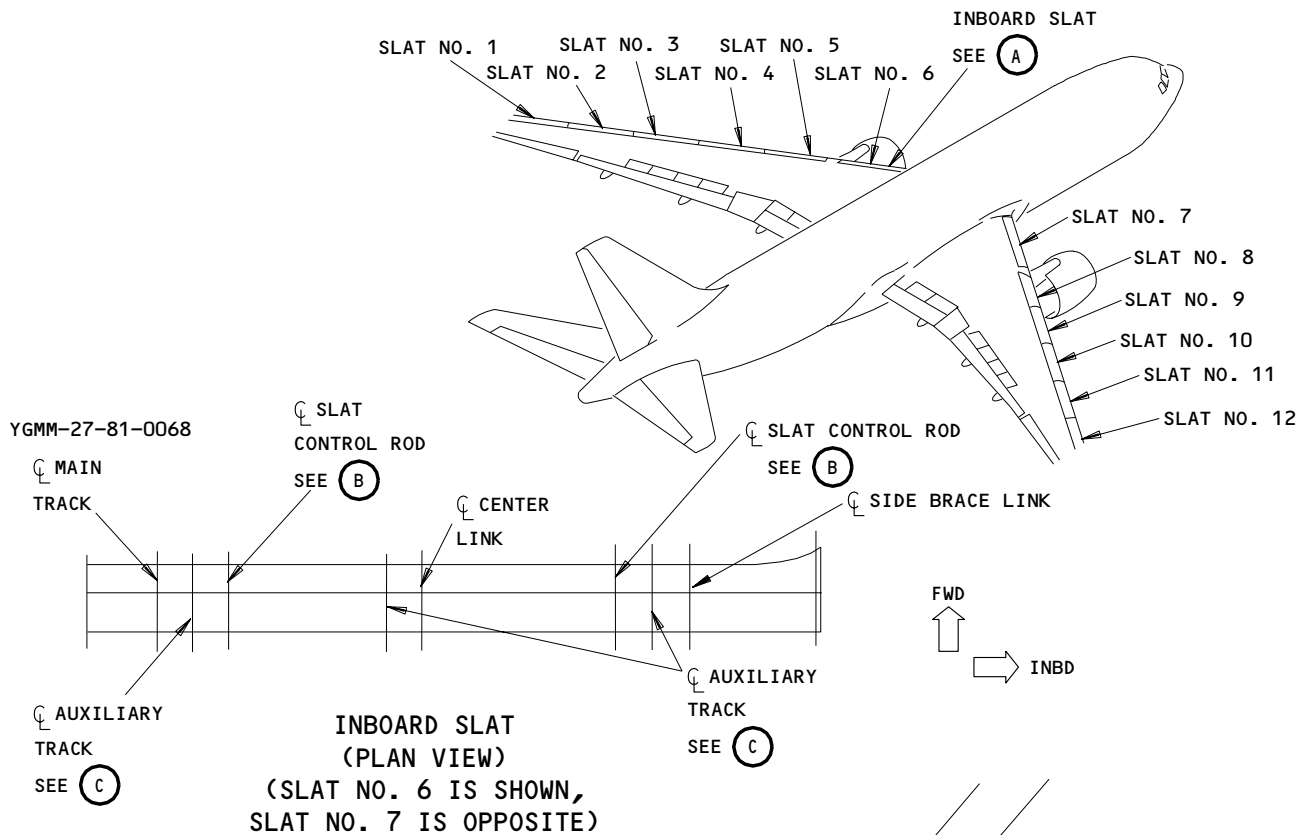
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# BOEING

## 767 MAINTENANCE MANUAL



**SLAT CONTROL ROD  
(2 LOCATIONS ON EACH  
INBOARD SLAT)**

(B)

- 1 INSTALL WASHERS AS NECESSARY TO GET THE CORRECT CLEARANCE. AT LEAST TWO WASHERS WILL BE NECESSARY.
- 2 PLAIN BUSHING IS ALWAYS INSTALLED UNDER THE NUT.

Inboard Slat Control Rod and Auxiliary Tracks  
Figure 401 (Sheet 1)

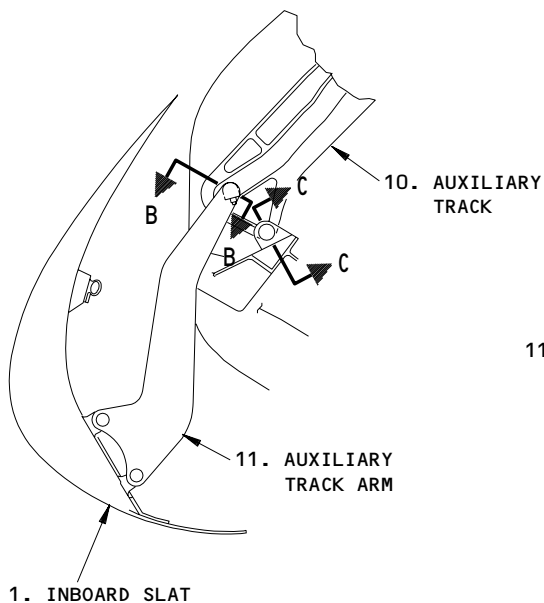
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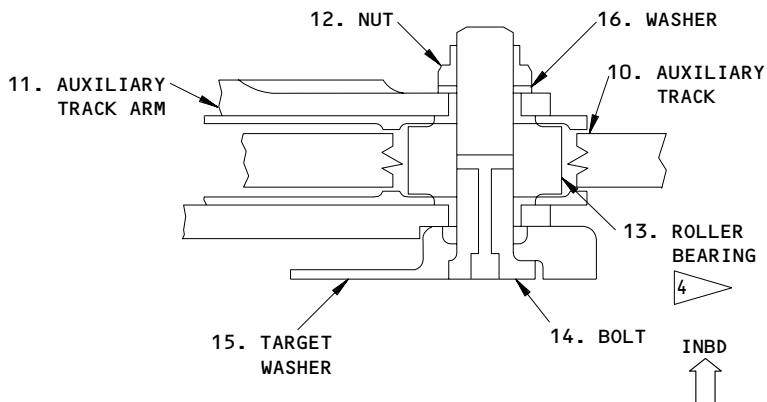
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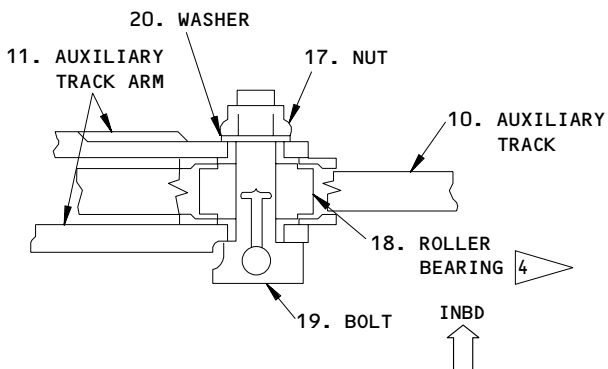
**AUXILIARY TRACK  
(3 LOCATIONS)**

**C**



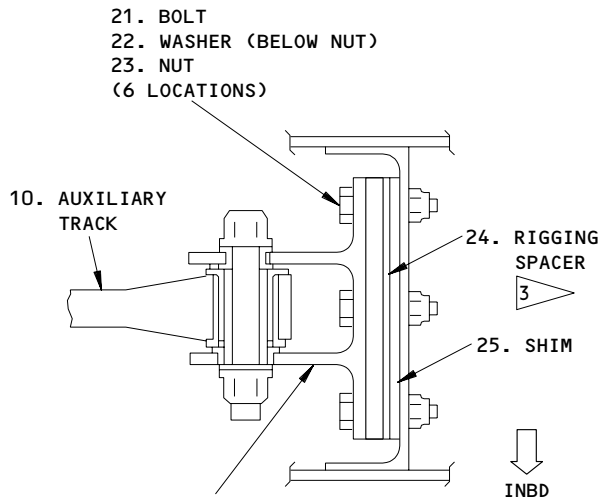
**INBOARD AND OUTBOARD  
AUXILIARY TRACKS**

**B-B**



**CENTER AUXILIARY TRACK**

**B-B**



**26. SUPPORT FITTING  
FOR THE FORWARD  
AUXILIARY TRACK**

**C-C**

- 3** REMOVE THE RIGGING SPACERS AFTER YOU ADJUST THE SLATS
- 4** USE IPC FOR RECOMMENDED APPLICABLE BOLT AND ROLLER BEARING. LUBRICATE WITH BMS 3-33 (PREFERRED) OR MIL-PRF-23827 (ALTERNATE) GREASE. APPLY GREASE TO THE FITTING AND MAKE SURE THAT THE ROLLER BEARING HAS SUFFICIENT LUBRICATION. USE TASK CARD FOR APPLICABLE PERIODIC LUBRICATION OF ROLLER BEARINGS.

**Inboard Slat Control Rods and Auxiliary Tracks  
Figure 401 (Sheet 2)**

EFFECTIVITY

ALL

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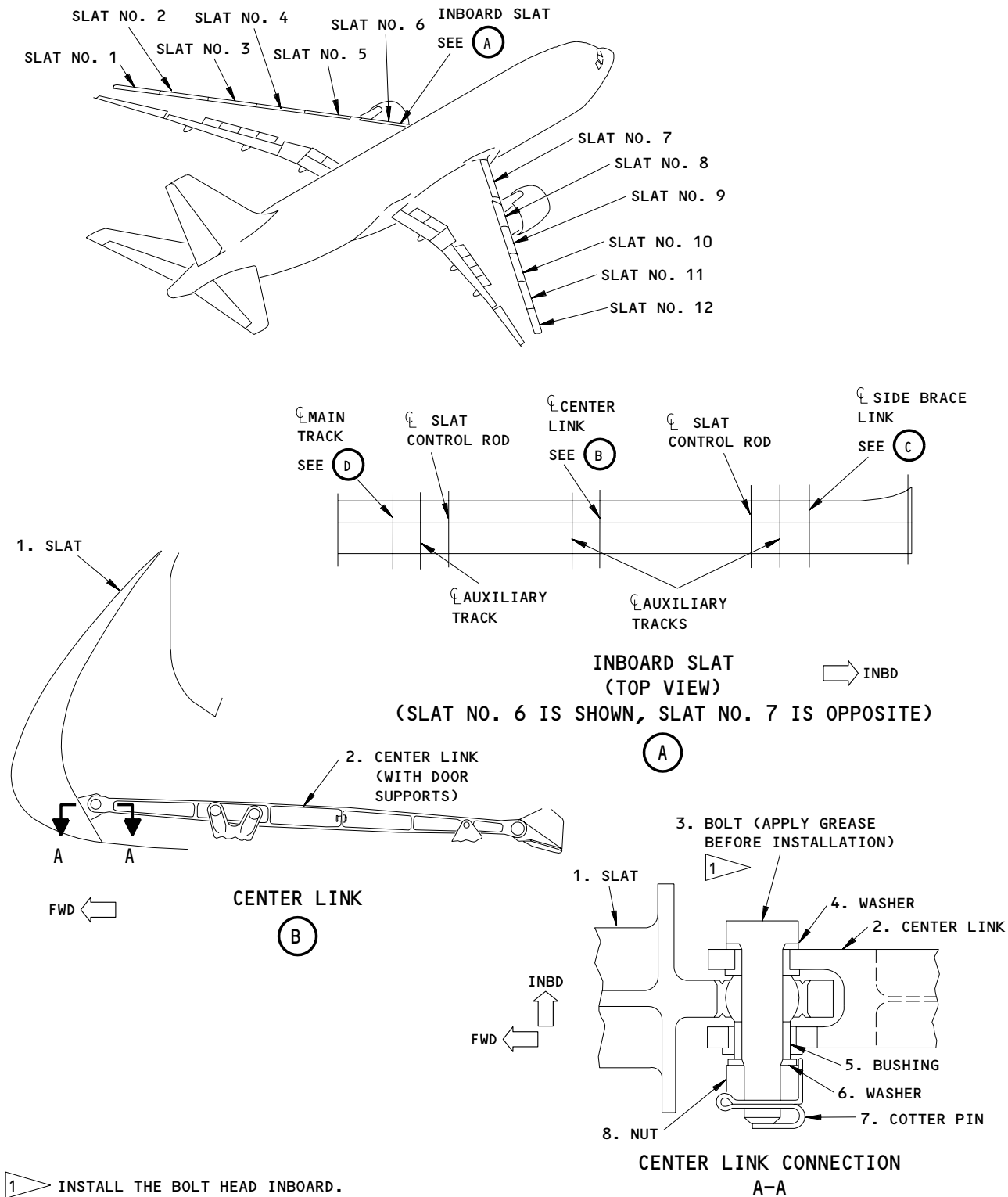
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# BOEING

## 767 MAINTENANCE MANUAL

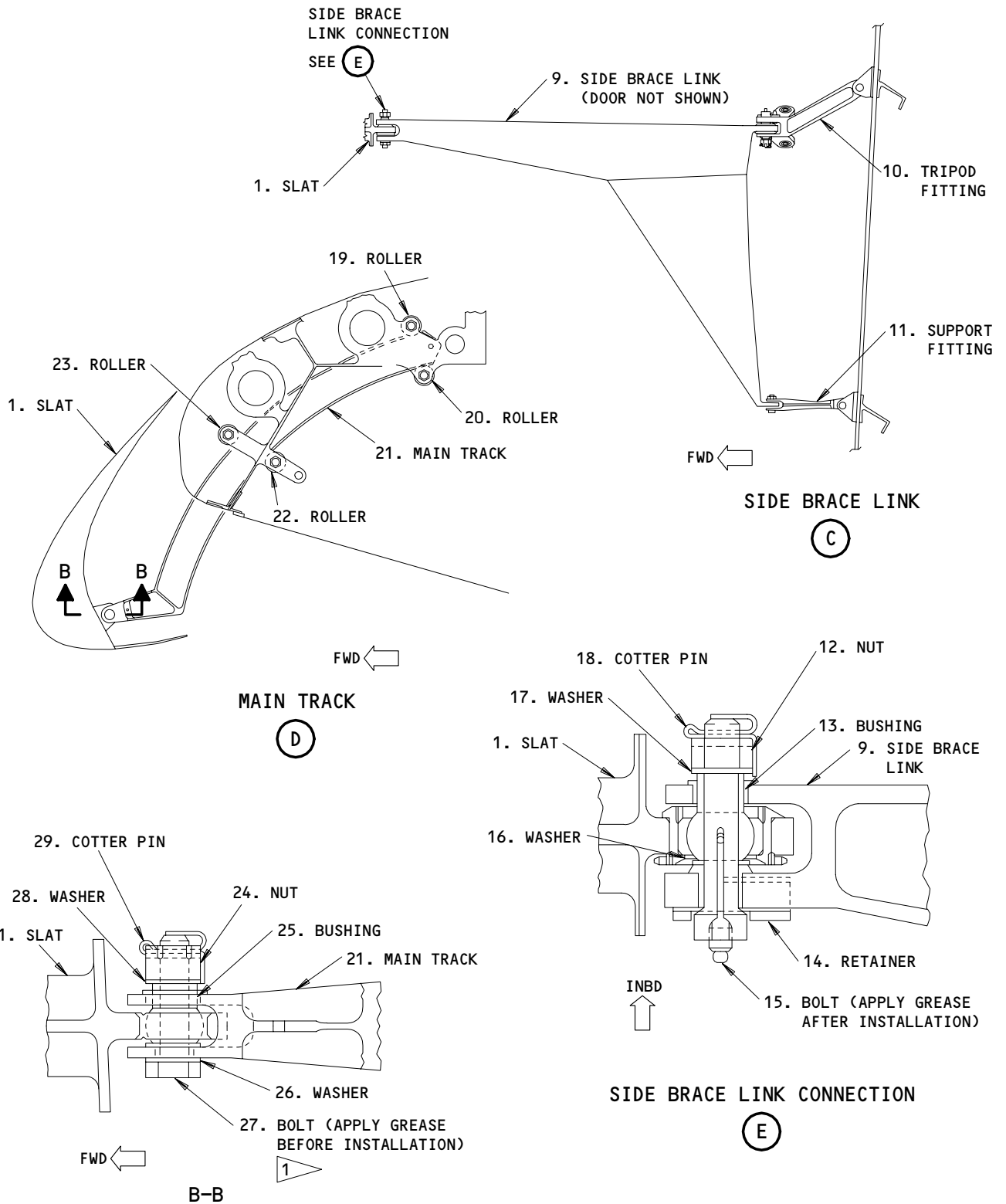


Center Link, Side Brace Link, and Main Track for the Inboard Slat  
Figure 402 (Sheet 1)

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Center Link, Side Brace Link, and Main Track for the Inboard Slat  
Figure 402 (Sheet 2)

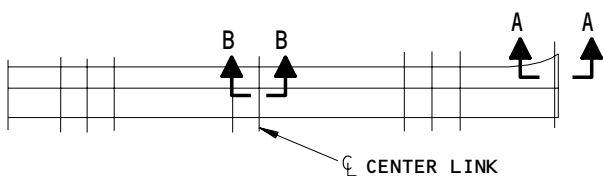
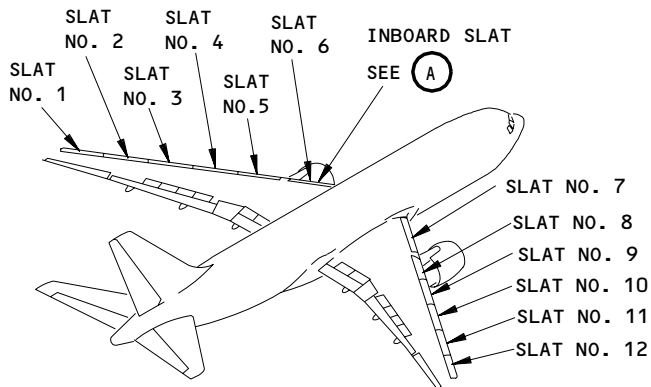
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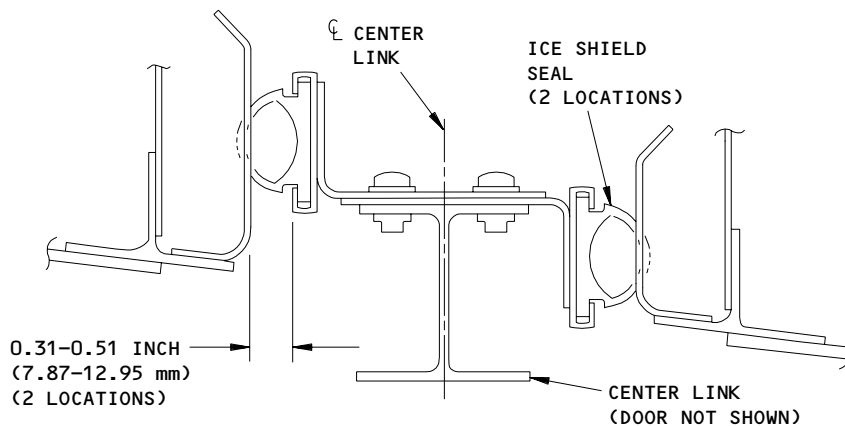
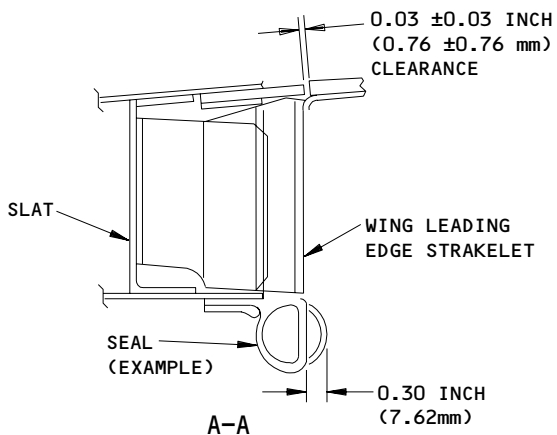
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**INBOARD SLAT  
(TOP VIEW)**  
(SLAT NO. 6 IS SHOWN, SLAT NO. 7 IS OPPOSITE)

(A)

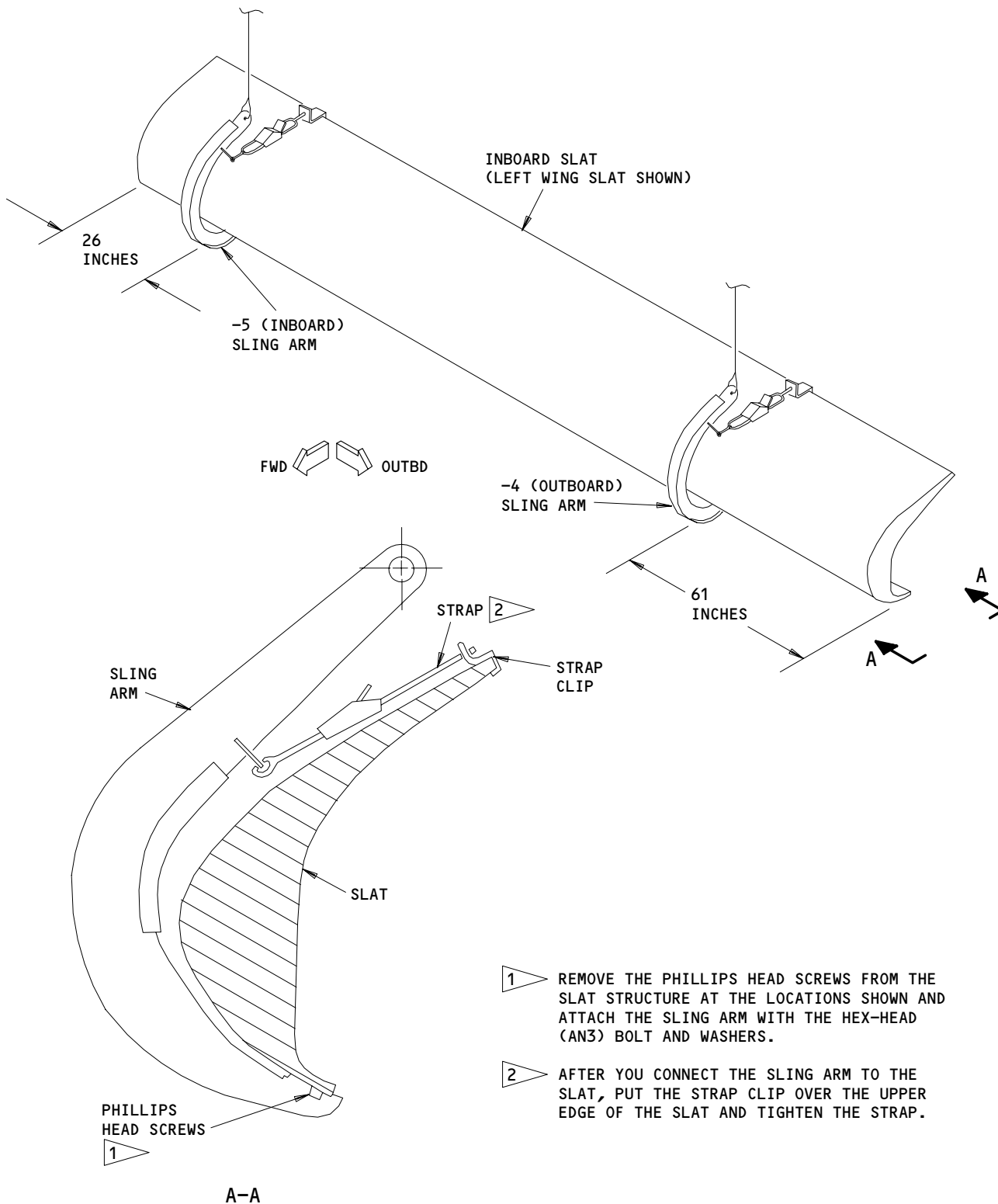


B-B

**Inboard Slat Seal Clearances  
Figure 403**

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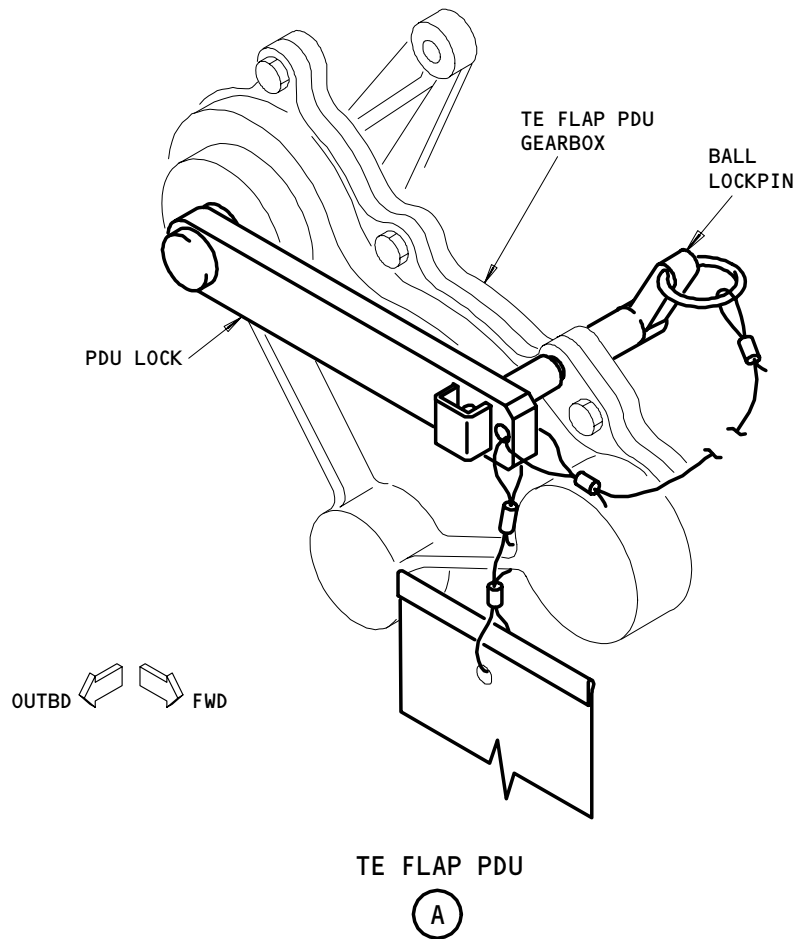
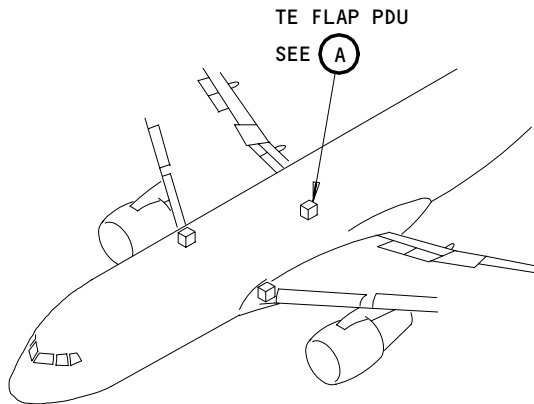
Inboard Slat Sling Equipment  
Figure 404

EFFECTIVITY	
	ALL

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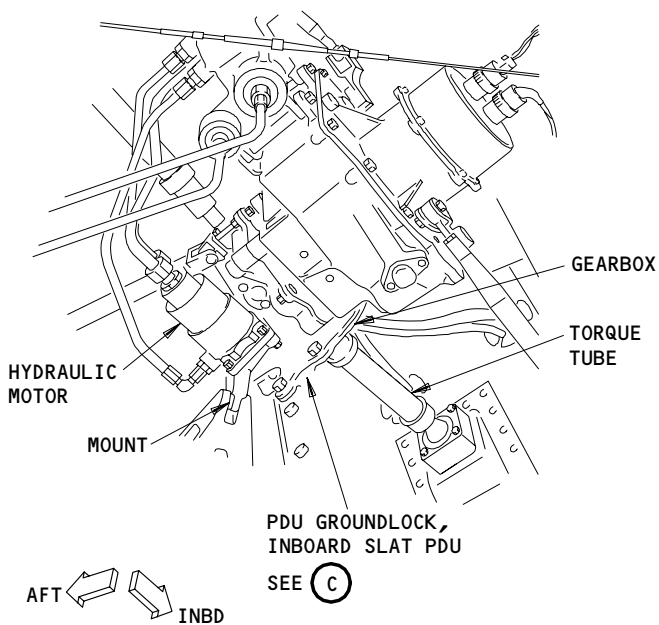
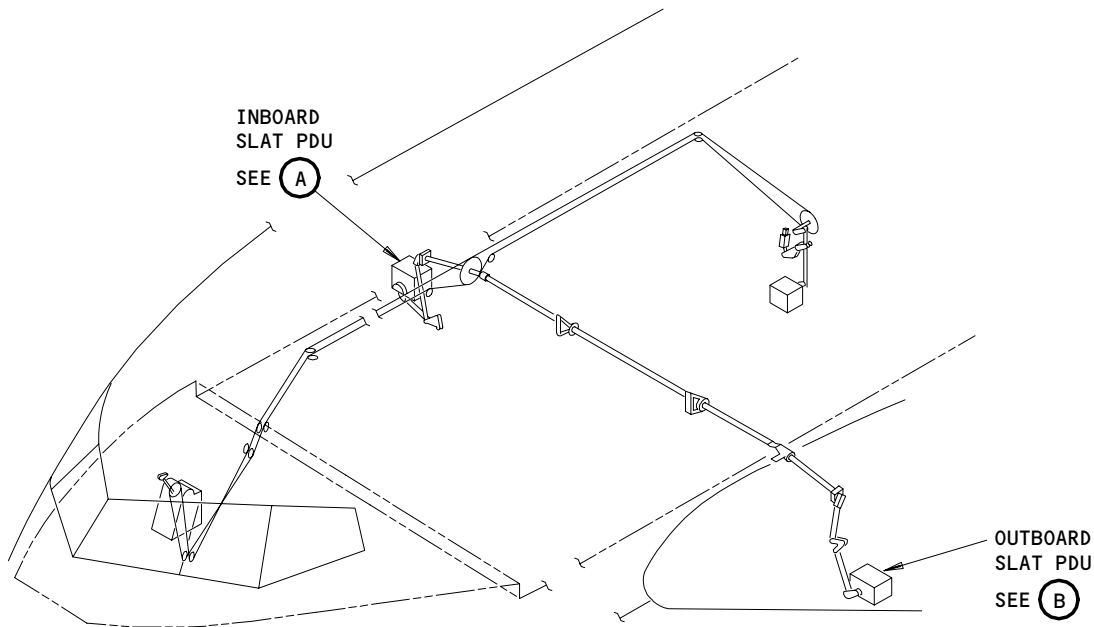
PDU Lock for the TE Flap PDU  
Figure 405

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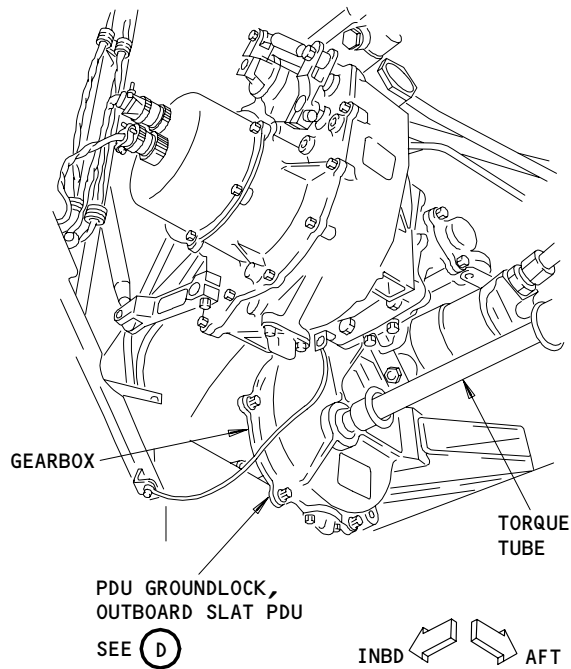
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INBOARD SLAT PDU  
(A)



OUTBOARD SLAT PDU  
(B)

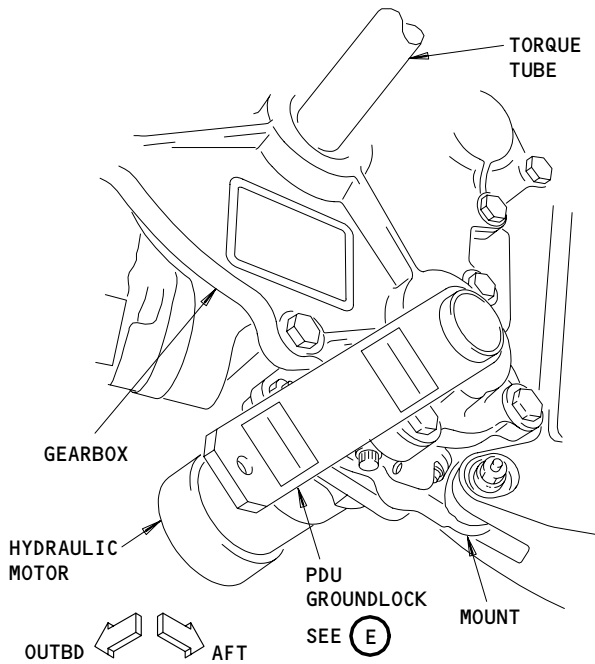
Slat PDU Groundlock  
Figure 406 (Sheet 1)

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	ALL

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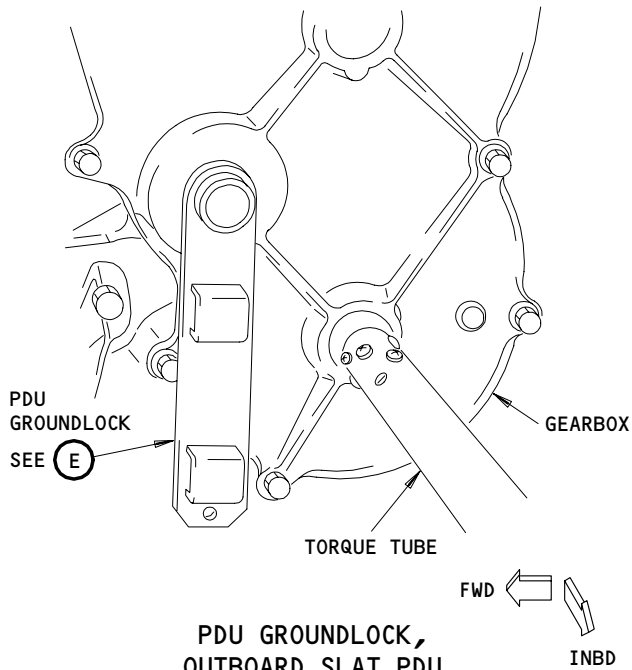
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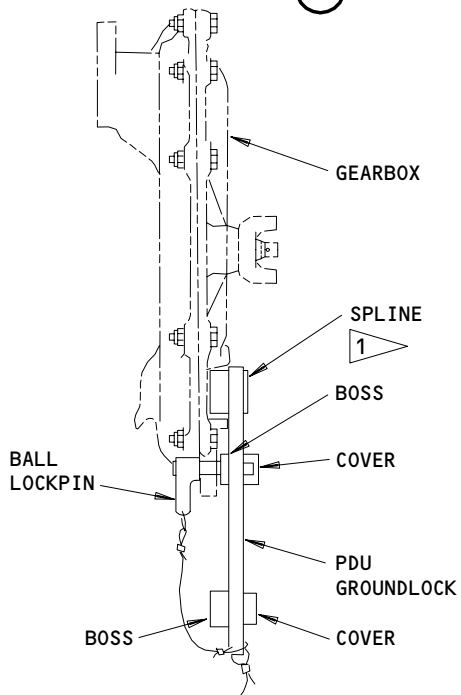
PDU GROUNDLOCK,  
INBOARD SLAT PDU

(C)



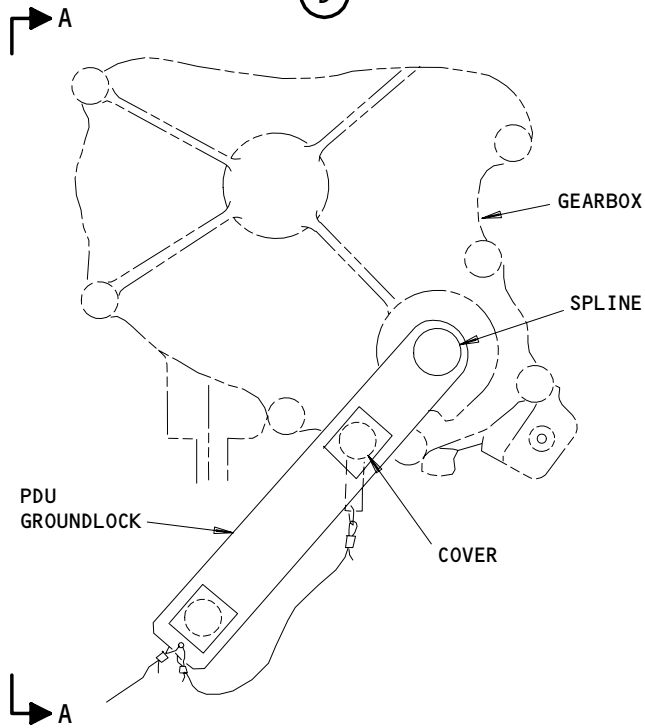
PDU GROUNDLOCK,  
OUTBOARD SLAT PDU

(D)



A-A

1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALLPIN INSTALLED THROUGH THE BOSS AND GEARBOX



PDU GROUNDLOCK  
(EXAMPLE)

(E)

Slat PDU Groundlock  
Figure 406 (Sheet 2)

EFFECTIVITY

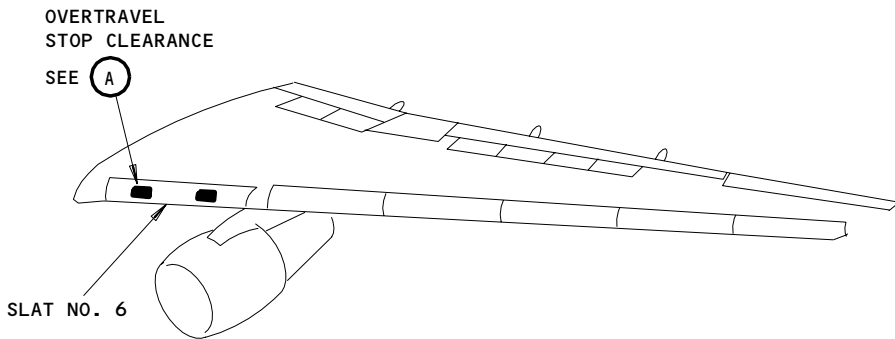
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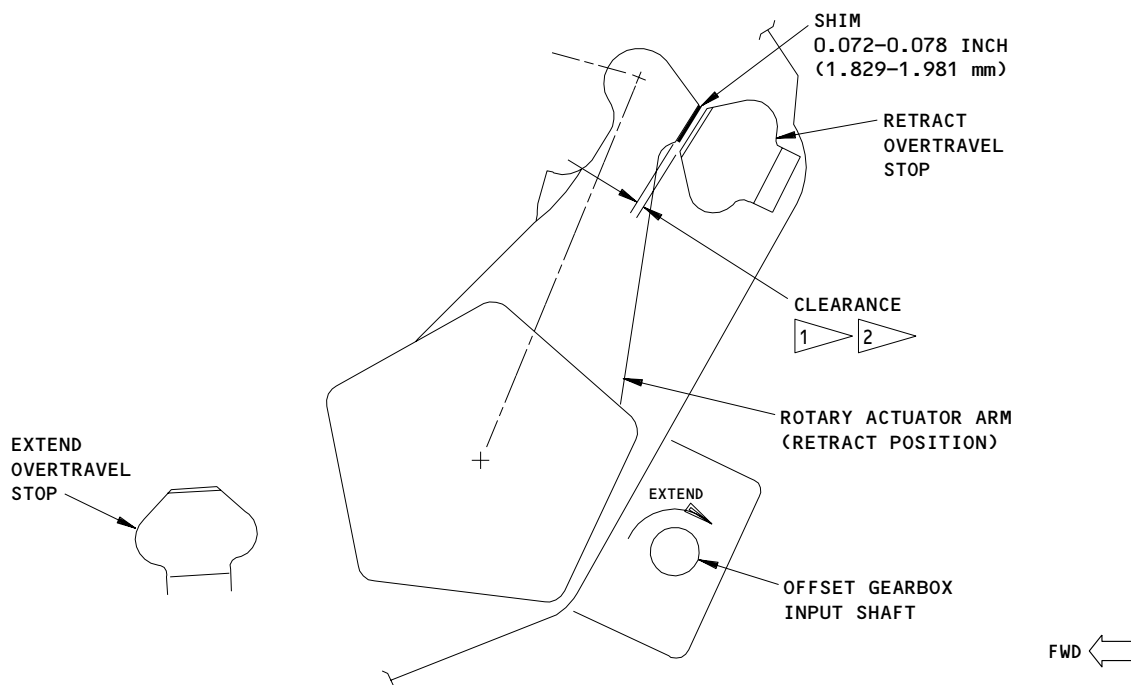
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LEFT WING  
(RIGHT WING IS OPPOSITE)



OVERTRAVEL STOP CLEARANCE  
(EXAMPLE, SLATS NO. 6 AND 7)

(A)

- 1 ▷ RETRACT WITH HYDRAULIC POWER: 0.05-0.10 INCH (1.3-2.5 mm)
- 2 ▷ RETRACT WITH ELECTRIC POWER: NOT LESS THAN 0.03 INCH (0.8 mm)

Retract Overtravel Stop Clearance for the Leading Edge Slat  
Figure 407

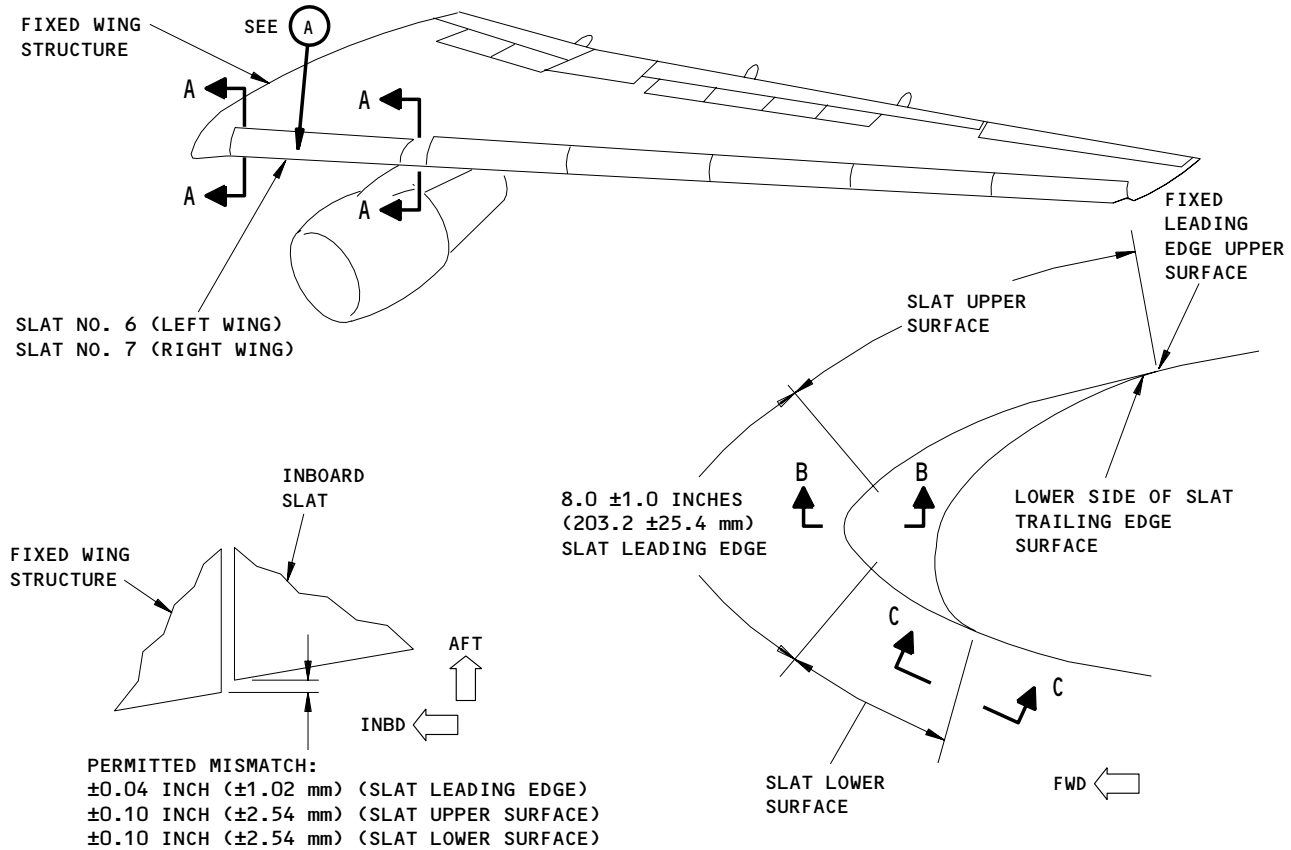
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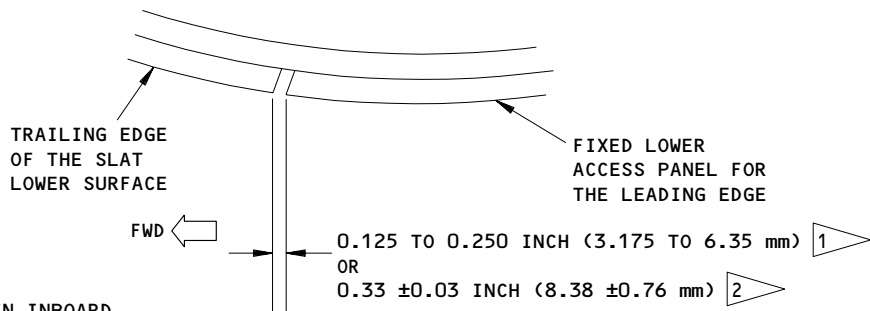
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**INBOARD AND OUTBOARD ENDS MISMATCH**  
B-B

**(EXAMPLE)**  
A-A

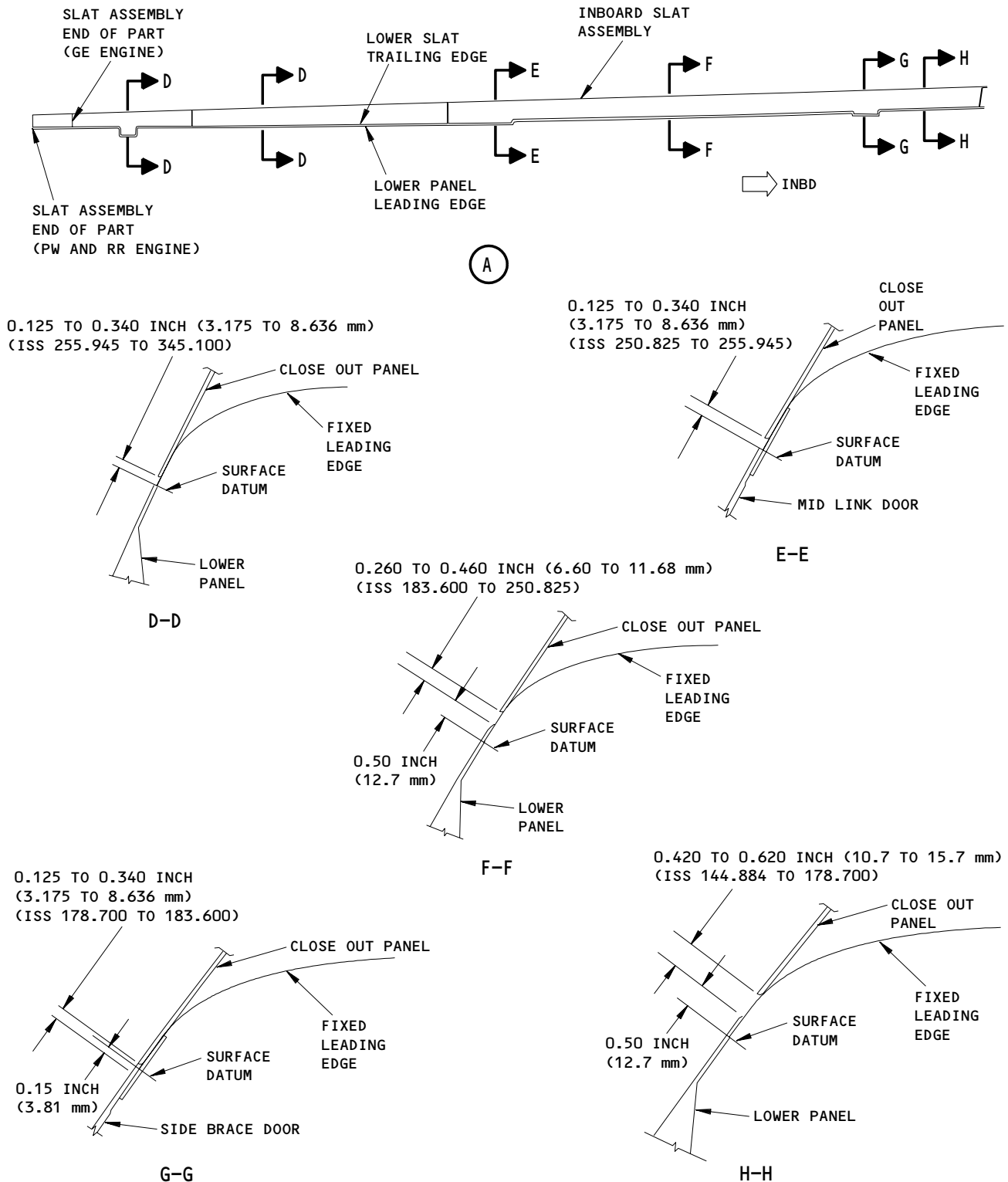


- 1 CLEARANCE AT LOCATIONS BETWEEN INBOARD SLAT STATIONS (ISS) 180 AND 345.
- 2 CLEARANCE AT LOCATIONS BETWEEN INBOARD SLAT STATIONS (ISS) 144 AND 180.
- 3 SEE VIEW A FOR PREFERRED CLEARANCES BETWEEN NEW CLOSE OUT PANELS 114T3165-13 THROUGH -22 AND LOWER FIXED LEADING EDGE PANELS. YOU CAN CORRECT PANEL INTERFERENCE BY REWORKING EXISTING CLOSE OUT PANELS AND BY USING THE NEW CLEARANCE LIMITS.

Inboard Slat Clearances and Mismatch  
Figure 408 (Sheet 1)

EFFECTIVITY	ALL
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Inboard Slat Clearances and Mismatch  
Figure 408 (Sheet 2)

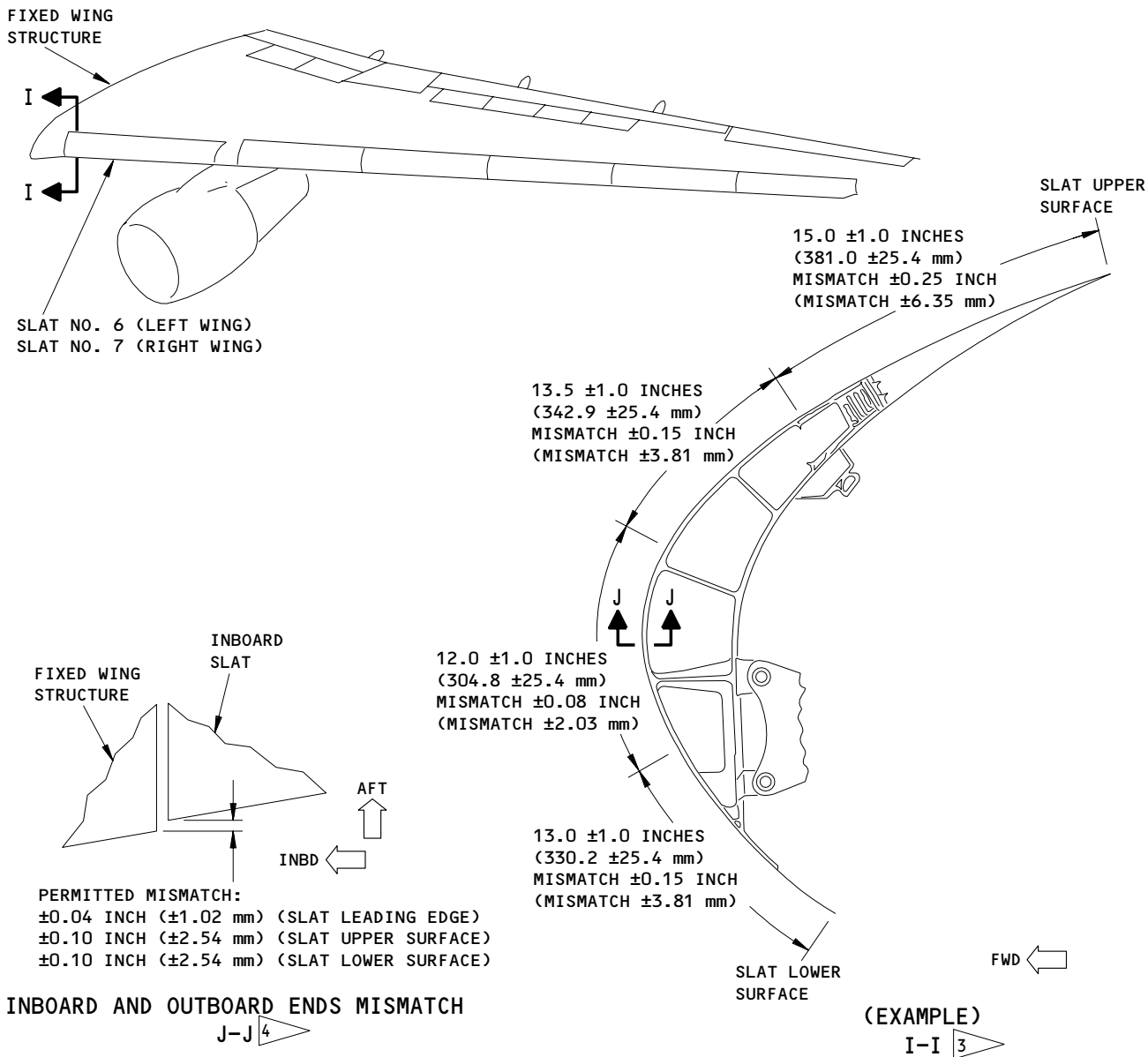
EFFECTIVITY	ALL
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**INBOARD AND OUTBOARD ENDS MISMATCH**

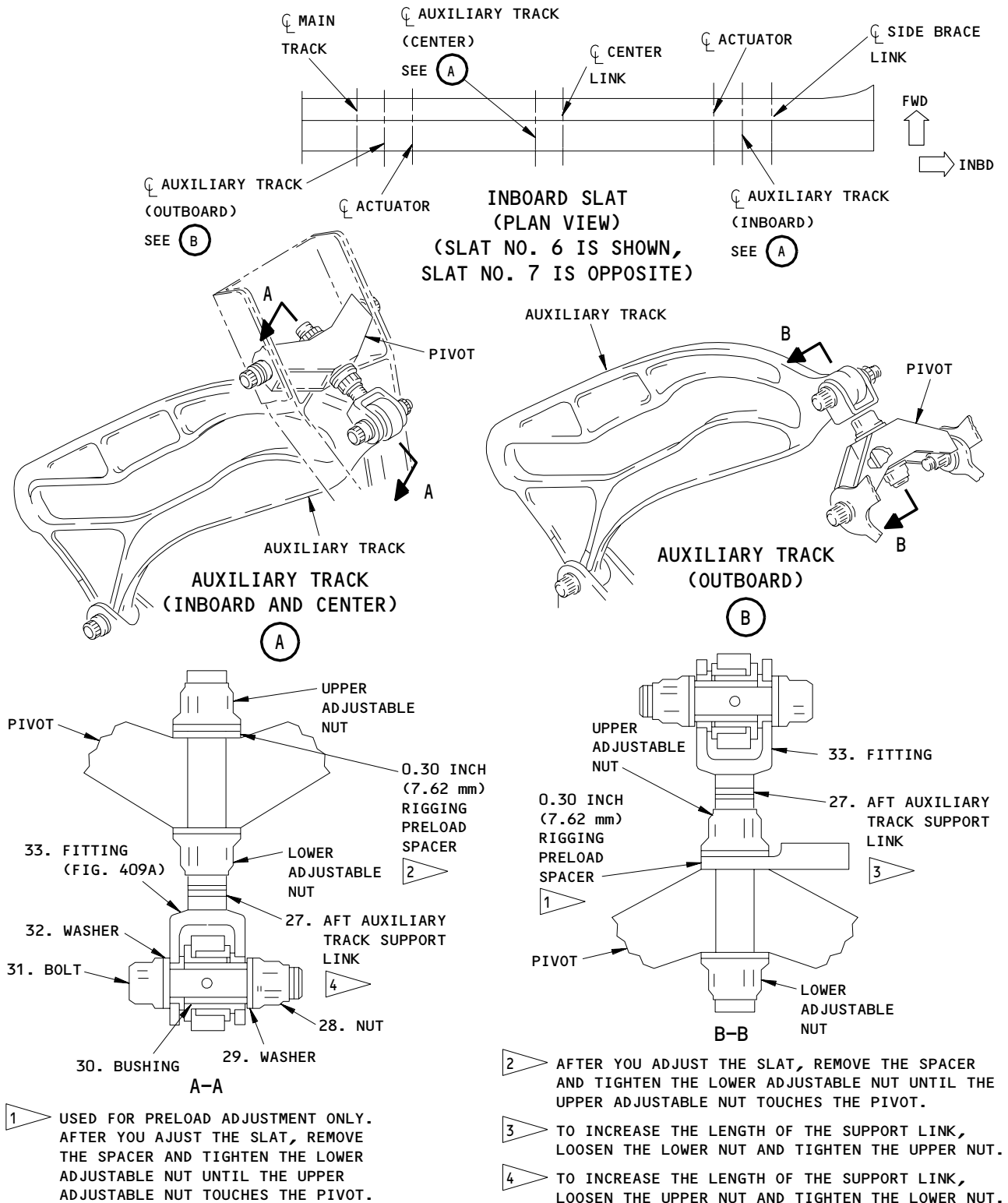
- 3** TO APPLY INCREASED MISMATCHES FOR AIRPLANES IN-SERVICE YOU MUST OBEY THE INSTRUCTIONS THAT FOLLOW:
1. THE INBOARD LEADING EDGE SLAT IS INSTALLED AND RIGGED CORRECTLY.
  2. IF VIBRATION OR BUFFETING OCCURS IN-SERVICE THAT CAN BE RELATED TO INCREASED MISMATCHES THEN ADDITIONAL ADJUSTMENT REWORK MUST BE DONE TO THE SLATS.

**4** A STEP GREATER THAN 0.10 INCH (2.54 mm) CAN CAUSE SOME PERFORMANCE LOSS AND MINIMAL DRAG PENALTY.

Inboard Slat Clearances and Mismatch  
Figure 408 (Sheet 3)

EFFECTIVITY	ALL
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Support Link for the Auxiliary Track  
Figure 409

EFFECTIVITY

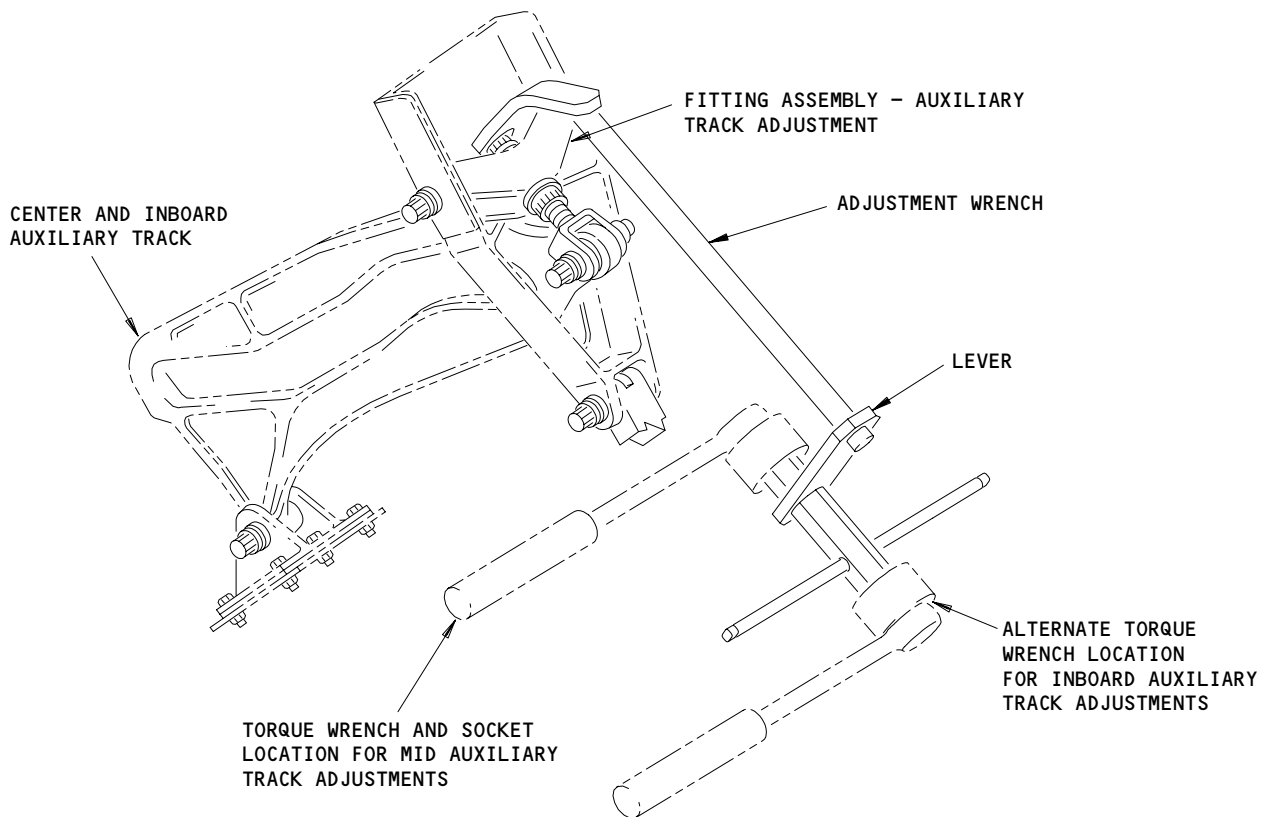
ALL

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MAINTENANCE MANUAL



	OUTBOARD AUX TRACK	MID AUX TRACK	INBOARD AUX TRACK
UPPER ADJUSTABLE NUT	3/4 INCH OPEN END WRENCH RECOMMENDED	WRENCH DRIVEN BY 3/4 INCH SOCKET ON TORQUE WRENCH (290-510 IN-LB REQUIRED)	WRENCH DRIVEN BY 3/4 INCH SOCKET ON TORQUE WRENCH (290-510 IN-LB REQUIRED)
LOWER ADJUSTABLE NUT	5/8 SOCKET ON TORQUE WRENCH RECOMMENDED (290-510 IN-LB REQUIRED)	3/4 OPEN END CROWS FOOT WRENCH ON A 6-9 INCH EXTENSION TO RATCHET DRIVE RECOMMENDED	3/4 OPEN END CROWS FOOT WRENCH ON A 9-12 INCH EXTENSION TO RATCHET DRIVE RECOMMENDED

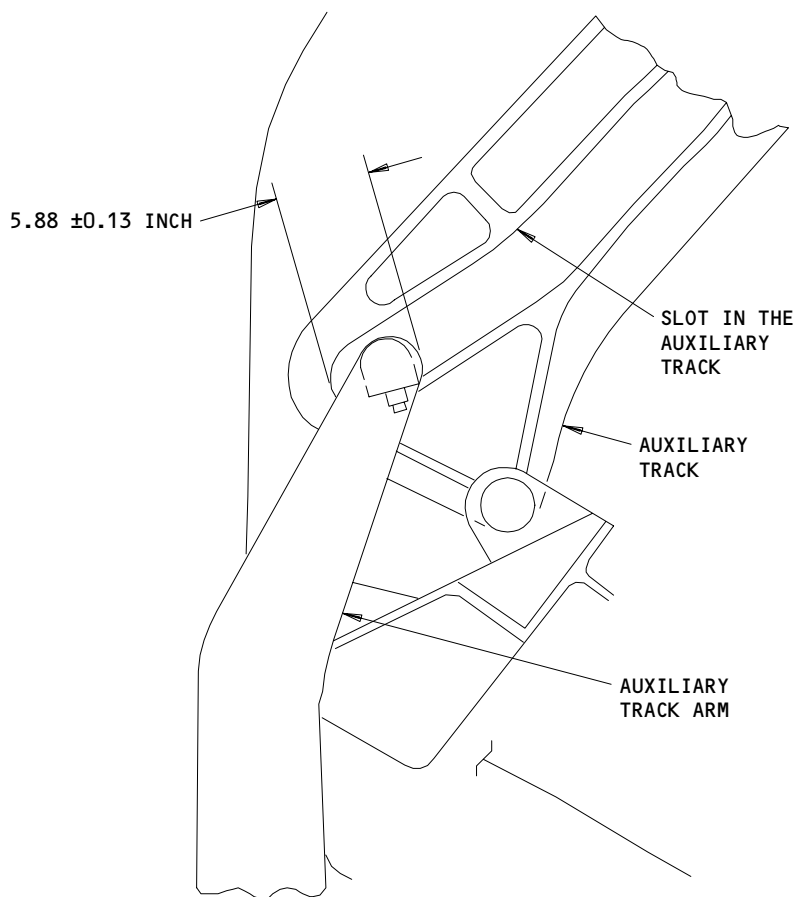
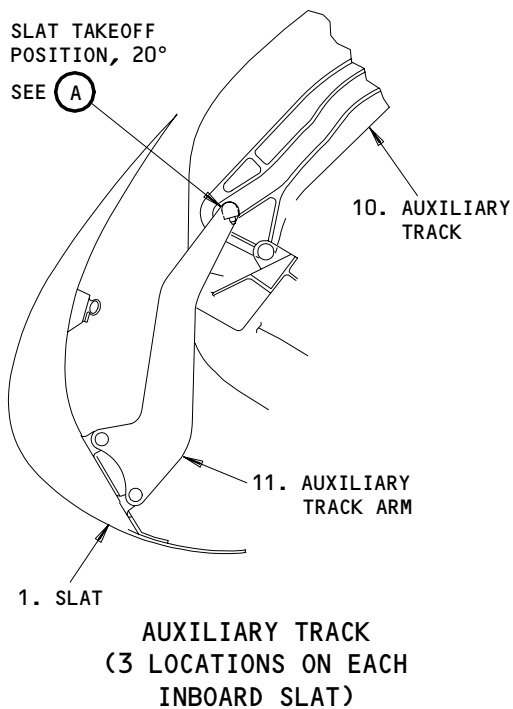
TOOL APPLICATION CHART

**NOTE:** LEVER ON WRENCH IS FOR NUT RUN UP ONLY, AND SHOULD NOT BE USED TO APPLY TORQUE.

Wrench Adjustment - Inboard LE Slats  
Figure 409A

EFFECTIVITY	ALL
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SLAT TAKEOFF POSITION, 20°  
(FOR RIGGING ONLY)

1 AUXILIARY TRACK ARM POSITION AFTER 94 TURNS OF THE TORQUE TUBE FROM THE FULLY RETRACTED POSITION.

(A) 1

Inboard Slat Extended Position  
Figure 410

EFFECTIVITY	ALL
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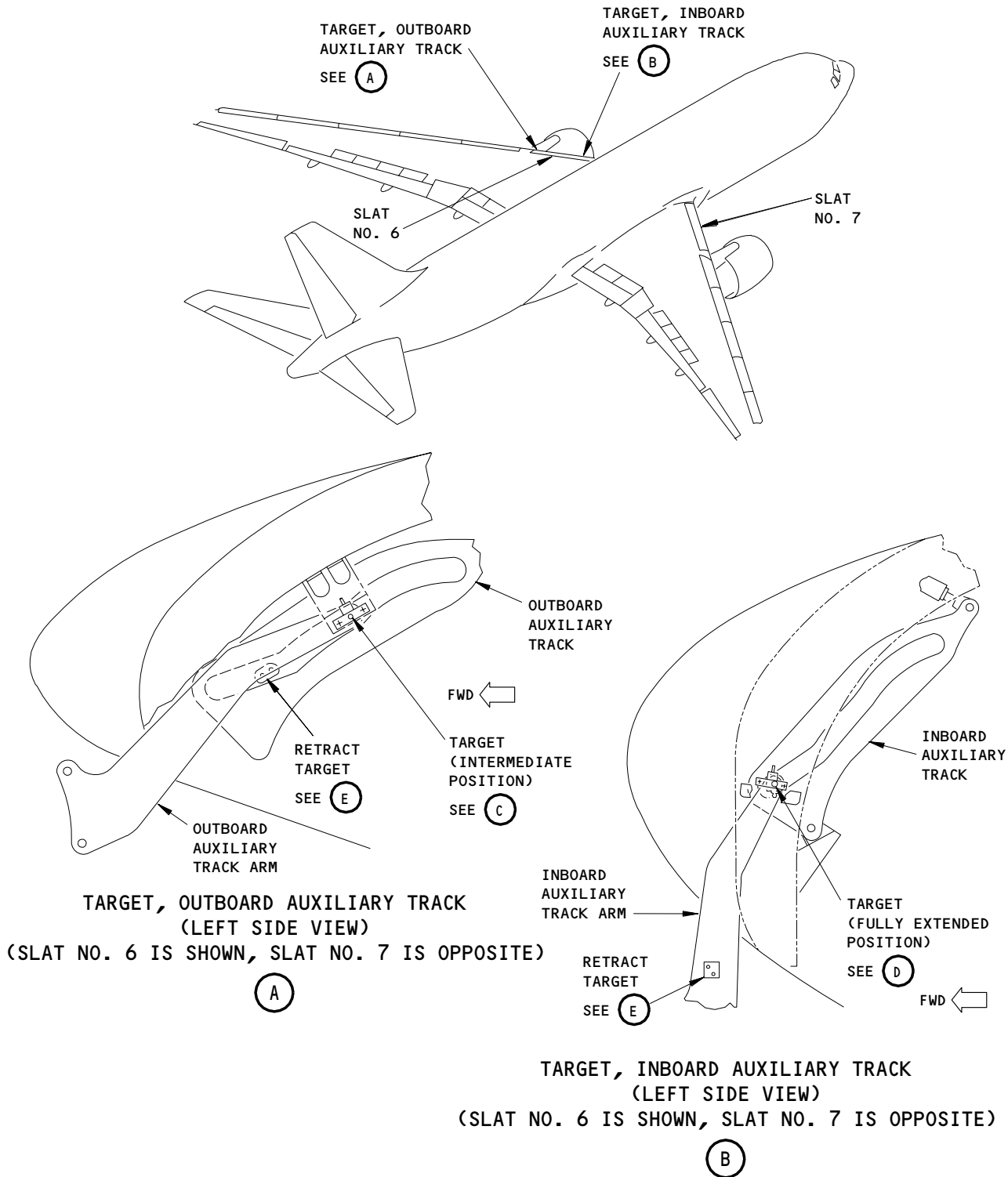
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MAINTENANCE MANUAL



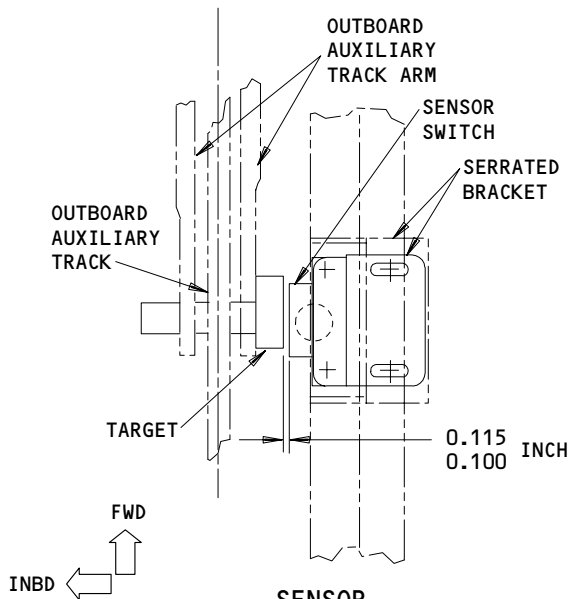
Slat Sensor Switch Clearance  
Figure 411 (Sheet 1)

EFFECTIVITY	ALL
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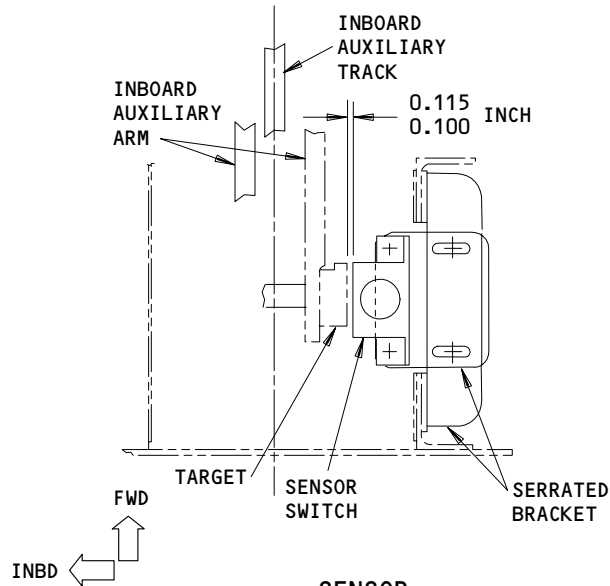
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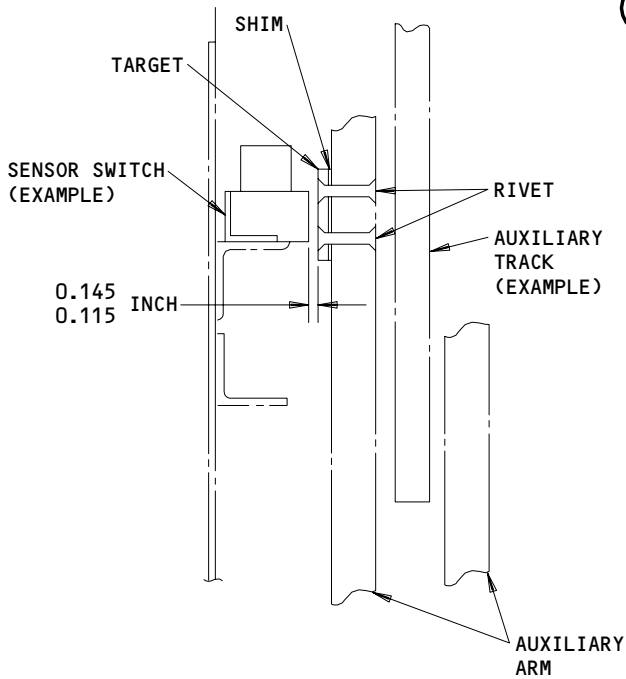
**SENSOR  
(INTERMEDIATE POSITION)  
(BOTTOM VIEW)  
(SLATS NO. 6 AND 7)**

C



**SENSOR  
(FULLY EXTENDED POSITION)  
(BOTTOM VIEW)  
(SLATS NO. 6 AND 7)**

D



**RETRACT TARGET  
(AT FULLY RETRACTED POSITION)**

E

Slat Sensor Switches Clearance  
Figure 411 (Sheet 2)

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**27-81-01**

S 984-016

- (16) Manually turn the torque tubes to extend the inboard slat, until you can get access to the bolts on the aft end of the auxiliary track arms.

S 014-017

- (17) Remove the fixed lower LE access panels if it is necessary to get access to the inboard slat components (Ref 06-44-00).

S 294-167

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (18) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

E. Remove the Inboard Leading Edge Slat

S 494-135

**CAUTION:** BE CAREFUL WHEN YOU REMOVE THE SLAT. DAMAGE CAN OCCUR TO THE SLAT SENSOR SWITCHES. IF IT IS NECESSARY, REMOVE THE SLAT SENSOR SWITCHES BEFORE YOU REMOVE THE SLAT.

- (1) Remove the inboard slat sensor switches, if it is necessary (AMM 27-88-01/201).

S 014-018

- (2) Remove the center link door and the side brace link door if it is necessary to get access (Ref 57-41-59).

S 494-019

- (3) Apply tape to hold the aerodynamic seals in the retracted position, at the cutouts of the fixed leading edge.

S 494-020

**CAUTION:** BE CAREFUL WHEN YOU INSTALL THE SLING EQUIPMENT TO THE SLAT. DAMAGE CAN OCCUR ON THE POLISHED EXTERNAL SKIN.

- (4) Install the sling equipment on the inboard slat (Fig. 404).

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S 494-021

- (5) Connect the overhead hoist to the sling equipment.

**NOTE:** Make sure the hoist can hold the weight of the inboard slat. The inboard slat weighs approximately 170 pounds (77.1 Kg).

S 034-022

- (6) Disconnect the slat control rod (2) from the inboard slat (1) at two locations (View A-A, Fig. 401).

**NOTE:** Do not change the length of the rod (2).

S 034-023

- (7) Disconnect the bolt (14) and remove the roller bearing (13) from each of the three auxiliary tracks (10). Keep disassembled parts together.

**NOTE:** This will disconnect the auxiliary track arms (11) from the auxiliary tracks (10) (View B-B, Fig. 401).

S 034-024

- (8) Disconnect the slat (1) from the center link (2) (View A-A, Fig. 402).

S 034-025

- (9) Disconnect the slat (1) from the side brace link (9) (Detail E, Fig. 402).

S 034-026

- (10) Disconnect the slat (1) from the main track (21) (View B-B, Fig. 402).

S 024-027

- (11) Remove the inboard slat from the airplane.

TASK 27-81-01-424-028

### 3. Inboard Leading Edge Slat - Installation

**NOTE:** The wear limit inspection for the components used in this procedure are given in 27-81-01/601.

#### A. Equipment

- (1) Rigging Spacers from Spacer Kit - A27023-22:  
(a) Rigging Spacer - P/N A27023-3  
(3 Necessary, included in kit)

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- (2) Spacer - Preload, L.E. Slat Rigging - A27094-5 (recommended) or A27094-1 (optional)  
(3 Necessary)
- (3) Sling Equipment, Leading Edge Slats - A27017-41:
  - (a) Outboard Sling Arm Assembly, Inboard Slat - P/N A27017-4
  - (b) Inboard Sling Arm Assembly, Inboard Slat - P/N A27017-5
- (4) LE Slats Groundlock - A27007-1  
(2 Necessary)
- (5) TE Flap PDU Lock - A27009-7
- (6) Circuit Breaker Lockout Clip - Commercially available.
- (7) Inboard Slat Adjustment Wrench - A27101-5
- (8) Shim - 0.075 ±0.003 inch (1.90 +/-0.07 mm) thick
- (9) Rivet - BACR15BA5AD (4 on each slat)

**NOTE:** These rivets are used to attach the sensor switch targets to the auxiliary track arm.

**B. Consumable Materials**

- (1) C00259 Primer - BMS 10-11, Type 1
- (2) D00633 Grease - BMS 3-33 (Preferred)
- (3) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (4) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

**C. Parts**

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Slat (No. 6)	27-81-01	05	245,
	1	Slat (No. 7)			253,
					255,
					258

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AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
402	1	Slat (No. 6)	27-81-01	05	245,
	1	Slat (No. 7)			253
	7	Cotter Pin			255,
	18	Cotter Pin			258
	29	Cotter Pin			158
					8
					223

D. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-44-00/201, Wing Access Doors and Panels
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 27-81-00/201, Leading Edge Slat System
- (5) AMM 27-81-01/601, Inboard Leading Edge Slat
- (6) AMM 27-81-04/201, Krueger Seal Flap and Krueger Seal Flap Drive
- (7) AMM 27-81-24/401, Leading Edge Slat Torque Tube
- (8) AMM 27-81-31/401, Leading Edge Slat Aerodynamic Seal
- (9) AMM 27-88-01/201, Leading Edge Slat Sensor Switch
- (10) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (11) AMM 32-00-15/201, Landing Gear Door Locks
- (12) AMM 57-41-59/401, Inboard Leading Edge Support Link Doors
- (13) FIM 32-09-03/101, PSEU BITE test
- (14) AMM 78-31-00/201, Thrust Reverser System

E. Access

- (1) Location Zones
  - 211/212 Control Cabin
  - 410 No. 1 Power Plant
  - 420 No. 2 Power Plant
  - 510/610 Wing Leading Edge - Inboard
  - 710 Nose Landing Gear and Doors
  - 730/740 Left/Right Main Landing Gear and Doors
- (2) Access Panels
  - 119AL Main Equipment Center
  - 511BB LE Slat Power Drive Unit - Outboard (Left)
  - 611BB LE Slat Power Drive Unit - Inboard (Right)

F. Install the Inboard Leading Edge Slat

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S 294-168

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 864-128

- (2) If you install the same removed inboard slat, rigging of the slats is not necessary when these occur:
  - (a) The auxiliary track adjustments have not been changed.
  - (b) The auxiliary arms have not been removed from the slat.
  - (c) The slat and/or auxiliary arm hardware have not been repaired, modified, adjusted or replaced.

S 824-127

- (3) If you install a slat that does not meet the conditions listed above, do these steps:
  - (a) Install the rigging spacers (24) below the support fittings (26) for the forward auxiliary track with these steps (View C-C, Fig. 401):
    - 1) Remove the six bolts (21), washers (22), and nuts (23).
    - 2) Put the rigging spacer (24) between the support fitting (26) for the forward auxiliary track and the shim (25).
    - 3) Tighten the support fitting (26) to the structure.
  - (b) Install the 0.30 inch (7.6 mm) rigging preload spacer at the inboard, center, and the support links (27) for the outboard auxiliary track with these steps (Views A-A and B-B, Fig. 409):
    - 1) Loosen the lower adjustable nut on the support link (Views A-A and B-B) while you hold the upper adjustable nut in position.

**NOTE:** For the inboard and center auxiliary tracks (Detail A, Fig. 409 and Fig. 409A), use the Inboard Slat Adjustment Wrench to hold the upper adjustable nut in position if necessary.

- 2) Install the rigging preload spacer between the upper adjustable nut and the pivot.
- 3) Tighten the lower adjustable nut.

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S 494-033

**CAUTION:** BE CAREFUL WHEN YOU INSTALL THE SLING EQUIPMENT TO THE SLAT. DAMAGE CAN OCCUR ON THE POLISHED EXTERNAL SKIN.

- (4) Install the sling equipment on the inboard slat (Fig. 404).

S 494-034

- (5) Connect the overhead hoist to the sling equipment.

**NOTE:** Make sure the hoist can hold the weight of the inboard slat. The inboard slat weighs approximately 170 pounds (77.1 Kg).

S 434-035

**CAUTION:** MAKE SURE THE SPRING LOADED SEAL ON THE OUTBOARD END OF THE SLAT IS PUSHED IN BEFORE YOU MOVE THE SLAT TO ITS POSITION FOR INSTALLATION. DAMAGE CAN OCCUR ON THE SEAL.

- (6) Move the slat (1) to its position for the installation and do these steps:
- (a) Make sure the main track can move freely through the front spar cutout.
  - (b) Make sure the side brace link, center link, main track, auxiliary track arms, and the slat control rods are aligned with the cutouts and doors in the wing fixed leading edge.

S 434-036

- (7) Attach the slat control rod (2) to the lug (7) on the inboard slat at two locations (View A-A, Fig. 401).

**NOTE:** Do not change the length of the slat control rod during the installation.

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S 424-169

**CAUTION:** MAKE SURE THAT THE DOWNSTOP SPACERS ARE INSTALLED CORRECTLY AND THE NUT HAS THE CORRECT TORQUE. IF THEY ARE NOT, THE MAIN TRACK/STRUCTURE JOINT CAN BECOME LOOSE. THE DOWNSTOP PARTS CAN DISCONNECT AND CAN CAUSE DAMAGE TO THE SLAT TRACK HOUSING.

- (8) Make sure the parts of the downstop assembly are installed correctly and the nut has the correct torque (IPC 27-81-10-01).

S 434-037

- (9) Connect the slat (1) to the main track (21) with these steps (View B-B, Fig. 402):
- (a) Apply grease to the bolt (27) before installation.
  - (b) Install the bolt (27), washer (26), bushing (25), washer (28) and nut (24) at the main track connection.
  - (c) Tighten the nut (24) to 145-200 pound-inches (16.4-22.5 newton-meters).
  - (d) Install the cotter pin (29) through the nut (24) and bolt (27).

S 434-038

- (10) Connect the slat (1) to the side brace link (9) with these steps (Detail E, Fig. 402):
- (a) Apply grease to the bolt (15).
  - (b) Install the retainer (14), bolt (15), washer (16), bushing (13), washer (17), and nut (12) at the side brace link connection.

**NOTE:** The bolt can be installed with the head in the inboard or outboard direction. It is recommended that the bolt be installed with the head in the inboard direction. This gives easier access to the bolt lube fitting.

- (c) Tighten the nut (12) to 145-200 pound-inches (16.4-22.5 newton-meters).
- (d) Install the cotter pin (18) through the bolt (15) and nut (12).

S 434-039

- (11) Connect the slat (1) to the center link (2) with these steps (View A-A, Fig 402):
- (a) Apply grease to the bolt (3).
  - (b) Install the bolt (3), washer (4), bushing (5), washer (6), and nut (8) to the center link connection.
  - (c) Tighten the nut to 145-200 pound-inches (16.4-22.5 newton-meters).
  - (d) Install the cotter pin (7) through the bolt (3) and nut (8).

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S 434-144

**CAUTION:** SL 27-83 RECOMMENDS REDUCTION OF SENSOR TARGET CLEARANCES TO PREVENT NUISANCE INDICATIONS (LE SLAT ASYM EICAS MESSAGE, LE LIGHT ILLUMINATION, TAKE OFF CONFIGURATION WARNING FLAPS OR STICK SHAKER ACTIVATION). THE TARGET WASHERS HAVE DIFFERENT PROFILES. THE EXISTING TARGET WASHER IS INTERCHANGEABLE BY SHIPSET ONLY. TARGET WASHERS ARE NOT INTERMIXABLE. NOTE THAT TARGET WASHERS VARY DEPENDENT ON LOCATION AND THAT INCORRECT PART NUMBER INSTALLATION CAN CAUSE NUISANCE INDICATIONS.

- (12) Connect the auxiliary track arms (11) to the auxiliary tracks (10) with these steps (View B-B, Fig. 401):
- (a) At the center auxiliary track, install the roller bearing (18), bolt (19), washer (20), and nut (17), and tighten the nut (17) to 290-510 pound-inches (32.8-57.6 newton-meters).
  - (b) At the inboard and outboard auxiliary tracks, install the bolt (14), target washer (15), roller bearing (10), washer (16), and nut (12). Tighten the nut (12) to 290-510 pound-inches.

**NOTE:** Install the bolt head and the target washer on the outboard side of the connection.  
SB 57-0052 adds step washers and reworks target washer and bolts.

- (c) Lubricate at the grease fitting on the bolt head or target washer at the auxiliary track/arm joint and make sure that grease goes out of the bearing on at least one side (BMS 3-33 preferred, MIL-PRF-23827 alternate).

**NOTE:** AMM 12-21-08/301 shows the procedure to lubricate the roller bearing that is installed with a solid (without grease fitting) bolt.

S 094-041

**CAUTION:** BE CAREFUL WHEN YOU REMOVE THE SLING EQUIPMENT. DAMAGE CAN OCCUR ON THE POLISHED EXTERNAL SKIN OF THE INBOARD SLAT.

- (13) Remove the sling equipment from the slat (Fig. 404).

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S 294-170

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (14) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 984-042

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (15) Manually retract fully the inboard slat with one of these two procedures:

**NOTE:** Make sure the slat trailing edge does not rub against the upper surface of the fixed wing leading edge.

- (a) PROCEDURE A: Turn the torque tube with an air motor and adapter, (AMM 27-81-00, Manually Extend and Retract the Leading Edge Slats without Airplane Power).
- (b) PROCEDURE B: Turn the torque tube by hand.

S 824-043

- (16) If the inboard slat rubs against the wing upper surface while it retracts, do these adjustments:
- (a) If the slat rubs against the wing upper surface from the fully extended position to the takeoff position (Fig. 410), adjust the shims (25) at the support fittings (26) for the forward auxiliary track (View C-C, Fig. 401).
- (b) If the slat rubs against the wing upper surface between the takeoff position (Fig. 410) and the fully retracted position, adjust the support link (27) for the aft auxiliary track (View A-A and B-B, Fig. 409).

**NOTE:** Use the Inboard Slat Adjustment Wrench to turn the upper adjustable nut for the inboard and center auxiliary tracks, if necessary (Detail A, Fig. 409 and Fig. 409A).

S 424-044

- (17) If removed, install the center link door and the side brace link door (Ref 57-41-59).

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S 424-140

- (18) Install the inboard slat sensor switches (if removed), after you installed the slat (AMM 27-88-01/201).

S 824-045

- (19) Do this task: Adjust the Inboard Leading Edge Slat.

**NOTE:** This task is not necessary if you installed the same removed slat and did not adjust the auxiliary track, or remove the auxiliary arms, or did not repair, modify, adjust or replace the slat and/or auxiliary arm hardware.

G. Adjust the Inboard Leading Edge Slat

**NOTE:** If you will not adjust the krueger seal flap, disconnect the drive to the krueger seal flap before you adjust the inboard slat (Ref 27-81-04).

S 294-171

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 214-046

- (2) Make sure the rigging spacer (24) is installed at each support fitting (26) for the forward auxiliary track (View C-C, Fig. 401).

S 214-047

- (3) Make sure the rigging preload spacer is installed at the inboard, center, and outboard support links (27) for the aft auxiliary track (View A-A and B-B, Fig. 409):

S 494-048

- (4) Attach a 0.075 +/- 0.003 inch (1.90 +/- 0.076 mm) shim to the retract overtravel stop at the inboard rotary actuator (Detail A, Fig. 407).

S 984-049

- (5) Manually retract fully the inboard slat with one of these procedures, until the inboard rotary actuator arm touches the shim on the retract overtravel stop:
- (a) PROCEDURE A: Turn the torque tube with an air motor and adapter (AMM 27-81-00, Manually Extend and Retract the Leading Edge Slats without Airplane Power)

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(b) PROCEDURE B: Turn the torque tube by hand.

S 224-052

- (6) Make sure the clearance between the lower side of the slat upper trailing edge and the upper surface of the wing fixed leading edge is 0.18 +/- 0.03 inch (4.57 +/- 0.76 mm), (View A-A, Fig. 408).

NOTE: Take measurement at any one point within 6 inches either side of each auxiliary track.

S 824-053

- (7) If the clearance is not correct, adjust the length of the support links (27) for the aft auxiliary track to get the correct clearance (View A-A and B-B, Fig. 409).

NOTE: Keep the rigging preload spacer between the upper adjustable nut and the pivot. Use the Inboard Slat Adjustment Wrench to turn the upper adjustable nut for the inboard and center auxiliary tracks if necessary (Detail B and C, Figs. 409 and 409A).

S 984-054

- (8) Turn the torque tube approximately 94 turns from the fully retracted position to extend the inboard slat to the 20-degrees take-off position, until the distance between the auxiliary track arm and the slot in the auxiliary track is as shown (Detail A, Fig. 410).

S 984-141

- (9) Use one of these procedures to turn the torque tube:  
(a) PROCEDURE A: Turn the torque tube with an air motor and adapter, (AMM 27-81-00, Manually Extend and Retract the Leading Edge Slats without Airplane Power).  
(b) PROCEDURE B: Turn the torque tube by hand.

S 224-055

- (10) Make sure the clearance between the lower side of the slat upper trailing edge and the upper surface of the wing fixed leading edge is 0.002 to 0.020 inch (0.05-0.508 mm) at any one point within six inches of either side of each auxiliary track (View A-A, Fig. 408).

S 824-056

- (11) If the clearance is not correct, adjust the shims (25) at the support fitting (26) for the forward auxiliary track until you get the correct clearance (View C-C, Fig. 401).

NOTE: Apply primer to the shims after dilamination.

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S 984-142

- (12) Turn the torque tube 121 revolutions from the fully retracted (cruise) position to fully extend the slat to the 30.3-degree landing position.

S 094-057

- (13) Remove the rigging spacers (24) from the support fittings (26) for the forward auxiliary track (View C-C, Fig. 401), and do these steps:
- (a) Apply primer between and around the shims.
  - (b) At each support fitting, install the bolt with a washer, bushing, and nut at six locations. Tighten the nuts.

S 094-058

- (14) Remove the rigging preload spacers (View A-A and B-B, Fig. 409), from the support link (27) for the aft auxiliary track with these steps:

**NOTE:** A preload is applied to the inboard slat against the wing fixed leading edge when you remove the preload spacer.

- (a) Loosen the lower adjustable nut while you hold the upper adjustable nut in position.
- (b) Remove the rigging preload spacer.
- (c) Tighten the lower adjustable nut until the upper adjustable nut is held against the pivot.

S 224-050

- (15) At the inboard and outboard ends of the inboard slat, do a check on the mismatch dimensions between the slat and the adjacent fixed wing structure, and make sure they are not more than the permitted limits (View B-B, Fig. 408).

**NOTE:** The inboard slat requires a manual retraction/extension to do the check on the mismatch dimensions.

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S 824-051

- (16) Do these adjustments if the mismatch dimensions are not correct:
- Install rigging spacers to help get the permitted mismatch dimensions with steps given in the "Install the Inboard Leading Edge Slat" procedure.

NOTE: Rigging spacers are used for initial fair pre-check. The final fair check is done with the rigging spacers removed. Installation of spacers help to align the upper trailing edge of the slat for a consistent mismatch measurement and for even preload condition.

- Remove the slat control rod (2) from the slat lug (7) (View A-A, Fig. 401).
- Adjust the length of the slat control rod (2) to get the slat mismatch below the limit.
- Apply grease to the bolt.
- Connect the slat control rod (2) to the slat lug (7) with the bolt (5), washers (6, 8, 9), bushing (4), and nut (3).

NOTE: Bushing (4) is always installed under the washer (9) and nut (3). If you install the nut in the outboard direction, make sure to have sufficient clearance for the bolt end to prevent interference.

- Remove rigging spacers with steps given before this adjustment task.
- Do this adjustment task until you get the permitted mismatch dimensions.

S 984-059

- (17) Manually retract the inboard slat with one of these procedures, until the inboard rotary actuator arm touches the 0.075 +/- 0.003 inch shim at the retract overtravel stop:
- PROCEDURE A: Turn the torque tube with an air motor and adapter, (AMM 27-81-00, Manually Extend and Retract the Leading Edge Slats without Airplane Power).
  - PROCEDURE B: Turn the torque tube by hand.

S 434-060

- (18) Connect the torque tube to the inboard slat PDU (Ref 27-81-24).

S 094-061

- (19) Remove the 0.075 +/- 0.003 inch (1.90 +/- 0.07 mm) shim from the retract overtravel stop, at the inboard rotary actuator (Detail A, Fig. 407).

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S 424-062

- (20) If you installed a new inboard slat, install and adjust the sensor switch targets on the slat auxiliary track arms (Ref 27-88-01).

S 094-063

- (21) Remove the PDU lock from the TE flap PDU (Fig. 405).

S 094-064

- (22) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 406).

S 864-065

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (23) Pressurize the center hydraulic system (Ref 29-11-00).

S 864-066

- (24) Move the flap control lever to the 20-Unit detent, and make sure the flaps move to the 20-degree position, and the slats move to the intermediate position.

S 864-067

- (25) Remove the power from the center hydraulic system (Ref 29-11-00).

S 494-068

- (26) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 406).

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S 224-145

**CAUTION:** SL 27-83 RECOMMENDS REDUCTION OF SENSOR TARGET CLEARANCES TO PREVENT NUISANCE INDICATIONS (LE SLAT ASYM EICAS MESSAGE, LE LIGHT ILLUMINATION, TAKE OFF CONFIGURATION WARNING FLAPS OR STICK SHAKER ACTIVATION). THE TARGET WASHERS HAVE DIFFERENT PROFILES. THE EXISTING TARGET WASHER IS INTERCHANGEABLE BY SHIPSET ONLY. TARGET WASHERS ARE NOT INTERMIXABLE. NOTE THAT TARGET WASHERS VARY DEPENDENT ON LOCATION AND THAT INCORRECT PART NUMBER INSTALLATION CAN CAUSE NUISANCE INDICATIONS.

(27) At the outboard auxiliary track arm, make sure there is permitted clearance between the sensor switch and the target on the auxiliary track arm (View C, Fig. 411) at the slat intermediate (take-off) position.

**NOTE:** Measure the clearance with the auxiliary track in the center of the auxiliary track arm. Adjust the sensor switch position, if necessary, to get the permitted sensor/target clearance (AMM 27-88-01/201).  
SB 57-0052 adds step washers and reworks target washers and bolts.

S 224-071

(28) Make sure the clearance of the ice shield seal on the center link is correct (View B-B, Fig. 403). Adjust the seal retainer if it is necessary.

S 094-072

(29) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 406).

S 864-073

(30) Supply electrical power (Ref 24-22-00).

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S 864-074

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(31) Pressurize the center hydraulic system (Ref 29-11-00).

S 864-075

(32) Move the flap control lever to the 30-unit detent, and make sure the flaps and slats move to the fully extended position.

S 864-076

(33) Remove the power from the center hydraulic system (Ref 29-11-00).

S 494-077

(34) Install the groundlocks on the inboard and outboard slat PDUs (Fig. 406).

S 224-146

**CAUTION:** SL 27-83 RECOMMENDS REDUCTION OF SENSOR TARGET CLEARANCES TO PREVENT NUISANCE INDICATIONS (LE SLAT ASYM EICAS MESSAGE, LE LIGHT ILLUMINATION, TAKE OFF CONFIGURATION WARNING FLAPS OR STICK SHAKER ACTIVATION). THE TARGET WASHERS HAVE DIFFERENT PROFILES. THE EXISTING TARGET WASHER IS INTERCHANGEABLE BY SHIPSET ONLY. TARGET WASHERS ARE NOT INTERMIXABLE. NOTE THAT TARGET WASHERS VARY DEPENDENT ON LOCATION AND THAT INCORRECT PART NUMBER INSTALLATION CAN CAUSE NUISANCE INDICATIONS.

(35) At the inboard auxiliary track arm, make sure there is permitted clearance between the sensor switch and the target on the auxiliary track arm (View D, Fig. 411) at the slat fully extended (landing) position.

**NOTE:** Measure the clearance with the auxiliary track in the center of the auxiliary track arm. Adjust the sensor switch position, if it is necessary, to get the permitted sensor/target clearance (AMM 27-88-01/201).  
SB 57-0052 adds step washers and reworks target washers and bolts.

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S 094-079

- (36) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 406).

S 294-172

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (37) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 864-080

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (38) Pressurize the center hydraulic system (Ref 29-11-00).

S 864-081

- (39) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted position.

S 864-082

- (40) Remove the power from the center hydraulic system (Ref 29-11-00).

S 494-083

- (41) Install the PDU lock in the TE flap PDU (Fig. 405).

S 494-084

- (42) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 406).

S 094-128

- (43) If you installed a new inboard slat, make sure to install and adjust the sensor switch targets on the auxiliary track arms (AMM 27-88-01/201).

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S 224-147

**CAUTION:** SL 27-83 RECOMMENDS REDUCTION OF SENSOR TARGET CLEARANCES TO PREVENT NUISANCE INDICATIONS (LE SLAT ASYM EICAS MESSAGE, LE LIGHT ILLUMINATION, TAKE OFF CONFIGURATION WARNING FLAPS OR STICK SHAKER ACTIVATION). THE TARGET WASHERS HAVE DIFFERENT PROFILES. THE EXISTING TARGET WASHER IS INTERCHANGEABLE BY SHIPSET ONLY. TARGET WASHERS ARE NOT INTERMIXABLE. NOTE THAT TARGET WASHERS VARY DEPENDENT ON LOCATION AND THAT INCORRECT PART NUMBER INSTALLATION CAN CAUSE NUISANCE INDICATIONS.

(44) At the inboard and outboard auxiliary track arm, make sure there is permitted clearance between the sensor switch and the target (View E, Fig. 411) at the slat fully retracted (cruise) position.

**NOTE:** Do not adjust the sensor switch. Adjust the retract target on the auxiliary track arm, if it is necessary, to get the permitted sensor/target clearance (AMM 27-88-01/201). SB 57-0052 adds step washers and reworks target washers and bolts.

S 434-086

(45) If disconnected, connect the krueger seal flap back to the inboard flap drive (Ref 27-81-04).

**NOTE:** Make sure the krueger seal flap is in the fully retracted position before you connect the flap drive. Adjust the krueger seal flap and flap drive if it is necessary (Ref 27-81-04).

S 094-087

(46) Remove the tape and release the aerodynamic seals from the retracted position.

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S 294-173

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

(47) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 414-088

(48) Install the fixed leading edge lower access panels (Ref 06-44-00).

**NOTE:** Do not close the access panels, 511BB and 611BB, for the inboard and outboard slat PDUs at this time.

S 224-089

(49) Do a check on the mismatch for the wing fixed lower leading edge at these locations, and make sure the mismatch is not more than  $\pm 0.04$  inch:

**NOTE:** Adjust the doors and tabs if it is necessary.

- (a) Inboard and center link doors.
- (b) Outboard main track tabs.
- (c) Outboard auxiliary track tabs.

S 224-090

(50) Do a check on the clearance along the trailing edge of the slat lower surface to the wing fixed lower leading edge, and make sure the clearance is between 0.125 and 0.250 inch (3.18-6.35 mm) (View C-C, Fig. 408).

S 224-091

(51) Do a check on the seal clearance at the inboard end of the slat (View A-A, Fig. 403).

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S 214-092

- (52) Make sure the adjustable seal along the inboard end of the slat touches the adjacent fixed wing structure at all locations (View A-A, Fig. 403).

NOTE: Adjust the seal if it is necessary.

S 224-093

- (53) Make sure the inboard and outboard ends of the slat align correctly with the adjacent structure as shown (View A-A, Fig. 408).

S 094-094

- (54) Remove the PDU lock from the TE flap PDU (Fig. 405).

S 094-095

- (55) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 406).

S 414-096

- (56) Close the access panels, 511BB and 611BB, for the inboard and outboard slat PDUs (Ref 06-44-00).

S 214-133

- (57) Do a check on the clearance along the trailing edge of the slat lower surface to the wing fixed lower leading edge, and make sure the clearance is between 0.125 and 0.250 inch (3.18-6.35 mm) (View C-C, Fig. 408).

S 714-097

- (58) Do the "Test for the Inboard Leading Edge Slat" procedure below.  
H. Test for the Inboard Leading Edge Slat

NOTE: During this test, make sure the EICAS messages do not show on the EICAS display and LEADING EDGE light, on the P3 panel, does not come on.

S 214-148

- (1) Make sure you close these circuit breakers on the P11 Overhead Panel:  
(a) 11J02, EICAS CMPTR L

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- (b) 11J03, EICAS UPPER DISPL
- (c) 11J29, EICAS CMPTR R
- (d) 11J30, EICAS LOWER DSPL
- (e) 11J31, EICAS DSPL SW
- (f) 11J32, EICAS PILOT DISPLAY, or  
DISPLAY SELECT

S 214-100

- (2) Make sure the flaps and slats are in the fully retracted position.

S 214-101

- (3) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 864-102

- (4) Supply electrical power (Ref 24-22-00).

S 864-103

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (5) Pressurize the center hydraulic system (Ref 29-11-00).

S 864-104

- (6) Move the flap control lever to the 20-unit detent and make sure the flaps move to the 20 degree position, and the slats move to the intermediate position.

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S 864-105

- (7) Move the flap control lever to the 30-unit detent and make sure the flaps and slats move to the fully extended position.

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- S 214-106
- (8) Make sure the aerodynamic seals in the cutouts on the fixed leading edge are extended (Ref 27-81-31).

- S 864-107
- (9) Move the flap control lever back to the 20-unit and zero-unit detents and make sure the flaps and slats move to the correct position as before.

- S 214-108
- (10) Make sure the aerodynamic seals in the cutouts of the fixed leading edge are retracted (Ref 27-81-31).

- S 014-109
- (11) Open the access door, 119AL, to get access to the main equipment center (Ref 06-41-00).

- S 724-110
- (12) Operate the test switch on the panel of the flap/slat electronics unit (FSEU) at the E2 equipment rack, and look for a no-fault indication.

- S 724-111
- (13) Operate the test switch on the proximity switch electronics unit (PSEU) BITE panel on the E1 equipment rack, and make sure there is a no-fault indication (AMM 27-88-01/201) or (FIM 32-09-03/101, Fig. 104).

I. Put the Airplane Back to Its Usual Condition.

- S 094-112
- (1) Remove the DO-NOT-OPERATE tag on the position selector switch, on the P3 panel, for the flap/slat alternate drive.

- S 214-113
- (2) Make sure the position selector switch is in the NORM detent.

- S 864-114
- (3) Remove the circuit breaker locks and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

- S 864-115
- (4) Remove the circuit breaker locks and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR

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S 414-116

- (5) Close the access door, 119AL, to the main equipment center (Ref 06-41-00).

S 094-117

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (6) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

S 444-118

- (7) Do the activation procedure for the thrust reverser (Ref 78-31-00).

S 864-123

- (8) Remove the power from the center hydraulic system (Ref 29-11-00).

S 864-124

- (9) Remove electrical power if it is necessary (Ref 24-22-00).

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INBOARD LE SLAT - INSPECTION/CHECK

1. General

- A. This procedure has illustrations and wear limit tables, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Inboard LE Slat - Removal/Installation for procedure to do these tasks.
- B. This procedure has a task to examine the slat control rods if a slat accidentally contacts on open thrust reverser cowl.

TASK 27-81-01-216-002

2. Examine the Slat Control Rods

- A. Examine the slat control rod.

S 426-003

- (1) Replace the control rod if it is damaged.

- B. Examine the auxiliary track and the track arm.

S 426-004

- (1) Replace any component that is damaged.

TASK 27-81-01-226-001

3. Wear Limits for the Inboard LE Slat (Fig. 601)

A. General

- (1) This procedure has illustrations and wear limit tables, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Inboard LE Slat - Removal/Installation for procedure to do these tasks.

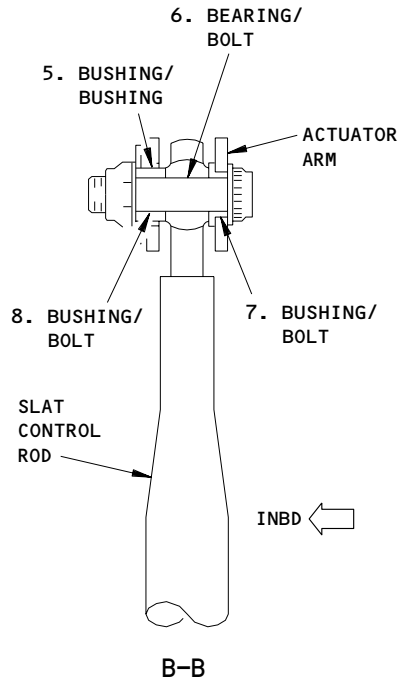
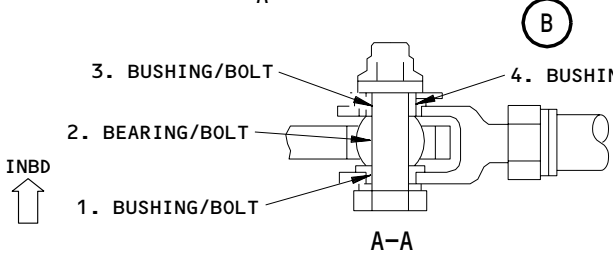
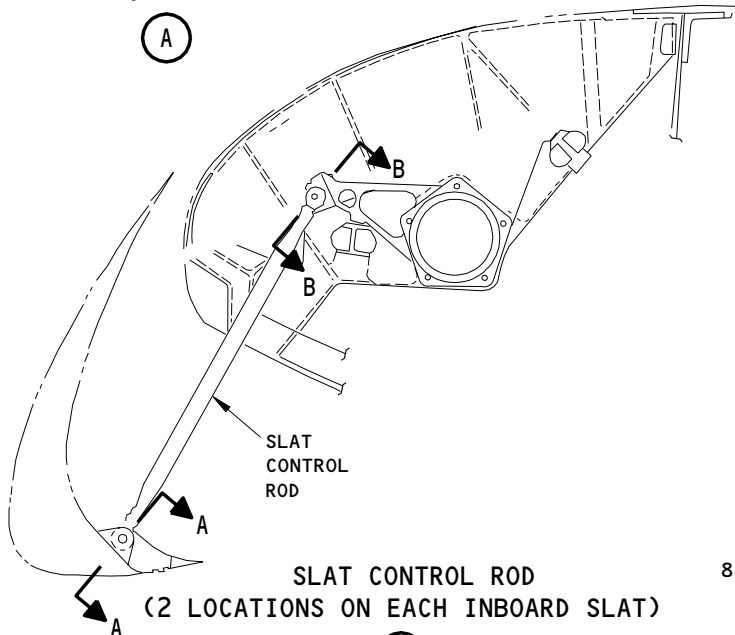
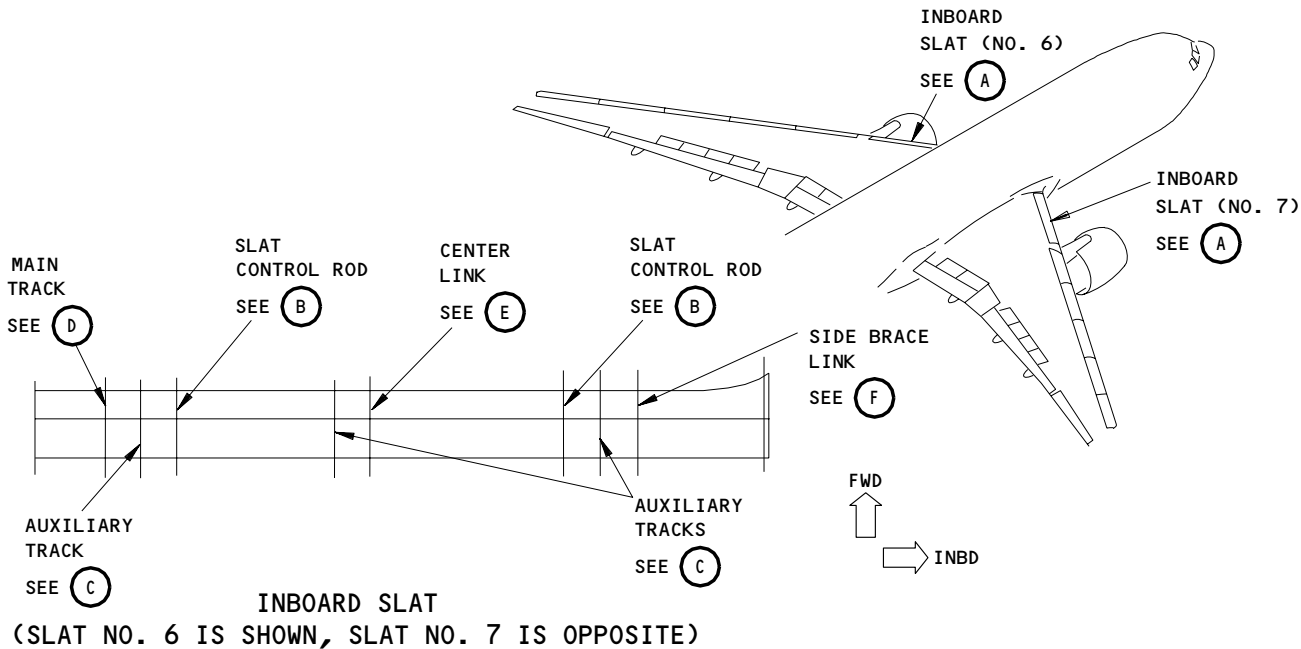
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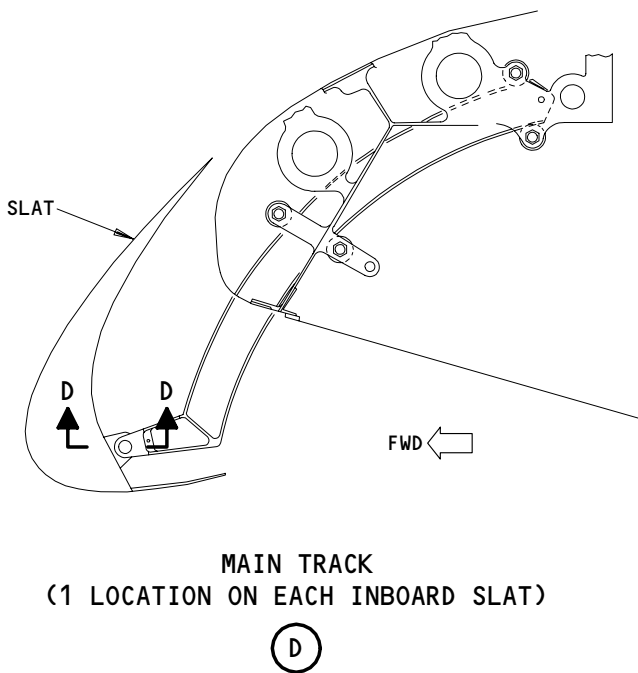
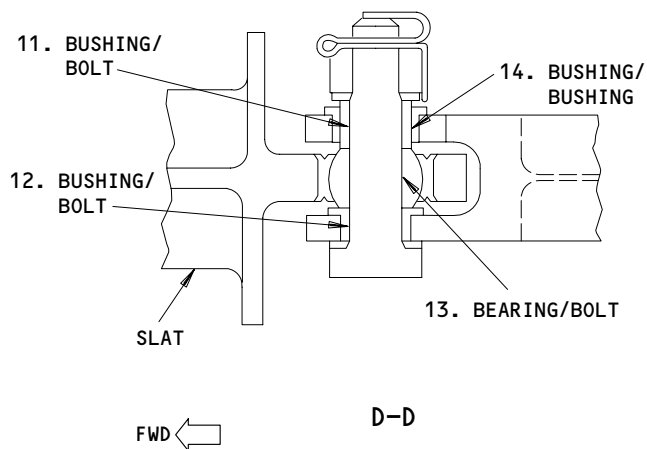
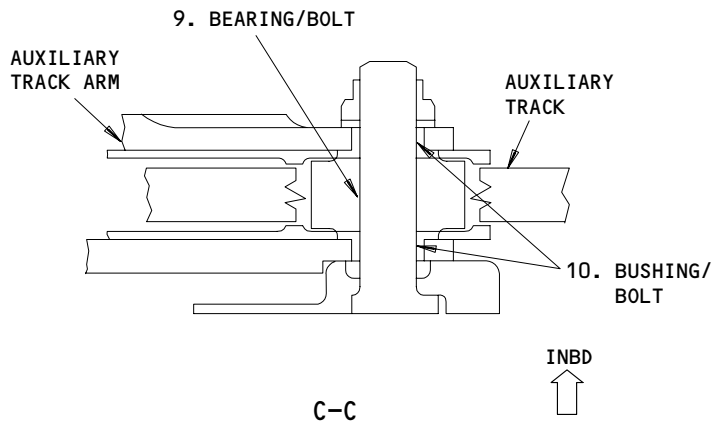
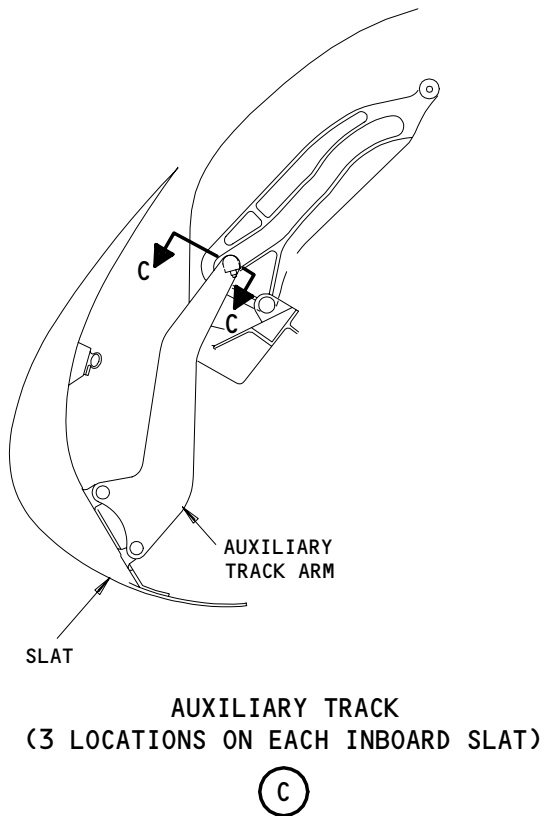


Wear Limits for the Inboard Slat  
Figure 601 (Sheet 1)

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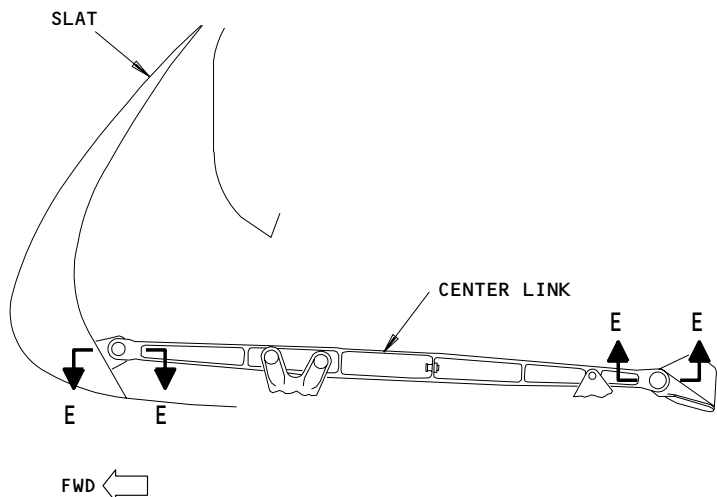
Wear Limits for the Inboard Slat  
Figure 601 (Sheet 2)

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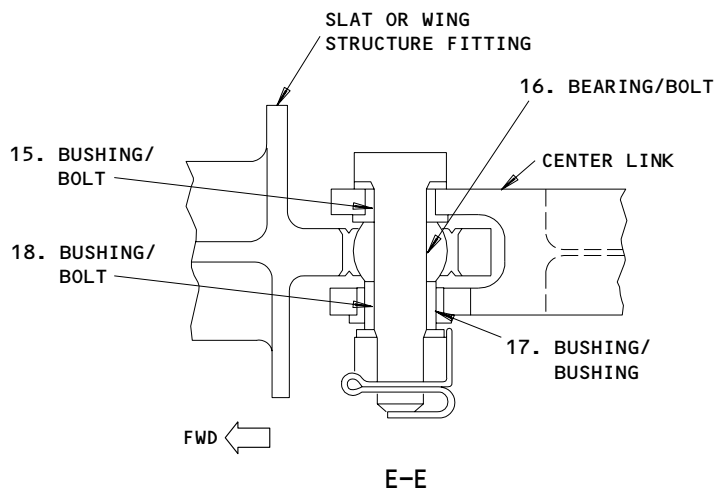
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**CENTER LINK**  
(1 LOCATION ON EACH INBOARD SLAT)

(E)



Wear Limits for the Inboard Slat  
Figure 601 (Sheet 3)

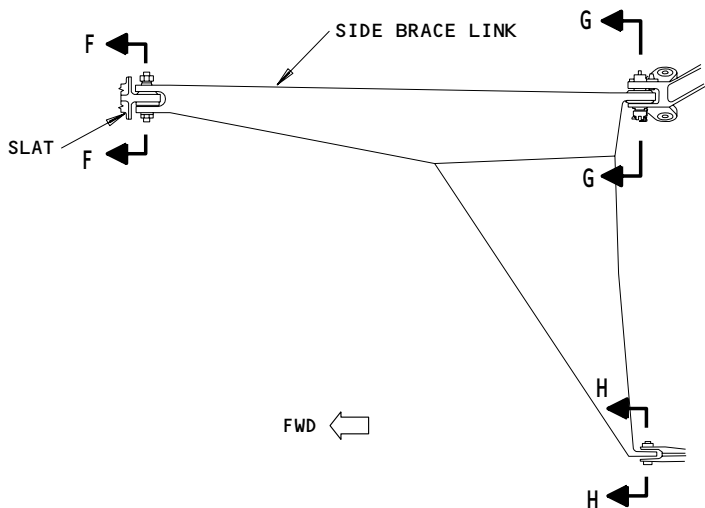
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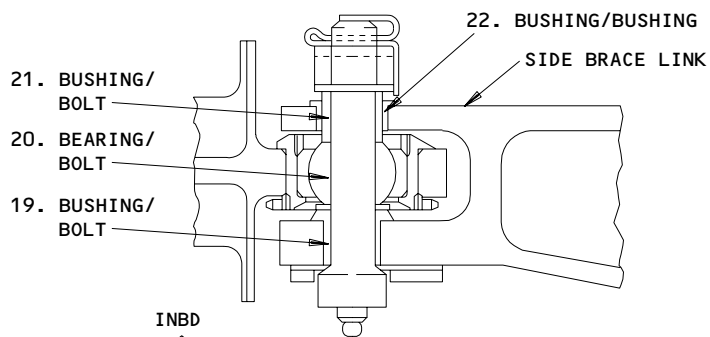
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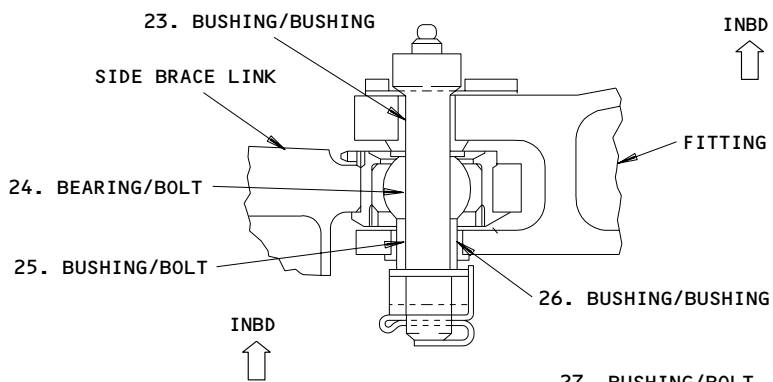


**SIDE BRACE LINK**  
(1 LOCATION ON EACH INBOARD SLAT)

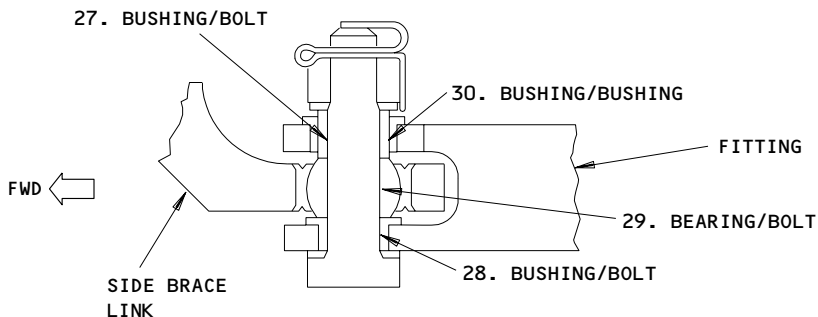
(F)



F-F



G-G



H-H

**Wear Limits for the Inboard Slat**  
**Figure 601 (Sheet 4)**

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.4375 (11.113)	0.4380 (11.125)	0.4420 (11.227)	0.0050 (0.127)	X		
	BOLT	OD	0.4360 (11.074)	0.4370 (11.100)	0.4330 (10.998)		X		
2	BEARING	ID	0.4375 (11.113)	0.4379 (11.123)	0.4420 (11.227)	0.0050 (0.127)	X		
	BOLT	OD	0.4360 (11.074)	0.4370 (11.100)	0.4329 (10.996)		X		
3	BUSHING	ID	0.4375 (11.113)	0.4380 (11.125)	0.4420 (11.227)	0.0050 (0.127)	X		
	BOLT	OD	0.4360 (11.074)	0.4370 (11.100)	0.4330 (10.998)		X		
4	BUSHING	ID	0.6245 (15.862)	0.6252 (15.880)	0.6290 (15.977)	0.0050 (0.127)	X		
	BUSHING	OD	0.6235 (15.837)	0.6240 (15.850)	0.6202 (15.753)		X		
5	BUSHING	ID	0.6245 (15.862)	0.6255 (15.888)	0.6290 (15.977)	0.0050 (0.127)	X		
	BUSHING	OD	0.6235 (15.837)	0.6240 (15.850)	0.6205 (15.761)		X		
6	BEARING	ID	0.4375 (11.113)	0.4379 (11.123)	0.4420 (11.227)	0.0050 (0.127)	X		
	BOLT	OD	0.4360 (11.074)	0.4370 (11.100)	0.4329 (10.996)		X		
7	BUSHING	ID	0.4375 (11.113)	0.4385 (11.138)	0.4420 (11.227)	0.0050 (0.127)	X		
	BOLT	OD	0.4360 (11.074)	0.4370 (11.100)	0.4335 (11.011)		X		
8	BUSHING	ID	0.4375 (11.113)	0.4380 (11.125)	0.4420 (11.227)	0.0050 (0.127)	X		
	BOLT	OD	0.4360 (11.074)	0.4370 (11.100)	0.4330 (10.998)		X		
9	BEARING	ID	0.4993 (12.682)	0.5000 (12.700)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4950 (12.573)		X		
10	BUSHING	ID	0.5000 (12.700)	0.5050 (12.827)	0.5105 (12.967)	0.0110 (0.279)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4940 (12.548)		X		

Wear Limits for the Inboard Slats  
Figure 601 (Sheet 5)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4955 (12.586)		X		
12	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4957 (12.591)		X		
13	BEARING	ID	0.5000 (12.700)	0.5004 (12.710)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4954 (12.583)		X		
14	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6917 (17.569)	0.0052 (0.132)	X		
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6825 (17.336)		X		
15	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4957 (12.591)		X		
16	BEARING	ID	0.5000 (12.700)	0.5004 (12.710)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4954 (12.583)		X		
17	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6917 (17.569)	0.0052 (0.132)	X		
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6825 (17.336)		X		
18	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4955 (12.586)		X		
19	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4957 (12.591)		X		
20	BEARING	ID	0.5000 (12.700)	0.5004 (12.710)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4954 (12.583)		X		

Wear Limits for the Inboard Slats  
Figure 601 (Sheet 6)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
21	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4955 (12.586)		X		
22	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6915 (17.564)	0.0050 (0.127)	X		
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6827 (17.341)		X		
23	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4957 (12.591)		X		
24	BEARING	ID	0.5000 (12.700)	0.5004 (12.710)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.5985 (15.202)	0.4995 (12.687)	0.4954 (12.583)		X		
25	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4955 (12.586)		X		
26	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6915 (17.564)	0.0050 (0.127)	X		
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6827 (17.341)		X		
27	BUSHING	ID	0.3125 (7.938)	0.3130 (7.950)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3080 (7.823)		X		
28	BUSHING	ID	0.3125 (7.938)	0.3131 (7.953)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3081 (7.826)		X		
29	BEARING	ID	0.3125 (7.938)	0.3129 (7.948)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3079 (7.821)		X		
30	BUSHING	ID	0.4375 (11.113)	0.7382 (18.750)	0.4420 (11.227)	0.0050 (0.127)	X		
	BUSHING	OD	0.4365 (11.087)	0.4370 (11.100)	0.4332 (11.003)		X		

Wear Limits for the Inboard Slats  
Figure 601 (Sheet 7)

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OUTBOARD LEADING EDGE SLAT – REMOVAL/INSTALLATION

1. General

- A. The slats are given the numbers from No. 1 through No. 12, from the left wing to the right wing. This procedure contains the removal and installation tasks for the outboard leading edge slats No. 1 through No. 5, and No. 8 through No. 12.

TASK 27-81-02-024-001

2. Outboard Leading Edge Slat – Removal

A. Equipment

- (1) Sling Equipment, Leading Edge Slats – A27017-41
  - (a) Outboard Slat Arm – A27017-3
- (2) Circuit Breaker Lockout Clip  
(Commercially Available).

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 27-81-00/201 Leading Edge Slat – Maintenance Practice
- (4) AMM 27-81-02/601 Outboard Leading Edge – Inspection/Check
- (5) AMM 27-81-16/401 Leading Edge Slat Drive Side-of-Body Angle Gearbox – Removal/installation.
- (6) AMM 27-81-20/201 LE Slat Drive Rotary Actuator and Offset Gearbox – Maintenance Practice
- (7) AMM 27-81-24/401 Leading Edge Slat Torque Tube – Removal/Installation
- (8) AMM 27-88-01/201, Leading Edge Slat Sensor Switches
- (9) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (10) AMM 30-11-05/401, Telescoping Duct
- (11) AMM 30-11-06/401, Interstitial Duct
- (12) AMM 32-00-15/201, Landing Gear Door Locks
- (13) AMM 32-00-20/201, Landing Gear Downlocks
- (14) AMM 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
520/620	Wing Leading Edge – Outboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panel

511BB	LE Slat Power Drive Unit – Outboard (Left)
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D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

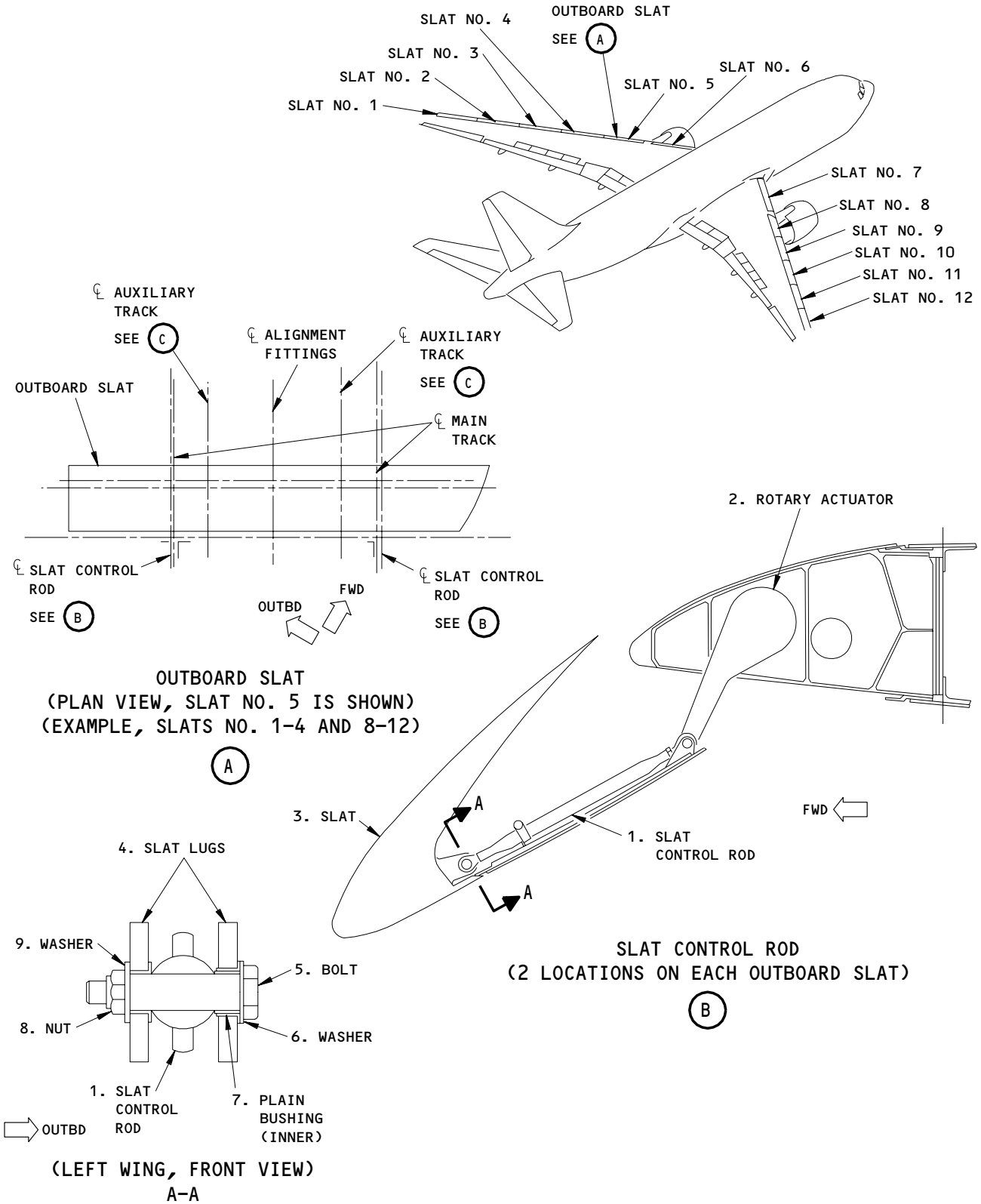
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Slat Control Rods and Auxiliary Tracks  
Figure 401 (Sheet 1)

EFFECTIVITY

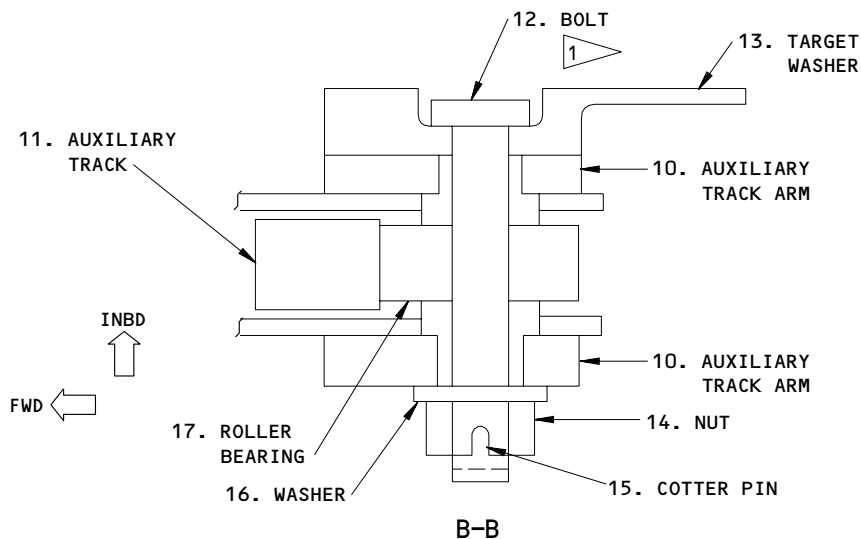
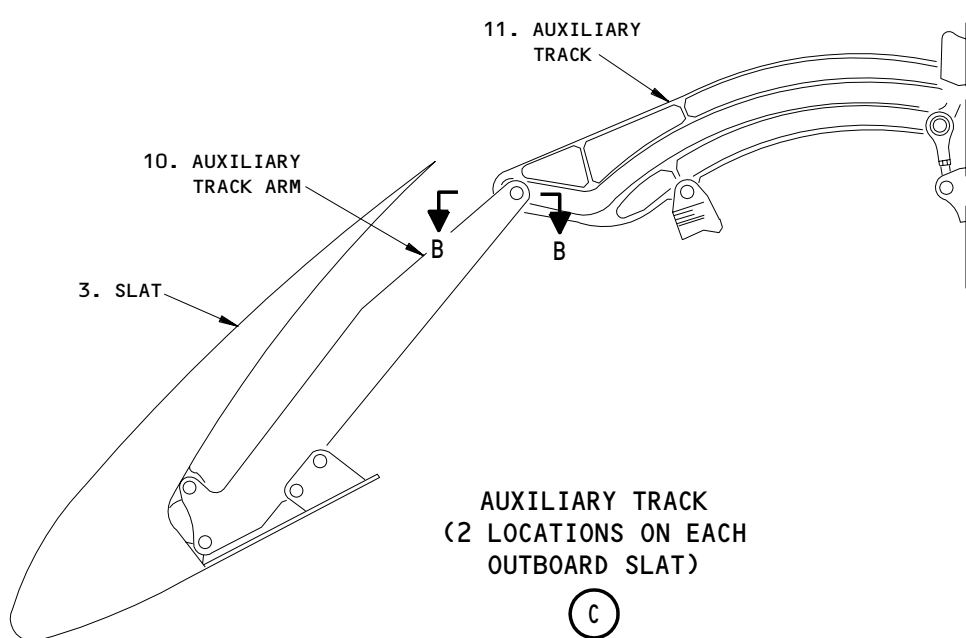
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**CAUTION:** THE TARGET WASHERS HAVE DIFFERENT PROFILES. TARGET WASHERS ARE NOT INTERCHANGEABLE. INSTALLATION OF TARGET WASHERS DEPEND ON LOCATION AND INCORRECT PART NUMBER INSTALLATION CAN CAUSE NUISANCE INDICATIONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

1 USE IPC FOR RECOMMENDED APPLICABLE BOLT AND ROLLER BEARING. LUBRICATE WITH BMS 3-33 (PREFERRED) OR MIL-PRF-23827 (ALTERNATE) GREASE. APPLY GREASE TO THE FITTING AND MAKE SURE THAT THE ROLLER BEARING HAS SUFFICIENT LUBRICATION. USE TASK CARD FOR APPLICABLE PERIODIC LUBRICATION OF ROLLER BEARINGS.

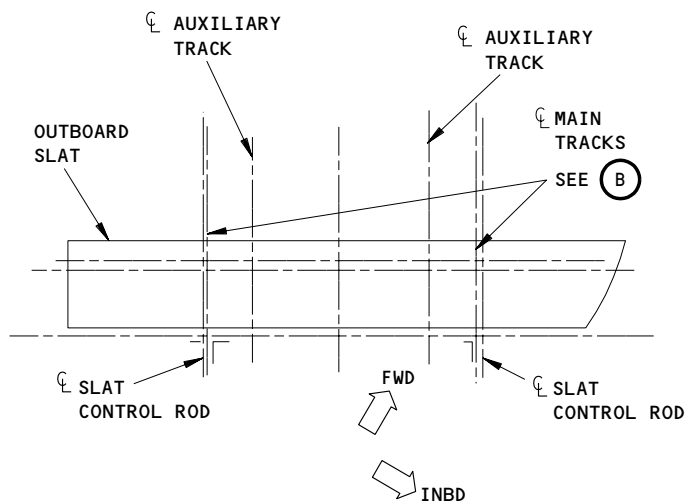
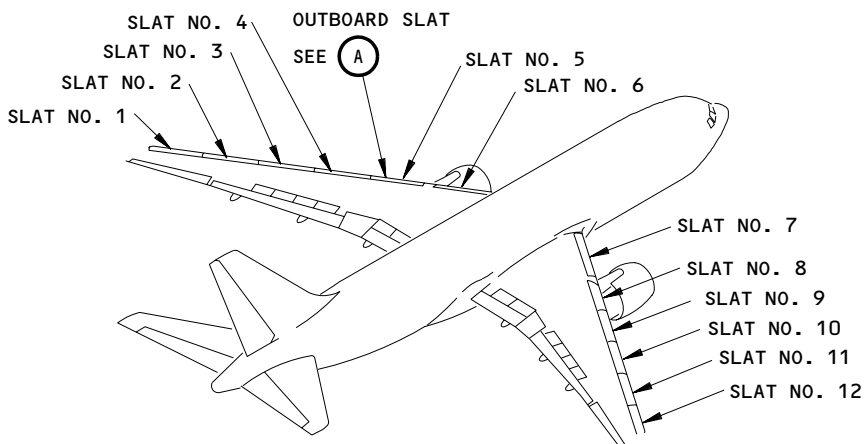
Slat Control Rods and Auxiliary Tracks  
Figure 401 (Sheet 2)

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1. APPLY BMS 3-24 GREASE TO THE BOLT OD, BUSHING, AND BEARING ID.
  2. INSTALL THE BOLT WITH THE HEAD POINTED INBOARD. INSTALL ONE WASHER UNDER THE BOLTHEAD, AND ONE WASHER UNDER THE NUT.
2. USE IPC FOR RECOMMENDED APPLICABLE BOLT AND ROLLER BEARING. LUBRICATE WITH BMS 3-33 (PREFERRED) OR MIL-PRF-23827 (ALTERNATE) GREASE. APPLY GREASE TO THE FITTING AND MAKE SURE THAT THE ROLLER BEARING HAS SUFFICIENT LUBRICATION. USE TASK CARD FOR APPLICABLE PERIODIC LUBRICATION OF ROLLER BEARINGS.

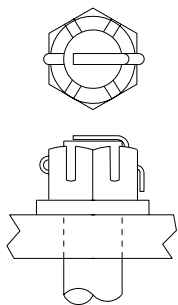
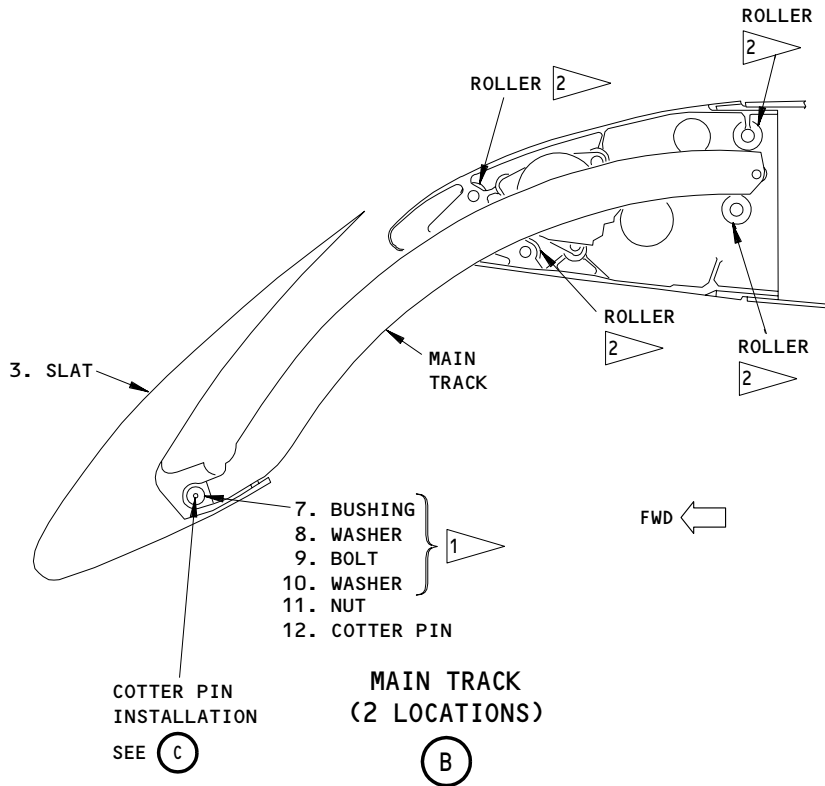
**OUTBOARD SLAT  
(PLAN VIEW)  
(SLAT NO. 5 IS SHOWN)  
(EXAMPLE, SLATS NO. 1-4 AND 8-12)**

A

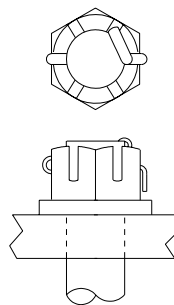
Outboard Slat Main Tracks  
Figure 402 (Sheet 1)

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(OPTIONAL)



(RECOMMENDED)

COTTER PIN INSTALLATION

(C)

Outboard Slat Main Tracks  
Figure 402 (Sheet 2)

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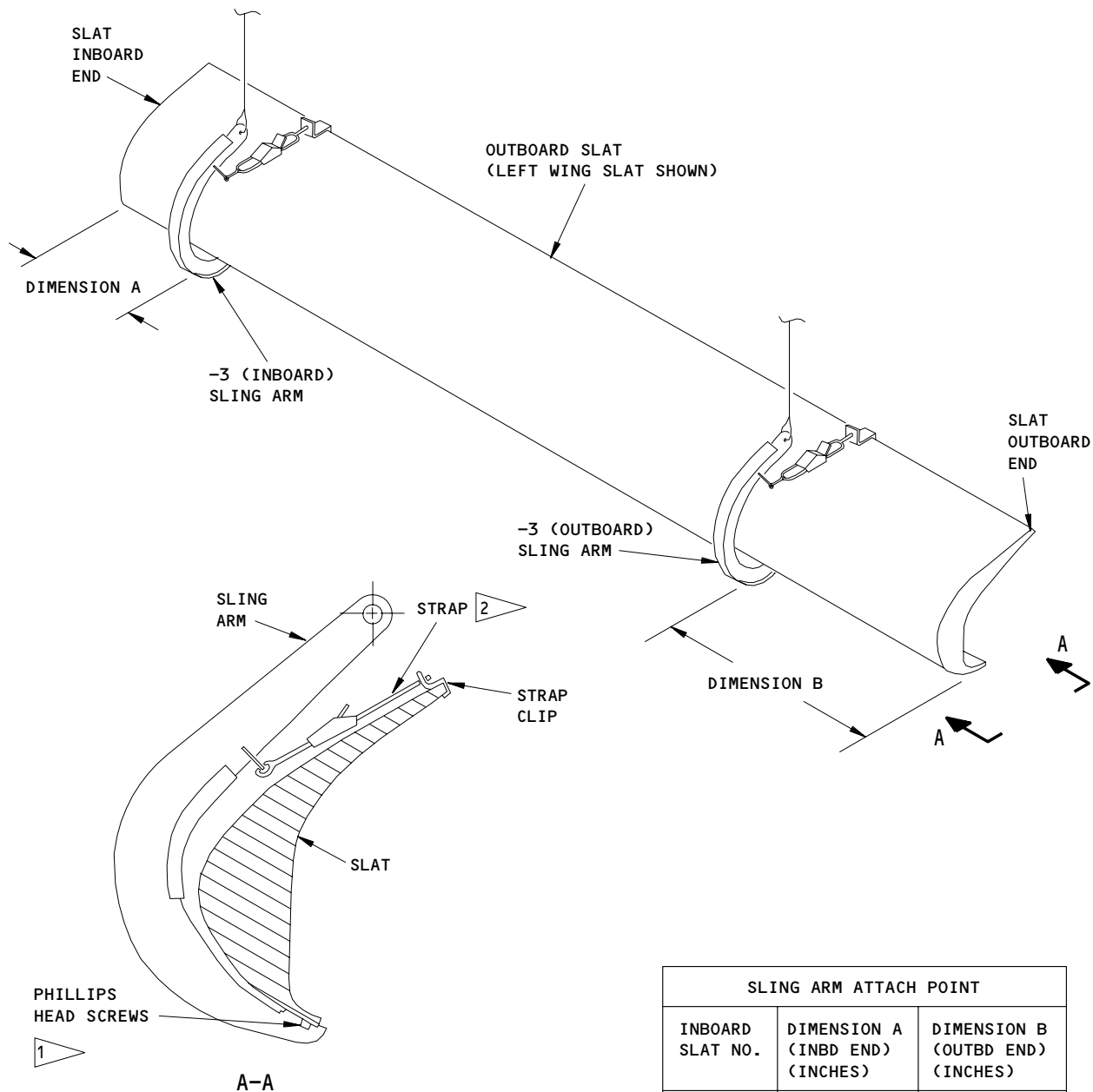
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SLING ARM ATTACH POINT		
INBOARD SLAT NO.	DIMENSION A (INBD END) (INCHES)	DIMENSION B (OUTBD END) (INCHES)
1 AND 12	22.0	22.0
2 AND 11	27.0	27.0
3 AND 10	31.0	31.0
4 AND 9	35.0	35.0
5 AND 8	26.0	32.0

- 1 REMOVE THE PHILLIPS HEAD SCREWS FROM THE SLAT STRUCTURE AT THE LOCATIONS SHOWN AND ATTACH THE SLING ARM WITH THE HEX-HEAD (AN3) BOLTS AND WASHERS
- 2 AFTER YOU CONNECT THE SLING ARM TO THE SLAT, PUT THE STRAP CLIP OVER THE UPPER EDGE OF THE SLAT AND TIGHTEN THE STRAP

Slat Sling Equipment  
Figure 403

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S 494-003

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 044-004

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 024-018

- (4) To remove slat No. 5 or 8, remove the telescoping duct for the thermal anti-ice system (AMM 30-11-05/401).

**NOTE:** Ignore the step "Put the slat drive system back to its usual condition" in AMM 30-11-05/401 ("Put the airplane back to its usual condition" in AMM 27-81-00/201) to continue with the removal of the interstitial duct with slat drive system deactivated.

S 024-073

- (5) Remove the interstitial ducts for the thermal anti-ice system at each end of the slat to be removed (AMM 30-11-06/401).

**NOTE:** Ignore the step "Put the slat drive system back to its usual condition" in AMM 30-11-06/401 ("Put the airplane back to its usual condition" in AMM 27-81-00/201) to continue with the removal of the slat(s) with slat drive system deactivated.

S 864-077

- (6) Make sure you keep disconnected duct parts and cable assembly parts (staying attached to the structure) out of path of travel of the slats.

S 864-072

- (7) Make sure the groundlocks are removed from the inboard and outboard slat PDUs.

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S 864-008

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

S 294-119

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (9) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 864-071

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE FLAPS AND SLATS IN THE STEP THAT FOLLOWS. THE INBOARD AND OUTBOARD SLATS WILL MOVE TO THE POSITION SHOWN ON THE FLAP CONTROL LEVER WHEN THE CENTER HYDRAULIC SYSTEM IS PRESSURIZED. THE ACCIDENTAL MOVEMENT OF THE SLATS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (10) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-074

- (11) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted position, and that the position of the flaps and slats agree with the position of the flap control lever.

S 494-007

- (12) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 864-009

- (13) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 014-075

- (14) Install the groundlocks on the inboard and outboard slat PDUs.

S 214-010

- (15) Make sure the position selector switch for the flap/slat alternate drive, on the first officer's main instrument panel, P3, is in the NORM detent.

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S 494-011

- (16) Attach a DO-NOT-OPERATE tag to the position selector switch.

S 864-012

- (17) Push the arming switch, on the P3 panel, for the slat alternate drive, to arm the slat alternate drive (ALTN switch light comes on at the LE side).

S 214-013

- (18) Make sure the amber LEADING EDGE light, on the P3 panel, comes on and the LE SLAT DISAGREE message shows on the EICAS display after 7 seconds.

S 864-014

- (19) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD

S 864-015

- (20) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 014-016

- (21) Remove the access panel, 511BB, to get access to the outboard slat power drive unit (PDU) (AMM 06-44-00/201).

S 014-017

- (22) Remove the fixed lower LE access panels as necessary to get access to the outboard slat components (AMM 06-44-00/201).

S 864-076

- (23) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 294-117

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (24) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

E. Remove the Outboard Leading Edge Slat

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S 494-069

**CAUTION:** BE CAREFUL NOT TO DAMAGE THE SENSOR SWITCHES WHEN YOU REMOVE THE SLAT. REMOVE THE SENSOR SWITCHES, IF IT IS NECESSARY.

- (1) Remove the outboard slat sensor switches, if it is necessary (AMM 27-88-01/201).

S 494-020

**CAUTION:** BE CAREFUL WHEN YOU INSTALL THE SLING EQUIPMENT TO THE SLAT. DAMAGE CAN OCCUR ON THE POLISHED EXTERNAL SKIN.

- (2) Install the sling equipment on the outboard slat (Fig. 403).

S 494-021

- (3) Connect the overhead hoist to the sling equipment.

**NOTE:** Make sure the hoist can hold the weight of the outboard slat. The outboard slat weighs approximately 110 pounds (49.9 Kg).

S 864-078

- (4) Make sure the hoist cable has the correct tension and is not loose.

S 984-116

- (5) Manually extend the outboard slat (3), as necessary, in order to get the slat control rods (1) and the tracks disconnected from the slat (AMM 27-81-00/201, Manually Extend and Retract the Leading Edge Slats without Airplane Power). (Fig. 401 and Fig. 402).

S 024-057

**CAUTION:** DO NOT OPERATE THE SLATS WITH THE SUPPORT/ATTACHMENT BRACKETS DOWN (LOOSE AT ONE END) IF THE CONTROL ROD DOOR (ACTUATOR SEAL DOOR) IS REMOVED. MAKE SURE YOU HAVE THE SUPPORT/ATTACHMENT BRACKETS UP (OUT OF THE WAY) . IMPACT DAMAGE TO THE FIXED SPLICE PLATE ON THE LEADING EDGE LOWER SURFACE CAN OCCUR.

- (6) Disconnect the slat control rods (1) from the slat (3) (View A-A, Fig. 401).

**NOTE:** Do not change the length of the slat control rod when you disconnect the rod. Keep the door attached to the rod (1) in the same position.

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S 034-024

- (7) Disconnect the bolt (12) and remove the roller bearing (17) from each of the two auxiliary tracks (11). Keep all disassembled parts together.

**NOTE:** This will disconnect the auxiliary track arms (10) from the auxiliary tracks (11) (View B-B, Fig. 401).

S 034-098

**CAUTION:** DO NOT LET THE SLAT TO FALL FREE FORWARD WHEN YOU DISCONNECT THE SLAT FROM THE FORWARD END OF THE MAIN TRACK. DAMAGE TO THE BRACKET OF THE SLAT SKEW SENSOR SWITCH INSTALLED ON MAIN TRACK AND TO THE WING FRONT SPAR CAN OCCUR.

- (8) Disconnect the outboard slat (3) from the main track at two locations (View B, Fig. 402).

S 024-064

- (9) Remove seal and retainer attached to the inboard end of slat which overlap the adjacent slat.

S 024-091

- (10) Remove seal and retainer attached to the slat located outboard of the slat to be removed.

S 024-026

- (11) Remove the outboard slat (3) from the airplane.

S 024-027

- (12) Remove the thermal anti-ice duct from the outboard slat.

S 864-079

- (13) If independent movement of left and right wing slat drive systems is necessary for other maintenance tasks before slat(s) are installed back in their original positions, do the steps that follow:
- (a) Remove control rods and doors at locations where slats were removed, if stayed attached to actuator.
  - (b) Identify all parts to permit installation at their original locations later.
  - (c) Measure retract overtravel stop clearances at all outboard slat actuators (AMM 27-81-20/201).
  - (d) Adjust extend and retract overtravel stop clearances if clearances are not within specified range (0.02 to 0.13 inch (0.50-3.3 mm) for retract and 0.08 inch (2.03 mm) minimum for extend) (AMM 27-81-20/201).
  - (e) Record retract overtravel stop clearances at inboard actuator arms on slats 5 and 8 for use in later steps.

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- (f) Get access to the right side-of-body angle gearbox for the outboard slats (AMM 27-81-16/401).
- (g) Put a temporary witness mark on the torque tube coupling and the torque tube shaft at the inboard end of each side of body angle gearbox for later alignment.
- (h) Put temporary witness marks on a tooth of the spline coupling and the mating spline root on the output shaft of the side-of-body angle gearbox.
- (i) Get access to the left side-of-body angle gearbox for the outboard slats (AMM 27-81-16/401).
- (j) Put a temporary witness mark on the torque tube coupling and the torque tube shaft at the inboard end of each side of body angle gearbox for later alignment.
- (k) Put temporary witness marks on a tooth of the spline coupling and the mating spline root on the output shaft of the side-of-body angle gearbox.
- (l) Install supports under all outboard slats to prevent sudden extension after torque tubes are disconnected.

**CAUTION:** DO NOT ADJUST/REPLACE AUXILIARY OR MAIN TRACKS UNTIL THIS TASK IS COMPLETED. THIS CAN CAUSE DAMAGE TO THE SLATS AND FIXED LEADING EDGE.

- (m) Remove safety wiring on torque tube couplings and disassemble torque tube joints on inboard side of left and right side-of-body angle gear boxes (AMM 27-81-24/401).

**NOTE:** Do not operate PDU and do not disconnect other torque tubes until this task is completed. If you do, slat drive system adjustment will be necessary.

**CAUTION:** DO NOT USE A NUT RUNNER OF HIGHER CAPACITY. OFFSET GEARBOXES AND ROTARY ACTUATORS WILL HAVE TO BE OVERHAULED IF A LARGER NUT RUNNER IS USED AND THE ACTUATOR ARM MAKES CONTACT WITH ANY OVERTRAVEL STOP.

- (n) Operate manually the slat drive systems on left and right wing separately as needed with a 180 inch-pound (20.3 newton-meters) nut runner and torque tube spline adapter (AMM 27-81-00/201, " Manually Extend and Retract the Leading Edge Slats").

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TASK 27-81-02-424-028

3. Install the Outboard Leading Edge Slat

NOTE: The wear limit inspection for the components used in this procedure are given in AMM 27-81-02/601.

A. Equipment

- (1) Sling Equipment, Leading Edge Slats - A27017-41
  - (a) Outboard Slat Arm - A27017-3
- (2) Circuit Breaker Lockout Clip,  
(Commercially Available).
- (3) Rigging Spacers from Spacer Kit - A27023-22:
  - (a) Outboard Slat Rigging Spacer - A27023-19  
(1 Spacer for Each Slat Hinge, 2 Spacers  
for each slat assembly)
  - (b) Torque Tube Spline Adapter

B. Consumable Materials

- (1) C00259 Primer - BMS 10-11, Type 1
- (2) D00633 Grease - BMS 3-33 (Preferred)
- (3) D00013 Grease - MIL-PRF-23827 (Alternate)
- (4) D00015 Grease - BMS 3-24 (Alternate)

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C. Parts

AMM		NOMENCLATURE	AIPC			
FIG	ITEM		SUBJECT	FIG	ITEM	
401	3	Slat (No. 1)	27-81-02	01	620-629	
			27-81-02	02	400	
		Slat (No. 2)	27-81-02	01	470-479	
			27-81-02	02	385	
		Slat (No. 3)	27-81-02	01	310-314	
			27-81-02	02	375	
		Slat (No. 4)	27-81-02	01	205-210	
			27-81-02	02	365	
		Slat (No. 5)	27-81-02	01	94-99	
			27-81-02	02	350	
		Slat (No. 8)	27-81-02	01	100-106	
			27-81-02	02	355	
		Slat (No. 9)	27-81-02	01	211-220	
	27-81-02	02	370			
	15	Slat (No. 10)	27-81-02	01	315-319	
		Slat (No. 11)	27-81-02	02	380	
		Slat (No. 11)	27-81-02	01	480-486	
		Slat (No. 11)	27-81-02	02	390	
		Slat (No. 12)	27-81-02	01	630-635	
		Cotter Pin	27-81-02	02	400	
			27-81-01	05	8	
			27-81-02	01	29,31	
			27-81-02	02	30,35,	
					50	
402		12	Cotter Pin	27-81-01	05	8
				27-81-02	01	29,31
				27-81-02	02	30,35,
				50		

D. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-81-00/201 Leading Edge Slat - Maintenance Practice
- (4) AMM 27-81-02/501, Outboard Leading Edge Slat
- (5) AMM 27-81-02/601 Outboard Leading Edge - Inspection/Check
- (6) AMM 27-81-16/401 Leading Edge Slat Drive Side-of-Body Angle Gearbox - Removal/installation.
- (7) AMM 27-81-20/201 LE Slat Drive Rotary Actuator and Offset Gearbox - Maintenance Practice
- (8) AMM 27-81-24/401 Leading Edge Slat Torque Tube - Removal/Installation
- (9) AMM 27-88-01/201, Leading Edge Slat Sensor Switches
- (10) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

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- (11) AMM 30-11-05/401, Telescoping Duct
- (12) AMM 30-11-06/401, Interstitial Duct
- (13) AMM 32-00-15/201, Landing Gear Door Locks
- (14) AMM 78-31-00/201, Thrust Reverser System

E. Access

(1) Location Zones

211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
520/620	Wing Leading Edge - Outboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panel

511BB	LE Slat Power Drive Unit - Outboard (Left)
-------	--

F. Install the Outboard Leading Edge Slats

S 294-118

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 864-097

- (2) If you install the same removed outboard slat, rigging of the slats is not necessary when these occur:
  - (a) The auxiliary track adjustments have not been changed.
  - (b) The auxiliary arms have not been removed from the slat.
  - (c) The slat and/or auxiliary arm hardware have not been repaired, modified, adjusted or replaced.

S 864-080

- (3) If the optional procedure for independent operation of left and right wing slat drive systems was used, do the steps that follow to install slat(s):
  - (a) Install metallic shim of exact thickness of the retract overtravel stop clearances recorded earlier in the steps for independent operation of left and right wing drive systems (Outboard Leading Edge Slat - Removal):
    - 1) Put metallic shim on the retract overtravel stop of the actuator arm (inboard actuator for slat 5 on left wing, and inboard actuator for slat 8 on right wing).

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**CAUTION:** DO NOT USE A NUT RUNNER OF HIGHER CAPACITY. OFFSET GEARBOXES AND ROTARY ACTUATORS WILL HAVE TO BE OVERHAULED IF A LARGER NUT RUNNER IS USED AND THE ACTUATOR ARM MAKES CONTACT WITH ANY OVERTRAVEL STOP.

- (b) Retract drive system on each wing (AMM 27-81-00/201, "Manually extend and Retract the Leading Edge Slats) with the steps that follow:
  - 1) Use a 180 inch-pound (20.3 newton-meters) nut runner and drive system in the retract direction until shim on arm makes contact with retract overtravel stop.
  - 2) Let drive system relax for 1 minute.
- (c) Align witness mark on torque tube coupling with the mark on the torque tube shaft and engage spline of coupling with spline of torque tube.
- (d) Rotate shaft of left and right side-of-body angle gearbox up to 1/2 turn until marked spline root on gearbox shaft lines up with the marked spline tooth on the torque tube coupling.
- (e) Connect torque tubes to side-of-body angle gearboxes (left and right) (AMM 27-81-24/401).
- (f) Extend slat drive system by hydraulic or electric mode using PDU (AMM 27-81-24/401).
- (g) Remove metallic shim from actuator arm on slats 5 and 8.
- (h) Make sure retract overtravel stop clearances (inboard actuators at slats 5 and 8) are within +/- 0.001 inch (+/- 0.025 mm) from the values that you recorded earlier in the steps for independent operation of left and right wing drive systems (Outboard Leading Edge Slat - Removal).
- (i) Adjust overtravel stop clearances (extend and retract) on actuators if any one of the clearances is out of tolerance (AMM 27-81-20/201).

S 424-029

- (4) Install the thermal anti-ice duct in the outboard slat.

S 494-030

**CAUTION:** BE CAREFUL WHEN YOU INSTALL THE SLING EQUIPMENT TO THE SLAT. DAMAGE CAN OCCUR ON THE POLISHED EXTERNAL SKIN.

- (5) Install the sling equipment on the outboard slat (Fig. 403).

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S 434-031

- (6) Connect the outboard slat (3) to the two main tracks with these steps (Detail B, Fig. 402):
- (a) Apply BMS 3-24 grease to the bolt, washers, and bushing.

NOTE: Remove all grease from the bolt threads immediately before installing nut or incorrect torque setting will occur.

- (b) Connect the main track to the slat using these parts, in the sequence that follows:
- bushing (7)
  - washer (8) (under the bolt head)
  - bolt (9) (bolt head pointed inboard)
  - washer (10) (under the nut)
  - nut (11)

- (c) Tighten the nut to the torque value at these locations as applicable:

- 1) At slat No. 1 or 12, tighten the nut to 270-350 pound-inches (30.5-39.5 newton-meters).
- 2) At slat No. 2 or 11, tighten the nut to 290-510 pound-inches (32.8-57.6 newton-meters).
- 3) At slat No. 3, 4, 5, 8, 9, or 10, tighten the nut to 480-850 pound-inches (54.3-96.0 newton-meters).

- (d) Install a cotter pin to the nut at each main track connection (AMM 20-10-23/401).

NOTE: Install the pin with the head parallel to the slot in the nut. The cotter pin eyes must be seated firmly so there is minimum axial movement of the pin after installation. The recommended method shown in Fig. 402 must be used whenever possible to reduce the potential for snags which could cause a damage by the cotter pin coming into contact with the leading edge slat. The optional method shown in Fig./402 is technically acceptable and can be used when the recommended method is not practical or access is limited.

S 984-032

- (7) Manually push the slat (3) to the fully retracted position.

S 984-033

- (8) Manually extend the slat (3) forward 3 to 4 inches (76.2-101.6 mm), until the holes in the aft end of the auxiliary arms (10) align with the slots in the auxiliary tracks (11) (Detail C, Fig. 401).

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S 434-115

- (9) Connect the auxiliary track arm (10) to the auxiliary track (11) with these steps at two locations (View B-B, Fig. 401):
- (a) Apply BMS 3-33 grease to the bolt and the roller bearing.

NOTE: Remove all grease from the bolt threads immediately before installing nut or incorrect torque setting will occur.

AMM 12-21-08/301 shows a procedure for the lubrication of the roller bearing installed with the solid bolt (without grease fitting).

CAUTION: THE TARGET WASHERS HAVE DIFFERENT PROFILES. TARGET WASHERS ARE NOT INTERCHANGEABLE. INSTALLATION OF TARGET WASHERS DEPEND ON LOCATION AND INCORRECT PART NUMBER INSTALLATION CAN CAUSE NUISANCE INDICATIONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (b) Install the roller bearing (17), bolt (12), target washer (13), washer (16), and nut (14).

NOTE: Install the bolt head and the target washer on the inboard side of the connection.

NOTE: Service Letter 27-83 recommends reduction of sensor target gaps to prevent nuisance indications (LE SLAT ASYM EICAS message, LE light illumination, take off configuration warning flaps, or stick shaker activation).

- (c) Tighten the nut to 30-50 pound-inches (3.4-5.6 newton-meters).  
(d) Install the cotter pin (15) at the nut (14).

S 094-035

- (10) Remove the sling equipment from the outboard slat (Fig. 403).

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S 424-058

**CAUTION:** DO NOT OPERATE THE SLATS WITH THE SUPPORT/ATTACHMENT BRACKETS DOWN (LOOSE AT ONE END) IF THE CONTROL ROD DOOR (ACTUATOR SEAL DOOR) IS REMOVED. MAKE SURE YOU HAVE THE SUPPORT/ATTACHMENT BRACKETS UP (OUT OF THE WAY). IMPACT DAMAGE TO THE FIXED SPLICE PLATE ON THE LEADING EDGE LOWER SURFACE CAN OCCUR.

- (11) Attach the slat control rod (1) to the slat lugs (4) on the outboard slat (3) at two locations (View A-A, Fig. 401):

**NOTE:** Do not change the length of the slat control rods (1). Do not change the position of the door that is attached to the slat control rod (1).

- (a) Tighten the nut (8) to 130-200 pound-inches (14.7-22.5 newton-meters).

S 424-065

- (12) Install seal and retainer on the inboard end of slat which overlap the adjacent slat

S 824-037

- (13) Adjust the slat tabs at the main and auxiliary tracks to the down position to prevent damage when you retract the slats.

S 824-038

- (14) If you installed the same outboard slat that you removed, do these steps:
- (a) Do a test of the leading edge slat sensor switch (AMM 27-88-01/201).
- (b) Do an adjustment of the outboard slat if it is necessary (AMM 27-81-02/501).

S 824-039

- (15) If you installed a new outboard slat (or a new part numbered slat with new wedge), do these adjustments:
- (a) Do the adjustment for the Outboard slat (AMM 27-81-02/501).

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- (b) Install and adjust the sensor switch targets on the new auxiliary track arms (AMM 27-88-01/201).

S 424-040

- (16) If you installed slat No. 5 or 8, install the telescoping duct for the thermal anti-ice system. Do not "Put the Airplane Back to its Usual Condition per AMM 27-81-00/201" as called out in AMM 30-11-05/401.

S 434-041

- (17) Connect the interstitial ducts for the thermal anti-ice system to the adjacent slats (AMM 30-11-06/401).

NOTE: Keep slats fully extended for the tasks that follow.

S 864-093

- (18) Make sure the flaps and slats are in the fully extended position.

S 864-094

- (19) Make sure the flap control lever is in the 30-unit detent.

S 424-070

- (20) Install the outboard slat sensor switches, if removed (AMM 27-88-01/201).

NOTE: Keep slats fully extended for the task that follow.

S 864-082

- (21) Make sure the groundlocks are not installed on the inboard and outboard slat PDUs.

S 094-083

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

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S 294-120

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

(23) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 424-121

**CAUTION:** MAKE SURE THAT THE DOWNSTOP SPACERS ARE INSTALLED CORRECTLY AND THE NUT HAS THE CORRECT TORQUE. IF THEY ARE NOT, THE MAIN TRACK/STRUCTURE JOINT CAN BECOME LOOSE. THE DOWNSTOP PARTS CAN DISCONNECT AND CAN CAUSE DAMAGE TO THE SLAT TRACK HOUSING.

(24) Make sure the parts of the downstop assembly are installed correctly and the nut has the correct torque (IPC 27-81-12-10/-10B).

S 864-084

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE FLAPS AND SLATS IN THE STEP THAT FOLLOWS. THE INBOARD AND OUTBOARD SLATS WILL MOVE TO THE POSITION SHOWN ON THE FLAP CONTROL LEVER WHEN THE CENTER HYDRAULIC SYSTEM IS PRESSURIZED. THE ACCIDENTAL MOVEMENT OF THE SLATS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(25) Pressurize the center hydraulic system (AMM 29-11-00/201).

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S 864-085

- (26) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted position, and that the position of the flaps and slats agree with the position of the flap control lever.

S 864-086

- (27) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

G. Put the Airplane Back to Its Usual Condition

S 864-042

- (1) Remove the circuit breaker locks and close these circuit breakers on the overhead panel, P11:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD

S 864-043

- (2) Remove the circuit breaker locks and close these circuit breakers on the main power distribution panel, P6:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 864-044

- (3) Push the arming switch for the slat alternate drive on the first officer's main instrument panel, P3, to disarm the slat alternate drives (ALTN switch light goes off).

S 214-045

- (4) Make sure the amber LEADING EDGE light, on the P3 panel, goes off and the LE SLAT DISAGREE message does not show on the EICAS display.

S 214-046

- (5) Make sure the position selector switch, on the P3 panel, for the flap/slat alternate drive is in the NORM detent.

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S 094-047  
(6) Remove the DO-NOT-OPERATE tag from the position selector switch.

S 084-059  
(7) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 414-048  
(8) Install the fixed lower LE access panels if removed  
(AMM 06-44-00/201).

S 094-049

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS.  
THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO  
PERSONS OR DAMAGE TO EQUIPMENT.

(9) Remove the door locks from the landing gear doors and close the  
doors (AMM 32-00-15/201).

S 444-050  
(10) Do the activation procedure for the thrust reverser  
(AMM 78-31-00/201).

S 864-055  
(11) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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OUTBOARD LEADING EDGE SLAT - ADJUSTMENT/TEST

1. General

- A. This procedure contains the adjustment and test tasks for the outboard leading edge (LE) slats.
- (1) If you install the same removed outboard slat, rigging of the slats is not necessary when these occur:
    - (a) The auxiliary track adjustments have not been changed.
    - (b) The auxiliary arms have not been removed from the slat.
    - (c) The slat and/or auxiliary arm hardware have not been repaired, modified, adjusted or replaced.
- B. The leading edge slats are given the numbers from 1 through 12, from the left wing to the right wing. This procedure contains the adjustment and test steps for slats No. 1 through No. 5, and No. 8 through No. 12. The leading edge slat adjustment is done in production with the airplane in the "rigging" position, that is on jigs. This position, with no engines installed and no weight to account for fuel load, best represents the in-flight configuration of the wing. This "unloaded" configuration is the best on the "ground" configuration for setting the fair of the slats. However, it is also acceptable to do the slat adjustment with the airplane in the loaded condition (with fuel and engines installed) since the weight factor has no effect on the slat adjustment.

TASK 27-81-02-825-001

2. Outboard Leading Edge Slat - Adjustment

A. Equipment

- (1) Rigging Spacers from Spacer Kit - A27023-22:
  - (a) Outboard Slat Rigging Spacer - A27023-19  
(2 necessary)
- (2) Rig Pin from Set A20004-XX (Ref 20-10-24):
  - (a) LE8 - P/N A20004-6
- (3) LE Slat Groundlock - A27007-1 (2 Necessary)
- (4) TE Flap PDU Lock - A27009-7
- (5) Circuit Breaker Lockout Clip (2 necessary)  
Commercially available
- (6) Rigging Gage (Outboard LE Slat) - A27089-9
- (7) Shim, 0.075 ±0.003 inch (1.90 +/- 0.076 mm) thick
- (8) Rivet - BACR15FT5AD (2 Necessary)

B. Parts

EFFECTIVITY

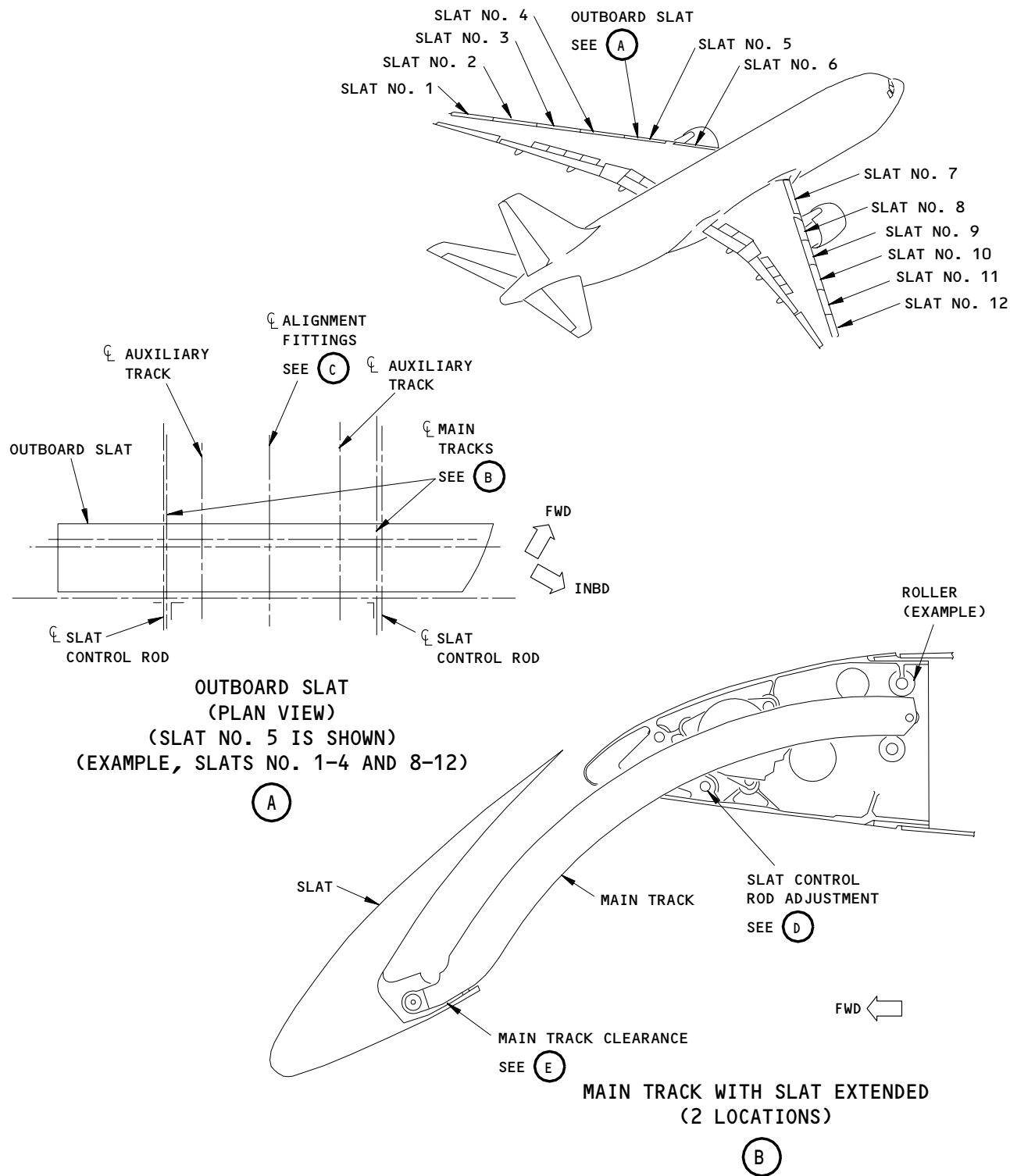
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**BOEING**  
767  
MAINTENANCE MANUAL



Main Tracks and Alignment Fittings for the Outboard Slat  
Figure 501 (Sheet 1)

EFFECTIVITY

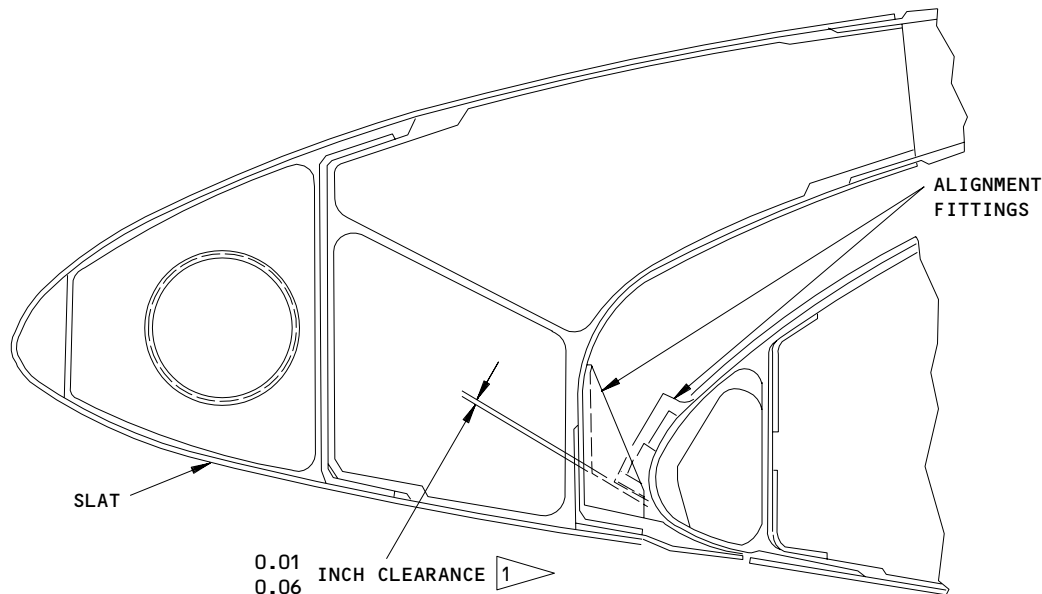
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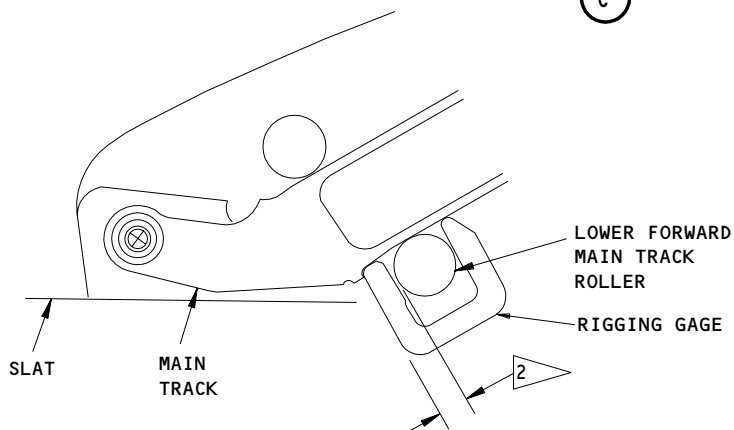
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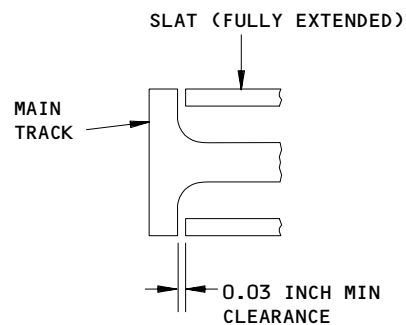
ALIGNMENT FITTINGS

(C)



SLAT CONTROL ROD ADJUSTMENT  
(SLAT SHOWN FULLY RETRACTED)

(D)



MAIN TRACK CLEARANCE

(E)

1 ADD WASHERS AS NECESSARY TO GET THE CLEARANCE SHOWN

2 0.480 TO 0.580 INCH RIGGING CLEARANCE WHEN USING THE TOOLKIT A27089-9 (-2 GAGE). 0.610 TO 0.710 INCH RIGGING CLEARANCE WHEN USING THE TOOLKIT A27089-9 (-11 GAGE). BEFORE TRACK REPLACEMENT USE THE TOOL KIT A27089-9 (-2 GAGE) FOR SLATS 1 THRU 5 AND 8 THRU 12. AFTER TRACK REPLACEMENT USE THE TOOLKIT A27089-9 (-11 GAGE) FOR SLATS 2 THRU 5 AND 8 THRU 11. USE THE TOOLKIT A27089-9 (-2 GAGE) FOR SLATS 1 AND 12.

Main Tracks and Alignment Fittings for the Outboard Slat  
Figure 501 (Sheet 2)

EFFECTIVITY

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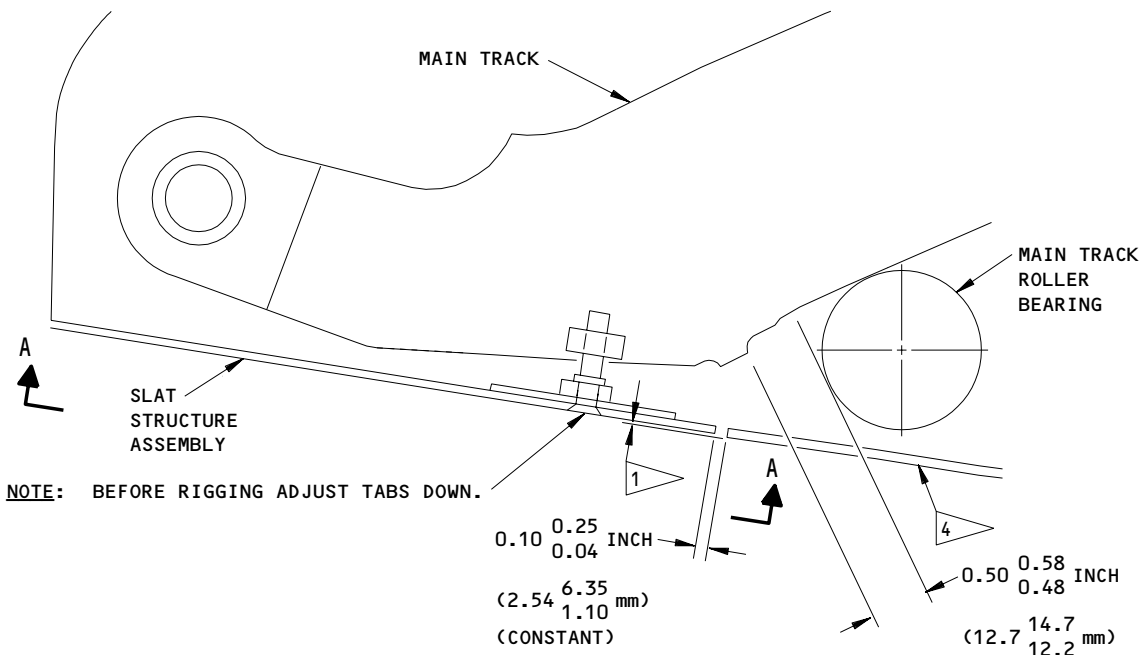
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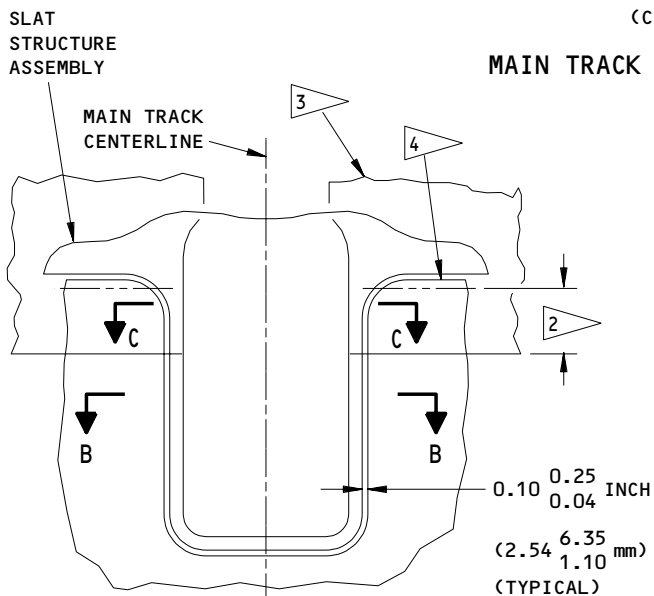
Page 503  
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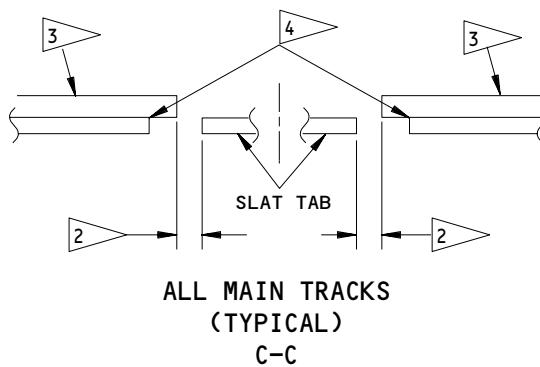
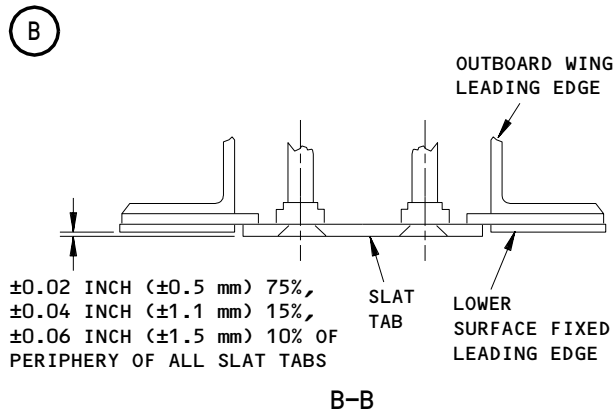




MAIN TRACK WITH SLAT RETRACTED



(ROTATED CLOCKWISE VIEW TYPICAL AT ALL MAIN TRACKS AND AUXILIARY TRACKS)  
A-A

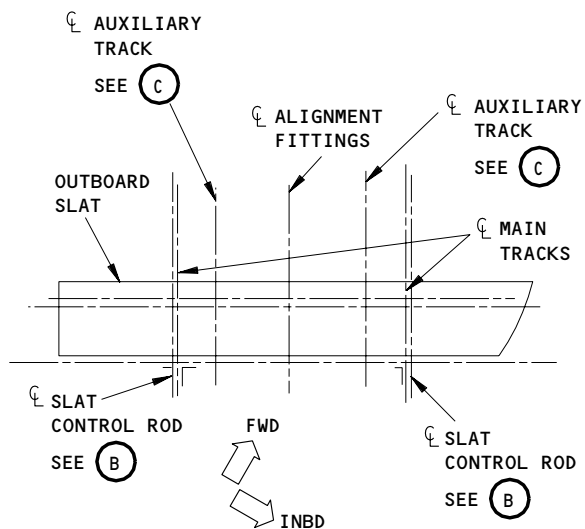
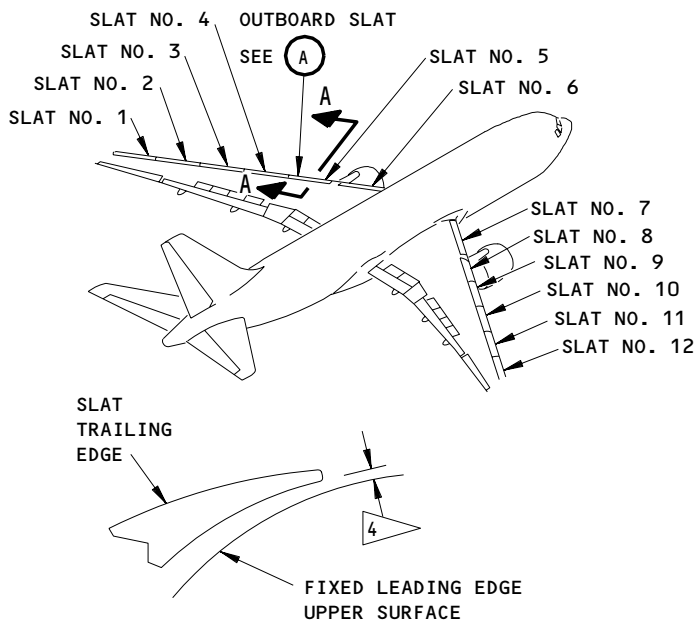


- 1  $\pm 0.06$  INCH ( $\pm 1.5$  mm) ALLOWABLE MISMATCH 10% OF SPAN  
 $\pm 0.04$  INCH ( $\pm 1.1$  mm) ALLOWABLE MISMATCH 15% OF SPAN  
 $\pm 0.02$  INCH ( $\pm 0.5$  mm) ALLOWABLE MISMATCH 75% OF SPAN
- 2 A 0.040 INCH (1.1 mm) MAXIMUM CLEARANCE BETWEEN THE SLAT TAB AND LEADING EDGE PANEL IS PERMITTED ON ONE SIDE ONLY (INBOARD OR OUTBOARD)
- 3 OUTBOARD WING UPPER FIXED LE SKIN PANEL
- 4 OUTBOARD FIXED LE LOWER PANEL AND BONDED ASSEMBLIES

Main Tracks and Alignment Fittings for the Outboard Slat  
Figure 501 (Sheet 3)

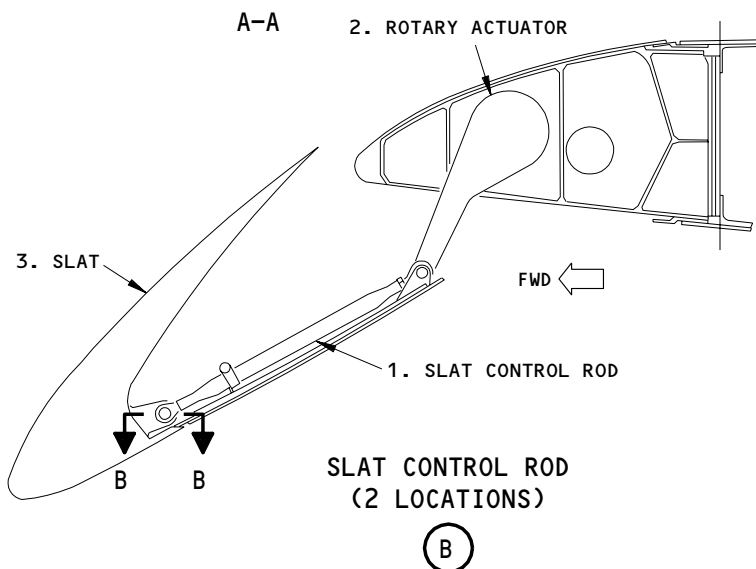
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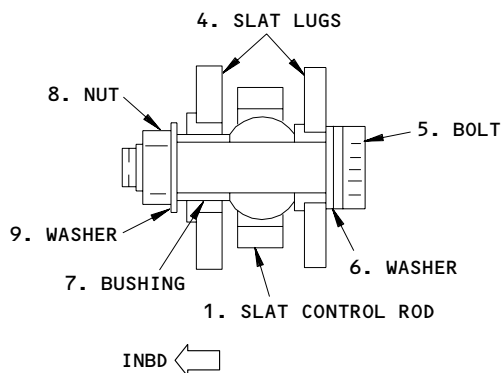
**OUTBOARD SLAT  
(PLAN VIEW)  
(SLAT NO. 5 IS SHOWN)  
(EXAMPLE, SLATS NO. 1-4 AND 8-12)**

A



**SLAT CONTROL ROD  
(2 LOCATIONS)**

B



B-B

1 CAUTION: MAKE SURE THE FORWARD EDGE OF THE FORWARD BRACKET AND THE SHIM ARE ALIGNED WITH THE BRIDGE SUPPORT FITTING DURING AND AFTER ALL EACH ADJUSTMENT. FATIGUE DAMAGE CAN OCCUR IF THESE COMPONENTS ARE NOT ALIGNED.

2 REMOVE THE RIGGING SPACERS AFTER YOU ADJUST THE SLATS.

3 4-HOLE SHIM OR SLOTTED SHIM

4 0.002-0.020 INCH (0.05-0.51 mm) WITH SLATS FULLY RETRACTED ONLY.  
0.002-0.200 INCH (0.05-5.08 mm) WITH SLATS IN THE INTERMEDIATE POSITION ONLY.

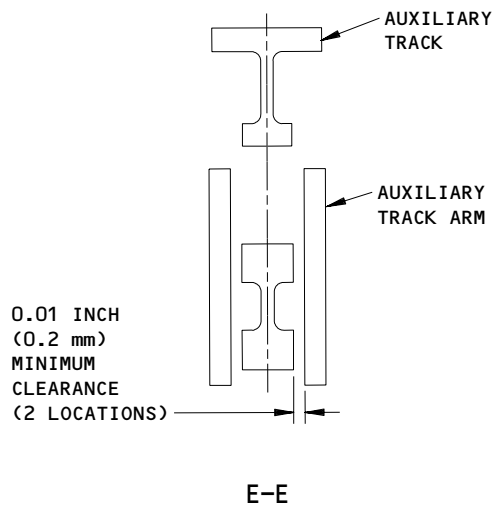
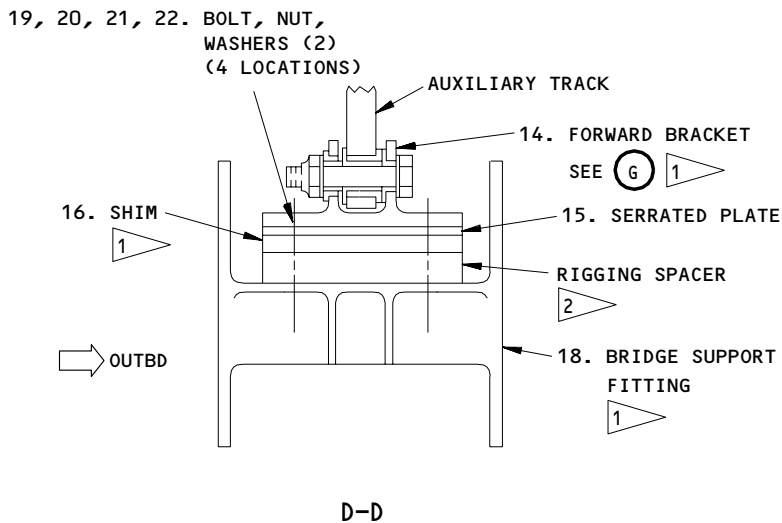
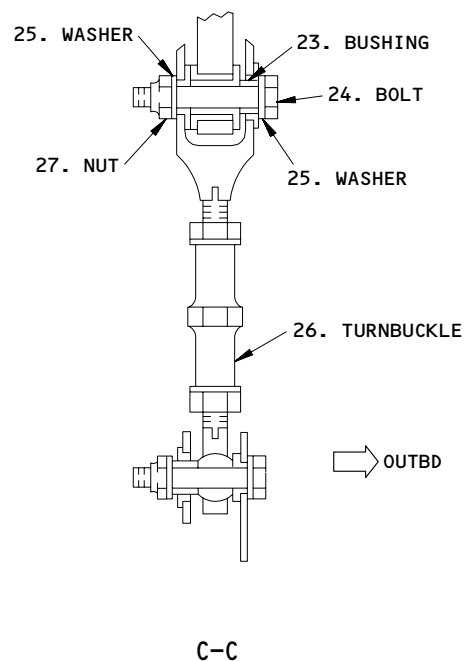
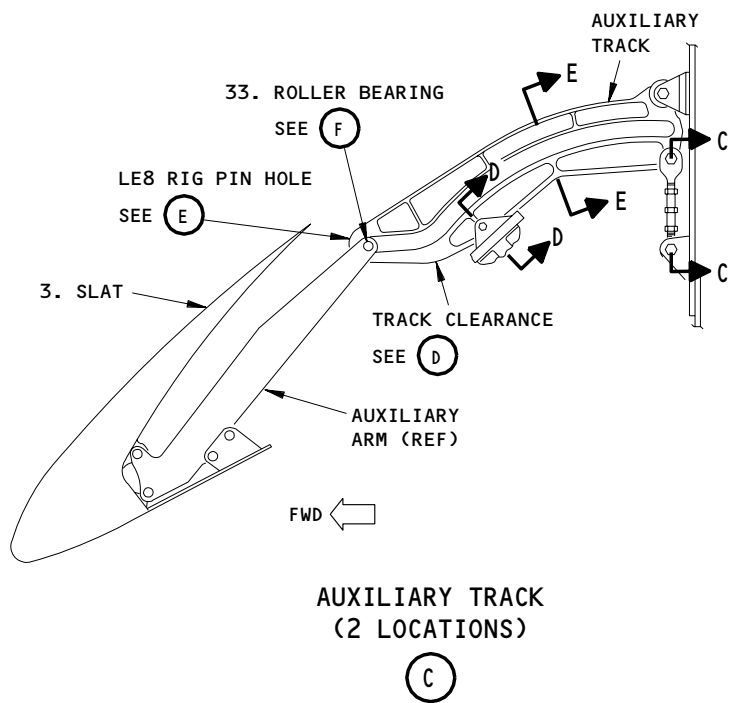
**Slat Control Rods and Auxiliary Tracks  
Figure 502 (Sheet 1)**

EFFECTIVITY	ALL

**27-81-02**

01

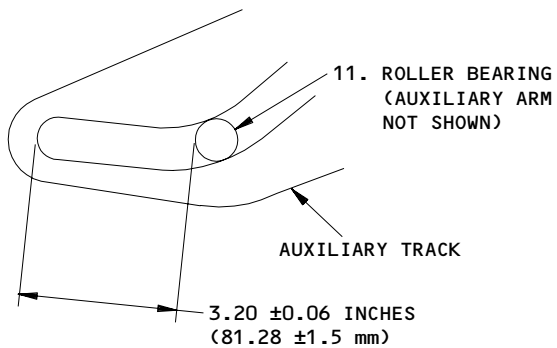
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Slat Control Rods and Auxiliary Tracks  
Figure 502 (Sheet 2)

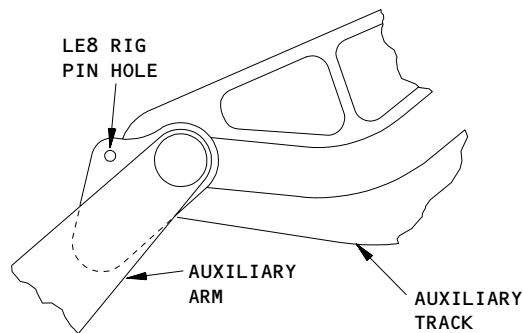
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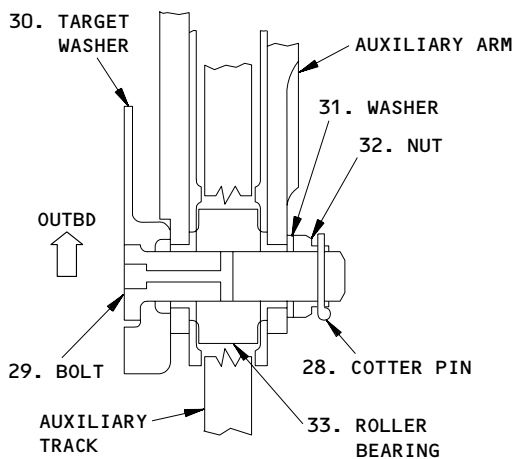
TRACK CLEARANCE

(D)



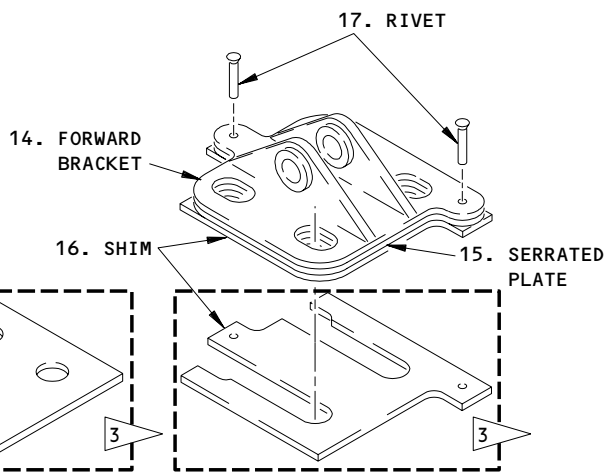
LE8 RIG PIN HOLE

(E)



ROLLER BEARING

(F)



FORWARD BRACKET

(G)

Slat Control Rods and Auxiliary Tracks  
Figure 502 (Sheet 3)

EFFECTIVITY

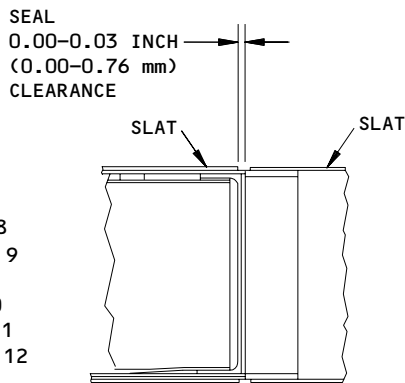
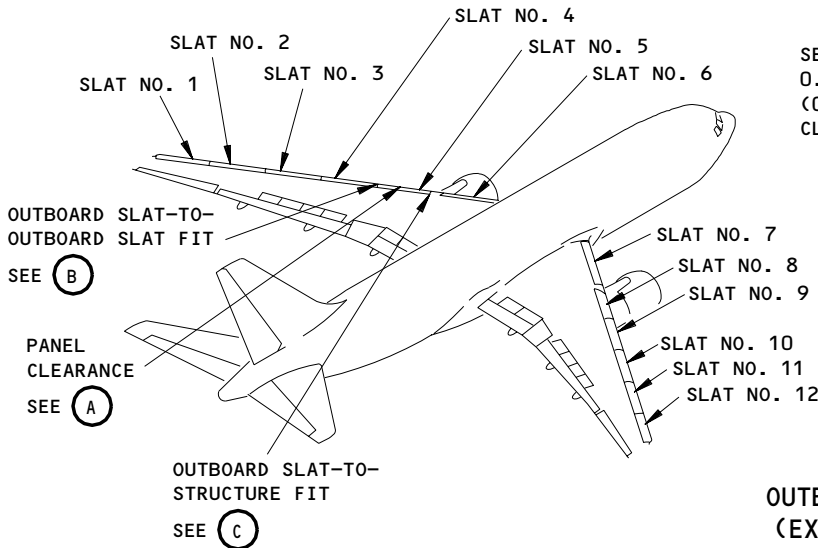
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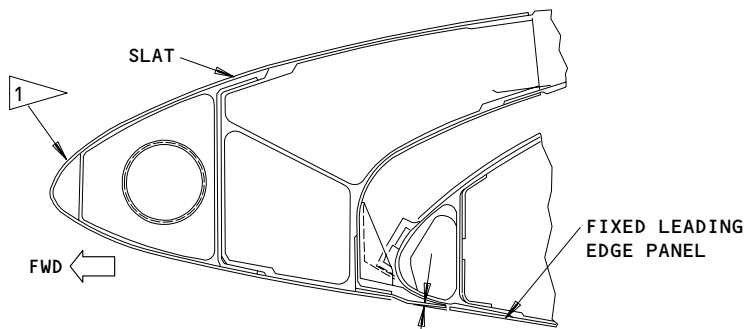
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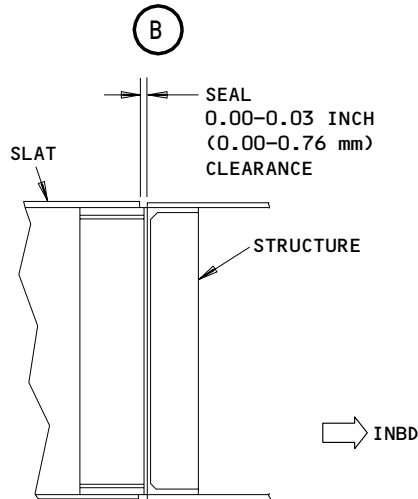


**OUTBOARD SLAT-TO-OUTBOARD SLAT FIT  
(EXAMPLE, SLATS NO. 1-5 AND 8-12)**



$\pm 0.04$  INCH (1.02 mm) MISMATCH PERMITTED AT MAIN TRACK, AUXILIARY TRACK TABS, AND LOWER SLAT TE TO LOWER FIXED LE REMOVABLE PANELS.  
 $\pm 0.06$  INCH (1.52 mm) MISMATCH PERMITTED FOR 5% OF TOTAL SPAN.  
 $\pm 0.08$  INCH (2.03 mm) MISMATCH PERMITTED FOR AN ADDITIONAL 5% OF SPAN.

**PANEL CLEARANCE  
(EXAMPLE, SLATS NO. 1-5 AND 8-12)**



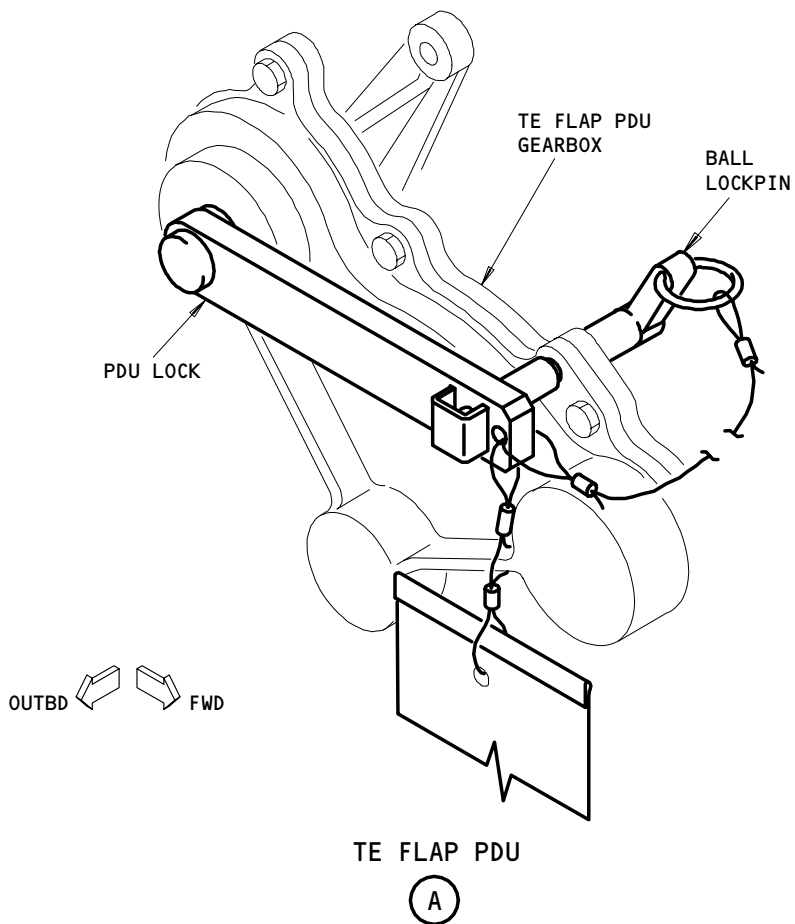
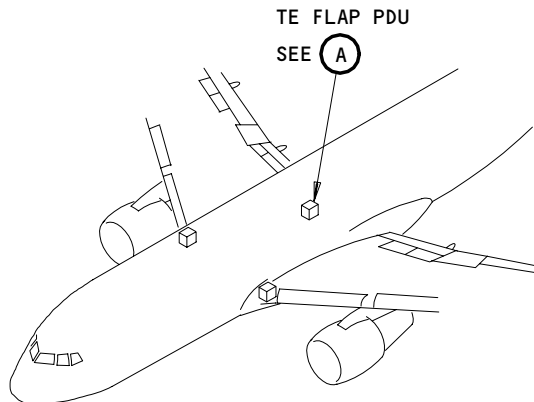
**OUTBOARD SLAT-TO-STRUCTURE FIT  
(EXAMPLE, SLATS NO. 5 AND 8)**

**1** THIS MISMATCH MEASUREMENT IS TAKEN WITH THE SLATS IN THE RETRACTED (CRUISE) POSITION ONLY. MISMATCH OF 0.20 INCH (5.08 mm) MAX PERMITTED BETWEEN THE ADJACENT SLATS AND BETWEEN SLATS NO. 5, NO. 8 AND NACELLE RIB. WHEN THE SLAT-TO-SLAT OR SLAT-TO-NACELLE RIB MISMATCH IS GREATER THAN 0.20 INCH (5.08 mm), IT IS AN INDICATION OF MISRIGGING, DAMAGED PARTS, INCORRECT PARTS, OR WORN PARTS. 0.14 INCH (3.56 mm) MISMATCH PERMITTED BETWEEN ADJACENT SLATS AND BETWEEN SLATS AND NACELLE RIBS ON ALL AIRPLANES. 0.14 INCH (3.56 mm) MISMATCH BETWEEN SLATS 1/12 CASTING AND FIXED LEADING EDGE ON AIRPLANES WITHOUT EXTENDED WING TIPS (STANDARD WING). A SLAT INSTALLATION AND RIGGING MUST HAVE A MISMATCH OF 0.14 INCH (3.56 mm) OR LESS. IF THERE IS A MISMATCH BETWEEN 0.14-0.20 INCH (3.56-5.08 mm) AT MORE THAN 3 OUT OF 10 LOCATIONS BETWEEN THE SLATS OR AT THE NACELLE RIBS, ADJUST THE SLAT AGAIN TO REDUCE THE NUMBER OF LOCATIONS WHERE MISMATCH IS BETWEEN 0.14-0.20 INCH (3.56-5.08 mm) TO 3 LOCATIONS OR LESS. ADJUST THE SLAT CONTROL RODS TO THE DIMENSIONS SHOWN (VIEW D, FIG. 501) TO MINIMIZE THE MISMATCH.

**Outboard Slat Clearance, Mismatch, and Seal Check  
Figure 503**

EFFECTIVITY	ALL
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**27-81-02**



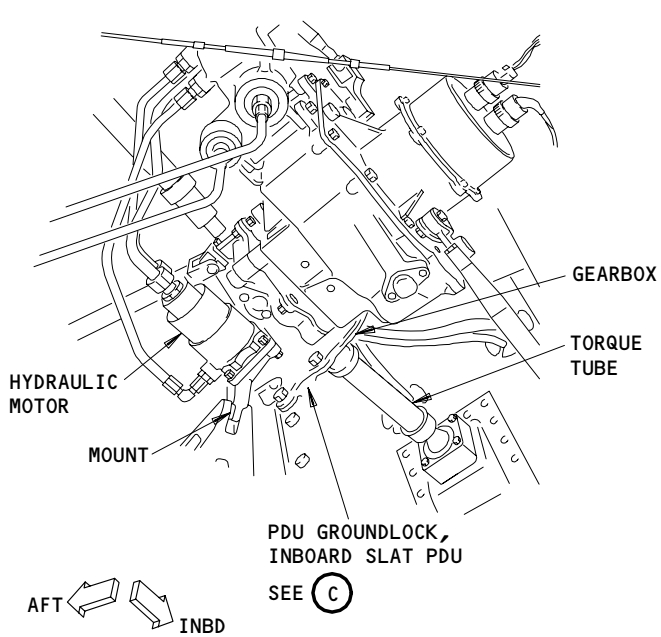
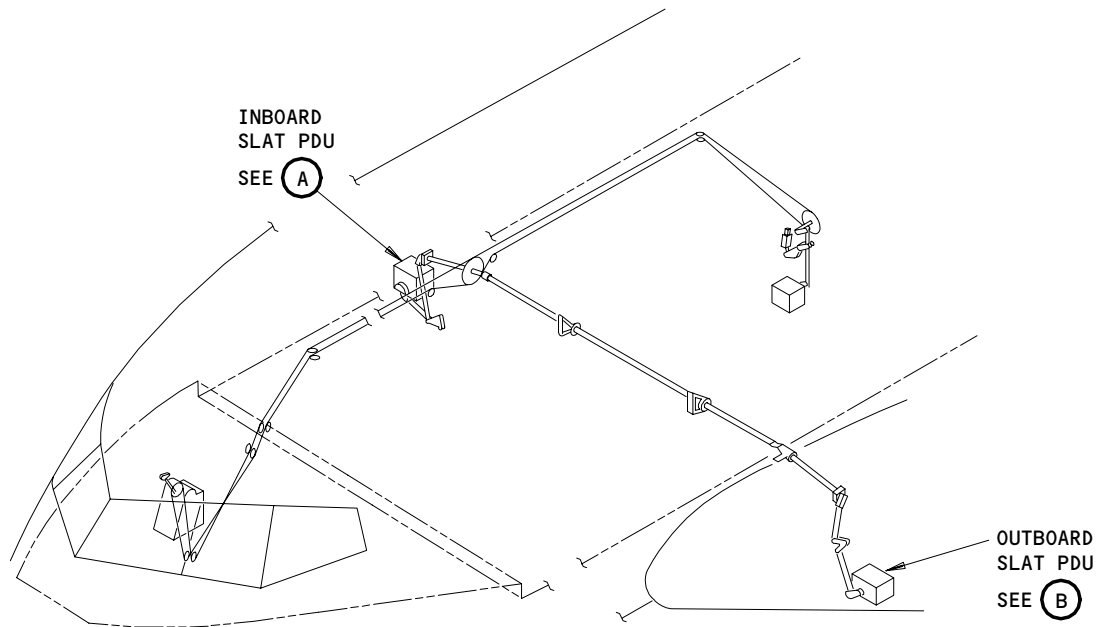
PDU Lock for the TE Flap PDU  
Figure 504

EFFECTIVITY	
	ALL

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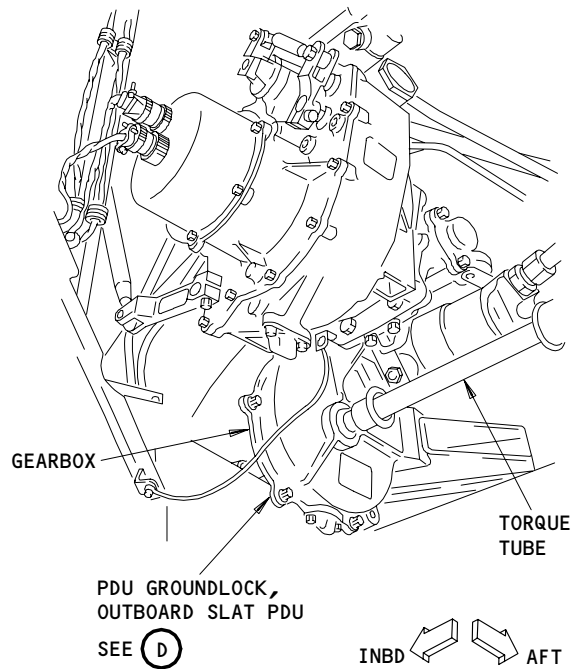
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INBOARD SLAT PDU

(A)



OUTBOARD SLAT PDU

(B)

Slat PDU Groundlock  
Figure 505 (Sheet 1)

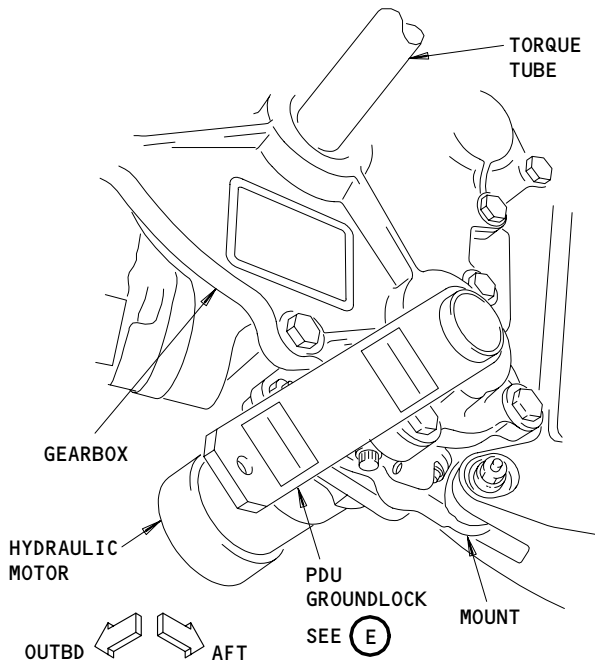
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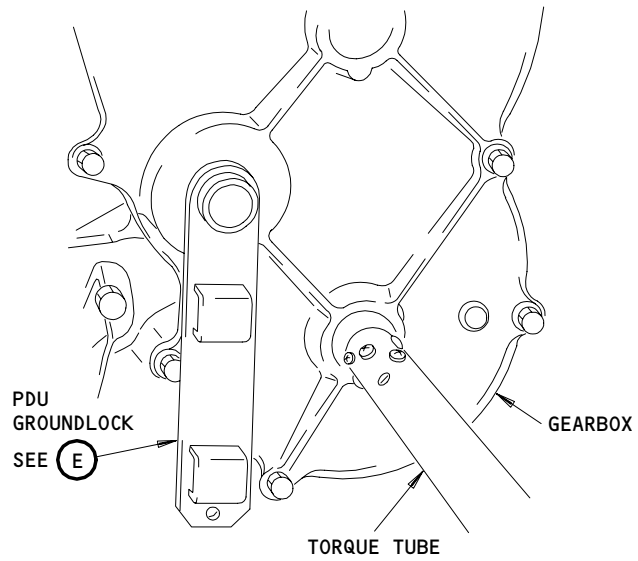
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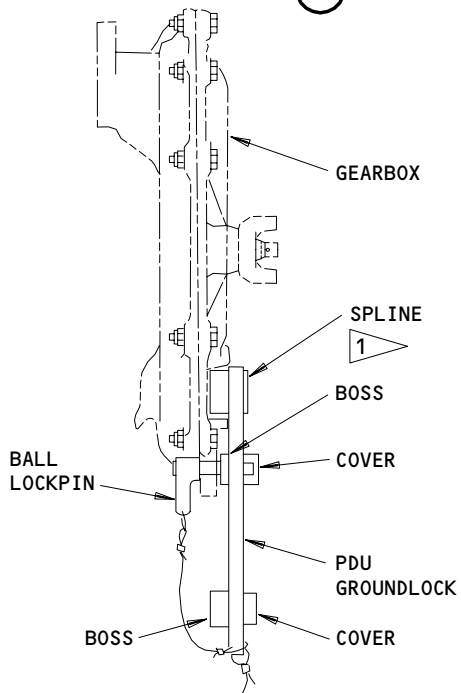
PDU GROUNDLOCK,  
INBOARD SLAT PDU

(C)



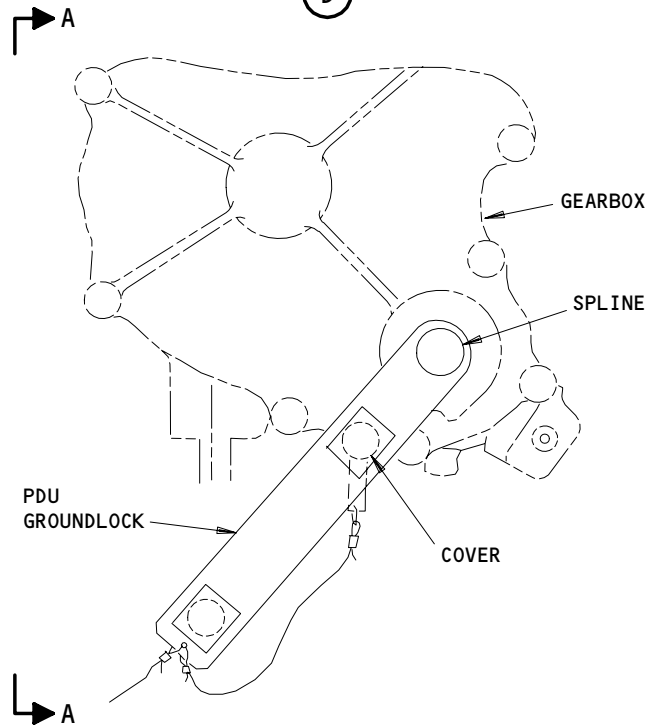
PDU GROUNDLOCK,  
OUTBOARD SLAT PDU

(D)



A-A

1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALLPIN INSTALLED THROUGH THE BOSS AND GEARBOX



PDU GROUNDLOCK  
(EXAMPLE)

(E)

Slat PDU Groundlock  
Figure 505 (Sheet 2)

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AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
502	28	Cotter Pin	27-81-01	05	8
			27-81-02	01	29,31
			27-81-02	02	30,35, 50

C. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 20-10-23/401, Lockwires
- (3) 24-22-00/201, Electrical Power - Control
- (4) 27-81-00/201, Leading Edge Slat System
- (5) 27-81-24/401, Leading Edge Slat Torque Tubes
- (6) 27-88-01/201, Leading Edge Slat Sensor Switches
- (7) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (8) 30-11-06/401, Interstitial Duct
- (9) 32-00-15/201, Landing Gear Door Locks
- (10) 32-00-20/201, Landing Gear Downlocks
- (11) 78-31-00/201, Thrust Reverser System

D. Access

(1) Location Zones

- |         |  |
|---------|--|
| 144     | Right MLG Wheel Well                   |
| 211/212 | Control Cabin                          |
| 410     | No. 1 Power Plant                      |
| 420     | No. 2 Power Plant                      |
| 520/620 | Wing Leading Edge - Outboard           |
| 710     | Nose Landing Gear and Doors            |
| 730/740 | Left/Right Main Landing Gear and Doors |

(2) Access Panels

- |       |  |
|-------|--|
| 511BB | LE Slat Power Drive Unit - Outboard (Left) |
| 611BB | LE Slat Power Drive Unit - Inboard (Right) |

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E. Prepare for the Adjustment

S 295-130

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 215-002

- (2) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 495-003

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the landing gear and install the door locks (Ref 32-00-15).

S 045-004

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (Ref 78-31-00).

S 215-103

**CAUTION:** DO NOT OPERATE THE SLATS WITH THE SUPPORT/ATTACHMENT BRACKETS DOWN (LOOSE AT ONE END) IF THE CONTROL ROD DOOR (ACTUATOR SEAL DOOR) IS REMOVED. MAKE SURE YOU HAVE THE SUPPORT/ATTACHMENT BRACKETS UP (OUT OF THE WAY). IMPACT DAMAGE TO THE FIXED SPLICE PLATE ON THE LEADING EDGE LOWER SURFACE CAN OCCUR.

- (5) Make sure the flaps and slats are fully retracted hydraulically.

S 215-006

- (6) Make sure the flap control lever is in the zero (FLAPS UP) detent.

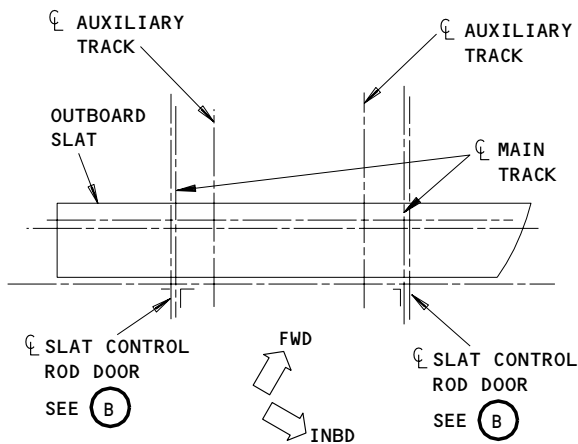
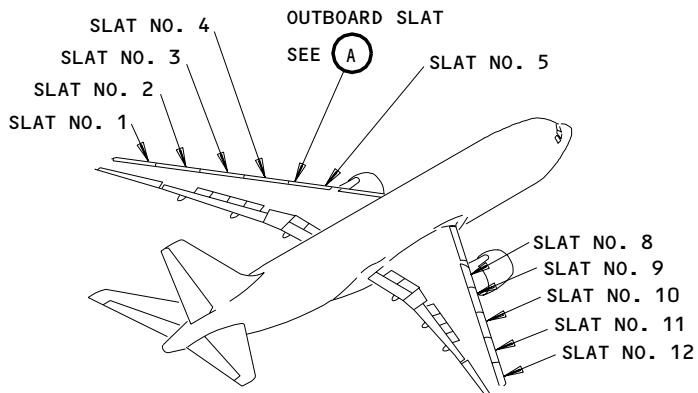
EFFECTIVITY

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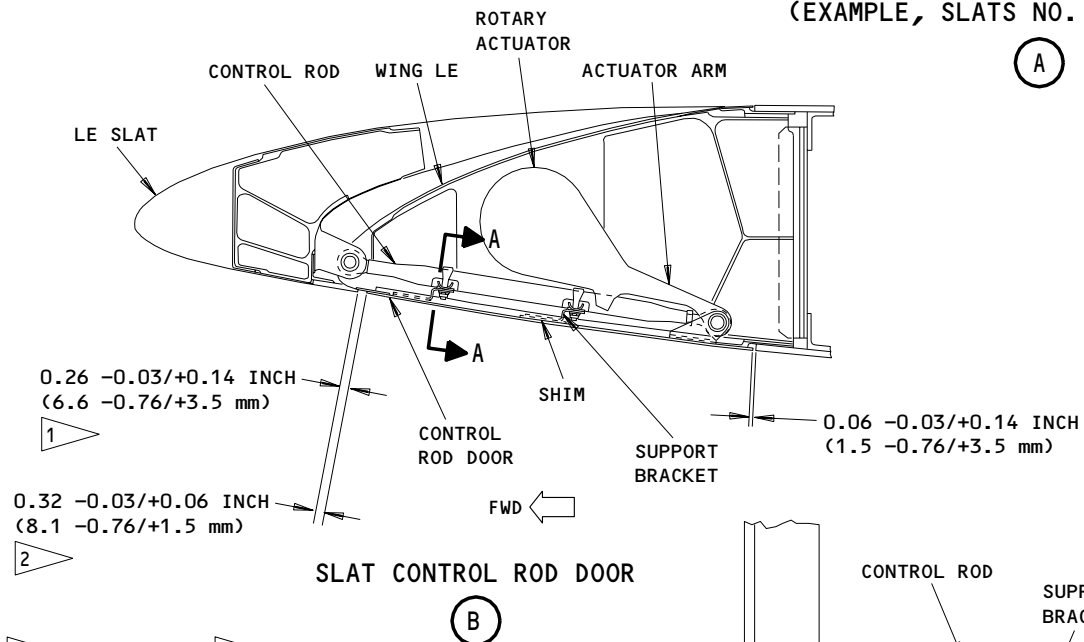
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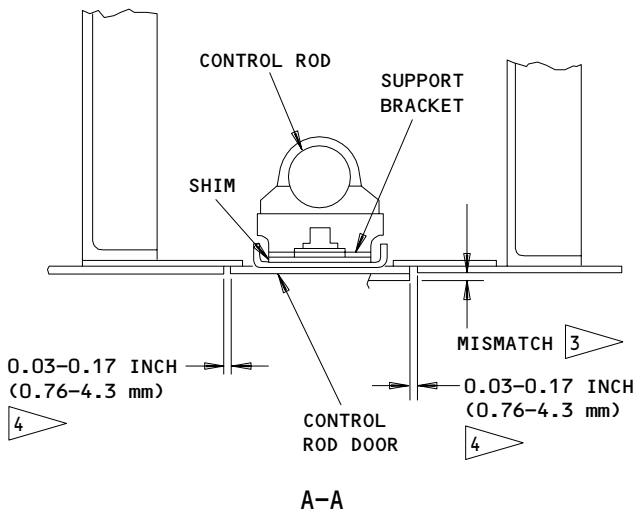
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**OUTBOARD SLAT  
(PLAN VIEW)  
(SLAT NO. 5 IS SHOWN)  
(EXAMPLE, SLATS NO. 1-4 AND 8-12)**



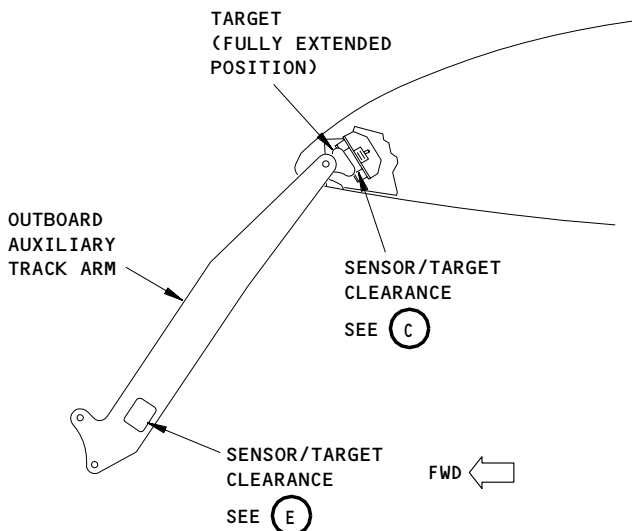
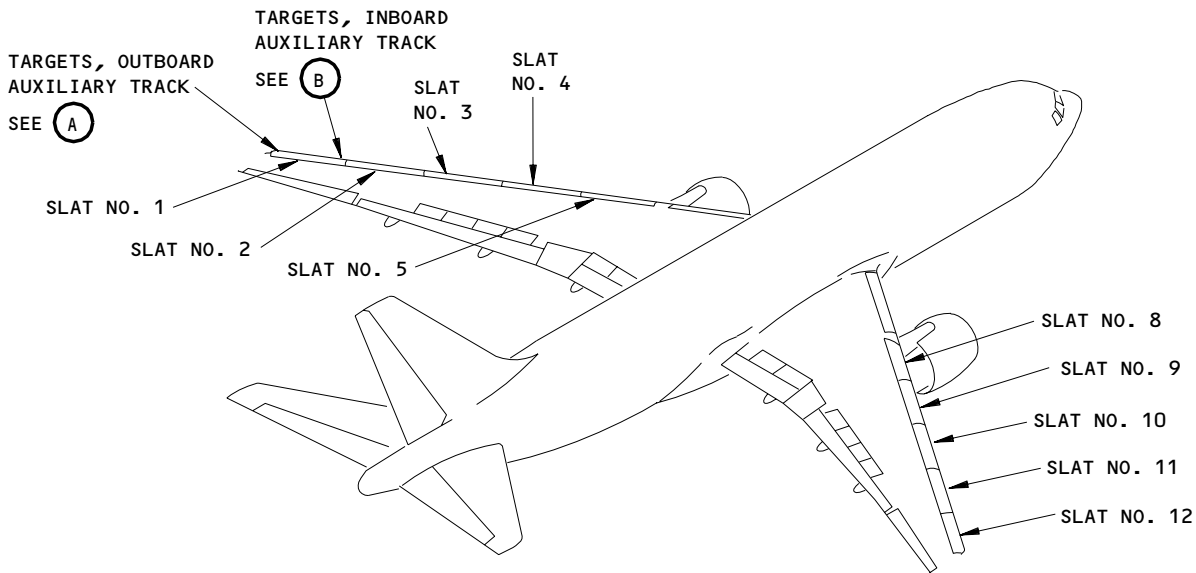
- 1 ALL EXCEPT 2
- 2 INBOARD CONTROL ROD (SLATS 5 AND 8)
- 3 MISMATCH BETWEEN THE DOOR AND THE ADJACENT STRUCTURE MUST NOT BE GREATER THAN  $\pm 0.02$  INCH ( $\pm 0.5$  mm) FOR A MINIMUM OF 75% OF ANY EDGE AND  $\pm 0.04$  INCH ( $\pm 1.0$  mm) FOR A MAXIMUM OF 15% OF ANY EDGE AND  $\pm 0.06$  INCH ( $\pm 1.5$  mm) FOR A MAXIMUM OF 10% OF ANY EDGE.
- 4 ADJUST THE DOOR WITH THE SLOTTED HOLES IN THE SUPPORT BRACKETS TO GET THE CORRECT CLEARANCE



**Outboard Slat Control Rod Door Adjustment  
Figure 506**

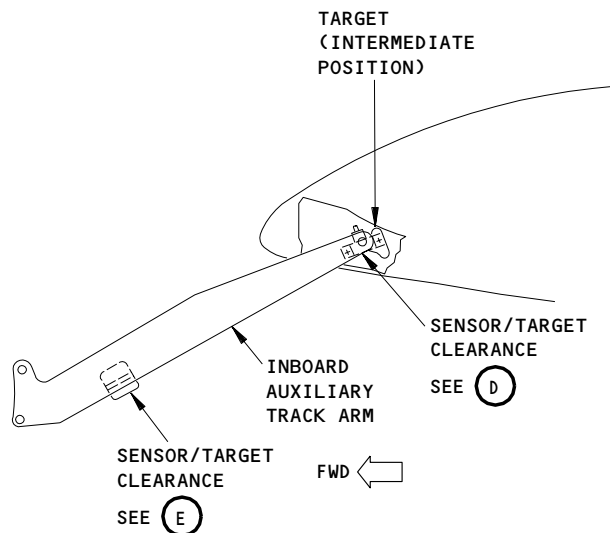
EFFECTIVITY	
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TARGETS, OUTBOARD AUXILIARY TRACK  
(LEFT SIDE VIEW)  
SLAT NO. 1 IS SHOWN  
(EXAMPLE, SLATS NO. 1-5 AND 8-12)

(A)



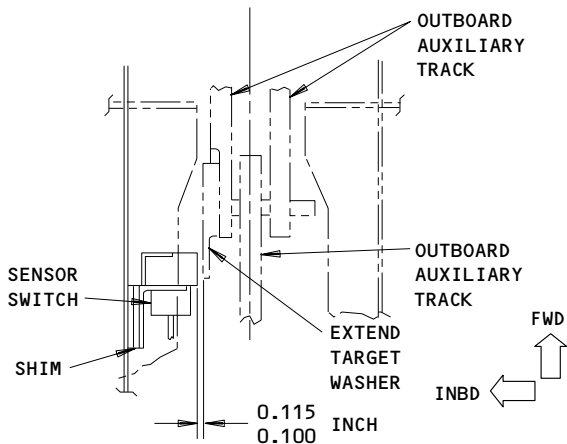
TARGETS, INBOARD AUXILIARY TRACK  
(LEFT SIDE VIEW)  
SLAT NO. 1 IS SHOWN  
(EXAMPLE, SLATS NO. 1-5 AND 8-12)

(B)

Slat Sensor Switch Clearance  
Figure 507 (Sheet 1)

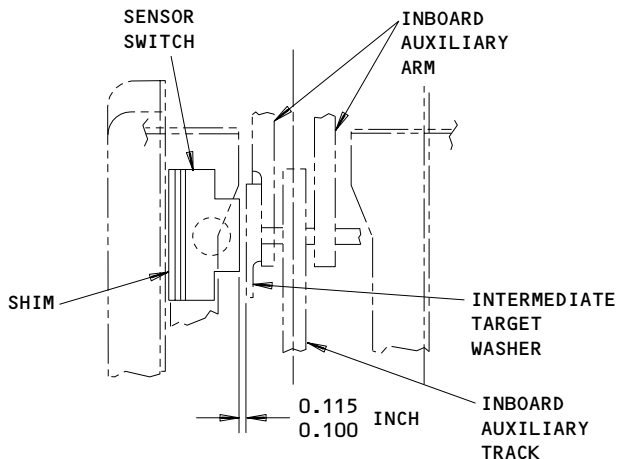
EFFECTIVITY	ALL
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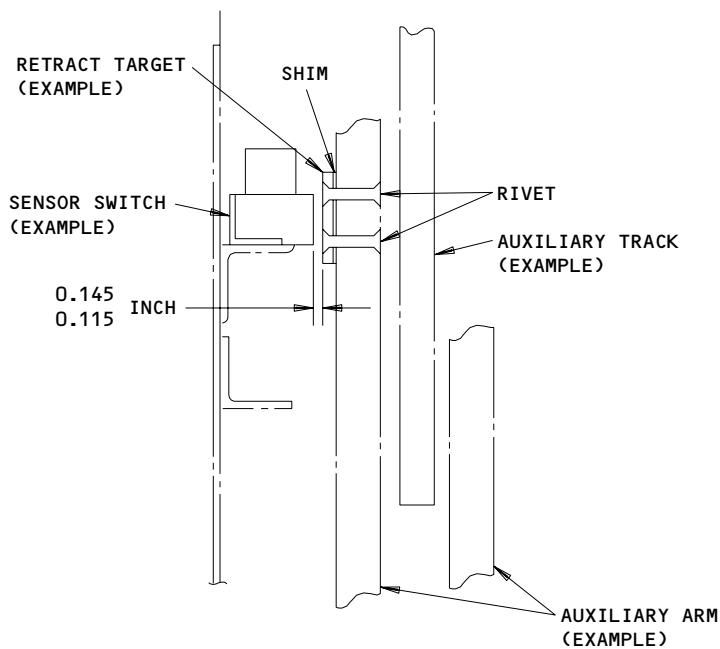
**SENSOR/TARGET CLEARANCE  
FULLY EXTENDED POSITION  
(BOTTOM VIEW)  
(OUTBOARD AUXILIARY TRACK,  
SLATS NO. 1-5 AND 8-12)**

(C)



**SENSOR/TARGET CLEARANCE  
INTERMEDIATE POSITION  
(BOTTOM VIEW)  
(INBOARD AUXILIARY TRACK,  
SLATS NO. 1-5 AND 8-12)**

(D)



**SENSOR/TARGET CLEARANCE  
FULLY RETRACTED POSITION  
(EXAMPLE, SLATS NO. 1-5 AND 8-12)**

(E)

**Slat Sensor Switches Clearance  
Figure 507 (Sheet 2)**

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- S 495-007
- (7) Attach a DO-NOT-OPERATE tag to the flap control lever.
- S 865-008
- (8) Supply electrical power (Ref 24-22-00).
- S 865-009
- (9) Remove the pressure from the center hydraulic system (Ref 29-11-00).
- S 215-010
- (10) Make sure the position selector switch for the flap/slat alternate drive, on the first officer's main instrument panel, P3, is in the NORM detent.
- S 495-011
- (11) Attach a DO-NOT-OPERATE tag to the position selector switch.
- S 865-012
- (12) Push the arming switch, on the P3 panel, for the slat alternate drive to arm the slat alternate drive (ALTN switch light comes on at the LE side).
- S 215-013
- (13) Make sure the amber LEADING EDGE light, on the P3 panel, comes on and the LE SLAT DISAGREE message shows in the EICAS display after 7 seconds.
- S 865-014
- (14) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR
- S 865-015
- (15) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD

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(b) 11H24, SLAT ALTN CONT OUTBD

S 015-016

- (16) Open the access panels, 511BB and 611BB, to get access to the inboard and outboard slat power drive units (PDU) (Ref 06-44-00).

S 015-017

- (17) Remove the fixed lower LE access panels as necessary to get access to the outboard slat components (Ref 06-44-00).

S 035-018

- (18) To adjust the outboard slats on the left wing (No. 1 to No. 5), disconnect the torque tube on the left side of the outboard slat PDU (Ref 27-81-24).

S 035-019

- (19) To adjust the outboard slats on the right wing (slat No. 8 to No. 12), disconnect the torque tube on the right side of the outboard slat PDU (Ref 27-81-24).

**NOTE:** Do not disconnect the torque tubes on the left and right side of the slat PDU at the same time. It will be necessary to adjust the slat drive system if you disconnect the two torque tubes at the same time.

S 985-020

- (20) Use one of the two procedures that follow to manually extend the outboard slats as necessary to remove the fixed lower LE access panels and access doors (Ref 06-44-00):
- (a) PROCEDURE A: Turn the torque tube with an air motor and adapter (AMM 27-81-00, Manually Extend and Retract the Leading Edge Slats without Airplane Power).
  - (b) PROCEDURE B: Turn the torque tube by hand.

S 035-021

- (21) Disconnect the interstitial duct for the thermal anti-ice system at each end of the slat that you will adjust (AMM 30-11-06/401).

S 495-022

- (22) Apply tape to hold the aerodynamic seals in the retracted position, at the cutout of the fixed leading edge.

S 825-023

- (23) If not done, adjust the slat tabs at the main and auxiliary tracks to the down position to prevent damage when you retract the slats (Fig. 501).

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S 985-024

- (24) Manually retract the outboard slats by hand or with an air motor (Ref 27-81-00), until the rotary actuator arms touch the retract overtravel stops.

F. Adjust the Outboard Slat

S 295-129

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 985-025

- (2) Turn the torque tube by hand until you get a  $0.075 \pm 0.003$  inch ( $1.90 \pm 0.07$  mm) clearance between the rotary actuator arm and the retract overtravel stop, at the inboard rotary actuator of slat No. 5 (for left wing adjustment) or No. 8 (for right wing adjustment).

**NOTE:** Use a shim with a thickness of  $0.075 \pm 0.003$  inch ( $1.90 \pm 0.07$  mm) to set the correct clearance.

S 225-026

- (3) Use the rigging gage and do a check on the main track roller clearance (Detail D, Fig. 501).

S 225-027

- (4) Do a check on the alignment fitting clearance as shown (Detail C, Fig. 501). Add washers 114T4000-11, as necessary, per the Illustrated Part Catalog to get the required clearance.

S 225-028

- (5) Do a check on the slat mismatch with the fixed leading edge (Detail A, Fig. 503).

S 825-029

- (6) Adjust the length of the slat control rod to get the correct clearances and mismatch if it is necessary.

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S 825-030

- (7) Adjust the retracted position of the slats with the steps that follow (Fig. 502):

**NOTE:** The slats are preloaded in the cruise (retracted) position (nominal interference at the slat wedge is 0.14 inch (3.55 mm)). This reduces in-flight clearance between the slats and the forward leading edge.

**CAUTION:** MAKE SURE YOU LOOSEN THE JAMNUTS AND LIFT THE LOCKING TAB WASHERS BEFORE YOU ADJUST THE TURNBUCKLE. YOU CAN CAUSE DAMAGE TO THE LOCKING TAB WASHERS IF YOU ADJUST THE TURNBUCKLE WHILE THE WASHERS ARE NOT LOOSE.

- (a) Adjust the aft link of the auxiliary track (View C-C) to get a 0.002 to 0.020 inch (0.05-0.50 mm) clearance between the slat trailing edge and the fixed LE panels.

**NOTE:** Measure the clearance at a point less than six inches away from one of the two sides of each auxiliary track.

- (b) Turn the aft link turnbuckle (26) by 1.5 to 1.75 turns (0.125 to 0.146 inch (3.2-3.7 mm)) to shorten the length.

**NOTE:** This will apply a preload to the outboard slat (3). Disconnect the lower end of the aft link from the bracket if it is necessary to get access to the jamnut.

- (c) Tighten the jamnut on the aft link and install a lockwire with the double twist procedure (Ref 20-10-23).  
(d) If disconnected, connect the aft link to the bracket (View D-D).

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S 825-101

- (8) Adjust the intermediate position of the slats with the steps that follow (Fig. 502):

**CAUTION:** DO NOT OPERATE THE SLATS WITH THE SUPPORT/ATTACHMENT BRACKETS DOWN (LOOSE AT ONE END) IF THE CONTROL ROD DOOR (ACTUATOR SEAL DOOR) IS REMOVED. MAKE SURE YOU HAVE THE SUPPORT/ATTACHMENT BRACKETS UP (OUT OF THE WAY). IMPACT DAMAGE TO THE FIXED SPLICE PLATE ON THE LEADING EDGE LOWER SURFACE CAN OCCUR.

- (a) Extend the outboard slats (3) to the dimension shown (Detail D) with one of these procedures:

**NOTE:** To extend the slats to the take off (intermediate) position, you can turn the slat-drive-torque-tube 87.5 +/- 5 revolutions from the cruise (fully retracted) position.

To move the slats accurately to the position shown, use less than 100 pound-inches (11.3 newton-meters) of torque when you extend the slats.

- 1) PROCEDURE A: Turn the torque tube with an air motor and adapter (AMM 27-81-00, Manually Extend and Retract the Leading Edge Slats without Airplane Power)
- 2) PROCEDURE B: Turn the torque tube by hand.

**CAUTION:** MAKE SURE THE RIGGING SPACER IS REMOVED BEFORE YOU OPERATE THE SLATS. DAMAGE CAN OCCUR IF YOU MOVE THE SLATS WITH THE RIGGING SPACER INSTALLED.

- (b) Install the (0.4375 inch (11.112 mm)) rigging spacer temporarily at the forward bracket with these steps (Fig. 502):

- 1) Remove the bolts (19), nuts (22), and washers (20 and 21) that hold the forward bracket assembly (14, 15, 16) in position.
- 2) Put the rigging spacer between the forward bracket and the bridge support fitting (18).
- 3) Install the forward bracket with the two bolts, nuts, and washers.

- (c) Measure the clearance between the outboard slat trailing edge and the fixed leading edge at a point less than six inches away from each auxiliary track.

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- (d) If the clearance is 0.002 to 0.200 inch (0.05–5.08 mm) between the trailing edge and the upper skin of the fixed leading edge, remove the rigging spacer and install the forward bracket assembly (14, 15, 16) shown in View D-D, Fig. 502.

NOTE: Follow the CAUTION note in Fig. 502 when you install the forward bracket assembly.

- (e) Do these steps if the clearance is not between 0.002 and 0.200 inch (Fig. 502):
- 1) Remove the forward bracket assembly and drill out the rivets (17) in the forward brackets.
  - 2) Adjust the shims (16) by small increments, until you get a clearance between 0.002 to 0.200 inch (0.05–5.1 mm), with the rigging spacer attached.
  - 3) Remove the rigging spacer when you get the correct clearance.
  - 4) Attach the forward bracket assembly (14), serrated plate (15), and shims (16) together with the two rivets (17) (Detail G).

NOTE: Install the forward bracket assembly (14) with temporary fasteners.

- 5) Install the forward brackets assembly (without the rigging spacer) to the bridge support fitting (18) with the bolts, washers, and nuts.

NOTE: Follow the CAUTION note in Fig. 502 when you install the forward bracket assembly.

S 835-099

- (9) Adjust the extended position of the slats with the steps that follow (Fig. 502):

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**CAUTION:** MAKE SURE THE RIGGING SPACER IS REMOVED BEFORE YOU OPERATE THE SLATS. DAMAGE CAN OCCUR IF YOU MOVE THE SLATS WITH THE RIGGING SPACER INSTALLED.

- (a) Extend the outboard slats until you get a 0.03 –0.18 inch (0.76–4.57 mm) clearance between the rotary actuator arm and the extend overtravel stop, at the inboard rotary actuator (this is the extended position of the slats). Use one of these two procedures to extend the slats:

**NOTE:** To extend the slats to the landing (fully extended) position, you can turn the slat-drive-torque-tube 116.25 +/- 0.5 revolutions from the cruise (fully retracted) position.  
The torque increases at the extended position because of the preload between the auxiliary track roller and the auxiliary track.

- 1) PROCEDURE A: Turn the torque tube with an air motor and adapter (AMM 27-81-00, Manually Extend and Retract the Leading Edge Slats without Airplane Power)
  - 2) PROCEDURE B: Turn the torque tube by hand.
- (b) Make sure there is clearance between the main tracks and the slat-rib fail-safe stops as shown in View E, Fig. 501.

**NOTE:** If the clearance is out of tolerance, you can set the auxiliary track adjustment downward while maintaining required dimensions.

- (c) Adjust the auxiliary track support bracket serrations.

**NOTE:** The forward edge of the serrated plate and shims must be in line with the bridge fitting during and after all phases of the adjustment. The forward edge of the forward auxiliary bracket assembly must be in line the bridge fitting within +/-0.111 inch (+/-2.81 mm) (3 serrations) after adjustment. Do not move the bracket more than (3) serrations forward or aft (ref.+/- 0.108 inch (+/- 2.74 mm)) from the middle position.  
The rig pin is used as a no go/go tool for the following two actuator positions.

- (d) Make sure you can install (in the landing position) the rig pin LE8 in the auxiliary arms without interfering with the auxiliary tracks (Detail E, Fig. 502).

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- (e) If moving the serrated plates does not permit sufficient adjustment then adjust the push rods, or add to the auxiliary track support bracket the minimum amount of shims needed to get all the required rigging dimensions.

1) If you cannot install rig pin LE8, do these steps:

NOTE: In these steps, try to install the minimum thickness of shims that is necessary to let you install the rig pin.

- a) Add a small thickness of shims (16) at the forward bracket assembly (14) (View D-D, Fig. 502), and do the "Adjust the intermediate position of the slats" task to make sure the clearance is not more than 0.200 inch (5.08 mm).
- b) Put the slats back in the extended position and try to install the rig pin.
- c) Do the above two steps until you can install the rig pin, or the clearance becomes 0.200 inch (5.08 mm).

NOTE: It will be necessary to remove or install the rigging spacer, and extend or retract the slats when you change between the two steps.

- d) If the clearance becomes 0.200 inch (5.08 mm) before you can install the rig pin, adjust the length of the slat control rod (Fig. 501) until you can install the rig pin.
  - e) Make sure the slat control rod adjustment is not more than 0.48-0.58 inch (12.2-14.7 mm) (Detail D, Fig. 501) or the slat mismatch (Detail A, Fig. 503).
  - f) If it is necessary to install the rig pin, remove the rivets (17) from the forward bracket assembly (14) and move the forward bracket assembly (14) forward, but not more than 0.11 inch (2.8 mm) (Fig. 502).
- (f) Remove rig pin LE8.
- (g) Manually turn the torque tubes no more than 5 full turns to retract the outboard slats.
- (h) Make sure that you cannot install rig pin LE8 at the two auxiliary tracks of the adjusted slat (Detail E, Fig. 502).
- (i) If moving the serrated plates does not permit sufficient adjustment then adjust the push rods, or add to the forward bracket the minimum amount of shims needed to get all the required rigging dimensions.

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- (j) If you can install rig pin LE8, remove shims (16) by small increments from the forward bracket assembly (14) (View D-D, Fig. 502) until you cannot install rig pin LE8.

NOTE: Make sure the clearance between the slat trailing edge and the fixed leading edge is not below 0.002 inch (0.05 mm) with the rigging spacer installed. Use the same procedure to adjust the shims as you did in the auxiliary track adjustments.

- (k) If it is necessary, adjust the slat control rod to NO GO pin and within 0.48-0.58 inch (12.2-14.7 mm) clearance (Detail D, Fig. 501).
- (l) Install the rivets (17) in the forward bracket assembly (14) as shown in Fig. 502.
- (m) If installed, remove rig pin LE8.

S 985-040

- (10) Manually retract the outboard slats until you get a clearance of 0.075 ±0.003 inch (1.905 +/- 0.076 mm) between the rotary actuator arm and the retract overtravel stop, at the inboard rotary actuator of slat No. 5 (for left wing adjustment) or No. 8 (for right wing adjustment).

NOTE: Use a shim with a thickness of 0.075 ±0.003 inch (1.905 +/- 0.076) to set the correct clearance.

S 435-041

- (11) Connect the torque tubes back to the outboard slat PDU (Ref 27-81-24) while you keep the slats in the position that you set in the step before.

S 865-042

- (12) Remove the circuit breaker locks and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR

S 865-043

- (13) Remove the circuit breaker locks and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

S 865-044

- (14) Push the arming switch for the slat alternate drive, on the P3 panel, to disarm the slat alternate drive (ALTN switch light goes off at the LE side).

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S 215-045

- (15) Make sure the amber LEADING EDGE light, on the P3 panel, goes off and the LE SLAT DISAGREE message does not show in the EICAS display.

S 865-046

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (16) Pressurize the center hydraulic system (Ref 29-11-00).

S 865-047

- (17) Remove the DO-NOT-OPERATE tag from the flap control lever, and move the lever to the 30-unit detent.

S 215-048

- (18) Make sure the flaps and slats move to the fully extended position.

S 495-049

- (19) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 865-050

- (20) Remove the pressure from the center hydraulic system (Ref 29-11-00).

S 215-051

- (21) Make sure you can install rig pin LE8 at the two auxiliary tracks in the outboard slat that you adjusted (Detail E, Fig. 502).

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- S 095-052  
(22) Remove rig pin LE8.
- S 865-053  
(23) Push the arming switch for the slat alternate drive (P3) to arm the slat alternate drive (ALTN switch light comes on at the LE side).
- S 215-054  
(24) Make sure the amber LEADING EDGE light, on the P3 panel, comes on and the LE SLAT DISAGREE message shows on the EICAS display.
- S 865-055  
(25) Open these circuit breakers on the P6 panel and install circuit breaker locks:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR
- S 865-056  
(26) Open these circuit breakers on the P11 panel and install circuit breaker locks:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD
- S 985-057  
(27) Manually turn the torque tubes no more than 5 full turns to retract the outboard slats.
- S 215-058  
(28) Make sure that you CANNOT install rig pin LE8 at the two auxiliary tracks of the adjusted slat (Detail E, Fig. 502).
- S 215-106  
(29) Make sure the auxiliary arms do not touch the auxiliary tracks (View E-E, Fig.502).
- S 215-107  
(30) Make sure the alignment-fitting clearance is correct as shown in Detail C, Fig. 501. Adjust if necessary.

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S 215-108

- (31) Make sure the slat tabs have the required flushness as shown in Fig. 501. Adjust if necessary.

S 985-059

- (32) Manually turn the torque tubes no more than 5 full turns to extend the outboard slats.

S 435-060

- (33) Connect the interstitial duct for the thermal anti-ice system to the adjacent slats and install the TAI duct cover doors (AMM 30-11-06/401).

S 865-061

- (34) Remove the circuit breaker locks and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR

S 865-062

- (35) Remove the circuit breaker locks and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

S 865-063

- (36) Push the arming switch for the slat alternate drive, on the P3 panel, to disarm the slat alternate drives (ALTN switch light goes off at the LE side).

S 215-064

- (37) Make sure the amber LEADING EDGE light, on the P3 panel, goes off and the LE SLAT DISAGREE message does not show in the EICAS display.

S 225-065

- (38) Do these checks on the clearance between the sensor switches and the targets for the adjusted outboard slat (Fig. 507):

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (a) Pressurize the center hydraulic system (Ref 29-11-00).
- (b) Remove the DO-NOT-OPERATE tag from the flap control lever and move the lever to the 20-unit detent.
- (c) Make sure the flaps move to the 20-degree position, and the slats move to the intermediate position.
- (d) Remove the power from the center hydraulic system (Ref 29-11-00).
- (e) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 505).

**CAUTION:** INCORRECT SENSOR TARGET CLEARANCES CAN CAUSE NUISANCE INDICATIONS (LE SLAT ASYM EICAS MESSAGE, LE LIGHT ILLUMINATION, TAKE OFF CONFIGURATION WARNING FLAPS OR STICK SHAKER ACTIVATION). THE TARGET WASHERS HAVE DIFFERENT PROFILES. THE EXISTING TARGET WASHER IS INTERCHANGEABLE BY SHIPSET ONLY. TARGET WASHERS ARE NOT INTERMIXABLE. NOTE THAT TARGET WASHERS VARY DEPENDENT ON LOCATION AND THAT INCORRECT PART NUMBER INSTALLATION CAN CAUSE NUISANCE INDICATIONS.

- (f) At the inboard auxiliary track arm, make sure there is permitted clearance between the sensor switch and the target on the auxiliary track arm (View D, Fig. 507) at the slat intermediate (take-off) position.

**NOTE:** Measure the clearance with the auxiliary track in the center of the auxiliary track arm. Adjust the sensor switch position, if it is necessary, to get the applicable sensor/target clearance (AMM 27-88-01/201). SB 57-0052 adds step washers and reworks target washers and bolts.

- (g) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 505).

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (h) Pressurize the center hydraulic system (Ref 29-11-00).
- (i) Move the flap control lever to the 30-unit detent and make sure the flaps and slats move to the fully extended position.
- (j) Remove the power from the center hydraulic system (Ref 29-11-00).
- (k) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 505).

**CAUTION:** INCORRECT SENSOR TARGET CLEARANCES CAN CAUSE NUISANCE INDICATIONS (LE SLAT ASYM EICAS MESSAGE, LE LIGHT ILLUMINATION, TAKE OFF CONFIGURATION WARNING FLAPS OR STICK SHAKER ACTIVATION). THE TARGET WASHERS HAVE DIFFERENT PROFILES. THE EXISTING TARGET WASHER IS INTERCHANGEABLE BY SHIPSET ONLY. TARGET WASHERS ARE NOT INTERMIXABLE. NOTE THAT TARGET WASHERS VARY DEPENDENT ON LOCATION AND THAT INCORRECT PART NUMBER INSTALLATION CAN CAUSE NUISANCE INDICATIONS.

- (l) At the outboard auxiliary track arm, make sure there is permitted clearance between the sensor switch and the target on the auxiliary track arm (View C, Fig. 507) at the slat fully extended (landing) position.

**NOTE:** Measure the clearance with the auxiliary track in the center of the auxiliary track arm. Adjust the sensor switch position, if it is necessary, to get the permitted sensor/target clearance (AMM 27-88-01/201).

SB 57-0052 adds step washers and reworks target washers and bolts.

- (m) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 505).

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S 295-131

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (39) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (a) Pressurize the center hydraulic system (Ref 29-11-00).
- (b) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted position.
- (c) Remove the power from the center hydraulic system (Ref 29-11-00).
- (d) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 505).

**CAUTION:** INCORRECT SENSOR TARGET CLEARANCES CAN CAUSE NUISANCE INDICATIONS (LE SLAT ASYM EICAS MESSAGE, LE LIGHT ILLUMINATION, TAKE OFF CONFIGURATION WARNING FLAPS OR STICK SHAKER ACTIVATION). THE TARGET WASHERS HAVE DIFFERENT PROFILES. THE EXISTING TARGET WASHER IS INTERCHANGEABLE BY SHIPSET ONLY. TARGET WASHERS ARE NOT INTERMIXABLE. NOTE THAT TARGET WASHERS VARY DEPENDENT ON LOCATION AND THAT INCORRECT PART NUMBER INSTALLATION CAN CAUSE NUISANCE INDICATIONS.

- (e) If you installed a new outboard slat, make sure to install and adjust the sensor switch targets on the slat auxiliary track arms (AMM 27-88-01/201).

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- (f) At the inboard and outboard auxiliary track arms, make sure there is permitted clearance between the sensor switch and the target (View E, Fig. 507) at the slat fully retracted (cruise) position.

**NOTE:** Do not adjust the sensor switch. Adjust the retract target on the auxiliary track arm, if it is necessary, to get the permitted sensor/target clearance (AMM 27-88-01/201).  
SB 57-0052 adds step washers and reworks target washers and bolts.

S 095-066

- (40) Remove the tape and release the aerodynamic seals from the retracted position.

S 295-132

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (41) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 415-067

- (42) Install the fixed leading edge lower access panels (Ref 06-44-00).

**NOTE:** Do not close the access panels, 511BB and 611BB, for the inboard and outboard slat PDUs at this time.

S 225-102

**CAUTION:** DO NOT OPERATE THE SLATS WITH THE SUPPORT/ATTACHMENT BRACKETS DOWN (LOOSE AT ONE END) IF THE CONTROL ROD DOOR (ACTUATOR SEAL DOOR) IS REMOVED. MAKE SURE YOU HAVE THE SUPPORT/ATTACHMENT BRACKETS UP (OUT OF THE WAY). IMPACT DAMAGE TO THE FIXED SPLICE PLATE ON THE LEADING EDGE LOWER SURFACE CAN OCCUR.

- (43) Make sure the door attached to the slat control rods aligns (without interference) with the lower fixed leading edge (Detail B, Fig. 506). Adjust the door if it is necessary.

S 225-069

- (44) Do these checks on the outboard slat clearances, mismatch, and seals (Fig. 503):  
(a) Make sure the mismatch is not more than the limit shown (Detail A).

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- (b) Make sure the seal clearance between the outboard slats is correct as shown (Detail B).
- (c) Make sure the seal clearance between slat No. 5 (or No. 8) and the adjacent structure is correct as shown (Detail C). Adjust if necessary.

S 095-070

- (45) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 505).

S 415-071

- (46) Close the access panels, 511BB and 611BB, for the inboard and outboard slat PDUs (Ref 06-44-00).

S 715-072

- (47) Do the steps in the "Outboard Leading Edge Slat - Test" procedure below.

TASK 27-81-02-715-073

3. Outboard Leading Edge Slat - Test

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 06-44-00/201, Wing Access Doors and Panels
- (3) 24-22-00/201, Electrical Power - Control
- (4) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) 32-00-15/201, Landing Gear Door Locks
- (6) FIM 32-09-03/101, PSEU BITE test
- (7) 78-31-00/201, Thrust Reverser System

B. Access

(1) Location Zones

120	Main Equipment Center (Right)
144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
500/600	Left Wing/Right Wing
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

119AL	Main Equipment Center
-------	-----------------------

C. Prepare for the Test

S 215-074

- (1) Make sure the flaps and slats are in the fully retracted position.

S 215-075

- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

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S 015-076

- (3) Open the access door, 119AL, to get access to the main equipment center (Ref 06-41-00).

S 215-109

- (4) Make sure you close these circuit breakers on the P11 Overhead Panel:

- (a) 11J02, EICAS CMPTR L
- (b) 11J03, EICAS UPPER DISPL
- (c) 11J29, EICAS CMPTR R
- (d) 11J30, EICAS LOWER DSPL
- (e) 11J31, EICAS DSPL SW
- (f) 11J32, EICAS PILOT DISPLAY, or  
DISPLAY SELECT

D. Test for the Outboard Slat

**NOTE:** During this test, make sure the EICAS messages do not show on the EICAS display and LEADING EDGE light on the first officer's instrument panel, P3, does not come on.

S 865-079

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (1) Pressurize the center hydraulic system (Ref 29-11-00).

S 865-080

- (2) Move the flap control lever to the 20-unit detent and make sure the flaps move to the 20-degree position, and the slats move to the intermediate position.

S 865-081

- (3) Move the flap control lever to the 30-unit detent and make sure the flaps and slats move to the fully extended position.

S 865-082

- (4) Move the flap control lever back to the 20 and the zero unit detents and make sure the flaps and slats move to the correct positions as before.

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S 725-083

- (5) Operate the test switch on the panel of the flap/slat electronics unit (FSEU) at the E2 equipment rack, and look for a no-fault indication.

S 725-084

- (6) Operate the test switch on the proximity switch electronics unit (PSEU) BITE panel on the E1 equipment rack, and make sure there is a no fault indication (AMM 27-88-01/201, FIM 32-09-03/101, Fig. 103).

E. Put the Airplane Back to Its Usual Condition

S 095-085

- (1) Remove the DO-NOT-OPERATE tag from the position selector switch, on the P3 panel, for the flap/slat alternate drive.

S 215-086

- (2) Make sure the position selector switch is in the NORM detent.

S 415-087

- (3) If removed, install all access panels below the wing (Ref 06-44-00).

S 415-088

- (4) Close the access door, 119AL, to the main equipment center (Ref 06-41-00).

S 095-089

**WARNING: USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.**

- (5) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

S 445-090

- (6) Do the activation procedure for the thrust reverser (Ref 78-31-00).

S 865-095

- (7) Remove the power from the center hydraulic system (Ref 29-11-00).

S 865-096

- (8) Remove electrical power if it is not necessary (Ref 24-22-00).

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OUTBOARD LEADING EDGE SLAT – INSPECTION/CHECK

1. General

A. This procedure only has illustrations and wear limit tables, which show the data for wear limits. There are no procedures for access, removal or installation of the parts. Refer to the Outboard LE Slat – Removal/Installation for procedures to do these tasks.

TASK 27-81-02-226-001

2. Wear Limits for the Outboard LE Slat (Fig. 601)

A. General

(1) This procedure only has illustrations and wear limit tables, which show the data for wear limits. There are no procedures for access, removal or installation of the parts. Refer to the Outboard LE Slat – Removal/Installation for procedures to do these tasks.

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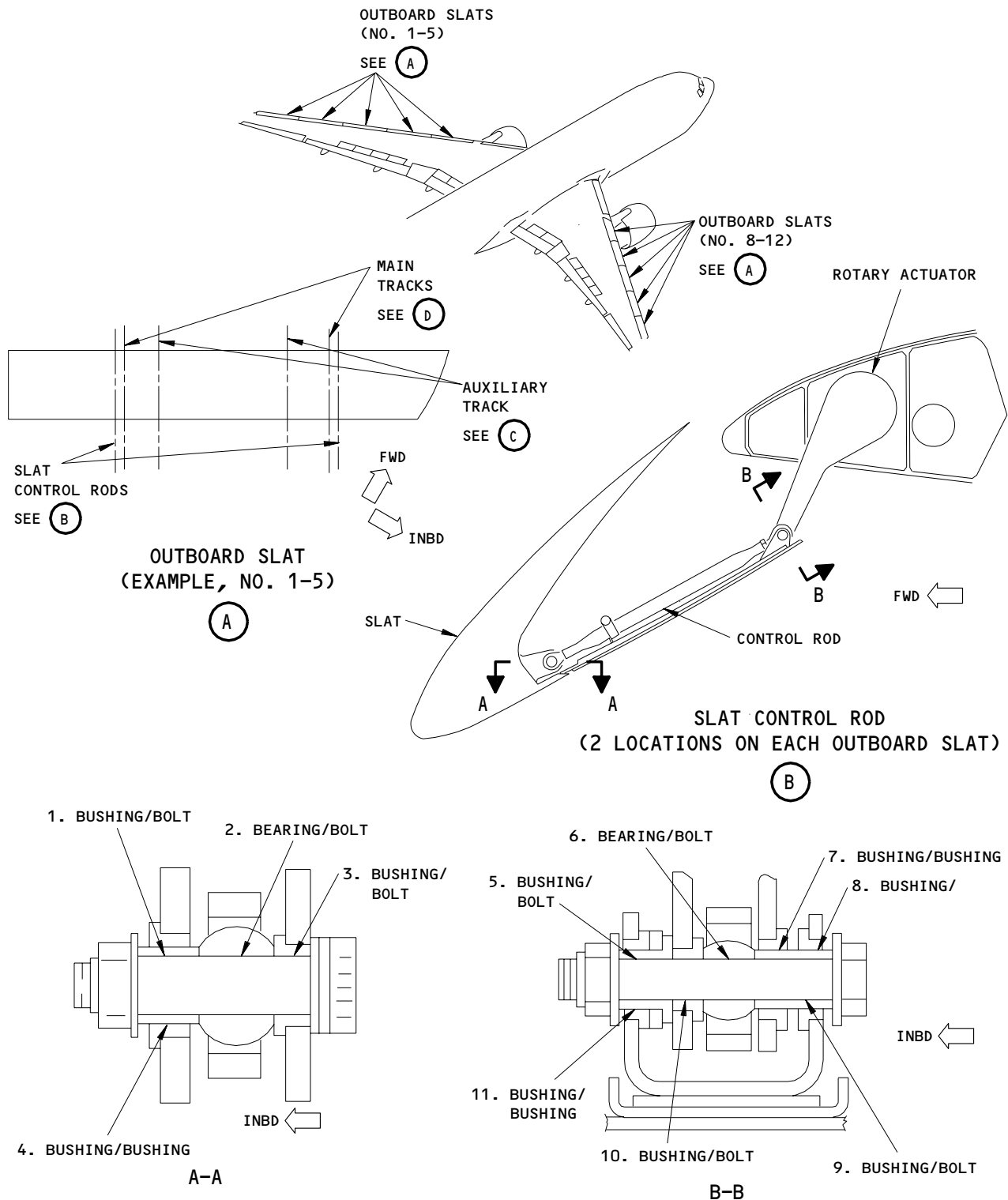
**27-81-02**

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# BOEING

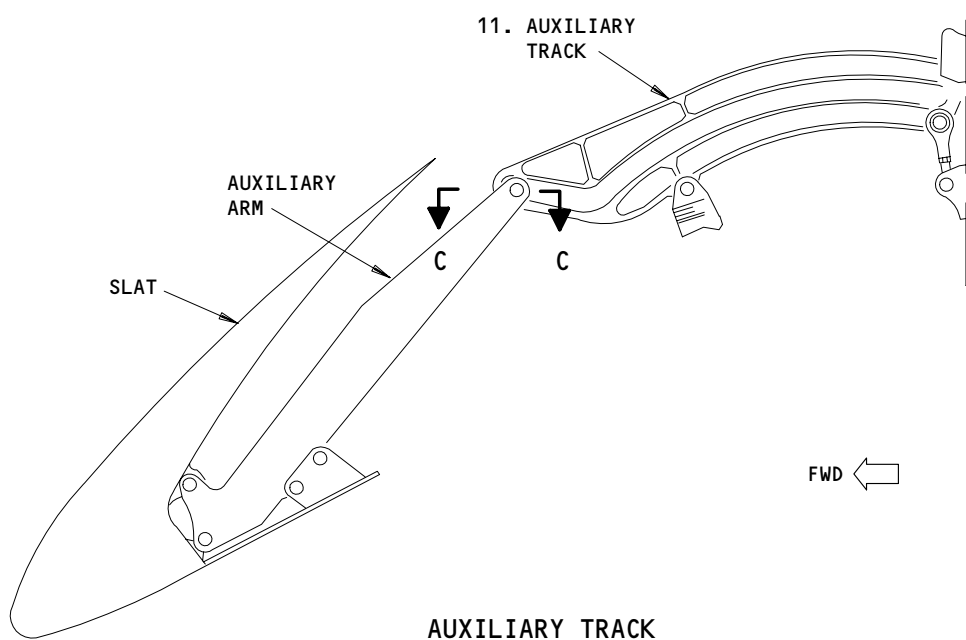
## 767 MAINTENANCE MANUAL



Wear Limits for the Outboard Slat  
Figure 601 (Sheet 1)

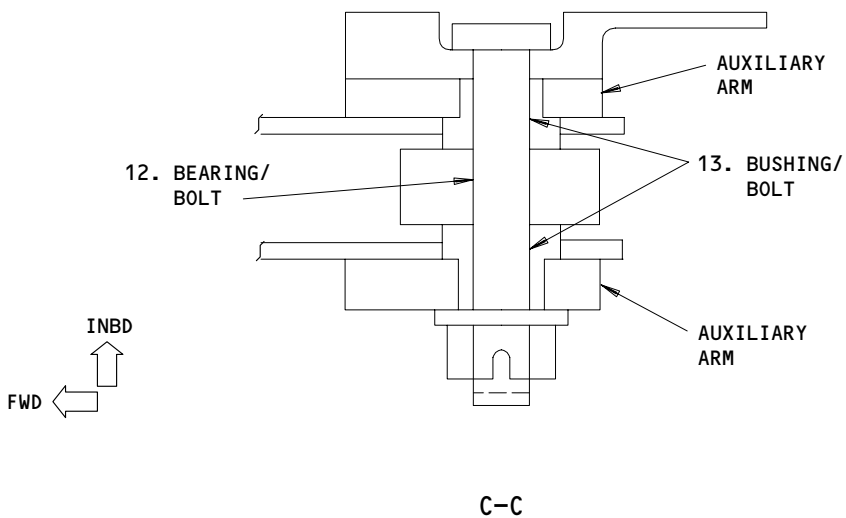
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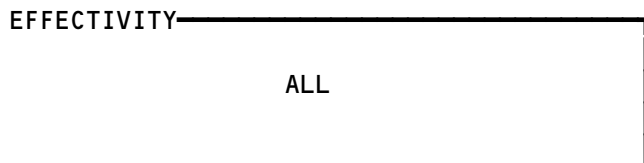


AUXILIARY TRACK  
(2 LOCATIONS ON EACH OUTBOARD SLAT)

(C)



Wear Limits for the Outboard Slat  
Figure 601 (Sheet 2)

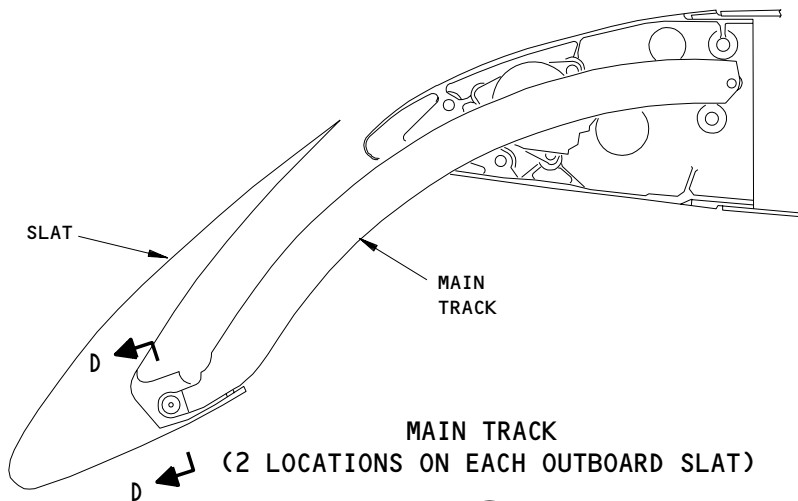


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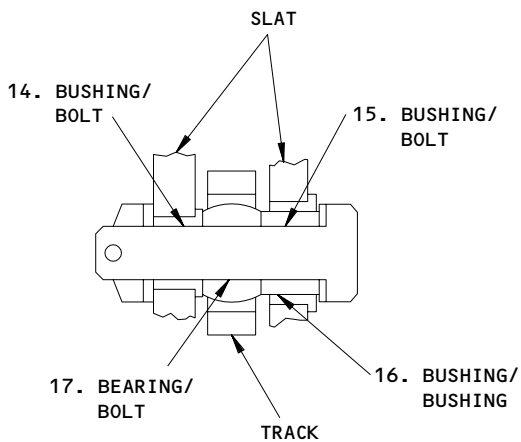
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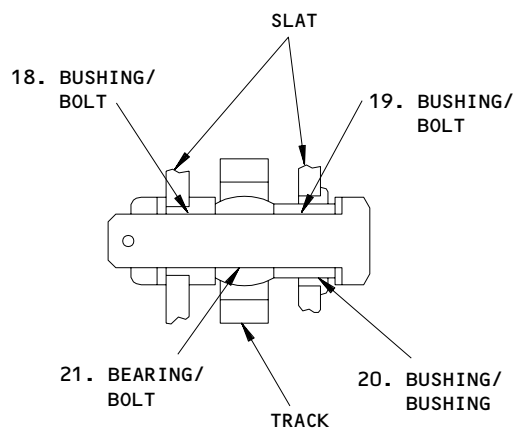
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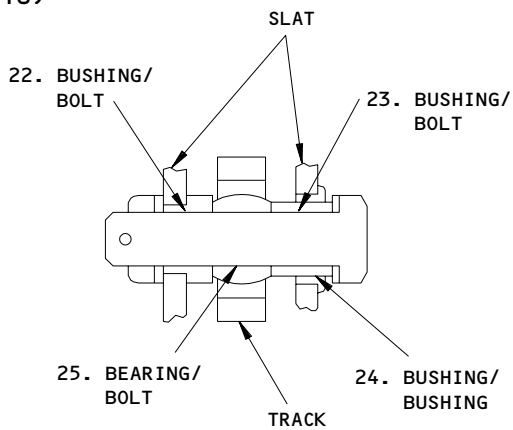
D



(SLATS NO. 3-5, AND 8-10)  
D-D



(SLATS NO. 2 AND 11)  
D-D



(SLATS NO. 1 AND 12)  
D-D

Wear Limits for the Outboard Slat  
Figure 601 (Sheet 3)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.3125 (7.938)	0.3130 (7.950)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3115 (7.912)	0.3120 (7.925)	0.3079 (7.821)		X		
2	BEARING	ID	0.3125 (7.938)	0.3129 (7.948)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3115 (7.912)	0.3120 (7.925)	0.3079 (7.821)		X		
3	BUSHING	ID	0.3125 (7.938)	0.3131 (7.953)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3116 (7.914)	0.3120 (7.925)	0.3081 (7.826)		X		
4	BUSHING	ID	0.4375 (11.113)	0.4382 (11.130)	0.4420 (11.227)	0.0050 (0.127)	X		
	BUSHING	OD	0.4365 (11.087)	0.4370 (11.100)	0.4332 (11.003)		X		
5	BUSHING	ID	0.3125 (7.938)	0.3130 (7.950)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3115 (7.912)	0.3120 (7.925)	0.3080 (7.823)		X		
6	BEARING	ID	0.3125 (7.938)	0.3129 (7.948)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3115 (7.912)	0.3120 (7.925)	0.3079 (7.821)		X		
7	BUSHING	ID	0.4375 (11.113)	0.4385 (11.138)	0.4420 (11.227)	0.0050 (0.127)	X		
	BUSHING	OD	0.4365 (11.087)	0.4370 (11.100)	0.4335 (11.011)		X		
8	BUSHING	ID	0.4380 (11.125)	0.4390 (11.151)	0.4420 (11.227)	0.0050 (0.127)	X		
	BUSHING	OD	0.4365 (11.087)	0.4370 (11.100)	0.4340 (11.024)		X		
9	BUSHING	ID	0.3125 (7.938)	0.3130 (7.950)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3115 (7.912)	0.3120 (7.925)	0.3080 (7.823)		X		
10	BUSHING	ID	0.3125 (7.938)	0.3135 (7.963)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3115 (7.912)	0.3120 (7.925)	0.3075 (7.811)		X		

Wear Limits for the Outboard Slats  
Figure 601 (Sheet 4)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BUSHING	ID	0.4380 (11.125)	0.4390 (11.151)	0.4420 (11.227)	0.0050 (0.127)	X		
	BUSHING	OD	0.4365 (11.087)	0.4370 (11.100)	0.4340 (11.024)		X		
12	BEARING	ID	0.2493 (6.332)	0.2500 (6.350)	0.2545 (6.464)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2450 (6.223)		X		
13	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2545 (6.464)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2455 (6.236)		X		
14	BUSHING	ID	0.5620 (14.275)	0.5627 (14.293)	0.5665 (14.389)	0.0050 (0.127)	X		
	BOLT	OD	0.5610 (14.249)	0.5615 (14.262)	0.5577 (14.166)		X		
15	BUSHING	ID	0.5620 (14.275)	0.5625 (14.288)	0.5665 (14.389)	0.0050 (0.127)	X		
	BOLT	OD	0.5610 (14.249)	0.5615 (14.262)	0.5575 (14.161)		X		
16	BUSHING	ID	0.8120 (20.625)	0.8128 (20.645)	0.8168 (20.747)	0.0050 (0.127)	X		
	BUSHING	OD	0.8110 (20.599)	0.8115 (20.612)	0.8075 (20.511)		X		
17	BEARING	ID	0.5625 (14.288)	0.5629 (14.298)	0.5665 (14.389)	0.0050 (0.127)	X		
	BOLT	OD	0.5605 (14.237)	0.5615 (14.262)	0.5579 (14.171)		X		
18	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4957 (12.591)		X		
19	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4955 (12.586)		X		
20	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6916 (17.567)	0.0051 (0.130)	X		
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6826 (17.338)		X		

Wear Limits for the Outboard Slats  
Figure 601 (Sheet 5)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
21	BEARING	ID	0.5000 (12.700)	0.5004 (12.710)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4955 (12.586)		X		
22	BUSHING	ID	0.4375 (11.113)	0.4382 (11.130)	0.4420 (11.227)	0.0050 (0.127)	X		
	BOLT	OD	0.4365 (11.087)	0.4370 (11.100)	0.4432 (11.257)		X		
23	BUSHING	ID	0.4375 (11.113)	0.4380 (11.125)	0.4420 (11.227)	0.0050 (0.127)	X		
	BOLT	OD	0.4365 (11.087)	0.4370 (11.100)	0.4330 (10.998)		X		
24	BUSHING	ID	0.6245 (15.862)	0.6252 (15.880)	0.6290 (15.977)	0.0050 (0.127)	X		
	BUSHING	OD	0.6235 (15.837)	0.6240 (15.850)	0.6202 (15.753)		X		
25	BEARING	ID	0.4375 (11.113)	0.4379 (11.123)	0.4420 (11.227)	0.0050 (0.127)	X		
	BOLT	OD	0.4365 (11.087)	0.4370 (11.100)	0.4329 (10.996)		X		

Wear Limits for the Outboard Slats  
Figure 601 (Sheet 6)

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KRUEGER SEAL FLAP SEAL – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the seals on the krueger seal flap.

TASK 27-81-03-024-001

2. Krueger Seal Flap Seal – Removal

A. Equipment

- (1) Leading Edge Slats Groundlock – A27007-1  
(2 Necessary)
- (2) TE Flap PDU Lock – A27009-7
- (3) Circuit Breaker Lockout Clip  
(4 Necessary) Commercially Available

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power – Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) 27-81-04/201, Krueger Seal Flap and Krueger Seal Flap Drive
- (5) 32-00-15/201, Landing Gear Door Locks
- (6) 32-00-20/201, Landing Gear Downlocks
- (7) 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

- 144 Right MLG Wheel Well
- 211/212 Control Cabin
- 410 No. 1 Power Plant
- 420 No. 2 Power Plant
- 510/610 Wing Leading Edge – Inboard
- 710 Nose Landing Gear and Doors
- 730/740 Left/Right Main Landing Gear and Doors

(2) Access Panels

- 511BB LE Slat Power Drive Unit – Outboard (Left)
- 511QB Lower LE Structure (Left)
- 511RB Lower LE Structure (Left)
- 611BB LE Slat Power Drive Unit – Inboard (Right)
- 611QB Lower LE Structure (Right)
- 611RB Lower LE Structure (Right)

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

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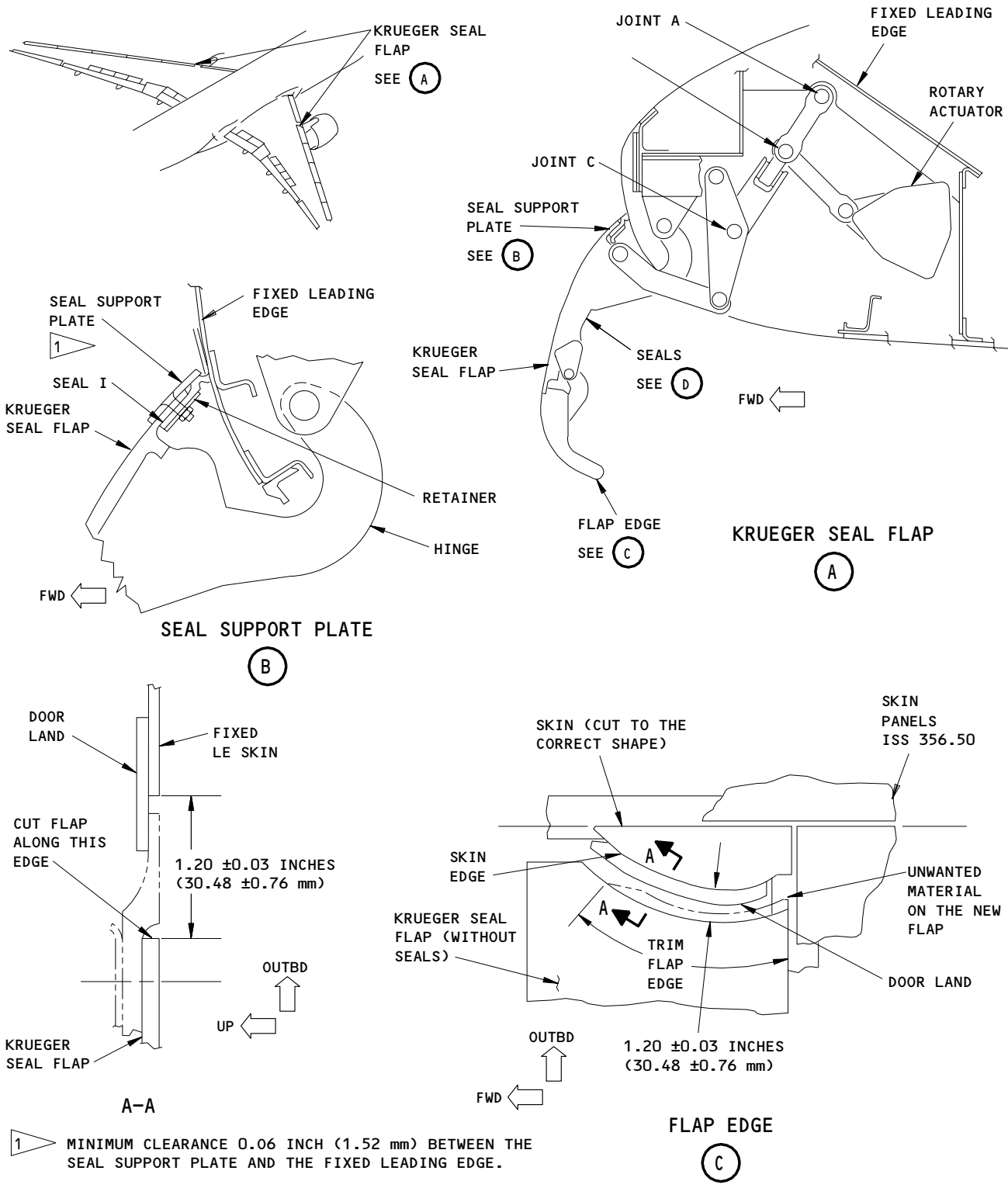
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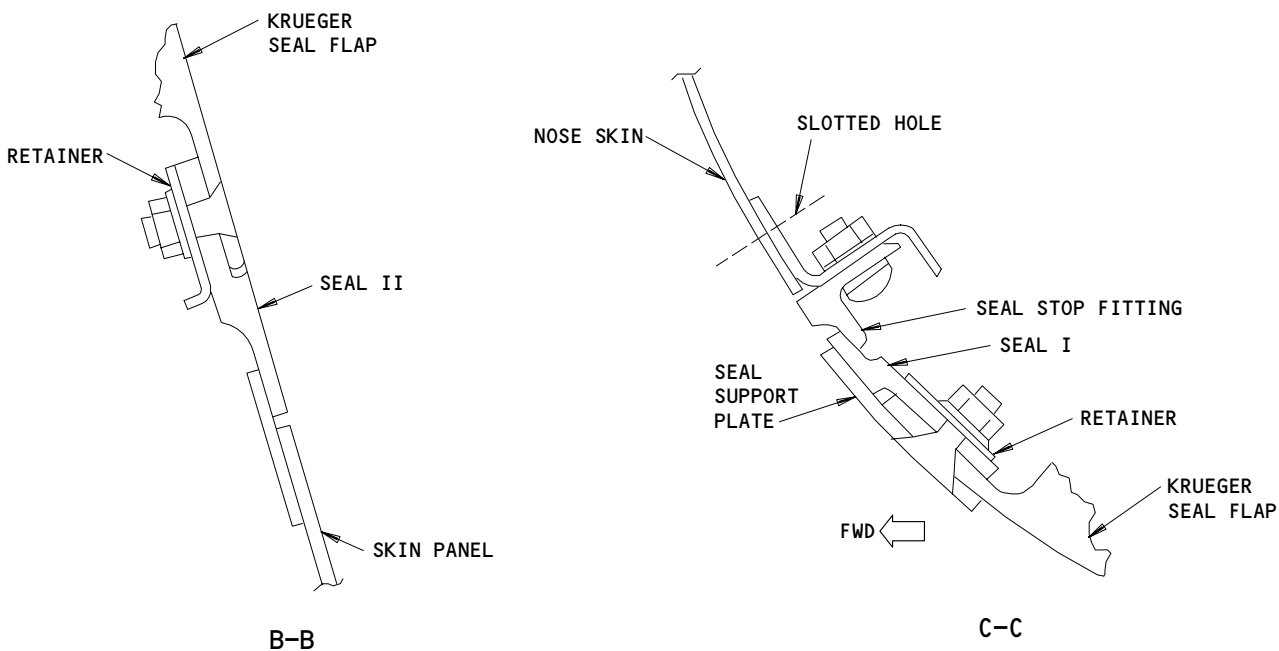
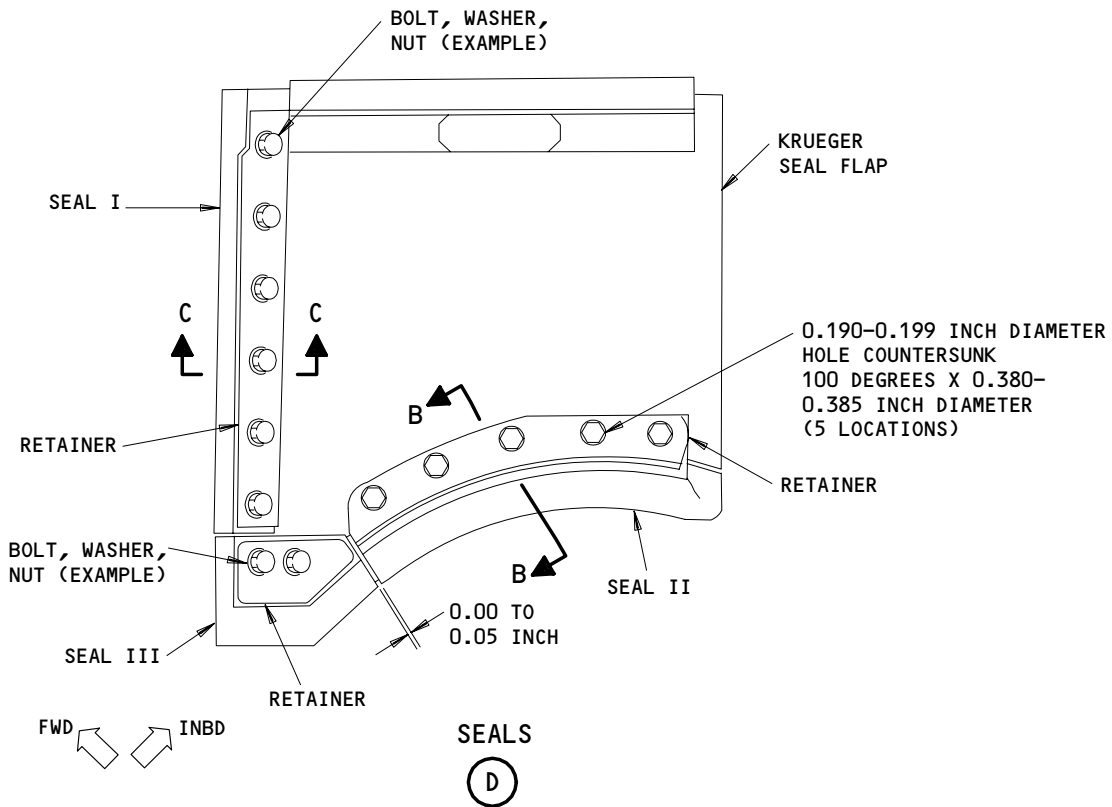
Krueger Seal Flap and Krueger Seal Flap Seal Adjustment  
Figure 401 (Sheet 1)

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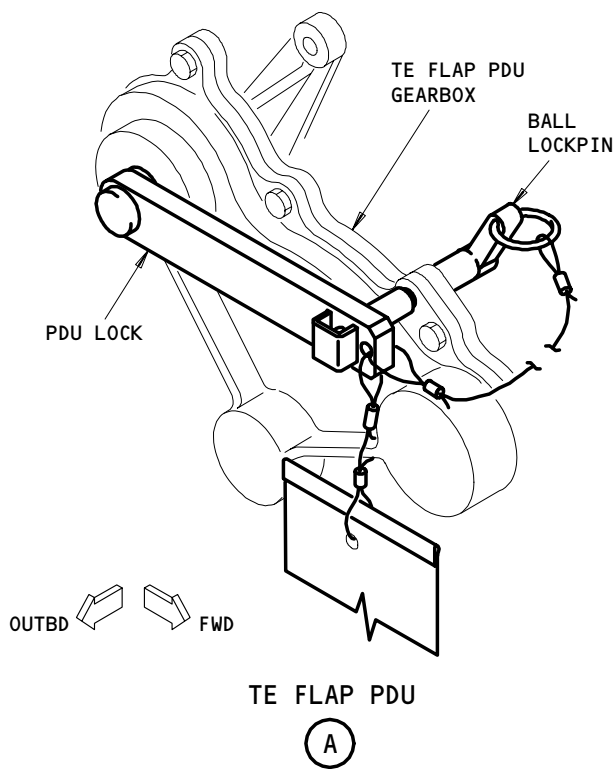
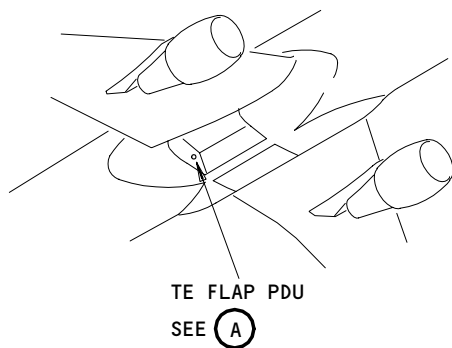
Krueger Seal Flap and Krueger Seal Flap Seal Adjustment  
Figure 401 (Sheet 2)

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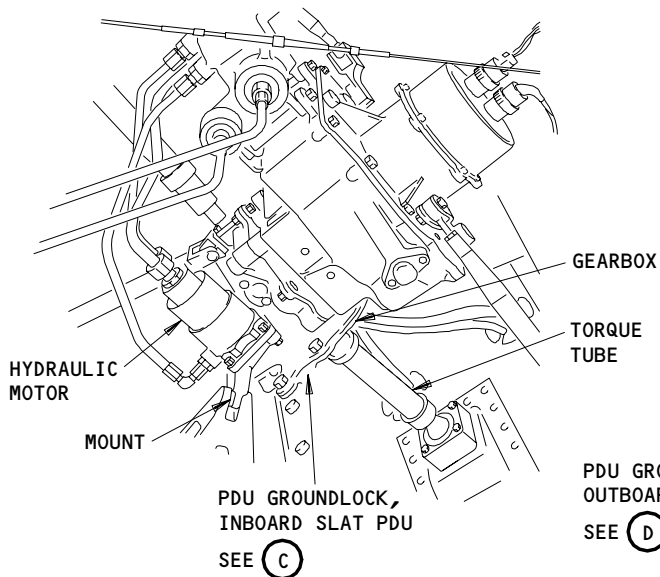
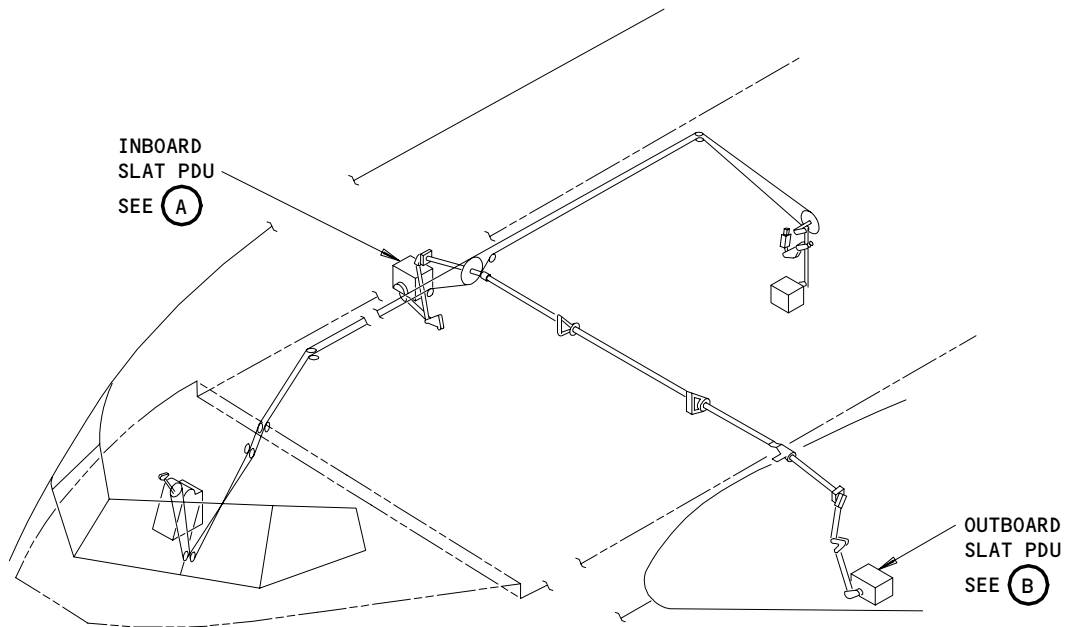
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PDU Lock for the TE Flap PDU  
Figure 402

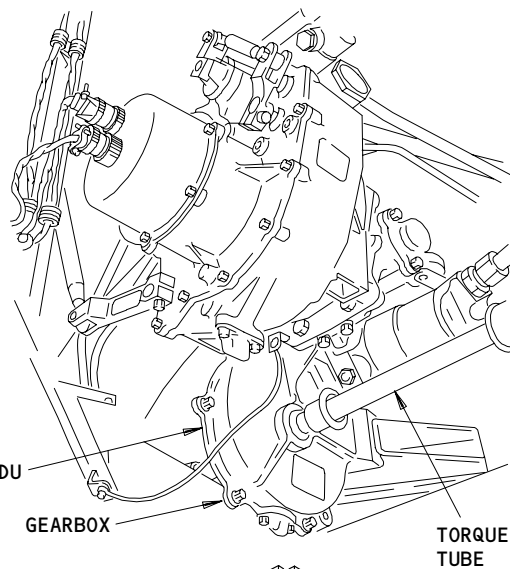
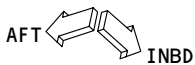
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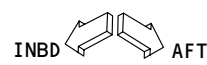
INBOARD SLAT PDU  
(BOTTOM VIEW)

(A)



OUTBOARD SLAT PDU

(B)



Slats PDU Groundlock  
Figure 403 (Sheet 1)

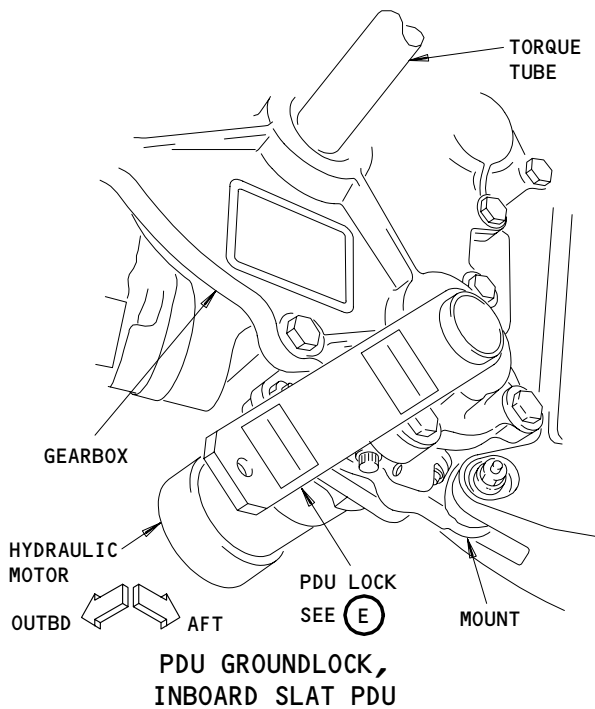
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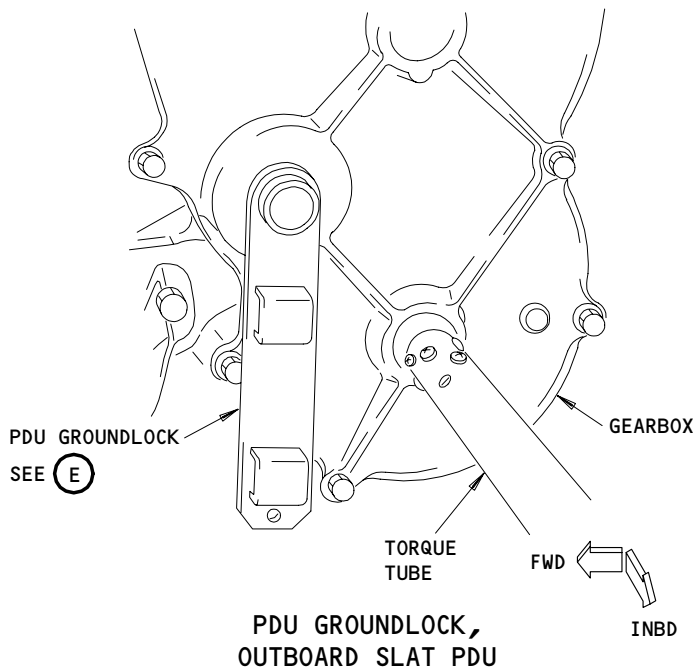
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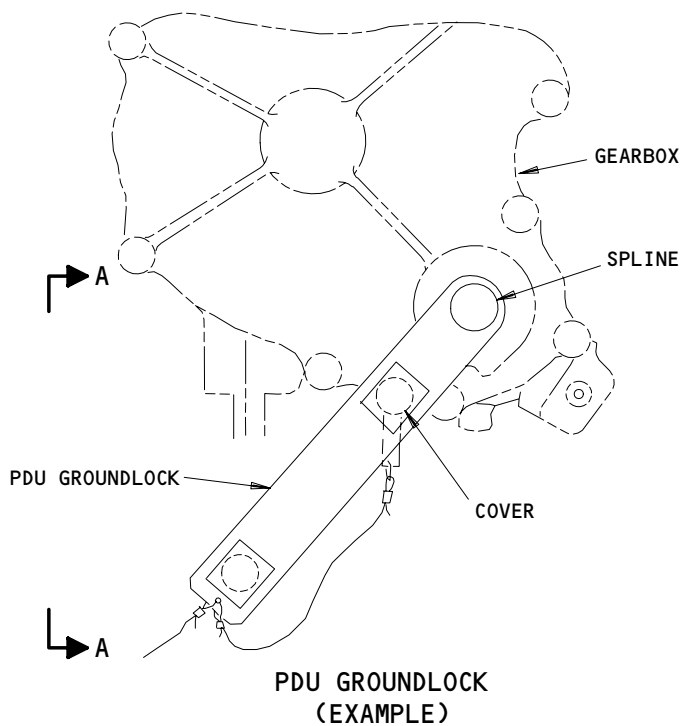
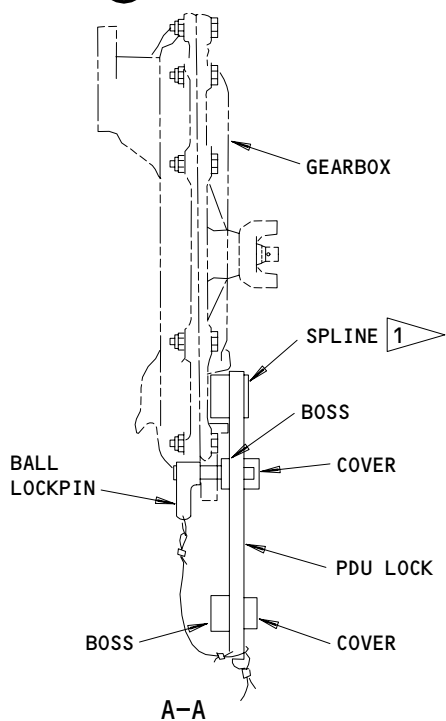
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(C)



(D)



(E)

1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN INSTALLED THROUGH THE BOSS AND GEARBOX

Slats PDU Groundlock  
Figure 403 (Sheet 2)

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S 494-003

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (Ref 32-00-15).

S 044-004

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 214-005

- (4) Make sure the flaps and slats are in the fully retracted position.

S 214-006

- (5) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 864-007

- (6) Supply electrical power (Ref 24-22-00).

S 864-008

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (7) Pressurize the center hydraulic system (Ref 29-11-00).

S 864-009

- (8) Move the flap control lever to the 30-unit detent, and make sure the flaps, slats, and the krueger seal flaps move to the fully extended position.

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- S 494-010
- (9) Attach a DO-NOT-OPERATE tag to the flap control lever.
- S 864-011
- (10) Remove the power from the center hydraulic system (Ref 29-11-00).
- S 494-012
- (11) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 402).
- S 014-013
- (12) Remove the access panels, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (Ref 06-44-00).
- S 494-014
- (13) Install the groundlocks on the inboard and outboard slat PDUs (Fig. 403).
- S 864-015
- (14) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT
- S 864-016
- (15) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR
- S 014-017
- (16) Remove these access panels, 511QB and 511RB (on the left wing), or, 611QB and 611RB (on the right wing), to get access to the krueger seal flap drive and seals.

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E. Remove the Seals

S 024-018

- (1) Remove the seals on the krueger seal flap as shown (Fig. 401).

TASK 27-81-03-424-019

3. Krueger Seal Flap Seal - Installation

A. Consumable Materials

- (1) A00247 Sealant - BMS 5-95
- (2) C00033 Enamel - BMS 10-60, Type II
- (3) C00261 Primer - BMS 10-79, Type II
- (4) C00271 Colored Chemical Coating - MIL-C-5541

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) 27-81-04/201, Krueger Seal Flap and Krueger Seal Flap Drive
- (5) 32-00-15/201, Landing Gear Door Locks
- (6) 32-00-20/201, Landing Gear Downlocks
- (7) 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge - Inboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
511QB	Lower LE Structure (Left)
511RB	Lower LE Structure (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)
611QB	Lower LE Structure (Right)
611RB	Lower LE Structure (Right)

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D. Trim the Krueger Seal Flap (Fig. 401)

**NOTE:** If you installed a new krueger seal flap, do this procedure before you install the seals. It is not necessary to trim the flap if you installed the same flap that you removed before (Ref 27-81-04).

S 214-020

- (1) Make sure the flaps, slats, and the krueger seal flaps are in the fully extended position.

S 214-021

- (2) Make sure the flap control lever is in the 30-unit detent.

S 094-022

- (3) Remove the PDU lock in the TE flap power drive unit (PDU) (Fig. 402).

S 094-023

- (4) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 403).

S 864-024

- (5) Supply electrical power (Ref 24-22-00).

S 864-025

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (6) Pressurize the center hydraulic system (Ref 29-11-00).

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- S 864-026
- (7) Remove the DO-NOT-OPERATE tag from the flap control lever, and move the lever to the zero (FLAPS UP) detent.
- S 214-027
- (8) Make sure the flaps, slats, and the krueger seal flaps move to the fully retracted position.
- S 494-028
- (9) Attach a DO-NOT-OPERATE tag to the flap control lever.
- S 864-029
- (10) Remove the power from the center hydraulic system (Ref 29-11-00).
- S 494-030
- (11) Install the PDU lock in the TE flap PDU (Fig. 402).
- S 494-031
- (12) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 403).
- S 824-032
- (13) To adjust the fit of the new flap, cut the outboard edge of the flap to get the correct clearance to the skin as shown (Detail C).
- S 324-033
- (14) Make a 0.03 to 0.04 inch (0.76-1.0 mm) chamfer (45 degree) to the inner edge of the flap, along the outboard edge.
- S 374-034
- (15) Apply colored chemical coating to the flap outboard edge with a brush or spray.
- S 374-035
- (16) Apply one coat of primer and one coat of gray gloss enamel.

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S 094-036

(17) Remove the PDU lock from the TE flap PDU (Fig. 402).

S 094-037

(18) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 403).

S 864-038

(19) Supply electrical power (Ref 24-22-00).

S 864-039

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(20) Pressurize the center hydraulic system (Ref 29-11-00).

S 864-040

(21) Remove the DO-NOT-OPERATE tag from the flap control lever and move the lever to the 30-unit detent.

S 214-041

(22) Make sure the flaps, slats, and the krueger seal flaps move to the fully extended position.

S 494-042

(23) Attach a DO-NOT-OPERATE tag to the flap control lever.

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S 864-043

(24) Remove the power from the center hydraulic system (Ref 29-11-00).

S 494-044

(25) Install the PDU lock in the TE flap PDU (Fig. 402).

S 494-045

(26) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 403).

E. Install the Seals (Fig. 401)

**NOTE:** The seals for the krueger seal flap are installed with the flap at the fully extended position (flap control lever in the 30-unit detent).

S 214-046

(1) Make sure that the joints A, B, and C are straight as shown (Detail A).

**NOTE:** These joints will align in a straight line when the flap is in the fully extended position.

S 324-047

(2) If you installed a new flap, drill five 0.190-0.199 inch (4.8-5.0 mm) diameter holes on the flap as shown (Detail D) for the installation of Seal II.

**NOTE:** Use Seal II with the retainer as a template to identify the hole locations on the flap.

S 424-048

(3) Install Seal II and retainer to the flap with five bolts, washers, and nuts (View B-B). Install the bolts with wet sealant.

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S 424-049

- (4) Attach the seal support plate, Seal I, and retainer to the flap with six bolts, washers, and nuts (View C-C).

**NOTE:** Install the bolts with wet sealant. Apply sealant between the flap surface and the seal support plate.

S 324-050

- (5) Cut the edge of the seal support plate if it is necessary to get the correct clearance as shown (Detail B).

**NOTE:** Make a small chamfer to all sharp corners and edges.

S 214-051

- (6) At the flap fully extended position, make sure the seal touches the fixed leading edge skin along the full length of the seal.

S 424-052

- (7) Install Seal III and retainer with two bolts, washers, and nuts (Detail D).

F. Put the Airplane Back to Its Usual Condition

S 094-053

- (1) Remove the PDU lock from the TE flap PDU (Fig. 402).

S 094-054

- (2) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 403).

S 864-055

- (3) Supply electrical power (Ref 24-22-00).

S 864-056

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (Ref 29-11-00).

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S 094-057

- (5) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 864-058

- (6) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps, slats, and the krueger seal flaps move to the fully retracted position.

S 864-059

- (7) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ATLN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-060

- (8) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 094-061

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (9) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

S 864-062

- (10) Remove the power from the center hydraulic system (Ref 29-11-00).

S 864-063

- (11) Remove electrical power (Ref 24-22-00).

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S 414-064

- (12) Install the access panels, 511QB and 511RB (left wing), 611QB and 611RB (right wing), to close the access to the krueger seal flap drive (Ref 06-44-00).

S 414-065

- (13) Install the access panels, 511BB and 611BB, to close the access to the outboard and inboard slat PDUs (Ref 06-44-00).

S 444-066

- (14) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

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KRUEGER SEAL FLAP AND KRUEGER SEAL FLAP DRIVE – MAINTENANCE PRACTICES

1. General

A. This procedure contains these four tasks:

- The Krueger Seal Flap and Krueger Seal Flap Drive Removal
- The Krueger Seal Flap and Krueger Seal Flap Drive Installation
- The Krueger Seal Flap and Flap Drive Adjustment/Test
- The Krueger Seal Flap and Flap Drive Inspection Check

TASK 27-81-04-022-001

2. The Krueger Seal Flap and Krueger Seal Flap Drive – Removal

A. General

- (1) This task contains two topics, one to remove the krueger seal flap, and one to remove the krueger seal flap drive. Because this task contains two procedures, it is only necessary do the group of steps applicable to your maintenance.

To start one of these procedures, do the steps in the "Prepare for the Removal" topic before you remove the component.

B. Equipment

- (1) Leading Edge Slats Groundlock – A27007-1  
(2 Necessary)
- (2) TE Flap PDU Lock – A27009-7
- (3) Circuit Breaker Lockout Clip  
(4 Necessary) Commercially Available

C. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power – Control
- (3) 27-81-03/401, Krueger Seal Flap Seal
- (4) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) 32-00-15/201, Landing Gear Door Locks
- (6) 32-00-20/201, Landing Gear Downlocks
- (7) 78-31-00/201, Thrust Reverser System

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D. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge - Inboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

E. Prepare for the Removal

S 212-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 492-003

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (Ref 32-00-15).

S 042-004

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PRECEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 212-005

- (4) Make sure the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position.

S 212-006

- (5) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 862-007

- (6) Supply electrical power (Ref 24-22-00).

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S 862-008

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(7) Pressurize the center hydraulic system (Ref 29-11-00).

S 862-009

(8) Move the flap control lever to the 30-unit detent, and make sure the flaps and slats move to the fully extended position.

S 492-010

(9) Attach a DO-NOT-OPERATE tag on the flap control lever.

S 862-011

(10) Remove the power from the center hydraulic system (Ref 29-11-00).

S 492-012

(11) Install the PDU lock in the TE flap PDU (Fig. 205).

S 012-013

(12) Open the access panels, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (Ref 06-44-00).

S 492-014

(13) Install the groundlocks on the inboard and outboard slat PDUs (Fig. 206).

S 862-015

(14) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:

- (a) 11H23, SLAT ALTN CONT INBD
- (b) 11H24, SLAT ALTN CONT OUTBD
- (c) 11J24, FLAPS ALTN CONT

S 862-016

(15) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:

- (a) 6D21, ALTN SLAT INBD PWR
- (b) 6D24, ALTN FLAP PWR
- (c) 6F24, ALTN SLAT OUTBD PWR

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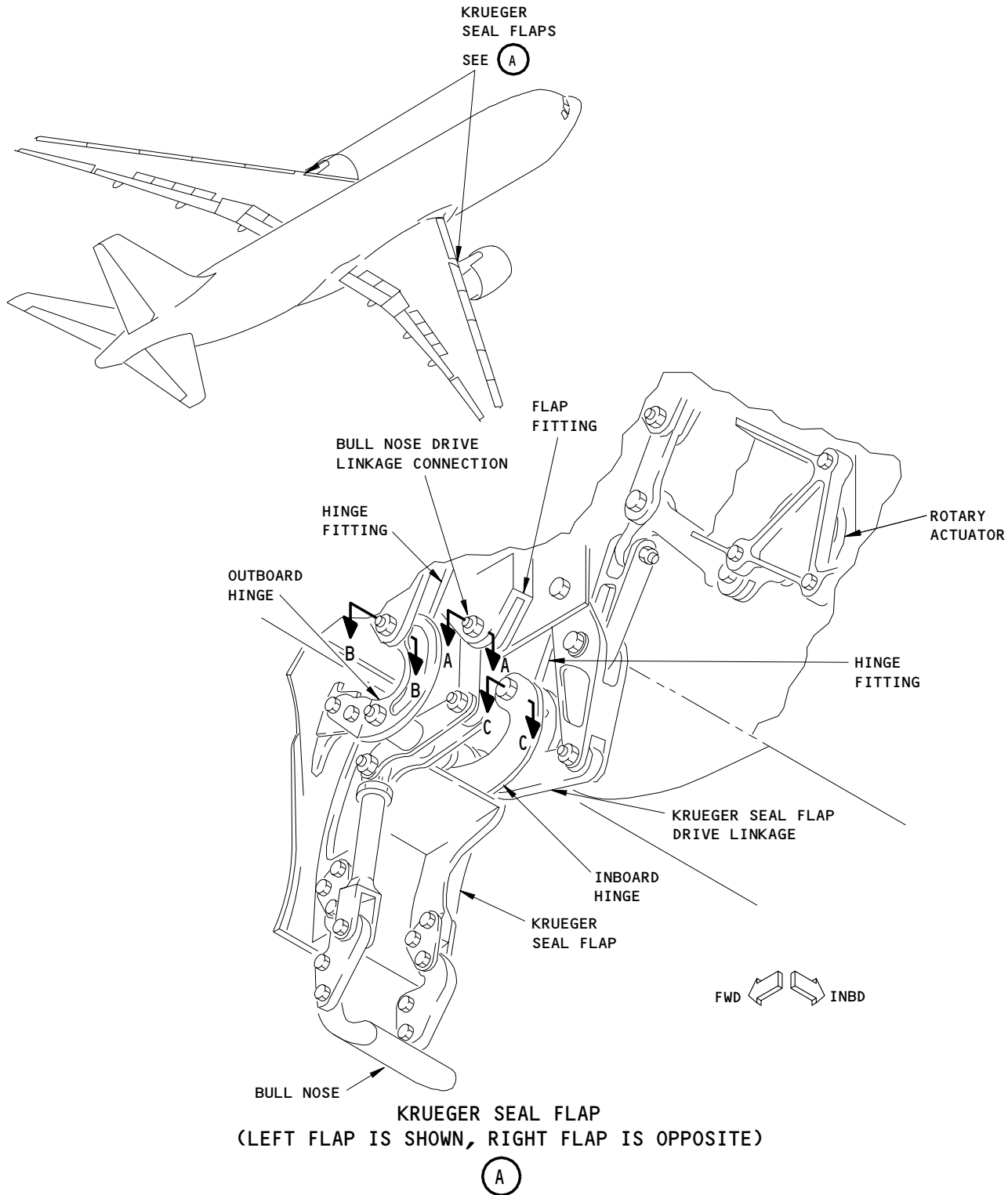
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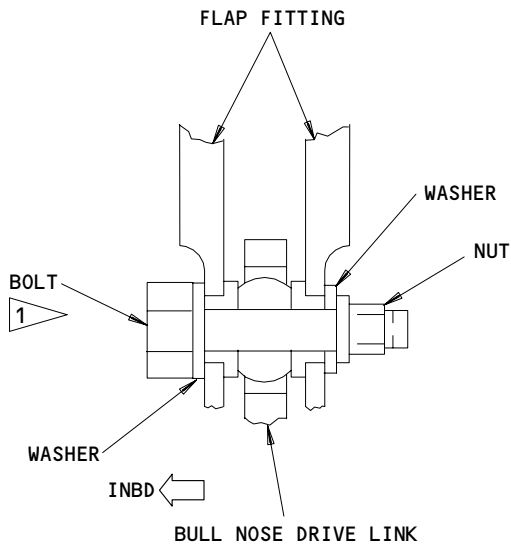
## 767 MAINTENANCE MANUAL



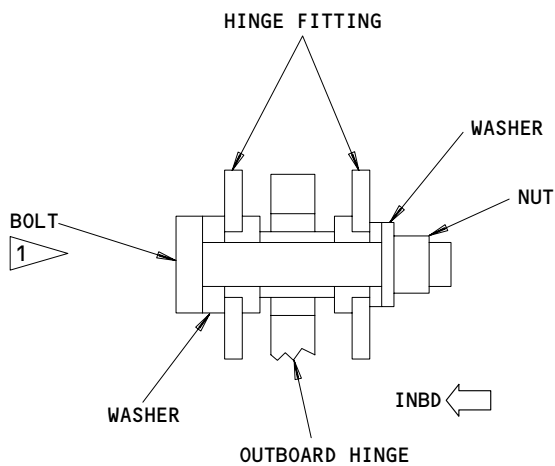
Krueger Seal Flap  
Figure 201 (Sheet 1)

EFFECTIVITY	ALL
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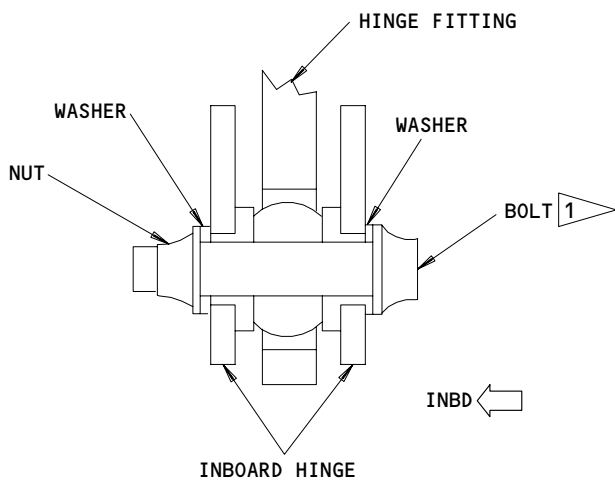
27-81-04



A-A



B-B



C-C

1 APPLY A LIGHT LAYER OF GREASE TO THE BOLT BEFORE THE INSTALLATION

Krueger Seal Flap  
Figure 201 (Sheet 2)

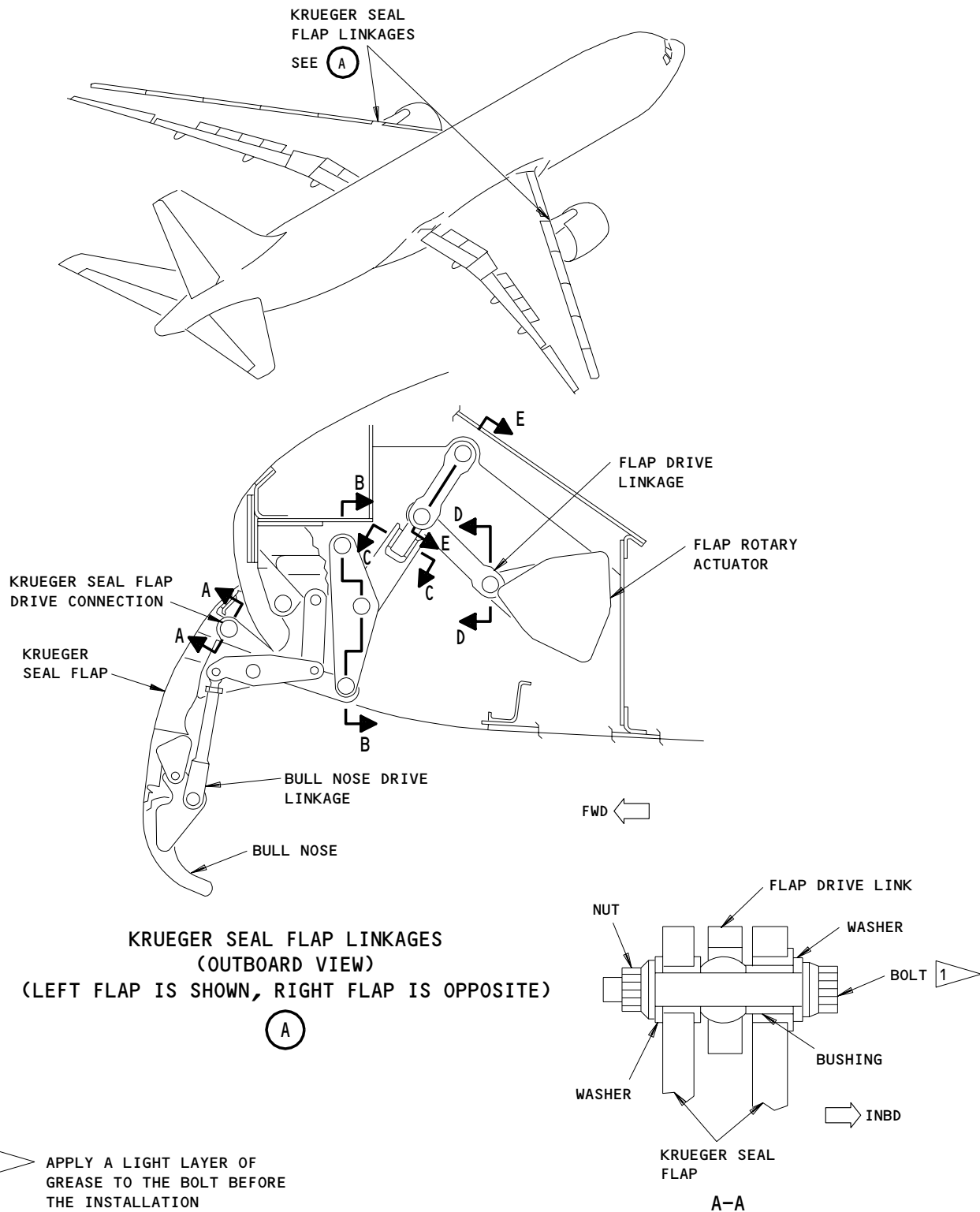
EFFECTIVITY	ALL
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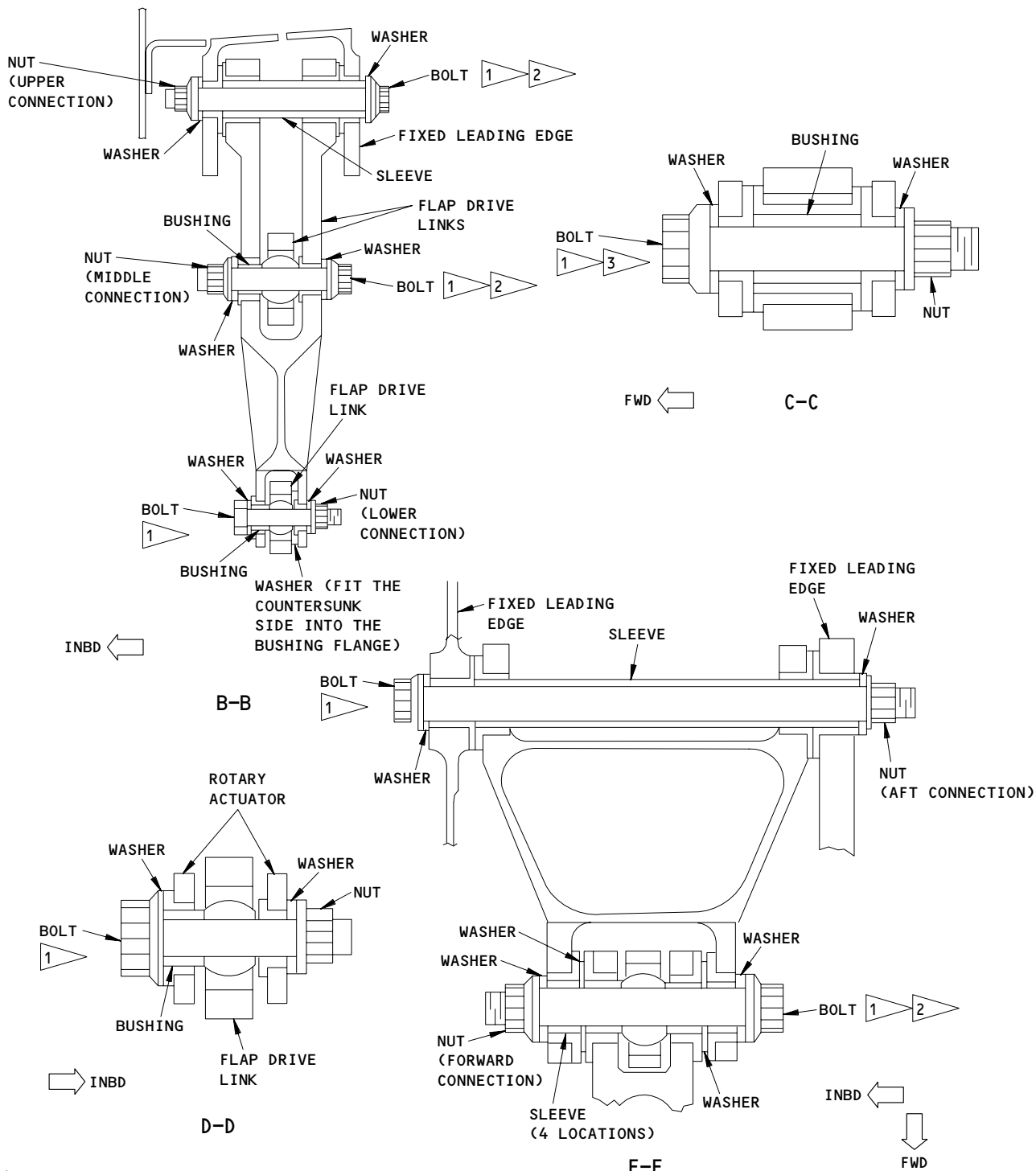
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Krueger Seal Flap Drive Linkage  
Figure 202 (Sheet 1)

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- 2 AIRPLANES WITH ROLL ROYCE AND PRATT AND WHITNEY ENGINES:  
BOLTHEAD ON OUTBOARD SIDE
- AIRPLANES WITH GE ENGINES:  
BOLTHEAD ON INBOARD SIDE
- 3 BOLTHEAD ON THE UPPER SIDE

Krueger Seal Flap Drive Linkage  
Figure 202 (Sheet 2)

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S 012-017

- (16) Remove the fixed lower access panels at the inboard leading edge if it is necessary to get access to the krueger seal flap drive (Ref 06-44-00).

F. Krueger Seal Flap Removal

S 032-018

- (1) Disconnect the flap drive link from the krueger seal flap (View A-A, Fig. 202).

S 032-019

- (2) Disconnect the bull nose drive link from the flap fitting (View A-A, Fig. 201).

S 032-020

- (3) Disconnect the krueger seal flap at the inboard hinge (View C-C) and the outboard hinge (View B-B, Fig. 201).

S 022-021

- (4) Remove the seal from the flap if you will install a new flap that does not have a seal (Ref 27-81-03).

G. Krueger Seal Flap Drive Removal (Fig. 202)

S 032-022

- (1) Disconnect the linkages as necessary to remove the components of the flap drive (View A-A thru E-E).

TASK 27-81-04-422-023

3. The Krueger Seal Flap and Krueger Seal Flap Drive - Installation

A. General

- (1) This task contains two topics, one to install the krueger seal flap, and one to install the krueger seal flap drive. Because this task contains two procedures, it is only necessary do the group of steps applicable to your maintenance.

To start one of these procedures, do the steps in the "Prepare for the Installation" topic before you do the installation procedure.

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)  
D00013 Grease - MIL-PRF-23827 (Optional)

C. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) 32-00-15/201, Landing Gear Door Locks
- (5) 78-31-00/201, Thrust Reverser System

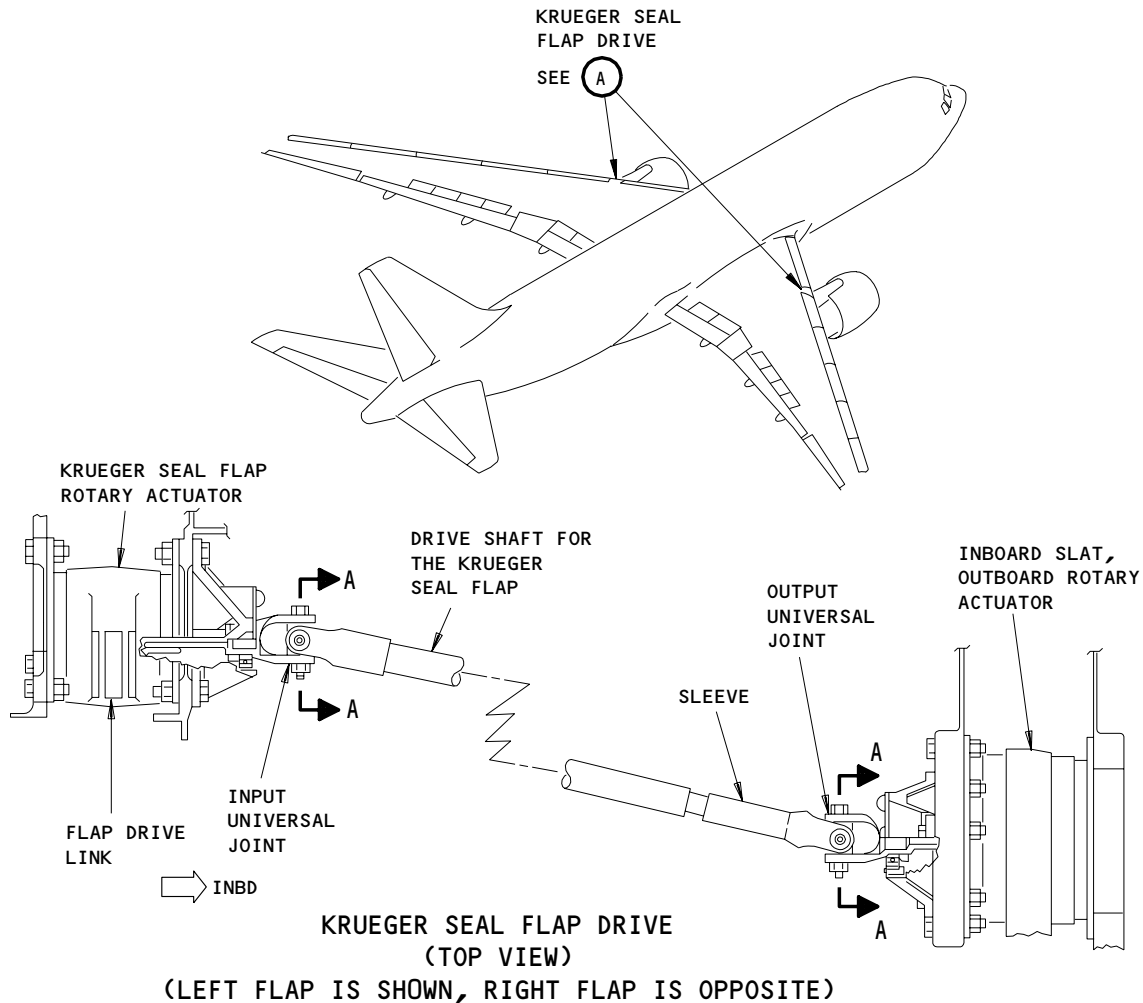
EFFECTIVITY

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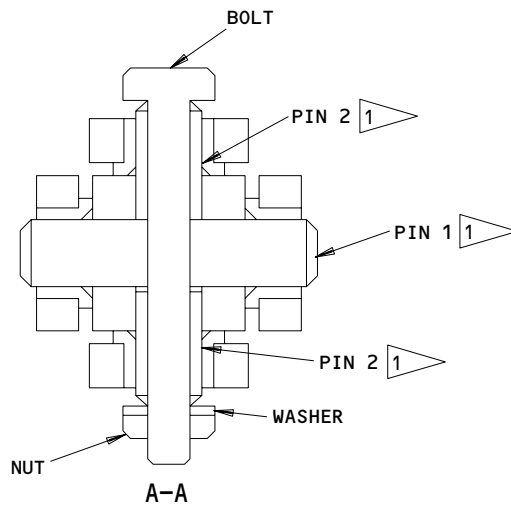
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**KRUEGER SEAL FLAP DRIVE  
(TOP VIEW)  
(LEFT FLAP IS SHOWN, RIGHT FLAP IS OPPOSITE)**

(A)



1 USE THE SLOT ON THE PIN 2 TO TURN THE PIN 2 UNTIL THE TANGS ON THE OPPOSITE END TOUCH THE RECESS ON PIN 1

**Krueger Seal Flap Drive  
Figure 203**

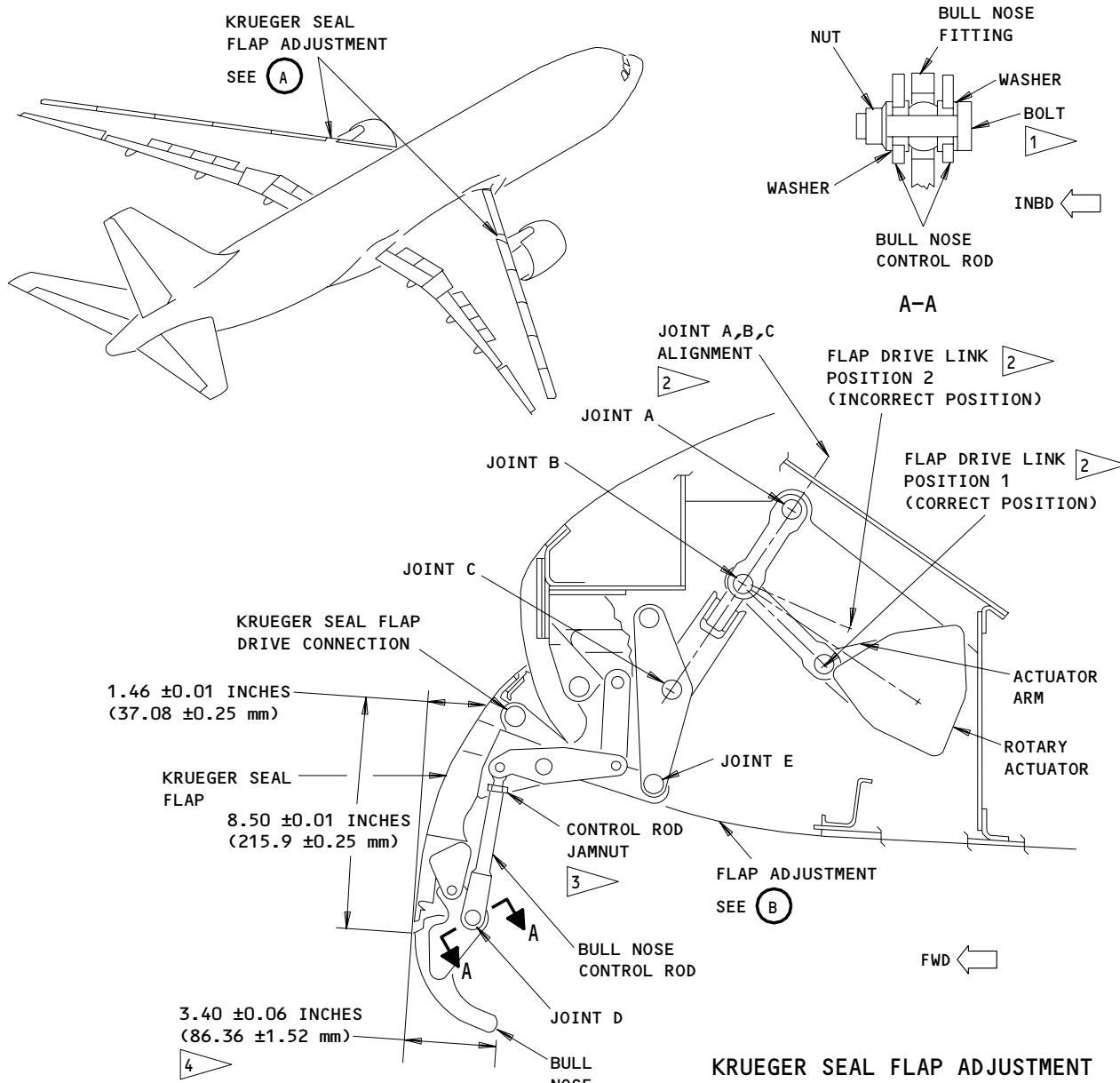
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- 1 APPLY A LIGHT LAYER OF GREASE BEFORE THE INSTALLATION.
- 2 JOINTS A,B,C MUST BE STRAIGHT WHEN YOU CONNECT THE DRIVE SHAFT TO THE ROTARY ACTUATOR. THE JOINTS ARE ALIGNED WHEN THE FLAP DRIVE LINKAGE IS IN POSITION 1 OR 2, BUT ONLY POSITION 1 IS THE CORRECT POSITION. YOU HAVE SET POSITION 1 CORRECTLY WHEN THE FLAP DRIVE LINK AND ROTARY ACTUATOR ARE FULLY DOWN AND JOINTS A, B AND C ARE ALIGNED.
- 3 INSTALL A LOCKWIRE TO THE JAMNUT WITH THE DOUBLE TWIST PROCEDURE (AMM 20-10-23).
- 4 ADJUST THE BULL NOSE CONTROL ROD TO GET THIS DIMENSION TO AGREE.

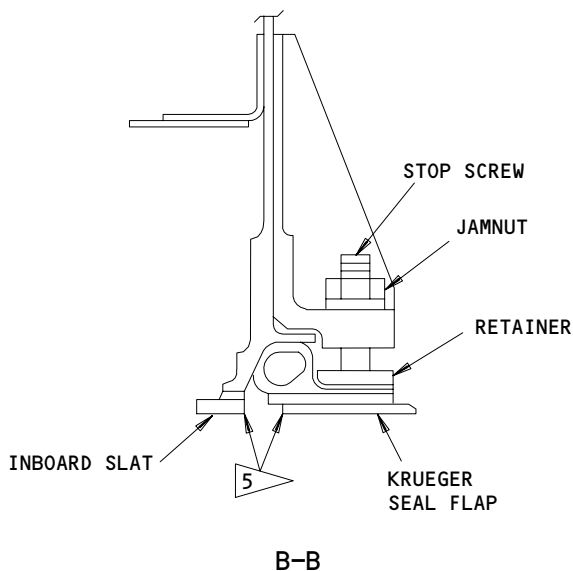
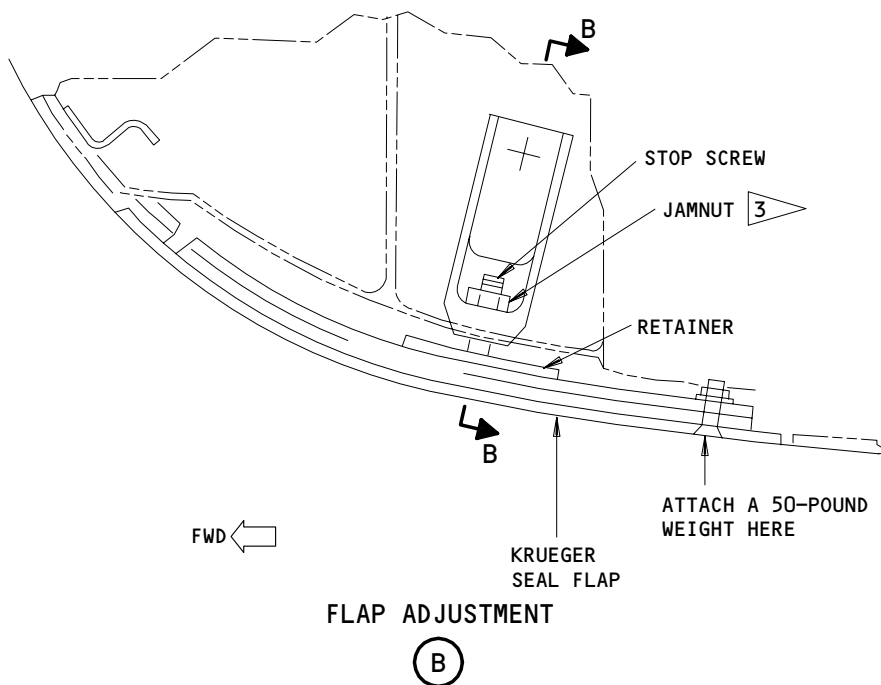
**KRUEGER SEAL FLAP ADJUSTMENT  
(OUTBOARD VIEW)  
(LEFT FLAP IS SHOWN,  
RIGHT FLAP IS OPPOSITE)**

(A)

Krueger Seal Flap Drive Adjustment  
Figure 204 (Sheet 1)

EFFECTIVITY	
	ALL

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5 THE SURFACE MUST ALIGN BY  $\pm 0.02$  INCH FOR AT LEAST 25% OF ANY EDGE, AND BY  $\pm 0.04$  INCH FOR A DISTANCE OF NO MORE THAN 25% OF ANY EDGE

Krueger Seal Flap Drive Adjustment  
Figure 204 (Sheet 2)

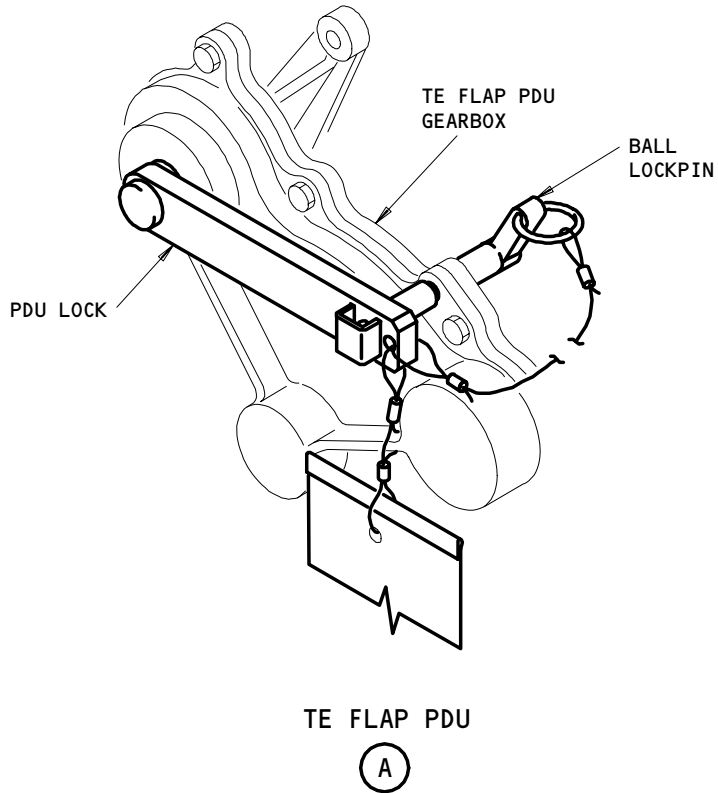
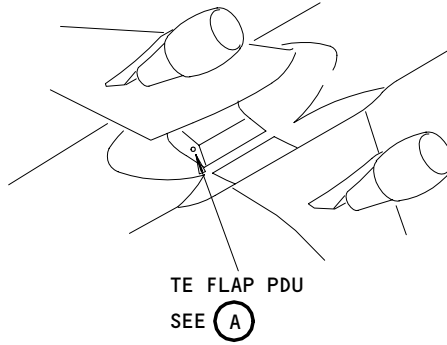
EFFECTIVITY	
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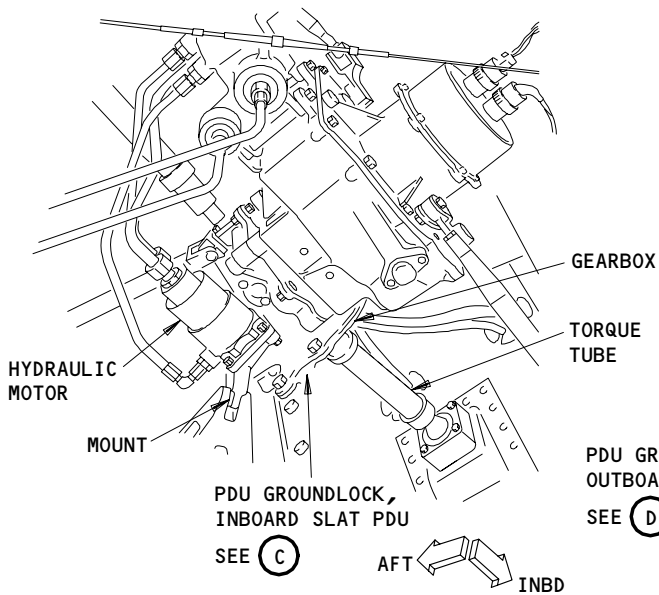
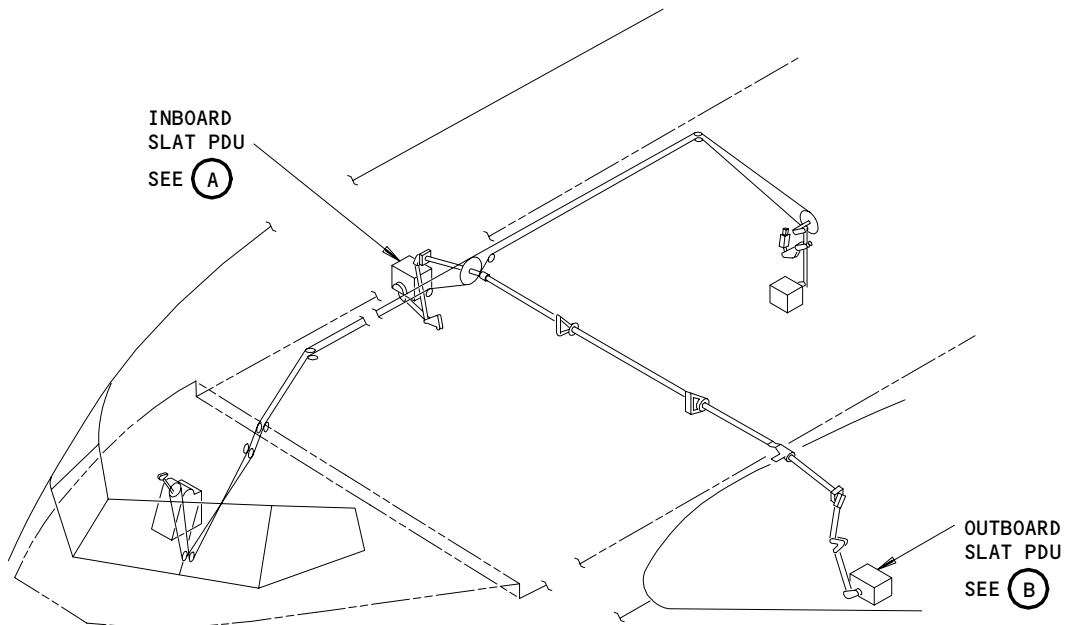
PDU Lock for the TE Flap PDU  
Figure 205

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	ALL

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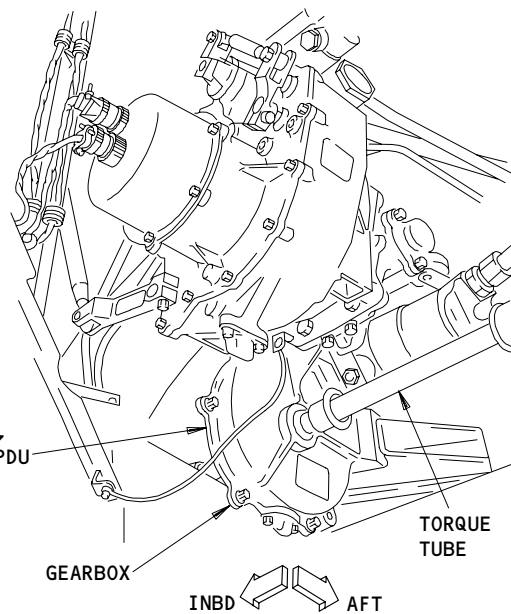
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INBOARD SLAT PDU  
(BOTTOM VIEW)

(A)



OUTBOARD SLAT PDU

(B)

Slat PDU Groundlock  
Figure 206 (Sheet 1)

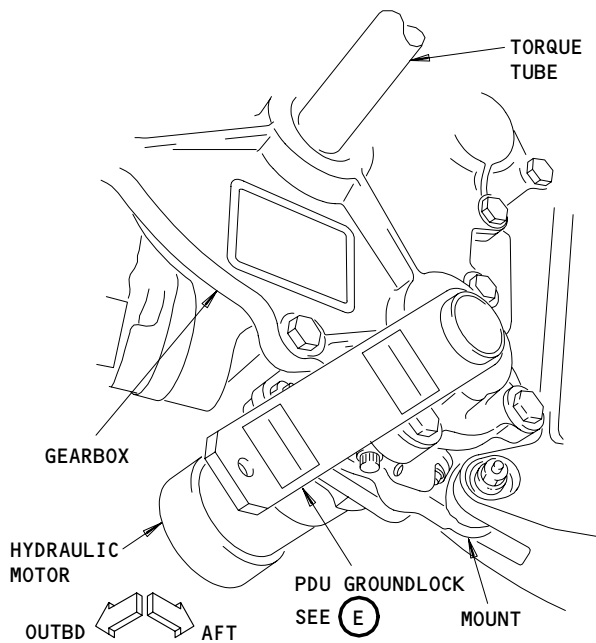
EFFECTIVITY

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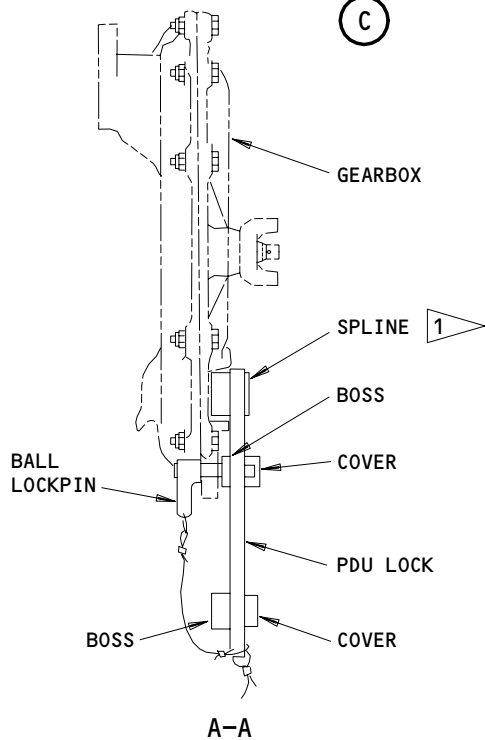
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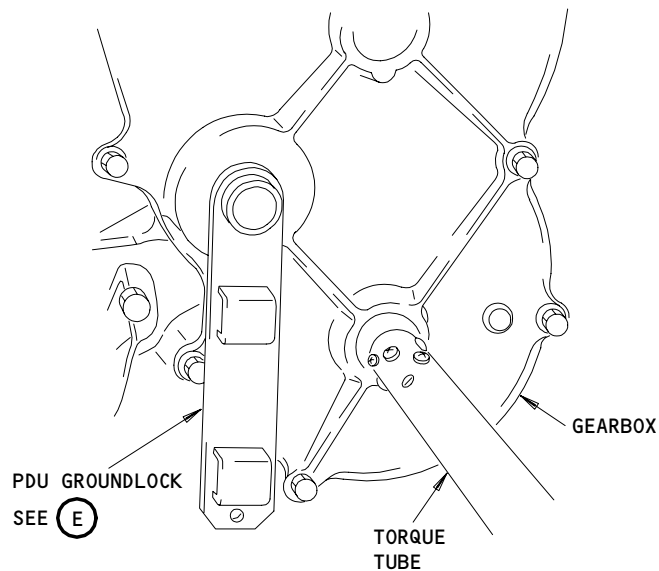
**PDU GROUNDLOCK,  
INBOARD SLAT PDU**

(C)



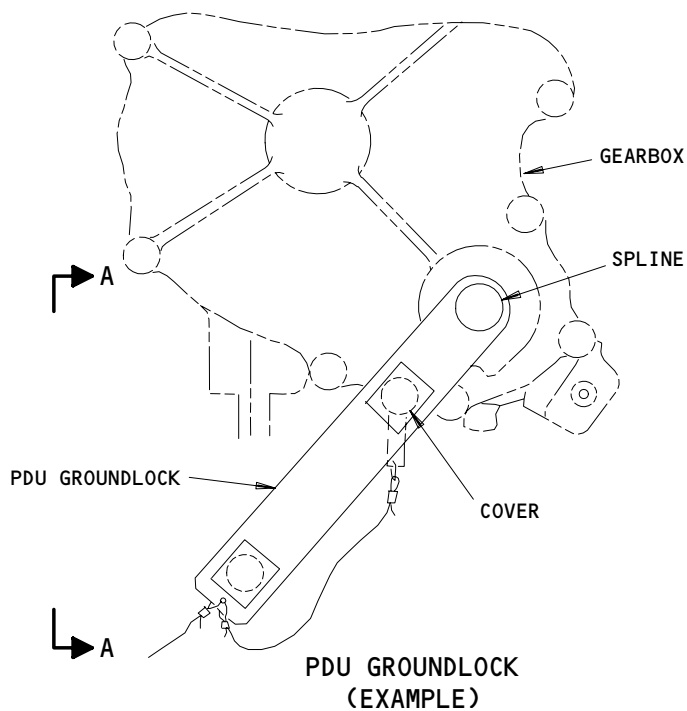
A-A

1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN, INSTALLED THROUGH THE BOSS AND THE GEAROX



**PDU GROUNDLOCK,  
OUTBOARD SLAT PDU**

(D)



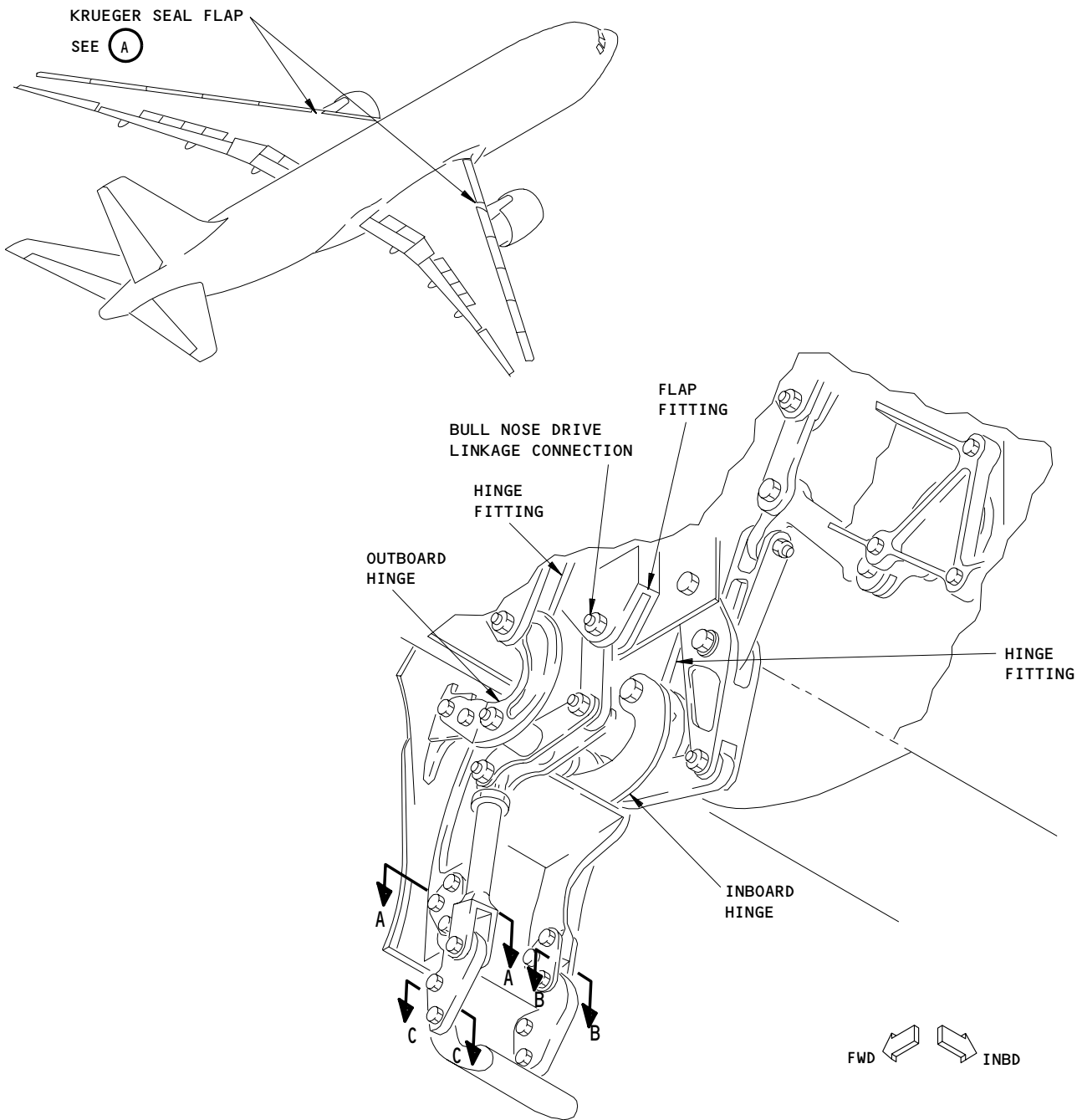
**PDU GROUNDLOCK  
(EXAMPLE)**

(E)

**Slat PDU Groundlock  
Figure 206 (Sheet 2)**

EFFECTIVITY	ALL
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**KRUEGER SEAL FLAP  
(LEFT FLAP IS SHOWN, RIGHT FLAP IS OPPOSITE)**

**A**

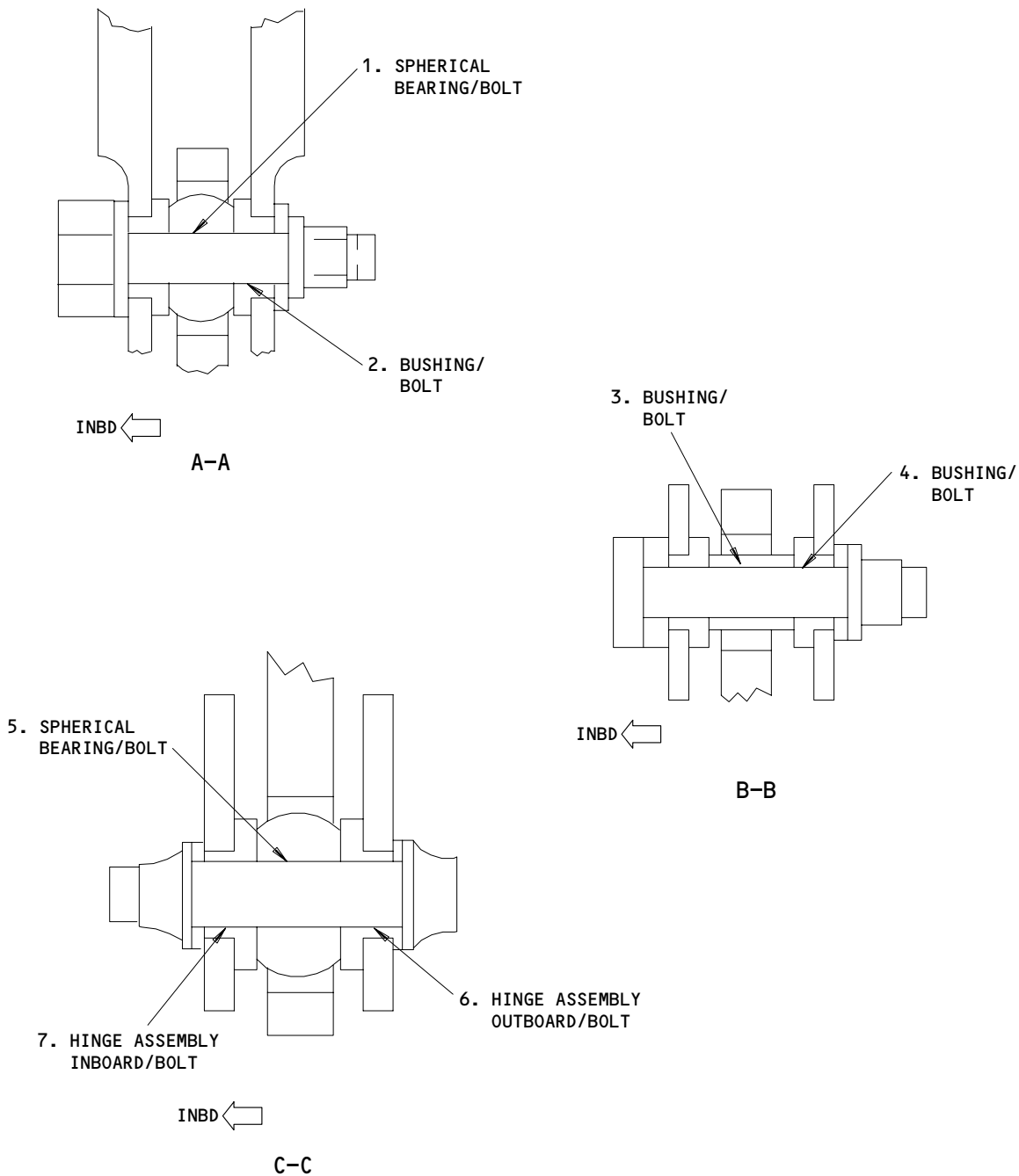
**Wear Limits for the Krueger Seal Flap Installation  
Figure 207 (Sheet 1)**

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Wear Limits for the Krueger Seal Flap Installation  
Figure 207 (Sheet 2)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIM.	MAX DIA CLEARANCE			
			MIN	MAX					
1	SPHERICAL BEARING	ID	0.2500	0.2504	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2454		X		
2	BUSHING	ID	0.2500	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
3	BUSHING	ID	0.2495	0.2500	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2450		X		
4	BUSHING	ID	0.2500	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
5	SPHERICAL BEARING	ID	0.3125	0.3129	0.3170	0.0050	X		
	BOLT	OD	0.3115	0.3120	0.3079		X		
6	BUSHING	ID	0.3125	0.3131	0.3170	0.0050	X		
	BOLT	OD	0.3115	0.3120	0.3081		X		
7	BUSHING	ID	0.3125	0.3131	0.3170	0.0050	X		
	BOLT	OD	0.3115	0.3120	0.3081		X		

Wear Limits for the Krueger Seal Flap Installation  
Figure 207 (Sheet 3)

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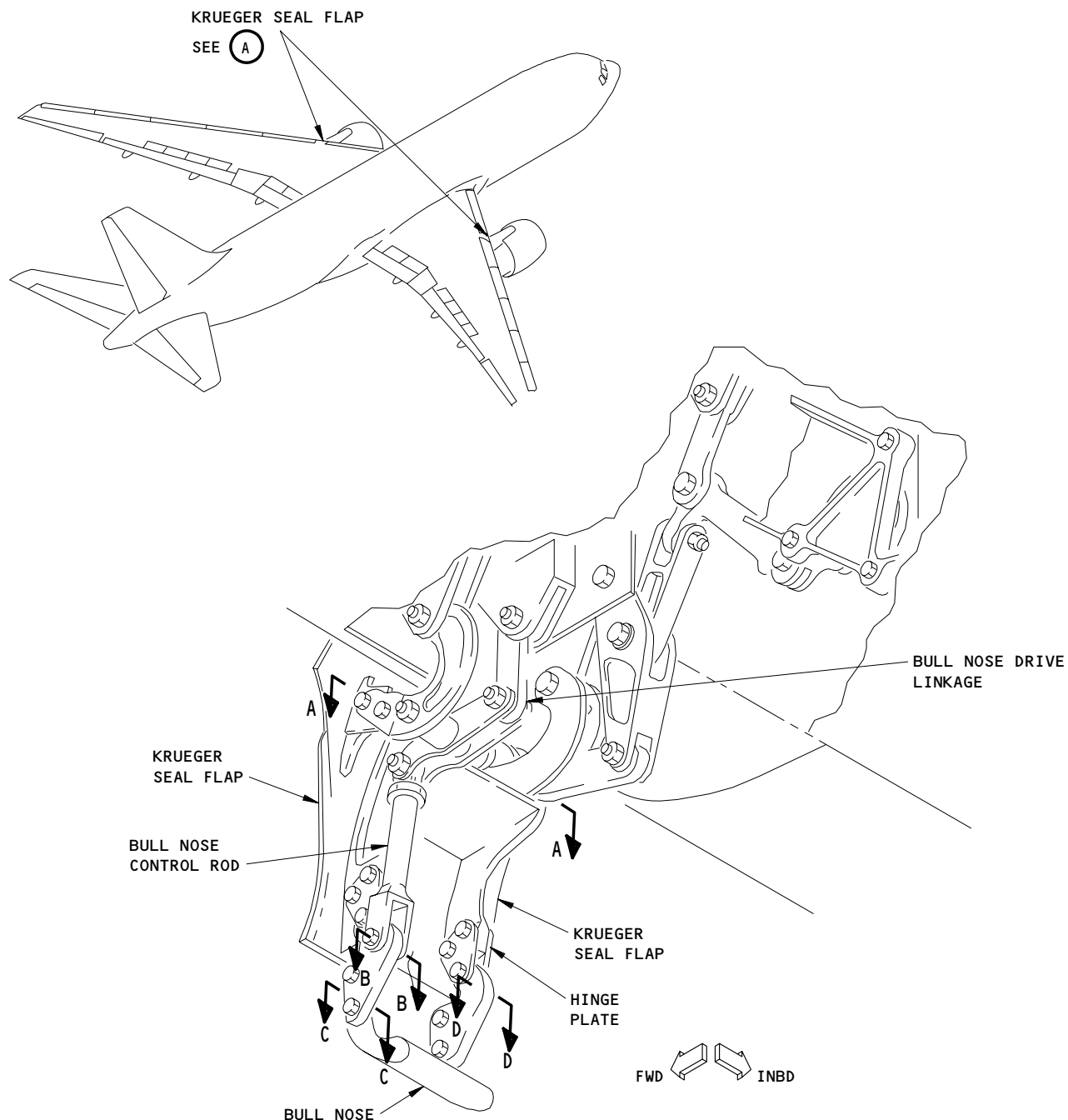
ALL
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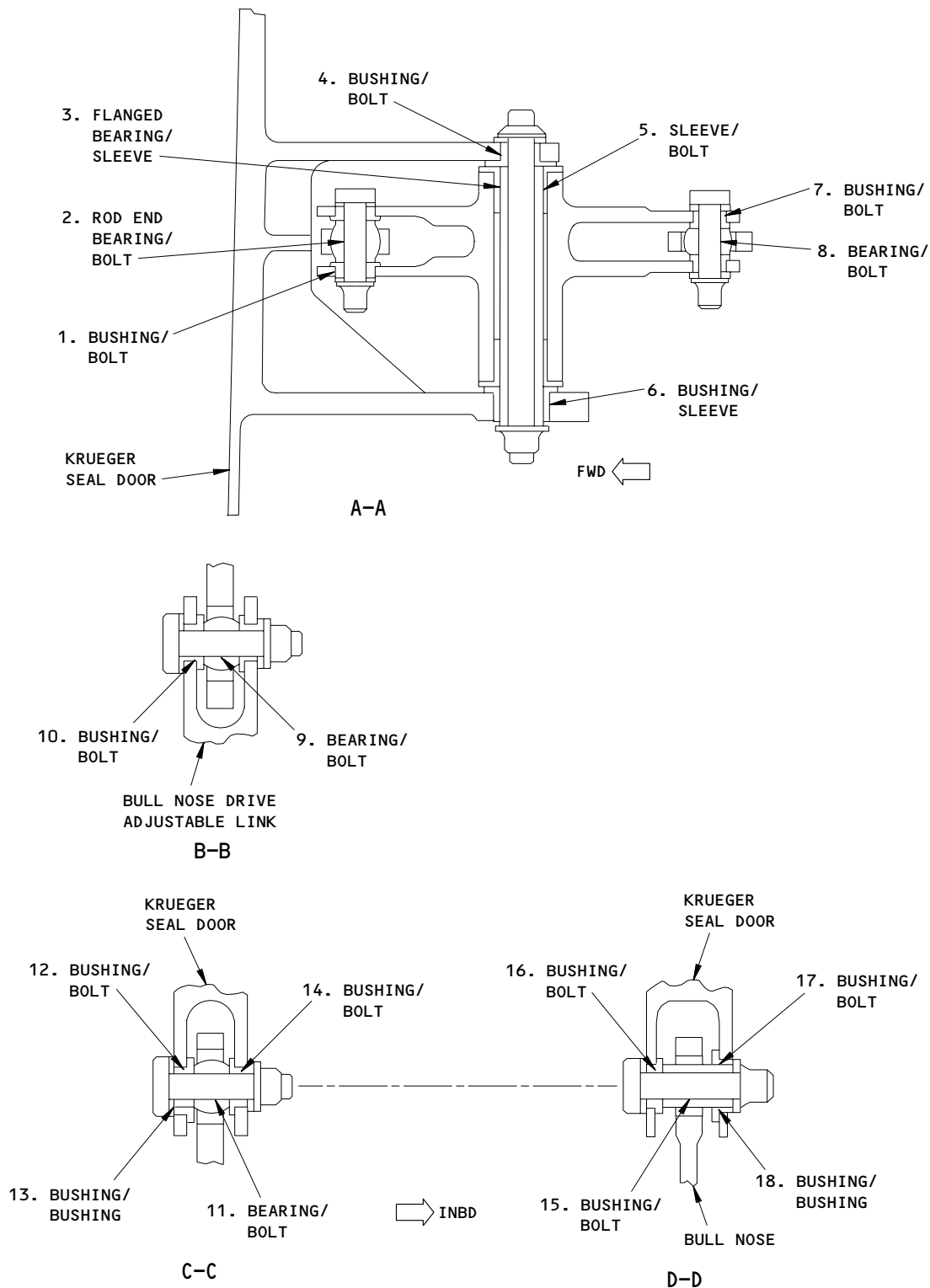
**KRUEGER SEAL FLAP**  
(LEFT FLAP IS SHOWN, RIGHT FLAP IS OPPOSITE)

(A)

**Wear Limits for the Krueger Seal Flap Assembly**  
Figure 208 (Sheet 1)

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Wear Limits for the Krueger Seal Flap Assembly  
Figure 208 (Sheet 2)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIM.	MAX DIA CLEARANCE			
			MIN	MAX					
1	BUSHING	ID	0.2495	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
2	ROD END BEARING	ID	0.2495	0.2500	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2450		X		
3	FLANGED BEARING	ID	0.5005	0.5025	0.5045	0.0050	X		
	SLEEVE	OD	0.4990	0.4995	0.4975		X		
4	BUSHING	ID	0.3125	0.3131	0.3170	0.0050	X		
	BOLT	OD	0.3115	0.3120	0.3081		X		
5	SLEEVE	ID	0.3130	0.3160	0.3215	0.0095	X		
	BOLT	OD	0.3115	0.3120	0.3065		X		
6	BUSHING	ID	0.5000	0.5007	0.5045	0.0050	X		
	SLEEVE	OD	0.4990	0.4995	0.4957		X		
7	BUSHING	ID	0.2495	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
8	BEARING	ID	0.2500	0.2504	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2454		X		
9	BEARING	ID	0.2500	0.2504	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2454		X		
10	BUSHING	ID	0.2495	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
11	BEARING	ID	0.2500	0.2504	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2454		X		

Wear Limits for the Krueger Seal Flap Assembly  
Figure 208 (Sheet 3)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIM.	MAX DIA CLEARANCE			
			MIN	MAX					
12	BUSHING	ID	0.2500	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
13	BUSHING	ID	0.3750	0.3756	0.3795	0.0050	X		
	BUSHING	OD	0.3740	0.3745	0.3706		X		
14	BUSHING	ID	0.2500	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
15	BUSHING	ID	0.2500	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
16	BUSHING	ID	0.2495	0.2500	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2450		X		
17	BUSHING	ID	0.2500	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
18	BUSHING	ID	0.3750	0.3756	0.3795	0.0050	X		
	BUSHING	OD	0.3740	0.3745	0.3706		X		

Wear Limits for the Krueger Seal Flap Assembly  
Figure 208 (Sheet 4)

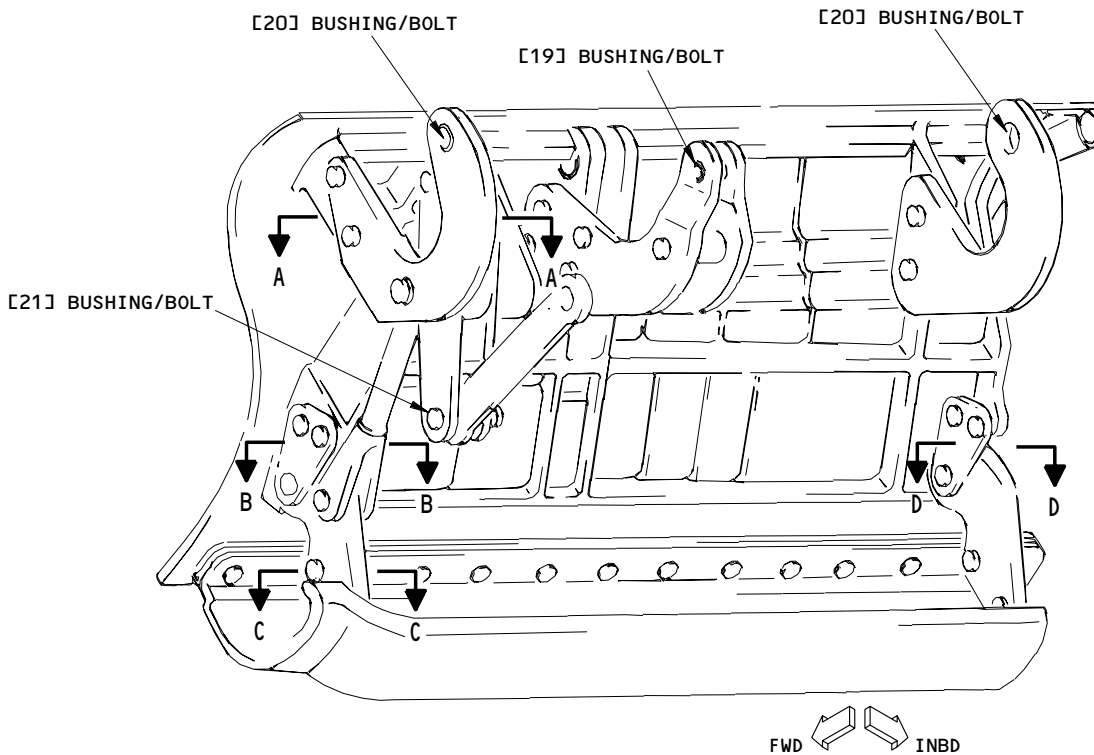
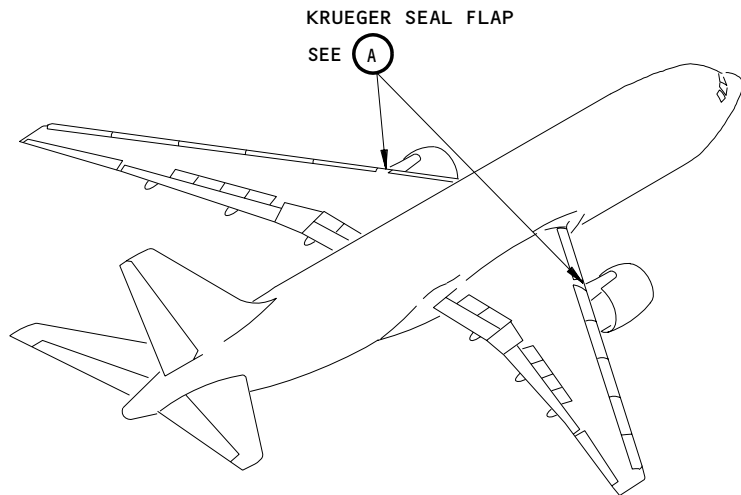
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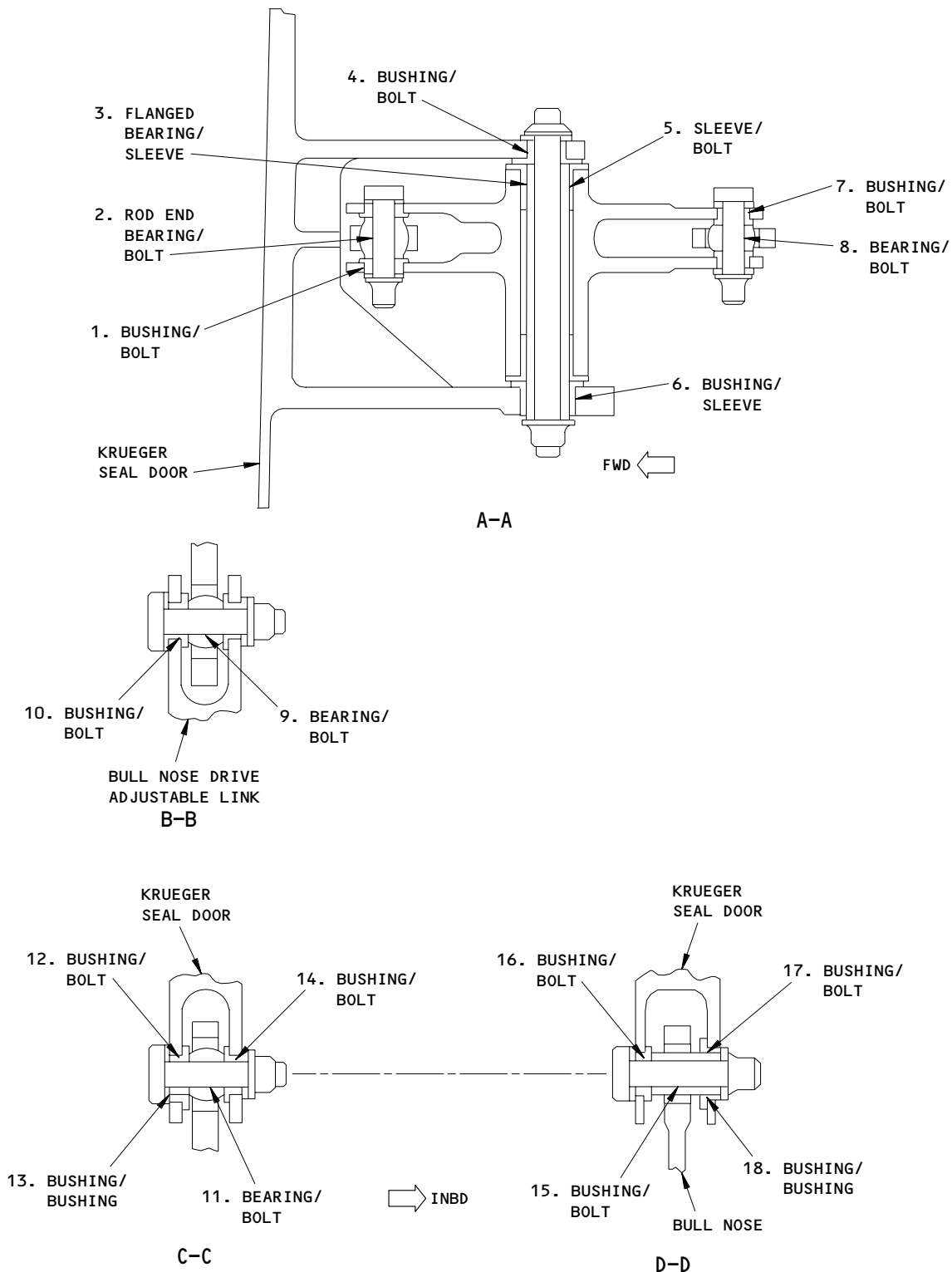
KRUEGER SEAL FLAP  
(LEFT FLAP IS SHOWN, RIGHT FLAP IS OPPOSITE)

(A)

Wear Limits for the Krueger Seal Flap Assembly  
Figure 208A (Sheet 1)

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Wear Limits for the Krueger Seal Flap Assembly  
Figure 208A (Sheet 2)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIM.	MAX DIA CLEARANCE			
			MIN	MAX					
1	BUSHING	ID	0.2495	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
2	ROD END BEARING	ID	0.2495	0.2500	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2450		X		
3	FLANGED BEARING	ID	0.5005	0.5025	0.5045	0.0050	X		
	SLEEVE	OD	0.4990	0.4995	0.4975		X		
4	BUSHING	ID	0.3125	0.3131	0.3170	0.0050	X		
	BOLT	OD	0.3115	0.3120	0.3081		X		
5	SLEEVE	ID	0.3130	0.3160	0.3215	0.0095	X		
	BOLT	OD	0.3115	0.3120	0.3065		X		
6	BUSHING	ID	0.5000	0.5007	0.5045	0.0050	X		
	SLEEVE	OD	0.4990	0.4995	0.4957		X		
7	BUSHING	ID	0.2495	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
8	BEARING	ID	0.2500	0.2504	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2454		X		
9	BEARING	ID	0.2500	0.2504	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2454		X		
10	BUSHING	ID	0.2495	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
11	BEARING	ID	0.2500	0.2504	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2454		X		

Wear Limits for the Krueger Seal Flap Assembly  
Figure 208A (Sheet 3)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIM.	MAX DIA CLEARANCE			
			MIN	MAX					
12	BUSHING	ID	0.2500	0.2504	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
13	BUSHING	ID	0.3750	0.3756	0.3795	0.0050	X		
	BUSHING	OD	0.3740	0.3745	0.3706		X		
14	BUSHING	ID	0.2500	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
15	BUSHING	ID	0.2500	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
16	BUSHING	ID	0.2495	0.2500	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2450		X		
17	BUSHING	ID	0.2500	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
18	BUSHING	ID	0.3750	0.3756	0.3795	0.0050	X		
	BUSHING	OD	0.3740	0.3745	0.3706		X		
19	BUSHING	ID	0.3129	0.3131	0.3170	0.0050	X		
	BOLT	OD	0.3115	0.3120	0.3081		X		
20	BUSHING	ID	0.2495	0.2500	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2450		X		
21	BEARING	ID	0.2500	0.2504	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2454		X		

Wear Limits for the Krueger Seal Flap Assembly  
Figure 208A (Sheet 4)

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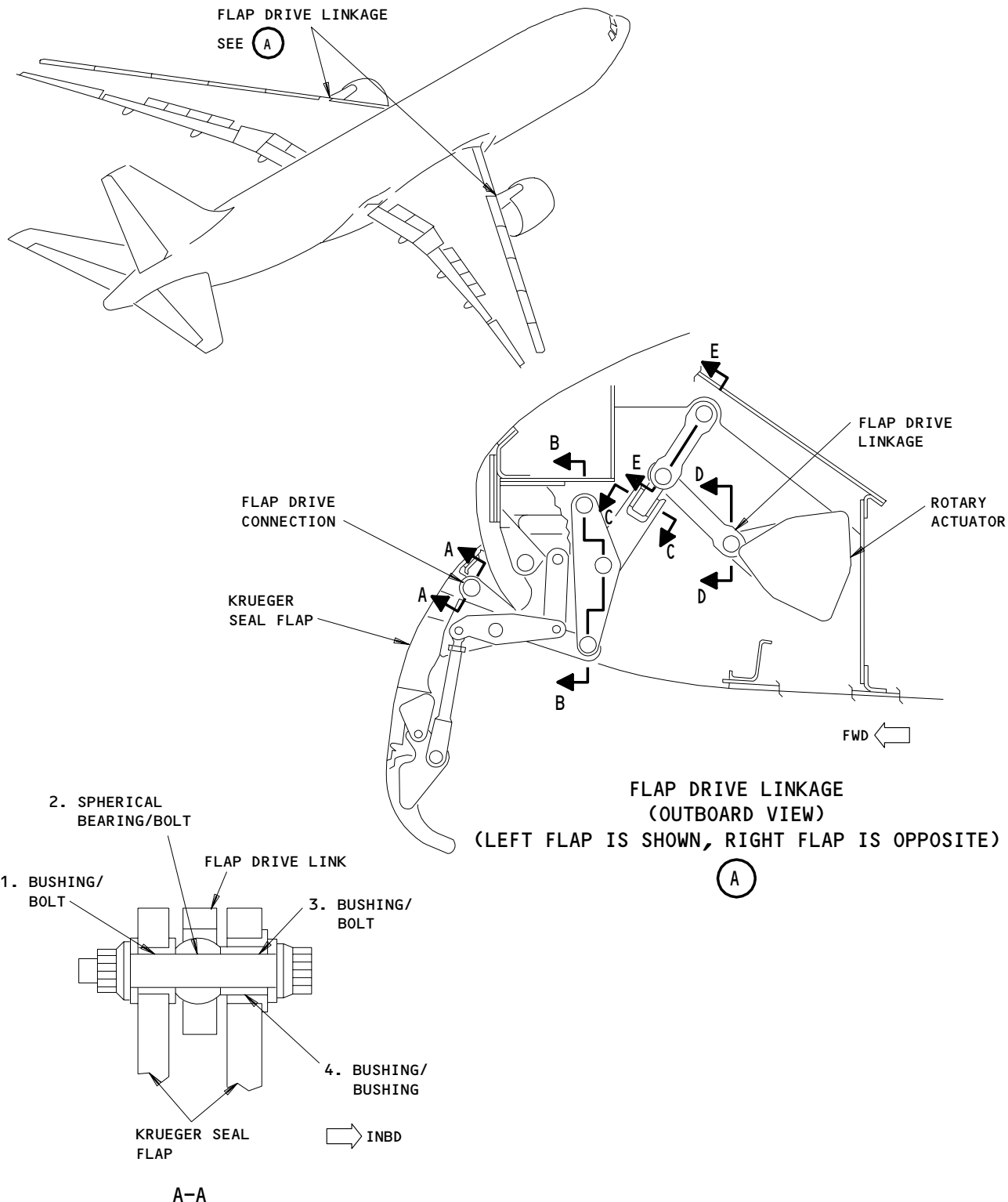
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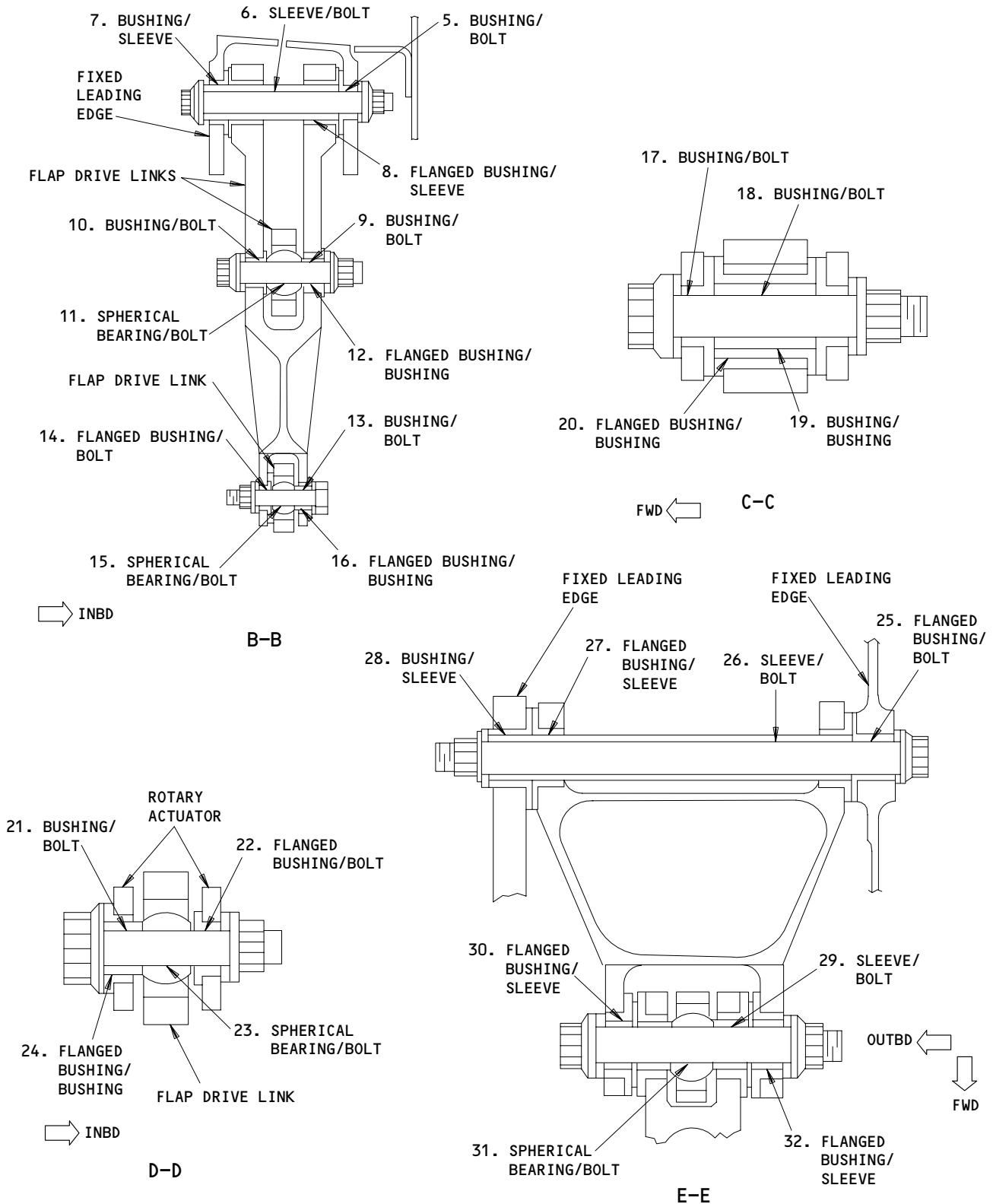




Wear Limits for the Flap Drive Linkage  
Figure 209 (Sheet 1)

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Wear Limits for the Flap Drive Linkage  
Figure 209 (Sheet 2)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIM.	MAX DIA CLEARANCE			
			MIN	MAX					
1	BUSHING	ID	0.3125	0.3140	0.3170	0.0050	X		
	BOLT	OD	0.3115	0.3120	0.3090		X		
2	SPHERICAL BEARING	ID	0.3125	0.3129	0.3170	0.0050	X		
	BOLT	OD	0.3115	0.3120	0.3079		X		
3	BUSHING	ID	0.3125	0.3130	0.3170	0.0050	X		
	BOLT	OD	0.3115	0.3120	0.3080		X		
4	BUSHING	ID	0.4375	0.4390	0.4420	0.0050	X		
	BUSHING	OD	0.4365	0.4370	0.4340		X		
5	BUSHING	ID	0.3750	0.3756	0.3795	0.0050	X		
	BOLT	OD	0.3740	0.3745	0.3706		X		
6	SLEEVE	ID	0.3760	0.3790	0.3795	0.0050	X		
	BOLT	OD	0.3740	0.3745	0.3740		X		
7	BUSHING	ID	0.5620	0.5627	0.5665	0.0050	X		
	SLEEVE	OD	0.5610	0.5615	0.5577		X		
8	FLANGED BUSHING	ID	0.5630	0.5640	0.5665	0.0050	X		
	SLEEVE	OD	0.5610	0.5615	0.5590		X		
9	BUSHING	ID	0.3750	0.3755	0.3795	0.0050	X		
	BOLT	OD	0.3740	0.3745	0.3705		X		
10	BUSHING	ID	0.3750	0.3756	0.3795	0.0050	X		
	BOLT	OD	0.3740	0.3745	0.3706		X		
11	SPHERICAL BEARING	ID	0.3750	0.3754	0.3795	0.0050	X		
	BOLT	OD	0.3740	0.3745	0.3704		X		

Wear Limits for the Flap Drive Linkage  
Figure 209 (Sheet 3)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIM.	MAX DIA CLEARANCE			
			MIN	MAX					
12	FLANGED BUSHING	ID	0.5620	0.5627	0.5665	0.0050	X		
	BUSHING	OD	0.5610	0.5615	0.5577		X		
13	BUSHING	ID	0.2500	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
14	FLANGED BUSHING	ID	0.2500	0.2505	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2455		X		
15	SPHERICAL BEARING	ID	0.2500	0.2504	0.2545	0.0050	X		
	BOLT	OD	0.2490	0.2495	0.2454		X		
16	FLANGED BUSHING	ID	0.3750	0.3756	0.3795	0.0050	X		
	BUSHING	OD	0.3740	0.3745	0.3706		X		
17	BUSHING	ID	0.3750	0.3756	0.3795	0.0050	X		
	BOLT	OD	0.3740	0.3745	0.3705		X		
18	BUSHING	ID	0.3750	0.3755	0.3795	0.0050	X		
	BOLT	OD	0.3740	0.3745	0.3705		X		
19	BUSHING	ID	0.5620	0.5627	0.5665	0.0050	X		
	BUSHING	OD	0.5610	0.5615	0.5577		X		
20	FLANGED BUSHING	ID	0.6875	0.6882	--	--	X		
	BUSHING	OD	0.6887	0.6893	--		X		
21	BUSHING	ID	0.3125	0.3130	0.3170	0.0050	X		
	BOLT	OD	0.3115	0.3120	0.3080		X		
22	FLANGED BUSHING	ID	0.3125	0.3135	0.3170	0.0050	X		
	BOLT	OD	0.3115	0.3120	0.3085		X		

Wear Limits for the Flap Drive Linkage  
Figure 209 (Sheet 4)

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









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
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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIM.	MAX DIA CLEARANCE			
			MIN	MAX					
23	SPHERICAL BEARING	ID	0.3125	0.3129	0.3170	0.0050	X		
	BOLT	OD	0.3115	0.3120	0.3079		X		
24	FLANGED BUSHING	ID	0.4375	0.4385	0.4420	0.0050	X		
	BUSHING	OD	0.4365	0.4370	0.4335		X		
25	FLANGED BUSHING	ID	0.3750	0.3756	0.3795	0.0050	X		
	BOLT	OD	0.3740	0.3745	0.3706		X		
26	SLEEVE	ID	0.3760	0.3790	0.3845	0.0100	X		
	BOLT	OD	0.3740	0.3745	0.3690		X		
27	FLANGED BUSHING	ID	0.5630	0.5640	0.5665	0.0050	X		
									
	0.6880	0.6890	0.6915	X					
									
SLEEVE	OD	0.5610	0.5615	0.5590	0.0050	X			
									
0.6860	0.6865	0.6840	X						
									
28	FLANGED BUSHING	ID	0.5620	0.5627	0.5665	0.0050	X		
	SLEEVE	OD	0.6870	0.6877	0.6915		X		
29	SLEEVE	ID	0.4390	0.4400	0.4420	0.0050	X		
	BOLT	OD	0.4365	0.4370	0.4350		X		
30	FLANGED BUSHING	ID	0.6255	0.6265	0.6290	0.0050	X		
	SLEEVE	OD	0.6235	0.6240	0.6215		X		
31	SPHERICAL BEARING	ID	0.4375	0.4379	0.4420	0.0050	X		
	BOLT	OD	0.4365	0.4370	0.4329		X		
32	FLANGED BUSHING	ID	0.6255	0.6265	0.6290	0.0050	X		
	SLEEVE	OD	0.6235	0.6240	0.6215		X		

 AIRPLANES WITH 9/16 ID ALUMINUM BUSHINGS LENGTH 5/16 INCH

 AIRPLANES WITH 11/16 ID CRES BUSHINGS LENGTH 9/16 INCH

 AIRPLANES WITH 9/16 OD SLEEVES LENGTH 4.390 INCHES + 0.000  
- 0.003

**NOTE:** AIRPLANES WITH CF6-80C2 ENGINES;  
YOU CAN REPLACE A 9/16 WITH A 11/16 SLEEVE.

 AIRPLANES WITH 11/16 OD SLEEVES LENGTH 4.630 INCHES + 0.000  
- 0.003

 AIRPLANES WITH 9/16 ID CRES BUSHINGS LENGTH 0.730 INCH

 AIRPLANES WITH 11/16 ID CRES BUSHINGS LENGTH 0.380 INCH

Wear Limits for the Flap Drive Linkage  
Figure 209 (Sheet 5)

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D. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge - Inboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

E. Prepare for the Installation

S 212-024

- (1) Make sure the flaps and slats are in the fully extended position.

S 212-025

- (2) Make sure the flap control lever is in the 30-unit detent.

S 212-026

- (3) Make sure the power is removed from the center hydraulic system (Ref 29-11-00).

S 212-027

- (4) Make sure the flap and slat alternate drives are not armed (ALTN switch lights are off on P3).

S 212-028

- (5) Make sure you deactivate the engine thrust reverser (AMM 78-31-00/201).

F. Krueger Seal Flap Drive Installation

**NOTE:** Refer to the "Krueger Seal Flap and Flap Drive Inspection Check" task for the wear limits of the components used in this installation.

S 432-029

- (1) Install the flap drive linkages that you removed, and tighten the nuts at these locations as shown (Fig. 202):  
(a) View A-A: 100-140 pound-inches (11.3-15.8 mm)

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- (b) View B-B: 160-190 pound-inches (18.0-21.4 newton-meters) at the upper connection  
160-190 pound-inches (18.1-21.4 newton-meters) at the middle connection  
50-75 pound-inches (5.7-8.4 newton-meters) at the lower connection.
- (c) View C-C: 160-190 pound-inches (18.1-21.4 newton-meters).
- (d) View D-D: 100-140 pound-inches (11.3-15.8 newton-meters).
- (e) View E-E: 160-190 pound-inches (18.1-21.4 newton-meters) at the aft connection  
320-440 pound-inches (36.2-49.7 newton-meters) at the forward connection.

S 432-030

- (2) Connect the drive shaft to the rotary actuator for the krueger seal flap at the input universal joint (Fig. 203).

**NOTE:** It is not necessary to connect the drive shaft at the output universal joint, adjacent to the outboard rotary actuator of the inboard slat. It will be necessary to disconnect the output universal joint for the subsequent flap drive adjustment.

S 822-031

- (3) Adjust the krueger seal flap drive.

**NOTE:** Put the airplane back to its usual condition after you do the flap drive adjustment. Use the procedure in the "Krueger Seal Flap and Flap Drive Adjustment/Test" task.

#### G. Krueger Seal Flap Installation

**NOTE:** Refer to the "Krueger Seal Flap and Flap Drive Inspection Check" task for the wear limits of the components used in this installation.

S 642-032

- (1) Apply a light layer of grease to the bolts before each installation.

S 432-033

- (2) Connect the flap inboard hinge to the hinge fitting with the bolt, nut, and washers (View C-C, Fig. 201). Tighten the nut to 100-140 pound-inches.

S 432-034

- (3) Connect the flap outboard hinge to the hinge fitting with the bolt, nut, and washers (View B-B, Fig. 201). Tighten the nut to 50-75 pound-inches.

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- S 432-035
- (4) Connect the bull nose drive link to the flap fitting with the bolt, nut, and washers (View A-A, Fig. 201). Tighten the nut to 50-75 pound-inches.
- S 432-036
- (5) Connect the flap drive link to the krueger seal flap with the bolt, nut, and washers (View A-A, Fig. 202). Tighten the nut to 100-140 pound-inches.
- S 822-037
- (6) Adjust the krueger seal flap.

**NOTE:** Put the airplane back to its usual condition after you do the flap adjustment. Use the procedure in the "Krueger Seal Flap and Flap Drive Adjustment/Test" task.

TASK 27-81-04-822-105

4. The Krueger Seal Flap and Krueger Seal Flap Drive - Adjustment/Test

A. General

- (1) This task contains the adjustment/test procedure for the krueger seal flap and the krueger seal flap drive.  
The krueger seal flap and the krueger seal flap drive adjustments are done in production with the airplane in the "rigging" position, that is on jigs. This position, with no engines installed and no weight to account for fuel load, best represents the in-flight configuration of the wing. This "unloaded" configuration is the best on the "ground" configuration for these adjustments. However, it is also acceptable to do these adjustments with the airplane in the loaded condition (with fuel and engine installed) since the weight factor has no effect on the krueger seal flap and krueger seal flap drive adjustments.

B. Equipment

- (1) 50-Pound Weight  
(2) Leading Edge Slats Groundlock - A27007-1  
(2 Necessary)  
(3) TE Flap PDU Lock - A27009-7  
(4) Circuit Breaker Lockout Clip  
(4 Necessary) Commercially Available

C. References

- (1) 06-44-00/201, Wing Access Doors and Panels  
(2) 20-10-23/401, Lockwires  
(3) 24-22-00/201, Electrical Power - Control  
(4) 27-81-03/401, Krueger Seal Flap Seal  
(5) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(6) 32-00-15/201, Landing Gear Door Locks  
(7) 78-31-00/201, Thrust Reverser System

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D. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge - Inboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

E. Prepare for the Adjustment

S 492-039

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Open the doors for the landing gear and install the door locks (Ref 32-00-15).

S 042-041

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PRECEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 862-042

- (3) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 862-043

- (4) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 212-044

- (5) Make sure the flaps and slats are in the fully extended position.

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- S 212-045
- (6) Make sure the flap control lever is in the 30-unit detent.
- S 212-046
- (7) Make sure the power is removed from the center hydraulic system (Ref 29-11-00).
- S 212-047
- (8) Make sure the flap and slat alternate drives are not armed (ALTN switch lights are off at P3).
- S 492-048
- (9) Install the PDU lock in the TE flap PDU (Fig. 205).
- S 012-049
- (10) If installed, remove the access panels, 511BB and 611BB, to get access to the inboard and outboard slat power drive units (PDU) (Ref 06-44-00).
- S 492-050
- (11) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 206).
- S 012-051
- (12) Remove the fixed lower access panels at the inboard leading edge as necessary to get access to the krueger seal flap drive (Ref 06-44-00).

F. Krueger Seal Flap Drive - Adjustment

- S 032-052
- (1) Disconnect the drive shaft for the krueger seal flap at the output universal joint, adjacent to the outboard rotary actuator of the inboard slat (Section A-A, Fig. 203).

S 032-109

**CAUTION:** MAKE SURE THE KRUEGER SEAL FLAP IS FULLY RETRACTED IF YOU NEED TO CONNECT THE DRIVE SHAFT. DAMAGE TO THE DRIVE SHAFT CAN OCCUR IF THE DRIVE SHAFT IS CONNECTED WITH THE KRUEGER SEAL FLAP EXTENDED.

- (2) Remove the sleeve from the drive shaft splines.

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S 822-054

**CAUTION:** MAKE SURE THE KRUEGER SEAL FLAP IS FULLY EXTENDED, AND THAT THE JOINTS A, B, AND C, ARE STRAIGHT WHILE THE FLAP DRIVE LINK IS IN POSITION 1, AS SHOWN IN FIG. 204. YOU CAN CAUSE DAMAGE TO THE KRUEGER SEAL FLAP DRIVE IF YOU ADJUST THE FLAP DRIVE WITH THE FLAP DRIVE LINK IN POSITION 2.

- (3) Move the flap drive link to align joints A, B, and C to a straight line while the flap drive link is in position 1. Keep this position while you do the adjustments that follow (Detail A, Fig. 204):

**NOTE:** The position 1 is the correct position for the maximum flap extension.

- (a) Disconnect the bull nose control rod at joint D (View A-A).
- (b) Remove the lockwire on the jamnut and adjust the length of the bull nose control rod to get the correct dimension as shown (Detail A).
- (c) Tighten the control rod jamnut to 90-125 pound-inches (10.2-14.1 newton-meters), and install a lockwire with the double twist procedure (Ref 20-10-23).
- (d) Apply a light layer of grease to the bolt that connects the bull nose control rod to the bull nose fitting.
- (e) Connect the bull nose control rod at joint D with the bolt, washers, and nut. Tighten the nut to 50-75 pound-inches (5.7-8.4 newton-meters) (View A-A).

S 422-055

- (4) Install and adjust the seal for the krueger seal flap if it is necessary (Ref 27-81-03).

S 032-056

- (5) Disconnect joint E in the krueger seal flap mechanism (Detail A, Fig. 204).

**NOTE:** This will permit you to manually open and close the krueger seal flap.

S 822-057

- (6) Adjust the stop screw to get the flap to align with the fixed leading edge while the stop screw touches the retainer as shown (Detail B and View B-B, Fig. 204).

**NOTE:** Align the surface by  $\pm 0.02$  inch ( $\pm 0.50$  mm) for at least 25% of an edge, and by  $\pm 0.04$  inch ( $\pm 1.0$  mm) for a distance of no more than 25% of an edge.

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- S 432-058
- (7) Tighten the stop screw jamnut to 100-140 pound-inches (11.3-15.8 newton-meters) and install a lockwire with the double twist procedure (Ref 20-10-23).
- S 642-059
- (8) Apply a light layer of grease to the bolt that connects joint E (Detail A, Fig. 204).
- S 432-060
- (9) Connect joint E with the bolt, washers, and nut as shown (View B-B, Fig. 202). Tighten the nut to 50-75 pound-inches (5.7-8.4 newton-meters).
- S 092-061
- (10) Remove the PDU lock from the TE flap PDU (Fig. 205).
- S 092-062
- (11) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 206).
- S 982-063
- (12) Keep the drive shaft for the krueger seal flap away from the movement of the inboard slat when you retract the inboard slats in the subsequent steps.
- S 862-064
- (13) Supply electrical power (Ref 24-22-00).
- S 862-065

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (14) Pressurize the center hydraulic system (Ref 29-11-00).
- S 862-066
- (15) Remove the DO-NOT-OPERATE tag from the flap control lever, and move the flap control lever to the zero (FLAPS UP) detent.

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S 212-067

- (16) Make sure the flaps and slats move to the fully retracted position.

S 492-068

- (17) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-069

- (18) Remove the power from the center hydraulic system (Ref 29-11-00).

S 492-070

- (19) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 206).

S 492-071

- (20) Install the PDU lock in the TE flap PDU (Fig. 205).

S 492-072

- (21) Remove the fastener at the lower inboard corner of the krueger seal flap and attach a 50-pound weight to the flap (Detail B, Fig. 204).

S 982-073

- (22) Manually turn the drive shaft to retract the krueger seal flap, until the flap touches the stop screw.

**NOTE:** Make sure that if you turn the drive shaft in the opposite direction by a small increment, the flap will not touch the stop screw.

S 432-110

**CAUTION:** MAKE SURE THAT THE KRUEGER SEAL FLAP IS FULLY RETRACTED BEFORE YOU CONNECT THE DRIVE SHAFT. DAMAGE TO THE DRIVE SHAFT CAN OCCUR IF YOU CONNECT THE DRIVE SHAFT WHILE THE KRUEGER SEAL FLAP IS EXTENDED.

- (23) Install the sleeve on the drive shaft splines.

S 432-075

- (24) Connect the drive shaft at the output universal joint, adjacent to the outboard rotary actuator of the inboard slat. Keep the krueger seal flap against the stop screw while you connect the drive shaft (Section A-A, Fig. 203).

**NOTE:** Increase the flap contact load on the on the stop screw by no more than one spline when you engage the splines between the sleeve and the drive shaft.

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S 092-076

- (25) Remove the 50-pound weight from the flap and install the fastener.

S 422-077

- (26) Install and adjust the remaining seals (Ref 27-81-03).

S 092-078

- (27) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 206).

S 092-079

- (28) Remove the PDU lock from the TE flap PDU (Fig. 205).

S 862-080

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (29) Pressurize the center hydraulic system (Ref 29-11-00).

S 862-081

- (30) Move the flap control lever from the zero (FLAPS UP) detent to the 30-unit detent, then back to the zero detent. Make sure the krueger seal flap moves correctly with the inboard slats.

G. Put the Airplane Back to Its Usual Condition

S 092-083

- (1) If installed, remove the PDU lock from the TE flap PDU (Fig. 205).

S 092-084

- (2) If installed, remove the groundlocks from the inboard and outboard slat PDUs (Fig. 206).

S 412-085

- (3) Install the access panels, 511BB and 611BB, to close the access to the inboard and outboard slat PDUs (Ref 06-44-00).

S 412-086

- (4) Install the fixed lower access panels for the leading edge (Ref 06-44-00).

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S 862-087

- (5) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 862-088

- (6) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 092-089

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (7) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

S 442-090

- (8) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

S 862-095

- (9) Remove the power from the center hydraulic system (Ref 29-11-00).

S 862-096

- (10) Remove electrical power if it is not necessary (Ref 24-22-00).

TASK 27-81-04-202-097

5. Krueger Seal Flap and Flap Drive - Inspection/Check

A. General

- (1) The procedure in this task only has illustrations and wear limit tables, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the krueger seal flap and krueger seal flap drive removal and installation topics to do these tasks.

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- (2) Wear Limits for the Krueger Seal Flap Installation (Fig. 207)
- (3) Wear Limits for the Krueger Seal Flap Assembly (Fig. 208)
- (4) Wear Limits for the Krueger Seal Flap Drive Linkage Installation (Fig. 209)

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LEADING EDGE SLAT AFT QUADRANT AND LEADING EDGE SLAT AFT QUADRANT  
CONTROL COMPONENTS - REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the leading edge slat aft quadrant and the quadrant control components.

TASK 27-81-05-024-001

2. Slat Aft Quadrant and Quadrant Control Components - Removal

A. General

- (1) This task contains the removal procedure for these components:

- the Slat Aft Quadrant
- the Aft Quadrant Drive Shaft
- the Non-Adjustable Control Rod
- the Adjustable Control Rod.

Because this task contains four procedures, only do the applicable procedure to remove the component.

To start one of these procedures, do the steps in the "Prepare for the Removal" topic, then do the applicable group of steps to remove the component.

B. Equipment

- (1) Rig Pins from Set A20004-XX (Ref 20-10-24):  
(a) LE1 - P/N A20004-17  
(b) LE2 - P/N A20004-9  
(c) LE5 - P/N A20004-9  
(d) TE1 - P/N A20004-9  
(2) LE Slat Groundlock - A27007-1 (2 Necessary)  
(3) TE Flap PDU Lock - A27009-7  
(4) Circuit Breaker Lockout Clip,  
(Commercially Available)

C. References

- (1) 06-44-00/201, Wing Access Doors and Panels  
(2) 20-10-23/401, Lockwires  
(3) 20-10-24/201, Rig Pins

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- (4) 24-22-00/201, Electrical Power - Control
- (5) 27-51-00/501, Trailing Edge Flap System
- (6) 27-81-00/501, Leading Edge Slant System
- (7) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (8) 32-00-15/201, Landing Gear Door Locks
- (9) 32-00-20/201, Landing Gear Downlocks
- (10) 51-31-01/201, Sealant

D. Access

(1) Location Zones

- 125/126 Area Aft of the Forward Cargo Compartment
- 144 Right MLG Wheel Well
- 211/212 Control Cabin
- 710 Nose Landing Gear and Doors
- 730/740 Left/Right Main Landing Gear and Doors

(2) Access Panels

- 511BB LE Slant Power Drive Unit - Outboard (Left)
- 611BB LE Slant Power Drive Unit - Inboard (Right)

E. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 494-003

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 214-004

- (3) Make sure the flaps and slats are in the fully retracted position.

S 214-005

- (4) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 494-006

- (5) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 864-007

- (6) Remove the power from the center hydraulic system (Ref 29-11-00).

S 494-008

- (7) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 405).

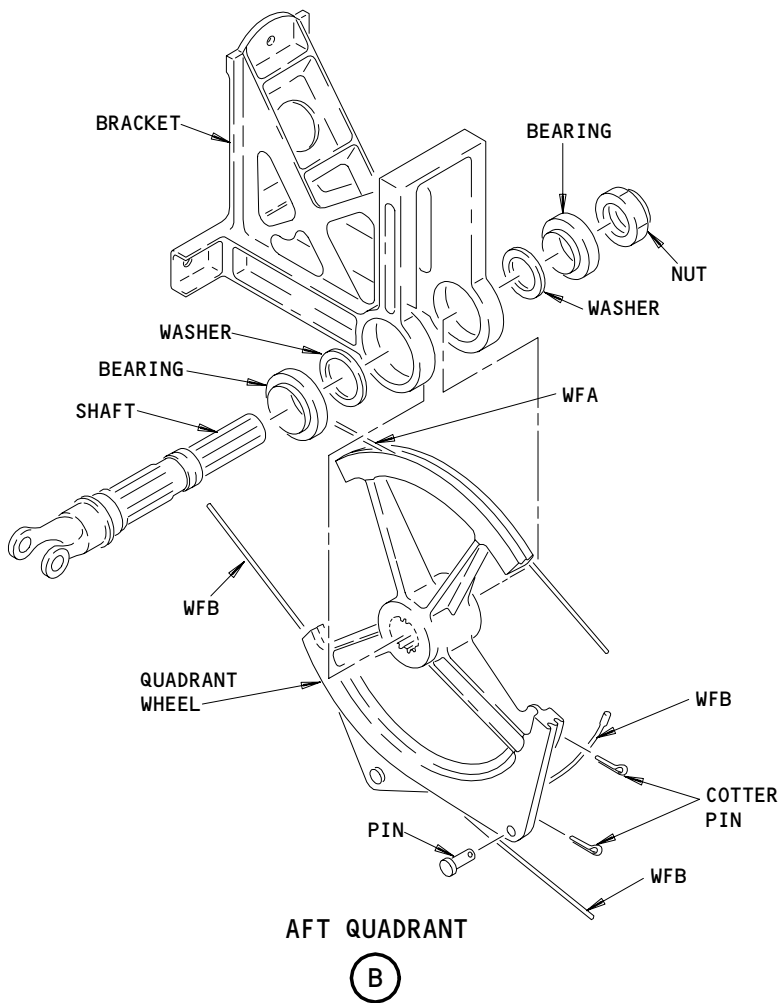
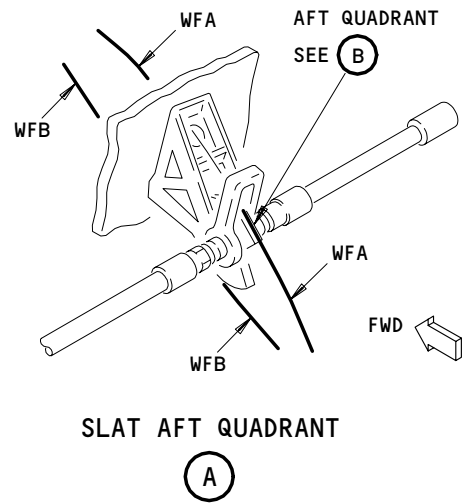
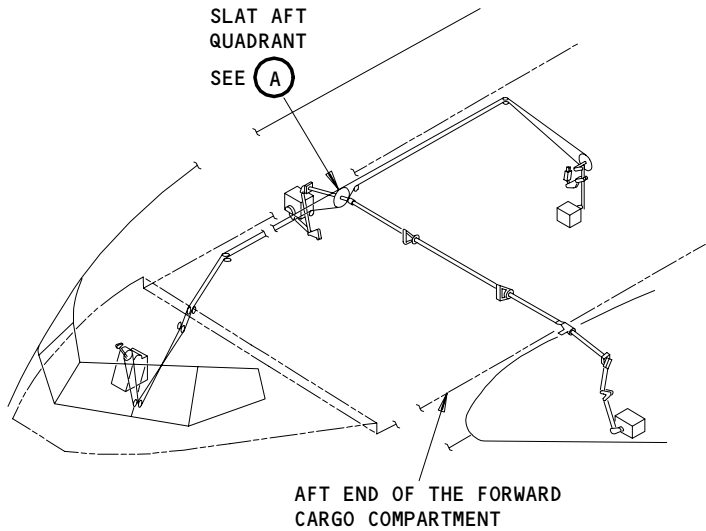
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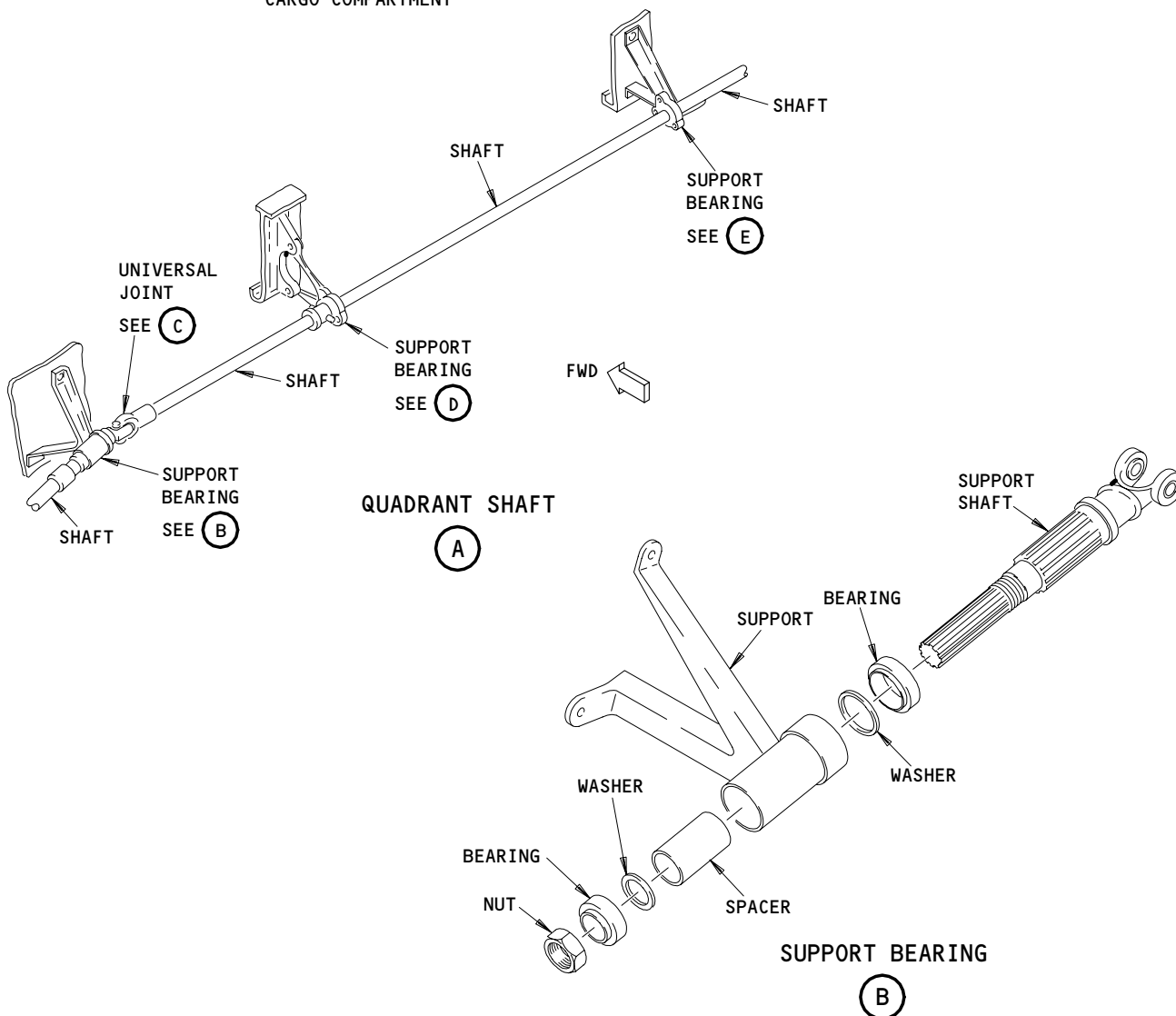
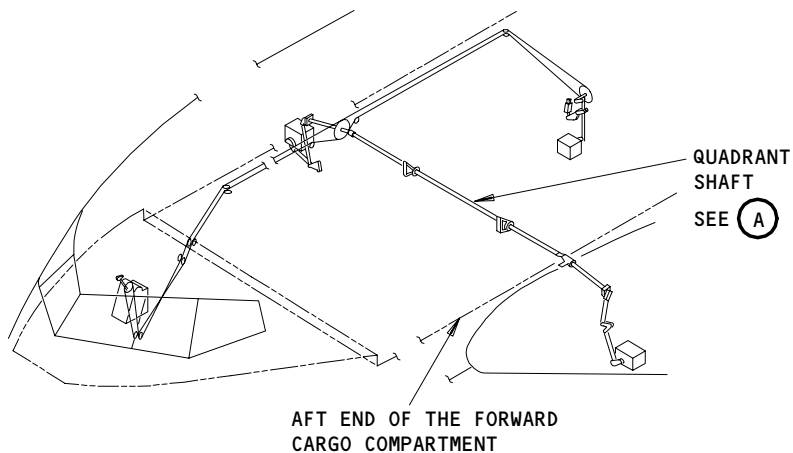
Slat Aft Quadrant  
Figure 401

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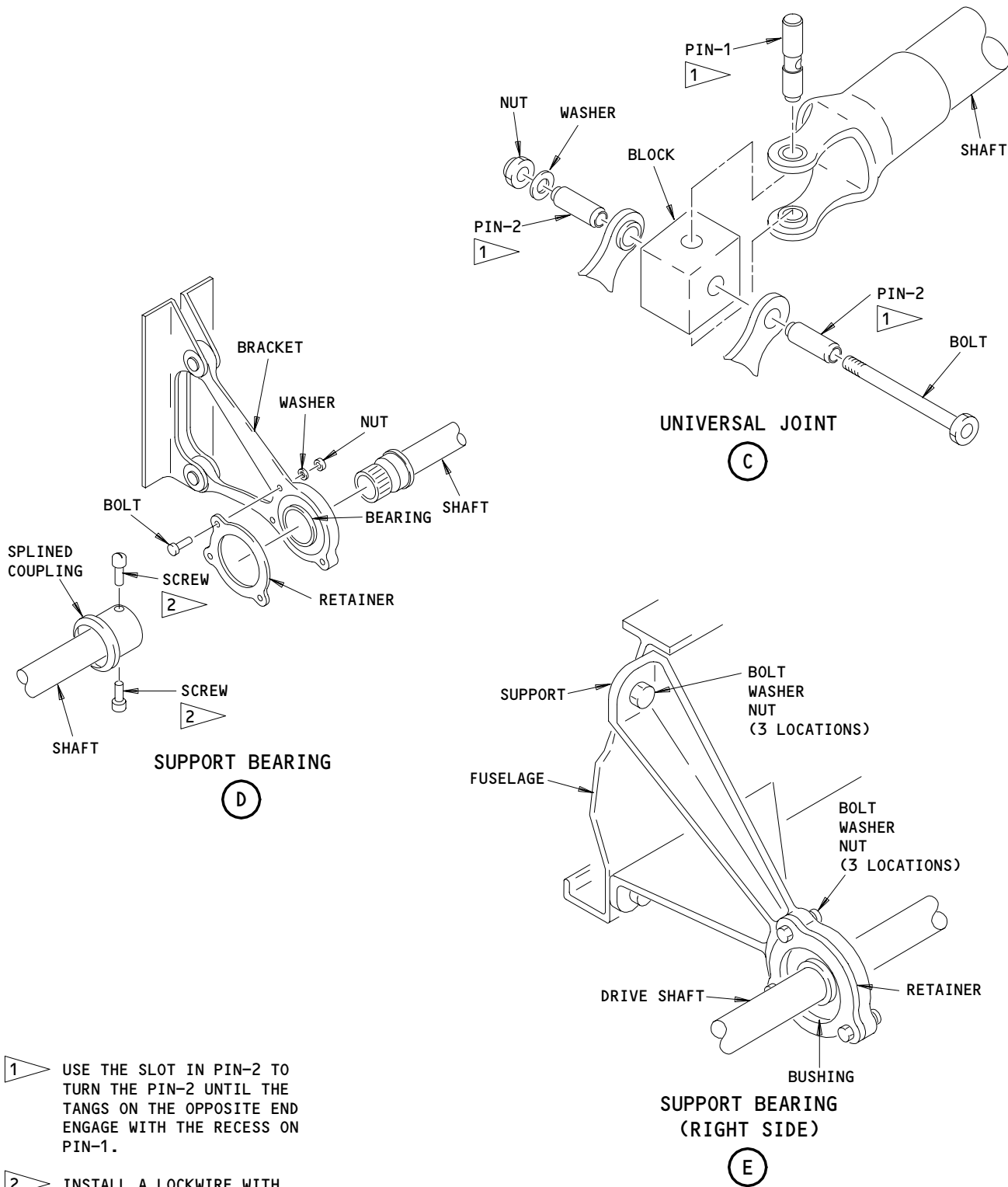
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Slat Aft Quadrant Control Components (Inside Fuselage)  
Figure 402 (Sheet 1)

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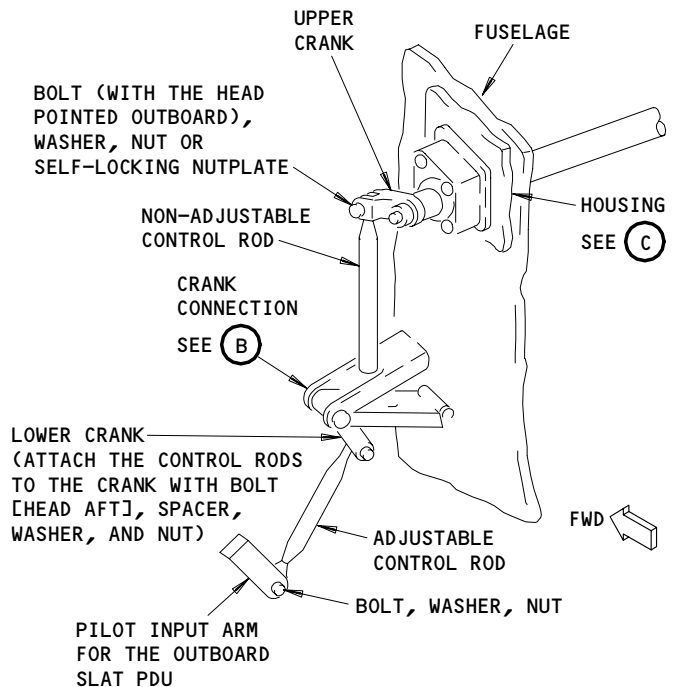
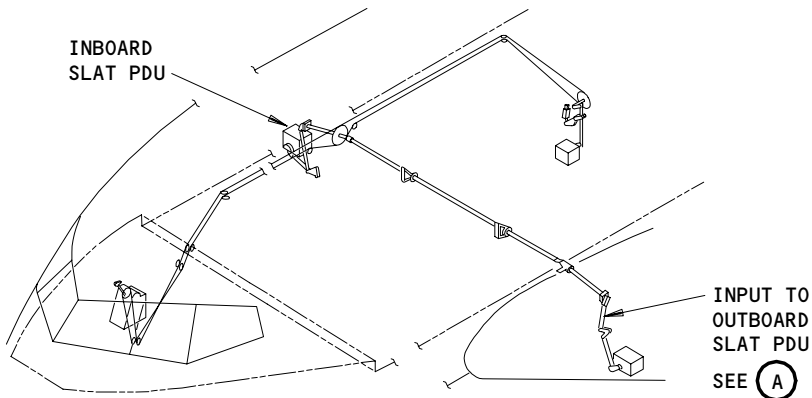
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Slat Aft Quadrant Control Components (Inside Fuselage)  
Figure 402 (Sheet 2)

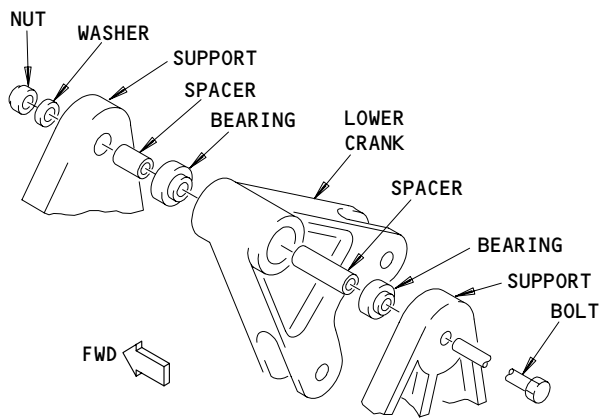
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INPUT TO OUTBOARD SLAT PDU  
(INPUT TO INBOARD SLAT PDU EQUIVALENT)

(A)



CRANK CONNECTION  
(EXAMPLE)

(B)

Slat Aft Quadrant Control Components (Outside Fuselage)  
Figure 403 (Sheet 1)

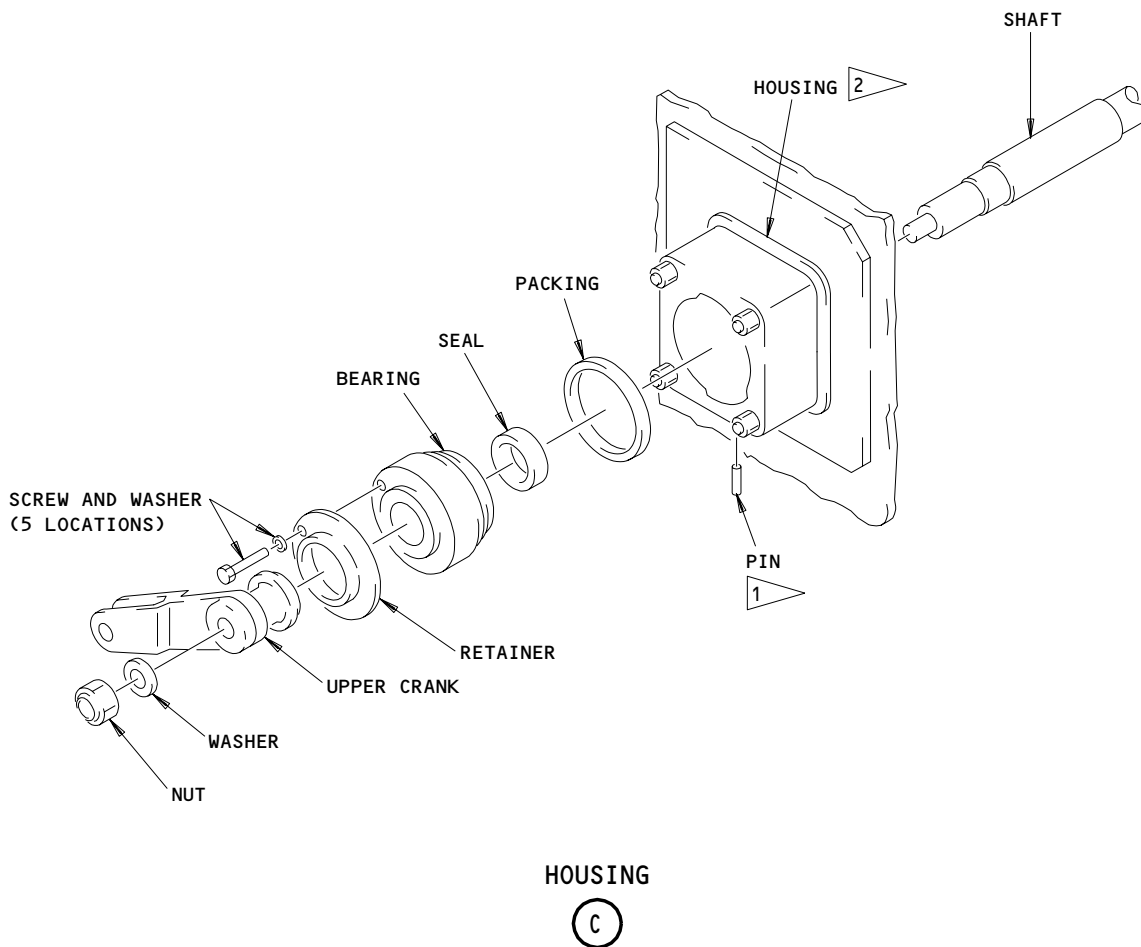
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- 1 INSTALL WITH THE PIN DOWN
- 2 APPLY CORROSION MATING SEAL TO ALL THE MATING SURFACES (AMM 51-31-01/201)

Slat Aft Quadrant Control Components (Outside Fuselage)  
Figure 403 (Sheet 2)

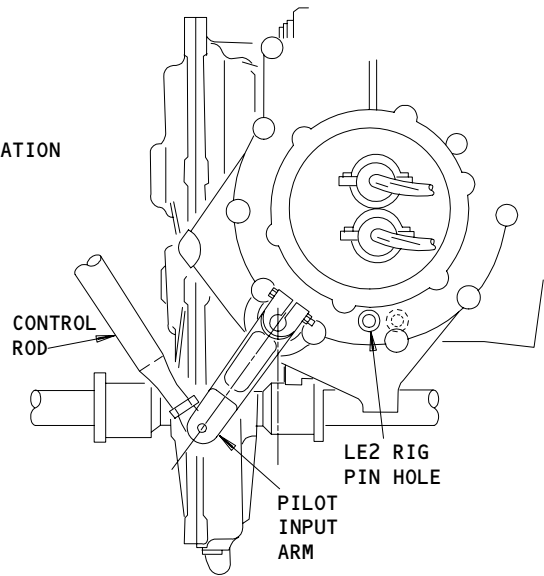
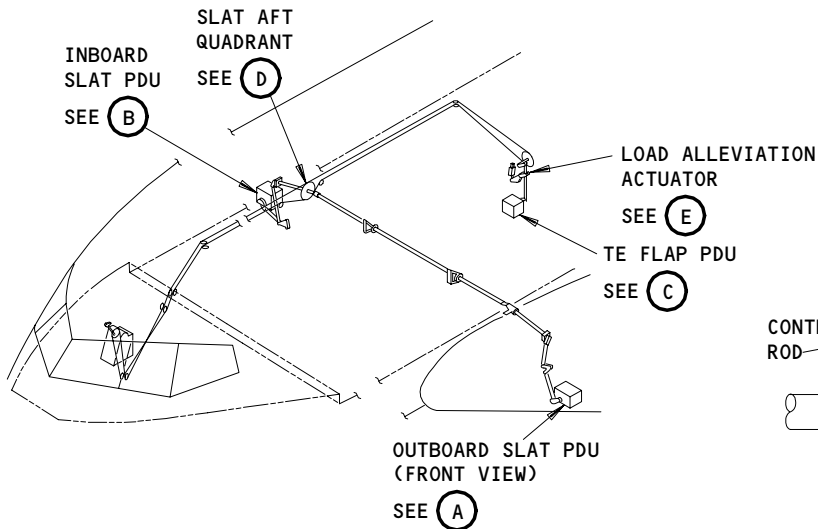
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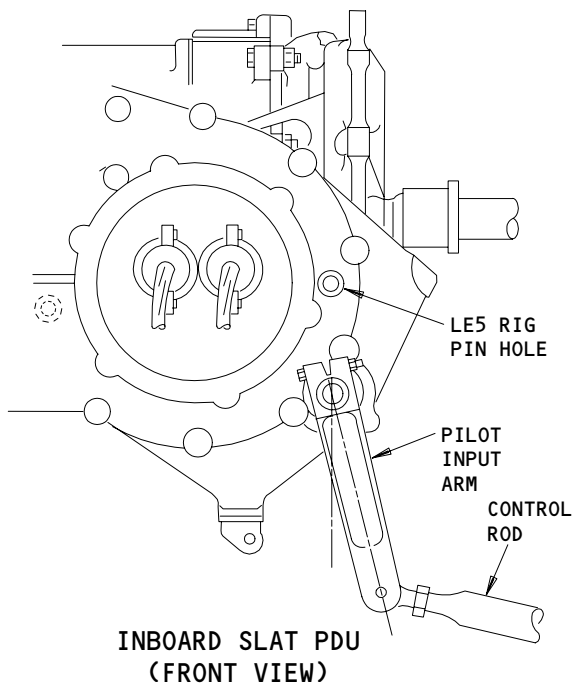
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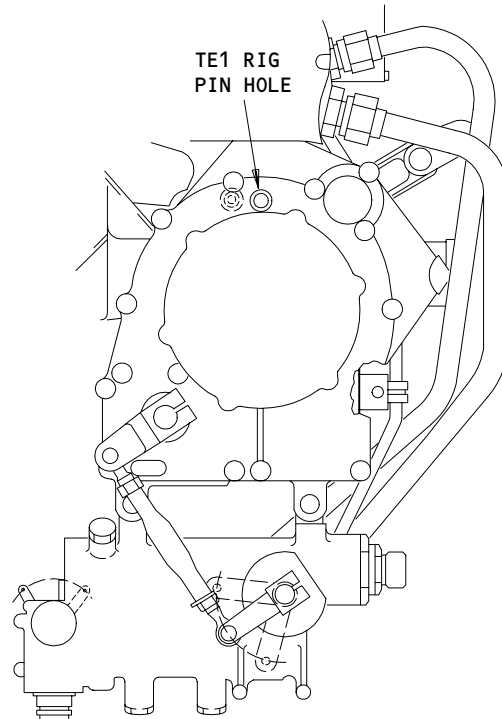
OUTBOARD SLAT PDU (FRONT VIEW)

(A)



INBOARD SLAT PDU (FRONT VIEW)

(B)



TE FLAP PDU (FRONT VIEW)

(C)

Rig Pin Location and TE Flap Aft Quadrant Crank  
Figure 404 (Sheet 1)

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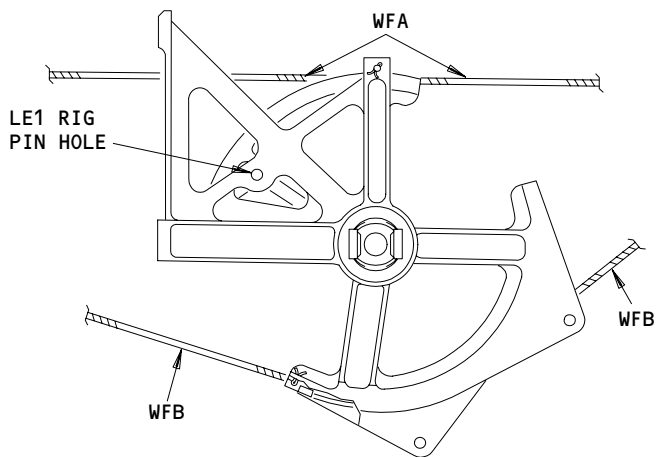
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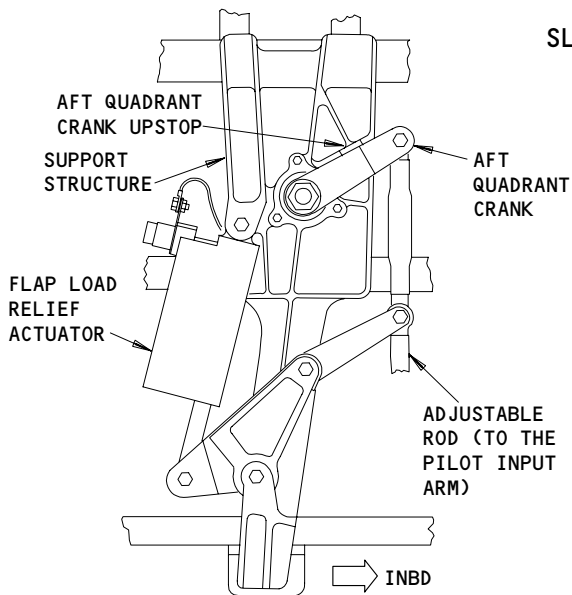
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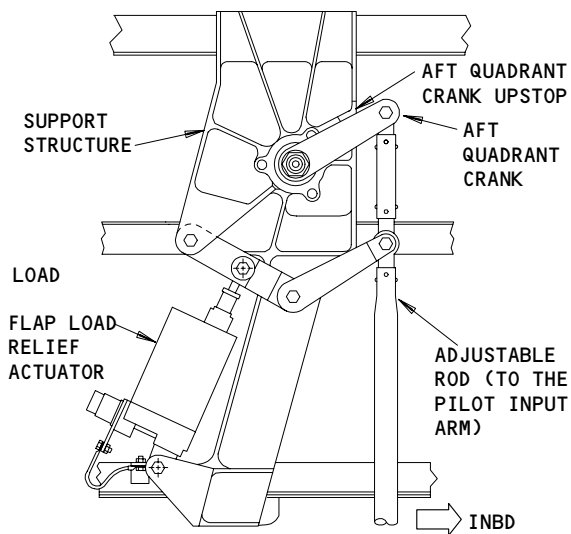
SLAT AFT QUADRANT

(D)



767-200 AIRPLANES  
FLAP LOAD RELIEF ACTUATOR

(E)



767-300 AIRPLANES  
FLAP LOAD RELIEF ACTUATOR

(E)

TABLE I	
AMBIENT AIR TEMP (DEGREES F)	CABLE RIG LOAD FOR WFA AND WFB (+10 -0 POUNDS)
110	67
90	61
70	55
50	49
30	43
10	37
-10	31
-30	25
-40	22

Rig Pin Location and TE Flap Aft Quadrant Crank  
Figure 404 (Sheet 2)

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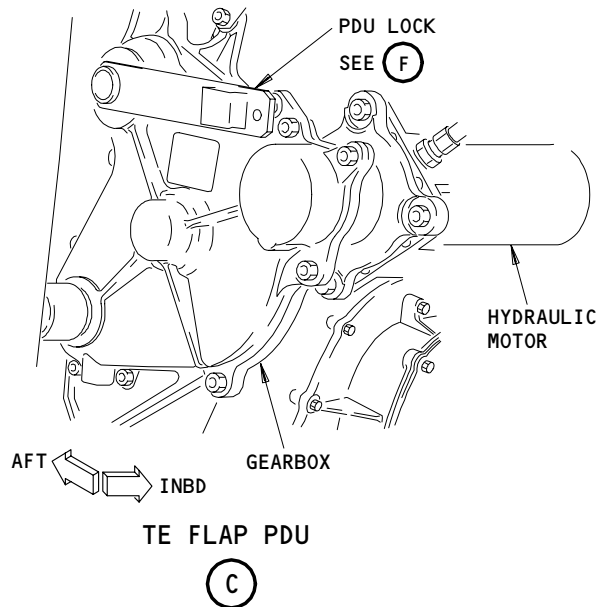
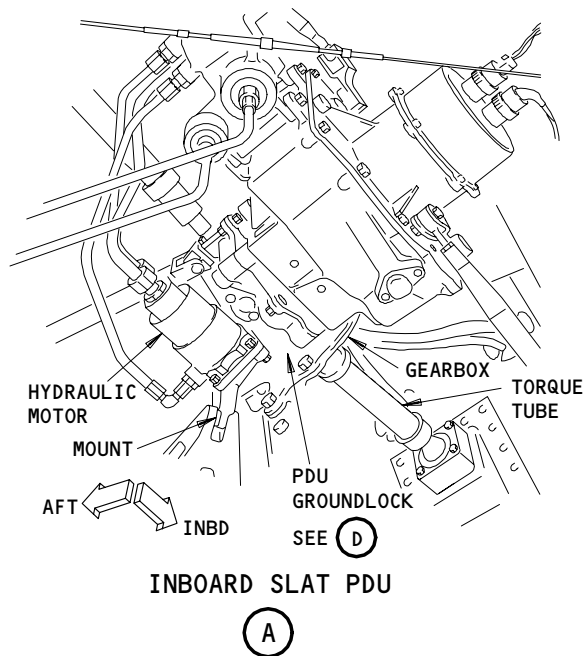
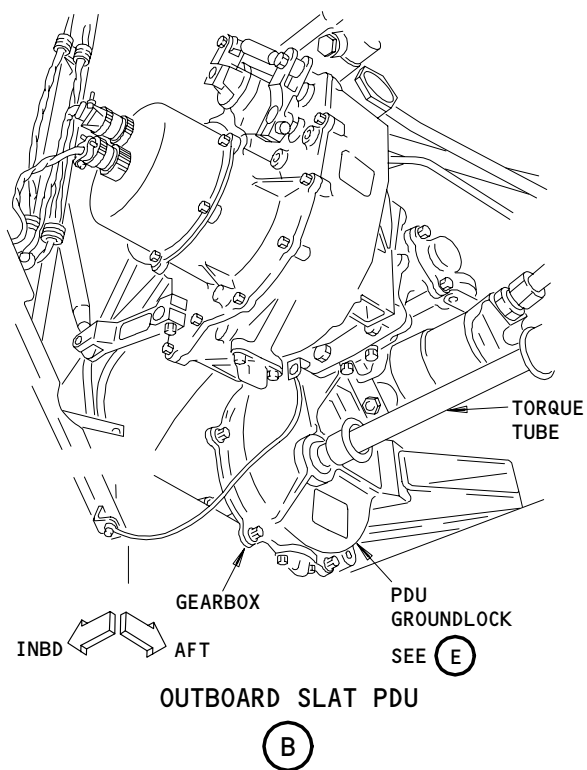
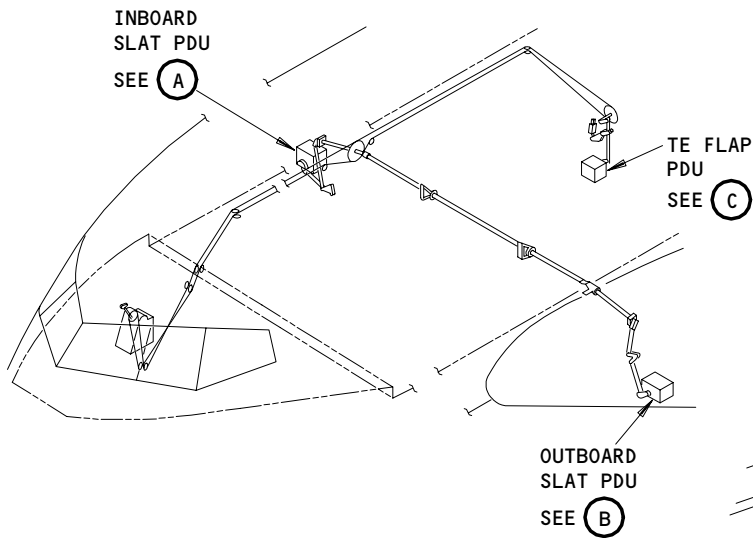
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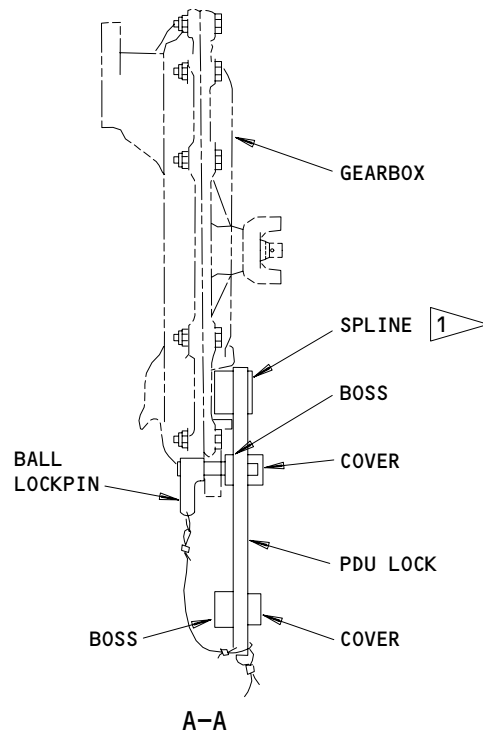
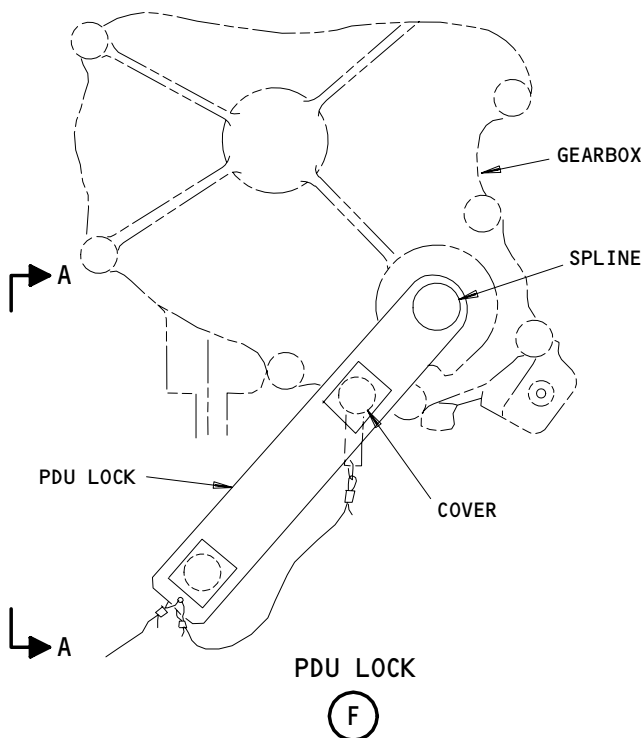
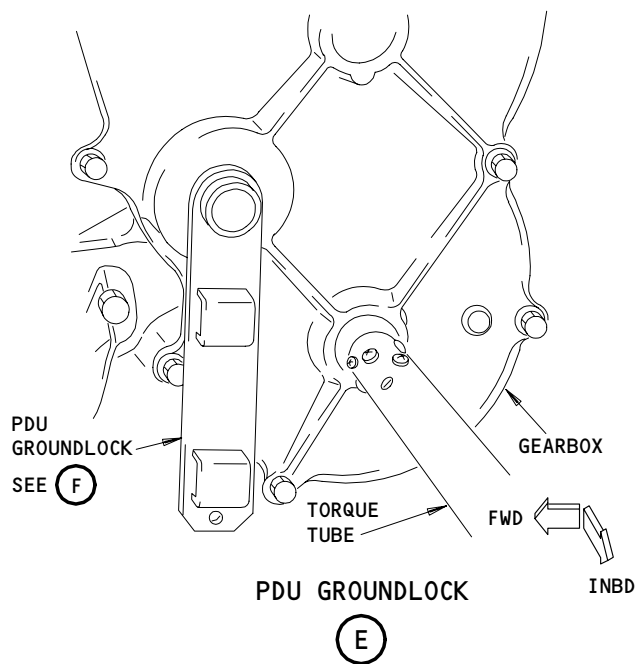
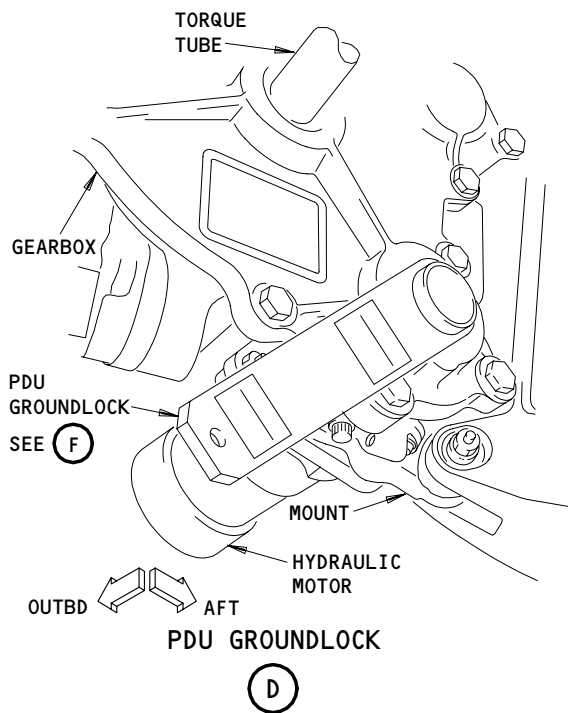
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Flap/Slat PDU Locks  
Figure 405 (Sheet 1)

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1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN INSTALLED THROUGH THE BOSS AND GEARBOX.

Flap/Slat PDU Locks  
Figure 405 (Sheet 2)

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- S 014-009
- (8) Open the access panels, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (Ref 06-44-00).
- S 494-010
- (9) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 405).
- S 864-011
- (10) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
- S 864-012
- (11) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
- (a) 11J24, FLAPS ALTN CONT
- S 864-013
- (12) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR
- S 864-014
- (13) Open this circuit breaker on the P6 panel and attach a DO-NOT-CLOSE tag:
- (a) 6D24, ALTN FLAP PWR
- S 014-015
- (14) Get access to the slat aft quadrant and the quadrant control components in the aft end of the forward cargo compartment.
- F. Remove the Slat Aft Quadrant
- S 494-016
- (1) Remove the rig pin hole plugs and install rig pin TE1 in the TE flap PDU, and rig pins LE2 and LE5 in the outboard and inboard slat PDUs (Fig. 404).
- S 034-017
- (2) Disconnect the control rods at the pilot input arms on the TE flap PDU, the inboard slat PDU, and the outboard slat PDU (Fig. 404).
- S 034-018
- (3) Loosen the WFA and WFB cables forward of the slat aft quadrant, at the turnbuckles near the control stand.

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S 034-019

- (4) Loosen the WFA and WFB cables aft of the slat aft quadrant, at the turnbuckles in the aft end of the forward cargo compartment.

S 034-020

- (5) Release the cable tension on each side of the slat aft quadrant.

S 034-021

- (6) Disconnect the WFA and WFB cables from the slat aft quadrant (Fig. 401), and install an identification tag to each cable.

**NOTE:** Keep the cables engaged on the pulleys after you remove the cables.

S 034-022

- (7) Disconnect the drive shaft from each side of the slat aft quadrant with the instructions given in the "Remove the Slat Aft Quadrant Drive Shaft" topic (Fig. 401).

S 034-023

- (8) Remove the nut, shaft, washers, and bearings at the slat aft quadrant (Detail B, Fig. 401).

S 024-024

- (9) Remove the quadrant wheel from the bracket.

G. Remove the Slat Aft Quadrant Drive Shaft

S 494-025

- (1) Remove the rig pin hole plugs and install rig pin TE1 in the TE flap PDU, and rig pins LE2 and LE5 in the outboard and inboard slat PDUs (Fig. 404).

S 024-026

- (2) Do these steps to remove the drive shaft with a universal joint at one end, and a splined coupling at the other end (Fig. 402):
  - (a) Disconnect the drive shaft from the universal joint (Detail C).
  - (b) Disconnect the lockwire and remove the screws from the splined coupling (Detail D).
  - (c) Move the coupling sleeve away from the coupling half and remove the drive shaft.

S 024-028

- (3) Do these steps to remove a drive shaft with a support bearing at one end, and a universal joint at the other end (Fig. 402):
  - (a) Disconnect the lockwire and remove the screws from the splined coupling on the adjacent drive shaft, to the direction of the left wing (Detail D).
  - (b) Move the coupling sleeve off the adjacent spline coupling.
  - (c) Disconnect the drive shaft at the universal joint (Detail C).

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- (d) Remove the support from the structure near the center of the drive shaft (Detail E).
- (e) Remove the drive shaft.

S 024-029

- (4) Do these steps to remove the outboard drive shaft that is connected to the housing:
  - (a) Disconnect the drive shaft from the housing (Detail C, Fig.403).
  - (b) For the drive shaft at the left side of the fuselage, disengage the drive shaft from the support shaft

NOTE: Disconnect the support shaft from the support if it is necessary (Detail B, Fig. 402).

- (c) For the drive shaft at the right side of the fuselage, disengage the drive shaft from the shaft in the slat aft quadrant (Detail B, Fig. 401).
- (d) Remove the drive shaft.

S 024-030

- (5) Do these steps to remove the support shaft in the support, with an universal joint at one end (Detail B, Fig. 402):
  - (a) Disconnect the support shaft at the universal joint (Detail C).
  - (b) Remove the nut from the support shaft (Detail B).
  - (c) Remove the support shaft with the two washers, two bearings, and a spacer, from the support.

H. Remove the Non-Adjustable Control Rod

S 494-031

- (1) Remove the rig pin hole plugs and install rig pin TE1 in the TE flap PDU, and rig pins LE2 and LE5 in the outboard and inboard slat PDUs (Fig. 404).

S 034-032

- (2) Disconnect the upper crank from the non-adjustable control rod (Detail A, Fig. 403).

S 034-033

- (3) Disconnect the lower crank from the non-adjustable control rod.

NOTE: Disconnect the lower crank from the support if it is necessary (Detail B, Fig.403).

S 024-034

- (4) Remove the non-adjustable control rod.

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I. Remove the Adjustable Control Rod

S 494-035

- (1) Remove the rig pin hole plugs and install rig pin TE1 in the TE flap PDU, and rig pins LE2 and LE5 in the outboard and inboard slat PDUs (Fig. 404).

S 034-036

- (2) Disconnect the adjustable control rod from the lower crank (Detail A, Fig. 403).

**NOTE:** Disconnect the lower crank from the support if it is necessary (Detail B).

S 034-037

- (3) Disconnect the adjustable control rod from the pilot input arm on the slat PDU.

S 024-038

- (4) Remove the adjustable control rod.

TASK 27-81-05-404-118

3. Slat Aft Quadrant and Quadrant Control Components - Installation

A. General

- (1) This task contains the installation procedure for these components:
  - the Slat Aft Quadrant
  - the Aft Quadrant Drive Shaft
  - the Non-Adjustable Control Rod
  - the Adjustable Control Rod.

Because this task contains four procedures, only do the applicable procedure to install the component.

To start one of these procedures, do the steps in the "Prepare for the Installation" before you do the applicable group of steps to install the component. Then do the "Installation Test" and the "Put the Airplane Back to Its Usual Condition" group of steps.

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**B. Equipment**

- (1) Rig Pins from Set A20004-XX (Ref 20-10-24):
  - (a) LE1 - P/N A20004-17
  - (b) LE2 - P/N A20004-9
  - (c) LE5 - P/N A20004-9
  - (d) TE1 - P/N A20004-9
- (2) Cable Tensiometer, 0-100 Pounds  
(0-445.0 newtons) - Commercially Available
- (3) Force Gage, 0-25 Pounds (0-111 newtons)

**C. Consumable Materials**

- (1) C00308 Corrosion Preventive Compound -  
MIL-C-11796, Class 3

**D. References**

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 20-10-23/401, Lockwires
- (3) 20-10-24/201, Rig Pins
- (4) 24-22-00/201, Electrical Power - Control
- (5) 27-51-00/501, Trailing Edge Flap System
- (6) 27-81-00/501, Leading Edge Slit System
- (7) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (8) 32-00-15/201, Landing Gear Door Locks
- (9) 51-31-01/201, Sealant

**E. Access**

- (1) Location Zones
  - 125/126 Area Aft of the Forward Cargo Compartment
  - 144 Right MLG Wheel Well
  - 211/212 Control Cabin
  - 710 Nose Landing Gear and Doors
  - 730/740 Left/Right Main Landing Gear and Doors
- (2) Access Panels
  - 511BB LE Slit Power Drive Unit - Outboard (Left)
  - 611BB LE Slit Power Drive Unit - Inboard (Right)

**F. Prepare for the Installation**

S 214-039

- (1) Make sure the flaps and slats are in the fully retracted position.

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- S 214-040
- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.
- S 214-041
- (3) Make sure the power is removed from the center hydraulic system (Ref 29-11-00).
- S 214-042
- (4) Make sure these circuit breakers are opened in the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT
- S 214-043
- (5) Make sure these circuit breakers are opened on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR
- S 214-044
- (6) Make sure the PDU lock is installed in the TE flap power drive unit (PDU) (Fig. 405).
- S 214-045
- (7) Make sure the groundlocks are installed in the inboard and outboard slat PDUs (Fig. 405).
- S 214-046
- (8) Make sure the rig pins TE1, LE2, and LE5 are installed (Fig. 404).
- G. Install the Slat Aft Quadrant
- S 424-047
- (1) Install the quadrant wheel on the bracket with the shaft, two bearings, two washers, and a nut (Fig. 401). Tighten the nut to 100-135 pound-inches (11.3-15.2 newton-meters).

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- S 434-048
- (2) Connect the quadrant control components to the slat aft quadrant (Fig. 402 and 403).
- S 494-049
- (3) Install rig pin LE1 in the slat aft quadrant (Fig. 404).
- S 984-050
- (4) Remove the DO-NOT-OPERATE tag from the flap control lever, and move the lever 2 degrees aft of the zero (FLAPS UP) detent (approximately 0.15 to 0.16 inch (3.8-4.0 mm) from the zero detent).
- NOTE:** Do not permit the flap control lever to move back to the zero detent during the cable adjustment, or the adjustment will be incorrect.
- S 494-051
- (5) Install a clamp to hold the flap aft quadrant crank against its full upstop (Detail E, Fig. 404).
- S 434-052
- (6) Remove the identification tags and connect the WFA and WFB cables to the slat aft quadrant (Fig. 401).
- S 434-053
- (7) Tighten the WFA and WFB cables with the tensiometer, to the load shown in Table I (Fig. 404), and do these checks:
- (a) Make sure the flap control lever is 0.15 to 0.16 inch (3.8-4.0 mm) aft of the zero (FLAPS UP) detent, measured on the control stand lightplate.
- NOTE:** This is approximately 2 degrees aft of the UP detent.
- (b) Make sure the flap aft quadrant crank is against the upstop (Detail E, Fig. 404).
- (c) Make sure you can turn rig pin LE1 easily in the rig pin hole on the slat aft quadrant (Detail D, Fig. 404).
- S 824-054
- (8) If you cannot get these conditions to agree when you apply tension to the cables, adjust the cables at the turnbuckles.
- S 094-055
- (9) Remove rig pin LE1 from the slat aft quadrant (Fig. 404).
- S 094-056
- (10) Remove the clamp from the flap aft quadrant crank (Fig. 404).

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S 824-057

- (11) Lightly shake the WFA and WFB cables to remove the friction from the cables and to release the tension in the components, and do these checks:

- (a) Make sure the flap control lever is 0.15 to 0.16 inch (3.8-4.0 mm) aft of the zero detent, measured on the control stand lightplate.
- (b) Make sure the flap aft quadrant crank touches the upstop (Detail E, Fig. 404).

NOTE: It is not necessary to apply force against the upstop.

- (c) Make sure you can install rig pin LE1 easily at the slat aft quadrant (Detail D, Fig. 404).
- (d) Make sure the tension in the WFA and WFB cables agrees with Table I (Fig. 404).

S 824-058

- (12) Adjust the WFA and WFB cables again if it is necessary.

S 434-059

- (13) Install the turnbuckle locking clips and apply corrosion preventive compound, after you completed the cable adjustment that is necessary.

S 094-060

- (14) Remove rig pin LE1 from the slat aft quadrant.

S 864-061

- (15) Move the flap control lever to the zero (FLAPS UP) detent.

S 494-062

- (16) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 434-063

- (17) With the rig pin TE1 installed in the flap PDU input cam, connect the control rods to the pilot input arms on the TE flap PDU (Fig. 404).

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S 824-064

- (18) If you cannot connect the control rod to the pilot input arm with rig pin TE1 installed, do these adjustments:
- (a) Adjust the length of the control rod until you can connect the control rod to the pilot input arm.

NOTE: Make sure you can turn rig pin TE1 easily in the rig pin hole.

- (b) Connect the the control rod to the pilot input arm on the TE flap PDU.

NOTE: Make sure you attach the adjustable end of the control rod to the pilot input arm on the PDU.

- (c) Install a lockwire to the jamnut on the adjustable end of the control rod.

S 434-065

- (19) With the rig pins LE2 and LE5 installed in the input cam on the outboard and inboard slat PDUs, connect the control rods to the pilot input arms on the two slat PDUs.

S 824-066

- (20) If you cannot connect the control rod to the pilot input arm with rig pin LE2 installed in the outboard slat PDU, or with rig pin LE5 installed in the inboard slat PDU, do these adjustments (Fig. 404):
- (a) At the inboard slat PDU, adjust the length of the control rod until you can connect the control rod to the pilot input arm with rig pin LE5 installed (Detail B).
  - (b) At the outboard slat PDU, do these steps:
    - 1) Adjust the control rod and connect the control rod to the pilot input arm.

NOTE: Keep rig pin LE2 installed in the input cam.

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- 2) Use a force gage and apply a 15–20 pound (66.7–88.9 newtons) load to the control rod, along the centerline of the rod, in the inboard direction.
  - 3) With the load applied, make sure you can easily turn rig pin LE2 in the rig pin hole.
  - 4) Adjust the control rod if it is necessary.
- (c) At the inboard and outboard slat PDUs:  
if the control rod is adjustable only at one end, do a check for these conditions:
- 1) Make sure the adjustable end of the rod is attached to pilot input arm on each slat PDU.
  - 2) Make sure that you can see the threads in the inspection hole at the adjustable end of the control rod.
- (d) At the inboard and outboard slat PDUs:  
if the control rod is adjustable at the two ends of the rod, do a check for these conditions:
- 1) Make sure the adjustable end that has a jamnut without a lockwire is connected to the pilot input arm on the slat PDU.
  - 2) If you adjusted the lockwire end of the control rod (away from the pilot input arm), install a lockwire with the double twist procedure (Ref 20–10–23).

NOTE: Make sure that the dimension between the center of the rod bolt hole and the nearest end of the rod barrel is not less than 1.25 inches (31.75 mm).

- 3) Make sure that you can see the threads in the inspection hole at the two ends of the control rod.

S 094–067

- (21) Remove rig pins TE1, LE2, and LE5 and install the rig pin hole plugs.

S 714–068

- (22) Do an installation test for the slat aft quadrant with the instructions given in the "Installation Test" topic.

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H. Install the Slat Aft Quadrant Drive Shafts

S 424-070

- (1) Do these steps to install a drive shaft that connects to a support bearing at one end, and a universal joint at the other end (Fig. 402):
  - (a) Put the splined end of the drive shaft through the bracket (Detail D).
  - (b) Install the bearing and retainer to the bracket with three bolts, washers, and nuts.
  - (c) Engage the splined end of the drive shaft to the splined coupling on the adjacent drive shaft.
  - (d) Tighten the two coupling screws and install a lockwire with the double twist procedure on the splined coupling (Ref 20-10-23).
  - (e) Connect the other end of the drive shaft to the universal joint with a bolt, pin-1, pin-2 (2 locations), washer, and a nut (Detail C). Tighten the nut.
  - (f) Install the support to the structure near the center of the drive shaft with three bolts, washers, and nuts (Detail E).

S 424-071

- (2) Do these steps to install the support shaft in the support, with an universal joint at one end (Detail B, Fig. 402):
  - (a) Install the support shaft through the support with a spacer, two washers, and two bearings.
  - (b) Put the nut on the support shaft and engage the splines of the shaft to the adjacent outboard drive shaft.
  - (c) Tighten the nut on the support shaft to 100-135 pound-inches (11.3-15.2 newton-meters).
  - (d) Connect the adjacent inboard drive shaft at the universal joint with a bolt, pin-1, pin-2 (2 locations), washer, and a nut (Detail C). Tighten the nut.

S 424-072

- (3) Do these steps to install the outboard drive shaft that connects to the housing:
  - (a) For the drive shaft at the left side of the fuselage, engage the splines on the inboard end of the drive shaft to the adjacent support shaft.

**NOTE:** If removed, install the support shaft and bearings into the support before you connect the drive shaft (Detail B, Fig. 402).

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- (b) For the drive shaft at the right side of the fuselage, engage the splines on the inboard end of the drive shaft to the shaft in the slat aft quadrant (Detail B, Fig. 401).
- (c) Connect the drive shaft to the housing with a packing, seal, bearing, retainer, retainer screws (5 locations), upper crank, washer, and nut. (Detail C, Fig. 403).

S 424-073

- (4) Do these steps to install a drive shaft with a universal joint at one end, and a splined coupling at the other end (Fig. 402):
  - (a) Engage the splined coupling to the adjacent drive shaft (Detail D).
  - (b) Tighten the two screws and install a lockwire with the double twist procedure on the splined coupling (Ref 20-10-23).
  - (c) Connect the other end of the drive shaft to the universal joint with a bolt, pin-1, pin-2 (2 locations), washer, and a nut (Detail C). Tighten the nut.

S 494-074

- (5) Do a check and make sure that you can easily install these rig pins in the locations that follow (Fig. 404):
  - (a) Rig pin TE1 in the input cam of the TE flap PDU
  - (b) Rig pin LE5 in the input cam of the inboard slat PDU
  - (c) Rig pin LE2 in the input cam of the outboard slat PDU.

**NOTE:** Install rig pin LE2 while you apply a 15-20 pound (66.8-88.9 newtons) load to the control rod, along the center of the rod, to the inboard direction. Apply the load with a force gage.

S 094-075

- (6) If you can easily install rig pins TE1, LE2, and LE5, remove these rig pins and install plugs in the rig pin holes.

S 824-076

- (7) If you cannot easily install rig pin TE1 in the TE flap PDU, rig pin LE5 in the inboard slat PDU, or rig pin LE2 in the outboard slat PDU, do these adjustments:
  - (a) For rig pin TE1, adjust the control rod connected to the TE flap PDU with the instructions given in the "TE Flap PDU Adjustment" topic, Ref 27-51-00.
  - (b) For rig pin LE2, adjust the control rod connected to the outboard slat PDU with the instruction given in the "Outboard Slat PDU Adjustment" topic, Ref 27-81-00.
  - (c) For rig pin LE5, adjust the control rod connected to the inboard slat PDU with the instruction given in the "Inboard Slat PDU Adjustment" topic, Ref 27-81-00.

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S 094-077

- (8) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 214-078

- (9) Operate the flap control lever, and make sure the slat aft quadrant, drive shafts, and the input mechanisms to the slat PDUs are free to move when you move the flap control lever.

S 984-079

- (10) Move the flap control lever back to the zero (FLAPS UP) detent.

S 714-080

- (11) Do a test on the drive shaft installation with the steps in the "Installation Test" topic.

I. Install the Non-Adjustable Control Rod

S 434-081

- (1) Connect the non-adjustable control rod to the lower crank (Detail A, Fig. 403) with a bolt (head pointed aft), spacer, washer, and nut.

S 434-082

- (2) If removed, install the lower crank to the support (Detail B) with a bolt, 2 bearings, 2 spacers, washer, and a nut.

S 434-083

- (3) Connect the non-adjustable control rod to the upper crank (View A) with a bolt (head pointed outboard), washer, and nut (or the self-locking nutplate).

S 494-084

- (4) Do a check and make sure that you can easily install these rig pins in the locations that follow (Fig. 404):  
(a) Rig pin TE1 in the input cam of the TE flap PDU

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- (b) Rig pin LE5 in the input cam of the inboard slat PDU
- (c) Rig pin LE2 in the input cam of the outboard slat PDU.

NOTE: Install rig pin LE2 while you apply a 15–20 pound (66.8–88.9 newtons) load to the control rod, along the center of the rod, to the inboard direction. Apply the load with a force gage.

S 094–085

- (5) If you can easily install rig pins TE1, LE2, and LE5, remove these rig pins and install plugs in the rig pin holes.

S 824–086

- (6) If you cannot easily install rig pin TE1 in the TE flap PDU, rig pin LE5 in the inboard slat PDU, or rig pin LE2 in the outboard slat PDU, do these adjustments:
  - (a) For rig pin TE1, adjust the control rod connected to the TE flap PDU with the instructions given in the "TE Flap PDU Adjustment" topic, Ref 27–51–00.
  - (b) For rig pin LE2, adjust the control rod connected to the outboard slat PDU with the instruction given in the "Outboard Slat PDU Adjustment" topic, Ref 27–81–00.
  - (c) For rig pin LE5, adjust the control rod connected to the inboard slat PDU with the instruction given in the "Inboard Slat PDU Adjustment" topic, Ref 27–81–00.

S 094–087

- (7) Remove the DO–NOT–OPERATE tag from the flap control lever.

S 214–088

- (8) Operate the flap control lever, and make sure the non-adjustable rods and the fuselage cranks (Detail A, Fig. 403) are free to move while you move the flap control lever.

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S 864-089

- (9) Move the flap control lever back to the zero (FLAPS UP) detent.

S 714-090

- (10) Do a test on the non-adjustable rod installation with the steps in the "Installation Test" topic.

J. Install the Adjustable Control Rod

S 434-091

- (1) Connect the adjustable control rod to the crank (View A, Fig. 403) with a bolt (head pointed aft), spacer, washer, and nut.

S 434-092

- (2) If removed, install the lower crank to the support (Detail B) with a bolt, 2 bearings, 2 spacers, washer, and a nut.

S 824-093

- (3) Adjust the length of the control rod if it is necessary, until you can easily install the rod to the pilot input arm on the slat PDU (Fig. 404).

S 434-094

- (4) Connect the adjustable control rod to pilot input arm on the slat PDU with a bolt, washer, and nut.

S 494-095

- (5) Do a check and make sure that you can easily install these rig pins in the locations that follow (Fig. 404):
- (a) Rig pin TE1 in the input cam of the TE flap PDU
  - (b) Rig pin LE5 in the input cam of the inboard slat PDU
  - (c) Rig pin LE2 in the input cam of the outboard slat PDU.

**NOTE:** Install rig pin LE2 while you apply a 15-20 pound (66.8-88.9 newtons) load to the control rod, along the center of the rod, to the inboard direction. Apply the load with a force gage.

S 094-096

- (6) If you can easily install rig pins TE1, LE2, and LE5, remove these rig pins and install plugs in the rig pin holes.

S 824-097

- (7) If you cannot easily install rig pin TE1 in the TE flap PDU, rig pin LE5 in the inboard slat PDU, or rig pin LE2 in the outboard slat PDU, do these adjustments:
- (a) For rig pin TE1, adjust the control rod connected to the TE flap PDU with the instructions given in the "TE Flap PDU Adjustment" topic, Ref 27-51-00.

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- (b) For rig pin LE2,  
adjust the control rod connected to the outboard slat PDU with  
the instruction given in the "Outboard Slat PDU Adjustment"  
topic, Ref 27-81-00.
- (c) For rig pin LE5,  
adjust the control rod connected to the inboard slat PDU with  
the instruction given in the "Inboard Slat PDU Adjustment"  
topic, Ref 27-81-00.

S 094-098

- (8) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 214-099

- (9) Operate the flap control lever, and make sure the cranks and the  
adjustable control rods (Detail A, Fig. 403) are free to move when  
you move the flap control lever.

S 864-100

- (10) Move the flap control lever back to the zero (FLAPS UP) detent.

S 714-101

- (11) Do a test on the drive shaft installation with the steps in the  
"Installation Test" topic.

K. Installation Test

S 214-102

- (1) Make sure the flaps and slats are in the fully retracted position.

S 214-103

- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 094-104

- (3) Remove the PDU lock from the TE flap PDU (Fig. 405).

S 094-105

- (4) Remove the groundlocks from the inboard and outboard slat PDUs  
(Fig. 405).

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S 864-106

- (5) Supply electrical power (Ref 24-22-00).

S 864-107

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (6) Pressurize the center hydraulic system (Ref 29-11-00).

S 864-108

- (7) Move the flap control lever to the 20-unit detent, and make sure the flaps move to the 20-degree position, and the slats move to the intermediate position.

S 864-109

- (8) Move the flap control lever to the 30-unit detent and make sure the flaps and slats move to the fully extended position.

S 864-110

- (9) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted position.

S 724-111

- (10) Examine the load on the flap control lever with the instructions given in the "Test for the Flap Control Lever Load" topic (Ref 27-51-00).

L. Put the Airplane Back to Its Usual Condition

S 864-112

- (1) Remove the power from the center hydraulic system (Ref 29-11-00).

S 864-113

- (2) Remove electrical power (Ref 24-22-00).

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S 414-114

- (3) Close the access panels, 511BB and 611BB, for the outboard and inboard slat PDUs (Ref 06-44-00).

S 864-115

- (4) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-116

- (5) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 094-117

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (6) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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LEADING EDGE SLAT AFT QUADRANT AND LEADING EDGE SLAT AFT QUADRANT  
CONTROL COMPONENTS - INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and wear limit tables, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Leading Edge Slat Aft Quadrant - Removal/Installation for procedures to do these tasks.

TASK 27-81-05-226-001

2. Wear Limits for the Slat Aft Quadrant (Fig. 601)

A. General

- (1) This procedure only has illustrations and wear limit tables, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Leading Edge Slat Aft Quadrant - Removal/Installation for procedures to do these tasks.

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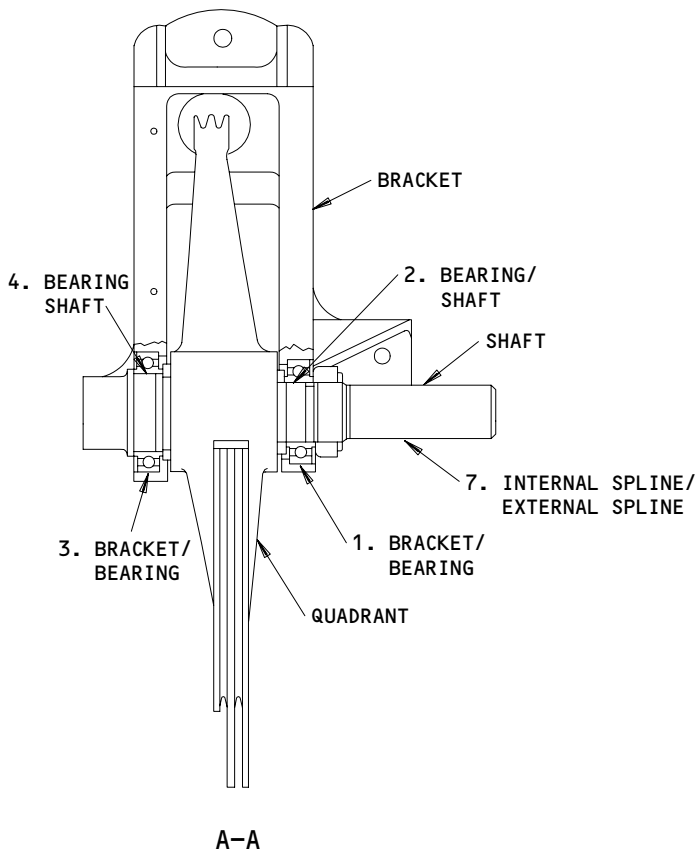
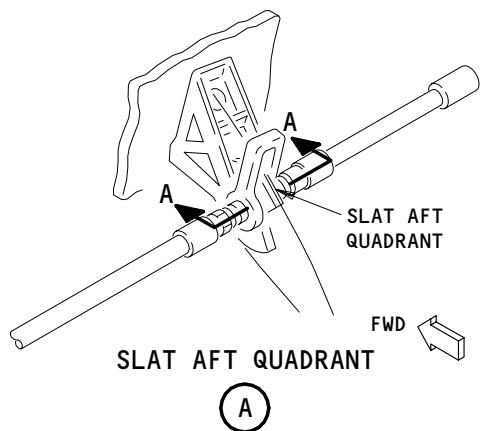
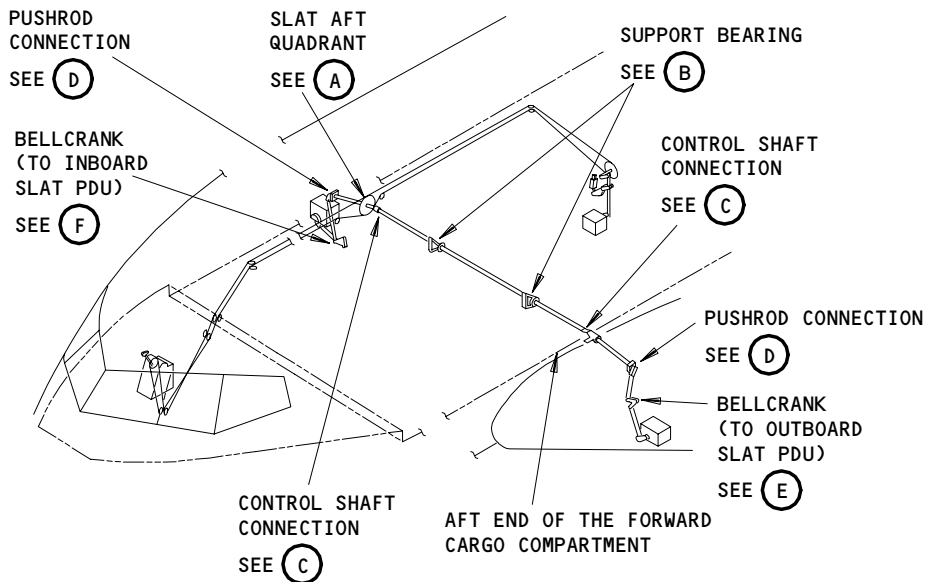
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# BOEING

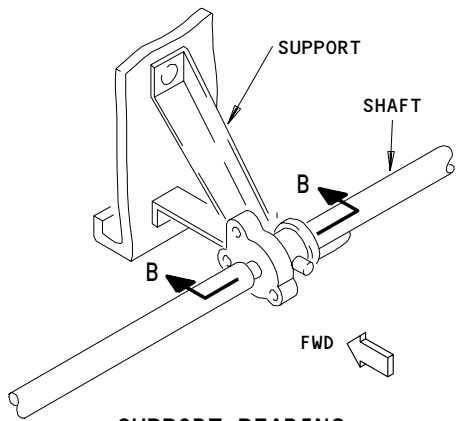
## 767 MAINTENANCE MANUAL



Wear Limits for the Slat Aft Quadrant  
Figure 601 (Sheet 1)

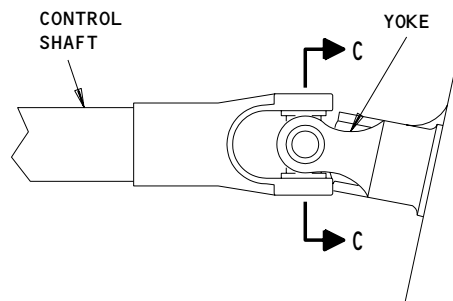
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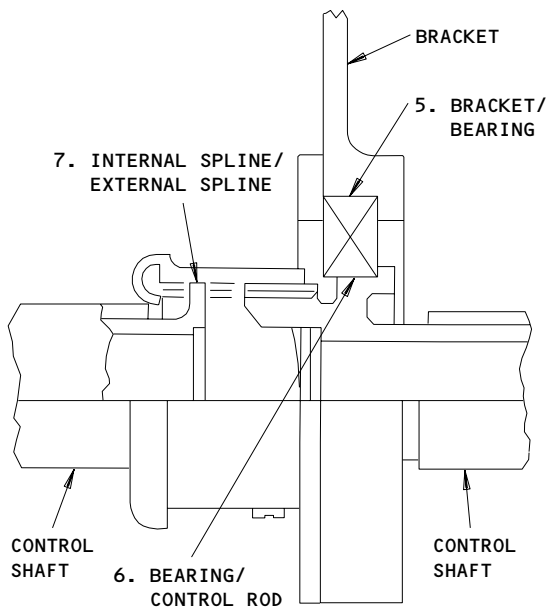
SUPPORT BEARING

(B)

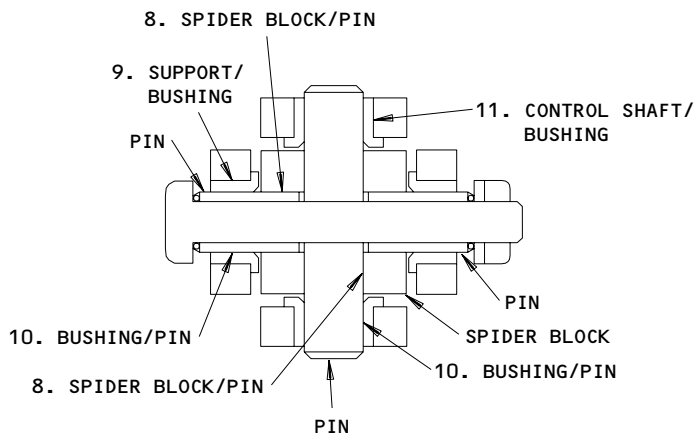


CONTROL SHAFT CONNECTION

(C)



B-B



C-C

Wear limits for the Slat Aft Quadrant  
Figure 601 (Sheet 2)

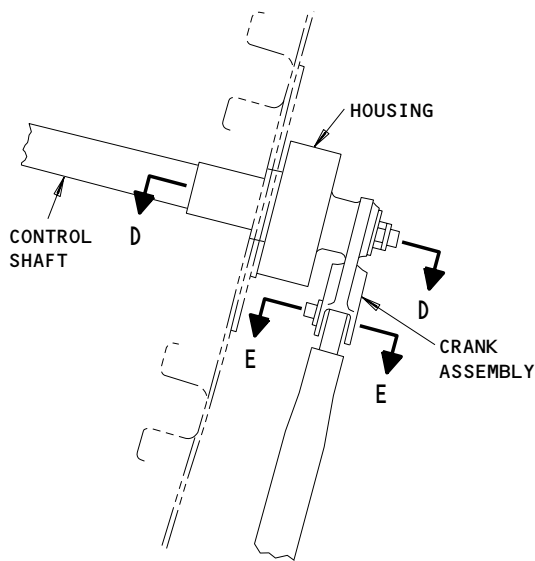
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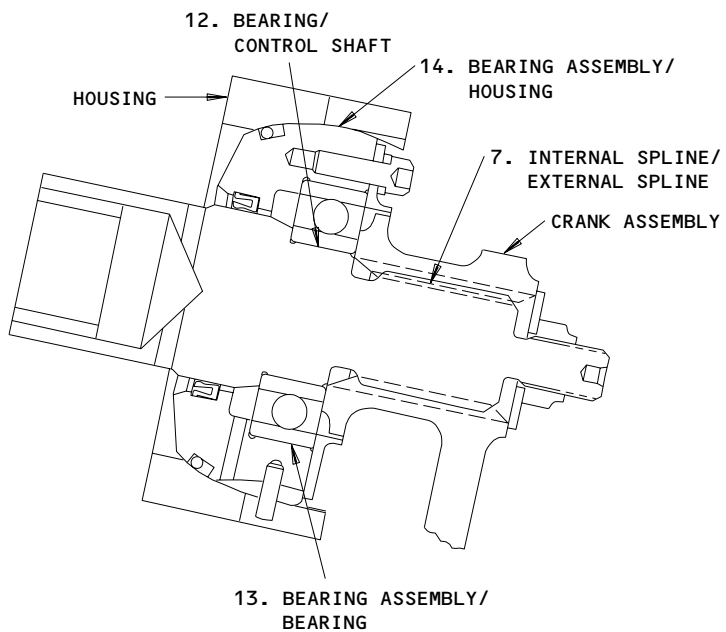
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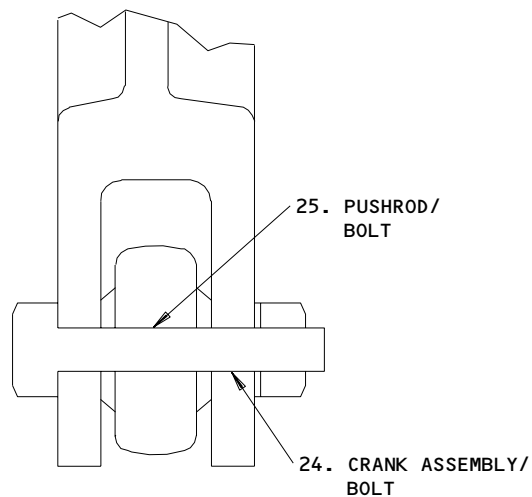


PUSHROD CONNECTION

D



D-D

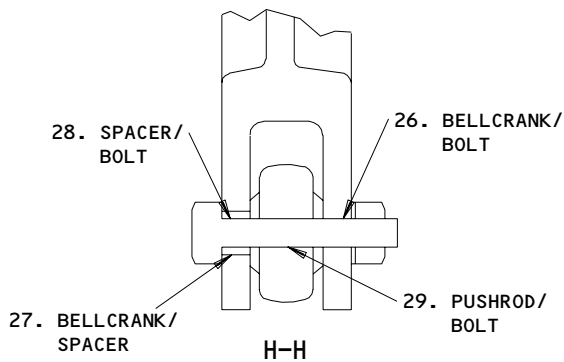
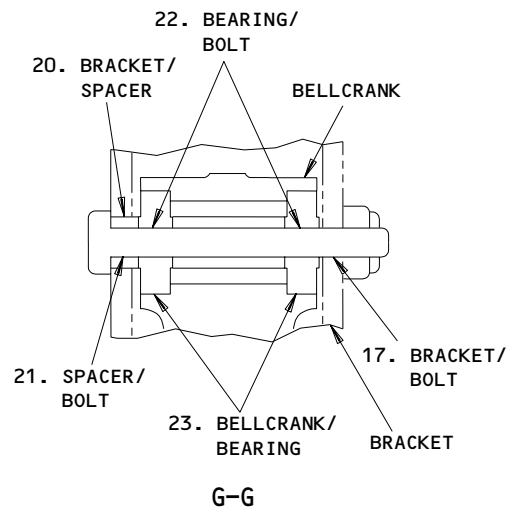
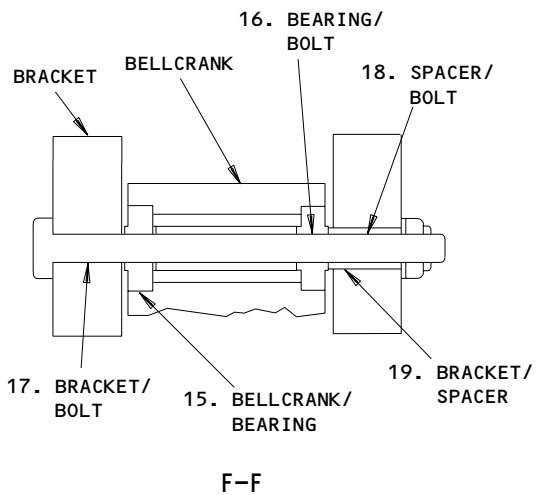
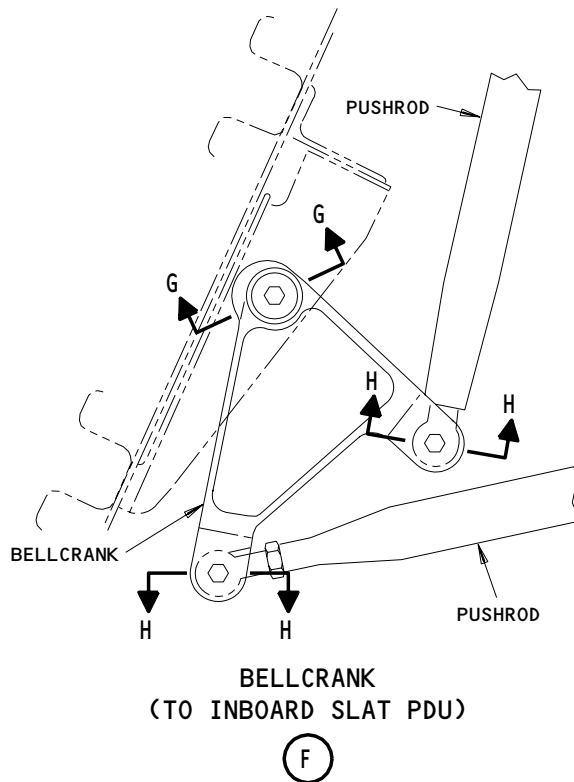
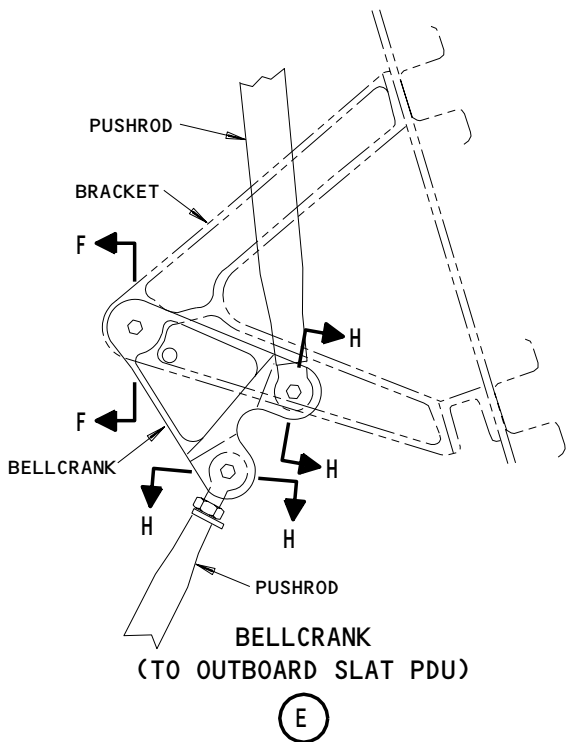


E-E

Wear Limits for the Slat Aft Quadrant  
Figure 601 (Sheet 3)

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Wear Limits for the Slat Aft Quadrant  
Figure 601 (Sheet 4)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIM.	MAX DIA CLEARANCE			
			MIN	MAX					
1	BRACKET	ID	1.7500	1.7510	1.7530	0.0040		X	1
	BEARING	OD	1.7490	1.7500	1.7460		X		
2	BEARING	ID	0.9990	1.0000	1.0035	0.0040	X		
	SHAFT	OD	0.9990	0.9950	0.9950			X	1
3	BRACKET	ID	2.0625	2.0635	2.0665	0.0040		X	1
	BEARING	OD	2.0615	2.0625	2.0585		X		
4	BEARING	ID	1.3120	1.3130	1.3160	0.0040	X		
	SHAFT	OD	1.3110	1.3120	1.3080			X	1
5	BRACKET	ID	2.3750	2.3760	2.3790	0.0040	X		
	BEARING	OD	2.3740	2.3750	2.3710		X		
6	BEARING	ID	1.4370	1.4380	1.4395	0.0020	X		
	CONTROL ROD	OD	1.4368	1.4375	1.4350			X	1
7	INTERNAL SPLINE	ID	--	--	--	2			
	EXTERNAL SPLINE	OD	--	--	--				
8	SPIDER BLOCK	ID	0.3760	0.3770	0.3795	0.0050	X		
	PIN	OD	0.3735	0.3745	0.3710		X		
9	SUPPORT	ID	0.5000	0.5006	0.5010	0.0000 3	X		
	BUSHING	OD	0.5010	0.5016	0.5006		X		
10	BUSHING	ID	0.3755	0.3765	0.3795	0.0050	X		
	PIN	OD	0.3735	0.3745	0.3705		X		
11	CONTROL SHAFT	ID	0.5000	0.5006	0.5010	0.0000 3	X		
	BUSHING	OD	0.5010	0.5016	0.5006		X		



THIS PART CAN BE REPAIRED.



VISUALLY EXAMINE (USE MAGNIFICATION IF NECESSARY) ALL THE BEARING SURFACES ON THE SPLINES FOR WEAR.

NOTE: REPLACE THE COUPLING WITH A NEW ONE IF YOU ARE NOT SURE ABOUT THE WEAR.



INTERFERENCE FIT.

Wear Limits for the Slat Aft Quadrant  
Figure 601 (Sheet 5)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PER-MITTED WEAR DIM.	MAX DIA CLEAR-ANCE			
			MIN	MAX					
12	BEARING	ID	0.9839	0.9843	0.9860	0.0020	X		
	CONTROL SHAFT	OD	0.9835	0.9840	0.9819			X	1
13	BEARING ASSEMBLY	ID	1.8504	1.8510	1.8524	0.0020	X		
	BEARING	OD	1.8499	1.8504	1.8484		X		
14	BEARING ASSEMBLY	ID	2.6970	2.6990	2.7150	0.0120	X		
	HOUSING	OD	2.7010	2.7030	2.6850		X		
15	BELLCRANK	ID	0.7502	0.7508	0.7530	0.0030	X		
	BEARINNG	OD	0.7495	0.7500	0.7472		X		
16	BEARING	ID	0.2495	0.2500	0.2525	0.0030	X		
	BOLT	OD	0.2485	0.2495	0.2465		X		
17	BRACKET	ID	0.2495	0.2505	0.2535	0.0040	X		
	BOLT	OD	0.2485	0.2495	0.2455		X		
18	SPACER	ID	0.2500	0.2515	0.2535	0.0040	X		
	BOLT	OD	0.2485	0.2495	0.2460		X		
19	BRACKET	ID	0.3759	0.3764	0.3781	0.0020	X		
	SPACER	OD	0.3756	0.3761	0.3739		X		
20	BRACKET	ID	0.3759	0.3764	0.3791	0.0030	X		
	SPACER	OD	0.3756	0.3761	0.3729		X		
21	SPACER	ID	0.2500	0.2515	0.2545	0.0050	X		
	BOLT	OD	0.2485	0.2495	0.2450		X		
22	BEARING	ID	0.2495	0.2500	0.2535	0.0040	X		
	BOLT	OD	0.2485	0.2495	0.2455		X		

Wear Limits for the Slat Aft Quadrant  
Figure 601 (Sheet 6)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIM.	MAX DIA CLEARANCE			
			MIN	MAX					
23	BELLCRANK	ID	0.7520	0.7575	0.7600	0.0100		X	▷1
	BEARING	OD	0.7495	0.7500	0.7420		X		
24	CRANK ASSY	ID	0.2495	0.2505	0.2525	0.0030	X		
	BOLT	OD	0.2485	0.2495	0.2465		X		
25	PUSHROD	ID	0.2497	0.2500	0.2525	0.0030	X		
	BOLT	OD	0.2485	0.2495	0.2467		X		
26	BELLCRANK	ID	0.2495	0.2505	0.2535	0.0040		X	▷1
	BOLT	OD	0.2485	0.2495	0.2455		X		
27	BELLCRANK	ID	0.3759	0.3764	0.3781	0.0020		X	▷1
	SPACER	OD	0.3756	0.3761	0.3739		X		
28	SPACER	ID	0.2500	0.2515	0.2535	0.0040	X		
	BOLT	OD	0.2485	0.2495	0.2460		X		
29	PUSHROD	ID	0.2497	0.2500	0.2525	0.0030	X		
	BOLT	OD	0.2485	0.2495	0.2465		X		

Wear Limits for the Slat Aft Quadrant  
Figure 601 (Sheet 7)

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LEADING EDGE SLAT POWER DRIVE UNIT – REMOVAL/INSTALLATION

1. General

A. This procedure contains the instruction to do these tasks:

- Remove the Leading Edge Slat Power Drive Unit
- Install the Leading Edge Slat Power Drive Unit
- Adjust the Leading Edge Power Drive Unit for Scheduled Maintenance

The slat power drive unit (PDU) installation task (2) contains the steps to adjust the power drive unit. Thus, if you do all the steps in the slat PDU installation task (2), then it is not necessary to do the slat PDU adjustment task (3) at the end of this procedure.

B. The leading edge slats are operated by two slat PDUs. The inboard slat PDU (in the right wing) is to operate the inboard slat drive. The outboard slat PDU (in the left wing) is to operate the outboard slat drive. You can remove and install each PDU independently.

TASK 27-81-10-024-001

2. Leading Edge Slat Power Drive Unit (PDU) – Removal

A. Equipment

- (1) General Boom Hoist - A20001-79
- (2) LE Slat Drive Hoist Adapter - A27004-1, -2
  - (-1 for the Inboard Slat Power Drive Unit)
  - (-2 for the Outboard Slat Power Drive Unit)
- (3) Leading Edge Slats Groundlock - A27007-1
  - (2 Necessary)
- (4) Circuit Breaker Lockout Clip
  - (4 Necessary) Commercially Available
- (5) TE Flap PDU Lock - A27009-7

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 12-12-01/301, Hydraulic Systems
- (3) AMM 24-22-00/201, Electrical Power – Control
- (4) AMM 27-51-00/501, Trailing Edge Flap System
- (5) AMM 27-51-32/201, TE Flap Power Drive Unit Control Valve Module

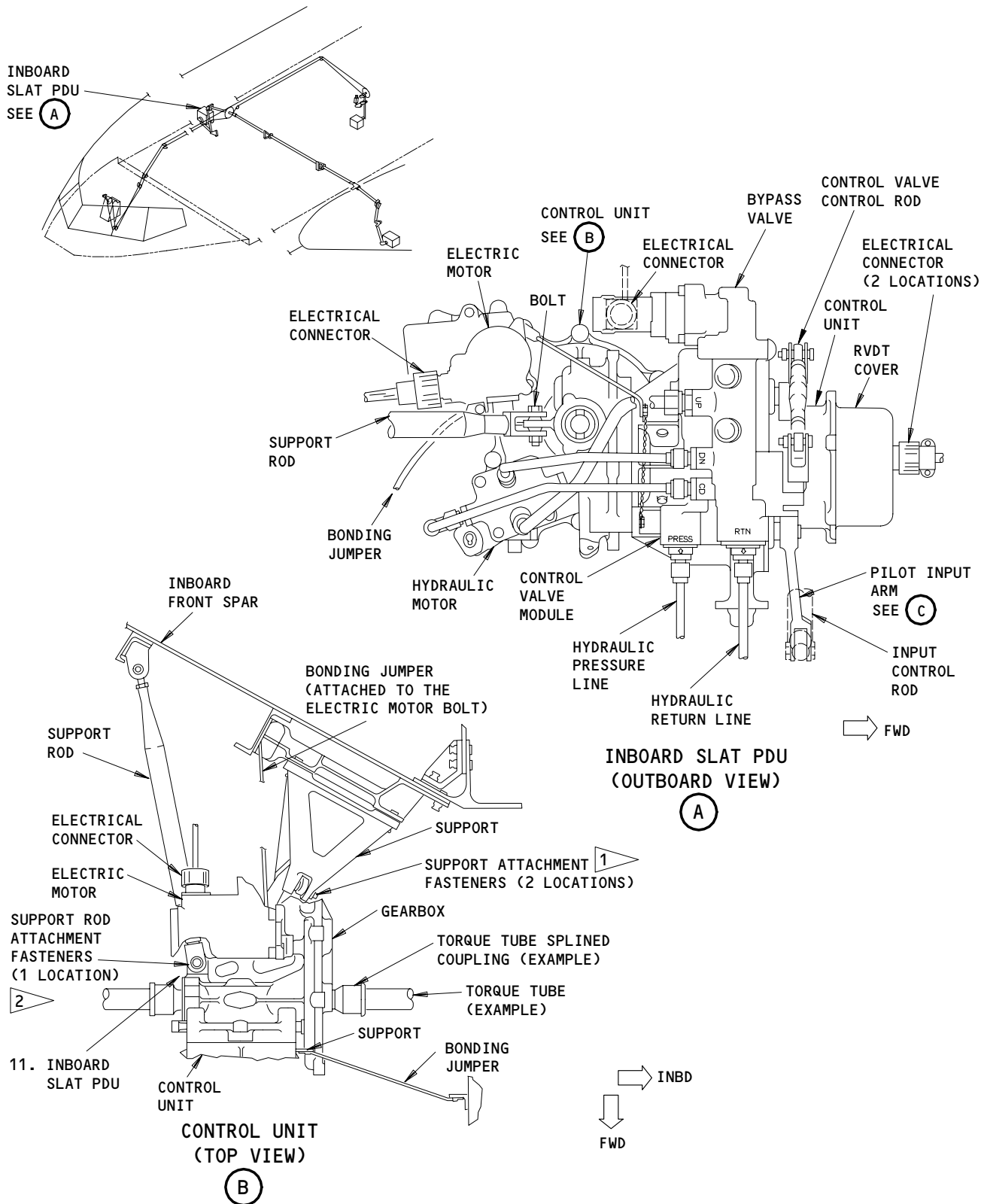
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Inboard Slat Power Drive Unit (PDU)  
Figure 401 (Sheet 1)

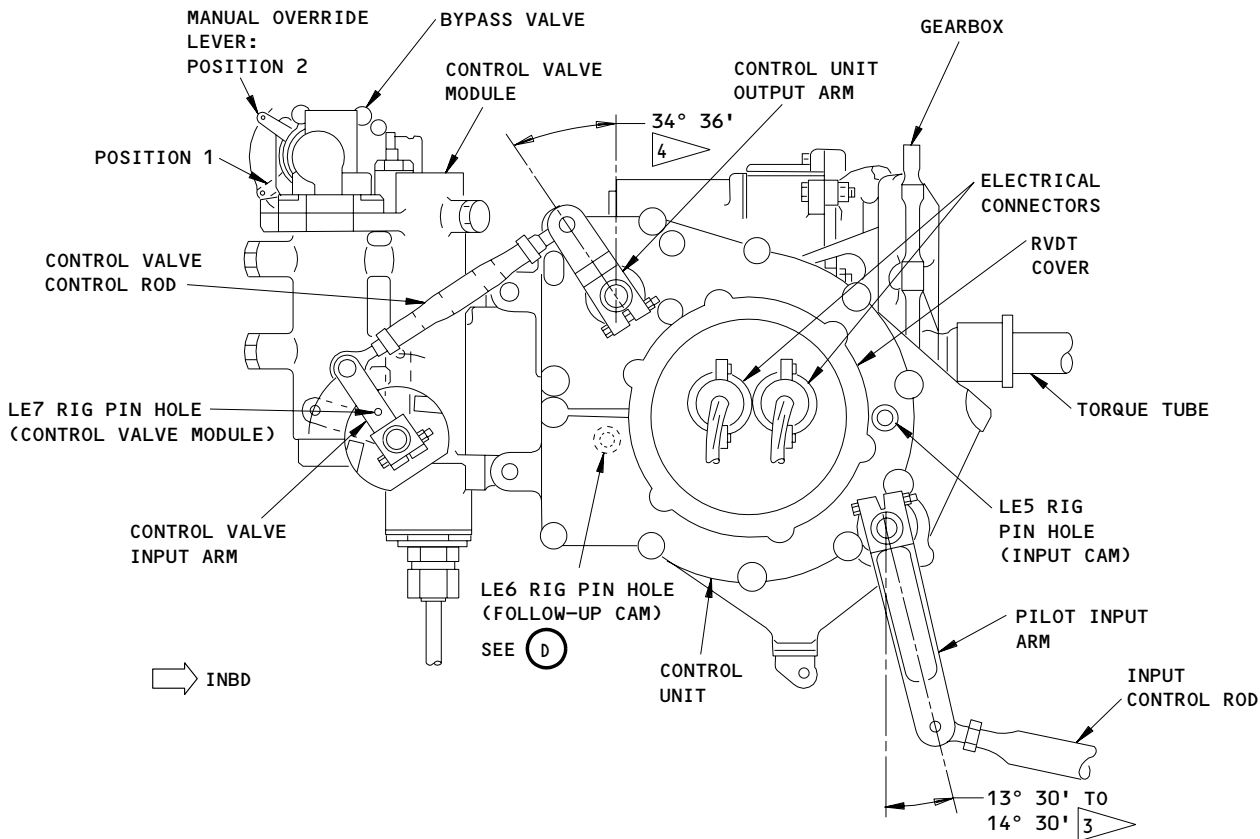
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PILOT INPUT ARM  
(FRONT VIEW)

(C)

1 INSTALL THESE PARTS AT TWO LOCATIONS. APPLY GREASE (BMS 3-24) TO ALL SURFACES BEFORE INSTALLATION:

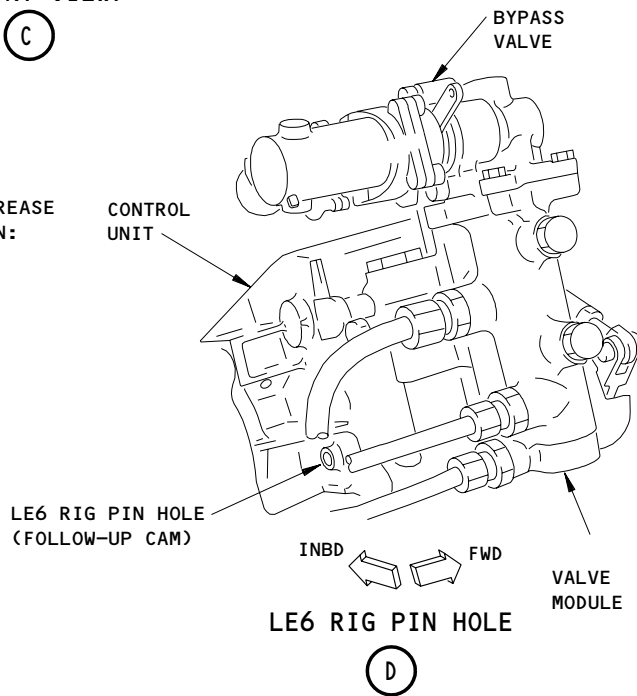
1. MOUNTING BOLT (HEAD OUTBOARD)
2. BUSHING
3. NUT
4. STEEL WASHER (BELOW THE NUT)
5. ALUMINUM WASHER (BELOW THE BOLTHEAD)

2 INSTALL THESE PARTS. APPLY GREASE (BMS 3-24) TO ALL SURFACES BEFORE INSTALLATION:

6. BOLT (HEAD UP)
7. BUSHING
8. NUT
9. STEEL WASHER (BELOW THE NUT)
10. ALUMINUM WASHER (BELOW THE BOLTHEAD)

3 POSITION TO INSTALL RIG PIN LE5

4 POSITION TO INSTALL RIG PIN LE6



Inboard Slat Power Drive Unit (PDU)  
Figure 401 (Sheet 2)

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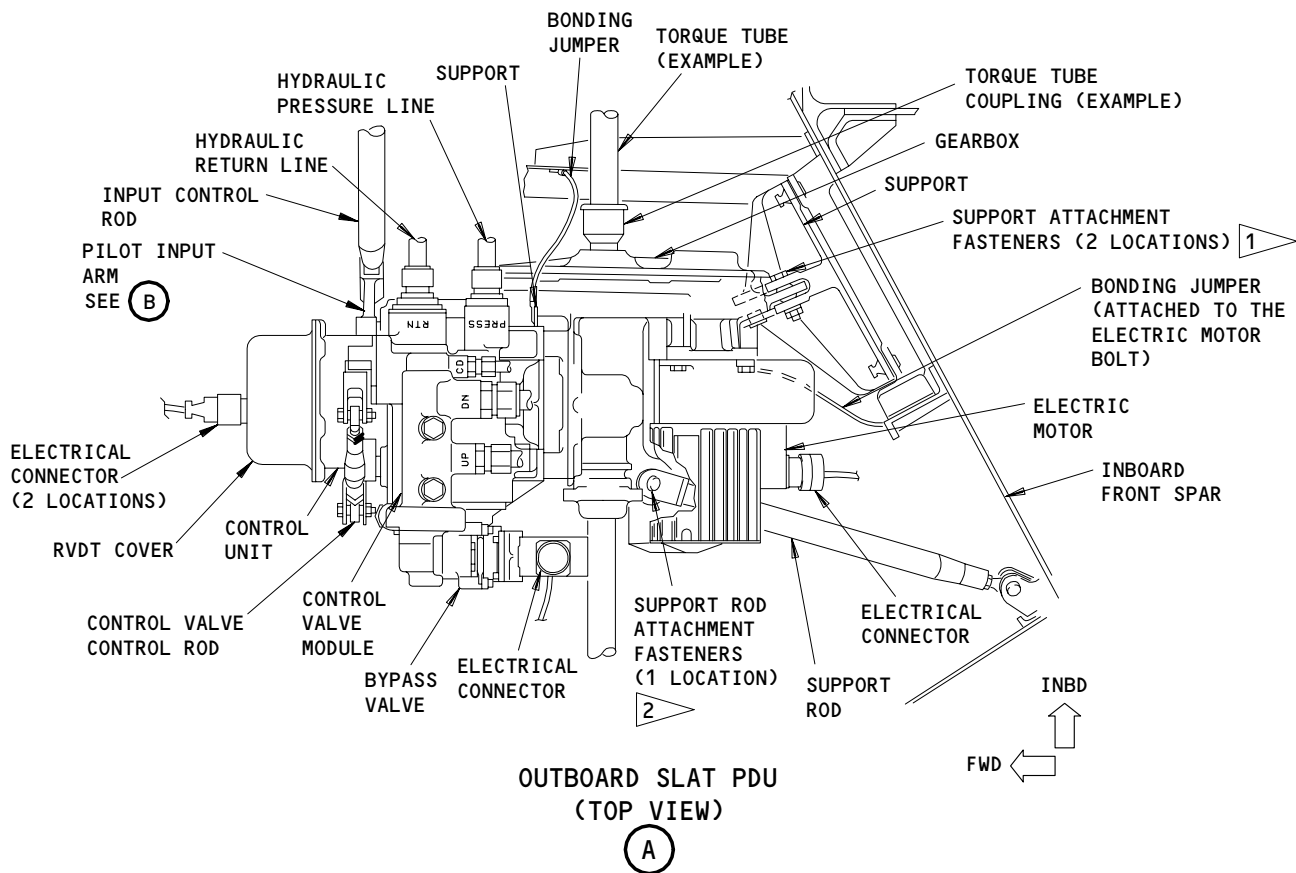
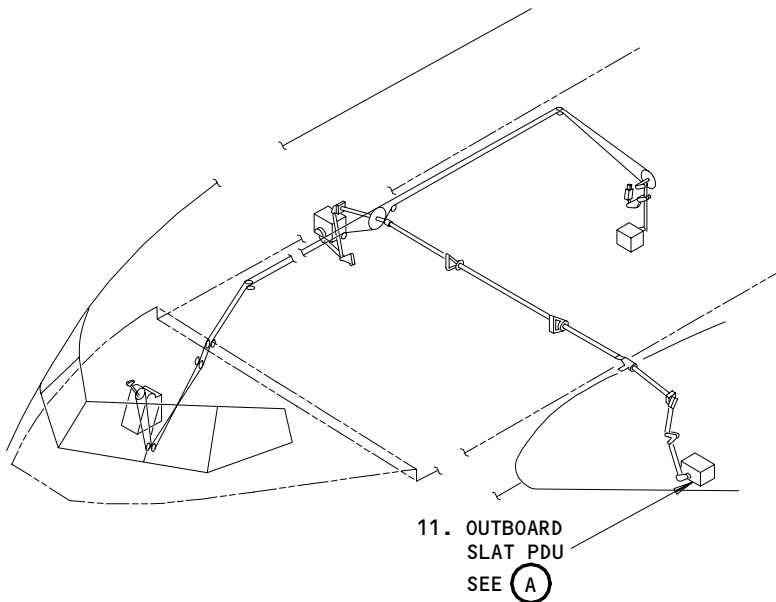
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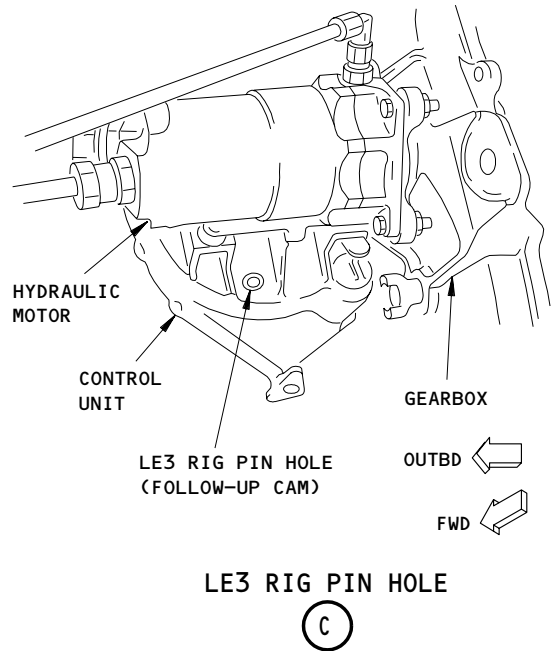
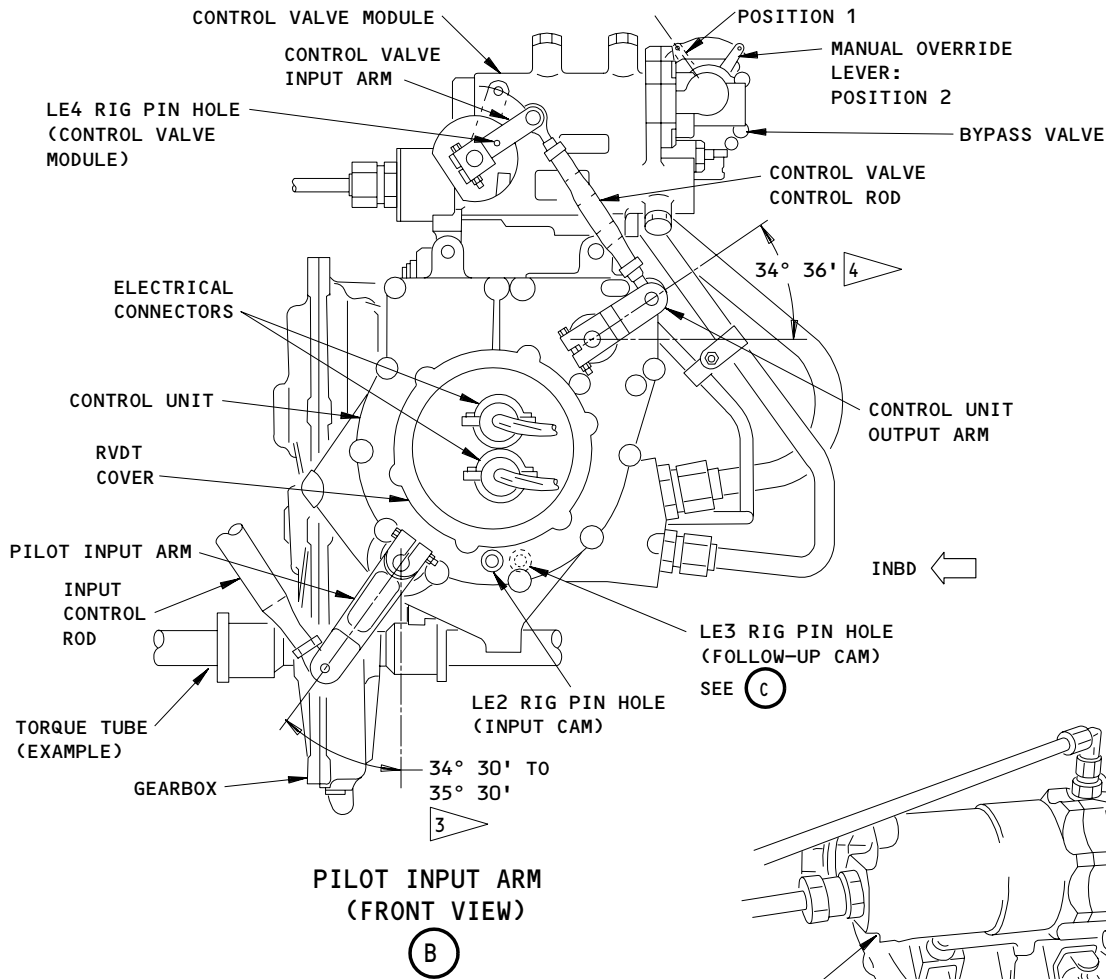
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Outboard Slat Power Drive Unit (PDU)  
Figure 402 (Sheet 1)

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- 1 INSTALL THESE PARTS AT TWO LOCATIONS. APPLY CORROSION PREVENTIVE COMPOUND (WET) TO MOUNTING HOLES BEFORE INSTALLATION:
1. MOUNTING BOLT (HEAD INBOARD)
  2. BUSHING
  3. NUT
  4. ALUMINUM WASHER (BELOW THE BOLTHEAD)
  5. STEEL WASHER (BELOW THE NUT)

- 2 INSTALL THESE PARTS. APPLY CORROSION PREVENTIVE COMPOUND TO MOUNTING HOLES BEFORE INSTALLATION:
6. BOLT (HEAD UP)
  7. BUSHING
  8. NUT
  9. ALUMINUM WASHER (BELOW THE BOLTHEAD)
  10. STEEL WASHER (BELOW THE NUT)

3 POSITION TO INSTALL RIG PIN LE2

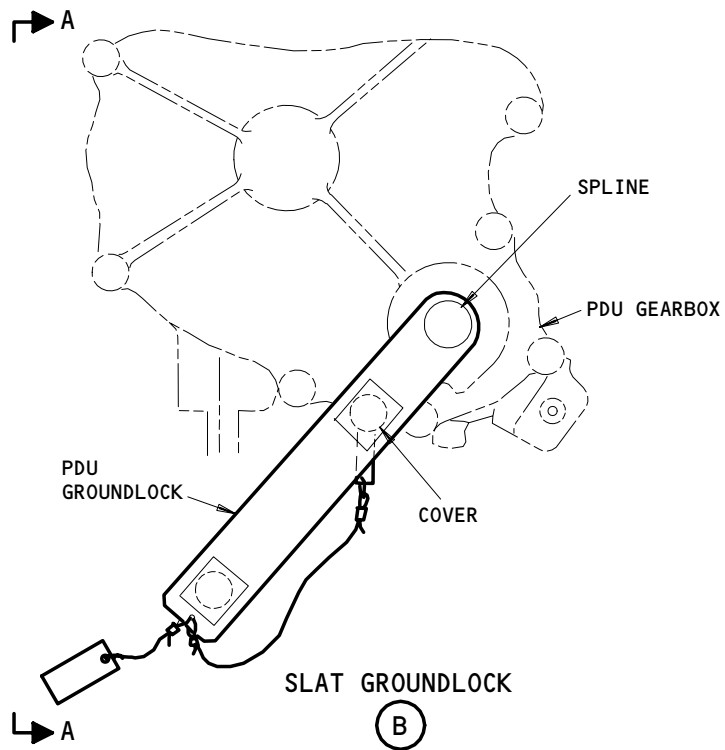
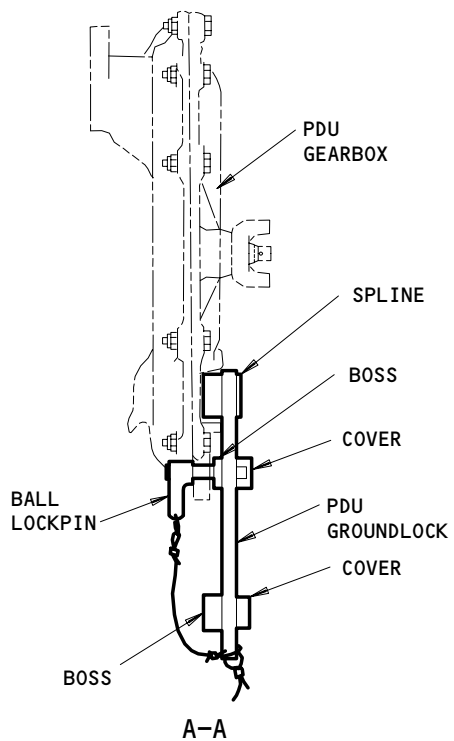
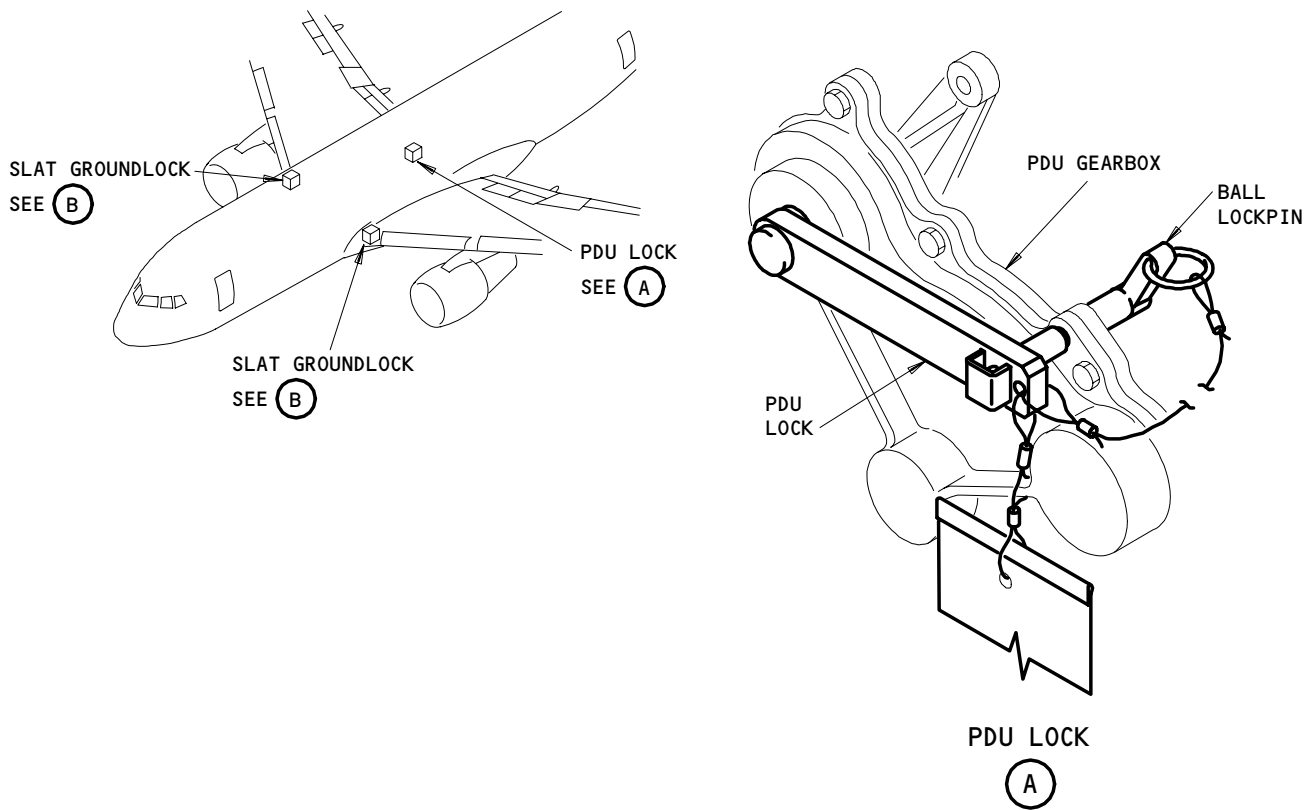
4 POSITION TO INSTALL RIG PIN LE3

Outboard Slat Power Drive Unit (PDU)  
Figure 402 (Sheet 2)

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Power Drive Unit Locks  
Figure 403

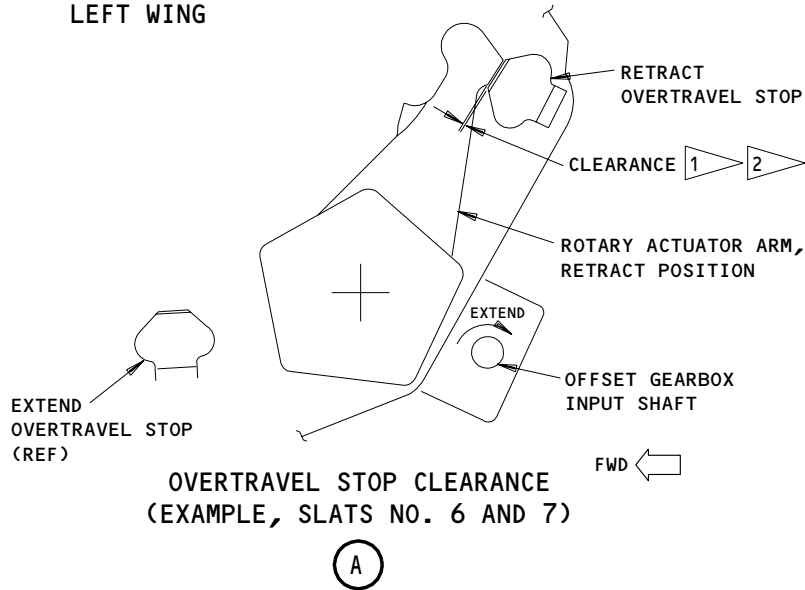
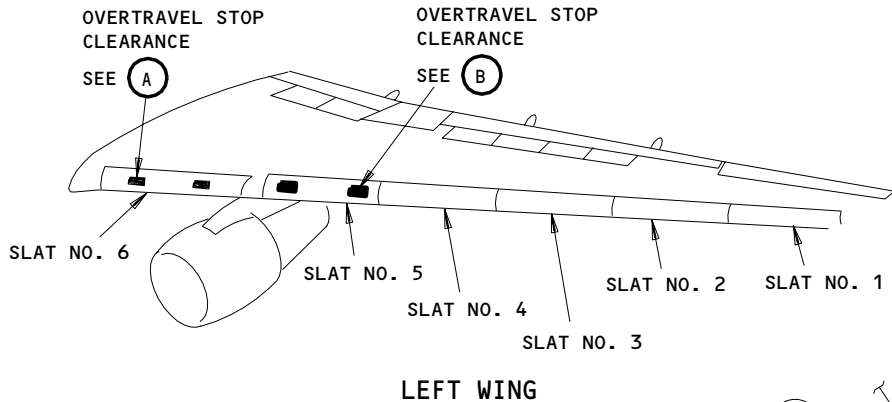
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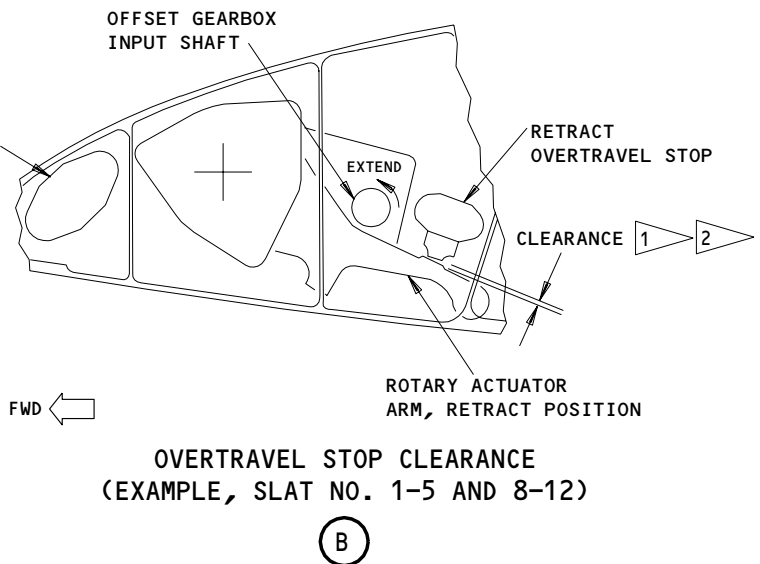
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**NOTE:** THE SLATS ARE GIVEN THE NUMBER FROM 1 THROUGH 12, FROM THE LEFT WING TO THE RIGHT WING.

1 ▷ RETRACT WITH HYDRAULIC POWER: 0.05 TO 0.10 INCH (1.3 TO 2.5 mm)

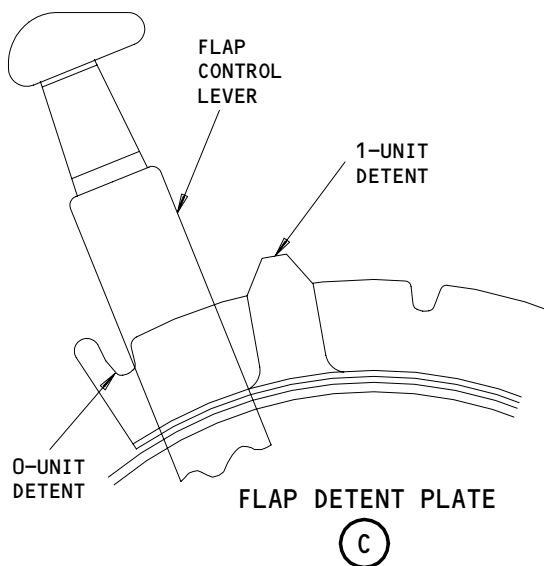
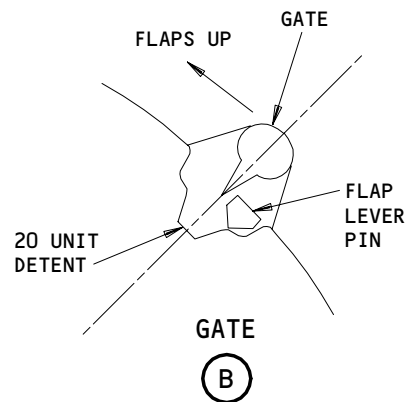
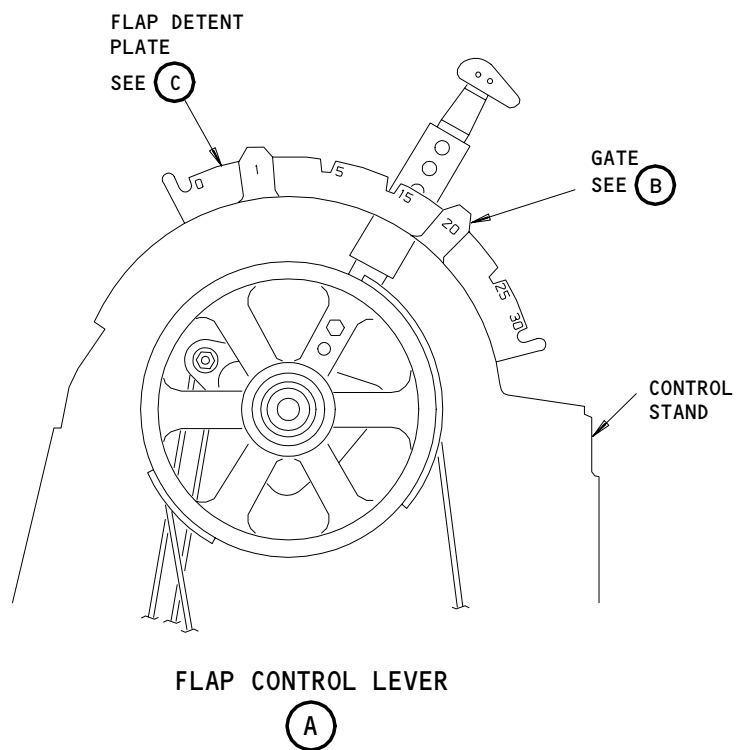
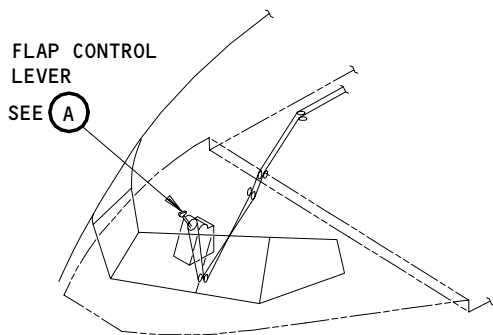
2 ▷ RETRACT WITH ELECTRIC POWER: NOT LESS THAN 0.03 INCH (0.8 mm)



Slat Retract Overtravel Stop Clearance  
Figure 404

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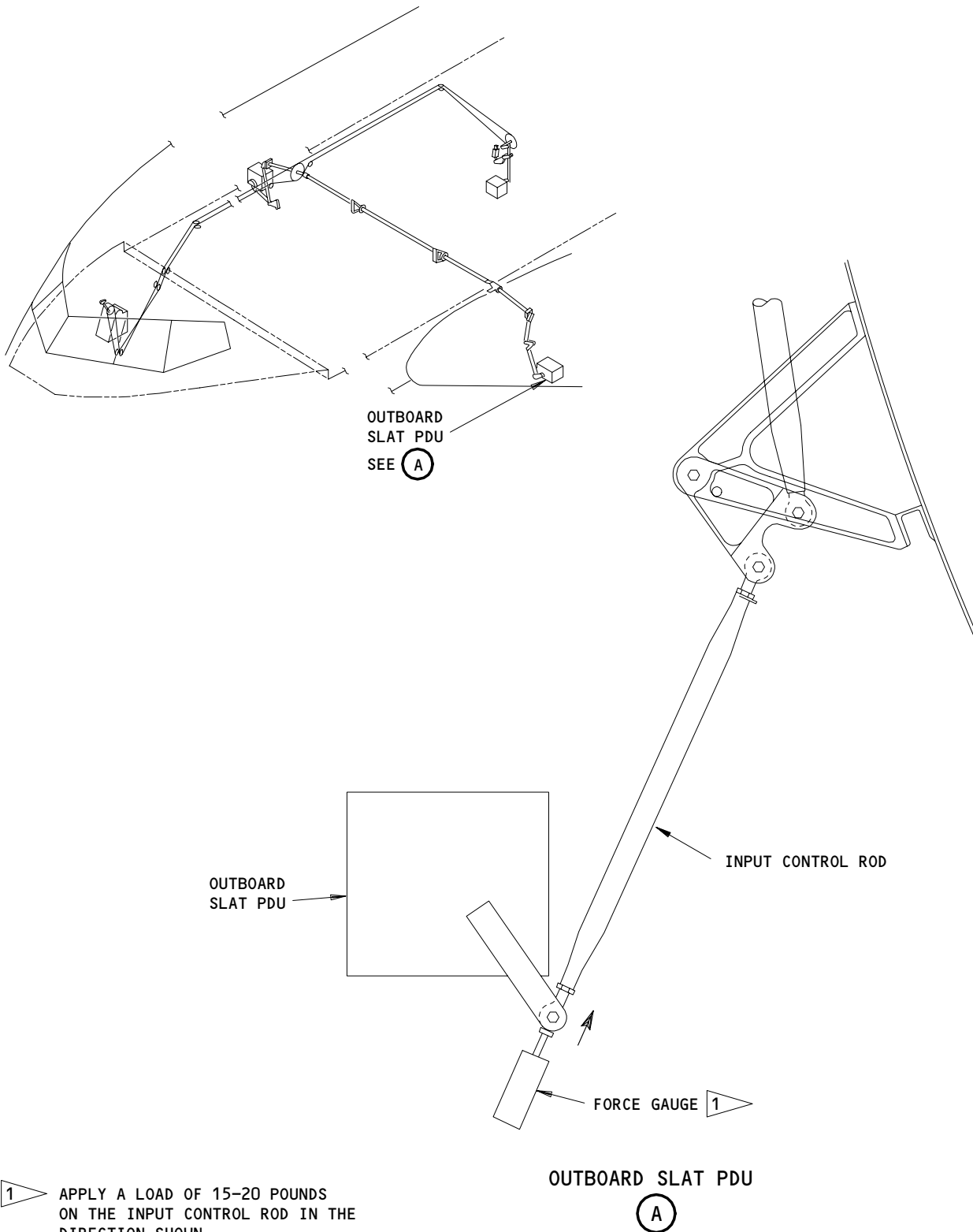
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Flap Control Lever  
Figure 405

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Outboard Slat Power Drive Unit - Adjustment  
Figure 406

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- (6) AMM 27-81-00/501, Leading Edge Slat System
- (7) AMM 27-81-11/401, Leading Edge Slat Power Drive Unit Components
- (8) AMM 27-81-12/401, Leading Edge Slat Drive Control Valve Module and Bypass Valve
- (9) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (10) AMM 32-00-15/201, Landing Gear Door Locks
- (11) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 214-004

- (3) Make sure the flaps and slats are in the fully retracted position.

S 214-005

- (4) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 494-006

- (5) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 864-007

- (6) Remove the pressure from the center hydraulic system and the reservoir (AMM 29-11-00/201).

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S 864-008

- (7) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR
  - (b) 11C16, FLAP SLAT ELEC UNIT 1 CONT
  - (c) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR
  - (d) 11G16, FLAP SLAT ELEC UNIT 2 CONT
  - (e) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR
  - (f) 11G23, FLAP SLAT ELEC UNIT 3 CONT
  - (g) 11H23, SLAT ALTN CONT INBD
  - (h) 11H24, SLAT ALTN CONT OUTBD
  - (i) 11J24, FLAPS ALTN CONT

S 864-009

- (8) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 014-010

- (9) Remove the access panels, 511BB and 611BB, to get access to the inboard and outboard slat PDUs (AMM 06-44-00/201).

E. Remove the LE Slat PDU

**NOTE:** Refer to Fig. 401 to remove the inboard slat PDU.  
Refer to Fig. 402 to remove the outboard slat PDU.

S 034-011

- (1) Disconnect the electrical connectors from the electric motor, the bypass valve, and the RVDT cover (2 locations).

**NOTE:** Attach an identification tag to each connector.

S 034-012

- (2) Disconnect the bonding jumpers from the airplane structure (2 locations).

S 034-013

- (3) Disconnect the hydraulic pressure line, the case drain, and the hydraulic return line from the control valve module.

S 494-014

- (4) Install plugs in the hydraulic lines, and caps on the hydraulic ports.

S 034-015

- (5) Disconnect the control rod from the pilot input arm.

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S 934-016

- (6) Make a mark to align the torque tube to the adjacent airplane structure, at each side of the slat PDU.

**NOTE:** These marks will help keep a record of the torque tube position, before you disconnect the torque tubes from the PDU.

S 494-017

- (7) Install a support to hold the weight of the slats.

**NOTE:** The weight of the slats can cause the torque tube to turn away from the adjusted position by a small increment.

S 034-018

- (8) Remove the screws from the splined coupling and disconnect the torque tube from each side of the slat PDU.

**NOTE:** Do not turn the torque tube. It will be necessary to adjust the slat drive if you turn the torque tube while it is disconnected (AMM 27-81-00/501).

S 024-130

- (9) Remove the LE slat PDU:

**NOTE:** The inboard slat PDU weighs approximately 48 pounds (21 Kg). The outboard slat PDU weighs approximately 84 pounds (38.1 Kg).

- (a) Install the general boom hoist, A20001-79 and the adapter to hold the drive unit on the slat PDU.
- (b) Disconnect the support rod from the slat PDU.
- (c) Remove the two support attachment fasteners (1 and 6) from the support.
- (d) Use the general boom hoist, A20001-79 with the adaptor to remove the slat PDU.

TASK 27-81-10-424-023

3. Leading Edge Slat Power Drive Unit (PDU) - Installation

A. Equipment

- (1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):
  - (a) LE2 - P/N A20004-9
  - (b) LE3 - P/N A20004-9
  - (c) LE4 - P/N A20004-73

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- (d) LE5 - P/N A20004-9
- (e) LE6 - P/N A20004-9
- (f) LE7 - P/N A20004-73
- (2) General Boom Hoist - A20001-79
- (3) LE Slat Drive Hoist Adapter - A27004-1, -2  
(-1, for the Inboard Slat Power Drive Unit)  
(-2, for the Outboard Slat Power Drive Unit)
- (4) Leading Edge Slats Groundlock - A27007-1  
(2 Necessary)
- (5) TE Flap PDU Lock - A27009-7
- (6) Force Gage (0-25 pounds (0-111 newtons))
- B. Consumable Materials
  - (1) C00308 Corrosion Preventive Compound -  
MIL-C-11796, Class 3
  - (2) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
  - (3) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)
  - (4) D00054 Skydrol Assembly Lube - MCS 352B  
(Hydraulic Fluid - BMS 3-11 Optional)
  - (5) D00153 Hydraulic Fluid, Fire Resistant - BMS 3-11  
(Skydrol Assembly Lube - MCS 352B Optional)
- C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	11	Power Drive Unit (Inboard)	27-81-10	01A	95
			27-81-10	01B	95
402	11	Power Drive Unit (Outboard)	27-81-10	05	85

- D. References
  - (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

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- (2) AMM 06-44-00/201, Wing Access Doors and Panels
- (3) AMM 12-12-01/301, Hydraulic Systems
- (4) AMM 20-10-23/401, Lockwires
- (5) AMM 20-10-24/201, Rig Pins
- (6) AMM 24-22-00/201, Electrical Power - Control
- (7) AMM 27-51-00/501, Trailing Edge Flap System
- (8) AMM 27-51-32/201, TE Flap Power Drive Unit Control Valve Module
- (9) AMM 27-81-00/201, Leading Edge Slat System
- (10) AMM 27-81-00/501, Leading Edge Slat System
- (11) AMM 27-81-11/401, Leading Edge Slat Power Drive Unit Components
- (12) AMM 27-81-12/401, Leading Edge Slat Drive Control Valve Module and Bypass Valve
- (13) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (14) AMM 32-00-15/201, Landing Gear Door Locks

E. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

119AL	Main Equipment Center
511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

F. Install the LE Slat PDU

NOTE: Refer to Fig. 401 to install the inboard slat PDU.  
Refer to Fig. 402 to install the outboard slat PDU.

S 214-024

- (1) Make sure the flaps and slats are in the fully retracted position.

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- S 214-025
- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.
- S 214-026
- (3) Make sure the pressure is removed from the center hydraulic system and reservoir (AMM 29-11-00/201).
- S 214-027
- (4) Make sure the flap and slat alternate drive is not armed (ALTN switch lights are off at the first officer's main instrument panel).
- S 494-028
- (5) Use the general boom hoist and the adapter and lift the slat PDU to its position for installation.
- S 434-029
- (6) Do these steps to connect the slat PDU to the support (2 locations):
- (a) On the Inboard Slat PDU,  
install these fasteners with BMS 3-33 grease on all the surfaces (Detail B, Fig. 401):
- bolt (1) (bolthead pointed outboard)
  - aluminum washer (5) (below the bolthead)
  - bushing (2)
  - steel washer (4) (below the nut)
  - nut (3)
- (b) On the Outboard Slat PDU,  
install these fasteners with MIL-C-11796 corrosion preventive compound on all the surfaces (Detail A, Fig. 402):
- bolt (1) (bolthead pointed inboard)
  - aluminum washer (4) (below the bolthead)
  - bushing (2)
  - steel washers (5) (below the nut)
  - nut (3)

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S 434-030

- (7) Do these steps to connect the support rod to the slat PDU:
- (a) On the Inboard Slat PDU,  
install these fasteners with BMS 3-33 grease on all the  
surfaces (Detail B, Fig. 401):
- bolt (6) (bolthead pointed up)
  - aluminum washer (10) (below the bolthead)
  - bushing (7)
  - steel washer (9) (below the nut)
  - nut (8)
- (b) On the Outboard Slat PDU,  
install these fasteners with MIL-C-11796 corrosion preventive  
compound on all the surfaces (Detail A, Fig. 402):
- bolt (6) (bolthead pointed up)
  - aluminum washer (9) (below the bolthead)
  - bushing (7)
  - steel washers (10) (below the nut)
  - nut (8)

S 094-031

- (8) Remove the hoist and the adapter from the slat PDU.

S 434-032

- (9) Connect the bonding jumpers to the airplane structure at two  
locations.

S 094-033

**CAUTION:** IF YOU INSTALLED A NEW SLAT PDU, MAKE SURE YOU REMOVE THE  
O-RINGS WITH THE SHIPPING CAP FROM THE HYDRAULIC PORTS ON THE  
CONTROL VALVE MODULE. THE O-RINGS ON THE SHIPPING CAPS CAN  
CAUSE INCORRECT CONNECTIONS WITH THE HYDRAULIC LINES AND LEAK  
HYDRAULIC FLUID.

- (10) Remove the plugs from the hydraulic lines, and the caps from the  
hydraulic ports.

**NOTE:** If you installed a new slat PDU or a new control valve  
module, remove the O-rings supplied with the shipping caps  
from the hydraulic ports.

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- S 644-034
- (11) Apply Skydrol assembly lube or hydraulic fluid to the packing O-rings and fittings before you connect the hydraulic lines.
- S 434-035
- (12) Connect the hydraulic pressure and return lines to the control valve module on the slat PDU.
- S 434-036
- (13) Remove the identification tags and connect the electrical connectors to the electric motor, the bypass valve, and the RVDT (2 locations).
- S 214-037
- (14) Make sure the manual override lever on the slat PDU bypass valve is in the No. 2 (normal) position.
- S 494-038
- (15) Remove the plug from the rig pin hole for the input cam, and install rig pin LE2 in the outboard slat PDU, or rig pin LE5 in the inboard slat PDU.
- S 864-039
- (16) Move the manual override lever on the TE flap PDU (in the right MLG wheel well) to the No. 1 (bypass) position, and install a DO-NOT-OPERATE tag on the lever.
- S 864-040
- (17) On the slat PDU that was not installed, move the manual override lever on the bypass valve to the No. 1 (bypass) position and install a DO-NOT-OPERATE tag on the lever.
- S 494-041
- (18) Install the PDU lock in the TE flap PDU (Fig. 403).
- S 494-042
- (19) Install the groundlock to the slat PDU that was not installed (Fig. 403).

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S 214-043

- (20) Make sure you can align the centerline of the torque tube to the centerline on the PDU splined coupling ( $\pm 0.5^\circ$ ) at the two sides of the PDU.

S 824-044

- (21) If the centerlines do not align, adjust the support rod attached to the PDU with these steps:
- Loosen the jamnut on the support rod and adjust the length of the rod.
  - Tighten the jamnut and apply a thin layer of BMS 3-33 grease to the threads on the rod ends.

S 824-045

- (22) If you installed the inboard slat PDU, adjust and connect the input control rod (one adjustable end) to the pilot input arm with these steps:
- Make sure rig pin LE5 is fully installed in the input cam (Detail C, Fig. 401).
  - Make sure the adjustable end of the input control rod will be connected to the pilot input arm.
  - Adjust the length of the input control rod until you can attach the rod to the slat PDU, and can freely turn the bolt at the rod attach point.
  - Make sure that you can see the threads in the inspection hole at the adjustable end of the input control rod.
  - Tighten the jamnut and install a lockwire with the double twist procedure (AMM 20-10-23/401).
  - Connect the input control rod to the pilot input arm with the bolt, washer, and nut. Tighten the nut.
  - If the input control rod is adjustable at the two ends of the rod, do these steps:
    - Make sure the adjustable end without a lockwire is connected to the pilot input arm.
    - If it is necessary to adjust the rod end with the lockwire (away from the pilot input arm), remove the lockwire and loosen the jamnut to adjust the rod.

**NOTE:** Do not adjust the input control rod shorter than 1.25 inches (31.8 mm) between the centerline of the rod end bolt hole and the nearest end of the control rod barrel.

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- 3) Make sure that you can see the threads through the inspection hole at the two adjustable ends of the input control rod.
- 4) Tighten the jamnut at the end(s) of the input control rod that you adjusted.
- 5) Safety the jamnut with a lockwire at the rod end that is away from the pilot input arm.
- 6) Connect the input control rod to the pilot input arm with the bolt, washer, and nut.

S 824-046

- (23) If you installed the outboard slat PDU, adjust and connect the input control rod to the pilot input arm with these steps:
- (a) Make sure rig pin LE2 is fully installed in the rig pin hole on the input cam (Detail B, Fig. 402).
  - (b) Use a force gage and apply a 15 to 20 pound (66.8-88.9 newtons) load to the input control rod, along the centerline of the rod, in the inboard direction (Fig. 406).
  - (c) Make sure that you can easily turn the bolt that connects the input control rod to the pilot input arm, while you apply the load to the rod.

**CAUTION:** DO NOT ADJUST THE SUPPORT ROD FOR THE OUTBOARD SLAT PDU TO MAKE ALLOWANCE FOR THE SHORT LENGTH OF THE INPUT CONTROL ROD. THE TORQUE TUBES WILL NOT ALIGN CORRECTLY AND CAUSE SLAT ASYMMETRY, WHICH WILL INCREASE WEAR ON THE TORQUE TUBE, IF YOU CHANGE THE ADJUSTMENT ON THE PDU SUPPORT.

- (d) Adjust the input control rod with these steps if you cannot turn the bolt easily in the step before:
- 1) If the input control rod is adjustable at one end only, make sure that you can see the threads at the adjustable end through the inspection hole in the control rod. Tighten the jamnut and install a lockwire with the double twist procedure (AMM 20-10-23/401).
  - 2) If the input control rod is adjustable at the two ends of the rod, do these steps:
    - a) Make sure the adjustable end without a lockwire is connected to the pilot input arm.
    - b) If it is necessary to adjust the rod end with the lockwire (away from the pilot input arm), remove the lockwire and loosen the jamnut to adjust the rod.

**NOTE:** Do not adjust the input control rod shorter than 1.25 inches (31.8 mm) between the centerline of the rod end bolt hole and the nearest end of the control rod barrel.

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- c) Make sure that you can see the threads through the inspection hole at the two adjustable ends of the input control rod.
  - d) Tighten the jamnut at the end(s) of the input control rod that you adjusted.
  - e) Safety the jamnut with a lockwire at the rod end that is away from the pilot input arm.
- 3) Connect the input control rod to the pilot input arm with the bolt, washer, and nut.

S 094-047

- (24) Remove rig pin LE2 or LE5, as applicable, from the input cam rig pin hole.

S 864-048

- (25) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
- (a) 11H14, SLATS SHUTOFF VALVE

S 864-049

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (26) Pressurize the center hydraulic system (AMM 29-11-00/201) and permit the slat PDU to become stable in the fully retracted position.

**NOTE:** It is usual for the output shaft to turn in the slat PDU when you pressurize the center hydraulic system.

S 494-050

- (27) Try to install rig pin LE3 (for the outboard slat PDU) or rig pin LE6 (for the inboard slat PDU) as applicable, into the rig pin hole for the follow-up cam.

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S 824-051

(28) If you cannot install rig pin LE3 or LE6 easily, set the slat PDU for mechanical null and hydraulic null with these steps:

(a) Set the slat PDU to mechanical null with these steps:

- 1) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- 2) Disconnect the control valve control rod (between the control unit and the control valve module) from the control unit output arm.

NOTE: You will release the fluid pressure lock in the control valve when you disconnect the control valve control rod from the output arm. This will permit you to turn the PDU output shafts to align the rig pin hole for rig pin LE3 (outboard slat PDU) or LE6 (inboard slat PDU).

- 3) Turn the output shaft on the slat PDU by small increments, until you can install rig pin LE3 or LE6 freely.
- 4) After you install the rig pin, connect the control valve control rod back to the control unit output arm.
- 5) Try to install rig pin LE4 (for the outboard slat PDU) or LE7 (for the inboard slat PDU), as applicable, in the control valve input arm.
- 6) If you cannot install rig pin LE4 or LE7 fully and easily, adjust the length of the control valve control rod with these steps:
  - a) Remove the lockwire and loosen the jamnut at each end of the control rod.
  - b) Turn the control rod body to adjust the rod length, until you can easily install rig pin LE4 or LE7.

NOTE: The usual length of the rod before the final adjustment is 6.56 inches (166.6 mm).

- c) Tighten the jamnuts on the control rod, but do not install the lockwires.

NOTE: It is possible that you will adjust the control valve control rod again during the hydraulic null adjustment.

- 7) Remove rig pins LE3 and LE4 from the outboard slat PDU, or, rig pins LE6 and LE7 from the inboard slat PDU as applicable.

(b) Set the slat PDU for hydraulic null with these steps after you set the PDU for mechanical null:

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- 1) Pressurize the center hydraulic system (AMM 29-11-00/201) and permit the slat PDU to become stable in the fully retracted position.

**NOTE:** It is usual for the output shaft to turn at the slat PDU when you pressurize the center hydraulic system.

**CAUTION:** DO NOT DISCONNECT THE CONTROL VALVE CONTROL ROD TO DO THE ROD ADJUSTMENT WHILE THE CENTER HYDRAULIC SYSTEM IS PRESSURIZED. DO NOT ADJUST THE CONTROL ROD WITH THE RIG PIN LE3 OR LE6 INSTALLED. ADJUST THE CONTROL ROD ONLY BY SMALL INCREMENTS TO PREVENT DAMAGE TO THE SLAT PDU.

- 2) Try to install rig pin LE3 (for the outboard slat PDU) or LE6 (for the inboard slat PDU), as applicable, into the rig pin hole for the follow-up cam.
- 3) If you cannot install rig pin LE3 or LE6 easily, adjust the control valve control rod with these steps:

**NOTE:** Do not adjust the control rod while rig pin LE3 or LE6 is installed. Install rig pin LE3 or LE6 only to make sure that the control rod is adjusted correctly.

- a) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- b) Loosen the jamnut at each end of the control valve control rod.

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- c) Turn the control rod to adjust the rod length until you can easily install rig pin LE3 or LE6.

NOTE: It is not necessary to install rig pin LE4 or LE7 for this adjustment.

- d) Tighten the jamnut at each end of the control rod.
  - e) Install lockwires to the jamnuts on the control rod with the double twist procedure (AMM 20-10-23/401).
- 4) Remove rig pin LE3 or LE6.

S 864-052

- (29) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 094-053

- (30) Remove the PDU lock from the TE flap PDU (Fig. 403).

S 094-054

- (31) Remove the groundlock from the slat PDU that you did not install (Fig. 403).

S 864-055

- (32) Remove the DO-NOT-OPERATE tag from the manual override lever on the TE flap PDU bypass valve, and move the lever to the No. 2 (normal) position.

S 864-056

- (33) On the slat PDU that was not installed, remove the DO-NOT-OPERATE tag from the manual override lever on the PDU bypass valve, and move the override lever to the No. 2 (normal) position.

S 094-057

- (34) Remove rig pin LE3 or LE6, as applicable, and install the plug in the rig pin hole.

S 214-058

- (35) Make sure the marks that you made before the PDU removal will align between the torque tube and the PDU coupling.

S 824-059

- (36) If the marks do not align, do these steps:
  - (a) Manually turn the torque tube on each side of the slat PDU to retract the slats (AMM 27-81-00/201), and make sure the retract overtravel stop clearances are correct as shown (Fig. 404).
  - (b) If the retract overtravel stops are not correct, adjust the slat drive with the steps given in the "Inboard Slat Drive Adjustment" or the "Outboard Slat Drive Adjustment" procedure (AMM 27-81-00/501).

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S 434-060

- (37) Connect the torque tubes back to the two sides of the slat PDU with these steps:
- Apply a thin layer of BMS 3-33 grease, to the full length of the torque tube splines and the splines in the PDU coupling.
  - Engage the torque tube to the splines in the PDU coupling and install the screws to the coupling.

NOTE: If it is necessary, turn the torque tube to the nearest distance possible to engage the spline teeth on the coupling ( $\pm 1/2$  tooth).

S 224-061

- (38) Do a check on the axial movement of the torque tube with these steps:
- Push the torque tube tightly against one end and make a mark on its position.
  - Move the torque tube fully to the opposite end.
  - Make sure the torque tube can move easily, and that the axial movement is between 0.100 to 0.460 inch (2.54-11.68 mm).

NOTE: If there is resistance when you move the torque tube, loosen the coupling screws by a small increment to permit the torque tube to move freely.

S 434-062

- (39) Install a lockwire to the coupling screws with the double twist procedure (AMM 20-10-23/401).

S 644-063

- (40) Fill the PDU coupling with grease, MIL-PRF-23827, through the lubrication hole.

S 094-064

- (41) Remove the supports from the slats.

S 864-065

- (42) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- 11H14, SLATS SHUTOFF VALVE

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S 824-066

(43) Do the "Slat PDU Adjustment" procedure below.

G. Slat PDU Adjustment

S 214-067

(1) Make sure the flaps and slats are in the fully retracted position.

S 214-068

(2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 094-069

(3) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 864-070

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

S 864-071

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(5) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-072

(6) Move the flap control lever to the 30-unit detent, and make sure the flaps and slats move to the fully extended position.

S 864-073

(7) Move the flap control lever back to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted position.

S 864-074

(8) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 494-075

(9) Install the PDU lock in the TE flap PDU (Fig. 403).

S 494-076

(10) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 403).

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S 214-077

- (11) For the inboard slat PDU,  
do a check on the control rod (at the pilot input arm) for the  
correct adjustment with these steps (Detail C, Fig. 401):
- (a) Make sure you can install rig pin LE5 fully and freely into the  
input cam rig pin hole.
  - (b) Make sure that you can see the threads in the inspection hole.  
Adjust the rod length if it is necessary.

S 214-078

- (12) For the outboard slat PDU,  
do a check on the control rod (at the pilot input arm) for the  
correct adjustment with these steps (Detail B, Fig. 402):
- (a) Use a force gage and apply a 15 to 20 pound (66.8-88.9 newtons)  
load to the control rod along the centerline of the rod, to the  
inboard direction (Fig. 406).
  - (b) Make sure that you can install rig pin LE2 fully and freely  
through the input cam rig pin hole (Detail B, Fig. 402) while  
you apply the load to the control rod.
  - (c) If you cannot install rig pin LE2 easily,  
adjust the control rod.

NOTE: Make sure you can see the threads through the inspection  
hole at the rod end.

S 094-079

- (13) If installed, remove rig pins LE2 and LE5 and install the plugs in  
the rig pin holes.

S 864-080

- (14) On the TE flap PDU in the right MLG wheel well,  
move the manual override lever on the PDU bypass valve to the No. 1  
(bypass) position, and install a DO-NOT-OPERATE tag.

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S 094-081

- (15) Remove the groundlocks from the inboard and outboard slat PDU (Fig. 403).

S 864-082

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (16) Pressurized the center hydraulic system (AMM 29-11-00/201).

S 214-083

- (17) Move the flap control lever to the 25-unit detent and make sure the inboard and outboard slats move to the fully extended position.

S 214-084

- (18) Move the flap control lever to a position aft of the 20-unit detent as shown (Detail B, Fig. 405) and make sure the inboard and outboard slats move to the intermediate position.

**NOTE:** Be careful not to move the lever in or forward of the 20-unit detent for this check.

S 214-085

- (19) Move the flap control lever to the zero (FLAPS UP) detent and make sure the inboard and outboard slats move to the fully retracted position.

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S 214-086

- (20) Move the flap control lever to a position approximately 1/4 to 1/3 of the distance between the zero and the 1-unit detents as shown (Detail C, Fig. 405).

S 214-087

- (21) Make sure the outboard slats stay in the fully retracted position.

**NOTE:** It is possible for the inboard slats to move a small distance.

S 214-088

- (22) Move the flap control lever back to the zero (FLAPS UP) detent and make sure the inboard and outboard slats stay in the fully retracted position.

S 864-089

- (23) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 494-090

- (24) Install the groundlocks in the inboard and outboard slat PDU (Fig. 403).

S 864-091

- (25) On the PDU bypass valve of the TE flap PDU, remove the DO-NOT-OPERATE tag from the manual override lever, and move the lever to the No. 2 (normal) position.

S 824-092

- (26) If you set the slat PDU to hydraulic null during the installation procedure, adjust the control unit RVDTS (AMM 27-81-11/401) on the slat PDU.

S 094-093

- (27) Remove the PDU lock from the TE flap PDU (Fig. 403).

S 094-094

- (28) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 403).

S 864-095

- (29) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the P11 panel:
- (a) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR
  - (b) 11C16, FLAP SLAT ELEC UNIT 1 CONT
  - (c) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR
  - (d) 11G16, FLAP SLAT ELEC UNIT 2 CONT
  - (e) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR

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- (f) 11G23, FLAP SLAT ELEC UNIT 3 CONT
- (g) 11H23, SLAT ALTN CONT INBD
- (h) 11H24, SLAT ALTN CONT OUTBD
- (i) 11J24, FLAPS ALTN CONT

S 864-096

- (30) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the main power distribution panel, P6:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 724-097

- (31) Do a test for the slat primary power and drive with the instructions given in the "Test for the Flap and Slat Primary Drives and Position Indication Systems" topic (AMM 27-51-00/501).

S 724-098

- (32) Do a test for the slat alternate drive with the instructions given in the "Test for the Slat Alternate Power and Drive System, and the Slat Position Indicating System" topic (AMM 27-81-00/501).

S 214-099

- (33) Make sure there is no leakage of hydraulic fluid at the hydraulic line connections on the slat PDU.

S 014-100

- (34) Open the access door, 119AL, to get access to the Main Equipment Center (AMM 06-41-00/201).

S 744-101

- (35) Operate the test switch on the panel of the flap/slat electronics unit (FSEU) at the E2 equipment rack, and look for a no-fault indication.

S 414-102

- (36) Close the access door, 119AL, for the Main Equipment Center (AMM 06-41-00/201).

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H. Put the Airplane Back to Its Usual Condition

S 864-103

- (1) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 864-104

- (2) Remove electrical power (AMM 24-22-00/201).

S 414-105

- (3) Install the access panels, 511BB and 611BB, for the inboard and outboard slat PDU (AMM 06-44-00/201).

S 614-106

- (4) Do the servicing steps for the center hydraulic system and reservoir (AMM 12-12-01/301).

S 094-107

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

TASK 27-81-10-824-108

4. LE Slat Power Drive Unit (PDU) Adjustment

**NOTE:** The data in this procedure is necessary only for scheduled maintenance.

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control  
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

B. Slat PDU Adjustment (Fig. 405)

S 214-109

- (1) Make sure the flaps and slats are in the fully retracted position.

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S 214-110

- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 864-111

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

S 864-112

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 214-113

- (5) Move the flap control lever to the 25-unit detent and make sure the inboard and outboard slats move to the fully extended position.

S 214-114

- (6) Move the flap control lever to a position aft of the 20-unit detent as shown (Detail B, Fig. 405) and make sure the inboard and outboard slats move to the intermediate position.

**NOTE:** Be careful not to move the lever in or forward of the 20-unit detent for this check.

S 214-115

- (7) Move the flap control lever to the zero (FLAPS UP) detent and make sure the inboard and outboard slats move to the fully retracted position.

S 214-116

- (8) Move the flap control lever to a position approximately 1/4 to 1/3 of the distance between the zero and the 1-unit detents as shown (Detail C, Fig. 405).

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S 214-117

- (9) Make sure the outboard slats stay in the fully retracted position.

NOTE: It is possible for the inboard slats to move a small distance.

S 214-118

- (10) Move the flap control lever back to the zero (FLAPS UP) detent and make sure the inboard and outboard slats stay in the fully retracted position.

C. Put the Airplane Back to Its Usual Condition

S 864-119

- (1) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 864-120

- (2) Remove electrical power (AMM 24-22-00/201).

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LEADING EDGE SLAT POWER DRIVE UNIT COMPONENTS – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the components on the leading edge (LE) slat power drive units (PDU).
- B. The LE slats are operated by two slat PDUs. The inboard slat PDU (in the right wing) is to operate the inboard slat drive. The outboard slat PDU (in the left wing) is to operate the outboard slat drive. You can remove and install the components on each slat PDU independently.

TASK 27-81-11-024-001

2. Leading Edge Slat Power Drive Unit (PDU) Components – Removal

A. General

- (1) This task contains the removal procedure for these components on the slat PDUs:

- the Control Unit
- the Hydraulic Motor
- the Electric Motor
- the Rotary Variable Differential Transformer (RVDT).

Because this task contains four procedures, only do the applicable procedure to remove the component.

To start one of these procedures, do the steps in the "Prepare for the Removal" topic, then do the applicable group of steps to remove the component.

B. Equipment

- (1) Circuit Breaker Lockout Clip  
(4 necessary) Commercially Available

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 27-81-12/401, Leading Edge Slat Drive Control Valve Module and Bypass Valve
- (4) AMM 27-81-24/401, Leading Edge Slat Drive Shaft

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- (5) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) AMM 32-00-15/201, Landing Gear Door Locks
- (7) AMM 32-00-20/201, Landing Gear Downlocks

D. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

E. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-003

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 214-004

- (3) Make sure the flaps and slats are in the fully retracted position.

S 214-005

- (4) Make sure the flap control lever is in the zero detent.

S 494-006

- (5) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 864-007

- (6) Remove the pressure from the center hydraulic system and reservoir (Ref 29-11-00).

S 864-008

- (7) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
  - (a) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR
  - (b) 11C16, FLAP SLAT ELEC UNIT 1 CONT

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- (c) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR
- (d) 11G16, FLAP SLAT ELEC UNIT 2 CONT
- (e) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR
- (f) 11G23, FLAP SLAT ELEC UNIT 3 CONT
- (g) 11H23, SLAT ALTN CONT INBD
- (h) 11H24, SLAT ALTN CONT OUTBD
- (i) 11J24, FLAPS ALTN CONT

S 864-009

- (8) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 014-010

- (9) Remove the access panels, 511BB and 611BB, to get access to the outboard and inboard slat power drive units (PDU) (AMM 06-44-00/201).

F. Remove the Control Unit

**NOTE:** Refer to Fig. 401 to remove the control unit on the inboard slat PDU.  
Refer to Fig. 402 to remove the control unit on the outboard slat PDU.

S 024-011

- (1) Remove the control valve module on the slat PDU (AMM 27-81-12/401).

S 034-012

- (2) Disconnect the control valve control rod from the control unit output arm (View A-A).

S 034-013

- (3) Disconnect the electrical connectors from the RVDT cover.

**NOTE:** Attach an identification tag (which reflects the RVDT equipment number; e.g. M548, etc.) to each airplane wiring connector and RVDT connector for the subsequent installation.

S 034-014

- (4) Disconnect the bonding jumper at the support on the control unit (Fig. 403).

S 034-015

- (5) Disconnect the input control rod from the pilot input arm (View A-A).

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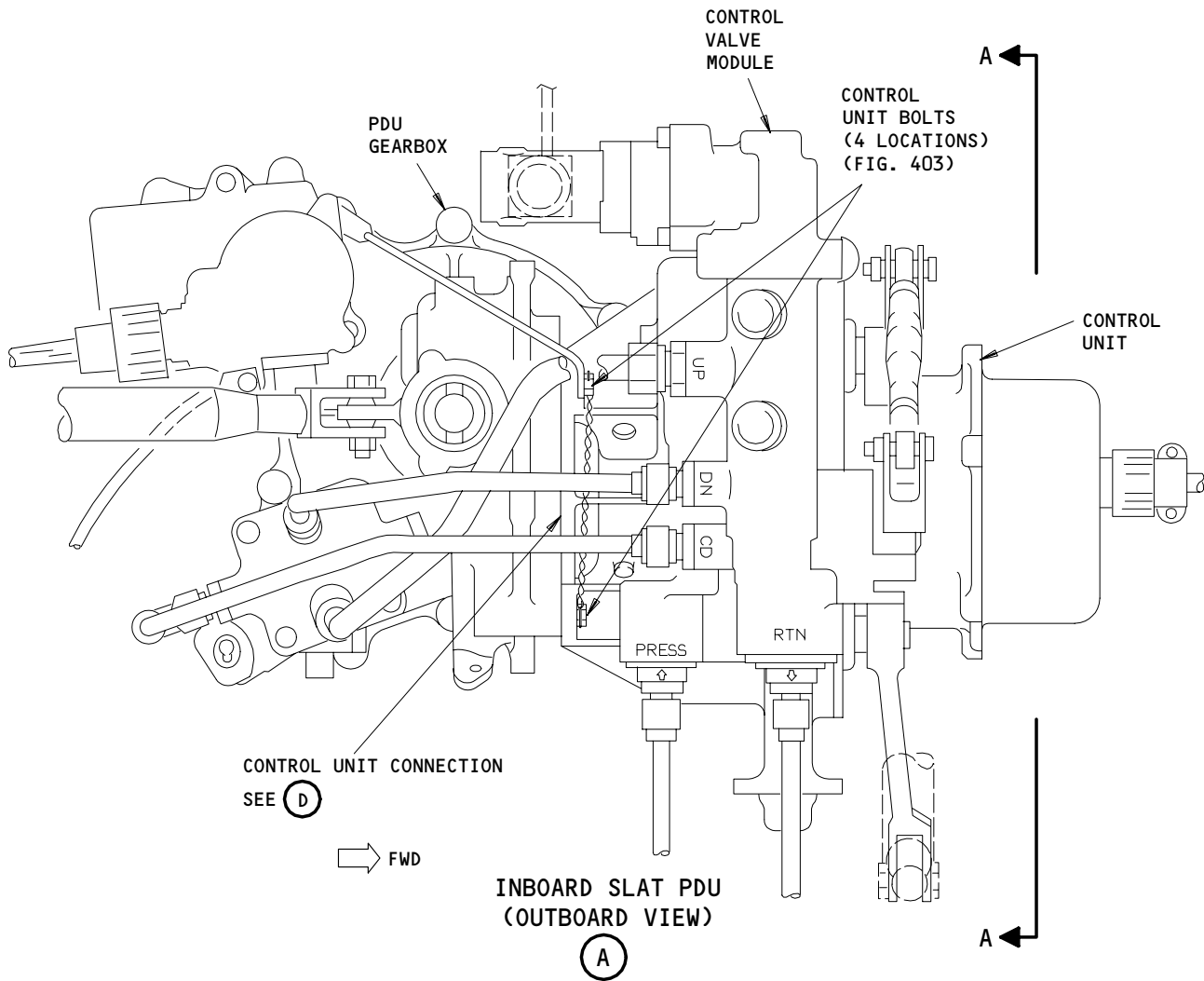
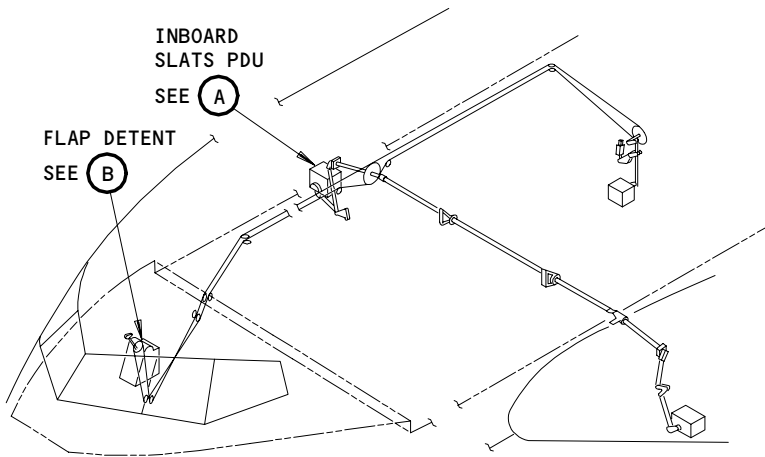
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Inboard Slats PDU Control Unit  
Figure 401 (Sheet 1)

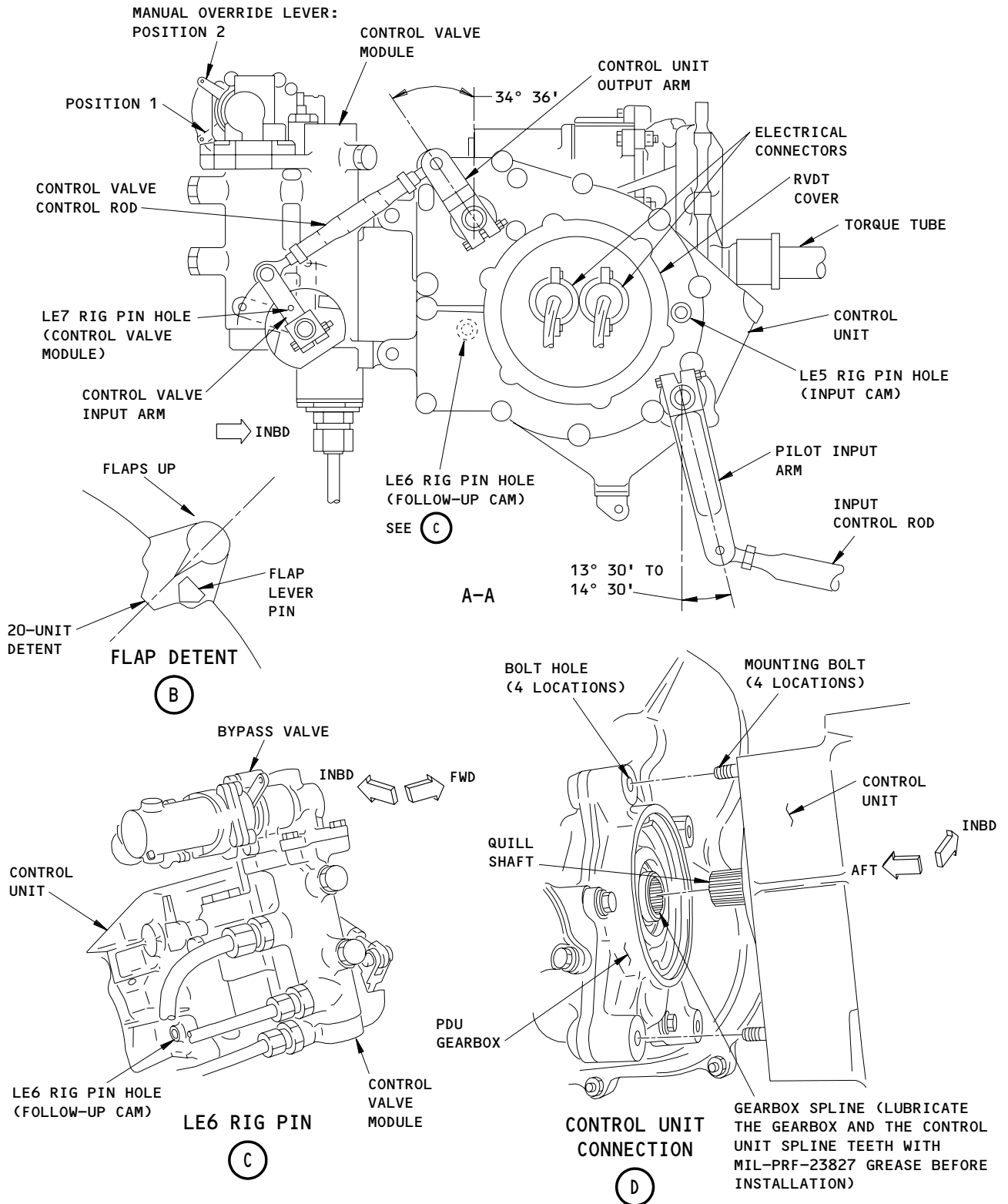
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**Inboard Slats PDU Control Unit  
Figure 401 (Sheet 2)**

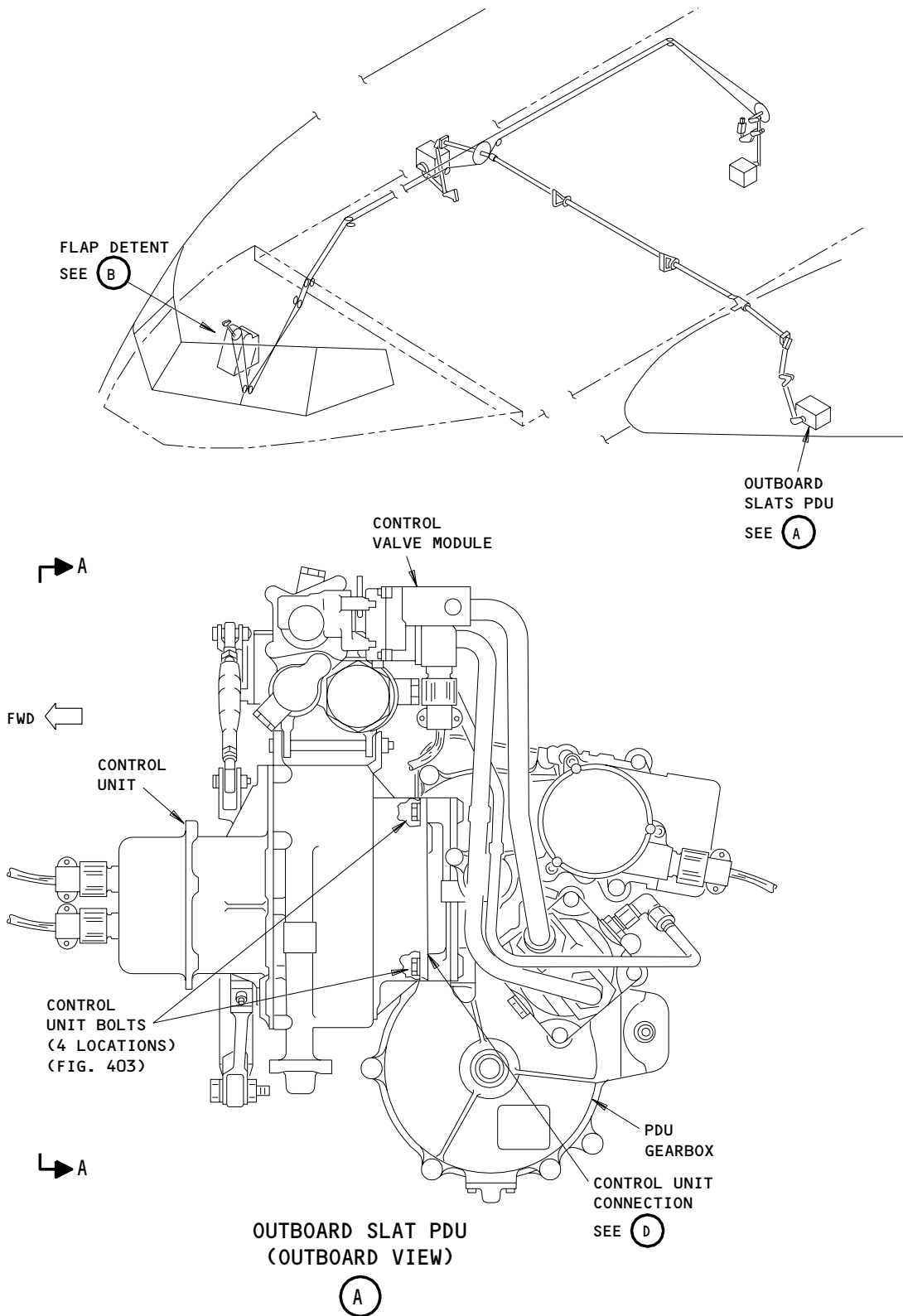
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Outboard Slats PDU Control Unit  
Figure 402 (Sheet 1)

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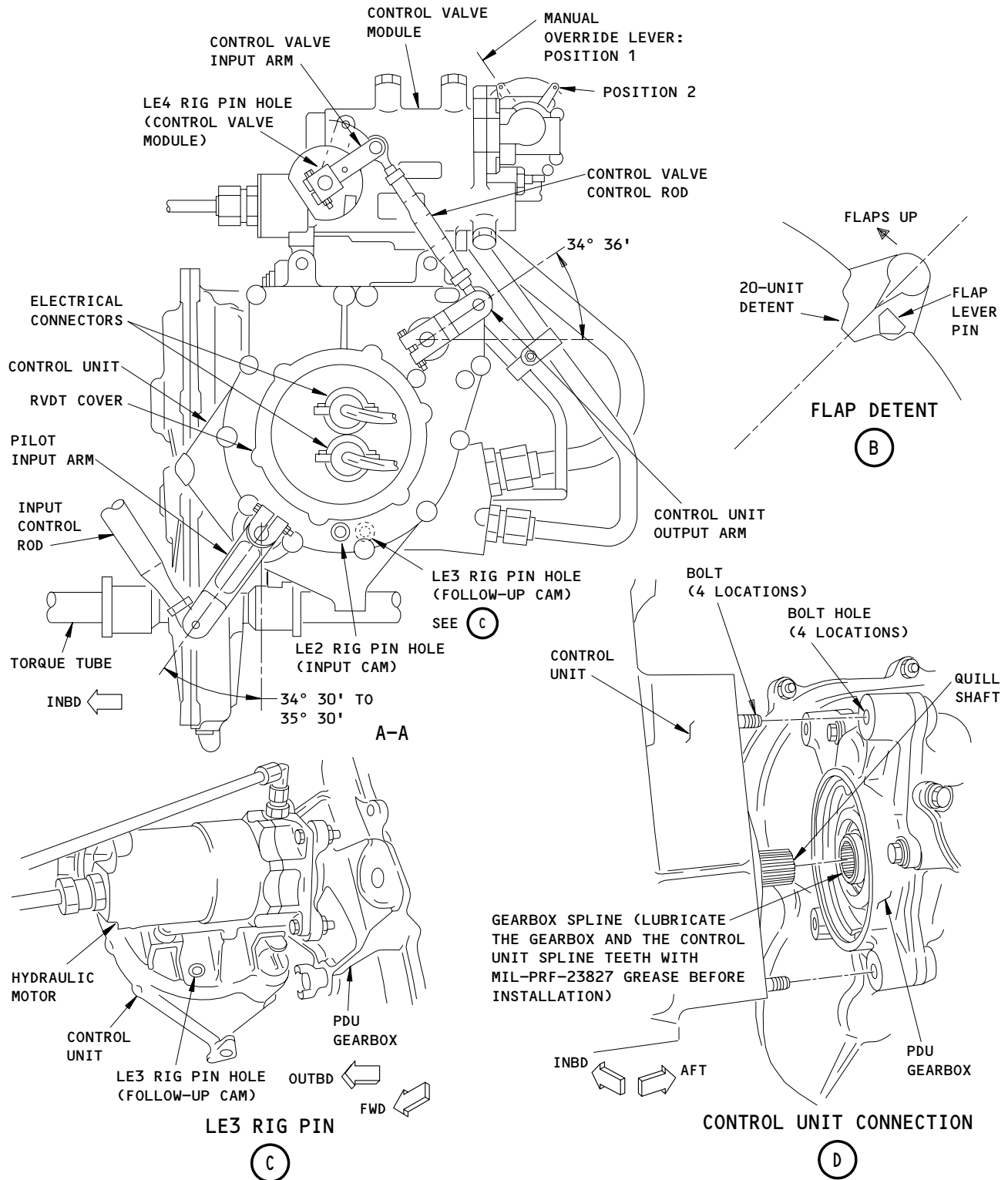
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Outboard Slats PDU Control Unit  
Figure 402 (Sheet 2)

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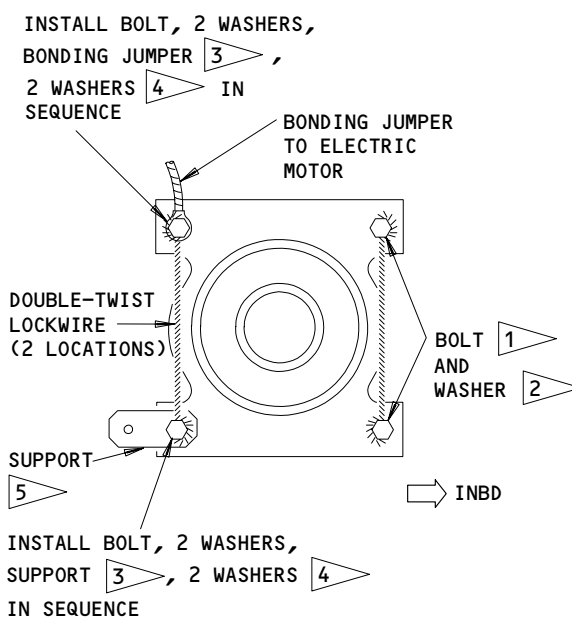
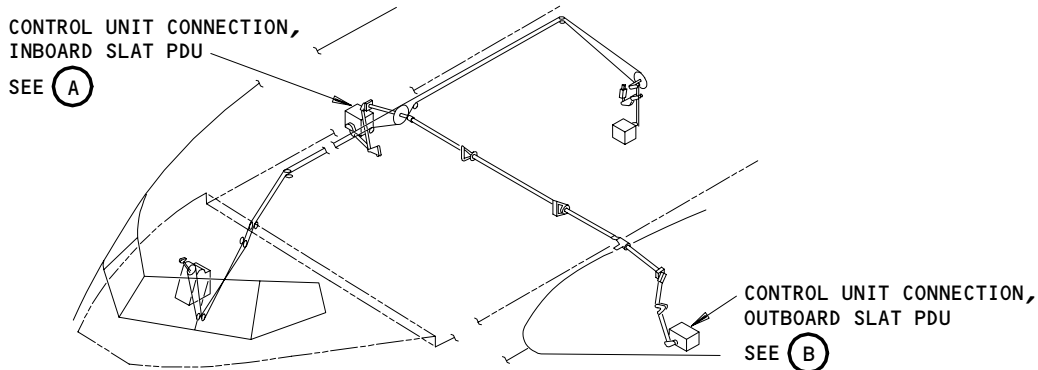
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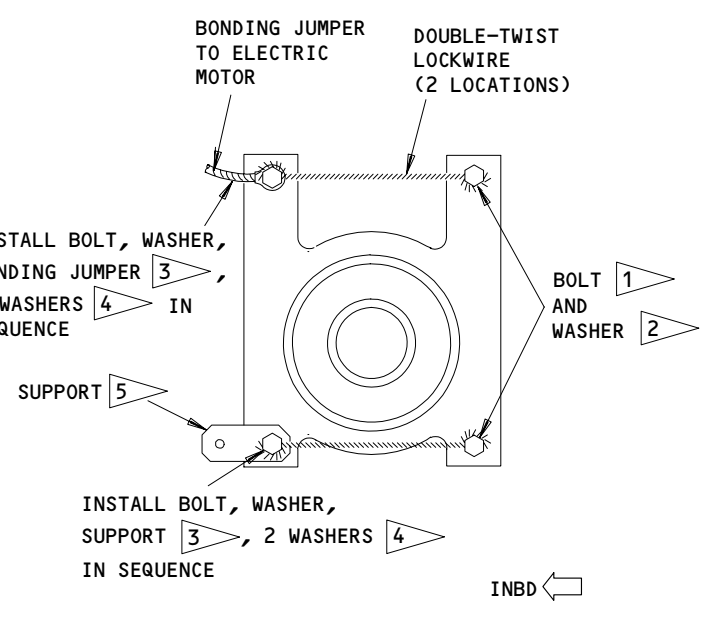
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# BOEING

## 767 MAINTENANCE MANUAL



CONTROL UNIT CONNECTION, INBOARD SLAT PDU  
**(A)**



CONTROL UNIT CONNECTION, OUTBOARD SLAT PDU  
**(B)**

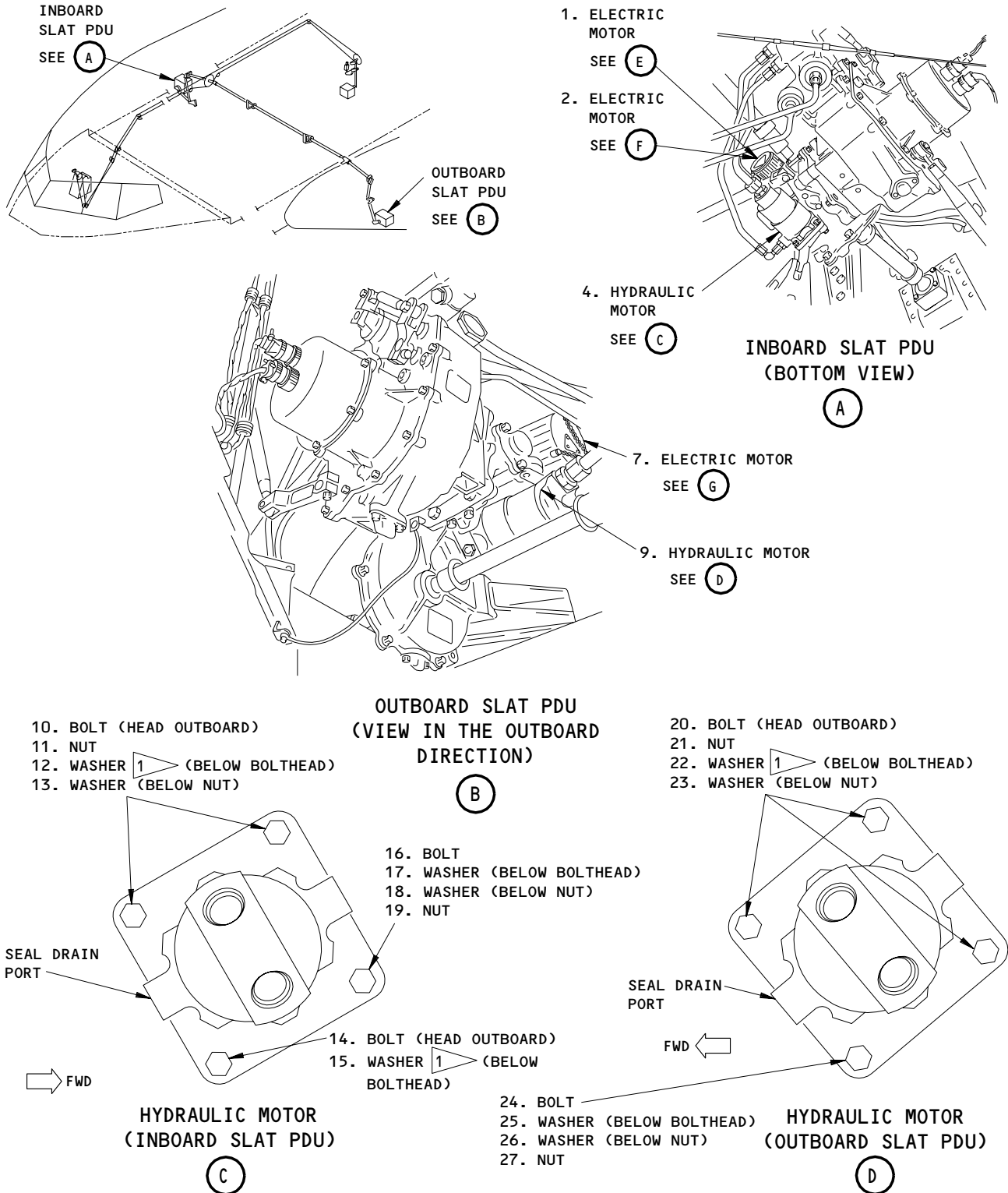
- 1** APPLY BMS 3-24 GREASE TO ALL THE SURFACES BEFORE INSTALLATION
- 2** ADD WASHERS AS NECESSARY TO GET A WRENCH TO ENGAGE WITH BOLT HEAD
- 3** CLEAN THE BONDING SURFACES WITH THE ROTARY STAINLESS STEEL BRUSH. MAKE SURE THE TOTAL RESISTANCE BETWEEN THE BOND IS NOT MORE THAN 0.001 OHM
- 4** ADD OR DELETE WASHERS AS NECESSARY TO GET THE WASHER FLUSH WITH OR EXTEND LESS THAN ONE WASHER THICKNESS ABOVE THE ADJACENT SURFACE.
- 5** CLEAN AND DO A CHECK ON THE RESISTANCE PER **3**. INSTALL THE BOLT WITH WASHER BELOW THE HEAD, AND AGAINST THE SUPPORT. ON THE OTHER SIDE OF THE SUPPORT, INSTALL THE BONDING JUMPER AND THE NUT WITH ONE WASHER UNDER THE JUMBER AND ONE WASHER UNDER THE NUT.

Control Unit Bolt and Bonding Jumper  
Figure 403

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Slat PDU Hydraulic and Electric Motor  
Figure 404 (Sheet 1)

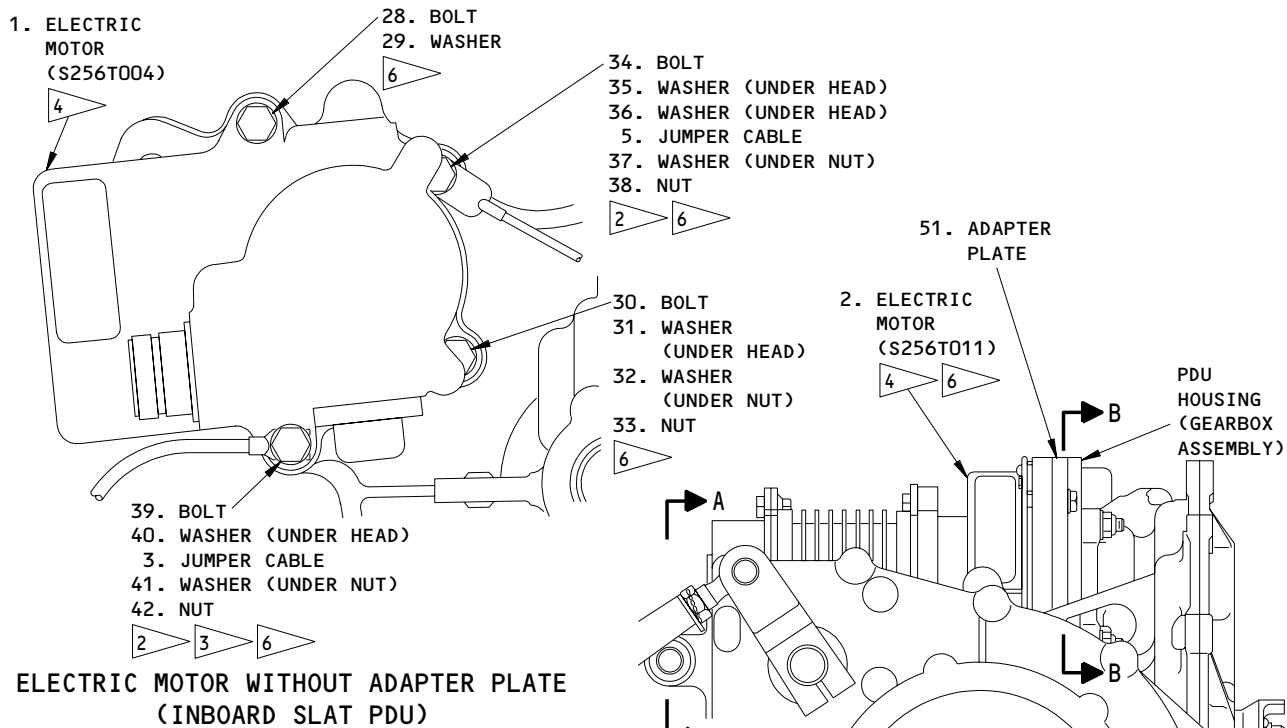
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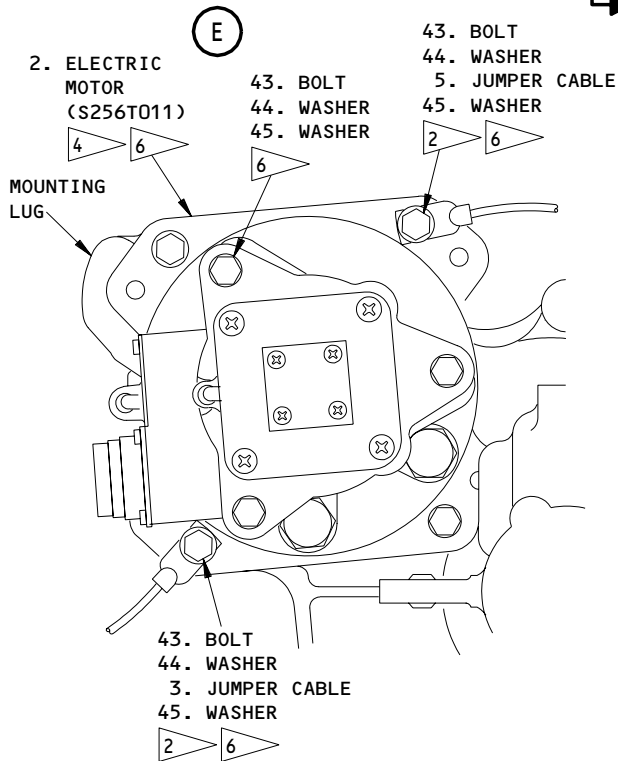
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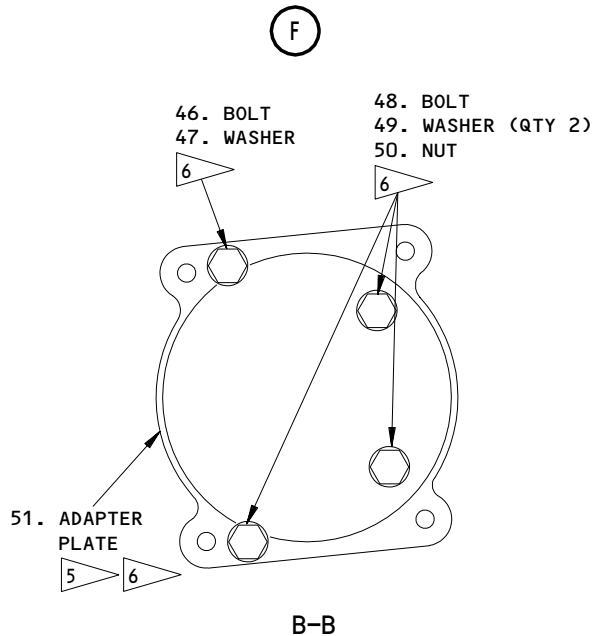
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ELECTRIC MOTOR WITHOUT ADAPTER PLATE (INBOARD SLAT PDU)



ELECTRIC MOTOR WITH ADAPTER PLATE (INBOARD SLAT PDU)



Slat PDU Hydraulic and Electric Motor  
Figure 404 (Sheet 2)

EFFECTIVITY

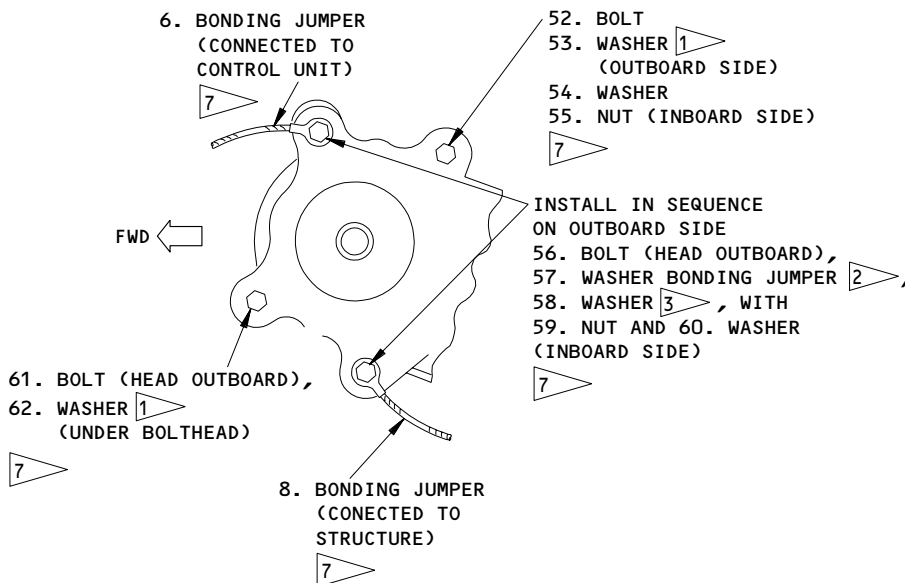
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**ELECTRIC MOTOR  
(OUTBOARD SLAT PDU)**

(G)

- 1 APPLY BMS 3-24 GREASE TO ALL THE SURFACES BEFORE INSTALLATION
- 2 CLEAN THE BONDING SURFACES WITH A ROTARY STAINLESS STEEL BRUSH. MAKE SURE THE TOTAL RESISTANCE BETWEEN THE BOND IS NOT MORE THAN 0.001 OHM
- 3 ADD OR DELETE WASHERS AS NECESSARY TO GET THE WASHER FLUSH WITH OR EXTEND LESS THAN ONE WASHER THICKNESS ABOVE THE ADJACENT SURFACE.
- 4 LUBRICATE SPLINE TEETH WITH BMS 3-33 (MIL-PRF-23827 ALTERNATE)
- 5 REMOVE ADAPTER PLATE FROM THE ALTERNATE MOTOR AND ATTACH IT TO THE PDU HOUSING.
- 6 AIPC 27-81-10-01A AND AIPC 27-81-10-01B
- 7 AIPC 27-81-10-05

Slat PDU Hydraulic and Electric Motor  
Figure 404 (Sheet 3)

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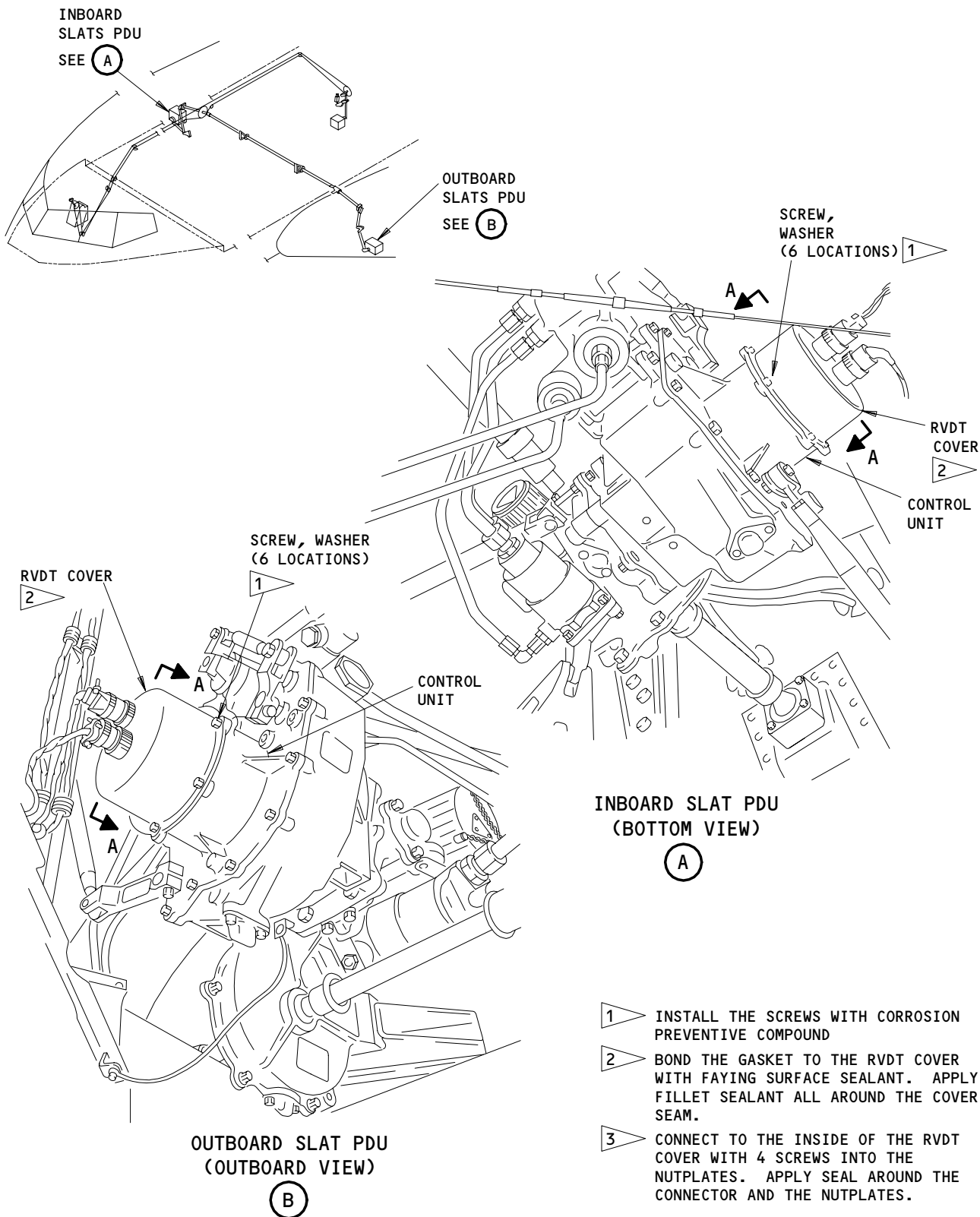
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Slat Power Drive Unit RVDT  
Figure 405 (Sheet 1)

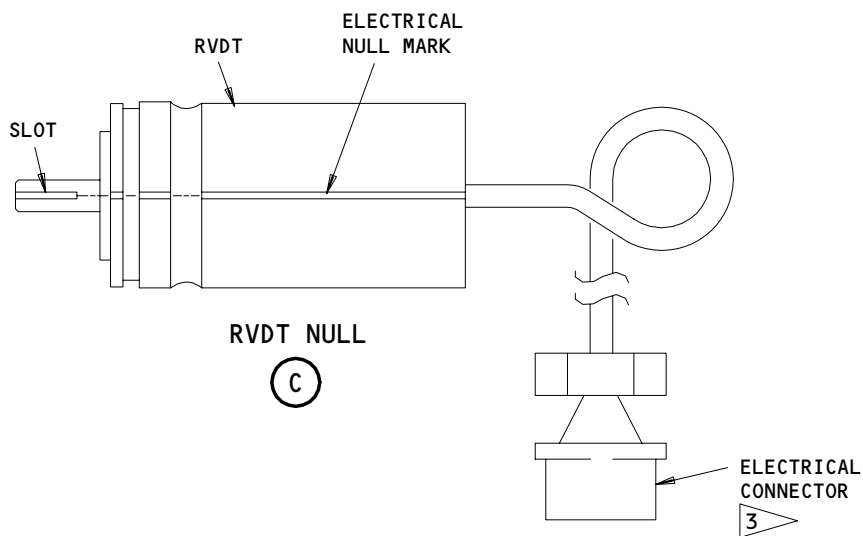
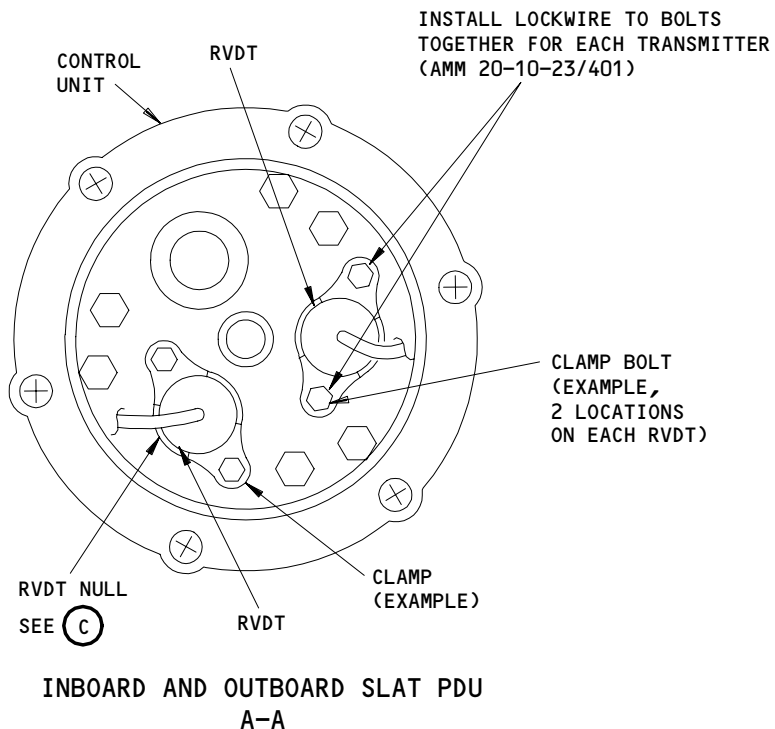
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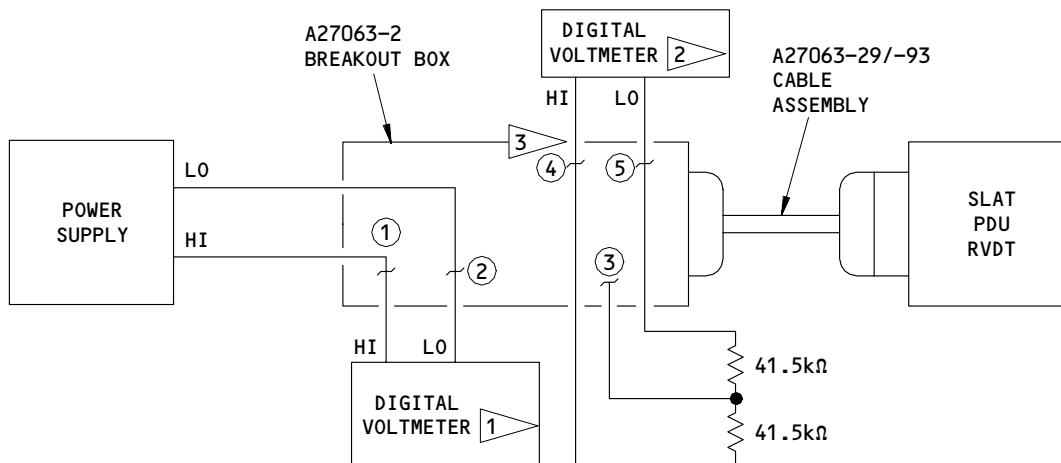
Slat Power Drive Unit RVDT  
Figure 405 (Sheet 2)

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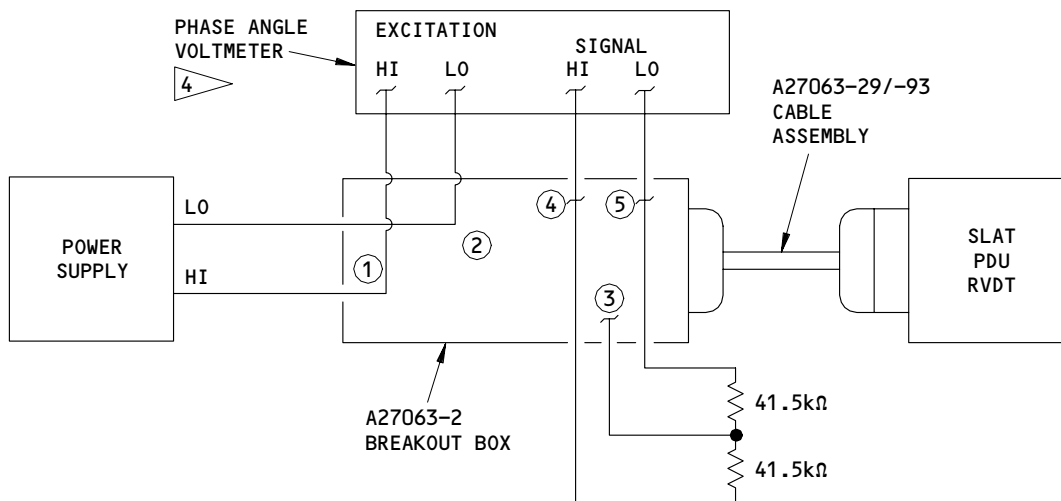
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**PROCEDURE A  
(POWER SUPPLY USING DIGITAL VOLTMETER)**



**PROCEDURE A  
(POWER SUPPLY USING PHASE ANGLE VOLTMETER)**

- 1 USE A 4-1/2 DIGIT VOLTMETER ON 200V AC SCALE
- 2 USE A 4-1/2 DIGIT VOLTMETER ON 20V AC SCALE
- 3 IF YOU USE A DIGITAL VOLTMETER TO CALCULATE THE RVDT SIGNAL VOLTAGE, TAKE THE VOLTAGE READINGS AS FOLLOWS:

**NOTE:** THE STEPS BELOW APPLY ALSO TO BOTH THE RETRACT AND EXTEND SIGNAL VOLTAGES;  
RETRACT SIGNAL VOLTAGE  $V1 > V2$ , EXTEND SIGNAL VOLTAGE  $V2 > V1$   
THIS IS TRUE FOR BOTH NO. 1 AND 2 RVDTs ON THE LE SLAT PDUs.

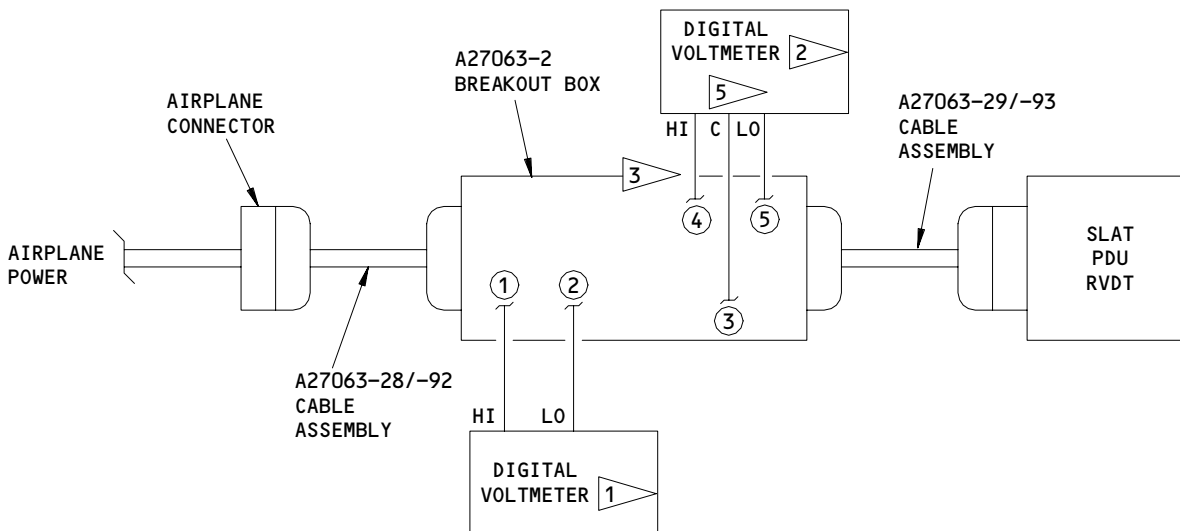
- 1.  $V1$ , BETWEEN PINS 3 AND 5;  $V2$ , BETWEEN PINS 3 AND 4
- 2. IF  $V1 < V2$ , DO THE REMOVAL/INSTALLATION PROCEDURE AGAIN.
- 3. RVDT SIGNAL VOLTAGE =  $V2 - V1$   
EXAMPLE:  $V1 = 10.93$ ,  $V2 = 2.18$      $V2 - V1 = 2.18 - 10.93 = -8.75$

- 4 TO READ THE ACTUAL RVDT SIGNAL VOLTAGE, CONNECT THE LEADS BETWEEN PINS 4 AND 5.  
IN-PHASE (+), OUT-PHASE (-)
- 5 "C" IS FOR COMMON

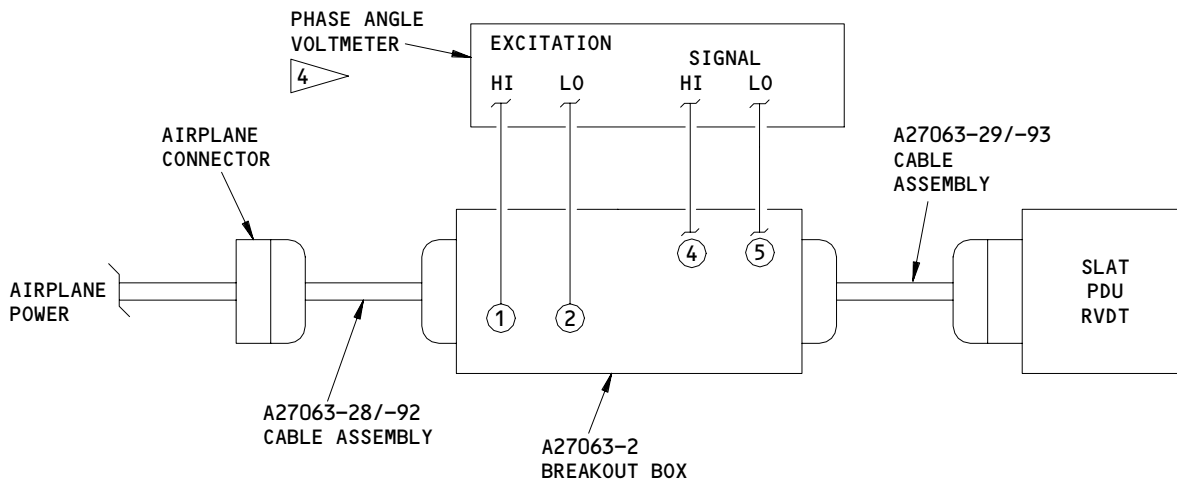
Slat Power Drive Unit RVDT Adjustment  
Figure 406 (Sheet 1)

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**PROCEDURE B  
(POWER SUPPLY USING DIGITAL VOLTMETER)**



**PROCEDURE B  
(POWER SUPPLY USING PHASE ANGLE VOLTMETER)**

Slat Power Drive Unit RVDT Adjustment  
Figure 406 (Sheet 2)

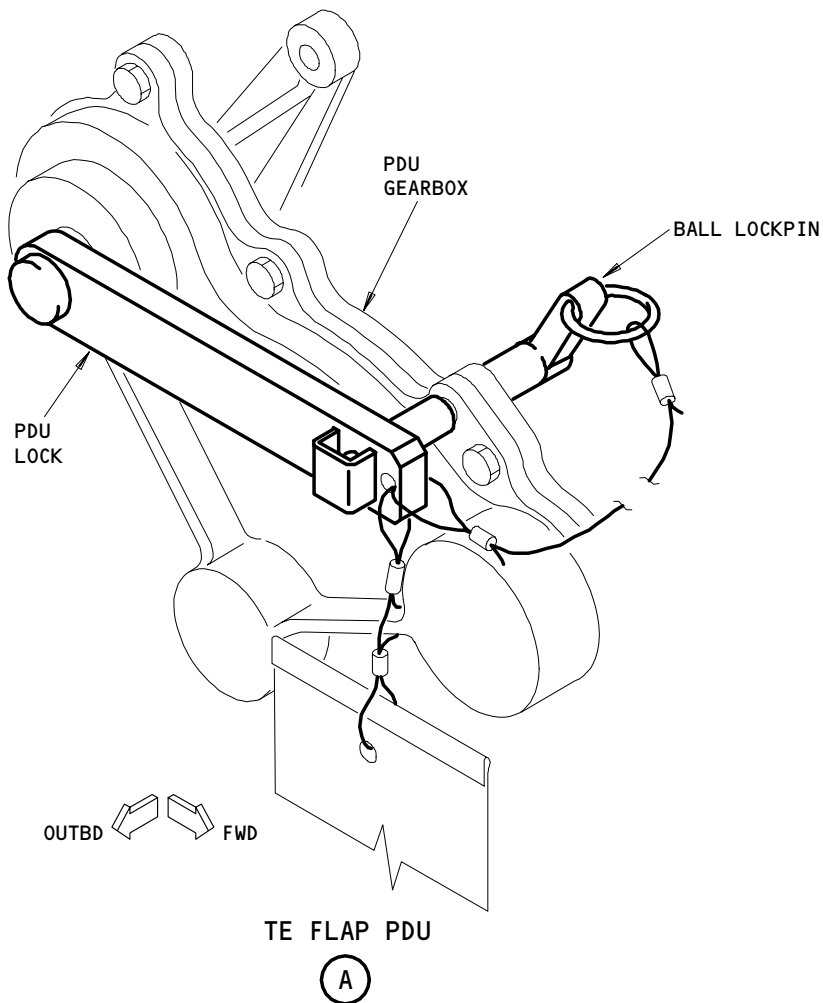
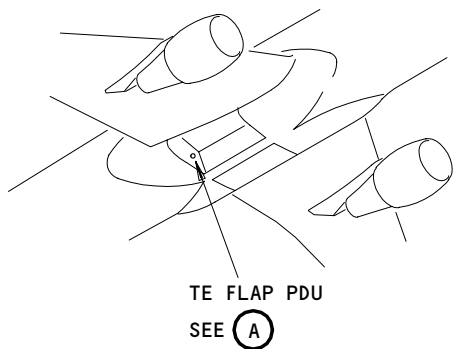
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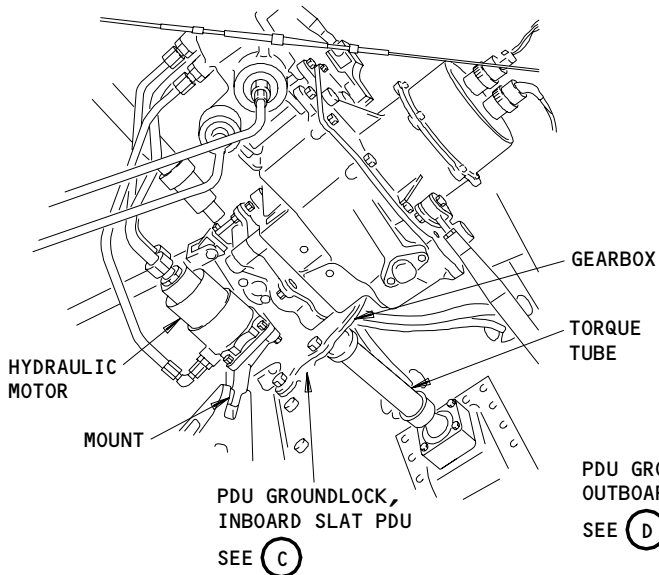
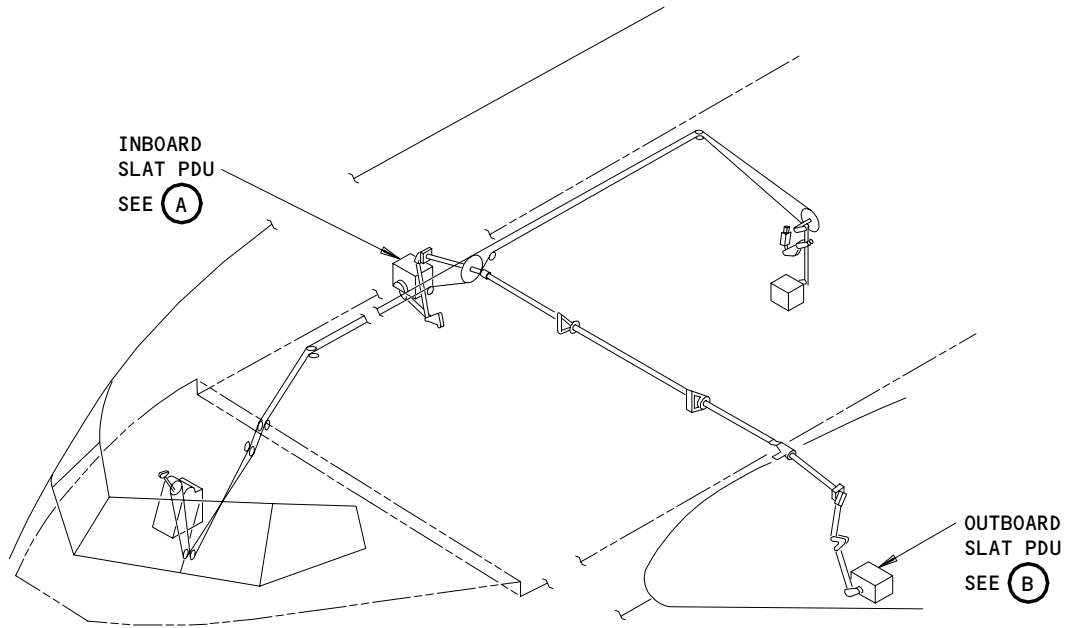
PDU Lock for the TE Flap PDU  
Figure 407

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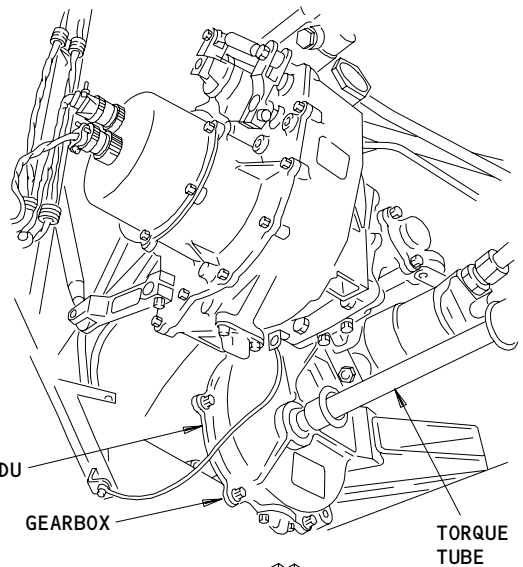
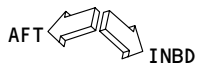
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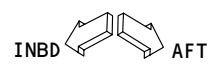
INBOARD SLAT PDU  
(BOTTOM VIEW)

(A)



OUTBOARD SLAT PDU

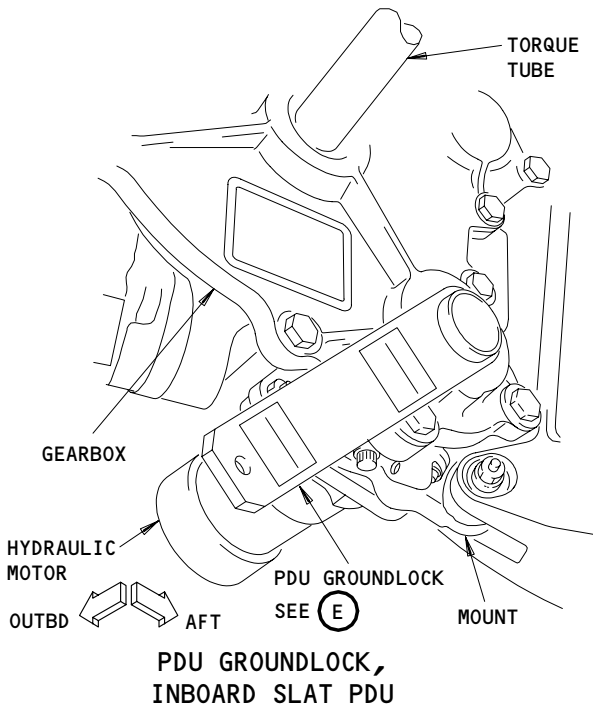
(B)



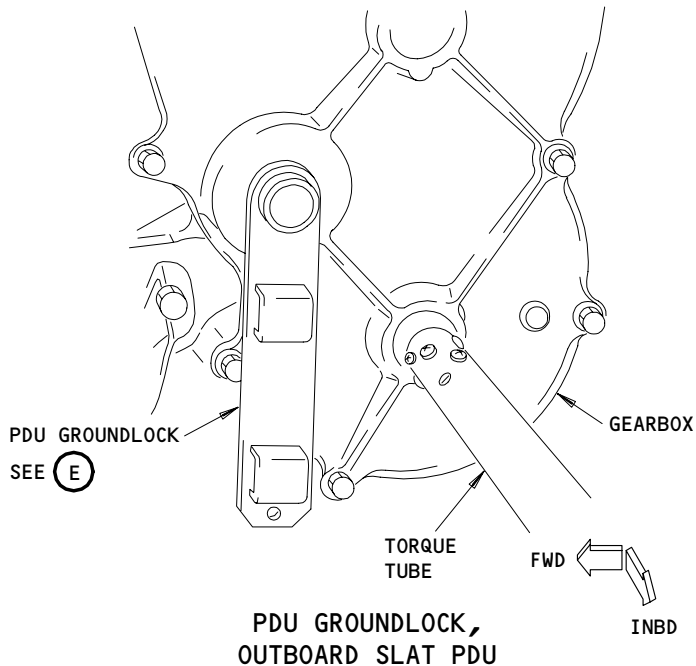
Slat PDU Groundlock  
Figure 408 (Sheet 1)

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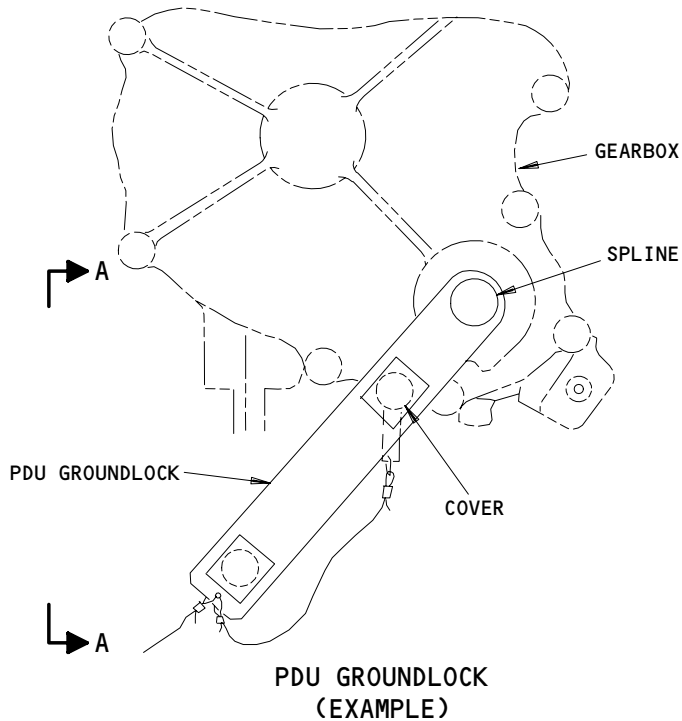
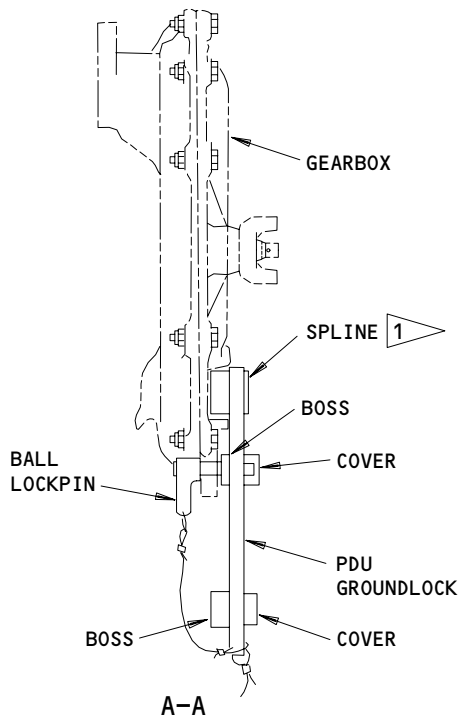
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(C)



(D)



(E)

1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN INSTALLED THROUGH THE BOSS AND GEARBOX

Slat PDU Groundlock  
Figure 408 (Sheet 2)

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S 034-016

- (6) Remove the four bolts that connect the control unit to the PDU gearbox (Detail A) and remove the control unit.

NOTE: The bonding jumper between the control unit and the electric motor will be disconnected after you remove the four bolts. Keep the quill shaft (Detail D) for the subsequent installation.

S 494-017

- (7) Put a cover on the control unit and the gearbox to keep dirt away from the mating surfaces.
- G. Remove the Hydraulic Motor (Fig. 404)

S 034-018

- (1) Disconnect the hydraulic lines at the pressure inlet and case drain ports.

S 494-019

- (2) Install plugs in the hydraulic lines, and caps on the hydraulic ports.

S 024-020

- (3) Disconnect the four bolts and remove the hydraulic motor from the PDU gearbox (Detail C or D).

NOTE: For the inboard slat PDU, the quill shaft is a component of the PDU gearbox, which stays with the gearbox after you remove the hydraulic motor.

S 494-021

- (4) Put a cover on the hydraulic motor and the gearbox to keep dirt away from the mating surfaces.
- H. Remove the Electric Motor (Fig. 404)

S 034-022

- (1) Disconnect the electrical connector from the electric motor.

S 024-023

- (2) Remove the electric motor from the PDU gearbox.
  - (a) Disconnect the four bolts and remove the electric motor from the PDU gearbox.

NOTE: The two bonding jumpers attached to the electric motor will be disconnected when you remove the four bolts.

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- (b) Remove the adapter plate (at the inboard slat PDU only), if the electric motor assembly you want to install does not include an adapter plate.

NOTE: If you are replacing motor assemblies with adapter plates then it is not necessary to remove the same adapter plate already installed.

- (c) Put a cover on the electric motor and the gearbox to keep dirt away from the mating surfaces.

I. Remove the Rotary Variable Differential Transformers (RVDT) (Fig. 405)

S 034-025

- (1) Disconnect the electrical connectors from the RVDT cover.

NOTE: Attach an identification tag (which reflects the RVDT equipment number; e.g. M548, etc) to each airplane wiring connector and receptacle for the subsequent installation.

S 034-026

- (2) Remove the six screws and washers that attach the RVDT cover to the control unit.

NOTE: Carefully remove the RVDT cover only for a small distance, sufficient to get access to the screws that attach the RVDT connectors to the inside of the cover.

S 034-027

- (3) Remove the screws attached to the RVDT electrical connectors at the inside of the RVDT cover, and remove the cover.

NOTE: Attach an identification tag (which reflects the RVDT equipment number, e.g., M548, etc.) to each airplane wiring connector and receptacle for the subsequent installation.

S 024-028

- (4) Remove the bolts and clamps that hold the RVDTs to the support plate, and remove the RVDTs.

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TASK 27-81-11-424-029

3. Leading Edge Slat Power Drive Unit (PDU) Components - Installation

A. General

(1) This task contains the installation procedure for these components:

- the Control Unit
- the Hydraulic Motor
- the Electric Motor
- the Rotary Variable Differential Transformer (RVDT).

Because this task contains four procedures, only do the applicable procedure to install the component.

To start one of these procedures, do the steps in the "Prepare for the Installation" topic before you do the applicable group of steps to install the component. Then do the "Put the Airplane Back to Its Usual Condition" group of steps.

B. Equipment

(1) Rig Pins from Set A20004-XX (AMM 20-10-24/201):

- (a) LE2 - P/N A20004-9
- (b) LE3 - P/N A20004-9
- (c) LE4 - P/N A20004-73
- (d) LE5 - P/N A20004-9
- (e) LE6 - P/N A20004-9
- (f) LE7 - P/N A20004-73

(2) Slat PDU Control Unit RVDT Adjustment Equipment (for Procedure A):

**NOTE:** Procedure A uses an external power supply, without airplane power.

- (a) Power Supply - Powertron Model 5900  
Industrial Test Equipment Corp.  
Port Washington, NY
- (b) Digital Voltmeter (DVM), 4-1/2 Digit  
Meter, 200 VAC Scale
- (c) Digital Voltmeter (DVM), 4-1/2 Digit  
Meter, 20 VAC Scale
- (d) Phase Angle Voltmeter - North Atlantic  
Model 2250
- (e) Resistor - 41.5k ohm (2 Necessary)
- (f) Breakout Box and Cables, Rigging, Flight  
Controls Position Sensors from the  
Breakout Box Equipment - A27063-71:
  - 1) Breakout Box - A27063-2
  - 2) Cable Assembly - A27063-29  
(for Inbd. Slat PDU RVDTs and Outbd. Slat PDU No. 1 RVDT)  
or  
Cable Assembly - A27063-93  
(for Outboard Slat PDU No. 2 RVDT)

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(3) Slat PDU Control Unit RVDT Adjustment Equipment (for Procedure B):

NOTE: Procedure B uses the airplane power as a power source.

- (a) Digital Voltmeter (DVM), 4-1/2 Digit Meter, 200 VAC Scale
- (b) Digital Voltmeter (DVM), 4-1/2 Digit Meter, 20 VAC Scale
- (c) Phase Angle Voltmeter - North Atlantic Model 2250-F1
- (d) Breakout Box and Cables, Rigging, Flight Controls Position Sensors from the Breakout Box Equipment - A27063-71:
  - 1) Breakout Box - A27063-2
  - 2) Cable Assembly - A27063-28 and -29 (for Inbd. Slat PDU RVDTs and Outbd. Slat PDU No. 1 RVDT) or Cable Assembly - A27063-92 and -93 (for Outboard Slat PDU No. 2 RVDT)
- (4) Rotary Stainless Steel Brush
- (5) Bonding Meter (Microhm Bridge, Type 2 Bonding Meter) - 477W Avtron Model Avtron Manufacturing Inc. Cleveland, Ohio
- (6) LE Slats Groundlock - A27007-1 (2 Necessary)
- (7) TE Flap PDU Lock - A27009-7
- (8) Force Gage, 0-25 Pounds (0-111 newtons)

NOTE: Used only for control unit Installation.

C. Consumable Materials

- (1) A00251 Sealant - BMS 5-26, Type II, Class B-2
- (2) A00276 Adhesive - BMS 5-126, Type II, Class 1 or Type III, Class 1
- (3) B00316 Solvent - Aliphatic Naphtha, TT-N-95, Type I
- (4) C00308 Corrosion Preventive Compound - MIL-C-11796, Class 3
- (5) D00633 Grease - BMS 3-33 (Preferred)

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- (6) D00013 Grease - MIL-PRF-23827 (Alternate)
- (7) D00015 Grease - BMS 3-24 (Alternate)
- (8) D00054 Skydrol Assembly Lube - MCS 352B  
(Hydraulic Fluid - BMS 3-11, Optional)
- (9) D00153 Hydraulic Fluid, Fire Resistant - BMS 3-11  
(Skydrol Assembly Lube - MCS 352B, Optional)

D. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
404	1	Electric Motor (without plate)	27-81-10	01A	225
	2	Electric Motor (with plate)			226
			27-81-10	01B	210
	4	Hydraulic Motor	27-81-10	01A	175
			27-81-10	01B	190
	7	Electric Motor	27-81-10	05	187
	9	Hydraulic Motor			110

E. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-44-00/201, Wing Access Doors and Panels
- (3) AMM 12-12-01/301, Hydraulic Systems
- (4) AMM 20-10-23/401, Lockwires
- (5) AMM 24-22-00/201, Electrical Power - Control
- (6) AMM 27-51-00/501, Trailing Edge Flap System
- (7) AMM 27-81-00/501, Leading Edge Slat System
- (8) AMM 27-81-12/401, Leading Edge Slat Drive Control Valve Module and Components
- (9) AMM 27-81-24/401, Leading Edge Slat Drive Shaft
- (10) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (11) AMM 32-00-15/201, Landing Gear Door Locks
- (12) AMM 51-31-01/201, Sealant

F. Access

- (1) Location Zones
  - 144 Right MLG Wheel Well
  - 211/212 Control Cabin
  - 510/610 Wing Leading Edge - Inboard
  - 520/620 Wing Leading Edge - Outboard
  - 710 Nose Landing Gear and Doors
  - 730/740 Left/Right Main Landing Gear and Doors

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(2) Access Panels

- 119AL Main Equipment Center
- 511BB LE Slat Power Drive Unit - Outboard (Left)
- 611BB LE Slat Power Drive Unit - Inboard (Right)

G. Prepare for the Installation

S 214-030

- (1) Make sure the flaps and slats are in the fully retracted position.

S 214-031

- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 214-032

- (3) Make sure the power is removed from the center hydraulic system (AMM 29-11-00/201).

S 214-033

- (4) Make sure these circuit breakers are opened in the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 214-034

- (5) Make sure these circuit breakers are opened on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

H. Install the Control Unit

**NOTE:** Refer to Fig. 401 to install the control unit on the inboard slat PDU. Refer to Fig. 402 to install the control unit on the outboard slat PDU.

S 094-035

- (1) Remove the covers on the mating surfaces of the control unit and the gearbox.

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S 494-036

- (2) Install rig pin LE2 (for outboard slat PDU) or LE5 (for inboard slat PDU) to the input cam rig pin hole on the control unit with these steps:
- (a) Turn the pilot input arm to the position shown (View A-A).
  - (b) Install rig pin LE2 or LE5, as applicable.

NOTE: If it is necessary, turn the pilot input arm by a small increment until you can fully and freely install the rig pin.

S 494-037

- (3) Install rig pin LE3 (for outboard slat PDU) or LE6 (for inboard slat PDU) in the follow-up cam rig pin hole on the control unit with these steps:
- (a) Turn the spline at the quill shaft interface, until the control unit output arm is in the position shown (View A-A).
  - (b) Install rig pin LE3 or LE6, as applicable.

NOTE: If it is necessary, adjust the output arm position by a small increment until you can fully and freely install the rig pin.

S 434-038

- (4) With the rig pins installed, engage the quill shaft (Detail D) to the splines in the control unit and the gearbox.

NOTE: Be careful not to cause damage to the quill shaft when you engage the splines.

S 214-039

- (5) With the quill shaft connected, do a check to see if the bolt holes align between the control unit and the gearbox.

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S 424-040

- (6) If the bolt holes align, install the control unit with these steps:
- (a) Apply BMS 3-24 grease to the bolts and washers for the control unit.
  - (b) Install the bolts and washers at four locations, and tighten the bolts.

NOTE: Install the bonding jumper for the electric motor at the bolt location shown (Fig. 403). Clean the bonding surfaces with a stainless steel brush. Make sure the total resistance across the wire connection is not more than 0.001 ohm.

- (c) Install lockwires at the location shown (Fig. 403) with the double twist procedure (AMM 20-10-23/401).

S 824-041

- (7) If the bolt holes on the control unit and the gearbox do not align, do these steps:
- (a) Make a mark between the PDU coupling and the torque tube on each side of the slat PDU.
  - (b) Disconnect the torque tubes on each side of the slat PDU to disengage the slat drive (AMM 27-81-24/401).

NOTE: Do not turn the torque tube. It will be necessary to adjust the slat drive if you turn the torque tubes while disconnected. Hold the torque tube in position with a clamp if it is necessary.

- (c) Turn the PDU coupling on the gearbox until you can align the bolt holes between the control unit and the gearbox.

NOTE: The control unit will turn with the quill shaft when you turn the output coupling on the PDU gearbox.

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- (d) Apply BMS 3-24 grease to the bolts and washers for the control unit.
- (e) Install the four bolts and washers on the control unit, and tighten the bolts.

**NOTE:** Install the bonding jumper for the electric motor at the bolt location shown (Fig. 403). Clean the bonding surfaces with a stainless steel brush. Make sure the total resistance across the wire connection is not more than 0.001 ohm.

- (f) Install lockwires to the four bolts at the location shown (Fig. 403) with the double twist procedure (AMM 20-10-23/401).
- (g) Make sure the slats are in the fully retracted position, and that the torque tubes did not turn while disconnected.
- (h) Align the marks that you made between the torque tube and the PDU coupling, and connect the torque tubes to each side of the slat PDU (AMM 27-81-24/401).
- (i) Make sure you install a lockwire to the PDU coupling screws with the double twist procedure (AMM 20-10-23/401).

S 434-042

- (8) Connect the control valve control rod to the control unit output arm (View A-A, Fig. 401 or 402) with the bolt, washers, and nut.

**NOTE:** Put a washer below the nut, and a washer below the bolt head. Install the bolt with the head pointed away from the control unit.

S 424-043

- (9) Install the control valve module on the control unit (AMM 27-81-12/401).

S 434-044

- (10) Connect the bonding jumper between the support on control unit and the structure (Fig. 403).

**NOTE:** Clean the bonding surfaces with a stainless steel brush. Make sure the total resistance across the wire connection is not more than 0.001 ohms. Add a washer to each side of the wire connection at the support.

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- S 434-045
- (11) Remove the identification tags and install the electrical connectors on the RVDT cover (Fig. 401 or 402).
- S 094-046
- (12) Remove rig pins LE2 and LE3 (outboard slat PDU) or rig pins LE5 and LE6 (inboard slat PDU), as applicable, and install the plugs in the rig pin holes.
- S 824-047
- (13) Adjust the inboard or outboard slat PDU, as applicable (AMM 27-81-00/501, "Inboard Slat PDU Adjustment" or "Outboard Slat PDU Adjustment").
- S 824-048
- (14) Adjust the RVDTs on the control unit with the instruction given in the "Install the RVDT" topic in this procedure.
- S 724-049
- (15) Do a test on the slat primary power and drive (AMM 27-51-00/501, "Test for the Flap and Slat Primary Drives and Position Indicating Systems").
- S 724-050
- (16) Do a test on the slat alternate power and drive (AMM 27-81-00/501, "Test for the Slat Alternate Power and Drive System, and the Slat Position Indicating System").
- I. Install the Hydraulic Motor (Fig. 404)
- S 094-051
- (1) Remove the cover from the hydraulic motor, and the caps from the hydraulic ports.
- S 644-052
- (2) Lightly lubricate the hydraulic fittings and the packing O-rings with Skydrol assembly lube or hydraulic fluid.
- S 644-053
- (3) Apply a thin layer of BMS 3-33 grease to the mating splines on the hydraulic motor.
- S 644-054
- (4) Install the lubricated packing O-ring, screw-thread plug, and bleeder in the seal drain port.
- S 094-055
- (5) Remove the cover on the gearbox mating surface.

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S 644-056

- (6) Apply a light layer of BMS 3-33 grease to the splines on the mating surface of the gearbox.

S 434-057

- (7) Carefully engage the splines of the hydraulic motor to the gearbox, with the lubricated packing O-ring between the motor and the gearbox.

S 424-058

- (8) Install the bolt, washer (below bolthead), washer (below the nut), and nut at four locations (Detail C or D) to connect the hydraulic motor.

NOTE: Apply BMS 3-24 grease to the washers before the installation.

S 094-059

- (9) Remove the plugs from the hydraulic lines.

S 614-060

- (10) Fill the hydraulic motor with hydraulic fluid.

S 824-061

- (11) Align the hydraulic lines for the installation.

NOTE: Make sure the hydraulic lines are clear from the adjacent components by a minimum of 0.25 inches (6.4 mm).

S 434-062

- (12) Install the hydraulic lines with the lubricated packing O-rings, and tighten the nuts.

S 724-063

- (13) Do a test on the slat primary power and drive (AMM 27-51-00/501, "Test for the Flap and Slat Primary Drives and Position Indicating Systems").

S 214-064

- (14) Do a check at all the hydraulic line connections to the hydraulic motor, and make sure there is no leakage of hydraulic fluid.

J. Install the Electric Motor

S 864-184

- (1) Make sure you remove pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-185

- (2) Make sure that the flap and slat alternate drives are off.

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- S 094-065
- (3) Remove the covers from the electric motor and the gearbox mating surface.
- S 104-066
- (4) Clean the mating surfaces with solvent.
- S 424-183
- (5) Do these steps to install the electric motor (Fig. 404).
- (a) If your replacement electric motor assembly includes an adapter plate, install adapter plate to the slat PDU housing.
- NOTE: Electric motors with adapter plate are installed at inboard slat PDUs only.
- (b) Apply a layer of BMS 3-33 grease to the splines of the electric motor and the gearbox.
- (c) Apply BMS 3-24 grease to the washers before the installation.
- (d) Install the electric motor to the gearbox and connect the two bonding jumpers (View E or F, Fig. 404).
- NOTE: Clean the bonding surfaces with a stainless steel brush. Make sure the total resistance across the wire connection is not more than 0.001 ohm.
- (e) Connect the electrical connector to the electric motor.
- S 724-071
- (6) Do a test on the slat alternate power and drive (AMM 27-81-00/501, "Test for the Slat Alternate Power and Drive System, and the Slat Position Indicating System").

K. Install the RVDTs

- S 424-176
- (1) Install the two RVDTs on the inboard slat PDU and the #1 RVDT on the outboard slat PDU.
- (a) Align the black electrical null mark on the RVDT body with the null slot on the RVDT shaft (Detail C, Fig. 405).
- (b) Put the RVDT in the control unit, and attach the clamp with two bolts on each RVDT (View A-A or B-B).
- NOTE: Keep the bolts loose for the subsequent adjustment.

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- (c) Adjust the RVDTs (with -53 or older FSEU installed) with the steps that follow:

NOTE: If you have a -63 FSEU installed then follow the RVDT adjustment using a -63 FSEU shown later in the procedure.

- 1) Connect the electrical equipment (-28 and/or -29 cable assemblies) and digital voltmeters (or phase angle voltmeter) with Procedure A (with external power) or Procedure B (with airplane power), as shown (Fig. 406).
- 2) Procedure A:  
Supply the excitation voltage:
  - a) Start the external power supply.
- 3) Procedure B:  
Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11, and supply electrical power (AMM 24-22-00/201):
  - a) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR
  - b) 11C16, FLAP SLAT ELEC UNIT 1 CONT
  - c) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR
  - d) 11G16, FLAP SLAT ELEC UNIT 2 CONT
  - e) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR
  - f) 11G23, FLAP SLAT ELEC UNIT 3 CONT
- 4) Turn the RVDT counterclockwise until you get a retract signal voltage of -8.75v ac (+/-60 mv), with an excitation voltage of 28.00v ac (Fig. 406).

NOTE: If you can not supply an excitation voltage of 28.00v ac, refer to Table 401 to get the relation between the excitation voltage and retract signal voltage.

- 5) Tighten the RVDT clamp bolts to 10-30 pound-inches (1.2-3.4 newton-meters), and make sure the voltage shown on the voltmeter does not change.
- 6) Install a lockwire between the two clamp bolts with the double twist procedure (AMM 20-10-23/401).

S 424-177

- (2) Install the #2 RVDT on the outboard slat PDU.
- (a) Make sure the lock pin for the RVDT spline shaft is held in the leaf spring notch on the RVDT.
  - (b) Align the RVDT attach bolts to the bolt holes on the control unit, and engage the RVDT spline shaft.

NOTE: The RVDT spline shaft is held in the locked (rigged) position during installation. The shaft will be free to turn after you tighten the second RVDT clamp bolt.

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- (c) Tighten the RVDT clamp bolt that is identified by an arrow with a label "TIGHTEN FIRST" on the RVDT. Tighten to 10-30 pound-inches.
- (d) Tighten the second RVDT clamp bolt to 10-30 pound-inches (1.2-3.4 newton-meters).
- (e) Do a check of the No. 2 RVDT adjustment (with -53 or older FSEU installed) on the outboard slat PDU with the steps that follow:

NOTE: If you have a -63 FSEU installed then follow the RVDT adjustment using a -63 FSEU shown later in the procedure.

- 1) Connect the electrical equipment (-92 and -93 cable assemblies) and digital voltmeters (or phase angle voltmeter) with either Procedure A (with external power) or Procedure B (with airplane power) as shown (Fig. 406).
- 2) Procedure A:  
Supply the excitation voltage:
  - a) Start the external power supply.
- 3) Procedure B:  
Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11, and supply electrical power (AMM 24-22-00/201):
  - a) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR
  - b) 11C16, FLAP SLAT ELEC UNIT 1 CONT
  - c) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR
  - d) 11G16, FLAP SLAT ELEC UNIT 2 CONT
  - e) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR
  - f) 11G23, FLAP SLAT ELEC UNIT 3 CONT
- 4) Make sure you get a retract signal voltage of -10.0 volts (+/- 60 mv), with an excitation voltage of 28.00v ac (Fig. 406). If the retract signal voltage is not correct do the steps that follow:

NOTE: If you cannot supply an excitation voltage of 28.00v ac, refer to Table 402 to get the relation between the excitation voltage and retract signal voltage.

- a) Loosen the clamp bolts.
- b) Turn the RVDT clockwise, and check the retract signal voltage.
  - If the voltage increases, continue to turn the RVDT until you get the correct voltage.
  - If the voltage decreases, turn the RVDT counterclockwise until you get the correct voltage.
- c) Tighten the clamp bolts to 10-30 pound-inches (1.2-3.4 newton-meters) and install a lockwire between the two clamp bolts with the double twist procedure (AMM 20-10-23/401).

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S 824-181

- (3) Do a check of the RVDT extend signal voltage (with -53 or older FSEU installed) with the steps that follow:

**NOTE:** If you have a -63 FSEU installed then follow the RVDT adjustment using a -63 FSEU shown later in the procedure.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

**CAUTION:** MAKE SURE YOU REMOVE ALL THE RIG PINS FROM THE SLAT PDU BEFORE YOU OPERATE THE SLATS WITH HYDRAULIC POWER. OPERATION OF THE PDU WITH RIG PINS INSTALLED WILL CAUSE DAMAGE TO THE SLAT PDU.

- (a) Pressurize the center hydraulic system and reservoir (AMM 29-11-00/201).
- (b) Remove the DO-NOT-OPERATE tag from the flap control lever, and move the lever to the 30-unit detent.
- (c) Make sure the flaps and slats move to the fully extended position.
- (d) Remove the power from the center hydraulic system (AMM 29-11-00/201).
- (e) Install the PDU lock in the TE flap PDU (Fig. 407).
- (f) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 408).
- (g) Make sure that the extend signal voltage is +11.25v ac  $\pm$ 225 mv for the RVDTs of the inboard slat PDU, or +10.32v ac  $\pm$ 220 mv for the #1 RVDT and +9.07v ac 220 mv for the #2 RVDT of the outboard slat PDU, with an ac excitation voltage of 28v ac.

**NOTE:** If you can not supply an excitation voltage of 28.00v ac, refer to Tables 401, 402 to get the relation between the excitation voltage and retract or extend signal voltage.

- (h) Remove the PDU lock from the TE flap PDU (Fig. 407).
- (i) Remove the groundlocks from the inboard and outboard slat PDU (Fig. 408).

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**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (j) Pressurize the center hydraulic system (AMM 29-11-00/201).
- (k) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted position.
- (l) Install a DO-NOT-OPERATE tag to the flap control lever.
- (m) Remove the power from the center hydraulic system (AMM 29-11-00/201).
- (n) Install the PDU lock in the TE flap PDU (Fig. 407).
- (o) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 408).
- (p) Procedure A:  
Remove the excitation voltage:  
1) Remove the power from the external power supply.
- (q) Procedure B:  
Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:  
1) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR  
2) 11C16, FLAP SLAT ELEC UNIT 1 CONT  
3) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR  
4) 11G16, FLAP SLAT ELEC UNIT 2 CONT  
5) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR  
6) 11G23, FLAP SLAT ELEC UNIT 3 CONT
- (r) Remove the electrical equipment and the voltmeters used in Procedure A or B as applicable (Fig. 406).

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TABLE 401			
EXCITATION VOLTAGE	RVDT RETRACT SIGNAL VOLTAGE (± 60 mv) RVDTs M483, M544, M549	RVDT EXTEND SIGNAL VOLTAGE	
		INBOARD SLAT PDU (±225 mv) RVDT 483 RVDT 549	OUTBOARD SLAT PDU (±220 mv) RVDT M544
26.00	-8.13	+10.45	+ 9.58
26.10	-8.16	+10.49	+ 9.62
26.20	-8.19	+10.53	+ 9.66
26.30	-8.22	+10.57	+ 9.69
26.40	-8.25	+10.61	+ 9.73
26.50	-8.28	+10.65	+ 9.77
26.60	-8.31	+10.69	+ 9.80
26.70	-8.34	+10.73	+ 9.84
26.80	-8.38	+10.77	+ 9.88
26.90	-8.41	+10.81	+ 9.91
27.00	-8.44	+10.85	+ 9.95
27.10	-8.47	+10.89	+ 9.99
27.20	-8.50	+10.93	+10.03
27.30	-8.53	+10.97	+10.06
27.40	-8.56	+11.01	+10.10
27.50	-8.59	+11.05	+10.14
27.60	-8.63	+11.09	+10.17
27.70	-8.66	+11.13	+10.21
27.80	-8.69	+11.17	+10.25
27.90	-8.72	+11.21	+10.28
28.00	-8.75	+11.25	+10.32
28.10	-8.78	+11.29	+10.36
28.20	-8.81	+11.33	+10.39
28.30	-8.84	+11.37	+10.43
28.40	-8.88	+11.41	+10.47
28.50	-8.91	+11.45	+10.50
28.60	-8.94	+11.49	+10.54
28.70	-8.97	+11.53	+10.58
28.80	-9.00	+11.57	+10.61
28.90	-9.03	+11.61	+10.65
29.00	-9.06	+11.65	+10.69
29.10	-9.09	+11.69	+10.73
29.20	-9.13	+11.73	+10.76
29.30	-9.16	+11.77	+10.80
29.40	-9.19	+11.81	+10.84
29.50	-9.22	+11.85	+10.87

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TABLE 401			
EXCITATION VOLTAGE	RVDT RETRACT SIGNAL VOLTAGE (± 60 mv) RVDTs M483, M544, M549	RVDT EXTEND SIGNAL VOLTAGE	
		INBOARD SLAT PDU (±225 mv) RVDT 483 RVDT 549	OUTBOARD SLAT PDU (±220 mv) RVDT M544
29.60	-9.25	+11.89	+10.91
29.70	-9.28	+11.93	+10.95
29.80	-9.31	+11.97	+10.98
29.90	-9.34	+12.01	+11.02
30.00	-9.38	+12.05	+11.06
30.10	-9.41	+12.09	+11.09
30.20	-9.44	+12.13	+11.13
30.30	-9.47	+12.17	+11.17
30.40	-9.50	+12.21	+11.20
30.50	-9.53	+12.25	+11.24
30.60	-9.56	+12.29	+11.28
30.70	-9.59	+12.33	+11.32
30.80	-9.62	+12.37	+11.35
30.90	-9.66	+12.42	+11.39
31.00	-9.69	+12.46	+11.43

**NOTE:** CALCULATE THE RVDT SIGNAL VOLTAGE WITH THESE FORMULAS:

RVDT RETRACT SIGNAL VOLTAGE (WITH THE INBOARD AND OUTBOARD SLATS IN THE FULLY RETRACTED POSITION)  
= [ACTUAL EXCITATION VOLTAGE] X (-8.75)  
-----  
28.00

RVDT EXTEND SIGNAL VOLTAGE (FOR THE INBOARD SLAT PDU, WITH THE INBOARD SLATS IN THE FULLY EXTENDED POSITION)  
= [ACTUAL EXCITATION VOLTAGE] X (+11.25)  
-----  
28.00

RVDT EXTEND SIGNAL VOLTAGE (FOR THE OUTBOARD SLAT PDU, WITH THE OUTBOARD SLATS IN THE FULLY EXTENDED POSITION)  
= [ACTUAL EXCITATION VOLTAGE] X (+10.32)  
-----  
28.00

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TABLE 402  
(FOR OUTBOARD #2 (M548) RVDT ONLY)

EXCITATION VOLTAGE	RVDT RETRACT SIGNAL VOLTAGE (± 60 mv)	RVDT EXTEND SIGNAL VOLTAGE (± 220 mv)
26.00	-9.29	8.42
26.10	-9.32	8.45
26.20	-9.36	8.49
26.30	-9.39	8.52
26.40	-9.43	8.55
26.50	-9.46	8.58
26.60	-9.50	8.62
26.70	-9.54	8.65
26.80	-9.57	8.68
26.90	-9.61	8.71
27.00	-9.64	8.75
27.10	-9.68	8.78
27.20	-9.71	8.81
27.30	-9.75	8.84
27.40	-9.79	8.88
27.50	-9.82	8.91
27.60	-9.86	8.94
27.70	-9.89	8.97
27.80	-9.93	9.01
27.90	-9.96	9.04
28.00	-10.00	9.07
28.10	-10.04	9.10
28.20	-10.07	9.13
28.30	-10.11	9.17
28.40	-10.14	9.20
28.50	-10.18	9.23
28.60	-10.21	9.26
28.70	-10.25	9.30
28.80	-10.29	9.33
28.90	-10.32	9.36
29.00	-10.36	9.39
29.10	-10.39	9.43
29.20	-10.43	9.46
29.30	-10.46	9.49
29.40	-10.50	9.52
29.50	-10.54	9.56
29.60	-10.57	9.59
29.70	-10.61	9.62
29.80	-10.64	9.65
29.90	-10.68	9.69
30.00	-10.71	9.72

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TABLE 402 (FOR OUTBOARD #2 (M548) RVDT ONLY)		
EXCITATION VOLTAGE	RVDT RETRACT SIGNAL VOLTAGE (± 60 mv)	RVDT EXTEND SIGNAL VOLTAGE (± 220 mv)
30.10	-10.75	9.75
30.20	-10.79	9.78
30.30	-10.82	9.81
30.40	-10.86	9.85
30.50	-10.89	9.88
30.60	-10.93	9.91
30.70	-10.96	9.94
30.80	-11.00	9.98
30.90	-11.04	10.01
31.00	-11.07	10.04
<p><b>NOTE:</b> CALCULATE THE RVDT SIGNAL VOLTAGE WITH THIS FORMULA IF THE EXCITATION VOLTAGE IS NOT GIVEN IN THIS TABLE:</p> <p>RVDT RETRACT SIGNAL VOLTAGE FOR THE #2 RVDT (M548) IN THE OUTBOARD SLAT PDU (WITH THE OUTBOARD SLAT FULLY RETRACTED)</p> $= \frac{[\text{ACTUAL EXCITATION VOLTAGE}] \times (-10.00)}{28.00}$ <p>RVDT EXTEND SIGNAL VOLTAGE FOR THE #2 RVDT (M548) IN THE OUTBOARD SLAT PDU (WITH THE OUTBOARD SLAT FULLY EXTENDED)</p> $= \frac{[\text{ACTUAL EXCITATION VOLTAGE}] \times (+9.07)}{28.00}$		

- S 394-075  
(4) Bond the gasket to the RVDT cover with sealant.

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S 434-076

- (5) Remove the identification tags and connect the RVDT connectors to the inner surface of the RVDT cover with the screws.

S 394-077

- (6) Apply sealant around the connectors in the RVDT cover.

S 424-078

- (7) Install the RVDT cover with six screws (Detail A or B, Fig.405).

NOTE: Apply corrosion preventive compound to the screws before the installation.

S 394-079

- (8) Apply sealant around the seam of the RVDT cover.

S 434-080

- (9) Remove the identification tags and connect the airplane electrical connectors to the connectors on the RVDT cover.

S 824-225

- (10) Adjustment of slat PDU RVDTs using the -63 FSEU  
(a) Adjust the slat PDU RVDTs using the -63 FSEU as the voltmeter instead of a phase angle voltmeter (PAV) with the steps that follow:

NOTE: The -63 FSEU includes a standard 2-line 8-character keypad BITE display. Adjustment of the RVDTs is done in the same way as with a PAV except the -63 FSEU replaces the PAV.

- 1) Turn the display on and navigate through the menus to monitor analog inputs (Top Level Menu->Other Functions->I/O Monitoring->Analog Inputs) to be able to read the RVDT voltage value on the FSEU BITE display.

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- 2) Down arrow to the RVDT you want to check and push YES key to display the RVDT reading.

NOTE: There is no need to correct the value displayed for excitation voltage as is necessary when using a PAV. This correction has already being done by the FSEU. To display another RVDT reading, push the down or up arrow key. This will take you to the next RVDT in the list. Push YES to display its value. There is a 5-minute automatic time limit after which the display will turn off if no keys are pushed in. To keep the display active while reading an RVDT value, push the YES key every few minutes. This has no effect on the display, but resets the 5-minute time limit.

FSEU BITE DISPLAY PROCEDURE		
DISPLAY	KEY	COMMENT
	ON/OFF	
EXISTING FAULTS?	down arrow	Repeat to scroll down through the list.
OTHER FUNCTNS?	YES	
LRU CONFIG?	down arrow	
I/O MONITOR?	YES	
ANALOG INPUTS?	YES	
LVR1 POS M604?	down arrow	Repeat to scroll down through the list.
IB POS 1 M483?	YES	down arrow to go to the next sensor.
IB POS 1 -8.75V	YES	Repeat every few minutes to prohibit display timeout.

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RIG AND FUNCTIONAL LIMITS INBD SLAT SENSOR #1 LIMITS (767-200/300/300ER)					
DETENT	FUNCTIONAL MAX	RIG MAX	NOMINAL VRMS	RIG MIN	FUNCTIONAL MIN
RET	-8.50	-8.63	-8.72	-8.83	-8.98
TKF	1.46	1.42	1.16	0.92	0.88
LDG	11.56	11.50	11.20	11.02	10.96

RIG AND FUNCTIONAL LIMITS INBD SLAT SENSOR #2 LIMITS (767-200/300/300ER)					
DETENT	FUNCTIONAL MAX	RIG MAX	NOMINAL VRMS	RIG MIN	FUNCTIONAL MIN
RET	-8.52	-8.63	-8.72	-8.83	-8.93
TKF	1.46	1.42	1.16	0.92	0.88
LDG	11.51	11.48	11.20	11.02	10.96

RIG AND FUNCTIONAL LIMITS OUTBD SLAT SENSOR #1 LIMITS					
DETENT	FUNCTIONAL MAX	RIG MAX	NOMINAL VRMS	RIG MIN	FUNCTIONAL MIN
RET	-8.46	-8.58	-8.69	-8.79	-8.94
TKF	5.87	5.81	5.58	5.31	5.25
LDG	10.56	10.46	10.27	9.99	9.94

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RIG AND FUNCTIONAL LIMITS OUTBD SLAT SENSOR #2 LIMITS					
DETENT	FUNCTIONAL MAX	RIG MAX	NOMINAL VRMS	RIG MIN	FUNCTIONAL MIN
RET	-9.80	-9.90	-10.00	-10.09	-10.19
TKF	4.45	4.39	4.23	4.05	4.00
LDG	9.18	9.12	8.95	8.79	8.73

S 724-081

- (11) Do a test on the slat primary power and drive (AMM 27-51-00/501, "Test for the Flap and Slat Primary Drives and Position Indicating Systems").

S 724-082

- (12) Do a test on the slat alternate power and drive (AMM 27-81-00/501, "Test for the Slat Alternate Power and Drive System, and the Slat Position Indicating System").

L. Put the Airplane Back to Its Usual Condition

S 094-083

- (1) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 094-084

- (2) Remove the PDU lock from the TE flap PDU (Fig. 407).

S 094-085

- (3) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 408).

S 864-086

- (4) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the P11 panel:  
(a) 11C15, FLAP SLAT ELEC UNIT 1 SENSOR

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- (b) 11C16, FLAP SLAT ELEC UNIT 1 CONT
- (c) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR
- (d) 11G16, FLAP SLAT ELEC UNIT 2 CONT
- (e) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR
- (f) 11G23, FLAP SLAT ELEC UNIT 3 CONT
- (g) 11H23, SLAT ALTN CONT INBD
- (h) 11H24, SLAT ALTN CONT OUTBD
- (i) 11J24, FLAPS ALTN CONT

S 864-087

- (5) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the main power distribution panel, P6:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 214-088

- (6) Make sure there is no leakage of hydraulic fluid on all the hydraulic connections on the slat PDU.

S 014-089

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

S 744-090

- (8) Operate the test switch on the panel of the flap/slat electronics unit (FSEU) at the E2 equipment rack, and look for a no-fault indication.

S 414-091

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

S 864-092

- (10) Remove the power from the center hydraulic system (AMM 29-11-00/201).

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S 864-093

(11) Remove electrical power (AMM 24-22-00/201).

S 414-094

(12) Install the access panels, 511BB and 611BB, to close the access to the outboard and inboard slat PDUs (AMM 06-44-00/201).

S 614-095

(13) Do the servicing steps for the center hydraulic system and reservoir if you removed and installed hydraulic lines for the slat PDU (AMM 12-12-01/301).

S 094-096

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(14) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

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LEADING EDGE SLAT DRIVE CONTROL VALVE MODULE AND BYPASS VALVE -  
REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the Flow Regulator Valve (On-Wing) of the Control Valve Module, the Control Valve Module, the Bypass Valve of the Control Valve Module, and the Bypass Valve Rotary Actuator (the electric motor with the gears).

TASK 27-81-12-024-001

2. Leading Edge Slat Power Drive Unit (PDU) Control Valve Module and Bypass Valve - Removal

A. General

- (1) This task contains the removal procedure for these components on the slat PDU:

- the Control Valve Module - the Flow Regulator Valve
- the Control Valve Module
- the Control Valve Module - the Bypass Valve
- the Bypass Valve Rotary Actuator.

Because this task contains four procedures, only do the applicable procedure to remove the component.

To start one of these procedures, do the steps in the "Prepare for the Removal" topic, then do the applicable group of steps to remove the component.

B. Equipment

- (1) LE Slat Groundlock - A27007-1 (2 Necessary)
- (2) TE Flap PDU Lock - A27009-7
- (3) Circuit Breaker Lockout Clip  
(4 Necessary) Commercially Available

C. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 27-81-11/401, Leading Edge Slat Power Drive Unit Components
- (4) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) 32-00-15/201, Landing Gear Door Locks
- (6) 32-00-20/201, Landing Gear Downlocks

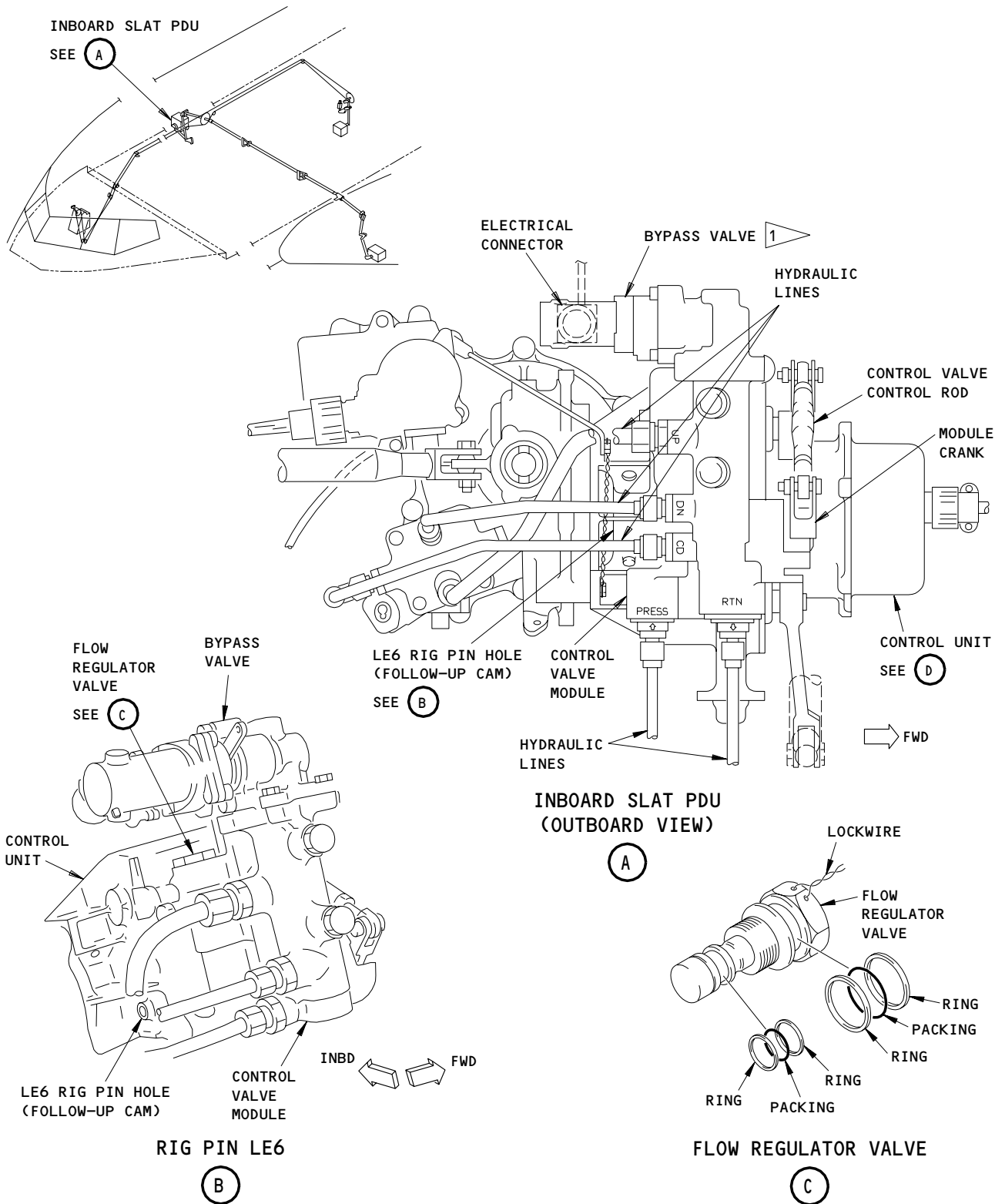
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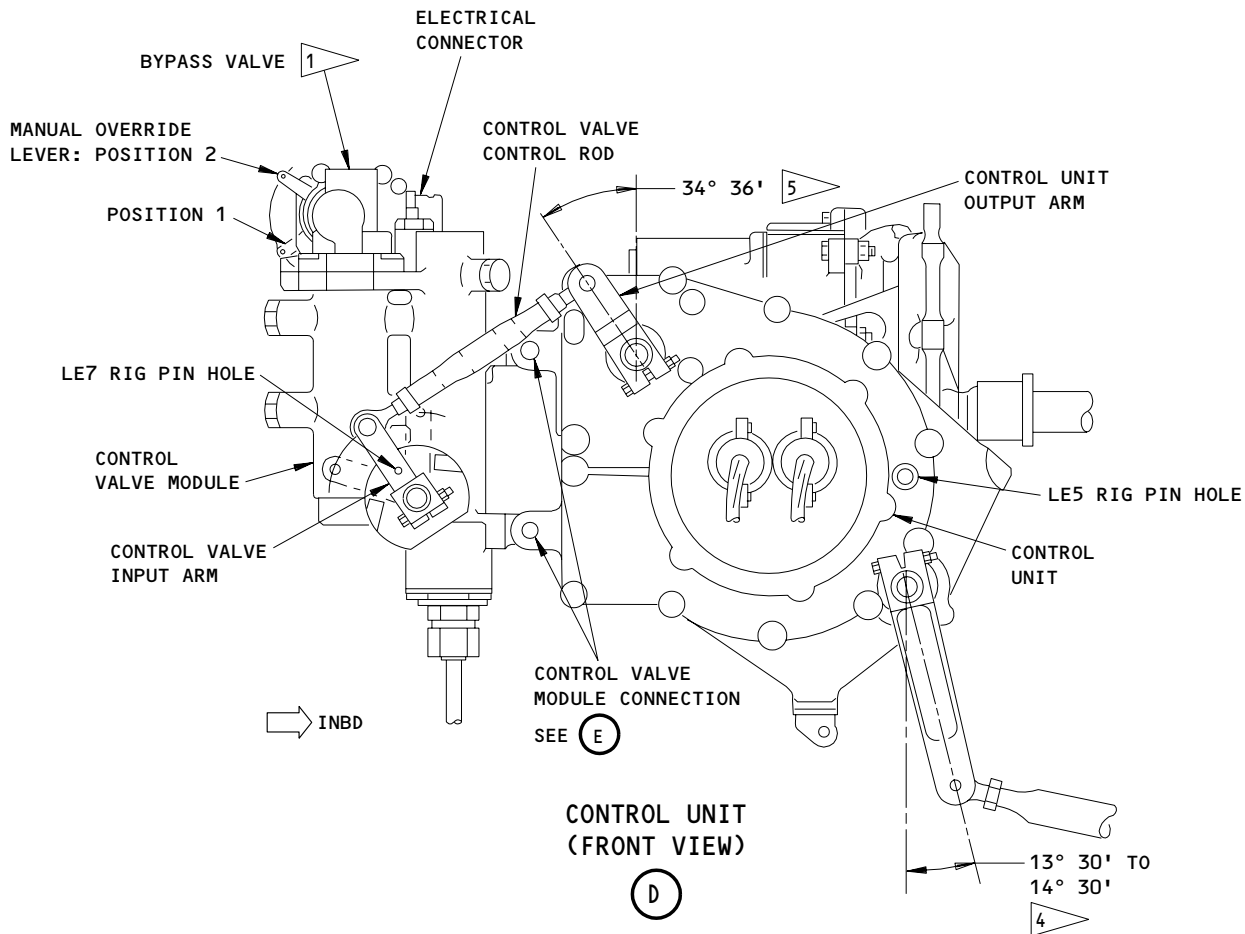
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Inboard Slat PDU Control Valve Module and Bypass Valve  
Figure 401 (Sheet 1)

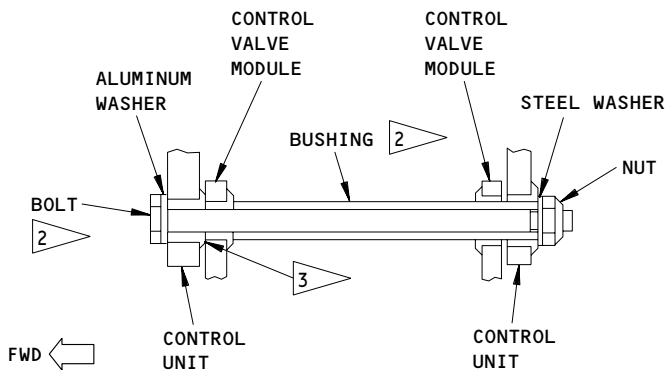
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**CONTROL UNIT  
(FRONT VIEW)**

**(D)**



**CONTROL VALVE MODULE CONNECTION**

**(E)**

- 1** INSTALL LOCKWIRES TO THE BOLTS WITH THE DOUBLE TWIST PROCEDURE (AMM 20-10-23/401)
- 2** APPLY BMS 3-24 GREASE TO ALL SURFACES BEFORE INSTALLATION
- 3** MAKE SURE THE BONDING SURFACE IS CLEAN. MAKE SURE THE TOTAL RESISTANCE AT THE BOND IS NOT MORE THAN 0.001 OHM
- 4** POSITION TO INSTALL RIG PIN LE5
- 5** POSITION TO INSTALL RIG PIN LE6

**Inboard Slat PDU Control Valve Module and Bypass Valve  
Figure 401 (Sheet 2)**

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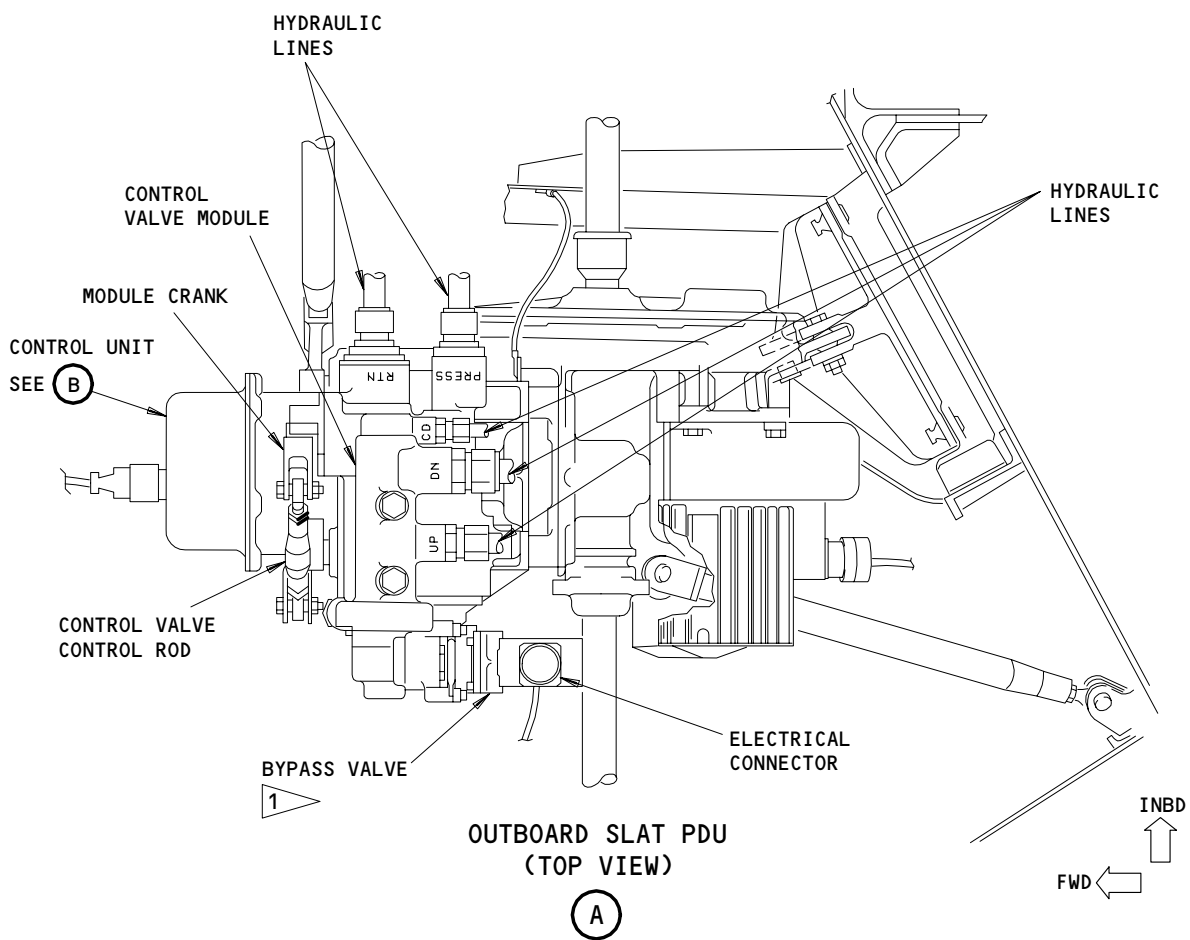
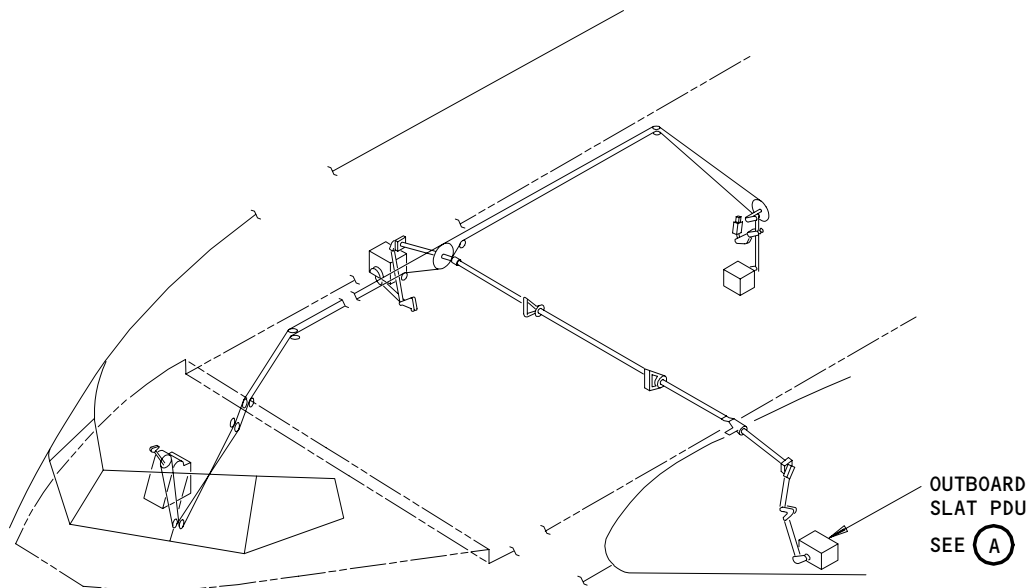
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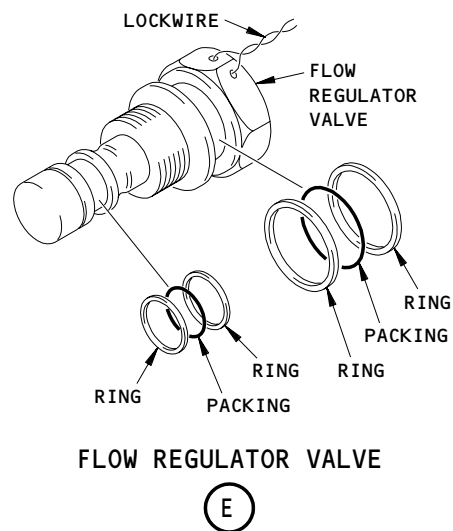
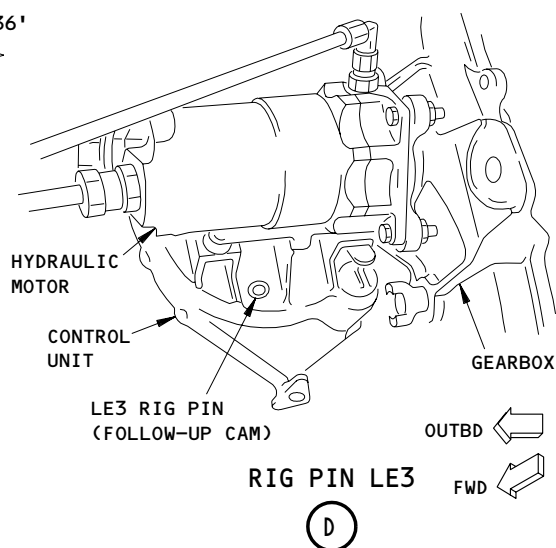
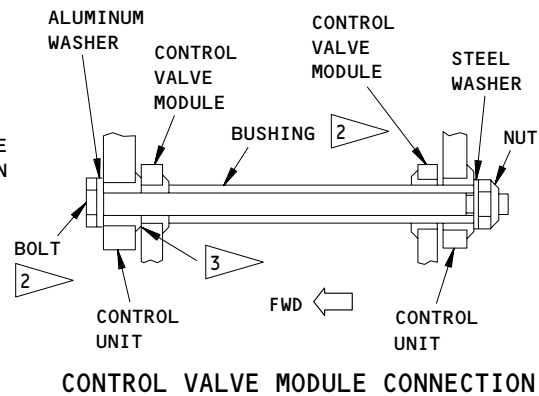
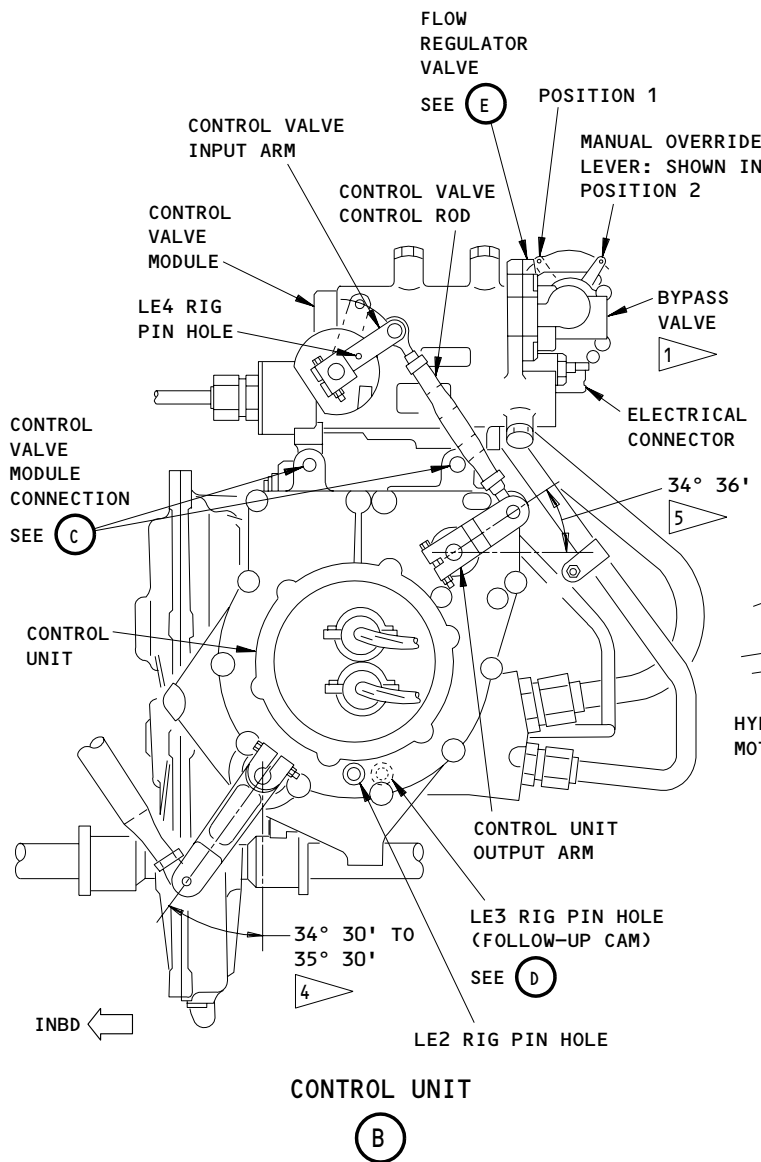
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Outboard Slat PDU Control Valve Module and Bypass Valve  
Figure 402 (Sheet 1)

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- 1 INSTALL LOCKWIRES TO THE BOLTS WITH THE DOUBLE TWIST PROCEDURE (AMM 20-10-23/401)
- 2 APPLY BMS 3-24 GREASE TO ALL SURFACES BEFORE INSTALLATION
- 3 MAKE SURE THE BONDING SURFACE IS CLEAN. MAKE SURE TOTAL RESISTANCE AT THE BOND IS NOT MORE THAN 0.001 OHM
- 4 POSITION TO INSTALL RIG PIN LE2
- 5 POSITION TO INSTALL RIG PIN LE3

Outboard Slat PDU Control Valve Module and Bypass Valve  
Figure 402 (Sheet 2)

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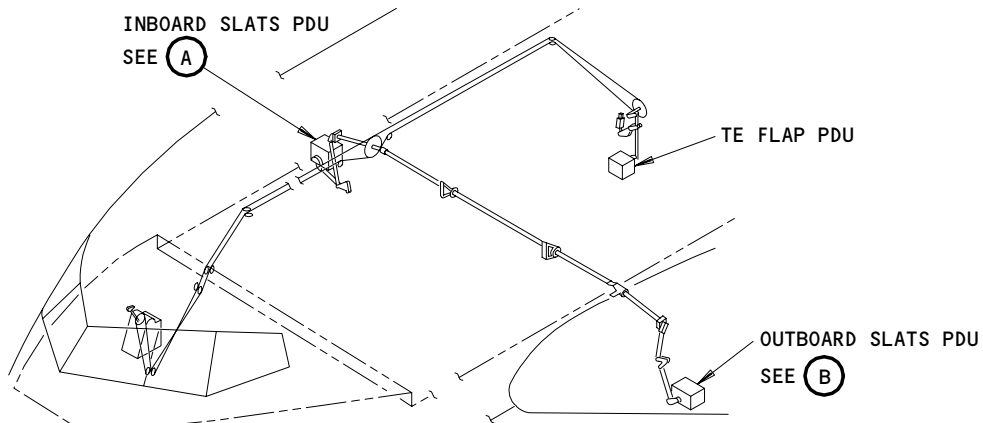
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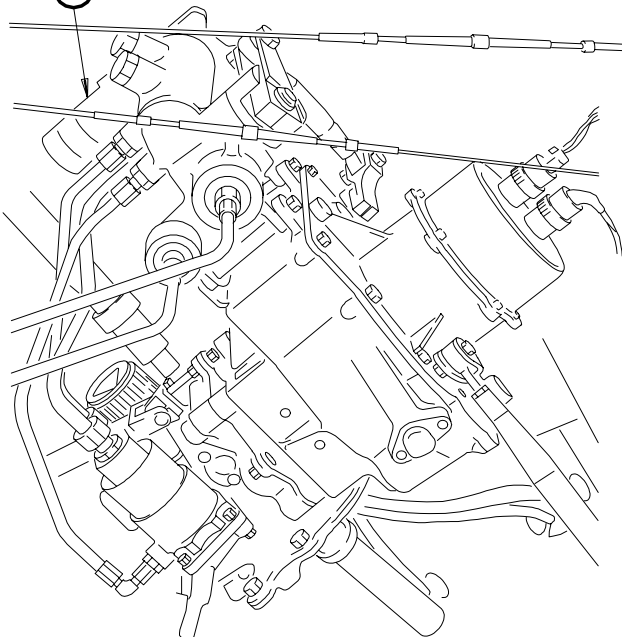
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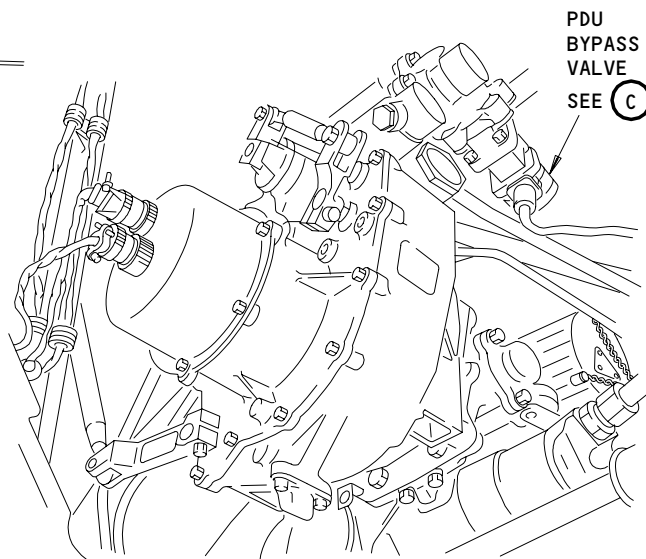


PDU BYPASS VALVE  
SEE (C)



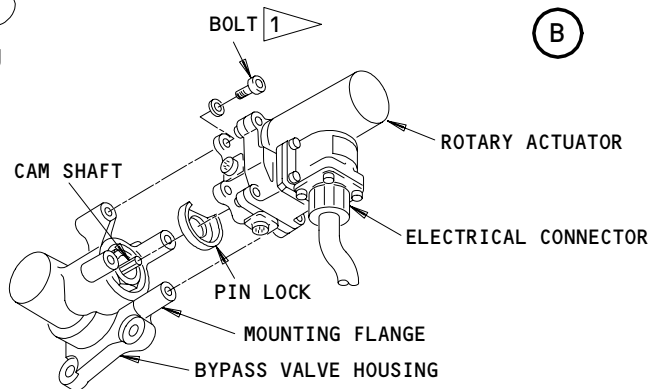
INBOARD SLAT PDU

(A)



OUTBOARD SLAT PDU

(B)



PDU BYPASS VALVE

(C)

Bypass Valve Rotary Actuator  
Figure 403

1 INSTALL LOCKWIRES TO THE BOLTS TOGETHER WITH THE DOUBLE TWIST PROCEDURE (20-10-23/401)

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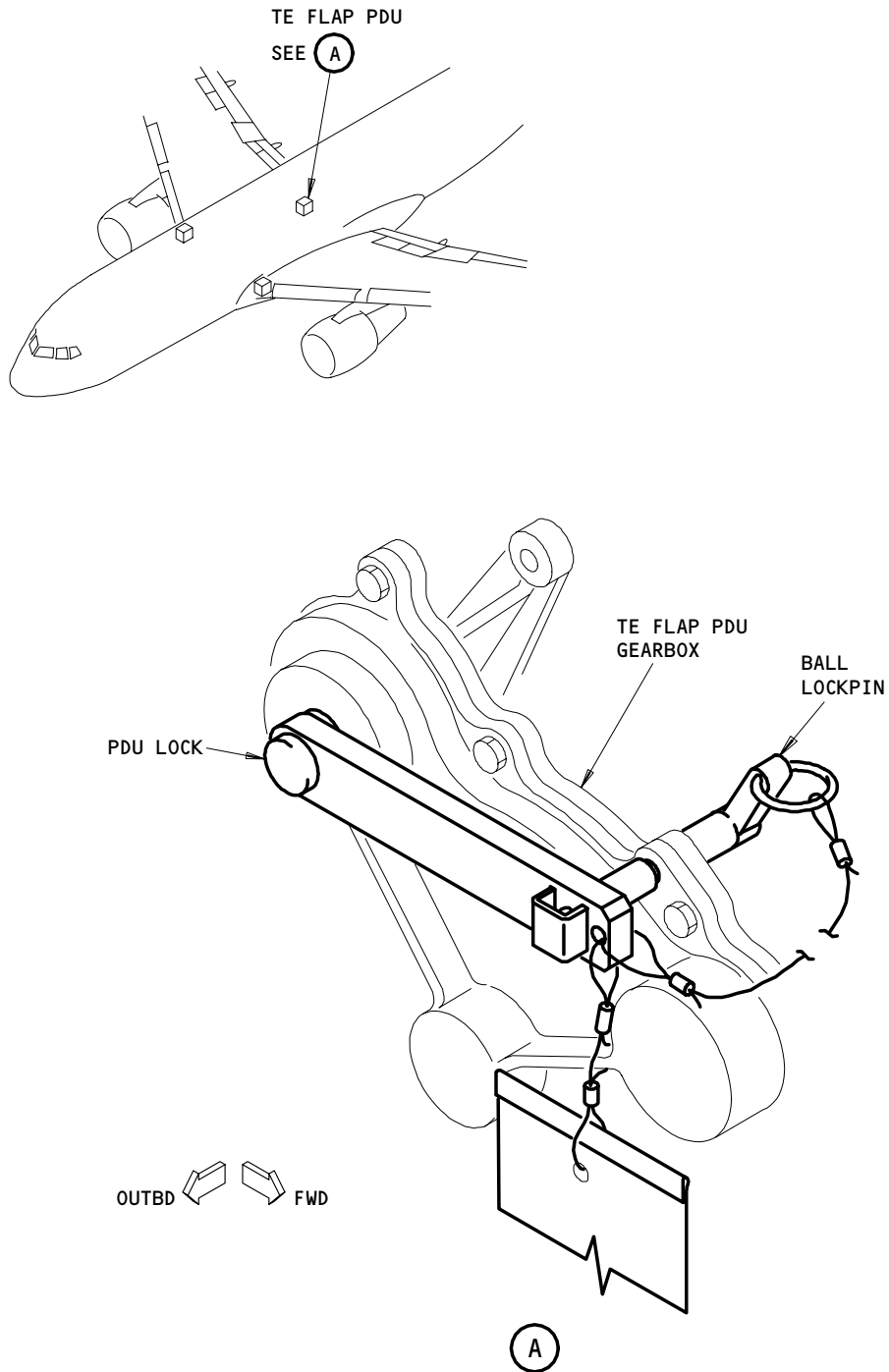
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PDU Lock for the TE Flap PDU  
Figure 404

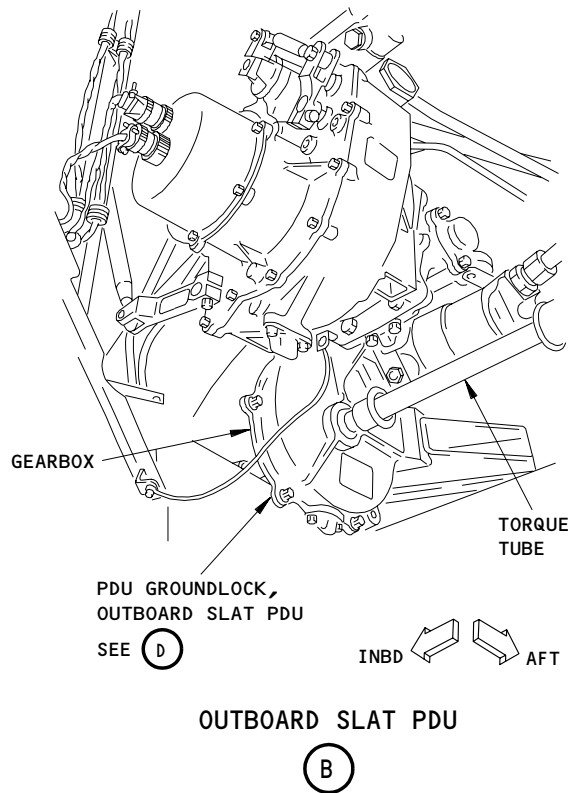
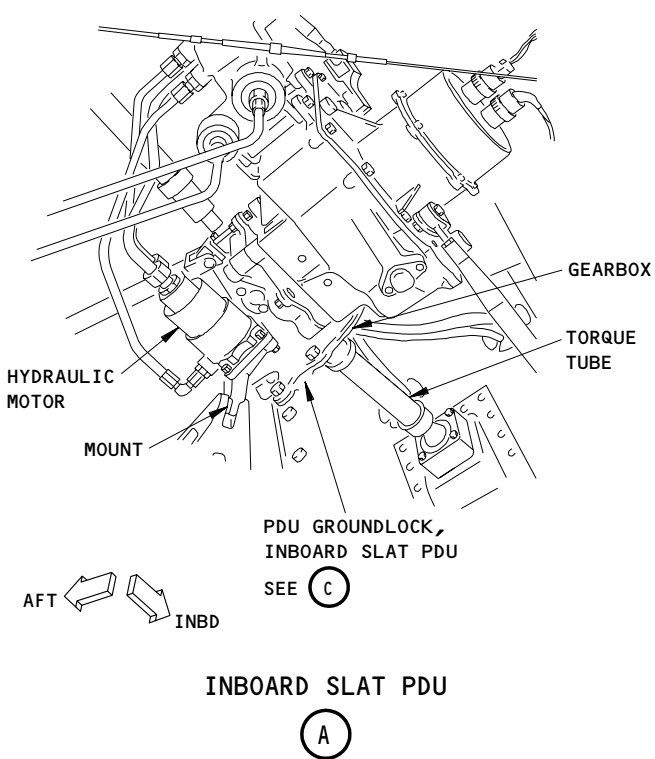
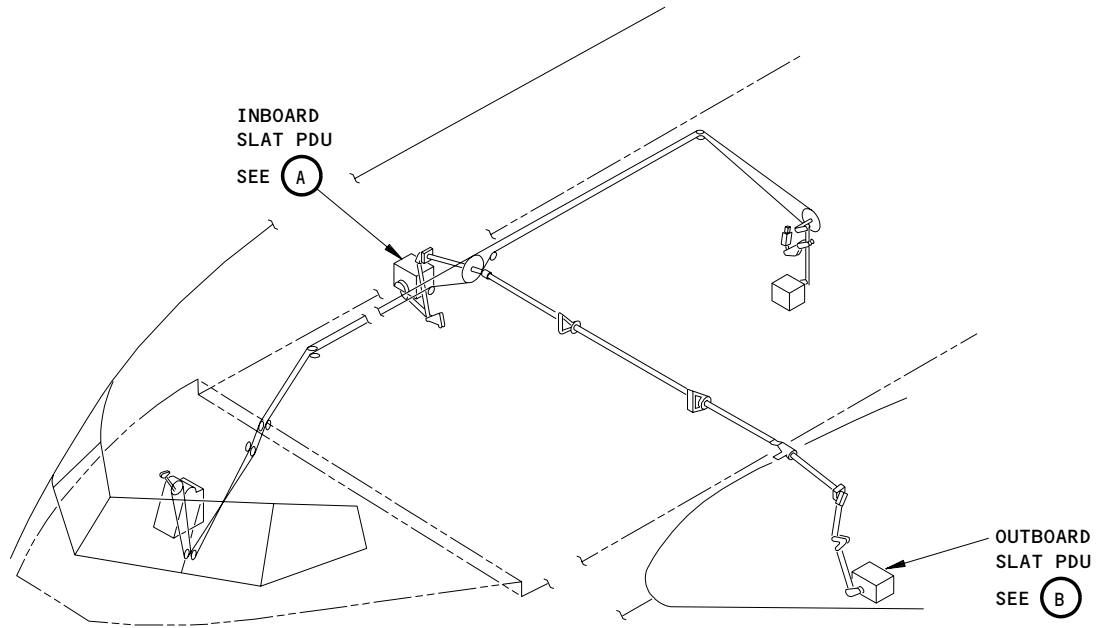
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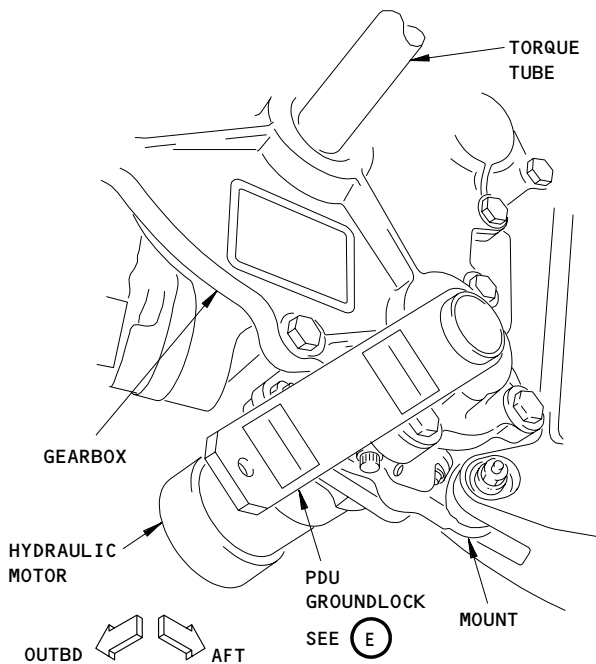




Slat PDU Groundlock  
Figure 405 (Sheet 1)

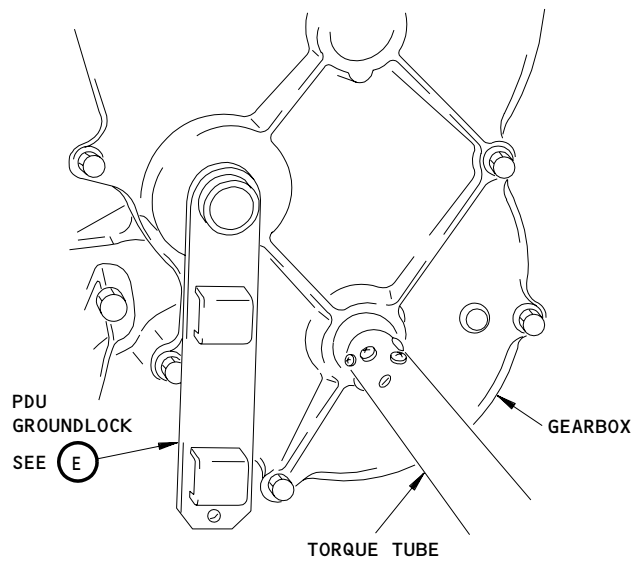
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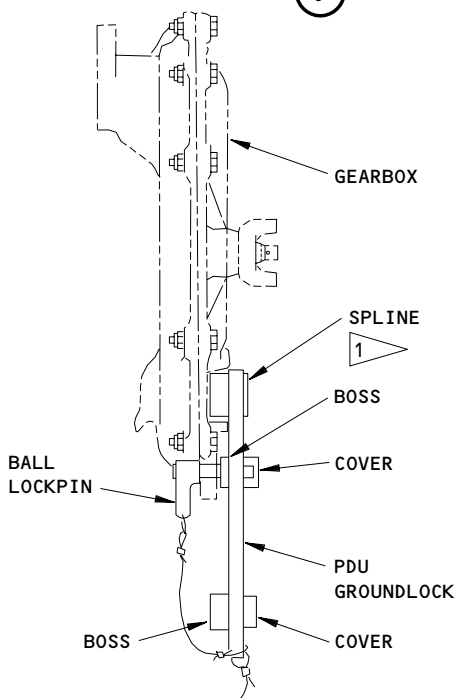
**PDU GROUNDLOCK,  
INBOARD SLAT PDU**

(C)



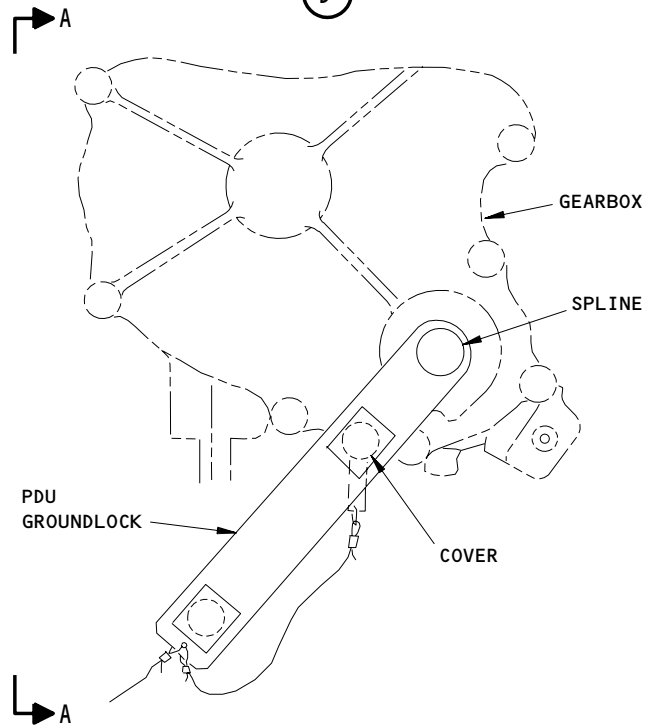
**PDU GROUNDLOCK,  
OUTBOARD SLAT PDU**

(D)



A-A

1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALLPIN INSTALLED THROUGH THE BOSS AND GEARBOX



**PDU GROUNDLOCK  
(EXAMPLE)**

(E)

**Slat PDU Groundlock  
Figure 405 (Sheet 2)**

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D. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard
710	Nose Landing Gear and Doors
730/740	Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

E. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 494-003

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors from the landing gear and install the door locks (Ref 32-00-15).

S 214-004

- (3) Make sure the flaps and slats are in the fully retracted position.

S 214-005

- (4) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 494-006

- (5) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 864-007

- (6) Remove the pressure from the center hydraulic system and reservoir (Ref 29-11-00).

S 864-008

- (7) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:

- (a) 11H23, SLAT ALTN CONT INBD
- (b) 11H24, SLAT ALTN CONT OUTBD
- (c) 11J24, FLAPS ALTN CONT

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S 864-009

- (8) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 494-010

- (9) Install the PDU lock in the TE flap PDU (Fig. 404).

S 014-011

- (10) Remove the access panel, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (Ref 06-44-00).

S 494-012

- (11) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 405).

- F. Remove the Flow Regulator Valve from the Control Valve Module (inboard or outboard slat PDU)

**NOTE:** Refer to Fig. 401 to remove the flow regulator valve on the inboard slat PDU.  
Refer to Fig. 402 to remove the flow regulator valve on the outboard slat PDU.

S 034-125

- (1) Disconnect the electrical connectors from the bypass valve.

S 024-126

- (2) Remove the lockwire and loosen the flow regulator.

S 494-128

- (3) Remove the flow regulator, packings, and rings.

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S 034-127

- (4) Put a cover on the control valve module to prevent any contamination.

S 214-129

- (5) Examine flow regulator valve parts for damage, wear, cracks, stripped screw threads, and replace them as necessary.

G. Remove the Control Valve Module

**NOTE:** Refer to Fig. 401 to remove the control valve module on the inboard slat PDU.  
Refer to Fig. 402 to remove the control valve module on the outboard slat PDU.

S 494-013

- (1) Remove the plugs from the rig pin holes, and install rig pins LE2 and LE3 (for the outboard slat PDU), and rig pins LE5 and LE6 (for the inboard slat PDU), as applicable.

S 034-014

- (2) Disconnect the electrical connectors from the bypass valve.

S 034-015

- (3) Disconnect the control valve control rod from the control valve input arm (View D, Fig. 401 or View B, Fig. 402).

**NOTE:** Do not change the length of control rod during or after you disconnect the rod.

S 034-016

- (4) Disconnect the hydraulic pressure, return, and case drain lines from the module at five locations on the control valve (View A, Fig. 401 or View A, Fig. 402).

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S 494-017

- (5) Install plugs in the hydraulic lines and caps on the hydraulic ports.

S 034-018

- (6) Disconnect the bolts as shown to remove the control valve module (View E, Fig. 401 or View C, Fig. 402).

H. Remove the Bypass Valve

**NOTE:** Refer to Fig. 401 to remove the bypass valve for the inboard slat PDU.  
Refer to Fig. 402 to remove the bypass valve for the outboard slat PDU.

S 494-019

- (1) Remove the plugs from the rig pin holes, and install rig pins LE2 and LE3 (outboard slat PDU), or rig pins LE5 and LE6 (inboard slat PDU), as applicable.

S 034-020

- (2) Disconnect the electrical connectors from the bypass valve.

S 034-021

- (3) Remove the bolts that attach the bypass valve to the control valve module.

S 024-022

- (4) Remove the bypass valve.

S 494-023

- (5) Put a cover on the control valve module and the bypass valve to keep dirt away from the mating surfaces.

I. Remove the Bypass Valve Rotary Actuator (Fig. 403)

S 034-024

- (1) Disconnect the electrical connector from the rotary actuator.

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- S 034-025
- (2) Remove the four bolts that connect the rotary actuator to the bypass valve housing.
- S 024-026
- (3) Remove the rotary actuator with the pin lock.
- S 494-027
- (4) Put a cover on the bypass valve housing and the rotary actuator to keep dirt away from the mating surfaces.

TASK 27-81-12-424-028

3. Leading Edge Slat Power Drive Unit (PDU) Control Valve Module and Bypass Valve - Installation

A. General

- (1) This task contains the installation procedure for these components:
- the Control Valve - the Flow Regulator Valve
  - the Control Valve Module
  - the Control Valve Module - the Bypass Valve Module
  - the Bypass Valve Rotary Actuator.

Because this task contains four different installation procedures, only do the applicable procedure to install the component.

To start one of these procedures, do the steps in the "Prepare for the Installation" topic before you do the applicable group of steps to install the component. Then do the "Put the Airplane Back to Its Usual Condition" group of steps.

- (2) If you will install the bypass valve, or the bypass valve rotary actuator, do the bypass valve operational tests for the slat primary and alternate drives after the installation, with the instructions given in this task.

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**B. Equipment**

- (1) Rig Pins from Set A20004-XX (Ref 20-10-24):
  - (a) LE2 - P/N A20004-9
  - (b) LE3 - P/N A20004-9
  - (c) LE4 - P/N A20004-73
  - (d) LE5 - P/N A20004-9
  - (e) LE6 - P/N A20004-9
  - (f) LE7 - P/N A20004-73
- (2) LE Slat Groundlock - A27007-1 (2 Necessary)
- (3) TE Flap PDU Lock - A27009-7
- (4) Bonding Meter (Microhm Bridge, Type 2 Bonding Meter) - 477W Avtron Model  
Avtron Manufacturing, Inc.  
Cleveland, Ohio
- (5) Force Gage, 0-25 Pounds (0-111 newtons)

**NOTE:** Used only for control valve module installation.

**C. Consumable Materials**

- (1) A00251 Sealant - BMS 5-26, Type II, Class 2-B
- (2) C00308 Compound, Corrosion Preventive -  
MIL-C-11796, Class 3
- (3) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (4) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)
- (5) D00054 Skydrol Assembly Lube - MCS 352B  
(Hydraulic Fluid - BMS 3-11, Optional)
- (6) D00153 Hydraulic Fluid, Fire Resistant - BMS 3-11  
(Skydrol Assembly Lube - MCS 352B, Optional)

**D. References**

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 06-44-00/201, Wing Access Doors and Panels
- (3) 12-12-01/301, Hydraulic Systems
- (4) AMM 20-10-23/401, Lockwires
- (5) 20-10-24/201, Rig Pins
- (6) 24-22-00/201, Electrical Power - Control

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- (7) 27-51-00/501, Trailing Edge Flap System
- (8) 27-81-00/501, Leading Edge Slat System
- (9) 27-81-11/401, Leading Edge Slat Power Drive Unit Components
- (10) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (11) 32-00-15/201, Landing Gear Door Locks
- (12) SWPM 20-20-00/1, Electrical Bonds and Grounds
- (13) 78-31-00/201, Thrust Reverser System

E. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard
710	Nose Landing Gear and Doors
730/740	Main Landing Gear and Doors

(2) Access Panels

119AL	Main Equipment Center
511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

F. Prepare for the Installation

S 214-029

- (1) Make sure the flaps and slats are in the fully retracted position.

S 214-030

- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 214-031

- (3) Make sure the power is removed from the center hydraulic system (Ref 29-11-00).

S 214-032

- (4) Make sure these circuit breakers are opened in the overhead panel, P11:
  - (a) 11H23, SLAT ALTN CONT INBD

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- (b) 11H24, SLAT ALTN CONT OUTBD
- (c) 11J24, FLAPS ALTN CONT

S 214-033

- (5) Make sure these circuit breakers are opened on the main power distribution panel, P6:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR
- G. Install the Flow Regulator Valve in the Control Valve Module (inboard or outboard slat PDU):

**NOTE:** Refer to Fig. 401 to install the flow regulator valve for the inboard slat PDU.  
Refer to Fig. 402 to install the flow regulator valve for the outboard slat PDU.

S 434-130

- (1) Lubricate the threads on the flow regulator, packings and rings with hydraulic fluid or skydrol assembly lube.

S 094-131

- (2) Install packings and rings on the flow regulator valve.

S 424-133

- (3) Remove the cover from the control valve module.

S 434-132

- (4) Thread flow regulator valve in the body assembly of the control valve module, and tighten flow regulator valve to 400 to 500 pound-inches (45.194 to 56.492 newton meter).

S 434-134

- (5) Install lockwire to the flow regulator valve using the double twist procedure (AMM 20-10-23/401).

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- S 714-135
- (6) Connect the electrical connector to the bypass valve of the control valve module.

- S 714-137
- (7) Do a test on the operation of the flow regulator valve for the slat primary drive with the instructions in the "Bypass Valve Operational Test - Slat Primary Drive" paragraph.

H. Install the Control Valve Module

NOTE: Refer to Fig. 401 to install the control valve module for the inboard slat PDU.  
Refer to Fig. 402 to install the control valve module for the outboard slat PDU.

- S 214-034
- (1) Make sure that (outboard slat PDU) rig pins LE2 and LE3 (View B and View D, Fig. 402) or (inboard slat PDU) rig pins LE5 and LE6 (View B and View D, Fig. 401) are installed in the applicable slat PDU.

- S 644-035
- (2) Apply BMS 3-33 grease to the bushings and bolts before the installation.

- S 104-148
- (3) Clean the bond surfaces between the control valve module and the control unit (SWPM 20-20-00).

- S 434-037
- (4) Put the control valve module on the control unit and install the bolt, aluminum washer (below the bolt head), bushing, steel washer (below the nut), and nut at two locations (View E, Fig. 401 or View C, Fig. 402). Tighten the nut.

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S 104-149

- (5) Make sure the bonding resistance between the control valve module and the control unit is not more than 0.001 ohm.

S 094-038

**CAUTION:** IF YOU INSTALLED A NEW CONTROL VALVE MODULE, MAKE SURE YOU REMOVE THE O-RINGS WITH THE SHIPPING CAP FROM THE HYDRAULIC PORTS ON THE CONTROL VALVE MODULE. THE O-RINGS ON THE SHIPPING CAPS CAN CAUSE INCORRECT CONNECTIONS WITH THE HYDRAULIC LINES AND CAUSE LEAKAGE OF HYDRAULIC FLUID.

- (6) Remove the plugs from the hydraulic lines, and the caps from the hydraulic ports.

**NOTE:** If you installed a new control valve module, remove the O-rings supplied with the shipping caps from the hydraulic ports.

S 644-039

- (7) Apply Skydrol assembly lube or hydraulic fluid to the packing O-rings and the fittings before you connect the hydraulic lines.

S 434-040

- (8) Connect the hydraulic pressure, return, and case drain lines to the control valve module at five locations (View A, Fig. 401 or View A, Fig. 402).

S 434-041

- (9) Install the electrical connector at the bypass valve.

S 434-042

- (10) Connect the control valve control rod to the control valve input arm.

**NOTE:** Do not change the length of the control rod during the installation.

S 824-043

- (11) Adjust the inboard or outboard slat PDU if it is necessary (Ref 27-81-00/501, "Inboard Slat PDU Adjustment" or "Outboard Slat PDU Adjustment").

S 824-044

- (12) Do a check of the PDU RVDT signal voltages and adjust the RVDT if it is necessary (AMM 27-81-11/401).

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S 094-045

- (13) Make sure you remove the rig pins LE2 and LE3, or LE5 and LE6, as applicable, and install the plugs in the rig pin holes.

S 714-046

- (14) Do a test on the slat primary power and drive (Ref 27-51-00/501, "Test for the Flap and Slat Primary Drives and Position Indicating Systems").

S 714-047

- (15) Do a test on the slat alternate power and drive (Ref 27-81-00/501, "Test for the Slat Alternate Power and Drive System, and the Slat Position Indicating System").

S 214-048

- (16) Make sure there is no leakage of hydraulic fluid at the hydraulic line connections on the control valve module.

I. Install the Bypass Valve

NOTE: Refer to Fig. 401 to install the bypass valve for the inboard slat PDU.  
Refer to Fig. 402 to install the bypass valve for the outboard slat PDU.

S 214-049

- (1) Make sure that (outboard slat PDU) rig pins LE2 and LE3 (View B and View D, Fig. 402) or (inboard slat PDU) rig pins LE5 and LE6 (View B and View D, Fig. 401) are installed in the applicable slat PDU.

S 644-050

- (2) Lightly lubricate the hydraulic fittings, packing O-rings, and the backup rings with Skydrol assembly lube or hydraulic fluid.

S 094-051

- (3) Remove the cover on the mating surface of the control valve module.

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- S 104-052
- (4) Clean the mating surfaces between the control valve module and the bypass valve, and make sure there is no grease on the surfaces.
- S 434-053
- (5) Install the packing O-ring and backup rings on the valve sleeve.
- S 424-054
- (6) Install the bypass valve in the control valve module, and tighten the bolts to 67-83 pound-inches (7.6-9.3 newton-meters).
- S 434-055
- (7) Install lockwires to the bolts together with the double twist procedure (Ref 20-10-23).
- S 394-056
- (8) Apply sealant around the mating edges of the flange and the bolts.
- S 434-057
- (9) Install the electrical connector.
- S 214-058
- (10) Make sure the manual override lever on the bypass valve is in the No. 2 (normal) position.
- S 094-059
- (11) Remove the rig pins LE2 and LE3, or, LE5 and LE6 as applicable, and install the plugs in the rig pin holes.
- S 714-060
- (12) Do a test on the operation of the bypass valve for the slat primary drive with the instructions in the "Bypass Valve Operational Test - Slat Primary Drive" paragraph.
- S 714-061
- (13) Do a test on the operation of the bypass valve for the slat alternate drive with the instructions in the "Bypass Valve Operational Test - Slat Alternate Drive" paragraph.
- J. Install the Bypass Valve Rotary Actuator (Fig. 403)
- S 094-062
- (1) Remove the covers from the bypass valve housing and the rotary actuator.
- S 104-063
- (2) Clean the mating surfaces between the bypass valve housing and the rotary actuator, and make sure there is no grease on the surfaces.
- S 434-064
- (3) Install the pin lock on the rotary actuator.

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- S 434-065
- (4) Align the bolt holes and the spline indexes of the rotary actuator and the cam shaft, and engage the actuator to the bypass valve housing.
- S 624-066
- (5) Apply corrosion preventive compound to the bolt threads.
- S 434-067
- (6) Install the bolts with washers, and tighten the bolts to 22-28 pound-inches.
- S 434-068
- (7) Install lockwires on the bolts together with the double twist procedure (Ref 20-10-23).
- S 394-069
- (8) Apply a bead of sealant around the mating flange.
- S 434-070
- (9) Connect the electrical connector to the rotary actuator.
- S 214-071
- (10) Make sure the manual override lever on the bypass valve is in the No. 2 (normal) position.
- S 714-072
- (11) Do a test on the operation of the rotary actuator for the slat primary drive with the instructions in the "Bypass Valve Operational Test - Slat Primary Drive" paragraph.
- S 714-073
- (12) Do a test on the operation of the rotary actuator for the slat alternate drive with the instructions in the "Bypass Valve Operational Test - Slat Alternate Drive" paragraph.

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K. Bypass Valve Operational Test - Slats Primary Drive

**NOTE:** During this test, make sure the EICAS messages on the EICAS display, and the amber LEADING EDGE light on the first officer's main instrument panel, P3, do not come on.

S 094-074

- (1) Remove the PDU lock in the TE flap PDU (Fig. 404).

S 094-075

- (2) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 405).

S 864-076

- (3) Supply electrical power (Ref 24-22-00).

S 214-077

- (4) Make sure the six EICAS circuit breakers are closed on the P11 panel.

S 214-079

- (5) Make sure the COMPUTER switch on the EICAS DISPLAY select panel is in the L position.

S 214-080

- (6) Make sure the flaps and slats are in the fully retracted position.

S 214-081

- (7) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 864-082

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (8) Pressurize the center hydraulic system (Ref 29-11-00).

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S 214-083

- (9) Move the flap control lever to the 1-unit detent and do these checks:
- (a) While the slats extend, make sure the L and R needles on the flap position indicator (P3) move to a position between the UP and the 1-unit marks.
  - (b) Make sure the flaps do not move.
  - (c) After the slats stop in the intermediate position, make sure the L and R needles on the flap position indicator point to the 1-unit mark.

S 214-084

- (10) Move the flap control lever to the zero (FLAPS UP) detent and do these checks:
- (a) While the slats retract, make sure the L and R needles on the flap position indicator move to a position between the 1-unit and the UP marks.
  - (b) After the slats stop at the fully retracted position, make sure the L and R needles on the flap position indicator point to the UP mark.

S 864-085

- (11) Remove the power from the center hydraulic system (Ref 29-11-00).  
L. Bypass Valve Operational Test - Slat Alternate Drive

**NOTE:** During this test, make sure the EICAS messages on the EICAS display, and the amber LEADING EDGE light, on the P3 panel, do not come on unless it is shown in the instruction.

S 094-086

- (1) Remove the PDU lock from the TE flap PDU (Fig. 404).

S 094-087

- (2) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 405).

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S 044-088

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 864-089

- (4) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-090

- (5) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 214-091

- (6) Make sure the six EICAS circuit breakers are closed on the P11 panel.

S 214-094

- (7) Make sure the flaps and slats are in the fully retracted position.

S 214-095

- (8) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 214-096

- (9) Make sure the position selector switch for the flap/slat alternate drive, on the P3 panel, is in the NORM detent.

S 864-097

- (10) Supply electrical power (Ref 24-22-00).

S 214-098

- (11) Make sure the arming switches for the flap and slat alternate drives, on the P3 panel, are off (ALTN switch lights are off).

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S 864-099

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(12) Pressurize the center hydraulic system (Ref 29-11-00).

S 864-100

(13) Push the arming switch for the slat alternate drive , on the P3 panel, to arm the slat alternate drive (ALTN switch light comes on), and look for these conditions to occur seven seconds after you push the arming switch:

(a) The amber LEADING EDGE light, on the P3 panel, comes on and this message, LE SLAT DISAGREE shows in the EICAS display.

S 864-101

(14) Move the flap control lever to the 1-unit detent and make sure the inboard and outboard slats do not move.

**NOTE:** It is normal that the slats move lightly. This is due to the transition of the bypass valve in the power drive unit.

S 864-102

(15) Move the flap control lever to the zero (FLAPS UP) detent.

S 864-103

(16) Remove the power from the center hydraulic system (Ref 29-11-00).

S 864-104

(17) Push the arming switch for the slat alternate drive, on the P3 panel, to disarm the slat alternate drives (ALTN switch lights go off).

S 214-105

(18) Make sure the amber LEADING EDGE light, on the P3 panel, goes off and the message, LE SLAT DISAGREE, does not show in the EICAS display.

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S 214-106

- (19) Make sure the EICAS message, LE SLAT DISAGREE, does not show on the display unit in the flight compartment.

M. Put the Airplane Back to Its Usual Condition

S 094-107

- (1) If installed, remove the DO-NOT-OPERATE tag from the flap control lever.

S 094-108

- (2) If installed, remove the PDU lock from the TE flap PDU (Fig. 404).

S 094-109

- (3) If installed, remove the groundlocks from the inboard and outboard slat PDUs (Fig. 405).

S 864-110

- (4) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-111

- (5) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 214-112

- (6) Make sure there is not leakage of hydraulic fluid at the hydraulic line connections on the control valve module.

S 744-113

- (7) Operate the test switch on the panel of the flap/slat electronics unit (FSEU) at the E2 equipment rack, and look for a no-fault indication.

S 864-114

- (8) Remove the power from the center hydraulic system (Ref 29-11-00).

S 864-115

- (9) Remove electrical power (Ref 24-22-00).

S 444-116

- (10) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

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S 414-121

- (11) Install the access panels, 511BB and 611BB, for the outboard and inboard slat PDU (Ref 06-44-00).

S 614-122

- (12) Do the servicing steps for the center hydraulic system and reservoir if you removed and installed hydraulic lines for the slat PDU (Ref 12-12-01).

S 094-123

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (13) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

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LEADING EDGE SLAT DRIVE BODY ANGLE GEARBOX – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the body angle gearbox for the leading edge (LE) slat drive.
- B. The body angle gearbox is a component of the inboard slat drive system.

TASK 27-81-15-024-001

2. Inboard Slat Drive Body Angle Gearbox – Removal

A. Equipment

- (1) Leading Edge Slats Groundlock – A27007-1  
(2 Necessary)
- (2) TE Flap PDU Lock – A27009-7
- (3) Circuit Breaker Lockout Clip  
(4 necessary) Commercially Available

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 06-46-00/201, Entry, Service and Cargo Doors
- (3) 24-22-00/201, Electrical Power – Control
- (4) 25-52-01/401, Sidewall Panels
- (5) 27-81-00/501, Leading Edge Slat System
- (6) 27-81-24/401, Leading Edge Slat Torque Tubes
- (7) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (8) 32-00-15/201, Landing Gear Door Locks
- (9) 32-00-20/201, Landing Gear Downlocks

C. Access

(1) Location Zones

125/126	Area Aft of the Forward Cargo Compartment
144	Right MLG Wheel Well
211/212	Control Cabin
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors
821	Forward Cargo Door

(2) Access Panel

511BB	LE Slat Power Drive Unit – Outboard (Left)
611BB	LE Slat Power Drive Unit – Inboard (Right)

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

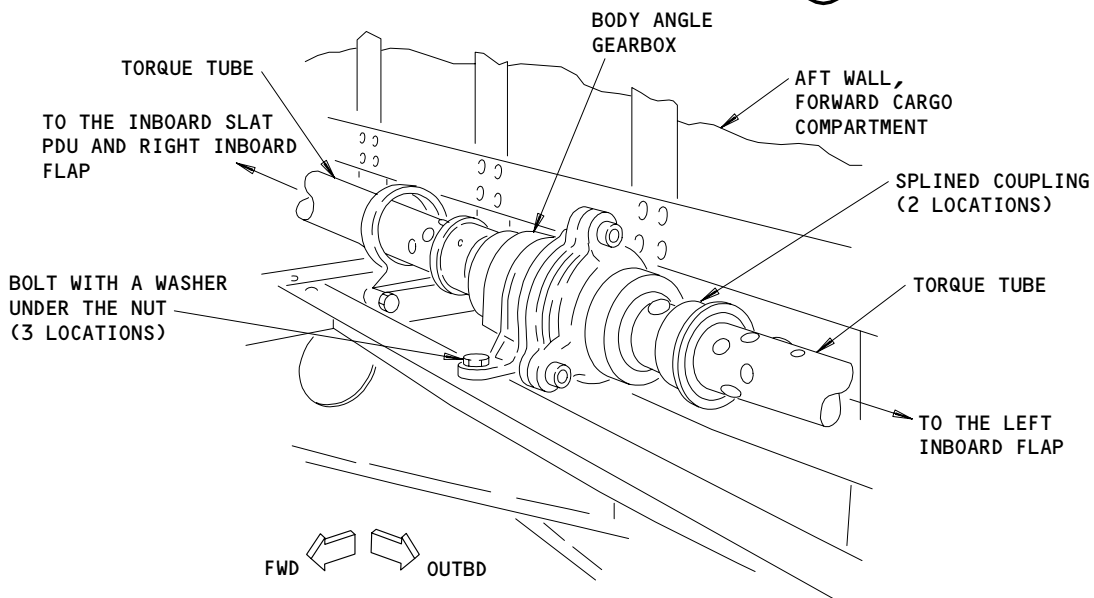
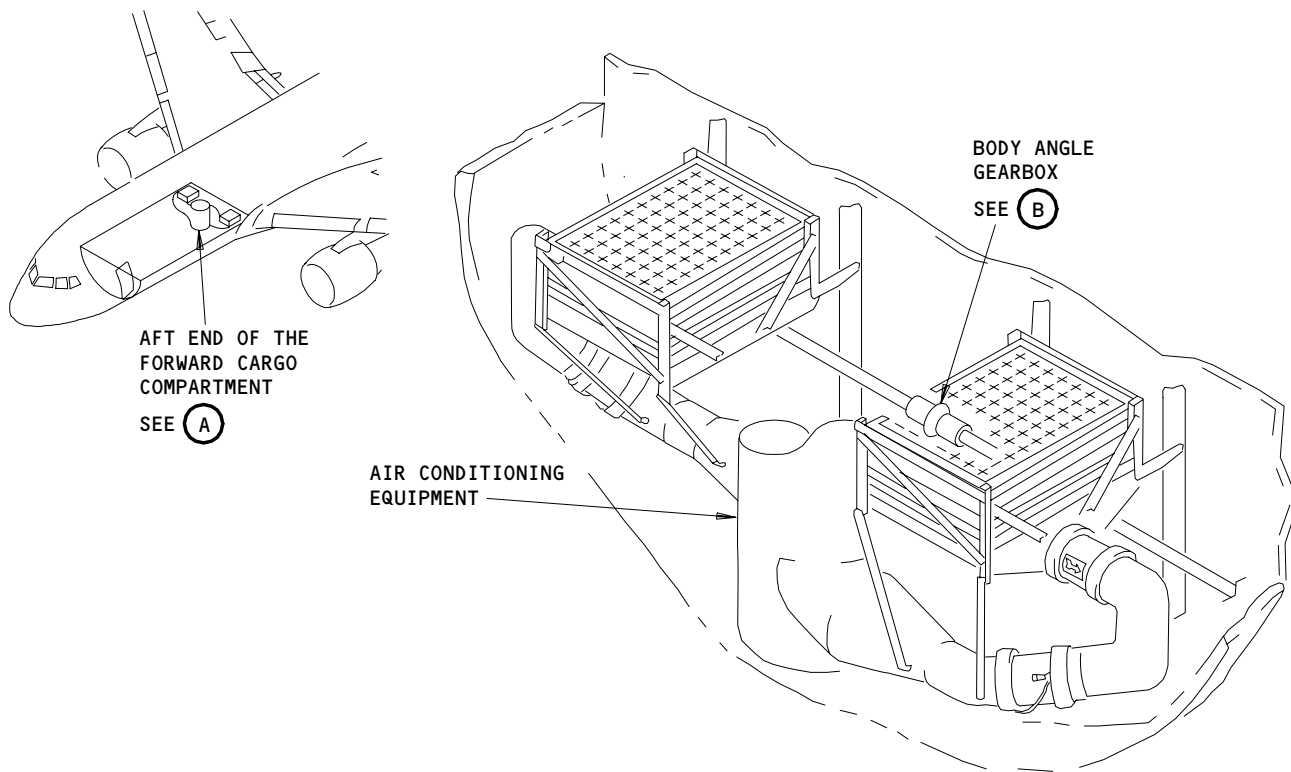
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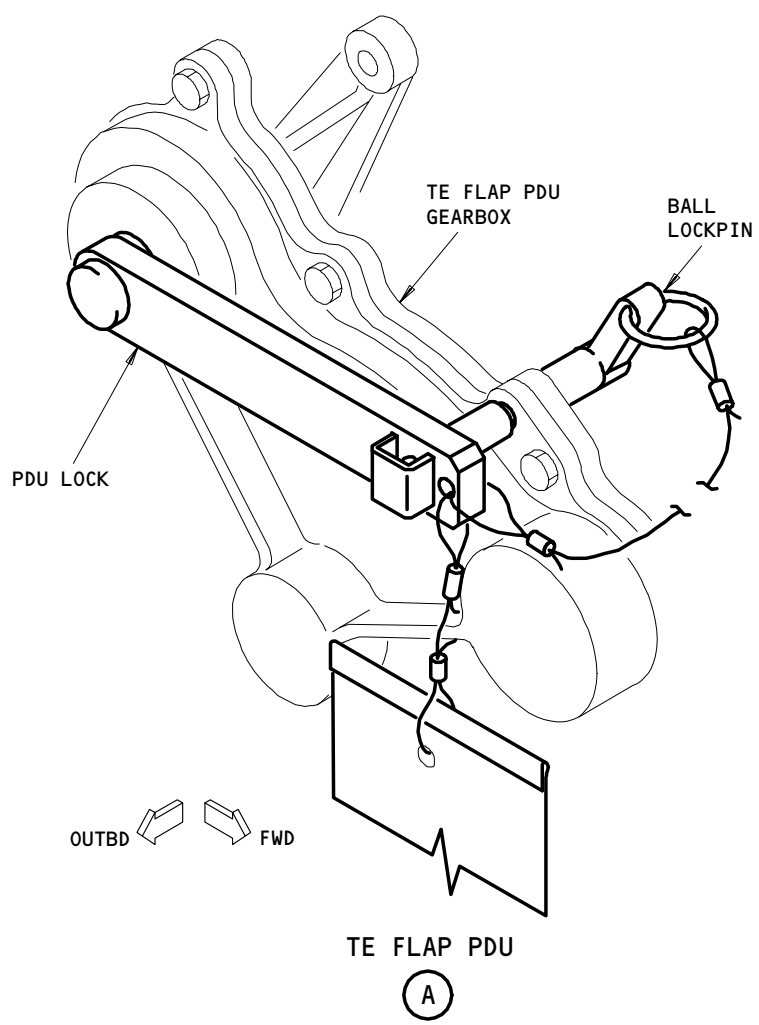
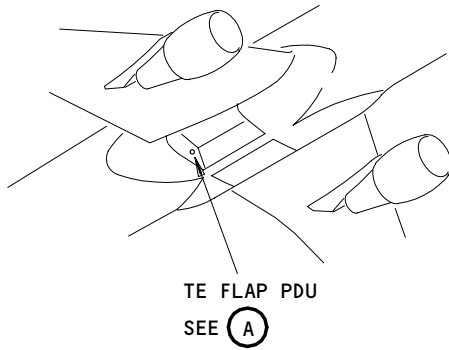
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Body Angle Gearbox  
Figure 401

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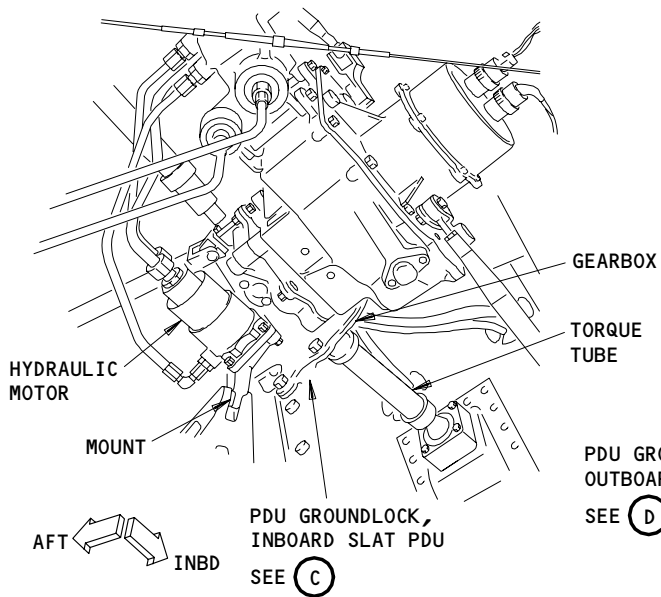
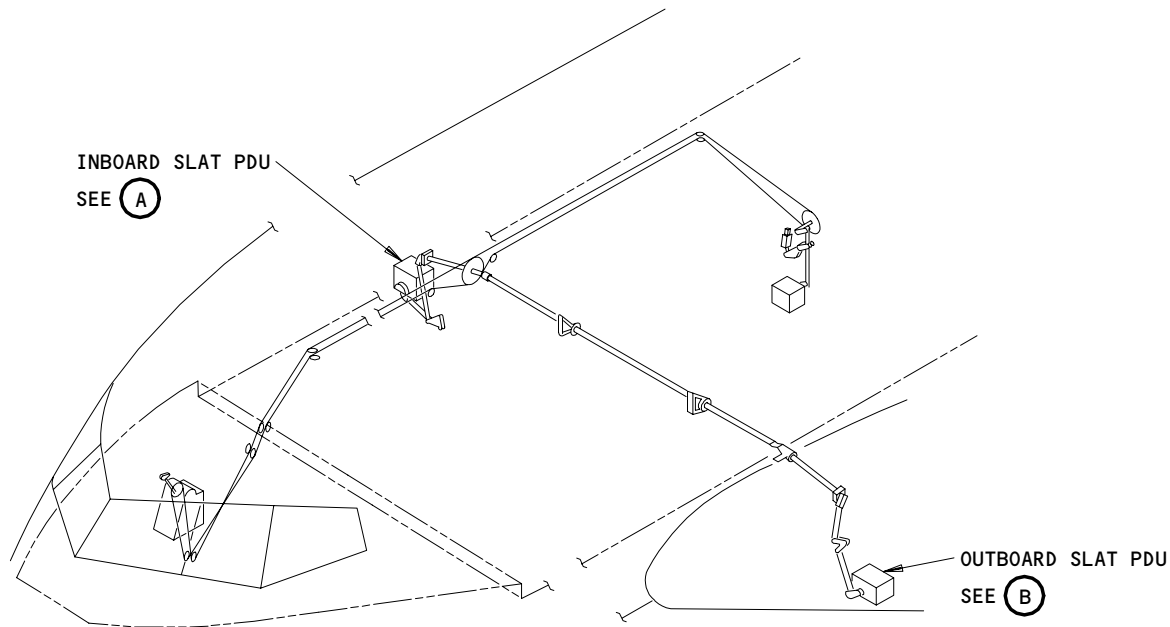
PDU Lock for the TE Flap PDU  
Figure 402

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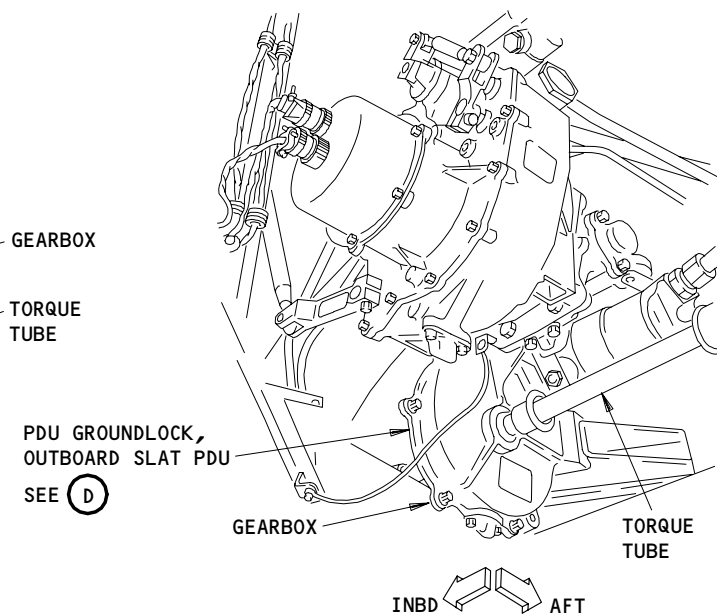
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INBOARD SLAT PDU  
(BOTTOM VIEW)

(A)



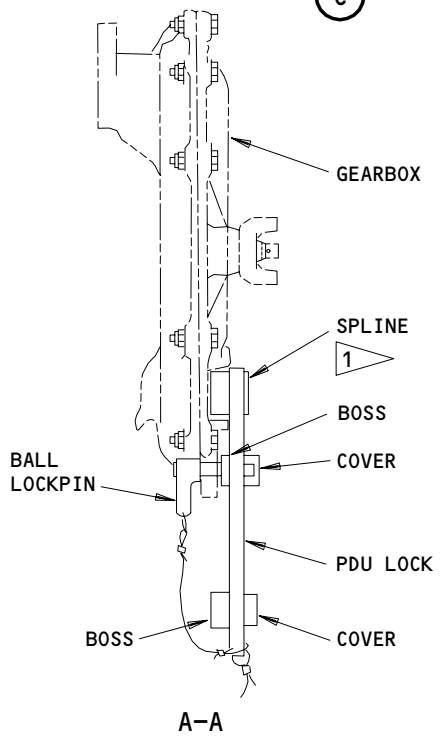
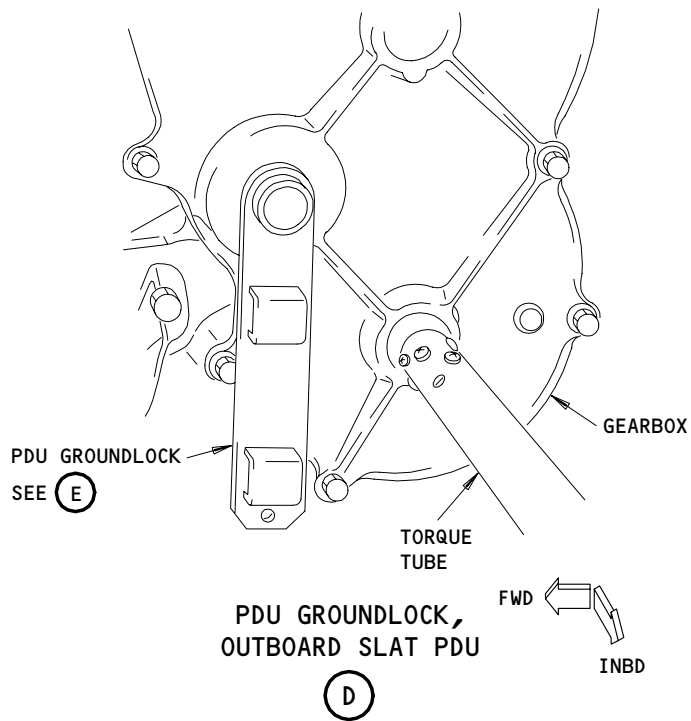
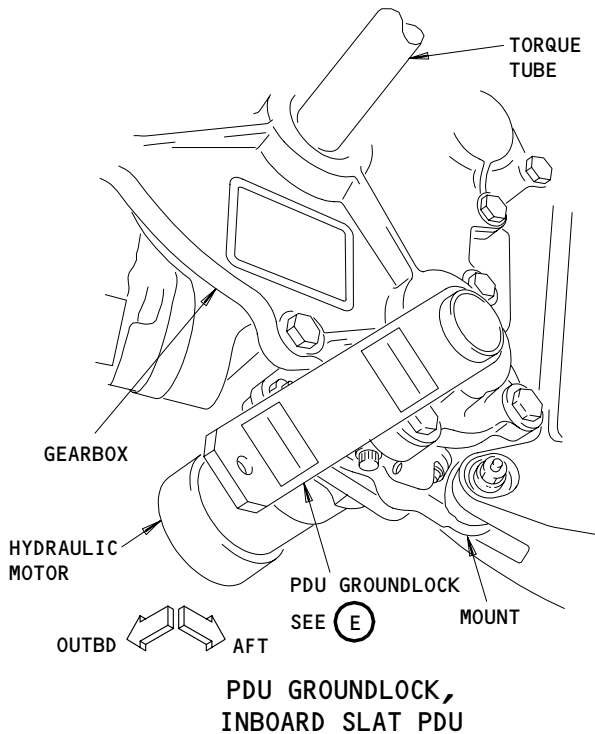
OUTBOARD SLAT PDU

(B)

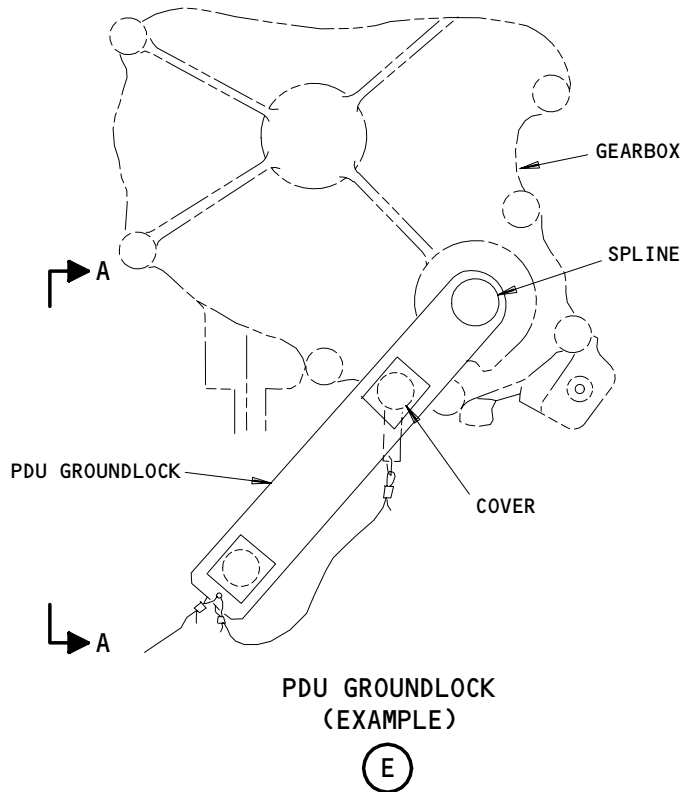
Slats PDU Groundlock  
Figure 403 (Sheet 1)

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1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN, INSTALLED THROUGH THE BOSS AND GEARBOX



Slats PDU Groundlock  
Figure 403 (Sheet 2)

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S 494-003

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (Ref 32-00-15).

S 214-004

- (3) Make sure the flaps and slats are in the fully retracted position.

S 214-005

- (4) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 494-006

- (5) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 864-007

- (6) Remove the power from the center hydraulic system (Ref 29-11-00).

S 494-008

- (7) Install the PDU lock on the TE flap power drive unit (PDU) (Fig. 402).

S 014-009

- (8) Remove the access panels, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (Ref 06-44-00).

S 494-010

- (9) Install the groundlocks on the inboard and outboard slat PDUs (Fig. 403).

S 864-011

- (10) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-012

- (11) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

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S 014-013

- (12) Open the forward cargo door (Ref 06-46-00).

S 014-014

- (13) Remove the cargo lining panels at the aft end of the forward cargo compartment (Ref 25-52-01).

S 014-015

- (14) Get access to the body angle gearbox behind the main distribution manifold (Fig. 401).

E. Remove the Body Angle Gearbox (Fig. 401)

S 934-016

- (1) Make a mark between the torque tube and the adjacent structure on each side of the body angle gearbox.

NOTE: These marks will help keep a record of the torque tube position before you disconnect the torque tube.

S 494-017

- (2) Hold the weight of the left inboard slat with a support.

NOTE: The weight of the left inboard slat can cause the torque tube to turn away from the adjusted position. The PDU groundlock will prevent the movement of the right inboard slat.

S 034-018

- (3) Disconnect the torque tube on each side of the body angle gearbox (Ref 27-81-24).

NOTE: Do not turn the torque tube. It will be necessary to adjust the inboard slat drive if you turn the torque tube while it is disconnected (Ref 27-81-00).

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- S 034-019  
 (4) Remove the three bolts that connect the gearbox to the structure.

- S 024-020  
 (5) Remove the gearbox from the airplane.

TASK 27-81-15-424-021

3. Inboard Slat Drive Body Angle Gearbox - Installation

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)  
 D00013 Grease - MIL-PRF-23827 (Optional)

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels  
 (2) 06-46-00/201, Entry, Service and Cargo Doors  
 (3) 20-10-23/401, Lockwires  
 (4) 24-22-00/201, Electrical Power - Control  
 (5) 25-52-01/401, Sidewall Panels  
 (6) 27-81-00/501, Leading Edge Slat System  
 (7) 27-81-24/401, Leading Edge Slat Torque Tubes  
 (8) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
 (9) 32-00-15/201, Landing Gear Door Locks

C. Access

(1) Location Zones

- |         |   |
|---------|---|
| 125/126 | Area Aft of the Forward Cargo Compartment |
| 144     | Right MLG Wheel Well                      |
| 211/212 | Control Cabin                             |
| 710     | Nose Landing Gear and Doors               |
| 730/740 | Left/Right Main Landing Gear and Doors    |
| 821     | Forward Cargo Compartment                 |

(2) Access Panel

- |       |  |
|-------|--|
| 511BB | LE Slat Power Drive Unit - Outboard (Left) |
| 611BB | LE Slat Power Drive Unit - Inboard (Right) |

D. Install the Body Angle Gearbox (Fig. 401)

- S 214-022  
 (1) Make sure the flaps and slats are in the fully retracted position.

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- S 214-023
- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.
- S 864-024
- (3) Make sure the power is removed from the center hydraulic system (Ref 29-11-00).
- S 864-025
- (4) Make sure the electrical power is removed (Ref 24-22-00).
- S 434-026
- (5) Put the gearbox into its position and install the three bolts with a washer under each nut. Tighten the nuts.
- S 434-027
- (6) Align the marks on each torque tube to the adjacent structure and connect the torque tubes to each side of the gearbox (Ref 27-81-24).
- NOTE:** Do not turn the torque tube during the installation. It will be necessary to adjust the inboard slat drive if you turn the torque tube (Ref 27-81-00).
- S 224-028
- (7) Do a check on the end clearances of the two torque tubes that you connected with this step:
- (a) Push the splined coupling away from the end of the torque tube and make sure that the clearance between the torque tube and the mating part is between 0.050 and 0.370 inch (1.3-9.4 mm).
- S 644-029
- (8) Fill the splined coupling with grease through the lubrication hole.
- S 434-030
- (9) Make sure you install a lockwire to the coupling screws on each splined coupling with the double twist procedure (Ref 20-10-23).
- S 094-031
- (10) Remove the support from the left inboard slat.
- S 224-032
- (11) Do a check on the retract overtravel stop clearances if it is necessary (Ref 27-81-00).

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S 714-033

(12) Do a test on the gearbox installation.

E. Test for the Body Angle Gearbox Installation

S 214-034

(1) Make sure the flaps and slats are in the fully retracted position.

S 214-035

(2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 094-036

(3) Remove the PDU lock from the TE flap power drive unit (PDU) (Fig. 402).

S 094-037

(4) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 403).

S 864-038

(5) Supply electrical power (Ref 24-22-00).

S 864-039

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(6) Pressurize the center hydraulic system (Ref 29-11-00).

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- S 864-040
- (7) Remove the DO-NOT-OPERATE tag from the flap control lever, and move the lever to the 30-unit detent.
- S 214-041
- (8) Make sure the flaps and slats move to the fully extended position.
- S 864-042
- (9) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted position.
- F. Put the Airplane Back to Its Usual Position

- S 414-043
- (1) Install the cargo lining panels at the aft end of the forward cargo compartment (Ref 25-52-01).

- S 414-044
- (2) Close the forward cargo door (Ref 06-46-00).

- S 414-045
- (3) Install the access panels, 511BB and 611BB, to close the access to the inboard and outboard slat PDUs (Ref 06-44-00).

- S 864-046
- (4) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

- S 864-047
- (5) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 094-048

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (6) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

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- S 864-049  
(7) Remove the power from the center hydraulic system (Ref 29-11-00).
- S 864-050  
(8) Remove electrical power if it is not necessary (Ref 24-22-00).

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BODY ANGLE GEARBOX – INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and a wear limit table, which show the data for wear limits. There are no procedures for access, removal or installation of the parts. Refer to the Body Angle Gearbox – Removal/Installation for procedure to do these tasks.

TASK 27-81-15-226-001

2. Wear Limits for the Body Angle Gearbox (Fig. 601)

A. General

- (1) This procedure only has illustrations and a wear limit table, which show the data for wear limits. There are no procedures for access, removal or installation of the parts. Refer to the Body Angle Gearbox – Removal/Installation for procedure to do these tasks.

EFFECTIVITY

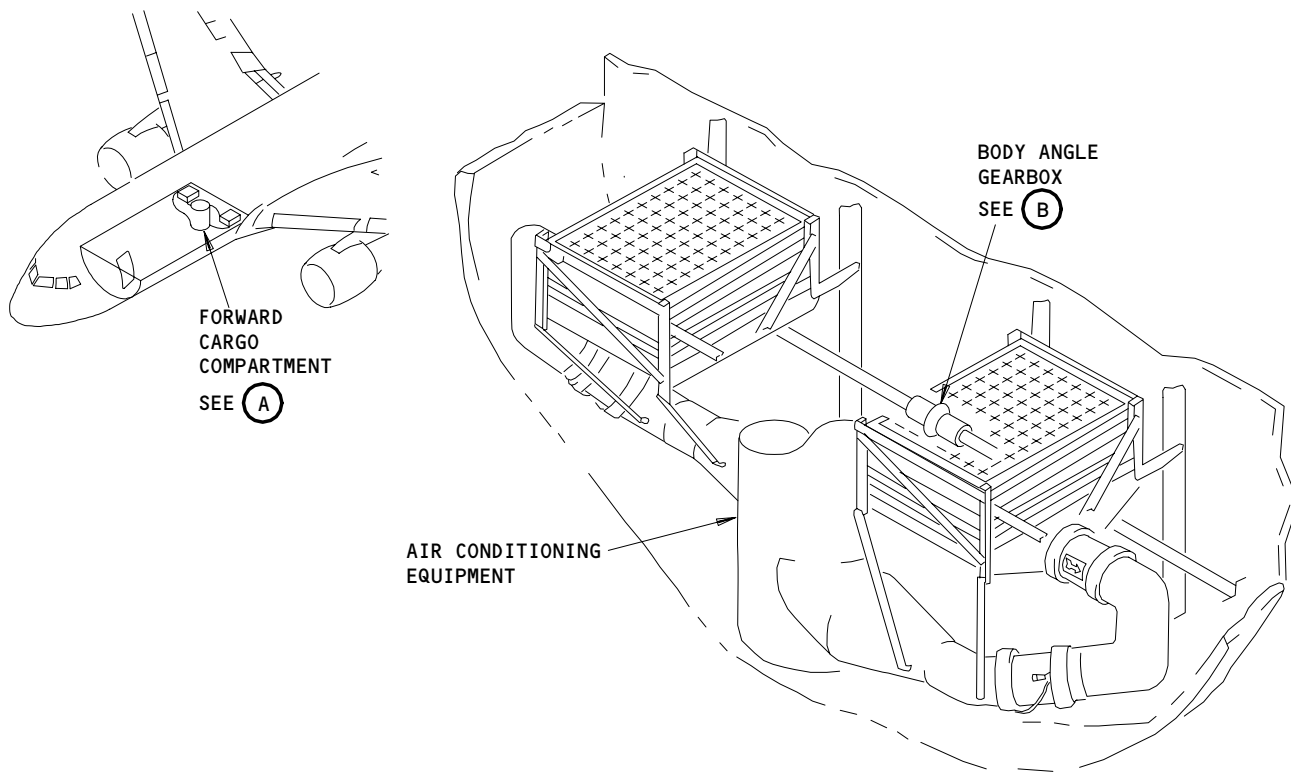
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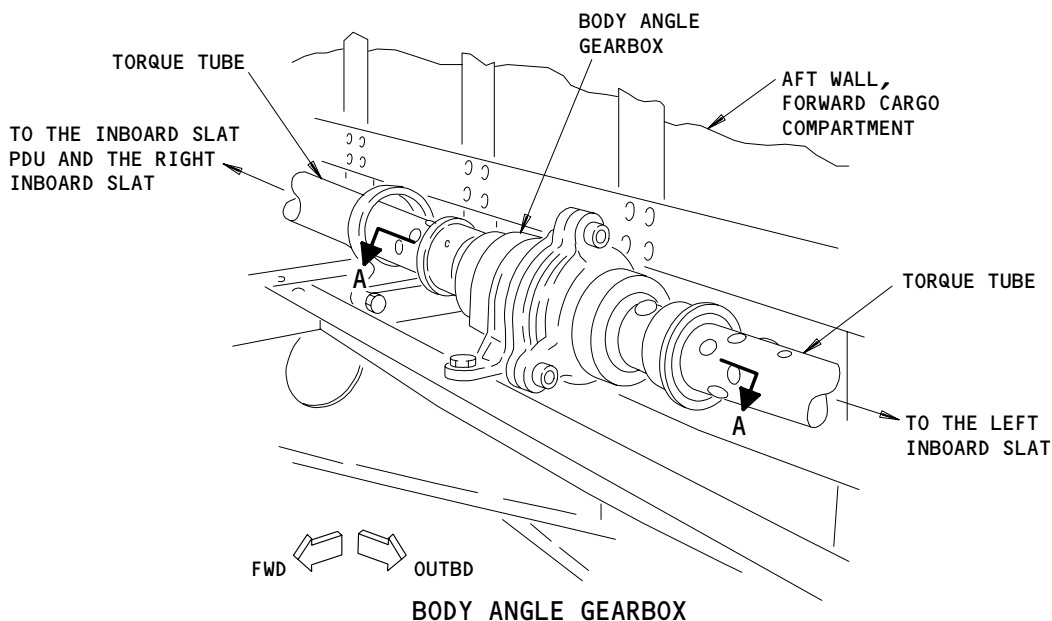
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FORWARD CARGO COMPARTMENT  
(AFT END)  
(A)

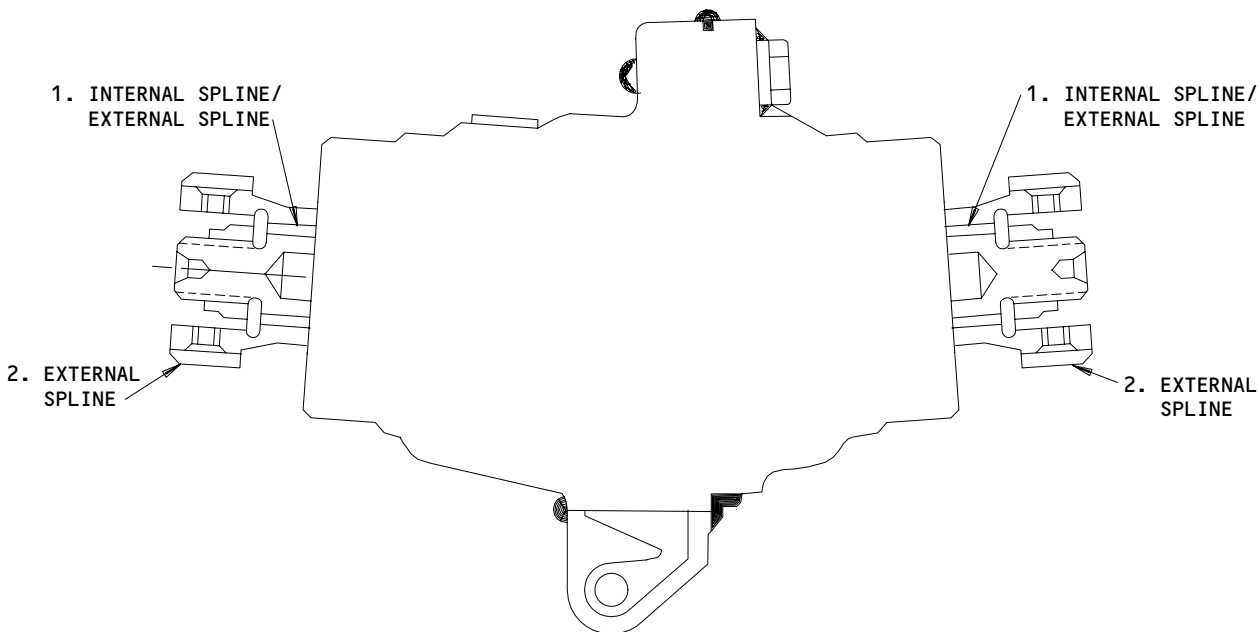


BODY ANGLE GEARBOX  
(B)

Wear Limits for the Body Angle Gearbox  
Figure 601 (Sheet 1)

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A-A

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR.
			DIAMETER		PERMITTED WEAR DIM.	MAX DIA CLEAR-ANCE			
			MIN	MAX					
1	INTERNAL SPLINE		--	--	--	1	--	--	
	EXTERNAL SPLINE		--	--	--		--	--	
2	EXTERNAL SPLINE		--	--	--	1	--	--	

1 VISUALLY EXAMINE (USE MAGNIFICATION IF NECESSARY) ALL THE BEARING SURFACES ON THE SPLINES FOR WEAR.

**NOTE:** REPLACE THE COUPLING IF YOU ARE NOT SURE ABOUT THE WEAR.

Wear Limits for the Body Angle Gearbox  
Figure 601 (Sheet 2)

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LEADING EDGE SLAT DRIVE SIDE-OF-BODY ANGLE GEARBOX –  
REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the side-of-body angle gearbox on the leading edge (LE) slat drive. The installation task also contains the steps for the test on the gearbox installation.

TASK 27-81-16-024-001

2. Side-of-Body Angle Gearbox – Removal

A. Equipment

- (1) Leading Edge Slats Groundlock – A27007-1  
(2 Necessary)
- (2) TE Flap PDU Lock – A27009-7
- (3) Circuit Breaker Lockout Clip  
(4 necessary) Commercially Available

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power – Control
- (3) 27-81-00/501, Leading Edge Slat System
- (4) 27-81-24/401, Leading Edge Slat Torque Tubes
- (5) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) 32-00-15/201, Landing Gear Door Locks
- (7) 32-00-20/201, Landing Gear Downlocks

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge – Inboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit – Outboard (Left)
611BB	LE Slat Power Drive Unit – Inboard (Right)

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

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S 494-003

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (Ref 32-00-15).

S 214-004

- (3) Make sure the flaps and slats are in the fully retracted position.

S 214-005

- (4) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 494-006

- (5) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 864-007

- (6) Remove the power from the center hydraulic system (Ref 29-11-00).

S 494-008

- (7) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 402).

S 014-010

- (8) Remove the access panels, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (Ref 06-44-00).

S 494-011

- (9) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 403).

S 864-013

- (10) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-014

- (11) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 014-015

- (12) Remove the fixed lower access panels when it is necessary to get access to the gearbox (Ref 06-44-00).

EFFECTIVITY

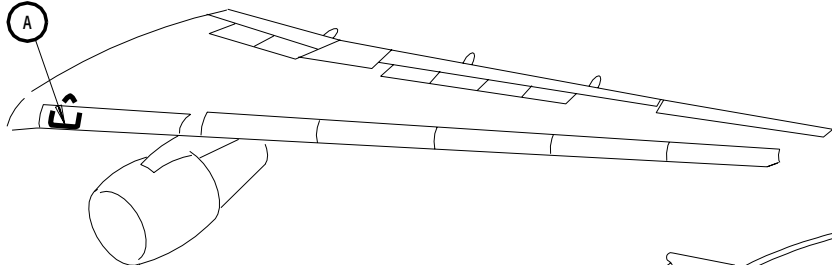
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27-81-16

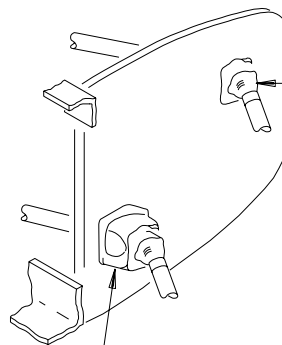
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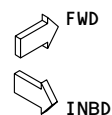
GEARBOX  
LOCATION  
SEE (A)



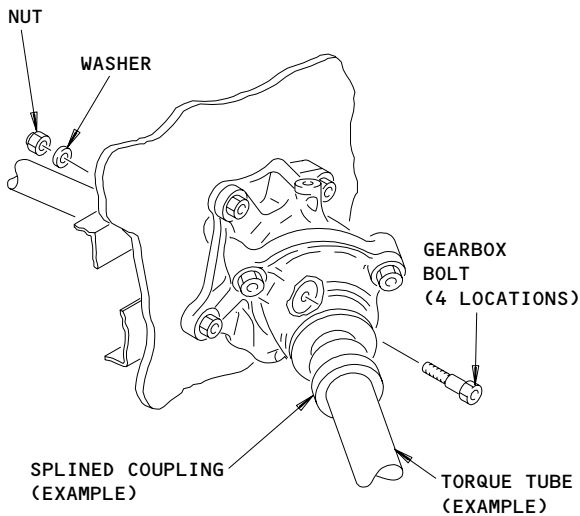
LEFT WING  
(RIGHT WING IS OPPOSITE)



SIDE-OF-BODY ANGLE  
GEARBOX, INBOARD SLATS  
SEE (B)



SIDE-OF-BODY ANGLE  
GEARBOX, OUTBOARD SLATS  
SEE (C)

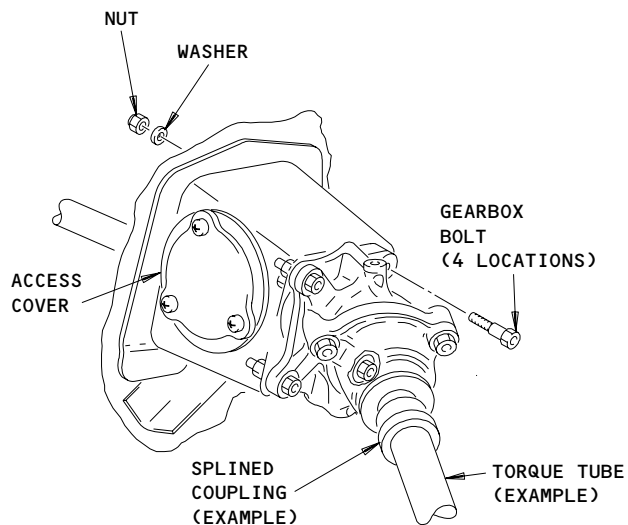


SIDE-OF-BODY ANGLE GEARBOX  
(INBOARD SLATS)

(B)

GEARBOX LOCATION

(A)



SIDE-OF-BODY ANGLE GEARBOX  
(OUTBOARD SLATS)

(C)

Side-of-Body Angle Gearbox  
Figure 401

EFFECTIVITY

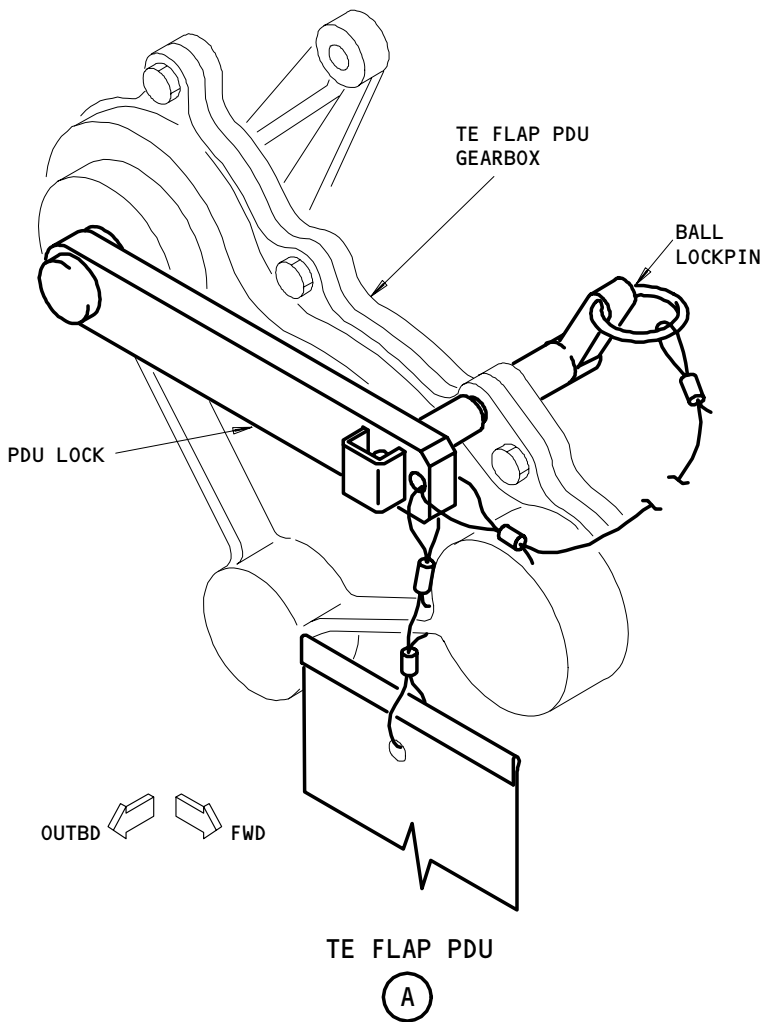
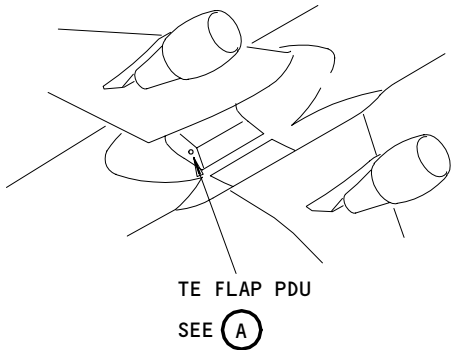
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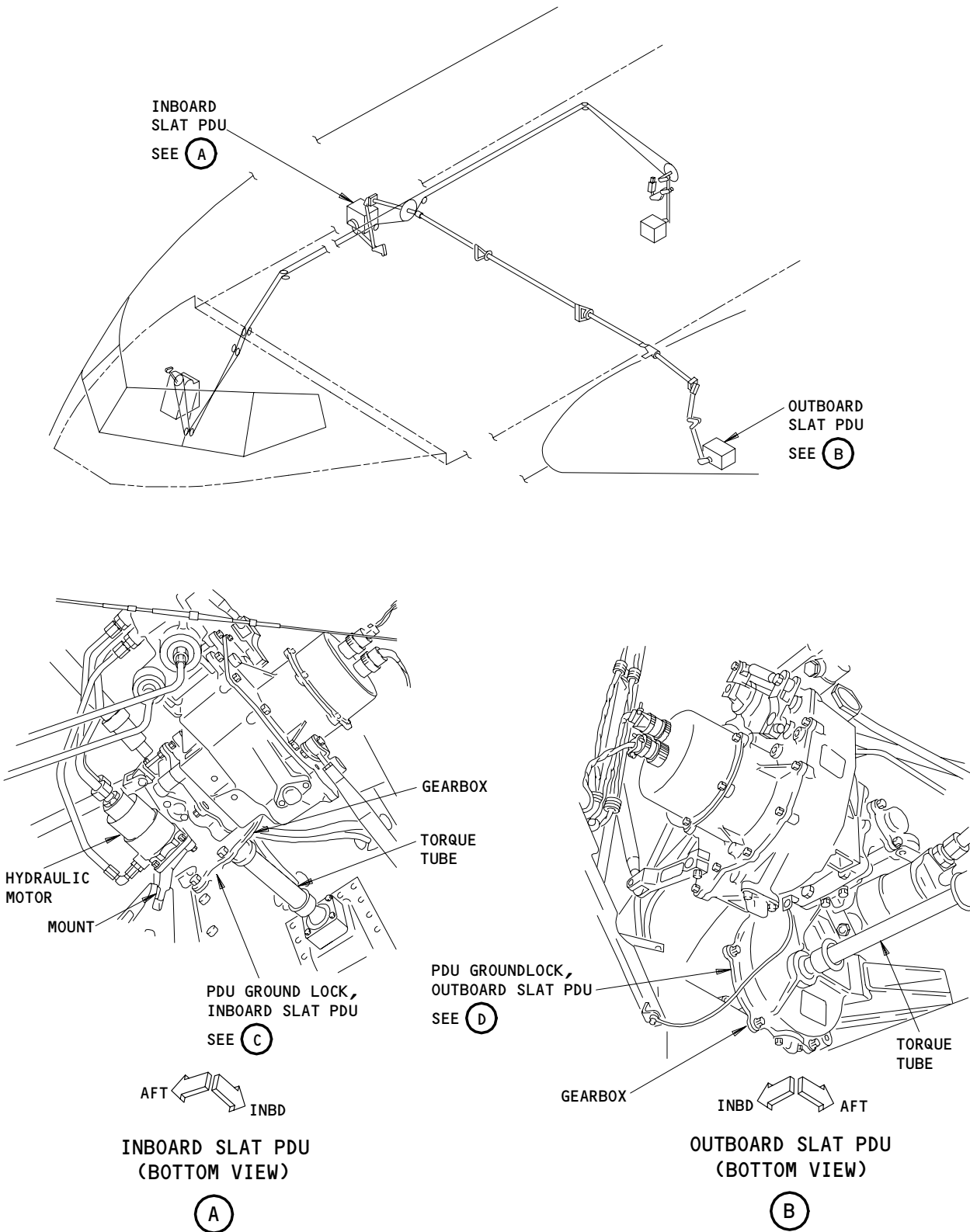


PDU Lock for the TE Flap PDU  
Figure 402

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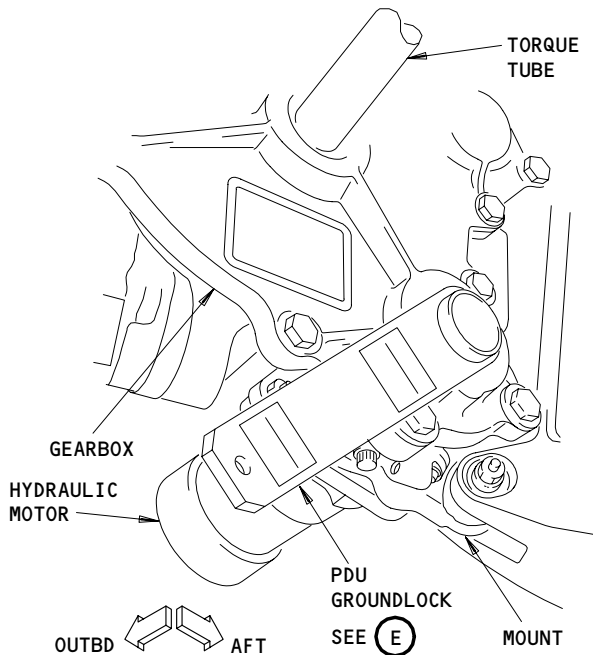




Slat PDU Groundlock  
Figure 403 (Sheet 1)

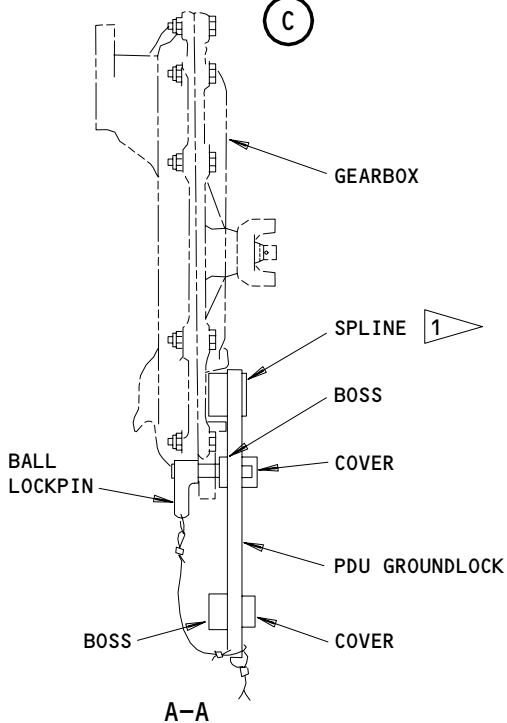
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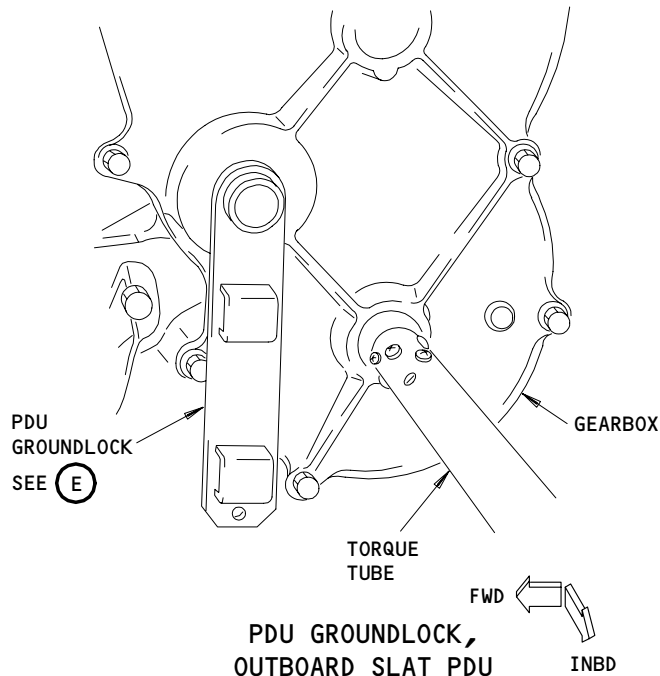


**PDU GROUNDLOCK,  
INBOARD SLAT PDU**

(C)

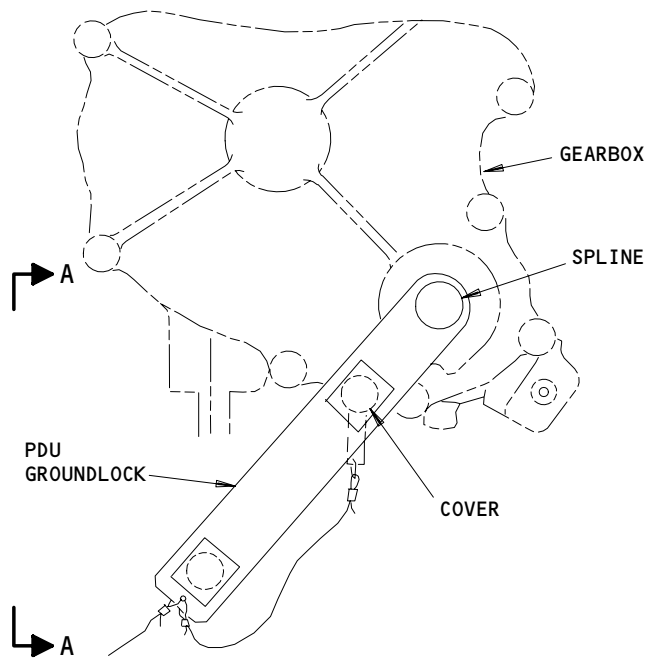


1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD IN POSITION BY A BALL LOCKPIN, INSTALLED THROUGH THE BOSS AND GEARBOX



**PDU GROUNDLOCK,  
OUTBOARD SLAT PDU**

(D)



**PDU GROUNDLOCK,  
(EXAMPLE)**

(E)

Slat PDU Groundlock  
Figure 403 (Sheet 2)

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807599

E. Remove the Side-of-Body Angle Gearbox (Fig. 401)

S 034-016

- (1) Remove the torque tubes that are connected to each side of the gearbox (Ref 27-81-24).

**NOTE:** Do not turn the torque tube while it is disconnected. It will be necessary to adjust the slat drive if you turn the torque tube (Ref 27-81-00).

S 034-017

- (2) For the inboard slat drive, remove the four gearbox bolts that connect the gearbox to the structure (Detail B).

S 034-018

- (3) For the outboard slat drive, remove the access cover on the structure adjacent to the gearbox, and remove the four gearbox bolts (Detail C).

S 024-019

- (4) Remove the gearbox from the airplane.

TASK 27-81-16-424-020

3. Side-of-Body Angle Gearbox - Installation

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)  
D00013 Grease - MIL-PRF-23827 (Optional)
- (2) D00015 Grease - BMS 3-24

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 20-10-23/401, Lockwires
- (3) 24-22-00/201, Electrical Power - Control
- (4) 27-81-00/501, Leading Edge Slat System
- (5) 27-81-24/401, Leading Edge Slat Torque Tubes
- (6) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

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(7) 32-00-15/201, Landing Gear Door Locks

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge - Inboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

D. Install the Side-of-Body Angle Gearbox

S 214-021

(1) Make sure the flaps and slats are in the fully retracted position.

S 214-022

(2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 214-023

(3) Make sure the power is removed from the center hydraulic system (Ref 29-11-00).

S 434-028

(4) Connect the torque tubes to each side of the gearbox (Ref 27-81-24).

**NOTE:** Do not turn the torque tube during the installation. It will be necessary to adjust the slat drive if you turn the torque tube (Ref 27-81-00).

S 224-029

(5) Make sure the axial movement and the clearance at each end of the torque tube are correct (Ref 27-81-24).

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- S 644-030
- (6) Fill the splined coupling with BMS 3-33 grease through the lubrication hole.
- S 434-031
- (7) Make sure you install a lockwire to the coupling screws on each coupling with the double twist procedure (Ref 20-10-23).
- S 434-032
- (8) Install the access cover adjacent to the gearbox, if you installed the gearbox for the outboard slat drive.
- S 714-033
- (9) Do a test on the gearbox installation.
- E. Test for the Gearbox Installation
- S 214-034
- (1) Make sure the flaps and slats are in the fully retracted position.
- S 214-035
- (2) Make sure the flap control lever is in the zero detent.
- S 094-036
- (3) Remove the PDU lock from the TE flap power drive unit (PDU) (Fig. 402).
- S 094-038
- (4) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 403).
- S 864-040
- (5) Supply electrical power (Ref 24-22-00).
- S 864-041

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (6) Pressurize the center hydraulic system (Ref 29-11-00).

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- S 864-042
- (7) Remove the DO-NOT-OPERATE tag from the flap control lever and move the lever to the 30-unit detent.
- S 214-043
- (8) Make sure the flaps and slats move to the fully extended position.
- S 864-044
- (9) Move the flap control lever to the zero (FLAPS UP) detent.
- S 214-045
- (10) Make sure the flaps and slats move to the fully retracted position.
- F. Put the Airplane Back to Its Usual Condition

- S 414-048
- (1) Install all fixed lower access panels at the leading edge (Ref 06-44-00).

- S 864-046
- (2) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

- S 864-047
- (3) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 094-049

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

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- S 864-050
- (5) Remove the power from the center hydraulic system (Ref 29-11-00).
- S 864-051
- (6) Remove electrical power if it is not necessary (Ref 24-22-00).

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SIDE-OF-BODY ANGLE GEARBOX – INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Side-of-Body Angle Gearbox Removal/Installation for procedures to do these tasks.

TASK 27-81-16-226-001

2. Wear Limits for the Side-of-Body Angle Gearbox (Fig. 601)

A. General

- (1) This procedure only has an illustration and a wear limit table, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Side-of-Body Angle Gearbox Removal/Installation for procedures to do these tasks.

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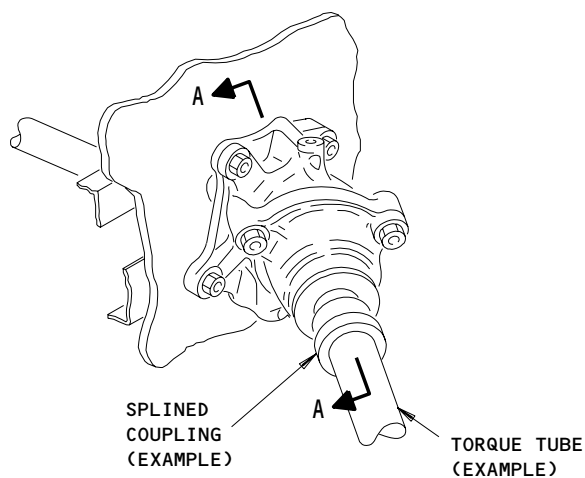
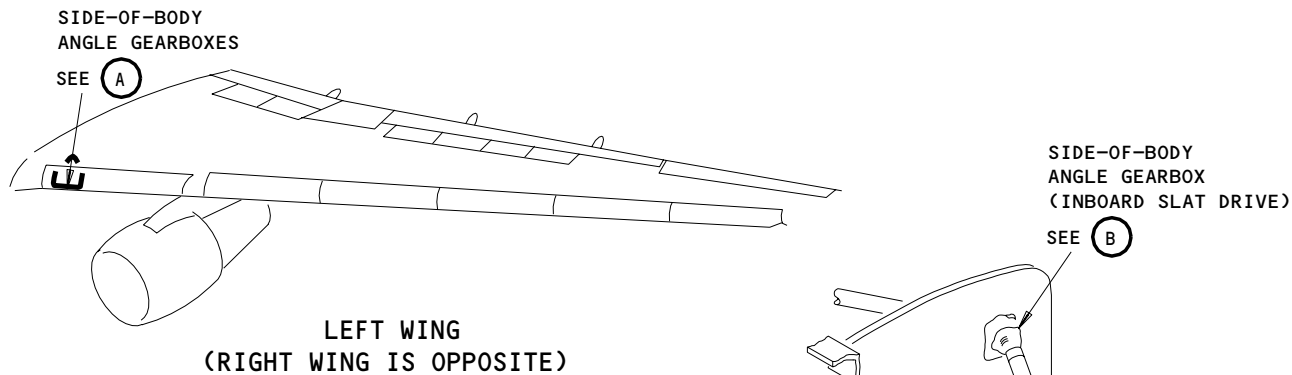
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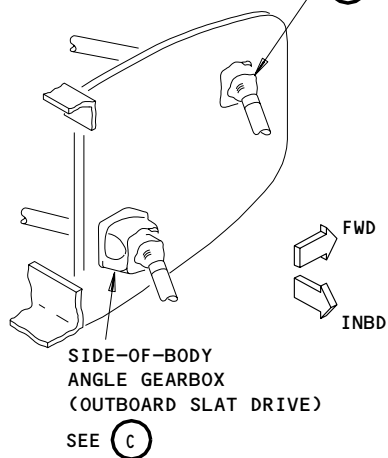
Page 601  
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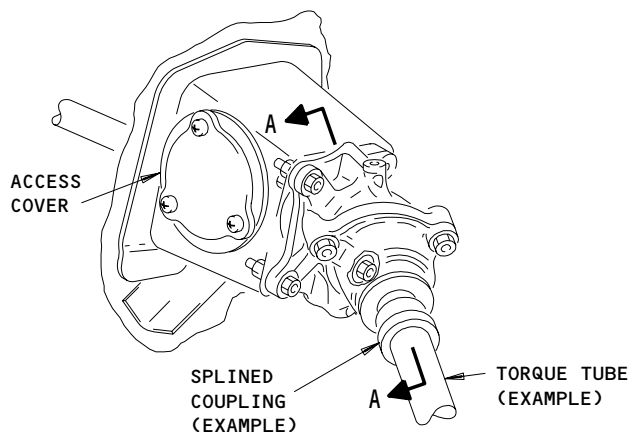
SIDE-OF-BODY ANGLE GEARBOX (INBOARD SLAT DRIVE)

(B)



SIDE-OF-BODY ANGLE GEARBOXES

(A)



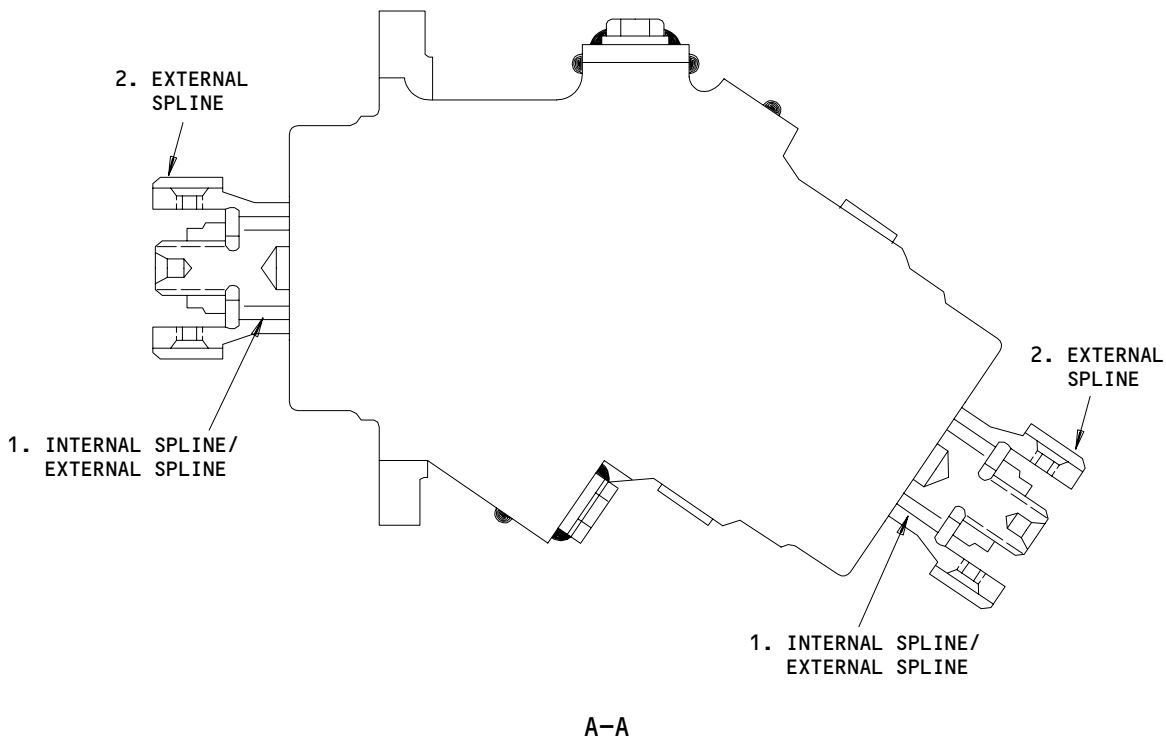
SIDE-OF-BODY ANGLE GEARBOX (OUTBOARD SLAT DRIVE)

(C)

Wear Limits for the Side-of-Body Angle Gearbox  
Figure 601 (Sheet 1)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIM.	MAX DIA CLEARANCE			
			MIN	MAX					
1	INTERNAL SPLINE		--	--	--	1	--	--	
	EXTERNAL SPLINE		--	--	--		--	--	
2	EXTERNAL SPLINE		--	--	--	1	--	--	

1 VISUALLY EXAMINE (USE MAGNIFICATION IF NECESSARY) ALL THE BEARING SURFACES ON THE SPLINES FOR WEAR

**NOTE:** REPLACE THE COUPLING IF YOU ARE NOT SURE ABOUT THE WEAR.

Wear Limits for the Side-of-Body Angle Gearbox  
Figure 601 (Sheet 2)

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LEADING EDGE SLAT DRIVE OUTBOARD ANGLE GEARBOX – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the outboard angle gearbox for the leading edge (LE) slat drive. The installation task also contains the steps for the test of the gearbox installation.
- B. The outboard angle gearbox is a component of the outboard slat drive system.

TASK 27-81-17-024-001

2. Outboard Slat Drive Outboard Angle Gearbox – Removal

A. Equipment

- (1) Leading Edge Slats Groundlock – A27007-1  
(2 Necessary)
- (2) TE Flap PDU Lock – A27009-7
- (3) Circuit Breaker Lockout Clip  
(4 necessary) Commercially Available

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power – Control
- (3) 27-81-00/501, Leading Edge Slat System
- (4) 27-81-24/401, Leading Edge Slat Torque Tubes
- (5) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) 32-00-15/201, Landing Gear Door Locks
- (7) 32-00-20/201, Landing Gear Downlocks
- (8) 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge – Inboard
520/620	Wing Leading Edge – Outboard
710	Nose Landing Gear and Doors
730/740	Main Landing Gear and Doors

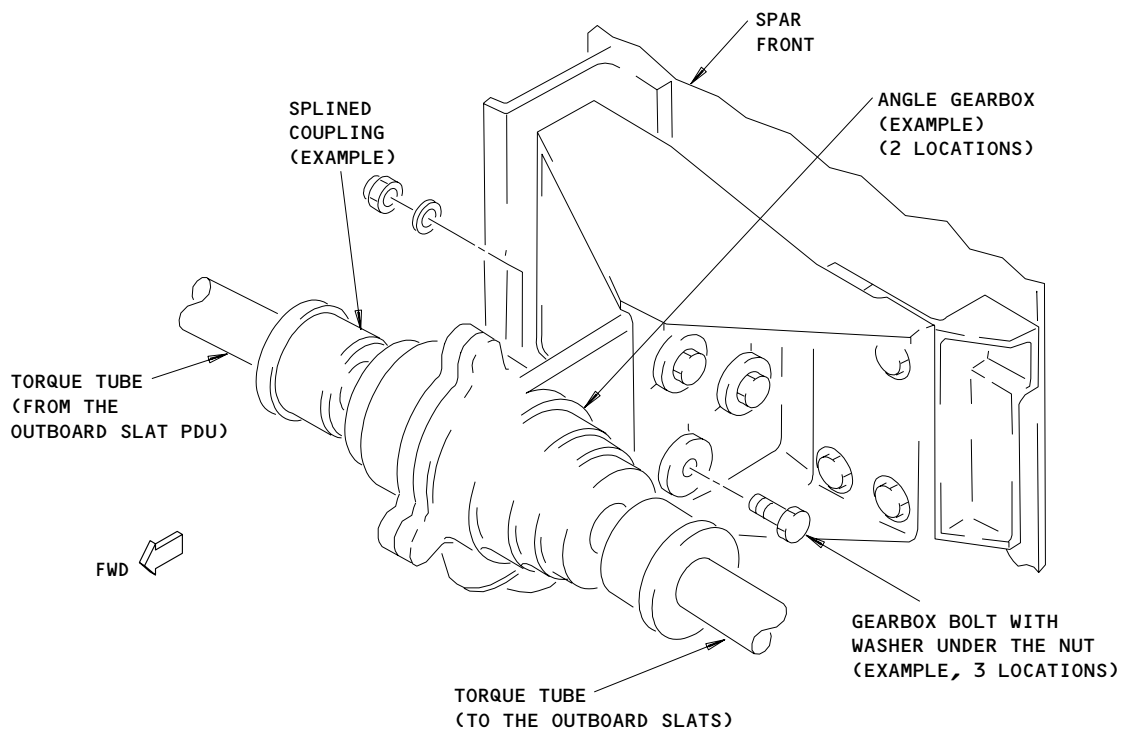
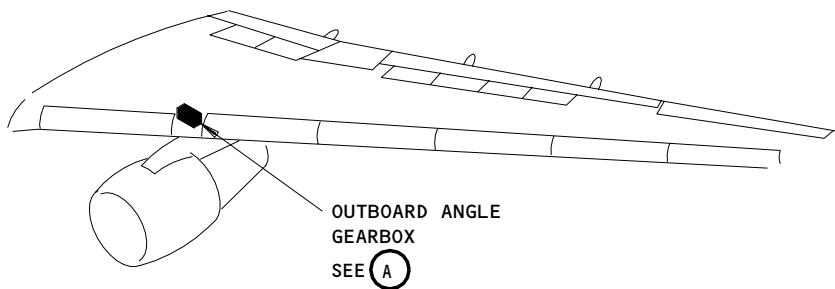
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OUTBOARD ANGLE GEARBOX

(A)

Outboard Angle Gearbox  
Figure 401

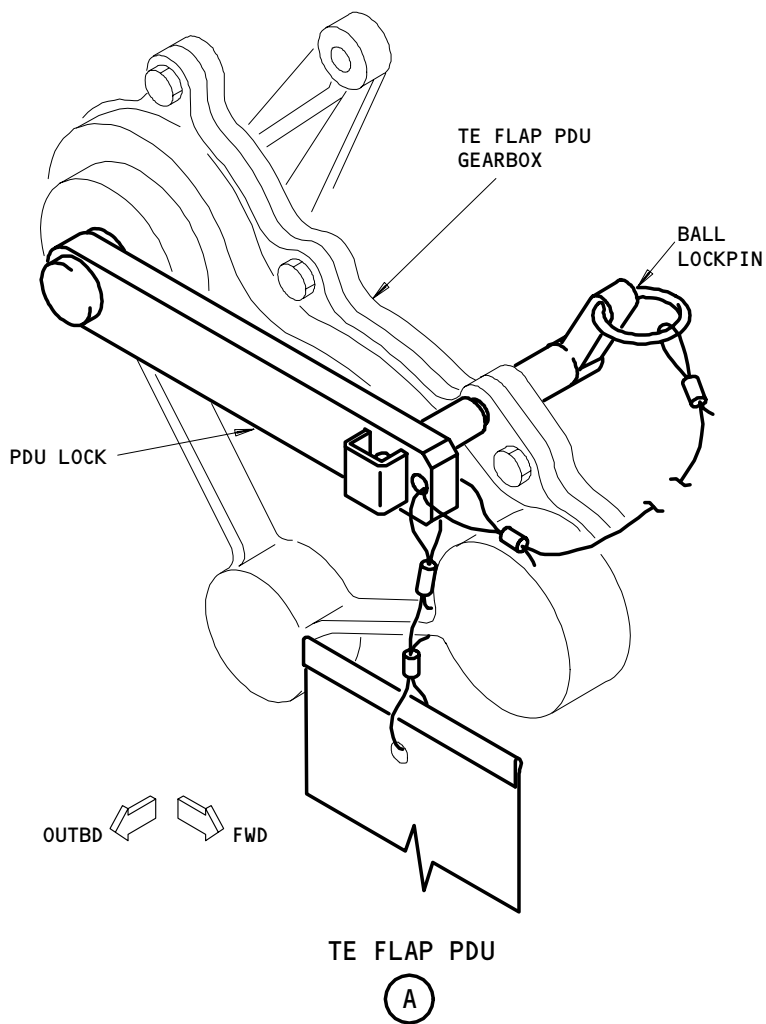
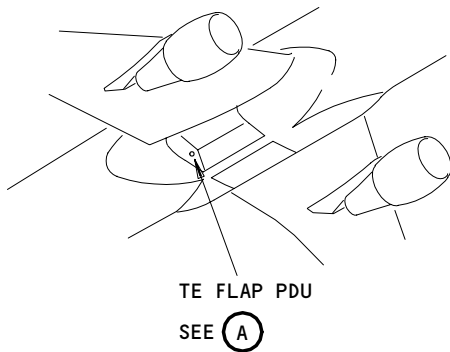
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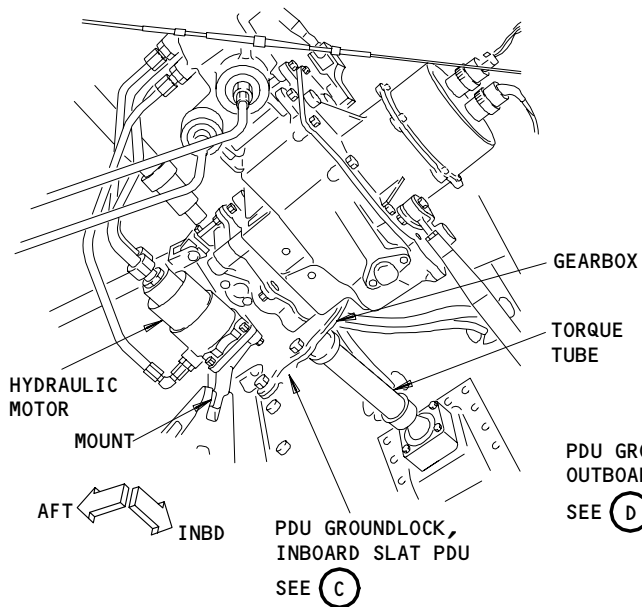
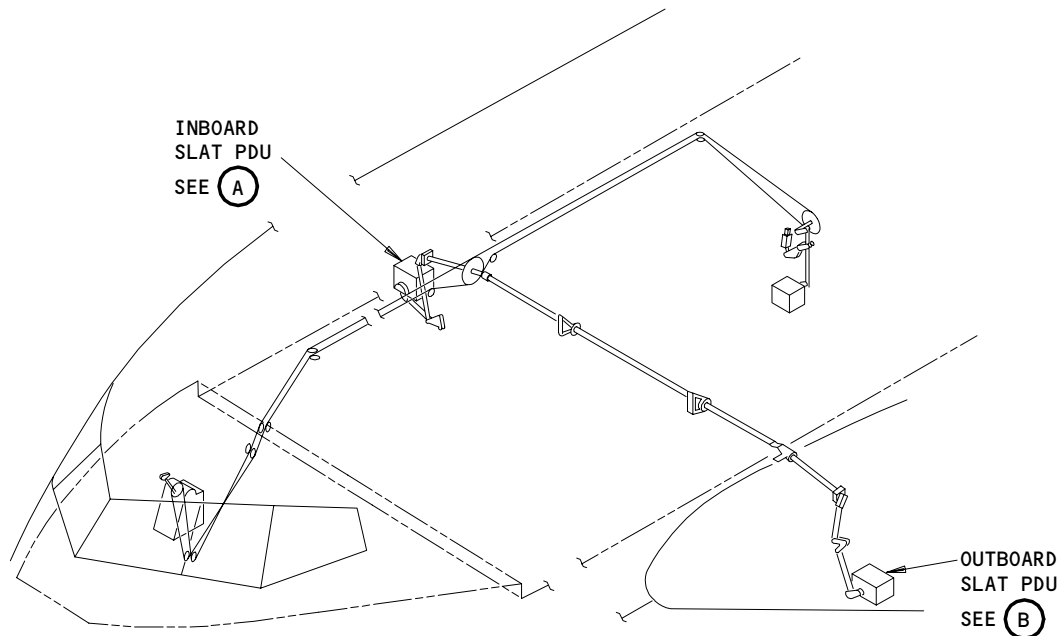
PDU Lock for the TE Flap PDU  
Figure 402

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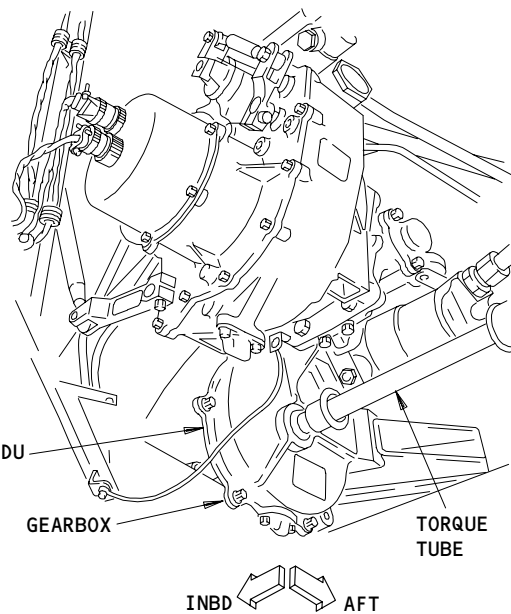
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INBOARD SLAT PDU  
(BOTTOM VIEW)

(A)



OUTBOARD SLAT PDU

(B)

Slats PDU Groundlock  
Figure 403 (Sheet 1)

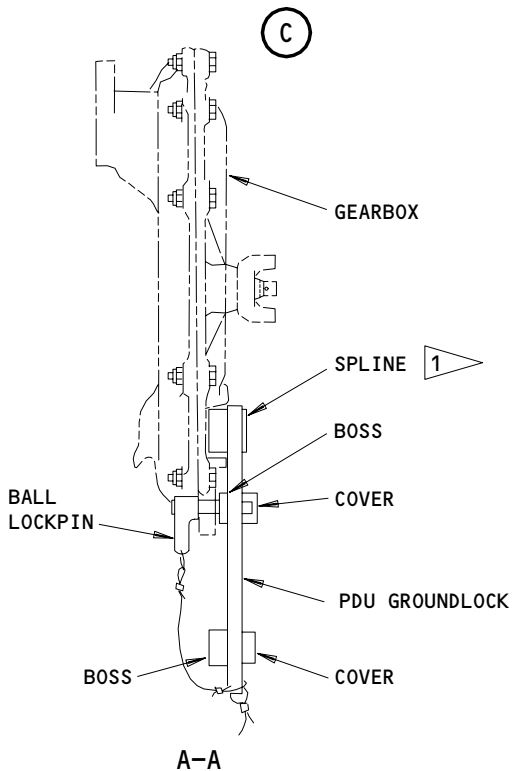
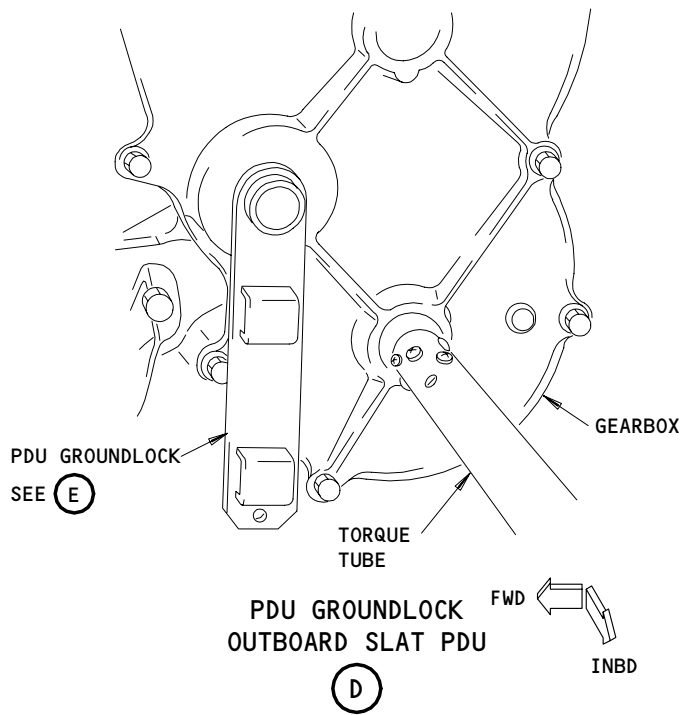
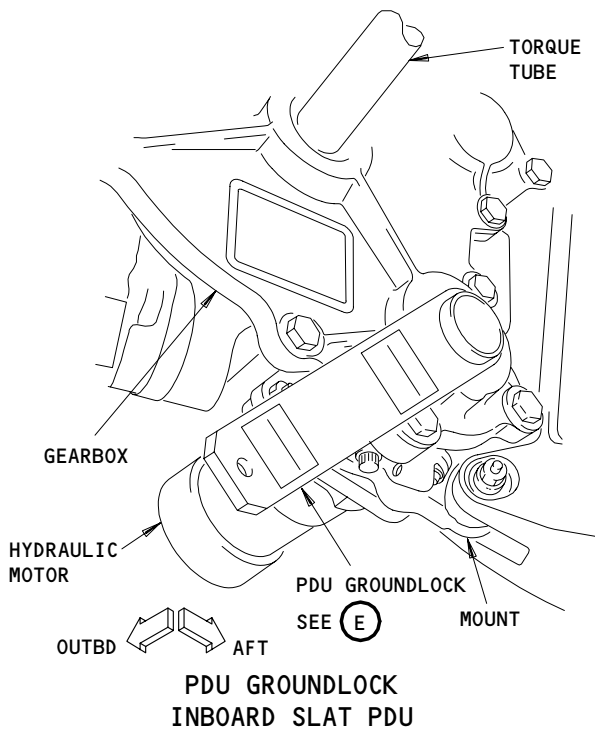
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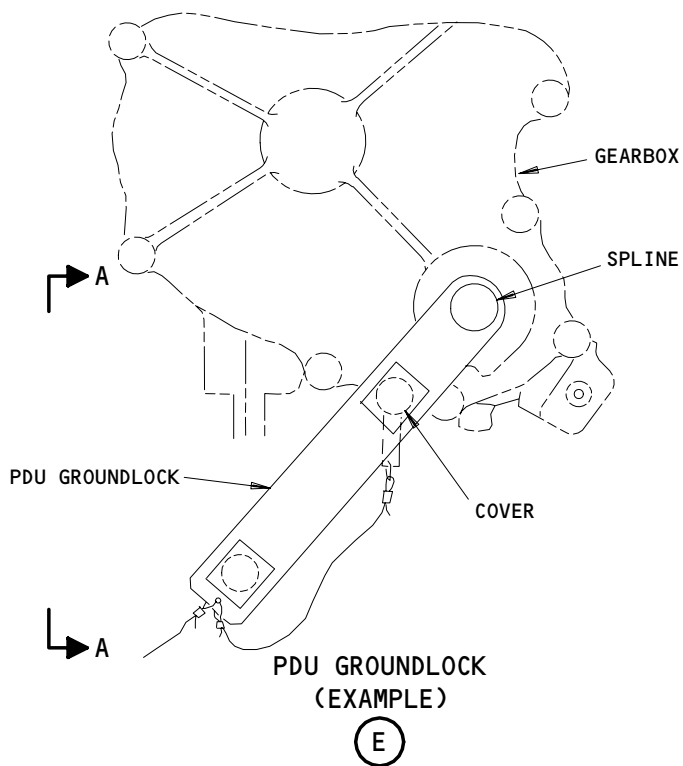
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1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN, INSTALLED THROUGH THE BOSS AND THE GEARBOX



Slats PDU Groundlock  
Figure 403 (Sheet 2)

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(2) Access Panels

- 511BB LE Slat Power Drive Unit - Outboard (Left)
- 511PT LE Access - Upper and TAI Shutoff Valve (Left)
- 511ST Upper LE Structure (Left)
- 611BB LE Slat Power Drive Unit - Inboard (Right)
- 611PT LE Access - Upper and TAI Shutoff Valve (Right)
- 611ST Upper LE Structure (Right)

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 494-003

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (Ref 32-00-15).

S 044-004

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 214-005

- (4) Make sure the flaps and slats are in the fully retracted position.

S 214-006

- (5) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 494-007

- (6) Attach a DO-NOT-OPERATE tag to the flap control lever.

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- S 864-008
- (7) Remove the power from the center hydraulic system (Ref 29-11-00).
- S 494-009
- (8) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 402).
- S 014-010
- (9) Remove the access panels, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (Ref 06-44-00).
- S 494-011
- (10) Install the groundlocks on the inboard and outboard slat PDUs (Fig. 403).
- S 864-012
- (11) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT
- S 864-013
- (12) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR
- S 014-014
- (13) Open the access panels, 511PT and 511ST (in the left wing), or 611PT and 611ST (in the right wing), to get access to the outboard angle gearbox (Ref 06-44-00).
- E. Remove the Outboard Angle Gearbox (Fig. 401)
- S 034-015
- (1) Disconnect the torque tubes on each side of the angle gearbox (Ref 27-81-24).
- NOTE:** Do not turn the torque tube. It will be necessary to adjust the outboard slat drive if you turn the torque tube while it is disconnected (Ref 27-81-00).

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- S 034-016
- (2) Remove the three gearbox bolts that attach the gearbox to the structure.

- S 024-017
- (3) Remove the gearbox from the airplane.

TASK 27-81-17-424-018

3. Outboard Slat Drive Outboard Angle Gearbox - Installation

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)  
 D00013 Grease - MIL-PRF-23827 (Optional)

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels  
 (2) 20-10-23/401, Lockwires  
 (3) 24-22-00/201, Electrical Power - Control  
 (4) 27-81-00/501, Leading Edge Slat System  
 (5) 27-81-24/401, Leading Edge Slat Torque Tubes  
 (6) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
 (7) 32-00-15/201, Landing Gear Door Locks  
 (8) 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard
710	Nose Landing Gear and Doors
730/740	Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
511PT	LE Access - Upper and TAI Shutoff Valve (Left)
511ST	Upper LE Structure (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)
611PT	LE Access - Upper and TAI Shutoff Valve (Right)
611ST	Upper LE Structure (Right)

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D. Outboard Angle Gearbox (Fig. 401)

S 214-019

- (1) Make sure the flaps and slats are in the fully retracted position.

S 214-020

- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 214-021

- (3) Make sure the power is removed from the center hydraulic system (Ref 29-11-00).

S 214-022

- (4) Make sure the electrical power is removed (Ref 24-22-00).

S 434-023

- (5) Put the gearbox in its position and install the three bolts with a washer below each nut. Tighten the nut.

S 644-024

- (6) Apply a light layer of grease to the splines of the coupling and the torque tube.

S 434-025

- (7) Connect the torque tubes to each side of the gearbox (Ref 27-81-24).

**NOTE:** Do not turn the torque tube during the installation. It will be necessary to adjust the outboard slat drive if you turn the torque tube (Ref 27-81-00).

S 224-026

- (8) Use these steps to do a check on the end clearances for the torque tubes that you connected:
- (a) Push the torque tube tightly against one end and make a mark on its position.
  - (b) Move the torque tube fully to the opposite end.
  - (c) Make sure the torque tube can move easily, and that the axial movement is between 0.100 and 0.460 inch (2.6-11.7 mm).

**NOTE:** If there is resistance when you move the torque tube, loosen the coupling screws by a small increment to permit the torque tube to move freely.

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- S 644-027
- (9) Fill the splined coupling with grease through the lubrication hole.
- S 434-028
- (10) Make sure you install a lockwire to the coupling screws on each coupling with the double twist procedure (Ref 20-10-23).
- S 224-029
- (11) Do a check on the retract overtravel stop clearances if it is necessary (Ref 27-81-00).
- S 714-030
- (12) Do a test on the gearbox installation.
- E. Test for the Outboard Angle Gearbox Installation

- S 214-031
- (1) Make sure the flaps and slats are in the fully retracted position.

- S 214-032
- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

- S 094-034
- (3) Remove the PDU lock from the TE flap power drive unit (PDU) (Fig. 402).

- S 094-033
- (4) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 403).

- S 864-035
- (5) Supply electrical power (Ref 24-22-00).

S 864-036

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (6) Pressurize the center hydraulic system (Ref 29-11-00).

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S 864-037

- (7) Remove the DO-NOT-OPERATE tag from the flap control lever, and move the lever to the 30-unit detent.

S 214-038

- (8) Make sure the flaps and slats move to the fully extended position.

S 864-039

- (9) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted position.

F. Put the Airplane Back to Its Usual Position

S 414-040

- (1) If removed, install the access panels, 511PT and 511ST (left wing), and, 611PT and 611ST (right wing), to close the access to the outboard angle gearbox (Ref 06-44-00).

S 414-041

- (2) Install the access panels, 511BB and 611BB, to close the access for the outboard and inboard slat PDUs (Ref 06-44-00).

S 864-042

- (3) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the overhead panel, P11:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-043

- (4) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 094-044

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

S 444-045

- (6) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

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- S 864-050
- (7) Remove the power from the center hydraulic system (Ref 29-11-00).
- S 864-051
- (8) Remove electrical power if it is not necessary (Ref 24-22-00).

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OUTBOARD ANGLE GEARBOX – INSPECTION/CHECK

1. General

- A. This procedure only has an illustration and a wear limit table, which show the data for wear limits. There are no procedures for access, removal or installation of the parts. Refer to the Outboard Angle Gearbox – Removal/Installation for procedures to do these tasks.

TASK 27-81-17-226-001

2. Wear Limits for the Outboard Angle Gearbox (Fig. 601)

A. General

- (1) This procedure only has an illustration and a wear limit table, which show the data for wear limits. There are no procedures for access, removal or installation of the parts. Refer to the Outboard Angle Gearbox – Removal/Installation for procedures to do these tasks.

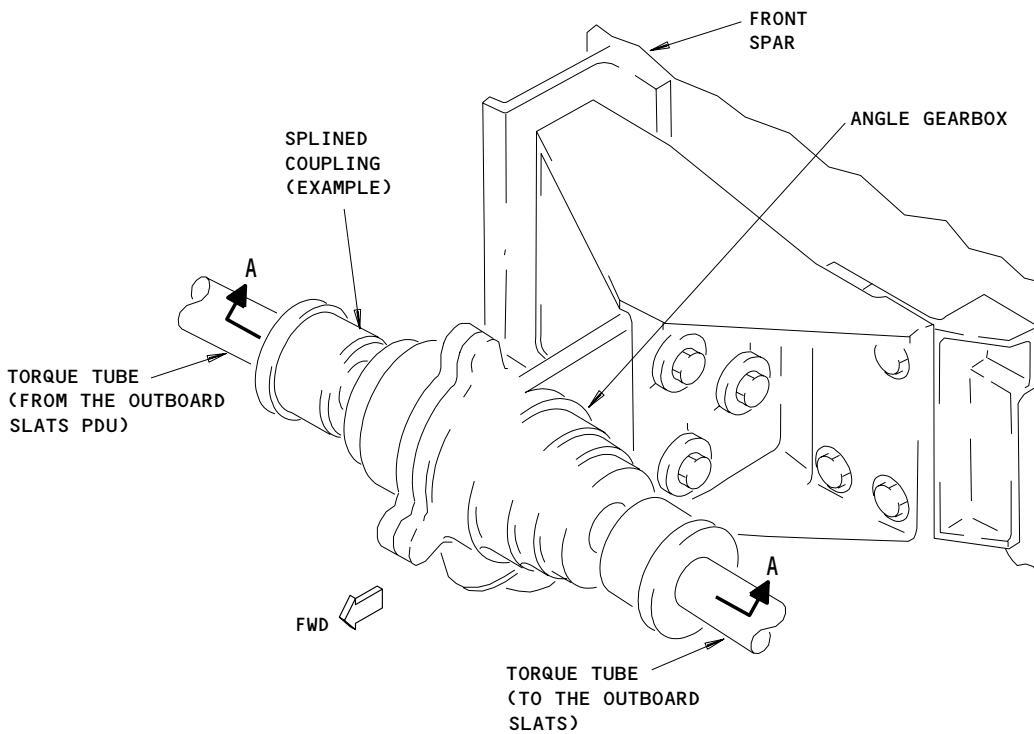
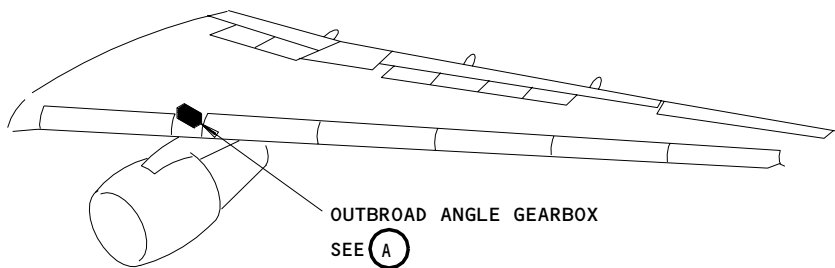
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OUTBOARD ANGLE GEARBOX  
(ONE ON EACH WING)

(A)

Wear Limits for the Outboard Angle Gearbox  
Figure 601 (Sheet 1)

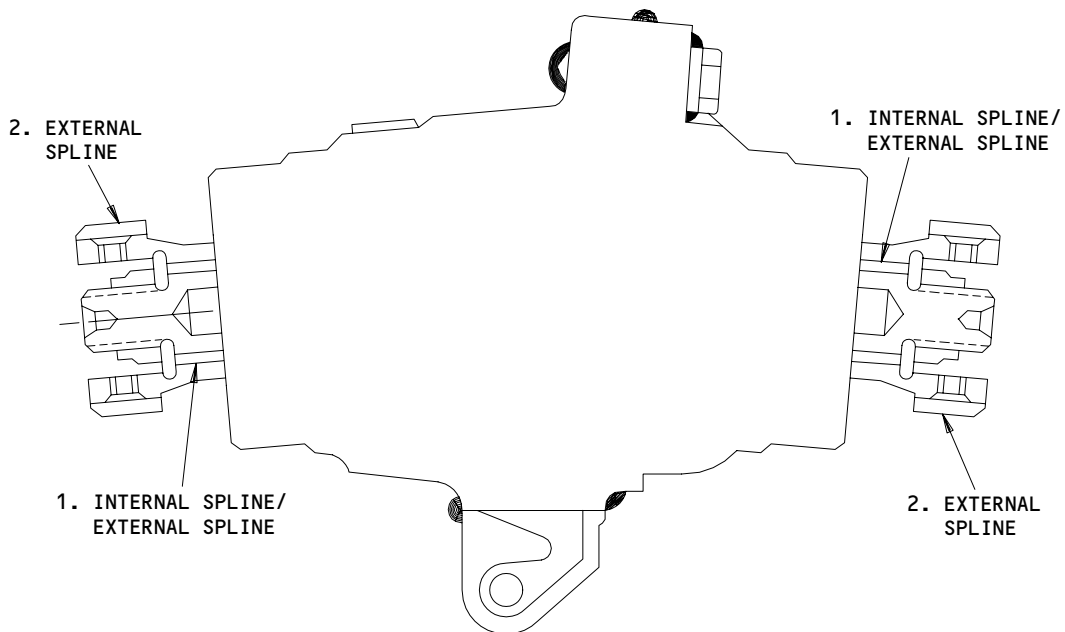
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A-A

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIM.	MAX DIA CLEARANCE			
			MIN	MAX					
1	INTERNAL SPLINE		--	--	--	1	--	--	
	EXTERNAL SPLINE		--	--	--		--	--	
2	EXTERNAL SPLINE		--	--	--	1	--	--	

1 VISUALLY EXAMINE (USE MAGNIFICATION IF NECESSARY) ALL THE BEARING SURFACES ON THE SPLINES FOR WEAR

**NOTE:** REPLACE THE COUPLING IF YOU ARE NOT SURE ABOUT THE WEAR.

Wear Limits for the Outboard Angle Gearbox  
Figure 601 (Sheet 2)

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KRUEGER SEAL FLAP ROTARY ACTUATOR – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the krueger seal flap rotary actuator. The installation task also contains the test steps for the rotary actuator installation.
- B. It is possible to see signs of grease at the external surface of the rotary actuator, migrated from the actuator drain hole. If the grease shown on the external surface is less than approximately 0.5 ounce (14 grams), and most of which did not leak from the area between the arm gear and the ring gear (Fig. 401), the actuator is normal. Repair or replace the actuator if grease leaked from the area between the arm gear and the ring gear.

TASK 27-81-19-024-001

2. Krueger Seal Flap Rotary Actuator – Removal

A. Equipment

- (1) Leading Edge Slats Groundlock – A27007-1  
(2 Necessary)
- (2) TE Flap PDU Lock – A27009-7
- (3) Circuit Breaker Lockout Clip  
(4 Necessary) Commercially Available

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power – Control
- (3) 27-81-00/501, Leading Edge Slat System
- (4) 27-81-04/201, Krueger Seal Flap and Krueger Seal Flap Drive
- (5) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) 32-00-15/201, Landing Gear Door Locks
- (7) 32-00-20/201, Landing Gear Downlocks
- (8) 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge – Inboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

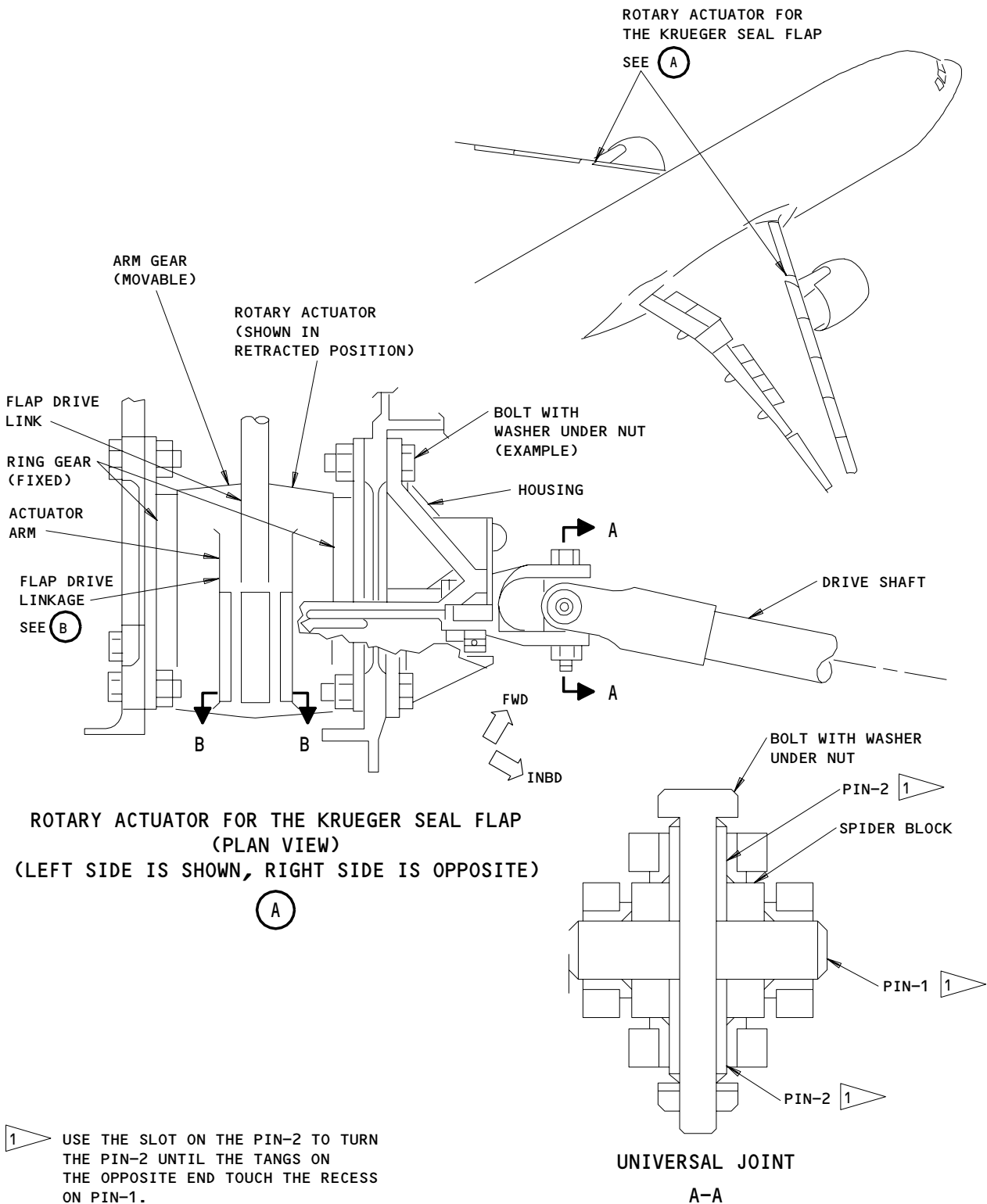
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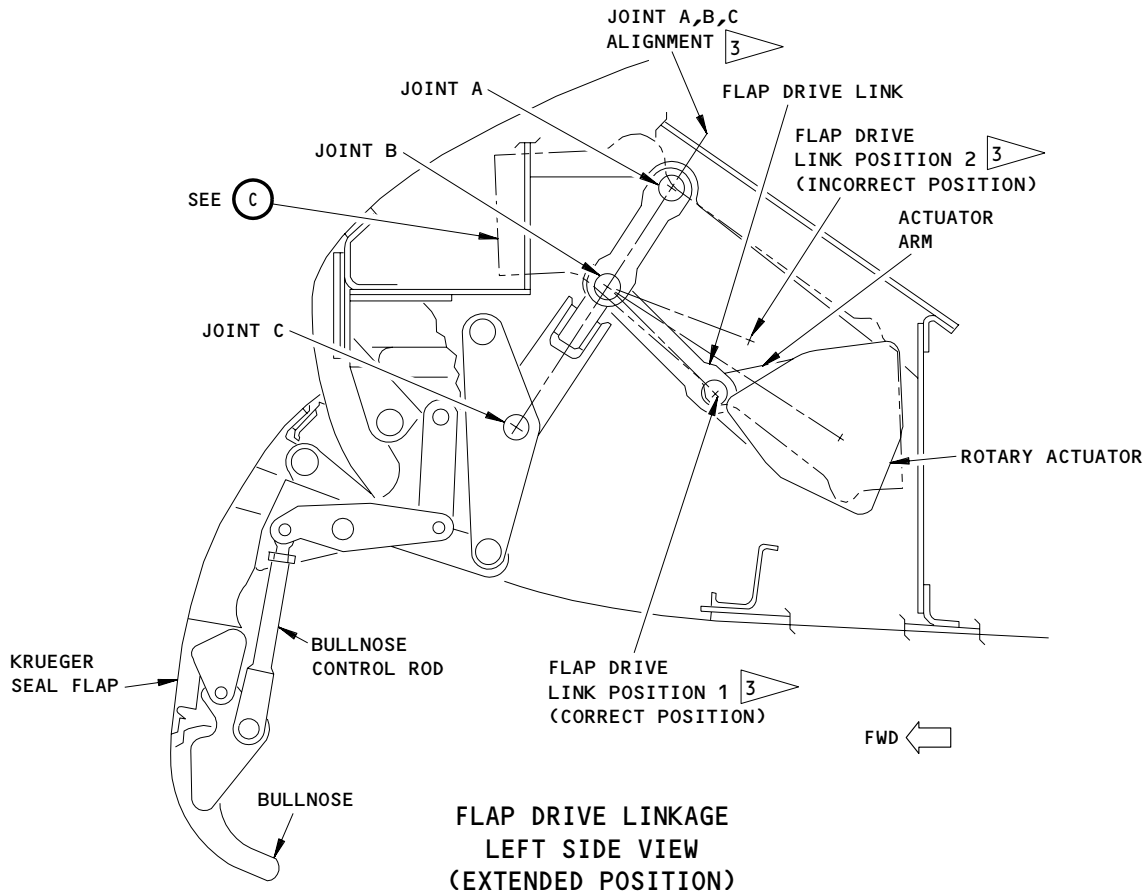
Krueger Seal Flap Rotary Actuator  
Figure 401 (Sheet 1)

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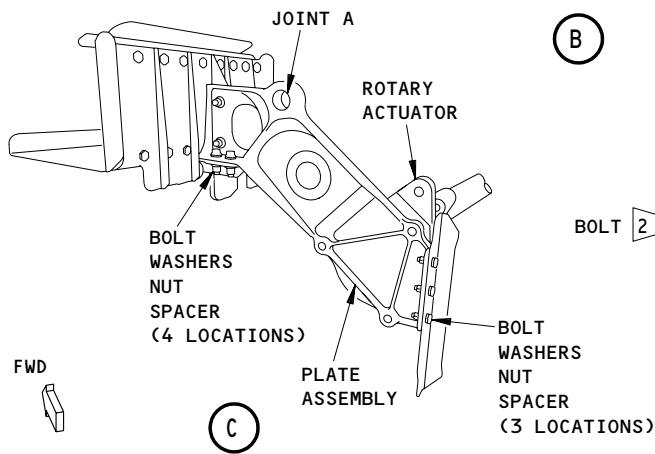
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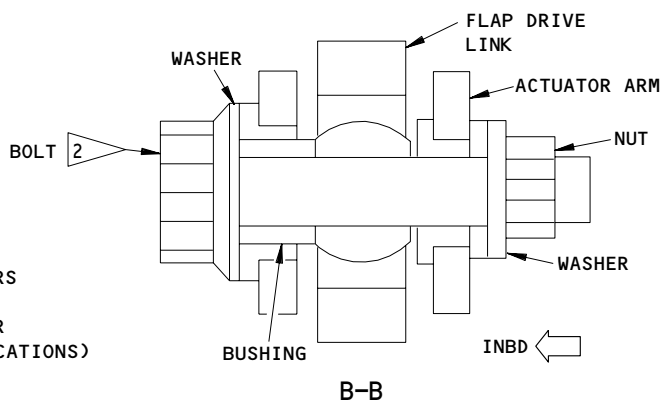
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FLAP DRIVE LINKAGE  
LEFT SIDE VIEW  
(EXTENDED POSITION)



(B)



2 APPLY A LIGHT LAYER OF GREASE TO THE BOLT BEFORE THE INSTALLATION.

3 JOINTS A,B,AND C MUST BE STRAIGHT WHEN YOU CONNECT THE DRIVE SHAFT TO THE ROTARY ACTUATOR. THE JOINTS ARE ALIGNED WHEN THE FLAP DRIVE LINK IS IN POSITION 1 OR 2, BUT ONLY POSITION 1 IS THE CORRECT POSITION. YOU HAVE SET POSITION 1 CORRECTLY WHEN THE FLAP DRIVE LINK AND ROTARY ACTUATOR ARE FULLY DOWN AND JOINTS A, B AND C ARE ALIGNED.

Krueger Seal Flap Rotary Actuator  
Figure 401 (Sheet 2)

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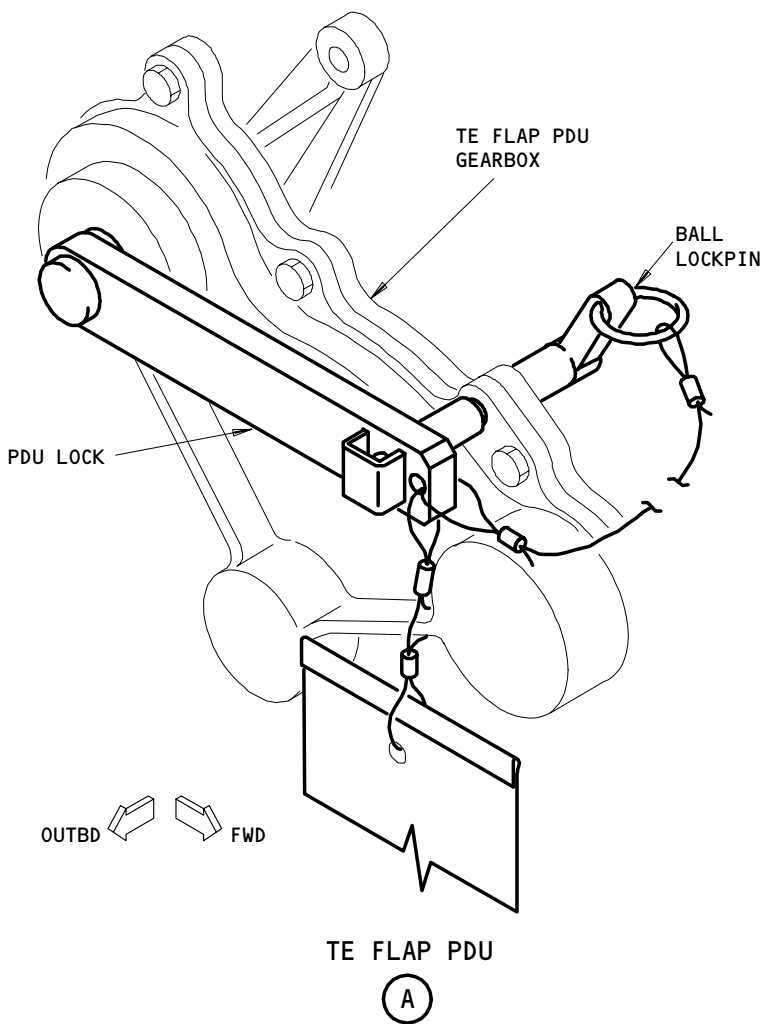
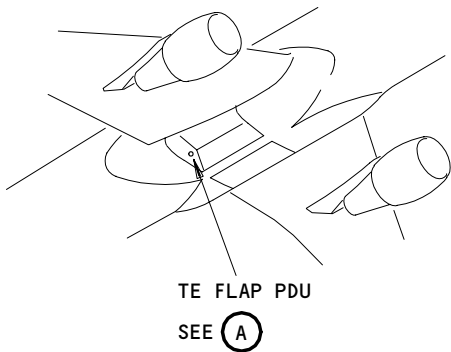
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PDU Lock for the TE Flap PDU  
Figure 402

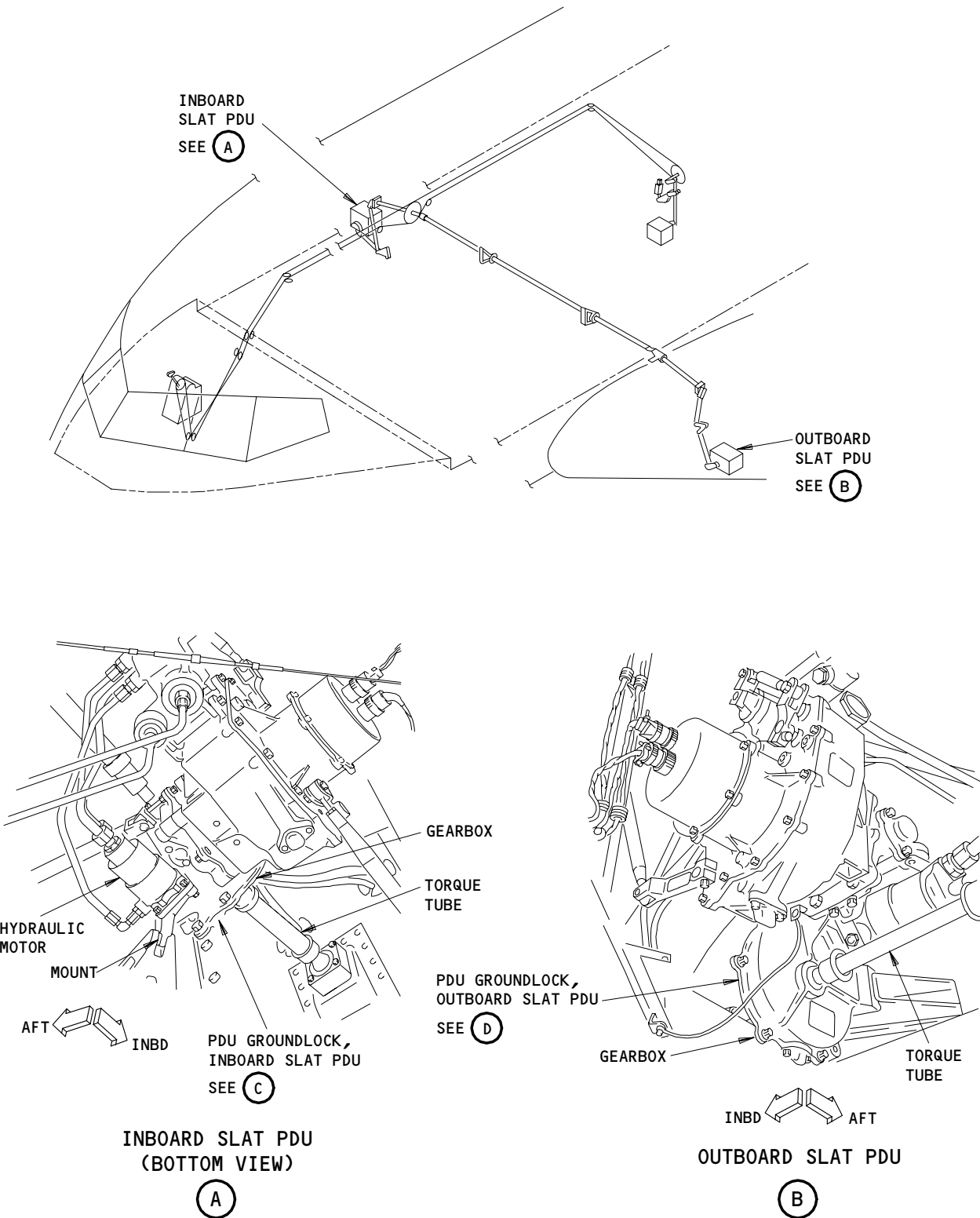
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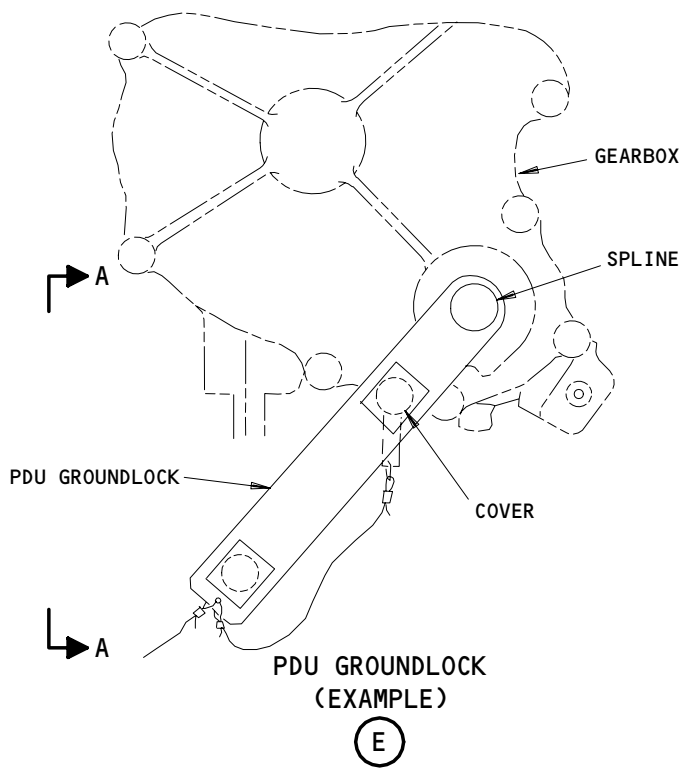
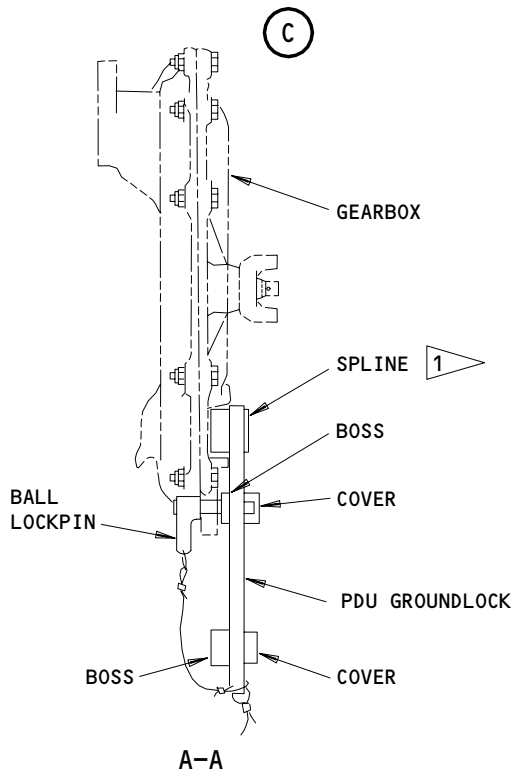
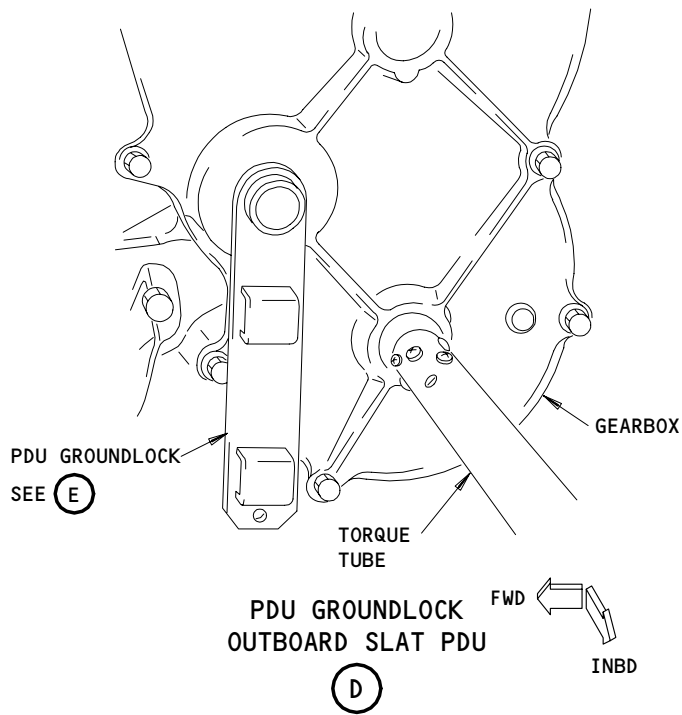
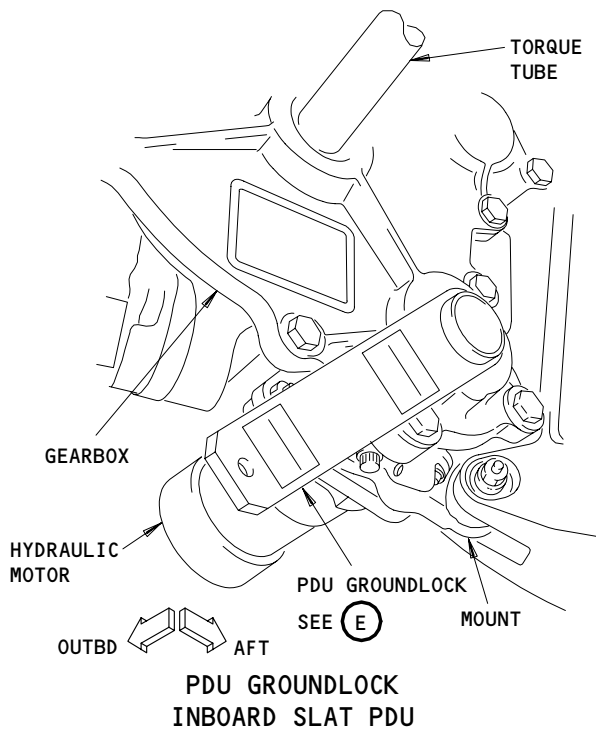
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Slats PDU Groundlock  
Figure 403 (Sheet 1)

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1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN, INSTALLED THROUGH THE BOSS AND THE GEARBOX

Slats PDU Groundlock  
Figure 403 (Sheet 2)

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(2) Access Panels

511BB	LE Slat Power Drive Unit – Outboard (Left)
511QB	Lower LE Structure (Left)
511RB	Lower LE Structure (Left)
611BB	LE Slat Power Drive Unit – Inboard (Right)
611QB	Lower LE Structure (Right)
611RB	Lower LE Structure (Right)

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 494-003

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (Ref 32-00-15).

S 044-004

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 214-005

- (4) Make sure the flaps and slats are in the fully retracted position.

S 214-006

- (5) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 864-007

- (6) Supply electrical power (Ref 24-22-00).

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S 864-008

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS . IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(7) Pressurize the center hydraulic system (Ref 29-11-00).

S 864-009

(8) Move the flap control lever to the 30-unit detent, and make sure the flaps and slats move to the fully extended position.

S 494-010

(9) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 864-011

(10) Remove the power from the center hydraulic system (Ref 29-11-00).

S 494-012

(11) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 402).

S 014-013

(12) Remove the access panels, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (Ref 06-44-00).

S 494-014

(13) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 403).

S 864-015

(14) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:

- (a) 11H23, SLAT ALTN CONT INBD
- (b) 11H24, SLAT ALTN CONT OUTBD
- (c) 11J24, FLAPS ALTN CONT

S 864-016

(15) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:

- (a) 6D21, ALTN SLAT INBD PWR
- (b) 6D24, ALTN FLAP PWR

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(c) 6F24, ALTN SLAT OUTBD PWR

S 014-017

- (16) Remove these access panels, 511QB and 511RB (on the left wing), or, 611QB and 611RB (on the right wing), to get access to the rotary actuator for the krueger seal flap (Ref 06-44-00).

E. Remove the Rotary Actuator (Fig. 401)

S 034-018

- (1) Disconnect the drive shaft at the universal joint (View A-A).

NOTE: Do not turn the drive shaft. It will be necessary to adjust the krueger seal flap drive if you turn the drive shaft while it is disconnected (Ref 27-81-00).

S 034-019

- (2) Disconnect the flap drive link from the rotary actuator arm (View B-B).

NOTE: You can manually turn the disconnected universal joint on the rotary actuator to move the actuator arm to get access to the flap drive link.

S 034-020

- (3) Disconnect the three bolts on the inboard side of the rotary actuator and remove the housing (Detail A).

S 034-021

- (4) Disconnect the three bolts on the outboard side of the rotary actuator.

S 034-087

- (5) Remove the plate assembly to allow removal of the rotary actuator. (View C, Fig. 401)

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S 034-088

- (6) Disconnect the three bolts on the plate assembly, the four bolts on the upper side of the plate, and the pin on joint 'A'. Keep track of all nuts, washers, shims, and spacers. (View C, Fig. 401).

S 024-022

- (7) Remove the rotary actuator from the airplane.

TASK 27-81-19-424-023

3. Krueger Seal Flap Rotary Actuator - Installation

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)  
D00013 Grease - MIL-PRF-23827 (Optional)

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 27-81-00/501, Leading Edge Slat System
- (4) 27-81-04/201, Krueger Seal Flap and Krueger Seal Flap Drive
- (5) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (6) 32-00-15/201, Landing Gear Door Locks
- (7) 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge - Inboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
511QB	Lower LE Structure (Left)
511RB	Lower LE Structure (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)
611QB	Lower LE Structure (Right)
611RB	Lower LE Structure (Right)

D. Install the Rotary Actuator (Fig. 401)

S 214-024

- (1) Make sure the flaps and slats are in the fully extended position.

S 214-025

- (2) Make sure the flap control lever is in the 30-unit detent.

S 214-026

- (3) Make sure the power is removed from the center hydraulic system (Ref 29-11-00).

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- S 214-027
- (4) Make sure the electrical power is removed (Ref 24-22-00).
- S 434-028
- (5) Put the rotary actuator in its position and install three bolts with a washer below each nut, at the outboard side of the actuator.
- S 434-089
- (6) Install the plate assembly after the rotary actuator is back into position. Install the three bolts, washers, shims and nuts, and the four bolts, washers, shims, and nuts, to re-install plate assembly. Re-install pin on joint 'A'. (View C, Fig. 401).
- S 434-029
- (7) Attach the housing and the inboard side of the rotary actuator to the structure with three bolts, washers, and nuts.
- S 864-058
- (8) Make sure the bullnose control rod is correctly adjusted.
- S 434-030
- (9) Connect the flap drive link to the actuator arm (View B-B). Tighten the nut to 100-140 pound-inches (11.3-15.8 newton-meters).

**NOTE:** You can manually turn the disconnected universal joint on the rotary actuator to move the actuator arm as necessary to connect the flap drive link.

S 984-031

**CAUTION:** BEFORE YOU CONNECT THE DRIVE SHAFT, MAKE SURE THE KRUEGER SEAL FLAP IS FULLY EXTENDED, AND THAT THE JOINTS A, B, AND C IS STRAIGHT WHILE THE FLAP DRIVE LINK IS IN POSITION 1, AS SHOWN IN FIG. 401. YOU CAN CAUSE DAMAGE TO THE KRUEGER SEAL FLAP DRIVE IF YOU CONNECT THE DRIVE SHAFT WHILE THE FLAP DRIVE LINK IS NOT IN POSITION 1.

BEFORE YOU CONNECT THE DRIVE SHAFT, MAKE SURE THE KRUEGER SEAL FLAP IS CORRECTLY RIGGED (AMM 27-81-00/501 "KRUEGER FLAP SEAL DRIVE ADJUSTMENT AT SLAT 6 OR 7"). YOU CAN CAUSE DAMAGE TO THE KRUEGER FLAP SEAL DRIVE IF THE KRUEGER FLAP SEAL IS NOT CORRECTLY ADJUSTED.

- (10) Manually extend the krueger seal flap until the joints A, B, and C are in a straight line, and that the flap drive link is in position 1. Keep this position while you connect the drive shaft in the subsequent step.

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S 434-032

- (11) Connect the drive shaft to the rotary actuator at the universal joint (View A-A).

**NOTE:** Do not move the drive shaft during the installation. It will be necessary to adjust the krueger seal flap drive if you turn or operate the drive shaft (AMM 27-81-00/501).

S 824-033

- (12) Do the adjustment for the krueger seal flap drive if you installed a new drive shaft (Ref 27-81-00).

S 714-034

- (13) Do a test on the rotary actuator installation.

E. Test for the Rotary Actuator Installation

S 214-035

- (1) Make sure the flaps, slats, and the krueger seal flaps are in the fully extended position.

S 214-036

- (2) Make sure the flap control lever is in the 30-unit detent.

S 094-037

- (3) Remove the PDU lock from the TE flap power drive unit (PDU) (Fig. 402).

S 094-038

- (4) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 403).

S 864-039

- (5) Supply electrical power (Ref 24-22-00).

S 864-040

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS . IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (6) Pressurize the center hydraulic system (Ref 29-11-00).

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- S 864-041
- (7) Remove the DO-NOT-OPERATE tag from the flap control lever, and move the lever to the zero (FLAPS UP) detent.
- S 214-042
- (8) Make sure the flaps, slats, and the krueger seal flaps move to the fully retracted position.
- S 864-043
- (9) Move the flap control lever to the 30-unit detent, and make sure the flaps, slats, and the Krueger seal flaps move to fully extended position.
- S 864-044
- (10) Move the flap control lever to the zero (FLAPS UP) detent again, and make sure the flaps, slats, and the krueger seal flaps move to the fully retracted position.

TASK 27-81-19-424-060

4. In-Service Backlash and Axial Freeplay Checks (On-Wing) for Krueger Seal Flap Rotary Actuator(s)

A. Equipment

- (1) Leading Edge Slats Groundlock - A27007-1  
(2 Necessary)
- (2) TE Flap PDU Lock - A27009-7
- (3) Circuit Breaker Lockout Clip (4 Necessary)  
Commercially Available
- (4) Force Gage (0-120 pound (0-533 newtons) force range)

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 32-00-15/201, Landing Gear Door Locks
- (5) AMM 32-00-20/201, Landing Gear Downlocks
- (6) 78-31-00/201, Thrust Reverser System

C. Access

- (1) Location Zones
 

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge - Inboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

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- (2) Access Panels
  - 511BB LE Slat Power Drive Unit – Outboard (Left)
  - 511QB Lower LE Structure (Left)
  - 511RB Lower LE Structure (Left)
  - 611BB LE Slat Power Drive Unit – Inboard (Right)
  - 611QB Lower LE Structure (Right)
  - 611RB Lower LE Structure (Right)

D. Prepare for the Checks

S 214-061

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 494-062

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 044-063

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 214-064

- (4) Make sure the flaps and slats are in the fully retracted position.

S 214-065

- (5) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 864-066

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

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S 864-067

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS . IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(7) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-068

(8) Move the flap control lever to the 25-unit detent and make sure the slats move to the fully extended position.

S 494-069

(9) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 864-070

(10) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-071

(11) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:

- (a) 11H23, SLAT ALTN CONT INBD
- (b) 11H24, SLAT ALTN CONT OUTBD
- (c) 11J24, FLAPS ALTN CONT

S 864-072

(12) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:

- (a) 6D21, ALTN SLAT INBD PWR
- (b) 6D24, ALTN FLAP PWR
- (c) 6F24, ALTN SLAT OUTBD PWR

S 494-073

(13) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 402).

S 014-074

(14) Open the lower access panels, on the wings LE to get access to the outboard and inboard slat PDUs, and rotary actuators (AMM 06-44-00/201).

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S 494-075

- (15) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 403).

S 494-076

- (16) Remove these access panels, 511QB and 511RB (on the left wing), or, 611QB and 611RB (on the right wing), to get access to the rotary actuator for the krueger seal flap (AMM 06-44-00/201).

S 034-077

- (17) Disconnect the control rod from the rotary actuator arm gear.

**NOTE:** Examine how the bolt and associated hardware are installed. It is important to install them, back in place, in the same order.

E. Backlash Check for the Krueger Seal Flap Rotary Actuator (s)

S 834-078

- (1) Apply 60 to 120 pound (266-533 newtons) force to the actuator at the clevis holes.

S 974-079

- (2) Install a dial indicator at the actuator arm clevis in line with the applied load.

S 974-080

- (3) Zero the dial indicator and reverse the direction of the load.

S 974-081

- (4) Measure the arm displacement.

S 974-082

- (5) Make sure the backlash is 0.048 inch (1.2 mm) maximum measured at 3.45 inches (87.6 mm) radius on the krueger actuator arm.

F. Axial Freeplay Check

S 974-083

- (1) Use an inside caliper or a feeler gage set to take linear axial travel measurements between arm gear and ring gears.

**NOTE:** If you use a dial indicator install it in such a way that you can measure the axial travel of the arm gear to a fixed point.

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S 974-084

- (2) Manually push arm gear inboard, as far as possible, and record the reading measurement shown on the caliper, dial indicator, or record the thickness of the feeler blade used.

S 974-085

- (3) Manually push arm gear outboard, as far as possible, and record measurement shown on caliper, dial indicator, or record the thickness of the feeler blade used.

S 974-086

- (4) Make sure that the subtraction of the two recorded measurements is no more than the maximum permitted axial freeplay of 0.070 inch (1.78 mm).

G. Put the Airplane Back to Its Usual Condition

S 414-045

- (1) Install the access panels, 511QB and 511RB (left wing), 611QB and 611RB (right wing), to close the access for the rotary actuators (Ref 06-44-00).

S 414-046

- (2) Install the access panels, 511BB and 611BB, to close the access to the outboard and inboard slat PDUs (Ref 06-44-00).

S 864-047

- (3) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the overhead panel, P11:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-048

- (4) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the main power distribution panel, P6:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 094-049

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

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- S 444-050
- (6) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).
- S 864-055
- (7) Remove the power from the center hydraulic system (Ref 29-11-00).
- S 864-056
- (8) Remove electrical power (Ref 24-22-00).

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KRUEGER SEAL FLAP ROTARY ACTUATOR – INSPECTION/CHECK

1. General

A. This procedure only has an illustration and a wear limit table, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Krueger Seal Flap Rotary Actuator – Removal/Installation for procedures to do these tasks.

TASK 27-81-19-226-001

2. Wear Limits for the Krueger Seal Flap Rotary Actuator (Fig. 601)

NOTE: The wear limits for the Krueger Seal Flap Drive Linkage that connects to the rotary actuator are given in AMM 27-81-04/201.

A. General

(1) This procedure only has an illustration and a wear limit table, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Krueger Seal Flap Rotary Actuator – Removal/Installation for procedures to do these tasks.

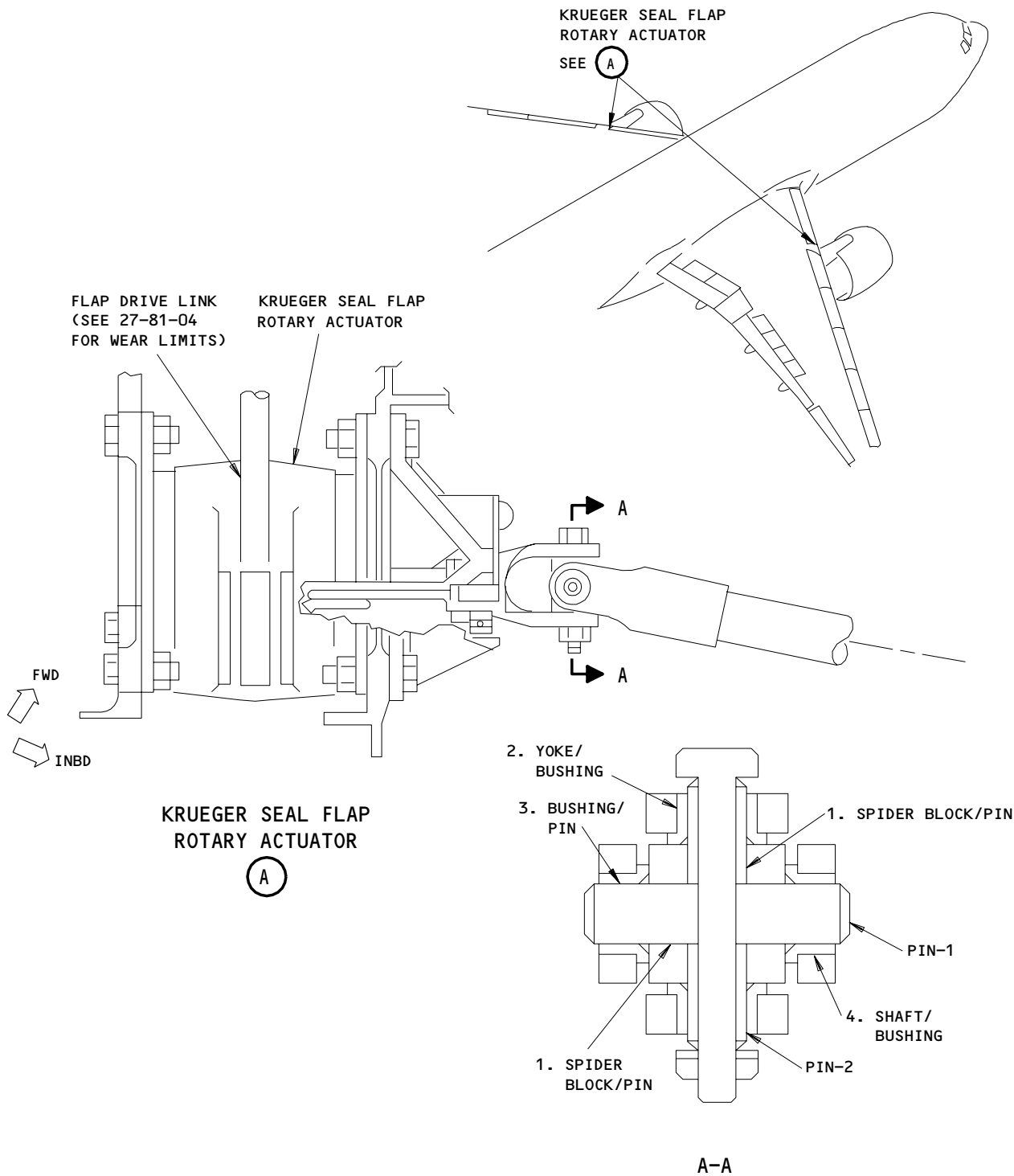
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Wear Limits for the Krueger Seal Flap Rotary Actuator  
Figure 601 (Sheet 1)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIM.	MAX DIA CLEARANCE			
			MIN	MAX					
1	SPIDER BLOCK	ID	0.3760	0.3770	0.3795	0.0050	X		
	PIN	OD	0.3735	0.3745	0.3710		X		
2	YOKE	ID	0.5000	0.5006	0.5010	0.0000 1	X		
	BUSHING	OD	0.5010	0.5016	0.5006		X		
3	BUSHING	ID	0.3755	0.3765	0.3795	0.0050	X		
	PIN	OD	0.3735	0.3745	0.3705		X		
4	SHAFT	ID	0.5000	0.5006	0.5010	0.0000 1	X		
	BUSHING	OD	0.5010	0.5016	0.5006		X		

1 INTERFERENCE FIT

Wear Limits for the Krueger Seal Flap Rotary Actuator  
Figure 601 (Sheet 2)

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LEADING EDGE SLAT DRIVE ROTARY ACTUATOR AND  
OFFSET GEARBOX – MAINTENANCE PRACTICES

1. General

- A. This procedure has these tasks:
- (1) Offset Gearbox Replacement
  - (2) Rotary Actuator Removal for the Inboard and Outboard Slats
  - (3) Rotary Actuator Installation for the Inboard and Outboard Slats
  - (4) Rotary Actuator and Offset Gearbox Test
  - (5) In-Service Backlash and Axial Freeplay Checks (On Wing) for the Leading Edge (LE) Slat Rotary Actuator(s)
  - (6) Slat Retract and Extend Overtravel Stop Clearance Check Leading Edge (LE) Slat Rotary Actuator(s)
- B. The rotary actuator installation task (3) contains the steps to check and adjust the slat retract and extend overtravel stop clearances. Thus, if you do all the steps in the rotary actuator installation task (3), it is not necessary to do the "slat retract and extend overtravel stop clearance check" task at the end of this procedure.

NOTE: Replace the rotary actuator and the offset gearbox where overtravel stop contact is found and no clearance exist.

- C. It is possible to see signs of grease at the external surface of the rotary actuator, migrated from the actuator drain hole. If the grease shown on the external surface is less than approximately 0.5 ounce (14 grams), most of which did not leak from the area between the arm gear and the ring gear (Fig. 201 and 202), the actuator is normal. Repair the seal or replace the actuator if large amounts of grease leaked from the area between the arm gear and the ring gear.

TASK 27-81-20-902-001

2. Offset Gearbox – Replacement

- A. Equipment
- (1) Leading Edge Slats Groundlock – A27007-1  
(2 Necessary)
  - (2) Socket – Thin Wall Inboard LE Slat Drive Gearbox – A27073-1
  - (3) TE Flap PDU Lock – A27009-7
  - (4) Circuit Breaker Lockout Clip (4 Necessary)  
Commercially Available
- B. Consumable Materials
- (1) D00633 Grease, Corrosion Preventive – BMS 3-33 (Preferred)

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(2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 20-10-23/401, Lockwires
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 27-81-00/201, Leading Edge Slat System
- (5) AMM 27-81-00/501, Leading Edge Slat System
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) AMM 32-00-15/201, Landing Gear Door Locks
- (8) AMM 32-00-20/201, Landing Gear Downlocks
- (9) AMM 78-31-00/201, Thrust Reverser System

D. Access

(1) Location Zone

144	Right MLG Wheel Well
211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

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(2) Access Panels

511BB LE Slat Power Drive Unit - Outboard (Left)  
 611BB LE Slat Power Drive Unit - Inboard (Right)  
 521ALB Gearbox - LE Slat No. 1 Outbd Drive Offset  
 521AEB Gearbox - LE Slat No. 1 Inbd Drive Offset  
 521AEB Gearbox - LE Slat No. 2 Outbd Drive Offset  
 521YB Gearbox - LE Slat No. 2 Inbd Drive Offset  
 521YB Gearbox - LE Slat No. 3 Outbd Drive Offset  
 521RB Gearbox - LE Slat No. 3 Inbd Drive Offset  
 521QB Gearbox - LE Slat No. 3 Inbd Drive Offset  
 521QB Gearbox - LE Slat No. 4 Outbd Drive Offset  
 521PB Gearbox - LE Slat No. 4 Outbd Drive Offset  
 521HB Gearbox - LE Slat No. 4 Inbd Drive Offset  
 521HB Gearbox - LE Slat No. 5 Outbd Drive Offset  
 521AMB Gearbox - LE Slat No. 5 Inbd Drive Offset  
 511LB,511NB Gearbox - LE Slat No. 6 Outbd Drive Offset  
 611LB,611NB Gearbox - LE Slat No. 7 Outbd Drive Offset  
 511FB Lower LE Structure, Slat Mechanism  
 511KB Lower LE Structure, Slat Mechanism  
 521BB Outboard Slat Mechanism  
 521EB Outboard Slat Mechanism  
 521JB Outboard Slat Mechanism  
 521RB Outboard Slat Mechanism  
 521TB Structure  
 521ZB Outboard Slat Mechanism  
 521AFB Outboard Slat Mechanism  
 521ANB Outboard Slat Mechanism  
 611FB Lower LE Structure, Slat Mechanism  
 611KB Lower LE Structure, Slat Mechanism  
 621AMB Gearbox - LE Slat No. 8 Inbd Drive Offset  
 621HB Gearbox - LE Slat No. 8 Outbd Drive Offset  
 621HB Gearbox - LE Slat No. 9 Inbd Drive Offset  
 621SB Gearbox - LE Slat No. 9 Outbd Drive Offset  
 621SB Gearbox - LE Slat No. 10 Inbd Drive Offset  
 621YB Gearbox - LE Slat No. 10 Outbd Drive Offset  
 621YB Gearbox - LE Slat No. 11 Inbd Drive Offset  
 621AEB Gearbox - LE Slat No. 11 Outbd Drive Offset  
 621AEB Gearbox - LE Slat No. 12 Inbd Drive Offset  
 621BB Outboard Slat Mechanism  
 621EB Outboard Slat Mechanism  
 621JB Outboard Slat Mechanism  
 621TB Structure  
 621ZB Outboard Slat Mechanism  
 621AFB Outboard Slat Mechanism  
 621ALB Gearbox - LE Slat No. 12 Outbd Drive Offset  
 621ANB Outboard Slat Mechanism

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E. Prepare for the Removal

S 212-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 492-003

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 042-004

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 212-006

- (4) Make sure the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position.

S 212-007

- (5) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 492-008

- (6) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-009

- (7) Remove the power from the center hydraulic system (AMM 29-11-00/201).

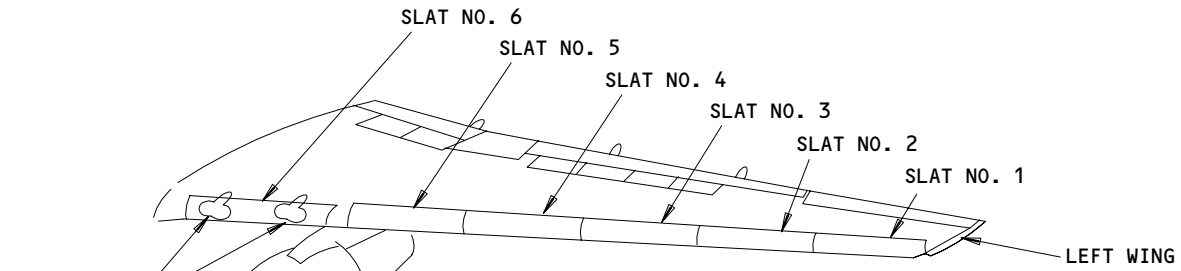
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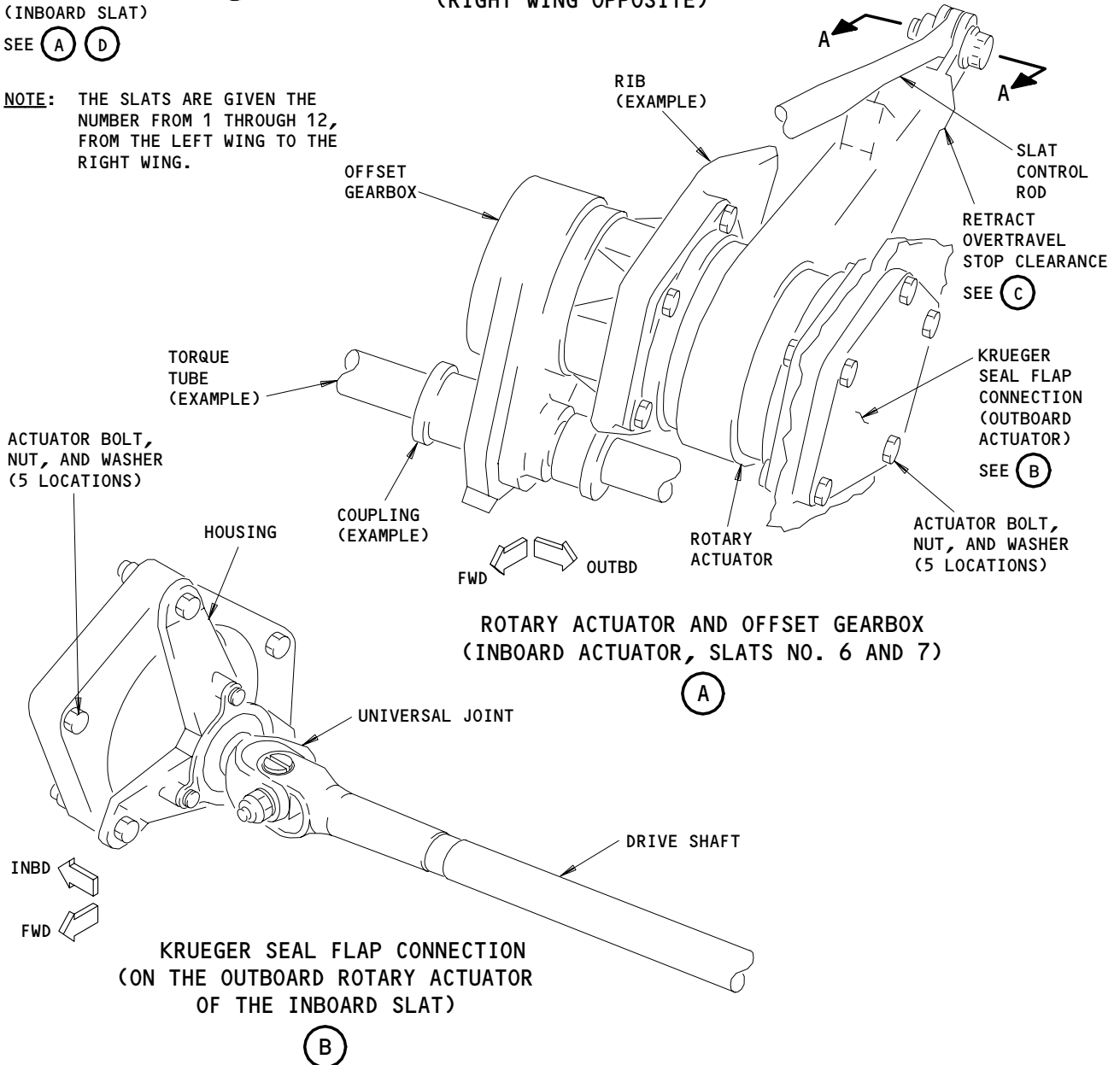


ROTARY ACTUATOR AND OFFSET GEARBOX (INBOARD SLAT)

SEE (A) (D)

LEFT WING SHOWN  
(RIGHT WING OPPOSITE)

**NOTE:** THE SLATS ARE GIVEN THE NUMBER FROM 1 THROUGH 12, FROM THE LEFT WING TO THE RIGHT WING.



ROTARY ACTUATOR AND OFFSET GEARBOX  
(INBOARD ACTUATOR, SLATS NO. 6 AND 7)

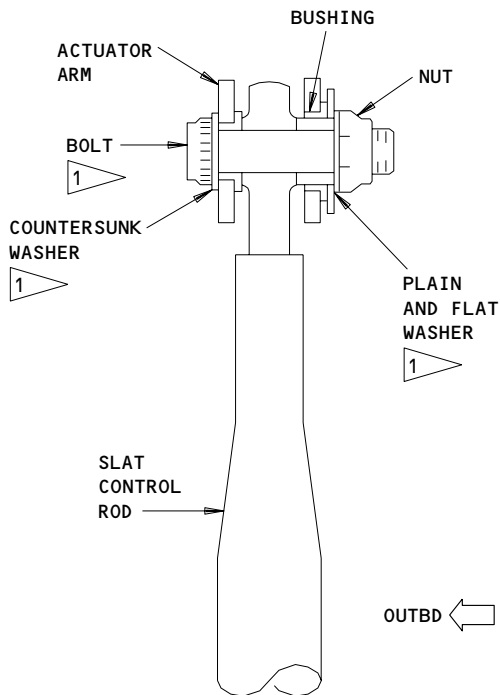
(A)

(B)

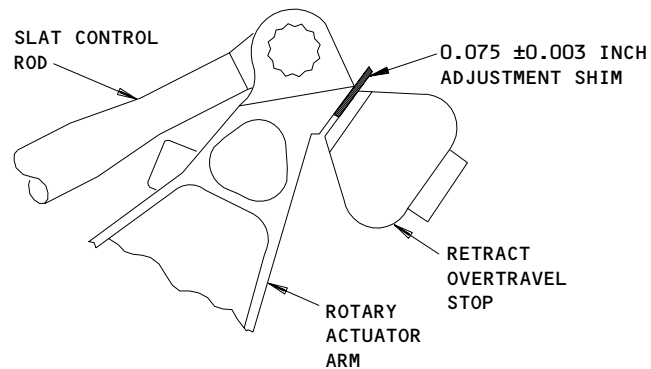
Rotary Actuator and Offset Gearbox for the Inboard Slat  
Figure 201 (Sheet 1)

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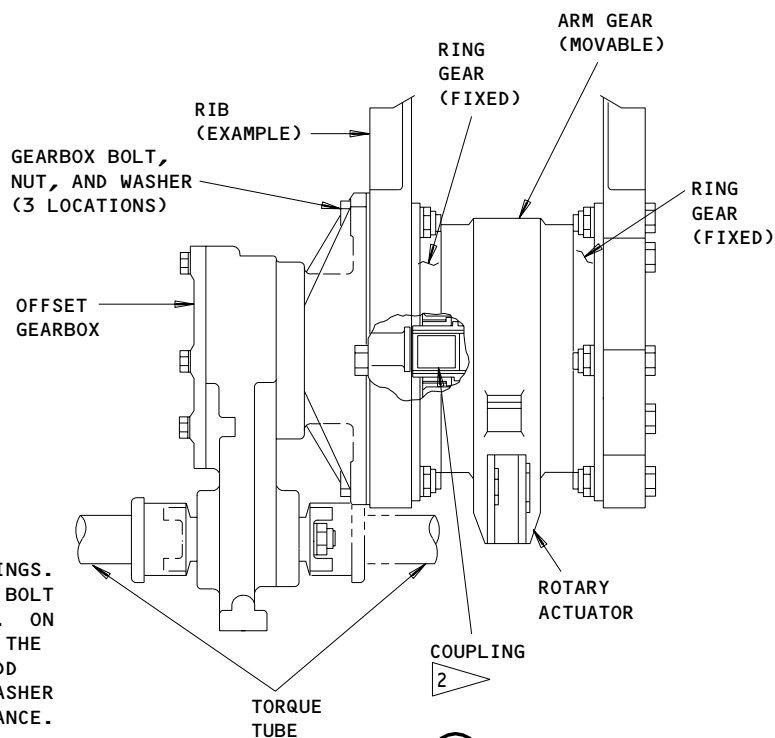


(LEFT WING, REAR VIEW)  
A-A



RETRACT OVERTRAVEL STOP ADJUSTMENT

(C)



(D)

- 1 INSTALL BOLT HEAD OUTBOARD ON BOTH WINGS. USE ONE COUNTERSUNK WASHER UNDER THE BOLT HEAD, ONE PLAIN WASHER UNDER THE NUT. ON THE LEFT WING ADD FLAT WASHERS UNDER THE PLAIN WASHER AND ON THE RIGHT WING ADD FLAT WASHERS UNDER THE COUNTERSUNK WASHER UNTIL YOU GET A 0.01-0.03 INCH CLEARANCE.
- 2 APPLY BMS 3-24 GREASE TO THE ID OF THE ROTARY ACTUATOR INPUT SHAFT AND THE OD OF THE OFFSET GEARBOX OUTPUT SPLINE BEFORE THE INSTALLATION.

Rotary Actuator and Offset Gearbox for the Inboard Slat  
Figure 201 (Sheet 2)

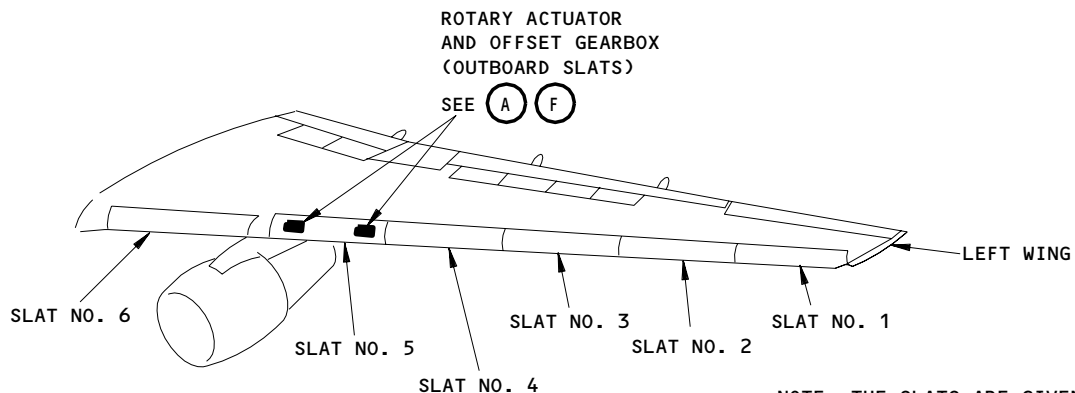
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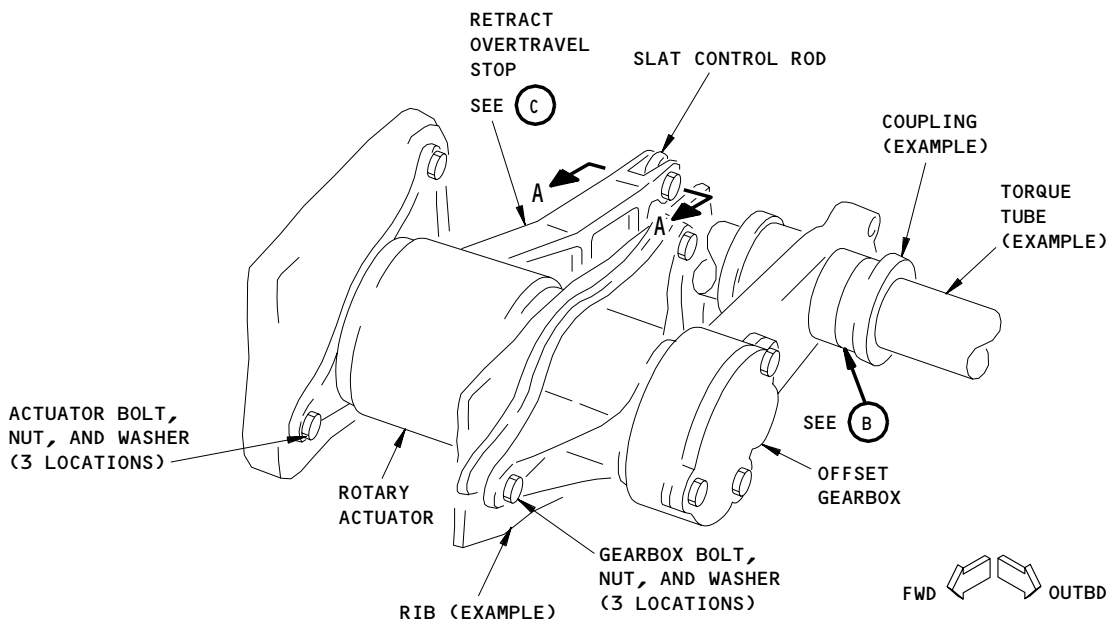
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**NOTE:** THE SLATS ARE GIVEN THE NUMBER FROM 1 THROUGH 12, FROM THE LEFT WING TO THE RIGHT WING.

LEFT WING  
(RIGHT WING IS OPPOSITE)



ROTARY ACTUATOR AND OFFSET GEARBOX  
(EXAMPLE, SLATS NO. 1-5 AND 8-12)

(A)

Rotary Actuator and Offset Gearbox for the Outboard Slat  
Figure 202 (Sheet 1)

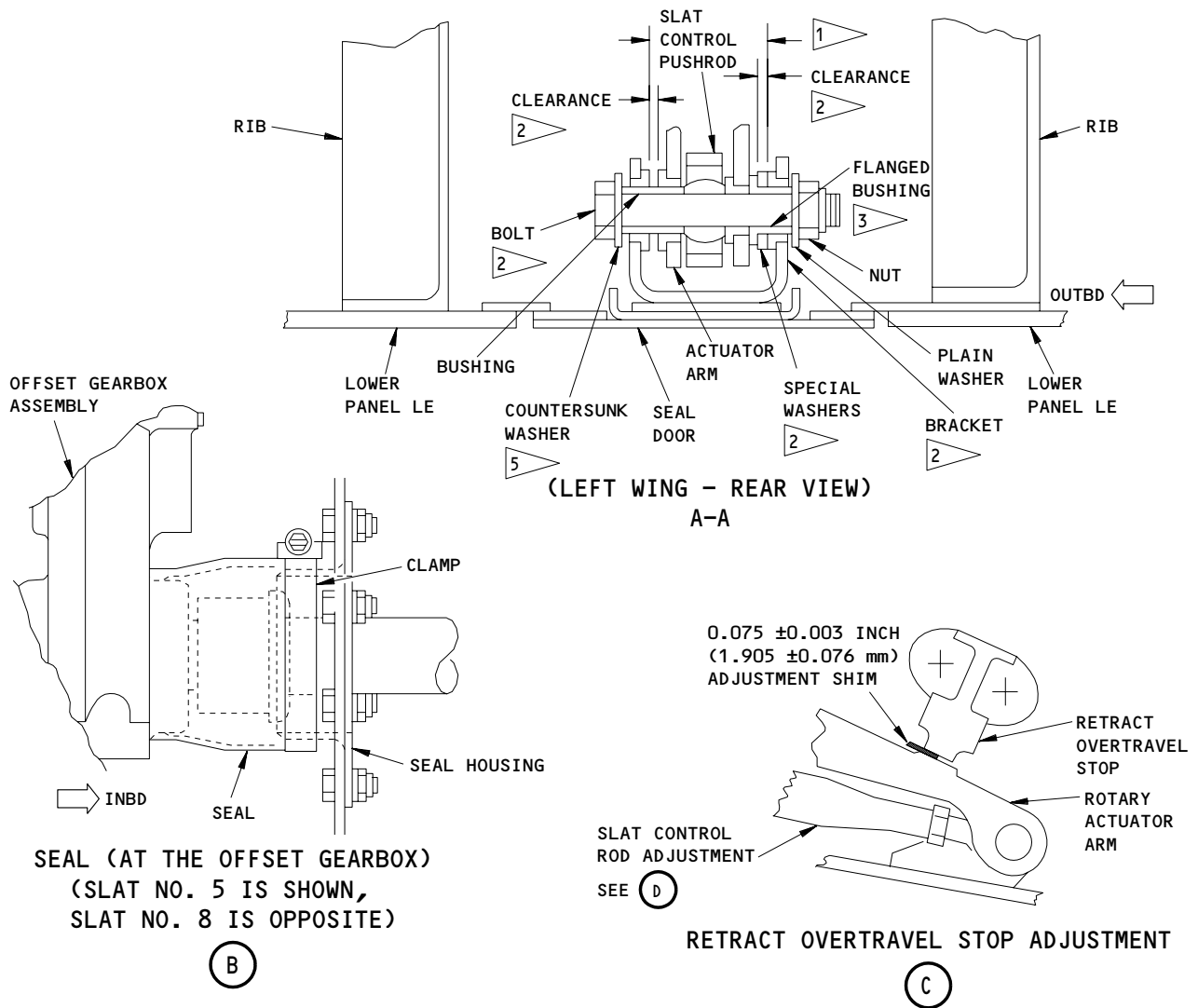
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- 1 BRACKET INTERNAL OPENING
- 2 INSTALL BOLT HEAD OUTBOARD ON BOTH WINGS. USE ONE COUNTERSUNK WASHER UNDER THE BOLT HEAD ONE PLAIN WASHER UNDER THE NUT. IF BRACKET INSTALLED HAS AN INTERNAL OPENING OF  $0.990 \pm 0.02$  INCH ( $25.15 \pm 0.51$  mm) YOU CAN INSTALL ADDITIONAL WASHERS AGAINST THE FLANGE BUSHING TO GET A TOTAL CLEARANCE OF  $0.001-0.025$  INCH ( $0.025-0.635$  mm) (NOT CLAMPED).
- 3 INSTALL THE FLANGE BUSHING AS SHOWN. YOU CAN CAUSE DAMAGE IF THE FLANGE BUSHING IS INCORRECTLY INSTALLED.
- 4 USE THE RIGGING GAGE AS SHOWN IN VIEW E IF AVAILABLE.
- 5 YOU CAN INSTALL TWO WASHERS UNDER THE BOLT HEAD TO INCREASE BOLT END CLEARANCE WHEN IN MOTION.
- 6 APPLY BMS 3-24 GREASE TO THE I.D. OF THE ROTARY ACTUATOR INPUT SHAFT AND THE O.D. OF THE OFFSET GEARBOX OUTPUT SPLINE BEFORE THE INSTALLATION.
- 7 OPTIONAL PART

Rotary Actuator and Offset Gearbox for the Outboard Slats  
Figure 202 (Sheet 2)

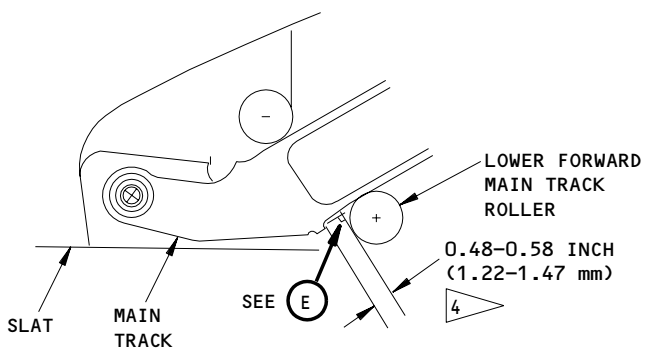
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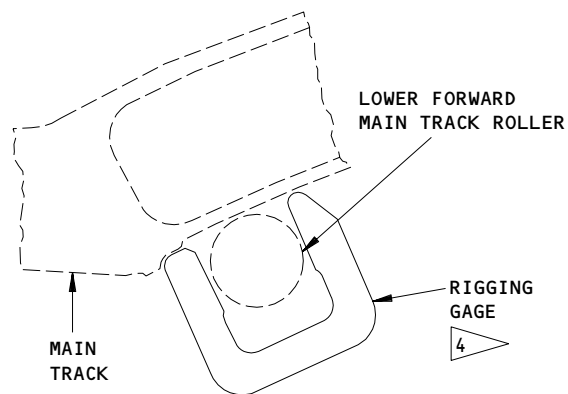
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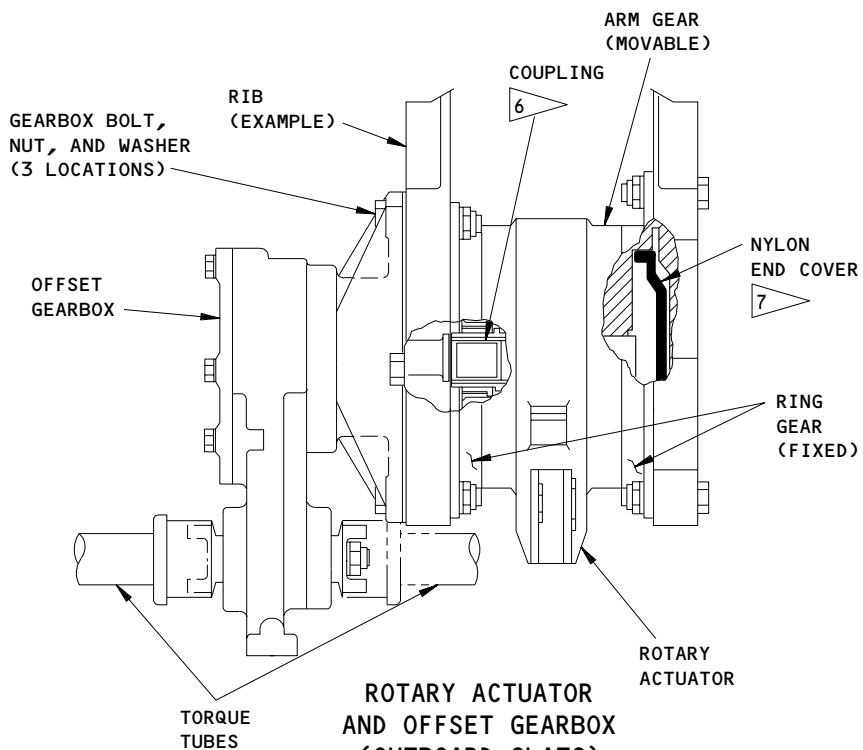
SLAT CONTROL ROD ADJUSTMENT  
(SLAT SHOWN IN THE FULLY  
RETRACTED POSITION)

(D)



RIGGING GAGE

(E)



ROTARY ACTUATOR  
AND OFFSET GEARBOX  
(OUTBOARD SLATS)

(F)

Rotary Actuator and Offset Gearbox for the Outboard Slat  
Figure 202 (Sheet 3)

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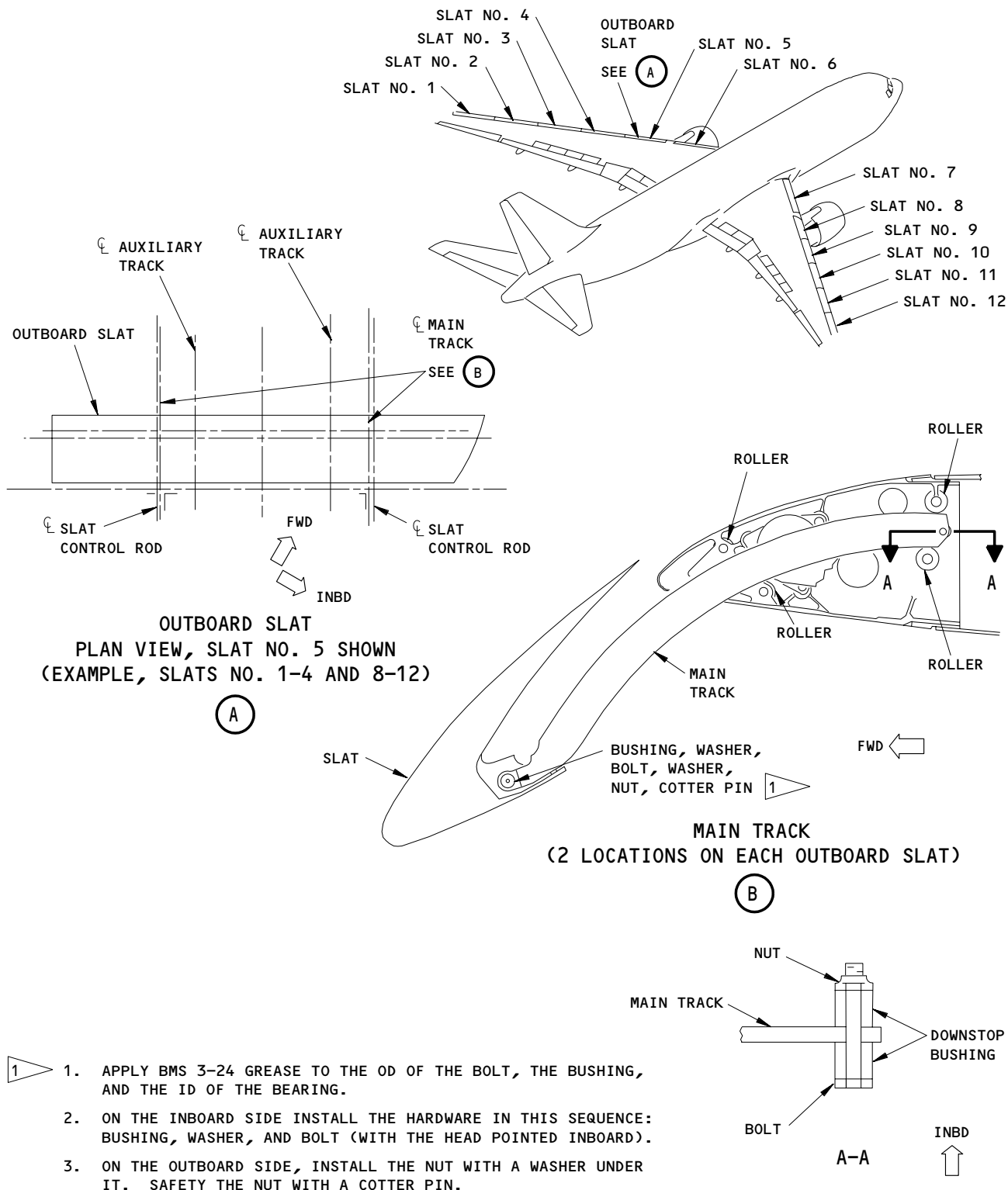
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Main Tracks for the Outboard Leading Edge Slat  
Figure 203

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- S 492-010  
(8) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 205).

- S 012-011  
(9) Open the lower access panels, on the wings LE to get access to the outboard and inboard slat PDUs, and offset gear boxes (AMM 06-44-00/201).

- S 492-012  
(10) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 206).

- S 862-013  
(11) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD  
(c) 11J24, FLAPS ALTN CONT

- S 862-014  
(12) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6D24, ALTN FLAP PWR  
(c) 6F24, ALTN SLAD OUTBD PWR

F. Remove the Offset Gearbox

S 292-630

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

- S 032-015  
(2) To remove the offset gearbox at the slat No. 5 (left wing) or No. 8 (right wing), remove the clamp (not installed on all seals), the seal, and the seal housing at the inboard side of the offset gearbox (Detail B, Fig. 202).

**NOTE:** This will get you the access to the torque tube coupling on the slat No. 5 or No. 8.

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S 932-016

- (3) Make a mark on the offset gearbox, the adjacent coupling, and the torque tube before you disconnect the torque tube from the gearbox.

**NOTE:** This will keep a record of the correct position for the subsequent installation.

S 032-017

- (4) Remove the screws on the torque tube coupling and disconnect the torque tube on each side of the offset gearbox at the applicable location:

**NOTE:** Do not turn a disconnected torque tube. It will be necessary to adjust the slat drive if you turn the torque tube (AMM 27-81-00/501).

- (a) Inboard slat (No. 6 and 7) (Fig. 201)  
(b) Outboard slat (No. 1-5 and 8-12) (Fig. 202).

**NOTE:** There is only one torque tube coupling attached to the outboard gearbox for the slats No.1 and 12.

S 032-018

**WARNING:** BE CAREFUL WHEN YOU REMOVE THE OFFSET GEARBOX. THE ROTATIONAL ENERGY CAN CAUSE THE GEARBOX TO TURN QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Remove the three gearbox bolts that attach the offset gearbox to the rotary actuator.

**NOTE:** Use the socket set for the slats No. 6 and 7.

S 022-019

- (6) Remove the offset gearbox from the airplane.  
G. Install the Offset Gearbox

S 642-020

- (1) Apply a thick layer of BMS 3-33 grease to the rotary actuator, and the offset gearbox mating surfaces at these locations as applicable:  
(a) The rotary actuator and the offset gearbox for the inboard slats (Detail D, Fig. 201).

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(b) The rotary actuator and the offset gearbox for the outboard slats (Detail F, Fig. 202).

S 642-021

- (2) Apply a light layer of BMS 3-33 grease to the shank of the gearbox bolts.

S 982-022

- (3) Put the offset gearbox into its position and engage the output spline to the rotary actuator input shaft.

S 212-023

- (4) If you install the rotary actuator at the same time, make sure the rotary actuator is tightly attached to the structure with the offset gearbox when you attach the gearbox bolts.

S 432-024

- (5) Attach the the offset gearbox and the rotary actuator to the rib structure together with the three gearbox bolts, nuts and washers.

**NOTE:** Install a washer at each nut. Use the socket set for the slats No. 6 and 7.

S 862-363

**CAUTION:** FAILURE TO COMPLETE THE STEP THAT FOLLOWS CAN CAUSE FASTER WEAR OR DAMAGE TO TORQUE TUBES, OFFSET GEARBOXES, AND ROTARY ACTUATORS.

- (6) Apply approximately 10 to 15 pound-inch (1.0 to 1.5 Nm) torque to the input shaft of the offset gearbox to remove the freeplay.

**NOTE:** See Table 201 for the correct direction to turn the input shaft. Rotate input shaft in the same direction as the rest of the offset gearboxes to align all the gearboxes and torque tubes.

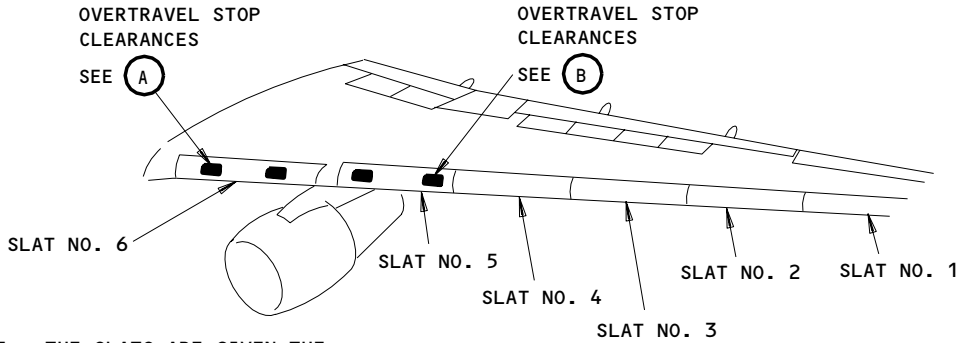
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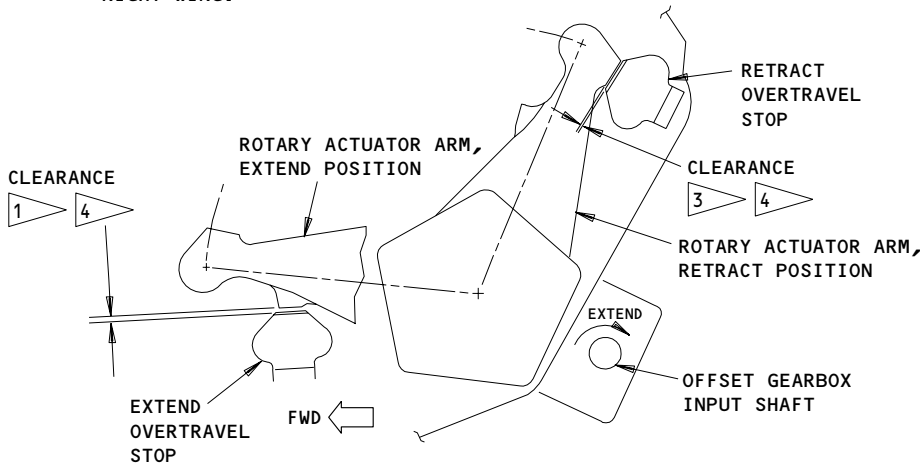
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**NOTE:** THE SLATS ARE GIVEN THE NUMBER FROM 1 THROUGH 12, FROM THE LEFT WING TO THE RIGHT WING.

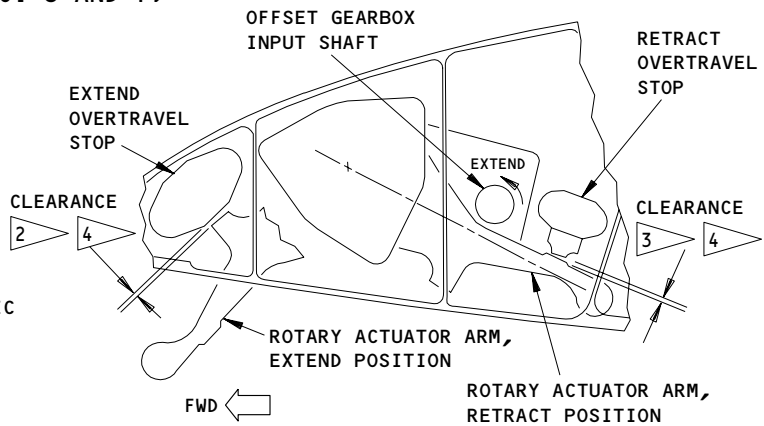
### LEFT WING (RIGHT WING IS OPPOSITE)



### OVERTRAVEL STOP CLEARANCES, INBOARD SLAT (EXAMPLE, SLATS NO. 6 AND 7)

(A)

- 1 0.03 INCH (0.8 mm) MINIMUM CLEARANCE (INBOARD SLATS EXTENDED WITH HYDRAULIC POWER) AT THE EXTEND OVERTRAVEL STOP.
- 2 0.03 INCH (0.8 mm) MINIMUM CLEARANCE (OUTBOARD SLATS EXTENDED WITH HYDRAULIC POWER) AT THE EXTEND OVERTRAVEL STOP.
- 3 0.05 TO 0.10 INCH (1.3 TO 2.5 mm) CLEARANCE (INBOARD OR OUTBOARD SLATS RETRACTED WITH HYDRAULIC POWER) AT THE RETRACT OVERTRAVEL STOP.
- 4 NOT LESS THAN 0.03 INCH (0.8 mm) (SLATS RETRACTED OR EXTENDED WITH ELECTRIC POWER) AT THE RETRACT OR EXTEND OVERTRAVEL STOPS.



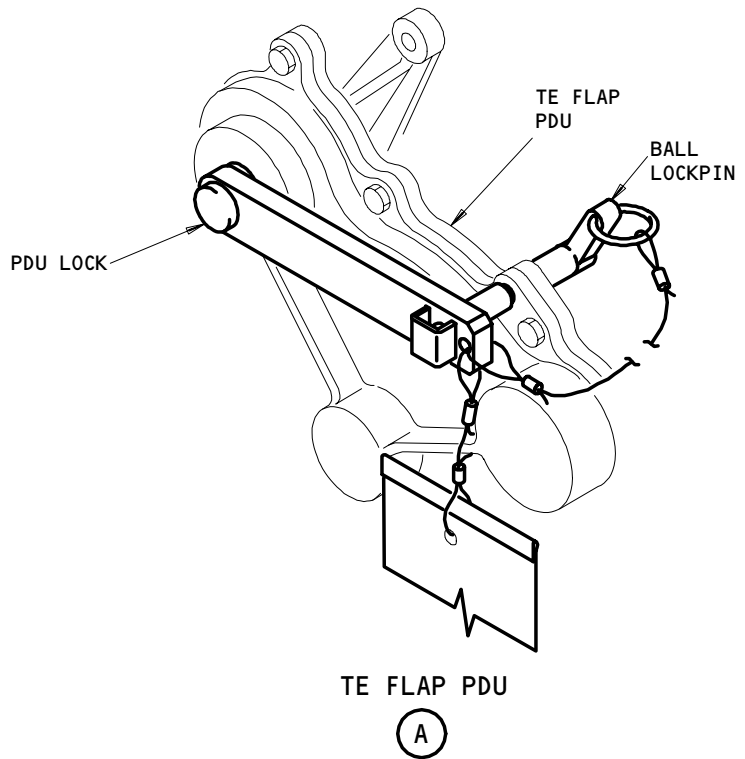
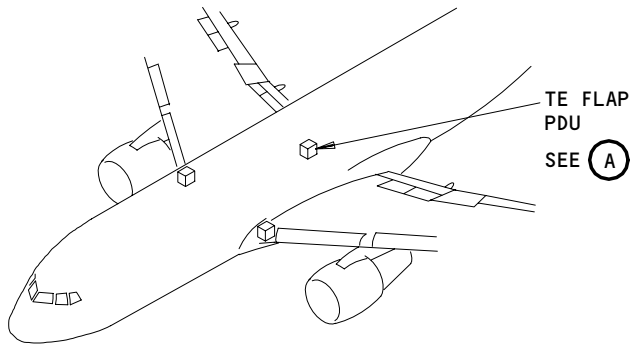
### OVERTRAVEL STOP CLEARANCES, OUTBOARD SLAT (EXAMPLE, SLATS NO. 1-5 AND 8-12)

(B)

Retract and Extend Stop Clearances for the Leading Edge Slats  
Figure 204

EFFECTIVITY	
	ALL

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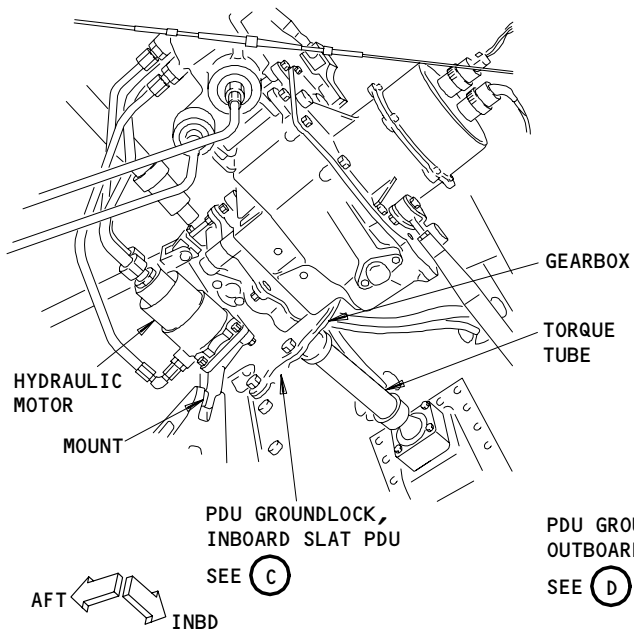
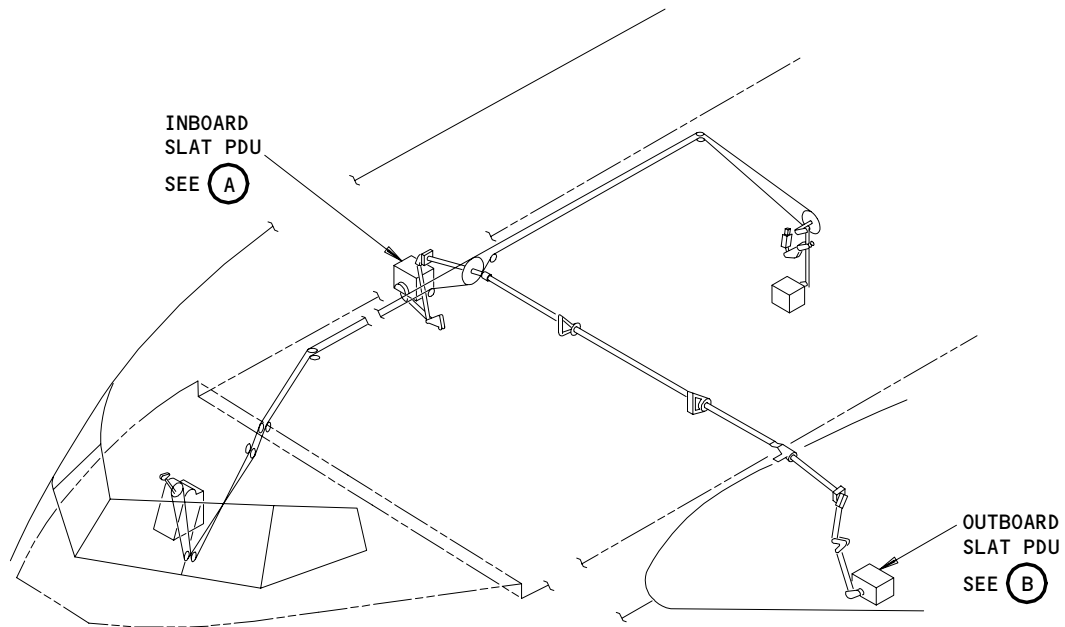
PDU Lock for the TE Flaps PDU  
Figure 205

EFFECTIVITY	
	ALL

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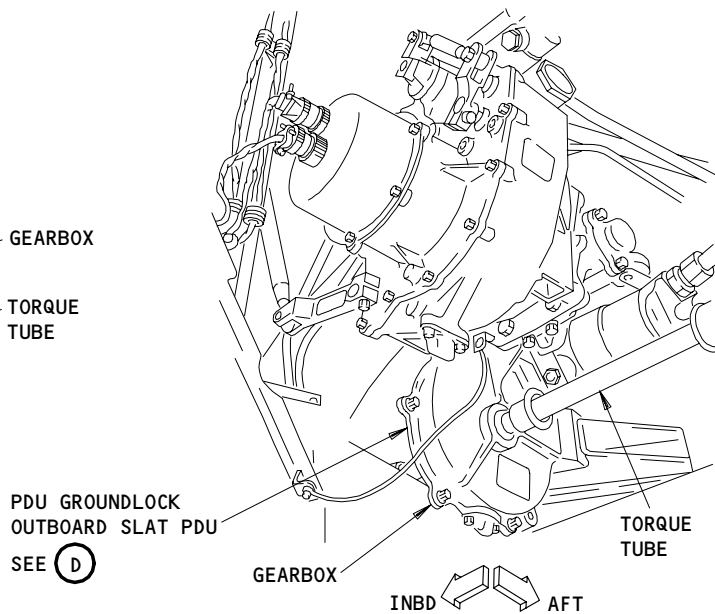
06

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INBOARD SLAT PDU  
(BOTTOM VIEW)

(A)



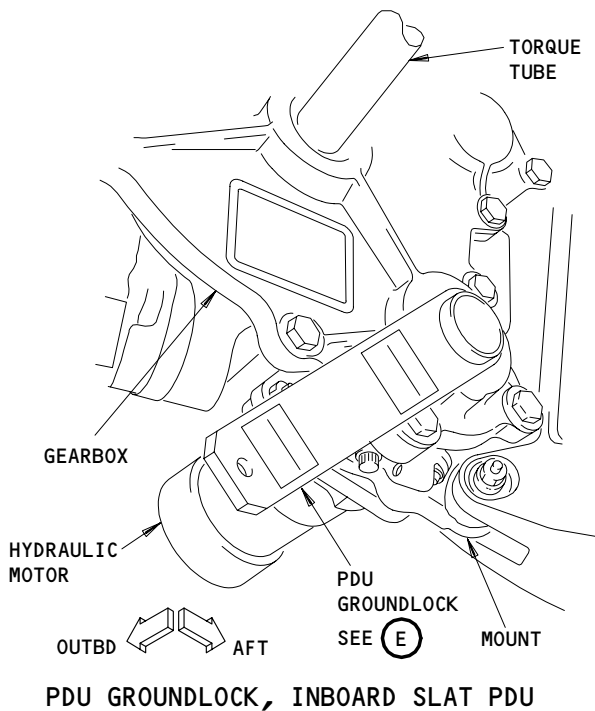
OUTBOARD SLAT PDU  
(BOTTOM VIEW)

(B)

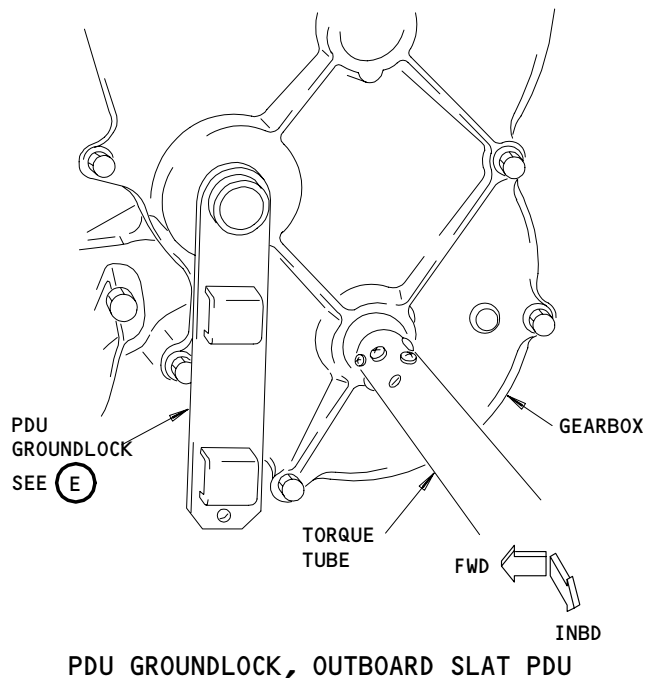
Slat PDU Groundlock  
Figure 206 (Sheet 1)

EFFECTIVITY	
	ALL

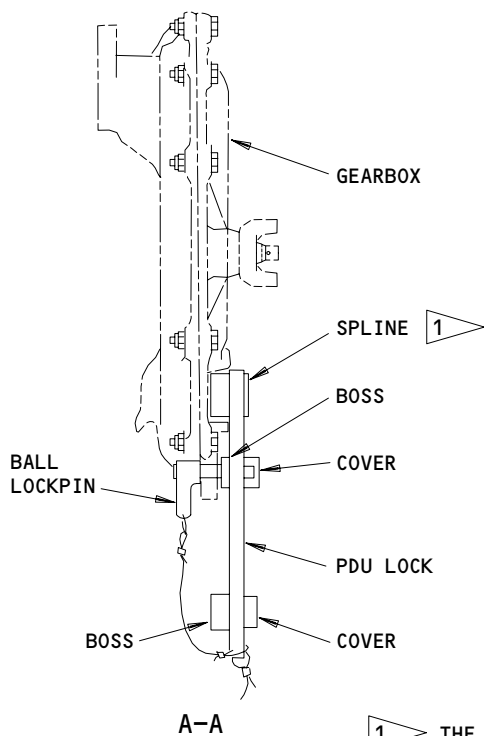
27-81-20



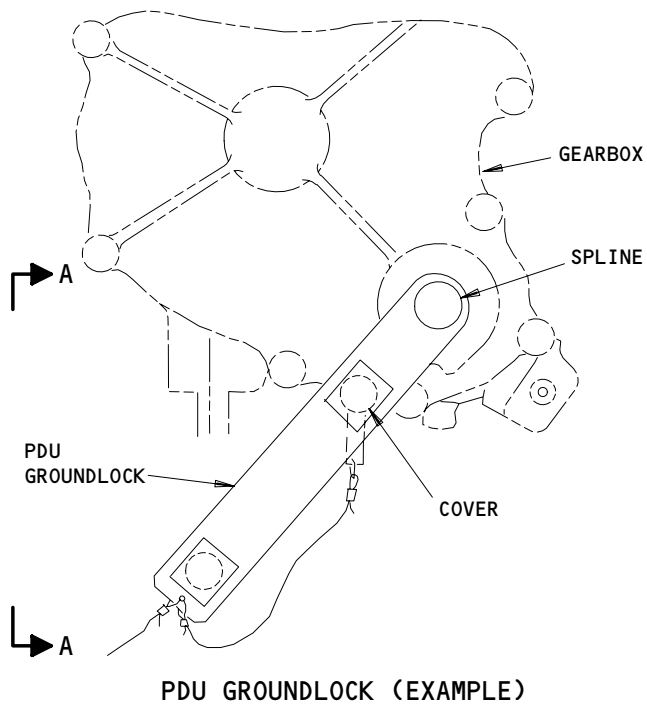
(C)



(D)



1 THE SPLINE FITS INTO THE GEARBOX AND IS HELD IN POSITION BY A BALL LOCKPIN, INSTALLED THROUGH THE BOSS AND GEARBOX



(E)

Slat PDU Groundlock  
Figure 206 (Sheet 2)

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Table 201	
SLAT #	DIRECTION TO TURN THE INPUT SHAFT OF THE GEARBOX *[1]
1-5	CLOCKWISE
6	COUNTER CLOCKWISE
7	CLOCKWISE
8-12	COUNTERCLOCKWISE
*[1] LOOK TO THE INBOARD DIRECTION	

S 642-026

- (7) Apply a layer of BMS 3-33 grease to the full length of the internal spline in the torque tube coupling and the offset gearbox.

S 822-027

- (8) Align the mark on the coupling and connect the torque tube to each end of the offset gearbox.

**NOTE:** Do not turn the torque tube when you connect it. It will be necessary to adjust the slat drive if you turn the torque tube.

S 032-028

- (9) Move the torque tube coupling on the offset gearbox connection and install the screws that attach the coupling to the offset gearbox. Do not tighten the coupling screws too tight.

S 222-029

- (10) Do these checks for the axial movement of a torque tube with a coupling at each end:
- (a) Push the torque tube tightly against one end and make a mark on its position.
  - (b) Move the torque tube fully to the opposite end.
  - (c) Make sure the torque tube can move easily, and that the axial movement is between 0.100 to 0.460 inch (2.54 to 11.7 mm).

**NOTE:** If there is resistance when you move the torque tube, loosen the coupling screws by a small increment to permit the torque tube to move freely.

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S 222-030

- (11) Do these checks on the axial movement of a torque tube with a coupling at one end and a bearing housing at the opposite end:
- (a) Push the coupling away from the end of the torque tube, and make sure that the clearance between the torque tube and the mating part is between 0.050 to 0.370 inch (1.27 to 9.40 mm).

S 642-031

- (12) Fill the torque tube coupling with BMS 3-33 grease through the lubrication hole.

S 432-032

- (13) Install a lockwire to the coupling screws with the double twist procedure (AMM 20-10-23/401).

S 432-033

- (14) Install the seal housing, the seal, and the clamp at the slat No. 5 or No. 8 if applicable (Detail B, Fig. 202). Tighten the clamp screw to 15 - 20 pound-inches (1.7 - 2.3 Nm).

S 292-631

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (15) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 712-034

- (16) Do a test on the gearbox installation with the steps given in the "Rotary Actuator and Offset Gearbox Test" paragraph.

TASK 27-81-20-022-035

3. Rotary Actuator Removal for the Inboard and Outboard Slats

A. Equipment

- (1) Leading Edge Slats Groundlock - A27007-1  
(2 Necessary)
- (2) TE Flap PDU Lock - A27009-7
- (3) Circuit Breaker Lockout Clip (4 Necessary)  
Commercially Available
- (4) Circuit Breaker Lock Set (4 Necessary)  
Commercially Available
- (5) Adapter - Leading Edge Slat Drive - A27077-1
- (6) Air Motor with 1/2-inch Drive -  
Commercially Available

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 27-81-00/201, Leading Edge Slat System

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- (3) AMM 27-81-04/201, Krueger Seal Flap and Krueger Seal Flap Drive
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Landing Gear Door Locks
- (6) AMM 32-00-20/201, Landing Gear Downlocks
- (7) AMM 30-11-05/401, Telescoping Duct
- (8) AMM 30-11-06/401, Interstitial Duct
- (9) AMM 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zone

144	Right MLG Wheel Well
211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

D. Prepare for the Removal

S 212-036

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 492-037

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 042-038

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

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- S 012-039
- (4) Remove the lower access panels for the leading edge when it is necessary to get access to the rotary actuators (AMM 06-44-00/201).

NOTE: Use the procedure in AMM 27-81-00/201 to extend and retract the slats to remove the access panels.

- S 212-040
- (5) Make sure the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position.

- S 212-041
- (6) Make sure the flap control lever is in the zero (FLAPS UP) detent.

- S 492-042
- (7) Attach a DO-NOT-OPERATE tag to the flap control lever.

- S 862-043
- (8) Remove the power from the center hydraulic system (AMM 29-11-00/201).

- S 492-044
- (9) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 205).

- S 012-045
- (10) Open the access panels, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (AMM 06-44-00/201).

- S 492-046
- (11) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 206).

- S 862-047
- (12) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

- S 862-048
- (13) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

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E. Remove the Rotary Actuator(s) for the Inboard Slats (No. 6 and 7)

S 292-645

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 862-439

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (2) At the inboard and outboard slat PDUs, move the manual override lever on the bypass valve to the No. 1 (bypass) position, and attach a DO-NOT-OPERATE tag.

S 862-050

- (3) At the TE flap PDU, move the manual override lever on the bypass valve to the No. 1 (bypass) position, and attach a DO-NOT-OPERATE tag.

S 972-051

- (4) Measure the retract overtravel stop clearance at the rotary actuator adjacent to the rotary actuator (on the same slat) that you will remove. Make a written record of the retract stop clearance (Detail A, Fig. 204).

**NOTE:** This dimension is used to adjust the rotary actuator at the subsequent installation. You can use a feeler gauge or a long shim to measure the stop clearance.

S 092-052

- (5) Remove the groundlock from the inboard slat PDU (Fig. 206).

S 982-053

- (6) Use one of the two procedures that follow to extend the inboard slats manually to get access to the bolt that connects the actuator arm to the slat control rod:
  - (a) Turn the torque tube with an air motor and adapter A27077 (AMM 27-81-00/501).

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(b) Turn the torque tube with your hand.

S 492-054

(7) Install the groundlock on the inboard slat PDU (Fig. 206).

S 032-055

(8) Disconnect the slat control rod from the actuator arm at each end of the slat (View A-A, Fig. 201).

**NOTE:** Do not change the length of the slat control rod in order to disconnect or after you disconnected it.

**NOTE:** Examine how the slat control rod and the actuator arm are connected together. It is important to install them in the same order.

S 492-056

(9) Attach a rope to hold the disconnected end of the slat into position.

S 022-057

(10) Remove the offset gearbox with the instructions given in the "Offset Gearbox Replacement" paragraph.

S 032-058

(11) For the inboard rotary actuator, remove the five actuator bolts on the side of the rotary actuator opposite to the offset gearbox (Detail A, Fig. 201).

S 032-059

(12) For the outboard rotary actuator, remove the five actuator bolt that connects the actuator and the universal joint housing (for the krueger seal flap) to the structure (Detail B, Fig. 201).

**NOTE:** Do not turn the universal joint for the krueger seal flap when you disconnect the housing from the rotary actuator. You must adjust the krueger seal flap drive if you turn the universal joint (AMM 27-81-04/201).

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S 022-060

- (13) Remove the rotary actuator from the airplane.  
F. Remove the Rotary Actuator(s) for the Outboard Slat (No. 1-5 and 8-12)

S 292-632

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 862-061

- (2) At the inboard and outboard slat PDUs, move the manual override lever on the bypass valve to the No. 1 (bypass) position, and attach a DO-NOT-OPERATE tag.

S 862-062

- (3) At the TE flap PDU, move the manual override lever on the bypass valve to the No. 1 (bypass) position, and attach a DO-NOT-OPERATE tag.

S 972-063

- (4) Measure the retract overtravel stop clearance at the rotary actuator adjacent to the rotary actuator (on the same slat) that you will remove. Make a written record of the retract stop clearance (Detail B, Fig. 204)

**NOTE:** This dimension is used to adjust the rotary actuator at the subsequent installation. You can use a feeler gauge or a long shim to measure the stop clearance.

S 092-064

- (5) Remove the groundlock from the outboard slat PDU (Fig. 206).

S 982-065

- (6) Use one of the two procedures that follow to extend the outboard slats manually, to get access to the bolt that connects the actuator arm to the slat control rod:  
(a) Turn the torque tube with an air motor and adapter A27077 (AMM 27-81-00/201).

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(b) Turn the torque tube with your hand.

S 492-066

(7) Install the groundlock on the outboard slat PDU (Fig. 206).

S 032-067

(8) Disconnect the slat control rod from the actuator arm at each end of the slat (Fig. 202).

**NOTE:** Do not change the length of the slat control rod in order to disconnect or after you disconnected it.

**NOTE:** Examine how the slat control rod and the actuator arm are connected together. It is important to install them in the same order.

S 022-068

(9) Remove the offset gearbox with the instructions given in the "Offset Gearbox Replacement" paragraph.

S 022-344

(10) Remove the telescoping duct for the thermal anti-ice system if you will remove the rotary actuators at slats No. 5 and/or 8 (AMM 30-11-05/401).

S 022-345

(11) Remove each of the interstitial duct from the thermal anti-ice duct(s) of the adjacent slat(s) (AMM 30-11-06/401).

**NOTE:** This step permits you to lift the slat up to pull the main track forward and to get access to the bolts that hold the rotary actuator to the rib in the wing leading edge.

S 032-464

**CAUTION:** DO NOT LET THE SLAT TO FALL FREE FORWARD WHEN YOU DISCONNECT THE SLAT FROM THE FORWARD END OF THE MAIN TRACK. DAMAGE TO THE BRACKET OF THE SLAT SKEW SENSOR SWITCH INSTALLED ON MAIN TRACK AND TO THE WING FRONT SPAR CAN OCCUR.

(12) Disconnect the two main tracks from the slat (Fig. 203).

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S 032-070

- (13) Remove the downstop bushings from the two main tracks that you disconnected.

S 982-071

**WARNING:** HOLD THE WEIGHT OF THE MAIN TRACK TO MOVE IT IN THE STEP THAT FOLLOWS. THE MAIN TRACK IS LOOSE WHEN IT IS DISCONNECTED FROM THE SLAT AND THE DOWNSTOP IS REMOVED. THE WEIGHT OF THE MAIN TRACK CAN CAUSE THE MAIN TRACK TO FALL AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (14) Pull the main tracks forward to clear the rotary actuators.

**NOTE:** You can lift the slat up to clear the path for the main track. It is not necessary to remove the main track.

S 492-072

- (15) Attach a rope to hold the main track to the slat.

S 032-073

- (16) Remove the three actuator bolts on the side of the rotary actuator opposite to the offset gearbox (Fig. 202).

S 022-074

- (17) Remove the rotary actuator from the airplane.

S 022-076

- (18) Remove the nylon end cover from the rotary actuator (Detail F, Fig. 202).

**NOTE:** This nylon end cover is installed only on the rotary actuators for the outboard slats.

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TASK 27-81-20-422-077

4. Rotary Actuator Installation for the Inboard and Outboard Slats

A. Equipment

- (1) Leading Edge Slats Groundlock - A27007-1 (two necessary)
- (2) TE Flap PDU Lock - A27009-7
- (3) Circuit Breaker Lockout Clip (4 Necessary)  
Commercially Available
- (4) Circuit Breaker Lock Set (4 Necessary)  
Commercially Available
- (5) Rigging Gage (Outboard Leading Edge Slat) - A27089-1
- (6) Adapter - Leading Edge Slat Drive - A27077-1
- (7) Air Motor with 1/2-inch Drive - Commercially Available
- (8) Shim - 0.075 ±0.003 inch (1.905 ±0.76 mm) thick
- (9) 50-Pound Weight (22.67 Kg)

B. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)
- (3) G02020 Modeling Clay

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 20-10-23/401, Lockwires
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 27-81-00/201, Leading Edge Slat System
- (5) AMM 27-81-04/201, Krueger Seal Flap and Krueger Seal Flap Drive
- (6) AMM 27-81-24/401, Leading Edge Slat Torque Tube
- (7) IPC 27-81-22-01, Door Installation - Outboard Wing LE
- (8) IPC 27-81-22-05, Door Installation - Outboard Wing LE
- (9) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (10) AMM 78-31-00/201, Thrust Reverser System

D. Access

- (1) Location Zone
  - 144 Right MLG Wheel Well
  - 211/212 Control Cabin
  - 510/610 Wing Leading Edge - Inboard
  - 520/620 Wing Leading Edge - Outboard

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- (2) Access Panels
  - 511EB Inboard Slat Mechanism, Slat Actuator (Left)
  - 511FB Lower LE Structure, Slat Mechanism (Left)
  - 511KB Lower LE Structure, Slat Mechanism (Left)
  - 611EB Inboard Slat Mechanism, Slat Actuator (Right)
  - 611FB Lower LE Structure, Slat Mechanism (Right)
  - 611KB Lower LE Structure, Slat Mechanism (Right)

E. Install the Rotary Actuator(s) for the Inboard Slat (Fig. 201)

**NOTE:** You can install the actuator bolts with the head pointed to the center of the actuator. Make sure you have at least 0.125 inch (3.175 mm) clearance between the actuator bolts and the slat track.

S 292-633

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 212-078

- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 212-079

- (3) Make sure the power for the center hydraulic system is removed (AMM 29-11-00/201).

S 982-080

- (4) Put the rotary actuator into position and loosely attach the actuator to the structure with the actuator bolts. Do not tighten the actuator bolts.

S 422-081

- (5) Use the instructions given in the "Offset Gearbox Replacement" paragraph and attach the offset gearbox and the rotary actuator to the structure, with the gearbox bolts.

S 032-082

- (6) Remove the loose actuator bolts on the side of the actuator opposite to the offset gearbox.

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S 642-083

- (7) Apply a light layer of BMS 3-33 grease to the shank of the actuator bolts.

S 432-084

- (8) Do this step for the inboard rotary actuator:  
(a) Install the five actuator bolts with one washer at each nut. Tighten the nuts.

S 432-085

- (9) Do these steps for the outboard rotary actuator:  
(a) Connect the universal joint housing and the rotary actuator to the structure with the five actuator bolts.

**NOTE:** Do not turn the universal joint for the krueger seal flap when you connect the housing to the actuator. It will be necessary to adjust the krueger seal flap drive if you turn the universal joint (AMM 27-81-04/201).

- (b) Install a washer and a nut to each actuator bolt and tighten the nut.

S 092-086

- (10) Remove the rope that holds the disconnected end of the slat.

S 432-087

- (11) Connect the slat control rod to the actuator arm at each end of the slat (Section A-A, Fig. 201). Tighten the nut to 270-300 pound-inches (31 - 34 Nm).

**NOTE:** Do not change the length of the slat control rod while you connect the slat control rod.

S 212-367

- (12) Make sure the slat control rods and actuator control arms are connected (tighten and lockwired) correctly.

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S 092-088

- (13) Remove the groundlock from the inboard slat PDU (Fig. 206).

S 982-089

- (14) Retract the slats manually until the retract overtravel stop clearance on the adjacent actuator (on the same slat) is the same as the clearance that you measured before the actuator removal (Detail A, Fig. 204). You can use one of these procedures to retract the slats:
- (a) Turn the torque tube with an air motor and adapter A27077 (AMM 27-81-00/201).
  - (b) Turn the torque tube by hand.

S 222-090

- (15) Measure the clearance of the retract overtravel stop for the rotary actuator that you installed.

S 822-091

- (16) If the clearance of the retract overtravel stop is not in the RIG position limit, adjust the retract overtravel stop.

S 092-092

- (17) Remove the groundlock from the outboard slat PDU (Fig. 206).

S 092-093

- (18) Remove the PDU lock from the TE flap PDU (Fig. 205).

S 862-094

**WARNING:** MAKE SURE THE POWER FOR THE CENTER HYDRAULIC SYSTEM IS REMOVED BEFORE YOU TURN THE MANUAL OVERRIDE LEVER TO THE NO.2 (NORMAL) POSITION. THE FLAPS AND SLATS CAN MOVE IF THE HYDRAULIC POWER IS ON, AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (19) Remove the DO-NOT-OPERATE tag from manual override lever on the inboard and outboard slat PDUs, and move the lever to the No. 2 (normal) position.

S 862-095

- (20) Remove the DO-NOT-OPERATE tag from the manual override lever on the TE flap PDU, and move the lever to the No. 2 (normal) position.

EFFECTIVITY

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S 862-096

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE FLAPS AND SLATS IN THE STEP THAT FOLLOWS. THE INBOARD AND OUTBOARD SLATS WILL MOVE TO THE POSITION SHOWN ON THE FLAP CONTROL LEVER WHEN THE CENTER HYDRAULIC SYSTEM IS PRESSURIZED. THE ACCIDENTAL MOVEMENT OF THE SLATS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(21) Pressurize the center hydraulic system (AMM 29-11-00/201), and permit the slats to move to the position shown on the flap control lever.

S 862-097

(22) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 492-098

(23) Install the PDU lock on the TE flap PDU (Fig. 205).

S 492-099

(24) Install the groundlocks on the inboard and outboard slat PDUs (Fig. 206).

S 222-100

(25) Make sure that the end of the slat that you connected aligns with the adjacent fixed structure within  $\pm 0.04$  inch ( $\pm 1.0$  mm) in the horizontal plane.

S 822-101

(26) Adjust the slat control rod if you cannot get this condition to agree.

S 712-102

(27) Do a test on the rotary actuator and the offset gearbox installation with the instructions given in the "Offset Gearbox and Rotary Actuator Test" paragraph.

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F. Install the Rotary Actuator(s) for the Outboard Slat (Fig. 202)

**NOTE:** You can install the actuator bolts with the head pointed to the center of the actuator. Make sure you have at least 0.125 inch (3.175 mm) clearance between the actuator bolts and the slat track.

S 292-634

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 212-103

- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 212-104

- (3) Make sure the power for the center hydraulic system is removed (AMM 29-11-00/201).

S 422-105

- (4) If removed, install the nylon end cover on the side of the rotary actuator opposite to the offset gearbox (Detail F, Fig. 202).

S 432-106

- (5) Put the rotary actuator into position and loosely attach the actuator to the structure with the actuator bolts. Do not tighten the actuator bolts.

S 422-107

- (6) Use the instruction given in the "Offset Gearbox Replacement" paragraph and attach the offset gearbox and the rotary actuator to the structure, with the gearbox bolts.

S 032-108

- (7) Remove the loose actuator bolts on the side of the actuator opposite to the offset gearbox.

S 642-109

- (8) Apply a light layer of BMS 3-33 grease to the shank of the actuator bolts.

S 432-110

- (9) Install the three actuator bolts with one washer at each nut.

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S 092-111

- (10) Hold the weight of the main track and release the rope between the main track and the slat.

S 432-112

- (11) Connect the main track to the slat and tighten the nut to these torque values as applicable (Fig. 203):
- (a) At slats No. 1 and 12, tighten the nut to 270-350 pound-inches (31 - 40 Nm).
  - (b) At slats No. 2 and 11, tighten the nut to 290-510 pound-inches (33 - 58 Nm).
  - (c) At slats No. 3-5 and 8-10, tighten the nut to 480-850 pound-inches (54 - 96 Nm).

S 422-635

**CAUTION:** MAKE SURE THAT THE DOWNSTOP BUSHINGS ARE INSTALLED CORRECTLY AND THE NUT HAS THE CORRECT TORQUE. IF THEY ARE NOT, THE MAIN TRACK/STRUCTURE JOINT CAN BECOME LOOSE. THE DOWNSTOP PARTS CAN DISCONNECT AND CAN CAUSE DAMAGE TO THE SLAT TRACK HOUSING.

- (12) Make sure the parts of the downstop assembly are installed correctly and the nut has the correct torque.

S 432-113

- (13) Install the downstop bushing to the main track (Section A-A, Fig. 203).

S 432-114

- (14) Do these steps to connect the slat control rod to the actuator arm at each end of the slat (View A-A, Fig. 202):

**NOTE:** Do not change the length of the control rod.

- (a) Install bolt (with bolthead in the outboard direction), washers, flange bushing, and nut.
- (b) Tighten the nut to 130-200 pound-inches (15 - 23 Nm).

S 212-371

- (15) Make sure the slat control rods and actuator control arms are connected (tighten and lockwired) correctly.

S 432-360

- (16) Install the telescoping duct(s) for the thermal anti-ice system if you installed the rotary actuator(s) for slats No.5 and/or 8 (AMM 32-11-05/401).

S 432-361

- (17) Install the interstitial duct(s) to the end(s) of the thermal anti-ice duct(s) of the adjacent slat(s) (AMM 30-11-06/401).

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S 092-115

- (18) Remove the groundlock from the outboard slat PDU (Fig. 206).

S 982-116

- (19) Retract the slats manually until the retract overtravel stop clearance on the adjacent actuator (on the same slat) has the same clearance that you measured before the actuator removal (Detail B, Fig. 204). You can use one of these procedure to retract the slats:
- (a) Turn the torque tube with an air motor and adapter A27077 (AMM 27-81-00/201).
  - (b) Turn the torque tube by hand.

S 222-117

- (20) Measure the clearance of the retract overtravel stop for the rotary actuator that you installed.

S 822-118

- (21) If the clearance of the retract overtravel stop is not in the RIG position limit, adjust the retract overtravel stop.

S 862-119

**WARNING:** MAKE SURE THE POWER FOR THE CENTER HYDRAULIC SYSTEM IS REMOVED BEFORE YOU TURN THE MANUAL OVERRIDE LEVER TO THE NO.2 (NORMAL) POSITION. THE FLAPS AND SLATS CAN MOVE IF THE HYDRAULIC POWER IS ON, AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (22) Remove the DO-NOT-OPERATE tag from manual override lever on the inboard and outboard slat PDUs, and move the lever to the No. 2 (normal) position.

S 862-120

- (23) Remove the DO-NOT-OPERATE tag from the manual override lever on the TE flap PDU, and move the lever to the No.2 (normal) position.

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S 862-121

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM THE FLAPS AND SLATS IN THE STEP THAT FOLLOWS. THE INBOARD AND OUTBOARD SLATS WILL MOVE TO THE POSITION SHOWN ON THE FLAP CONTROL LEVER WHEN THE CENTER HYDRAULIC SYSTEM IS PRESSURIZED. THE ACCIDENTAL MOVEMENT OF THE SLATS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(24) Pressurize the center hydraulic system (AMM 29-11-00/201), and permit the slats to move to the position shown on the flap control lever.

S 862-122

(25) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 492-123

(26) Install the PDU lock in the TE flap PDU (Fig. 205).

S 492-124

(27) Install the groundlocks on the inboard and outboard slat PDUs (Fig. 206).

S 222-125

(28) Do a check on the position of the outboard slat with the rigging gage A27089 (Detail D, Fig. 202).

S 822-126

(29) Adjust the slat control rod if you cannot get this condition to agree.

S 712-127

(30) Do a test on the rotary actuator and offset gearbox installation with the steps given in the "Offset Gearbox and Rotary Actuator Test" paragraph.

G. Prepare for the Check and the Adjustment for the Retract and Extend Overtravel Stop Clearances

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S 042-128

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 862-129

- (2) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 862-130

- (3) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
  - (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 862-131

- (4) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 862-132

- (5) Supply electrical power (AMM 24-22-00/201).
- H. Retract and Extend Overtravel Stop Clearance Check - Inboard Slat (Detail A, Fig. 204)

S 862-133

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (1) Pressurize the center hydraulic system (AMM 29-11-00/201).

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S 862-134

- (2) Move the flap control lever to the 25-unit detent, and make sure the slats move to the fully extended position.

S 492-135

- (3) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-136

- (4) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 012-137

- (5) Remove lower leading edge access panels, 511EB, 511FB, 511KB, 611EB, 611FB, and 611KB (AMM 06-44-00/201).

S 222-138

- (6) Do a check of the clearance between the actuator arm and the EXTEND overtravel stop (for the inboard slat) at each rotary actuator on the same slat (Fig. 204).

S 492-139

- (7) Attach the modeling clay to the RETRACT overtravel stop at the outboard rotary actuator only.

**NOTE:** Attach a piece of tape to the structure so that you can remove the clay easily.

S 862-268

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (8) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-141

- (9) Remove the DO-NOT-OPERATE tag from the flap control lever.

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S 862-142

- (10) Move the flap control lever to the zero (FLAPS UP) detent and make sure the slats move to the fully retracted position.

**NOTE:** After the slats moved to the fully retracted position, stop for one minute before you do the next step.

S 492-143

- (11) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-144

- (12) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 222-145

- (13) At the inboard rotary actuator, do a check of the clearance between the actuator arm and the retract overtravel stop (Fig. 204).

S 862-269

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (14) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-147

- (15) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-148

- (16) Move the flap control lever to the 25-unit detent and make sure the slats move to the fully extended position.

S 492-149

- (17) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-150

- (18) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

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S 092-151

- (19) Carefully remove the modeling clay from the outboard rotary actuator.

S 222-152

- (20) Measure the thickness of the clay and make sure the thickness is between 0.05 and 0.10 inch (1.3 and 2.5 mm).

**NOTE:** The thickness of the modeling clay is the retract overtravel stop clearance for the outboard actuator (Fig. 204).

S 862-270

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (21) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-154

- (22) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-155

- (23) Move the flap control lever to the zero (FLAPS UP) detent and make sure the slats move to the fully retracted position.

S 492-156

- (24) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-157

- (25) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 822-158

- (26) If the retract or extend overtravel stop clearances are incorrect as specified in Fig. 204, adjust the stop clearance for the inboard slat (refer to the tasks for Retract and Extend Overtravel Stop Clearance Adjustment - Inboard and Outboard Rotary Actuators, Inboard Slat).

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S 412-159

- (27) Install the access panels, 511EB, 511FB, 511KB, 611EB, 611FB, and 611KB (AMM 06-44-00/201).

S 712-160

- (28) Do a test on the offset gearbox and the rotary actuator with the instructions given in the "Rotary Actuator and Offset Gearbox Test" paragraph.

I. Retract and Extend Overtravel Stop Clearance Check - Outboard Slats (Detail B, Fig. 204)

S 292-636

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 862-161

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (2) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-164

- (3) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-162

- (4) Move the flap control lever to the 25-unit detent, and make sure the slats move to the fully extended position.

S 492-163

- (5) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-165

- (6) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

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S 222-166

- (7) Do a check of the clearance between the actuator arm and the EXTEND overtravel stop at each rotary actuator on the same slat (Fig. 204).

S 492-167

- (8) Attach the modeling clay to the RETRACT overtravel stops at the two rotary actuators.

**NOTE:** Attach tape to the structure so that you can remove the clay easily.

S 862-271

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (9) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-169

- (10) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-170

- (11) Move the flap control lever to the zero (FLAPS UP) detent and make sure the slats move to the fully retracted position.

**NOTE:** After the slats moved to the fully retracted position, stop for one minute before you do the next step.

S 862-171

- (12) Move the flap control lever to the 25-unit detent and make sure the slats move to the fully extended position.

S 492-172

- (13) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-173

- (14) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

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S 092-174

- (15) Carefully remove the modeling clay from the two rotary actuators.

S 222-175

- (16) Measure the thicknesses of the two modeling clay and make sure the two thicknesses are between 0.05 to 0.10 inch (1.3 to 2.5 mm) (Fig. 204).

**NOTE:** The thickness of the modeling clay is the retract overtravel stop clearance.

S 862-272

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (17) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-177

- (18) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-178

- (19) Move the flap control lever to the zero (FLAPS UP) detent and make sure the slats move to the fully retracted position.

S 492-179

- (20) Attach a DO-NOT-OPERATE tag to the flap control lever.

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S 862-180

- (21) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 822-181

- (22) If the retract or extend overtravel stop clearances are incorrect as specified in Fig. 204, adjust the stop clearance for the outboard slat (refer to the tasks for Retract and Extend Overtravel Stop Clearance Adjustment - Inboard and Outboard Rotary Actuators, Outboard Slat).

S 712-182

- (23) Do a test on the offset gearbox and the rotary actuator with the instruction given in the "Rotary Actuator and Offset Gearbox Test" paragraph.

J. Retract and Extend Overtravel Stop Clearance Adjustment - Inboard Rotary Actuator, Inboard Slat (Fig. 201)

S 292-637

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 212-183

- (2) Make sure the flaps and slats are in the fully retracted position, and the flap control lever is in the zero (FLAPS UP) detent.

S 212-184

- (3) Make sure the pressure is removed from the center hydraulic system (AMM 29-11-00/201).

S 032-187

- (4) At the inboard rotary actuator of the inboard slat, remove the lockwire and screws on the coupling and disconnect the torque tube on each side of the offset gearbox (Fig. 201).

S 982-435

- (5) Manually turn the input shaft on the inboard offset gearbox in the extend direction until a shim can be installed on the retract stop of the actuator arm.

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S 432-434

- (6) Install shim on the actuator arm retract stop with a thickness of 0.075 +/- 0.003 inch (1.91 +/- 0.08 mm) to set the clearance (Fig. 201).

S 982-188

- (7) Manually turn the input shaft on the inboard offset gearbox in the retract direction until the shim on the actuator arm makes contact with the retract overtravel stop (Fig. 201).

S 432-189

- (8) Install the torque tube on each side of the inboard offset gearbox. (AMM 27-81-24/401).

**NOTE:** To remove freeplay on the gearbox, apply 10 to 15 pound-inches (1 to 1.5 Nm) of torque to the gearbox input shaft at one side of the gearbox, while you connect the torque tube to the other side. Keep the shim between the actuator arm and the retract stop during this step.

Turn the torque tube to the nearest distance possible to align the spline teeth on the coupling when you connect the torque tube ( $\pm 1/2$  tooth).

S 862-191

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (9) Pressurize the center hydraulic system (AMM 29-11-00/201).

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S 092-192

- (10) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-193

- (11) Move the flap control lever to the 25-unit detent and make sure the slats move to the fully extended position.

S 492-194

- (12) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-195

- (13) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 092-196

- (14) Remove the shim between the actuator arm and the retract overtravel stop at the inboard rotary actuator.

S 862-273

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (15) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-198

- (16) Remove the DO-NOT-OPERATE tag from the flap control lever.

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S 862-199

- (17) Move the flap control lever to the zero (FLAPS UP) detent and make sure the slats and the krueger seal flaps move to the fully retracted position.

S 492-200

- (18) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-201

- (19) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 222-202

- (20) Do a check on the overtravel stop clearances for the inboard slats with the instructions given by the "Retract and Extend Overtravel Stop Clearance Check - Inboard Slat" paragraph.

S 432-203

- (21) Make sure you install lockwires to the coupling screws with the double twist procedure for the torque tubes that you connected (AMM 20-10-23/401).

K. Retract and Extend Overtravel Stop Clearance Adjustment -  
Outboard Rotary Actuator, Inboard Slat (Fig. 201)

S 292-638

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 212-204

- (2) Make sure the flaps and slats are in the fully retracted position, and the flap control lever is in the zero (FLAPS UP) detent.

S 212-205

- (3) Make sure the pressure is removed from the center hydraulic system (AMM 29-11-00/201).

S 032-206

- (4) Disconnect the drive shaft for the krueger seal flap at the universal joint, at the outboard rotary actuator of the inboard slat (AMM 27-81-04/201).

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S 032-207

- (5) Remove the sleeve from the drive shaft.

S 032-208

- (6) At the inboard rotary actuator of the inboard slat, remove the lockwire and screws on the coupling and disconnect the torque tube on each side of the inboard offset gearbox (Fig. 201).

S 982-209

- (7) Manually turn the disconnected torque tube between the two rotary actuators (for the inboard slat) in the retract direction, until the actuator arm on the outboard rotary actuator touches the retract stop.

**NOTE:** Apply 10 to 15 pound-inch (1 to 1.5 Nm) torque to the torque tube to remove the gearbox freeplay, and to keep the actuator arm against the retract stop at the outboard actuator.

S 982-210

- (8) Manually turn the input shaft on the inboard offset gearbox to the retract direction until the actuator arm on the inboard rotary actuator touches the retract stop.

**NOTE:** Apply 10 to 15 pound-inch (1 to 1.5 Nm) torque to the input shaft to remove the gearbox freeplay, and to keep the actuator arm against the retract stop at the inboard actuator.

S 432-211

- (9) Install the torque tube to the outboard side of the inboard offset gearbox (AMM 27-81-24/401).

**NOTE:** Turn the torque tube to the nearest distance possible to align the spline teeth on the coupling when you connect the torque tube ( $\pm 1/2$  tooth). Apply 10 to 15 pound-inch (1 to 1.5 Nm) torque to the input shaft at the inboard side of the inboard gearbox to remove the freeplay while you connect the torque tube.

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S 982-436

- (10) Manually turn the input shaft on the outboard offset gearbox in the extend direction until a shim can be installed on the retract stop of the inboard actuator arm.

S 432-437

- (11) Install shim on the inboard actuator arm retract stop with a thickness of 0.075 +/- 0.003 inch (1.9 +/- 0.08 mm) to set the clearance (Fig. 201).

S 982-438

- (12) Manually turn the input shaft on the outboard offset gearbox in the retract direction until the shim on the inboard actuator arm makes contact with the retract overtravel stop (Fig. 201).

S 432-213

- (13) Install the torque tube to the inboard side of the inboard offset gearbox (AMM 27-81-24/401).

**NOTE:** Turn the torque tube to the nearest distance possible to align the spline teeth on the coupling when you connect the torque tube ( $\pm 1/2$  tooth). Apply 10 to 15 pound-inch (1 to 1.5 Nm) torque on the input shaft at the inboard side of the inboard gearbox to remove the freeplay while you connect the torque tube.

S 822-214

- (14) Adjust the stop screw for the Krueger seal flap drive with these steps (AMM 27-81-04/201):

**NOTE:** Use the Figures in AMM 27-81-04/201 to do this adjustment.

- (a) Remove the fastener at the lower inboard corner of the Krueger seal flap and attach a 50-pound (20 kg) weight to the Krueger seal flap.
- (b) Manually turn the drive shaft to retract the Krueger seal flap until the flap touches the stop screw.

**NOTE:** Make sure the flap does not touch the stop screw when you turn the drive shaft by a small increment in the opposite direction.

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- (c) Install the sleeve on the drive shaft.
- (d) Connect the drive shaft to the outboard rotary actuator at the universal joint.

**NOTE:** Increase the flap contact load on the stop screw by a maximum of one spline when you engage the splines between the sleeve and the drive shaft.

- (e) Remove the 50-pound (20 kg) weight from the flap and install the fastener.

S 862-215

- (15) Remove the circuit breaker lock and DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
  - (a) 11H23, SLAT ALTN CONT INBD

S 862-216

- (16) Push the arming switch for the slat alternate drive to arm the slat alternate drive.

**NOTE:** The slat alternate drive will move the manual override lever to the No. 1 (bypass) position on the inboard slat PDU.

S 862-217

- (17) Open this circuit breaker on the P11 panel:
  - (a) 11H23, SLAT ALTN CONT INBD

S 982-218

- (18) Manually turn the torque tube on the inboard side of the inboard offset gearbox to the extend direction and remove the shim between the inboard actuator arm and the retract stop at the inboard rotary actuator.

S 862-219

- (19) Close this circuit breaker on the P11 panel:
  - (a) 11H23, SLAT ALTN CONT INBD

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S 862-220

- (20) Push the arming switch for the slat alternate drive to disarm the slat alternate drive.

**NOTE:** This will move the manual override lever to the No. 2 (normal) position on the inboard slat PDU.

S 862-221

- (21) Open this circuit breaker on the P11 panel and install a circuit breaker lock and a DO-NOT-CLOSE tag:  
(a) 11H23, SLAT ALTN CONT INBD

S 862-222

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (22) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-223

- (23) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-224

- (24) Move the flap control lever to the zero (FLAPS UP) detent and make sure the slats and the krueger seal flaps move to the fully retracted position.

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S 492-225

- (25) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-226

- (26) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 222-227

- (27) Do a check on the overtravel stop clearances for the inboard slats with the instructions given in the "Retract and Extend Overtravel Stop Clearance Check - Inboard Slat" paragraph.

S 432-228

- (28) Make sure you install lockwires to the coupling screws with the double twist procedure for the torque tubes that you connected (AMM 20-10-23/401).

- L. Retract and Extend Overtravel Stop Clearance Adjustment - Inboard and Outboard Rotary Actuators, Outboard Slat (Fig. 202)

S 292-639

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 212-229

- (2) Make sure the flaps and slats are in the fully retracted position, and the flap control lever is in the zero (FLAPS UP) detent.

S 212-230

- (3) Make sure the power is removed from the center hydraulic system (AMM 29-11-00/201).

S 032-231

- (4) At the rotary actuator that you will adjust, remove the lockwire and screws on the coupling and disconnect the torque tube on each side of the offset gearbox (Fig. 202).

S 982-432

- (5) Manually turn the input shaft of the offset gearbox in the extend direction until the shim can be installed on the actuator arm retract stop.

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S 432-433

- (6) Install 0.075 +/- 0.003 inch (1.9 +/- 0.08 mm) shim on the actuator arm retract stop (Fig. 202).

S 982-232

- (7) Manually turn the input shaft to the offset gearbox until the shim on the actuator arm makes contact with the retract overtravel stop.

S 432-233

- (8) Install the torque tube on each side of the offset gearbox. (AMM 27-81-24/401).

**NOTE:** To remove freeplay on the gearbox, apply 10 to 15 pound-inches (1 to 1.5 Nm) of torque to the gearbox input shaft at one side of the gearbox, while you connect the torque tube to the other side. Keep the shim between the actuator arm and the retract stop during this step.

Turn the torque tube to the nearest distance possible to align the spline teeth on the coupling when you connect the torque tube ( $\pm 1/2$  tooth).

S 862-234

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (9) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-235

- (10) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-236

- (11) Move the flap control lever to the 25-unit detent and make sure the slats move to the fully extended position.

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S 492-237

- (12) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-238

- (13) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 092-239

- (14) Remove the shim between the actuator arm and the retract overtravel stop at the rotary actuator.

S 862-274

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (15) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-241

- (16) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-242

- (17) Move the flap control lever to the zero (FLAPS UP) detent and make sure the slats move to the fully retracted position.

S 492-243

- (18) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-244

- (19) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 222-245

- (20) Do a check on the overtravel stop clearances for the inboard slats with the instructions given by the "Retract and Extend Overtravel Stop Clearance Check - Outboard Slat" paragraph.

S 432-246

- (21) Make sure you install lockwires to the coupling screws with the double twist procedure for the torque tubes that you connected (AMM 20-10-23/401).

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TASK 27-81-20-712-247

5. Rotary Actuator and Offset Gearbox Test

A. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-81-00/201, Leading Edge Slat System
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Landing Gear Door Locks
- (6) AMM 78-31-00/201, Thrust Reverser System

B. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard
550/650	Wing Trailing Edge - Inboard
560/660	Wing Trailing Edge - Outboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

C. Prepare for Test

S 212-248

- (1) Make sure the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position.

S 212-249

- (2) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 092-250

- (3) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-251

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

S 092-252

- (5) Remove the groundlocks from the inboard and outboard slat power drive units (PDU) (Fig. 206).

S 092-253

- (6) Remove the PDU lock from the TE flap PDU (Fig. 205).

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S 862-254

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (7) Pressurize the center hydraulic system (AMM 29-11-00/201).  
D. Test for the Rotary Actuator and Offset Gearbox Installation

S 862-255

- (1) Move the flap control lever to the 30-unit detent, and make sure the flaps and slats move to the fully extended position.

S 862-256

- (2) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted position.  
E. Put the Airplane Back to the Usual Condition

S 412-257

- (1) Install the lower access panels for the leading edge (AMM 06-44-00/201).

**NOTE:** Use the procedure in AMM 27-81-00/201 to operate the slats as necessary to install the access panels.

S 862-258

- (2) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD  
(c) 11J24, FLAPS ALTN CONT

S 862-259

- (3) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6D24, ALTN FLAP PWR  
(c) 6F24, ALTN SLAT OUTBD PWR

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S 092-260

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 862-261

(5) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 862-262

(6) Remove electrical power (AMM 24-22-00/201).

S 412-263

(7) Install the access panels, 511BB and 611BB, for the inboard and outboard slat PDUs (AMM 06-44-00/201).

S 442-264

(8) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

TASK 27-81-20-422-401

6. In-Service Backlash and Axial Freeplay Checks (On-Wing) for the Leading Edge (LE) Slat Rotary Actuator(s)

A. Equipment

- (1) Leading Edge Slats Groundlock - A27007-1  
(2 Necessary)
- (2) TE Flap PDU Lock - A27009-7
- (3) Circuit Breaker Lockout Clip (4 Necessary)  
Commercially Available
- (4) Force Gage (0 to 50 pounds)(0-222 newtons)

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels

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- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 32-00-15/201, Landing Gear Door Locks
- (5) AMM 32-00-20/201, Landing Gear Downlocks
- (6) AMM 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zone

144	Right MLG Wheel Well
211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard

(2) Access Panels

511EB	Inboard Slat Mechanism, Slat Actuator (Left)
511FB	Lower LE Structure, Slat Mechanism (Left)
511KB	Lower LE Structure, Slat Mechanism (Left)
611EB	Inboard Slat Mechanism, Slat Actuator (Right)
611FB	Lower LE Structure, Slat Mechanism (Right)
611KB	Lower LE Structure, Slat Mechanism (Right)

D. Prepare for the Checks

S 292-640

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 492-402

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 422-429

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

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S 012-005

- (4) Remove the lower access panels for the leading edge when it is necessary to get to the rotary actuators (AMM 06-44-00/201).

**NOTE:** Use the procedure in AMM 27-81-00/201 to extend and retract the slats to remove the access panels.

S 012-428

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 862-425

- (6) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 862-426

- (7) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 412-407

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

S 862-343

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (9) Pressurize the center hydraulic system (AMM 29-11-00/201).

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S 212-348

- (10) Move the flap control lever to the 25-unit detent and make sure the slats move to the fully extended position.

S 492-349

- (11) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-355

- (12) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 012-409

- (13) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 205).

S 492-410

- (14) Open the lower access panels, on the wings LE to get access to the outboard and inboard slat PDUs, and rotary actuators (AMM 06-44-00/201).

S 862-411

- (15) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 206).

S 032-356

- (16) Disconnect the control rod from the rotary actuator arm gear.

**NOTE:** Notice how the bolt and associated hardware are installed. It is important to install them, back in place, in the same order.

E. Backlash Check for the Inboard and Outboard Slat Rotary Actuator (s)

S 832-358

- (1) Pull aft on the actuator arm, 25 to 50 pounds (100 to 200 Newtons) maximum.

**NOTE:** If the force applied to the actuator arm gear is more than 50 pounds (200 Newtons), it can cause the sun gear of the rotary actuator to rotate, which will make the measurements that follow incorrect.

S 972-346

- (2) Measure the clearance at the extend overtravel stop.

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S 832-359

- (3) Push forward on the actuator arm gear, 25 to 50 pounds (100 to 200 Newtons) maximum.

**NOTE:** If the force applied to the actuator arm gear is more than 50 pounds (200 Newtons), it can cause the sun gear of the rotary actuator to rotate, which will make the measurements that follow incorrect.

S 972-347

- (4) Measure the clearance at the extend overtravel stop.

S 222-357

- (5) Make sure the difference of the two measurements taken before is not greater than 0.052 inch (1.3 mm).

F. Axial Freeplay Check

S 832-412

- (1) Use an inside caliper or a feeler gage set to take linear axial travel measurements between arm gear and ring gears.

**NOTE:** If you use a dial indicator install it in such a way that you can measure the axial travel of the arm gear to a fixed point.

S 832-413

- (2) Manually push arm gear inboard, as far as possible, and record the reading measurement shown on the caliper, dial indicator, or record the thickness of the feeler blade used.

S 832-414

- (3) Manually push arm gear outboard, as far as possible, and record measurement shown on caliper, dial indicator, or record the thickness of the feeler blade used.

S 832-415

- (4) Make sure that the subtraction of the two recorded measurements is no more than the maximum permitted axial freeplay of 0.070 inch (1.8 mm).

G. Put the Airplane Back to the Usual Condition

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S 292-641

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 832-416

- (2) Connect the control rod to the actuator arm gear.

**NOTE:** It is important you install the bolt and associated hardware in the same order they were installed.

S 492-350

- (3) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-353

- (4) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 212-351

- (5) Move the flap control lever to the zero (FLAPS UP) detent and make sure the slats move to the fully retracted position.

S 862-354

- (6) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 412-417

- (7) Remove electrical power (AMM 24-22-00/201).

S 862-430

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (8) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 442-419

- (9) Install the access panels, 511BB and 611BB, for the inboard and outboard slat PDUs (AMM 06-44-00/201).

S 442-420

- (10) Install the lower access panels for the leading edge that you removed to get to the rotary actuators (AMM 06-44-00/201).

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S 862-421

- (11) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 862-422

- (12) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 862-423

- (13) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

TASK 27-81-20-202-277

7. Slat Retract and Extend Overtravel Stop Clearance Check

NOTE: This is a scheduled maintenance task.

A. Equipment

- (1) Circuit Breaker Lockout Clip (4 Necessary)  
Commercially Available
- (2) Circuit Breaker Lock Set (4 Necessary)  
Commercially Available

B. Consumable Materials

- (1) G02020 Modeling Clay

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 78-31-00/201, Thrust Reverser System

D. Prepare for Check

S 042-278

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 862-279

- (2) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

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S 862-281

- (3) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 862-282

- (4) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 862-283

- (5) Supply electrical power (AMM 24-22-00/201).
- E. Retract and Extend Overtravel Stop Clearance Check - Inboard Slat (Detail A, Fig. 204)

S 292-644

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 862-284

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (2) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 862-285

- (3) Move the flap control lever to the 25-unit detent, and make sure the slats move to the fully extended position.

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- S 492-286
- (4) Attach a DO-NOT-OPERATE tag to the flap control lever.
- S 862-287
- (5) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).
- S 012-288
- (6) Remove lower leading edge access panels 511EB, 511FB, 511KB on left wing and/or 611EB, 611FB, 611KB on right wing (AMM 06-44-00/201).
- S 222-289
- (7) Do a check of the clearance between the actuator arm and the EXTEND overtravel stop (for the inboard slat), a clearance of more than 0.03 inch (0.8 mm) is needed at each rotary actuator.
- S 492-290
- (8) Attach modeling clay to the RETRACT overtravel stop at the outboard rotary actuator only.

**NOTE:** Attach a piece of tape to the structure so that you can remove the clay easily.

S 862-291

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (9) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-292

- (10) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-293

- (11) Move the flap control lever to the zero (FLAPS UP) detent and make sure the slats move to the fully retracted position.

**NOTE:** After the slats moved to the fully retracted position, stop for one minute before you do the next step.

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S 492-294

- (12) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-295

- (13) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 222-296

- (14) At the inboard rotary actuator, make sure the clearance between the actuator arm and the retract overtravel stop is 0.05 to 0.10 inch (1.3 to 2.5 mm).

S 862-297

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (15) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-298

- (16) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-299

- (17) Move the flap control lever to the 25-unit detent and make sure the slats move to the fully extended position.

S 492-300

- (18) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-301

- (19) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 092-302

- (20) Carefully remove the modeling clay from the outboard rotary actuator.

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S 222-303

- (21) Measure the thickness of the clay and make sure the thickness is between 0.05 and 0.10 inch (1.3 to 2.5 mm).

**NOTE:** The thickness of the modeling clay is the retract overtravel stop clearance for the outboard actuator.

S 862-304

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (22) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-305

- (23) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-306

- (24) Move the flap control lever to the zero (FLAPS UP) detent and make sure the slats move to the fully retracted position.

S 492-307

- (25) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-308

- (26) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 822-309

- (27) If the retract or extend overtravel stop clearances are incorrect as specified in Fig. 204, adjust the stop clearance for the inboard slat (refer to the tasks for Retract and Extend Overtravel Stop Clearance Adjustment - Inboard and Outboard Rotary Actuators, Inboard Slat).

S 412-310

- (28) Install the access panels, 511EB, 511FB, 511KB on left wing and/or 611EB, 611FB, 611KB on right wing (AMM 06-44-00/201).

- F. Retract and Extend Overtravel Stop Clearance Check - Outboard Slats (Detail B, Fig. 204)

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S 862-311

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (1) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-312

- (2) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 842-313

- (3) Move the flap control lever to the 25-unit detent, and make sure the slats move to the fully extended position.

S 492-314

- (4) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-315

- (5) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 012-625

- (6) Remove the access panels, 521BB, 521EB, 511JB, 511RB, 521ZB, 521AFB, 521ANB on the left wing and/or 621BB, 621EB, 621JB, 621ZB, 621AFB, 621ANB on the right wing (AMM 06-44-00/201).

S 222-316

- (7) Do a check of the clearance between the actuator arm and the EXTEND overtravel stop at each rotary actuator on the same slat (Fig. 204).

S 492-317

- (8) Attach modeling clay to the RETRACT overtravel stops on each rotary actuator.

**NOTE:** Attach tape to the structure so the clay can be removed easily.

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S 862-318

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(9) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 092-319

(10) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-320

(11) Move the flap control lever to the zero (FLAPS UP) detent and make sure the slats move to the fully retracted position.

**NOTE:** After the slats move to the fully retracted position, stop for one minute before doing the next step.

S 862-321

(12) Move the flap control lever to the 25-unit detent and make sure the slats move to the fully extended position.

S 492-322

(13) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-323

(14) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 092-324

(15) Carefully remove the modeling clay from each rotary actuator.

S 222-325

(16) Measure the thicknesses of each modeling clay and make sure the thickness is between 0.05 and 0.10 inch (1.3 and 2.5 mm).

**NOTE:** The thickness of the modeling clay is the retract overtravel stop clearance (Fig. 204).

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S 862-326

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(17) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 862-327

(18) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 862-328

(19) Move the flap control lever to the zero (FLAPS UP) detent and make sure the slats move to the fully retracted position.

S 492-329

(20) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-330

(21) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 822-331

(22) If the retract or extend overtravel stop clearances are incorrect as specified in Fig. 204, adjust the stop clearance for the outboard slat (refer to the tasks for Retract and Extend Overtravel Stop Clearance Adjustment - Inboard and Outboard Rotary Actuators, Outboard Slat).

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S 412-624

- (23) Install the access panels, 521BB, 521EB, 511JB, 511RB, 521ZB, 521AFB, 521ANB on the left wing and/or 621BB, 621EB, 621JB, 621ZB, 621AFB, 621ANB on the right wing (AMM 06-44-00/201).

G. Put the Airplane Back to the Usual Condition

S 292-646

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 862-332

- (2) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 862-333

- (3) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 862-334

- (4) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 862-335

- (5) Remove electrical power (AMM 24-22-00/201).

S 042-336

- (6) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

EFFECTIVITY

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LEADING EDGE SLAT TORQUE TUBE - REMOVAL/INSTALLATION

1. General

- A. This procedure contains the tasks for the removal and the installation of the leading edge (LE) slat torque tubes. The LE slats are identified by the numbers 1 through 12, from the left wing to the right wing. There are six slats on each wing.
- B. There are three types of torque tubes:
  - (1) Torque tubes with a splined coupling at each end
  - (2) Torque tubes with a splined coupling at one end and a bearing housing at the other end
  - (3) Torque tubes with a bearing housing at each end.
- C. You must remove the torque tubes with the coupling on each end first, before you can remove any other types of torque tubes.
- D. The safety straps are installed in the slat drive system to prevent damage on the adjacent structure if a torque tube becomes disconnected during the operation of the slats (Fig. 404).

TASK 27-81-24-024-001

2. Leading Edge Slat Torque Tube - Removal

A. Equipment

- (1) Leading Edge Slats Groundlock - A27007-1 (2 necessary)
- (2) TE Flap PDU Lock - A27009-7
- (3) Circuit Breaker Lockout Clip  
(4 necessary) Commercially Available
- (4) Rig Pins from Set A20004-XX (Ref 20-10-24):
  - (a) LE2 - P/N A20004-9
  - (b) LE5 - P/N A20004-9

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 20-10-24/201, Rig Pins
- (3) 27-81-00/201, Leading Edge Slat System
- (4) 27-81-00/501, Leading Edge Slat System
- (5) 27-81-20/201, LE Slat Drive Rotary Actuator and Offset Gearbox
- (6) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) 32-00-15/201, Landing Gear Door Locks
- (8) 32-00-20/201, Landing Gear Downlocks
- (9) 78-31-00/201, Thrust Reverser System

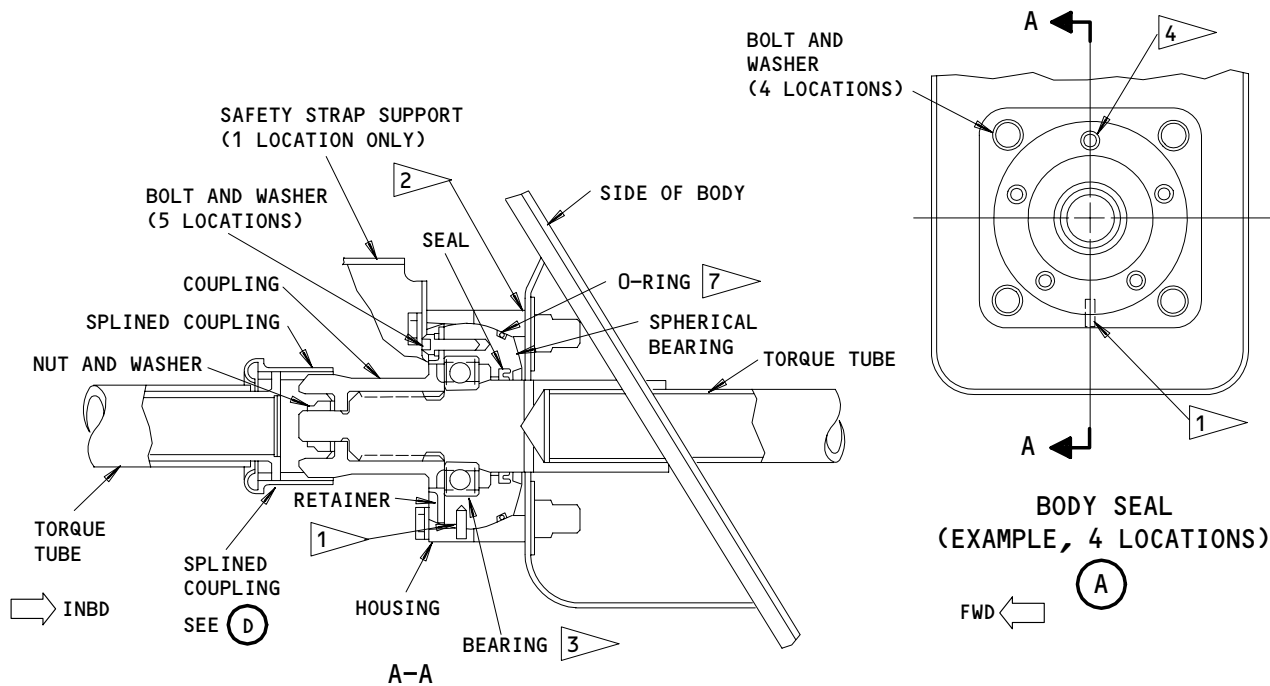
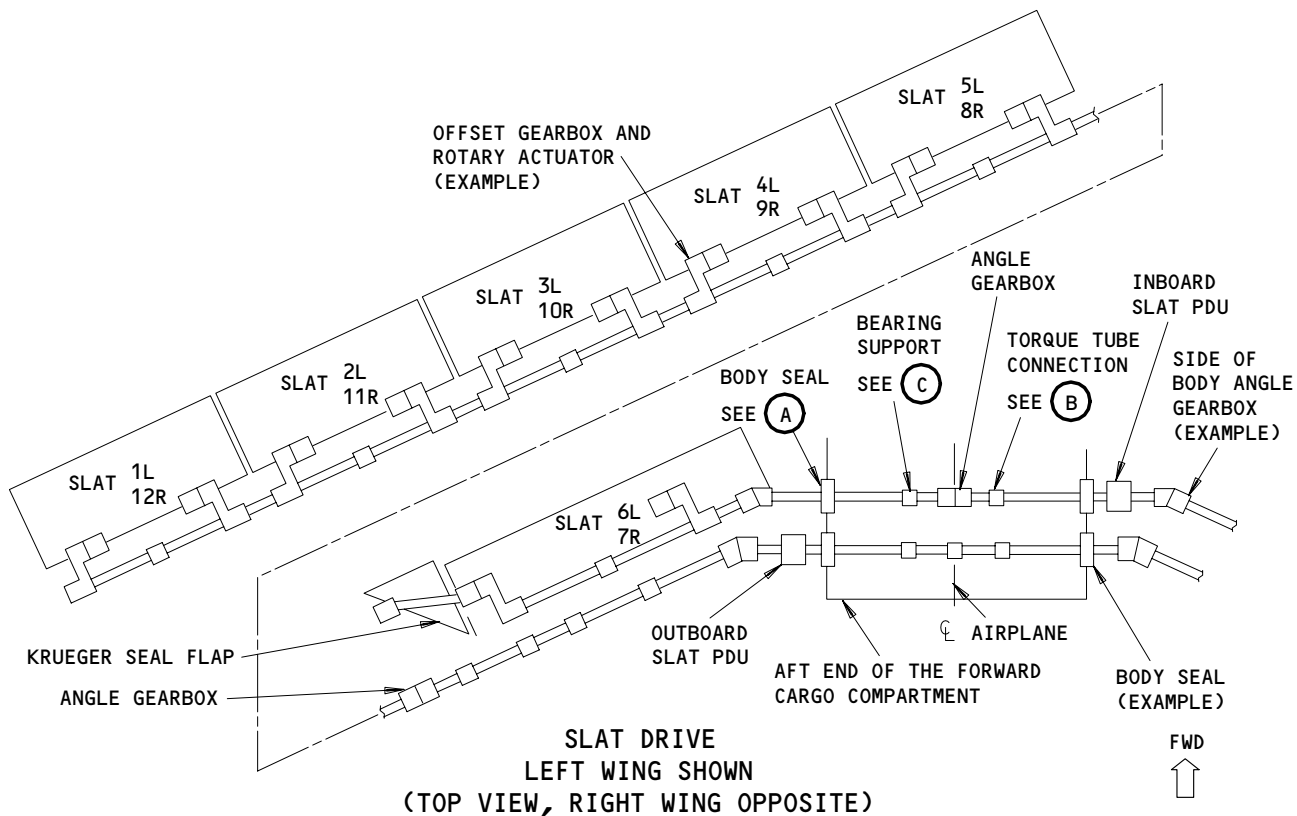
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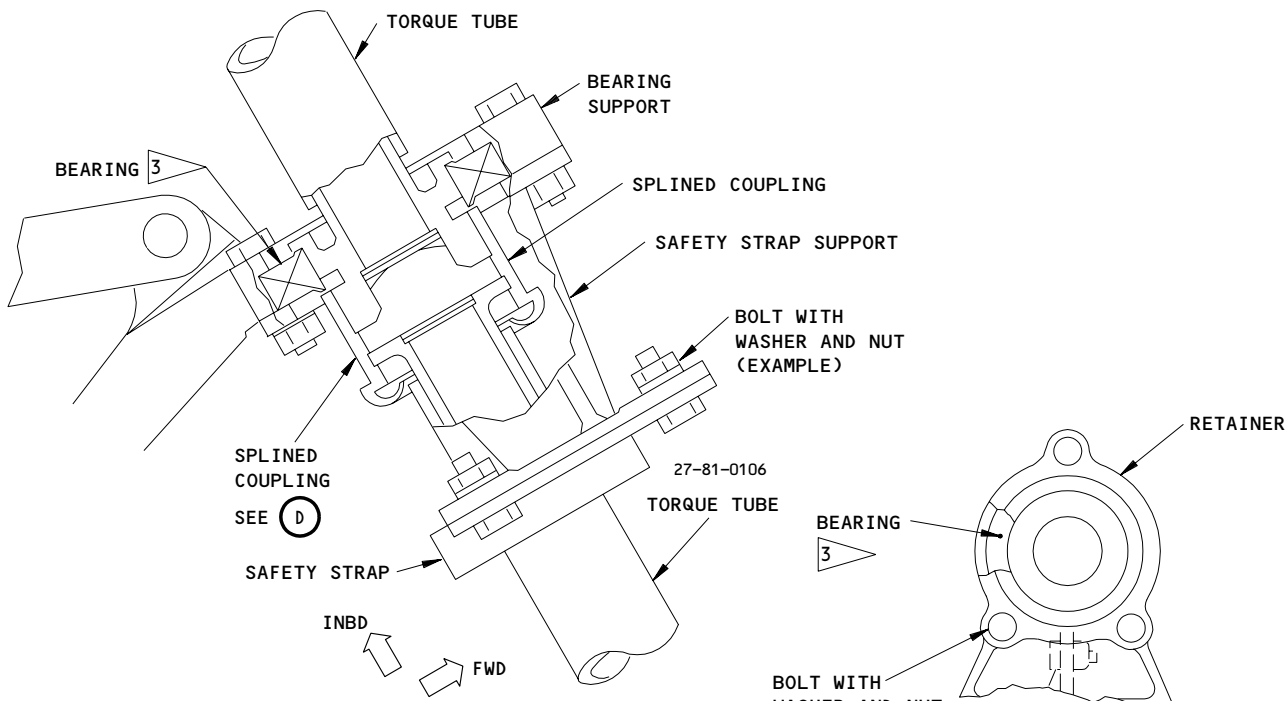
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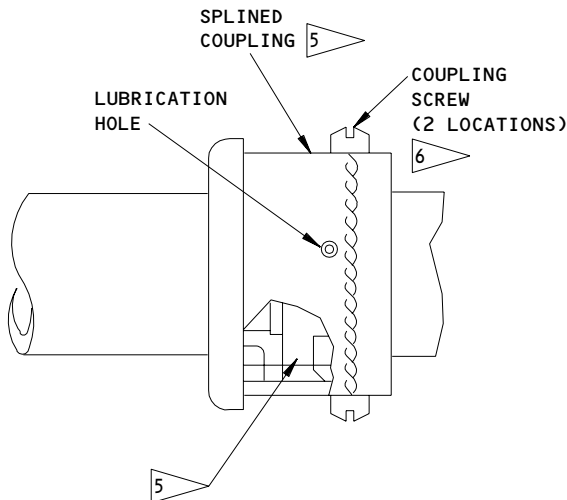


**TORQUE TUBE CONNECTION  
(EXAMPLE, 2 LOCATIONS)**

(B)

**BEARING SUPPORT  
(EXAMPLE, 3 LOCATIONS)**

(C)



**SPLINED COUPLING  
(EXAMPLE)**

(D)

- 1 INSTALL WITH THE PIN DOWN
- 2 APPLY PRESSURE HEAVILY ON THE MATING SURFACE SEAL
- 3 APPLY GREASE (BMS 3-24) ON THE OD AND ID OF THE BEARING BEFORE INSTALLATION
- 4 INSTALL LOCKWIRE ON THE FIVE BOLTS WITH THE DOUBLE TWIST PROCEDURE AFTER INSTALLATION (AMM 20-10-23/401)
- 5 APPLY A THIN LAYER OF GREASE (MIL-PRF-23827 OR MIL-G-81322) TO THE FULL LENGTH OF THE INTERNAL SPLINE BEFORE INSTALLATION. FILL THE SPLINED COUPLING WITH GREASE THROUGH THE LUBRICATION HOLE AFTER INSTALLATION. CLEAN OFF ALL THE GREASE FROM THE EXTERNAL SIDE OF THE SPLINED COUPLING
- 6 INSTALL THE COUPLING SCREWS AT TWO LOCATIONS BUT DO NOT OVERTIGHTEN THE SCREWS. INSTALL LOCKWIRE TO THE SCREWS (USE THE DOUBLE TWIST PROCEDURE REF 20-10-23/401).
- 7 APPLY GREASE (MIL-PRF-23827) TO THE O-RING BEFORE INSTALLATION

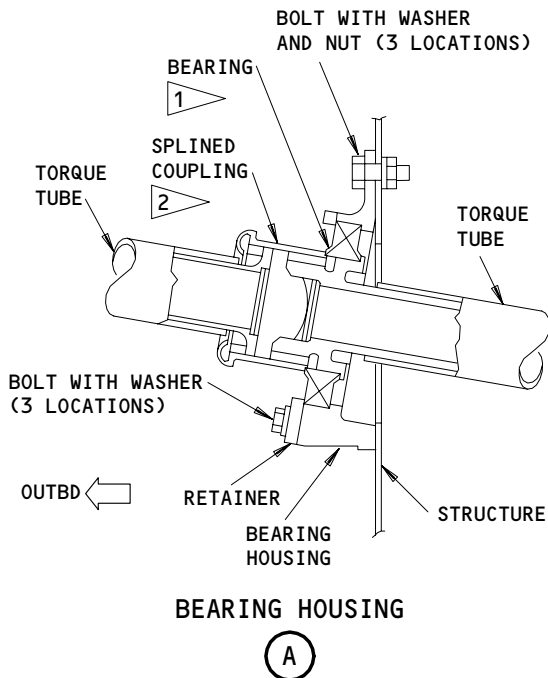
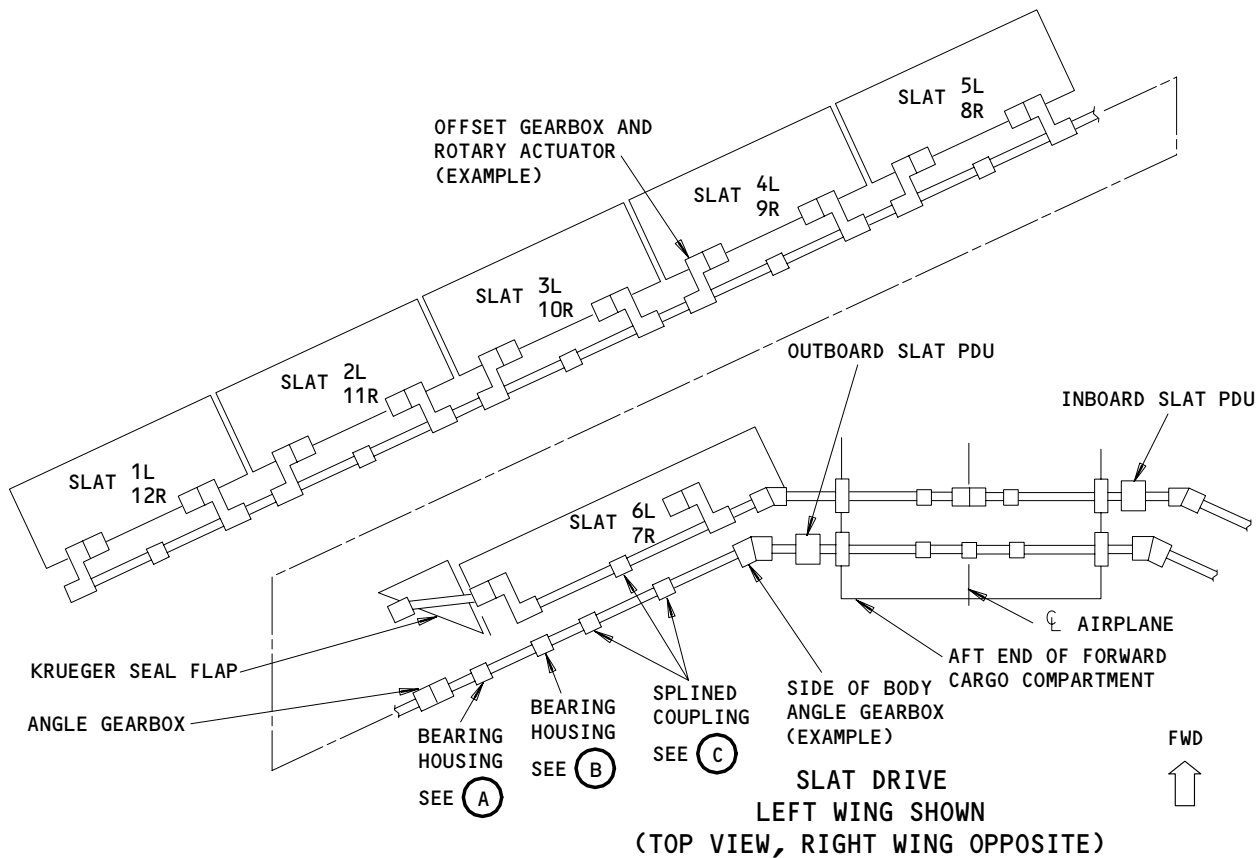
**Leading Edge Slat Torque Tubes (Aft End of the Forward Cargo Compartment)  
Figure 401 (Sheet 2)**

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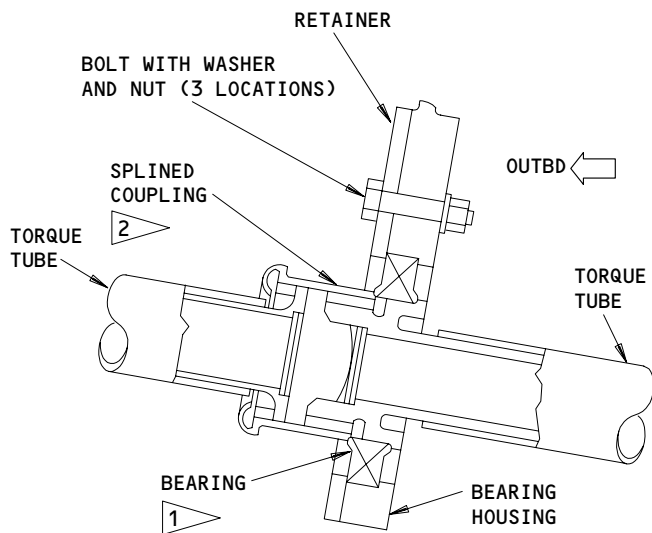
- 1 ▷ APPLY GREASE (BMS 3-24) ON THE OD AND ID OF THE BEARING BEFORE INSTALLATION
- 2 ▷ SEE FIG. 401 FOR EXAMPLE OF A SPLINED COUPLING INSTALLATION

Leading Edge Slat Torque Tubes  
(Slats No. 6 and 7, and Area Inboard of Slats No. 5 and 8)  
Figure 402 (Sheet 1)

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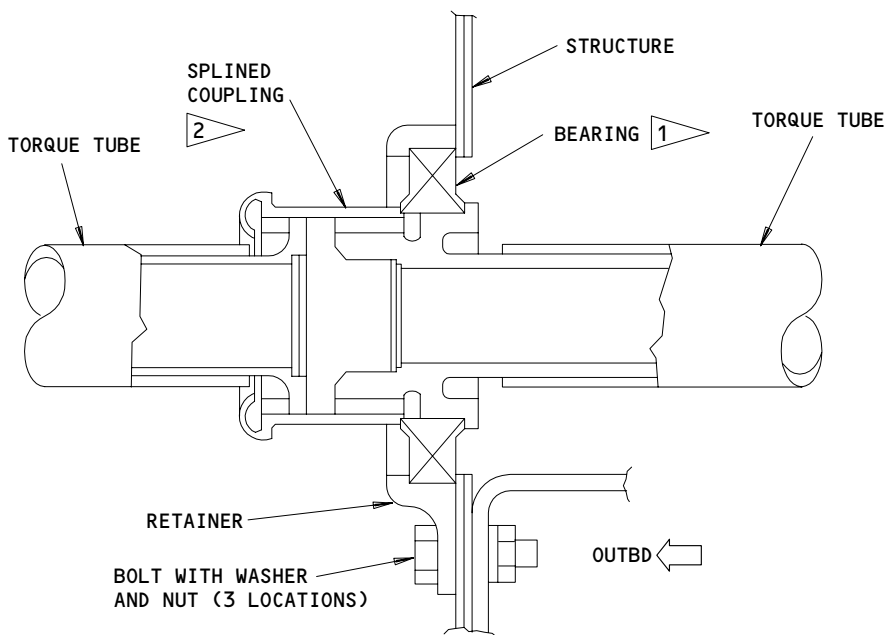
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BEARING HOUSING

(B)



SPLINED COUPLING

(C)

Leading Edge Slat Torque Tube  
(Slats No. 6 and 7, and Area Inboard of Slats No. 5 and 8)  
Figure 402 (Sheet 2)

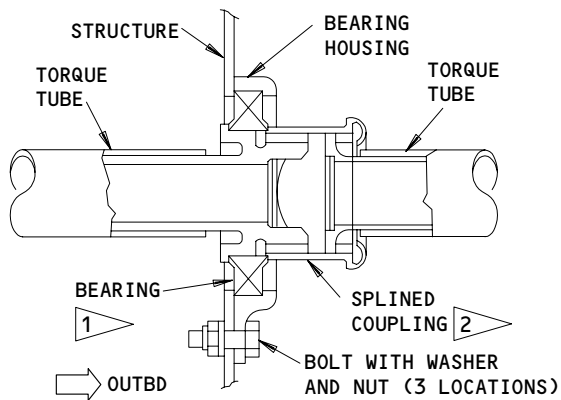
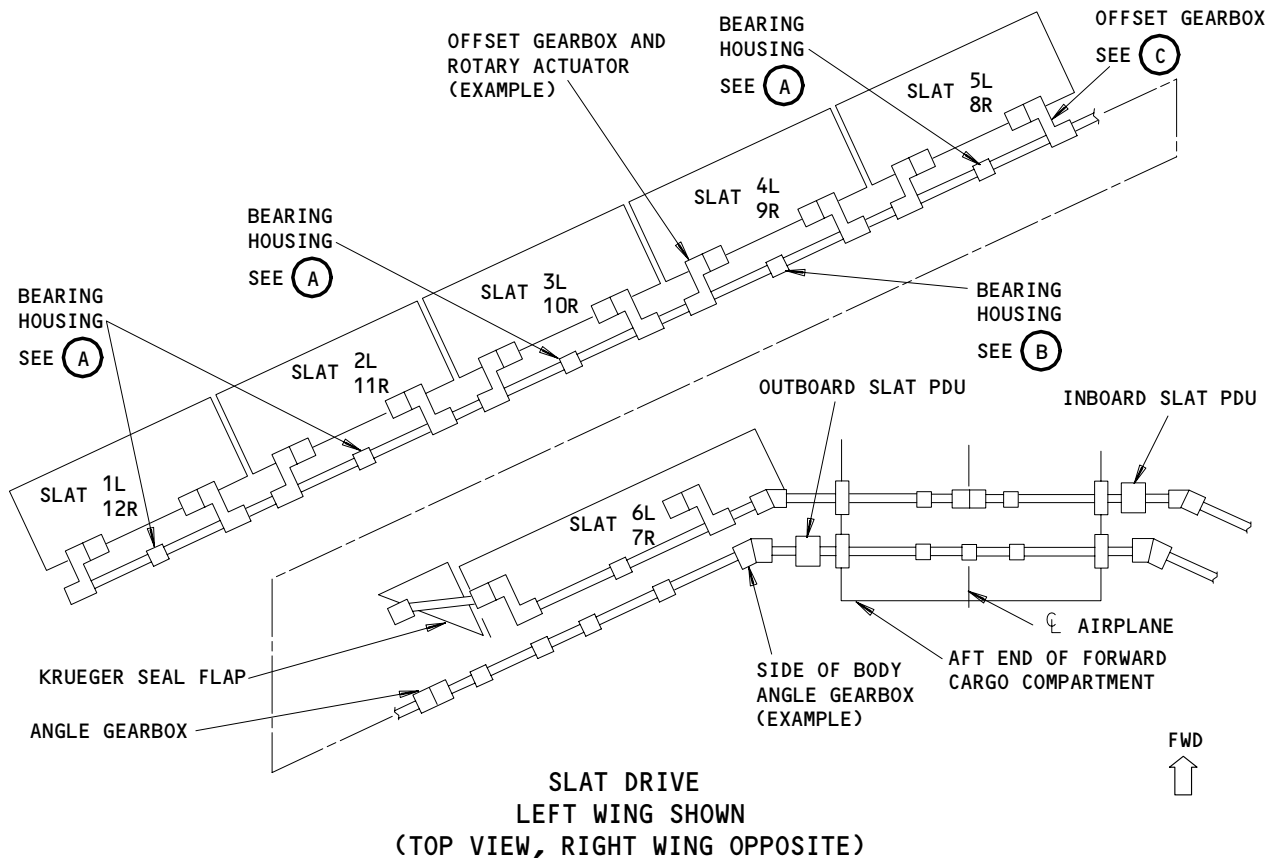
EFFECTIVITY

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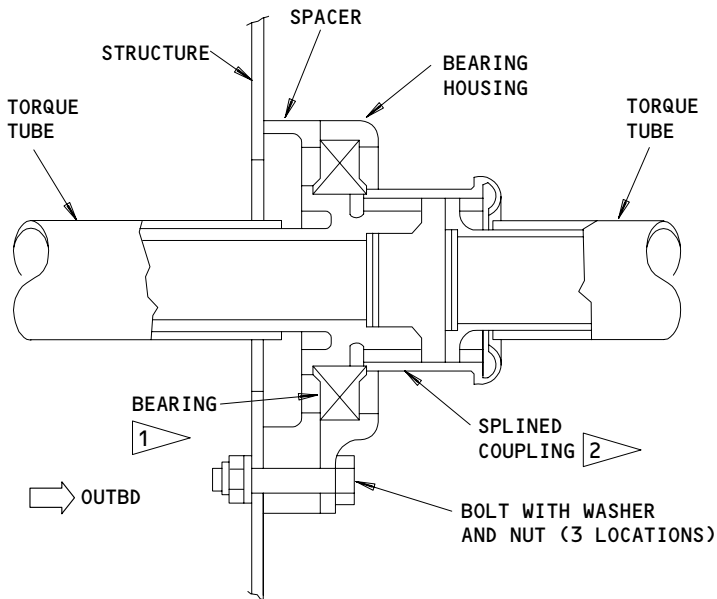


- 1 APPLY GREASE (BMS 3-24) ON THE OD AND ID OF THE BEARING BEFORE INSTALLATION
- 2 SEE FIG. 401 FOR EXAMPLE OF A SPLINED COUPLING INSTALLATION

**Leading Edge Slat Torque Tubes  
(Slats No. 1 through 5, and No. 8 through 12)  
Figure 403 (Sheet 1)**

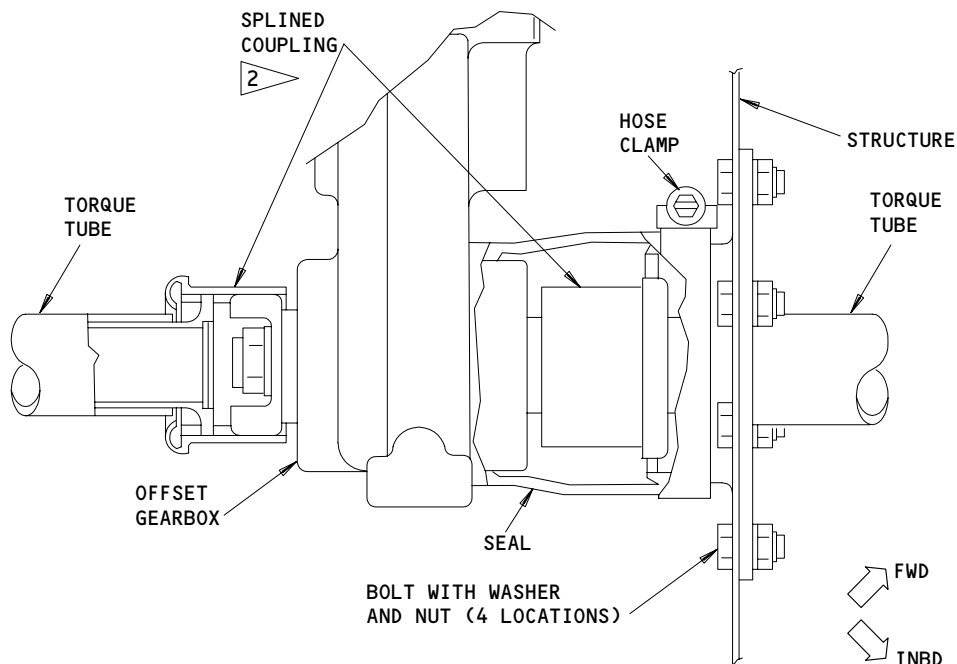
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BEARING HOUSING

(B)



OFFSET GEARBOX

(C)

Leading Edge Slat Torque Tubes  
(Slats No. 1 through 5, and No. 8 through 12)  
Figure 403 (Sheet 2)

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C. Access

(1) Location Zones

122	Right MLG Wheel Well
125/126	Area Aft of the Forward Cargo Compartment
211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard
710	Nose landing Gear and Doors
730/740	Left/Right Main landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit, Outboard (Left)
611BB	LE Slat Power Drive Unit, Inboard (Right)

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 494-003

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (Ref 32-00-15).

S 044-004

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 014-005

- (4) Remove the lower access panels for the leading edge as necessary to get to the torque tubes (Ref 06-44-00).

**NOTE:** Use the procedure in 27-81-00/201 to extend and retract the slats as necessary to remove the access panels.

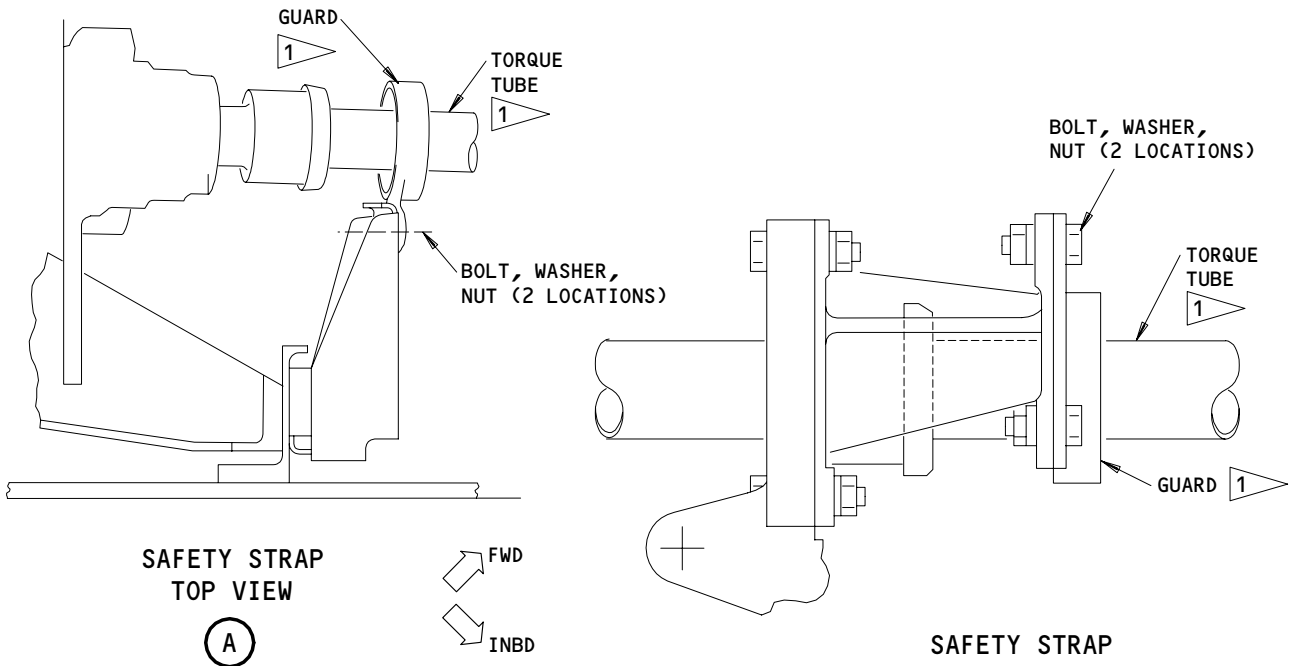
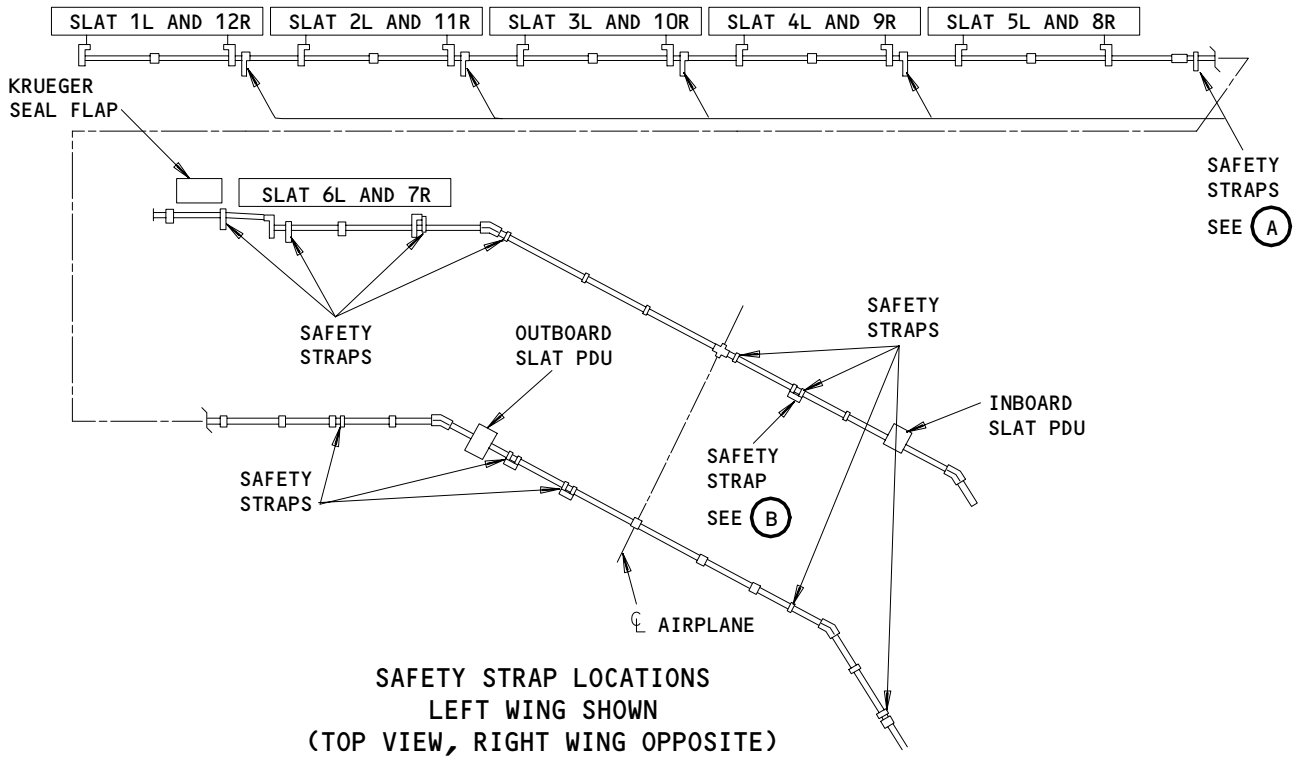
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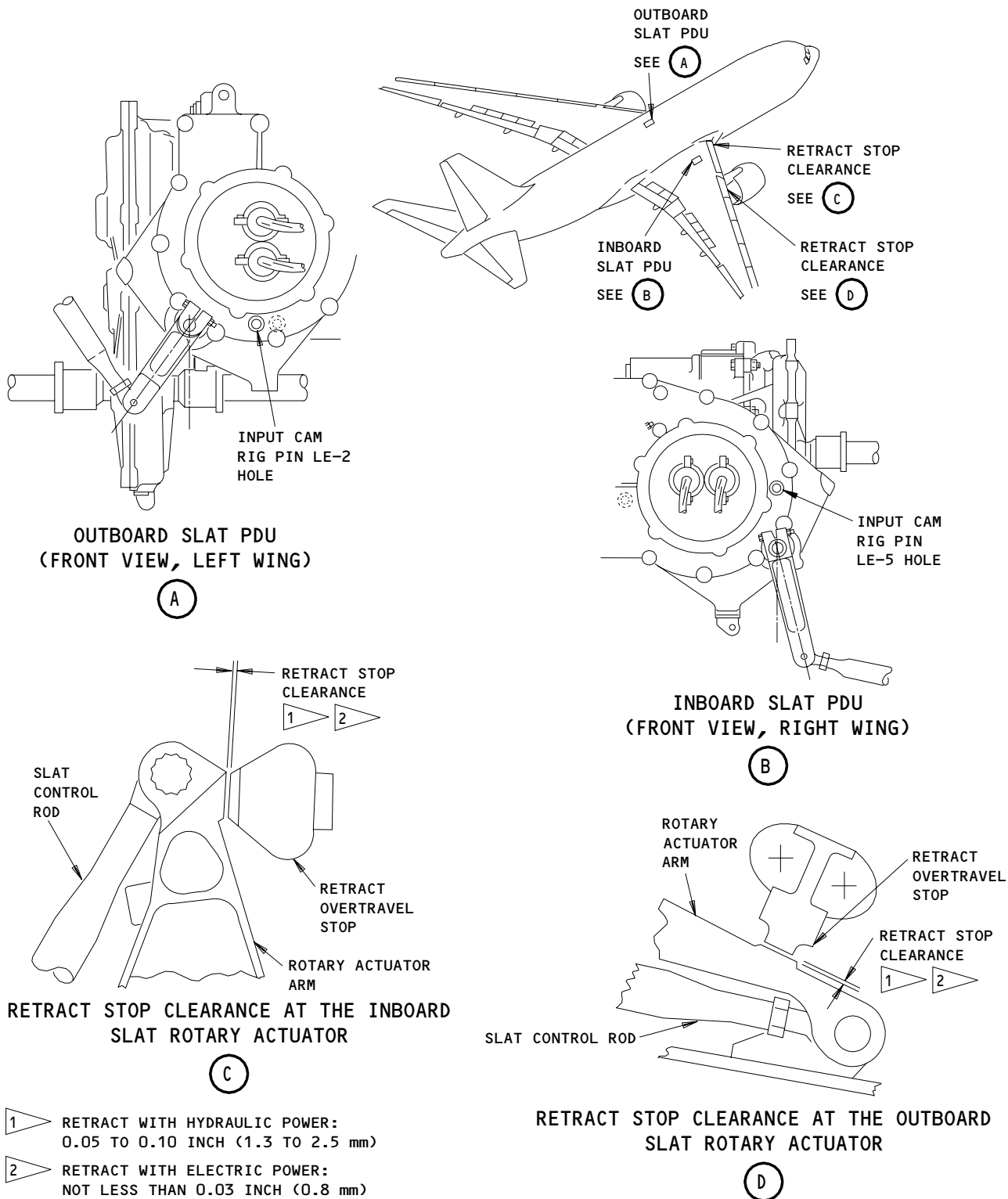


**1** KEEP A 0.20 INCH MINIMUM RADIAL CLEARANCE BETWEEN THE GUARD AND THE TORQUE TUBE. THE SAME CLEARANCE IS APPLICABLE AT ALL SAFETY STRAP LOCATIONS

**Safety Strap Location and Clearances  
Figure 404**

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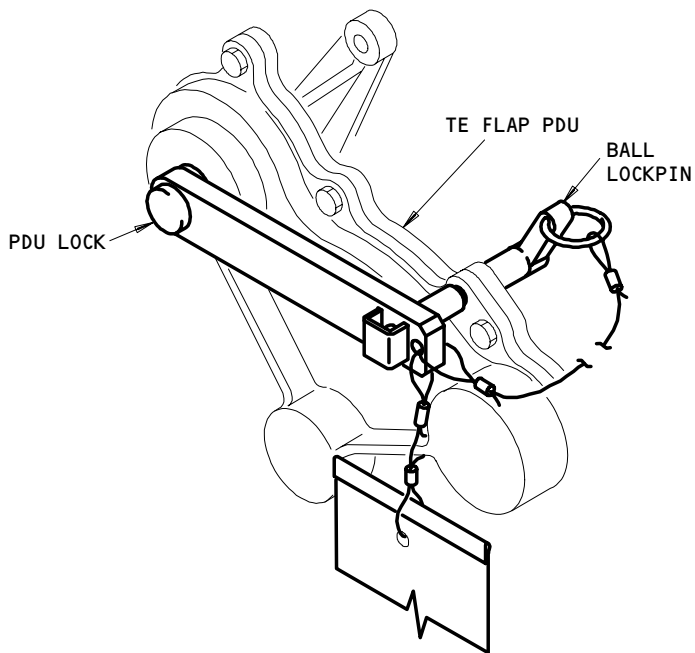
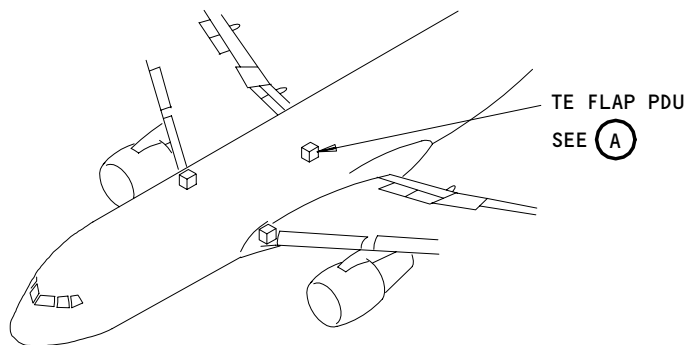
### 27-81-24



Leading Edge Slat PDU Rig Pin Location and Rotary Actuator Retract Stop Clearance  
Figure 405

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TE FLAP PDU

(A)

PDU Lock for the TE Flap  
Figure 406

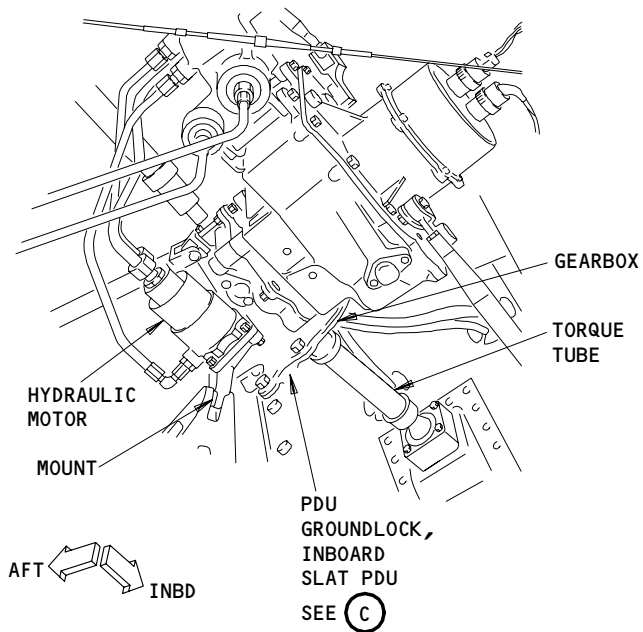
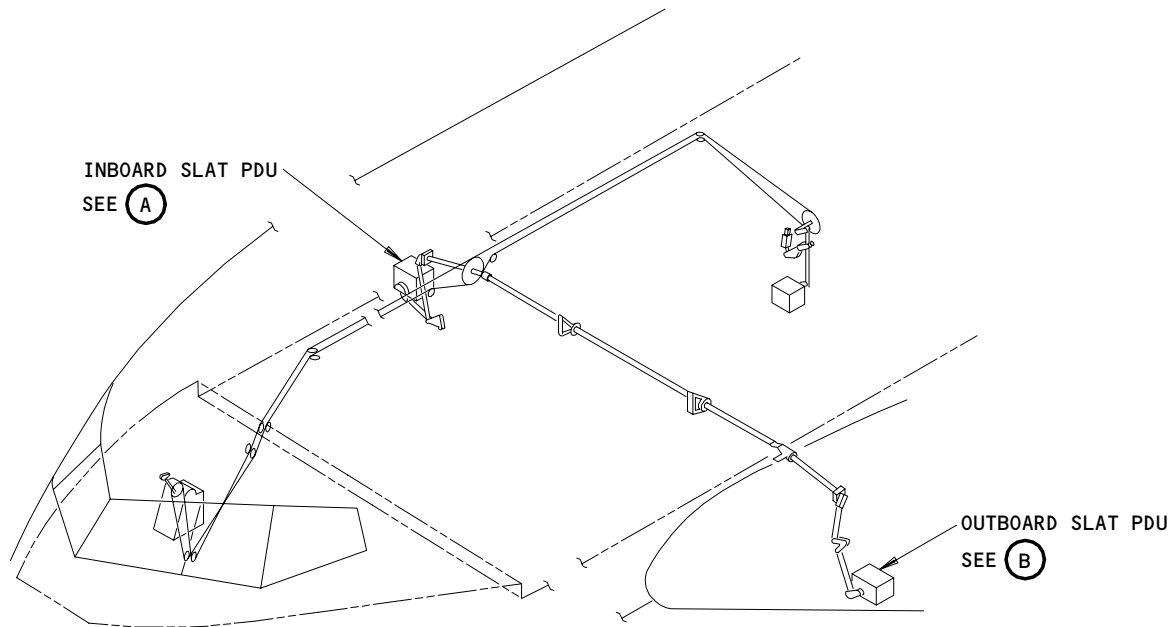
EFFECTIVITY	
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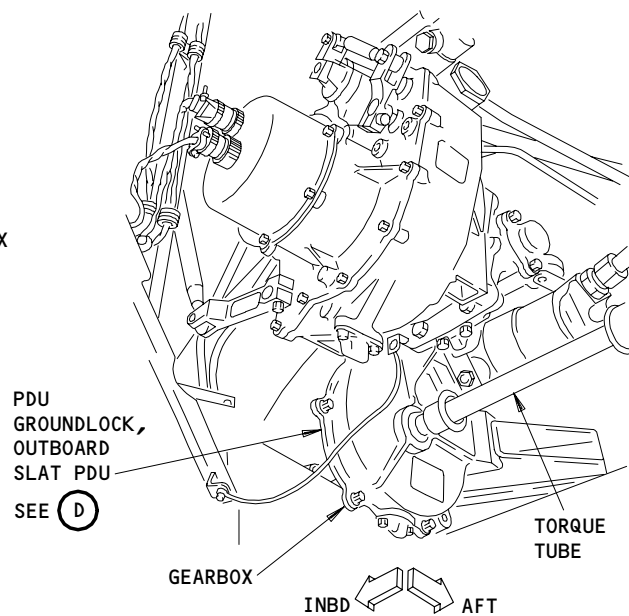
01

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INBOARD SLAT PDU  
(BOTTOM VIEW)

(A)



OUTBOARD SLAT PDU

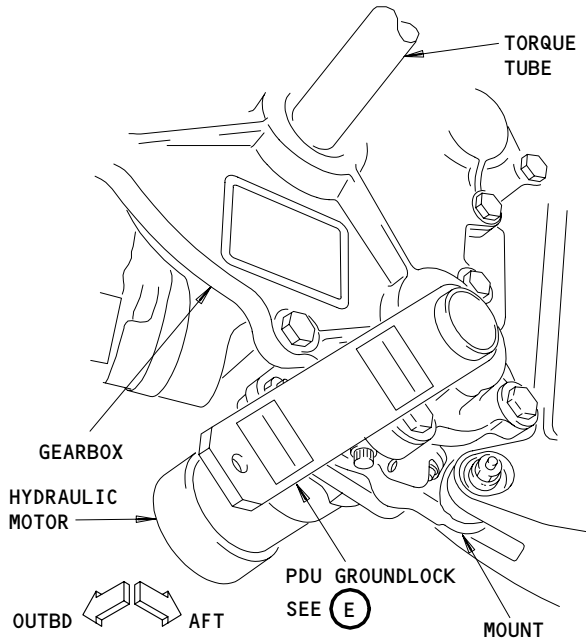
(B)

Slat PDU Groundlock  
Figure 407 (Sheet 1)

EFFECTIVITY	
	ALL

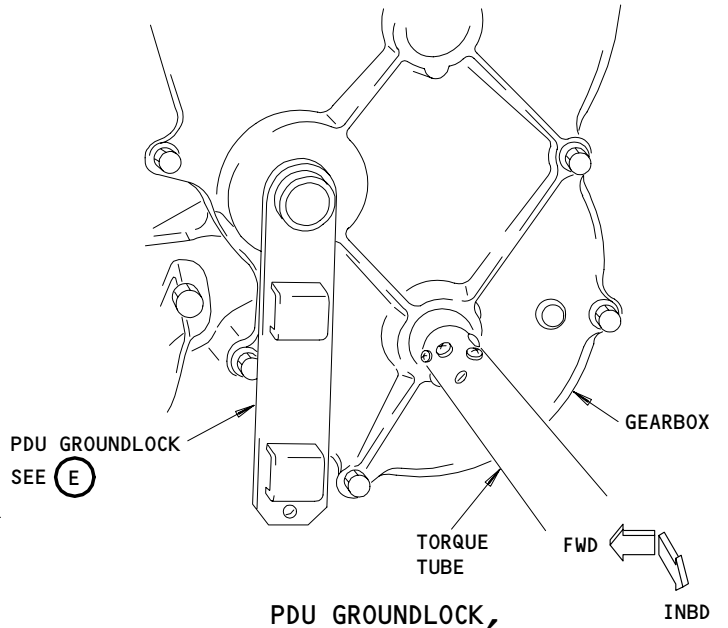
27-81-24





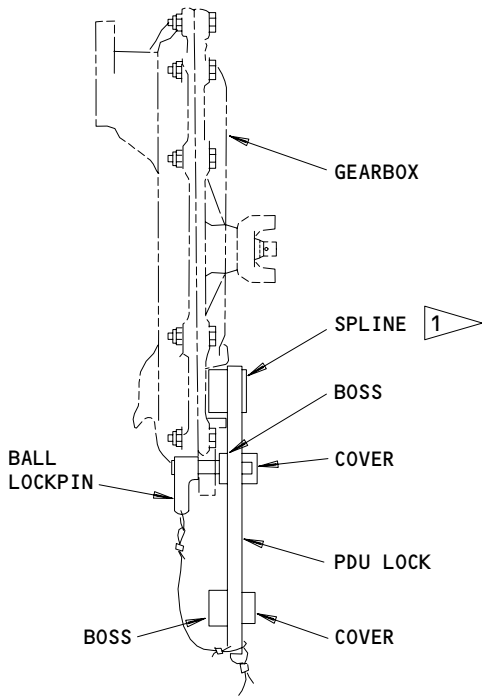
PDU GROUNDLOCK,  
INBOARD SLAT PDU

(C)



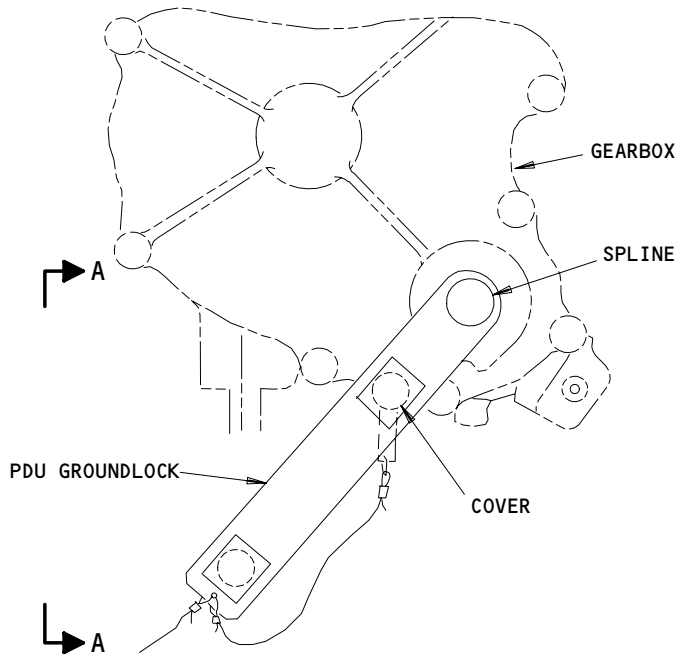
PDU GROUNDLOCK,  
OUTBOARD SLAT PDU

(D)



A-A

1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN, INSTALLED THROUGH THE BOSS AND GEARBOX



PDU GROUNDLOCK

(E)

Slat PDU Groundlock  
Figure 407 (Sheet 2)

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- S 014-037
- (5) Remove the access panels and open the access doors at the area aft of the forward cargo compartment to get access to the torque tubes if necessary (Ref 06-44-00).
- S 214-006
- (6) Make sure that the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position.
- S 214-007
- (7) Make sure the flap control lever is in the zero (FLAPS UP) detent.
- S 494-008
- (8) Install a DO-NOT-OPERATE tag on the flap control lever.
- S 864-009
- (9) Remove the power from the center hydraulic system (Ref 29-11-00).
- S 494-010
- (10) Install the PDU lock on the TE flap power drive unit (PDU) (Fig. 406).
- S 014-027
- (11) Remove the access panels, 511BB and 611BB, to get access to the inboard and outboard LE slat PDUs (Ref 06-44-00).
- S 494-011
- (12) Install the LE slat groundlocks on the inboard and outboard slat power drive units (PDU) (Fig. 407).
- S 864-012
- (13) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT
- S 864-013
- (14) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR
- S 494-026
- (15) Remove the rig pin hole plug for the input cam on the LE slat PDUs and install the rig pin LE2 (for the torque tube removal at the outboard slat drive) or LE5 (for the torque tube removal at the inboard slat drive) (Fig. 405).

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E. LE Slat Torque Tube Removal

S 294-046

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 974-044

- (2) Measure the retract stop clearance at the rotary actuator arms that are adjacent to the torque tube that you will remove. Make a written record of your measurement.

**NOTE:** This record of the retract stop clearance will be used to do the subsequent installation.

S 034-014

- (3) Remove the splined coupling, retainer, bearing housing, or body seal at these locations as applicable to remove the torque tube:

**NOTE:** Do not turn the torque tube while it is disconnected. It will be necessary to adjust the slat drive if you turn the torque tube (Ref 27-81-00/501).

- (a) At the aft end of the forward cargo compartment, remove the body seal (Fig. 401)
- (b) At slats No. 6 and 7, and the area inboard of slats No. 5 and 8, (Fig. 402)
- (c) At slats No. 1 through 5, and slats No. 8 through 12 (Fig. 403).

S 034-018

- (4) Disconnect the safety straps as necessary (Fig. 404).

S 034-034

- (5) If you do not have sufficient clearance to remove the torque tube, do these steps:
  - (a) Disconnect the adjacent torque tubes and offset gearbox as necessary to get sufficient clearance (Ref 27-81-20/201).

**NOTE:** Be careful not to turn the crank arm for the rotary actuator out of the rig position if you move or turn the disconnected gearbox.

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- (b) Move the torque tube through the holes in the structural ribs to a different area for better access to remove the torque tube.

S 024-019

- (6) Remove the torque tube from the airplane.

TASK 27-81-24-404-020

3. Leading Edge Slat Torque Tube - Installation

NOTE: The wear limit inspection for the torque tubes is given in 27-81-24.

A. Consumable Materials

- (1) D00633 Grease, Corrosion Preventive - BMS 3-33 (Preferred)
- (2) D00015 Grease, Corrosion Preventive - BMS 3-24 (Alternate)

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 20-10-23/401, Lockwires
- (3) 24-22-00/201, Electrical Power - Control
- (4) 27-51-00/201, Trailing Edge Flap System
- (5) 27-81-00/201, Leading Edge Slat System
- (6) 27-81-00/501, Leading Edge Slat System
- (7) 27-81-20/201, LE Slat Drive Rotary Actuator and Offset Gearbox
- (8) 27-81-24/601, Leading Edge Slat Torque Tube
- (9) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (10) 32-00-15/201, Landing Gear Door Locks
- (11) 32-00-20/201, Landing Gear Downlocks
- (12) 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

- |         |   |
|---------|---|
| 122     | Right MLG Wheel Well                      |
| 125/126 | Area Aft of the Forward Cargo Compartment |
| 211/212 | Control Cabin                             |
| 510/610 | Wing Leading Edge - Inboard               |
| 520/620 | Wing Leading Edge - Outboard              |
| 710     | Nose landing Gear and Doors               |
| 730/740 | Left/Right Main landing Gear and Doors    |

(2) Access Panels

- |       |   |
|-------|---|
| 511BB | LE Slat Power Drive Unit, Outboard (Left) |
| 611BB | LE Slat Power Drive Unit, Inboard (Right) |

D. Install the Torque Tube

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S 294-047

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 214-023

- (2) Make sure the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position.

S 214-024

- (3) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 214-021

- (4) Make sure the deactivation procedure for the TE flaps is done (Ref 27-51-00).

S 214-022

- (5) Make sure the deactivation procedure for the LE slats is done (Ref 27-81-00/201).

S 844-025

- (6) Put the torque tube through the safety straps and hold the torque tube into position for installation (Fig. 404).

S 434-028

- (7) Install the mating components with the instructions given in the figures that follow, and connect the torque tube at these locations as applicable:

**NOTE:** Do not turn the adjacent torque tubes during the component installation. It will be necessary to adjust the slat drive if you turn the adjacent torque tubes (Ref 27-81-00/501).

- (a) At the aft end of the forward cargo compartment (Fig. 401)
- (b) At the slats No. 6 and 7, and the area inboard of the slats No. 5 and 8 (Fig. 402)
- (c) At the slats No. 1 through 5, and slats No. 8 through 12 (Fig. 403).

S 434-035

- (8) If removed, install the adjacent torque tubes and offset gearbox (Ref 27-81-20/201).

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S 434-027

- (9) Attach the safety straps to the structure (Fig. 404).

S 224-026

- (10) Make sure the radial clearance for the safety straps is correct (Fig. 404).

S 224-028

- (11) Do the checks that follow on the axial movement for a torque tube with a splined coupling at each end:
- (a) Push the torque tube tightly against one end and make a mark on its position.
  - (b) Move the torque tube fully to the opposite end.
  - (c) Make sure the torque tube can move easily, and that the axial movement is between 0.100 and 0.460 inch (2.6-11.7 mm).

**NOTE:** If there is resistance when you move the torque tube, loosen the coupling screws by a small increment to permit the torque tube to move freely.

S 224-029

- (12) Do the check that follows on the axial movement for a torque tube with a splined coupling at one end and a bearing housing at the opposite end:
- (a) Push the splined coupling away from the end of the torque tube and make sure that the clearance between the torque tube and the mating part is between 0.050 and 0.370 inch (1.3-9.4 mm).

S 224-030

- (13) Do a check on the retract stop clearance between the rotary actuator arm and the retract stop at these locations as necessary (Fig. 405):

**NOTE:** Set the retract stop clearance to the distance that you measured before the torque tube removal. This will put the slat drive to the correctly adjusted position.

- (a) Measure the clearance at the inboard rotary actuator of slats No. 6 and 7 if you replaced the torque tubes for the inboard slat drive
- (b) Measure the clearance at the outboard rotary actuator of slats No. 5 and 8 if you replaced the torque tubes for the outboard slat drive.

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S 224-031

- (14) If you disconnected a torque tube between any two rotary actuators on the same wing, do a check on the stop clearance at each rotary actuator arm (Fig. 405).

**NOTE:** Set the retract stop clearance to the distance that you measured before the torque tube removal. This will put the slat drive to the correctly adjusted position.

S 824-032

- (15) Adjust the slat drive if you cannot get the correct stop clearance (Ref 27-81-00/501).

S 434-036

**CAUTION:** MAKE SURE YOU INSTALL LOCKWIRE ON THE COUPLING SCREWS. IF THE COUPLING SCREWS COME OFF, THE TORQUE TUBE COUPLING WILL DISCONNECT AND CAUSE DAMAGE TO THE AIRPLANE.

- (16) Install a lockwire to the coupling screws with the double twist procedure given in 20-10-23, at the locations where a splined coupling was installed (Fig. 401).

E. Test for the Torque Tube Adjustment

S 094-033

- (1) Remove the DO-NOT OPERATE tag from the flap control lever.

S 094-034

- (2) Remove the rig pin LE2 or LE5 as applicable and install the plug into the rig pin hole.

S 864-035

- (3) Supply electrical power (Ref 24-22-00).

S 094-037

- (4) Remove the PDU lock from the TE flap PDU (Fig. 406).

S 094-038

- (5) Remove the ground locks from the inboard and outboard slat PDUs (Fig. 407).

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27-81-24

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S 864-036

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(6) Pressurize the center hydraulic system (Ref 29-11-00).

S 864-040

(7) Move the flap control lever to the 20-unit detent and do this check:  
(a) Make sure the TE flaps and the LE slats extend to the intermediate position.

S 864-041

(8) Move the flap control lever to the 30-unit detent and do this check:  
(a) Make sure the TE flaps and the LE slats move to the fully extended position.

S 864-043

(9) Move the flap control lever to the zero (FLAPS UP) detent and do this check:  
(a) Make sure the TE flaps and the LE slats move to the fully retracted position.

F. Put the Airplane Back to Its Usual Condition

S 294-048

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

(1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 864-017

(2) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD  
(c) 11J24, FLAPS ALTN CONT

EFFECTIVITY

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02

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S 864-018

- (3) Remove the circuit breaker locks and the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 414-016

- (4) Install the fixed lower access panels for the leading edge (Ref 06-44-00).

**NOTE:** Use the procedure in 27-81-00/201 to extend and retract the slats as necessary to install the access panels.

S 414-029

- (5) Install the access panels and close the access doors at the aft end of the forward cargo compartment as necessary (Ref 06-44-00).

S 414-031

- (6) Install the access panels, 511BB and 611BB, for the Inboard and Outboard LE Slat PDUs (Ref 06-44-00).

S 494-019

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT

- (7) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

S 444-020

- (8) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

S 864-024

- (9) Remove the power from the center hydraulic system (Ref 29-11-00).

S 864-025

- (10) Remove electrical power (Ref 24-22-00).

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27-81-24

02

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LEADING EDGE SLAT TORQUE TUBE - INSPECTION/CHECK

TASK 27-81-24-206-020

1. Wear Limit Inspection for the Leading Edge Slat Torque Tubes

A. General

- (1) This procedure only has illustrations and a wear limit table, which show the data for wear limits. There are no procedures for the removal or installation of the parts. Refer to the Leading Edge Slat Torque Tube Removal/Installation for procedures to do these tasks.

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels  
(2) 27-81-24/401, Leading Edge Slat Torque Tubes  
(3) 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems  
(4) 32-00-15/201, Landing Gear Door Locks  
(5) 32-00-20/201, Landing Gear Downlocks  
(6) 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard
730/740	Left/Right Main Landing Gear and Doors

D. Prepare for the Inspection

S 216-001

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 496-002

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (Ref 32-00-15).

EFFECTIVITY

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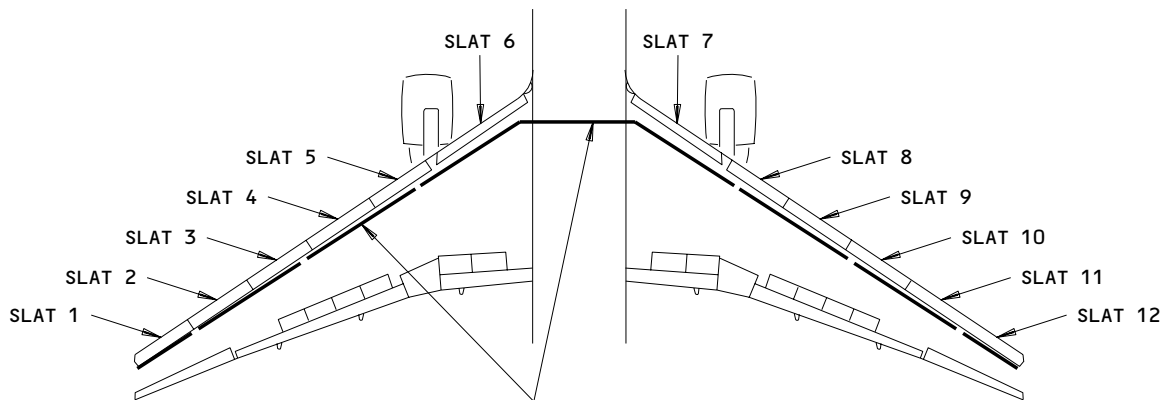
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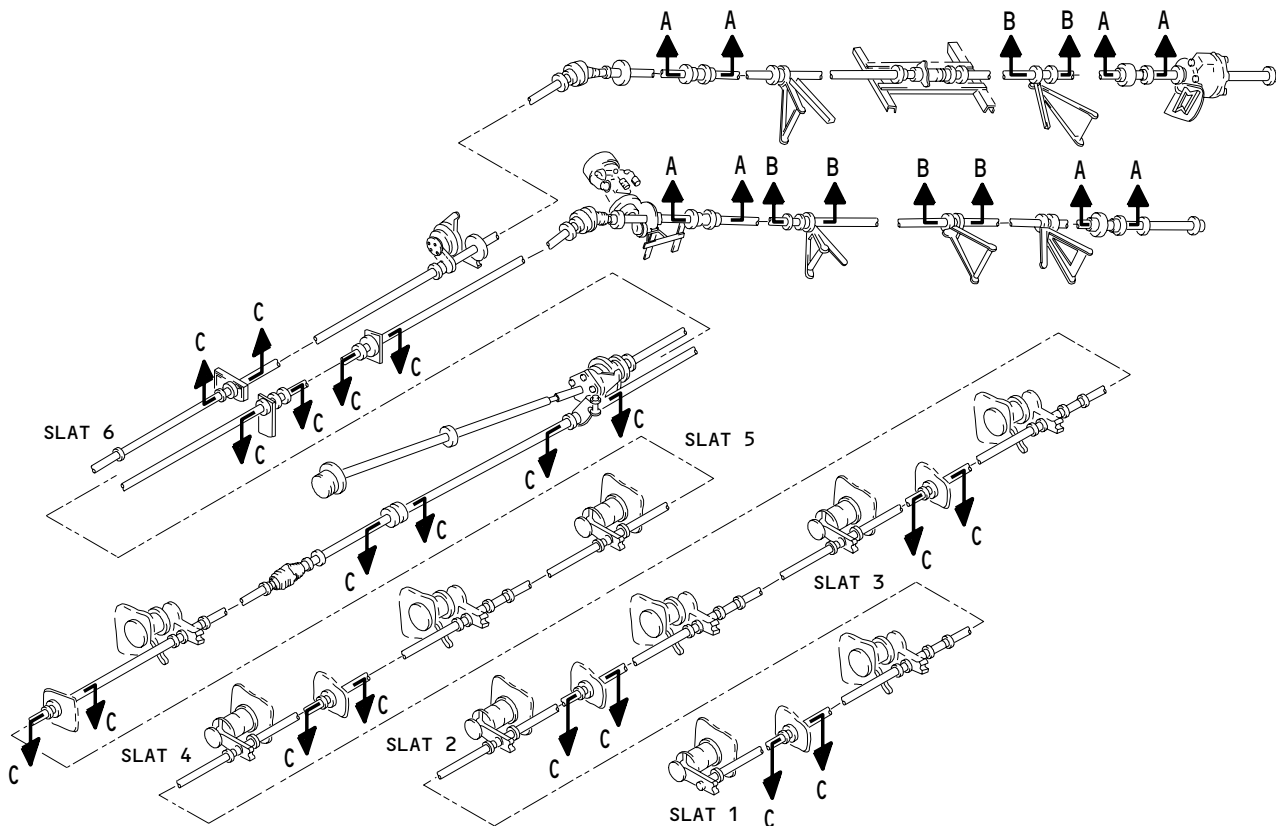
# BOEING

## 767 MAINTENANCE MANUAL



LE SLAT  
TORQUE  
TUBES

SEE (A)



LE SLAT TORQUE TUBES  
(LEFT WING IS SHOWN,  
RIGHT WING IS OPPOSITE)

(A)

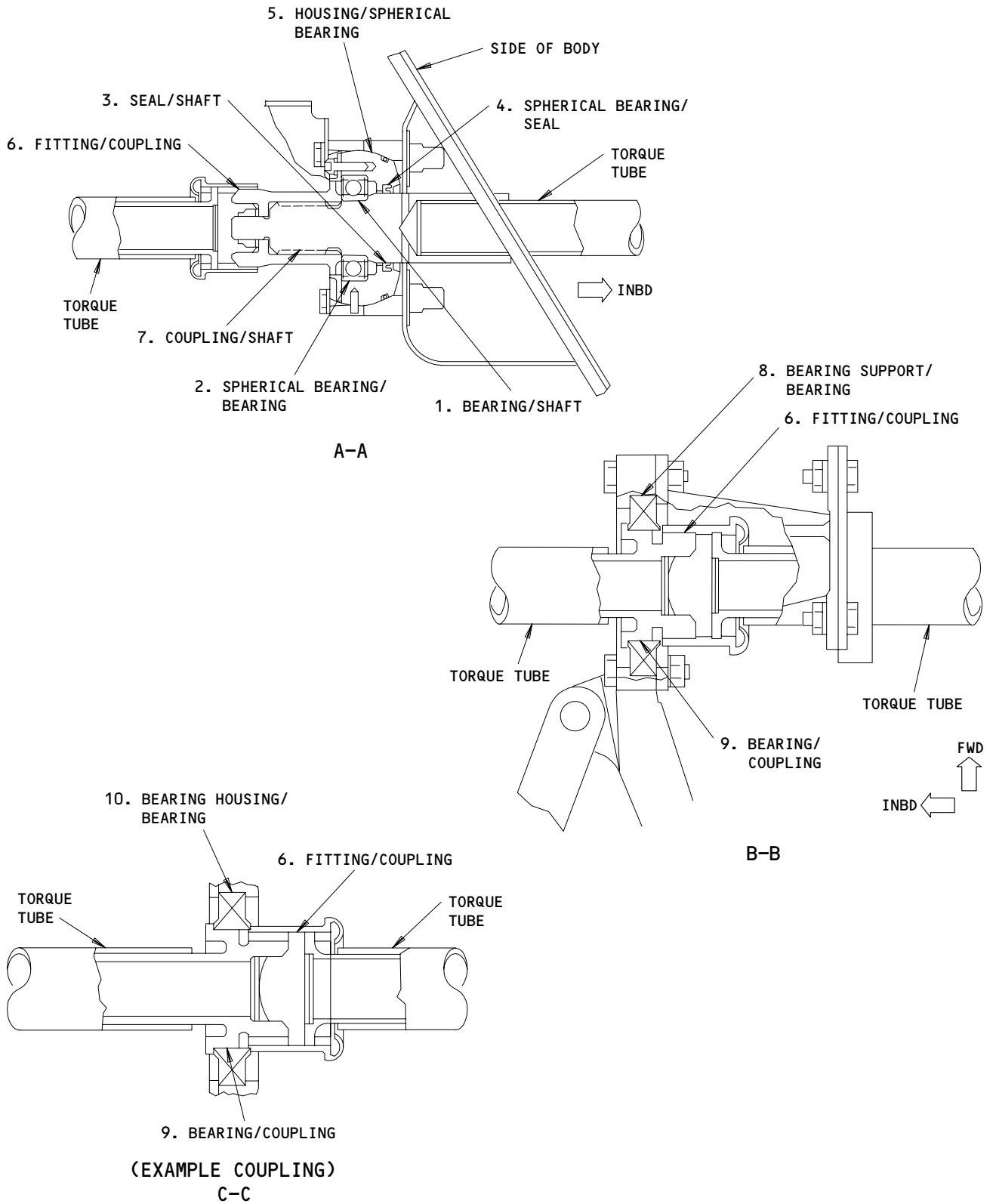
Wear Limits for the LE Slat Torque Tube  
Figure 601 (Sheet 1)

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Wear Limits for the LE Slat Torque Tube  
Figure 601 (Sheet 2)

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# BOEING

## 767 MAINTENANCE MANUAL

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BEARING	ID	0.9839 (24.991)	0.9843 (25.001)	0.9845 (25.006)	0.0010 (0.025)	X		
	SHAFT	OD	0.9835 (24.981)	0.9840 (24.994)	0.9833 (24.976)			X	1
2	SPHERICAL BEARING	ID	1.8504 (47.000)	1.8510 (47.015)	1.8524 (47.051)	0.0020 (0.051)	X		
	BEARING	OD	1.8499 (46.987)	1.8504 (47.000)	1.8490 (46.965)		X		
3	SEAL	ID	1.2460 (31.648)	1.2480 (31.699)	1.2500 (31.750)	0.0040 (0.102)	X		
	SHAFT	OD	1.2460 (31.648)	1.2480 (31.699)	1.2460 (31.648)		X		
4	SPHERICAL BEARING	ID	1.4910 (37.871)	1.4930 (37.922)	1.4970 (38.024)	0.0040 (0.102)	X		
	SEAL	OD	1.4910 (37.871)	1.4930 (37.922)	1.4890 (37.821)		X		
5	HOUSING	ID	2.0701 (52.581)	2.7030 (68.656)	2.7110 (68.859)	0.0120 (0.305)	X		
	SPHERICAL BEARING	OD	2.6970 (68.504)	2.6990 (68.555)	2.6910 (68.351)		X		
6	FITTING	ID	---	---	---	2	2		
	COUPLING	OD	---	---	---				
7	COUPLING	ID	---	---	---	2	2		
	SHAFT	OD	---	---	---				
8	BEARING SUPPORT	ID	2.3750 (60.325)	2.3760 (60.350)	2.3790 (60.427)	0.0040 (0.102)	X		
	BEARING	OD	2.3740 (60.300)	2.3750 (60.325)	2.3720 (60.249)		X		
9	BEARING	ID	1.4370 (36.500)	1.4380 (36.525)	1.4410 (36.601)	0.0040 (0.102)			
	COUPLING	OD	1.4360 (36.474)	1.4370 (36.500)	1.4340 (36.424)		2		
10	BEARING HOUSING	ID	2.3750 (60.325)	2.3760 (60.350)	2.3790 (60.427)	0.0040 (0.102)	X		
	BEARING	OD	2.3740 (60.300)	2.3750 (60.325)	2.3720 (60.249)		X		

1 THIS PART CAN BE REPAIRED.

2 VISUALLY EXAMINE THE BEARING SURFACE FOR WEAR. REPLACE BOTH MATING PARTS IF YOU FIND ANY WEAR.

Wear Limits for the LE Slat Torque Tube  
Figure 601 (Sheet 3)

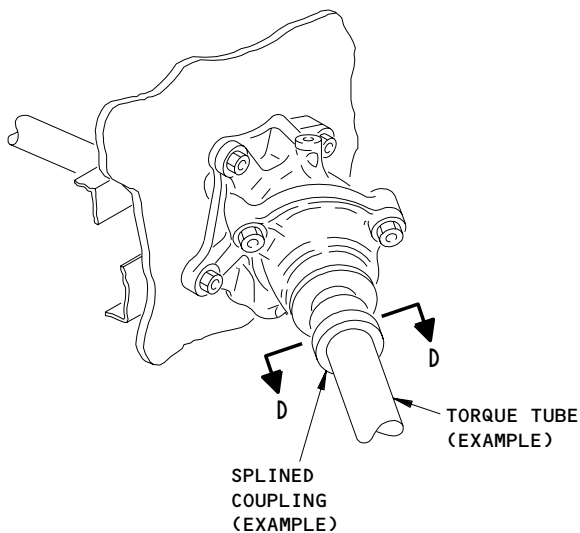
EFFECTIVITY

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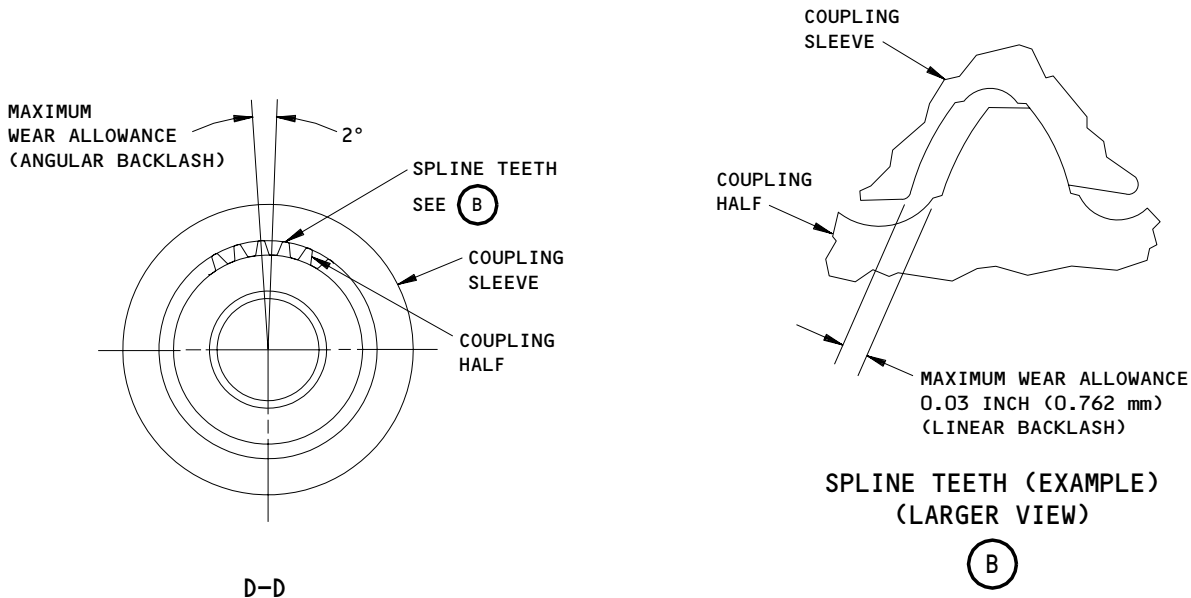
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**SIDE-OF-BODY ANGLE GEARBOX INSTALLATION  
(INBOARD SLAT DRIVE)  
(EXAMPLE)**



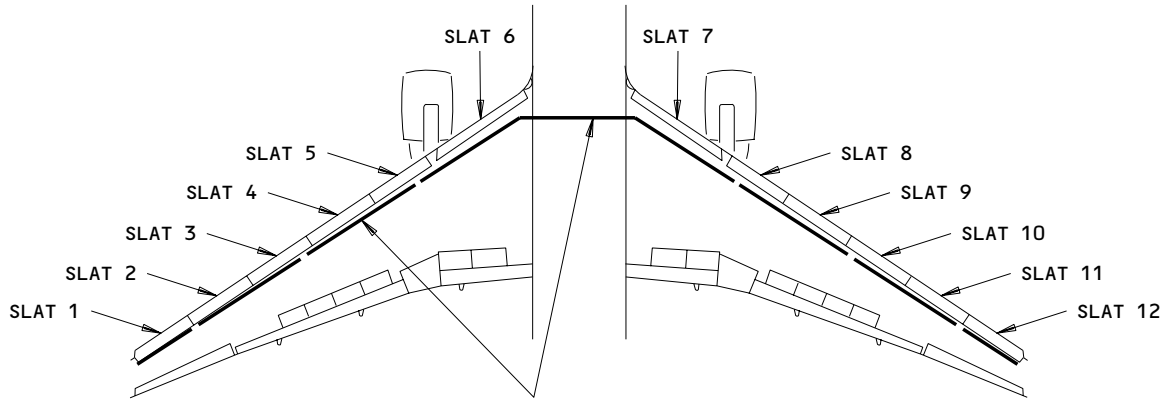
**Wear Limits for the LE Slat Torque Tube  
Figure 601 (Sheet 4)**

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**27-81-24**

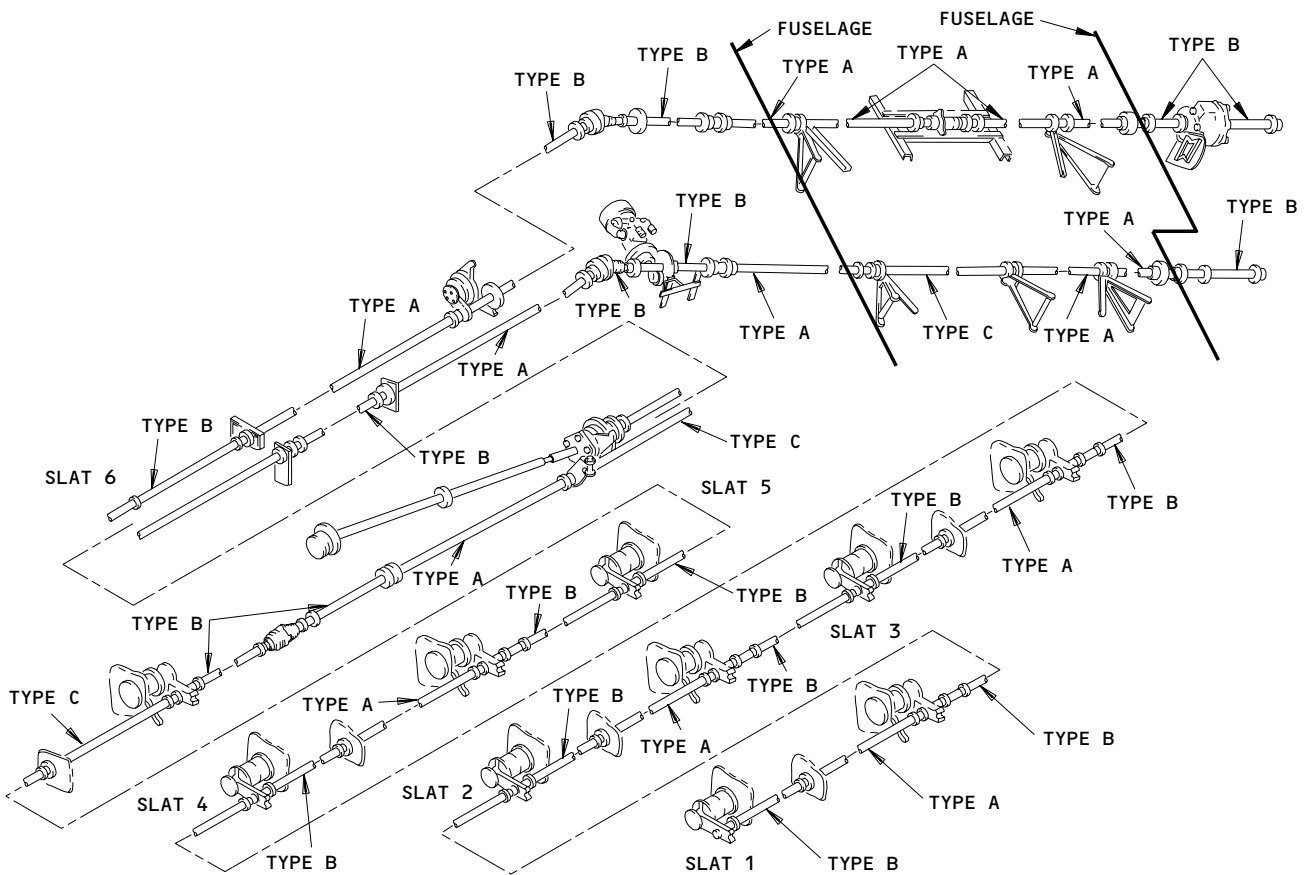
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LE SLAT TORQUE TUBES

SEE (A)



LE SLAT TORQUE TUBES  
(LEFT WING AND FUSELAGE ARE SHOWN,  
RIGHT WING IS OPPOSITE)

(A)

Axial Clearance for the LE Slat Torque Tube  
Figure 602

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S 046-022

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 866-021

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (4) Supply the power to the center hydraulic system (Ref 29-11-00).

S 866-003

- (5) Move the flap control level to the 30-unit detent and permit the TE flaps and the LE slats to move to the fully extended position.

S 496-004

- (6) Attach a DO-NOT-OPERATE tag on the flap control lever.

S 866-005

- (7) Remove the power from the center hydraulic system (Ref 29-11-00).

S 866-006

- (8) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:  
(a) 6D21, ALTN SLAT INBD PWR  
(b) 6F24, ALTN SLAT OUTBD PWR

S 866-007

- (9) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:  
(a) 11H23, SLAT ALTN CONT INBD  
(b) 11H24, SLAT ALTN CONT OUTBD

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S 026-008

- (10) Remove the Leading Edge Access Panels as necessary to get access to the torque tubes (Ref 06-44-00).

S 296-035

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (11) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

E. Wear Limits for the LE Slat Torque Tubes (Fig. 601)

S 226-032

- (1) Disconnect one end of the torque tube opposite to the end that you will examine.

**NOTE:** Do not turn the torque tube. The slat drive will be out of adjustment if you turn the torque tube while it is disconnected.

S 226-033

- (2) Measure the angular backlash (Fig. 601) and the spline wear. If the backlash or spline wear is more than the permitted wear limit, replace the coupling sleeve and the coupling half at this connection (AMM 27-81-24/401).

**NOTE:** Move the torque tube axially through the length of the splined sleeve to find the maximum backlash.

S 226-009

- (3) Use the data in figure 601 to examine the LE slat torque tubes for wear.

S 436-034

- (4) Connect the torque tube at the opposite end (AMM 27-81-24/401).

F. Axial Clearance Inspection for the LE Slat Torque Tubes (Fig. 602)

S 226-010

- (1) Do these steps to examine the axial clearance of a type A torque tube:

**NOTE:** A type A torque tube has a splined coupling at one end, and a fixed support bearing at the other end.

- (a) Move the coupling sleeve off the splined coupling.

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- (b) Measure the clearance between the end of the torque tube and its mating part. Do the step that follow:
  - 1) Move the torque tube in the direction of the fixed support bearing (to make the clearance as large as possible).
- (c) Make sure the clearance is between 0.050 and 0.370 inch (1.3-9.4 mm).

S 226-011

- (2) Do a check on the axial movement of a type B torque tube with the steps that follow:

NOTE: A type B torque tube has a splined coupling at each end of the torque tube.

- (a) Push the torque tube fully one direction, and make a written record of its position.
- (b) Move the torque tube axially until it touches the opposite end. Make sure the torque tube can move easily and that the axial movement is between 0.100 and 0.460 inch (2.6-11.7 mm).
- (c) If there is resistance when you move the torque tube axially, loosen the coupling screws by a small increment to permit the torque tube to move freely.

S 216-012

- (3) No axial clearance check is necessary for a type C torque tube.

NOTE: A type C torque tube has a fixed support bearing at each end of the torque tube.

#### G. Put the Airplane Back to Its Usual Condition

S 296-036

WARNING: DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 416-013

- (2) Install the leading edge access panels as necessary (Ref 06-44-00).

S 866-014

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
  - (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6F24, ALTN SLAT OUTBD PWR

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S 866-015

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

S 866-016

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (5) Pressurize the center hydraulic system (Ref 29-11-00).

S 866-017

- (6) Remove the DO-NOT-OPERATE tag from the flap control lever, and move the flap control lever to the zero (FLAPS UP) detent.

S 096-018

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (7) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

S 446-023

- (8) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

S 866-019

- (9) Remove the power from the center hydraulic system (Ref 29-11-00).

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LEADING EDGE SLAT TORQUE TUBE - APPROVED REPAIRS

TASK 27-81-24-308-013

1. Approved Repairs for the Leading Edge Slat Torque Tube

A. General

- (1) This procedure gives instructions for the repair of damaged torque tubes caused by wear on the outer diameter. This procedure does not give instructions to remove or install the torque tube.

B. Consumable Materials

- (1) C00064 Alodine 1200S  
(2) C00699 Primer - BMS 10-11, Type 1  
(3) C00032 Enamel BMS 10-60, Type I, Boeing color 707

C. References

- (1) 27-81-24/401, Leading Edge Slat Torque Tubes  
(2) 51-21-04/701, Alodine Coating  
(3) 51-21-10/701, Decorative Exterior Finishes  
(4) 78-31-00/201, Thrust Reverser System

D. Access

- (1) Location Zones  
510/610 Wing Leading Edge - Inboard  
520/620 Wing Leading Edge - Outboard

E. Examine the Torque Tube for Repair or Replacement

S 228-001

- (1) You must replace the torque tube if you have one or more of these conditions (Ref 27-81-24):
- (a) The full diameter surface at the worn area of the torque tube was repaired before.
  - (b) The worn area is adjacent to the end fitting fasteners.
  - (c) The depth of the repair done before is larger than the repair limits given by Table 801.

S 228-002

- (2) You can repair the torque tube if the repair is less than the limits given by Table 801:

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Table 801		
OUTER DIAMETER OF THE TORQUE TUBE	PERMITTED AREA OF THE REPAIR *[1]	PERMITTED DEPTH OF THE REPAIR *[1]
1.00 INCH BY 0.083 INCH WALL THICKNESS	less than 30% of the torque tube circumference and less than 3 inches long	0.018 inch
	more than 30% of the torque tube circumference or more than 3 inches long	0.009 inch
*[1] THE REPAIR LIMITS ARE THE TOTAL OF THE REPAIR THAT YOU WILL DO, AND THE REPAIR DONE BEFORE.		

S 228-003

- (3) If there are two or more defects on the torque tube, you can repair the torque tube only if the defects are at least 1.50 inches (38.1 mm) apart.

F. Repair the Torque Tube

S 048-004

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 328-005

- (2) Machine the worn area. Use a minimum machine radius 1.00 inch (2.54 centimeters) . The surface finish of the repaired area must be 63 microinches or less (1.6 micrometers). The torque tube is structurally satisfactory if the depth of the repair (include the repair done before) is not more than the repair limits given by Table 801.

S 238-006

- (3) Do a penetrant inspection of the repaired area.

S 378-007

- (4) Apply Alodine to the repaired surface (Ref 51-21-04).

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- S 378-008
- (5) Apply one layer of primer to the repaired surface (Ref 51-21-10).
- S 378-009
- (6) Apply one layer of enamel to the repaired surface (Ref 51-21-10).
- S 448-010
- (7) Do the Activation Procedure for the thrust reverser (AMM 78-31-00/201).

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LEADING EDGE SLAT AERODYNAMIC SEAL – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and the installation tasks for the leading edge (LE) slat aerodynamic seals. The installation task also contains the steps for the test on the aerodynamic seal installation.

TASK 27-81-31-024-001

2. Leading Edge Slat Aerodynamic Seal – Removal

A. Equipment

- (1) Leading Edge Slats Groundlock – A27007-1  
(2 Necessary)
- (2) TE Flap PDU Lock – A27009-7
- (3) Circuit Breaker Lockout Clip  
(4 necessary) Commercially available

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power – Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) 32-00-15/201, Landing Gear Door Locks
- (5) 32-00-20/201, Landing Gear Downlocks
- (6) 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge – Inboard
520/620	Wing Leading Edge – Outboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit – Outboard (Left)
611BB	LE Slat Power Drive Unit – Inboard (Right)

D. Prepare for the Removal

S 214-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

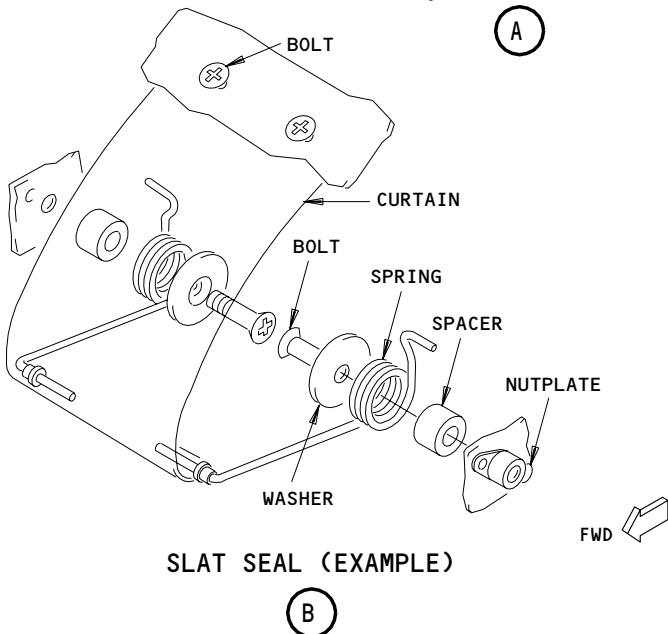
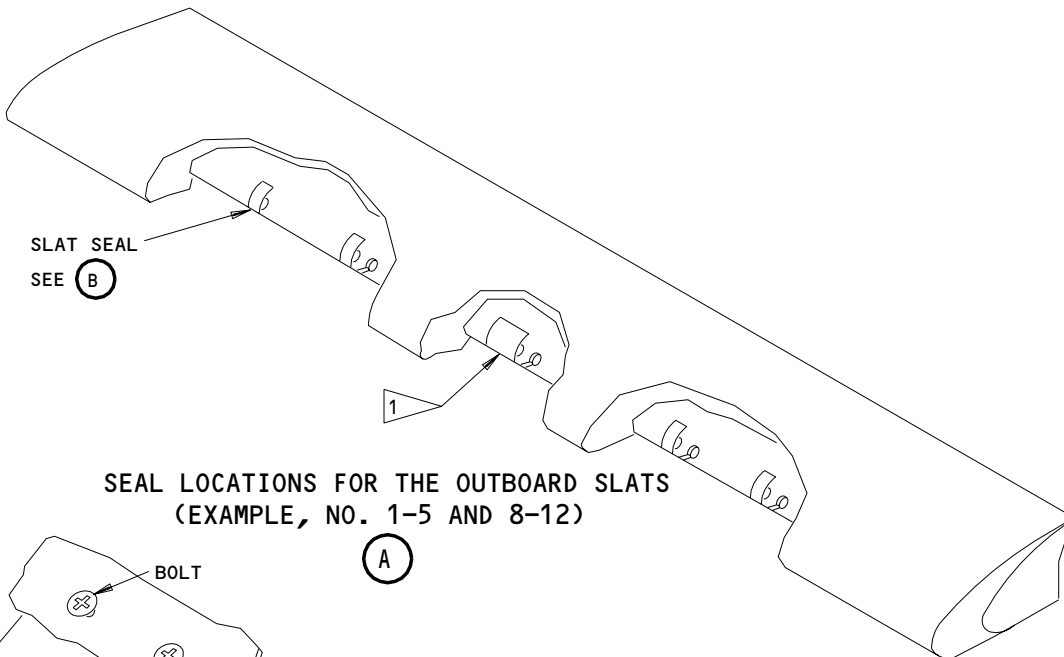
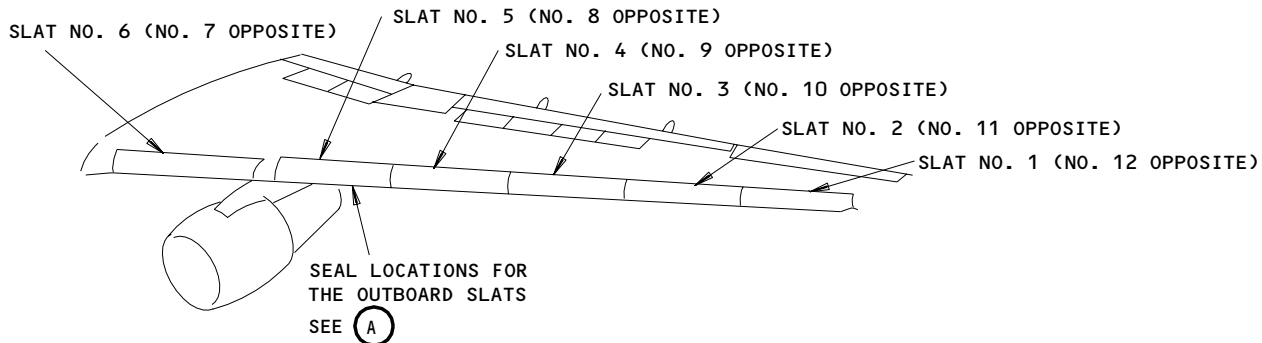
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1 ON SLATS NO. 5 AND 8 ONLY

Outboard Slat Aerodynamic Seals  
Figure 401

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S 494-003

**WARNING:** USE AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (Ref 32-00-15).

S 044-004

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 214-005

- (4) Make sure the flaps and slats are in the fully retracted position.

S 214-006

- (5) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 864-007

- (6) Supply electrical power (Ref 24-22-00).

S 864-008

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (7) Pressurize the center hydraulic system (Ref 29-11-00).

S 864-009

- (8) Move the flap control lever to the 30-unit detent, and make sure the flaps and slats move to the fully extended position.

S 494-010

- (9) Attach a DO-NOT-OPERATE tag to the flap control lever.

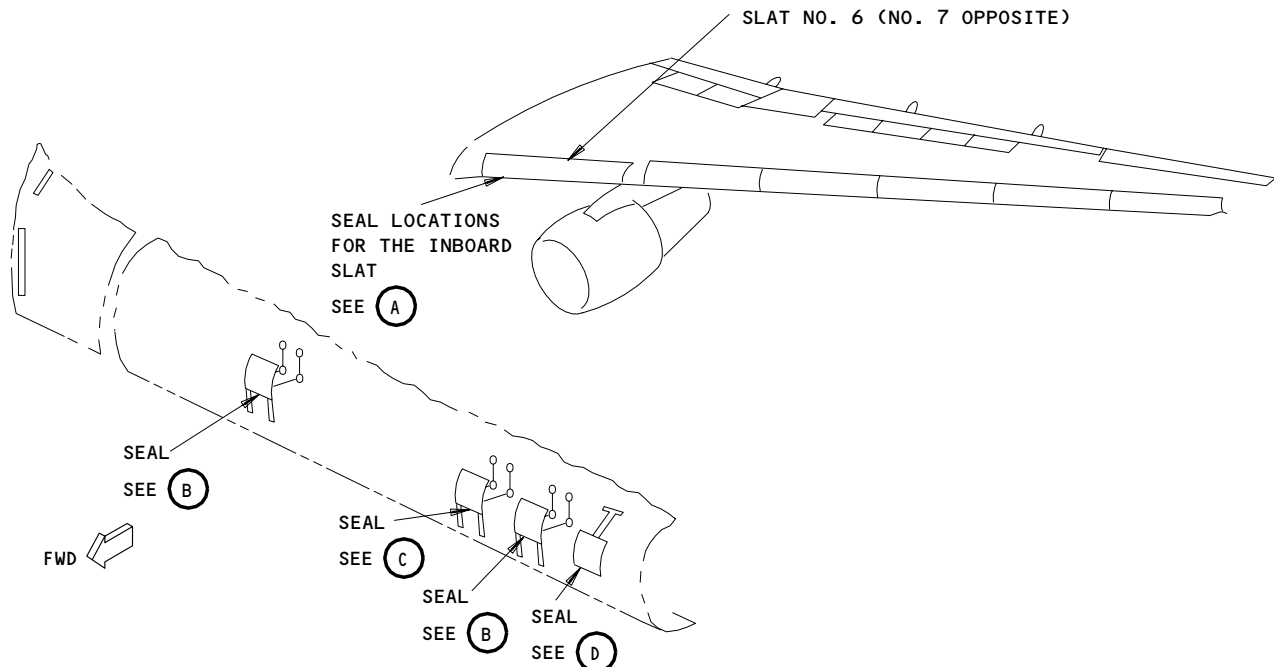
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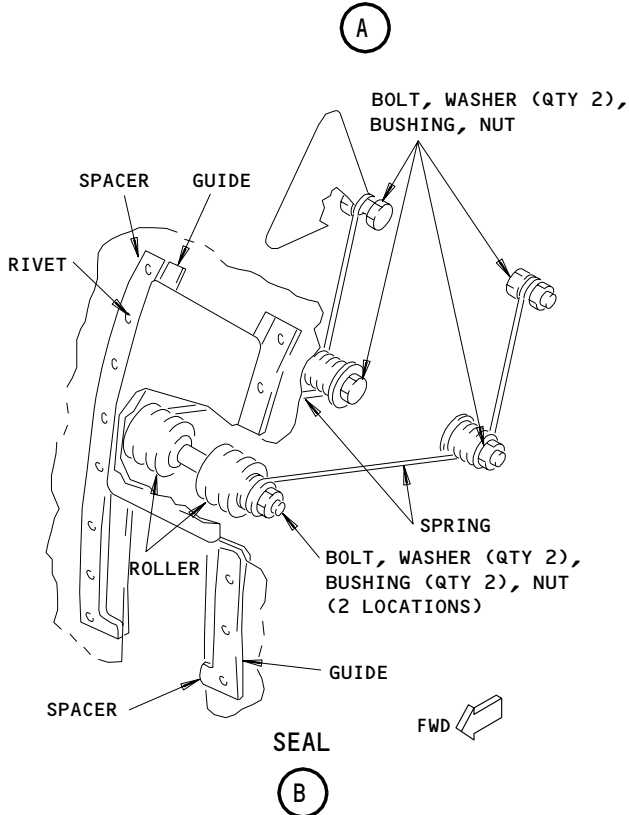
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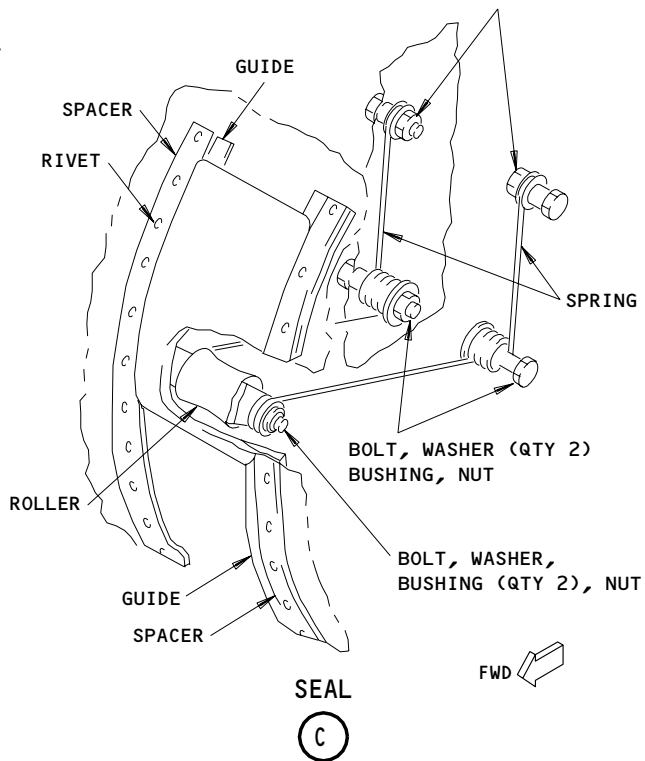


SEAL LOCATIONS FOR THE INBOARD SLAT

(A)



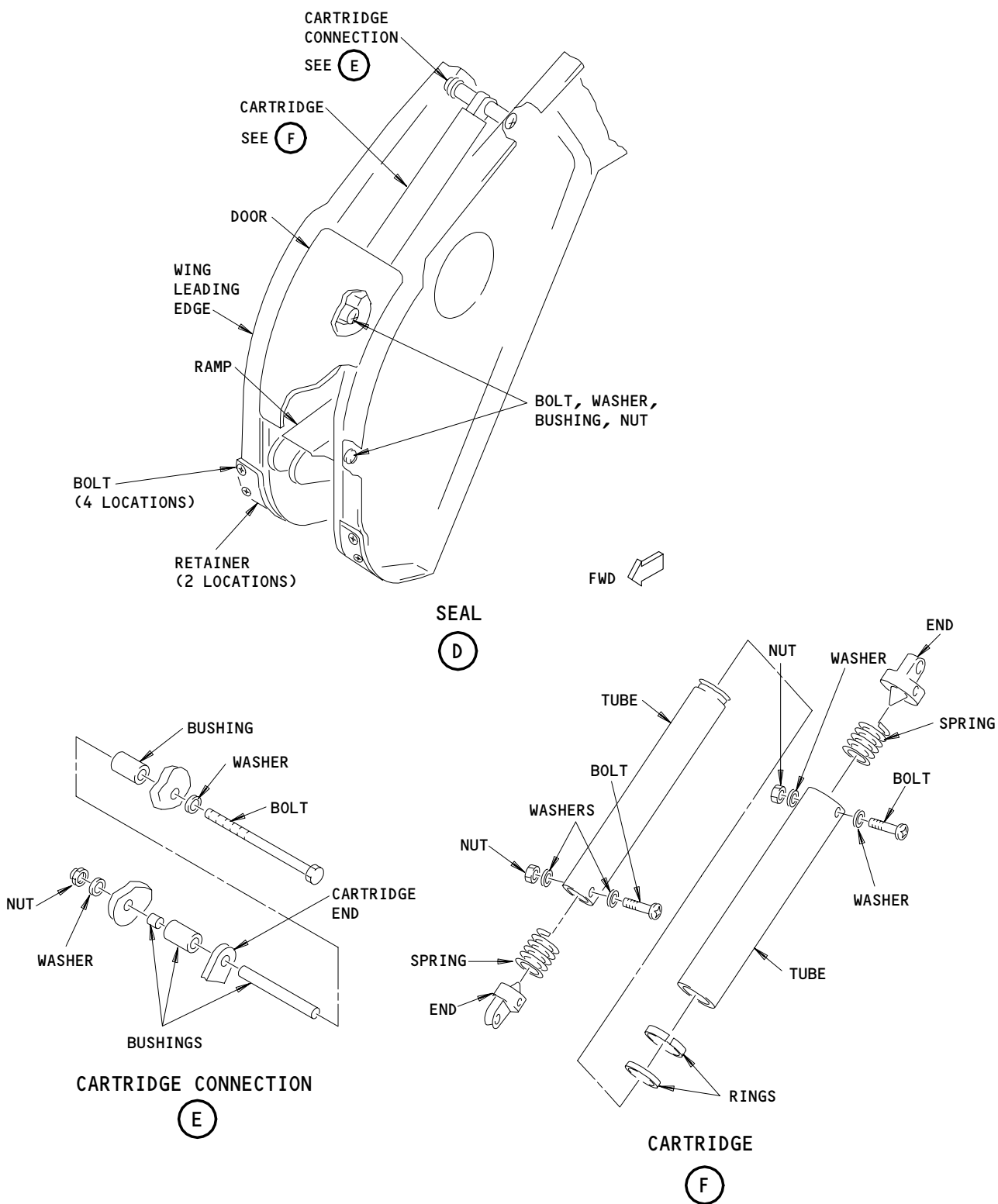
BOLT, WASHER (QTY 2),  
BUSHING (QTY 2), NUT



Inboard Slat Aerodynamic Seals  
Figure 402 (Sheet 1)

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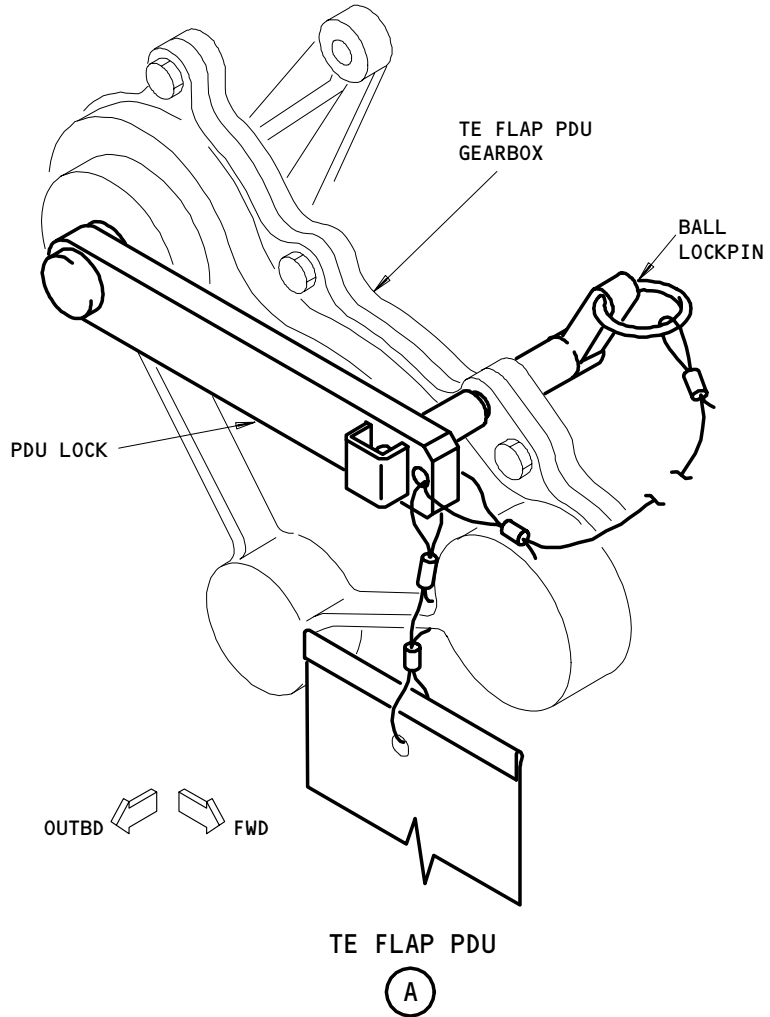
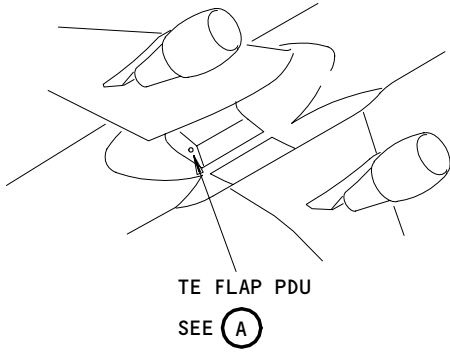
Inboard Slat Aerodynamic Seal  
Figure 402 (Sheet 2)

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PDU Lock for the TE Flap PDU  
Figure 403

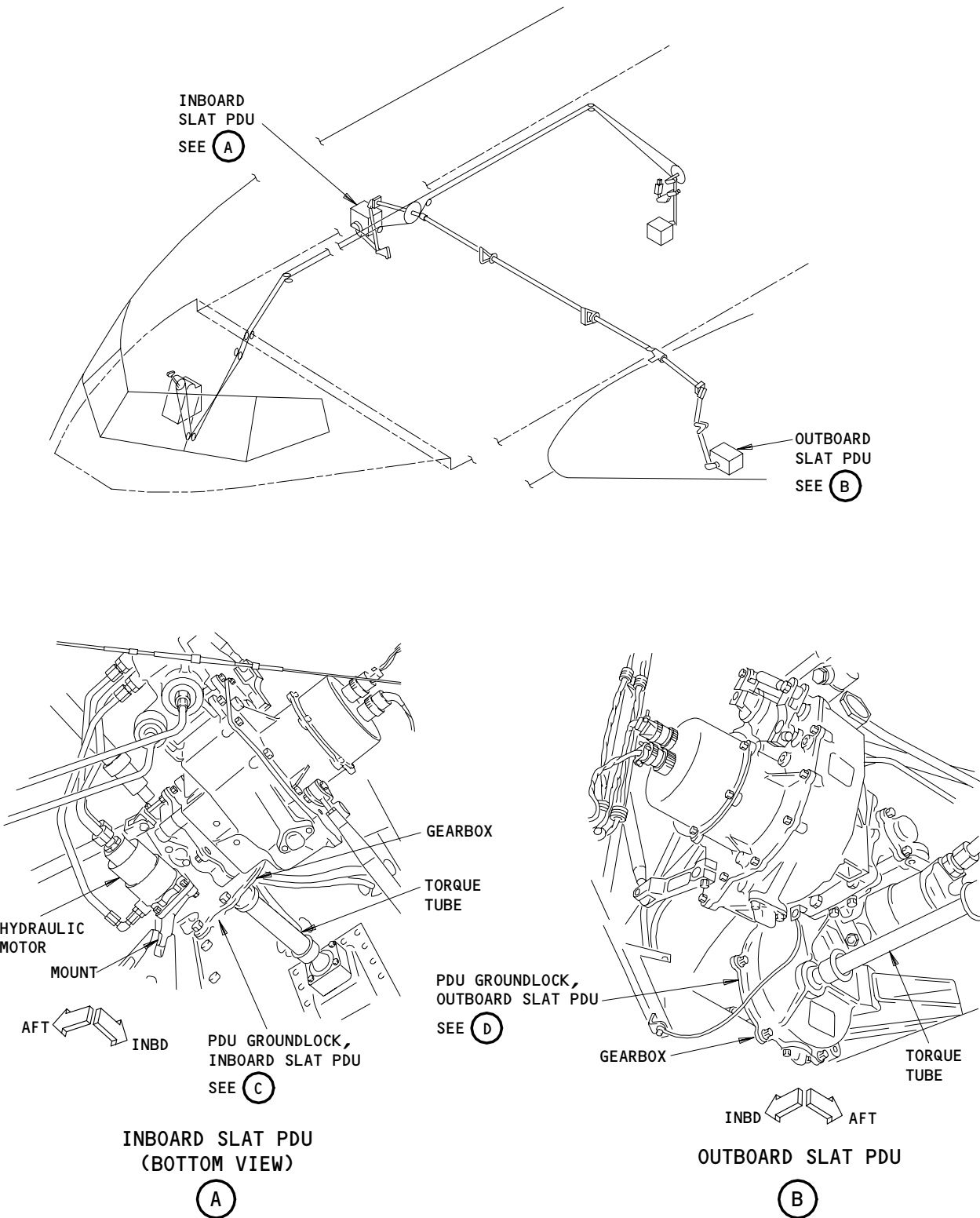
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Slats PDU Groundlock  
Figure 404 (Sheet 1)

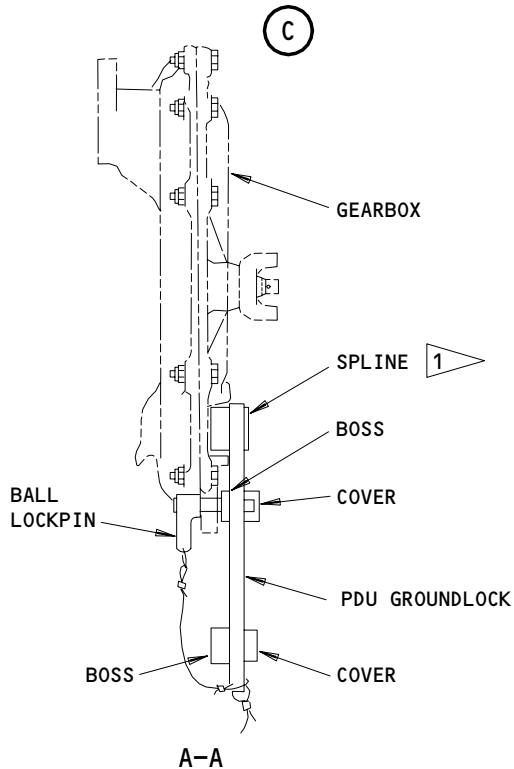
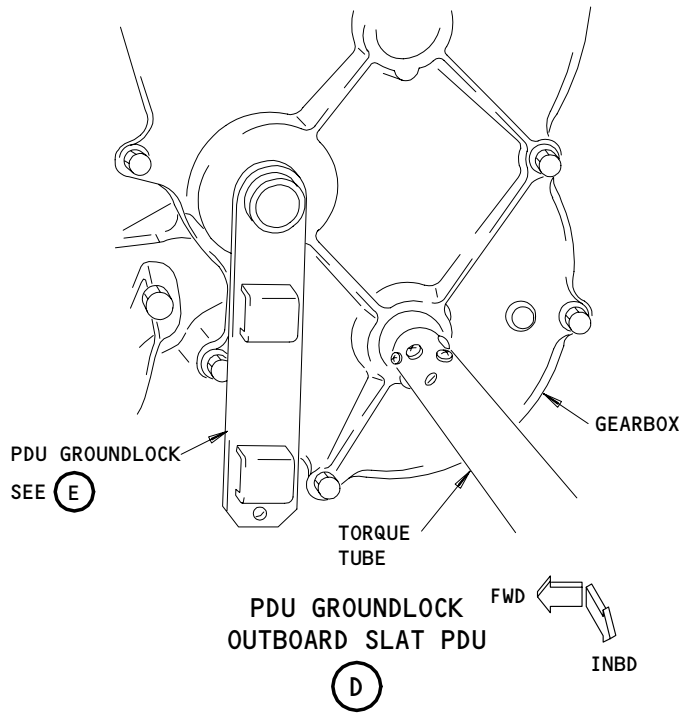
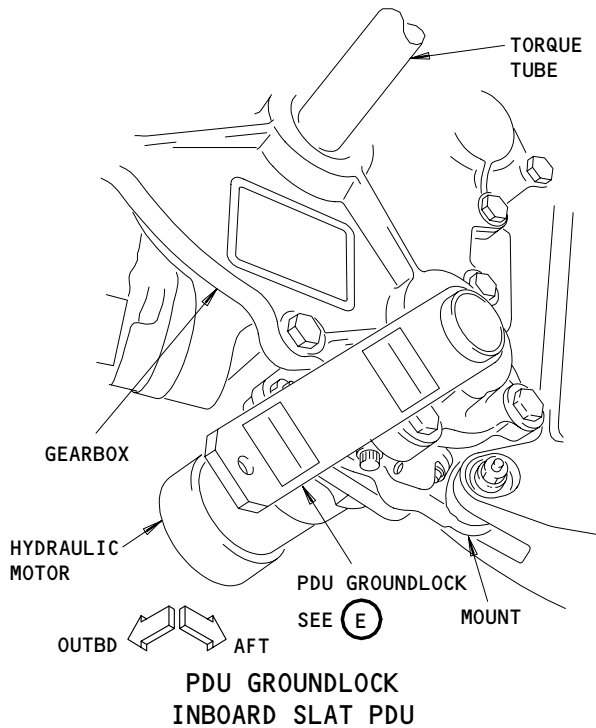
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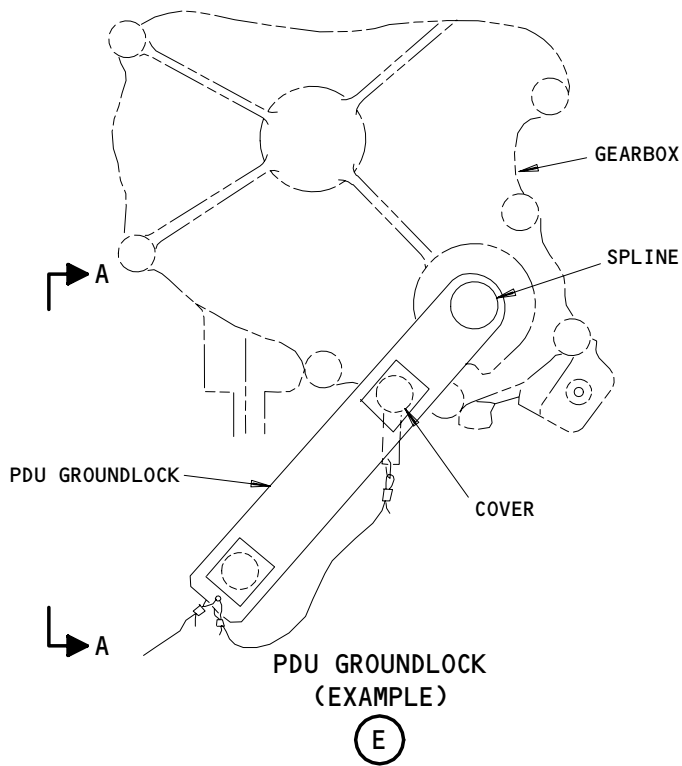
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1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN, INSTALLED THROUGH THE BOSS AND THE GEARBOX



Slats PDU Groundlock  
Figure 404 (Sheet 2)

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S 864-011

- (10) Remove the power from the center hydraulic system (Ref 29-11-00).

S 494-012

- (11) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 403).

S 014-013

- (12) Remove the access panels, 511BB and 611BB, to get access to the outboard and inboard slat PDU (Ref 06-44-00).

S 494-014

- (13) Install the groundlocks on the inboard and outboard slat PDUs (Fig. 404).

S 864-015

- (14) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-016

- (15) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 014-017

- (16) Remove the fixed lower access panels at the leading edge when it is necessary to get access to the aerodynamic seals (Ref 06-44-00).

S 294-049

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (17) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

E. Remove the Aerodynamic Seal

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S 024-018

**CAUTION:** DO NOT EXTEND THE SEAL SPRINGS THROUGH THE OPENING ON THE SLAT SKIN. YOU CAN CAUSE PERMANENT DAMAGE TO THE SPRINGS IF THEY ARE EXTENDED TOO FAR.

(1) Remove the seals on an inboard slat as shown (Fig. 402).

S 024-046

(2) Remove the seals on an outboard slat as shown (Fig. 401).

TASK 27-81-31-424-019

3. Leading Edge Slat Aerodynamic Seal - Installation

A. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) 32-00-15/201, Landing Gear Door Locks
- (5) 78-31-00/201, Thrust Reverser System

B. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

C. Install the Aerodynamic Seal

S 214-020

(1) Make sure the power is removed from the center hydraulic system (Ref 29-11-00).

S 214-021

(2) Make sure electrical power is removed (Ref 24-22-00).

S 214-022

(3) Make sure the flaps and slats are in the fully extended position.

S 214-023

(4) Make sure the flap control lever is in the 30-unit detent.

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S 424-024

**CAUTION:** DO NOT EXTEND THE SEAL SPRINGS THROUGH THE OPENING ON THE SLAT SKIN. YOU CAN CAUSE PERMANENT DAMAGE TO THE SPRINGS IF THEY ARE EXTENDED TOO FAR.

(5) Install the seals on an inboard slat as shown (Fig. 402).

S 424-047

(6) Install the seals on an outboard slat as shown (Fig. 401).

D. Test for the Seal Installation

S 094-025

(1) Remove the PDU lock from the TE flap power drive unit (PDU) (Fig. 403).

S 094-026

(2) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 404).

S 094-027

(3) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 864-028

(4) Supply electrical power (Ref 24-22-00).

S 864-029

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(5) Pressurize the center hydraulic system (Ref 29-11-00).

S 214-030

(6) Move the flap control lever to the zero (FLAPS UP) detent and do these checks:

(a) Make sure the flaps and slats move to the fully retracted position.

(b) Make sure the seals are retracted.

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S 214-031

- (7) Move the flap control lever to the 30-unit detent and do these checks:
- (a) Make sure the flaps and slats move to the 30-degree position.
  - (b) Make sure the seals are extended.

S 214-032

- (8) Move the flap control lever to the zero (FLAPS UP) detent and do these checks:
- (a) Make sure the flaps and slats move to the fully retracted position.
  - (b) Make sure the seals are retracted.

E. Put the Airplane Back to Its Usual Condition

S 294-050

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 414-038

- (2) Install the access panels, 511BB and 611BB, for inboard and outboard slat PDUs (Ref 06-44-00).

S 414-039

- (3) Install all the fixed lower access panels at the leading edge (Ref 06-44-00).

S 864-033

- (4) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-034

- (5) Remove the circuit breaker locks and DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

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S 094-035

**WARNING:** USE AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (6) Remove the door locks from the landing gear doors and close the doors (Ref 32-00-15).

S 444-040

- (7) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

S 864-036

- (8) Remove the power from the center hydraulic system (Ref 29-11-00).

S 864-037

- (9) Remove electrical power if it is not necessary (Ref 24-22-00).

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LEADING EDGE SLAT AUXILIARY TRACK – REMOVAL/INSTALLATION

1. General

- A. This procedure contains the replacement task (removal and installation) for the leading edge (LE) slat auxiliary track.
- B. The leading edge (LE) slats are given the numbers from No. 1 through No. 12, from the left wing to the right wing.

TASK 27-81-32-904-001

2. Auxiliary Track – Replacement

A. Consumable Materials

- (1) C00259 Primer – BMS 10-11, Type 1

B. References

- (1) 27-81-01/401, Inboard Leading Edge Slat
- (2) 27-81-02/401, Outboard Leading Edge Slat
- (3) 27-81-32/601, Leading Edge Slat Auxiliary Track

C. Access

(1) Location Zones

- 510/610 Wing Leading Edge – Inboard
- 520/620 Wing Leading Edge – Outboard

- D. Remove the Auxiliary Track for the Inboard Slat (Fig. 401)

S 294-021

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 024-002

- (2) Remove the inboard slat (Ref 27-81-01).

**NOTE:** Prepare for the removal with the instructions given in 27-81-01.

S 034-003

- (3) Remove the bolt that connects the aft end of the auxiliary track to the link.

**NOTE:** Do not change the length of the link during the removal.

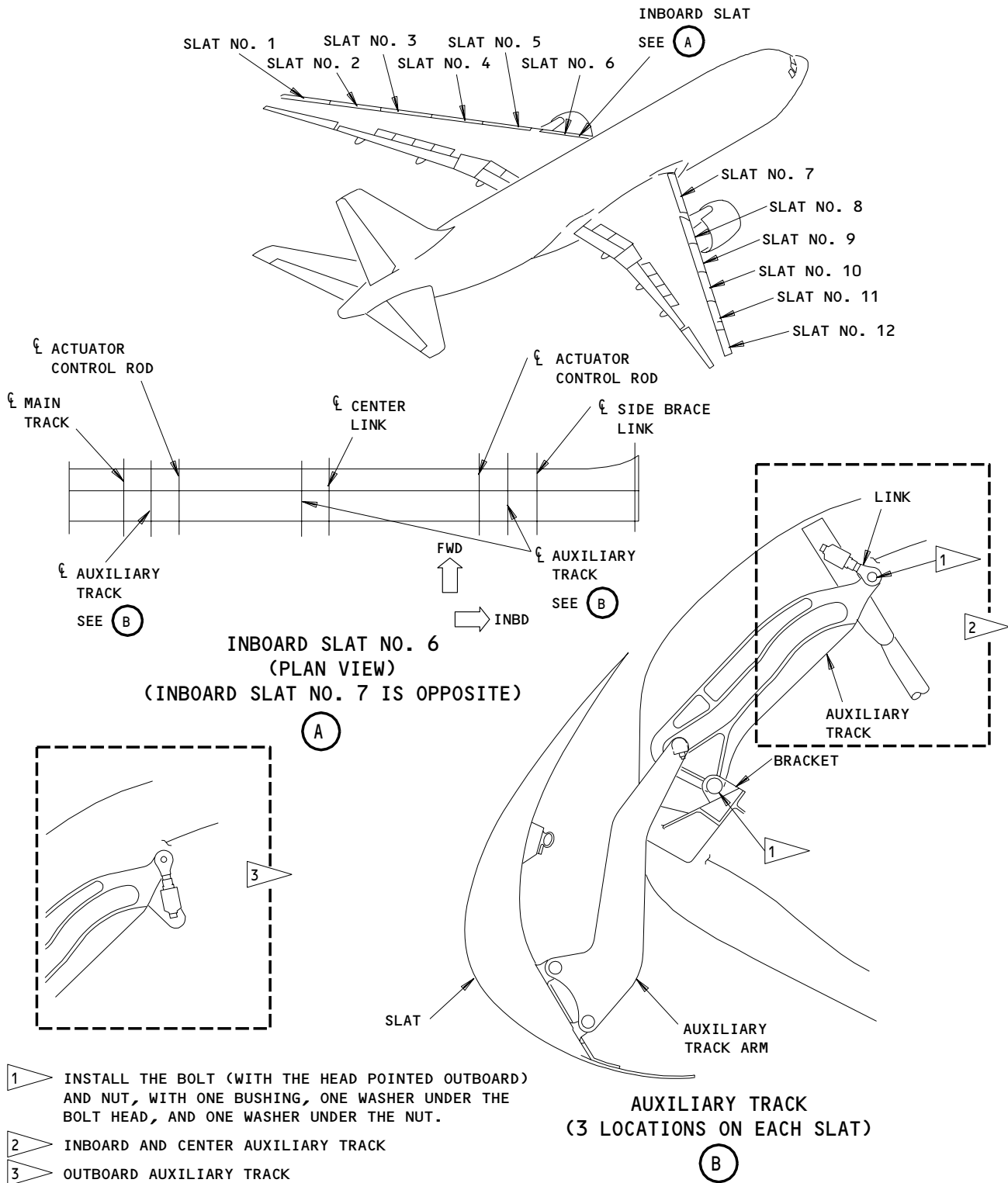
EFFECTIVITY

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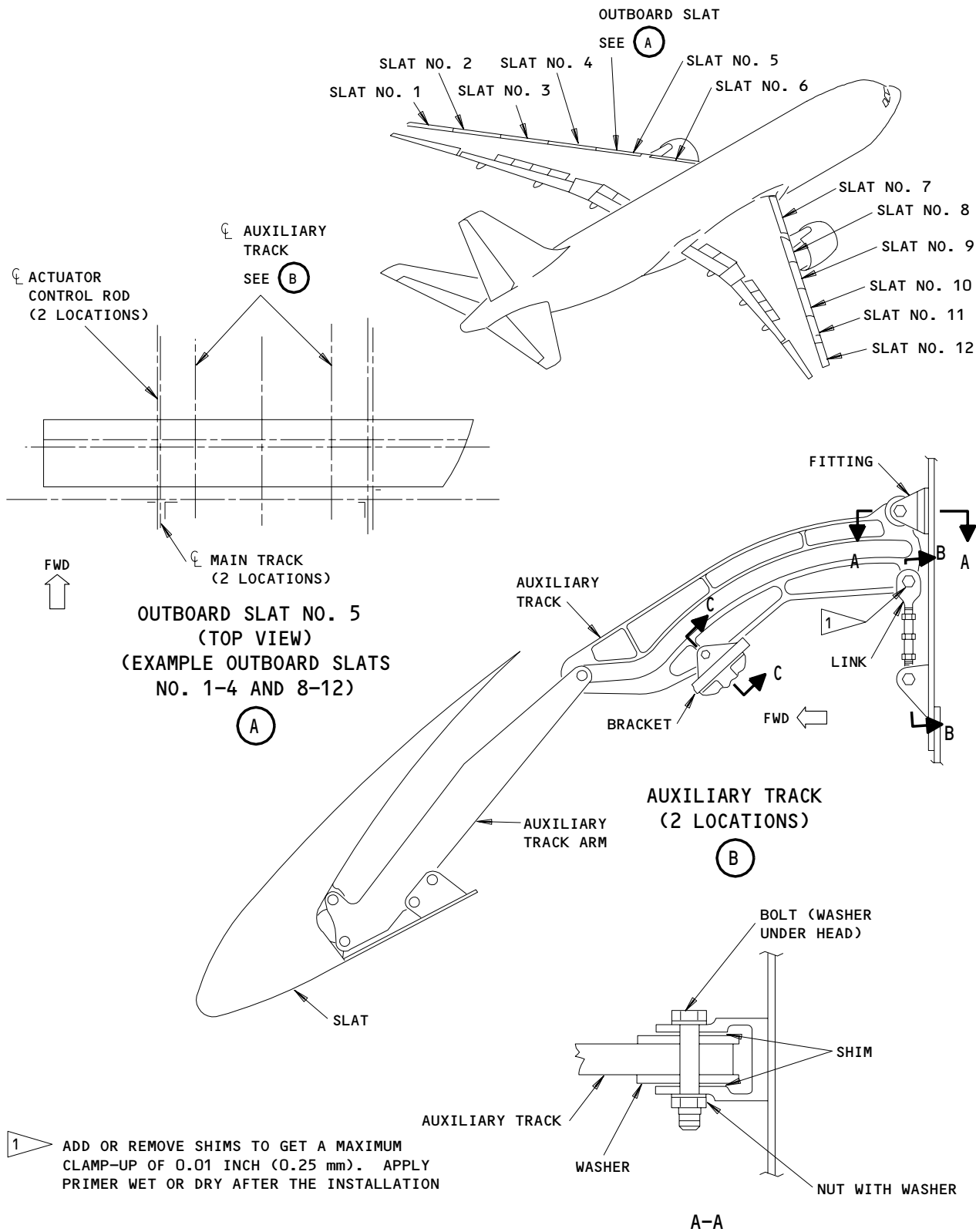
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Inboard Slat Auxiliary Track  
Figure 401

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Outboard Slat Auxiliary Track  
Figure 402 (Sheet 1)

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S 034-004

- (4) Remove the bolt that connects the forward end of the auxiliary track to the bracket on the fixed wing structure.

S 024-005

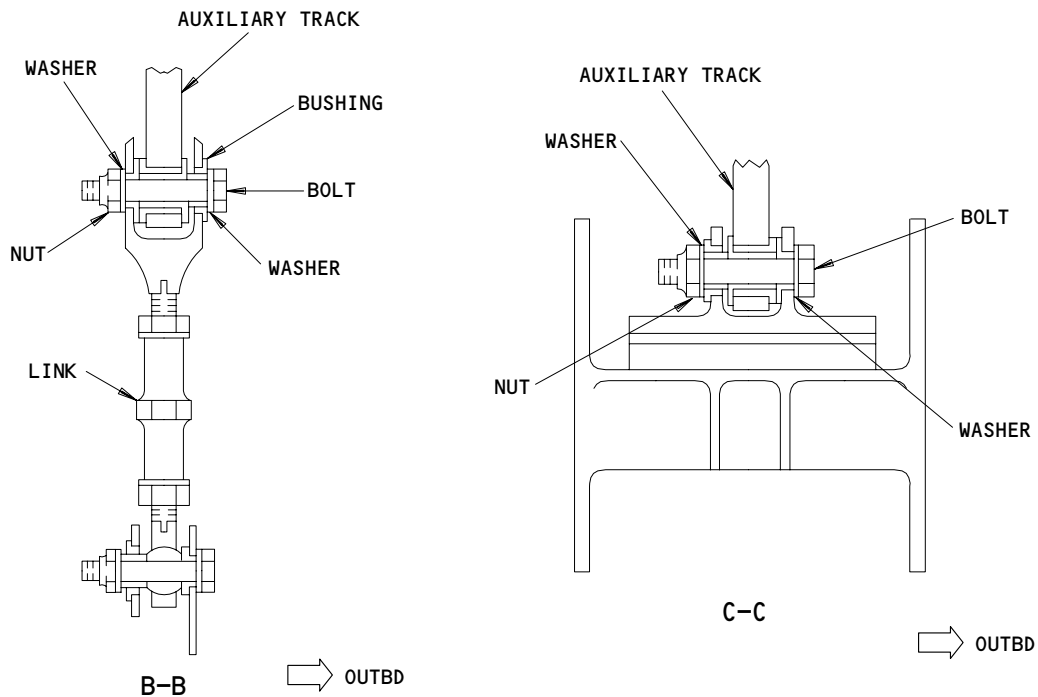
- (5) Remove the auxiliary track from the airplane.

E. Remove the Auxiliary Track for the Outboard Slat (Fig. 402)

S 024-006

- (1) Remove the outboard slat (Ref 27-81-02).

**NOTE:** Prepare for the removal with the instructions given in 27-81-02.



Outboard Slat Auxiliary Track  
Figure 402 (Sheet 2)

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S 034-007

- (2) Remove the bolt that connects the aft end of the auxiliary track to the link (View B-B).

**NOTE:** Do not change the length of the link during the removal.

S 034-008

- (3) Remove the bolts that connect the auxiliary track to the fixed wing structure (View A-A and View C-C).

S 024-009

- (4) Remove the auxiliary track from the airplane.
- F. Install the Auxiliary Track for the Inboard Slat (Fig. 401)

**NOTE:** Refer to 27-81-32/601 for the wear limits on the components used in this installation.

S 294-022

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 434-010

- (2) Connect the forward end of the auxiliary track to the fixed wing structure with a bolt, bushing, two washers, and nut. Tighten the nut to 95-110 pound-inches (10.7-12.4 newton-meters).

**NOTE:** Install the bolt with the head pointed in the outboard direction.

S 434-011

- (3) Connect the aft end of the auxiliary track to the link with a bolt, bushing, two washers, and nut. Tighten the nut to 95-110 pound-inches.

**NOTE:** Do not change the length of the link during the installation. Install the bolt with the head pointed to the outboard direction.

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S 424-012

- (4) Install the inboard slat (Ref 27-81-01).

S 824-013

- (5) Adjust and test the inboard slat (Ref 27-81-01).

**NOTE:** Put the airplane back to its usual condition with the instructions given in 27-81-01.

G. Install the Auxiliary Track for the Outboard Slat (Fig. 402)

**NOTE:** Refer to 27-81-32/601 for the wear limits on the components used in this installation.

S 294-023

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 434-015

- (2) Connect the aft end of the auxiliary track to the fixed wing structure (View A-A) with a bolt, two washers, and nut. Tighten the nut to 40-60 pound-inches (4.5-6.7 newton-meters).

S 434-016

- (3) Connect the forward end of the auxiliary track to the fixed wing structure (View C-C) with a bolt, bushing, washers, and nut. Tighten the nut.

S 434-017

- (4) Connect the aft end of the auxiliary track to the link with a bolt, bushing, washers, and nut. Tighten the nut.

**NOTE:** Do not change the length of the link during the installation.

S 424-018

- (5) Install the outboard slat (Ref 27-81-02).

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S 824-019

- (6) Adjust and test the outboard slat (Ref 27-81-02).

**NOTE:** Put the airplane back to its usual condition with the instructions given in 27-81-02.

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LE SLAT AUXILIARY TRACKS – INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and wear limit tables, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Leading Edge Slat Auxiliary Track – Removal/Installation for procedures to do these tasks.

TASK 27-81-32-226-002

2. Wear Limits for the Auxiliary Tracks on the Inboard LE Slat (Fig. 601)

A. General

- (1) This procedure only has illustrations and wear limit tables, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Leading Edge Slat Auxiliary Track – Removal/Installation for procedures to do these tasks.

TASK 27-81-32-226-001

3. Wear Limits for the Auxiliary Tracks on the Outboard LE Slat (Fig. 602)

A. General

- (1) This procedure only has illustrations and wear limit tables, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Leading Edge Slat Auxiliary Track – Removal/Installation for procedures to do these tasks.

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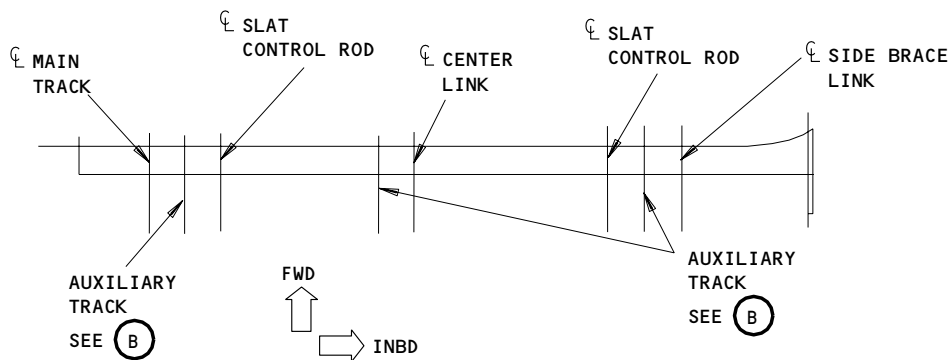
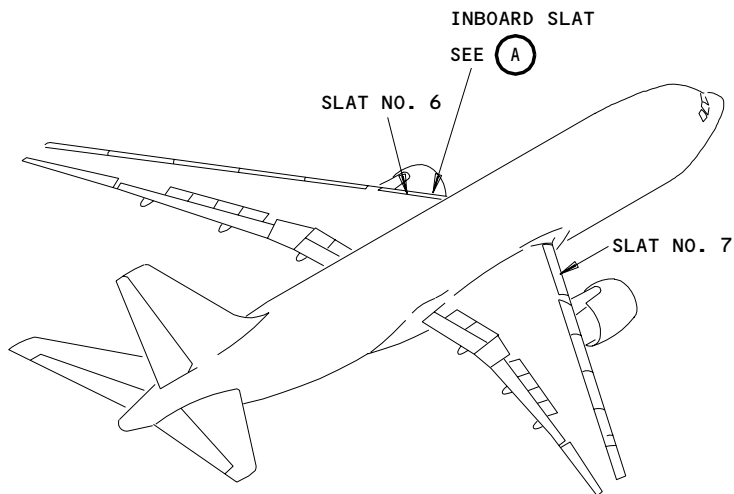
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INBOARD SLAT  
(LEFT WING IS SHOWN, RIGHT WING IS OPPOSITE)

(A)

Wear Limits for the Auxiliary Tracks on the Inboard LE Slat  
Figure 601 (Sheet 1)

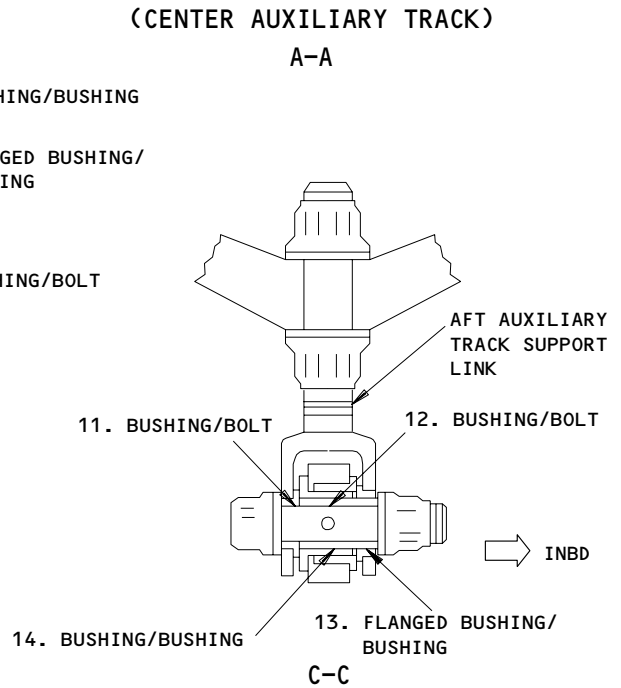
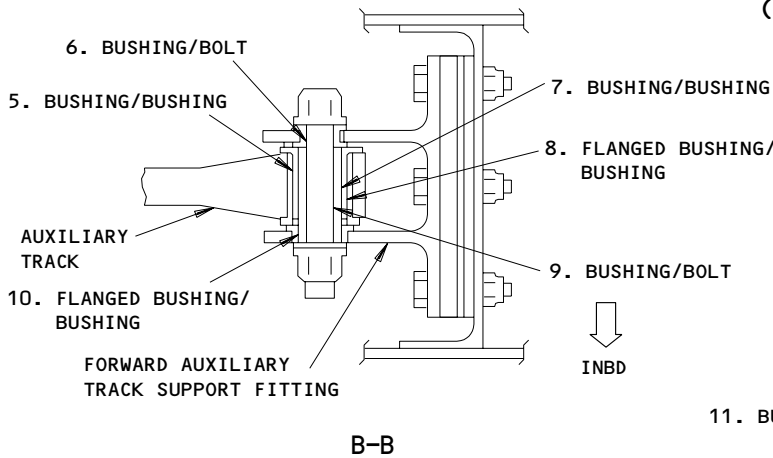
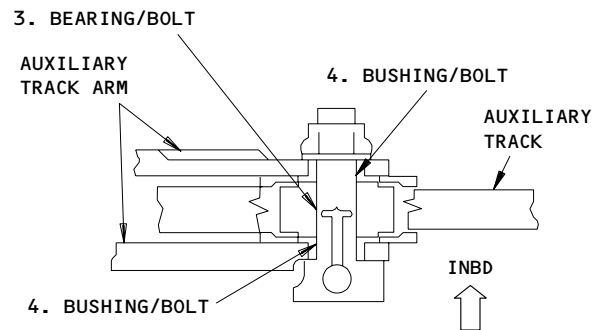
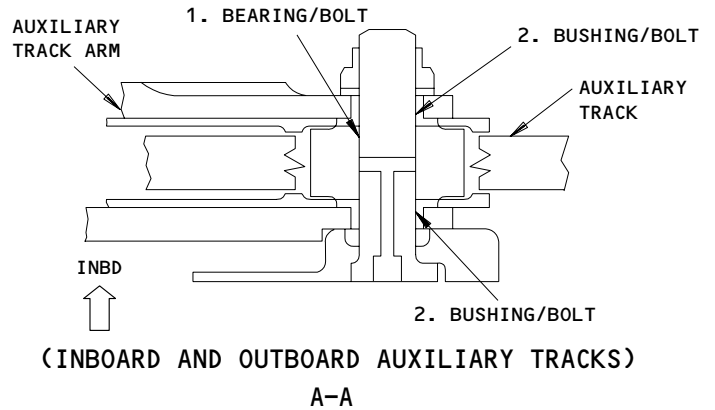
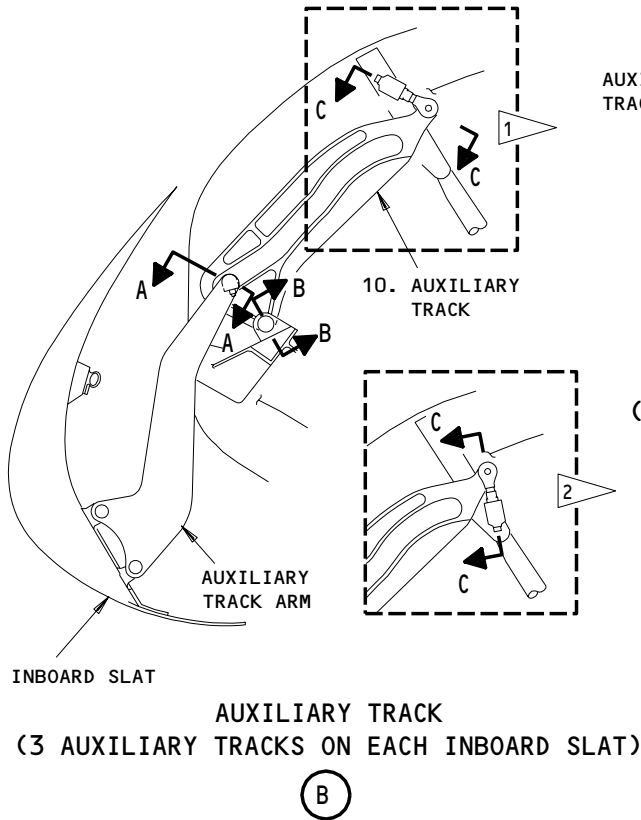
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- 1 CENTER AND INBOARD AUXILIARY TRACK
- 2 OUTBOARD AUXILIARY TRACK

**Wear Limits for the Auxiliary Tracks on the Inboard LE Slat**  
Figure 601 (Sheet 2)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BEARING	ID	0.4993 (12.682)	0.5000 (12.700)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4950 (12.573)		X		
2	BUSHING	ID	0.5000 (12.700)	0.5050 (12.827)	0.5105 (12.967)	0.0110 (0.279)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4940 (12.548)		X		
3	BEARING	ID	0.4993 (12.682)	0.5000 (12.700)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4950 (12.573)		X		
4	BUSHING	ID	0.5000 (12.700)	0.5050 (12.827)	0.5110 (12.979)	0.0115 (0.292)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4935 (12.535)		X		
5	BUSHING	ID	0.6872 (17.455)	0.6879 (17.473)	---	---	X		
	BUSHING	OD	0.6882 (17.480)	0.6892 (17.506)	---		X		
6	BUSHING	ID	0.3750 (9.525)	0.3756 (9.540)	0.3795 (9.639)	0.0050 (0.127)	X		
	BOLT	OD	0.3740 (9.500)	0.3745 (9.512)	0.3706 (9.413)		X		
7	BUSHING	ID	0.5620 (14.275)	0.5627 (14.293)	0.5665 (14.389)	0.0050 (0.127)	X		
	BUSHING	OD	0.5610 14.249	0.5615 14.262	0.5577 14.166		X		
8	FLANGED BUSHING	ID	0.6872 (17.455)	0.6879 (17.473)	---	---	X		
	BUSHING	OD	0.6882 (17.480)	0.6892 (17.506)	---		X		
9	BUSHING	ID	0.3750 (9.525)	0.3755 (9.538)	0.3795 (9.639)	0.0050 (0.127)	X		
	BOLT	OD	0.3740 (9.500)	0.3745 (9.512)	0.3705 (9.411)		X		
10	FLANGED BUSHING	ID	0.5620 (14.275)	0.5627 (14.293)	0.5665 (14.389)	0.0050 (0.127)	X		
	BUSHING	OD	0.5610 14.249	0.5615 14.262	0.5577 14.166		X		

Wear Limits for the Auxiliary Tracks on the Inboard LE Slat  
Figure 601 (Sheet 3)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BUSHING	ID	0.3750 (9.525)	0.3756 (9.540)	0.3795 (9.639)	0.0050 (0.127)	X		
	BOLT	OD	0.3740 (9.500)	0.3745 (9.512)	0.3706 (9.413)		X		
12	BUSHING	ID	0.3750 (9.525)	0.3755 (9.538)	0.3795 (9.639)	0.0050 (0.127)	X		
	BOLT	OD	0.3740 (9.500)	0.3745 (9.512)	0.3705 (9.411)		X		
13	FLANGED BUSHING	ID	0.5620 (14.275)	0.5627 (14.293)	0.5665 (14.389)	0.0050 (0.127)	X		
	BUSHING	OD	0.5610 (14.249)	0.5615 (14.262)	0.5577 (14.166)		X		
14	BUSHING	ID	0.5620 (14.275)	0.5627 (14.293)	0.5665 (14.389)	0.0050 (0.127)	X		
	BUSHING	OD	0.5610 (14.249)	0.5615 (14.262)	0.5577 (14.166)		X		

Wear Limits for the Auxiliary Tracks on the Inboard LE Slat  
Figure 601 (Sheet 4)

EFFECTIVITY

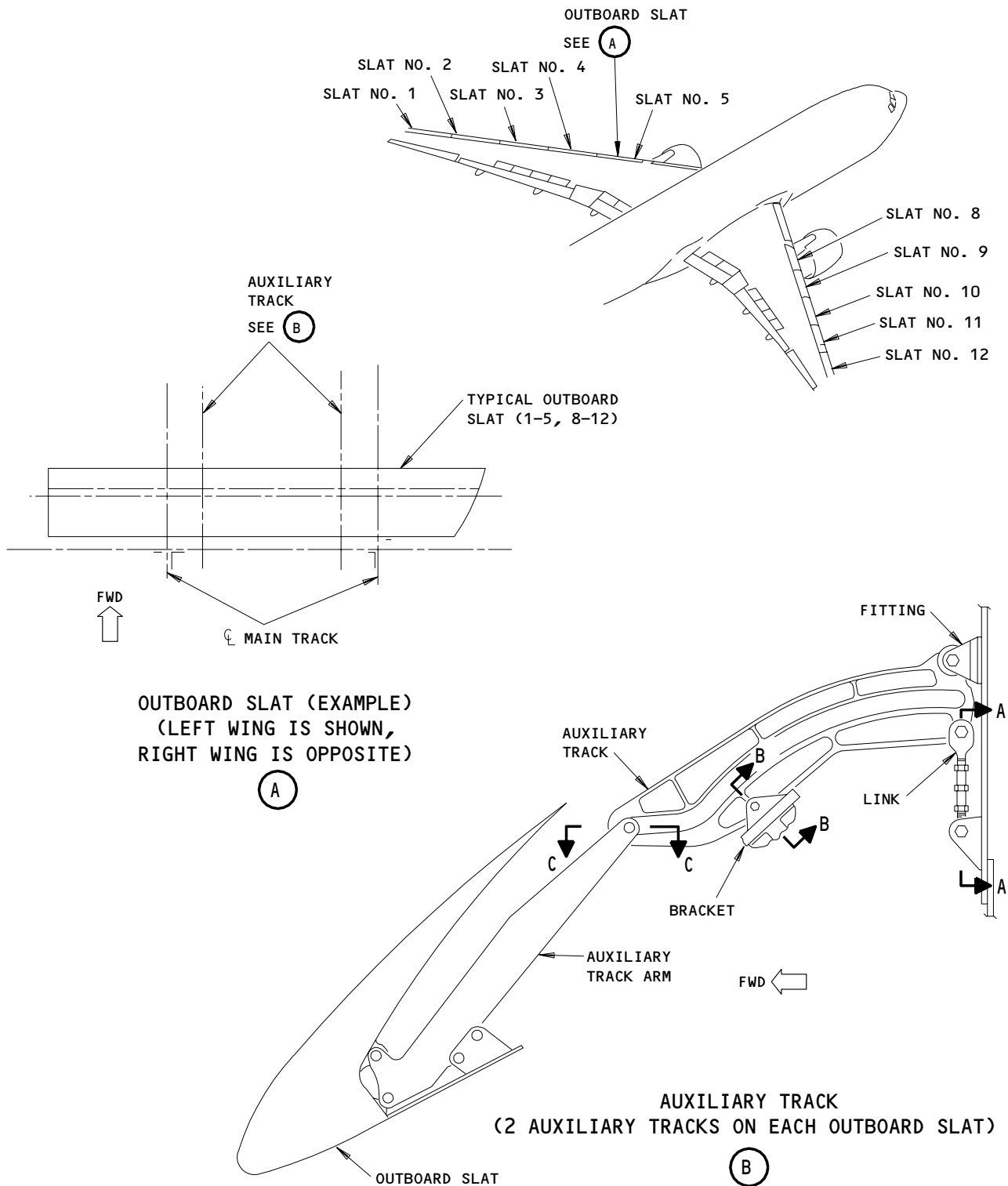
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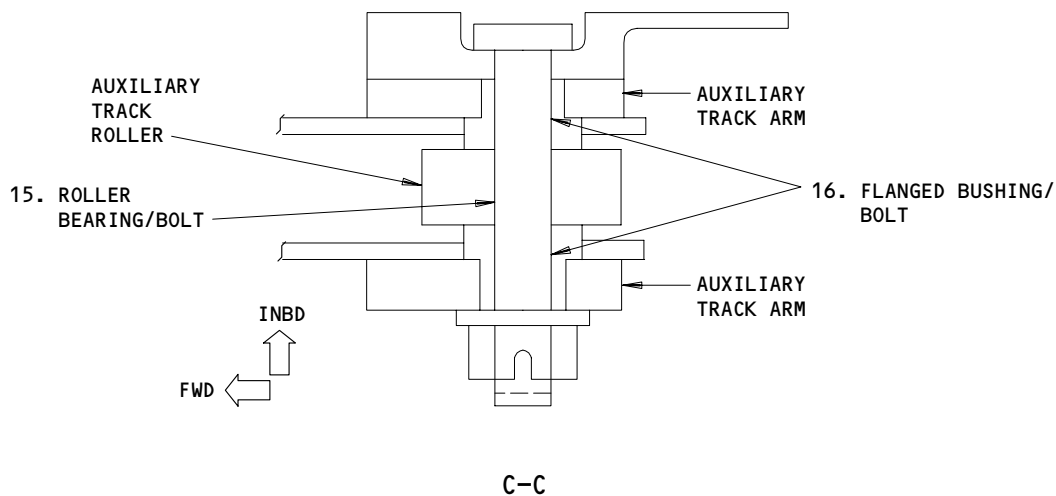
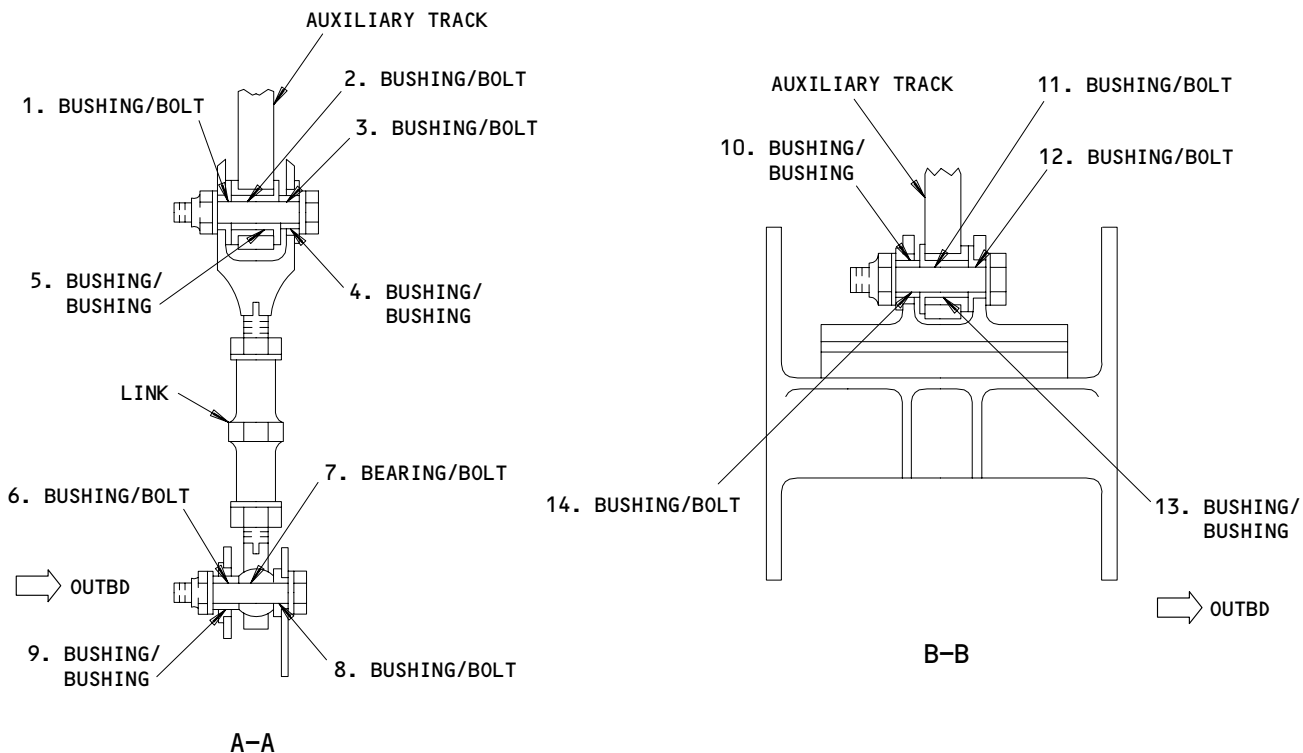


Wear Limits for the Auxiliary Track on the Outboard LE Slat  
Figure 602 (Sheet 1)

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Wear Limits for the Auxiliary Track on the Outboard LE Slat  
Figure 602 (Sheet 2)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2545 (6.464)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2455 (6.236)		X		
2	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2545 (6.464)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2455 (6.236)		X		
3	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2545 (6.464)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2455 (6.236)		X		
4	BUSHING	ID	0.3750 (9.525)	0.3756 (9.540)	0.3795 (9.639)	0.0050 (0.127)	X		
	BUSHING	OD	0.3740 (9.500)	0.3745 (9.512)	0.3706 (9.413)		X		
5	BUSHING	ID	0.3750 (9.525)	0.3756 (9.540)	0.3811 (9.680)	0.0050 (0.127)	X		
	BUSHING	OD	0.3756 (9.540)	0.3761 (9.553)	0.3706 (9.413)		X		
6	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2545 (6.464)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2455 (6.236)		X		
7	BEARING	ID	0.2495 (6.337)	0.2500 (6.350)	0.2545 (6.464)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2450 (6.223)		X		
8	BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2545 (6.464)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2455 (6.236)		X		
9	BUSHING	ID	0.3750 (9.525)	0.3756 (9.540)	0.3795 (9.639)	0.0050 (0.127)	X		
	BUSHING	OD	0.3740 (9.500)	0.3745 (9.512)	0.3706 (9.413)		X		
10	BUSHING	ID	0.4375 (11.113)	0.4382 (11.130)	0.4420 (11.227)	0.0050 (0.127)	X		
	BUSHING	OD	0.4365 (11.087)	0.4370 (11.100)	0.4332 (11.003)		X		

Wear Limits for the Auxiliary Track on the Outboard LE Slat  
Figure 602 (Sheet 3)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BUSHING	ID	0.3125 (7.938)	0.3131 (7.953)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3081 (7.826)		X		
12	BUSHING	ID	0.3125 (7.938)	0.3131 (7.953)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3081 (7.826)		X		
13	BUSHING	ID	0.4375 (11.113)	0.4381 (11.128)	0.4436 (11.267)	0.0050 (0.127)	X		
	BUSHING	OD	0.4381 (11.128)	0.4386 (11.140)	0.4331 (11.001)		X		
14	BUSHING	ID	0.3125 (7.938)	0.3130 (7.950)	0.3170 (8.052)	0.0050 (0.127)	X		
	BOLT	OD	0.3110 (7.899)	0.3120 (7.925)	0.3080 (7.823)		X		
15	ROLLER BEARING	ID	0.2493 (6.332)	0.2500 (6.350)	0.2545 (6.464)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2450 (6.223)		X		
16	FLANGED BUSHING	ID	0.2500 (6.350)	0.2505 (6.363)	0.2545 (6.464)	0.0050 (0.127)	X		
	BOLT	OD	0.2485 (6.312)	0.2495 (6.337)	0.2455 (6.236)		X		

Wear Limits for the Auxiliary Track on the Outboard LE Slat  
Figure 602 (Sheet 4)

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LEADING EDGE SLAT MAIN TRACK - REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task removes the main track for the leading edge slat. The second task installs the main track for the leading edge slat.
- B. The slats are given the numbers from No. 1 through No. 12, from the left wing to the right wing.

TASK 27-81-34-004-001

2. Remove the Main Track for the Leading Edge Slat

A. References

- (1) 27-81-01/401, Inboard Leading Edge Slat
- (2) 27-81-02/401, Outboard Leading Edge Slat

B. Access

- (1) Location Zones
  - 510/610 Wing Leading Edge - Inboard
  - 520/620 Wing Leading Edge - Outboard

C. Remove the Main Track for the Inboard Slat (Fig. 401)

S 294-035

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 014-002

- (2) Remove the inboard slat (AMM 27-81-01/401).

S 034-003

- (3) Remove the downstop on the main track.

**NOTE:** Hold the weight of the main track while you remove the downstop.

S 024-004

- (4) Remove the main track from the airplane.

D. Remove the Main Track for the Outboard Slat (Fig. 402)

EFFECTIVITY

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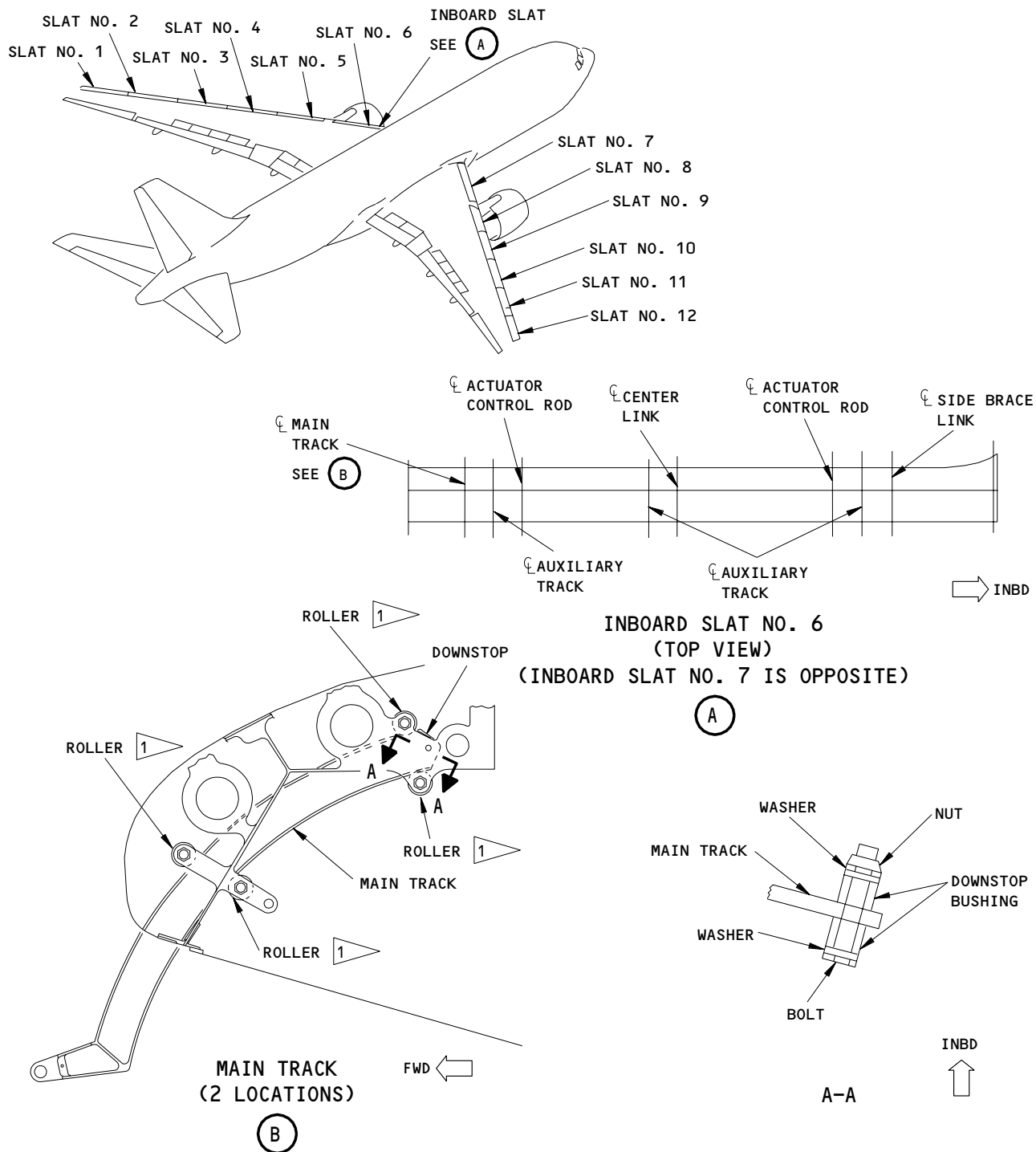
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# BOEING

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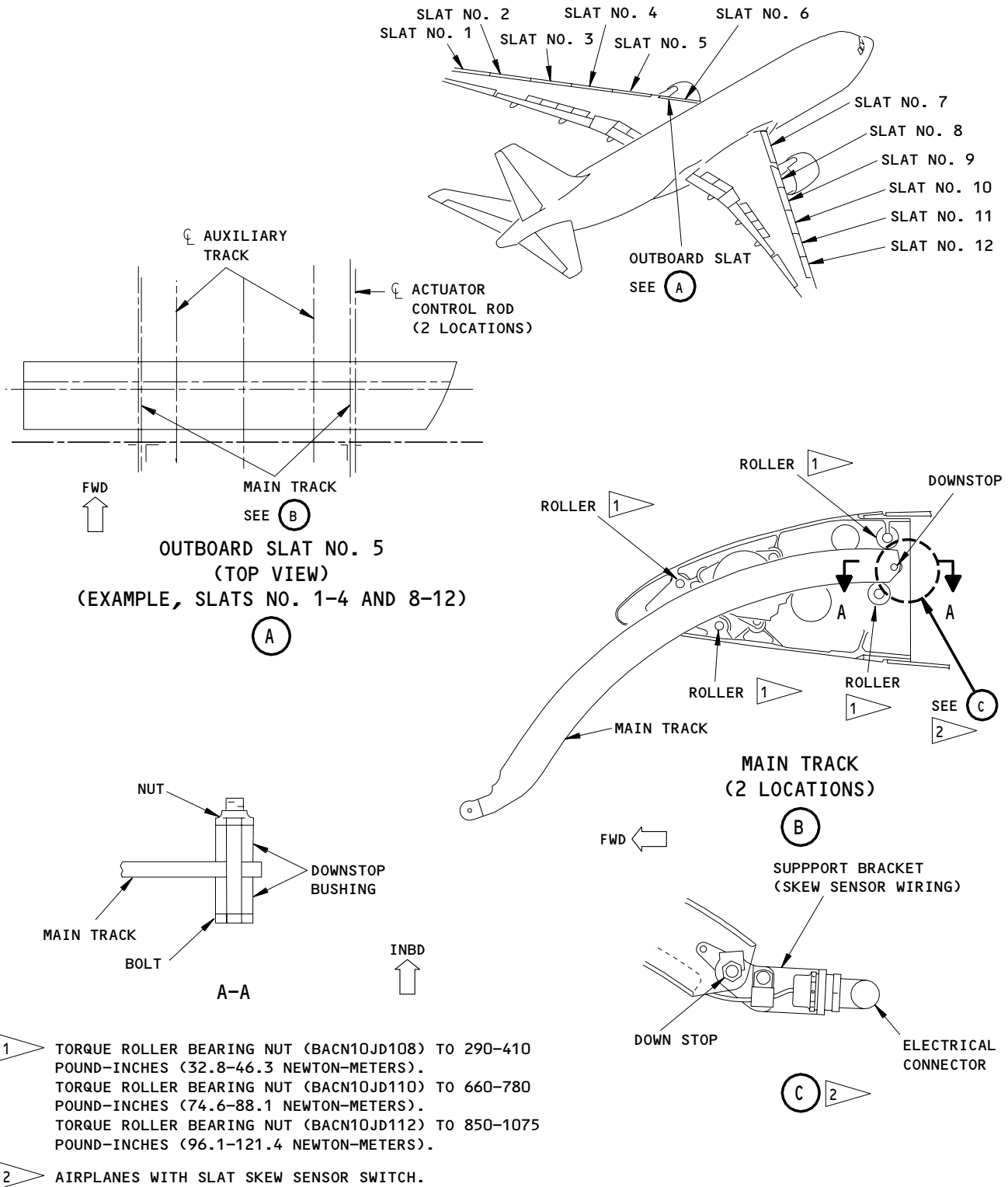


1 TORQUE ROLLER BEARING NUT (BACN10JD10ASU) TO 660-880 POUND-INCHES (74.6-88.1 NEWTON-METERS).

Inboard Slat Main Track  
Figure 401

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Outboard Slat Main Track  
Figure 402

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### 27-81-34

S 294-037

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 014-005

- (2) Remove the outboard slat (AMM 27-81-02/401).

S 034-034

**CAUTION:** DO NOT LET THE SLAT TO FALL FREE FORWARD WHEN YOU DISCONNECT THE SLAT FROM THE FORWARD END OF THE MAIN TRACK. DAMAGE TO THE BRACKET OF THE SLAT SKEW SENSOR SWITCH INSTALLED ON MAIN TRACK AND TO THE WING FRONT SPAR CAN OCCUR.

- (3) Remove the downstop on the main track (and the electrical wiring support-bracket, if airplane has Outboard LE Slat Skew Detection System).

**NOTE:** Hold the weight of the main track while you remove the downstop.

S 024-007

- (4) Remove the main track from the airplane.

TASK 27-81-34-404-014

3. Install the Main Track for the Leading Edge Slat

A. References

- (1) 27-81-01/401, Inboard Leading Edge Slat
- (2) 27-81-02/401, Outboard Leading Edge Slat
- (3) 27-81-02/501, Outboard Leading Edge Slat
- (4) 27-81-34/601, Leading Edge Slat Main Track

B. Access

(1) Location Zones

- |         |                              |
|---------|------------------------------|
| 510/610 | Wing Leading Edge - Inboard  |
| 520/620 | Wing Leading Edge - Outboard |

C. Install the Main Track for the Inboard Slat (Fig. 401)

**NOTE:** The wear limit inspection for main track of the inboard slat is in 27-81-34/601.

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S 294-039

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 424-043

**CAUTION:** MAKE SURE THAT THE DOWNSTOP BUSHINGS ARE INSTALLED CORRECTLY AND THE NUT HAS THE CORRECT TORQUE. IF THEY ARE NOT, THE MAIN TRACK/STRUCTURE JOINT CAN BECOME LOOSE. THE DOWNSTOP PARTS CAN DISCONNECT AND CAN CAUSE DAMAGE TO THE SLAT TRACK HOUSING.

- (2) Make sure the parts of the downstop assembly are installed correctly and the nut has the correct torque.

S 424-008

- (3) Put the main track through the track rollers and install the downstop.

S 414-009

- (4) Install the inboard slat (AMM 27-81-01/401).

**NOTE:** The instructions for the adjustment, test, and put the airplane back to its usual condition for the inboard slat are in the installation procedure in AMM 27-81-01/401.

D. Install the Main Track for the Outboard Slat (Fig. 402)

**NOTE:** The wear limit inspection for main track of the outboard slat is in 27-81-34/601.

S 294-040

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

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S 214-010

- (2) Do a check of the bearing plates for wear.

**NOTE:** The maximum acceptable wear on the bearing plate is 0.030 inch (0.762 mm). If the bearing plate thickness is less than 0.070 inch (1.78 mm), replace the bearing plate (AMM 57-41-65/401).

S 424-012

- (3) Do these steps to install the main track for the outboard slat:
- (a) Put the slat main track through the track rollers.
  - (b) Move track up and down by hand.
  - (c) Do a check for the clearance between forward bearing plate, nutplate and track.

**NOTE:** If track is found to contact nut plate, re-position nutplate (AMM 57-41-65/401).

**CAUTION:** MAKE SURE THAT THE DOWNSTOP BUSHINGS ARE INSTALLED CORRECTLY AND THE NUT HAS THE CORRECT TORQUE. IF THEY ARE NOT, THE MAIN TRACK/STRUCTURE JOINT CAN BECOME LOOSE. THE DOWNSTOP PARTS CAN DISCONNECT AND CAN CAUSE DAMAGE TO THE SLAT TRACK HOUSING.

- (d) Make sure the parts of the downstop assembly are installed correctly and the nut has the correct torque.
  - 1) Apply a minimum self locking (run-on) torque of 10 pound-inches to the nut. Replace the nut if it does meet the minimum self locking torque.
  - 2) Tighten the nut within the range of 120-130 pound-inches.
- (e) Install the down stop (and the electrical wiring support-bracket, if airplane has Outboard LE Slat Skew Detection System).

S 414-013

- (4) Install the outboard slat (AMM 27-81-02/401).

S 824-014

- (5) Adjust and test the outboard slat (AMM 27-81-02/501).

**NOTE:** Put the airplane back to its usual condition with the instructions given in 27-81-02.

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LE SLAT MAIN TRACKS – INSPECTION/CHECK

1. General

- A. This procedure only has illustrations and wear limit tables, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Leading Edge Slat Main Track – Removal/Installation for procedures to do these tasks.

TASK 27-81-34-226-001

2. Wear Limits for the Inboard Slat Main Track (Fig. 601)

A. General

- (1) This procedure only has illustrations and wear limit tables, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Leading Edge Slat Main Track – Removal/Installation for procedures to do these tasks.

TASK 27-81-34-226-002

3. Wear Limits for the Outboard Slat Main Track (Fig. 602 and 603)

A. General

- (1) This procedure only has illustrations and wear limit tables, which show the data for wear limits. There are no procedures for access, removal, or installation of the parts. Refer to the Leading Edge Slat Main Track – Removal/Installation for procedures to do these tasks.

EFFECTIVITY

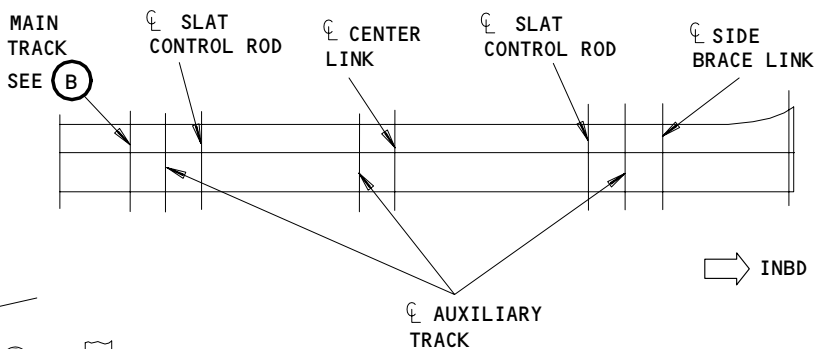
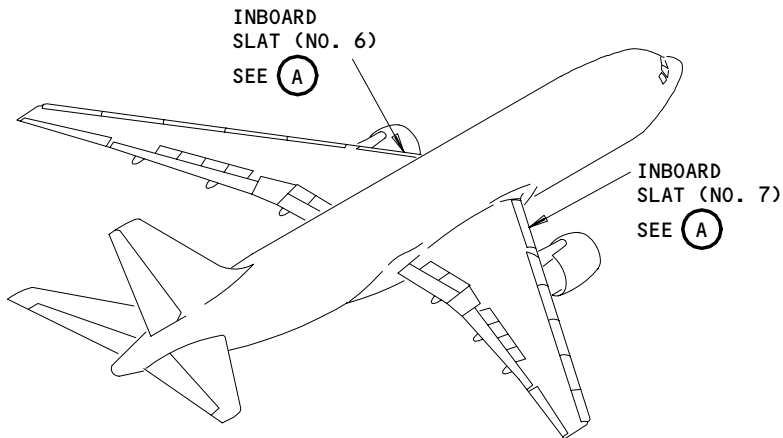
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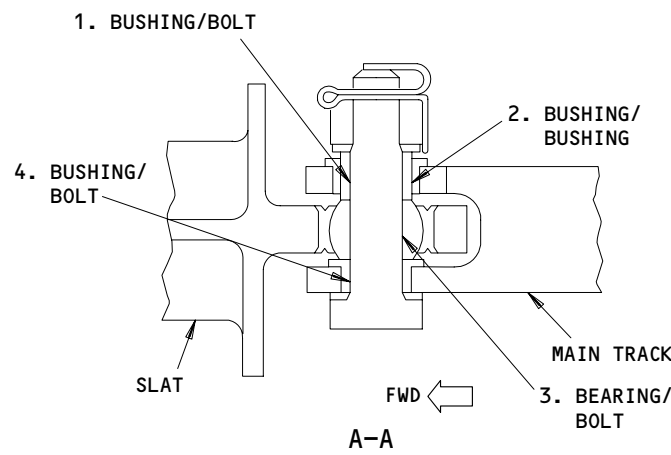
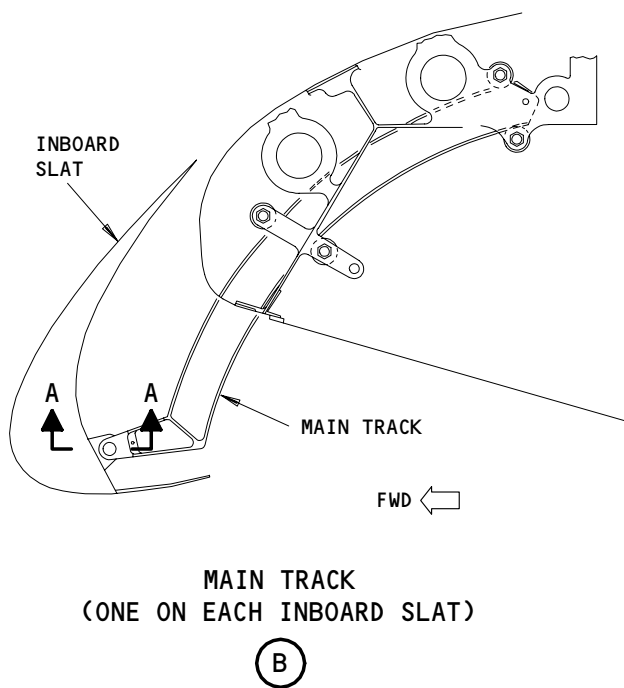
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INBOARD SLAT  
LEFT WING SHOWN  
(RIGHT WING OPPOSITE)  
(A)



Wear Limits for the Inboard Slat Main Track  
Figure 601 (Sheet 1)

EFFECTIVITY	ALL
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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4955 (12.586)		X		
2	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6917 (17.569)	0.0052 (0.132)	X		
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6825 (17.336)		X		
3	BEARING	ID	0.5000 (12.700)	0.5004 (12.710)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4954 (12.583)		X		
4	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4957 (12.591)		X		

Wear Limits for the Inboard Slat Main Track  
Figure 601 (Sheet 2)

EFFECTIVITY

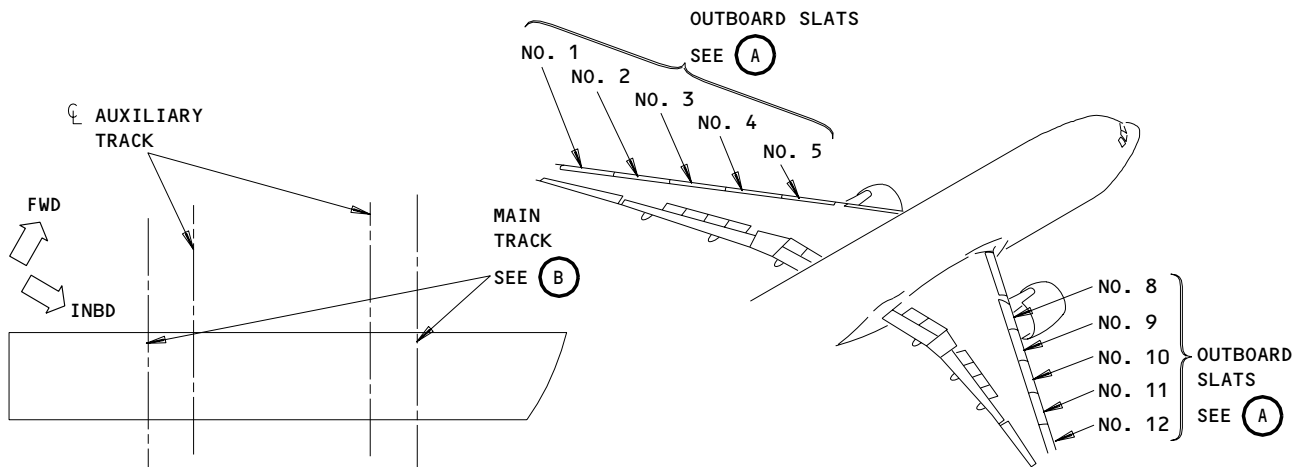
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**27-81-34**

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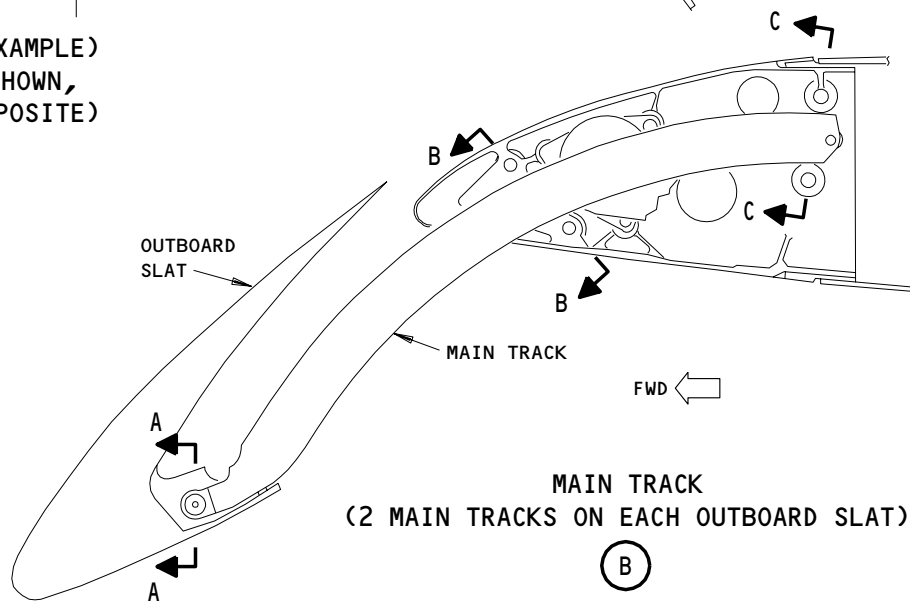
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243340



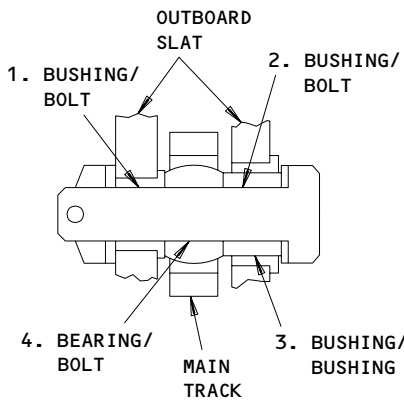
OUTBOARD SLAT (EXAMPLE)  
(LEFT WING IS SHOWN,  
RIGHT WING IS OPPOSITE)

(A)

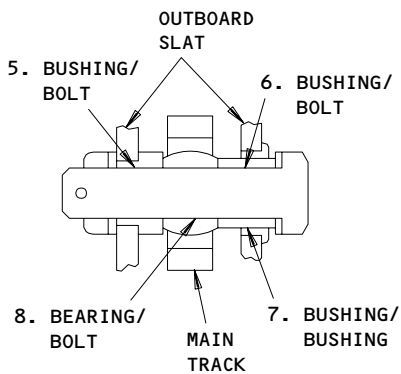


MAIN TRACK  
(2 MAIN TRACKS ON EACH OUTBOARD SLAT)

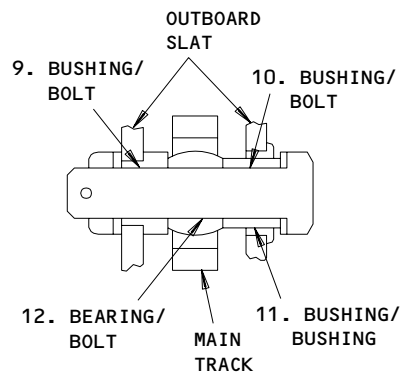
(B)



(SLATS NO. 3-5 AND 8-10)  
A-A



(SLATS NO. 2 AND 11)  
A-A

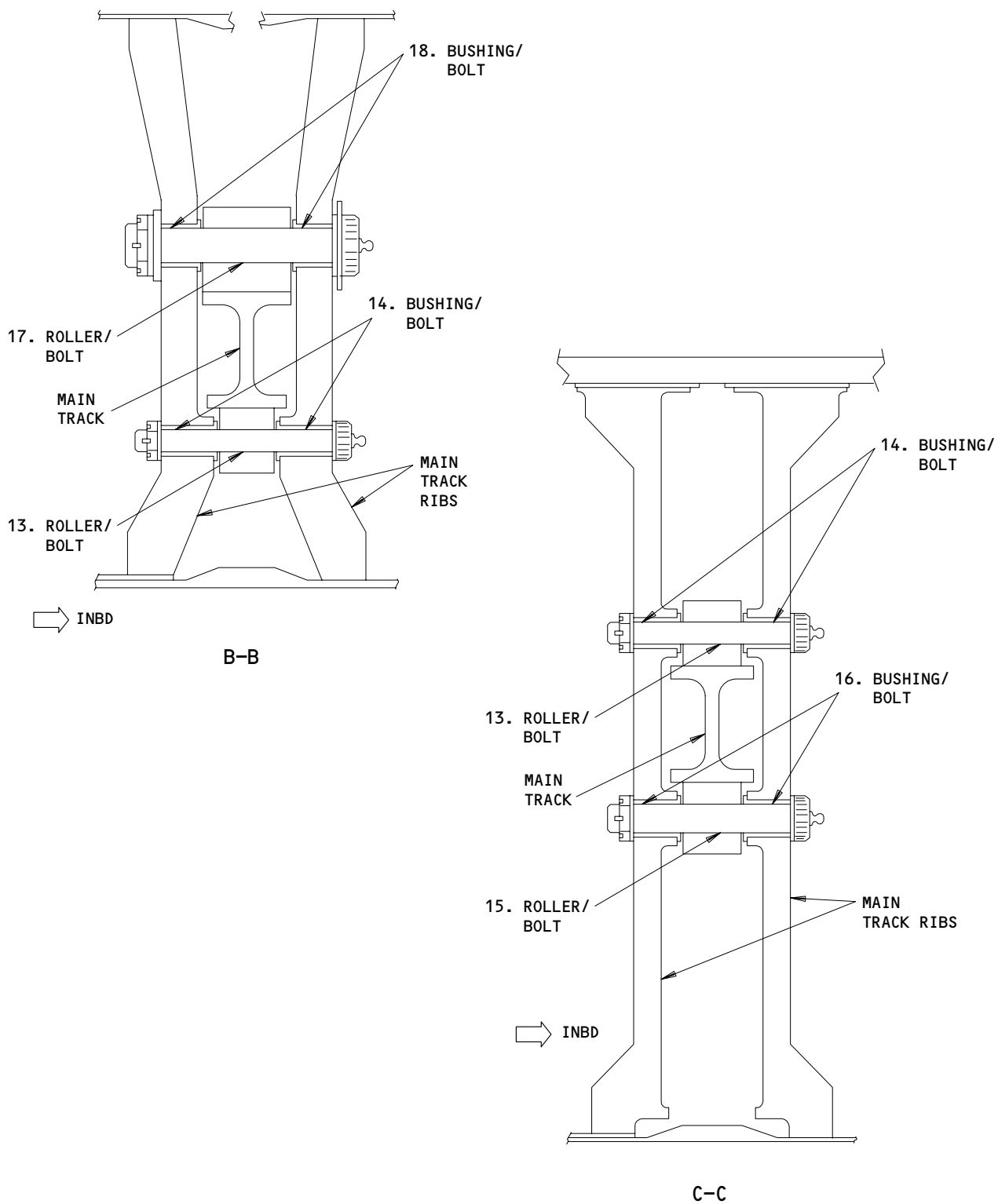


(SLATS NO. 1 AND 12)  
A-A

Wear Limits for the Outboard Slat Main Track  
Figure 602 (Sheet 1)

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Wear Limits for the Outboard Slat Main Track  
Figure 602 (Sheet 2)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
1	BUSHING	ID	0.5620 (14.275)	0.5627 (14.293)	0.5665 (14.389)	0.0050 (0.127)	X		
	BOLT	OD	0.5610 (14.249)	0.5615 (14.262)	0.5577 (14.166)		X		
2	BUSHING	ID	0.5620 (14.275)	0.5625 (14.288)	0.5665 (14.389)	0.0050 (0.127)	X		
	BOLT	OD	0.5610 (14.249)	0.5615 (14.262)	0.5575 (14.161)		X		
3	BUSHING	ID	0.8120 (20.625)	0.8128 (20.645)	0.8168 (20.747)	0.0050 (0.127)	X		
	BUSHING	OD	0.8110 (20.599)	0.8115 (20.612)	0.8075 (20.511)		X		
4	BEARING	ID	0.5625 (14.288)	0.5629 (14.298)	0.5665 (14.389)	0.0050 (0.127)	X		
	BOLT	OD	0.5605 (14.237)	0.5615 (14.262)	0.5579 (14.171)		X		
5	BUSHING	ID	0.5000 (12.700)	0.5007 (12.718)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4957 (12.591)		X		
6	BUSHING	ID	0.5000 (12.700)	0.5005 (12.713)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4990 (12.675)	0.4995 (12.687)	0.4955 (12.586)		X		
7	BUSHING	ID	0.6870 (17.450)	0.6877 (17.468)	0.6916 (17.567)	0.0051 (0.130)	X		
	BUSHING	OD	0.6860 (17.424)	0.6865 (17.437)	0.6826 (17.338)		X		
8	BEARING	ID	0.5000 (12.700)	0.5004 (12.710)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4955 (12.586)		X		
9	BUSHING	ID	0.4375 (11.113)	0.4382 (11.130)	0.4420 (11.227)	0.0050 (0.127)	X		
	BOLT	OD	0.4365 (11.087)	0.4370 (11.100)	0.4432 (11.257)		X		
10	BUSHING	ID	0.4375 (11.113)	0.4370 (11.100)	0.4330 (10.998)	0.0050 (0.127)	X		
	BOLT	OD	0.4365 (11.087)	0.4370 (11.100)	0.4330 (10.998)		X		

Wear Limits for the Outboard Slat Main Track  
Figure 602 (Sheet 3)

EFFECTIVITY







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
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
INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			DIAMETER		PERMITTED WEAR DIMENSION INCHES (mm)	MAXIMUM DIAMETER CLEARANCE INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)					
11	BOLT	ID	0.6245 (15.862)	0.6252 (15.880)	0.6290 (15.977)	0.0050 (0.127)	X		
	BUSHING	OD	0.6235 (15.837)	0.6240 (15.850)	0.6202 (15.753)		X		
12	BUSHING	ID	0.4375 (11.113)	0.7379 (18.743)	0.4420 (11.227)	0.0050 (0.127)	X		
	BEARING	OD	0.4365 (11.087)	0.4370 (11.100)	0.4329 (10.996)		X		
13	BUSHING	ID	0.4993 (12.682)	0.5000 (12.700)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4950 (12.573)		X		
14	BUSHING	ID	0.5000 (12.700)	0.5015 (12.738)	0.5045 (12.814)	0.0050 (0.127)	X		
	BOLT	OD	0.4985 (12.662)	0.4995 (12.687)	0.4965 (12.611)		X		
15	ROLLER	ID	0.6243 (15.857)	0.6250 (15.875)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6230 (15.824)	0.6240 (15.850)	0.6200 (15.748)		X		
16	BUSHING	ID	0.6250 (15.875)	0.6265 (15.913)	0.6290 (15.977)	0.0050 (0.127)	X		
	BOLT	OD	0.6230 (15.824)	0.6240 (15.850)	0.6215 (15.786)		X		
17	ROLLER	ID	0.7493 (19.032)	0.7500 (19.050)	0.7548 (19.172)	0.0058 (0.147)	X		
	BOLT	OD	0.7480 (18.999)	0.7490 (19.025)	0.7442 (18.903)		X		
18	BUSHING	ID	0.7500 (19.050)	0.7515 (19.088)	0.7548 (19.172)	0.0058 (0.147)	X		
	BOLT	OD	  	  	0.7457 (18.941)		X		

 OUTBOARD SLAT STATIONS (OSS):

- 426.997 AND 429.997, 491.453 AND 494.453, 571.049 AND 574.049, 640.445 AND 643.445
- MINIMUM DIAMETER: 0.7480 INCH (18.9992 mm)
- MAXIMUM DIAMETER: 0.7490 INCH (19.0246 mm)

 OUTBOARD SLAT STATIONS (OSS):

- 1094.820 AND 1097.820
- MINIMUM DIAMETER: 0.4985 INCH (12.6619 mm)
- MAXIMUM DIAMETER: 0.4995 INCH (12.6873 mm)

 OUTBOARD SLAT STATIONS (OSS):

- 722.441 AND 725.441, 791.037 AND 794.037, 870.132 AND 873.132, 945.328 AND 948.328, 1014.925 AND 1017.925
- MINIMUM DIAMETER: 0.6230 INCH (15.8242 mm)
- MAXIMUM DIAMETER: 0.6240 INCH (15.8496 mm)

Wear Limits for the Outboard Slat Main Track  
Figure 602 (Sheet 4)

EFFECTIVITY

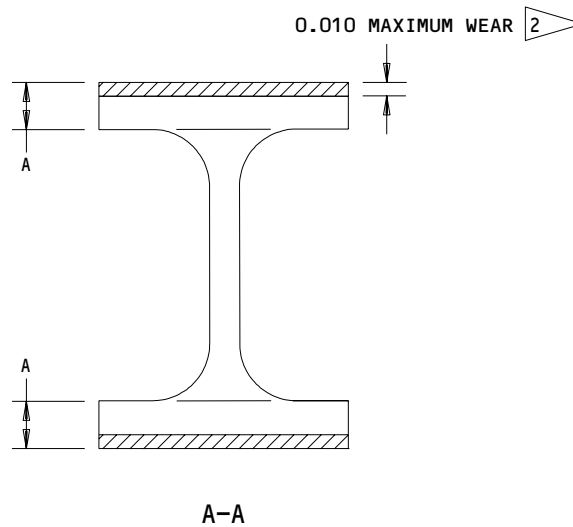
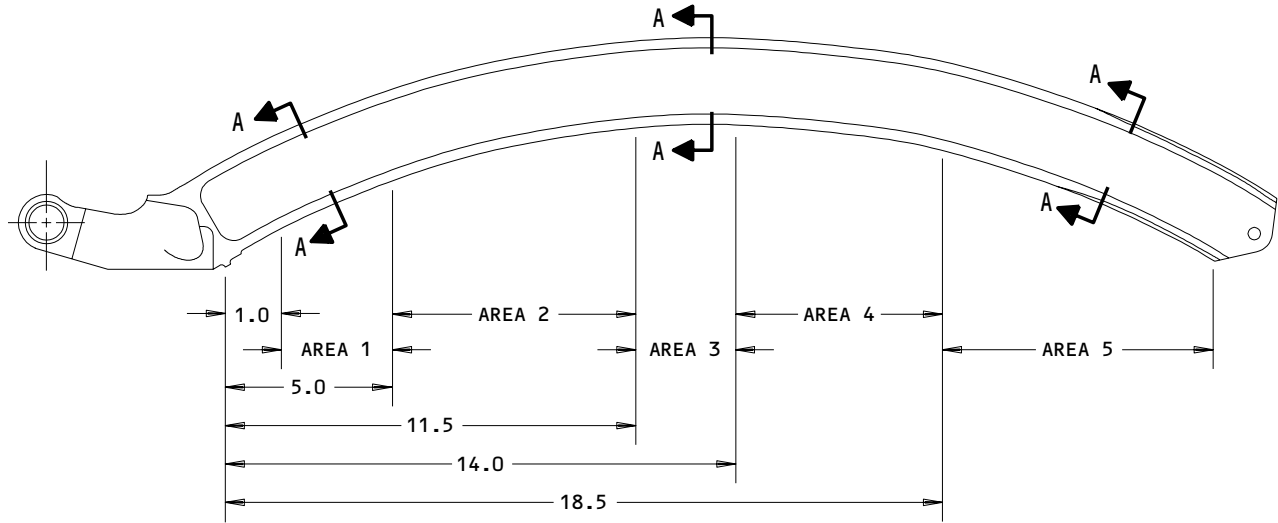
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**NOTE:** ALL DIMENSIONS ARE IN INCHES

 WEAR SURFACE - ROLLER CONTACT

Wear Limits for the Main Track Surface  
Figure 603 (Sheet 1)

























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**BOEING**  
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AREA NO.	SLAT NO. (PART NO. OF TRACK)	DIM.	DESIGN LIMITS		WEAR LIMITS 	REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR
			THICKNESS		MINIMUM THICKNESS INCHES (mm)			
			MINIMUM INCHES (mm)	MAXIMUM INCHES (mm)				
1	ALL SLATS (ALL TRACKS)	A	0.2100 (5.334)	0.2300 (5.842)	0.2000 (5.080)			
2	ALL SLATS (ALL TRACKS)	A						
3	1 AND 12 (114T4180-1, -11)	A	0.2400 (6.096)	0.2600 (6.604)	0.2300 (5.842)			
3	1 AND 12 (114T4180-21, -31)	A	0.2600 (6.604)	0.2800 (7.112)	0.2500 (6.350)			
3	2 AND 11 (114T4180-12, -2)	A	0.3100 (7.874)	0.3200 (8.128)	0.3000 (7.620)			
3	2 AND 11 (114T4180-22, -32)	A	0.3400 (8.636)	0.3600 (9.144)	0.3300 (8.382)			
3	3 AND 10 (114T4180-13, -3)	A	0.3800 (9.652)	0.4000 (10.160)	0.3700 (9.398)			
3	3 AND 10 (114T4180-23, -33)	A	0.4100 (10.414)	0.4300 (10.922)	0.4000 (10.160)			
3	3 AND 10 (114T4180-43, -53)	A	0.4500 (11.430)	0.4700 (11.938)	0.4400 (11.176)			
3	4 AND 9 (114T4180-14, -4)	A	0.3900 (9.906)	0.4100 (10.414)	0.3800 (9.652)			
3	4 AND 9 (114T4180-24, -34)	A	0.4200 (10.668)	0.4400 (11.176)	0.4100 (10.414)			
3	4 AND 9 (114T4180-44, -54)	A	0.4900 (12.446)	0.5100 (12.954)	0.4800 (12.192)			
3	5 AND 8 (114T4180-15, -5)	A	0.3600 (9.144)	0.3800 (9.652)	0.3500 (8.890)			
3	5 AND 8 (114T4180-25, -35)	A	0.3900 (9.906)	0.4100 (10.414)	0.3800 (9.652)			
3	5 AND 8 (114T4180-45, -55)	A	0.4400 (11.176)	0.4600 (11.684)	0.4300 (10.922)			
4	ALL SLATS (ALL TRACKS)	A						
5	ALL SLATS (ALL TRACKS)	A	0.2100 (5.334)	0.2300 (5.842)	0.2000 (5.080)			

Wear Limits for the Main Track Surface  
Figure 603 (Sheet 2)

EFFECTIVITY

ALL

27-81-34

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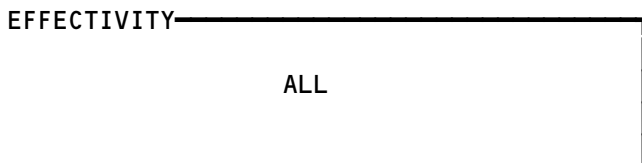
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 **BOEING**  
767  
MAINTENANCE MANUAL

- 1 THE MINIMUM THICKNESS IS EQUIVALANT TO THE MINIMUM DESIGN THICKNESS, MINUS 0.010 INCH (0.254 mm).
- 2 IF THE TRACK IS WORN BETWEEN 0.010-0.025 INCH (0.254-0.635 mm) FROM THE MINIMUM DESIGN THICKNESS 0.015 (0.381 mm)(MORE WEAR THAN THE MINIMUM THICKNESS), IT CAN BE REPAIRED. IF THE TRACK IS WORN MORE THAN 0.025 INCH (0.6096 mm)(FROM THE MINIMUM DESIGN THICKNESS), IT CANNOT BE REPAIRED.
- 3 THE THICKNESS IN AREA 2 CHANGES AT A CONSTANT RATE BETWEEN THE THICKNESS AT AREA 1 AND THE THICKNESS AT AREA 3.
- 4 THE THICKNESS IN AREA 4 CHANGES AT A CONSTANT RATE BETWEEN THE THICKNESS AT AREA 3 AND THE THICKNESS AT AREA 5.
- 5 IN AREAS 2 AND 4, MAKE SURE THE THICKNESS CHANGES SMOOTHLY. MAKE SURE THERE ARE NO DENTS DEEPER THAN 0.010 INCH (0.254 mm).

Wear Limits for the Main Track Surface  
Figure 603 (Sheet 3)



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INBOARD LEADING EDGE SLAT SIDE BRACE LINK -  
REMOVAL/INSTALLATION

1. General

- A. This procedure contains the removal and installation tasks for the inboard slat side brace link.

TASK 27-81-36-024-009

2. Remove the Side Brace Link for the Inboard Slat

A. Equipment

- (1) Leading Edge Slat Sling Equipment - A27017-41
- (2) Circuit Breaker Lockout Clip  
(6 necessary) Commercially Available
- (3) Groundlock, Leading Edge Slat - A27007-1  
(2 Necessary)

B. References

- (1) AMM 06-44-00/201, Wings Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 32-00-20/201, Landing Gear Downlocks
- (5) AMM 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

143/144	Left/Right MLG Wheel Well
211/212	Control Cabin
520/620	Wing Leading Edge - Inboard

(2) Access Panel

511BB	LE Slat Power Drive Unit - Outboard (Left)
511EB	Inboard Slat Mechanism, Slat Actuator (Left)
511FB	Lower LE Structure, Slat Mechanism (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)
611EB	Inboard Slat Mechanism, Slat Actuator (Right)
611FB	Lower LE Structure, Slat Mechanism (Right)

D. Prepare for the Removal

S 214-001

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

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S 044-002

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 864-003

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (3) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-004

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

S 864-005

- (5) Move the flap control lever to the 30-unit detent, and permit the slats to move to the fully extended position.

S 864-006

- (6) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 864-007

- (7) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 864-008

- (8) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

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S 014-010

- (9) Remove these access panels at the left and right inboard leading edge (LE): 511BB, 511EB, 511FB (left), and 611BB, 611EB, 611FB (right) (AMM 06-44-00/201).

S 494-011

- (10) Install the PDU groundlocks on the inboard and outboard slat power drive units (PDUs) (Fig. 405).

S 294-049

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (11) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

E. Remove the Side Brace Link

S 034-012

- (1) Remove the screws on the support door for the side brace link (Fig. 403).

S 024-013

- (2) Remove the support door.

S 034-014

- (3) Remove the shims.

**NOTE:** Measure and make a written record of the thickness of the shims. Keep the shims for the subsequent installation.

S 494-015

**CAUTION:** BE CAREFUL WHEN YOU INSTALL THE SLING EQUIPMENT TO THE SLAT. THE POLISHED EXTERNAL SKIN OF THE SLAT CAN BE EASILY DAMAGED.

- (4) Install the sling equipment on the slat (Fig. 404).

S 034-016

- (5) Disconnect the forward supports from the side brace link (Fig. 402).

**NOTE:** Keep the forward supports for the subsequent installation.

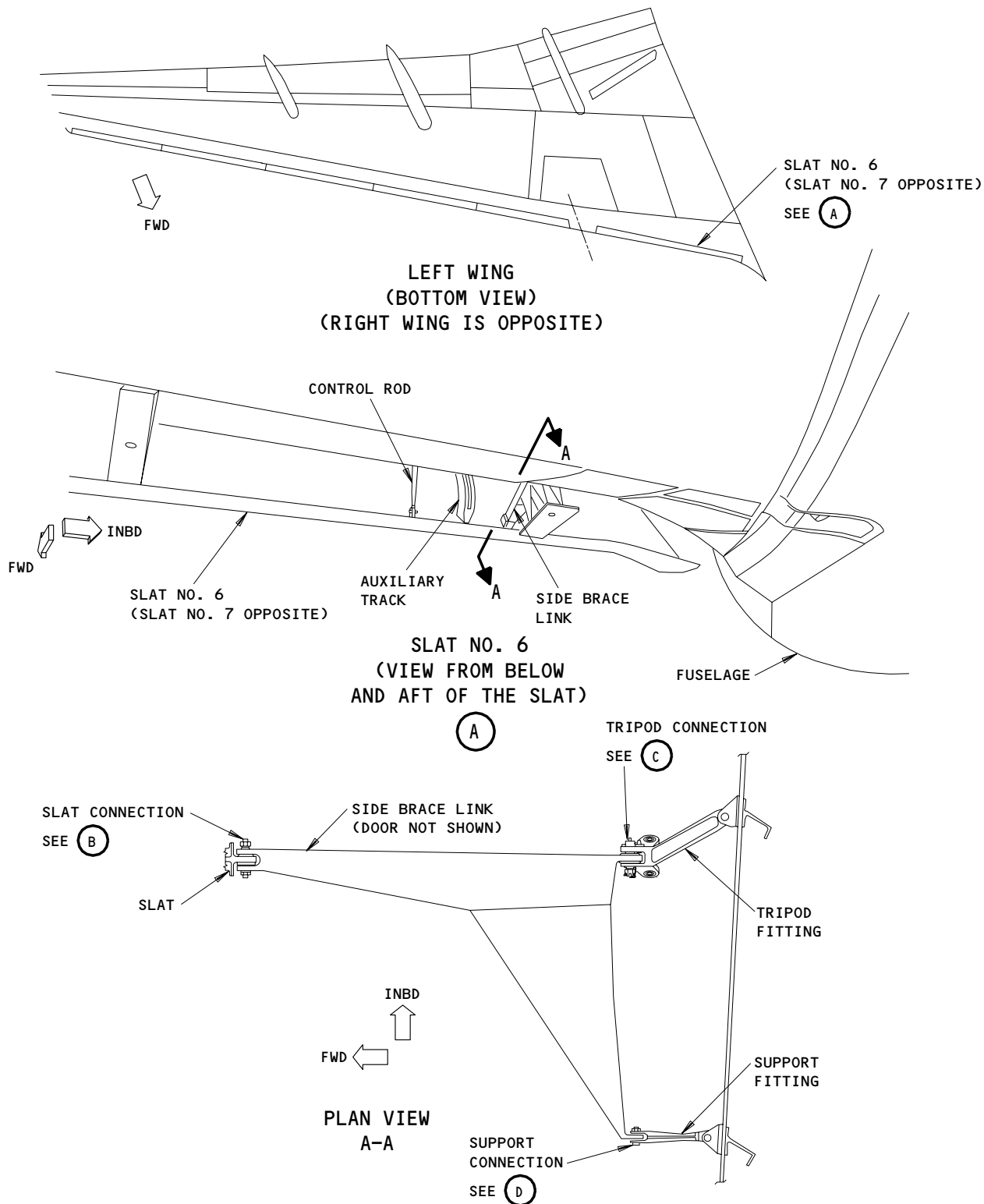
EFFECTIVITY

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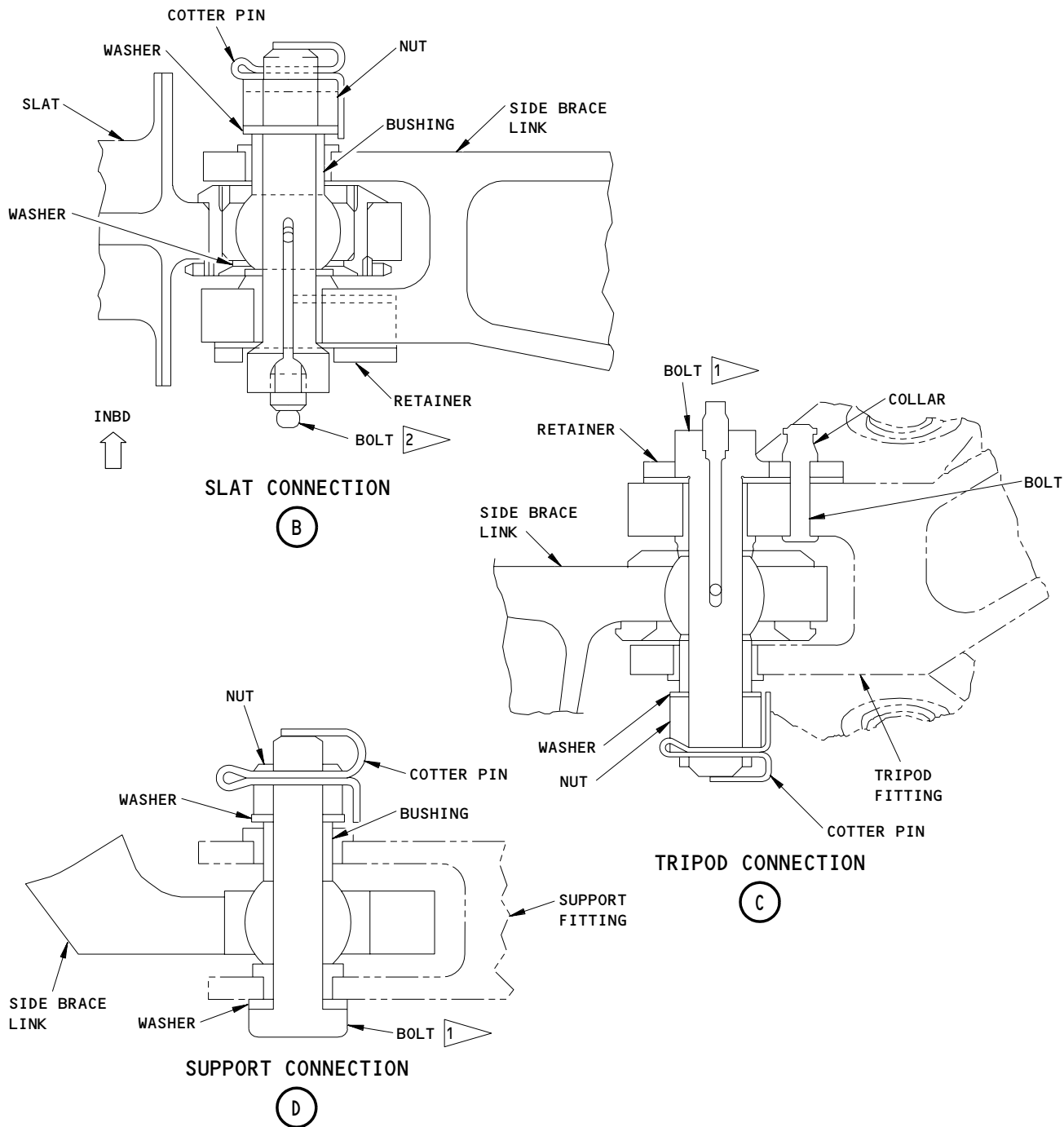
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Side Brace Link of the Inboard Slat  
Figure 401 (Sheet 1)

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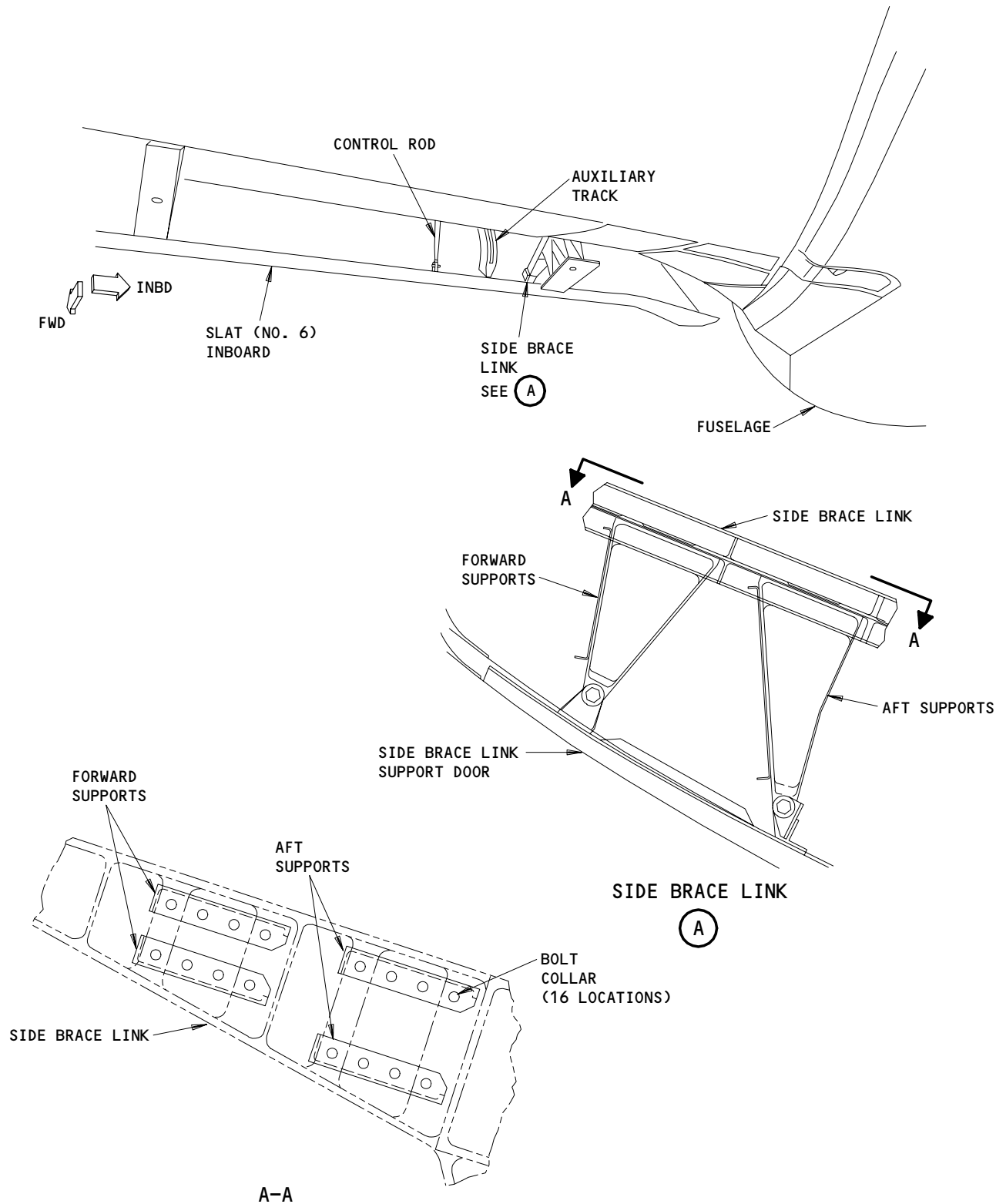
- 1 APPLY BMS 3-33 (PREFERRED) OR BMS 3-24 (ALTERNATE) GREASE TO THE BOLT SHANK AND ID OF THE BUSHINGS BEFORE INSTALLATION
- 2 APPLY BMS 3-33 (PREFERRED) OR BMS 3-24 (ALTERNATE) GREASE TO THE FITTING AFTER INSTALLATION

Side Brace Link of the Inboard Slat  
Figure 401 (Sheet 2)

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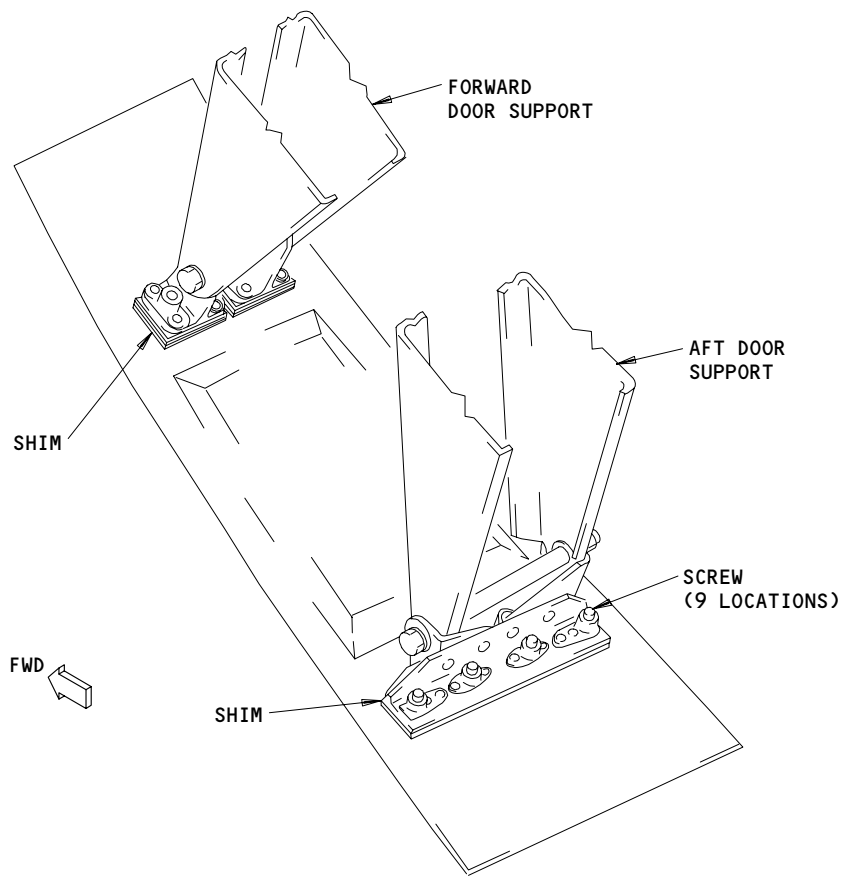
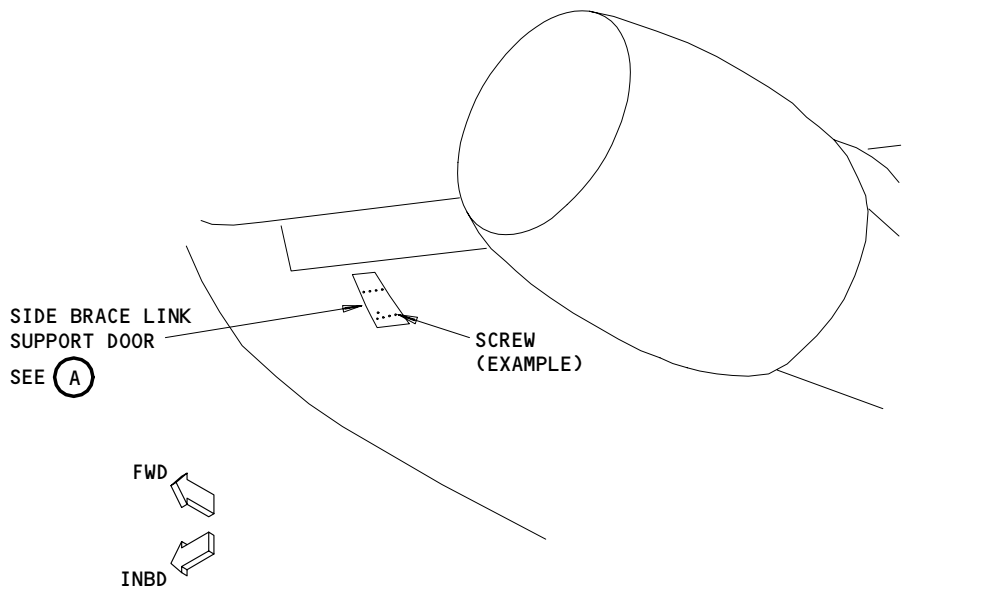
Side Brace Link Supports  
Figure 402

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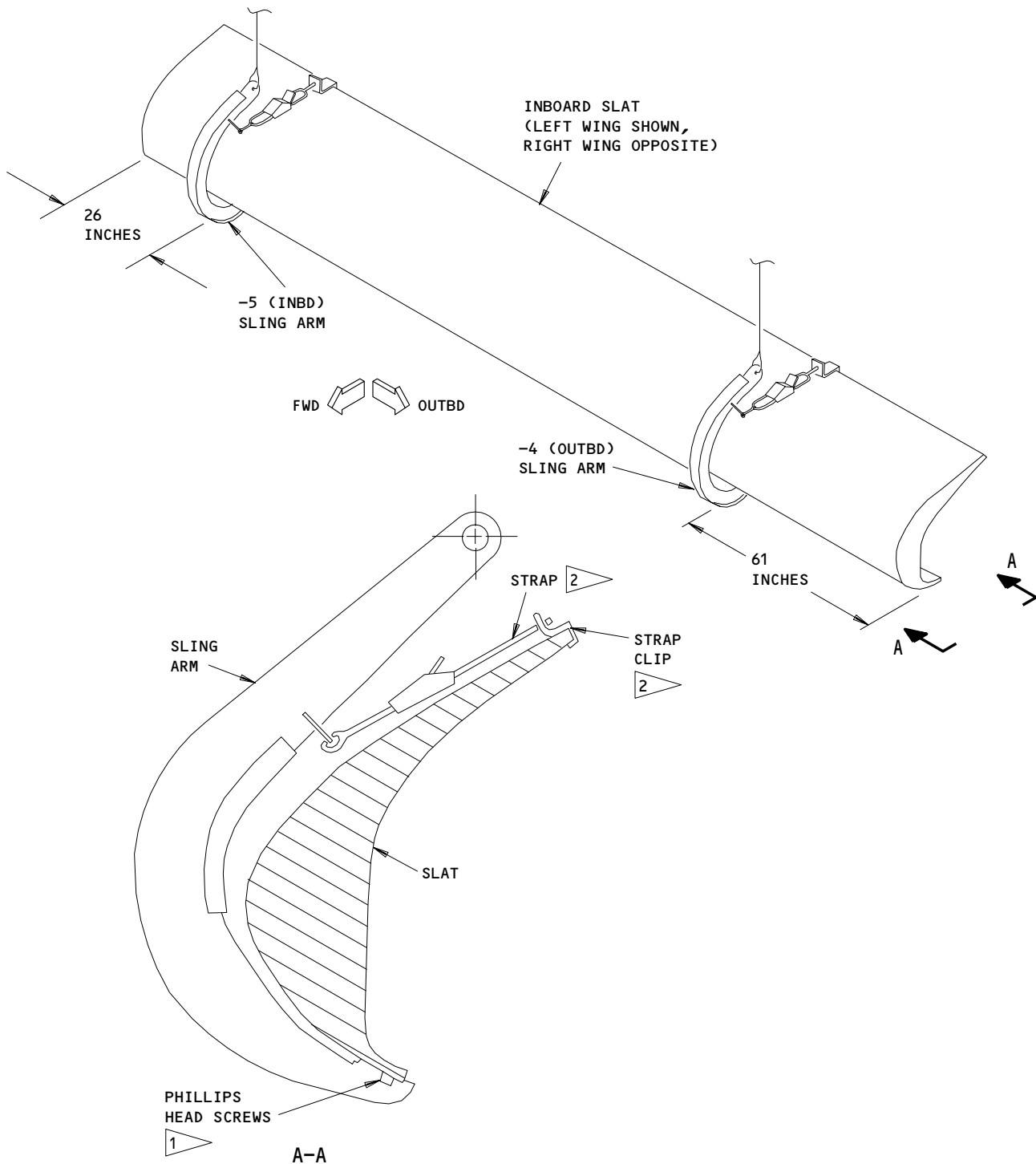
SIDE BRACE LINK SUPPORT DOOR  
(A)

Side Brace Link Support Door  
Figure 403

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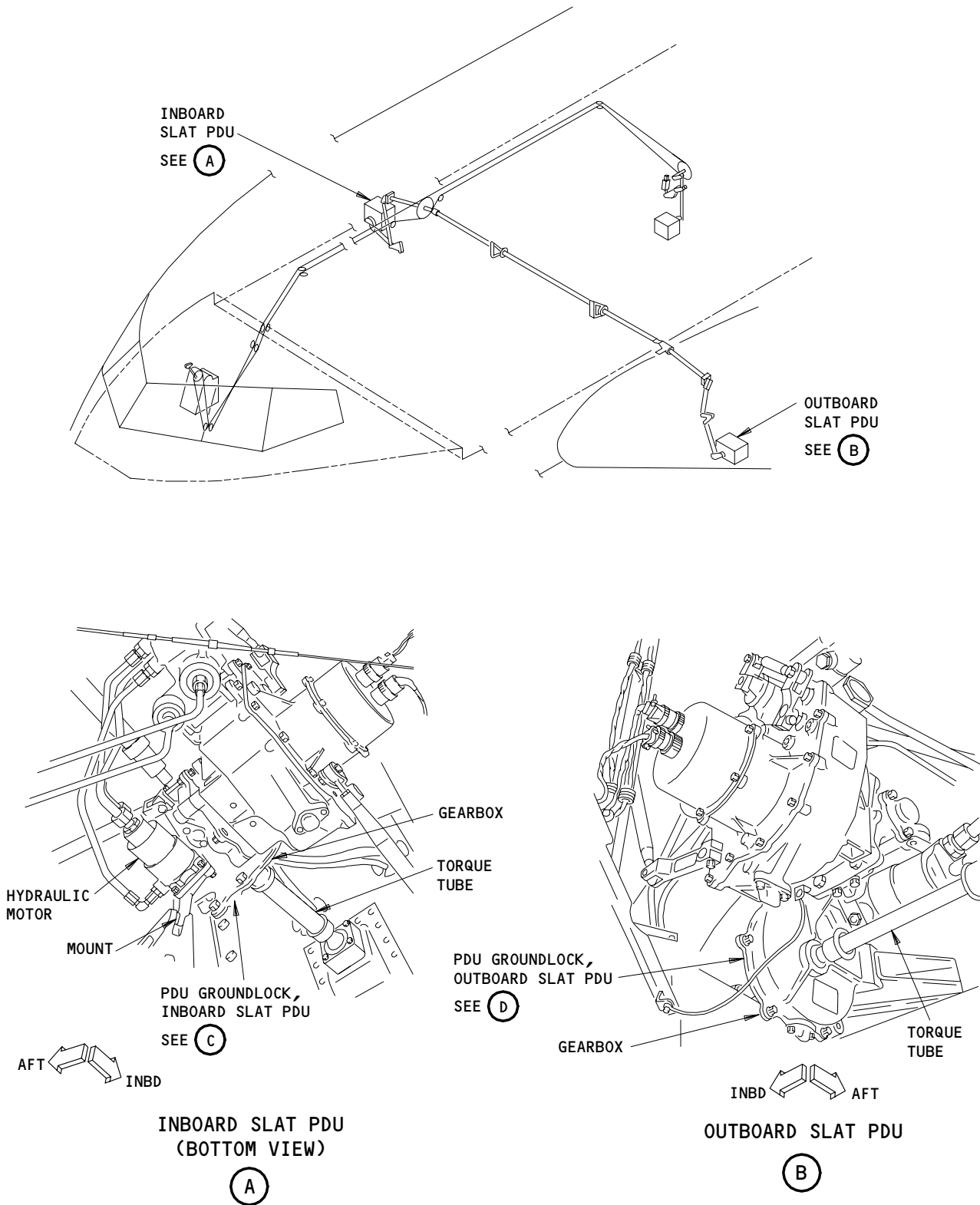
1 REMOVE THE PHILLIPS HEAD SCREWS FROM THE SLAT STRUCTURE AT THE LOCATIONS SHOWN, AND ATTACH THE SLING ARM WITH HEX-HEAD (AN3) BOLTS AND WASHERS

2 AFTER YOU CONNECT THE SLING ARM TO THE SLAT, PUT THE STRAP CLIP OVER THE UPPER EDGE OF THE SLAT AND TIGHTEN THE STRAP

Inboard Slat Sling Equipment  
Figure 404

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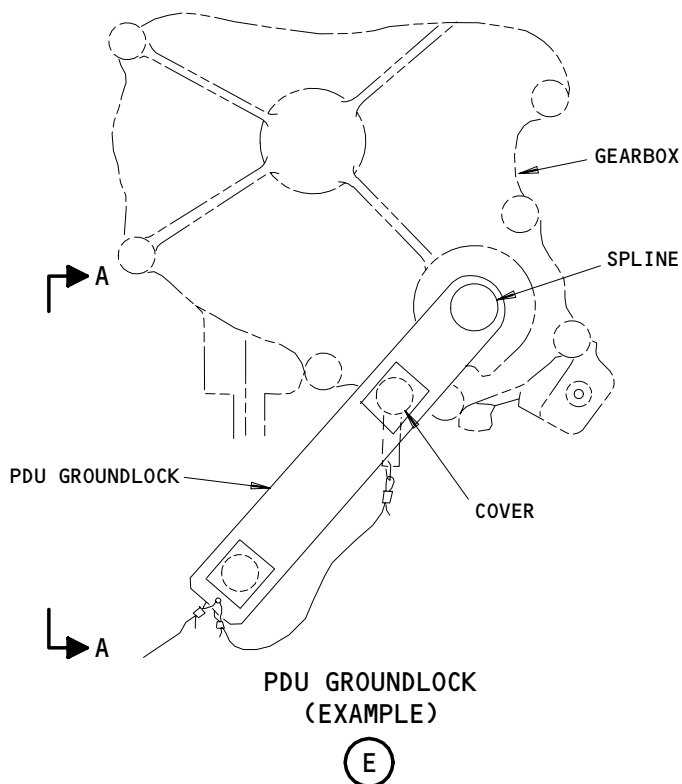
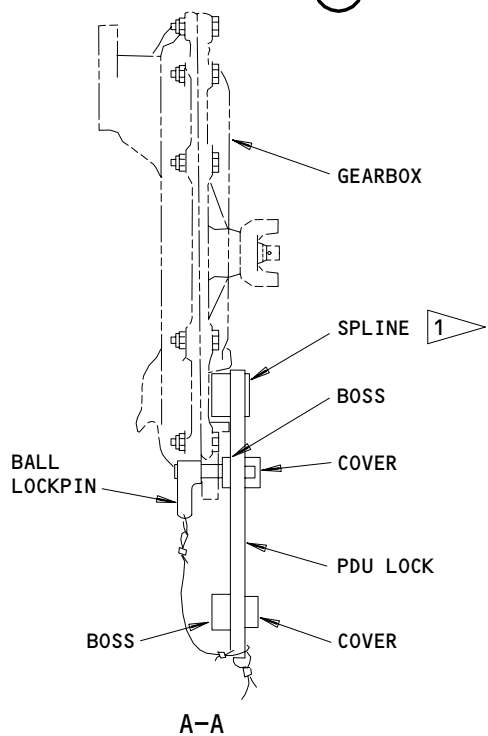
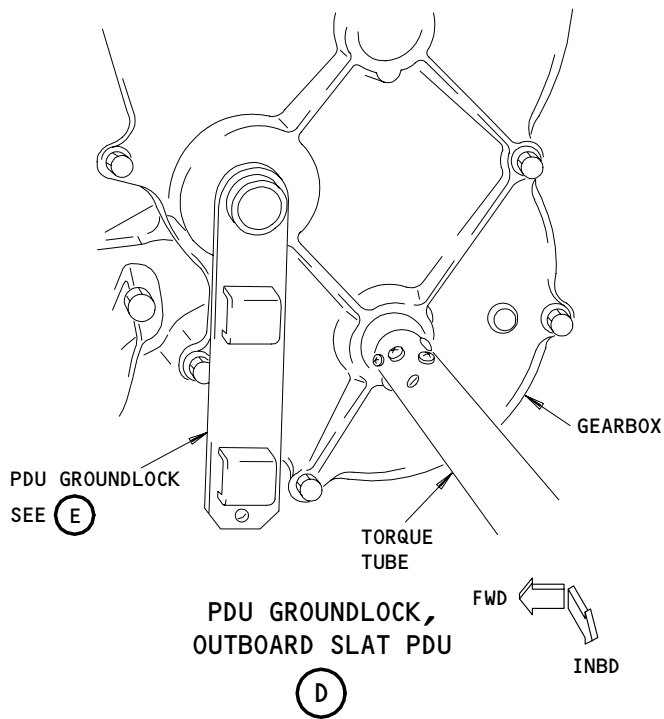
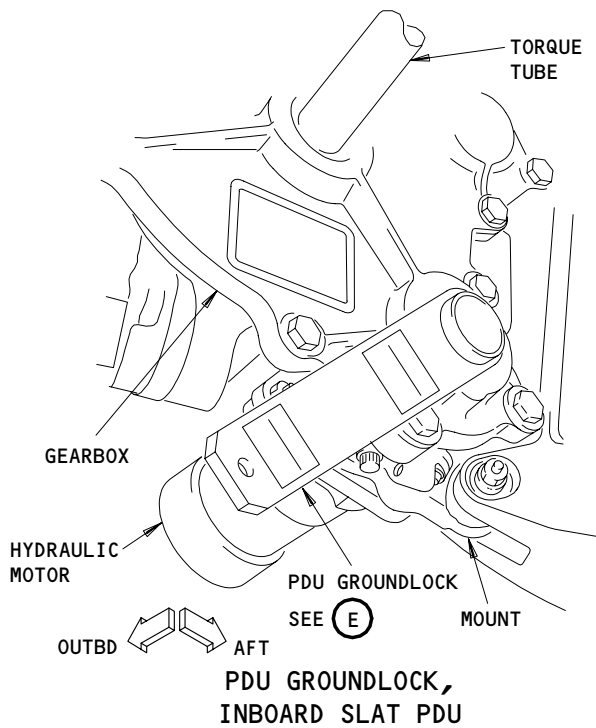
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Slat PDU Groundlock  
Figure 405 (Sheet 1)

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1 SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN INSTALLED THROUGH THE BOSS AND THE GEARBOX

Slat PDU Groundlock  
Figure 405 (Sheet 2)

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S 034-017

- (6) Disconnect the aft supports from the side brace link (Section A-A).

NOTE: Keep the aft supports for the subsequent installation.

S 034-018

- (7) Disconnect the side brace link from the slat (Detail B, Fig. 401).

S 034-019

- (8) Disconnect the side brace link from the tripod fitting (Detail C).

S 034-020

- (9) Disconnect the side brace link from the support fitting (Detail D) and remove the side brace link.

TASK 27-81-36-424-021

3. Install the Side Brace Link for the Inboard Slat

A. Equipment

- (1) Groundlock, Leading Edge Slat - A27007-1  
(2 Necessary)

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)  
(2) D00015 Grease - Corrosion Preventive BMS 3-24  
(Alternate)

C. References

- (1) AMM 06-44-00/201, Wings Access Doors and Panels  
(2) AMM 24-22-00/201, Electrical Power - Control  
(3) AMM 27-81-00/201, Leading Edge Slat System  
(4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems  
(5) AMM 32-00-20/201, Landing Gear Downlocks  
(6) AMM 78-31-00/201, Thrust Reverser System

D. Access

(1) Location Zones

143/144	Left/Right MLG Wheel Well
211/212	Control Cabin
520/620	Wing Leading Edge - Inboard

(2) Access Panel

511BB	LE Slat Power Drive Unit - Outboard (Left)
511EB	Inboard Slat Mechanism, Slat Actuator (Left)
511FB	Lower LE Structure, Slat Mechanism (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)
611EB	Inboard Slat Mechanism, Slat Actuator (Right)
611FB	Lower LE Structure, Slat Mechanism (Right)

E. Install the Side Brace Link (Fig. 401)

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S 294-050

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 434-022

- (2) Connect the side brace link to the support fitting (Detail D) with a bolt, washers (two), bushing, and nut.

S 434-023

- (3) Tighten the nut for the support fitting to 90-125 pound-inches (10.2-14.1 newton-meters), and install the cotter pin.

S 434-025

- (4) Connect the side brace link to the tripod fitting (Detail C) with a bolt, washer, and nut.

S 434-024

- (5) Tighten the nut for the tripod fitting to 440-650 pound-inches (49.8-73.4 newton-meters), and install the cotter pin.

S 434-026

- (6) Connect the side brace link to the slat (Detail B) with a bolt, washers (two), bushing, and nut.

S 434-027

- (7) Tighten the nut for the slat connection to 145-200 pound-inches (16.4-22.5 newton-meters), and install the cotter pin.

S 434-028

- (8) Connect the forward supports to the side brace link with eight bolts and eight collars (Fig. 402).

S 434-029

- (9) Connect the aft supports to the side brace link with eight bolts and eight collars.

S 094-030

- (10) Remove the sling equipment on the slat (Fig. 404).

S 094-031

- (11) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 405).

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S 864-032

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(12) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 864-033

(13) Move the flap control lever to the zero (FLAPS UP) detent and permit the flaps and slats to move to the fully retracted position.

S 864-034

(14) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 494-035

(15) Install the groundlocks to the inboard and outboard slat PDUs (Fig. 405).

S 434-036

(16) Do this step only if old shims are available:  
(a) Install the old shims at the connections for the side brace link door. Install the shims by the same sequence as you removed them before, and add a 0.10 inch (2.54 mm) thick shim at each door support (Fig. 403).

**NOTE:** The 0.10 inch (2.54 mm) thick shim is removed in the subsequent steps to get the correct preload.

S 824-038

(17) Do this step only if old shims are lost are damaged and new shims will be installed:  
(a) Add or remove the new shims between the door and the supports until you can get the door to align by 0.02 inch (0.50 mm) along the contour of the slat.

S 434-037

(18) Put the door into its position and install the screws.

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S 034-039

- (19) Do these steps to get the correct preload for the door:
- (a) At the forward door support, remove the 0.10 inch (2.54 mm) shim.
  - (b) At the aft door support, remove the 0.10 inch (2.54 mm) shim.

F. Put the Airplane Back to Its Usual Condition

S 294-051

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 864-040

- (2) Remove the pressure from the center hydraulic system (AMM 29-11-00/201).

S 094-041

- (3) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 405).

S 414-042

- (4) Install these access panels aft of the left and right inboard slats: 511BB, 511EB, 511FB (left), and 611BB, 611EB, 611FB (right) (AMM 06-44-00/201).

S 864-043

- (5) Remove electrical power (AMM 24-22-00/201).

S 864-044

- (6) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers at the overhead panel, P11:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT

S 864-045

- (7) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the main power distribution panel, P6:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

S 444-046

- (8) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

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LEADING EDGE SLAT POSITION INDICATING SYSTEM –  
DESCRIPTION AND OPERATION

1. General

- A. The slat position indicating system checks slat position. The system uses sensor switches on the slats and two rotary variable differential transformers (RVDTs) on each of the inboard and outboard slat power drive units.
- B. The signals from the switches and the RVDTs are matched with flap lever position signals by the proximity switch electronic unit (PSEU) and flap/slat electronic unit (FSEU). PSEU and FSEU logic control the slat hydraulic shutoff valve and failure protection and annunciation (AMM 27-51-01/001, Flap/Slat Electronics Unit – Description and Operation).
- C. The flap/slat position indicator provides slat position indication when between zero and one.

2. General Description

- A. Indicating System Purpose (Fig. 1)
  - (1) The slat position indicating system checks the slats for: Asymmetry, un-commanded motion (slat motion without command or slat motion opposite to command), and slat condition when slats do not move with command.
  - (2) The system has two sensor (proximity) switches with targets on each slat. A two-unit rotary variable differential transformer (RVDT) installation is on each slat power drive unit. A two-unit RVDT installation is in the control stand for flap lever position signals.
  - (3) Each RVDT on the slat power drive units is driven by a shaft. The shaft connects to the power drive unit gearbox.
  - (4) A flap/slat position indicator with an amber LEADING EDGE slat failure light is on P3.
  - (5) Inboard and outboard slat alternate drive armed condition is shown by arming switch light indication (AMM 27-81-00/001, Leading Edge Slat System – Description and Operation).
  - (6) The EICAS system accepts inputs from various systems. The inputs are prioritized and coded in alphanumeric data. The EICAS data is sent to a display in the flight compartment where the warning or caution messages are displayed. The messages are divided into three levels and two colors. The red messages are level A warnings. Amber messages are considered cautions and are divided into levels B and C with B the highest priority message.
  - (7) The FSEU and PSEU receive signals related to the flap lever and the slats. The FSEU and PSEU process and analyze the signals. Some conditions require the FSEU and PSEU to make an EICAS input to the display (LE SLAT DISAGREE or LE SLAT ASYM) and to the LEADING EDGE slat failure light (AMM 27-51-01/001, Flap/Slat Electronics Unit – Description and Operation).

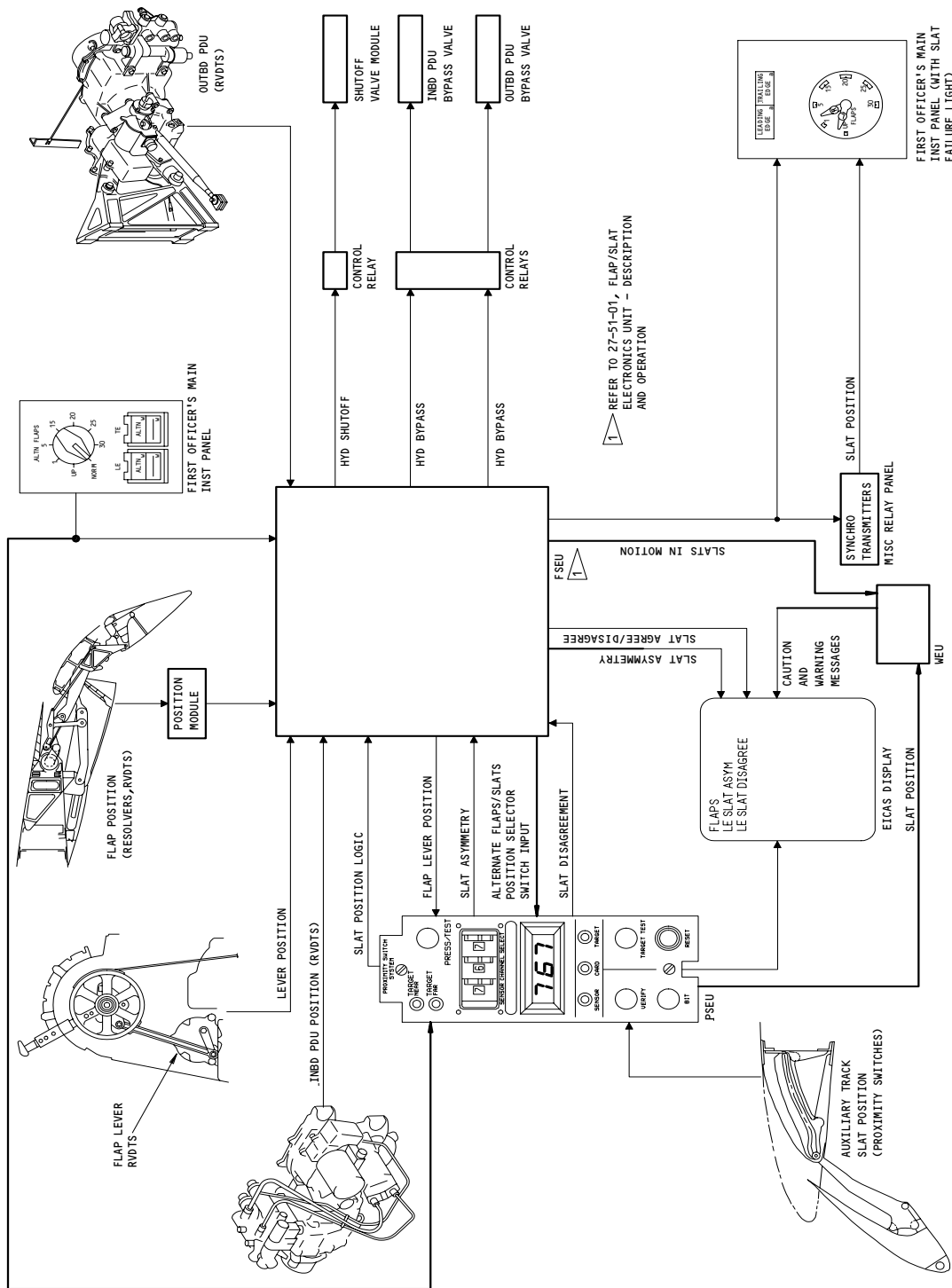
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Leading Edge Slat Position Indicating System  
Figure 1

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B. LE Slat Proximity Sensor Switches (Fig. 2 and Fig. 3)

- (1) Each slat has four moving targets and two structure-mounted sensor switches. The targets for full retraction are mounted on the forward section of each slat inboard and outboard auxiliary track arm. The targets for intermediate and fully extended positions are part of the bolt installations connecting auxiliary tracks with auxiliary track arms. The two sensor switches for each slat are mounted to wing leading edge fixed structure and the targets are in proximity to the sensor switches for an extend or retract signal. The sensor switches are located in the wing leading edge so that one switch picks up an intermediate position signal and the other switch picks up a fully-extended position signal. In the fully retracted position, both of the retract targets are in proximity to sensor switches.
- (2) The sensor switches operate from 28vdc power. Replacement of the sensor switches and targets is on a failure basis rather than a scheduled time basis.
- (3) The slat position signals are sent to the proximity switch electronics unit (PSEU). The PSEU compares slat position signal with an incoming flap lever position signal or alternate flaps/slats position selector system switch from the flap/slat electronic unit (FSEU) The PSEU also compares slat position signals for asymmetry detection.
- (4) When the FSEU and PSEU combine to detect a failure condition in the leading edge slat system, such as asymmetry, uncommanded motion (slat motion without command or slat motion opposite to command), and no slat motion with command, EICAS failure messages will appear on the display (LE SLAT DISAGREE or LE SLAT ASYM) and the LEADING EDGE slat failure light will come on (AMM 27-51-01/001, Flap/Slat Electronics Unit - Description and Operation).
- (5) The PSEU and the FSEU combine to interpret slat and flap lever position signals for control of the leading edge slat hydraulic shutoff valve and the bypass valves on each power drive unit (AMM 27-51-01/001, Flap/Slat Electronics Unit - Description and Operation). Bypass valve control provides failure protection.

C. PSEU (Fig. 1)

- (1) The proximity switch electronic unit (PSEU) is on electronic shelf E1. The PSEU contains the logic and circuits to process position signals from the slat sensor switches and, by way of the flap/slat electronic unit (FSEU), from the flap lever rotary differential transformers (RVDTs) on the control stand and the alternate flaps/slats position selector switch.
- (2) All electrical components are mounted on printed circuit cards. Cards are mounted in plug-in connectors. Circuit card replacement may be done from the front of the unit without removing the unit from the shelf and with the hold-down in place.
- (3) The PSEU has extensive built-in-test equipment (BITE).
- (4) The PSEU receives position signals from the sensor switches mounted on the slats. The PSEU also receives a flap lever position signal from the flap/slat electronic unit (FSEU).

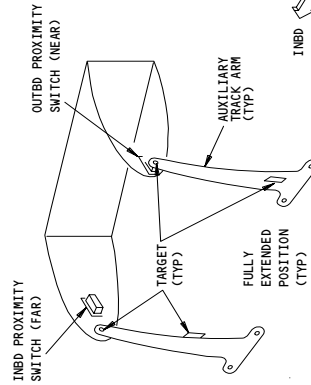
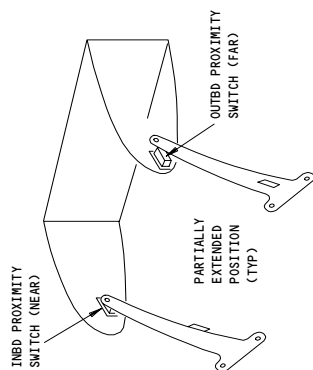
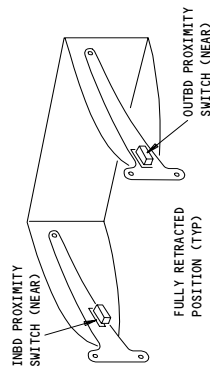
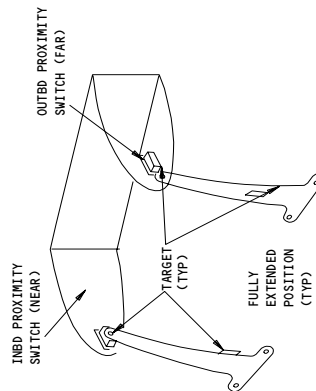
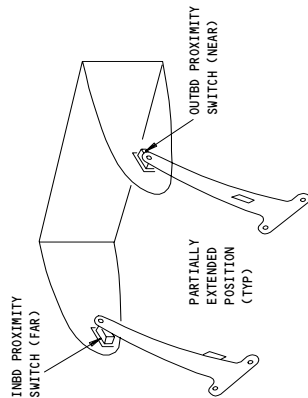
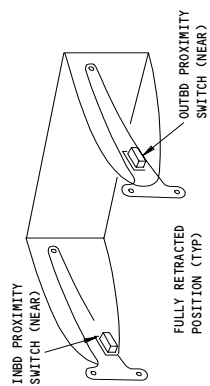
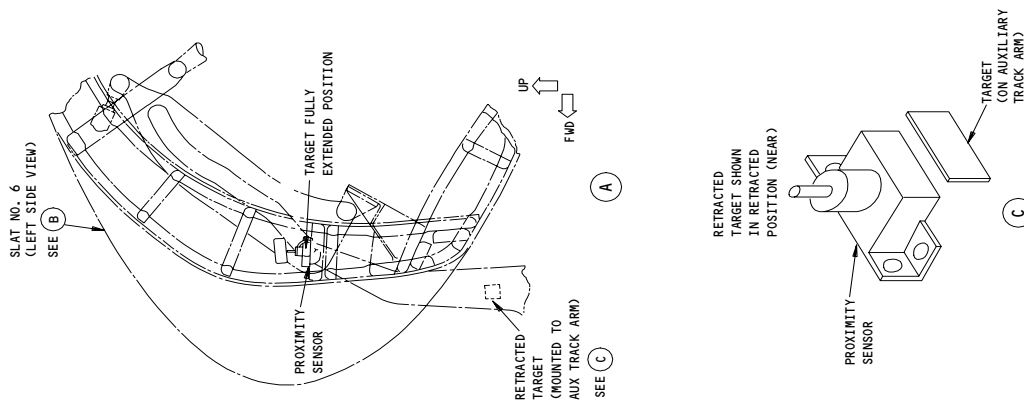
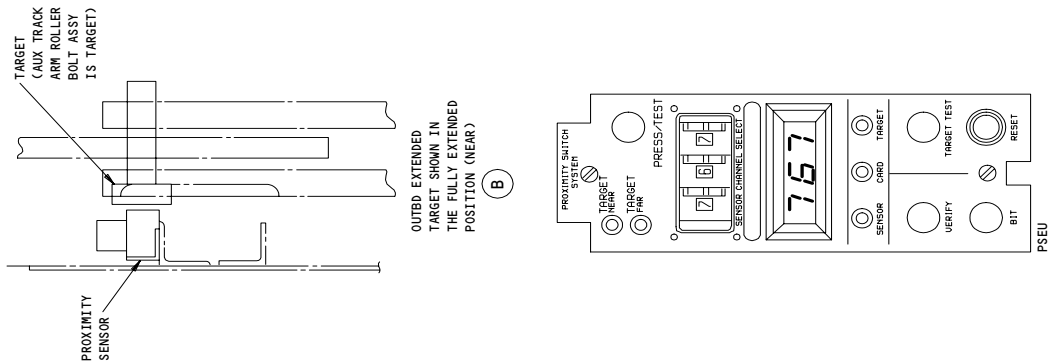
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SLATS NO. 6 AND NO. 7 POSITIONS

SLATS NO. 1-5 AND NO. 8-12 POSITIONS

Leading Edge Slat Sensor Switches  
Figure 2

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- (5) Built-In-Test Equipment (BITE)
- (a) The PSEU BITE fault isolation is to the level of: Sensor switches, associated sensor switch wiring, sensor switch targets, and printed circuit cards. Fault indication on the control and display panel is by: Sensor switch number and indicator lights labeled TARGET NEAR, TARGET FAR, SENSOR, CARD, and TARGET.
  - (b) Three levels of PSEU BITE function are provided. These are: An automatic in-flight test, an on-ground test, and a target test. The memory function of the PSEU BITE is the storing of LRU failures. The failures are stored by LRU number and LRU type. Memory contents may be called up by depressing the BITE button on the control and display panel. Memory contents are shown by LRU number display and LRU type lights. Further button depressions recall memory contents on last in-first out basis. The LRU number displays code 000 when the recall button is depressed and the memory contains no LRU entries or all entries have been recalled. Memory recall does not erase the memory contents. The memory contents are erased when the memory reset button is depressed.
  - (c) The PSEU automatic in-flight BITE function initiates a test to isolate a fault in the sensor switch system. The test records a failure by LRU number and LRU type identification in the memory.
  - (d) AIRPLANES WITH S283T006-14 AND EARLIER;  
all automatic in-flight test functions only occur after the landing gear is indicated tilted (in-flight).
  - (e) AIRPLANES WITH PSEU S283T006-15 AND LATER;  
the automatic in-flight test functions occur after the landing gear is indicated tilted (in-flight), or the -15 PSEU automatically monitors and isolates faults in the leading edge slat position indication system (on-ground), when all the doors and hatches of the airplane are closed.
  - (f) The PSEU BITE on-ground test function covers fault detection, fault isolation, operational verification, and BITE self-test. On-ground test is initiated by actuating the VERIFY switch. Test completion is indicated by code 999 in the LRU number display.

D. LE Slat PDU RVDTs (Fig. 1)

- (1) Two rotary variable differential transformers (RVDTs) are components of both the inboard and outboard power drive units.
- (2) The RVDTs are located in the control unit of each power drive unit. Each RVDT is driven by a shaft connected to the power drive unit gearbox.
- (3) The RVDTs detect slat position and motion.
- (4) Slat position signals are sent from the inboard and outboard PDU No. 2 RVDTs to the flap/slat electronic unit (FSEU) for control of the inboard and outboard leading edge slat alternate drives (AMM 27-81-00/001, Leading Edge Slat System - Description and Operation).

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- (5) Slat position signals are sent from the inboard and outboard PDU No. 1 RVDTs to the FSEU for control of the leading edge slat hydraulic shutoff valve (AMM 27-81-00/001, Leading Edge Slat System - Description and Operation).
  - (6) Slat-in-motion signals are sent from the RVDTs to the FSEU. The FSEU logic interprets slat-in-motion signals together with flap lever and slat position signals for failure protection. Slat-in-motion signals are also sent from the FSEU to the warning electronic module (WEU) for interpretation in the stall warning system.
- E. Flap/Slat Position Indicator (Fig. 1)
- (1) The flap/slat position indicator is on P3. The indicator has a split needle. The needles show position of the left and right side trailing edge flaps and leading edge slats. Table 1 shows flap/slat movement related to needle position.
  - (2) If the slats do not extend with flap lever in the 1-unit detent (slats to intermediate position), the flaps will not extend. When the flap lever is moved from the 5-unit detent to the zero (FLAPS UP) detent in the retract mode, the slats will not move from intermediate position to fully retracted position until the flaps are fully retracted.

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Table 1		
FLAP LEVER COMMAND	NORMAL IN-TRANSIT INDICATION	NORMAL COMMANDED POSITION INDICATION
ZERO (FLAPS UP)	-----	INDICATOR AT UP
1	INDICATOR MOVES HALFWAY TO 1 WHEN ANY SLAT LEAVES RETRACT POSITION	INDICATOR AT 1
5	INDICATOR MOVES TO 5 AS T.E. FLAPS EXTEND	INDICATOR AT 5
15	INDICATOR MOVES TO 15 AS T.E. FLAPS EXTEND	INDICATOR AT 15
20	INDICATOR MOVES TO 20 AS T.E. FLAPS EXTEND	INDICATOR AT 20
25	INDICATOR MOVES TO 25 AS L.E. SLATS AND T.E. FLAPS EXTEND	INDICATOR AT 25
30	INDICATOR MOVES TO 30 AS T.E. FLAPS EXTEND	INDICATOR AT 30

F. LE Slat Failure Annunciator Light (Fig. 1)

- (1) The amber LEADING EDGE slat failure annunciator light is on P3. The light is controlled by logic circuits in the proximity switch electronic unit (PSEU) and flap/slat electronic unit (FSEU) where signals for slat position, flap lever position, alternate flaps/slats position selector switch position, and slat motion are analyzed (AMM 27-51-01/001, Flap/Slat Electronic Unit - Description and Operation).
- (2) When the logic circuits in the PSEU and the FSEU interpret a slat failure condition, a ground is completed in the FSEU, and the LEADING EDGE slat failure annunciator light will come on.
- (3) Illumination of the LEADING EDGE slat failure annunciator light is accompanied by slat failure messages (LE SLAT DISAGREE or LE SLAT ASYM) on the EICAS display.

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- G. L.E. Slat Caution and Warning Annunciations (Fig. 1)
- (1) The flap/slat electronic unit (FSEU), the proximity switch electronic unit (PSEU), and the warning electronic module (WEU) process signals for positions of the flap lever and the slats. Lights come on, aural indication comes on, and display messages are shown for caution or warning annunciation.
  - (2) Takeoff Warning
    - (a) If the slats are not in takeoff position (intermediate position) as commanded by flap lever and the thrust levers are advanced into takeoff range with the engines running, takeoff warning is announced as follows:
      - 1) A red level A FLAPS EICAS message will appear on the display.
      - 2) The master warning lights on P2 will come on.
      - 3) The aural warning will sound.
      - 4) The red CONFIGURATION light on P2 will come on.

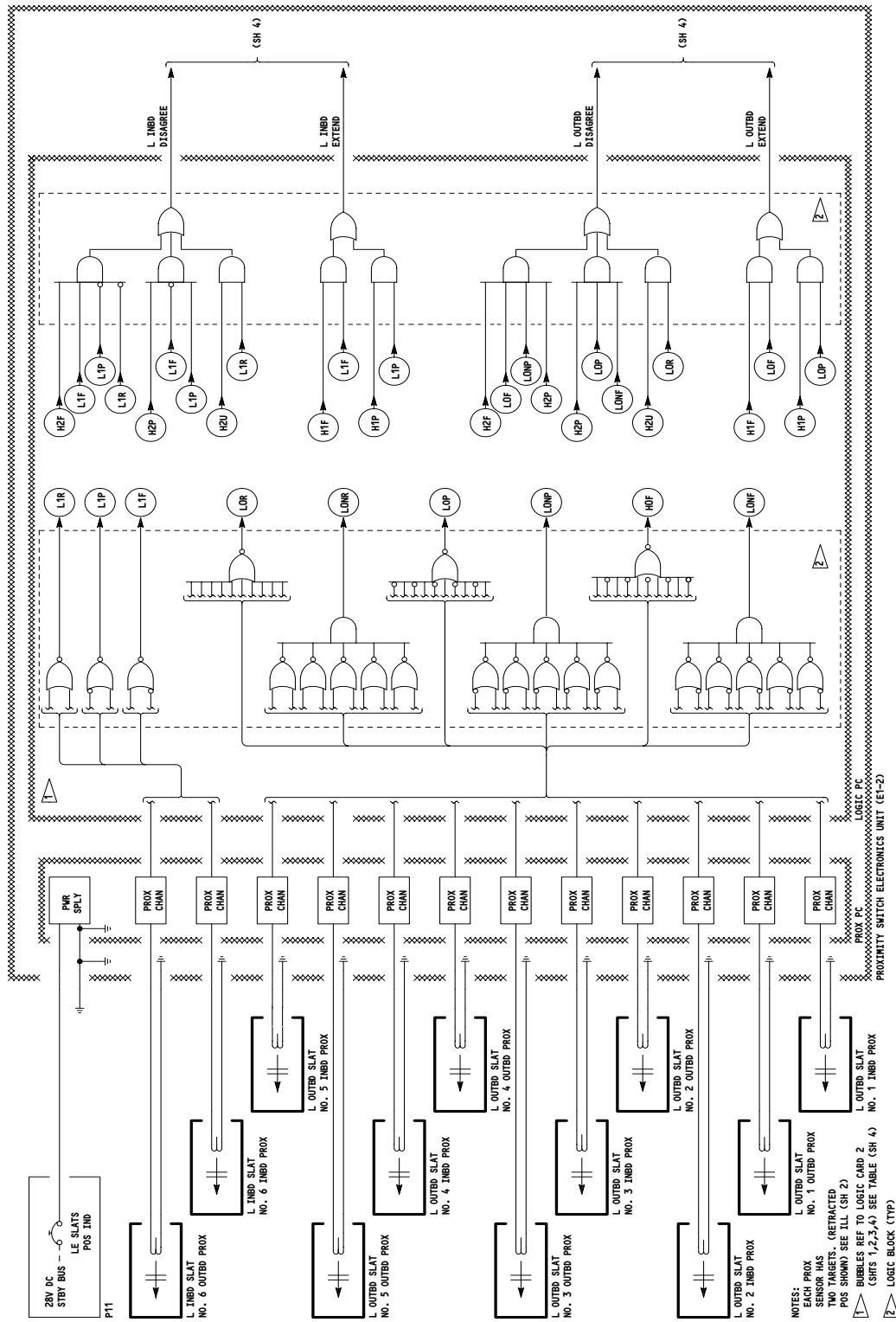
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Leading Edge Slats Position Indication Schematic  
Figure 3 (Sheet 1)

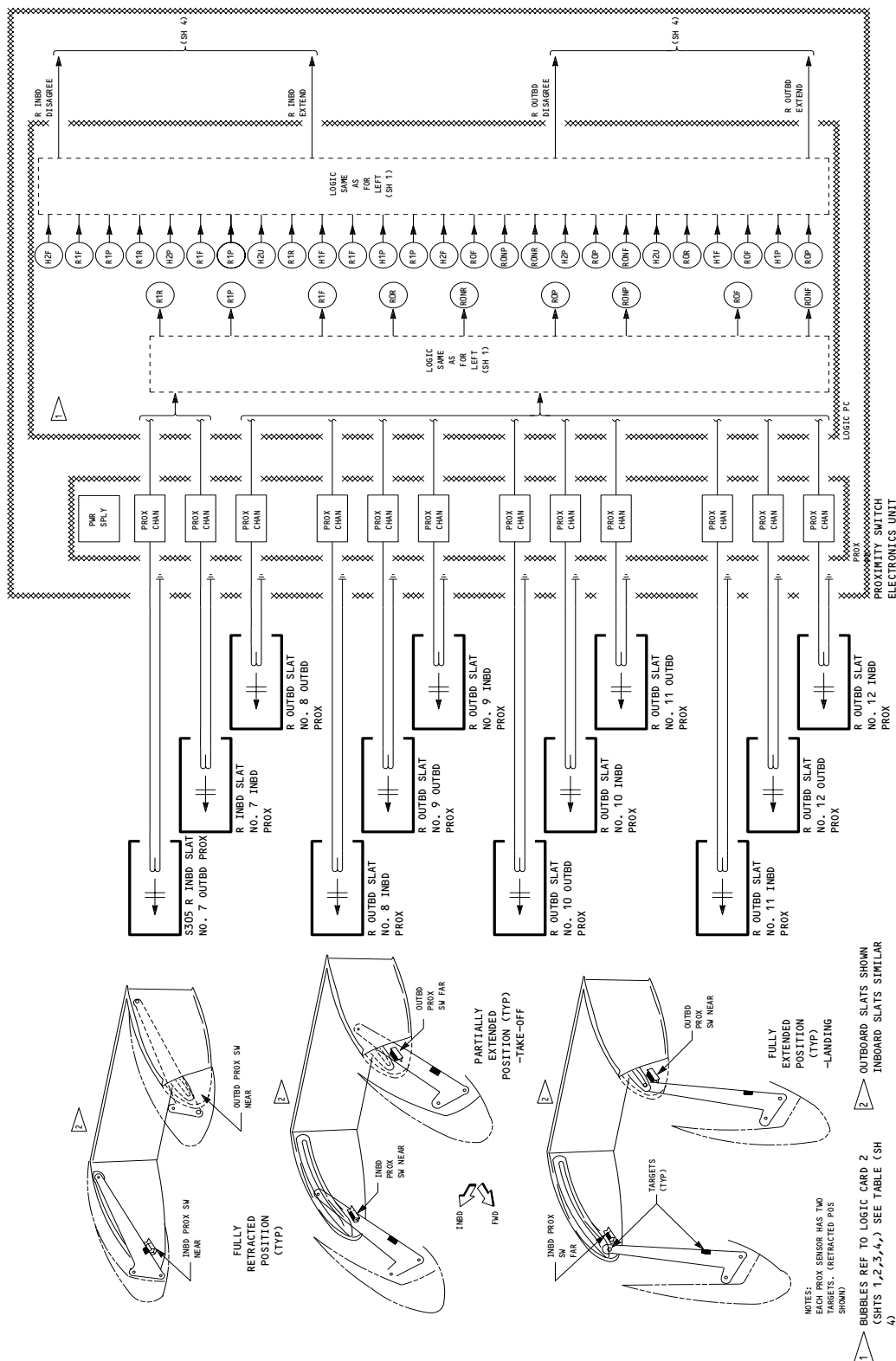
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Leading Edge Slats Position Indication Schematic  
Figure 3 (Sheet 2)

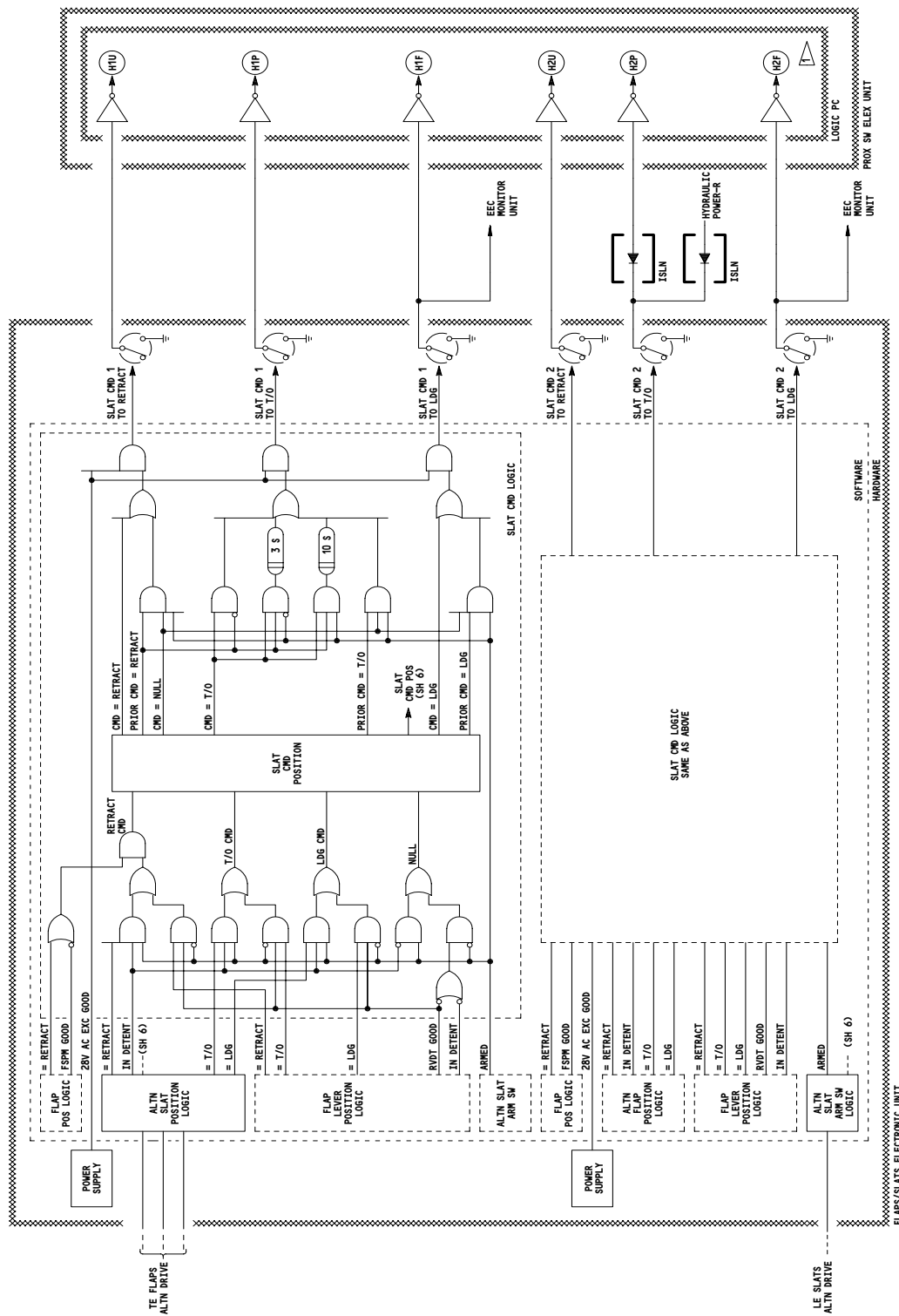
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Leading Edge Slats Position Indication Schematic  
Figure 3 (Sheet 3)

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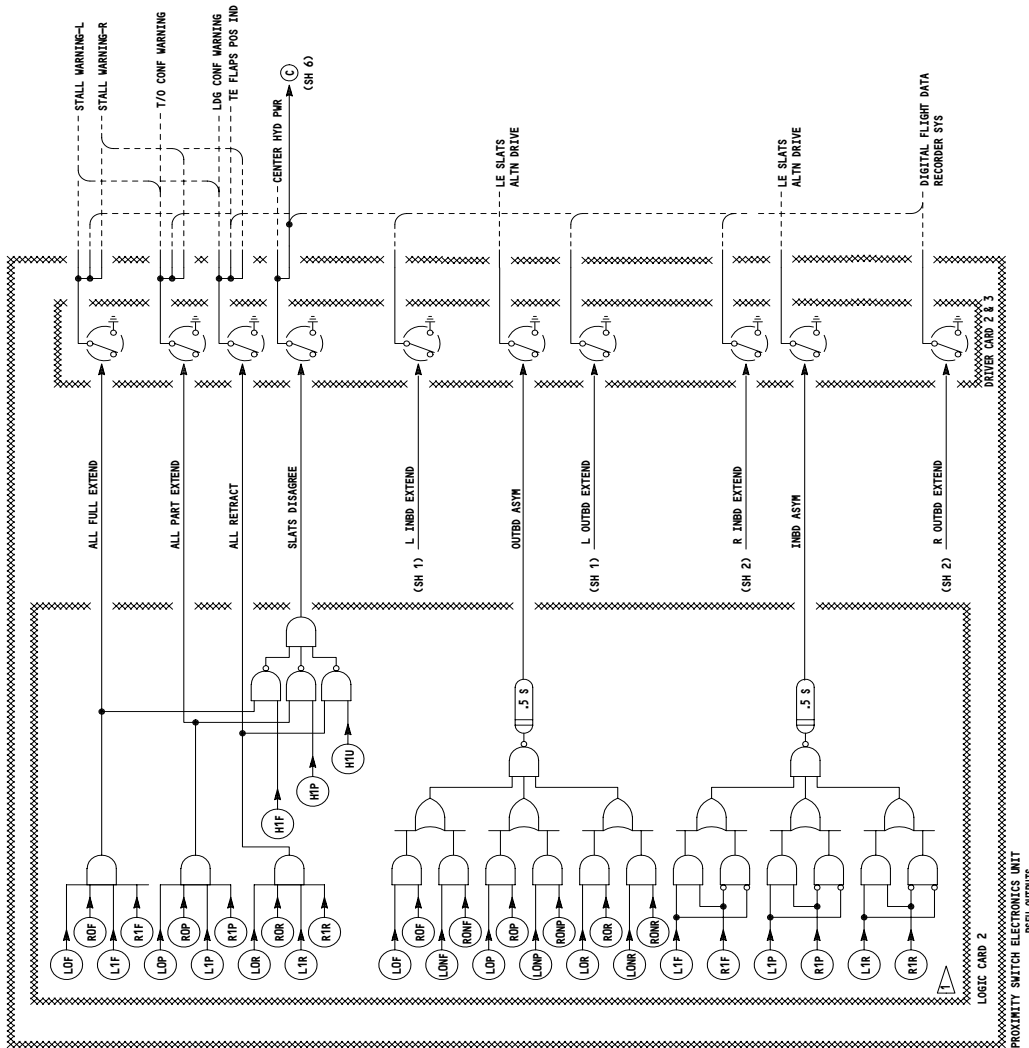
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LOGIC CARD BUBBLE REF CODES		MEANING
LEFT (SH 1)	L1R	INBD RETR
	L1F	INBD PART
	L1P	INBD FULL
	L2R	OUTBD RETR
	L2F	OUTBD NOT RETR
	L2P	OUTBD PART
	L3R	OUTBD NOT PART
	L3F	OUTBD FULL
	L3P	OUTBD NOT FULL
	L4R	FLAP LEVER UP
RIGHT (SH 2)	R1R	FLAP LEVER PART
	R1F	FLAP LEVER FULL
	R2F	FLAP LEVER FULL
FLAP LEVER (SH 3)		
H1U	H2U	
H1P	H2P	
H1F	H2F	

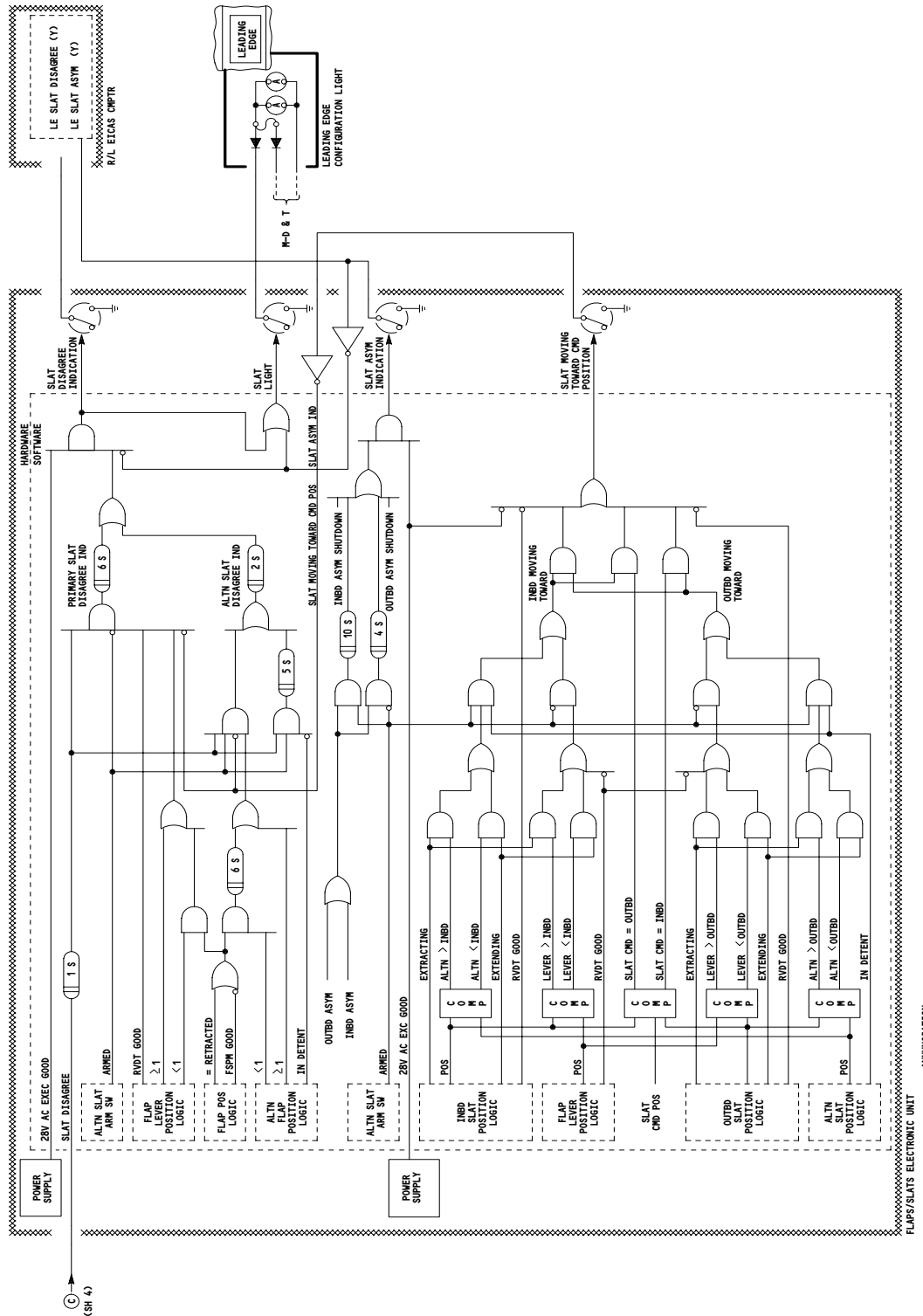


NOTES:  
 1) BUBBLES REF TO LOGIC CARD 2 (SHTS 1, 2, 3) SEE TABLE ABOVE  
 2) PROXIMITY SWITCH  
 3) PSD OUTPUTS

Leading Edge Slats Position Indication Schematic  
Figure 3 (Sheet 4)

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Leading Edge Slats Position Indication Schematic  
Figure 3 (Sheet 5)

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 **BOEING**  
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FAULT ISOLATION/MAINT MANUAL

LEADING EDGE SLAT POSITION INDICATING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
CIRCUIT BREAKERS	3		FLT COMPT, P6	
ALTN SLAT INBD PWR, C324		1	6D21	*
ALTN SLAT OUTBD PWR, C325		1	6F24	*
CIRCUIT BREAKERS	3		FLT COMPT, P11	
FLAP SLAT ELEC UNIT 1 CONT, C1025		1	11C16	*
FLAP SLAT ELEC UNIT 2 CONT, C1521		1	11G16	*
FLAP SLAT ELEC UNIT 1 SENSOR, C1037		1	11C15	*
FLAP SLAT ELEC UNIT 2 SENSOR, C1524		1	11G15	*
SLAT ALTN CONT INBD, C1028		1	11H23	*
SLAT ALTN CONT OUTBD, C1029		1	11H24	*
SLAT SHUTOFF, C1020		1	11H14	*
SLAT POS IND, C1001		1	11C10	*
PROX SW TEST, C1178		1	11T36	*
COMPUTER - (REF 31-41-00, FIG. 101)				
EICAS L, M10181				
EICAS R, M10182				
DIODES - R176,R178,R213,R214,R215,R216	3	6	119AL, MAIN EQUIP CTR, E2-4	*
LIGHT - LEADING EDGE, L661	1	1	FLT COMPT, P3	*
SWITCH - SENSOR				
SLAT NO. 1, S276 AND S282	1	2	OUTBD SLATS, SLATS EXTENDED	27-88-01
SLAT NO. 2, S277 AND S283	1	2	OUTBD SLATS, SLATS EXTENDED	27-88-01
SLAT NO. 3, S278 AND S284	1	2	OUTBD SLATS, SLATS EXTENDED	27-88-01
SLAT NO. 4, S279 AND S285	1	2	OUTBD SLATS, SLATS EXTENDED	27-88-01
SLAT NO. 5, S280 AND S286	1	2	OUTBD SLATS, SLATS EXTENDED	27-88-01
SLAT NO. 6, S281 AND S287	1	2	INBD SLATS, SLATS EXTENDED	27-88-01
SLAT NO. 7, S299 AND S305	1	2	INBD SLATS, SLATS EXTENDED	27-88-01
SLAT NO. 8, S298 AND S304	1	2	OUTBD SLATS, SLATS EXTENDED	27-88-01
SLAT NO. 9, S297 AND S303	1	2	OUTBD SLATS, SLATS EXTENDED	27-88-01
SLAT NO. 10, S296 AND S302	1	2	OUTBD SLATS, SLATS EXTENDED	27-88-01
SLAT NO. 11, S295 AND S301	1	2	OUTBD SLATS, SLATS EXTENDED	27-88-01
SLAT NO. 12, S294 AND S300	1	2	OUTBD SLATS, SLATS EXTENDED	27-88-01
UNIT - (REF 27-51-00, FIG. 101)				
FLAPS/SLATS ELEC (FSEU), M545				
UNIT - (REF 32-09-03, FIG. 101)				
PROX SW ELEC (PSEU), M162				

\* SEE WM EQUIPMENT LIST

Component Index  
Figure 101

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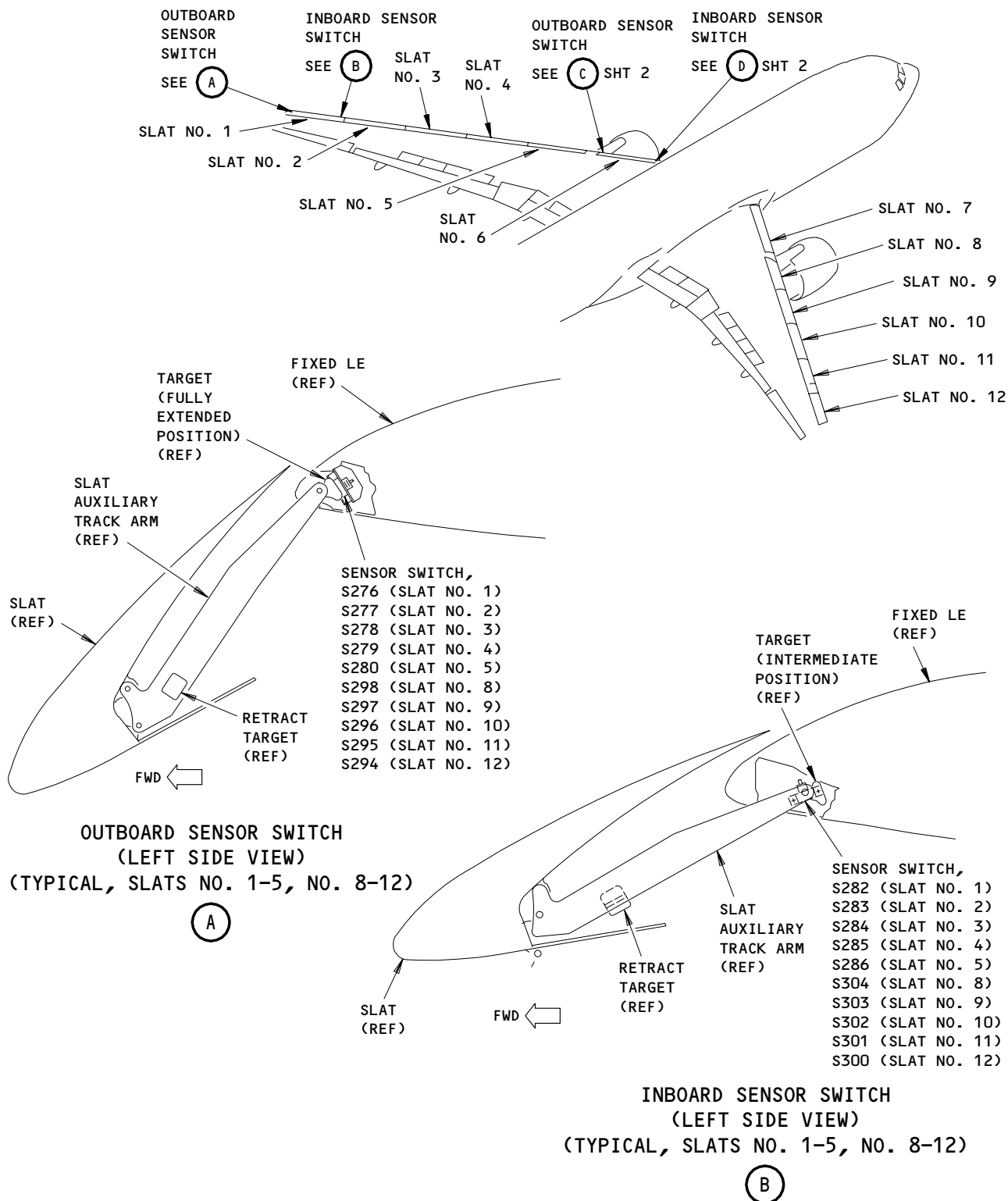
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### FAULT ISOLATION/MAINT MANUAL



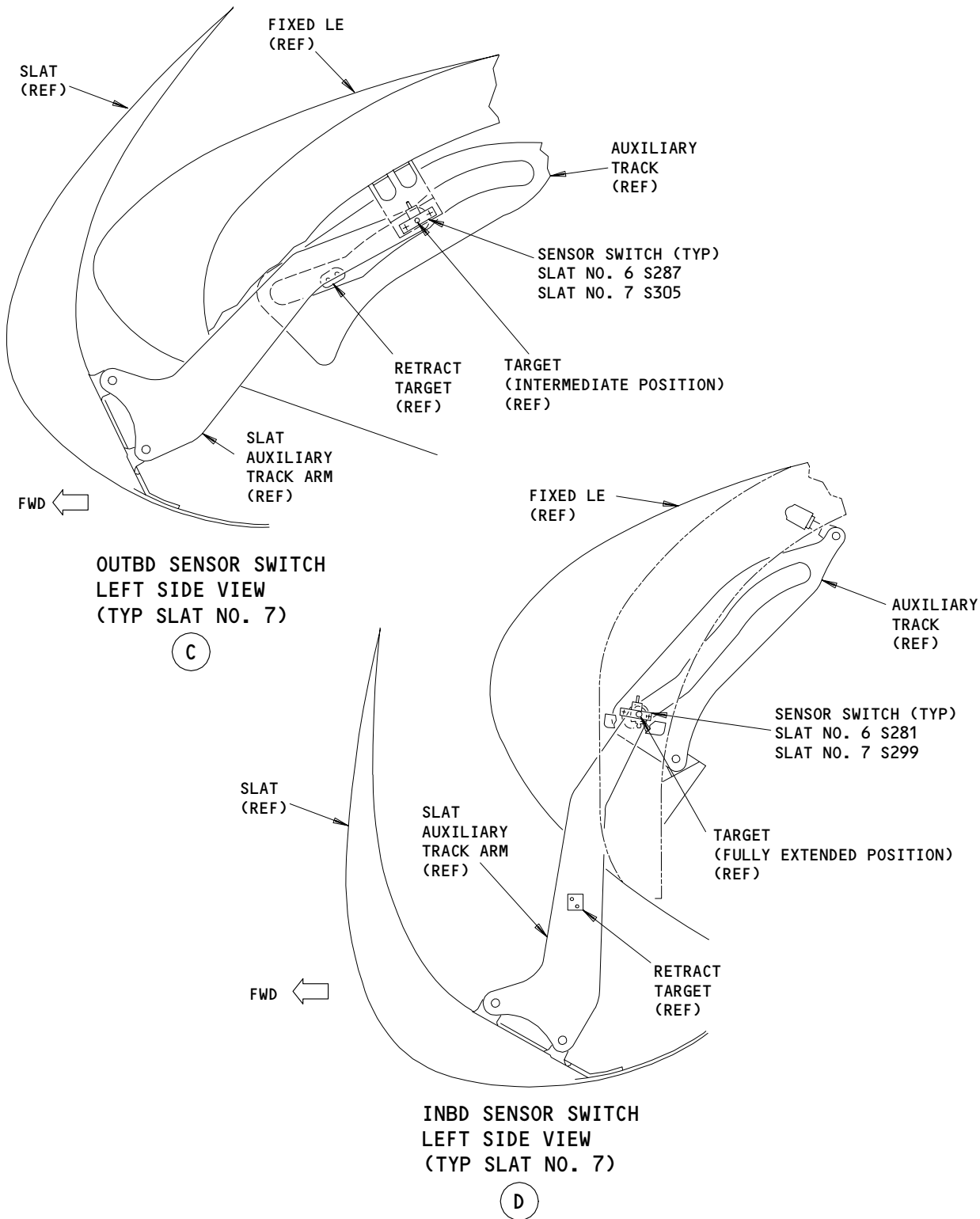
Leading Edge Slat Position Indication System - Component Location  
Figure 102 (Sheet 1)

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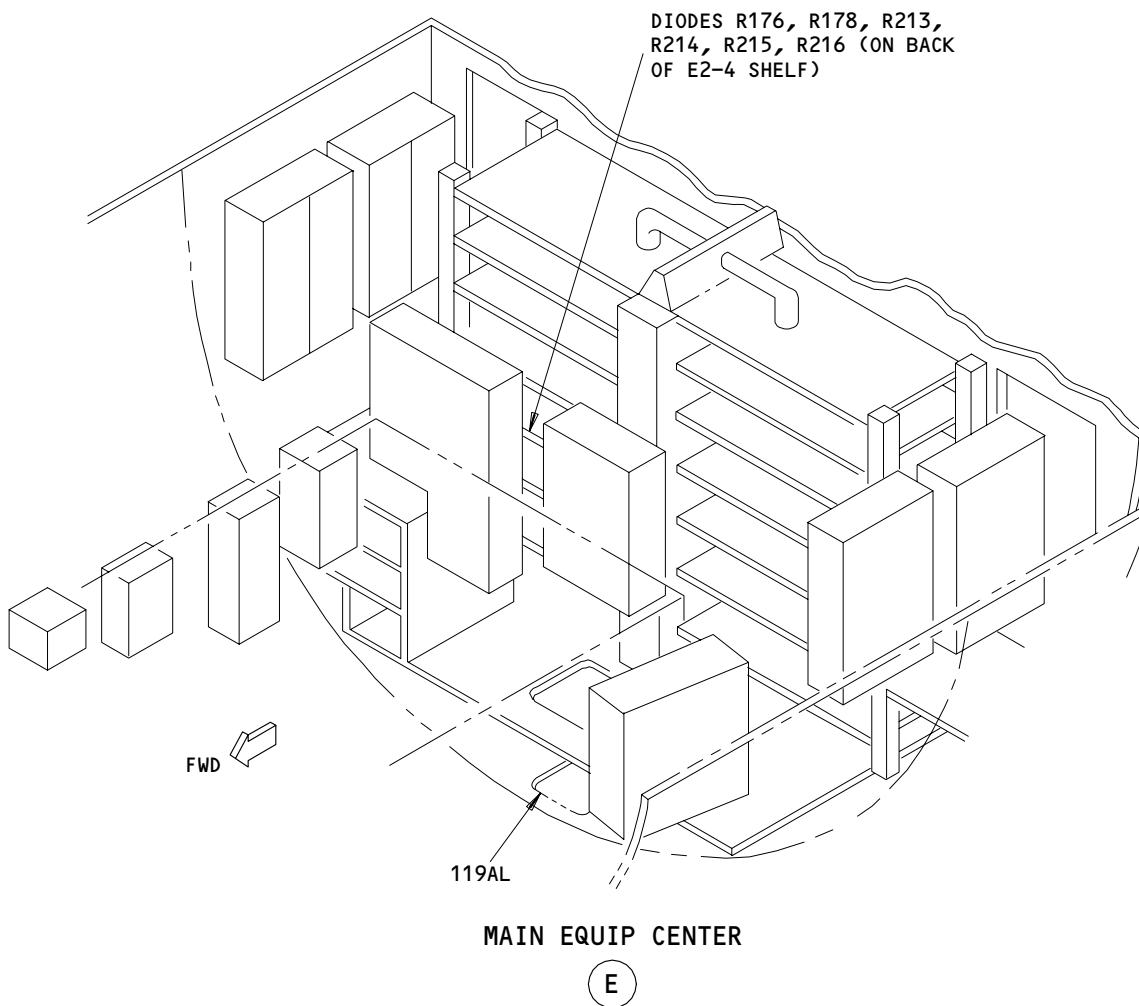
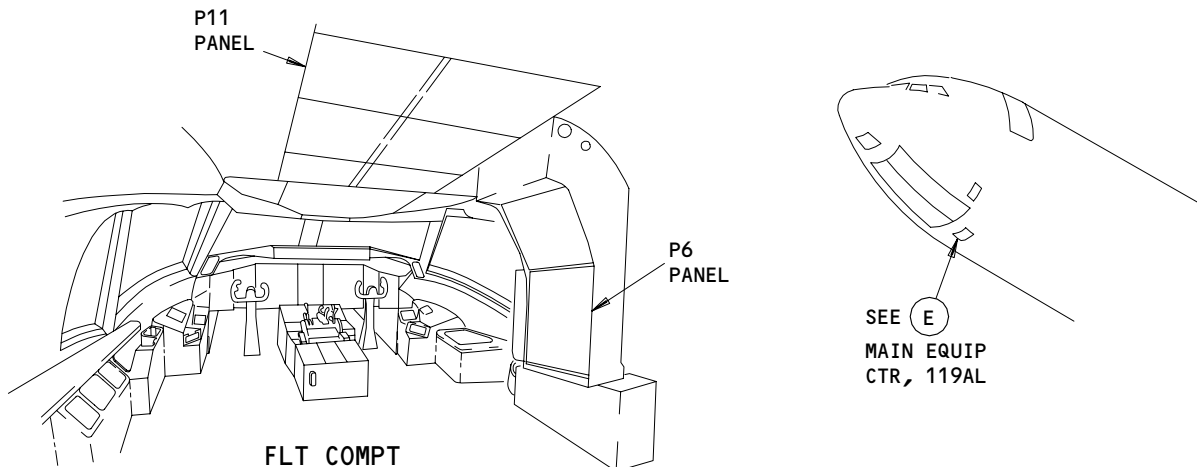


Component Location  
Figure 102 (Sheet 2)

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767  
FAULT ISOLATION/MAINT MANUAL



Component Location  
Figure 102 (Sheet 3)

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LEADING EDGE SLAT POSITION INDICATING SYSTEM -  
ADJUSTMENT/TEST

1. General

- A. This procedure contains these tasks:
  - (1) Leading Edge Slat Sensor Switch - Operational Test
  - (2) Leading Edge Slat Sensor Switch - System Test
- B. For a complete OPERATIONAL TEST of the leading edge slat position indicating system, it is necessary to do these tests:
  - Leading Edge Slat Sensor Switch - Operational Test
  - Flap and Slat Primary Drives and Position Indicating System - Test (Ref 27-51-00/501)
- C. Refer to 31-51-00/501, Warning System, for a test of the LE slat takeoff warning.
- D. Refer to 27-88-01/201, Leading Edge Slat Sensor Switches, for the adjustment of the slat sensor switch clearance.
- E. For the adjustment of the two RVDTs in the control unit of the inboard and outboard slat PDUs, it is necessary to remove the RVDTs. Refer to 27-81-11/401, Leading Edge Power Drive Unit Components, to remove, adjust, or install the RVDTs.

TASK 27-88-00-715-098

2. Leading Edge Slat Sensor Switch - Operational Test

- A. References
  - (1) 06-41-00/201, Fuselage Access Doors and Panels
  - (2) 24-22-00/201, Electrical Power - Control
  - (3) 27-51-00/501, Trailing Edge Flap System
  - (4) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- B. Access
  - (1) Location Zones
    - 211/212 Control Cabin
    - 510/610 Wing Leading Edge - Inboard
    - 520/620 Wing Leading Edge - Outboard
  - (2) Access Panels:
    - 119AL Main Equipment Center

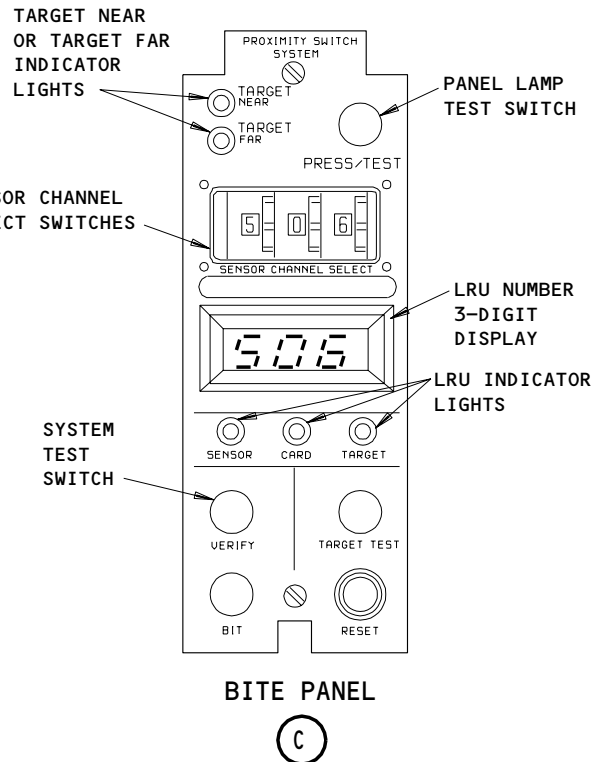
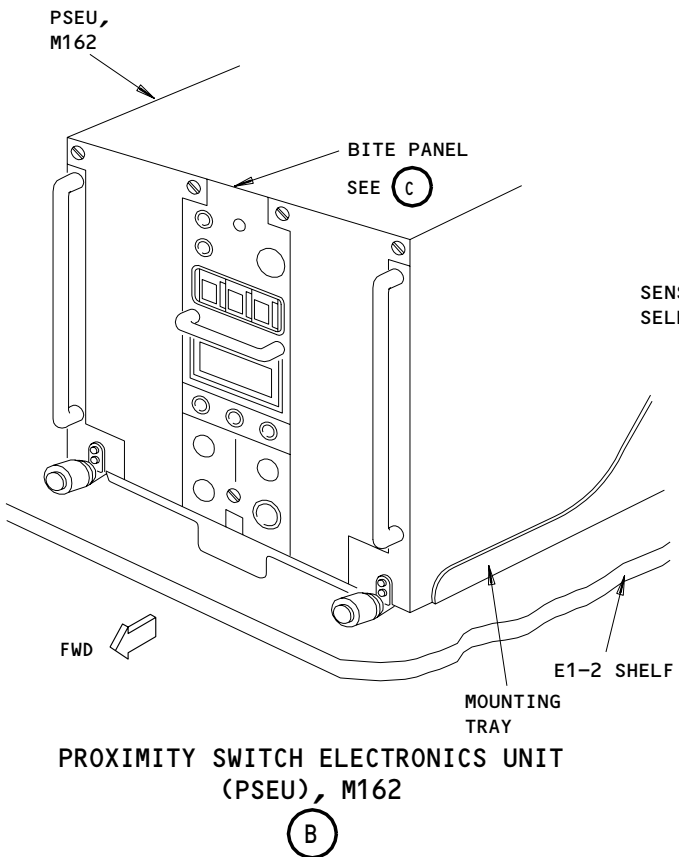
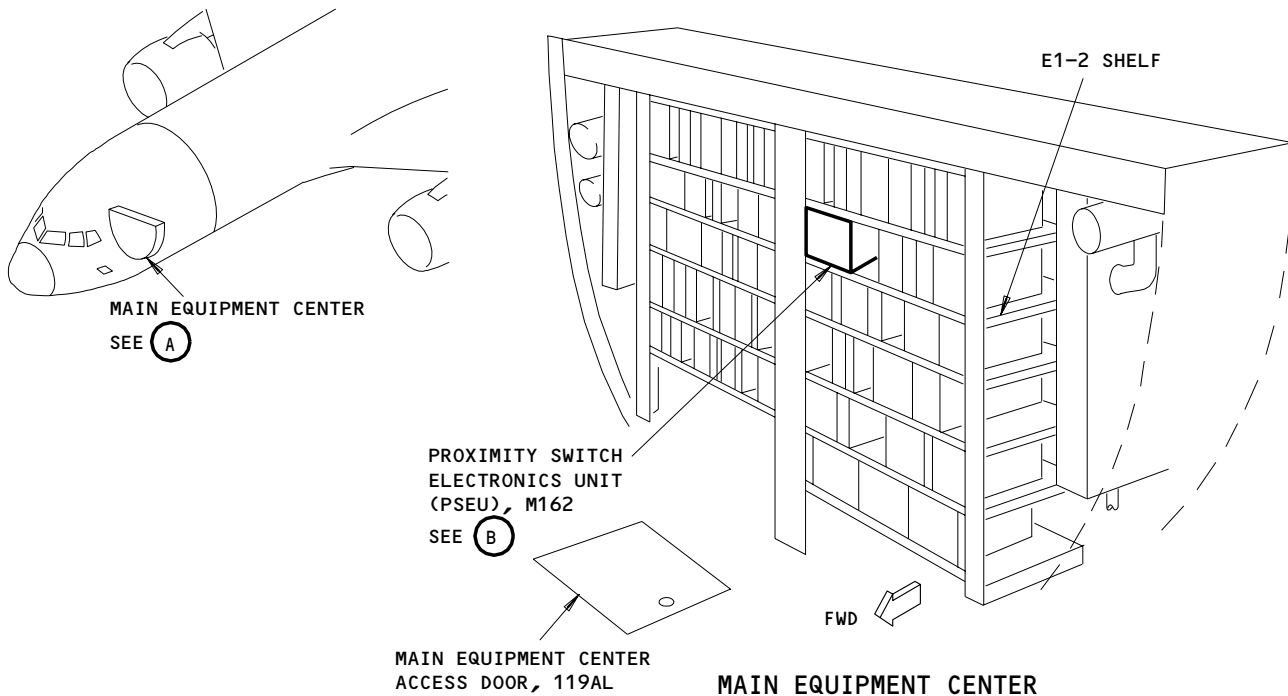
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Proximity Switch Electronics Unit (PSEU)  
Figure 501

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C. Prepare for the Test

S 215-121

- (1) Make sure you close these circuit breakers on the P11 Overhead Panel:
  - (a) 11J02, EICAS CMPTR L
  - (b) 11J03, EICAS UPPER DISPL
  - (c) 11J29, EICAS CMPTR R
  - (d) 11J30, EICAS LOWER DSPL
  - (e) 11J31, EICAS DSPL SW
  - (f) 11J32, EICAS PILOT DISPLAY, or  
DISPLAY SELECT

S 215-101

- (2) Make sure the flaps and slats are in the fully retracted position.

S 215-102

- (3) Make sure the flap control lever is in the zero (FLAPS UP) detent.

S 865-103

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

D. Leading Edge Slat Proximity Switch Operational Test (Fig. 501)

S 015-104

- (1) Open the access door, 119AL, and get access to the main equipment center, E1-2 shelf (Ref 06-41-00/201).

S 985-105

- (2) At the BITE panel of the Proximity Switch Electronics Unit (PSEU), set the SENSOR CHANNEL SELECT dials to "507".

S 725-106

- (3) Push the VERIFY button on the PSEU to start the test, and make sure these conditions occur:
  - (a) The PSEU display will show "CCC" for approximately two minutes.
  - (b) The PSEU display will show the code "999" when the test is completed.

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S 865-107

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(4) Pressurize the center hydraulic system (Ref 29-11-00/201).

S 865-108

(5) Move the flap control lever to the 1-unit detent and permit the slats to extend.

S 215-109

(6) Make sure the SENSOR CHANNEL SELECT dials is set at "507" on the PSEU.

S 725-110

(7) Push the VERIFY button on the PSEU to start the test, and make sure these conditions occur:  
(a) The PSEU display will show "CCC" for approximately two minutes.  
(b) The PSEU display will show the code "999" when the test is completed.

S 865-111

(8) Move the flap control lever to the 25-unit detent, and permit the flaps and slats to extend.

S 215-112

(9) Make sure the SENSOR CHANNEL SELECT dials is set at "507" on the PSEU.

S 725-113

(10) Push the VERIFY button on the PSEU to start the test, and make sure these conditions occur:  
(a) The PSEU display will show "CCC" for approximately two minutes.  
(b) The PSEU display will show the code "999" when the test is completed.

S 865-114

(11) Move the flap control lever to the zero (FLAPS UP) detent , and permit the flaps and slats to move to the fully retracted position.

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- S 215-115
- (12) Make sure the SENSOR CHANNEL SELECT dial is set at "507" on the PSEU.
- S 725-116
- (13) Push the VERIFY button on the PSEU to start the test, and make sure these conditions occur:
- (a) The PSEU display will show "CCC" for approximately two minutes.
  - (b) The PSEU display will show the code "999" when the test is completed.
- S 865-117
- (14) Remove the power from the center hydraulic system (Ref 29-11-00/201).
- S 415-118
- (15) Close the access door, 119AL, for the main equipment center (Ref 06-41-00/201).
- E. Put the Airplane Back to Its Usual Condition
- S 865-119
- (1) Remove electrical power (Ref 24-22-00/201).

TASK 27-88-00-735-001

3. Leading Edge Slat Sensor Switches - System Test

A. Equipment

- (1) Circuit Breaker Lockout Clip  
(2 necessary) Commercially Available

B. References

- (1) 06-44-00/201, Wing Access Doors and Panels
- (2) 24-22-00/201, Electrical Power - Control
- (3) 27-51-00/501, Trailing Edge Flap System
- (4) 27-81-11/401, Leading Edge Slat Power Drive Unit Components
- (5) 27-88-01/201, Leading Edge Slat Sensor Switches
- (6) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) 31-51-00/501, Warning System

C. Access

(1) Location Zones

211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard

(2) Access Panels:

511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

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D. Prepare for the Test

S 015-002

- (1) Remove the access panels, 511BB and 611BB to get access to the outboard and inboard slat power drive units (PDU) (Ref 06-44-00).

S 215-003

- (2) Make sure the position selector switch for the flap/slat alternate drive on the first officer main instrument panel, P3, is in the NORM detent.

S 495-004

- (3) Attach a DO-NOT-OPERATE tag to the position selector switch.

S 865-005

- (4) Supply electrical power (Ref 24-22-00).

S 865-006

- (5) Turn the captain's panel dimmer control knob on the light shield panel, P7, to full clockwise.

S 215-007

- (6) Make sure the six EICAS circuit breakers on the overhead panel, P11, are closed.

S 215-124

- (7) Make sure you close these circuit breakers on the P11 Overhead Panel:

- (a) 11J02, EICAS CMPTR L
- (b) 11J03, EICAS UPPER DISPL
- (c) 11J11, FLAP/SLAT POS IND
- (d) 11J15, L FLAP POS IND
- (e) 11J16, R FLAP POS IND
- (f) 11J29, EICAS CMPTR R
- (g) 11J30, EICAS LOWER DSPL
- (h) 11J31, EICAS DSPL SW
- (i) 11J32, EICAS PILOT DISPLAY, or  
DISPLAY SELECT

S 215-009

- (8) Make sure the flaps and slats are in the fully retracted position.

S 215-010

- (9) Make sure the flap control lever is in the zero (FLAPS UP) detent.

E. Test for the Slat Proximity Switches - Normal Control

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S 865-011

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(1) Pressurize the center hydraulic system (Ref 29-11-00).

S 865-012

(2) Move the flap control lever to the 1-unit detent, and make sure the slats move to the intermediate position.

S 865-013

(3) Remove the pressure from the center hydraulic system (Ref 29-11-00).

S 865-014

(4) Push the arming switch for the slat alternate drive (on the P3 panel) to arm the slat alternate drive for the inboard and outboard slats (ALTN switch light comes on).

S 215-015

(5) Make sure the amber LEADING EDGE light (on the P3 panel) comes on seven seconds after you push the arming switch:

S 215-146

(6) Make sure the LE SLAT DISAGREE message shows on the EICAS display after 7 seconds.

S 865-016

(7) Open these circuit breakers on the P11 panel and install circuit breaker locks:

- (a) 11H23, SLAT ALTN CONT INBD
- (b) 11H24, SLAT ALTN CONT OUTBD

S 985-017

(8) Manually turn the output shaft on the inboard slat PDU for five full turns in the extend direction (clockwise when you look from the left wing to the right wing).

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S 985-018

- (9) Manually turn the output shaft on the outboard slat PDU for five full turns in the extend direction (counterclockwise when you look from the left wing to the right wing).

S 215-019

- (10) Make sure the message, LE SLAT DISAGREE or LE SLAT ASYM, does not show on the top EICAS display.

S 865-020

- (11) Remove the circuit breaker locks and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

S 865-021

- (12) Push the arming switch for the slat alternate drive to disarm the slat alternate drive (ALTN switch light goes off).

S 215-022

- (13) Make sure the amber LEADING EDGE light goes off.

S 215-148

- (14) Make sure the LE SLAT DISAGREE message does not show on the EICAS display after 7 seconds.

S 865-023

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (15) Pressurize the center hydraulic system (Ref 29-11-00).

S 865-024

- (16) Move the flap control lever to the 25-unit detent, and make sure the flaps move to the 25-degree position, and the slats move to the fully extended position.

S 865-025

- (17) Remove the pressure from the center hydraulic system (Ref 29-11-00).

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- S 865-026
- (18) Push the arming switch for the slat alternate drive to arm the slat alternate drive (ALTN switch light comes on).
- S 215-027
- (19) Make sure the amber LEADING EDGE light comes on.
- S 215-150
- (20) Make sure the LE SLAT DISAGREE message shows on the EICAS display after 7 seconds.
- S 865-028
- (21) Open these circuit breakers on the P11 panel and install the circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
- S 985-029
- (22) Manually turn the output shaft on the inboard slat PDU for five full turns in the retract direction (counterclockwise when you look from the left wing to the right wing).
- S 985-030
- (23) Manually turn the output shaft on the outboard slat PDU for five full turns in the retract direction (clockwise when you look from the left wing to the right wing).
- S 215-031
- (24) Make sure the message, LE SLAT DISAGREE or LE SLAT ASYM, does not show on the top EICAS display.
- S 865-032
- (25) Remove the circuit breaker locks and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
- S 865-033
- (26) Push the arming switch for the slat alternate drive to disarm the slat alternate drive (ALTN switch light goes off).
- S 215-034
- (27) Make sure the amber LEADING EDGE light goes off.

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S 215-152

- (28) Make sure the LE SLAT DISAGREE message does not show on the EICAS display after 7 seconds.

S 865-035

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (29) Pressurize the center hydraulic system (Ref 29-11-00).

S 865-036

- (30) Move the flap control lever to the 20-unit detent, and make sure the flaps move to the 20-degree position, and the slats move to the intermediate position.

S 865-037

- (31) Remove the pressure from the center hydraulic system (Ref 29-11-00).

S 865-038

- (32) Push the arming switch for the slat alternate drive to arm the slat alternate drive (ALTN switch comes on).

S 215-039

- (33) Make sure the amber LEADING EDGE light comes on.

S 215-154

- (34) Make sure the LE SLAT DISAGREE message shows on the EICAS display after 7 seconds.

S 865-040

- (35) Open these circuit breakers on the P11 panel and install the circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT OUTBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

S 985-041

- (36) Manually turn the output shaft on the inboard slat PDU for five full turns in the retract direction (counterclockwise when you look from the left wing to the right wing).

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S 985-042

- (37) Manually turn the output shaft on the outboard slat PDU for five full turns in the retract direction (clockwise when you look from the left wing to the right wing).

S 865-043

- (38) Remove the circuit breaker locks and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

S 865-044

- (39) Push the arming switch for the slat alternate drive to disarm the slat alternate drive (ALTN switch light goes off).

S 215-045

- (40) Make sure the amber LEADING EDGE light goes off.

S 215-156

- (41) Make sure the LE SLAT DISAGREE message does not show on the EICAS display after 7 seconds.

S 865-046

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (42) Pressurize the center hydraulic system (Ref 29-11-00).

S 865-047

- (43) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted position.

S 865-048

- (44) Remove the pressure from the center hydraulic system (Ref 29-11-00).

S 865-049

- (45) Push the arming switch for the slat alternate drive to arm the slat alternate drive (ALTN switch light comes on).

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S 215-050

- (46) Make sure the amber LEADING EDGE light comes on.

S 215-158

- (47) Make sure the LE SLAT DISAGREE message shows on the EICAS display after 7 seconds.

S 865-051

- (48) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

S 985-052

- (49) Manually turn the output shaft on the inboard slat PDU for five full turns in the extend direction (clockwise when you look from the left wing to the right wing).

S 985-053

- (50) Manually turn the output shaft on the outboard slat PDU for five full turns in the extend direction (counterclockwise when you look from the left wing to the right wing).

S 215-054

- (51) Make sure the message, LE SLAT DISAGREE or LE SLAT ASYM, does not show on the top EICAS display.

S 865-055

- (52) Remove the circuit breaker locks and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

S 865-056

- (53) Push the arming switch for the slat alternate drive to disarm the slat alternate drive (ALTN switch light goes off).

S 215-057

- (54) Make sure the amber LEADING EDGE light goes off.

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S 215-160

- (55) Make sure the LE SLAT DISAGREE message does not show on the EICAS display after 7 seconds.

S 865-058

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (56) Pressurize the center hydraulic system for one minute, then remove the pressurize from the center hydraulic system (Ref 29-11-00).

F. Test for the Slat Proximity Switches - Alternate Control

S 865-059

- (1) Supply electrical power (Ref 24-22-00).

S 865-060

- (2) Push the arming switch (on the P3 panel) for slat alternate drive to arm the slat alternate drive (ALTN switch light comes on).

S 215-061

- (3) Make sure the amber LEADING EDGE light comes on seven seconds after you push the arming switch.

S 215-162

- (4) Make sure the LE SLAT DISAGREE message shows on the EICAS display after 7 seconds.

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- S 095-173
- (5) Remove the DO-NOT-OPERATE tag from the position selector switch (on the P3 panel) for the flap/slat alternate drive.
- S 865-063
- (6) Turn the position selector switch to the 1-unit detent (amber LEADING EDGE light goes off), and make sure the slats move to the intermediate position.
- S 215-164
- (7) Make sure the LE SLAT DISAGREE message does not show on the EICAS display after 7 seconds.
- S 865-064
- (8) Move the flap control lever to the 1-unit detent.
- S 865-065
- (9) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
- S 985-066
- (10) Manually turn the output shaft on the inboard slat PDU for five full turns in the extend direction (clockwise when you look from the left wing to the right wing).
- S 985-067
- (11) Manually turn the output shaft on the outboard slat PDU for five full turns in the extend direction (counterclockwise when you look from the left wing to the right wing).
- S 215-068
- (12) Make sure the message, LE SLAT DISAGREE or LE SLAT ASYM, does not show on the top EICAS display.

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S 865-069

- (13) Remove the circuit breaker locks and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

S 865-070

- (14) Turn the position selector switch for the flap/slat alternate drive to the 25-unit detent, and make sure the slats move to the fully extended position.

S 865-071

- (15) Move the flap control lever to the 25-unit detent.

S 865-072

- (16) Open these circuit breakers on the P11 panel and install circuit breaker locks:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD

S 985-073

- (17) Manually turn the output shaft on the inboard slat PDU for five full turns in the retract direction (counterclockwise when you look from the left wing to the right wing).

S 985-074

- (18) Manually turn the output shaft on the outboard slat PDU for five full turns in the retract direction (clockwise when you look from the left wing to the right wing).

S 215-075

- (19) Make sure the message, LE SLAT DISAGREE or LE SLAT ASYM, does not show on the top EICAS display.

S 865-076

- (20) Remove the circuit breaker locks and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD

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(b) 11H24, SLAT ALTN CONT OUTBD

S 865-077

- (21) Turn the position selector switch for the flap/slat alternate drive to the 1-unit detent, and make sure the slats move to intermediate position.

S 865-078

- (22) Move the flap control lever to the 1-unit detent.

S 865-079

- (23) Open these circuit breakers on the P11 panel and install circuit breaker locks:

(a) 11H23, SLAT ALTN CONT INBD

(b) 11H24, SLAT ALTN CONT OUTBD

S 985-080

- (24) Manually turn the output shaft on the inboard slat PDU for five full turns in the retract direction (counterclockwise when you look from the left wing to the right wing).

S 985-081

- (25) Manually turn the output shaft on the outboard slat PDU for five full turns in the retract direction (clockwise when you look from the left wing to the right wing).

S 215-082

- (26) Make sure the message, LE SLAT DISAGREE or LE SLAT ASYM, does not show on the top EICAS display.

S 865-083

- (27) Remove the circuit breaker locks and close these circuit breakers on the P11 panel:

(a) 11H23, SLAT ALTN CONT INBD

(b) 11H24, SLAT ALTN CONT OUTBD

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S 865-084

- (28) Turn the position selector switch for the flap/slat alternate drive to the UP detent, and make sure the slats move to the fully retracted position.

S 865-085

- (29) Move the flap control lever to the zero (FLAPS UP) detent.

S 865-086

- (30) Open these circuit breakers on the P11 panel and install circuit breaker locks:

- (a) 11H23, SLAT ALTN CONT INBD
- (b) 11H24, SLAT ALTN CONT OUTBD

S 985-087

- (31) Manually turn the output shaft on the inboard slat PDU for five full turns in the extend direction (clockwise when you look from the left wing to the right wing).

S 985-088

- (32) Manually turn the output shaft on the outboard slat PDU for five full turns in the extend direction (counterclockwise when you look from the left wing to the right wing).

S 215-089

- (33) Make sure the message, LE SLAT DISAGREE or LE SLAT ASYM, does not show on the top EICAS display.

S 865-090

- (34) Remove the circuit breaker locks and close these circuit breakers on the P11 panel:

- (a) 11H23, SLAT ALTN CONT INBD
- (b) 11H24, SLAT ALTN CONT OUTBD

S 865-091

- (35) Turn the position selector switch for the flap/slat alternate drive to the NORM detent (amber LEADING EDGE light comes on).

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S 215-166

- (36) Make sure the LE SLAT DISAGREE message shows on the EICAS display after 7 seconds.

S 865-092

- (37) Push the arming switch for the slat alternate drive to disarm the slat alternate drive (ALTN switch light goes off).

S 215-093

- (38) Make sure the amber LEADING EDGE light goes off.

S 215-168

- (39) Make sure the LE SLAT DISAGREE message does not show on the EICAS display after 7 seconds.

S 865-094

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (40) Pressurize the center hydraulic system for one minute, then remove the pressure from the center hydraulic system (Ref 29-11-00).

G. Put the Airplane Back to Its Usual Condition

S 865-095

- (1) Remove the power from the center hydraulic power (Ref 29-11-00).

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- S 415-096
- (2) Install the access panel, 511BB and 611BB, for the outboard and inboard slat PDU (Ref 06-44-00).
- S 865-097
- (3) Remove electrical power (Ref 24-22-00).

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LEADING EDGE SLAT SENSOR SWITCHES – MAINTENANCE PRACTICES

1. General

- A. This procedure contains the replacement and test tasks for the leading edge slat sensor switches. The test procedure contains the test steps for the sensor installation, and the adjustment steps for the switch-to-target clearance.

It will be necessary to adjust the switch-to-target clearance if you replaced a inboard or a outboard slat.

- B. The bolts that attach the slat track rollers to the inboard and outboard auxiliary track arms on each slat make a target. While the auxiliary track arms move with the slats in the auxiliary tracks, the sensor switches will come on when the targets are adjacent to the sensor switches. This condition occurs when the slats are in the intermediate and fully extended positions. In the slat fully retracted position, the sensor switches are set to on by the targets attached to the slat auxiliary track arms.

TASK 27-88-01-902-001

2. Leading Edge Slat Sensor Switch – Replacement

A. Equipment

- (1) Leading Edge Slats Groundlock – A27007-1  
(2 Necessary)
- (2) TE Flap PDU Lock – A27009-7
- (3) Circuit Breaker Lockout Clip  
(4-necessary) Commercially Available

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-44-00/201, Wing Access Doors and Panels
- (3) AMM 24-22-00/201, Electrical Power – Control
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Landing Gear Door Locks
- (6) AMM 32-00-20/201, Landing Gear Downlocks
- (7) FIM 32-09-03/101, PSEU BITE
- (8) AMM 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge – Inboard
520/620	Wing Leading Edge – Outboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

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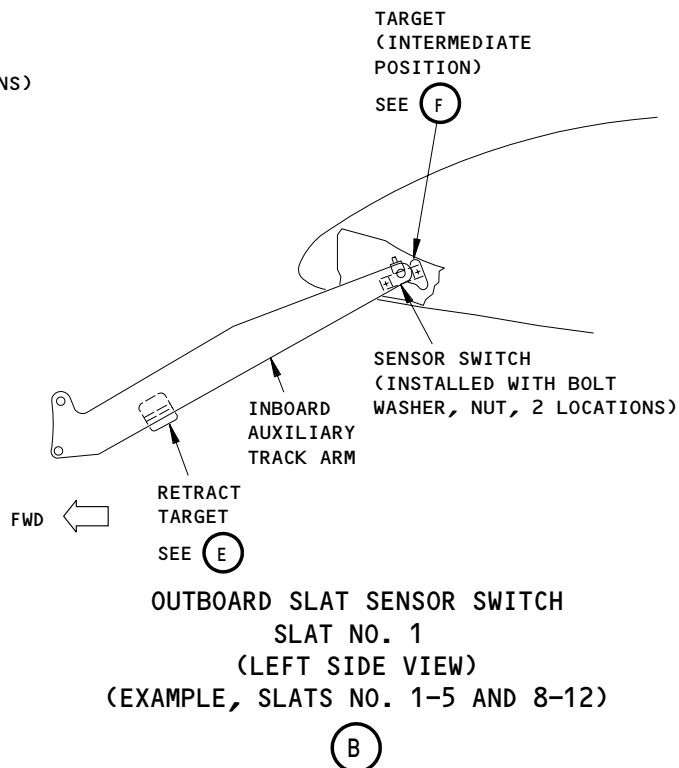
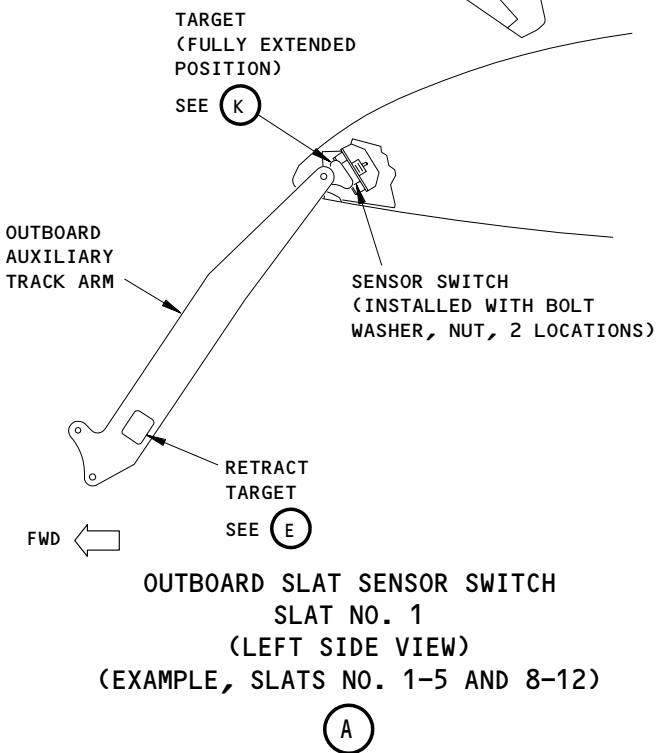
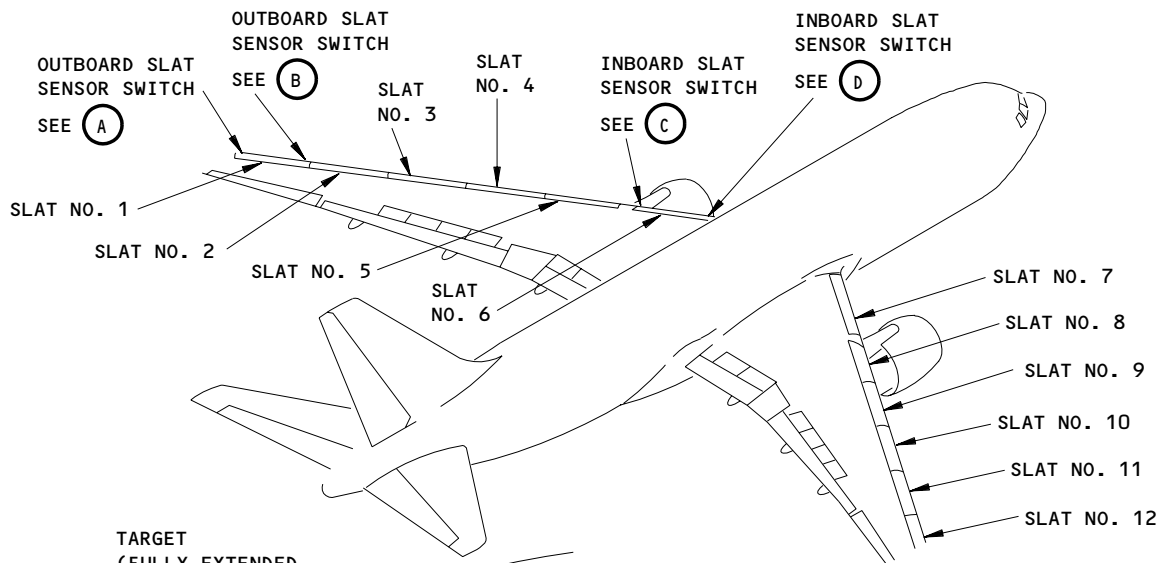
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# BOEING

## 767 MAINTENANCE MANUAL

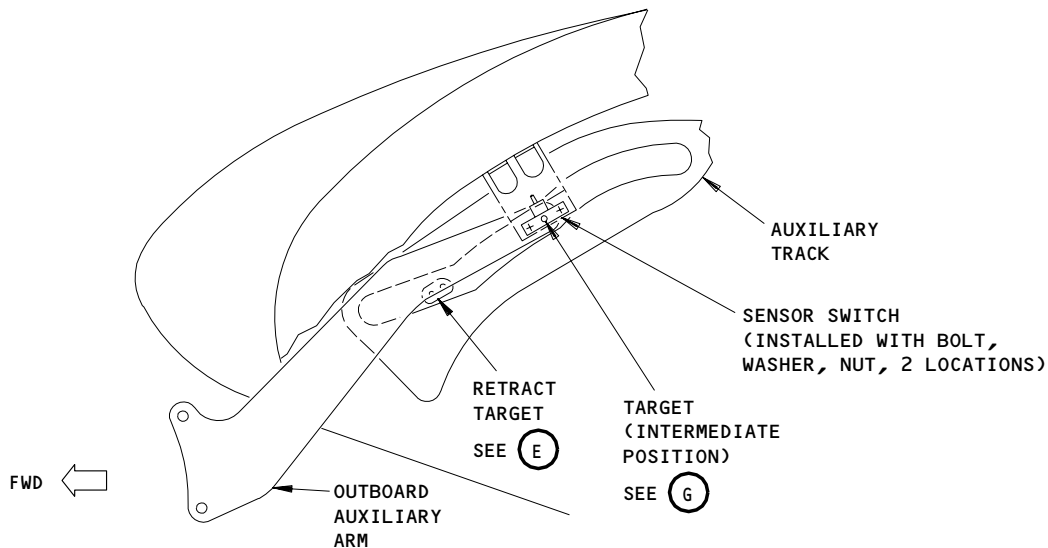


1 ▷ ADJUST THE CLEARANCE WITH SHIMS UNDER THE TARGET.

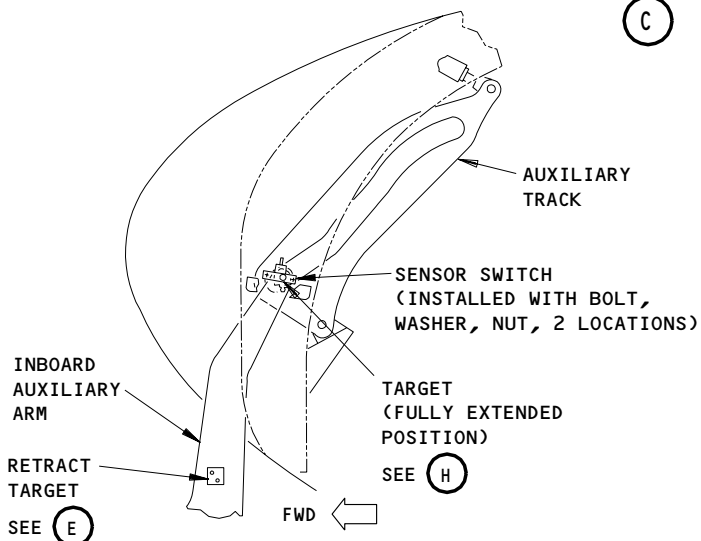
Slat Sensor Switches  
Figure 201 (Sheet 1)

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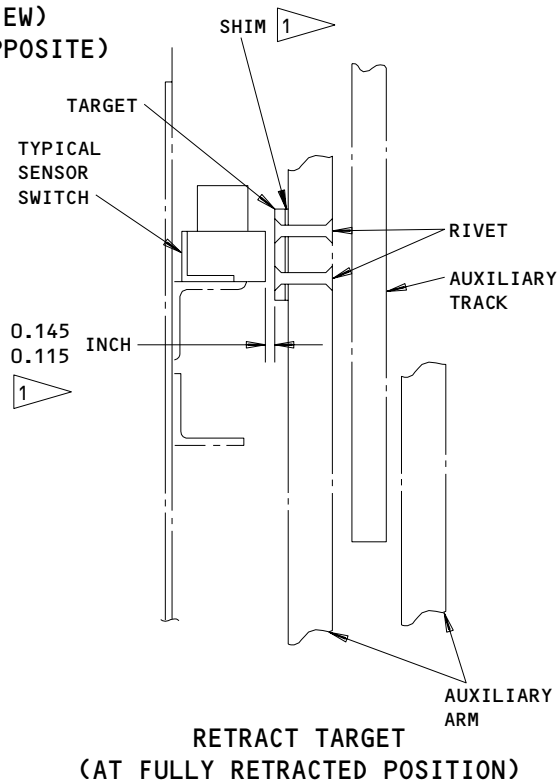
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**INBOARD SLAT SENSOR SWITCH  
SLAT NO. 6  
(LEFT SIDE VIEW)  
(SLAT NO. 7 IS OPPOSITE)**



**INBOARD SLAT SENSOR SWITCH  
SLAT NO. 6  
(LEFT SIDE VIEW)  
(SLAT NO. 7 IS OPPOSITE)**



**RETRACT TARGET  
(AT FULLY RETRACTED POSITION)**

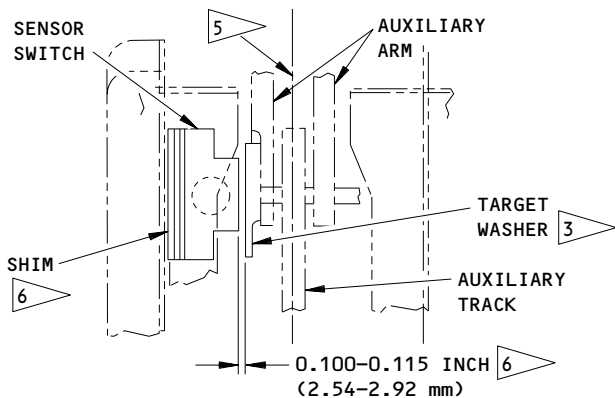
**NOTE:** WHEN THE INBOARD OR OUTBOARD SLATS ARE IN THE FULLY RETRACTED POSITION, THE SWITCHES ARE NEAR TO THE TARGETS ON THE AUXILIARY ARMS (SEE FIG. 201). THE CLEARANCE BETWEEN THE AUXILIARY ARM TARGETS AND THE SWITCHES MUST BE 0.115-0.145 INCH AT ALL LOCATIONS. ADJUST THE AUXILIARY ARM TARGETS WITH SHIMS.

**Slat Sensor Switches  
Figure 201 (Sheet 2)**

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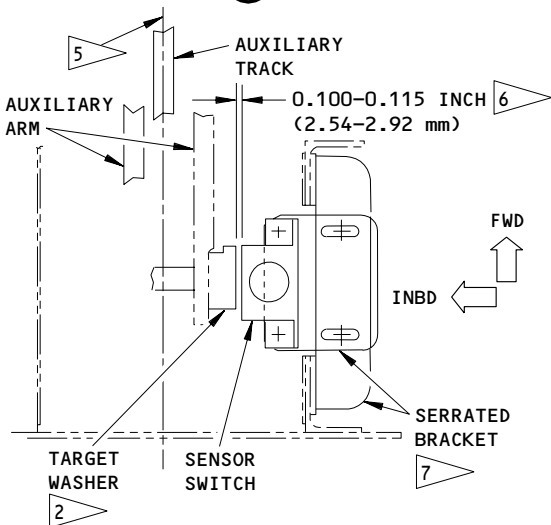
**27-88-01**





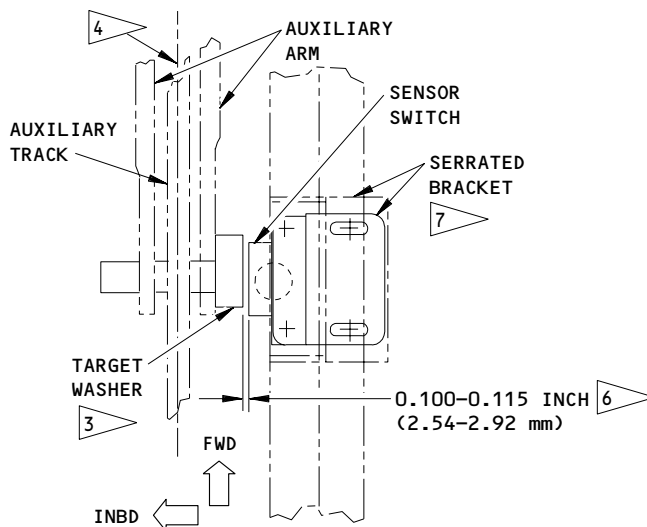
**INBOARD SENSOR  
INTERMEDIATE POSITION  
(BOTTOM VIEW)  
(OUTBOARD SLATS NO. 1-5 AND 8-12)**

(F)



**INBOARD SENSOR  
EXTENDED POSITION  
(BOTTOM VIEW)  
(INBOARD SLATS NO. 6 AND 7)**

(H)



**OUTBOARD SENSOR  
INTERMEDIATE POSITION  
(BOTTOM VIEW)  
(INBOARD SLATS NO. 6 AND 7)**

(G)

**CAUTION:** THE TARGET WASHERS HAVE DIFFERENT PROFILES. TARGET WASHERS ARE NOT INTERMIXABLE. NOTE THAT TARGET WASHERS VARY DEPENDENT ON LOCATION AND THAT INCORRECT PART NUMBER INSTALLATION CAN CAUSE STALL WARNING (STICK SHAKER ACTIVATION - EICAS LE ASYMMETRY MESSAGE) AND/OR PSEU BITE DETECTED FAULT.

- 2 THE SENSOR SWITCH COMES ON WHEN THE SLATS ARE IN THE FULLY EXTENDED POSITION.
- 3 THE SENSOR SWITCH COMES ON WHEN THE SLATS ARE IN THE INTERMEDIATE POSITION.
- 4 OUTBOARD AUXILIARY TRACK AND AUXILIARY ARM
- 5 INBOARD AUXILIARY TRACK AND AUXILIARY ARM

- 6 ADJUST WITH SHIMS. YOU CAN USE THE SERRATED BRACKET AT THE SLATS NO. 6 AND 7 FOR THE ADJUSTMENT. APPLY ADHESIVE AND BOND SHIMS TO STRUCTURE AFTER FINAL ADJUSTMENT.
- 7 APPLY CORROSION PREVENTIVE COMPOUND TO SERRATIONS AND ADJUST SERRATED PLATE TO GET CLEARANCE AS SHOWN.

Slat Sensor Switches  
Figure 201 (Sheet 3)

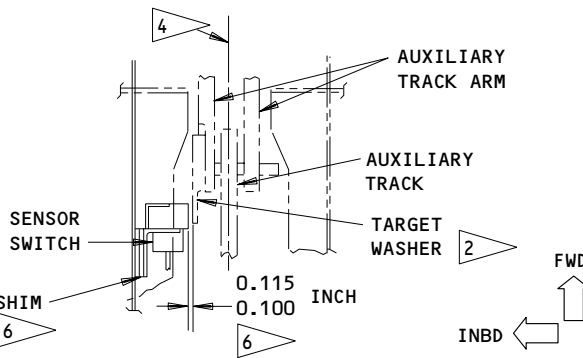
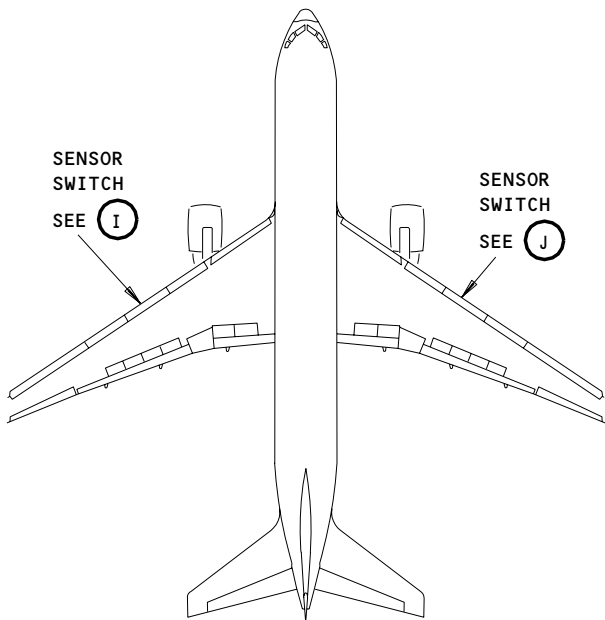
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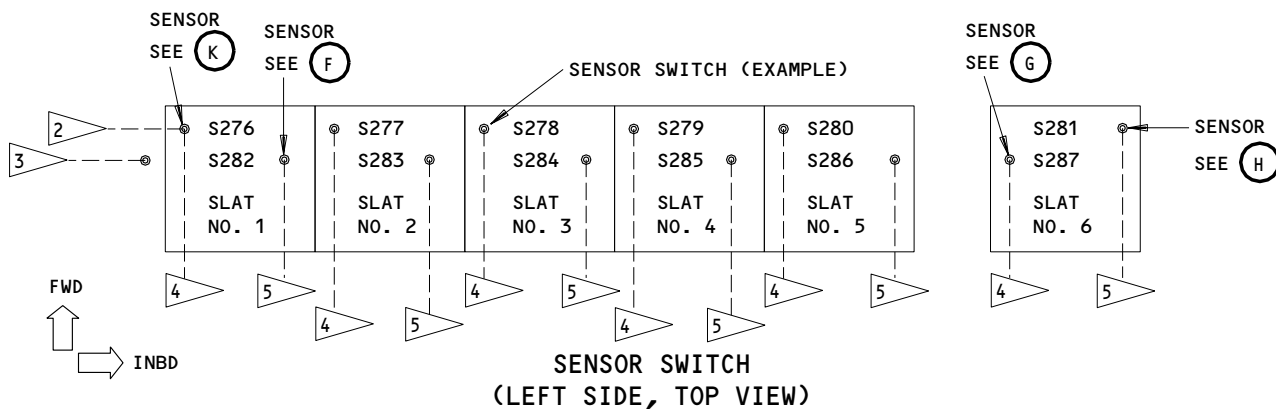
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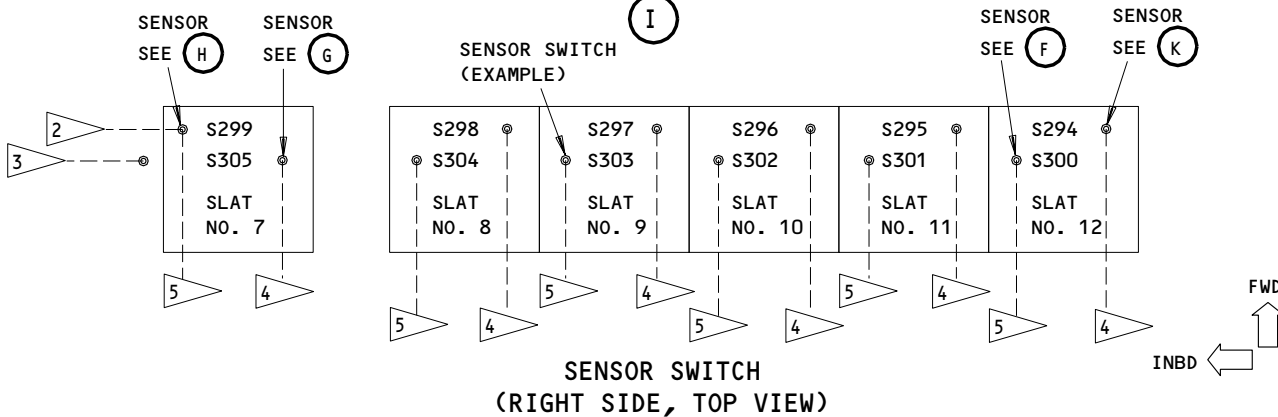
OUTBOARD SENSOR  
EXTENDED POSITION  
(BOTTOM VIEW)  
(EXAMPLE, SLATS NO. 1-5 AND 8-12)

(K)



SENSOR SWITCH  
(LEFT SIDE, TOP VIEW)

(I)



SENSOR SWITCH  
(RIGHT SIDE, TOP VIEW)

(J)

Slat Sensor Switches  
Figure 201 (Sheet 4)

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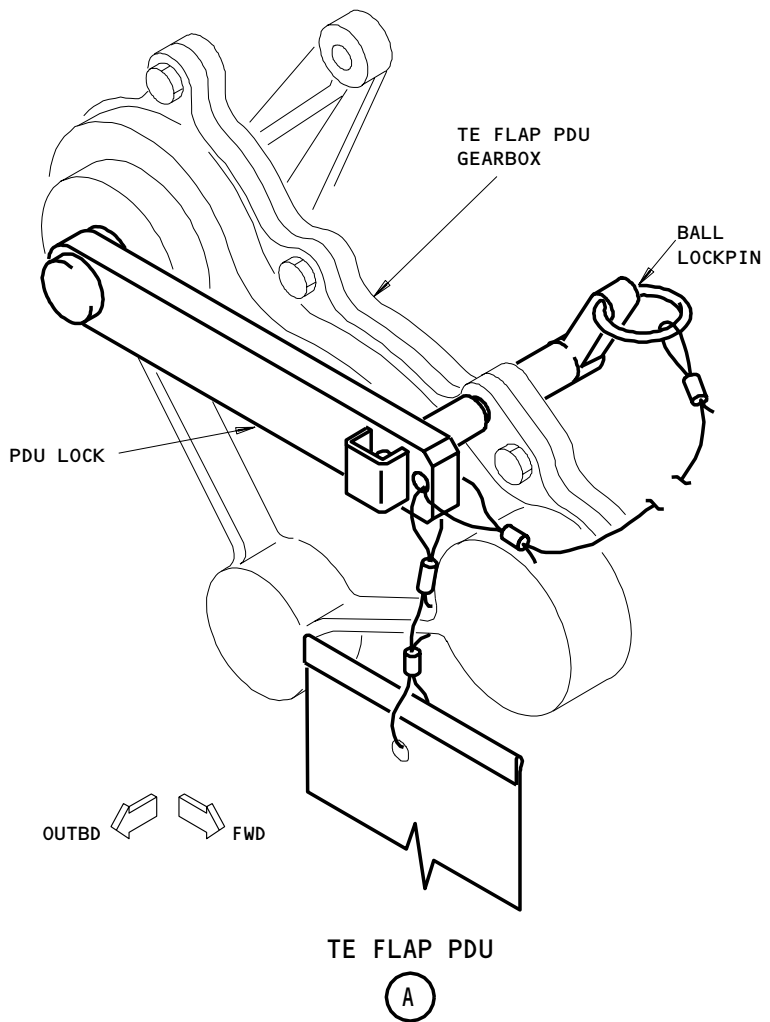
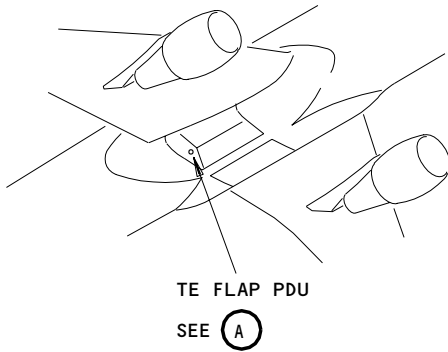
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PDU Lock for the TE Flap PDU  
Figure 202

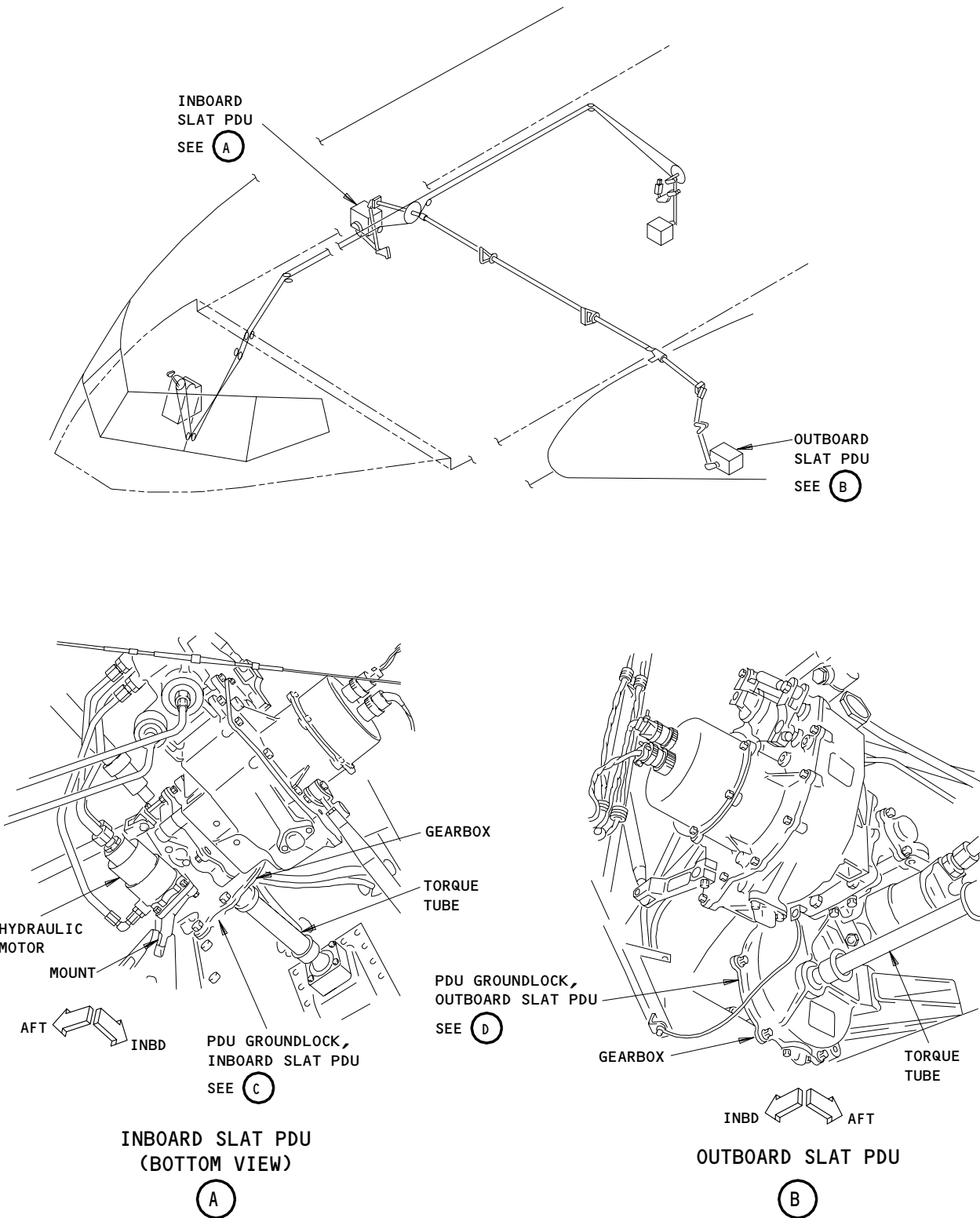
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Slats PDU Groundlock  
Figure 203 (Sheet 1)

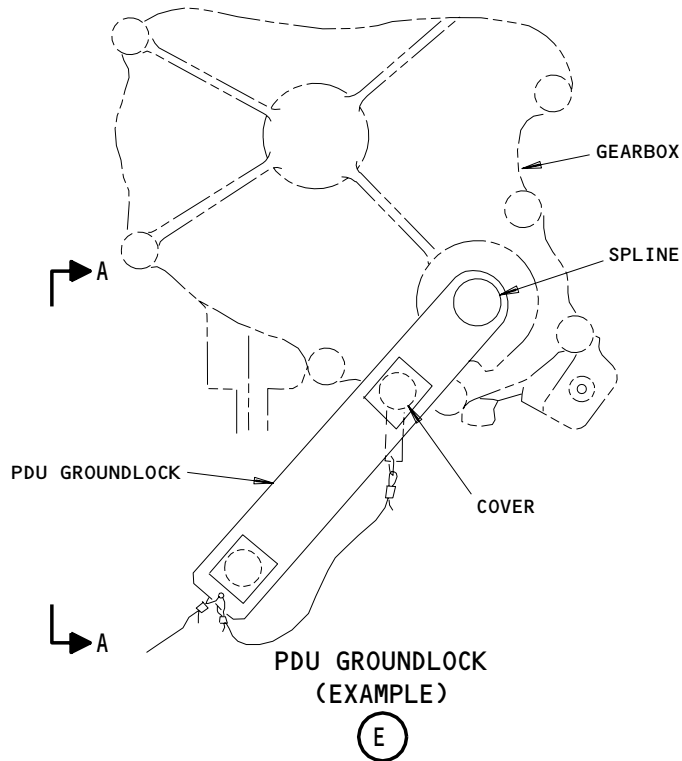
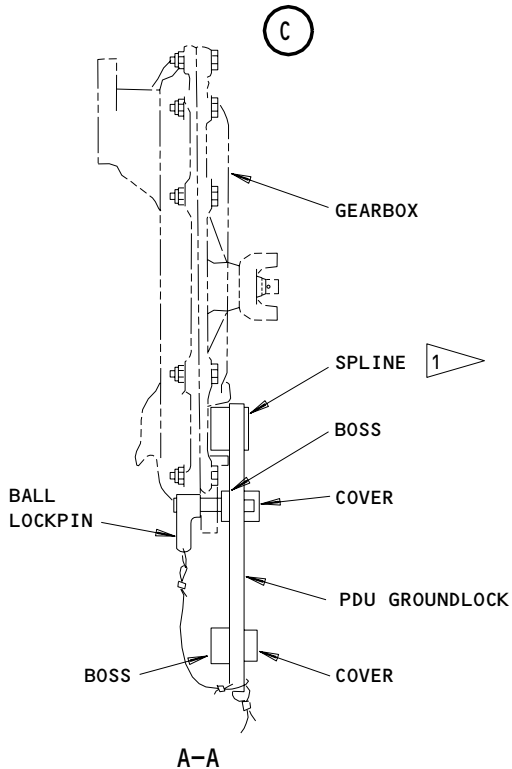
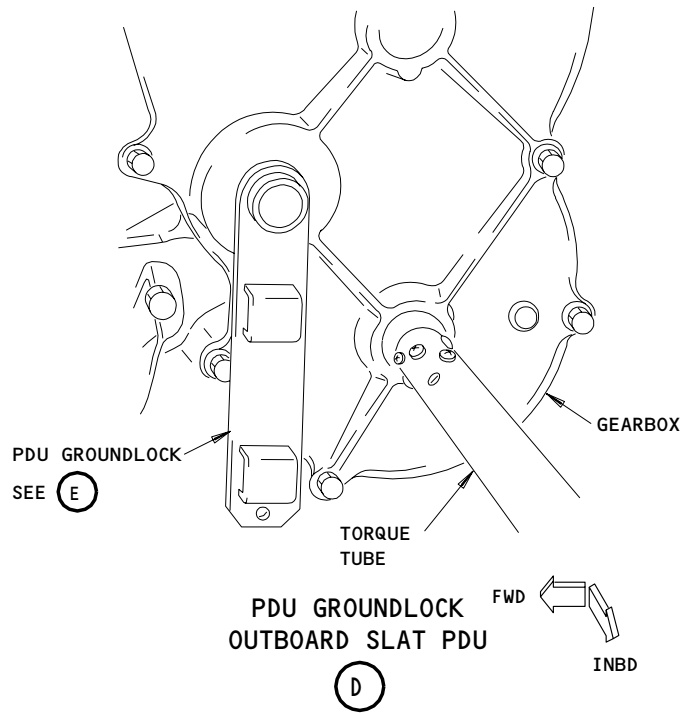
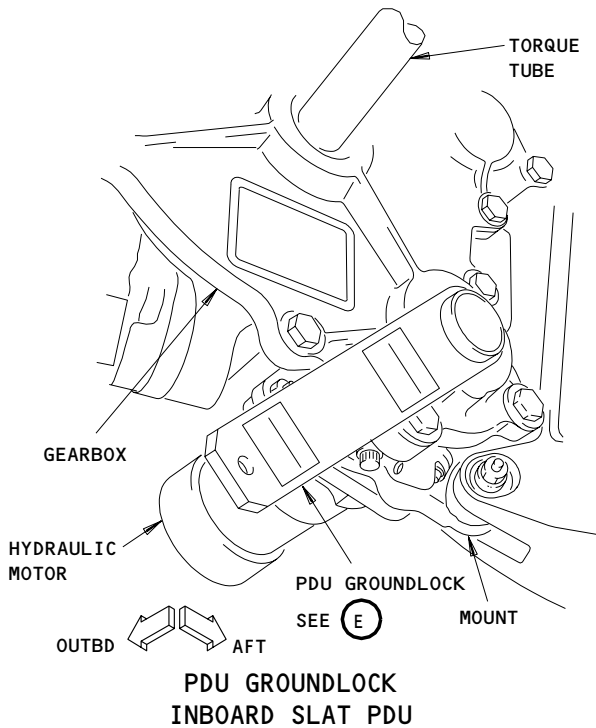
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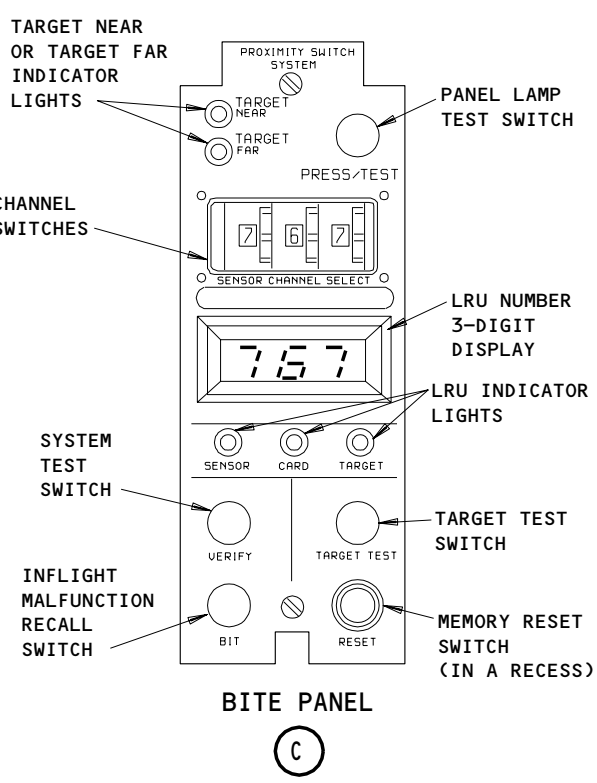
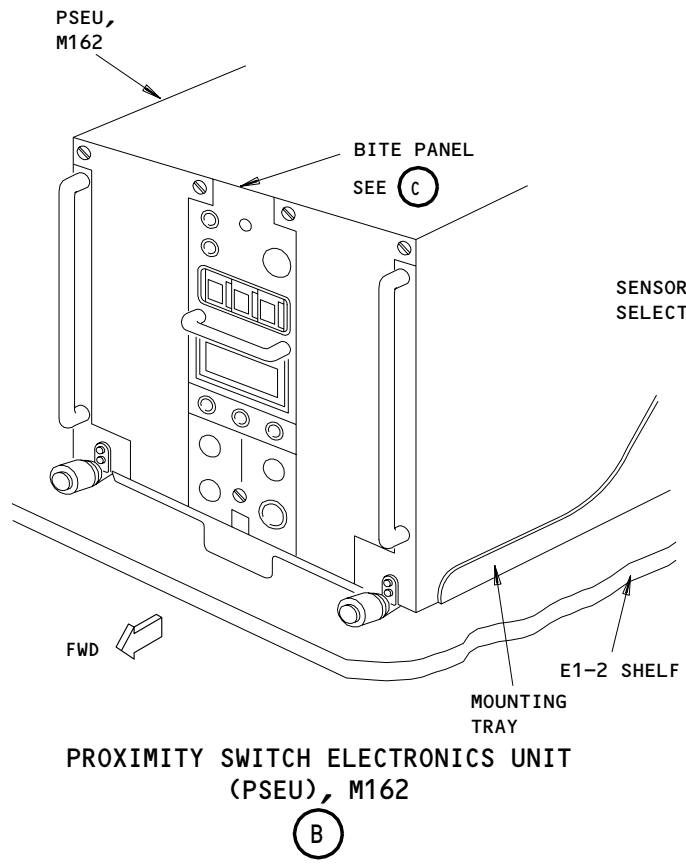
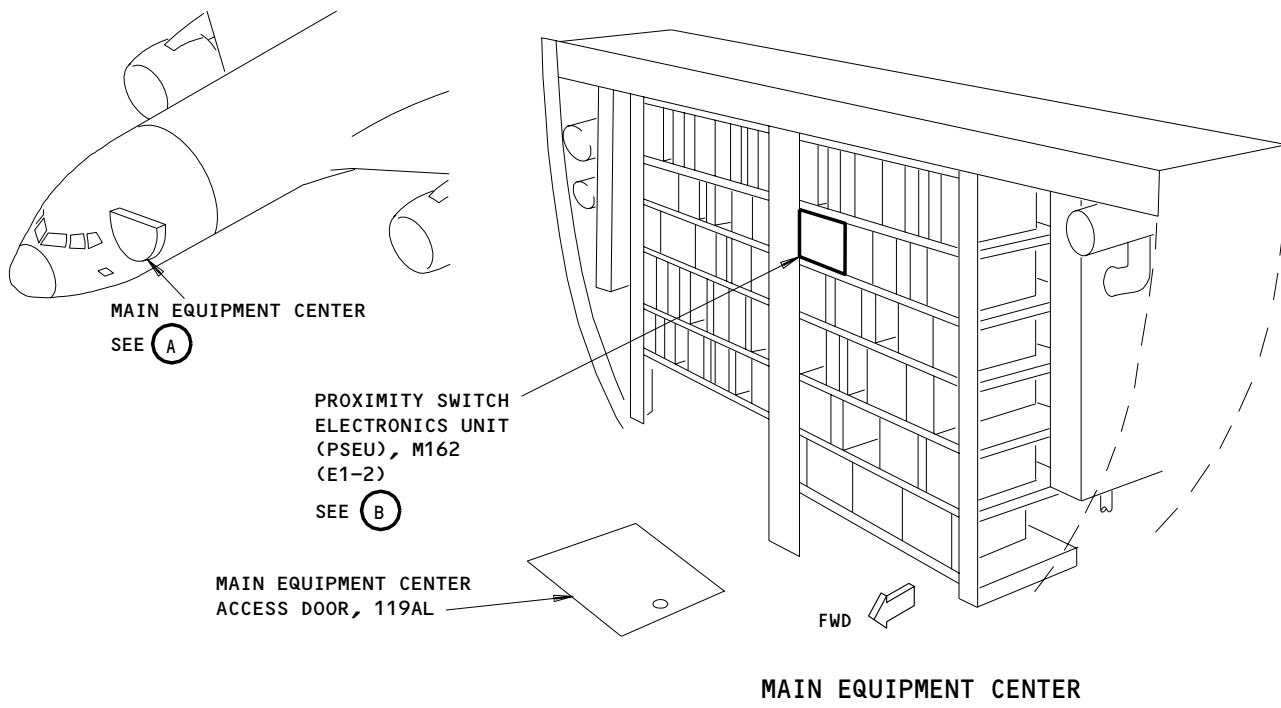


1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD BY A BALL LOCKPIN, INSTALLED THROUGH THE BOSS AND THE GEARBOX

Slats PDU Groundlock  
Figure 203 (Sheet 2)

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Proximity Switch Electronics Unit (PSEU)  
Figure 204

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- (2) Access Panels:  
511BB LE Slat Power Drive Unit - Outboard (Left)  
611BB LE Slat Power Drive Unit - Inboard (Right)

D. Prepare for the Removal

S 212-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 492-003

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 042-004

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 212-005

- (4) Make sure the trailing edge (TE) flaps and the leading edge (LE) slats are in the fully retracted position, and the flap control lever is in the zero (FLAPS UP) detent.

S 862-006

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

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S 862-007

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(6) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 862-008

(7) Move the flap control lever to the 30-unit detent, and make sure the flaps and slats move to the fully extended position.

S 492-009

(8) Attach a DO-NOT-OPERATE tag to the flap control lever.

S 862-010

(9) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 492-011

(10) Install the PDU lock in the TE flap power drive unit (PDU) (Fig. 202).

S 012-012

(11) Remove the access panels, 511BB and 611BB, to get access to the outboard and inboard slat PDUs (AMM 06-44-00/201).

S 492-013

(12) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 203).

S 862-014

(13) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:

- (a) 11C10, SLAT POS IND
- (b) 11H23, SLAT ALTN CONT INBD
- (c) 11H24, SLAT ALTN CONT OUTBD
- (d) 11J24, FLAPS ALTN CONT

S 862-015

(14) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:

- (a) 6D21, ALTN SLAT INBD PWR

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- (b) 6D24, ALTN FLAP PWR
- (c) 6F24, ALTN SLAT OUTBD PWR

S 012-016

- (15) Remove the fixed lower access panels when it is necessary (AMM 06-44-00/201).

S 292-155

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (16) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

E. Remove the Slat Sensor Switch (Fig. 201)

S 032-017

- (1) Disconnect the wiring at the splice and identify the wires with tags.

S 032-018

- (2) Remove the bolts that attach the switch to the structure.

S 022-019

- (3) Remove the switch.

F. Install the Slat Sensor Switch (Fig. 201)

S 212-020

- (1) Make sure the power is removed from the center hydraulic system (AMM 29-11-00/201).

S 212-021

- (2) Make sure the flaps and slats are in the fully extended position.

S 212-022

- (3) Make sure the flap control lever is in the 30-unit detent.

S 422-023

- (4) Put the switch into its position and install the bolts.

S 432-024

- (5) Remove the tags from the wires and connect the switch wires at the splice.

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S 822-077

**CAUTION:** SL 27-83 RECOMMENDS REDUCTION OF SENSOR TARGET CLEARANCES TO PREVENT NUISANCE INDICATIONS (LE SLAT ASYM EICAS MESSAGE, LE LIGHT ILLUMINATION, TAKE OFF CONFIGURATION WARNING FLAPS OR STICK SHAKER ACTIVATION). THE TARGET WASHERS HAVE DIFFERENT PROFILES. TARGET WASHERS ARE NOT INTERMIXABLE. INSTALLATION OF TARGET WASHERS DEPEND ON LOCATION AND INCORRECT PART NUMBER INSTALLATION CAN CAUSE NUISANCE INDICATIONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (6) Adjust the switch-to-target clearance, if you moved the mounting bracket when you replaced the switch.

**NOTE:** If you do the clearance adjustment, make sure you install the target closest to the proximity sensor. The target can be identified by the countersunk holes on one side. Metal attraction by the target is stronger than by the shims. Airplanes that have not completed the intent of service letter 767-SL-27-83 can keep superseded wider clearance. SB 57-0052 adds step washers and reworks target washers and bolts.

S 742-026

- (7) Do the BITE procedure for the PSEU sensor target to examine the sensor switch operation (FIM 32-09-03/101).

S 292-156

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (8) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 722-027

- (9) Do a test on the switch installation.

**NOTE:** Put the airplane back to its usual condition after you do the test on the switch installation. Use the procedure in the "Leading Edge Slat Sensor Switch - Test" task.

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TASK 27-88-01-722-028

3. Leading Edge Slat Sensor Switch - Test

A. Equipment

- (1) Leading Edge Slats Groundlock - A27007-1  
(2 Necessary)
- (2) Slat Sensor/Target Rigging Tool Kit - A27112-1
- (3) TE Flap PDU Lock - A27009-7

B. Consumable Materials

- (1) C00308 Corrosion Preventive Compound -  
MIL-C-11796B, Class 3
- (2) A00258 Adhesive - BMS 5-26 or BMS 5-44, Type B

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-44-00/201, Wing Access Doors and Panels
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 27-81-00/201, Leading Edge Slat System
- (5) AMM 27-88-00/501, Leading Edge Slat Position Indicating System
- (6) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (7) AMM 32-00-15/201, Landing Gear Door Locks
- (8) AMM 32-00-20/201, Landing Gear Downlocks
- (9) FIM 32-09-03/101, PSEU BITE
- (10) AMM 78-31-00/201, Thrust Reverser System

D. Access

(1) Location Zones

120	Main Equipment Center
144	Right MLG Wheel Well
211/212	Control Cabin
410	No. 1 Power Plant
420	No. 2 Power Plant
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard
710	Nose Landing Gear and Doors
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

119AL	Main Equipment Center
511BB	LE Slat Power Drive Unit - Outboard (Left)
611BB	LE Slat Power Drive Unit - Inboard (Right)

E. Prepare for the Switch Test

S 042-029

**WARNING:** DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

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- S 862-030
- (2) Open these circuit breakers on the overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
  - (b) 11H24, SLAT ALTN CONT OUTBD
  - (c) 11J24, FLAPS ALTN CONT
- S 862-031
- (3) Open these circuit breakers on the main power distribution panel, P6, and install circuit breaker locks and DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR
- S 862-032
- (4) If open, remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead panel, P11:
- (a) 11C10, SLAT POS IND
- S 862-033
- (5) Supply electrical power (AMM 24-22-00/201).
- S 212-089
- (6) Make sure you close these circuit breakers on the P11 Overhead Panel:
- (a) 11J02, EICAS CMPTR L
  - (b) 11J03, EICAS UPPER DISPL
  - (c) 11J29, EICAS CMPTR R
  - (d) 11J30, EICAS LOWER DSPL
  - (e) 11J31, EICAS DSPL SW
  - (f) 11J32, EICAS PILOT DISPLAY, or  
DISPLAY SELECT
- S 092-036
- (7) If installed, remove the PDU lock from the TE flap power drive unit (PDU) (Fig. 202).
- S 092-037
- (8) If installed, remove the groundlocks from the inboard and outboard slat PDUs (Fig. 203).
- S 012-038
- (9) Open the access door for the main equipment center (AMM 06-41-00/201).

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S 292-157

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

(10) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

F. Sensor Switch Test

S 222-082

**CAUTION:** SL 27-83 RECOMMENDS REDUCTION OF SENSOR TARGET CLEARANCES TO PREVENT NUISANCE INDICATIONS (LE SLAT ASYM EICAS MESSAGE, LE LIGHT ILLUMINATION, TAKE OFF CONFIGURATION WARNING FLAPS OR STICK SHAKER ACTIVATION). THE TARGET WASHERS HAVE DIFFERENT PROFILES. TARGET WASHERS ARE NOT INTERMIXABLE. INSTALLATION OF TARGET WASHERS DEPEND ON LOCATION AND INCORRECT PART NUMBER INSTALLATION CAN CAUSE NUISANCE INDICATIONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) If it is necessary, do a check on the switch-to-target clearance at the slat fully extended (landing) position with these steps:

**NOTE:** Airplanes that have not completed the intend of service letter 767-SL-27-83 can keep superseded wider clearance. SB 57-0052 adds step washers and reworks target washers and bolts.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (a) Pressurize the center hydraulic system (AMM 29-11-00/201).
- (b) Move the flap control lever to the 30-unit detent, and make sure the slats move to the fully extended (landing) position.
- (c) Remove the power from the center hydraulic system (AMM 29-11-00/201).
- (d) Install the groundlocks in the inboard and outboard slat PDUs (Fig. 203).

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**CAUTION:** SL 27-83 RECOMMENDS REDUCTION OF SENSOR TARGET CLEARANCES TO PREVENT NUISANCE INDICATIONS (LE SLAT ASYM EICAS MESSAGE, LE LIGHT ILLUMINATION, TAKE OFF CONFIGURATION WARNING FLAPS OR STICK SHAKER ACTIVATION). THE TARGET WASHERS HAVE DIFFERENT PROFILES. TARGET WASHERS ARE NOT INTERMIXABLE. INSTALLATION OF TARGET WASHERS DEPEND ON LOCATION AND INCORRECT PART NUMBER INSTALLATION CAN CAUSE NUISANCE INDICATIONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (e) Make sure there is permitted switch-to-target clearance with the inboard slats in the extended (landing) position (View H, Fig. 201).

**NOTE:** Airplanes that have not completed the intent of service letter 767-SL-27-83 can keep superseded wider clearance. SB 57-0052 adds step washers and reworks target washers and bolts.

- (f) Make sure there is permitted switch-to-target clearance with the outboard slats in the extended (landing) position (View K, Fig. 201).

**NOTE:** Airplanes that have not completed the intend of service letter 767-SL-27-83 can keep superseded wider clearance. SB 57-0052 adds step washers and reworks target washers and bolts.

- (g) Adjust the switch position to get the permitted clearance with rigging tool kit as necessary.

**NOTE:** If you do the adjustment, install the target closest to the proximity sensor. The target can be identified by the two countersunk holes on one side. Metal attraction by the target is stronger than by the shims.

- (h) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 203).

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S 822-149

**CAUTION:** SL 27-83 RECOMMENDS REDUCTION OF SENSOR TARGET CLEARANCES TO PREVENT NUISANCE INDICATIONS (LE SLAT ASYM EICAS MESSAGE, LE LIGHT ILLUMINATION, TAKE OFF CONFIGURATION WARNING FLAPS OR STICK SHAKER ACTIVATION). THE TARGET WASHERS HAVE DIFFERENT PROFILES. TARGET WASHERS ARE NOT INTERMIXABLE. INSTALLATION OF TARGET WASHERS DEPEND ON LOCATION AND INCORRECT PART NUMBER INSTALLATION CAN CAUSE NUISANCE INDICATIONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) If it is necessary, do a check on the switch-to-target clearance at the slats intermediate (take-off) position with these steps:

**NOTE:** Airplanes that have not completed the intent of service letter 767-SL-27-83 can keep superseded wider clearance. SB 57-0052 adds step washers and reworks target washers and bolts.

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (a) Pressurize the center hydraulic system (AMM 29-11-00/201).
- (b) Move the flap control lever to the 20-unit detent, and make sure the slats move to the intermediate (take-off) position.
- (c) Remove the power from the center hydraulic system (AMM 29-11-00/201).
- (d) Install the groundlocks on the inboard and outboard slat PDUs (Fig. 203).
- (e) Make sure there is permitted switch-to-target clearance with the inboard slats in the intermediate (take-off) position (View G, Fig. 201).

**NOTE:** Airplanes that have not completed the intent of service letter 767-SL-27-83 can keep superseded wider clearance. SB 57-0052 adds step washers and reworks target washers and bolts.

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- (f) Make sure there is permitted switch-to-target clearance with the outboard slats in the intermediate (take-off) position (View F, Fig. 201).

**NOTE:** Airplanes that have not completed the intent of service letter 767-SL-27-83 can keep superseded wider clearance. SB 57-0052 adds step washers and reworks target washers and bolts.

- (g) Adjust the switch position to get the permitted clearance with rigging tool kit as necessary.

**NOTE:** Make sure you install the target closest to the proximity sensor. The target can be identified by the two countersunk holes on one side. Metal attraction by the target is stronger than by the shims.

- (h) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 203).

S 742-041

- (3) At the BITE panel of the proximity switch electronic unit (PSEU, at the main equipment center, E1), set the SENSOR CHANNEL SELECT switches to the switch that you examined (Fig. 204) (FIM 32-09-03/101, Fig. 103).

S 742-042

- (4) Push the TARGET TEST switch and make sure the TARGET NEAR light comes on.

S 862-043

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (5) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 862-044

- (6) Move the flap control lever to the zero (FLAPS UP) detent, and make sure the flaps and slats move to the fully retracted (cruise) position.

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S 862-045

- (7) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 492-046

- (8) Install the groundlocks on the inboard and outboard slat PDUs (Fig. 203).

S 492-047

- (9) Install the PDU lock in the TE flap PDU (Fig. 202).

S 222-081

**CAUTION:** SL 27-83 RECOMMENDS REDUCTION OF SENSOR TARGET CLEARANCES TO PREVENT NUISANCE INDICATIONS (LE SLAT ASYM EICAS MESSAGE, LE LIGHT ILLUMINATION, TAKE OFF CONFIGURATION WARNING FLAPS OR STICK SHAKER ACTIVATION). THE TARGET WASHERS HAVE DIFFERENT PROFILES. TARGET WASHERS ARE NOT INTERMIXABLE. INSTALLATION OF TARGET WASHERS DEPEND ON LOCATION AND INCORRECT PART NUMBER INSTALLATION CAN CAUSE NUISANCE INDICATIONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (10) Make sure that there is permitted clearance between the switch and the retract target on the auxiliary track arm (View E, Fig. 201).

**NOTE:** Airplanes that have not completed the intend of service letter 767-SL-27-83 can keep superseded wider clearance. SB 57-0052 adds step washers and reworks target washers and bolts.

S 822-049

- (11) If it is necessary, adjust the retract target on the auxiliary track arm with rigging tool kit to get the permitted clearance:

**NOTE:** Do not adjust the switch. Install the target closest to the proximity sensor. The target can be identified by the two countersunk holes on one side. Metal attraction by the target is stronger than by the shims.

- (a) Drill and remove BACR15BA5D rivets (4 on each slat) that attach the target and shims to the auxiliary track arm.  
(b) If you installed a new slat, drill the countersunk holes in the auxiliary track arm on the side opposite the sensor switch.  
(c) Adjust the thickness of the shims to get the permitted clearance between the switch and the retract target (Fig. 201).

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- (d) Attach the target and shims to the auxiliary track arm with new rivets.

**NOTE:** Install the rivets with the head on the side of the arm opposite to the sensor switch.

S 742-050

- (12) On the PSEU BITE panel (E1), set the switch number to the switch that you examined (Fig. 204) (FIM 32-09-03/101, Fig. 103).

S 742-051

- (13) Push the TARGET TEST switch and make sure the TARGET NEAR light comes on.

S 092-052

- (14) Remove the groundlocks from the inboard and outboard slat PDUs (Fig. 203).

S 092-053

- (15) Remove the PDU lock from the TE flap PDU (Fig. 202).

S 862-054

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (16) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 212-055

- (17) Move the flap control lever from the zero (FLAPS UP) detent to the 30-unit detent, and stop at each detent to do this check:
- (a) Make sure the effects of the amber TRAILING EDGE light (on the first officer's main instrument panel, P3) and the EICAS display messages (on P2) agree with the movement of the slats as shown in Table 201.

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<u>TABLE 201</u>				
FLAP CONTL LEVER COMMAND	FLAP POSITION	SLAT POSITION	CORRECT MOVEMENT INDICATION	CORRECT COMMANDED INDICATION
ZERO	FULLY RETR	FULLY RETR		LEADING EDGE LIGHT OFF, NO EICAS DISPLAY MESSAGES
	DURING SLAT MOVEMENT	DURING SLAT MOVEMENT	LEADING EDGE LIGHT OFF, NO EICAS DISPLAY MESSAGES	
20	20° *[1]	INTER- MEDIATE *[1]		LEADING EDGE LIGHT OFF, NO EICAS DISPLAY MESSAGES
	DURING SLAT MOVEMENT	DURING SLAT MOVEMENT	LEADING EDGE LIGHT OFF, NO EICAS DISPLAY MESSAGES	
30	FULLY EXT *[2]	FULLY EXT *[2]		LEADING EDGE LIGHT OFF, NO EICAS DISPLAY MESSAGES

\*[1] TAKEOFF POSITION

\*[2] LANDING POSITION

S 212-056

- (18) Move the flap control lever from the 30-unit detent to the zero (FLAPS UP) detent, and stop at each detent to do this check:
- (a) Make sure the effects of the amber TRAILING EDGE light (P3) and the EICAS display messages (P2) agree with the movement of the slats as shown in Table 201.

S 742-057

- (19) Do a check on the slat position indicating system on the PSEU BITE panel with these steps (Fig. 204):
- (a) Set the SENSOR CHANNEL SELECT dials to 506.
  - (b) Push the VERIFY system test switch and make sure that there are no fault indication.

S 822-058

- (20) Do the slat position indicating system adjustment/test if it is necessary (AMM 27-88-00/501).

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G. Put the Airplane Back to Its Usual Condition

S 292-158

**WARNING:** DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (1) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 092-059

- (2) If installed, remove the groundlocks from the inboard and outboard slat PDU (Fig.203).

S 092-060

- (3) If installed, remove the PDU lock from the TE flap PDU (Fig. 202).

S 412-061

- (4) Install the access panels, 511BB and 611BB, to close the access to the inboard and outboard slat PDUs (AMM 06-44-00/201).

S 412-062

- (5) Install the fixed lower access panels for the leading edge (AMM 06-44-00/201).

S 412-063

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

S 862-064

- (7) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the P11 panel:
- (a) 11C10, SLAT POS IND
  - (b) 11H23, SLAT ALTN CONT INBD
  - (c) 11H24, SLAT ALTN CONT OUTBD
  - (d) 11J24, FLAPS ALTN CONT

S 862-065

- (8) Remove the circuit breaker locks and DO-NOT-CLOSE tags, and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
  - (b) 6D24, ALTN FLAP PWR
  - (c) 6F24, ALTN SLAT OUTBD PWR

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S 092-066

**WARNING:** USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS.  
THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO  
PERSONS OR DAMAGE TO EQUIPMENT.

(9) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 442-067

(10) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

S 862-072

(11) Remove the power from the center hydraulic system (AMM 29-11-00/201).

S 862-073

(12) Remove electrical power (AMM 24-22-00/201).

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