

Aerolinas Argentinas

PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
CHAPTER 52 TAB DOORS			52-09-131			52-11-0		CONT.
			401	DEC 01/04	01	405	DEC 01/04	02
			402	DEC 01/04	01	406	DEC 01/04	02
			403	DEC 01/04	01	407	DEC 01/04	02
			404	DEC 01/04	01	408	BLANK	
			405	DEC 01/04	01			
			406	DEC 01/04	01	52-11-0		
EFFECTIVE PAGES SEE LAST PAGE OF LIST FOR NUMBER OF PAGES						501	DEC 01/04	01
52-CONTENTS			52-09-141			502	DEC 01/04	01
R 1	AUG 01/07	ARG.1	401	AUG 01/06	01	503	DEC 01/04	01
R 2	AUG 01/07	ARG.1	402	DEC 01/04	01	504	DEC 01/04	01
R 3	AUG 01/07	ARG.1	403	DEC 01/04	01	505	DEC 01/04	01
R 4	AUG 01/07	ARG.1	404	AUG 01/06	01	506	DEC 01/04	01
R 5	AUG 01/07	ARG.1	405	DEC 01/04	01	507	DEC 01/04	01
R 6	AUG 01/07	ARG.1	406	BLANK		508	DEC 01/04	01
R 7	AUG 01/07	ARG.1				509	DEC 01/04	01
R 8	AUG 01/07	ARG.101	52-09-151			510	DEC 01/04	01
R 9	AUG 01/07	ARG.1	401	AUG 01/06	01	511	MAR 18/05	02
R 10	AUG 01/07	ARG.1	402	DEC 01/04	01	512	AUG 01/05	01
R 11	AUG 01/07	ARG.1	403	DEC 01/04	01	513	DEC 01/04	01
12	BLANK		404	BLANK		514	MAR 18/05	01
						515	DEC 01/04	05
			52-09-161			516	BLANK	
52-00-00			401	DEC 01/04	01			
R 1	AUG 01/07	06.101	402	DEC 01/04	01	52-11-0		
2	AUG 01/05	04				601	DEC 01/04	01
3	AUG 01/05	04	52-09-171			602	DEC 01/04	01
4	AUG 01/05	04	401	AUG 01/06	01	603	DEC 01/04	01
5	AUG 01/05	13	402	DEC 01/04	01	604	BLANK	
6	AUG 01/05	15	403	AUG 01/06	01			
			404	BLANK		52-11-0		
52-09-100						801	DEC 01/04	01
801	AUG 01/06	01	52-11-0			802	DEC 01/04	01
802	DEC 01/04	01	1	DEC 01/04	01	803	DEC 01/04	01
803	AUG 01/06	01	2	DEC 01/04	01	804	DEC 01/04	01
804	AUG 01/06	01	3	DEC 01/04	01	805	DEC 01/04	01
805	AUG 01/06	01	4	DEC 01/04	01	806	BLANK	
806	DEC 01/04	01	5	DEC 01/04	01			
807	AUG 01/06	01	6	DEC 01/04	01	52-11-01		
808	DEC 01/04	01	7	DEC 01/04	03	101	DEC 01/04	01
809	DEC 01/04	01	8	DEC 01/04	01	102	DEC 01/04	01
810	DEC 01/04	01	9	DEC 01/04	01	103	DEC 01/04	01
811	DEC 01/04	01	10	AUG 01/05	01	104	BLANK	
812	BLANK		11	DEC 01/04	01			
			12	BLANK		52-11-11		
52-09-111						R 401	AUG 01/07	01.1
401	AUG 01/06	01	52-11-0			402	DEC 01/04	01
402	DEC 01/04	01	201	AUG 01/05	01	403	DEC 01/04	01
403	AUG 01/06	01	202	AUG 01/05	01	404	DEC 01/04	01
404	BLANK		203	AUG 01/06	01	405	DEC 01/04	01
			204	AUG 01/06	01	406	DEC 01/04	01
52-09-121			205	AUG 01/05	01	407	DEC 01/04	01
401	AUG 01/06	01	206	AUG 01/05	01	408	AUG 01/05	01
402	DEC 01/04	01				409	DEC 01/04	01
			52-11-0			410	BLANK	
			R 401	AUG 01/07	01.1	410	BLANK	
			402	DEC 01/04	01			
			R 403	AUG 01/07	04.1			
			404	DEC 01/04	04			

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
52-11-21			52-14-0		CONT.	52-14-11		
R 401	AUG 01/07	01.1	5	DEC 01/04	04	401	DEC 01/04	01
402	DEC 01/04	01	6	DEC 01/04	04	402	DEC 01/04	01
403	DEC 01/04	01	7	DEC 01/04	04	403	DEC 01/04	01
404	BLANK		8	DEC 01/04	04	404	DEC 01/04	01
52-11-31			9	DEC 01/04	04	405	DEC 01/04	01
401	AUG 01/05	01	10	DEC 01/04	04	406	DEC 01/04	01
402	DEC 01/04	02	11	DEC 01/04	04			
403	DEC 01/04	01	12	BLANK		52-14-11		
404	AUG 01/05	01				501	DEC 01/04	01
52-11-41			52-14-0			502	DEC 01/04	01
R 401	AUG 01/07	01.1	R 101	AUG 01/07	04.1	503	DEC 01/04	01
402	DEC 01/04	01	R 102	AUG 01/07	04.1	504	DEC 01/04	01
403	DEC 01/04	01	R 103	AUG 01/07	04.1			
404	DEC 01/04	01	R 104	AUG 01/07	04.1	52-14-21		
405	DEC 01/04	01	R 105	AUG 01/07	04.1	201	DEC 01/04	01
406	BLANK		R 106	AUG 01/07	04.1	202	DEC 01/04	01
			D 107	DELETED	04			
			D 108	DELETED	04	52-14-21		
52-13-0						401	DEC 01/04	01
1	DEC 01/04	04	52-14-0			402	DEC 01/04	01
2	BLANK		201	DEC 01/04	01	403	DEC 01/04	01
			202	DEC 01/04	01	404	DEC 01/04	01
52-13-0						405	DEC 01/04	01
401	DEC 01/04	03	52-14-0			406	DEC 01/04	01
402	BLANK		401	DEC 01/04	01	407	DEC 01/04	01
52-13-0			402	DEC 01/04	01	408	BLANK	
501	DEC 01/04	03	403	DEC 01/04	01			
502	DEC 01/04	06	404	DEC 01/04	01	52-14-21		
52-13-0			405	DEC 01/04	01	501	DEC 01/04	03
601	DEC 01/04	03	406	DEC 01/04	01	502	DEC 01/04	03
602	DEC 01/04	03	407	DEC 01/04	01	503	DEC 01/04	03
			408	DEC 01/04	01	504	DEC 01/04	03
52-13-11			409	DEC 01/04	01			
401	DEC 01/04	03	410	BLANK		52-14-21		
402	BLANK					601	DEC 01/04	01
52-13-21			52-14-0			602	DEC 01/04	01
401	DEC 01/04	03	501	DEC 01/04	01	603	DEC 01/04	01
402	BLANK		502	DEC 01/04	01	604	DEC 01/04	01
52-13-31			503	DEC 01/04	01	605	DEC 01/04	01
401	DEC 01/04	03	504	DEC 01/04	01	606	DEC 01/04	01
402	BLANK		505	DEC 01/04	01	607	DEC 01/04	01
52-13-41			506	DEC 01/04	01	608	DEC 01/04	01
401	DEC 01/04	03	507	DEC 01/04	01	609	DEC 01/04	01
402	BLANK		508	DEC 01/04	01	610	DEC 01/04	01
52-13-41			509	DEC 01/04	01			
401	AUG 01/06	02	510	DEC 01/04	01	52-14-31		
402	DEC 01/04	02	511	DEC 01/04	01	401	DEC 01/04	01
403	DEC 01/04	02	512	DEC 01/04	03	402	DEC 01/04	01
404	BLANK		513	DEC 01/04	03			
52-14-0			514	DEC 01/04	03	52-14-41		
1	DEC 01/04	04				401	DEC 01/04	01
2	DEC 01/04	04	52-14-1			402	DEC 01/04	01
3	DEC 01/04	04	501	AUG 01/05	01	403	DEC 01/04	01
4	DEC 01/04	04	502	AUG 01/05	01	404	BLANK	

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
52-14-51			52-20-0			52-31-0		
401	DEC 01/04	01	1	DEC 01/04	01	401	DEC 01/04	02
402	DEC 01/04	01	2	BLANK		402	DEC 01/04	02
52-14-61			52-21-0			403	DEC 01/04	01
401	DEC 01/04	03	1	DEC 01/04	02	404	DEC 01/04	01
402	DEC 01/04	01	2	DEC 01/04	02	405	DEC 01/04	01
52-14-61			3	DEC 01/04	01	406	DEC 01/04	02
501	DEC 01/04	03	4	DEC 01/04	02	407	DEC 01/04	02
502	BLANK		5	DEC 01/04	02	408	DEC 01/04	02
52-14-71			6	BLANK		409	DEC 01/04	02
401	DEC 01/04	01	52-21-0			410	DEC 01/04	01
402	DEC 01/04	01	401	DEC 01/04	03	52-31-0		
52-14-71			402	DEC 01/04	02	601	DEC 01/04	01
601	DEC 01/04	01	403	DEC 01/04	02	602	DEC 01/04	01
602	DEC 01/04	01	404	BLANK		52-31-0		
52-14-81			52-21-0			801	DEC 01/04	01
401	DEC 01/04	01	501	DEC 01/04	01	802	DEC 01/04	01
402	DEC 01/04	01	502	DEC 01/04	01	52-31-11		
403	DEC 01/04	01	503	DEC 01/04	01	401	DEC 01/04	03
404	BLANK		504	DEC 01/04	01	402	DEC 01/04	02
52-14-91			505	DEC 01/04	01	403	DEC 01/04	03
401	DEC 01/04	03	506	BLANK		404	DEC 01/04	03
402	DEC 01/04	03	52-21-0			405	DEC 01/04	04
52-14-101			601	DEC 01/04	01	406	BLANK	
501	DEC 01/04	01	602	BLANK		52-31-13		
502	DEC 01/04	01	52-21-11			601	DEC 01/04	01
503	DEC 01/04	01	401	AUG 01/05	ARG	602	BLANK	
504	DEC 01/04	01	402	AUG 01/05	04	52-32-0		
505	DEC 01/04	01	403	AUG 01/05	15	1	DEC 01/04	01
506	BLANK		404	AUG 01/05	12	2	DEC 01/04	01
52-14-111			405	AUG 01/05	04	3	DEC 01/04	01
401	DEC 01/04	01	406	BLANK		4	DEC 01/04	08
402	DEC 01/04	01	52-21-12			5	DEC 01/04	08
52-14-121			401	DEC 01/04	03	6	DEC 01/04	06
401	DEC 01/04	01	402	DEC 01/04	03	7	DEC 01/04	08
402	DEC 01/04	01	403	DEC 01/04	03	8	DEC 01/04	01
403	DEC 01/04	01	404	DEC 01/04	03	9	DEC 01/04	01
404	DEC 01/04	01	52-31-0			10	DEC 01/04	01
52-14-131			1	DEC 01/04	02	11	DEC 01/04	03
401	DEC 01/04	03	2	DEC 01/04	02	12	DEC 01/04	03
402	DEC 01/04	03	3	DEC 01/04	01	13	DEC 01/04	03
52-14-141			4	DEC 01/04	02	14	AUG 01/05	07
401	DEC 01/04	01	5	DEC 01/04	02	15	DEC 01/04	01
402	DEC 01/04	01	6	BLANK		16	DEC 01/04	07
403	DEC 01/04	01	52-31-0			17	DEC 01/04	08
404	DEC 01/04	01	101	DEC 01/04	01	18	DEC 01/04	09
405	DEC 01/04	01	102	DEC 01/04	01	19	AUG 01/05	09
406	BLANK		103	DEC 01/04	02	20	DEC 01/04	07
			104	BLANK		21	AUG 01/05	08
						22	DEC 01/04	10
						23	DEC 01/04	09
						24	BLANK	

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
52-32-0			52-32-13			52-32-91		
R 101	AUG 01/07	02.1	R 401	AUG 01/07	01.1	401	DEC 01/04	01
R 102	AUG 01/07	01.1	R 402	AUG 01/07	05.1	402	DEC 01/04	01
R 103	AUG 01/07	01.1	R 403	AUG 01/07	01.101			
R 104	AUG 01/07	01.1	R 404	AUG 01/07	07.1	52-32-111		
R 105	AUG 01/07	01.1	R 405	AUG 01/07	07.1	501	DEC 01/04	01
R 106	AUG 01/07	01.1	406	BLANK		502	DEC 01/04	01
R 107	AUG 01/07	01.1				503	DEC 01/04	01
R 108	AUG 01/07	01.1	52-32-21			504	DEC 01/04	01
R 109	AUG 01/07	01.1	R 401	AUG 01/07	01.1			
R 110	AUG 01/07	01.1	402	DEC 01/04	01	52-32-121		
R 111	AUG 01/07	02.1	403	DEC 01/04	01	501	DEC 01/04	01
R 112	AUG 01/07	01.1	404	BLANK		502	DEC 01/04	01
R 113	AUG 01/07	02.1						
R 114	BLANK		52-32-31			52-32-131		
D 115	DELETED	01	R 401	AUG 01/07	01.1	501	DEC 01/04	02
D 116	DELETED	02	402	DEC 01/04	01	502	DEC 01/04	02
D 117	DELETED	02	403	DEC 01/04	01			
D 118	DELETED	02	404	DEC 01/04	01	52-32-141		
D 119	DELETED	02				501	DEC 01/04	01
D 120	DELETED	02	52-32-31			502	DEC 01/04	01
D 121	DELETED	01	501	DEC 01/04	01			
D 122	DELETED		502	DEC 01/04	01	52-41-0		
52-32-0						1	DEC 01/04	01
301	DEC 01/04	02	52-32-41			2	DEC 01/04	02
302	DEC 01/04	02	R 401	AUG 01/07	01.1	3	DEC 01/04	01
303	DEC 01/04	01	402	DEC 01/04	01	4	DEC 01/04	01
304	BLANK		403	DEC 01/04	01	5	DEC 01/04	02
			404	BLANK		6	DEC 01/04	01
52-32-0						7	DEC 01/04	02
501	DEC 01/04	07	52-32-41			8	DEC 01/04	01
502	DEC 01/04	08	601	DEC 01/04	01	9	DEC 01/04	02
503	DEC 01/04	06	602	DEC 01/04	01	10	DEC 01/04	01
504	DEC 01/04	02	603	DEC 01/04	01			
			604	DEC 01/04	01	52-41-0		
			605	DEC 01/04	01	101	DEC 01/04	01
			606	DEC 01/04	01	102	DEC 01/04	01
52-32-11						103	DEC 01/04	01
401	DEC 01/04	01	52-32-51			104	BLANK	
402	DEC 01/04	01	401	AUG 01/06	01			
403	DEC 01/04	01	402	DEC 01/04	01	52-41-0		
404	DEC 01/04	01				R 401	AUG 01/07	01.1
405	DEC 01/04	01	52-32-61			402	DEC 01/04	01
406	DEC 01/04	01	401	AUG 01/06	01	403	DEC 01/04	02
			402	DEC 01/04	01	404	DEC 01/04	01
52-32-11								
501	DEC 01/04	04	52-32-71			52-41-0		
502	DEC 01/04	01	401	AUG 01/06	01	501	DEC 01/04	02
503	AUG 01/05	09	402	DEC 01/04	01	502	DEC 01/04	02
504	DEC 01/04	04				503	DEC 01/04	02
505	DEC 01/04	05	52-32-81			504	DEC 01/04	02
506	DEC 01/04	02	401	DEC 01/04	01	505	DEC 01/04	02
507	DEC 01/04	02	402	DEC 01/04	01	506	DEC 01/04	02
508	DEC 01/04	09	403	DEC 01/04	01	507	DEC 01/04	02
509	DEC 01/04	09	404	DEC 01/04	01	508	DEC 01/04	02
510	DEC 01/04	09	405	DEC 01/04	01	509	DEC 01/04	02
			406	DEC 01/04	01	510	DEC 01/04	02
						511	AUG 01/05	02
						512	DEC 01/04	02

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
52-41-0		CONT.	52-48-21			52-49-21		
513	DEC 01/04	02	1	DEC 01/04	02	501	DEC 01/04	01
514	BLANK		2	DEC 01/04	01	502	DEC 01/04	01
52-41-0			3	DEC 01/04	01	52-49-31		
601	AUG 01/05	01	4	DEC 01/04	01	201	DEC 01/04	01
602	AUG 01/05	02	52-48-31			202	DEC 01/04	01
603	DEC 01/04	02	1	DEC 01/04	01	203	DEC 01/04	01
604	DEC 01/04	01	2	DEC 01/04	02	204	DEC 01/04	01
605	DEC 01/04	01	52-48-31			52-49-31		
606	DEC 01/04	01	401	DEC 01/04	02	401	DEC 01/04	01
607	DEC 01/04	01	402	DEC 01/04	01	402	DEC 01/04	01
608	BLANK		403	DEC 01/04	03	403	DEC 01/04	01
52-41-0			404	BLANK		404	DEC 01/04	01
801	DEC 01/04	01	52-48-41			405	DEC 01/04	01
802	DEC 01/04	01	1	AUG 01/05	01	406	DEC 01/04	01
803	DEC 01/04	01	2	DEC 01/04	01	52-51-00		
804	DEC 01/04	01	3	DEC 01/04	01	1	AUG 01/06	01
52-41-11			4	DEC 01/04	01	2	DEC 01/04	01
R 401	AUG 01/07	01.1	5	DEC 01/04	01	3	DEC 01/04	01
402	DEC 01/04	01	6	DEC 01/04	01	4	DEC 01/04	01
403	DEC 01/04	01	7	DEC 01/04	01	52-51-12		
404	DEC 01/04	02	8	DEC 01/04	01	401	DEC 01/04	03
405	DEC 01/04	02	52-48-41			402	DEC 01/04	03
406	DEC 01/04	03	401	DEC 01/04	03	52-51-12		
407	DEC 01/04	01	402	DEC 01/04	03	501	DEC 01/04	03
408	BLANK		403	DEC 01/04	03	502	BLANK	
52-41-21			404	BLANK		52-51-21		
R 401	AUG 01/07	03.1	52-48-41			401	DEC 01/04	01
402	DEC 01/04	02	501	AUG 01/05	01	402	DEC 01/04	01
403	DEC 01/04	01	502	DEC 01/04	01	52-51-31		
404	BLANK		503	DEC 01/04	01	401	AUG 01/05	01
52-41-31			504	DEC 01/04	01	402	DEC 01/04	01
401	DEC 01/04	01	505	DEC 01/04	01	403	DEC 01/04	01
402	DEC 01/04	01	506	DEC 01/04	01	404	BLANK	
403	DEC 01/04	01	507	AUG 01/05	01	52-52-0		
404	DEC 01/04	01	508	AUG 01/05	01	1	DEC 01/04	04
52-41-41			52-49-0			2	DEC 01/04	01
R 401	AUG 01/07	01.1	1	DEC 01/04	01	52-61-0		
402	DEC 01/04	01	2	DEC 01/04	09	1	AUG 01/05	03
403	DEC 01/04	01	3	DEC 01/04	08	2	AUG 01/05	05
404	BLANK		4	DEC 01/04	04	3	AUG 01/05	05
52-48-11			52-49-11			4	AUG 01/05	15
1	DEC 01/04	01	401	DEC 01/04	01	5	AUG 01/05	07
2	DEC 01/04	01	402	DEC 01/04	01	6	AUG 01/05	07
52-48-11			52-49-11			7	AUG 01/05	07
801	DEC 01/04	01	501	DEC 01/04	01	8	AUG 01/05	07
802	DEC 01/04	01	502	DEC 01/04	01	9	AUG 01/05	07
			503	DEC 01/04	01	10	AUG 01/05	07
			504	BLANK		11	AUG 01/05	05
						12	AUG 01/05	05

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# MAINTENANCE MANUAL

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
52-61-0		CONT.	52-61-100			52-61-141		
13	AUG 01/05	07	201	AUG 01/05	02	401	DEC 01/04	02
14	AUG 01/05	07	202	DEC 01/04	02	402	DEC 01/04	02
15	AUG 01/05	07	203	DEC 01/04	02			
16	AUG 01/05	07	204	AUG 01/05	02	52-61-141		
17	AUG 01/05	06	205	AUG 01/05	02	501	DEC 01/04	02
18	AUG 01/05	05	206	AUG 01/05	02	502	DEC 01/04	02
19	AUG 01/05	06				503	DEC 01/04	02
20	BLANK		52-61-100			504	DEC 01/04	02
52-61-0			401	DEC 01/04	02			
R 101	AUG 01/07	02.1	402	AUG 01/05	07	52-61-151		
R 102	AUG 01/07	03.1	403	DEC 01/04	02	401	DEC 01/04	02
R 103	AUG 01/07	03.1	404	DEC 01/04	02	402	DEC 01/04	02
R 104	AUG 01/07	03.1	405	DEC 01/04	08	403	DEC 01/04	02
105	DEC 01/04	06	406	DEC 01/04	02	404	BLANK	
R 106	AUG 01/07	03.1	407	DEC 01/04	08			
R 107	AUG 01/07	06.1	408	DEC 01/04	02	52-61-151		
R 108	AUG 01/07	07.1				501	AUG 01/05	02
R 109	AUG 01/07	07.1	52-61-100			502	AUG 01/05	02
R 110	AUG 01/07	06.1	601	AUG 01/05	02	503	AUG 01/05	02
R 111	AUG 01/07	07.101	602	AUG 01/05	02	504	AUG 01/05	02
R 112	AUG 01/07	06.101	603	AUG 01/05	02	505	AUG 01/05	02
R 113	AUG 01/07	06.101	604	AUG 01/05	02	506	BLANK	
R 114	AUG 01/07	06.101	605	AUG 01/05	02			
R 115	AUG 01/07	06.101	606	BLANK		52-61-161		
R 116	AUG 01/07	06.1				401	DEC 01/04	02
R 117	AUG 01/07	06.1	52-61-111			402	DEC 01/04	02
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### DOORS – DESCRIPTION AND OPERATION

#### 1. General

- A. The doors are removable units which enclose various compartments of the airplane and which permit entry to or exit from those compartments by passengers, crew or maintenance personnel. The doors are divided for their specific purpose into the following groups:
  - Passenger/Crew Doors
  - Emergency Exits
  - Cargo Doors
  - Service Doors
  - Fixed Interior Doors
- B. Included in this chapter is the forward airstair which is installed on some airplanes to provide access from the ground through the forward entry door. The forward airstair is installed under the floor at the forward entry door. The door can be opened and closed without extending or retracting the airstair.
- C. An electrical door warning system is provided to indicate to the flight crew that all doors are closed and properly latched before flight.
- D. This chapter also includes a description of the main landing gear doors, which consist of small door segments attached to the main gear shock strut, and the nose landing gear doors which are single clamshell doors that are slaved to the nose gear drag brace.
- E. All doors are fitted with extruded rubber seals to prevent air pressurization loss or improve airflow over exterior joining surfaces.
- F. If a door is removed or stowed open for a prolonged period during inclement weather a protective cover should be installed to prevent damage to the airplane interior. Refer to Illustrated Tool and Equipment List for available covers.
- G. Passenger/Crew and cargo doors may be opened and closed in winds up to 40 knots or left latched open in winds up to 65 knots without structural damage.

#### 2. Passenger/Crew Doors

- A. Forward Entry Doors
  - (1) The forward entry door is on the left forward side of the airplane (Fig. 1). It is an inward-outward opening plug type door which can be operated from inside or outside the airplane.
- B. Aft Entry Door
  - (1) The aft entry door is on the left aft side of the airplane (Fig. 1). It is an inward-outward opening plug type door similar to the forward entry door, though slightly smaller, and can be operated from inside or outside the airplane.

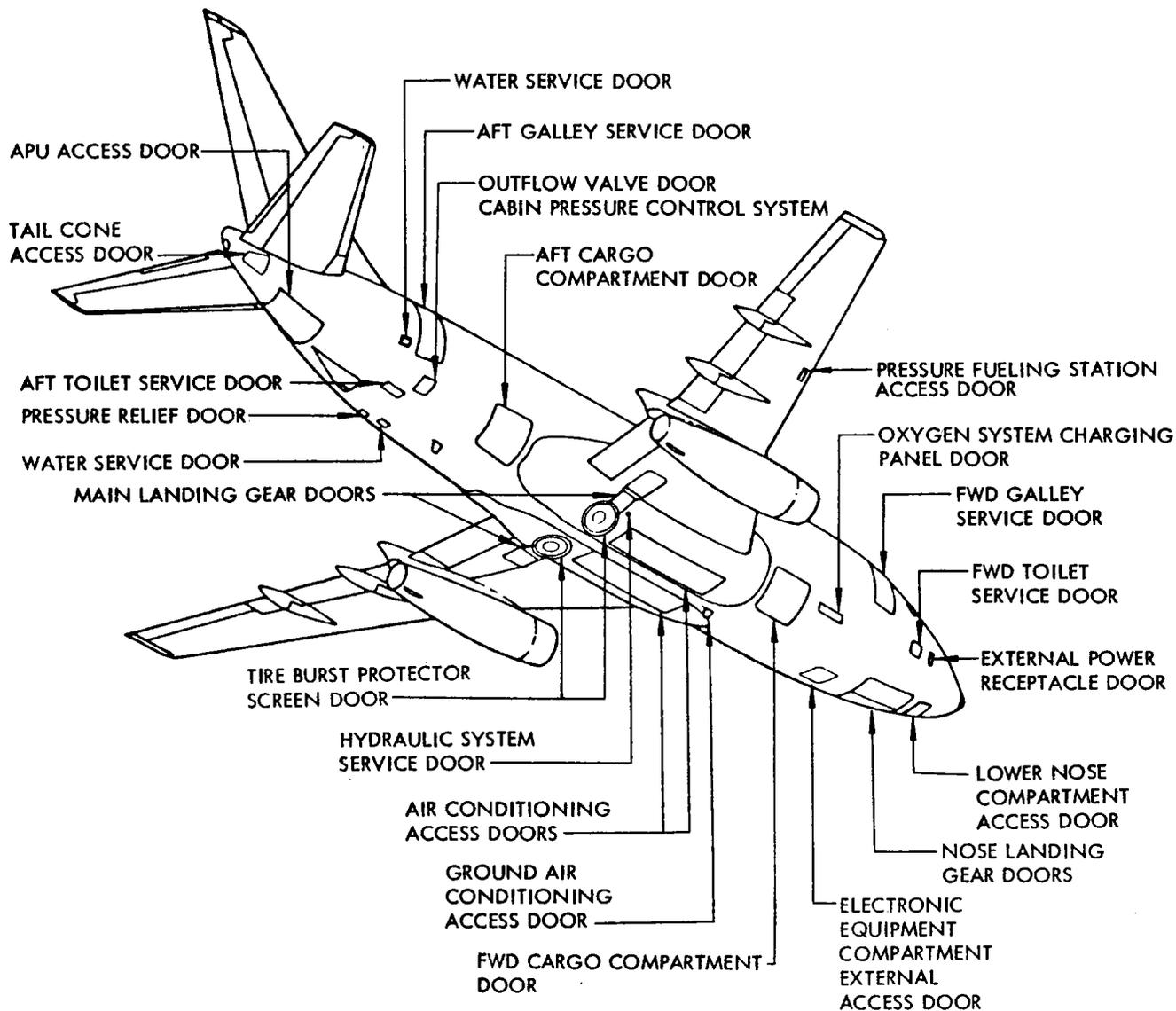
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Door Locations  
 Figure 1 (Sheet 1)

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3. Emergency Exits

- A. There are two emergency exit hatches, one on each side of the fuselage, over the wing area. (See figure 1.) The two hatches are identical plug-type units and incorporate a cabin window. A hatch is removed by unlatching then pulling it inboard and up to clear the fuselage structure.
- B. A door-mounted evacuation slide is installed on each passenger/crew entry door and on each galley service door to facilitate emergency evacuation of passengers from the passenger cabin. For additional information on the evacuation slide installations, refer to Emergency Equipment, Chapter 25.
- C. On Standard Passenger Airplanes the pilots' right sliding window can be operated from outside the airplane as an emergency exit. On Passenger/Cargo Convertible Airplanes both pilots' sliding windows can be operated from outside the airplane as emergency exits. An external release handle permits the sliding window to be unlocked allowing the window to be opened from outside the airplane. (Refer to Sliding Control Cabin Windows, Chapter 56.)
- D. The control cabin door is provided with an emergency exit feature which is described in Control Cabin Door, section 52-51-0.

4. Cargo Doors

- A. On the Passenger/Cargo Convertible airplanes the main cargo door is located on the left forward side of the fuselage immediately aft of the forward passenger/crew entry door. (Fig. 1) For information on the main cargo door, refer to Main Cargo Door, 52-32-0.
- B. On all airplanes there are two cargo compartment doors on the lower right side of the fuselage, one serving each cargo compartment. (Fig. 1) Both doors are hinged at their upper edges and open inward. Access panels are provided in the external skins of the cargo doors, to enable manual release of the cargo door latches if the operating mechanisms fail. Except for slight differences of size and shape, both doors are similar in design and operation.

5. Service Doors

A. Galley Service Doors

- (1) The galley service doors are on the right side of the airplane and are situated approximately opposite the entry doors. (Fig. 1) They are similar in design and operation to the forward passenger/crew entry door, though slightly smaller.

6. Equipment Compartments Exterior Doors

- A. The equipment compartments exterior doors (Fig. 1) are the hinged doors which are large enough to permit the entry of personnel into the airplane or various compartments of the airplane. The doors which provide access to the equipment compartments from outside of the airplane include:
  - (1) Electronic Equipment Compartment External Access Door
  - (2) Air conditioning access doors
  - (3) APU access door

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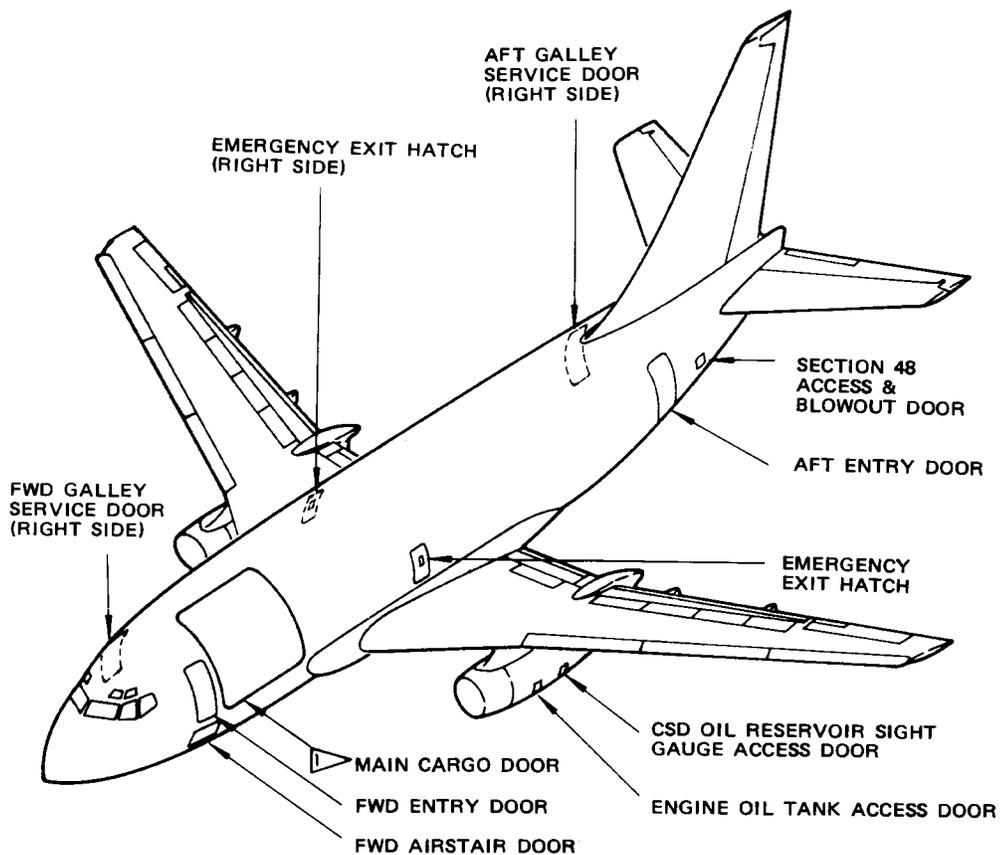
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**BOEING**  
**737**   
**MAINTENANCE MANUAL**



 PASSENGER:CARGO CONVERTIBLE AIRPLANES

Door Locations  
 Figure 1 (Sheet 2)

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(4) Lower nose compartment access door

7. Miscellaneous Exterior Service Doors

A. The miscellaneous exterior service doors (Fig. 1) are the small exterior doors, which provide access for servicing the various systems on the airplane. These service doors include:

- (1) Aft toilet service door
- (2) CSD oil reservoir sight gauge access door
- (3) Engine oil tank access door
- (4) External power receptacle door
- (5) Forward toilet service door
- (6) Ground air conditioning access door
- (7) Oxygen system charging panel door
- (8) Pressure fueling station access door
- (9) Section 48-access and blowout door
- (10) Tire burst protector screen doors
- (11) Water service door

8. Fixed Interior Doors

A. Control Cabin Door

(1) The control cabin door gives access from the passenger cabin to the control cabin. (Fig. 1) It hinges aft from its left side.

B. Lavatory Doors

(1) The lavatories in the cabin are equipped with similar doors. (Fig. 1) The doors hinge outward from the lavatory compartment, and are fitted with indicating locks, which may be overridden from outside the compartment in the event of emergency.

9. Entrance Stairs

A. Forward Airstair

(1) The forward airstair (Fig. 1) is located at the forward passenger/crew entry door (if installed) and can be operated from inside or outside the airplane. When extended the airstair forms a stairway for passengers and crew to enter or leave the airplane. The forward entry door can be opened and closed without extending or retracting the forward airstair. The airstair can be extended by normal or standby electrical power.

(2) When the airstair is retracted it folds, and telescopes, and is stowed in a compartment immediately below the forward entry door. The compartment is closed by the airstair door which fairs with the fuselage contour. The airstair door is included in the door warning system. For additional information of the forward airstair refer to 52-61-0 D&O.

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10. Door Warning System

- A. The door warning system is an electrical circuit which provides the flight crew with a visual warning if certain doors are open or incompletely latched. The doors included in this system are the forward and aft passenger/crew entry doors, forward and aft galley service doors, forward and aft cargo compartment doors, lower nose compartment access door and the electronic equipment compartment external access door. The forward airstair door and the tire burst protector screen doors are also included in the system.
- B. The warning provided by the system consists of eight independent warning lights. The lower nose compartment access door, the electronic equipment compartment external access door and the left and right tire burst protector screen doors share the same warning light. The warning lights are mounted on the P5-20 Door Warning Module which is located on the overhead panel. The lights can be tested individually or by a master test switch that can simultaneously test all the warning lights. Each warning light is provided with an illuminated legend which indicates the door served by the warning light. The microswitch, or proximity switch, which is mounted on each door installation served by the door warning system, is included in the circuit served by the corresponding warning light. The circuits are similar for each warning light.
- C. The microswitch or proximity sensor at each door is located so that the circuit to the corresponding warning light is de-energized when the door is closed and latched. When the door is unlatched and opened, the switch or sensor at the door activates the circuit from the power source through the corresponding warning light to ground and the circuit is energized. The warning light is then illuminated; visually warning the flight crew that the door served by the warning light is open or not latched.

11. Landing Gear Doors

- A. The main landing gear doors (Fig. 1) consist of small door segments attached to the shock strut and actuated by pushrods slaved to the main gear at the lower side brace universal assembly and to an actuation fitting attached to a bracket on the trunnion link. The door segments close the spanwise wing cavity when the gear is retracted. No powered main body wheel well doors are installed since the wheel well cavity is effectively closed by the retracted gear tire and is sealed by a rubber seal.
- B. The nose landing gear doors consist of single clamshell doors actuated by a simple pushrod linkage system slaved to the drag brace (Fig 1). The linkage connected to the wheel well doors is arranged so that the doors open to allow the nose landing gear to leave the wheel well when the gear is extended and close when the gear is retracted. Each door is of epoxy reinforced glass fabric laminate-faced honeycomb construction. The skins, doublers, fillers, and blocks are of epoxy preimpregnated fiberglass fabric. The outer surface of the doors is coated with flame-sprayed aluminum.

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### DOOR SEALS - APPROVED REPAIRS

#### 1. General

- A. The silicone rubber seals used for pressure sealing doors and hatches are subject to three different types of failure or damage.
- (1) Delamination of joints occurs where the mechanical bulb seal section joins the diaphragm seal section on the door seals. See Fig. 801 for this type of joint. The fabric-reinforced rubber which forms the joint peels loose from the mechanical or diaphragm seal. Primary cause of this failure is poor bonding.
  - (2) Cuts, nicks, splits or tears in the seal section are primarily a result of lack of care in handling and installation.
  - (3) Splice failure occurs on those continuous seals formed by splicing the ends of the extruded bulb section. The splices are reinforced with fabric. Delamination can occur as described in par. 1.A.(1). On emergency exit hatch seals, the ends of the seal are joined by a thick layer of vulcanized rubber. Flexing of the seal causes separation of the bond between this material and the ends of the extruded section.
- B. Seal repair procedure for the silicone rubber door and hatch seals may be divided into three general methods:
- (1) Method A is a procedure for repairs in which the cut, delaminated or otherwise, separated surfaces are rejoined by adhesive only.
  - (2) Method B consists of repairs with an adhesive reinforced with open mesh Dacron D-117 or D-118 fabric. The fabric is embedded in the adhesive on the seal surface.
  - (3) Method C repair procedure comprises the replacement of a section of seal using adhesive, and when required, fabric cemented into place.
- C. There are three types of adhesives used for repairs.
- (1) Type I is a high tack (two part system) adhesive. This type of adhesive, air cured, is relatively hard and inflexible. The adhesive may be handled after 8 hours and requires 24 hours before stressing. This type of adhesive may be used for the repair of delaminated areas away from the seal edge, on the flange or channel. A Type I adhesive is:

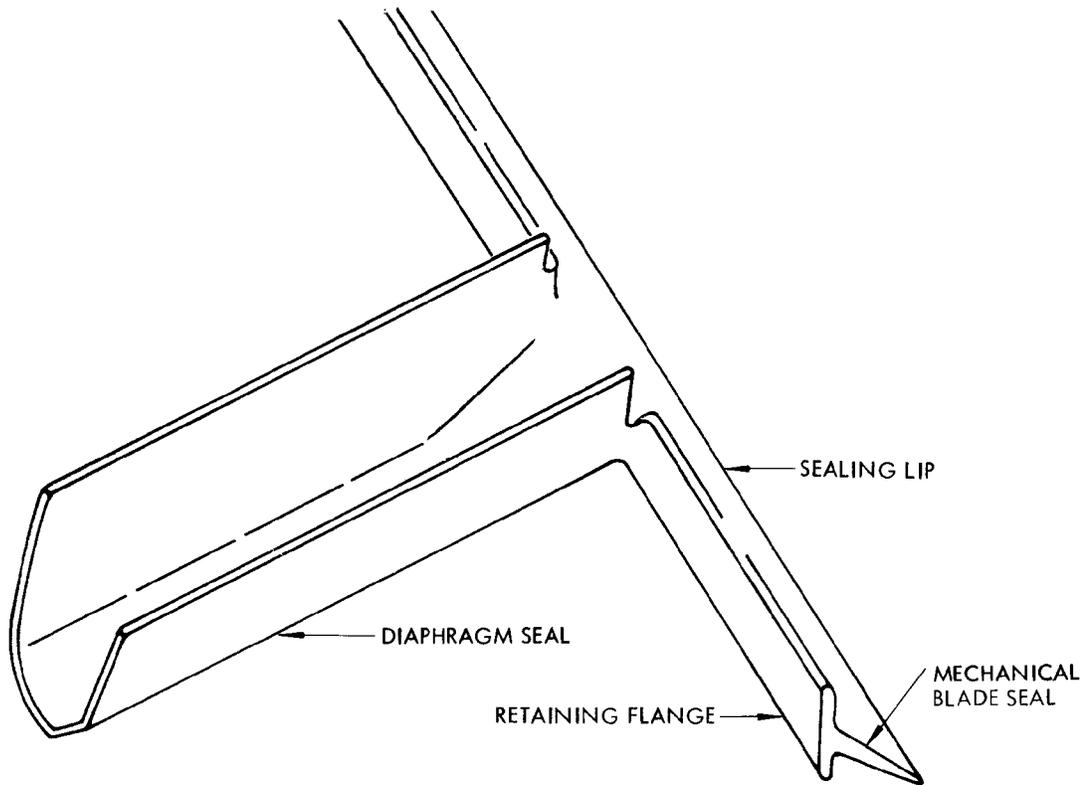
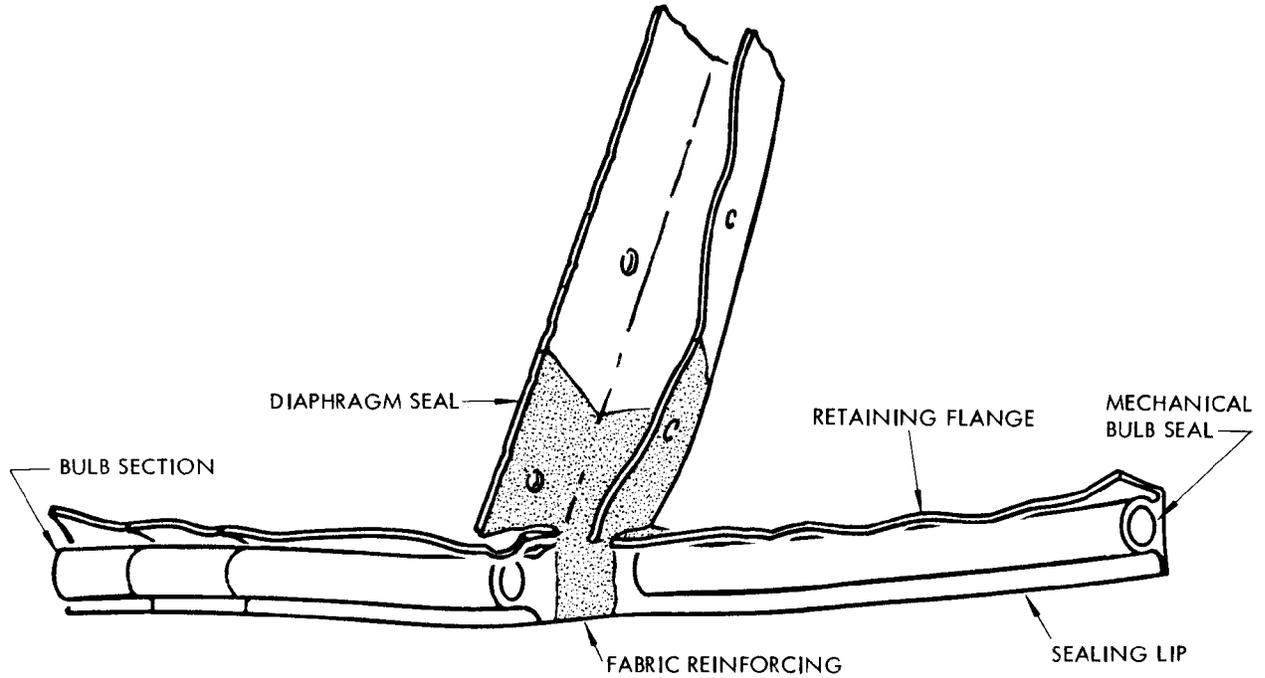
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Typical Pressure Seals  
 Figure 801

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- (a) General Electric PSA-529 adhesive base with SRC-18 catalyst.
- (2) Type II is a high flexibility (one part clear) adhesive. The Type II air cured rubbery type adhesive retains flexibility after curing and has good low temperature flexibility. The adhesive may be handled after 24 hours and requires 48 hours before stressing. This type of adhesive, or the Type III adhesive described in a following paragraph may be used for repairs on the sealing lip or flat side of a seal where flexibility is necessary to make an airtight seal. Two of the Type II adhesives are:
  - (a) Clear - Dow Corning Silastic 140 RTV
  - (b) White - General Electric RTV 102 or General Electric RTV 174 (Optional)
    - 1) Due to a low pot life of 10 minutes General Electric RTV 174 adhesive surfaces must be joined immediately after application.
- (3) Type III is a two-part aerospace sealant. Type III adhesive is air cured or cured under polyethylene and has high flexibility. Two Type III adhesives are Dow Corning 93-076-1/2 and 93-076-2.
  - (a) It is necessary to cure Type III adhesive for 24 hours before stressing.
  - (b) Type III adhesive can be used for all door seal locations.
  - (c) Accelerated cure times for Type III adhesive may be obtained using contact pressure.

NOTE: Cure under contact pressure at approximately 180°F for 4 hours minimum or at approximately 200°F for 2 hours minimum before handling parts. For small areas, a heat lamp is recommended to accelerate adhesive cure times. The cure times for the foregoing Types I, II and III adhesives are based on standard conditions of 75 ±5°F and 50 ±5% relative humidity. Lesser temperatures and humidities will cause longer adhesive cure times.

- D. All repairs should be made with the seal readily accessible and under as little stress as possible. On installed seals it may be necessary to remove one or more sections of retaining strip to work on the damaged area. For repairs in the joint area of the entry door seal the gate should be disengaged to release tension in the seal.
- E. In the application of adhesives in seal repair, apply adhesive to both surfaces, which have been cleaned and abraded, and join together in the proper position within the pot life limit of the adhesive. Use fabric when a stronger bond is necessary. When a fabric patch is required, cut Dacron Tricot D-117 or D-118 to fit the area and press into the wet adhesive. Then apply more adhesive over the fabric. Smooth surface of excess adhesive and allow to cure the minimum time required (par. 1.C.(1), (2) and (3)) prior to stressing.
- F. In determining the type of repair required and the procedure to be used consideration should be given to replacement of the seal if warranted.

## 2. Equipment and Materials

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- A. A00923 Adhesive - General Electric PSA-529, with Catalyst SRC-18 (Ref 20-30-11)
- B. A00337 Adhesive - Dow Corning Silastic 140 (Ref 20-30-11)
- C. A01077 Adhesive - General Electric RTV 102 (Ref 20-30-11)
- D. A50102 Adhesive - General Electric RTV 174 Optional (Ref 20-30-11)
- E. A50094 Adhesive - Dow Corning 93-076-1/2 or 93-076-2 (Ref 20-30-11)
- F. C60157 Primer - Dow Corning 1200 RTV or S-2260 (Ref 20-30-11)
- G. Primer - Dow Corning 1204 (Ref 20-30-11)
- H. C00511 Primer - Thermolite 12 (Ref 20-30-11)
- I. G00028 Dacron Tricot Reinforcing Fabric - D-117 (Ref 20-30-51)
- J. G00029 Dacron Tricot Reinforcing Fabric - D-118 (Ref 20-30-51)
- K. Solvent - Final Cleaning of Metal Prior to Non-structural Bonding (Series 88) (Ref AMM/SOPM 20-30-88)
- L. G00034 Cotton Wiper-Process Cleaning Absorbent Wiper (Ref 20-30-51)
- M. B00137 Abrasive Paper - 100 grit

### 3. Storage of Adhesives

- A. Adhesives may be stored for 14 months at 35 to 90°F.
- B. When not in use, keep all containers of adhesive sealed. Containers of the Type II adhesive should always be kept sealed when not in use. Once the container has been opened, a plug of cured material, which forms in the nozzle or tube tip during storage, must be removed prior to bonding.

### 4. Prepare Adhesive

- A. Mix adhesive only as needed and use as soon after mixing as possible.

**NOTE:** Adhesives are usually supplied in preweighed portions for shop use.

#### (1) Type I:

- (a) Thoroughly mix 100 parts by weight of PSA-529 adhesive base with 4.5 parts by weight SRC-18 catalyst. Use adhesive as soon as possible after mixing. Pot life of the adhesive is 8 hours at 70°F.

#### (2) Type II:

**NOTE:** Type II adhesives, Dow Corning Silastic 140 and General Electric RTV 102 and RTV 174 are one part adhesives. Each has an indefinite pot life until exposed to air.

#### (3) Type III:

- (a) Thoroughly mix 100 parts by weight of Dow Corning 93-076-1/2 or 93-076-2 adhesive base with 10 parts by weight of catalyst. Use adhesive as soon as possible after mixing. Pot life of the adhesive is a maximum of 2 hours.

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5. Prepare Surfaces

- A. Clean both surfaces to be joined, including approximately 2 inches of surrounding area, with a clean cotton wiper wet with solvent, Series 88 (ref AMM/SOPM 20-30-88).

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- B. Wipe dry with clean dry cotton wiper before solvent evaporates.  
C. Repeat steps A and B as necessary to completely remove dirt, oil, paint and other soils.

**NOTE:** Clean surfaces are essential for good adhesion.

- D. Lightly abrade the area to be repaired with 100 grit, or finer, abrasive paper to roughen the surface. Remove the particles with a dry cotton wiper.

- E. Apply primer to all surfaces which adhesives are to be applied as follows:

- (1) Spray or brush light coat of Dow Corning 1200 RTV or S-2260 primer on all materials except silicone rubber and air dry for 30 minutes before applying Dow Corning Silastic 140 RTV or General Electric PSA-529, RTV 102, RTV 174(Optional) adhesives.

**NOTE:** Primer is not required on silicone rubber.

- (2) Spray or brush light coat of Dow Corning 1204 primer on all materials except silicone rubber and dry for 1-24 hours before applying Dow Corning 93-076-1/2 or -2 adhesive.  
(3) Spray or brush light coat of Thermolite 12 primer on silicone rubber and dry for 10 minutes to 24 hours before applying Dow Corning 93-076-1/2 or -2 adhesive.  
(4) Primer is not required before applying General Electric RTV 102 or RTV 174 (Optional) adhesive.

6. Repair Delamination at Joints

A. General

- (1) Delamination in a small area (up to 0.50 square inch) may be localized or cover most of that area (extensive). If delamination is localized and the adjoining bond is tight, it may be possible to cut off the delaminated area; if extensive, repair can be effected by use of adhesive. Repairs to delamination in large areas (over 0.50 square inch) may require complete removal and replacement of fabric reinforcement.

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- B. Repair small delaminated areas (localized in edge of splice and sealing capability is not impaired).
  - (1) Cut off loose flap with a sharp knife.
  - (2) Feather edge to discourage further peeling.
  - (3) Apply a light coat of Type II or Type III adhesive (par. 1.C.(2) or (3)).
- C. Repair small delaminated areas (a maximum of 0.50 sq. in.).
  - (1) Pull back delaminated flap and prepare faying surfaces per par. 5.
  - (2) Repair seal using Method A (par. 1.B.(1)) with a Type I adhesive (par. 1.C.(1)). Allow 5 to 30 minutes drying time before joining surfaces.

**NOTE:** The longer times are required at high humidity (over 75% relative humidity) or at temperatures below 65°F.

- (3) Press surfaces together firmly to ensure complete contact.
- (4) Allow adhesive to cure the minimum time required (par. 1.C.(1)).
- D. Repair delaminated areas which may result in leaks on propagation of damaged area.
  - (1) Repair delamination on sealing edge (fabric intact).
    - (a) Prepare faying surfaces per par. 5.
    - (b) Repair seal using Method A (par. 1.B.(1)) with a Type II or Type III adhesive (par. 1.C.(2) or (3)).
    - (c) Press surfaces firmly together as soon as possible after application of adhesive to ensure complete contact and exclude air pockets.
    - (d) Allow adhesive to cure the minimum time required (par. 1.C.(2) or (3)).
  - (2) Repair delamination on sealing edge (fabric damaged).
    - (a) Remove damaged fabric by carefully peeling away from seal.
    - (b) Prepare seal surfaces per par. 5.
    - (c) Repair seal using Method B (par. 1.B.(2)) with a Type II or Type III adhesive (par. 1.C.(2) or (3)).
      - 1) Cut a patch of D-117 or D-118 fabric and press it into the wet adhesive on seal surfaces.
      - 2) Apply three or four uniform coats of adhesive over the fabric to build up a film of adhesive over fabric.
    - (d) Allow adhesive to cure the minimum time required before stressing bond.
  - (3) Repair delamination away from sealing edge (on flange or channel - fabric intact).
    - (a) Proceed per par. 6.D.(1).
  - (4) Repair delamination away from sealing edge (on flange or channel - fabric damaged).
    - (a) Remove damaged fabric by carefully peeling away from seal.
    - (b) Prepare seal surfaces per par. 5.

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- (c) Repair seal using Method B (par. 1.B.(2)) with a Type I, Type II or Type III adhesive (par. 1.C.(1), (2) or (3)).
  - 1) Cut a patch of D-117 or D-118 fabric and press it into the wet adhesive on seal surfaces.
  - 2) Apply a coat of adhesive over the fabric.
- (d) Allow adhesive to cure the minimum time required before stressing bond.

7. Repair Cuts or Splits in Rubber in Joint Area

A. General

- (1) Repair procedures for the above types of damage consist of cleaning and reinforcing the damaged area using Method B (par. 1.B.(2)) with a Type II or Type III adhesive (par. 1.C.(2) or (3)). Ref par. 6.D.(2) and 6.D.(4).

8. Repair Cuts or Splits in Extruded or Molded Seal Section

A. General

- (1) Repairs to the extruded seal section are divided into three groups; (1) repairs on seal body, (2) repairs on retaining flange, (3) repairs on seal lip or flat side of seal (Fig. 802). Procedures within these groups are divided according to size of damage and type of adhesive used in the repair. In repairs to areas away from the seal lip with no fabric reinforcement General Electric PSA-529 adhesive only should be used; if fabric reinforcement is required, any approved adhesive may be used. In all types of repairs to the seal lip or flat side of seal, Dow Corning Silastic 140; Dow Corning 93-076-1/2 or -2; or General Electric RTV 102 or 174(Optional) adhesive only must be used as this adhesive, when cured, allows flexibility of the lip under operational conditions, thus ensuring an airtight seal.

B. Repair bulb and blade type seal.

- (1) Repair small splits or nicks.
  - (a) Cut out the damaged area leaving a round smooth hole not greater than 0.20 inch in diameter.

NOTE: This may be accomplished using a sharpened tube as the drill bit.

- (b) Repair seal using Method A (par. 1.B.(1)) with a Type I, Type II or Type III adhesive (par. 1.C.(1), (2) or (3)).
- (2) Repair large splits (1 inch maximum length).
  - (a) Flex the seal to open the split.
  - (b) Carefully cut out the ends of the split to a round smooth hole and miter the edges. The hole may be drilled using a sharpened tube as the drill bit.
  - (c) Prepare seal surfaces for repair (par. 5).

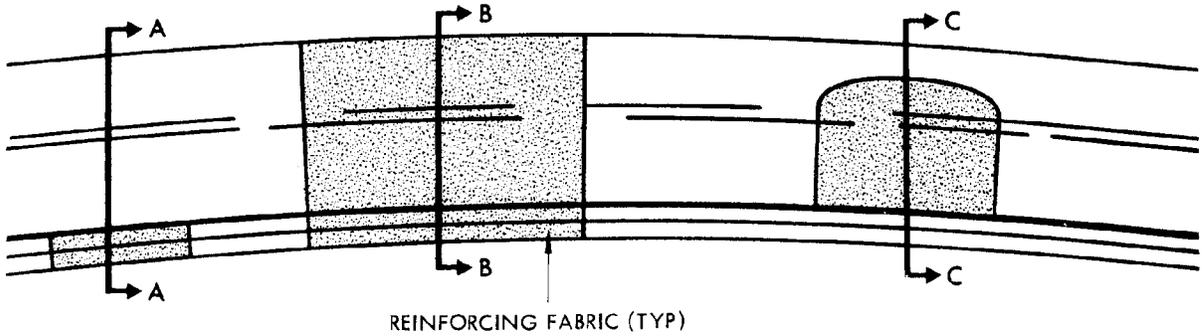
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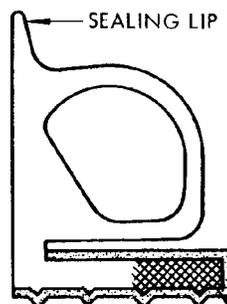
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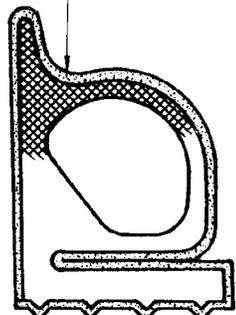
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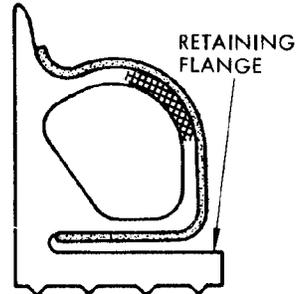
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SECTION A-A

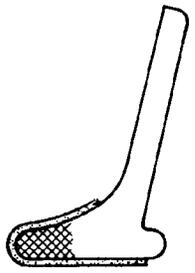
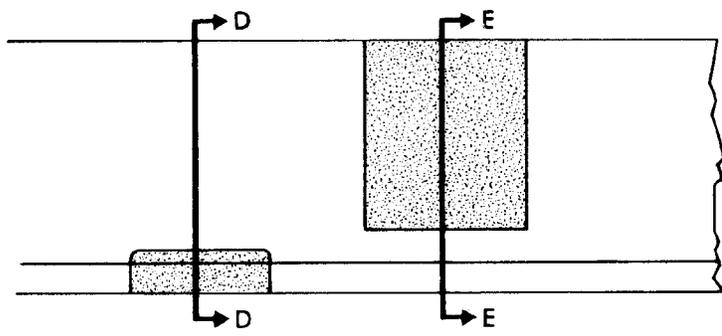


SECTION B-B

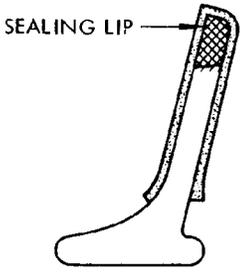


SECTION C-C

EXTENT OF  
 DAMAGE SHOWN  
 CROSS HATCHED (TYP)



SECTION D-D



SECTION E-E

Typical Seal Section Repairs  
 Figure 802

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- (d) Coat split surfaces with a Type II or Type III adhesive (par. 1.C.(2) or (3)) and leave a few minutes to allow adhesive to reach the tacky stage.
  - (e) Press the coated surfaces together and hold under pressure until adhesive cures.
- (3) Repair large splits (2 inches maximum length with gap open).
- (a) Prepare both surfaces and surrounding area per par. 5.
  - (b) Carefully cut ends of split to a smooth round hole. The hole may be drilled using a sharpened tube as the drill bit.
  - (c) Repair seal using Method B (par. 1.B.(2)).
    - 1) Coat split surfaces and surrounding area with a Type I, Type II or Type III adhesive (par. 1.C.(1), (2) or (3)).
    - 2) Cut a patch of D-117 or D-118 fabric large enough to overlap 0.50 inch on sides and ends of split.
    - 3) Press fabric into the wet adhesive on seal surface (Fig. 802).
  - (d) If the required 0.50 inch overlap carries fabric over the seal lip, extend fabric down the flat sealing surface to within 0.25 inch of the retaining flange corner.

**CAUTION:** DOW CORNING SILASTIC 140 OR DOW CORNING 93-076-1/2 OR -2 ADHESIVE MUST BE USED IF FABRIC CARRIES OVER SEAL LIP. ONLY THESE ADHESIVES ALLOW FLEXIBILITY OF LIP.

### C. Repair retaining flange (3 inch maximum patch length).

#### (1) General

- (a) Repair procedure for a damaged retaining flange consists of preparing surfaces (par. 5) and repairing the seal using Method B (par. 1.B.(2)) with a Type II or Type III adhesive (par. 1.C.(2) or (3)). The procedure is described in par. 6.D.(4).
- (b) If a section of seal rubber is missing, a matching piece may be cut from a scrap seal and bonded in place using Method C (par. 1.B.(3)) with a Type II or Type III adhesive, (par.1.C.(2) and (3)) and reinforced with a fabric patch. Ref par. 6.D.(4).

**NOTE:** Fabric patches shall overlap 0.50 inch minimum on all sides of damaged areas but shall not extend more than 0.25 inch up the flat side of the seal. Maximum allowable patch length is 3.0 inches (Section A-A, Fig. 802).

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### D. Repair sealing lip or flat side of seal (3 inch maximum patch length).

#### (1) General

- (a) The repair procedure for a damaged sealing lip or flat side of seal consists of preparing surfaces (par. 5) and repairing the seal using Method B or Method C (par. 1.B.(2) or (3)) with a Type II or Type III adhesive (par. 1.C.(2) or (3)). Apply one brush coat of the Type II or Type III adhesive then lay up the fabric patch and press into position (Sections B-B and E-E, Fig. 802., Ref par. 6.D.(2)).
- (b) When a portion of the seal is missing, trim all ragged edges and repair using a similar section of a surplus seal. Proceed with fabric patch using Method C (par. 1.B.(3)) with a Type II or Type III adhesive (par. 1.C.(2) or (3)).

**NOTE:** Cut fabric patches to overlap 0.50 inch minimum on all sides of damaged areas. Adjust so that the patch covers the seal lip and comes to within 0.25 inch of the seal flange on both sides of the lip. No patch should terminate on the flat sealing area. Maximum allowable patch length is 3.0 inches (Section D-D, Fig. 802).

- (c) Small imperfections or minor damage extending into the lip not more than 0.08 inch may be faired into the seal lip over a length of 0.50 inch to 1.0 inch with a Type II or Type III adhesive (par. 1.C.(2) or (3)). Faired surface must be smooth and free of cuts or nicks which might propagate under flexing.

### 9. Repair Splices

#### A. Repair splices (galley and entry doors).

- (1) Repair splice using Method A or Method B (par. 1.B.(1) or (2)) with a Type II or Type III adhesive (par. 1.C.(2) or (3)). Proceed as in par. 6.C. or 6.D.

#### B. Repair separated splice bonds (cargo doors and escape hatches).

- (1) Clean seal surfaces for approximately 2.0 inches on each side of splice per par. 5.
- (2) Cut a patch of D-117 or D-118 fabric a minimum of 2.0 inches wide and long enough to wrap completely around seal.
- (3) Apply a liberal brush coat of Type II or Type III adhesive (par. 1.C.(2) or (3)) to cleaned seal surfaces.
- (4) Press fabric patch into wet adhesive on seal and wrap it completely around seal, smoothing it into all contours, and trim off excess material.
- (5) Apply several additional thin coats of adhesive by brush.
- (6) Feather or fair the edges of the patch, taking special care to get a smooth surface on the sealing lip. Avoid using an excessive thickness of adhesive which will produce a stiff, rigid area over the seal lip.

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10. Repair Large Seal Areas or Severely Damaged Seal Sections

A. General

- (1) Large seal areas or severely damaged sections of seal may be repaired using Method C plus Method B (par. 1.B.(3) plus (2)) with a Type II or Type III adhesive (par. 1.C.(2) or (3)).

B. Repair Large Seal Area or Severely Damaged Seal Section

- (1) Remove the entire damaged area or section.
- (2) Replace seal area or section with a similar section of a surplus seal cut to the exact length.
- (3) Locate joint splice in straight section of seal.
- (4) Make mitered cut on abutting seal surface and fill with a Type II or Type III adhesive (par. 1.C.(2) or (3)).
- (5) Apply adhesive to complete the seal.

NOTE: For an emergency seal repair, Method A (par. 1.B.(1)) can be used with Type III adhesive (par. 1.C.(3)).

11. Check Door Drain Holes

- A. Check that drain holes in doors are not blocked.

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## MAINTENANCE MANUAL

### DIAPHRAGM SEALS - REMOVAL/INSTALLATION

#### 1. General

- A. Diaphragm door seals are used to pressure seal the gate hinges on the passenger/crew entry doors and the galley service doors. There are two methods used for attaching the diaphragm seals to the doors (Fig. 401.)
  - (1) The seal may be retained by nylon rods in the socket of an extruded seal retainer attached to the door structure.
  - (2) The seal may be attached by a seal retainer that is secured by screws or bolts through the seal to the door structure.

#### 2. Equipment and Materials

- A. Liquid soap lubricant
  - (1) B50093 Kelite Spraywhite
  - (2) B00052 Turco 1526
- B. A00436 Pressure and Moisture Sealant, BMS 5-45, Class B
- C. Leather punch 0.09 inch diameter hole
- D. B01008 Solvent - Final Cleaning of Metal Prior to Non-structural Bonding (Series 88) (Ref AMM/SOPM 20-30-88)
- E. A00635 Sealant - BAC 5010 Type 60 Grade 2
- F. G00034 Cotton Wiper-Process Cleaning Absorbent Wiper BMS 15-5

#### 3. Remove Diaphragm Seal

- A. Position door as necessary to facilitate seal removal.
- B. Remove gate control rod attachment bolt (Section A-A) and rotate gate outboard.

**NOTE:** If difficulty is encountered while removing or installing seal, remove door lining for access.

- C. Use solvent, Series 88 (Ref AMM/SOPM 20-30-88) if necessary to remove adhesive between seal and door structure.
- D. On door with extruded seal retainers, pull nylon rods from retainers, freeing the seal from the door.
- E. On doors with a seal retainer fixed by screws through the seal, remove screws and retainer angle and remove seal from the door.

#### 4. Install Diaphragm Seal

- A. Clean seal seating surface thoroughly to remove grease, oil, dirt or adhesive with solvent, Series 88 (Ref AMM/SOPM 20-30-88) and a clean cotton wiper.

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- B. On doors with extruded seal retainer, check that the gap of the socket entrance is 0.132 +0.000/-0.010 inch.

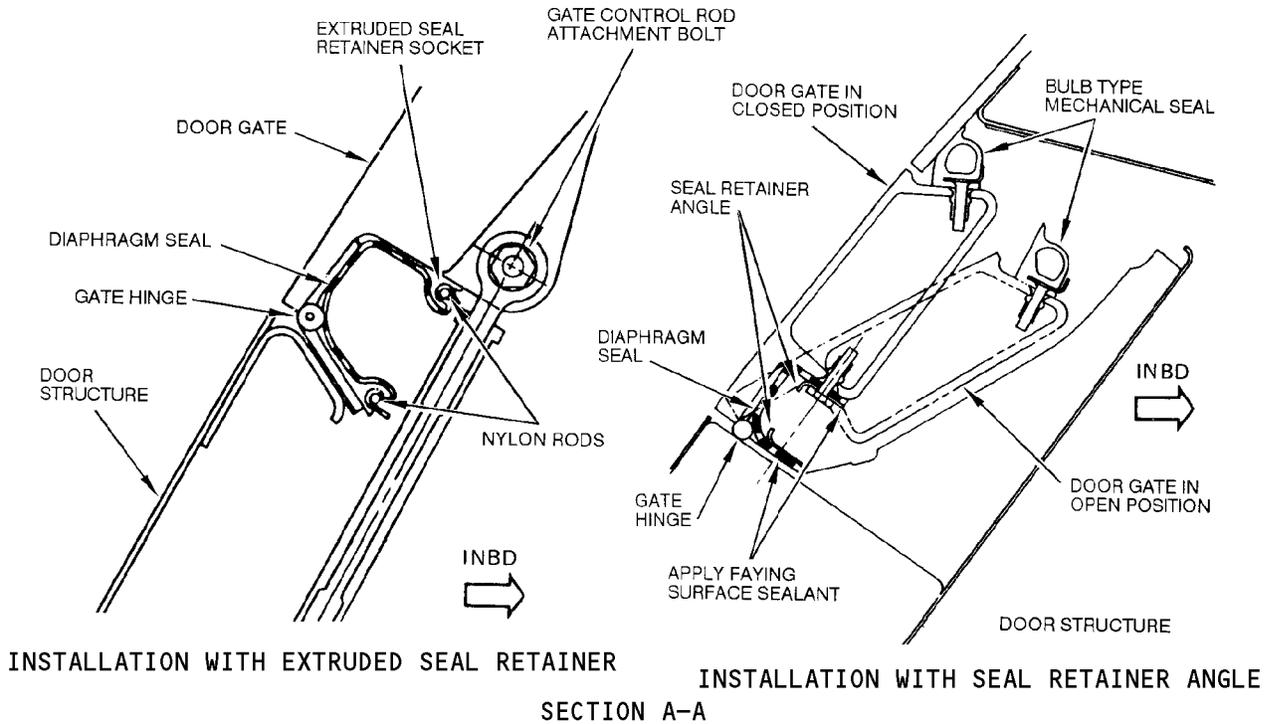
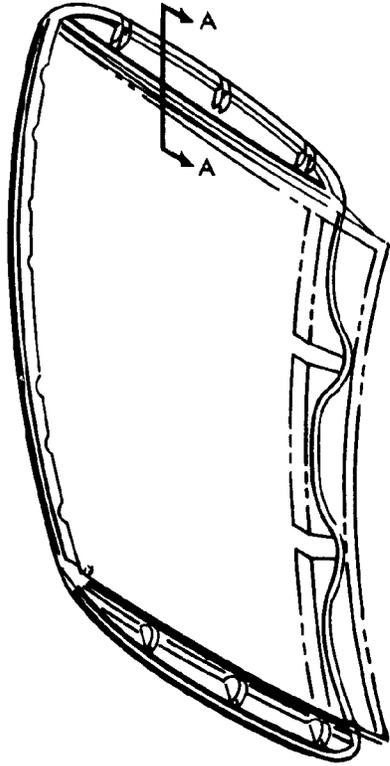
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Diaphragm Seal Installation  
 Figure 401

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## MAINTENANCE MANUAL

- C. Position seal on door adjacent to the seal retainer.
- D. Apply the sealant over entire end of seal retainer, pin and diaphragm. Overlap well on to diaphragm. Fair sealant smooth.
- E. On doors with extruded seal retainer insert two nylon rods, forming a butt fit of the radius end of the rods at the center of the door, trapping the seal material in the socket of the seal retainer.

**NOTE:** Liquid soap may be used as a lubricant during installation.

- F. On doors with a seal retainer fixed by screws through the seal, temporarily install the seal along hinge, punching holes corresponding to the holes in the seal retainer.
  - (1) Remove seal and apply sealant as a faying surface seal between seal and the door and gate in the retainer area. Refer to 51-31-0, Seals and Sealing.

**CAUTION:** OBEY THE INSTRUCTIONS IN THE PROCEDURE TO REMOVE AND APPLY THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

- (2) Position seal on door and screw seal retainer in place by tightening screws until compression of seal flange just becomes visible.
- G. Install gate control rod attachment bolt (Section A-A).
- H. Install door lining, if removed. Refer to applicable section for door lining and insulation R/I.

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FLAP TYPE MECHANICAL SEALS - REMOVAL/INSTALLATION

1. General
  - A. A flap type mechanical door seal, installed around the perimeter of a door, is used to reduce air leaks from pressurized areas.
2. Equipment and Materials
  - A. Liquid soap
    - (1) B50093 Kelite Spraywhite
    - (2) B00052 Turco 1526
  - B. Door Seal Installation Tool - SE52-1002, or equivalent
  - C. G00270 3M #250 Masking Tape A-A-883
3. Remove Flap Type Mechanical Seal
  - A. Position door as necessary to facilitate seal removal.
  - B. Grip the lip of the door seal and by pulling and rolling the seal, disengage it from the seal retainer. Work around the seal until the seal is detached. (See figure 401.)
4. Install Flap Type Mechanical Seal
  - A. Slip seal over door and move into its approximate location near the seal retainer on the fuselage. Ensure that top, bottom, and corners of seal are properly positioned and lip of seal is pointing outboard. Equalize stretch through entire seal and temporarily attach the seal to the door frame with strips of masking tape. (See figure 401.)
  - B. Install the seal in the seal retainer at each corner.
    - (1) First install the inboard seal edge into the inner side of the seal retainer.
    - (2) Using the door seal installation tool, SE52-1002, push the outboard edge of the seal into the retainer. If seal is pushed square to seal edge, excessive bunching will be avoided.
  - C. Install seal in seal retainer at points midway between corners using the method described in step B.(2). Ensure that the section of seal installed at each midpoint is approximately two to three inches long.
  - D. Install remainder of the seal by working from the midpoints to the corners until all the seal is fitted into the seal retainer.
  - E. Smooth out excessive wrinkles in the lip of seal.
  - F. Close and lock door. Visually check that seal lip bears smoothly and evenly on the edge of the door.

**CAUTION:** USE CARE IN INSTALLATION OF SEAL TO PREVENT CUTS, TEARS OR PUNCTURES.

**NOTE:** Liquid soap may be used to lubricate seal during installation.

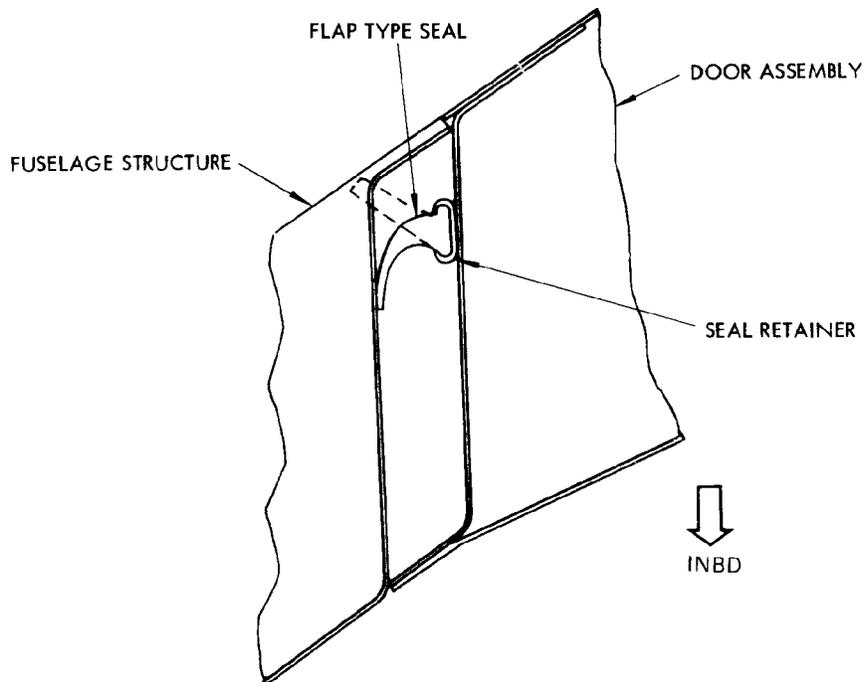
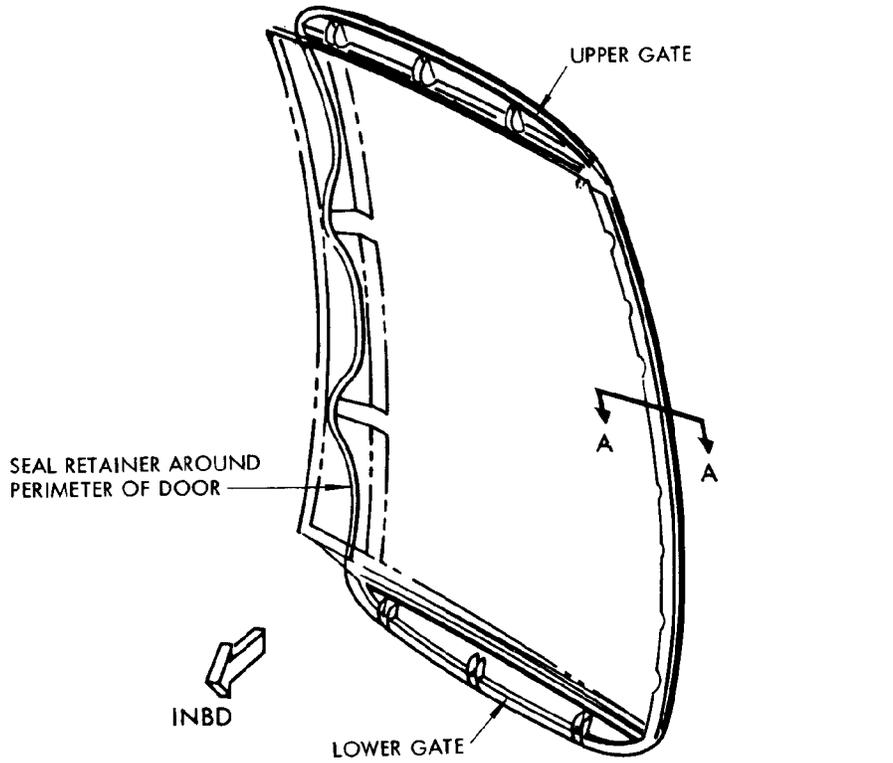
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SECTION A-A

Flap Type Mechanical Door Seal Installation  
 Figure 401

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BULB TYPE MECHANICAL SEALS – REMOVAL/INSTALLATION

1. General
  - A. A bulb type mechanical door seal, installed around the perimeter of a door or latch, is used to reduce air leaks from pressurized areas.
2. Equipment and Materials
  - A. Shims, 0.06 inch
  - B. Silicone Sponge Rubber Windlace Cord, 3/8 inch diameter, BMS 1-45, or equivalent
  - C. Leather punch, 0.09 inch diameter hole
  - D. Metal washers, 0.125 inch inside diameter
3. Remove Bulb Type Mechanical Seal
  - A. Position door as necessary to facilitate removal of seal.
  - B. Bend bulb section of seal away from locator angle and remove screws attaching seal retainer angle to door. (See figure 401.)
  - C. Continue around perimeter of seal until seal is free to be removed from door.
4. Install Bulb Type Mechanical Seal
  - A. Position door as necessary to facilitate seal installation.
  - B. Position seal around door with its longer side at forward (hinge) edge, and with cutout sections correctly located along upper and lower gate hinges. (See figure 401.)
  - C. Install seal temporarily at any one door corner.
    - (1) Place seal tightly against flange of locator angle on main part of door and around corner to its location on gate hinge. (See detail A.)
    - (2) Locate and punch hole in seal attachment flange to align with hole in locator angle, adjacent to corner.
    - (3) Temporarily install screw and washer tightening until washer just begins to squeeze rubber.
  - D. Fit seal at remaining three door corners and four gate hinge ends in a similar temporary manner.
  - E. Fit seal temporarily along forward (hinge) edge of door, locating and punching holes and installing screws and washers in sequence shown in view 1.

**NOTE:** Seal should be under some tension between points 3 and 4, and under slight compression between points 1 and 4 and between points 2 and 3, in order to maintain angle of 90 degrees between door edge and outboard face of seal.

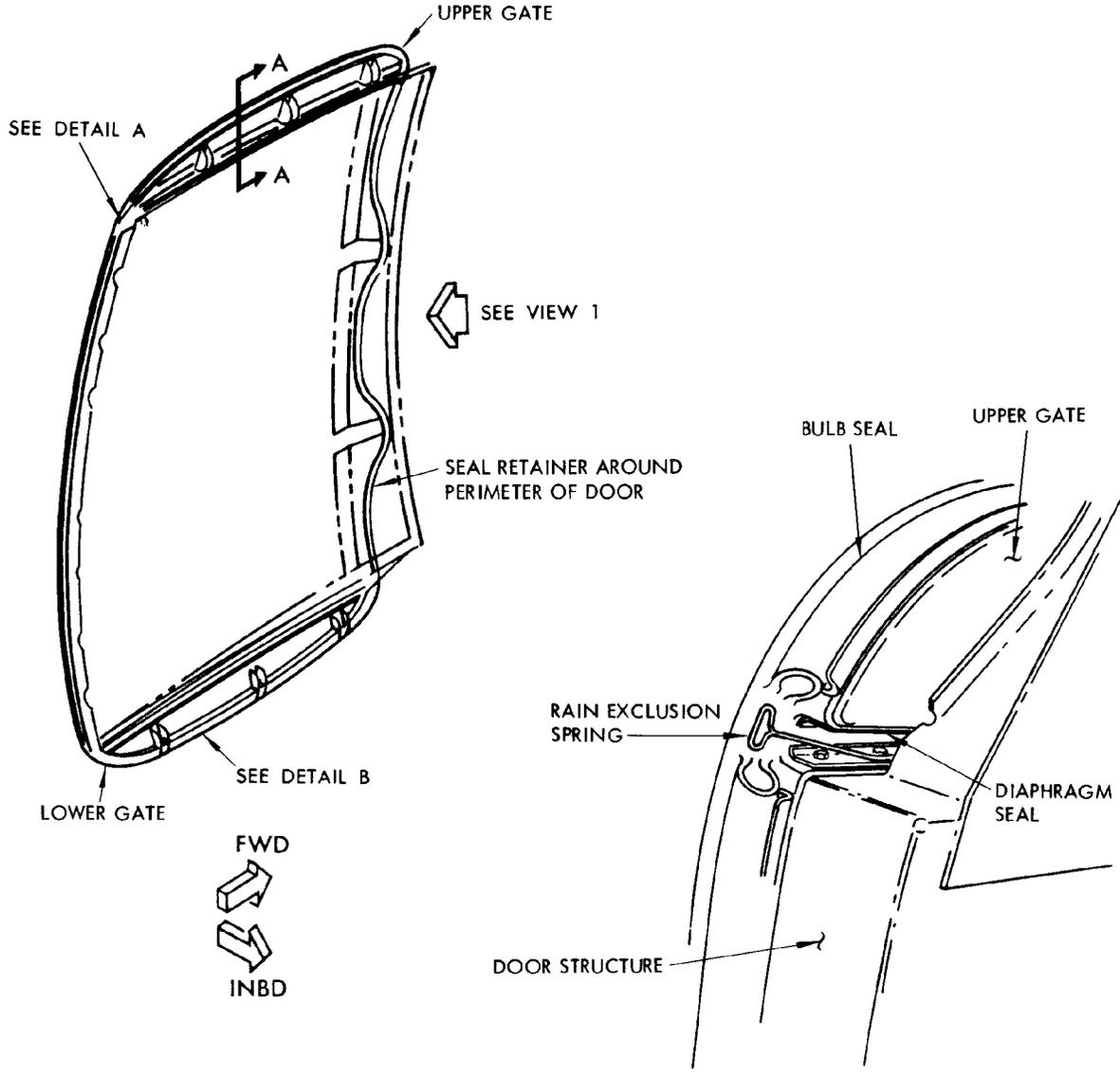
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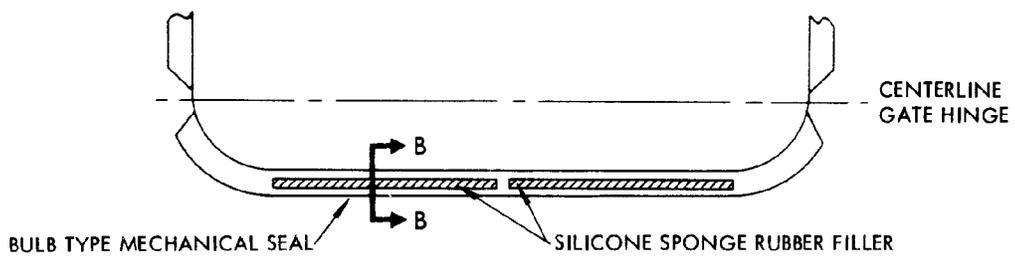
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**DETAIL A**  
**BULB SEAL AT GATE HINGE**



**DETAIL B**

**Mechanical Door Seal Installation**  
**Figure 401 (Sheet 1)**

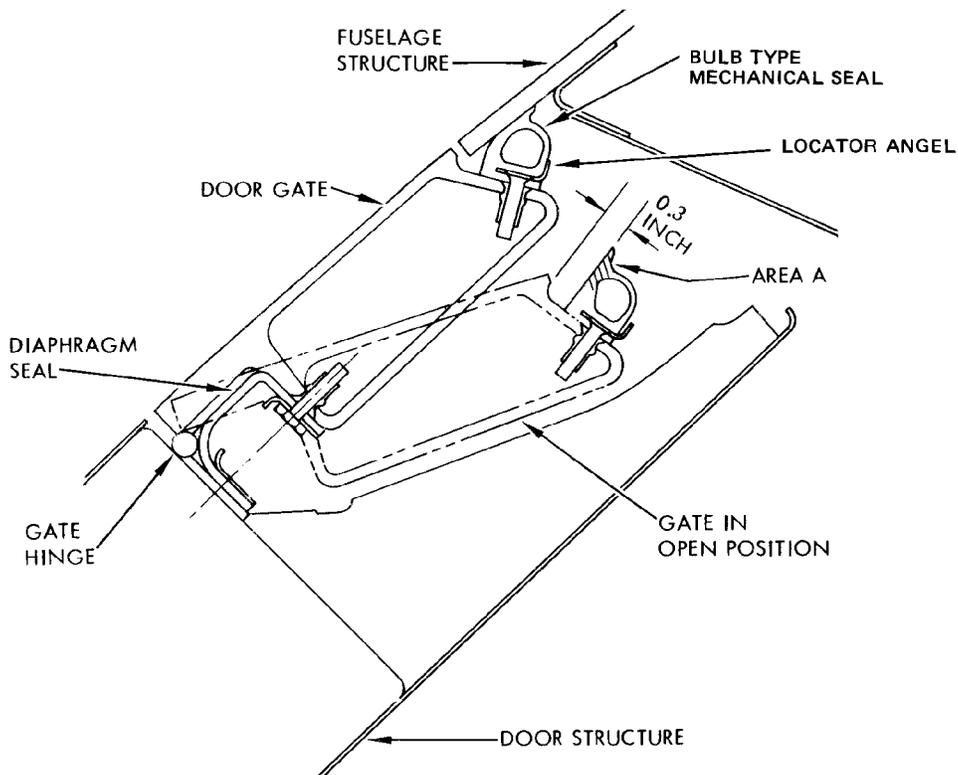
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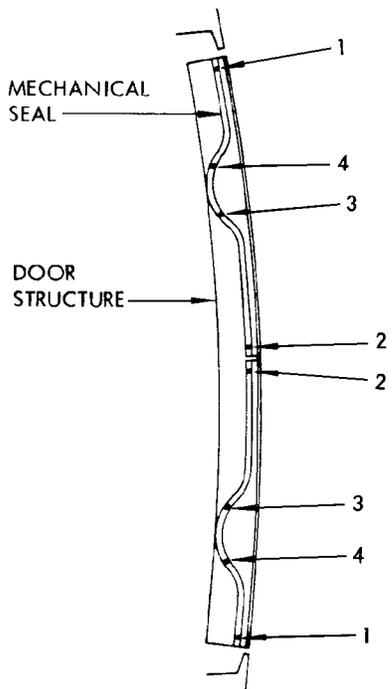
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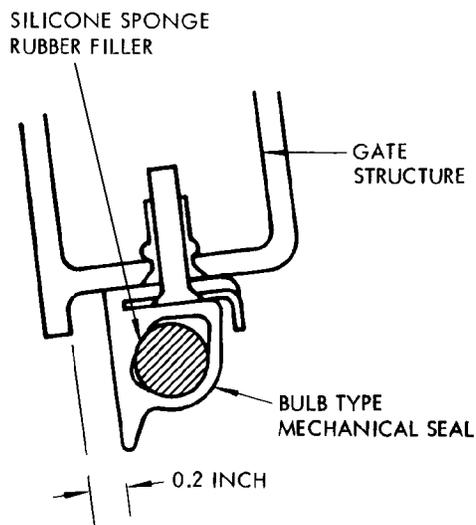
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SECTION A-A



VIEW 1



SECTION B-B

Mechanical Door Seal Installation  
Figure 401 (Sheet 2)

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## MAINTENANCE MANUAL

- F. Locate and punch remaining holes in seal attachment flange all around door and along gate hinges.

**NOTE:** On upper and lower gates no locating angle is fitted and holes must be punched to locate seal parallel to gate edge and in accordance with dimensions on Sections A -A and B-B, figure 401.

- G. Remove all screws, discard washers and install retainer angles, using same screws as were used temporarily.
- H. Install remaining screws in seal retainer angles around edges of door and gates, and install bolts in retainer angles along channel section. Tighten screws and bolts until compression of seal attachment flange just becomes visible.

**NOTE:** The rain exclusion spring should be installed under the heads of the channel section retaining strip attachment bolts at both ends of both gate hinges. (See detail A.)

- I. Insert 3/8 inch diameter silicone sponge rubber filler into open ends of seal bulb section at each end of lower gate. When installed, both fillers should lie within straight length of seal along lower gate. (See section B-B and detail B.)
- J. Connect control and stop rods at upper and lower gates if a unit seal is being installed.
- K. Check seal installation.
- (1) Tape 0.06 inch shim to stop fittings adjacent to latches and close door until contact is made with shims.

**CAUTION:** DO NOT ATTEMPT TO CLOSE DOOR COMPLETELY.

- (2) Check that when a source of light is moved along forward and aft edges of door outside airplane, no light is visible through these edges from inside airplane.
- (3) Shim seal locally if necessary to obtain correct installation.
- (a) Open door.

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## MAINTENANCE MANUAL

- (b) Remove retainer angle attachment screws at each end of length of seal to be shimmed.

**NOTE:** The length of individual shims is generally limited to the distance between alternate screws. Where the seal bends to approach the hinge cutouts, however, the shims should be limited in length to the distance between adjacent screws. No shims should be installed in those portions of the seal which butt against the hinge flap gates (between points 3 and 4, view 1, figure 401), as excessive pinching and damage of the seal may result.

- (c) Cut shim to length required.

**NOTE:** Shims should be cut from a wedge-section rubber extrusion (BAC1521-585), or may be made by cutting down part of an old or spare seal to obtain area A, shown shaded on Section A-A.

- (d) Trap ends of shim under shim retaining clip (figure 402) and install retainer angle attachment screws.
- (e) Check seal installation as described in step (2).
- (4) Open door, remove shims from stop fittings and close door completely.
- (5) Check that when source of light is moved around entire edge of door, outside airplane, no light is visible through any part of seal from inside airplane. Shim seal again if necessary until installation is satisfactory.

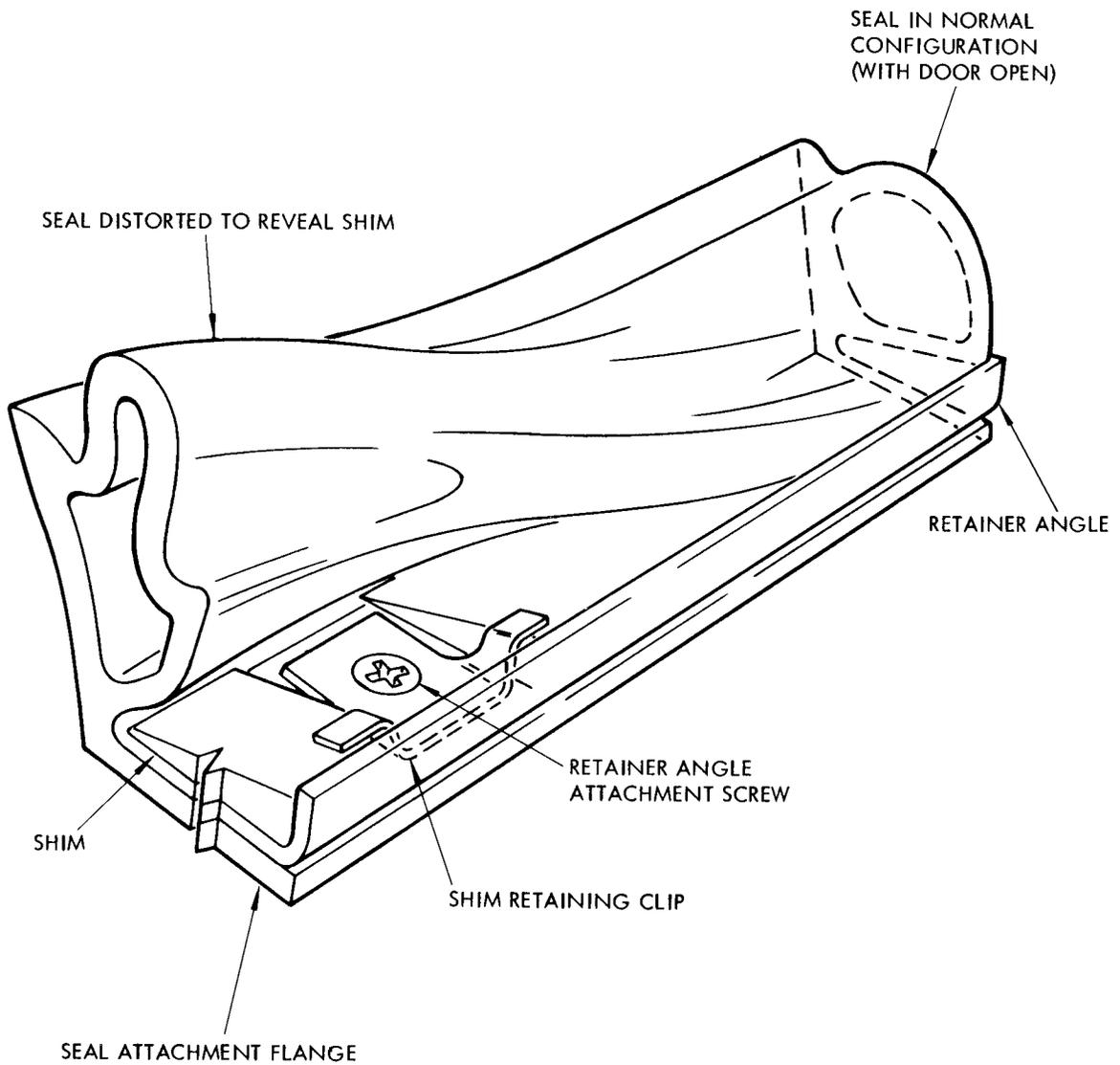
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Door Seal Shim Installation  
 Figure 402

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DIAPHRAGM – MECHANICAL SEALS – REMOVAL/INSTALLATION

1. General

- A. The diaphragm – mechanical type seal is a one-piece silicone rubber molded door seal. The seal consists of a mechanical type seal at the door edge and a diaphragm type seal at the upper and lower gate hinges.
- B. For seal repairs refer to 52-09-100 AR.

2. Equipment and Materials

- A. Liquid soap lubricant
  - (1) B50093 Kelite Spraywhite
  - (2) B00052 Turco 1526
- B. B01008 Solvent – Final Cleaning of Metal Prior to Non-structural Bonding (Series 88) (Ref AMM/SOPM 20-30-88)
- C. A00635 Sealant – BAC 5010 Type 60 Grade 2
- D. G00034 Cotton Wiper–Process Cleaning Absorbent Wiper
- E. G00215 Brush – Soft Bristle Fiber
- F. Door Seal Installation Tool – SE52-1002

3. Remove Diaphragm – Mechanical Seal

- A. Position door as necessary to facilitate seal removal.
- B. Remove gate control rod attachment bolt (Section A-A) and rotate gate outboard.

**NOTE:** If difficulty is encountered while removing or installing seal, remove door lining and lining support plates.

- C. Remove upper and lower diaphragm seals (Detail A and Section A-A).
  - (1) Use solvent, Series 88 (Ref AMM/SOPM 20 30-88) if necessary to remove adhesive between seal and door structure.
  - (2) Pull nylon rods from diaphragm seal retainers (Section A-A).
- D. Pull and roll mechanical seal and remove from retainer around the door edge (Section B-B).
- E. Remove diaphragm – mechanical seal from door structure.

4. Prepare Surface for Seal Installation

- A. Remove old sealant from seal locations on door structure.
- B. Remove any loose soil, grease or oil with a clean cotton wiper.
- C. Apply solvent, Series 88 (Ref AMM/SOPM 20-30-88) to surface by dispensing from squirt or squeeze type bottles. Do not dip the cotton wiper in the solvent container. All cleaner shall be wiped off, while wet, with a clean dry cotton wiper.

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIRMENTS FOR PROPER HANDLING PROCEDURES.

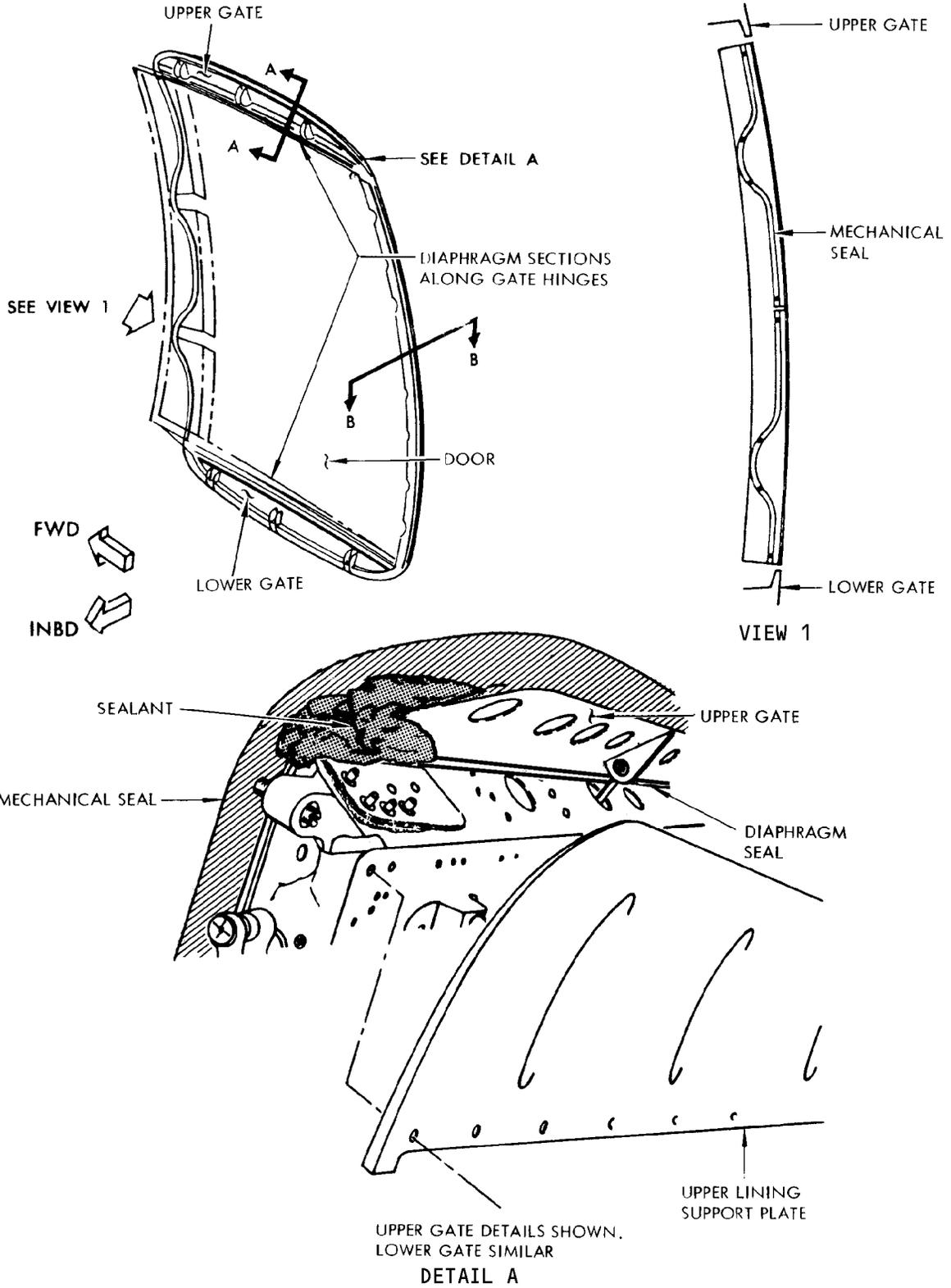
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Diaphragm-Mechanical Door Seal Installation  
 Figure 401 (Sheet 1)

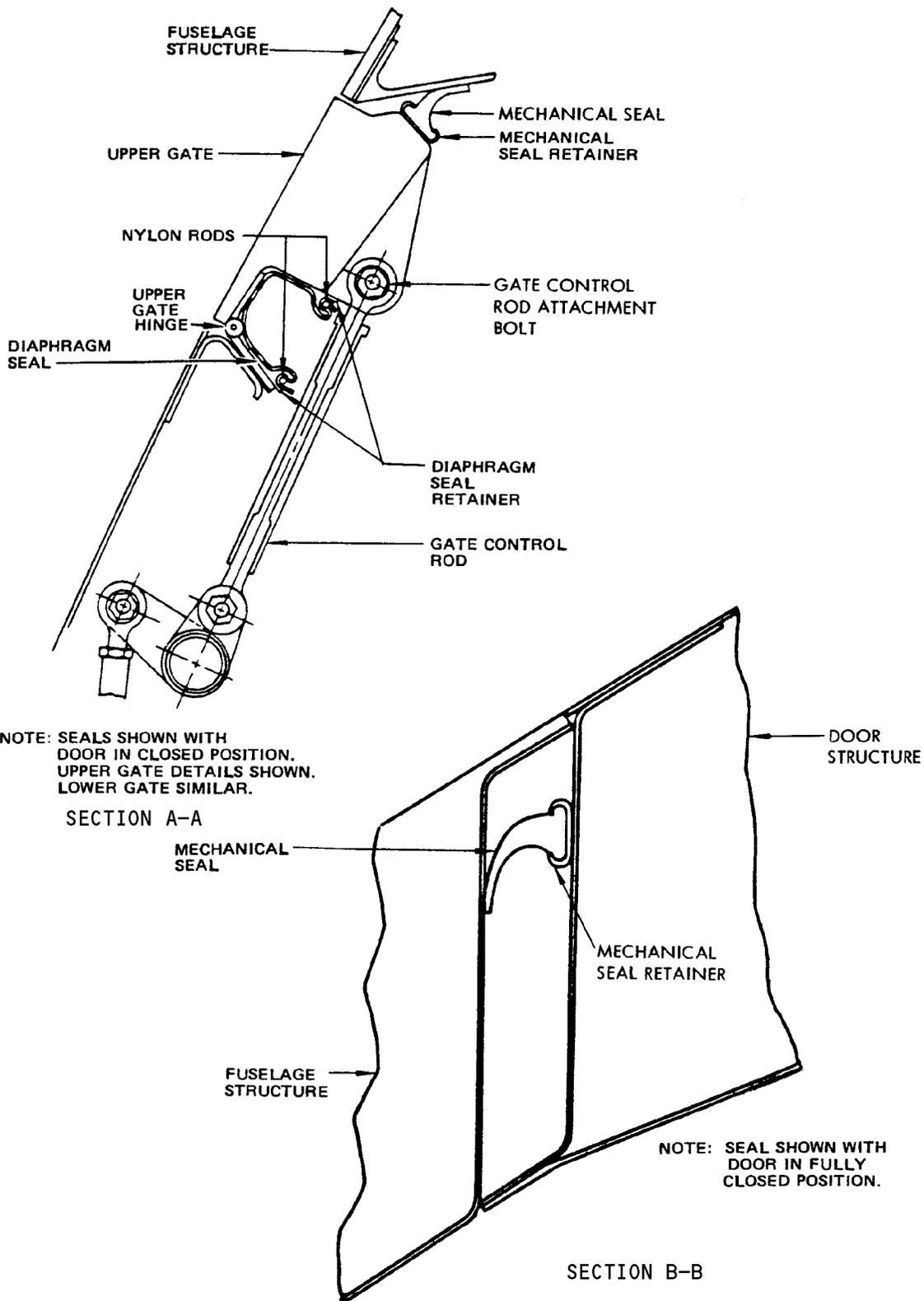
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Diaphragm-Mechanical Door Seal Installation  
Figure 401 (Sheet 2)

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- D. Rub the surface until soil is removed. If necessary, scrub with a soft bristle brush to remove difficult soils.
- E. Exchange soiled cotton wipers for clean ones frequently.
- F. Repeat cleaning operations until cleaning cotton wiper shows no soil.
- G. Let surface dry.

### 5. Install Diaphragm – Mechanical Seal

- A. Correctly position seal around door periphery with lip of seal facing outboard with approximately equal stretch along entire length of seal.

NOTE: Seal is marked TOP and BOTTOM along upper and lower edge of seal.

- B. Install upper and lower diaphragm seals (Fig. 401, Section A-A).
  - (1) Insert edge of diaphragm seal into seal retainer.
  - (2) Inject the sealant between mechanical seal and seal retainer, approximately 1.50 inches long, centered on door centerline. Force seal into gap as far as possible (seal lower retainer of both gates only).
  - (3) Apply liquid soap lubricant to nylon rods.
  - (4) Insert two nylon rods, one from each end of retainer to form a butt fit at center of seal retainer.
  - (5) Similarly insert two rods in other diaphragm seal retainer.

- C. Install mechanical seal (Fig. 401).

- (1) Install the inboard edge of mechanical seal attachment flange into seal retainer.
- (2) Using the door seal installation tool, SE52-1002, push the outboard edge of mechanical seal into seal retainer.

NOTE: If necessary, remove portions of mechanical seal and refit to remove any stretch that may have occurred during initial positioning.

- D. Apply silicone sealant to diaphragm seal.
  - (1) Apply a uniform layer of sealant over the entire end of each diaphragm seal nylon rod retainer, pin and diaphragm as shown in detail A. Overlap well onto diaphragm. Fair sealant smooth. The sealant forms a surface skin a few minutes after it is applied so fairing should be done immediately after application. The fairing tool may be kept wet with solvent to assist in fairing.
  - (2) Allow the sealant to cure for a minimum of 24 hours at 75°F and 50% relative humidity. Lower temperatures and humidity will slow the rate of cure. The cure rate can be accelerated by circulating warm humidified air (140°F maximum) over the sealant.
- E. Install bolt connecting each gate to its respective control rod (section A-A).
- F. Close the door and check from inside that seal lip bears correctly on inner face of body skin.

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- G. Install lining support plates and door lining if removed. Refer to applicable section of door lining and insulation R/I (detail A).

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## MAINTENANCE MANUAL

### AERODYNAMIC SEALS – REMOVAL/INSTALLATION

#### 1. General

A. Aerodynamic door seals are used in or around door cavities to reduce aerodynamic drag. There are two primary methods of attaching aerodynamic door seals.

- (1) The seal is shaped to fit into a retaining flange and held in place by its own retaining lips.
- (2) The door seal is secured in place under a retaining angle that is bolted or screwed through a seal lip into the door structure.

#### 2. Equipment and Materials

- A. B00650 Methyl Ethyl Ketone - TT-M-261
- B. Liquid Soap
  - (1) B50093 Kelite Spraywhite
  - (2) B00052 Turco 1526
- C. Door Seal Installation Tool - SE52-1002, or equivalent
- D. G00270 3M #250 General Purpose Masking Tape, A-A-883

#### 3. Removal Aerodynamic Seals (See figure 401.)

- A. Seals which are shaped to fit into a seal retainer are removed by gripping the protruding portion of the seal and by rolling and pulling, removing the seal from the seal retainer on the door structure.
- B. Seals held in place by a retaining angle are removed by removing the screws or bolts securing the retaining angle to the door structure and lifting off the retaining angle and the seal.

#### 4. Install Aerodynamic Seals

A. Clean all surfaces adjacent to seal surface with methyl ethyl ketone and a clean cotton wiper.

**WARNING:** METHYL ETHYL KETONE IS FLAMMABLE AND TOXIC. USE ONLY IN WELL VENTILATED AREA.

- B. Position seal adjacent to the seal retainer assuring that the top, bottom and corners of the seal are in their respective positions. Equalize stretch through the entire perimeter of the seal. Strips of tape may be used to temporarily hold the seal in place. (See figure 401.)
- C. Install the seal in the seal retainer by inserting one lip into seal retainer and using the door seal installation tool, SE52-1002, push the remaining edge of the seal into the retainer.

**CAUTION:** USE EXTREME CARE IN INSTALLATION OF SEAL TO PREVENT CUTS, TEARS OR PUNCTURES.

**NOTE:** Liquid soap may be used to lubricate seal during installation.

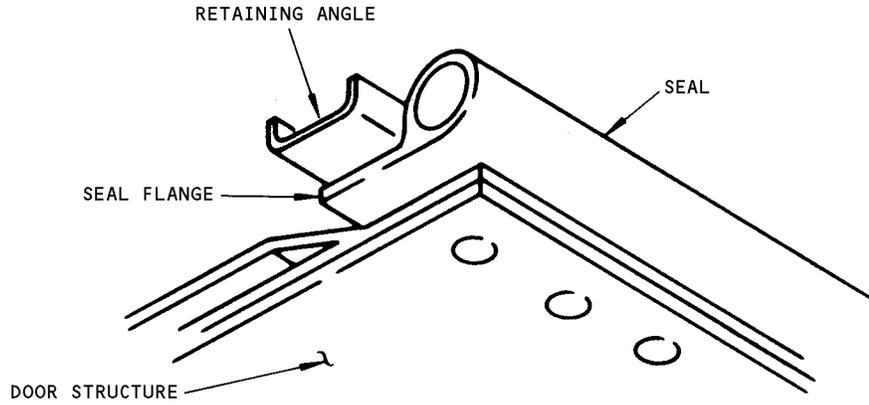
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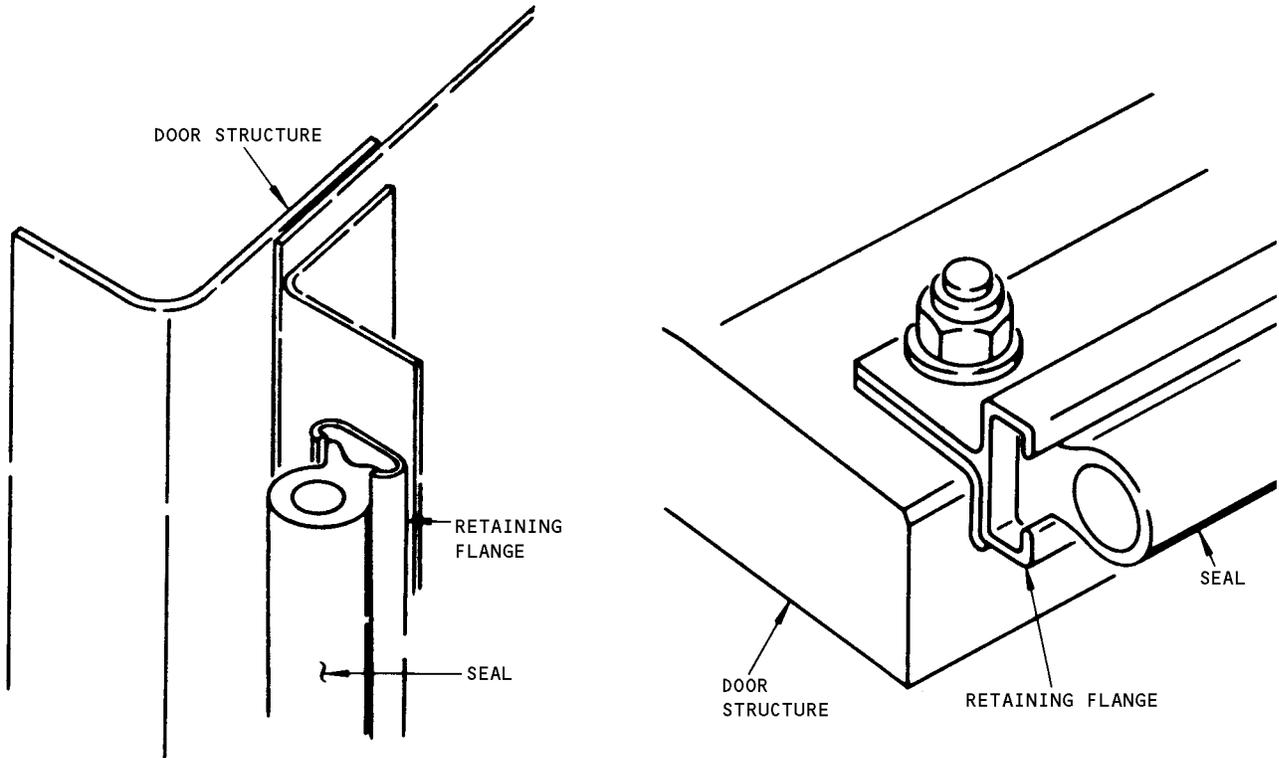
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TYPICAL INSTALLATION WITH SEAL RETAINER ANGLE



TYPICAL INSTALLATIONS WITH RETAINING FLANGE

Aerodynamic Seal Installation  
 Figure 401

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- D. Seals which are held in place by a retainer angle should be installed by positioning the seal under the retainer. Holes must be punched in the seal flange of new seals to correspond with the holes in the retaining flange.
- E. Tighten screws until compression of seal attachment flange just becomes visible.
- F. Close door and check that seals do not overlap at intersections when compressed. If necessary, trim seals the minimum amount required at intersections to prevent overlapping when door is closed and latched.

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## MAINTENANCE MANUAL

### ACOUSTIC AND THERMO SEALS - REMOVAL/INSTALLATION

#### 1. General

- A. Acoustic and thermo door seals are used to reduce noise levels and heat losses. Each seal is normally a separate installation but they are used in conjunction with each other. (See figure 401).
- B. The bulb type acoustic and thermo door seal is attached to the door lining. For removal of the door lining and seal, refer to the applicable door lining and insulation - removal/installation procedures.
- C. The lip type acoustic and thermo door seal is removed and installed in a manner similar to the flap type aerodynamic seal. (Refer to Flap Type Mechanical Seals - Removal/Installation, section 52-09-121.)

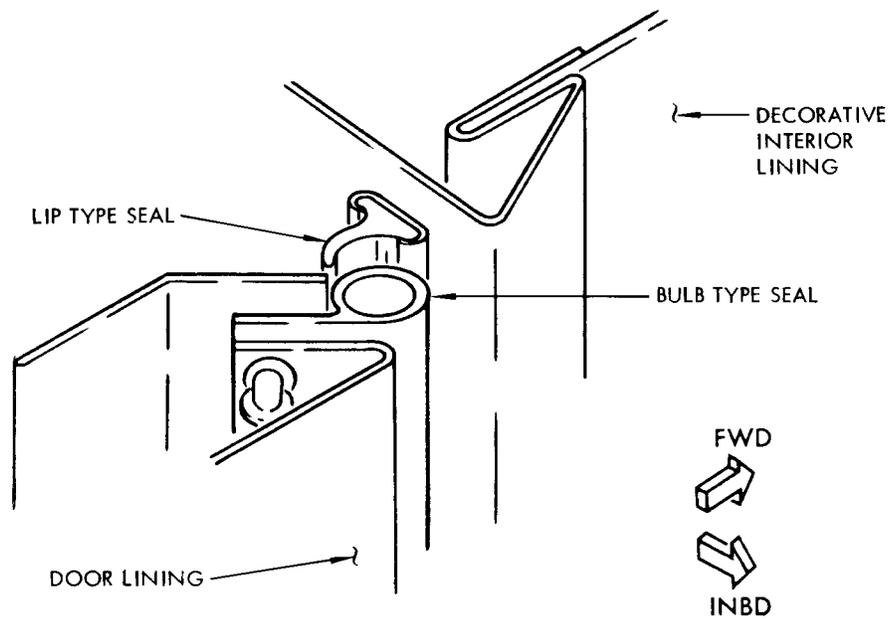
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Acoustic and Thermo Seal Installation  
 Figure 401

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## MAINTENANCE MANUAL

### LIGHT SEALS - REMOVAL/INSTALLATION

1. General
  - A. Light seals are used to prevent light leakage between individual compartments of the cabin area. Light seals are attached by bonding or placed under a retainer or hinge on the door and partition structure.
2. Equipment and Materials
  - A. Leather punch - 0.22-inch diameter hole
  - B. B01008 Solvent - Final Cleaning of Metal Prior to Non-structural Bonding (Series 88) (Ref AMM/SOPM 20-30-88)
  - C. Adhesive - EC-4475, Minnesota Mining and Manufacturing Co., St . Paul, Minnesota
  - D. B00068 Denatured ethyl alcohol
  - E. G00034 Cotton Wiper-Process Cleaning Absorbent Wiper BMS 15-5
  - F. Brush for application of adhesive
3. Remove Light Seal (See figure 401.)
  - A. Door light seals that are between the partition and the hinge may be removed by removing the hinge screws freeing seal from the partition structure.
  - B. Remove bonded seals by pulling the seal and breaking the adhesive bond to the partition structure.
4. Install Light Seal (See figure 401.)
  - A. Install door light seal in hinge area.
    - (1) Position door seal on partition and punch holes in seal flange to correspond with hinge attachment holes.
    - (2) Set door in place and attach the seal and hinge to partition structure with the decorative screws.
  - B. Install door bonded light seal.
    - (1) Clean partition seal surface. Remove old adhesive with solvent, Series 88 (Ref AMM/SOPM 20-30-88) and a clean cotton wiper prior to bonding a new seal in place.

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIRMENTS FOR PROPER HANDLING PROCEDURES.

- (2) Clean vinyl surfaces. Denatured alcohol may be used instead of aliphatic naphtha. Wipe off solvent before it has evaporated using a new cotton wiper.
- (3) Prepare EC-4475 for brushing. Stir thoroughly. Thin EC-4475 with one part of methyl ethyl ketone to one part of adhesive by volume, well blended.

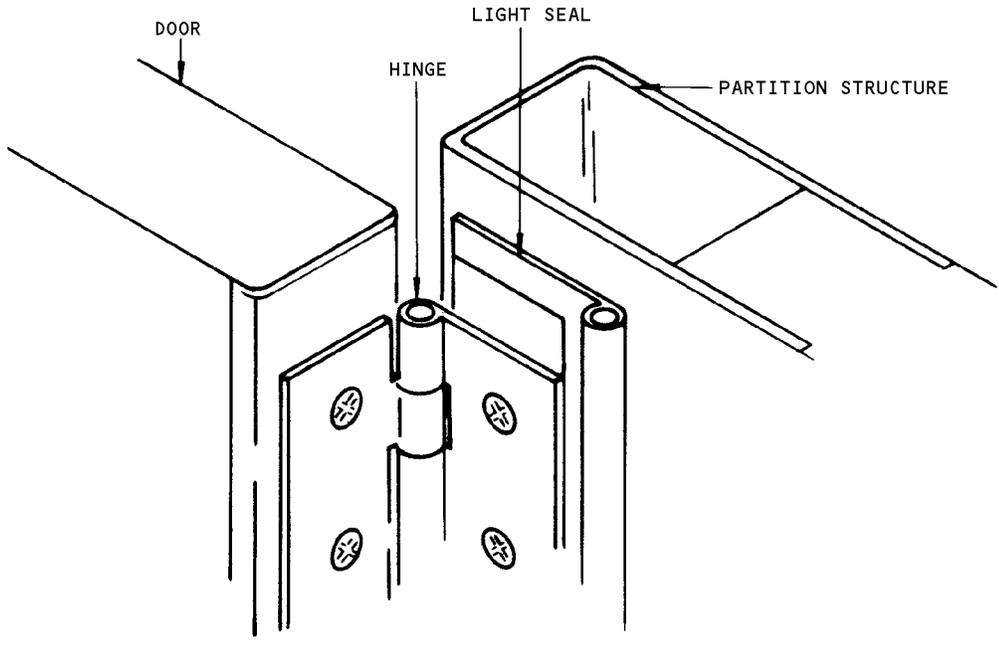
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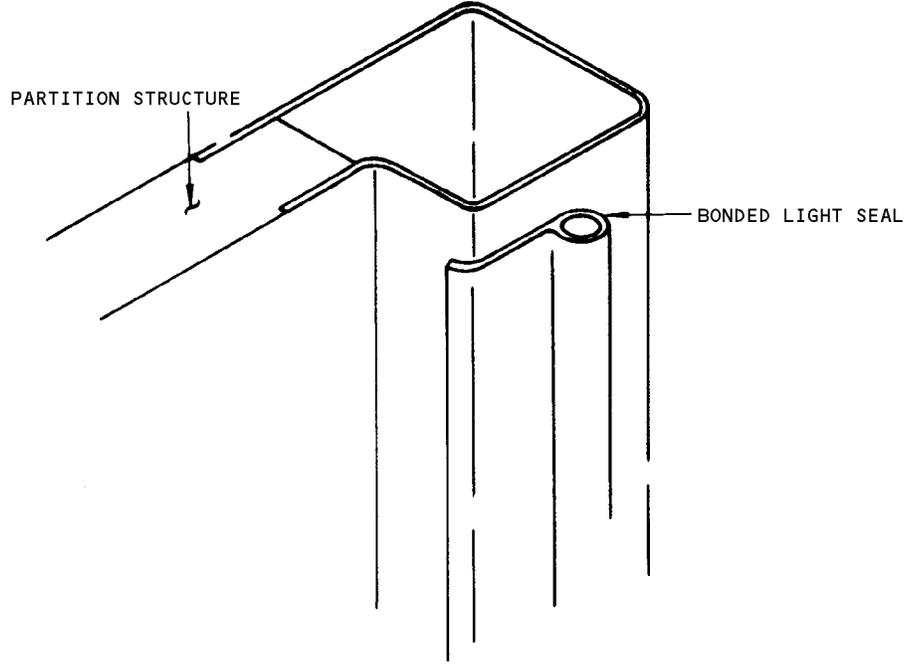
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TYPICAL LIGHT SEAL INSTALLATION AT HINGE



TYPICAL BONDED LIGHT SEAL INSTALLATION

Door Light Seal Installation  
 Figure 401

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- (4) Apply an even brush coat of EC-4475 to both bonding surfaces. Allow to dry 20 to 30 minutes. Apply a second coat of adhesive to both bonding surfaces and commence the bonding operation immediately.
- (5) Accurately position the vinyl seal at one end or edge of the surface to be bonded. Bond the new seal in place on the partition seal surface so that when the door is closed the seal will be depressed equally along its length.

**NOTE:** Press the seal carefully in place progressively over the entire bond area. Extreme care must be taken when positioning the vinyl because once the surfaces have touched they should not be moved or separated. Heavy hand pressure or roller pressure may be used to obtain good contact between bonding surfaces. If the adhesive becomes too dry before completion of bonding, it may be reactivated by wetting one surface with cotton wiper or a brush dampened with methyl ethyl ketone.

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FORWARD ENTRY DOOR - DESCRIPTION AND OPERATION

1. General

- A. The forward entry door is an inward-outward opening plug type door at the forward end of the fuselage, on the left side. (See figure 1.) An upper and a lower hinge assembly support the door on its forward edge in the door opening, and the door may be closed or opened from inside or outside the airplane.
- B. The door is opened by manually operating the centrally located handle, which causes an internal mechanism within the door to release roller latches on the door from latch fittings on the door jambs, folds the gates inward, and moves the door to its most inward position. The door is then manually swung through the door opening and stowed in the open position by the engagement of a latch pin in a hole in the upper hinge assembly.
- C. The door is guided during the final closing operation by a centering guide attached to the center of the aft edge of the door engaging with a centering track located on the aft frame of the door opening. When the door is in the closed position and the passenger cabin is pressurized, door stops mounted on the forward and aft frames of the door opening are contacted by adjustable door stop pins attached to the forward and aft edges of the door. The door stops transmit the pressurization loads on the door to the fuselage structure surrounding the door, and prevent excessive deflection of the seal attached around the entire edge of the door. A flap is located at both the upper and lower hinges between cutouts in the door reveal and is attached by a hinge to the forward frame of the door opening. The flap provides continuity of contact surface for the seal around the hinge cutouts when the door is in the closed position. Water drains are provided at the upper and lower hinge locations and along the lower edge of the lower gate. A proximity switch, attached to the door and door frame, is in circuit with the door warning system. Refer to 52-71-0. Assist handles are provided to give additional control during the door operating cycle.

2. Handle Mechanism

- A. The inside handle (detail B, figure 1) is bolted to a cam plate which is splined to receive the outside handle shaft. The outside handle in a recess panel flush with the door exterior skin is attached to a handle sleeve which is splined to receive the outer end of the handle shaft. A seal, to prevent pressurization losses is located inside the handle shaft. Another seal is positioned between the sleeve housing and the seal plate. An outside handle seating spring is retained within the handle shaft by a nut and spring retainer. A pin located inside the spring is attached to a pin retaining washer, which is clamped between the outside handle and the handle sleeve. A centering cam on the handle sleeve engages on a cam on the sleeve housing, which is attached to the handle mechanism housing.

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## MAINTENANCE MANUAL

### 3. Latching Crank and Door Locking Crank

A. Two cam rollers attached to two roller cranks bear against a cam plate. Viewing the door from inside the airplane, the left cam roller crank is splined to a latching crank. The complete crank assembly rotates in ball bearings secured in the handle mechanism housing by bearing retainers. Two separate control rods, connected to each end of the latching crank connect with latch rods at the top and bottom of the door. The right cam roller crank is splined to the door cocking crank which is connected to the torque tube. The torque tube is supported on two ball bearings mounted in the handle mechanism housing. Two nuts allow vertical adjustment of the door in the door opening. Twelve bolts secure the handle mechanism housing to the door structure.

### 4. Latch Assembly

A. Latch rollers (detail E, figure 1) at the ends of the latch rods engage with latches mounted on the door jambs. The upper and lower latch rods have control rods connected to the upper and lower gates respectively. The gates are mounted at the top and bottom of the door with piano-type hinges with diaphragm seals to prevent pressurization leaks. Stop rods at both ends of each gate prevent distortion of the gates when the cabin is pressurized.

### 5. Upper Hinge Assembly

A. The upper hinge arm (detail C, figure 1) is bolted to the hinge pin which rotates in plain bushings in the upper hinge support. The hinge pin is secured to the torque tube. A guide arm is connected with a bearing to the upper hinge support. The other end of the guide arm contains a spring-loaded guide arm roller that carries two guide arm roller bushings which operate in S-shaped tracks in the roller guide plates. A hole in the top guide plate allows engagement of a latch pin which is manually released by a stowing latch lever. The upper spigot at the end of the spring-loaded torque tube connects radius links and upper hinge arm to the roller guide plates.

B. The door open stowing latch consists of a latch lever and a spring-loaded latch pin. The latch pin is installed concentrically within the guide arm roller and extends above the roller bushing, the pin is further extended by spring action into a hole in the roller guide plate when the door reaches the stowed open position. A collar mounted circumferentially around the guide arm roller and latch pin has two spring pins which extend from the outer periphery to engage the stowing latch lever. Another spring pin is installed through the collar, guide arm roller, and latch pin. The hole on either side of the guide arm roller is slotted so that manual depression of the stowing latch lever causes the collar and latch pin to be pulled down sufficiently against the spring force to clear the stop hole in the roller guide plate permitting door closing to be started.

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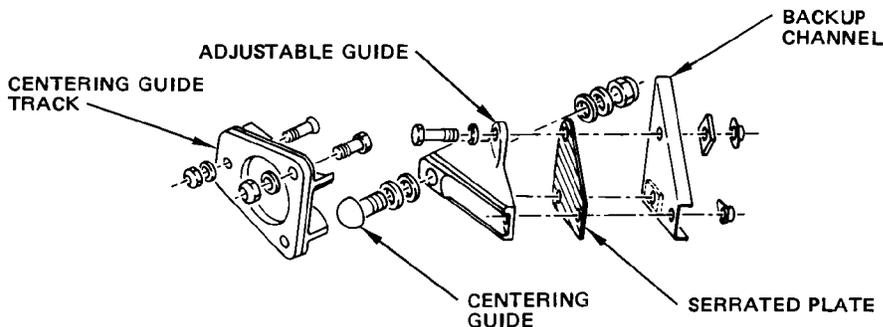
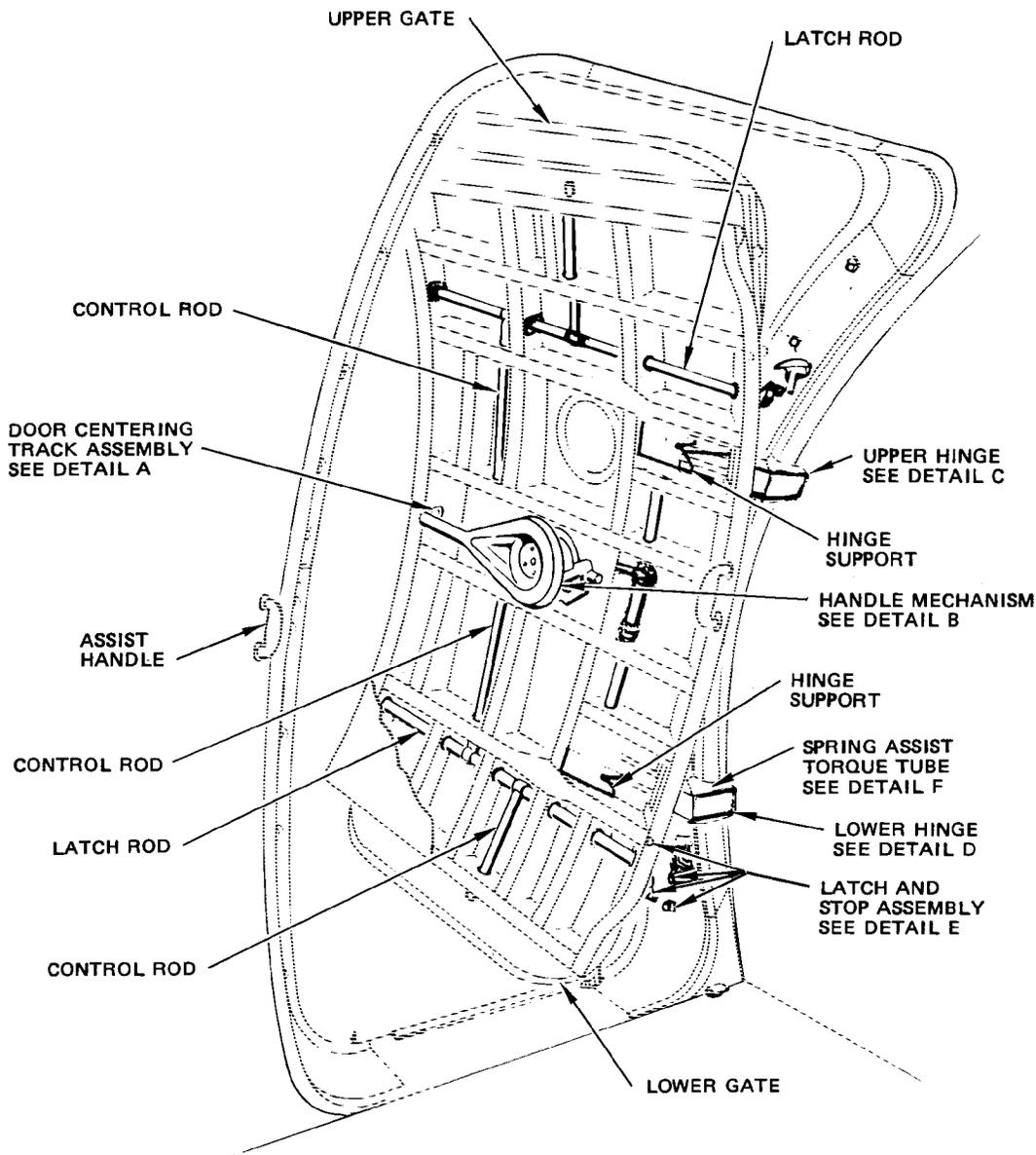
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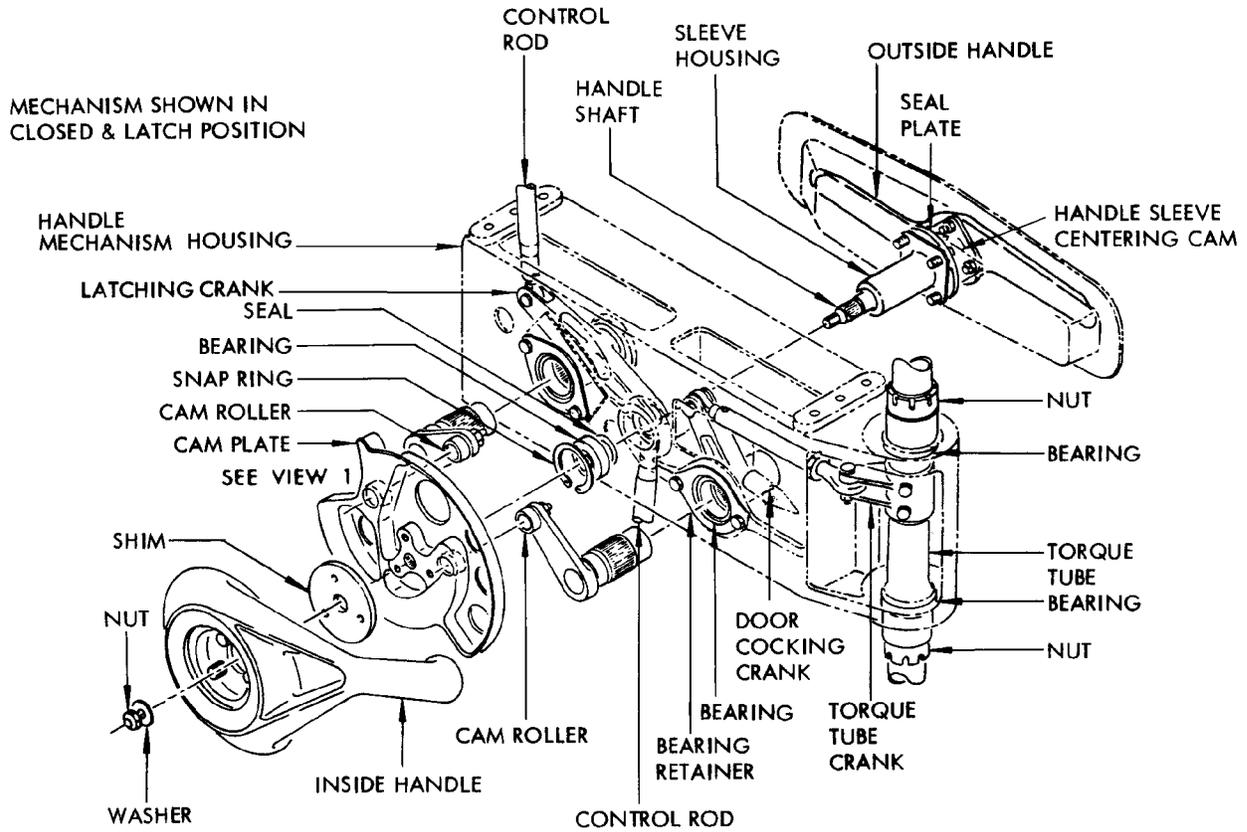
**DETAIL A**

**Forward Entry Door Mechanism  
Figure 1 (Sheet 1)**

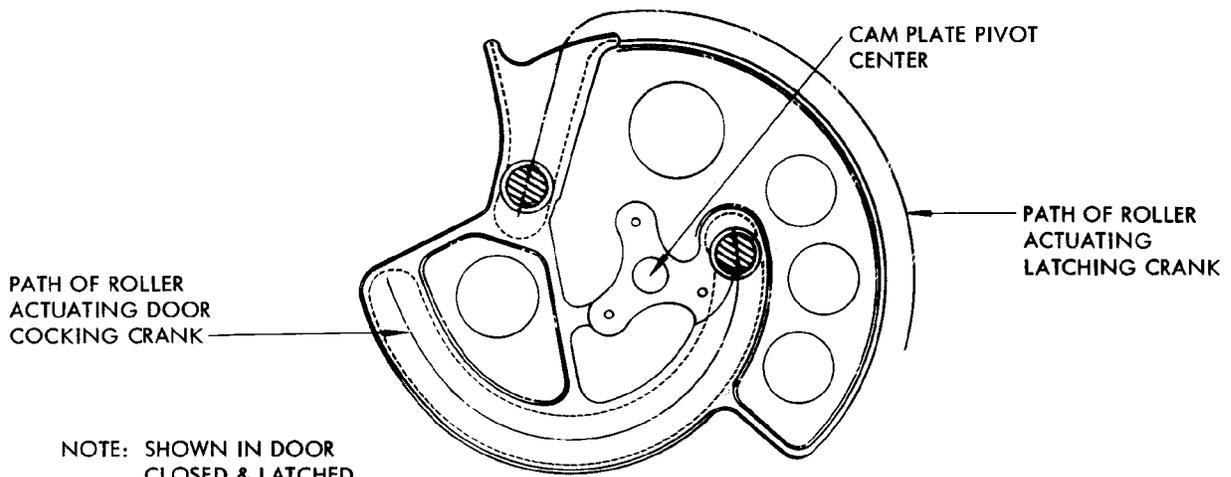
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**MAINTENANCE MANUAL**



**HANDLE MECHANISM  
DETAIL B**



**CAM PLATE  
VIEW 1**

**Forward Entry Door Mechanism  
Figure 1 (Sheet 2)**

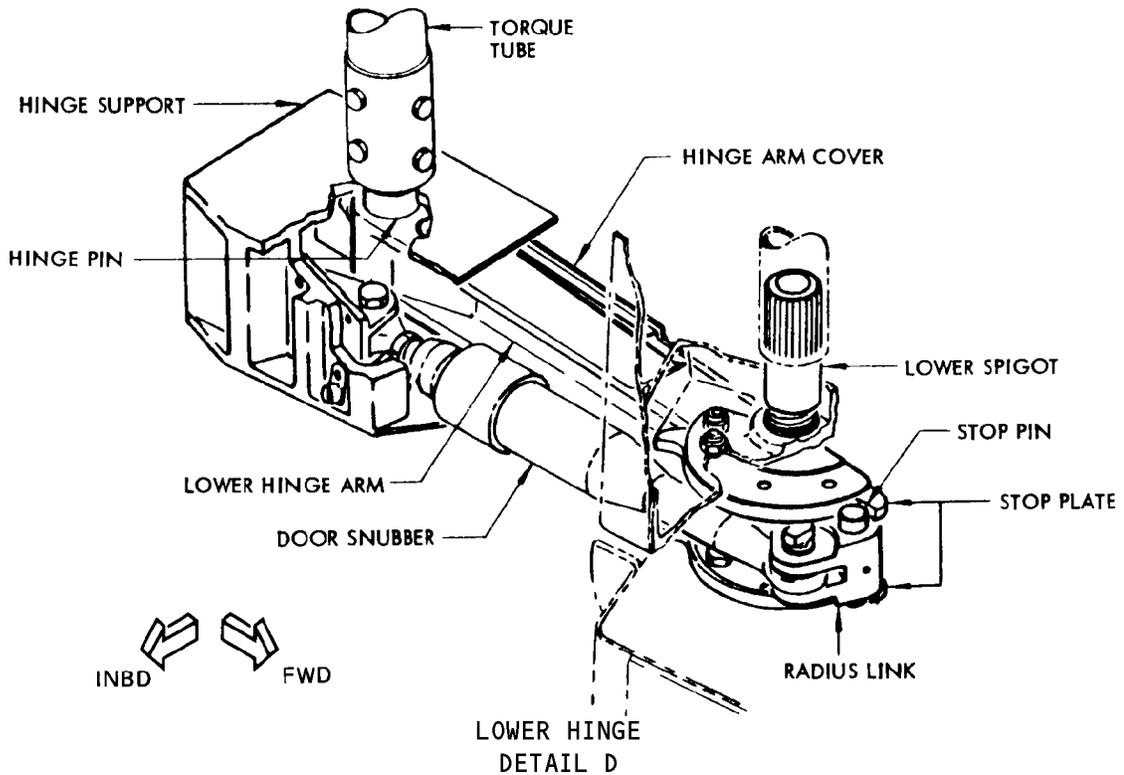
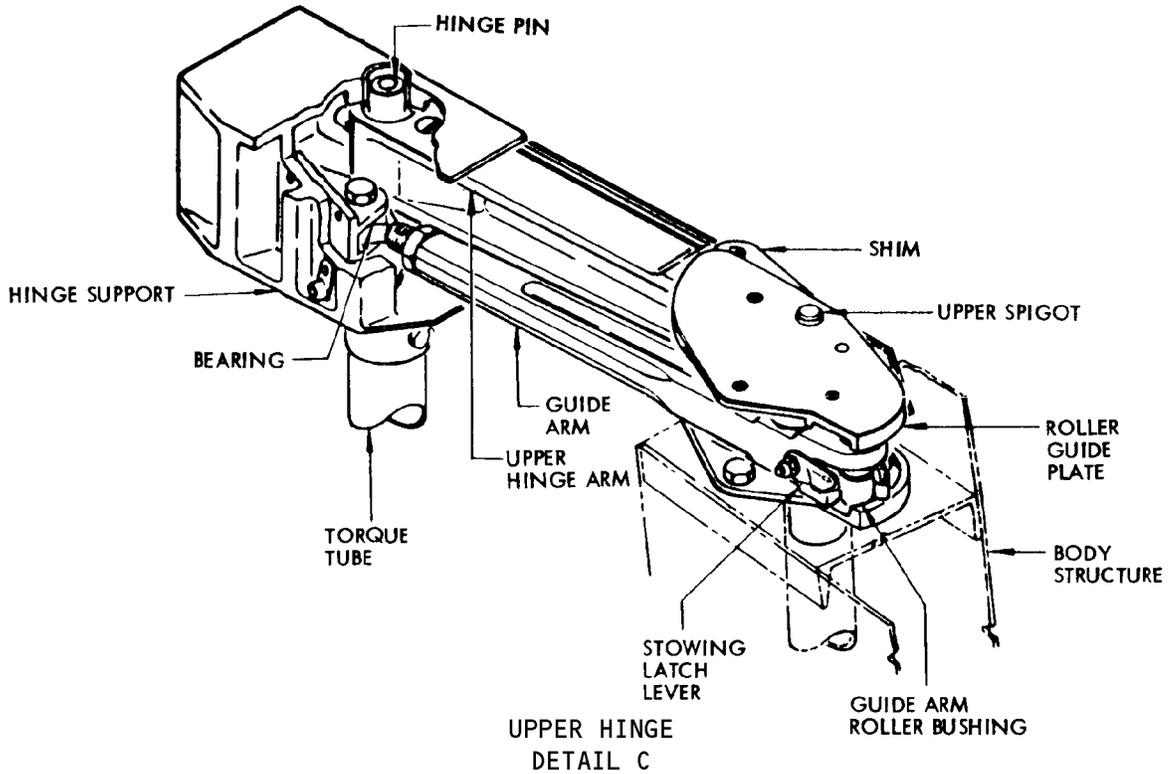
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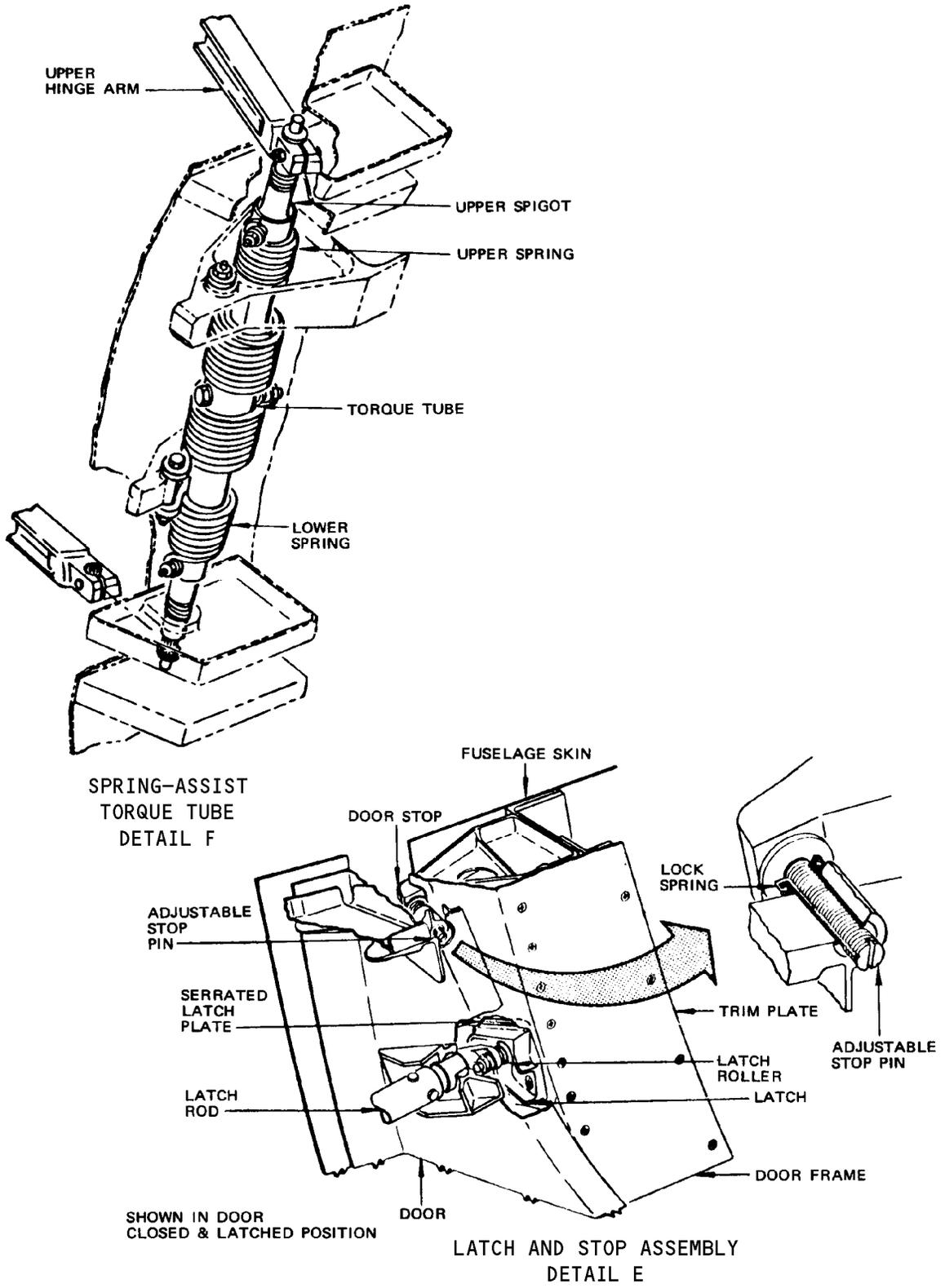
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Forward Entry Door Mechanism  
 Figure 1 (Sheet 3)

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Forward Entry Door Mechanism  
 Figure 1 (Sheet 4)

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6. Lower Hinge Assembly

A. The lower hinge arm (Detail D, Fig. 1) is bolted to the hinge pin which is located in two plain bushings in the lower hinge support. A seal for pressurization, is located between the hinge pin and the hinge support. Two stop plates are mounted at the lower hinge position on the forward frame of the door opening. A radius link, including a stop pin, is located between the stop plates. The lower hinge arm is attached to the radius link and stop plates by the lower hinge spigot. A door snubber is located at the lower hinge assembly. Both ends of the snubber contain a spherical-type bearing. One end is bolted to the lower hinge support and the other end is bolted to the radius link.

7. Spring Assist Torque Tube

A. A spring-loaded torque tube assembly (Detail F, Fig. 1) is mounted in the right side of the door frame. The upper and lower hinge arms (Detail F) are either splined and clamped to the upper and lower spigots or have a smooth oval cross-section which mates with a hole in the hinge arm. The upper spigot is connected to the torque tube by the upper spring attachment nut and bolt. The lower spigot is splined to the lower end of the torque tube. Three springs are mounted on the torque tube. The upper and lower springs are connected to the structure and torque tube to assist the initial 60 degrees of door closing from the door "stowed open" position. The center spring is connected to the torque tube and the structure to assist the door opening from the "door cocked" position to the balanced position, which is approximately 60 degrees from the door "stowed" open position. Spring-loaded retainers support seals at the upper and lower spigots to prevent pressurization losses.

8. Door Lining and Insulation

A. The entry door panels are decorative linings made of vinyl-aluminum laminate with an insulation blanket cemented to the outboard side of each panel. The entry door has an upper panel and a lower panel. The inboard window is removable without removing the panel.

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### 9. Operation

- A. The door is opened from the airplane interior by rotating the inside handle counterclockwise (figure 2). Initial rotation of the cam plate transmits angular movement to the latching crank assembly. The control rods at each end of the latching crank, turn the latch rods and withdraw the latch rollers from the latches, allowing the door to move inward. When the door moves inward, the proximity switch is closed in the door warning circuit and the door warning light is illuminated. Refer to 52-71-0. The latch rods also operate the control rods attached to the upper and lower gates, causing these to fold inward and push the stop rods away from their stops. Further rotation of the handle to its full travel of 180 degrees allows the cam plate to transmit angular movement to the cocking crank assembly. The cocking crank operates the pushrod connected to the torque tube crank. Movement of the pushrod is resisted by the torque tube, causing the door to rotate on the hinge arms and pivot about the torque tube axis. This motion is due to the change in relative positions of the hinge arm and guide arm at the upper hinge, and the hinge arm and snubber at the lower hinge. Tracking of the door is controlled by the guide arm roller in the roller guide plates. As the door rotates to the cocked position, (figure 2, step 3), the guide arm and snubber deflect the upper and lower hinge flaps inward on their hinges. The door is swung through the opening by means of the assist handle. The outward lateral travel of the hinge arm transmits motion through the radius link to the guide arm which in turn causes the door to rotate, in an outward direction, about the pivot axis of the torque tube. The inside handle on the door automatically rotates approximately 45 degrees clockwise during final movement of the door to the open latched position, (figure 2, step 6). This is due to the change in relative position of the hinge arms, guide arm and snubber, passing beyond 180 degrees from the door cocked position and causing the door to counter-rotate and operate the cocking crank and cam plate in reverse. When the door is approximately parallel with the airplane exterior, the stop pin contacts the stop plate and prevents further movement of the door. The door is latched in the open position by the latch pin engaging the latch pin hole.
- B. The door is opened from the airplane exterior by holding the outside handle with both hands and pulling outward to clear the handle recess panel (figure 3, step 1). This compresses the handle seating spring and engages the handle sleeve splines with the splines on the handle shaft. Rotating the handle 180° clockwise operates the door mechanism as described in paragraph 9.A., bringing the door into the cocked position. The handle is then returned into the recess. The centering cam on the handle sleeve ensures that the handle is centered in the recess. The door is swung through the opening until the stop is contacted, and is latched in the open position by the latch pin engaging the latch pin hole (figure 3, step 4).

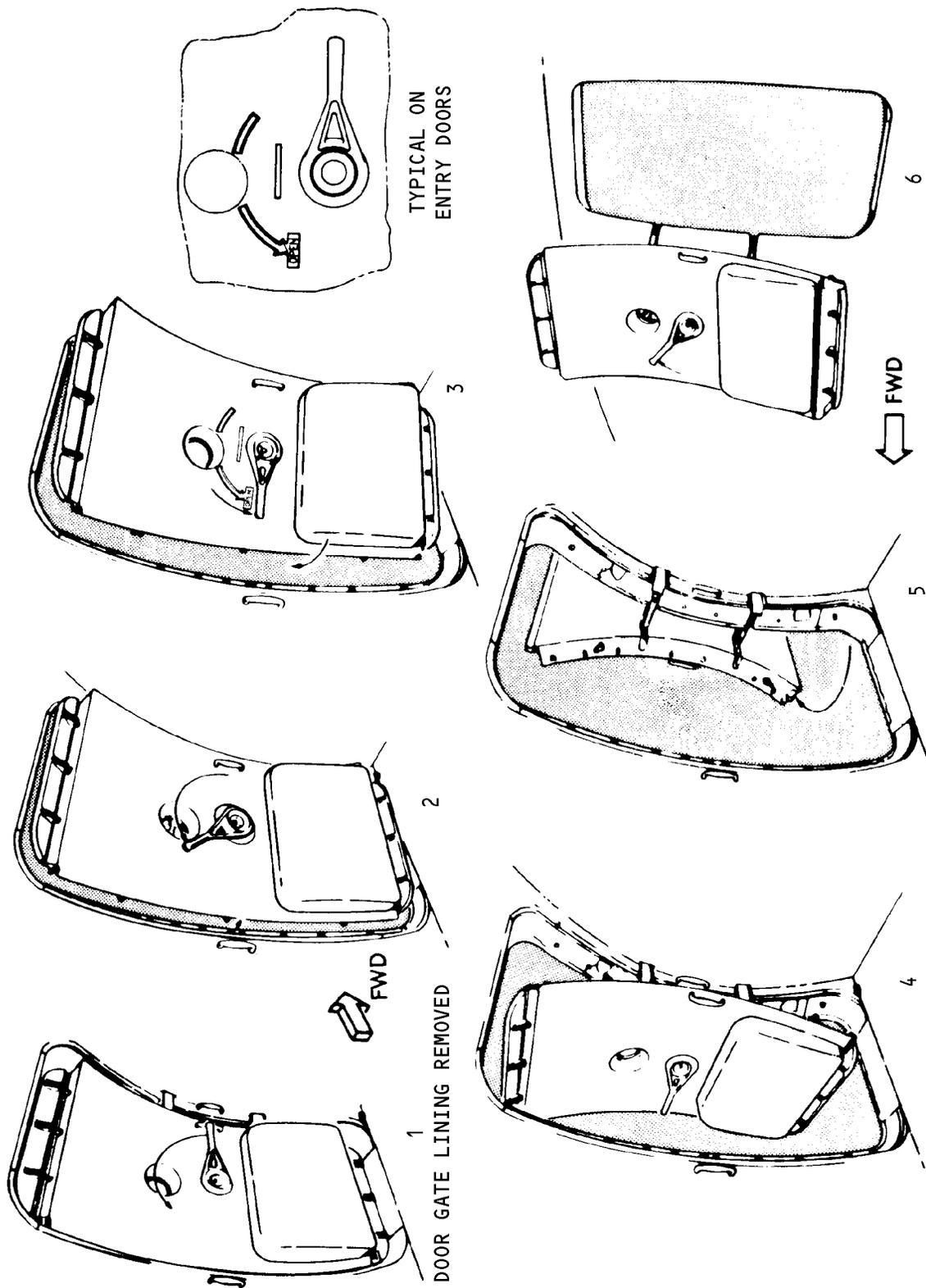
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Entry Door Operation from Inside Airplane  
 Figure 2

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- C. AIRPLANES WITH FORWARD AIRSTAIRS;  
The door is opened from the airplane exterior on the airstair by first extending the forward airstair. Pull the exterior door handle outboard from the recess in the door. Turn the exterior handle 180 degrees clockwise to unlatch the door and move the door to the cocked position. Lift and attach the airstair aft handrail extension to the support bracket in the doorway. Use the door assist handle to open the door to the full position. Because the airstair platform area is so small, as you open the door it may be necessary to move down the airstair a few steps to prevent falling. When the door opens to the full position, it will contact the door stop. A latch pin engages the latch pin hole to hold the door in the fully open position. Lift and attach the airstair forward handrail extension to the support bracket in the doorway.
- D. The door is closed from the airplane interior by depressing door open stowing latch lever which releases the latch pin. The door is swung through the door opening by means of the assist handle, and is permitted to "fall" into the opening until stopped by the door snubber. When the stop pin contacts the stop plate, the door is in the cocked position. As the door is swung around from the latched open position, the inside handle automatically moves counterclockwise to the fully open position, as described in paragraph 9.A. Rotating the inside handle 180° clockwise operates the door mechanism in the reverse direction to that described in paragraph 9.A., and brings the door into the center of the door opening. The door centering roller engages with the centering track and guides the door into the center of the door opening, allowing the latch rollers to engage with the latches. Rotation of the latch rods operates the upper and lower gate control rods and unfolds the gates outward. The action of the latch rollers in the latches pulls the door into the door opening, compresses the seal around the edge of the door and opens the door warning proximity switch. Refer to Section 52-71-0.
- E. The door is closed from the airplane exterior by depressing the door open stowing latch lever and swinging the door through the door opening by means of the assist handle. The outside handle is grasped with both hands, pulled outward to clear the handle recess panel, and rotated 180° counterclockwise. The handle is then returned into the recess.
- F. AIRPLANES WITH FORWARD AIRSTAIRS;  
The door is closed from the airplane exterior on the airstair by first disconnecting and stowing the airstair aft and forward handrail extensions. Stay in the door opening to depress the door open stowing latch lever. Pull the door halfway closed by means of the assist handle. Step down approximately four steps onto the stairs while holding the door stationary. Move the door into the door opening. The exterior door handle is grasped with both hands, pulled outboard to clear the handle recess panel, and rotated 180 degrees counterclockwise to close and latch the door. The handle is then returned into the recess. Retract the airstair.

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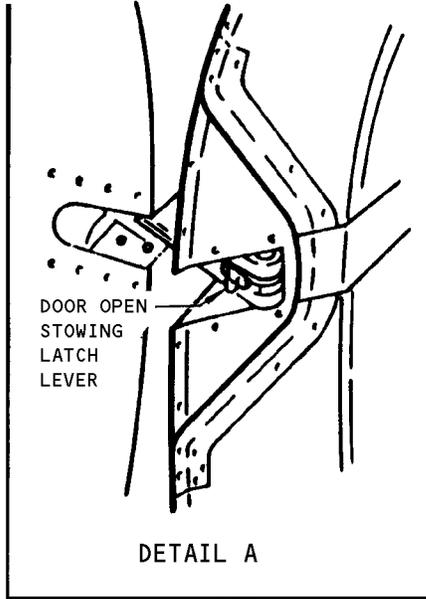
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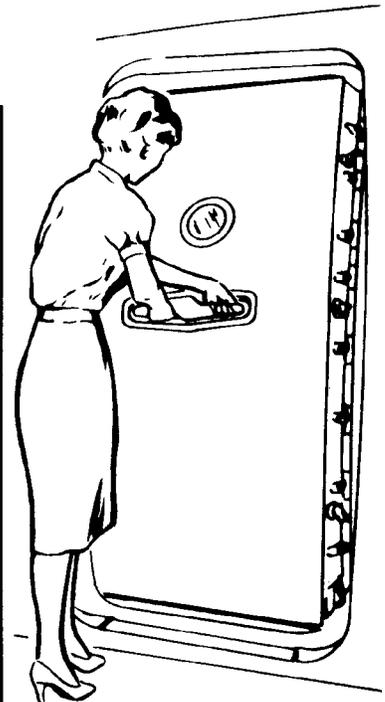


1 PULL HANDLE

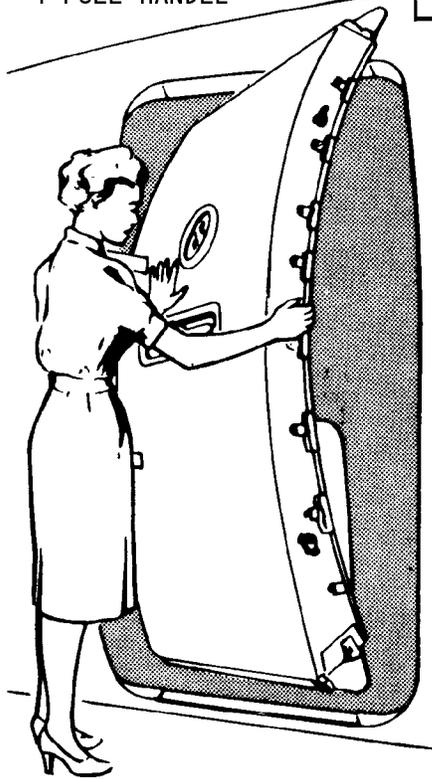


DOOR OPEN  
 STOWING  
 LATCH  
 LEVER

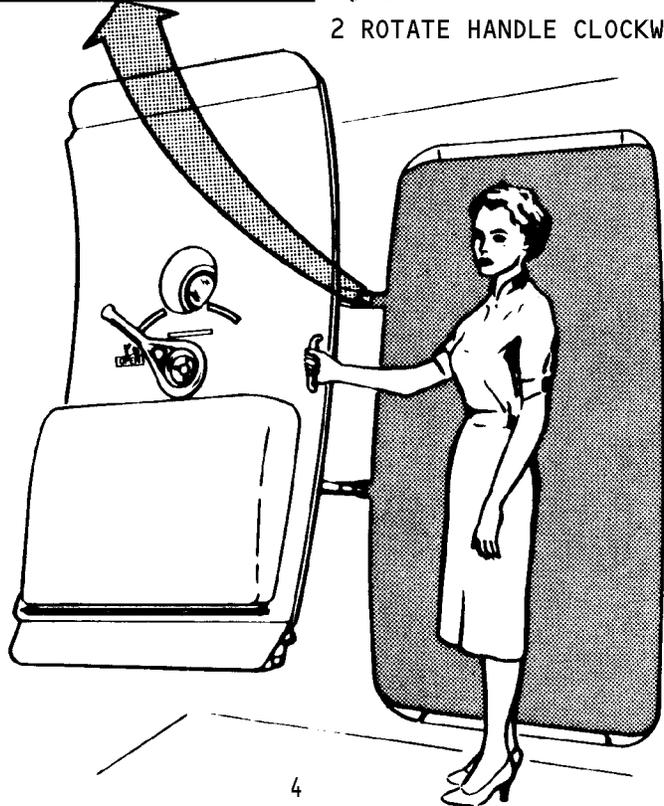
DETAIL A



2 ROTATE HANDLE CLOCKWISE



3



4

Entry Door Operation from Outside Airplane  
 Figure 3

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MAINTENANCE MANUAL

FORWARD ENTRY DOOR – MAINTENANCE PRACTICES

1. General

A. This procedure contains these tasks:

- (1) Use the exterior handle to open the forward entry door from the airstair.
- (2) Use the exterior handle to close the forward entry door from the airstair.

TASK 52-11-0-012-001

Open the Forward Entry Door from the Airstair

A. General

- (1) This task has the steps to open the forward entry door from the forward airstair.

B. References

- (1) 24-22-0/201, Manual Control
- (2) 52-61-0/1, Forward Airstair and Door

C. Access

- (1) Location Zone  
105 Forward Entry Door

D. Procedure

S 862-002

- (1) Supply electrical power (Ref AMM 24-22-0/201).

S 862-003

- (2) As required, do this step to make sure that the door is safe:

**WARNING:** MAKE SURE THAT THE GIRT BAR IS NOT ENGAGED IN THE BRACKETS OF THE FLOOR-MOUNTED ESCAPE SLIDE. IF THE GIRT BAR IS ENGAGED IN THE BRACKETS, THE ESCAPE SYSTEM CAN OPERATE WHEN YOU OPEN THE DOOR. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (a) Make sure the girt bar is not engaged in the floor-mounted escape slide brackets.

S 862-004

- (3) Do these steps to open the forward entry door from the airstair:

**CAUTION:** DO NOT OPERATE THE DOOR DURING WINDS OF MORE THAN 40 KNOTS. DO NOT KEEP THE DOOR OPEN WHEN WIND GUSTS ARE MORE THAN 65 KNOTS. STRONG WINDS CAN CAUSE DAMAGE TO THE STRUCTURE OF THE AIRPLANE.

- (a) Extend the airstair (Ref. AMM 52-61-0/1).

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AIRPLANES WITH FORWARD AIRSTAIRS

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- (b) Pull the exterior door handle outboard from the recess in the forward entry door to engage the door drive mechanism.
- (c) Turn the exterior handle 180 degrees clockwise to unlatch the door.

**NOTE:** When you turn the handle 180 degrees clockwise, the rollers disengage with the latch fittings.

**NOTE:** The initial movement of the door is inward.

- (d) Return the exterior handle into the recess of the door.
- (e) Turn the door to the cocked position in the door opening.

**WARNING:** EXTEND AND CONNECT THE AIRSTAIR AFT HANDRAIL. IF YOU DO NOT EXTEND AND CONNECT THE AIRSTAIR AFT HANDRAIL, PERSONS CAN FALL FROM THE AIRSTAIR. INJURIES TO PERSONS CAN OCCUR.

- (f) Extend and connect the airstair AFT handrail to the support bracket in the doorway.

**WARNING:** MOVE DOWN THE AIRSTAIR WHILE THE DOOR MOVES TO THE OPEN POSITION. IF YOU DO NOT MOVE DOWN THE AIRSTAIR, THE DOOR WILL HIT YOU AND YOU MAY FALL. INJURIES CAN OCCUR.

- (g) Use the door assist handle to pull the door outboard and forward until the hold open mechanism in the guide arm engages and the door is held in the fully open position.

**NOTE:** The door will be parallel to the fuselage when fully open.

- (h) Extend and connect the airstair FORWARD handrail to the support bracket in the doorway.
- (i) Put the warning strap across the door opening, if necessary.

TASK 52-11-0-412-005

### Close the Forward Entry Door from the Airstair

#### A. General

- (1) This task has the steps to close the forward entry door from the forward airstair.

#### B. References

- (1) 24-22-0/201, Manual Control
- (2) 52-61-0/1, Forward Airstair and Door

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C. Access

- (1) Location Zone  
105 Forward Entry Door

D. Procedure

S 862-006

- (1) Do these steps to close the door with the exterior handle from the airstair.

**CAUTION:** DO NOT OPERATE THE DOOR DURING WINDS OF MORE THAN 40 KNOTS. DO NOT KEEP THE DOOR OPEN WHEN WIND GUSTS ARE MORE THAN 65 KNOTS. STRONG WINDS CAN CAUSE DAMAGE TO THE STRUCTURE OF THE AIRPLANE.

- (a) Remove the warning strap from across the door opening if it is installed.

**WARNING:** BE CAREFUL WHEN YOU OPERATE THE DOOR FROM THE AIRSTAIRS OR A MAINTENANCE STAND. IT IS NOT EASY TO OPERATE THE DOOR FROM THE SMALL PLATFORM AREA AND DURING BAD WEATHER CONDITIONS. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (b) Disconnect the FWD and AFT handrail extensions from the support brackets in the doorway.  
(c) Retract the airstair FWD and AFT handrail extensions.  
(d) Release the door hold open lock from the locked position.

**NOTE:** It is possible to release the hold open lock and pull the door to the cocked position while standing in the door opening. This may allow better leverage to close the door.

**WARNING:** MOVE DOWN THE AIRSTAIR WHILE THE DOOR MOVES TO THE CLOSED POSITION. IF YOU DO NOT MOVE DOWN THE AIRSTAIR, THE DOOR WILL HIT YOU AND YOU MAY FALL. INJURIES CAN OCCUR.

**CAUTION:** OBEY THE INSTRUCTIONS THAT FOLLOW TO CLOSE THE DOOR. IF YOU DO NOT FOLLOW THE STEPS IN THE GIVEN SEQUENCE, DAMAGE TO EQUIPMENT CAN OCCUR.

- (e) Use the door assist handle to pull the door into the door opening.

**NOTE:** The door should be in the cocked position in the door opening.

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AIRPLANES WITH FORWARD AIRSTAIRS

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(f) Pull and turn the exterior handle 180 degrees counterclockwise to fully close the door.

NOTE: When you turn the handle 180 degrees counterclockwise, the latch rollers engage with the latch fittings.

(g) Put the exterior handle into the recess of the door.

(h) Retract the airstair (Ref. AMM 52-61-0/1).

S 862-007

(2) Put the airplane back to its usual condition.

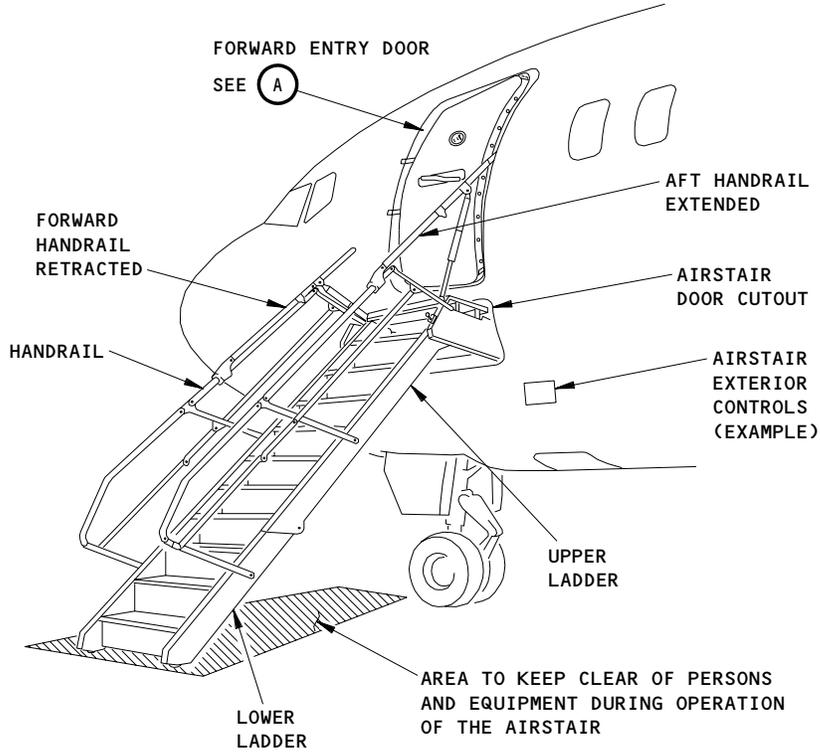
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AIRPLANES WITH FORWARD AIRSTAIRS

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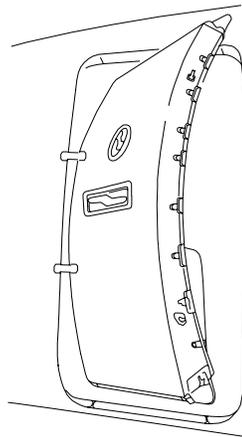
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**737**   
**MAINTENANCE MANUAL**



**AIRSTAIR  
(DOOR IN COCKED POSITION)**



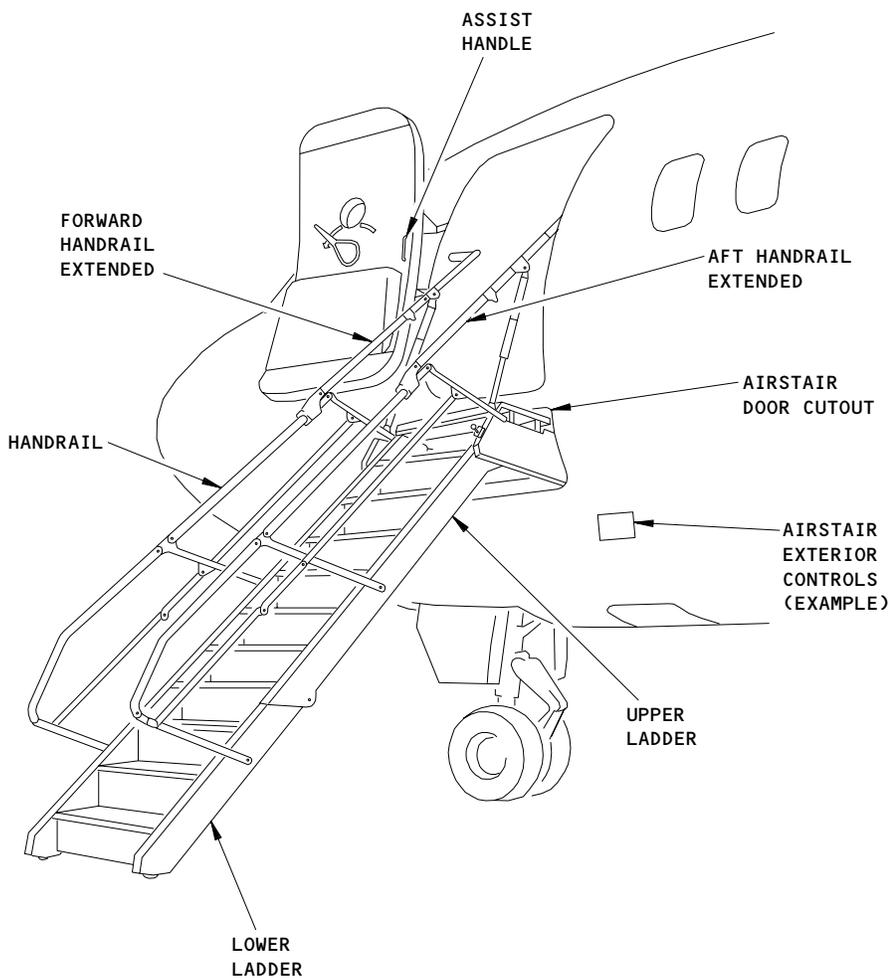
**FORWARD ENTRY DOOR  
(IN COCKED POSITION)**

(A)

**Forward Entry Door Operation  
Figure 201 (Sheet 1)**

EFFECTIVITY  
AIRPLANES WITH FORWARD AIRSTAIRS

**52-11-0**



**AIRSTAIR  
(DOOR FULLY OPEN)**

**Forward Entry Door Operation  
Figure 201 (Sheet 2)**

**EFFECTIVITY**  
**AIRPLANES WITH FORWARD AIRSTAIRS**

**52-11-0**

FORWARD ENTRY DOOR - REMOVAL/INSTALLATION

1. Equipment and Materials

- A. Corrosion Preventive Compound MIL-C-16173, Grade 2 (Ref 20-30-21)
- B. Primer BMS 10-11, Type 1 (Ref 20-30-41)
- C. Safety Barrier, Entry and Galley Doors C52012-1, or 4PRE50-7945, or Warning Strap
- D. Grease - BMS 3-33 (Preferred)
- E. Grease - MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)
- F. Organic Corrosion Inhibiting Compound BMS 3-27 (Ref 20-30-21)

2. Remove Forward Entry Door

- A. Remove door lining and insulation panels (Ref 52-11-31 R/I).
- B. Remove assist spring and torque tube from forward edge of door frame (Ref 52-11-41 R/I).
- C. At lower hinge, disconnect snubber (24, Detail B, Fig. 401) from door by removing four bolts securing attach fitting (25) to hinge support (26). Remove snubber and radius link (21) as a unit from forward edge of door frame.
- D. At upper hinge, loosen clamp bolt (7, Detail A) on upper hinge arm (2) and withdraw upper spigot (10) together with thrust washer (8), compression spring (11), retainer washer (12) and O-ring (13).

**NOTE:** For reference on installation, mark upper spigot and upper hinge arm to index relative position of these parts.

- E. Disconnect guide arm (14) from door by removing four bolts securing attach fitting (16) to hinge support (17). Carefully slide roller end of guide arm out from between roller guide plates (5) and remove guide arm from forward edge of door frame.
- F. Swing upper and lower hinge arms away from forward edge of door frame and remove entry door.

**NOTE:** Weight of forward entry door is approximately 180 pounds.

- G. If new door is not to be installed immediately, install cargo door personnel safety barrier or warning strap across door opening.

**WARNING:** DO NOT USE THE WARNING STRAP TO SUPPORT THE WEIGHT OF A PERSON. THE WARNING STRAP INSTALLED ACROSS THE DOOR IS ONLY A VISUAL INDICATION THAT THE DOOR IS OPEN AND WILL NOT SUPPORT A PERSON. IF YOU USE THE STRAP TO SUPPORT YOUR WEIGHT, YOU CAN FALL THROUGH THE DOOR AND CAUSE INJURY.

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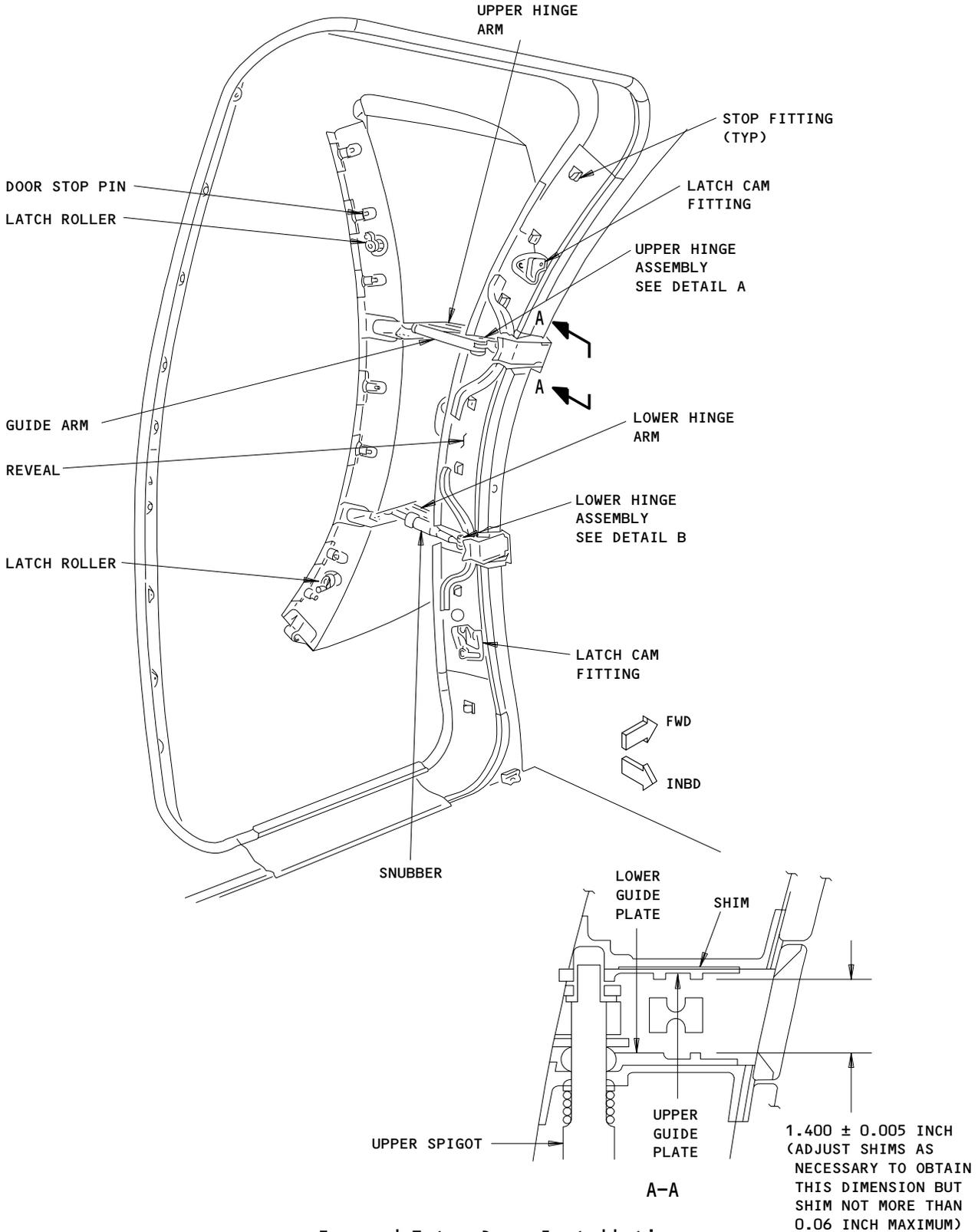
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**MAINTENANCE MANUAL**



**Forward Entry Door Installation**  
**Figure 401 (Sheet 1)**

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3. Prepare for Installation

- A. Check that dimension between guide plates at upper hinge is as specified in Section A-A, Fig. 401. Adjust shims underneath guide plate as necessary to achieve this dimension.

**NOTE:** It is necessary to maintain this dimension to ensure door latchpin engagement.

- B. If a new door is to be installed, remove the following parts from the old door for reinstallation on the new door.

- (1) Remove upper and lower hinge arm covers by removing attachment bolts.

**NOTE:** Collect and tag shims.

- (2) Remove stop pins and locksprings from forward and aft edge of door.  
(3) Remove the seal from door (Ref 52-09-131, Bulb-Type Mechanical Seals).  
(4) Apply organic corrosion inhibiting compound to door hinge areas, under scuff plates, and lower 3 to 4 inches of door interior per instructions in 51-21-91.  
(5) Remove door safety barrier or warning strap, if installed.

4. Install Forward Entry Door

- A. Support door in position at door opening at approximately 60 degrees from the "door stowed" open position, with the hinge arms positioned properly at the forward edge of doorframe.

**NOTE:** Until installation and adjustment of guide arm and snubber are complete, care should be taken not to allow excessive door movement which might strain hinge mechanism.

- B. Install guide arm (14, Detail A).

- (1) At upper hinge, carefully slide roller end of guide arm (14) between roller guide plates (5).  
(2) If attach fitting (16) was removed from guide arm (14), connect attach fitting to guide arm rod end bearing (15) by means of guide arm attachment bolt (1).  
(3) Connect attach fitting (16) to hinge support (17) with four bolts.

**CAUTION:** ATTACH FITTING (16) IS NOT SYMMETRICAL. BE SURE FITTING (16) IS ORIENTED AS SHOWN IN FIG. 401 OR DAMAGE TO HINGE LINKAGE CAN RESULT.

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- C. At upper hinge, apply a coating of grease to the three necks of upper spigot (10) and a coating of corrosion preventive compound to body of upper spigot, assemble compression spring (11), retainer washer (12), and O-ring (13) on upper spigot (10).
- D. Engage upper hinge arm (2) with radius links (6), line up hinge pin holes in roller guide plates (5), insert thrust washer (8) between radius links and hinge arm, fill cavity of upper spigot support housing with grease, then insert upper spigot (10). Tighten clamp bolt (7) on upper hinge arm. Wipe off excess grease.

**NOTE:** Ensure that reference marks on upper hinge arm and upper spigot are aligned.

- E. Install snubber (24, detail B).

**CAUTION:** ATTACH FITTING (25) IS NOT SYMMETRICAL. BE SURE FITTING IS ORIENTED AS SHOWN IN FIG. 401 OR DAMAGE TO SNUBBER CAN RESULT DURING DOOR OPERATION.

**CAUTION:** INSTALL SNUBBER WITH LUBRICATION FITTINGS (28) ON ROD ENDS INBOARD AND FILLER PLUG SCREW OUTBOARD (27) AS SHOWN IN FIG. 401 OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) If attach fitting (25) was removed from snubber (24), connect attach fitting to snubber by installing snubber attachment bolt (18).
- (2) If radius link (21) was removed from snubber (24), connect radius link to snubber by installing bolt (22), washers, nut, and cotter pin.
- (3) Engage radius link (21) with stop plates (20) and install attach fitting (25) to hinge support (26) with four bolts.
- F. At lower hinge, engage lower hinge arm (19) with radius link (21) and insert thrust washer (23). Line up hinge pin holes with holes in stop plates (20). Apply coating of grease to necks of spigot.
- G. Install assist spring and torque tube (Ref 52-11-41, R/I).
- H. If a new door was installed on airplane, install the following components on door.
  - (1) Apply wet primer to attachment bolts. Install upper and lower hinge arm covers with attachment bolts.
  - (2) Install stop pins on forward and aft edges of door.

**NOTE:** Install stop pins with thin coating of corrosion preventive compound on both internal and external surfaces of mating threads.

- (3) Install door seal (Ref 52-09-131, R/I).

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I. Adjust and test door in accordance with adjustment/test procedures.

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## MAINTENANCE MANUAL

### FORWARD ENTRY DOOR – ADJUSTMENT/TEST

#### 1. General

- A. This procedure contains an operational test to verify proper door operation in par. 1A. and an adjustment procedure in par. 2.
- B. Paragraph 2 is the normal door installation adjustment procedure to be used when installing a new or overhauled door. Paragraph 3 is a special adjustment to be used to re-establish or verify proper overcenter of the door latch torque tubes if the door has been reported to have soft unlatching problems (door comes unlatched). If proper overcenter on the latch torque tubes has been lost, there may not be sufficient latching force to maintain the door in the latched condition.

#### 2. Operational Test – Forward Entry Door

##### A. General

- (1) The following procedure provides an operational check of the forward entry door to assure satisfactory performance. The operational test is not intended to verify adjustment.

##### B. Test Forward Entry Door Operation

- (1) Provide electrical power (Ref 24-21-00 and 24-31-00).
- (2) Check that the following circuit breakers on panel P6 are closed:
  - (a) MASTER CAUTION BUS-BAT
  - (b) DOOR WARNING DC
  - (c) DIM AND TEST
  - (d) Circuit breakers under heading INDICATOR-MASTER DIM
- (3) Operate forward entry door from airplane interior.
  - (a) With door closed, rotate inside handle counterclockwise. Check that door moves inward and FWD ENTRY light on P5 panel comes on.
  - (b) Continue rotating inside handle counterclockwise to full travel of 180 degrees and check that door moves inward to cocked position.
  - (c) Swing door outward and forward through opening until door is latched in open position.
  - (d) Lift door open stowing latch lever and swing door inward through opening using assist handle. Check that door falls into opening until motion is stopped in cocked position by door snubber.
  - (e) Rotate inside handle clockwise. Check that door moves outward into door opening as handle is rotated.
  - (f) Continue rotating inside handle clockwise to full travel of 180 degrees and check that door closes and latches and FWD ENTRY light goes off.
- (4) Operate forward entry door from airplane exterior.
  - (a) With door closed, pull outside handle clear of recess panel and rotate outside handle clockwise. Check that door moves inward and FWD ENTRY light comes on.

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- (b) Continue rotating outside handle clockwise to full travel of 180 degrees and check that door moves inward to cocked position.
- (c) Return outside handle into recess panel and swing door outward and forward through opening until door is latched in open position.
- (d) Lift door open stowing latch lever and swing door inward through opening using assist handle. Check that door falls into opening until motion is stopped in cocked position by door snubber.
- (e) Pull outside handle clear of recess panel and rotate handle counterclockwise. Check that door moves outward into door opening as handle is rotated.
- (f) Continue rotating outside handle counterclockwise to full travel of 180 degrees and check that door closes and latches and FWD ENTRY light goes off.
- (g) Return outside handle into recess panel.

### 3. Forward Entry Door Adjustment

#### A. Equipment and Materials

- (1) Bearing Retainer Nut Spanner Wrench - F70085
- (2) Door Handle Mechanism Nut Wrench - F70038

#### B. Prepare for Adjustment

- (1) Remove door lining and insulation panels (Ref 52-11-31, Forward Entry Door Lining and Insulation).
- (2) Remove screws attaching forward mechanism access panel (4, Fig. 501) to door structure and remove panel.
- (3) Attach 60-pound weight to inside door frame at approximate midpoint of lower half of door.

**NOTE:** This weight is to allow for escape slide pack that will be installed on lower half of door to facilitate door adjustment for better seal effect.

#### C. Adjust Forward Entry Door

**NOTE:** It is recommended that door adjustments be made with airplane on its wheels. However, door adjustments may be accomplished on a jacked airplane provided that stop pin misalignment, door gap and flushness, and interior handle torque requirements are met when checking door with airplane on its wheels.

- (1) Back off all door stop pins (1, Detail A, Fig. 501) until pin contact surface is flush with outboard side of stop fitting (6).
- (2) Adjust vertical position of door in door frame.
  - (a) Remove three bolts (22, detail E) attaching adjustable guide (21) to center of aft edge of door and remove adjustable guide.

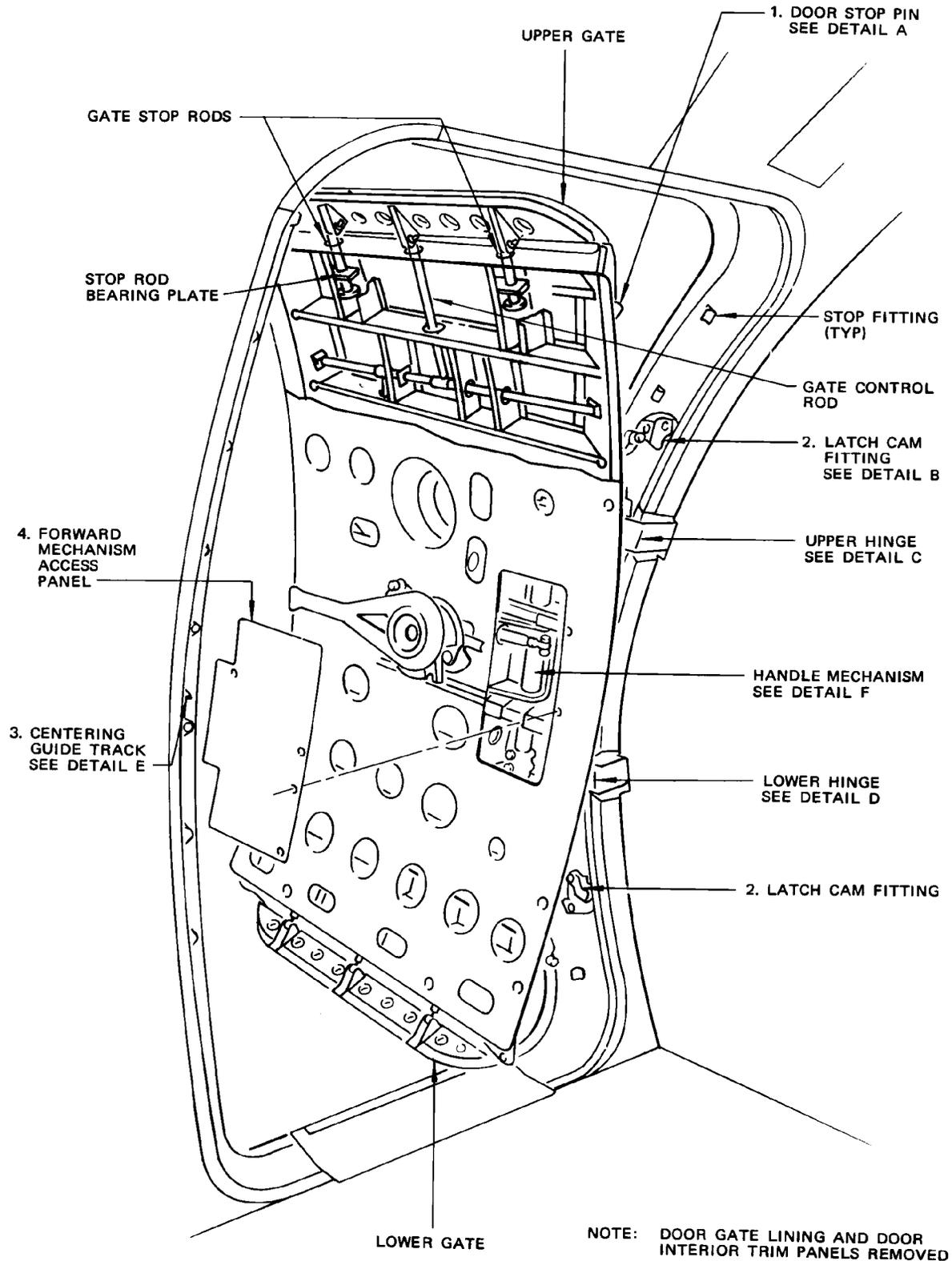
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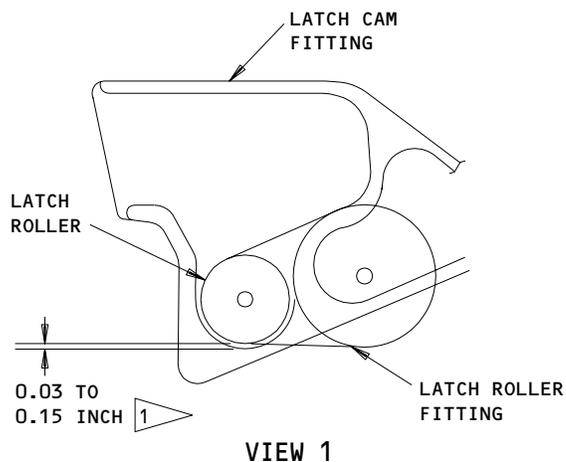
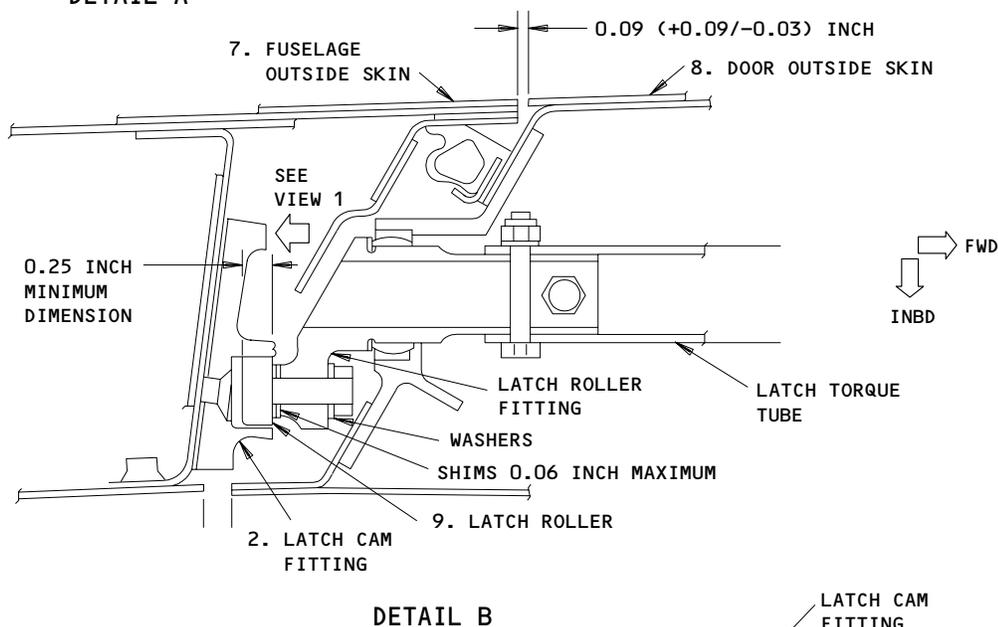
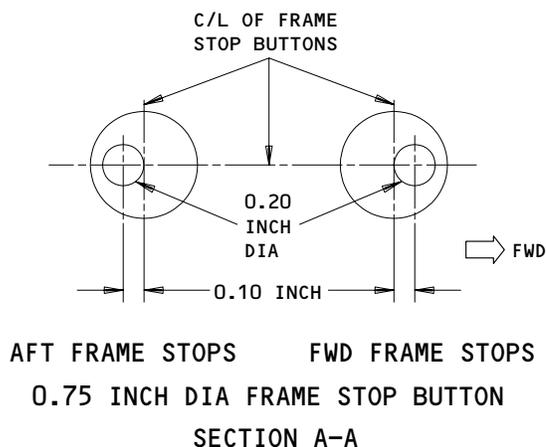
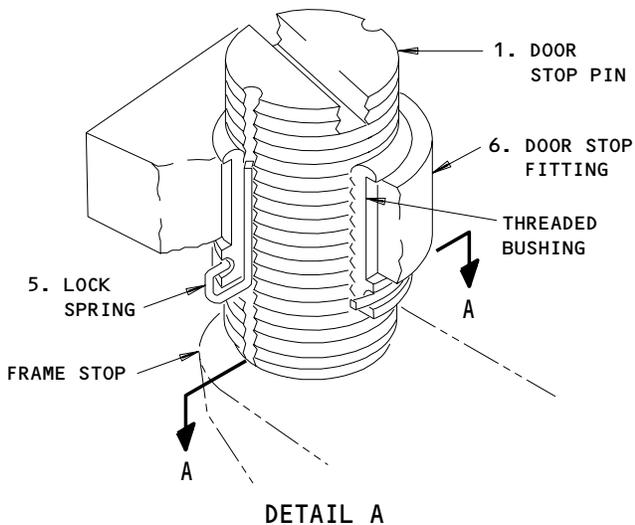
Forward Entry Door Adjustment  
 Figure 501 (Sheet 1)

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**NOTE:** CENTERLINE OF STOP PINS ON FWD AND AFT EDGES MUST ALIGN WITH CENTERLINE OF FRAME STOP BUTTONS WITHIN 0.20 INCH DIA CIRCLE AS SHOWN

**1** AT ONE OF THE THREE LATCH FITTINGS OTHER THAN THE UPPER FORWARD LATCH FITTING THE ROLLER CLEARANCE MAY BE 0.03 THRU 0.21 INCH

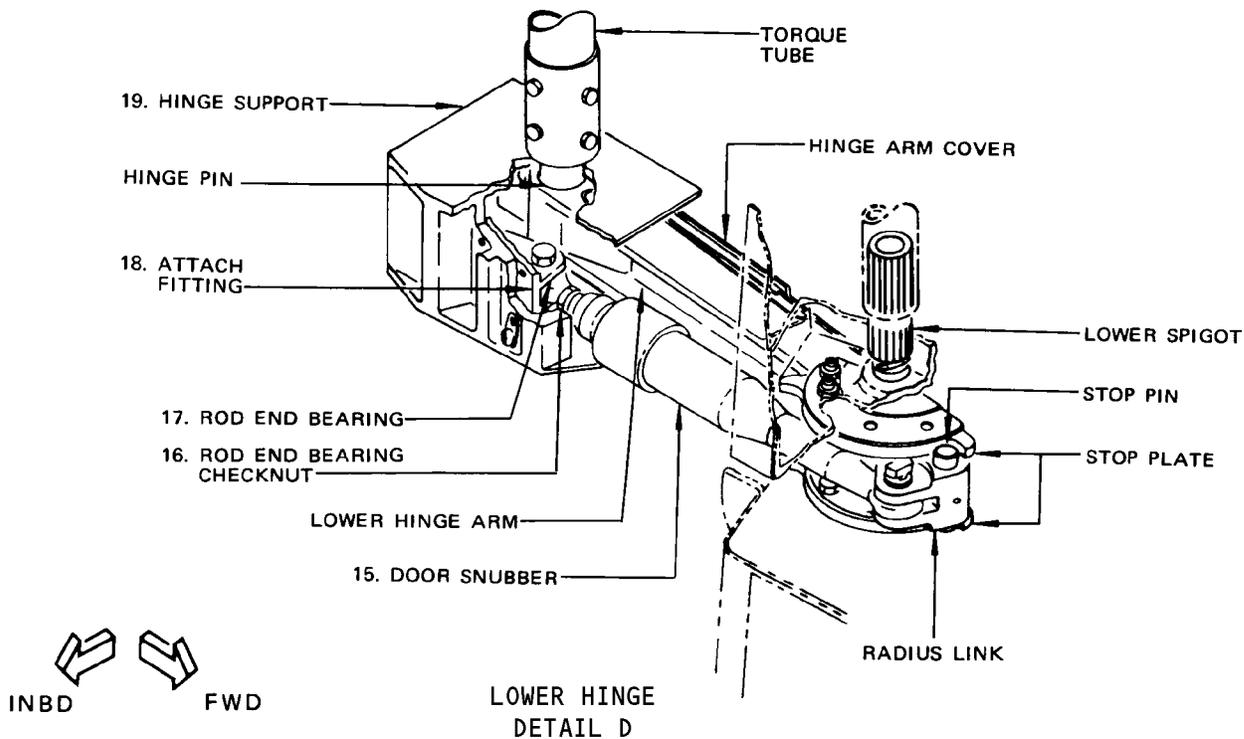
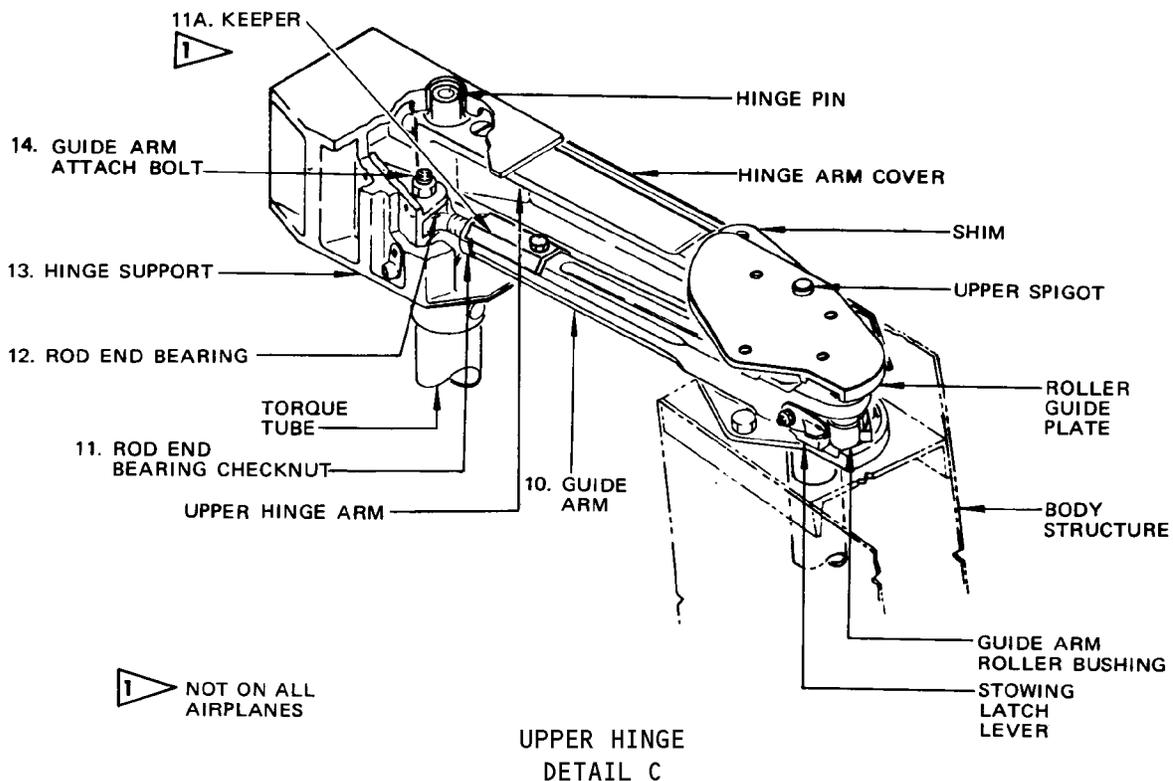
**Forward Entry Door Adjustment  
 Figure 501 (Sheet 2)**

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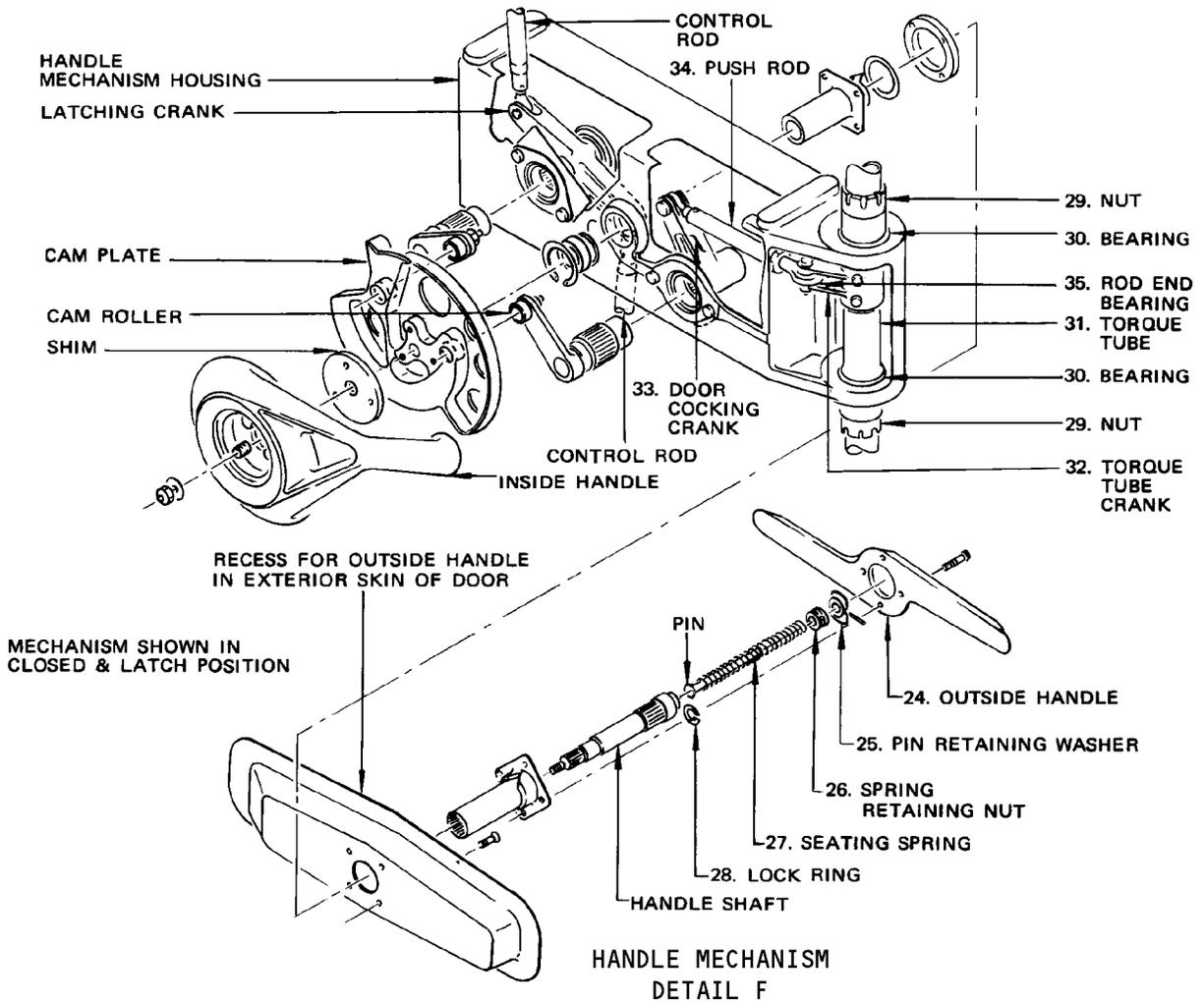
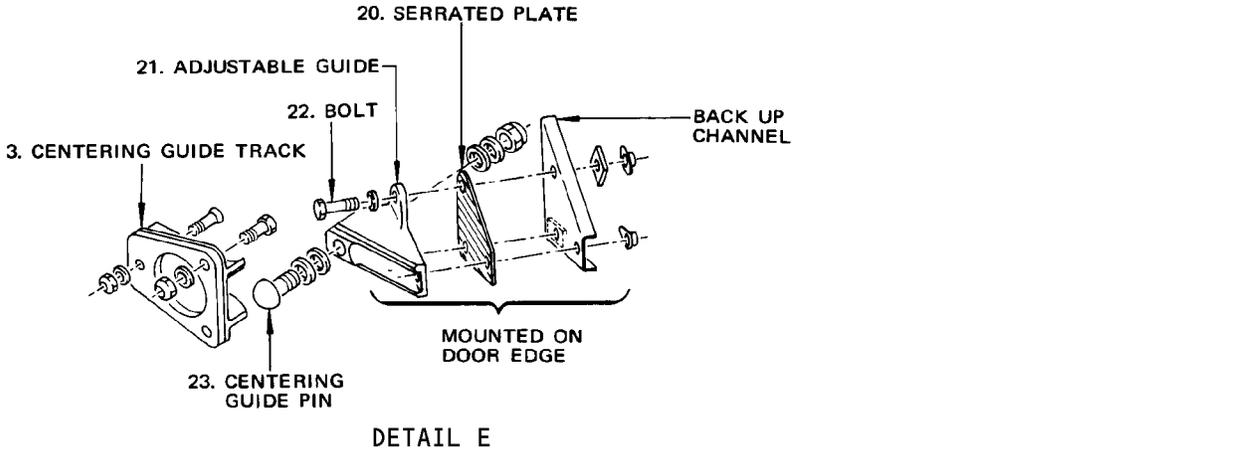
Forward Entry Door Adjustment  
 Figure 501 (Sheet 3)

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Forward Entry Door Adjustment  
 Figure 501 (Sheet 4)

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- (b) Adjust vertical position of door by means of nuts (29, detail F) on torque tube (31) so that door is vertically centered in door frame and gaps at upper and lower gates (see step (10)) are maintained. Install cotter pins.

**NOTE:** If vertical adjustment nuts (29) are hard to turn, use wrench F70085 to rotate nuts. Avoid overtightening of nuts which would cause excessive end loads on bearings (30).

- (c) Adjust latch cam fittings (2, detail B) vertically so that all latch rollers (9) enter latch cam fittings with equal clearance when door is operated to closed position.
- 1) Latch cam fittings are serrated. Loosen screw and move cam fitting up to decrease clearance or down to increase clearance.
- (d) Install adjustable guide (21, detail E) on door and adjust position on serrated plate (20) to allow engagement of centering guide pin (23) with centering guide track (3) on doorjamb.
- (3) Adjust the following to fair door with fuselage external profile.

**CAUTION:** DO NOT CLOSE A NEW DOOR UNTIL DOOR HAS BEEN TRIMMED TO FIT IN DOOR OPENING. DOOR CLOSING AND SKIN TRIM MUST BE DONE SIMULTANEOUSLY.

**NOTE:** Measurements of flushness should only be made at points along straight sections between rounded corners of door skin. Measure between door outer skin and normal body outer skin surface. Measurements at skin splices must subtract additional skin and bonding film thickness.

- (a) Adjust forward and aft latch cam fittings (2) on serrated latch plates attached to doorjamb so that when door is closed and latched, outside surface of door along forward and aft edges is flush with fuselage external profile within the flushness requirements called out in Fig. 502.

**NOTE:** Each latch location has a different cam shape and it is necessary that when replacing any of the four fittings installed on the door, replacement fittings used are of same cam shape as existing ones.

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- (b) Adjust upper and lower gate control rods (Fig. 501) so that with door closed and latched, outside surface of upper and lower gates are recessed below fuselage exterior profile as shown in Fig. 502.

**NOTE:** Lengthen the four gate stop rods as required to prevent interference with adjustment of gate control rods.

- (c) With door closed and latched, adjust the four gate stop rods by screwing rod end in until shoulder on rod just contacts bearing plate; then back off to nearest locking notch, tighten checknut and lockwire.
- (4) Adjust guide arm (10) length at rod end bearing (12) by removing guide arm attachment bolt (14) so that both fore and aft latch rollers (9) enter latch cam fittings (2) at same time when door is operated to closed position. Aft rollers may be allowed to lead forward rollers slightly to improve clearance on forward edge of door. Tighten rod end bearing checknut (11).
- (a) On airplanes with keeper installed, make fine adjustment by removing keeper (11A) and loosen checknut (11). Rotate adjustment fitting. Tighten checknut and install keeper.
- (5) Check latch roller (9) engagement with latch cam fittings (2).
- (a) Latch rollers should engage latch cam fittings with no lateral interference between roller retainers and latch cam fittings.
- (b) Close and lock door and check that all latch rollers engage latch cam fitting surfaces.
- (c) Check that width of contact surface between latch roller and latch cam fitting is 0.25 inch minimum.  
1) Add or subtract shims behind roller to obtain clearance.
- (d) Check that clearance between latch roller and latch cam fitting, when door is closed and locked, is as shown in view 1.

**NOTE:** The last two checks may be made by using modeling clay or any other approved method.

- (e) After adjusting upper forward latch fitting, recheck the operation of the door warning sensor (Ref 52-71-0 A/T).
- (6) With door closed and latched, screw door stop pins (1, Detail A) out until they just contact frame stop buttons. Back off stop pins half a turn, then further to nearest locking groove and lock them with lock springs (5). Check that stop pins contact frame stop button within limits shown in section A-A. The check may be made by using modeling clay or any other approved method.

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- (7) With door closed and latched, adjust length of pushrod (34, Detail F) so that it just fits between cocking crank (33) and torque tube crank (32). Then unlatch door, shorten pushrod by one-half turn of rod end bearing (35), tighten checknut and reinstall.
- (8) Check roller engagement with each latch fitting to verify that roller clears entry lip on latch fitting when handle is moved to the latched position. Check clearance at each latch consecutively with  $10 \pm 1$  pound spring load or equivalent applied to the door in an inboard direction at the adjacent corner stop pin fitting while latching. If necessary, adjust by shortening pushrod (34) an additional  $1/2$  to  $1-1/2$  turns, as required, to move door outboard to provide roller clearance. After adjustment, check that force required to move handle from extended to retracted position does not exceed 20 pounds.

**NOTE:** Shortening the control rod will increase handle retraction force.

- (9) With door latch in open position, check length of snubber (15, detail D) to make sure snubber does not bottom before latch pin engages hole in upper roller guide plate at upper hinge assembly. If necessary, adjust snubber length at rod end bearing (17) by removing four bolts holding attach fitting (18) to hinge support. Tighten rod end bearing check nut (16) and reinstall attach fitting.
- (10) Check fuselage outside skin (7, detail B) and door outside skin (8) gap measurements.
  - (a) Gap around upper gate should be  $0.12 \pm 0.06$  inch.
  - (b) Gap along forward and aft edge of door should be  $0.09 + 0.09 / - 0.03$  inch.
  - (c) Deleted.
  - (d) Gap at bottom of lower gate should be  $0.15 + 0.06 / - 0.09$  inch.
- (11) Check operation of outside handle seating spring (27, detail F).
  - (a) Check that handle seating spring will retain handle (24) in stowed position. If necessary, adjust seating spring retaining nut (26) using tool F70038.

**NOTE:** To gain access to the spring retaining nut (26), the outside handle (24), pin retaining washer (25), and lock ring (28) should be removed.

- (12) Check installation of upper and lower hinge arm covers. If necessary, use laminated shims to fair covers with fuselage external contour.
- (13) Check seal installation (Ref 52-09-131, Bulb Type Mechanical Seals).

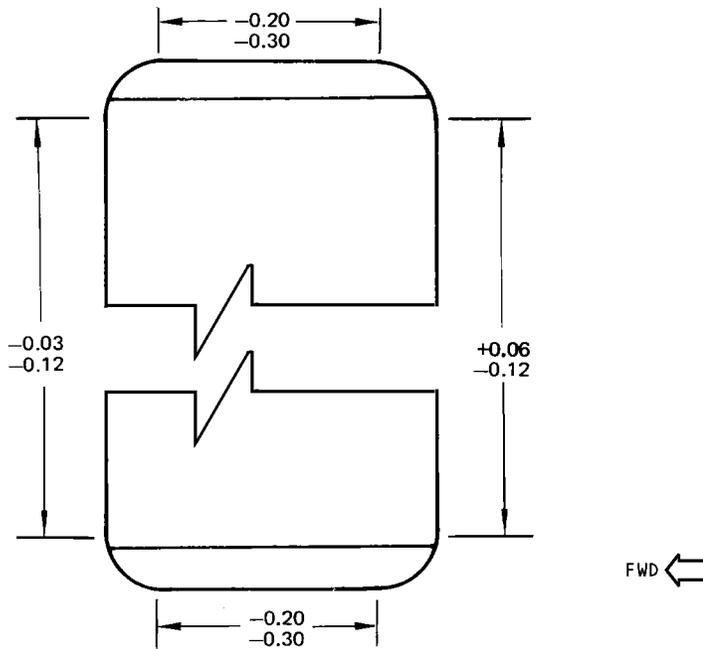
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NOTE: THIS ILLUSTRATION SHOWS THE LIMITS TO ALIGN THE FORWARD ENTRY DOOR CONTOUR WITH THE FUSELAGE CONTOUR. A PLUS LIMIT SHOWS THAT THE DOOR IS OUTBOARD OF THE CONTOUR OF THE FUSELAGE. A MINUS LIMIT SHOWS THAT THE DOOR IS INBOARD OF THE CONTOUR OF THE FUSELAGE. THE LIMITS ARE FOR THE STRAIGHT EDGES OF THE DOOR BETWEEN THE POINTS SHOWN.

YOU CAN INCREASE THE LIMITS BY 0.03 INCH IN ONE OR MORE LOCATIONS. THE SUM OF THE LENGTHS OF THE INCREASED LIMITS MUST NOT BE MORE THAN 11 INCHES.

MEASURE ALL DIMENSIONS WHEN THE AIRPLANE IS NOT PRESSURIZED.

ALL DIMENSIONS ARE IN INCHES.

Forward Entry Door Flushness Requirements  
 Figure 502

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**MAINTENANCE MANUAL**

- (14) Check striker pin fitting installation on door (if installed).
- (a) If a new door was installed, attach striker pin fitting to door.
    - 1) Locate striker pin fitting index hole on lower aft edge of door, position fitting initially as shown in Fig. 504 and attach to doorframe with bolt, washer and self-locking nut.
    - 2) After the striker pin fitting has been positioned per step C, drill three 0.190 +0.009/-0.000-inch holes through the fitting and doorframe and install bolts (NAS1103-3), flat washers (AN960DI0L) and self-locking nuts (NAS679A3).
  - (b) Fill the inner surface of the airstair latch pin actuating lever and the recessed portion of the scuff plate with modeling clay, or use any other approved method.
  - (c) Close door slowly and check striker pin location on lever. Ensure that lever is sufficiently clear of the scuff plate. Adjust striker pin fitting position as required to obtain 1.05 +0.15/-0.03-inch dimension (Section B-B, Fig. 504).

**NOTE:** If necessary, slot the index hole on doorframe to 0.15 inch maximum dimension for vertical adjustment.

- (d) Check that striker pin engagement with lever is 0.50-inch minimum dimension (Section A-A, Fig. 504). If this dimension is not obtained, adjust per 52-51-531, Internal Control Assembly.

D. Restore Airplane to Normal

- (1) Remove 60-pound weight from door.
- (2) Install forward mechanism access panel (4, Fig. 501) on door with screws.
- (3) Install door lining and insulation panels (Ref 52-11-31, Forward Entry Door Lining and Insulation).
- (4) Test door for proper operation per par. 4.

4. Forward Entry Door Adjustment for Soft Unlatching

A. Equipment and Materials

- (1) Forward Entry Door Latch Roller Setting Tool - F80178-1.

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## MAINTENANCE MANUAL

- (2) Forward Entry Door Latch Roller Setting Tool - C52008-1 Optional.
- B. Prepare for Adjustment
  - (1) Remove door lining and insulation panels (Ref. 52-11-31, Removal/Installation).
  - (2) Remove screws attaching forward mechanism access panel (4, Fig. 501) to door structure and remove panel.
  - (3) Attach 60-pound weight to inside door frame at approximate midpoint of lower half of door. This weight is a substitute for escape slide pack removed with lining.
- C. Adjust Forward Entry Door to Correct for Soft Unlatching
  - (1) Set latch roller overcenter using forward entry door latch roller setting tool and proceed to step (4) or, if tool is not available, set overcenter per steps (2) and (3).
  - (2) Disconnect control rods (3, Fig. 503) from latch torque tube cranks (4).
  - (3) Align torque tube (5), torque tube crank (2) and gate control rod (1) in straight-line relationship (at both upper and lower torque tubes) (Fig. 503, Section A-A). While maintaining the straight-line relationship adjust length of upper and lower control rods (3) as necessary to permit installation of bolt through rod end and crank (4). Install bolts.

**NOTE:** A locally fabricated tool may be desirable to obtain the straight-line relationship.

- (4) With mechanism in closed position, check that latch rollers engage latch roller cam fittings with no interference.

### 5. Forward Entry Door Test

- A. Equipment and Materials
  - (1) Entry Door Torque Wrench - F80171-1
- B. Test Forward Entry Door

**NOTE:** Airplane must be on its wheels to test door (no jack support).

- (1) Check that snubber operates correctly to retard or snub rapid motion of door toward stowed and cocked position. No snubbing action should be felt when door is moved slowly from the cocked to stowed position or back to the cocked position. The snubber is designed to resist accelerated movement only and if the snubber performs otherwise, it should be replaced.
- (2) Check forward airstair door lock mechanism for correct operation when door is opened and closed (Ref. 52-61-531, Forward Airstair Door Lock Mechanism).

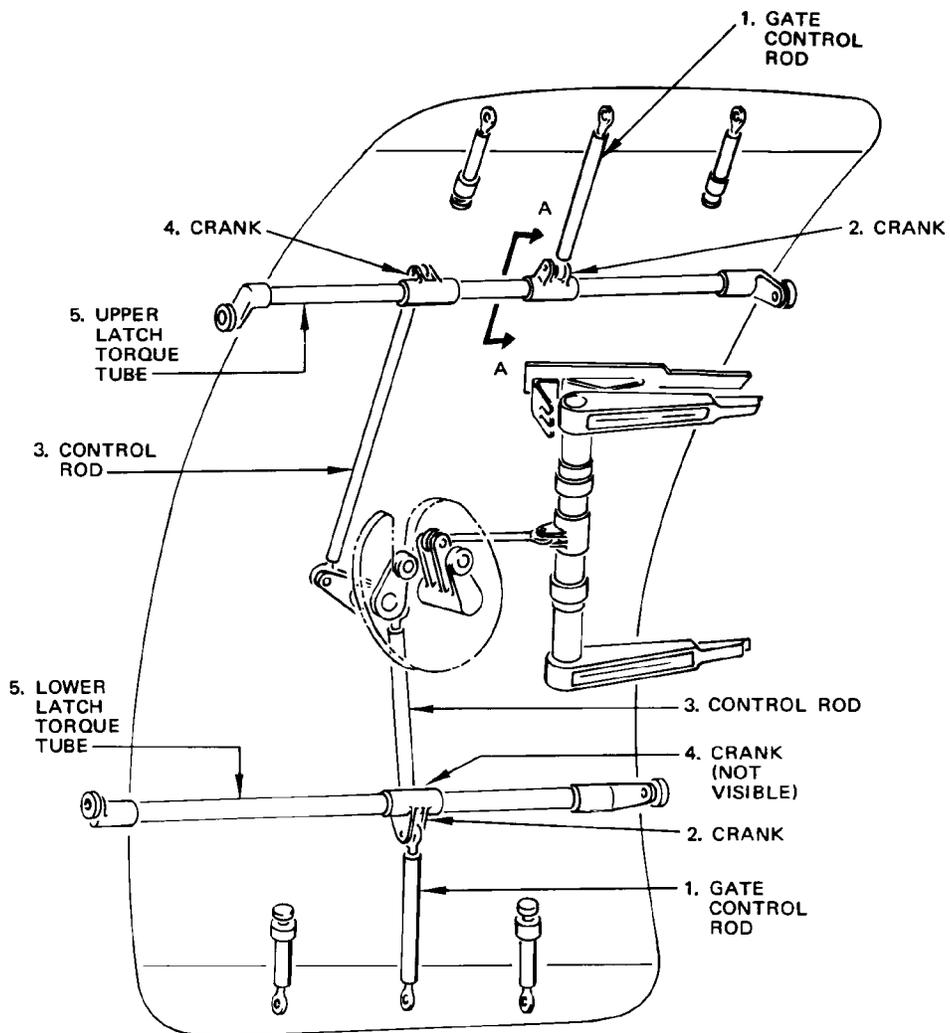
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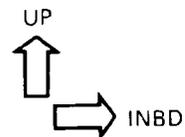
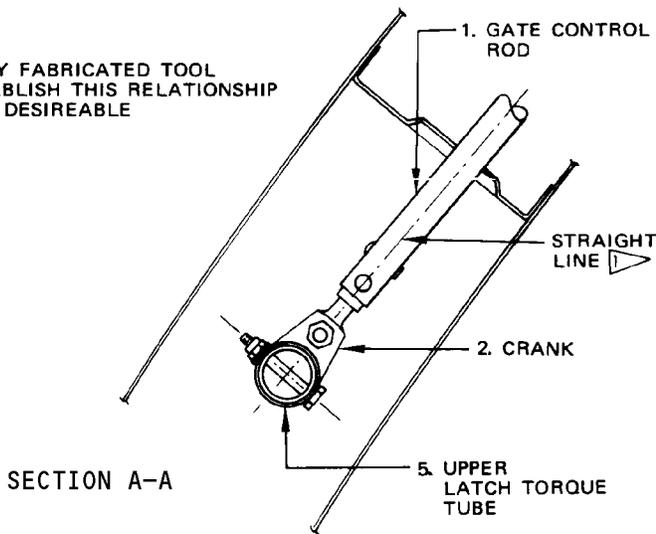
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▷ LOCALLY FABRICATED TOOL TO ESTABLISH THIS RELATIONSHIP MAY BE DESIREABLE



Forward Entry Door Overcenter Adjustment  
 Figure 503

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- (3) Check that door, with interior trim installed, moves through full cycle of operation smoothly with no binding spots and handle operates within torque limits.
- NOTE:** Use entry door torque wrench, or equivalent, to facilitate checking of door handle torque. Force applied shall be perpendicular to handle in a plane parallel to handle cam plate.
- (a) Unlatch door and move to cocked position and check torque to operate handle does not exceed 420 inch-pounds.
- (b) Complete door opening from cocked position and close door until seals just contact doorway and check torque required to operate handle does not exceed 600 inch-pounds.
- (c) Complete door closure from seal contact and check torque to operate handle does not exceed 700 inch-pounds.
- (d) If handle torque is within requirements, proceed to step (5). If not within requirements, perform step (4).
- (4) If requirements in step (2) are not obtained, remove door lining and insulation panels (Ref. 52-11-31, Forward Entry Door Lining and Insulation).
- (a) Attach a 60-pound weight to inside doorframe at approximate midpoint of lower half of door to simulate the escape slide weight.
- (b) Unlatch door and move to cocked position and check torque to operate handle does not exceed 420 inch-pounds.
- (c) Complete door opening from cocked position and close door until seals just contact doorway and check torque to operate handle does not exceed 600 inch-pounds.
- (d) Complete door closure from seal contact and check torque to operate handle does not exceed 550 inch-pounds.
- (e) If limits are not exceeded, reinstall and adjust door interior trim to satisfy requirements in step (3). If limits are exceeded, adjust door per par. 1.
- (5) Check door warning system for correct operation when door is opened and closed (Ref. 52-71-0, Door Warning System).

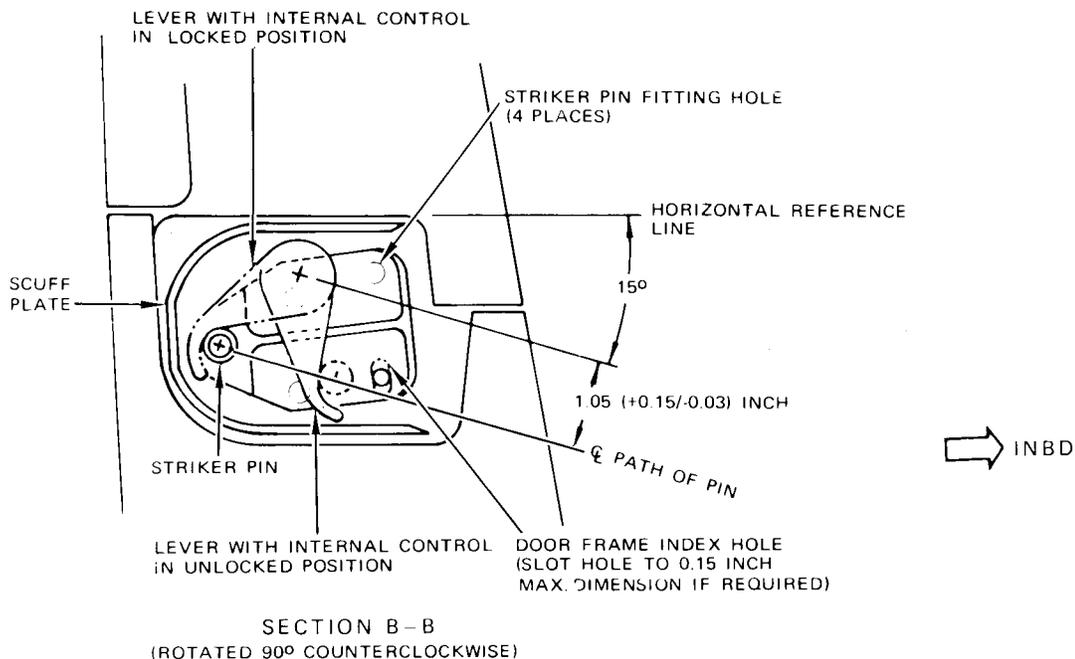
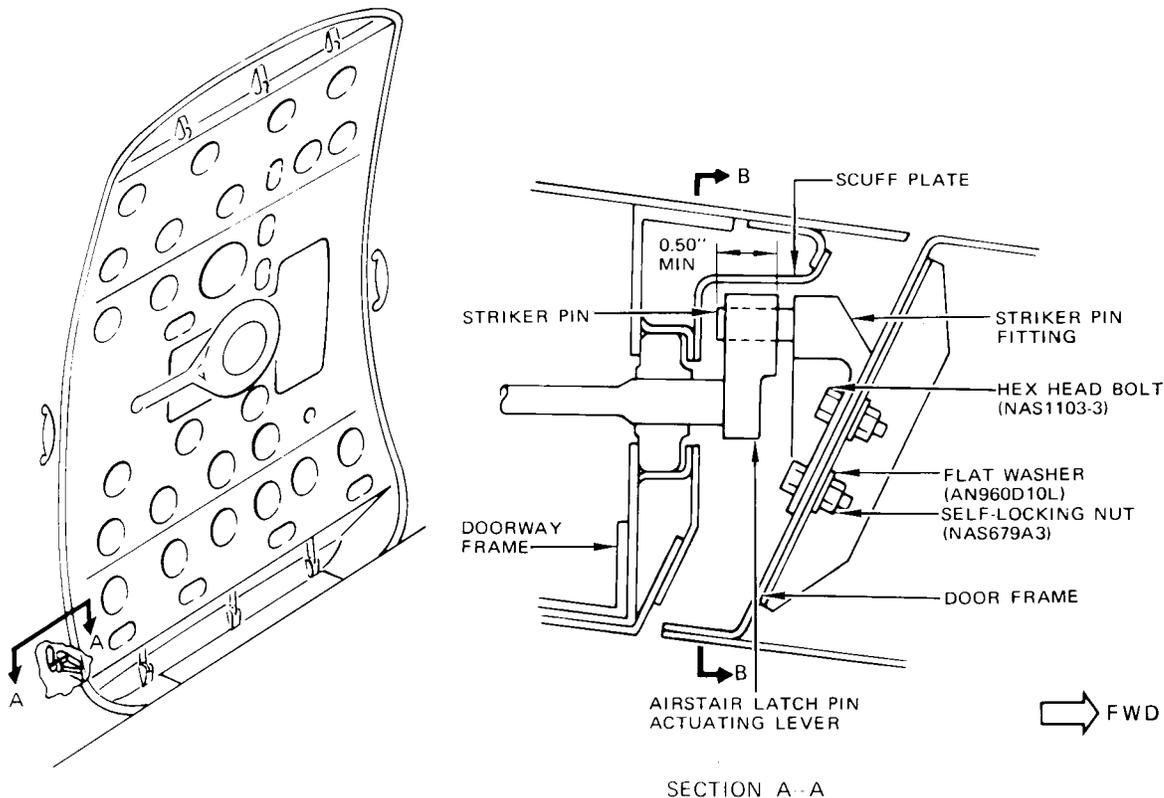
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Forward Entry Door Striker Pin Fitting Adjustment  
 Figure 504

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 AIRPLANES WITH FORWARD  
 AIRSTAIRS

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FORWARD ENTRY DOOR – INSPECTION/CHECK

1. Forward Entry Door Inspection

A. Examine Forward Entry Door

- (1) Examine external and internal skins for cracks, and corrosion; hinge fairings for looseness and missing screws.
- (2) Examine frames, internal brackets, handle mechanism housing, and hinges for cracks, corrosion, and loose bolts.
- (3) Examine window and frame for cracks, and corrosion.
- (4) Examine door operating mechanism for cracks, corrosion, excessive wear, and loose bolts.
- (5) Examine latch rollers, latches, and door stops for cracks, corrosion and foreign particles lodged in latches or attached to stops.
- (6) Examine drain holes for obstruction.
- (7) Examine door seals for cracks, cuts and tears, and correct seating when door is in closed position.
- (8) Examine roller cam plates and guide arm roller for excessive wear, which may cause door to malfunction (Ref 52-11-21 – Removal/Installation.
  - (a) Check for excessive wear (elongation) of latch pin hole in upper roller guide plate. (Hole may wear 0.06 inch oversize to a maximum diameter (part number 65-29993-2 only) of 0.4078 inch.)
- (9) Check that snubber operates correctly to retard or snub rapid motion of the door towards stowed and cocked positions.
- (10) Examine door stops for misalignment, using the door stop pin bearing marks on frame stop buttons (Fig. 601).

**NOTE:** Door stop bearing marks are a result of flight plus fuselage pressure loads. Check must be performed with airplane on its wheels.

- (11) Check door flushness requirements shown in Fig. 602.

**NOTE:** Measurements of flushness are to be made only at points along straight sections between rounded corners of door skin. Check must be performed with airplane on its wheels.

- (12) Check fuselage and door outside skin gap measurements with airplane on its wheels.
  - (a) Gap around upper gate should be 0.12 ±0.06 inch.
  - (b) Gap along forward and aft edge of door should be 0.09 +0.09/±0.03 inch.
  - (c) Deleted
  - (d) Gap at bottom of lower gate should be 0.15 +0.06/±0.09 inch.

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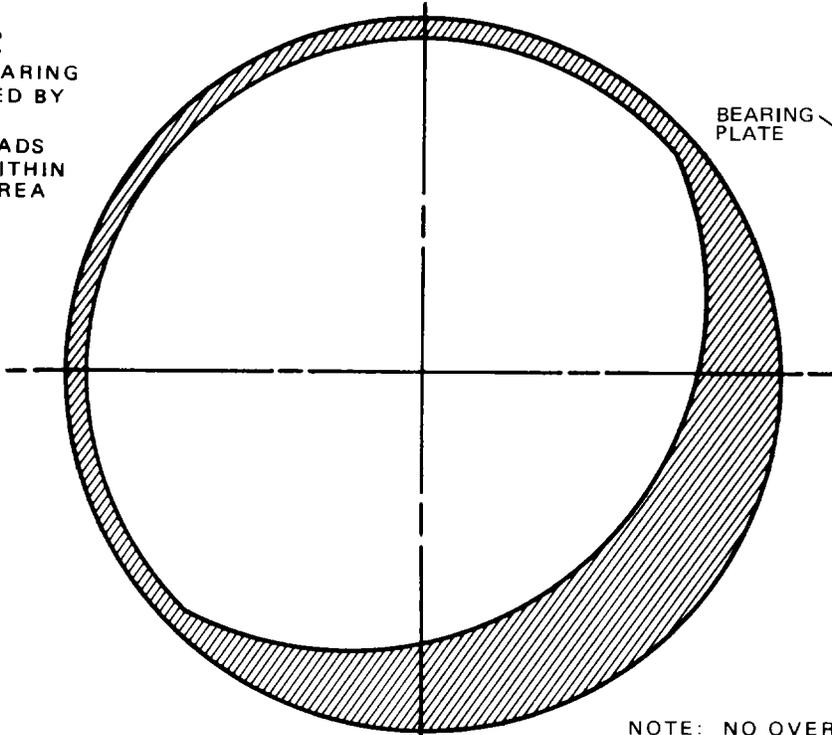
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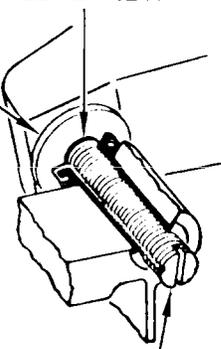
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CORNER STOP  
 COMPLETE BEARING  
 MARKS CAUSED BY  
 FLIGHT PLUS  
 PRESSURE LOADS  
 MUST FALL WITHIN  
 UNSHADED AREA



SEE DETAIL A

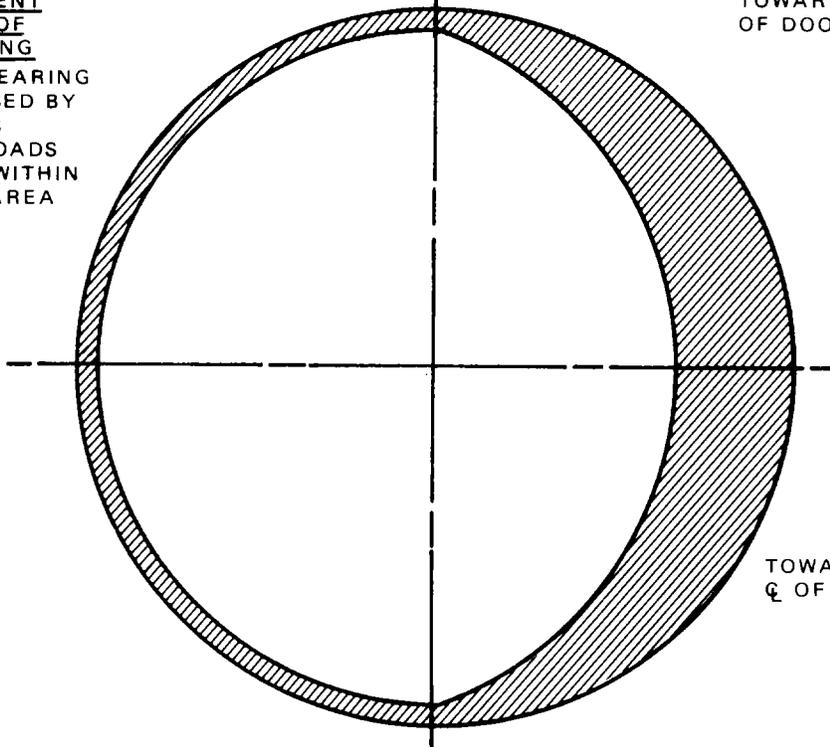
BEARING  
 PLATE



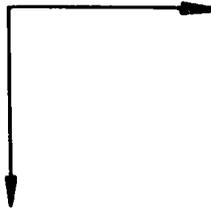
ADJUSTABLE  
 STOP PIN

NOTE: NO OVERHANG OF DOOR  
 STOP PIN PERMITTED  
 ON FRAME STOP BUTTON  
 TOWARD CENTERLINE  
 OF DOOR OPENING.

STOP ADJACENT  
 TO CENTER OF  
 DOOR OPENING  
 COMPLETE BEARING  
 MARKS CAUSED BY  
 FLIGHT PLUS  
 PRESSURE LOADS  
 MUST FALL WITHIN  
 UNSHADED AREA



TOWARD VERT  
 $\phi$  OF DOOR



TOWARD HORIZ  
 $\phi$  OF DOOR

Typical Door Stop Misalignment Data  
 Figure 601

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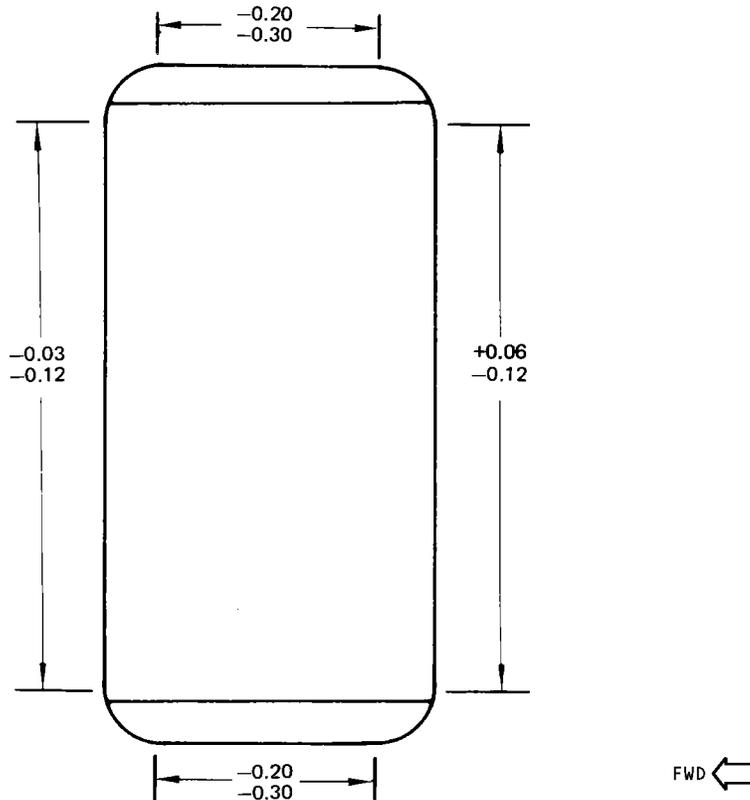
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NOTE: THIS ILLUSTRATION SHOWS THE LIMITS TO ALIGN THE FORWARD ENTRY DOOR CONTOUR WITH THE FUSELAGE CONTOUR. A PLUS LIMIT SHOWS THAT THE DOOR IS OUTBOARD OF THE CONTOUR OF THE FUSELAGE. A MINUS LIMIT SHOWS THAT THE DOOR IS INBOARD OF THE CONTOUR OF THE FUSELAGE. THE LIMITS ARE FOR THE STRAIGHT EDGES OF THE DOOR BETWEEN THE POINTS SHOWN.

YOU CAN INCREASE THE LIMITS BY 0.03 INCH IN ONE OR MORE LOCATIONS. THE SUM OF THE LENGTHS OF THE INCREASED LIMITS MUST NOT BE MORE THAN 11 INCHES.

MEASURE ALL DIMENSIONS WHEN THE AIRPLANE IS NOT PRESSURIZED.

ALL DIMENSIONS ARE IN INCHES.

Forward Entry Door Flushness Requirements  
 Figure 602

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FORWARD ENTRY DOOR – APPROVED REPAIRS

1. General

- A. Elongation of top roller guide plate 65-29993-2 latch pin hole can result in latch pin disengaging and door blowing closed under high wind conditions. A repair procedure to restore latch pin open hole to original design dimensions follows. Latch pin hole may wear 0.06 inch oversize to a maximum diameter of 0.4078 inch before repair is required.
- B. Ovalization of the bolt holes through which the bolts are installed that assemble the forward entry door torque tube, torque tube sleeve, and hinge pin may cause the entry door to sag on its hinges. If this condition is encountered, the bolt holes in these parts may be oversized one-sixteenth inch to eliminate ovalness and oversized bolts installed. Refer to par. 4 for repair procedure.
- C. Repair of forward entry door fuselage mounted door stops may be accomplished as a basic repair (Ref par. 6).

2. Equipment and Materials

- A. Spotfacing fixture, guide plate latch pin hole - fabricate fixture to allow spotfacing 65-29993-2 guide plate latch pin hole to 0.08 inch depth and 0.593 inch diameter with guide plate either on or off airplane per step 3.A. below.
- B. Bushing, 17-4PH stainless steel - fabricate to meet requirements of step 3.C.
- C. Alodine 1200 - MIL-C-5541 (Ref 20-30-41)
- D. Chemical and Solvent Resistant Finish - BMS 10-11, Type I (Ref 20-30-41)
- E. Assembly Tool, Latch Roller, Entry Door - ST1813B
- F. Sealant - BMS 5-79 or 5-95 (Ref 20-30-41)

3. Repair Upper Roller Guide Plate (65-29993-2) Latch Pin Hole (Fig. 801)

- A. Gain access to rework area by either removing upper roller guide plate from airplane or removing guide plate attach bolts and rotating plate sufficiently to accomplish rework.
- B. Using spotfacing fixture, spotface upper surface of guide plate at latch pin hole to a depth of approximately 0.080 inch and diameter of 0.593 inch.
- C. Fabricate 17-4PH stainless steel bushing with inside diameter of 0.3438 to 0.3478 inch and an outside diameter to allow an interference fit of 0.0015 to 0.0020 inch. Bushing thickness is to match spotface depth and to be flush with upper surface of guide plate and lower surface of channel surface. Heat treat bushing per standard industry practice to 900 °F for one hour and air cool.
- D. Install bushing in guide plate, finish reworked area to match existing finish and reinstall guide plate.

4. Repair Forward Entry Door Torque Tube (Fig. 802)

- A. Disassemble torque tube, hinge pins, and connecting sleeves per instructions in 52-11-11 R/I.

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- B. Ream existing 0.2487/0.2497 inch mating holes through connecting sleeve torque tube and hinge pin (4 places at each torque tube) to 0.3112/0.3122 inch, to accommodate NAS1105 bolts. Pretreat holes (Method II) and apply Alodine per 51-21-21 and 51-21-41 CP. Apply primer per 51-21-171 CP.
  - C. Install torque tube and door per 52-11-11 R/I. Replace the bolts formerly installed through reworked holes with 5/16 inch bolts.
5. Replace Entry Door Latch Roller Assembly (Fig. 803)
- A. Using roller assembly tool, remove and replace latch roller assembly.
6. Repair Stop Fitting Cracked Along Parting Line from End Into Stop Fitting Bearing Plate Hole (Fig. 803)
- A. If crack is within 45 degrees each side of parting plane, as shown in Fig. 801, and does not progress beyond stop fitting hole, repair as follows:
    - (1) Remove bearing plate.
    - (2) Cut out crack with a 0.06 inch wide slot into stop pin hole.
    - (3) Enlarge stop fitting hole to provide a 0.002 to 0.012-inch diameter clearance with bearing plate.
    - (4) Pretreat surfaces (Method II) and apply Alodine per 51-20-2 and 51-20-21 CP. Apply primer per 51-20-151 CP.
    - (5) Bond bearing plate back in using BMS 5-79 or 5-95 sealant.

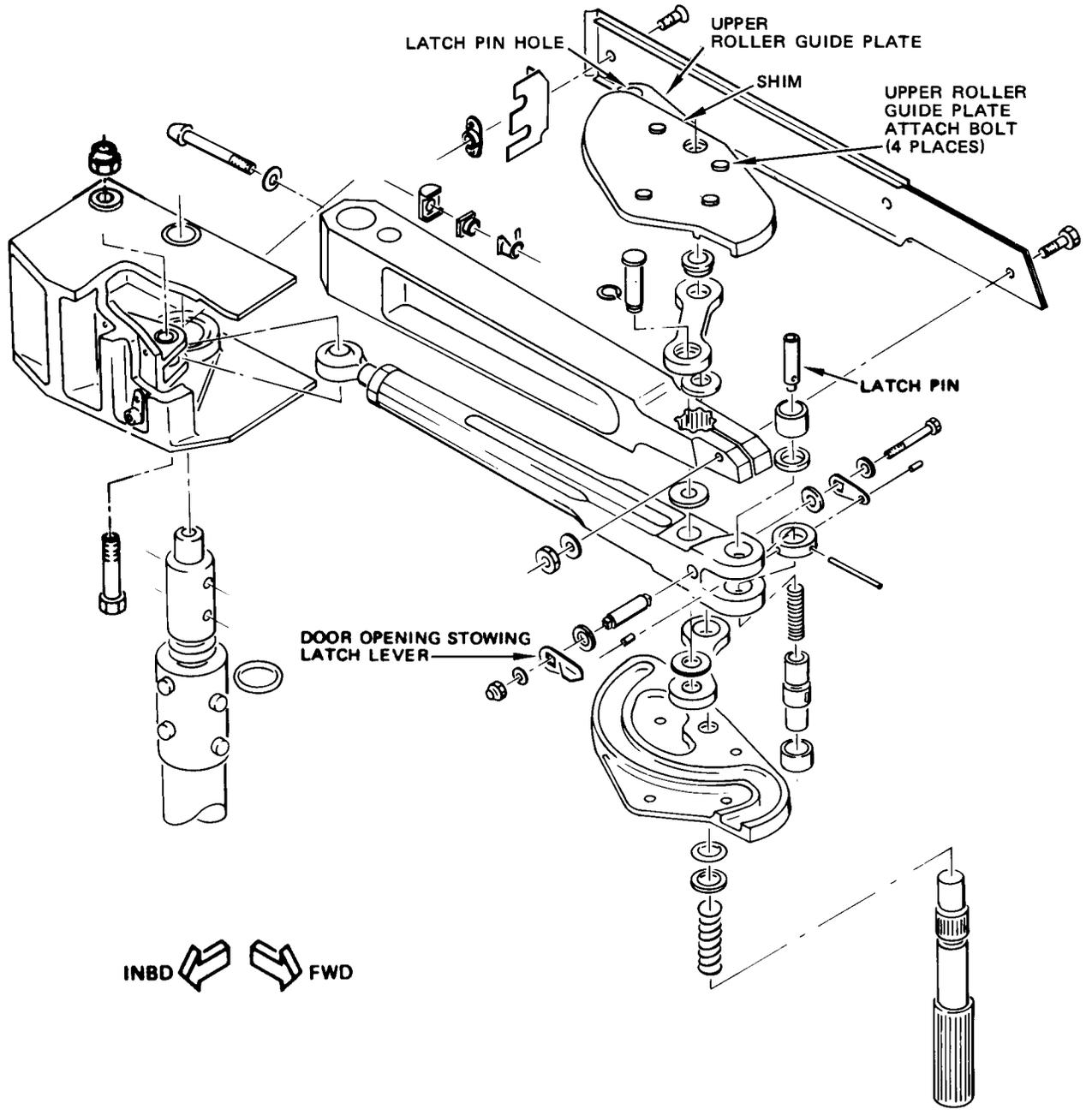
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Forward Entry Door Upper Roller Guide Plate Latch Pin Hole Repair  
 Figure 801

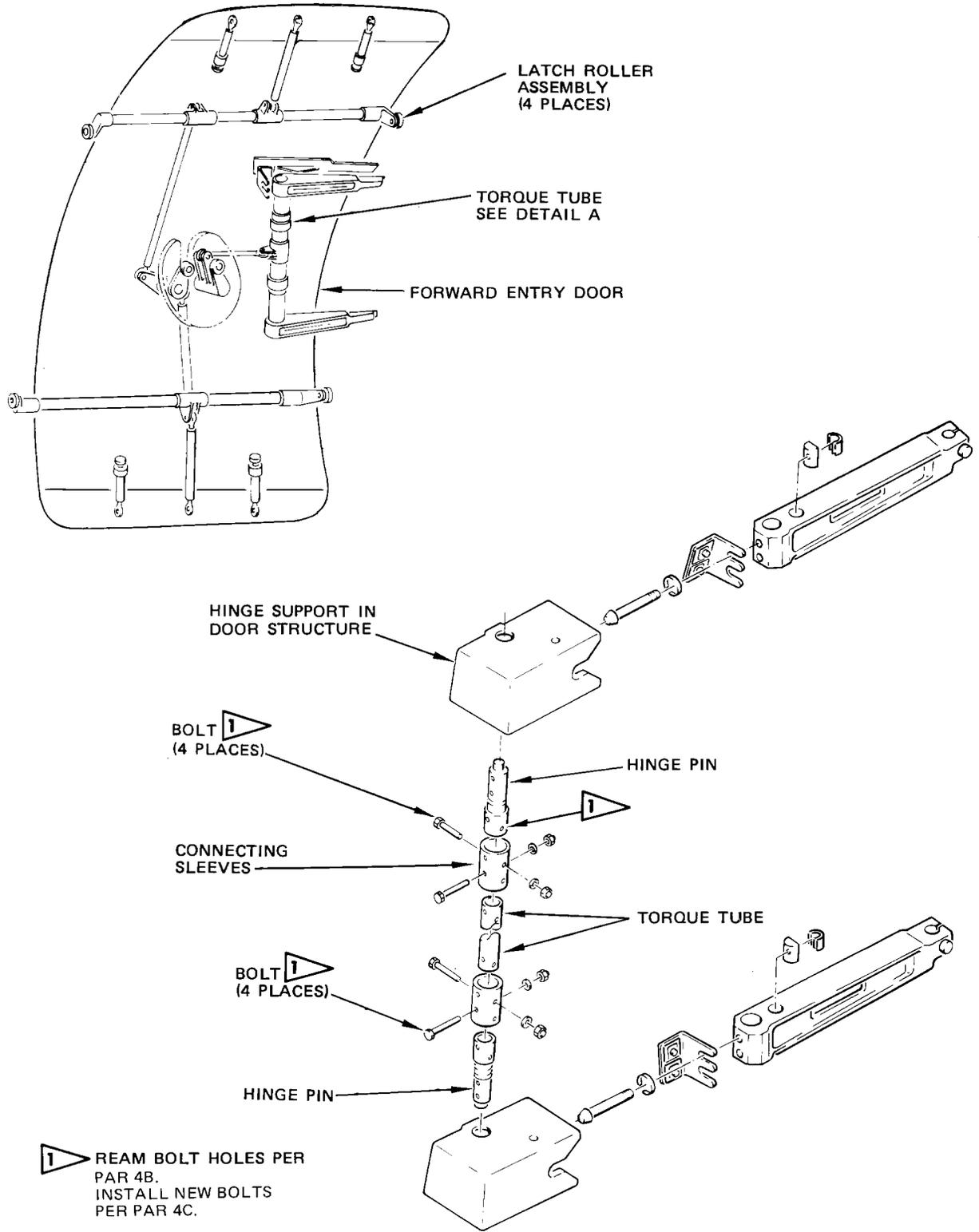
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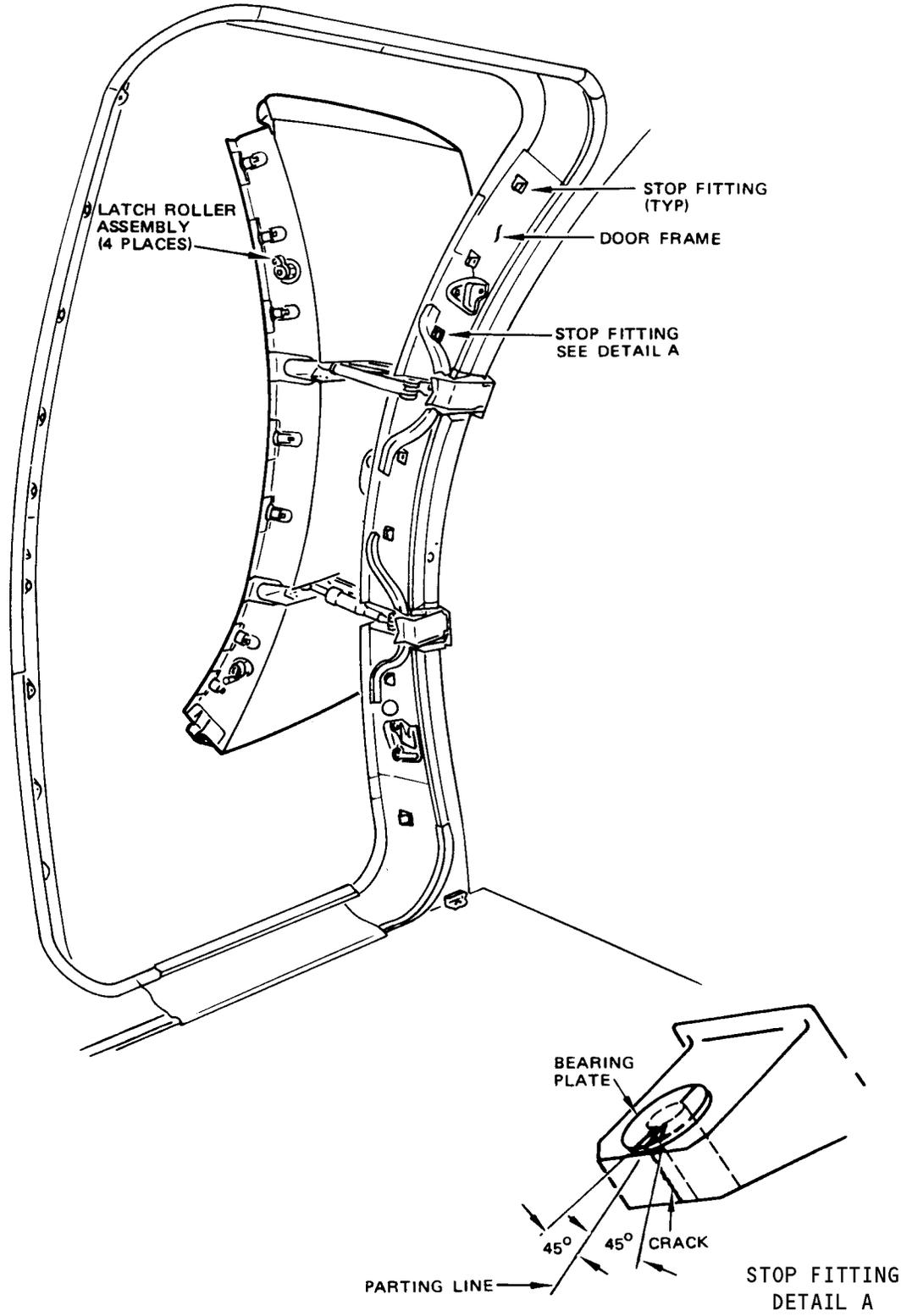


Forward Entry Door Torque Tube Approved Repair  
 Figure 802

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Forward Entry Door Stop Fitting Repair  
 Figure 803

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### FORWARD ENTRY DOOR – TROUBLESHOOTING

#### 1. General

- A. If entry door is hard to operate looseness is felt when operating door or door handle closing torque is high, troubleshoot door by operating door as described below to isolate trouble area.
- B. Check clearance and gaps specified below and make any adjustments per 52-11-00, Adjustment/Test.

#### 2. Troubleshoot Forward Entry Door

- A. Operate door toward closed position and check for hard spots while door is going through the cycle up to but not closing (Ref step D for last inch of closing). If a check does not reveal anything, disconnect linkages until the hard spot can be found. Lubricate all moving bearings except teflon bearings.
- B. Check for grinding noises. These can be pinpointed in a noisy area by using a plastic tube approximately 1/4 X 10 X 24 inches long held to the cam at one end and search for the location while someone moves the door mechanism.
- C. Check for loose bolts or elongated holes in torque tube by observation or by placing the finger on the part in question while someone operates the mechanism. There should be no movement felt between the torque tubes and cranks, splices, or end fittings.
- D. When closing the door during the last inch of travel, follow these steps closely:
  - (1) Door must travel parallel to opening.
  - (2) Door latch rollers must be in latch cams before the latch roller crank turns.
  - (3) Vertical clearance of the gates at top and bottom.
  - (4) Door flushness of door skin and body skin.
  - (5) Gate flushness at upper and lower edge of cutout.
  - (6) Stop pins must clear stop pads by 1/2 turn.
  - (7) Check for bottoming of latches, stop pins, or cranks in clearance holes. Use modeling clay in the inspected area.

**NOTE:** A light coating of vaseline on the clay surface will prevent clay pickup on moving parts.

- (8) Check for latches being out of time with handle cam. When closing the door, the door body should drop back in 0.015 inch as the latches go 10 degrees overcenter. The gates should just stop and not go back in. Check the alignment of the push rod and crank that operates the gate when the door is closed. These should have dead center alignment with the latching torque tube with door closed.
- (9) Snubber may be bottoming out. Check travel of snubber piston.

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- (10) Binding of guide arm in guide cams at upper hinge may be due to misaligned cam plates. Check by moving the guide arm (one end removed from door) through the cams and check for alignment of guide arm with centerline of hinge plane. Misaligned cam plates can cause the guide arm to work hard on one cam plate and force it to come loose. Cam plates may be aligned but rotated. This will cause the door to have extra travel in either the cocked position or the open position. It may not cause the handle loads to be high.

**NOTE:** Misaligned guide cams would probably only occur after cam replacement due to tolerances in cam installation boltholes.

E. Excessive torque problems (Ref. 52-11-00, for door operating torque limits)

- (1) Operate door and check for interference with body structure. Look for scraped paint as an indication. To verify, place a strip of paper over suspected area and close door. Paper should pull out without tearing.
- (2) Check seal plane for smoothness and excessive build-up.
- (3) Check stop gaps. If there is evidence of excessive bottoming out, readjust. Also recheck gate stops.
- (4) Make sure the bearings in the upper and lower gate pushrods move freely.
  - (a) Lubricate the bearings if they cannot move (Ref. 12-25-21/201).
  - (5) Check snubber for bottoming out.
- (5) Check for door entering opening evenly at forward and aft latches during last inch of travel. Adjust guide arm if required.
- (6) Check misfair. If a latch cam can be moved inboard without exceeding misfair tolerances, torque can be reduced. Stops must be reset if adjustment is made. Also, shortening the gate control rods will reduce torque.
- (7) Check for latch cam rollers entering latch cams before roller arms begin to rotate. Adjustment to the horizontal control rod at handle cam can reduce torque. Recheck exterior handle stowage force.
- (8) If lining is installed, check for interference of lining and body structure or trim. Check with a strip of paper as in step (1).
- (9) Check for smooth operation, without jerks or bumps, at handle cam. High spot in cam can cause excessive torque.
- (10) Check for clearance between latch cam rollers and outboard face of cam. Throughout operation of normally operating door, roller should not touch outboard face of cam. This contact can cause high torque.
- (12) Check for proper adjustment of hinge cutout covers.

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- F. Check for excessive misfair (Ref. 52-11-00, Adjustment/Test for allowable misfair)
  - (1) Excessive misfair will often result from adjustments to lower torque tube. If adjustments to latch cams or gate rods to improve fair result in excessive torque, trouble shoot per item A above.
- G. Troubleshoot problem of door handle not staying latched in flight or handle moves during taxi:
  - (1) Check for clearance between latch roller and bottom of latch cam. Improper clearance indicates door overcenter out of adjustment. Adjust for soft unlatching per 52-11-00, A/T
- H. Troubleshoot excessive handle stowage force (Ref. 52-11-00, A/T for allowable handle stowage force)
  - (1) Check adjustment of handle cam horizontal control rod. Lengthening the rod will reduce the handle stowage force. If adjustment is made recheck roller entrance to latches and handle torque.
  - (2) Check for proper handle shaft lubrication.

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### FORWARD ENTRY DOOR HINGE ARMS - REMOVAL/INSTALLATION

#### 1. General

- A. Procedures described and illustrated in the following apply to the forward entry door. Procedures for the galley door are similar, though sizes and proportions may differ slightly.

#### 2. Equipment and Materials

- A. 1/4-inch allen wrench
- B. Grease - BMS 3-33 (Preferred)
- C. Grease - MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)

#### 3. Remove Forward Entry Door Hinge Arms

- A. Remove door from airplane as described in 52-11-0 R/I.
- B. Remove nut (10, Fig. 401), washer (9) and cam plate (5) and allow handle shaft (8) and outside handle (7) to drop clear.
- C. Unscrew and remove hinge arm cover from outside surface of each hinge arm (16).
- D. Remove access panels (6) to obtain access to torque tube (2) and handle mechanism housing (3).
- E. Remove bolts from torque tube (2), connecting sleeves (18) and hinge pins (17). Slide connecting sleeves (18) away from hinges far enough to expose joints between torque tube (2) and hinge pins (17).
- F. Remove twelve housing attachment bolts (21) securing handle mechanism housing (3) to door structure.
- G. Remove four bolts (28) and washers (29) from exterior handle recess.
- H. Remove bolts securing splice plates (1) and (4) to door structure and remove splice plates.
- I. Disconnect upper and lower gate control rods (19) and (27) at their connection to each gate.
- J. Disconnect upper and lower gate control rods (19) and (27) through the access holes in the handle mechanism, from the gate operating crank (20). Move gate control rods (19) and (27) clear of handle mechanism.
- K. Remove hinge pin bolts (12) and cover support brackets (13) from hinge arms (16).

**NOTE:** The hinge pin bolts (12) can be reached from the outside of the door after the hinge covers are removed. The bolts can be turned by using a long 1/4-inch allen wrench which has the short arm length reduced to 0.5-inch.

- L. Slide hinge pins (17) out of engagement with hinge arms (16) and remove hinge arms.
- M. Remove handle mechanism housing (3) complete with torque tube crank (26) and torque tube (2) from the door.
- N. Remove and discard the exterior handle O-ring (30).

#### 4. Install Forward Entry Door Hinge Arms

- A. Examine the bushings (17) in the hinge fittings for wear, corrosion and fit.

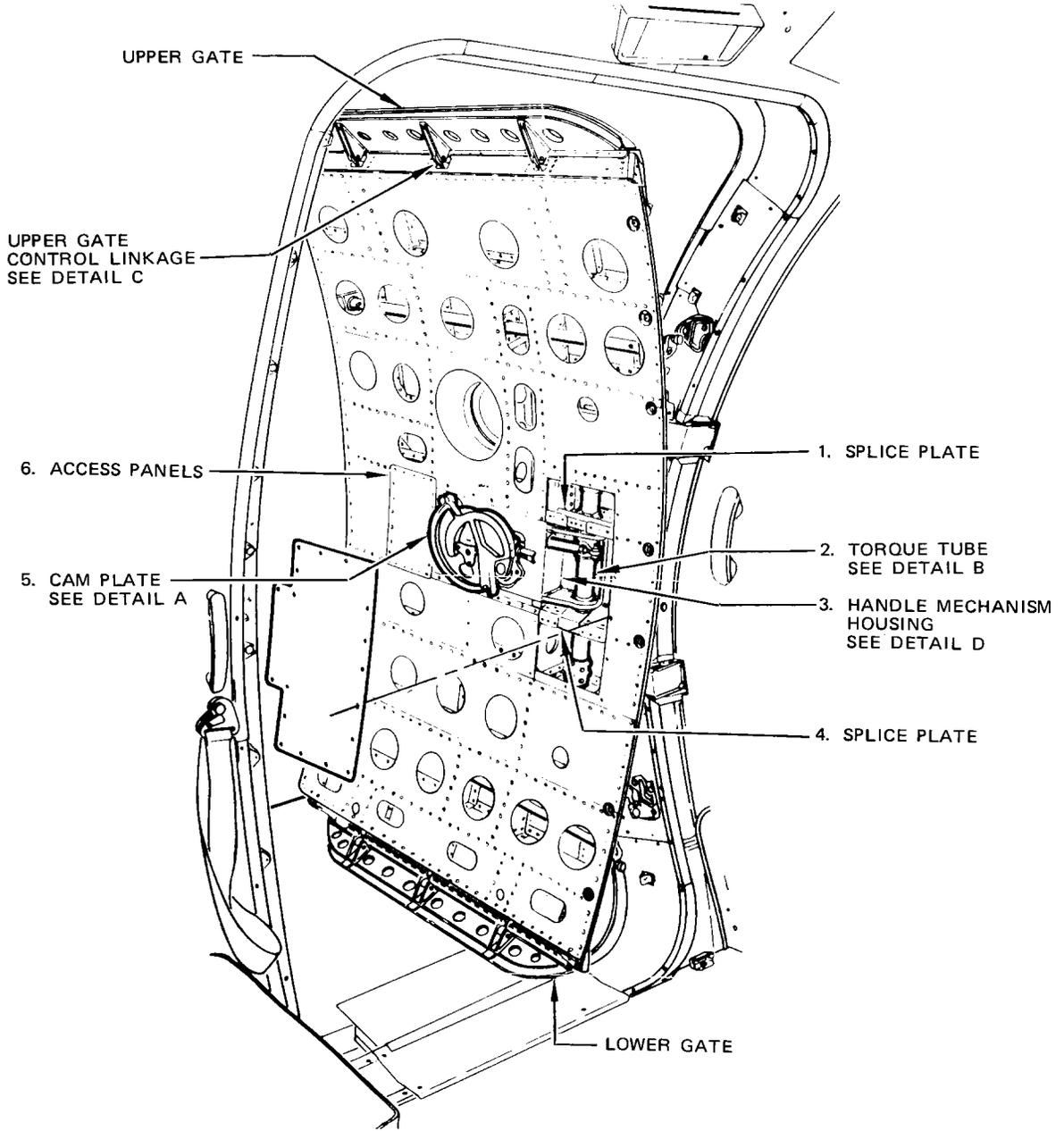
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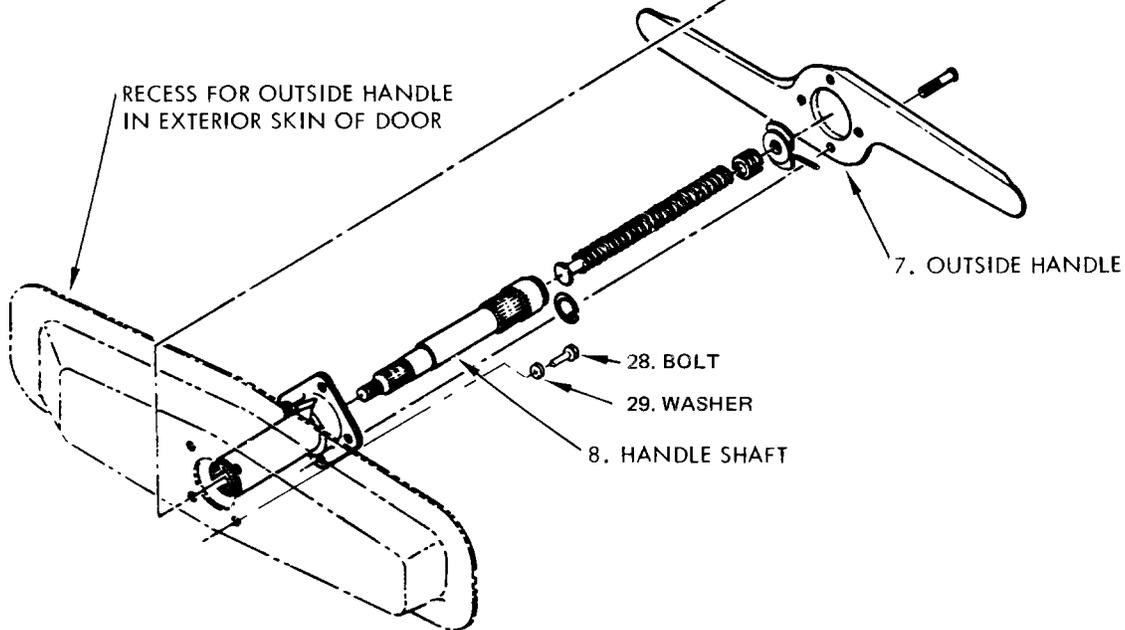
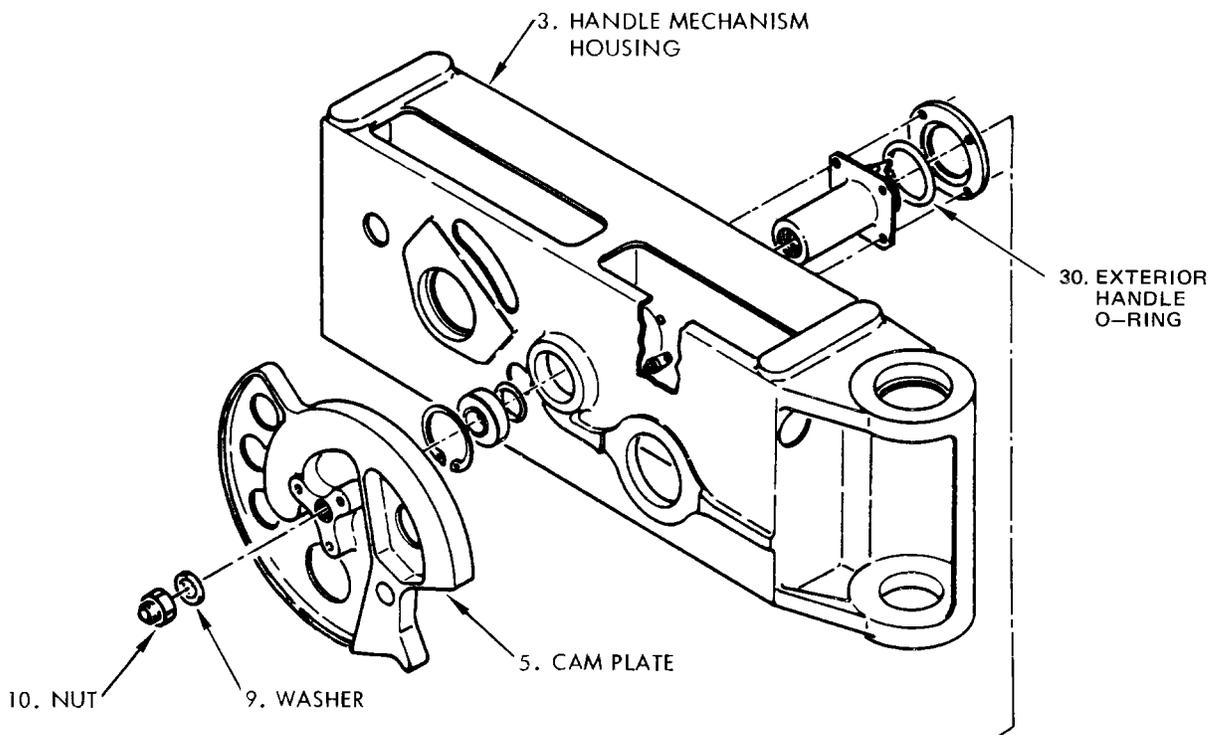


Door hinge Arm Installation  
 Figure 401 (Sheet 1)

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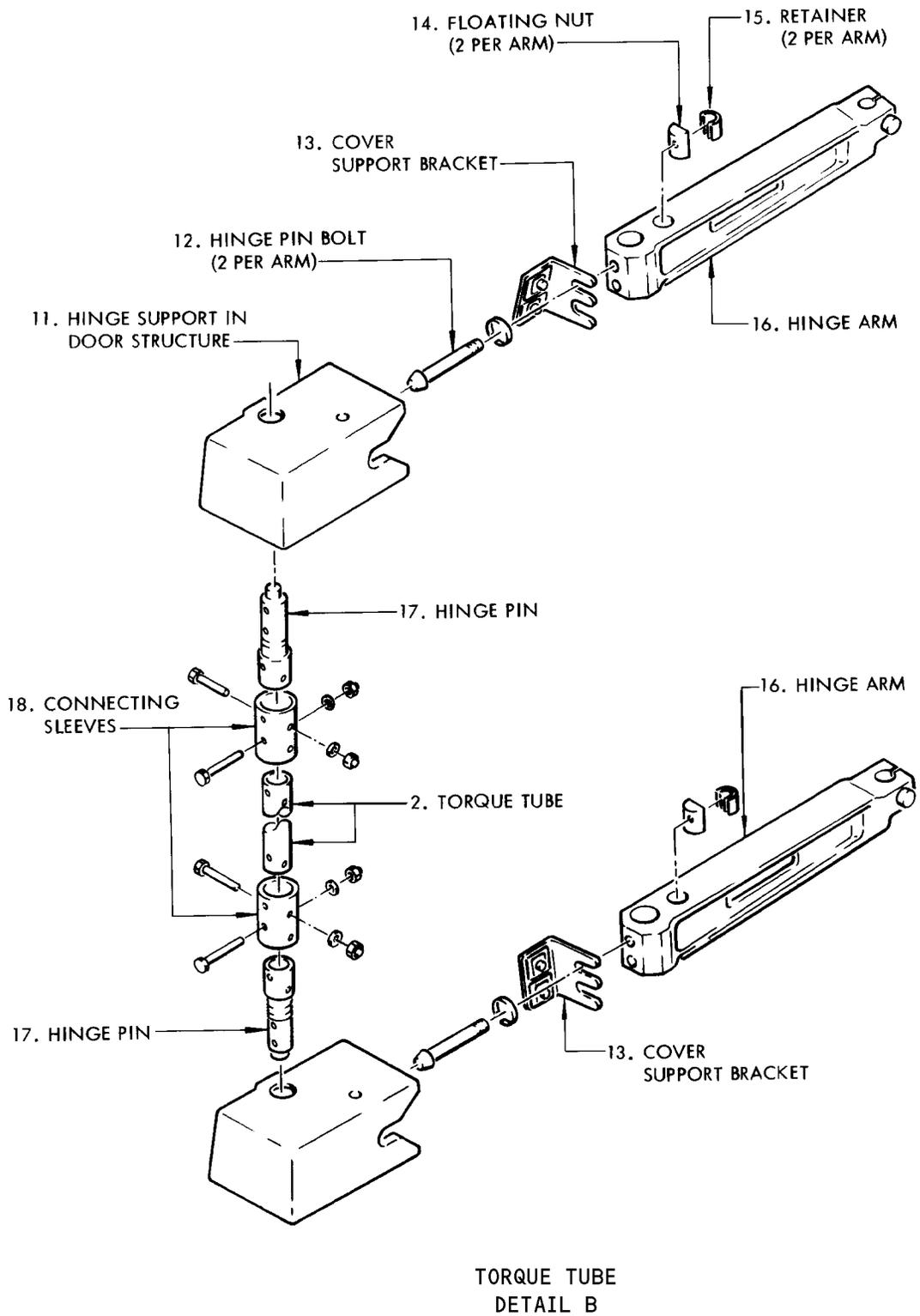


CAM PLATE  
DETAIL A

Door Hinge Arm Installation  
Figure 401 (Sheet 2)

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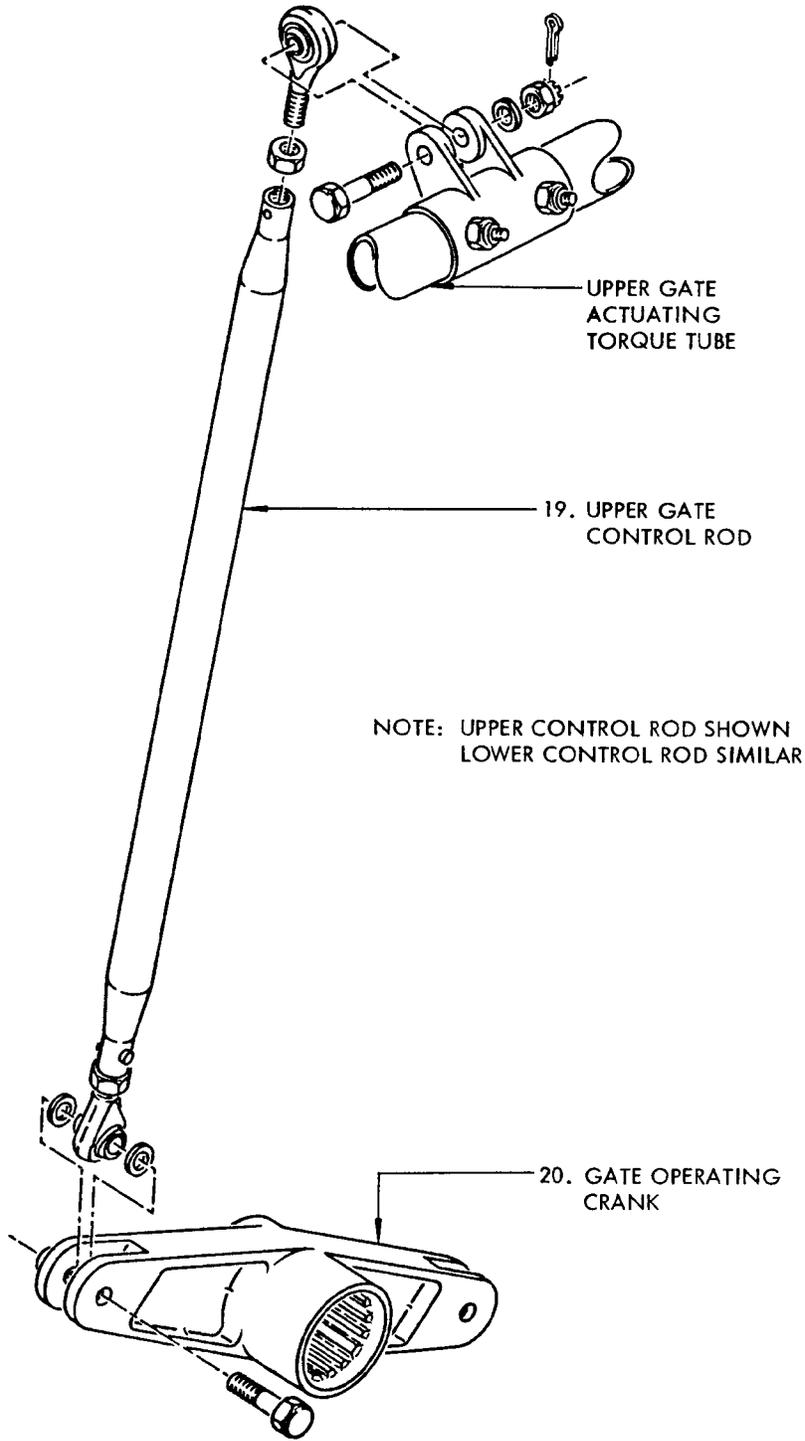
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Door Hinge Arm Installation  
 Figure 401 (Sheet 3)

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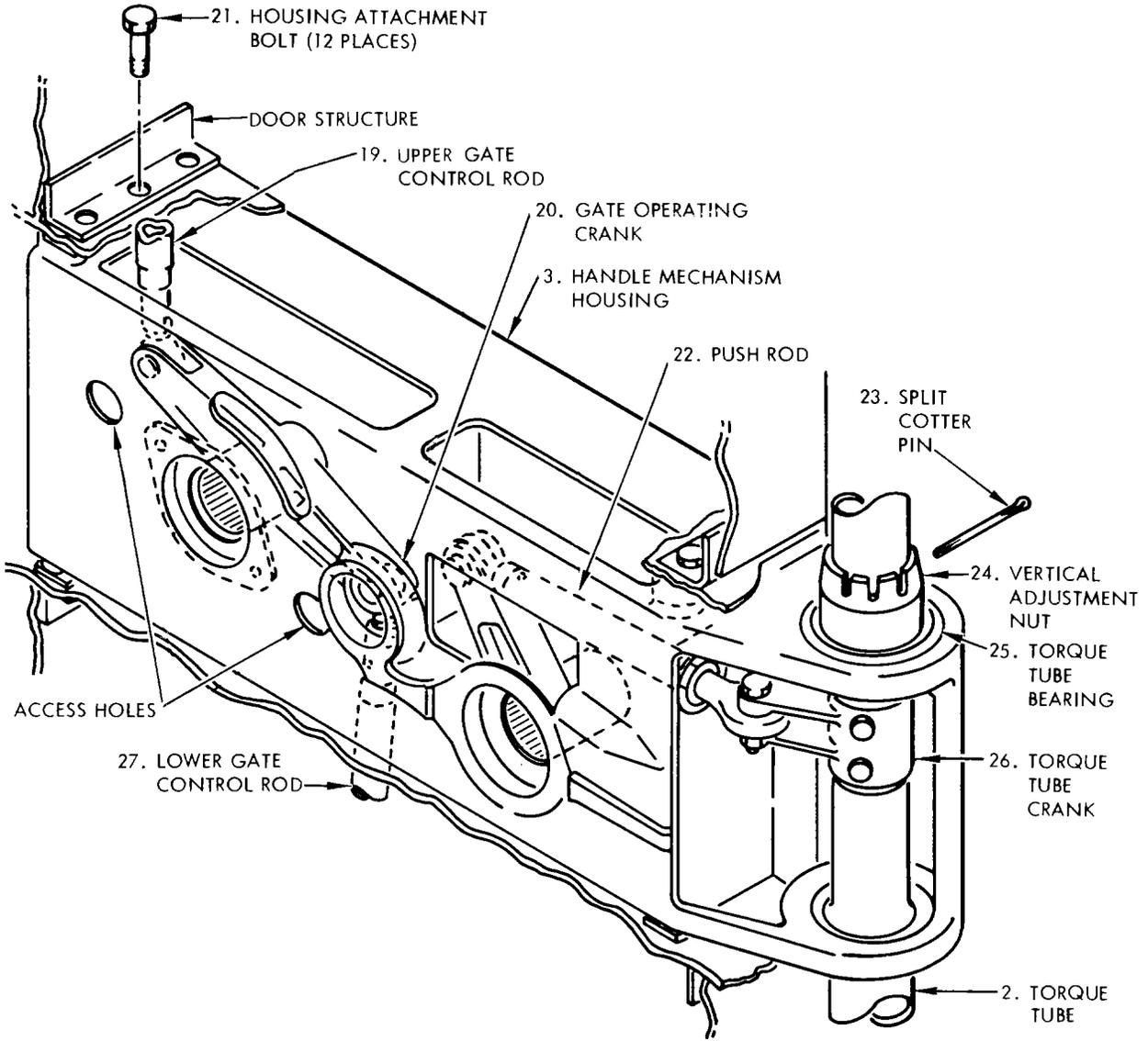


UPPER GATE CONTROL LINKAGE  
 DETAIL C

Door Hinge Arm Installation  
 Figure 401 (Sheet 4)

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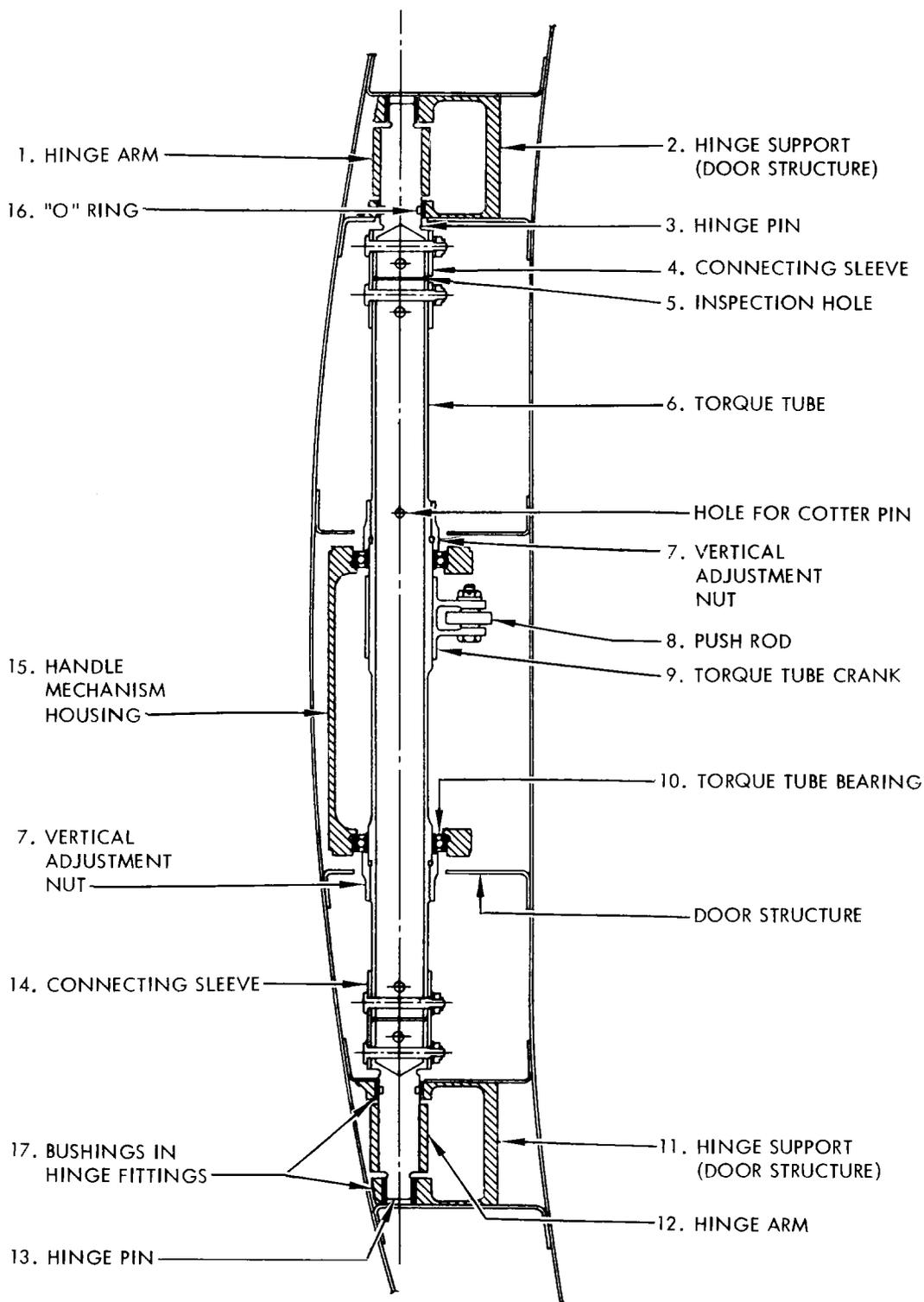
HANDLE MECHANISM HOUSING  
 DETAIL D

Door Hinge Arm Installation  
 Figure 401 (Sheet 5)

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Door Hinge Arm and Torque Tube Assembly  
 Figure 402

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- B. Check that O-rings (Fig. 401) are in good condition and are seated properly in the hinge pin grooves.
- C. Check that both floating nuts (14, Fig. 401) and their retainers (15) are positioned correctly in each hinge arm (16). Grease hinge pin bearing surfaces.
- D. Position each hinge arm (16, Fig. 401) in hinge support (11) in door structure, insert hinge pin (17) through support bushing and hinge arm, and install hinge pin bolts (12) without fully tightening.
- E. Install a new exterior handle O-ring (30).
- F. Install handle mechanism housing (3) in door structure so that torque tube (2) lines up with hinge pins.

**NOTE:** If endwise interference exists, adjust torque tube along its axis by manipulating the vertical adjustment nuts (24). Do not lock these nuts.

- G. Assemble the torque tube, hinge pins and sleeves.
  - (1) Move the sleeves (18) over the hinge pins (17).
  - (2) Put the bolts through the torque tube, sleeves and hinge pins.
  - (3) Tighten the nuts until they are at the end of the threads on the bolts.

**NOTE:** The nuts do not tighten against the sleeve.

- (4) Make sure there is no more than 0.016 inch between the sleeve and the washers.
- (5) Install another washer if it is necessary to get the correct distance.
- (6) Make any endwise adjustment of the torque tube by means of the vertical adjustment nuts (24).

**NOTE:** These vertical adjustment nuts should be left finger-tight and unlocked because they will be used to obtain vertical adjustment of the door when it is installed in the airplane.

- H. Install four bolts (28) and washers (29) in the recess for the outside door handle.
- I. Install 12 housing attachment bolts (21) securing housing to door structure.
- J. Connect control rods (19 and 27) to upper and lower gates. Connect control rods to gate operating crank (20) through the access holes in the handle mechanism housing (3).
- K. Install splice plates (1) and (4) across cutaways in door structure.
- L. Replace access panels (6) over torque tube and handle mechanism.

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- M. Fit cover support brackets (13) under heads of hinge pin bolts (12) on each hinge arm (16), tightening bolts 110 to 130 pound-inches when brackets are positioned satisfactorily.
- N. Install hinge cover on each hinge arm.
- O. Install handle shaft (8) and outside handle (7) on door, with the camplate (5), washer (9) and nut (10) correctly positioned. On airplanes with cotter pin hole in shaft, secure nut (10) with cotter pin.
- P. Install door on airplane as described in 52-11-0 R/I.

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FORWARD ENTRY DOOR GUIDE ARM ROLLER – REMOVAL/INSTALLATION

1. Equipment and Materials

- A. Grease – BMS 3-33 (Preferred)
- B. Grease – MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)

2. Remove Forward Entry Door Guide Arm Roller

- A. Open the door to a position where retainer ring (25, Fig. 401) is readily accessible, and remove retainer ring (25), pin (26) and washers (13) and (23). Swing radius links (4) and (16) away from guide arm (22).

**CAUTION:** WHEN THE GUIDE ARM IS DISCONNECTED FROM THE HINGE ARM OR REMOVED FROM THE DOOR, EXTREME CARE SHOULD BE EXERCISED IN HANDLING THE DOOR AS ITS MOTION WILL BE UNCONTROLLED. PARTICULAR CARE SHOULD BE OBSERVED WHEN MOVING THE DOOR TO OR FROM THE CLOSED POSITION IN ORDER TO PREVENT THE WEATHER/PRESSURIZATION SEAL FROM BEING PINCHED OR OTHERWISE DAMAGED.

- B. Remove latch lever retaining screw (8), nut (18) and washers (19), and remove door open stowing latch lever (20), link (9) and shaft (21).
- C. Move door to almost closed position, switch the upper hinge flap inwards, and then slide the roller end of guide arm (22) out of tracks on roller guide plates (3) and (17). Release hinge flap.
- D. Open door and keep it in cocked position, then remove four bolts holding attach fitting (1) to hinge support.
- E. Hold latch pin (5) against spring pressure and drive out the long spring pin (11) through collar (10), guide arm roller (14) and latch pin (5). Remove latch pin (5) and spring (12).
- F. Insert a punch in latch pin end of guide arm roller (14) and drive out guide arm roller (14) together with guide arm roller bushings (6) and (15). Remove collar (10) and thrust bearing (7).
- G. Remove attach fitting (1) from rod end bearing (24) by removing guide arm attachment bolt (2).

3. Install Forward Entry Door Guide Arm Roller

- A. Check that dimension between guide plates at upper hinge is as specified in Section A-A, Fig. 401. Adjust shims underneath guide plate as necessary to achieve this dimension.

**NOTE:** It is necessary to maintain this dimension to ensure door latchpin engagement.

- B. Apply a light film of grease to latch pin (5, Fig. 401), guide arm roller (14), thrust bearing (7), collar (10), guide arm roller bushings (6) and (15), and also tracks on roller guide plates (3) and (17).

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- C. Place collar (10) and thrust bearing (7) between jaws of guide arm (22), and press guide arm roller (14) and roller bushings (6) and (15) into place.

**CAUTION:** ENSURE THAT CORRECT SIDE OF GUIDE ARM (22) IS FACING UP (CHAMFERED FACE AT INBOARD END FACING FORWARD WITH DOOR OPEN) WHEN ASSEMBLING GUIDE ARM ROLLER COMPONENTS TO GUIDE ARM.

- D. Insert spring (12) and latch pin (5) in top end of guide arm roller (14). Depress latch pin (5) so that spring pin (11) may be driven into place through collar (10), guide arm roller (14), and latch pin (5).

**CAUTION:** WHEN GUIDE ARM IS DISCONNECTED FROM HINGE ARM OR REMOVED FROM DOOR, CARE SHOULD BE EXERCISED IN HANDLING DOOR AS ITS MOTION WILL BE UNCONTROLLED. PARTICULAR CARE SHOULD BE OBSERVED WHEN MOVING DOOR TO OR FROM CLOSED POSITION TO PREVENT WEATHER/PRESSURIZATION SEAL FROM BEING PINCHED OR DAMAGED.

- E. Connect rod end bearing (24) to attach fitting (1) using guide arm attachment bolt (2).

**CAUTION:** ENSURE THAT LATCH PIN (5) IS FACING UP WHEN CONNECTING GUIDE ARM TO DOOR.

- F. Open door to cocked position and install attach fitting (1) to hinge support using four bolts.  
G. Move door to almost closed position. Swing the upper hinge flap inwards and with the latch pin depressed, slide roller end of guide arm (22) into the tracks on roller guide plates. Release hinge flap.

**NOTE:** To facilitate installation of guide arm (22) it may be necessary to rock the door alternately inwards and outwards very slightly while sliding the guide arm (22) between the roller guide plates (3) and (17).

- H. Open door to position where latch lever shaft (21), link (9), door open stowing latch lever (20), and retaining screw (8), nut (18) and washers (19) may be installed.  
I. Swing radius links (4) and (16) round on to guide arm, line up holes and install pin (26), washers (13) and (23) and retainer ring (25).

**CAUTION:** DO NOT INSTALL A USED RETAINER RING (25). INSTALL A NEW RETAINER RING (25) ONLY. IF THE RETAINER RING COMES OFF THE PIN (26) THE DOOR MAY NOT OPEN.

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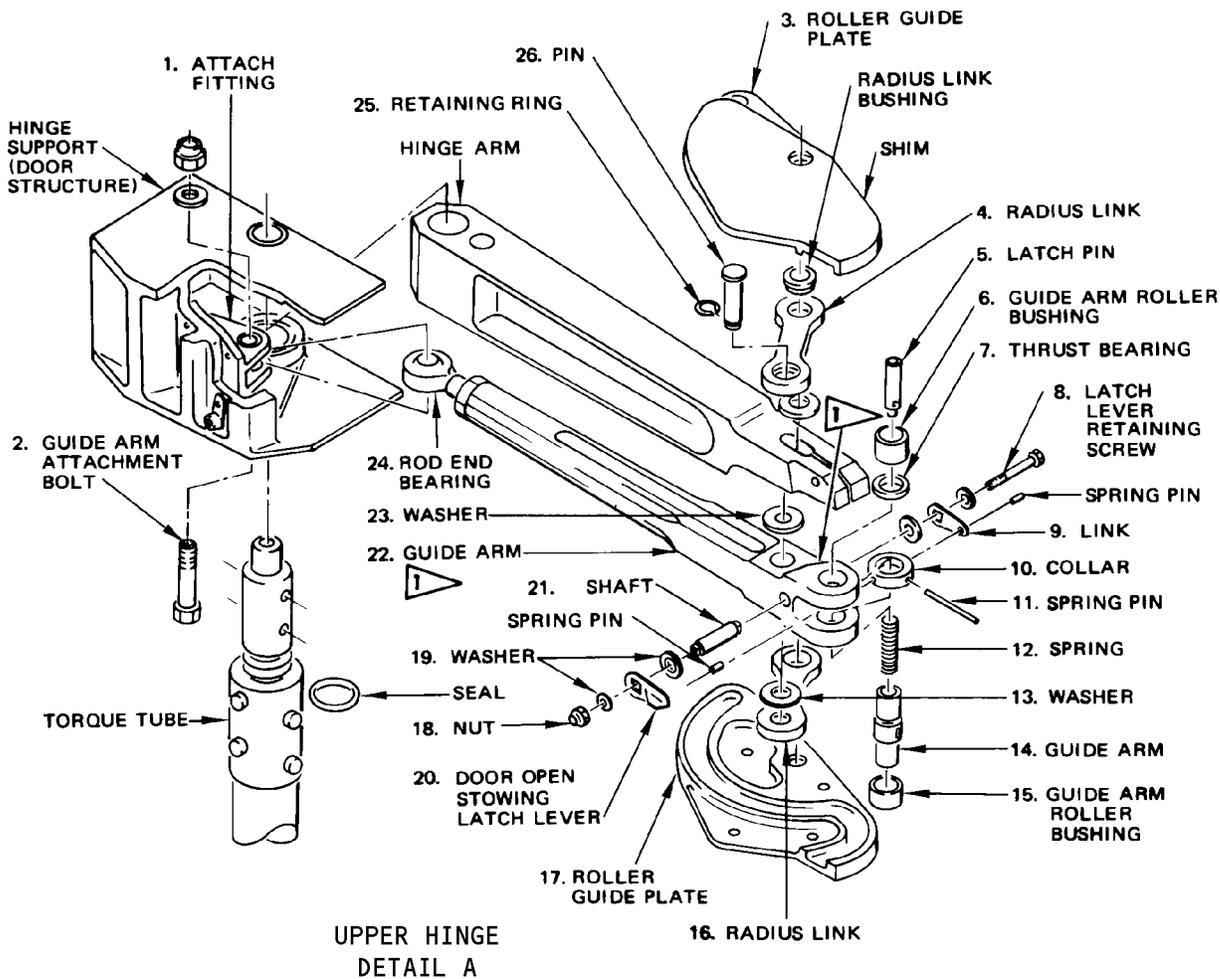
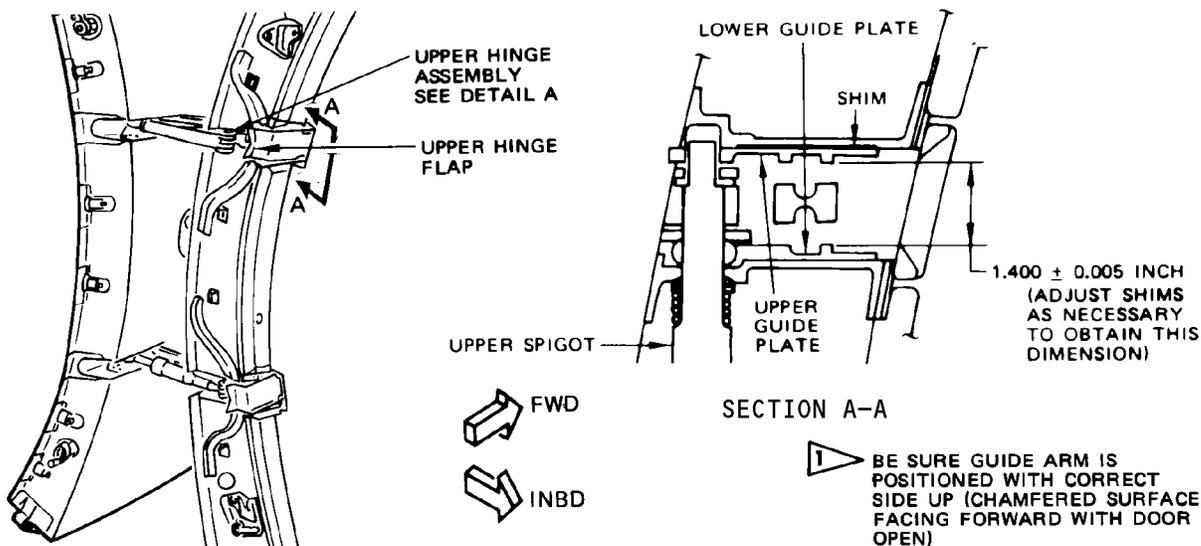
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Forward Entry Door Guide Arm Roller Installation  
Figure 401

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FORWARD ENTRY DOOR LINING AND INSULATION – REMOVAL/INSTALLATION

1. Equipment and Materials

A. Spanner Wrench – Assist Handle, Main Entry Door – F70336-1.

2. Remove Forward Entry Door Lining and Insulation (Fig. 402)

**CAUTION:** USE SPECIAL CARE IN HANDLING THE PARTS OF THIS INSTALLATION. SURFACES VISIBLE TO CABIN INTERIOR MUST BE FREE OF SCRATCHES, MARKS AND DENTS.

- A. Operate door handle fully, bringing door into cocked position.
- B. Remove upper panel (1) from door (3).
  - (1) Remove attach nuts (2) at forward and aft corners of upper edge of panel (1). Loosen remaining nuts along top edge of panel.
  - (2) Loosen panel fastener studs (11, detail A) one-quarter turn on forward and aft edges of panel.
  - (3) Pull upper edge of panel (1) inboard and up to release panel from trim strip (4). Remove upper panel from door.
- C. Remove escape slide assembly (8) from door (3) (Ref Chapter 25, Escape Slide Assembly [Door-Mounted].)
- D. Remove lower panel (6) from door (3).
  - (1) With door in cocked position, remove door interior handle (9, detail B).
    - (a) Remove insert (17) from spring clips (18), taking care not to mar polished surface of handle.
    - (b) Remove three bolts (16), washers, insert support, and remove the handle and shims (14) from the door.
  - (2) Remove four screws (15) attaching lower panel (6) to lining retainer (13).
  - (3) Remove assist handle (5, detail C).
    - (a) Rotate nut (20) using wrench (23), and remove assist handle.
    - (b) Remove bolts (22), washers, and collars (21) within nuts and lift off nuts and outer collars (19).
  - (4) Remove attach nuts (7) at forward and aft corners of lower edge of panel (6). Loosen remaining nuts along bottom edge of panel.
    - (a) Loosen panel fastener studs (12, detail A) one-quarter turn on forward and aft edges of panel (6).
  - (5) Pull lower edge of panel (6) inboard and down to release panel from trim strip (4). Remove panel from door.

**NOTE:** Inboard window pane assembly (10) will be removed with lower panel (6). For removal of window from door, refer to Chapter 56, Door-Mounted Windows.

- E. Remove retaining nuts and remove inboard window pane assembly (10) from the panel (6).

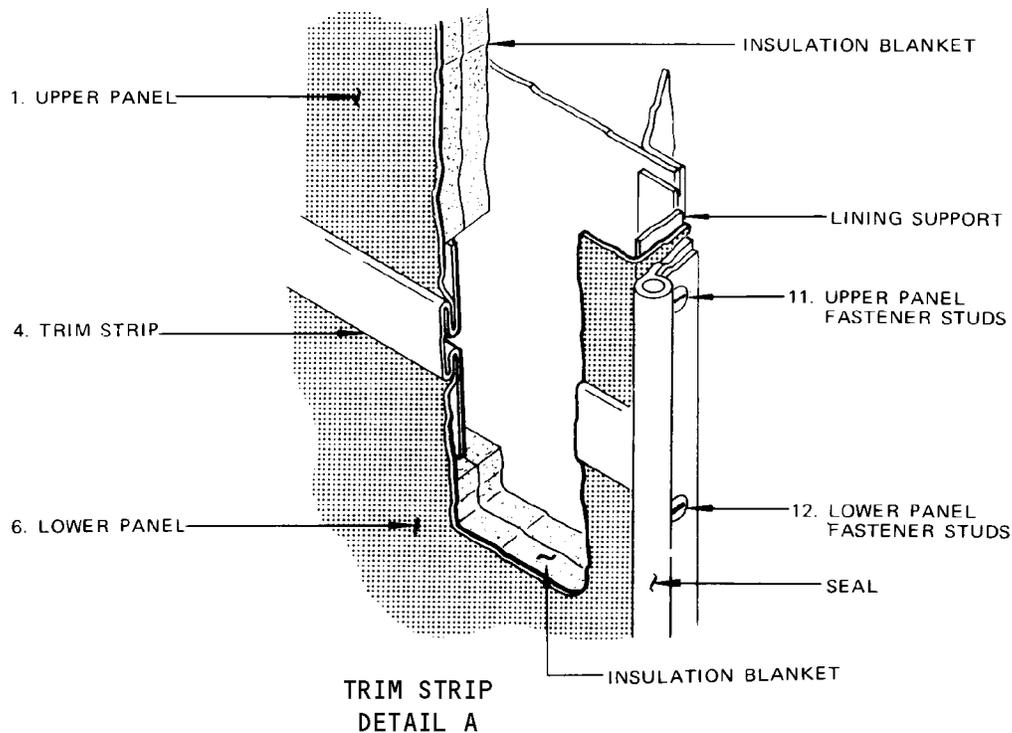
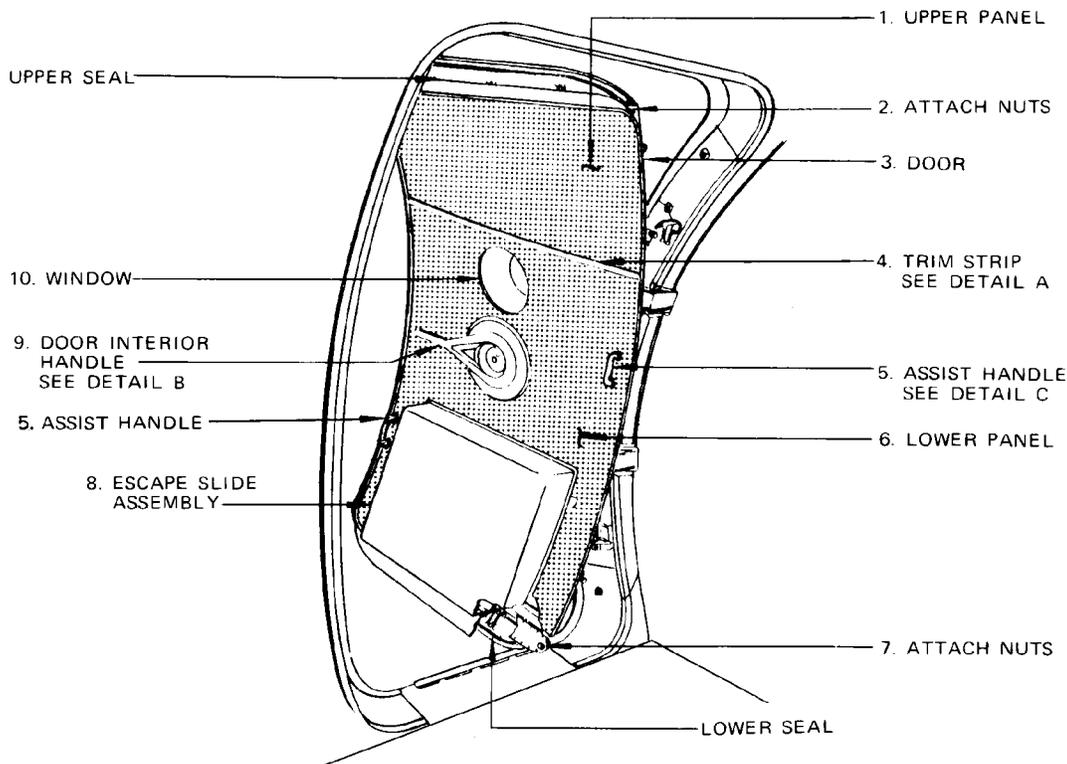
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Forward Entry Door Lining and Insulation  
 Figure 401

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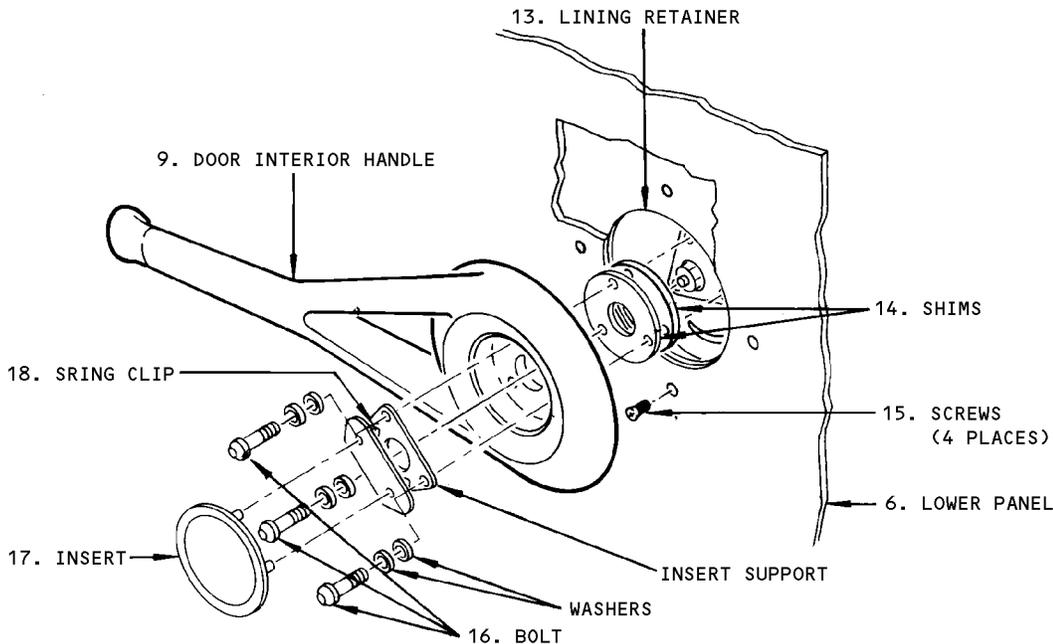
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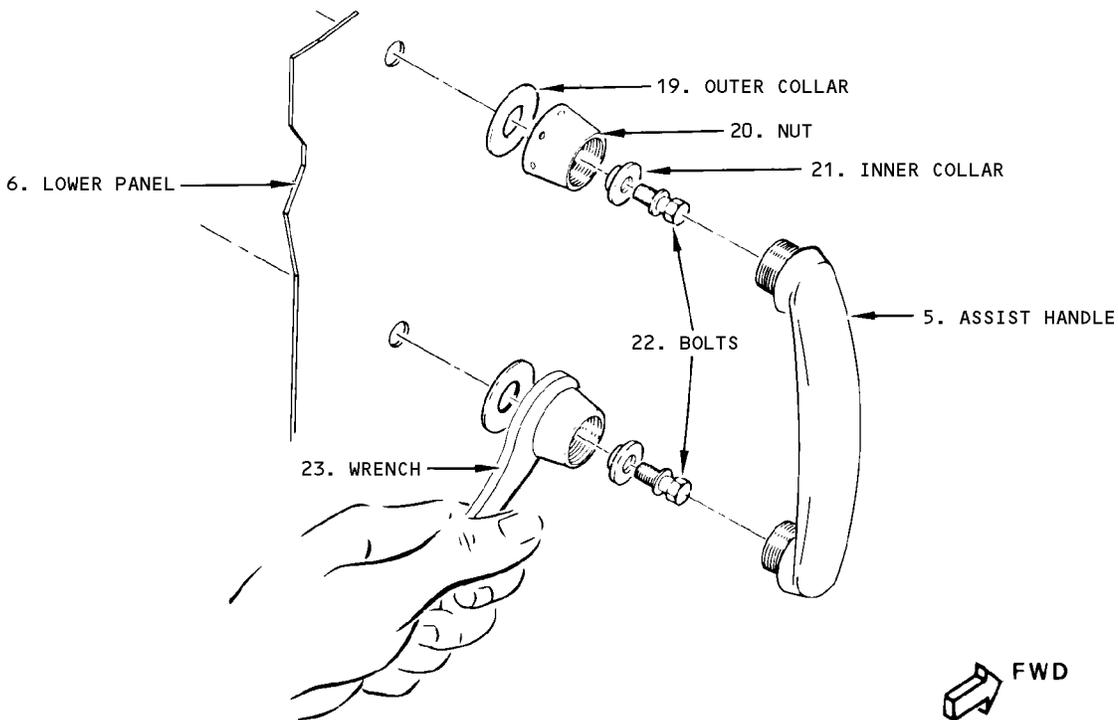
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**DOOR INTERIOR HANDLE  
DETAIL B**



**DOOR ASSIST HANDLE  
DETAIL C**



**Forward Entry Door Lining and Insulation Installation  
Figure 402**

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F. Remove trim strip (4) from door (3).

### 3. Install Forward Entry Door Lining and Insulation (Fig. 402)

**CAUTION:** USE SPECIAL CARE IN HANDLING THE PARTS OF THIS INSTALLATION. SURFACES VISIBLE TO CABIN INTERIOR MUST BE FREE OF SCRATCHES, MARKS AND DENTS.

- A. Install trim strip (4) on door (3).
- B. Install inboard window pane assembly (10) on lower panel (6) with retaining nuts.
- C. Install lower panel (6) on door (3).
- (1) Position lower panel (6) on door (3) then insert lower edge of panel under trim strip (4).
  - (2) Engage and tighten panel fastener studs (12, detail A) on forward and aft edges of panel (6).
  - (3) Install attach nuts (7) at forward and aft corners of lower edge of panel (6). Tighten remaining nuts along bottom edge of panel.
  - (4) Install assist handle (5, detail C).
    - (a) Install door assist handle nuts (20) with outer collar (19) and inner collar (21), washers and bolts (22).
    - (b) Engage threads on assist handle with threads in nuts and install assist handle by rotating nuts using wrench (23).
  - (5) Secure lower panel (6, detail B) to lining retainer (13) with four screws (15).
    - (a) Install door interior handle (9).
    - (b) With door in cocked position, install shims (14), interior handle (9), insert support, washers and three bolts (16). Lockwire bolts.
    - (c) Check that gap between edge of circular portion of handle (9) and lower panel (6) is 0.15 (+0.00/-0.003) inch. If necessary, add or delaminate outboard shim (14) to obtain this dimension.

**NOTE:** Alter bolt grip length or add washer under bolt head as required for shimming variations.
    - (d) Install insert (17) in center of handle.
- D. Install escape slide assembly (8) on door (3). Refer to Chapter 25, Escape Slide Assembly (Door-Mounted).
- E. Install upper panel (1) on door (3).
- (1) Position upper panel (1) on door (3) then insert lower edge of panel under trim strip (4).
  - (2) Secure upper panel (1) to door (3) . Engage and tighten panel fastener studs (11, detail A) on forward and aft edges of panel.
  - (3) Install attach nuts (2) at upper edge of panel (1). Tighten remaining nuts along top edge of panel and close door.

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FORWARD ENTRY DOOR ASSIST SPRING - REMOVAL/INSTALLATION

1. General

- A. The following procedure is applicable to the removal/installation of the center assist spring without the removal/installation of the door. The same procedure is required for the removal/installation of either the upper or lower torsion springs installed on each end of the torque tube.

2. Equipment and Materials

- A. Wood block of suitable dimensions to support door weight of 180 pounds  
B. Grease - BMS 3-33 (Preferred)  
C. Grease - MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)  
D. Grease - MIL-G-21164 (Alternate)  
E. Corrosion Preventive Compound - MIL-C-16173

3. Prepare for Removal (Fig. 401)

- A. Remove evacuation slide (5) from door (Ref 52-11-31).  
B. Remove interior lining (3) between upper hinge arm (1) and lower hinge arm (4) (Ref Chapter 25, Doorway Sidewall Linings).  
C. Remove cover (2) between upper and lower hinge arms.  
D. Rotate door to a balanced position where upper and lower torsion springs (10, detail A) and center assist torsion spring (16) are not loaded, which is approximately 60 degrees from door stowed open position.  
E. Place wood block support under door, or provide other suitable support.

**CAUTION:** UNLESS DOOR SUPPORT IS USED, ON REMOVAL OF TORQUE TUBE, DOOR WILL BE SUPPORTED ONLY BY UPPER SPIGOT. DOOR WEIGHS APPROXIMATELY 180 POUNDS AND SHOULD BE SUPPORTED UNTIL LOWER SPIGOT IS INSTALLED.

4. Remove Forward Entry Door Assist Spring (Fig. 401)

- A. Remove upper and lower spring mounting bolts (11, detail A) from torque tube (17).  
B. Remove two spring attach bolts (15) from stop fittings (13).  
C. Remove bolts (9), (18 and 19, section A-A ) and screw (14) from lower stop support fitting (8) and lower stop fitting (13).  
D. Loosen clamp bolt (6) on forward end of lower hinge arm (4) and remove lower spigot-to-hinge torque tube bolt (20) if installed. This allows lower spigot to be withdrawn from lower hinge assembly.

**NOTE:** For reference on installation, mark ends of torque tube to upper spigot (7) and to lower spigot (12) and lower spigot (12) to lower hinge arm (4) to index relative position of these parts.

- E. Slide the lower spigot up into torque tube until sufficiently clear of hinge brackets to allow torque tube to be lowered clear of upper spigot.

**NOTE:** Take care not to drop lower compression spring and seal from lower spigot.

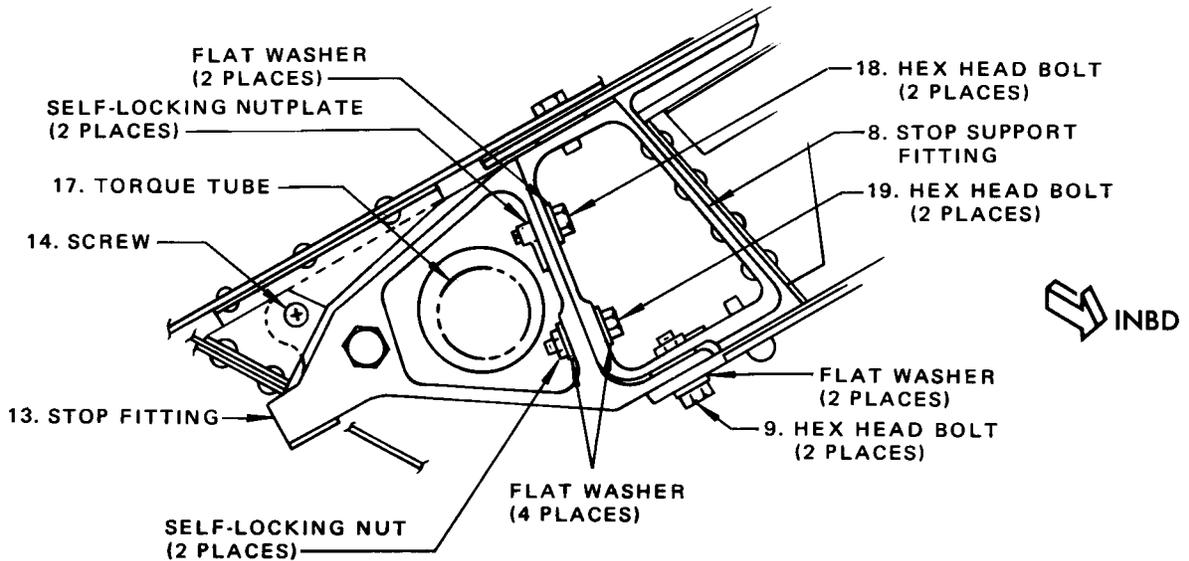
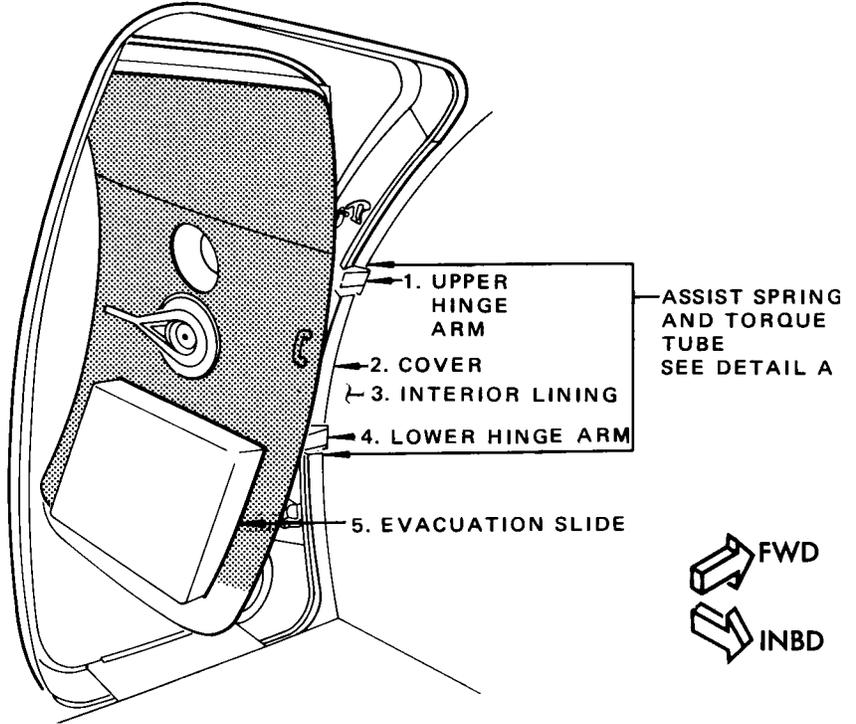
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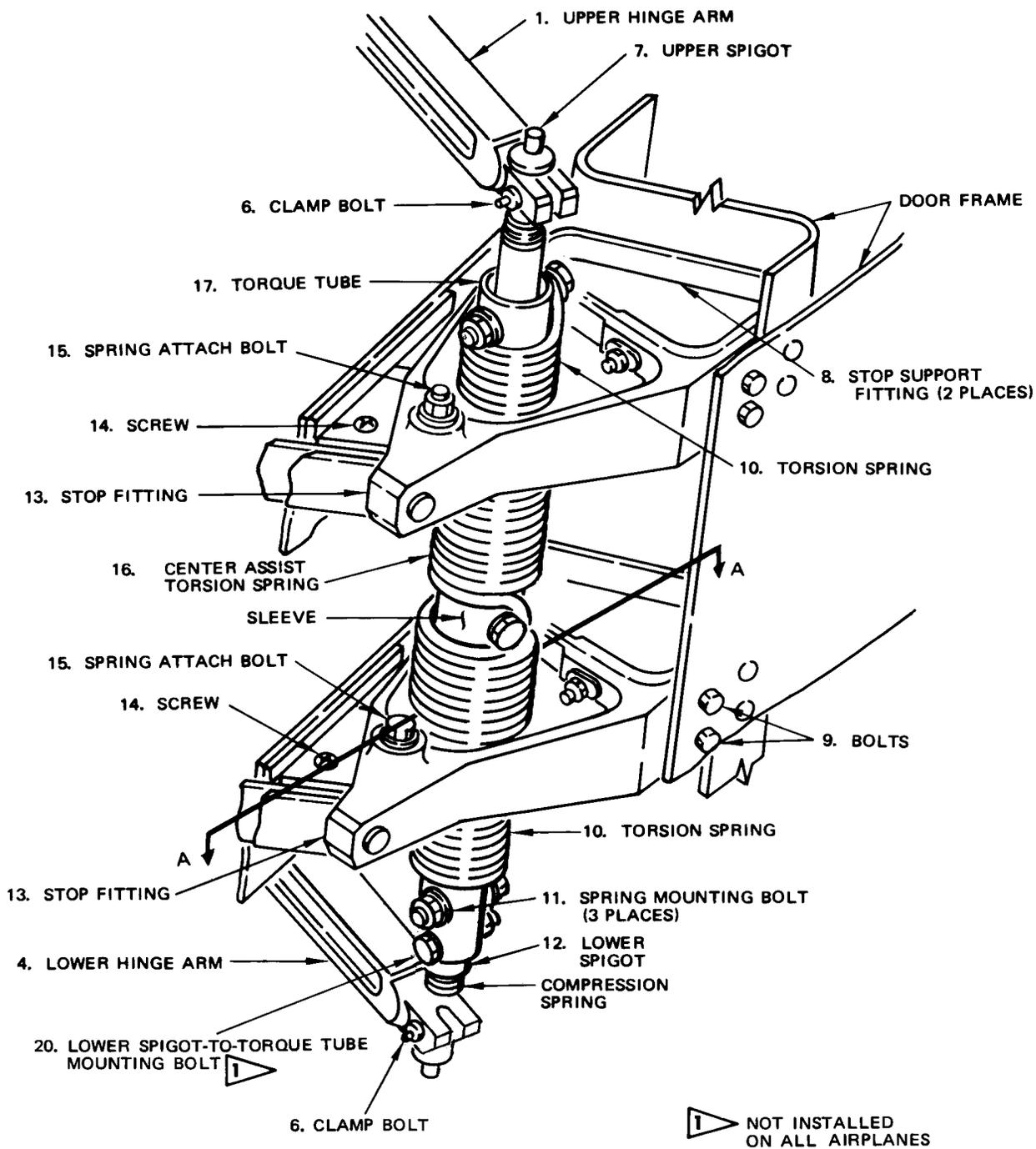
SECTION A-A

Forward Entry Door Assist Spring Installation  
 Figure 401 (Sheet 1)

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DETAIL A

Forward Entry Door Assist Spring Installation  
 Figure 401 (Sheet 2)

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- F. Lower and rotate torque tube until clear of lower hinge assembly and upper stop fitting.
- G. Remove torque tube, center spring, lower stop fitting, and lower torsion spring as a unit from airplane.
- H. Remove upper torsion spring from airplane.
- I. Remove springs from torque tube as required.

5. Install Forward Entry Door Assist Spring (Fig. 401)

- A. Position upper torsion spring (10, detail A) on upper stop fitting (13).
- B. Apply a coating of corrosion preventive compound to mating surfaces of lower spigot (12) and torque tube (17). Assemble torque tube (17), center spring (16), lower stop fitting (13), lower torsion spring (10), and lower spigot (12) as a unit.

**NOTE:** Make sure compression spring and seal are in place on lower spigot. During assembly, hand lubricate center torsion spring (16) and torque tube (17) with grease.

- C. Install torque tube with assembled springs and stop fitting as a unit on airplane.
  - (1) Fill cavities of upper and lower spigot support housings with grease.
  - (2) Apply a coating of grease to necks of upper and lower spigots.
  - (3) Apply a coating of corrosion preventive compound to mating surfaces of upper spigot (7) and torque tube (17).
  - (4) Raise torque tube through upper stop fitting and upper torsion spring and rotate into position over lower hinge assembly.
  - (5) Align upper end of torque tube with reference marks on upper spigot (7) and engage parts.
- D. Align the lower spigot with the reference marks on lower hinge arm and engage parts.
- E. Install two spring attach bolts (15) on stop fittings (13) and two spring mounting bolts (11) on the torque tube (17).

**CAUTION:** BOLTS (11) MUST BE INSTALLED WITH BOLTHEADS ORIENTED AS SHOWN IN DETAIL A, FIG. 401, TO PREVENT INTERFERENCE WITH STRUCTURE DURING DOOR OPERATION.

- F. If required, install lower spigot-to-torque tube hinge bolt (20).
- G. Tighten clamp bolt (6) on lower hinge arm (4).
- H. Install bolts (9, 18 and 19, section A-A) and screw (14) on lower stop support fitting (8) and lower stop fitting (13).

**NOTE:** On later airplane s bolts (18) are attached using nutplates to facilitate installation.

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6. Restore Airplane to Normal
  - A. Remove wood block support from the door.
  - B. Install cover (2, Fig. 401) between upper hinge arm (1) and lower hinge arm (4).
  - C. Install interior lining (3) between the upper and lower hinge arms (Ref Chapter 25, Doorway Sidewall Linings).
  - D. Install evacuation slide (5) on the door (Ref 52-11-31). 507

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### AFT ENTRY DOOR - DESCRIPTION AND OPERATION

#### 1. General

- A. The aft entry door is located near the aft end of the fuselage on the left side of the airplane. The door is included in the door warning system and is provided with a switch, attached to the door frame, in circuit with the warning light for the door. Refer to Section 52-71-0. The aft entry door is similar to the galley service door. For information applicable to the aft entry door, refer to Galley Service Doors - Description and Operation, Section 52-41-0.

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## MAINTENANCE MANUAL

### AFT ENTRY DOOR - REMOVAL/INSTALLATION

#### 1. General

- A. The aft entry door is similar to the galley service door. For removal/installation of the aft entry door, refer to 52-41-0, Galley Service Door.

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AFT ENTRY DOOR – ADJUSTMENT/TEST

1. General

- A. The aft entry door adjustment/test procedures are similar to those covered in 52-41-0, Galley Service Door; except refer to Fig. 501 for aft entry door flushness requirements.

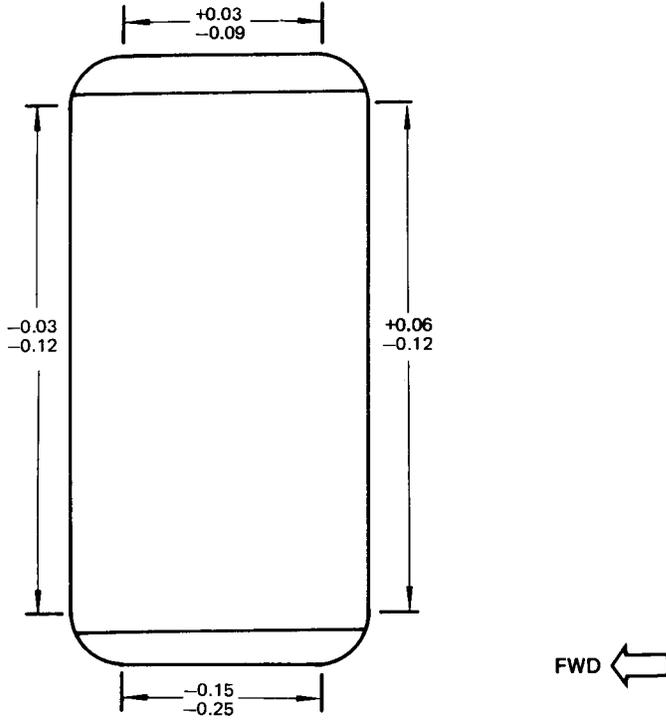
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NOTE: THIS ILLUSTRATION SHOWS THE LIMITS TO ALIGN THE AFT ENTRY DOOR CONTOUR WITH THE FUSELAGE CONTOUR. A PLUS LIMIT SHOWS THAT THE DOOR IS OUTBOARD OF THE CONTOUR OF THE FUSELAGE. A MINUS LIMIT SHOWS THAT THE DOOR IS INBOARD OF THE CONTOUR OF THE FUSELAGE. THE LIMITS ARE FOR THE STRAIGHT EDGES OF THE DOOR BETWEEN THE POINTS SHOWN.

YOU CAN INCREASE THE LIMITS BY 0.03 INCH IN ONE OR MORE LOCATIONS. THE SUM OF THE LENGTHS OF THE INCREASED LIMITS MUST NOT BE MORE THAN 10 INCHES.

MEASURE ALL DIMENSIONS WHEN THE AIRPLANE IS NOT PRESSURIZED.

ALL DIMENSIONS ARE IN INCHES.

Aft Entry Door Flushness Requirements  
 Figure 501

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## MAINTENANCE MANUAL

### AFT ENTRY DOOR – INSPECTION/CHECK

#### 1. Aft Entry Door Inspection

##### A. Examine Aft Entry Door

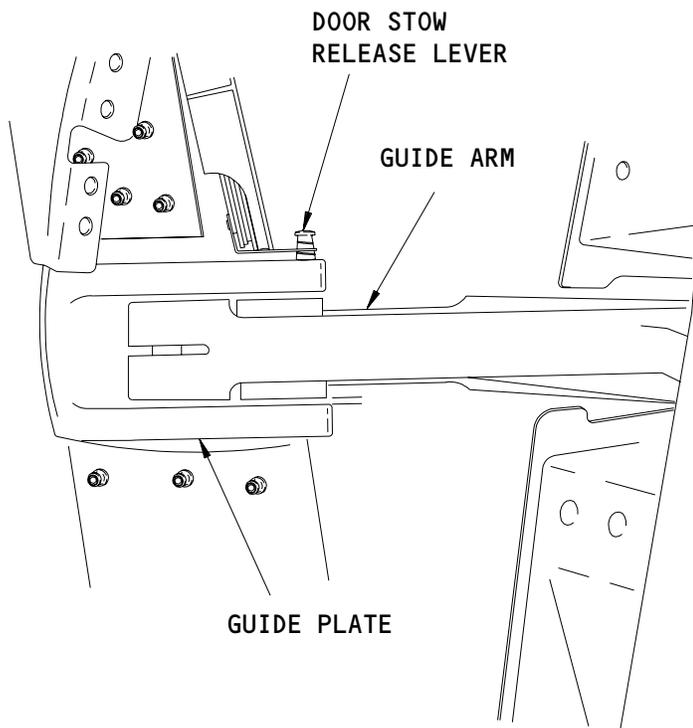
- (1) Examine external and internal skins for cracks and corrosion; hinge fairings for looseness and missing screws.
- (2) Examine frames, internal brackets, handle mechanism housing, and hinges for cracks, corrosion, and loose bolts.
- (3) Examine door operating mechanism for cracks, corrosion, excessive wear, and loose bolts.
- (4) Examine latch rollers, latches, and door stops for cracks, corrosion, and foreign particles lodged in latches or attached to stops.
- (5) Examine drain holes for obstruction.
- (6) Examine door seals for cracks, cuts and tears, and correct seating when door is in closed position.
- (7) Examine roller cam plates and guide arm roller for excessive wear, which may cause door to malfunction (Ref 52-13-31 R/I).
- (8) Check that snubber operates correctly to retard or snub rapid motion of door towards stowed and cocked position.

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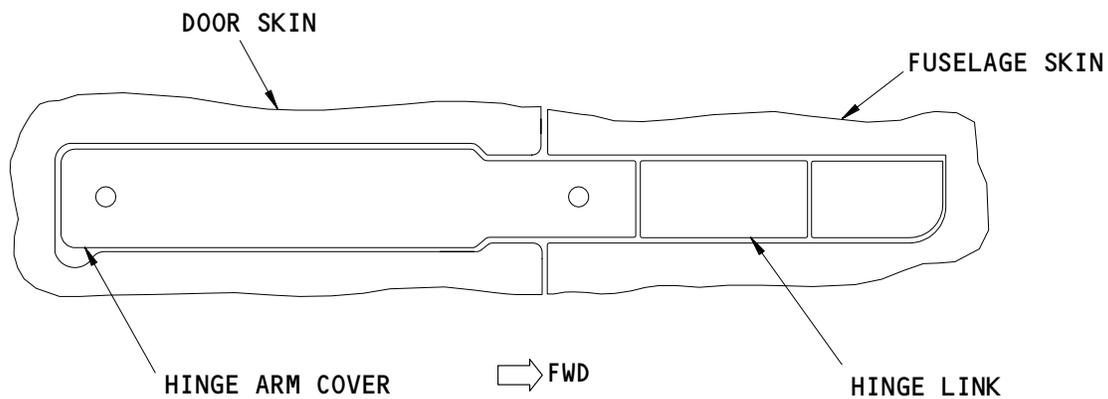
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UPPER GUIDE ARM AND GUIDE PLATE



LOWER HINGE SHOWN, UPPER HINGE SIMILAR

Aft Entry Door Hinge Inspection  
 Figure 601

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## MAINTENANCE MANUAL

### AFT ENTRY DOOR HINGE ARMS – REMOVAL/INSTALLATION

#### 1. General

- A. The aft entry door hinge arms are similar to the galley service door hinge arms. For removal/installation of the aft entry door hinge arms, refer to Galley Service Door Hinge Arms – Removal/Installation, section 52-41-11.

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## MAINTENANCE MANUAL

### AFT ENTRY DOOR LINING - REMOVAL/INSTALLATION

#### 1. General

- A. The lining and insulation installed on the aft entry door is similar to that installed on the galley service doors. For removal/installation of aft entry door lining, refer to Galley Service Door Lining and Insulation - Removal/Installation, section 52-41-31.

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AFT ENTRY DOOR GUIDE ARM AND ROLLER – REMOVAL/INSTALLATION

1. General

- A. The aft entry door guide arm and roller is similar to the galley service door guide arm and roller. For removal/installation of the aft entry door guide arm and roller, refer to 52-41-21, Galley Service Door Guide Arm and Roller.

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AFT ENTRY DOOR STRUCTURE TORQUE TUBE – REMOVAL/INSTALLATION

1. Equipment and Materials
  - A. Grease – MIL-G-21164 (AMM 20-30-21/201)
2. Remove Aft Entry Door Structure Torque Tube (Fig. 401)
  - A. Remove door from airplane (Ref. 52-13-0, Removal/Installation).
  - B. Remove access panel on outside of body between the upper and lower door hinge cutouts to obtain access to structure torque tube.
  - C. Remove bolts securing sleeves to torque tube and upper and lower hinge link pin. Slide the sleeves clear of hinge link pins.
  - D. Raise and lower torque tube to remove sleeves.
  - E. Remove torque tube by withdrawing outboard through upper or lower hole in structure.
3. Install Aft Entry Door Structure Torque Tube (Fig. 401)

**NOTE:** Hinge link pins, sleeves, and torque tube spares are supplied as a matched assembly or as individual undrilled parts. Undrilled hinge link pins and torque tubes or a combination of undrilled hinge link pins/sleeves or torque tube/sleeves may be installed and drilled during installation.

- A. Apply a thin coat of grease to mating surfaces of hinge link pins, sleeves and torque tube.
- B. Install hinge link pins in upper and lower hinge link.

**NOTE:** A master spline is incorporated in the splines of the link pins and the upper and lower hinge links. If matched structure torque tube assembly is installed the hinge links will be properly aligned when all components are assembled.

- C. Position torque tube in structure by inserting through upper or lower hole in structure.
- D. Raise and lower torque tube and install sleeves.
- E. Insert bolts through sleeves, install washers and nuts.
- F. If required, drill hinge link pin and/or torque tube to match fastener holes in sleeve.
  - (1) Clamp upper and lower hinge links so that they are flush with airplane external skin.
  - (2) Drill two 0.234-inch diameter holes through sleeve and torque tube and/or sleeve and hinge link pin. Ream holes to a finished size of 0.2500 ±0.0005 inch.
  - (3) Insert bolts through sleeve, install washers and nuts.

**NOTE:** Final alignment of torque tube upper and lower hinge links is made by adjusting snubber during door installation.

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- G. Check that sleeve fasteners clear structure when torque tube assembly is rotated. If necessary, trim any fastener threads to provide clearance.
- H. Install access panel removed to obtain access to torque tube.
- I. Install door (Ref 52-13-0, Removal/Installation).

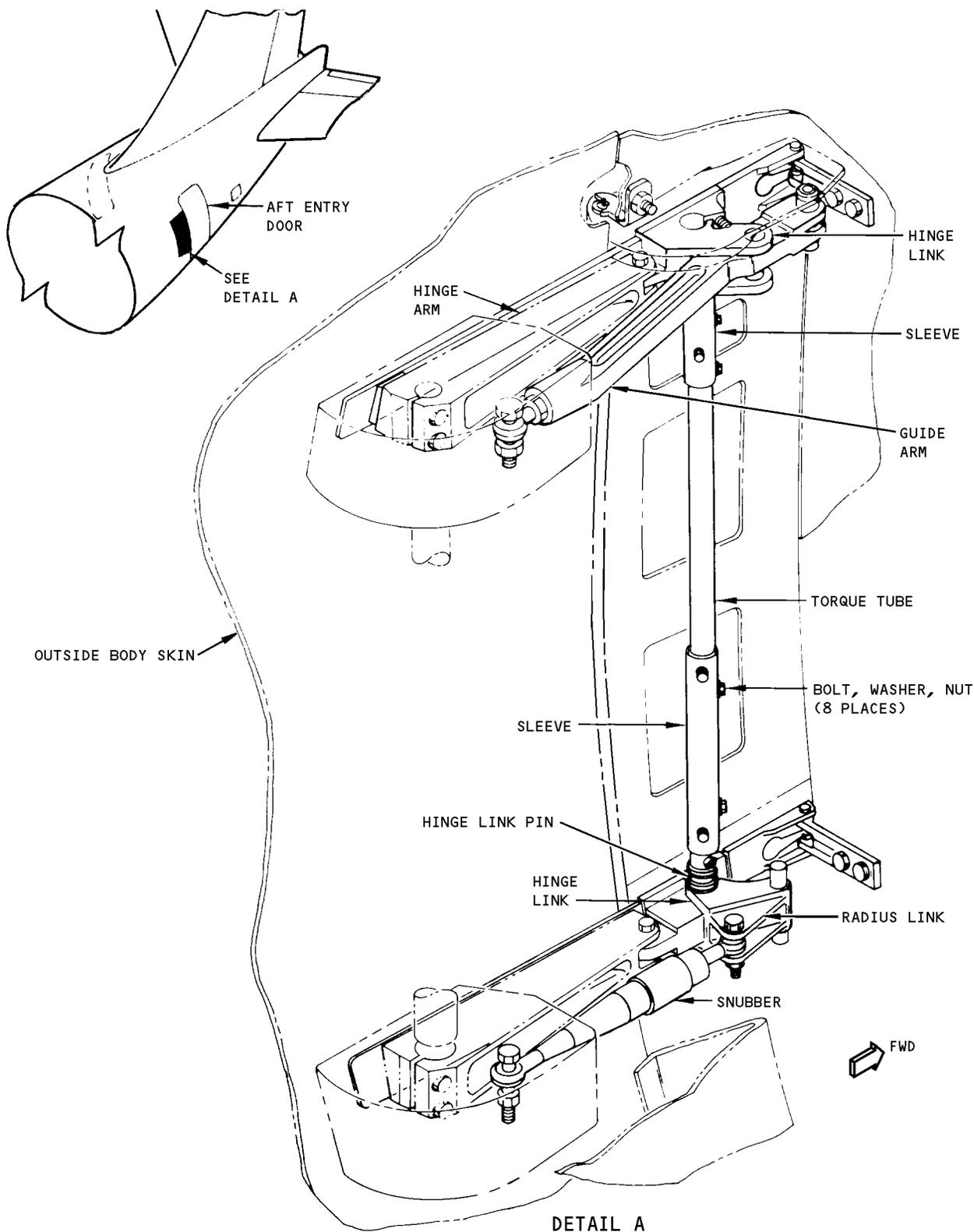
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Aft Entry Door Structure Torque Tube Installation  
 Figure 401

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AFT ENTRY DOOR AND AIRSTAIR – DESCRIPTION AND OPERATION

1. General

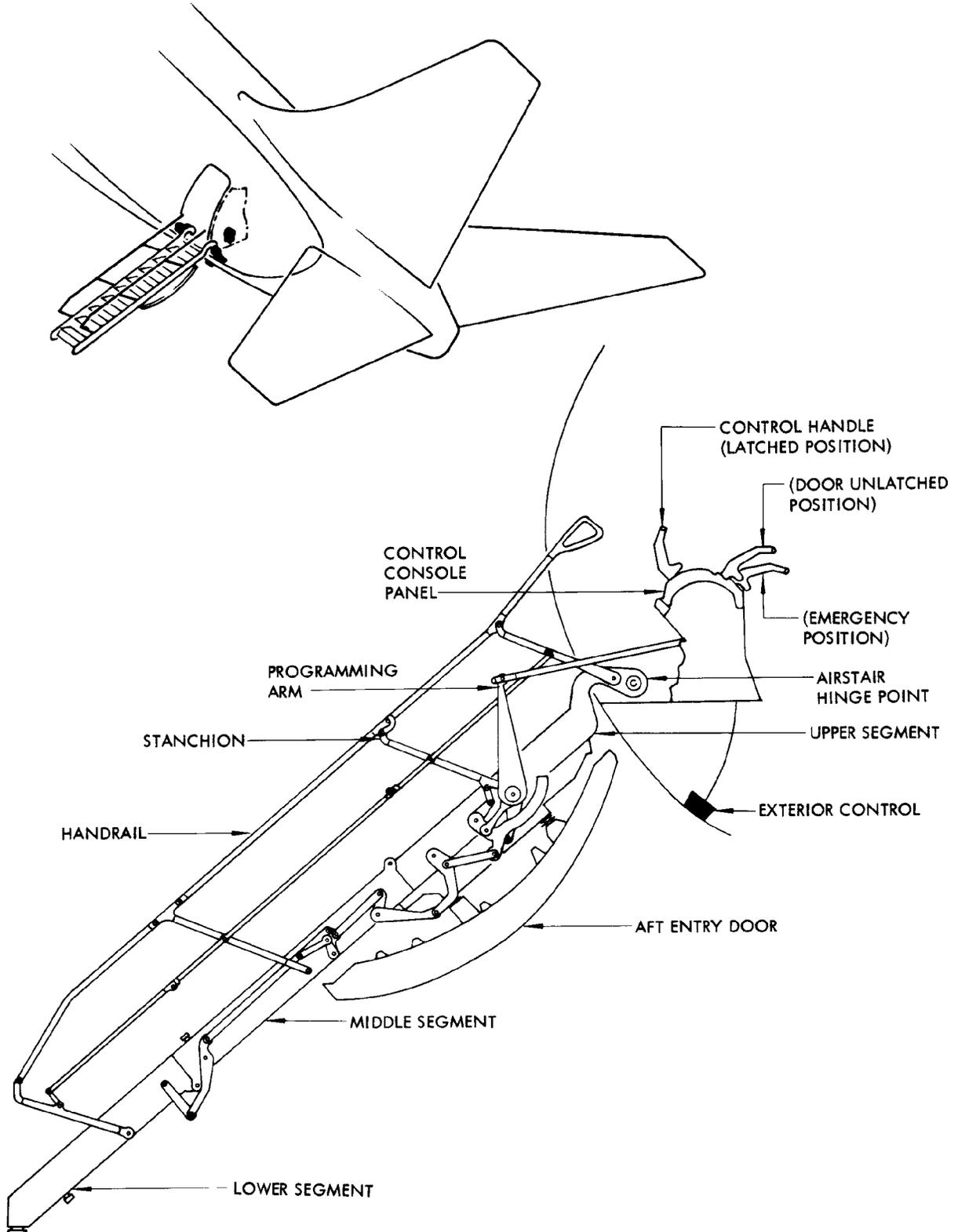
- A. The aft entry door and airstair is designed to permit rapid access to or from the aft end of the passenger cabin. The aft airstair installation consists of the following major assemblies.
- (1) Aft airstair
  - (2) Aft entry door
  - (3) Drive mechanism
  - (4) Controls
- B. The aft entry door and airstair are a self-contained mechanism which provides entry into the aft section of the passenger cabin. In the stowed position, the airstair is folded inboard of the aft entry door. (See figure 1.) The entry door is attached directly to the upper segment of the airstair. Before the door is opened, an unlatching mechanism unlatches and lifts the door inward and upward, thus enabling the drive mechanism to be actuated to rotate the airstair and door outward. The airstair rotates around a hinge point at approximately floor level. As the airstair and door rotate, a programming arm unfolds the airstair. The airstair is completely extended when it is approximately in the horizontal position in relation to the cabin floor. The airstair continues to rotate downward until it contacts the ground. The entry door is then located beneath the upper segment of the airstair.

2. Aft Entry Door

- A. The aft entry door is an outward opening plug-type door. The door is located on the left side of the airplane forward of the rear pressure bulkhead. The entry door is attached to the upper segment of the airstair and mechanically linked to the programming arm on the airstair. Unlatching and latching the door is accomplished by actuating the control handle on the console control panel or by the external handle. Outward movement of the door is controlled by movement of the airstair. The door moves on rollers in carriage tracks attached to the upper segment.
- B. The door is an aluminum structure with outer and inner skins internal webs and stiffeners. A continuous silicone ribbon seal mounted on the door opening reveal prevents loss of cabin pressure through the door edges. Pressurization loads on the door are transmitted to the fuselage by adjustable stop fittings. These fittings bear against corresponding stop pads attached to fuselage structure surrounding the door. The door is positioned in the opening by cam fittings on the door, which engage cam rollers attached to the body frame.

3. Aft Airstair

- A. The aft airstair is a three-segment, folding metal airstair, which is connected through the hinge support fitting to floor structure in the area of the aft entry door. (See figure 1.)



Aft Entry Door and Airstair Equipment Location  
 Figure 1

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- B. Each segment of the airstair consists of built-up side beams with permanently attached risers with removable treads. Handrails, guardrails, and stanchions are attached to the side beams of the airstair. The handrails raise to their erect position as the airstair unfolds to its down or extended position and retract as the airstair folds to its up or stowed position.
- C. A rotary hydraulic damper is installed at the upper end of the middle segment of the airstair. The damper is connected to the upper segment through a link and crank assembly. The damper prevents the airstair segments from bouncing during extension and retraction by restricting the velocity of the folding mechanism. The damper is a self-contained unit consisting of a housing, a rotary shaft splined at the drive end, a 2-cubic inch reservoir with an integral capacity indicator and a fill port. The reservoir is serviced with hydraulic fluid, MIL-H-5606.
- D. An emergency lock is installed to restrain the airstair from unfolding when sudden G-loads may be encountered. The locking device consists of a hook that is operated by a cam on the flange of the airstair hinge, and a pin attached to the middle segment of the airstair. The hook engages the pin when the airstair is retracted.

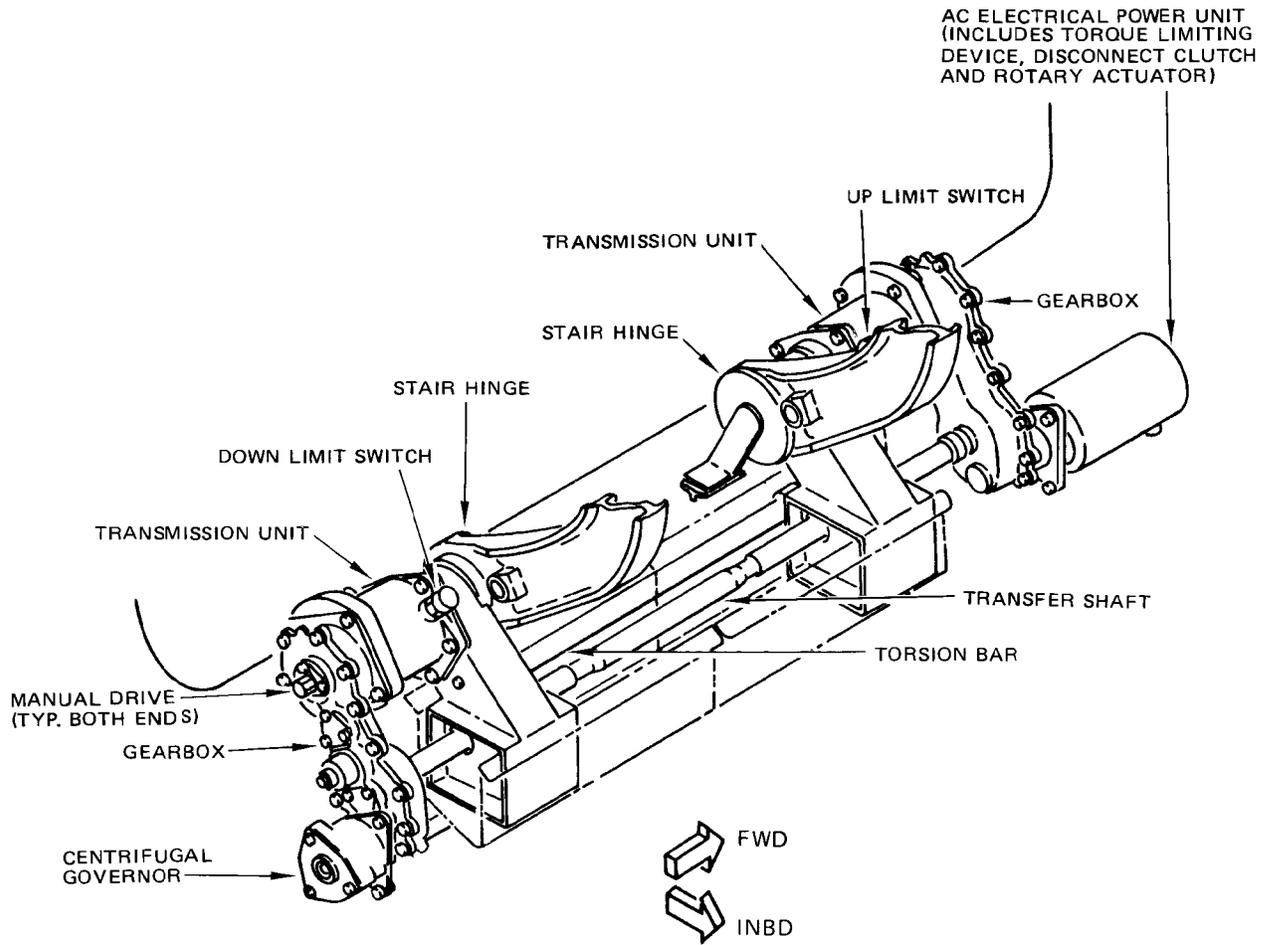
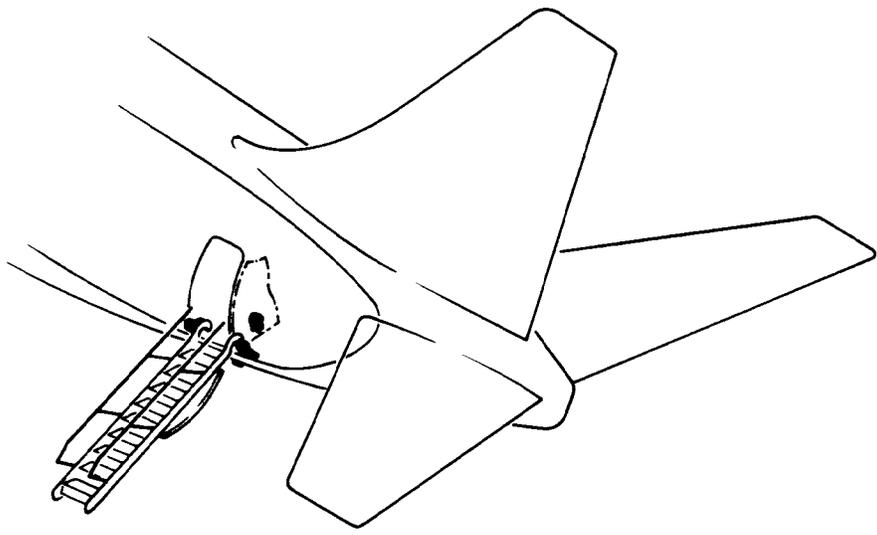
#### 4. Drive Mechanism

- A. The drive mechanism consists of a reversible three-phase 115 volt ac electrical power unit, which drives two interconnected gearboxes centrifugal governor and transmission units. (See figure 2.) The control of the drive mechanism electrical functions is accomplished by 28 volt dc power. (See figure 3.)

**NOTE:** Both 115 volt ac and 28 volt dc electrical power are required to operate the drive mechanism.

#### B. Power Unit

- (1) The power unit consists of a three-phase ac induction motor and a rotary actuator, which comprises a planetary gear set, torque limiting device, and a disconnect clutch. These components are housed within an aluminum casing.
- (2) AC Motor
  - (a) The ac motor is a bi-directional squirrel cage, induction type. The motor operates at 965 (+125/-100) RPM and is capable of driving the actuator under all operating-load conditions. The motor housing is vented to the atmosphere to eliminate possible moisture condensation.



Aft Entry Door and Airstair Drive Mechanism  
 Figure 2

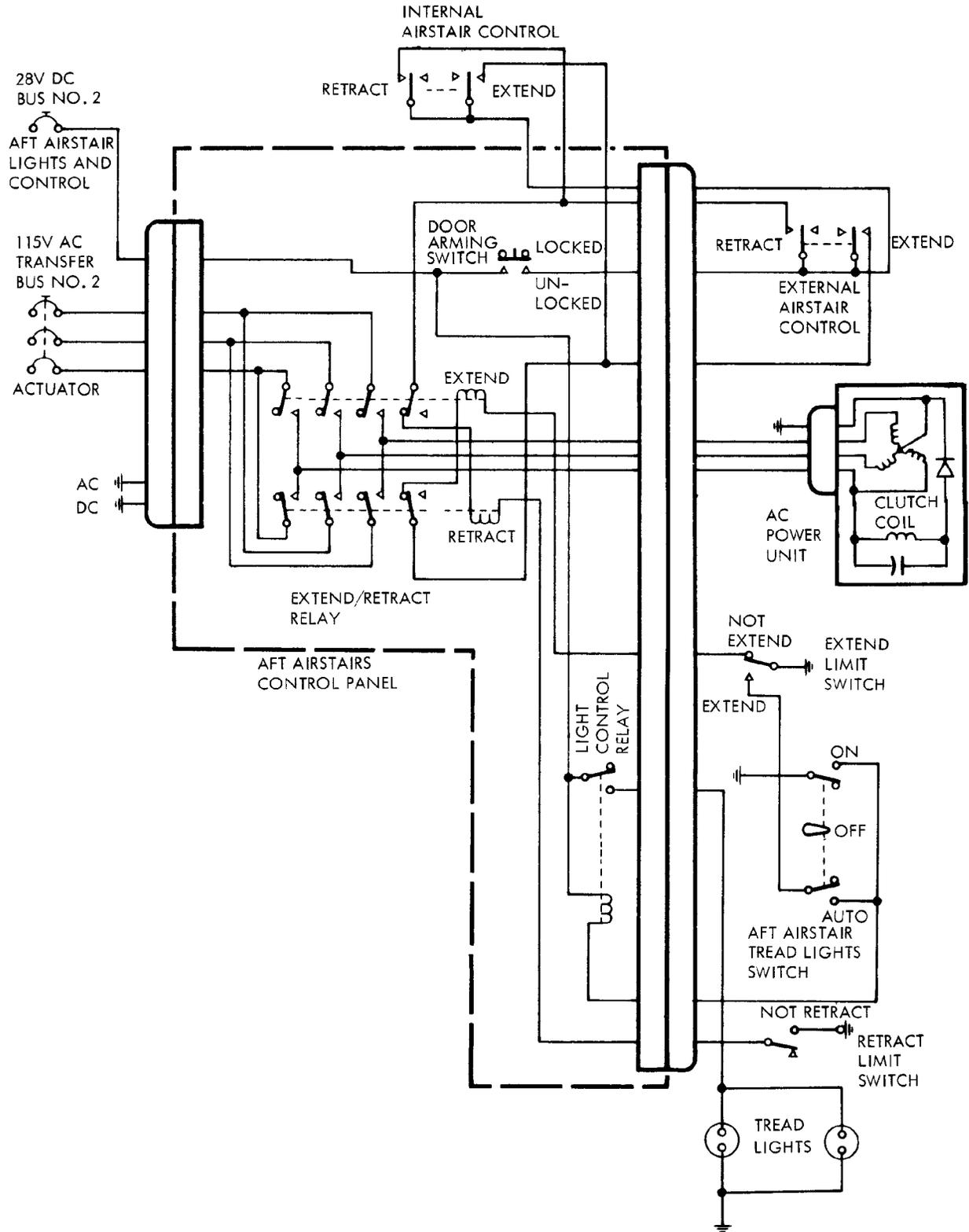
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Aft Entry Door and Airstair Circuit  
Figure 3

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- (3) Rotary Actuator
- (a) The rotary actuator is powered by the bi-directional, ac motor. Motor output is through a torsion bar pinion shaft. The pinion serves as the sun gear in a three-planet gear system. Equally spaced around the sun gear, and meshing with it, are three planet gears, which are supported by a driven cage. Meshing with all planet gears is a common, fixed ring gear. The driven cage drives the input shaft of the torque limiting device. All planetary gears are mounted on needle bearings.

- (4) Torque Limiting Device and Disconnect Clutch
- (a) The torque limiting device is functionally designed to protect the aircraft structure from stalled ac motor loads. The device is comprised of a number of clutch discs. One set of discs are made of steel and splined internally to mate with the output of the planetary gear system cage. The other set of discs consist of steel plates with sintered friction material facings, and are splined externally to the output clutch element. This clutch disc pack is held under spring pressure. When the load torque is greater than the clutch setting, the spring pressure is relieved by a ball detent sensor; and the clutch discs slip.

**CAUTION:** THE TORQUE LIMITING DEVICE IS FUNCTIONALLY INOPERATIVE WHEN OPERATING THE AIRSTAIR IN THE MANUAL MODE OR WHILE AIRSTAIR MOVEMENT IS RESTRICTED IN TRANSIT DURING POWERED OPERATION. DO NOT ATTEMPT TO RESTRICT AIRSTAIR MOVEMENT WHILE OPERATING OR DAMAGE MAY OCCUR TO THE AIRPLANE STRUCTURE OR THE AIRSTAIR.

- (b) The output of the torque limiter is coupled to the rotor of an electrically-operated, single disk, dry operating friction clutch. When power is applied to the ac motor, the clutch rotor and armature engage to drive the gearbox. The clutch is engaged by an electromagnetic field generated by rectified ac. One phase of the three-phase ac applied to the motor is used to generate the magnetic field. Therefore, as long as power is applied to the ac motor, the clutch will remain engaged. When power is interrupted, the clutch is disengaged by spring force.

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C. Gearbox

- (1) The gearbox consists of a spur gear train, which reduces the ac power unit input RPM (nominal 965 RPM) by 8 to 1 ratio to a nominal output of 120 RPM. (See figure 2.) The gearbox is equipped with an external 11/16 inch hexagon drive to permit manual operation. The maximum torque required to rotate the manual drive is approximately 180 inch-pounds measured at the hexagon drive.

**CAUTION:** THE TORQUE APPLIED TO THE MANUAL DRIVE MUST NOT EXCEED 250 INCH-POUNDS OR DAMAGE TO THE AIRCRAFT STRUCTURE AND/OR AIRSTAIR MECHANISM MAY RESULT.

D. Transmission Unit

- (1) The transmission units are directly coupled between their respective gearboxes and aft airstair hinges. Each transmission unit reduces the transmission input RPM (nominal 120 RPM) by 250 to 1 ratio, thereby providing a positive and controlled force to extend or retract the aft airstair. In addition, each transmission unit contains a plunger-type limit switch to deactivate the ac power, unit when the aft airstairs reach a predetermined point during the retraction or extension cycles. (See figure 2.)

E. Centrifugal Governor

- (1) The purpose of the centrifugal governor is to prevent excessive rate of aft airstair movement during an emergency extend cycle or in the event of loss of electrical power during a normal extension. The governor consists of two spring-loaded brake shoes which contact the walls of the governor housing to provide braking action when the input speed exceeds 2200 RPM (transfer shaft speed 550 RPM). (See figure 2.) In normal operation, the ac power unit clutch will be energized on the extend cycle, and the rate of descent will be controlled by the magnetic field in the ac motor. This limits the power unit output to a maximum of 1090 RPM. In emergency extend, the power unit clutch is de-energized; therefore, the centrifugal governor limits the rate of extension.

5. Controls

- A. The aft airstair and entry door are controlled by the interior console control panel, or by the external controls. The external and interior controls perform identical functions and differ only in their physical characteristics and location.

B. Interior Controls

(1) The interior console control panel is located in the cabin adjacent to the aft entry door, and consists of a control handle, and a guarded, momentary-type lever lock three-position switch. The switch is located on top of the console and is marked EXTEND, OFF, and RETRACT. The switch is spring-loaded to the OFF position. (See figure 3.) The control handle has three positions, DOOR UNLATCHED, DOOR LATCHED, and EMERGENCY EXTENSION. (See figure 1.)

C. External Controls

(1) The external controls consist of an external handle and a momentary three-position switch. The external handle is connected directly to the interior control handle by a teleflex cable. The cable contains a controlled shear joint at the console end assuring interior operation if the external handle becomes jammed. The operation of the external handle and the unguarded three-position switch is identical in function and operation as the interior controls. The external control components are located near the forward lower corner of the entry door.

6. Operation

A. The aft airstairs may be operated in three separate modes: electrical, manual, and/or emergency.

NOTE: For maintenance requirements, the manual mode should be used to extend the aft airstairs whenever ac and dc electrical power is not readily available.

CAUTION: PRIOR TO EXTENDING THE AFT AIRSTAIR IN THE MANUAL MODE, THE AFT ENTRY DOOR MUST BE UNLATCHED OR DAMAGE TO THE AIRCRAFT STRUCTURE OR AFT AIRSTAIR MECHANISMS WILL OCCUR.

B. Electrical Mode

(1) The operation of the aft airstairs in the electrical mode requires both 28 volt dc and 115 (3-phase) volt ac power. The power unit operates on ac power, and the associated control circuits are controlled by dc power. (See figure 3.)



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- (2) To extend the airstairs, place the console control handle in the DOOR UNLATCHED position. DC power is now simultaneously available to the external or internal airstair electrical control switch. By indexing either control switch to the extend position, the aft airstairs will begin to extend. When the airstairs have extended approximately 128 degrees the extend limit switch in the transmission unit will de-energize the power unit. The aft airstairs will continue to free fall to the ground level.

**CAUTION:** PREMATURE RELEASE OF THE EXTEND SWITCH WILL ALLOW AIRSTAIR TO FREE FALL WITH SPEED CONTROLLED BY THE CENTRIFUGAL GOVERNOR. THIS WILL SHORTEN THE LIFE OF THE GOVERNOR.

- (3) To prevent inadvertent operation of the emergency system during a normal stair extension, the emergency system is rendered imperative when the airstair has moved approximately 15 degrees in the extend direction. This is achieved by a cam and follower arrangement at the door hinge. This mechanism collapses the overcenter linkage, which locks out the emergency latch mechanism.
  - (4) To retract the airstairs, operate the internal or external switch to the RETRACT position. The stairs will retract to the full UP position. In the full UP position, the retract limit switch in the transmission unit will de-energize the power unit. As this occurs, position the console control handle to the DOOR LATCHED position to secure the aft entry door.
  - (5) Whenever the aft airstairs are extended (power unit de-energized) the treadway lights will illuminate automatically if the aft airstairs tread lights switch is in the AUTO position. However, the lights will be illuminated whenever the switch is in the ON position.
- C. Manual Mode - Interior
- (1) The manual extension operation of the aft airstair is accomplished by placing the console control handle in the DOOR UNLATCHED position and manually pushing the airstair out the doorway until it free falls.
  - (2) The manual drive attachments are located on the aft end of the aft transmission unit and the forward end of the forward transmission unit (Fig. 2). Access to the aft attachment is thru the lavatory cupboard unit. Access to the forward attachment is thru an opening on the forward side of the windscreen.

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- (3) To retract the aft airstair using the manual drive, place the console control handle in the DOOR UNLATCHED position. Rotate the manual drive counterclockwise. A ratchet wrench and socket on the aft transmission manual drive will serve as a ratchet for the airstair drive system while raising the airstair from the forward transmission manual drive.

**WARNING:** DO NOT EXCEED 250 INCH-POUNDS TORQUE ON MANUAL DRIVE.

**CAUTION:** PRIOR TO ROTATING THE MANUAL DRIVE, THE CONSOLE CONTROL HANDLE MUST BE PLACED IN THE DOOR UNLATCHED POSITION. THIS PROCEDURE IS NECESSARY TO PREVENT DAMAGE TO THE AIRCRAFT STRUCTURE AND/OR AIRSTAIR MECHANISMS.

**NOTE:** Approximately 94 complete turns of the manual drive are required to completely retract the airstairs.

- (4) When the airstairs are fully retracted, place the console control handle in the DOOR LATCHED position.

D. Emergency Mode

- (1) Emergency extension of the aft airstairs is accomplished by moving the handle on the control console through its normal range and into the emergency detent position. The first portion of control handle travel in the normal range unlatches and mechanically raises the door to a position where it is clear of surrounding structure. Movement of the control handle into the emergency detent causes a cam in the console to rotate a crank and pull a control rod attached to an arm on a latch release shaft located below the floor. Rotation of this shaft rotates a latch mechanism, which releases the operating arm of a torsion bar installed below the door threshold. The torsion bar arm bears against a roller on the door hinge member. The stored energy in the torsion bar overcomes the effect of stair weight and drive train friction and drives the airstair sufficiently far to initiate a free fall. The airstair will free fall to approximately 70 degrees open and then stop. The center segment is then manually lifted outward to complete the extension. The rate of free fall is limited by a centrifugal governor installed on the aft gearbox pad of the drive mechanism. Whenever an emergency (free fall) extension is accomplished, the electrically controlled three-position switches are rendered temporarily inoperative. This is accomplished internally within the console control panel by mechanical linkage, which opens the door-arming switch. (See figure 3.) Following an emergency extension, the latch system is rearmed by moving the control handle to DOOR UNLATCHED position, then rotating the roller arm on the aft flange of the aft airstair hinge to the SET position engraved on the roller and carrying out a normal retract cycle. Extending the airstair using either the manual or normal mode and returning the roller arm to the NORM position as engraved on the roller completes rearming.

**NOTE:** Under adverse conditions of high winds, extreme cold or airplane tilt, it may be required to manually push the airstair out the doorway. After airstair has partially extended, personnel then must lift up and push out the center ladder section. To complete extension when operated from external control, the airstair door may be pulled down.

**CAUTION:** IF AIRSTAIR IS EXTENDED MORE THAN 132 INCHES DURING EMERGENCY OPERATION, SECONDARY STRUCTURE MAY BE DAMAGED.

AFT ENTRY DOOR AND AIRSTAIR – TROUBLESHOOTING

1. General

- A. This troubleshooting of the aft entry door and airstair will cover the electrical functions of the system. Should a mechanical malfunction occur caused by misalignment of the pushrods, bellcranks and attaching hardware, refer to Aft Entry and Airstair – Adjustment/Test and AMM 52-14-101/501, Aft Airstair Folding Mechanism.
- B. Prior to initiating the following troubleshooting procedures, carefully examine the accessible mechanical components for proper installation. Correct all noted discrepancies before proceeding.
- C. Isolation of an electrical malfunction is accomplished using electrical connectors D4846J and D4846P on the aft airstairs control panel. Voltage and continuity checks completed through the connectors determine the position of switches, electrical continuity, and system operation.
- D. Make sure that the aft airstair actuator and lights and control circuit breakers are closed on load control center P6, and that electrical power is available for system operation. The console control handle must be in the DOOR UNLATCHED position before attempting operation of the airstair.

NOTE: Place the tread lights switch to the ON position to determine the presence of dc power.



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2. Extend Aft Entry Door and Airstair Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Airstair fails to extend when control switch on internal or external control panel is operated	1. Faulty internal control switch	Attempt operation of airstair from external control switch. If airstair extends, internal control switch is faulty. If airstair fails to extend, proceed to step 3.	Replace faulty internal control switch
Airstair fails to extend when control switch on internal or external control panel is operated (Cont)	2. Faulty external control switch	Attempt operation of airstair from internal control switch. If airstair extends, external control switch is faulty. If airstair fails to extend, proceed to step 3.	Replace faulty external control switch
Airstair fails to extend when control switch on internal or external control panel is operated (Cont)	3. Faulty door arming switch	Disconnect electrical connector D4846P from mating connector D4846J on aft airstair control panel. Check for 28 volts dc on D4846J between pin No. 8 and ground. If voltage is not available, door arming switch is faulty. If voltage is available, proceed to step 4.	Adjust or replace door arming switch (AMM 52-14-11)
Airstair fails to extend when control switch on internal or external control panel is operated (Cont)	4. Faulty extend limit switch	Check for continuity on connector D4846P between pin No. 2 and ground. If continuity is not present, extend limit switch is faulty. If continuity is present, proceed to step 5.	Adjust or replace extend limit switch (AMM 52-14-81)

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Airstair fails to extend when control switch on internal or external control panel is operated (Cont)	5. Faulty extend or retract relay	Check for continuity on connector D4846J between pin No. 2 and pin No. 7. If continuity is not present, replace retract relay. If continuity is present, reconnect D4846P to D4846J and proceed to step 6.	Replace extend relay and/or retract relay
Airstair fails to extend when control switch on internal or external control panel is operated (Cont)	6. Faulty extend relay or ac power unit	Disconnect connector D502 from ac power unit. Attempt operation of system with control switch and check for 115 volts ac between pins No. 1,2,3, and ground on pin No. 4. If voltage is not available, extend relay is faulty. If voltage is available, ac power unit is faulty.	Replace extend relay or ac power unit

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### 3. Retract Aft Entry Door and Airstair Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Airstair fails to retract when control switch on internal or external control panel is operated	1. Faulty internal control switch	Attempt operation of airstair from external control switch. If airstair retracts, internal control switch is faulty. If airstair fails to retract, proceed to step 3.	Replace faulty internal control switch
Airstair fails to retract when control switch on internal or external control panel is operated (Cont)	2. Faulty external control switch	Attempt operation of airstair from internal control switch. If airstair retracts, external control switch is faulty. If airstair fails to retract, proceed to step 3.	Replace faulty external control switch
Airstair fails to retract when control switch on internal or external control panel is operated (Cont)	3. Faulty door arming switch	Disconnect electrical connector D4846P from mating connector D4846J on airstair control panel. Check for 28 volts dc on D4846J between pin No. 8 and ground. If voltage is not available, door-arming switch is faulty. If voltage is available, proceed to step 4.	Adjust or replace door-arming switch (AMM 52-14-11)
Airstair fails to retract when control switch on internal or external control panel is operated (Cont)	4. Faulty retracting limit switch	Check for continuity on connector D4846F between pin No. 1 and ground. If continuity is not present, retract limit switch is faulty. If continuity is present, proceed to step 5.	Adjust or replace retract limit switch (AMM 52-14-81)

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Airstair fails to retract when control switch on internal or external control panel is operated (Cont)	5. Faulty retract or extend relay	Check for continuity on connector D4846J between pins No. 1 and 9. If continuity is not present, replace retract relay and repeat continuity check. If continuity is still not present, replace extend relay. If continuity is present, reconnect D4846P to D4846J and proceed to step 6.	Replace retract relay and/or extend relay
Airstair fails to retract when control switch on internal or external control panel is operated (Cont)	6. Faulty retract relay or ac power unit	Disconnect connector D502 from ac power unit. Attempt operation of system with control switch and check for 115 volts ac between pins No. 1,2,3, and ground on pin No. 4. If voltage is not available, retract relay is faulty. If voltage is available, ac power unit is faulty.	Replace retract relay or ac power unit

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4. Auto Lighting Aft Entry Door and Airstair Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Treadway lights fail to illuminate when airstair is extended. Switch in AUTO position	1. Faulty aft airstair tread light switch	Disconnect electrical connector D4550P from mating connector D4250J on aft attendant's panel. Check for continuity on D4250J between pins No. 16 and 17. If continuity is not present, tread light switch is faulty. If continuity is present, reconnect D4250P to D4250J and proceed to step 2.	Replace aft airstair tread light switch
	2. Faulty light control relay or extend limit switch	Disconnect electrical connector D4846P from mating connector D4846J on aft airstair control panel. On connector D4846J, ground pin No. 11 to pull in light control relay and check for 28 volts dc on pin No. 4. If voltage is not available, relay is faulty. If voltage is available, extend limit switch is faulty.	Replace light control relay. Replace or adjust extend limit switch (AMM 52-14-81)

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AFT ENTRY DOOR AND AIRSTAIR – MAINTENANCE PRACTICES

1. General

- A. The maintenance practices included in this section (201–299 page block) are general maintenance instructions that do not definitely fall within a specific category. Other maintenance practices such as Servicing, Removal/Installation, Adjustment/Test, etc. are provided in the applicable page blocks.
- B. The airplane can be flown under certain conditions with the aft airstair deactivated. The aft entry door and airstair must be deactivated when the airstair is removed or when the lower and/or middle segments of the airstair have been removed. If a segment has been removed, the airstair cannot be used as an emergency escape exit. Also, the airstair will exceed the rotation limits causing damage to the airplane. If the airplane is to be flown with a segment removed, retract the airstair, check that the door is closed and latched, and placard all airstair controls as being deactivated. If the airstair has been removed, deactivate the system as follows:

2. Aft Entry Door and Airstair Deactivation

- A. Remove radius rod from control console. (See figure 201).
- B. Remove free motion flanges from hinge support fittings.
- C. Manually install door in opening and engage door cams with frame-mounted rollers.
- D. Move door inward and down until cams and rollers are fully engaged and door stop pins are centered on frame stops.
- E. Engage latch pin by rotating control console handle to the latched position.
- F. Pry back interior acoustical seal to visually check latch pin and door stops.
- G. Safety wire control handle in latched position and placard all airstair controls as being deactivated.

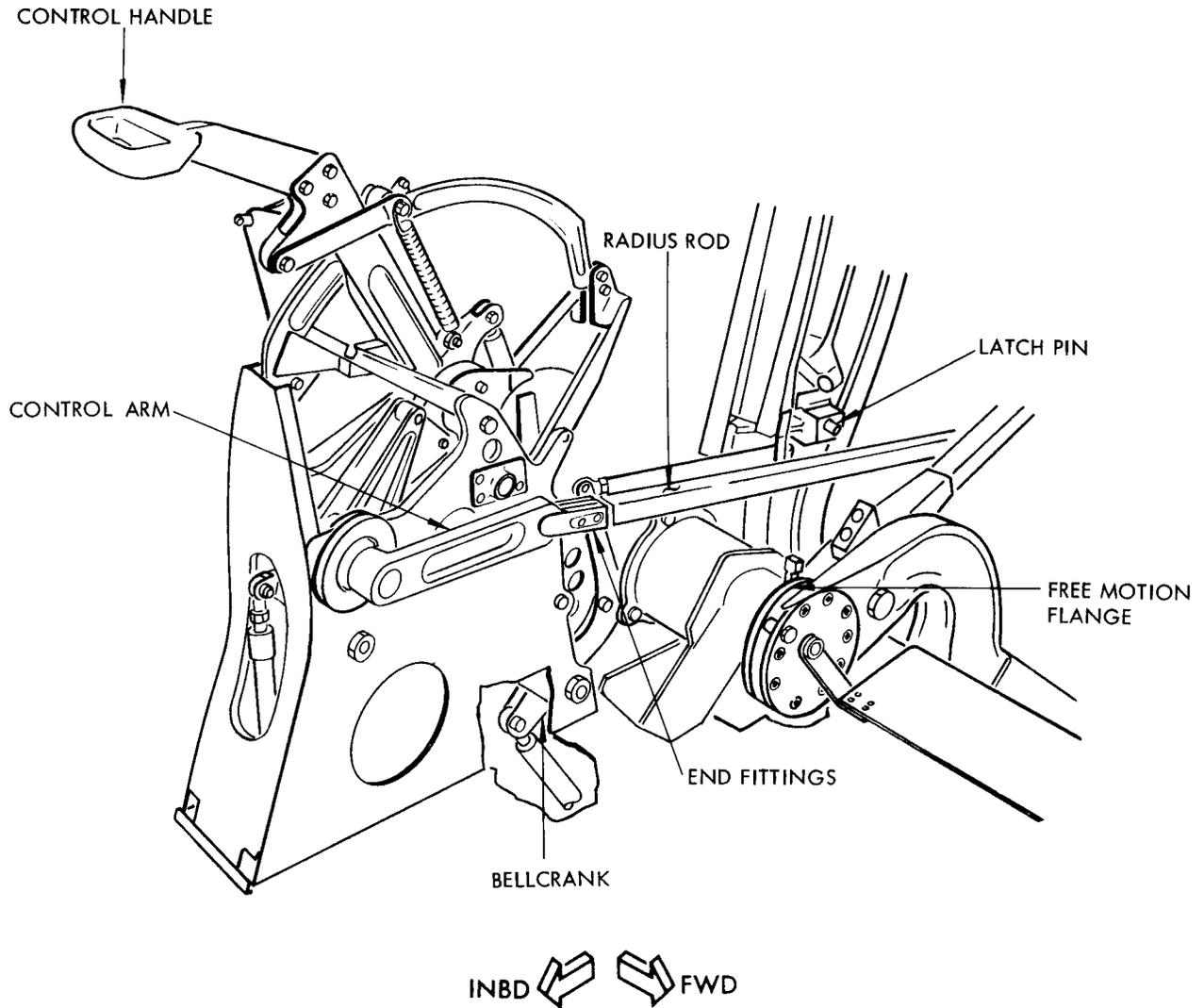
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Aft Entry Door and Airstair Deactivation  
 Figure 201

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AFT ENTRY DOOR AND AIRSTAIR – REMOVAL/INSTALLATION

1. General

- A. When adjustments to either the aft entry door or airstair are required, the door and airstair should be removed and reinstalled separately. However, the aft entry door and airstair can be removed and installed as a unit when no adjustments re to be made to either. Paragraph 3, Removal/Installation of Aft airstair, should be used when removing the door and airstair as a unit.

2. Removal/Installation of Aft Entry Door

A. General

- (1) If the entry door is altered in a manner that might affect door fit, the door should be readjusted before installation. If a new door is to be installed it must also be adjusted before installation. See Aft Door and Airstair – Adjustment/Test in both instances.

B. Equipment and Materials

- (1) Suitable support for storing door

C. Remove Aft Entry Door

- (1) With the door latched, place two index marks between the door and body skin on both sides of the door approximately half way up the door.  
(2) Rotate airstair to the full extended position using emergency extension system.

**CAUTION:** DO NOT EXTEND AIRSTAIR WHEN AIRPLANE IS ON JACKS WITHOUT PLACING A SUPPORT UNDER END OF AIRSTAIR. AIRSTAIR SHOULD NOT EXTEND MORE THAN 117 INCHES BELOW ENTRY DOOR OR AIRSTAIR COMPONENTS MAY CONTACT BODY STRUCTURE.

- (3) Open aft airstair circuit breaker on P6 panel.  
(4) Remove door from airstair carriage by removing attaching bolts from mounting plates.

**NOTE:** If door is to be reinstalled without readjustment, mark mounting plates on door and airstair so the door can be reinstalled on airstrip in same position. (See figure 401.)

- (a) Remove latch stop from lower aft edge of door if door is to be adjusted.

D. Install Aft Entry Door (When Door and/or Airstair Require Adjustment)

- (1) Adjust door and/or airstair. Refer to Aft Entry Door and Airstair – Adjustment/Test.  
(2) Install airstair per paragraph 3.D.  
(3) Install door and check preadjusted door in entryway is within + 0.01 inch of index marks on door and body skin.

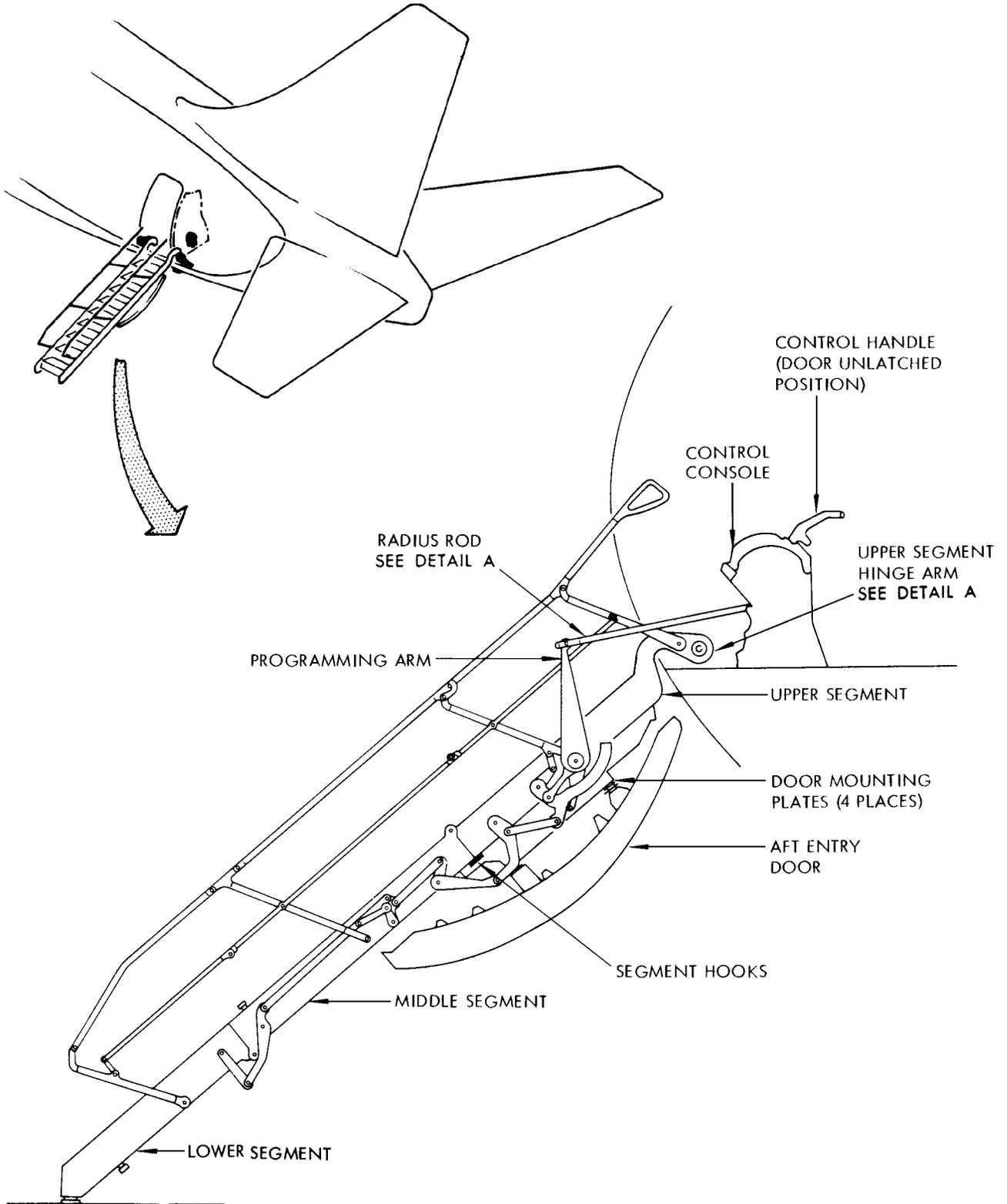
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Aft Entry Door and Airstair Installation  
 Figure 401 (Sheet 1)

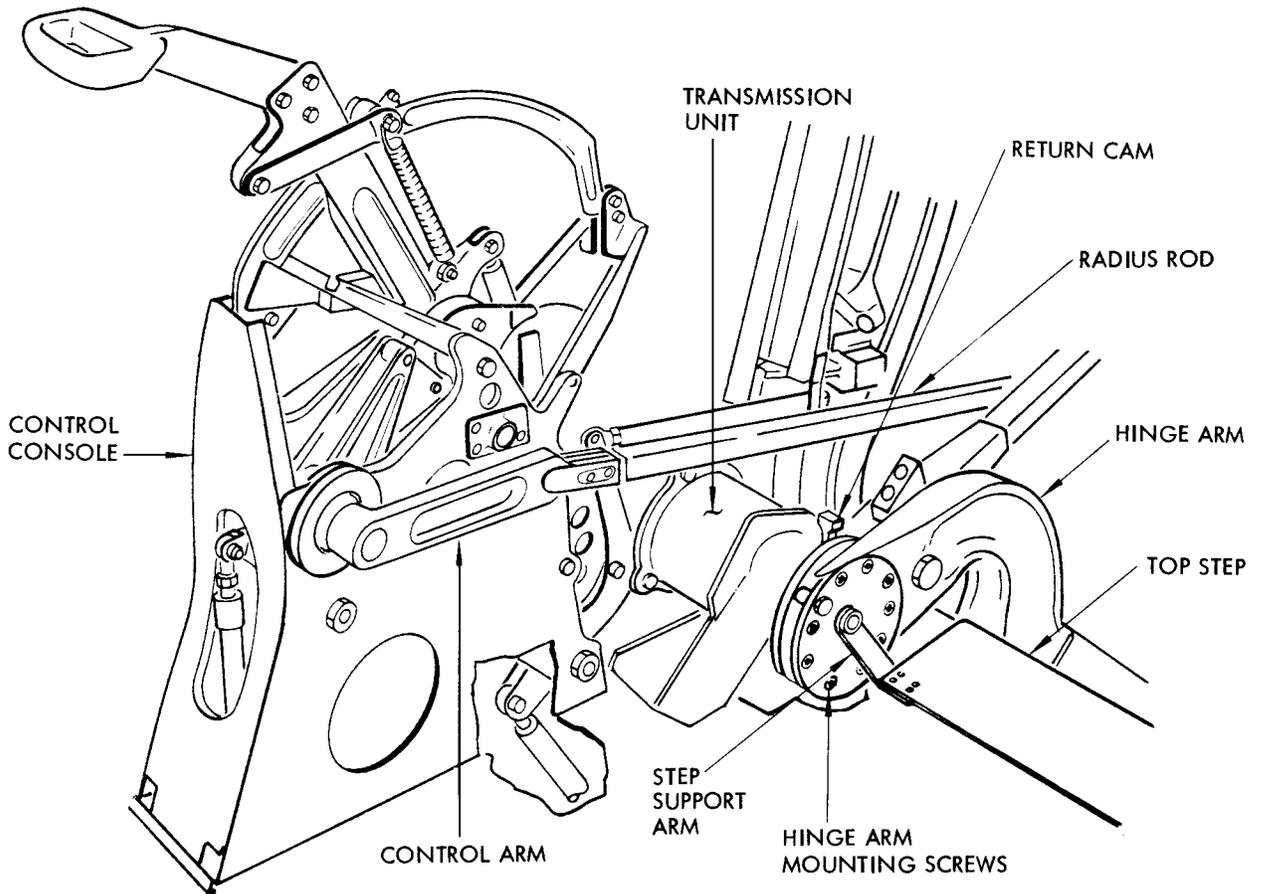
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DETAIL A

Aft Entry Door and Airstair Installation  
 Figure 401 (Sheet 2)

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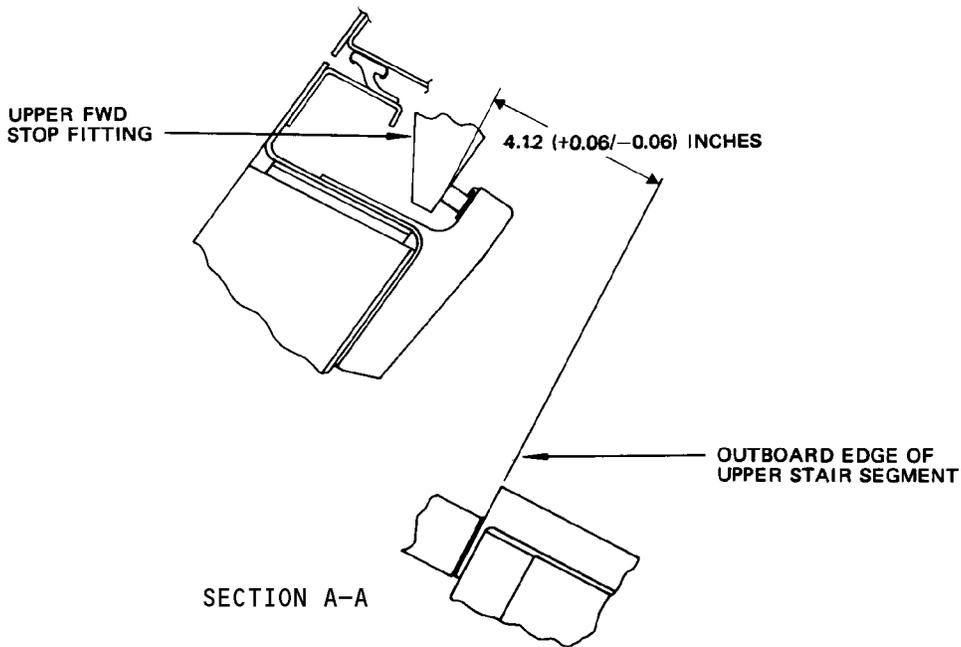
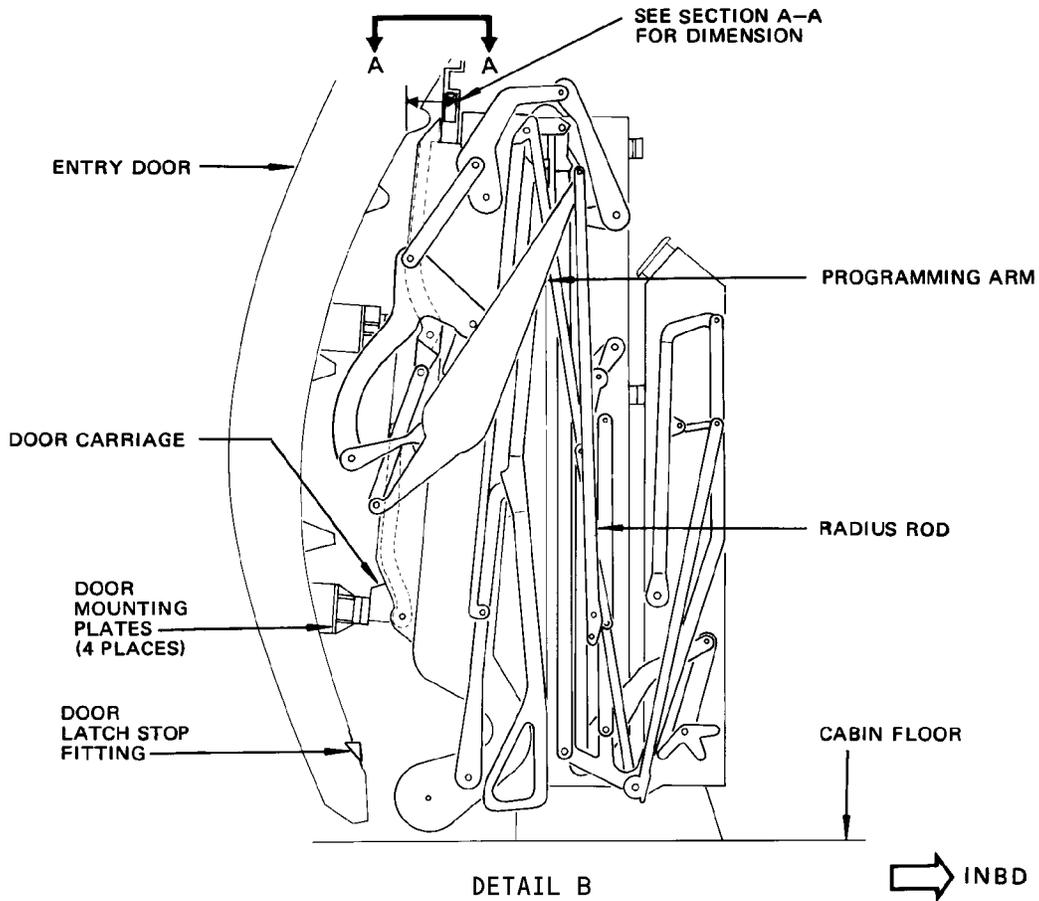
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Aft Entry Door and Airstair Installation  
Figure 401 (Sheet 3)

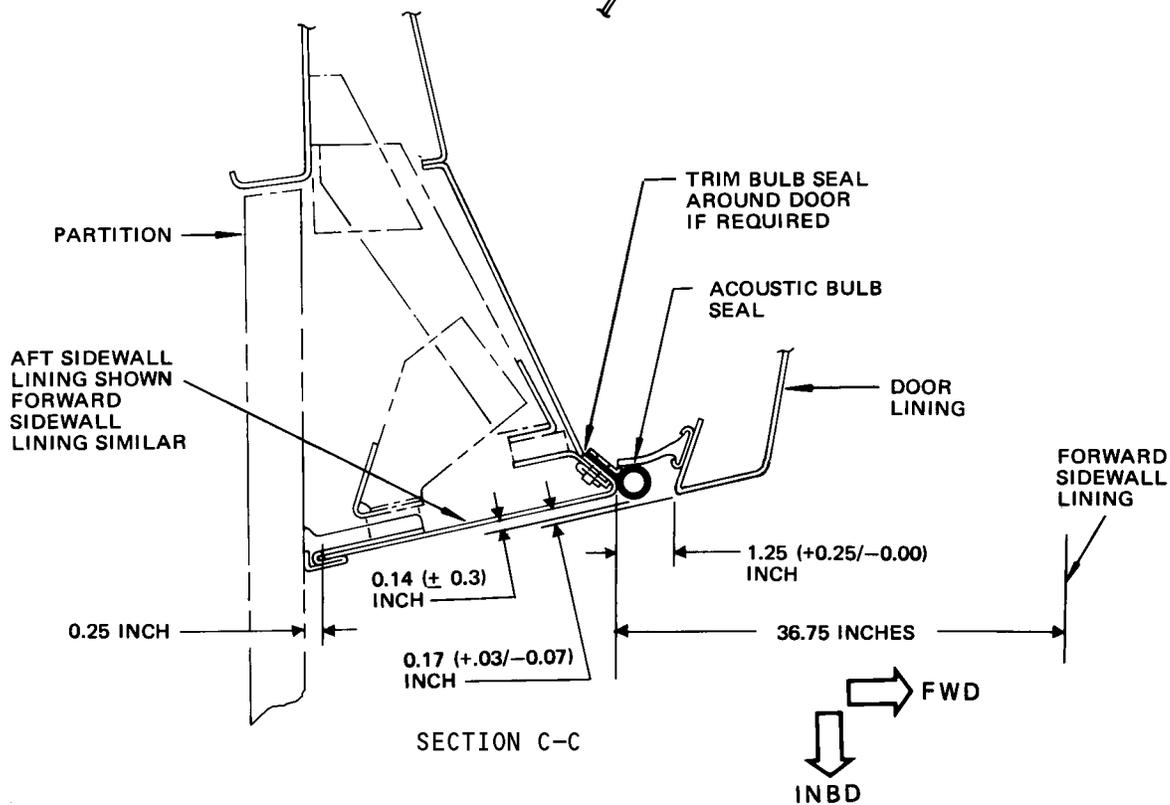
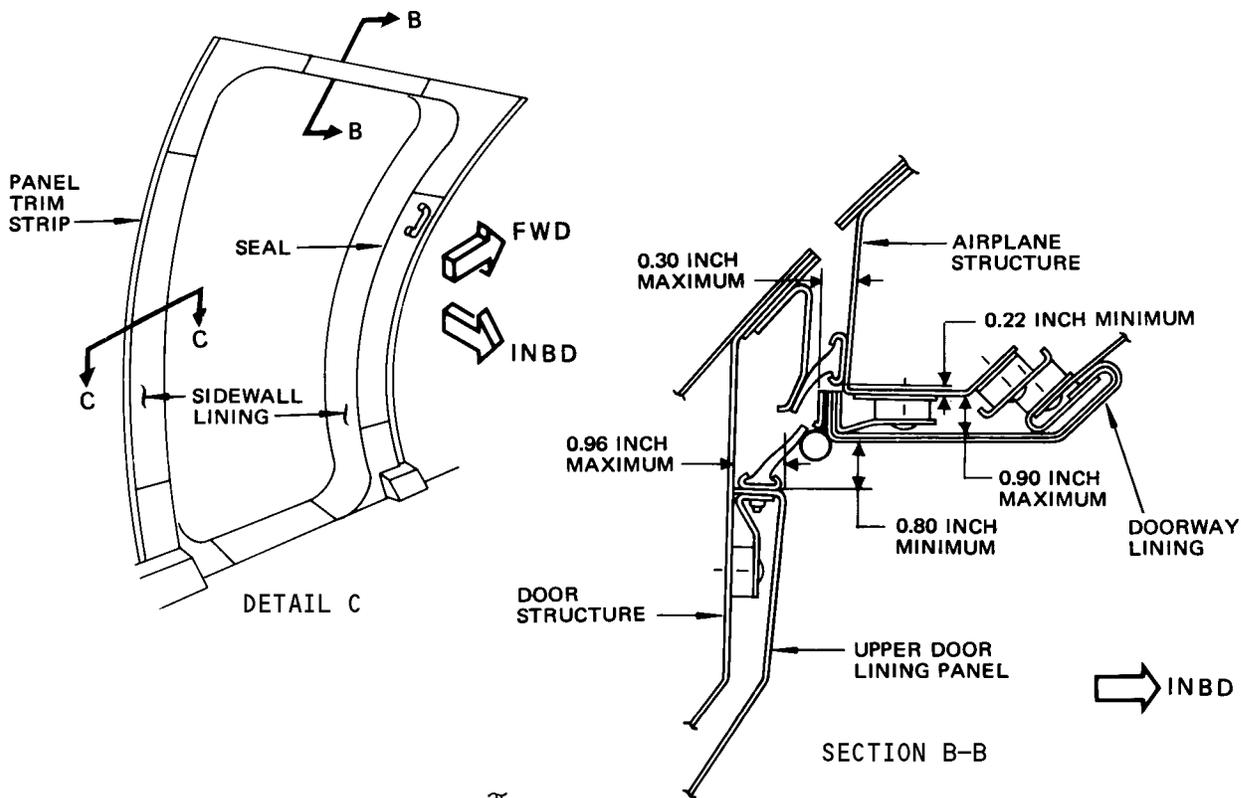
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Aft Entry Door and Airstair Installation  
 Figure 401 (Sheet 4)

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- (4) Position upper segment of airstair 4.1 2 (+ 0.06) inches from center of upper stop fitting. (See section A-A.)

**CAUTION:** DO NOT ALLOW DISTANCE BETWEEN UPPER SEGMENT AND STOP FITTING TO EXCEED 4.50 INCHES WHILE POSITIONING AIRSTAIR OR DAMAGE MAY OCCUR.

**NOTE:** A block should be placed under the lower inboard edge of the stairs to maintain the above dimension. The control handle should be latched.

- (5) Adjust or align mounting plates on each corner of carriage to fit mounting plates on door. (See figure 401.) Install and tighten bolts. Do not preload shockmounts.

**NOTE:** Ensure center bolt of each shockmount on carriage is tightened so metal spacer inside shockmount is bottomed out.

- (6) Latch and unlatch door several times and check door is not binding on door cams or latch pin and check index marks on door and body are aligned within + 0.03 inch.
- (7) Latch door and check gap between latch pin and latch stop fitting on lower edge of door is 0.06 (+0.05/-0.02) inch.
- (8) Check force to move handle to the door unlatched position does not exceed 45 pounds when measured at an angle of approximately 30 degrees down from upper surface of handle.
- (a) If force required exceeds 45 pounds, perform the following to locate cause:
- 1) Check position of upper door lining per section B-B and adjust if required.
  - 2) Realign carriage mounting plates.
  - 3) Test control console per 52-14-11, Adjustment/Test.
- (9) Check force to move handle from unlatched to latch position does not exceed 15 pounds when measured at an angle of approximately 30 degrees down from upper surface of handle.
- (a) If force required exceeds 15 pounds, realign carriage mounting plates or test operation of control console per 52-14-11, Adjustment/Test.
- (10) Extend airstair and install doorway lining. (Refer to Chapter 25, Doorway Sidewall Lining.)
- (a) Retract airstair and check position of lining is as shown in section B-B and C-C of sheet 4, figure 401.
- (b) Trim or adjust doorway lining and seals as required.

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- (11) Check force required to operate interior control handle. Measure force at an approximate 30-degree angle to the upper surface of the control handle.
  - (a) Move handle to the door unlatched position and verify maximum force does not exceed 65 pounds.
  - (b) Move handle to the door latched position and verify maximum force does not exceed 25 pounds.
  - (c) If force required to operate handle is excessive, check doorway lining for proper dimension per sections B-B and C-C and readjust as required.
- (12) Install new door lining marks on upper door lining and doorway with door closed and latched.

**NOTE:** Index marks on door exterior surface will be aligned with body marks within + 0.03 inch.

### E. Install Aft Entry Door (When Door & Airstair do not Require Adjustment)

- (1) Extend airstair.
- (2) Adjust or align premarked mounting plates (5) on each corner of carriage to fit mounting plates on door. (See figure 401.) Install and tighten bolts. Do not preload shockmounts.

**NOTE:** Ensure center bolt of each shockmount (6) on carriage is tightened so metal spacer inside shockmount is bottomed out.

- (3) Retract airstair; latch and unlatch door several times and check for binding of door on cams or latch pin. Index marks on door and body should be aligned within + 0.03 inches.
- (4) Check gap between latch pin and latch stop fitting on door is 0.06 (+0.05/-0.02) inch with door closed and latched.
- (5) Check force required to operate interior control handle. Measure force at an approximate 30-degree angle to the upper surface of the control handle.
  - (a) Move handle to the door unlatched position and verify maximum force does not exceed 65 pounds.
  - (b) Move handle to the door latched position and verify maximum force does not exceed 25 pounds.
  - (c) If force required to operate handle is excessive, check doorway lining for proper dimension per sections B-B and C-C and readjust as required.
    - 1) If doorway lining dimensions are correct and force is excessive, remove doorway lining and perform steps 2.D.( 8) through 2.D.(12).

### 3. Removal/Installation of Aft Airstair

#### A. Equipment and Materials

- (1) Lifting device and sling suitable for supporting airstair.

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## MAINTENANCE MANUAL

### B. Prepare to Remove Aft Airstair

- (1) Rotate airstair to the fully extended position using emergency extension system.

**CAUTION:** DO NOT EXTEND AIRSTAIR WHEN AIRPLANE IS ON JACKS WITHOUT PLACING A SUPPORT UNDER END OF AIRSTAIR. AIRSTAIR SHOULD NOT EXTEND MORE THAN 117 INCHES BELOW ENTRY DOOR OR AIRSTAIR COMPONENTS MAY CONTACT BODY STRUCTURE.

- (2) Open aft airstair circuit breaker on P6 panel.
- (3) Remove carry-on baggage compartment on forward side of airstair doorway for access. Refer to Carry-On Baggage Compartment, Chapter 25.
- (4) Remove doorway sidewall lining if aft entry door is to be adjusted. Refer to Chapter 25, Doorway Sidewall Lining.
- (5) Remove aft entry door, if required. Refer to paragraph 2, Removal/Installation of Aft Entry Door.
- (6) Attach lifting device and sling to upper segment of airstair.

**NOTE:** A 3-inch pipe passed through programming arm shaft may be used for lifting.

### C. Remove Aft Airstair

- (1) Remove return cam from aft airstair hinge. (See detail A.)
- (2) Disconnect radius rod at control arm on control console.
- (3) Disconnect tread light wiring at splices at upper end of airstair at floor level.
- (4) Remove top step by removing bolts from step support arm located between upper segment hinge arms.
- (5) Pull step support arms from transmission units.
- (6) Remove screws attaching flange and hinge arm to free motion flanges.
- (7) Remove the eight wedges between free motion flange and transmission drive shaft on those airplanes with wedges.
- (8) Support airstair and remove from airplane.
- (9) Remove airstair from sling. Support upper segment and manually fold airstair while guiding programming arm. Store on a suitable support to protect airstair from damage.

### D. Install Aft Airstair

- (1) Support upper segment and unfold airstair to the full extended position while guiding programming arm.

**NOTE:** Before airstair is installed the aft entry door should be properly adjusted. Refer to Aft Entry Door and Airstair - Adjustment/Test.

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- (2) Attach sling and lifting device to airstair.

**NOTE:** A 3-inch pipe passed through programming arm shaft may be used for lifting.

- (3) Raise hinge end of airstair and align with transmission drive shaft and free motion flanges. Insert eight wedges between transmission drive shaft and free motion flanges if used. Attach airstair to free motion flanges.

**NOTE:** Foot of airstair must be resting on ground surface 97 to 117 inches below entry door opening.

- (4) Connect radius rod to control arm on control console.  
(5) Insert top step support arms in transmission units.  
(6) Install bolts attaching top step to step support arms.  
(7) Connect tread light wiring at splices at floor level of door opening.  
(8) Remove segment hook cams.  
(9) Conduct airstair centrifugal governor test. Refer to 52-14-61, Aft Entry Door and Airstair Centrifugal Governor.  
(10) Retract airstair using manual drives on transmission units.  
(11) Move control handle to the latched position and adjust airstair. Refer to Aft Entry Door and Airstair - Adjustment/Test.

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AFT ENTRY DOOR AND AIRSTAIR – ADJUSTMENT/TEST

1. General

- A. Initial adjustments to the entry door are made on the airplane with the airstair removed from the airplane. Adjustments for the airstair are made with the airstair installed on the airplane and the entry door removed from the airstair. Final adjustments to the entry door are made with the door on the airstair after the airstair has been installed, adjusted and retracted. Refer to Aft Entry Door and Airstair – Removal/Installation.
- B. Before performing adjustment/test of the airstair and door, the control console, release handle and torsion bar assemblies must be properly installed and adjusted. The remaining major portions of the airstair must also be installed.
- C. Since the adjustments on the airstair are made without the use of the emergency extension mechanism, the return cam in the emergency extension mechanism must be removed to prevent accidental damage to the mechanism. The emergency extension system is adjusted after the airstair and door are installed and adjusted. Refer to 52-14-21, Emergency Extension Mechanism – Adjustment/Test.

2. Aft Entry Door and Airstair Adjustment

- A. Equipment and Materials
  - (1) Corrosion Preventive Compound – MIL-C-16173, Grade 2
- B. Adjust Entry Door

**NOTE:** These procedures may not be required if the same entry door is being reinstalled with no alterations. Also the doorway must not have been altered while the door was removed.

- (1) Remove door from airstair and remove airstair. Refer to Aft Entry Door and Airstair – Removal/Installation.
- (2) Remove top, side and bottom door lining panels if installed. (Refer to 52-14-131, Aft Airstair Door Lining.)
- (3) Remove door pressure seal.
- (4) Remove all bolts in door cam fitting (2) except the upper inboard bolt on each fitting. This bolt must be loosened. (See section A-A.)
- (5) Remove locksprings (10) and all stop pins except at lower forward, lower aft and upper forward fitting locations. Adjust three remaining stop pins to approximately 0.40-inch protrusion. (Detail B).
- (6) Install door in opening and engage door cam fittings (2) with cam rollers (4) (Detail B).

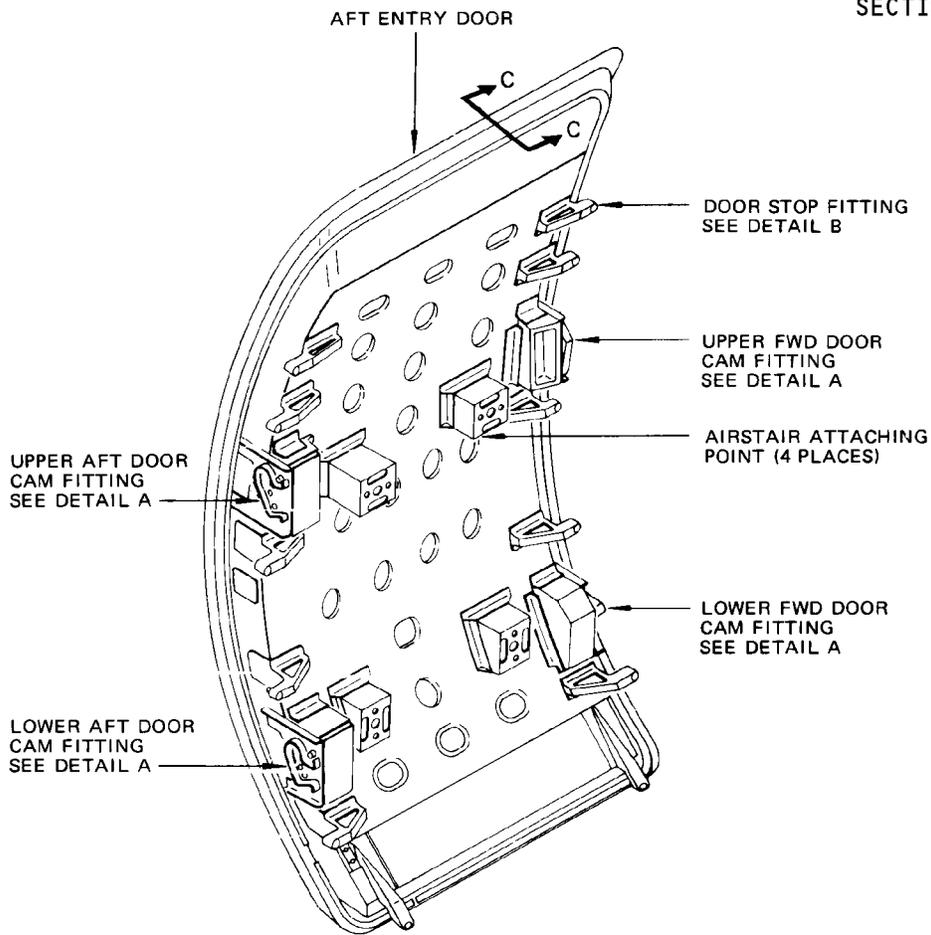
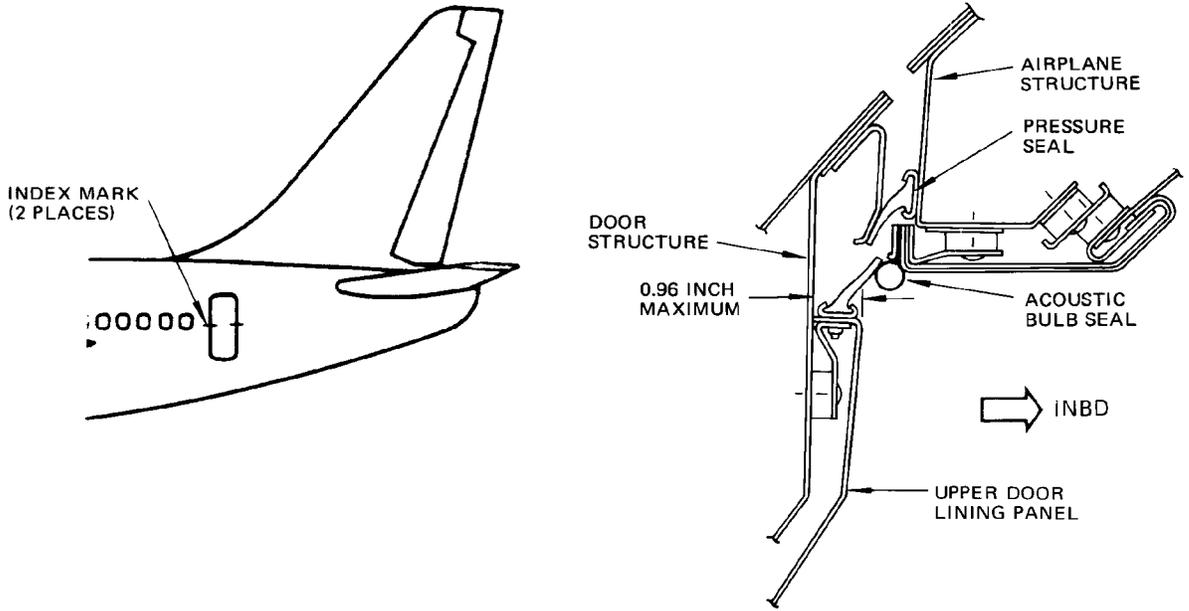
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Aft Entry Door Adjustment  
 Figure 501 (Sheet 1)

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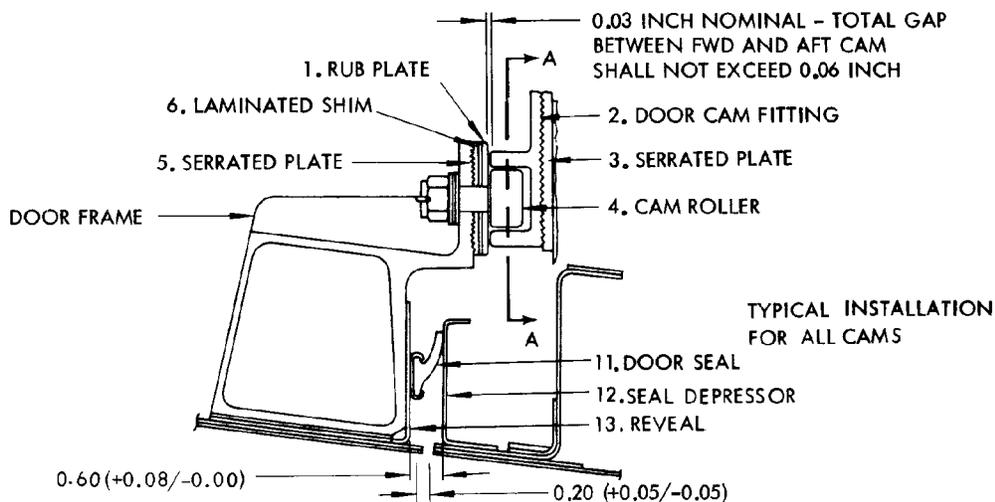
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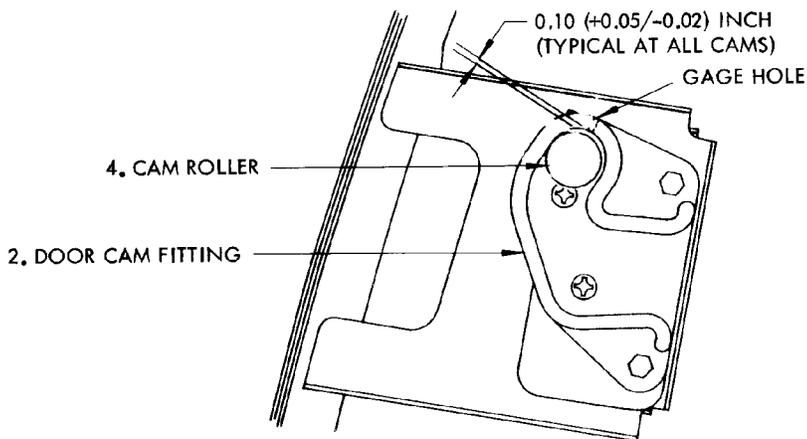
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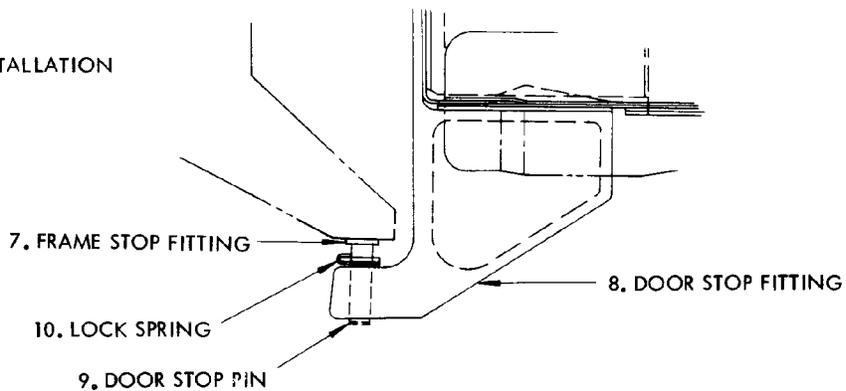


**DETAIL A**



**SECTION A-A**

TYPICAL INSTALLATION  
12 PLACES



**DETAIL B**

**Aft Entry Door Adjustment  
Figure 501 (Sheet 2)**

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- (7) Lower door until door stop pins (9) are centered on frame stop fittings (7) within 0.10 inch of center of stop fittings (Detail B).

**NOTE:** Use block between lower door edge beam and lower main sill to maintain the above position.

- (8) Center door fore and aft using laminated shims (6) to obtain 0.03-inch nominal gap between a pair of roller cams (2) and rub plates (1) (Detail A). Gap between door skin and fuselage skin should be 0.20 (+0.05/-0.05) inches.
- (9) Adjust clearance between cam rollers (4) and end of cam fitting slot to 0.10 (+0.05/-0.02) inches by adjusting serrated plate (5) (Detail A and section A-A). Measurement can be made by inserting wire through gage hole in end of cam slot.
- (10) Adjust upper forward and aft door stop pins, and lower forward stop pin to position door until outside of door is flush to within +0.00/-0.12 at the sides and +0.00/-0.15 at top and bottom.

**NOTE:** You can increase the limits by  $\pm 0.03$  inch in one or more locations. The sum of the lengths of the increased limits must not be more than 10 inches.

- (11) Move door cam fittings (2) inboard on their serrations to contact cam rollers (4) and tighten bolts to secure cam in nearest serration.
- (12) Readjust lower forward and aft door stop fittings and upper forward door stop fitting to allow rollers to contact the door cam fitting.
- (13) Use clay to recheck cam roller clearance and gap per step (7). At least three cam rollers must contact the outboard face in the cam fittings. The fourth cam roller may have a maximum clearance with the outboard face of its cam fitting of 0.030 inches. Readjust if necessary.
- (14) Install remaining stop pins with thin coat of MIL-C-16173, Grade 2 corrosion preventive compound on surfaces of mating threads.
- (15) Adjust remaining nine door stop pins until they contact frame stop fittings.
- (16) Back off door stop pins until slot in pins match first available slot in stop fitting's sleeves and install locksprings. Install bolts in cam fittings and tighten.
- (17) Install or remove shims (6) as required to center door on stops per step (6) and provide a nominal 0.03-inch clearance between door cams (2) and rub plates (1) (Detail A). Sum of gaps between upper forward and aft cams or lower forward and aft cams shall not exceed 0.06 inch.
- (18) With door installed, place two index marks between the door and body skin as shown in Fig 502.

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- (19) If door has been readjusted or new door installed, adjust seal depressor (12) (Ref 52-14-1, Aft Airstair Door Seal Depressor).
  - (20) Remove door and install door seal (11).
  - (21) Reposition door in entryway and check alignment of door index marks. Index marks must align within + 0.01 inch. Do not remove index marks.
    - (a) If index marks do not align, check for seal interference or faulty seal depressor adjustment.
  - (22) Adjust aft entry door warning position switch (Ref 52-71-0, Door Warning System).
  - (23) Install latch stop and adjust so top of stop is within 0.06 +0.03/-0.00 inch from stop pin.
  - (24) Remove door and install door lining as required (Ref 52-14-131, Aft Airstair Door Lining).
  - (25) Reinstall door and check that index marks are aligned within 0.01 inch. Misalignment of index stripes indicate a lining obstruction is preventing door from reaching its rigged position.
  - (26) Check that upper door lining is adjusted within a maximum of 0.96 inch of door structure (Section C-C). Readjust upper door lining panel as required.
  - (27) Remove door from airplane.
- C. Adjust Airstair

**NOTE:** The aft airstair folding mechanism should be properly adjusted before proceeding (Ref 52-14-101, Aft Airstair Folding Mechanism).

- (1) With airstair in retracted position, disconnect carriage control pushrods (1) from carriage (2) (Fig. 502).
- (2) Position upper segment of airstair 4.12 (+0.06/-0.06) inches from centerline of upper forward stop fitting. (See section A-A.)

**CAUTION:** DO NOT EXCEED 4.50 INCHES WHILE POSITIONING STAIRS.

**NOTE:** A block should be installed under the lower inboard edge of the stairs to maintain the above dimension. The control handle should be latched.

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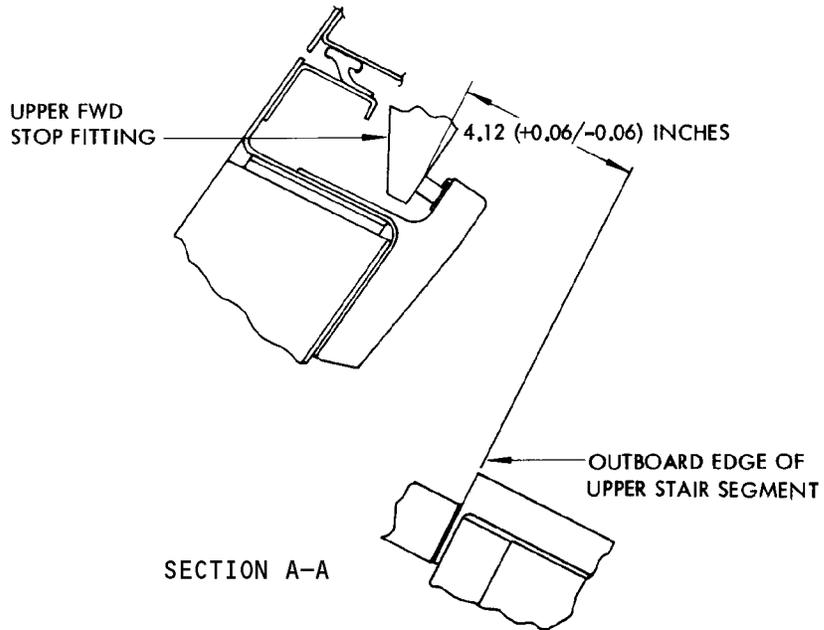
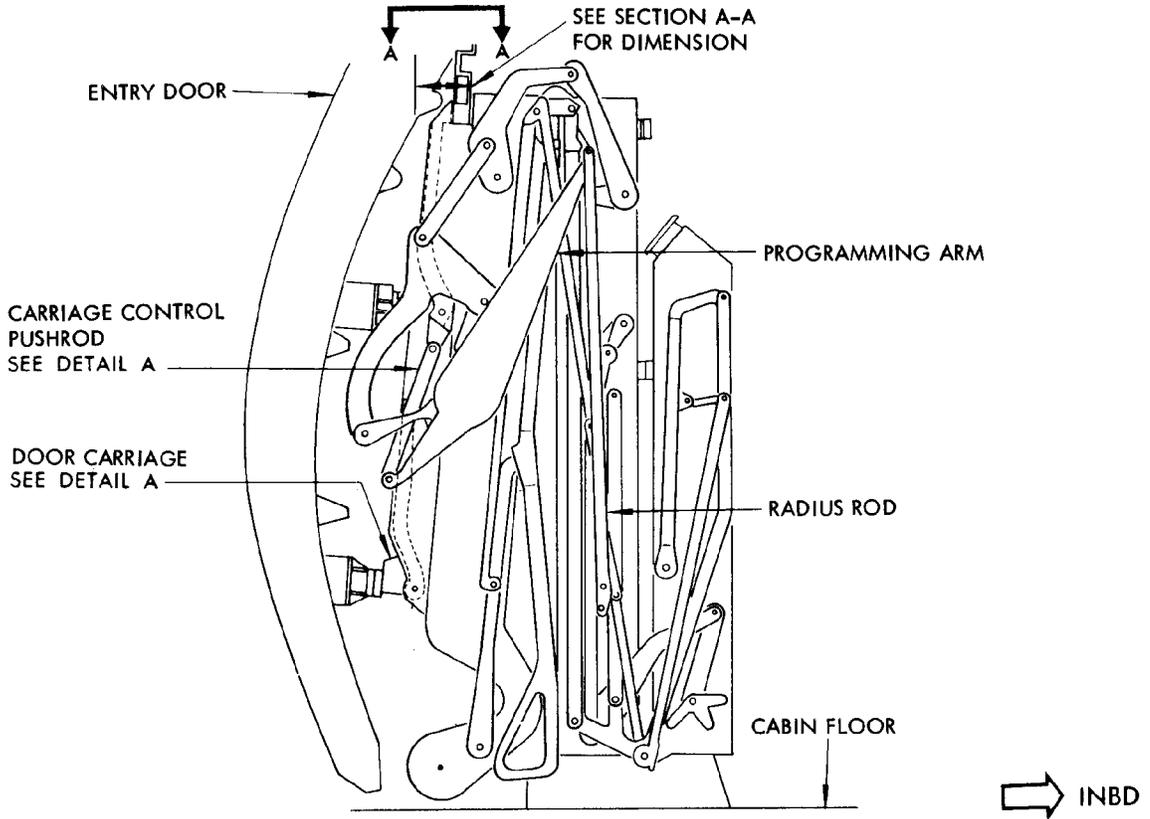
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Aft Airstair Adjustment  
Figure 502 (Sheet 1)

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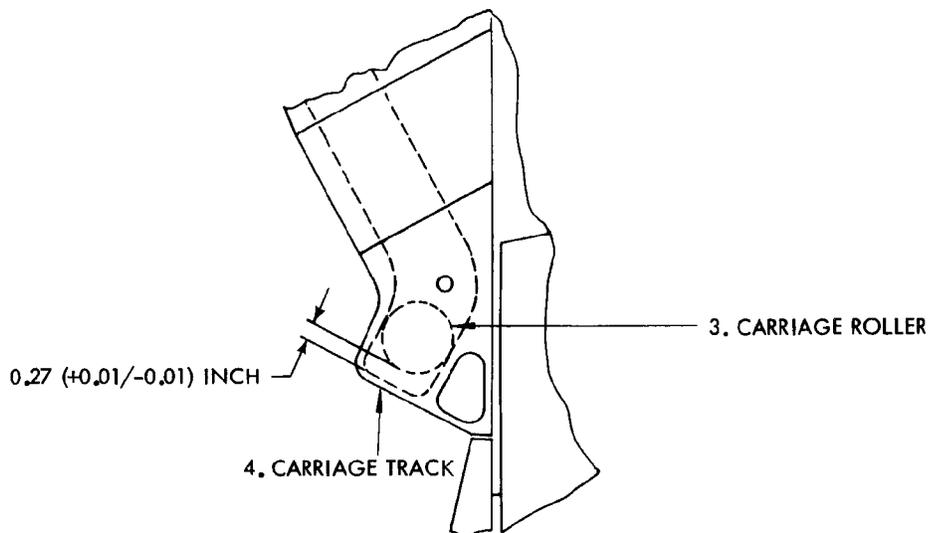
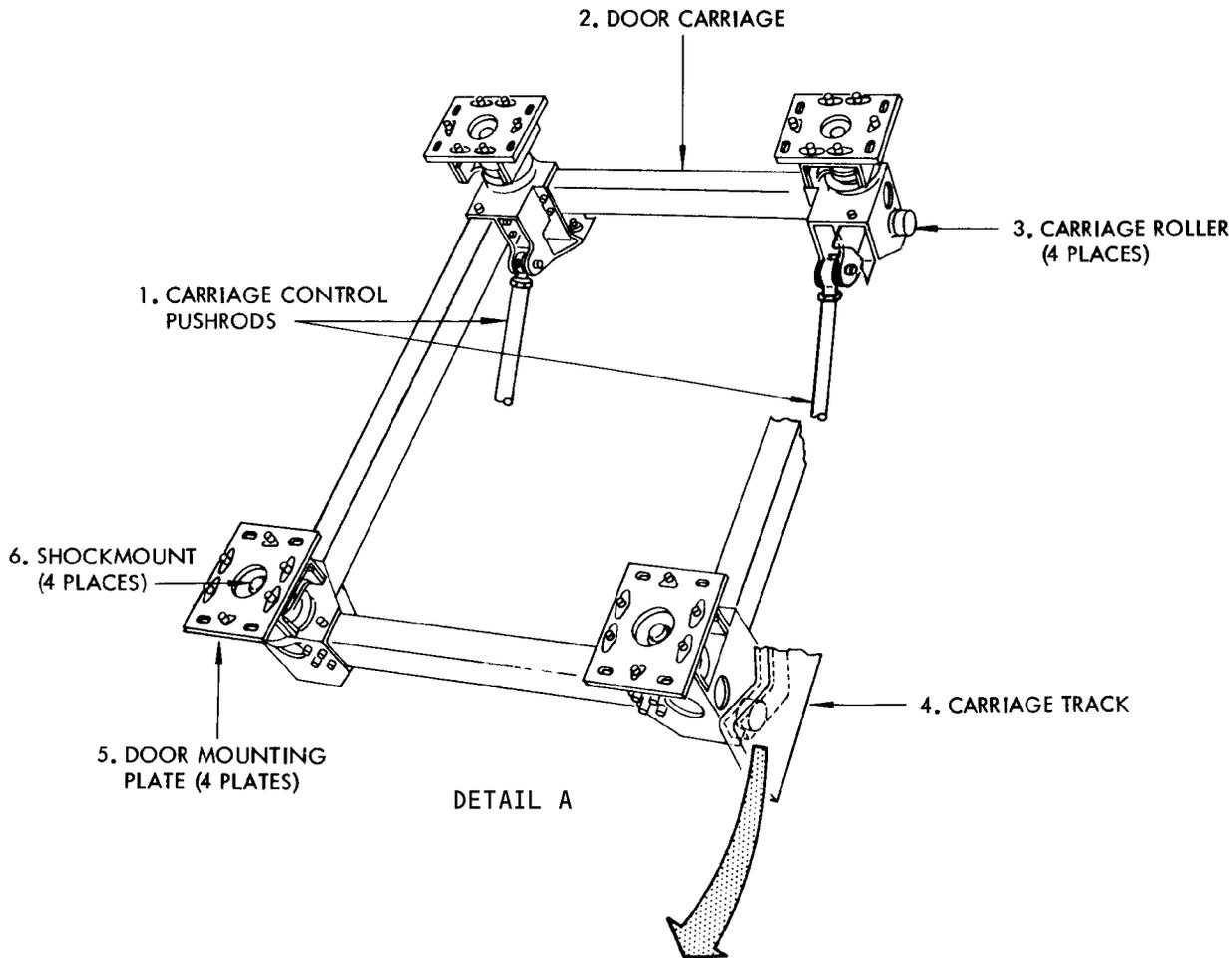
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Aft Airstair Adjustment  
Figure 502 (Sheet 2)

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- (3) Position door carriage (2) in tracks (4) to obtain 0.27 (+0.01/-0.01) inches between carriage roller (3) and end of carriage track (4). (See detail A.)

**NOTE:** A locally fabricated shim or spacer may be temporarily inserted between roller and end of track to maintain the above dimension.

- (4) Adjust carriage control pushrods (1) to match door carriage (2) and reconnect pushrods.
- (5) Extend airstair by pushing it out and allowing it to just completely unfold (115 degrees from the fully closed position). Hold in this position by supporting through the program arm torque tube.
- (6) Install and adjust segment hook cams (2) to obtain 0.56 (+0.02/-0.02) inches between end of segment hooks (1) and bearing (3) centerlines. (See figure 503, detail A.)
- (7) Continue rotation of airstair and check that segment hooks are fully latched.
- (8) Retract airstair to its fully retracted position. After airstair is retracted, move the control handle to the unlatched position to withdraw the latch pin.
- (9) Install preadjusted entry door. Refer to Aft Entry Door and Airstair, Removal/Installation.
- (10) Manually retract and extend airstair and check for proper operation of segment hooks.
- (11) Install return cam and adjust emergency extension mechanism. Refer to 52-14-21, Emergency Extension Mechanism.
- (12) Electrically or manually extend airstair. With console handle in unlatched position, check for 0.06 minimum gap between crank and bellcrank on the console. (See figure 504, detail A.)
- (13) Test aft entry door and airstair.
- (14) Install carry-on baggage compartment on forward side of entry door. Refer to Carry-On Baggage Compartment, Chapter 25.

### 3. Aft Entry Door and Airstair Test

#### A. General

- (1) Prior to testing the mechanical and electrical operation of the door and airstair, the following conditions are assumed to have been complied with:
  - (a) The aft entry door, airstair operating mechanism, and airstair have been properly installed and rigged.
  - (b) The airstair has been manually-operated through a complete cycle and returned to the retracted position.
  - (c) The desired form of electrical power is available on the airplane.

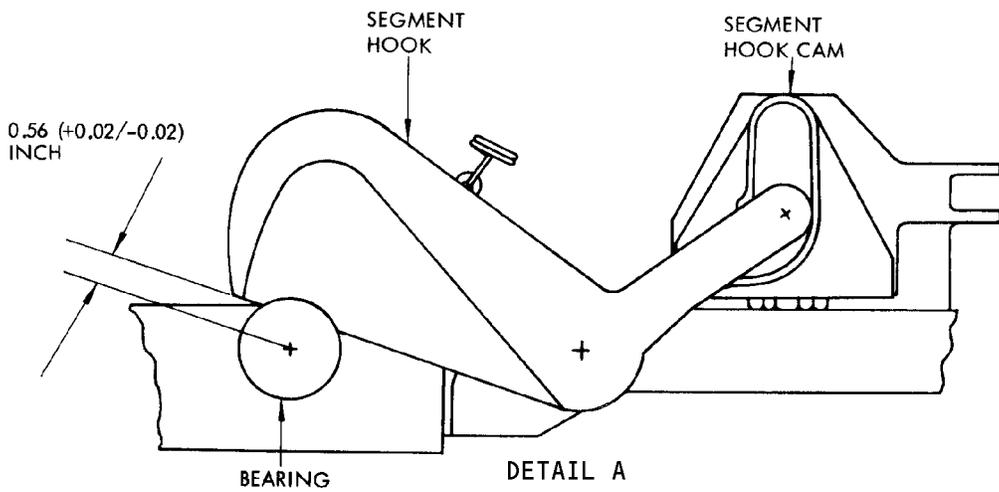
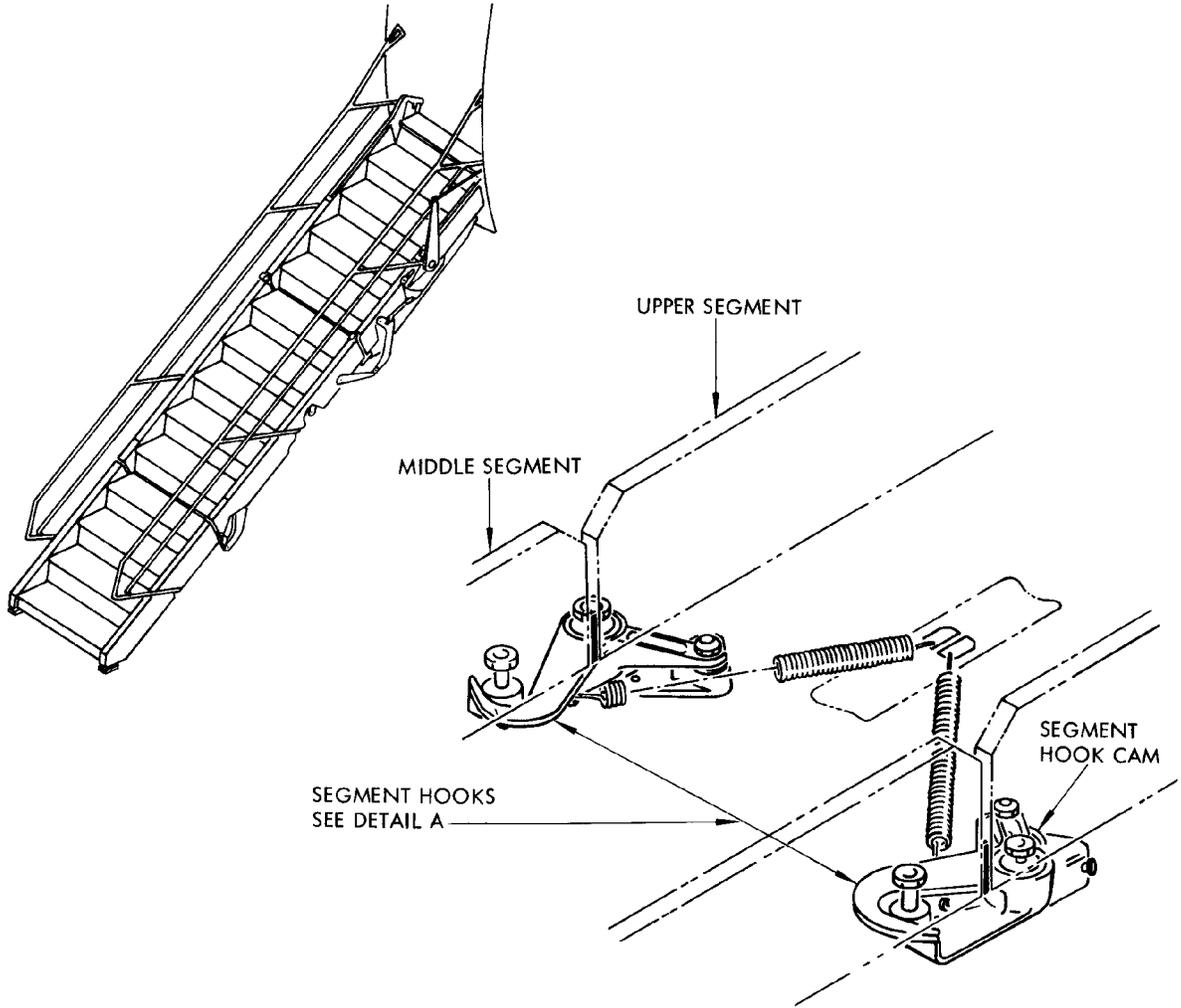
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Aft Airstair Segment Hook Adjustment  
 Figure 503

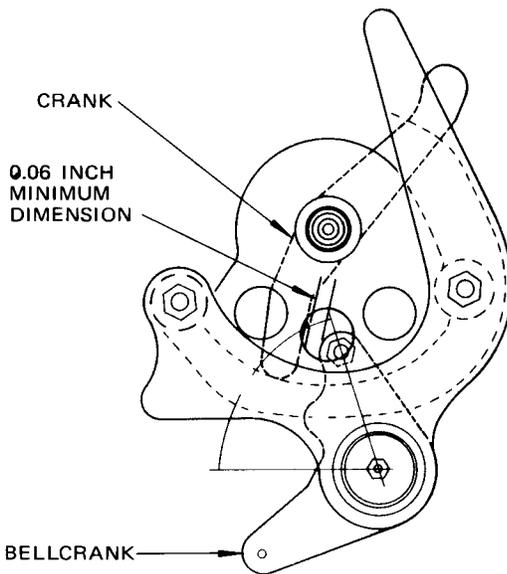
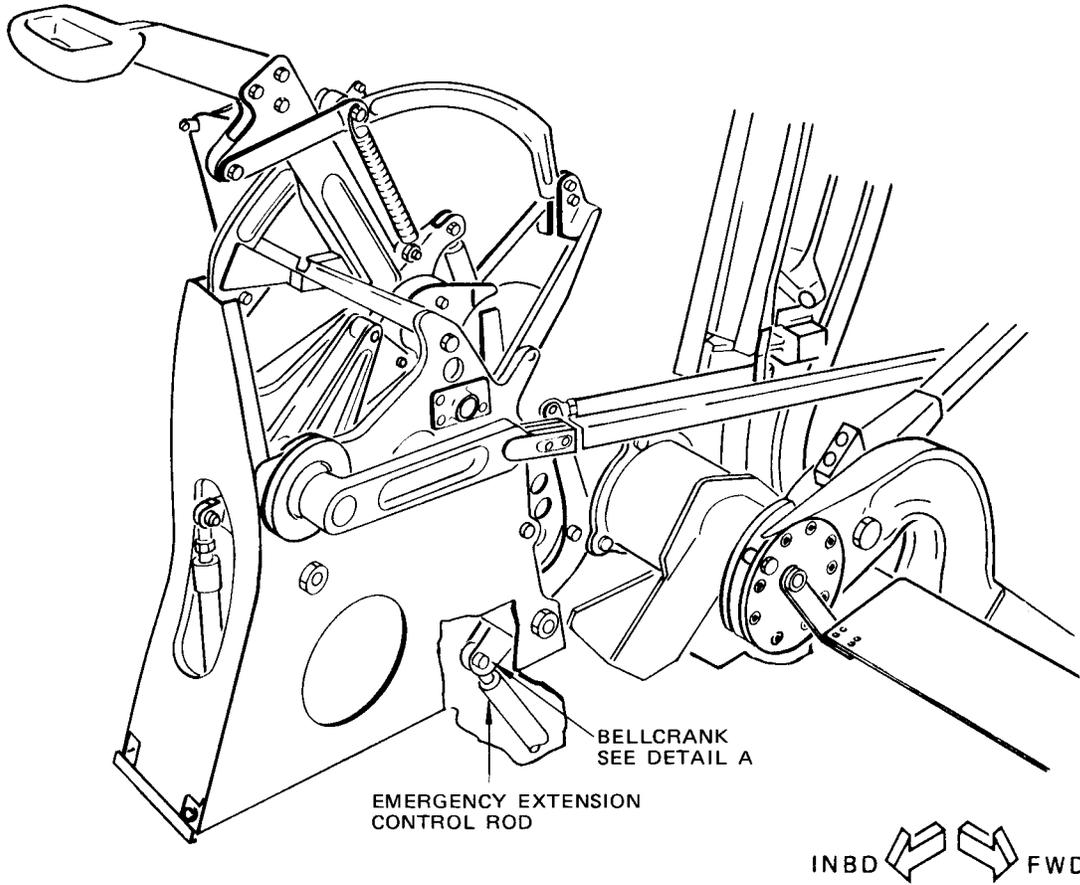
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**DETAIL A**

**Aft Airstair Control Console  
Figure 504**

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B. Prepare for Aft Entry Door and Airstair Test

- (1) Check that airplane is level within 0 to 2 degrees nosedown and 1 degree maximum wing up or down.
- (2) Check that distance between ground line and upper surface of top step at aft entry door location is 107.7 + 7.0/-10.0 inches.

**CAUTION:** TESTING OF AFT ENTRY DOOR AND AIRSTAIR SHOULD NOT BE PERFORMED WITH AIRPLANE IN JACKED POSITION WITHOUT PROVIDING A SUPPORT FOR LOWER END OF AFT AIRSTAIR IN ITS FULLY EXTENDED POSITION.

- (3) Check that exterior control handle is stowed and flush with handle housing.
- (4) Test centrifugal governor. Refer to 52-14-61, Adjustment/Test.
- (5) Retract airstair fully and latch aft entry door.
- (6) Remove electrical power from aft airstair system.

C. Test Aft Entry Door and Airstair

**WARNING:** PERSONNEL AND EQUIPMENT SHOULD BE KEPT CLEAR OF AIRSTAIR DURING OPERATION.

**CAUTION:** A 2-1/2 MINUTE COOLING OFF PERIOD SHOULD BE ALLOWED AFTER TWO CONSECUTIVE POWERED OPERATIONS. ( A POWERED OPERATION CONSISTS OF EITHER A RETRACTION OR AN EXTENSION.)

- (1) Check force required to operate interior control handle as follows:

**NOTE:** Measure force at an approximate 30-degree angle to the upper surface of the control handle.

- (a) Move handle to the door unlatched position. Maximum force should not exceed 65 pounds and should not exceed 55 pounds during the final 2 inches of travel into unlatched position.
- (b) Move handle to the door latched position. Maximum force should not exceed 25 pounds.

- (2) Check force required to operate exterior control handle.

**NOTE:** Measure force at a point 2 inches from the end of the handle and normal to handle pivot.

- (a) Move handle to the door unlatched position. Maximum force should not exceed 90 pounds.
- (b) Move handle to the door latched position. Maximum force should not exceed 37 pounds.

- (3) Provide electrical power to the aft airstair system.

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- (4) Check that all indicator and master caution circuit breakers on P6 panel are closed.
- (5) Move interior airstair control switch to the extend position. There should be no motion of the airstair. Release switch.
- (6) Move interior control handle to the door unlatched position.
  - (a) Door latch pin should move to the unlatched position.
  - (b) Aft entry door should raise to clear the door cam rollers.
  - (c) The exterior control handle should move to the door unlatched position.
  - (d) The AFT ENTRY light on P5 panel, both MASTER CAUTION lights, and the DOORS light of the master caution annunciator should illuminate.
- (7) Extend airstair electrically making checks during and after extension as follows:
  - (a) Place airstair tread lights switch, located on aft attendant's panel, in the AUTO position.
  - (b) Place interior airstair control switch in the extend position and hold switch in this position until airstair is fully extended.

**NOTE:** After the airstair is driven to the free fall position (approximately 10 degrees stair angle) the rate of fall is controlled by the drive motor until the extend limit switch has actuated. Early release of interior airstair operating switch from the extend position will deactivate breaking action of the motor and allow stair to ride and wear the emergency extend speed governor.

- (c) Check that airstair starts its free fall when the end of the lower ladder is approximately 3-1/2 feet off the ground.
- (d) Check that 30 to 45 seconds are required for full extension of airstair.
- (e) Check that stair operates smoothly during extension.
- (f) Check that tread lights are extinguished during extension of airstair and become illuminated at completion of extension.
- (g) Place airstair tread lights switch in off position. Check that lights are extinguished. Return switch to the auto position and check that tread lights are illuminated.
- (h) Place the interior airstair control switch in the extend position. There should be no motion in the drive unit. Release switch.
- (i) Check that movement of interior control handle is restricted to an arc of 11 degrees maximum toward the door latched position from the door unlatched position.

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## MAINTENANCE MANUAL

- (8) Retract airstair electrically making checks during and after retraction as follows:
  - (a) Place interior airstair control switch in the retract position and hold switch in this position until airstair is fully retracted. Retract limit switch should remove power from drive unit. Release switch.
  - (b) Check that 35 to 45 seconds are required for full retraction of airstair.
  - (c) Check that stair operates smoothly during retraction.
  - (d) Check that tread lights are extinguished as airstair starts to retract.
  - (e) After retraction place airstair tread lights switch in the ON position and check that lights are illuminated. Return switch to the AUTO position and check that tread lights are extinguished.
- (9) Move interior control handle to the door latched position.
  - (a) Aft entry door should center on door stops.
  - (b) Door latch pin should move to the latched position. Check that latch pin engages door a minimum of 0.75 inch.
  - (c) Exterior control handle should be in door latched position and flush with handle housing.
  - (d) The AFT ENTRY light on panel P5, both MASTER CAUTION lights, and the DOORS light of the master caution annunciator should be extinguished.
  - (e) Move exterior control handle to the door unlatched position.
  - (f) The interior control handle should move to the door unlatched position.
  - (g) Door latch pin should move to the unlatched position. Check that latch pin does not exceed 0.16 inch extension from support fitting.
  - (h) Aft entry door should raise to clear the door cam rollers.
- (10) Extend and retract airstair using external control switch.
- (11) Move exterior control handle to the door latched position.
- (12) Move interior control handle to the emergency extend position. Maximum force required shall not exceed 65 pounds.

**NOTE:** Under adverse conditions of high winds, extreme cold or airplane tilt, it may be required to manually push the airstair out the doorway. After airstair has partially extended, personnel then must lift up and push out the center ladder section.

**CAUTION:** IF AIRSTAIR IS EXTENDED MORE THAN 132 INCHES DURING EMERGENCY OPERATION, SECONDARY STRUCTURE MAY BE DAMAGED.

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- (13) Check that a maximum elapsed time of 12 seconds is required for full extension of airstair.
- (14) With control handle in the emergency extend position and airstair fully extended, place interior airstair control switch in the retract position. There should be no movement in the drive unit. Release switch.
- (15) Move interior control handle to the door unlatched position.
- (16) Arm the emergency extension system. Refer to Aft Airstair Emergency Extension Mechanism, 52-14-21.
- (17) Move interior control handle to the door latched position.
- (18) Move exterior control handle to the emergency extend position. Maximum force required shall not exceed 90 pounds.

**NOTE:** After airstair has extended partially, complete extension by pulling down on door from side.

- (19) Check that a maximum elapsed time of 12 seconds is required for full extension of airstair.
- (20) With control handle in the emergency position, place exterior airstair control switch in the retract position. There should be no movement in the drive unit. Release switch.
- (21) Move exterior control handle to the door unlatched position.
- (22) Arm and test the emergency extension system. Refer to Aft Airstair Emergency Extension Mechanism, 52-14-21.
- (23) Move control handle to the unlatched position and retract airstair using internal control switch.
- (24) Place control switch in the extend position and rotate airstair to approximate midtravel. Move control switch to the retract position and airstair should reverse its direction of travel.
- (25) With airstair retracted, check that red marks on door lining and door frame are in alignment within 0.01 inch.
- (26) Check that crash restraint latch at bottom of doorway is engaged by pulling lower end of center ladder inboard. The center ladder should not move more than 1 inch from its retracted position.

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AFT ENTRY DOOR SEAL DEPRESSOR – ADJUSTMENT/TEST

1. Seal Depressor Adjustment

A. General

- (1) These procedures will be required only when an aft entry door has been replaced or the door was readjusted requiring readjusting seal depressor. The seal depressor should not be spliced until seal depressor has been adjusted properly.

B. Equipment and Materials

- (1) Solvent – BMS 11-7 or Methyl Ethyl Ketone
- (2) Adhesive – BMS 5-19, Class 3-1/2, Type 44
- (3) Durometer – Rex Model A or Shore A
- (4) Paint Stripper – Del Chem EZ

C. Adjust Seal Depressor

- (1) Remove foil and splice angles from seal depressors if required.

NOTE: Removal of foil and splice angles may not be required on readjusted doors if only minor adjustment to seal depressor is required.

- (2) Adjust seal depressor to obtain 0.60 (+0.08/-0.00) inches between depressor and reveal. See figure 201.
- (3) Fasten depressor splice angles to seal depressors.
- (4) Thoroughly clean area on depressor above splice angle.
- (5) Bond foil to depressors.
  - (a) Thoroughly blend adhesive in accordance with the manufacturer's instructions. The adhesive shall not be thinned.
  - (b) Apply a thin, uniform coat of the blended adhesive to each faying surface.
  - (c) Locate foil on depressor as shown in figure 201 and apply sufficient pressure to ensure complete contact of the faying surfaces. A continuous bead of extruded adhesive around the foil usually indicates proper contact.
  - (d) Cure adhesive.
    - 1) The time required to obtain handling strength is 16 hours at 75 to 80 degrees Fahrenheit.

NOTE: A Rex Model A Durometer (preferred) reading of 30 or a Shore A Durometer reading of 20 will indicate attainment of handling strength. Curing may be accelerated by applying heat not to exceed a bond line temperature of 120 degrees Fahrenheit. As a rough rule of thumb, the cure time will be reduced by 50 percent for each 20 degrees Fahrenheit rise in temperature. Conversely, temperatures below 75 degrees Fahrenheit will greatly increase the cure time.

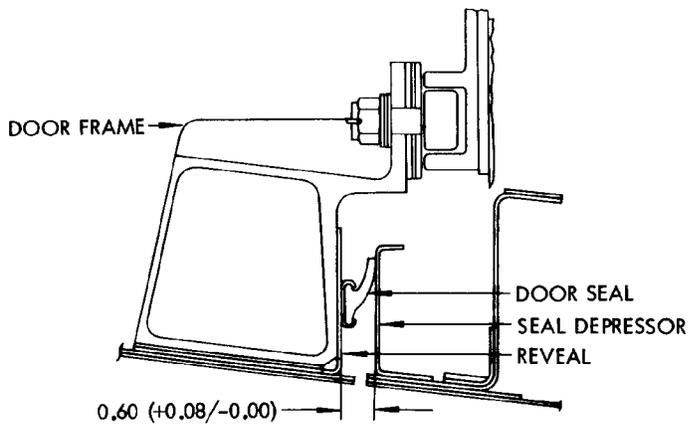
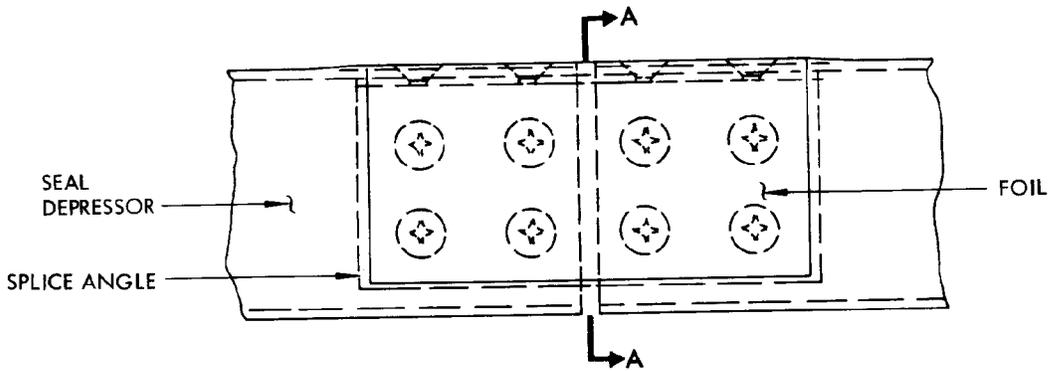
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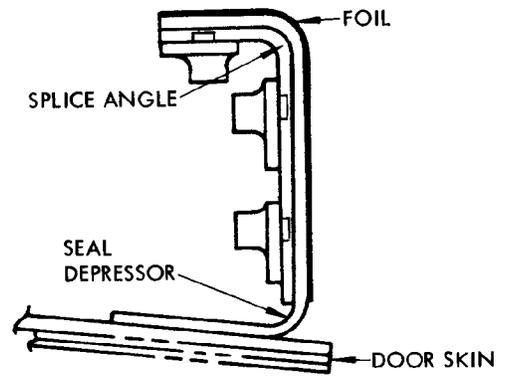
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DETAIL A



SECTION A-A

Seal Depressor Splicing  
 Figure 501

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AFT AIRSTAIR CONTROL CONSOLE – REMOVAL/INSTALLATION

1. Equipment and Materials
  - A. Grease, MIL-G-21164, or equivalent
2. Remove Aft Airstair Control Console
  - A. Open aft airstair circuit breakers on P6 panel.
  - B. Extend airstair using emergency mode.
  - C. Remove access panel on inboard side of control console shroud (figure 401).
  - D. Remove bolts (2) attaching control handle (1) and remove handle.
  - E. Disconnect electrical wiring from interior control operating switch.
  - F. Remove control console shroud.
  - G. Disconnect exterior control telescopic unit (15) from bellcrank (16).
  - H. Remove end fittings (10) that connect radius rod (8) to control arm (4) by removing two bolts.
  - I. Disconnect inboard end of door latch control rod (7) from cam follower(11).
  - J. Disconnect upper end of emergency extension control rod (13) from bellcrank (12).
  - K. Disconnect electrical wiring from door arming switch (17).
  - L. Remove five bolts (14) attaching control console to floor (three at inboard edge and two at outboard edge) and remove console.
3. Install Aft Airstair Control Console
  - A. Adjust control console. Refer to Aft Airstair Control Console –Adjustment/Test.
  - B. With aft airstair fully extended and aft airstairs circuit breaker on P6 panel open, position control console at installation location and install five attaching bolts (14, figure 401).
  - C. Place interior control lever (3) in the door latched position. This may be accomplished by holding stop bolt (6) away from boss (5) while the lever is being moved.
  - D. Connect inboard end of door latch control rod (7) to cam follower (11) as follows:
    - (1) Adjust length of door latch control rod (7) to obtain 1.67 (+0.03/-0.03) inches extension of latch pin (9) beyond latch support fitting (19). (See detail B.) Check that latch pin (9) overlaps door stop fitting a minimum of 0.75 inch.
    - (2) Check that gap between door warning switch (18) and sensor plate (20) is 0.08 (+0.02/-0.02) inch. If switch adjustment is necessary, refer to 52-71-0, Door Warning System.
  - E. With control handle in the emergency position, adjust control rod (13) to obtain 0.03 (+0.02/-0.02) inch dimension between bolt head (23) and crank (22) on emergency extension mechanism. (See detail D.) Connect rod (13) to bellcrank (12).

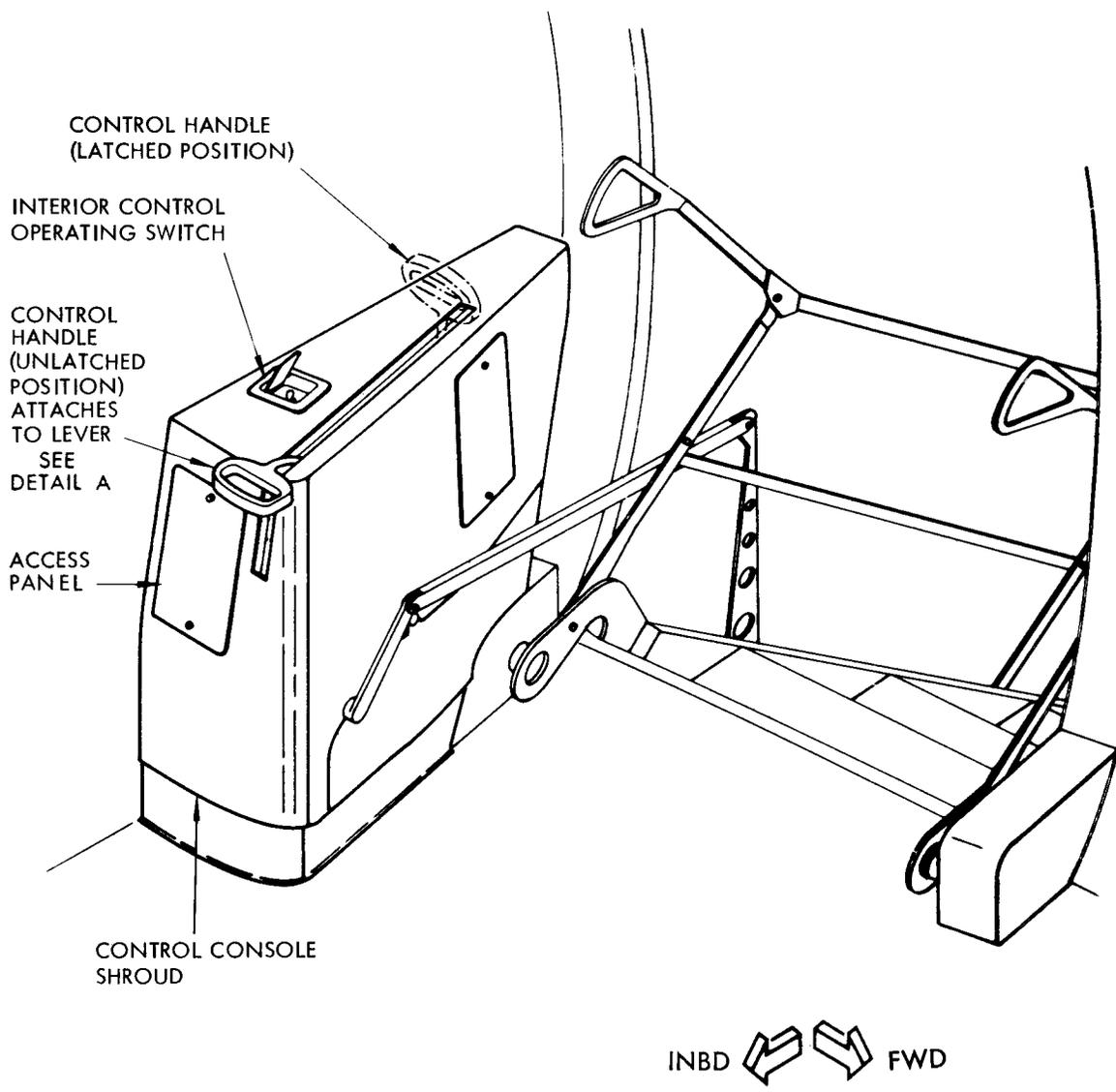
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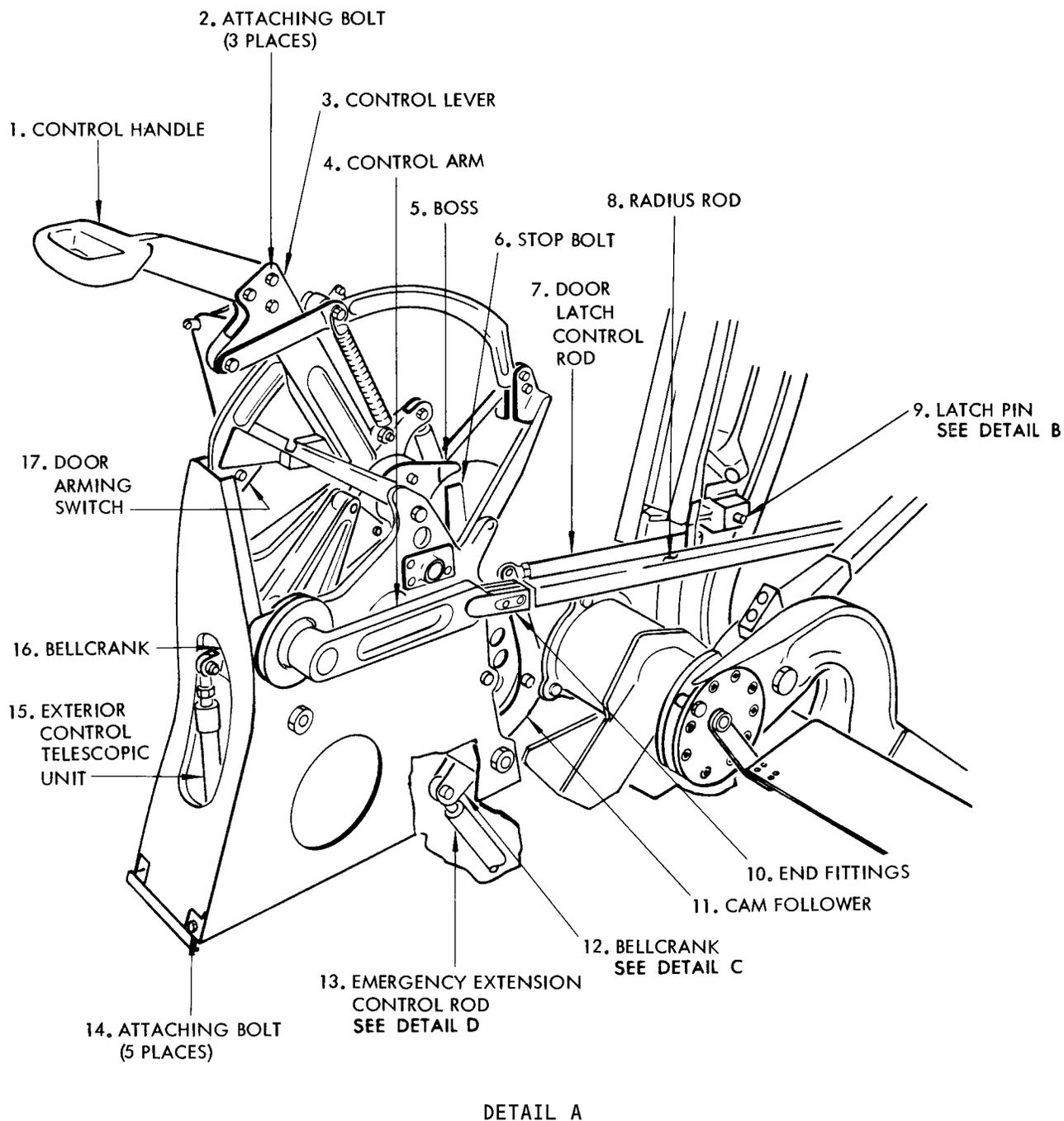
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Aft Airstair Control Console Installation  
 Figure 401 (Sheet 1)

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Aft Airstair Control Console Installation  
 Figure 401 (Sheet 2)

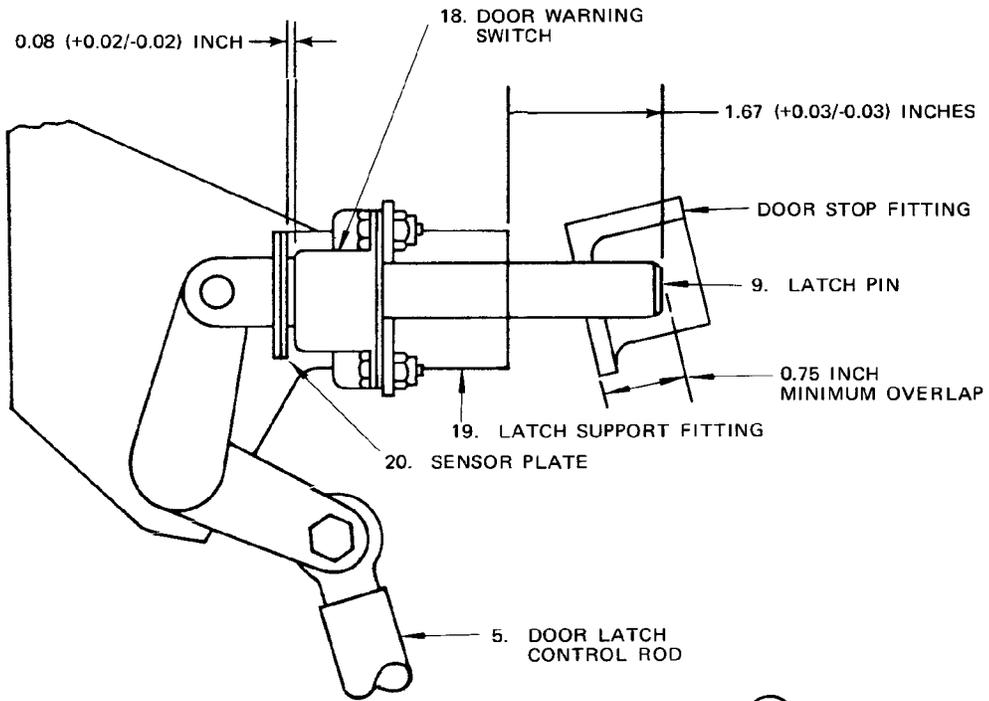
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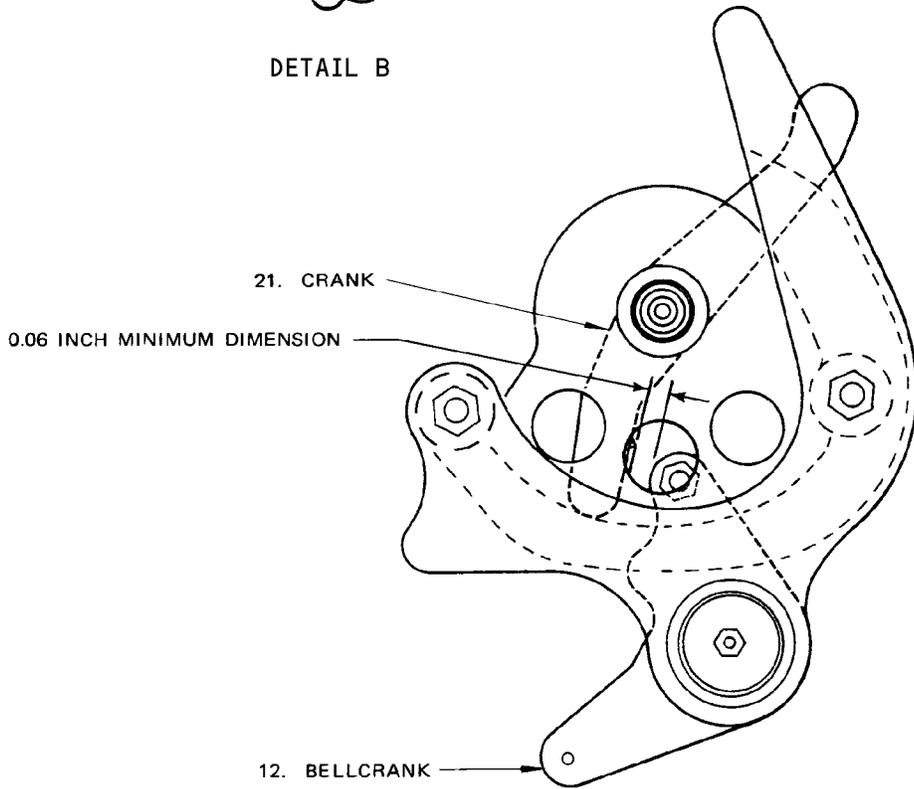
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DETAIL B

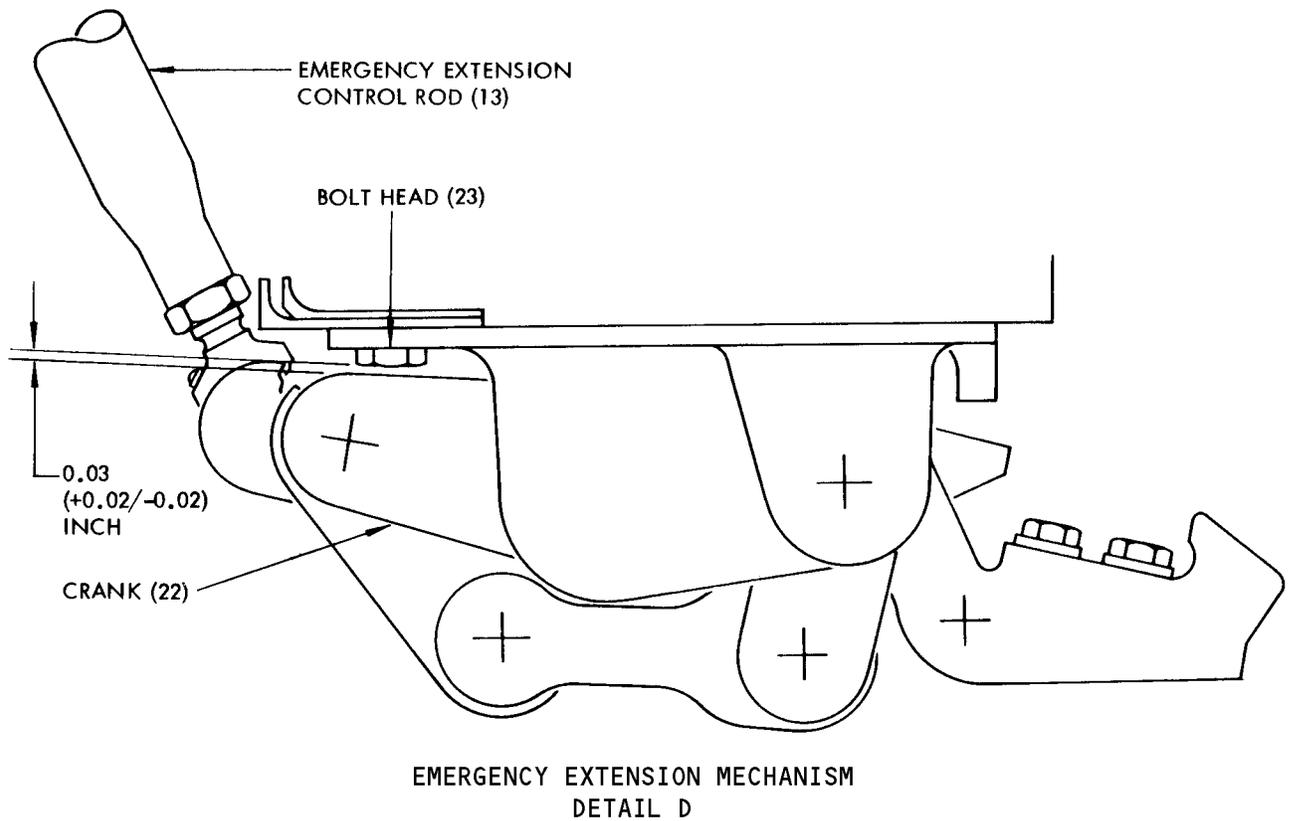


DETAIL C

Aft Airstair Control Console Installation  
 Figure 401 (Sheet 3)

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Aft Airstair Control Console Installation  
 Figure 401 (Sheet 4)

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- F. With control handle in the unlatched position, check for 0.06 inch minimum clearance between bellcrank (12) and crank (21). (See detail C.)
- G. Test control console. Refer to Aft Airstair Control Console, Adjustment/Test.
- H. With both control handles out of door latched or unlatched position, connect exterior control telescopic unit (15) to bellcrank (16).

**NOTE:** Check that preload on exterior control handle is 36 to 72 pound-inches when handles are in the door latched position. Adjust upper end of telescopic unit as required.

- I. With control handles in the door unlatched position connect radius rod (8) to control arm (4). Coat pin on end fitting (10) with grease prior to installation.
- J. Connect electrical wiring to door arming switch (17).
- K. Install control console shroud and connect electrical wiring to interior control operating switch.
- L. Install control handle (1) on control lever (3) with three attaching bolts (2).
- M. Arm emergency extension system. See Aft Airstair Emergency Extension Mechanism, 52-14-21.
- N. Extend airstair using manual or electrical mode.
- O. Install access panel on shroud.
- P. Operate airstair through complete cycle and check for smooth operation.

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AFT AIRSTAIR CONTROL CONSOLE – ADJUSTMENT/TEST

1. General

A. Adjustment and test of the control console is required when replaced or repaired. However, the test can also be used to check for suspected faulty operation of console.

2. Aft Airstair Control Console Adjustment

A. Adjust Aft Airstair Console

- (1) Remove aft airstair control console. Refer to Aft Airstair Control Console – Removal/Installation.
- (2) Disconnect control rod (9, figure 501).
- (3) Apply a light force to door latch cam (8) to hold both rollers (11) of cam follower (7) in contact with cam surface in position shown in detail A.
- (4) Position control lever to obtain the 0.545 (+0.000/-0.010) inch dimension between door lift cam (2) and lower roller (12) of cam follower (4) shown in detail B and hold in this position.
- (5) Adjust length of control rod (9) and connect to crank (6).
- (6) Rotate control lever (1) to the unlatched position.
- (7) Adjust stop bolt (10) to the 0.69 (+0.02/-0.02) inch dimension shown in detail C. Tighten jamnut (14) and install pin and cotter pin (13).
- (8) Rotate control lever toward the latched position and adjust tab to arming switch (3) to a free position dimension of 1.70 (+0.02/-0.02) inches as shown in detail D.

**NOTE:** The arming switch should be in closed position when control lever is 3 degrees on either side of the door latched detent.

- (9) Test console in accordance with paragraph 3.
- (10) Install control console in airplane. Refer to Aft Airstair Control Console – Removal/Installation.

3. Aft Airstair Control Console Test

A. Test Control Console

- (1) Disconnect from the control console, if connected, the exterior control telescopic unit, the airstair radius rod, the door latch control rod and the emergency extension control rod. Refer to Aft Airstair Control Console Removal/Installation.
- (2) Install handle if removed.
- (3) Move the control lever from the door latched to door unlatched position. The maximum force required shall be 25 (+ 5) pounds and shall occur at approximately 8 degrees from latched position.

**NOTE:** Measure all forces from tip of handle perpendicular to control lever arm.

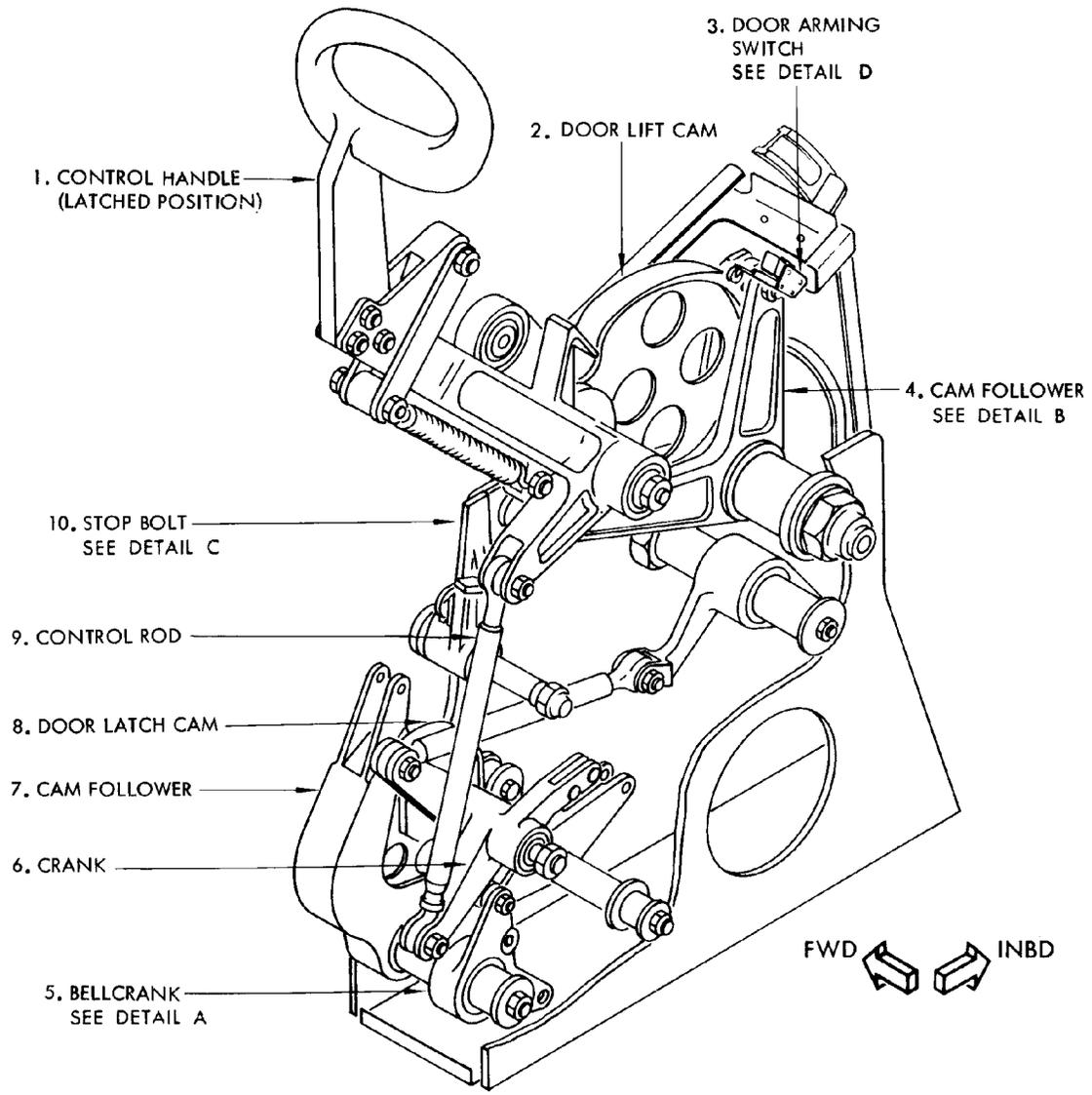
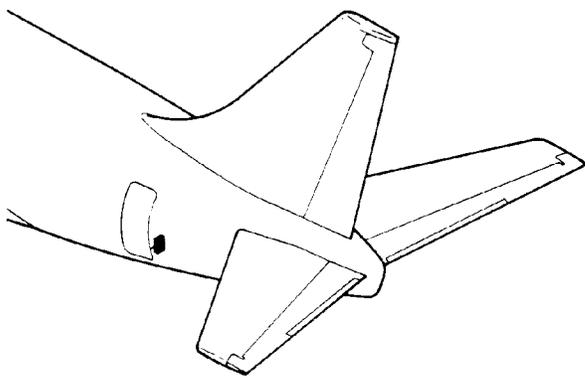
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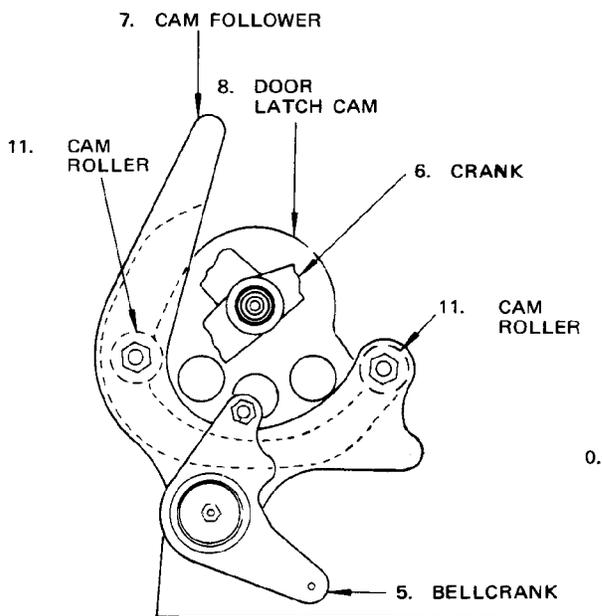
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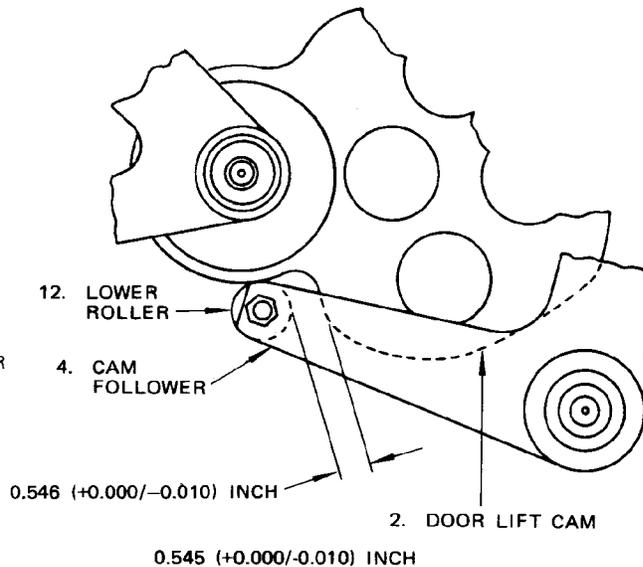
Aft Airstair Control Console Adjustment  
 Figure 501 (Sheet 1)

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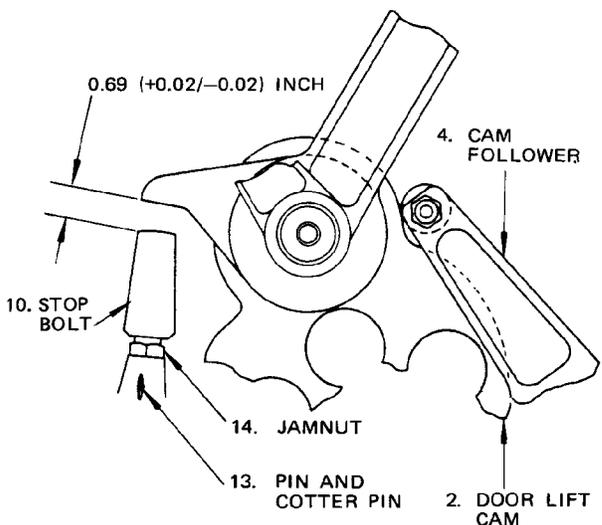
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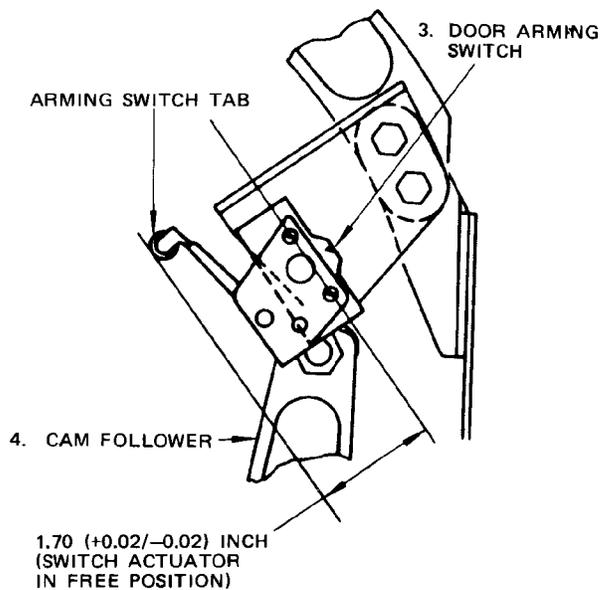
DETAIL A



DETAIL B



DETAIL C



DETAIL D

Aft Airstair Control Console Adjustment  
 Figure 501 (Sheet 2)

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- (4) Measure maximum force required to move handle from unlatched to emergency position. The maximum force shall occur at the unlatched position and be 60 (+ 10) pounds.
- (5) Measure the maximum force required to move the handle from emergency to unlatched position. The force shall be 15 (+ 5 ) pounds.
- (6) Measure the maximum force required to move the handle from unlatched to the latched position. The force shall be 15 (+ 5) pounds and occur at the unlatched position.
- (7) Remove handle and reconnect exterior control telescopic unit, control rods and radius rod. Refer to Aft Airstair Control Console Removal/Installation.

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AFT AIRSTAIR EMERGENCY EXTENSION MECHANISM – MAINTENANCE PRACTICES

1. General

A. The maintenance practices included in this section (201-299 page block) are general maintenance instructions that do not definitely fall within a specific category. Other maintenance practices such as Servicing, Removal/Installation, Adjustment/Test, etc. are provided in the applicable page blocks.

2. Emergency Extension Mechanism Arming

A. General

(1) Arming emergency extension mechanism will be required only after emergency operation of airstair and adjustment of emergency extension mechanism. Refer to Aft Airstair Emergency Extension Mechanism – Adjustment/Test.

B. Arm Emergency Extension Mechanism

- (1) Extend airstair using emergency operation.
- (2) Rotate roller arm to SET position. (See figure 201.)

NOTE: Pull out on spring behind roller arm to release tension on arm and cam.

- (3) Retract the airstair.
- (4) Manually or electrically extend airstair.
- (5) Rotate the roller arm to the NORM position.
- (6) Retract airstair. Emergency extension mechanism is armed.

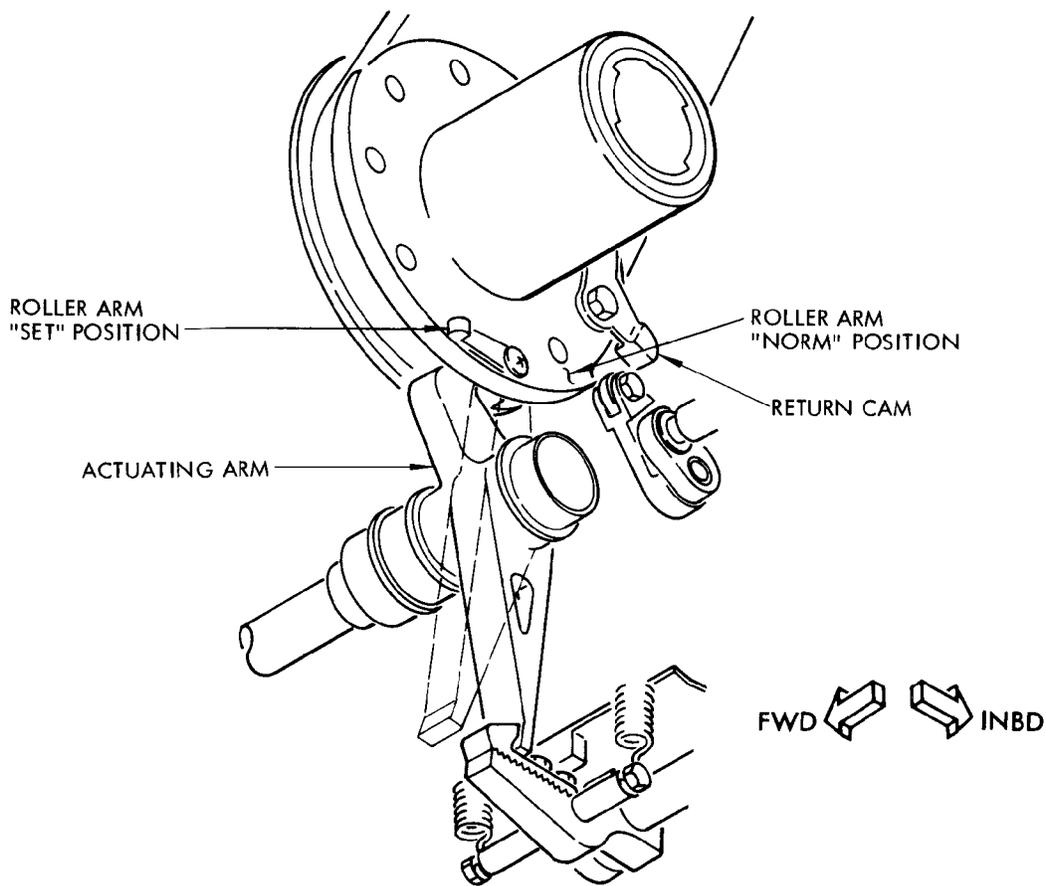
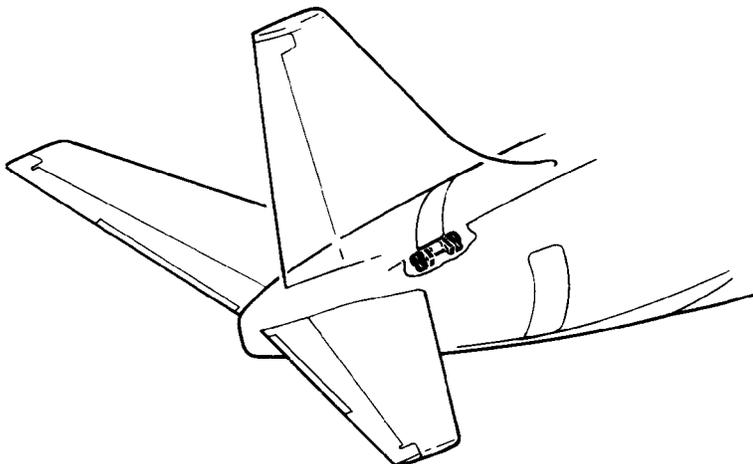
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VIEW 1

Emergency Extension Mechanism - Maintenance Practices  
 Figure 201

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AFT AIRSTAIR DRIVE EMERGENCY EXTENSION LATCH AND  
LOCKOUT MECHANISM - REMOVAL/INSTALLATION

1. General

- A. The aft airstair emergency extension mechanism consists of an assembly of cams, links, cranks and springs arranged to control a latch and lockout mechanism which in turn controls the energy stored in a torsion bar. The stored energy of the torsion bar is used to initiate the emergency extension of the aft airstair. The mechanism is located below and aft of the hinge support fitting of the aft airstair door. (See figure 401.)
- B. Removal of the emergency extension latch and lockout mechanism consists of disconnecting and removing the various mechanism components until the mechanism is completely removed. The following procedures are written assuming the complete mechanism is to be removed. However, all steps do not necessarily need to be accomplished if only a portion of the mechanism requires removal. The complete procedure should be read with only those steps required for partial removal and installation performed.

2. Equipment and Materials

- A. Grease - MIL-G-21164A
- B. Corrosion-Preventive Compound - MIL-C-11796, Class 3

3. Prepare for Removal

- A. Open aft airstair circuit breakers (2 places) on P6 panel.
- B. Extend aft airstair using emergency mode.

**WARNING:** BEFORE REMOVING MOUNTING BOLTS, AIRSTAIR MUST BE EXTENDED USING THE EMERGENCY MODE TO RELIEVE ALL STORED ENERGY IN THE TORSION BAR.

**CAUTION:** DO NOT EXTEND AIRSTAIR MORE THAN 132 INCHES DURING EMERGENCY OPERATION AS SECONDARY STRUCTURE MAY BE DAMAGED.

- C. Remove aft airstair control console (Ref 52-14-11, Removal/Installation).
- D. Remove center and left bulkhead panels from aft cargo compartment aft bulkhead for access to emergency extension mechanism (Ref Chapter 25, Cargo Compartment Bulkhead Lining).
- E. Remove pneumatic duct adjacent to emergency extension mechanism. Duct joints are located just forward of the aft pressure bulkhead and just forward of the cargo compartment aft bulkhead. Access to the latter joint requires removal of cargo compartment sidewall lining. Refer to Chapter 25, Cargo Compartment Sidewall Lining, for removal of lining.
- F. Remove emergency extension torsion bar (Ref 52-14-31, Removal/Installation).

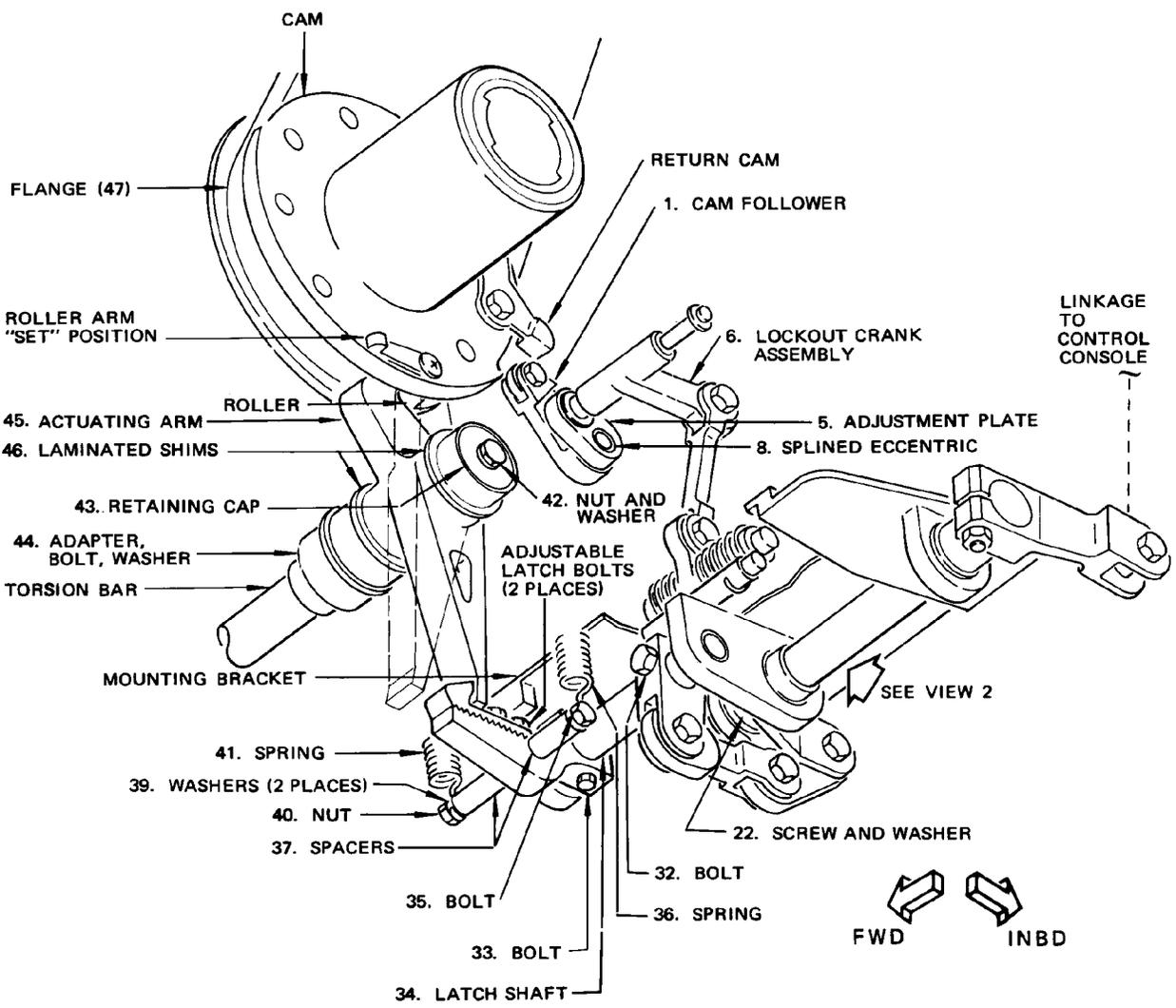
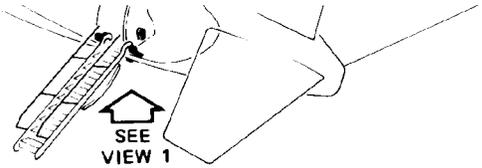
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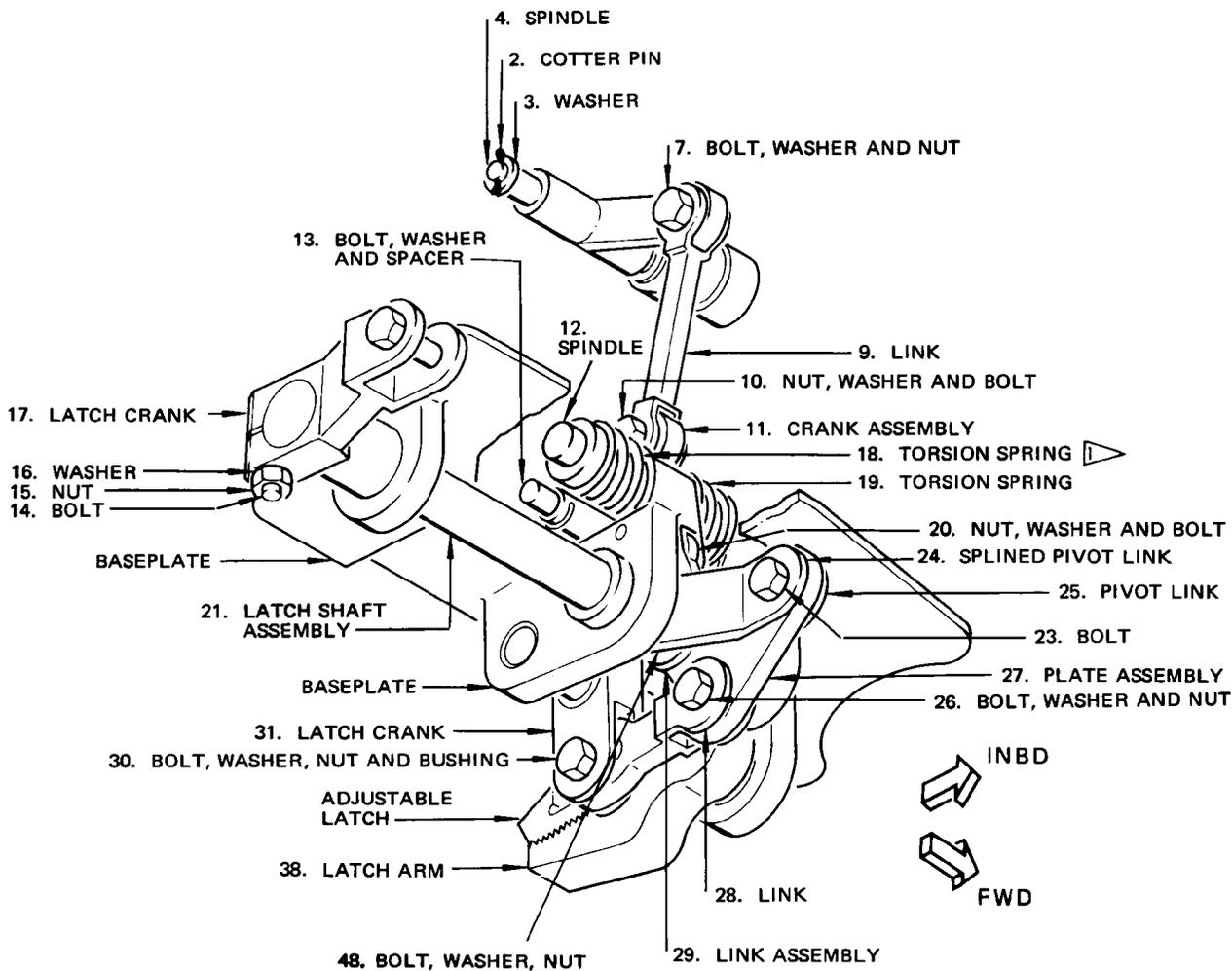
VIEW 1

Aft Airstair Drive Emergency Extension Latch and Lockout Mechanism  
 Figure 401 (Sheet 1)

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VIEW 2

 NOT INSTALLED ON ALL AIRPLANES

Aft Airstair Drive Emergency Extension Latch and Lockout Mechanism  
 Figure 401 (Sheet 2)

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4. Remove Aft Airstair Drive Emergency Extension Latch and Lockout Mechanism

A. Working from underneath mechanism, remove items located beneath baseplate assembly as follows:

- (1) Remove nut and washer (42, Fig. 401), retaining cap (43), adapter bolt, washer and adapter (44). Remove actuating arm (45) and laminated shims (46).
- (2) Disconnect springs (36, 41) from eyebolts on mounting bracket.
- (3) Remove bolts (32 and 33), latch crank (31), latch arm (38), and latch shaft (34).

**NOTE:** Note orientation of crank (31) on shaft (34) before removal. Crank can be installed on shaft two different ways. Correct way position bolt (30) washer, nut, and bushing in outboard end of slot in fork link (28).

- (4) Remove nut (40), washers (39), bolt (35), spring (36, 41) and spacers (37) from latch arm (38).

**CAUTION:** AVOID DAMAGE TO DRY-FILM LUBRICATED SURFACE OF LATCH.

- (5) Remove bolts, washers, and nuts (23, 26 and 30) and remove link (28). Rotate plate assembly for access and remove bolt, washer, and nut (48) attaching link assembly (29) to plate (27) and remove plate (27). Remove pivot link (25).
- (6) Remove nut (15), washer (16) and bolt (14) from latch crank (17) and remove latch crank from latch shaft assembly (21).
- (7) Remove screw and washer (22), latch shaft assembly (21) and splined pivot link (24) from baseplate.

B. Remove baseplate assembly by removing bolts attaching baseplate to housing.

C. Remove remainder of mechanism located inside housing as follows:

- (1) Remove bolt, washer and spacer (13) (located on outside of housing) from spindle (12), and remove spindle. Remove spacer from underneath housing.

**NOTE:** The spindle (12) may be difficult to pull out of bushings in crank assembly (11).

- (2) Working from outside of housing, remove cotter pin (2, figure 401) and washer (3) from spindle (4) and remove spindle by pulling out through opposite side of housing with cam follower (1), adjustment plate (5), and splined eccentric (8) still attached.

**CAUTION:** AVOID DAMAGE TO LINING OF SELF-LUBRICATED BEARING IN CRANK ASSEMBLY (6).

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- (3) Remove linkage consisting of lockout crank assembly (6), link (9), crank assembly (11), torsion springs (18, if installed) and (19), link (29) as a unit by lowering through bottom of housing.
- (4) Check for loose fit bushings on either side of the housing at the two spindle shaft installation positions. If bushings are loose fit, save and identify for installation.

### 5. Install Aft Airstair Drive Emergency Extension Latch and Lockout Mechanism

- A. If used parts are being installed, check for allowable wear (Ref 52-14-21).
- B. Check mechanism housing for loose fit bushings at the two spindle shaft locations. Install bushings as required and maintain in installed position for shaft installations.
- C. Assemble and install linkage consisting of lockout crank assembly (6), link (9), crank assembly (11), torsion springs (18 and 19), and link (29) to allow insertion in housing as a single unit.
  - (1) Assemble lockout crank assembly to link (9) with bolt, nut, and washer (7).
  - (2) Attach link (9) to crank (11) with bolt, nut, and washer (10). Attach link (29) to crank (11) with bolt (20), nut, and washer through bearing and install fasteners with corrosion preventive compound and tighten nut to 50-70 pound-inches.

**CAUTION:** AVOID DAMAGE TO BUSHINGS AND TEFLON SURFACE OF BEARINGS IN CRANK ASSEMBLY.

- (3) Position assembled linkage in housing with lockout crank assembly up and with internally splined shaft on crank aligned with spindle shaft installation holes in housing.
- D. Install spindle (4) through housing and lockout crank assembly splined shaft (6). Secure with washer (3) and cotter pin (2).

**NOTE:** Adjustment plate (5), splined eccentric (8) and cam follower (1) should be installed during adjustment of lockout assembly performed in par. 6.C.

- E. Position crank assembly (11) in housing to align with installation holes for spindle (12) and install spindle (12) through housing and crank.
- F. Position spacer (13) to align with installation holes for bolt (13) in housing, and install bolt (13) with washer through spindle flange, housing and spacer. Hook end of spring(s) over spacer. Install bolt, washer, and spacer with corrosion preventive compound.

**NOTE:** Crank assembly shall rotate freely after bolt is tightened.

- G. Install baseplate assembly.

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- H. Lubricate splined pivot link (24) and latch shaft assembly (21) with grease. Install splined pivot link (24) through bushing in baseplate flange and insert latch shaft assembly (21) through baseplate flanges so that smaller diameter splined end of shaft mates with pivot link splines. Secure shaft to pivot link with screw (22) and washer. Lubricate washer and screw with corrosion preventive compound.
- I. Lubricate splined surfaces of latch crank (17) and latch shaft assembly (21) with grease. Install latch crank on latch shaft with bolt (14), washer (16) and nut (15).

**NOTE:** If crank (17) contacts structure during actuation, index spline on crank may be removed by machining per standard industry practice to permit re-indexing of crank to eliminate contact with structure during actuation.

- J. Install pivot link (25) through baseplate flange. Install so that clevis holes in link (24 and 25) are aligned. Position plate (27) between pivot links and with correct flange oriented in up position, connect plate to clevis of link (29) with bolt, nut, and washer.
- K. Rotate plate (27) to align with flanges on pivot links (24 and 25), and install bolt (23), nut, and washer. Tighten nut to 100-140 pound-inches torque.
- L. Assemble spacers (37), springs (36, 41) on latch arm (38) with bolt (35) and washers (39) on each end of bolt. Install nut (40), but do not tighten.

**CAUTION:** AVOID DAMAGE TO DAY FILM-LUBRICATED SURFACE OF LATCH.

- M. Lubricate splines and bearing surfaces of latch shaft (34) with grease and insert latch shaft (34) through baseplate, latch arm (38) and latch crank (31). Tighten bolt, washer, and nut (33) on latch arm (38) and bolt, washer and nut (32) on latch crank (31). Tighten nut to 50-70 pound-inches torque. Provide only enough end play for free movement.

**CAUTION:** LATCH CRANK (31) CAN BE INSTALLED ON SHAFT (34) TWO DIFFERENT WAYS. CORRECT INSTALLATION OF CRANK (31) POSITIONS BOLT (30), WASHER, NUT, AND BUSHING IN OUTBOARD END OF SLOT IN FORK LINK (28) WHEN LINK (28) IS INSTALLED (STEP P).

- N. Connect springs (36, 41) to eyebolts on mounting bracket.

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## MAINTENANCE MANUAL

- O. Connect plate assembly (27) to link (28) with bolt, washer and nut (26). Tighten nuts to 100-140 pound-inches torque. Install bolts with corrosion preventive compound.

**CAUTION:** AVOID DAMAGE TO TEFLON SURFACES OF BEARINGS IN PLATE AND LINK ASSEMBLIES.

- P. Lubricate splines of latch crank (31) with grease and assemble latch crank and link (28) with bolt, bushing, washer, and nut (30).
- Q. Lubricate splined surfaces on actuating arm (45) and both splined and bearing surfaces on adapter (44) with grease.
- R. Install actuating arm (45), laminated shims (46) and adapter (44) on mounting bracket with adapter bolt, retaining cap (43), washer and nut (42).

**NOTE:** Shims should be installed so that the forward face of the upper portion of actuation arm is 0.05 +0.02/-0.00 inch from aft surface of forward flange on airstair hinge.

### 6. Restore Airplane to Normal

- A. Install emergency extension torsion bar (Ref 52-14-31, Removal/Installation). Do not attempt to arm emergency extension system.
- B. Install aft airstair control console (Ref 52-14-11, Removal/Installation). Do not attempt to arm emergency extension system.
- C. Adjust torsion bar latch assembly and lockout assembly and test emergency extension mechanism (Ref Aft Airstair Emergency Extension Mechanism - Adjustment/Test).
- D. Install pneumatic ducting.
- E. Install cargo compartment sidewall lining and bulkhead panels (Ref Chapter 25, Cargo Compartment Sidewall Lining and Cargo Compartment Bulkhead Lining).

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AFT AIRSTAIR EMERGENCY EXTENSION MECHANISM – ADJUSTMENT/TEST

1. General

- A. The aft airstair emergency extension mechanism may occasionally require adjustment. Adjustments are made to the cam follower assembly of the lockout components and the adjustable latch of the torsion bar and latch assembly. Excessive pressure required to move the console handle to the emergency position or oscillation of the door when in the retracted position may be an indication of the need for adjustment of the torsion bar latch. The torsion bar and latch assembly are locked in place when the airstair is operated normally. Failure of the torsion bar and latch assembly to be locked may be an indication of the need for adjustment of the cam follower and lockout assembly. (See figure 501.) The emergency extension mechanism will also require adjustment whenever the airstair is replaced.
- B. Operating the emergency extension mechanism releases the torsion bar latch. The torsion bar then drives the aft airstair and door outward and allows the airstair to free fall until the airstair begins to unfold. Manual assistance is required to lift the lower airstair segment outward; then the airstair will extend completely. The emergency extension mechanism must be armed after each emergency extension.

2. Emergency Extension Mechanism Adjustment

A. Torsion Bar Latch Assembly Adjustment

- (1) Prepare for Adjustment
    - (a) Extend airstair.
    - (b) Rotate the roller arm (14) to the SET position as engraved on the roller. (See figure 501.)

NOTE: Pull out on spring behind roller arm to release tension.

    - (c) Retract airstair and place console handle in latched position.
    - (d) Remove left panel from aft bulkhead of aft cargo compartment for access.
  - (2) Adjust Torsion Bar Latch Assembly
    - (a) Adjust the adjustable latch (10) to obtain 0.020 to 0.040 inch between the latch face and the actuating arm (11).
    - (b) Extend airstair in normal mode.
    - (c) Retract airstair and place console handle in latched position.
    - (d) Check measurements made in step 2(a) and readjust if necessary.
    - (e) Manually or electrically extend airstair.
    - (f) Rotate roller arm (14) to the NORM position as shown on roller arm.
    - (g) Retract airstair.
- B. Lockout Assembly Adjustment
- (1) Equipment and Materials
    - (a) Rigging Pin, 3/16 inch diameter, 3-1/2 inches long

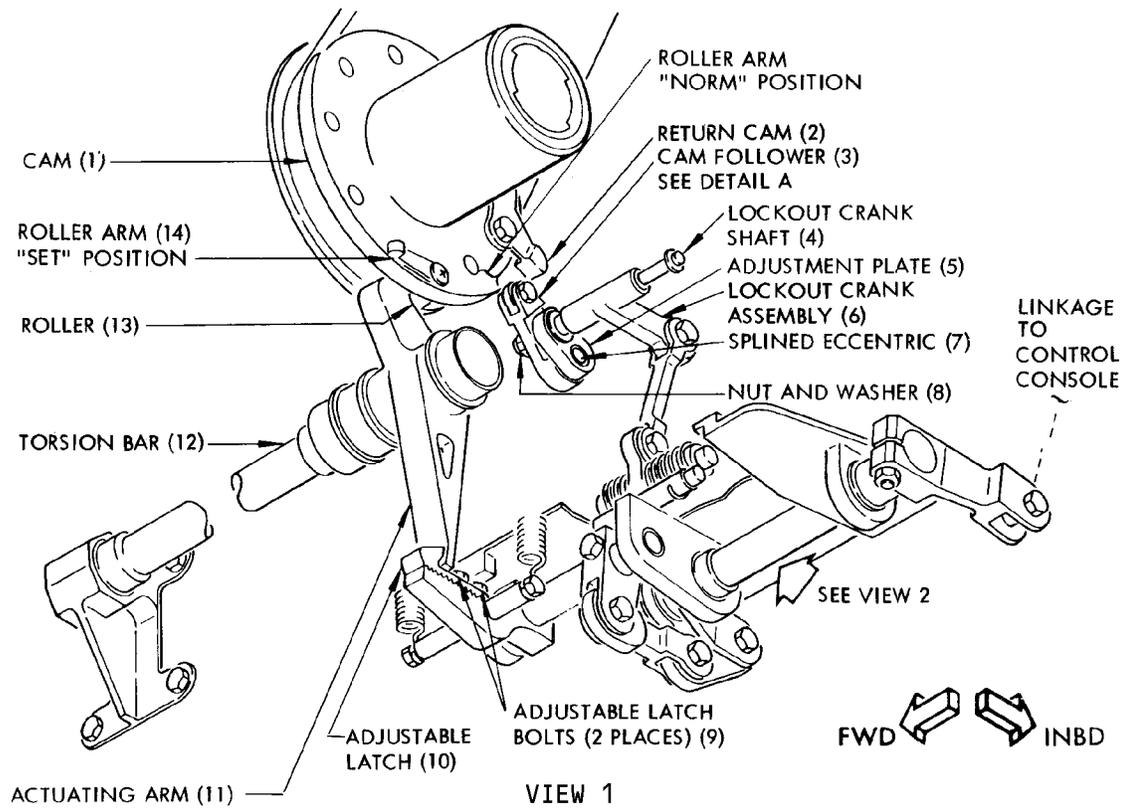
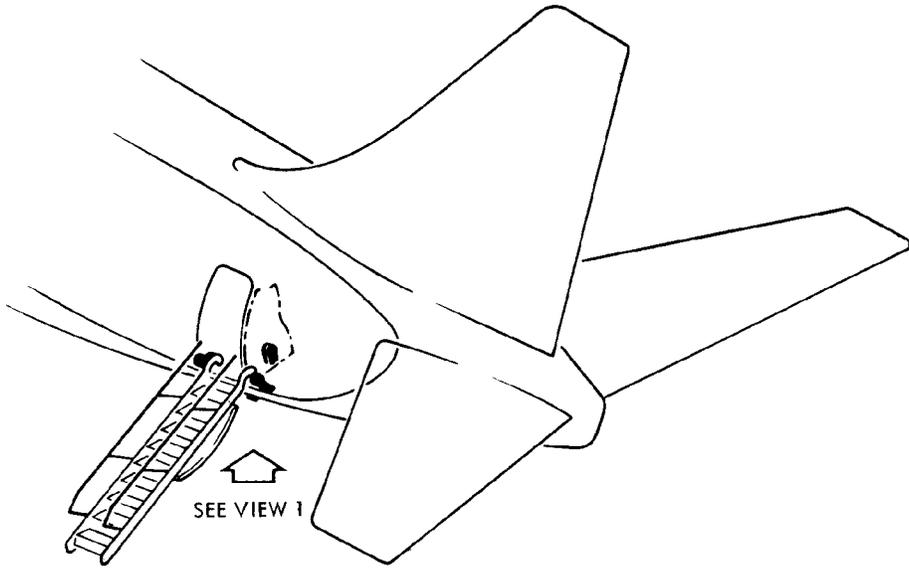
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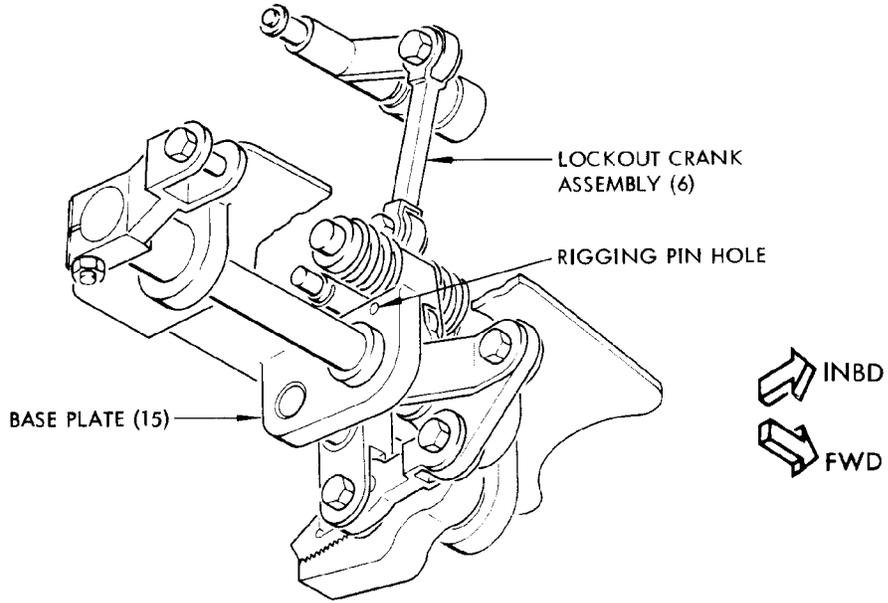
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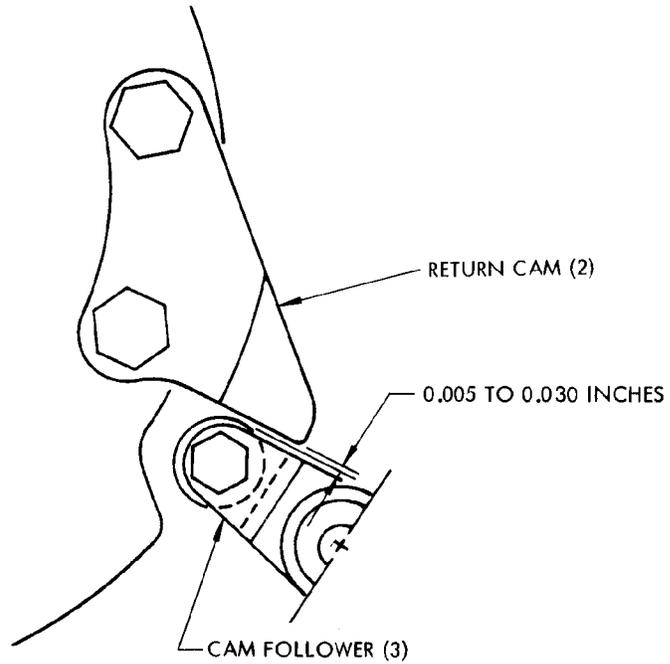
Emergency Extension Mechanism Adjustment  
 Figure 501 (Sheet 1)

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VIEW 2



DETAIL A

Emergency Extension Mechanism Adjustment  
 Figure 501 (Sheet 2)

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- (2) Adjust Lockout Assembly
  - (a) Retract and latch airstair.
  - (b) Insert rigging pin in baseplate (15). (See view 2, figure 501.)

**NOTE:** Lockout assembly should be pivoted outboard. Rigging pin prevents accidental pivoting of assembly inboard.

- (c) Remove nut and washer (8) on end of lockout crank shaft (4).
- (d) Remove cam follower (3).
- (e) Remove splined eccentric (7) and place cam follower (3) back on eccentric (7).
- (f) Place splined eccentric (7) and cam follower (3) against adjustment plate (5) and end of lockout crank shaft (4). Rotate the splined eccentric until 0.005 to 0.030 gap is obtained between the cam follower and the return cam. (See detail A, figure 501.) Press eccentric into splined adjustment plate and push cam follower onto lockout crank shaft.
- (g) Replace washer and nut.
- (h) Torque nut 50 to 70 inch-pounds.
- (i) Remove rigging pin.

### 3. Emergency Extension Mechanism Test

#### A. Test Emergency Extension Mechanism

- (1) Arm emergency extension mechanism. Refer to Aft Airstair Emergency Extension Mechanism - Maintenance Practices.
- (2) Attach a spring scale to the stair approximately 60 inches above the stair hinge line.
- (3) Move control handle to emergency extend position and check that the force required to restrain the door from opening exceeds 50 pounds.
- (4) Complete emergency extension and move control handle to unlatched position.
- (5) Move control handle to emergency extend position and check that adjustable latch (10) does not move and readjust if required.
- (6) Rearm the emergency extension mechanism.
- (7) Fully extend airstair using normal operation.
- (8) Move control handle to emergency position. Adjustable latch (10) should not move to release torsion bar.

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### AFT AIRSTAIR DRIVE EMERGENCY EXTENSION LATCH AND LOCKOUT MECHANISM - INSPECTION/CHECK

1. General
  - A. The data consists of illustrations and wear limits charts. No procedure is given in this section for gaining access to permit inspection. For this information, refer to Aft Airstair Drive Emergency Extension Latch and Lockout Mechanism - Removal/Installation.
2. Aft Airstair Drive Emergency Extension Latch and Lockout Mechanism - Wear Limits

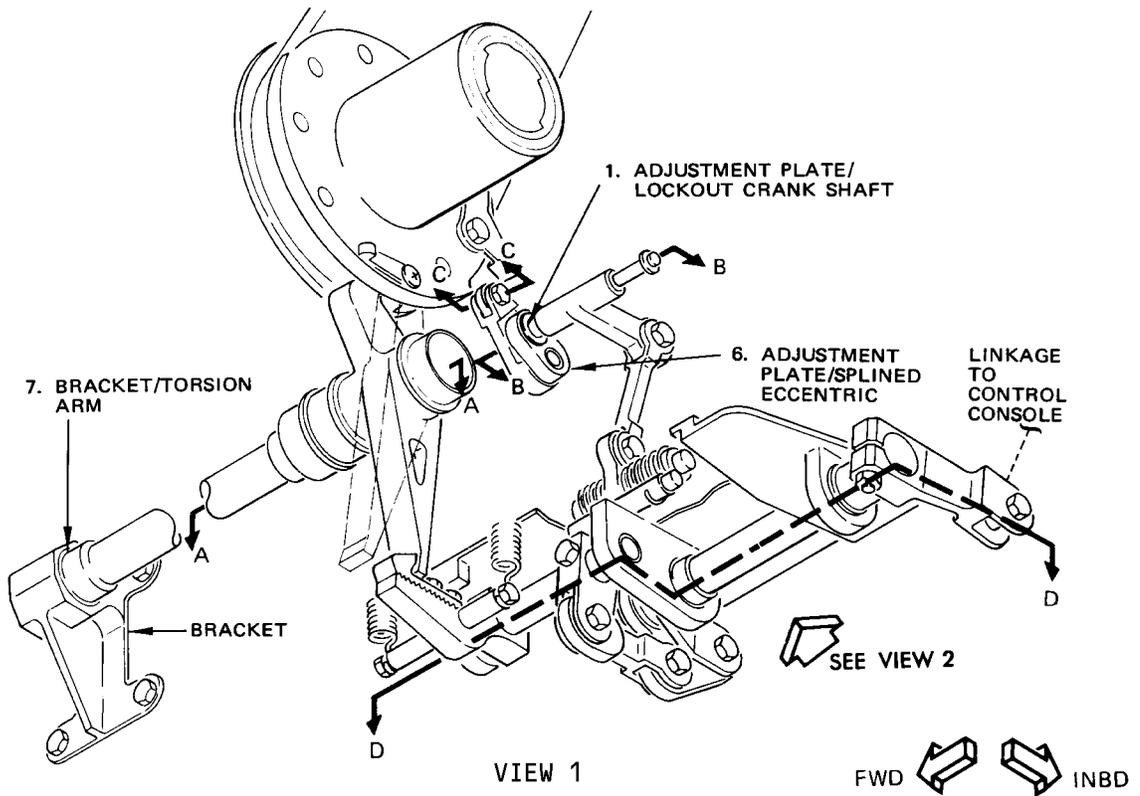
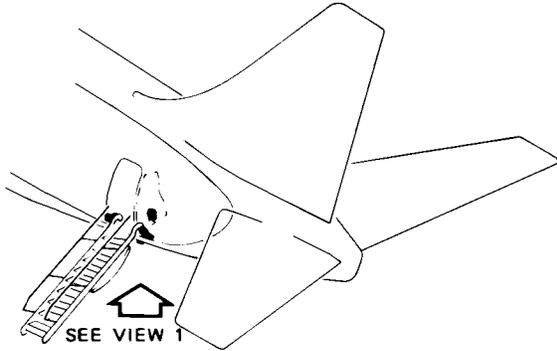
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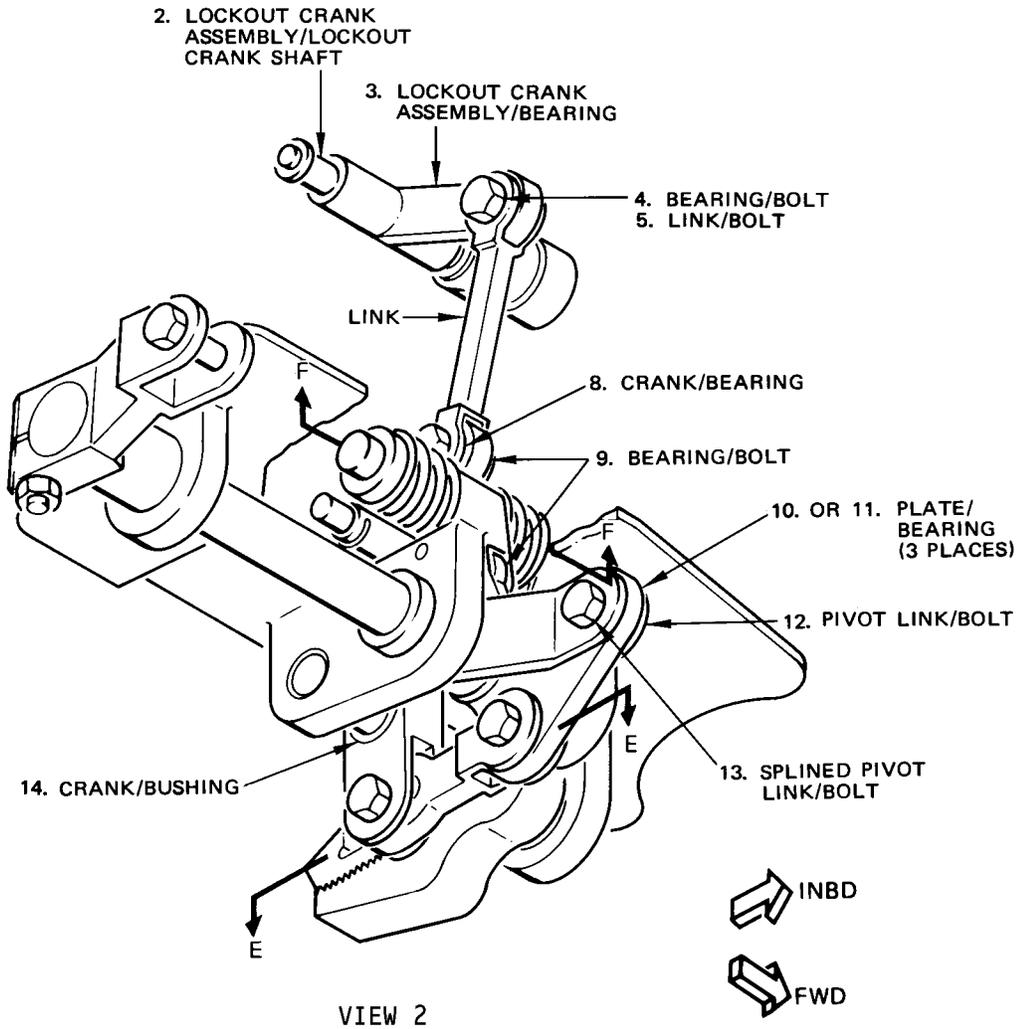
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Emergency Extension Mechanism Wear Limits  
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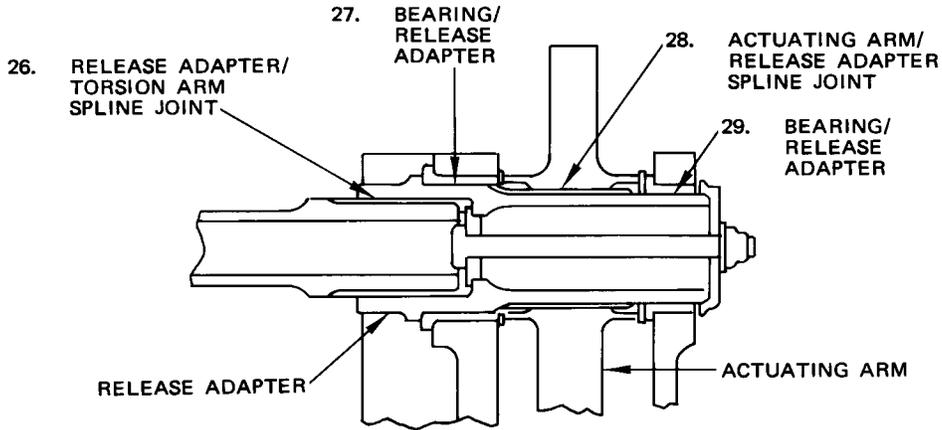
Emergency Extension Mechanism Wear Limits  
 Figure 601 (Sheet 2)

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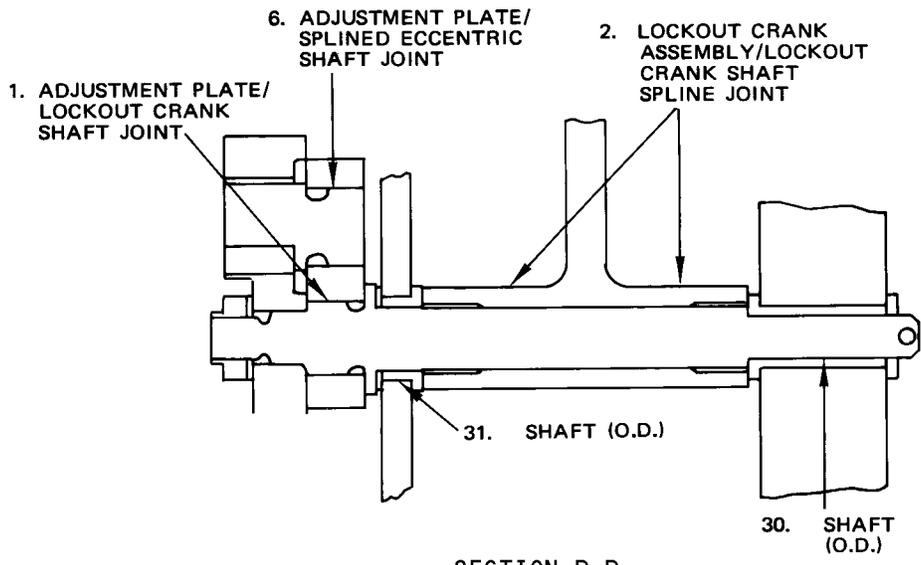
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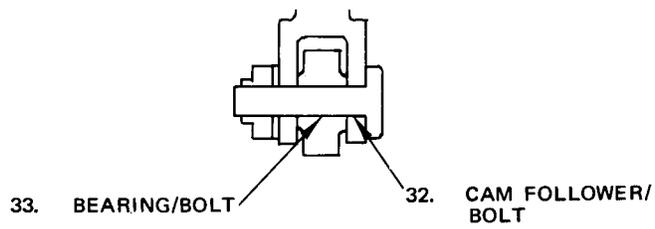
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SECTION A-A



SECTION B-B



SECTION C-C

Emergency Extension Mechanism Wear Limits  
 Figure 601 (Sheet 3)

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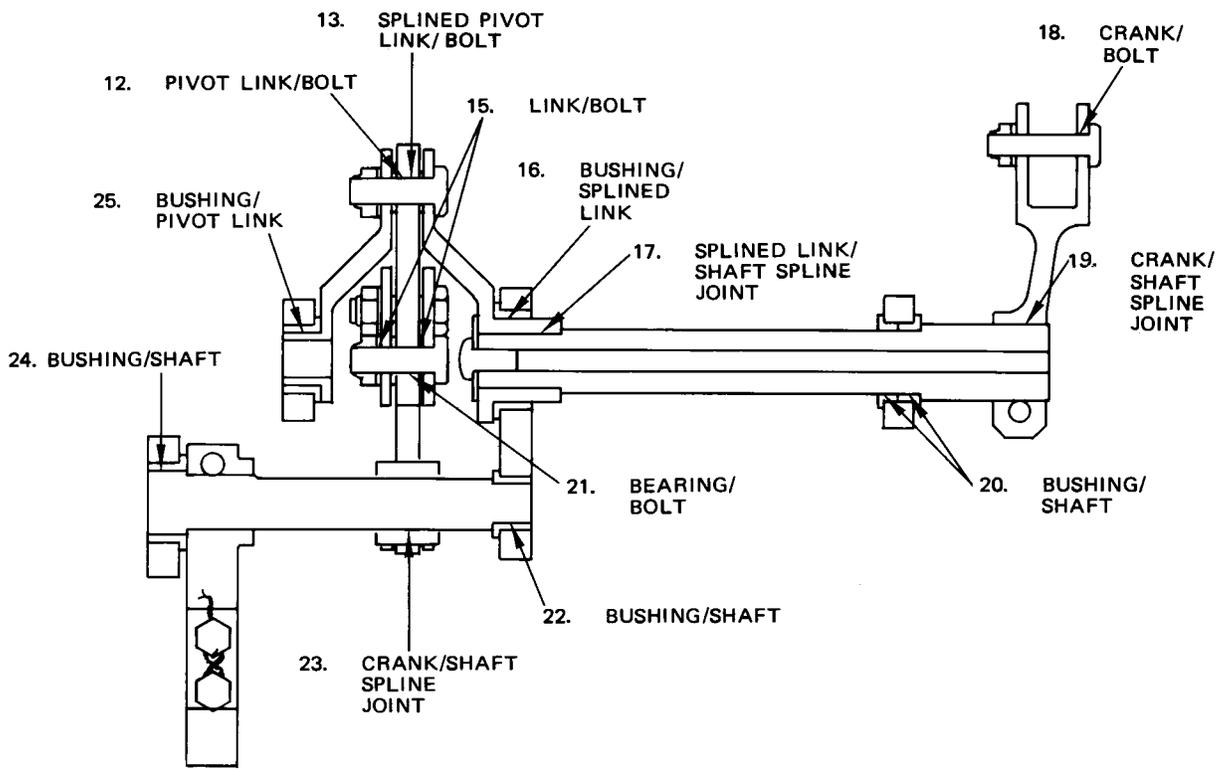
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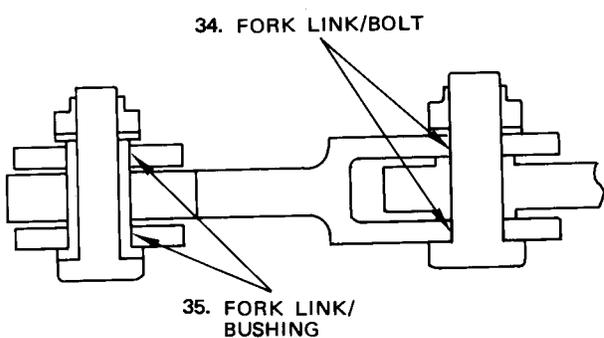
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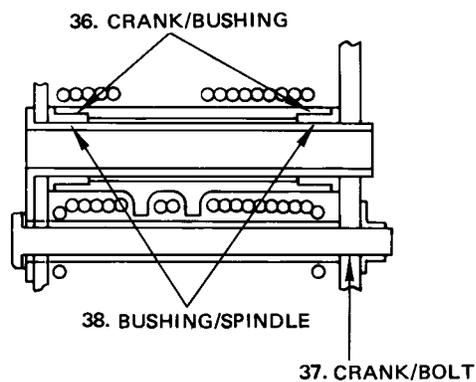
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SECTION D-D



SECTION E-E



SECTION F-F

Emergency Extension 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		MAX WEAR DIM.	MAX DIAM CLEAR-ANCE			
			MIN	MAX					
1	ADJUSTMENT PLATE		SPLINE				BACK-LASH	X	
	LOCKOUT CRANK SHAFT		SPLINE				3/4°	X	
2	LOCKOUT CRANK ASSEMBLY		SPLINE				BACK-LASH	X	
	LOCKOUT CRANK SHAFT		SPLINE				1/2°	X	
3	LOCKOUT CRANK ASSEMBLY	ID	0.6597	0.6607	0.6607	0.0052	X		
	BEARING 	OD	0.6555	0.6560	0.6555		X		
4	BEARING	ID	0.2495	0.2500	0.2500	0.0019	X		
	BOLT	OD	0.2485	0.2495	0.2481		X		
5	LINK	ID	0.2495	0.2505	0.2505	0.0024	X		
	BOLT	OD	0.2485	0.2495	0.2481		X		
6	ADJUSTMENT PLATE		SPLINE				BACK-LASH	X	
	SPLINED ECCENTRIC		SPLINE				3/4°	X	
7	BRACKET		SPLINE				BACK-LASH	X	
	TORSION ARM		SPLINE				3/4°	X	
8	CRANK	ID	0.6597	0.6607	0.6607	0.0050	X		
	BEARING	OD	0.6557	0.6562	0.6557		X		

Emergency Extension Mechanism 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		MAX WEAR DIM.	MAX DIAM CLEAR-ANCE			
			MIN	MAX					
9	BEARING 	ID	0.2495	0.2500	0.2500	0.0019	X		
	BOLT	OD	0.2485	0.2495	0.2481		X		
10	PLATE	ID	0.7485	0.7495	0.7495	0	X		
	BEARING 	OD	0.7495	0.7500	0.7495		X		
11	PLATE	ID	0.7535	0.7545	0.7545	0.0050	X		
	BEARING 	OD	0.7495	0.7500	0.7495		X		
12	PIVOT LINK	ID	0.3120	0.3130	0.3130	0.0024		X	
	BOLT	OD	0.3110	0.3120	0.3106		X		
13	SPLINED PIVOT LINK	ID	0.3120	0.3130	0.3130	0.0024		X	
	BOLT	OD	0.3110	0.3120	0.3106		X		
14	CRANK	ID	0.3748	0.3754	0.3754	0.0002			
	BUSHING	OD	0.3756	0.3761	0.3756		X		
15	LINK	ID	0.3120	0.3130	0.3130	0.0024	X		
	BOLT	OD	0.3110	0.3120	0.3106		X		
16	BUSHING	ID	1.003	1.005	1.0080	0.010	X		
	SPLINED LINK	OD	0.9980	0.9990	0.9980		X		

Emergency Extension Mechanism Wear Limit  
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		MAX WEAR DIM.	MAX DIAM CLEAR-ANCE			
			MIN	MAX					
17	SPLINED LINK		SPLINE			BACK-LASH 3/4°	X		
	SHAFT		SPLINE				X		
18	CRANK	ID	0.2495	0.2505	0.2505	0.0024	X		
	BOLT	OD	0.2485	0.2495	0.2481		X		
19	CRANK	ID	SPLINE			BACK-LASH 3/4°	X		
	SHAFT	OD	SPLINE				X		
20	BUSHING	ID	0.7530	0.7550	0.7550	0.0080	X		
	SHAFT	OD	0.7480	0.7490	0.7470		X		
21	BEARING 	ID	0.3120	0.3125	0.3125	0.0019	X		
	BOLT	OD	0.3110	0.3120	0.3106		X		
22	BUSHING	ID	0.5030	0.5050	0.5050	0.0070	X		
	SHAFT	OD	0.4985	0.4995	0.4980		X		
23	CRANK	ID	SPLINE			BACK-LASH 3/4°	X		
	SHAFT	OD	SPLINE				X		
24	BUSHING	ID	0.7530	0.7550	0.7550	0.0075	X		
	SHAFT	OD	0.7480	0.7490	0.7475		X		

Emergency Extension Mechanism Wear Limits  
Figure 601 (Sheet 7)

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**MAINTENANCE MANUAL**

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR.
			DIAMETER		MAX WEAR DIM.	MAX DIAM CLEARANCE			
			MIN	MAX					
25	BUSHING	ID	0.6280	0.6300	0.6300	0.010	X		
	PIVOT LINK	OD	0.6230	0.6240	0.6200		X		
26	RELEASE ADAPTER		SPLINE			BACK-LASH 3/4°	X		
	TORSION ARM		SPLINE				X		
27	BEARING 	ID	1.500	1.501	1.507	0.0036	X		
	RELEASE ADAPTER	OD	1.4975	1.4982	1.4971		X		
28	ACTUATING ARM		SPLINE			BACK-LASH 3/4°	X		
	RELEASE ADAPTER		SPLINE				X		
29	BEARING	ID	1.2490	1.2500	1.2510	0.0049	X		
	RELEASE ADAPTER	OD	1.2465	1.2470	1.2461		X		
30									
	LOCKOUT CRANK SHAFT	OD	0.2485	0.2495	0.2481		X		
31									
	LOCKOUT CRANK SHAFT	OD	0.3735	0.3745	0.3731		X		
32	CAM FOLLOWER	ID	0.1895	0.1905	0.1981	0.010	X		
	BOLT	OD	0.1885	0.1895	0.1881		X		

Emergency Extension Mechanism Wear Limits  
Figure 601 (Sheet 8)

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR.
			DIAMETER		MAX WEAR DIM.	MAX DIAM CLEARANCE			
			MIN	MAX					
33	BEARING 	ID	0.1895	0.1900	0.1900	0.0019	X		
	BOLT	OD	0.1885	0.1895	0.1881		X		
34	FORK LINK	ID	0.3120	0.3130	0.3130	0.0024	X		
	BOLT	OD	0.3110	0.3120	0.3106		X		
35	FORK LINK	ID	0.3850	0.3950	0.4100	0.0040	X		
	BUSHING	OD	0.3756	0.3761	0.3700		X		
36	CRANK	ID	0.6247	0.6254	0.6254	0.0003	X		
	BUSHING	OD	0.6257	0.6265	0.6257		X		
37	CRANK	ID	0.2495	0.2505	0.2505	0.0024	X		
	BOLT	OD	0.2485	0.2495	0.2481		X		
38	BUSHING	ID	0.5000	0.5015	0.5015	0.0030	X		
	SPINDLE	OD	0.4985	0.4995	0.4985		X		

-  MAX ALLOWABLE RADIAL PLAY OF BEARING IS 0.0020 INCH
-  OBTAIN BUSHING BORE HOLE TO ATTAIN 0 TO 0.002 INCH INTERFERENCE FIT (0.433 INCH MAXIMUM) REAM BUSHING TO 0.3120/0.0130-INCH DIAMETER
-  IF BUSHING CAN BE REMOVED FROM CRANK EASILY REPAIR AS FOLLOWS OVERSIZE HOLE TO 0.4954. INSTALL BUSHING WITH 0.0002 TO 0.0013 INTERFERENCE FIT.

Emergency Extension Mechanism Wear Limits  
Figure 601 (Sheet 9)

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EMERGENCY EXTENSION TORSION BAR – REMOVAL/INSTALLATION

1. Prepare for Removal

- A. Open aft airstair circuit breakers (2 places) on P6 panel.
- B. Extend aft airstair using emergency mode.

**WARNING:** BEFORE REMOVING MOUNTING BOLTS, AIRSTAIR MUST BE EXTENDED USING THE EMERGENCY MODE TO RELIEVE ALL STORED ENERGY IN THE TORSION BAR.

- C. Remove section of floor panel inboard of aft airstair door opening.

2. Remove Torsion Bar

- A. If same torsion bar is to be reinstalled, check torsion bar installation for wear prior to removal by checking backlash at splined couplings (Ref 52-14-21, Inspection/Check).
- B. Remove bolts securing forward support bracket for torsion bar (Fig. 401).
- C. Remove aft end of torsion bar from actuating arm support and remove bar from airplane.

3. Install Torsion Bar

- A. Engage torsion bar with actuating arm support (Fig. 401).
- B. Set lower end of actuating arm 4.80 (+0.10/-0.10) inches outboard from latch pivot.
- C. Align forward support bracket to torsion bar and engage bar.
- D. Install support bracket mounting bolts and check that 4.80 dimension is maintained.
- E. Close aft airstair circuit breakers (2 places) on P6 panel.
- F. Arm the emergency extension system (Ref 52-14-21, Emergency Extension Mechanism).
- G. Extend airstair using emergency mode and check that torsion bar rotates airstair to the free fall position.
- H. Rearm the emergency extension system.
- I. Install floor panel.

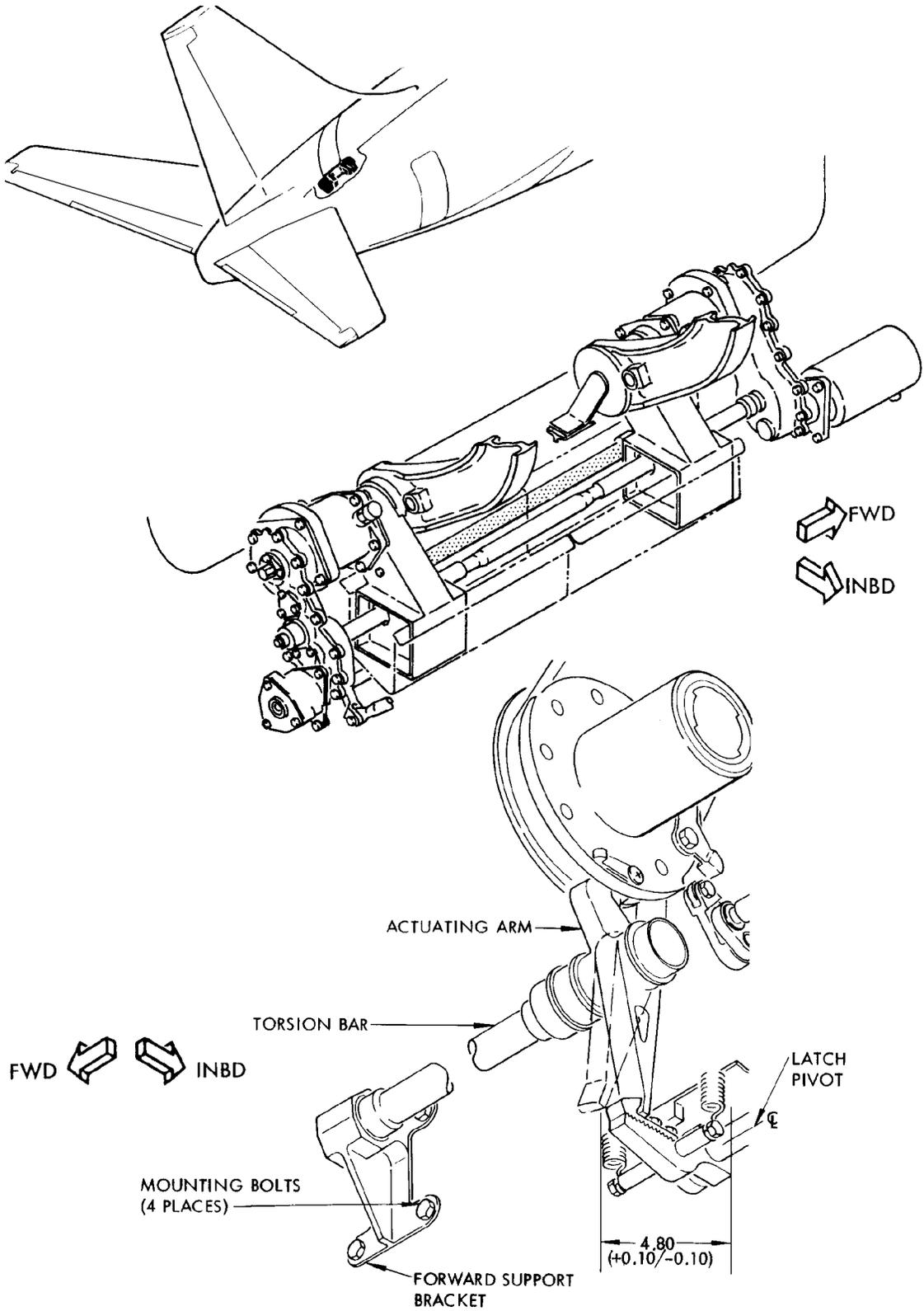
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Emergency Extension Torsion Bar Installation  
 Figure 401

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AFT ENTRY DOOR AND AIRSTAIR TRANSMISSION UNITS – REMOVAL/INSTALLATION

1. General
  - A. The airstair forward and aft transmission unit installations are similar. Therefore, only one procedure is given. Differences in removal and installation between the forward and aft units are given in the procedure.
2. Equipment and Materials
  - A. Grease, MIL-G-23827A
3. Prepare for Removal
  - A. Extend airstair using emergency mode.

**CAUTION:** IF AIRSTAIR IS EXTENDED MORE THAN 132 INCHES DURING EMERGENCY OPERATION, SECONDARY STRUCTURE MAY BE DAMAGED.

- B. Open aft airstair circuit breakers (2 places) on P6 panel.
  - C. If aft transmission unit is being replaced, remove control console shroud.
  - D. Remove cover over transmission unit.
4. Remove Transmission Unit
  - A. Remove retract and/or extend limit switch from forward and/or aft transmission units respectively. Refer to 52-14-81 and/or 52-14-91 for removal and installation procedures.
  - B. Remove bolts attaching gearbox to transmission unit and move gearbox from splined shaft of transmission unit and transfer shaft. (See figure 401.)
  - C. Block airstair hinge to prevent movement while unscrewed from free motion flange. Remove hinge screws and flange and remove wedges between transmission shaft and free motion flange. This step not required for those airplanes without wedges.
  - D. Remove bolts attaching transmission unit to airstair hinge support fitting and withdraw transmission unit from support fitting shaft.
5. Install Transmission Unit
  - A. Position transmission unit on shaft of hinge support fitting and install mounting bolts. (See figure 401.)
  - B. Butter lubricate gearbox transfer shaft spline with grease.

**NOTE:** Do not lubricate splined shaft which mates with transmission unit.

- C. Position gearbox on splined shaft of transmission unit and transfer shaft. Install mounting bolts.
  - D. Install wedges between transmission shaft and free motion flange on those airplanes requiring wedges. Install airstair hinge with screws and flange.
  - E. Install limit switch in transmission unit. Refer to 52-14-81 and/or 52-14-91 for retract and/or extend limit switch removal and installation procedures.

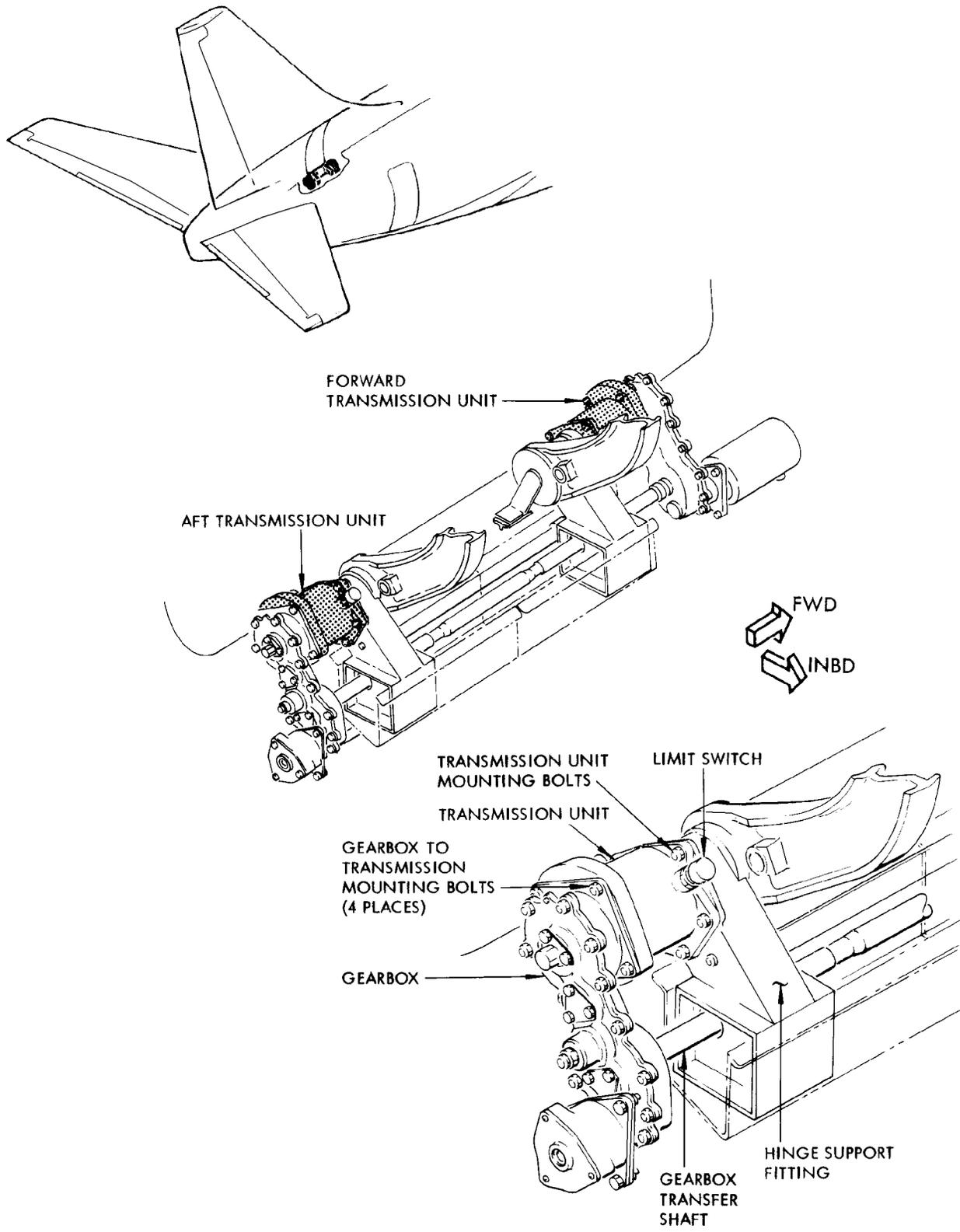
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Aft Airstair Transmission Unit Installation  
 Figure 401

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6. Restore Airplane to Normal
  - A. Install cover over transmission unit.
  - B. If aft transmission unit is being replaced, install control console shroud.
  - C. Close aft airstair circuit breakers (2 places) on P6 panel.
  - D. Cycle airstair and check for smooth operation with no evidence of binding in the transmission unit.
  - E. Rearm emergency extension system. Refer to Emergency Extension Mechanism, 52-14-21.

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AFT ENTRY DOOR AND AIRSTAIR AC POWER UNIT – REMOVAL/INSTALLATION

1. Prepare for Removal
  - A. Open aft airstair circuit breakers (2 places) on P6 panel.
  - B. To gain access to power unit, enter lower cargo compartment and remove fasteners at aft end of upper left access panel and roll back panel. It is not necessary to remove entire panel.
2. Remove AC Power Unit
  - A. Disconnect electrical connector from power unit. (See figure 401.)
  - B. Remove bolts attaching power unit to gearbox and remove power unit.
3. Install AC Power Unit
  - A. Engage spline of power unit with gearbox and install mounting bolts. (See figure 401.)
  - B. Connect electrical connector to power unit.
  - C. Close aft airstair circuit breakers (2 places) on P6 panel.
  - D. Operate airstair using normal mode of operation. Check that 35 to 45 seconds are required for full extension and full retraction.

CAUTION: A 2-1/2 MINUTE COOLING PERIOD SHOULD BE ALLOWED AFTER TWO CONSECUTIVE POWERED OPERATIONS. (A POWERED OPERATION CONSISTS OF EITHER A RETRACTION OR AN EXTENSION.)

- E. Fasten side access panel in aft end of lower cargo compartment.

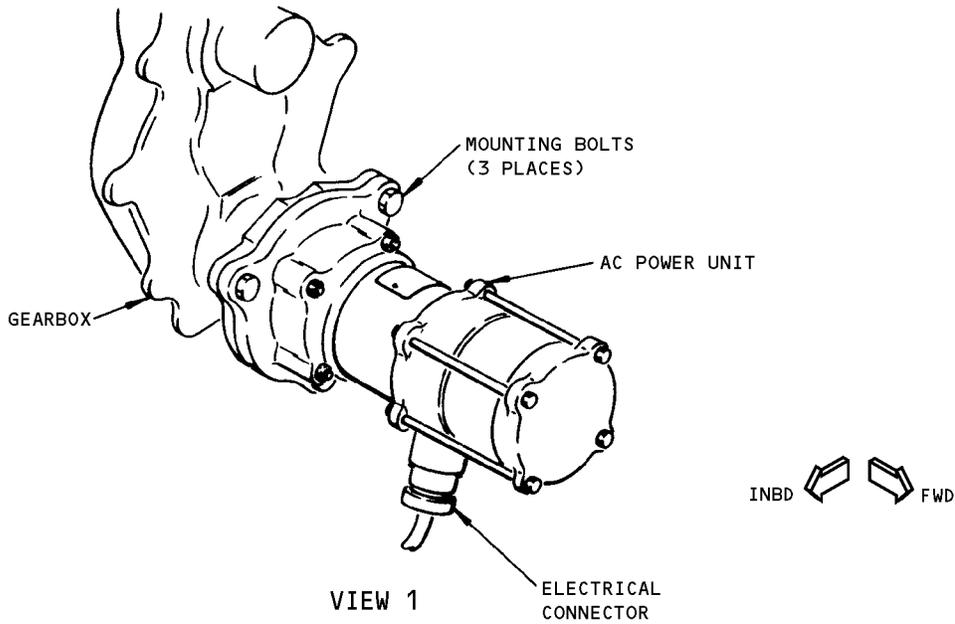
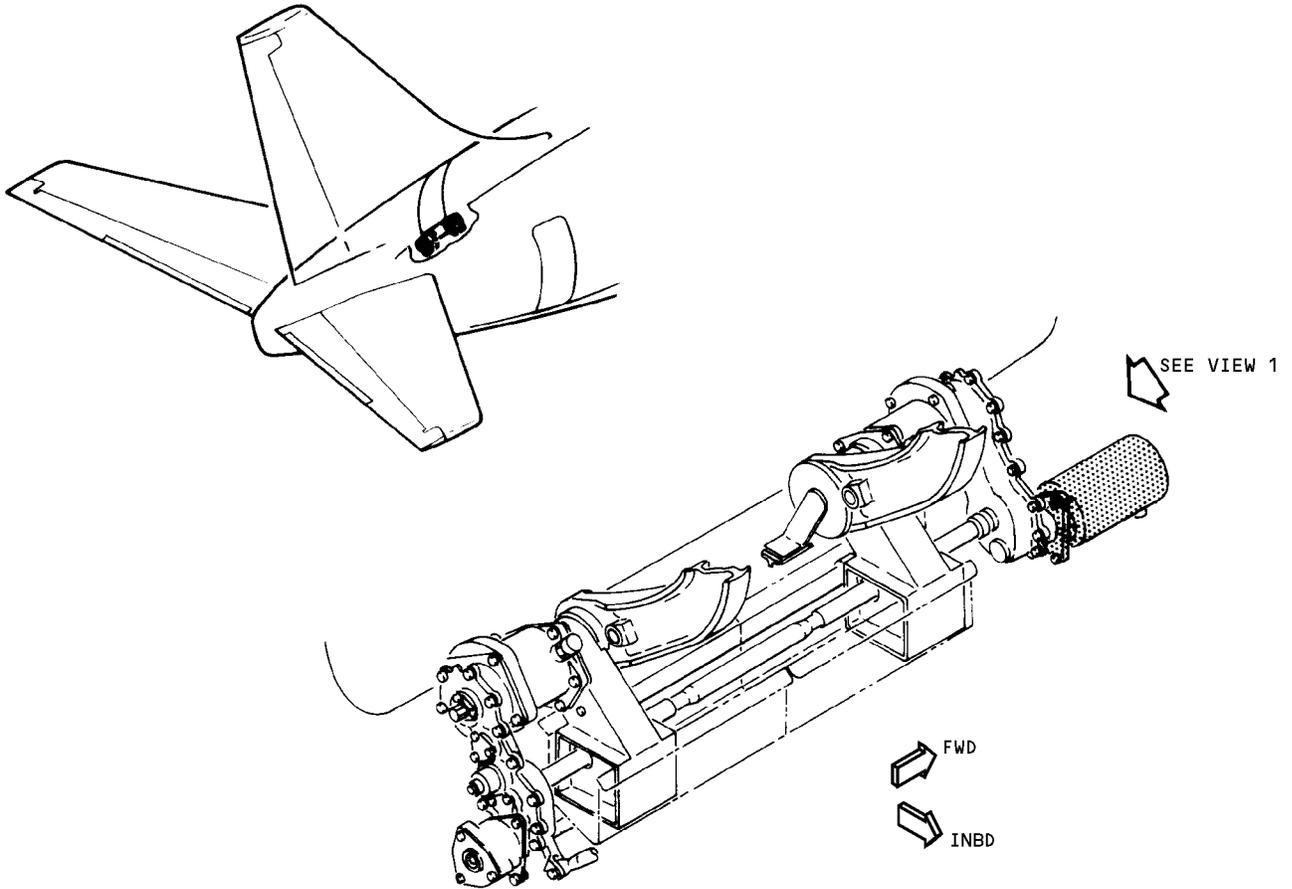
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Aft Airstair AC Power Unit Installation  
 Figure 401

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AFT ENTRY DOOR AND AIRSTAIR CENTRIFUGAL GOVERNOR – REMOVAL/INSTALLATION

1. Prepare for Removal
  - A. Open aft airstair circuit breakers (2 places) on P6 panel.
  - B. To gain access to governor, enter lower cargo compartment and remove access panels at aft end of compartment.
2. Remove Centrifugal Governor
  - A. Remove bolts attaching governor to gearbox. (See figure 401.)
  - B. Disengage governor from gearbox and remove governor.

**CAUTION:** PLACARD AIRSTAIR CONTROLS. DO NOT OPERATE WITHOUT GROUND SUPPORT. CENTRIFUGAL GOVERNOR IS REMOVED.

3. Install Centrifugal Governor
  - A. Align index pin on governor with hole on gearbox mating flange and engage splined shaft with gearbox. (See figure 401.)
  - B. Install governor mounting bolts.
  - C. Close aft airstair circuit breaker s (2 places) on P6 panel.
  - D. Perform the centrifugal governor test. Refer to Aft Entry Door and Airstair Centrifugal Governor – Adjustment/Test.
  - E. Extend airstair using emergency mode and check that airstair extends within 12 seconds.
  - F. Install access panels in lower cargo compartment.
  - G. Rearm emergency extension system. Refer to Emergency Extension Mechanism, 52-14-21.

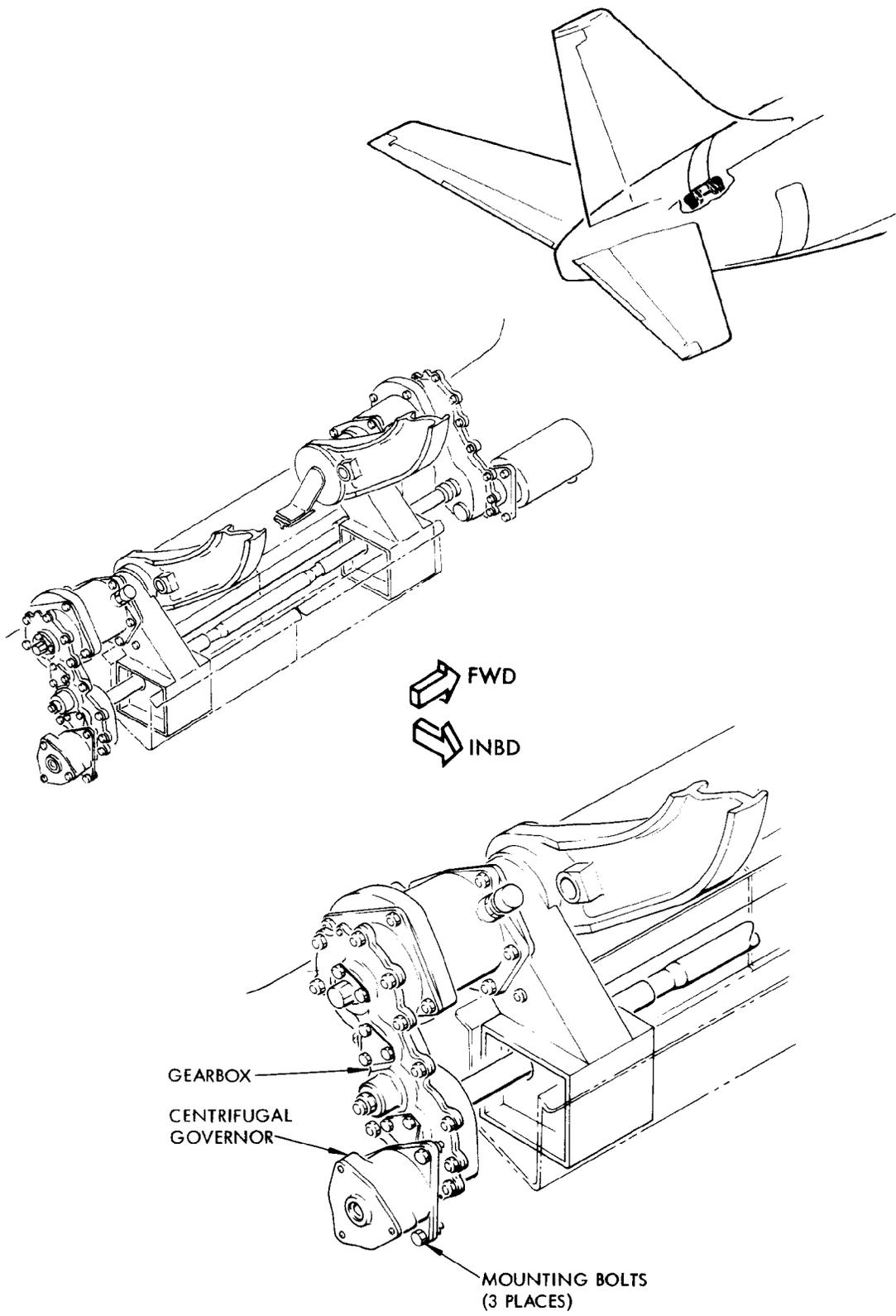
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Aft Airstair Centrifugal Governor Installation  
 Figure 401

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AFT ENTRY DOOR AND AIRSTAIR CENTRIFUGAL GOVERNOR – ADJUSTMENT/TEST

1. Centrifugal Governor Test

A. Prepare for Test

- (1) Airstair should be extended.
- (2) Check that distance between ground line and upper surface of step at aft entry door is 107.7 (+10.0/-10.0) inches.
- (3) Close aft airstair circuit breakers (2 places) on P6 panel.
- (4) Place Console Control handle in UNLATCHED position.

B. Test Centrifugal Governor

- (1) Retract airstair using normal mode until lower end of airstair is 48 to 54 inches above ground level.
- (2) Return switch to neutral and note time required for airstair to free fall back to ground. The time shall not be less than 1 second.
- (3) Retract airstair 72 to 78 inches above ground level. Free fall time shall not be less than 1.5 seconds.

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AFT ENTRY DOOR AND AIRSTAIR GEARBOX – REMOVAL/INSTALLATION

1. General
  - A. The aft entry door and airstair gearbox installations are similar. Therefore, only one procedure is given. Differences in removal and installation between the forward and aft units are given in the procedure.
2. Equipment and Materials
  - A. Grease – MIL –G-21164A
3. Prepare for Removal
  - A. Open aft airstair circuit breaker on P6 panel.
  - B. Extend airstair using emergency mode.
  - C. If aft gearbox is being replaced, remove control console shroud.
  - D. Remove cover over transmission unit.
4. Remove Gearbox
  - A. If forward gearbox is being replaced , remove ac power unit (Ref 52-14-51).
  - B. If aft gearbox is being replaced, remove centrifugal governor (Ref 52-14-61).
  - C. Remove bolts attaching gearbox to transmission unit (Fig. 401).
  - D. Disengage gearbox from splined shaft of transmission unit and from gearbox transfer shaft and remove gearbox.
5. Install Gearbox
  - A. Check for allowable wear at transfer shaft to gearbox coupling (Ref 52-14-71).
  - B. Butter lubricate spline of gearbox transfer shaft with grease. Engage gearbox with splined shaft of transmission unit and with gearbox transfer shaft (Fig. 401).

NOTE: Do not lubricate splined shaft which mates with transmission unit.

  - C. Install bolts attaching gearbox to transmission unit.
  - D. If forward gearbox is being replaced, install ac power unit (Ref 52-14-51, R/I).
  - E. If aft gearbox is being replaced, install centrifugal governor (Ref 52-14-61, R/I).
  - F. Install cover over transmission unit.
  - G. If aft gearbox is being replaced, install control console shroud.
  - H. Arm emergency extension system (Ref 52-14-21).

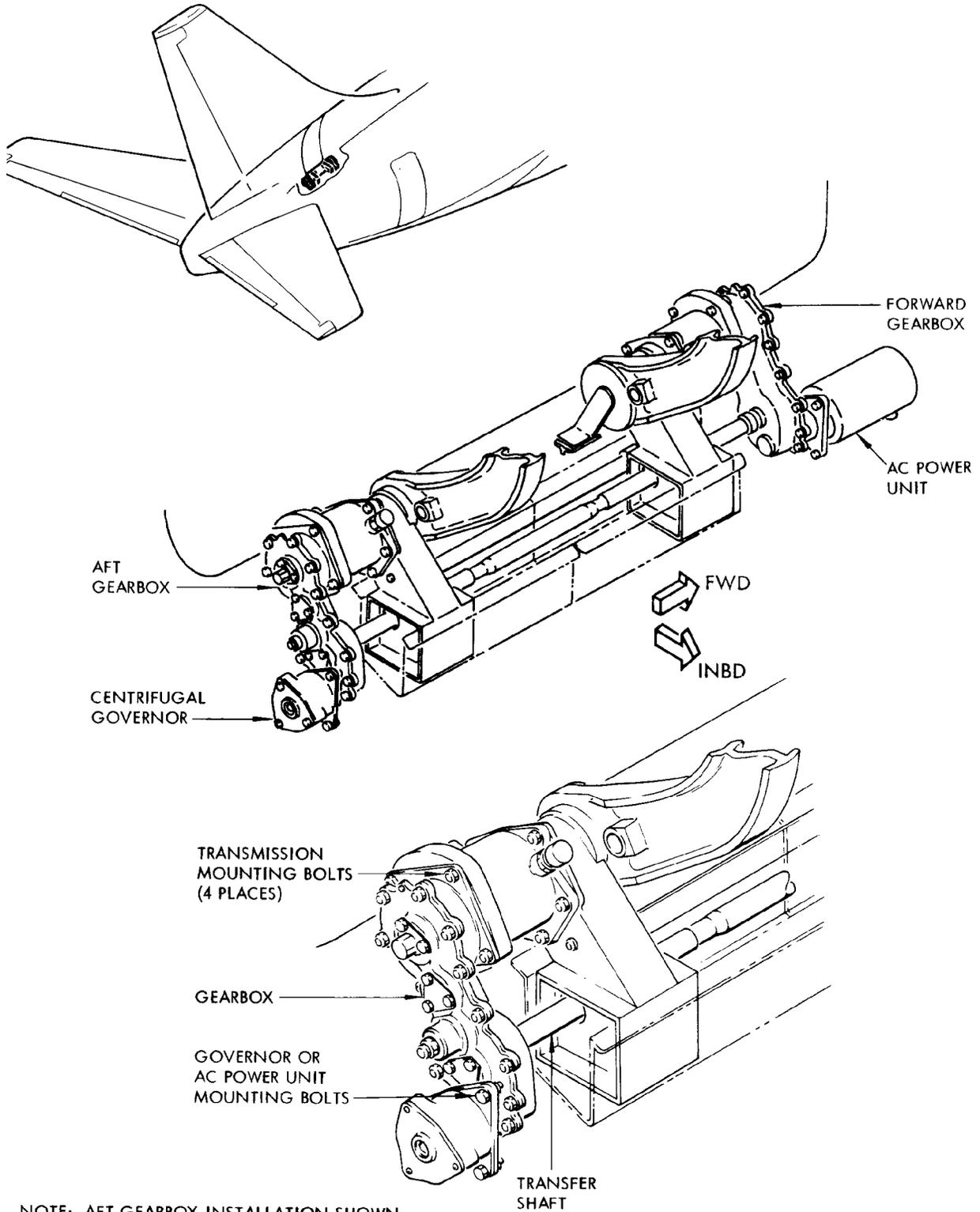
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NOTE: AFT GEARBOX INSTALLATION SHOWN.  
 FORWARD GEARBOX SIMILAR.

Aft Airstair Gearbox Installation  
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AFT ENTRY DOOR AND AIRSTAIR GEARBOX – INSPECTION/CHECK

1. General
  - A. The data consists of illustrations and wear limits charts. No procedure is given in this section for gaining access to permit inspection. For this information, refer to Aft Airstair Drive Emergency Extension Latch and Lockout Mechanism – Removal/Installation.
2. Aft Airstair Gearbox and Transfer Shaft Wear Limits

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INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR.
			DIAMETER		MAX WEAR DIM.	MAX DIAM CLEAR-ANCE			
			MIN	MAX					
1	SPLINED HALF COUPLING	ID	SPLINE	SPLINE		BACKLASH 1 DEGREE	X		
	REDUCTION GEAR	OD	SPLINE				X		
2	SPLINE COUPLING	ID	SPLINE			BACKLASH 3/4 DEGREE	X		
	SPLINED HALF COUPLING	OD	SPLINE				X		

Aft Airstair Gearbox and Transfer Shaft Wear Limits  
 Figure 601

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AFT AIRSTAIR RETRACT LIMIT SWITCH – REMOVAL/INSTALLATION

1. General
  - A. The aft airstair uses limit switches operated by cams in the transmission units. The limit switches determine the cutoff point of the ac power unit when the airstair is extended or retracted. The retract limit switch is on the forward transmission unit. (See figure 401.)
2. Equipment and Materials
  - A. Ohmmeter
3. Remove Retract Limit Switch
  - A. Manually extend aft entry door and airstair and remove limit switch cover on forward transmission unit.
  - B. Disconnect switch wiring at splice.
  - C. Back off locking nuts and unscrew limit switch from transmission unit. (See figure 401.)
4. Install Retract Limit Switch
  - A. Manually retract aft airstair until the upper forward roller of the fuselage door frame is just entering the airstair door cam and the outside of aft door to the fuselage skin measures 1.40 (+0.10/-0.10) inches in line with the roller. (Refer to door alignment detail, figure 401.)
  - B. Screw limit switch into forward transmission unit. (Refer to detail A, figure 401.)
  - C. Attach ohmmeter to wires A-A and A-C and screw in limit switch until continuity is just apparent.
  - D. Tighten locking nuts and install lockwire.
  - E. Connect switch to airplane wiring at splice.
  - F. Test aft entry door and airstair. Refer to 52-14-0 Aft Entry Door and Airstair.
  - G. Install unit switch cover on forward transmission unit.

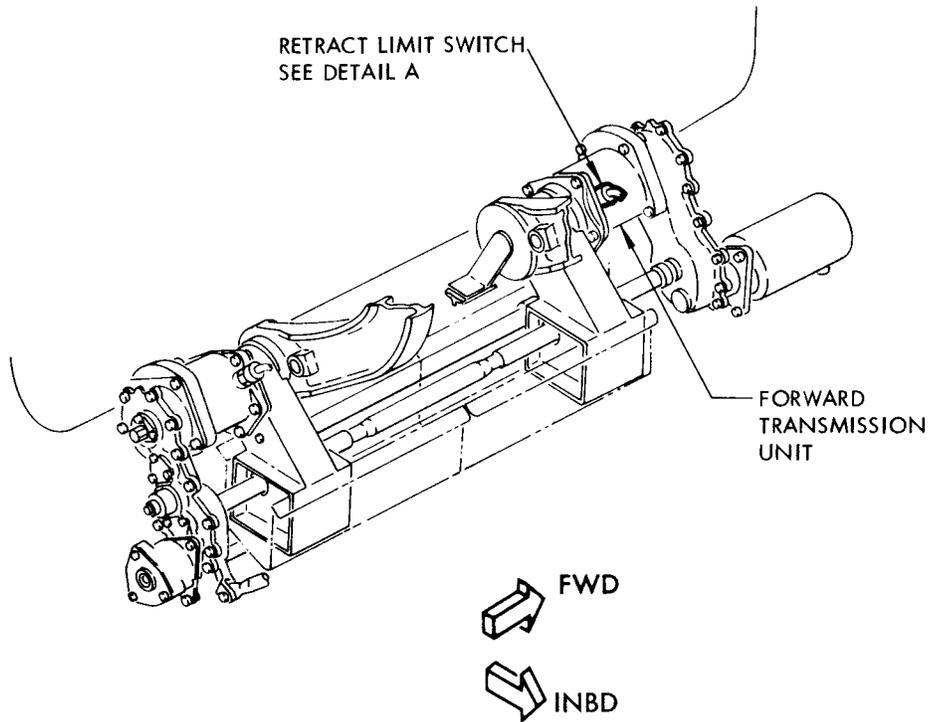
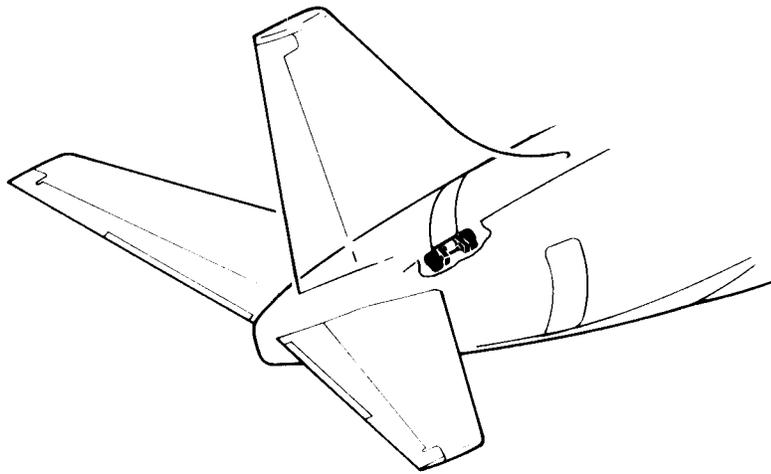
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Retract Limit Switch Installation  
 Figure 401 (Sheet 1)

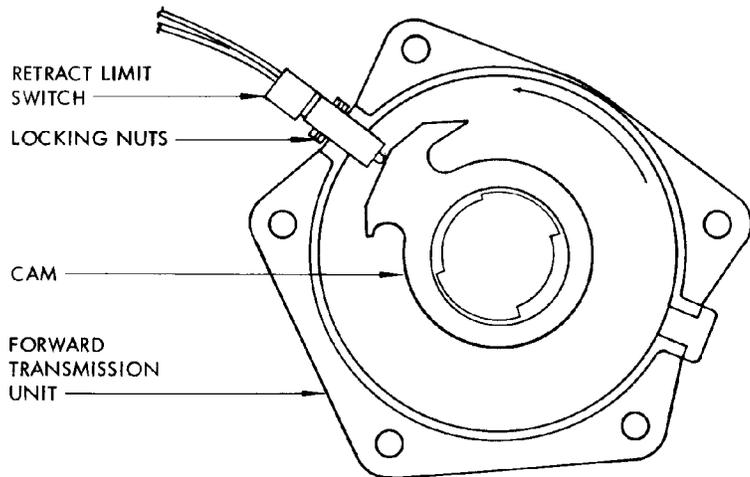
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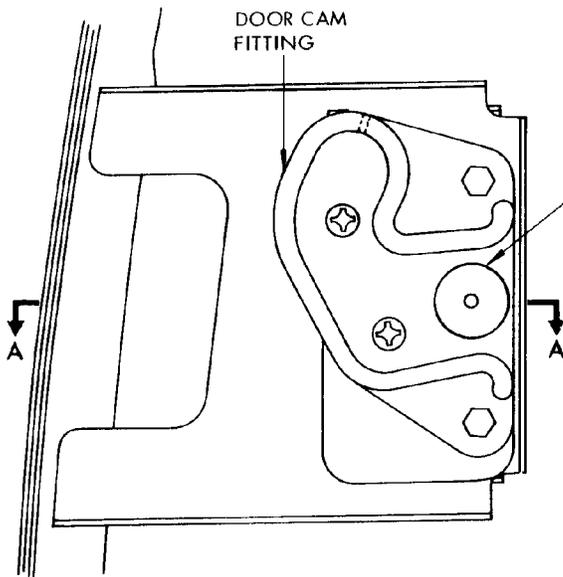
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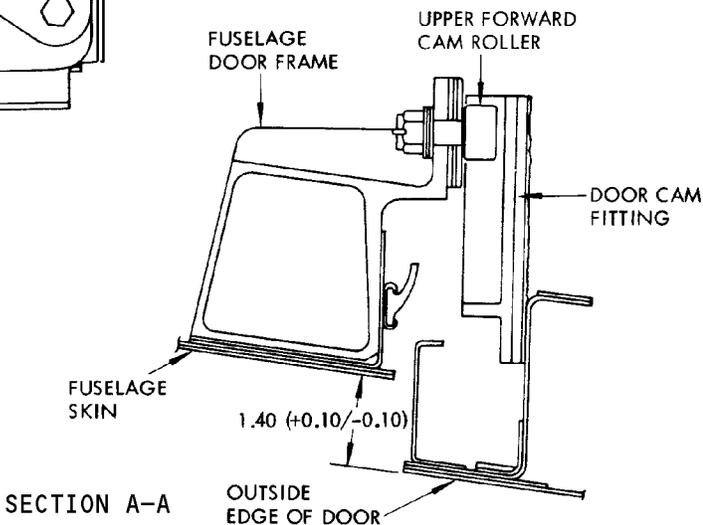
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CROSS SECTION OF CAM AND  
 RETRACT LIMIT SWITCH  
 DETAIL A



DOOR ALIGNMENT DETAIL



SECTION A-A

Retract Limit Switch Installation  
 Figure 401 (Sheet 2)

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AFT AIRSTAIR EXTEND LIMIT SWITCH – REMOVAL/INSTALLATION

1. General
  - A. The aft airstair uses limit switches operated by cams in the transmission units. The limit switches determine the cutoff point of the ac power unit when the airstair is extended or retracted. The extend limit switch is on the aft transmission unit in the door entryway. (See figure 401.)
2. Equipment and Materials
  - A. Airstair support 15.0 (+ 1.0) inches high
  - B. Ohmmeter
  - C. Bubble Protractor
3. Remove Extend Limit Switch
  - A. Manually extend aft entry door and airstair.
  - B. Back off locking nuts and unscrew limit switch from transmission unit. (See figure 401.)

NOTE: Limit switch wiring is spliced into airplane wiring.

4. Install Extend Limit Switch
  - A. Level airplane. See Chapter 8, Leveling and Weighing.
  - B. Manually extend airstairs.
  - C. Raise airstair approximately 60 inches . Place protractor on upper segment, then lower so the upper segment is 21 (+ 1) degrees from horizontal. Hold in this position.
  - D. Insert limit switch in aft transmission unit and screw in until switch just operates. (Refer to detail A, figure 401.)
  - E. Check for continuity across terminals C-N0 and for no continuity across terminals C-NC of switch.
  - F. Tighten locking nuts and install lockwire.
  - G. Connect switch to airplane wiring.
  - H. Test aft entry door and airstair. Refer to 52-14-0, Adjustment/Test.

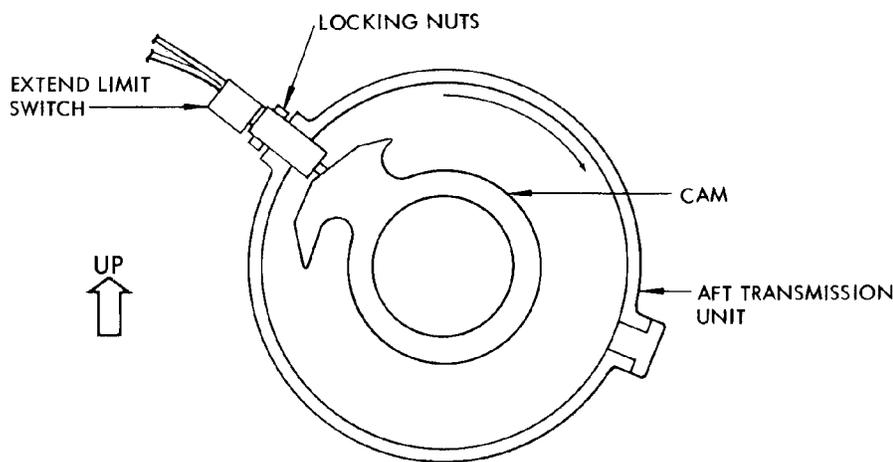
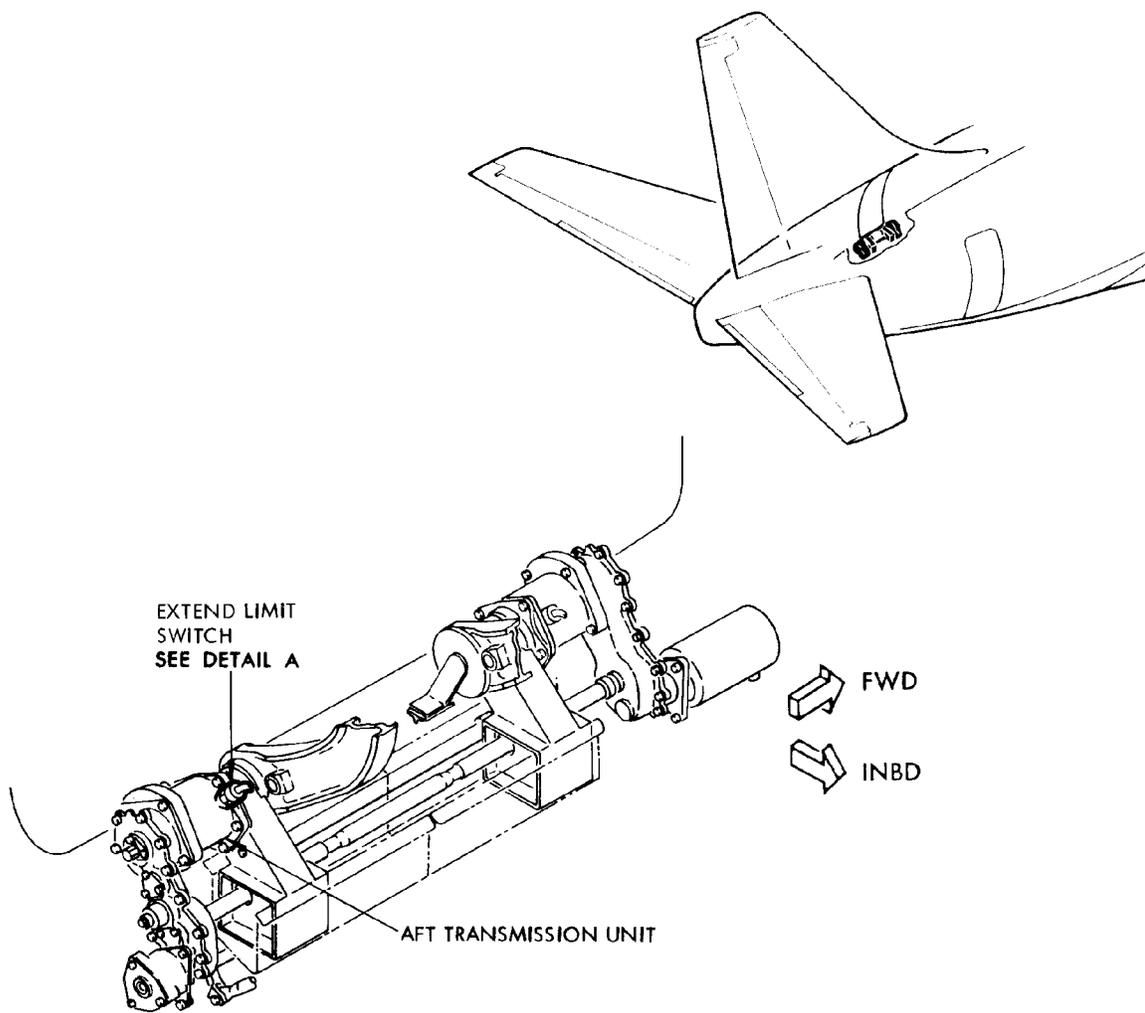
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CROSS SECTION OF CAM AND EXTEND LIMIT SWITCH  
 DETAIL A

Extend Limit Switch Installation  
 Figure 401

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AFT AIRSTAIR FOLDING MECHANISM – ADJUSTMENT/TEST

1. General

A. Adjustment and test of the folding mechanism will normally be required only when a folding mechanism is replaced or repaired. However, the test can also be used to check for suspected faulty operation of folding mechanism.

2. Aft Airstair Folding Mechanism Adjustment

A. General

(1) Except for the programming arm, the aft airstair folding mechanism linkage is identical on both sides of the airstair. All adjustments should be equal on both sides to prevent the airstair from twisting and binding during operation. Only the linkage on the aft side of the airstair is shown.

B. Equipment and Materials

- (1) Two 4-inch "C" clamps
- (2) Two small shims, 0.30 inch thick, 0.8 inch wide, 1.3 inch long
- (3) Spring scale, hand-type, 75 pound- minimum scale
- (4) Two suitable stands for supporting airstair

C. Prepare for Adjustment

- (1) Remove aft entry door. Refer to Aft Entry Door and Airstair – Removal/Installation.
- (2) Remove handrails. Refer to Aft Airstair Handrails – Removal/Installation.
- (3) Disconnect radius rod (l, figure 501) from programming arm.

D. Adjust aft airstair folding mechanism.

- (1) Support airstair assembly in a position that will allow lower and middle segments to be cantilevered off upper segment and middle segment contacts upper segment at point B (Fig. 501). Lower segment should be clamped to middle segment near point A. Support airstair by inserting a bar through torque tube (10) and placing each end on a suitable support.
- (2) If airstair is removed and supported on a work bench, rotate program arm to position cam rollers (12) 0.06 to 1.00 inches from end of cam as shown in Section A-A. Do not support airstair on carriage. Supports for airstair must be clear of door carriage.
- (3) Disconnect forward and aft upper pushrods (4) by removing bolt at lower ends.
- (4) Release clamps and place 0.30 inch shims between middle and lower segments at points A (one each side of airstair) and clamp lower segment tightly to middle segment.
- (5) Extend pushrods (7) until loose play in all joints is snugged up (finger-tight).
- (6) Remove clamps and shims from point A. Load required to close gap at point A shall not exceed 100 pounds at end of lower segment.

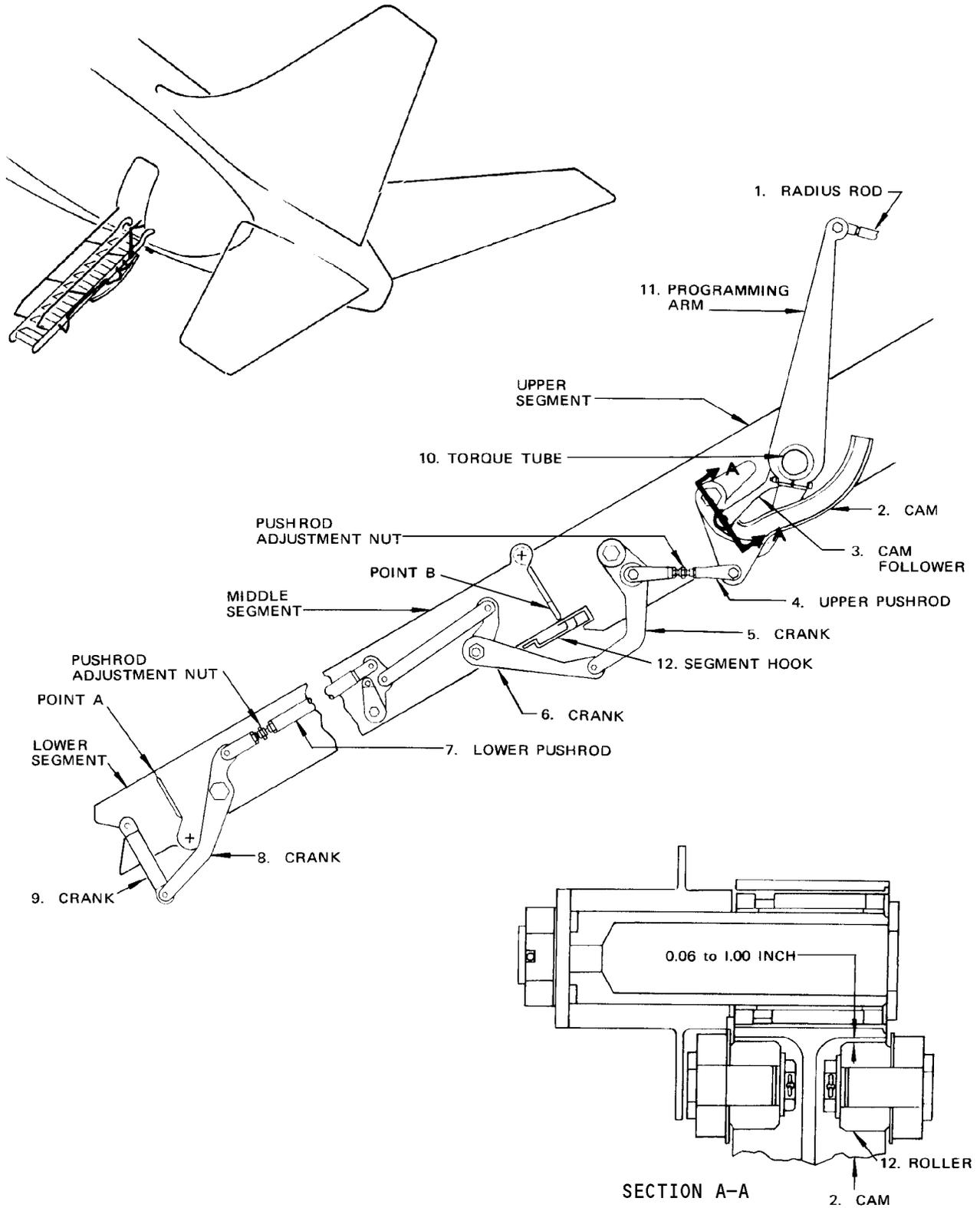
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Aft Airstair Folding Mechanism Adjustment  
 Figure 501

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- (7) Connect pushrods (4) and shorten rods until loose play in all joints is snugged up (finger-tight). Tighten all adjustment nuts 400 to 600 pound-inches.
- (8) Remove support from airstair.
- (9) Connect radius rod (1) to programming arm (11) and manually retract airstair.

**NOTE:** Airstair should be installed on airplane if removed (Ref 52-14-0, Aft Entry Door and Airstair).

- (10) Test aft airstair folding mechanism.

### 3. Aft Airstair Folding Mechanism Test

#### A. Prepare for Test

- (1) Extend airstair fully.
- (2) Remove aft entry door if installed (Ref Aft Entry Door and Airstair - Removal/Installation).
- (3) Remove handrails if installed (Ref Aft Airstair Handrails - Removal/Installation).

#### B. Test Aft Airstair Folding Mechanism

- (1) With a spring scale hooked between lower and middle segments, pull inboard parallel to cabin floor and check that a preload of 15-30 pounds is present on the center segment bumper that rests on the hinge arm of the upper ladder (Fig. 502).

**NOTE:** If 15-30 pound preload is not correct, extend airstair and readjust each upper pushrod (4) equally one-half turn until preload is correct. Do not shorten rod more than two turns from initial adjustment.

- (2) With spring scale hooked to end of lower segment, pull inboard parallel to cabin floor and check for a preload of 10-60 pounds on lower segment bumper (Fig. 502).

**NOTE:** Do not lengthen the lower pushrod (7) when adjusting preload. The lower preload limit can be adjusted by adding washers under the lower segment bumper. They are not to exceed 0.50 inch total thickness.

- (3) Extend airstair, tighten and lockwire pushrod (7) adjustment nuts, except do not lockwire pushrod (4) until after step (6).
- (4) Retract airstair slowly using manual mode. Check that folding mechanism operates freely with no evidence of binding or twisting of the airstair assembly.
- (5) With spring scale, check preload of center stair segment bumper is 15-30 pounds as checked in step (1).

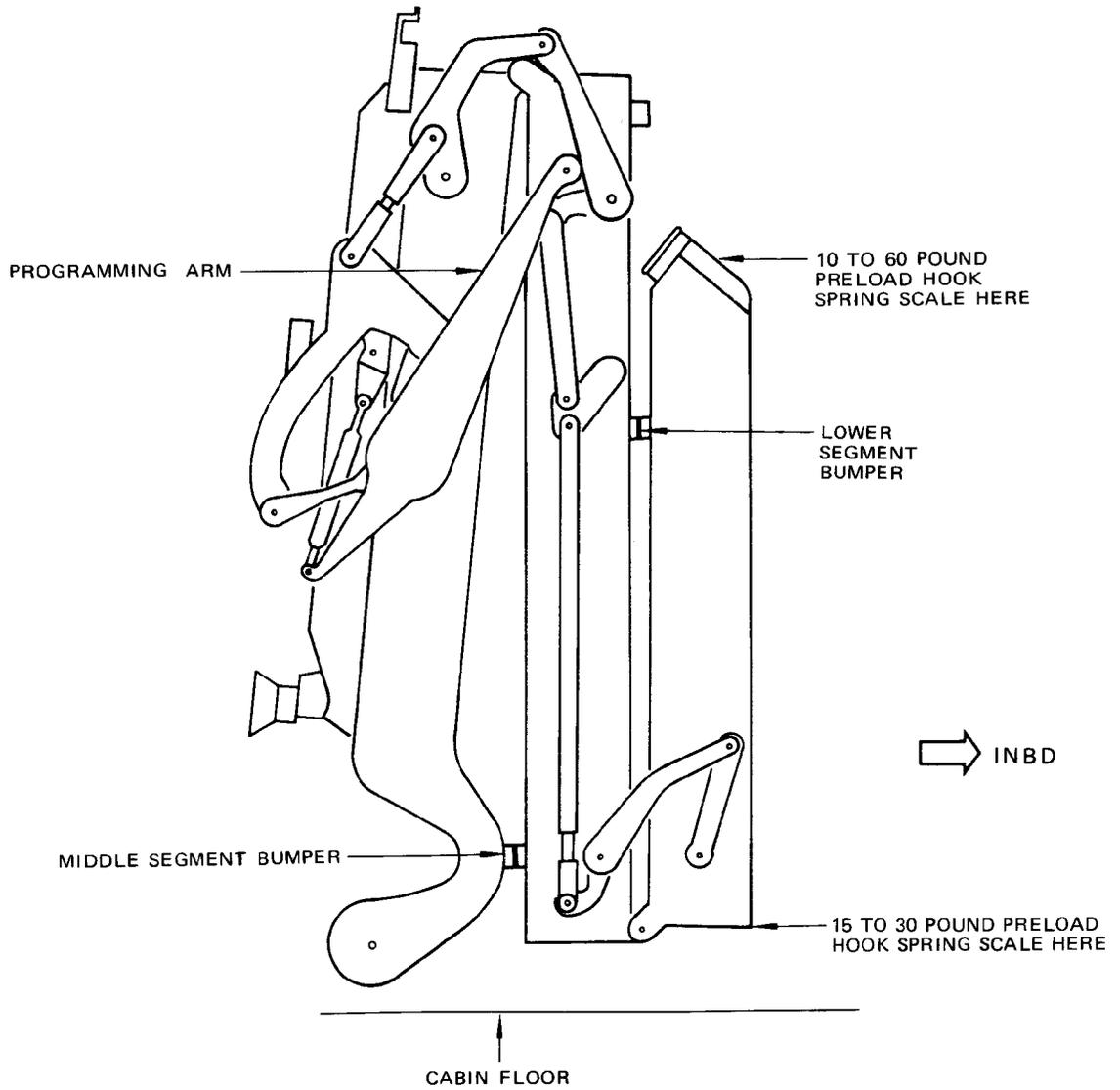
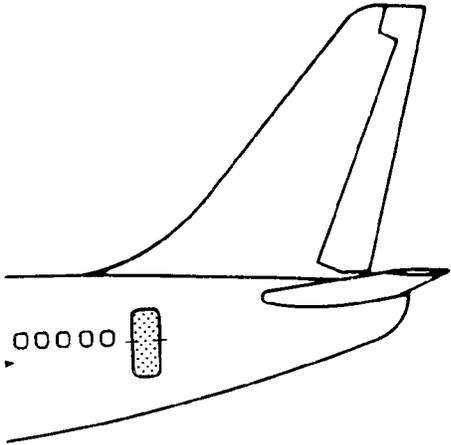
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Aft Airstair Folding Mechanism Test  
 Figure 502

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MAINTENANCE MANUAL

- (6) Perform additional rigging check as follows. Handrails and aft entry door may be installed for this check.
  - (a) Support airstair per par. 2.D.(1). Airstair should be near ground to meet dimension 0.06 to 1.0 inch per par. 2.D.(2).
  - (b) Verify that forward and aft cams (2, Fig. 501) are only snug against stair up side of forward and aft cam follower rollers (3) Lift on upper handrails to check cam roller fit.
  - (c) Per adjustment of par. 2.D.(7), check that forward and aft pushrods (4) have been shortened just enough to hold forward and aft cams (2) snug against cam follower rollers (3). There should not be any significant preload in rods.

NOTE: Rotation of male course thread on adjustment nut into female course thread will shorten rod assembly.

- (7) Install handrails (Ref Aft Airstairs Handrails - Removal/Installation).
- (8) Install aft entry door (Ref Aft Entry Door and Airstair - Removal/Installation).

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AFT AIRSTAIR HYDRAULIC DAMPER – REMOVAL/INSTALLATION

1. Remove Damper

- A. Extend airstair and open aft airstair circuit breaker on P6 panel.
- B. Remove cover plate. (See figure 401.)
- C. Remove cotter pin, nut, washer, and bolt connecting damper crank and upper segment link.
- D. Remove four mounting nuts, washers and bolts from damper.
- E. Pull out on damper to release from crank spline.

2. Install Damper

- A. Hold damper in position against end of crank assembly spline. Rotate damper crank until splines mate and push damper into position. (See figure 401.)

NOTE: One tooth is missing on damper spline and one groove is missing on crank assembly spline.

- B. Rotate assembly to align mounting holes and insert four mounting bolts, washers and nuts.
- C. Tighten mounting nuts.
- D. Connect damper crank to upper segment link with bolt, washer and nut.
- E. Insert cotter pin.
- F. Test aft entry door and airstair. Refer to 52-14-0, Adjustment/Test.

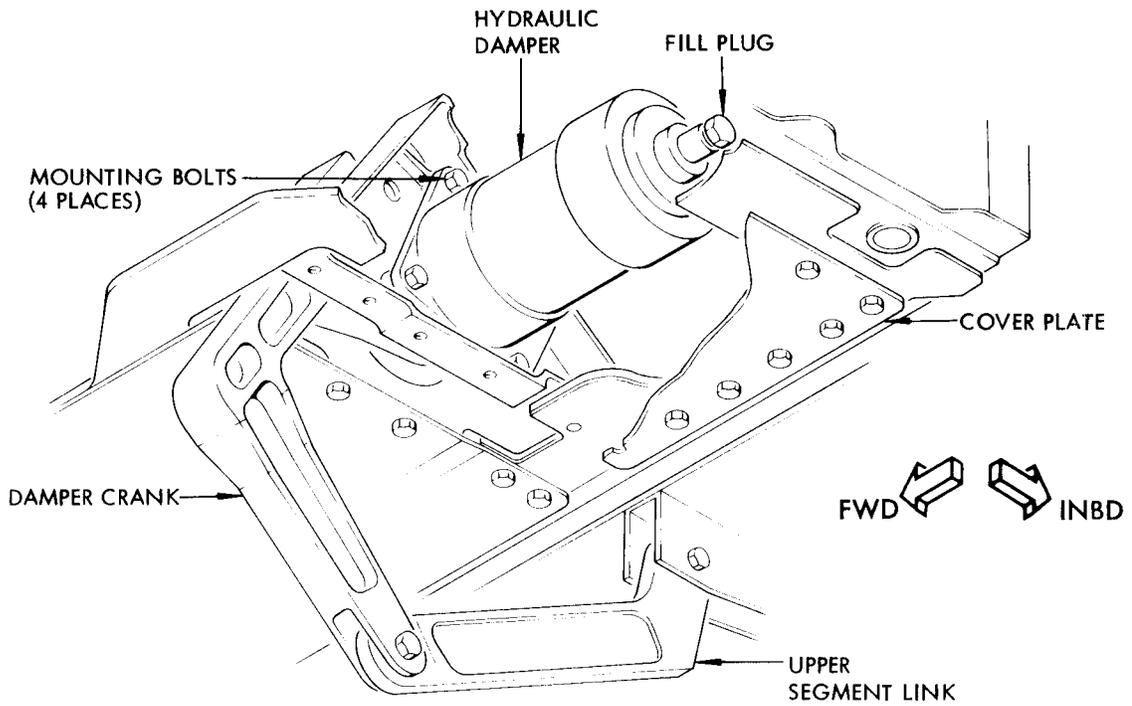
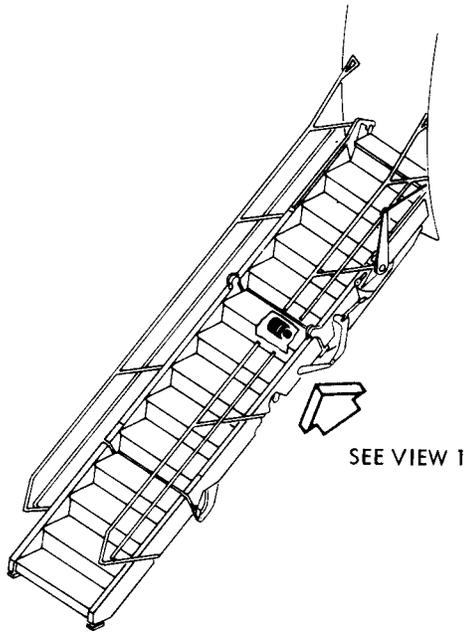
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VIEW 1

Aft Airstair Hydraulic Damper Installation  
 Figure 401

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AFT ENTRY DOOR AND AIRSTAIR EXTERIOR CONTROL – REMOVAL/INSTALLATION

1. Prepare for Exterior Control Removal
  - A. Extend airstair.
  - B. Open aft airstair circuit breaker on P6 panel.
  - C. Remove aft airstair control console shroud.
  - D. To gain access to under floor portion of control, enter lower cargo compartment and remove access panels at aft end.
2. Equipment and Materials
  - A. Pressure Sealant
3. Remove Exterior Control
  - A. Remove bolt connecting exterior control telescopic unit to crank in control console. (See figure 401.)
  - B. Remove bolts attaching control to structure at lower side of console.
  - C. Remove clamp securing control cable to structure, if provided.
  - D. Remove bolts and spacer attaching control cable to exterior handle housing. Retain radius filler on lower bolt for reinstallation.
  - E. Remove bolts from exterior handle pivot pin retainer and remove pivot pin. (See section B-B.)
  - F. Move handle aft in housing and force cable out of housing until bolt can be removed from terminal end of control cable.

**CAUTION:** DO NOT FORCE CABLE MORE THAN NECESSARY TO REMOVE BOLT OR CABLE HOUSING MAY BE DAMAGED.

- G. Slide control unit up through access hole in control console until lower end of control clears housing.
  - H. Move control unit down through control console and remove unit through lower cargo compartment.
4. Install Exterior Control
  - A. Enter lower cargo compartment and place upper end of control cable through access hole in floor below inboard end of control console.
  - B. Slide cable up through access hole in control console until lower end of control cable can be inserted into exterior control handle housing. Position spacer at aft end of housing before inserting control. (See figure 401.)
  - C. Force terminal end of control cable out of exterior control handle housing and connect terminal to handle. Install cotter pin in bolt.

**CAUTION:** DO NOT FORCE CABLE MORE THAN NECESSARY TO INSTALL BOLT OR CABLE HOUSING MAY BE DAMAGED.

- D. Apply pressure sealant to each side of spacer at aft end of housing.
  - E. Install bolts attaching control cable and spacer to control handle housing. Install radius filler retained during removal on lower bolt.
  - F. Install bolts attaching control cable to structure below control console.

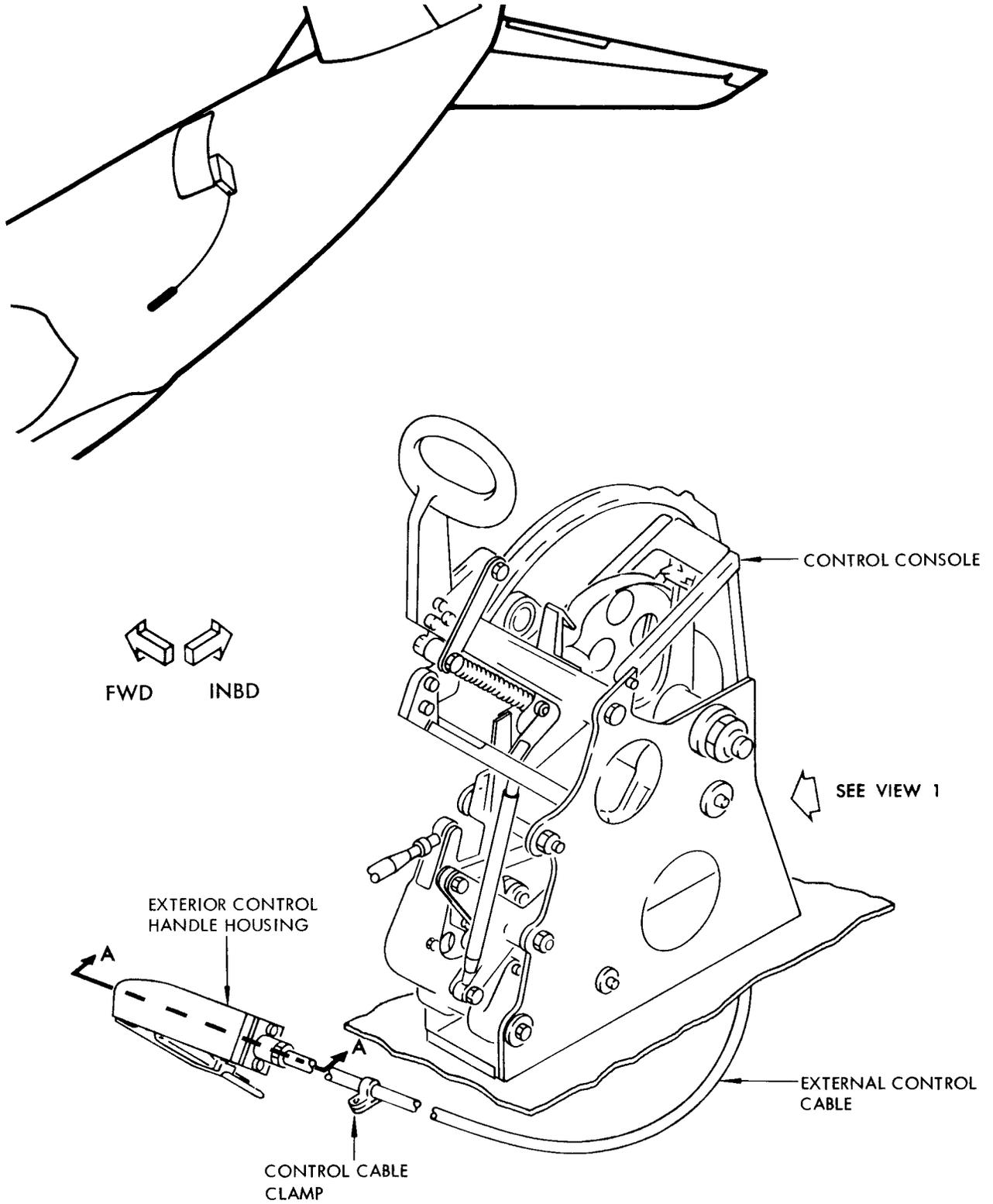
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Aft Entry Door and Airstair Exterior Control Installation  
 Figure 401 (Sheet 1)

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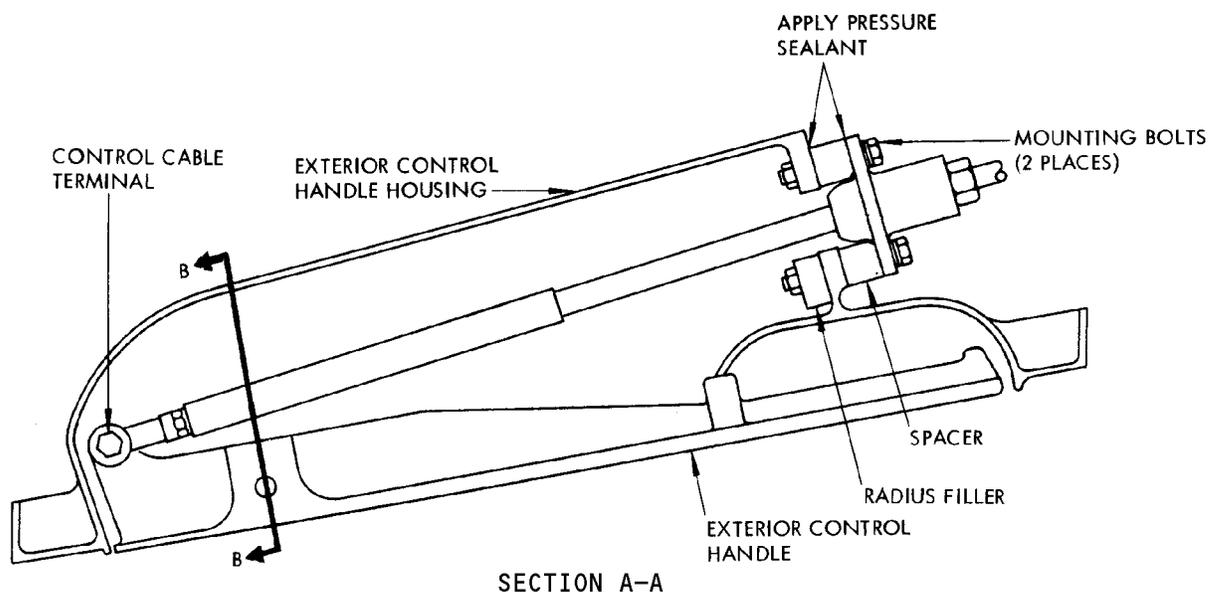
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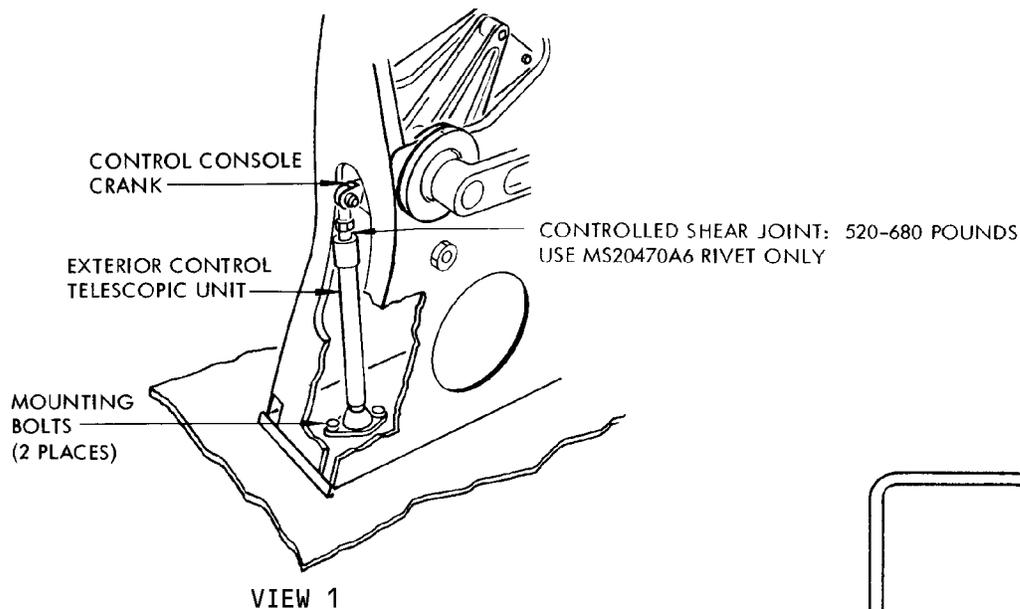
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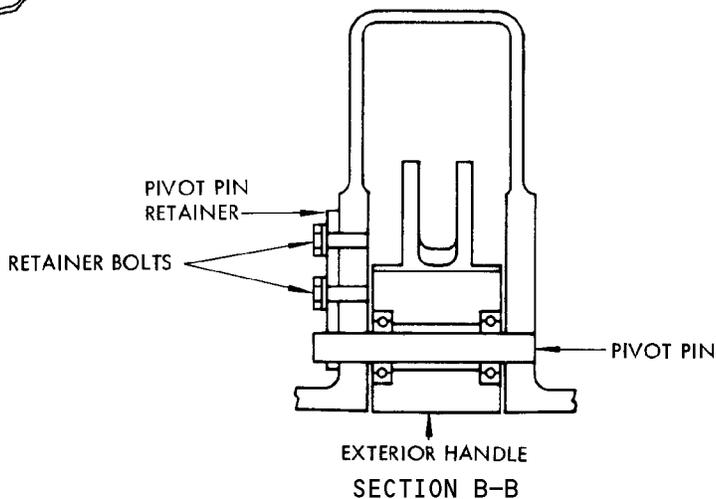
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SECTION A-A



VIEW 1



EXTERIOR HANDLE  
SECTION B-B

Aft Entry Door and Airstair Exterior Control Installation  
Figure 401 (Sheet 2)

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## MAINTENANCE MANUAL

- G. Install clamp securing control cable to structure, if provided.
- H. Install pivot pin through exterior handle and housing and install pivot pin retainer.
- I. Connect telescopic unit of control to crank in control console. Install cotter pin in bolt.

**NOTE:** Check that preload on exterior handle is 36 to 72 pound-inches when handles are in the door latched position. Adjust telescopic unit as required.

### 5. Restore Airplane to Normal

- A. Install access panels in lower cargo compartment.
- B. Install aft airstair control console shroud.
- C. Test aft airstair. Refer to 52-14-0, Adjustment/Test.

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AFT ENTRY DOOR LINING – REMOVAL/INSTALLATION

1. General

- A. The aft entry door lining is readily replaced when no damage has occurred to the door or lining supports. Therefore, before replacing lining, check that no damage has occurred to the lining supports or the replaced lining may become damaged due to improper alignment with the doorway. Center door panel can be removed without removing side and top panels after door is removed.

2. Remove Aft Entry Door Lining

- A. Carefully remove the acoustic seal from lining retainer at top and sides of door (Fig. 401).

**CAUTION:** USE CARE HANDLING THE SEAL AT THE BOTTOM CORNERS TO PREVENT BREAKING SEAL SPLICES.

- B. Remove quarter-turn fasteners around periphery of center panel.  
C. Remove seal retainers from around door lining and fasteners holding forward side panel to lining supports.  
D. Remove top, bottom and side lining panels.  
E. Remove entry door and remove center panel (Ref 52-14-0 RI).

3. Install Aft Entry Door Lining

- A. Install top, bottom and side lining panels onto the door lining supports.

**NOTE:** Install center lining panel over top, bottom and side panels if removed.

- B. Install seal retainers onto door lining and fasten to lining support and fasten forward lining panel to lining supports.  
C. Carefully install the acoustic seal in the retainer at the bottom corner of door. Complete installation of acoustic seal around door.  
D. Install fasteners around periphery of center panel.  
E. Install entry door if removed. Refer to Aft Entry Door, Removal/Installation, 52-14-0. Check that door and doorway lining marks in upper corners of door are aligned within 0.01 inches.

**NOTE:** If upper lining panel is replaced, install new lining marks after door is closed and aligned.

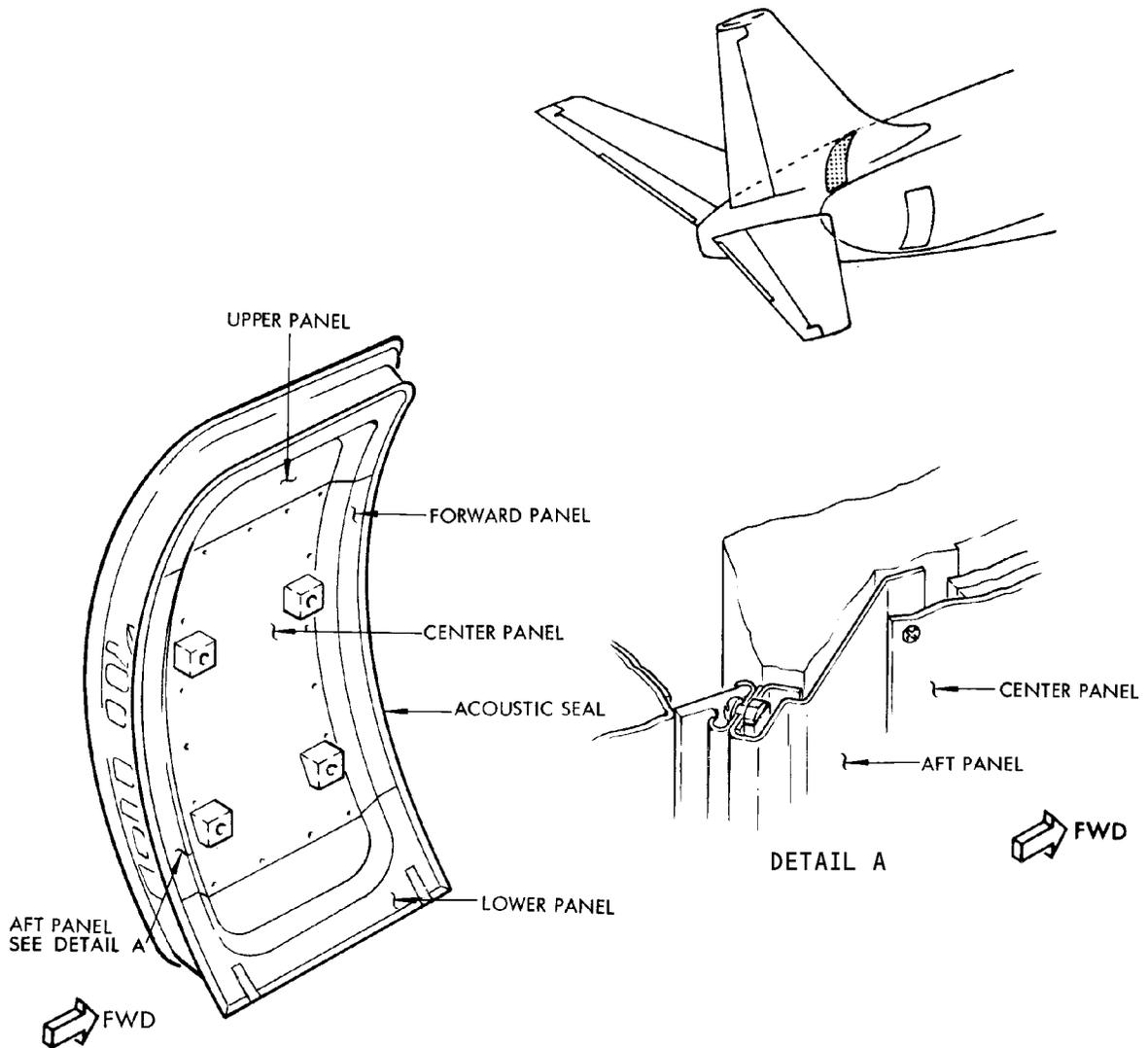
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Aft Airstair Door Lining Installation  
 Figure 401

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AFT AIRSTAIR HANDRAILS – REMOVAL/INSTALLATION

1. General

- A. The aft airstair handrails will require removal when handrail replacement is required or the folding mechanism is to be adjusted and tested (Ref Aft Airstair Folding Mechanism – Adjustment/Test). The following procedures are applicable to either the forward or aft handrails (Fig. 401).
- B. Individual aft airstair handrail sections may be removed and installed using aft airstairs handrail hinge pin wrench to remove the hinge pins. Use of this tool is applicable only to airstairs with hinge pin installations as shown in Fig. 401.

2. Equipment and Materials

- A. Lockbolt – BACB30LA6-2 (8 required), new installation only
- B. Lockbolt – BACB30LA8-4 (6 required), new installation only
- C. Aft Airstairs Handrail Hinge Pin Wrench – F80157-1, or equivalent

3. Remove Aft Airstair Handrails

- A. Extend airstairs fully.
- B. Open aft airstair circuit breaker on P6 panel.
- C. Remove individual handrail sections on airstairs having hinge pins as shown in Fig. 401 by using hinge pin wrench to hold the hinge pin while turning screw. This applies to all handrail sections joined by the hinge pins. If removal of complete aft airstair handrail installation is required proceed to step D.
- D. Remove cotter pin, nut and washers from upper inboard and lower stanchion at upper and lower segments respectively.
- E. Remove cover and nut cap in upper side rail to gain access to fastener at upper outboard stanchion.
- F. Remove nut and washers from upper outboard stanchion and center stanchion at upper and center ladder segments.
- G. Disconnect handrail tie rods from upper and center ladder segments.

**CAUTION:** SUPPORT HANDRAIL TO PREVENT HANDRAIL COLLAPSE WHICH CAN RESULT IN HANDRAIL DAMAGE.

- H. Remove handrails from airstair.

4. Install Aft Airstair Handrails

- A. Install individual handrail sections by inserting hinge pins through mating parts and installing screw while holding hinge pin with handrail hinge pin wrench. Install special washers and spacers at required locations. If installing the complete handrail installation, proceed to step B.

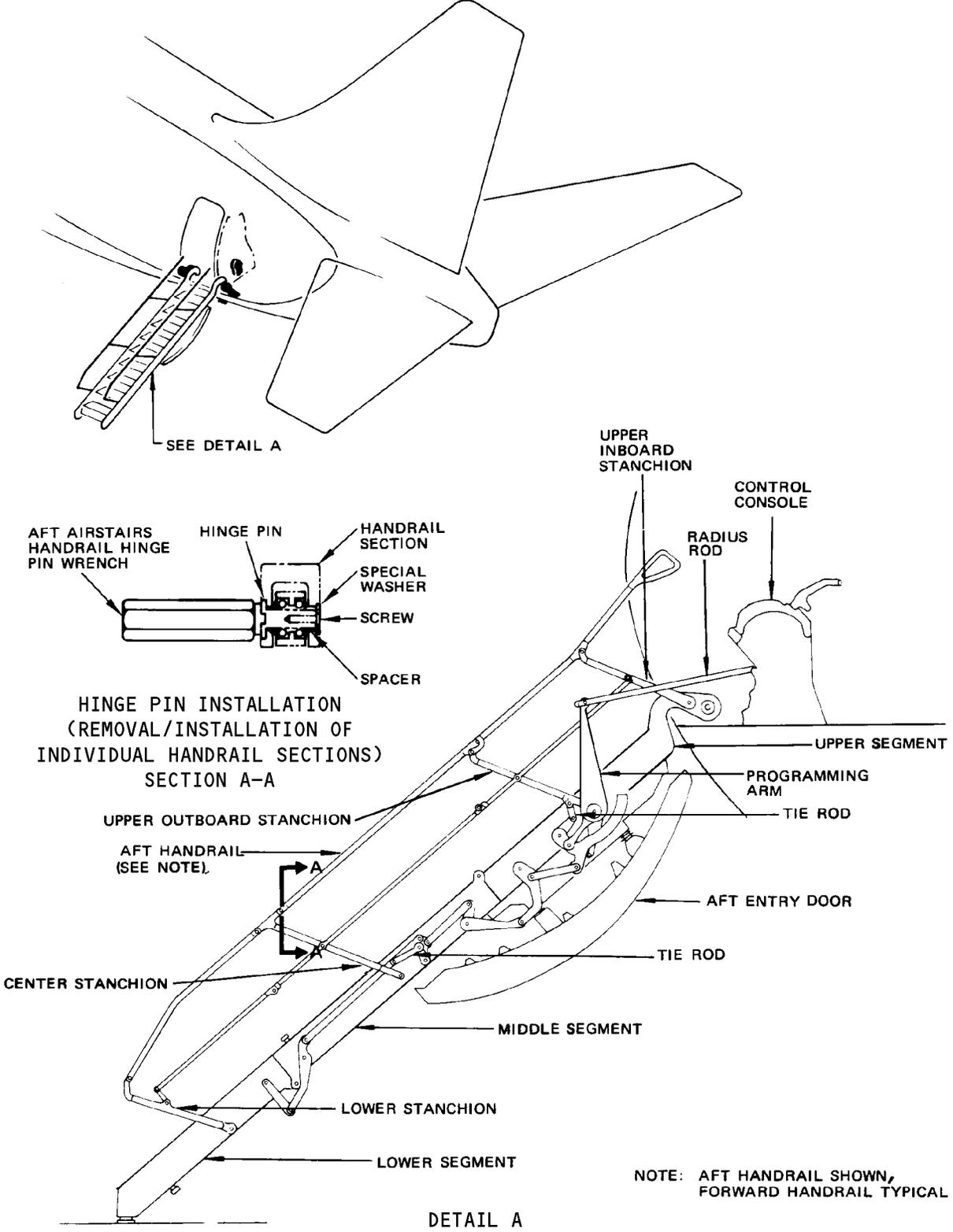
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DETAIL A  
 Aft Airstair Handrails Installation  
 Figure 401

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- B. Orient handrail assembly as shown in Fig. 401 and insert upper outboard and center stanchion fittings in upper and center ladder segments. Install washers and nut and tighten.

**CAUTION:** SUPPORT HANDRAIL TO PREVENT HANDRAIL COLLAPSE WHICH CAN RESULT IN HANDRAIL DAMAGE.

**NOTE:** If new handrail assembly is being installed, tape or tie upper handrails to upper and lower stanchions since lockbolts are not installed at this time.

- C. Install nut cap in upper side rail access hole for fastener at upper outboard stanchion and install cover.
- D. Position upper inboard and lower stanchions on upper and middle segments and install bolts, washers (three required) and nuts. Tighten nut to a torque range of 100 to 1000 pound-inches and install cotter pin.

**NOTE:** Add or remove one washer to permit installation of cotter pin with nut tightened to required torque.

- E. Connect both handrail tie rods to upper and middle ladder segment cranks. If a new handrail is being installed or the tie rods have been replaced or adjusted, connect only the center stanchion tie rod and rig handrails as follows:

- (1) Manually retract the airstair and manually aid handrails to fold (Fig. 402).

**CAUTION:** CONTINUALLY CHECK THAT HANDRAIL PIVOT JOINTS ARE FREE OF BINDING AS AIRSTAIR RETRACTS. BINDING OF JOINTS CAN CAUSE DAMAGE TO HANDRAILS.

- (2) with airstair retracted, disconnect center stanchion tie rod (1). If lockbolts (2) and (7) are already installed, go directly to step (9).
- (3) Position outboard upper ladder stanchion (9) parallel to top surface of upper ladder beam (10) within 0.06 inch.
- (4) Rotate upper stanchion (6) until handrail contacts bumper (5) with a 3- to 5-pound preload.
- (5) Drill six 0.260 ±0.003-0.000-inch holes in upper stanchion per predrilled holes in handrail. Install BACB30LAC8-4 lockbolts (detail A).
- (6) Position center stanchion (4) outboard hinge within 0.06 inch of the middle and lower segment hinge centerline.
- (7) Rotate lower stanchion (3) against bumper and hold.

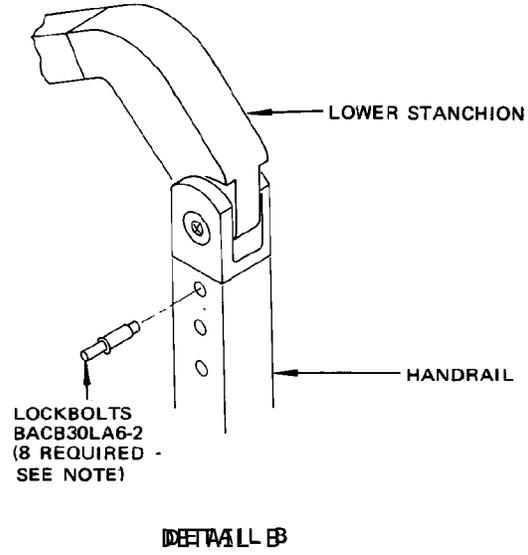
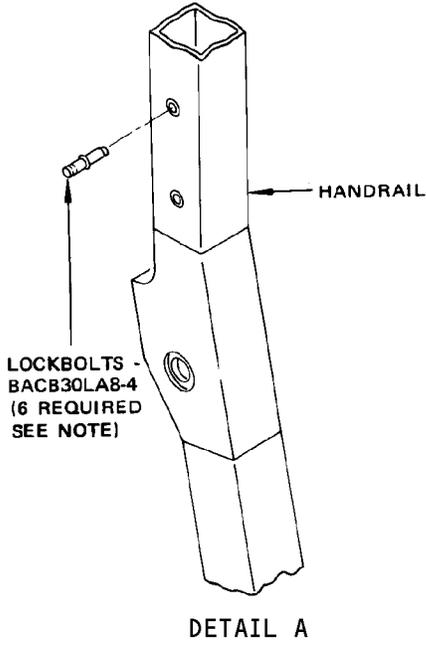
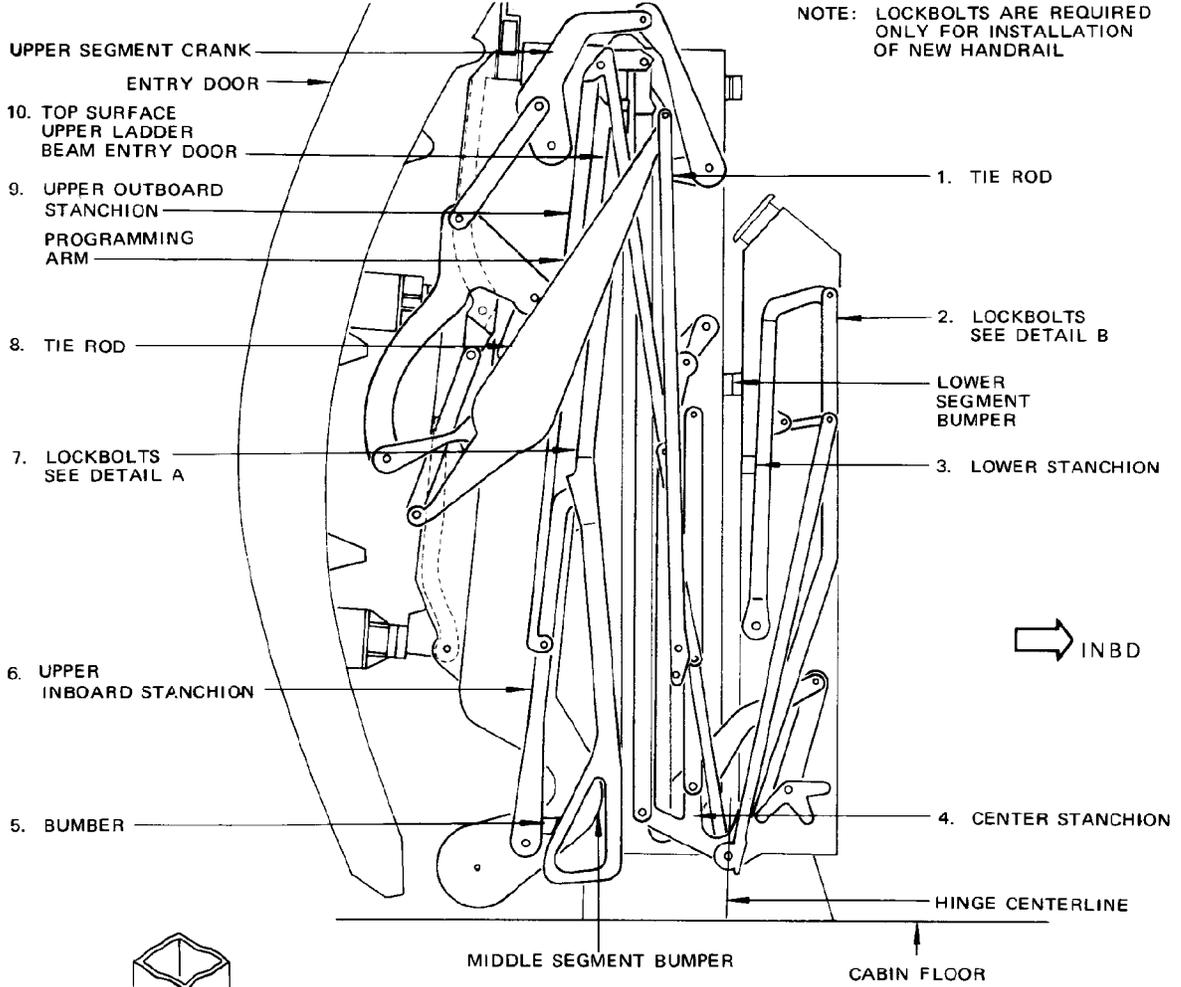
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Aft Airstair Handrails Rigging  
 Figure 402

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- (8) Drill eight  $0.199 \pm 0.003 / -0.000$ -inch holes in handrail per predrilled holes in handrails. Install BACB30LA6-2 lockbolts (detail B).
  - (9) Adjust and connect upper tie rod (8) so upper outboard stanchion contacts rub pad on hub of upper segment crank.
  - (10) Adjust and connect tie rod (1) to maintain center stanchion (4) outboard hinge within 0.06 inch of lower ladder segment hinge centerline with a 2- to 5-pound preload on lower bumper by lower stanchion (3).
- F. Close aft airstair circuit breaker on P6 panel.
- G. Operate airstairs slowly and check handrails for smooth operation with no binding.

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EMERGENCY EXITS - DESCRIPTION AND OPERATION

1. General

- A. An emergency exit hatch is located on each side of the fuselage over the wing area for use in emergency exit from the passenger cabin. The two hatches are of the plug-type and are identical in size and operation. Each emergency exit hatch can be opened from inside or outside the airplane by a spring-loaded manually operated handle that is located above the window near the top of the hatch. The emergency exit hatches are covered in 52-21-0.
- B. The emergency evacuation of passengers from the passenger cabin can be facilitated through the use of door-mounted evacuation slides. For information on the evacuation slide installations, refer to Emergency Equipment, Chapter 25,.
- C. On Standard Passenger Airplanes the control cabin right sliding window can be operated from outside the airplane as an emergency exit. On Passenger/Cargo Convertible Airplanes control cabin sliding windows both can be operated from outside the airplane as emergency exits. A spring-loaded release handle located outside and below the sliding window permits an operator to unlock and slide the window first inwards and then aft to its fully opened position. The sliding window emergency release mechanism is covered in Control Cabin Sliding Windows, Chapter 56.
- D. An emergency exit feature is provided in the control cabin door, which permits the release and removal of the two upper blowout panels from the door. The emergency exit is used if an obstruction on the aft side of the door prevents the control cabin door from opening and thus prevents communication with the passenger cabin. For further information, refer to Control Cabin Door - Description and Operation, 52-51-0.

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EMERGENCY EXIT HATCH – DESCRIPTION AND OPERATION

1. General

- A. Two emergency exit hatches are provided to facilitate emergency exit from the passenger cabin. These individual hatches are located one on each side of the fuselage over the wing area. Each emergency exit hatch can be opened from inside or outside the airplane by a spring-loaded manually-operated handle located near the top of the hatch. A detachable light above the hatch illuminates the area for exit hatch operation. For additional information on this light, refer to LIGHTS, Chapter 33.
- B. Each hatch (Fig. 1) is supported in the hatch opening by a lower pivot fitting which is engaged with a lower pivot hook on the sill of the hatch opening. (See detail C, figure 1.) Two heel pads attached to the lower edge of the hatch on each side of the lower pivot fitting bear against the sill of the hatch opening. The hatch may be opened from inside or outside of the airplane by means of a manually-operated handle, located at the top of the hatch. The handle is an integral casting formed with a pull-type lever on the inside surface, and a push-type panel flush with the outside contour of the hatch. A continuous seal is attached around the entire edge of the handle frame. The lower end of the handle on the inside of the hatch is pinned to a torque tube. Two torsion springs, one on each side of the handle, are at one end attached to the outside of the torque tube, and at the other end bear against a wear plate on the handle frame. Each end of the torque tube is attached to separate bell crank assemblies. Each bell crank assembly rotates in a spherical bearing, which is supported in a bearing housing. One bearing housing is attached to the forward frame of the hatch, and the other to the aft frame. Two latch rollers, one on each bell crank, engage with the latch fittings attached to the forward and aft frames of the hatch opening. When the passenger cabin is pressurized, adjustable stop pins attached to the forward and aft edge of the hatch, contact stop fittings attached to the forward and aft frames of the hatch opening. The stops transmit the pressurization loads on the hatch to the fuselage structure surrounding the hatch, and prevent excessive deflection of the continuous seal attached around the entire edge of the hatch. A window is located below the hatch operating handle.
- C. The trim panel attached to the inside surface of the hatch is provided with a recess-type handhold in the lower part of the panel to assist in removing the hatch from the hatch opening. A roller-type window shade is also incorporated in the trim panel. The emergency exit hatches are not included in the door open warning system.

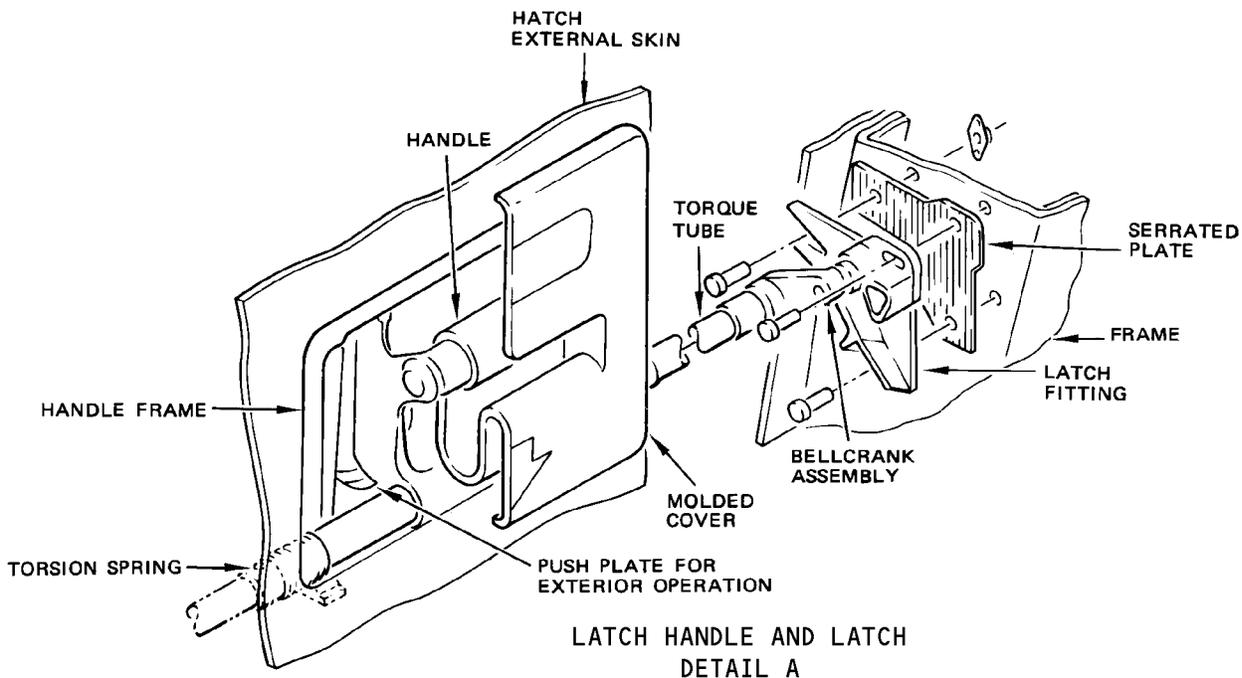
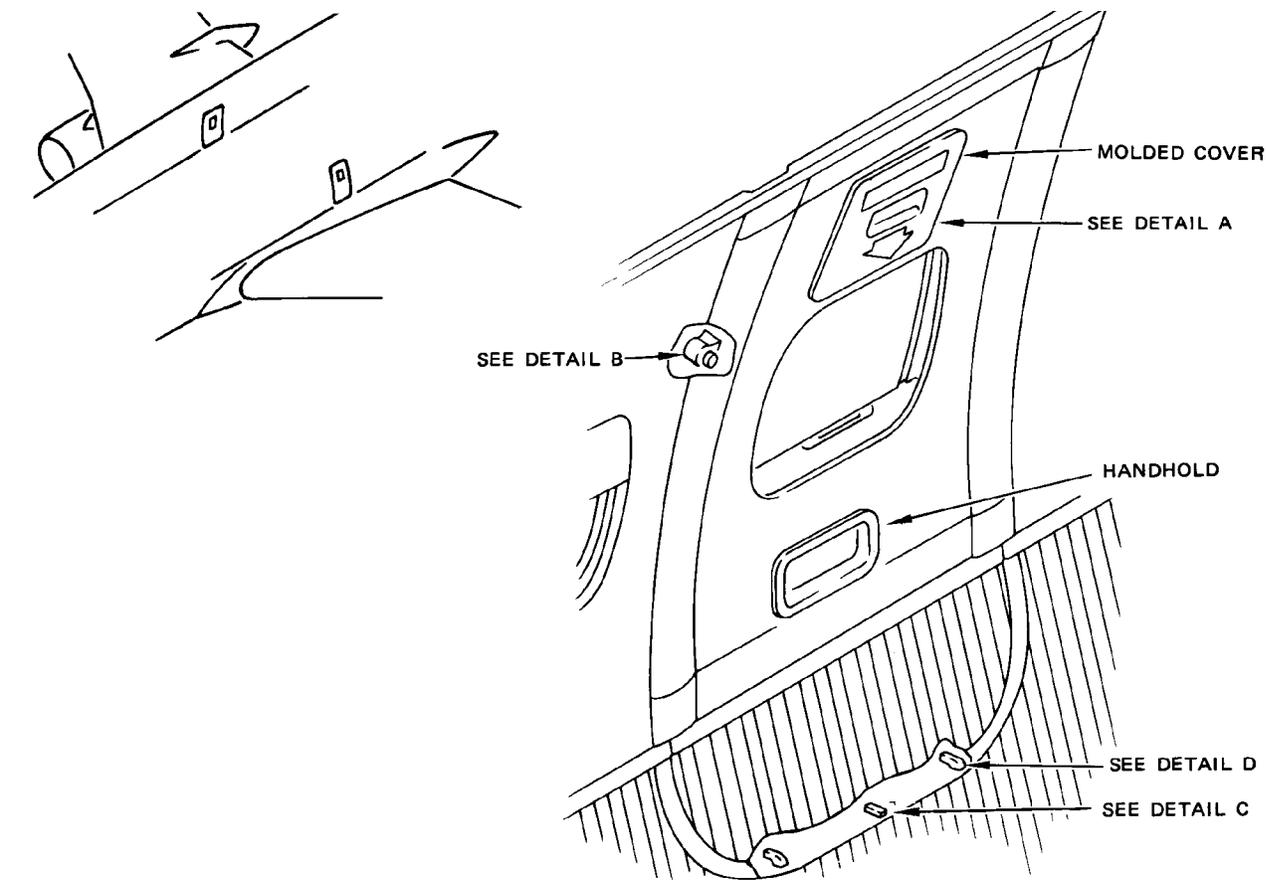
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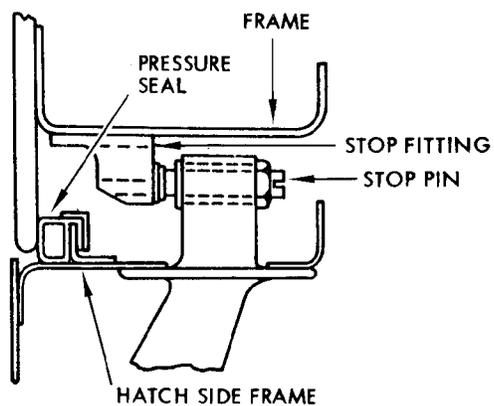
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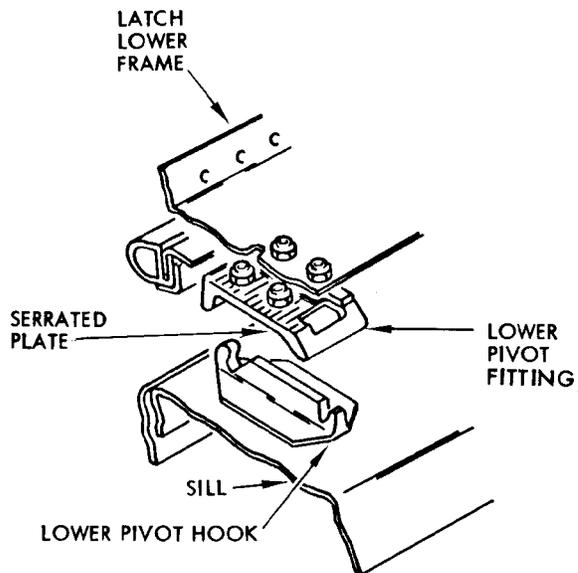
Emergency Exit Hatch  
 Figure 1 (Sheet 1)

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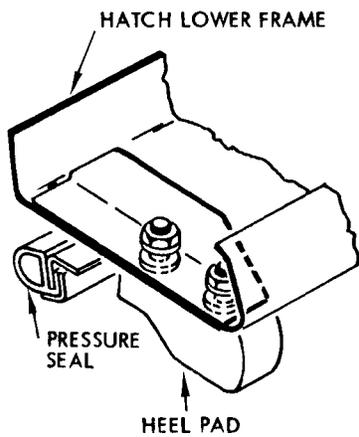
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HATCH AND FRAME STOPS (6 PLACES)  
 DETAIL B



PIVOT STOP AND HOOK  
 DETAIL C



WHEEL PAD (2 PLACES)  
 DETAIL D

Emergency Exit Hatch  
 Figure 1 (Sheet 2)

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- D. The hatch is opened from inside the airplane by pulling down on the handhold pocket which is attached to the operating handle . (See figure 2.) The action of the handle rotates the torque tube against the torsion spring load, and causes the bell cranks to turn. The latch rollers disengage from the latch fittings and allow the hatch to move inward at the top edge. Continuing to hold the upper handle, the lower handle is grasped with the free hand and the hatch is pulled inward at the top edge, disengaging the lower pivot fitting from the lower pivot hook. With both hands, the hatch is lifted upwards and inwards away from the opening.
- E. The hatch is opened from outside the airplane by pushing in the flush panel at the top of hatch and then pushing the hatch inwards. (See figure 2.) An assistant should be inside the airplane to receive the hatch to avoid damage.

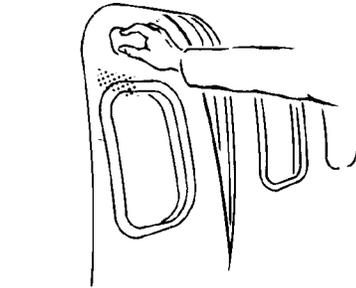
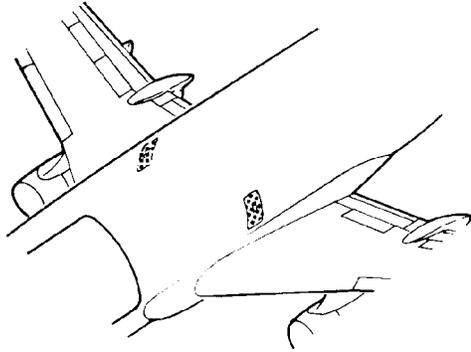
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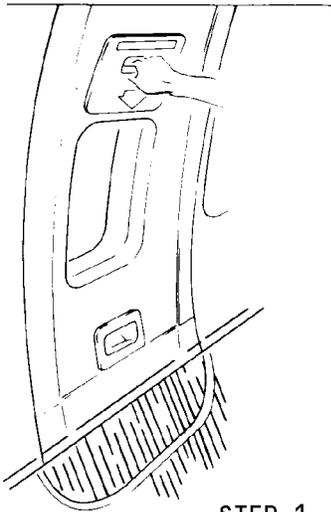
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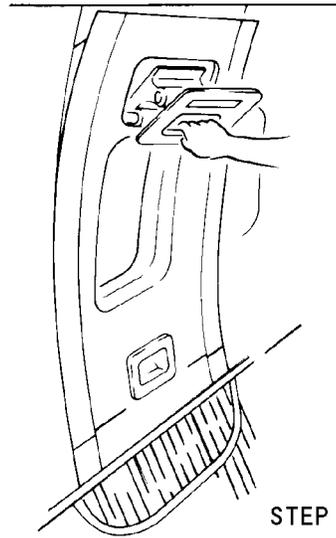
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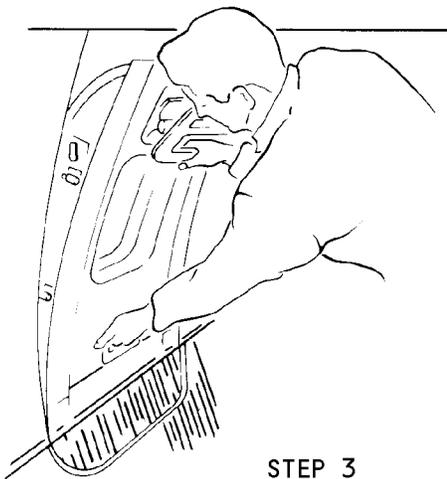
HATCH REMOVAL (EXTERIOR)



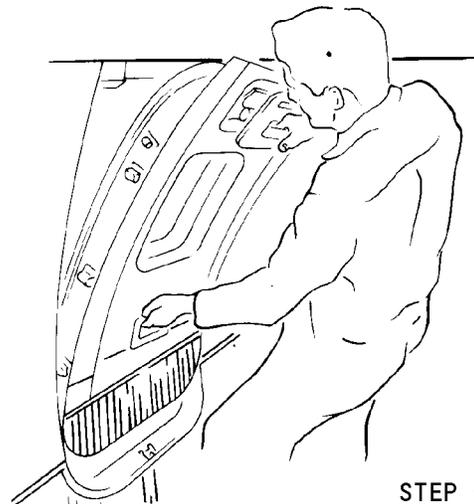
STEP 1



STEP 2



STEP 3



STEP 4

HATCH REMOVAL (INTERIOR)

Emergency Exit Hatch Operation  
 Figure 2

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EMERGENCY EXIT HATCH – REMOVAL/INSTALLATION

1. General

- A. On airplanes with Carry-all Compartment Interior, self-illuminating signs are used for emergency exit hatches. The signs use gas-filled capsules of radioactive tritium to cause the phosphorescent material in the signs to glow. No radiological health hazard is present when signs are intact. However, if a sign is cracked or broken, a potential health hazard exists.

**WARNING:** IF SIGN IS CRACKED OR BROKEN, LEAVE AREA IMMEDIATELY. KEEP AIR DISTRIBUTION SYSTEM OPERATING. AFTER APPROXIMATELY 20 MINUTES REPLACE SIGN PER CHAPTER 33, SELF-ILLUMINATING SIGNS – MAINTENANCE PRACTICES.

- B. If an emergency exit hatch is removed and reinstalled at the same location to the same airplane, without disturbance to its adjustments, it may be installed in accordance with par. 3.
- C. If the emergency exit hatch to be installed is a new unit or one that is being installed at a different location, it must first be prepared as described in Emergency Exit Hatch – Adjustment/Test.

2. Remove Emergency Exit Hatch

- A. From inside airplane, unlatch emergency exit hatch by pulling down on upper handhold (Fig. 401).
- B. Grasp lower handhold with free hand, and pull hatch inward at top edge by means of upper handle until lower pivot fitting can be disengaged from lower pivot hook.
- C. Lift hatch up and inboard with both hands, and remove from opening.

3. Install Emergency Exit Hatch

- A. From inside airplane, support hatch in hatch opening and engage lower pivot fitting (2, Section B-B, Fig. 402) with lower pivot hook (4) on sill (3) of hatch opening.

**CAUTION:** TO AVOID SEAL DAMAGE, HATCH WILL HAVE TO BE IN AS NEAR VERTICAL POSITION AS POSSIBLE WHILE LOWER PIVOT FITTING ENGAGES LOWER PIVOT HOOK. LOWER EDGE OF HATCH MUST ALIGN WITH SILL EDGE BEFORE LATCHING.

- B. Pull down on upper handhold and push upper edge of hatch outboard so that latch rollers engage latches.
- C. Push upper handhold upward to engage latch rollers with latches.
- D. Check hatch seal (1) correct seating around hatch opening.

**NOTE:** This check may be made from outside of airplane by viewing seal through gap between hatch and fuselage skin.

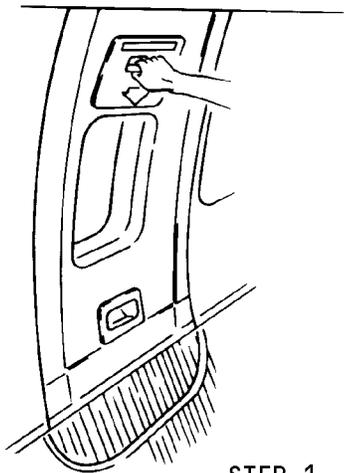
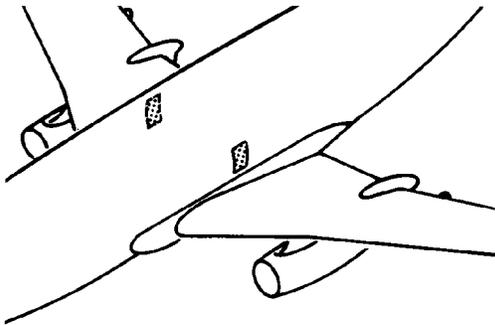
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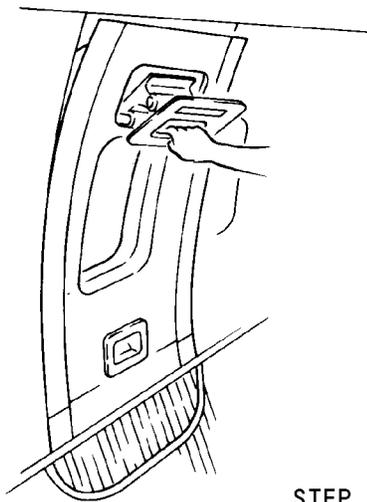
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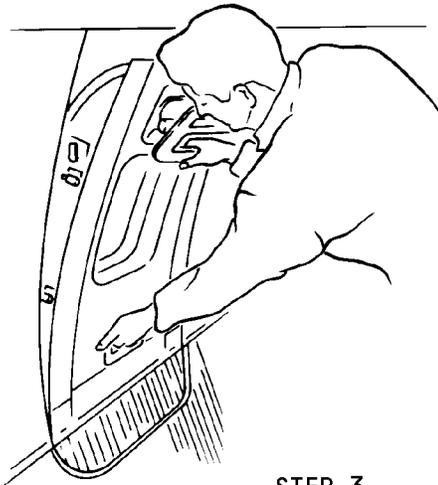
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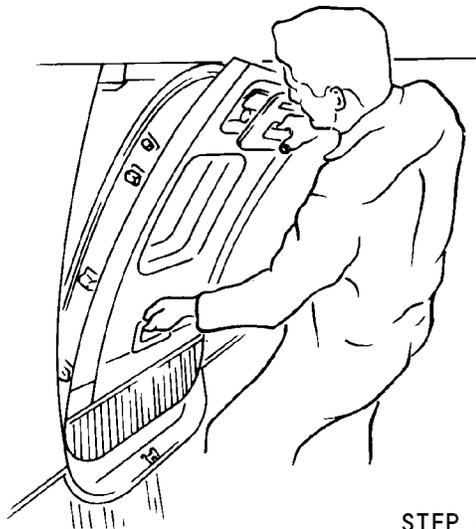
STEP 1



STEP 2



STEP 3



STEP 4

Emergency Exit Hatch Removal  
 Figure 401

EFFECTIVITY

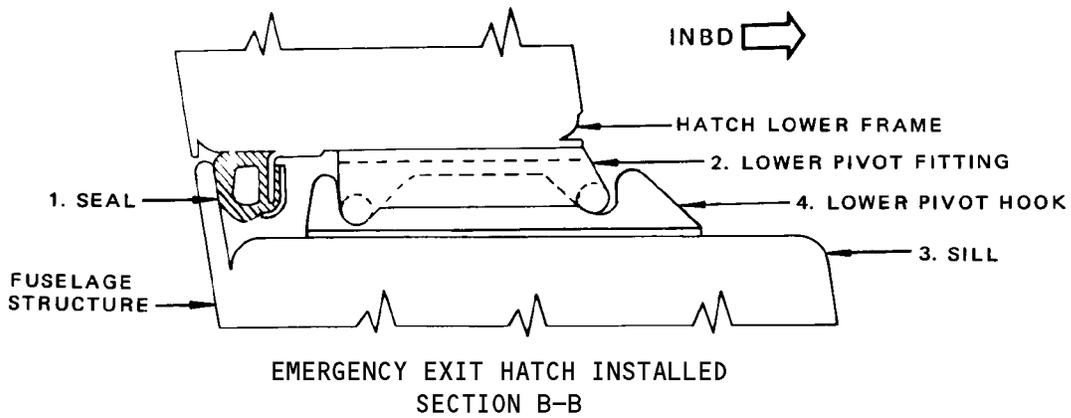
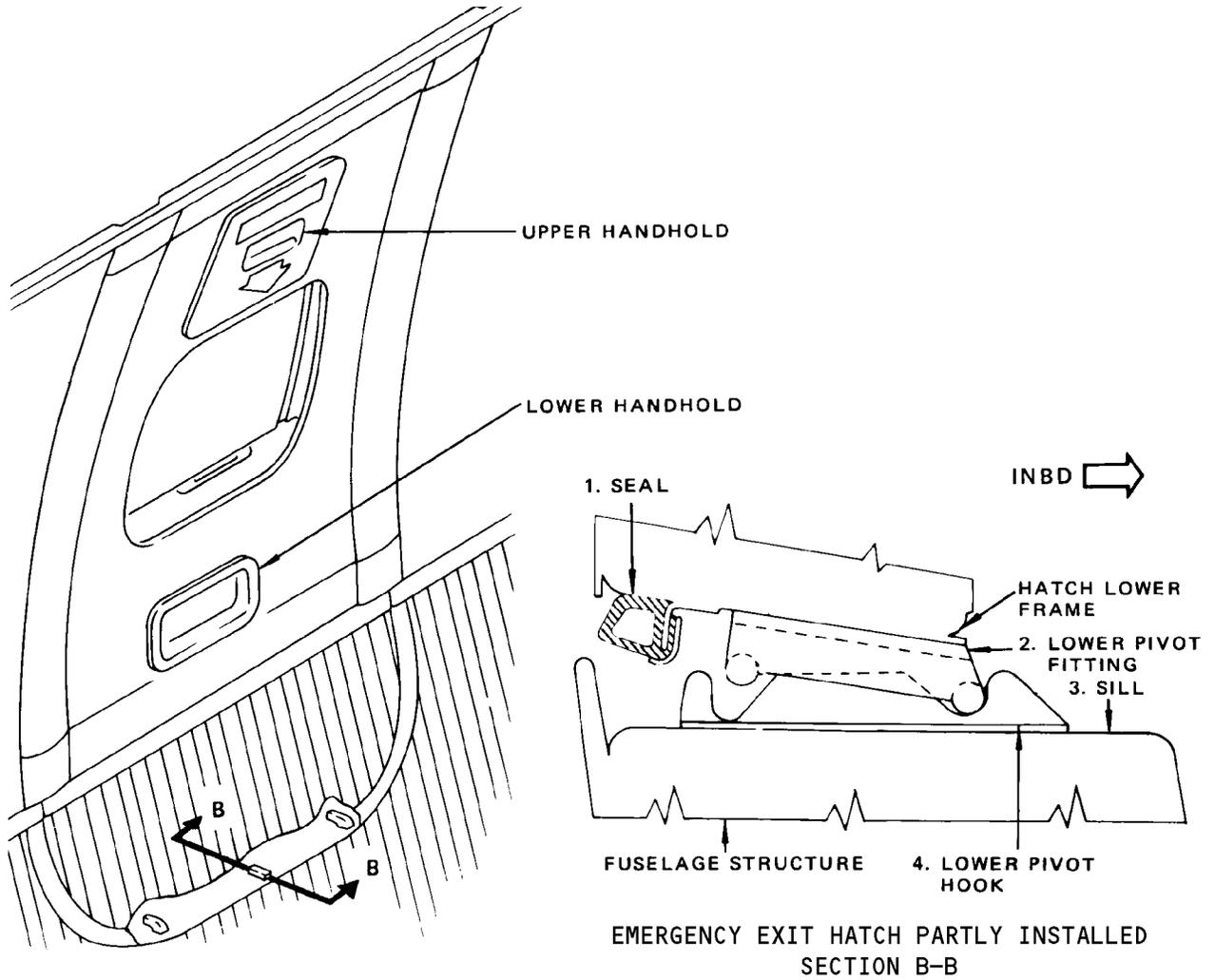
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Emergency Exit Hatch Installation  
Figure 402

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EMERGENCY EXIT HATCH – ADJUSTMENT/TEST

1. Emergency Exit Hatch Adjustment

A. Equipment and Materials

- (1) Laminated Shims – BACS40B24-34
- (2) Washers – AN960-10L
- (3) Shims – 69-36674-5
- (4) Shims – 63-2541-1
- (5) Shims – 69-36674-7

B. Adjust Hatch Vertically and in a Station-Wise Direction

- (1) Install hatch (Ref Emergency Exit Hatch – R/I).
- (2) Adjust stop pins (4, Fig. 501, Detail B) vertical alignment with frame stop fittings (5) by adding or removing laminated shims (BACS40B24-34) (8, detail C) under the lower pivot fitting (7).
- (3) Adjust the two heel pads (10, detail D) by adding or removing washers (AN960-10L) (11) as required so the heel pads just contact the sill as the hatch closes. With the hatch closed and latched, the pads will be unloaded.
- (4) Check that gap between hatch skin and fuselage skin is  $0.12 \pm 0.06$  inch at any point when hatch is closed and latched. On a new hatch, where necessary, trim edge of hatch to achieve this condition.

CAUTION: UNDER NO CIRCUMSTANCES SHOULD MATERIAL BE TRIMMED FROM EDGE OF HATCH OPENING.

C. Adjust Hatch Flushness

- (1) Remove emergency exit hatch (Ref Emergency Exit Hatch – Removal/Installation).
- (2) Remove emergency exit hatch lining, if installed (Ref 52-21-11, Emergency Exit Hatch Lining – Removal/Installation).
- (3) Back off all hatch stop pins (4, Fig. 501, Detail B).
- (4) Install hatch and adjust latch fittings (3, detail A) on serrated latch plates (2) attached to hatch opening frames (1), and also lower pivot fitting (7, detail C) on serrated plate (9) attached to lower frame, so that hatch is flush with fuselage.

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- (5) With hatch closed and latched, screw stop pins (4) out until pins just contact stop fittings (5) on hatch opening frames. Back off a half turn on stop pins. Then back off an additional amount until first slot in stop pin lines up with first slot in bushing (1/16 turn maximum) and secure with lock spring.

**NOTE:** The outside surface of the emergency exit hatch must always be inboard from the outside surface of the fuselage. The distance between the outside surface of the hatch and the outside surface of the fuselage should be 0.03 to 0.09 inch. You can make this distance 0.00 to 0.12 inch if it does not occur around more than 5.8 inches of the outside edge of the hatch.

- (6) Remove hatch.
  - (7) If hatch is new or one that is being adjusted for a new location, install metal-cal at top edge of hatch. Identify hatch location by crossing out, taping over, or painting over three portions of metal-cal on top of hatch to leave correct location callout.
  - (8) Install emergency exit hatch lining (Ref 52-21-11 R/I).
- D. Adjust Force Required to Close Hatch
- (1) Adjust force required to close hatch by removing or adding shims (69-36674-5, -7, and 63-2541-1) under mounting flanges of lining fasteners (L, Fig. 502). Force required to close hatch with lining installed should be between 10 and 25 pounds.

**NOTE:** Adding shims decreases force, removing shims increases force.

- (2) Install emergency exit hatch lining and check force required to close hatch is within limits.

### 2. Emergency Exit Hatch Test

- A. Test hatch opening and closing operations from inside and outside airplane.

**CAUTION:** TO AVOID POSSIBLE DAMAGE TO HATCH WHEN CHECKING HATCH OPENING FROM OUTSIDE, AN ASSISTANT SHOULD BE INSIDE AIRPLANE TO RECEIVE HATCH.

- (1) Check hatch for freedom from binding or obstructions throughout opening cycle.
- (2) Close hatch and check that force required to close hatch is between 10 and 25 pounds with lining installed, also check hatch for freedom from binding or obstructions throughout closing cycle.

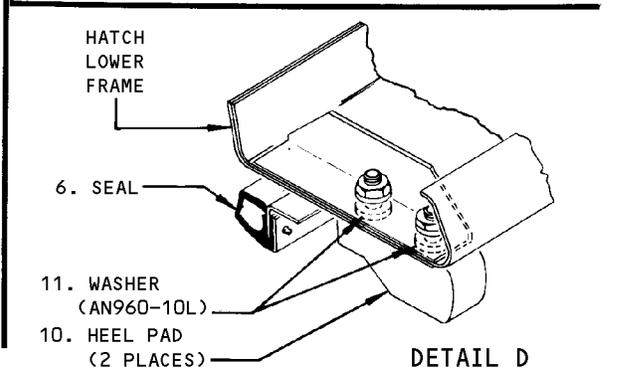
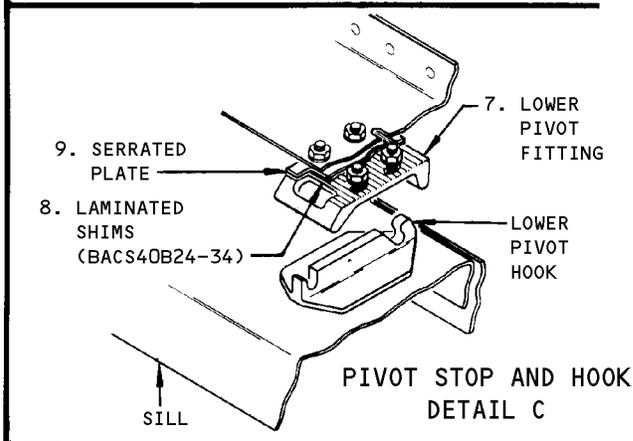
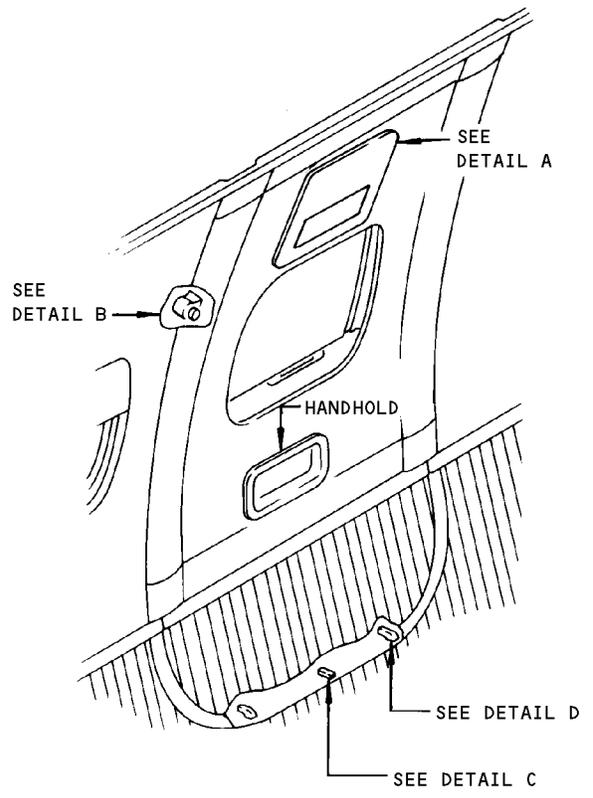
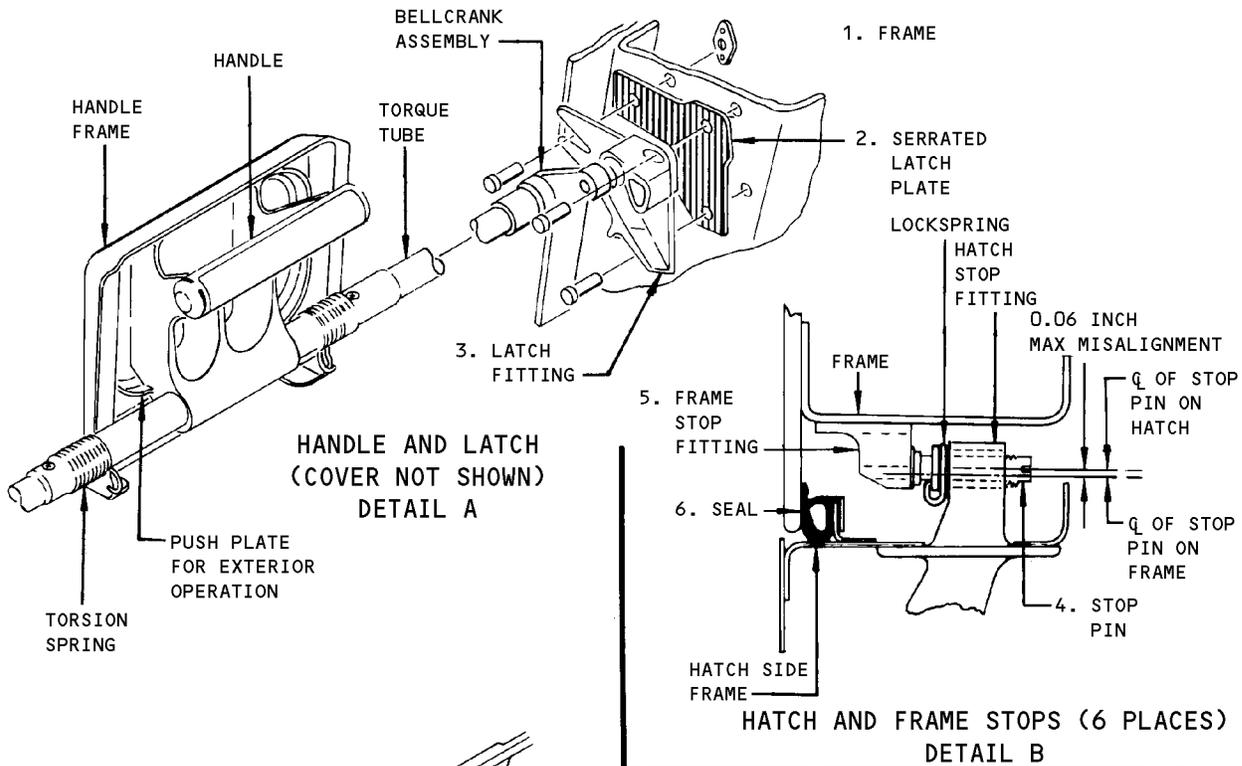
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Emergency Exit Hatch Adjustment  
 Figure 501

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**737**   
MAINTENANCE MANUAL

(3) Check correct sealing of seal around hatch periphery.

NOTE: This check may be made from outside airplane by viewing seal through gap between hatch and fuselage skin.

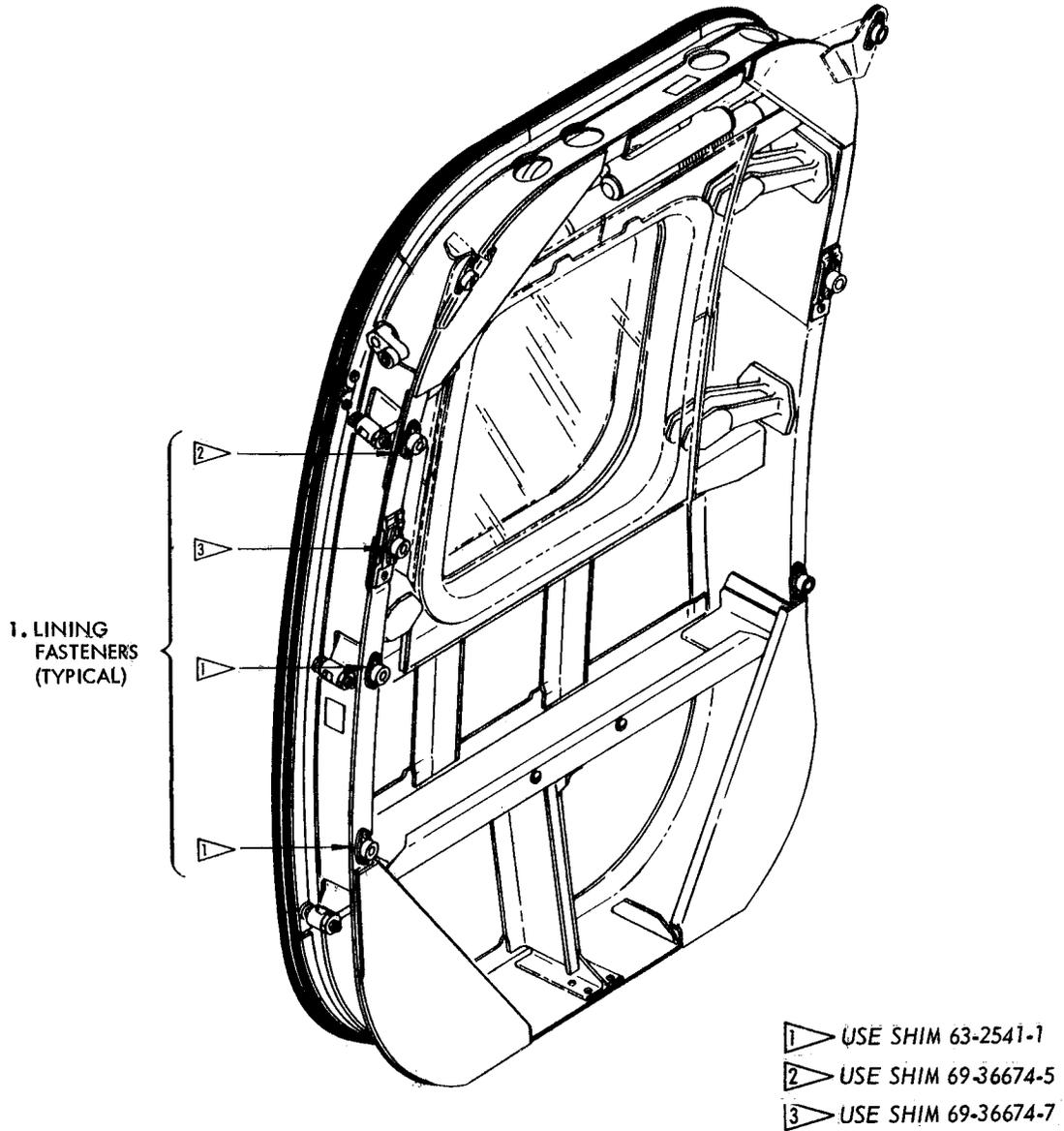
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Emergency Exit Hatch closing Force Adjustment  
 Figure 502

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EMERGENCY EXIT HATCH – INSPECTION/CHECK

1. Emergency Exit Hatch Inspection

A. Examine Emergency Exit Hatch

- (1) Examine external skin and framing around opening, for cracks, corrosion, loose and missing fasteners.
- (2) Examine frames, and internal brackets for cracks, corrosion, and loose bolts.
- (3) Examine window and frame for cracks and corrosion.
- (4) Examine hatch operating mechanism for cracks, corrosion, excessive wear, and loose bolts.
- (5) Examine latch rollers, latches, lower pivot fitting, and lower pivot hook for cracks, corrosion, and foreign particles lodged in latches or attached to stops.
- (6) Examine operating handle seal for cracks, cuts, tears and signs of deterioration.
- (7) Examine hatch peripheral seal for cracks, cuts and tears, signs of deterioration, and correct seating when hatch is in closed position.

**NOTE:** This check could be made from outside airplane by viewing seal through gap between hatch and fuselage skin.

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PEX

EMERGENCY EXIT HATCH LINING – REMOVAL/INSTALLATION

1. Remove Emergency Exit Hatch Lining

- A. Remove emergency exit hatch (Ref 52-21-0, Removal/Installation).
- B. Remove molded cover from handle (Detail A, Fig. 401).
  - (1) Move handle to down position and remove three screws or three nuts and bolts as applicable. (See detail A for effectivity.) Also remove spring, if installed.
- C. Remove four screws and two quick-release fasteners attaching sidewall sponge pad panel and support pan to hatch structure and remove sidewall sponge pad panel and support pan (Fig. 401).
- D. Remove two quick-release fasteners attaching lift handle access molding to hatch structure and remove molding.
- E. Remove two quick-release fasteners below lift handle molding attaching handle support zee to hatch structure.
- F. Remove two sidewall mullion trim strips.
- G. Release 10 quick-release fasteners and remove mullion trim strip retainers.
- H. Remove trim panel and trim panel seal.

2. Install Emergency Exit Hatch Lining

- A. Assemble trim panel, trim panel seal and handle support zee (Fig. 401). Position lining to hatch structure and engage quick-release fasteners on mullion trim strip retainers. Engage two quick-release fasteners at handle support zee.
- B. Assemble support pan, sponge pad seal and sponge pad panel and engage two quick-release fasteners.
- C. Position support pan and sponge pad to hatch structure and install four attach screws.
- D. Install lift handle access moulding using two quick-release fasteners.
- E. Install two sidewall mullion trim strips.
- F. Install molded cover on handle clamp (detail A).
  - (1) Position cover without metal straps (see detail A for effectivity) on handle clamp and install three screws and washers.
  - (2) Position cover with metal straps (see section A-A for effectivity) on handle and install three bolts, inserts, washers and nuts.
    - (a) If spring is installed (detail A), attach spring to handle web with screw, nut, and one washer each under screw head, under nut, and between spring and upper surface of handle web. Attach spring to clamp with screw, nut and one washer each under screw head, between spring and upper surface of clamp flange, and under nut (bolt installed with head on lower side of clamp flange).

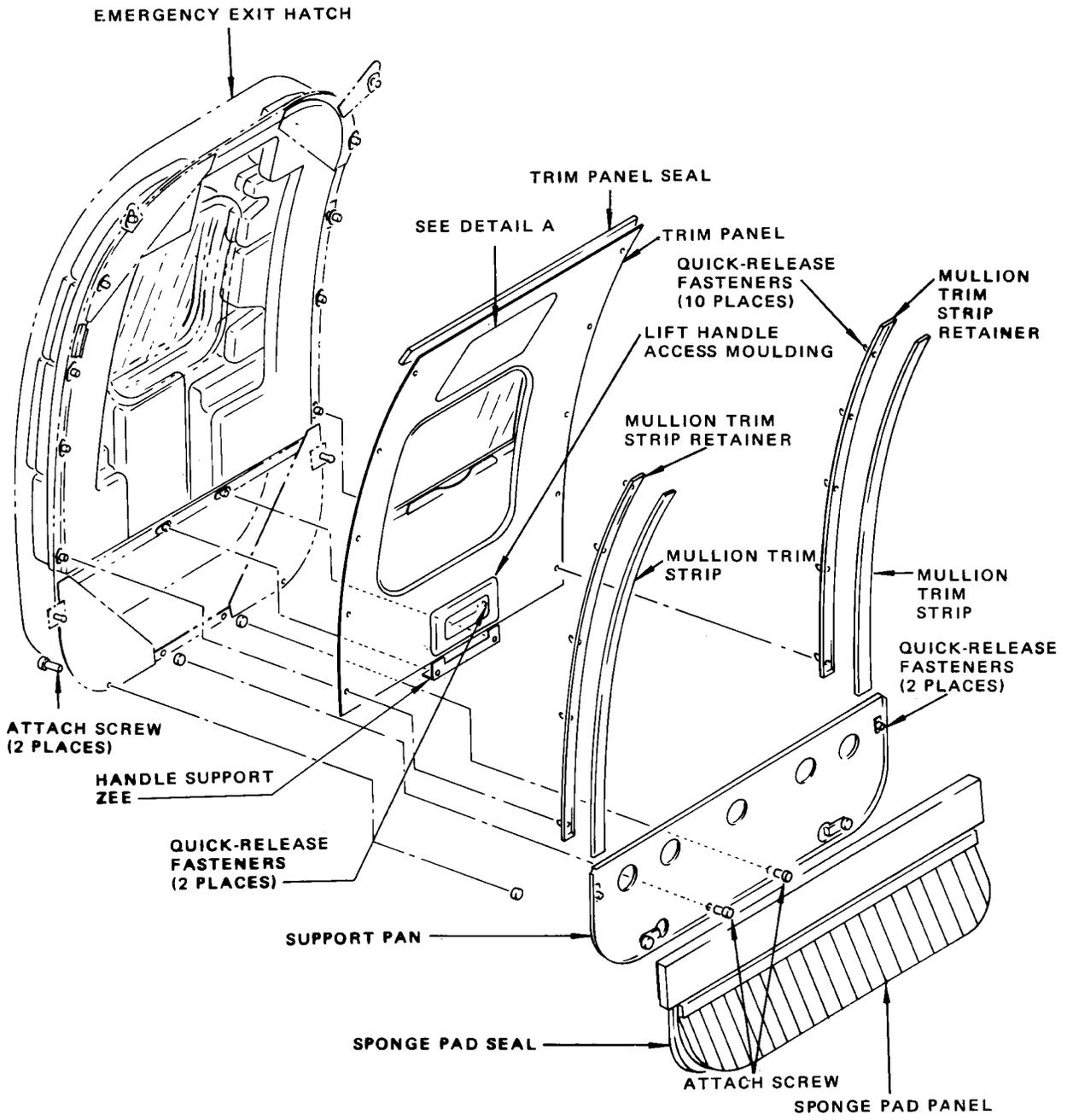
NOTE: On installations using spring, clamp spacers are permanently riveted in place.

EFFECTIVITY  
Airplanes without New Look Interior

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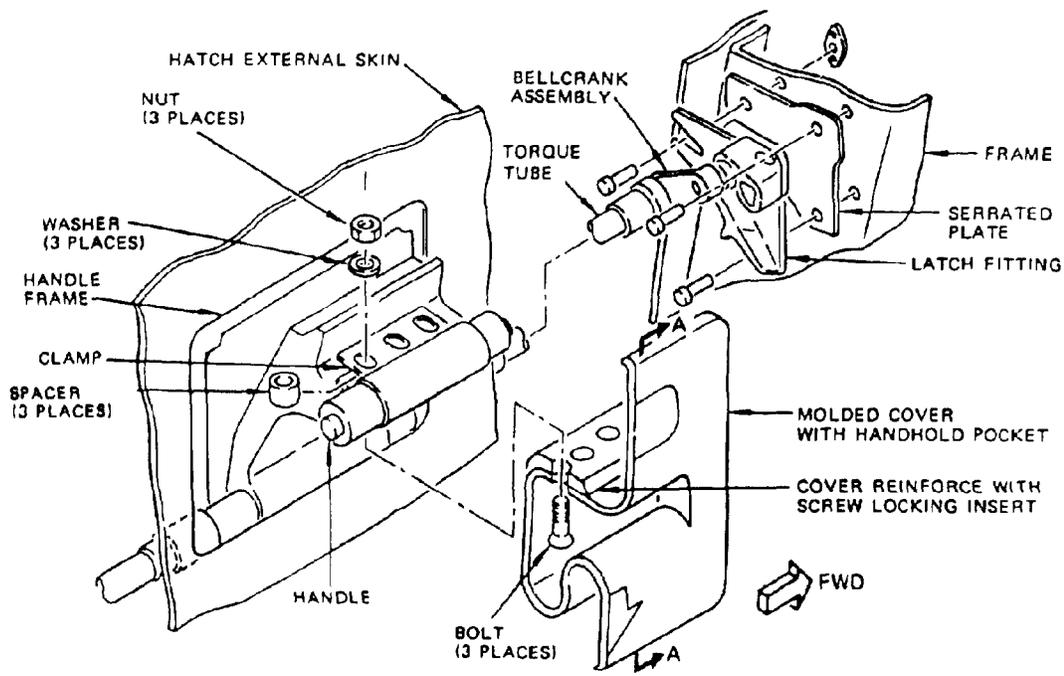


Emergency Exit Hatch Lining Installation  
 Figure 401 (Sheet 1)

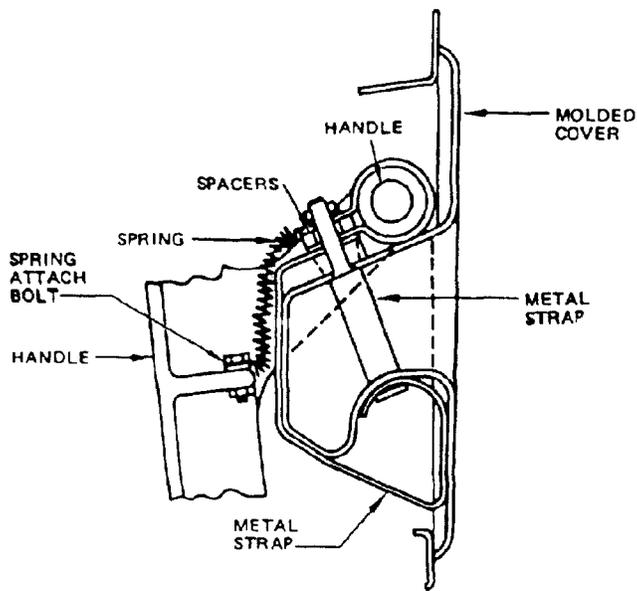
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DETAIL A 



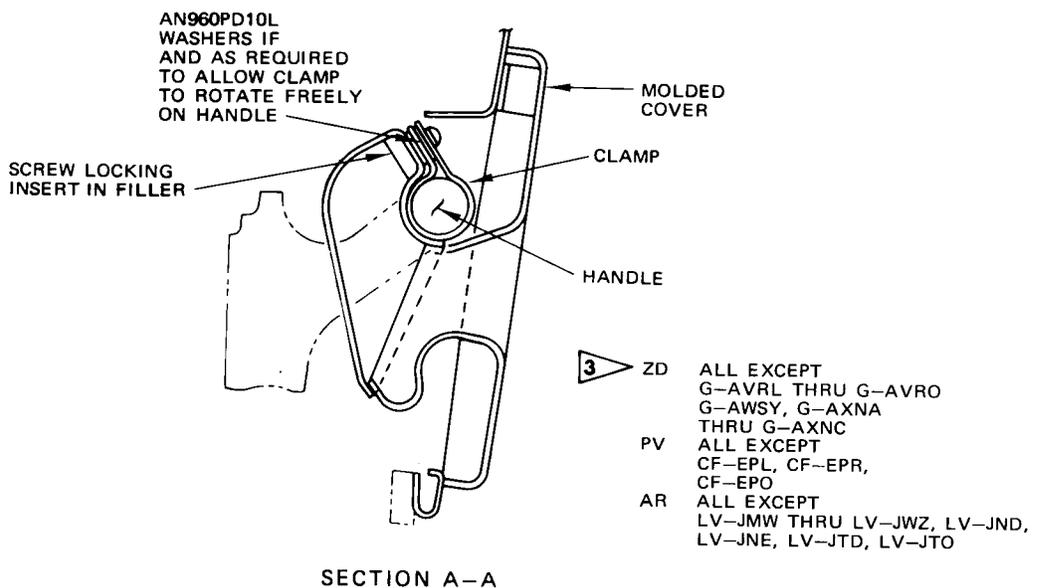
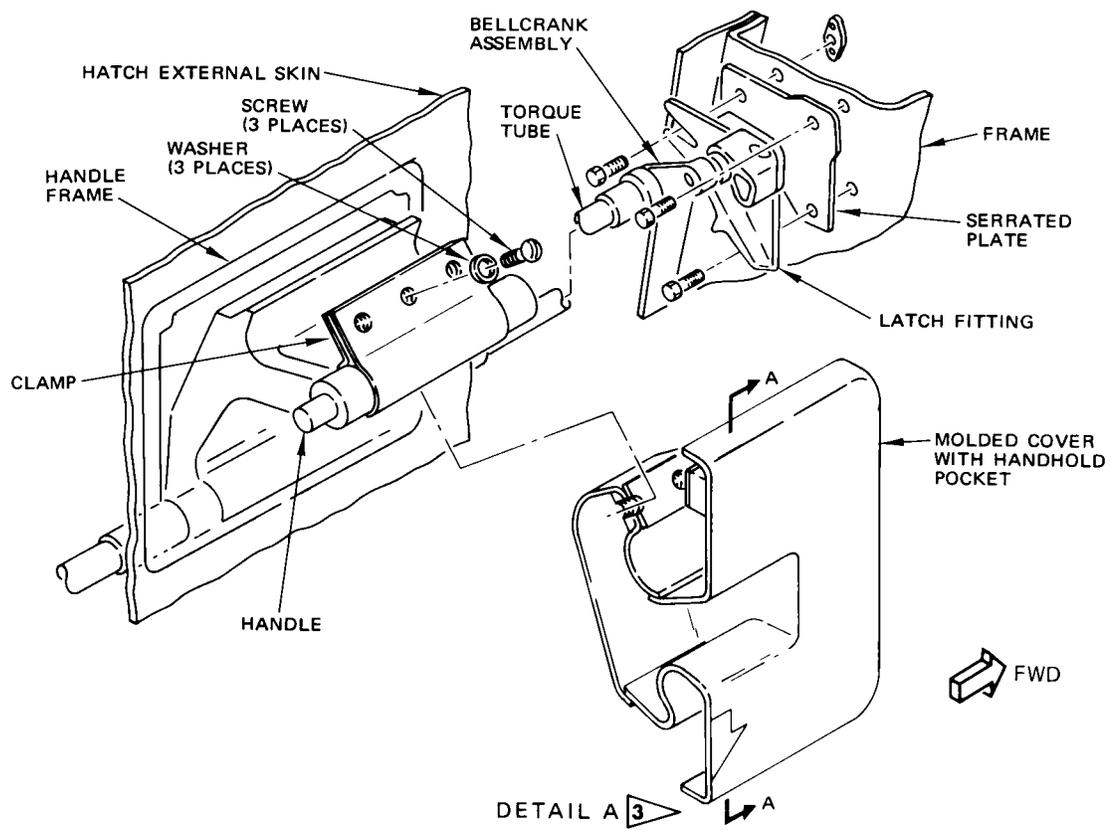
SECTION A-A 

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 LV-JNE, LV-JTD THRU LV-JTO

Emergency Exit Hatch Lining Installation  
 Figure 401 (Sheet 2)

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 Airplanes without New Look Interior

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Emergency Exit Hatch Lining Installation  
 Figure 401 (Sheet 3)

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- (3) Adjust cover for minimum gap against trim panel and tighten screws or nuts as applicable.
- G. Install emergency exit hatch (Ref 52-21-0, Removal/Installation).
- H. Check that force required to operate hatch is between 10 and 25 pounds, with lining installed (Ref 52-21-0, Adjustment/Test).

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EMERGENCY EXIT HATCH LINING - REMOVAL/INSTALLATION

1. Remove Emergency Exit Hatch Lining

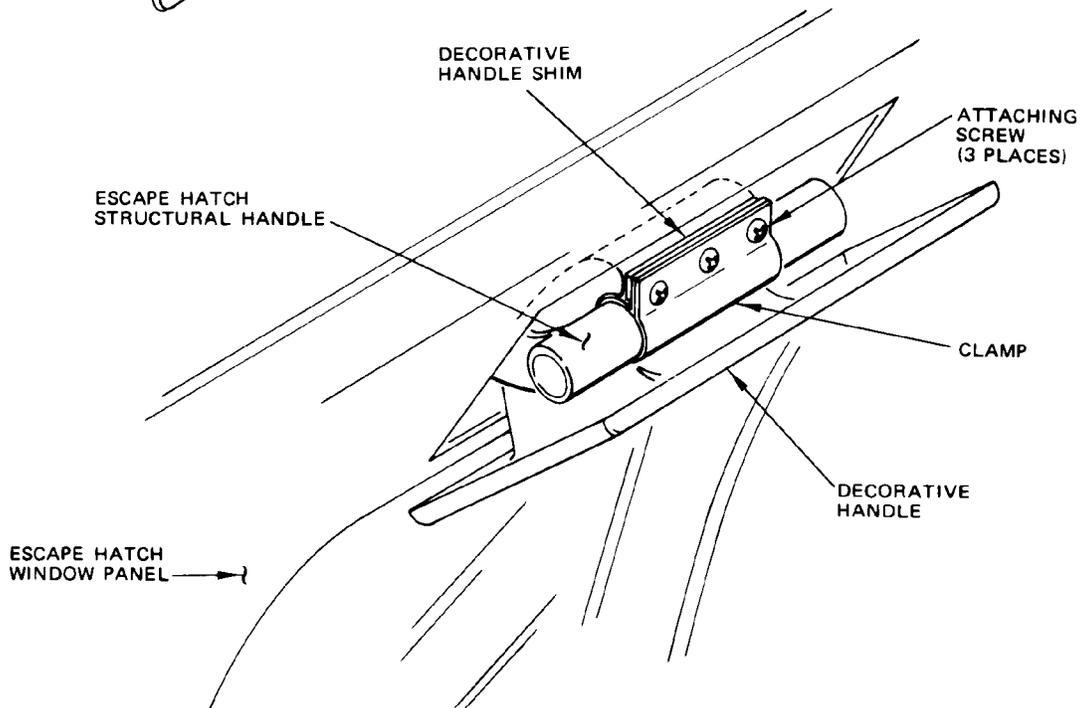
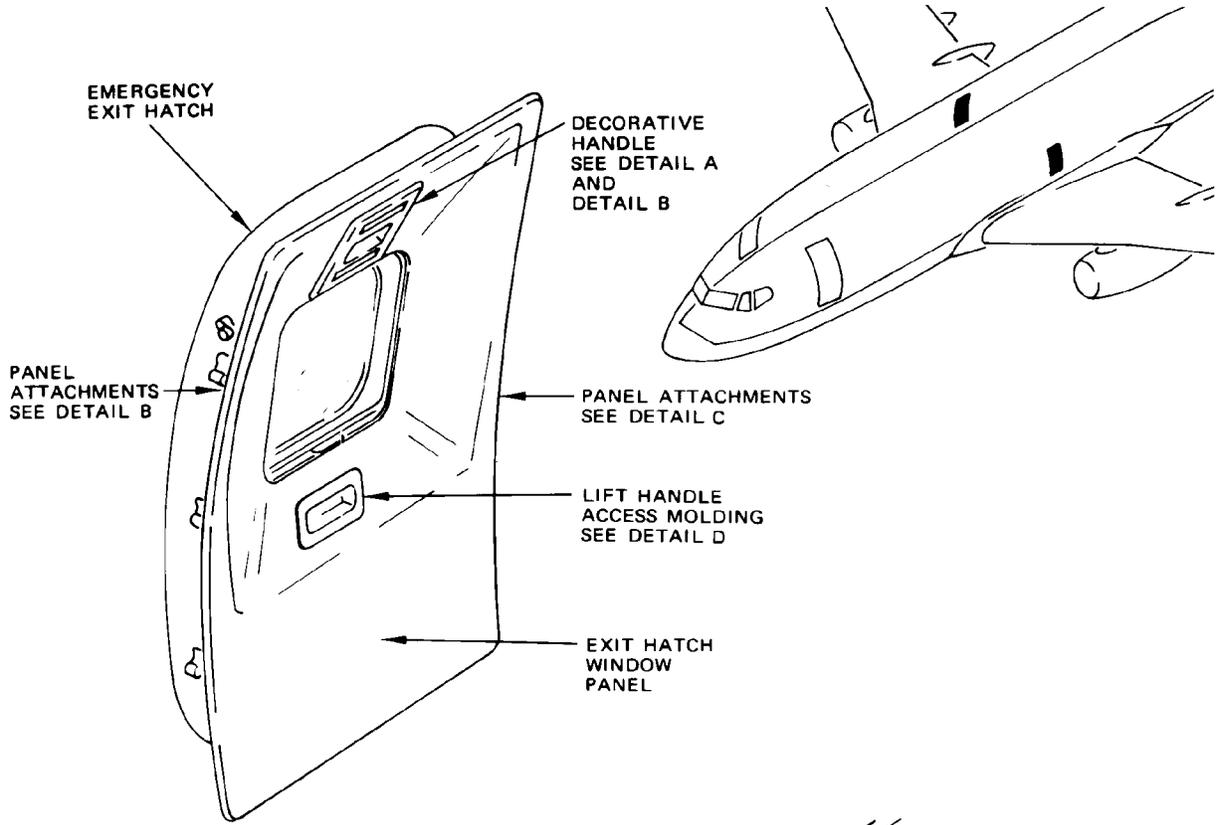
- A. Remove emergency exit hatch (Ref 52-21-0 R/I).
- B. With the handle in the down position, remove three screws that attach molded cover to clamp on handle and remove cover (Detail A, Fig. 401).
- C. Remove two quick-release fasteners attaching lift handle access moulding to hatch structure and remove moulding.
- D. Remove two fasteners below lift handle moulding attaching handle support zee to hatch structure.
- E. Remove 30 screws around hatch periphery attaching trim panel and seal to hatch structure.
- F. Remove trim panel and seal.
- G. Deleted.

2. Install Emergency Exit Hatch Lining

- A. Deleted.
- B. Position trim panel on hatch structure and engage two fasteners below lift handle moulding attaching handle support zee to hatch structure.
- C. With seal in place around periphery of hatch structure, engage 30 screws attaching trim panel and seal to hatch structure.
- D. Install lift handle access molding using two quick-release fasteners (Detail D, Fig. 401).
- E. Position molded cover to clamp on handle and install screws (Detail A, Fig. 401).

NOTE: Adjust cover position for minimum gap against window panel before tightening screws.

- F. Install emergency exit hatch. Refer to 52-21-0, Emergency Exit Hatch - Removal/Installation.
- G. Check that force required to operate hatch is between 10 and 25 pounds, with lining installed. Refer to 52-21-0, Emergency Exit Hatch - Adjustment/Test.



DETAIL A

Emergency Exit Hatch Lining Installation  
 Figure 401 (Sheet 1)

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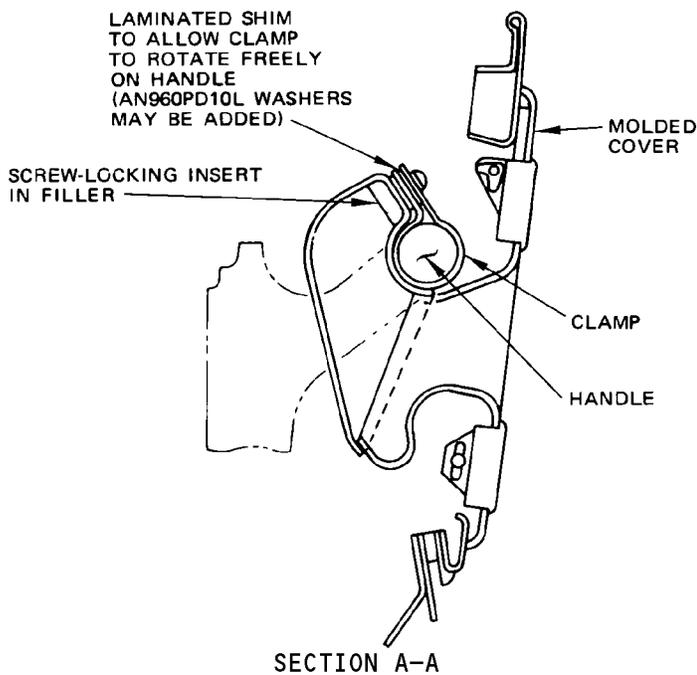
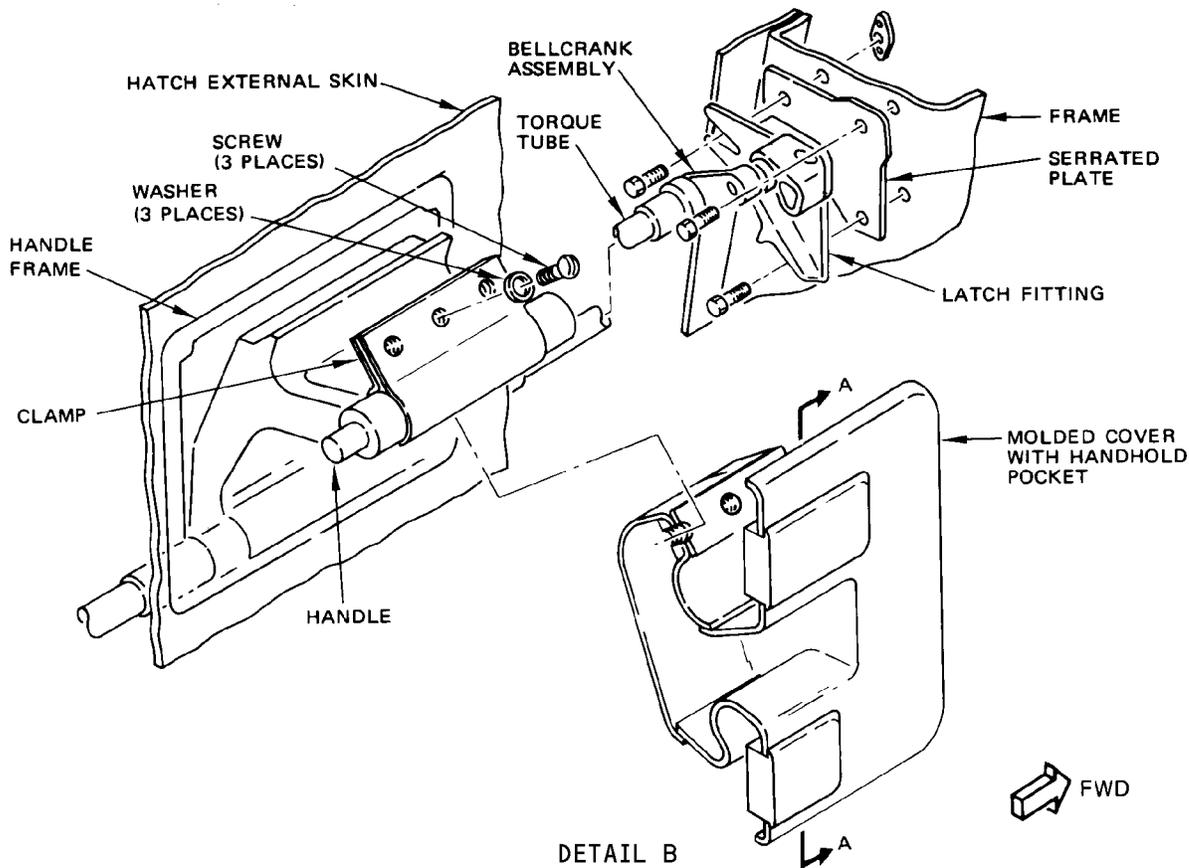
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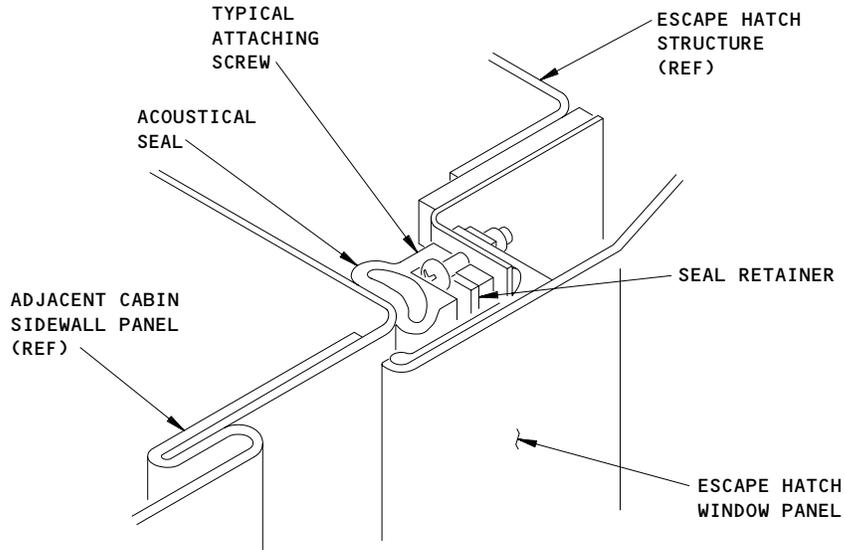
**MAINTENANCE MANUAL**



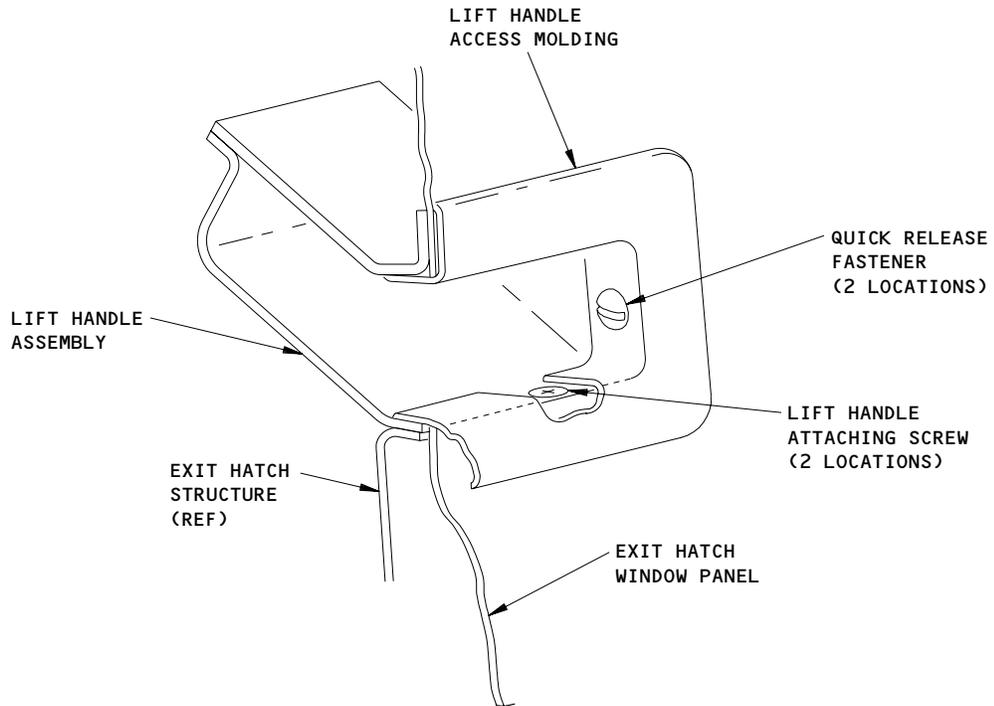
Emergency Exit Hatch Lining Installation  
Figure 401 (Sheet 2)

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DETAIL C



DETAIL D

Emergency Exit Hatch Lining Installation  
 Figure 401 (Sheet 3)

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 Airplanes with New Look  
 Interior

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CARGO COMPARTMENT DOORS – DESCRIPTION AND OPERATION

1. General

- A. There are two cargo compartment doors on the lower right side of the fuselage, one serving each cargo compartment. (See figure 1.) Both are plug-type, inward opening doors, hinged at their upper edges and operated manually from either inside or outside the airplane. Except for slight differences in shape, both doors are similar in design and operation.
- B. The forward cargo compartment door provides access to the oxygen storage cylinders which are located in the forward cargo compartment.
- C. Each cargo door is an alclad structure with outer and inner skin and internal webs and stiffeners. The door is hinged from the fuselage structure by two hinge arms on its upper edge which are adjustable through the use of serrated plates and shims. The forward and aft cargo doors are equipped with a centering device. Two rollers at the fore and aft door edges locate the door in the closed position by engaging roller stop fittings on the door jambs. Around the periphery of the door a continuous sealing strip prevents loss of cabin pressure around the door edges when the airplane is in flight. Pressurization loads on the door are transmitted to the fuselage by twelve adjustable stop fittings attached along the forward, aft, and lower edge of the door, which bear against corresponding stop pads attached to the fuselage structure surrounding the door. Loads on the upper edge of the door are transmitted to fuselage structure by the two hinge arms. Two access panels in the outer skin provide external access to the door latching mechanism to open the door in the event of failure of the latching mechanism.
- D. Each door is equipped with a balance mechanism which counterbalances the weight of the door and thus, facilitates door opening. A snubber, installed between the hinge arms on each door, restrains the free fall of door from the open position if the balance mechanism cable fails. A positive mechanical latch on each door secures it in the fully open position while this condition is desired. Each door has a door warning switch.

2. Latching Mechanism

- A. The door latching mechanism consists of an internal horizontal torque tube at each end of which a short arm carrying a latching roller protrudes beyond the edge of the door. These latching rollers engage latch fittings attached to the fuselage structure. The torque tube in the door is connected to the operating handle assembly, which consists of a short shaft passing through the thickness of the door, with an operating handle at each end. The handle on the inboard side of the door projects beyond the inboard skin, but the outboard handle is spring-loaded so that it retracts flush with the exterior surface when it is released after use. A recessed finger access pan adjacent to the handle provides access for the fingers when the handle is to be used.

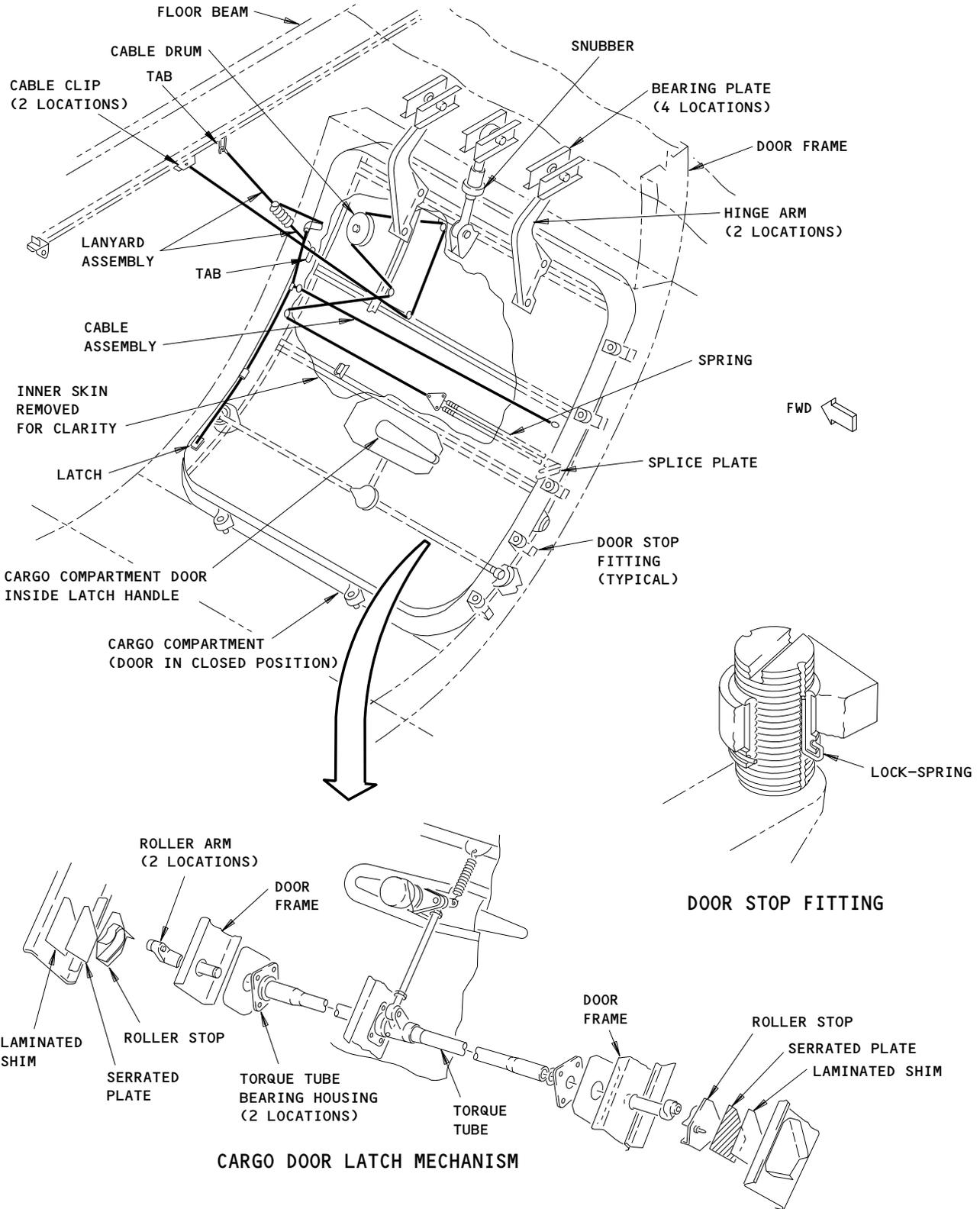
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Cargo Compartment Doors Component Location  
 Figure 1

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3. Balance Mechanism

A. Door balance is maintained by helical extension springs attached to the upper aft inner edge of the door, between the inner web and outer skin. The springs connect to a cable assembly that is wound on a cable drum mounted on the forward inner structure of the door. (See figure 1.) From the cable drum the cable runs over two pulleys mounted on the inner structure of the door, through a grommet in the door inner web, and connects to an overhead floor beam. The cable grooves in the cable drum have a decreasing radius in order to provide a constant tension in the cable system as the door is opened and closed. The balance mechanism is arranged so that when the door is closed the springs are stretched; when the door is opened the springs contract to raise the door to or near the open latched position.

4. Operation

A. The door is opened from outside the airplane by pulling the door handle out of its recess and rotating it counterclockwise. Rotation of the handle actuates a torque tube to withdraw the latch rollers from their latch fittings. As the door swings inboard, under tension of the door balance mechanism, the door warning proximity switch is actuated to energize the appropriate door warning light in the control cabin. As soon as the door has moved clear of its latch fittings, the handle may be released. Springs within the handle will cause it to return to its normally locked and recessed position. With little or no manual effort, the door may be swung open until the spring-loaded mechanical latch on its lower edge engages with a fitting under the fuselage floor structure. The door may also be opened from inside the airplane, using the nonretracting inner handle. In this case the procedure is similar except that rotation of the handle appears clockwise to the operator. Access to the inside handle is obtained by pulling aside the cargo net which extends from the ceiling to the lower edge of the door.

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- B. The door is closed by pulling on the handle of the lanyard which releases the latch (Fig. 2). This handle is adjacent to the cargo retaining net just inside and forward of the door opening, and is accessible to personnel standing on the ground. The lanyard to which it is attached is so designed that the handle has to be pulled outside the door opening before the latch will disengage. After the latch is disengaged, a continued pull on the lanyard brings the door down until the operating handle is within reach of the operator's left hand. The handle is grasped by lifting the handle out of its recess. As soon as a firm grip is established on the operating handle, the handle of the lanyard is released and springs back to its normal position within the cargo compartment. Counterclockwise rotation of the operating handle aligns the latch rollers with their latch fittings and allows the door to be pulled down and latched by a clockwise rotation of the handle. This final movement engages both latch rollers in their fittings, actuates the door warning proximity switch de-energizing the appropriate warning light in the control cabin. When the door is thus closed and latched, the handle may be released to spring back into its recess.

**WARNING:** ENSURE HANDLE ROTATION IS COMPLETE BEFORE STOWING EXTERNAL HANDLE TO ENSURE LATCHES ARE ENGAGED.

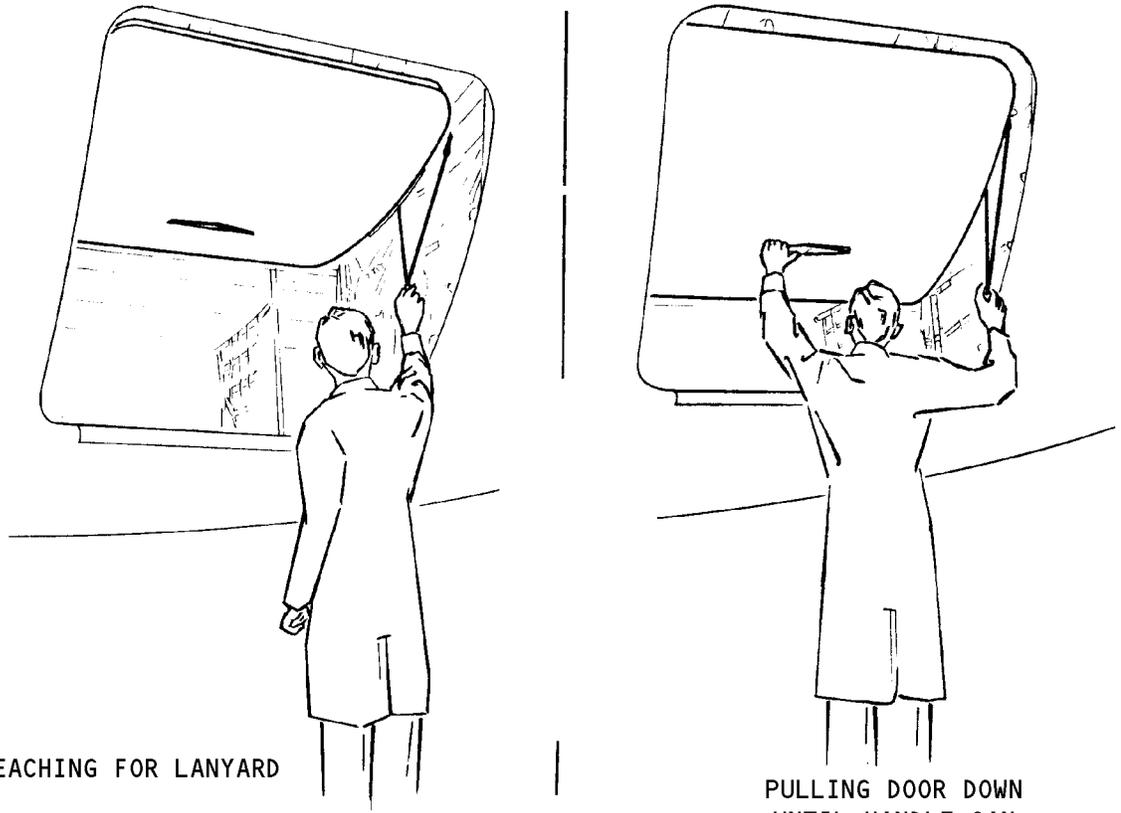
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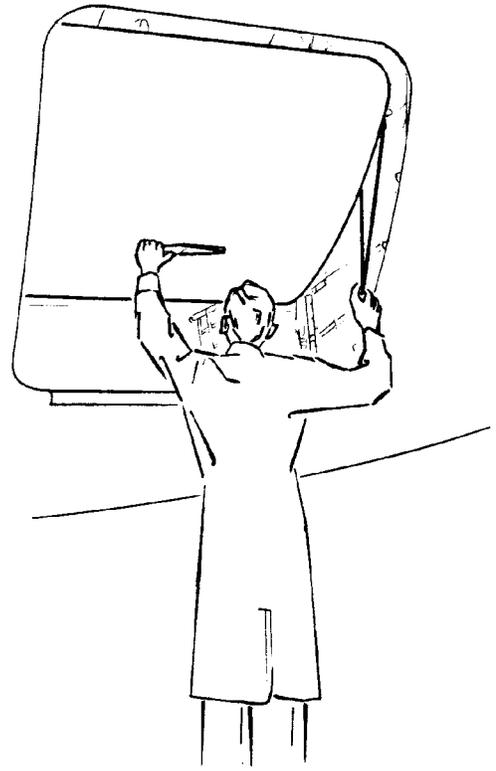
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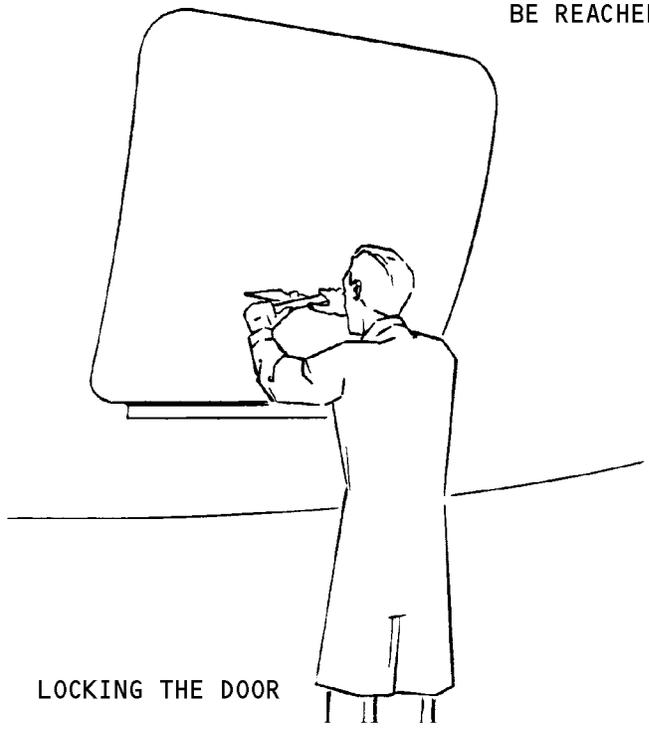
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REACHING FOR LANYARD



PULLING DOOR DOWN  
UNTIL HANDLE CAN  
BE REACHED



LOCKING THE DOOR

Cargo Compartment Door Operation  
Figure 2

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MAINTENANCE MANUAL

CARGO COMPARTMENT DOORS - TROUBLESHOOTING

1. Forward and Aft Lower Lobe Cargo Doors Troubleshooting Chart

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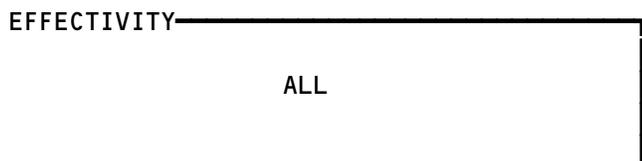
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TROUBLE	PROBABLE CAUSE	REMEDY
<p>High closing torque on door handle            (Exceeds 400 pound-inches on outer handle, or 300 pound-inches on inner handle)</p> <p>Excessive play between balance mechanism cable drum and bearing.</p> <p>Deformation of balance mechanism cable drum grooves.</p>	<p>Interference between door and structure other than seal. Locate problem area by pushing on each corner of door while operating handle (maximum force of 80 pounds). Locate point of interference by listening for bottoming of door on structure</p> <p>Heavy contact of door seal on seal plane. (A strip of paper 1-inch wide trapped between seal and structure will tear when pulled out if contact is excessive).</p> <p>Bottoming of latch rollers, stop pins, or cranks. Use modeling clay to inspect where bottoming occurs.</p> <p>Door appears warped or does not match body contour within allowable tolerance. This may be due to wear or misalignment of upper door hinges.</p> <p>Wear or corrosion of bearing outer race resulting in bearing being loose inside drum.</p> <p>Bearing wear allowing excessive play in drum.</p>	<p>Eliminate source of interference.</p> <p>Check seal retention in seal channel and eliminate all seal warpage. Seal should be loose enough to be pulled along in channel.</p> <p>Readjust latch roller stop fittings, stop pins, etc., as necessary (Ref 52-31-0, Removal/Installation).</p> <p>Adjust door (Ref 52-31-0, Removal/Installation)</p> <p>Replace worn or corroded parts.</p> <p>Replace worn or damaged parts.</p>

Cargo Compartment Door Operation  
 Figure 101 (Sheet 1)

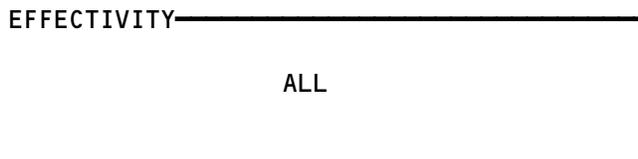


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TROUBLE	PROBABLE CAUSE	REMEDY
Excessive movement between torque tubes, cranks, splices and fittings	Check for loose, worn or damaged parts.	Replace worn or defective parts.
Hard spots and mechanism binding when operating door handle	Door latching rollers may not be engaging roller stop fittings during the last inch of travel.	Adjust door latch roller stop fittings and/or door (Ref 52-31-0 Removal/Installation).
Grinding or scraping noises.	Lack of lubrication or corrosion in moving components.	Lubricate components (Ref 12-25-31) or replace parts.
No snubbing action when door is being closed.	Door snubber or snubber linkage broken or malfunctioning.	Replace damaged components.
Door Warning Light illuminated with door closed.	Misadjusted or failed door sensor.	Adjust or replace door sensor (Ref 52-71-0, Adjustment/Test).
Door Warning Light is not illuminated when door is open.	Failed or malfunctioning circuit cards A6 and/or A7 in Miscellaneous Switching Module M278.	Replace faulty circuit card A6 or A7.
	Failure of K1 or K2 relays.	Replace K1 or K2 relays.

Cargo Compartment Door Operation  
Figure 101 (Sheet 2)



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CARGO COMPARTMENT DOORS – REMOVAL/INSTALLATION

1. General

- A. The forward and aft cargo compartment doors are similar in design and operation (Fig. 401 and 402).
- B. Two procedures are given to cover the following:
  - (1) Removal/Installation of an existing cargo compartment door (Ref par 3).
  - (2) Installation of a new cargo compartment door or a door that has not been fitted to the airplane (Ref par. 4).

2. Equipment and Materials

- A. Door support brace – 2- x 4-inch wood painted red of suitable length to support the door in open position, or equivalent
- B. C-clamp (or equivalent) to hold balance mechanism cable
- C. Corrosion Preventive Compound – MIL-C-16173, Grade 2, or equivalent (Ref 20-30-21)
- D. Organic Corrosion Inhibiting Compound – BMS 3-23 (Ref 20-30-21)
- E. Sealant – BMS 5-95

3. Removal/Installation, Existing Cargo Compartment Door

- A. Remove Cargo Compartment Door
  - (1) Open cargo compartment door. Using the door support brace, position door as necessary to facilitate removal of equipment.
  - (2) Remove latch support clip (13, Fig. 401) from overhead floor beam
    - (1) This is a safety precaution to ensure use of the door support brace.

**WARNING:** IF DOOR BALANCE MECHANISM AND SNUBBER ARE DISCONNECTED AND DOOR IS LATCHED OPEN, THE ACCIDENTAL UNLATCHING OF THE DOOR CAN RESULT IN INJURY TO PERSONNEL AS DOOR WILL FALL TO THE CLOSED POSITION.

- (3) Place clamp on door balance mechanism cable at inner surface of door to prevent cable from retracting when disconnected from overhead beam.
- (4) Disconnect door balance mechanism cable from cable clip (15, Fig. 401) on overhead floor beam (1).
- (5) Remove clamp installed on cable in step 3.

**CAUTION:** CABLE IS UNDER HIGH TENSION. HOLD CABLE FIRMLY DURING REMOVAL OF CLAMP. RELEASE CABLE GRADUALLY, PERMITTING SPRINGS TO RETRACT SLOWLY.

- (6) Disconnect lanyard assembly (14) from door or from floor beam (L).
- (7) Disconnect snubber (16) from door by removing bolt (17).
- (8) Remove hinge bolts (3) to disconnect door from hinge arms (2). Collect and tag shims for reinstallation.

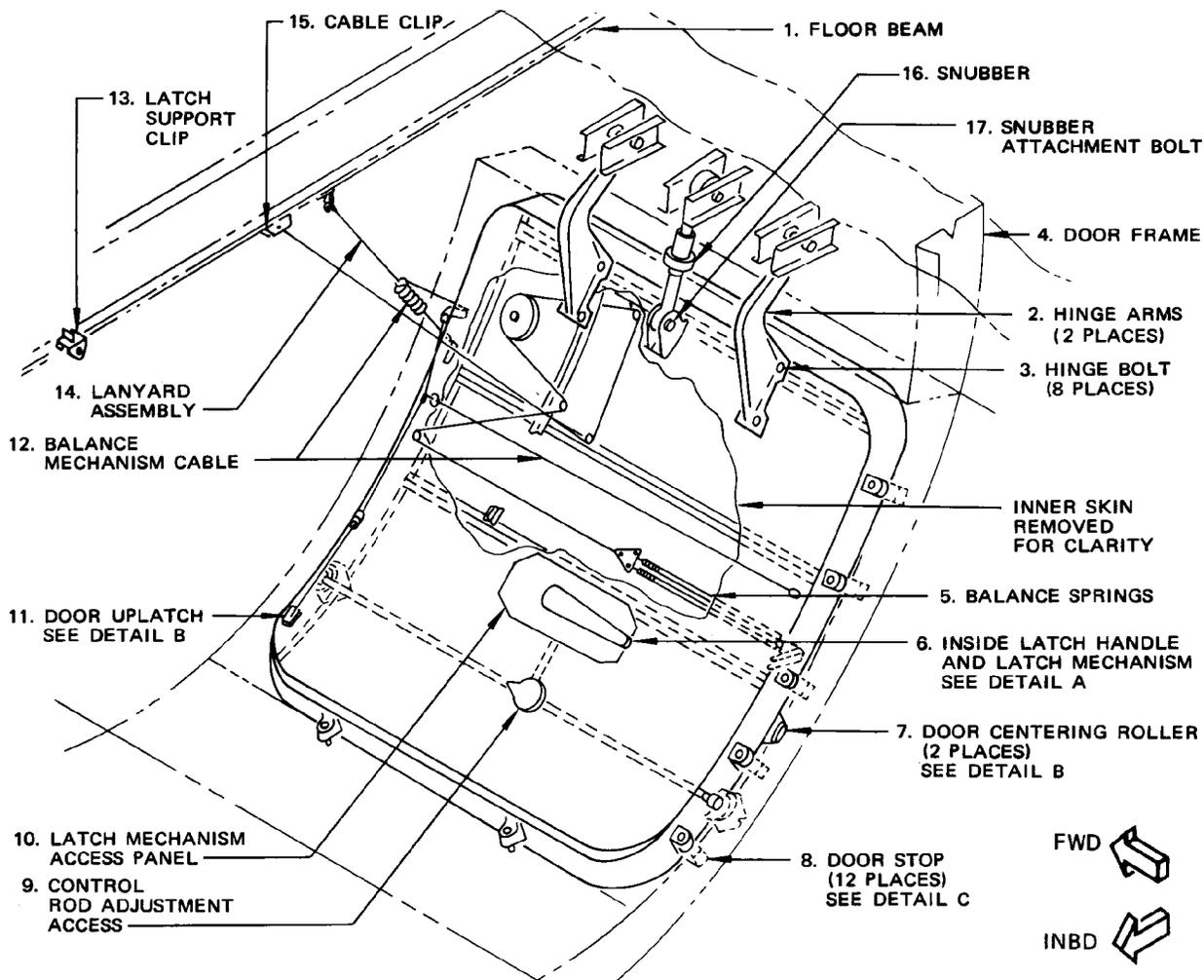
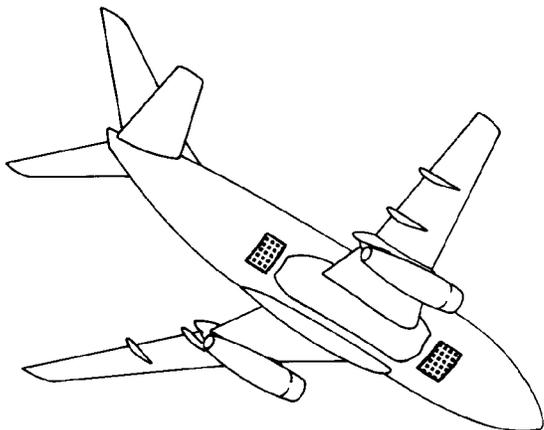
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Cargo Compartment Door Installation  
 Figure 401 (Sheet 1)

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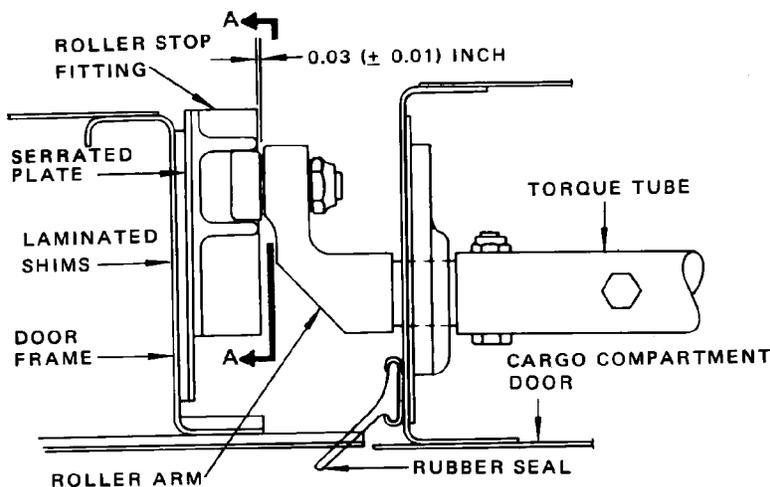
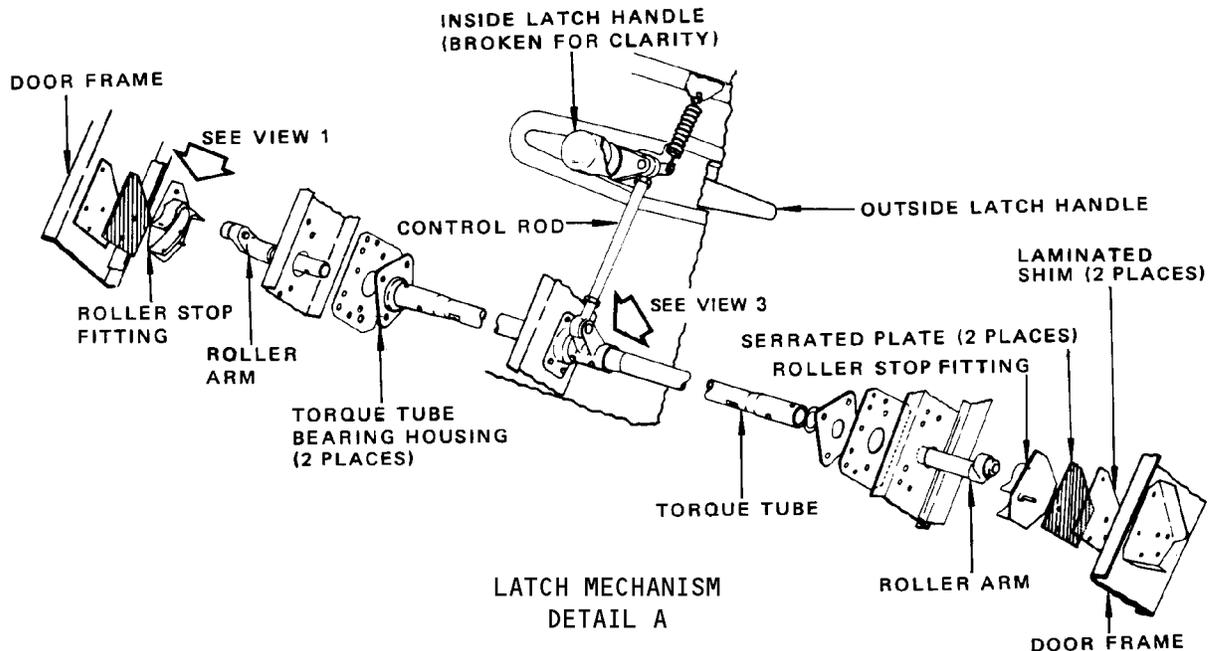
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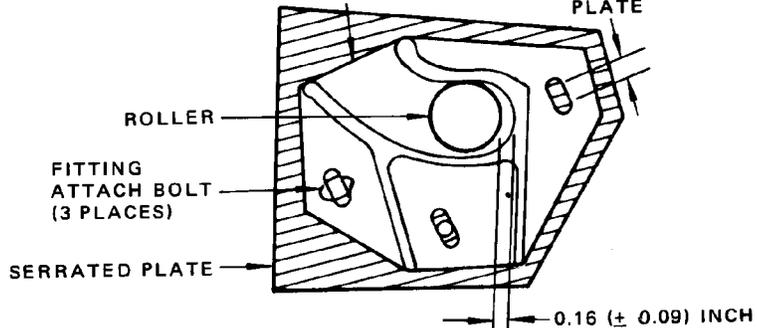


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CAM  
ADJUSTMENT  
RANGE  
0.25 INCH  
ON SERRATED  
PLATE

ROLLER STOP FITTING  
WITH DOOR IN CLOSED  
POSITION



ROLLER STOP FITTING  
SECTION A-A

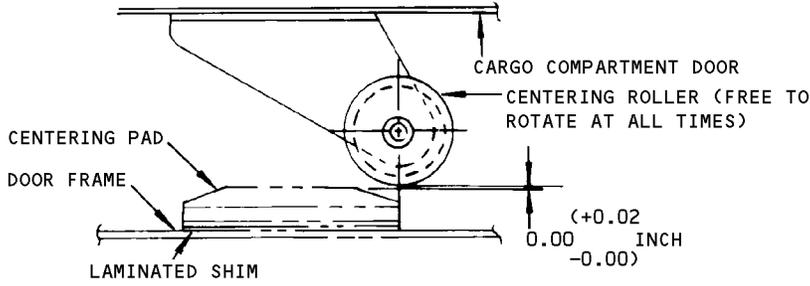
Cargo Compartment Door Installation  
Figure 401 (Sheet 2)

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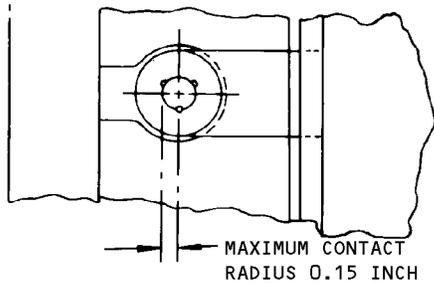
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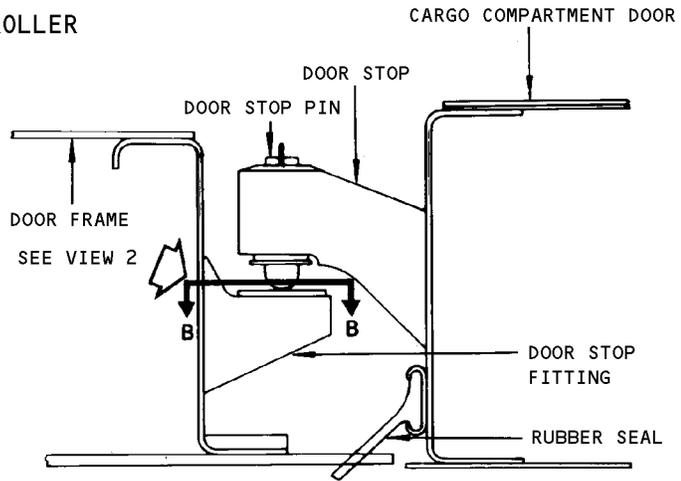
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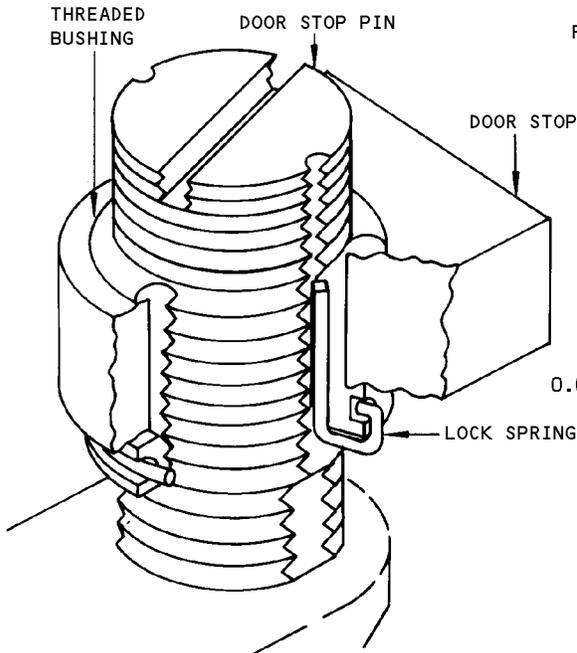
**DOOR CENTERING ROLLER  
 DETAIL B**



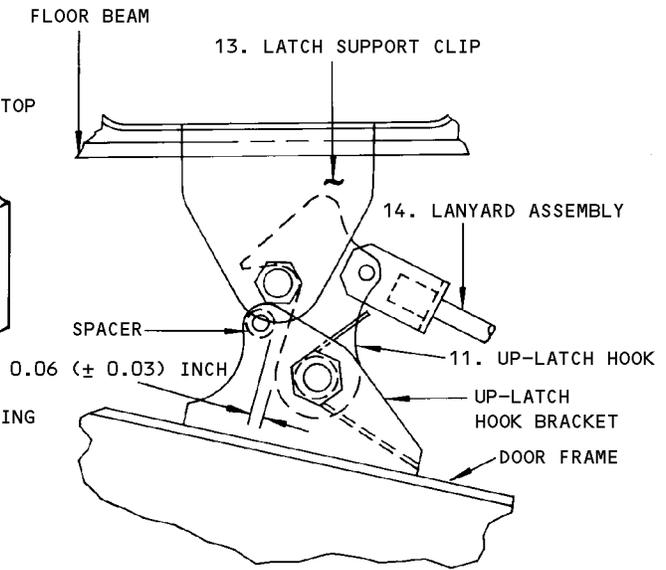
**DOOR STOP FITTING  
 SECTION B-B**



**DOOR STOP  
 DETAIL C**



**DOOR STOP PIN  
 VIEW 2**

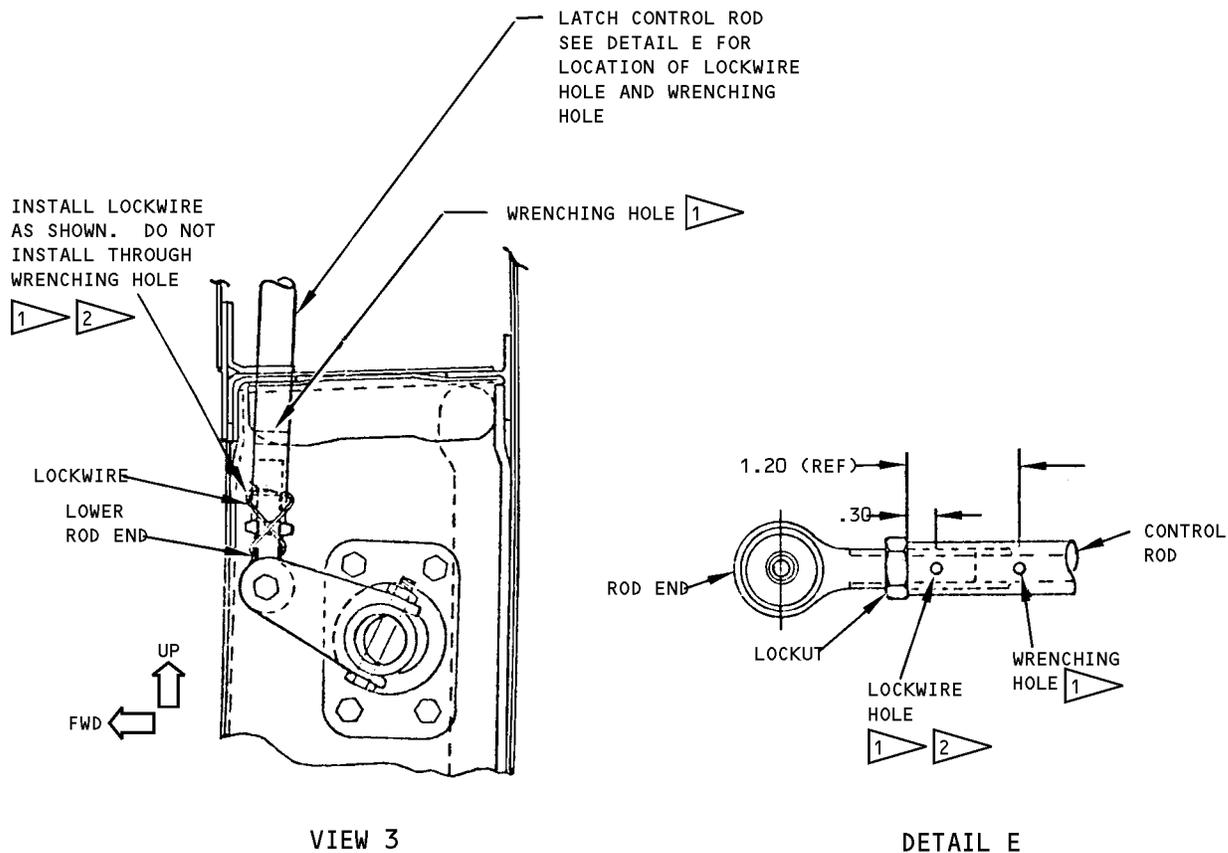


**SHOWN WITH DOOR LATCHED OPEN  
 DETAIL D**

**Cargo Compartment Door Installation  
 Figure 401 (Sheet 3)**

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- 1 INSTALLATION OF LOCKWIRE THROUGH WRENCHING HOLE CAN MAKE IT POSSIBLE FOR ROD ADJUSTMENT TO CHANGE, AND COULD RESULT IN DOOR UNLATCHING
- 2 IF THERE IS NO LOCKWIRE HOLE, DRILL 0.070 INCH DIAMETER HOLE THRU ROD END TO MATCH EXISTING LOCKWIRE HOLE IN ROD. SECURE ROD END AS SHOWN IN VIEW 3 WITH LOCKWIRE MS20995C32 USING DOUBLE TWIST METHOD. (REF OVERHAUL MANUAL, SUBJECT 20-50-02)

Cargo Compartment Door Installation  
 Figure 401 (Sheet 4)

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- (9) Remove door and door support brace through opening.  
B. Install Cargo Compartment Door

**NOTE:** Door being installed must have already been fitted to airplane.

- (1) Apply organic corrosion inhibiting compound to door hinge areas, under scuff plates, and lower 3 to 4 inches of door interior per instructions in 51-21-91.
- (2) Insert door through opening into cargo compartment.
- (3) Connect hinge arms (2, Fig. 401) to door as follows:
  - (a) Examine hinge attach bolts and nuts prior to installation. If bolt threads show evidence of bottoming out, the nut should be checked for damaged thread and replaced if necessary along with a proper bolt.

**NOTE:** Variations in shim thickness between the hinge fitting and door necessitate selective bolt length dependent on amount of stackup. Use of proper length bolts ensure the integrity of the hinge attachment.

- (b) Install shims removed in step 3.A.(8) between hinge arms (2) and door; connect hinge arm to door with bolt (3).
  - 1) After installation, if any bolt is loose or not clamping hinge fitting securely to door, the bolt should be removed and checked for proper grip length. If bolt does not fully engage locking feature of nut, a longer bolt should be installed.
- (4) Position door on door support brace and connect snubber (16) to bracket on door with bolt (17). Check that the snubber restrains the free fall of door from the open position.

**WARNING:** TO AVOID INJURY TO PERSONNEL WORKING ON OR NEAR THE DOOR, ALWAYS USE THE RED COLORED DOOR SUPPORT BRACE TO HOLD DOOR OPEN WHEN BALANCE MECHANISM AND SNUBBER ARE DISCONNECTED.

- (5) Pull 8 to 10 inches of balance mechanism cable from door and place clamp on cable to prevent retraction.
- (6) Connect balance mechanism cable (12) to cable clip (15) on overhead floor beam (1). Remove clamp from cable.
- (7) Connect door lanyard assembly (14) to door or to floor beam.
- (8) Install latch support clip (13) on overhead floor beam (1). The clip was removed as a safety precaution.

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4. Installation, New Cargo Compartment Door

A. Prepare for installation.

- (1) The following items must be removed from old door for installation on new door.
  - (a) Door lanyard assembly.
  - (b) Door balance mechanism (Ref 52-31-11).
  - (c) Doorstops (2 places) on lower edge of aft door only.
  - (d) Doorstop pins and lock springs 12 places on forward door, 10 places on aft door.
  - (e) Door seals and door up-latch.
- (2) Install door up-latch (11, Fig. 401) on new door.

**NOTE:** The latch hook bracket is provided with slotted holes to allow adjustment of the up-latch hook per step B.(16).

- (3) Install doorstops (two places) on lower edge of aft door only.
- (4) Install stop pins 10 places on aft door, 12 places on forward door (detail C).

**NOTE:** Install stop pins with thin coating of MIL-C-16173, Grade 2, corrosion preventive compound on both internal and external surfaces of mating threads.

- (5) Remove roller stop fittings, serrated plates and shims (detail A) from doorframe, two places. Collect and tag shims for reinstallation.

**NOTE:** Door warning switch must be disconnected from forward roller stop fitting.

- (6) Remove centering pads and shims from doorframes two places (detail B).
- (7) Apply organic corrosion inhibiting compound to door areas per par. 3.B.(1).
- (8) Apply a 0.12 inch fillet of sealant between the inboard edge of the door stop pin and the door stop fitting.

B. Install New Cargo Door

- (1) Position door in opening so that stop pins are centered on stop pads within 0.15 inch (Detail C, Fig. 401).
- (2) Adjust stop pins until door is recessed as shown in Fig. 402. Door must not protrude beyond fuselage exterior.

**NOTE:** If necessary trim door skin to clear body skin; however, final clearance must be per step (10) with door closed and latched.

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- (3) Attach hinge arms to door; shim between door and hinge arm as required. Maintain position and recess per steps (1) and (2). Observe special bolt installation instructions specified in par. 3.B. (3).
- (4) Using door support brace, position door as necessary and connect snubber (16) to bracket on door with bolt (17). Check that snubber restrains free fall of door from open position.

**WARNING:** TO AVOID INJURY TO PERSONNEL WORKING ON OR NEAR DOOR, ALWAYS USE RED COLORED DOOR SUPPORT BRACE TO HOLD DOOR OPEN WHEN DOOR BALANCE MECHANISM AND SNUBBER ARE DISCONNECTED.

- (5) Install door balance mechanism (Ref 52-31-11 R/I).
- (6) Install centering pads on door frames 2 places (Detail B). Shim as required to have rollers free to rotate at all times with maximum clearance of 0.02 inch; delaminate shims if necessary to obtain required dimension.
- (7) Back off stop pins and install roller stop fittings with serrated plates. Shim to provide  $0.03 \pm 0.01$  inch clearance between stop fitting and latch roller arm (Detail A). Install door warning switch on forward latch fitting.
- (8) Adjust roller stop fittings inboard or outboard on serrated plates so that with door closed and latched, door recess is again as shown in Fig. 402 and latch roller clearance is  $0.16 \pm 0.09$  inch as shown in Fig. 401, Detail A. Both rollers must engage roller stop fitting inner surfaces and torque tube must rotate freely in bearings (Detail A).

**NOTE:** Roller and stop fitting engagement can be checked using modeling clay or similar approved method.

- (9) If required conditions (step 7) cannot be achieved by adjusting roller stop fittings, remove access panel (9) and adjust length of latch mechanism control rod.

**CAUTION:** AFTER ADJUSTMENT OF CONTROL ROD, BE SURE TO RESAFETY CONTROL ROD AS SHOWN IN VIEW 3, FIG. 401. FAILURE TO PROPERLY SAFETY WIRE CONTROL ROD MAKES IT POSSIBLE FOR ROD ADJUSTMENT TO CHANGE WHICH COULD RESULT IN DOOR UNLATCHING DURING UNPRESSURIZED FLIGHT (TAKEOFF OR LANDING).

- (10) Close and latch door. Check that gap between door outer skin and fuselage outer skin is as follows; trim door as necessary.
  - (a) Forward door: top, forward, and aft edge 0.06 to 0.15 inch; lower sill 0.22 to 0.28 inch.

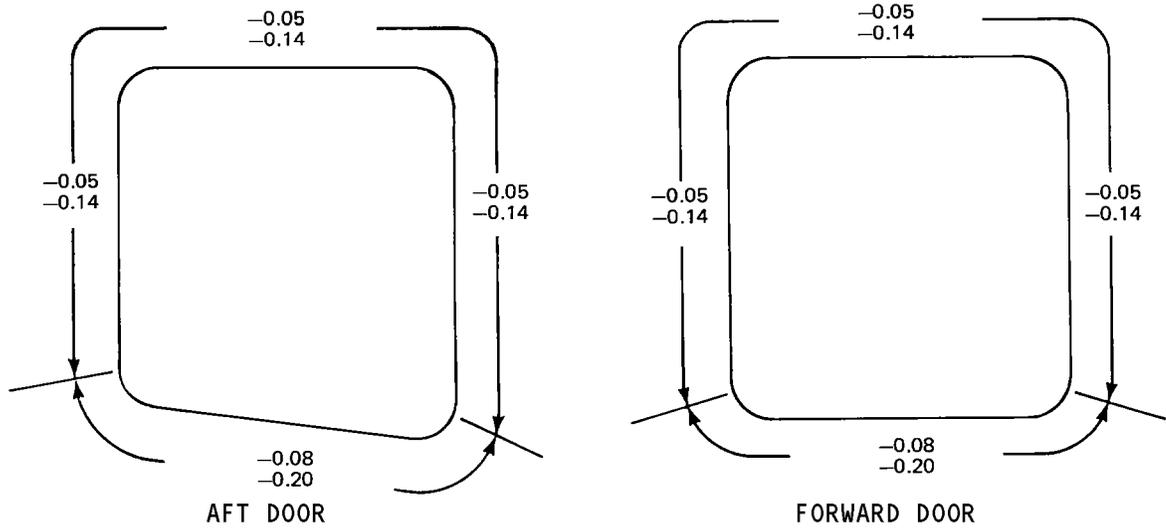
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NOTE: THIS ILLUSTRATION SHOWS THE LIMITS TO ALIGN THE CARGO COMPARTMENT DOOR CONTOURS WITH THE FUSELAGE CONTOURS. A PLUS LIMIT SHOWS THAT THE DOOR IS OUTBOARD OF THE CONTOUR OF THE FUSELAGE. A MINUS LIMIT SHOWS THAT THE DOOR IS INBOARD OF THE CONTOUR OF THE FUSELAGE.

YOU CAN INCREASE THE LIMITS BY 0.03 INCH IN ONE OR MORE LOCATIONS. THE SUM OF THE LENGTHS OF THE INCREASED LIMITS MUST NOT BE MORE THAN 10 INCHES.

MEASURE ALL DIMENSIONS WHEN THE AIRPLANE IS NOT PRESSURIZED.

ALL DIMENSIONS ARE IN INCHES.

Cargo Compartment Door Flushness Requirements  
 Figure 402

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- (b) Aft door: top and forward edges 0.06 to 0.15 inch; aft edge 0.15 to 0.21 inch; lower sill 0.23 to 0.28 inch.
- (11) With door closed and latched, check that torque necessary to operate door handle does not exceed 400 pound-inches applied to outer handle or 300 pound-inches applied to inner handle. Adjust roller stop fittings if necessary.
- (12) With door closed and latched, screw stop pins (Detail C) down until they just contact stop fittings on airframe structure. Open door and back off each stop pin half a turn; then turn the pin to nearest groove in bushing that lines up with a groove in pin and install lockspring.
- (13) Install latch mechanism access panel in door.
- (14) Install door lanyard assembly (14).
- (15) Install latch support clip (13) on overhead floor beam (1). The clip was removed as a safety precaution.
- (16) Latch door in open position and adjust latch hook bracket as necessary to obtain 0.06 +0.03 inch dimension (Detail D). Tighten screws after making adjustments.
- (17) Check seating of door seal.
- (18) Check door warning system for correct operation and adjust if required (52-71-0, Door Warning System).
- (19) Check balance mechanism for correct operation. When door is opened and released using outside handle it should move smoothly upward to or near its up-latched position.

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CARGO COMPARTMENT DOORS – INSPECTION/CHECK

1. Cargo Compartment Doors Inspection

A. Examine Cargo Compartment Doors

- (1) Examine external and internal skins for cracks, burrs and corrosion.
- (2) Examine frames, internal brackets, hinge arm fittings, handle and handle housing for cracks, corrosion and security of attachment.
- (3) Examine the hinge-to-door attach bolts (4 places each hinge arm). If any bolt is found loose or not clamping hinge fitting securely to door, the bolt should be removed and checked for proper grip length. If bolt does not fully engage locking feature of nut, a longer bolt should be installed. If bolt threads show evidence of bottoming out, the nut should be checked for damaged threads and replaced if necessary along with a proper bolt.
- (4) Examine door-operating mechanism for cracks, corrosion, excessive wear and security of attachment.
- (5) Examine latch rollers, latches, doorstops and stop pins for cracks, corrosion and foreign material lodged in latches or attached to stops.
- (6) Examine counterbalance mechanism.
  - (a) Examine cable assembly for condition of cables and swaged terminals. Swaged terminals must be tight to cable.

NOTE: The cable must be replaced if there is more than one broken wire in any 10 inches of cable length.

- (b) Examine pulleys and cable assembly for misalignment. Cable to pulley alignment must be within  $\pm 1$  degree.
- (c) Examine pulleys and pulley brackets for condition and security of attachment.
- (d) Examine grooves in drum and cable ball terminal hole for condition and security of drum attachment.
- (e) Examine springs for condition and security of attachment.
- (7) Examine lanyard assembly for condition of cables, elastic cords and swaged terminals. Swaged terminals must be tight to cable.
- (8) Examine guide assembly, up-latch hook and associated parts for condition and security of attachment.
- (9) Examine exterior skin insulation for condition of pads and security of attachment.
- (10) Examine doorstops for misalignment using doorstop pin bearing marks on frame stop buttons.

NOTE: Doorstop bearing marks are a result of flight plus fuselage and pressure loads.

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- (11) Examine door seal for cracks, cuts and tears, signs of deterioration, and correct seating when door is in closed position.

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### CARGO COMPARTMENT DOORS – APPROVED REPAIRS

1. General
  - A. Repair of cargo compartment doors fuselage mounted doorstops may be accomplished as a basic repair (Ref par. 3).
2. Equipment and Materials
  - A. Primer – BMS 10-11, Type 1 (Ref 20-30-41)
  - B. Sealant – BMS 5-79 or 5-95 (Ref 20-30-41)
  - C. Alodine 1200 – MIL-C-5541 (Ref 20-30-41)
3. Repair Stop Fitting Cracked Along Parting Line from End Into Stop Fitting Bearing Plate Hole (Fig. 801)
  - A. If crack is within 45° each side of parting plane, as shown in Fig. 801, and does not progress beyond stop fitting hole, repair as follows:
    - (1) Remove bearing plate.
    - (2) Cut out crack with a 0.06 inch wide slot into stop pin hole.
    - (3) Enlarge stop fitting hole to provide a 0.002 to 0.012-inch diameter clearance with learning plate.
    - (4) Pretreat surfaces (Method II) and apply Alodine per 51-21-41 and 51-21-21, Cleaning and Painting. Apply primer per 51-20-171, Cleaning and Painting.
    - (5) Bond bearing plate back in using BMS 5-79 or 5-95 sealant.

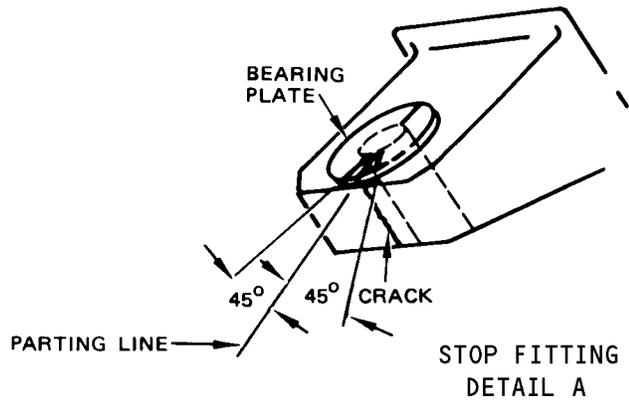
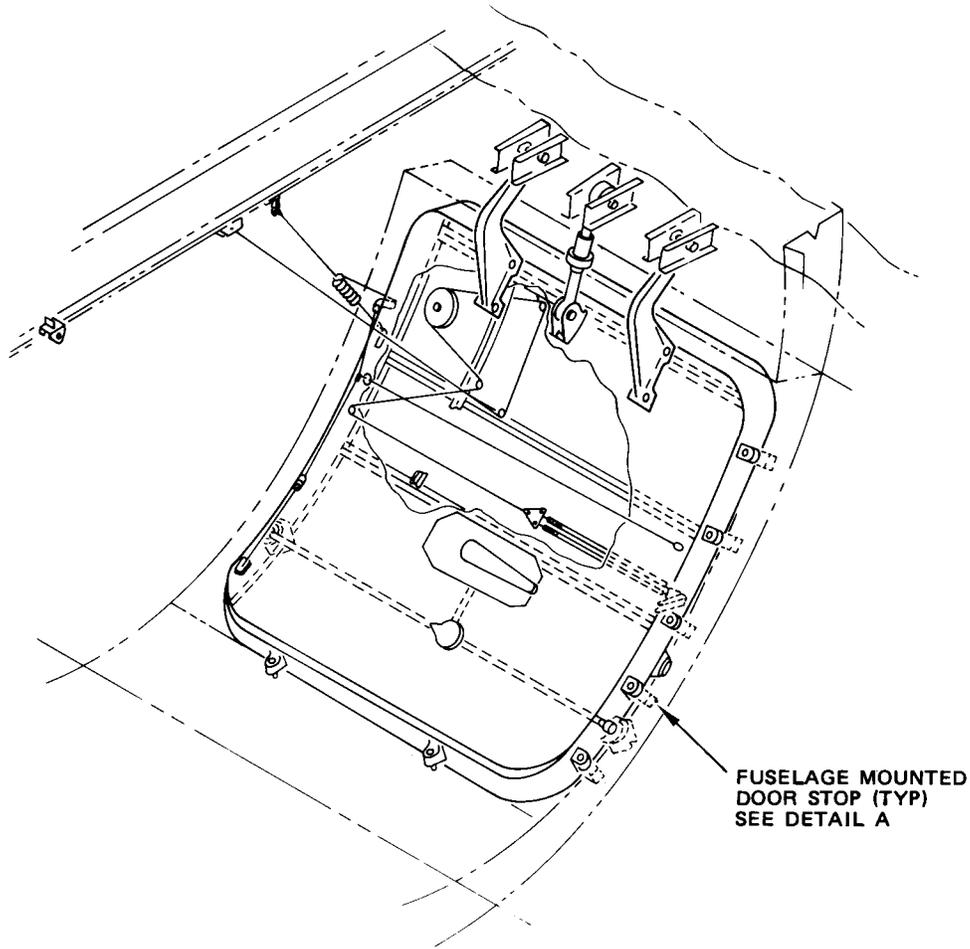
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Cargo Door Approved Repair  
 Figure 801

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CARGO COMPARTMENT DOOR BALANCE MECHANISM – REMOVAL/INSTALLATION

1. General

- A. The balance mechanisms installed on the forward and aft cargo compartment doors are similar. After installation of the balance mechanism, no further rigging is necessary.

2. Equipment and Materials

- A. Door support brace, 2 x 4 inch wood painted red of suitable length to support the door in open position, or equivalent  
B. C-clamp (or equivalent) to hold balance mechanism cable  
C. Grease – BMS 3-24 (Ref 20-30-21)

3. Remove Balance Mechanism

- A. Using the door support brace, position cargo compartment door as necessary to facilitate balance mechanism removal.  
B. Deleted.  
C. Place clamp on cable at interior surface of door to prevent cable from retracting when disconnected from overhead beam.  
D. Remove bolt connecting cable clevis (7) to support clip (9) on overhead floor beam (1).  
E. Remove clamp installed on cable (step C).

**CAUTION:** CABLE IS UNDER HIGH TENSION. HOLD CABLE FIRMLY DURING REMOVAL OF CLAMP. RELEASE CABLE GRADUALLY, PERMITTING SPRINGS TO RETRACT SLOWLY.

- F. Remove screws in cable drum access panel and remove panel.  
G. Remove lining retainer studs and remove insulation from door inner skin.  
H. Remove bolt connecting cable assembly clevis to splice plate (2). Unhook springs (3) from door structure. Remove springs (3) and splice plate (2).  
I. Remove four bolts and remove four pulleys (5) from door.  
J. Remove bolt, cable drum (6) and cable assembly (4) from door.  
K. Cut safety wire and unwind cable from cable drum.

4. Install Balance Mechanism

- A. Open door and position door support brace to hold door open.

**WARNING:** TO AVOID INJURY OF PERSONNEL WORKING ON OR NEAR THE DOOR, ALWAYS USE THE RED COLORED DOOR SUPPORT BRACE TO SECURE THE DOOR IN OPEN POSITION WHEN THE DOOR BALANCE MECHANISM IS DISCONNECTED OR INOPERATIVE.

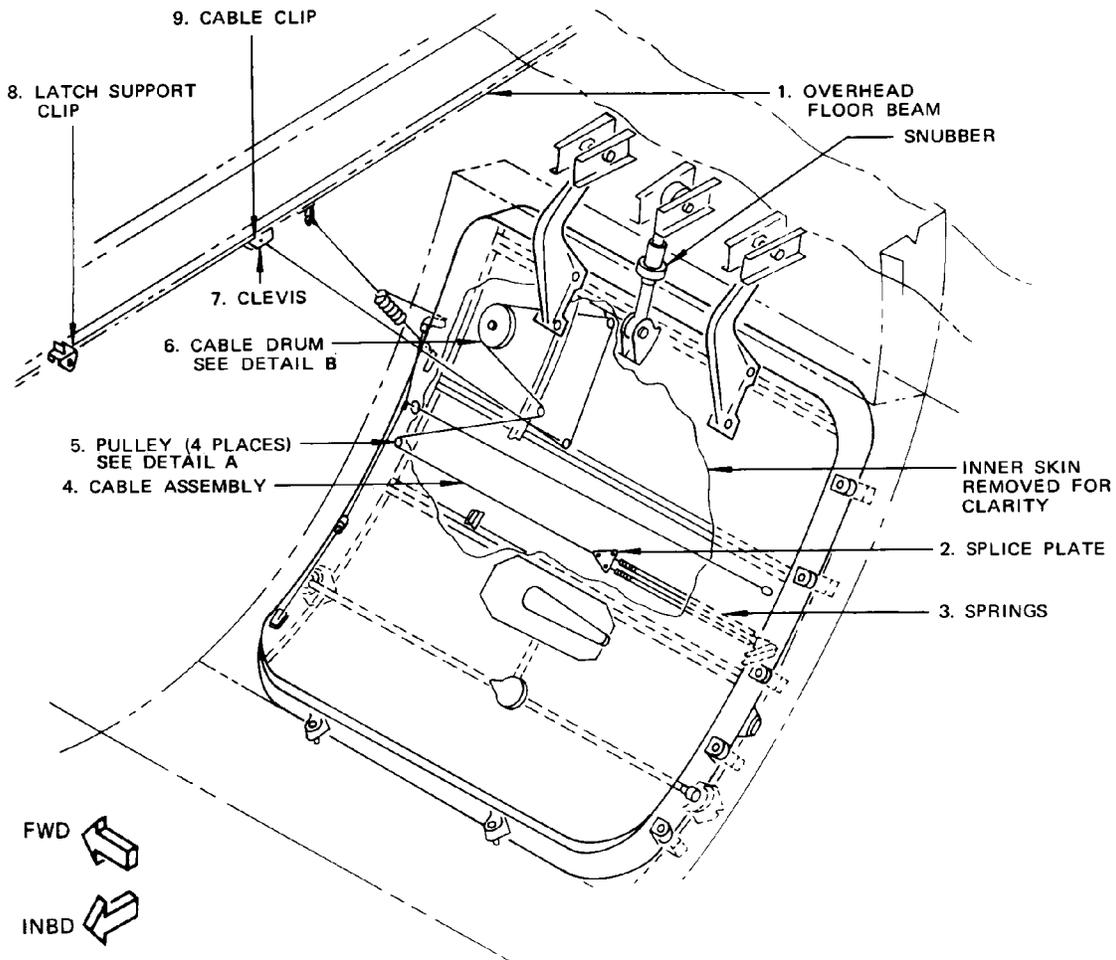
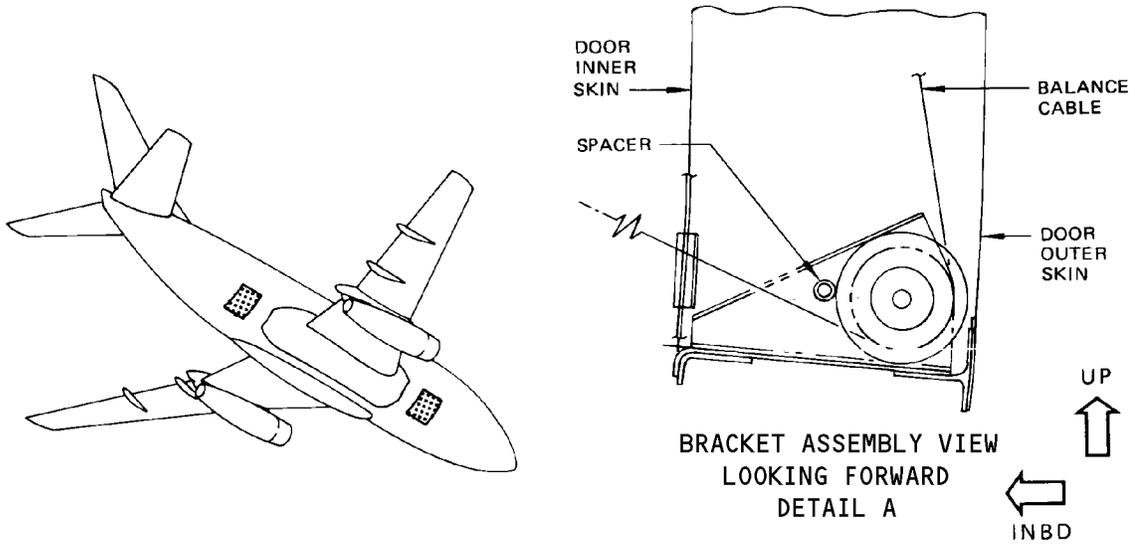
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Cargo Compartment Door Balance Mechanism Installation  
 Figure 401 (Sheet 1)

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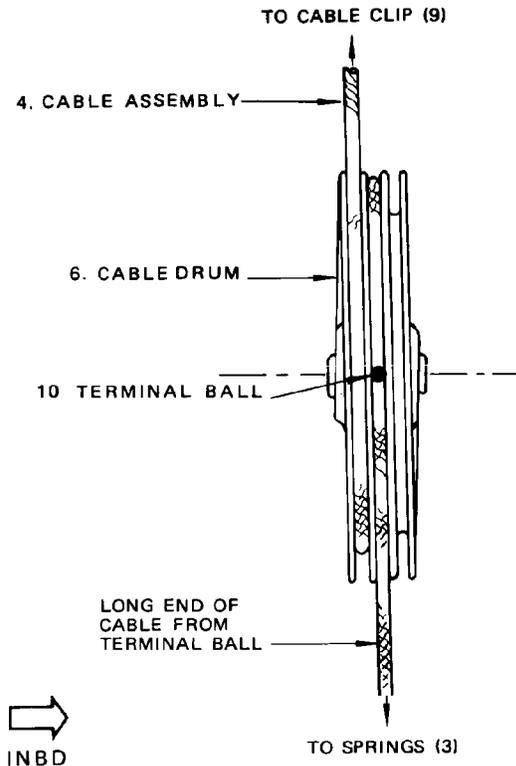
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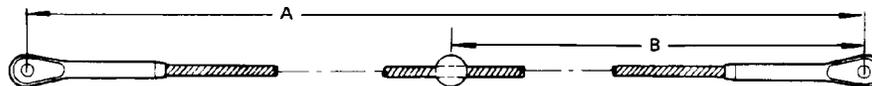
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CABLE DRUM  
VIEW LOOKING AFT

DETAIL B

**1** CABLE SIZE - 3/32 7X19



CABLE LENGTH

DIMENSION (INCHES)	FWD CARGO DOOR	AFT CARGO DOOR
"A"	109.1	100.0
"B"	49.8	41.8

"A" DIMENSION FROM  $\phi$  EYE TO  $\phi$  EYE OF MS20667-3 CABLE TERMINALS

"B" DIMENSION FROM  $\phi$  EYE OF MS20667-3 TO  $\phi$  BACT14B3 BALL TERMINAL

**CABLE MATERIAL** - CARBON STEEL PER MIL-W-83430, TYPE I, COMPOSITION A (PREF)  
OPTION 1 : CARBON STEEL PER MIL-W, 1511A **1**

Cargo Compartment Door Balance Mechanism Installation  
Figure 401 (Sheet 2)

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## MAINTENANCE MANUAL

- B. Attach cable assembly (4, figure 401) to cable drum (6) by nesting terminal ball (10, detail A) in hole on drum and securing with lockwire. Place pigtail in hole on cable drum with the terminal ball, not in grooves of cable drum.

**NOTE:** Ensure cable assembly is lubricated with MIL-G-25760 grease. If not, lubricate entire length of cable per step I. prior to installation on door.

- C. With long end of cable assembly from terminal ball (10) toward inboard side of door, wind other end of cable on drum toward outboard side of door until a total of one and one-half turns cable wrap is made. (See detail A.)
- D. Position cable drum and cable assembly on the door. Insert bolt in cable drum and torque to within 80 to 90 pound-inches.
- E. Thread cable assembly through pulley brackets, inner webs, and inner skin on door.

**NOTE:** Locate balance cable under the spacer on the pulley brackets. The spacer is used only as a bracket separator.

- F. Install and bolt four cable pulleys (5) in place.
- G. Hook springs (3) to door structure and splice plate (2).
- H. Bolt cable clevis to splice plate.
- I. Check condition of cable assembly. If cable assembly becomes contaminated with foreign matter (debris due to machining operations)
- (1) Gain access to affected portion and wipe with a clean, dry cloth.

**CAUTION:** DO NOT CLEAN CABLE BY SOLVENT DEGREASING OR WIPING WITH SOLVENT WETTED CLOTH.

- (2) After cleaning cable, immediately apply a minimum quantity of grease sufficient to produce a continuous thin visible ribbon of grease in cable grooves. Application may be done by hand or by a grease applicator.

**CAUTION:** GREASE APPLIED MUST NOT BE THINNED BY HEATING OR DILUTING WITH SOLVENT.

- J. With cable properly seated in grooves of all pulleys, pull 8 to 10 inches of cable from door and place clamp on cable to prevent retraction.
- K. Bolt cable clevis (7) to cable clip (9) on overhead floor beam (1); remove clamp placed on cable.
- L. Install insulation pad and secure with lining retainer studs.
- M. Install cable drum access panel and screws.

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- N. Check balance mechanism for proper operation. When door is released, it should move smoothly upward to or near its up-latched position.

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CARGO COMPARTMENT DOOR SNUBBER – INSPECTION/CHECK

1. Operational Check – Cargo Compartment Door Snubber

A. Do the operational check of the snubbers as follows:

- (1) Open the cargo compartment door.

**WARNING:** MAKE SURE YOU INSTALL THE DOOR SUPPORT BRACE TO KEEP THE DOOR IN THE OPEN POSITION. IF THE DOOR BALANCE MECHANISM AND THE SNUBBER ARE DISCONNECTED AND THE DOOR IS LATCHED OPEN, THE DOOR CAN FALL TO THE CLOSED POSITION AND RESULT IN INJURY OR DAMAGE.

- (2) Use the door support brace to keep the door in the open position.
- (3) Disconnect the balance mechanism cable (Ref 52-31-00/401).
- (4) Remove the door support brace and see that the snubber does not let the door close quickly.
- (5) Open the cargo compartment door.

**WARNING:** MAKE SURE YOU INSTALL THE DOOR SUPPORT BRACE TO KEEP THE DOOR IN THE OPEN POSITION. IF THE DOOR BALANCE MECHANISM AND THE SNUBBER ARE DISCONNECTED AND THE DOOR IS LATCHED OPEN, THE DOOR CAN FALL TO THE CLOSED POSITION AND RESULT IN INJURY OR DAMAGE.

- (6) Use the door support brace to keep the door in the open position.
- (7) Connect the balance mechanism cable (Ref 52-31-00/401).

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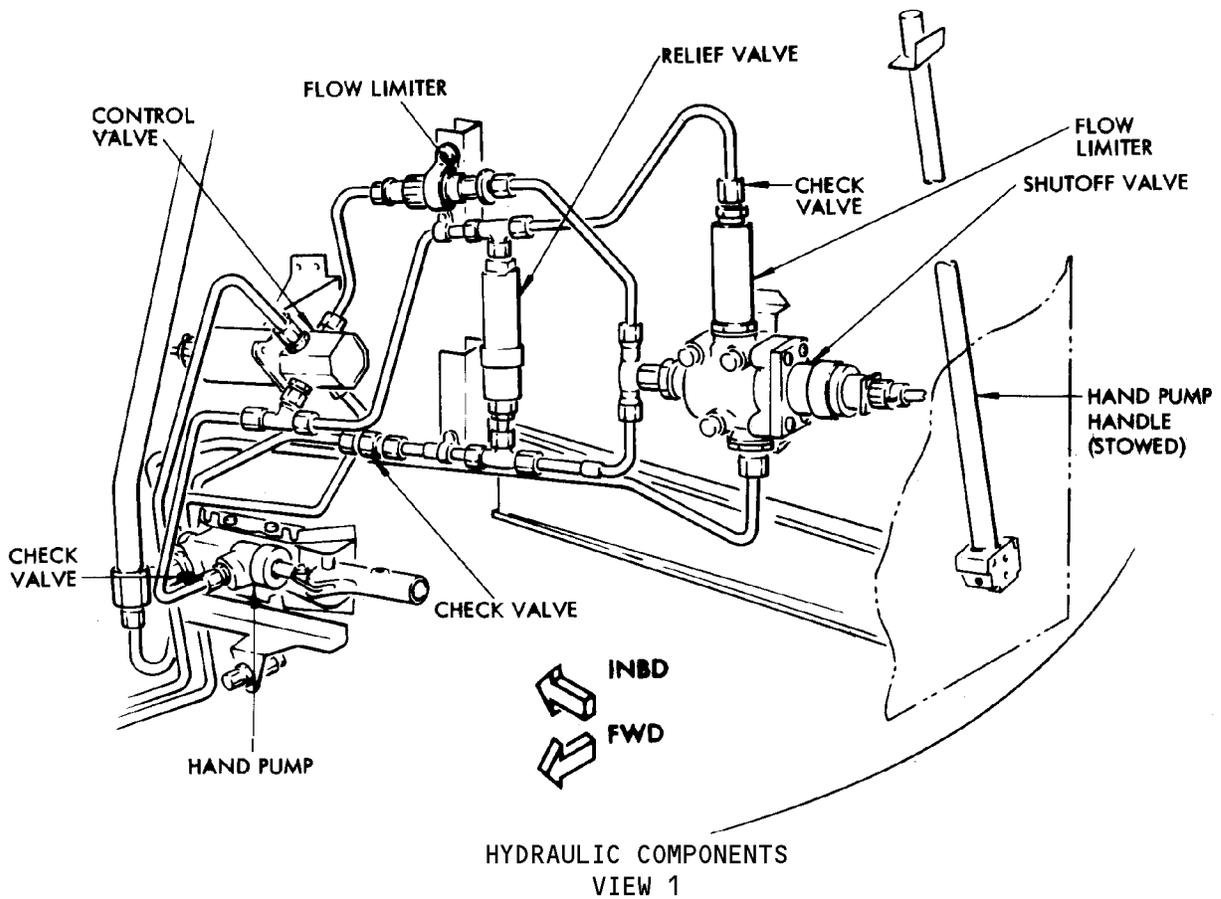
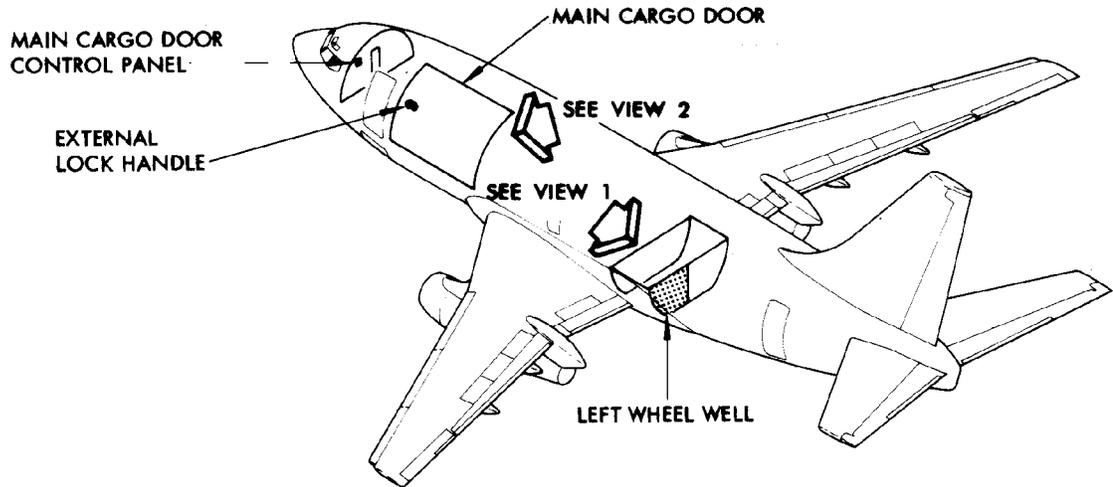
MAIN CARGO DOOR SYSTEM – DESCRIPTION AND OPERATION

1. General

- A. The main cargo door, installed on the upper left side of the fuselage, provides an access for loading cargo into the main compartment of the airplane. The cargo door hinges outward and normally opens to two positions, canopy and full open. However, the door may be hydraulically locked open at any position up to full open. The lower edge of the door opens to a minimum of 124 inches above the floor of the fuselage when in the canopy position. The highest point of the door when in the canopy position does not exceed 157 inches above the floor of the fuselage. The full open position provides complete vertical clearance up to the door opening. The forward edge of the cargo door is at station 360. The aft edge of the cargo door is at station 500. The main cargo door is normally operated open and closed with a hydraulic latch actuator and a hydraulic lift actuator powered from hydraulic system B. However, the cargo door may also be opened using a manual pump to supply hydraulic pressure for the actuators. Controls for the main cargo door consist of a manual unlocking and locking handle mounted flush on the outside of the door, which is accessible from the forward entryway and a control panel installed on the bulkhead adjacent to the forward left entryway.
- B. The main cargo door is hinged at the top with 12 removable hinge pins and 10 hinge segments. (See figure 1.) Centering cams are installed on the lower forward and aft edges of the door. The centering cams mate with rollers installed on the lower forward and aft door body frames. A latching mechanism and latch locking mechanism are installed along the lower portion of the door. The latch mechanism consists of eight mechanical latch hooks which pull the door completely closed and latch the door to latch pins on the fuselage doorsill. A hydraulically operated latch actuator, installed in the lower center of the door, moves the latching mechanism. The latching mechanism also opens the door enough to break a bulb-type pressure seal around the perimeter of the door. The latch lock mechanism consists of eight lockpins, with interconnecting mechanism and a manually operated control handle. The lockpins prevent the latch mechanism from operating until the latch lock mechanism is unlocked. The latch lock mechanism is unlocked with a flush-mounted external locking handle on the forward outboard side of the door. Access

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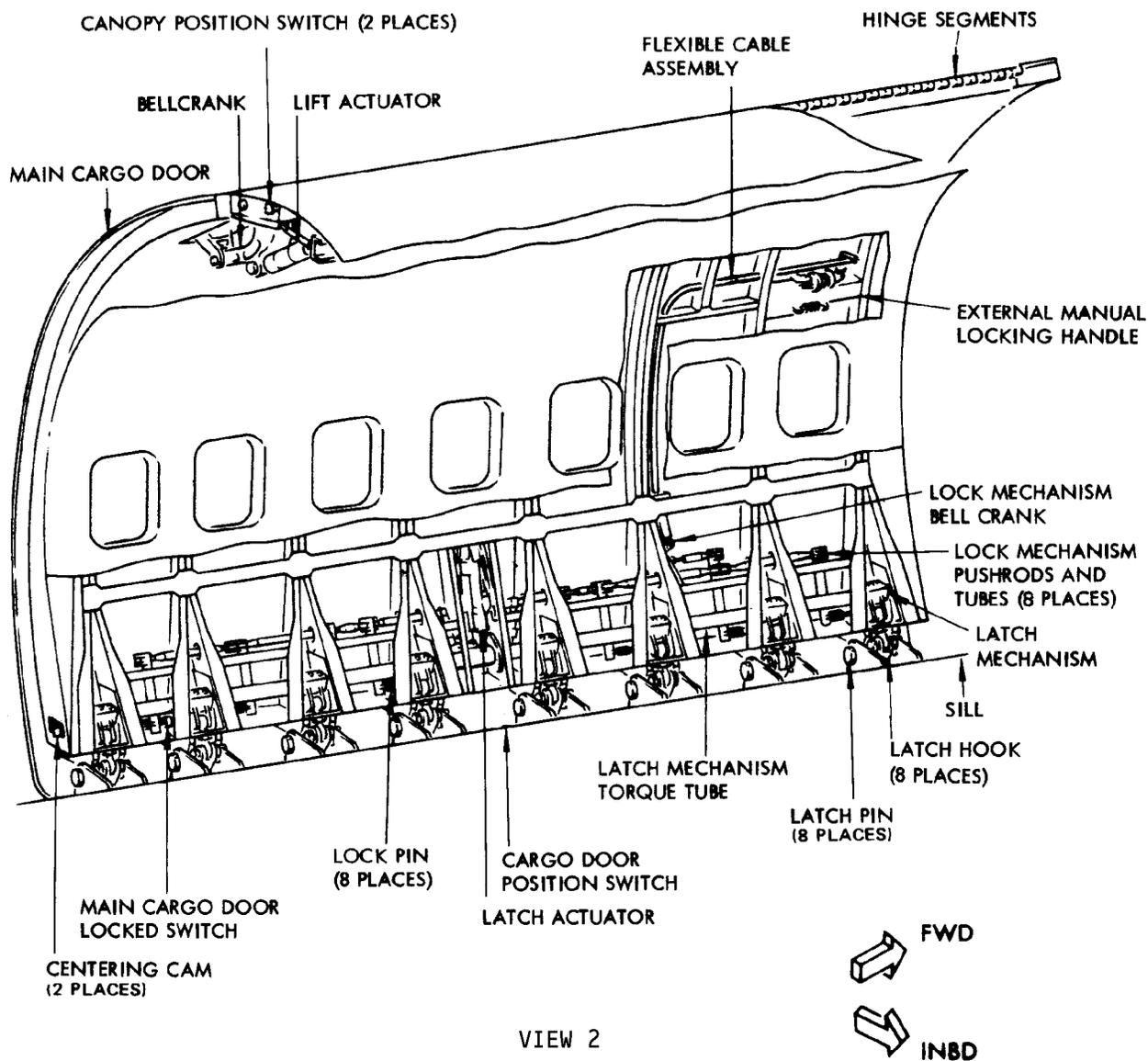
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Main Cargo Door Mechanism Component Location  
 Figure 1 (Sheet 1)

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Main Cargo Door Mechanism Component Location  
 Figure 1 (Sheet 2)

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## MAINTENANCE MANUAL

- C. forward outboard side of the door. Access panels along the lower outside edge of the door provide access for emergency unlocking and unlatching of the door in the event of a malfunction of the normal or manual systems. Eight latch mechanism viewing windows are on the lower outside edge of the door below the access panels. The hydraulically operated lift actuator is installed above the ceiling panels adjacent to the main cargo door at station 486. On airplanes without New Look Interior, an access door on the ceiling panels at the aft end of the door allows for movement of the lift actuator bellcrank. Seven windows with associated panels are installed on the door. On airplanes without New Look Interior, two folding hatrack sections are also mounted on the door, and two hatrack interlock switches installed in the center of the door operate whenever both hatracks are folded and stowed. (Refer to Chapter 25.) A main cargo door locked switch is in the lower aft section of the cargo door. The hatrack interlock switch and cargo door locked switch interrupt power to the main cargo door control panel switches whenever the hatracks are down or the cargo door is locked. A main cargo door position switch is installed in the fuselage doorsill at station 427. The cargo door position switch is part of the door unlocked warning circuit, door warning circuits, floodlight circuits and control valve sequencing circuits. Two canopy position switches (limit switches) and operating cams are installed with the lift actuator at station 486. The main cargo door control panel is installed in the passenger compartment on the left side of station 304 bulkhead. A control valve, shutoff valve, handpump, relief valve, two flow limiters and three check valves are installed in the hydraulic lines on the left wheel well aft bulkhead.
- D. The main cargo door is manually unlocked by pulling on the external locking handle; the cargo door is then hydraulically unlatched and opened. Hydraulic system pressure for operation of the main cargo door actuators is controlled from the cargo door control panel. The panel contains two cargo door position switches, an amber warning light and cargo area lighting switches. One switch controls raising the cargo door to the canopy position and closing the door from canopy position. The second switch controls raising the door from the canopy position to the full open position and back to the canopy position. The warning light illuminates whenever the door is not closed and not locked. Electrical power for the system is from 28 -volt dc bus No. 2 circuit breakers on load control center P6. Manual operation of the door is accomplished with the hydraulic handpump and manual positioning of the hydraulic control valve.

### 2. Door Assembly

- A. The door is an aluminum structure consisting of the upper and lower door beams, door frames and stringers. The structure is covered with a full outer skin and on the inside upper portion, with an inner skin. Seven window assemblies are installed below the horizontal centerline of the

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## MAINTENANCE MANUAL

- B. door. Ten piano-type hinge sections are bolted to the upper door beam. The components of the latch mechanism are attached to the lower beam and frames. A locking handle assembly is installed at the forward end of the door at about the horizontal centerline of the door. The locking mechanism is installed throughout the lower portion of the door below the windows. The latch actuator is installed below the windows in the center of the door. Eight clear plastic viewing panels are installed in the outer skin at the bottom of the door. Eight removable access panels are also installed in the outside skin of the door just above the viewing panels. A door centering cam is installed at the junction of the lower beam and the end doorframe at the fore and aft doorframes. Hydraulic lines, electrical wiring, gasper air and oxygen are connected at the aft end of the door through cutouts in the ceiling lining support beam.
- C. On airplanes without New Look Interior, the door structure on the inside of the airplane is normally covered with the door lining consisting of lower dado panels, decorative window panels, metal trim and a curved ceiling panel. Between the lower dado panels and the door structure are three insulation and heating panels. On airplanes with New Look Interior the door lining consists of a formed decorative window panel, a carpet riser panel, overhead stowage compartments, and passenger service units. Between the windows and the door lower edge are three insulation and heating panels. One panel starts at the forward edge of the door to the latch actuator; the second panel starts at the aft edge of the latch actuator to the aft end of the door. The third panel runs full length of the door and covers the area above the latch actuator cutout to about halfway up the edge of the window panels. The heating panels are installed with quick disconnects. A bulb seal runs around the periphery of the door. A diaphragm seal runs full length of the door and is connected to the upper door beam and the fuselage beam just below the hinge sections. On airplanes without New Look Interior, two hatrack sections with passenger service units are mounted on the door. Cove light assemblies are installed full length of the door.

### 3. Latch and Lock Mechanisms

#### A. Door Latching Mechanism (See figure 2.)

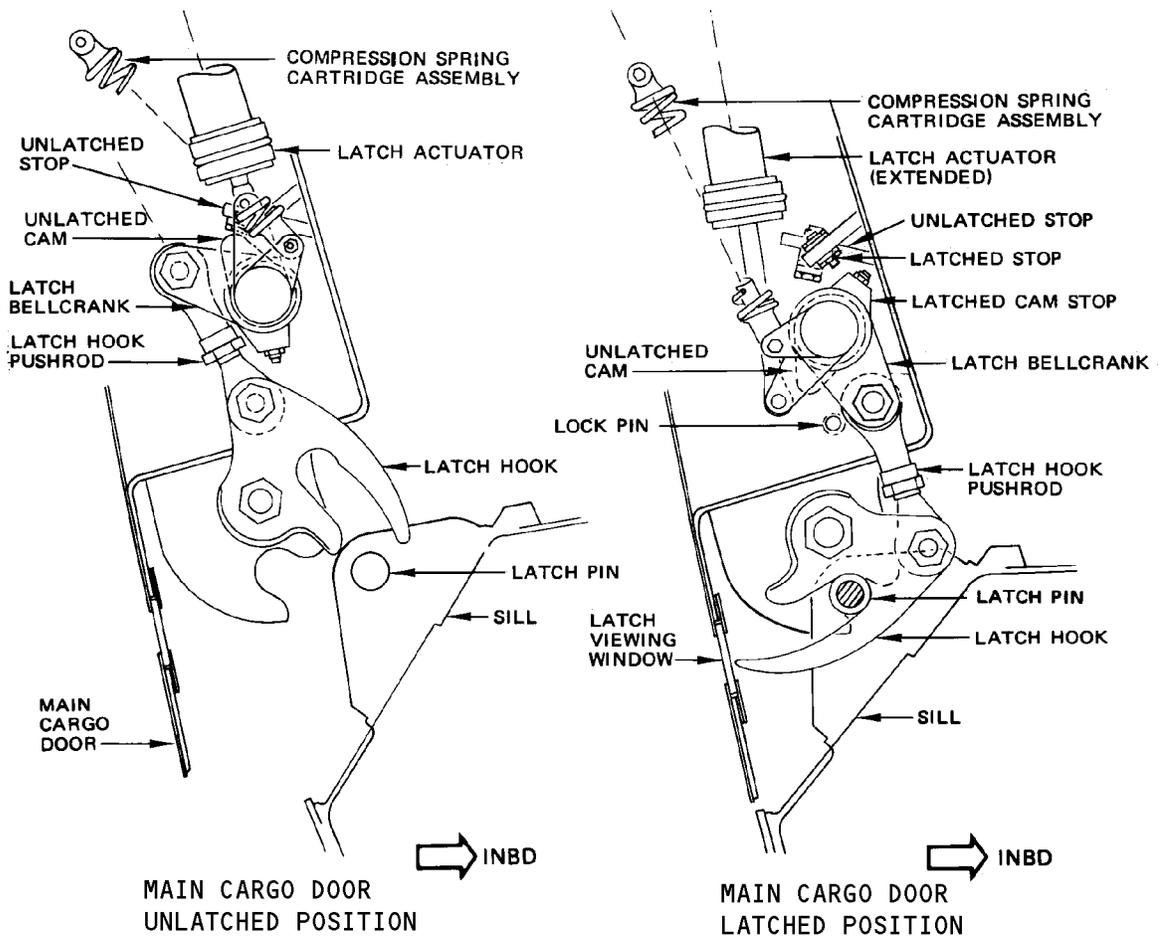
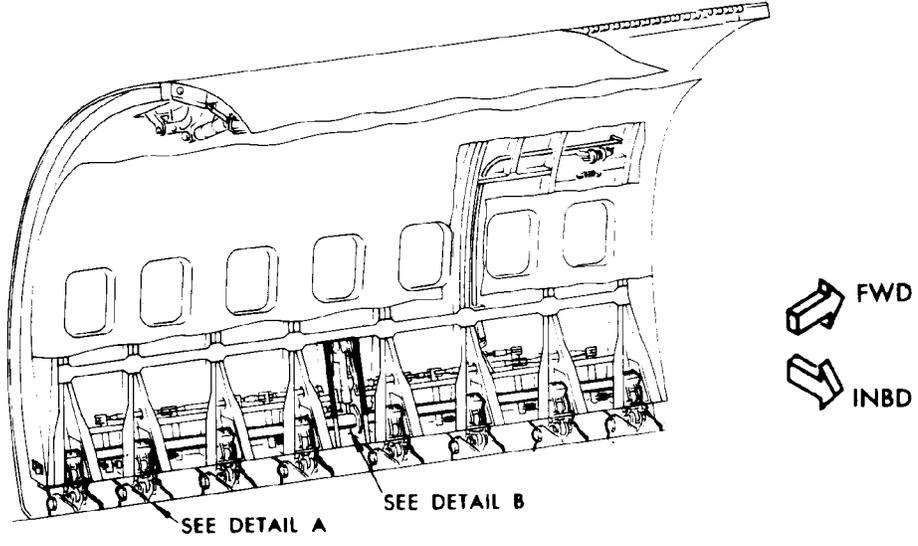
- (1) The door latching mechanism consists of a hydraulic latch actuator, torque tube assembly, eight latch bellcranks, eight latch hooks and a compression spring cartridge assembly. The latch hooks are installed along the bottom of the doorframe. The torque tube runs the full length of the door and has eight bellcrank assemblies installed along its length. The bellcrank assemblies are connected to the latch hooks. Eight latch pins are installed in the fuselage doorsill. The spring cartridge assembly is attached to structure at the upper end and to a bellcrank on the torque tube at the lower end. The spring cartridge assembly keeps the torque tube bellcranks driven overcenter after the door is latched or unlatched. The hydraulic latch actuator is connected to structure at the upper end

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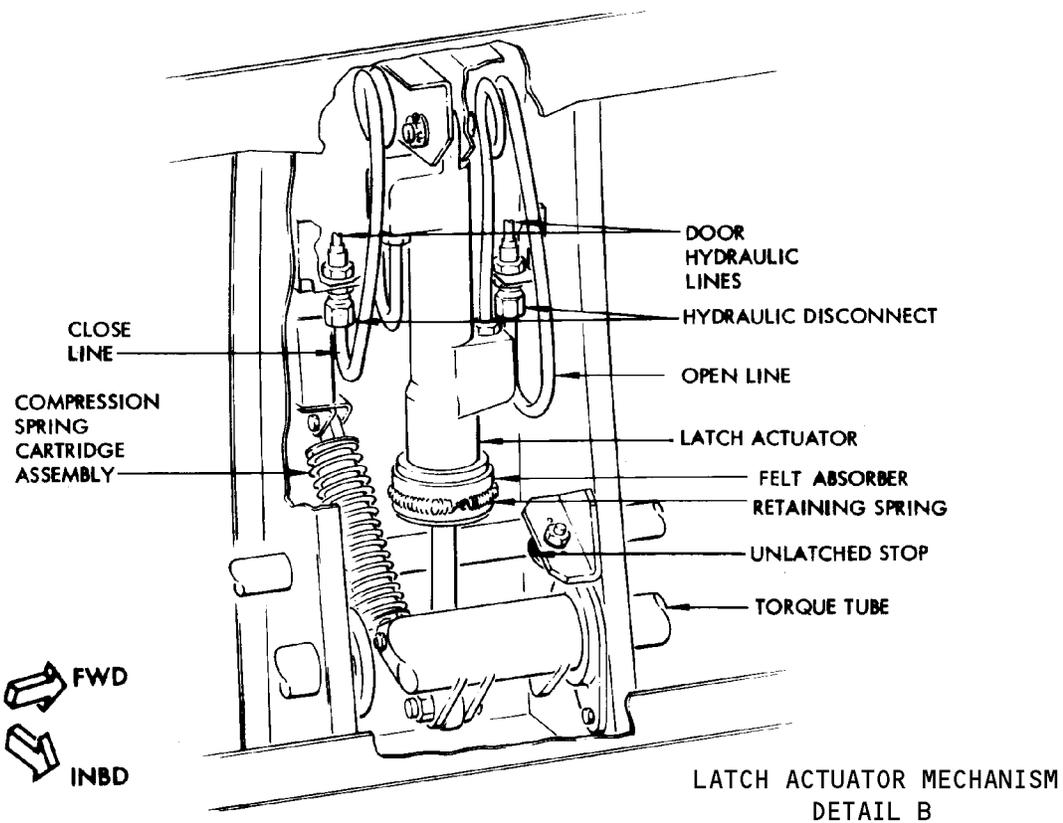
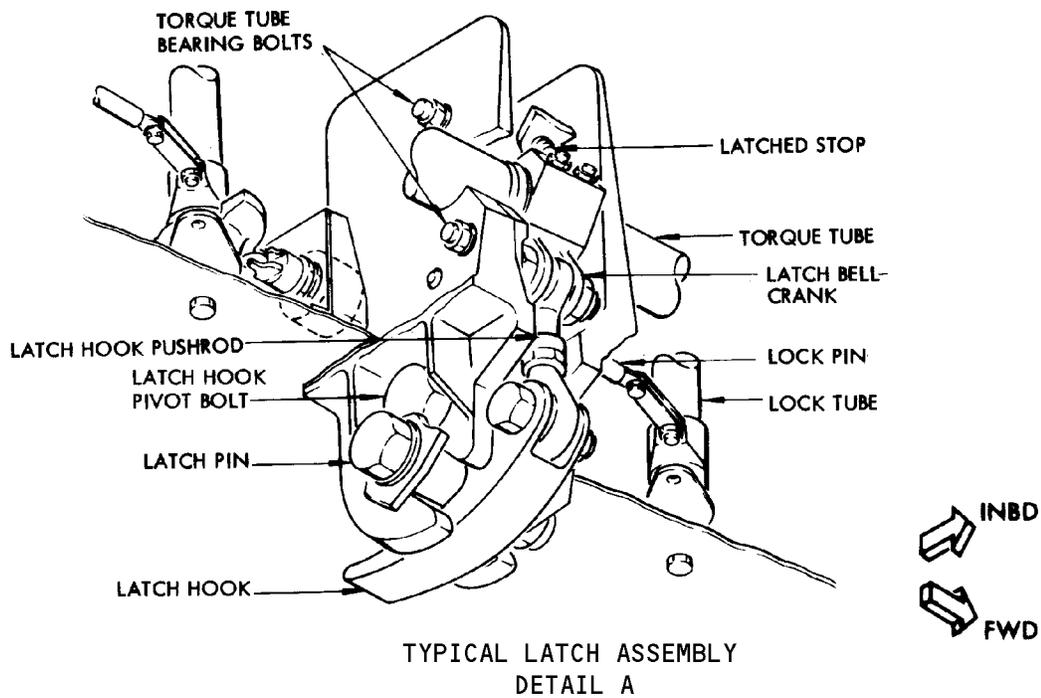


Main Cargo Door Latching Mechanism  
 Figure 2 (Sheet 1)

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Main Cargo Door Latching Mechanism  
 Figure 2 (Sheet 2)

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- (2) and to a bellcrank in the center of the torque tube at the lower end. When unlatching the door, the hydraulic latch actuator retracts. The actuator rod pulls on the torque tube bellcrank causing the torque tube to rotate with the latch bellcranks. The eight latch bellcranks cause the latch hooks to rotate and release the latch pins in the doorsill. As the latch hooks release, they simultaneously push against the latch pins and force the door open to break the pressure seal. Final rotation of the mechanism moves the latch actuator rod end slightly overcenter of the torque tube. The compression spring cartridge retains the mechanism in its overcenter position when hydraulic pressure is removed from the actuator. Mechanical stops limit the maximum amount of torque tube rotation. When the door is latching shut, the latch hooks engage the latch pins and pull the door shut to the sealed position. Due to a restrictor in the lift actuator, the door and latch motion is sequenced when opening the door so that the latch actuator operates before the door lift actuator operates. When the door is closing, the latch actuator operates after the lift actuator has lowered the door and the latch hooks engage the latch pins.
  - (3) Latch Actuator
    - (a) The latch actuator is composed of a cylinder, piston and rod, necessary seals and a fluid absorber. Two hydraulic ports are near each end of the actuator. The piston responds to hydraulic pressure applied to one of the ports. The remaining port acts as a return line. A felt ring installed on the end of the actuator absorbs any leaking hydraulic fluid. The absorber is retained with a spring. Hydraulic lines to the actuator are coiled near the actuators upper attachment point, thereby minimizing hydraulic line flexing as the actuator moves.
- B. Lock Mechanism (See figure 3.)
- (1) The lock mechanism consists of an external locking handle assembly, a flexible control cable, bellcrank assembly, pushrod assembly, eight tube assemblies with bellcranks and eight locking pins and links. The external locking handle assembly is mounted flush on the forward outboard section of the main cargo door near the horizontal centerline of the door. The handle assembly has a spring-loaded fairing covering the handhold. The hand can be slipped under the control handle after pushing in on the fairing to gain access to the handle. The locking handle assembly is connected to the flexible cable which, in turn, is connected to the bellcrank assembly. The bellcrank assembly is connected to a series of pushrods and

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(2) tube-bellcrank assemblies which, when rotated, insert or pull out lockpins outboard of the latch bellcrank assemblies. When the lockpins are inserted, each latch bellcrank is prevented from rotating, thereby locking the door closed. Pulling on the lock handle causes the lockpins to be pulled out. On later airplanes and airplanes incorporating Service Bulletin 52-1033, an adjustable stop at lockpin No. 7 prevents the lockpin torque tube from traveling overcenter in the unlocked position. A cam on the aftmost tube operates the main cargo door locked switch. The access panels on the outside of the door provide access for unlocking and unlatching the door in event of a malfunction in the system.

4. Lift Mechanism (See figure 4.)

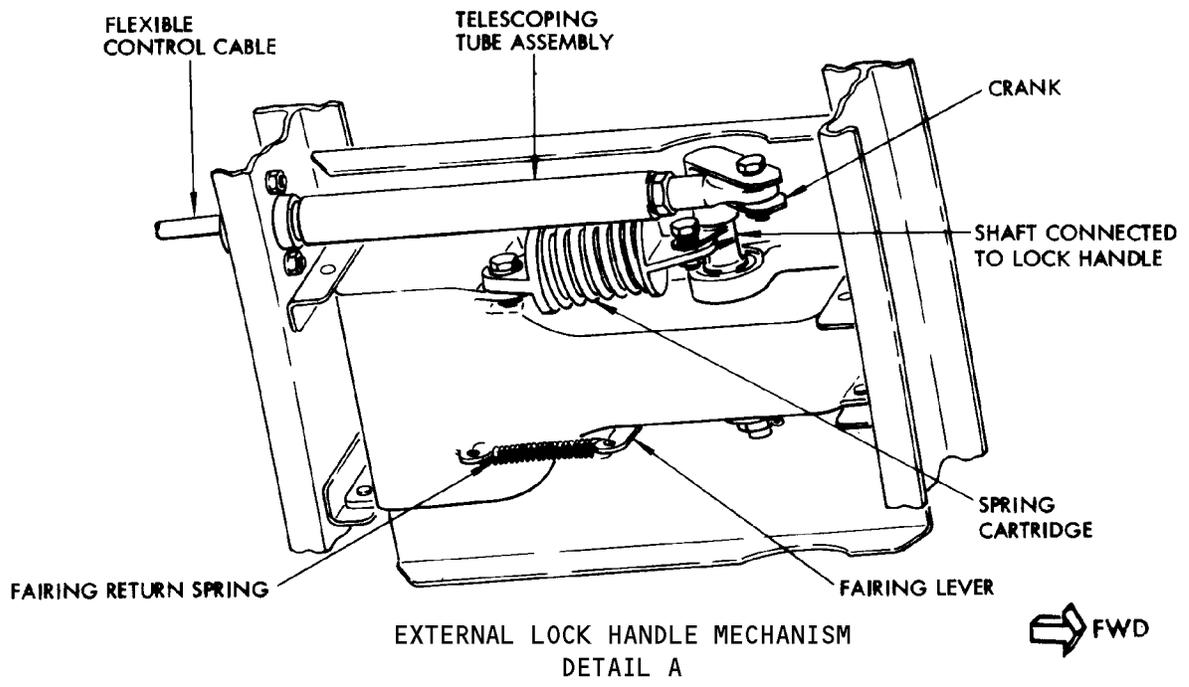
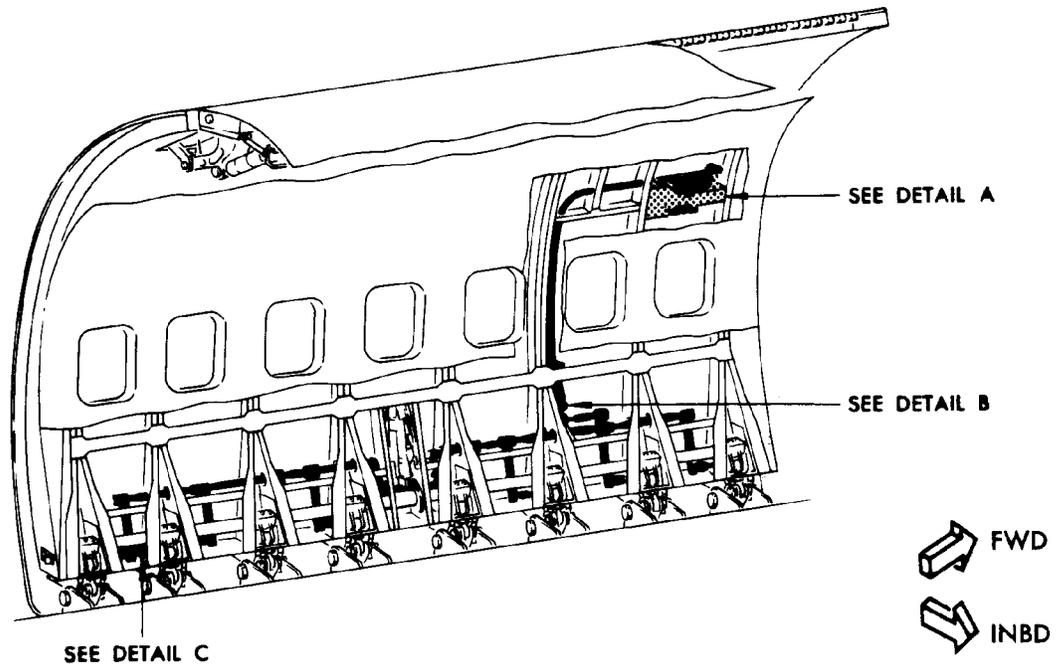
A. The lift mechanism is installed above the ceiling panels at the aft end of the main cargo door at station 486. It consists of a hydraulic lift actuator, two thrust rods, a bellcrank, an outboard link and two inboard links. The outboard link is held to the cargo door with a single bolt. The remaining assembly is attached to fuselage structure. The outboard link is connected to a bellcrank which is rotated by extension or retraction of the lift actuator rod. The inboard end of the actuator is connected to two thrust rods which transmit loads back to fuselage structure. The inboard end of the actuator and thrust rods are supported by two links bolted to structure. The links prevent any up and down motion of the thrust rods and inboard end of the actuator. Hydraulic tubing is coiled around the inboard end of the actuator to minimize flexing of the tubing. The tubing is also supported with clamps connected to the thrust rods. A strap supported by the thrust rod wraps around the actuator, thereby providing a support for the outboard end of the actuator when installing or removing the actuator. Two canopy position switches are installed adjacent to the bellcrank pivot point. A dual cam lever is operated by the movement of the bellcrank when the door has rotated open 87 degrees or more.

B. Lift Actuator

(1) The lift actuator is hydraulically operated. The actuator is composed of a cylinder assembly and a piston assembly which incorporates a ram lock assembly. The piston assembly is driven when hydraulic pressure is applied to an "open" or "close" port on each end of the actuator. If hydraulic pressure is lost and if the main cargo door is in the canopy position, an internal mechanical ram lock locks the actuator. The mechanical locked position is referred to as the "ram lock" position and is slightly below canopy position, which is a hydraulically locked position. The door may be lowered below the canopy position and ram lock position after hydraulic pressure applied to the "close" line is sensed by the pressure differential assembly of the ram lock assembly. The pressure differential assembly releases the lock and allows the cargo door to be lowered when a pressure differential of 300 to 900 psi is present. The rate that the cargo door closes in the event of hydraulic line rupture is controlled by a restrictor in the "open" port of the actuator. A spring retained felt ring on the outboard end of the actuator absorbs any hydraulic fluid which may leak past the piston rod seal.

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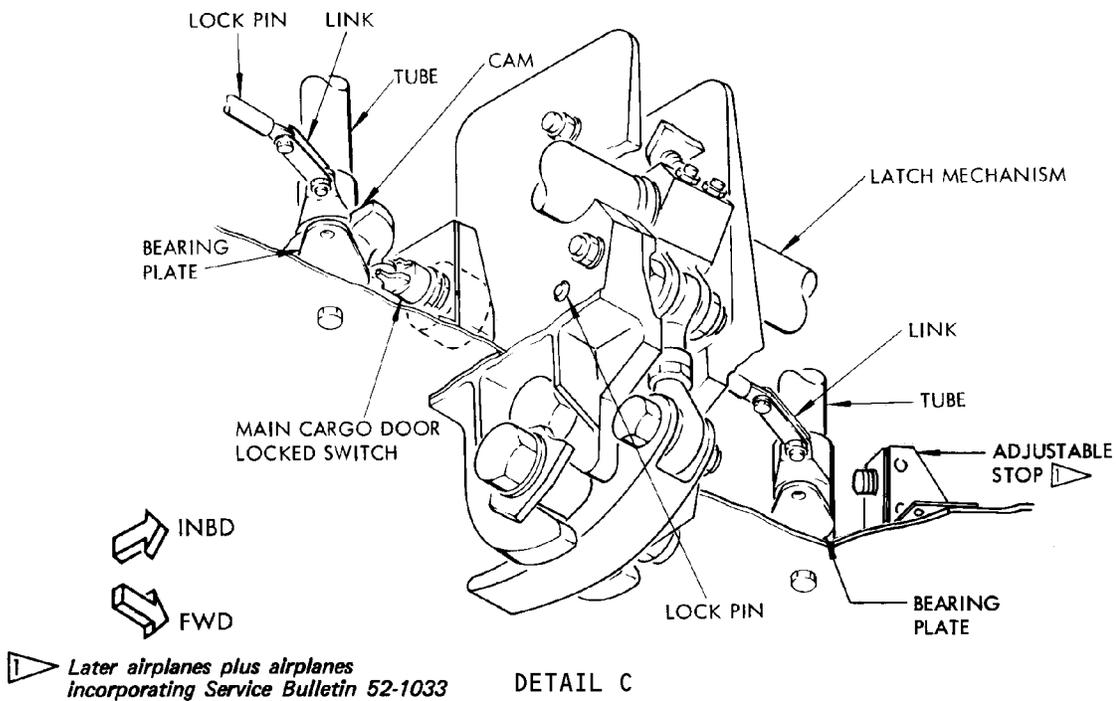
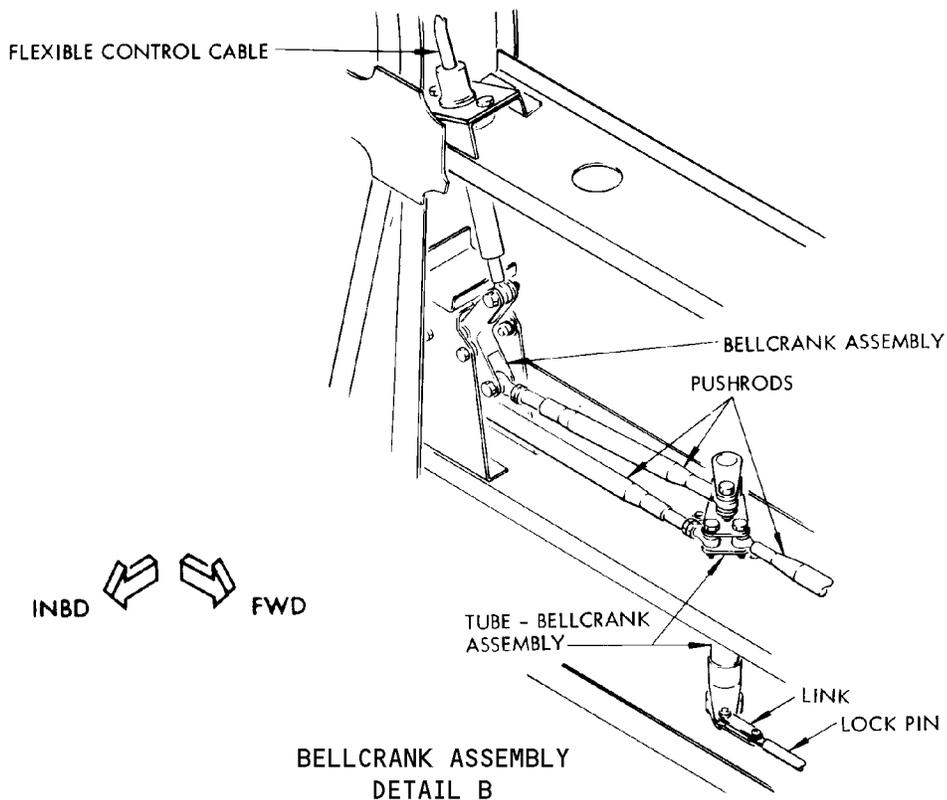
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Main Cargo Door Locking Mechanism  
 Figure 3 (Sheet 1)

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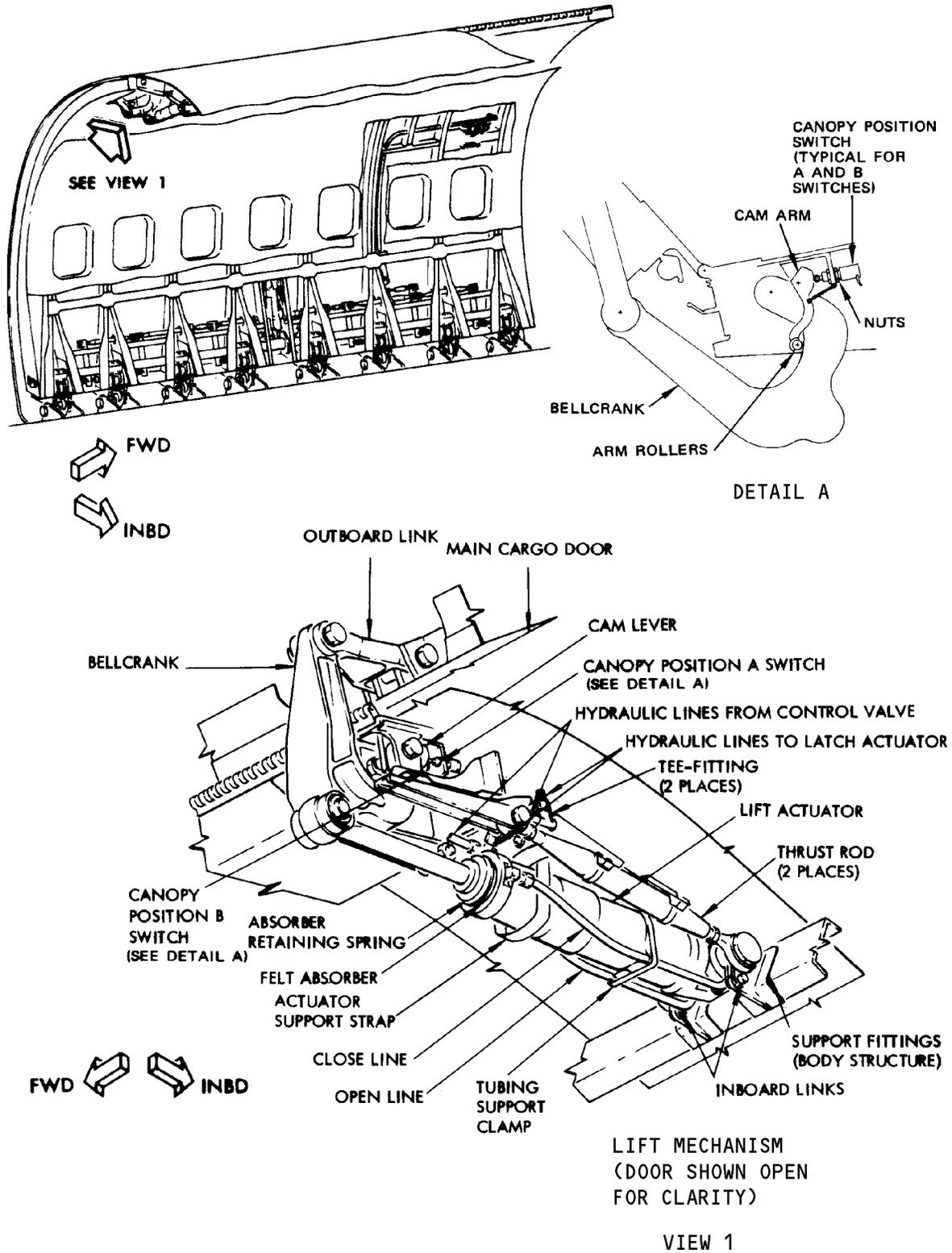
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**Main Cargo Door Locking Mechanism  
 Figure 3 (Sheet 2)**

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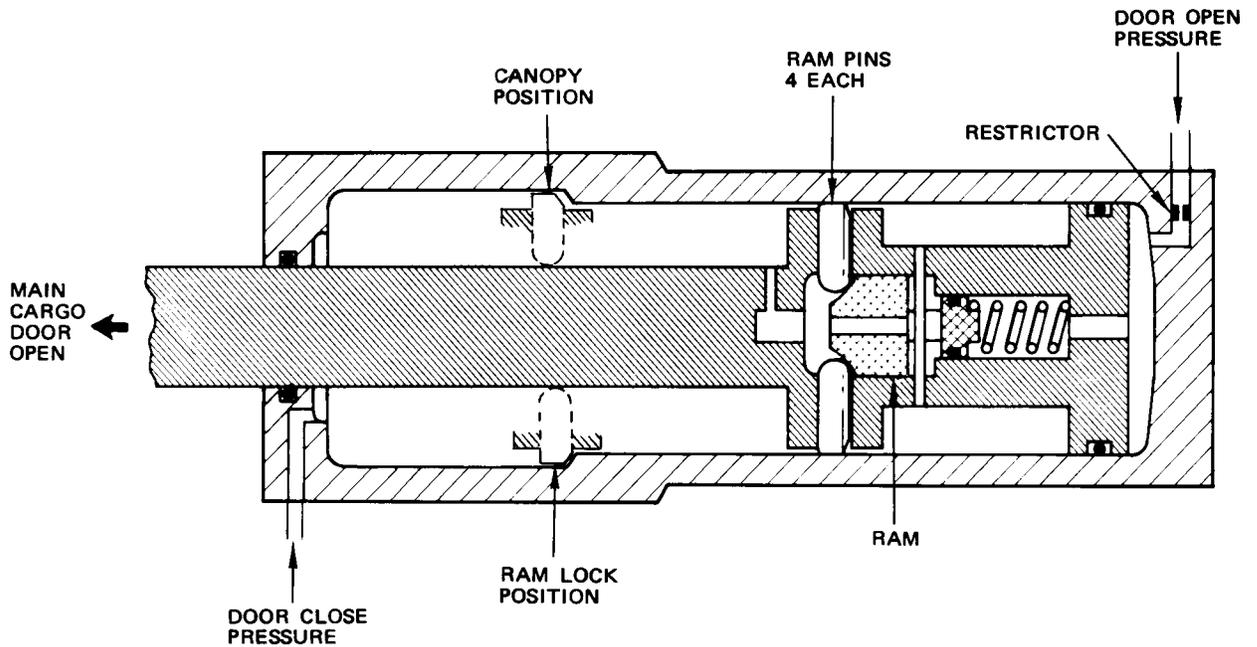
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Main Cargo Door Lift Mechanism  
 Figure 4

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Main Cargo Door Lift Actuator  
 Figure 5

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## MAINTENANCE MANUAL

### 5. Control Panel

- A. The main cargo door control panel is on the left side of the forward bulkhead of the passenger compartment. The panel contains two main cargo door control switches, an amber warning light and lighting switches (refer to Chapter 33). (Fig. 6).
- B. The two main cargo door switches are three position switches which are spring loaded to a center (OFF) position. The left switch is referred to as switch No. 1; the right switch is referred to as switch No. 2. The two switches must be operated in sequence to raise the cargo door to the full open position or lower it from the full open position. Switch No. 1 is held in the UP TO CANOPY position to unlatch and raise the door to the canopy position. The door will automatically stop when the canopy position (approximately 87 degrees) is reached. Holding switch No. 1 to CLOSE causes the door to close and latch from canopy position. Switch No. 2 is used to raise the door above the canopy position and to lower the door to the canopy position when positioned to FULL OPEN or DOWN TO CANOPY respectively. Releasing a control switch while the door is in transit causes the door to hydraulically lock in the interim position. If the switch is operated again, the door will continue to raise or lower, depending on the position of the switch.
- C. The amber light will be illuminated whenever the door is unlocked or open. The light is of the press-to-test type.

### 6. Handpump

- A. A handpump and handle are installed on the left wheel well aft bulkhead. The handpump is a single piston type which can be used to supply hydraulic pressure to the cargo door if system B pressure is not available. The pump has two ports, supply and pressure, and a sleeve for installation of a removable handle. The pump may be operated after removing the handle from its stowage rack, inserting the handle into a sleeve on the pump and rotating the handle a half turn to engage the slots of the handle over a retaining bolt in the sleeve. Approximately 40 strokes of the pump will raise the cargo door to the canopy position. Approximately 25 additional strokes are needed to raise the door to the full open position.

### 7. Control Valve

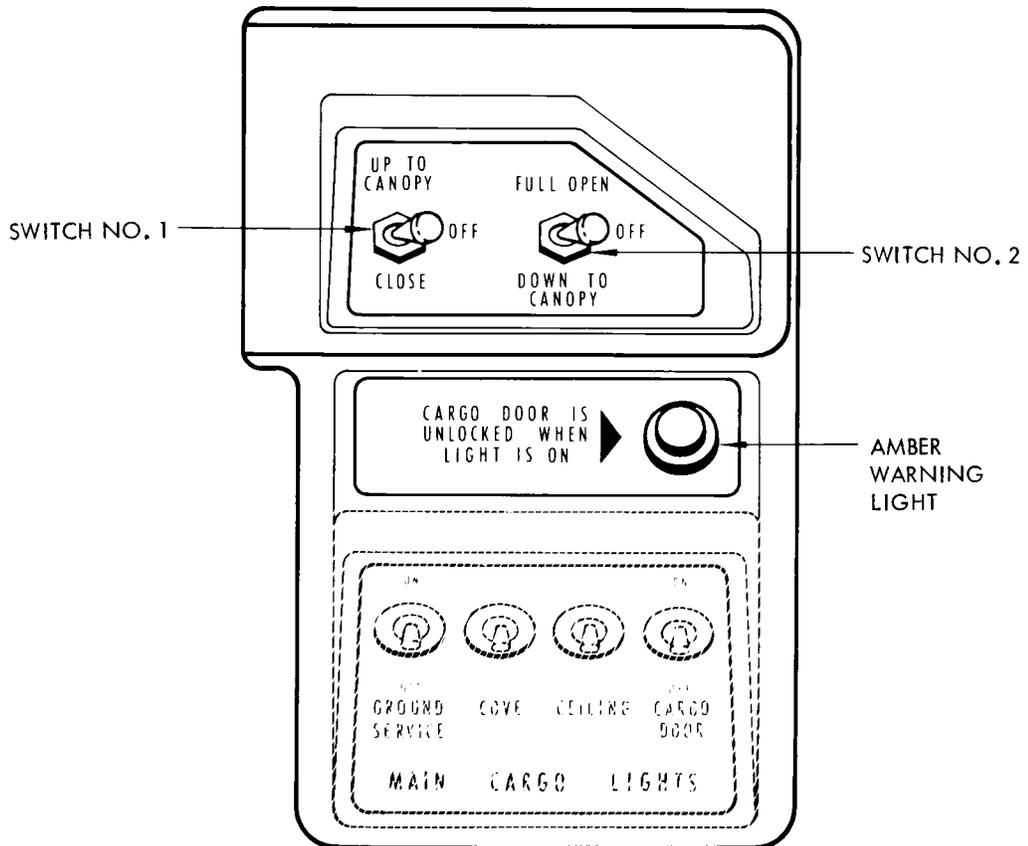
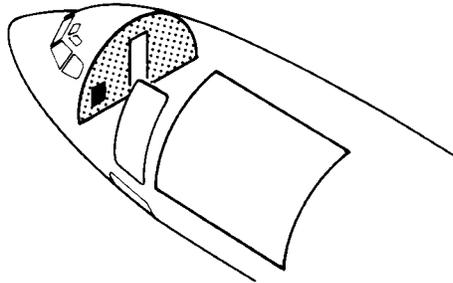
- A. The control valve is installed on the left wheel well aft bulkhead. The valve is motor driven, has four ports and a manual override lever. The valve has two internal double pole switches which are operated whenever the valve is ported to "door open" or "door closed" positions. These positions are marked Position No. 1 and Position No. 2, respectively on the valve. The switches the motor to drive the valve to position 1 or position 2, depending on the last position of the internal switches. When the valve moves to one extreme position, the switch connected to the driven winding is opened, thus automatically stopping the motor, and the switch connected to the second winding was closed when the valve left the other extreme position. The motor uses 28-volt dc power.

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Main Cargo Door Control Panel  
 Figure 6

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## MAINTENANCE MANUAL

- B. Two ports of the valve are connected to the door open and door close lines of the lift and latch actuators. The other two ports are connected to the pressure and return lines. In position No. 1, the door closed line of the lift actuator is connected to the return line and the door open line at the lift actuator is connected to the pressure line. In position No. 2, the door closed line is connected to the pressure line and the door open line is connected to the return line. The POS 1 and POS 2 positions are marked adjacent to the control valve manual override lever.

**CAUTION:** ELECTRICAL POWER MUST NOT BE SUPPLIED TO THE CONTROL VALVE WHEN THE MANUAL OVERRIDE LEVER IS USED OR DAMAGE TO THE MOTOR MAY OCCUR.

### 8. Shutoff Valve

- A. A solenoid-operated shutoff valve is installed on the left wheel well aft bulkhead. The shutoff valve is of the piston type with an internal solenoid connected to the piston. The valve has three ports labeled (1), (2) and (3). When the solenoid is de-energized, the piston connects the output port (2) to the return port (3) and the pressure port (1) is blocked; when energized, the solenoid moves the piston which connects the pressure port (1) to the output port (2) and the return port (3) is blocked. The solenoid uses 28-volt dc power.

### 9. Relief Valve

- A. The relief valve, installed at the left wheel well aft bulkhead, is in a bypass line across the output and return lines of the shutoff valve. The relief valve is set for approximately 3500 psi and prevents overpressurization of the cargo door system. It also allows free flow from return to pressure to prevent cavitation within the system during the door closing cycle.

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10. Flow Limiters

- A. Two flow limiters installed in the hydraulic lines control the speed of the main cargo door during opening and closing. Flow limiting, in one direction only, is done by a variable orifice within the limiter. Variations in flow rate cause a piston to vary the diameter of the orifice. One limiter is installed in the output port of the shutoff valve, the other limiter is installed in the return line between the control valve and shutoff valve.

11 Operation

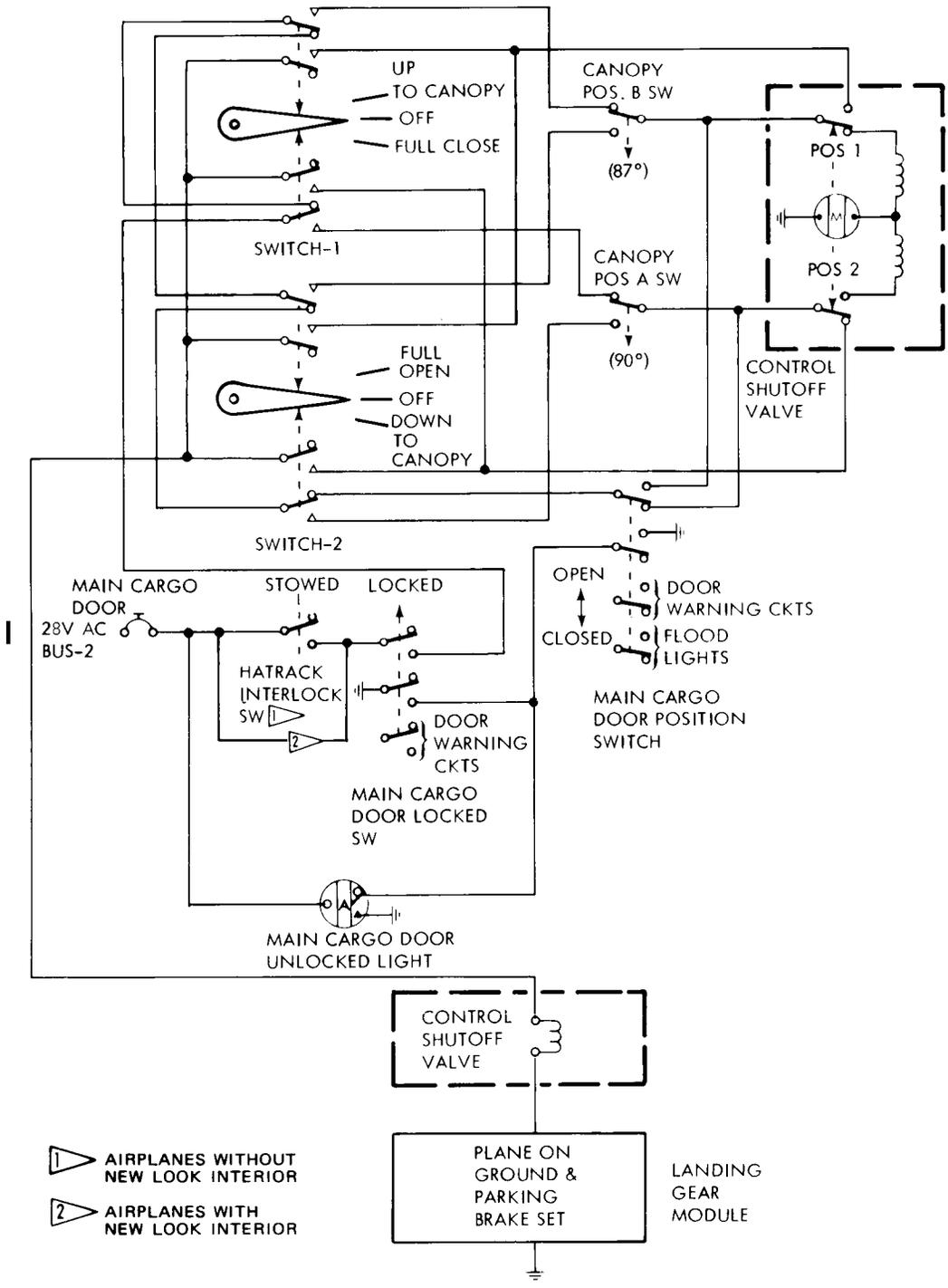
**CAUTION:** DO NOT OPERATE THE MAIN CARGO DOOR WHILE JACKING FORCES ARE BEING APPLIED TO FORWARD BODY JACKING POINT. OPERATION OF THE DOOR CAN RESULT IN DAMAGE TO BOTH DOOR AND FUSELAGE (REF CHAPTER 7, JACKING). THE MAIN CARGO DOOR MUST NOT BE IN THE CANOPY POSITION WHEN WIND VELOCITY EXCEEDS 60 KNOTS, OR IN THE FULL OPEN POSITION WHEN WIND VELOCITY EXCEEDS 40 KNOTS. THE DOOR ACTUATION SYSTEM IS DESIGNED FOR OPERATION THROUGHOUT FULL DOOR TRAVEL IN WINDS UP TO 40 KNOTS. IF IT BECOMES NECESSARY TO CLOSE THE DOOR IN WINDS EXCEEDING 40 KNOTS, AND DIFFICULTY IS EXPERIENCED DUE TO WIND DIRECTION, THE AIRPLANE SHOULD BE MOVED SO THE DOOR OPENING IS ON THE DOWNWIND SIDE OF AIRPLANE.

- B. The main cargo door may be opened using the control panel, or the manually operated handpump, or in event of a malfunction in the system, by removing the access panels on the outside of the door for manual actuation of the lockpins and latches. Manual operation with the handpump is used when hydraulic power and electrical power systems of the airplane are not operating. Normal operation of the door is from the main cargo door control panel, with the airplane on the ground, the parking brake set, hydraulic system B operating, and electrical power on the airplane. The main cargo door circuit is wired through the landing gear safety relay circuit to prevent the cargo door from being opened or closed when the right main gear oleo is extended (Ref Chapter 32, Landing Gear). On airplanes without New Look Interior, the main cargo door hatrack must be folded and stowed before the cargo door can be opened. Oxygen, gasper air, hydraulic and electrical lines are completed to the door with flexible lines at the door hinge; therefore, no disconnects are required before opening the door. On airplanes without New Look Interior, the lift actuator access door must also be opened, prior to opening the cargo door, to allow for movement of the bellcrank.

**CAUTION:** ON AIRPLANES WITHOUT NEW LOOK INTERIOR, LIFT ACTUATOR ACCESS DOOR MUST BE OPENED BEFORE MAIN CARGO DOOR IS OPERATED TO PREVENT DAMAGE TO CEILING PANEL.

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- 1 AIRPLANES WITHOUT NEW LOOK INTERIOR
- 2 AIRPLANES WITH NEW LOOK INTERIOR

Main Cargo Door Electrical Schematic  
 Figure 7

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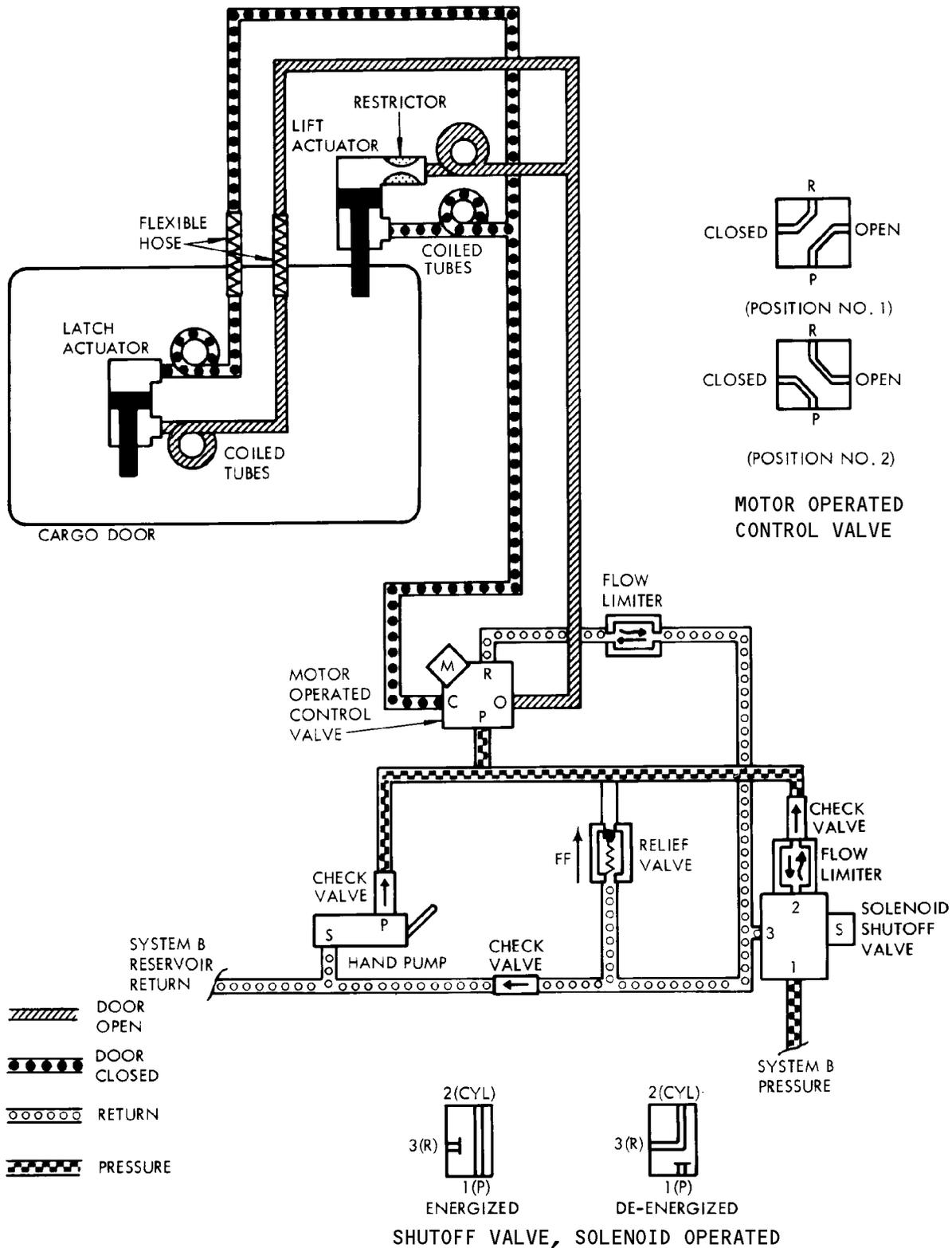
C. Normal Operation

- (1) On airplanes without New Look Interior, the main cargo door electrical circuits require the two cargo door hatracks be stowed (Ref Chapter 25). Stowing the hatracks closes two hatrack interlock switches which form part of a series interlock circuit with the main cargo door locked switch (Fig. 7). The door is unlocked by pulling on the lock handle on the outside of the door. (The handle can be reached when standing in the forward entryway.) Pulling on the handle causes the eight locking pins to be removed from the rotational path of the eight latch hooks and operates the main cargo door locked switch, thereby completing 28 volts dc to the main cargo door control panel control switches. The amber main cargo door unlocked light on the control panel then illuminates.
- (2) The two main cargo door control switches must be operated in sequence to raise the door to the full open position and fully close the door. Switch No. 1 is operated first to unlatch and open the door to the canopy position. Switch No. 2 is operated to raise the door from the canopy position to full open. Closing the door requires switch No. 2 be operated first to lower the door to the canopy position. Switch No. 1 can then be operated to close the door.
- (3) Holding switch No. 1 to UP TO CANOPY completes 28 volts dc through a canopy position B switch to the main cargo door motor-operated control valve (Fig. 8) The motor drives the valve to POS 1 which connects the hydraulic pressure line to the "open" line of the lift and latch actuators and then closes an internal switch which removes 28 volts dc from the "open" motor winding. The internal switch then connects power to the main cargo door shutoff valve. Another switch within the control valve connects a circuit from the canopy position A switch to the "close" motor winding. The main cargo door shutoff valve opens and applies hydraulic pressure to the "open" side of the lift actuator and latch actuator, provided the airplane is on the ground and the parking brake is set. Due to a restrictor in the lift actuator, the latch actuator operates first to unlatch the door, open it far enough to break the seal and to operate the door position switch. When the door is unlatched, the lift actuator opens the door approximately 87 degrees. At this point the canopy position B switch is operated by a cam driven by the lift bellcrank and 28-volt dc power is disconnected from the solenoid-operated shutoff valve to isolate system B pressure from the actuators and hydraulically lock the door in the canopy position.

**NOTE:** Due to possible internal or external hydraulic leakage, the door may settle from canopy (a hydraulic lock position) to ram lock. In this case, to raise the door up from ram lock position, it is necessary to actuate control switch No. 1 up to canopy, to raise the door sufficiently to operate position B switch. This makes 28 volts dc available to the shutoff valve through switch No. 2.

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Main Cargo Door Hydraulic Schematic  
 Figure 8

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- (4) Operating switch No. 2 to FULL OPEN completes 28 volts dc to the canopy position B switch (now repositioned) which completes power to the shutoff valve. The shutoff valve then opens and applies pressure to the system. Since the control valve is still open, hydraulic pressure is again applied to the "open" side of the lift actuator and the door rises to the full open position. As the door passes the 90-degree open position, a second cam on the lift actuator bell crank operates the canopy position A switch which connects switch No. 2 DOWN TO CANOPY control circuits to the control valve. The door will raise to full open provided switch No. 2 is held until the door has reached its maximum height. Door full open position is with door overcenter and the lift actuator bottomed out.
- (5) If either switch No. 1 or 2 is released before the door has reached the canopy position or the full open position, 28 volts dc through the main cargo door position switch ensures the control valve is in POS 1 and the door is hydraulically locked open. This also occurs any time either switch is released with the door position switch in the "door open" position.
- (6) Operating switch No. 2 to DOWN TO CANOPY completes 28 volts dc through canopy position A switch to the control valve motor to drive the valve to POS No. 2. The control valve connects the hydraulic pressure line to the "closed" line of the lift actuator and latch actuator. An internal switch within the control valve connects power to the shutoff valve when the control valve reaches position No. 2. The shutoff valve then opens and connects hydraulic pressure to the system. However, due to the spring cartridge assembly holding the latch actuator overcenter, the latch actuator cannot operate until the door reaches the closed position. The lift actuator lowers the door at a rate controlled by the return line flow limiter. At approximately 90 degrees the canopy position A switch operates and disconnects switch No. 2 from the shutoff valve and the position 2 side of the control valve. The control valve remains in position 2 as long as switch No. 2 is held in DOWN position. Hydraulic pressure is removed from the door actuators but door motion continues due to door weight. At approximately 87 degrees the canopy position B switch operates and connects switch No. 1 to the shutoff valve and the POS 1 side of the control valve but no electrical power is available until switch No. 1 is held in FULL CLOSE position. The door continues to the ram-lock position, which is slightly below where the canopy position B switch operates. Release of switch No. 2 connects 28 volts dc through the door position switch to the POS 1 side of the control valve which rotates the control valve to the POS 1 position creating a hydraulic lock. (See Fig. 4 and 6 for switch locations.)

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- (7) Operating switch No. 1 to CLOSE completes 28 volts dc through the canopy position A switch to the POS 2 winding of the control valve. The valve then goes to the POS 2 position, operates the internal switches and completes 28 volts dc to the shutoff valve. Hydraulic pressure is again connected to the "close" lines of the actuator and the door closes. When the latch hooks contact the latch pins on the sill the hooks rotate slightly to move the latch actuator overcenter so that it may operate. The latch actuator then continues the rotation of the latch hooks around the latch pins to pull the door completely closed. When the door is closed and switch No. 1 is released, 28 volts dc is connected through the door position switch to the control valve to ensure the control valve is held in POS 2 and the other internal switch connects to the POS 1 winding for the next open sequence. Locking the door with the external control handle insert lockpins across the latch hooks to prevent the door from being accidentally opened and the door lock switch shuts off electrical power to the main cargo door switches No. 1 and 2. The main cargo door unlocked light will extinguish when the door is closed and locked. Refer to Door Warning System for operation of additional door warning circuits.

### D. Manual Operation with Handpump

- (1) Manual operation of the main cargo door requires all electrical power be removed from the system (main cargo door circuit breaker pulled). It is assumed hydraulic system B is inoperable. Hatracks on the door must be folded and stowed, and the lift actuator access door must be open.

**CAUTION:** CONTROL VALVE MOTOR BURNOUT MAY OCCUR IF CONTROL VALVE IS POSITIONED WHEN ELECTRICAL POWER IS ON THE SYSTEM. ENSURE MAIN CARGO DOOR CIRCUIT BREAKER IS OPEN AND SUITABLY TAGGED BEFORE MANUAL OPERATION.

- (2) The cargo door is first unlocked by pulling on the external lock handle. The motor-operated control valve in the left wheel well must be positioned to POS 1. A manual override is on the control valve. The main cargo door hand pump in the left wheel well is then operated to raise the door. Operation of the lift and latch actuators and associated mechanisms is similar to that described under normal operation. Approximately 45 strokes of the pump are required to raise the door to the canopy position. The door should be raised slightly above the canopy position; the manual override on the control valve is then positioned to POS 2 to release the hydraulic lock. The door then lowers until the internal ram lock of the lift actuator stops the door just below the canopy position. The door is raised to the full open position by positioning the control valve override to POS 1 and operating the hand pump for approximately 25 strokes. A hydraulic lock holds the door open as long as the control valve is left in POS 1.

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(3) The door is closed from the full open position by operating the control valve override to POS 2 and operating the handpump. After the door passes top dead center, door weight will drive the door to the canopy position where the internal ram lock in the lift actuator will stop the door. Further operation of the handpump will unlock the lift actuator's internal ram lock and allow the door to lower. The return line flow limiter controls the rate that the cargo door closes. Additional pumping is not required until the door is resting on the latch pins. The door may be stopped in any position by positioning the control valve override to POS 1. Positioning the control valve override to POS 2 allows the door to continue closing. The door is latched by operating the handpump. Hydraulic pressure then operates the latch actuator which causes the latch hooks to rotate, engage the latch pins and pull the door closed. The door should then be locked by operating the external lock handle. The control valve should remain in POS 2 after it is locked closed.

### E. Emergency External Operation

(1) In the event that a system malfunction prevents the door from being opened normally or with the manual handpump, panels on the exterior of the door may be removed for access to the lock and latch mechanisms. Normally the lockpins can be retracted using the unlocking handle; if not, they will have to be levered to a retracted position through the access opening. Similarly the latches can be levered to the unlatched position. Once the door is unlatched it may be raised with a hoist or crane.

**CAUTION:** LIFT ACTUATOR ACCESS DOOR MUST BE OPENED BEFORE DOOR IS LIFTED OR CEILING PANEL WILL BE DAMAGED.

**NOTE:** If a hydraulic lock in the system prevents unlatching, open a hydraulic line to relieve pressure.

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### MAIN CARGO DOOR – TROUBLESHOOTING

#### 1. General

- A. Before using the troubleshooting chart, prepare to test operation of main cargo door in accordance with system adjustment/test procedures (AMM 52-32-0). Troubles are presented on the chart in the order that they occur during the system test. Probable causes are presented according to the frequency in which they are most likely to occur.
- B. Control switches No. 1 and 2 and the amber door-unlocked light are on the main cargo door control panel. Both canopy position switches are adjacent to the bellcrank pivot point on the lift mechanism. The hydraulic control valve and the solenoid shutoff valve are on the left wheel well aft bulkhead.
- C. When hydraulic system B is inoperable, the main cargo door can be opened or closed by using the handpump installed on the left wheel well aft bulkhead. Manual operation requires that the main cargo door control circuit breaker be pulled. This will remove all electrical power from the system (AMM 52-32-0, Manual Operation with Handpump).

#### 2. Prepare to Troubleshoot

- A. When troubleshooting the main cargo door in normal operation, make sure that the following conditions are in effect:
  - (1) Parking brake set.
  - (2) Hydraulic system B pressurized (AMM Chapter 29, Hydraulic Power).
  - (3) Electrical power on.
  - (4) Door warning light on door warning module is operable (AMM 52-71-0, Door Warning System).
  - (5) Lift actuator access door open.
  - (6) On airplanes without New Look Interior, both main cargo door hatracks folded and stowed.

**NOTE:** Stowing the hatracks closes two hatrack interlock microswitches that form part of a series interlock circuit with the main cargo door locked switch.

- B. Prior to troubleshooting, make sure that the following circuit breakers on load control center P6 are closed:
  - (1) Hydraulic System B Pumps
  - (2) Main Cargo Door Control
  - (3) Landing Gear Failure Warning and Parking Brake

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3. Main Cargo Door Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Door unlocked light does not illuminate when door is unlocked		Press-to-test door unlocked light. IF -	
		Light does not illuminate. Check for 28v dc at terminal 1 of light socket. IF -	
	Defective light bulb or socket	Voltage OK.	Replace light bulb or socket
	Defective wiring	No voltage.	Repair wiring between circuit breaker and light socket
		Light illuminates. Check if cargo door warning light on door warning module is illuminated. IF -	
	Defective lock mechanism or locked switch	Cargo door warning light is not illuminated.	Adjust or repair lock mechanism or switch
		Cargo door warning light is illuminated. Check for continuity across terminals 10 and 11 of door locked switch. IF -	
Defective wiring	Continuity OK.	Repair wiring between switch ground and light socket	
Defective door locked switch	No continuity.	Replace door locked switch	

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Door fails to raise when either switch held to open		Check position of control valve indicator. IF -	
		Indicator at position 1. Check if door raises in manual operations. IF -	
	Defective check valve, relief valve, flow limits, actuator, latch mechanism (door closed position)	Door still does not raise.	Replace hydraulic component or adjust door latch mechanism (door does not unlock)
		Door raise. Check for 28v dc at pin 1 and continuity to ground and pin 3 of shutoff valve connector D1222. IF -	
	Defective shutoff valve	Voltage and ground OK.	Replace shutoff valve
	Defective landing gear safety circuit	No ground at pin 3.	Refer to landing gear module M338 troubleshooting (AMM 32-09-100)
		No voltage at pin 1. Check for continuity across pins A and C of control valve and terminal 3C-3NO of respective control switch.	
Defective control valve	No continuity across control valve pins A and C.	Replace control valve	

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Door fails to raise when either switch held open (Cont)	Defective control switch	No continuity across switch terminals.	Replace respective control switch
	Defective wiring	Continuity OK.	Repair wiring between pin 1 of shutoff valve and pin C of control valve
		Indicator not at position 1. Check for 28v dc at pin A and continuity to ground at pin E of connector D1220 of control valve. IF -	
	Defective control valve	Voltage and ground OK.	Replace control valve
Defective wiring	No continuity for ground.	No voltage at pin A. Check for continuity across terminals 1 and 2 of each hatrack interlock switch and door locked switch, and 2C-2NC of control switch No. 1. If door below canopy position, check continuity across terminals 4C-4NO of control switch No. 1 and terminals 1 and 2 of canopy position B switch. If door above canopy position, check continuity across terminals 4C-4NC of control switch No. 1, 4C-4NO of control switch No. 2 and terminals 1 and 3 of canopy position B switch. IF -	Repair circuit between pin E and ground

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Door fails to raise when either switch held open (Cont)	Defective wiring	Continuity OK.	Repair wiring between circuit breaker and control valve pin A
	Defective hatrack, door locked, canopy position B, or control switch	No continuity.	Adjust or replace defective switch
Door continues to raise after control switch is released		Check for voltage at terminal 1 of connector D1222 of shutoff valve. IF -	
	Defective shutoff valve	No voltage.	Replace shutoff valve
		Voltage present. Check for short across terminals 3C-3N0 of control switches No. 1 and 2. IF -	
	Defective control switch	Short exists.	Replace affected switch
Defective wiring	No short.	Repair wiring between control switch and shutoff valve	

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Door lowers after control switch is released		Check position of control valve indicator. IF -	
	Defective check valve, relief valve, actuator, or line leak	Indicator at position 1. Check hydraulic components and lines for faulty operation or leakage.	Replace affected component
		Indicator not at position 1. Check for voltage at pin A, no voltage at pin B and continuity to ground at pin E of connector D1220 of control valve. IF -	
		No voltage at pin A. Check for continuity across terminals 1 and 2 of door position switch and 2C-2NC, 4C-4NC of control switches 1 and 2. IF -	

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Door lowers after control switch is released (Cont)	Defective wiring	Continuity OK.	Repair wiring between control switch and pin A of connector D1220
		No continuity.	Adjust or replace affected switch
		Voltage at pin B. Check for short across terminals 1 and 3 of door position switch and 2C-2N0 of control switch No. 1 if below canopy position or control switch No. 2 if above canopy position. IF -	
	Defective door position or control switch	Short exists.	Adjust or replace affected switch
	Defective wiring	No short exists.	Repair wiring between control switch and pin B of connector D1220
	Defective wiring	No continuity to ground at pin E.	Repair wiring between pin E and ground
	Defective control valve	Voltage at pins A and B and continuity to ground at pin E OK.	Replace control valve

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Door fails to stop at canopy position when being raised	Check for short across terminals 1 and 2 of canopy position B switch and 4C-4NC of control switch No. 1. IF -		
	Defective canopy position B switch or control switch No. 1	Short exists.	Adjust or replace affected switch
		No short.	Repair wiring between control switch and shutoff valve

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Door fails to lower when either switch held to close		Check position of control valve indicator. IF -	
		Indicator at position 2. Check if door lowers in manual operation. IF -	
	Defective check valve, relief valve or actuator	Door still does not lower. Check for faulty check valve, relief valve or actuator.	Replace affected component
		Door lowers. Check for 28v dc at pin 1 and continuity to ground at pin 3 of shutoff valve connector D1222. IF -	
	Defective shutoff valve	Voltage and ground OK.	Replace shutoff valve
	Defective landing gear safety circuit	No ground at pin 3.	Refer to landing gear module or 338 troubleshooting (AMM 32-09-100)
No voltage at pin 1. Check for continuity across terminals 1C-1N0 of control switches No. 1 and 2 and pins B and D of control valve. IF -			
Defective control switch	No continuity across switch terminals	Repair or replace control switch	

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Door fails to lower when either switch held to close (Cont)	Defective control valve	No continuity across control valve pins B and D.	Replace control valve
	Defective wiring	Continuity OK.	Repair wiring between pin 1 of shutoff valve and pin D of control valve
		Indicator not at position 2. Check for 28v dc at pin B and continuity to ground at pin E of connector D1220 of control valve. IF -	
	Faulty control valve	Voltage and ground OK.	Replace control valve
	Defective wiring	No continuity to ground.	Repair circuit between pin E and ground

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Door fails to lower when either switch held to close (Cont)		No voltage at pin B. Check for continuity across terminals 1 and 2 of each hatrack interior switches and door locked switch. If door is below canopy position, check for continuity across terminals 2C-2NO of control switch No. 1 and terminals 1 and 3 of canopy position A switch. If door is above canopy position, check for continuity across terminals 2C-2NC and 4C-4NC of control switch No. 1, 2C-2NO and 4C-4NC of control switch No. 2, and terminals 1 and 3 of canopy position A switch. IF -	
	Defective wiring	Continuity OK.	Repair wiring between circuit breaker and shutoff valve pin B
	* Airplanes without New Look Interior  Defective hatrack door locked *, canopy position or control switch	No continuity.	Adjust or replace defective switch

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY	
Door does not stop at canopy position when lowered from full open position		Check for short across terminals 1 and 3 of canopy position A switch. IF -		
	Defective canopy position A, switch	Short exists.	Adjust or replace canopy position A switch	
	Defective door actuator (no ram lock)	No short exists.	Replace door actuator	
Door unlocked light is not extinguished when door is closed and locked		Check door warning light on warning module is illuminated. IF -		
		Warning light is illuminated unlock door and depress plunger on door locked switch. IF -		
	Door locked switch out of adjustment		Unlocked and warning lights are extinguished	Adjust door locked switch
			Either unlocked or warning light, or both remains illuminated. Check for continuity across terminals 10 and 11 or 7 and 8 of door locked switch. IF -	
Defective door locked switch		Continuity OK.	Repair or replace door locked switch	

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURES	REMEDY
Door unlocked light is not extinguished when door is closed and locked (Cont)		No continuity. Disconnect wires from terminal 10 of terminal strip T259 (located behind the ceiling panel inboard of the aft section of the cargo door hinge line) and open main cargo door until door position switch plunger is accessible. Depress plunger on door position switch to stimulate door closed condition. IF -	
	Main cargo door position switch out of adjustment	Cargo door unlocked and warning light are extinguished.	Adjust door position switch
Door unlocked light is not extinguished when door is closed and locked (Cont)		Cargo door unlocked or warning light, or both remains illuminated. Check for continuity across terminals 4 and 5 or 7 and 8 of door position switch. IF -	
	Defective door position switch	Continuity OK.	Repair or replace door position switch
	Defective lock mechanism	No continuity.	Repair or replace lock mechanism
		Warning light is not illuminated. Check for short across terminals 1 and 3 of unlocked light socket. IF -	
	Defective light socket	Short exists.	Replace light socket
Defective wiring	No short exists.	Repair wiring between light socket and door locked or door position switch	

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MAIN CARGO DOOR SYSTEM – SERVICING

1. General

- A. This procedure provides instructions for bleeding, filling and leak-checking the main cargo door hydraulic system and should be used any time a main cargo door hydraulic component has been replaced or reinstalled. Tubing, hydraulic components and actuators should be continually checked for leaks during procedure. Should any fluid spill on the airplane, decontaminate. Refer to Chapter 12, Cleaning and Washing. Filling and bleeding of the A, B, and standby hydraulic systems should be completed before operating the main cargo door. Refer to Chapter 29.
- B. The main cargo door hydraulic system may be bled and filled using either a variable-pressure test bench or the main cargo door hand pump. If a control valve or shutoff valve has been replaced, the test bench procedure is recommended to simultaneously check electrical circuits.

2. Bleed and Fill Main Cargo Door Hydraulic System (Test Bench)

- A. Equipment and Materials
- (1) Variable volume BMS 3-11, Test Bench capable of delivering 20 GPM at 3000 PSI, with pressure adjustment from 0-3500 PSIG, and oil filtration of 5 microns nominal and 15 microns absolute.
- B. Prepare to Bleed and Fill
- (1) Ensure main cargo door is closed.
  - (2) Ensure control valve indicator is on POS-2.

NOTE: Control valve is on left wheel well aft bulkhead.

- (3) Provide electrical power to the airplane.
- (4) Check that main cargo door control circuit breaker on load control center P6 is closed.
- (5) Ensure landing gear failure warning and parking brake circuit breaker is closed on load control center P6.
- (6) Ensure parking brake is set.

NOTE: If airplane is on jacks, compress right gear approximately six inches.

- (7) Open lift actuator access door.

CAUTION: LIFT ACTUATOR ACCESS DOOR MUST BE OPEN TO PREVENT DAMAGE TO CEILING PANEL DURING MAIN CARGO DOOR OPERATION.

- (8) Fold both main cargo door hatracks to the up-and-locked position.
  - (9) Connect hydraulic test bench to ground service module.
- C. Bleed and Fill System
- (1) Operate external lock handle to unlocked position.



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- (2) Slowly increase hydraulic pressure to 3000 PSIG and check hydraulic components and fittings for leaks.
- (3) Using main cargo switch No. 1, operate door through 10 complete cycles between closed and canopy positions, gradually increasing opening until canopy position is reached. Repeat cycle as required until operation is smooth and quiet.
- (4) With door at canopy position and using switch No. 2, gradually raise and lower door (increasing opening until full-open position is obtained). Cycle as required until door operation is smooth and quiet.
- (5) Close main cargo door.
- (6) Slowly increase hydraulic pressure to 3400 (+50/-50) PSIG and hold for minimum of five minutes. There should be no evidence of leakage from any main cargo door hydraulic lines or components.
- (7) Raise main cargo door to full-open position and repeat step (6).
- (8) Close main cargo door and reduce hydraulic pressure to zero.
- (9) Lock main cargo door.

### D. Restore Airplane to Normal

- (1) Close lift actuator access door.
- (2) Disconnect test bench.
- (3) Replace any panels removed to observe hydraulic lines or components.
- (4) Determine whether there is any further need for electrical power on the airplane; if not, remove electrical power.

### 3. Bleed and Fill Main Cargo Door Hydraulic System (Handpump)

#### A. Prepare to Bleed and Fill

- (1) Open main cargo door control circuit breaker on load control center P6.
- (2) Open lift actuator access door.

**CAUTION:** LIFT ACTUATOR ACCESS DOOR MUST BE OPEN TO PREVENT DAMAGE TO CEILING PANEL DURING MAIN CARGO DOOR OPERATION.

- (3) Fold main cargo door hatracks to up-and-locked position.

#### B. Bleed and Fill System

- (1) Operate external lock handle to unlocked position.
- (2) Manually operate control valve to POS-1.

**CAUTION:** CONTROL VALVE MOTOR MAY BURN OUT IF CONTROL VALVE IS MANUALLY POSITIONED WHILE ELECTRICAL POWER IS APPLIED TO MOTOR. ENSURE MAIN CARGO DOOR CONTROL CIRCUIT BREAKER IS OPEN AND SUITABLY TAGGED TO PREVENT INAVERTENT CLOSING.

**NOTE:** Control valve is on left wheel well aft bulkhead adjacent to handpump.

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- (3) Using main cargo door handpump, operate door through 10 complete cycles between closed and canopy positions, gradually increasing opening until canopy position is reached. Repeat cycle as required until operation is smooth and quiet.

**NOTE:** Manually operate control valve to POS-2 when closing door and to POS-1 when opening door.

- (4) With door at canopy position, raise and lower door, gradually increasing opening until full-open position is obtained. Cycle as required until operation is smooth and quiet.
- (5) With door at full-open position, manually operate control valve to POS-2 and operate handpump until door begins to close. The door should close to canopy position (actuator ram lock position).

**NOTE:** Do not operate handpump when door is closing. Handpump needs to be operated only to release ram lock in actuator or to drive door overcenter when closing door from full open position.

- (6) Operate handpump to release ram lock and allow to close.
  - (7) Operate handpump until door is completely closed and latched.
  - (8) Lock main cargo door.
- C. Return Airplane to Normal
- (1) Close lift actuator door.
  - (2) Replace any panels removed to observe hydraulic lines or components.
  - (3) Close main cargo door control circuit breaker.

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MAIN CARGO DOOR SYSTEM – ADJUSTMENT/TEST

1. Main Cargo Door System Test

A. General

- (1) The purpose of this procedure is to test all operating components of the main cargo door, including actuators, canopy switches, door position switch, lock switch and hatrack switches (on airplanes without New Look Interior). Refer to 52-71-0, Adjustment/Test for door warning circuits test.
- (2) Prior to test the door shall be properly adjusted and checked for operating clearances. For adjustment procedures on door components see 52-32-11, Main Cargo Door Assembly, Adjustment/Test; for hatrack switch adjustment see Chapter 25. Filling and bleeding of the A, B, standby, and main cargo door hydraulic systems shall have been completed. Refer to Main Cargo Door System – Maintenance Practices and Chapter 29.

B. Prepare to Test

- (1) Provide electrical power to the airplane.
- (2) Check that following circuit breakers on load control center P6 are closed:
  - (a) Hydraulic System B Pumps
  - (b) Main Cargo Door Control
  - (c) Indicator Lights, Master Dimming Bus (9 places)
  - (d) Landing Gear Failure Warning and Parking Brake
  - (e) Landing Gear Indicating Lights
- (3) Ensure main cargo door is closed.
- (4) Remove panels over latch actuator (Ref 52-32-81)
- (5) Ensure main cargo door control valve indicator is on POS-2.

NOTE: Control valve is on left wheel well aft bulkhead.

- (6) Open lift actuator access door.

CAUTION: LIFT ACTUATOR ACCESS DOOR MUST BE OPEN TO PREVENT DAMAGE TO CEILING PANEL DURING MAIN CARGO DOOR OPERATION.

- (7) Ensure parking brake is set.

NOTE: If airplane is on jacks, compress right main gear approximately 6 inches.

- (8) Pressurize hydraulic system B (Ref Chapter 29)

C. Test Main Cargo Door System

CAUTION: PERSONNEL AND EQUIPMENT MUST BE CLEAR OF MAIN CARGO DOOR PATH.



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- (1) Operate external lock handle to unlocked position. Check that amber door-unlocked light on main cargo door control panel illuminates.
- (2) Operate main cargo door switch No. 1 to UP TO CANOPY. Check door does not open.
- (3) On airplanes without New Look Interior, fold main cargo door forward hatrack to up and locked position.
- (4) Repeat step (2). Results should be similar.
- (5) Lower forward hatrack and fold main cargo door aft hatrack to up and locked position.
- (6) Repeat step (2).
- (7) On airplanes without New Look Interior, fold both hatracks to up and locked position.
- (8) Operate main cargo door switch No. 1 to UP TO CANOPY. Check that door raises; then release switch before door reaches canopy position. Check that door stops.
- (9) Using switch No. 1, close main cargo door but keep external lock handle in unlocked position. Check that door-unlocked light on main cargo door control panel remains illuminated.
- (10) Operate external lock handle to locked position. Check that door-unlocked light extinguishes.
- (11) On ALL EXCEPT airplanes incorporating SB 52-1060.
  - (a) Disconnect wire from terminal 10 and terminal 11 of terminal strip T259 and unlock door. Check that door-unlocked light and main cargo door warning light in P5 are extinguished.

**NOTE:** Terminal strip T259 is located behind the ceiling panel inboard of the aft section of the main cargo door hinge line. For removal of ceiling panel, refer to Chapter 25, Passenger Cabin Lining and Insulation.

- (b) Using switch No. 1, open the main cargo door a minimum of 10 inches. Check that door-unlocked light and main cargo door warning light illuminate.
- (c) Close and lock main cargo door. Check that door-unlocked light and main cargo door warning light are extinguished.
- (d) Reconnect wire to terminal 10 and terminal 11 of terminal strip T259. Unlock door handle. Check that door-unlocked light and main cargo door warning light are illuminated.

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- (12) On airplanes incorporating SB 52-1060.
- (a) Disconnect wire from terminal 10 and terminal 11 of terminal strip T259 and unlock door. Check that door-unlocked light and main cargo door warning light on forward overhead panel P5 are extinguished.
- NOTE:** Terminal strip T259 is located behind ceiling panel inboard of aft section of main cargo door hinge line. For removal of ceiling panel, refer to Chapter 25, Passenger Cabin Lining and Insulation.
- (b) Using switch No. 1, open main cargo door a minimum of 10 inches. Check that door-unlocked light illuminates.
- (c) Reconnect wire to terminal 10 and terminal 11 of terminal strip T259. Actuate door position switch on doorsill, lockpin switch at No. 3 door latch, and lockpin switch at No. 6 door latch. Check that main cargo door warning light extinguishes and that lights at No. 2 and 7 latch viewing windows are illuminated.
- (d) Release No. 3 door latch lockpin switch. Check that light at No. 2 latch viewing window extinguishes, that light at No. 7 latch viewing window remains illuminated, and that main cargo door warning light illuminates.
- (e) Actuate No. 3 door latch lockpin switch and release No. 6 door latch lockpin switch. Check that light at No. 7 latch viewing window is extinguished, that light at No. 2 latch viewing window is illuminated, and that main cargo door warning light is illuminated.
- (f) Actuate No. 6 door latch lockpin switch. Check that main cargo door warning light extinguishes.
- (g) Release door position switch. Check that main cargo door warning light illuminates.
- (h) Release No. 3 and 6 door latch lockpin switches, close door and lock handle. Check that door-unlocked light and main cargo door warning light are extinguished, and that lights at No. 2 and 7 latch viewing windows are illuminated.
- (i) Unlock door. Check that door-unlocked light and main cargo door warning light are illuminated, and that lights at No. 2 and 7 latch viewing windows are extinguished.
- (13) Operate switch No. 1 to UP TO CANOPY. Check that door raises to canopy position (approximately 87 degrees).
- (14) Operate switch No. 2 to DOWN TO CANOPY. Check that door does not move.
- (15) Operate switch No. 2 to FULL OPEN. Check that door raises to full open position (slightly overcenter of hinge line).

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- (16) Operate switch No. 2 to DOWN TO CANOPY and release switch before canopy position is reached. Check that door stops.
  - (17) Operate switch No. 2 to DOWN TO CANOPY. Check that door lowers to canopy position and stops.
  - (18) Operate switch No. 1 to CLOSE. Check that door closes and latches.
  - (19) Lock main cargo door; check that door-unlocked light extinguishes.
- D. Return Airplane to Normal
- (1) Close lift actuator access door.
  - (2) Install window and dado panels (Ref 52-32-81).
  - (3) Depressurize hydraulic system B (Ref Chapter 29).
  - (4) Determine whether there is any further need for electrical power on the airplane; if not, remove electrical power.

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MAIN CARGO DOOR ASSEMBLY – REMOVAL/INSTALLATION

1. General

A. This procedure covers removal and installation of a cargo door that has been previously trimmed and fitted to the airplane.

2. Equipment and Materials

- A. Lifting Device for Main Cargo Door
  - (1) Cargo Door Sling – SYME 65-54916 or
  - (2) Lifting Fixture Assembly – Main Cargo Door, 7 Window – F70250-3 (preferred for future procurement)
- B. Solvent – BMS 3-2
- C. Overhead Crane – 1100-pound minimum capacity
- D. Suitable container for catching hydraulic fluid
- E. Bolts – NAS 1304-7 (8 required)
- F. Personnel Safety Barrier, Cargo Door – F70258-1
- G. Lubricant – MIL-G-21164 (Ref 20-30-21)

3. Prepare for Removal

- A. Remove cargo door ceiling panels (Ref 52-32-81).
- B. On airplanes without New Look Interior, secure hatrack in folded position. On airplanes with New Look Interior, remove overhead stowage compartment (Ref Chapter 25, Equipment and Furnishings).
- C. Open lift actuator access door.
- D. Open cargo door to the angle at which door will hang when suspended by sling (View 1, Fig. 401).
- E. With overhead crane, position sling over center of gravity of door.
- F. Secure main cargo door lifting device to main cargo door as follows:
  - (1) Remove eight countersunk screws from lifting device attachment points at body stations 380 and 480.
  - (2) If SYME 65-54916 cargo door sling is used, attach sling to door using two NAS1304-7 bolts in each of the upper and lower attachment pads.
  - (3) If F70250-3 lifting fixture is used, proceed as follows:
    - (a) Position two curved spreader fittings at forward and aft attach points on door and secure to door with special bolts stowed on spreader bars adjacent to attach points.
    - (b) Attach curved spreaders at cable attachment rings to hooks at either end of horizontal spreader bar.
- G. Support weight of door with crane by taking up cable slack. Tension in each sling cable should be approximately equal.

CAUTION: DOOR MAY BE DAMAGED IF CRANE LIFTS DOOR.

- H. Open the following circuit breakers on load control center P18:
  - (1) COVER LTS – LEFT
  - (2) CEIL LTS – L FWD
  - (3) READING LT – LEFT

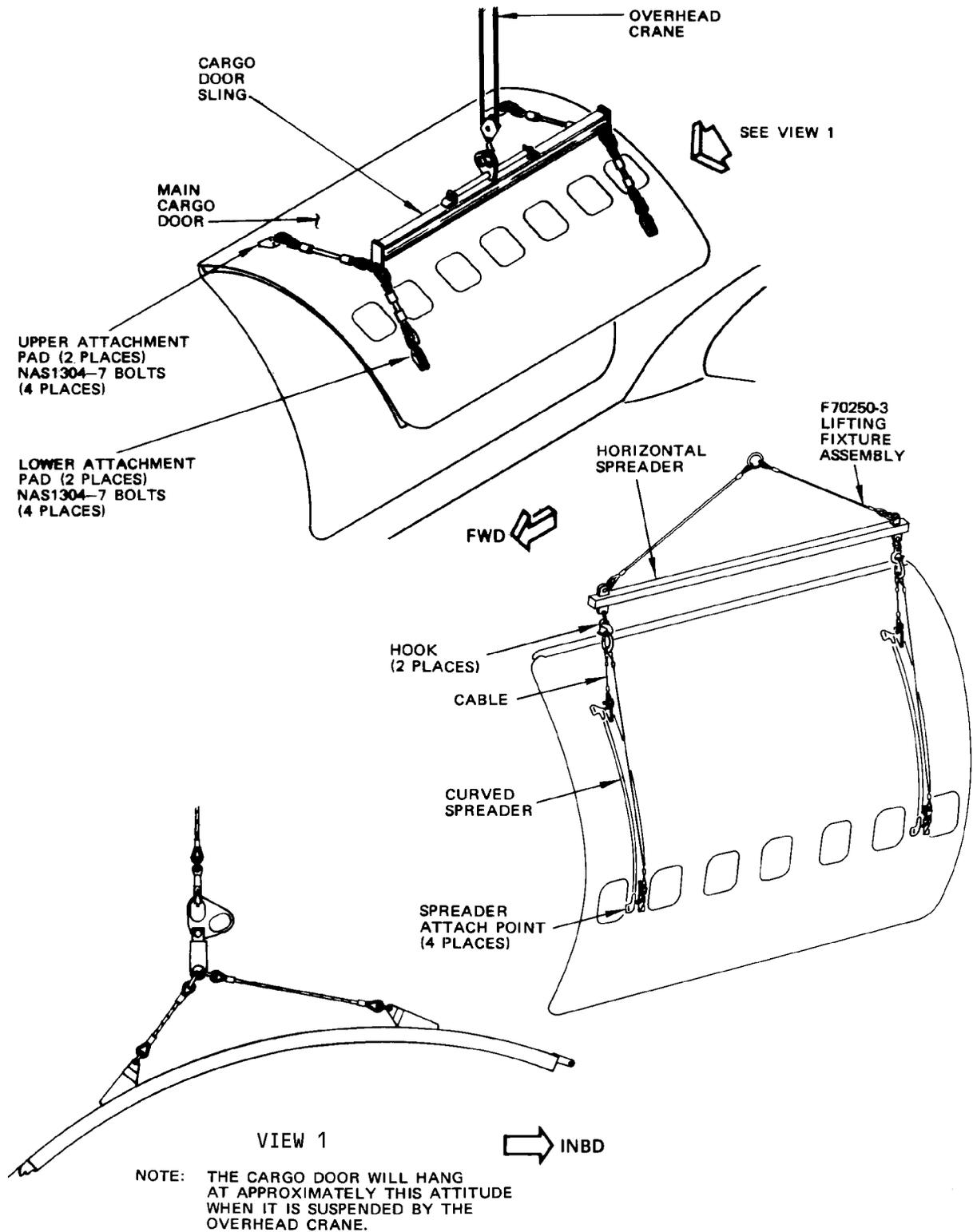
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Main Cargo Door Lifting Device Installation  
 Figure 401

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- (4) NO SMOKING
- (5) PASS SIGN CONTROL
- (6) FASTEN SEAT BELT
- (7) PASS AND CREW CALL
- I. Open the following circuit breakers on load control center P6:
  - (1) PASSENGER ADDRESS
  - (2) MAIN CARGO DOOR CONTROL
- J. Actuate the manual override on control valve to POS-2.
- 4. Remove Main Cargo Door
  - A. Disconnect and cap both flexible hydraulic lines on the cargo door.

**NOTE:** A container should be used to catch draining hydraulic fluid. Refer to Chapter 12, Cleaning and Washing, for cleaning of spilled hydraulic fluid.
  - B. Disconnect and cap the flexible oxygen line on the cargo door.
  - C. Disconnect wiring from terminal strip above door at body station 460. Pull wiring out of ceiling through grommet.

**NOTE:** Tag wires for proper reconnection.
  - D. Remove cotter pin, nut, bolt and washers and disconnect outboard link from door.
  - E. Remove the diaphragm seal from the door hinge (Ref 52-09-111, Diaphragm Seals).
  - F. Remove the attaching bolts of each forward and aft hinge fairing plate and remove the fairing plates.
  - G. Remove the attaching bolts and remove the two hinge segments adjacent to the end hinges (Fig. 402).
  - H. Using a drift and a light hammer or pneumatic hammer, drift the segmented hinge pin from the forward and aft hinge sections.
  - I. Drift out the remaining hinge pins from each hinge section, removing hinge sections as necessary.

**CAUTION:** RESTRAIN THE CARGO DOOR TO PREVENT SWINGING AS HINGE PINS AND DRIFT ARE REMOVED FROM THE HINGE.
  - J. Remove door from airplane.
  - K. If new door is not to be installed immediately, install cargo door personnel safety barrier across door opening.
  - L. If a new door is to be installed, remove the following components for reinstalling on new door.
    - (1) Hatracks overhead stowage compartment on airplanes with New Look Interior and passenger service units (Ref Chapter 25).
    - (2) Cove assembly (Ref Chapter 25)
    - (3) Door lining (Ref 52-32-81, Main Cargo Door Lining)

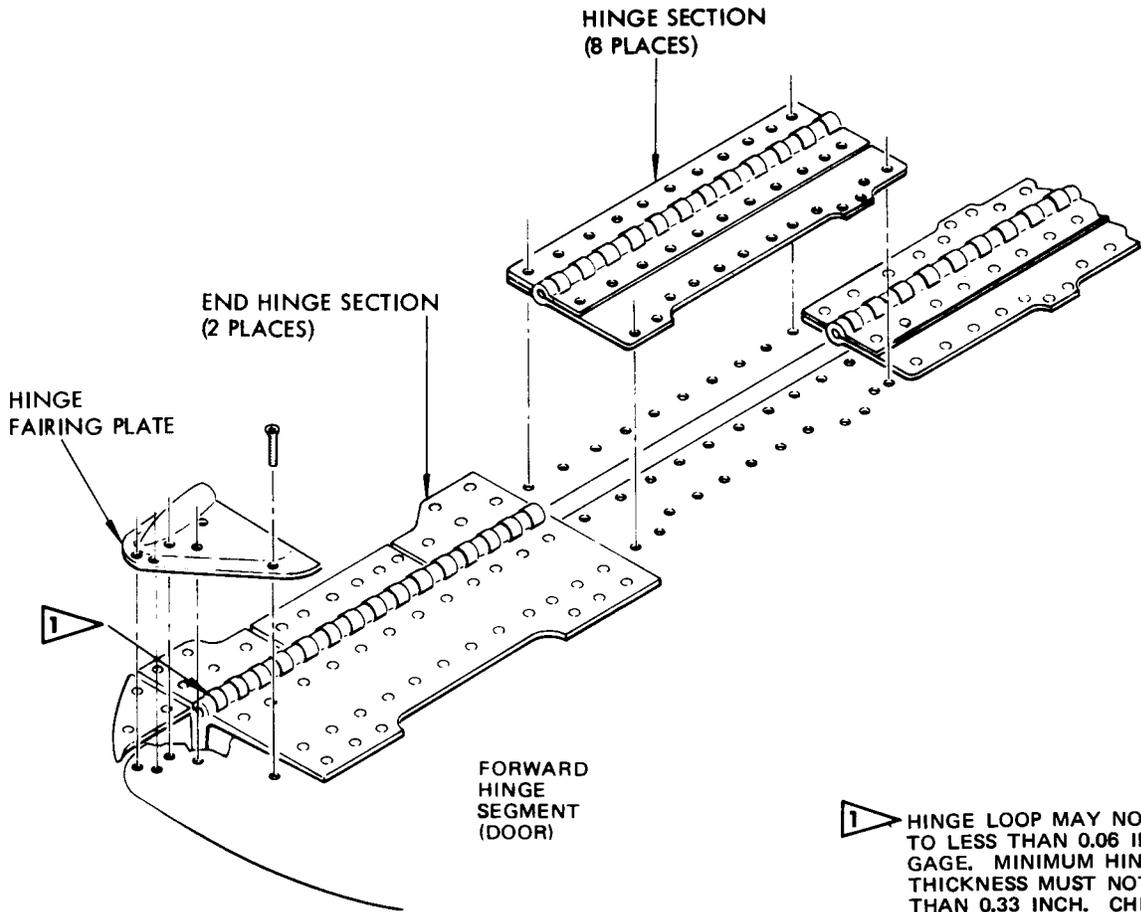
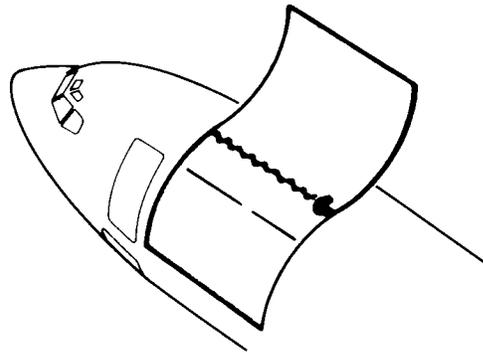
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Main Cargo Door Hinge Installation  
 Figure 402

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- (4) Door insulation (Ref 52-32-91, Main Cargo Door Insulation)
- (5) Latch actuator (Ref 52-32-21, Main Cargo Door Latch Actuator)
- (6) Heating blankets (Ref Chapter 21)
- (7) Wiring bundles
- (8) Gasper air, hydraulic and oxygen tubing

### 5. Prepare for Installation

- A. If a new door is to be installed, the following components must be installed on the door:
  - (1) Gasper air, hydraulic and oxygen tubing
  - (2) Wiring bundles (some permanent splices will have to be broken)
- B. Install cargo door sling or lifting fixture assembly (Fig. 401).
- C. Thoroughly clean dirt from hinge pins and hinge pin holes. Remove grease or oil with BMS 3-2 solvent.
- D. The following conditions must be satisfied only while door is being closed for the purpose of marking door skin for trimming operation and for checking skin gap between door and fuselage. Refer to steps E and M of par. 6.
  - (1) Airplane must be on its wheels (no jack support) and without tailstand.
  - (2) Fuel tanks empty.
  - (3) Airplane shall be substantially complete with all major components installed, except that interior items such as seats, galleys, lavatories, etc., may be missing. Electronic "Black Boxes" may also be missing.
  - (4) All tools, equipment, and personnel must be removed from airplane. Tools and equipment may be placed directly over main gear if removal is not convenient.
  - (5) All airplane parts of significant weight (30 pounds) that are on airplane but not installed would be placed in the approximate position they will occupy when installed.
- E. Remove cargo door personnel safety barrier, if installed.

### 6. Install Main Cargo Door

- A. Check hinge loops and pins for wear per Fig. 402.
- B. Position door so that hinge pin holes are in alignment.
- C. On airplanes without dry lubricant on hinge pins, lightly lubricate forward and aft hinge pins.

**CAUTION:** DO NOT LUBRICATE DRY LUBRICATON HINGE PINS.

- D. With a hammer or pneumatic hammer carefully install hinge pins. Assemble removed hinge sections as necessary.

**CAUTION:** DO NOT USE LUBRICANT ON HINGE PINS WITH DRY LUBRICANT DURING HINGE PIN INSTALLATION. REMOVE AS LITTLE DRY LUBRICANT AS POSSIBLE WHEN INSTALLING PINS.

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- E. Position forward and aft hinge fairing plates and install bolts.
  - F. Install diaphragm seal at door hinge (Ref 52-09-111, Removal/Installation).
  - G. Lower cargo door with the overhead crane until door fits in door opening. If new door is being installed, trim door as necessary to fit into door opening. Final trim will be per step M.
  - H. Remove door sling or lifting fixture and replace countersunk screws.
  - I. Connect wiring bundle from door to terminal strop in ceiling at station 460.
  - J. Connect both flexible hydraulic lines to door.
  - K. Connect the flexible oxygen line to door.
  - L. Position outboard link on door, install the bolt and washers and firmly tighten nut. Back off nut until cotter pin can be installed.
  - M. If not previously installed, install latch actuator (Ref 52-32-21, Removal/Installation).
  - N. Adjust and test main cargo door assembly (Ref 52-32-0, Adjustment/Test).
  - O. Trim door to final dimensions. Gap between door outside skin and fuselage outside skin at forward lower and aft sides should be 0.18 to 0.25 inch.
  - P. Test main cargo door system (Ref 52-32-0, Adjustment/Test).
  - Q. Install cargo door ceiling panels (Ref 52-32-81, Removal/Installation).
  - R. Install hatracks, passenger service units and cove assembly (Ref Chapter 25, Equipment/Furnishings).
7. Restore Airplane to Normal
- A. Install cargo door ceiling panels (Ref 52-32-81).
  - B. If a new door was installed, install the following components on the cargo door as required:
    - (1) New bulb seal
    - (2) Insulation and heating blankets
    - (3) Dado panels
    - (4) Window panels
    - (5) Cove assembly
    - (6) Hatracks and passenger service units
  - C. Close the following circuit breakers on load control center P18:
    - (1) COVE LTS - LEFT
    - (2) CEIL LTS - L FWD
    - (3) READING LT - LEFT
    - (4) NO SMOKING
    - (5) PASS SIGN CONTROL
    - (6) FASTEN SEAT BELT
    - (7) PASS AND CREW CALL
  - D. Close the PASSENGER ADDRESS circuit breaker on load control center P6.

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MAIN CARGO DOOR ASSEMBLY - ADJUSTMENT/TEST

1. Main Cargo Door Assembly Adjustment

A. General

- (1) The following procedures cover adjustment of door centering, lock mechanism and latch mechanism. Additional adjustments other than those given in this procedure may be required. For adjustment of switches, refer to the appropriate subject adjustment/test procedure. The latch actuator should be installed prior to completing the latch mechanism adjustments.

B. Equipment and Materials

- (1) Overcenter Measurement Locating Tool, Main Cargo Door Latch - F80187-6

C. Prepare for Adjustment

- (1) Remove window panels and dado panels from door (Ref 52-32-81 R/I).
- (2) Remove door insulation (Ref 52-32-91 R/I).
- (3) Remove door heating blankets (Ref Chapter 21, Heating).
- (4) Depressurize hydraulic system B (Ref Chapter 29, Hydraulic Power).
- (5) Open main cargo door control circuit breaker on load control center P6.
- (6) The following conditions must be satisfied only while door is being closed for the purpose of checking latch and door centering cam clearances. Refer to steps (1) and (3) of par. C.
  - (a) Airplane must be on its wheels (no jack support) and without tail stand.
  - (b) Fuel tanks empty.
  - (c) Airplane shall be substantially complete with all major components installed, except that interior items such as seats, galleys, lavatories, etc., may be missing. Electronic "Black Boxes" may also be missing.
  - (d) All tools, equipment, and personnel must be removed from airplane. Tools and equipment may be placed directly over main gear if removal is not convenient.
  - (e) All airplane parts of significant weight (30 pounds) that are on airplane but not installed should be placed in the approximate position they will occupy when installed.

D. Adjust Main Cargo Door

- (1) Adjust Door Centering Guide Rollers (See figure 501.)
  - (a) The distance between the forward edge of the front centering cam and the aft edge of the rear centering cam is 135.90 ( $\pm$  0.03) inches. The distance between the guide rollers on the body door frame should be 0.00 to 0.03 inch greater than the distance between the centering cams. See dimension A. Adjust distance by varying gage of shims under guide roller brackets.

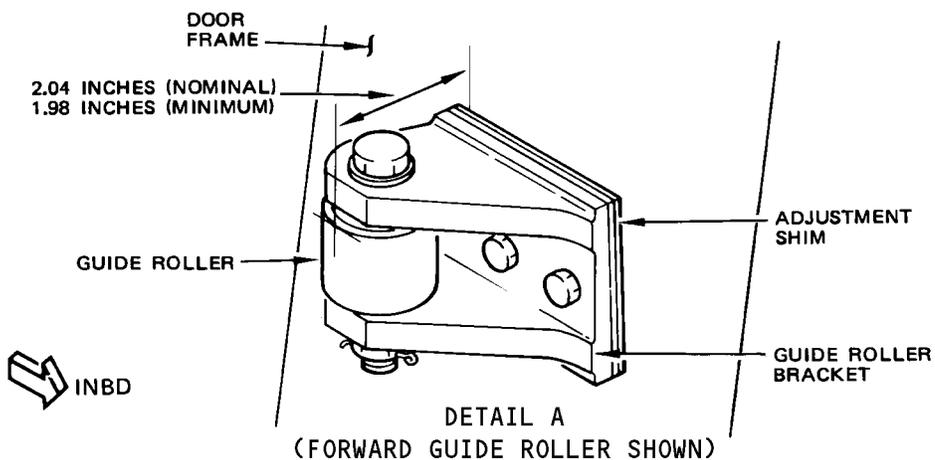
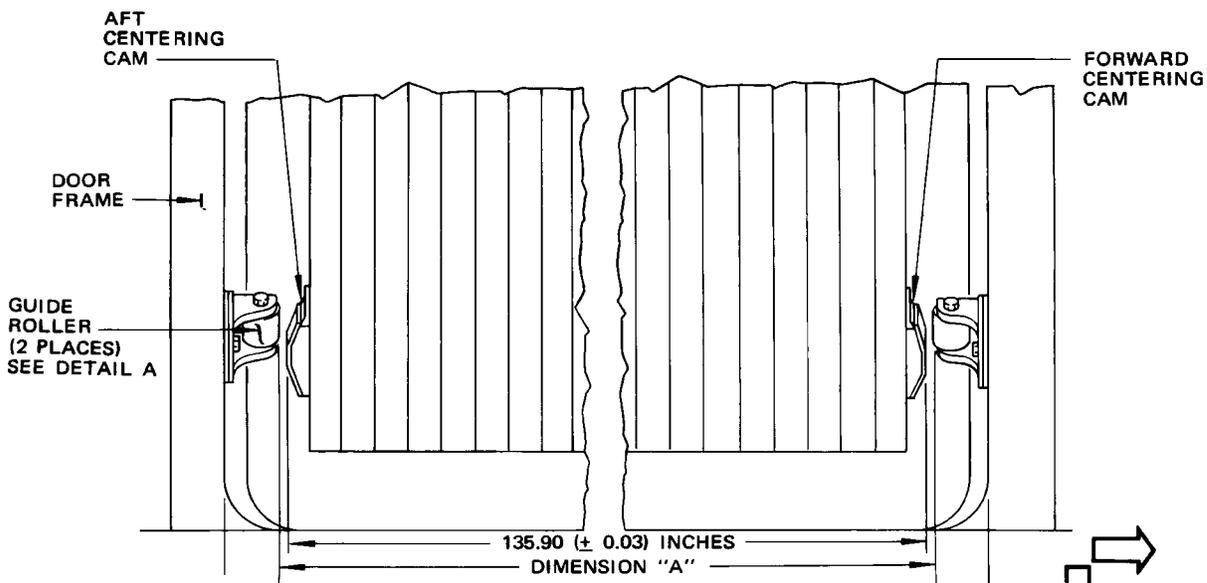
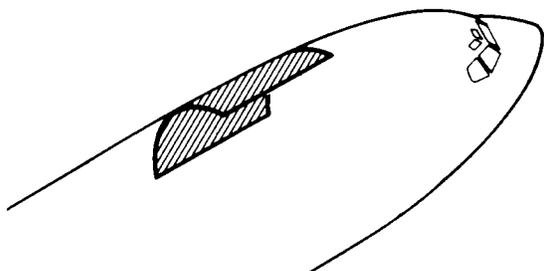
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Main Cargo Door Centering Guide Roller Adjustment  
 Figure 501

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- (b) Ensure distances from roller surface to frame surfaces at station 360 and station 500 are 2.04 inches nominal, 1.98 inches minimum.
- (2) Adjust Lock Mechanism (Fig. 503).
  - (a) Open locking handle until control cable assembly bottoms out and locking pins retract.
  - (b) Apply an aft preload of 20 ( $\pm 5$ ) pounds to the No. 8 lockpin (STA 490).
  - (c) Adjust pushrods to position lockpins on face of latch support fittings as shown on detail A. Adjust bellcrank pushrod for No. 2 lockpin first and then adjust No. 1 pin. Progressively work aft to pin No. 8.

**NOTE:** On later airplanes plus airplanes incorporating Service Bulletin 52-1033, an adjustable stop on the lower beam at lockpin No. 7 is used to limit the overtravel (backlash) of the lockpin mechanism in the unlocked position. Provide clearance between stop and bellcrank until stop pin unlock position adjustments are completed, then reset to suit final position of pin No. 7.
  - (d) Remove preload from No. 8 lockpin.
  - (e) Close locking handle then apply a forward preload of 20 ( $\pm 5$ ) pounds to No. 8 lockpin.
  - (f) Check that lockpins are positioned in latch support fittings as shown in detail A. Repeat adjustments as necessary to obtain desired results.
  - (g) Remove preload from No. 8 lockpin. Operate lock handle. Operation of mechanism should be free from binding and force required to move handle should not exceed 40 pounds throughout entire cycle.
- (3) Adjust Latch Mechanism (Fig. 504)
  - (a) Retract lockpins.
  - (b) Rotate latch mechanism to unlatch position. Partially open door.
  - (c) Adjust stop bolt at latch actuator bellcrank assembly by removing or adding washers to position bellcrank 0.04 +0.03/-0.02 inch overcenter (Detail A).
    - 1) Establish overcenter by removing latch actuator and replacing with overcenter measurement locating tool (Fig. 504). After establishing overcenter, remove tool and replace with actuator.
  - (d) Rotate latching mechanism to the latched position and extend lockpins to locked position.

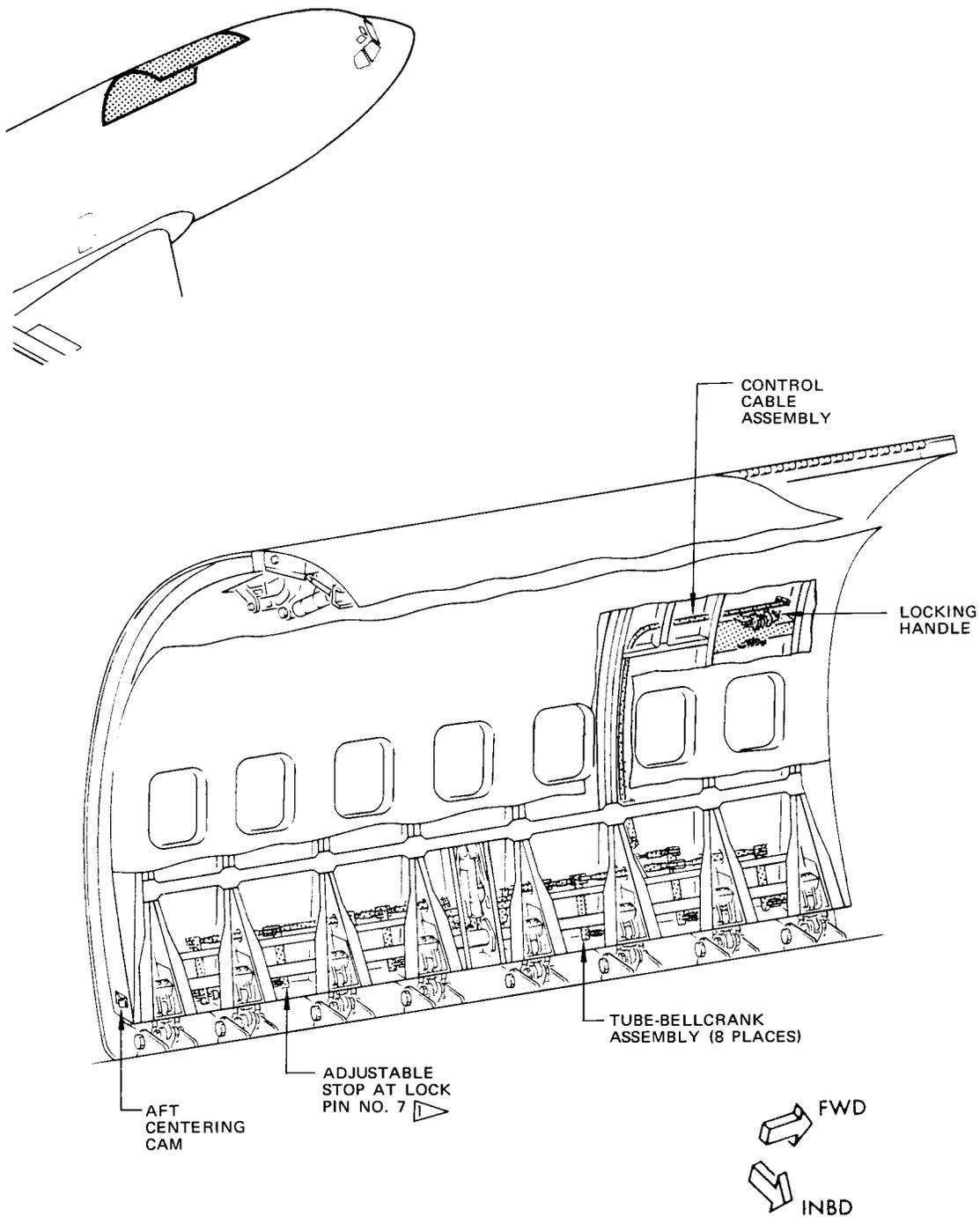
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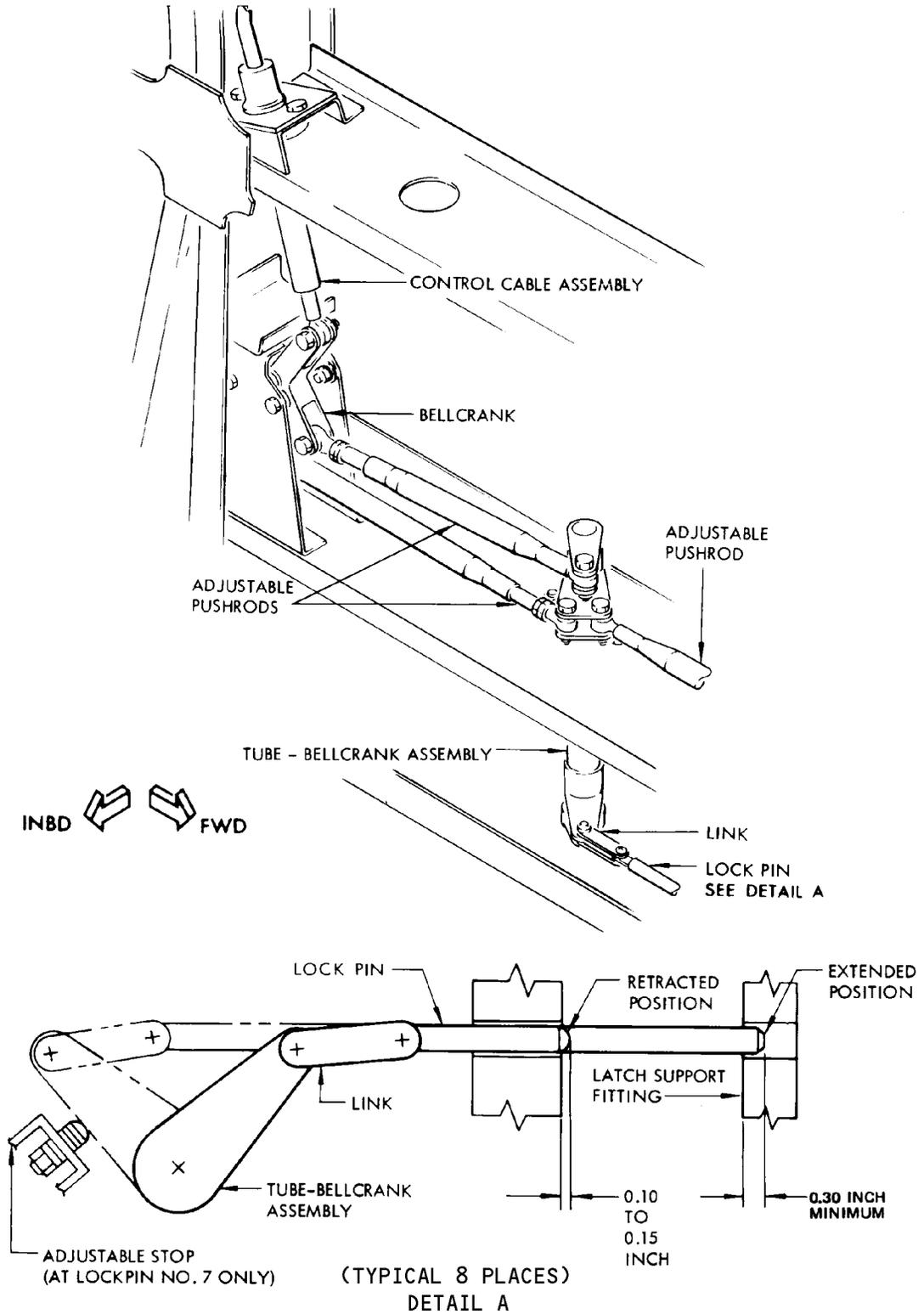


 Later airplanes plus airplanes incorporating Service Bulletin 52-1033

Main Cargo Door Locking Mechanism Adjustment  
 Figure 502

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Locking Mechanism Adjustment  
 Figure 503

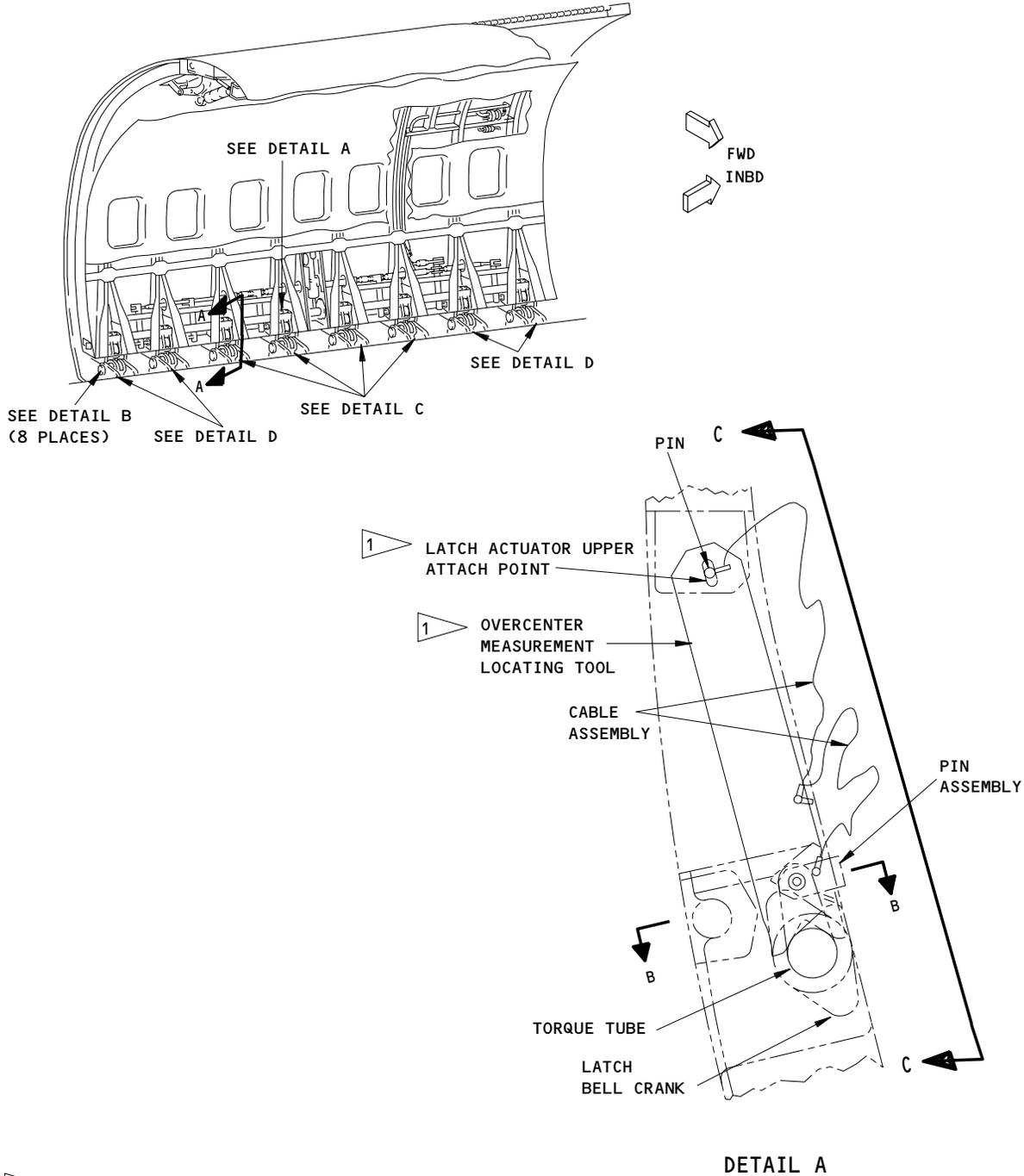
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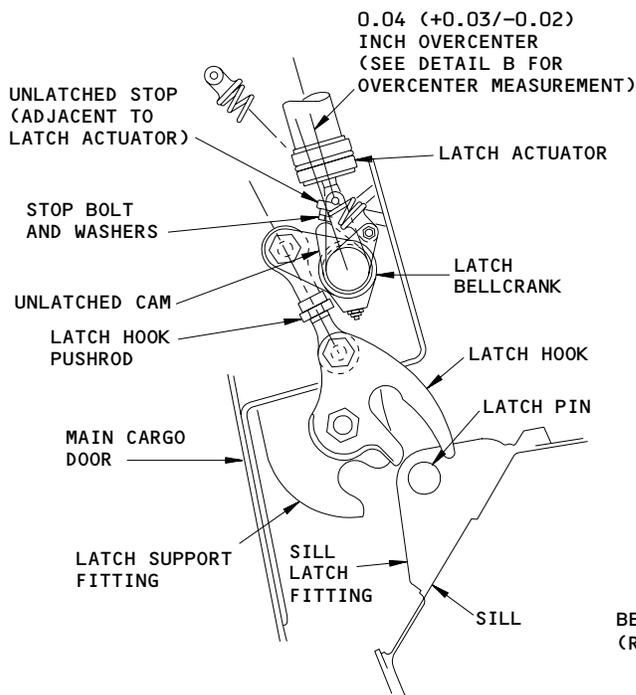


1 REMOVE ACTUATOR AND REPLACE WITH LOCATING TOOL. USE ACTUATOR FASTENER TO SECURE TOOL AT UPPER END. INSTALL PIN ASSEMBLY AS SHOWN IN SECTION A-A AND USE FEELER GAGE TO ESTABLISH OVERCENTER DIMENSION.

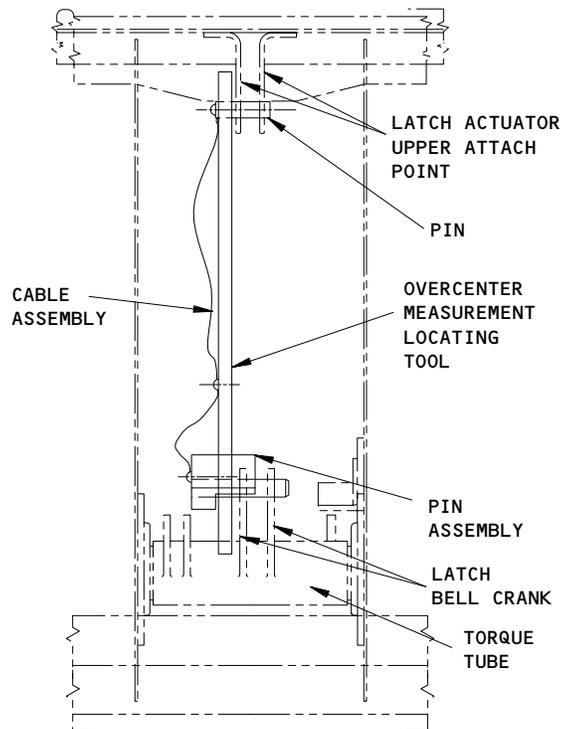
Latch Mechanism Adjustment  
 Figure 504 (Sheet 1)

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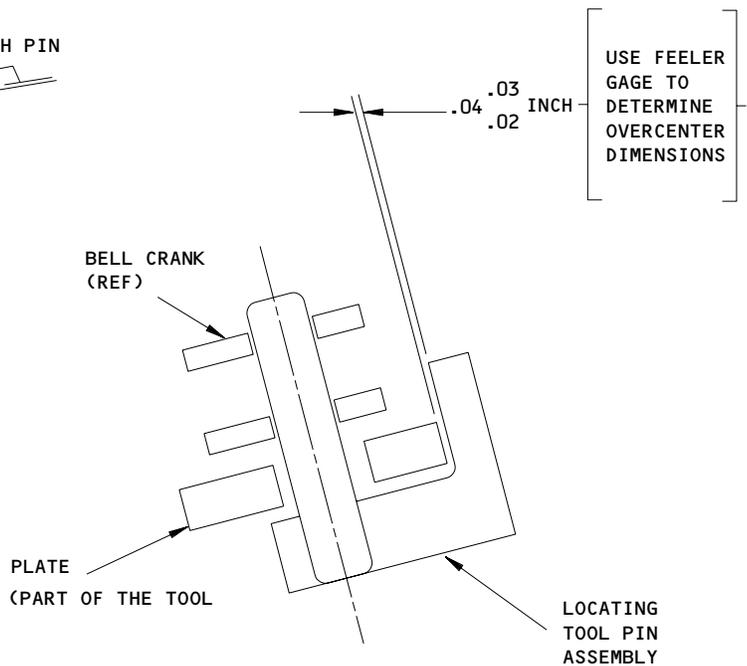
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**MAIN CARGO DOOR  
 UNLATCHED POSITION  
 SECTION A-A**



**SECTION C-C**

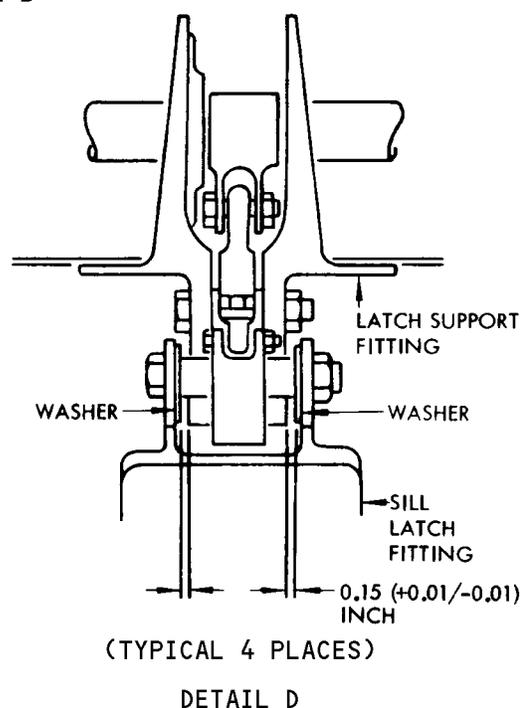
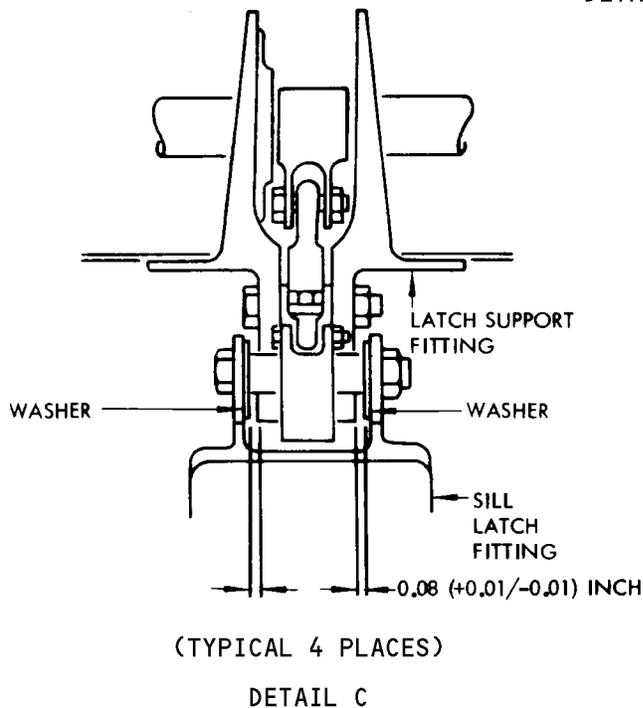
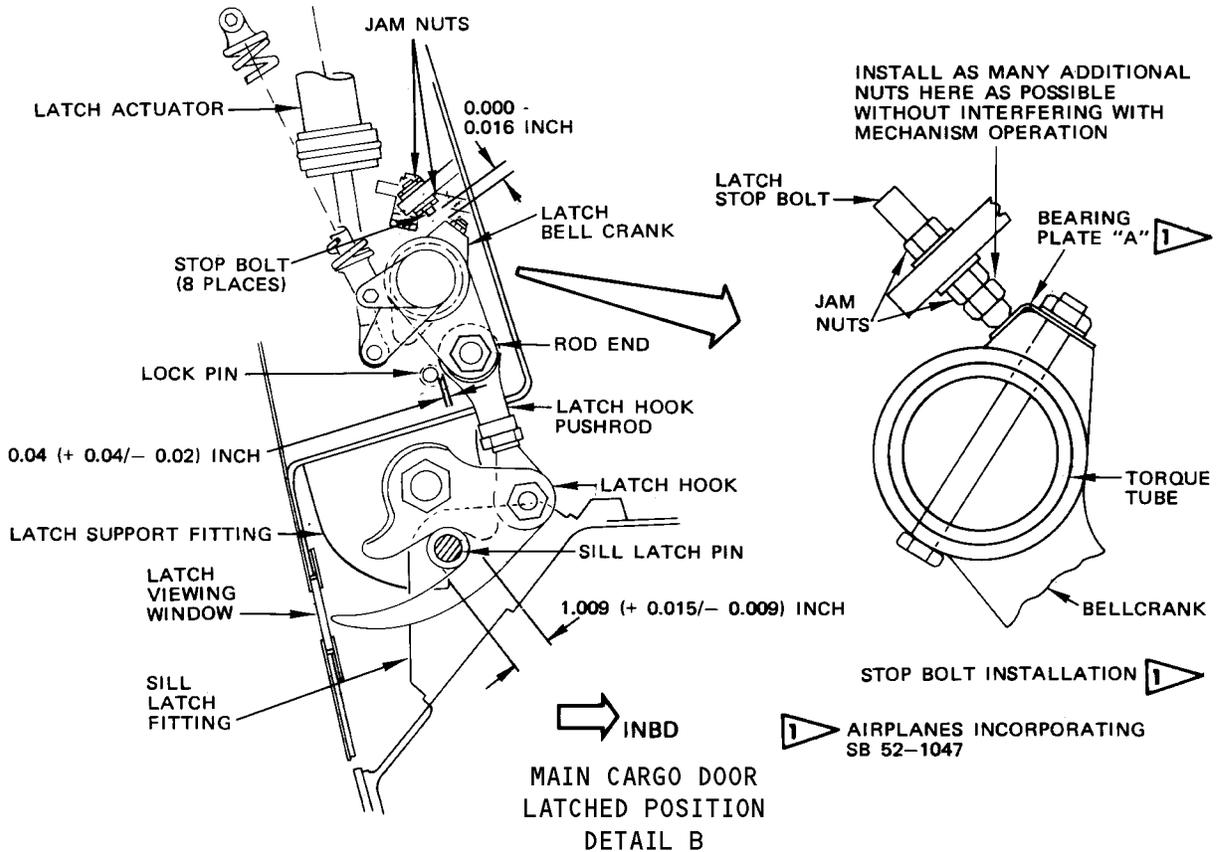


**SECTION B-B**

**Latch Mechanism Adjustment  
 Figure 504 (Sheet 2)**

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Latch Mechanism Adjustment  
 Figure 504 (Sheet 3)

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- (e) Adjust stop bolt at each latch mechanism bellcrank assembly to provide  $0.04 +0.04/- 0.02$  gap between rod ends and lockpins. Tighten jamnuts and lockwire (Detail B). Install additional nuts on lower end of stop bolts per step 1).

**NOTE:** The latch bellcrank may be within 0.016 inch of contacting stop bolt. Lockpins are located to position the bellcrank assembly 0.12-inch overcenter when the rod end is bearing against lockpin.

- 1) On airplanes with bearing plates on bellcranks (installed per SB 52-1047) additional nuts are installed on lower end of stop bolt. Install as many of these additional nuts on the lower end of the stop bolt as can be installed without interfering with mechanism operation. Lockwire nuts.

**NOTE:** Additional nuts may also be installed on stop bolts prior to incorporation of SB 52-1047. Installation of additional nuts provides added stiffness to the stop bolt to help prevent bending or failure of the bolt if overloading should occur.

- (f) Adjust latch hook pushrod to provide  $1.009 +0.015/-0.009$  inch between latch hook and latch support fitting.

- (g) Close door and check that latch hooks do not bind on latch pins. Lubricate latch hooks (Ref 21-25-101, Main Cargo Door Lubrication). If binding occurs readjust latch hook pushrods within limits of  $1.009 +0.015/-0.009$ .

**NOTE:** Binding can also be caused by improperly positioned sill latch fittings. Fittings may be adjusted in or out on serrated plates, and adjusted normal (perpendicular) to body sill by use of laminated shims under fitting.

- (h) Ensure that door edges are flush with fuselage skin within limits of  $+0.06$  to  $-0.09$  inch. Readjust sill latch fittings as necessary to bring door flush within required tolerance.

**NOTE:** Plus limit indicates door is outside fuselage exterior profile. Negative limit indicates door is inside fuselage exterior profile. Limits may be increased by 0.03 inch in one or more locations, provided the total length to which increased limit applies does not exceed 5% of door periphery.

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## MAINTENANCE MANUAL

- (i) Latch door closed.
- (j) Ensure clearance between washer, sill latch fitting and latch support fitting bearing cap is  $0.08 \pm 0.01$  inch on the four center latch mechanisms (detail C).
- (k) Ensure clearance between washer, sill latch fitting and latch support fitting bearing cap is  $0.15 \pm 0.01$  inch on the four end latch mechanisms (two on each end) (detail D).

NOTE: Special washers may be replaced or interchanged to obtain proper clearance. End play of sleeve on sill latch pins shall be 0.01 to 0.03 inch. Ensure that gap between centering roller and centering cam at fore and aft ends of door is 0.087 minimum with the door latched.

- (l) After all adjustments are completed, check for visual indication of door latch engagement. With the door closed and latched and the outside lock pin handle in the closed position, the painted portion of each latch hook shall be visible through its viewing window.

### E. Restore Airplane to Normal

- (1) Install door insulation (Ref 52-32-91, Removal/Installation).
- (2) Install door heating blankets (Ref Chapter 21, Heating).
- (3) Install door lining (Ref 52-32-81, Removal/Installation).
- (4) Close main cargo door control circuit breaker on load control center P6.

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MAIN CARGO DOOR HINGE – REMOVAL/INSTALLATION

1. General

- A. The main cargo door is supported along the upper edge by a piano-type hinge. The hinge installation consists of a series of hinge segments mounted along the upper edge of the door and a series of mating hinge segments mounted on the upper doorsill. The mating hinge halves are joined together by hinge pins. There is one hinge pin for each segment pair, except there are two hinge pins joining the long door-mounted hinge segment at each end of the door to the three mating short sill-mounted segments.
- B. Wear necessitating hinge segment replacement will most likely start in the end hinge lug on the aft sill-mounted hinge segment. The three end hinge segments are located for installation as a one-piece fitting and holes predrilled to mating doorsill structure. Then the hinge is removed and separated into the three segments by sawing at the two saw cut locations. All three of the aft hinge segments have to be replaced at the same time in the manner described. The mating body-mounted door hinge must also be replaced at the same time.
- C. Wear due to corrosion or galling may also occur on the forward hinge segments. The requirements for replacement of the forward hinge segments as indicated in par. F are the same as for the aft hinge segments. Refer to par. 2 for aft hinge removal/installation and to par. 3 for forward hinge removal/installation.
- D. The following procedure will cover replacement of the forward and aft hinge segments only. Service experience indicates that replacement of the eight intermediate hinge segments will not be required.

2. Equipment and Materials

- A. Solvent – Naphtha, Aliphatic TT-N-95C (Supercedes BMS 3-2 Solvent)
- B. Grease – MIL-G-21164 (Alternate)
- C. Corrosion Inhibiting Compound – BMS 3-23

3. Removal/Installation Main Cargo Door Aft Hinge

- A. Remove Main Cargo Door Aft Hinge.
  - (1) Prepare for hinge removal by performing par. 3 of 52-32-11, Removal/Installation.
  - (2) Remove components at weather seal installation as necessary to gain access to hinge fasteners.

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## MAINTENANCE MANUAL

- (3) Remove hinge end fairings on door and on doorsill by removing bolts.
- (4) Using a drift and a light hammer or pneumatic hammer, drift the two hinge pins (some installations have only one hinge pin) aft out of the aft hinge segment half on the door and the three mating hinge segment halves on the doorsill. Save shims for reinstallation.

**NOTE:** Bolts are of varying lengths. Tag for installation location.

### B. Install Main Cargo Door Aft Hinge (Fig. 401)

- (1) Examine removed hinge segment for wear at the aft hinge loop per Fig. 401.
- (2) Prior to pin installation, remove dirt and other contamination from pin and hinge pin holes with air blast and/or round bristle brush. Remove grease and oil with general purpose cleaning solvent.
- (3) If any of the three short end hinge segments of the sill-mounted hinge are being replaced, they must all be replaced and the aft door-mounted hinge segment must also be replaced. Proceed as follows:
  - (a) Position new 65-62223-1 or 65-62223-501 hinge at installation position on doorsill and drill holes to mate with installation holes in doorsill.
  - (b) Remove 65-62223-1 or 65-62223-501 hinge segment and saw into three segments at existing saw cut locations. Prepare sawed surfaces per standard operator's procedure.
  - (c) Position shims beneath hinge sections and install bolts (except for bolts common to weather seal installation).

**NOTE:** If reshimming is required, maximum shim thickness is 0.06 inch, maximum gap before clamp-up is 0.008 inch.

- (d) Install doorsill components at weather seal removed in step 2.B.
- (e) Install door-mounted hinge segment. Shim per step (3) above.
- (f) Align door- and sill-mounted hinges with hammer or pneumatic hammer and install hinge pins.  
On some airplanes, lightly lubricate aft hinge pins.

**CAUTION:** DO NOT LUBRICANT DRY LUBRICATION HINGE PINS. REMOVE AS LITTLE DRY LUBRICANT AS POSSIBLE WHEN INSTALLING PINS. APPLICATION OF ORGANIC CORROSION INHIBITING COMPOUND IS PERMISSIBLE (REF 51-21-91).

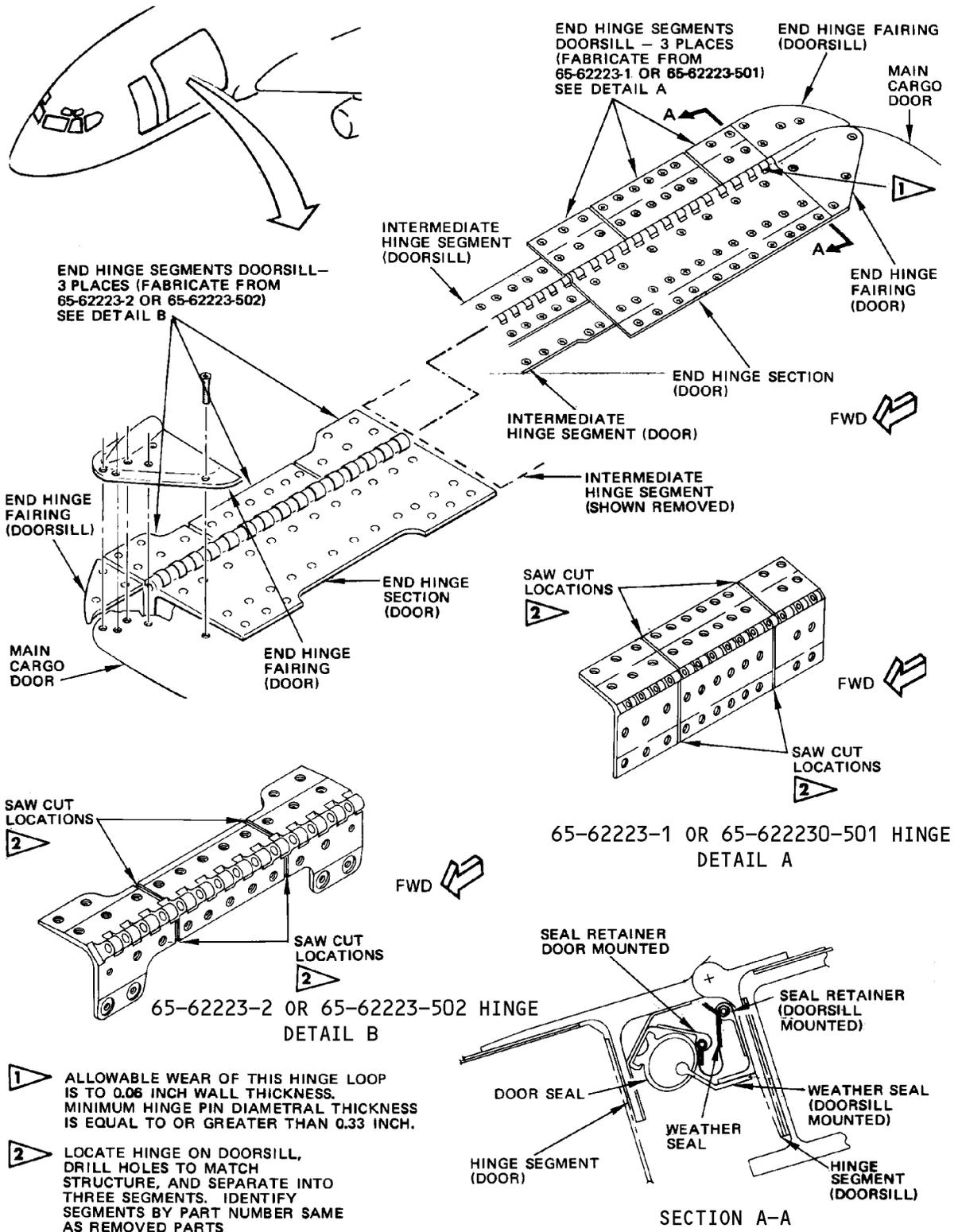
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Main Cargo Door Forward and Aft Hinge Installation  
 Figure 401

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- (g) Install hinge end fairings.
  - (h) Apply water corrosion inhibiting compound to hinges per instructions in 51-21-91.
  - (i) Complete installation of weather seal components removed in step 2.B.
- (4) Perform steps (5) thru (7) unless forward hinge is also being replaced.
  - (5) Remove the attaching bolts and the sling from the cargo door and replace countersunk screws in the cargo door sling attachment points.
  - (6) Close circuit breakers opened in par. 3.
  - (7) Operate door through open and close cycles to check for proper operation.

#### 4. Removal/Installation Main Cargo Door Forward Hinge

##### A. Remove main cargo door forward hinge (Fig. 401)

- (1) Prepare for hinge removal by performing par. 3 of 52-32-11, Removal/Installation.
- (2) Remove components at weather seal installation as necessary to gain access to hinge fasteners.
- (3) Remove hinge end fairings on door and on doorsill by removing bolts.
- (4) Using a drift and a light hammer or pneumatic hammer, drift the two hinge pins aft out of the forward hinge segment half on the door and the three mating hinge segment halves on the doorsill. Save shims for reinstallation.

NOTE: Bolts are of varying lengths. Tag for installation location.

##### B. Install Main Cargo Door Forward Hinge (Fig. 401)

- (1) Prior to pin installation, remove dirt and other contamination from pin and hinge pin holes with air blast and/or round bristle brush. Remove grease and oil with general purpose cleaning solvent.
- (2) If any of the three short end hinge segments of the sill-mounted hinge are being replaced, they must all be replaced and the forward door-mounted hinge segment must also be replaced. Proceed as follows:
  - (a) Position new 65-62223-2 or 65-62223-502 hinge at installation position on doorsill and drill holes to mate with installation holes in doorsill.

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## MAINTENANCE MANUAL

- (b) Remove hinge segment and saw into three segments at existing saw cut locations. Prepare sawed surfaces per standard operator's procedure.
- (c) Position shims beneath hinge sections and install bolts (except for bolts common to weather seal installation).

**NOTE:** If reshimming is required, maximum shim thickness is 0.06 inch, maximum gap before clamp-up is 0.008 inch.

- (d) Install doorsill components at weather seal removed in step 2.B.(2).
- (e) Install door-mounted hinge segment. Shim per step (c) above.
- (f) Align door- and sill-mounted hinges with hammer or pneumatic hammer and install hinge pins. On airplanes without dry lubricant on hinge pins, lightly lubricate forward hinge pin.

**CAUTION:** DO NOT LUBRICATE DRY LUBRICATION HINGE PINS. REMOVE AS LITTLE DRY LUBRICANT AS POSSIBLE WHEN INSTALLING PINS.

- (g) Install hinge end fairings.
  - (h) Apply corrosion inhibiting compound to hinges per instruction in 51-21-91.
  - (i) Complete installation of weather seal components removed in step 2.B.(2).
- (3) Remove the attaching bolts and the sling from the cargo door and replace countersunk screws in the cargo door sling attachment points.
  - (4) Close circuit breakers opened in par. 3.B.(1).
  - (5) Operate door through open and close cycles to check for proper operation.

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## MAINTENANCE MANUAL

### MAIN CARGO DOOR LATCH ACTUATOR – REMOVAL/INSTALLATION

#### 1. General

- A. During removal or installation of the latch actuator assembly or during lubrication of actuator and linkage components, extreme care must be taken to avoid contamination of the cabin lining with hydraulic fluid or lubricants. A container will be necessary to catch hydraulic fluid from disconnected lines. Should any fluid spill on the airplane, decontaminate. Refer to Chapter 12, Cleaning and Washing.

#### 2. Equipment and Materials

- A. A suitable container to catch hydraulic fluid
- B. Grease – BMS 3-33 (Preferred)
- C. Grease – MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)

#### 3. Prepare for Removal

- A. Close and lock main cargo door.
- B. Open main cargo door circuit breaker on load control center P6.
- C. Remove center window and dado panels. Refer to 52-32-81.

#### 4. Remove Latch Actuator

- A. Disconnect and cap actuator hydraulic lines (2, figure 401) from door hydraulic lines at adjustable mounting bracket (3).
- B. Remove cotter pin, nut, washer and bolt (9) from actuator pushrod and latch torque tube (8).
- C. Remove cotter pin, nut, washer and bolt (1) from upper actuator (5) fitting.
- D. Remove actuator.

#### 5. Install Latch Actuator

- A. With main cargo door closed and locked, place actuator upper fitting between upper attachment brackets and install bolt, washer and nut (1, figure 401).

**NOTE:** Before installing actuator attaching bolts, coat shanks with film of BMS 3-33 grease.

- B. Attach actuator pushrod to latch torque tube (8) with bolt, washer and nut (9).
- C. Torque nuts to range of 270 to 300 inch-pounds and install cotter pins.

**NOTE:** If cotter pins cannot be installed within specified torque range, interchange nuts and/or add one washer as necessary.

- D. Loosen bolts on adjustable mounting brackets (3).
- E. Remove caps from hydraulic lines and install coiled actuator hydraulic lines (2) with B-nuts.
- F. Adjust mounting brackets such that no strain is placed on coiled actuator hydraulic lines and tighten bolts.
- G. Remove retainer spring (7) and felt absorber pad (6) from actuator (5).

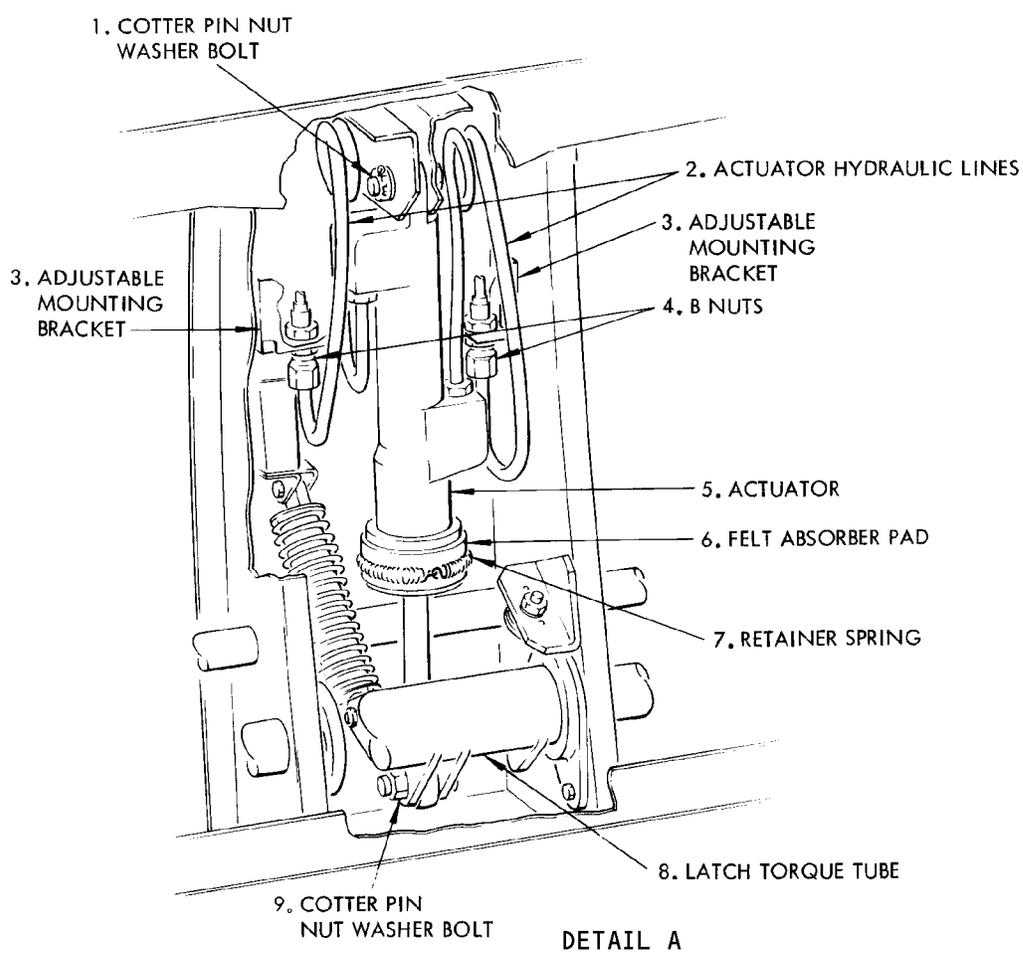
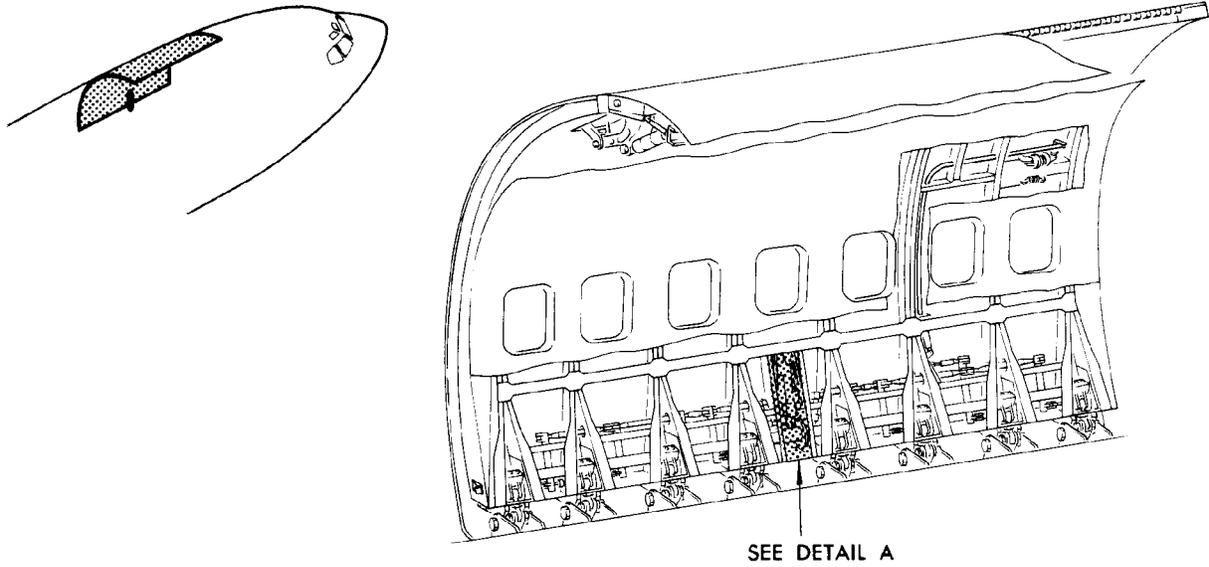
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DETAIL A  
 Latch Actuator Installation  
 Figure 401

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- H. Bleed main cargo door hydraulic system and ensure actuator is free from leaks and binding. Refer to 52-32-0, Maintenance Practices.
- I. Install felt absorber pad (6) and retainer spring (7).
- J. Install center window and dado panels. Refer to 52-32-81.

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MAIN CARGO DOOR LIFT ACTUATOR ASSEMBLY – REMOVAL/INSTALLATION

1. General

- A. During removal or installation of the link actuator assembly or during lubrication of actuator and linkage components, extreme care must be taken to avoid contamination of the cabin lining with hydraulic fluid or lubricants. A container will be necessary to catch hydraulic fluid from disconnected lines. Should any fluid spill on the airplane, decontaminate (Ref Chapter 12, Cleaning and Washing).

2. Equipment and Materials

- A. A suitable container to catch hydraulic fluid  
B. Grease – BMS 3-33 (Preferred)  
C. Grease – MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)  
D. Grease gun with MS24203 nozzle

3. Prepare for Removal

- A. Close and lock main cargo door.  
B. Open main cargo door control circuit breaker on load control center P6.  
C. Remove aft curved ceiling panels from cargo door and cabin ceiling (Ref 52-32-81 and Chapter 25, Ceiling Lining).

4. Remove Lift Actuator Assembly (Fig. 401)

NOTE: Assembly consists of lift actuator (19), thrust rods (9), support pin, nut and washer (11), brackets (6 and 8), coiled tubing (17), and support clamps and blocks (7).

- A. Remove hydraulic lines to control valve and latch actuator from tee-fittings (4).  
B. Cap or plug all open hydraulic ports and lines.  
C. Remove bolt attaching bellcrank (1) to link (2) and rotate bellcrank (1) upward to disconnect actuator rod from bellcrank assembly (1) by removing attaching nut, bolt, and spacers (21). Strap (5) will support actuator.  
D. Insert wood support between actuator (19) and bracket (6).  
E. Disconnect thrust rods (9) from strut fittings (3) by removing attaching nuts and bolts (18).  
F. Remove nuts and bolts (12) attaching actuator links (15) to support fittings (14).  
G. Remove actuator assembly.

5. Prepare for Installation

- A. Main cargo door must be installed and rigged prior to actuator assembly installation. Refer to 52-32-11, Adjustment/Test.  
B. Lock cargo door in closed position.

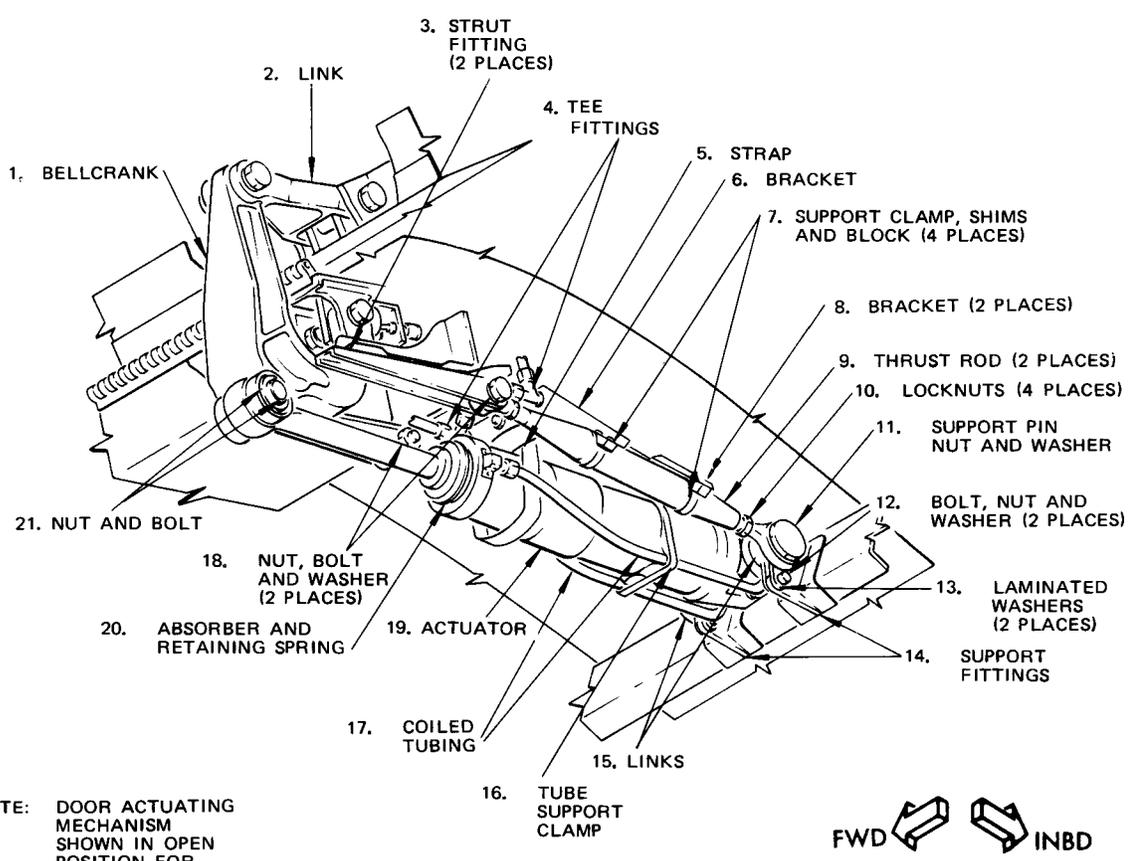
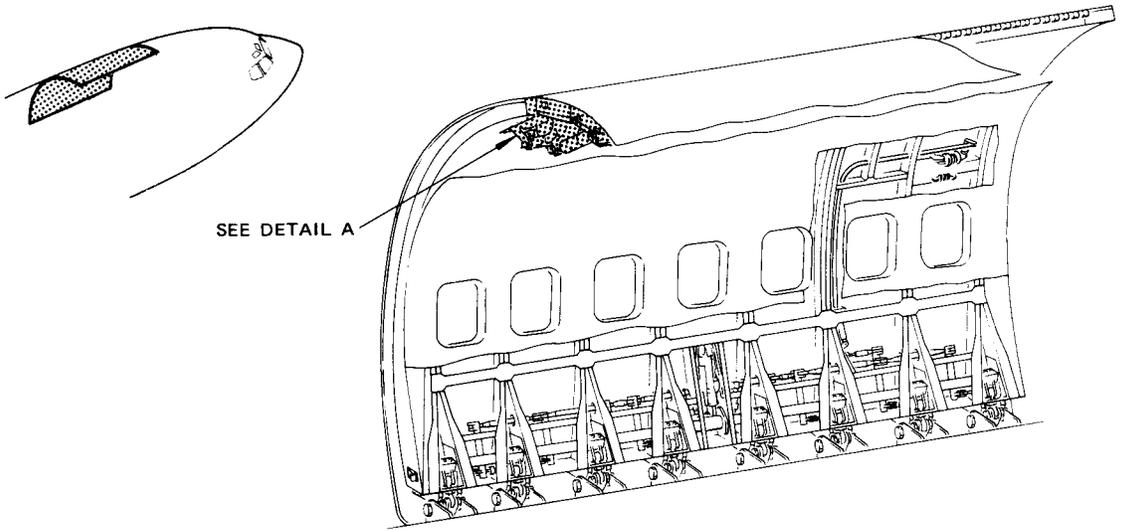
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**DETAIL A**

Lift Actuator Installation  
 Figure 401

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C. Ensure bellcrank (1) and link (2) are installed. Refer to 52-32-11.

**NOTE:** Lift actuator assembly is assembled prior to installation and consists of the actuator (figure 401), thrust rod assemblies (9), two link fittings (15) and attaching support pin (11), washers and nut, brackets (6 and 8) and support clamps and blocks (7). Felt absorber pad is not installed until after cargo door is adjusted and tested.

- D. Install thrust rods (9), and links (15) on inboard end of actuator (19) with support pin (11), nut and washers.
- E. Tighten nut on support pin (11) to take up slack but leave loose enough for free rotation of links.
- F. Clamp bracket assembly (6) loosely to the thrust rods (9) with clamps and blocks (7).
- G. Install two tee-fittings (4) in outboard bracket (6). Tighten fitting jamnuts finger-tight.
- H. Position bracket (6) along thrust rods and position thrust rods to permit connection of hydraulic coiled tubes (17) to the tee-fittings (4). Finger tighten tubing B-nuts.
- I. While maintaining the thrust rod actuator relationship, install the strap (5) around the actuator and fasten to the bracket (6) with nut and bolt.
- J. Install a temporary support between the actuator and bracket (6).
- K. Install the two tube support brackets (8) loosely with attaching hardware.

6. Install Lift Actuator Assembly (Fig. 401)

A. Position actuator links (15) between support fittings (14) mounted on cabin ceiling and install bolts (12), washers, and nuts.

**NOTE:** Before installing actuator attaching bolts, coat shanks with film of grease. Two additional laminated washers (13) are installed between both sides of aft actuator link (15) and aft support fitting. Peel off laminations as required to maintain a gap of .01 inch maximum.

- B. Tighten nuts until washers are snug against bolt shoulders and then back off only as required to install cotter pins.
- C. Remove temporary support between actuator and bracket (6).
- D. Attach outboard ends of thrust rods (9) to strut fittings (3) with bolts, nuts and washers (18).
- E. Tighten nuts until washers are snug against bolt shoulders and then back off only as required to install cotter pins.
- F. Rotate bellcrank (1) upward and connect actuator rod end to bellcrank (1) with spacers attaching bolt, washer, and nut (21). Install bolt attaching bellcrank (1) to link (2).

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- G. Tighten nut on support pin (11) 1500 to 2000 pound-inches. Tighten further (up to 10 degrees maximum) only as required to install cotter pin. Do not back off nut to install cotter pin.
- H. Remove lockwire and loosen locknuts (10) on both ends of thrust rod assemblies (9).
- I. With door closed and locked, turn barrels of both thrust rods the same amount and direction as required to adjust actuator length to 23.72 +0.06/-0.06 inches measured between center points of actuator rod attaching bolt (21) and actuator support pin (11). This should provide nominal canopy (ram lock) position. If further adjustment is required see Main Cargo Door Lift Actuator, Adjustment/Test.

**CAUTION:** THRUST ROD END THREADS MUST BE VISIBLE THROUGH INSPECTION HOLES AFTER FINAL ADJUSTMENT. MAXIMUM DEVIATION BETWEEN ROD LENGTHS IS 0.02 INCH.

- J. Tighten locknuts on inboard end of thrust rods 720 to 840 pound-inches and lockwire. Tighten locknuts on outboard ends 300 to 450 pound-inches and lockwire.
- K. Tighten B-nuts connecting coiled tubes (17) to bulkhead tee-fittings (4) and tighten fitting jamnuts.
- L. Position thrust rod support clamps (7) and tube support bracket (8) on thrust rods and tighten clamp bolts.
- M. Connect all hydraulic lines to tee-fittings (4) and tighten B-nuts.
- N. Ensure all attaching nuts, bolts, locknuts for proper torque, safety wire or cotter pin as applicable and ensure all hydraulic fittings are tightened.
- O. Bleed main cargo door hydraulic system and ensure actuator is free from leaks and binding of linkage. Refer to 52-32-0, Main Cargo Door System.
- P. Install new felt absorber pad and retainer spring (20).
- Q. Install aft curved ceiling panels on cargo door and cabin ceiling. Refer to 52-32-81 and Chapter 25, Ceiling Lining.

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MAIN CARGO DOOR LIFT ACTUATOR – ADJUSTMENT/TEST

1. Lift Actuator Adjustment

A. General

- (1) The height at which the cargo door stops when being raised to canopy position is determined by the canopy position switch. The position at which the door remains when open to canopy is determined by the ram lock position which may be varied by adjusting the lift actuator. During installation of the lift actuator the length of actuator rod is set at 23.72 (+0.06/-0.06) inches. (See 52-32-31.) This dimension provides for a door height of approximately 124 inches above the fuselage floor at canopy (ram lock) position. If canopy position is not satisfactory or if a slightly higher or lower position is desired, some adjustment can be achieved as follows:

B. Prepare for Adjustment

- (1) Check that main cargo door control circuit breaker on load control center P6 is closed.
- (2) Remove aft curved ceiling panels from cargo door and cabin ceiling. Refer to Main Cargo Door Lining, 52-32-81 and Chapter 25, Ceiling Lining.

C. Adjust Lift Actuator

- (1) Open cargo door to canopy ram lock position.
- (2) Loosen thrust rod support clamps and tube support brackets on thrust rods assemblies.
- (3) Remove lockwire and loosen locknuts on both ends of thrust rod assemblies.
- (4) Turn barrels of both thrust rods the same amount and direction as required to adjust actuator length. (Shortening rod will increase canopy height.)

**CAUTION:** THRUST RODS MUST NOT BE ADJUSTED BEYOND LIMITS OF 22.47 INCHES MINIMUM AND 22.71 MAXIMUM OR STRUCTURED DAMAGE WILL OCCUR WHEN DOOR REACHES FULL OPEN OR CLOSED POSITIONS. THIS DIMENSION IS THRUST ROD LENGTH MEASURED FROM CENTER OF ACTUATOR SUPPORT PIN TO CENTER OF ROD ATTACHMENT BOLT. MAXIMUM DEVIATION BETWEEN THRUST ROD LENGTHS MUST NOT EXCEED 0.02 INCH. THRUST ROD THREADS MUST BE VISIBLE THROUGH INSPECTION HOLES AFTER FINAL ADJUSTMENT.

- (5) Tighten locknut on inboard end of thrust rods to 720-840 inch-pounds and lockwire. Tighten locknut on outboard ends to 300-450 inch-pounds and lockwire.
- (6) Tighten thrust rod support clamps and tube support brackets on thrust rods.
- (7) Readjust canopy position switch. (See 52-32-111.)

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- (8) Install aft curved ceiling panels on cargo door and cabin ceiling. Refer to Main Cargo Door Lining, 52-32-81 and Chapter 25, Ceiling Lining.

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## MAINTENANCE MANUAL

### MAIN CARGO DOOR LIFT ACTUATOR LINKAGE – REMOVAL/INSTALLATION

1. General
  - A. Components of the lift actuator linkage consist of a link assembly, bellcrank assembly, a door actuator fitting, two strut fittings and attaching bolts, nuts and washers. (See figure 401.)
  - B. Extreme care should be exercised to avoid contaminating cabin lining with grease. Should any grease spill on the airplane, decontaminate. Refer to Chapter 12, Cleaning and Washing.
2. Equipment and Materials
  - A. Grease – BMS 3-33 (Preferred)
  - B. Grease – MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
  - C. Grease gun equipped with MS24203 nozzle or equivalent
3. Prepare for Removal
  - A. Close and lock main cargo door.
  - B. Open main cargo door control circuit breaker on load control center P6.
  - C. Remove aft curved ceiling panels from cargo door and cabin ceiling. Refer to 52-32-81 and Chapter 25, Ceiling Lining.
4. Remove Lift Actuator Linkage
  - A. Remove actuator rod attaching bolt, nut and washer (13, figure 401.)
  - B. Remove the two nuts, bolts and washers (7) attaching bellcrank assembly (1) to ceiling bellcrank fittings.
  - C. Remove bolt, nut and washer (2) connecting bellcrank assembly to link assembly (3).
  - D. Remove bellcrank.
  - E. Remove cotter pin from nut on link attaching bolt (4) and remove bolt, nut and washer connecting link assembly (3) to door actuator fitting (5).
  - F. Remove link assembly.
5. Install Lift Actuator Linkage
  - A. If used parts are being installed, check for allowable wear (Ref 52-32-41).
  - B. With cargo door in closed position, lift actuator 11, Fig. 401) must be in retracted position. (Fig. 401 shows actuator in extended – door open position – for clarity.)
  - C. Install link assembly (3, Fig. 401) on cargo door actuator fitting (5) with attaching bolt, nut and washer (4).
  - D. Torque nut until washer is snug against bolt shoulder and back off only as required to install cotter pin.
  - E. Position bellcrank (1) in the ceiling bellcrank fittings and install bolts, nuts and washers (7).
  - F. Tighten nuts (7) to 900-1200 pound-inches.

**NOTE:** Two washers may be used between nuts and bellcrank bushings, if required, to ensure torque is applied to bushing and not to bolt shoulder.

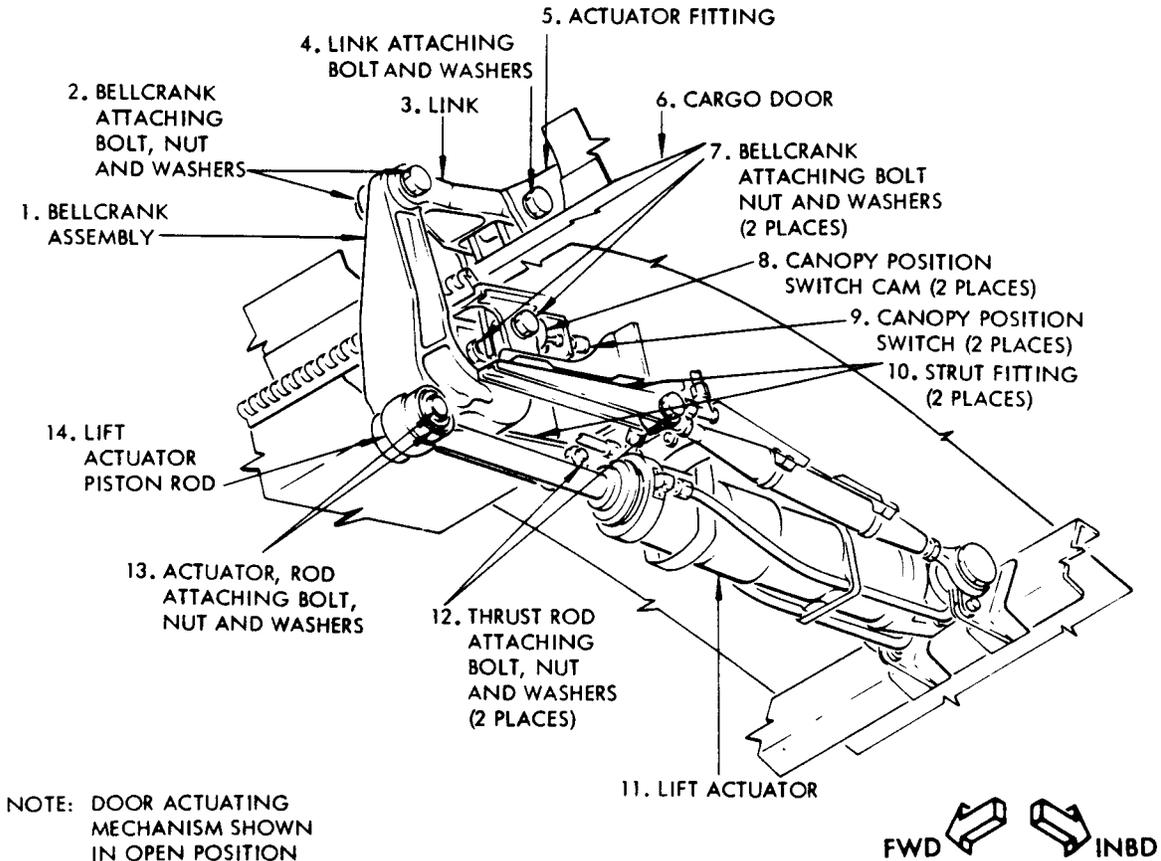
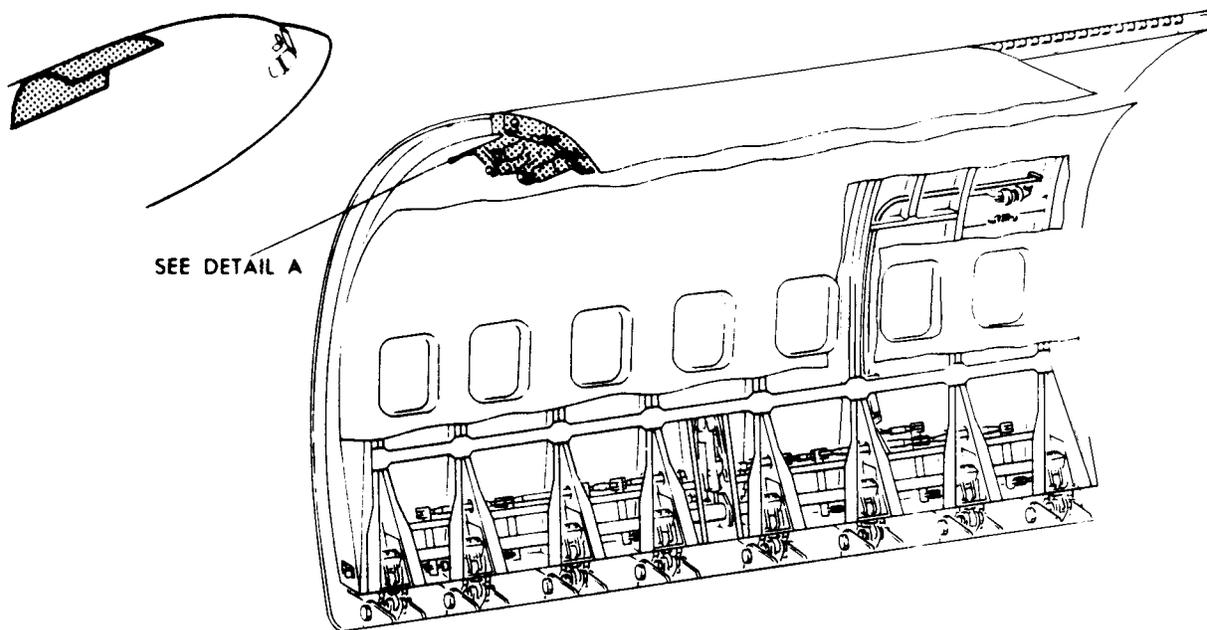
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DETAIL A

Lift Actuator Linkage Installation  
 Figure 401

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- G. Connect outboard end of bellcrank assembly (1) to link assembly (3) with attaching bolt, nut and washers (2).
- H. Tighten nut (2) to 900-1200 pound-inches.

**NOTE:** Two washers may be used between nut and link bushing if required, to ensure torque is applied to bushing and not to bolt shoulder.

- I. Position lift actuator piston rod end (14) on bellcrank and install spacers, attaching bolt, nut and washers (13).

**NOTE:** Length of lift actuator rod as measured from center of rod bearing to center of inboard actuator bearing should be 23.72 +0.06/-0.06 inches for nominal canopy position. If further adjustment is required, see Main Cargo Door Lift Actuator, Adjustment/Test.

- J. Tighten nut to 900-1200 pound-inches.

**NOTE:** Two washers may be used between nut and bushing, if required, to ensure torque is applied to bushing and not to bolt shoulder.

- K. Grease all lift actuator grease fittings after installation and before operation of cargo door (Ref Chapter 12, Main Cargo Door Lubrication).

**NOTE:** Wipe all excess grease from exposed areas to prevent contamination of cabin lining.

- L. Test main cargo door (Ref 52-32-0, Adjustment/Test).
- M. Install aft curved ceiling panels (Ref 52-32-81 and Chapter 25, Ceiling Lining).

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## MAINTENANCE MANUAL

### MAIN CARGO DOOR LIFT ACTUATOR LINKAGE - INSPECTION/CHECK

1. General

A. The data consists of illustrations and wear limits charts. No procedure is given in this section for gaining access to permit inspection. For this information, refer to Main Cargo Door Lift Actuator Linkage - Removal/Installation.

2. Main Cargo Door Lift Actuator Linkage Wear Limits

REPLACE OR REPLATE SHOULDER BOLT. CHROMEPLATE 0.005 MAX THICKNESS  
ALLOWED FOR PLATING

REPLACE OR REPLATE CLAMP-UP BUSHING. CHROMEPLATE 0.005 MAX THICKNESS  
ALLOWED FOR PLATING

APPLY SOLID FILM LUBRICANT BMS 3-8 PER BAC 5811, METHOD 3 PLATING  
PERMITTED PRIOR TO LUBRICATION

REPLACE BUSHING

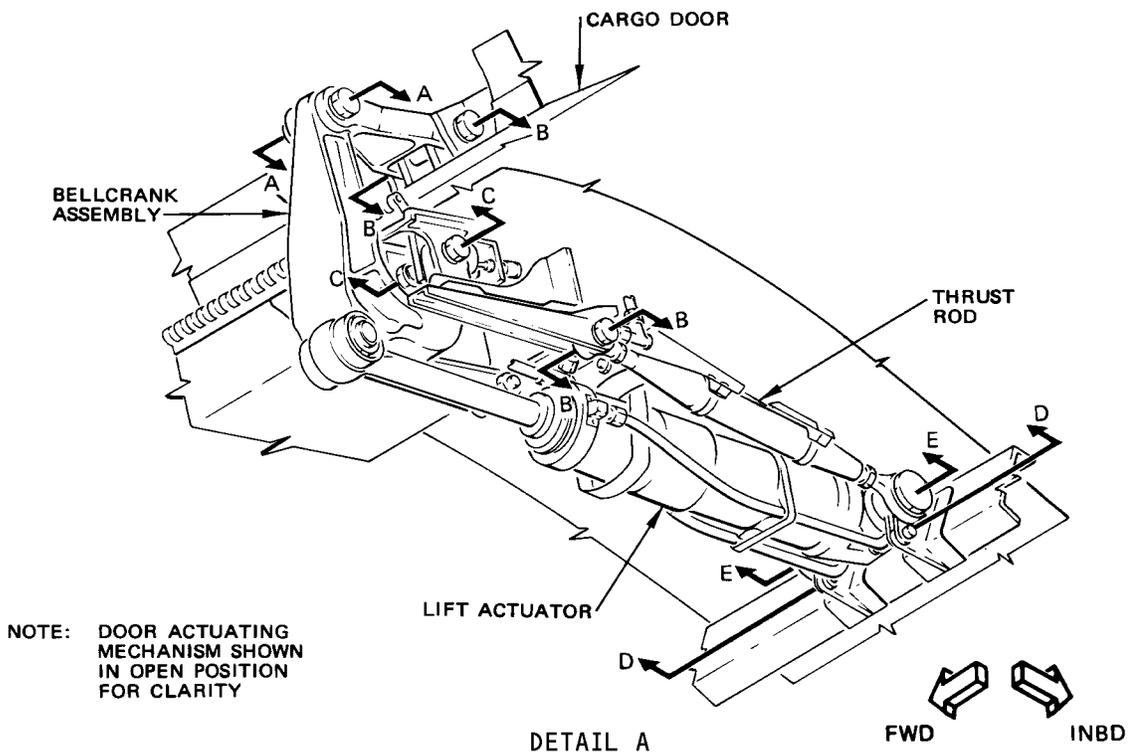
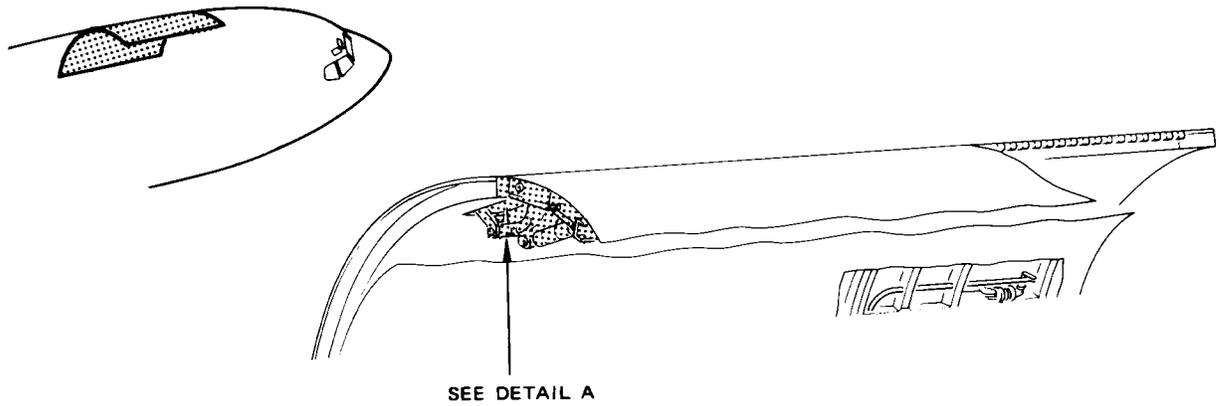
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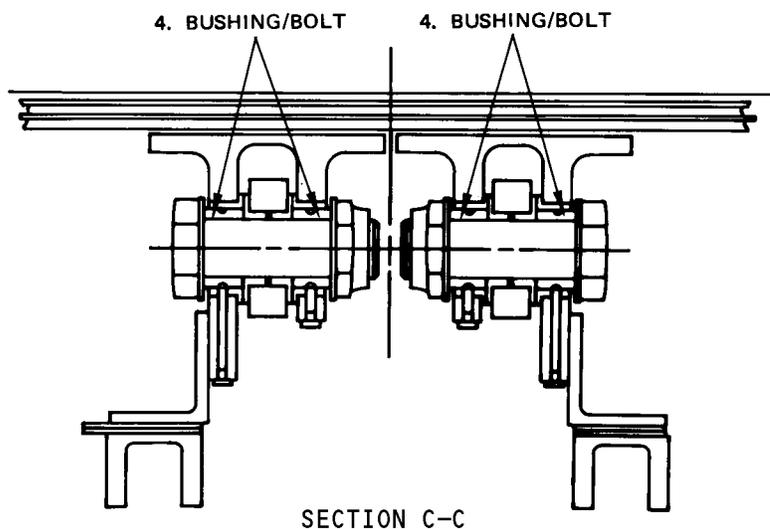
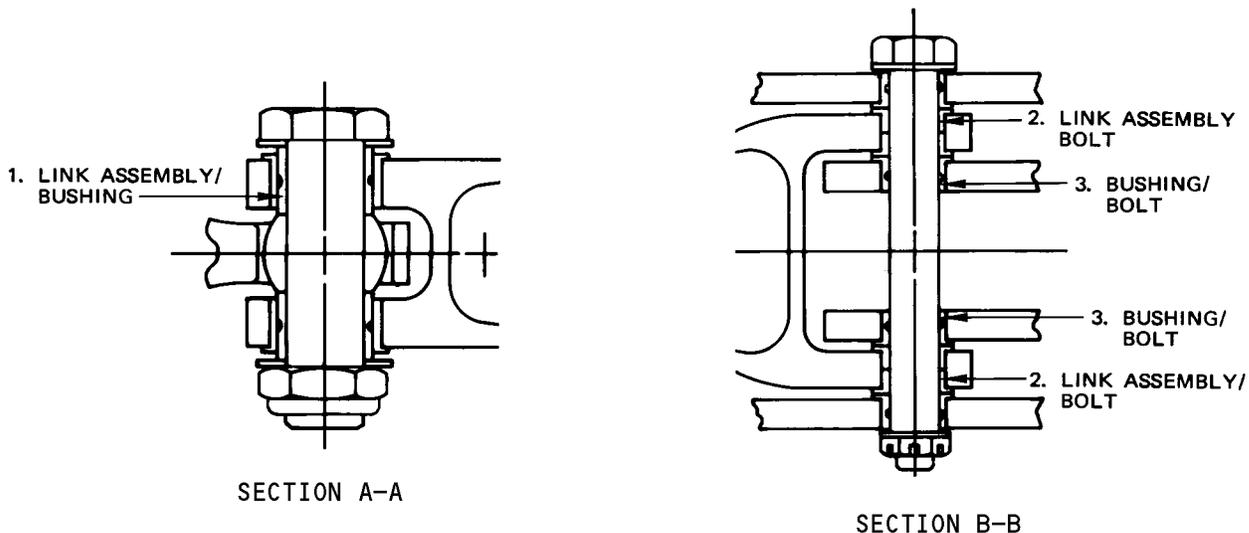
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Main Cargo Door Lift Actuator Linkage Wear Limits  
 Figure 601 (Sheet 1)

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Main Cargo Door Lift Actuator Linkage Wear Limits  
 Figure 601 (Sheet 2)

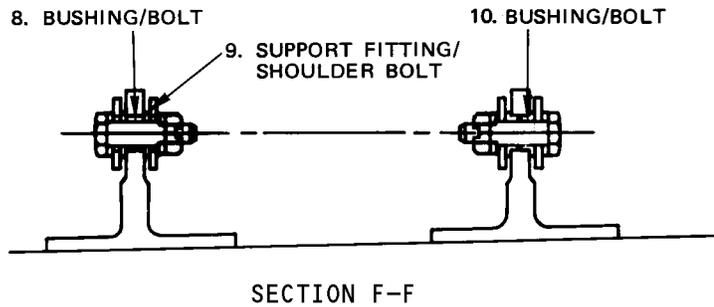
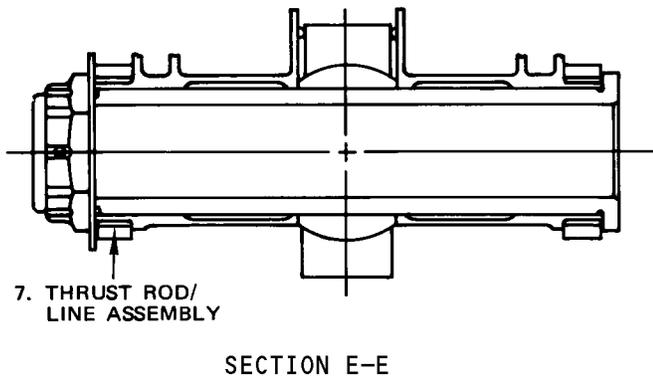
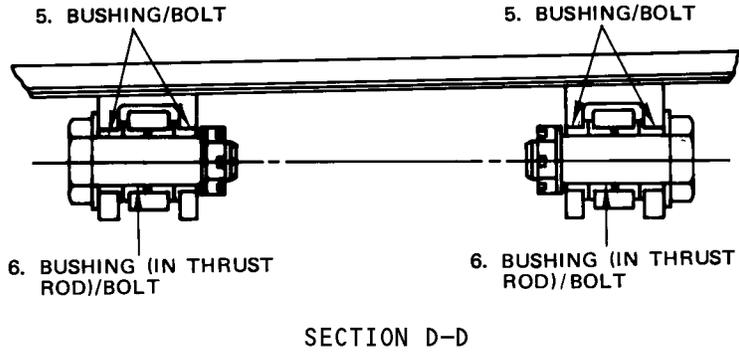
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Main Cargo Door Lift Actuator Linkage Wear Limits  
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**MAINTENANCE MANUAL**

INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS		REPLACE WORN PART	REPAIR WORN PART	REPAIR INSTR.
			DIAMETER		MAX WEAR DIM.	MAX DIAM CLEARANCE			
			MIN	MAX					
1	LINK ASSEMBLY (BUSHING)	ID	1.2522	1.2537	1.2587	0.0137	X		
	BUSHING	OD	1.2490	1.2490	1.2450		X	X	2
2	LINK ASSEMBLY (BUSHING)	ID	0.6275	0.6290	0.6340	0.0140	X		
	BOLT	OD	0.6230	0.6240	0.6200		X	X	1
3	BUSHING	ID	0.6250	0.6265	0.6315	0.0105	X		
	SHOUDER BOLT	OD	0.6230	0.6240	0.6200		X	X	1
4	CLAMP-UP BUSHING	ID	0.7495	0.7510	0.7550	0.0110	X		
	BOLT	OD	0.7480	0.7490	0.7440		X	X	1
5	(BUSHING) STRUT FITTING	ID	0.6275	0.6290	0.6340	0.0140	X		
	BOLT	OD	0.6230	0.6240	0.6200		X	X	1
6	THRUST ROD	ID	0.6275	0.6290	0.6340	0.0140	X		
	BOLT	OD	0.6230	0.6240	0.6200		X	X	1
7	THRUST ROD (BUSHING)	ID	1.7523	1.7538	1.7580	0.0140	X		
	LINK ASSEMBLY	OD	1.7480	1.7495	1.7440			X	3
8	SUPPORT FITTING (BUSHING)	ID	0.3143	0.3158	0.3208	0.0128	X		
	SHOULDER BOLT	OD	0.3110	0.3120	0.3080		X	X	

Main Cargo Door Lift Actuator Linkage 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		MAX WEAR DIM.	MAX DIAM CLEARANCE			
			MIN	MAX					
9	SUPPORT FITTING	ID	0.3145	0.3160	0.3210	0.0120		X	4
	SHOULDER BOLT	OD	0.3110	0.3120	0.3090		X	X	1
10	SUPPORT FITTING (BUSHING)	ID	0.3145	0.3160	0.3210	0.0130	X		
	SHOULDER BOLT	OD	0.3110	0.3120	0.3080		X	X	1

Main Cargo Door Lift Actuator Linkage Wear Limits  
 Figure 601 (Sheet 5)

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MAIN CARGO DOOR HANDPUMP – REMOVAL/INSTALLATION

1. General
  - A. A container will be necessary to catch fluid from disconnected hydraulic lines. Should any fluid spill on the airplane, decontaminate. Refer to Chapter 12, Cleaning and Washing. The main cargo door should be closed and locked.
2. Equipment and Materials
  - A. Skydrol Lubricant MCS 352B – Monsanto Chemical Co., St. Louis, Mo.
  - B. Suitable container to catch hydraulic fluid.
3. Remove Hand pump (See figure 401.)
  - A. Open main cargo door circuit breaker on load control center P6.
  - B. Disconnect supply and pressure hydraulic lines.
  - C. Cap hydraulic lines.
  - D. Remove mounting nuts, washers and bolts from handpump.
  - E. Remove handpump.
4. Install Handpump (See figure 401.)
  - A. If new handpump is being installed, remove reducer and O-ring from supply port of old handpump. Remove check valve and O-ring from pressure port of old pump.
  - B. Lubricate threads of reducer, check valve and new O-rings with Skydrol lubricant.
  - C. Install reducer, check valve and O-rings on handpump.
  - D. Install handpump with bolts, washers and nuts.
  - E. Connect hydraulic lines to handpump.
  - F. Close main cargo door circuit breaker on load control center P6.
  - G. Manually test handpump and main cargo door and check for leaks. Refer to 52-32-0, Adjustment/Test.

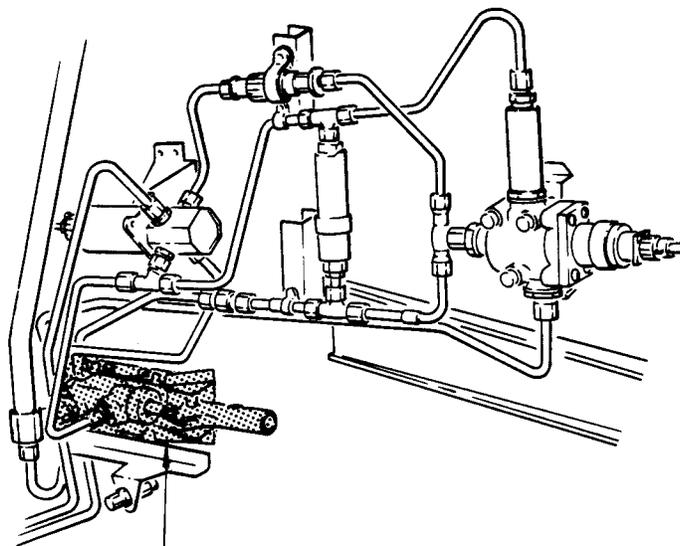
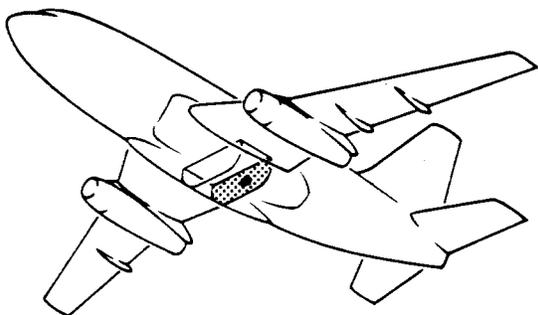
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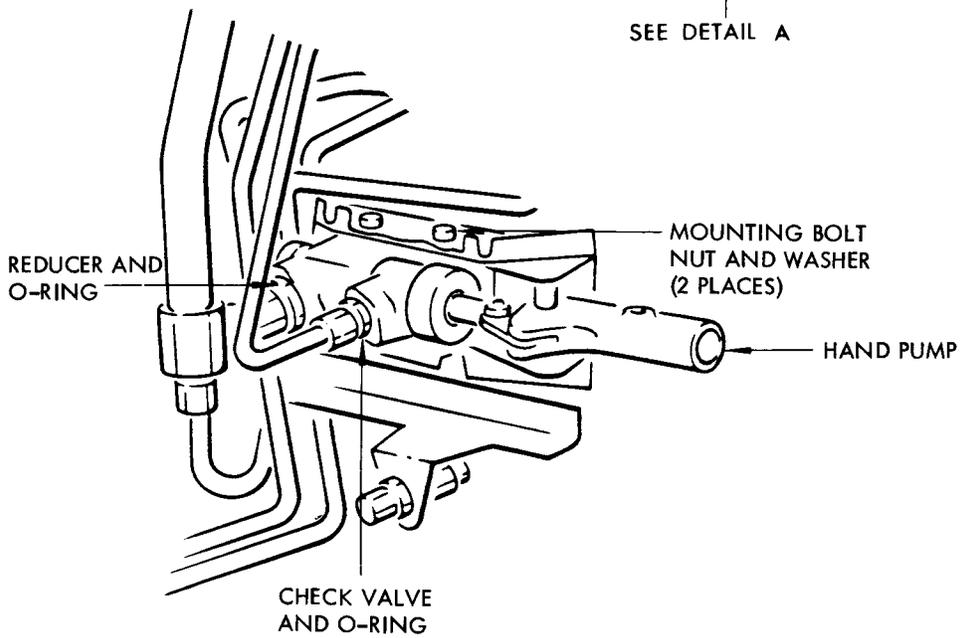
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SEE DETAIL A



DETAIL A

Main Cargo Door Hand Pump Installation  
 Figure 401

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MAIN CARGO DOOR HYDRAULIC CONTROL VALVE – REMOVAL/INSTALLATION

1. General
  - A. A container will be necessary to catch fluid from disconnected hydraulic lines. Should any fluid spill on the airplane, decontaminate. Refer to Chapter 12, Cleaning and Washing. The main cargo door should be closed and locked.
2. Equipment and Materials
  - A. Skydrol Lubricant MCS 352B – Monsanto Chemical Co., St. Louis, Mo.
  - B. Suitable container to catch hydraulic fluid
3. Remove Control Valve (See figure 401.)
  - A. Open main cargo door circuit breaker on load control center P6.
  - B. Disconnect electrical connector from control valve.
  - C. Disconnect and cap hydraulic lines.
  - D. Remove nuts, washers, bolts and remove control valve from bracket.
4. Install Control Valve
  - A. If a new control valve is being installed, remove reducers and O-rings from old control valve.
  - B. Lubricate threads of reducers and new O-rings with Skydrol lubricant.
  - C. Install reducers and O-rings in control valve.
  - D. Install control valve on bracket with bolts, washers and nuts.
  - E. Connect hydraulic lines to control valve.
  - F. Connect electrical connector to control valve.
  - G. Close main cargo door circuit breaker on load control center P6.
  - H. Test control valve and main cargo door and check for leaks. Refer to 52-32-0, Adjustment/Test.

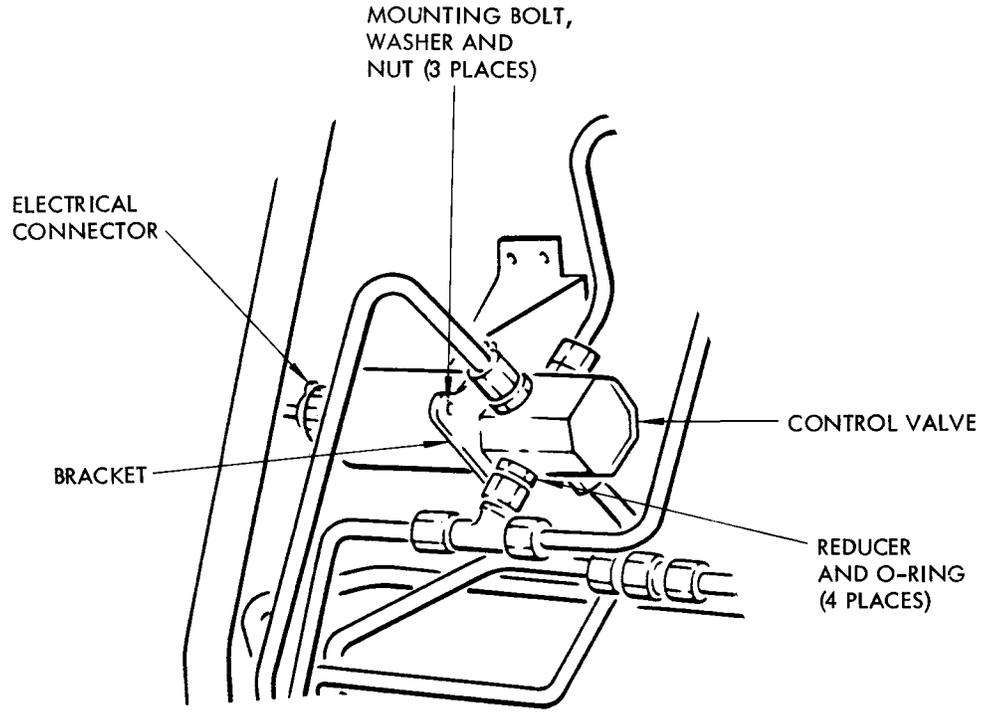
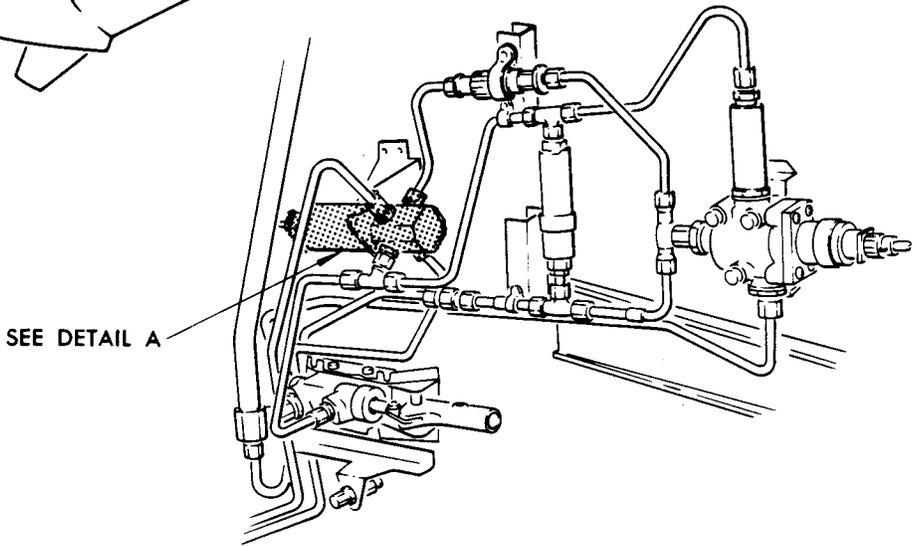
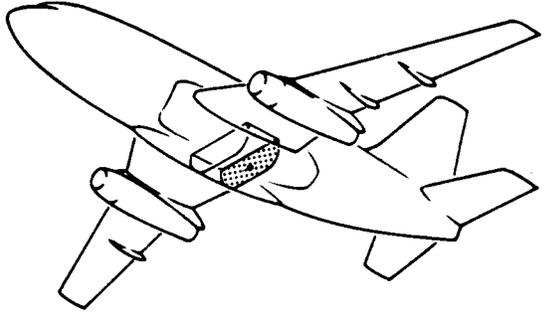
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DETAIL A

Main Cargo Door Hydraulic Control Valve Installation  
 Figure 401

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MAIN CARGO DOOR HYDRAULIC SHUTOFF VALVE – REMOVAL/INSTALLATION

1. General
  - A. A container will be necessary to catch fluid from disconnected hydraulic lines. Should any fluid spill on the airplane, decontaminate. Refer to Chapter 12, Cleaning and Washing.
  - B. The main cargo door should be closed and locked and hydraulic system B must be depressurized before working on the shutoff valve. Refer to Chapter 29.
2. Equipment and Materials
  - A. Skydrol Lubricant MCS 352B – Monsanto Chemical Co., St. Louis, Mo.
  - B. Suitable container to catch hydraulic fluid
3. Remove Shutoff Valve
  - A. Open main cargo door circuit breaker on load control center P6.
  - B. Disconnect electrical connector from shutoff valve. (See figure 401.)
  - C. Disconnect and cap hydraulic lines.
  - D. Remove mounting bolts and washers and remove shutoff valve from bracket.
4. Install Shutoff Valve
  - A. If a new shutoff valve is being installed, remove reducers, flow limiter, O-rings and check valve from old shutoff valve.
  - B. Lubricate threads of reducers, flow limiter, check valve and new O-rings with Skydrol lubricant.
  - C. Install reducers, flow limiter, check valve and O-rings in shutoff valve.
  - D. Install shutoff valve on bracket with bolts and washers.
  - E. Connect hydraulic lines to shutoff valve.
  - F. Connect electrical connector to shutoff valve.
  - G. Close main cargo door circuit breaker on load control center P6.
  - H. Test shutoff valve and main cargo door and check for leaks. Refer to 52-32-0, Adjustment/Test.

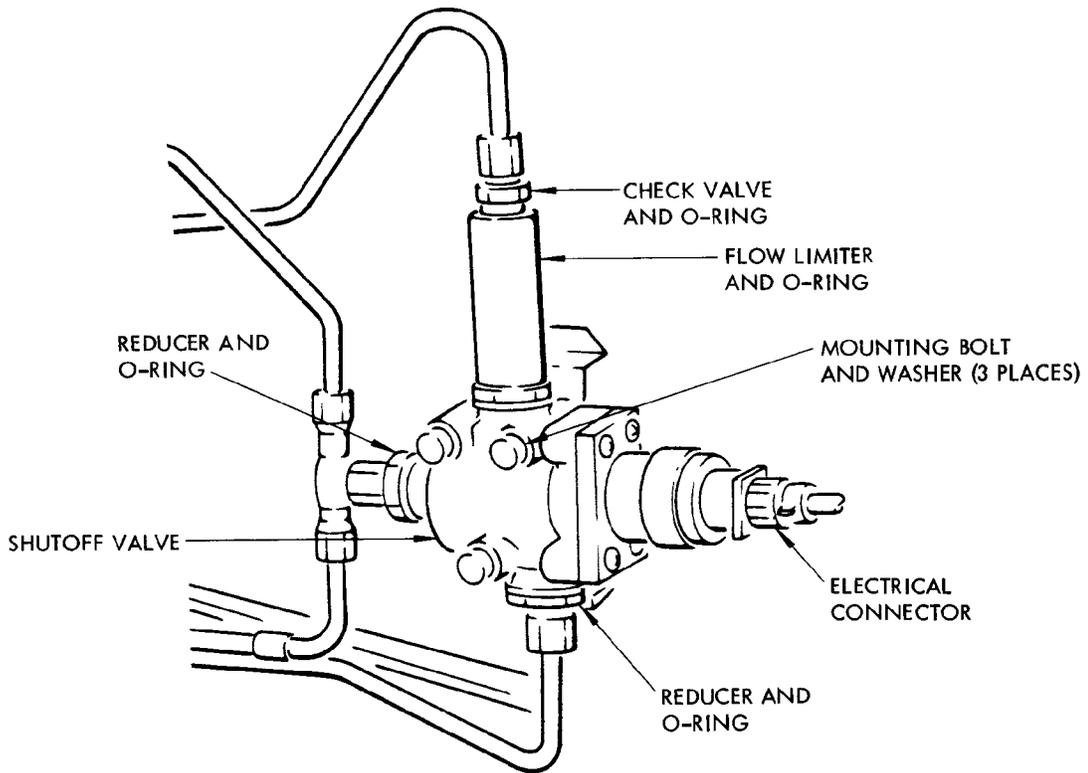
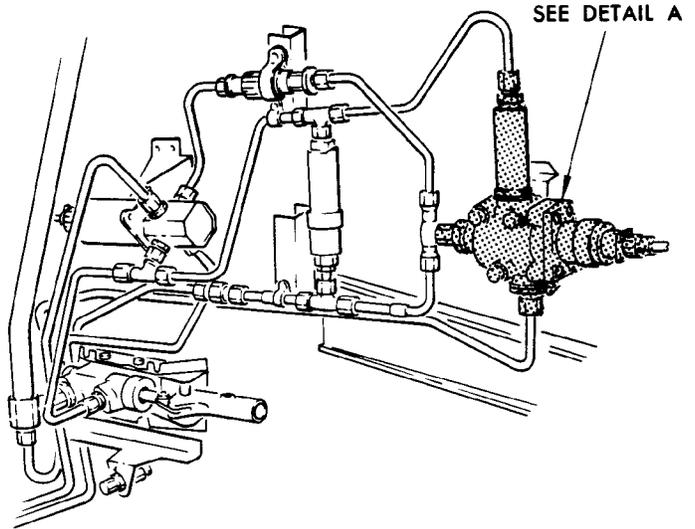
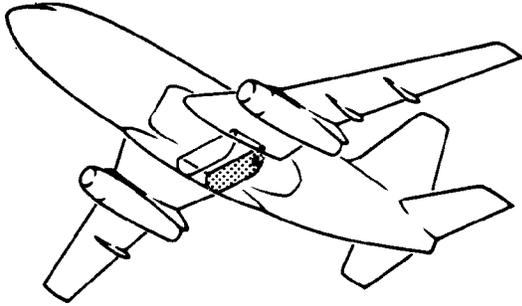
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DETAIL A

Main Cargo Door Hydraulic Shutoff Valve Installation  
 Figure 401

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MAIN CARGO DOOR LINING – REMOVAL/INSTALLATION

1. General

- A. This section provides removal/installation procedures for Main Cargo Door Lining components and includes window panels, dado panels, and ceiling panels. Removal/installation procedures for cove light, hatrack, and closure panels are provided in appropriate sections in Equipment and Furnishings, Chapter 25.
- B. Remove passenger seats before attempting to dismantle door lining.
- C. In the following procedures, all parts and fasteners removed must be identified for correct location when reinstalling.

2. Equipment and Materials

- A. Interior Trim Remover Assembly – F70033 or equivalent, for removing snap-on trim without marring or tearing vinyl covering.

3. Remove Main Cargo Door Lining. (See figure 401.)

A. Remove window panel.

- (1) Remove window panel side trim on both sides of window panel.
  - (a) Snap side trim loose at bottom, using special tool.
  - (b) Pull inboard on side trim to disengage from retainer and pull down at top to disengage upper tab from groove of cove trim.
- (2) Disengage retainer fasteners and remove window panel retainers on both sides of window panel.

**NOTE:** There are four fasteners per retainer. Fasteners are quick release type and require one-quarter turn to disengage.

- (3) Slide window panel upward to disengage lower edge from dado panel floating trim; then pull inboard and down on bottom to remove panel.

B. Remove dado panel.

- (1) After removing the required number of consecutive window panels, remove dado panel floating trim strip by sliding off dado panel.

**NOTE:** There are three dado panel floating trim strips on the main cargo door.

- (2) Remove dado panel by sliding upward to disengage lower edge from groove in air grille stiffener and flexing with care to disengage side edges from dado panel retainers.
- (3) Disengage dado panel retainer fasteners and remove retainer and air grille stiffener.

**NOTE:** There are three fasteners per retainer with the lower fastener common to the air grille stiffener and the dado panel retainer. Fasteners are quick-release type and require one-quarter turn to disengage.

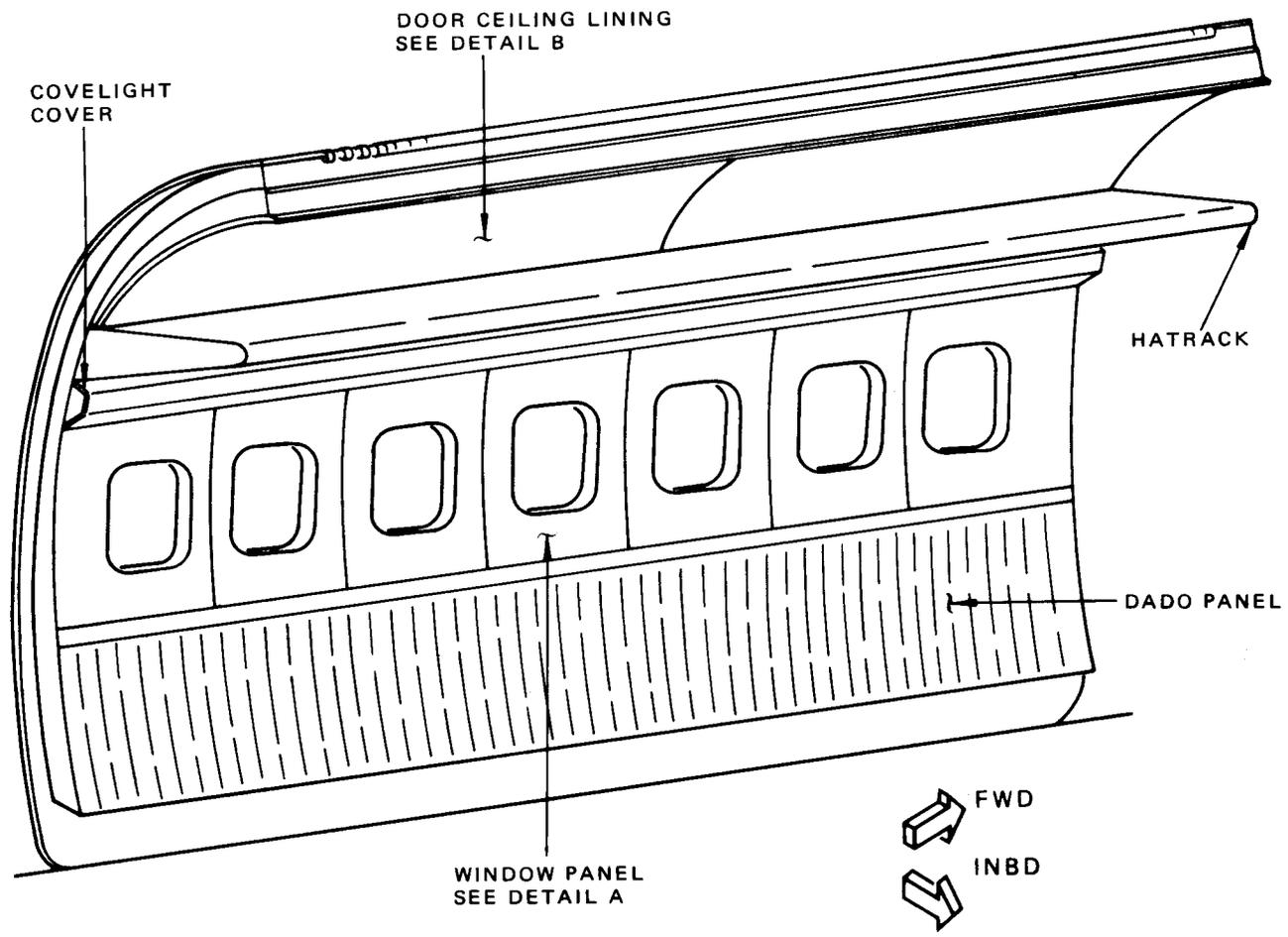
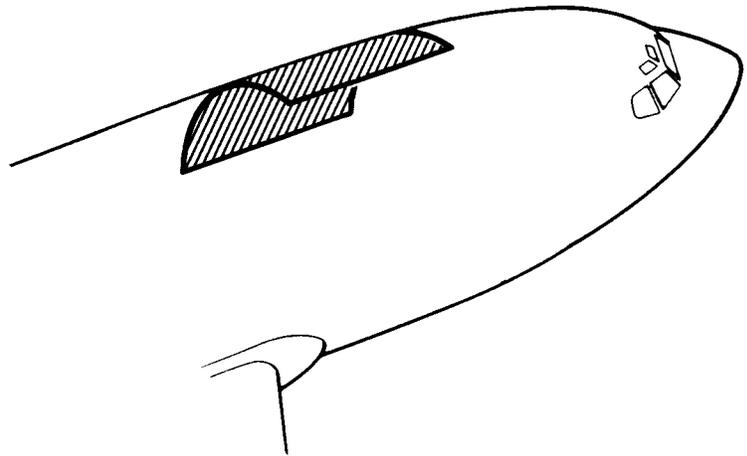
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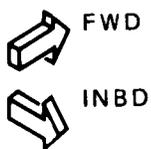
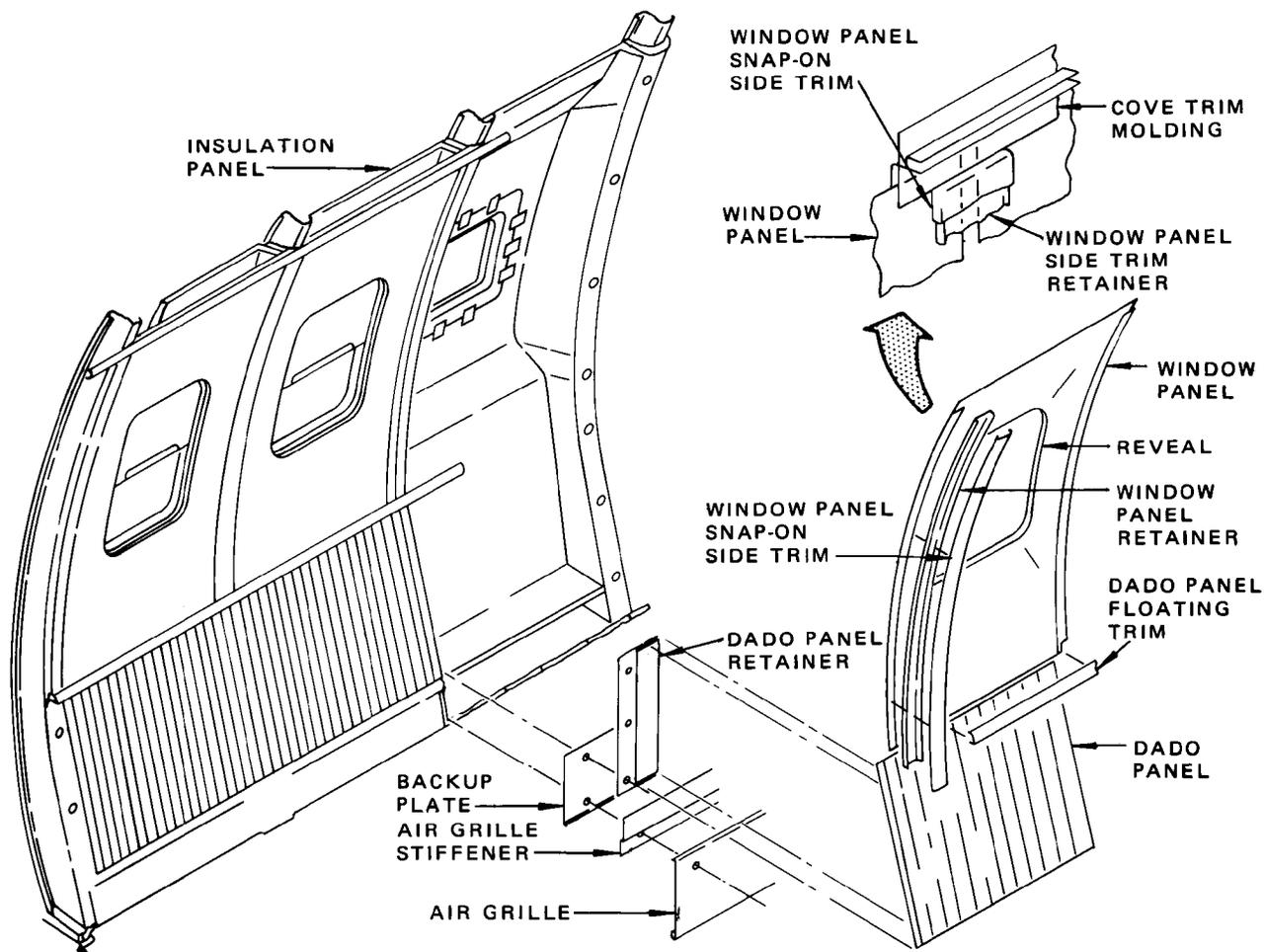


Main Cargo Door Lining Installation  
 Figure 401 (Sheet 1)

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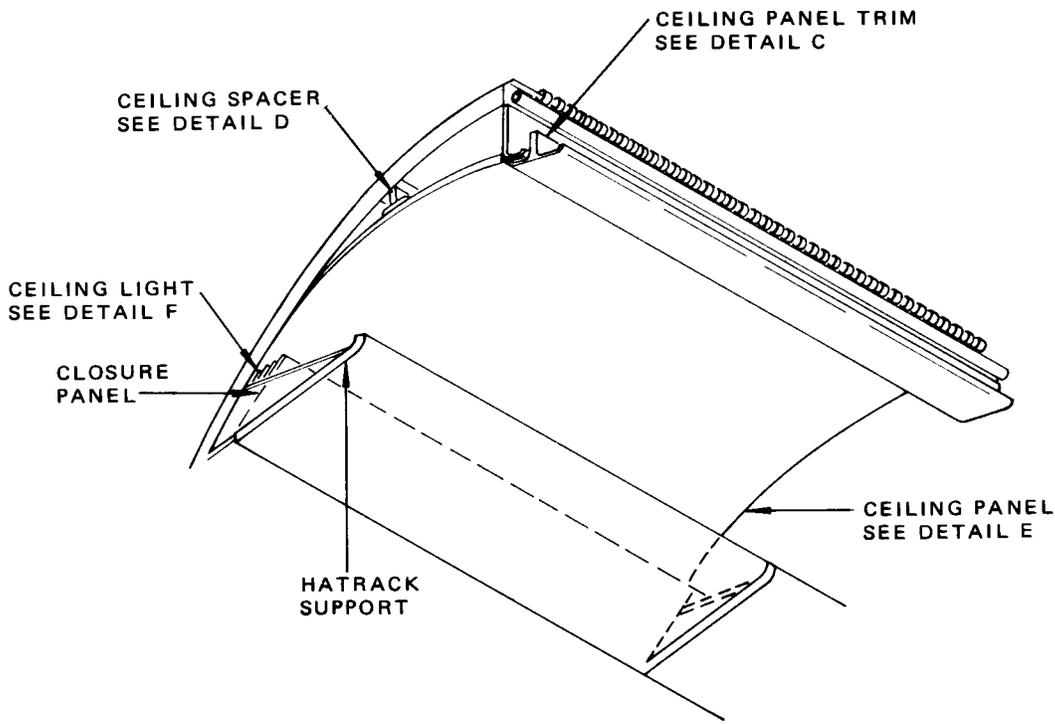


DETAIL A

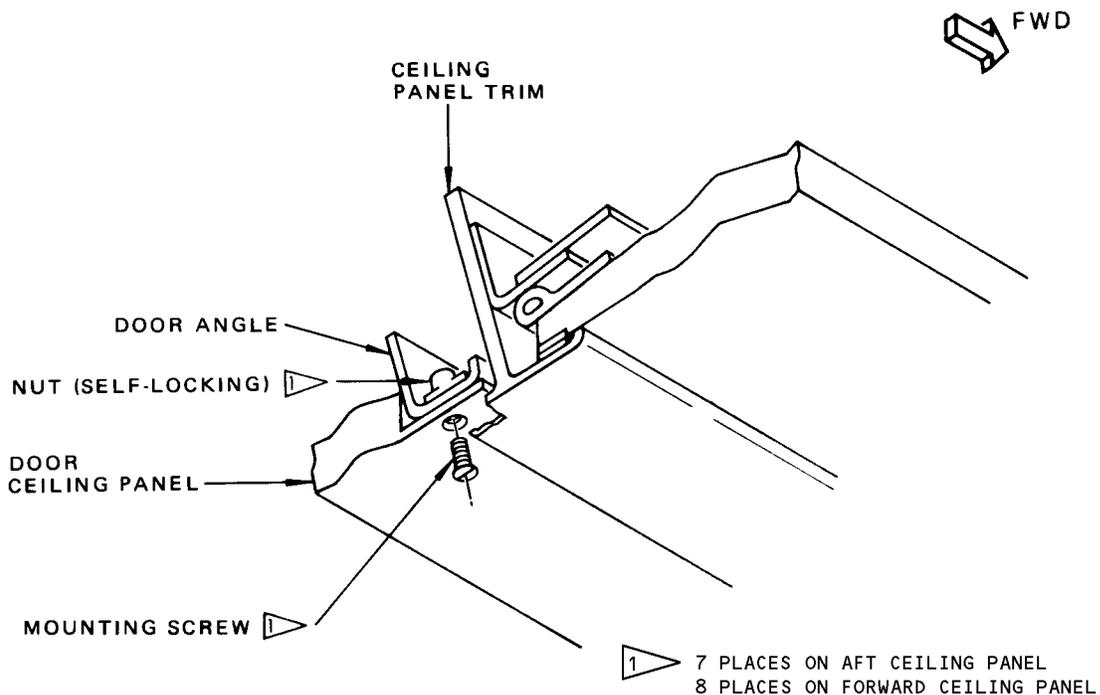
Main Cargo Door Lining Installation  
 Figure 401 (Sheet 2)

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DETAIL B



DETAIL C

Main Cargo Door Lining Installation  
 Figure 401 (Sheet 3)

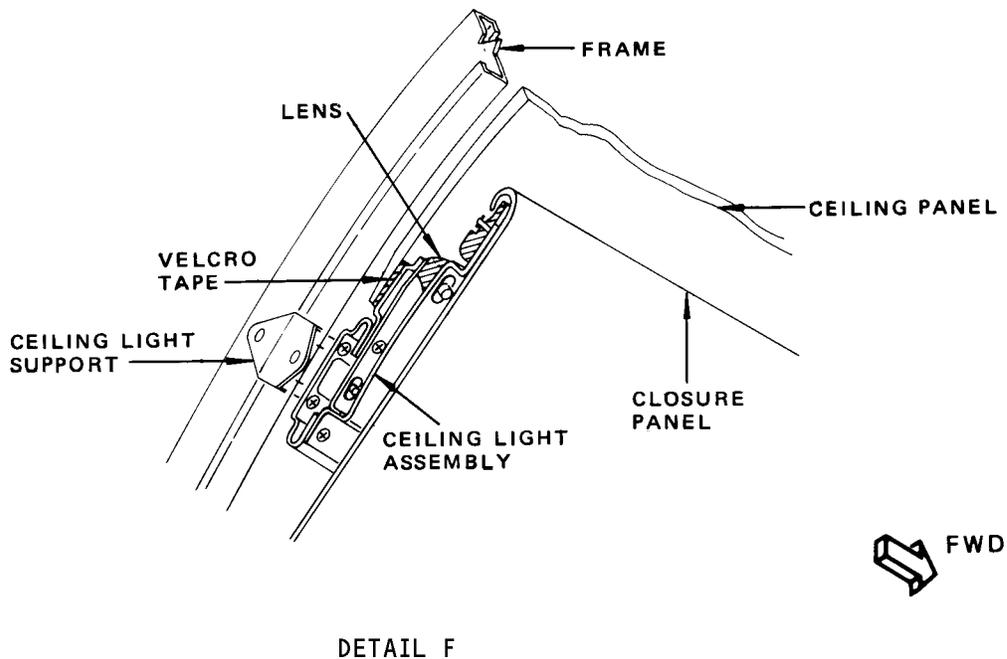
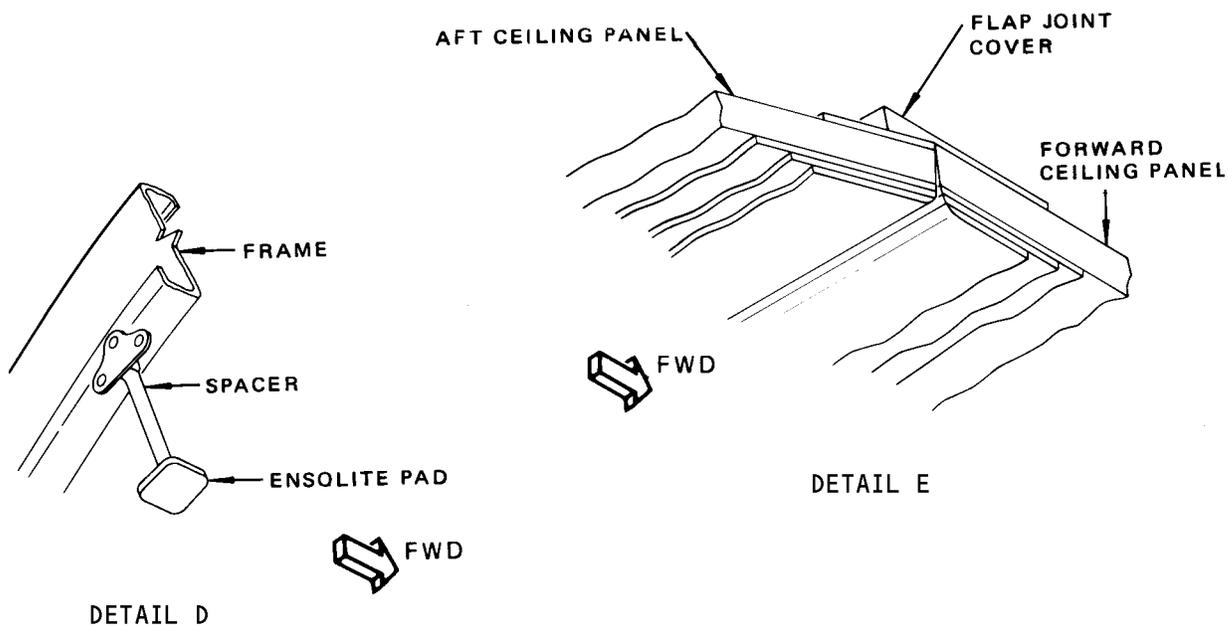
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Main Cargo Door Lining Installation  
 Figure 401 (Sheet 4)

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## MAINTENANCE MANUAL

C. Remove door ceiling lining. (See figure 401.)

**NOTE:** The forward and aft ceiling panels are attached to the door angle by means of screws: eight on the forward panel and seven on the aft panel. It is necessary to remove the forward ceiling panel first in order to remove the aft ceiling panel.

- (1) Open main cargo door until upper edge of ceiling panel is free of the ceiling panel trim.
- (2) Remove screws that attach upper edge of forward ceiling panel to door angle.
- (3) After removing all the screws, push lower edge of ceiling panel outboard to disengage the velcro tape; then tip upper edge of panel down and pull inboard to remove lower edge from behind ceiling light and closure panel.
- (4) Repeat steps (2) and (3) to remove aft ceiling panel.
- (5) Close main cargo door.

#### 4. Install Main Cargo Door Lining

A. Install door ceiling lining.

- (1) Open main cargo door until hole locations on door angle can be seen.
- (2) Position lower edge of aft ceiling panel outboard of closure panel and ceiling light, taking care not to engage the velcro tape.
- (3) Engage screws and release panel.

**NOTE:** The spacers will exert pressure against ceiling panel to engage the velcro tape.

- (4) Repeat steps (2) and (3) to install forward ceiling panel.
- (5) Ensure that screws are tight and close main cargo door.

B. Install dado panel.

- (1) Position dado panel retainer and air grille stiffener simultaneously and engage retainer fasteners.
- (2) Install dado panel by sliding side edges into grooves of dado panel retainers and work panel downward into groove of air grille stiffener.
- (3) When dado panels are in position, install dado panel floating trim.

C. Install window panel.

- (1) Engage upper edge of window panel into groove of cove trim and work panel down to engage lower edge into groove of dado panel floating trim.
- (2) After window panels have been installed, position window panel retainer and engage fasteners.
- (3) Install window panel side trim.
  - (a) Engage upper tab of window panel side trim into groove of cove trim.
  - (b) Press on window panel snap-on side trim.

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MAIN CARGO DOOR INSULATION – REMOVAL/INSTALLATION

1. General
  - A. Removal and installation of all or any part of the door insulation may be accomplished. Due to the variety of installation methods, only general instructions are given.
2. Remove Main Cargo Door Insulation (See figure 401.)
  - A. Remove one or more components of door lining as required in order to gain access to any particular section of door insulation. (See Main Cargo Door Lining – Removal/Installation, 52-32-81.)
  - B. Remove heating blankets as required. Refer to Chapter 21.
  - C. Remove retainers as required.
  - D. When all obstructions have been removed; remove insulation panels. (In some places, it may be necessary to peel the panel free of the velcro tape which is used to retain it against door structure.) (See figure 401.)
  - E. Mark insulation components as they are removed for proper location when reinstalling.
3. Install Main Cargo Door Insulation
  - A. Position insulation panels in proper location on door.
    - (1) When installing insulation panels around windows, ensure that the blanket contacts the window reveal around the entire window periphery, with no gaps, to form an air seal.
    - (2) When installing the insulation panels that are held in place with velcro tape, it is necessary to align the tape on the panel with the tape that is bonded to door structure before pressing panel outboard to make tapes contact.
  - B. Install retainers where applicable.
  - C. Ensure that all insulation components are in proper places so as not to interfere with door lining or other equipment mounted on the cargo door.
  - D. Install heating blankets removed in step 2.B. Refer to Chapter 21.
  - E. Install door lining components that were removed to facilitate door insulation removal. (See Main Cargo Door Lining – Removal/Installation, 52-32-81.)

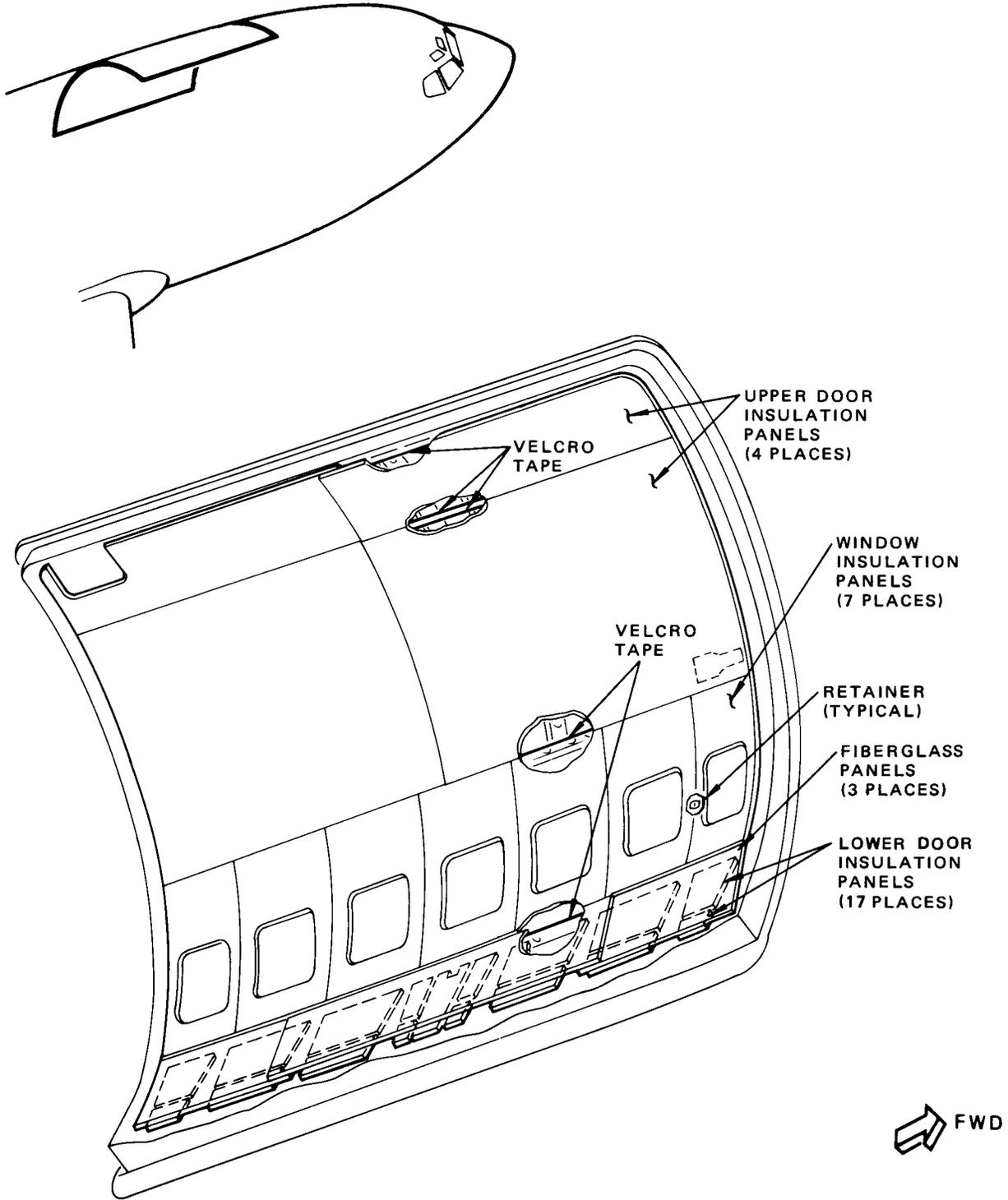
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**NOTE: LINING PANELS REMOVED FOR CLARITY**  
 Main Cargo Door Insulation Installation  
 Figure 401

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MAIN CARGO DOOR CANOPY POSITION SWITCHES – ADJUSTMENT/TEST

1. General

- A. All switch adjustments are to be made with the main cargo door in the canopy position (actuator extended to the ram lock position). The door should be operated manually when making switch adjustment/test. The ram lock position is obtained by raising door to just above canopy position and then lowering it until stopped by the internal lock of the lift actuator. Access to the switches is gained by removing the aft curved ceiling panel adjacent to the main cargo door. Refer to Chapter 25, Ceiling Lining.
- B. Both rollers on the cam arm should contact the surface of the bellcrank. Minor adjustments in arm position may be done by repositioning the switch support bracket. (See figure 501.) When only one roller contacts the bellcrank surface, all shimming shall be accomplished at this point.

2. Canopy Position Switches Adjustment

- A. Equipment and Materials
  - (1) Shim 0.05 inch
  - (2) Shim 0.06 inch
  - (3) Shim 0.09 inch
  - (4) Shim 0.10 inch
- B. Adjust Canopy Position A Switch (See detail A, figure 501.)
  - (1) With door in actuator ram lock position, insert a 0.09 shim between cam arm rollers and bellcrank surface. Adjust switch to release at this point by loosening nuts, adjusting switch and tightening nuts.
  - (2) Rotate arm far enough to actuate switch; remove the 0.09 shim and insert a 0.10 shim.
  - (3) Rotate arm to contact shim. Switch shall remain actuated.
  - (4) Test switch per paragraph 4. A.
- C. Adjust Canopy Position B Switch (See detail B, figure 501.)
  - (1) With door in actuator ram lock position, insert 0.06 shim between cam arm rollers and bellcrank surface. Adjust switch to actuate at this point by loosening nuts, adjusting switch and tightening nuts.
  - (2) Remove the 0.06 shim. Check that the switch releases when cam arm rollers rotate to contact bellcrank surface.
  - (3) Insert 0.05 shim between arm rollers and bellcrank. The switch shall not actuate.
  - (4) Test switch per paragraph 4.B.

3. Canopy Position Switches Test

- A. Equipment and Materials
  - (1) Shim 0.05 inch
  - (2) Shim 0.06 inch
  - (3) Shim 0.09 inch
  - (4) Shim 0.10 inch
  - (5) Test lamp or equivalent to check circuit continuity

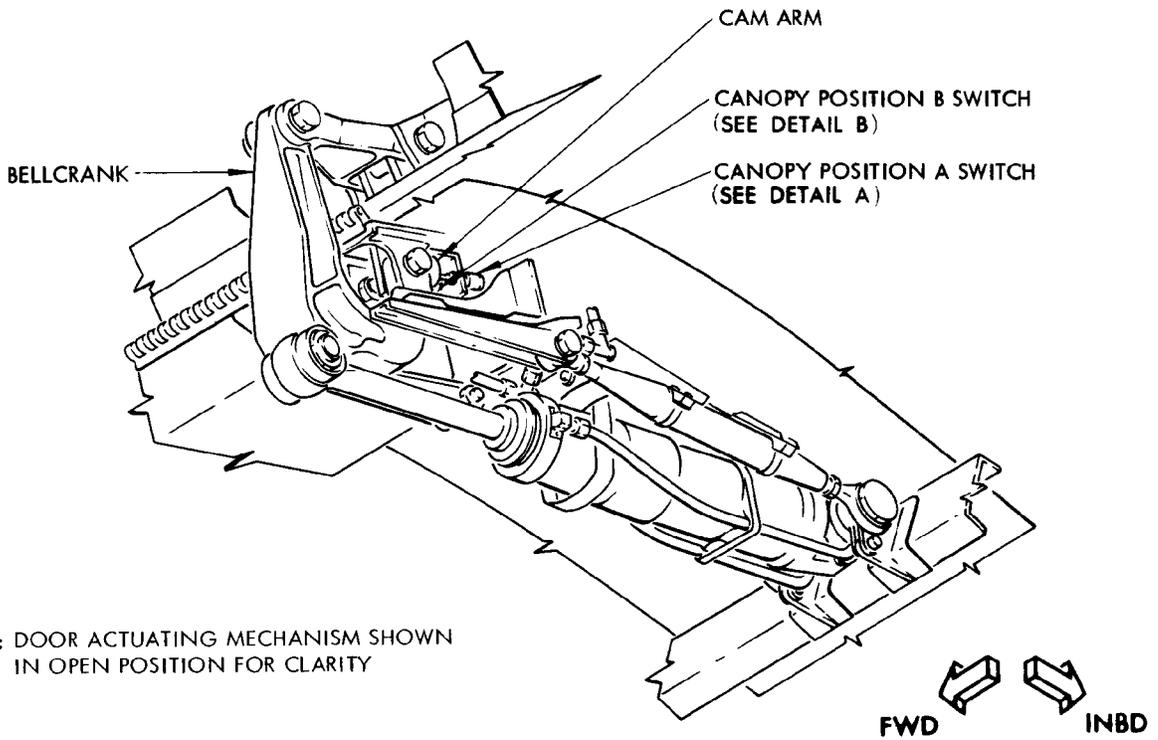
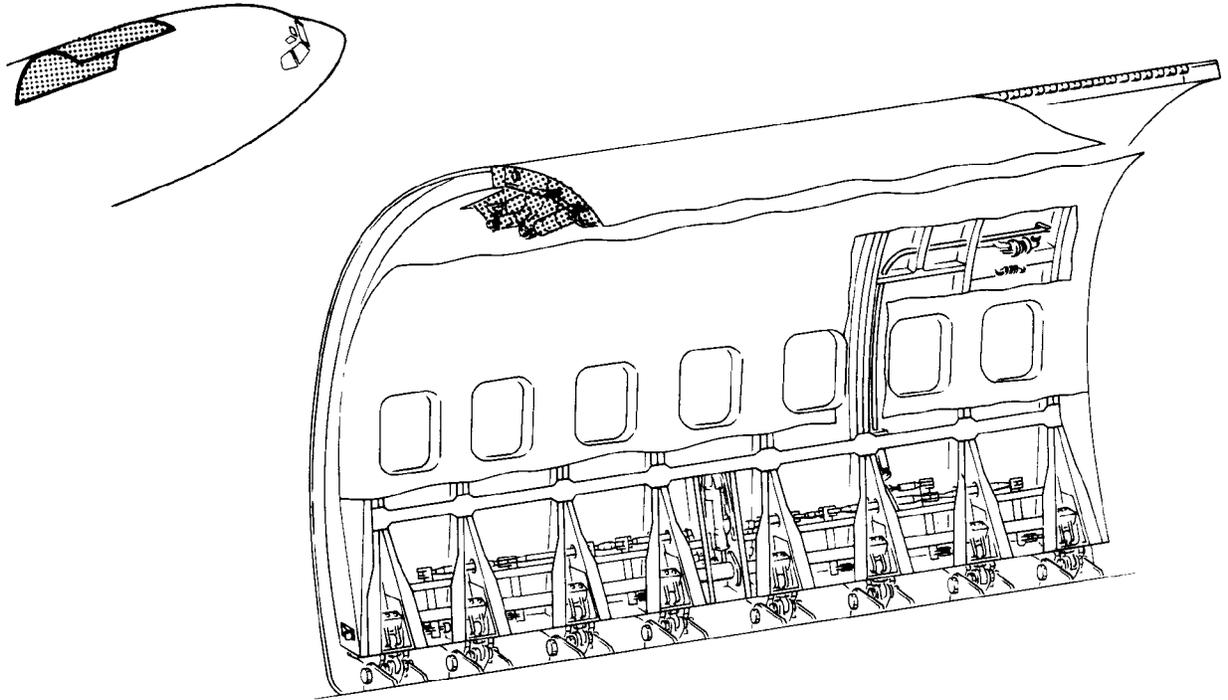
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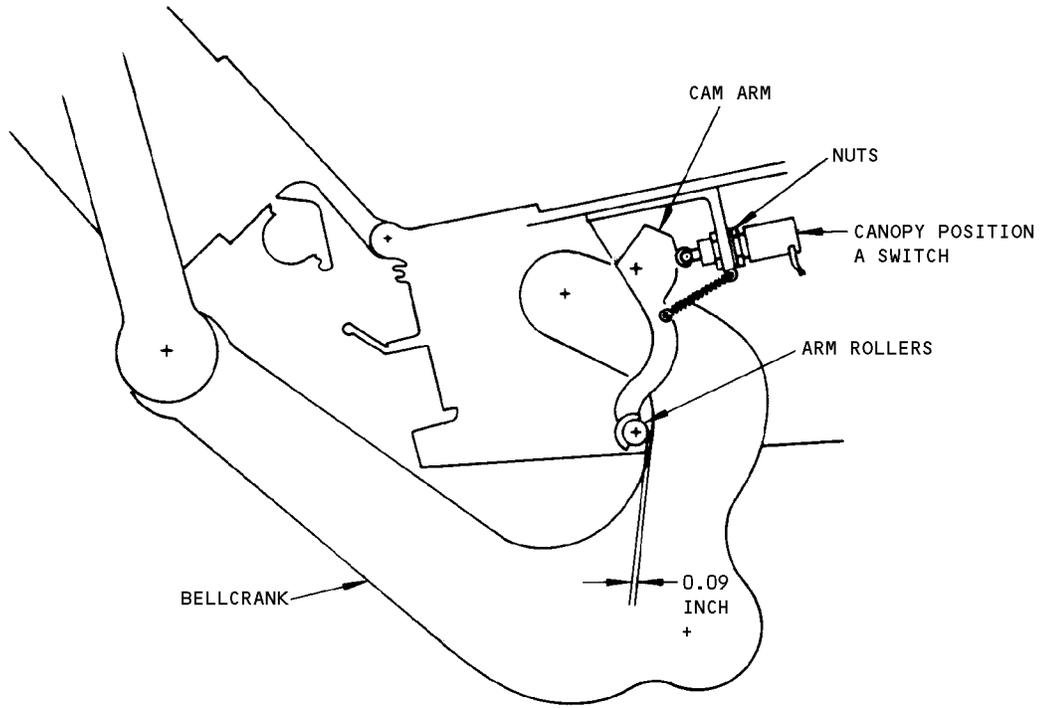


NOTE: DOOR ACTUATING MECHANISM SHOWN  
 IN OPEN POSITION FOR CLARITY

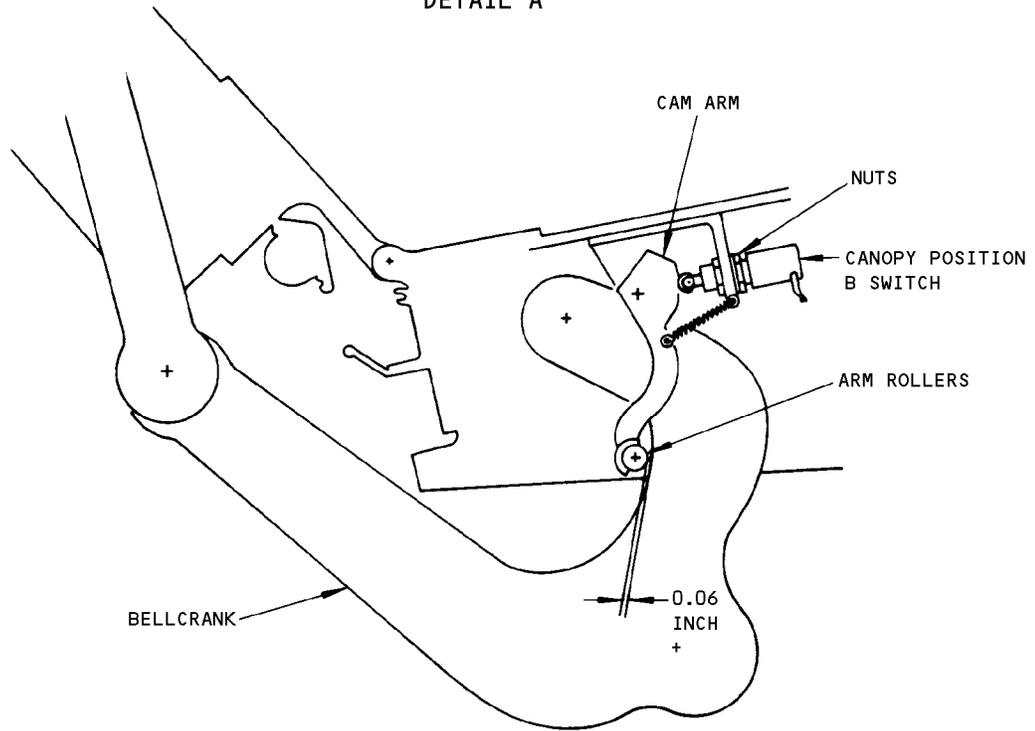
Canopy Switch Adjustment  
 Figure 501 (Sheet 1)

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DETAIL A



DETAIL B

Canopy Switch Adjustment  
 Figure 501 (Sheet 2)

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## MAINTENANCE MANUAL

- B. Test Canopy Position A Switch
- (1) With main cargo door in actuator ram lock position, check for continuity across terminals 1-2 and no continuity across terminals 1-3 of switch.
  - (2) Rotate cam arm rollers far enough to actuate switch; then insert a 0.10 shim between cam arm rollers and bellcrank surface.
  - (3) Check for continuity across terminals 1-3 and no continuity across terminals 1 and 2 of switch.
  - (4) Lift cam arm, replace 0.10 shim with 0.09 shim, then rotate arm to contact shim.
  - (5) Check for continuity across terminals 1-2 and no continuity across terminals 1 and 3 of switch.
- C. Test Canopy Position B Switch
- (1) With main cargo door in actuator ram lock position, check for continuity across terminals 1-2 and no continuity across terminals 1-3 of switch.
  - (2) Insert a 0.05 shim between cam arm rollers and bellcrank surface.
  - (3) Check for continuity across terminals 1-2 and no continuity across terminals 1-3 of switch.
  - (4) Replace 0.05 shim with 0.06 shim.
  - (5) Check for continuity across terminals 1-3 and no continuity across terminals 1 and 2 of switch.

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## MAINTENANCE MANUAL

### MAIN CARGO DOOR LOCKED SWITCH – ADJUSTMENT/TEST

#### 1. General

- A. The main cargo door locked switch is located in the lower aft end of the door. Access to the switch is gained by removing the aft window and dado panels. Refer to 52-32-81, Main Cargo Door Lining.
- B. Prior to door locked switch adjustment/test, ensure lock mechanism is properly adjusted per 52-32-11, Main Cargo Door Assembly.

#### 2. Door Locked Switch Adjustment

- A. Adjust Door Locked Switch (See figure 501.)
  - (1) Ensure main cargo door is unlocked and pins are fully retracted.
  - (2) With switch roller in fully extended position, loosen and adjust switch mounting nuts until switch roller just contacts cam.

**NOTE:** Ensure that distance between roller surface and switch base is 1.781 (+ 0.030) inches when switch roller is in fully extended position. (See section A-A.)

- (3) Tighten switch mounting nuts.
- (4) Test switch per paragraph 3.

#### 3. Door Locked Switch Test

- A. Equipment and Materials
  - (1) Test lamp or equivalent to check circuit continuity.
- B. Test Door Locked Switch
  - (1) Ensure main cargo door is closed and locked.
  - (2) Check continuity across terminals 1-2, 10-11 and 7-8 of switch. There shall be no electrical continuity across these terminals.
  - (3) Operate main cargo door external handle to unlocked position.
  - (4) Check continuity across terminals 1-2, 10-11 and 7-8 of switch. Electrical continuity shall exist across these terminals.
  - (5) Return external handle to locked position.

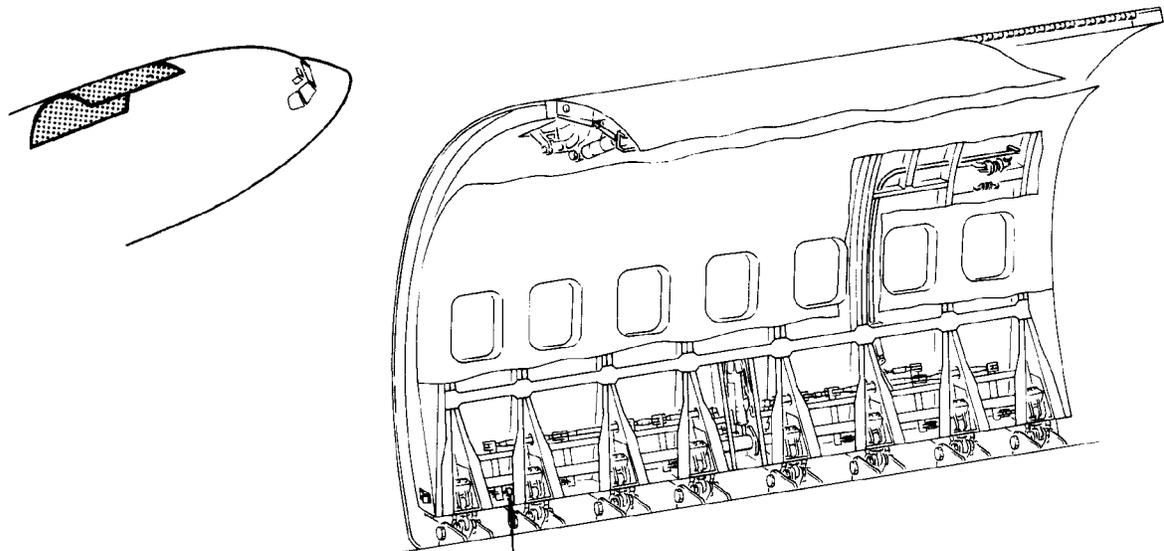
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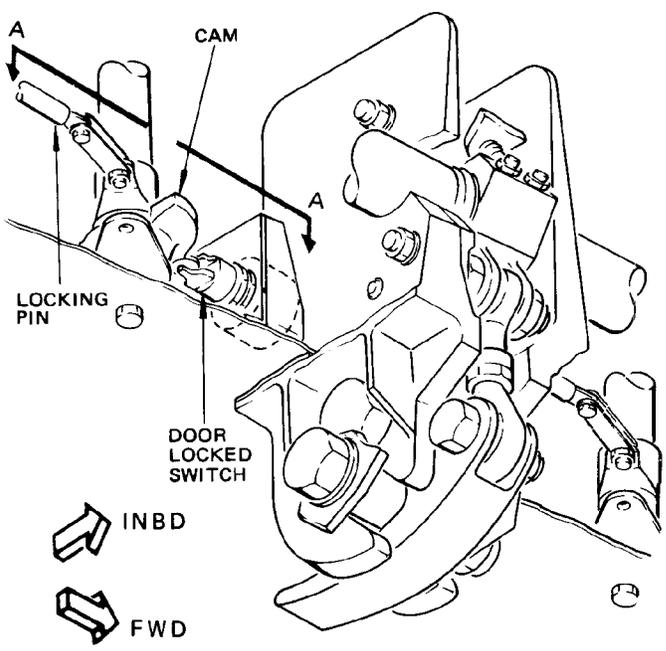
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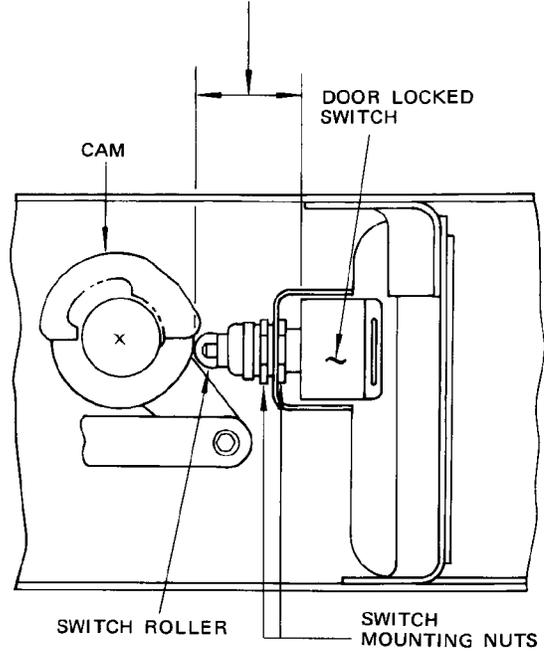


SEE DETAIL A

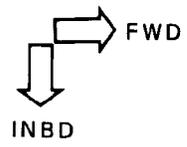
1.781 (± 0.030) INCHES



DETAIL A



SECTION A-A  
 (SHOWN WITH EXTERNAL  
 HANDLE IN UNLOCKED  
 POSITION)



Main Cargo Door Locked Switch Adjustment  
 Figure 501

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MAIN CARGO DOOR POSITION SWITCH – ADJUSTMENT/TEST

1. General

A. The main cargo door position switch is installed in the center of the body door sill. Access to the switch is in the lower forward cargo compartment. The ceiling lining and shroud closure below the switch must be removed as well as miscellaneous interfering wiring and insulation. Refer to Chapter 25, Cargo Compartment Ceiling Lining. The door should be opened manually when making switch adjustment/test. Refer to 52-32-0, Description and Operation – Manual Operation.

2. Door Position Switch Adjustment

A. Adjust Door Position Switch (See figure 501.)

- (1) Manually open main cargo door.
- (2) Loosen door position switch nuts and remove switch.
- (3) Close main cargo door.
- (4) With cargo door closed and locked, measure distance (x) from face of switch striker on door to inboard surface of switch mounting casting.
- (5) If installed, remove outside nut, lockwasher and keying washer from switch.
- (6) Position remaining nut on switch so that distance between face of nut and end of switch plunger is (x)+0.16 inch.
- (7) Open main cargo door.
- (8) Install switch in casting, being careful not to move nut.
- (9) Install keying washer, lockwasher and nut.
- (10) Tighten nut firmly.
- (11) Close main cargo door.
- (12) Test switch per paragraph 3.

3. Door Position Switch Test

A. Equipment and Materials

- (1) Test lamp or equivalent to check circuit continuity

B. Test Door Position Switch

- (1) With main cargo door closed and locked, check continuity across terminals 1-2, 4-5 and 7-8 of door position switch. There shall be no electrical continuity across these terminals.
- (2) Manually open main cargo door until clear of switch plunger.
- (3) Check continuity across terminals 1-2, 4-5 and 7-8 of door position switch. Electrical continuity shall exist across these terminals.
- (4) Manually close main cargo door.

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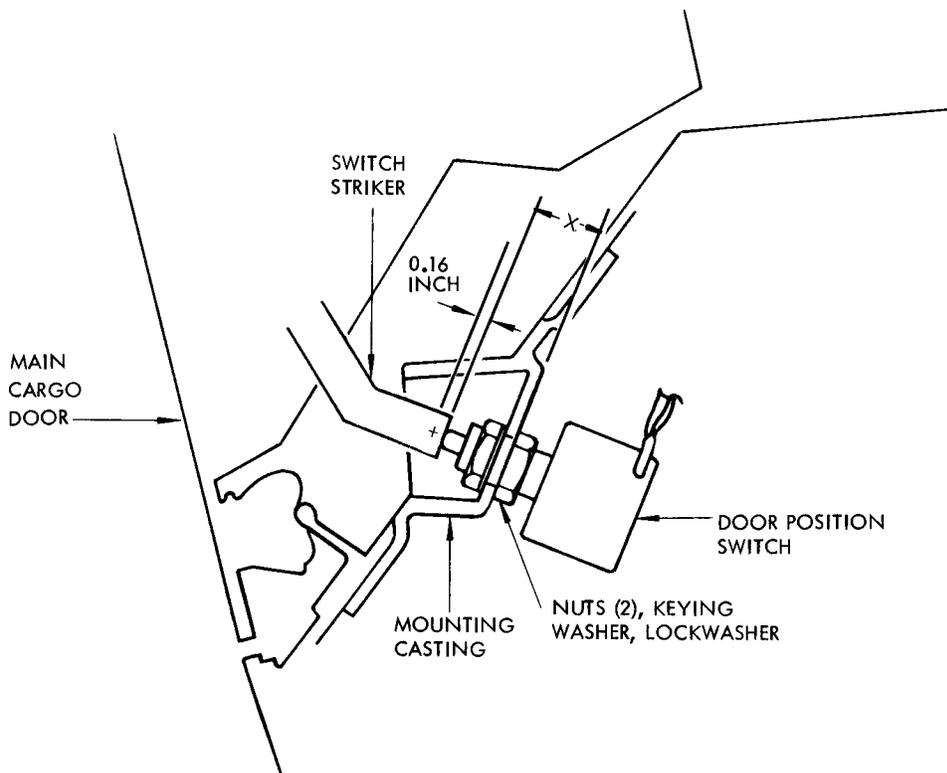
3. Door Position Switch Test

A. Equipment and Materials

- (1) Test lamp or equivalent to check circuit continuity

B. Test Door Position Switch

- (1) With main cargo door closed and locked, check continuity across terminals 1-2, 4-5 and 7-8 of door position switch. There shall be no electrical continuity across these terminals.
- (2) Manually open main cargo door until clear of switch plunger.
- (3) Check continuity across terminals 1-2, 4-5 and 7-8 of door position switch. Electrical continuity shall exist across these terminals.
- (4) Manually close main cargo door.



Door Position Switch Adjustment  
 Figure 501

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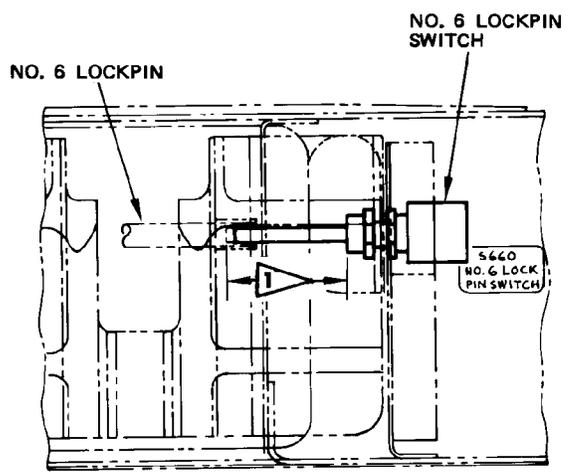
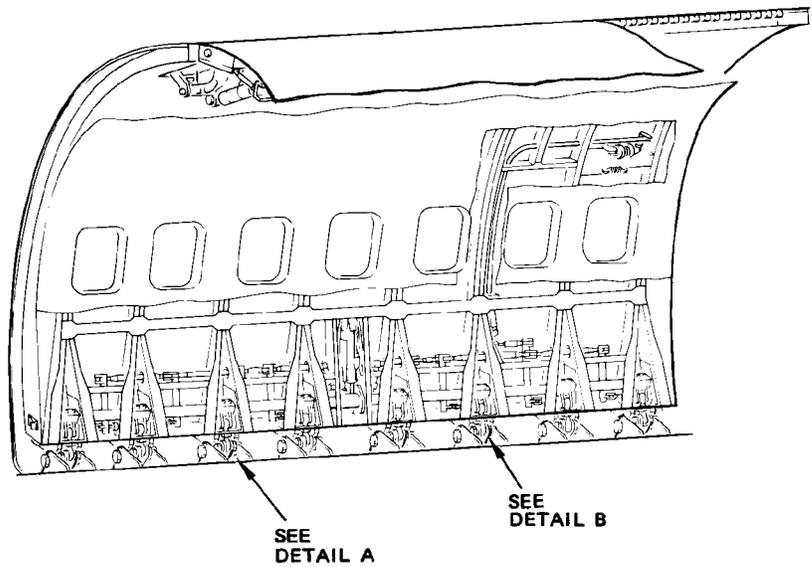
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MAIN CARGO DOOR LOCKPIN NO. 3 AND 6 SWITCHES - ADJUSTMENT/TEST

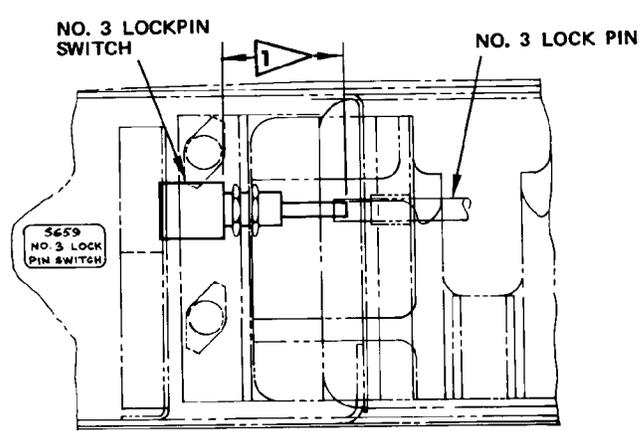
1. General
  - A. Two lockpin switches are mounted on the cargo door; one at lockpin No. 3 and one at lockpin No. 6, with the switch plunger located in line with the respective lockpin. Remove door lining for access (Ref 52-32-81, Removal/Installation).
2. Adjust Main Cargo Door No. 3 and 6 Lockpin Switches (Fig. 501)
  - A. Ensure that main cargo door and lock mechanism is properly rigged (Ref 52-32-11, Adjustment/Test).
  - B. Adjust No. 3 or 6 lockpin switch so that plunger is depressed by the lockpin as specified in Fig. 501.
  - C. Tighten adjustment nuts.
  - D. Test switch per par. 3.
3. Test Main Cargo Door No. 3 and 6 Lockpin Switches (Fig. 501)
  - A. With electric power on 28-volt ac bus No. 2, close MAIN CARGO DOOR CONTROL circuit breaker on P6 panel.
  - B. Operate cargo door to closed and latched position.
  - C. Check that lockpin viewing lights at latch viewing windows No. 2 and 7 are illuminated (this provides indication that lockpin switches No. 3 and 6 have been depressed by the respective lockpins and are functioning properly). Check that main cargo door warning light on annunciator panel is not illuminated.
  - D. Operate main cargo door external handle to unlocked position. Check that door warning light on annunciator panel is illuminated and No. 3 and 6 lockpin lights are extinguished.
  - E. Return external handle to locked position.
  - F. Remove electrical power if no longer required.

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DETAIL A



DETAIL C

 WITH DOOR IN LOCKED POSITION  
 ADJUST SWITCH SO THAT  
 PLUNGER IS DEPRESSED BY THE  
 LOCK PIN 0.14 TO 0.40 INCH

No. 3 and 6 Lockpin Switch Adjustment  
 Figure 501

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GALLEY SERVICE DOORS – DESCRIPTION AND OPERATION

1. General

- A. The forward and aft galley service doors are located on the right side of the fuselage approximately opposite the forward and aft entry doors (Fig. 1). An upper and a lower hinge assembly supports each galley service door on its forward edge in the door opening. Each door may be closed or opened from inside or outside the airplane. Since the forward and aft galley service doors are similar in design and operation, only the aft door will be described in the following paragraphs.
- B. The door is opened by manually operating the centrally located handle, which causes an internal mechanism within the door to release roller latches on the door from latch fittings on the door jambs, folds the gates inward, and moves the door to its most inward position. The door is then manually swung through the door opening and stowed in the open position by the engagement of a latch pin in a hole in the upper guide plate at the upper hinge.
- C. The door is guided during the final closing operation by a centering guide attached to the center of the aft edge of the door engaging with a centering track located on the aft frame of the door opening. (Detail A, Fig. 1) When the door is in the closed position and the passenger cabin is pressurized, door stops mounted on the forward and aft frames of the door opening contact adjustable door stop pins attached to the forward and aft edges of the door. The door stops transmit the pressurization loads on the door to the fuselage structure surrounding the door, and prevent excessive deflection of the seal attached around the entire edge of the door. A flap is located at both the upper and lower hinges in cutouts in the body skin and is attached by spring-loaded hinges to the forward frame of the door opening. The flap covers the gap between the hinge link and body skin around the hinge cutouts when the door is in the closed position. Water drains are provided at the upper and lower hinge locations and along the lower edge of the lower gate. A proximity switch, attached to the door and door frame, is in circuit with the door warning system. Refer to Section 52-71-0. Assist handles are provided to give additional control during the door operating cycle.
- D. A removable body skin panel is located between the upper and lower hinge attach points which provides access to the hinge torque tube for overhaul purposes.

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2. Handle Mechanism

A. The inside handle (Detail B, Fig. 1) is bolted to a cam plate which is splined to receive the outside handle shaft. The outside handle in a recess panel flush with the door exterior skin is attached to a handle sleeve which is splined to receive the outer end of the handle shaft. A seal, to prevent pressurization losses is located inside the handle sleeve housing. Another seal is positioned between the sleeve housing and the seal plate. An outside handle seating spring is retained within the handle shaft by a nut and spring retainer. A pin located inside the spring is attached to a pin retaining washer, which is located between the outside handle and the handle sleeve. A centering cam on the handle sleeve engages on a cam on the sleeve housing, which is attached to the handle mechanism housing.

3. Latching Crank and Door Locking Crank

A. Two cam rollers attached to two roller cranks (Detail B, Fig. 1) bear against a cam plate. Viewing the door from inside the airplane, the left cam roller crank is splined to a latching crank. The complete crank assembly rotates in ball bearings secured in the handle mechanism housing by bearing retainers. Two separate control rods, connected to each end of the latching crank connect with latch rods at the top and bottom of the door. The right cam roller crank is splined to the door cocking crank which is connected to the torque tube. The torque tube is supported on two ball bearings mounted in the handle mechanism housing. Two nuts allow vertical adjustment of the door in the door opening. Twelve bolts secure the handle mechanism housing to the door structure.

4. Latch Assembly

A. Latch rollers (detail E, Fig. 1) at the ends of the latch rods engage with latches mounted on the door jambs. The upper and lower latch rods have control rods connected to the upper and lower gates respectively. The gates are mounted at the top and bottom of the door with piano-type hinges with diaphragm seals to prevent pressurization leaks. The adjustable door stops are also shown on detail E, Fig. 1.

5. Upper Hinge Assembly

A. The upper hinge arm (9, detail C, figure 1) is splined to receive the torque tube (12) which rotates in the upper hinge support (11). The other end of the hinge arm (9) is bolted to the hinge link (5) which is connected to the guide arm (15) by means of pin (4). The hinge link (5) is splined to receive torque tube (14). Guide arm (15) is connected with rod end bearing (13) and attach fitting (10) to hinge support (11). The other end of guide arm (15) contains a spring-loaded guide arm roller that carries two guide arm roller bushings which operate in tracks in roller guide plates (1). A hole in the top guide plate allows engagement of a latch pin which is manually released by a stowing release lever or a stowing release button (3).

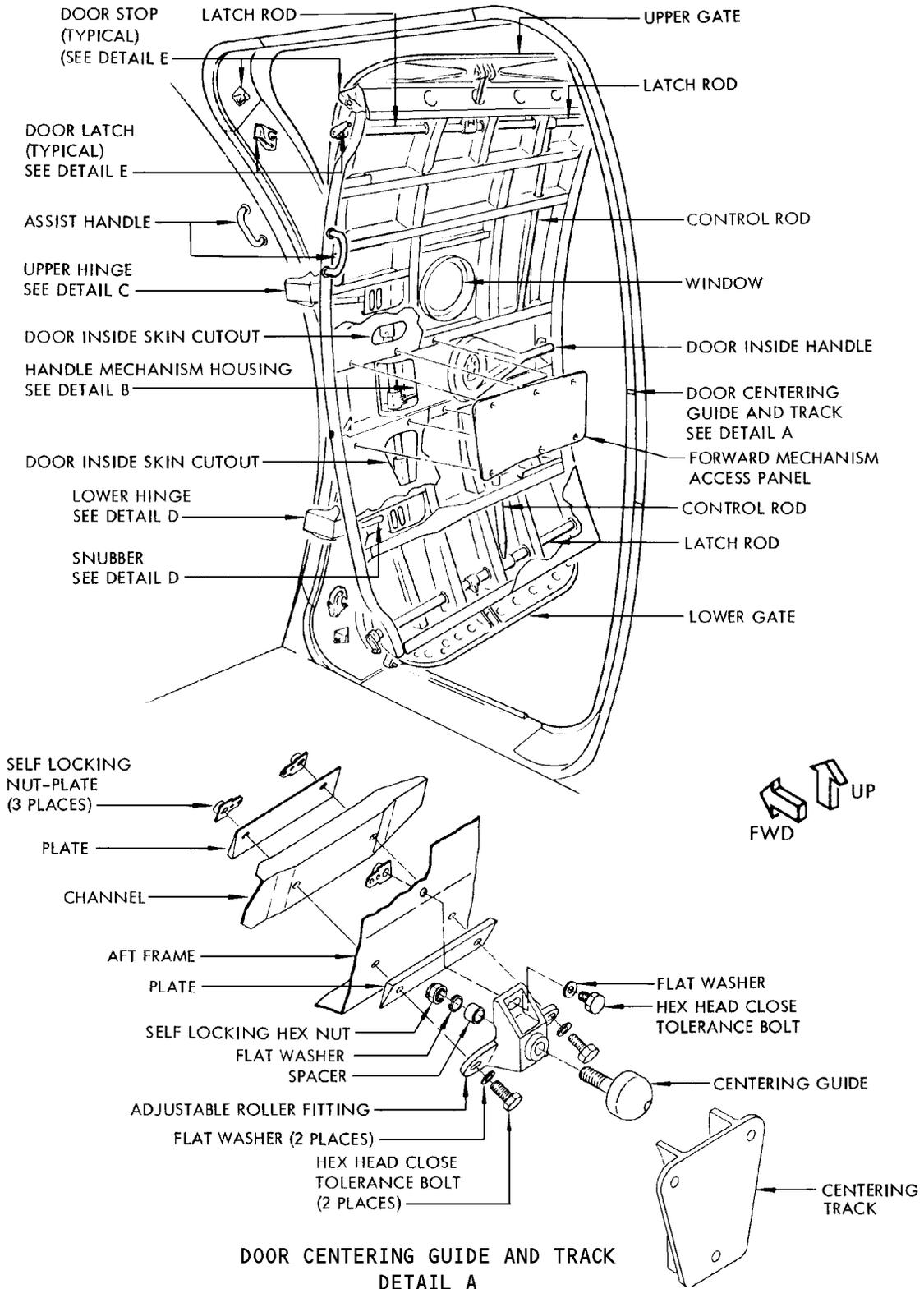
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**DOOR CENTERING GUIDE AND TRACK  
 DETAIL A**

**Galley Service Door Mechanism  
 Figure 1 (Sheet 1)**

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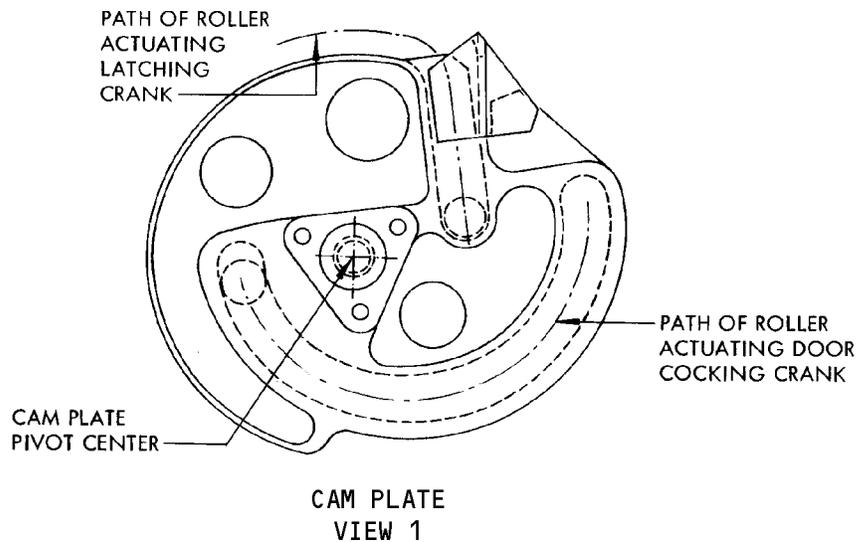
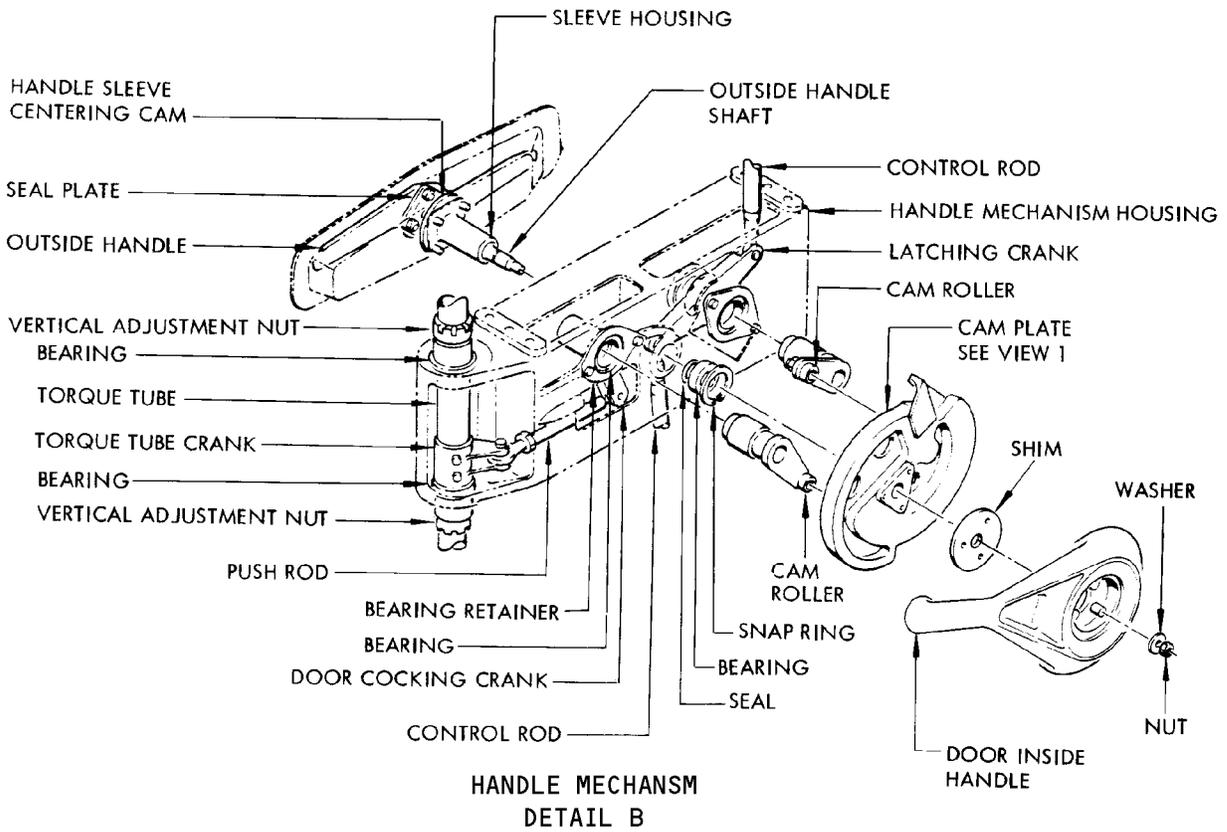
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NOTE: MECHANISM SHOWN IN CLOSED AND LATCHED POSITION



Galley Service Door Mechanism  
Figure 1 (Sheet 2)

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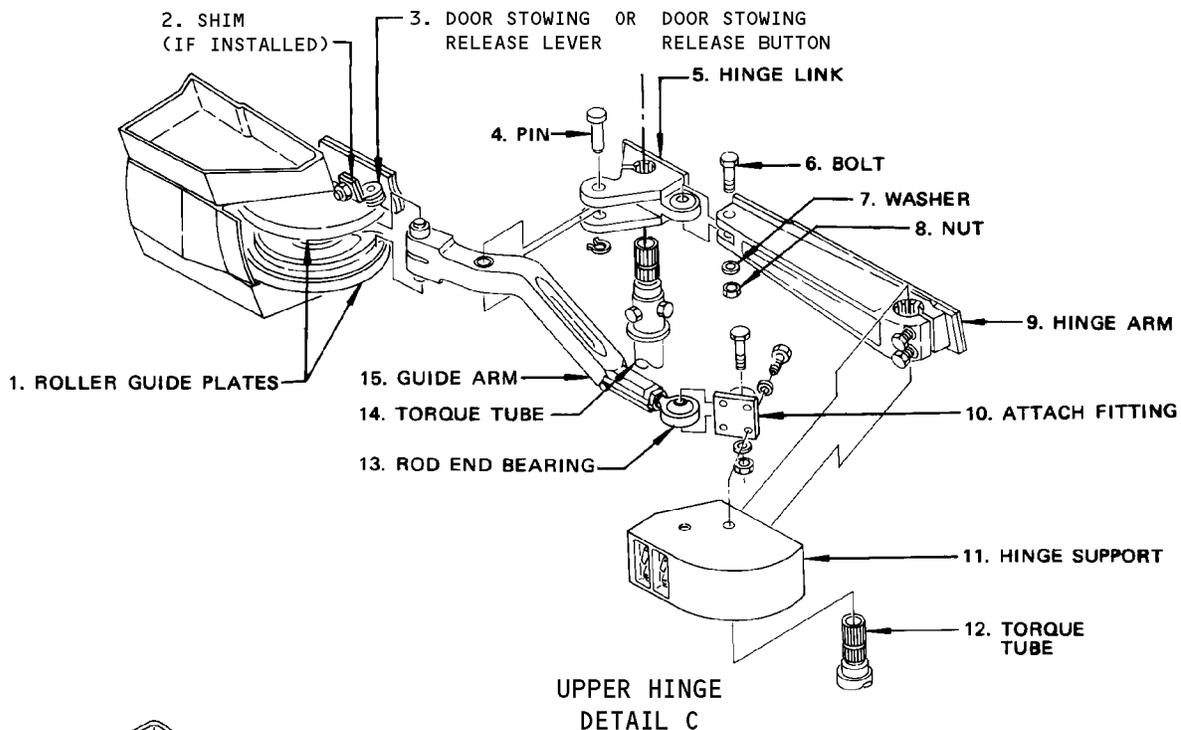
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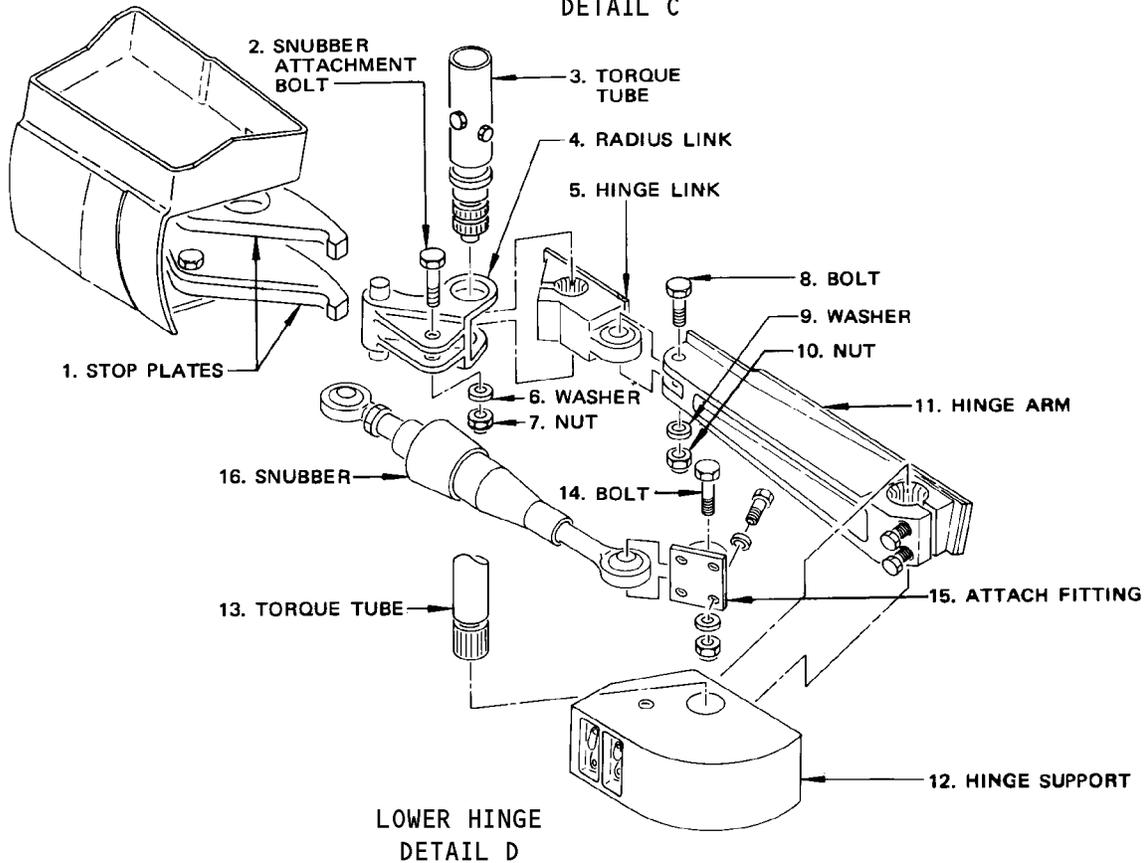
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**MAINTENANCE MANUAL**



**UPPER HINGE  
DETAIL C**



**LOWER HINGE  
DETAIL D**

**Galley Service Door Mechanism  
Figure 1 (Sheet 3)**

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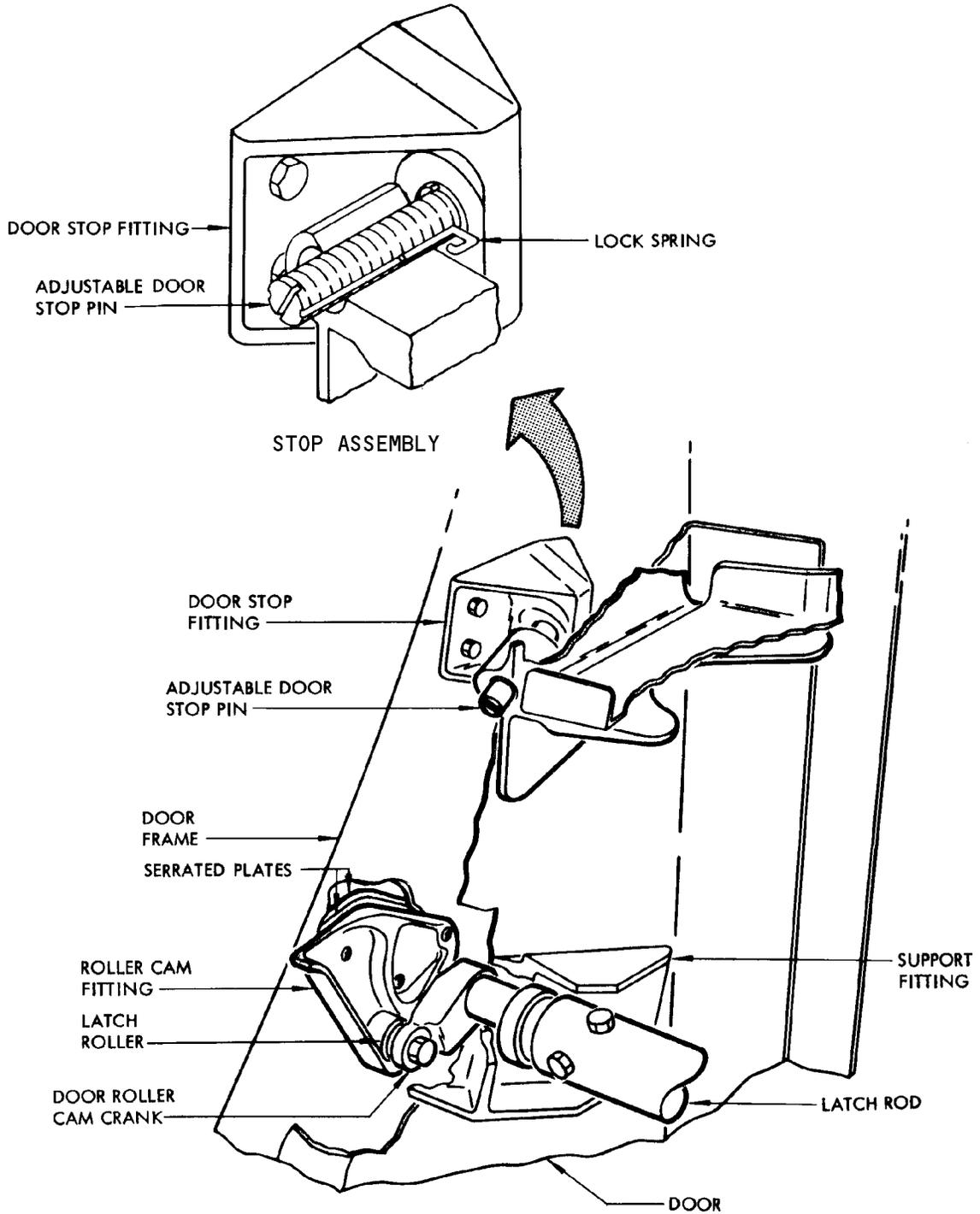
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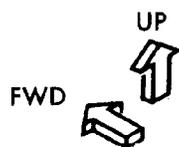
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NOTE: LATCH AND STOP ASSEMBLY SHOWN IN CLOSED AND LATCHED POSITION



LATCH AND STOP ASSEMBLY  
 DETAIL E

Galley Service Door Mechanism  
 Figure 1 (Sheet 4)

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6. Lower Hinge Assembly

A. The lower hinge arm (11, detail D, figure 1) is splined at one end to receive torque tube (13) which rotates in the lower hinge support (12). The other end of hinge arm (11) is connected by bolt (8) to hinge link (5) which is splined to receive torque tube (3). The two stop plates (1) are mounted at the lower hinge position at the forward frame of the door opening. A radius link (4) is located between the stop plates (1) and is fork shaped to receive the hinge link (5) and has a stop pin to engage the stop plates (1). The snubber (16), has spherical-type end bearings connected to radius link (4) at one end by snubber attachment bolt (2); the other end is connected by bolt (14) to attach fitting (15) which is bolted to hinge support (12).

7. Door Lining and Insulation

A. The galley door panels are decorative linings made of vinyl-aluminum laminate with an insulation blanket cemented to the outboard side of each panel. The galley door has an upper panel and a lower panel. The inboard window is removable without removing the panel. Refer to Door-Mounted Windows in Chapter 56.

8. Operation

A. The door is opened from the airplane interior by rotating the inside handle clockwise (figure 2). Initial rotation of the cam plate transmits angular movement to the latching crank assembly. The control rods at each end of the latching crank, turn the latch rods and withdraw the latch rollers from the latches, allowing the door to move inward. As the door moves inward the proximity switch in the door warning circuit is closed and the door warning light is energized. Refer to Section 52-71-0. The latch rods also operate the control rods attached to the upper and lower gates, causing these to fold inward. Further rotation of the handle to its full travel of 180° allows the cam plate to transmit angular movement.

B. to the cocking crank assembly. The cocking crank operates the pushrod connected to the torque tube crank. Movement of the pushrod is resisted by the torque tube, causing the door to rotate on the hinge arms and pivot about the torque tube axis. This motion is due to the change in relative positions of the hinge arm and guide arm at the upper hinge, and the hinge arm and snubber at the lower hinge. Tracking of the door is controlled by the guide arm roller in the roller guide plates as the door rotates to the cocked position (figure 2, step 3). The door is swung through the opening by means of the assist handle. The outward lateral travel of the hinge arm transmits motion through the radius link to the guide arm which in turn causes the door to rotate, in an outward direction, about the pivot axis of the torque tube. The inside handle on the door automatically rotates approximately 45° counterclockwise during final movement of the door to the open latched position (figure 2, step 6). This is due to the change in relative position of the hinge arms, guide arm and snubber, passing beyond 180° from the door cocked position and causing the door to counter-rotate and operate the cocking crank and cam plate in reverse. When the door is approximately parallel with the airplane exterior, the stop pin contacts the stop plate and prevents further movement of the door. The door is latched in the open position by the latch pin engaging the latch pin hole.

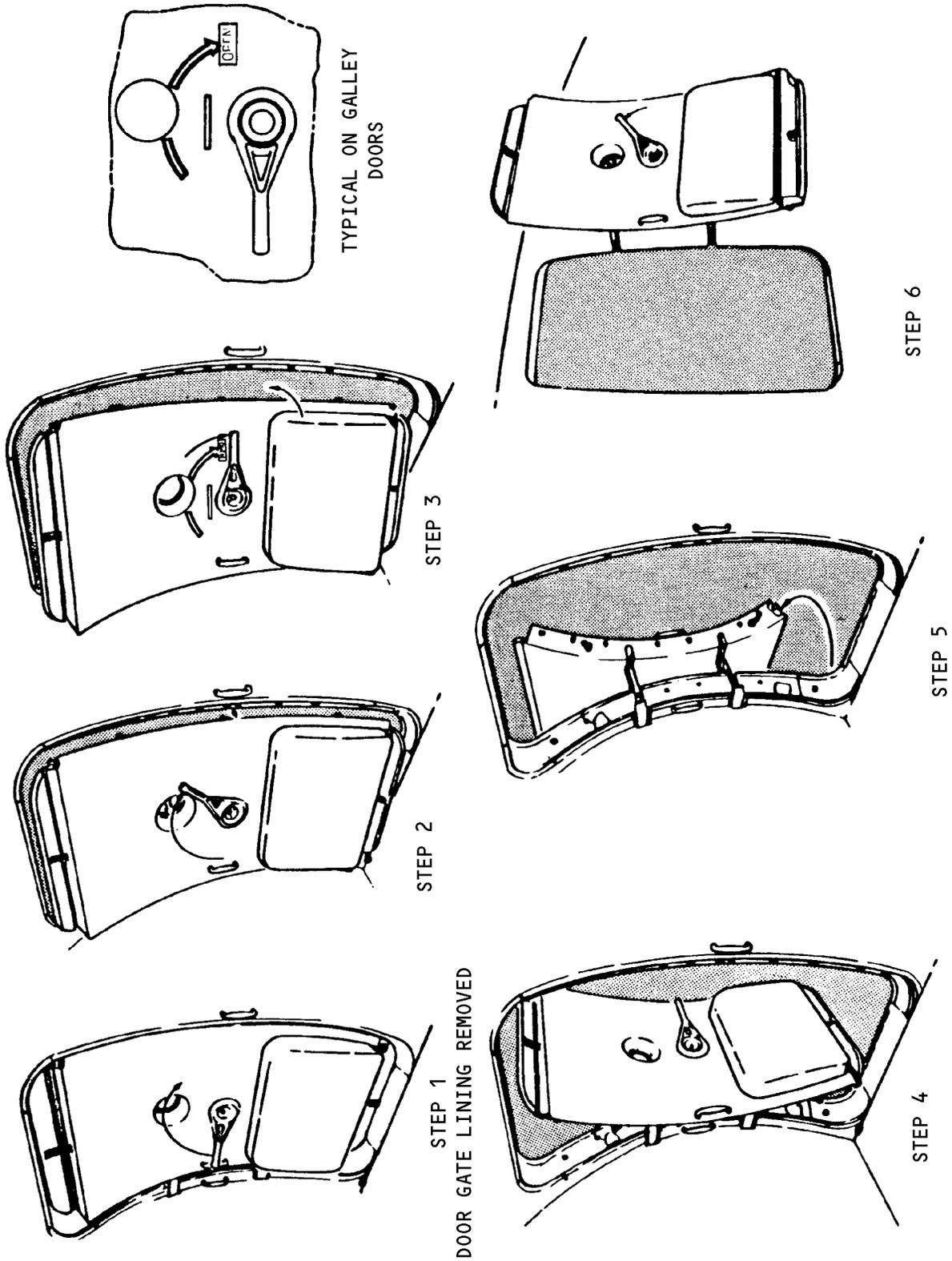
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Galley Service Door Operation from Inside Airplane  
 Figure 2

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- C. The door is opened from the airplane exterior by holding the outside handle with both hands and pulling outward to clear the handle recess panel (figure 3, step 1). This compresses the handle seating spring and engages the handle sleeve splines with the splines on the handle shaft. Rotating the handle 180° counterclockwise operates the door mechanism as described in paragraph 8.A., bringing the door into the cocked position. The handle is then returned into the recess. The centering cam on the handle sleeve ensures that the handle is centered in the recess. The door is swung through the opening until the stop is contacted, and is latched in the open position by the latch pin engaging the latch pin hole (figure 3, step 4).
- D. The door is closed from the airplane interior by depressing door open stowing latch lever which releases the latch pin. The door is swung through the opening by means of the assist handle, and when the stop pin contacts the stop plate, the door is in the cocked position. As the door is swung around from the latched open position, the inside handle automatically moves clockwise to the fully open position, as described in paragraph 8.A. Rotating the inside handle 180° counterclockwise operates the door mechanism in the reverse direction to that described in paragraph 8.A., and brings the door into the center of the door opening. The door centering guide engages with the centering track and guides the door into the center of the door opening, allowing the latch rollers to engage with the latches. Rotation of the latch rods operates the upper and lower gate control rods and unfolds the gates outward. The action of the latch rollers in the latches pulls the door into the door opening, compresses the seal around the edge of the door and opens the door warning switch. Refer to Section 52-71-0.
- E. The door is closed from the airplane exterior by depressing the door open stowing latch lever or stowing latch button and swinging the door through the opening by means of the assist handle. The outside handle is grasped with both hands, pulled outward to engage the splines on the handle sleeve with the splines on the handle shaft and to clear the handle recess panel, and rotated 180° counterclockwise. The handle is then returned into the recess.

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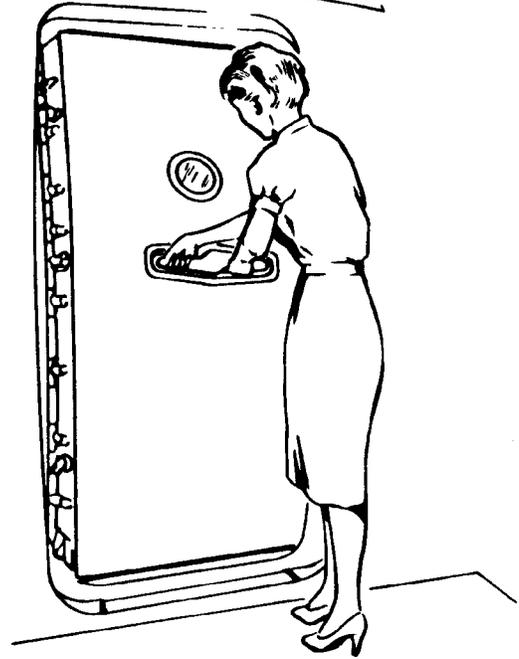
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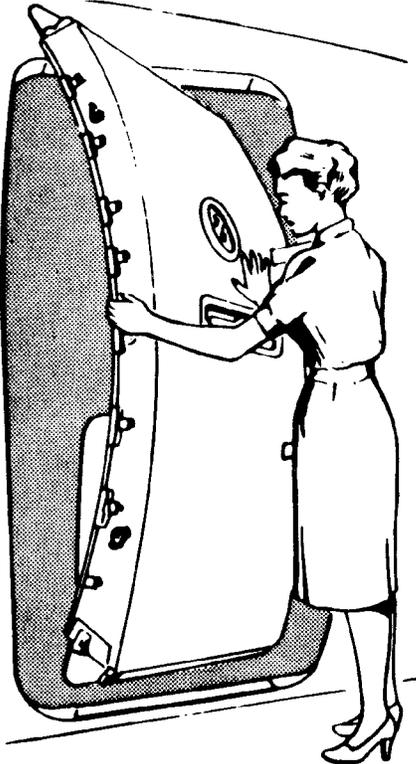
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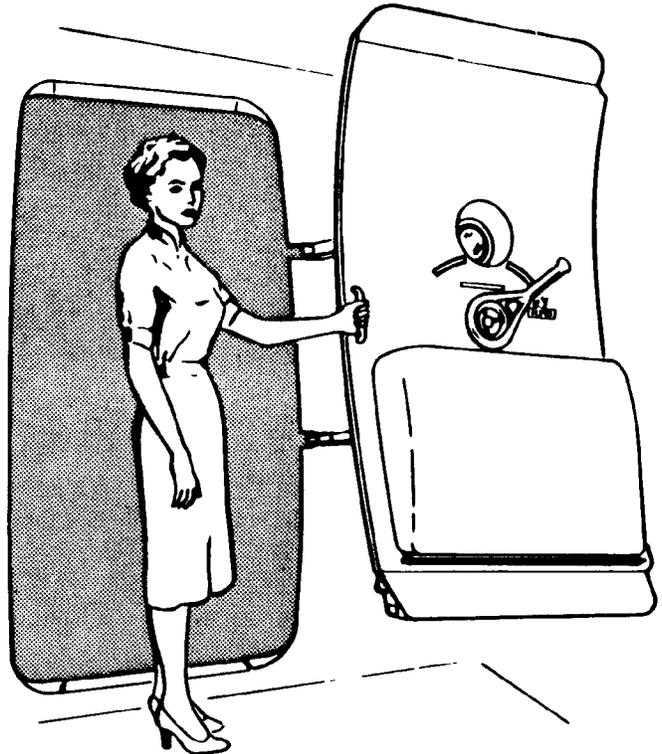
STEP 1 PULL HANDLE



STEP 2 ROTATE HANDLE COUNTERCLOCKWISE



STEP 3



STEP 4

Galley Service Door Operation from Outside Airplane  
 Figure 3

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GALLEY SERVICE DOOR – TROUBLESHOOTING

1. General

- A. If galley service door his hard to operate looseness is felt when operating door or door handle closing torque is high, troubleshoot door by operating door as described below to isolate trouble area.
- B. Check clearance and gaps specified below and make any adjustments per 52-41-0, Adjustment/Test.

2. Troubleshoot Galley Service Door

- A. Operate door toward closed position and check for hard spots while door is going through the cycle up to but not closing (Ref step D for last inch of closing). If a check does not reveal anything, disconnect linkages until the hard spot can be found. Lubricate all moving bearings except teflon bearings.
- B. Check for grinding noises. These can be pinpointed in a noisy area by using a plastic tube approximately 1/4 X 10 X 24 inches long held to the cam at one end and search for the location while someone moves the door mechanism.
- C. Check for loose bolts or elongated holes in torque tube by observation or by placing the finger on the part in question while someone operates the mechanism. There should be no movement felt between the torque tubes and cranks, splices, or end fittings.
- D. When closing the door during the last inch of travel, follow these steps closely:
  - (1) Door must travel parallel to opening.
  - (2) Door latch rollers must be in latch cams before the latch roller crank turns.
  - (3) Vertical clearance of the gates at top and bottom.
  - (4) Door flushness of door skin and body skin.
  - (5) Gate flushness at upper and lower edge of cutout.
  - (6) Stop pins must clear stop pads by 1/2 turn.
  - (7) Check for bottoming of latches, stop pins, or cranks in clearance holes. Use modeling clay in the inspected area.

NOTE: A light coating of vaseline on the clay surface will prevent clay pickup on moving parts.

- (8) Check for latches being out of time with handle cam. When closing the door, the door body should drop back in 0.015 inch as the latches go 10 degrees overcenter. The gates should just stop and not go back in. Check the alignment o f the push rod and crank that operates the gate when the door is closed. These should have dead center alignment with the latching torque tube with door closed.
- (9) Snubber may be bottoming out. Check travel of snubber piston.

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- (10) Binding of guide arm in guide cams at upper hinge may be due to misaligned cam plates. Check by moving the guide arm (one end removed from door) through the cams and check for alignment of guide arm with centerline of hinge plane. Misaligned cam plates can cause the guide arm to work hard on one cam plate and force it to come loose. Cam plates may be aligned but rotated. This will cause the door to have extra travel in either the cocked position or the open position. It may not cause the handle loads to be high.

**NOTE:** Misaligned guide cams would probably only occur after cam replacement due to tolerances in cam installation boltholes.

- E. Excessive torque problems (Ref 52-41-0 A/T, for door operating torque limits).
- (1) Operate door and check for interference with body structure. Look for scraped paint as an indication. To verify, place a strip of paper over suspected area and close door. Paper should pull out without tearing.
  - (2) Check seal plane for smoothness and excessive build-up.
  - (3) Check stop gaps. If there is evidence of excessive bottoming out, readjust. Also recheck gate stops.
  - (4) Make sure the bearings in the upper and lower gate pushrods move freely.
    - (a) Lubricate the bearings if they cannot move (Ref 12-25-41/201).
  - (5) Check snubber for bottoming out.
  - (6) Check for door entering opening evenly at forward and aft latches during last inch of travel. Adjust guide arm if required.
  - (7) Check misfair. If a latch cam can be moved inboard without exceeding misfair tolerances, torque can be reduced. Stops must be reset if adjustment is made. Also, shortening the gate control rods will reduce torque.
  - (8) Check for latch cam rollers entering latch cams before roller arms begin to rotate. Adjustment to the horizontal control rod at handle cam can reduce torque. Recheck exterior handle stowage force.
  - (9) If lining is installed, check for interference of lining and body structure or trim. Check with a strip of paper as in step (1).
  - (10) Check for smooth operation, without jerks or bumps, at handle cam. High spot in cam can cause excessive torque.
  - (11) Check for clearance between latch cam rollers and outboard face of cam. Throughout operation of normally operating door, roller should not touch outboard face of cam. This contact can cause high torque.
- F. Check for excessive misfair (Ref 52-41-0 A/T for allowable misfair).
- (1) Excessive misfair will often result from adjustments to lower torque tube. If adjustments to latch cams or gate rods to improve fair result in excessive torque, troubleshoot per item A above.

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- G. Troubleshoot problem of door handle not staying latched in flight or handle moves during taxi:
- (1) Check for clearance between latch roller and bottom of latch cam. Improper clearance indicates door overcenter out of adjustment. Adjust for soft unlatching per 52-41-0, Adjustment/Test.
- H. Troubleshoot excessive handle stowage force (Ref 52-41-0, Adjustment/Test for allowable handle stowage force)
- (1) Check adjustment of handle cam horizontal control rod. Lengthening the rod will reduce the handle stowage force. If adjustment is made recheck roller entrance to latches and handle torque.
  - (2) Check for proper handle shaft lubrication.

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## MAINTENANCE MANUAL

### GALLEY SERVICE DOOR – REMOVAL/INSTALLATION

#### 1. Equipment and Materials

- A. Corrosion Preventive Compound – MIL-C-16173, Grade 2 (Ref 20-30-21)
- B. Safety Barrier, Entry and Galley Doors – C52012-1, or 4PRE50-7945, or Warning Strap
- C. Organic Corrosion Inhibiting Compound – BMS 3-23 (Ref 20-30-21)

#### 2. Remove Galley Service Door

**NOTE:** Illustrations shown in this section are for aft galley service door and are typical for forward galley service door.

- A. Remove door lining and insulation panels (Ref 52-41-31, Galley Service Door Lining and Insulation).
- B. Rotate door to a position at approximately 90 degrees to airplane exterior and provide adequate support for door.
- C. At upper hinge, remove bolt (2, Detail A, Fig. 401) attaching hinge arm (5) to hinge link (1).
- D. Disconnect guide arm (10) from door by removing four bolts securing attach fitting (6) to hinge support (7).
- E. At lower hinge, remove bolt (12, Detail B) connecting hinge arm (15) to hinge link (11).
- F. Disconnect snubber (18) from door by removing four bolts securing attach fitting (16) to hinge support (17) and remove door.

**NOTE:** Weight of galley door is about 136 pounds.

- G. If new door is not to be installed immediately, install safety barrier or warning strap across door opening.

**WARNING:** DO NOT USE THE WARNING STRAP TO SUPPORT THE WEIGHT OF A PERSON. THE WARNING STRAP INSTALLED ACROSS THE DOOR IS ONLY A VISUAL INDICATION THAT THE DOOR IS OPEN AND WILL NOT SUPPORT A PERSON. IF YOU USE THE STRAP TO SUPPORT YOUR WEIGHT, YOU CAN FALL THROUGH THE DOOR AND CAUSE INJURY.

- H. If a new door is to be installed, remove the following components from door for installing on new door.
  - (1) Remove upper and lower hinge arm covers by removing attachment bolts.
  - (2) Remove stop pins and lock springs from forward and aft edges of door.
  - (3) Remove door seal (Ref 52-09-141, Diaphragm – Mechanical Seals).

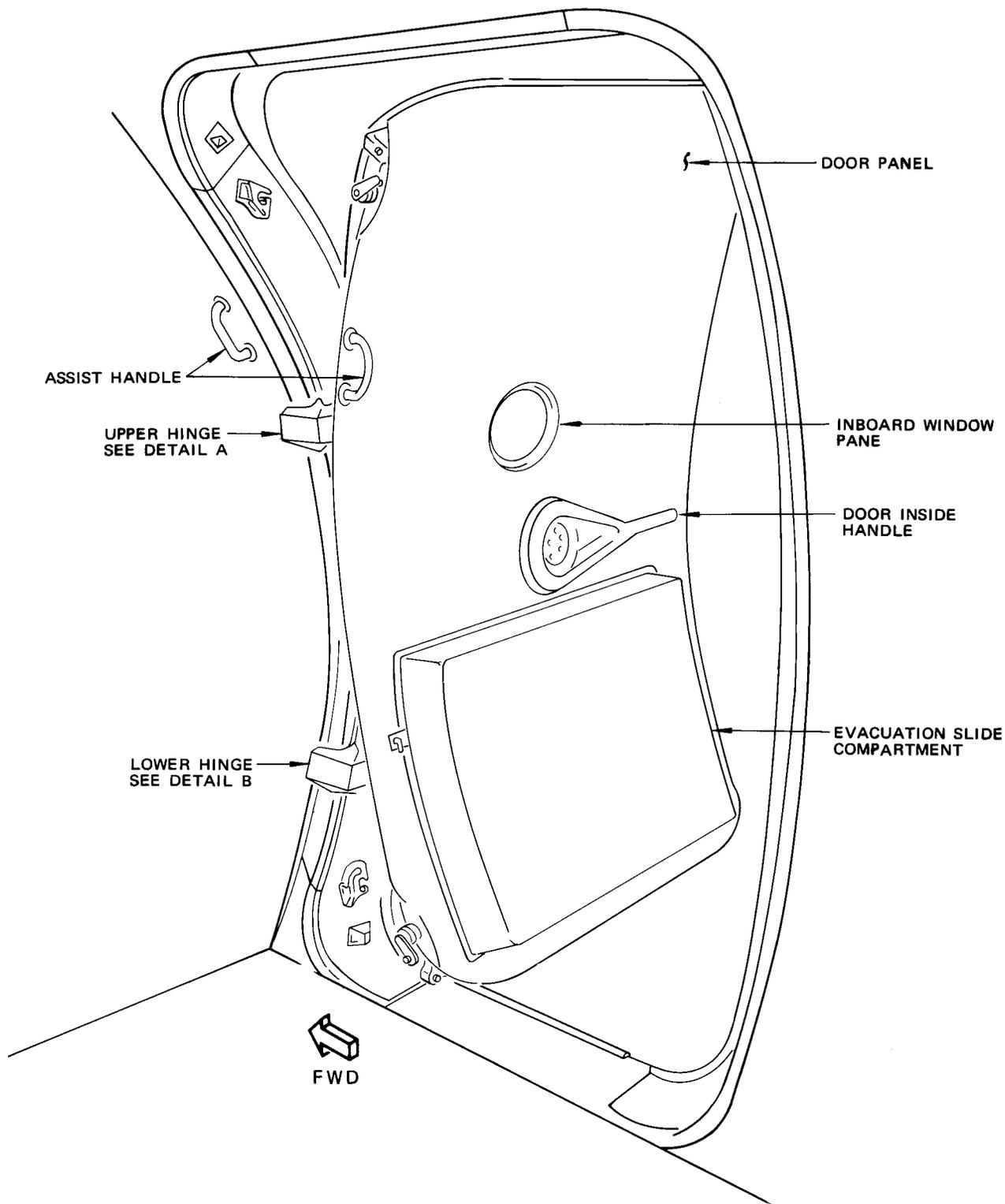
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Galley Service Door Installation  
 Figure 401 (Sheet 1)

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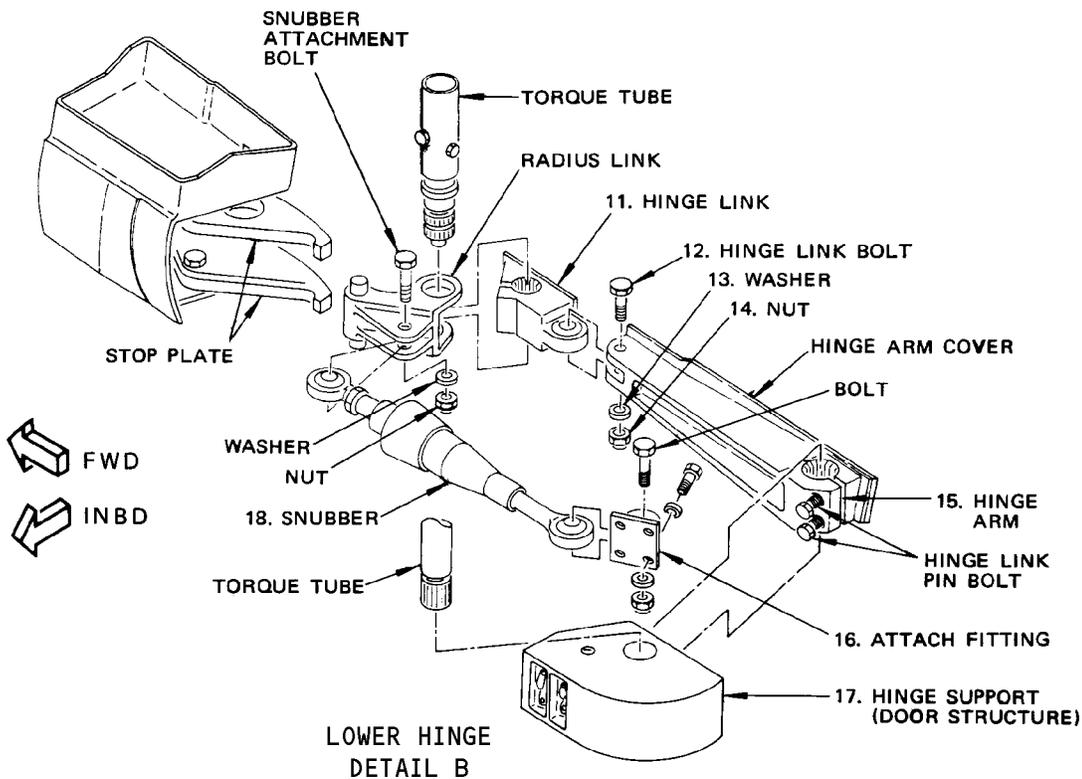
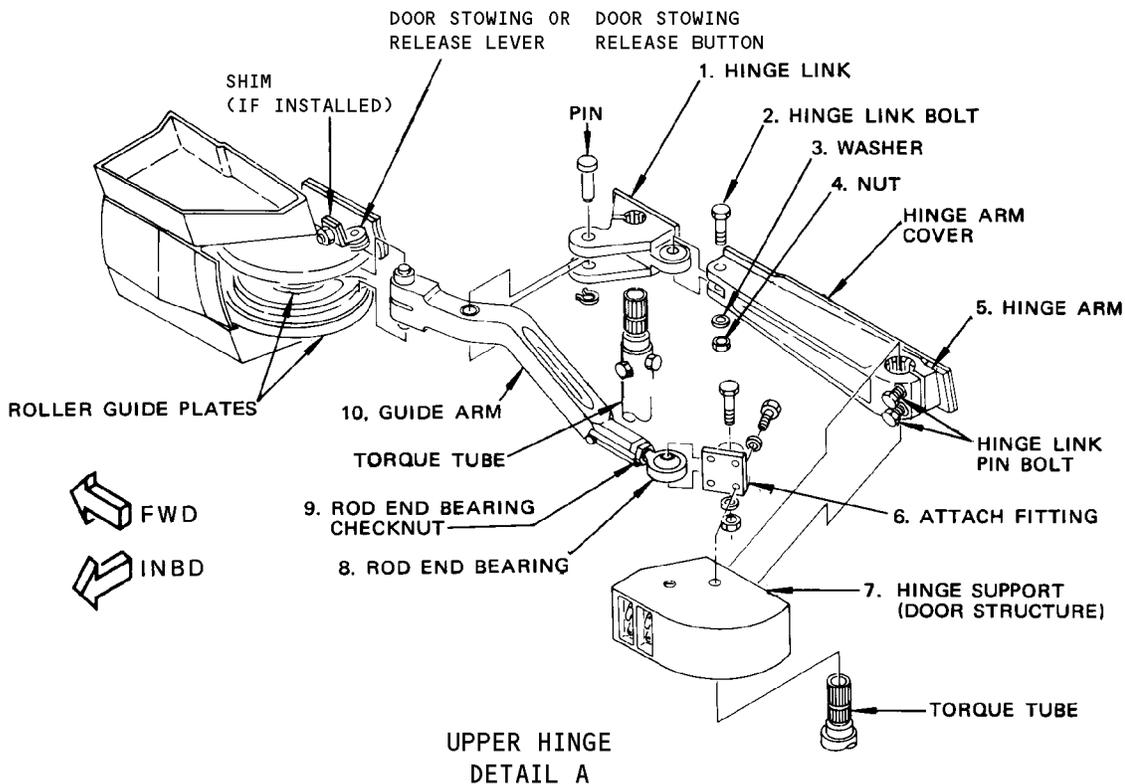
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**MAINTENANCE MANUAL**



Galley Service Door Installation  
Figure 401 (Sheet 2)

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### 3. Install Galley Service Door

**NOTE:** Illustrations shown in this section are for aft galley service door and are typical for forward galley service door.

- A. Prior to door installation, apply organic corrosion inhibiting compound to door hinge areas, under scuff plates and lower 3 to 4 inches of door interior per instructions in 51-21-91.
- B. Remove door safety barrier or warning strap, if installed.
- C. Support door in position at door opening at approximately 90 degrees to airplane exterior.

**NOTE:** Until installation and adjustment of guide arm and snubber are complete, care should be taken not to allow excessive door movement which might strain hinge mechanism.

- D. At lower hinge, connect snubber (18, Detail B, Fig. 401) to door by securing attach fitting (16) to hinge support (17) using four bolts.
- E. Engage lower hinge arm (15) with hinge link (11) and install bolt (12), washer (13), and nut (14).
- F. At upper hinge, connect guide arm (10, Detail A) to door by securing attach fitting (6) to hinge support (7) using four bolts.
- G. Engage upper hinge arm (5) with hinge link (1) and install bolt (2), washer (3) and nut (4).
- H. Remove support from door.
- I. If a new door was installed on the airplane, install the following components on door.
  - (1) Install upper and lower hinge arm covers with attachment bolts.
  - (2) Install stop pins on forward and aft edges of door.

**NOTE:** Install stop pins with thin coating of MIL-C-16173, Grade 2, corrosion preventive compound on both internal and external surfaces of mating threads.

- (3) Install door seal (Ref 52-09-141, Diaphragm - Mechanical Seals).
- J. Adjust and test door in accordance with adjustment/test procedures.

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GALLEY SERVICE DOOR – ADJUSTMENT/TEST

1. General

- A. The procedures described and illustrated in this section are for the aft galley service door and are typical for the forward galley service door.
- B. Paragraph 2 is the normal door installation adjustment procedure to be used when installing a new or overhauled door. Paragraph 3 is a special adjustment to be used to re-establish or verify proper overcenter of the door latch torque tubes if the door has been reported to have soft unlatching problems (door comes unlatched). If proper overcenter on the latch torque tubes has been lost, there may not be sufficient latching force to maintain the door in the latches condition.

2. Galley Service Door Adjustment

- A. Equipment and Materials
  - (1) Bearing Retainer Nut Spanner Wrench – F70085, or equivalent
- B. Prepare for Adjustment
  - (1) Remove door lining and insulation panels. Refer to 52-41-31, Galley Service Door Lining and Insulation.
  - (2) Remove screws attaching forward mechanism access panel (L, figure 501) to door structure and remove panel.
  - (3) Attach 60-pound weight to inside door frame at approximate midpoint of lower half of door.

NOTE: This weight is to allow for escape slide pack that will be installed on lower half of door to facilitate door adjustment for better seal effect.

C. Adjust Galley Service Door

NOTE: It is recommended that door adjustments be made with airplane on its wheels. However, door adjustments may be accomplished on a jacked airplane provided that stop pin misalignment, door gap and flushness, and interior handle torque requirements are met when checking door with airplane on its wheels.

- (1) Back off all door adjustable stop pins (26, detail E, figure 501) until pin is flush with inboard side of stop fitting (22).
- (2) Adjust vertical position of door in door frame.
  - (a) Remove three bolts (3, detail A) attaching adjustable roller fitting (2) to center of aft edge of door and remove roller fitting.

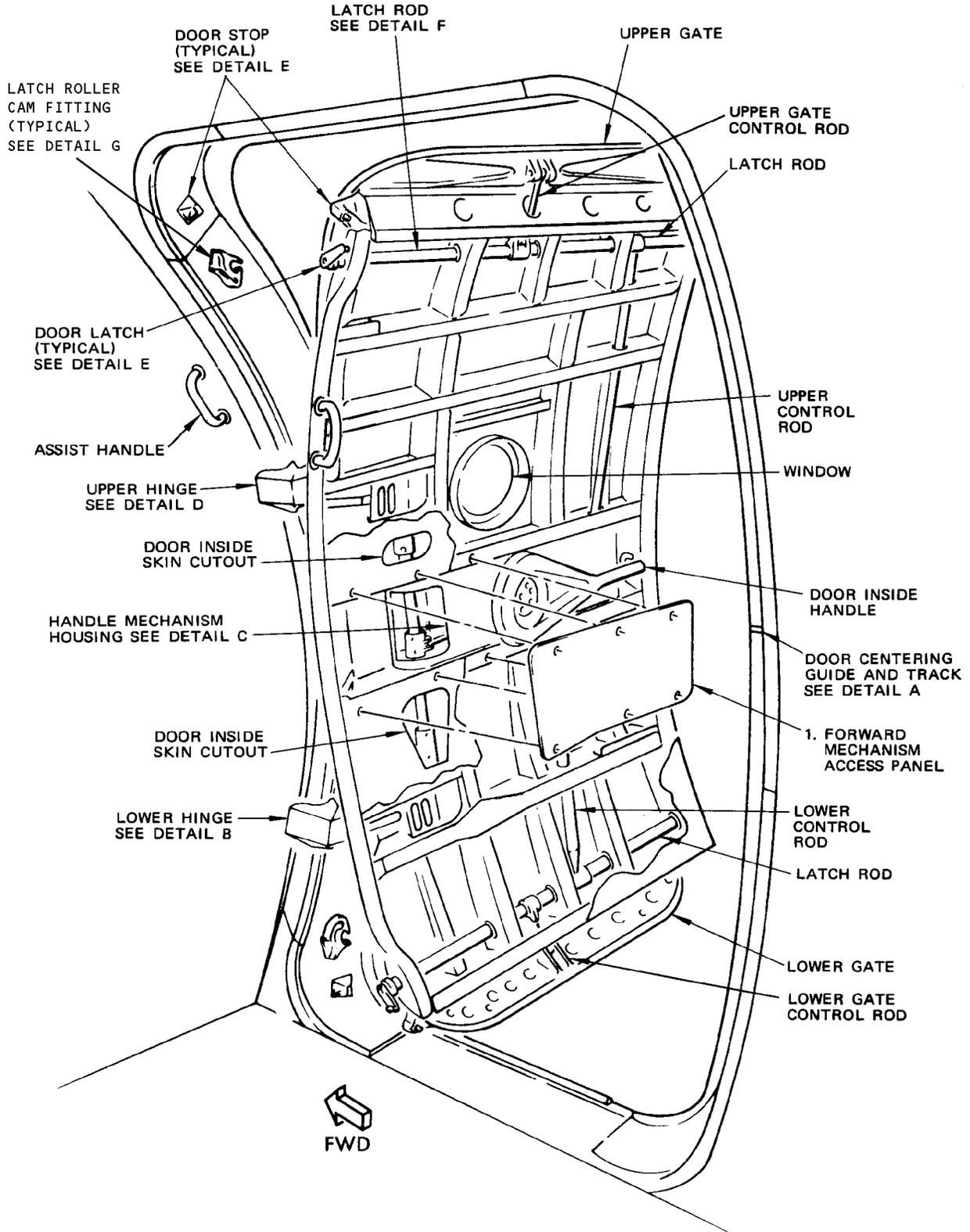
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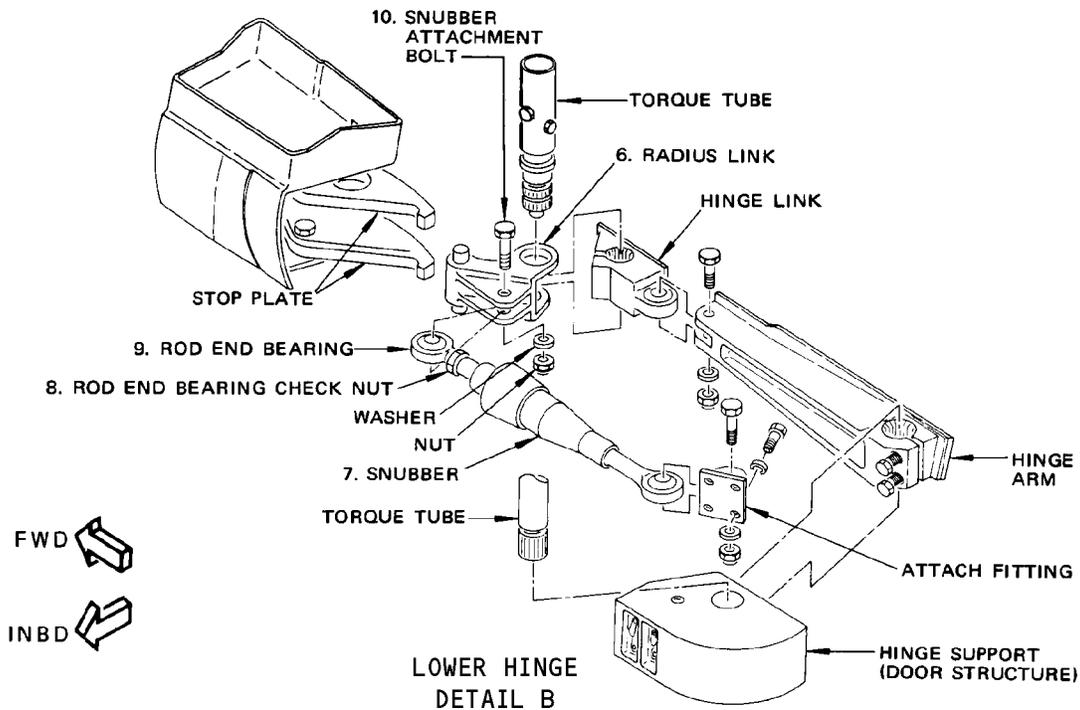
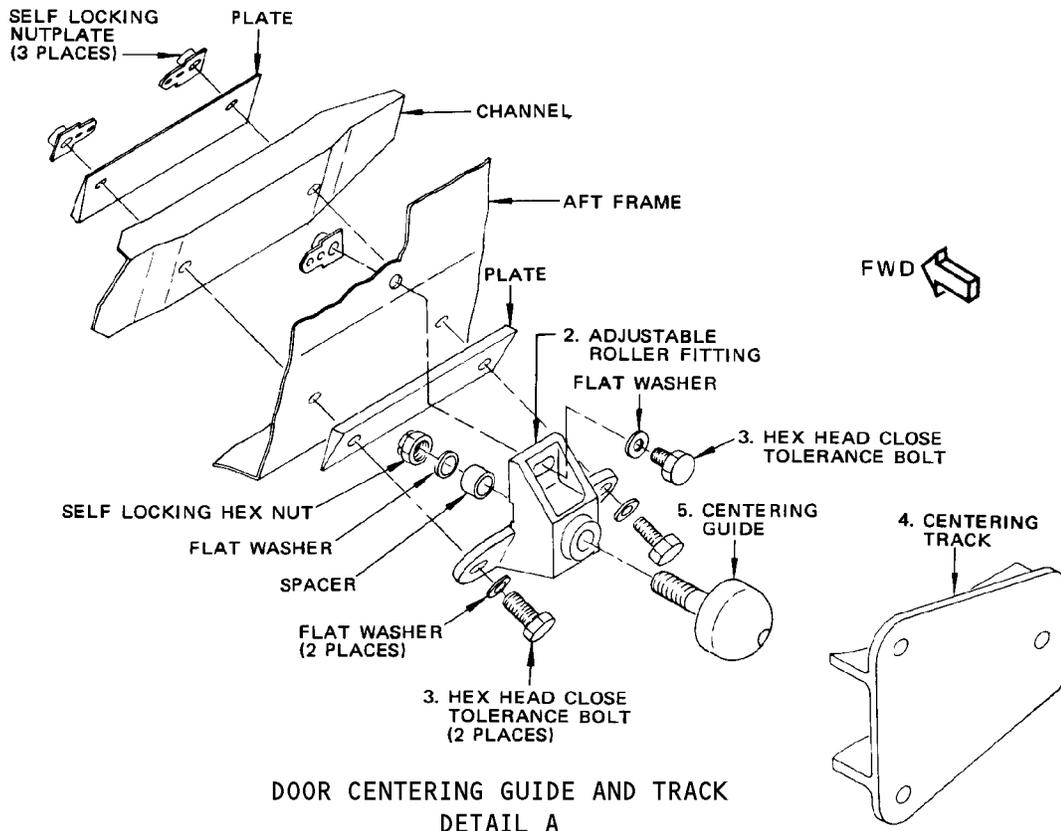
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Galley Service Door Adjustment  
 Figure 501 (Sheet 1)

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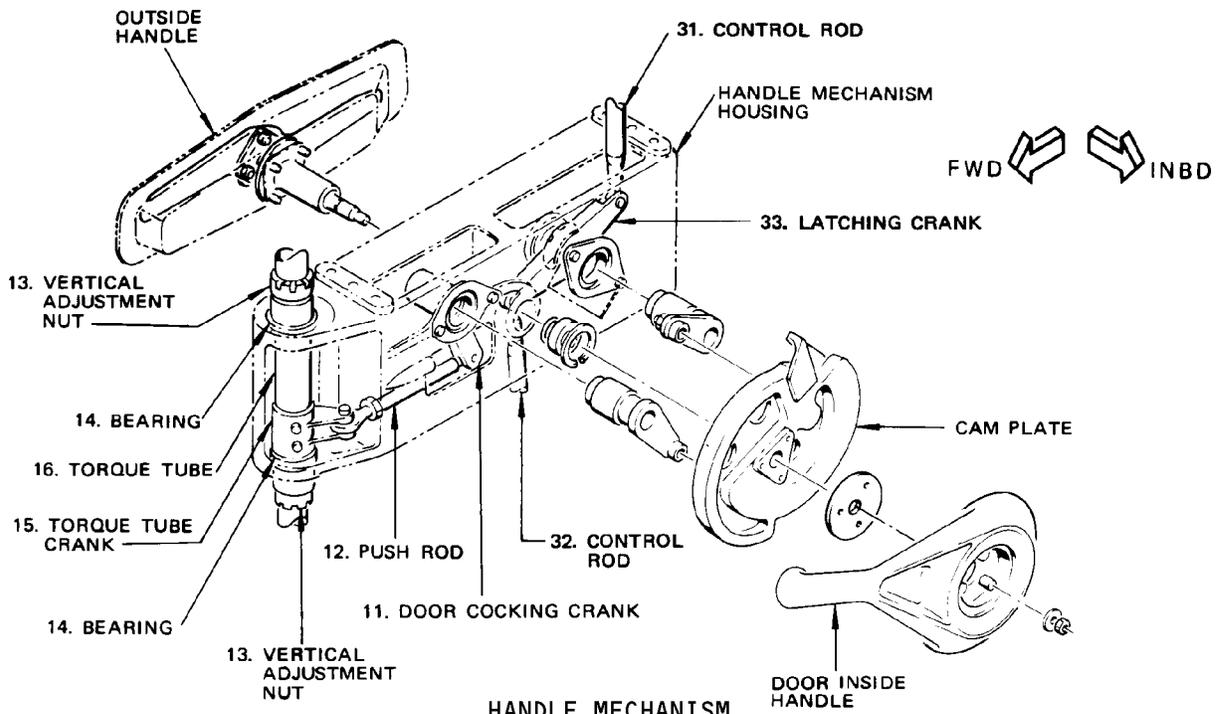
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Galley Service Door Adjustment  
 Figure 501 (Sheet 2)

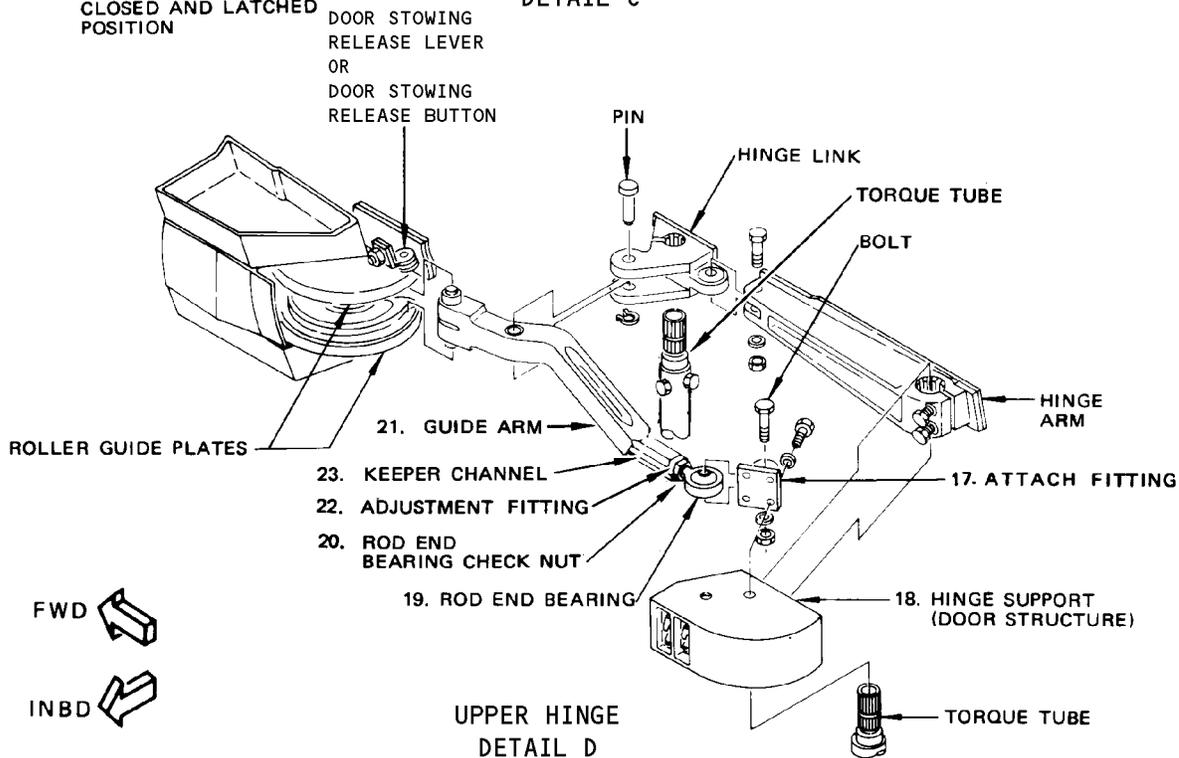
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**HANDLE MECHANISM  
 DETAIL C**

NOTE: MECHANISM SHOWN IN CLOSED AND LATCHED POSITION



**Galley Service Door Adjustment  
 Figure 501 (Sheet 3)**

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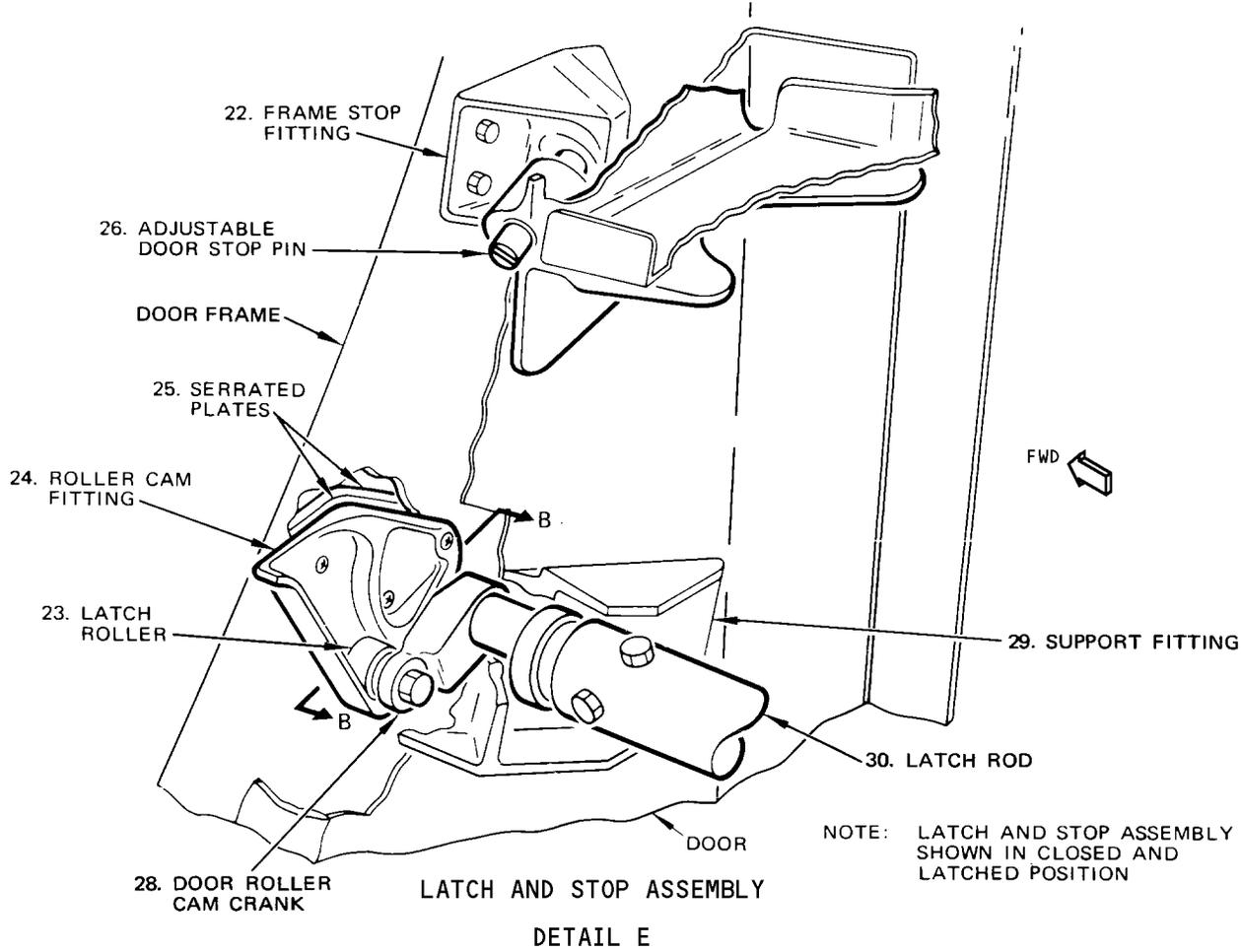
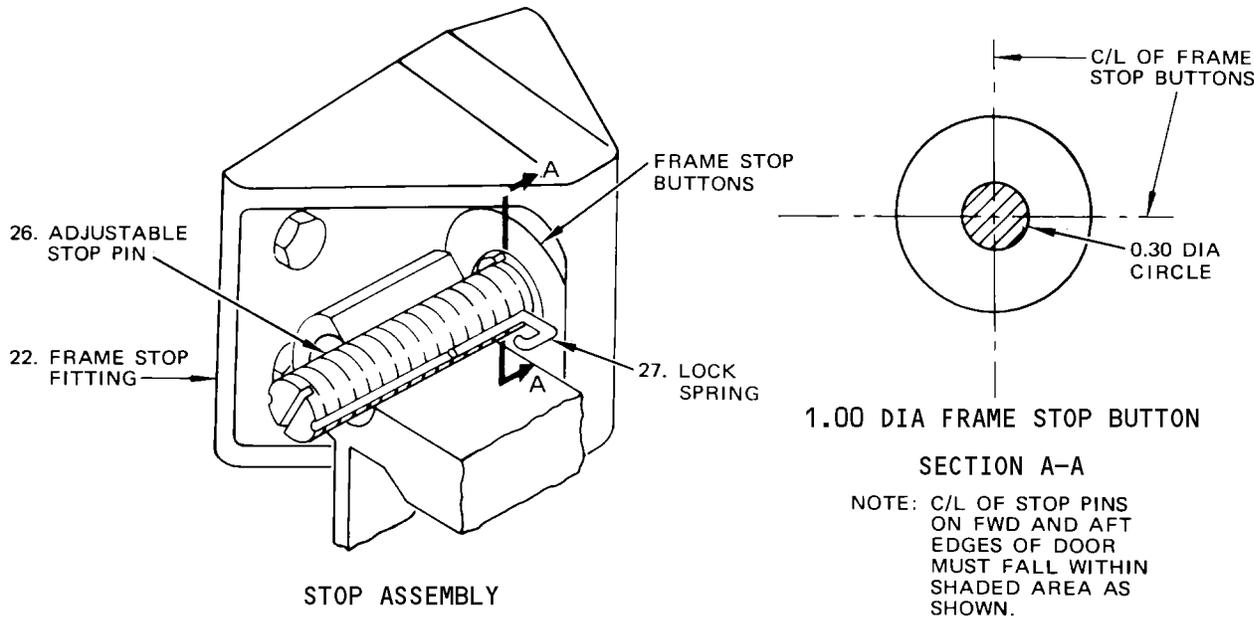
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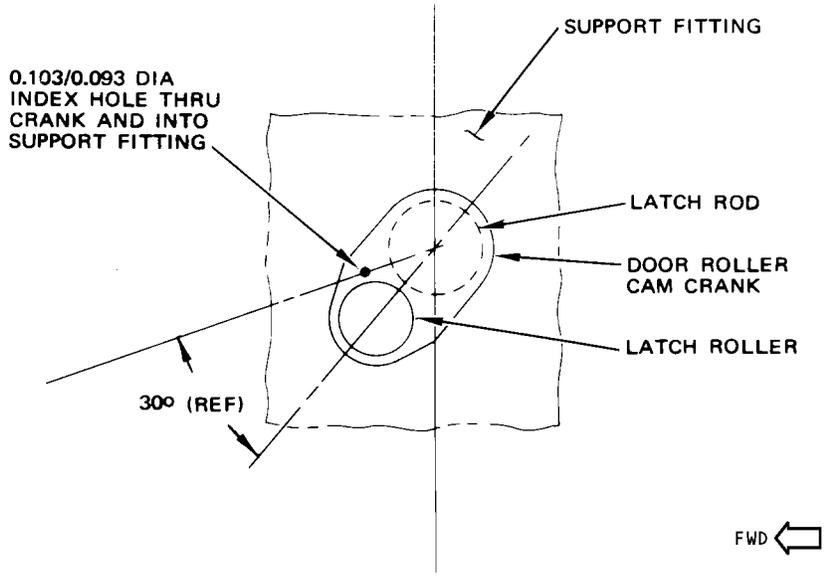
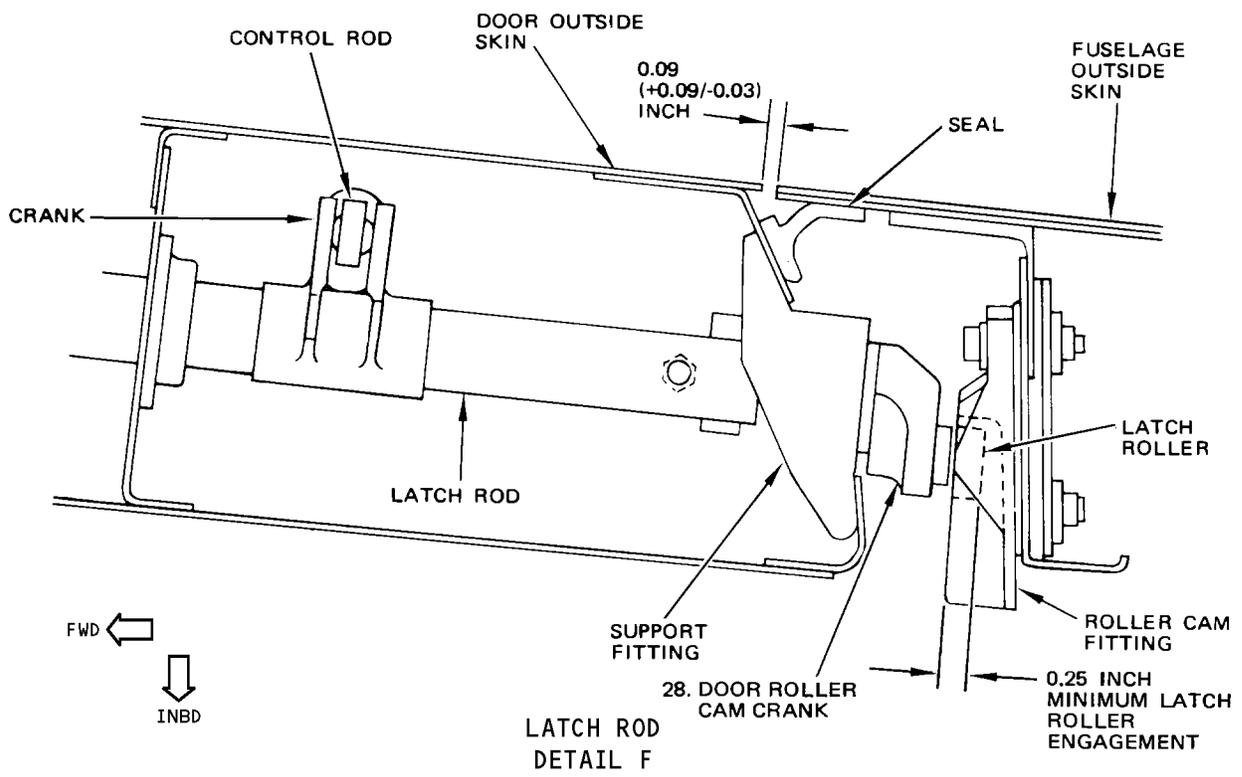


Galley Service Door Adjustment  
 Figure 501 (Sheet 4)

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Galley Service Door Adjustment  
 Figure 501 (Sheet 5)

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## MAINTENANCE MANUAL

- (b) Adjust vertical position of door by means of vertical adjustment nuts (13, detail C) on torque tube (16) so that gap between upper edge of door gate and fuselage skin is 0.19 +0.09/-0.006 inch. Install cotter pins.

**NOTE:** If vertical adjustment nuts are hard to turn, use wrench F70085 to rotate nuts. Avoid overtightening of nuts which would cause excessive end loads on bearings (14).

- (c) Install adjustable roller fitting (2, detail A) on door and adjust position to allow engagement of centering guide (5) with centering track (4) on doorjamb.
- (3) Adjust the following to fair door with fuselage external profile.

**NOTE:** Measurements of flushness should only be made at points along straight sections between rounded corners of door skin. Measure between door outer skin and normal body outer skin surface. Measurements at skin splices must subtract the additional skin and bonding film thickness.

- (a) Adjust forward and aft latch cam fittings (24, detail E) on serrated latch plates attached to doorjamb so that when door is closed and latched, outside surface of door along forward and aft edges is flush with fuselage external profile within flushness requirements called out in Fig. 502. Check that all latch rollers enter latch cam fittings with equal clearance when door is operated to closed position.
- (b) Adjust upper and lower gate control rods (Fig. 501) so that with door closed and latched, outside surface of upper and lower gates are recessed below fuselage exterior profile as shown in Fig. 502.
- (4) Adjust guide arm (21, Fig. 501, detail D) length so that both fore and aft latch rollers enter their fittings at the same time when door is closed. If necessary, aft rollers may lead forward rollers slightly to improve clearance on forward edge of door. Adjust guide arm as follows:
- (a) If necessary, make coarse adjustment. Remove four bolts holding attach fitting (17) to hinge support (18). Loosen rod end bearing checknut (20), rotate rod end bearing (19), then tighten checknut. Install attach fitting (17).
- (b) Make fine adjustment. Remove keeper channel (23) and loosen checknut (20). Rotate adjustment fitting (22). Tighten checknut and install keeper channel.

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- (5) Adjust vertical position of door in doorframe.
- (a) Remove three bolts (3, Detail A) attaching adjustable roller fitting (2) to center of aft edge of door and remove roller fitting.
  - (b) Adjust vertical position of door by means of vertical adjustment nuts (13, Detail C) on torque tube (16) so that gap between upper edge of door gate and fuselage skin is 0.19 +0.09/-0.006 inch. Install cotter pins.
- (c) Install adjustable roller fitting (2, Detail A) on door and adjust position to allow engagement of centering guide (5) with centering track (4) on doorjamb.
- (6) Adjust the following to fair door with fuselage external profile.

**NOTE:** Measurements of flushness should only be made at points along straight sections between rounded corners of door skin. Measure between door outer skin and normal body outer skin surface. Measurements at skin splices must subtract the additional skin and bonding film thickness.

- (a) Adjust forward and aft latch cam fittings (24, Detail E) on serrated latch plates attached to doorjamb so that when door is closed and latched, outside surface of door along forward and aft edges is flush with fuselage external profile within flushness requirements called out in Fig. 502. Check that all latch rollers enter latch cam fittings with equal clearance when door is operated to closed position.
  - (b) Adjust the upper and lower gate control rods (Fig. 501) so that with door closed and latched, the outside surface of the upper and lower gates are recessed below the fuselage exterior profile as shown in Fig. 502.
- (7) Adjust guide arm (21, Fig. 501, Detail D) length so that both fore and aft latch rollers enter their fittings at the same time when door is closed. If necessary, aft rollers may lead forward rollers slightly to improve clearance on forward edge of door. Adjust guide arm as follows:
- (a) If necessary, make coarse adjustment. Remove four bolts holding attach fitting (17) to hinge support (18). Loosen rod end bearing checknut (20), rotate rod end bearing (19), then tighten checknut. Install attach fitting (17).

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- (b) Make fine adjustment. Remove keeper channel (23) and loosen checknut (20). Rotate adjustment-fitting (22). Tighten checknut and install keeper channel.
- (8) Using index hole through door roller cam crank (28, Detail E, Fig. 501) and into support fitting (29), check latch roller (23) engagement with latch roller cam fitting as follows:
  - (a) With pushrod (12, Detail C) disconnected from torque tube crank, operate interior handle to closed position.
  - (b) Check that rig pin can be inserted through door roller cam crank and into support fitting. If necessary to get rig pin insertion, disconnect both upper and lower control rods (31 and 32, Detail C). Adjust control rod length to allow bolt insertion through rod ends.
  - (c) With mechanism in closed position, check that latch rollers engage latch roller cam fittings with no interferences. Clearance between the stop pin and stop fitting pad must be 0.015–0.030 inch.
  - (d) Check that width of contact surface between latch roller and latch cam is 0.25 inch minimum (Detail F).
- (9) With door closed and latched, screw adjustable stop pins (26, Detail E) out until stop pins just contact stop buttons on frame stop fittings (22). Back off stop pins half a turn, then further to nearest locking groove and lock with lock springs (27). Check that stop pins contact frame stop buttons within limits shown in section A-A. Check may be made by using modeling clay or any other approved method.
- (10) With door closed and latched, adjust length of pushrod (12, Detail C) so that pushrod just fits between door cocking crank (11) and torque tube crank (15). Then unlatch door, shorten pushrod by one-half turn of rod end bearing, tighten check nut and reinstall.
- (11) Check roller engagement with each latch fitting to verify that roller clears entry lip on latch fitting when handle is moved to latched position. Check clearance at each latch consecutively with 10 ±1 pound spring load, or equivalent applied to door in an inboard direction at adjacent corner stop pin fitting while latching. If necessary, adjust by shortening pushrod (12) an additional 1/2 to 1-1/2 turns, as required, to move door outboard to provide roller clearance. After adjustment, check that force required to move handle from extended to retracted position does not exceed 20 pounds.

**NOTE:** Shortening control rod will increase handle retraction force.

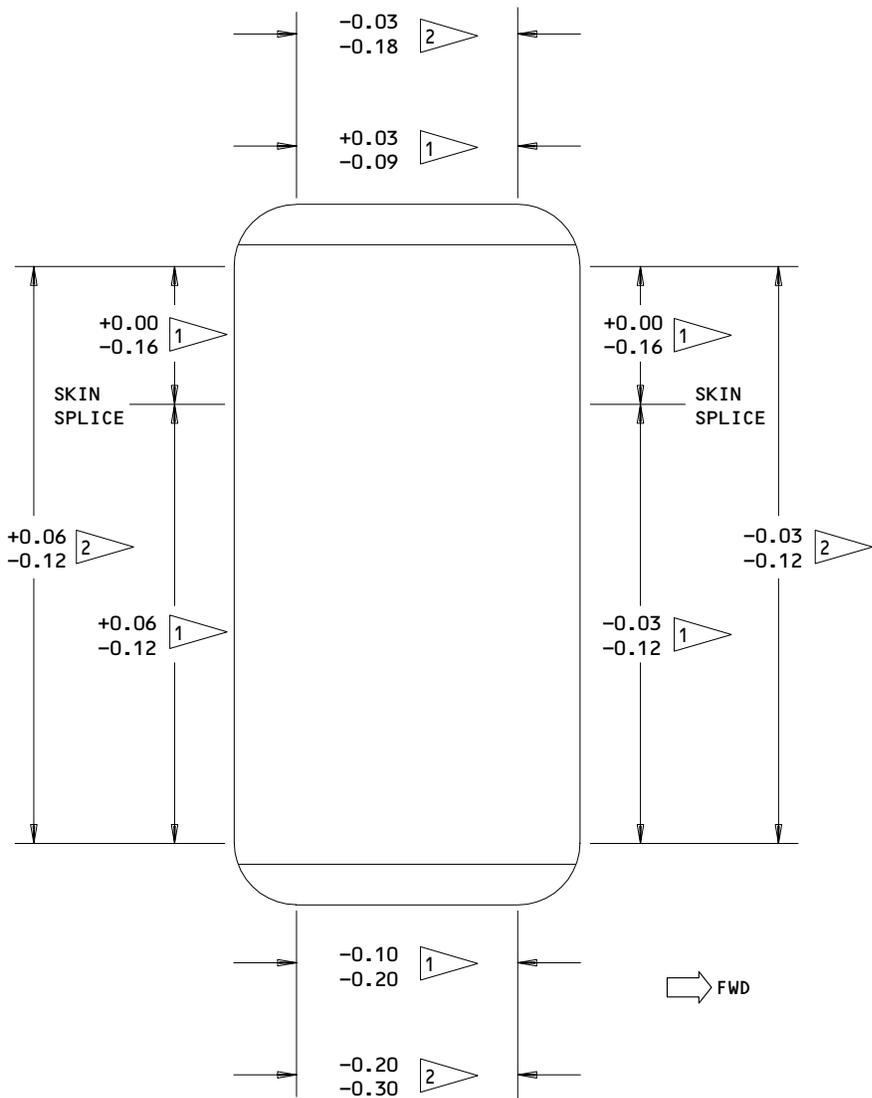
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**NOTE:** THIS ILLUSTRATION SHOWS THE LIMITS TO ALIGN EACH GALLEY SERVICE DOOR CONTOUR WITH THE FUSELAGE CONTOUR. A PLUS LIMIT SHOWS THAT THE DOOR IS OUTBOARD OF THE CONTOUR OF THE FUSELAGE. A MINUS LIMIT SHOWS THAT THE DOOR IS INBOARD OF THE CONTOUR OF THE FUSELAGE. THE LIMITS ARE FOR THE STRAIGHT EDGES OF THE DOOR BETWEEN THE POINTS SHOWN.

YOU CAN INCREASE THE LIMITS BY 0.03 INCH IN ONE OR MORE LOCATIONS. ON THE FORWARD GALLEY SERVICE DOOR, THE SUM OF THE LENGTHS OF THE INCREASED LIMITS MUST NOT BE MORE THAN 10 INCHES. ON THE AFT GALLEY SERVICE DOOR, THE SUM OF THE LENGTHS OF THE INCREASED LIMITS MUST NOT BE MORE THAN 9 INCHES.

MEASURE ALL DIMENSIONS WHEN THE AIRPLANE IS NOT PRESSURIZED.

ALL DIMENSIONS ARE IN INCHES.

-  AFT DOOR ONLY
-  FORWARD DOOR ONLY

Galley Door Contour Adjustment  
 Figure 502

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- (12) With door latched in open position, check length of snubber to make sure it does not bottom before latch pin engages hole in upper roller guide plate at upper hinge assembly. If necessary, adjust snubber (7, detail B) length at rod end bearing (9) by removing snubber attachment bolt (10) connecting snubber to radius link (6). Tighten rod end bearing checknut (8) and reinstall.
- (13) Check that gap between door outside skin and fuselage outside skin is  $0.09 +0.09/-0.03$  inch at sides and lower sill when door is closed and latched. Where necessary, trim edge of door skin to achieve this condition (detail F).
- (14) Check upper and lower hinge arm cover installation. If necessary, use laminated shims to fair covers with fuselage external contour.
- (15) Check seal installation (Ref 52-09-141, Diaphragm-Mechanical Seals).

### D. Restore Airplane to Normal

- (1) Remove 60-pound weight from door.
- (2) Install forward mechanism access panel (L, Fig. 501) on door with screws.
- (3) Install door lining and insulation panels (Ref 52-41-31, Removal/Installation).
- (4) Test door as described in par. 3.
- (5) Door Interior Handle Torque Wrench Adapter - C52008-1 Optional.

### 3. Galley Door Adjustment for Soft Unlatching

#### A. Prepare for Adjustment

- (1) Remove door lining and insulation panels (Ref 52-41-31, Removal/Installation).
- (2) Remove screws attaching forward mechanism access panel (L, Fig. 501) to door structure and remove panel.
- (3) Attach 60-pound weight to inside door frame at approximate midpoint at lower half of door. (This weight is a substitute for escape slide pack removed with lining.)

#### B. Adjust Galley Door to correct for Soft Unlatching

**NOTE:** Adjust door when airplane is on wheels. Do not make door adjustments when airplane is jacked.

- (1) Disconnect upper and lower control rods (Fig. 501) from latch rods at crank (33).
- (2) Rotate latch rod (30) until rig pin can be inserted through index holes in door roller cam crank (28) and into support fitting (29), and adjust control rod (31 or 32, detail C) length to allow bolt insertion through rod end and crank. Install bolt. Repeat for the other latch rod. Remove rig pins.
- (3) After completion of adjustments, check that latch rollers engage latch roller cam fittings with no interference.
- (4) Check that latch roller clearance is  $0.04-0.28$  inch (Detail G) and adjust if necessary.

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### C. Restore Airplane to Normal

- (1) Remove 60-pound weight from door.
- (2) Install forward mechanism access panel (1, Fig. 501) on door with screws.
- (3) Install door lining and insulation panels (Ref 52-41-31, Removal/Installation).
- (4) Test door as described in par. 4.

### 4. Galley Service Door Test

#### A. Equipment and Materials

- (1) Door Interior Handle Torque Wrench Adapter - F80171-1, or equivalent

#### B. Test Galley Service Door

**NOTE:** Airplane must be on its wheels to test door (no jack support).

- (1) Check that snubber operates correctly to retard or snub rapid motion of door toward stowed and cocked position. No snubbing action should be felt when door is moved slowly from the cocked to stowed position or back to the cocked position. The snubber is designed to resist accelerated movement only and if the snubber performs otherwise, it should be replaced.
- (2) With interior trim installed, check torque applied on handle when door is opened and closed.

**NOTE:** Use interior handle torque wrench adapter ST2580-257 or equivalent to facilitate checking of handle torque.

- (a) Check that door moves through full cycle of operation smoothly with no binding spots.
  - (b) Check that door opening torque applied to operate handle during the first 90 degrees of handle rotation does not exceed 360 pound-inches. Check that torque required for remaining portion of the opening cycle does not exceed 600 pound-inches.
  - (c) Close door and check that torque applied to handle during closing cycle does not exceed 600 pound-inches.
  - (d) If requirements are not obtained, remove door lining and insulation panels and perform step (3). Refer to 52-41-31, Galley Service Door Lining and Insulation.
- (3) With interior trim removed, check torque applied on handle when door is opened and closed when requirements in step (2) are not met.
    - (a) Attach a 60-pound weight to inside door frame at approximate midpoint of lower half of door to simulate the escape slide weight.

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- (b) Reinstall door interior handle temporarily and check that door opening torque applied to operate handle during the first 90 degrees of handle rotation does not exceed 270 pound-inches. The torque applied on handle for the remaining portion of opening cycle must not exceed 450 pound-inches.
  - (c) Close door and check that torque applied to handle during closing cycle does not exceed 450 pound-inches.
  - (d) If limits are not exceeded, reinstall and adjust door interior trim to satisfy requirements in step (2). If limits are exceeded, adjust door per paragraph 2.
- (4) Check door warning system for correct operation when door is opened and closed. Refer to 52-71-0, Door Warning System - Adjustment/Test.

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GALLEY SERVICE DOOR – INSPECTION/CHECK

1. General

- A. This examination will ensure structural integrity and proper operation of the galley service doors by looking for cracks, corrosion and excessive wear in door mechanisms and structures.
- B. This examination also is intended to assure proper alignment of the forward galley service doorway lower stop pads to prevent the door lower gate stops overriding the pads and wedging the door in closed position.

2. Galley Service Door Inspection (Fig. 602)

NOTE: Do steps A. and B. for forward door only. Do steps C. thru J. for both forward and aft doors.

- A. Examine the stop pads on forward galley service doorway lower threshold and replace the stop pads, if any of following is found:
  - (1) In the fore and aft direction, the stop should center on the pad.
  - (2) In the inboard and outboard direction, the outboard edge of the stop pad should not protrude over inboard radius or be lower than 0.375 inch to the center line of the stop contact point.
  - (3) Chamfers on the upper edge of the pad should be on the forward and aft edge only. Chamfers should not exceed 45° x 0.03 +0.01 inch wide.
- B. Examine the stop fitting cutouts in the aft frame of the forward galley service door for cracks.
- C. Examine external and internal skins for cracks and corrosion; hinge fairings for looseness and missing screws.
- D. Examine frames, internal brackets, handle mechanism housing, and hinges for cracks, corrosion, and loose bolts.
- E. Examine door operating mechanism for cracks, corrosion, excessive wear, and loose bolts.
- F. Examine latch rollers, latches, and door stops for cracks, corrosion, and foreign particles lodged in latches or attached to stops.
- G. Examine drain holes for obstruction.
- H. Examine door seals for cracks, cuts and tears, and correct seating when door is in closed position.
- I. Examine roller cam plates and guide arm roller for excessive wear, which may cause door to malfunction (Ref 52-41-31 R/I).
- J. Check that snubber operates correctly to retard or snub rapid motion of door towards stowed and cocked position.

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3. Forward Galley Service Door Lower Gate Hinge Inspection (Fig. 603)

A. Measure the thickness of the hinge.

**NOTE:** If the hinge thickness is 0.080 inch or 0.100 inch, no further inspection is required. If the hinge is 0.050 inch thick, continue the inspection.

B. Carefully push against hinge with a tool.

**NOTE:** Free movement of the hinge can indicate a large crack. If a crack is found, stop the inspection and replace hinge per Service Bulletin 737-52A1124.

C. Remove sealant and clean the area as needed to expose the lower gate hinge.

D. If accessible, drive out the spring pins. If the pins are not accessible, drill through each spring pin by inserting a correctly sized drill bit into the open end of the hinge.

E. Drive the hinge pin until one end of the hinge pin can be firmly clamped with locking pliers. Then pull the hinge pin out by carefully striking the locking pliers with a hammer. Penetrating oil should be used to aid in the removal of the hinge pin.

F. Carefully separate the hinge and clean the hinge surfaces.

G. Lightly push against the hinge and do a close visual inspection of the hinge for cracks. Use an inspection mirror and light as needed. A crack will appear as a thin line. Be careful not to mistake the edge of the shim for a crack. Free movement of the hinge could be the result of a large crack or loose hinge screws. Tighten any loose hinge screws as needed.

**NOTE:** If a crack is found, stop the inspection and replace hinge per Service Bulletin 737-52A1124.

H. Put the Airplane Back in Its Usual Condition

(1) Install hinge pin. If the old hinge pin was damaged, use a new pin.

(2) Install spring pins. If necessary, drill new holes 0.094 to 0.097 inch diameter.

(3) Replace sealant removed in step C.

4. Galley Service Doors Hinge Inspection (Fig. 604)

A. Measure the clearance at the top and bottom of the doors. Refer to 52-41-00/501 for clearance limits.

B. Visually inspect clearance around hinge arm covers and hinge links. Make sure hinge arm covers and hinge links do not contact the outer skin of the fuselage or the outer skin of the door throughout the opening and closing cycle.

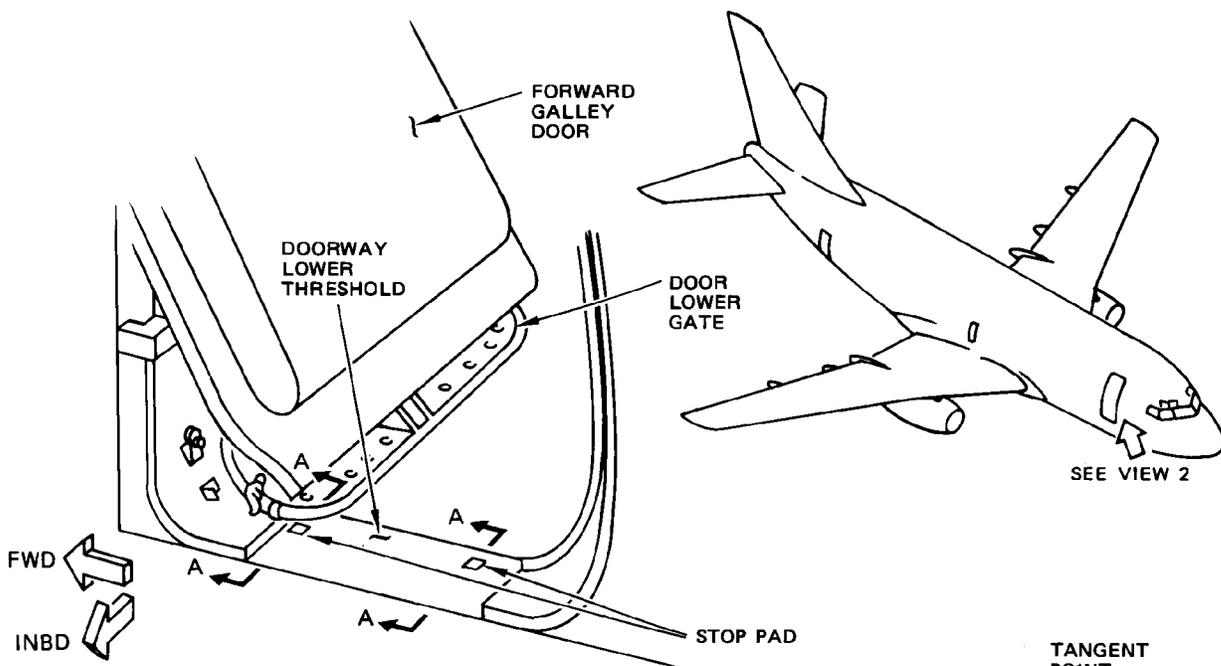
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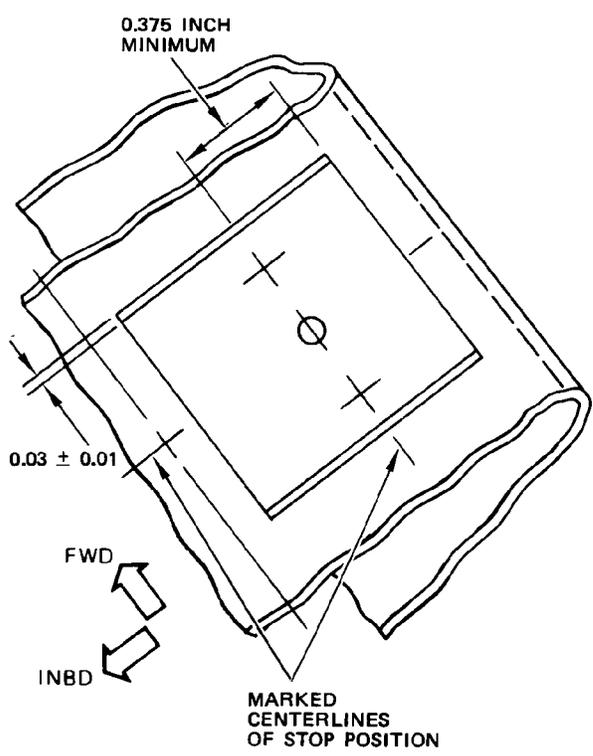
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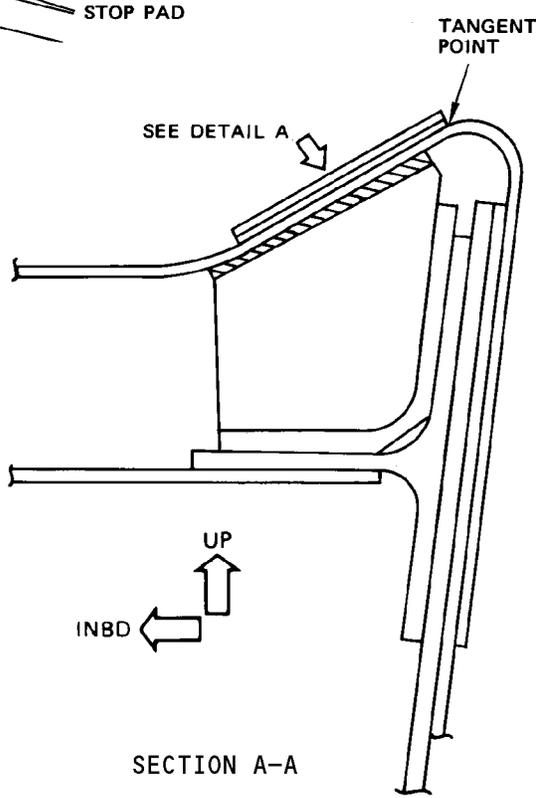
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VIEW 1



DETAIL A



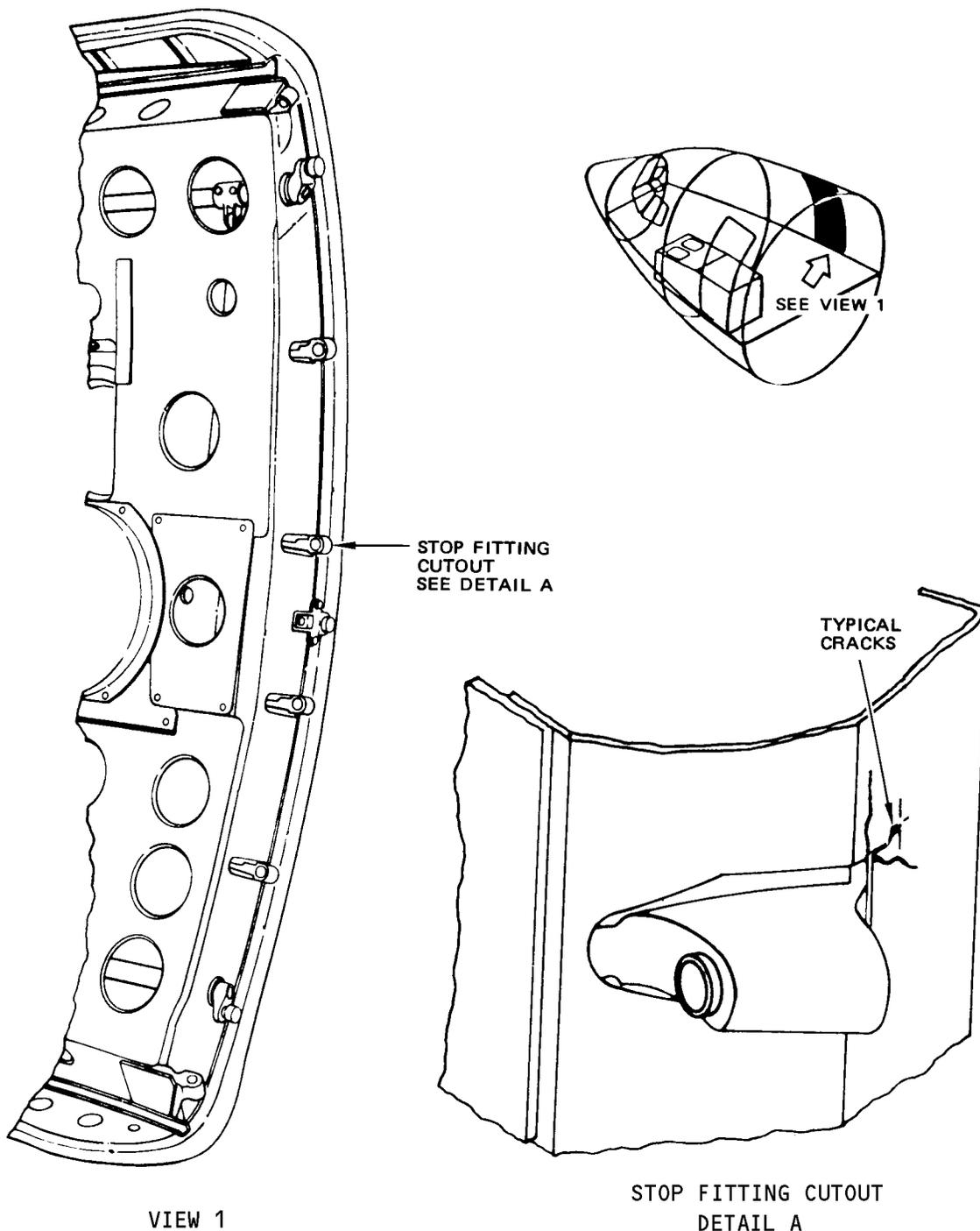
SECTION A-A

Forward Service Door Inspection/Check  
 Figure 601

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Forward Galley Service Door Inspection/Check  
 Figure 602

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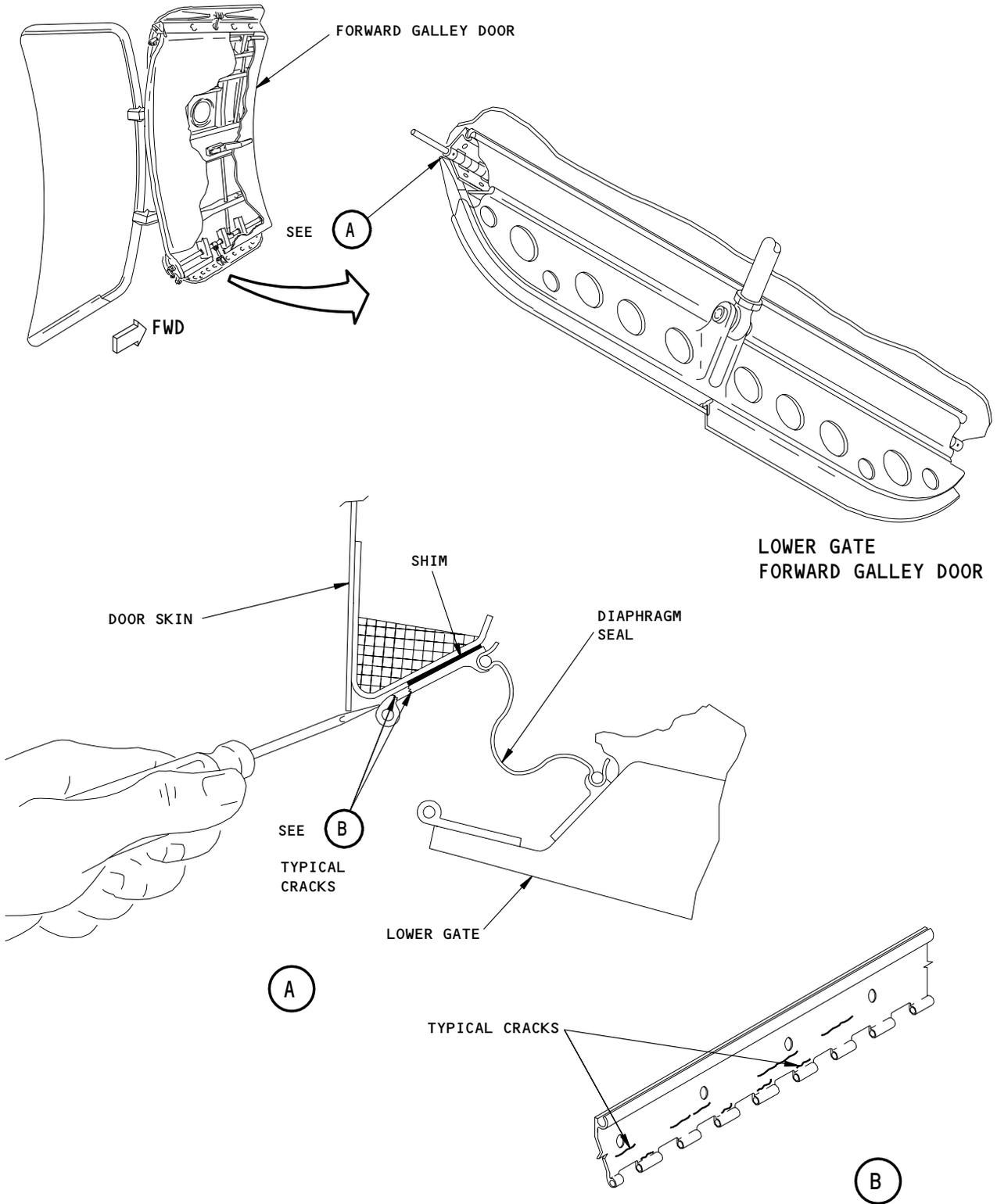
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Forward Galley Service Door Lower Gate Hinge Inspection  
 Figure 603

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- C. Visually inspect clearance between upper hinge link and guide plate. Make sure the upper hinge link does not contact the guide plate throughout the opening and closing cycle.

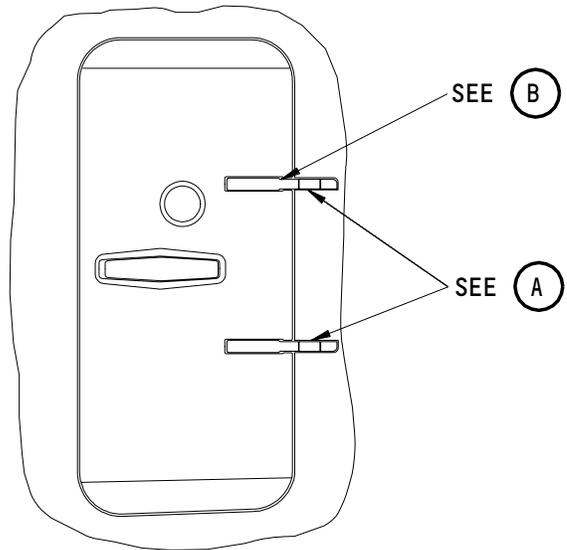
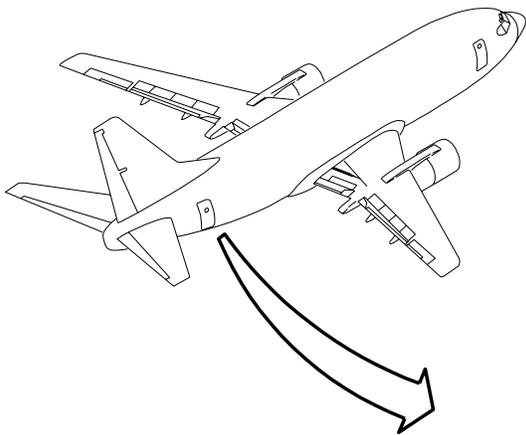
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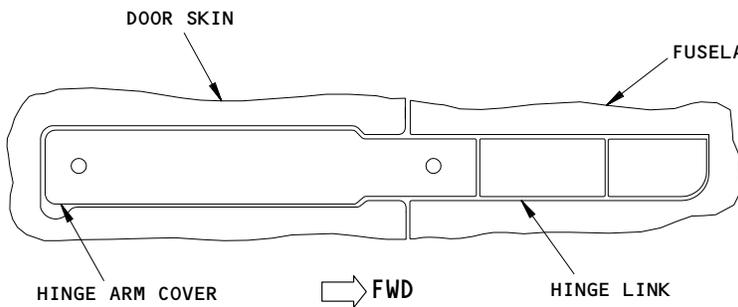
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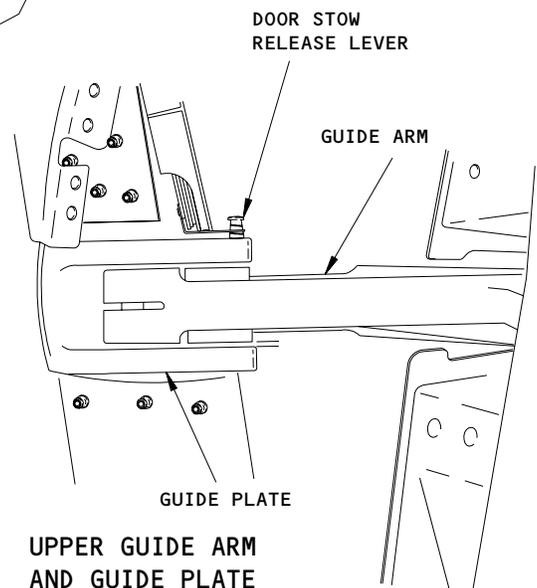
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FORWARD OR AFT SERVICE DOOR SHOWN



LOWER HINGE SHOWN,  
 UPPER HINGE SIMILAR

(A)



UPPER GUIDE ARM  
 AND GUIDE PLATE

(B)

Galley Service Doors Hinge Inspection  
 Figure 604

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GALLEY SERVICE DOOR – APPROVED REPAIRS

1. General

- A. In some cases, due to tolerances and mismatching of hinge arms, door hinge arm locking bolts are not properly engaging with their respective grooves in the torque tube hinge link pins. This results in the door slipping down on the hinges making it difficult to position the door in the opening during closing. It has been necessary in some cases to raise the door into position before closing.
- B. The hinge arms may be modified to provide positive engagement of the hinge arm to the hinge link pins by drilling the 0.250-inch diameter locking bolt holes in the hinge arms oversize, adding flanged spacers in the bolt holes and reinstalling the locking bolts through the spacers. The larger diameter of the locking bolt spacer combination ensures positive contact with the grooves in the hinge link pins. Hinge arms with part numbers 65-73978-7 and -8 are redesigned to bring the hinge bolt holes closer to the locking grooves and this procedure does not apply to these parts.

NOTE: This repair procedure applies to the aft entry door also.

- C. Repair of galley service door fuselage mounted door stops may be accomplished as a basic repair (Ref par. 4).

2. Equipment and Materials

- A. Alodine 1200 – MIL-C-5541 (Ref 20-30-41)
- B. Chemical and Solvent Resistant Finish – BMS 10-11, type I (Ref 20-30-41)
- C. Spacers, Flanged – BACS18C8-8 (4 required)
- D. Sealant – BMS 5-79 or 5-95 (Ref 20-30-41)

3. Repair Galley Service Door Hinge Arms (Fig. 801)

- A. Position door in stowed open position.
- B. Remove two locking bolts from upper hinge arm.
- C. Align grooves in hinge pin with holes in hinge arm.
- D. Ream existing 0.250/0.254-inch diameter locking bolt holes in hinge arm to 0.257/0.261-inch diameter 0.50 inch deep to accommodate spacers. Pretreat holes (Method II) and apply Alodine per 51-21-21 and 51-21-41, Cleaning and Painting. Apply primer per 51-21-171, Cleaning and Painting.
- E. Insert BACS18C8-8 flanged spacer through hinge arm at each bolt hole. Allow spacers to bottom out against hinge arm face on far side of slot (detail A). Add thin washers if required to eliminate any gap between spacer flanges and hinge arm. A maximum of five washers per spacer is allowed.
- F. Install locking bolts.
- G. Repeat above steps on lower hinge arm.

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### 4. Repair Stop Fitting Cracked Along Parting Line from End Into Stop Fitting Bearing Plate Hole (Fig. 802)

- A. If crack is within 45° each side of the parting plane, as shown in Fig. 802, and does not progress beyond stop fitting hole, repair as follows:
- (1) Remove bearing plate.
  - (2) Cut out crack with a 0.06 inch wide slot into the stop pin hole.
  - (3) Enlarge stop fitting hole to provide a 0.002 to 0.012-inch diameter clearance with bearing plate.
  - (4) Pretreat surfaces (Method II) and apply Alodine per 51-20-2 and 51-20-21, Cleaning and Painting. Apply primer per 51-20-151, Cleaning and Painting.
  - (5) Bond bearing plate back in using BMS 5-79 or 5-95 sealant.

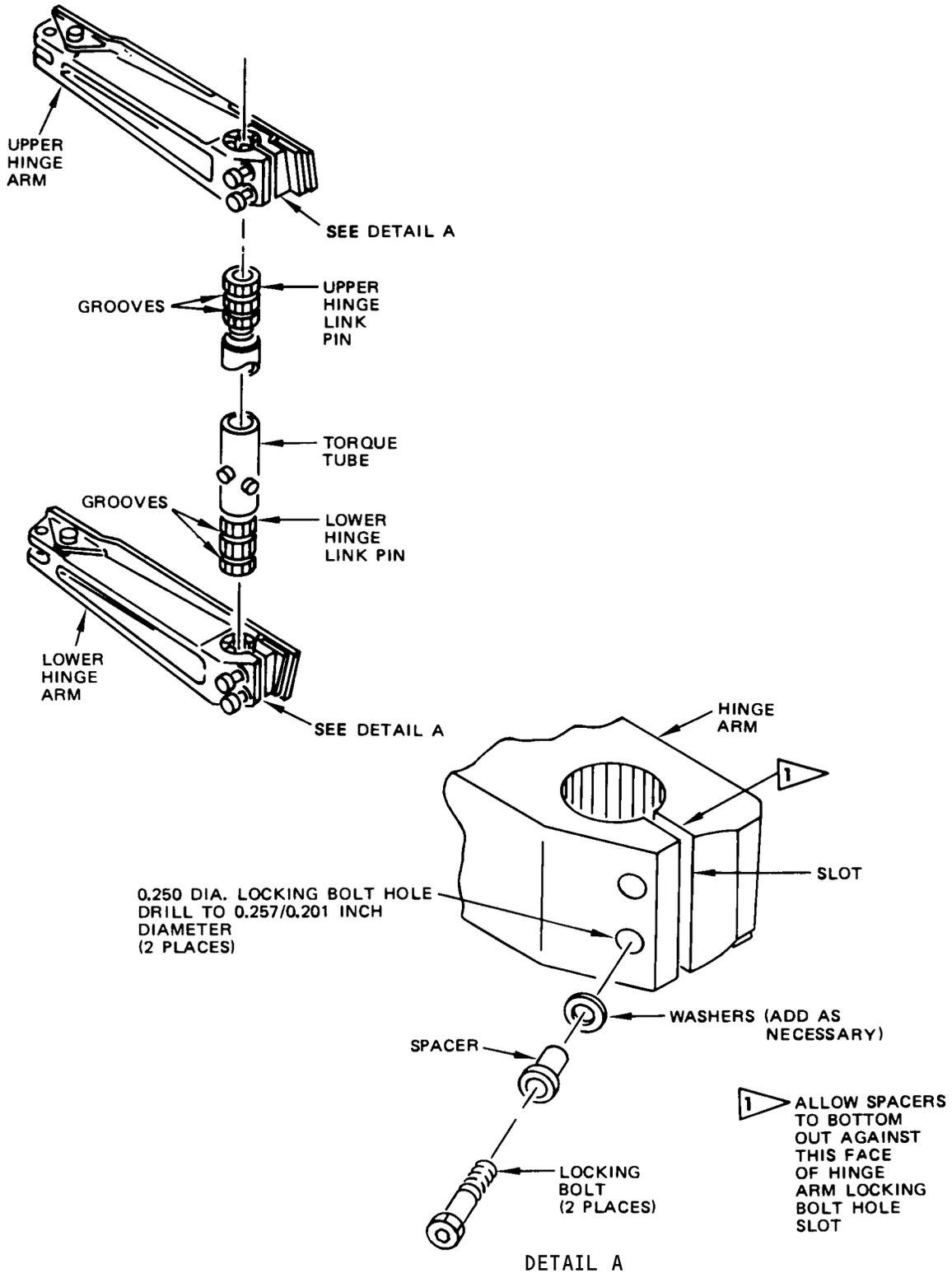
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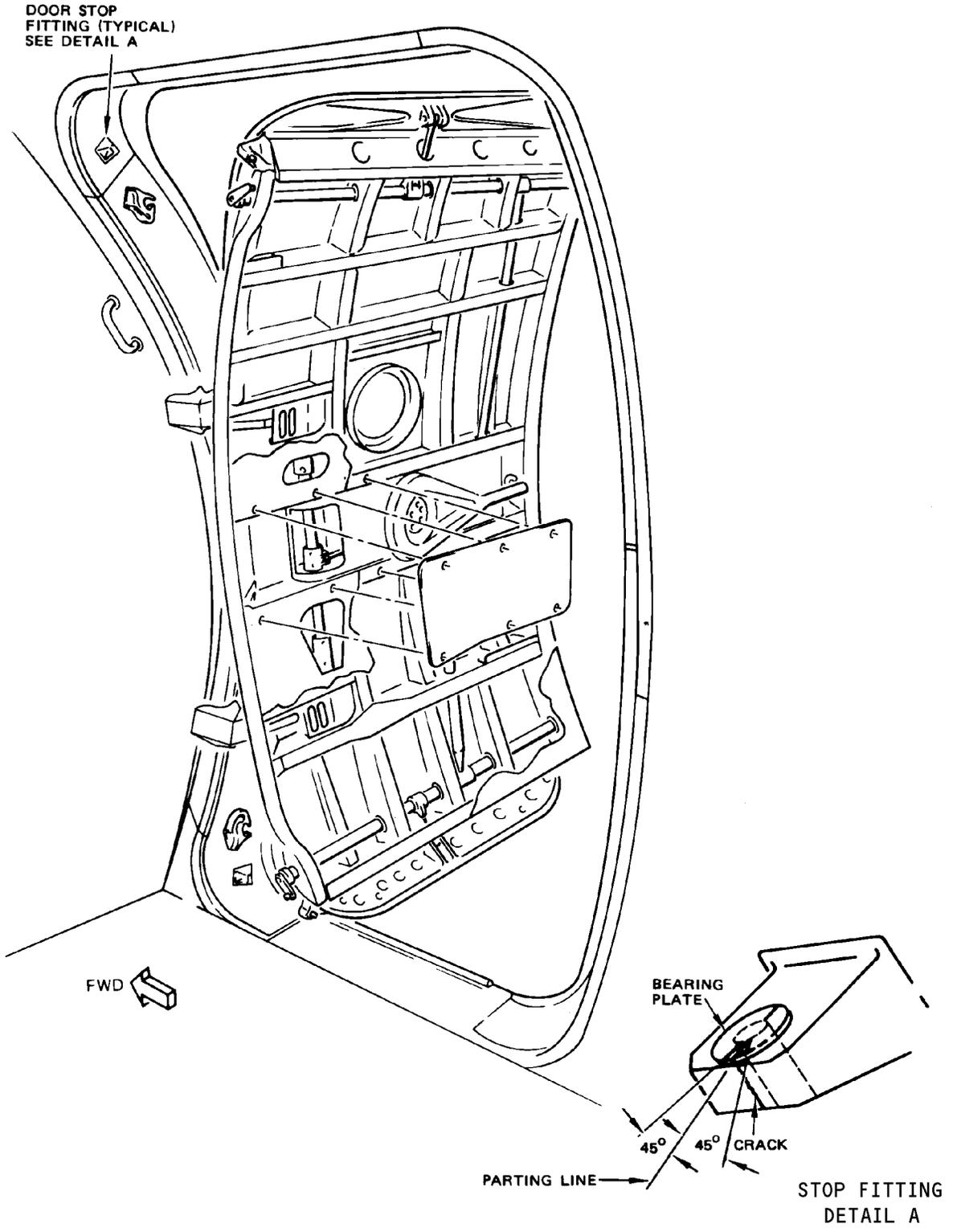
Galley Service Door Hinge Arm Modification  
 Figure 801

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Galley Service Door Approved Repair  
 Figure 802

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GALLEY SERVICE DOOR HINGE ARMS - REMOVAL/INSTALLATION

1. General

A. The procedures described and illustrated in this section are for the aft galley service door and are typical for the forward galley service door.

2. Equipment and Materials

A. Grease - BMS 3-33 (Preferred)

B. Grease - MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)

3. Remove Galley Service Door Hinge Arms

A. Remove door from airplane as described in 52-41-0 R/I - Galley Service Door.

B. Unscrew and remove hinge arm cover from outside surface of each hinge arm (18, Details B and C).

C. Remove forward mechanism access panel (2) to obtain access to door torque tube (5) and handle mechanism housing (4).

D. Remove bolts from torque tube (3, Fig. 402), connecting sleeves (2) and hinge link pins (1). Slide the connecting sleeves away from the hinges far enough to expose joints between the torque tube and the hinge link pins.

E. Remove the four bolts (21) that hold the outside handle to the handle housing.

F. Remove twelve housing attachment bolts (8, Detail A, Fig. 401) securing handle mechanism housing (4) to door structure.

G. Disconnect upper and lower gate control rods at their connection to each gate.

H. Disconnect upper and lower control rods (1) and (3) through the access holes in the handle mechanism housing from the latching crank (9). Move the control rods clear of the handle mechanism.

I. Remove hinge link bolts (15, Details B and C) and hinge link pin bolts (19) from hinge arms (18).

NOTE: The hinge link pin bolts can be reached from the outside of the door after the hinge covers are removed.

J. Slide the hinge link pins out of engagement with the hinge arms and remove the hinge arms

K. Remove the handle mechanism housing complete with torque tube crank (14) and the torque tube from the door. This step is necessary if the distortion that necessitated the replacement of a hinge arm may also have resulted (to a less noticeable extent) in the distortion of the torque tube. Even a slight bend in the torque tube, or in one hinge arm, will put the several bearings of the mechanism out of alignment, thus necessitating heavy torque on the operating handle.

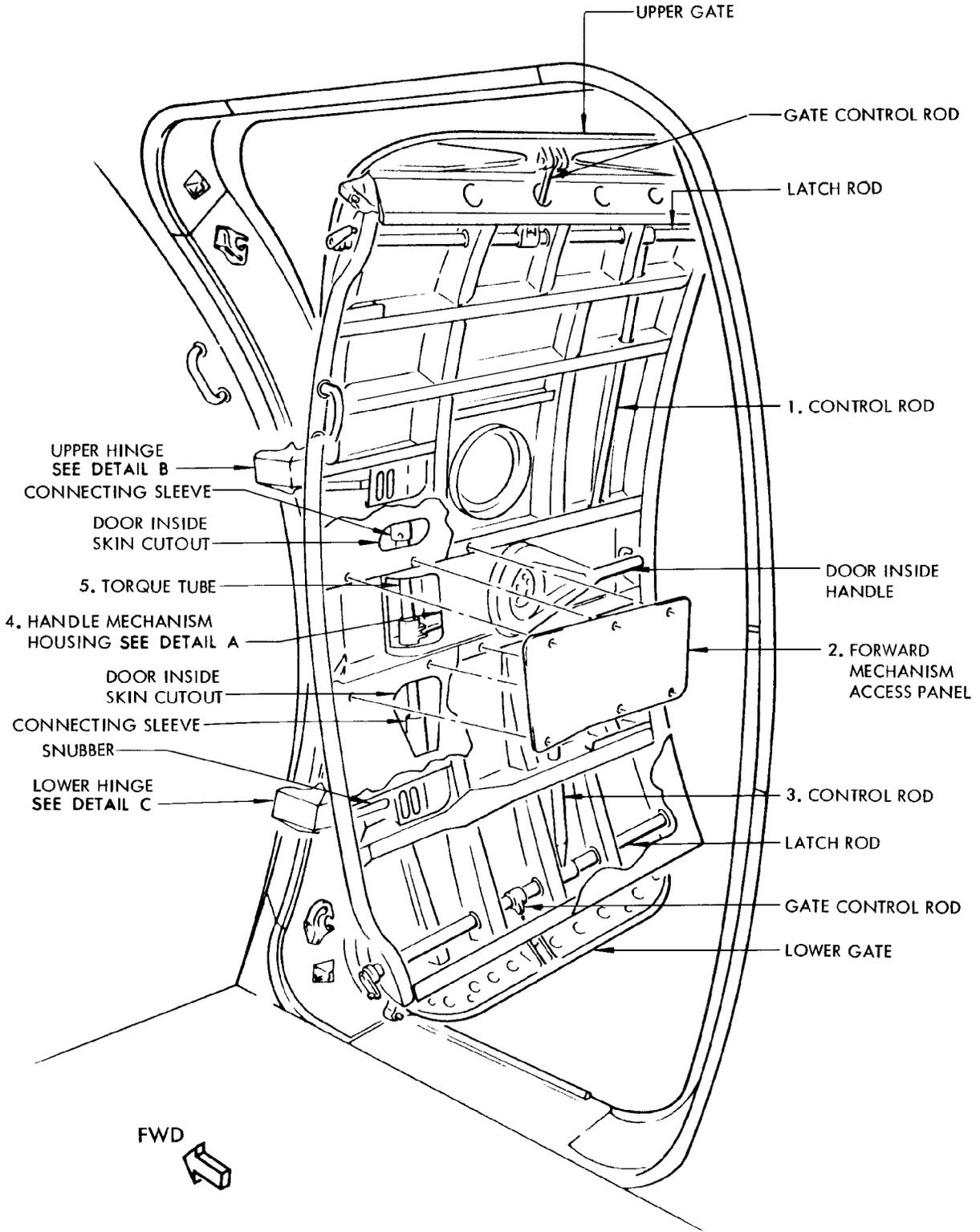
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Galley Service Door Hinge Arm Installation  
 Figure 401 (Sheet 1)

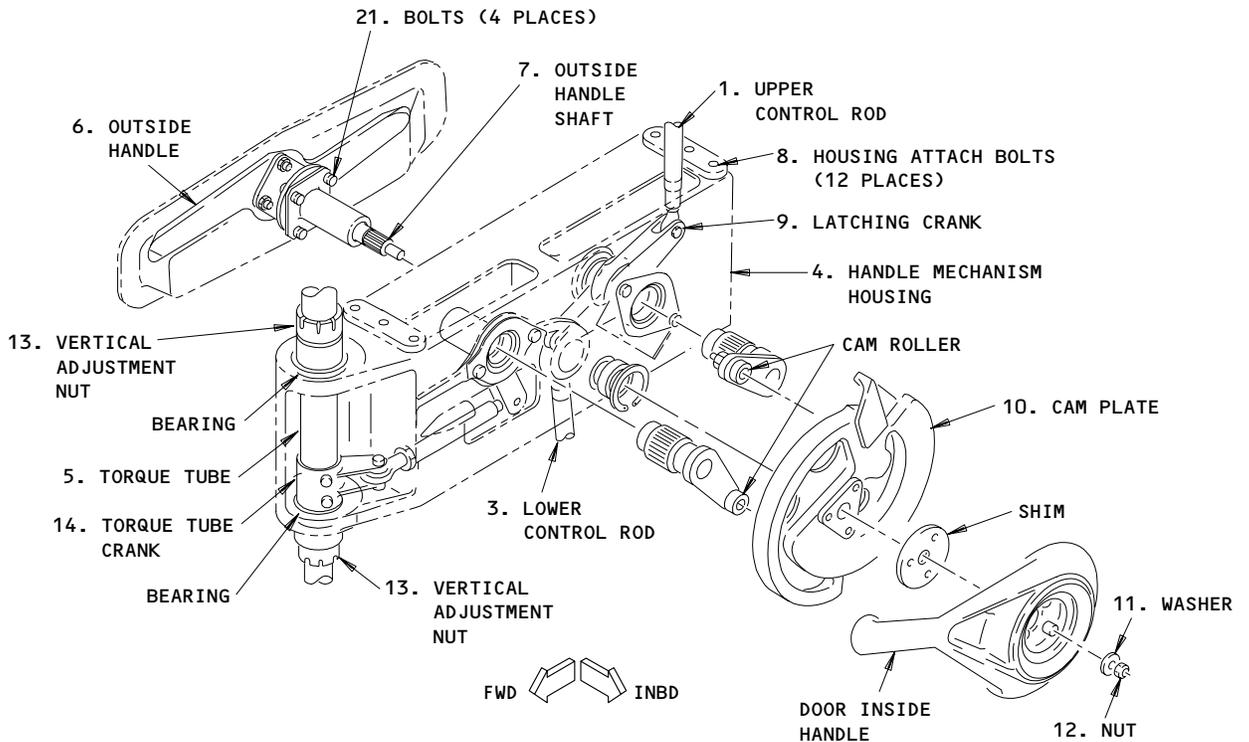
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**NOTE:** MECHANISM SHOWN IN CLOSED AND LATCHED POSITION.

**HANDLE MECHANISM HOUSING  
 DETAIL A**

**Galley Service Door Hinge Arm Installation  
 Figure 401 (Sheet 2)**

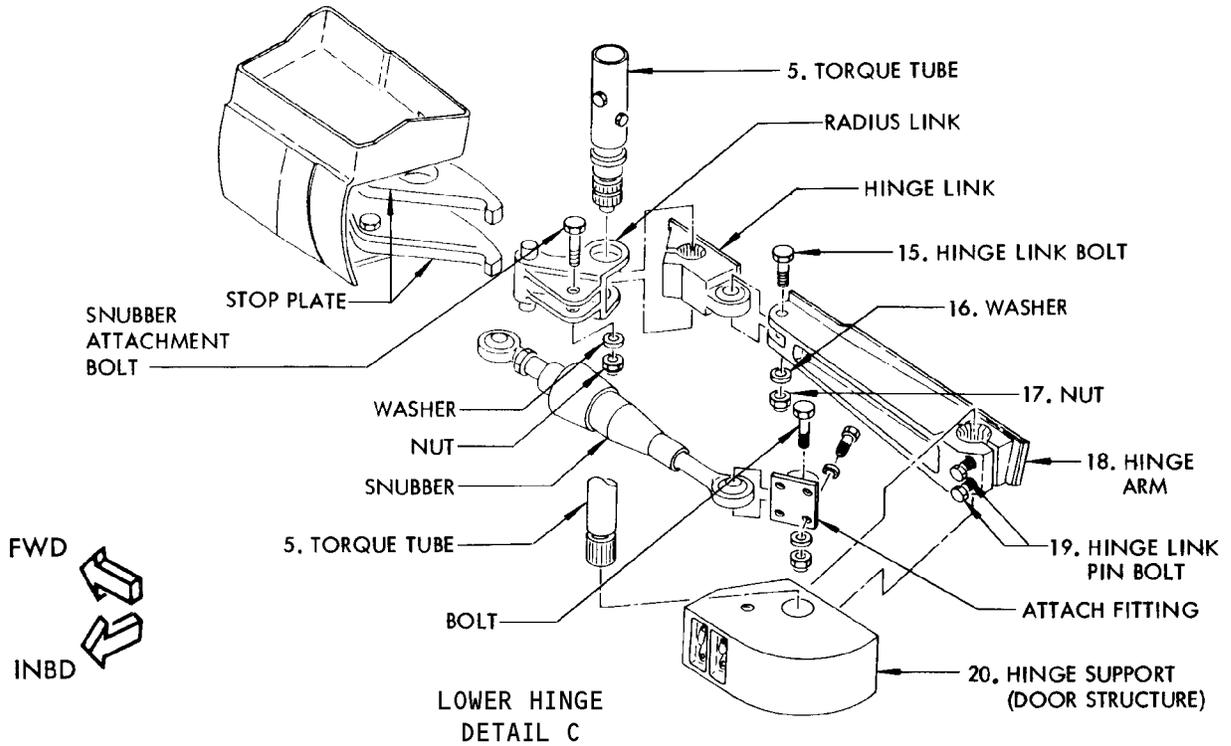
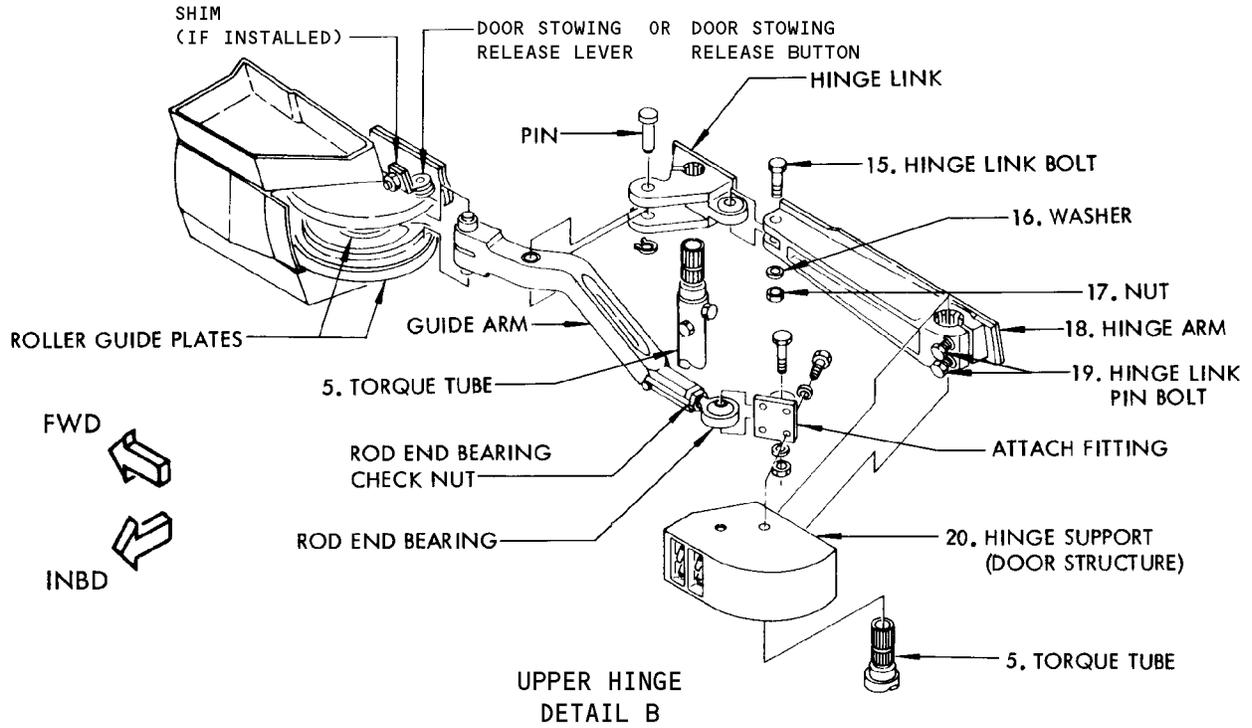
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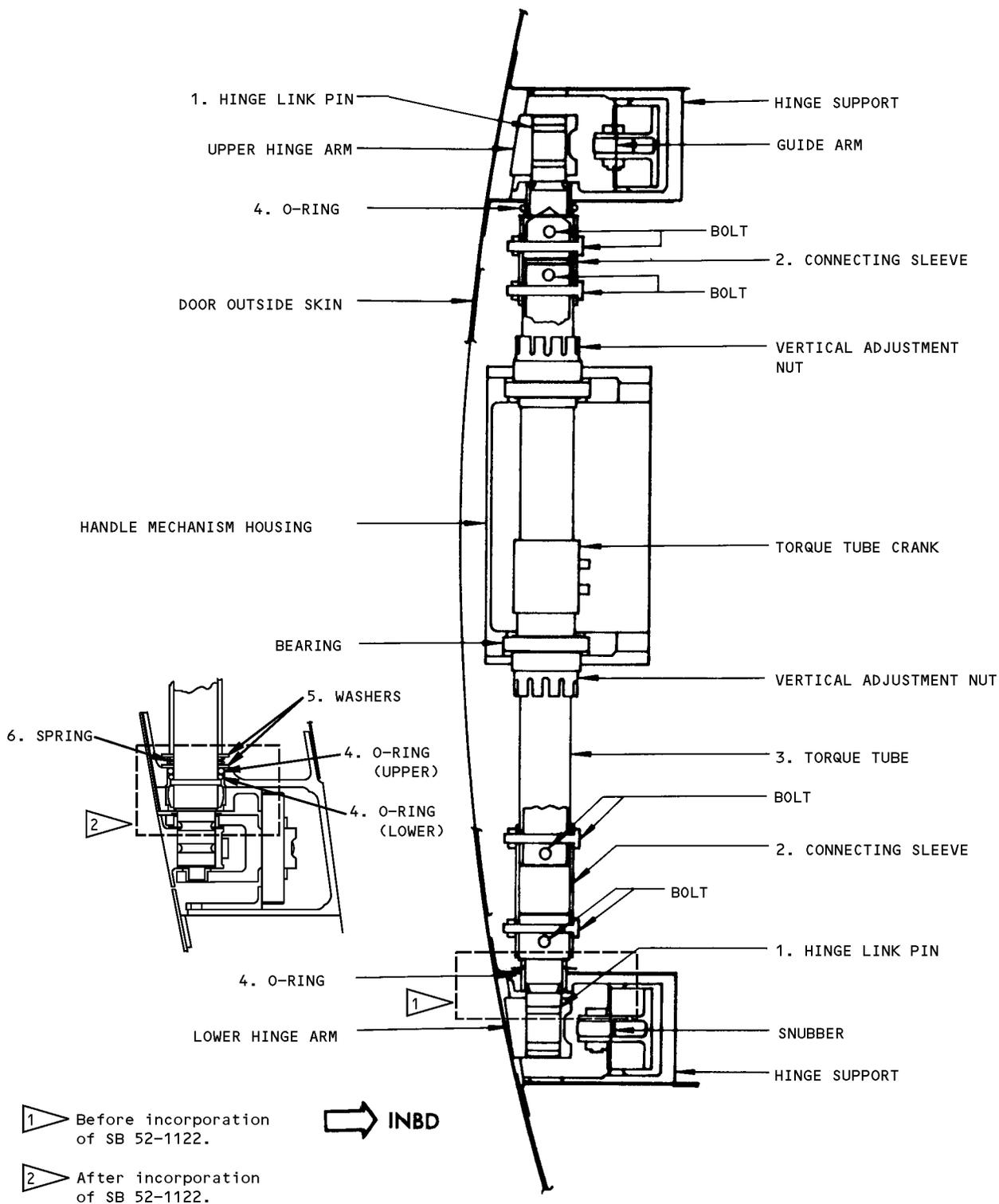
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Galley Service Door Hinge Arm Installation  
 Figure 401 (Sheet 3)

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Door Hinge Arm and Torque Tube Assembly  
 Figure 402

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### 4. Install Galley Service Door Hinge Arms

- A. Check that O-rings (4, Fig. 402) are in good condition and are seated properly in the grooves of hinge link pin (1). Grease the bearing surfaces of the hinge link pins.
- B. Position each hinge arm (18, Details B and C, Fig. 401) in hinge support (20) in door structure, insert the hinge link pins through the support bushings and hinge arms, and install hinge link bolts (15) and hinge link pin bolts (19).
- C. Install handle mechanism housing (4, Detail A) in door structure so that torque tube (5) lines up with the hinge link pins.

**NOTE:** If endwise interference exists, adjust torque tube along its axis by manipulating the vertical adjustment nuts (13). Do not lock these nuts.

- D. Assemble the torque tube, hinge pins and sleeves.
  - (1) On airplanes with SB 52-1122;  
Install washers (5, Fig. 402) and spring (6) on torque tube.
  - (2) Move the sleeves (2) over the hinge pins (1).
  - (3) Put the bolts through the torque tube, sleeves and hinge pins.
  - (4) Install the nuts and washers on the bolts.
  - (5) Make sure there is from 0.000 to 0.016 inch between the sleeve and the washers.
  - (6) Install one more washer if it is necessary to get the correct distance.
  - (7) Make any endwise adjustment of the torque tube by means of the vertical adjustment nuts.

**NOTE:** These vertical adjustment nuts should be left finger-tight and unlocked because they will be used to obtain vertical adjustment of the door when it is installed in the airplane.

- E. Install the four bolts (21) that hold the outside handle to the handle housing.
- F. Install 12 housing attach bolts (8, Detail A, Fig. 401) securing housing to door structure.
- G. Connect control rods (1 and 3) to latching crank (9) through the access holes in the handle mechanism housing (4).
- H. Connect gate control rods to the gates.
- I. Install forward mechanism access panel (2) over the torque tube and the handle mechanism housing.
- J. Install hinge arm cover on each hinge arm.
- K. Install outside handle shaft (7, Detail A) and outside handle (6) on door, with the cam plate (10), washer (11) and nut (12) correctly positioned. Secure nut (10) with cotter pin.

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- L. Install door on airplane as described in 52-41-0 R/I - Galley Service Door.

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GALLEY SERVICE DOOR GUIDE ARM AND ROLLER – REMOVAL/INSTALLATION

1. Equipment and Materials

- A. Grease – BMS 3-33 (Preferred)
- B. Grease – MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)

2. Remove Galley Service Door Guide Arm and Roller

- A. Remove door stowing release lever or door stowing release button (3, figure 401, detail A) and shim, if installed (2).
- B. Open the door to a position where retainer ring (6) is readily accessible, and remove the retainer ring and pin (5) from hinge link (7).

**CAUTION:** WHEN THE GUIDE ARM IS DISCONNECTED FROM THE HINGE ARM OR REMOVED FROM THE DOOR, EXTREME CARE SHOULD BE EXERCISED IN HANDLING THE DOOR AS ITS MOTION WILL BE UNCONTROLLED. PARTICULAR CARE SHOULD BE OBSERVED WHEN MOVING THE DOOR TO OR FROM THE CLOSED POSITION IN ORDER TO PREVENT THE WEATHER/PRESSURIZATION SEAL FROM BEING PINCHED OR OTHERWISE DAMAGED.

- C. Open the door fully and insert a punch in the lower hole of the roller guide plates (1) and drive out the roller through upper hole in the roller guide plate. The roller bushing in the upper guide plate will be removed with the roller.
- D. Swing the guide arm away from hinge arm (9). Remove four bolts connecting attach fitting (10) to hinge support (13) and remove the guide arm together with the attach fitting.
- E. Remove locknut (12), washer (11) and bolt (8) connecting the attach fitting to rod end bearing (14) and remove the guide arm.

3. Install Galley Door Guide Arm and Roller

**CAUTION:** WHEN THE GUIDE ARM IS DISCONNECTED FROM THE HINGE ARM OR REMOVED FROM THE DOOR, EXTREME CARE SHOULD BE EXERCISED IN HANDLING THE DOOR AS ITS MOTION WILL BE UNCONTROLLED. PARTICULAR CARE SHOULD BE OBSERVED WHEN MOVING THE DOOR TO OR FROM THE CLOSED POSITION IN ORDER TO PREVENT THE WEATHER/PRESSURIZATION SEAL FROM BEING PINCHED OR OTHERWISE DAMAGED.

- A. Apply a light film of grease to roller (16, detail A), place guide arm (4) between roller guide plates (1), line up holes in guide arm with those in roller guide plates and insert roller thru bushings in guide arm. Install spring clip, if removed, in roller.
- B. Install roller bushing in upper guide plate.
- C. Install door stowing release lever (3) with shim (2), or door stowing release button (3).
- D. Connect guide arm rod end bearing (14) to attach fitting (10) using bolt (8), washer (11) and locknut (12).
- E. Position door in a cocked position and install attach fitting on hinge support (13) using four bolts.

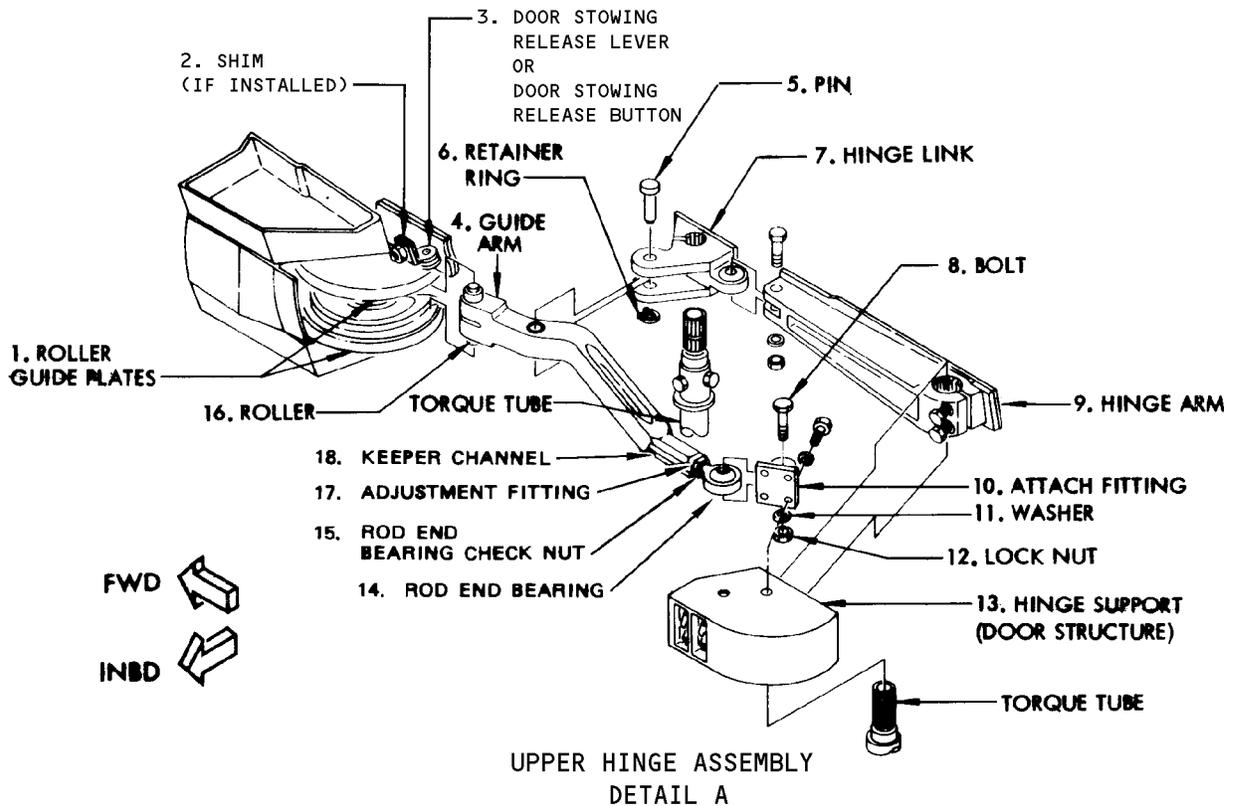
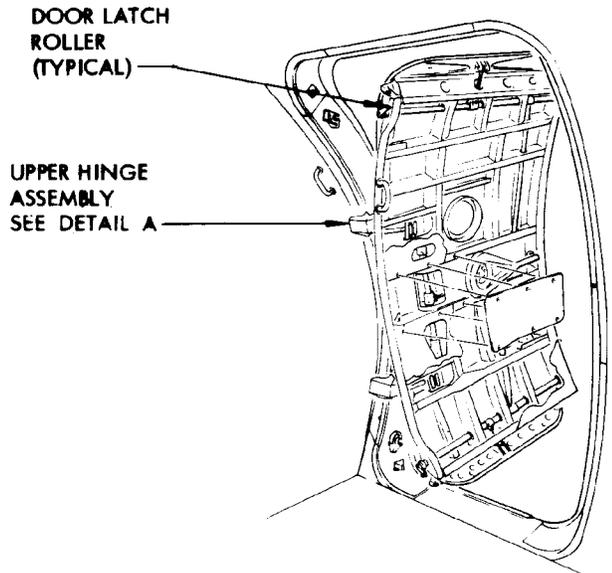
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Galley Service Door Guide Arm and Roller Installation  
 Figure 401

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- F. Line up holes in guide arm with those in hinge link (7) and install pin (5) and retainer ring (6).

**CAUTION:** DO NOT INSTALL USED RETAINER RING (6). INSTALL A NEW RETAINER RING (6) ONLY. IF THE RETAINER RING COMES OFF THE PIN (5) THE DOOR MAY NOT OPEN.

- G. Operate door to closed position and check that both fore and aft latch rollers enter their fittings at the same time. If necessary, aft rollers may lead forward rollers slightly to improve clearance on forward edge of door. If necessary, adjust guide arm length as follows:
- (1) If necessary, make coarse adjustment. Remove four bolts holding attach fitting (10) to hinge support (13). Loosen rod end bearing checknut (15), rotate rod end bearing (14), then tighten checknut. Install attach fitting (10).
  - (2) Make fine adjustment. Remove keeper channel (18) and loosen checknut (15). Rotate adjustment fitting (17). Tighten checknut and install keeper channel.

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GALLEY SERVICE DOOR LINING AND INSULATION – REMOVAL/INSTALLATION

1. General

- A. The lining and insulation is similar on forward and aft galley service doors.
- B. The door insulation blanket is cemented to the outboard side of the door panel to form one assembly.

2. Equipment and Materials

- A. Wrench – F70336-1

3. Remove Galley Service Door Lining and Insulation (Fig. 401)

**CAUTION:** USE SPECIAL CARE IN HANDLING THE PARTS OF THIS INSTALLATION. SURFACES VISIBLE TO CABIN INTERIOR MUST BE FREE OF SCRATCHES, MARKS AND DENTS.

- A. Remove escape slide assembly (4) from door (Ref Chapter 25, Escape Slide Assembly [Door-Mounted]).
- B. Remove galley service door inside handle (Detail A).
  - (1) Operate door inside handle (3) and bring the door into cocked position.
  - (2) Carefully pry out insert (11).

**NOTE:** Insert is held by spring fasteners on insert support (9).

- (3) Remove lockwiring, three bolts (12), washers (10), and insert support (9) from handle.
  - (4) Remove door inside handle and shim(s) (7).
- C. Remove assist handle (Detail B).
  - (1) Using wrench, rotate assist handle nuts (14) and remove assist handle (5).
  - (2) Remove bolts (16), inner collars (15), assist handle nuts (14) and outer collars (13) from door structure.
- D. Remove lining and insulation.
  - (1) Remove four screws (8, detail A), attaching panel to lining retainer (6).
  - (2) Remove panel attach nuts (and screws where applicable) along the top and bottom of door panel (1).
  - (3) Loosen panel fastener studs (18), one-quarter turn, along forward and aft edges of the panel. (See view 1.)
  - (4) Remove lining, insulation panel and seal (17) from door structure.

**NOTE:** Inboard windowpane assembly will be removed with the panel.

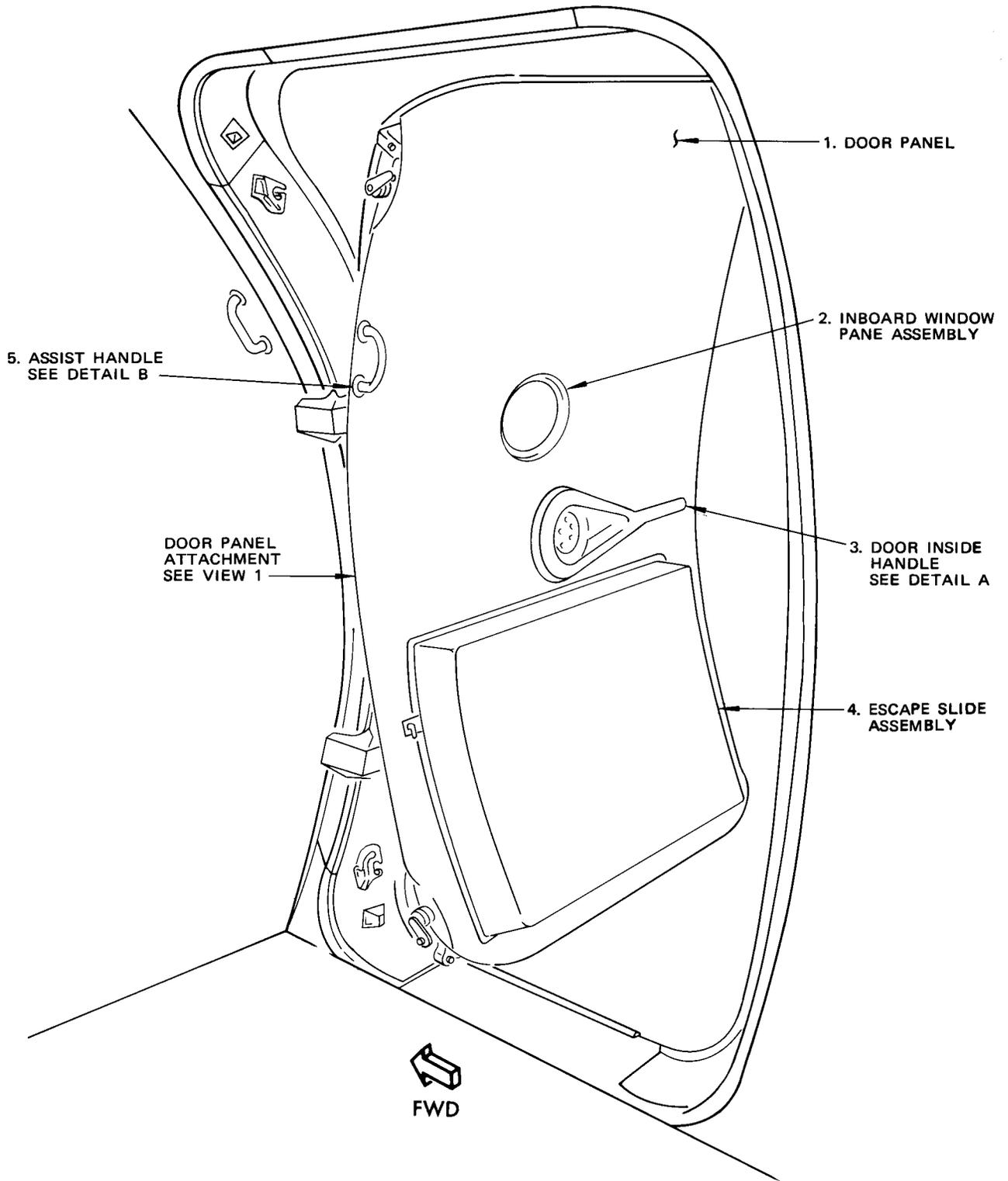
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Galley Service Door Panel Installation  
 Figure 401 (Sheet 1)

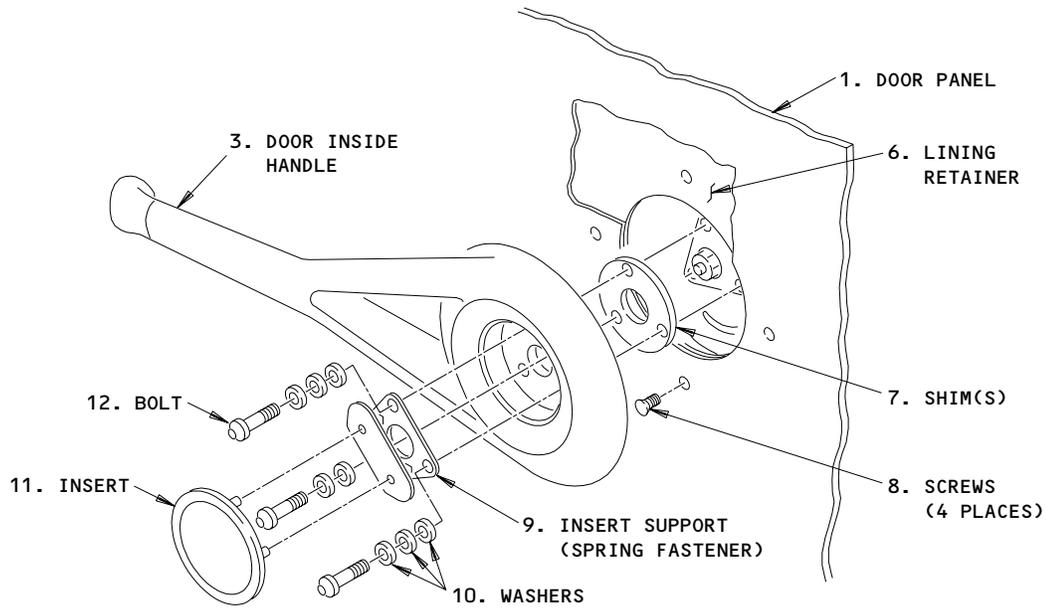
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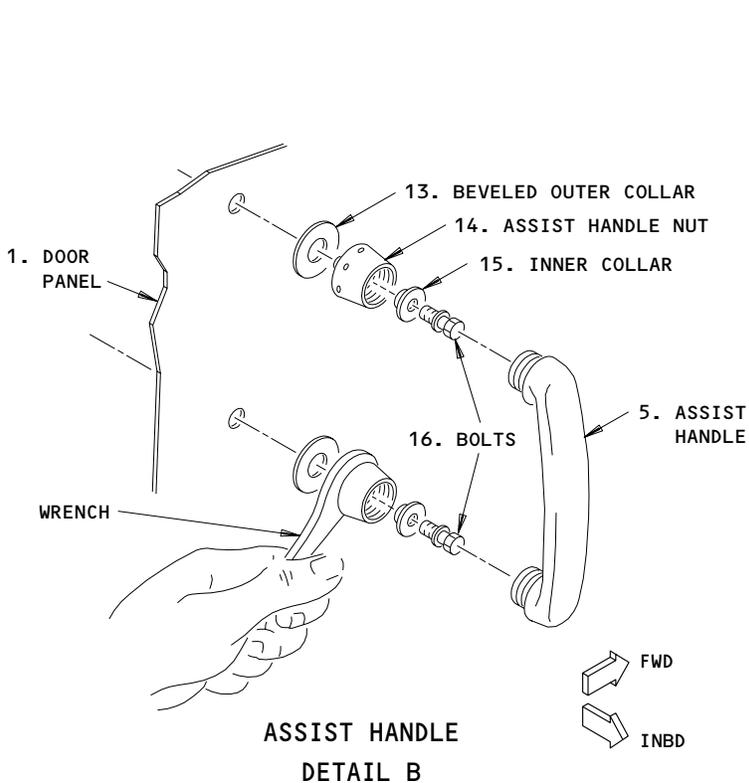
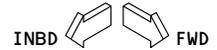
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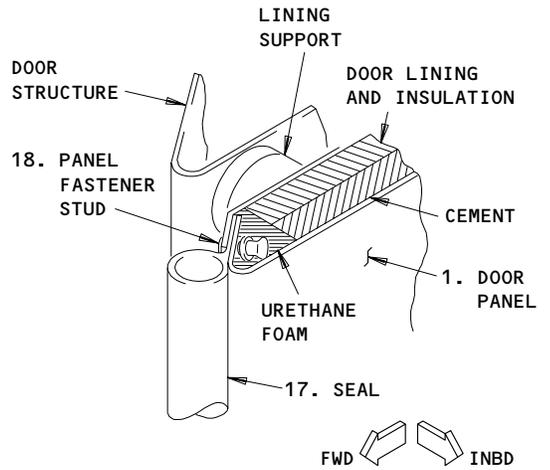
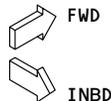
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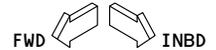
**DOOR INSIDE HANDLE  
 DETAIL A**



**ASSIST HANDLE  
 DETAIL B**



**DOOR PANEL ATTACHMENT  
 VIEW 1**



**Galley Service Door Panel Installation  
 Figure 401 (Sheet 2)**

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4. Install Galley Service Door Lining and Insulation

A. Install lining and insulation. (See figure 401.)

**CAUTION:** USE SPECIAL CARE IN HANDLING THE PARTS OF THIS INSTALLATION. SURFACES VISIBLE TO CABIN INTERIOR MUST BE FREE OF SCRATCHES, MARKS AND DENTS.

- (1) Position lining, insulation panel and seal (17, view 1) on door structure.
  - (2) Install panel attach nuts (and screws where applicable) along top and bottom edge of the panel.
  - (3) Tighten panel fastener studs (18), one-quarter turn, along forward and aft edges of the panel.
  - (4) Attach panel to lining retainer (6, detail A) with four screws (8).
- B. Install assist handle. (See detail B.)
- (1) Attach beveled outer collars (13), assist handle nuts (14), and inner collars (15) to door structure with bolts (16).
  - (2) Engage threads on assist handle (5) with threads in the assist handle nuts (14) and install assist handle by rotating nuts using the AN8514-4 wrench.
- C. Install galley service door inside handle. (See detail A.)
- (1) Install door inside handle (3) with shim(s) (7), insert support (9), washers (10), and three bolts (12).

**NOTE:** On airplanes with shim (7) made up of laminations, remove laminations as necessary to allow a clearance of 0.10 inch between outer edge of door inside handle and door lining. Alter bolt grip length or add washer under bolt head as required to allow for shimming variations.

- (2) Lockwire bolts.
  - (3) Install insert (11) in center of door inside handle.
- D. Install escape slide assembly (4) on door. Refer to Escape Slide Assembly (Door-Mounted), Chapter 25.

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GALLEY SERVICE DOOR STRUCTURE TORQUE TUBE – REMOVAL/INSTALLATION

1. General
  - A. The following procedure is for the forward galley service door but is also applicable for the aft galley service door.
2. Equipment and Materials
  - A. Grease – MIL-G-21164
3. Remove Galley Service Door Structure Torque Tube (Fig. 401)
  - A. Remove door from airplane, as described in 52-41-0, Removal/Installation.
  - B. Remove access panel on outside of body between the upper and lower door hinge cutouts to obtain access to structure torque tube.
  - C. Remove bolts securing sleeves to torque tube and upper and lower hinge link pin. Slide the sleeves clear of hinge link pins.
  - D. Raise and lower torque tube to remove sleeves.
  - E. Remove torque tube by withdrawing outboard through upper or lower hole in structure.
4. Install Galley Service Door Structure Torque Tube (Fig. 401)

**NOTE:** Hinge link pins, sleeves, and torque tube spares are supplied as a matched assembly or as individual undrilled parts. Undrilled hinge link pins and torque tubes or a combination of undrilled hinge link pins/sleeves or torque tube/sleeves may be installed and drilled during installation.

- A. Apply a thin coat of grease to mating surfaces of hinge link pins, sleeves and torque tube.
- B. Install hinge link pins in upper and lower hinge link.

**NOTE:** A master spline is incorporated in the splines of the link pins and the upper and lower hinge links. If matched structure torque tube assembly is installed the hinge links will be properly aligned when all components are assembled.

- C. Position torque tube in structure by inserting through upper or lower hole in structure.
- D. Raise and lower torque tube and install sleeves.
- E. Insert bolts through sleeves, install washers and nuts, and tighten bolts.
- F. If required, drill hinge link pin and/or torque tube to match fastener holes in sleeve.
  - (1) Clamp upper and lower hinge links so that they are flush with airplane external skin.
  - (2) Drill two 0.234-inch diameter holes through sleeve and torque tube and/or sleeve and hinge link pin. Ream holes to a finished size of 0.2500 ±0.0005 inch.

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- (3) Insert bolts through sleeve, install washers and nuts, and tighten bolts.

**NOTE:** Final alignment of torque tube upper and lower hinge links is made by adjusting snubber during door installation.

- G. Check that sleeve fasteners clear structure when torque tube assembly is rotated. If necessary, trim any fastener threads to provide clearance.  
H. Install access panel removed to obtain access to torque tube.  
I. Install door as described in 52-41-0, Removal/Installation.

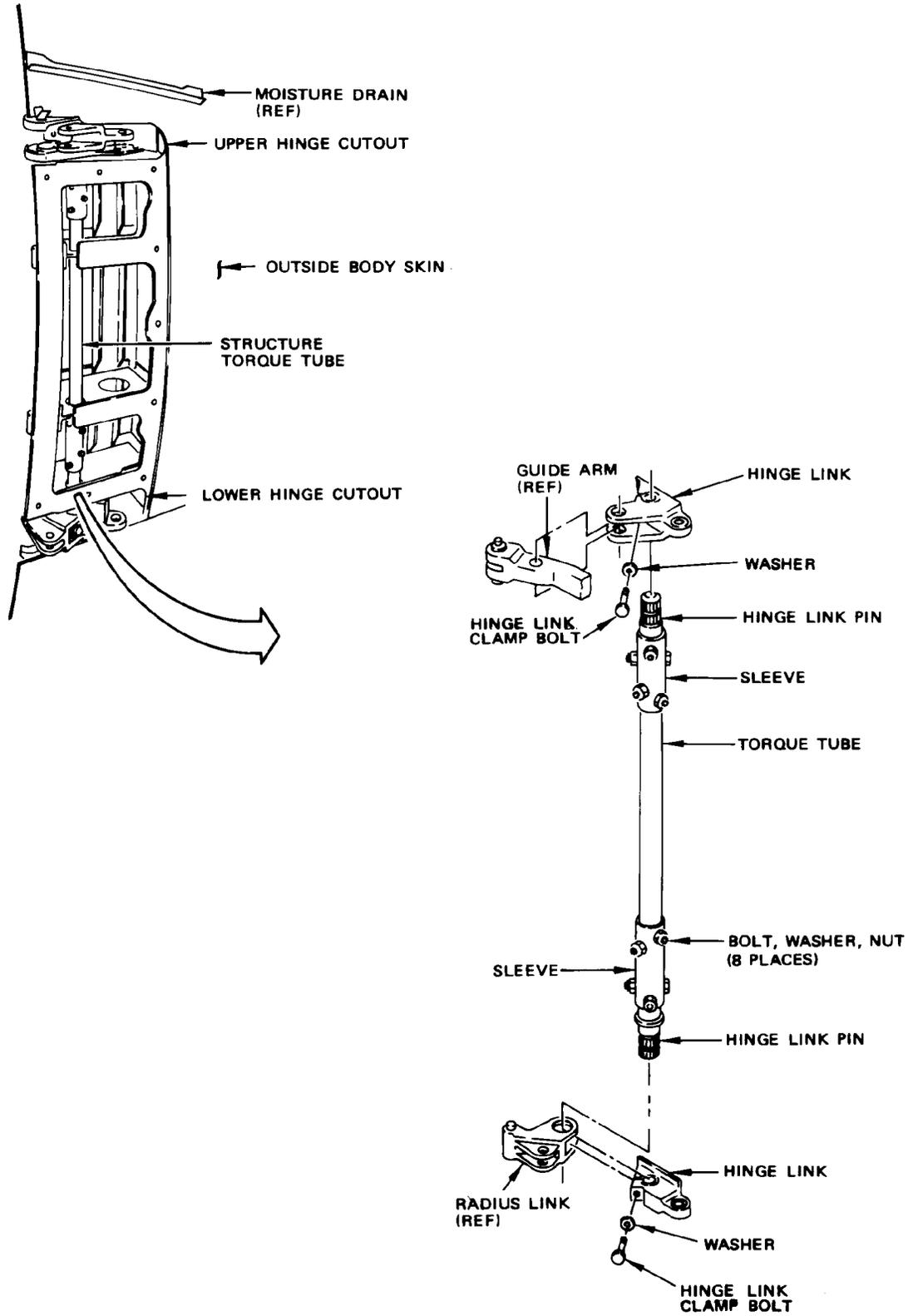
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Door Structure Torque Tube Installation  
 Figure 401

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AIR CONDITIONING ACCESS DOORS – DESCRIPTION AND OPERATION

1. General

- A. The air conditioning access doors provide access to the two air conditioning packs which are installed one on each side of the fuselage keel beam (Fig. 1). The doors form a part of the unpressurized fairing on the lower surface of the fuselage near the wing root extending from the intersection of the wing front spar plane and fairing contour to the intersection of the wing rear spar plane and fairing contour.
- B. The doors are similar in construction and the five hinges on each door are arranged so that the doors hinge down from their inboard edge from the keel beam lower chord structure. Each door is of epoxy reinforced glass fabric laminate faced honeycomb core construction. The skins, doublers, gap covers and inserts are of epoxy reinforced fiberglass fabric. The inner surface of each door is covered with aluminum foil and the outer surface is coated with flame sprayed aluminum.

2. Latching Mechanism

- A. There are ten heavy duty flush latches installed normal to the door contour on each door. Six of the latches are located near the outboard edge of each door, three near the forward edge and one near the aft edge. The latches secure the doors in closed position, with the latch mechanism permitting quick access to the equipment enclosed by the doors. A trigger is provided on each latch which can be operated by moderate thumb pressure to release the latch bolt from the closed position. The fail-safe design of the latch is such that the failure of the trigger return mechanism will not cause the bolt to open. The exposed surface of each flush latch in closed position is similar in color to the adjacent flame sprayed aluminum fiberglass structure. The other surfaces of the latch that are visible from the outside when the latch is in open position are, in contrast, a bright red fluorescent color to provide rapid visual inspection of the latch position. For information on adjustment/test of these latches, refer to Hartwell Type Latches, Chapter 12.

3. Operation

- A. Each door is opened by unlatching and manually restraining the door as it hinges down from its closed position. The free end of the brace tube is then unlatched from its stowed position on the brace catch, on the inner surface of the door panel, and used to secure the door in open position. When closing the door the brace tube is returned to its stowed position on the catch and the door is then closed and latched.

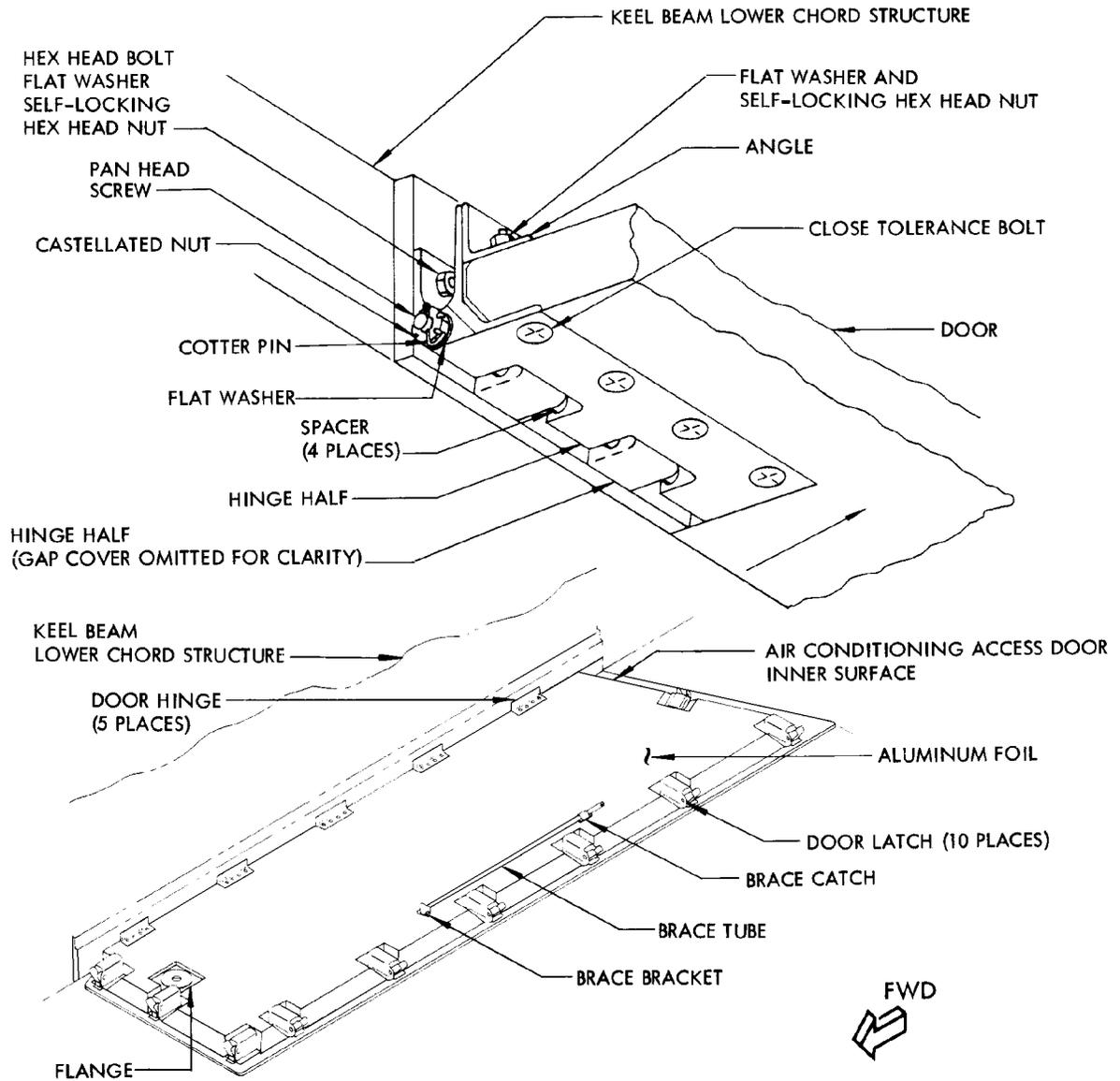
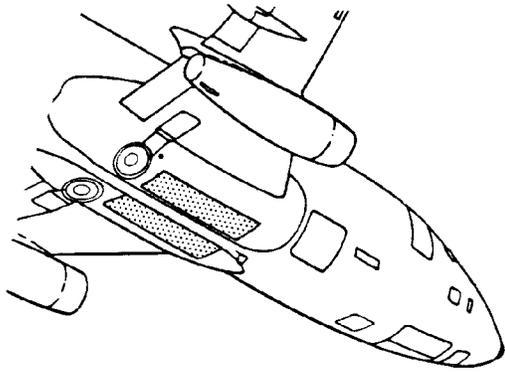
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Air Conditioning Access Door  
 Figure 1

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AIR CONDITIONING ACCESS DOORS – APPROVED REPAIRS

1. General

A. Aluminum foil delamination or blisters on the inner surface of the air conditioning bay access doors will affect the ADF system due to the proximity of the ADF loop. Any removal of the aluminum foil from the door, either in part or as a whole, will also affect the ADF system. The following procedure describes the repair of delaminated or blistered areas in the foil.

2. Equipment and Materials

A. Sharp instrument for cutting aluminum foil  
B. Smooth edges plastic spatula, or other suitable instrument, to smooth aluminum foil

3. Repair Air Conditioning Access Doors

A. Visually establish the area over which the foil has delaminated from the door inner skin.  
B. Using a sharp instrument, cut 0.10 (+0.15/-0.05) inch long slits in the foil with a 3.0 x 3.0 inch (approximately) matrix pattern to cover the entire delaminated area. (See figure 801.)

**CAUTION:** EXTREME CARE IS NECESSARY TO PREVENT CUTTING OF THE GLASSCLOTH SKIN IMMEDIATELY UNDER THE FOIL. USE A SIDE SLITTING ACTION RATHER THAN A DIRECT CUT ONTO THE DOOR.

C. Starting from the edge of the delaminated area, press the foil back onto the door. Work evenly around the delaminated area, finishing in the center. Due to stretching of the foil, large delaminated areas will have an excess of foil material, causing wrinkles to form during the process of pressing the foil back onto the door inner skin.  
D. Use a smooth edged plastic spatula, or other similar instrument, to smooth out or reduce as much as possible the wrinkles formed in the foil.

**CAUTION:** ANY REMOVAL OF ALUMINUM FOIL FROM THE DOOR, EITHER IN PART OR AS A WHOLE, WILL AFFECT THE ADF SYSTEM.

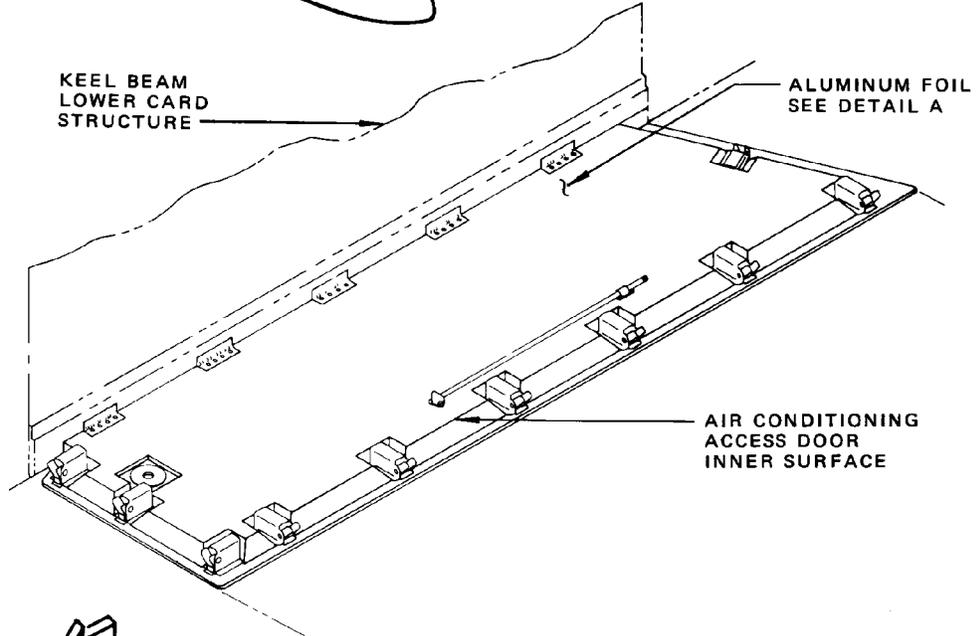
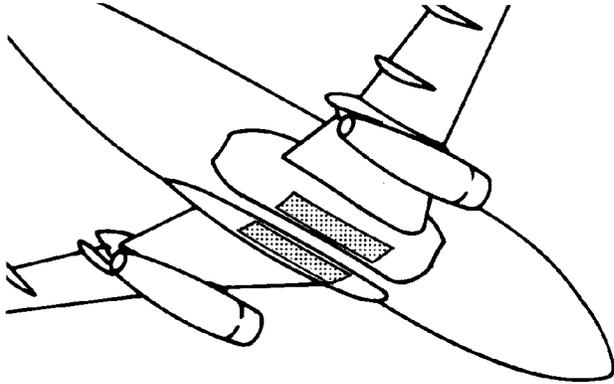
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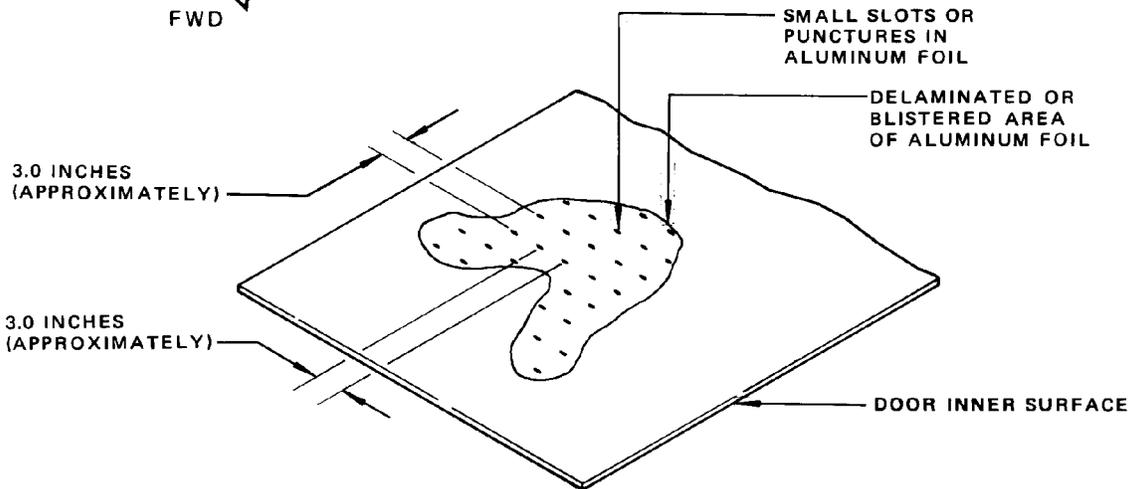
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ALUMINUM FOIL REPAIR  
 DETAIL A

Air Conditioning Access Doors Inner Surface Repair  
 Figure 801

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APU ACCESS DOOR - DESCRIPTION AND OPERATION

1. General

- A. The APU access door is situated on the aft lower surface of the fuselage and extends from approximately station 1088 bulkhead to station 1156 bulkhead. (See figure 1.) This is a cowl door that is arranged to provide easy access to the APU. The door is supported on the door sill and fuselage lower torque box structure by two hinges on the right edge of the door and by three tension latches that are located on the left edge of the door. The hinges are equipped with locking levers and shear pins to facilitate door removal. An adjustable latch fitting and stop assembly, attached to the lower torque box structure, mates with each latch. Two door-open brace rods, one located near the forward edge and one near the aft edge of the door inner surface, are provided to secure the door in open position. A drain mast (detail A) is situated in the left forward side of the door and diagonally opposite the APU cooling air exhaust duct (detail B) and the air exhaust exit in the door. The drain mast is connected by fluid line tubes to drain cups which are attached by brackets to the inner surface of the door. The tail skid fairing aft assembly is attached to the forward lower surface of the APU access door and extends to station 1114. For information on the tail skid fairing, refer to Tail Skid, Chapter 32.
- B. The door gussets, doublers, clips, intercostals, hinge frame and the two-piece bonded type skin are fabricated from clad aluminum alloy sheet. Tees and latch frame channels are aluminum alloy extrusions. The latches, latch fitting and stop assemblies and hinges are constructed of aluminum alloy and as required of corrosion resistant steel. The drain mast is constructed of an epoxy reinforced plastic glass fabric and the drain cups and the fluid line tubes of corrosion resistant steel. The cooling air duct, flange and outlet are also fabricated from corrosion resistant steel. The door is formed to fair with the fuselage contour when it is closed and latched.

2. Latching Mechanism

- A. The three tension latch assemblies provide a means of quickly unlatching the APU access door, permitting the door to be opened for easy access to the APU. The latches also provide a positive door lock.
- B. The latches are of fail-safe design. Safety features include trigger action and actuator safety and the overcenter toggle action of the latch handle. A fail-safe spring design is incorporated in the trigger mechanism so that failure of the spring will not cause the latch to open.
- C. The trigger in the latch handle can be operated by moderate pressure to release the latch handle from the closed and locked position. The latch handle has approximately 15 degrees of free travel and affords as much as an eight-to-one mechanical advantage in latch operation.
- D. The exposed surfaces of the handle and trigger are agreeable in color with the adjacent clad aluminum structure.

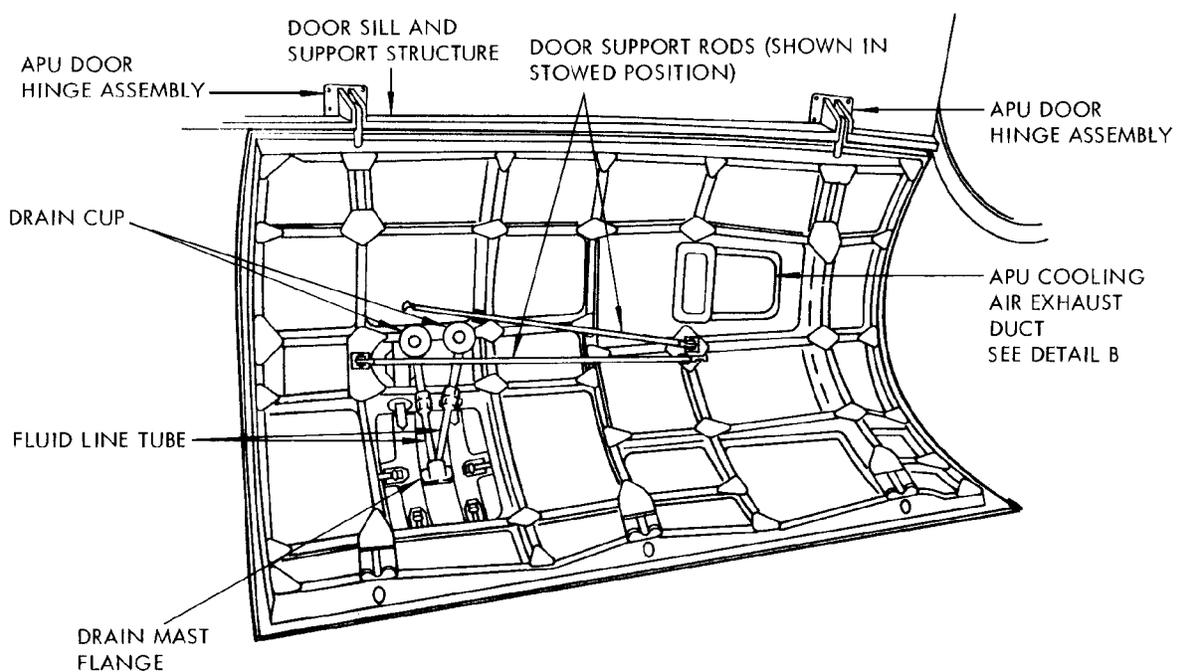
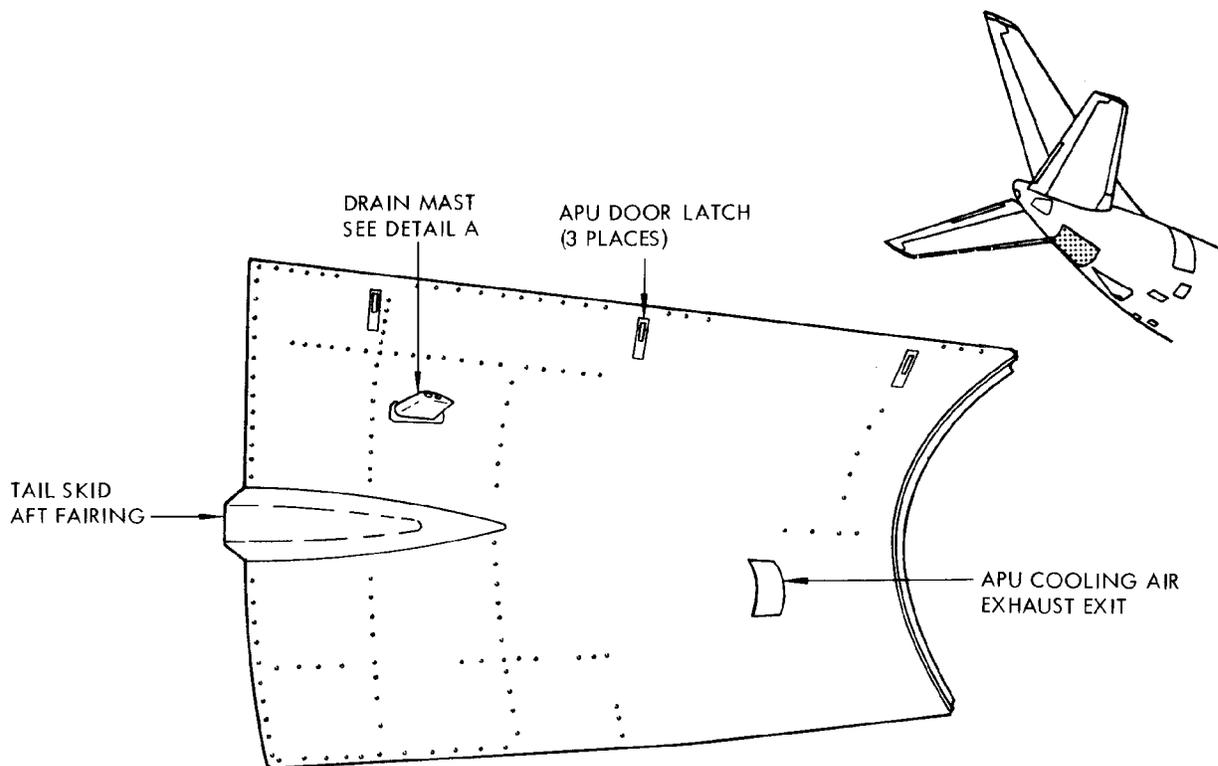
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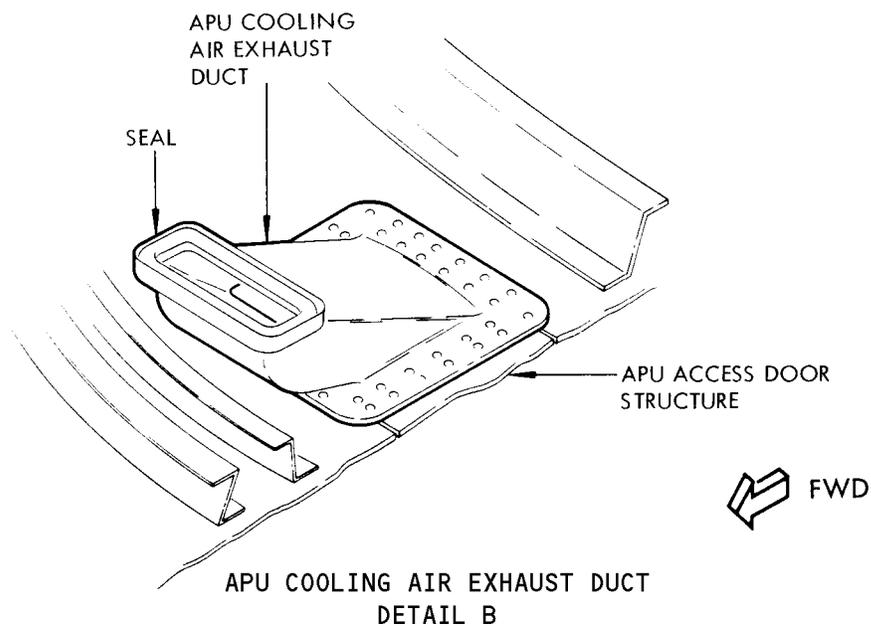
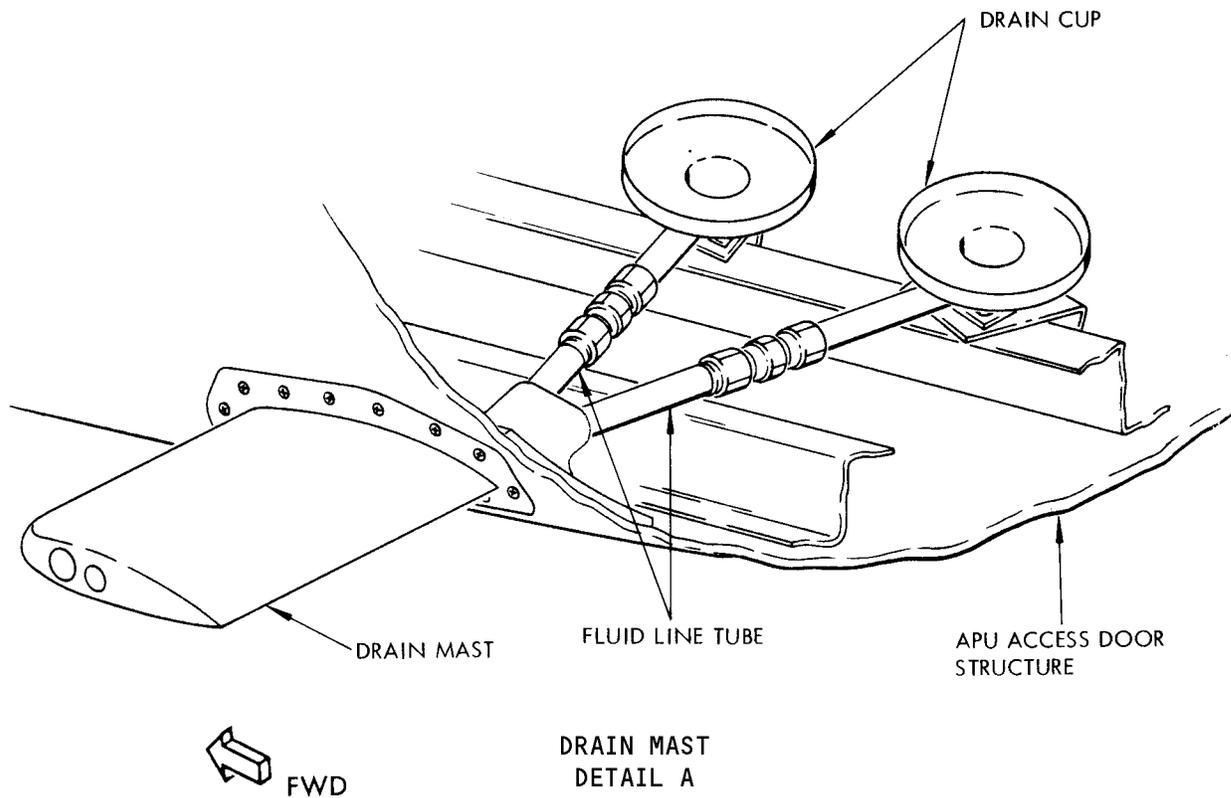
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APU Access Door  
 Figure 1 (Sheet 1)

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APU Access Door  
 Figure 1 (Sheet 2)

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## MAINTENANCE MANUAL

### 3. Drain Mast

A. A drain mast (detail A) is located on the forward left exterior surface of the door and diagonally opposite the APU cooling air exhaust exit in the door. The mast is situated on the door at an angle to prevent its being damaged in the event the airplane is scuffed. Fluid line tubes lead from the exterior surface of the mast to drain cups which are attached by brackets to the inner surface of the door. Fluid that enters the cups flows overboard through the tubes and the drain mast.

### 4. APU Cooling Air Exhaust Duct

A. The APU cooling air exhaust duct (detail B) is attached to the aft right interior surface of the door. The duct directs the cooling air from the APU through the cooling air exhaust exit in the door.

### 5. Operation

A. The APU access door is opened by pushing the trigger in each latch handle, using moderate thumb pressure, which releases the latch safety catch allowing the latch handle and hook to begin the movement required to unlatch the door. While manually restraining the door from opening, each latch handle is moved to its full open position. This action disengages the latch hook and the mated latch fitting and allows the door to open. The door is then manually swung open. The free end of each door brace rod is then unlatched from its stowed position on the door inner surface and is used to secure the door in open position.

B. The door is closed by returning the door brace rods to their stowed position and manually moving the door to closed position to begin latch engagement. Each latch hook is engaged with its mated latch fitting and the door is closed and locked by pushing the latch handle to its closed position flush with the skin. Hand pressure only is used to close the latches.

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LOWER NOSE COMPARTMENT ACCESS DOOR – DESCRIPTION AND OPERATION

1. General

- A. The lower nose compartment access door is an inward opening plug type door, which is operated from outside the airplane, and is situated forward of the nose wheel well. (See figure 1.) The door is included in the door warning system, sharing a common warning light in the control cabin with the equipment compartment external access door.
- B. The door is of alclad frame and skin construction. Two hinge arms extend aft from the door structure to engage hinge fittings on the forward face of the nose wheel well forward bulkhead. Around the periphery of the door a continuous seal prevents loss of cabin air when the airplane is in flight. Pressurization loads on the door are transmitted to the fuselage by four stop pads on the edge of the door, which bear against equivalent pads attached to the fuselage structure surrounding the door.

2. Latching Mechanism

- A. The door latching mechanism consists of an operating shaft connected to a latch pin which protrudes through the forward edge of the door to engage with a hole in the surrounding structure. The operating shaft has an outside handle which is recessed flush with the exterior skin. (See figure 1.)

3. Operation

- A. The door is opened from outside the airplane by pushing the trigger in the door handle, which allows the handle to spring out from its flush position so that it may be easily grasped, and then rotating the handle counterclockwise. This action withdraws the latch plunger, energizes the door warning light in the control cabin, and allows the door to be hinged upward. As soon as the door has moved clear of its opening the handle may be rotated clockwise and pushed back into its recess in the exterior skin of the door.
- B. When the door is closed the handle must be returned to its open position before the door will seat in its opening. The door is latched shut by a final clockwise rotation of the handle which pushes the latch plunger into the structure forward of the door and opens the door warning switch. When the door is thus closed and latched, the handle is then pushed back into its recess.

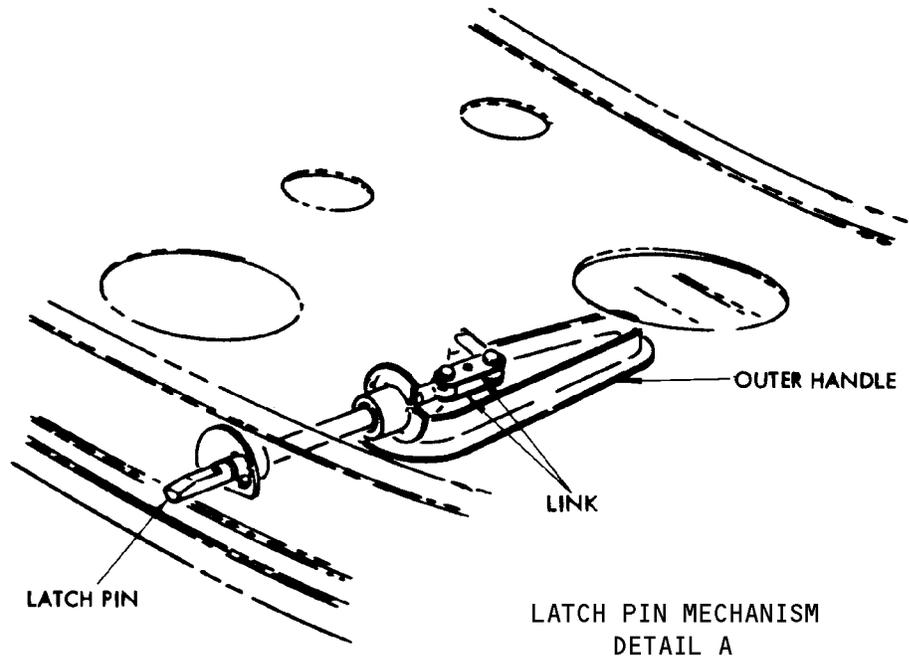
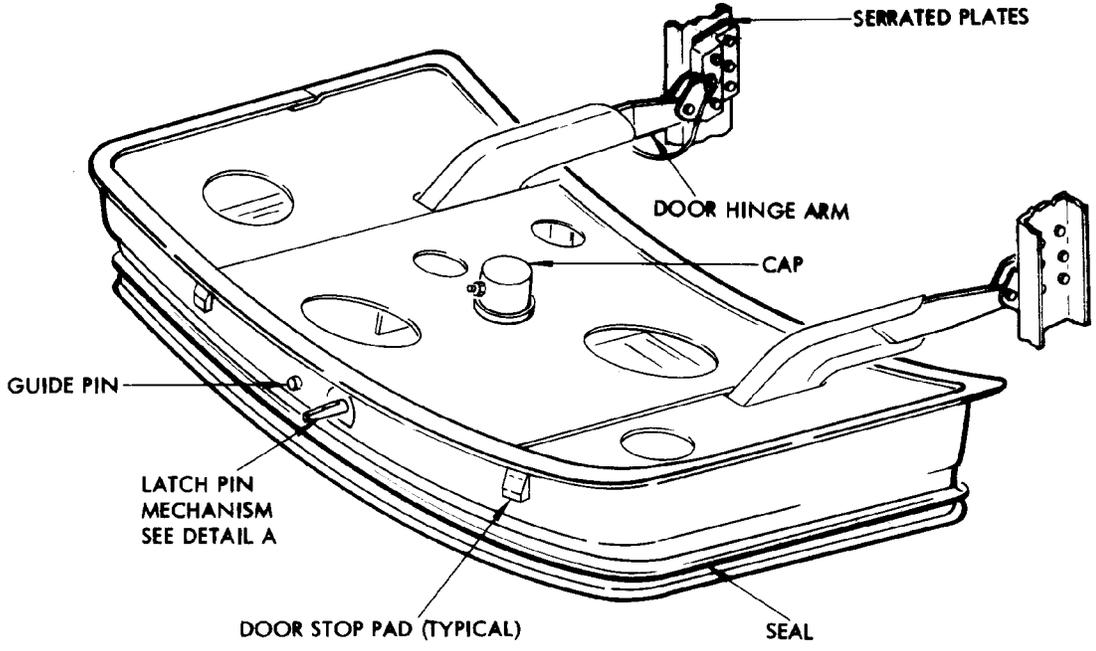
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Lower Nose Compartment Access Door  
 Figure 1

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LOWER NOSE COMPARTMENT ACCESS DOOR – REMOVAL/INSTALLATION

1. General

- A. If the lower nose compartment access door is removed and reinstalled on the same airplane without any disturbance to its adjustments, it may be accomplished in accordance with par. 4 by performing only steps A, B, G and H.
- B. If the door to be installed is a new unit, it must be accomplished in accordance with par. 4 by performing all steps.

2. Equipment and Materials

- A. Shim – 0.050 inch

3. Remove Lower Nose Compartment Access Door

- A. Open door and place in full open position.
- B. Remove bolt (10, Fig. 401, Detail A), washer, nut, and spacer (9) from each door hinge arm (2) and serrated hinge (1).
- C. Slide door out of airplane through door access hole.

4. Install Lower Nose Compartment Access Door

- A. Check door seals for condition. If required, repair per 52-09-100, Approved Repairs.
- B. From inside airplane, place door in mounting position and install spacer (9, Fig. 401, Detail A), bolt (10), washer and nut through each hinge arm (2) and serrated hinge (1). Tighten bolt.

NOTE: Tighten bolt finger-tight only if door is to be adjusted.

- C. Adjust doorstops (4) so that door is recessed -0.03 to -0.09 inch in from fuselage exterior profile. This tolerance is for an unpressurized condition.

NOTE: All doorstop pads must rest on respective frame stops. Serrations on frame stops must be properly seated. You can increase the limits by 0.03 inch in one or more locations to make the door recessed 0.00 to -0.12 inch. The sum of the lengths of the increased limits must not be more than 4.2 inches.

- D. Serrations in serrated hinge (1) must be seated in serrated plates (8). Tighten bolts (7).
- E. With 0.050-inch shims between forward doorstops, adjust serrated latch plate so that door will latch. Door should rest on shims but latch pin (5) should not force door against shims except to overcome resistance of seal (3). Remove shims.
- F. Install guide pin (6) on door.
  - (1) Loosen screw to allow guide pin assembly to slide into slotted hole in guide pin plate.

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## MAINTENANCE MANUAL

- (2) Close door, position door in center of opening and latch. This will position guide to match guide pin plate on door frame.

NOTE: Gap between door and fuselage skin should be  $0.12 \pm 0.06$  inch.

- (3) Carefully open door and tighten guide pin, attach screw.
- G. Check operation of door warning system (Ref 52-71-0, Door Warning System).
- H. Close and latch lower nose compartment access door.

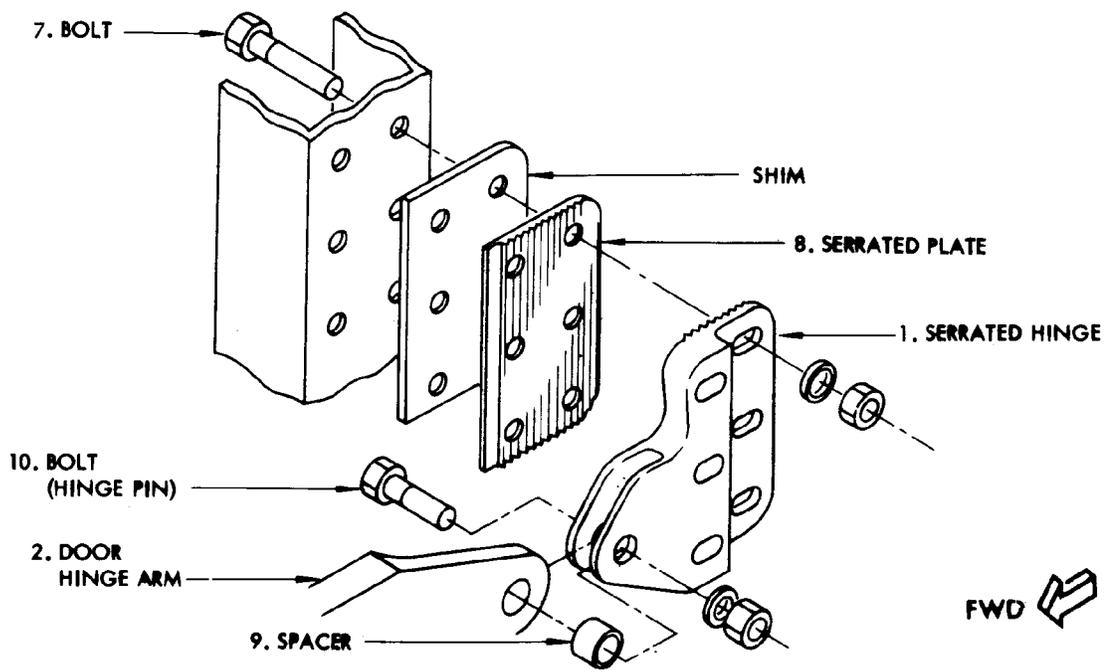
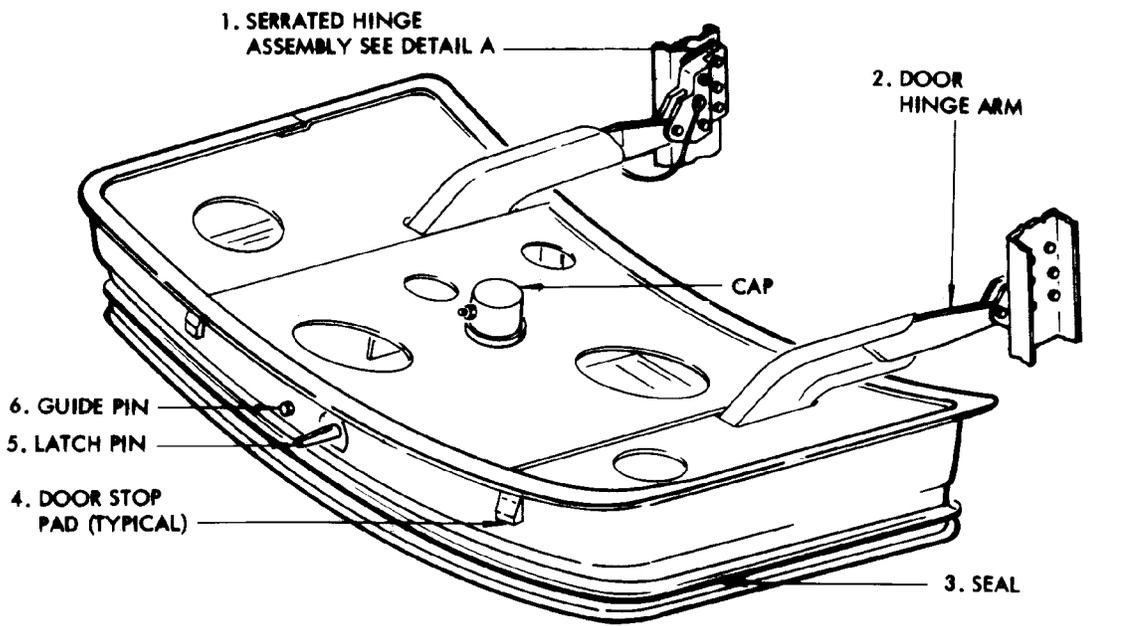
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SERRATED HINGE ASSEMBLY  
 DETAIL A

Lower Nose Compartment Access Door Installation  
 Figure 401

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ELECTRONIC EQUIPMENT COMPARTMENT EXTERNAL ACCESS DOOR -  
DESCRIPTION AND OPERATION

1. General

- A. The electronic equipment compartment external access door is a plug type, inward opening, sliding door in the lower fuselage aft of the nose wheel well (Fig. 2). The door is operated from outside the fuselage and it is included in the door warning system, sharing a common warning light in the control cabin with the lower nose compartment access door. A door track installation inside the fuselage structure allows the door to be pushed inward, up, and to slide to the right of the door opening in the fuselage when entry is desired.
- B. The door is of alclad frame and skin construction. Around the periphery of the door a continuous seal prevents loss of cabin air when the airplane is in flight. Pressurization loads on the door are transmitted to the fuselage by the four latch pins. The stop fittings on the door and the door lock fittings on the structure through which the latch pins pass are so designed that, if the pins should accidentally be left unlatched, the fittings will bear against each other and so transmit pressurization loads safely.

2. Latching Mechanism

- A. The door latching mechanism consists of four latch pins (Fig. 2), which project through stop fittings (24, detail D), on the four edges of the door and engage corresponding door lock fittings (16, detail B), in the fuselage structure surrounding the door. The latch pins are actuated by a common rack and pinion mechanism. (See detail C.) The inner end of each pin is in the form of a rack and all four racks engage with a pinion on the central actuator shaft (21). The shaft has an outer handle (17, detail A) by means of which the door is operated from outside the airplane.

3. Operation

- A. The means by which the door is moved inward, up and to the right of the door opening in the fuselage to its stowed position is provided by door tracks (8), a lower web (12), upper web (11) with eight rollers (9), a spring spool assembly (4), track attach brackets (19), uplatch (23, view 1), and the necessary stops to limit travel of components of the installation. The door tracks are inclined upward and outboard from door opening. Near the door opening, door tracks are attached to electronic rack supports (2) and outboard and upward from the opening they are attached to electronic rack stanchions (3). The lower web

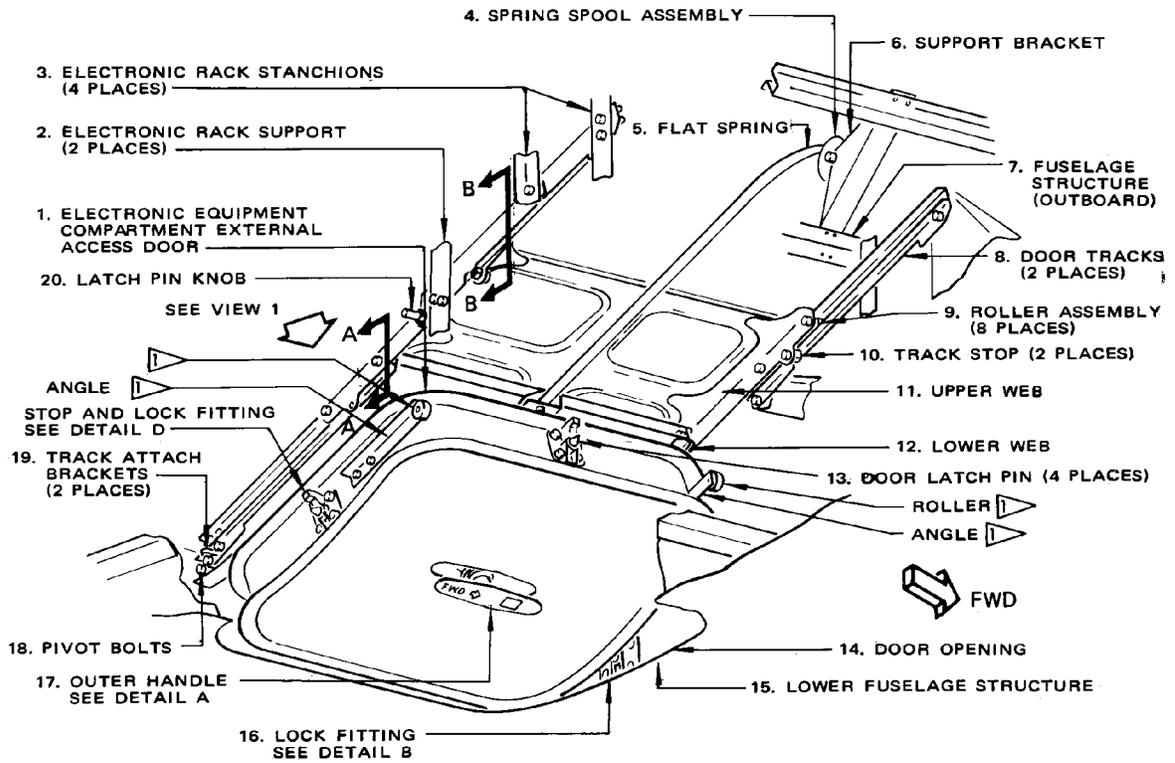
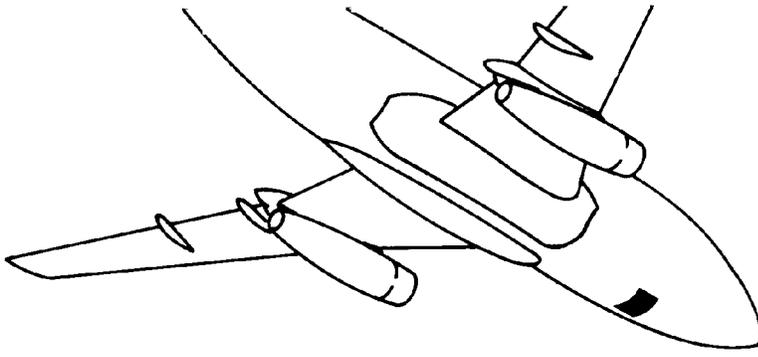
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 ON LATER AIRPLANES AND AIRPLANES INCORPORATING BOEING SERVICE BULLETIN NO. 52-1016

Electronic Equipment Compartment External Access Door  
 Figure 1 (Sheet 1)

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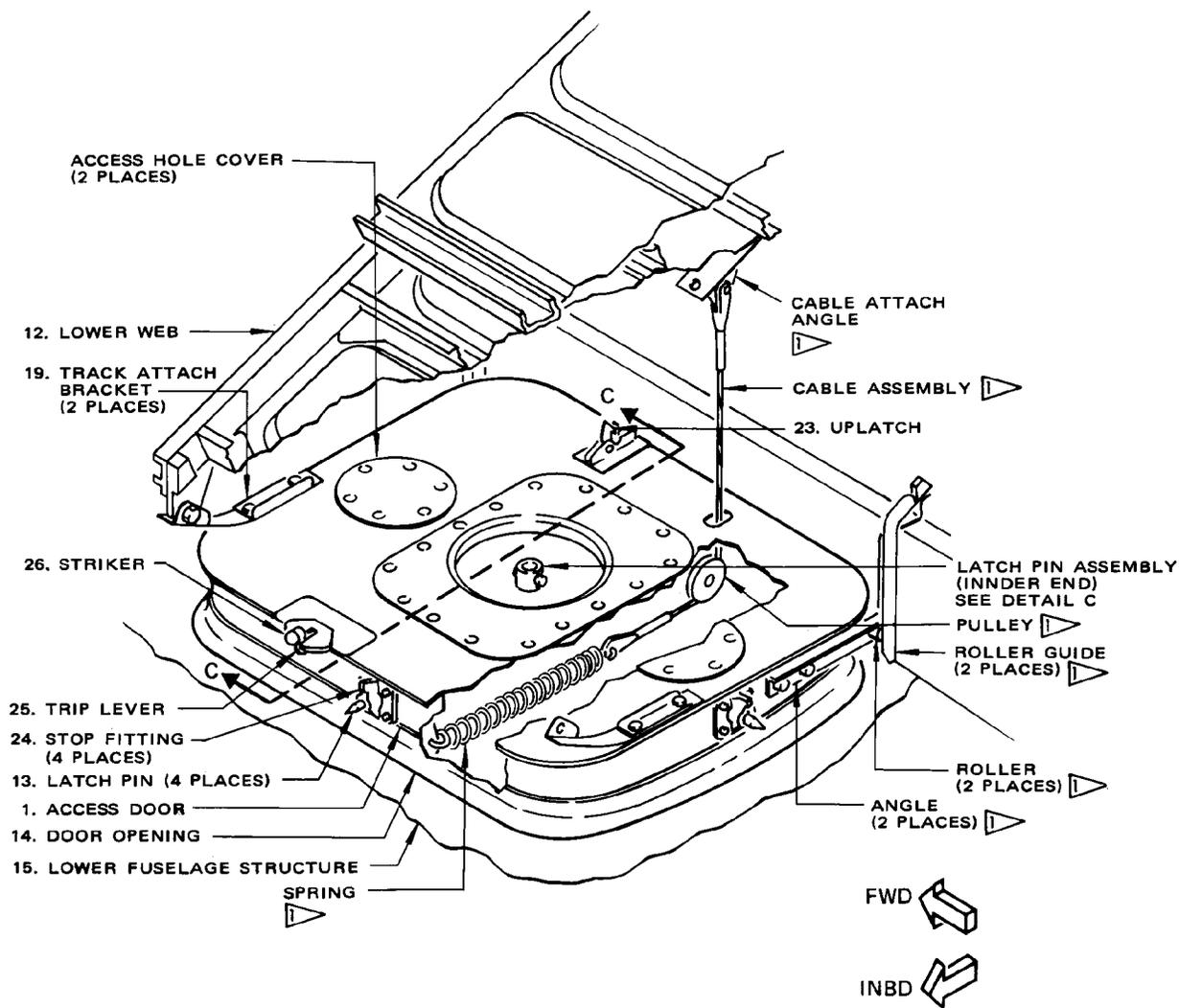
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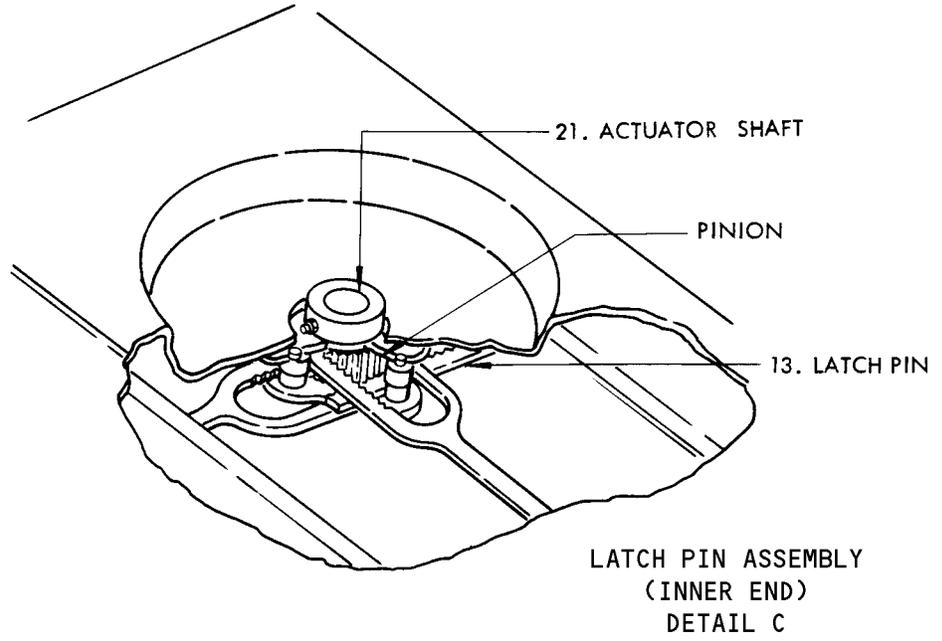
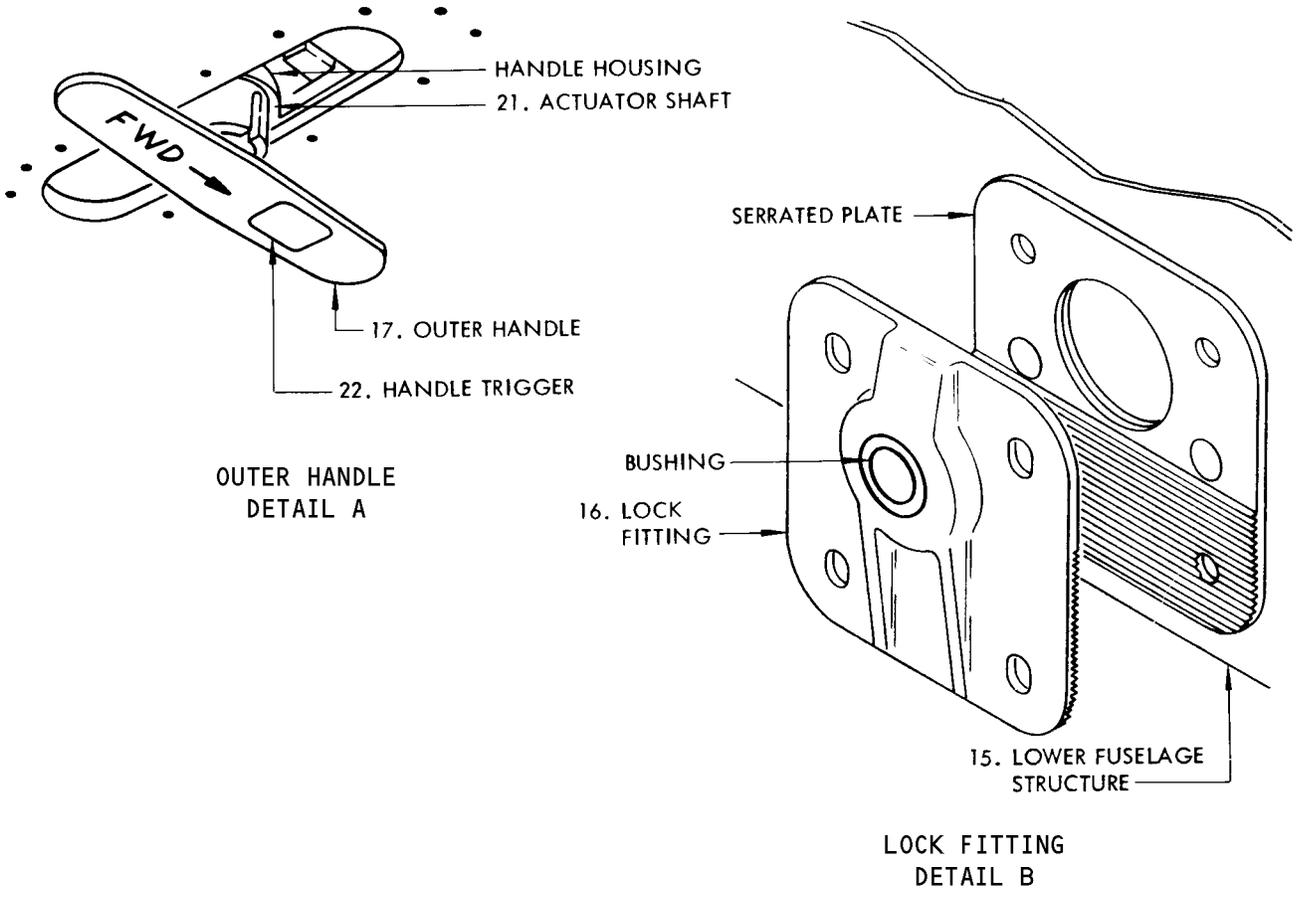


ELECTRONIC EQUIPMENT COMPARTMENT EXTERNAL ACCESS DOOR  
 VIEW 1

Electronic Equipment Compartment External Access Door  
 Figure 1 (Sheet 2)

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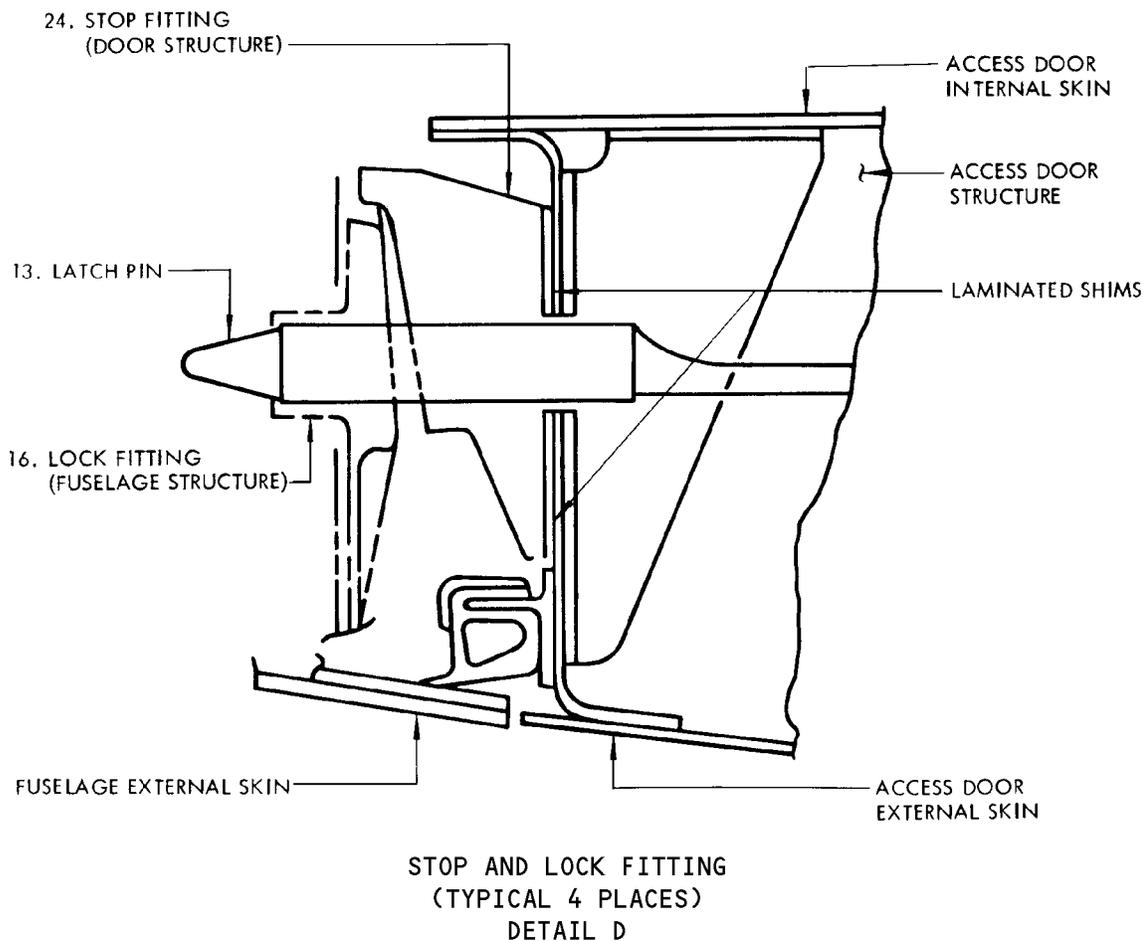
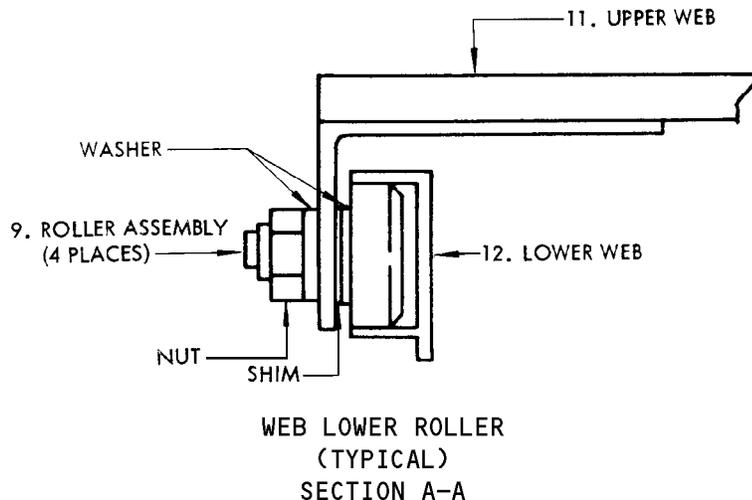


Electronic Equipment Compartment External Access Door  
 Figure 1 (Sheet 3)

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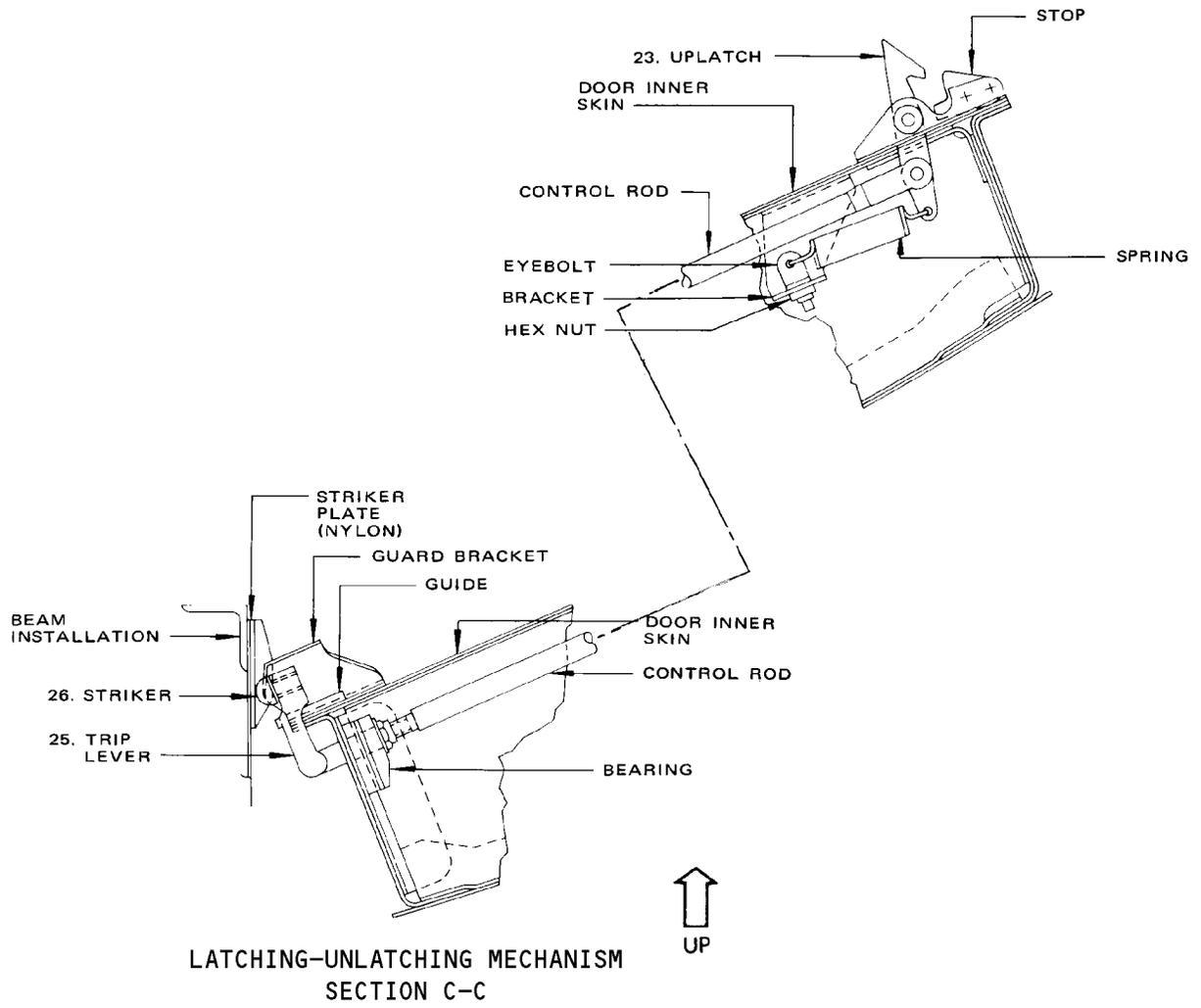
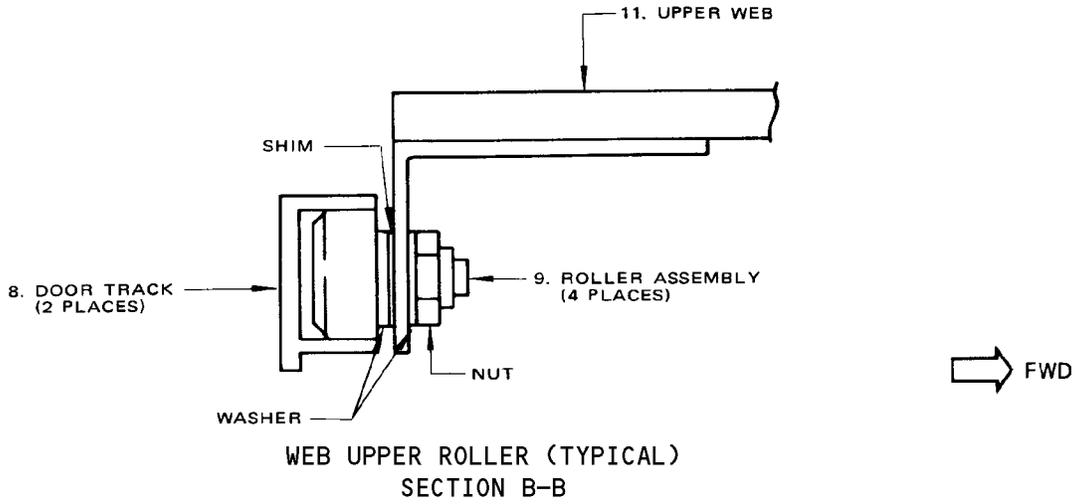
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Electronic Equipment Compartment External Access Door  
 Figure 1 (Sheet 4)

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Electronic Equipment Compartment  
 Figure 2

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**MAINTENANCE MANUAL**

- B. Supports the door when it is opened and moved upward along the inclined tracks to its stowed position. The door is attached to tracks on the lower web by flexible leaf-spring type track attach brackets (19) located near the forward and aft edges of the inner side of the door. On the inner right side of the door a spring-loaded uplatch (23, view 1, section C-C), attaches door to a latch pin on the lower web when the door is opened and pushed upward to the right 1/2 to 1 inch. If the door is allowed to roll to the left, when opened, it will disengage itself from the tracks. The upper web is located between the door tracks and is equipped with eight rollers (9, sections A-A and B-B), which permits lower web (12) to telescope under the upper web as the door moves up the tracks to a stowed position. The rollers are arranged to provide a rolling support for the upper web on the door tracks and, also, support the lower web with attached door on the upper web. Spring spool assembly (4) is attached by support bracket (6) to fuselage structure near the upper, outboard, end of the tracks. The free end of flat spring (5) is attached to the lower web assembly. When the door is opened and pushed up and to the right, the lower web is engaged and spring spool assembly (4) assists in propelling the door into its stowed position. Stops (10) are located to limit door travel and trip lever (25, view 1, section C-C), is provided to actuate the uplatch (23), freeing the door from its outboard attachment to the lower web when the door is closed.
- C. On later airplanes, and airplanes incorporating Boeing Service Bulletin No. 52-1016, a cable attached to an angle on the lower track structure and to a spring inside the door reduces the rate of fall of the door after it is released from the uplatch. Also, needle bearing rollers, supported by angles attached to the door, and roller guides attached to the right beam at the door opening to accept the rollers, center the door in the opening and on the door track when the door is opened and closed. A guard over the striker prevents accidental release of the door from the uplatch.
- D. The door is opened from outside the airplane by pushing trigger (22, detail A) in outer handle (17), which allows the handle to spring out from its flush position so that it may be easily grasped, and then rotating the handle counterclockwise. This action withdraws all four latch pins (13), closes the switch to energize the appropriate door warning light in the control cabin, and allows the door to be pushed up and to the right. As the entire door is pushed up, the right end of door pivots upward about track attach bracket pivot bolts (18), which are located on the left end of the door, and uplatch (23), on the right end of door, engages the latch pin on lower web. The door is then pushed up and to the right on the inclined tracks to its stowed position. Very little effort is required to push the door into stowed position as the spring spool assembly (4) acts to counterbalance the weight of the door.

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## MAINTENANCE MANUAL

- E. The door is closed from outside the airplane, after making sure the uplatch was engaged when the door was stowed, by pushing aft on latch pin knob (20), which releases the door from stowed position, then pulling the door and track down and to the left until it is possible to grasp the door handle. Using the door handle, the door and track are pulled down and to the left until the door track on the lower web, and striker (26), are located on the left beam at the door opening. Trip lever (25) then trips uplatch (23), releasing the door from the lower web and allowing it to be pulled down into the door opening. When the door is properly seated, a downward pull on the door handle will cause the door to compress the door pressure seal. A clockwise rotation of the handle pushes the four latch pins (13) into engagement and opens the door warning switch. With door locked in closed position, the handle must then be pushed back into its flush position in its recess in the exterior skin of the door.

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ELECTRONIC EQUIPMENT COMPARTMENT EXTERNAL ACCESS DOOR -

REMOVAL/INSTALLATION

1. General

- A. If the electronic equipment compartment external access door is removed and installed on the same airplane, without disturbing door adjustments, it may be installed in accordance with par. 3 of the following procedures.
- B. If the door to be installed is a new unit, it must first be prepared as described in Electronic Equipment Compartment External Access Door - Adjustment/Test.

2. Remove Electronic Equipment Compartment External Access Door

- A. Open electronic equipment compartment external access door (1, Fig. 401), and slide door outboard to gain access to the two pivot bolts (5).
- B. Support the door then trip uplatch (7, view 1) using striker (8) to free door from lower web (2).
- C. Disconnect the door cable assembly from the attach angle on lower track structure.
- D. Restrain the lower web from moving into stowed position, then remove the two pivot bolts from track attach brackets (6) and tracks (4).
- E. Move track installation into stowed position.

**WARNING:** FAILURE TO STOW TRACK INSTALLATION BEFORE REMOVING DOOR CAN RESULT IN STOWAGE ASSIST SPRING COMING OFF SPOOL AND CAUSING INJURY TO PERSONNEL.

- F. Remove the door from the airplane through door opening (3).

3. Install Electronic Equipment Compartment External Access Door

- A. Position door (1, Fig. 401), in door opening (3) in lower fuselage structure. Locate door so that lower web (2) can roll into position over the door.
- B. Release track from stowed position and move the lower web into position over the door. Align bolt holes in track attach bracket (6) and track (4).
- C. Install pivot bolts (5).
- D. Connect the door cable assembly to the attach angle on lower track structure.
- E. Engage door uplatch (7, view 1) on uplatch catch on lower web (2).
- F. Check for unobstructed movement of door and track. If required, adjust door as described in Electronic Equipment Compartment External Access Door - Adjustment/Test.

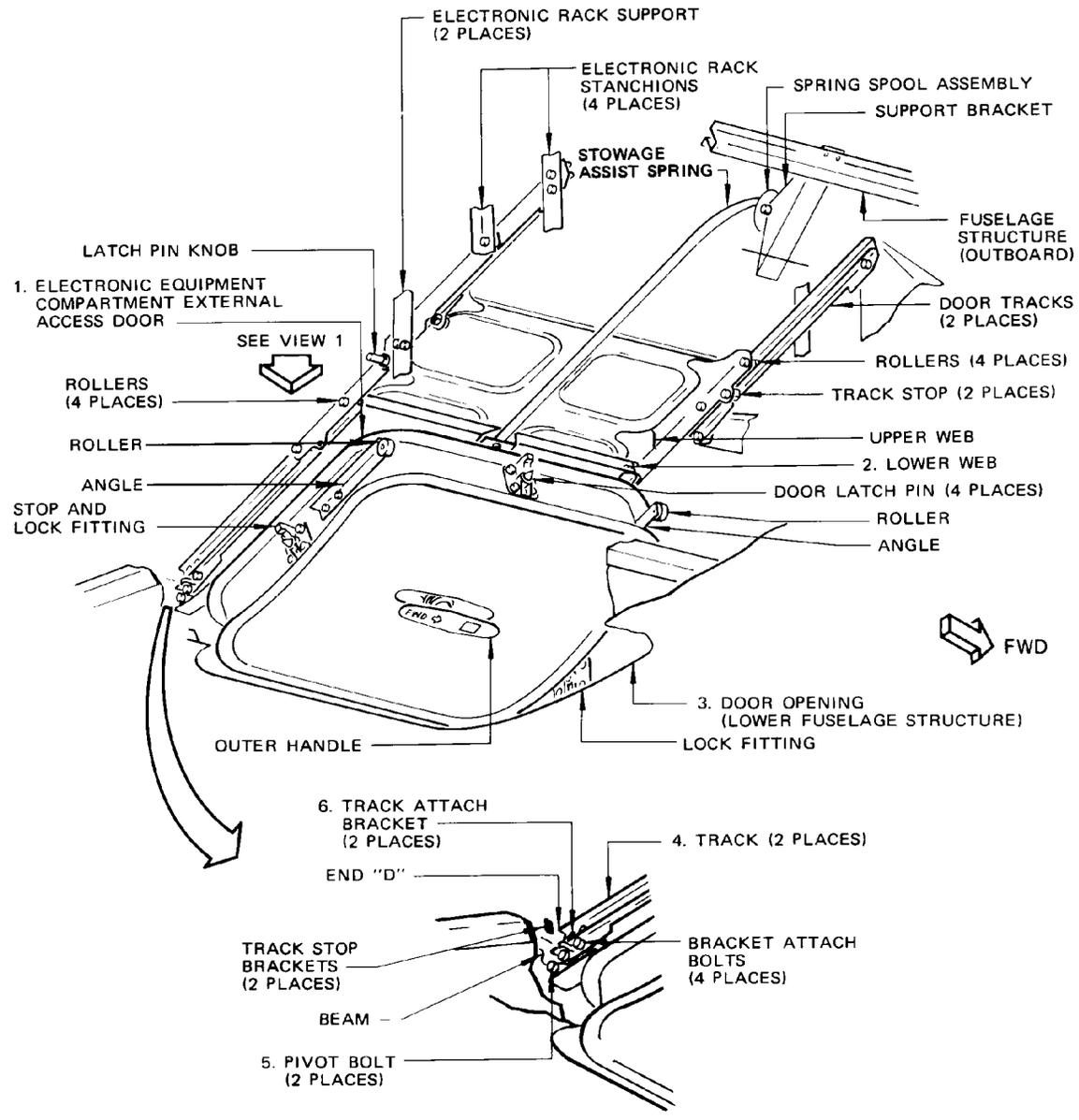
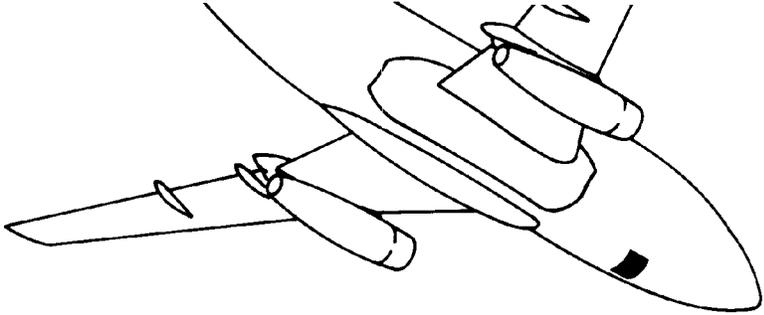
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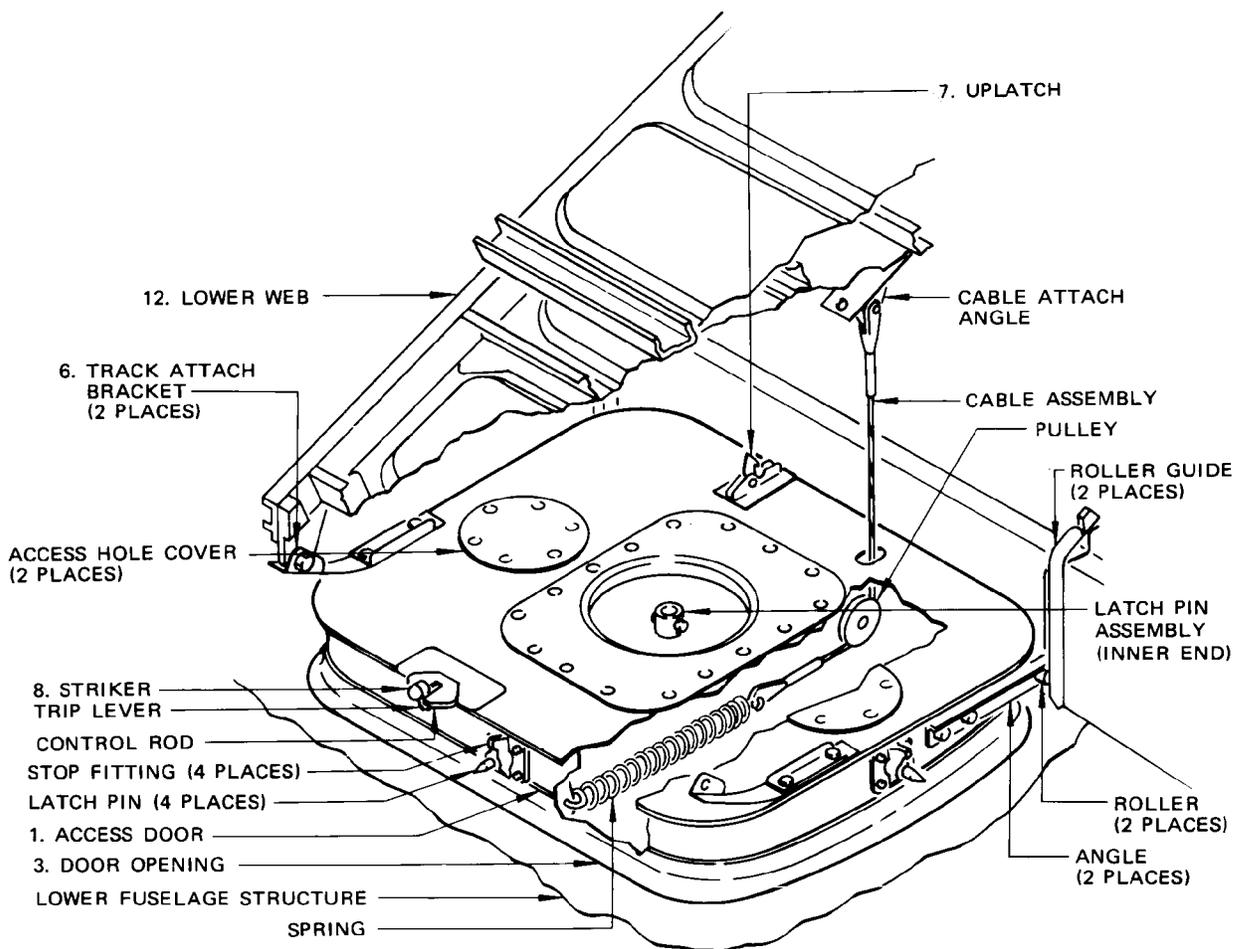


Electronic Equipment Compartment External Access Door Installation  
 Figure 401 (Sheet 1)

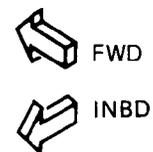
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ELECTRONIC EQUIPMENT COMPARTMENT EXTERNAL ACCESS DOOR  
 VIEW 1



Electronic Equipment Compartment External Access Door Installation  
 Figure 401 (Sheet 2)

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ELECTRONIC EQUIPMENT COMPARTMENT EXTERNAL ACCESS DOOR - ADJUSTMENT/TEST

1. Electronic Equipment Compartment External Access Door Adjustment

A. Equipment and Materials

- (1) Laminated Shims - BACS4OR05U05
- (2) Washer - BACW10P227AX

B. Adjust Electronic Equipment Compartment External Access Door

- (1) Position door assembly (Fig. 502, 503, 504, 505) in door opening (7) and lock door.
- (2) Check that gap between fuselage external skin (29) and door external skin (28) is 0.09 +0.03/-0.03 inch. Where necessary, trim door skin to achieve this condition (Detail D).

**CAUTION:** DO NOT TRIM FUSELAGE EXTERNAL SKIN

- (3) Check gap between stop fitting (22) and lock fitting (19), on fuselage structure is 0.03 +0.02/-0.02 inch. Adjust by removing laminated shims (27) as required.
- (4) Make sure the contour of the door is inboard of the contour of the fuselage 0.03 to 0.09 inch.

**NOTE:** You can increase the limits by 0.03 inch in one or more locations to make the door inboard 0.00 to 0.12 inch. The sum of the lengths of the increased limits must not be more than 4.5 inches.

- (a) If it is necessary, move the correct latch fitting (19) vertically over serrated plate (17) to adjust the door.
- (b) Tighten all bolts on latch fittings after you adjust them.
- (5) If adjustments are being made on new door installation, install door on door tracks before proceeding with step (6) (Ref 52-48-41 R/I).
- (6) Adjust latching-unlatching mechanism between access door and track installation.

**NOTE:** The following described adjustments should be made in the sequence indicated.

- (a) Loosen bolts attaching track stop brackets (Fig. 502, 503, 504, 505) to beam (12).
- (b) Extend track (15) until track ends locate in brackets (13).
- (c) Adjust brackets (13) forward or aft so that track (15) has 0.020- to 0.050-inch total forward and aft movement on brackets. Make sure track locates naturally into brackets without any forward or aft straining of track and without any binding of track rollers.
- (d) Tighten bolts attaching track stop brackets (13) to beam (12).

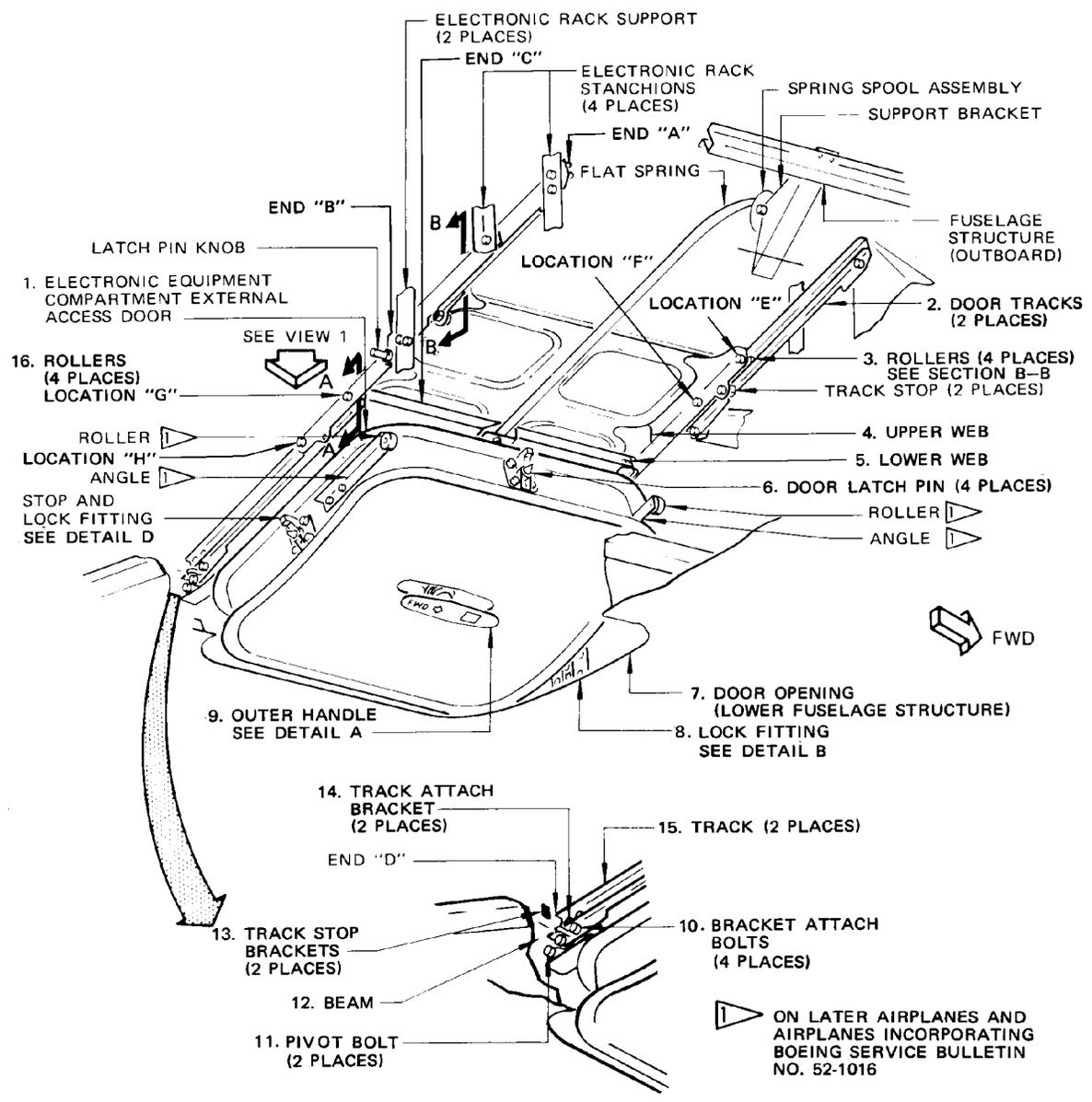
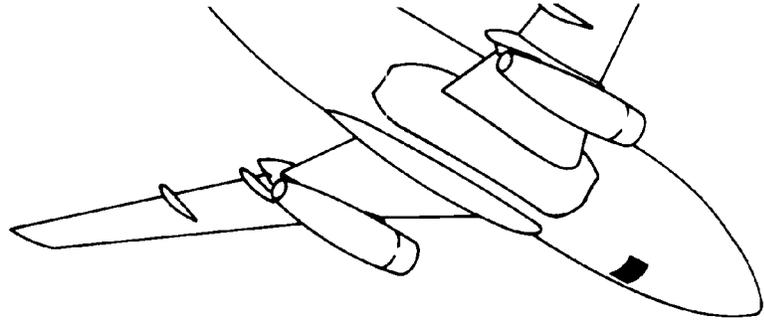
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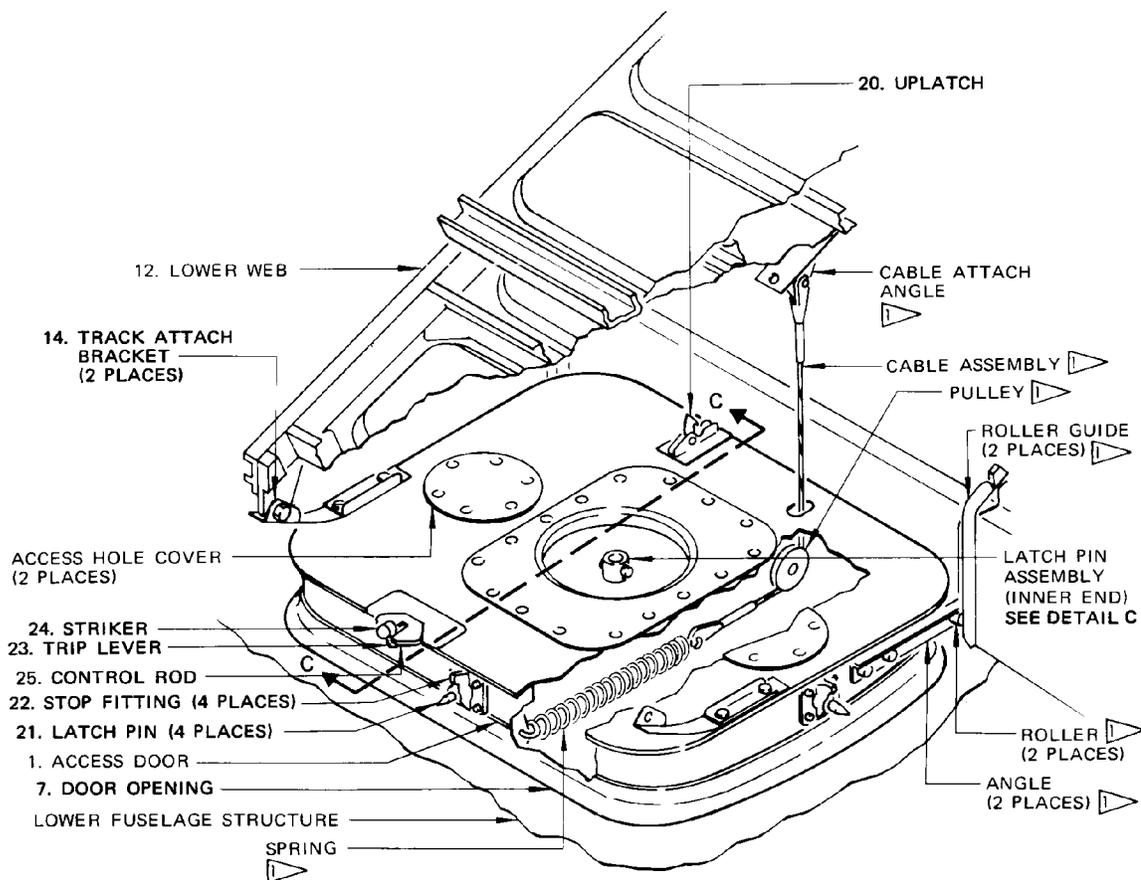
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Electronic Equipment Compartment  
 Figure 501

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**ELECTRONIC EQUIPMENT COMPARTMENT EXTERNAL ACCESS DOOR  
 VIEW 1**

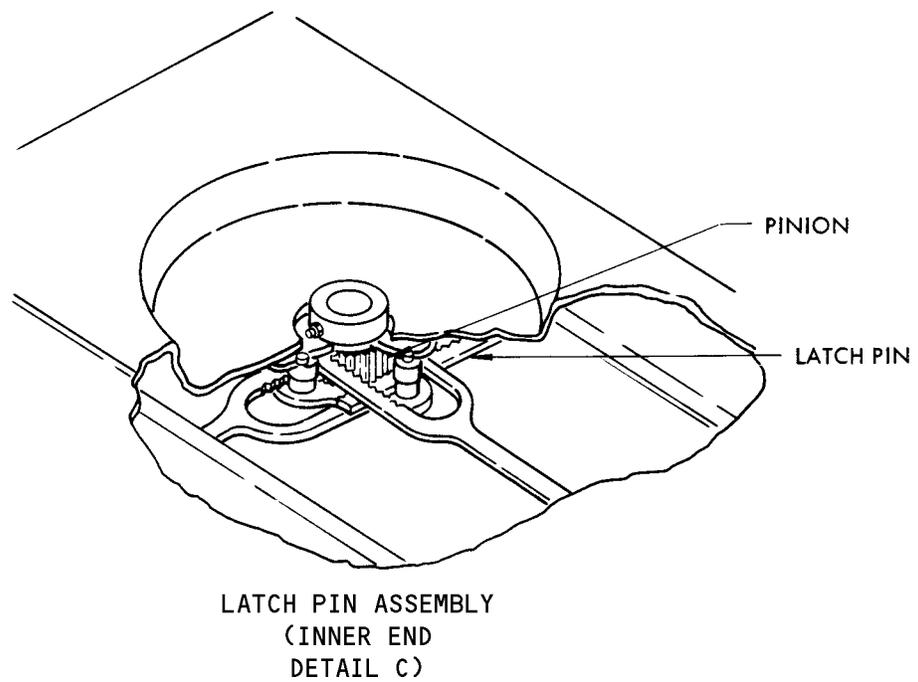
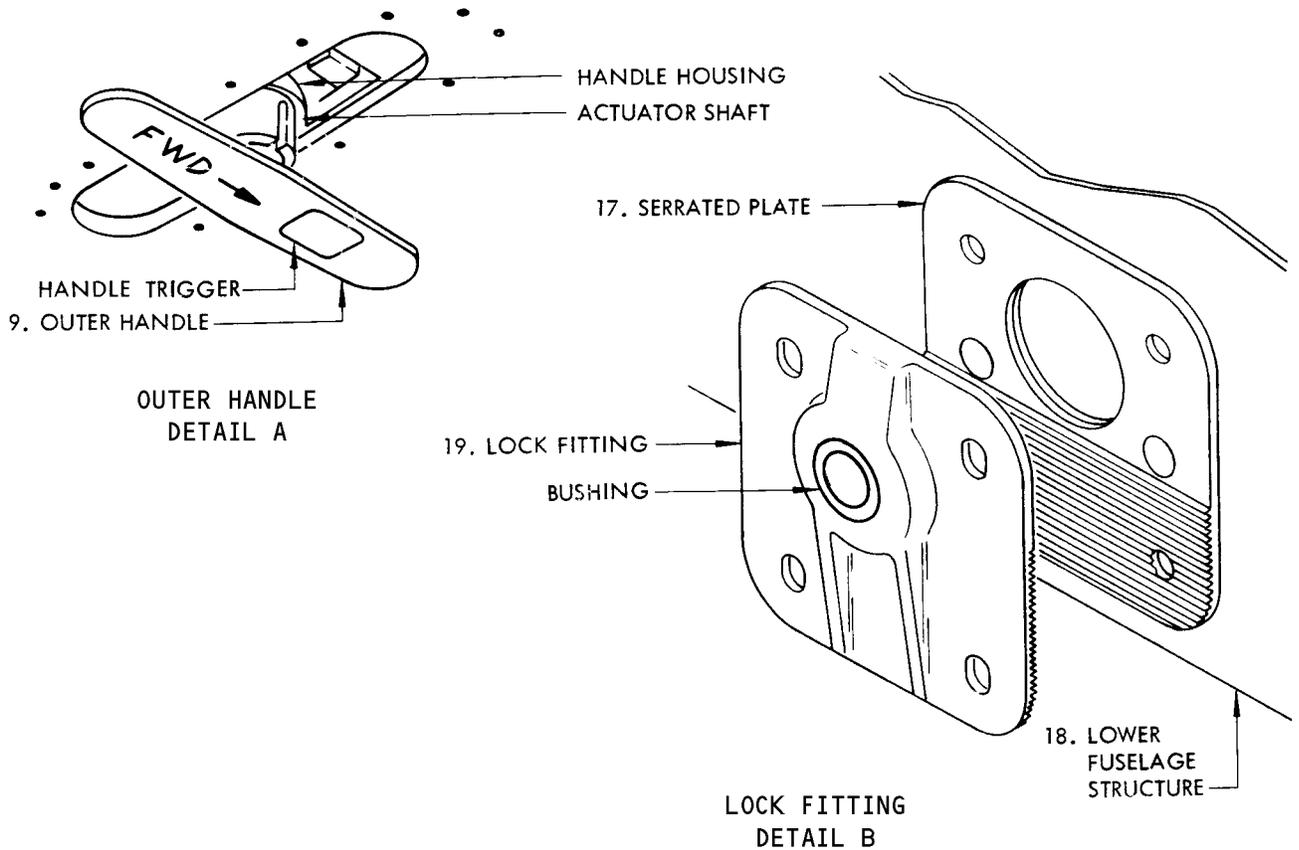
**Electronic Equipment Compartment 500  
 Figure 502**

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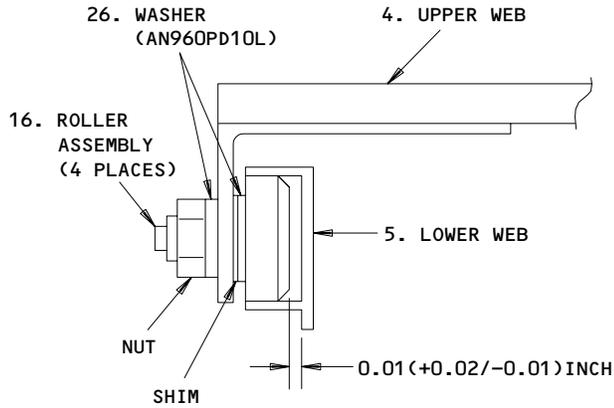


Electronic Equipment Compartment  
 Figure 503

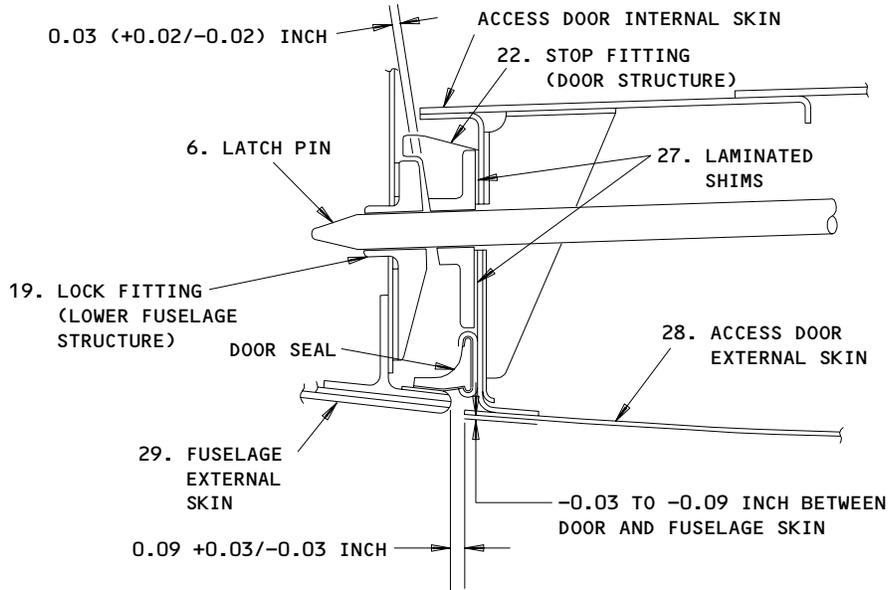
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**WEB LOWER ROLLER  
 SECTION A-A**

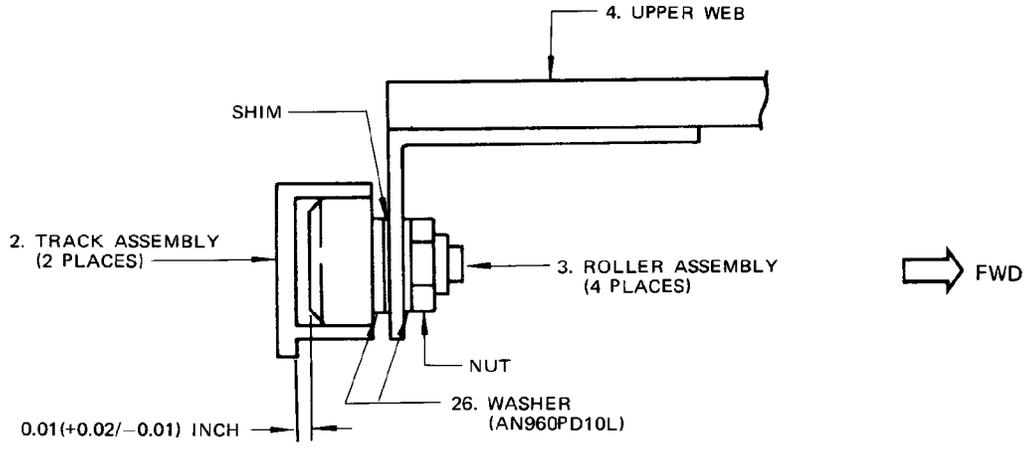


**STOP AND LOCK FITTING  
 (TYPICAL 4 PLACES)  
 DETAIL D**

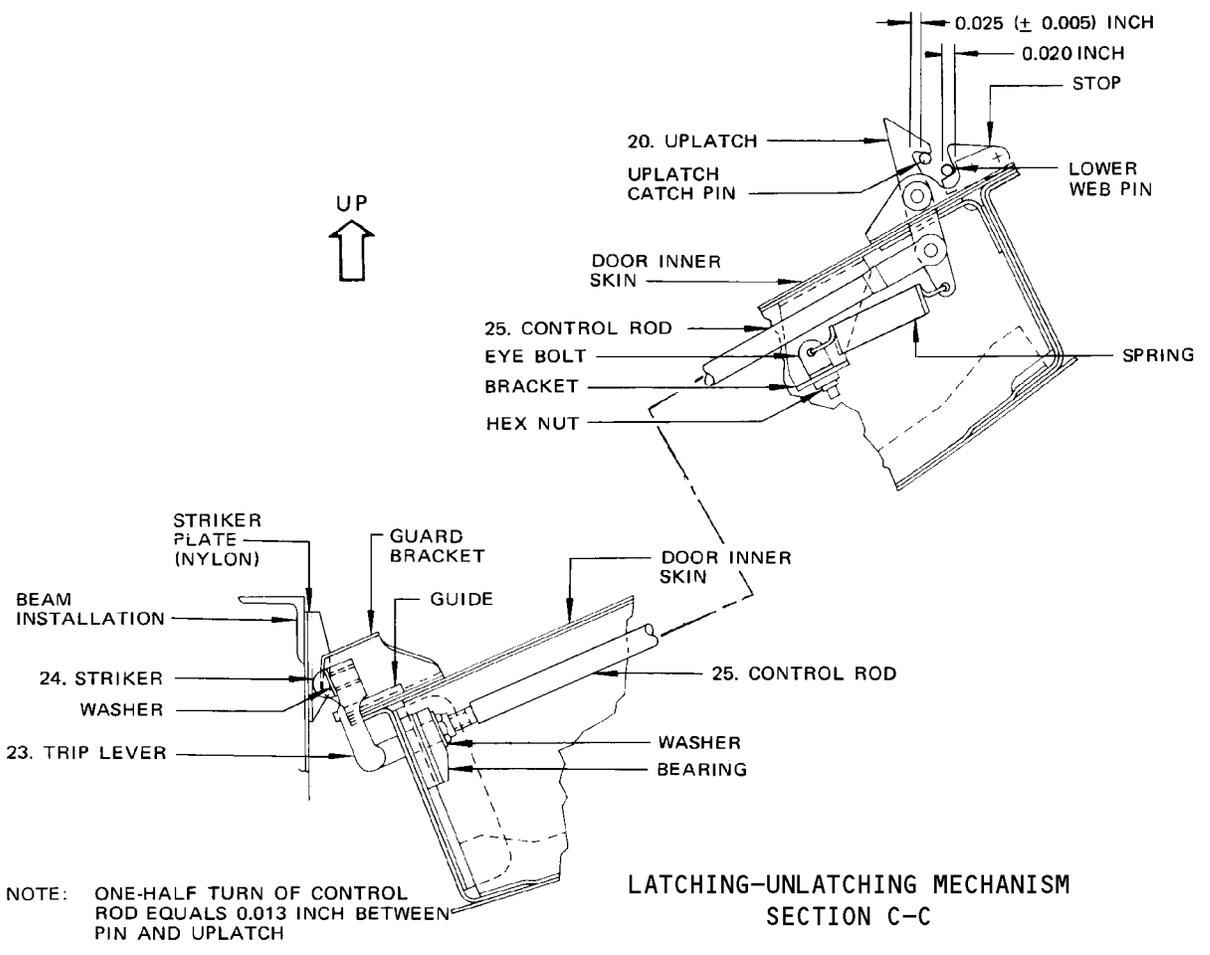
**Electronic Equipment Compartment External Access Door Adjustment  
 Figure 504**

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**WEB UPPER ROLLER  
 SECTION B-B**



**LATCHING-UNLATCHING MECHANISM  
 SECTION C-C**

**Electronic Equipment Compartment  
 Figure 505**

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- (e) Attach door to track.
  - (f) Loosen four bracket attach bolts (10) that secure track attach brackets (14) to door.
  - (g) Position door in door opening and lock the door.
  - (h) Check that ends of track (15) are fully located in track stop brackets (13).
  - (i) Tighten bracket attach bolts (10).
  - (j) Engage uplatch (20) on uplatch catch on lower web (5).
  - (k) Adjust shims on uplatch catch so there is 0.020 (+0.000/-0.000) inch clearance between the uplatch pin and stop.
- (7) Gain access to control rod (25, section C-C), loosen locknut and adjust trip lever (23) and control rod with washer against the bearing, to give 0.025 ( $\pm 0.005$ /-0.005) inch clearance between uplatch (20) and pin in uplatch catch. One-half turn of the control rod equals 0.013 inch between pin and latch. Tighten locknut.
- (a) Remove all washers from behind head of striker (24) on door then screw striker finger-tight into trip lever (23).
  - (b) Allow track to extend until ends of track (15) are fully located in track stop brackets (13) on beam (12).
  - (c) If the door releases from the track in the condition described in step (n), add one washer (BACW10P227AX) between striker (24) and trip lever (23). Lock with cotter pin. Proceed to step (q).
  - (d) If door (1) does not release from track (15), in the condition described in step (o), add washers (BACW10P227AX) one at a time until the door will release from the track. When the correct number of washers have been added to achieve door release from the track, add one additional washer. Lock with cotter pin.
  - (e) Check that during both opening and closing cycles of the door, that no interference or undue straining of the track occurs.
- (8) Adjust end clearance between ends of rollers and lower web.

**NOTE:** The following described adjustments should be made in the sequence indicated.

- (a) Roll lower web (Fig. 502, 503, 504), inboard until end "C" is within 1 inch of location "G."
- (b) Move lower web forward until ends of forward rollers (16) are flush with forward track of lower web.

**NOTE:** No clearance allowed.

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- (c) Adjust end clearance between ends of aft rollers at location "G" and track on lower web (5) at end "C." Remove shim laminations from rollers, either forward or aft rollers, to maintain 0.01 (+0.02/-0.01) inch end clearance. (See section A-A.) Do not remove the two washers (26) on each roller (16).
  - (d) Roll lower web outboard until end "D" is within 1 inch of location "H."
  - (e) Repeat steps (b) and (c) using end "D" with roller location "H."
  - (f) Check that upper web (4) rolls the entire length of lower web (5) without interference.
- (9) Adjust end clearance between ends of rollers and track.

**NOTE:** The following described adjustments should be made in the sequence indicated.

- (a) Roll upper web (Fig. 502, 503, 504, 505), outboard until location "E" is within 1 to 2 inches of end "A."
- (b) Move upper web forward until ends of forward rollers (3) are flush with forward track (2).

**NOTE:** No clearance allowed.

- (c) Adjust end clearance between ends of rollers at location "E" and aft track (2). Remove shim laminations from forward rollers, then aft rollers if necessary, to maintain 0.01 (+0.02/-0.01) inch end clearance. (See section B-B.) Do not remove the two washers (26) on each roller (3).
- (d) Roll upper web inboard until location "F" is within 1 to 2 inches of end "B."
- (e) Repeat steps (b) and (c) using roller locations "F" with end "B."
- (f) Check that upper web rolls the entire length of track installation without interference.

### 2. Electronic Equipment Compartment External Access Door Test

- A. Slide door into stowed position. Check for unobstructed movement of door and track.
- B. Close and lock door and visually check seating of door seal.
- C. Check operation of door warning system. Refer to Door Warning System, 52-71-0.

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MISCELLANEOUS EXTERIOR SERVICE DOORS – DESCRIPTION AND OPERATION

1. Aft Toilet Service Door
  - A. The door is located on the aft lower right surface of the fuselage. (See figure 1.) When unlatched the door hinges open to provide access to a four inch drain outlet and a flush line fitting and drain valve handle for each waste tank.
2. CSD Oil Reservoir Sight Gage Access Door
  - A. The door is located aft of the engine oil tank access door on the left removable cowl panel on each engine. (See figure 1.) It is a small rectangular shaped door that hinges up to provide access to the CSD oil reservoir sight gage. The door is secured by quick-opening fasteners.
3. Engine Oil Tank Access Door
  - A. The door is located on the lower left side of the left removable cowl panel on each engine. (See figure 1.) When opened, the door hinges up to provide access to the oil tank filler cap, and when closed, is secured by quick-opening fasteners.
4. Ground Air Conditioning Access Door
  - A. The ground air conditioning access door forms a part of the lower fuselage surface on the centerline at the intersection of the wing center section front spar and body contour. (See figure 1.) The door hinges down to provide access to the ground service conditioned air connection on the airplane air conditioning system to allow use of a ground service cart when the airplane air conditioning system is off. The door is secured by a flush type latch on the aft circular part of the door.
5. Section 48 Access and Blowout Door
  - A. The door forms a part of the lower left side of the fuselage aft of the passenger cabin pressure bulkhead. (See figure 1.) The door provides access to the APU fuel lines, air inlet duct, air inlet door actuator and the aft surface control systems. The door latch is arranged to release the door to open position within a load range of 52 to 68 pounds.
6. Water Service Door
  - A. The water service door is a rectangular shaped door with rounded corners that is located on the aft lower right side of the fuselage. (See figure 1.) When unlatched the door hinges open approximately 90 degrees to provide access to the passenger water system water tank fill valve, water fill connection, water quantity indicator, overflow fitting, pressure gauge, and air valve.
7. External Power Receptacle Door
  - A. The door is located on the forward right side of the fuselage. (See figure 1.) It is a small rectangular shaped door that provides access to the external power receptacle.

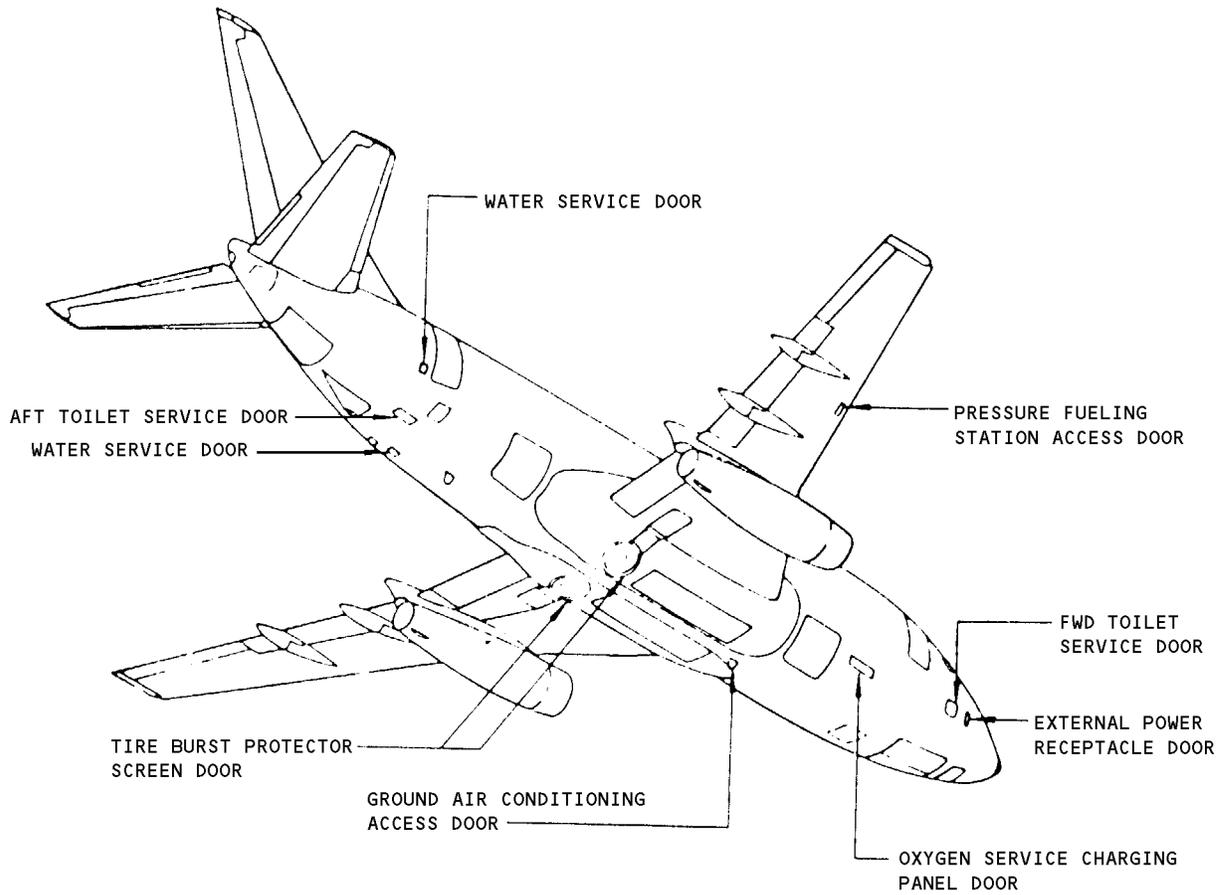
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Door Locations  
 Figure 1 (Sheet 1)

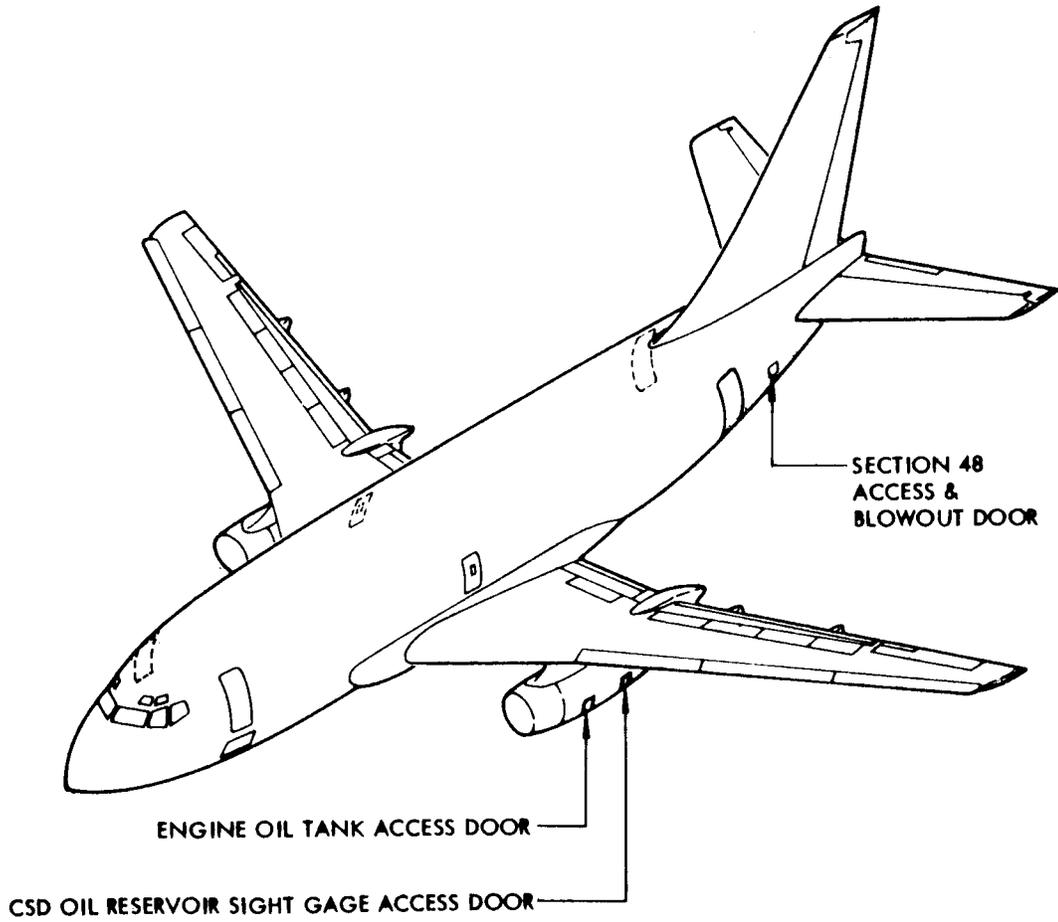
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Door Locations  
 Figure 1 (Sheet 2)

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## MAINTENANCE MANUAL

8. Forward Toilet Service Door
  - A. The door is located on the right side of the fuselage. (See figure 1.) When unlatched the door hinges open in two stages, rotating around two hinge points, for a total arc of approximately 145 degrees. When closed and locked the door fairings with the fuselage contour.
9. Oxygen System Charging Panel Door
  - A. The door is rectangular shaped with rounded corners and forms a part of the right exterior surface of the fuselage. (See figure 1.) When unlatched the door hinges up to provide access to the oxygen system filler valve, two shutoff valves and two oxygen system pressure indicators.
10. Pressure Fueling Station Access Door
  - A. The door forms a part of the right wing leading edge lower surface. (See figure 1.) The door hinges down from the fixed leading edge beam and is locked in closed position by latches that secure the door to front spar structure.
11. Tire Burst Protector Screen Doors
  - A. A door installation is located in each main landing gear wheel well. (See figure 1.) When opened, the door hinges outboard to provide access to components located on the main gear wheel well forward bulkhead. The doors are manually opened and closed and are included in the door warning system. (See Door Warning System, Section 52-71-0.)

**CAUTION:** WHEN DOORS ARE CLOSED, LATCH PINS MUST BE INSERTED IN DOOR FITTINGS AND SUPPORT FITTINGS TO SECURE THE DOORS IN CLOSED AND LATCHED POSITION. (REFER TO TIRE BURST PROTECTOR SCREEN DOORS - MAINTENANCE PRACTICES, 52-49-31.)

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## MAINTENANCE MANUAL

### SECTION 48 ACCESS AND BLOWOUT DOOR – REMOVAL/INSTALLATION

#### 1. Equipment and Materials

A. Laminated shims, BACS40K13A32

#### 2. Remove Section 48 Access and Blowout Door

A. Open door fully.

B. Remove bolt attaching lower end of jury strut to door. (See figure 401.)

C. Remove bolt, washer and nut attaching ground cable to door structure.

D. Support door and remove hinge bolts and shims attaching door hinges to door.

NOTE: Collect and tag shims.

E. Lower door from airplane.

#### 3. Install Section 48 Access and Blowout Door

NOTE: If a new door is to be installed, trim door edges to fit door frame within 0.04 to 0.10 inch gap. Gap must be equal within 0.03 inch on both sides of door.

A. Raise door and provide adequate support.

B. Attach hinges to door with hinge bolts and shims. (See figure 401.) Add or delaminate shims as required to obtain contact between door and door frame around complete periphery.

C. Check that door opens freely.

D. Attach lower end of jury strut to door with bolt. Tighten bolt within torque range of 25 to 30 inch-pounds.

E. Attach ground cable to door with bolt, washer and nut.

F. Adjust and test door in accordance with adjustment/test procedure.

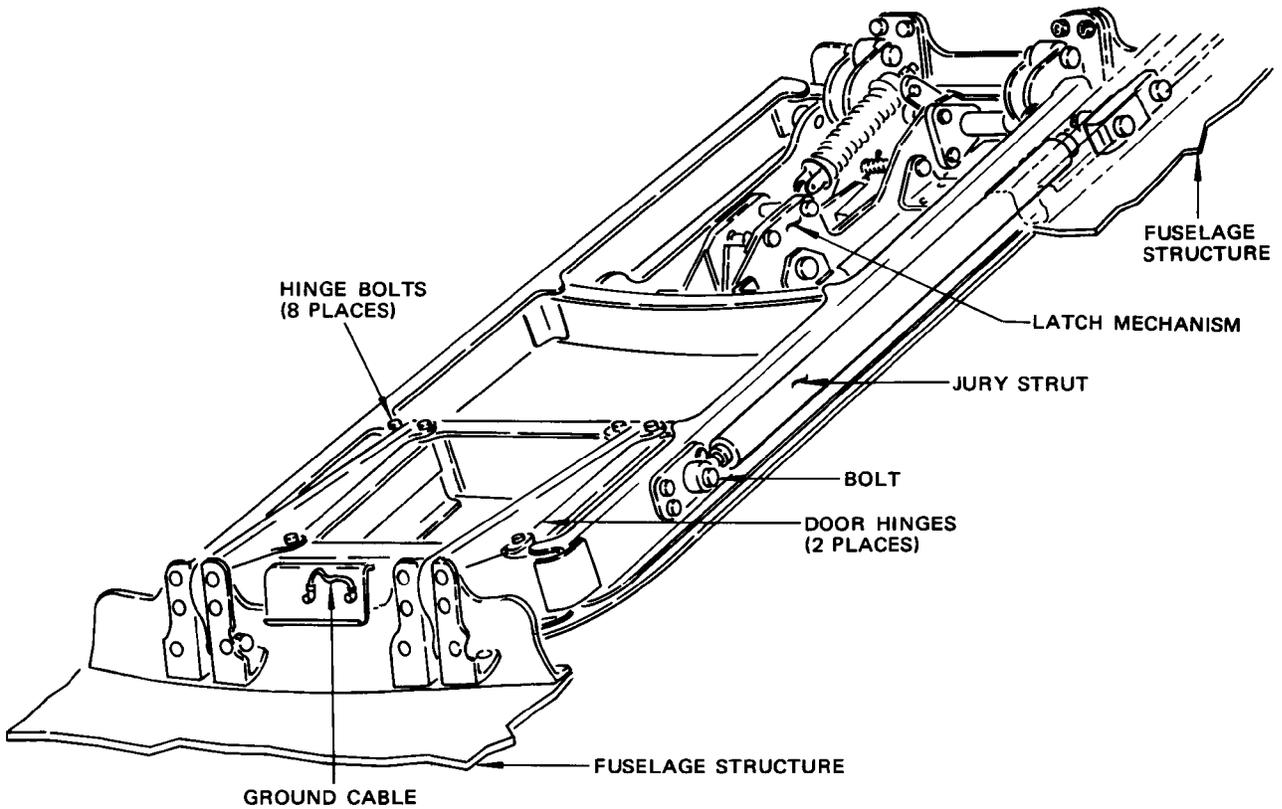
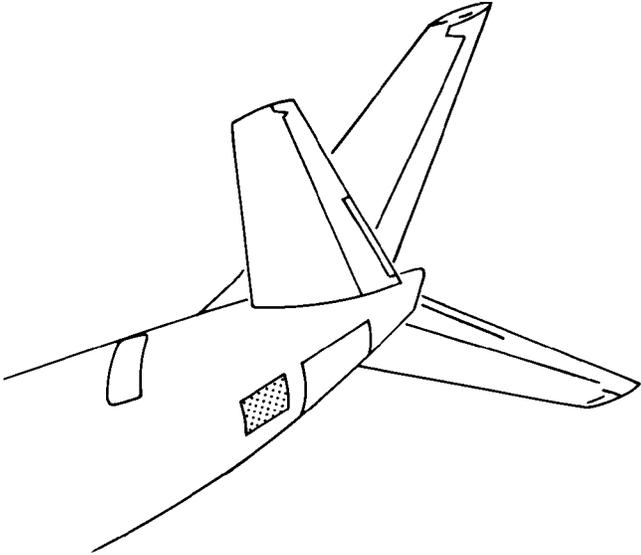
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Section 48 Access and Blowout Door Installation  
 Figure 401

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SECTION 48 ACCESS AND BLOWOUT DOOR – ADJUSTMENT/TEST

1. General

- A. The section 48 access and blowout door functions as access to the stabilizer jackscrew compartment and as a blowout door in case of pressure bulkhead leakage or rupture of the air conditioning air duct. (Refer to, Servicing, Door 3701, Chapter 12.)

2. Section 48 Access and Blowout Door Adjustment

A. Adjust Section 48 Access and Blowout Door

- (1) Adjust gap between spring aft end plate nut and spring aft end plate to allow door to meet flushness requirements of +0.02/-0.02 inch. (See figure 501.) Ensure that gap does not exceed 0.06 inch minimum dimension.

**NOTE:** Two types of latches are used on the door; a Boeing designed latch on earlier airplanes and a Hartwell latch on later airplanes. If a Boeing designed latch is installed on the door, drill a new 0.078 (+0.003/-0.000) inch cotter pin hole in spring assembly rod 0.10 inch aft of original hole if necessary to allow for further slackening of spring.

- (2) With door closed and latched, check 0.41 (+0.01/-0.00) inch dimension.

**NOTE:** This check may be made by using modeling clay or any other approved method. (3) If 0.41 (+0.01/-0.00) inch dimension is not met, remove door stops and serrated plates by removing attachment bolts.

- (3) Shim door stops to meet 0.41 (+0.01/-0.00) inch dimension and install door stops and serrated plates temporarily to meet flushness requirement of +0.02/-0.02 inch.
- (4) Check that rollers contact door stops at each stop location.
- (a) Insert a 0.020 feeler gage between roller and door stop at stringer 23.
- (b) Using feeler gages, check that gap between roller and door stop at stringer 21 is within 0.002 to 0.020 inch. Adjust the serrated plate behind stop to obtain this dimension.
- (5) Test door per paragraph 3. If load range of 52 to 75 pounds cannot be met, repeat steps (1) thru (5) as necessary.
- (6) When load range of 52 to 75 pounds is met, install door stops and serrated plates permanently.

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## MAINTENANCE MANUAL

### 3. Section 48 Access and Blowout Door Test

#### A. Test Section 48 Access and Blowout Door

- (1) Apply a force of 52 to 75 pounds to outstanding flange of channel as shown in Fig. 501. Load shall be distributed over a bearing area of one square inch minimum at centerline of door. The latch shall completely release and door shall open within applied load range.
- (2) If load range of 52 to 75 pounds cannot be obtained, adjust door per par. 2.

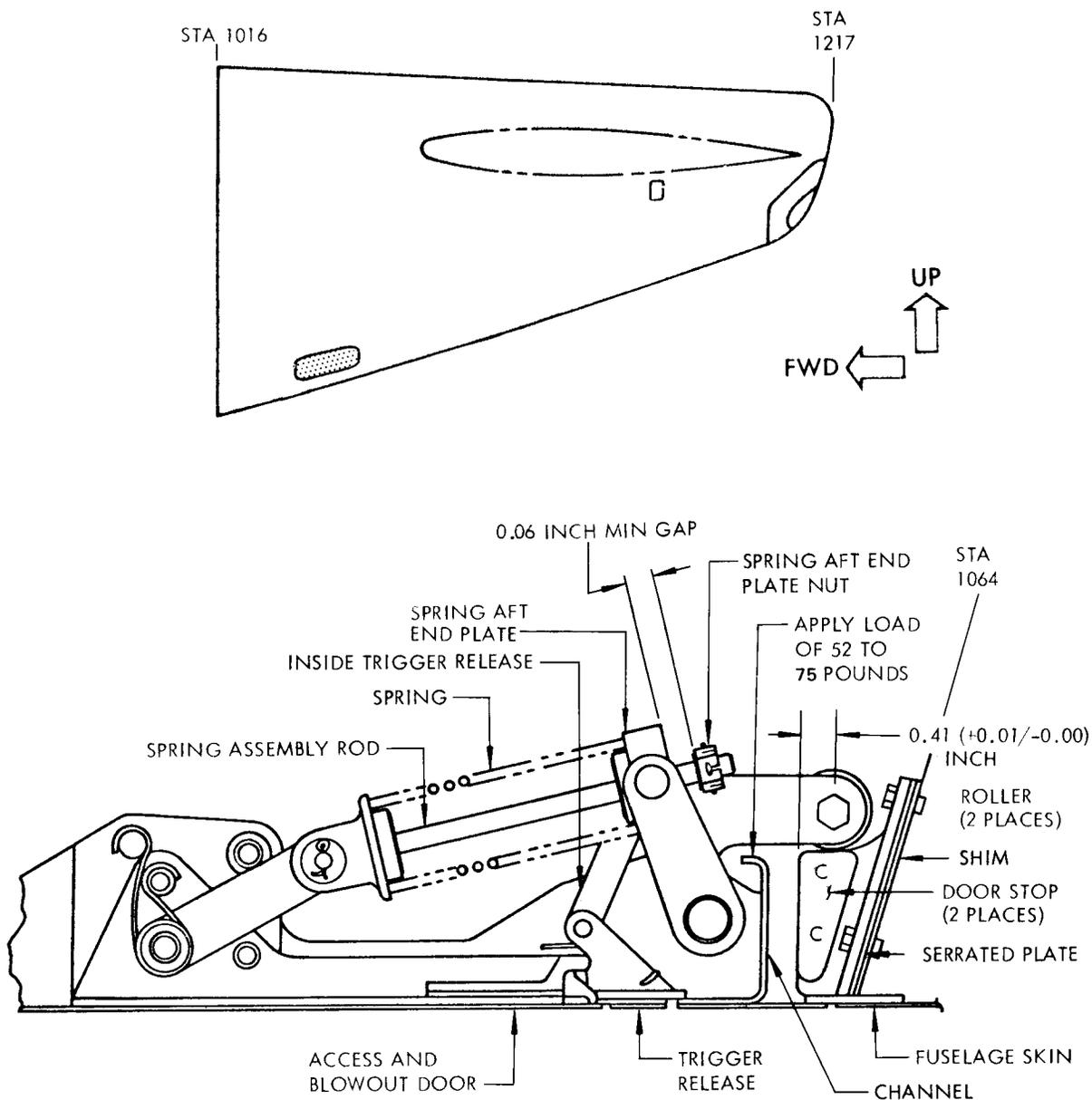
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NOTE: DOOR TO BE FLUSH WITH FUSELAGE SKIN TO WITHIN +0.02/-0.02 INCH AND ROLLER TO CONTACT DOOR STOP

Section 48 Access and Blowout Door Adjustment/Test  
 Figure 501

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PRESSURE FUELING STATION ACCESS DOOR – ADJUSTMENT

1. General

A. The pressure fueling station access door is located in the lower leading edge of the right wing. (Refer to Servicing, Door 6540, Chapter 12.)

2. Pressure Fueling Station Access Door Adjustment

A. Adjust Pressure Fueling Station Access Door

(1) Adjust door latches.

(a) At latch being adjusted, press door to its fit and fair position at door edge as shown in figure 501.

(b) Lock latch and check that preload exists by depressing latch bolt at location indicated in figure 501. There must be 0.005 to 0.020 inch depression free play at this point.

(c) If free play required in step (b) is not obtained, add or subtract shims as shown in figure 501.

CAUTION: WHEN DOOR IS UNLATCHED IT SHOULD FREE FALL OPEN 1.00 INCH MINIMUM.

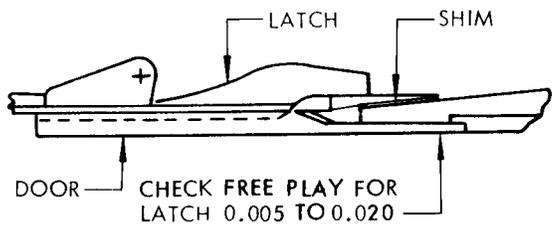
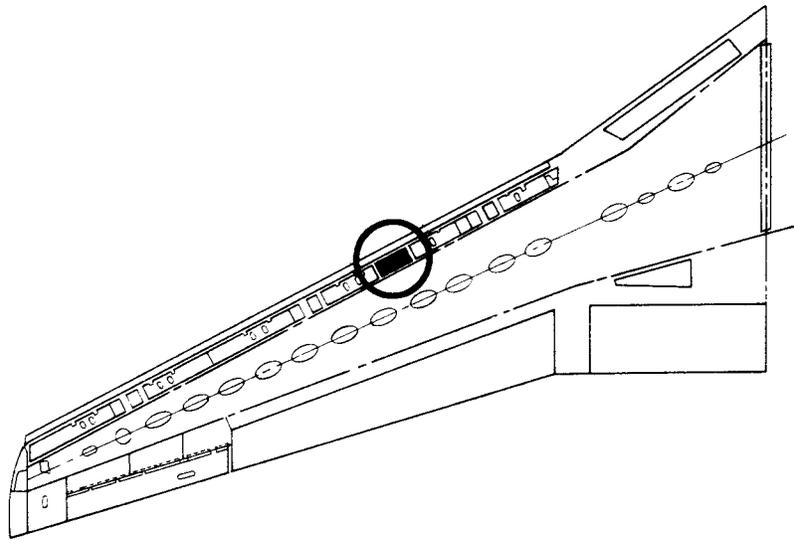
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Pressure Fueling Station Access Door Latch Free Play  
 Figure 501

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TIRE BURST PROTECTOR SCREEN DOORS – MAINTENANCE PRACTICES

1. General

- A. The maintenance practices included in this section (201 to 299 page block) are general maintenance instructions that do not definitely fall within a specific category. Other maintenance practices such as Removal/Installation, Adjustment/Test, etc., are provided in the applicable page blocks.
- B. A tire burst protector screen door is located in each main landing gear wheel well. When opened, each door hinges outboard to provide access to components located on the main gear wheel well forward bulkhead. The two doors are similar and are included in the door warning system. (See Door Warning System, 52-71-0.) The door installations are not identical, however, the following procedure is applicable to either door.

2. Tire Burst Protector Screen Doors Opening and Closing Procedure

A. Open Tire Burst Protector Screen Door

- (1) Remove safety pin from latch fitting and guide on door frame and protector screen. (See figure 201.) The pin is located at approximately the vertical midpoint on the door frame above the handles and is attached to a safety chain.
- (2) Rotate spring safety latch, located on door lower frame at end of upper handle, and release the upper handle from closed and latched position.
- (3) Rotate upper handle away from the door and pull the handle downward. This removes the lower latch pin from engagement in the latch fittings on door frame and support structure.
- (4) Push up on the lower handle and disengage the upper latch pin from latch fittings on door frame and support structure.

**NOTE:** As the latch pin is pushed up to disengaged position, the proximity sensor will actuate the door warning system and the appropriate door warning light on the P5-20 Door Warning Module will illuminate indicating the door is unlatched. The door warning light will be illuminated until the door is again latched.

- (5) Open the tire burst protector screen door, which hinges outboard from the bulkhead.

**CAUTION:** TO PRECLUDE THE LEFT LATCH PIN AND SAFETY CHAIN FROM INTERFERING WITH THE AILERON CONTROL CABLE, REINSTALL THE PIN IN THE GUIDE.

B. Close Tire Burst Protector Screen Door

- (1) Remove latch pin from guide if installed.

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- (2) Close the door then pull down on the lower handle. (See figure 201.) Make sure the upper latch pin is properly inserted in the latch fittings on door frame and support structure.
- (3) Push the upper handle upward and rotate the handle toward the door. Make sure the lower latch pin is properly inserted in the latch fittings on door frame and support structure.
- (4) Secure the upper handle in closed and latched position with the spring safety latch.
- (5) Insert the safety pin, located above the handles and attached to a safety chain, in the latch fitting and guide on door frame and protector screen.

**CAUTION:** THE TIRE BURST PROTECTOR SCREEN DOORS MUST BE IN CLOSED POSITION TO PREVENT DAMAGE TO THE AIRPLANE WHEN THE MAIN LANDING GEAR IS RETRACTED.

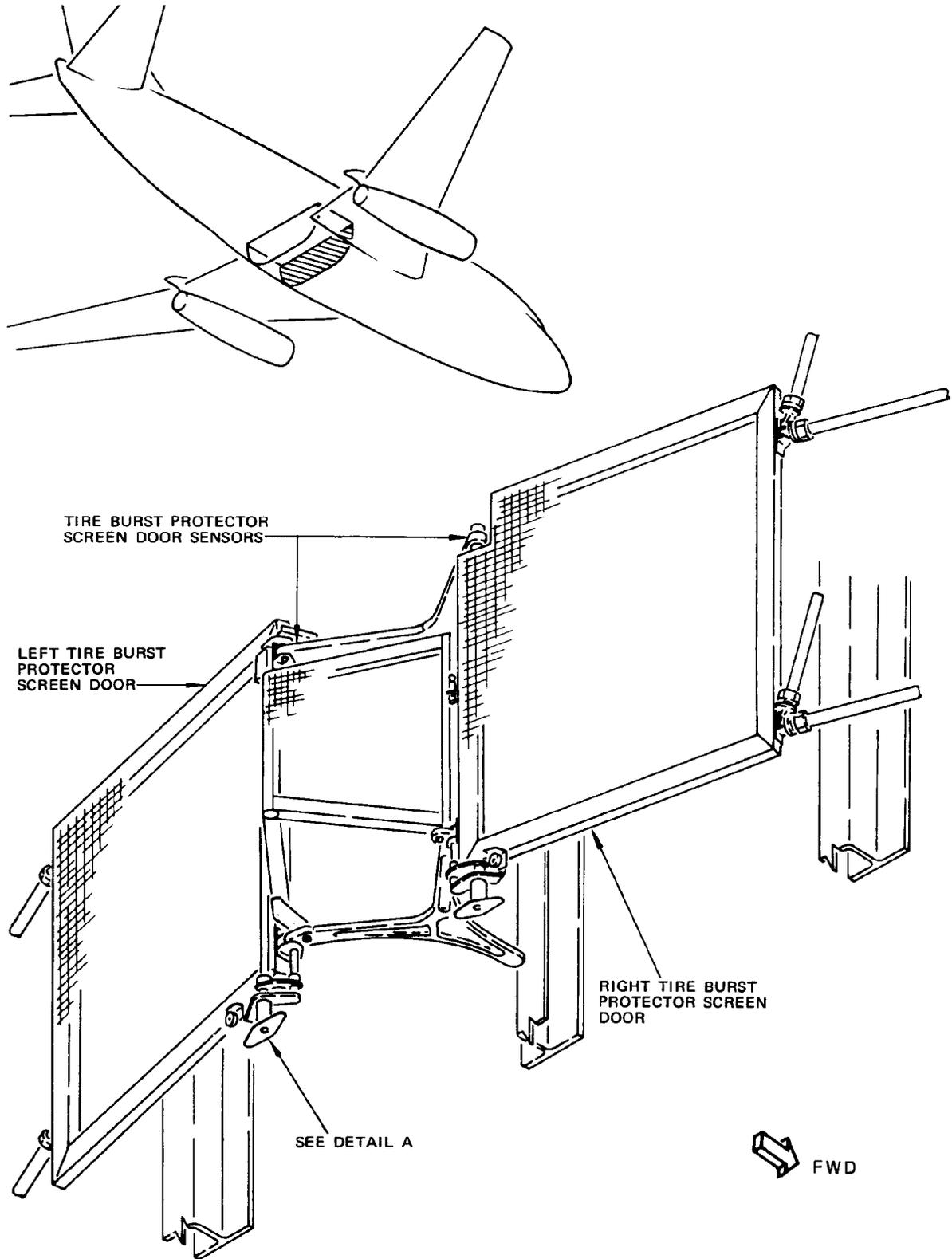
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Tire Burst Protector Screen Door Latch Mechanism (Typical)  
 Figure 201 (Sheet 1)

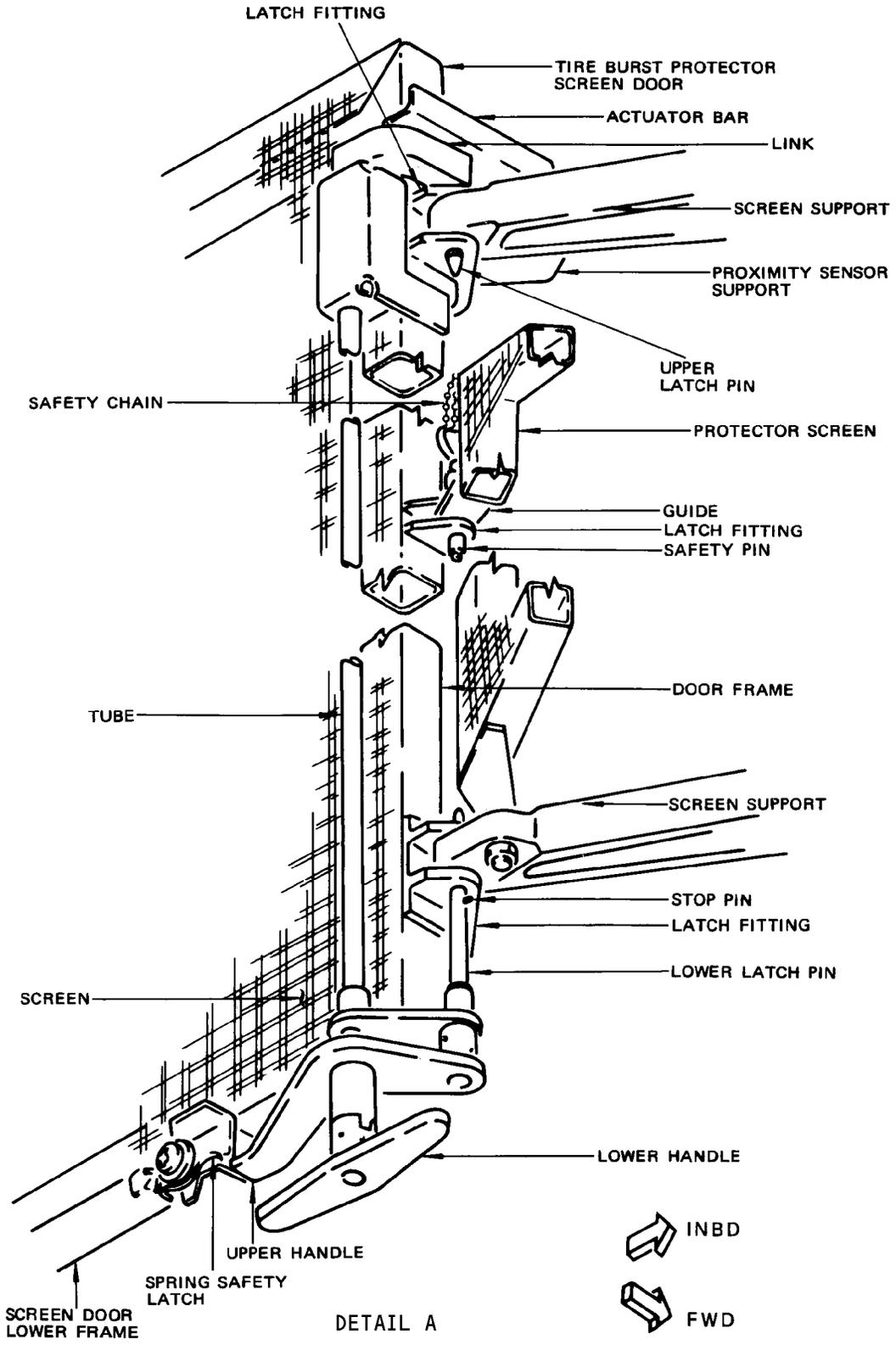
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Tire Burst Protector Screen Door Latch Mechanism (Typical)  
 Figure 201 (Sheet 2)

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## MAINTENANCE MANUAL

### TIRE BURST PROTECTOR – REMOVAL/INSTALLATION

1. Equipment and Materials
  - A. Rigging Pin – TP-1, 1/8 inch diameter
2. Remove Tire Burst Protector (Fig. 401)
  - A. Remove center tire burst protector screen as follows (detail A):
    - (1) Remove safety pins from latch fitting and guide on door frame.
    - (2) Remove two bolts attaching screen to lower screen support and remove screen.
  - B. Remove all rods and support strut from outboard sections of tire burst protector screen doors (Sections B-B and C-C).
  - C. Remove doors from screen support (detail A):
    - (1) Rotate spring safety latch on end of upper handle, and release upper handle from closed and latched position.
    - (2) Rotate upper handle away from door and pull handle downward to remove lower latch pin.
    - (3) Push up on lower handle and disengage upper latch pin.
  - D. Remove rods connected to upper and lower screen supports (Section A-A).
  - E. Remove proximity sensors from upper screen support (detail A).
  - F. Remove screen supports.
3. Install Tire Burst Protector (Fig. 401)
  - A. Connect upper and lower screen supports to wheel well (Section A-A).
  - B. Install rod 1 on upper screen support and adjust to obtain dimension shown in Section A-A.
  - C. Connect left and right tire burst protector screen doors to screen support (detail A):
    - (1) Position tire burst protector screen doors on screen supports and pull down on lower handle.
    - (2) Push upper handle upward and rotate handle toward door. Check that upper and lower latch pins are properly inserted in the latch fitting on door frame and support structure.
  - D. Check that upper and lower latch pins (detail A) are not binding. If pins bind, adjust rod 1 on upper screen support to eliminate binding.
  - E. Connect two remaining rods on outboard sections of left and right doors and adjust to fit door in present position (Sections B-B and C-C).
  - F. Connect rod at lower screen support (Section A-A).
  - G. Adjust rods at screen supports such that doors open and close freely.
  - H. Install rigging pin TP-1 in center strut and adjust center strut to fit door in present position. Tighten jam nuts and remove rig pin (Section B-B).
  - I. Install and adjust rods 2 and 3 on upper screen support such that doors open and close freely (Section A-A).

**WARNING:** OBSERVE NECESSARY CAUTION TO AVOID INJURY, SINCE DOORS ARE FREE TO MOVE.

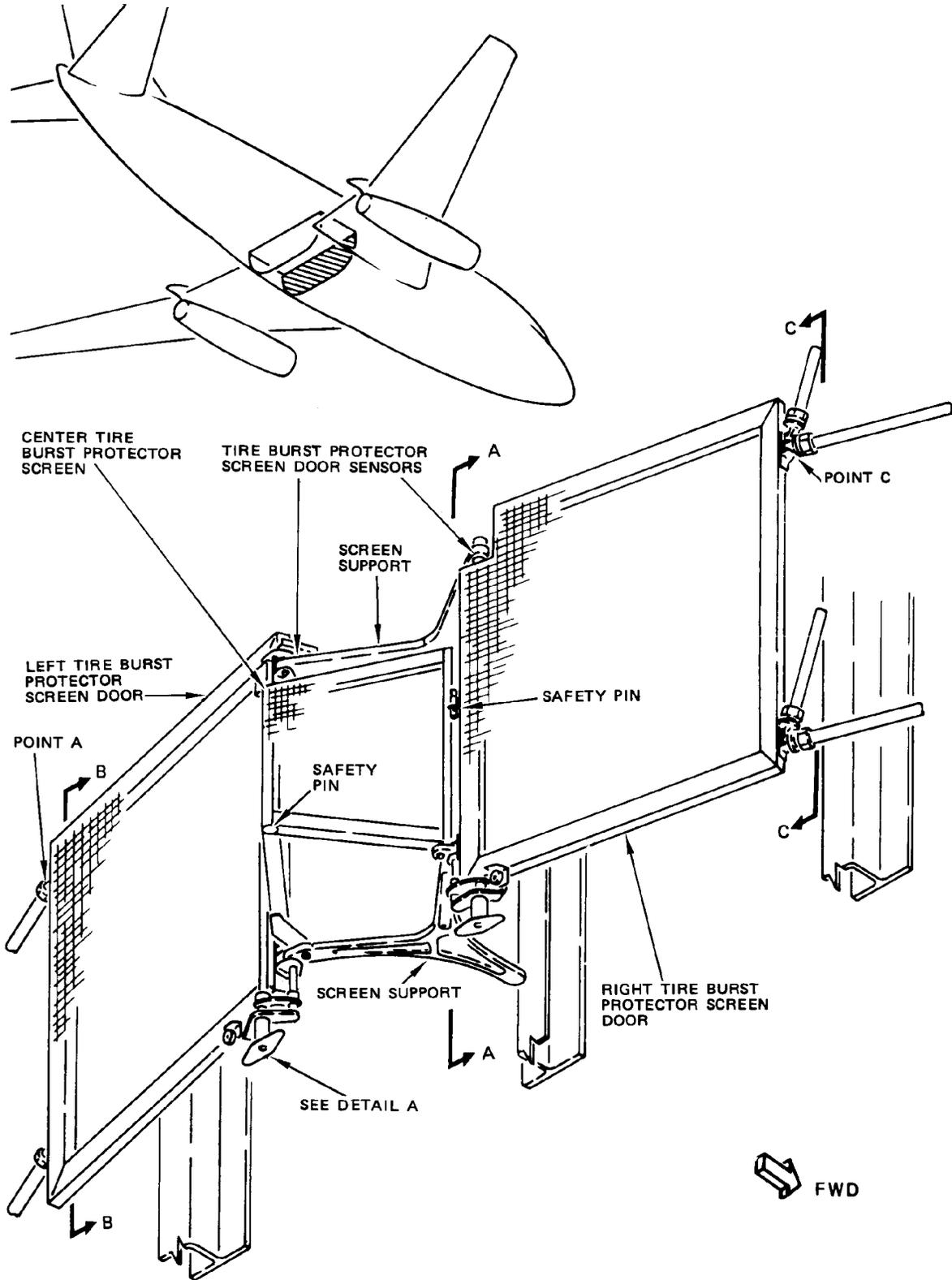
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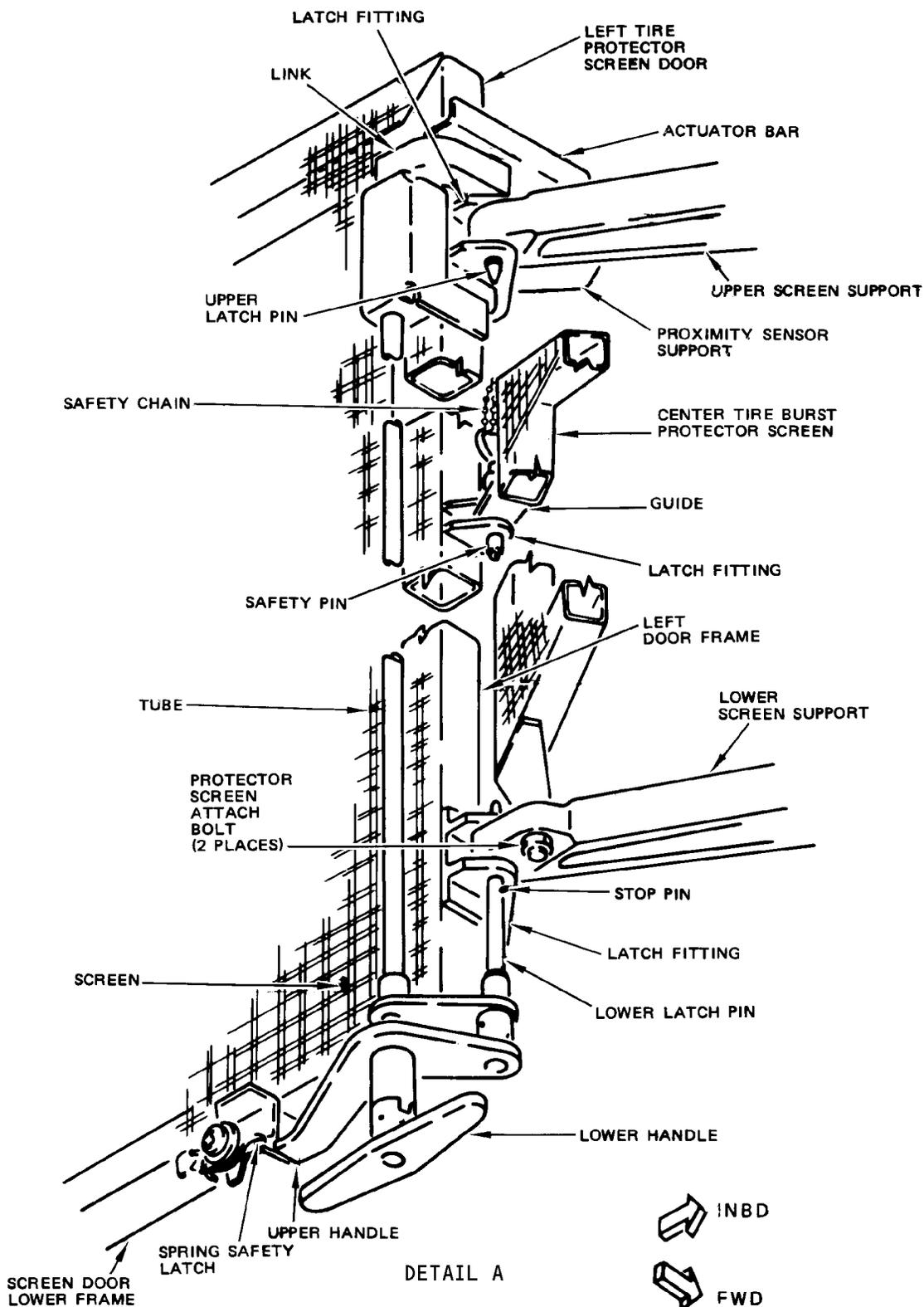
Tire Burst Protector Installation  
 Figure 401 (Sheet 1)

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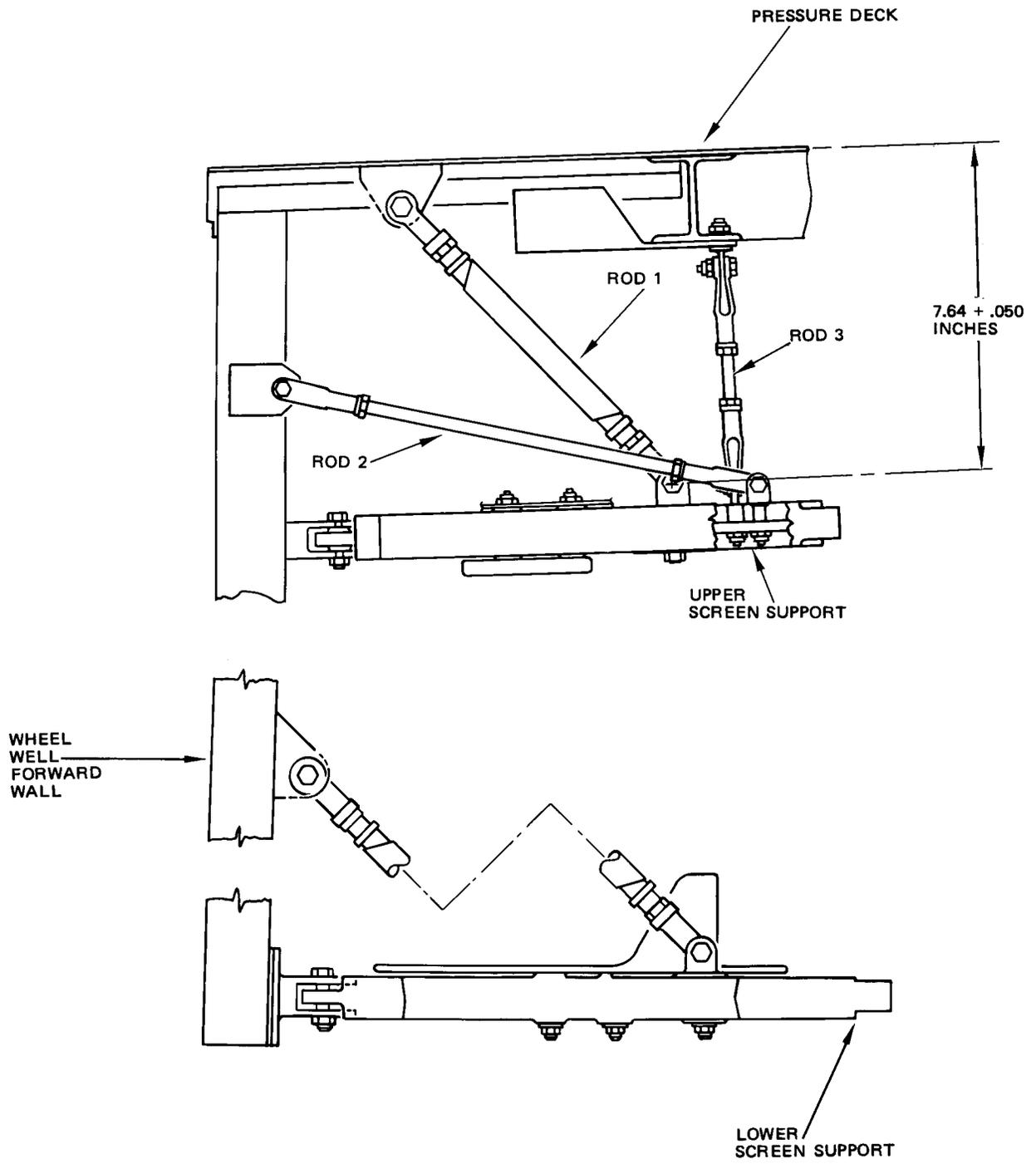
**MAINTENANCE MANUAL**



Tire Burst Protector Installation  
Figure 401 (Sheet 2)

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SECTION A-A

Tire Burst Protector Installation  
 Figure 401 (Sheet 3)

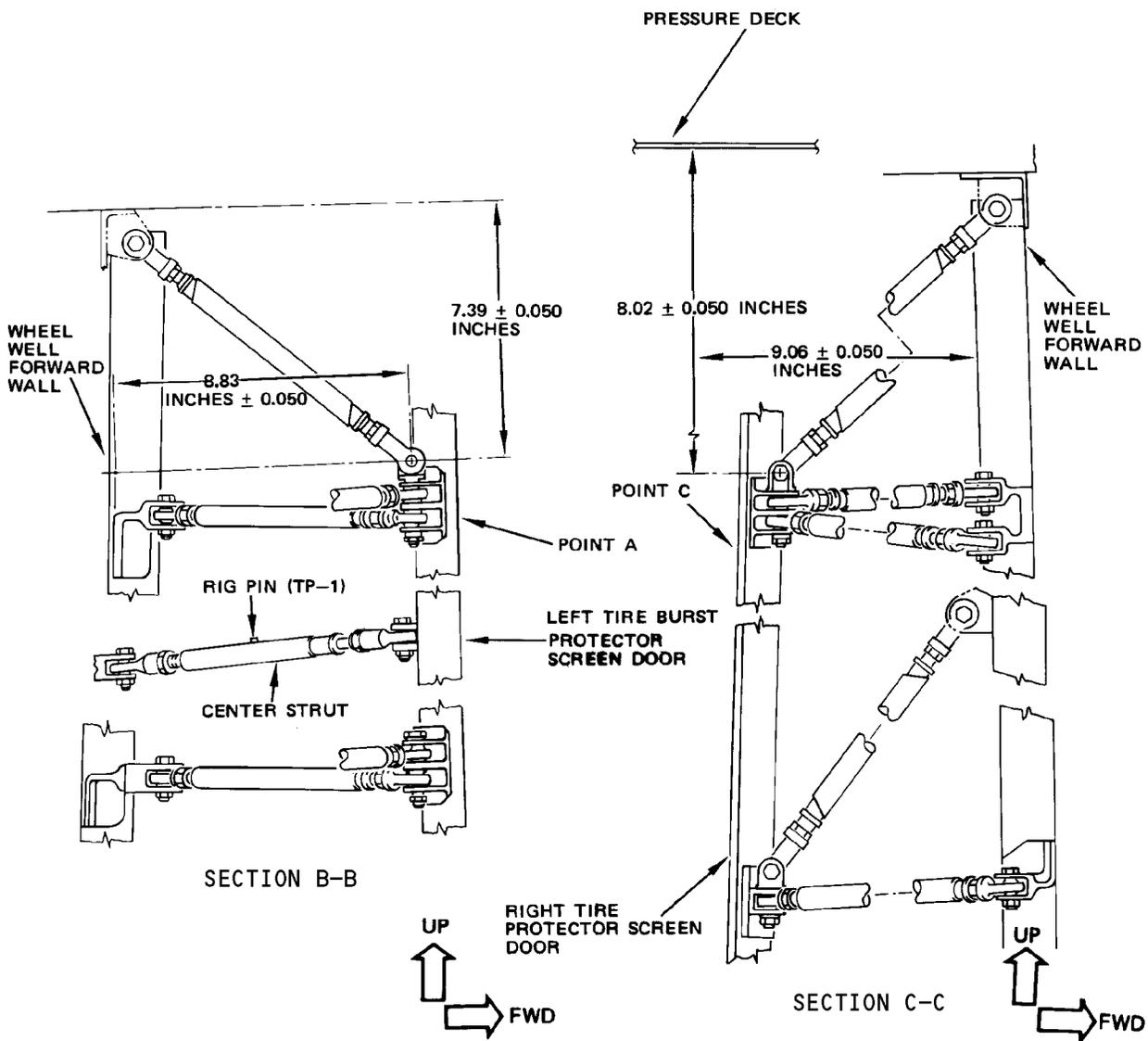
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Tire Burst Protector Installation  
 Figure 401 (Sheet 4)

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- J. Tighten jam nuts on all rods and check inspection hole on each rod end to verify that at least half of inspection hole is covered by center tube of rod. If not, adjust tube so that condition is met.
- K. Install tire burst protector screen door proximity sensors on upper screen support (detail A) and adjust per 52-71-0, Adjustment/Test.
- L. Install center tire burst protector screen (detail A):
  - (1) Install two bolts on lower support.
  - (2) Install safety pins in latch fitting and guide on door frame.
- M. Close and latch both doors (Ref 52-49-31, Maintenance Practices).

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CONTROL CABIN DOOR - DESCRIPTION AND OPERATION

1. General

- A. The control cabin door provides access from the passenger cabin to the control cabin (Fig. 1). It hinges aft from its left side. A door handle and an electric and keyed lock permits the door to be opened and closed, and locked, from either side. An emergency exit or inner door and blowout panels are provided in the control cabin door. A wide angle optical peep device in the door permits observation of the forward entry area from the control cabin. A mirror for use by the crew is attached to the upper forward side of the door.
- B. Components in the circuit for operating the electric lock on the control cabin door are shown on figure 2. The equipment consists of a door lock switch with indicator lights mounted on the aft control stand and an electric strike that receives power through the switch from a 28 volt DC circuit breaker. The strike is mounted on the partition at the door latch and is spring loaded in the latched position. The minimum pull required to open the door when the strike is de-energized is 10 pounds. A shear pin on the strike is provided to withstand a 250 pound pull at the door knob.
- C. There are four blowout panels located in the control cabin door (Fig. 1). In the event of a sudden depressurization of the control cabin the blowout panels hinge out from the door uncovering openings in the door which allows the air pressure in the control cabin and the passenger cabin to equalize. This permits the control cabin door to be safely opened. Shear pins are installed on each side of the two lower blowout panels and two shear pins are located on the upper edge of the upper panel and on the lower edge of the adjacent panel. The shear pins secure the panels in the normal closed position in the door. The pins are sheared permitting the panels to hinge out from the door by the difference in air pressure on the forward and aft surfaces of the door. A control cabin door retainer assembly restrains the upper blowout panel when the pins are sheared thus preventing an occupant in the first observer's position from being injured.

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- D. An emergency exit feature is provided in the control cabin door which permits the release and removal of the two upper blowout panels from the door. The removal of the two upper panels, which comprise an inner door, provides an emergency exit through the control cabin door. The emergency exit is used if an obstruction on the aft side of the door prevents the control cabin door from opening and thus prevents communication with the passenger cabin. The emergency exit door release handle is located on the forward side of the control cabin door between the two upper blowout panels. In an emergency the release handle is grasped and pulled forward. This movement of the handle operates a cable assembly and linkage which disengages retaining pins located on each side of the handle at the door channel and allows the release handle to move forward. As the release handle moves forward the extreme ends of the two blowout panels move toward each other which allows the shear pins to clear retaining fittings mounted on the control cabin door frame. The panels are then pulled forward of the door structure and are allowed to drop straight down to the control cabin floor. As the panels fall to the floor the ball terminal on the upper blowout panel door retainer is pulled out of its retaining slot in the panel. The panels are then free of the door structure and the emergency exit is available for use. The first observer's seat can be released from stowed position and used as a step in egress from the control cabin.
- E. The control cabin door frame and structural channels are constructed of aluminum alloy standard sheet stock materials. The blowout panels are of honeycomb core construction. The door is attached to the door frame by extruded structural hinges. A decorative finish is provided on all exposed surfaces. A seal of extruded synthetic rubber is attached around the perimeter of the door to provide a light seal.

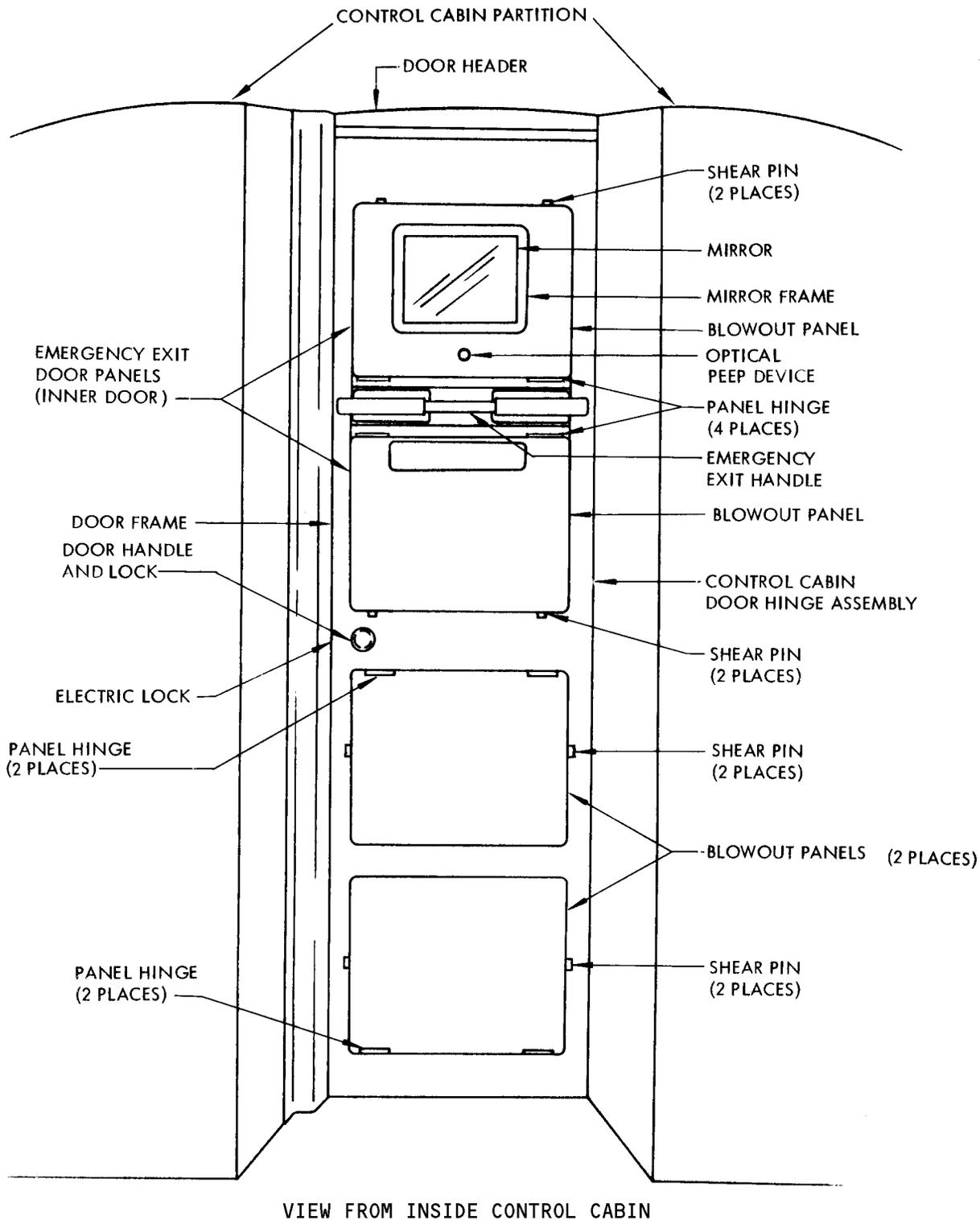
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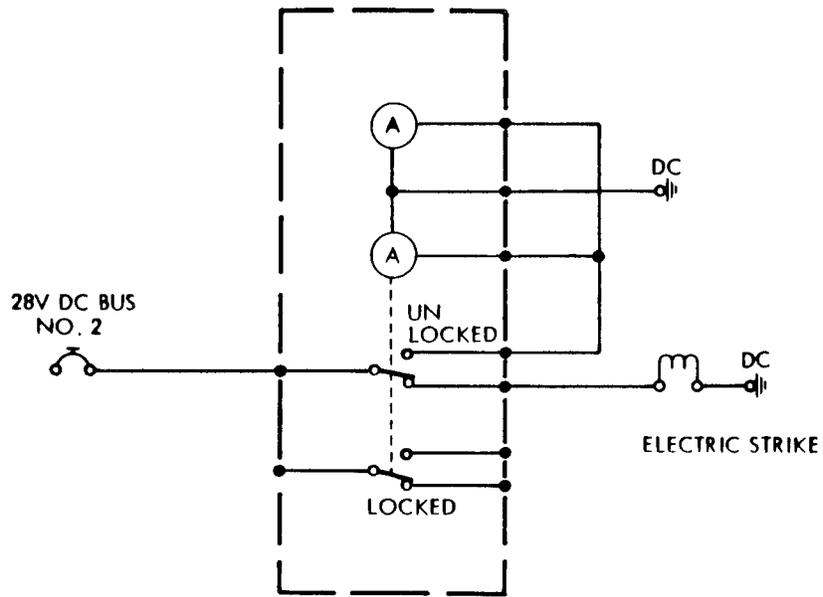
Control Cabin Door  
 Figure 1

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Control Cabin Door Lock Circuit  
 Figure 2

Control Cabin Door Lock Circuit  
 Figure 2

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CONTROL CABIN DOOR LOCK SWITCH/LIGHT – REMOVAL/INSTALLATION

1. General

- A. The control cabin door lock switch/light is attached to a switch coverplate mounted on the aft coverplate of the P8 control stand. Replaceable parts of the switch/light are light bulbs, switch/light actuator and switch.
- B. Light bulbs are accessible for replacement by removing the light cap. The switch is attached to the switch/light by a retaining clip and is accessible for replacement by either removing the switch coverplate or by gaining access through a door located on the aft left side of the control stand.

**NOTE:** If the light cap and socket assembly are squeezed together during relamping the lock pins will cam out of the plunger which could on installation, force the lamp terminal assembly out of the base or prevent complete assembly.

2. Remove Control Cabin Door Lock Switch/Light

- A. Open control cabin DOOR LOCK circuit breaker on panel P6.
- B. Remove access door cover located on the aft left side of the control stand by removing four screws (Fig. 401).
- C. Disconnect and mark electrical wires on switch/light terminal box.
- D. Remove switch coverplate with attached switch/light from control stand coverplate by removing two switch mounting screws.
- E. Remove door lock switch/light from switch coverplate (Detail A, Fig. 401).
  - (1) Remove two screws on bottom of switch/light and detach mounting bracket.
  - (2) Slide switch/light out of hole in coverplate.

3. Install Control Cabin Door Lock Switch/Light (Fig. 401)

- A. Attach door lock switch/light to switch coverplate (Detail A, Fig. 401).
  - (1) Slide switch/light into hole in coverplate.
  - (2) Attach mounting bracket on bottom of switch/light with two switch assembly screws.
- B. Install switch coverplate with attached switch/light on control stand coverplate. Secure coverplate with switch mounting screws.
- C. Connect electrical wires on switch/light terminal box.
- D. Install access door cover on proper location with four screws.
- E. Close control cabin DOOR LOCK circuit breaker on panel P6.
- F. Test control cabin door lock switch/light. See Control Cabin Door Lock Switch/Light – Adjustment/Test.

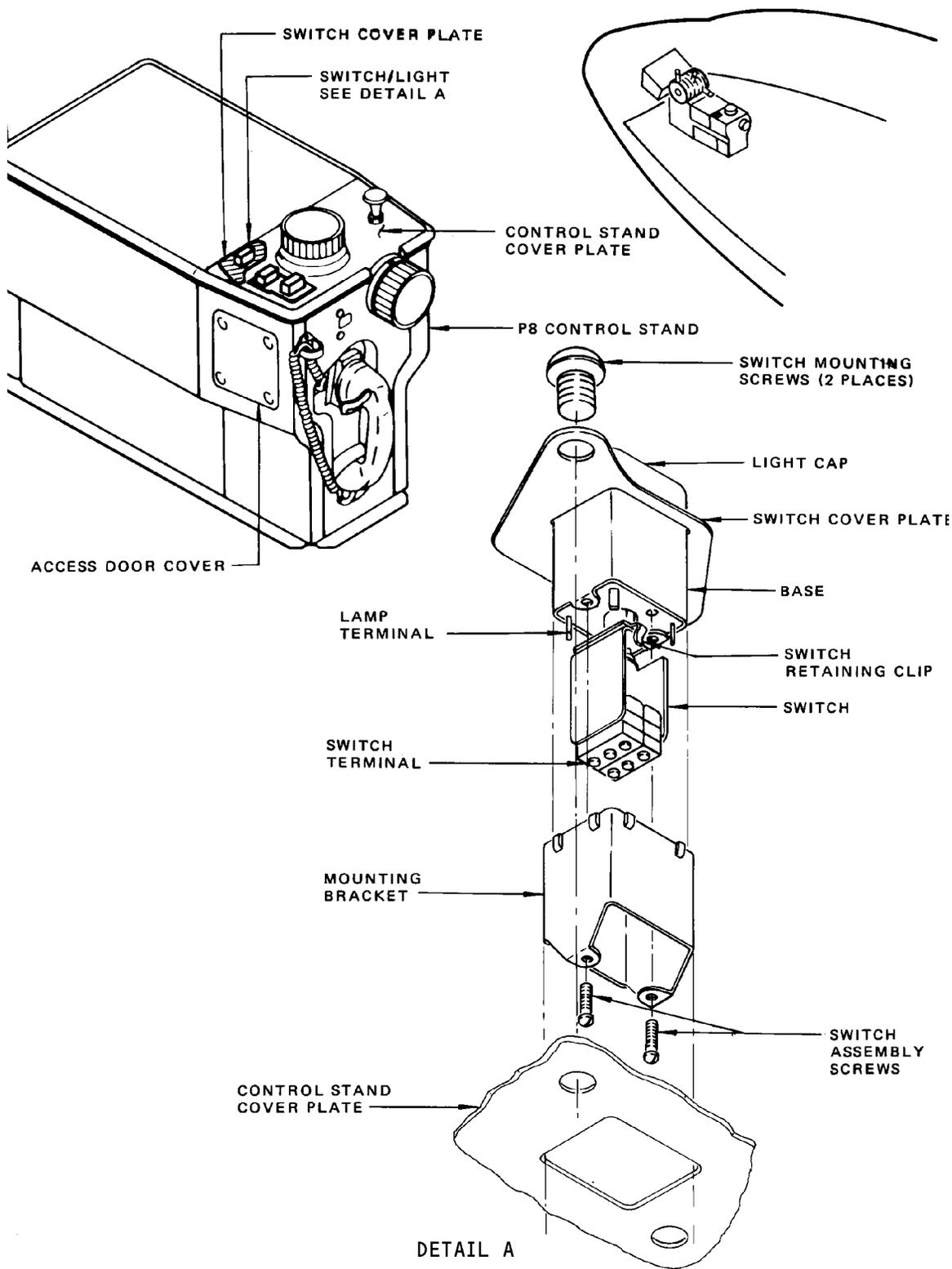
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Control Cabin Door Lock Switch/Light Installation  
 Figure 401

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CONTROL CABIN DOOR LOCK SWITCH/LIGHT - ADJUSTMENT/TEST

1. General

A. This procedure has this task.

2. Test Control Cabin Door Lock Switch/Light

- A. Connect the external, 400 cps 115/200 volt AC 3-phase, power supply to the external power receptacle, unless the APU is being used.
- B. Check that control cabin DOOR LOCK circuit breaker on panel P6 is closed.
- C. Push down on control cabin door lock switch/light cap on the P8 control stand if light in cap is off.
- D. Check that the light in the cap comes on.

NOTE: When the light is on, the striker on the partition is not energized and the door is unlocked (Ref 52-51-0, Fig. 2).

- E. Close control cabin door.
- F. Check that door can be opened with a minimum pull which does not exceed 60 pounds from passenger cabin.
- G. Push down on control cabin door lock switch/light cap.
- H. Check that the light goes off.

NOTE: When the light is off, the striker on the partition is energized and door is locked (AMM 52-51-0, Fig. 2).

I. Close control cabin door.

- (1) Check that the door is locked from the passenger cabin.

NOTE: The shear pin on the striker can withstand 250 pounds of pull at the door knob.

- (2) Using door key, check that door can be unlocked from passenger cabin.

- (3) Check that door can be opened from control cabin.

- J. Determine if there is further need for electrical power; if not, remove power.

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CONTROL CABIN DOOR LOCK – REMOVAL/INSTALLATION

1. General

- A. The control cabin door lock assembly is attached to the inside of the right hand door frame structure. A cutout is provided in the door frame structure to facilitate easy removal of the door lock assembly.

2. Remove Control Cabin Door Lock

- A. Open the control cabin D00R LOCK circuit breaker on panel P6.  
B. Remove the edge trim and seal by removing the attachment screws (Detail A, Fig. 401).  
C. Remove the door lock mounting bracket screws and the work bracket, and the attached door lock assembly out of the cutout in the door frame structure.  
D. Perform the following steps as required:  
(1) If the shear pin is to be replaced, remove the spring pin from the solenoid shaft adapter and then remove the shear pin.  
(2) If the rocker solenoid is to be replaced, disconnect and mark the solenoid electrical wires; then remove the three screws attaching the solenoid housing to the mounting bracket.

3. Install Control Cabin Door Lock

- A. Prepare the door lock assembly for installation.  
(1) If a new rocker solenoid is to be installed, attach the solenoid housing to the mounting bracket with three screws; then connect the solenoid electrical wires.  
(2) If a new shear pin is to be installed, position the shear pin into the solenoid shaft adapter; then insert the spring pin through the hole in the adapter and the shear pin.

NOTE: If the new shear pin does not have a hole in it, drill a 0.062 (+0.003/-0.000) inch diameter hole through the pin using the pilot hole in the adapter as reference.

- B. Work the bracket inside of the cutout in the door frame structure. Position the bracket properly and install the mounting bracket screws. (Detail A, Fig. 401).  
C. Position the edge trim and seal on the door frame and secure with the attachment screws.  
D. Test the door lock for proper operation. Refer to AMM 52-51-11/501 or AMM 52-51-12/501, Control Cabin Door Lock Switch/Light, whichever is applicable.

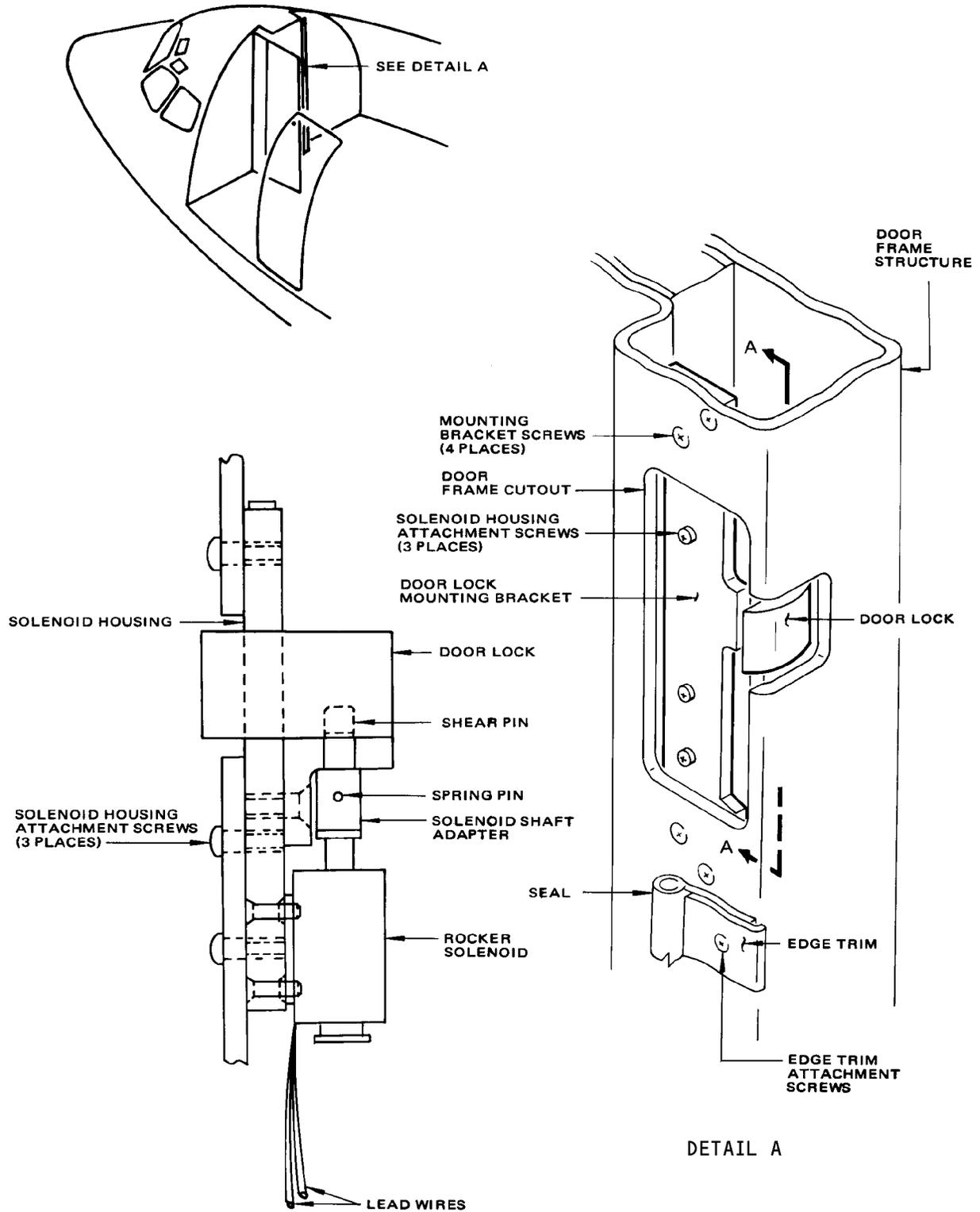
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SECTION A-A

Control Cabin Door Lock Installation  
 Figure 401

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CONTROL CABIN DOOR EMERGENCY EXIT PANELS – REMOVAL/INSTALLATION

1. Remove Control Cabin Door Emergency Exit Panels
  - A. Grasp and pull forward on the emergency exit handle. This will disengage the handle retaining pins and allow the shear pins to clear the retaining fittings mounted on the door frame (Fig. 402).
  - B. Remove the handle and emergency exit door panels as a unit from the door.
2. Install Control Cabin Door Emergency Exit Panels
  - A. Position the emergency exit handle and emergency exit door panels as a unit on the forward face of the door, and engage the cable ball terminals into their respective retaining slots on the upper panel.
  - B. Collapse the panels at the middle horizontal hinge lines, with the exit handle jutting forward (Fig. 402).
  - C. Engage the shear pins at the upper and lower panels with retaining fittings on the door frame (Fig. 402).
  - D. Push the panels at the middle horizontal hinge lines and pull forward on the exit handle at the same time. This will retract the handle retaining pins on each side of the handle and allow the panels to seat on the door frame.
  - E. Release the handle to engage the retaining pins with the fittings on the door.

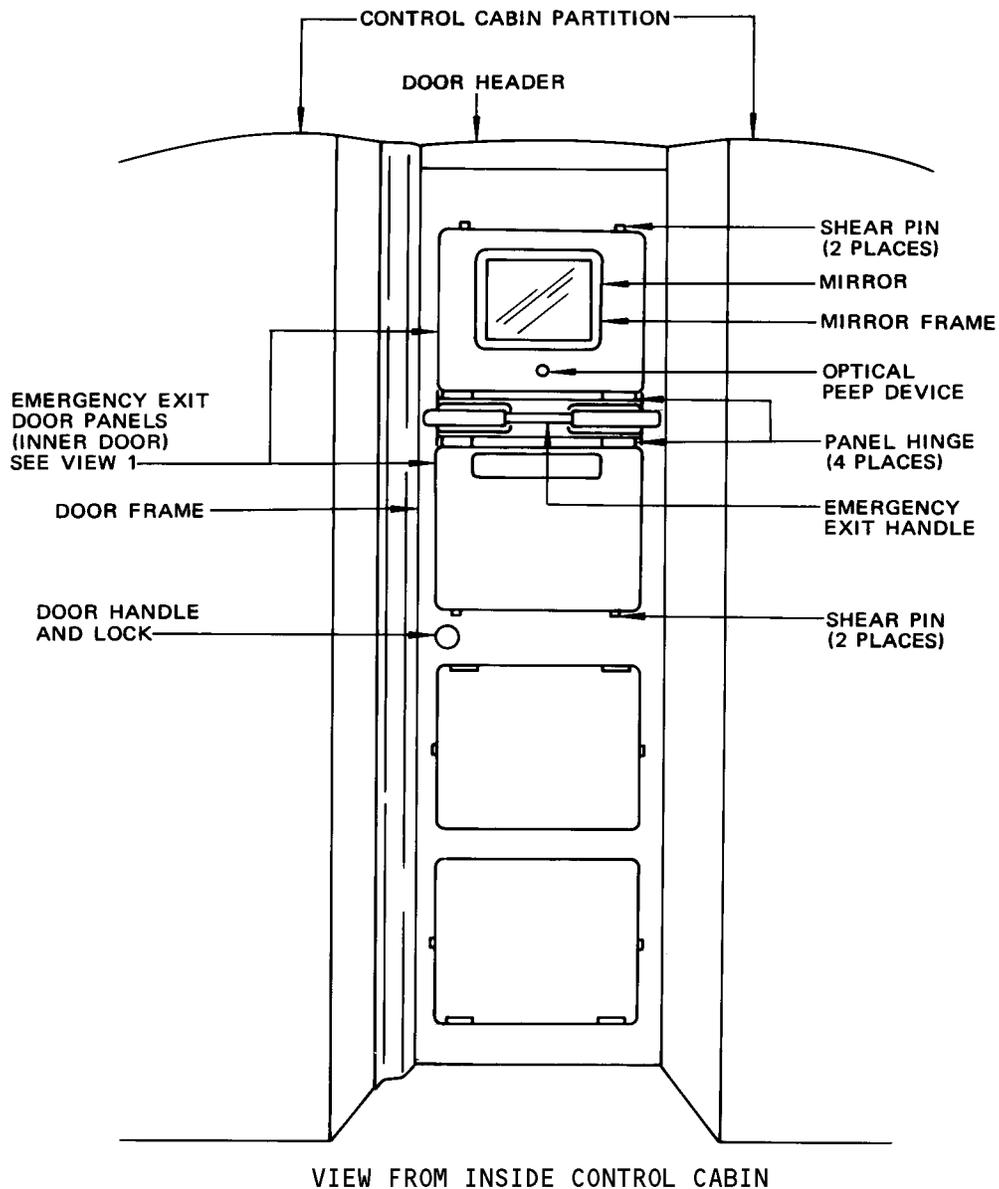
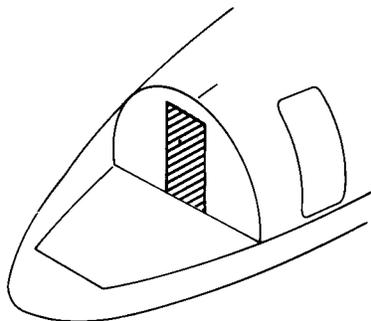
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Control Cabin Door Emergency Kit  
 Figure 401

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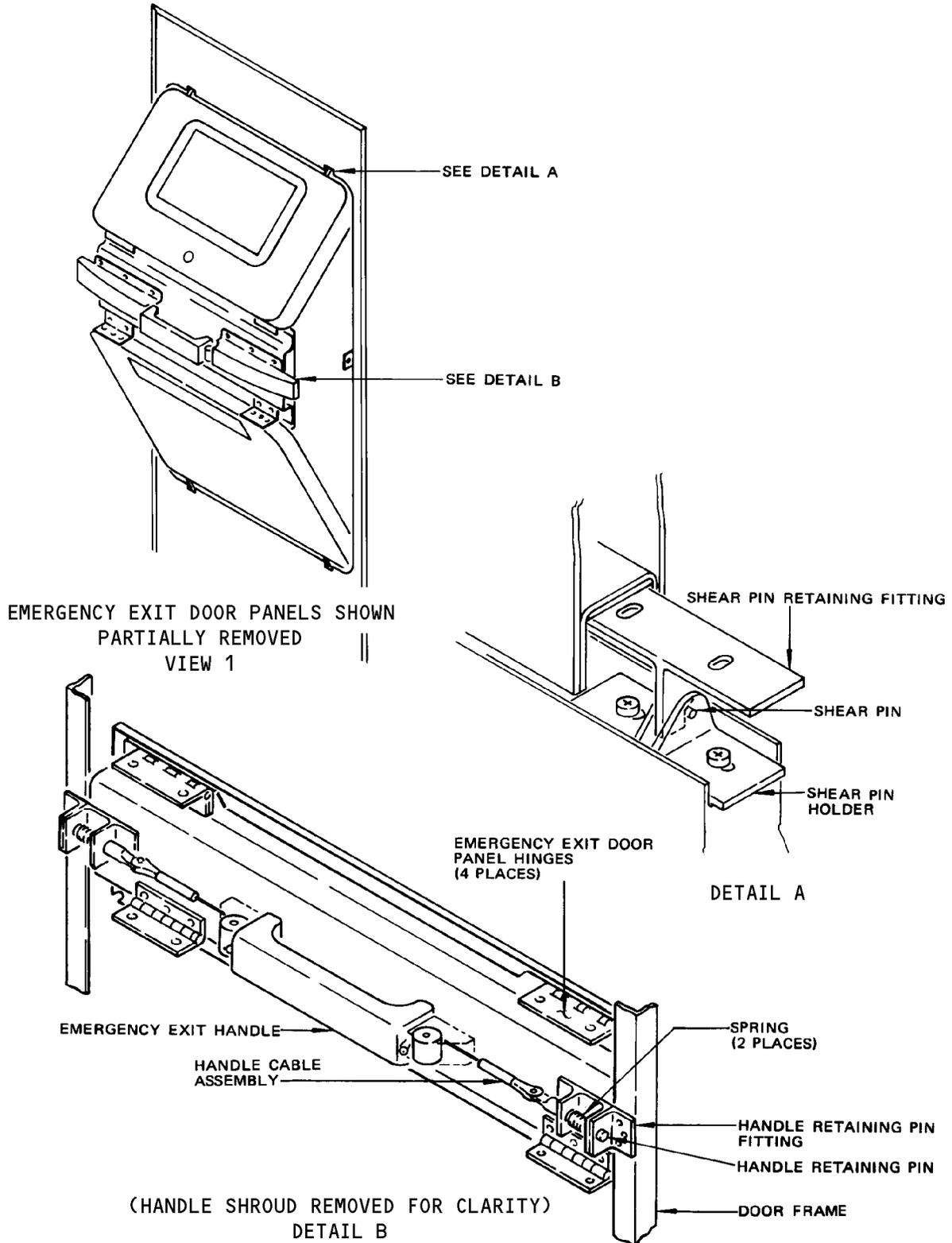
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Control Cabin Door Emergency Exit 596  
 Figure 402

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LAVATORY DOORS - DESCRIPTION AND OPERATION

1. General

- A. The lavatory doors are similar in size and principle of door operation (Fig. 1). The doors hinge outward from the lavatory compartment and a door latch permits the door to be opened and closed from either side. Each door is provided with a lock of the slide bar type incorporating a Vacant and Occupied indicator. The lock allows the door to be closed and locked from inside the lavatory compartment. The lock can be overridden, however in the event of an emergency from outside the lavatory compartment by moving a small pin which protrudes through a lateral slot on the face of the fixed indicator panel. The latch bolt is withdrawn by applying a fingernail, or an equivalent implement, to the pin and sliding it away from the door edge. A coat hook is located near the top of the door on the inside surface. An air louver and grille is located near the bottom of the door. On some airplanes, the lavatory doors have a self-contained removable ashtray on the aisle side of the lavatory door.
- B. The lavatory doors are of paper honeycomb core construction with a fiberglass fabric covering and a decorative finished exterior facing. Industrial clear spruce wood is used on the latch side, hinge side, upper member, lock retainer, latch retainer, coat hook support insert, the louver cutout and for door corner reinforcing. A decorative trim is attached to the top, bottom and latch side of the door. The hinge is an extruded structural hinge with a decorative finish.

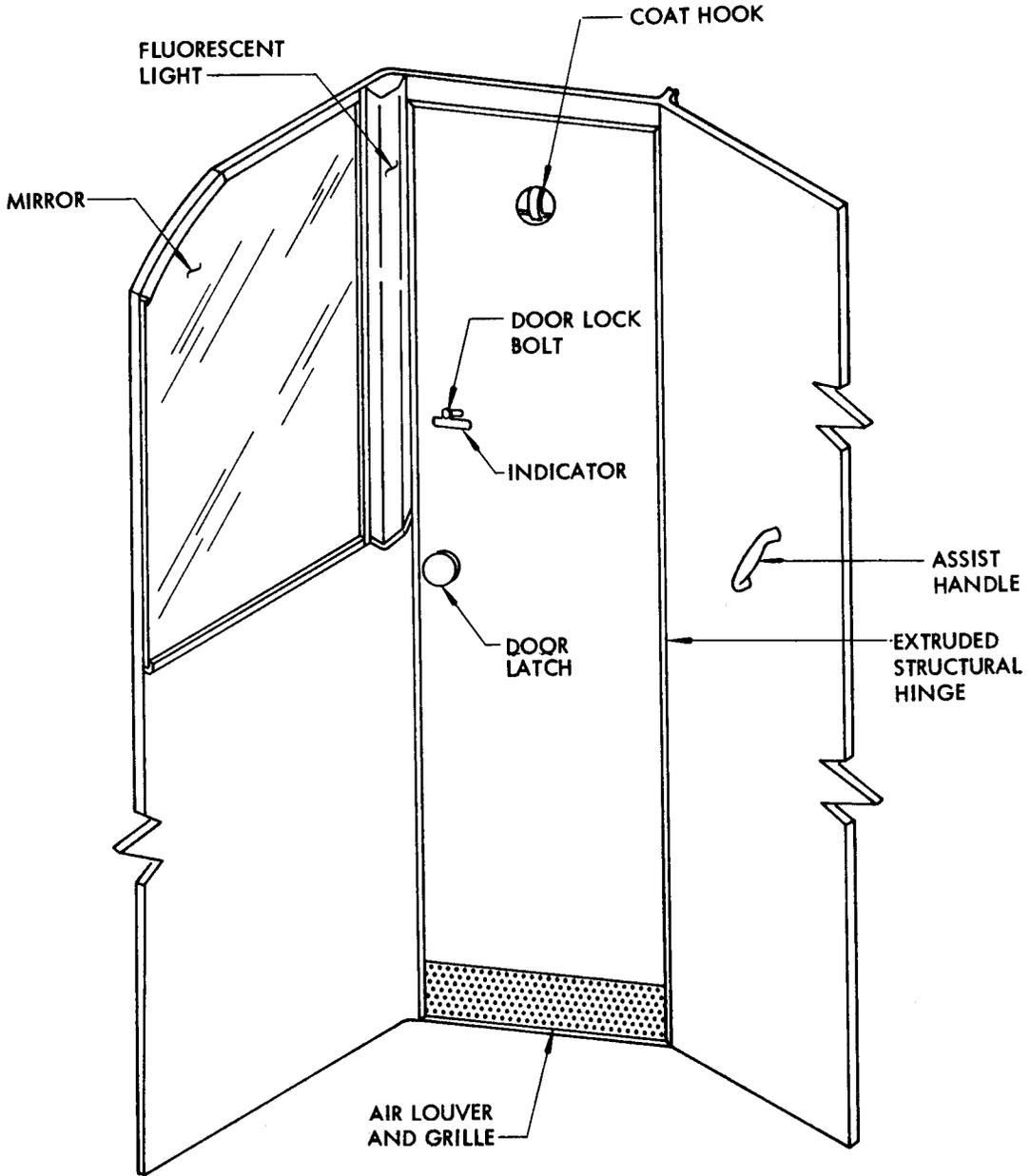
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VIEW FROM INSIDE  
 OF LAVATORY  
 COMPARTMENT

Lavatory Door  
 Figure 1

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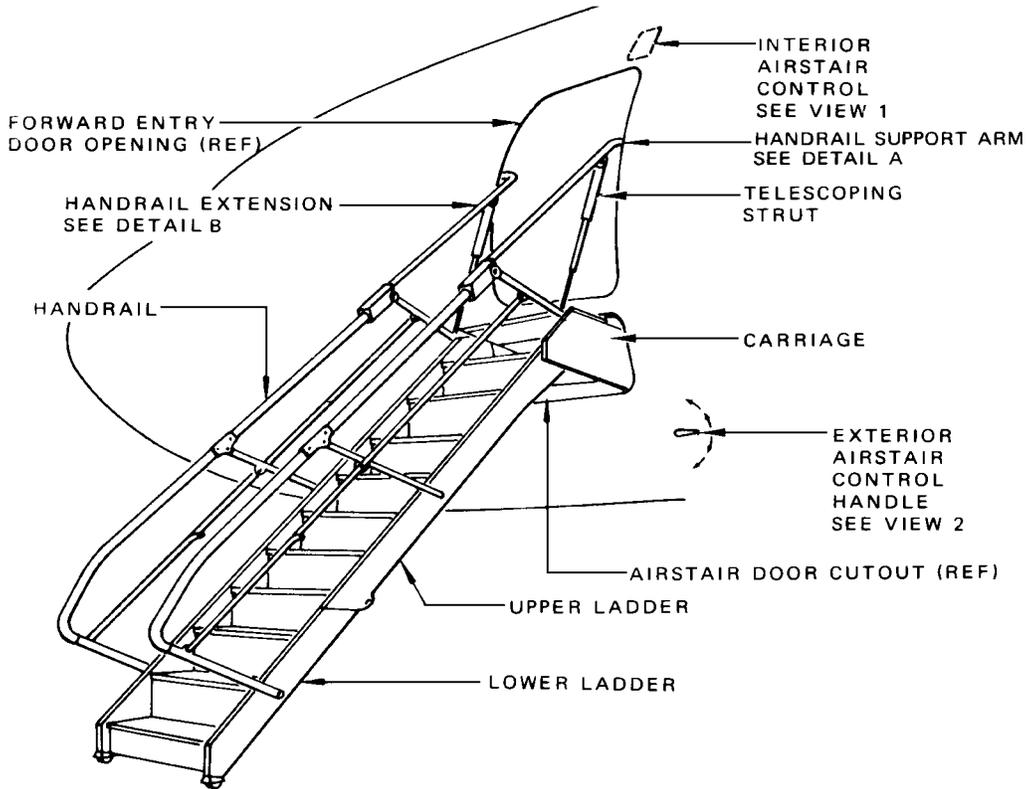
FORWARD AIRSTAIR AND DOOR – DESCRIPTION AND OPERATION

1. General

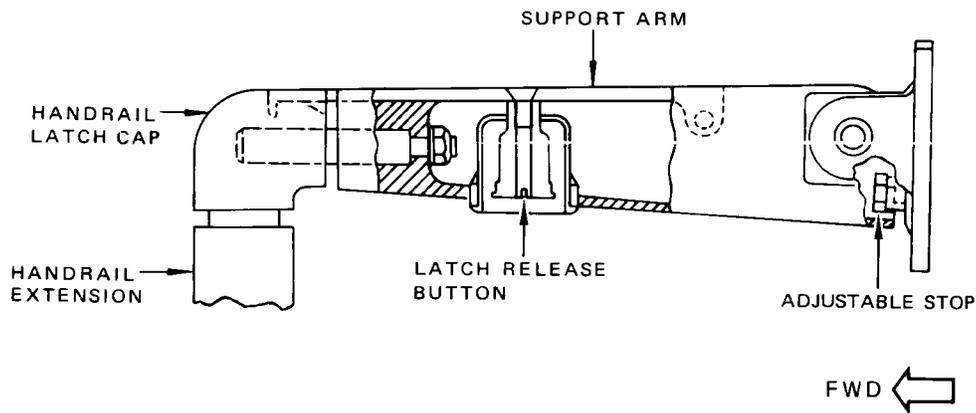
- A. The forward airstair is an integral part of the airplane and when extended it is used to load and unload passengers at the forward entry door. When retracted, the airstair is contained in an area under the passenger cabin floor at the forward entry door location. When the airstair is in the retracted position, the airstair door closes the cutout in the fuselage directly below the forward entry door to form a smooth contour with the fuselage exterior skin. The airstair is designed so it can be used when variations in height from 90.0 to 105.0 inches exist between top of forward entry door threshold and ground (Fig. 1).
- B. The airstair is electromechanically operated and is provided with both normal and standby operating systems. The standby system provides the capability for airstair operation in the event of an electrical failure in the normal system.
- C. The airstair operation can be controlled from either inside or outside the airplane. Control from inside the airplane is from a control panel located near the upper aft corner of the forward entry door. Control from outside the airplane is from a control handle located near the lower aft corner of the forward airstair door. The STAIRS OPERATING light on the interior control panel illuminates when the airstair door and the stair are in an operating cycle. The light will remain illuminated as long as the stair is in any position other than full extend with the airstair door open, or full retract with the airstair door closed. The STAIRS OPERATING light will operate if dc power is provided by the normal airplane system either in normal or standby mode. If dc power is lost the battery will provide power for airstair operation, but the STAIRS OPERATING light will not be active.
- D. Inadvertent extension of the airstair while the airplane is in flight is prevented by a latch pin which prevents the airstair door from moving inward from the closed position. The latch pin can only be retracted by opening the forward entry door or by operating the airstair exterior control handle.
- E. The airstair door is provided with microswitches which energize door warning lights on the control cabin forward overhead panel and master caution lights on the flight crew panel. These lights are illuminated whenever the airstair door is UNLOCKED or OPEN and go out when the door is CLOSED and LOCKED (Ref 52-71-0, Door Warning System).
- F. Power for operating of the airstair is provided from the main load control center panel (P6). The normal system uses airplanes ac and dc power for operation. The standby system uses airplane dc and/or battery dc power for operation (Fig. 2 and 3). Battery power is locked out whenever airplane dc power is available.

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AIRPLANES WITH FORWARD AIRSTAIRS

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AFT HANDRAIL SHOWN, FORWARD HANDRAIL TYPICAL

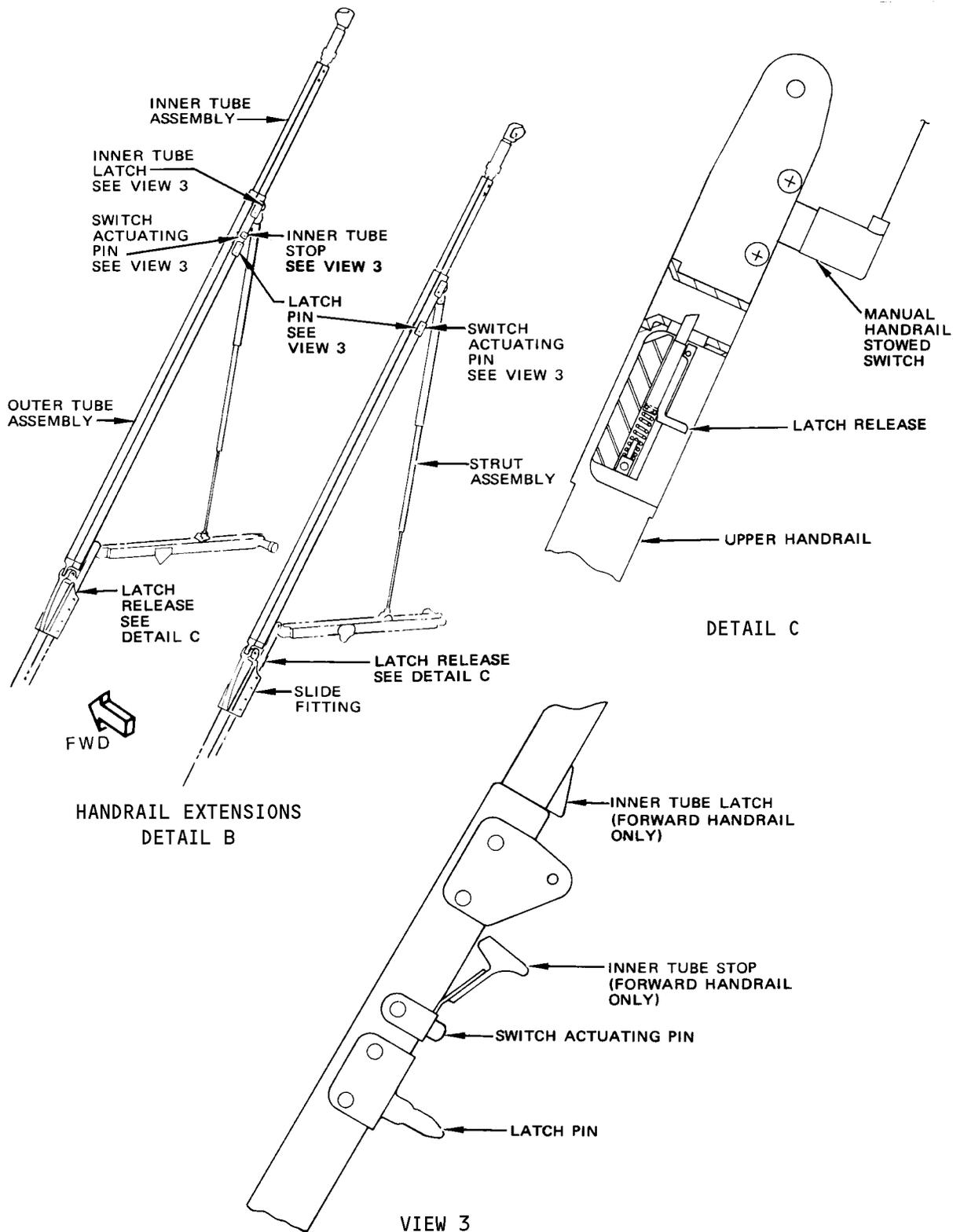


DETAIL A

Forward Airstair and Door  
 Figure 1 (Sheet 1)

EFFECTIVITY AIRPLANES WITH FORWARD AIRSTAIRS

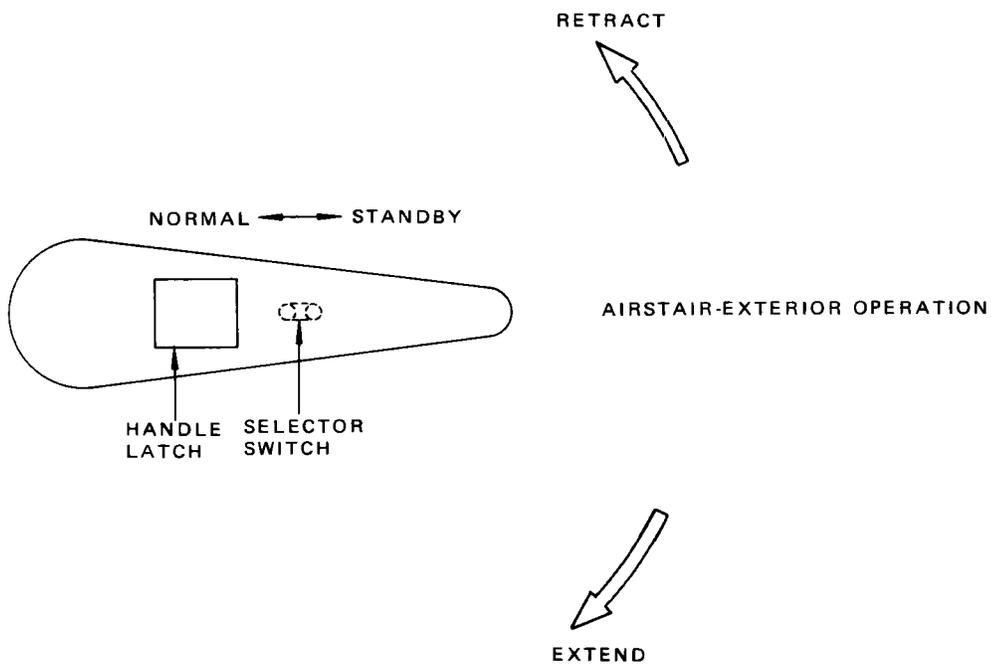
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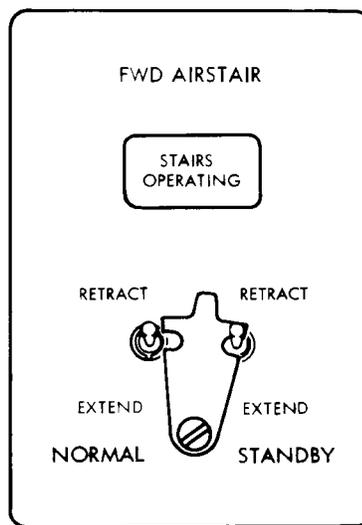
Forward Airstair and Door  
 Figure 1 (Sheet 2)

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 AIRPLANES WITH FORWARD AIRSTAIRS

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VIEW 2



VIEW 1

Forward Airstair and Door  
 Figure 1 (Sheet 3)

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 AIRPLANES WITH FORWARD AIRSTAIRS

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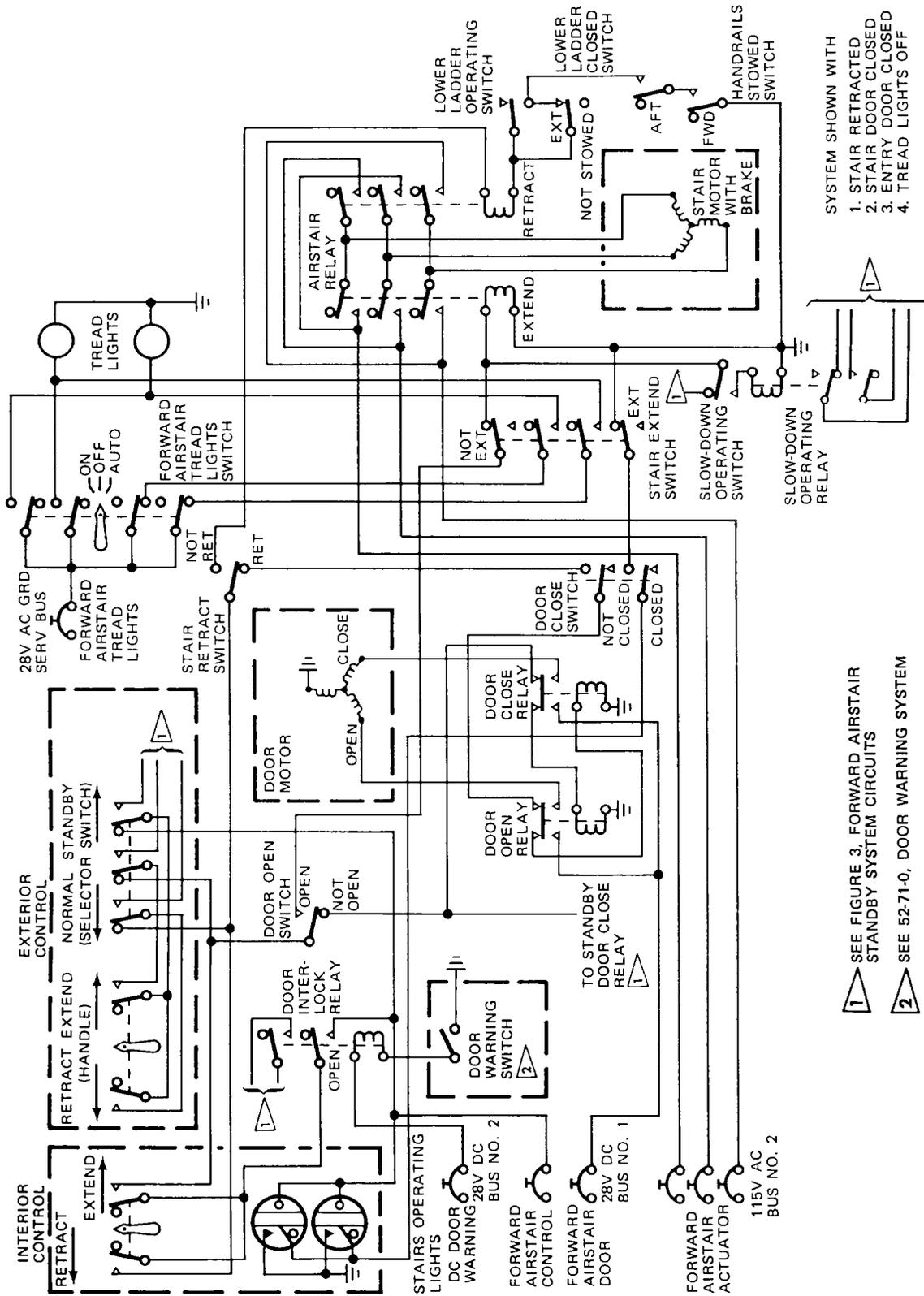
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G. The entire airstair assembly and/or various component parts of the airstair assembly can be removed for maintenance or replacement. For maintenance and service, access to the airstair can be gained through the door cutout when the stair is extended, or by removal of panels in the electronics compartment moisture shroud.

## 2. Operation

### A. General

- (1) There are three modes of operation for the forward airstair and door; normal, standby, and manual. For normal operation, the airstair uses 115 volt ac 3 phase 400 cycle power from ac bus No. 2, and the airstair door uses 28 volt dc power from dc bus No. 1. For standby operation, the airstair and the airstair door both use 28 volt dc airplane or battery power from the battery bus. When standby operation is selected, the handrail stowed limit switches are bypassed. During the retract cycle, it is important the handrails are stowed to avoid structural damage. For maintenance or emergency purposes, the airstair may be extended and/or retracted manually, and the airstair door may be operated manually and independent of the airstair. Airstair must be resequenced prior to power operation following manual extension and/or retraction. Manual operation and resequencing of airstair is described in the maintenance practices section, Forward Airstair - Manual Operation.
- (2) For normal and standby operation, the airstair and airstair door function in response to sequenced control signals (Fig. 2 and 3). The control signals are initiated by actuation of either the interior or exterior controls (Fig. 1). The interior control panel is located near the upper aft corner of the forward entry door. The exterior control handle is located near the lower aft corner of the forward airstair door. The controls for airstair lighting are located on the attendants forward auxiliary panel. For airstair positions during various phases of operation, see Fig. 4.
- (3) When operating the airstair from the interior control panel, the forward entry door must be unlatched so the airstair door latch pin will retract to unlock the airstair door. Unlatching the entry door also energizes an interlock relay allowing control power to be applied to the interior control panel. The relay is energized when the door warning circuit is actuated and prevents application of power to the airstair door motor while the airstair door is still latched. The interlock relay also prevents operation of the airstair from the internal control when airplane power is not available. The external control must be used to apply battery power. Also the entry door should be open far enough to provide good visibility of the area below the entry door (Fig. 2 and 3).
- (4) When operating the airstair from the exterior control handle, the forward entry door can be either open or closed because actuation of the control handle will retract the airstair door latch pin.



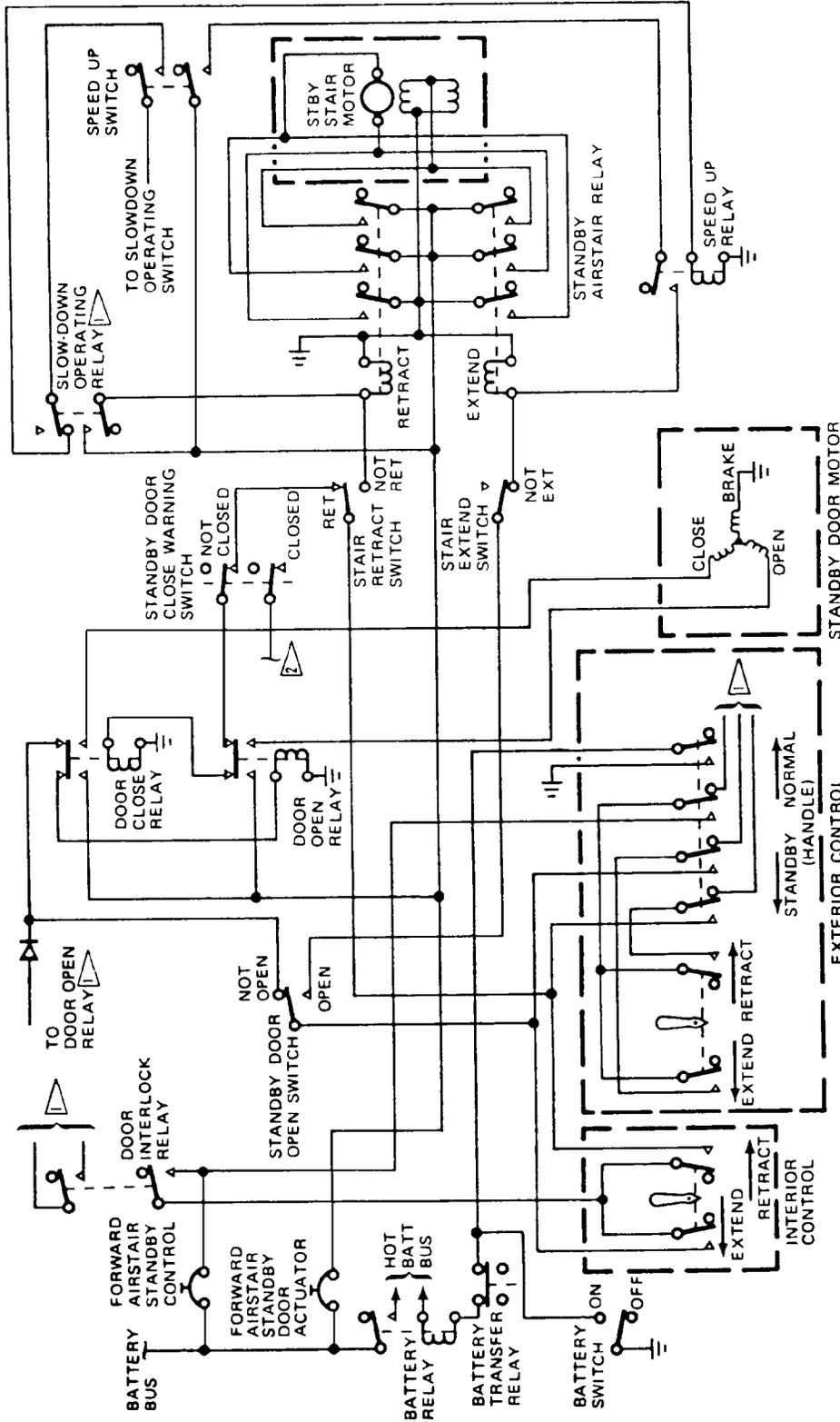
Forward Airstair Normal System Circuit  
Figure 2

SYSTEM SHOWN WITH  
1. STAIR RETRACTED  
2. STAIR DOOR CLOSED  
3. ENTRY DOOR CLOSED  
4. TREAD LIGHTS OFF

1 SEE FIGURE 3, FORWARD AIRSTAIR  
STANDBY SYSTEM CIRCUITS  
2 SEE 52-71-0, DOOR WARNING SYSTEM

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AIRPLANES WITH FORWARD AIRSTAIRS

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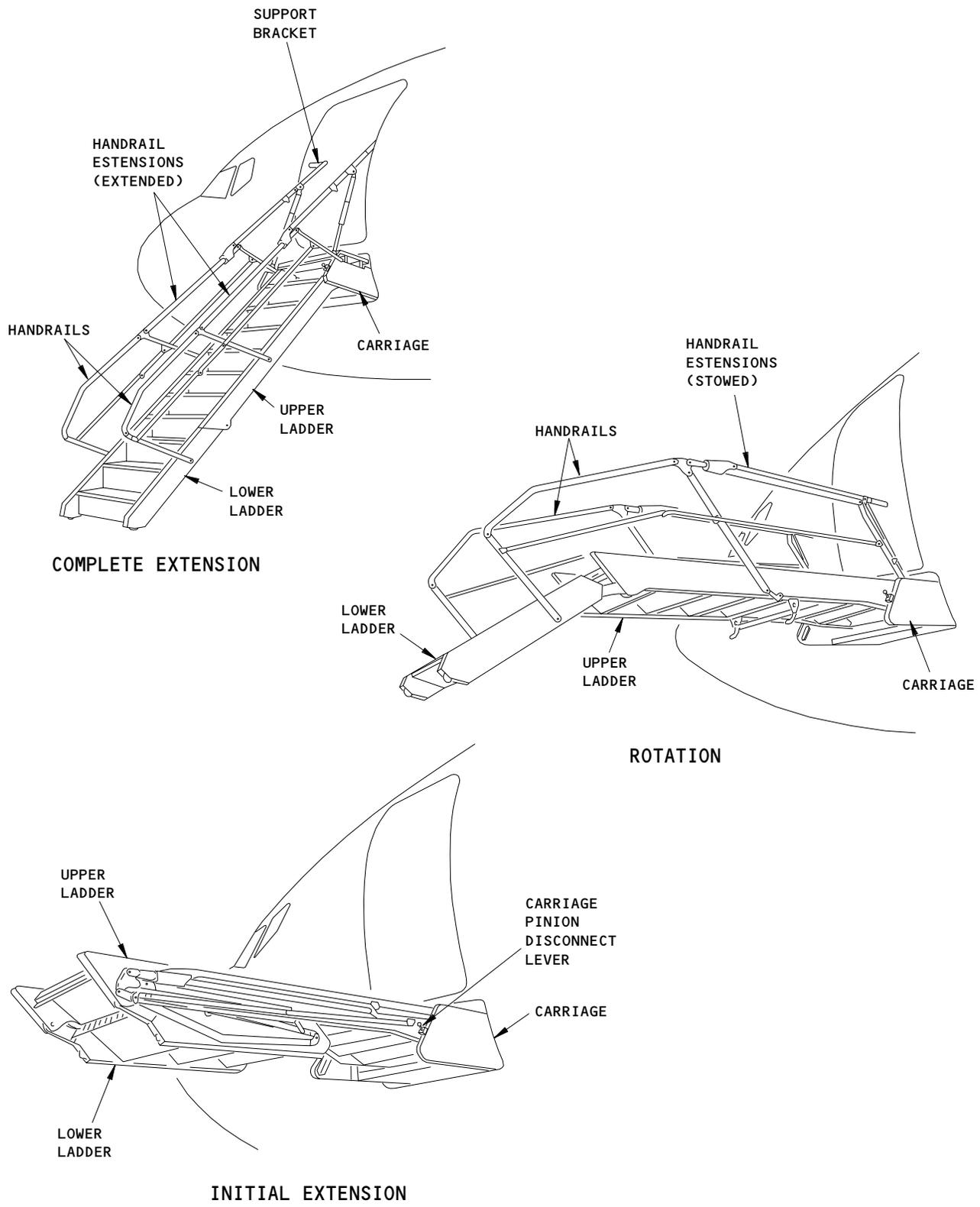


Forward Airstair Standby System Circuit  
 Figure 3

- SYSTEM SHOWN WITH  
 1. STAIR RETRACTED  
 2. STAIR DOOR CLOSED  
 3. PASSENGER DOOR CLOSED  
 4. TREAD LIGHTS OFF  
 5. BATTERY SWITCH OFF
- 1 SEE FIGURE 2, FORWARD AIRSTAIR  
 NORMAL SYSTEM CIRCUITS  
 2 SEE 52-71-0, DOOR WARNING SYSTEM

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 AIRPLANES WITH FORWARD AIRSTAIRS

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Forward Airstair Extension Positions  
 Figure 4

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 AIRPLANES WITH FORWARD AIRSTAIRS

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- (5) The interior and exterior controls are wired in parallel and have equal operating control once the forward entry door is open and the interlock relay energized.
- (6) During maintenance or when power is not available, the airstair door may be operated manually by removing the standby motor and applying torque to the input drive shaft of the actuator.
- (7) When the airstair is removed from the airplane, the airstair door can be electrically operated by using a special plug that can be inserted into the airstair power receptacle. The plug is made from a standard BACC45FT22-19P plug with pins No. 9 and 10, for normal system, and pins No. 14 and 15, for standby system, connected by No. 20 wire.
- (8) The airstair should not be extended when the airplane is jacked or in any attitude that would prevent the lower ladder from firmly contacting the ground. Use of the airstair while unsupported could cause damage.

B. Forward Airstair Extension - Normal Operation (Fig. 5)

**WARNING:** WHEN OPERATING AIRSTAIRS FROM INTERIOR CONTROL PANEL, OPEN ENTRY DOOR TO COCKED POSITION TO ALLOW CLEAR VISIBILITY OF AREA OUTSIDE AIRPLANE TO PREVENT INJURY TO PERSONNEL. DO NOT OPEN DOOR BEYOND COCKED POSITION WHILE OPERATING AIRSTAIR OR EQUIPMENT MAY BE DAMAGED.

**CAUTION:** THE AIRSTAIR SHOULD NOT BE OPERATED MORE FREQUENTLY THAN THREE CONSECUTIVE CYCLES WITH NORMAL OPERATION SYSTEM WITHIN A 20 MINUTE PERIOD. AIRSTAIR SHALL NOT BE OPERATED IF WINDS EXCEED 40 KNOTS.

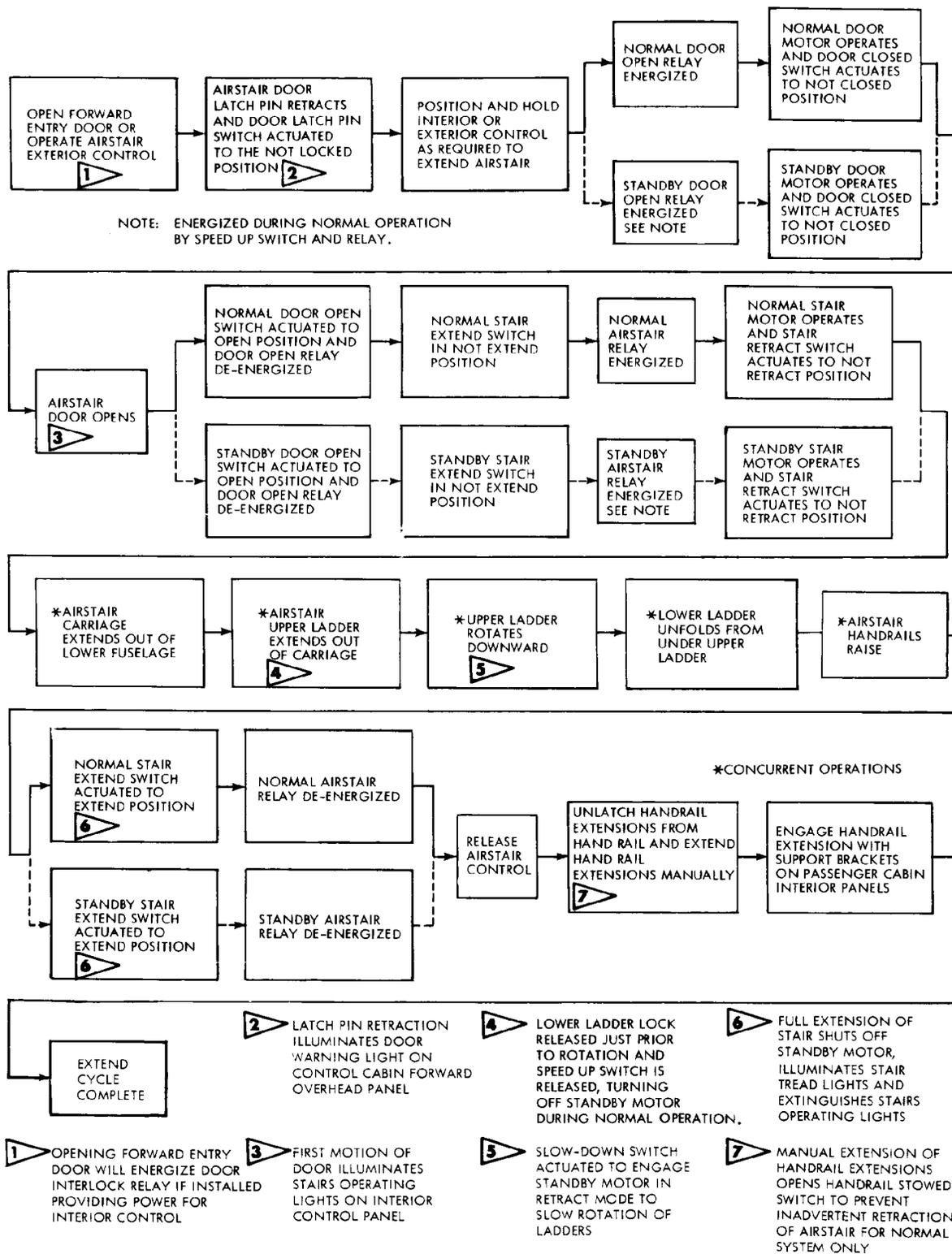
**NOTE:** With the airstair retracted and the airstair door and forward entry door closed and latched, it is mechanically and electrically impossible to extend the airstair until the airstair door latch pin has been retracted. Opening the forward entry door or positioning the exterior control handle to NORMAL EXTEND retracts the airstair door latch pin and allows application of electrical power for airstair extension. Whenever the latch pin is retracted, the door open warning lights on the control cabin forward overhead panel and the master caution lights on the flight crew's panel will be illuminated. With the forward entry door unlatched, either the interior or exterior controls may be used to extend the airstair. Whichever control is used, the control must be held in the position required to extend the airstair until the entire extend cycle is complete.

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AIRPLANES WITH FORWARD AIRSTAIRS

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Forward Airstair Extend Sequence  
Figure 5

EFFECTIVITY  
AIRPLANES WITH FORWARD AIRSTAIRS

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- (1) Position interior control to EXTEND or exterior control handle to NORMAL EXTEND and hold in that position.
  - (a) Positioning the controls to EXTEND energizes the normal and standby door open relays, thereby energizing the normal and standby door motors. The door open and close relays are interlocked to prevent energizing simultaneously the open and close side of the airstair door motor. The motors drive the actuator jackscrew to move the door inboard and down on the carriage tracks. The door will open rapidly since both door motors are driving the actuator. The initial movement of the door closes the door close switch, illuminating the STAIRS OPERATING light on the interior control panel. When the door reaches its full open position, the door open switch actuates, thereby removing power from the normal and standby door motors. The open switch energizes the normal airstair extend relay. The standby airstair relay is also energized via the speedup switch and speedup relay.
  - (b) With the airstair extend relays energized, power is applied to the normal and standby stair motors to operate the airstair actuator. With both motors energized, the actuator drives the carriage and upper ladder outboard rapidly. Just before the upper ladder rollers enter the curved tracks of the carriage, the speedup switch is released thereby removing power from the standby airstair motor.
  - (c) As the lead rollers of the upper ladder enter the curved tracks of the carriage, the lower ladder lock is triggered to release the lower ladder. Also, the slow-down operating switch is actuated by a ramp on aft carriage beam which energizes the standby airstair motor in the retract mode to slow the rotation of the ladders as they rotate downward. When rotation of the lower ladder is nearly complete the slow down operating-switch is released, thereby de-energizing the standby airstair motor.
  - (d) As the upper and lower ladders reach full extension, the carriage continues to extend until the carriage actuates the extend switches to remove power from the airstair motor.
  - (e) The extend switch, in the actuated position, lights the stair tread lights and turns out the STAIRS OPERATING light on the interior control panel.
- (2) When extend cycle is complete, move interior control to OFF or exterior control handle to the neutral position.
- (3) Open forward entry door to the full open position.

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- (4) Disengage handrail extensions from stowed position by sliding handrail latch release outboard and lifting handrail extension (detail C).
  - (a) When handrail extensions are disengaged from stowed position on handrails, microswitches in the handrails are actuated to disarm the airstair retract relay. This ensures, for normal system operation only, that the stair cannot be retracted until the handrail extensions are properly stowed on the handrails. For standby operation, the handrail microswitches and relays are bypassed. Actuator retraction using standby mode can be attempted, without stowing the handrails; however, structural damage may result.
- (5) Extend handrail extensions inside doorway and latch ends of handrail extensions to the handrail support brackets located just inside forward entry doorway.
  - (a) The support brackets are spring-loaded and fold vertically against the passenger compartment interior panels when not in use.

**WARNING:** CHECK HANDRAIL LATCHES ARE LOCKED BY STRONGLY SHAKING LATCH FORE AND AFT. SHOULD THE LATCHES NOT BE LOCKED AND COME UNLATCHED, AN INDIVIDUAL COULD FALL SINCE THE HANDRAIL EXTENSIONS DO NOT PROVIDE SUPPORT WHEN UNLATCHED.

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C. Forward Airstair Extension - Standby Operation (Fig. 5)

**WARNING:** WHEN OPERATING AIRSTAIRS FROM INTERIOR CONTROL PANEL, OPEN ENTRY DOOR TO COCKED POSITION TO ALLOW CLEAR VISIBILITY OF AREA OUTSIDE AIRPLANE TO PREVENT INJURY TO PERSONNEL. DO NOT OPEN DOOR BEYOND COCKED POSITION WHILE OPERATING AIRSTAIR OR EQUIPMENT MAY BE DAMAGED.

**CAUTION:** THE AIRSTAIR SHOULD NOT BE OPERATED MORE FREQUENTLY THAN THREE CONSECUTIVE CYCLES WITH STANDBY OPERATION SYSTEM WITHIN A 20-MINUTE PERIOD. AIRSTAIR SHALL NOT BE OPERATED IF WINDS EXCEED 40 KNOTS.

**NOTE:** In the event of an electrical failure in the normal system, the standby system is provided to operate the airstair. This system operates from 28-volt dc airplane power or if airplane power is not available, airplane battery power is used to operate the airstairs. Operating the standby system from outside the airplane is identical using either power source. However, the airstair can be operated from inside the airplane only if airplane dc power is available. With the airstair retracted and the airstair door and forward entry door closed and latched, it is mechanically and electrically impossible to extend the airstair until the airstair door latch pin has been retracted. Opening the forward entry door or positioning the exterior control handle to STANDBY EXTEND retracts the airstair door latch pin and allows application of electrical power for airstair extension. Whenever the latch pin is retracted, the door open warning lights on the control cabin forward overhead panel and the master caution lights on the flight crew's panel will be illuminated.

**NOTE:** With the forward entry door open, either the interior or exterior controls may be used to extend the airstair. Whichever control is used, the control must be held in the position required to extend the airstair until the entire extend cycle is complete.

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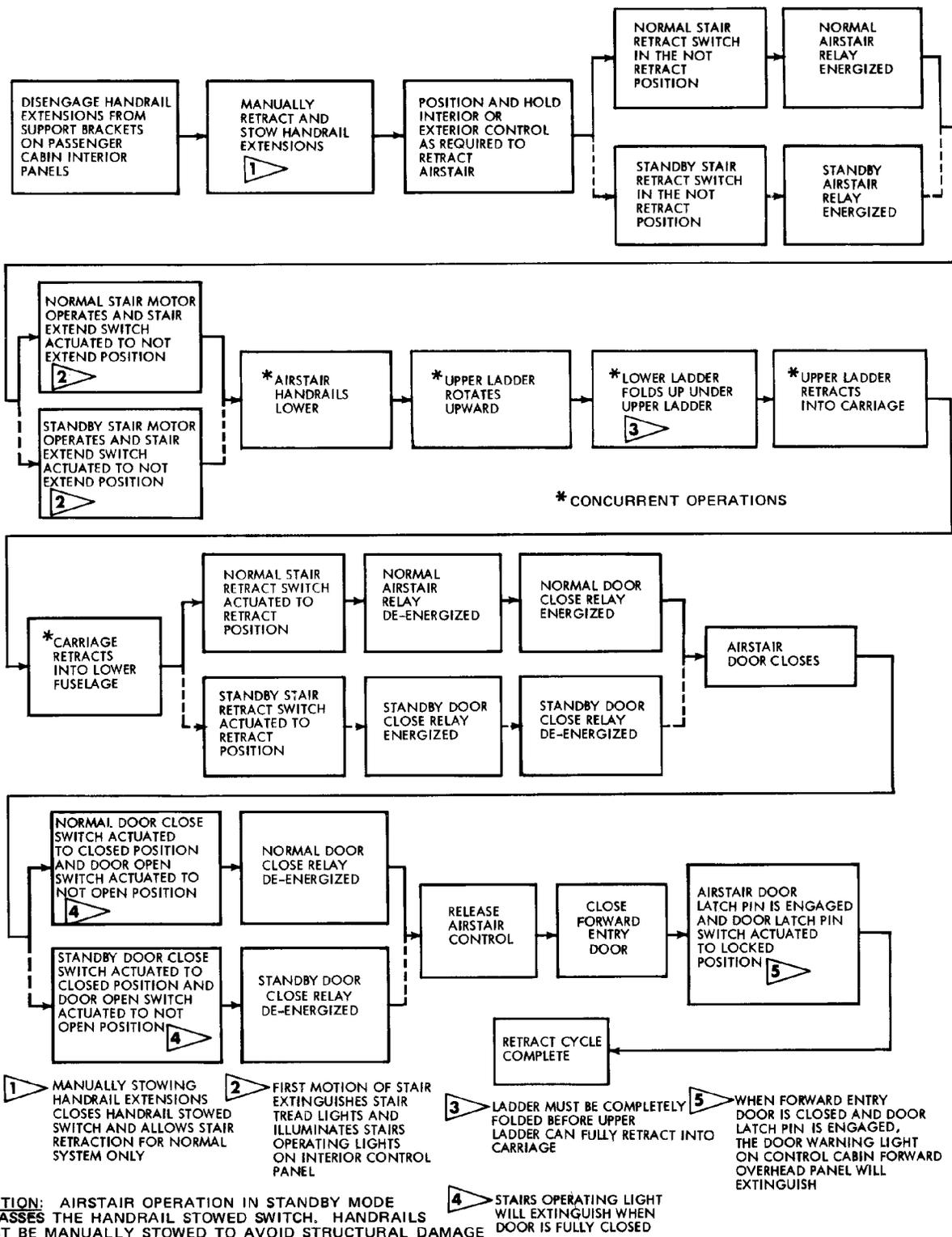
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- (1) Position interior standby control to EXTEND or exterior control handle to EXTEND and hold selector switch in STANDBY position.
  - (a) Positioning of the controls to extend the airstair provides power to energize the door open relay of the airstair door motor. The motor rotates the actuator jackscrew to open the door and cause it to travel inboard and down on the carriage tracks. The initial movement of the door actuates the door-closed switch, which illuminates the STAIRS OPERATING light on the interior control panel. When the door reaches the full open position, the door open switch closes and allows power to energize the airstair extend relay.
  - (b) With the airstair extend relay energized, power is supplied to the stair motor which operates the airstair actuator. The actuator drives the carriage pinions that cause the carriage to travel outboard on the rail assemblies. Ball screws attached to the carriage beams drive the ball bearing nuts attached to the upper ladder to extend the upper ladder out of the carriage.
  - (c) As the upper ladder begins to rotate down, the mechanism within the ladder side beams causes the lower ladder to unfold from under the upper ladder and raises the handrails.
  - (d) When the lower end of the lower ladder contacts the ground, the ladder moves outboard until the carriage actuates the extend switch.
  - (e) When the extend switch is actuated, the stair tread lights are illuminated and the STAIRS OPERATING light on the interior control panel goes out.
- (2) When extend cycle is complete, move interior control to OFF or release exterior selector switch and return exterior control handle to the neutral position.
- (3) Open forward entry door to the full open position.
- (4) Disengage handrail extensions from stowed position by sliding handrail latch release outboard and lifting handrail extensions.
- (5) Extend handrail extensions inside door and latch end of handrail extensions to the support brackets.

**WARNING:** CHECK HANDRAIL LATCHES ARE LOCKED BY STRONGLY SHAKING LATCH FORE AND AFT. SHOULD THE LATCHES NOT BE LOCKED AND COME UNLATCHED, AN INDIVIDUAL COULD FALL, SINCE THE HANDRAIL EXTENSIONS DO NOT PROVIDE SUPPORT WHEN UNLATCHED.



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Forward Airstair Retract Sequence  
Figure 6

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D. Forward Airstair Retraction - Normal Operation (Fig. 6)

**NOTE:** The airstair cannot be retracted until the handrail extensions are manually retracted and stowed in the proper position on the handrails.

- (1) Disengage handrail from support brackets just inside forward entry doorway by depressing the latch release button on the underside of the support bracket.
  - (a) The support brackets are spring-loaded and fold flat against the passenger cabin interior panels when not in use.
- (2) Retract handrail extensions and stow on handrails.
  - (a) The forward handrail extension is retracted and stowed by depressing the handrail extension inner tube latch and telescoping the inner tube until the inner tube stop springs into notch to stop inner tube from telescoping. Slide the handrail extension outboard and insert the handrail latch pin in handrail until latched. (See detail B, figure 1.)
  - (b) The aft handrail extension is retracted and stowed by sliding the extension outboard and inserting handrail latch pin in handrail until latched.

**WARNING:** WHEN OPERATING AIRSTAIRS FROM INTERIOR CONTROL PANEL, OPEN ENTRY DOOR TO COCKED POSITION TO ALLOW CLEAR VISIBILITY OF AREA OUTSIDE AIRPLANE TO PREVENT INJURY TO PERSONNEL. DO NOT OPEN DOOR BEYOND COCKED POSITION WHILE OPERATING AIRSTAIR OR EQUIPMENT MAY BE DAMAGED.

**CAUTION:** TO PREVENT POSSIBLE DAMAGE TO AIRSTAIR, CHECK THAT HANDRAIL EXTENSIONS ARE PROPERLY STOWED BY PULLING ON HANDRAIL EXTENSIONS PERPENDICULAR TO THE HANDRAILS.

- (3) Position interior normal control to RETRACT or exterior control to NORMAL RETRACT and hold in that position.
  - (a) Positioning of the controls to retract the airstair provides power to energize the retract relay of the stair motor which operates the airstair actuator. The actuator drives the carriage pinions that cause the carriage to travel inboard on the rail assemblies. Ball bearing nuts attached to the upper ladder and driven by the ball screws attached to the carriage beams retract the upper ladder into the carriage.



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- (b) The initial motion of the airstair retract cycle causes the extend switch to move to the not-extend position which will illuminate the STAIRS OPERATING light on the interior control panel and cause the stair tread lights to go out.
- (c) As the upper ladder begins to rotate up from the ground, the handrail mechanism within the upper ladder side rails will lower the handrails down against the ladders and the lower ladder will fold up under the upper ladder.
- (d) When the lower ladder is completely folded, the lower ladder retract switch is actuated, for normal system only, to allow retraction of the upper ladder into the airstair carriage. The lower ladder is held in place by a mechanical lock mechanism.
- (e) The upper ladder retracts inboard into the carriage and the carriage retracts inboard on the rails until it reaches the limit of travel and the airstair retract switch is actuated. Actuation of the retract switch will stop the actuator motor and transfer power through the airstair door close switch, which is in the door not-closed position, to the door close relay. The airstair is prevented from moving while in the retracted position by the motor brake and is stabilized in flight by inflight supports.
- (f) When the door close relay is energized, power is provided to operate the door motor, which rotates the door actuator. The actuator operates the jackscrew connected to the door carriage. The door travels upward and outboard in the door and carriage tracks to the closed position. When the doorstops are seated properly, the door close switch is actuated to the closed position to stop the door actuator motor, and the STAIRS OPERATING light on the interior control panel will go out.
- (g) When retract cycle is complete, position interior control to OFF or exterior control to the neutral position.

**NOTE:** If the forward entry door is open, the airstair door latch pin is not engaged and the AIRSTAIR door warning on the control cabin forward overhead panel will be illuminated. If the forward entry door is closed, returning the exterior control handle to the neutral position will automatically engage the airstair door latch pin and cause the AIRSTAIR door warning light to go out.

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E. Forward Airstair Retraction - Standby Operation (Fig. 6)

**NOTE:** In the event of an electrical failure in the normal system, the standby system is provided to operate the airstair. This system operates from 28-volt dc airplane power or if airplane power is not available, airplane battery power is used to operate the airstairs. Operating the standby system from outside the airplane is identical using either power source. However, the airstair can be operated from inside the airplane only if airplane dc power is available. Either the interior or exterior controls may be used to retract the airstair. Whichever control is used, the control must be held in the position required to retract the airstair until the entire retract cycle is complete.

**CAUTION:** NO SAFETY SWITCH IS PROVIDED IN THE STANDBY SYSTEM. ENSURE THAT HANDRAIL EXTENSIONS ARE RETRACTED AND PROPERLY STOWED BEFORE ATTEMPTING RETRACTION. FAILURE TO DO SO MAY RESULT IN STRUCTURAL DAMAGE.

- (1) Disengage handrail from support brackets just inside forward entry doorway (Ref. Forward Airstair Retraction - Normal Operation).
  - (a) The support brackets are spring loaded and fold vertically against the passenger cabin interior panels when not in use.
- (2) Retract handrail extensions and stow on handrails (Ref. Forward Airstair Retraction - Normal Operation).

**WARNING:** WHEN OPERATING THE AIRSTAIR FROM THE INTERIOR CONTROL PANEL, OPEN ENTRY DOOR TO COCKED POSITION TO ALLOW CLEAR VISIBILITY OF AREA OUTSIDE AIRPLANE TO PREVENT INJURY TO PERSONNEL. DO NOT OPEN DOOR BEYOND COCKED POSITION WHILE OPERATING AIRSTAIR OR EQUIPMENT MAY BE DAMAGED.

- (3) Position interior standby control to RETRACT or exterior control to RETRACT and control switch to STANDBY position.
  - (a) Positioning of the controls to retract the airstair provides power to energize the retract relay of the stair motor which operates the airstair actuator. The actuator drives the carriage pinions that cause the carriage to travel inboard on the rail assemblies. Ball bearing nuts attached to the upper ladder and driven by the ball screws attached to the carriage beams retract the upper ladder into the carriage.
  - (b) carriage pinions that cause the carriage to travel inboard on the rail assemblies. Ball bearing nuts attached to the upper ladder and driven by the ball screws attached to the carriage beams retract the upper ladder into the carriage.

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- (c) The initial motion of the airstair retract cycle causes the extend switch to move to the not-extend position which will illuminate the STAIRS OPERATING light on the interior control panel and cause the stair tread lights to go out.
- (d) As the upper ladder begins to rotate up from the ground, the handrail mechanism within the upper ladder side rails will lower the handrails down against the ladders and the lower ladder will fold up under the upper ladder.

**CAUTION:** NO SAFETY SWITCH IS PROVIDED IN THE STANDBY SYSTEM TO ENSURE THAT LOWER LADDER IS COMPLETELY FOLDED AGAINST UPPER LADDER BEFORE LADDER IS COMPLETELY RETRACTED INTO THE CARRIAGE.

- (e) When the lower ladder has folded, the upper ladder retracts inboard into the carriage and the carriage retracts inboard on the rails until it reaches the limit of travel and the airstair retract switch is actuated. Actuation of the retract switch will stop the actuator motor and transfer power through the airstair door close switch, which is in the door not-closed position, to the door close relay. The airstair is prevented from moving while in the retracted position by the motor brake and is stabilized in flight by inflight supports.
  - (f) When the door close relay is energized, power is provided to operate the door motor, which rotates the door actuator. The actuator operates the door jackscrew connected to the door carriage. The door travels upward and outboard in the door and carriage tracks to the closed position. When the doorstops are seated properly, the door close switch is actuated to the closed position to stop the door actuator motor, and the STAIRS OPERATING light on the interior control panel will go out.
- (4) When retract cycle is complete, position interior control to OFF or exterior control to the neutral position. Exterior selector switch will return to NORMAL position when released.

**NOTE:** If the forward entry door is open, the airstair door latch pin is not engaged and the AIRSTAIR door warning on the control cabin forward overhead panel will be illuminated. If the forward entry door is closed, returning the exterior control handle to the neutral position will automatically engage the airstair door latch pin and cause the AIRSTAIR door warning light to go out.

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### FORWARD AIRSTAIR AND DOOR – TROUBLESHOOTING

#### 1. General

A. The possible troubles for the forward airstairs are grouped into four charts, Door Opening, Airstair Extension, Airstair Retraction and Door Closing. Refer to the appropriate chart for troubleshooting a specific fault.

**CAUTION:** IF AT ANY TIME DURING EXTENSION OR RETRACTION, CHATTERING OR ERRATIC OPERATION OCCURS, IMMEDIATELY DISCONNECT POWER FROM THE AIRSTAIR AND INVESTIGATE THE CAUSE.

B. When troubleshooting the airstairs in NORMAL or STANDBY operation, the following conditions should be in effect:

- (1) Power is on the airplane.
- (2) The following forward airstair circuit breakers on the load control center are closed unless specified otherwise.
  - (a) Forward airstair control
  - (b) Forward airstair standby control
  - (c) Forward airstair actuator
  - (d) Forward airstair door
  - (e) Forward airstair door standby
- (3) All electrical connections, particularly swing arm connectors, are checked to make sure proper mating and firm connections.
  - (a) For access to area below airstair while stair is extended and drain pan is installed, remove two screws connecting swing arm bracket at aft rail and lay swing arm aft of hatch.

**CAUTION:** DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

**NOTE:** Temporary access can be attained without disconnecting swing arm bracket by partially retracting airstair.

- (b) Reconnect swing arm with spring section forward of a line between attach points before retracting airstair.
- (c) After performing an isolation procedure requiring opening a circuit breaker or disconnecting a connector, always restore the circuit to its initial condition before proceeding to the next procedure.
- (4) In the AIRSTAIR RETRACTION sequence, the handrail extensions should be disengaged from the entry door and stowed.

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- C. When troubleshooting the airstair in manual operation, the following conditions should be in effect:
- (1) Electrical connector to airstair is disconnected from its receptacle.
  - (2) Pinion drive is disconnected when moving the carriage on the aircraft rails.
  - (3) Ladder drive shafts are disconnected when moving the ladder assembly in or out of the carriage.

**CAUTION:** AFTER ANY MANUAL EXTENSION OR RETRACTION, NO MATTER HOW SLIGHT, THE FORWARD AIRSTAIR SHOULD BE RESEQUENCED TO ENSURE THAT DAMAGE WILL NOT RESULT WHEN AUTOMATIC OPERATION IS RESUMED.

- D. The following warning should be referred to frequently while trouble shooting the airstairs.

**WARNING:** IT IS DANGEROUS TO WORK BELOW CARRIAGE WHILE ELECTRICAL POWER IS ON THE AIRSTAIRS. UNEXPECTED RETRACTION OF THE UPPER STAIRS OR THE CARRIAGE COULD CAUSE SERIOUS INJURY. ALL FORWARD AIRSTAIR CIRCUIT BREAKERS SHOULD BE OPENED WHILE WORKING ON THE AIRSTAIR, EXCEPT WHEN MAKING A SPECIFIC VOLTAGE CHECK. CIRCUIT BREAKERS SHOULD NOT BE CLOSED UNTIL ALL PERSONNEL ARE CLEAR OF AIRSTAIR AND CARRIAGE EXTENSION OR RETRACTION AREA.

- E. The airstairs should not be fully extended when the airplane is on jacks or is about to be jacked. This is because the airstairs can be damaged by personnel using them while the lower end is unsupported. Also the airstairs, when fully extended, could be damaged when the airplane was lowered: an irregular ground surface might prevent the lower stairs feet from sliding away from the airplane as they normally do for small vertical movements of the airplane.

**NOTE:** When working with the ladder partially extended, it is recommended that some support be provided under the outboard end of the extended portion of the upper ladder. This will protect the carriage from the strains imposed by its cantilevered attitude, which may become exaggerated by personnel working with the ladder partially extended. A forklift truck with an empty pallet applying a light upward load would serve this purpose.

2. Door Opening Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Airstair door will not open with NORMAL power	Airstair door latch pin mechanism defective	Check airstair door lock warning light is illuminated. If not, airstair door latch pin mechanism is defective	Replace or adjust door latch pin mechanism (AMM 25-61-531, Adjustment/Test)
	Normal door open limit switch defective	Disconnect connector D4668P on junction box and check for 28v dc at pin 2 with airstair control switch in the extend position. If voltage is not present, switch is defective.	Replace or adjust switch (AMM 52-61-611, Adjustment/Test)
	Normal door open relay, normal door close relay or normal door motor is defective	Disconnect normal door motor connector D912 and check for 28v dc at pin 4 with airstair control switch in extend position. If voltage is present, motor is defective. If voltage is not present, door open relay or door close relay is defective	Replace door open relay or normal door motor
Airstair door will not open with normal power and airstair attempts to extend into back of door	Normal door open limit switch defective	Disconnect airstair connector D934 and check for 28v dc at pin 5 on plug with airstair door control in the extend position. If voltage is present, switch is defective	Replace or adjust normal door open limit switch

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Airstair door opens with normal power and motor continues to run	Normal door open limit switch or door open relay is defective	With door open, disconnect connector D4668P on junction box and check for 28v dc at pin 2 with airstair control in the extend position. If voltage is present, switch is defective. If voltage not present, relay is defective	Replace or adjust door open switch (AMM 52-61-611, Adjustment/Test). Replace relay

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Airstair door opens with only normal motor energized	Airstair door diode open or standby door open relay or motor faulty	Operate airstair control to standby extend. If door operates, diode is faulty. If door does not operate see following trouble	Replace airstair diode
Airstair door will not open with STANDBY power	Airstair door latch pin mechanism defective	Check airstair door lock warning light is illuminated. If not, airstair door latch pin mechanism is defective	Replace or adjust door latch pin mechanism. Refer to 52-61-531, Adjustment/Test
	Standby door open limit switch defective	Disconnect connector D934 on junction box and check for 28 volts dc at pin 17 with airstair door control in the extend position. If voltage is present, switch is defective	Replace or adjust switch. Refer to 52-61-611, Adjustment/Test
	Standby door open relay or standby door motor defective	Disconnect standby door motor connector D914 and check for 28 volts dc at pin 4 with airstair control in the extend position. If voltage is not present, relay is defective. If voltage is present, motor is defective	Replace door open relay or motor
Airstair door will not open with standby power and airstair attempts to extend into back of door	Standby door open switch defective	Disconnect airstair connector D934 and check for 28 volts dc at pin 17 on plug with airstair control in the extend position. If voltage is present, switch is defective	Replace or adjust normal door open switch. Refer to 52-61-611, Adjustment/Test
Airstair door opens with standby power and motor continues to run	Standby door open switch on or standby door open relay defective	Disconnect connector D4668P on junction box and check for 28 volts dc at pin 4 with airstair control in extend position. If voltage is present, switch is defective. If voltage is not present, relay is defective	Replace or adjust door open switch or replace relay

FORWARD AIRSTAIR AND DOOR - Troubleshooting  
Figure 101 (Sheet 1)

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3. Airstair Extension Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Airstair will not extend with NORMAL power	Door interlock relay defective if airstair extends with external control only	Disconnect connector D4822J at interior control panel and check for 28v dc at pin 5. If voltage is not present, relay is defective or forward entry door warning sensor is defective.	Replace relay or adjust door warning sensor (AMM 52-71-0/501)
	Normal extend limit switch defective	Disconnect airstair connector D934 and check continuity between pin 5 on plug P1 and pin Y1 on normal relay K1. If open is present, switch is defective.	Replace or adjust switch (AMM 52-61-151, Adjustment/Test)
	Normal door open switch defective	Disconnect airstair connector D934 and check for 28v dc at pin 5 on D934 with airstair control in extend position. If voltage is not present, switch is defective.	Replace or adjust switch (AMM 52-61-611, Adjustment/Test)
	Normal airstair relay or normal stair motor defective	Disconnect normal motor connector J4 and check for 115v ac at pins 1, 2 and 3 with airstair control in extend position. If voltage is not present at all three pins, relay is defective. If voltage is present, motor is defective.	Replace either the relay or motor

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Airstair will not extend with STANDBY power	Door interlock relay defective if airstair extends with external control only	Disconnect connector D822J at interior control panel and check for 28v dc at pin 2. If voltage is not present, relay is defective or forward entry door warning sensor is defective.	Replace relay or adjust door warning sensor (AMM 52-71-0/501)
Airstair will not extend with STANDBY power (Cont)	Standby door open limit switch defective	Disconnect airstair connector D934 and check for 28v dc at pin 17 on D934 with the airstair control in the standby extend position. If voltage is not present, switch is defective.	Replace or adjust switch (AMM 52-61-611, Adjustment/Test)
Airstair extends too slow with NORMAL power	Standby airstair relay or standby airstair motor defective	Operate airstair in standby mode. If stair operates, motor and relay ok. If stair does not operate, see following trouble for remedy:	
	Normal airstair relay, or normal airstair motor is defective	Open FORWARD AIRSTAIR STANDBY CONTROL circuit breaker and operate airstair in normal mode. If stair extends, relay and motor ok. If not, motor or relay is defective. See proceeding trouble for remedy.	

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
	Speed-up switch or relay defective	With airstair retracted and FORWARD AIRSTAIR ACTUATOR circuit breakers open, check for 28v dc at terminals X1 and A2 of speed-up relay with control in extend position. If both voltages are present, relay is defective. If both are not present, switch is defective.	Replace or adjust speed-up switch (AMM 52-61-211). Replace relay
	Slow-down operating switch or slow-down operating relay defective	Extend airstair fully, using normal power and note ladder rotation rate. If rate is too rapid, slow-down switch or relay is defective.	See following trouble for rapid airstair ladder extension
Normal actuator motor continues to run after extension with NORMAL power applied	Normal stair extend limit switch or normal airstair relay is defective	Disconnect airstair connector D934 and check for continuity between pins 5 and 18 of plug P1. If not open, switch is defective. If open, relay is defective.	Replace or adjust switch AMM 52-61-151/501 Replace relay
Standby airstair motor continues to run after ladder rotation with NORMAL power applied	Slow-down operating switch or slow-down operating relay defective	Check for 28v dc at terminal X1 of relay with control in extend position. If voltage is present, switch is defective. If voltage is not present, relay is defective.	Replace or adjust switch AMM 52-61-151/201 Replace relay
	Standby airstair relay defective	Disconnect standby airstair motor connector J3 and measure 28v dc at pin 2 of J3. If voltage is present, relay is defective.	Replace relay

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Airstair ladders extend rapidly creating hazard to ground personnel with NORMAL power	Standby motor or standby retract relay defective	Partially retract airstair using standby power. If stair will not retract, see trouble in Airstair Retraction Troubleshooting.	Replace motor or relay
	Slow-down operating switch or slow-down relay defective	Check for 28v dc at terminal X1 of slow-down relay with control in normal extend position. If voltage is not present, switch is defective. If voltage is present, relay is defective.	Replace or adjust switch AMM 52-61-151/201 Replace relay
Tread lights fail to illuminate with tread light switch in AUTO position	Normal stair extend limit switch defective	Disconnect airstair connector D934 and check for continuity between pins 3 and 11 of plug P1. If open, switch is defective.	Replace switch
Standby actuator motor continues to run after extension with STANDBY power	Standby stair extend limit switch or standby airstair relay is defective	Disconnect airstair connector D934 and check continuity between pins 17 and Y1 of standby airstair relay. If open, relay is defective. If not open, switch is defective.	Replace relay or replace or adjust switch (AMM 52-61-151, Adjustment/Test)

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Lower ladder fails to unlock from upper ladder	Upper ladder has not extended far enough to trip lower ladder uplock trigger	Upper ladder out of sequence with carriage.	Resequence airstair assembly AMM 52-61-100, Forward Airstair Manual Operation
	Lower ladder lock faulty	Extend upper ladder to the unlock position. Check control rod length allows full opening of up-lock hook assembly.	Adjust control rod AMM 52-61-191, Adjustment/Test
Carriage step fails to rise	Defective carriage step actuating mechanism	Extend carriage until actuator arm contacts actuator. Check linkage of rod assembly.	Adjust carriage step actuating mechanism, AMM 52-61-131, Adjustment/Test
Carriage top step is unstable	Mechanism is out of adjustment	Extend carriage until actuator arm contacts actuator. Check rod assemblies for proper alignment.	Realign and adjust AMM 52-61-131, Adjustment/Test

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Ladder assemblies extend but carriage remains stationary	Pinion gears are stripped	If pinion driveshaft linkage is rotating at pinion assembly connection, pinion gears are stripped	Replace airstair
	Carriage pinion disconnect lever unlocked or defective	Check lever operation	Adjust pinion disconnect lever assembly
	Actuator pinion drive gears defective	If pinion gears and linkage are not rotating, fault lies in actuator assembly	Replace actuator assembly
Carriage extends but ladder assemblies do not	Actuator drive gears defective	Check rotation of actuator drive shaft	Replace actuator
Ladder assemblies extend but bouncing and binding occur during last 9 inches of ball screw travel	Excessive and play in ball screw ball nut	Check for excessive and play in ball screw ball nut. Refer to 52-61-100, Forward Airstair - Inspection/Check	Replace ball screw assembly
Airstairs continues to retract with lower ladder nut locked	Defective switch S10 or S11	Check for continuity through switch when not activated	Replace switch
Airstairs only partially retracts	Lower ladder closed switch (S11) defective or improperly adjusted	Perform continuity check of switch S11	Properly adjust switch or replace switch

FORWARD AIRSTAIR AND DOOR - Troubleshooting  
Figure 101 (Sheet 2)

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Airplanes With Forward Airstairs

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Airstair will not retract with NORMAL power	Manual handrails not properly stowed	Check insertion of handrail extension attach pin in end fitting of upper rail	Stow handrail fully
	Forward and/or aft handrails stowed switches defective	Disconnect forward and/or aft handrail switch connectors J15 and/or J16 and check continuity between pin 1 and pin 3 on P15 and/or P16. If open, switch is defective	Replace or adjust switches. Refer to 52-61-181 Adjustment/Test
	Lower ladder operating switch defective	Disconnect lower ladder operating switch connector J13 and check continuity between pin 1 and pin 3 of P13. If open, switch is defective	Replace or adjust switch. Refer to 52-61-161 Adjustment/Test
	Normal airstair retract limit switch defective	Disconnect airstair connector D934 and check continuity between pin 10 on plug P1 and pin X1 on normal airstair relay K1	Replace or adjust switch. Refer to 52-61-151 Adjustment/Test
Tread lights fail to extinguish automatically	Normal airstair relay or normal stair motor defective	Disconnect normal motor connector J4 and check for 115 volts ac at pins 1, 2 and 3 of J4 with airstair control switch in retract position. If voltage is not present at all three pins, relay is defective. If voltage is present, motor is defective	Replace either the relay or motor
	Normal airstair extend limit switch defective	Disconnect airstair connector D934 and check continuity between pin 3 and pin 11 of plug P1. If closed, switch is defective	Replace switch

FORWARD AIRSTAIR AND DOOR - Troubleshooting  
Figure 101 (Sheet 3)

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**MAINTENANCE MANUAL**

TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Airstair will not retract with STANDBY power	Standby airstair retract limit switch defective	Disconnect airstair connector D934 and check continuity between pin 15 on plug P1 and pin X1 on standby airstair relay K2. If open, switch is defective	Replace or adjust switch. (Refer 52-61-141, Adjustment/Test)
	Standby airstair relay or standby airstair motor is defective	Disconnect standby motor connector J3 and measure 28 volts dc at pins 1 and 2 of J3 with the airstair control in the standby retract position. If voltage is not present, relay is defective. If voltage is present, motor is defective	Replace either relay or motor
Airstair only partially retracts in normal operation	Lower ladder closed switch defective	Disconnect lower ladder operating switch connector J13 and check continuity between pin 1 and pin 3 of P14. If open, switch is defective	Replace or Adjust switch. (Refer 52-61-171, Adjustment/Test)
Normal airstair motor continues to run after retraction	Normal airstair retract limit switch or normal airstair relay defective	Disconnect airstair connector D934 and check continuity between pin 10 and X1 or normal airstair relay. If open, relay is defective. If closed, switch is defective	Replace relay. Replace or adjust switch. (Refer 52-61-141, Adjustment/Test)

FORWARD AIRSTAIR AND DOOR - Troubleshooting  
Figure 101 (Sheet 4)

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Standby airstair motor continues to run after retraction	Standby airstair retract limit switch or standby airstair relay defective	Disconnect airstair connector D934 and check continuity between pin 15 on plug P1 and X1 of standby airstair relay. If closed, switch is defective. If open, relay is defective	Replace relay. Replace or adjust switch (Ref 52-61-141, Adjustment/Test)
Airstair stops during retract cycle	Manual hand-rail(s) improperly stowed in mechanical hand-rail  Low forward airstair actuator clutch holding torque	Handrail stow latch fitting latch screw improperly adjusted  Test torque per Weber Overhaul Manual, 52-60-4	Adjust latch screw (Ref 52-61-181, Adjustment/Test)  Adjust torque per Weber Overhaul Manual
Ladder assemblies operate but bouncing and binding occur during last 9 inches of jack-screw travel	Excessive end play in ball screw ball nut	Check for excessive end play in ball screw ball nut (Ref 52-61-100, Inspection/Check)	Replace ball screw assembly

FORWARD AIRSTAIR AND DOOR - Troubleshooting  
Figure 101 (Sheet 5)

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MAINTENANCE MANUAL

TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
<p>Airstair will not extend or retract in either normal or standby mode (or operation is slow or erratic)</p>	<p>Sheared (or broken) output shaft of either "normal" or standby motor</p>	<p>Remove both motors and check for condition of output shaft and proper brake operation (Ref 52-61-121, Removal/Installation)</p>	<p>Replace defective motor (Ref 52-61-121, Removal/Installation)</p>

FORWARD AIRSTAIR AND DOOR - Troubleshooting  
Figure 101 (Sheet 6)

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4. Door Closing Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Airstair door does not close after airstair has retracted with NORMAL power	Normal airstair retract limit switch defective	Disconnect airstair connector D934 and check continuity between pins 9 and 10 on the plug P1. If open, switch is defective.	Replace or adjust switch (AMM 52-61-141, Adjustment/Test)
	Normal door close limit switch defective	Disconnect connector D4668P on junction box and check for 28v dc at pin 8 of the plug with airstair control in retract position. If voltage is not present, switch is defective.	Replace or adjust switch (AMM 52-61-601, Adjustment/Test)
	Normal door close relay or normal door motor defective	Disconnect normal door motor connector D912 and check for 28v dc at pin 2. If voltage is not present, relay is defective. If voltage is present, motor is defective.	Replace either the relay or motor
Airstair door closes, but motor continues to run	Normal door close limit switch or door close relay defective	Disconnect connector D4668P on junction box and check voltage is present at pin 8 of plug with airstair control switch in normal position. If voltage is present, switch is defective. If voltage not present relay is defective	Replace either the relay or switch

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Airstair door does not close after airstair has retracted with STANDBY power	Standby airstair retract limit switch defective	Disconnect airstair connector D934 and check continuity between pins 14 and 15 on the plug P1. If open, switch is defective.	Replace or adjust switch (AMM 52-61-141, Adjustment/Test)
	Standby door close limit switch defective	Disconnect connector D4668P on junction box and check for 28v dc at pin 7 on D4668P with the airstair control switch in the standby retract position. If voltage is not present, switch is defective.	Replace or adjust swich (AMM 52-61-601, 00justment/Test)
	Standby door close relay or standby door motor defective	Disconnect standby door motor connector D914 and check for 28-volt dc at pin 2 of plug P1. If voltage is not present, relay is defective. If voltage is present, motor is defective.	Replace either the relay or motor
Airstair door closes but standby motor continues to run	Standby door close limit switch or door close relay defective	Disconnect connector D4668P on junction box and check that voltage is not present at pin 7 of D4668P. If voltage is present, switch is defective. If voltage is not present, relay is defective	Replace or adjust switch (AMM 52-61-601, Adjustment/Test)

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5. Top Step is not Stable

TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
The top step of the airstair is not stable when the airstair is extended	Airstair rails out of adjustment. Step actuator out of adjustment. Step actuator is damaged or worn	Examine the airstair (AMM 52-61-100/601, Forward Airstair).	Do the Top Step Actuator Check (AMM 52-61-100, Adjustment/Test)

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FORWARD AIRSTAIR AND DOOR – ADJUSTMENT/TEST

1. Forward Airstair and Door Adjustment

A. General

- (1) Adjustments to the airstair and airstair door can be performed independently of the other. Refer to par. 1.B. for adjusting forward airstair and par. 1.C. for adjusting airstair door.

**WARNING:** IT IS DANGEROUS TO WORK BELOW THE AIRSTAIR CARRIAGE WHILE ELECTRICAL POWER IS ON THE AIRSTAIR. UNEXPECTED MOVEMENT OF THE AIRSTAIR OR DOOR COULD CAUSE SERIOUS INJURY.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
– YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
– THE WIND IS MORE THAN 40 KNOTS  
– THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
– THE FORWARD ENTRY DOOR IS OPENED FULLY  
– THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

B. Forward Airstair Adjustment

(1) Equipment and Materials

- (a) No. 1 rigging pin – 0.4980 +0.0005/–0.0010 by 4.00 inches  
(b) No. 2 rigging pin – 0.2480 +0.0005/–0.001 by 2.50 inches

**NOTE:** Rigging pins are part of F70207–61.

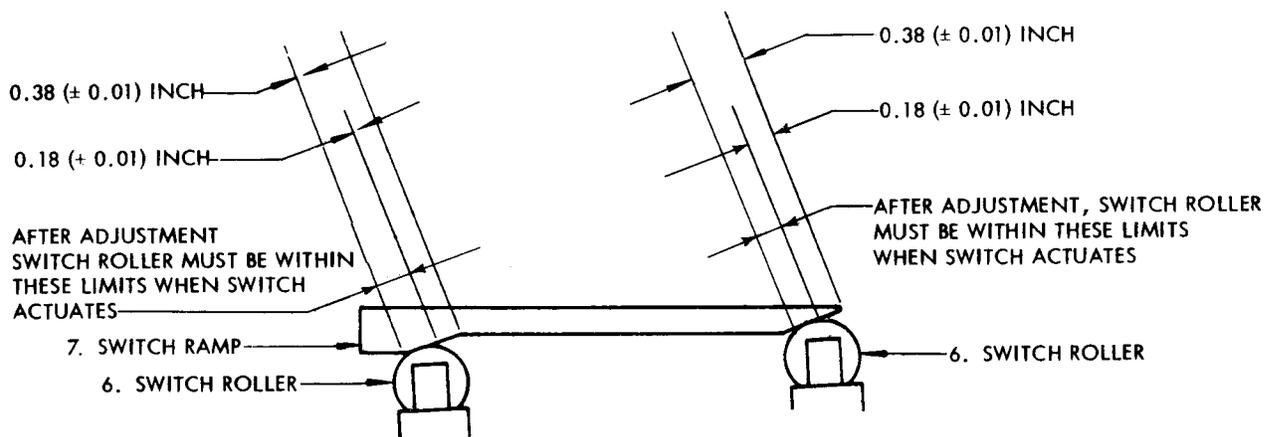
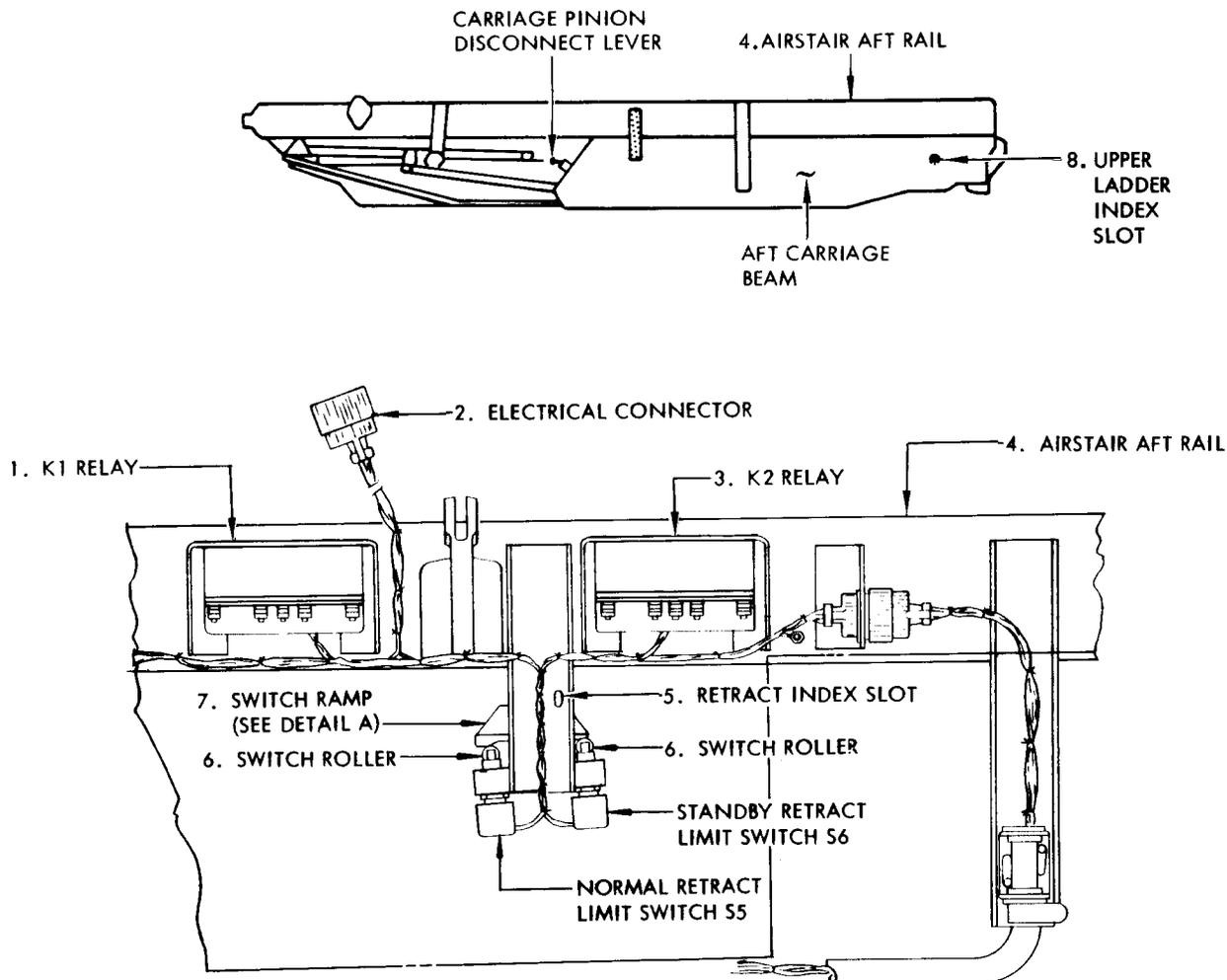
(c) Voltohmmeter – Simpson, Model 260

(2) Adjust Forward Airstairs

- (a) Remove drain pan (if installed).  
1) Extend airstair to provide clearance for removing drip pan attachment fasteners (Fig. 502).

**NOTE:** Temporary access can be attained by partially retracting airstair.

- 2) Gain access to drip pan through electronic compartment access door.  
3) Remove hose clamp and drain hose from access hatch in drip pan. Remove access hatch.



DETAIL A

Retract Limit Switch Adjustment  
 Figure 501

EFFECTIVITY  
 Airplanes With Forward Airstairs

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## MAINTENANCE MANUAL

- 4) Obtain access to drip pan attachment fasteners through access hatch. Remove fasteners.

**CAUTION:** DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OF USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

- 5) Retract airstair and release control before airstair door begins to close. Remove drip pan through airstair - airstair door opening on side of fuselage.
  - (b) Open airstair circuit breakers on panel P6. Disconnect airstair electrical connector (2). (Fig. 501)
  - (c) Insert No. 2 rig pin through retract index slot (5) in aft rail and into index hole in carriage beam.
  - (d) Insert No. 1 rig pin into upper ladder index slot (8) to verify upper ladder is fully retracted.
  - (e) If either the No. 1 or 2 rig pin cannot be inserted, resequence forward airstair, AMM 52-61-100.
  - (f) Disengage carriage drive pinions by moving carriage pinion disconnect lever to unlocked position.
  - (g) Connect voltohmmeter across terminal X1 on relay K1 (1) and pin 10 of airstair electrical connector (2) to check normal retract limit switch S5. Adjust locknuts on switch S5 until switch just opens.
  - (h) Connect voltohmmeter across terminal X1 on relay K2 (3) and pin 15 of airstair electrical connector (2) to check standby retract limit switch S6. Adjust locknuts on switch S6 until switch just opens.
  - (i) Remove rig pin and move carriage outboard then slowly inboard; index holes should be aligned when switches actuate. Check by inserting rig pin.
  - (j) After adjustment, check that switches actuate when rollers are positioned on ramp within limits shown on detail A.
  - (k) Remove rig pin and move carriage outboard and inboard several times to assure that switches maintain adjustment. Install safety wire on switches.
  - (l) Remove voltohmmeter.

**NOTE:** Removal of carriage step control actuator from left end of forward and aft rails may be accomplished to facilitate smooth and even manual movement of carriage during adjustment of airstair extend limit switches (S3 and S4).

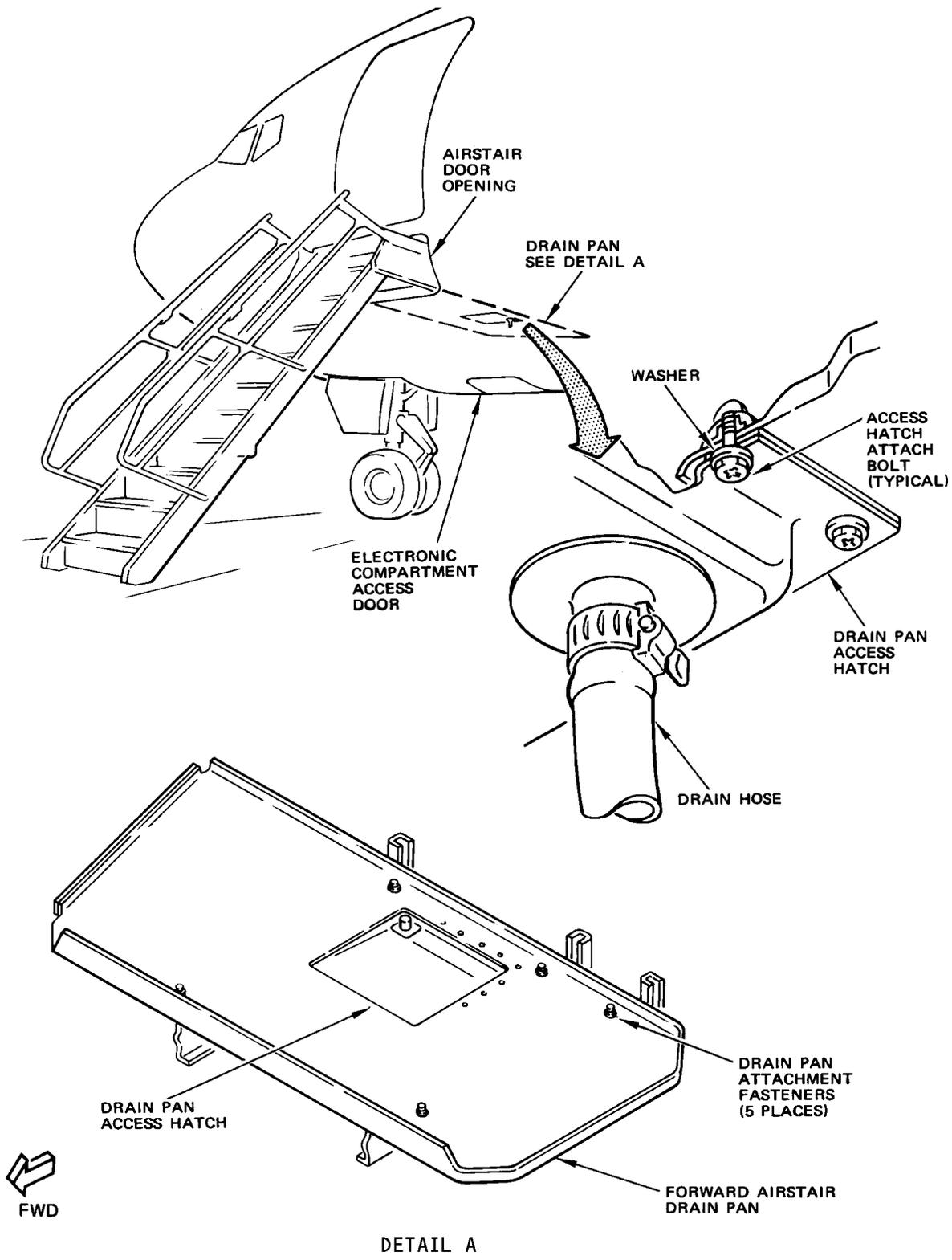
- (m) Move carriage to extended position and insert rig pin through index hole in aft rail and into index slot in carriage beam. (Fig. 503)

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Airplanes With Forward Airstairs

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Forward Airstair Drain Pan Access  
 Figure 502

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## MAINTENANCE MANUAL

- (n) Connect voltohmmeter across terminal Y1 on relay K1 (1, Fig. 501) and pin 5 of airstair electrical connector (2) to check normal extend limit switch S3 (Fig. 503). Adjust locknuts on switch S3 until switch just opens.
- (o) Connect voltohmmeter across terminal Y1 on relay K2 (3, Fig. 501) and pin 17 of airstair electrical connector (2) to check standby extend limit switch S4 (Fig. 503). Adjust locknuts on switch S4 until switch just opens.
- (p) Remove rig pin and move carriage inboard then slowly outboard; index holes should be aligned when switches actuate. Check by inserting rig pin.
- (q) After adjustment, check that switches actuate when rollers are positioned on ramp within limits shown on detail A.
- (r) Remove rig pin and adjust slow-down-operating switch. Refer to 52-61-201, Adjustment/Test.
- (s) Adjust speedup limit switch. Refer to 52-61-211, Adjustment/Test.
- (t) Move carriage inboard and outboard several times to assure that all switches maintain adjustment. Safety wire all switches.
- (u) Install carriage step control actuator to left end of forward and aft rail, if removed earlier, and check that carriage step elevates when carriage is moved to extended position.
- (v) With airstair in fully retracted position, insert rig pin in index slot (5, Fig. 501) and engage carriage drive pinions by moving carriage pinion disconnect lever to locked position. Safety wire the lever.
- (w) Remove voltohmmeter and rig pin and connect airstair electrical connector (2, Fig. 501).
- (x) Reinstall drain pan below airstair, if removed, and close forward airstair circuit breakers on panel P6.
- (y) Extend airstair to gain access through drain pan hatch to install drain pan attachment fasteners. Install fasteners. Install drain pan hatch and connect drain hose to drain fitting.

**CAUTION:** DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

**NOTE:** Temporary access can be attained by partially extending airstair.

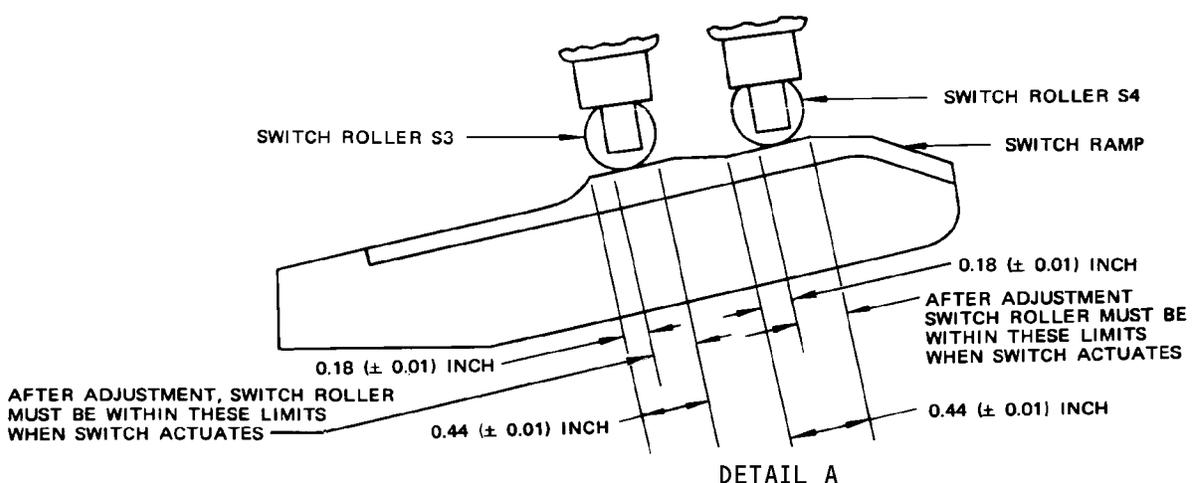
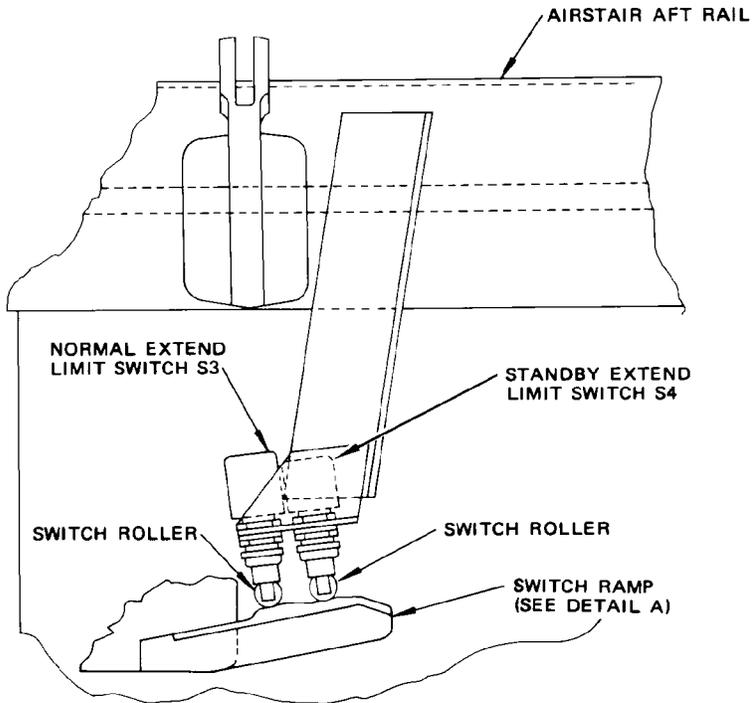
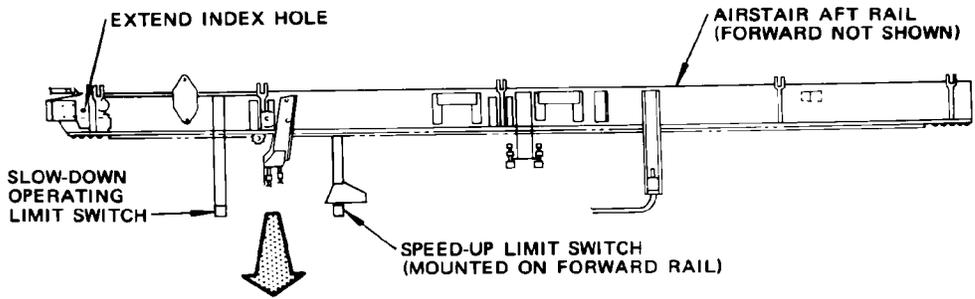
- (z) Adjust stops on forward and aft handrail support arms so the handrails will latch easily.
- (aa) Retract airstair and close airstair door if it is not being adjusted.

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Airplanes With Forward Airstairs

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Extend Limit Switch Adjustment  
 Figure 503

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C. Forward Airstair Door Adjustment

(1) Adjust Forward Airstair Door

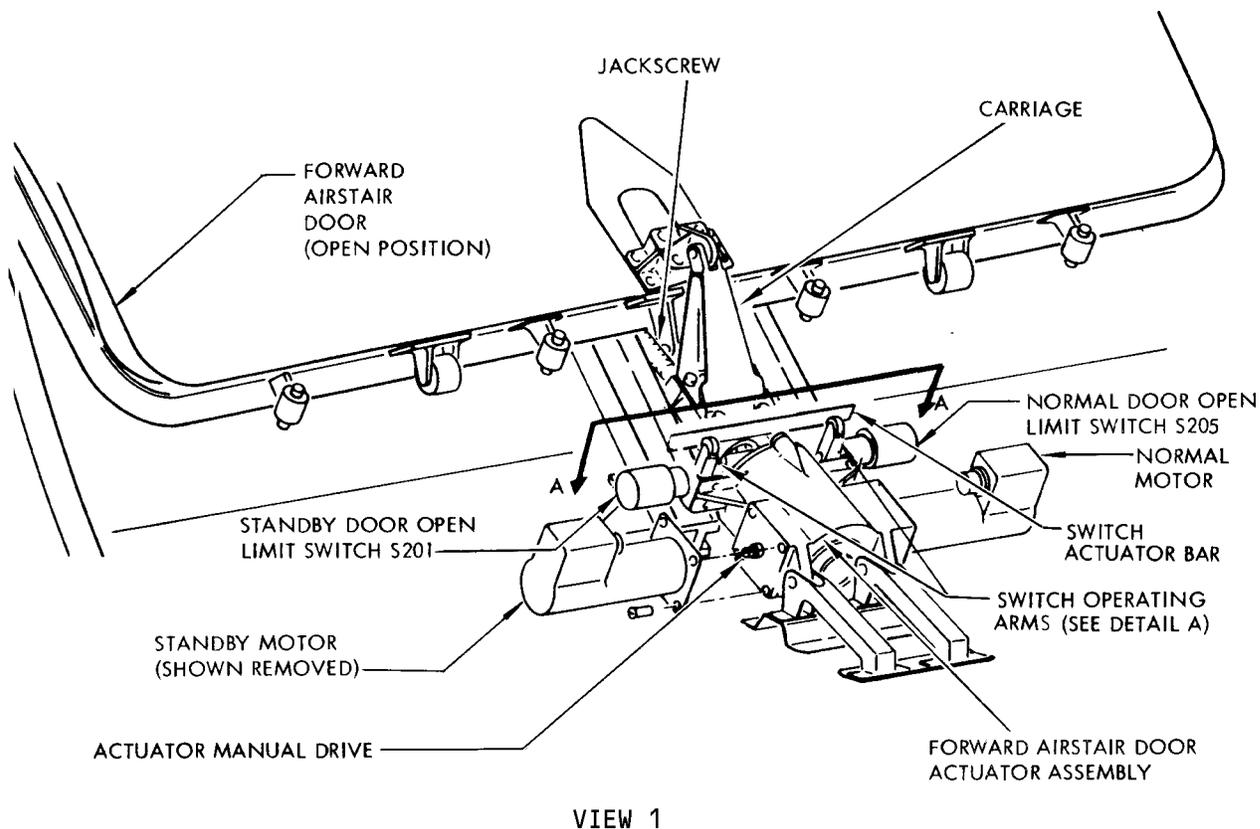
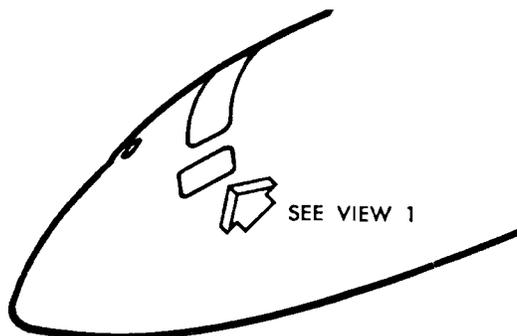
- (a) With airstair door fully open and airstair fully retracted, open the forward airstair circuit breakers located on circuit breaker panel P6.
- (b) Remove standby motor from door actuator assembly. Refer to 52-61-591, Forward Airstair Door Standby System Motor - Removal/Installation.

**CAUTION:** STANDBY AND NORMAL MOTOR REMOVAL/INSTALLATION PROCEDURES ARE NOT THE SAME. ALWAYS USE THE CORRECT PROCEDURE.

- (c) Using a 3/8-inch socket, obtain dimension between end of jackscrew threads and inboard face of nut assembly shown in section A-A Fig. 504, by rotating actuator manual drive.
- (d) Loosen lock screw on inboard edge of switch operating arm of both switches. (See detail A, Fig. 504.)
- (e) Turn worm gear of each switch arm to drive arm against actuator bar of carriage until each switch actuates (indicated by an audible click).
- (f) Tighten and safety wire lock screw of each switch.
- (g) Loosen locknuts on door closed limit switches S207 and S208 and move switches as far outboard as their threads permit and tighten locknuts (Fig. 505).
- (h) Apply a lump of molding clay, or similar substance, to outboard face of each plate on door, which actuates switches.
- (i) Using a 3/8-inch socket, close airstair door by rotating actuator manual drive (Fig. 504) and observe the following as door approaches the closed position:
  - 1) Observe relationship between crosspin on door latch fitting and end of door latch pin protruding through doorsill (Fig. 505). Stop turning manual drive when crosspin appears to have moved outboard of latch pin, or when an outside observer signals that exterior of door is flush with surrounding fuselage skin.
  - 2) Extend latch pin and check that clearance between latch pin and crosspin is as shown on Section A-A.
  - 3) Check that any accessible door stop pin is in contact with bearing plate on structure.
- (j) Manually open airstair door. From impression made in molding clay, measure amount of clearance between end of each switch plunger and actuating plate.
- (k) Adjust position of switches to move them inboard by amount of clearance measured in step (j) plus an additional 0.07 to 0.11 inch. Tighten both nuts securing each switch.

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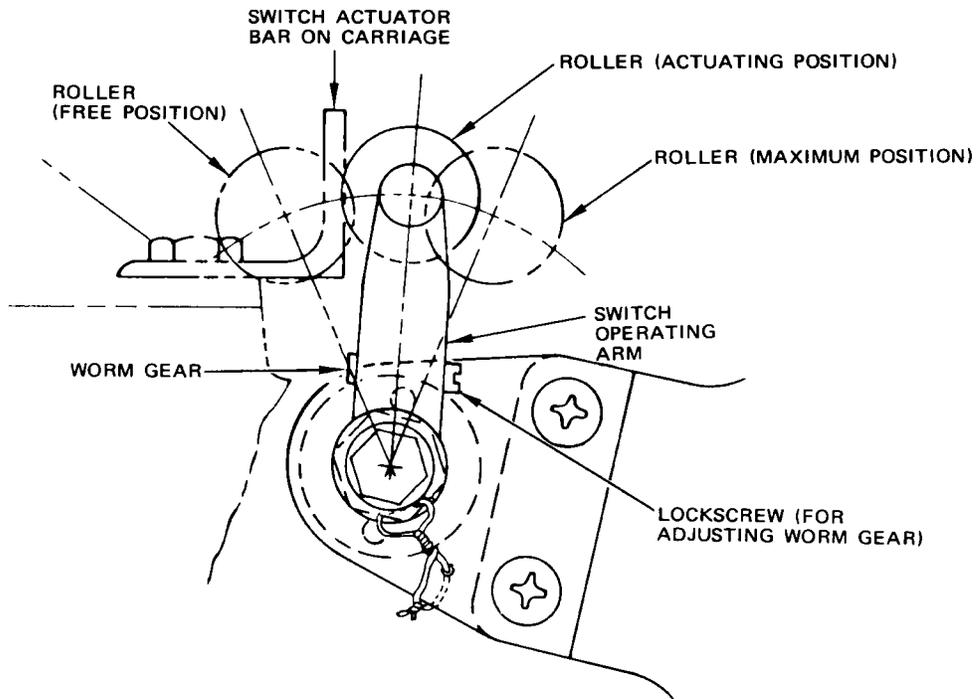
Door Open Limit Switches Adjustment  
 Figure 504 (Sheet 1)

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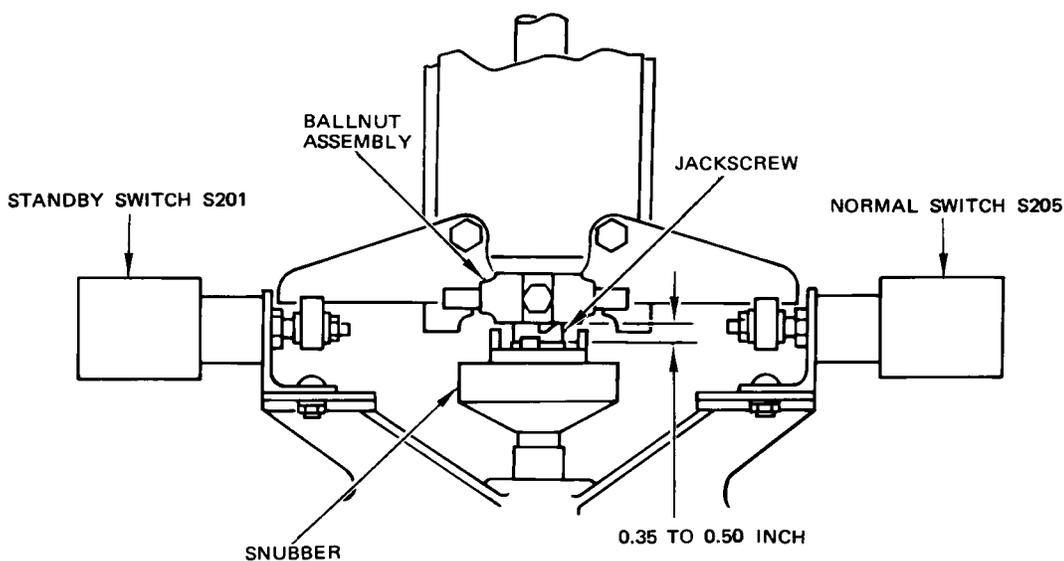
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DETAIL A  
(LOOKING FORWARD)  
NORMAL SWITCH SHOWN, STANDBY SWITCH SIMILAR



SECTION A-A

Door Open Limit Switches Adjustment  
Figure 504 (Sheet 2)

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## MAINTENANCE MANUAL

- (l) Clean molding clay from switch actuating plates.
- (m) Install standby motor on door actuator assembly. Refer to 52-61-591, Forward Airstair Door Standby System Motor - Removal/Installation.
- (n) Close the forward airstair circuit breakers on panel P6-4:
- (o) Operate forward airstair door electrically (normal operation and standby operation) and check that each switch actuates properly to stop actuator and extinguish STAIRS IN OPERATION warning light (at internal control station) when airstair door is closed.
- (p) With door closed extend airstair door latch pin and check that it clears crosspin on door latch fitting by at least 0.02 inch (Fig. 505).
- (q) Open airstair door and apply lump of molding clay to all eight bearing plates around door opening.
- (r) Close airstair door electrically (normal operation and standby operation). When actuator has stopped, open door again and check that all door stop pins have contacted bearing plates.
- (s) If steps (p) and/or (r) indicate that airstair door is not traveling far enough when closing, adjust position of door closed limit switch (one or both as necessary) to move it slightly outboard as necessary.
- (t) Repeat step (o).
- (u) When adjustment is satisfactory, lockwire both nuts securing each switch, and clean molding clay from bearing plates.

### 2. Forward Airstair and Door Test

#### A. General

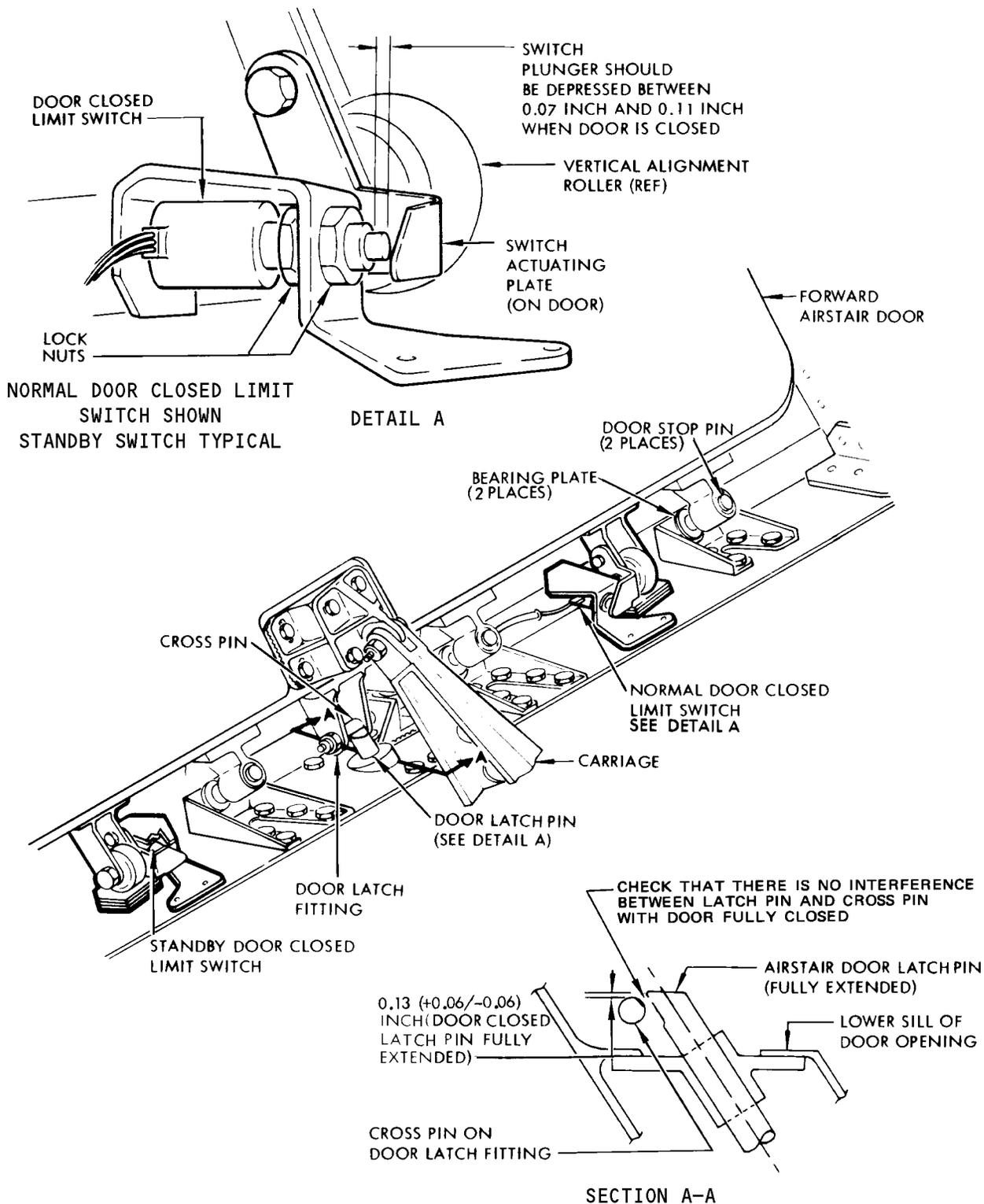
- (1) Prior to testing the mechanical and electrical operation of the airstair and door, the following conditions are assumed to have complied with:
  - (a) The airstair door, its carriage and latch mechanism, and all associated switches are properly installed and rigged.
  - (b) The airstair and all associated switches are properly installed and rigged.
  - (c) The desired form of electrical power from either APU or external ac power unit is available on the airplane.
  - (d) The FORWARD AIRSTAIR TREAD LIGHTS switch on attendants forward auxiliary panel is in AUTO position.
  - (e) The following circuit breakers on panel P6-4 are closed:
    - 1) FORWARD AIRSTAIR CONTROL
    - 2) FORWARD AIRSTAIR DOOR
    - 3) FORWARD AIRSTAIR ACTUATOR
    - 4) FORWARD AIRSTAIR STANDBY CONTROL
    - 5) FORWARD AIRSTAIR STANDBY
    - 6) FORWARD AIRSTAIR TREAD LIGHTS

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Door Closed Limit Switch Adjustment  
 Figure 505

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## MAINTENANCE MANUAL

- (f) The height of the forward entry door threshold above ground line is between 90 inches and 105 inches.

**CAUTION:** TESTING OF FORWARD AIRSTAIR AND DOOR SHOULD NOT BE PERFORMED WITH AIRPLANE IN JACKED POSITION WITHOUT PROVIDING A SUPPORT FOR LOWER END OF AIRSTAIR IN ITS FULLY EXTENDED POSITION.

- (g) The airstair is fully retracted and airstair door is closed and latched.  
(h) The forward entry door is closed and latched.

**CAUTION:** THE AIRSTAIR SHOULD NOT BE OPERATED MORE FREQUENTLY THAN THREE CONSECUTIVE CYCLES WITH NORMAL SYSTEM AND/OR THREE CONSECUTIVE CYCLES WITH STANDBY SYSTEM WITHIN A 20-MINUTE PERIOD.

### B. Test Airstair and Door

- (1) Extend airstair fully by moving exterior control handle to NORMAL EXTEND position.

- (a) Door and airstair operation should be smooth and free of binding.

**CAUTION:** USE CAUTION DURING EXTENSION AND BE ALERT TO POSSIBLE INTERFERENCE CONDITIONS. CLEARANCE BETWEEN AIRSTAIR AND DOOR CUTOUT SHOULD NEVER BE LESS THAN 0.25 INCH.

- (b) Check that airstair door actuator jackscrew ballnut (Section A-A, Fig. 504) is not in contact with snubber with door in the fully open position.
- 1) If necessary, readjust door open limit switches within adjustment range shown in section A-A, so that ballnut and snubber will not make contact. Position jackscrew ballnut electrically using control handle.
- (c) Check the following using 28-volt dc test lights connected to terminals X1 of speedup relay and slow-down relay.
- 1) Check that from start of airstair extension until just before ladder unfolding, the speedup relay test light is illuminated while the slow-down test light is extinguished.
  - 2) Check that just prior to ladder unfolding the speedup test light extinguishes and the slow-down test light illuminates and remains so until ladder unfolding is complete.
  - 3) Check that the total airstair extension cycle time excluding door opening, is  $25 + 2.0$  seconds.

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- (2) Open forward entry door; extend and latch one handrail extension to support bracket in airplane.
- (3) Using caution, verify that power has been interrupted to airstair control system by moving exterior control handle momentarily to NORMAL RETRACT position.
  - (a) Check that carriage step is erected and against its stops.
- (4) Stow handrail extension that was extended in step B. (2); extend and latch remaining handrail.
- (5) Repeat step B.(3).
- (6) Extend and latch both handrail extensions.
  - (a) Check that handrail extensions are latched securely to support brackets.
- (7) Check that all tread lights (22 places) on airstair are illuminated.
- (8) Verify that STAIRS OPERATING warning light on interior control panel is not illuminated.
  - (a) Use press-to-test light to check that power is available to warning light.
- (9) Check that AIRSTAIR door warning light on control cabin forward overhead panel is illuminated.
- (10) Unlatch and stow both handrail extensions; check that handrails are secured in their stowed position.
- (11) Close and latch forward entry door.
- (12) Retract airstair and close airstair door by moving exterior control handle to NORMAL RETRACT position.
  - (a) Check that airstair and door operation is smooth and free of binding.
  - (b) Check that lower ladder uplock secures the lower ladder during retraction.
  - (c) Check that springs in handrail extension support brackets stow and hold brackets in vertical position against airplane partitions.
- (13) Check that AIRSTAIR door warning light on control cabin forward overhead panel is not illuminated.
- (14) Extend airstair fully by moving exterior control handle to STANDBY EXTEND position.
  - (a) Check that airstair and door operation is smooth and free of binding.
- (15) Check that all tread lights (22 places) on airstair are illuminated.
- (16) After the airstair is fully extended, verify that STAIRS OPERATING warning light on interior control panel is not illuminated.
  - (a) Use press-to-test light to check that power is available to warning light.

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Airplanes With Forward Airstairs

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## MAINTENANCE MANUAL

- (17) Check that AIRSTAIR door warning light on control cabin forward overhead panel is illuminated.

**CAUTION:** NO SAFETY SWITCH IS PROVIDED IN THE STANDBY SYSTEM. ENSURE THAT HANDRAIL EXTENSIONS ARE RETRACTED AND PROPERLY STOWED BEFORE ATTEMPTING RETRACTION.

- (18) Check that handrail extensions are retracted and properly stowed and forward entry door is closed and latched.
- (19) Retract airstair and close airstair door by moving exterior control handle to STANDBY RETRACT position.
- (a) Check that airstair and door operation is smooth and free of binding.
- (20) Check that AIRSTAIR door warning light on forward overhead panel is not illuminated.
- (21) Unlatch and open forward entry door.
- (a) Check that AIRSTAIR door warning light on forward overhead panel is illuminated.

**WARNING:** WHEN OPERATING AIRSTAIR FROM INTERIOR CONTROL PANEL, FORWARD ENTRY DOOR SHOULD BE OPENED FAR ENOUGH TO ALLOW OPERATOR CLEAR VISIBILITY OF AREA OUTSIDE AIRPLANE TO PREVENT INJURY TO PERSONNEL OR EQUIPMENT DAMAGE.

- (22) Extend airstair fully by actuating NORMAL switch on interior panel to EXTEND position.
- (a) Check that carriage and upper ladder extension speed is reduced approximately one-half just prior to rotation of upper ladder and remains reduced throughout ladder rotation.
- (b) Check that STAIRS OPERATING light on interior control panel is illuminated during door and airstair extension cycle and is extinguished when airstair is fully extended.
- (c) Leave handrail extensions in stowed position.
- (23) Move FORWARD AIRSTAIR TREAD LIGHTS switch on attendant's forward auxiliary panel to OFF position.
- (a) Check that all tread lights (22 places) are extinguished.
- (b) Return FORWARD AIRSTAIR TREAD LIGHTS switch to AUTO position and observe that all tread lights are illuminated.
- (24) Retract airstair fully by actuating NORMAL switch on interior control panel to RETRACT position.
- (a) Check that STAIRS OPERATING light on interior control panel is illuminated during airstair and door retraction cycle and is extinguished when airstair door is fully closed.

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- (25) With forward entry door open, extend airstair fully by actuating STANDBY switch on interior control panel to EXTEND position.
  - (a) Check that STAIRS OPERATING light on interior control panel is illuminated during door and airstair extension cycle and is extinguished when airstair is fully extended.
  - (b) Leave handrail extensions in stowed position.
- (26) Retract airstair fully by actuating STANDBY switch on interior control panel to RETRACT position.
  - (a) Check that STAIRS OPERATING light on interior control panel is illuminated during airstair and door retraction cycle and is extinguished when airstair door is fully closed.
- (27) With forward entry door open, actuate NORMAL switch on interior control panel to EXTEND position.
  - (a) While airstair is operating and, just prior to full extension, move NORMAL switch to center position.
  - (b) Check that airstair will stop and remain in a cantilevered position.
- (28) Move FORWARD AIRSTAIR TREAD LIGHTS switch on attendant's forward auxiliary panel to ON position.
  - (a) Check that all tread lights (22 places) on airstair are illuminated.
- (29) Return FORWARD AIRSTAIR TREAD LIGHTS switch to AUTO position and observe that all tread lights are now extinguished.
- (30) Retract airstair by actuating NORMAL switch to RETRACT position.
- (31) With forward entry door open, actuate STANDBY switch on interior control panel to EXTEND position.
  - (a) While airstair is operating and, just prior to full extension, move STANDBY switch to center position.
  - (b) Check that airstair will stop and remain in a cantilevered position.
- (32) Retract airstair and close airstair door fully by actuating STANDBY switch to RETRACT position and close forward entry door.
- (33) With forward entry door closed, actuate NORMAL switch at interior control panel to EXTEND position for approximately five seconds.
  - (a) During this period, the airstair door motor should not operate.
- (34) Repeat step (33) using STANDBY switch on interior control panel.
- (35) Remove electrical power from airplane.
- (36) Fully extend airstair by moving exterior control handle to STANDBY EXTEND position.

NOTE: Tread lights will not illuminate.

- (37) Fully retract airstair and close airstair door by moving exterior control handle to STANDBY RETRACT position.

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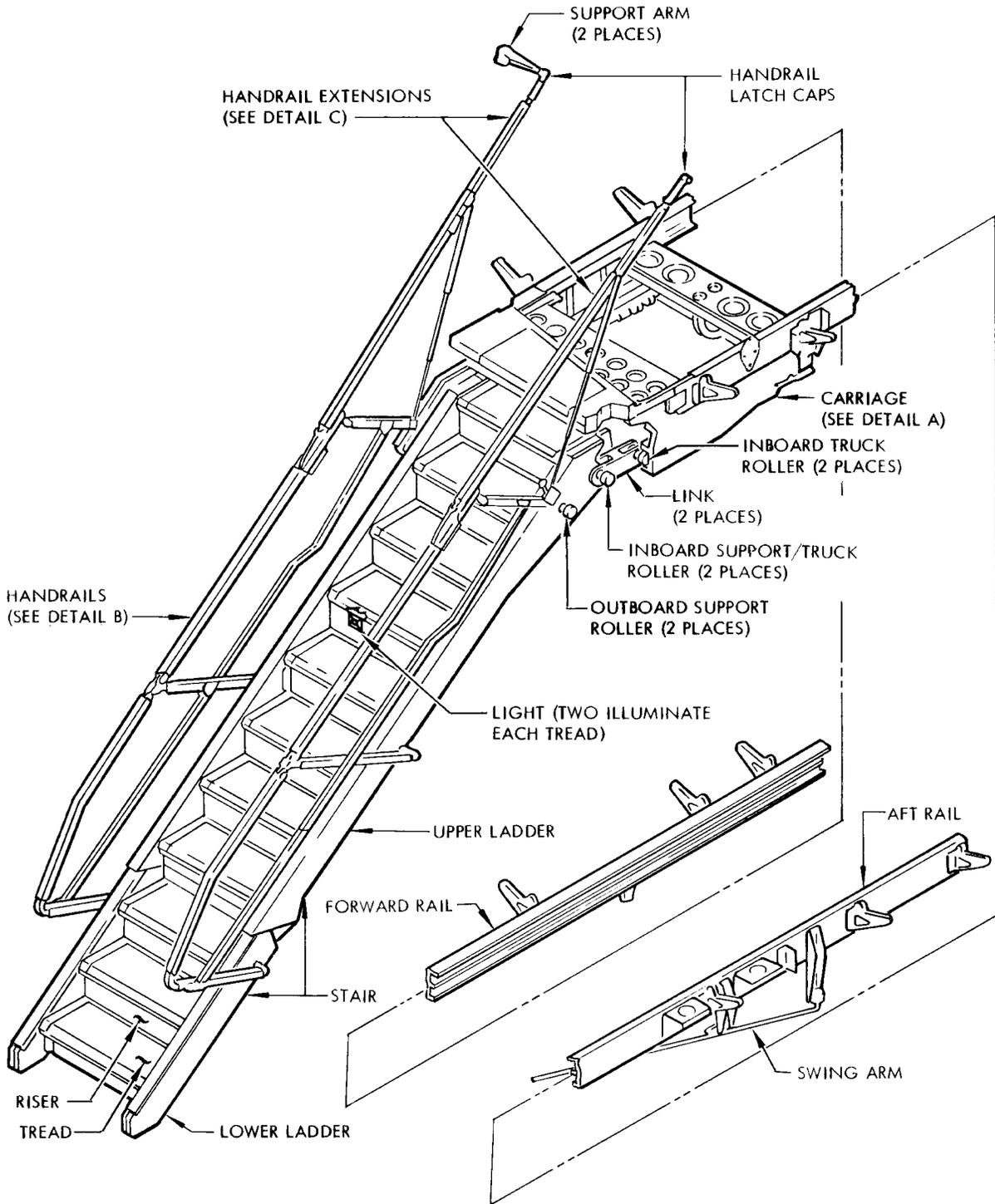
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FORWARD AIRSTAIR – DESCRIPTION AND OPERATION

1. General
  - A. The forward airstair installation consists of forward and aft rail assemblies, carriage, stair, handrails, handrail extensions, actuation system and electrical system (Fig. 1).
2. Rail Assemblies
  - A. The forward and aft rail assemblies are attached to the airplane structure to provide a set of rigid parallel rails on which the airstair carriage travels during the extension and retraction cycles.
3. Carriage
  - A. The carriage is mounted on the rail assemblies and supports the stair. It also contains the stair drive mechanism for extending and retracting the stair. The carriage consists of side beams connected by a torque box, shear panels, cross braces, and the carriage step. (See Detail A, Fig. 1).
  - B. The carriage is supported by rollers that are mounted on the outside surface of each side beam at the upper right end of the beam (two rollers on each beam). The pinions that drive the carriage along the rail assemblies protrude beyond the outside surface of the beams and are located adjacent to the rollers.
  - C. The carriage step is a part of the carriage and translates upward during the extension cycle to form the top step of the fully extended airstair. The step has provision for illuminating the top tread of the stair.
4. Stair
  - A. The stair consists of an upper and lower ladder in a hinged arrangement. During the extend cycle, the stair telescopes out of the carriage and the lower ladder unfolds from under the upper ladder as the extended stair rotates down to the ground. During retraction, the stair rotates upward, the lower ladder folds back under the upper ladder and the folded stair telescopes back into the carriage.
  - B. The upper ladder consists of two side beams that are connected by step risers and treads. Each side beam has a pair of rollers mounted on the outside surface near the upper inboard end that support the upper ladder in the carriage track. Ball screws, which drive the upper ladder along the carriage track, are attached to the inside surface of each carriage side beam. Each upper ladder side beam supports two stanchions, a handrail and the mechanism for raising and lowering the handrail and folding and unfolding the lower ladder.



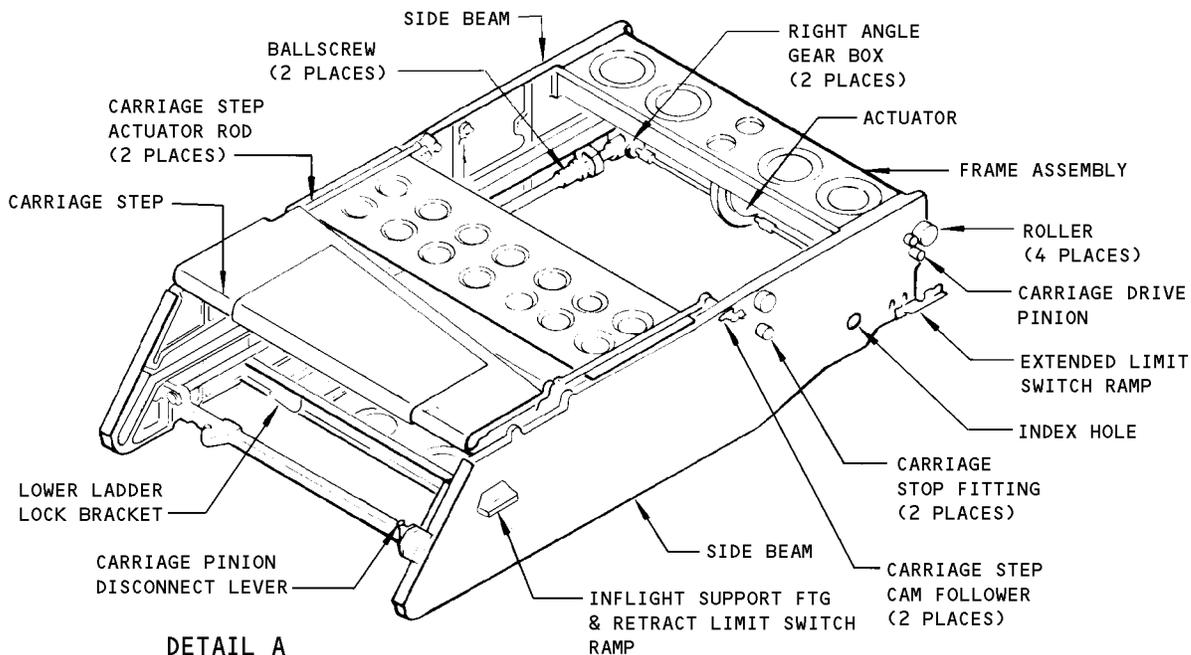
Forward Airstair Component Location  
 Figure 1 (Sheet 1)

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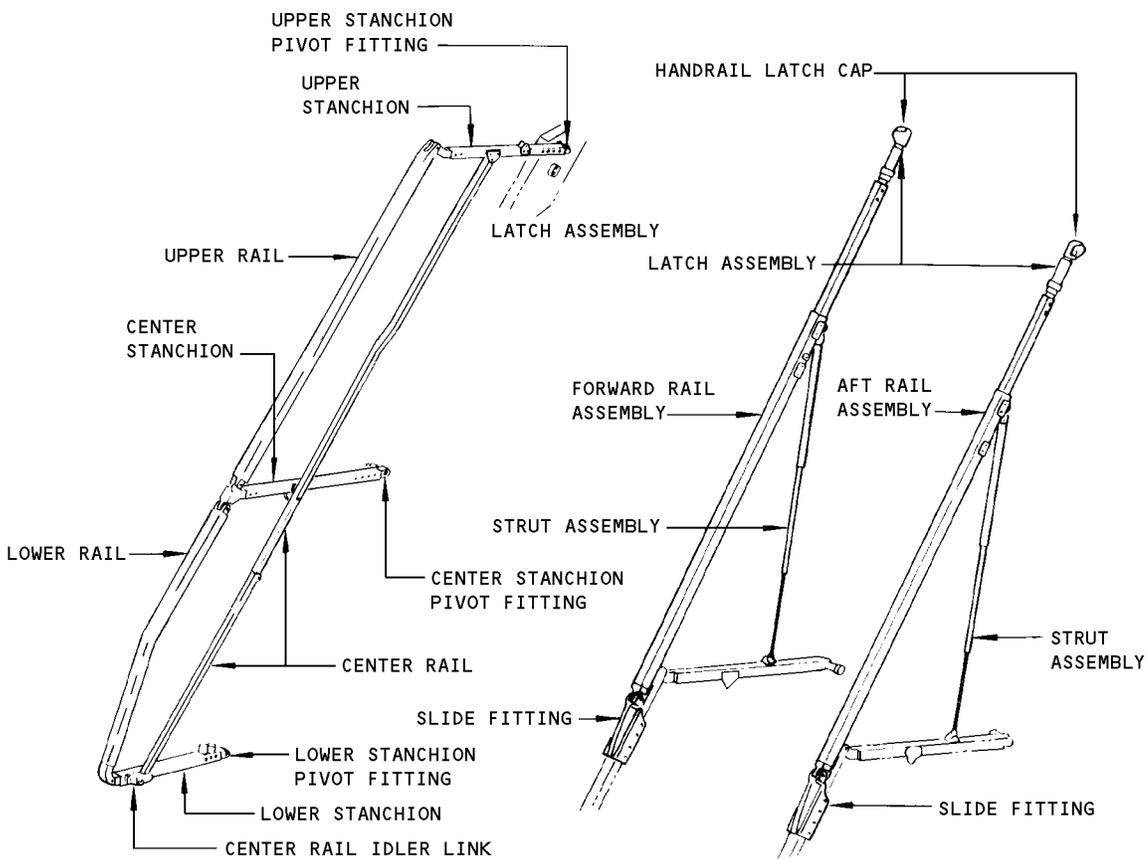
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**MAINTENANCE MANUAL**



**DETAIL A**



**DETAIL B**

**DETAIL C**

**Forward Airstair Component Location  
Figure 1 (Sheet 2)**

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- C. An additional roller is attached to each inboard support roller by a link to form a truck. The trucks remain horizontal in the carriage tracks when the ladder outboard support rollers extend over the curved end of the track at the limit of travel. A trunnion attached to each truck supports a pivot mounted ball bearing nut, which engages the corresponding ball screw in the carriage. The ball screw and ball bearing nut make up the drive mechanism for extension and retraction of the stair. The trucks are connected to the handrail operating mechanism, and to the gears that operate the lower ladder, by a series of bell cranks and pushrods. When the upper ladder outboard support rollers extend over the curved end of the carriage track, the upper ladder begins to rotate down toward the ground and the trucks maintain a horizontal position in the carriage track. The relative angular motion between the trucks and upper ladder cause bellcranks to turn which in turn operate pushrods. The pushrods cause the lower ladder to unfold from under the upper ladder and the handrails to raise to the erect position.
- D. The lower ladder is hinged to the outboard end of the upper ladder, folds under the upper ladder during the retract cycle and unfolds from under the upper ladder during the extend cycle. The ladder consists of two side beams connected by fixed treads and risers. Each side beam supports a handrail stanchion. The lower end of each beam has a wheel and shoe installed. The shoe provides for stability by making firm contact with the ground when load is placed on the stair. The wheel provides for rolling action at the start of retraction cycle and end of extension cycle.

5. Handrails

- A. The handrails are of tubular construction and rise automatically to an erect position during the airstair extend cycle and lower automatically to the stowed position during the retract cycle. (See detail B, figure 1.)
- B. The handrails are supported by stanchions attached to the upper and lower ladders. The two upper powered stanchions are raised and lowered by a series of cranks and linkages actuated by the relative angular movement of the upper ladder with the upper ladder trucks. The lower end stanchions are not powered.

6. Handrail Extensions

- A. Each handrail has an additional section of rail that can be manually extended to close the gap between the erected handrails and the forward entry doorway. (See detail C, figure 1.)
- B. Each extension has a slide fitting which fits over the handrail. The slide fitting allows the lower end of the extension to slide along the handrail as the upper end of the extension is pulled up into the opening of the forward entry door. The upper end of each extension is then attached to a support bracket mounted on the passenger compartment interior panels. The support brackets are spring hinged and when not in use are stowed against the panels.

7. Actuation System

- A. The airstair actuation system consists of a control assembly, motor-driven actuator, right angle gearboxes, ball screws, pinions and various shafts and couplings.
- B. The control assembly is used to engage and disengage the carriage drive pinions during removal and installation of the carriage for maintenance. The control consists of a cable, fork, and carriage pinion disconnect lever. The lever is located on the carriage at the outboard end of the aft beam. The lever is connected to a control cable, which in turn is connected to the actuator transmission by a linkage and fork fitting. Once the airstair is installed, the lever is lockwired and remains in the locked position.
- C. The motor-driven actuator contains the transmission which transmits power through drive shafts to the carriage pinions and through drive shafts to the right angle gearboxes for the ball screws, which drive the upper ladder in the carriage tracks.
- D. From the motion imparted to the carriage and upper ladder by the actuator, the carriage step, the lower ladder and the handrails are operated by a series of cranks, linkages and gear throughout various phases of the extend and retract cycles.

8. Electrical System

- A. The airstair electrical system consists of a normal system ac stair motor, a standby system dc stair motor, relays, switches, circuit breakers, stair tread lights, controls, and swing arms. (See 52-61-0, figures 2 and 3.)
- B. The motors are equipped with brakes that allow stopping the retract or extend cycles at any point in the cycle while preventing creep of the stair mechanism.
- C. The relays and switches are used to provide power to the system components in the proper sequence to perform smooth operation of the airstair.
- D. The circuit breakers in the airplane provide a means of power disconnect at the power bus to isolate the airstair circuits.
- E. There are 22 lights provided to illuminate the stair treads. The lights are controlled so they will illuminate automatically when the airstair is fully extended and automatically go out when it starts to retract. The lights may be manually turned on or off when the airstair is in any position. The tread light control switch is located on the attendants forward auxiliary panel.
- F. Swing arms are provided to give protection and support to the electrical cabling between the rails and carriage and between the carriage and upper ladder. The swing arms are of tubular construction with a coil spring center segment to provide flexibility when the carriage is in motion, relative to the rails, and when the upper ladder is in motion relative to the carriage.



## MAINTENANCE MANUAL

### FORWARD AIRSTAIR – MANUAL OPERATION

#### 1. General

- A. The airstair should not be operated manually except for maintenance or emergency purposes. Manual extension will cause airstair to be out of sequence, necessitating manual retraction of the airstair followed by the performance of a resequence operation prior to power operation of the airstair.

#### 2. Equipment and Materials

- A. No. 1 Rig Pin, 0.4980 (+0.0005/-0.0010) inch diameter by 4.0 inches long
- B. No. 2 Rig Pin, 0.2480 (+0.0005/-0.0010) inch diameter by 2.50 inches long

#### 3. Extend Forward Airstair

- A. With airstair door open, open forward airstair system circuit breakers on circuit breaker panel P6.
- B. Gain access to airstair area through electronics compartment access door.
- C. Disconnect airstair electrical connector (L, Fig. 201) and tag connector with a note stating DO NOT OPERATE. AIRSTAIR OUT OF SEQUENCE.
- D. Partially extend carriage.
  - (1) Remove lockwire from carriage pinion disconnect lever (5, Fig. 201) and move to unlocked position.
  - (2) Move airstair outboard until inboard edge of carriage step (6) is immediately below upper sill of airstair door opening. Stop airstair movement short of point where carriage step starts to rise.
  - (3) Engage carriage drive pinions by moving carriage pinion disconnect lever to locked position.
- E. Extend ladders.
  - (1) Disconnect "dog" coupling (10, Detail B) on actuator drive shaft (11) by gaining access through drain pan hatch if installed.

**CAUTION:** DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

- (2) Pull ladders horizontally out of carriage. Use three or more men to control upper ladder while lower ladder is unfolding from under upper ladder and handrails are erecting. As inboard end of upper ladder approaches outboard end of carriage, upper ladder must be supported and controlled during its downward rotation.

**WARNING:** KEEP HANDS AND BODY CLEAR OF LOWER LADDER DURING DOWNWARD ROTATION OF UPPER LADDER.

**CAUTION:** DO NOT PERMIT STAIR TO FREE FALL.

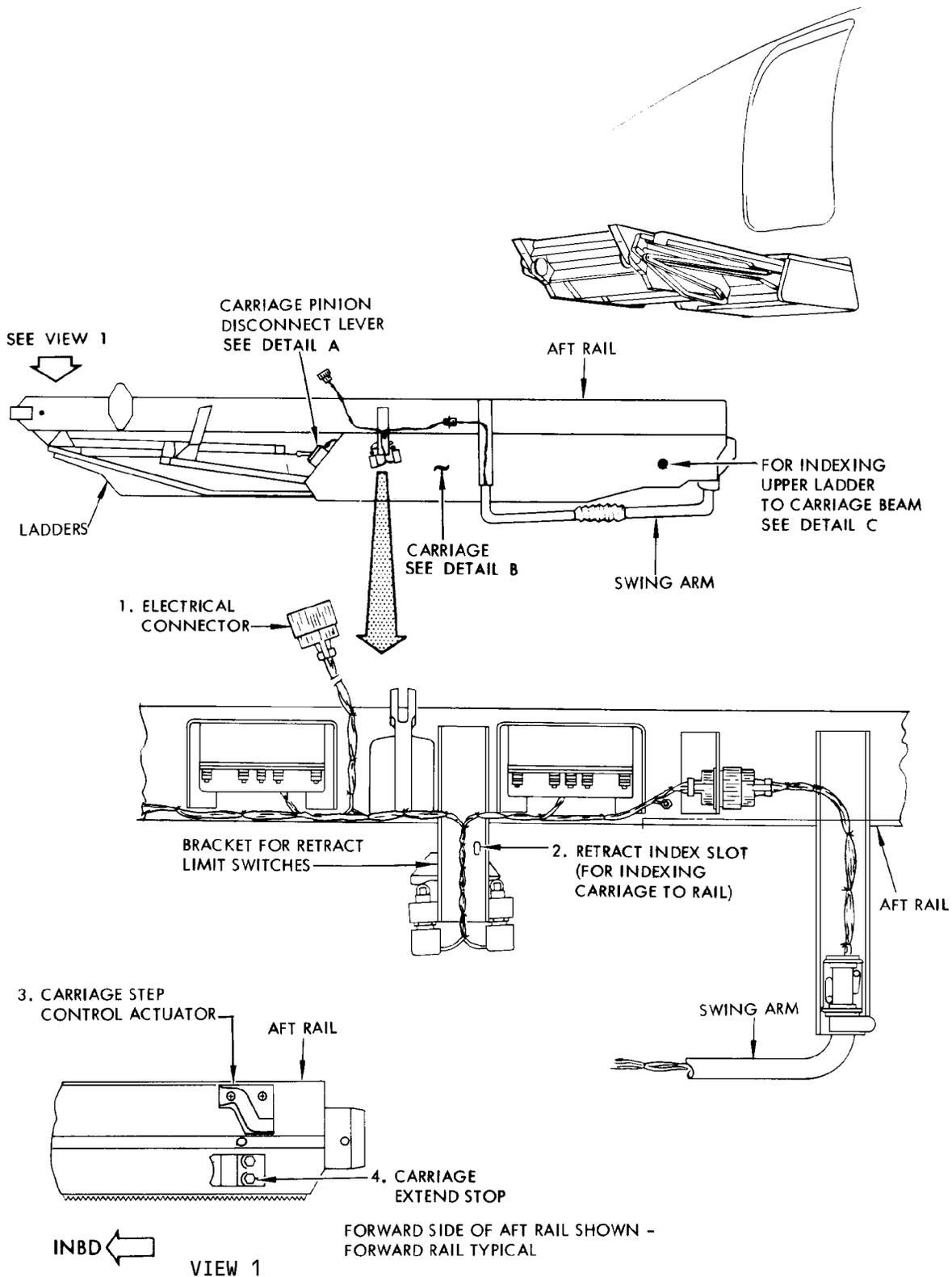
**NOTE:** During horizontal extension, lower ladder will be unlocked. As upper ladder rotates downward, handrail-erecting mechanism will be actuated. At full extension, lower ladder will have rotated into alignment with upper ladder and contacted ground.

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Forward Airstairs Manual Operation and Resequencing  
 Figure 201 (Sheet 1)

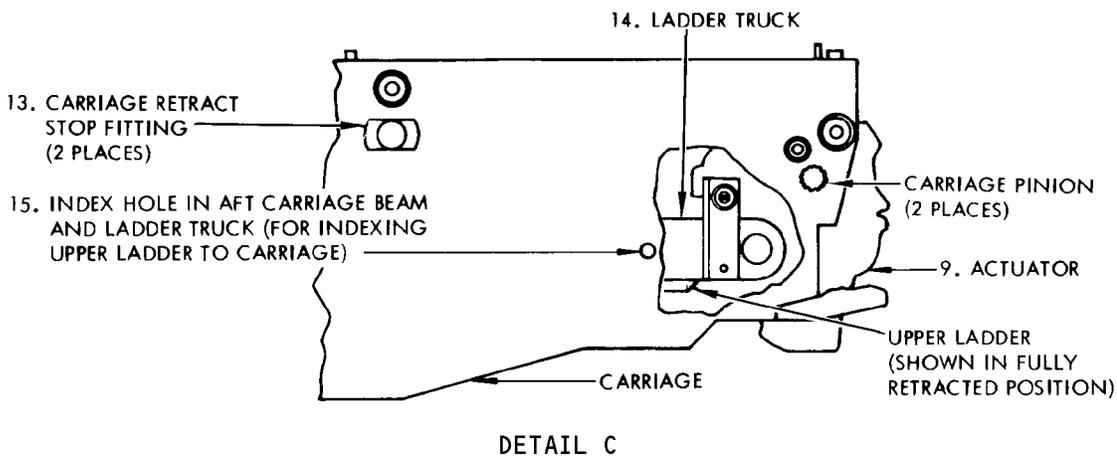
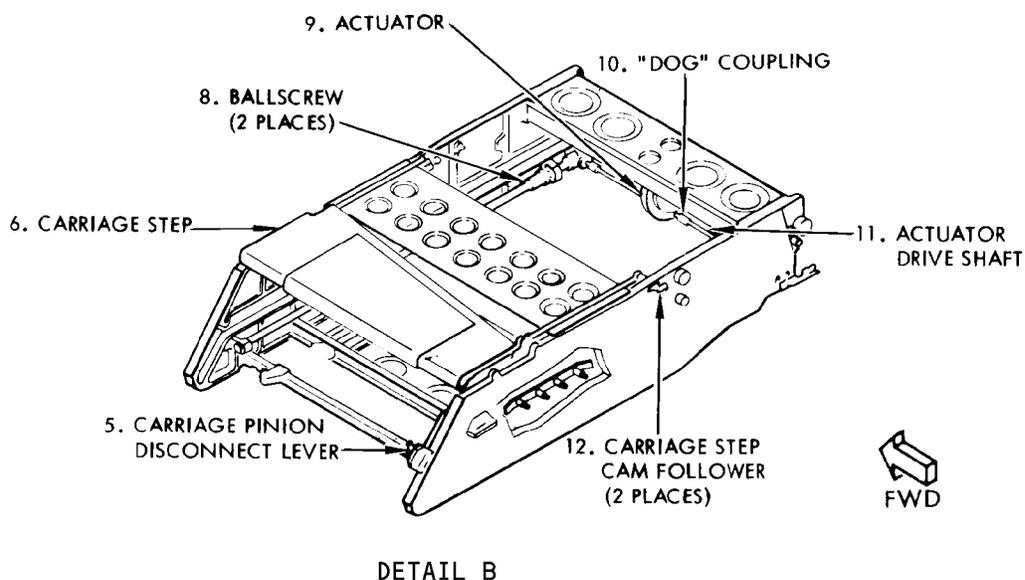
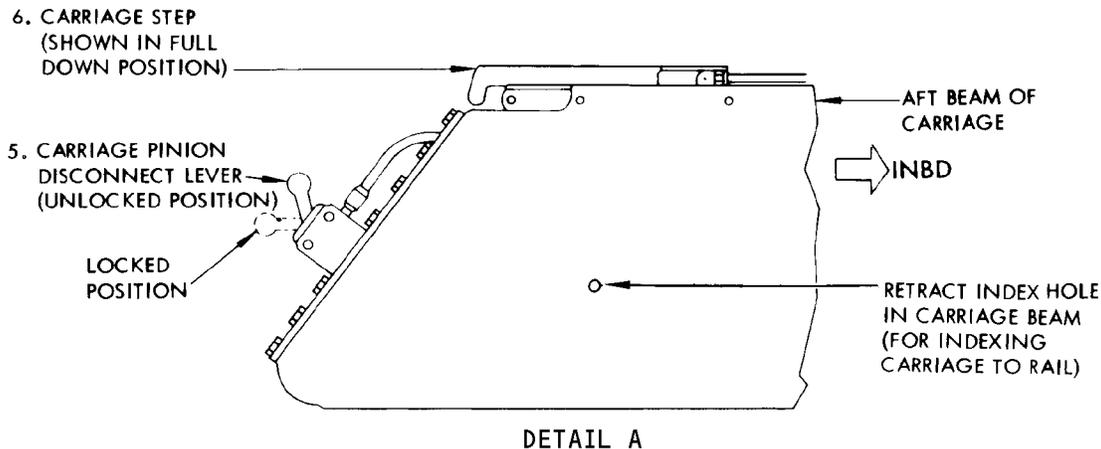
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Forward Airstairs Manual Operation and Resequencing  
 Figure 201 (Sheet 2)

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## MAINTENANCE MANUAL

- F. Fully extend carriage.
- (1) Move carriage pinion disconnect lever to unlocked position.
  - (2) Pull airstair carriage outboard (allowing lower ladder to move along ground surface) until carriage extend stops (4, view 1) on forward and aft rails are contacted. During this final travel, carriage step cam followers (12, detail B) will engage carriage step control actuator (3, view 1) on forward and aft rails causing carriage step to elevate.
  - (3) Extend manual handrail extensions and latch extensions to handrail support brackets inside forward entry doorway.

**NOTE:** After manual extension and prior to power operation of airstair, it must be retracted manually and resequenced as described in paragraphs 4 and 5.

- (4) Move carriage pinion disconnect lever to locked position prior to using airstairs.

### 4. Retract Forward Airstair

- A. Check that airstair electrical connector (1, Fig. 201) has been disconnected and tagged with an operational limitation tag.
- B. Check that handrail extensions are stowed and latched to handrails.
- C. Check position of airstair.
  - (1) If stair is fully extended and contacting the ground, proceed with step D.
  - (2) If stair is partially rotated, omit step D. and use caution when proceeding with step E.
  - (3) If stair is retracted to horizontal and all upper ladder truck rollers are on horizontal track section of the rails, omit step D.
- D. Partially retract airstair carriage.
  - (1) Remove lockwire from carriage pinion disconnect lever (5, detail A) and move lever to the unlocked position.
  - (2) Push carriage inboard until the carriage step (6) moves to the full down position. Step should lie flush with top of forward and aft carriage beams.
  - (3) Engage carriage drive pinions by moving carriage pinion disconnect lever to locked position.

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E. Fully retract ladders into carriage.

- (1) Disconnect "dog" coupling (10, detail B) on actuator drive shaft (11) by gaining access through hatch of drain pan if installed.

**CAUTION:** WHEN DISCONNECTING "DOG" COUPLING, SUPPORT THE STAIRS TO PREVENT FALLING, IF STAIR IS PARTIALLY ROTATED.  
DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

- (2) Manually fold and push the ladders until they are halfway into carriage. Use three or more men to control upper ladder while lower ladder is folding under upper ladder and mechanical handrails are lowering.

**WARNING:** GRASP UPPER LADDER INBOARD OF LOWER LADDER LOCK MECHANISM TO PREVENT LOWER LADDER FROM CLOSING ON HANDS OR HITTING PERSONNEL RETRACTING UPPER LADDER.

**NOTE:** Rotation of upper ladder will actuate the handrail mechanism and lower ladder will be locked during horizontal retraction.

- (3) Manually pull the ladders outboard until the ballscrews (8) begin to rotate. This should occur within ten inches of movement outboard.
- (4) Manually push the ladders inboard until ladders are fully stowed in carriage.
- (5) Connect the "dog" coupling on actuator drive shaft.

F. Fully retract airstair carriage.

- (1) Disengage carriage drive pinions by moving carriage pinion disconnected lever to unlocked position.
- (2) Manually push the airstair inboard until carriage retract stop fittings (13, detail C) are contacted.
- (3) Engage carriage drive pinions by moving carriage pinion disconnect lever to the locked position.

**NOTE:** After manual retraction and prior to power operation of airstair it must be resequenced as described in paragraph 5. After the airstair has been manually retracted, the airstair door may be closed electrically. This can be accomplished by closing the normal forward airstair door circuit breaker on circuit breaker panel P6; connecting the airstair electrical connector (1) and operating the controls for the normal retract mode.

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5. Resequence Forward Airstair

- A. Check that forward airstair system circuit breakers on circuit breaker panel P6 are in open position.
- B. Check that airstair electrical connector (1, Fig. 201) has been disconnected and tagged with an operational limitation tag.
- C. With the airstair fully retracted and airstair door fully open, place the carriage pinion disconnect lever (5, Fig. 201) in the unlocked position and manually pull the airstair outboard until the airstair actuator (9, detail B) is positioned over the electronic compartment access door.
- D. Engage carriage drive pinions by moving carriage pinion disconnect lever to locked position.
- E. Index the upper ladder to the carriage.
  - (1) Disconnect the "dog" coupling (10) on actuator drive shaft (11) and manually move ladders horizontally until index hole (15, detail C) in aft beam of carriage is aligned with hole in ladder truck (14) and insert No. 1 rig pin.
  - (2) Connect the "dog" coupling on actuator drive shaft and remove No. 1 rig pin.
- F. Index the carriage to the airstair aft rail.
  - (1) Disengage carriage drive pinions by moving carriage pinion disconnect lever to unlocked position.
  - (2) Manually move carriage inboard until retract index hole (7) in aft beam of carriage is aligned with retract index slot (2) in retract limit switch bracket on aft rail and insert No. 2 rig pin.
  - (3) Engage carriage drive pinions by moving carriage pinion disconnect lever to the locked position. Install safety wire on the lever and remove No. 2 rig pin.
- G. Remove operational limitation tag from electrical connector (1) and connect electrical connector to receptacle in airplane.
- H. Close forward airstair system circuit breakers on circuit breaker panel P6.
- I. Install drain pan hatch if removed.

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## MAINTENANCE MANUAL

### FORWARD AIRSTAIR – REMOVAL/INSTALLATION

#### 1. General

- A. The forward airstair is a self-contained unit which is removed from, and installed in the airplane in its retracted condition. Prior to removal or installation of the airstair, the forward airstair door must be fully open and power should be removed from the electrical connection to the airstair.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
– YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
– THE WIND IS MORE THAN 40 KNOTS  
– THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
– THE FORWARD ENTRY DOOR IS OPENED FULLY  
– THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

#### 2. Equipment and Materials

- A. Forward Airstair Transportation Sling, OHME65-45888  
B. Use commercial lifting equipment

**NOTE:** Only airplanes equipped with structural attach points can use Rail Extension Tool.

- C. No. 1 rig pin, 0.4980 (+0.0005/-0.0010)-inch diameter by 4.0 inches long  
D. No. 2 rig pin, 0.2480 (+0.0005/-0.0010)-inch diameter by 2.50 inches long

#### 3. Remove Forward Airstair

- A. Extend airstair and gain access to area above drain pan through access hatch and remove drain pan attachment fittings if installed.

**CAUTION:** DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

**NOTE:** Temporary access can be attained by partially retracting airstair.

- B. Retract airstair and release control before airstair door begins to close. Remove drain pan if installed.  
C. Open airstair circuit breakers on panel P6. Disconnect airstair electrical connector (Fig. 402).  
D. Disengage carriage drive pinions by moving carriage pinion disconnect lever to unlocked position (View 2, Fig. 401).

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- E. Move airstair outboard until airstair actuator is accessible over electronic compartment access door and return carriage pinion disconnect lever to locked position.
- F. Disconnect electrical connector at carriage end of rail-to-carriage swing arm and remove swing arm from bracket on airstair actuator.
  - (1) Check the distance between the forward and aft rails is 35.62 +/- 0.06 inches (90.49 +/- 0.15 cm).
- G. Tie disconnected electrical connectors and swing arm out of way to prevent damage by movement of airstair (Fig. 402).
- H. Loosen locknuts on normal extend limit switch (S3). Raise switch away from ramp so that only one thread is visible below bottom locknut (Fig. 403).
- I. Remove carriage step control actuator from door end of each rail (View 1, Fig. 401).
- J. Remove carriage extend stop from door end of each rail (View 1).

**CAUTION:** DO NOT LIFT AIRSTAIR BY HANDRAILS. HANDLING THE AIRSTAIR REQUIRES PROPER TOOLING TO PREVENT DAMAGE TO UNIT AND TO ASSURE PROPER ALIGNMENT BETWEEN AIRSTAIR AND AIRPLANE.

- K. If required, install rail extension tool (Fig. 401).
  - (1) Remove three screws from body of airplane on each side of forward entry door at installation locations for rail extension tool vertical supports. Install vertical supports with three bolts at each location (detail B).
  - (2) Install pins connecting inboard ends of rail extension tool to door end of airstair rails and connect vertical supports to cross bar of rail extension tool.
  - (3) Check alignment of extension tool rails with airstair rails. Adjust as necessary.
  - (4) Check position of teeth on adjustable racks of rail extension tool to ensure proper engagement of pinions when airstair is removed.
- L. Position hoist and sling and attach sling to lifting lugs of airstair.
- M. Disengage carriage drive pinions by moving carriage pinion disconnect lever to unlocked position and move airstair outboard unit disengaged.
- N. Place airstair in suitable container and remove sling.

#### 4. Install Forward Airstair

**CAUTION:** IF A REPLACEMENT AIRSTAIR IS BEING INSTALLED, BOTH EXTEND LIMIT SWITCHES (S3 AND S4) AND RETRACT LIMIT SWITCHES (S5 AND S6) SHOULD BE LOOSENED TO PREVENT POSSIBLE DAMAGE TO SWITCHES.

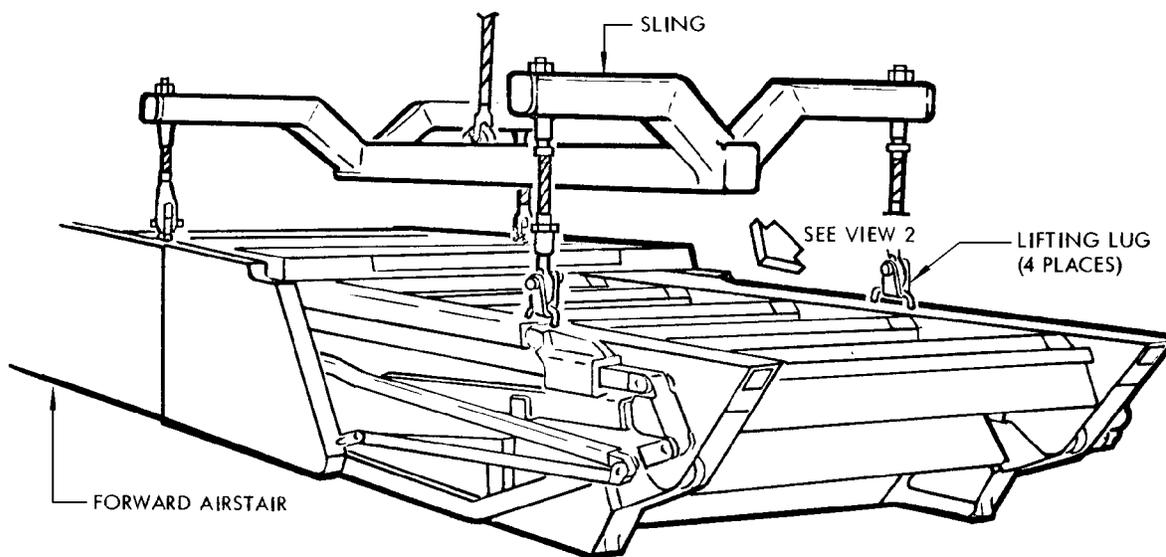
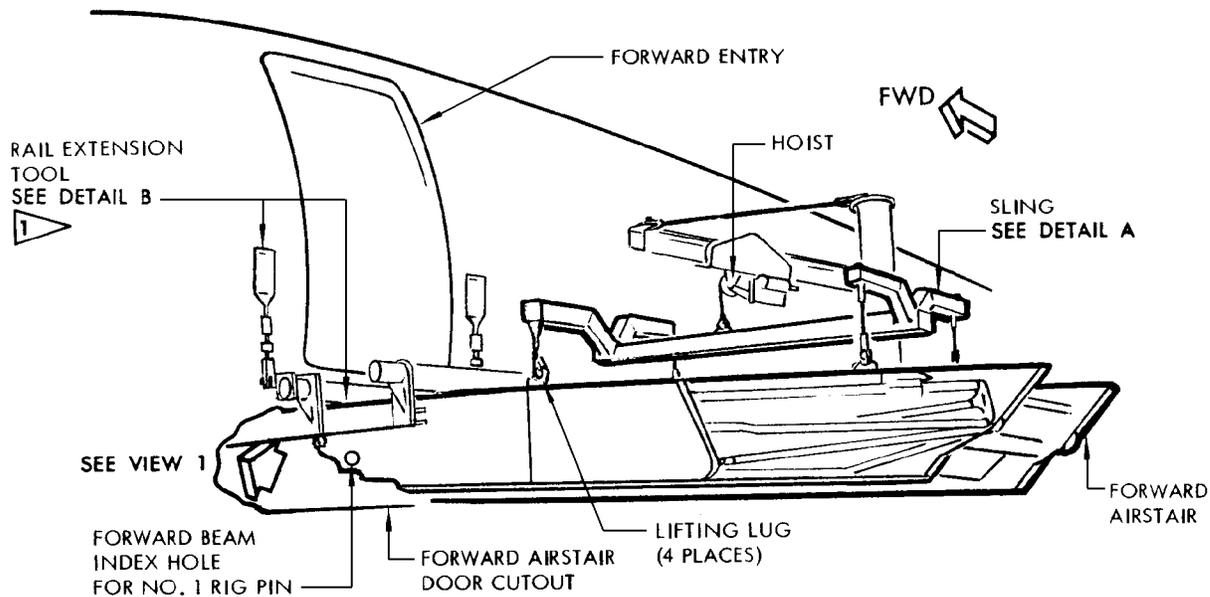
- A. Open airstair door fully and open forward airstair circuit breakers on P6-4 panel.
- B. Tie swing arm and electrical connectors out of way to prevent damage from movement of airstair.

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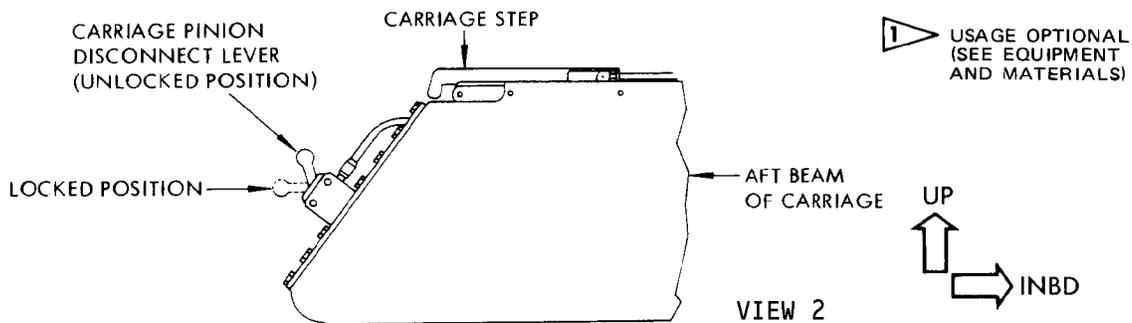
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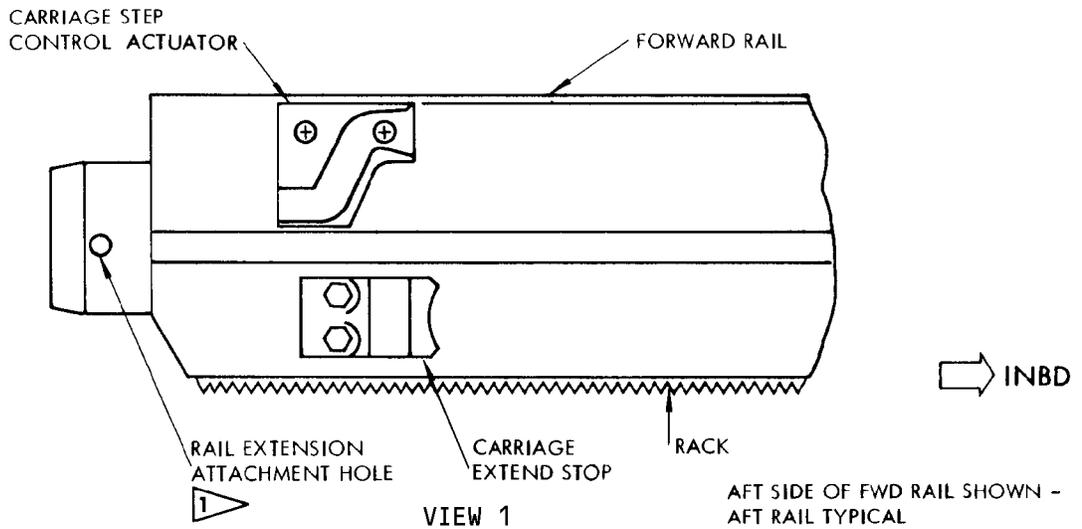
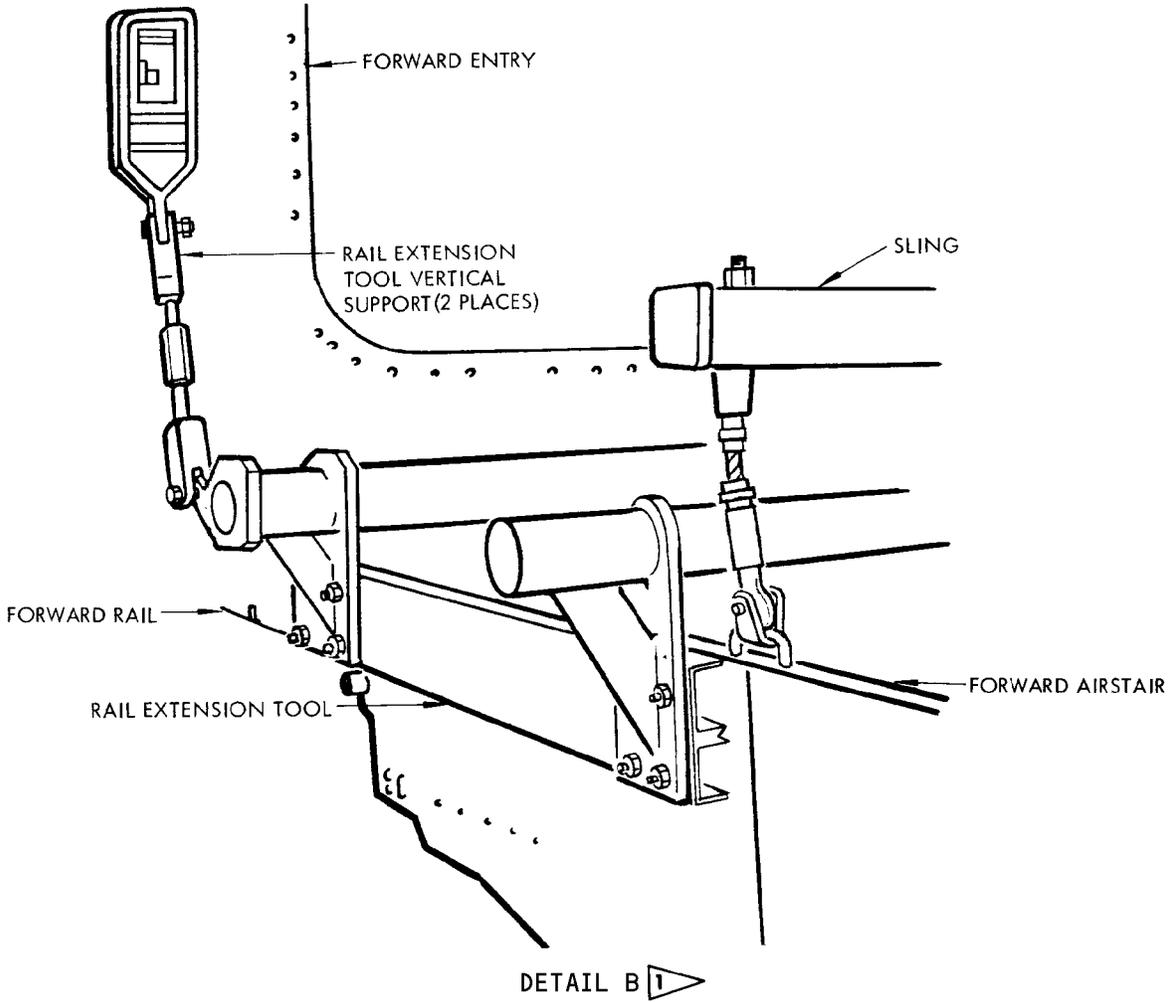
DETAIL A



Forward Airstair Installation  
 Figure 401 (Sheet 1)

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Forward Airstair Installation  
 Figure 401 (Sheet 2)

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- C. Assure that upper ladder is fully retracted by inserting No. 1 rig pin through index hole in carriage aft beam and into index hole in ladder truck; remove rig pin. Make same check at carriage forward beam; remove rig pin (Fig. 401).
- D. Check that lower ladder is fully folded and locked.
- E. Check that carriage step is fully down.
- F. Place carriage pinion disconnect lever in unlocked position.

**CAUTION:** DO NOT LIFT AIRSTAIR BY HANDRAILS. HANDLING THE AIRSTAIR REQUIRES PROPER TOOLING TO PREVENT DAMAGE TO UNIT AND TO ASSURE PROPER ALIGNMENT BETWEEN AIRSTAIR AND AIRPLANE.

- G. Insert airstair on rails as follows:
  - (1) Position hoist and sling over airstair and attach sling to lifting lugs.
  - (2) If rail extension tool is to be used, make sure tool is properly installed per step 3.1.
  - (3) If other support device is used, position airstairs on device.
  - (4) Position airstair at opening in fuselage.

**CAUTION:** AIRSTAIR MUST BE FIRMLY SUPPORTED DURING INSTALLATION OR STRUCTURE AND AIRSTAIR WILL BE DAMAGED.

- (5) Orient airstair to airplane, and index carriage pinions to racks on rails.

**CAUTION:** CARRIAGE PINIONS MUST ENGAGE FIRST TOOTH OF RACKS ON FORWARD AND AFT RAILS SIMULTANEOUSLY.

- (6) Move airstair inboard until fully engaged with rails. If rail extension tool is used, move airstair carefully inboard until sling contacts crossbar on rail extension tool.

**CAUTION:** SPECIAL CARE SHOULD BE TAKEN WHEN WORKING ON AIRSTAIRS TO NOT TRIP THE LOWER LADDER OUT-OF-SEQUENCE POSITION. EXTENSIVE DAMAGE WILL OCCUR IF STAIRS ARE OPERATED WITH LATCH IN INCORRECT POSITION.

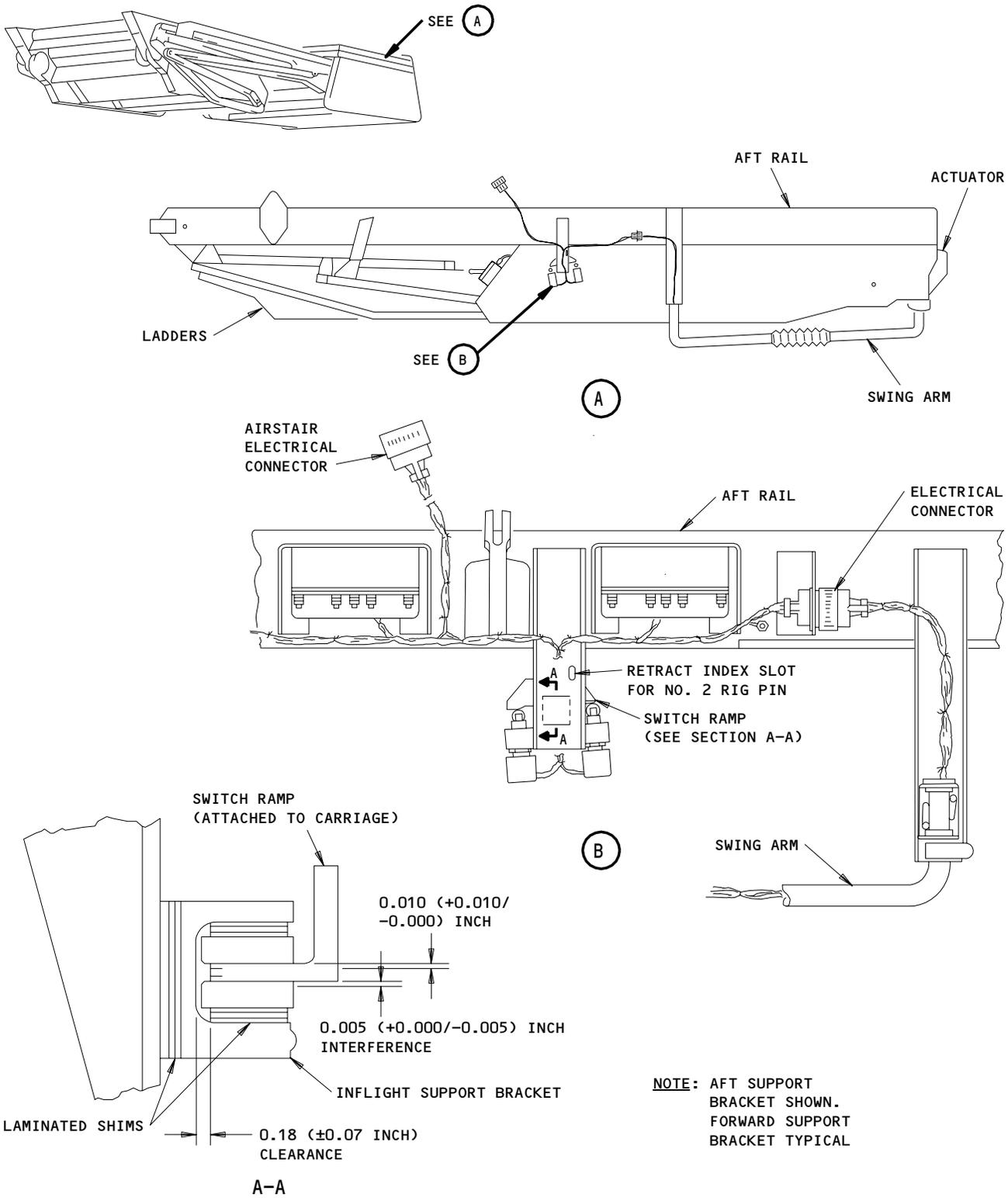
- (7) If installed remove sling.
- H. Move carriage inboard until retract stops are contacted. Engage carriage drive pinions by moving carriage pinion disconnect lever to locked position.
- I. Remove support device, or if installed rail extension tool and install screws in airplane body bolt hole locations used for attaching the two vertical supports.

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Airstair Electrical Connector Locations and Inflight Support Bracket Adjustment  
 Figure 402

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- J. Install carriage extend stop on door end of each rail (View 1, Fig. 401).
  - (1) Install shim under forward and aft stop to achieve a gap of 0.005 to 0.040 between roller and carriage beam with one roller contacting carriage beam. Shim forward and aft stops equally.
- K. Disengage carriage drive pinions and move airstair outboard until airstair actuator is accessible over electronic compartment access door.
- L. Install the swing arm (Fig. 402):
  - (1) Attach the swing arm to the bracket on the airstair actuator.
  - (2) Make sure both ends of the swing arm point up.

**CAUTION:** DO NOT INSTALL THE SWING ARM SO THAT THE ENDS POINT DOWN. IF THE ENDS POINT DOWN THE SWING ARM AND THE WIRE CAN BREAK. THIS CAN CAUSE SPARKS, FIRE AND DAMAGE TO EQUIPMENT.

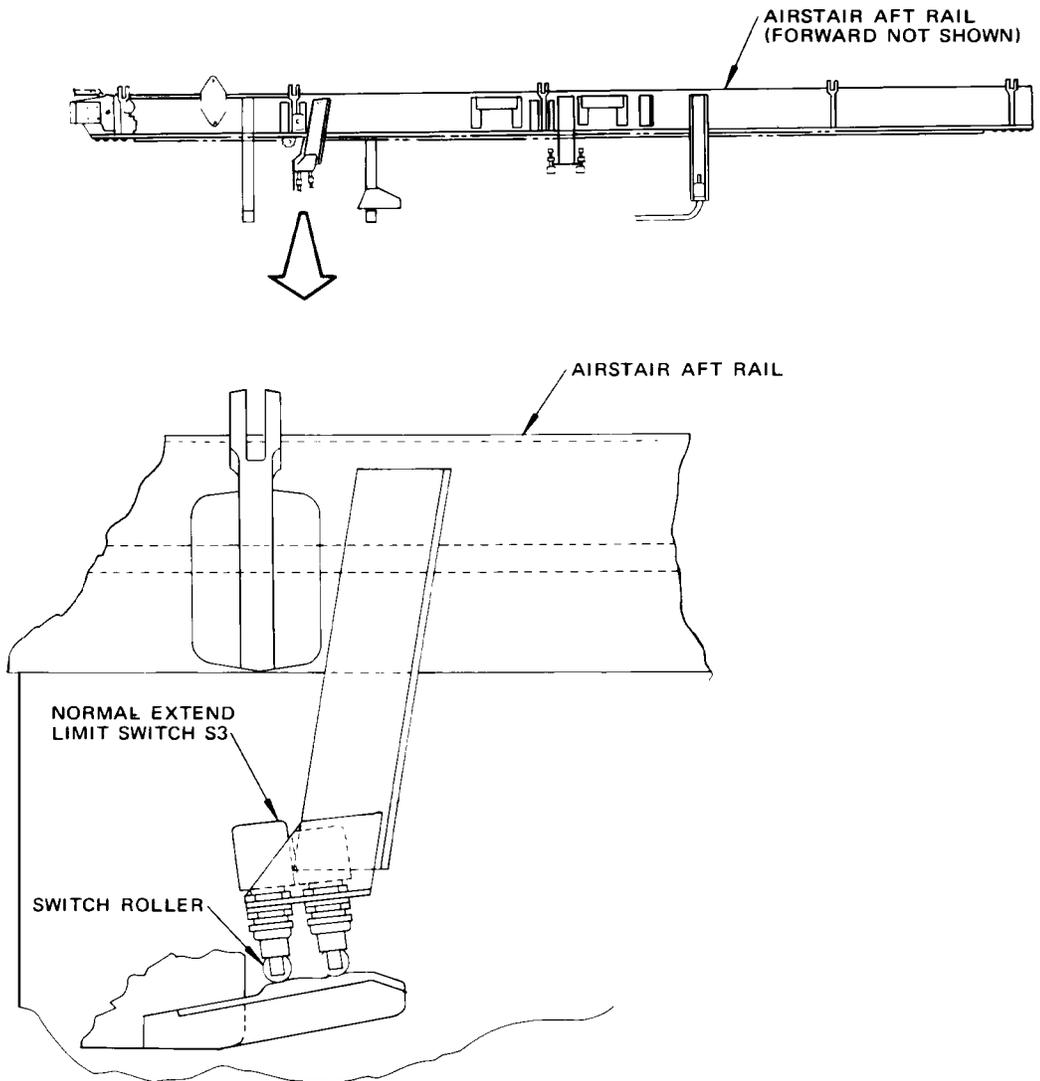
- (3) Connect the electrical connector to the receptacle on the carriage.
- M. Adjust Airstair.
  - (1) If same airstair is being reinstalled, adjust normal extend limit switch (S3) (Ref. 52-61-211 A/T).
  - (2) If new airstair is being installed refer to 52-61-0 A/T.
- N. Move airstair to retracted position and install carriage step control actuator on door end of each rail (View 1, Fig. 401).
- O. Check for satisfactory operation of carriage step by moving airstair outboard to full carriage travel.
- P. Check adjustment of forward and aft inflight support brackets as shown on Fig. 402.
- Q. Move carriage assembly to retracted position and insert No. 2 rig pin through retract index slot in aft rail (Fig. 402) and into index hole in carriage beam.
- R. Engage carriage drive pinions by moving carriage pinion disconnect lever to locked position.
- S. Remove No. 2 rig pin.
- T. Connect airstair electrical connector to receptacle (Fig. 402)
- U. Test airstair operation (Ref. 52-61-0 A/T).

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Normal Extend Limit Switch (S3) Location  
 Figure 403

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FORWARD AIRSTAIR – INSPECTION/CHECK

1. General

A. This procedure contains two Tasks:

**WARNING:** DO NOT OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES. DO NOT OPERATE THE AIRSTAIR IF THE WIND IS MORE THAN 40 KNOTS. DO NOT OPERATE THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS. DO NOT OPERATE THE AIRSTAIR IF THE FORWARD ENTRY DOOR IS OPENED FULLY. MAKE SURE THAT THE AREA IS CLEAR OF PEOPLE OR EQUIPMENT. IF YOU DO NOT OBEY THESE CONDITIONS, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Forward Airstair Ball Screw Ball Nut End Play Check.

- (a) The following procedure provides a means of checking airstair ball screw ball nut end play without removing the ball screw assembly from the airstair in the airplane.
- (b) The ball nut end play limits specified in this procedure are applicable to ball screw assemblies manufactured by Walter Kidde Company. For end play limits on ball screw assemblies manufactured by Edwards Enterprises, refer to Weber Aircraft Overhaul Manual for the forward airstair assembly.

**WARNING:** DO NOT OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES. DO NOT OPERATE THE AIRSTAIR IF THE WIND IS MORE THAN 40 KNOTS. DO NOT OPERATE THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS. DO NOT OPERATE THE AIRSTAIR IF THE FORWARD ENTRY DOOR IS OPENED FULLY. MAKE SURE THAT THE AREA IS CLEAR OF PEOPLE OR EQUIPMENT. IF YOU DO NOT OBEY THESE CONDITIONS, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(2) Top Step Actuator Check.

- (a) Do this task when the airstair is replaced or if the top step is not stable when the airstair is extended.

2. Equipment and Materials

- A. Dial indicator – capable of taking readings from 0.000 to 0.020 inch
- B. Dial indicator clamping tool – a clamping tool configuration that can be used to mount a dial indicator on the ball screw with the assembly on the airstair in the airplane.

3. Check Forward Airstair Ball Screw Ball Nut End Play

A. Extend airstair to full down position.

**NOTE:** Full extension of the airstair unloads the ball nut trunnions after the stair contacts the ground, since the ball screw will overdrive until the down limit switch provides cutoff.

- B. Open airstair circuit breakers on panel P6. Disconnect airstair electrical connector (Fig. 602).
- C. Mount dial indicator on ball screw using clamping fixture. Adjust dial indicator probe so that it is in contact with ball nut (Fig. 601).

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- D. With all play of ball nut taken out by handloading in one direction, adjust dial indicator to zero.
- E. Hand load ball nut in opposite direction until dial indicator movement stops and record end play. Repeat three times.

**NOTE:** Prevent relative rotation between ball nut and screw during measurement process.

- F. If endplay exceeds 0.015 inch on a ball screw having original size balls, replace the ball screw assembly.
- G. If endplay exceeds 0.010 inch on a ball screw assembly having oversize balls, replace the ball screw assembly for overhaul.
- H. Connect electrical connector to receptacle.
- I. Close forward airstair system circuit breakers on circuit breaker panel P6.
- J. Retract forward airstair, if no longer required for access or maintenance.

#### 4. Top Step Actuator Check

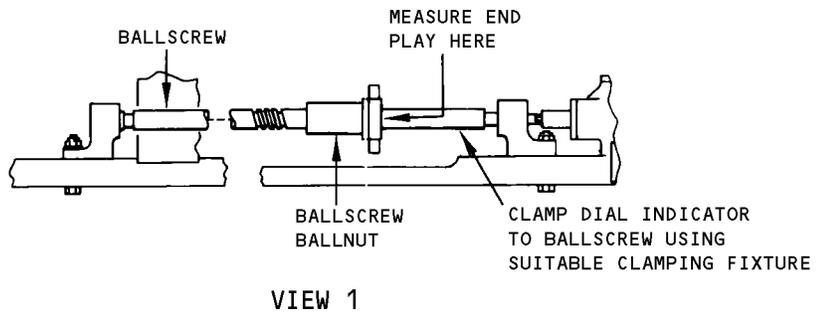
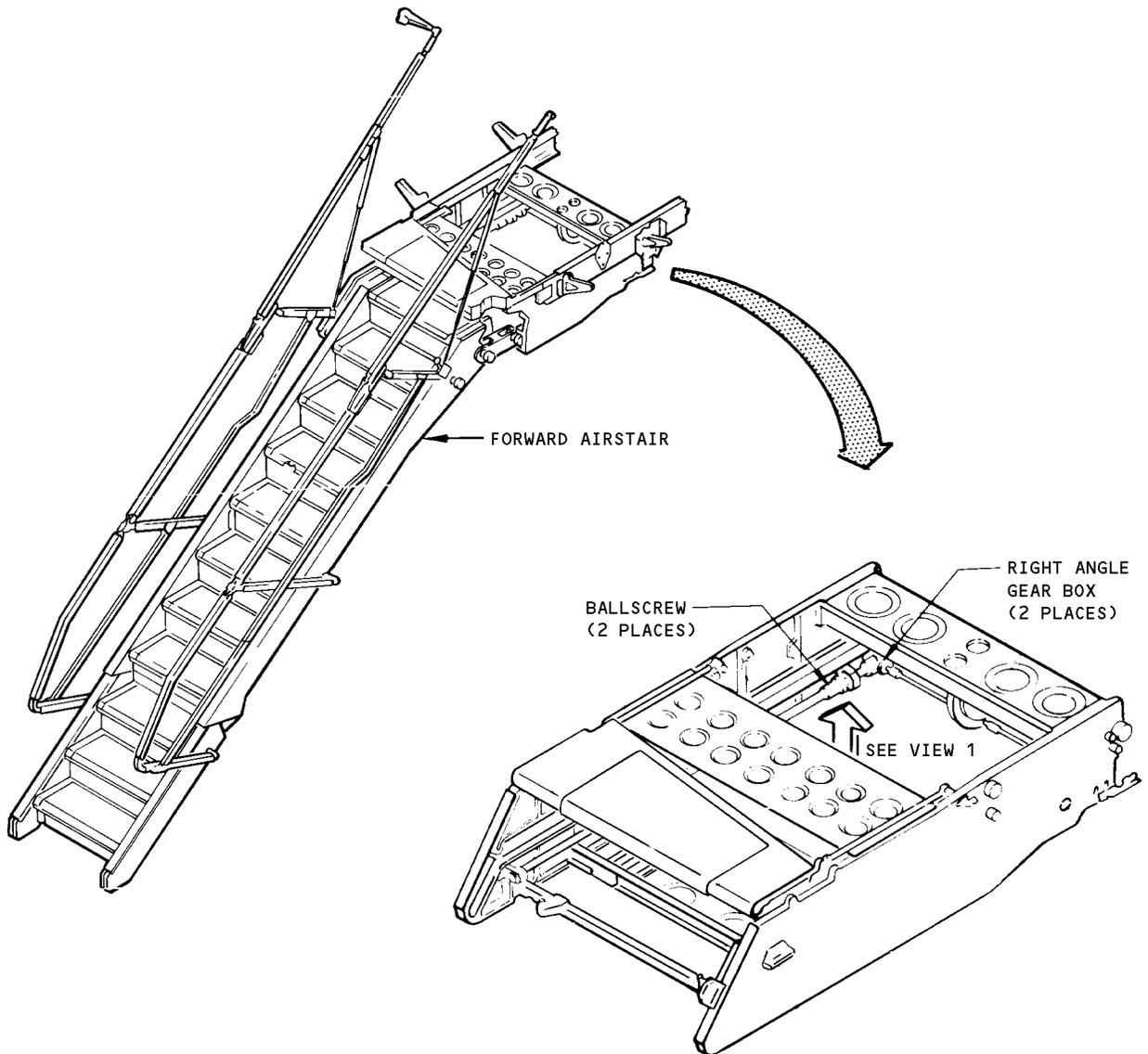
- A. Prepare for the Procedure
  - (1) Fully extend the airstair.
  - (2) Get access to the top step actuation rollers and the actuator blocks.
- B. Examine the top step rollers and actuator blocks:
  - (1) If a roller or an actuator block shows signs of damage or excessive wear, then replace it.
  - (2) Make sure that a minimum of 50% of the two rollers engage with the two actuator blocks
    - (a) If a minimum of 50% of the rollers engage with the actuator blocks, then no further check is necessary.
      - 1) Retract the airstair.
    - (b) If the rollers are not correctly engaged in the actuator blocks, then continue.
  - (3) Make a record of the estimated distance needed so that the two rollers will correctly engage with the actuator blocks.
  - (4) Retract the airstair.

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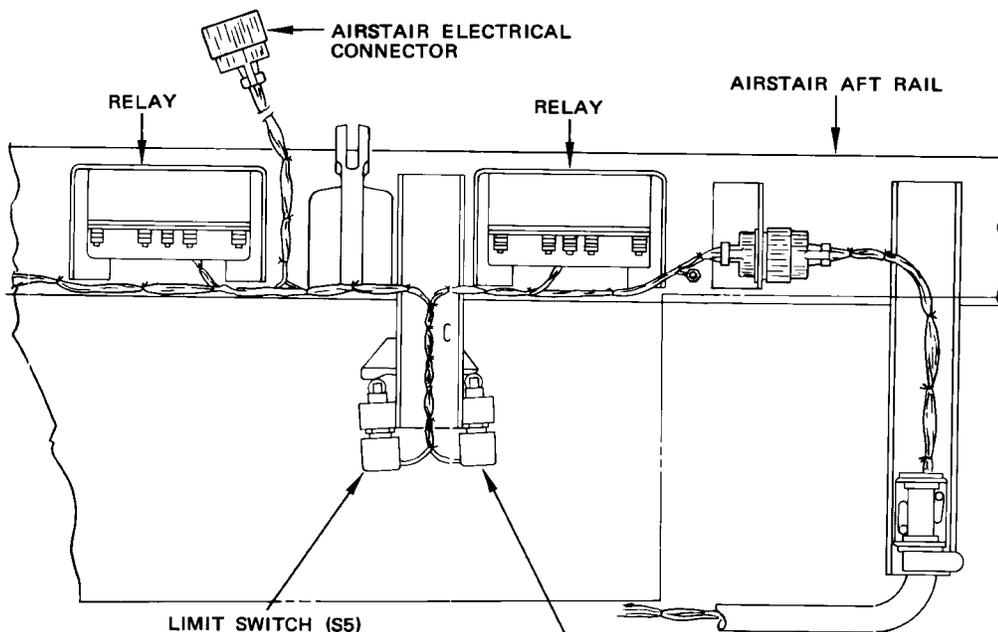
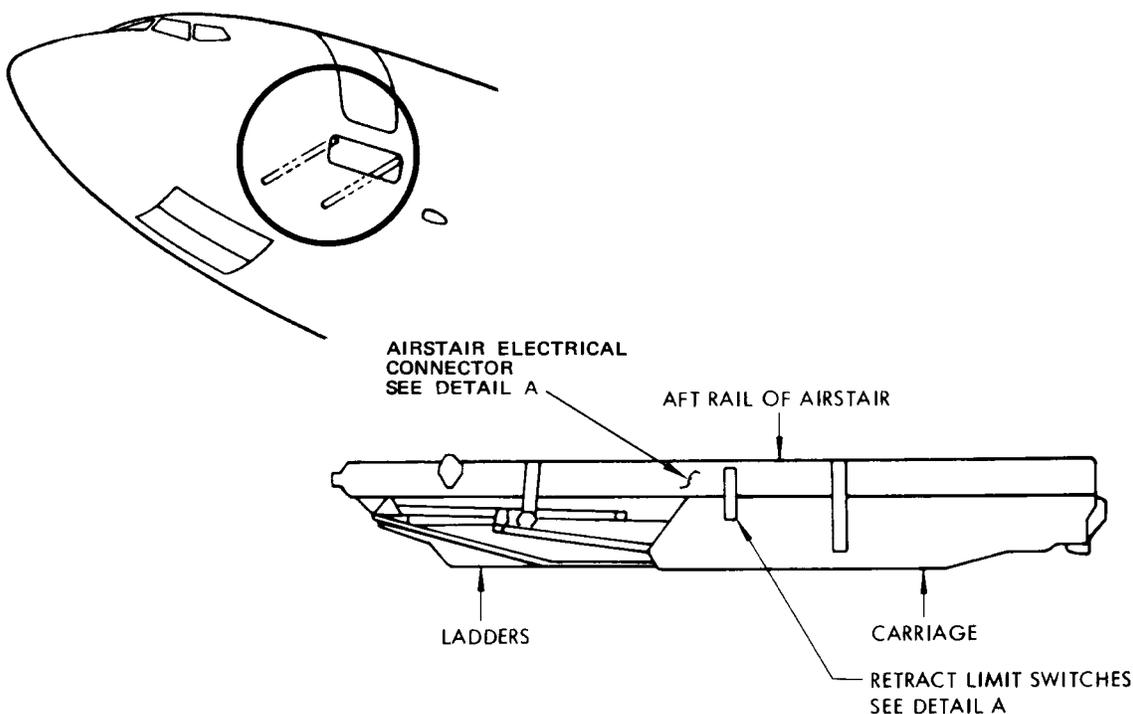
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Forward Airstair Ballscrew Ballnut End Play Check  
 Figure 601

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Airstair Electrical Connector Location  
 Figure 602

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## MAINTENANCE MANUAL

- (5) Measure the distance between the forward and aft airstair rails:
  - (a) The distance between the top inner flange of the two rails must be 35.564 to 35.684 inches (90.33 to 90.63 cm).
    - 1) If the distance between the rails is not in the limits, then adjust the rail on the side that the roller is not correctly engaged.
    - 2) If the distance between the rails is in the limits, then continue.
- (6) Adjust the actuator block:
  - (a) Remove the actuator block from the side that the roller is not correctly engaged.
  - (b) Get access to aluminum that has a thickness that is equal to the estimated distance needed above.
  - (c) Use the aluminum to make a shim that is the shape of the actuator block.
  - (d) Install the actuator block with the shim.
  - (e) Fully extend the airstair.
  - (f) Make sure that a minimum of 50% of the two rollers engage with the two actuator blocks
- (7) Retract the airstair.

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Airplanes With Forward Airstairs

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FORWARD AIRSTAIR ACTUATOR – REMOVAL/INSTALLATION

1. Equipment and Materials

- A. No. 1 rig pin – 0.4980 + 0.0005/-0.0010 inch diameter by 4.0 inches long
- B. No. 2 rig pin – 0.2480 + 0.0005/-0.0010 inch diameter by 2.50 inches long
- C. Grease – BMS 3-33 (Preferred)
- D. Grease – MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)

2. Prepare for Removal

- A. Remove Drain Pan (if installed)
  - (1) Extend airstair to provide clearance for removing drip pan attachment fasteners (Fig. 402).

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
– YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 INUTES  
– THE WIND IS MORE THAN 40 KNOTS  
– THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
– THE FORWARD ENTRY DOOR IS OPENED FULLY  
– THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

**NOTE:** Temporary access can be attained by partially retracting airstair.

- (2) Gain access to drip pan through electronic compartment access door.
- (3) Remove hose clamp and drain hose from access hatch in drip pan. Remove access hatch.
- (4) Obtain access to drip pan attachment fasteners through access hatch. Remove fasteners.

**CAUTION:** DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR SWING ARM MAY BE DAMAGED.

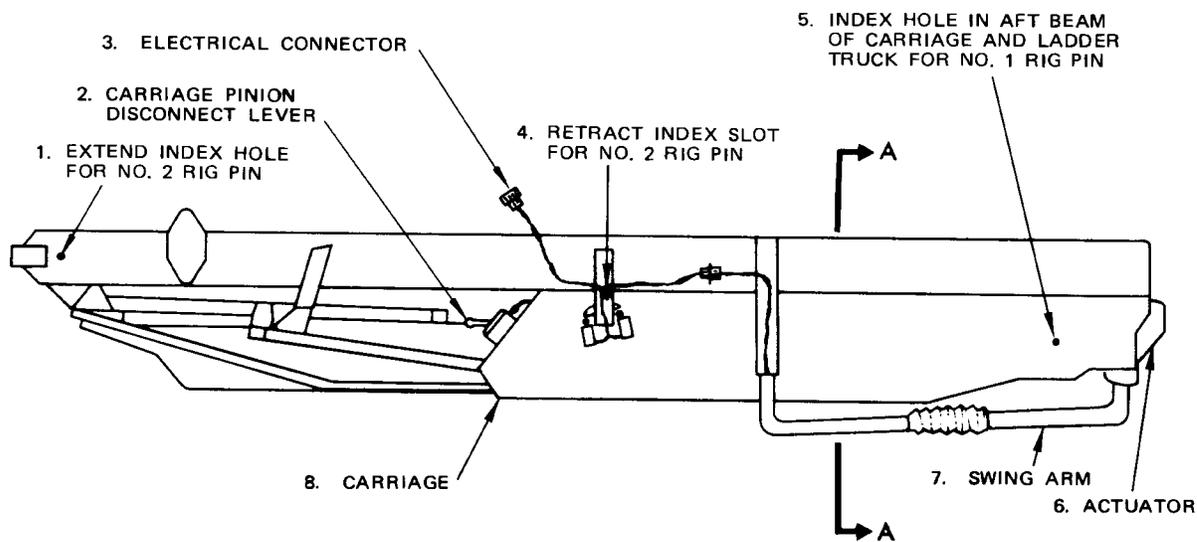
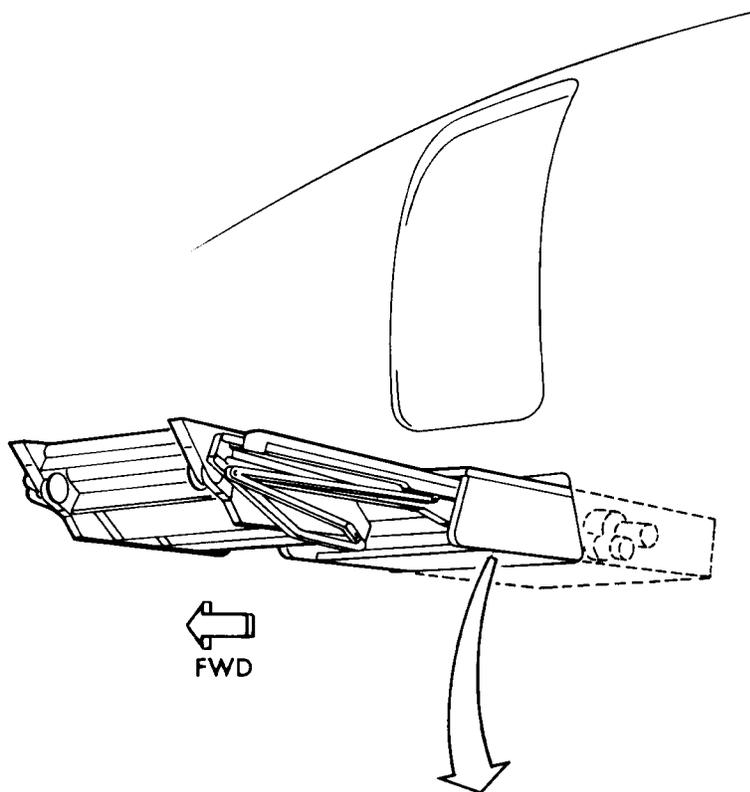
- (5) Retract airstair and release control before airstair door begins to close. Remove drip pan through airstair – airstair door opening on side of fuselage.
- B. Open airstair circuit breakers on panel P6. Disconnect airstair electrical connector (3) (Fig. 401).
- C. Disengage carriage drive pinions by moving carriage pinion disconnect lever (2) to unlocked position.
- D. Manually move carriage outboard to fully extended position and move carriage pinion disconnect lever to locked position.
- E. Secure carriage to rail by inserting No. 2 rig pin through extend index hole (1) in aft rail and into index slot in aft beam of carriage.

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AIRPLANES WITH FORWARD  
AIRSTAIRS

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REAR VIEW  
 AIRSTAIR SHOWN IN  
 RETRACTED POSITION

Forward Airstair Actuator Installation  
 Figure 401 (Sheet 1)

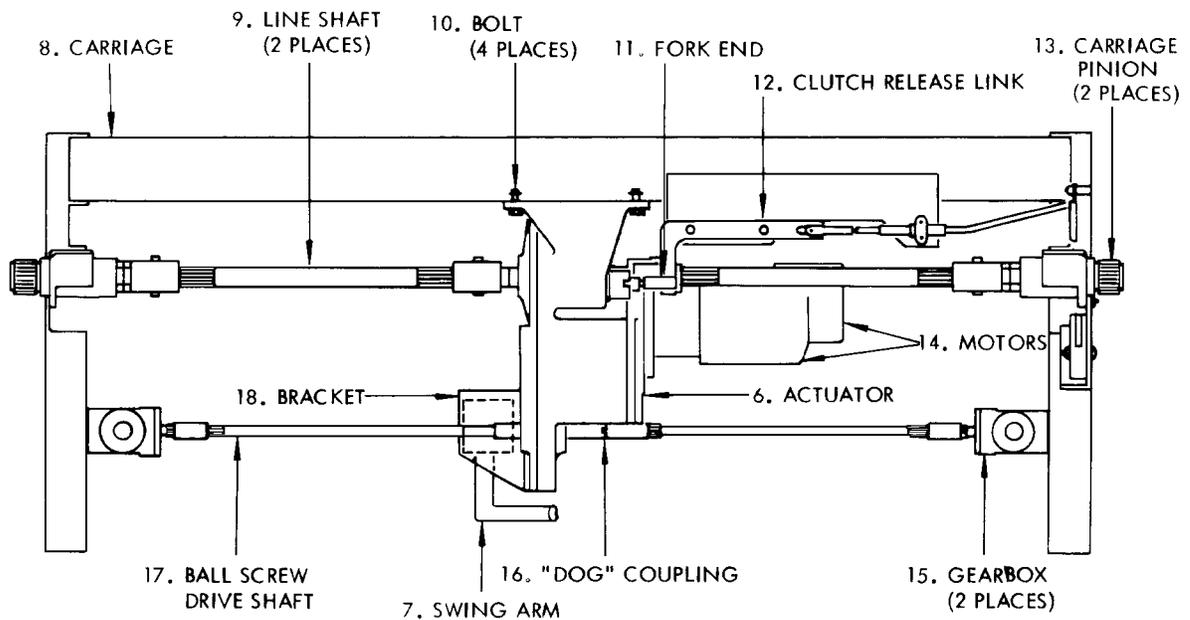
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 AIRSTAIRS

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SECTION A-A

Forward Airstair Actuator Installation  
 Figure 401 (Sheet 2)

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 AIRPLANES WITH FORWARD  
 AIRSTAIRS

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F. Secure ladders to carriage by inserting No. 1 rig pin through index hole (5) in aft beam of carriage and into index hole in ladder truck.

### 3. Remove Forward Airstair Actuator

- A. Remove pin which attaches fork end (11) on actuator (6) to clutch release link (12) on carriage pinion disconnect mechanism.
- B. Remove swing arm (7) from bracket (18) on actuator.
- C. Disconnect electrical connectors of the two actuator motors (14).
- D. Disconnect couplings on forward and aft line shafts (9) and remove shafts.
- E. Disconnect ball screw drive shaft (17) at forward and aft end leaving shaft in actuator.
- F. Remove four bolts (10)—securing actuator to carriage and remove actuator.
- G. Disconnect "dog" coupling (16) on ball screw drive shaft and remove shaft from actuator.

### 4. Install Forward Airstair Actuator

- A. Insert ball screw drive shaft (17) in actuator leaving "dog" coupling (16) disconnected.

**NOTE:** Apply a film of grease to splines, bores, shanks, and threads of parts prior to assembly.

- B. Hold actuator in mounting position on carriage and install four attaching bolts (10).
- C. Connect both ends of ball screw drive shaft (17) to adjacent gearbox (15).
- D. Install forward and aft line shafts (9) connecting actuator to carriage pinions.
- E. Install the swing arm (Fig. 401):
  - (1) Attach the swing arm to the bracket on the airstair actuator.
  - (2) Make sure both ends of the swing arm point up.

**CAUTION:** DO NOT INSTALL THE SWING ARM SO THAT THE ENDS POINT DOWN. IF THE ENDS POINT DOWN THE SWING ARM AND THE WIRE CAN BREAK. THIS CAN CAUSE SPARKS, FIRE AND DAMAGE TO EQUIPMENT.

- (3) Connect the electrical connector to the receptacle on the carriage.
- F. Install pin connecting fork end (11) on actuator to clutch release link (12) on carriage pinion disconnect mechanism.
- G. Connect "dog" coupling (16) on ball screw drive shaft and remove No. 1 rig pin.
- H. Connect electrical connectors of both actuator motors (14).

### 5. Restore Airplane to Normal

- A. Remove No. 2 rig pin and disengage carriage drive pinions by moving carriage pinion disconnect lever (2) to unlocked position.

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AIRPLANES WITH FORWARD  
AIRSTAIRS

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## MAINTENANCE MANUAL

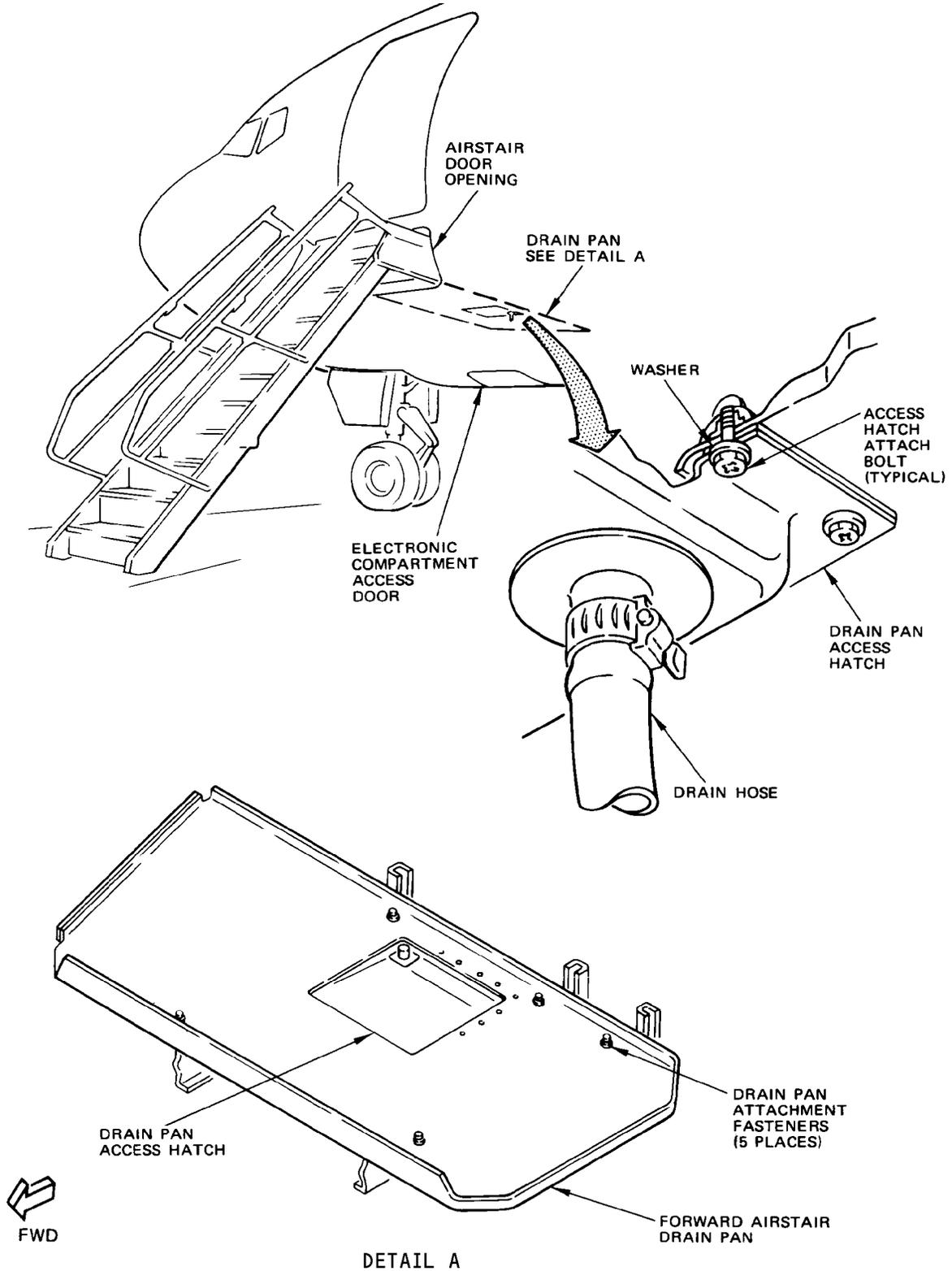
- B. Manually move carriage to retracted position and insert No. 2 rig pin through retract index slot (4) and into retract index hole in aft beam of carriage.
- C. Engage carriage drive pinions by moving carriage pinion disconnect lever (2) to locked position. Install lockwire on lever.
- D. Remove No. 2 rig pin and connect electrical connector (3) to receptacle.
- E. If required, install drain pan through airstair door opening inside of fuselage (Fig. 402).
- F. Close forward airstair system circuit breakers on circuit breaker panel P6.
- G. Extend airstair and install drain pan attachment fasteners if installed. Install drain pan access hatch and connect drain hose.

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AIRPLANES WITH FORWARD  
AIRSTAIRS

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Forward Airstair Drain Pan Access  
 Figure 402

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 AIRSTAIRS

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FORWARD AIRSTAIR BALLSCREW – REMOVAL/INSTALLATION

1. General

- A. Extension of airstair to full down position will unload ballnut trunnions after airstair contacts ground since ballscrew will override until down limit switch provides cutoff.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
– YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
– THE WIND IS MORE THAN 40 KNOTS  
– THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
– THE FORWARD ENTRY DOOR IS OPENED FULLY  
– THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- B. Removal and replacement of the ballscrew can be accomplished without removing airstair assembly from airplane.

2. Equipment and Materials

- A. No. 1 rig pin – 0.4980 (+ 0.0005/-0.0010) inch diameter by 4.0 inches long  
B. No. 2 rig pin – 0.2480 (+ 0.0005/-0.0010) inch diameter by 2.50 inches long  
C. Grease – BMS 3-33 (Preferred)  
D. Grease – MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)

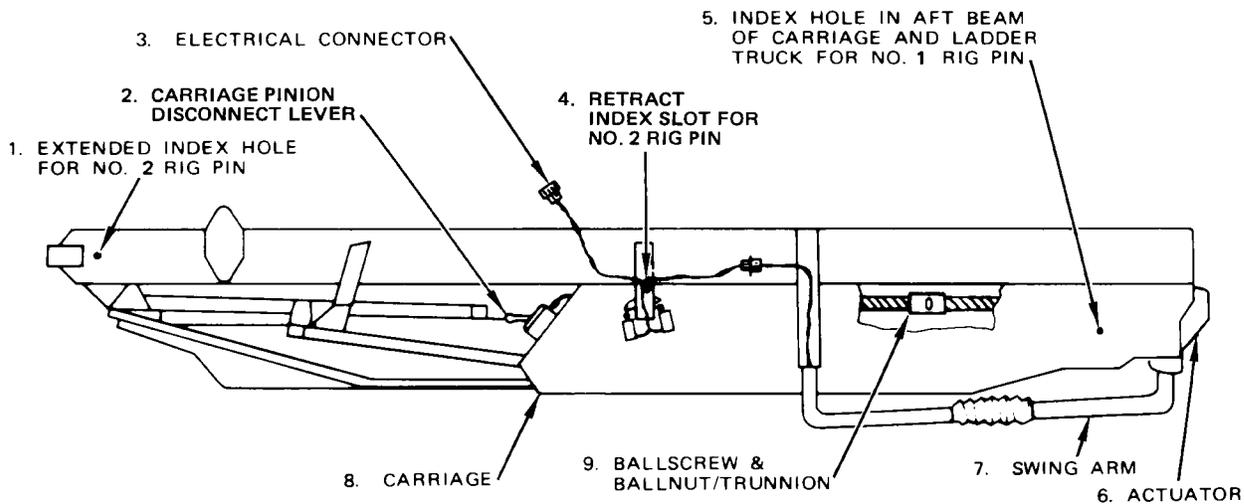
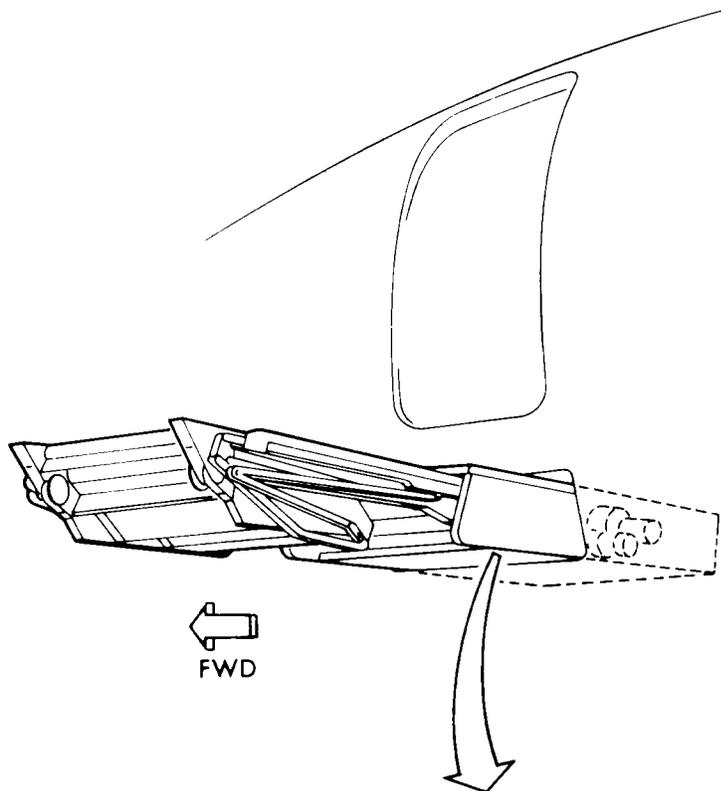
3. Prepare for Removal

- A. Extend airstair and gain access to area above drain pan through access hatch and remove drain pan attachment fittings if installed.

**CAUTION:** DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR SWING ARM MAY BE DAMAGED.

**NOTE:** Temporary access can be attained by partially retracting airstair.

- B. Retract airstair and release control before airstair door begins to close. Remove drain pan if installed.  
C. Open airstair circuit breakers on panel P6. Disconnect airstair electrical connector (3) (Fig. 401).  
D. Disengage carriage drive pinions by moving carriage pinion disconnect lever (2) to unlocked position.  
E. Manually move carriage outboard to fully extended position and move carriage pinion disconnect lever to locked position.  
F. Secure carriage to rail by inserting No. 2 rig pin through extend index hole (1) in aft rail and into index slot in aft beam of carriage.



REAR VIEW  
 AIRSTAIR SHOWN IN  
 RETRACTED POSITION

Forward Airstair Ballscrew Installation  
 Figure 401

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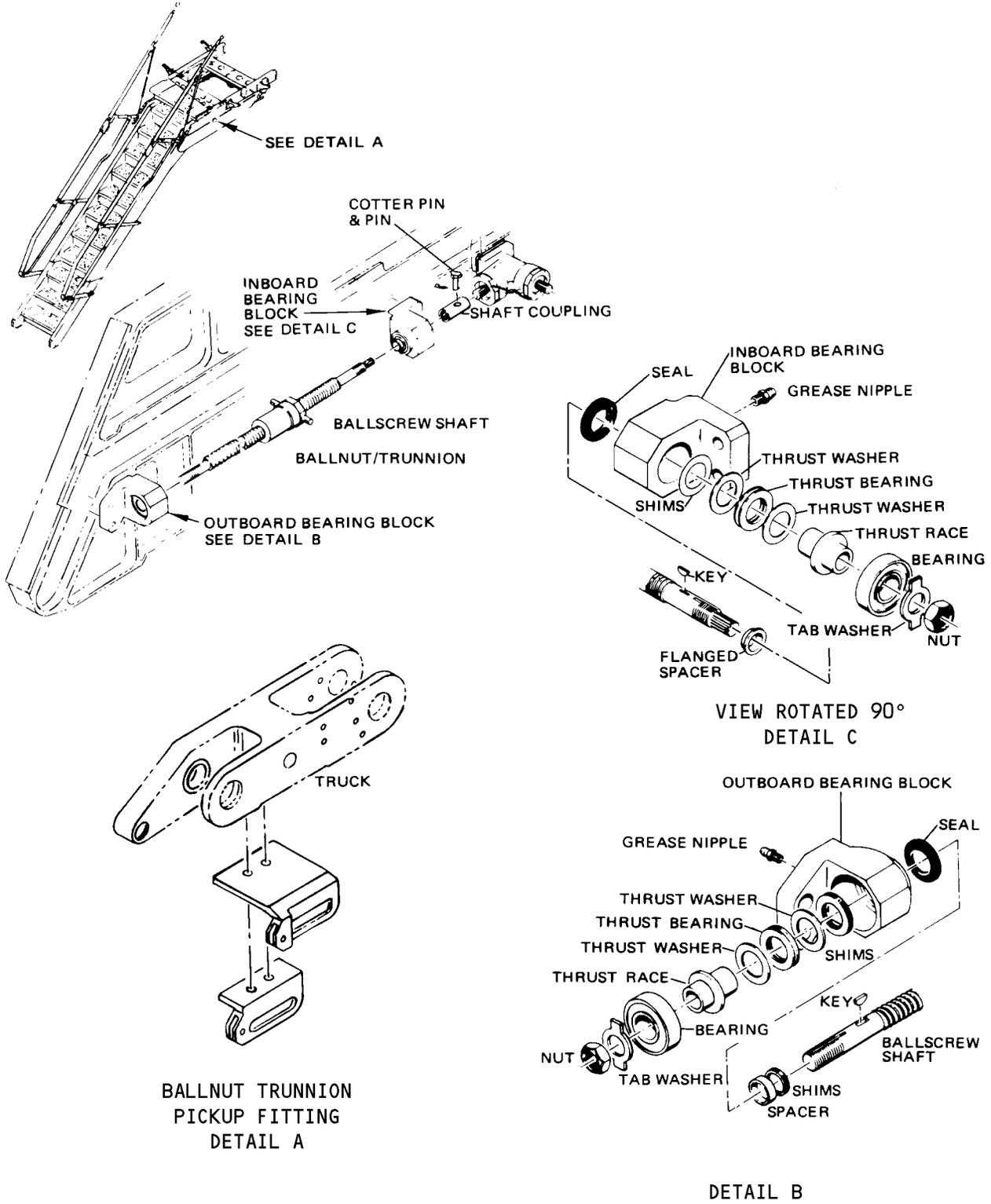
- G. Secure ladders to carriage by inserting No. 1 rig pin through index hole (5) in aft beam of carriage and into index hole in ladder truck.
4. Remove Ballscrew and Bearing Block Assembly (Fig. 402)
- A. Remove cotter pin and pin from ballscrew splined coupling.
  - B. Remove bolts and washers securing trunnion pickup fittings from truck assembly.
  - C. Wrap tape around ballscrew shaft both sides of ballnut/trunnion to prevent overrunning off end of shaft.
  - D. Remove nuts and bolts securing inboard bearing block assembly.
  - E. Remove nuts and bolts securing outboard bearing block assembly, taking care to support ballscrew shaft in the horizontal plane.
  - F. Bend tab washer lug and undo ballscrew outboard retaining nut.
  - G. Slide outboard bearing block assembly from ballscrew shaft.

**NOTE:** Thrust races and bearings should not be disassembled unless damaged or required for inspection.

- H. Remove key from shaft.
  - I. Remove spacer and shims and wire together.
  - J. Bend tab washer lug and undo ballscrew inboard retaining nut.
  - K. Slide inboard bearing block assembly from ballscrew shaft.
  - L. Remove key from shaft.
  - M. Remove spacer.
  - N. Protect threads and ends of removed ballscrew.
5. Install Ballscrew and Bearing Block Assembly (Fig. 402)

**CAUTION:** WHILE WORKING WITH BALLSCREW ASSEMBLIES, THE BALL NUT/TRUNNION SHOULD BE TAPED IN PLACE TO PREVENT POSSIBLE DAMAGE. IF TRUNNION IS ALLOWED TO OVERRUN AFT ENDS OF BALLSCREW, INTERNAL THREADING COULD BE CROSSED OR STRIPPED.

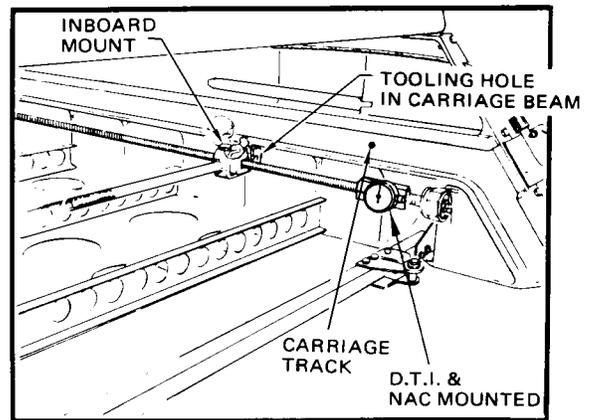
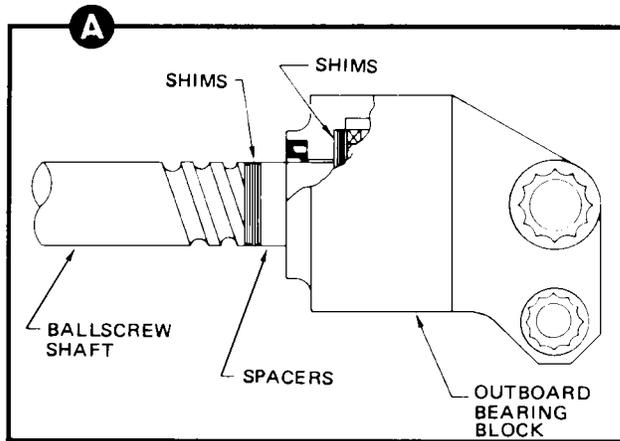
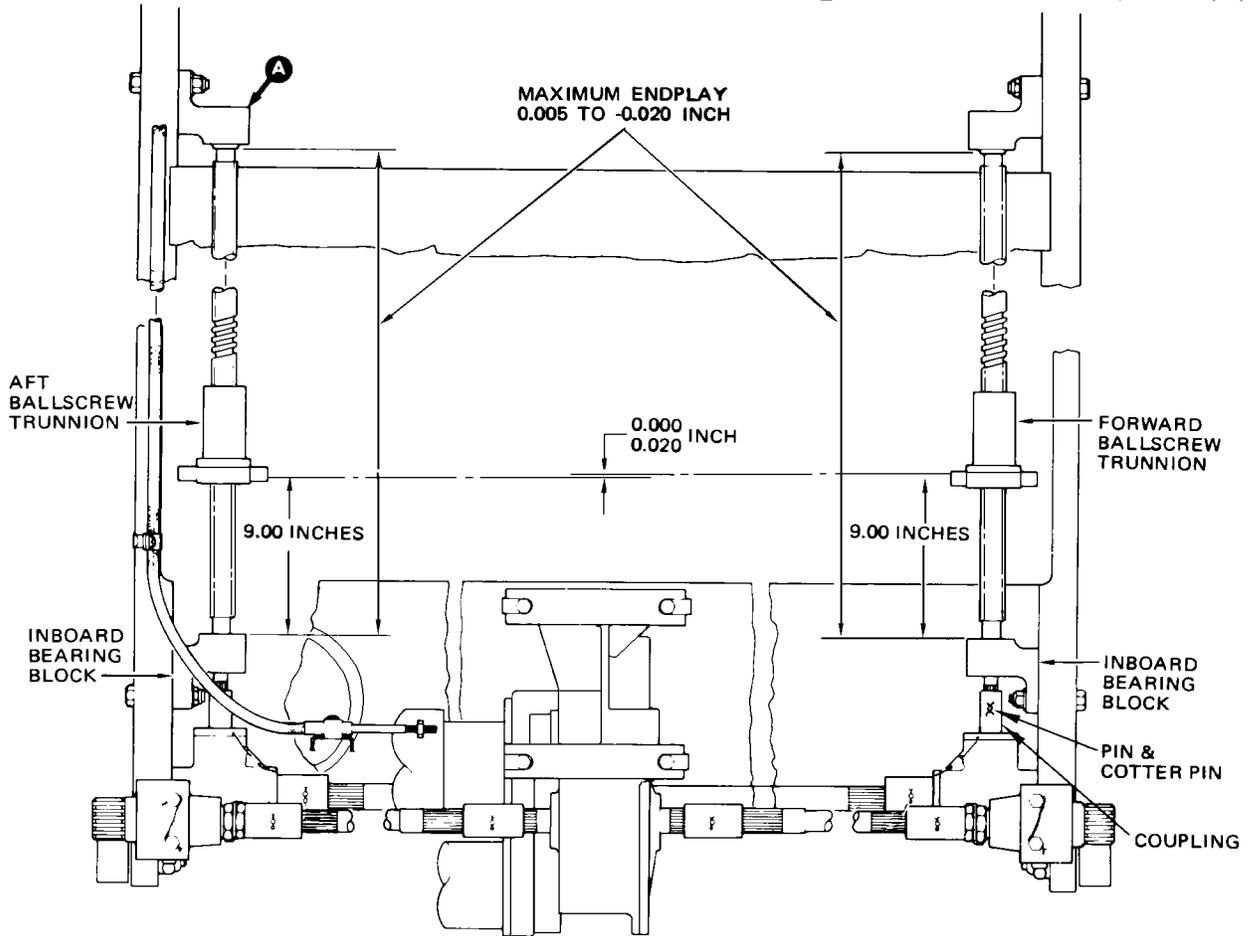
- A. Slide spacer onto splined end of ballscrew assembly, install with large diameter of spacer towards spline end of shaft.
- B. Fit key into shaft.
- C. Slide inboard bearing block assembly over splined end of ballscrew assembly rotating thrust race until key engages key slot of race. Slide block remainder of way until thrust race firmly seats against flanged end of spacer.
- D. Install tab washer and nut. Tighten nut 70-100 pound-inches and bend locking tab against flat of nut.
- E. Slide shims and spacer onto non splined end of ballscrew assembly.
- F. Fit key into shaft.
- G. Slide outboard bearing block assembly onto ballscrew assembly rotating thrust race until key engages key slot of race. Slide block remainder of way until thrust race firmly seats against spacer.



Ballscrew and Bearing Block Assembly  
 Figure 402

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Ballscrew Alignment and Endplay Adjustment  
 Figure 403

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H. Install tab washer and nut. Tighten nut 70-100 pound-inches.

**NOTE:** Do not bend tab of washer until an end play check has been carried out and is satisfactory.

I. Apply a film of grease to ballscrew splines, bevel gearbox splines and splined coupling, then slide splined coupling onto ballscrew splines and bevel gearbox splines.

J. Attach outboard ballscrew bearing block to carriage assembly with bolts and nuts.

K. Attach inboard ballscrew bearing block to carriage assembly with bolts and nuts.

L. Check ballscrew endplay as detailed in 52-61-100, Inspection/Check. If outside limits proceed as follows:

- (1) Remove ballscrew outboard bearing block; refer Item 4.E. thru I, keeping ballscrew in horizontal plane.
- (2) Remove required amount of shims.

**NOTE:** Shims are laminated. Removal of some leaves from the shims will decrease endplay of ballscrew.

(3) Install outboard bearing block, refer Item 5.E. thru H and bend tab of tab washer against nut.

M. Remove tape from ballscrew and ballnut/trunnion.

N. Slide splined coupling until coupling is out of mesh with ballscrew splines, then rotate ballscrew until ballnut trunnion is within 0.020 inch in line with other trunnion (Fig. 401). This can be measured with a vernier caliper or finely graduated ruler.

O. Slide splined coupling back into mesh with bevel gearbox splines, recheck 0.020-inch limit has not altered, then insert pin and cotter pin into splined coupling.

P. Assemble trunnion pickup fittings to truck assembly with washers and bolts. Lockwire bolts.

Q. Connect and secure detached linkages to truck assembly.

R. Lubricate ballscrew shaft and trunnion assembly with grease.

6. Restore Airplane to Normal

A. Remove No. 2 rig pin and disengage carriage drive pinions by moving carriage pinion disconnect lever (2) to unlocked position.

B. Manually move carriage to retracted position and insert No. 2 rig pin through retract index slot (4) and into retract index hole in aft beam of carriage.

C. Engage carriage drive pinions by moving carriage pinion disconnect lever (2) to locked position. Install safety wire on lever.

D. Remove No. 2 rig pin and connect electrical connector (3) to receptacle.

E. Install drain pan if removed.

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- F. Close forward airstair system circuit breakers on circuit breaker panel P6.
- G. Extend airstair and install drain pan attachment fittings if installed.
- H. Visually inspect entire airstair for scrapes, bends, dents, loose connections, cleanliness and completeness of assemblies.
- I. Perform at least three complete cycles (extension and retraction) of airstair checking for smooth operation noting in particular any binding or interference of parts having relative motion to each other.

**CAUTION:** IF DURING EXTENSION AND RETRACTION OF THE AIRSTAIR, EXCESSIVE BINDING, DRAGGING OR INTERFERENCE IS NOTED, STOP THE CYCLE, INVESTIGATE CAUSE AND TAKE CORRECTIVE MEASURES OR DAMAGE TO THE AIRSTAIR MAY RESULT.

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Airplanes With Forward Airstairs

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FORWARD AIRSTAIR MOTOR – REMOVAL/INSTALLATION

1. General

- A. The normal system motor (115 volts ac) and standby system motor (28 volts dc) are removed and installed in the same manner therefore the following instructions are applicable to both motors.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:

- YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 INUTES
- THE WIND IS MORE THAN 40 KNOTS
- THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS
- THE FORWARD ENTRY DOOR IS OPENED FULLY
- THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.

IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

2. Equipment and Materials

- A. No. 1 rigging pin - 0.4980 +0.0005/-0.001 inch diameter by 4.00 inches long
- B. No. 2 rigging pin - 0.2480 +0.0005/-0.001 inch diameter by 2.50 inches long

**NOTE:** Rigging pins are part of F70207-61.

3. Prepare for Removal

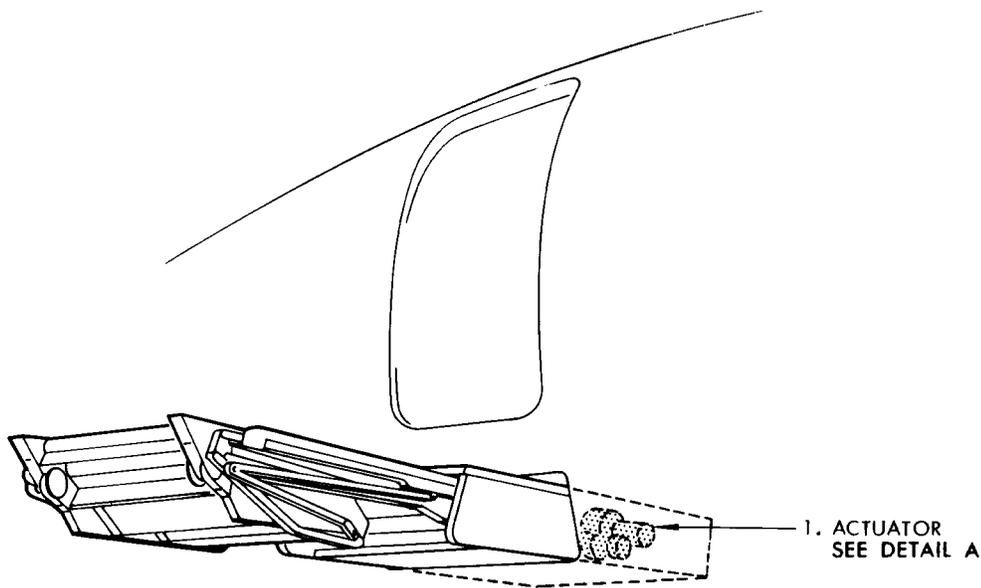
- A. Remove Drain Pan (if installed)
- (1) Extend airstair to provide clearance for removing drip pan attachment fasteners (Fig. 402).

**NOTE:** Temporary access can be attained by partially retracting airstair.

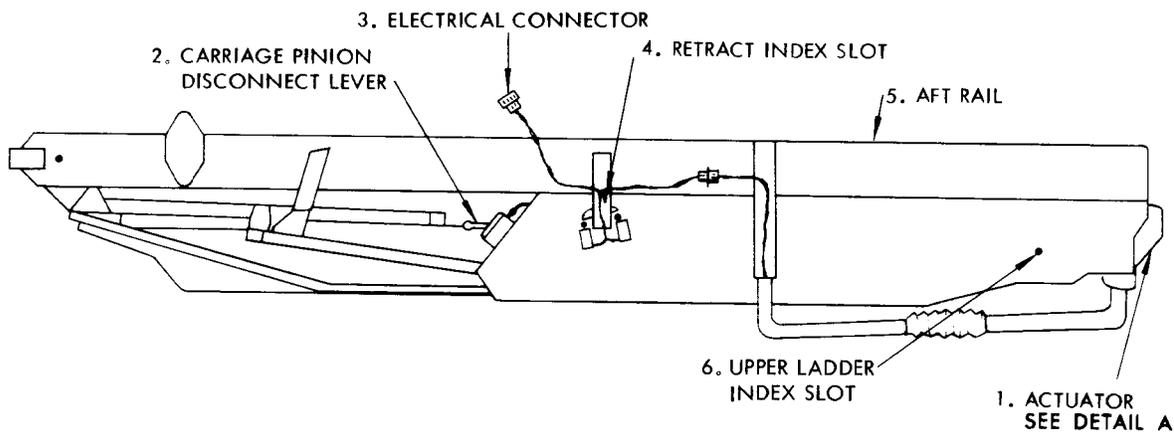
- (2) Gain access to drip pan through electronic compartment access door.
- (3) Remove hose clamp and drain hose from access hatch in drip pan. Remove access hatch.
- (4) Obtain access to drip pan attachment fasteners through access hatch. Remove fasteners.

**CAUTION:** DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

- (5) Retract airstair and release control before airstair door begins to close. Remove drip pan through airstair - airstair door opening on side of fuselage.



  
**FWD**



**REAR VIEW**  
**AIRSTAIR SHOWN IN FULLY**  
**RETRACTED POSITION**

**Forward Airstair Motor Installation**  
**Figure 401 (Sheet 1)**

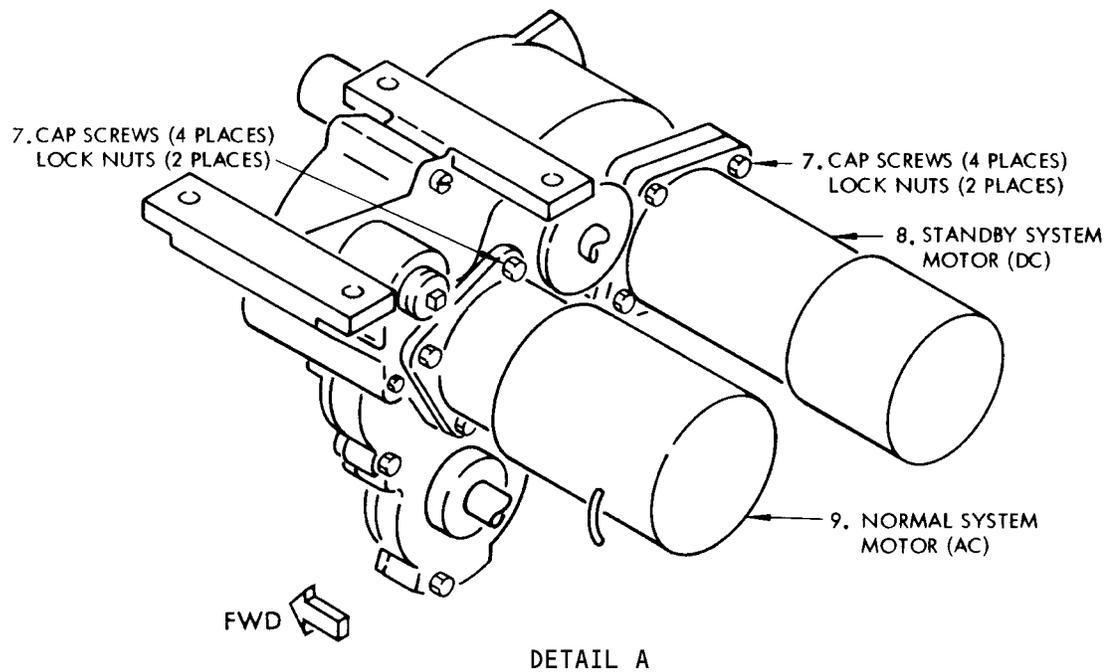
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 Airplanes With Forward  
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Forward Airstair Motor Installation  
 Figure 401 (Sheet 2)

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 Airplanes With Forward  
 Airstairs

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## MAINTENANCE MANUAL

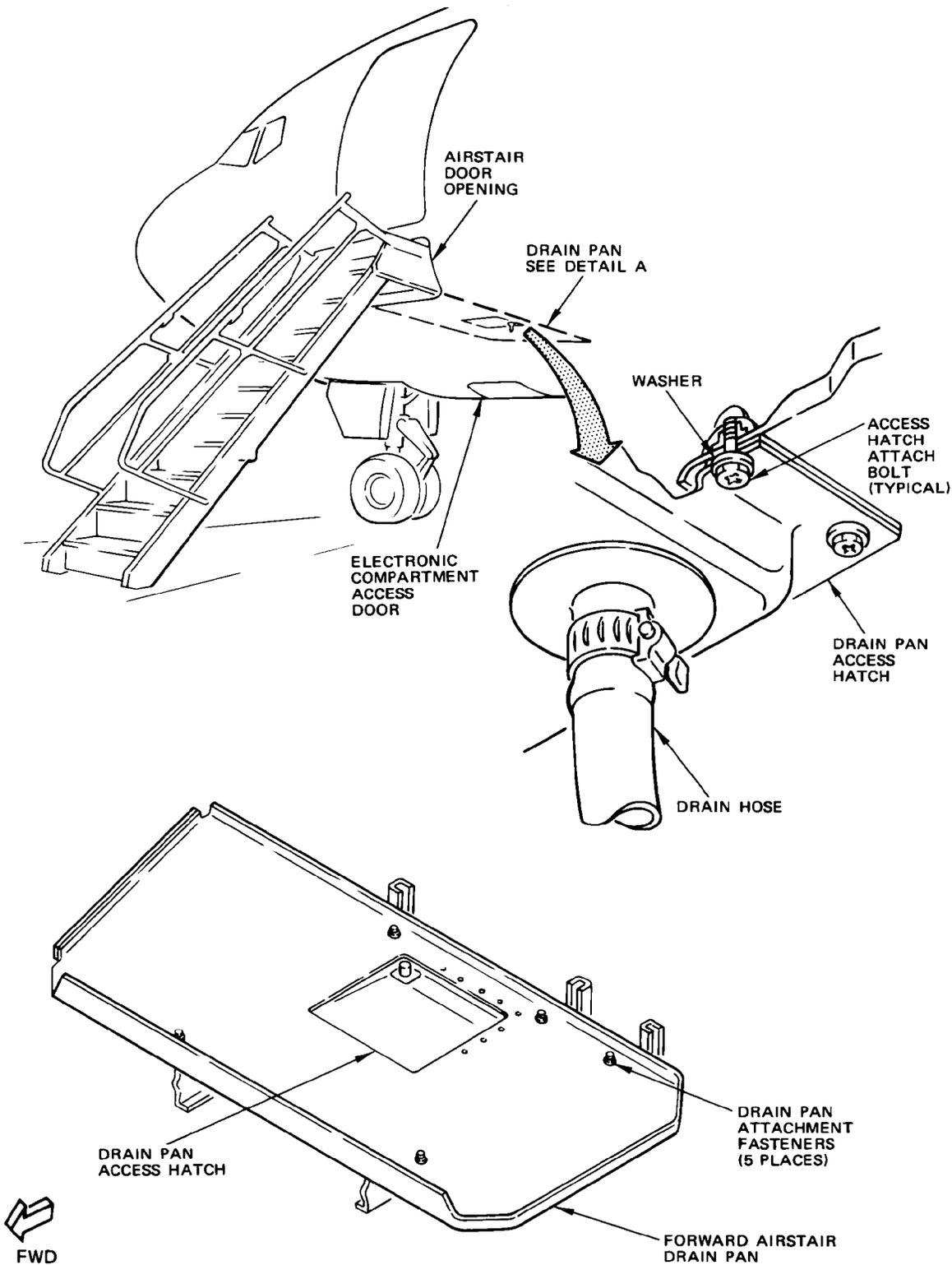
- B. Open airstair circuit breakers on panel P6. Disconnect airstair electrical connector (3) (Fig. 401).
  - C. Disengage carriage drive pinions by moving carriage pinion disconnect lever (2) to unlocked position.
  - D. Manually move carriage outboard until airstair actuator (1) is positioned above electronic compartment access door.
  - E. Engage carriage drive pinions by moving carriage pinion disconnect lever to locked position.
4. Remove Forward Airstair Motor
- A. Disconnect electrical connector of motor (8 or 9) being removed.
  - B. Remove four socket head cap screws (7) and two locknuts attaching motor to actuator and remove motor.
5. Install Forward Airstair Motor
- A. Position motor (8 or 9) on aft side of actuator and secure the motor with four socket head cap screws (7) and two locknuts.
  - B. Install safety wire on the two cap screws that are not secured with locknuts.
  - C. Connect electrical connector of motor to receptacle.
6. Restore Airplane to Normal
- A. Disengage carriage drive pinions by moving carriage pinion disconnect lever (2) to unlocked position.
  - B. Manually move carriage inboard to fully retracted position and insert No. 2 rig pin through retract index slot (4) and into retract index hole in aft carriage beam.
  - C. Using No. 1 rig pin check that it can be inserted through upper ladder index slot (6). Remove No. 1 rig pin.
  - D. Engage carriage drive pinions by moving carriage pinion disconnect lever to locked position and install safety wire on lever.
  - E. Remove No. 2 rig pin and connect electrical connector (3) to receptacle.
  - F. If required, install drain pan through airstair door opening inside of fuselage (Fig. 402).
  - G. Close forward airstair system circuit breakers on circuit breaker panel P6.
  - H. Extend airstair and install drain pan attachment fasteners if removed. Install drain pan access hatch and connect drain hose.

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DETAIL A

Forward Airstair Drain Pan Access  
 Figure 402

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 Airstairs

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FORWARD AIRSTAIR CARRIAGE STEP ACTUATING MECHANISM – ADJUSTMENT/TEST

1. Forward Airstair Carriage Step Actuating Mechanism Adjustment

A. Equipment and Materials

- (1) Rigging pin – 0.2480 +0.0005/-0.0010 inch diameter by 2.50 inches long

NOTE: Rigging pin is part of F70207-61.

B. Prepare for Adjustment

- (1) Remove Drain Pan (if installed)  
(a) Extend airstair to provide clearance for removing drain pan attachment fasteners (Fig. 502).

WARNING: DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
– YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
– THE WIND IS MORE THAN 40 KNOTS  
– THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
– THE FORWARD ENTRY DOOR IS OPENED FULLY  
– THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

NOTE: Temporary access can be attained by partially retracting airstair.

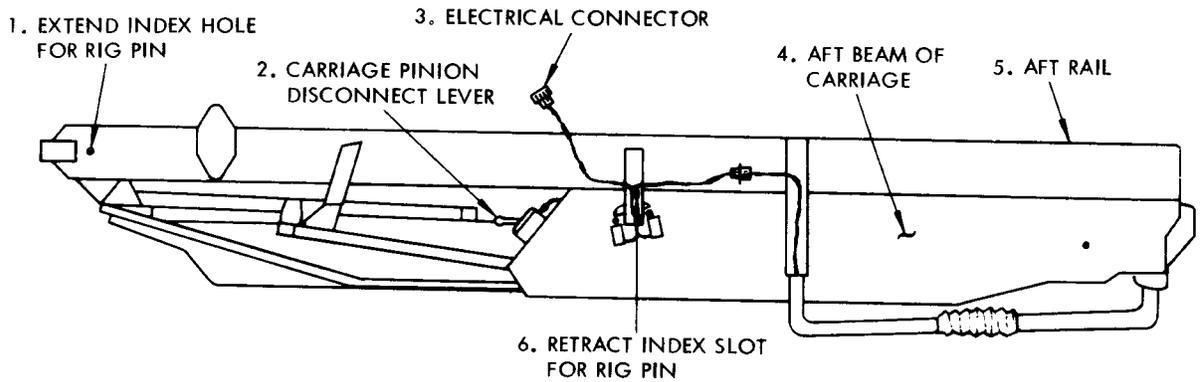
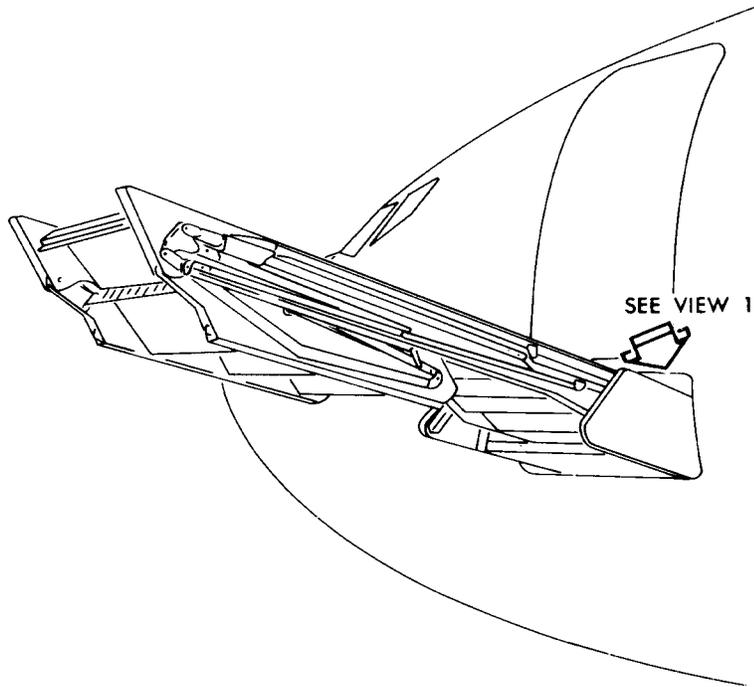
- (b) Gain access to drain pan through electronic compartment access door.  
(c) Remove hose clamp and drain hose from access hatch in drip pan. Remove access hatch.  
(d) Obtain access to drip pan attachment fasteners through access hatch. Remove fasteners.

CAUTION: DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

- (e) Retract airstair and release control before airstair door begins to close. Remove drip pan through airstair – airstair door opening on side of fuselage.  
(2) Open airstair circuit breakers on panel P6. Disconnect airstair electrical connector (3) (Fig. 501).

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REAR VIEW  
 AIRSTAIR SHOWN IN  
 RETRACTED POSITION

Forward Airstair Carriage Step Actuating Mechanism Adjustment  
 Figure 501 (Sheet 1)

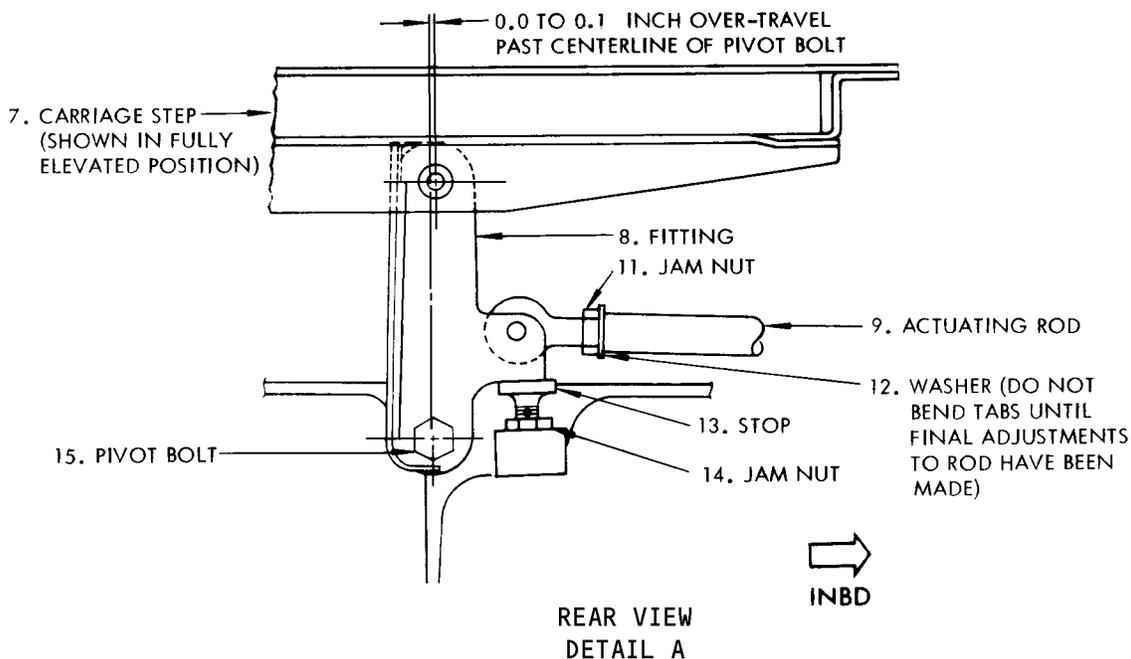
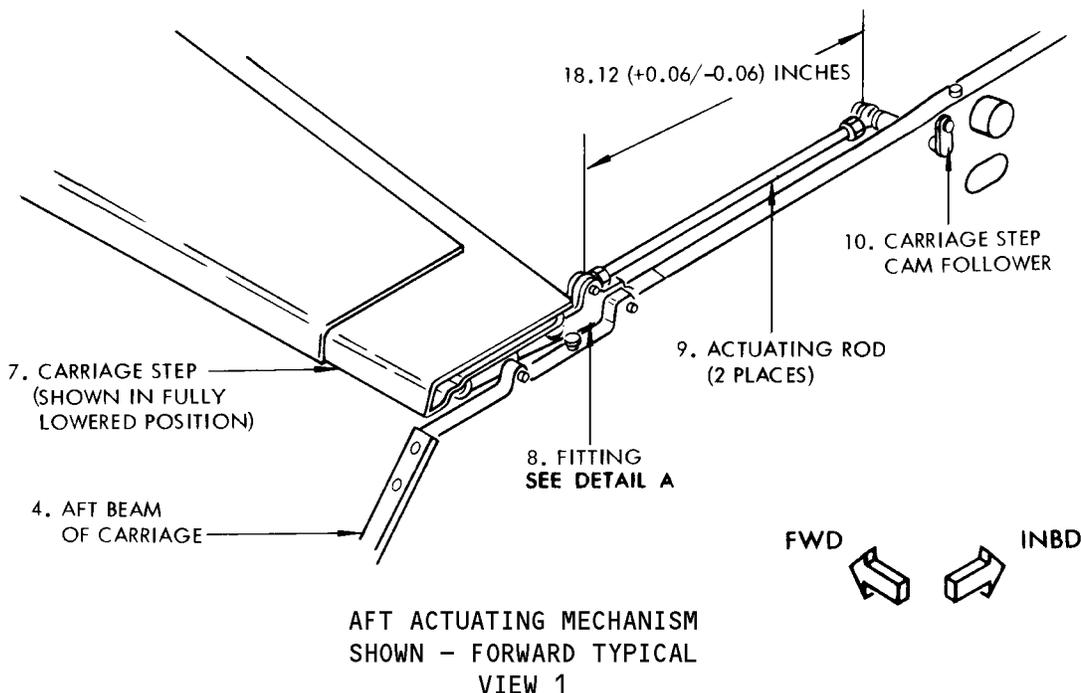
EFFECTIVITY  
 Airplanes With Forward  
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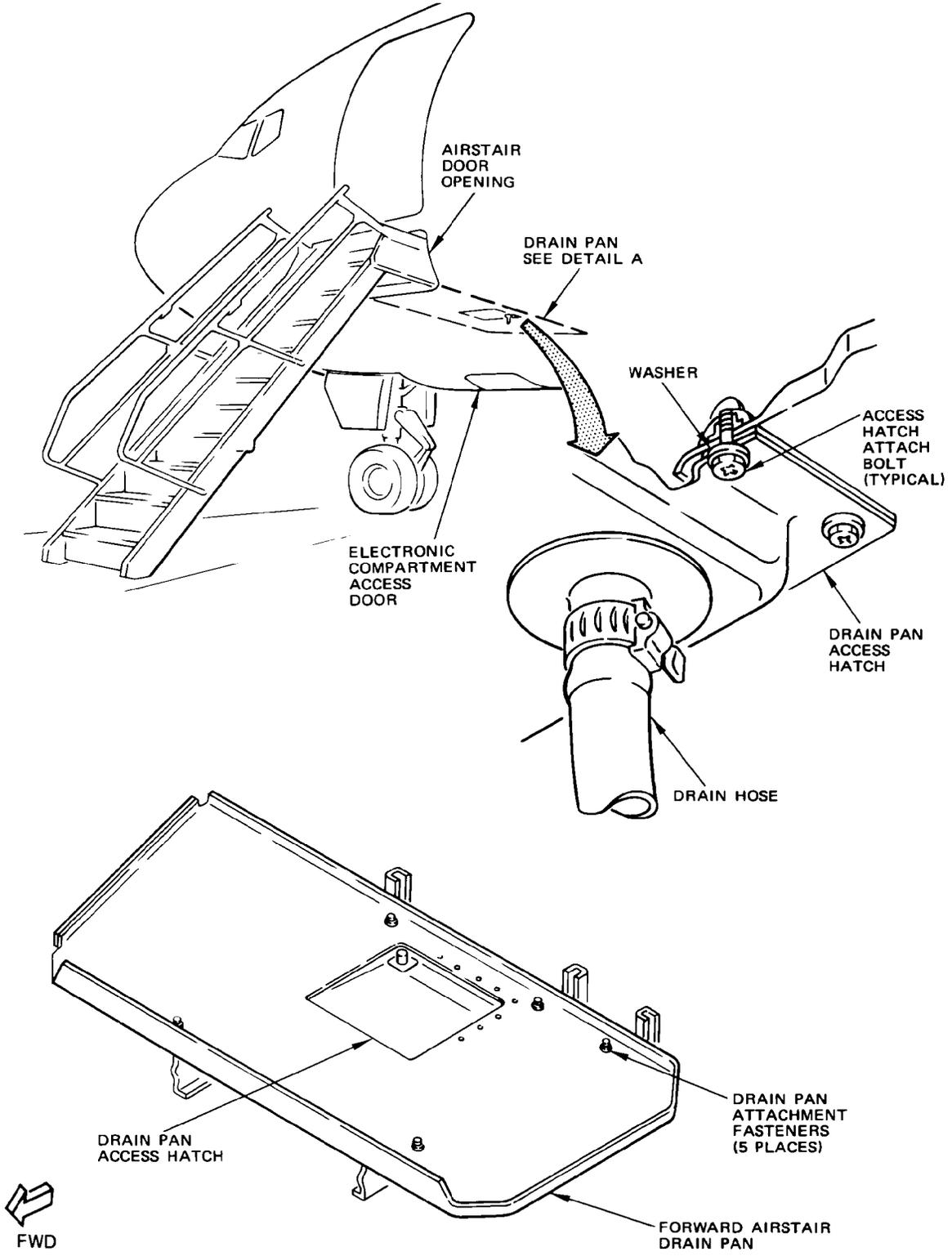
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Forward Airstair Carriage Step Actuating Mechanism Adjustment  
 Figure 501 (Sheet 2)

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 Airplanes With Forward  
 Airstairs

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DETAIL A

Forward Airstair Drain Pan Removal  
 Figure 502

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## MAINTENANCE MANUAL

- (3) Disengage carriage drive pinions by moving carriage pinion disconnect lever (2) to unlocked position.
  - (4) Manually move carriage outboard to fully extended position against stop.
  - (5) Loosen jamnuts (14) securing forward and aft stops (13) and screw both stops down several turns to clear fittings (8).
- C. Adjust Carriage Step Actuating Mechanism
- (1) Adjust forward and aft rods (9) to a length allowing 0.0 to 0.1-inch inboard overtravel of fittings (8). Tighten jamnuts (11) and lock in place by bending tabs of washer (12) over flats of nut.

**NOTE:** Nominal length of actuating rod should be  $18.12 \pm 0.06$  inches between centers of bolt holes in rod ends.

- (2) Adjust forward and aft stops (13) so that upper surface of stops contact lower surface of fittings (8) and secure with jamnuts (14).
  - (3) Test actuating mechanism in accordance with par. 2.C.
- D. Restore Airplane to Normal
- (1) Manually move carriage to retracted position and insert rig pin through retract index slot (6) and into retract index hole in aft beam of carriage.
  - (2) Engage carriage drive pinions by moving carriage pinion disconnect lever (2) to locked position and install safety wire on lever.
  - (3) Remove rig pin and connect airstair electrical connector (3) to receptacle.
  - (4) Close forward airstair system circuit breakers on circuit breaker panel P6 and close forward airstair door.

### 2. Forward Airstair Carriage Step Actuating Mechanism Test

- A. Equipment and Materials
- (1) Rig pin - 0.2480 (+ 0.0005/-0.0010) inch diameter by 2.50 inches long
- B. Prepare for test
- (1) If installed, remove drain pan per par. 1.B.(1).
  - (2) Open airstair circuit breakers on panel P6. Disconnect airstair electrical connector (2). (Fig. 501)
  - (3) Disengage carriage drive pinions by moving carriage pinion disconnect lever (2) to unlocked position.
- C. Test Carriage Step Actuating Mechanism
- (1) With carriage in retracted position check that carriage step (7) lies flush with top of forward and aft carriage beams.
  - (2) Manually move carriage outboard to the fully extended position. Insert rig pin through index hole (1) and into index slot in carriage beam.

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Airplanes With Forward  
Airstairs

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## MAINTENANCE MANUAL

- (3) Check that carriage step is fully elevated by observing that forward and aft fittings (8) are perpendicular to carriage beams within the tolerance shown and that forward and aft stops (13) are contacting lower surface of fittings (8).
  - (4) Remove rig pin and manually move carriage inboard until actuating mechanism has lowered carriage step.
  - (5) Check that carriage step lies flush with top of forward and aft carriage beams.
- D. Restore Airplane to Normal
- (1) Manually move carriage to retracted position and insert rig pin through retract index slot (6) and into retract index hole in aft beam of carriage.
  - (2) Engage carriage drive pinions by moving carriage pinion disconnect lever (2) to locked position and install safety wire on lever.
  - (3) Remove rig pin and connect airstair electrical connector (3) to receptacle.
  - (4) If required, install drain pan through airstair door opening inside of fuselage. (Fig. 502)
  - (5) Close forward airstair system circuit breakers on circuit breaker panel P6.
  - (6) Extend airstairs and install drain pan attachment fasteners. Install drain pan access hatch and connect drain hose.

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Airplanes With Forward  
Airstairs

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FORWARD AIRSTAIR RETRACT LIMIT SWITCHES – REMOVAL/INSTALLATION

1. General

A. The normal system retract limit switch (S5) and standby system retract limit switch (S6) are identical switches which are removed and installed in the same manner. Therefore, the following procedure is applicable to both switches.

2. Remove Forward Airstair Retract Limit Switches

- A. Gain access to work area through electronic compartment access door.
- B. Open airstair circuit breakers on panel P6 and disconnect airstair electrical connector (See Detail A, Fig. 401).

**CAUTION:** DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM FOR HANDHOLD OR IT MAY BE DAMAGED.

- C. Disconnect electrical wiring from retract limit switch.
- D. Remove retract limit switch from mounting bracket.

3. Install Forward Airstair Retract Limit Switches

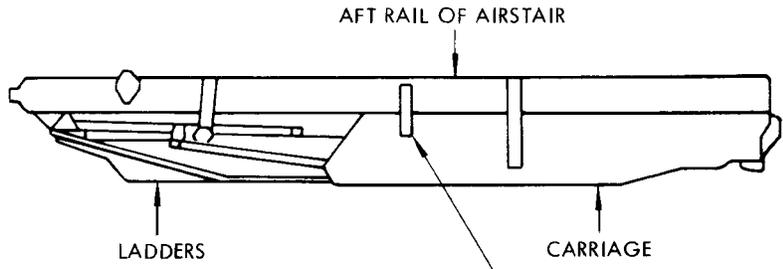
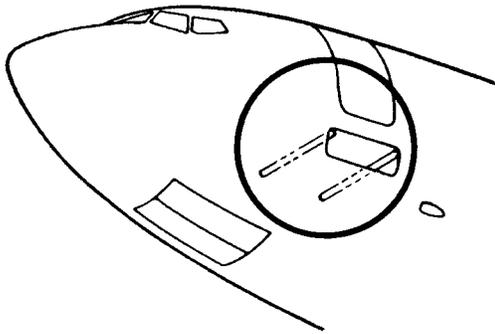
- A. Position retract limit switch on mounting bracket with switch roller up. (See Detail A, Fig. 401).
- B. Adjust locknuts so that switch is lowered away from switch actuating ramp as far as threads permit.
- C. Adjust retract limit switch. Refer to 52-61-141, Forward Airstair Retract Limit Switches – Adjustment/Test.

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Airplanes With Forward  
Airstairs

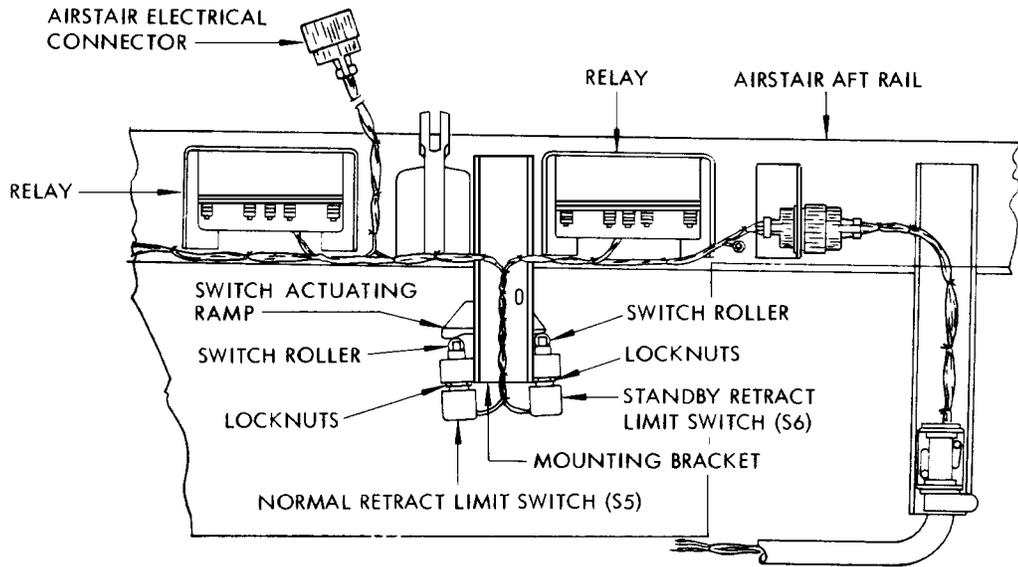
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REAR VIEW -  
 AIRSTAIR SHOWN IN  
 RETRACTED POSITION  
 RETRACT LIMIT SWITCHES  
 SEE DETAIL A



DETAIL A

Forward Airstair Retract Limit Switches Installation  
 Figure 401

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 Airplanes With Forward  
 Airstairs

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FORWARD AIRSTAIR RETRACT LIMIT SWITCHES – ADJUSTMENT/TEST

1. Forward Airstair Retract Limit Switches Adjustment

A. General

- (1) The normal system retract limit switch (S5) and standby system retract limit switch (S6) are identical switches and are adjusted to their proper operating limits in a similar manner. Therefore, the following procedure is applicable to both switches with exceptions noted.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
– YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
– THE WIND IS MORE THAN 40 KNOTS  
– THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
– THE FORWARD ENTRY DOOR IS OPENED FULLY  
– THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

B. Equipment and Materials

- (1) Rig Pin, 0.2480 (+0.0005/-0.0010) inch diameter by 2.50 inches long
- (2) Voltohmmeter, Simpson, Model 260

C. Adjust Forward Airstair Retract Limit Switches

- (1) Open airstair door fully leaving airstair fully retracted.
- (2) Gain access to work area through electronic compartment access door.
- (3) Open airstair circuit breakers on circuit breaker panel P6 and disconnect airstair electrical connector (Detail A, Fig. 501).

**CAUTION:** DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

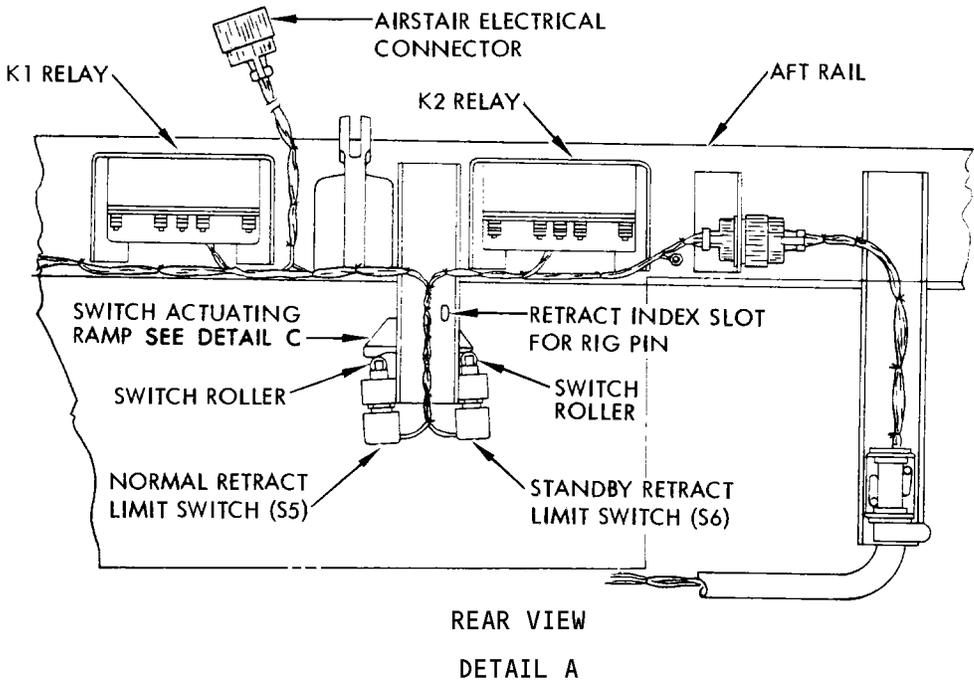
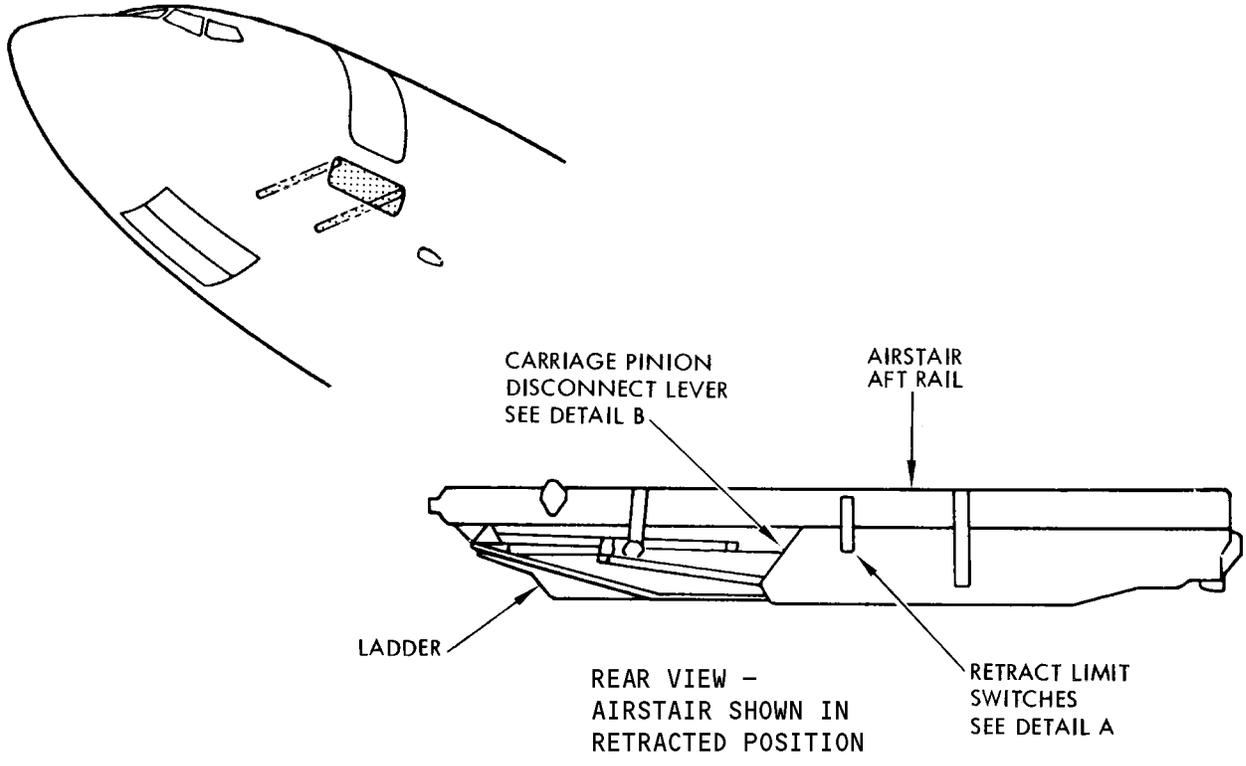
- (4) With airstair retracted, insert rig pin through index slot in aft rail and into index hole in carriage beam.
- (5) Disengage carriage drive pinions by moving carriage pinion disconnect lever to unlocked position.

**NOTE:** Step (6) is applicable to adjustment of normal system retract limit switch (S5) only. Step (7) is applicable to adjustment of standby system retract limit switch (S6) only.

- (6) Connect voltohmmeter across terminal X1 on relay K1 and pin 10 of airstair electrical connector for normal system retract limit switch (S5).

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Airplanes With Forward  
Airstairs

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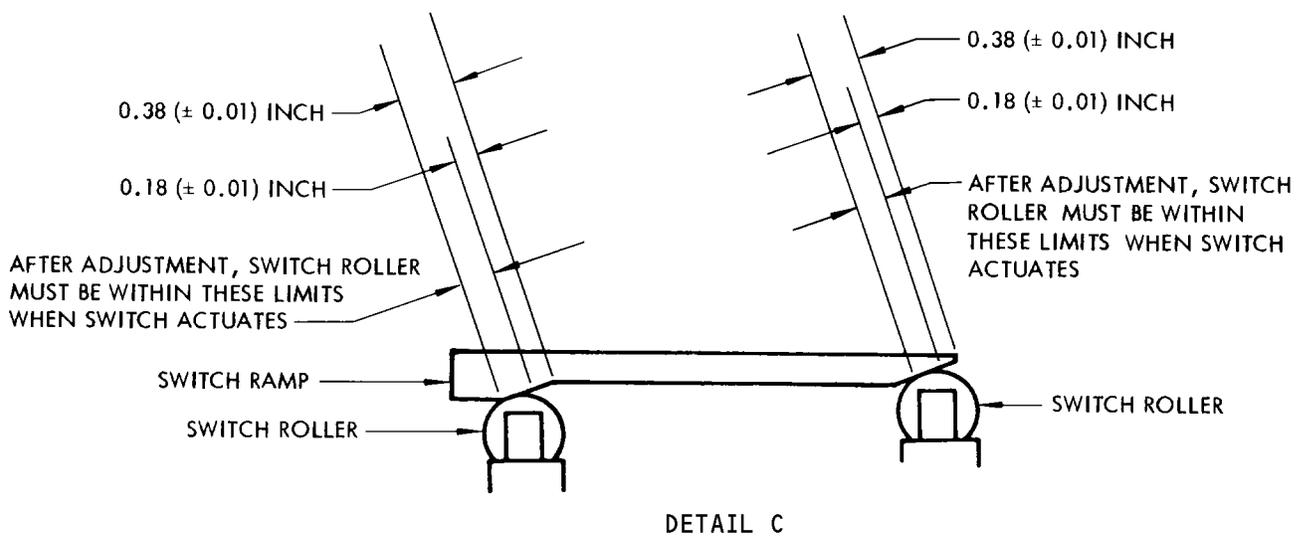
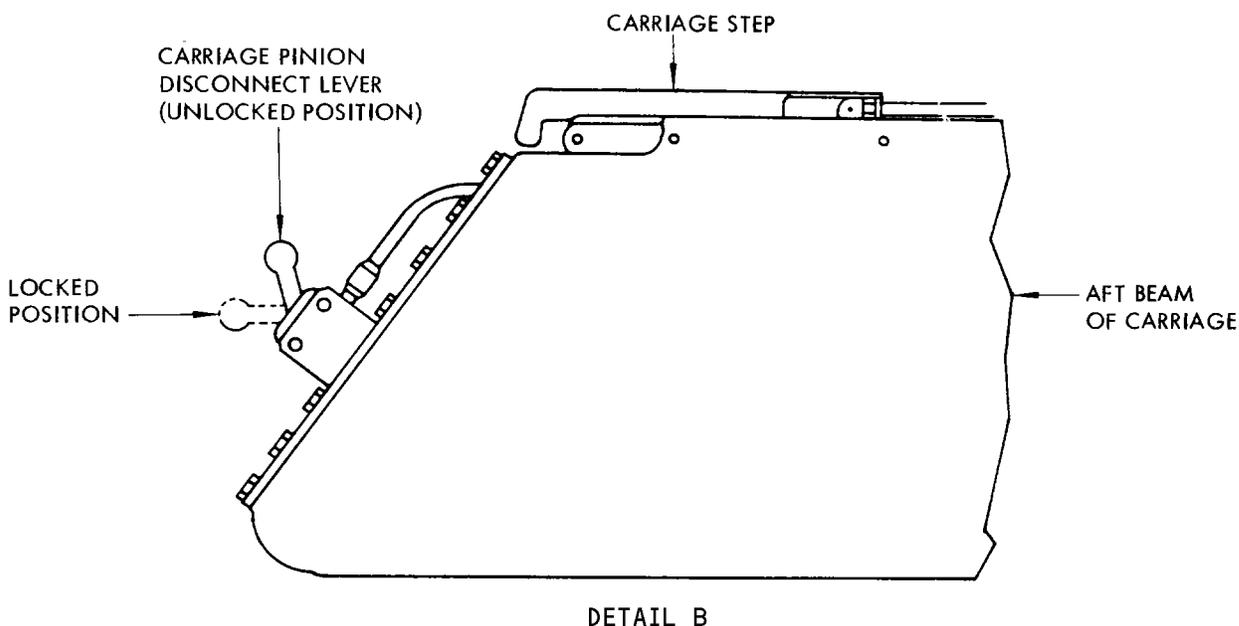


REAR VIEW  
 DETAIL A  
 Forward Airstair Retract Limit Switches Adjustment  
 Figure 501 (Sheet 1)

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 Airplanes With Forward  
 Airstairs

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Forward Airstair Retract Limit Switches Adjustment  
 Figure 501 (Sheet 2)

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 Airstairs

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## MAINTENANCE MANUAL

- (7) Connect voltohmmeter across terminal X1 on relay K2 and pin 15 of airstair electrical connector for standby system retract limit switch (S6).
- (8) Adjust locknuts on limit switch until volt-ohmmeter indicates zero ohms.
- (9) Remove rig pin and manually move carriage outboard then slowly inboard; index holes should be aligned when switches actuate. Check by inserting rig pin.
- (10) After adjustment/check that switch actuates when switch roller is positioned on switch actuating ramp within limits shown (Detail C).
- (11) Remove rig pin, manually move carriage outboard and inboard several times to assure that switch maintains adjustment.
- (12) Install safety wire on switch and remove volt-ohmmeter.
- (13) Manually move carriage to retracted position and insert rig pin.
- (14) Engage carriage drive pinions by moving carriage pinion disconnect lever to locked position and install safety wire on lever (Detail B).
- (15) Remove rig pin and connect airstair electrical connector (Detail A).

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Airplanes With Forward  
Airstairs

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FORWARD AIRSTAIR EXTEND LIMIT SWITCHES – REMOVAL/INSTALLATION

1. General

- A. The normal system extend limit switch (S3) and standby system extend limit switch (S4) are not identical switches; however, they are removed and installed in the same manner. Therefore, the following procedure is applicable to both switches.

2. Remove Forward Airstair Extend Limit Switches

- A. Gain access to work area through electronic compartment access door.
- B. Open airstair circuit breakers on panel P6 and disconnect airstair electrical connector (Fig. 401).

**CAUTION:** DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

- C. Disconnect electrical wiring from extend limit switch. (See Detail A.)
- D. Remove extend limit switch from mounting bracket.

3. Install Forward Airstair Extend Limit Switches

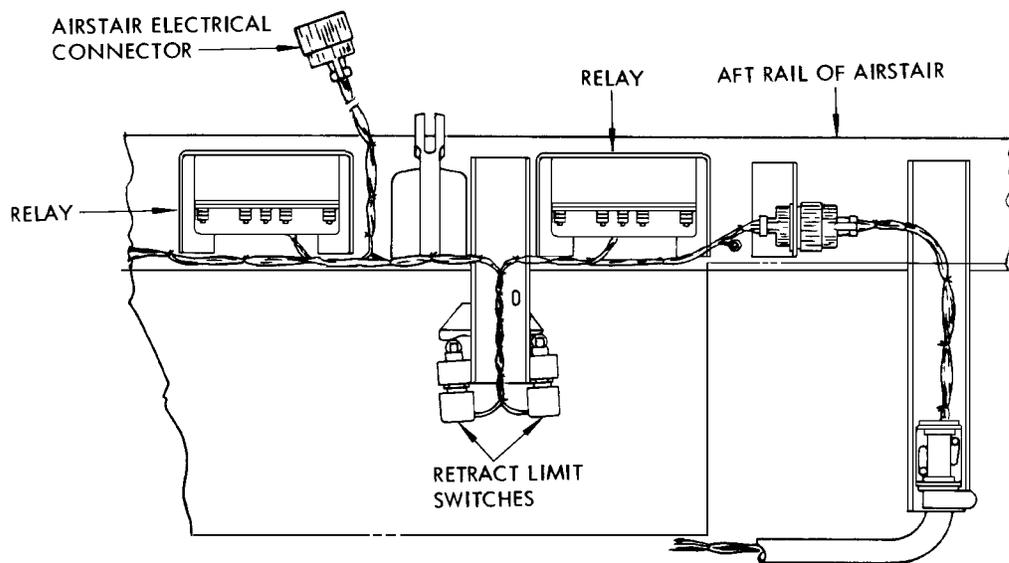
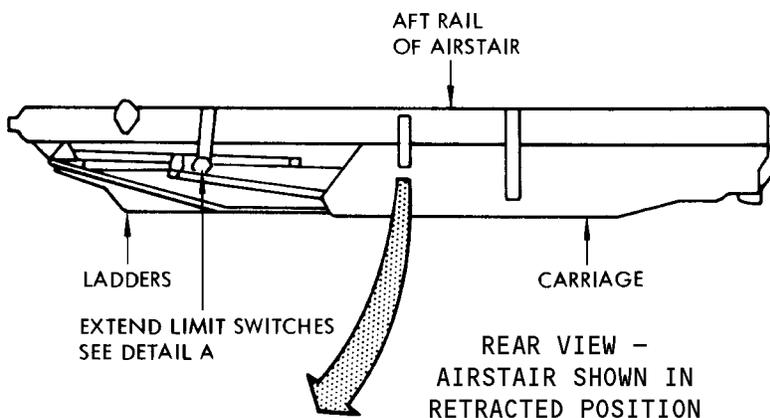
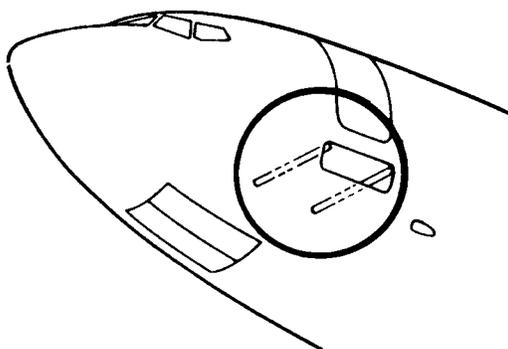
- A. Position extend limit switch on mounting bracket with switch roller down. (See Detail A, Fig. 401).
- B. Adjust locknuts so that switch roller is raised away from switch actuating ramp as far as threads permit.
- C. Adjust extend limit switch. Refer to 52-61-151, Forward Airstair Extend Limit Switches – Adjustment/Test.

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Airplanes With Forward  
Airstairs

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Forward Airstair Extend Limit Switches Installation  
 Figure 401 (Sheet 1)

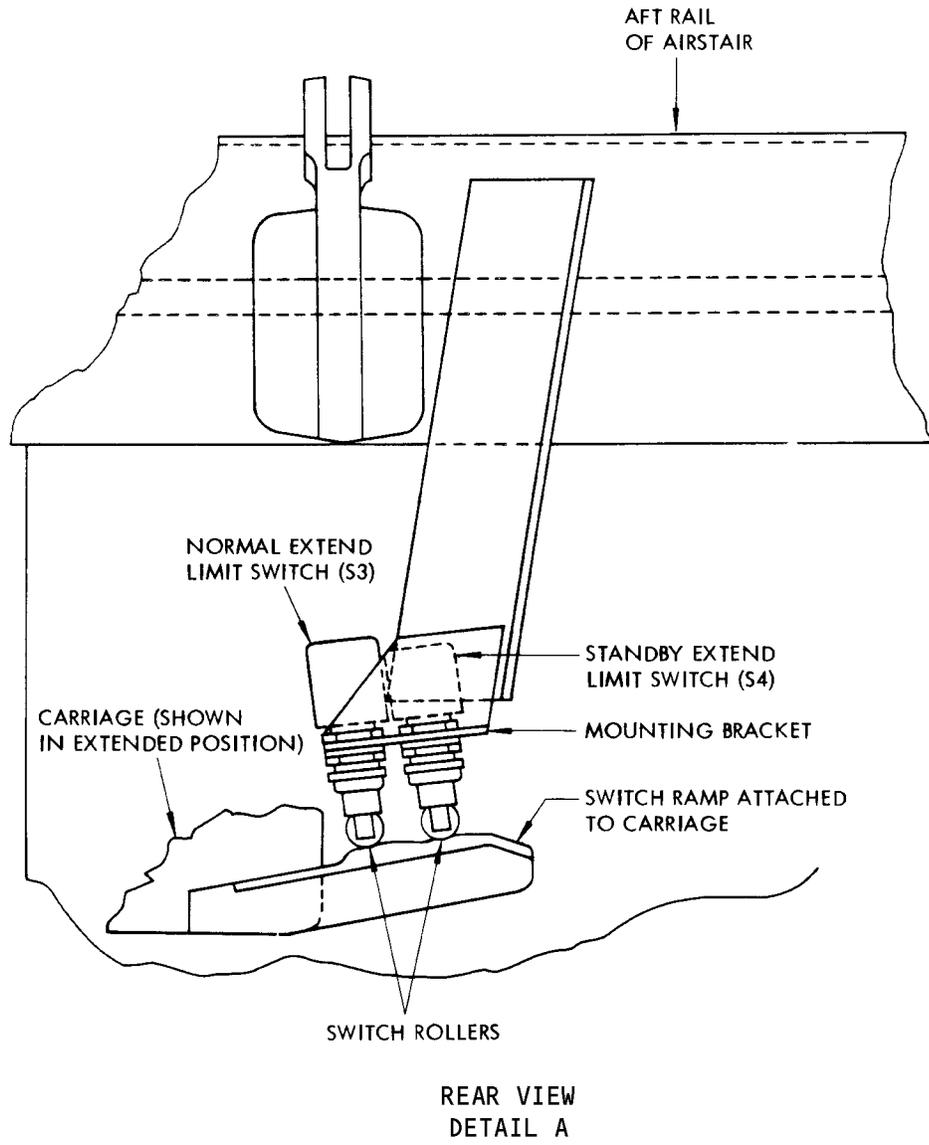
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Forward Airstair Extend Limit Switches Installation  
 Figure 401 (Sheet 2)

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 Airplanes With Forward  
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FORWARD AIRSTAIR EXTEND LIMIT SWITCHES – ADJUSTMENT/TEST

1. Forward Airstair Extend Limit Switches Adjustment

A. General

- (1) The normal system extend limit switch (S3) and standby extend limit switch (S4) are not identical switches, but they are adjusted to their proper operating limits in a similar manner. Therefore, the following procedure is applicable to both switches with exceptions noted.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
– YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
– THE WIND IS MORE THAN 40 KNOTS  
– THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
– THE FORWARD ENTRY DOOR IS OPENED FULLY  
– THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

B. Equipment and Materials

- (1) Rig Pin, 0.2480 (+0.0005/-0.0010) inch diameter by 2.50 inches long
- (2) Volt-Ohmmeter, Simpson, Model 260

C. Adjust Forward Airstair External Limit Switches

- (1) Open airstair door fully leaving airstair fully retracted.
- (2) Gain access to work area through electronic compartment access door.
- (3) Open airstair circuit breakers on panel P6 and disconnect airstair electrical connector (Fig. 502).

**CAUTION:** DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

- (4) Disengage carriage drive pinions by moving carriage pinion disconnect lever to unlocked position (Detail B).

**NOTE:** Removal of carriage step control actuator from left end of forward and aft rails (View 1) may be accomplished to facilitate smooth and even manual movement of carriage during adjustment of airstair extend limit switches.



## MAINTENANCE MANUAL

- (5) Manually move carriage to extended position and insert rig pin through index hole in aft rail and into index slot in carriage beam.

**NOTE:** Step (6) is applicable to adjustment of normal system extend limit switch (S3) only. Step (7) is applicable to adjustment of standby system extend limit switch (S4) only.

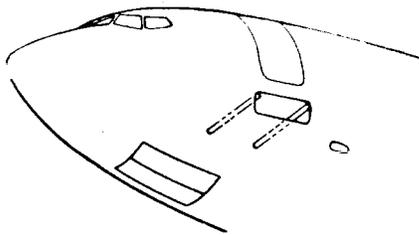
- (6) Connect volt-ohmmeter across terminal Y1 on relay K1 and pin 5 of airstair electrical connector for normal system extend limit switch (S3).
- (7) Connect volt-ohmmeter across terminal Y1 on relay K2 and pin 17 of airstair electrical connector for standby system extend limit switch (S4).
- (8) Adjust locknuts on limit switch until volt-ohmmeter indicates zero ohms.
- (9) Remove rig pin and manually move carriage inboard then slowly outboard; index holes should be aligned when switch actuates. Check by inserting rig pin.
- (10) After adjustment, check that switch actuates when switch roller is positioned on switch actuating ramp within limits shown on Detail D.
- (11) Remove rig pin and manually move carriage inboard and outboard several times to assure that switch maintains adjustment.
- (12) Install safety wire on switch and remove volt-ohmmeter.
- (13) Install carriage step control actuator (view 1) on left end of forward and aft rail, if removed earlier, and check that carriage step elevates when carriage is moved to extended position.
- (14) Manually move carriage to retracted position, insert rig pin through index slot in aft rail and into index hole in carriage beam (Detail A).
- (15) Engage carriage drive pinions by moving carriage pinion disconnect lever to locked position and install safety wire on lever (Detail B).
- (16) Remove rig pin and connect airstair electrical connector.

EFFECTIVITY  
Airplanes With Forward Airstairs

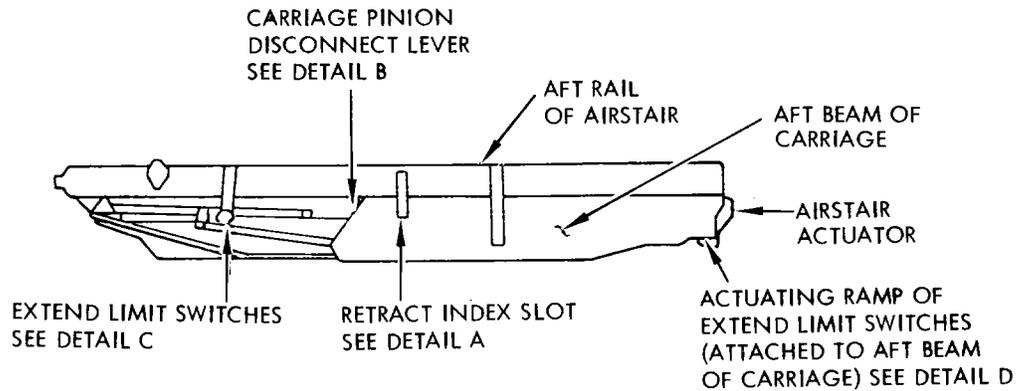
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SEE VIEW 1



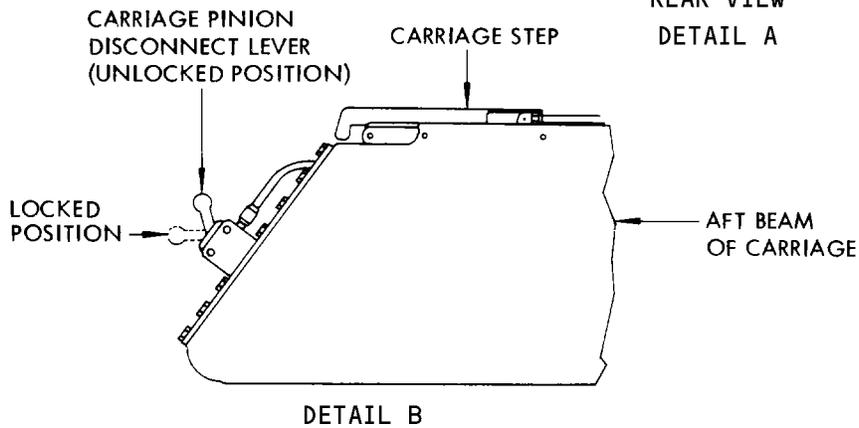
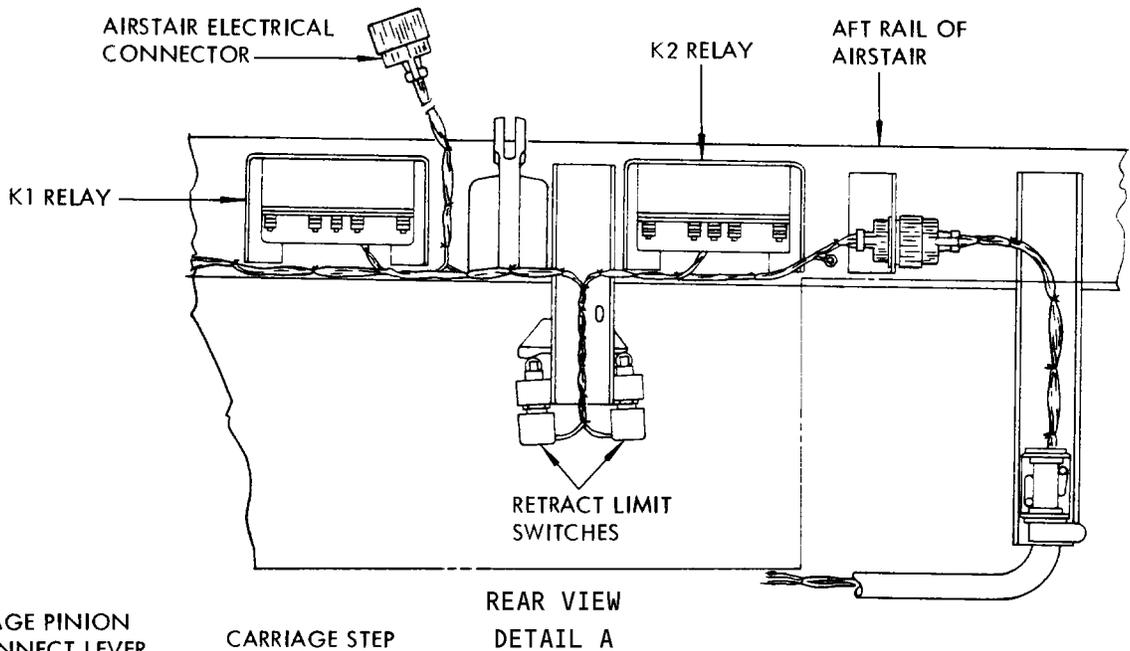
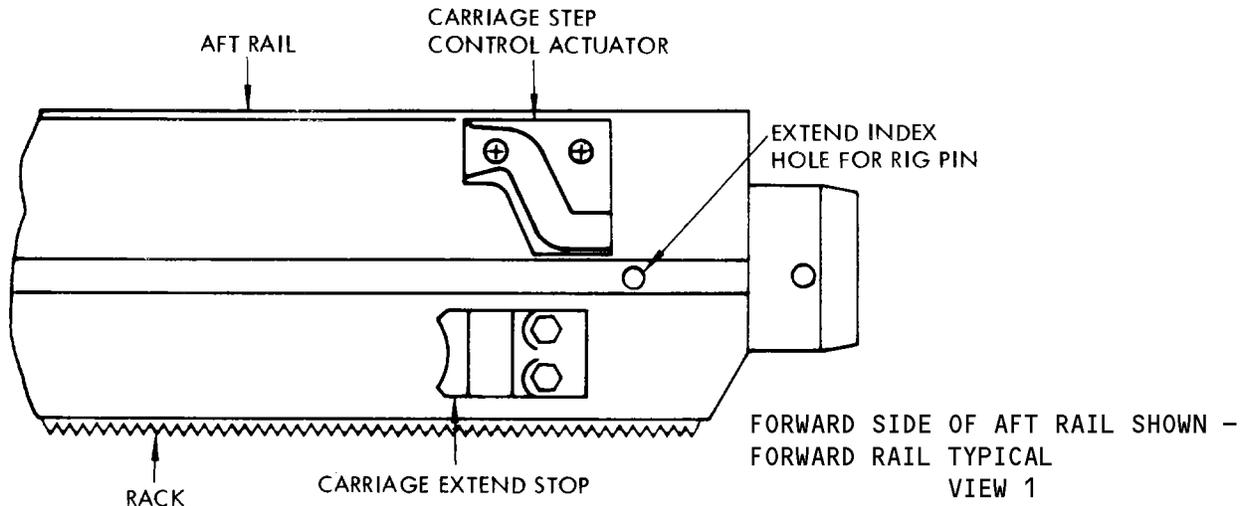
REAR VIEW - AIRSTAIRS SHOWN IN RETRACTED POSITION

Forward Airstair Retract Limit Switches Adjustment  
 Figure 501

EFFECTIVITY  
 Airplanes With Forward Airstairs

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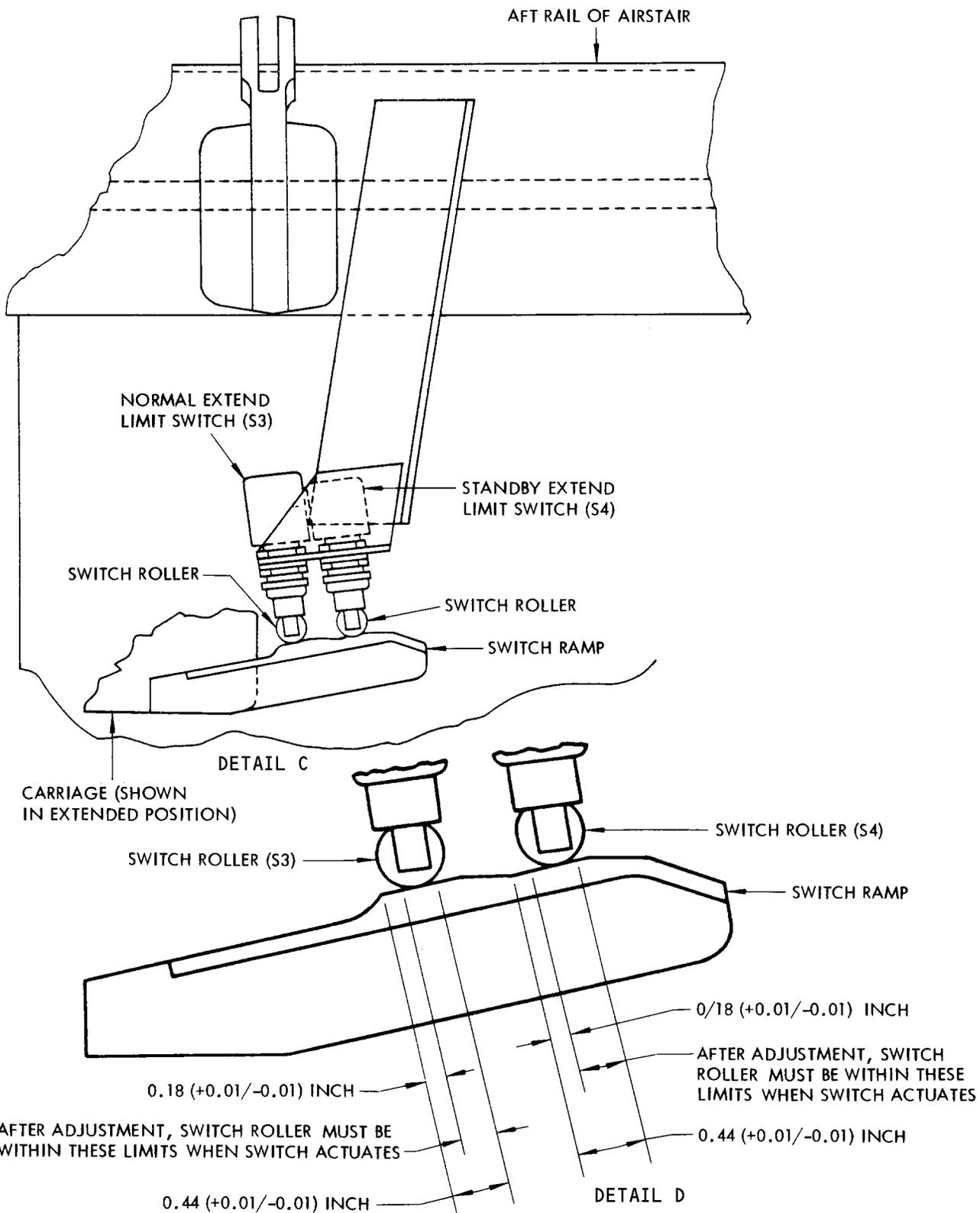
**MAINTENANCE MANUAL**



Forward Airstair Extend Limit Switches Adjustment  
Figure 502 (Sheet 1)

EFFECTIVITY  
Airplanes With Forward Airstairs

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Forward Airstair Extend Limit Switches Adjustment  
Figure 502 (Sheet 2)

EFFECTIVITY  
Airplanes With Forward Airstairs

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FORWARD AIRSTAIR LOWER LADDER OPERATING SWITCH - REMOVAL/INSTALLATION

1. Remove Forward Airstair Lower Ladder Operating Switch

A. Extend forward airstair fully.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
- YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
- THE WIND IS MORE THAN 40 KNOTS  
- THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
- THE FORWARD ENTRY DOOR IS OPENED FULLY  
- THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

B. Open the forward airstair circuit breakers on circuit breaker panel P6.

C. Disconnect electrical wiring from lower ladder operating switch (Fig. 401).

D. Remove switch mounting nuts and remove switch from angle attached to ladder truck (Detail A).

2. Install Forward Airstair Lower Ladder Operating Switch

A. Position lower ladder operating switch on mounting angle attached to ladder truck and adjust mounting nuts so that switch is positioned as far forward as threads permit (View 1).

B. Connect electrical wiring to switch.

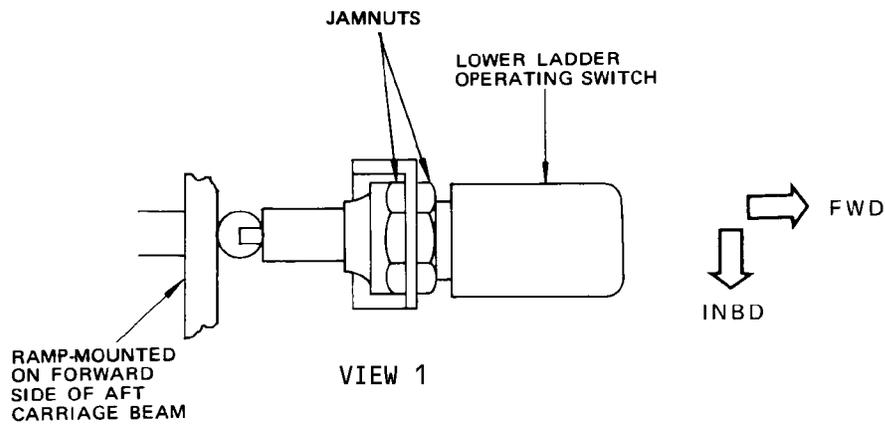
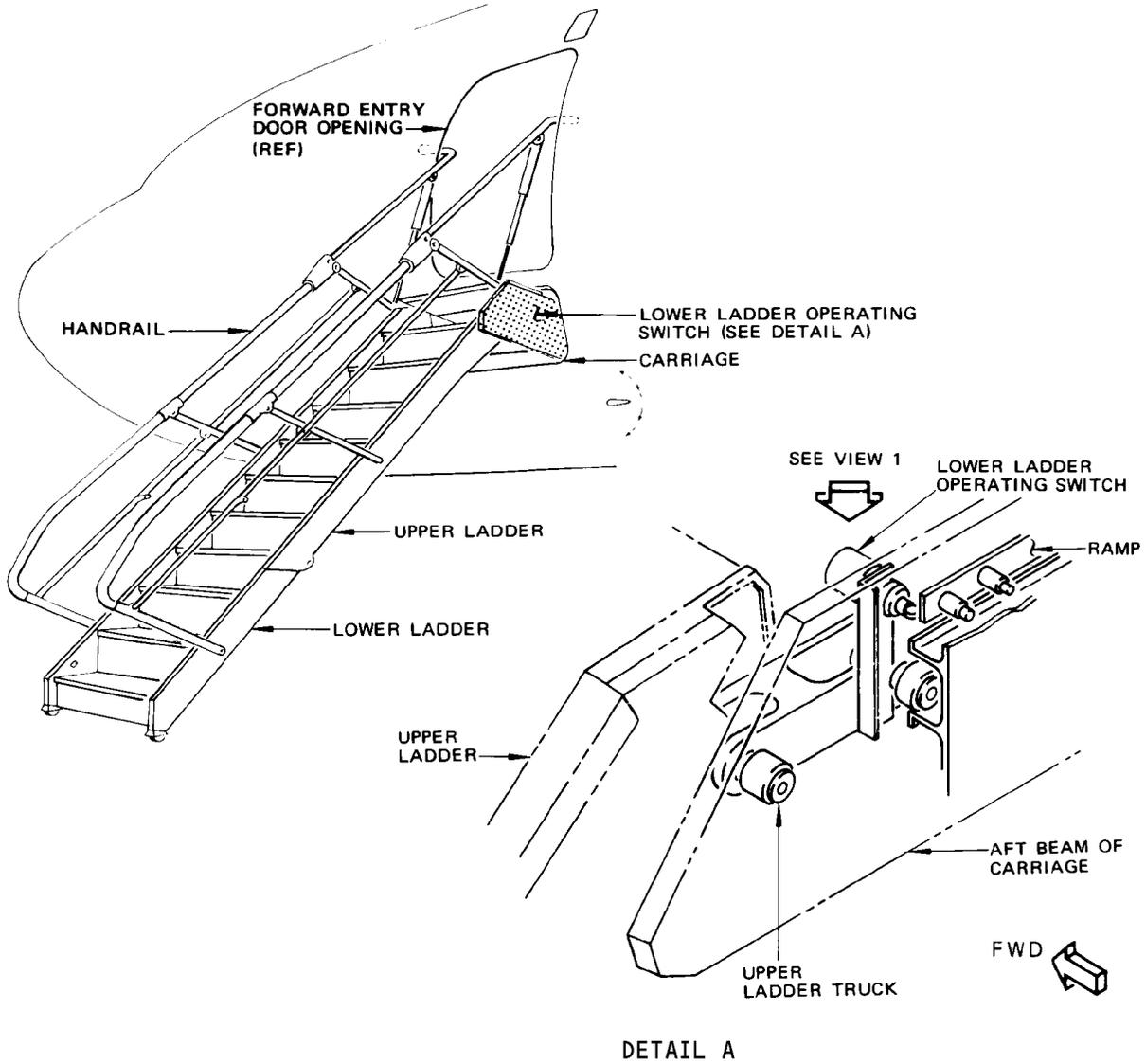
C. Adjust switch (Ref Forward Airstair Lower Ladder Operating Switch - A/T).

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Airstairs

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Forward Airstair Lower Ladder Operating Switch Installation  
 Figure 401

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 Airplanes With Forward  
 Airstairs

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FORWARD AIRSTAIR LOWER LADDER OPERATING SWITCH - ADJUSTMENT/TEST

1. Forward Airstair Lower Ladder Operating Switch Adjustment

- A. Equipment and Materials
  - (1) Voltohmmeter, Simpson, Model 260
- B. Adjust Forward Airstair Lower Ladder Operating Switch
  - (1) Fully extend forward airstair.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
- YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
- THE WIND IS MORE THAN 40 KNOTS  
- THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
- THE FORWARD ENTRY DOOR IS OPENED FULLY  
- THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

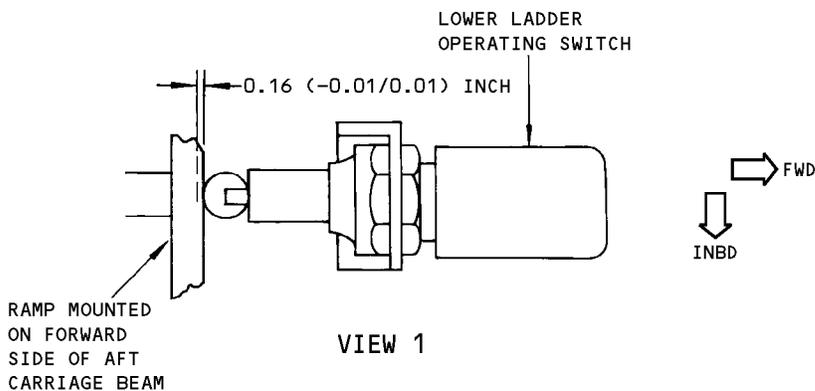
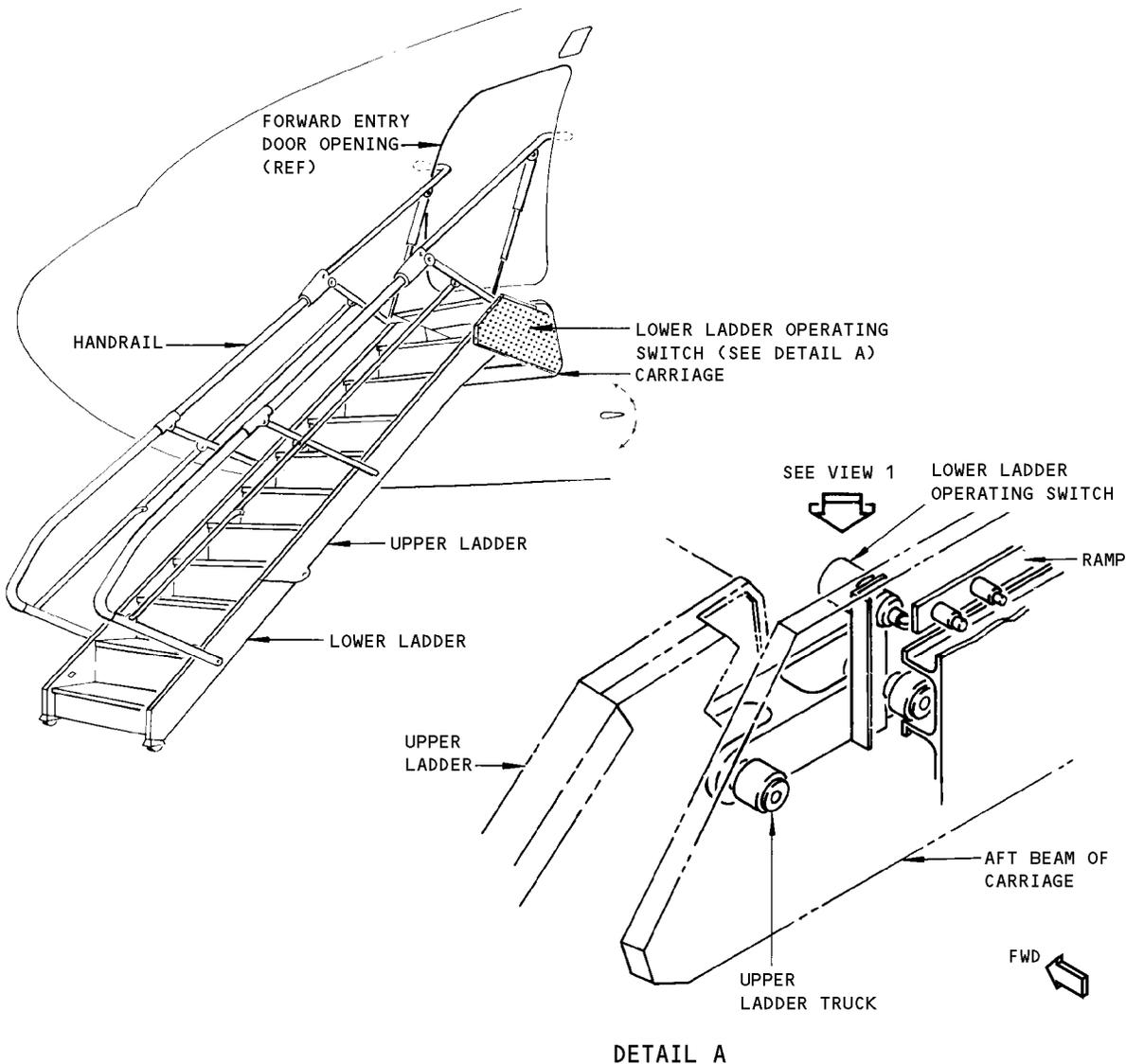
- (2) Open the following circuit breakers on circuit breaker panel P6:
  - (a) Forward Airstair Control
  - (b) Forward Airstair Standby Control
- (3) Loosen jamnuts holding switch to mounting bracket and move switch roller until it just contacts ramp (Fig. 501).
- (4) Connect ohmmeter between pins 1 and 3 of connector on upper ladder truck and check that switch is open.
- (5) Adjust jamnuts to move switch until switch plunger is depressed 0.16 (0.01/-0.01) inch and check that switch is closed (View 1).
- (6) Disconnect ohmmeter and reconnect connector on upper ladder truck.
- (7) Lockwire jamnuts and open circuit breakers.

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Forward Airstair Lower Ladder Operating Switch Adjustment  
 Figure 501

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FORWARD AIRSTAIR LOWER LADDER CLOSED SWITCH - REMOVAL/INSTALLATION

1. Remove Lower Ladder Closed Switch

A. Operate airstair to fully extended position.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
- YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
- THE WIND IS MORE THAN 40 KNOTS  
- THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
- THE FORWARD ENTRY DOOR IS OPENED FULLY  
- THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

B. Open forward airstair system circuit breakers on circuit breaker panel P6.

C. Disconnect switch electrical connector from receptacle (Fig. 401).

D. Disconnect wires from switch electrical connector and retain connector.

E. Remove switch from mounting bracket.

2. Install Lower Ladder Closed Switch

F. Connect wiring of switch to switch electrical connector (Fig. 401).

G. Position switch on mounting bracket and connect switch electrical connector to receptacle.

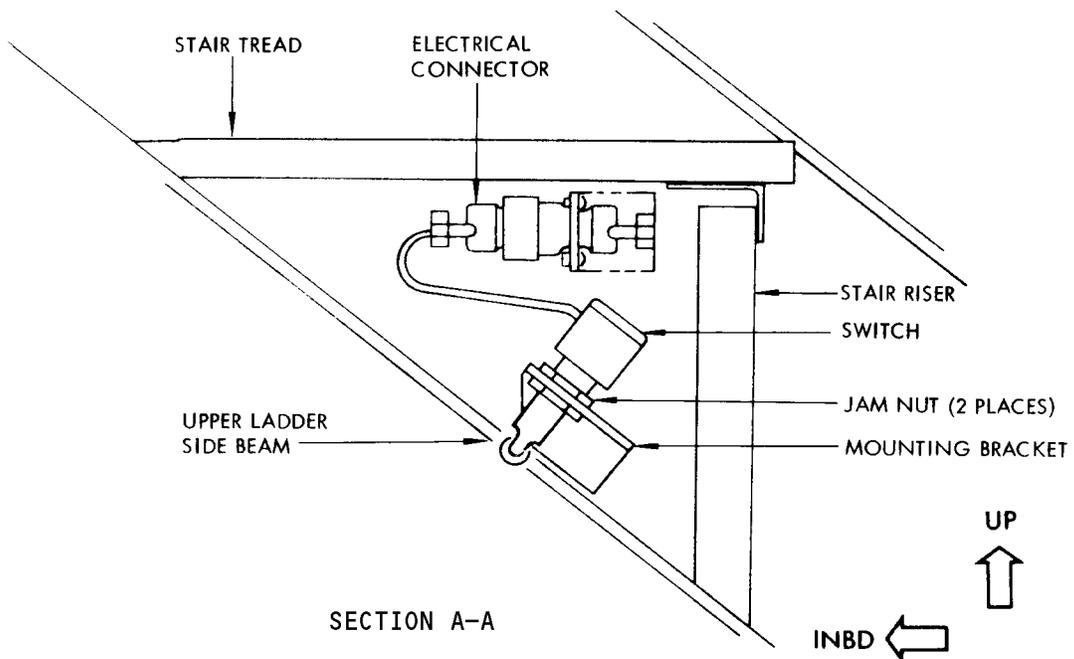
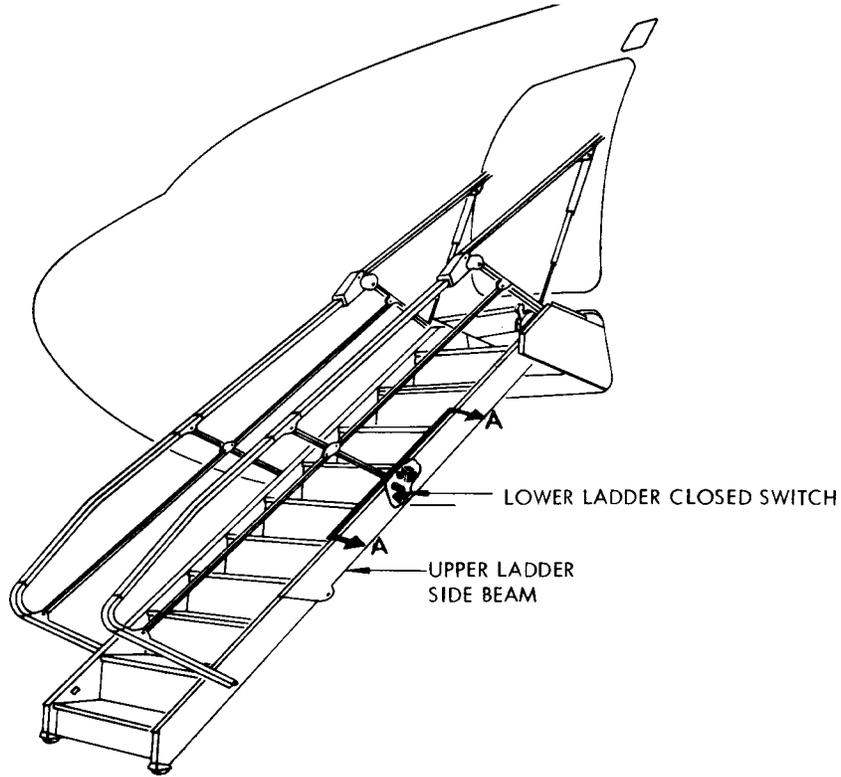
H. Adjust and test switch (Ref Forward Airstair Lower Ladder Closed Switch - A/T).

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Airplanes With Forward  
Airstairs

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Forward Airstair Lower Ladder Closed Switch Installation  
 Figure 401

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FORWARD AIRSTAIR LOWER LADDER CLOSED SWITCH – ADJUSTMENT/TEST

1. Forward Airstair Lower Ladder Closed Switch Adjustment

A. Equipment and Materials

(1) Voltohmmeter, Simpson, Model 260

B. Adjust Lower Ladder Closed Switch

(1) Extend airstair just enough to gain access to lower ladder closed switch.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
– YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
– THE WIND IS MORE THAN 40 KNOTS  
– THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
– THE FORWARD ENTRY DOOR IS OPENED FULLY  
– THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

**NOTE:** Do not allow lower ladder to unlock from upper ladder.

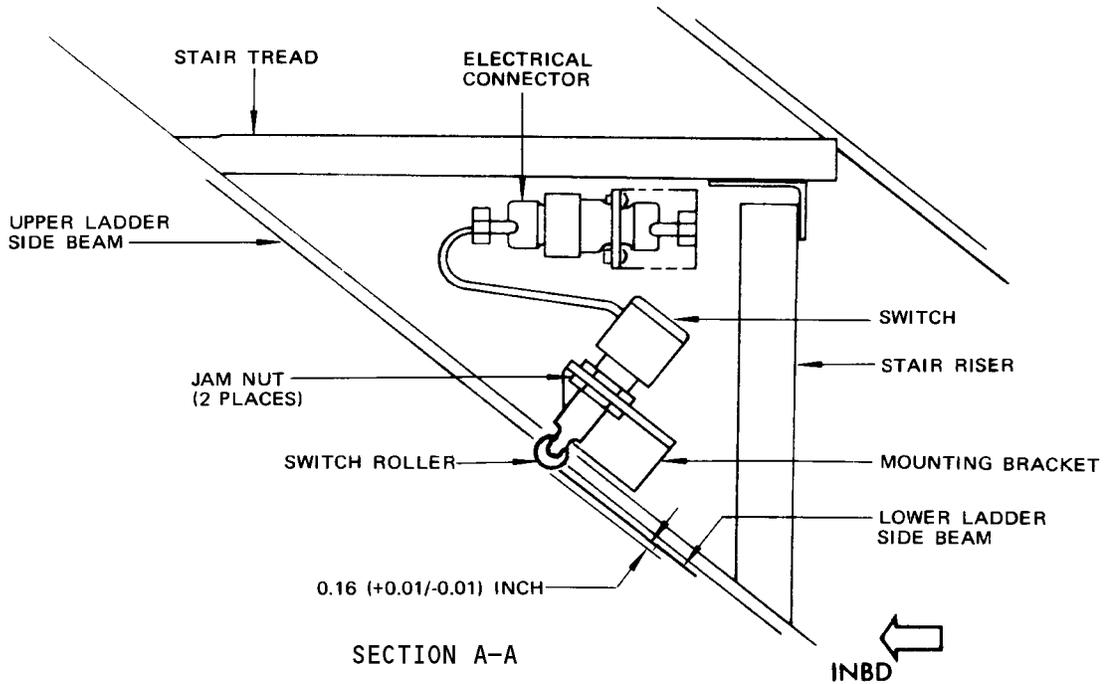
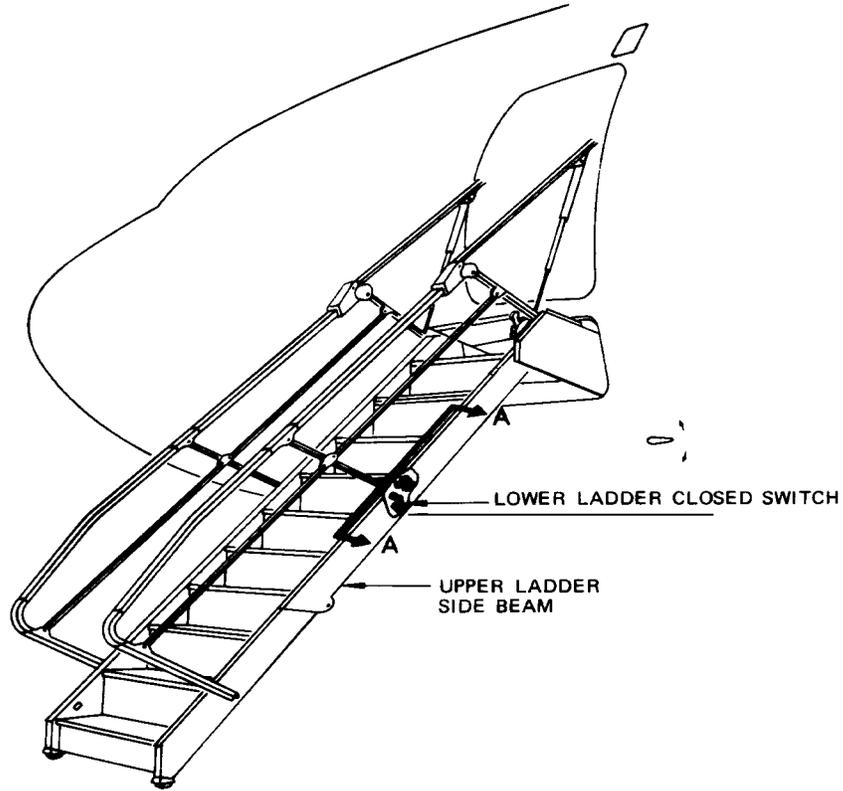
- (2) Open the following circuit breakers on circuit breaker panel P6.
  - (a) Forward Airstair Control
  - (b) Forward Airstair Standby Control
- (3) Loosen jamnuts holding switch to mounting bracket and move switch roller until it just contacts lower ladder.
- (4) Connect ohmmeter between pins 1 and 3 of connector on upper ladder and check that the switch is open.
- (5) Adjust jamnuts to move switch until switch plunger is depressed 0.16 (0.01/-0.01) inch and check that switch is closed.
- (6) Disconnect ohmmeter and reconnect connector on upper ladder.
- (7) Close the above circuit breakers.

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Forward Airstair Lower Ladder Closed Switch Adjustment  
 Figure 501

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 Airplanes With Forward  
 Airstairs

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FORWARD AIRSTAIR MANUAL HANDRAIL STOWED SWITCHES – REMOVAL/INSTALLATION

1. General

- A. The manual handrail stowed switches are identical switches which are removed and installed in the same manner. Therefore, the following procedure is applicable to both switches. Each switch is located in the inboard end of each upper handrail.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:

- YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES
- THE WIND IS MORE THAN 40 KNOTS
- THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS
- THE FORWARD ENTRY DOOR IS OPENED FULLY
- THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.

IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

2. Remove Forward Airstair Manual Handrail Stowed Switches

- A. Operate forward airstair to fully extended position, but do not engage manual handrail extensions to their supports inside forward entry door.
- B. Open forward airstair system circuit breakers on circuit breaker panel P6.
- C. Disconnect wire leads from switch electrical connector (P15 for forward switch or P16 for aft switch) mounted on lower surface of upper ladder top step (Fig. 401).
- D. Tie a length of cord to end of disconnected leads.

**NOTE:** Check that cord is of sufficient length to extend from electrical connector position up through upper stanchion to upper stanchion pivot fitting, with about one foot of excess length at each end.

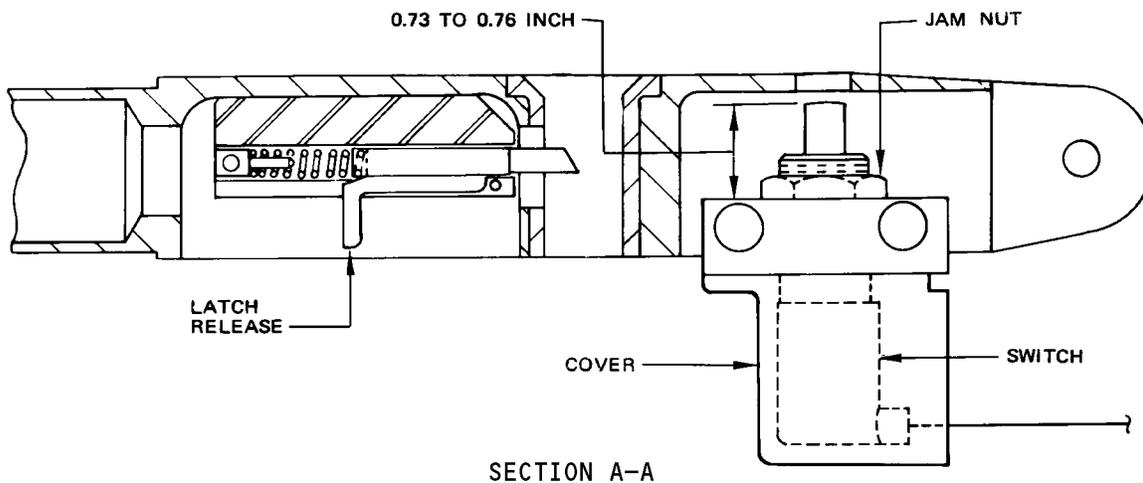
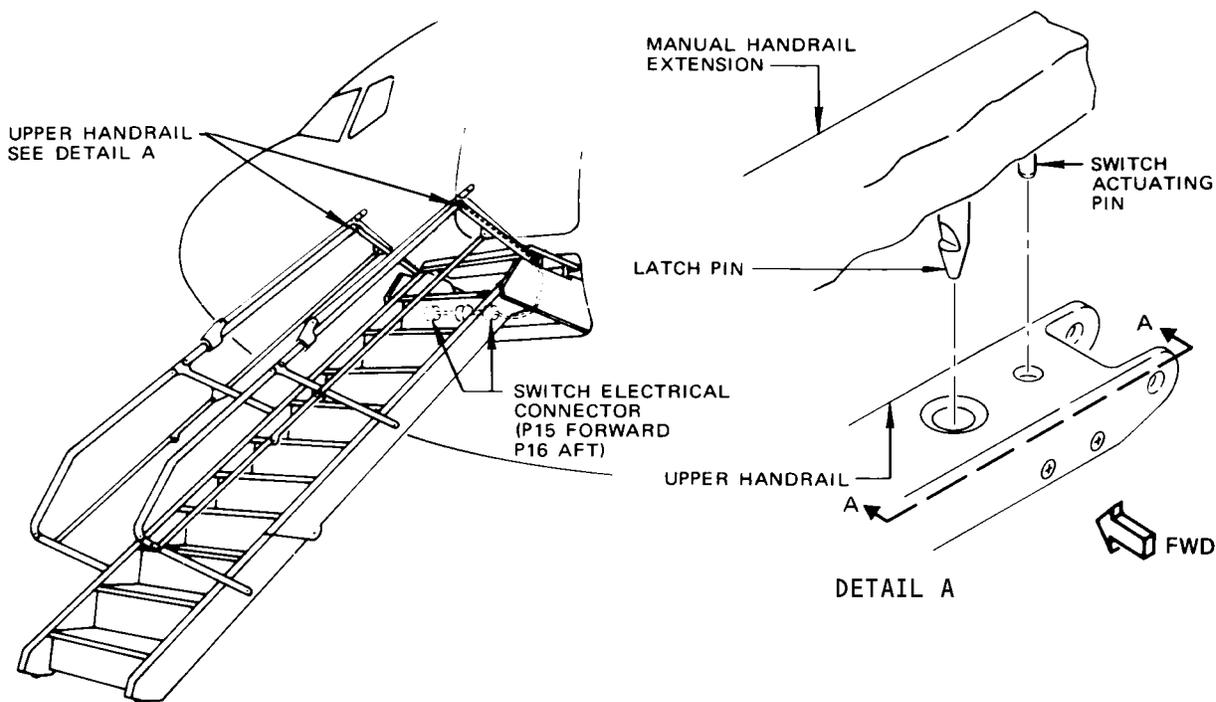
- E. Remove handrail extension from stowed position and move to one side.
- F. Remove four screws attaching switch support to upper handrail.
- G. Remove support, with switch attached, from the pivot fitting.
- H. Remove the single jamnut attaching switch to its support and separate.
- I. Remove switch by pulling the wiring up through stanchion, and disconnecting cord from wires. Leave cord inside and extending from each end of wire route.

3. Install Forward Airstair Manual Handrail Stowed Switches

**NOTE:** Cord should be inside of and extending from both ends of wire route through upper stanchion to pivot fitting.

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Airplanes With Forward  
Airstairs

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Forward Airstairs Manual Handrail Stowed Switches Installation  
 Figure 401

EFFECTIVITY  
 Airplanes With Forward  
 Airstairs

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**BOEING**  
**737**   
MAINTENANCE MANUAL

- A. Tie pivot fitting end of cord to ends of both leads of replacement switch. Pull cord from lower end until leads emerge. Disconnect cord and discard.
- B. Connect wire leads to switch electrical connector and install connector in receptacle.
- C. Thread replacement switch onto switch support and install jamnut.
- D. Adjust switch. Refer to Forward Airstair Manual Handrail Stowed Switches - Adjustment/Test.

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Airplanes With Forward  
Airstairs

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FORWARD AIRSTAIR MANUAL HANDRAIL STOWED SWITCHES - ADJUSTMENT/TEST

1. General

- A. The forward and aft manual handrail stowed switches are identical and are adjusted and tested in the same manner. The following procedures are applicable to either switch.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:

- YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES
- THE WIND IS MORE THAN 40 KNOTS
- THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS
- THE FORWARD ENTRY DOOR IS OPENED FULLY
- THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.

IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

2. Forward Airstair Manual Handrail Stowed Switches Adjustment

A. Adjust Manual Handrail Stowed Switches

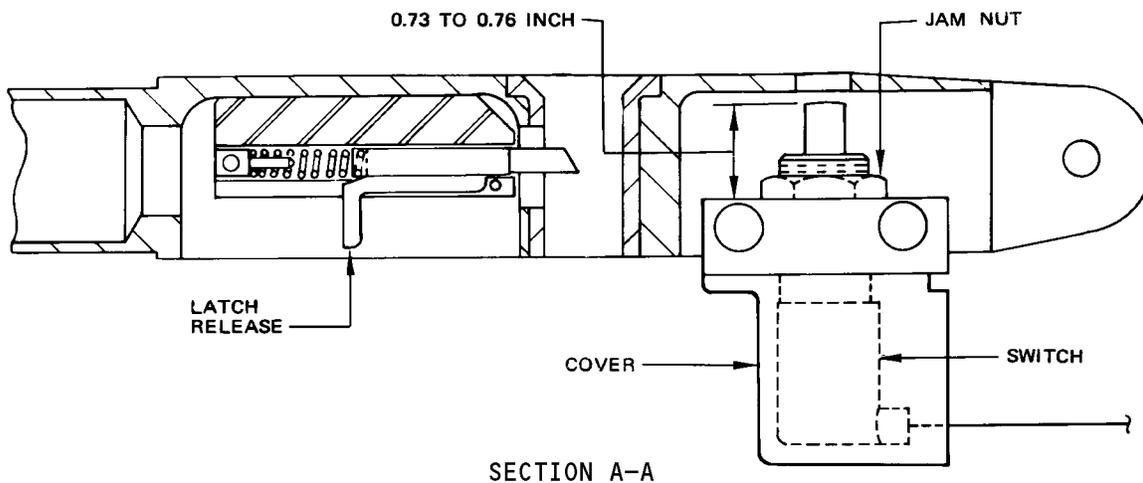
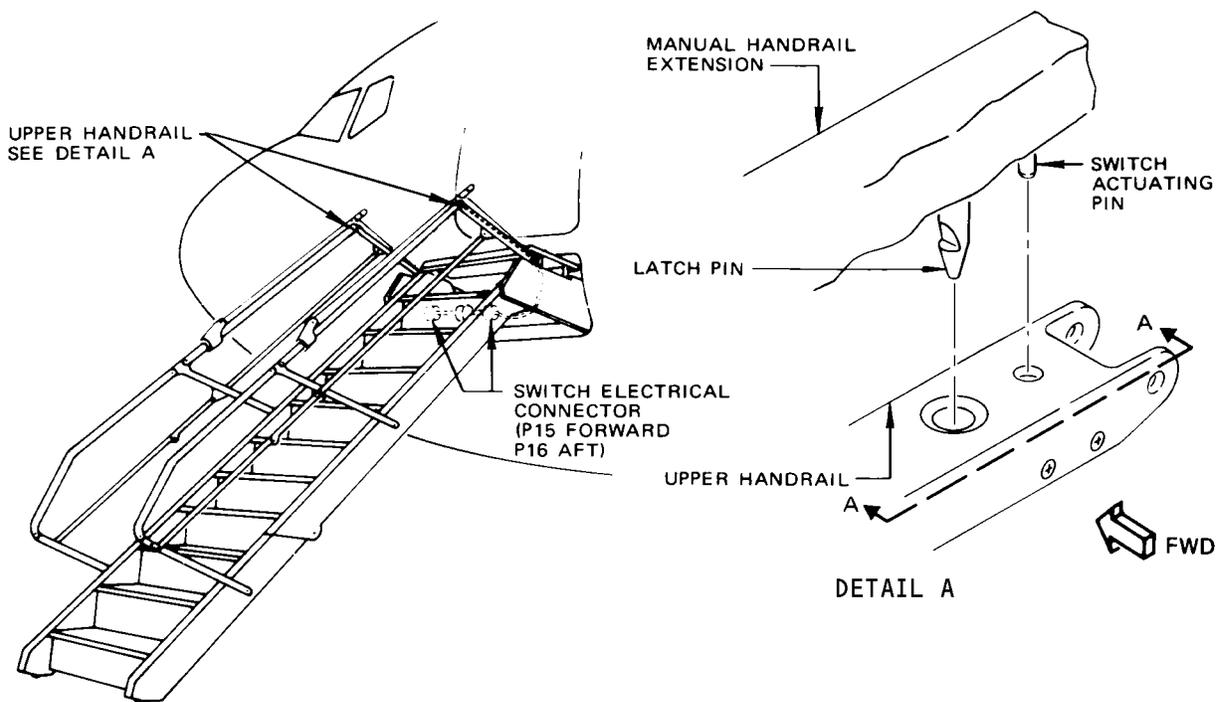
- (1) Operate forward airstair to fully extended position and disengage manual handrail extensions.
- (2) Open forward airstair system circuit breakers on circuit breaker panel P6.
- (3) On airplanes with configuration 1 switch installation as shown in Section A-A, Fig. 501, adjust switches as follows: (See Fig. 501 for effectivity.)
  - (a) Loosen jamnut on adjusting screw, and rotate screw to achieve 0.15 (+0.01/-0.01) inch dimension shown in section A-A. Secure jamnut.
  - (b) Remove switch support from handrail and adjust jamnut on switch so the end of the switch roller is 0.25 (+0.02/-0.02) inch from actuating pin hole.
  - (c) Lockwire jamnut and reinstall switch in handrail with attaching screws.
- (4) On airplanes with configuration 2 switch installation as shown in Section A-A, Fig. 501, adjust switches as follows:
  - (a) Remove switch support from handrail and thread switch onto support until end of switch plunger is 0.73 to 0.76 inch from top surface of switch support.
  - (b) Lockwire jamnut and reinstall switch in handrail with attaching screws.
- (5) Test switches (Ref Manual Handrail Stowed Switches Test).

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Airplanes With Forward  
Airstairs

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Forward Airstairs Manual Handrail Stowed Switches Adjustment  
 Figure 501

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 Airplanes With Forward  
 Airstairs

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FORWARD AIRSTAIR LOWER LADDER LOCK – ADJUSTMENT/TEST

1. Forward Airstair Lower Ladder Lock Adjustment

A. Adjust Lower Ladder Lock

- (1) Operate forward airstair to fully extended position.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
– YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
– THE WIND IS MORE THAN 40 KNOTS  
– THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
– THE FORWARD ENTRY DOOR IS OPENED FULLY  
– THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

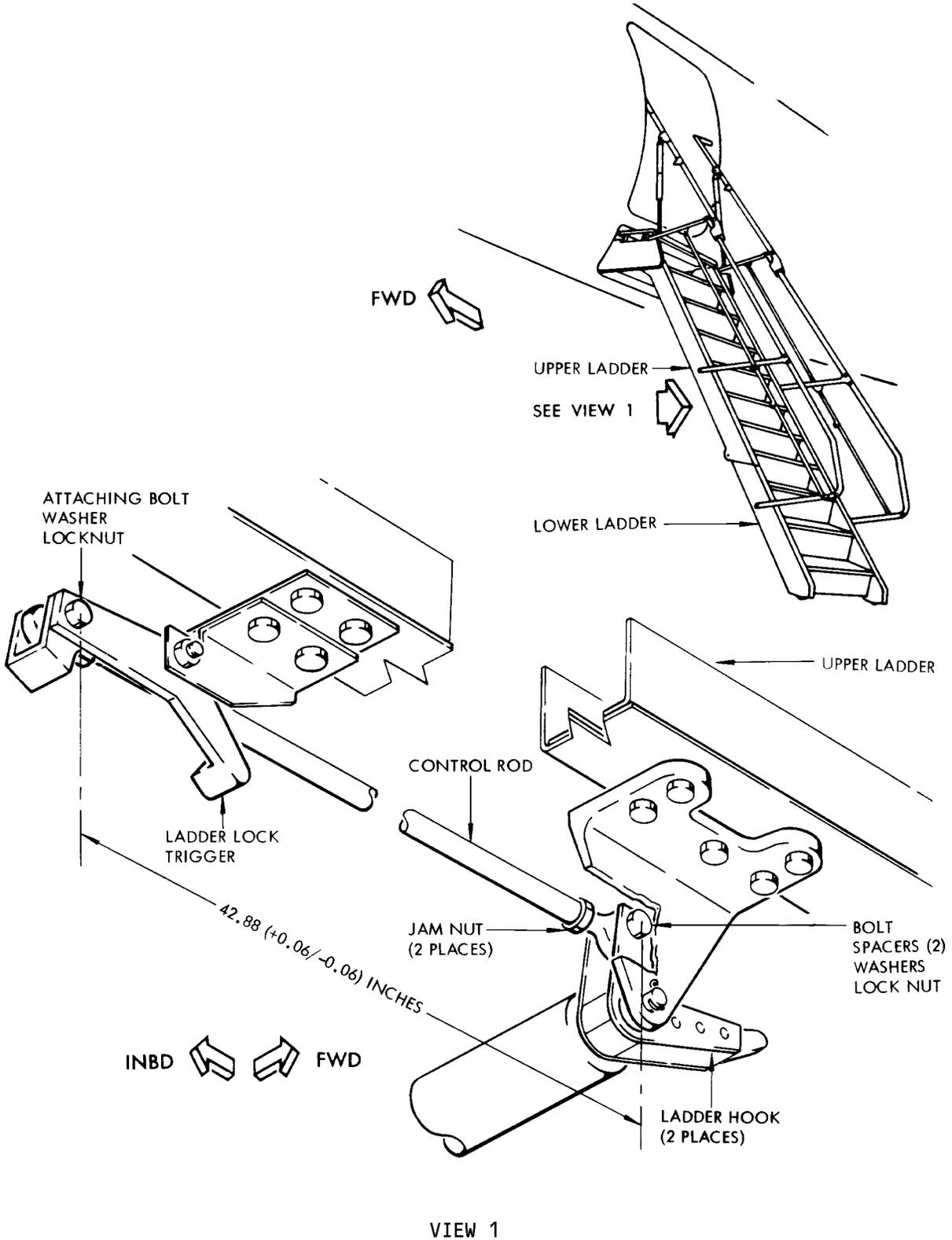
- (2) Open forward airstair system circuit breakers on circuit breaker panel P6.
- (3) Disconnect control rod from ladder hook by removing the attaching bolt, two spacers, washer, and locknut (Fig. 501).
- (4) Disconnect control rod from ladder lock trigger by removing the attaching bolt, washer, and locknut.
- (5) Loosen jamnut at each end of control rod.
- (6) Adjust rod end at each end of control rod until a length of 42.88 ±0.06 inches has been established between center of bolt holes in rod ends.
- (7) Tighten jamnuts at each end of control rod to secure rod ends and install safety wire on each jamnut.
- (8) Connect one end of control rod to ladder lock trigger with bolt, washer and locknut.
- (9) Connect other end of control rod to ladder hook with bolt, two spacers, washer, and locknut.

B. Test Lower Ladder Lock

- (1) Close forward airstair system circuit breakers on circuit breaker panel P6.
- (2) Check that handrail extensions are in stowed position.
- (3) Using exterior control, operate forward airstair toward the retracted position. Stop the retraction cycle as soon as lower ladder lock trigger has been actuated and ladder hooks have locked lower ladder to upper ladder.
- (4) Check that lower ladder is held firmly against upper ladder with a minimum of movement in lock.
- (5) Operate airstair toward fully retracted position or fully extended position as desired.

EFFECTIVITY  
Airplanes With Forward  
Airstairs

52-61-191



**VIEW 1**  
**Forward Airstair Lower Ladder Lock Adjustment**  
**Figure 501**

EFFECTIVITY  
 Airplanes With Forward  
 Airstairs

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FORWARD AIRSTAIR SLOW-DOWN OPERATING LIMIT SWITCH - REMOVAL/INSTALLATION

1. Remove Forward Airstair Slow-Down Operating Switch

- A. Extend airstair and gain access to area above drain pan through access hatch and remove drain pan attachment fittings if installed.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:

- YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES
- THE WIND IS MORE THAN 40 KNOTS
- THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS
- THE FORWARD ENTRY DOOR IS OPENED FULLY
- THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.

IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

**CAUTION:** DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

**NOTE:** Temporary access can be attained by partially retracting airstairs.

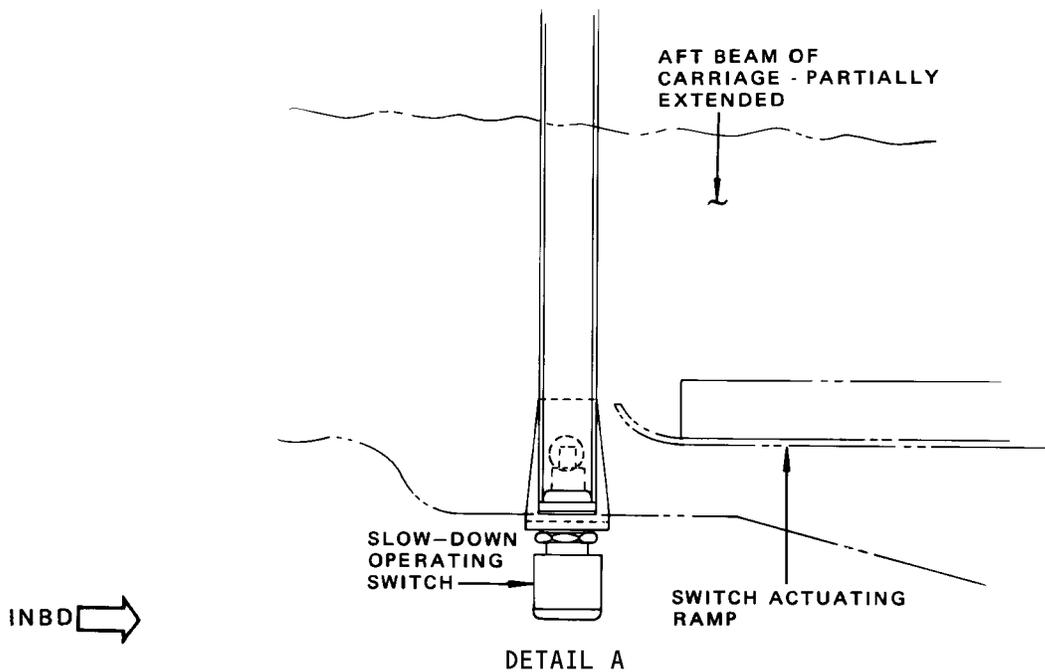
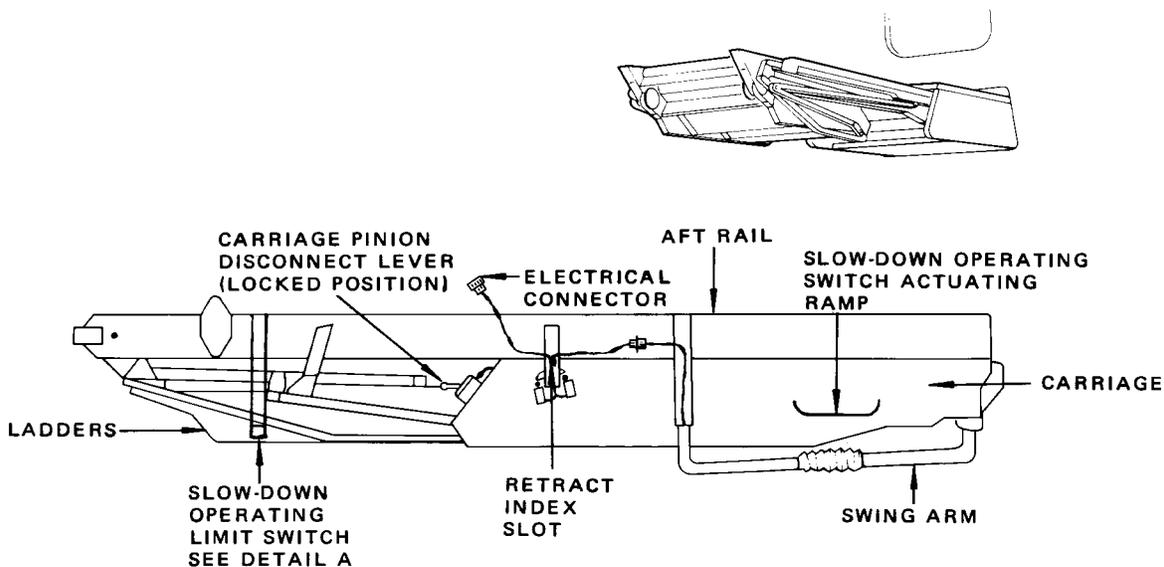
- B. Retract airstair and release control before airstair door begins to close. Remove drain pan if installed.
- C. Open airstair circuit breakers on panel P6. Disconnect airstair electrical connector (2) (Fig. 401).
- D. Disconnect electrical wiring from switch.
- E. Remove locknuts and switch (Detail A).

2. Install Forward Airstair Slow-Down Operating Switch

- A. Position switch on mounting bracket with switch roller up (Detail A).
- B. Adjust locknuts on switch so the switch roller is lowered from the switch actuating ramp as far as threads permit.
- C. Adjust slow-down limit switch (Ref Forward Airstair Slow-Down Operating Limit Switch - A/T).
- D. Install drain pan, and extend airstair and install drain pan attachment fittings if removed.

EFFECTIVITY  
Airplanes With Forward Airstairs

52-61-201



Forward Airstairs Slow-Down Operating Limit Switch Installation  
 Figure 401

EFFECTIVITY  
 Airplanes With Forward Airstairs

**52-61-201**

FORWARD AIRSTAIR SLOW-DOWN OPERATING LIMIT SWITCH - ADJUSTMENT/TEST

1. Forward Airstair Slow-Down Operating Limit Switch Adjustment

A. Equipment and Materials

- (1) Rigging Pin, 0.2480 +0.0005/-0.001 inch diameter by 2.50 inches long

NOTE: Rigging pin is part of F70207-61.

- (2) Voltohmmeter, Simpson Model 260

B. Adjust Forward Airstair Slow-Down Operating Switch

- (1) Extend airstair and gain access to area above drain pan through access hatch and remove drain pan attachment fittings if installed.

WARNING: DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
- YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
- THE WIND IS MORE THAN 40 KNOTS  
- THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
- THE FORWARD ENTRY DOOR IS OPENED FULLY  
- THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

CAUTION: DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

NOTE: Temporary access can be attained by partially retracting airstair.

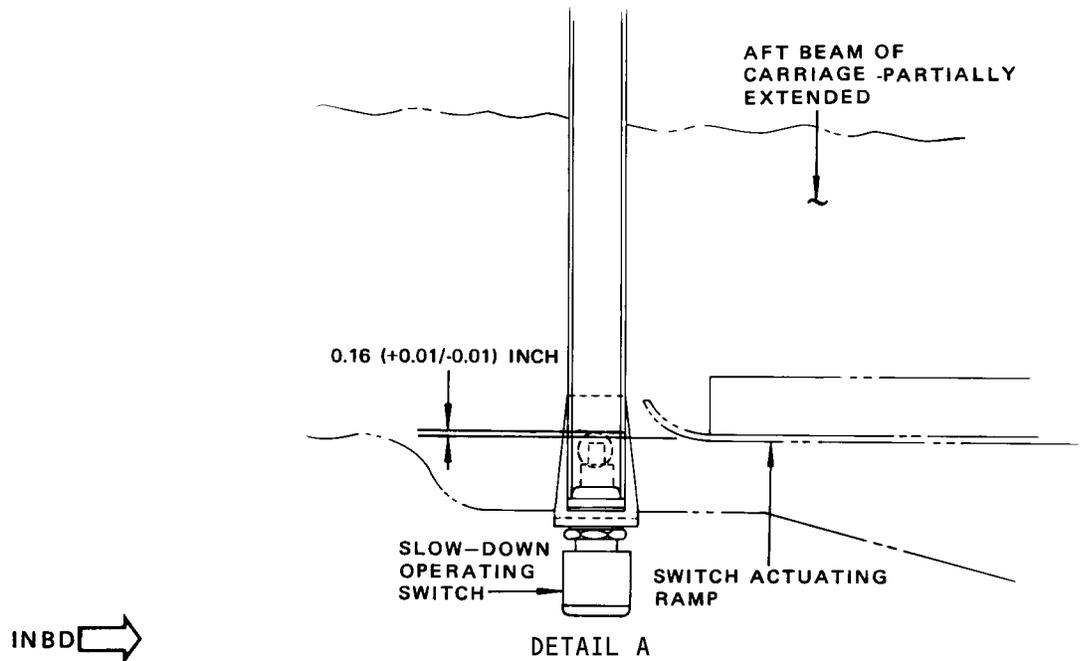
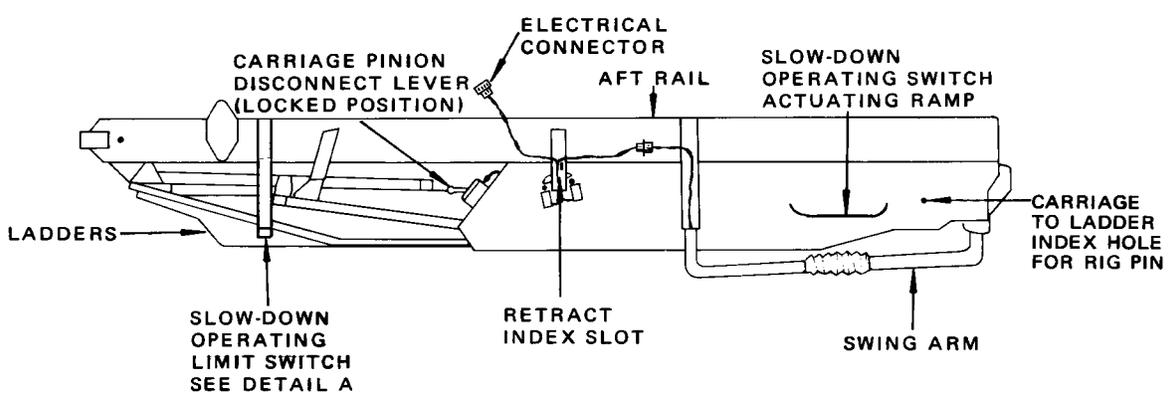
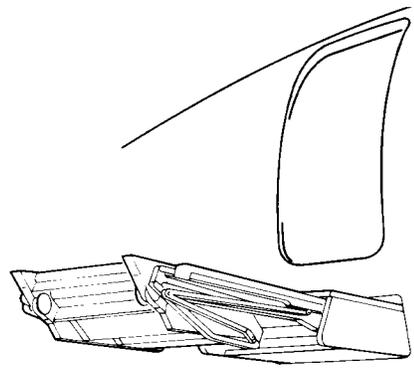
- (2) Retract airstair and release control before airstair door begins to close. Remove drain pan if installed.  
(3) Open airstair circuit breakers on panel P6. Disconnect airstair electrical connector (Fig. 501).  
(4) Disengage carriage drive pinions by moving carriage pinion disconnect lever to unlocked position.  
(5) Disconnect carriage step control actuating rod from forward and aft side of top step to allow ease of movement of carriage.

NOTE: Do not adjust actuating rod.

- (6) Extend carriage manually until switch ramp actuator is directly above switch and adjust switch roller so roller is just touching ramp.

EFFECTIVITY  
Airplanes With Forward Airstairs

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Forward Airstair Slow-Down Operating Limit Switch Adjustment  
 Figure 501

EFFECTIVITY  
 Airplanes With Forward Airstairs

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## MAINTENANCE MANUAL

- (7) Connect ohmmeter across switch and check that switch is open.
- (8) Adjust jamnuts so switch plunger is depressed 0.16 0.02/- 0.02 inch by ramp and check that switch is closed.
- (9) Manually move carriage inboard and outboard several times to check that switch maintains adjustment.
- (10) Disconnect voltohmmeter and install lockwire on switch.
- (11) Connect carriage step control actuating rod to forward and aft side of top step.
- (12) Move carriage to retracted position and insert rig pin through index slot in aft rail and into index hole in carriage beam (Fig. 501).
- (13) Engage carriage drive pinions by moving carriage pinion disconnect lever to locked position and install safety wire on lever.
- (14) Remove rig pin and connect airstair connector.
- (15) Extend airstair fully using NORMAL power.
- (16) Check that extension speed of carriage and upper ladder is reduced approximately one-half when slow-down switch actuates - just prior to rotation of upper ladder.
- (17) Retract airstair and install drain pan if removed.
- (18) Extend airstair and install drain pan attachment fittings if removed.

EFFECTIVITY  
Airplanes With Forward Airstairs

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AIRSTAIR SPEED-UP LIMIT SWITCH - REMOVAL/INSTALLATION

1. Remove the Forward Airstair Speed-up Limit Switch

- A. Gain access to airstair area through electronics access door and remove drain pan if installed.

**CAUTION:** DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

**NOTE:** Temporary access can be attained by partially retracting airstair.

- B. Extend airstair and open airstair circuit breakers on panel P6.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:

- THE WIND IS MORE THAN 40 KNOTS.
- THE END OF THE AIRSTAIR HAS NO SUPPORT WHEN THE AIRPLANE IS ON JACKS.
- THE FORWARD ENTRY DOOR IS FULLY OPEN.
- THE AREA IS NOT CLEAR OF PERSONNEL AND EQUIPMENT.

DO NOT OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES.

OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

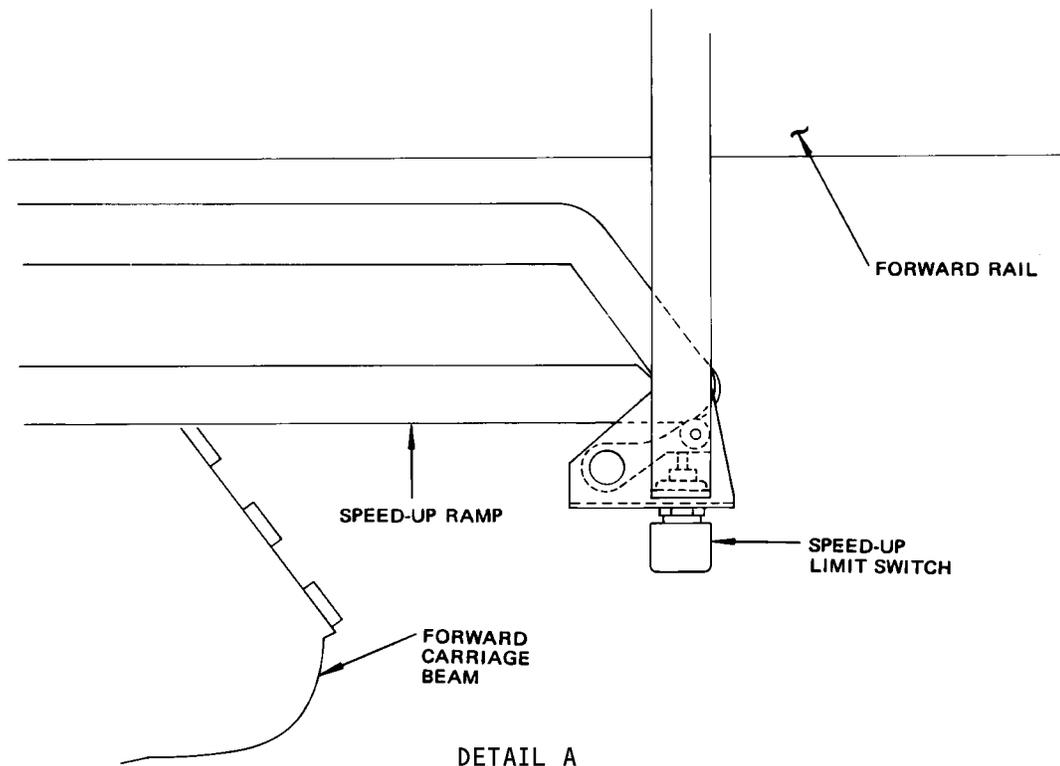
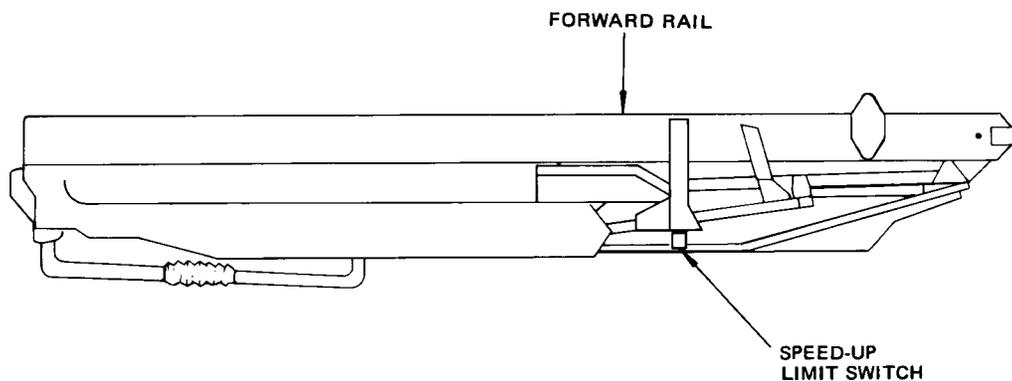
- C. Disconnect airstair electrical connector P1 on aft rail.  
D. Disconnect electrical wiring from switch.  
E. Remove locknuts and switch (Fig. 401, Detail A).

2. Install the Forward Airstair Speed-up Limit Switch

- A. Position switch on mounting bracket with switch plunger up (Detail A).  
B. Adjust locknuts on switch so the switch plunger is lowered from the switch actuating arm as far as threads permit.  
C. Adjust speed-up limit switch (Ref Forward Airstair Speed-up Limit Switch - A/T).

EFFECTIVITY  
Airplanes with forward airstairs

52-61-211



Forward Airstair Speed-up Switch Installation  
 Figure 401

EFFECTIVITY  
 Airplanes with forward airstairs

52-61-211

FORWARD AIRSTAIR SPEED-UP LIMIT SWITCH - ADJUSTMENT/TEST

1. Forward Airstair Speed-up Limit Switch Adjustment

A. Equipment and Materials

(1) Voltohmmeter, Simpson Model 260

B. Adjust Forward Airstair Speed-up Limit Switch

(1) Extend airstair and open airstair circuit breakers on panel P6.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
- YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
- THE WIND IS MORE THAN 40 KNOTS  
- THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
- THE FORWARD ENTRY DOOR IS OPENED FULLY  
- THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(2) Gain access to airstair area through electronic compartment access door and remove drain pan, if installed.

**CAUTION:** DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

**NOTE:** Temporary access can be attained by partially retracting airstair.

(3) Partially retract airstair and disconnect airstair electrical connector P1 on aft rail.

(4) Check that switch actuator roller is touching flat portion of ramp (Fig. 501).

(5) Adjust switch plunger so it is just touching switch actuator (Detail A).

(6) Disconnect switch wiring and connect ohmmeter across switch and check for open.

(7) Adjust jamnuts so switch plunger is depressed  $0.16 \pm 0.02$  inch by ramp. Check that switch is closed.

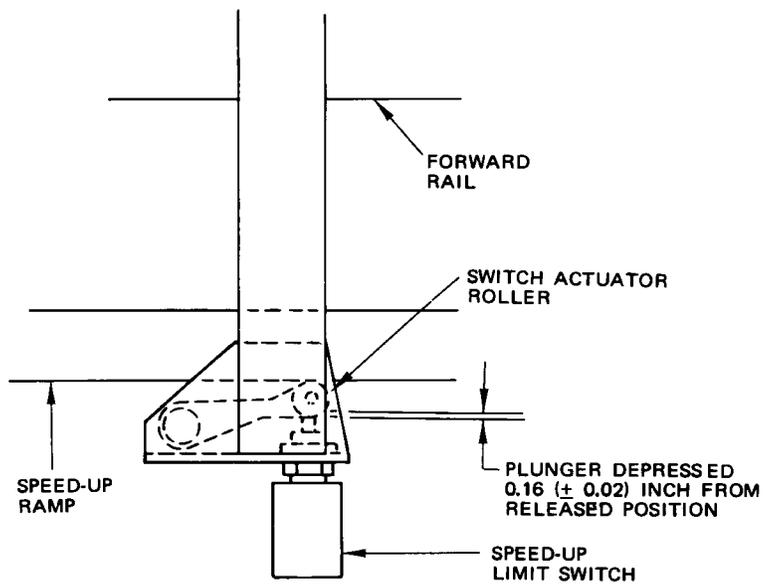
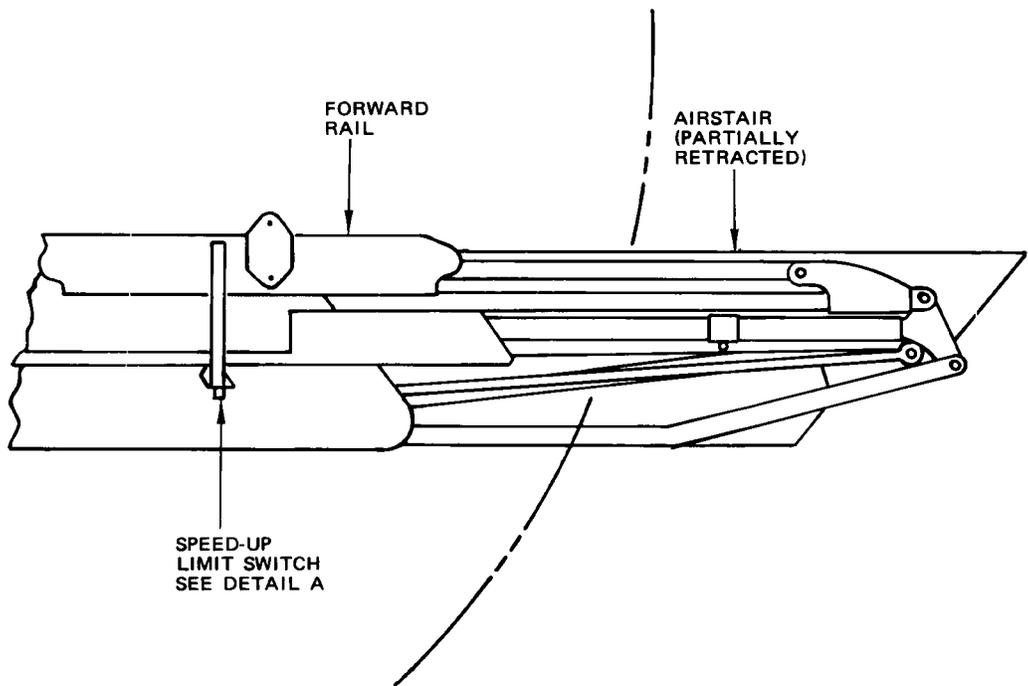
(8) Connect airstair electrical connector P1 on aft rail, close airstair circuit breakers, and extend and partially retract airstair using STANDBY power and check that switch maintains adjustment.

(9) Disconnect voltohmmeter and install lockwire on switch.

(10) Connect switch wiring and install drain pan if removed.

EFFECTIVITY  
Airplanes with forward airstairs

52-61-211



DETAIL A

Forward Airstair Speed-up Switch Adjustment  
 Figure 501

EFFECTIVITY  
 Airplanes with forward airstairs

52-61-211

FORWARD AIRSTAIR ANGLE GEARBOX – REMOVAL/INSTALLATION

1. Equipment and Materials

- A. No. 1 rigging pin – 0.4980 (+0.0005/-0.001) inch diameter by 4.00 inches long
- B. No. 2 rigging pin – 0.2480 (+0.0005/- 0.001) inch diameter by 2.50 inches long

NOTE: Rigging pins are part of F70207-61.

- C. Grease – BMS 3-33 (Preferred)
- D. Grease – MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)

2. Prepare for Removal

- A. Remove Drain Pan (if installed)
  - (1) Extend airstair to provide clearance for removing drip pan attachment fasteners (Fig. 403).

WARNING: DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
– YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
– THE WIND IS MORE THAN 40 KNOTS  
– THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
– THE FORWARD ENTRY DOOR IS OPENED FULLY  
– THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

NOTE: Temporary access can be attained by partially retracting airstair.

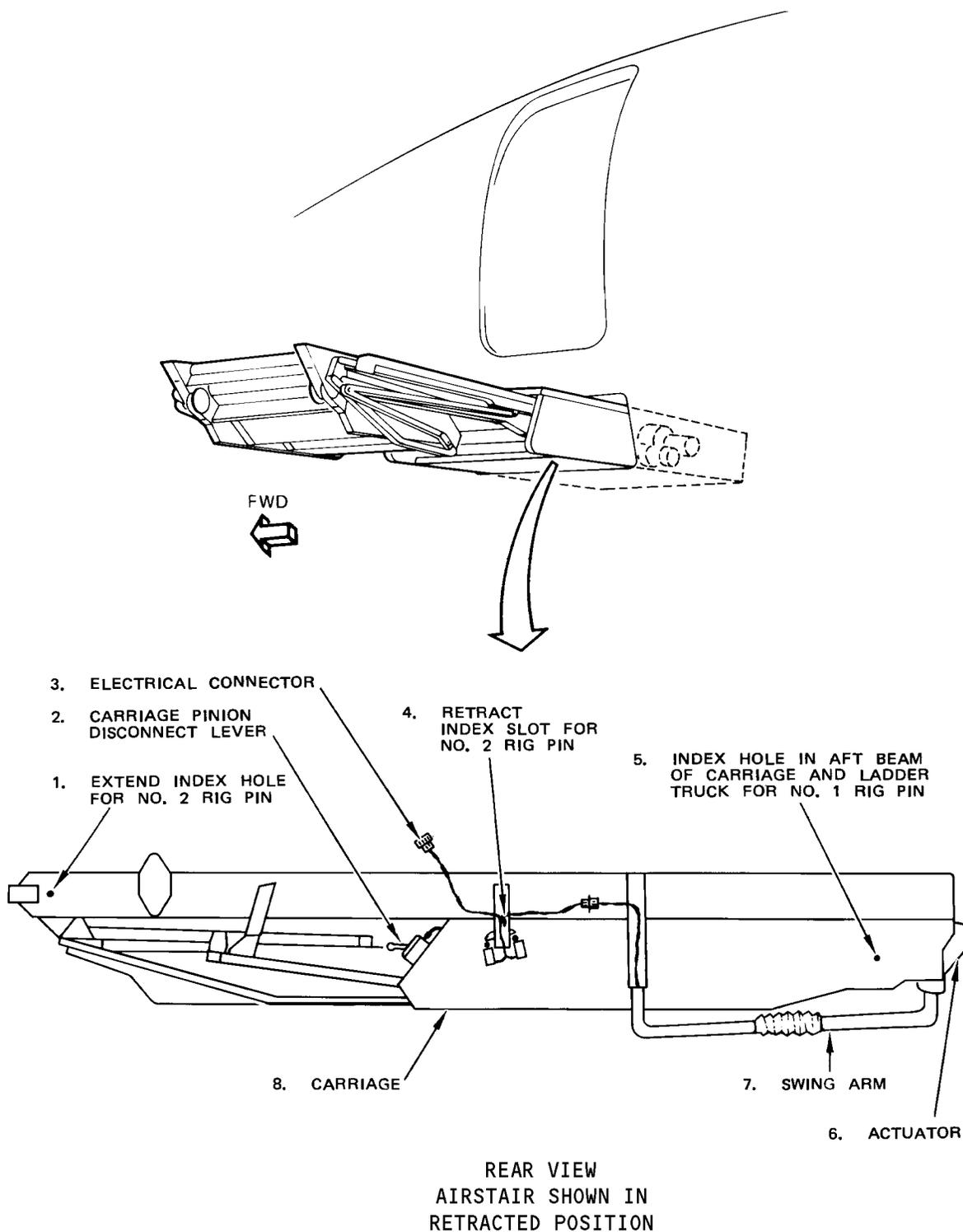
- (2) Gain access to drip pan through electronic compartment access door.
- (3) Remove hose clamp and drain hose from access hatch in drip pan. Remove access hatch.
- (4) Obtain access to drip pan attachment fasteners through access hatch. Remove fasteners.

CAUTION: DO NOT ATTEMPT TO MOVE SWING ARM OUT OF WAY OR USE SWING ARM AS HANDHOLD OR IT MAY BE DAMAGED.

- (5) Retract airstair and release control before airstair door begins to close. Remove drip pan through airstair – airstair door opening on side of fuselage.
- B. Open airstair circuit breakers on panel P6. Disconnect airstair electrical connector (3) (Fig. 402).

EFFECTIVITY  
Airplanes With Forward Airstairs

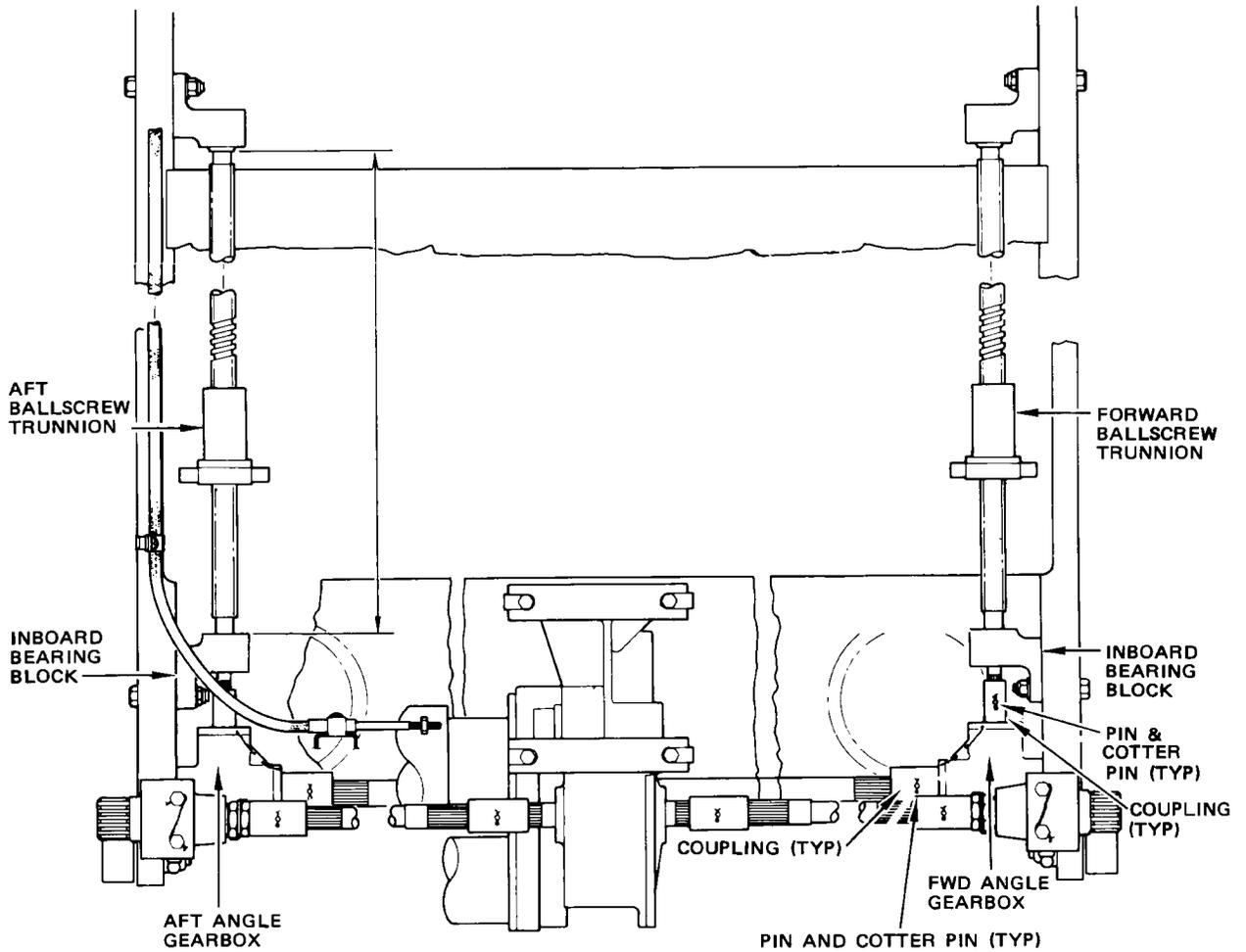
52-61-221



Forward Airstair Angle Gear Installation  
 Figure 401

EFFECTIVITY  
 Airplanes With Forward Airstairs

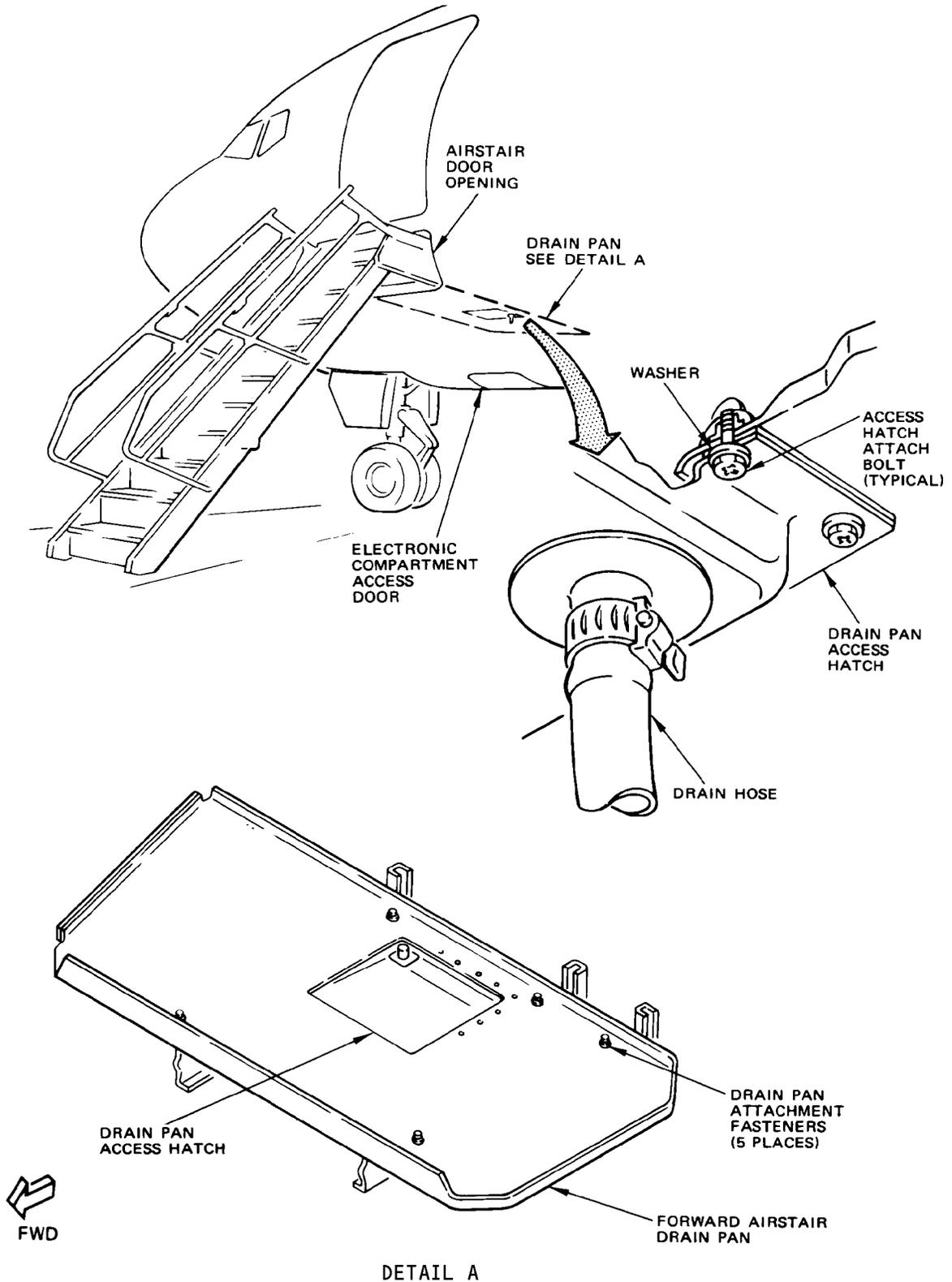
**52-61-221**



Forward Airstair Angle Gearbox Installation  
 Figure 402

EFFECTIVITY  
 Airplanes With Forward Airstairs

52-61-221



Forward Airstair Drain Pan Access  
 Figure 403

EFFECTIVITY  
 Airplanes With Forward Airstairs

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- C. Disengage carriage drive pinions by moving carriage pinion disconnect lever (2) to unlocked position.
  - D. Manually move carriage outboard to fully extended position and move carriage pinion disconnect lever to locked position.
  - E. Engage carriage drive pinions by moving carriage pinion disconnect lever to locked position.
  - F. Secure carriage to rail by inserting No. 2 rig pin through extend index hole (1) in aft rail end into index slot in aft beam of carriage.
  - G. Secure ladders to carriage by inserting No. 1 rig pin through index hole (5) in ladder truck.
3. Remove Forward Airstair Angle Gearbox
- A. Disconnect ball screw drive shaft and ball screw from angle gearbox by removing cotter pins and pins from splined couplings.
  - B. Remove four bolts securing gearbox to carriage and remove gearbox.
4. Install Forward Airstair Angle Gearbox

**CAUTION:** ENSURE ANGLE GEARBOX IS CORRECT ONE FOR THE POSITION. A CLOCKWISE INPUT ROTATION INTO A FORWARD ANGLE GEARBOX GIVES A COUNTERCLOCKWISE OUTPUT, WHILE SUCH AN INPUT INTO AN AFT ONE RESULTS IN A CLOCKWISE OUTPUT.

- A. Place angle gearbox in position and install 4 bolts.

**NOTE:** Apply a film of grease to splines, bores, shanks and threads of parts before assy.

- B. Connect couplings and secure with pins and cotter pins.
5. Restore Airplane to Normal
- A. Disengage carriage drive pinions by moving carriage pinion disconnect lever (2) to unlocked position.
  - B. Manually move carriage inboard to fully retracted position and insert No. 2 rig pin through retract index slot (4) and into retract index hole in aft carriage beam.
  - C. Using No. 1 rig pin check that it can be inserted through upper ladder index slot (5). Remove No. 1 rig pin.
  - D. Engage carriage drive pinions by moving carriage pinion disconnect lever to locked position and install safety wire on lever.
  - E. Remove No. 2 rig pin and connect electrical connector (3) to receptacle.
  - F. If required, install drain pan through airstair door opening inside of fuselage (Fig. 403).
  - G. Close forward airstair system circuit breakers on circuit breaker panel P6.
  - H. Extend airstair and install drain pan attachment fasteners if removed. Install drain pan access hatch and connect drain hose.

EFFECTIVITY  
Airplanes With Forward Airstairs

52-61-221

FORWARD AIRSTAIR DOOR – DESCRIPTION AND OPERATION

1. General

A. The forward airstair door is a plug type door, which closes the cutout in the lower fuselage directly below the forward entry door. The door opens inward by moving inboard and down along door tracks to a position below the airstair. The door is opened by a jackscrew driven by an electrically operated actuator. The door installation consists of a door, door tracks, a carriage, carriage tracks, an actuator, door lock mechanism, and an electrical system (Fig. 1).

2. Airstair Door Assembly

A. The door is an aluminum structure with an inner and outer skin and internal webs and stiffeners. A continuous seal around the periphery of the door provides a pressure seal to prevent loss of cabin pressure during flight. The door is equipped with adjustable stops that transmit pressure loads to the fuselage structure and allow adjustment of the door for proper fit. The door is also equipped with guide pins and rollers to provide for alignment of the door with the door cutout as the door closes.

3. Door Tracks

A. Door tracks provide a guide for the rollers on the door guide fittings during opening and closing operations and support the upper part of the door.

4. Carriage

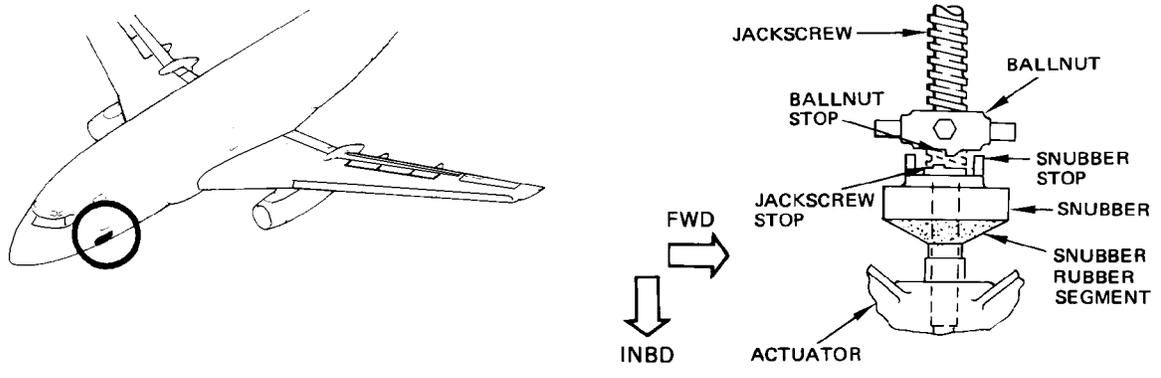
A. The carriage is connected to the lower part of the door and to the actuator jackscrew. It is equipped with rollers that travel in the carriage tracks to guide the carriage during opening and closing operations.

5. Carriage Tracks

A. The carriage tracks provide a guide for the rollers on the carriage as the carriage is driven by the actuator jackscrew during opening and closing operations. The tracks also support the carriage and door when in the open position.

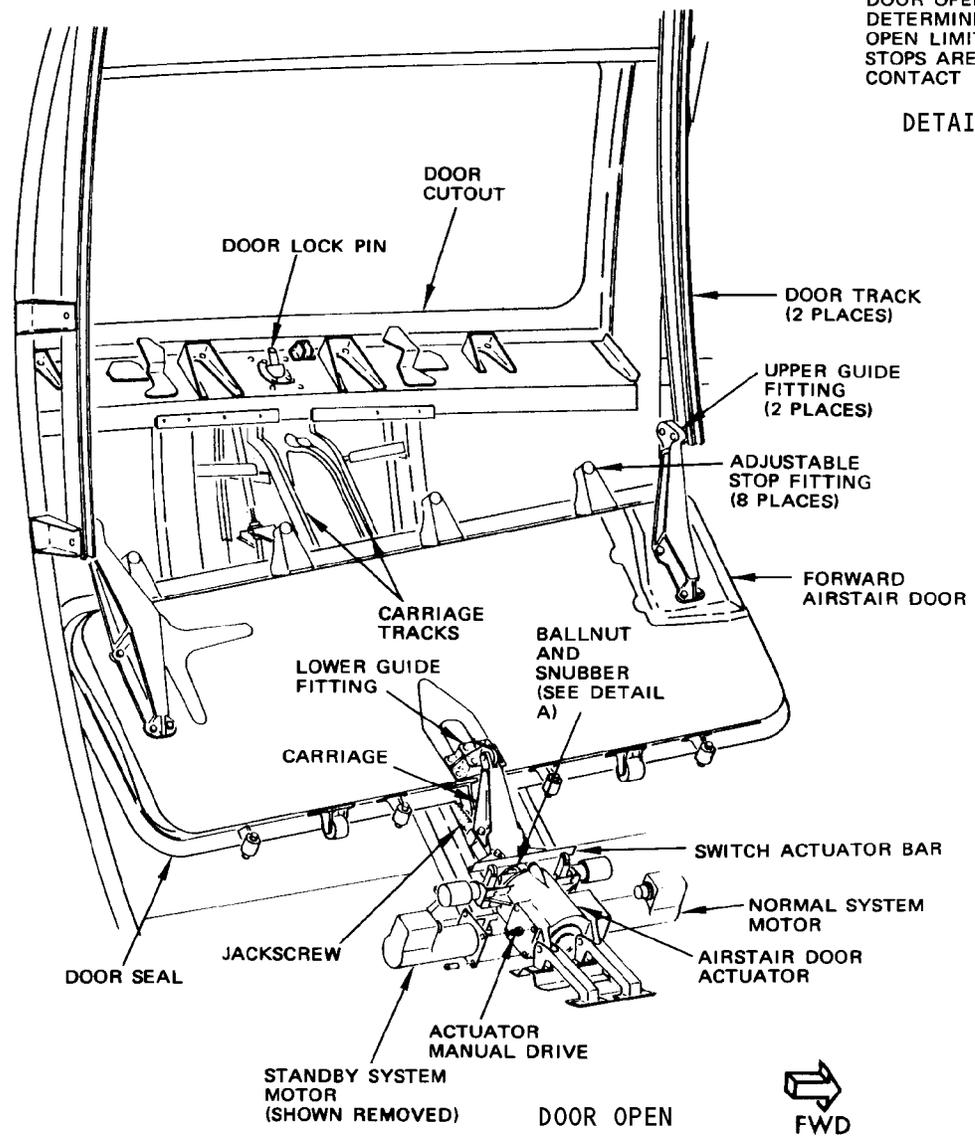
6. Actuator and Jackscrew

A. The actuator is an electromechanical device, which converts electrical energy to mechanical rotary motion to turn the door actuator jackscrew. The actuator consists of a gearbox with output shaft, and two identical motor and brake assemblies, primary and standby. Motors are of the series-wound split-field type and have a magnetic brake that engages mechanically when current is removed. The actuator also incorporates a torque-limiting drive clutch to prevent damage due to overload, and a manual drive input when the standby motor is removed from the actuator.



SHOWN IN DOOR OPEN POSITION DETERMINED BY DOOR OPEN LIMIT SWITCH. STOPS ARE NOT IN CONTACT

DETAIL A

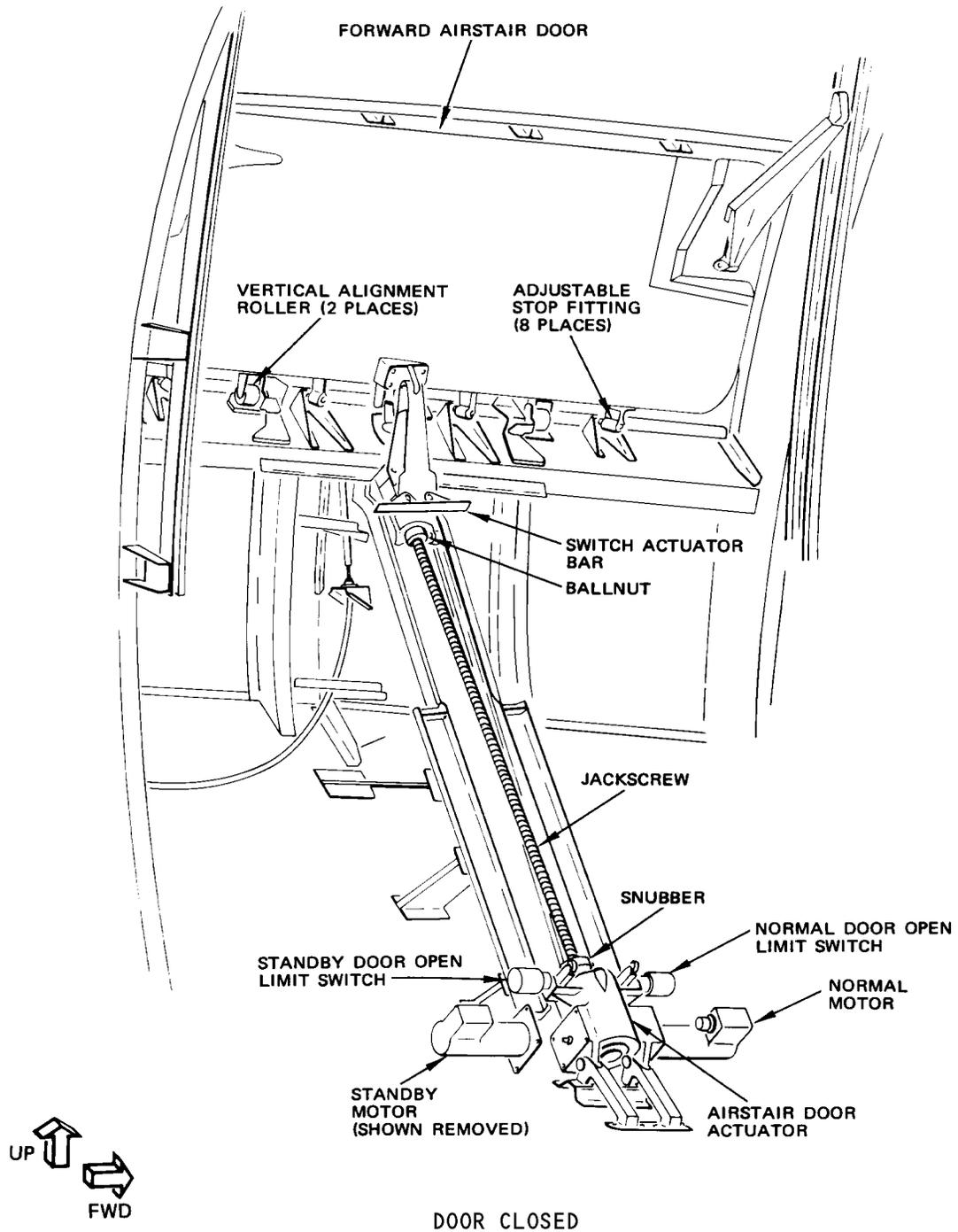


Forward Airstair Door  
 Figure 1 (Sheet 1)

EFFECTIVITY  
 Airplanes With Forward Airstairs

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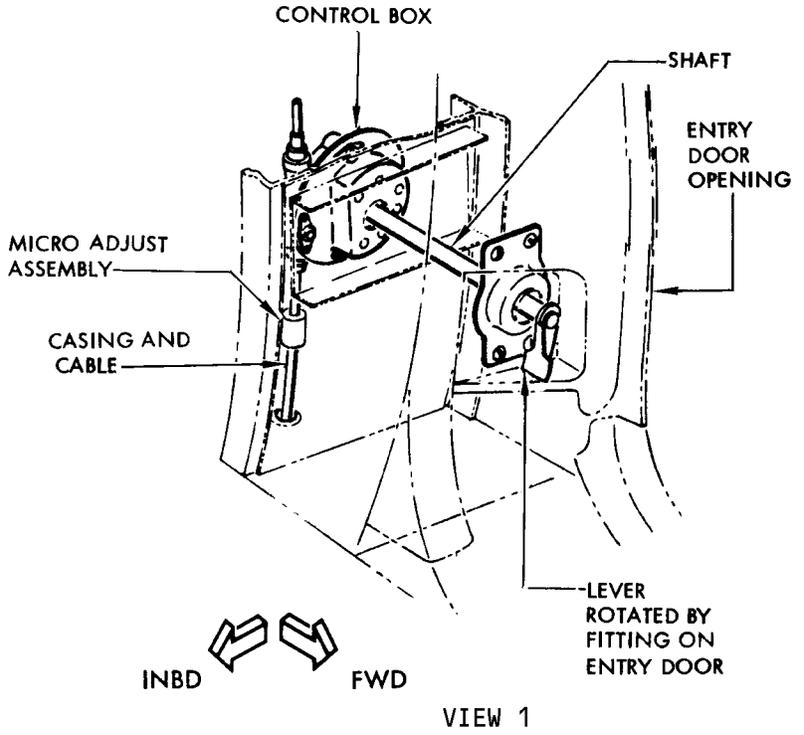
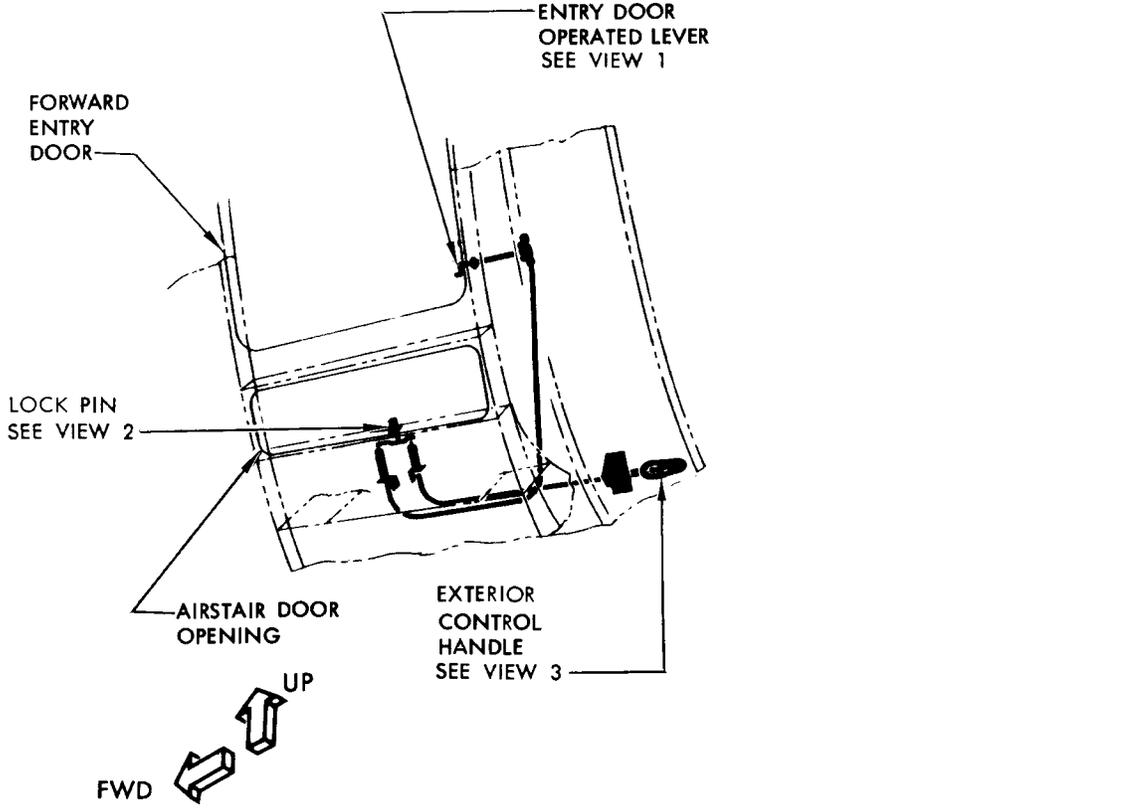
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Forward Airstair Door  
 Figure 1 (Sheet 2)

EFFECTIVITY  
 Airplanes With Forward Airstairs

**52-61-500**



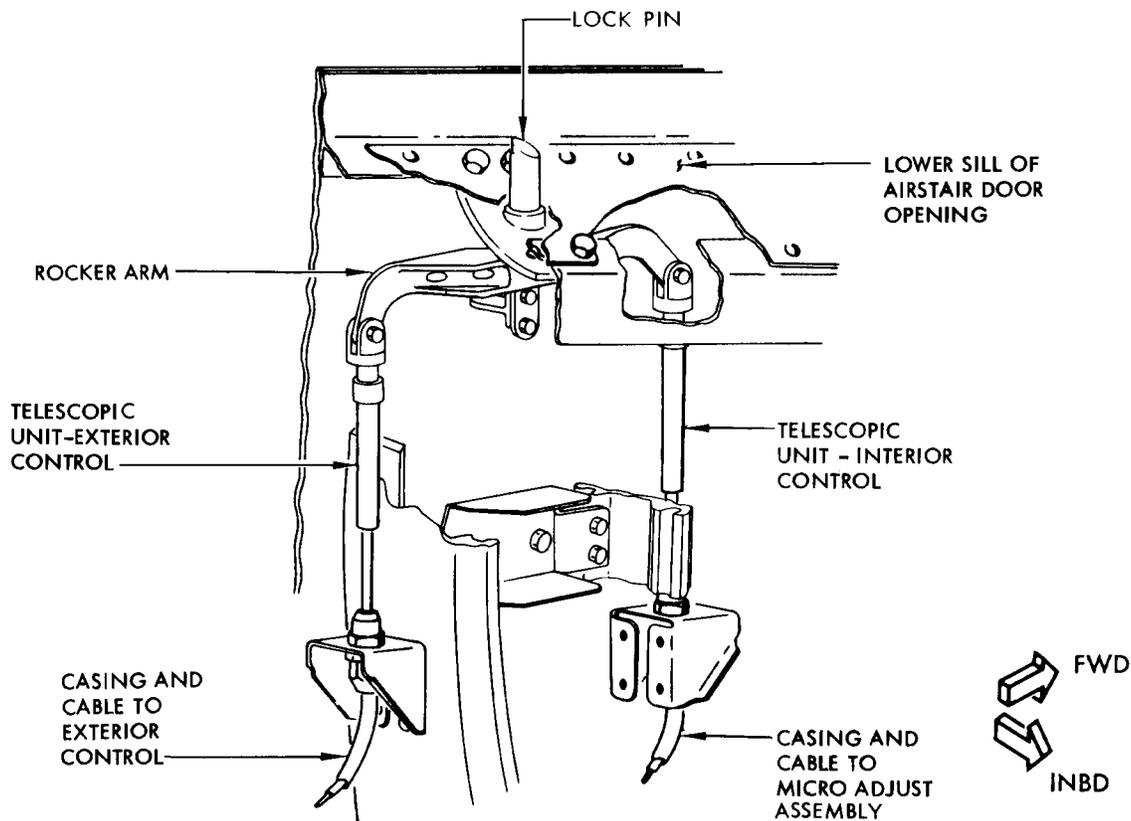
Forward Airstair Door Lock Mechanism  
 Figure 2 (Sheet 1)

EFFECTIVITY  
 Airplanes With Forward Airstairs

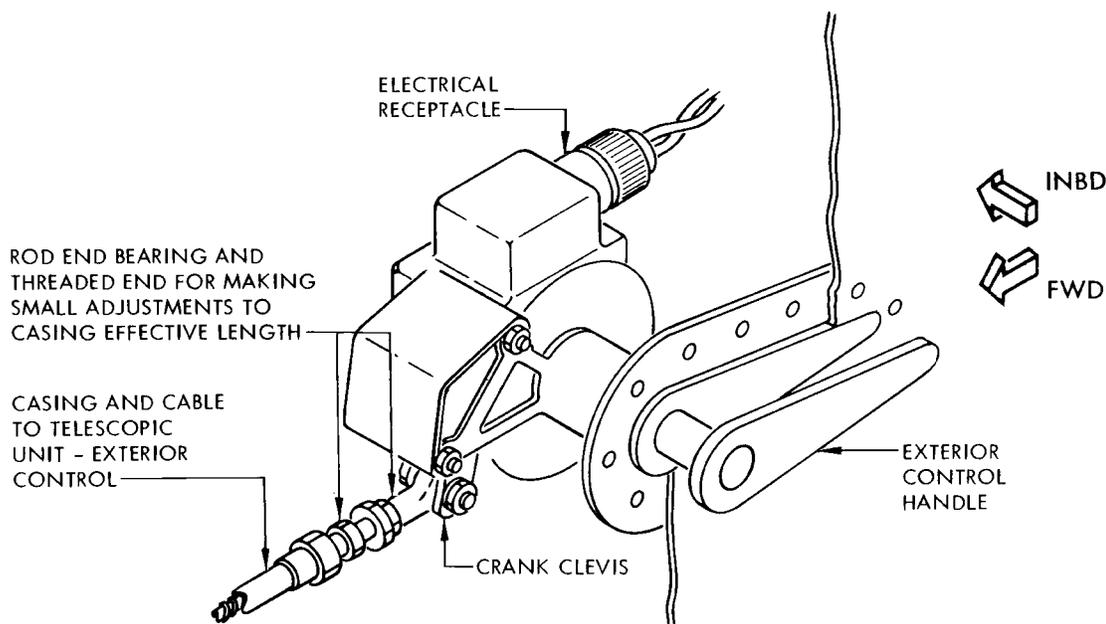
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**MAINTENANCE MANUAL**



VIEW 2



VIEW 3

Forward Airstair Door Lock Mechanism  
Figure 2 (Sheet 2)

EFFECTIVITY  
Airplanes With Forward Airstairs

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## MAINTENANCE MANUAL

- B. The actuator jackscrew is a ball screw device splined to the actuator gearbox output shaft at one end and connected to the airstair door carriage through the ball nut. A snubber assembly is installed on the jackscrew to protect the actuator from excessive jackscrew travel. The snubber assembly consists of a circular solid rubber snubber bonded at its outer circumference to a metal cover half. An internally splined sleeve insert through the axis of the rubber snubber mates with the jackscrew shaft. The metal cover half has stops for contact with the ball nut stops. If the jackscrew travel exceeds door open switch limits the ball nut stops engage the stops on the snubber, compressing the rubber face and twisting it through 90 degrees with respect to the jackscrew at which point the jackscrew stops are contacted. This braking action reduces the speed at which the stops make contact.
7. Door Lock and Control
- A. The door lock mechanism consists of actuating levers, control box, telescopic units, cables, rocker arm, and lockpin. When the door is closed and locked, the lockpin engages the door lock bracket on the lower edge of the door. (Fig. 2)
- B. The lockpin can be retracted by two methods while the airplane is on the ground but it cannot be retracted while in flight. Opening the forward entry door or operating the airstair exterior control handle will retract the lockpin.
- C. The rocker arm is connected directly to the lockpin and force applied to either end or to both ends of the rocker arm will retract the lockpin. When the forward entry door is opened, the spring loaded-telescopic unit for the interior control automatically applies a force to one end of the rocker arm. When the exterior control is moved to the open position, a force is applied to the other end of the rocker arm.
8. Electrical System
- A. The door electrical system provides for both normal and standby operation. The system consists of a normal dc airstair door motor, a standby dc airstair door motor, relays, and microswitches. (Ref. 52-61-0, Fig.2 and 3)
9. Operation
- A. By positioning the interior or exterior controls to the EXTEND or RETRACT position, the airstair door can be operated electrically when power is available and the airstair is connected. Either the NORMAL or STANDBY mode of operation may be used. When power is applied to either the NORMAL or STANDBY airstair door motor, the motor drives the actuator, which drives the actuator jackscrew. The actuator jackscrew will then move the door in the carriage and door tracks. (Fig. 1) During EXTEND, power to the airstair motor is automatically removed by either door open switch - NORMAL or STANDBY - when actuated by the door in its full open position. Power is also removed from the airstair door motor automatically during the retract cycle when either door close switch - NORMAL or STANDBY - is actuated by the door in its full close position. The door is locked or unlocked by either the forward entry door or the exterior control handle via the airstair door lock mechanism. Refer to 52-61-0, for system operation.

EFFECTIVITY  
Airplanes With Forward Airstairs

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**737**   
**MAINTENANCE MANUAL**

- B. The airstair door can be operated from the interior or exterior control when the airstair is removed or disconnected by inserting a special plug in the airstair power receptacle. The plug is made from a standard BACC45FT22-19P plug with a jumper of No. 20 wire between pins 9 and 10 for normal system operation. Jumper pins No. 14 and 15 for operation using the standby system. These jumpers functionally replace the airstair NORMAL and STANDBY retract switches in their retract position. Ref. to 52-61-0
- C. If power is not available, the airstair door may be operated manually by removing the standby motor and applying torque to the input shaft of the actuator. (Fig. 1)

EFFECTIVITY  
Airplanes With Forward Airstairs

**52-61-500**

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FORWARD AIRSTAIR DOOR – REMOVAL/INSTALLATION

1. General

- A. The forward entry door should be open during removal or installation of the forward airstair door, to ensure that the airstair door latch pin is retracted.
- B. If the airstair door is removed and reinstalled on the same airplane without any disturbance to its adjustments, it may be installed as described in par. 3 of the following procedures.
- C. If the airstair door to be installed is a new unit, it must first be prepared as described in par. 4.
- D. Installation of a prepared new door, or one which has previously been installed on another airplane, should be accomplished as described in par. 5.
- E. The door adjustments described in par. 5 are designed to satisfy three conditions as follows:
  - (1) Door must be adjusted so that its outside skin is within the allowable tolerances of flushness relative to the exterior fuselage skin around perimeter of door opening.
  - (2) Door must be adjusted horizontally and vertically within the door opening to ensure the two following conditions:
    - (a) That each of the eight door stop pins contact the center of the eight matching bearing plates on door opening.
    - (b) That the gap between the edges of door outer skin and the door opening is within allowable tolerances
  - (3) The relationship between the door and the door carriage mechanism must be adjusted so that door will travel smoothly into and out of its properly centered closed position.

NOTE: "Horizontal" adjustment is in a forward or aft direction within the airstair door opening. "Vertical" adjustment is in a vertical direction when looking normal to the plane of door opening.

2. Equipment and Materials

- A. Organic Corrosion Inhibiting Compound – BMS 3-23 (Ref. 20-30-21)

3. Remove Forward Airstair Door

- A. Deleted
- B. Fully open airstair door and open the following circuit breakers on circuit breaker panel P6:
  - (1) FORWARD AIRSTAIR CONTROL
  - (2) FORWARD AIRSTAIR DOOR
  - (3) FORWARD AIRSTAIR ACTUATOR
  - (4) FORWARD AIRSTAIR STANDBY CONTROL
  - (5) FORWARD AIRSTAIR STANDBY
- C. Remove bolt securing lower guide fitting of door to carriage (Fig. 401).

- D. Lift door clear of carriage and disengage upper guide rollers from lower ends of door tracks.

**NOTE:** An access panel, in web which supports aft door track, may be removed if necessary to provide additional clearance to rotate door.

- E. Rotate door so that it may be removed from airplane through airstair door cutout.

4. Install Forward Airstair Door (Existing Unit)

- A. Check door seals for condition. If required, repair per 52-09-100, Approved Repairs.
- B. Apply organic corrosion inhibiting compound to exposed areas of door interior structure (access through lightening holes) per instructions in 51-21-91.
- C. With airstair removed and door carriage in door open position, insert airstair door through cutout in body skin.
- D. Rotate door and engage rollers on upper guide fittings in lower ends of door tracks (Fig. 401).

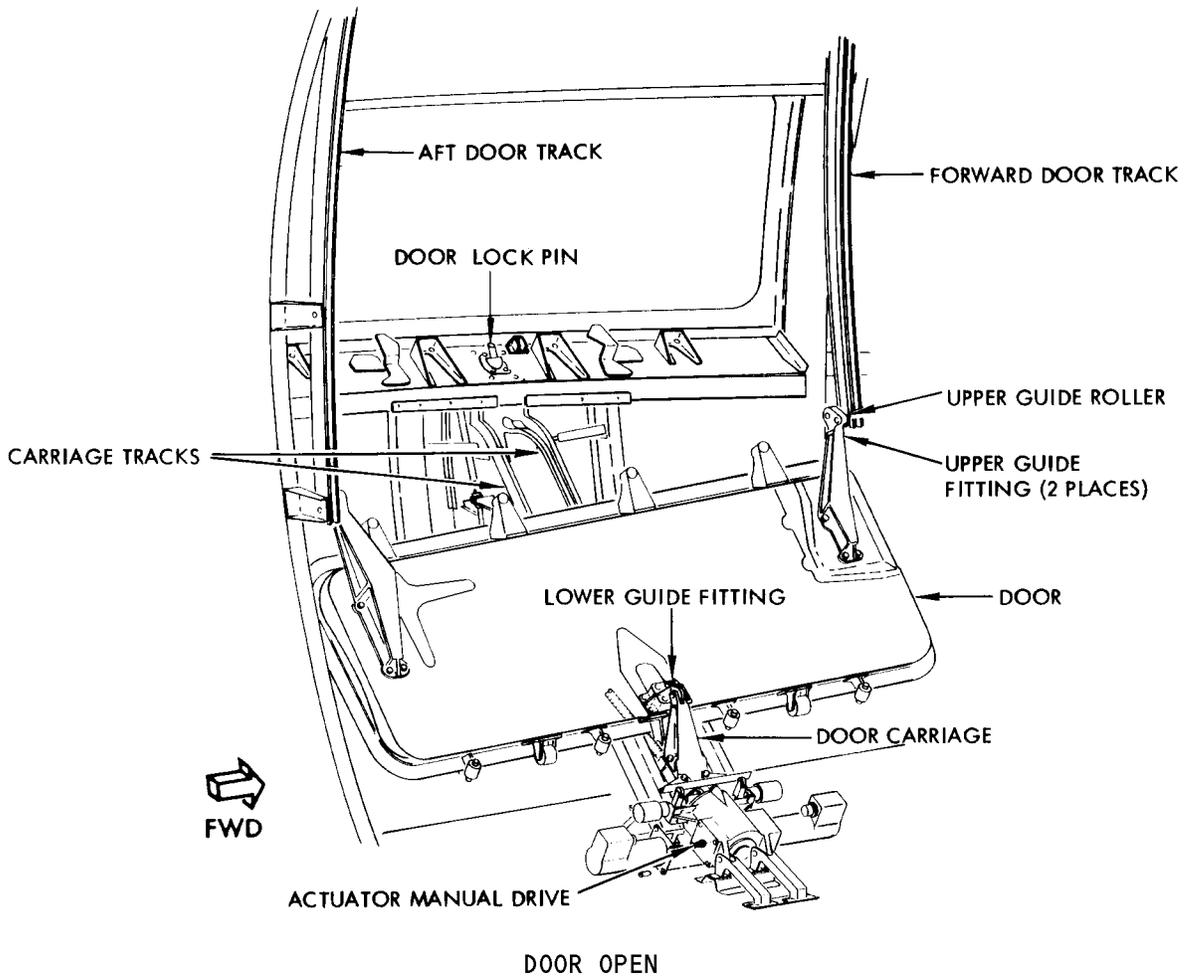
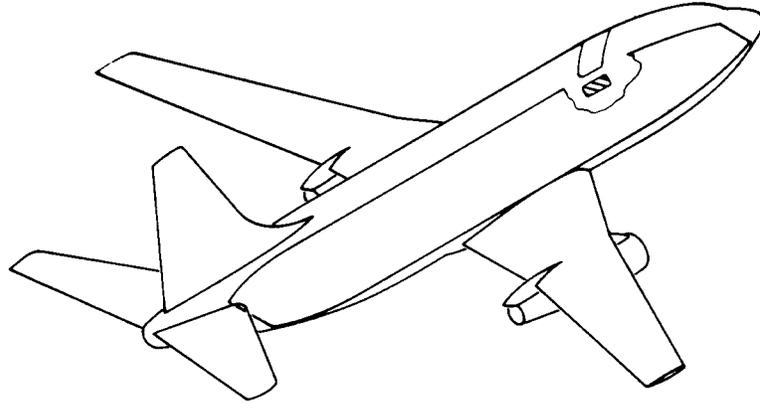
**NOTE:** An access panel, in web which supports aft door track, may be removed if necessary to provide additional clearance to rotate door.

- E. Install bolt, washers, and nut connecting door carriage to lower guide fitting.

F. Deleted

5. Prepare Forward Airstair Door for Installation (New Unit)

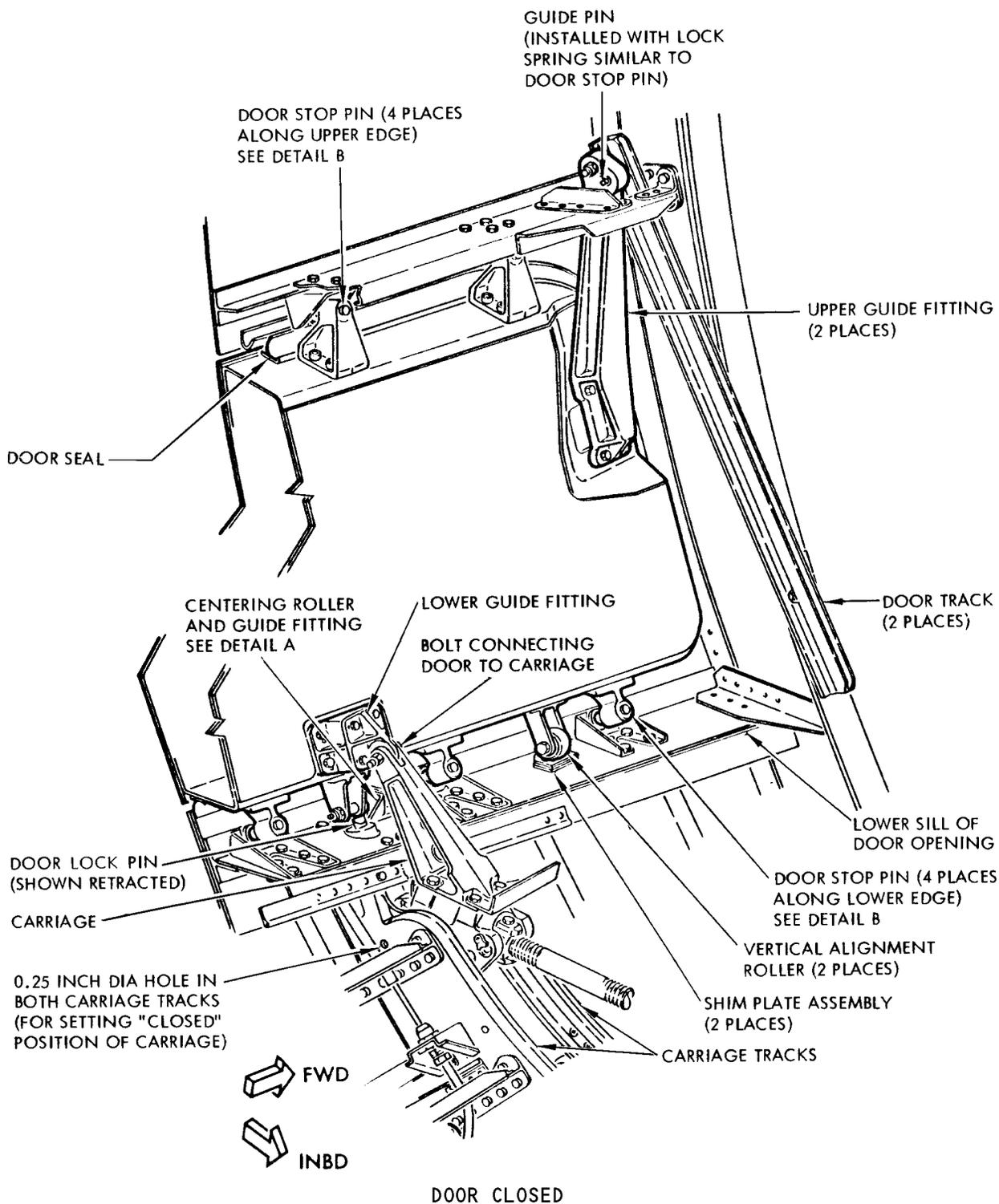
- A. Remove standby motor (Ref. 52-61-591, Removal/Installation).
- B. Check door seals for condition. If required, repair per 52-09-100, Approved Repairs.
- C. Manually move airstair door carriage to inboard end of carriage tracks by rotating the actuator manual drive.
- D. Loosen two bolts securing centering guide fitting to lower sill of door opening (Fig. 401, Detail A).
- E. Remove lock springs from upper guide fittings of door. Screw head of each guide pin approximately two full turns toward guide fitting.
- F. Remove all eight door stop pins (Detail B).
- G. Engage upper guide rollers of door in door tracks and install bolt connecting lower guide fitting of door to door carriage.
- H. Rotate actuator manual drive to move door toward closed position. Stop when surplus edge margin of outboard skin of door contacts inboard surface of skin around door opening.
- I. Install door stop pins at forward and aft lower corners of door and screw outboard until they contact the adjacent bearing plates.



Forward Airstair Door Installation  
 Figure 401 (Sheet 1)

EFFECTIVITY  
 Airplanes With Forward Airstairs

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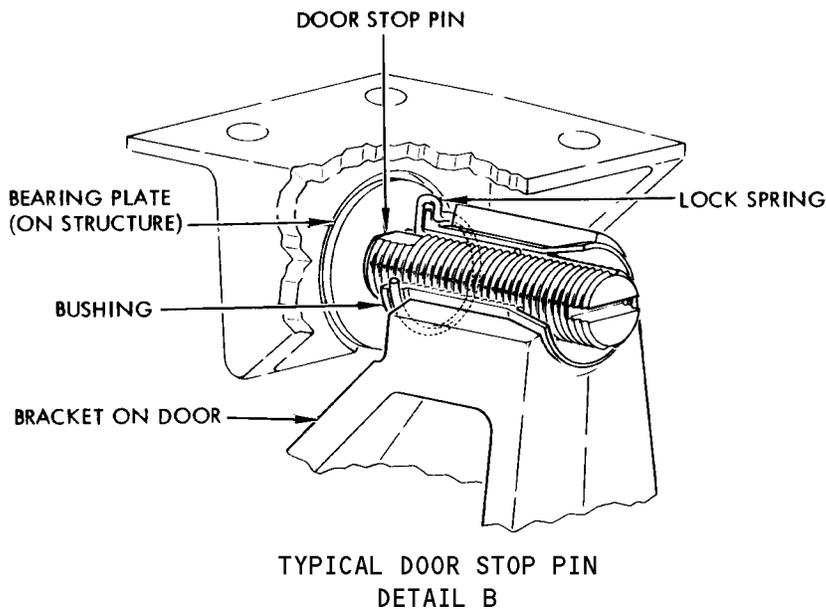
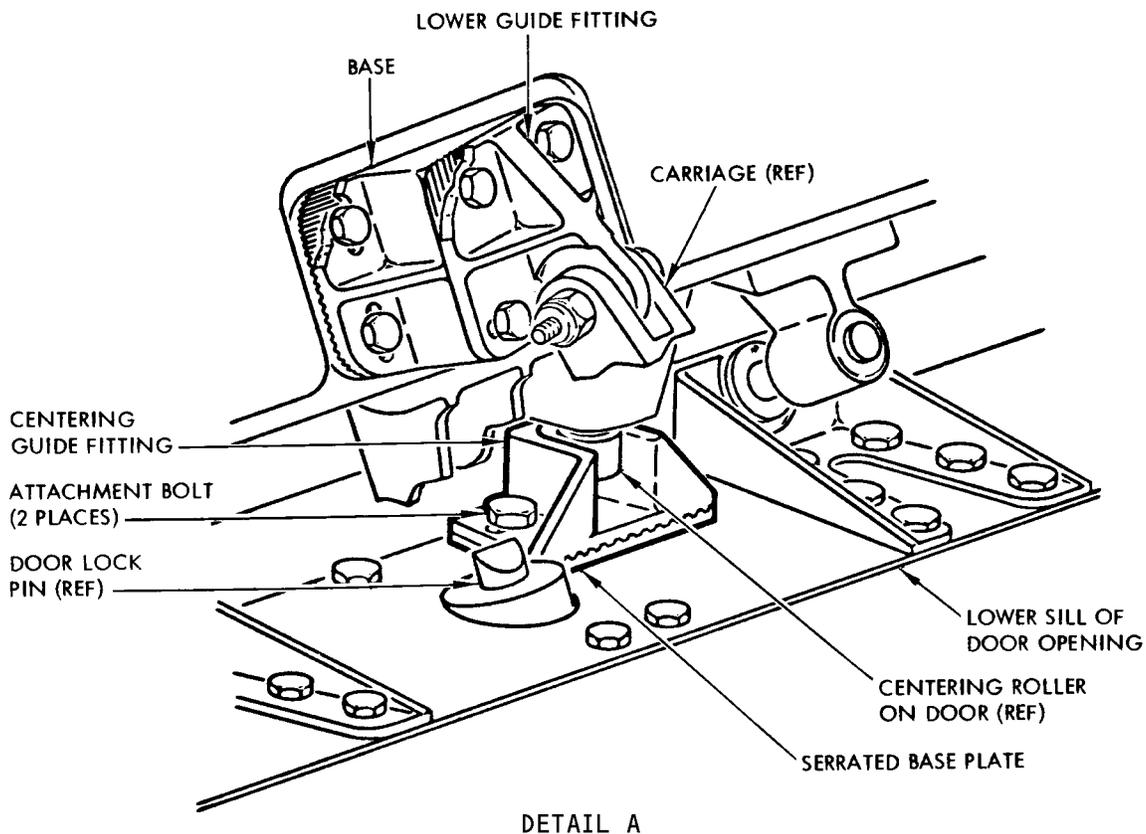


Forward Airstair Door Installation  
 Figure 401 (Sheet 2)

EFFECTIVITY  
 Airplanes With Forward Airstairs

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**MAINTENANCE MANUAL**



Forward Airstair Door Installation  
Figure 401 (Sheet 3)

EFFECTIVITY  
Airplanes With Forward Airstairs

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## MAINTENANCE MANUAL

- J. Check that door stop pins are centered on the bearing plates (Fig. 402).  
If necessary, adjust position of door as follows:
  - (1) Loosen the eight lower guide fitting attachment bolts and move fitting horizontally and/or vertically on its serrations (Fig. 401, Detail A).
  - (2) After positioning door, to center the door stop pins, tighten bolts of lower guide fitting.
- K. With door stop pins centered on their bearing plates, scribe a line around outboard surface of door skin, using door opening as a template.
- L. Manually open door, remove bolt connecting lower guide fitting to carriage, and remove door from airplane.
- M. Remove doorstop pins from forward and aft lower corners of door.
- N. Trim material from edge of outboard skin of door using scribed line as a guide.

**CAUTION:** UNDER NO CIRCUMSTANCES SHOULD ANY MATERIAL BE TRIMMED FROM THE FUSELAGE SKIN AROUND THE DOOR OPENING.

**NOTE:** The allowable gap between the edge of the door skin and edge of the door opening is as follows (Fig. 403):  
At top and sides of door --  $0.09 + 0.09/- 0.03$  inch  
At bottom of door --  $0.12 + 0.09/- 0.03$  inch

- O. Apply organic corrosion inhibiting compound to exposed areas of interior structure (access through lightening holes) per instructions in 51-21-91.
6. Install Forward Airstair Door (New Unit)

**NOTE:** The following instructions are equally applicable to installing a door, which was previously installed on another airplane.

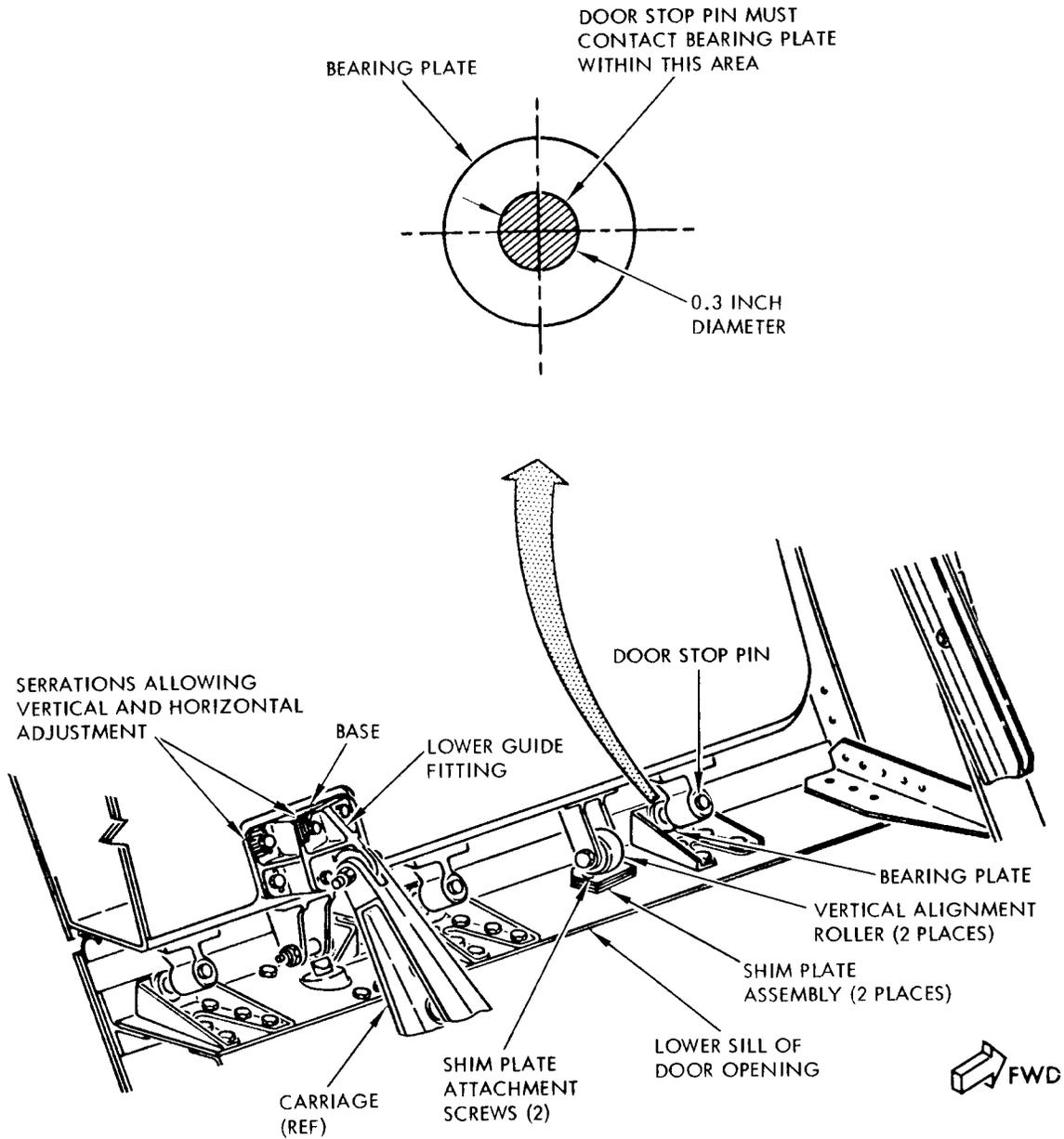
- A. Accomplish steps A thru G of par. 5, or check that these preparatory steps have been completed.
- B. Manually move door to closed position, stopping when outboard rollers of carriage are in line with 0.25-inch diameter hole at outboard end of carriage tracks (Fig. 401).

**NOTE:** As the door approaches closed position it may be necessary to move the centering guide fitting on its serrations to align with centering roller on lower edge of door (Detail A).

- C. Adjust door for flushness with outboard surface of fuselage skin at perimeter of door (Fig. 404).
  - (1) Adjust upper edge of door by loosening screws attaching upper ends of both door tracks to fuselage structure (Detail A).

EFFECTIVITY  
Airplanes With Forward Airstairs

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Forward Airstair Door Centering Adjustment  
 Figure 402

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 Airplanes With Forward Airstairs

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## MAINTENANCE MANUAL

- (2) Move each door track the required distance inboard or outboard, as necessary, on its serrated mounting plate. Retighten attachment screws.
- (3) Adjust lower edge of door by installing door stop pins at forward and aft lower corners of door and screwing each pin against its bearing plate as required.
- (4) Rotate each doorstop pin to align one of its grooves with nearest groove in bushing and install lock spring (Detail B, Fig. 401).

**NOTE:** The adjustment for flushness at lower edge of airstair door affects the airstair door latch pin clearance. The latch pin should be extended (by closing the forward entry door) and a check should be made that there is no interference between the outboard face of the latch pin and the inboard face of the cross pin on the door (Detail B, Section A-A, Fig. 404). After making this check, the forward entry door should be opened to keep the latch pin retracted.

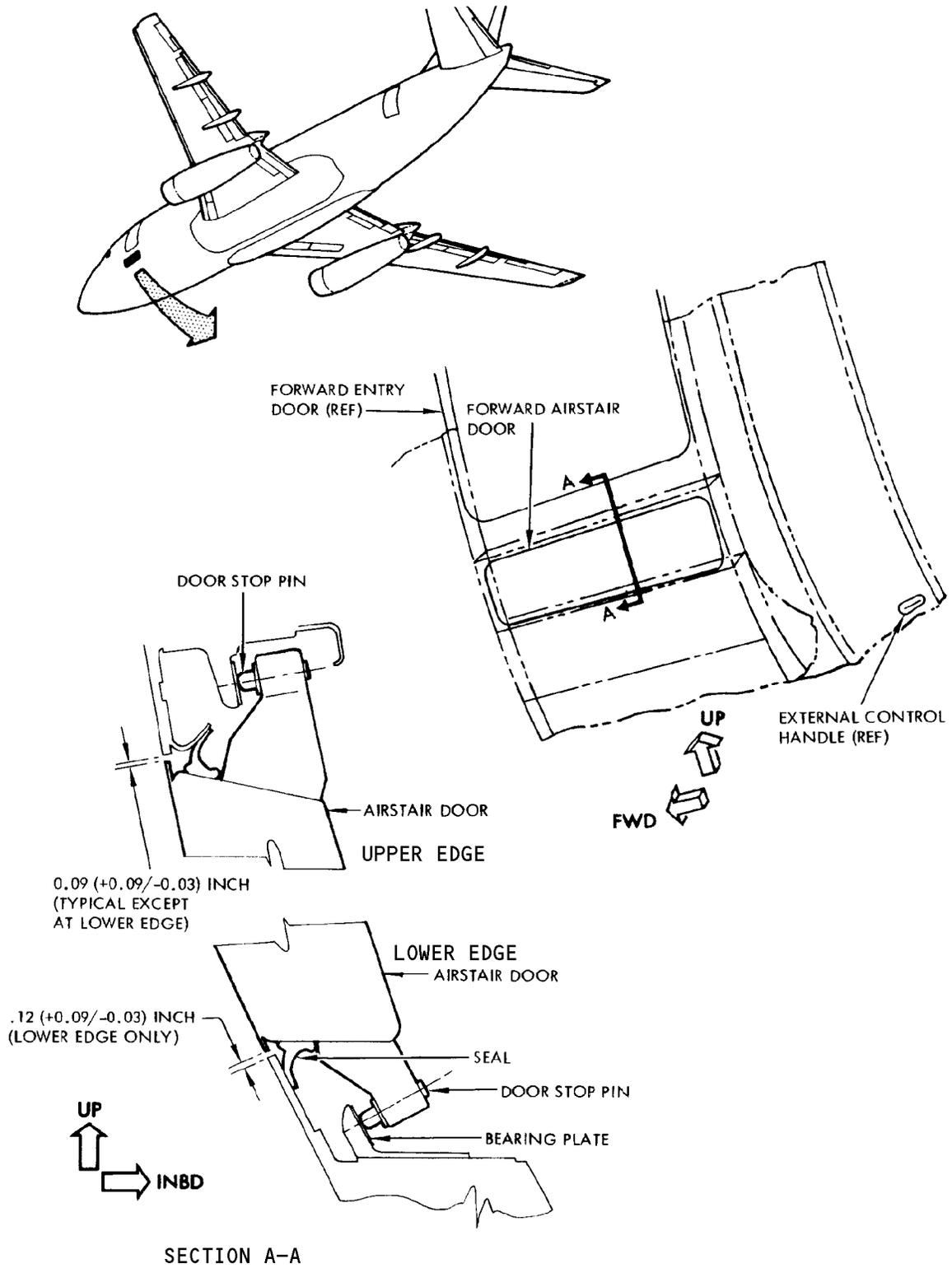
- D. Adjust door vertically and horizontally to center it within the door opening.

**CAUTION:** UNDER NO CIRCUMSTANCES SHOULD ANY MATERIAL BE TRIMMED FROM THE FUSELAGE SKIN AROUND THE DOOR OPENING.

**NOTE:** The object of the vertical and horizontal adjustment is to ensure that door stop pins contact their bearing plates within a 0.3-inch diameter circle at the center of each bearing plate (Fig. 402). During these adjustments, a close watch should be kept on the gap tolerances around edges of the door outer skin (Fig. 403). In the case of a door which has been previously installed on another airplane it may be necessary to compromise between the door stop pin centering tolerances and the edge of skin gap tolerances. In such cases more material may be trimmed from certain portions of the door's edge, if necessary.

- (1) Loosen four bolts securing lower guide fitting to its base and four bolts securing the base to the door (Fig. 402).
- (2) Remove two flush head screws securing shim plate to lower sill of door opening (two places). Lift shim plates and remove or add shims to obtain required vertical adjustment. Replace shim plates and attaching screws.

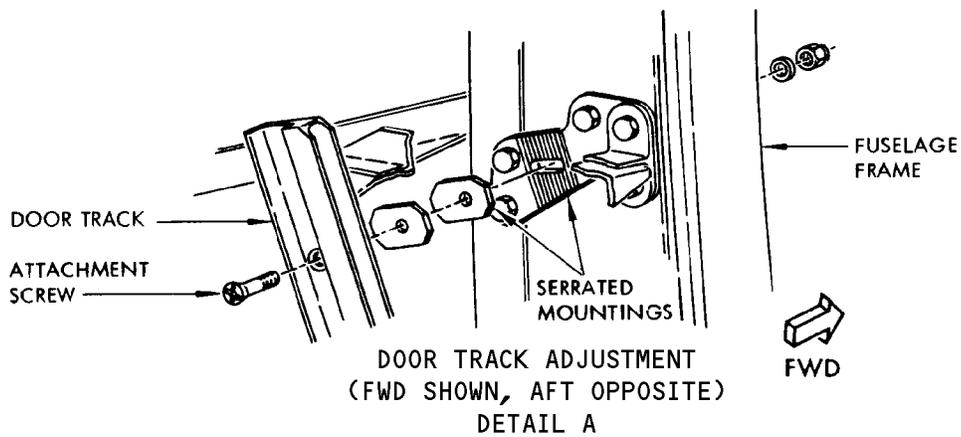
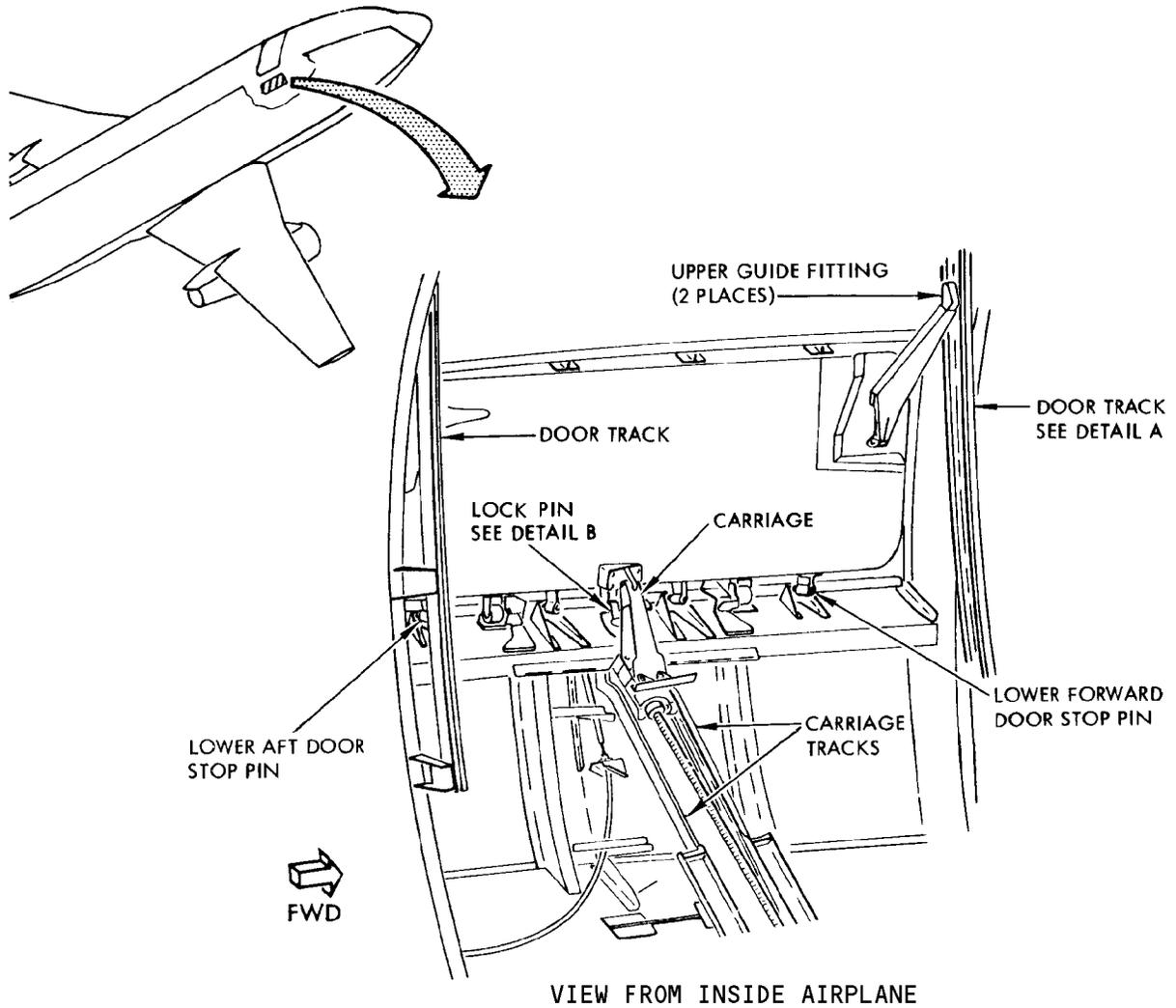
**NOTE:** The adjustment required at the two-shim plate locations may differ.



Forward Airstair Door Edge Tolerance  
Figure 403

EFFECTIVITY  
Airplanes With Forward Airstairs

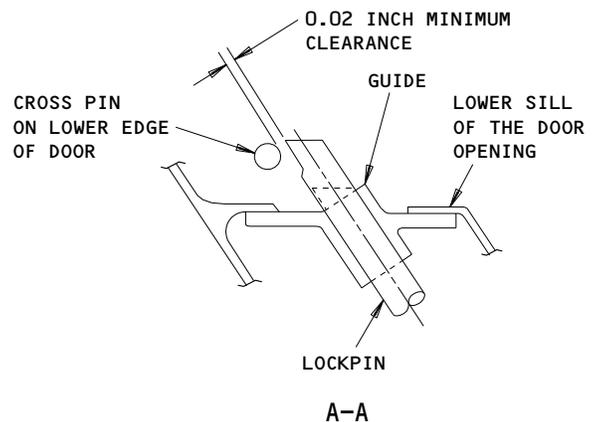
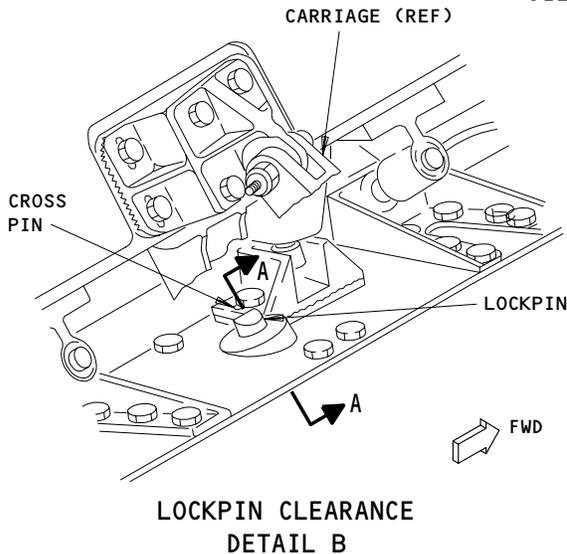
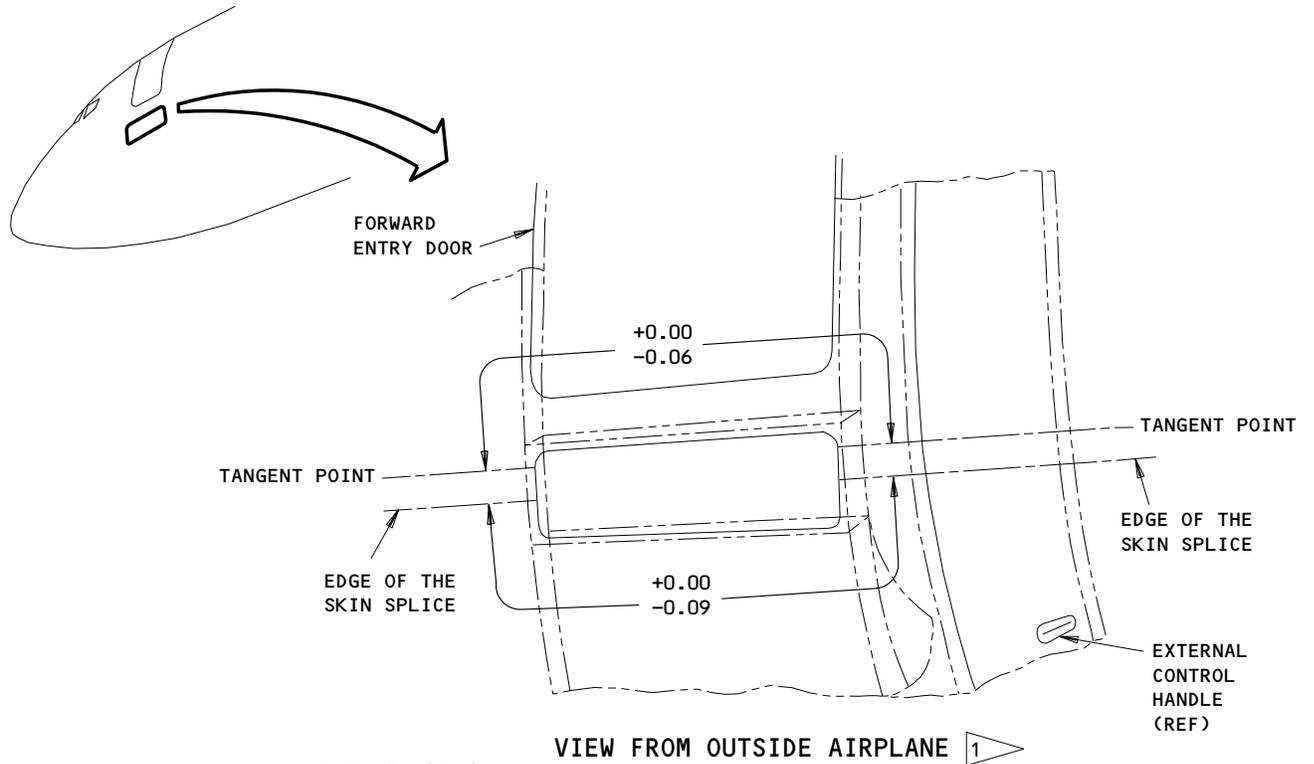
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Forward Airstair Door Flushness Adjustment  
 Figure 404 (Sheet 1)

EFFECTIVITY  
 Airplanes With Forward Airstairs

**52-61-500**



1 THIS ILLUSTRATION SHOWS THE LIMITS TO ALIGN THE FORWARD AIRSTAIR DOOR CONTOUR WITH THE FUSELAGE CONTOUR. A PLUS LIMIT SHOWS THAT THE DOOR IS OUTBOARD OF THE CONTOUR OF THE FUSELAGE. A MINUS LIMIT SHOWS THAT THE DOOR IS INBOARD OF THE CONTOUR OF THE FUSELAGE.

YOU CAN INCREASE THE LIMITS BY 0.03 INCH IN ONE OR MORE LOCATIONS. THE SUM OF THE LENGTHS OF THE INCREASED LIMITS MUST NOT BE MORE THAN 6.1 INCHES.

MEASURE ALL DIMENSIONS WHEN THE AIRPLANE IS NOT PRESSURIZED.

ALL DIMENSIONS ARE IN INCHES.

Forward Airstair Door Flushness Adjustment  
 Figure 404 (Sheet 2)

EFFECTIVITY  
 Airplanes With Forward Airstairs

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## MAINTENANCE MANUAL

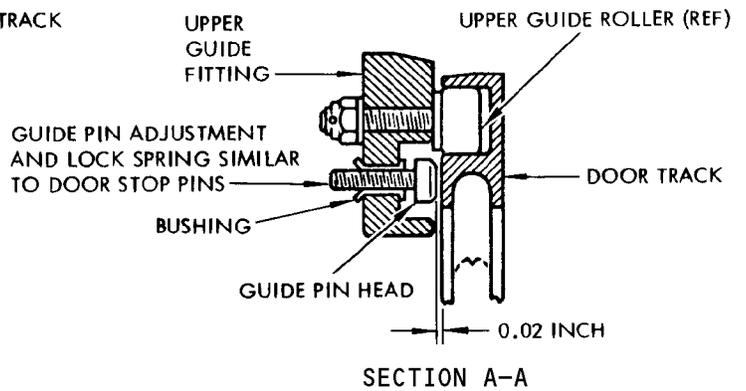
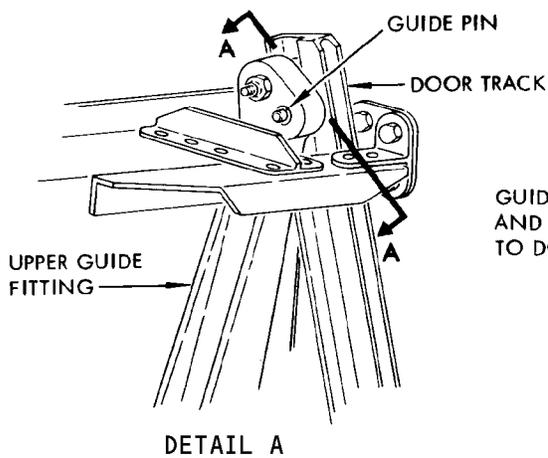
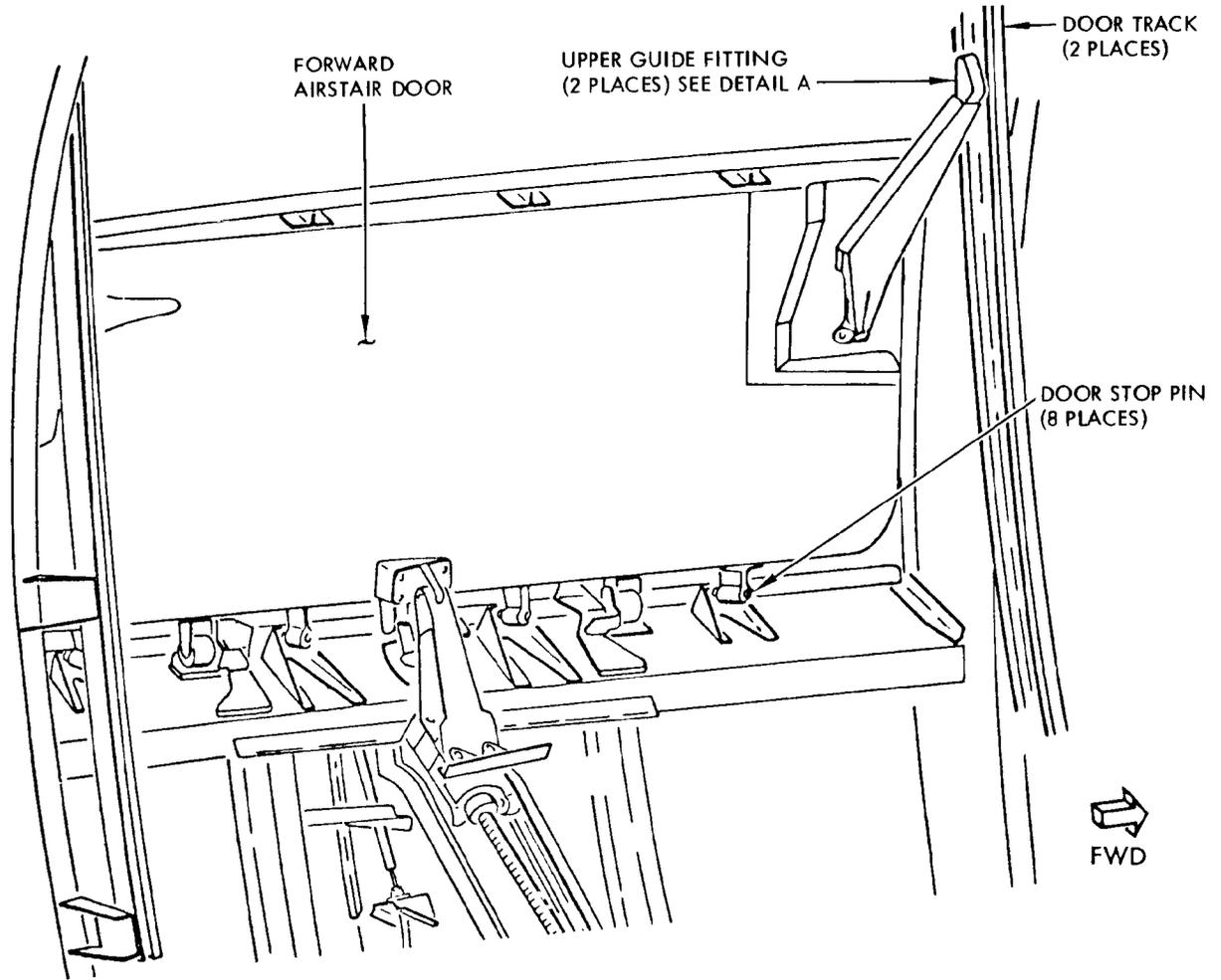
- (3) Adjust lower guide fitting base to serrations on door, which allow vertical alignment rollers of door to rest on shim plates. Tighten four bolts securing lower guide fitting base to door.
  - (4) To obtain horizontal adjustment of door, move centering guide fitting (on lower sill of door opening) forward or aft, as required, on its serrated base. Tighten the two bolts securing centering guide fitting to lower sill and tighten the four bolts securing lower guide fitting to its base (Detail A, Fig. 401).
  - (5) Complete the horizontal adjustment by adjusting guide pin on each of the two upper guide fittings to obtain 0.02-inch nominal gap between head of pin and face of track (Fig. 405).
- E. After completion of door adjustment, manually move door to fully open position and return to fully closed position. Check that there is no binding or interference between guide pins and door tracks during any part of travel.
  - F. Lock the two guide pins by backing them off to align one of its grooves with the nearest groove in bushing and install lockspring.
  - G. With door in closed position, install all four stop pins along upper edge of door and the two center stop pins along lower edge. Rotate each pin until it contacts its bearing plate.
  - H. Partially open the door and install locksprings on the six stop pins by rotation each pin until one of its grooves align with nearest groove in bushing. Close the door and check that all eight stop pins contact the center of their respective bearing plate.
  - I. Check that plungers of airstair door closed limit switches travel between 0.07 and 0.11 inch when airstair door closes. Adjust if necessary (Ref. 52-61-601, Adjustment/Test).
  - J. Manually operate airstair door to its fully open position and check that door open limit switches actuate (indicated by an audible click) when a 0.35 to 0.50-inch dimension is obtained between end of jackscrew threads and inboard face of jackscrew nut assembly. Adjust door open limit switches if necessary (Ref. 52-61-611, Adjustment/Test).
  - K. Install motor (Ref. 52-61-591, Removal/Installation).
  - L. Deleted

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Forward Airstair Door Upper Guide Adjustment  
 Figure 405

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FORWARD AIRSTAIR DOOR CARRIAGE – REMOVAL/INSTALLATION

1. Remove Forward Airstair Door Carriage

- A. Open the airstair door, leaving airstair fully retracted.
- B. Open the following circuit breakers on circuit breaker panel P6:
  - (1) FORWARD AIRSTAIR CONTROL
  - (2) FORWARD AIRSTAIR DOOR
  - (3) FORWARD AIRSTAIR ACTUATOR
  - (4) FORWARD AIRSTAIR STANDBY CONTROL
  - (5) FORWARD AIRSTAIR STANDBY
- C. Remove two jackscrew nut bushings and disengage jackscrew nut from carriage (Detail A, Fig. 401).
- D. Move airstair door to closed position and temporarily secure.
- E. Remove locknut and washer from inboard end of jackscrew and withdraw jackscrew from actuator.
- F. Remove bolt connecting carriage to lower guide fitting on door and remove carriage from guide rails by disengaging rollers at lower end of carriage guide rails.

**NOTE:** Airstair door actuator may be pivoted up and inboard on mounting bracket to facilitate removal of carriage from carriage guide rails.

2. Install Forward Airstair Door Carriage

- A. Remove standby motor Refer 52-61-591, Forward Airstair Door Standby System Motor – Removal/Installation.
- B. Position jackscrew (with jackscrew nut threaded on) between the carriage guide rails. Do not insert jackscrew into actuator at this time.
- C. Position door carriage on lower end of carriage guide rails.

**NOTE:** Airstair door actuator may be pivoted up and inboard on mounting bracket to facilitate positioning of carriage on guide rails.

- D. Check that end clearance between each guide pin and adjacent guide rail is 0.02 inch. (Sec. A-A, Fig. 401) Adjust guide pins as necessary.
- E. Move carriage up and down carriage rails and check that carriage operates freely.
- F. Temporarily secure carriage in position on rails away from actuator and insert jackscrew into actuator. Check that snubber is installed on carriage at this time. Snubber assembly is positioned over splines on end of jackscrew shaft with rubber face away from ball nut. (Fig. 401) Install washer and self-locking nut securing jackscrew to actuator.
- G. Release carriage from its temporarily secured position and connect jackscrew nut to carriage using two jackscrew nut bushings. (Detail A)
- H. Manually operate carriage along rails by rotating actuator manual drive and check that jackscrew drives carriage freely.

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I. With airstair door secured in fully closed position continue manual operation of carriage to position the two outboard rollers on carriage in alignment with 0.25 inch diameter holes in guide rails. (View 1) When the rollers are in this position the carriage should engage lower guide fitting on door.

(1) If necessary, adjust lower guide fitting so that carriage aligns properly without binding against either of the carriage guide rails.

**NOTE:** The lower guide fitting is adjustable vertically and horizontally by using the serrations on its base. Laminated shims between the base and door may be added or removed to adjust in the inboard/outboard direction. (Detail B)

J. Install bolt connecting door to carriage and remove temporarily installed restraints holding door in fully closed position.

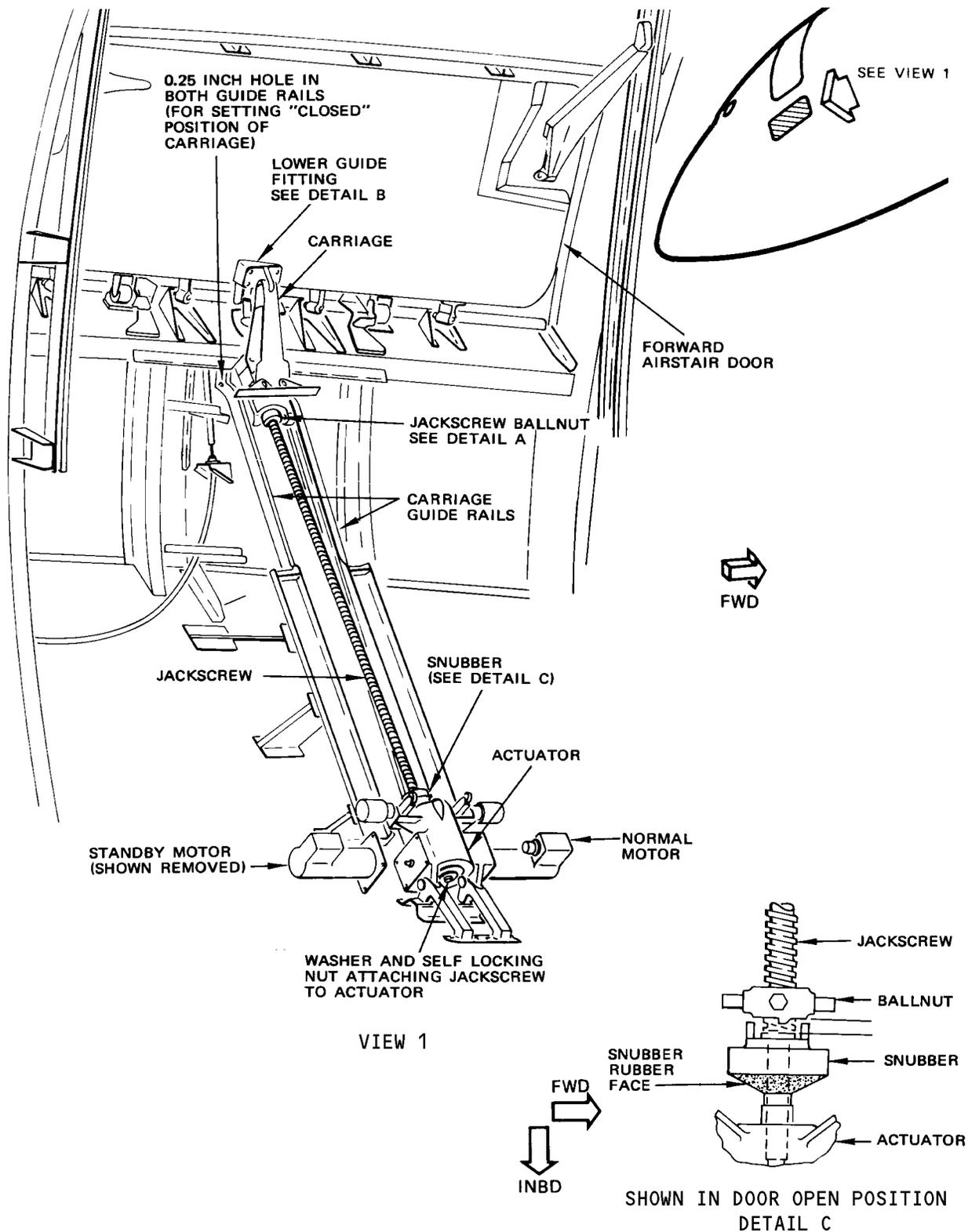
K. Check adjustment of door closed limit switches and door open limit switches. Refer to 52-61-601, Forward Airstair Door Closed Limit Switches - Adjustment/Test and 52-61-611, Forward Airstair Door Open Limit Switches - Adjustment/Test.

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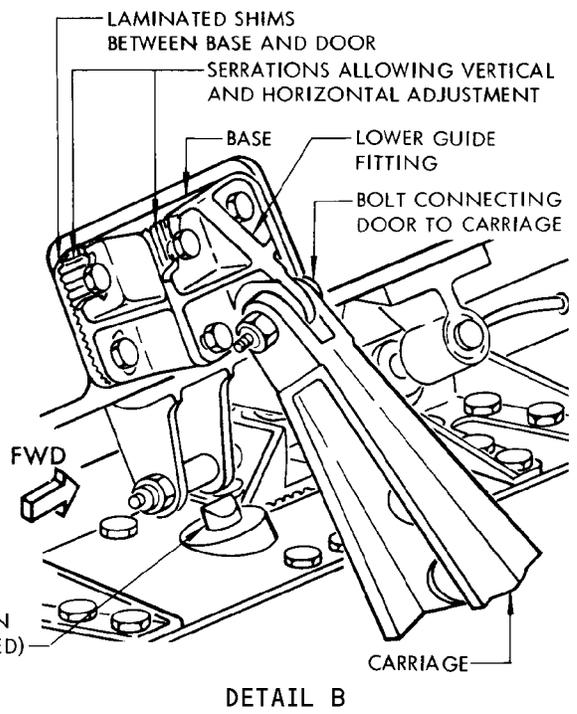
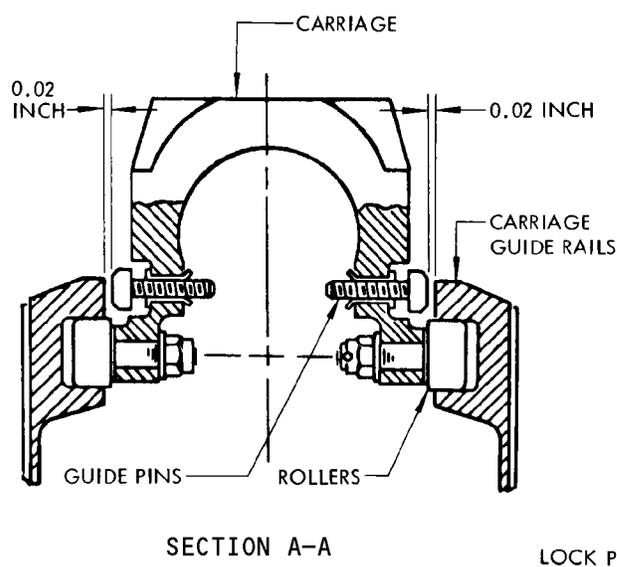
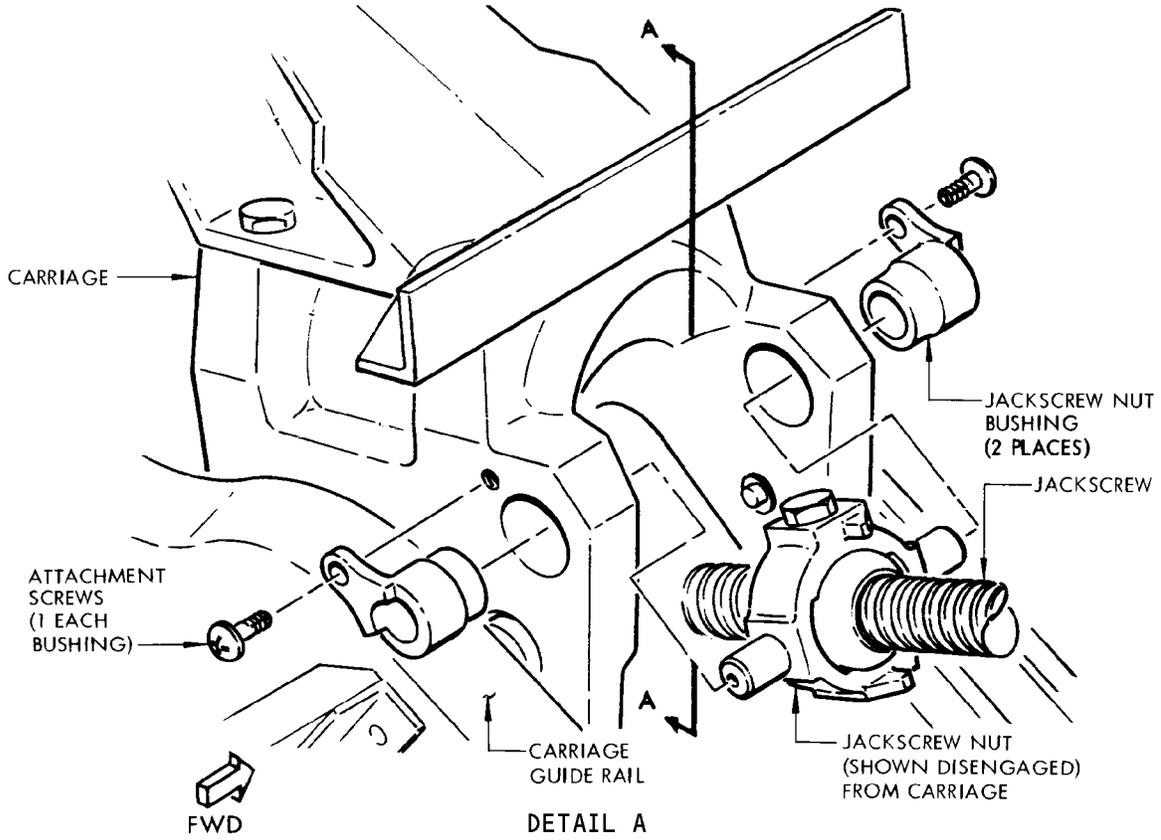
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Forward Airstair Door Carriage Installation  
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Forward Airstair Door carriage Installation  
 Figure 401 (Sheet 2)

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FORWARD AIRSTAIR DOOR ACTUATOR – REMOVAL/INSTALLATION

1. Remove Forward Airstair Door Actuator

- A. Open the forward airstair door 2 inches or more from closed position and temporarily secure in this position.
- B. Open the following circuit breakers on circuit breaker panel P6:
  - (1) FORWARD AIRSTAIR CONTROL
  - (2) FORWARD AIRSTAIR DOOR
  - (3) FORWARD AIRSTAIR ACTUATOR
  - (4) FORWARD AIRSTAIR STANDBY CONTROL
  - (5) FORWARD AIRSTAIR STANDBY
- C. Gain access to work area through electronic compartment access door.
- D. Disconnect electrical connectors from normal actuator motor and standby actuator motor (See Detail A, Fig. 401).
- E. Remove bolts attaching each door open limit switch mounting bracket to the door actuator. Leave switches attached to mounting bracket and allow to hang free.
- F. Remove self-locking nut and washer securing inboard end of jackscrew to door actuator.
- G. Remove two bolts and bushings securing actuator to actuator support.
- H. Lift actuator slightly and move actuator inboard to withdraw jackscrew and remove actuator.

**NOTE:** Normal and standby actuator motors are mounted on the actuator and will be removed with actuator.

2. Install Forward Airstair Door Actuator

- A. With airstair door temporarily secured in a partially open position, hold actuator (with normal and standby motors attached) in position and insert jackscrew into actuator. If snubber assembly is used on this installation, check that snubber is positioned over splines on end of shaft with rubber face toward actuator (Fig. 401).
- B. Position actuator on actuator support and install two bushings, attaching bolts, and washers. With door in open position and actuator and screw centered, install AN960C516 and/or AN960C516L washers to maintain a maximum fore and aft actuator movement of 0.05 inch. (Fig. 401)
- C. Compress snubber approximately 0.27 inch until jackscrew is bottomed in actuator. Install washer and self-locking nut on inboard end of jackscrew securing it to door actuator.
- D. Release airstair door from its temporarily secured position.
- E. Position each door open limit switch and attached mounting bracket on door actuator and install attaching bolts.

**NOTE:** The electrical bonding jumper provided on some airplanes should be reconnected to the standby switch bracket at the lower bolt.

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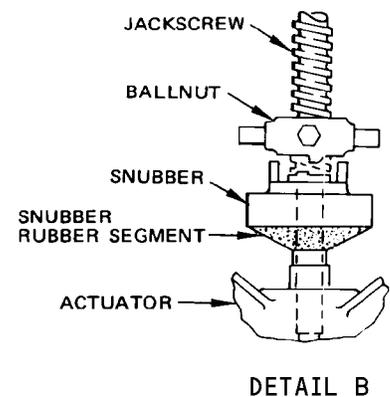
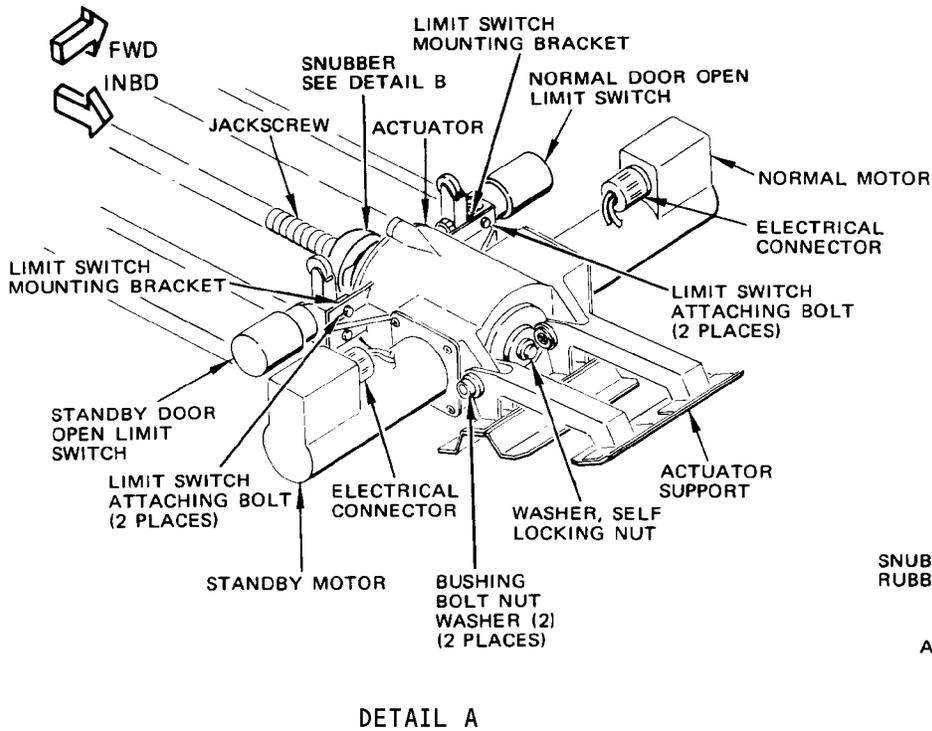
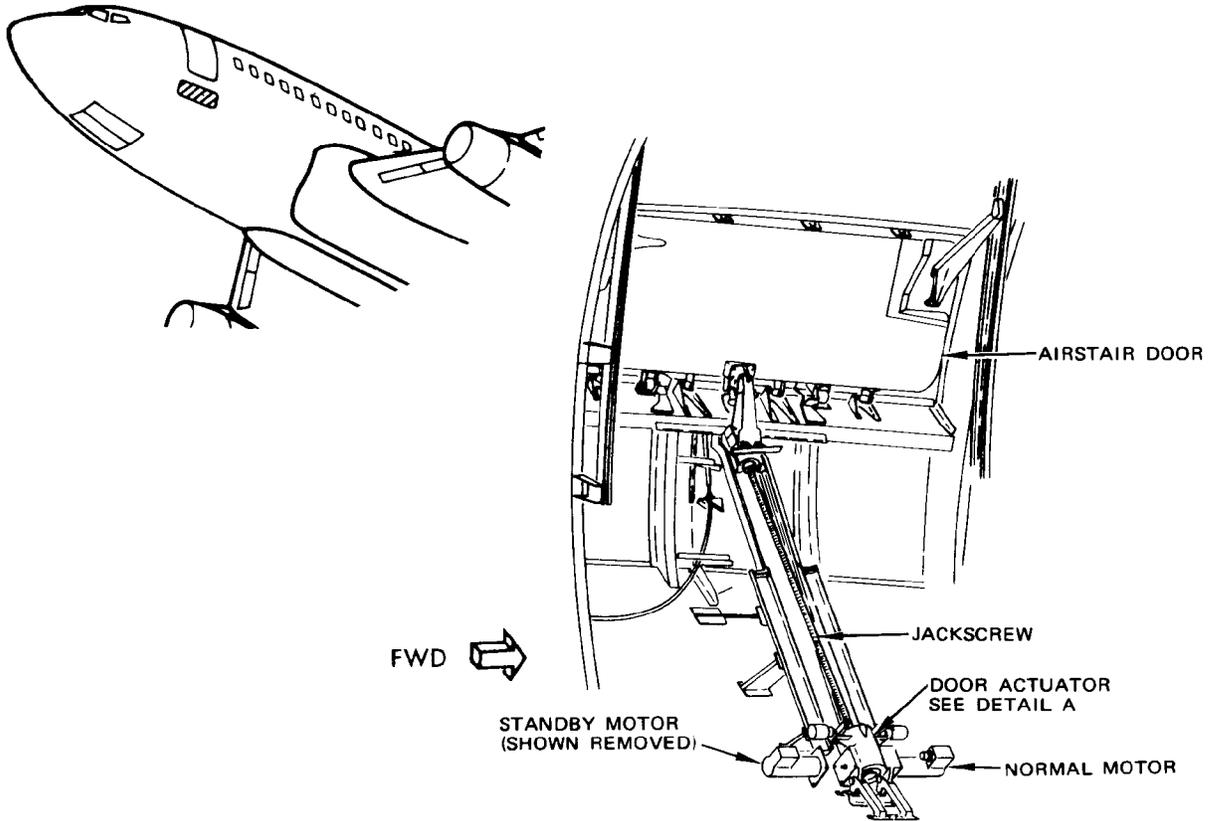
- F. Connect electrical connectors to normal actuator motor and standby actuator motor.
- G. Check adjustment of door open limit switches. Refer to 52-61-611, Forward Airstair Door Open Limit Switches - Adjustment/Test.
- H. Close circuit breakers opened in paragraph 1.B. and cycle airstair door electrically (normal system and standby system) to check operation.

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forward Airstairs Door Actuator Installation  
 Figure 401

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FORWARD AIRSTAIR DOOR LOCK MECHANISM – REMOVAL/INSTALLATION

1. General

A. The forward airstair door lock mechanism consists of an exterior and interior control assembly and a lock pin assembly. Each assembly (or part of) may be removed and installed independent of the others and are covered under separate procedures. However, the operation of the assemblies is interdependent and the door lock mechanism must be complete to allow adjustment of the installation.

2. Removal/Installation Exterior Control Assembly

A. General

(1) The exterior control assembly consists of an exterior control handle, two telescoping units, a control cable and casing (Fig. 401). The following procedure covers the complete assembly. For partial removal of the assembly omit steps for components not affected.

B. Equipment and Materials

(1) BMS 519 Class B Pressure Sealant (Required for control handle installation)  
(2) Grease – BMS 3-24 (Ref 20-30-21)

C. Remove Exterior Control Assembly

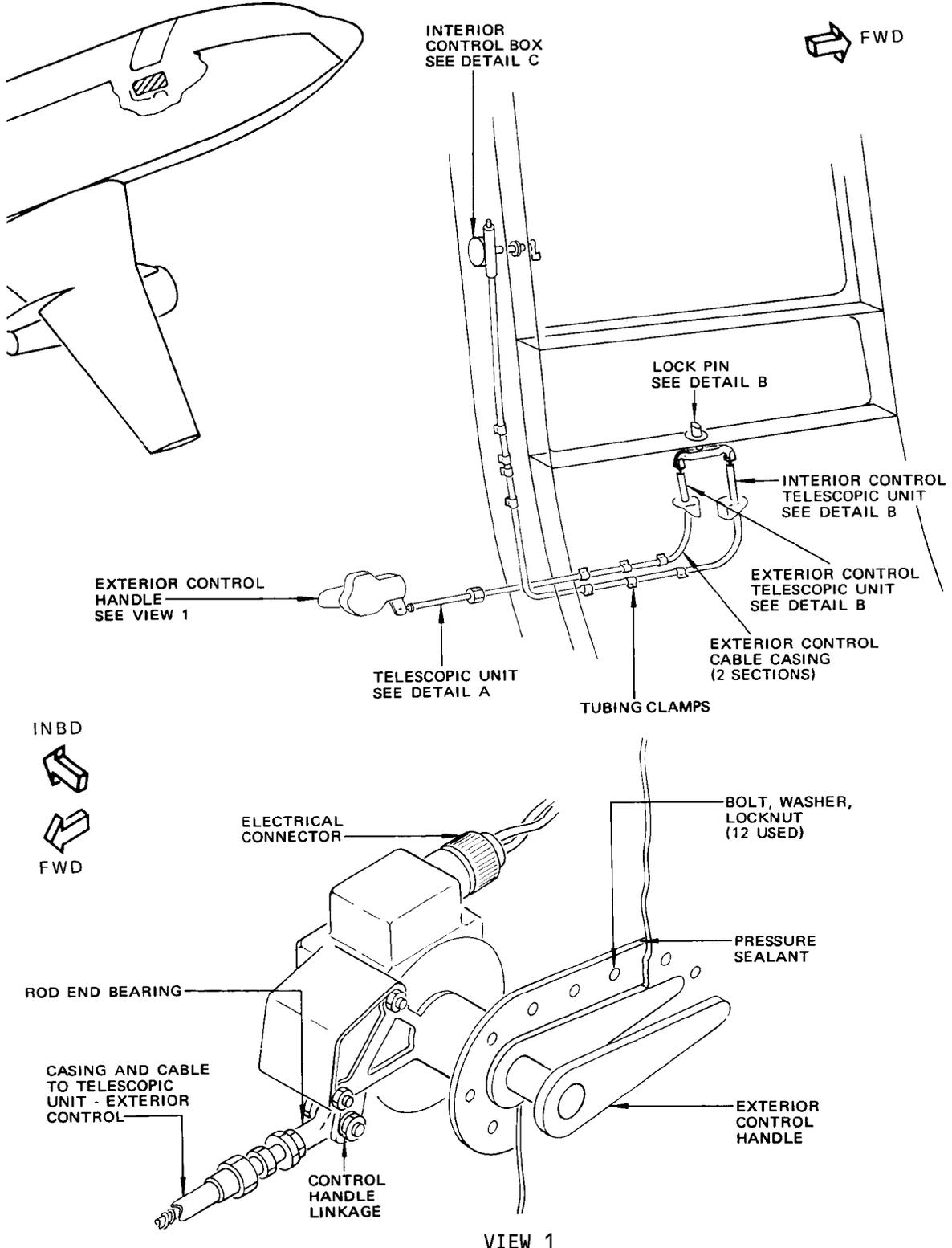
(1) Open airstair door leaving airstair fully retracted.  
(2) Open the following circuit breakers on circuit breaker panel P6.  
(a) Forward Airstair Control  
(b) Forward Airstair Door  
(c) Forward Airstair Actuator  
(d) Forward Airstair Standby Control  
(e) Forward Airstair Standby  
(3) Remove extreme left access panel on the forward bulkhead of the forward cargo compartment to gain access to control handle.  
(4) Remove bolt, washer and locknut connecting rod-end bearing to the exterior control handle linkage. (Fig. 401, View 1)  
(5) Remove exterior control handle (if required).  
(a) Disconnect electrical connector from control handle control box.  
(b) Remove twelve bolts, washers and locknuts attaching control handle housing to airplane structure.  
(c) Remove sealant around handle housing and remove control handle assembly.

NOTE: Refer to Chapter 51, Seals and Sealing for procedures to remove the pressure sealant.

(6) Remove rod end bearing and threaded-end fitting from telescoping unit connected to exterior control handle. (Detail A)  
(7) Compress telescopic unit and remove cable lock from exposed cable.

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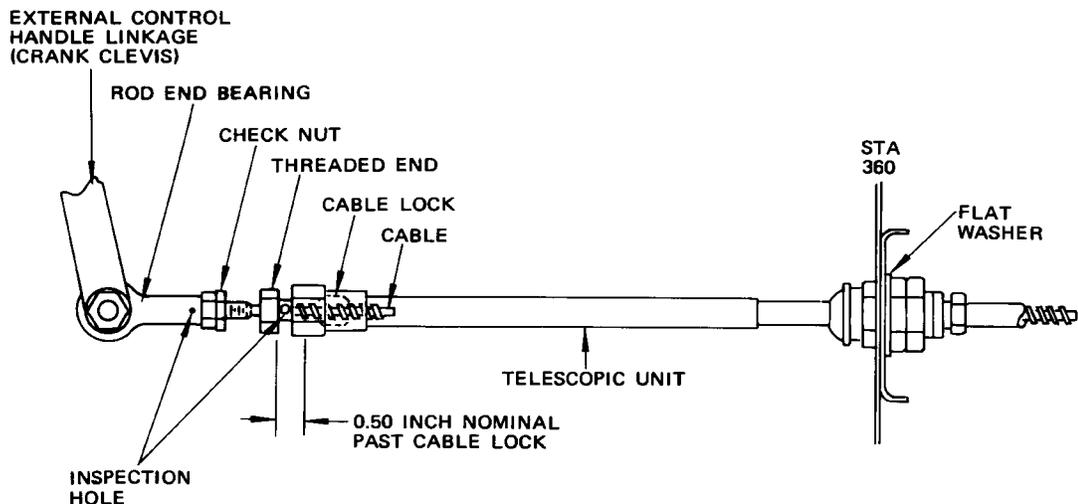


Forward Airstair Door Lock Mechanism  
 Figure 401 (Sheet 1)

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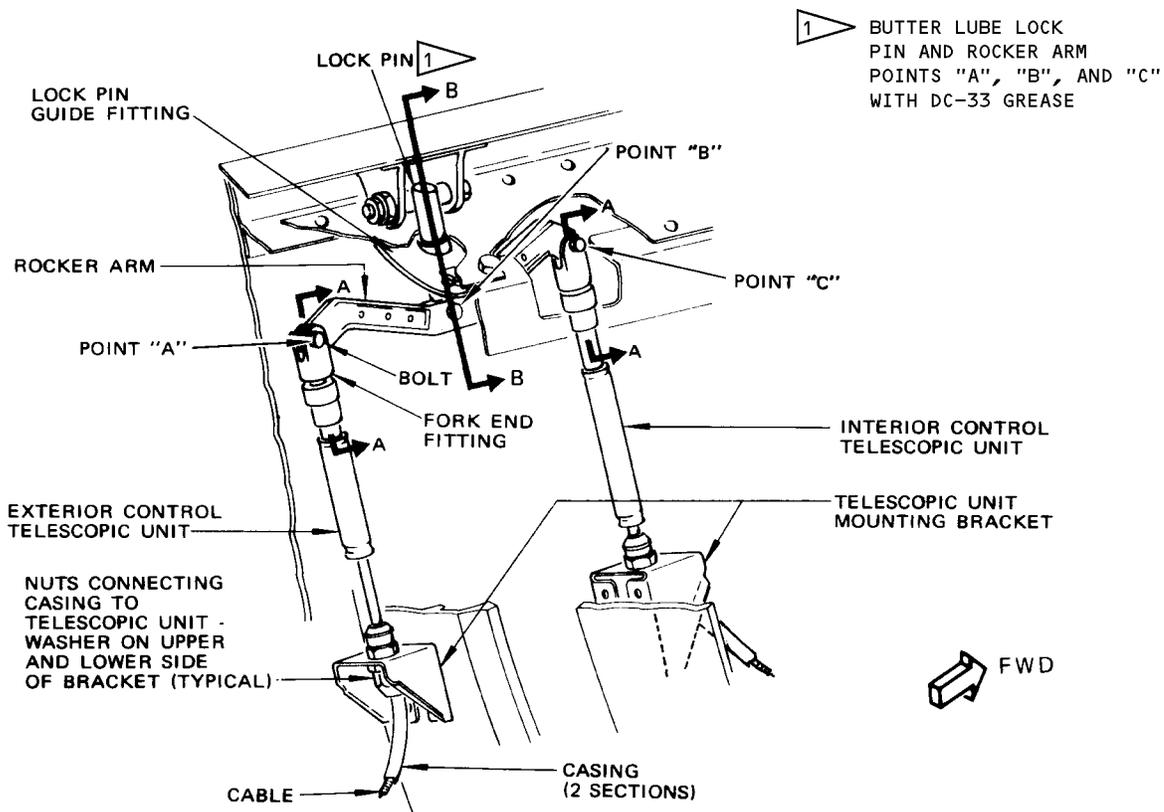
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➔ FWD

DETAIL A



1 BUTTER LUBE LOCK PIN AND ROCKER ARM POINTS "A", "B", AND "C" WITH DC-33 GREASE

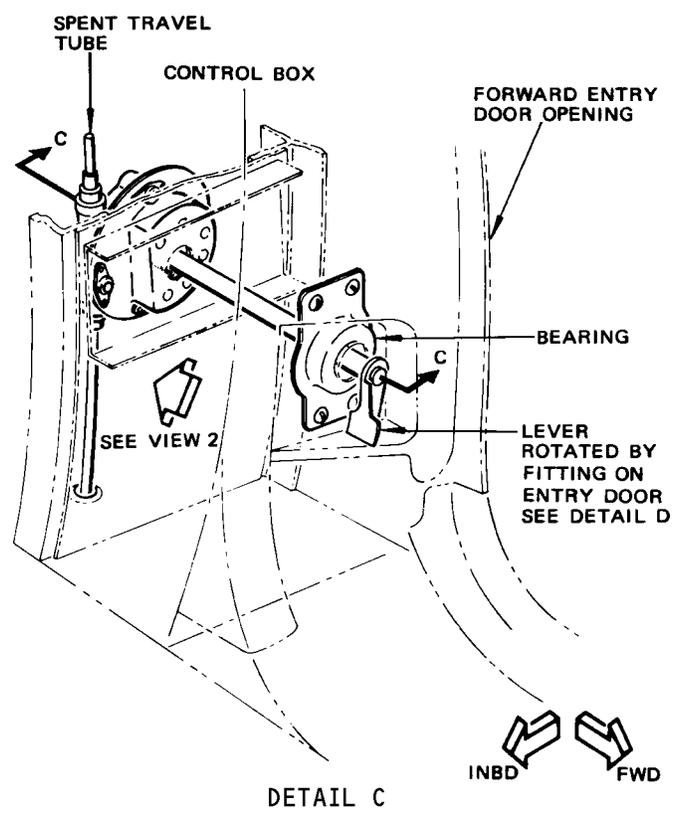
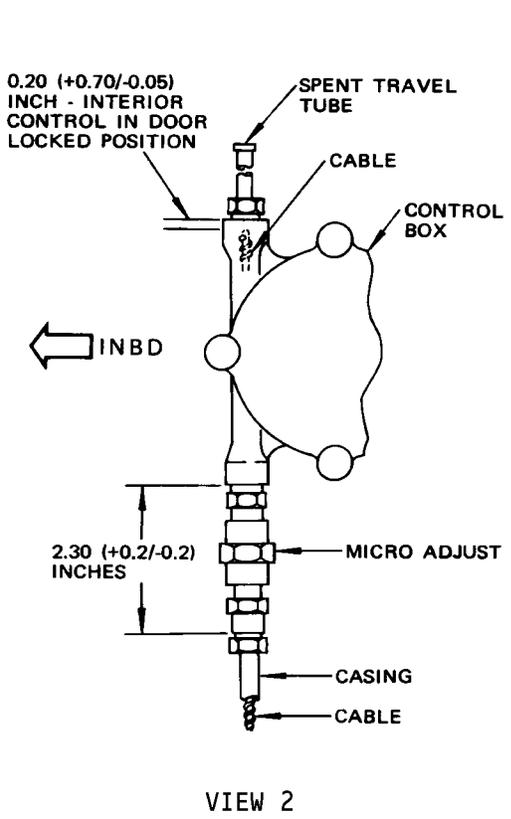
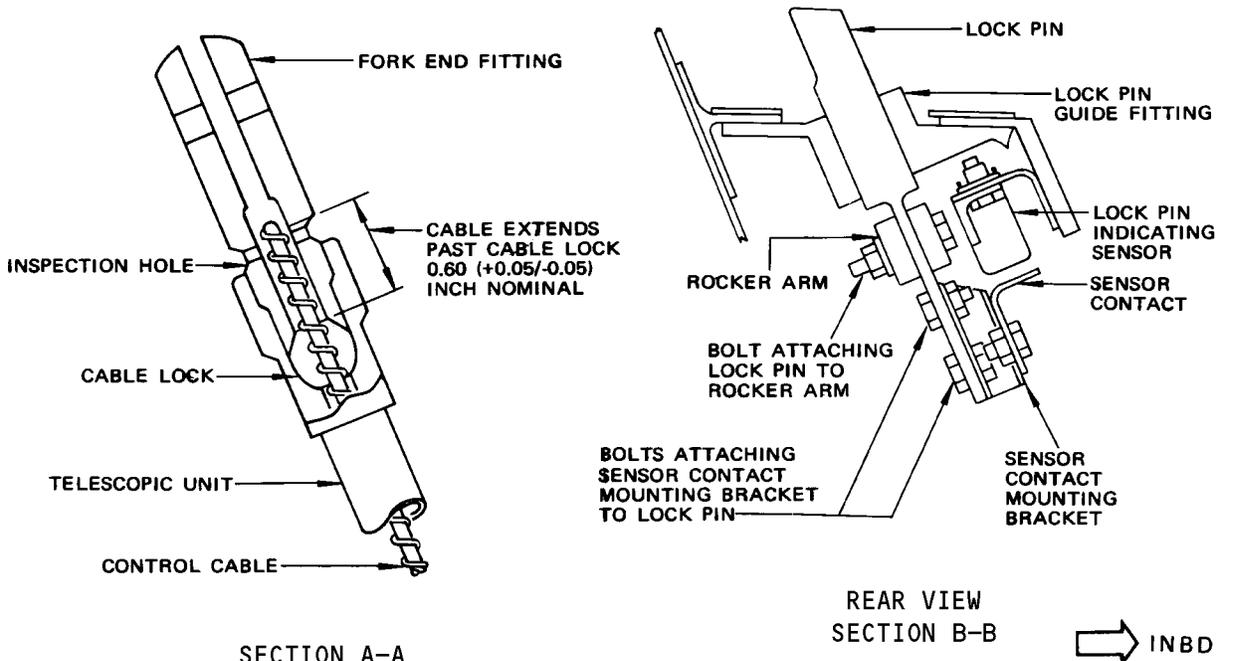
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DETAIL B

Forward Airstair Door Lock Mechanism  
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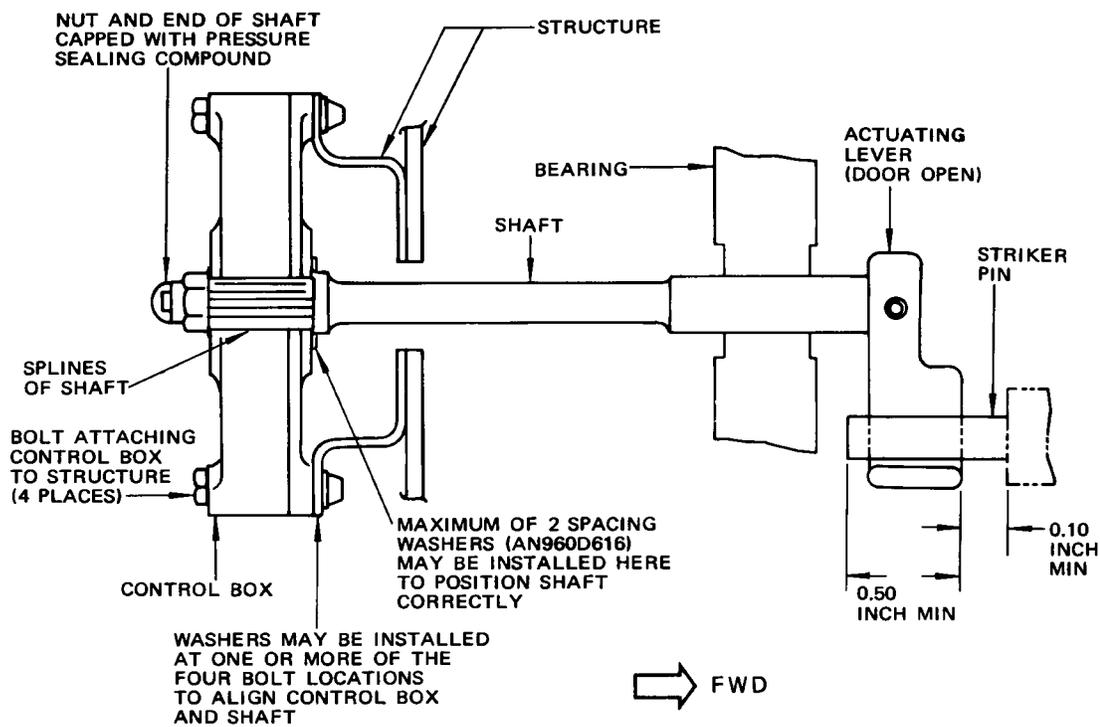


Forward Airstair Door Lock Mechanism  
 Figure 401 (Sheet 3)

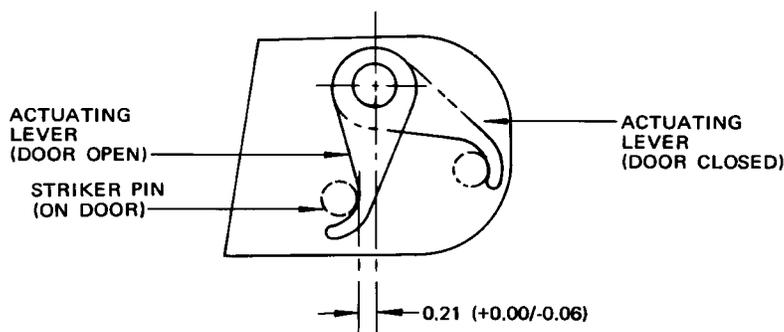
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SECTION C-C



DETAIL D

Forward Airstair Door Lock Mechanism  
 Figure 401 (Sheet 4)

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- (8) Remove cotter pin, nut, washer and bolt connecting aft end of airstair door lock pin rocker arm to fork-end fitting of telescoping unit, and remove fork-end fitting. (Sec. A-A)
- (9) Pull cable from telescoping unit until cable lock emerges and remove cable lock from cable.
- (10) Remove control cable from cable casing.

**CAUTION:** USE CARE TO KEEP CABLE CLEAN AND FREE OF KINKS IF CABLE IS TO BE REINSTALLED.

- (11) Remove telescoping unit (if required, 2 places).
  - (a) Disconnect casing from base of telescoping unit. (Detail B)
  - (b) Remove jam nuts from base of telescoping unit noting position of washers, and remove telescoping unit.
- (12) Remove control cable casing (if required).
  - (a) Unscrew connectors at each end of casing section to be removed.
  - (b) Release tubing clamps securing casing to structure, and remove casing.

### D. Install Exterior Control Assembly

- (1) Install control cable casing (if removed).
  - (a) Place sections of casing in position; orient-casing sections in accordance with markings etched on surface of casing.

**NOTE:** One end of each casing section is marked FWD with an arrow to indicate orientation.

- (b) Join connectors at each end of casing section being installed; tighten connectors after all components have been assembled.
  - (c) Install casing clamps securing sections of casing to structure.
- (2) Install telescoping units (if removed, 2 places).
  - (a) Position telescoping unit and washers on mounting bracket and secure with jam nuts.

**NOTE:** Telescoping unit adjacent to rocker arm is spring-loaded in the extend position and installed with AN960PU1016 washer on upper side of bracket and AN960PD1016L washer on lower side of bracket. The telescoping unit adjacent to the control handle is not spring-loaded and installed with AN960PD1016 washer on forward side of bracket.

- (b) Join casing to telescoping unit and tighten connector.
- (3) Install control cable.
  - (a) Prior to installation of cable, hand lubricate cable assembly with grease (BMS 3-24).

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- (b) Insert end of cable into opening of telescoping unit and push cable through casing.

**CAUTION:** USE CARE TO KEEP CABLE CLEAN AND PREVENT KINKING OF CABLE.

- (c) Install cable lock on end of cable at telescopic unit adjacent to rocker arm so that cable extends 0.60 (+ 0.05/- 0.05) inch past cable lock and push cable into telescoping unit to seat cable lock. (Sec. A-A)
  - (d) Screw fork-end fitting into telescoping unit and torque to 200 pound-inches. Check that cable is visible at inspection hole in fork-end fitting.
  - (e) Connect fork-end fitting of telescoping unit to aft end of rocker arm with bolt, washer and nut.
  - (f) Compress telescoping unit adjacent to control handle and install cable lock on end of cable so that cable extends .50 inch past cable lock. Pull telescopic unit to extended position to seat cable lock. (Detail A)
  - (g) Screw threaded-end fitting into telescoping unit and torque to 200 pound-inches. Check that cable is visible at inspection hole in threaded-end fitting.
- (4) Install exterior control handle (if removed).
    - (a) Attach control handle housing to airplane structure using twelve bolts, washers and locknuts. (View 1)
    - (b) Apply sealant around control handle housing flange. Refer to Chapter 51, Seals and Sealant.
    - (c) Connect electrical connector to control handle control box.
  - (5) Install rod-end bearing and jam nut on threaded end fitting and adjust rod-end bearing to match control handle linkage with control handle in stowed position. Lock with jam nut.
  - (6) Check that threaded-end fitting is visible at inspection hole in rod-end bearing. (Detail A)

**NOTE:** If threaded-end fitting is not visible at inspection hole in rod-end bearing, or if cable is too long to adjust rod end, the cable lock in either or both telescoping units must be released and turned to increase or decrease the amount that cable extends past the cable lock. If cable is too long to adjust rod end, trim cable to required amount.

- (7) Connect rod-end bearing to control handle linkage with bolt, washer and locknut.
- (8) Adjust and test latch mechanism in accordance with adjustment/test procedure.

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### 3. Removal/Installation Interior Control Assembly

#### A. General

- (1) The interior control assembly consists of a control box, a telescoping unit, a control cable and tubing including a variable length micro-adjust assembly (Fig. 401). The following procedure covers the complete assembly; for partial removal of the assembly omit steps for components not affected.

#### B. Equipment and Materials

- (1) BMS 519 Class B pressure sealant. (Required on control shaft retaining nut.)
- (2) Grease - BMS 3-24 (Ref. 20-60-2)

#### C. Remove Interior Control Assembly

- (1) Open airstair door leaving airstair fully retracted.
- (2) Open the following circuit breakers on circuit breaker panel P6.
  - (a) Forward Airstair Control
  - (b) Forward Airstair Door
  - (c) Forward Airstair Actuator
  - (d) Forward Airstair Standby Control
  - (e) Forward Airstair Standby
- (3) Remove forward left windscreen and sidewall lining panel immediately aft of forward entry door (Ref. Chapter 25, Forward Left Windscreen and Doorway Linings).
- (4) Remove nut and washer from center of control box on aft side and gently pull shaft of door operated lever until splines on shaft are disengaged from control box.

**NOTE:** Do not withdraw shaft any more than necessary to disengage splines, or spacing washers, which may be on end of shaft, may fall inside of control box support bracket, requiring removal of control box for recovery.

**CAUTION:** DO NOT ATTEMPT TO CLOSE THE FORWARD ENTRY DOOR WHILE THE SHAFT IS EXTENDED INTO THE DOOR OPENING.

- (5) Remove spent travel tube from upper side of control box (Detail C).
- (6) Remove cotter pin, washer, and bolt connecting forward end of airstair door lock pin rocker arm to fork-end fitting of telescoping unit, and remove fork-end fitting. (Sec. A-A)
- (7) Pull cable from telescoping unit until cable lock emerges and remove cable lock from cable.
- (8) Remove control cable from cable casing.

**CAUTION:** USE CARE TO KEEP CABLE CLEAN AND FREE OF KINKS IF CABLE IS TO BE REINSTALLED.



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- (9) Remove telescoping unit (if required).
    - (a) Disconnect cable casing from base of telescoping unit. (Detail B.)
    - (b) Remove jam nuts from base of telescoping unit noting position of washers, and remove telescoping unit.
  - (10) Remove control box (if required).
    - (a) Disconnect micro-adjust from control box.
    - (b) Remove four bolts and washers attaching control box to support bracket and remove control box. (Note position of washers between control box and support bracket if any.)
    - (c) Remove control shaft from shaft bearing. (Remove spacing washer from end of shaft if installed.)
  - (11) Remove control cable casing (if required).
    - (a) Unscrew connectors at each end of casing section to be removed.
    - (b) Release tubing clamps securing casing to structure, and remove casing.
- D. Install Interior Control Assembly
- (1) Install control cable casing (if removed).
    - (a) Orient casing sections in accordance with markings etched on surface of casing and place sections of casing in position.

**NOTE:** One end of casing section is marked either FWD or UP with an arrow to indicate orientation.
    - (b) Join connectors at each end of casing section being installed; tighten connectors after all components have been assembled.
    - (c) Set micro-adjust assembly to 2.30-inch nominal length (View 2).
    - (d) Install tubing clamps securing sections of casing to structure. (Do not tighten tubing clamps at this time.)
  - (2) Install control box (if removed).
    - (a) Position control box on support bracket, insert control shaft through bearing into splines in control box and rotate shaft to check that shaft turns freely in the bearing. If shaft movement is stiff or if rough spots are felt, disengage shaft, remove control box and insert AN96OPD10 or AN96OPD10L washers between control box and bracket at bolt locations as required to align control box with shaft bearing. If control box has 1/8-inch diameter drain hole on aft face near bottom edge, check that drain hole is not obstructed.

**NOTE:** If the same control box is being installed the same quantity of washers (if any) should be installed on the shaft and at the four attach locations as were used when control box was previously installed.

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- (b) Install bolts and shaft and recheck for freedom of shaft rotation.
- (c) Place modeling clay on full-length outboard side of lever striker pin and close and latch door.
- (d) Open entry door and check that forward edge of control box actuating lever is 0.10-inch minimum from striker pin mounting surface and lever engages pin a minimum of 0.50-inch (Ref. Sec. C-C).
- (e) Add one or two (AN960D616) washers between shaft collar and forward face of control box to obtain proper engagement if required.
- (f) Carefully disengage shaft from control box.

**NOTE:** Take care not to slide washers from shaft while disengaging shaft from control box.

- (g) Connect micro-adjust to control box.
- (3) Install telescoping unit (if removed).
  - (a) Position telescoping unit and washers on mounting bracket and secure with jam nuts.

**NOTE:** Telescoping unit is spring-loaded in the retracted position and is installed with AN960PD1016 washer on upper side of bracket and AN960PD1016L washer on lower side of bracket.

- (4) Install control cable.
  - (a) Prior to installation of cable, hand lubricate cable assembly with BMS 3-24 grease.
  - (b) Insert end of cable into opening on upper side of control box and push cable through casing until cable emerges from telescoping unit adjacent to forward end of lock pin rocker arm (Detail B).
  - (c) Install cable lock on end of cable at telescoping unit so that cable extends 0.60 (+ 0.05/- 0.05) inch past cable lock, and push cable into telescoping unit to seat cable lock (Sec. A-A).
  - (d) Screw fork-end fitting into telescoping unit and torque to 200 pound-inches. Check that cable is visible at inspection hole in fork-end fitting.
  - (e) Connect fork-end fitting of telescoping unit to forward end of rocker arm with bolt, washer and nut.



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- (f) Position control shaft actuating lever as shown in Detail D and engage with control box to closest spline. Use micro-adjust unit if necessary to position lever within required tolerance (Detail D).

**NOTE:** If adjustment range of micro-adjust unit is exceeded, reset unit to nominal 2.30 dimension and reposition shaft in control box to adjacent spline and repeat step.

- (g) Install washer and nut on control shaft. Do not tighten.  
(h) Close and latch entry door and check that end of control cable is below upper face of control box within 0.2 (+ 0.7/- 0.05) inch.

**NOTE:** If end of cable is not within tolerance, the cable lock in telescoping unit must be released and reset required amount, or if cable is long, cable end can be trimmed required amount. Repeat steps (c) thru (g).

- (i) Install spent travel tube on upper side of control box (Detail C).  
(j) Tighten all casing clamps and nut on control box shaft. Secure nut on control box shaft with sealant.  
(k) Adjust and test mechanism in accordance with adjustment/test procedure (Ref. Airstair Door Lock Mechanism - Adjustment/Test).

#### 4. Removal/Installation Lock Pin Assembly

##### A. General

- (1) The lock pin assembly consists of a rocker arm assembly, a lock pin and a lock pin guide fitting (Detail B). The following procedure covers the complete assembly; for partial removal of the assembly omit steps for components not affected.

##### B. Equipment and Materials

- (1) Grease - Silicon e Base - DC-33 (Ref. 20-30-21)

##### C. Remove Lock Pin Assembly

- (1) Open airstair door leaving airstair fully retracted.  
(2) Open the following circuit breakers on circuit breaker panel 16.  
(a) Forward Airstair Control  
(b) Forward Airstair Door  
(c) Forward Airstair Actuator  
(d) Forward Airstair Standby Control  
(e) Forward Airstair Standby  
(3) Remove cotter pin, nut, washer and bolt connecting fork-end fitting of each telescoping unit to rocker arm, and remove rocker arm and lock pin assembly.

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- (4) Remove bolts attaching lock pin and/or sensor actuator mounting bracket to rocker arm to disassemble (if required).
  - (5) Remove two bolts attaching lock pin guide fitting to door sill structure and remove guide fitting (if required).
- D. Install Lock Pin Assembly
- (1) Position lock pin guide fitting under door sill and install bolts attaching guide fitting to structure (if removed).
  - (2) Assemble lockpin and/or sensor actuator bracket to rocker arm (if disassembled).
  - (3) Position rocker arm and lockpin assembly with chamfer on upper end of lockpin parallel with doorsill and end of rocker arm with greater offset forward. Attach rocker arm to fork-end fitting at each telescoping unit with bolt, nut, washer and cotter pin.
  - (4) Hand lubricate lockpin and rocker arm attach points A, B, and C (Detail B) with DC-33 grease.
  - (5) Adjust and test lock mechanism in accordance with adjustment/test procedure (Ref Forward Airstair Door Lock Mechanism - Adjustment/Test).
  - (6) Adjust and test lockpin-indicating switch in accordance with adjustment/test procedure (Ref 52-71-0, Door Warning System).

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Airplanes With Forward Airstairs

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FORWARD AIRSTAIR DOOR LOCK MECHANISM – ADJUSTMENT/TEST

1. General

- A. Adjustment procedures should be performed after any of the door lock mechanism components have been replaced or the lock mechanism fails to operate properly. The adjustment procedures cannot be performed until all components are properly installed.
- B. The test procedures should be performed only after all components of the door lock mechanism are installed and adjusted.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
– YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
– THE WIND IS MORE THAN 40 KNOTS  
– THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
– THE FORWARD ENTRY DOOR IS OPENED FULLY  
– THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

2. Equipment and Materials

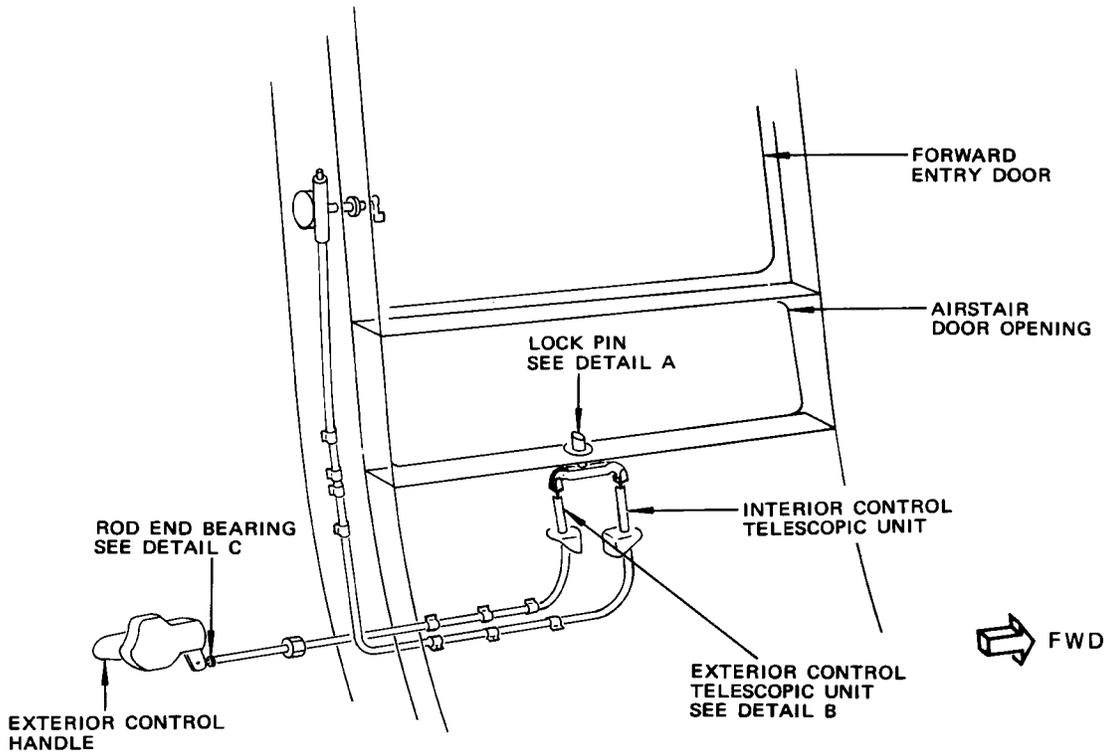
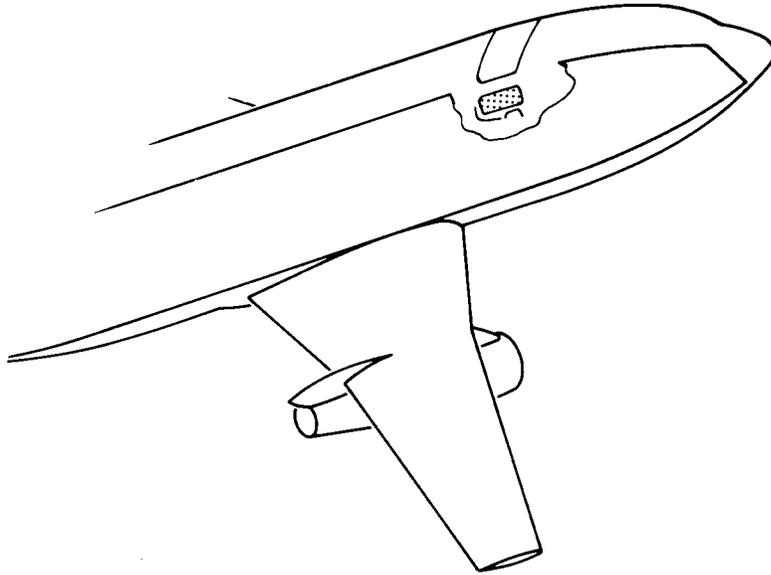
- A. Push-pull scale – 0 to 50 pound capacity, John Chattillon Model DPP 50

3. Forward Airstair Door Lock Mechanism Adjustment

- A. Adjust Door Lock Mechanism
- B. Adjust Door Lock Mechanism
  - (1) Fully retract the forward airstair and check that the airstair door is closed.
  - (2) Open the following circuit breakers on the circuit breaker panel P6.
    - (a) Forward Airstair Control
    - (b) Forward Airstair Door
    - (c) Forward Airstair Actuator
    - (d) Forward Airstair Standby Control
    - (e) Forward Airstair Standby
  - (3) With forward entry door open and exterior control handle stowed, check that top of airstair door lock pin is 0.12 +0.03/-0.10 inch from bottom of airstair door cross pin (Fig. 502, Detail A). If adjustment is required, perform the following steps.
    - (a) Adjust the external control rod end bearing until above dimension is obtained (Detail C).
    - (b) Check that threads are visible at inspection hole of rod end. If threads are not visible, or if cable is too long to adjust rod-end, perform the following steps.
      - 1) Disconnect exterior control fork end fitting from rocker arm, and unscrew fork end. (Detail B)

EFFECTIVITY  
Airplanes With Forward Airstairs

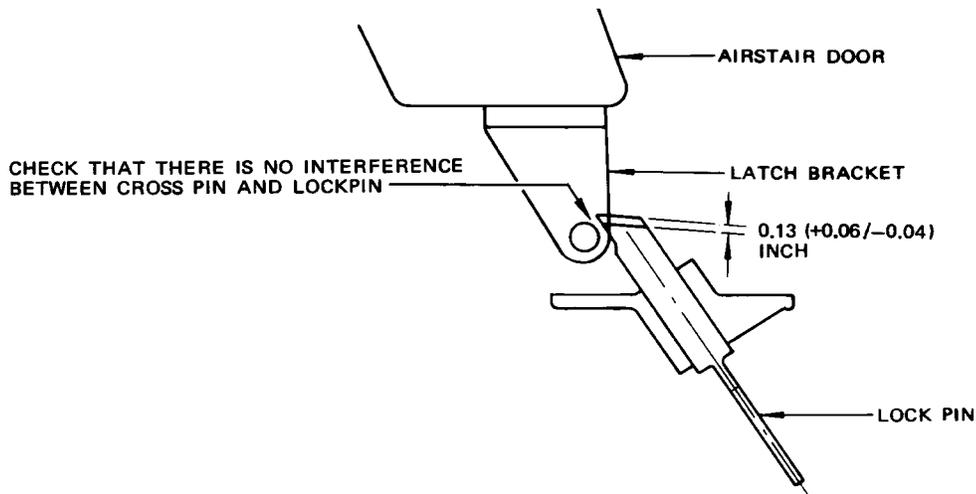
52-61-531



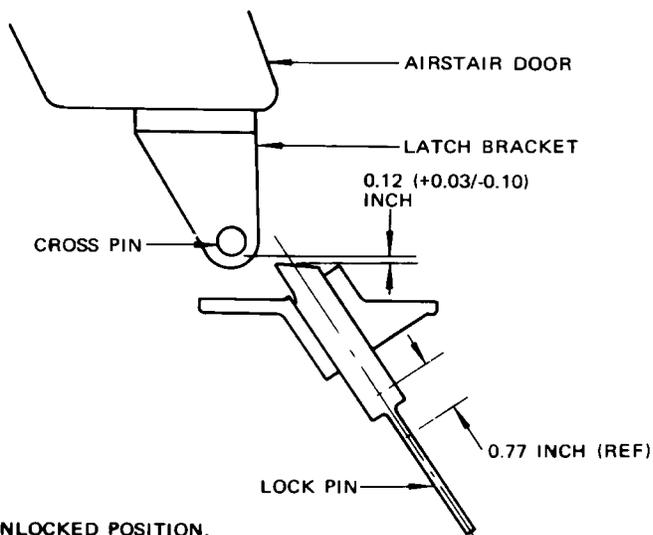
Forward Airstair Door Lock Mechanism  
 Figure 501 (Sheet 1)

EFFECTIVITY  
 Airplanes With Forward Airstairs

**52-61-531**



LOCK PIN IN DOOR LOCKED POSITION.  
 FORWARD ENTRY DOOR CLOSED AND LATCHED  
 AND EXTERIOR CONTROL HANDLE IN STOWED  
 POSITION (BOTH TELESCOPIC UNITS EXTENDED)



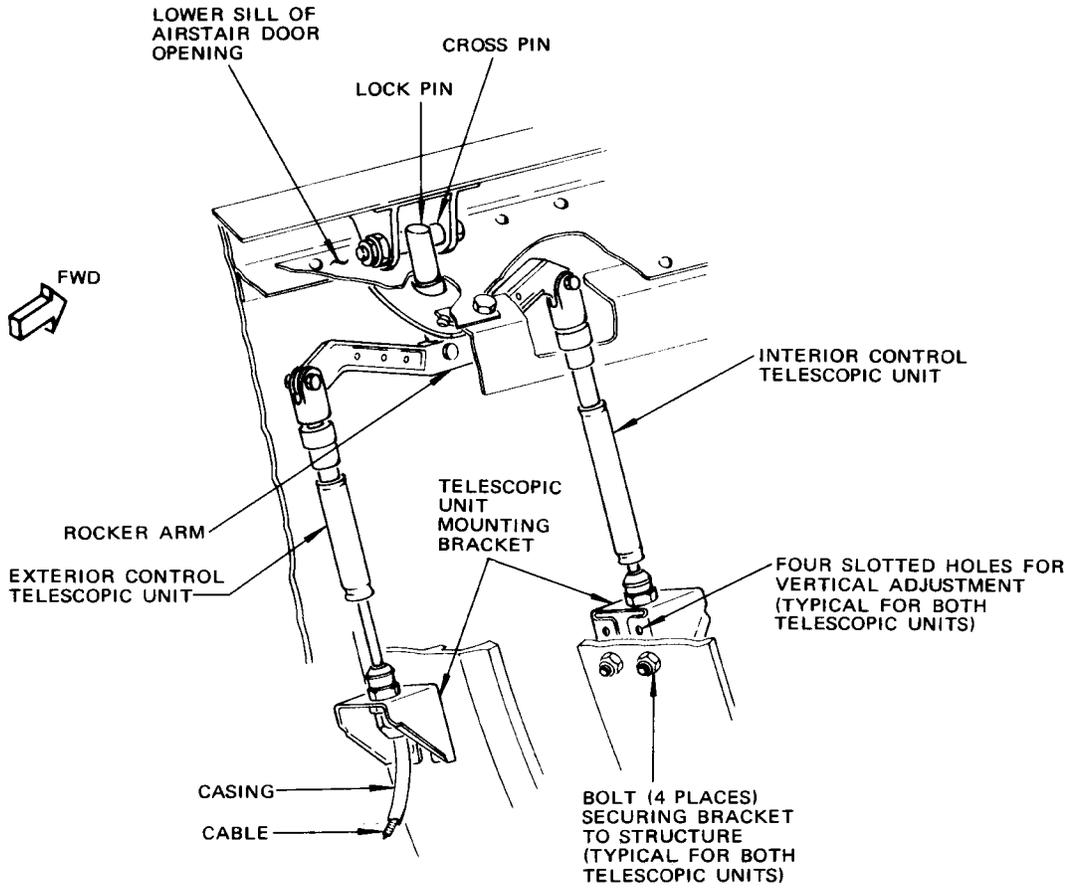
LOCK PIN IN DOOR UNLOCKED POSITION.  
 EXTERIOR CONTROL HANDLE ROTATED TO  
 STOPS AND FORWARD ENTRY DOOR  
 CLOSED AND LATCHED (ONE TELESCOPIC  
 UNIT RETRACTED AND ONE EXTENDED)

DETAIL A

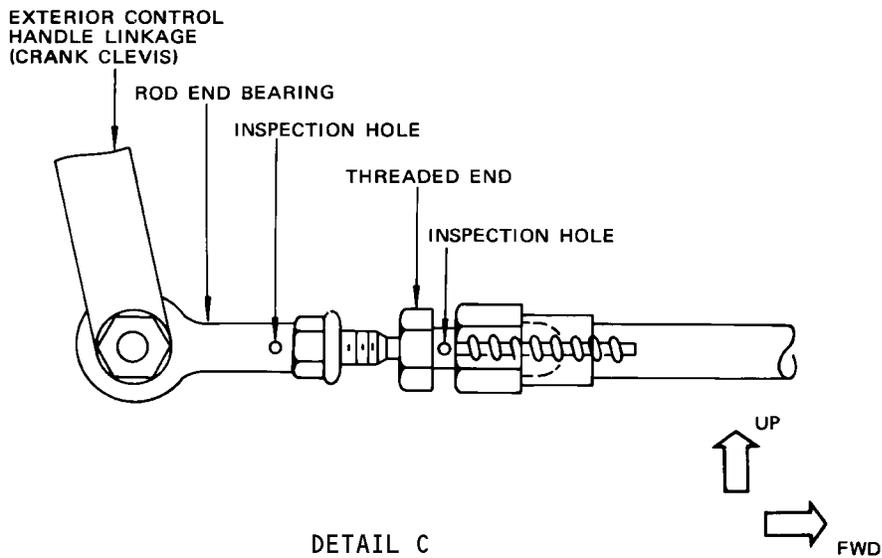
Forward Airstair Door Lock Mechanism  
 Figure 501 (Sheet 2)

EFFECTIVITY  
 Airplanes With Forward Airstairs

52-61-531



DETAIL B



DETAIL C

Forward Airstair Door Lock Mechanism Adjustment  
 Figure 502

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 Airplanes With Forward Airstairs

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## MAINTENANCE MANUAL

- 2) Adjust cable lock to increase or decrease effective length of cable required. If cable is too long, trim cable required amount.
  - 3) Pull cable lock back to seat in telescopic unit.
  - 4) Screw fork end in telescopic unit and torque 200 pound-inches.
  - 5) Check that cable is visible at inspection hole in fork end fitting.
  - 6) Repeat step (3).
- (4) Close and latch the forward entry door and rotate the exterior control handle to its stops in either direction.
  - (5) Check that the top of door lock pin is 0.12 (+ 0.03/- 0.10) inch from bottom of airstair door cross pin. (Detail A) If adjustment is required, repeat step (3), (4), and (5), readjusting towards
  - (6) Close and latch the forward entry door and stow the exterior control handle.
  - (7) Check that top of the door lock pin is 0.13 (+ 0.06/- 0.04) inch above the top of the airstair door cross pin. (Detail A) If adjustment is required, repeat steps (3) through (7), readjusting towards opposite end of tolerance.
    - (a) If correct adjustment cannot be obtained, reposition control shaft actuating lever to increase or decrease effective interior control cable stroke. Refer to 52-61-531, Install Control Cable.
    - (b) Repeat steps (3) through (7).
  - (8) Install cotter pins, if removed, in nuts, which connect fork end fitting to rocker arm.
  - (9) Lockwire control box mounting nuts, fork end fitting nuts, micro-adjust and rod end fitting on exterior control handle, if removed.
  - (10) Test airstair door lock mechanism in accordance with test procedure.
4. Forward Airstair Door Lock Mechanism Test
- A. Test Door Lock Mechanism
- (1) Fully retract airstair and close airstair door.
  - (2) Open the following circuit breakers on the circuit breaker panel P6 if closed.
    - (a) Forward Airstair Control
    - (b) Forward Airstair Door
    - (c) Forward Airstair Actuator
    - (d) Forward Airstair Standby Control
    - (e) Forward Airstair Standby

EFFECTIVITY  
Airplanes With Forward Airstairs

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## MAINTENANCE MANUAL

- (3) Open the forward entry door. Measure operating load of entry door-operated control lever by rotating the lever approximately 66 degrees counterclockwise (facing aft) pushing on inside of lever at about 1-inch radius from lever shaft axis with push-type scale. Check that force does not exceed 45 pounds (Fig. 502). Release lever and check that lever returns to original position without binding.
- (4) Check top of airstair door lockpin is  $0.12 + 0.03/- 0.10$  inch below bottom of cross pin (Detail A).
- (5) Close and latch forward entry door. Measure operating load of external control handle by rotating the handle about 45 degrees in both directions pulling on handle with push-pull type scale at about 4-inch radius from handle shaft axis in both directions. Check that force does not exceed 44 pounds. Release handle and check that handle operates without binding and returns to neutral position when released from any position.
- (6) Hold exterior control handle in extend and retract positions and check top of lockpin is  $0.12 + 0.03/- 0.10$  inch below bottom of crosspin while handle is in each position (Detail A).
- (7) Stow exterior control handle and check top of lockpin is  $0.13 + 0.06/- 0.06$  inch above top of crosspin.
- (8) Close forward airstair circuit breakers opened in step 2.

EFFECTIVITY  
Airplanes With Forward Airstairs

52-61-531

02

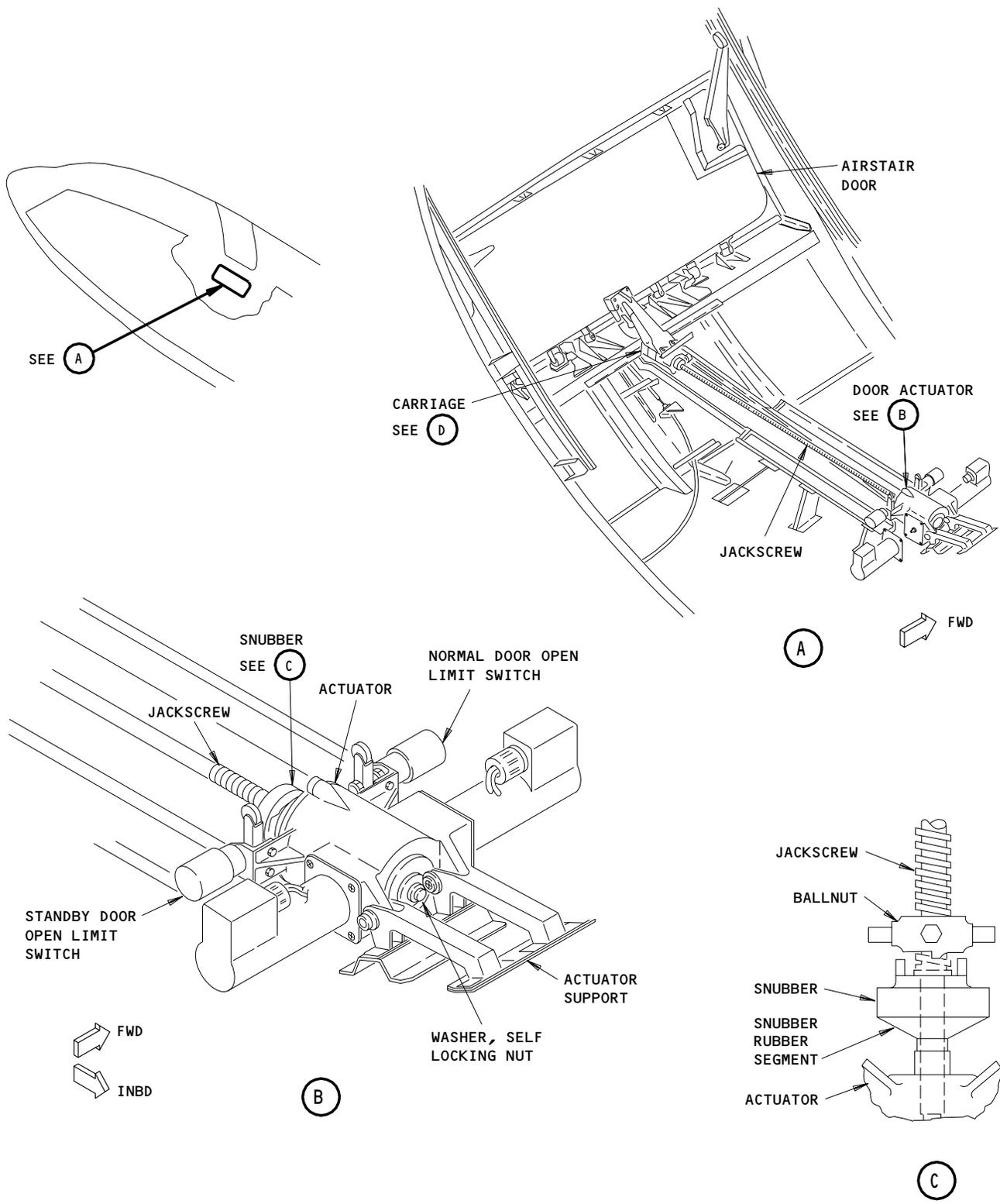
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FORWARD AIRSTAIR DOOR ACTUATOR SNUBBER – REMOVAL/INSTALLATION

1. Remove Door Actuator Snubber (Fig. 401)
  - A. Open the forward airstair door and leave airstair fully retracted.
  - B. Open following circuit breakers on P6 panels:
    - (1) FORWARD AIRSTAIR CONTROL
    - (2) FORWARD AIRSTAIR DOOR
    - (3) FORWARD AIRSTAIR ACTUATOR
    - (4) FORWARD AIRSTAIR STANDBY CONTROL
    - (5) FORWARD AIRSTAIR STANDBY
  - C. Remove two jackscrew nut bushings and disengage jackscrew nut from carriage.
  - D. Move airstair door to closed position and temporarily secure.
  - E. Remove locknut and washer from inboard end of jackscrew and withdraw jackscrew from actuator.
  - F. Remove snubber from end of jackscrew.
2. Install Door Actuator Snubber
  - A. Position snubber over splines on end of jackscrew shaft with rubber face away from ball nut.
  - B. Insert jackscrew into actuator.
  - C. Compress snubber approximately 0.27 inch until jackscrew is bottomed in actuator.
  - D. Install washer and self-locking nut on inboard end of jackscrew.
  - E. Release door from its temporarily secured position and connect jackscrew ball nut to carriage with jackscrew nut bushings.
  - F. Manually operate carriage along rails by rotating actuator manual drive and check that jackscrew drives freely.
    - (1) If necessary, adjust lower guide fitting so that carriage aligns properly without binding against either carriage guide rails.
  - G. Close all circuit breakers on P6 panel opened in step 1.B.
  - H. Check adjustment of door closed limit switches (Ref 52-61-601 A/T).
  - I. Check adjustment of door open limit switches (Ref 52-61-611 A/T).

EFFECTIVITY  
Airplanes with forward airstairs

52-61-541

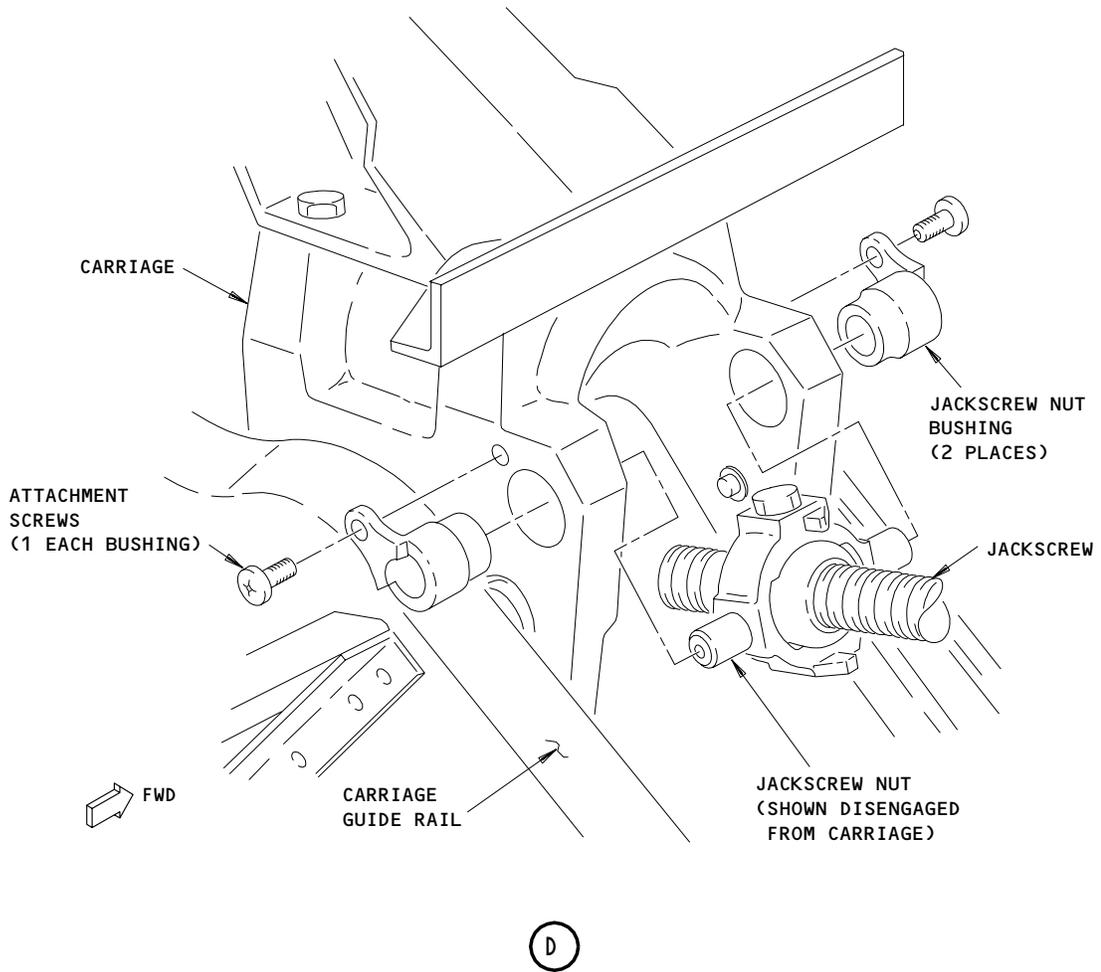


Forward Airstair Door Actuator Snubber Installation  
 Figure 401 (Sheet 1)

EFFECTIVITY  
 Airplanes with forward airstairs

**52-61-541**

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Forward Airstair Door Actuator Snubber Installation  
 Figure 401 (Sheet 2)

EFFECTIVITY  
 Airplanes with forward airstairs

**52-61-541**

FORWARD AIRSTAIR DOOR NORMAL SYSTEM MOTOR – REMOVAL/INSTALLATION

1. Remove Forward Airstair Door Normal System Motor (Fig. 401)
  - A. Open the following circuit breakers on circuit breaker panel P6:
    - (1) FORWARD AIRSTAIR CONTROL
    - (2) FORWARD AIRSTAIR DOOR
    - (3) FORWARD AIRSTAIR ACTUATOR
    - (4) FORWARD AIRSTAIR STANDBY CONTROL
    - (5) FORWARD AIRSTAIR STANDBY
  - B. Gain access to work area through electronic compartment access door.
  - C. Disconnect normal system motor electrical connector (Fig. 401).
  - D. Remove safety wire from bolts.
  - E. Remove the four bolts attaching motor to forward side of actuator and carefully remove motor. Remove shim and retain.
2. Install Forward Airstair Door Normal System Motor (Fig. 401)
  - A. Measure with a depth micrometer and record the dimension between the outer face of ball bearing in actuator housing and face of actuator housing (Section A-A, Fig. 401).
  - B. Measure with depth micrometer the depth of the mounting pilot of commutator end housing.
  - C. Install shims with thickness equal to difference between two dimensions.
  - D. Position motor on forward side of actuator and install four attaching bolts (Fig. 401). Electrical connector should be in line with identification plate.
  - E. Install safety wire on attaching bolts.
  - F. Connect electrical connector to normal system motor.
  - G. Close forward airstair circuit breakers on P6 panel.
  - H. Operate airstair through complete normal cycle to check operation of normal system motor.

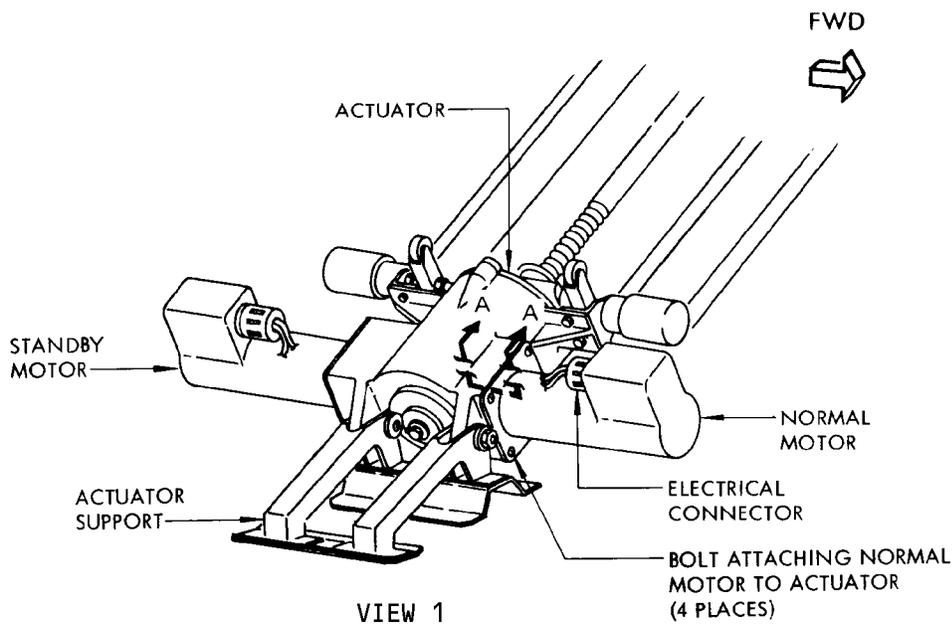
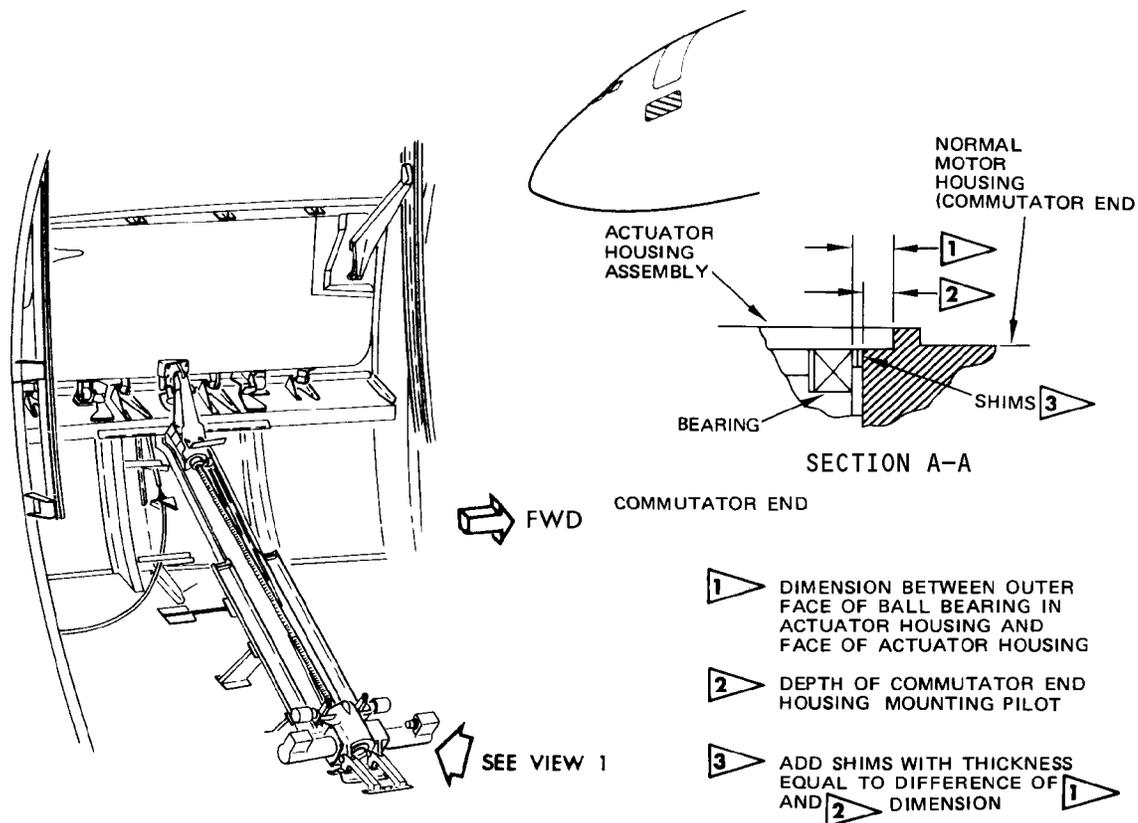
**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
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– THE WIND IS MORE THAN 40 KNOTS  
– THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
– THE FORWARD ENTRY DOOR IS OPENED FULLY  
– THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

EFFECTIVITY  
Airplanes With Forward Airstairs

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Forward Airstair Door Normal System Motor Installation  
 Figure 401

EFFECTIVITY  
 Airplanes With Forward Airstairs

**52-61-581**

FORWARD AIRSTAIR DOOR STANDBY SYSTEM MOTOR – REMOVAL/INSTALLATION

1. Remove Forward Airstair Door Standby System Motor
  - A. Open the following circuit breakers on circuit breaker panel P6:
    - (1) FORWARD AIRSTAIR CONTROL
    - (2) FORWARD AIRSTAIR DOOR
    - (3) FORWARD AIRSTAIR ACTUATOR
    - (4) FORWARD AIRSTAIR STANDBY CONTROL
    - (5) FORWARD AIRSTAIR STANDBY
  - B. Gain access to work area through electronic compartment access door.
  - C. Disconnect electrical connector from standby system motor (Fig. 401).
  - D. Remove the four bolts attaching motor to aft side of actuator and remove motor.
2. Install Forward Airstair Door Standby System Motor
  - A. Position motor on aft side of actuator and install four attaching bolts (Fig. 401).
  - B. Install safety wire on attaching bolts.
  - C. Connect electrical connector to standby system motor.
  - D. Close forward airstair circuit breaker and P6 panel.
  - E. Operate airstair through complete cycle using standby system to check operation of motor.

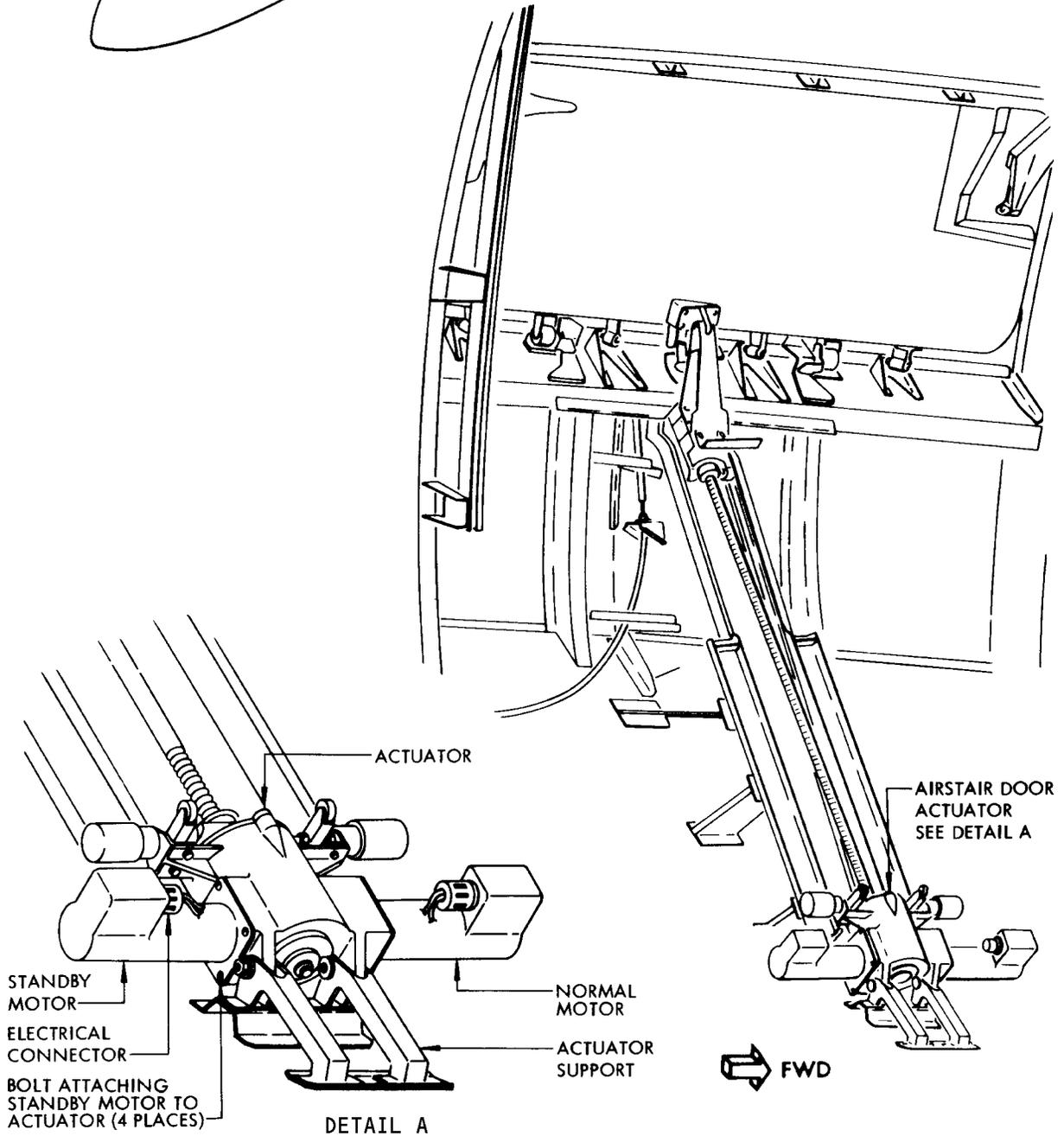
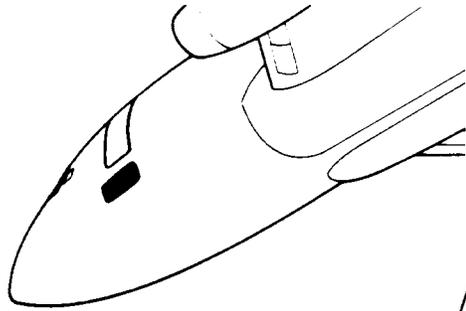
**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:  
– YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES  
– THE WIND IS MORE THAN 40 KNOTS  
– THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS  
– THE FORWARD ENTRY DOOR IS OPENED FULLY  
– THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.  
IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

EFFECTIVITY  
Airplanes With Forward Airstairs

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Forward Airstair Door Standby System Motor Installation  
 Figure 401

EFFECTIVITY  
 Airplanes With Forward Airstairs

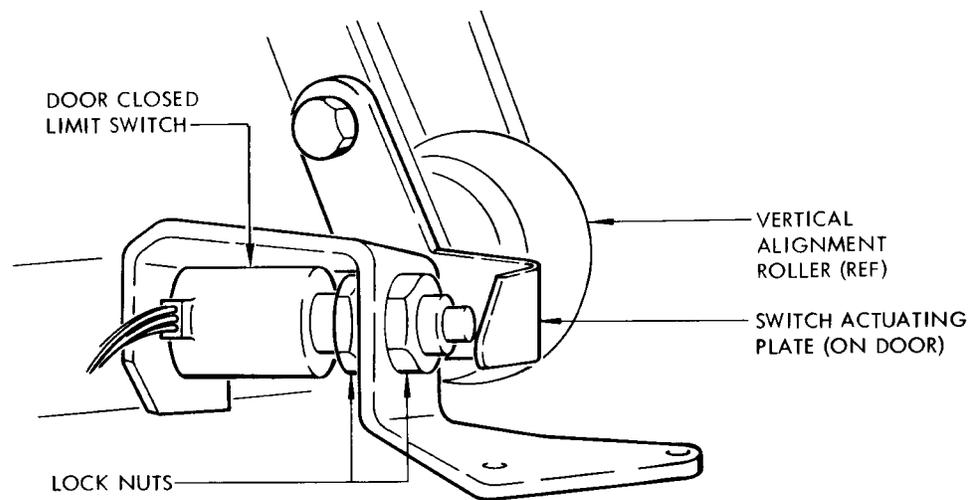
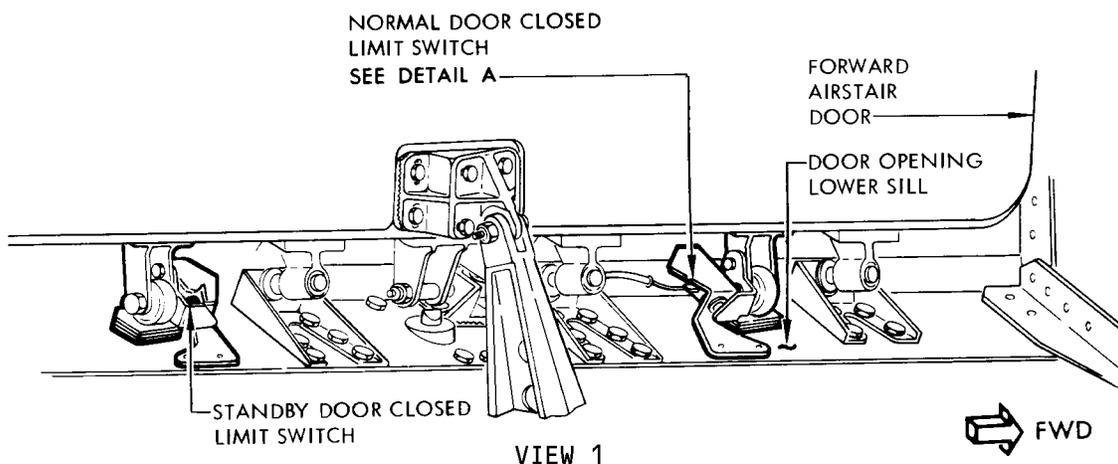
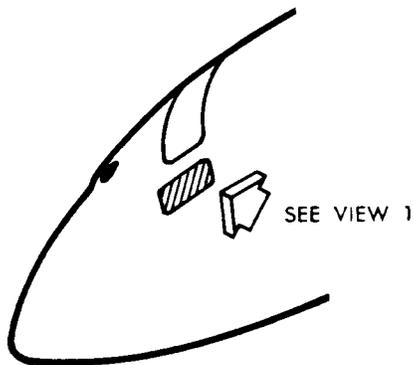
**52-61-591**

FORWARD AIRSTAIR DOOR CLOSED LIMIT SWITCHES – REMOVAL/INSTALLATION

1. General
  - A. The normal system door closed limit switch and standby system door closed limit switch are identical switches and the following procedure is applicable to each switch.
2. Remove Forward Airstair Door Closed Limit Switches
  - A. With forward airstair door open providing access to lower sill of airstair door opening, open the following circuit breakers on panel P6:
    - (1) FORWARD AIRSTAIR CONTROL
    - (2) FORWARD AIRSTAIR DOOR
    - (3) FORWARD AIRSTAIR ACTUATOR
    - (4) FORWARD AIRSTAIR STANDBY CONTROL
    - (5) FORWARD AIRSTAIR STANDBY
  - B. Disconnect limit switch electrical wiring at splices.
  - C. Remove inboard locknut from limit switch and remove switch from switch bracket (Fig. 401).
3. Install Forward Airstair Door Closed Limit Switches
  - A. Remove outside locknut from limit switch, position switch on switch bracket and secure with locknut.
  - B. Connect electrical wiring to limit switch at splices.
  - C. Adjust limit switch (Ref 52-61-601 A/T).

EFFECTIVITY  
Airplanes With Forward Airstairs

52-61-601



NORMAL DOOR CLOSED  
 LIMIT SWITCH SHOWN  
 STANDBY SWITCH TYPICAL

DETAIL A

Forward Airstair Door Closed Limit Switches Installation  
 Figure 401

EFFECTIVITY  
 Airplanes With Forward Airstairs

**52-61-601**

FORWARD AIRSTAIR DOOR CLOSED LIMIT SWITCHES – ADJUSTMENT/TEST

1. General

- A. The normal system door closed limit switch and standby system door closed limit switch are identical switches and the following procedure is applicable to each switch.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:

- YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES
- THE WIND IS MORE THAN 40 KNOTS
- THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS
- THE FORWARD ENTRY DOOR IS OPENED FULLY
- THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.

IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

2. Forward Airstair Door Closed Limit Switches Adjustment

- A. Equipment and Materials
- (1) Molding Clay or similar substance
- B. Adjust Airstair Door Closed Limit Switch
- (1) Remove standby motor (Ref 52-61-591 R/I).
  - (2) Manually open airstair door by rotating the actuator manual drive.
  - (3) Loosen locknuts on door closed limit switch, move switch outboard as far as threads permit, and retighten locknuts (Detail A, Fig. 501).
  - (4) Apply a lump of molding clay, or similar substance, to outboard face of switch actuating plate.
  - (5) Manually close airstair door by rotating the actuator manual drive and observe the following as door approaches the closed position:
    - (a) Observe relationship between cross-pin on door latch fitting and top of door latch pin protruding through door sill. Stop turning manual drive when cross-pin appears to have moved outboard of latch pin, or when an outside observer signals that exterior of door is flush with surrounding fuselage skin.
    - (b) Deleted
    - (c) Check that any accessible stop pin is in contact with its bearing plate on structure.
  - (6) Manually open airstair door. From impression made in molding clay, measure amount of clearance between end of switch plunger and actuating plate.
  - (7) Adjust position of switch to move it inboard by the amount of clearance measured in step (6) plus an additional 0.07 to 0.11 inch. Tighten switch locknuts to secure switch in position.
  - (8) Clean molding clay from switch actuating plate.
  - (9) Install standby motor (Ref 52-61-591, Removal/Installation).

EFFECTIVITY  
Airplanes With Forward Airstairs

52-61-601



## MAINTENANCE MANUAL

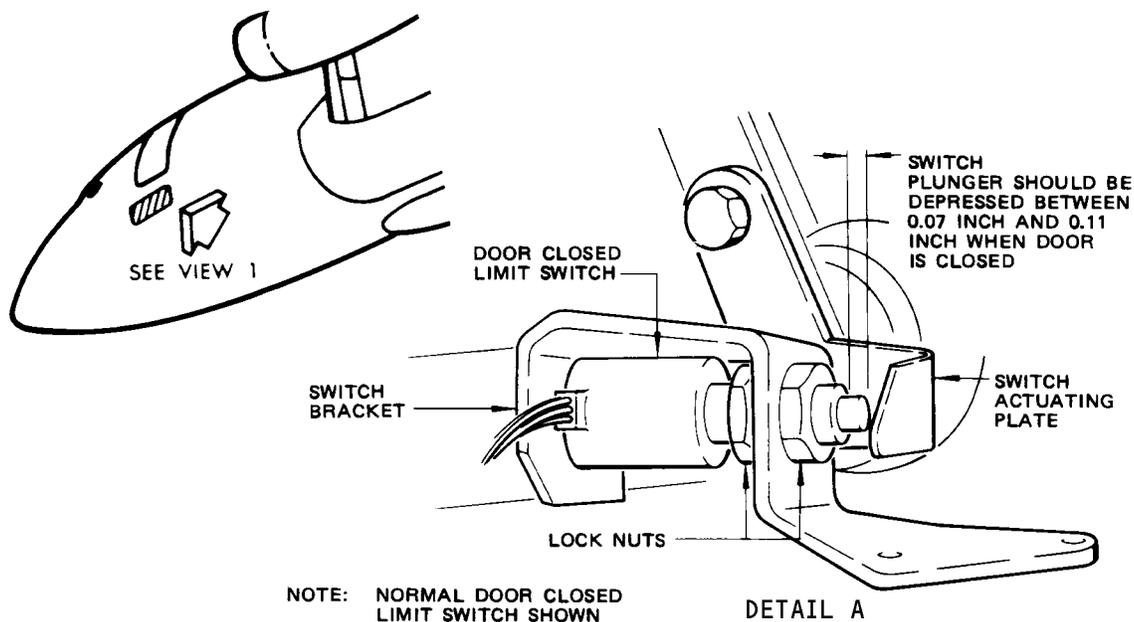
- (10) Close the following circuit breakers on circuit breaker panel P6-4:
  - (a) FORWARD AIRSTAIR CONTROL
  - (b) FORWARD AIRSTAIR DOOR
  - (c) FORWARD AIRSTAIR ACTUATOR
  - (d) FORWARD AIRSTAIR STANDBY CONTROL
  - (e) FORWARD AIRSTAIR STANDBY
- (11) Operate forward airstair door electrically and check that switch actuates properly to stop actuator and extinguish STAIRS IN OPERATION warning light (at internal control station) when airstair door is closed.
- (12) With door closed and latch pin fully extended check that there is no interference between inboard face of cross pin and outboard face of latch pin.
- (13) Open airstair door and apply lump of molding clay to all eight bearing plates around door opening.
- (14) Close airstair door electrically. When actuator has stopped, open door again and check that all door stop pins have contacted bearing plates.
- (15) If steps (12) and/or (14) indicate that airstair door is not traveling far enough when closing, adjust position of limit switch slightly outboard as necessary, and repeat steps (11) thru (14).
- (16) When adjustment is satisfactory, install safety wire on locknuts securing switch to bracket and clean molding clay from bearing plates.

EFFECTIVITY  
Airplanes With Forward Airstairs

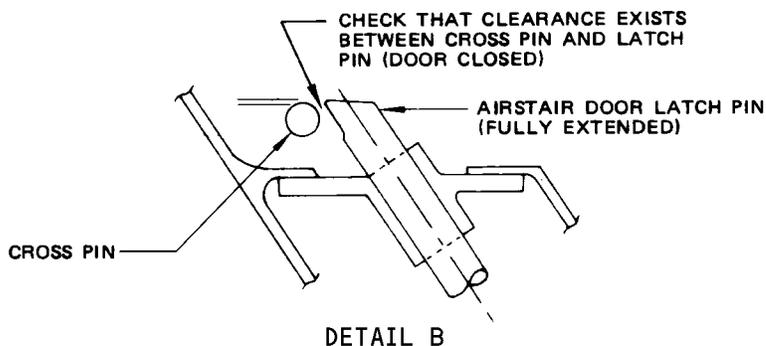
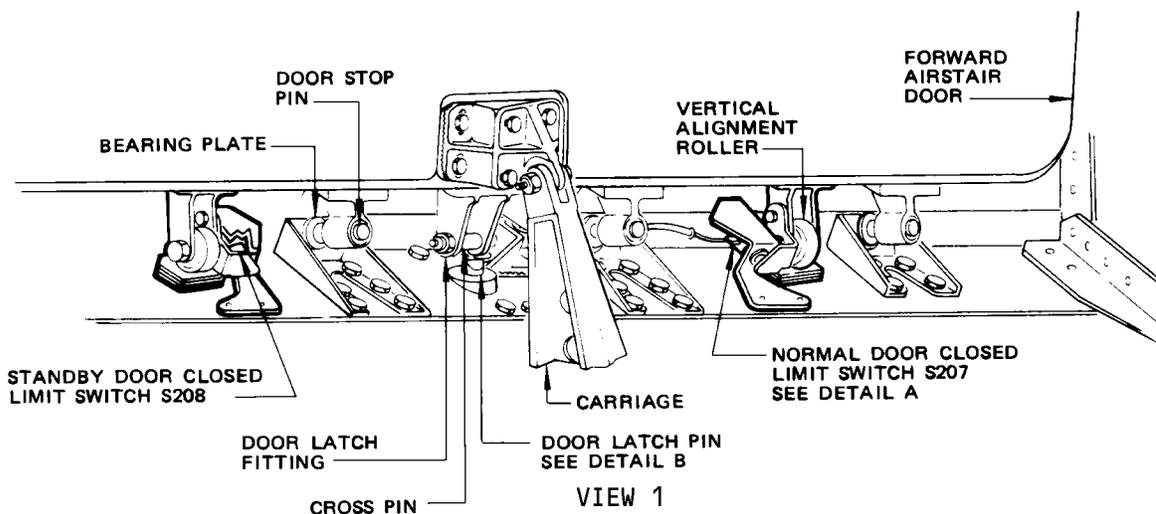
52-61-601

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NOTE: NORMAL DOOR CLOSED LIMIT SWITCH SHOWN  
 STANDBY SWITCH TYPICAL



Forward Airstair Door Closed Limit Switches Adjustment  
 Figure 501

EFFECTIVITY  
 Airplanes With Forward Airstairs

**52-61-601**

FORWARD AIRSTAIR DOOR OPEN LIMIT SWITCHES – REMOVAL/INSTALLATION

1. General

A. The following removal and installation procedure is applicable to each of the two airstair door open limit switches (normal system and standby system); however, these two switches are not identical and are not interchangeable. The normal system switch is actuated by a clockwise rotation of the switch shaft by the switch arm and the standby system switch is actuated by a counterclockwise rotation of the switch shaft by the switch arm. The normal system switch is mounted with switch arm aft and the standby system switch is mounted with switch arm forward (Fig. 401).

2. Remove Forward Airstair Door Open Limit Switches

A. Open the following circuit breakers on circuit breaker panel P6:

- (1) FORWARD AIRSTAIR CONTROL
- (2) FORWARD AIRSTAIR DOOR
- (3) FORWARD AIRSTAIR ACTUATOR
- (4) FORWARD AIRSTAIR STANDBY CONTROL
- (5) FORWARD AIRSTAIR STANDBY

B. Gain access to work area through electronic compartment access door.

C. Disconnect limit switch electrical wiring at splices.

D. Loosen lockscrew on switch operating arm, remove locknut from end of switch shaft, and remove operating arm from switch (Fig. 401).

E. Remove nut securing limit switch to bracket and remove switch.

3. Install Forward Airstair Door Open Limit Switches

A. With operating arm removed from limit switch, position switch on mounting bracket and secure with nut. Install safety wire on switch attaching nut (Fig. 401).

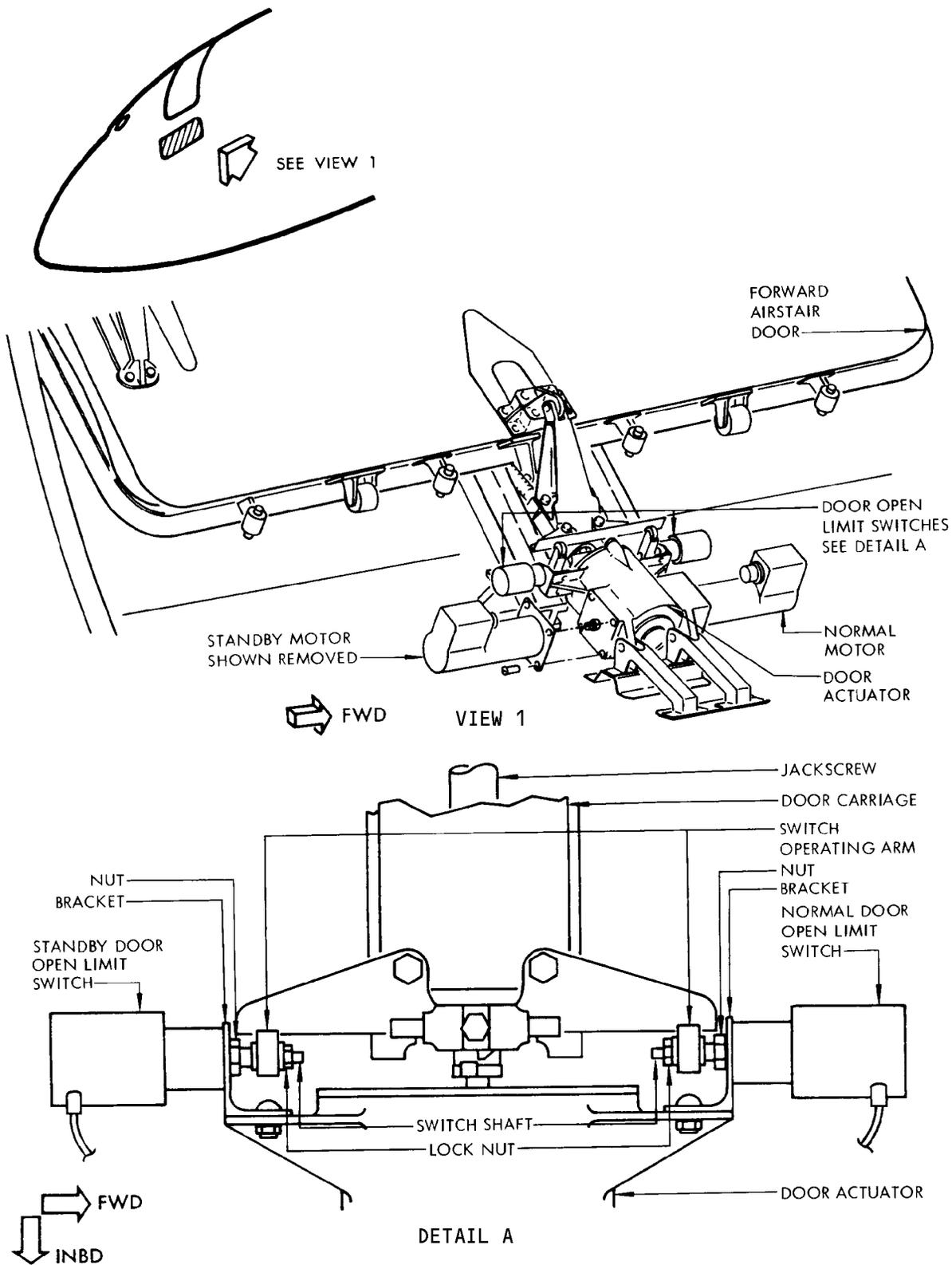
B. Install operating arm on limit switch shaft with locknut.

C. Connect limit switch electrical wiring at splices.

D. Adjust limit switch (Ref 52-61-611 A/T).

EFFECTIVITY  
Airplanes With Forward Airstairs

52-61-611



Forward Airstair Door Open Limit Switches Installation  
 Figure 401

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 Airplanes With Forward Airstairs

**52-61-611**

FORWARD AIRSTAIR DOOR OPEN LIMIT SWITCHES - ADJUSTMENT/TEST

1. Forward Airstair Door Open Limit Switches Adjustment

A. General

(1) The following adjustment procedure is applicable to each of the two-door open limit switches (normal system limit switch and standby system limit switch).

B. Adjust Airstair Door Open Limit Switches

- (1) Open airstair door, using normal or standby mode, until dimension between end of jackscrew threads and inboard face of jackscrew nut is as shown in Fig. 501.
- (2) Open forward airstair circuit breakers on circuit breaker panel P6.
- (3) Loosen lockscrew on inboard edge of switch operating arm (Fig. 501).
- (4) Turn worm gear on outboard edge of switch operating arm to drive arm against switch actuator bar on door carriage until switch actuates (indicated by an audible click).
- (5) Tighten lockscrew of switch operating arm and install safety wire on lockscrew.
- (6) Close the forward airstair circuit breakers on circuit breaker panel P6.
- (7) Cycle airstair door electrically (using normal system and standby system) to make sure that each switch actuates to stop actuator. When door is retracted to the fully open position, make sure that stops on ballnut do not contact the snubber. Re-adjust switch, if necessary, within switch adjustment limits.

**WARNING:** DO NOT OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR:

YOU WILL OPERATE THE AIRSTAIR MORE THAN 3 CYCLES IN 20 MINUTES.

THE WIND IS MORE THAN 40 KNOTS.

THERE IS NO SUPPORT UNDER THE END OF THE AIRSTAIR WHEN THE AIRPLANE IS ON JACKS.

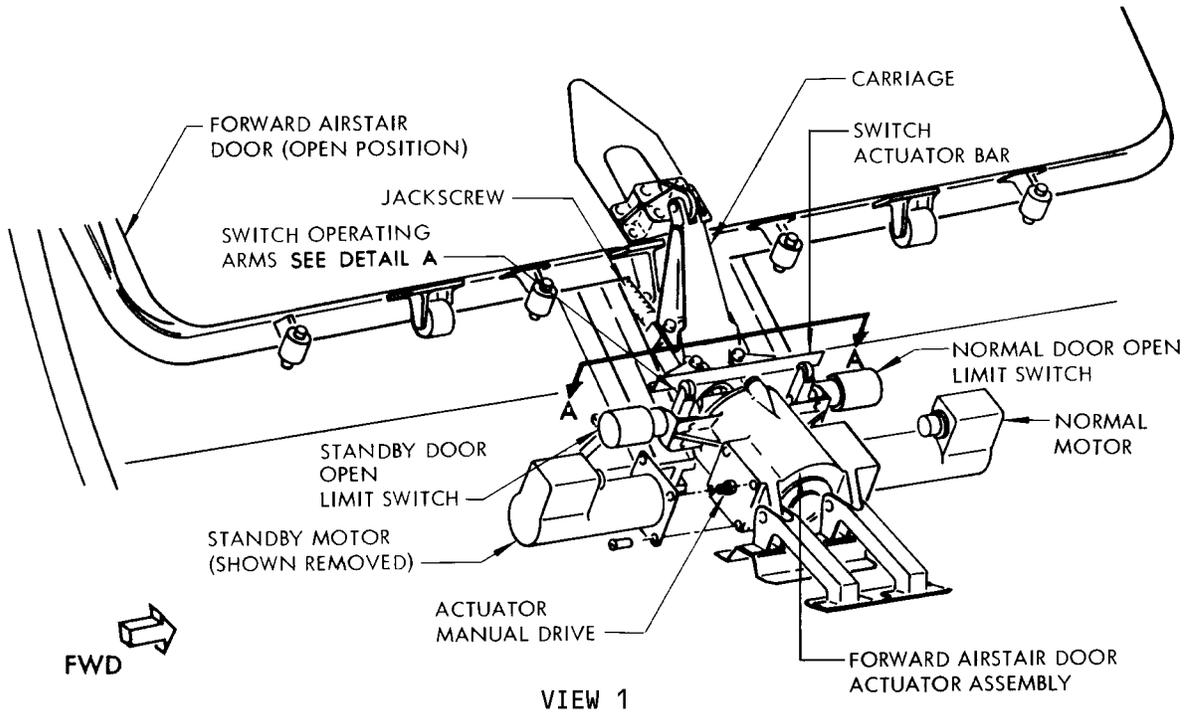
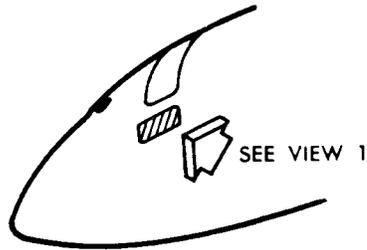
THE FORWARD ENTRY DOOR IS OPENED FULLY.

THE AREA IS NOT CLEAR OF PEOPLE OR EQUIPMENT.

IF YOU OPERATE THE AIRSTAIR WHEN THESE CONDITIONS OCCUR, YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

EFFECTIVITY  
Airplanes With Forward Airstairs

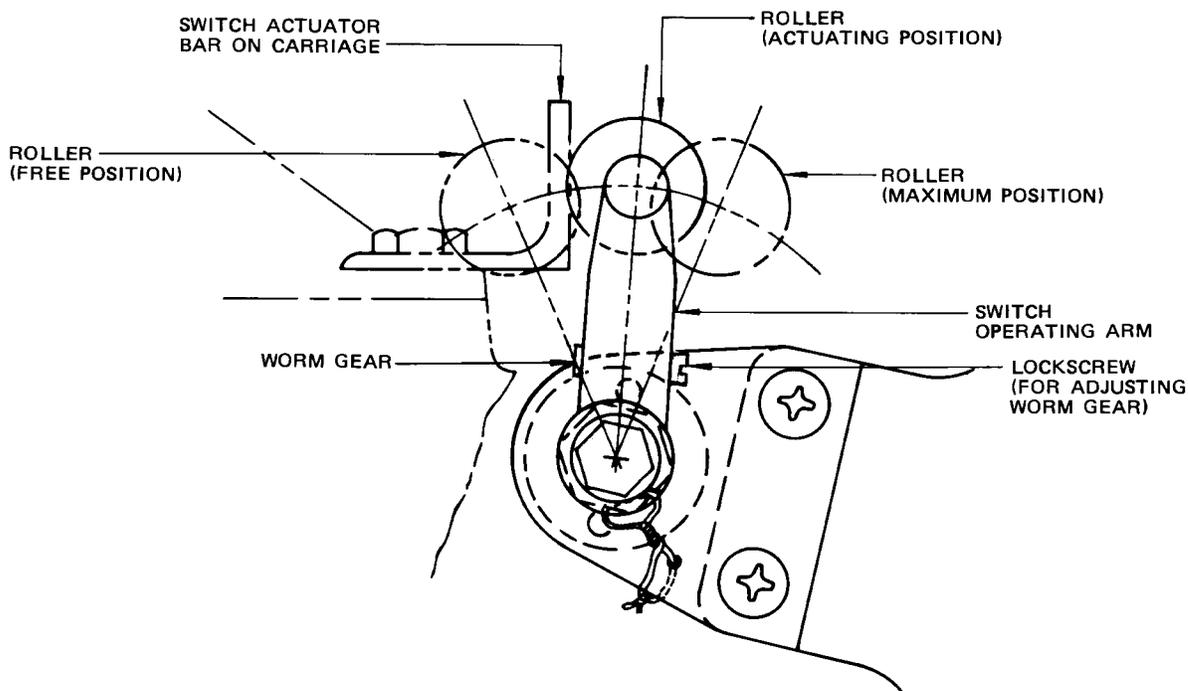
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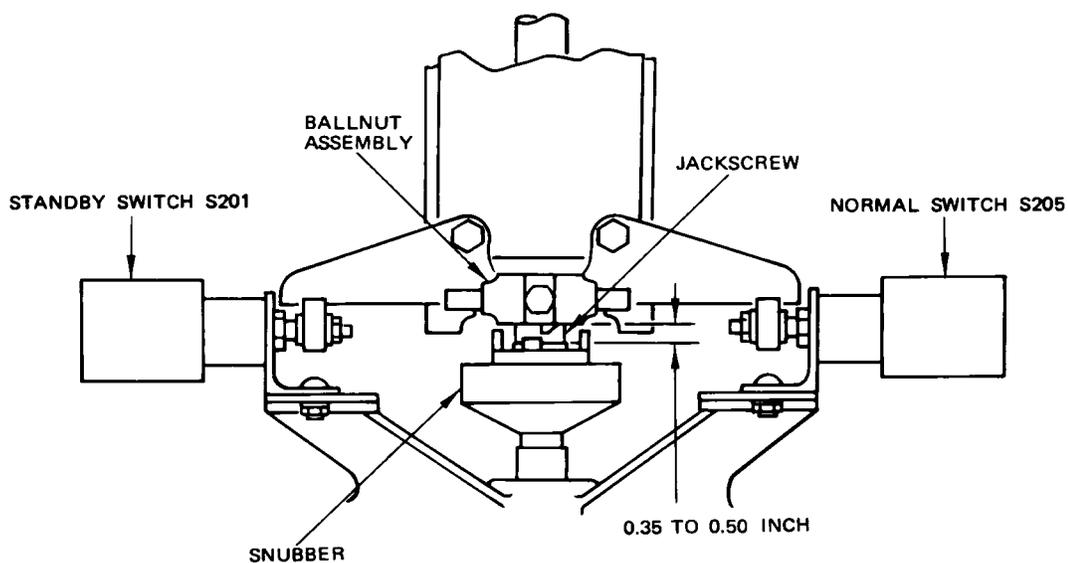
Forward Airstair Door Open Limit Switches Adjustment  
 Figure 501 (Sheet 1)

EFFECTIVITY  
 Airplanes With Forward Airstairs

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LOOKING FORWARD  
 NORMAL SWITCH SHOWN, STANDBY SWITCH SIMILAR  
 DETAIL A



SECTION A-A

Forward Airstair Door Open Limit Switches Adjustment  
 Figure 501 (Sheet 2)

EFFECTIVITY  
 Airplanes With Forward Airstairs

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DOOR WARNING SYSTEM - DESCRIPTION AND OPERATION

1. General

- A. The door warning system is an electrical circuit which provides the flight crew with a visual warning if certain doors are open or incompletely latched (Fig. 1). The doors included in this system are the forward and aft entry doors, the forward and aft galley service doors, the forward and aft cargo compartment doors, the lower nose compartment access door, the electronic equipment compartment external access door, and the tire burst protector screen doors. On airplanes with forward airstair, the door warning system also includes the forward airstair door. On Passenger/Cargo Convertible Airplanes, the main cargo door is included in the door warning system.
- B. The warning provided by the system consists of door warning lights which are installed on the P5-20 Door Warning Module located on the overhead panel. The lights can be tested individually or by a master test switch that simultaneously checks all of the door warning system lights and similar lights in the control cabin. Each door warning light consists of a translucent lens cap illuminated by a pair of bulbs with a background light which continuously illuminates the legend on the cap. The illuminated color is amber/opaque and the nonilluminated color is white/gray. The warning lights are energized and de-energized when the microswitches or proximity sensors in the respective circuits in the door warning system are activated and deactivated.
- C. The proximity sensor is a part of a solid-state switching circuit (Fig. 2). The circuit consists of a sensor installed at the door, an actuator that is located immediately adjacent to the sensor unit when the door is closed, and a control card located in the solid-state M278 miscellaneous switching module on shelf E3-2 on the electronic equipment rack. The rack is accessible through the electronic equipment compartment external access door. The sensor senses the proximity of the actuator, or conversely, the absence of the actuator, and thus provides the appropriate signal to a control card in the module. The sensor and control card function together as a switch. The control card uses the signal from the sensor to actuate the warning light. The sensor and actuator can be physically adjusted in relation to each other; however, any system malfunction which can be isolated to the control card can be corrected only by replacement of the control card.
- D. The door warning system circuits that serve the forward and aft entry doors, the forward and aft galley service doors, the forward and aft cargo compartment doors, and the tire burst protector screen doors are provided with proximity sensors. On airplanes with forward airstair, a standby door close warning microswitch for the airstair door is provided in the circuit to the airstair door warning light. On Passenger/Cargo Convertible Airplanes, the aft entry door latch is included in the circuit to the aft entry door warning light.

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- E. The lower nose compartment access door and the electronic equipment compartment external access door share the same warning light. A microswitch is located at each compartment access door and the unlatching of a door will energize the circuit to the warning light. Similarly, the tire burst protector screen doors share the same door warning light. The unlatching of either door will activate the proximity sensor at the door and energize the circuit to the tire screen door warning light.
- F. On Passenger/Cargo Convertible Airplanes, the door warning system circuits that serve the main cargo door include a main cargo door position microswitch and a main cargo door locked microswitch which are located at the main cargo door. The door warning system circuit is arranged so that when the main cargo door is either opened or unlocked the microswitches are actuated and the circuit to the main cargo door warning light is energized and the light is illuminated.

### 2. Operation

- A. The door warning system circuits are powered from a 28-volt dc door warning circuit breaker and the activation of any one of the switches or sensors in the system provides a path to ground through the appropriate warning light which is thus illuminated. The pair of bulbs comprising each warning light are connected in parallel with each other and the circuit is arranged to ensure that the activation of one switch or sensor energizes only the proper warning light.
- B. The lights can be tested individually or the master test switch can be used at any time to connect all the pairs of lights to ground, thus energizing the lights and proving that they are operative.
- C. The switches and sensors installed at the doors are arranged so that the circuits to the individual door warning lights are de-energized when the doors are closed and the latch fittings are completely engaged. When a door is unlatched, the switch or sensor at the door completes the circuit to the appropriate door warning light which is illuminated, thus warning that the door is unlatched.
- D. On airplanes with forward airstair, the circuits to the forward airstair door are arranged so that when the airstair door is unlocked and the airstair extended, the sensor installed at the airstair door pin lock closes and the airstair warning light circuit is energized and the warning light is illuminated. When the airstair is retracted, the airstair warning light will only be de-energized when the airstair has risen to its fully retracted stowed position in the airplane which permits the airstair door to close and lock and deactivate the sensor which de-energizes the door warning light circuit.

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- E. On Passenger/Cargo Convertible Airplanes, the aft entry door houses the aft airstair and is included in the door warning system. Circuits are arranged so that when the aft entry door is unlatched, the aft entry door warning circuit is energized. Proximity sensors at the door and door latch activate the circuit to the power source through the aft entry door warning light to ground and the light is illuminated. The door warning light is de-energized by the proximity sensors which deactivate when the aft airstair has been fully retracted and stowed and the aft entry door closed and latched.
- F. The main cargo door warning light on Passenger/Cargo Convertible Airplanes, is illuminated when the main cargo door is either open or unlocked. When the main cargo door is closed and locked, the microswitches located at the door are moved to closed and locked positions which de-energizes the circuit to the main cargo door warning light.

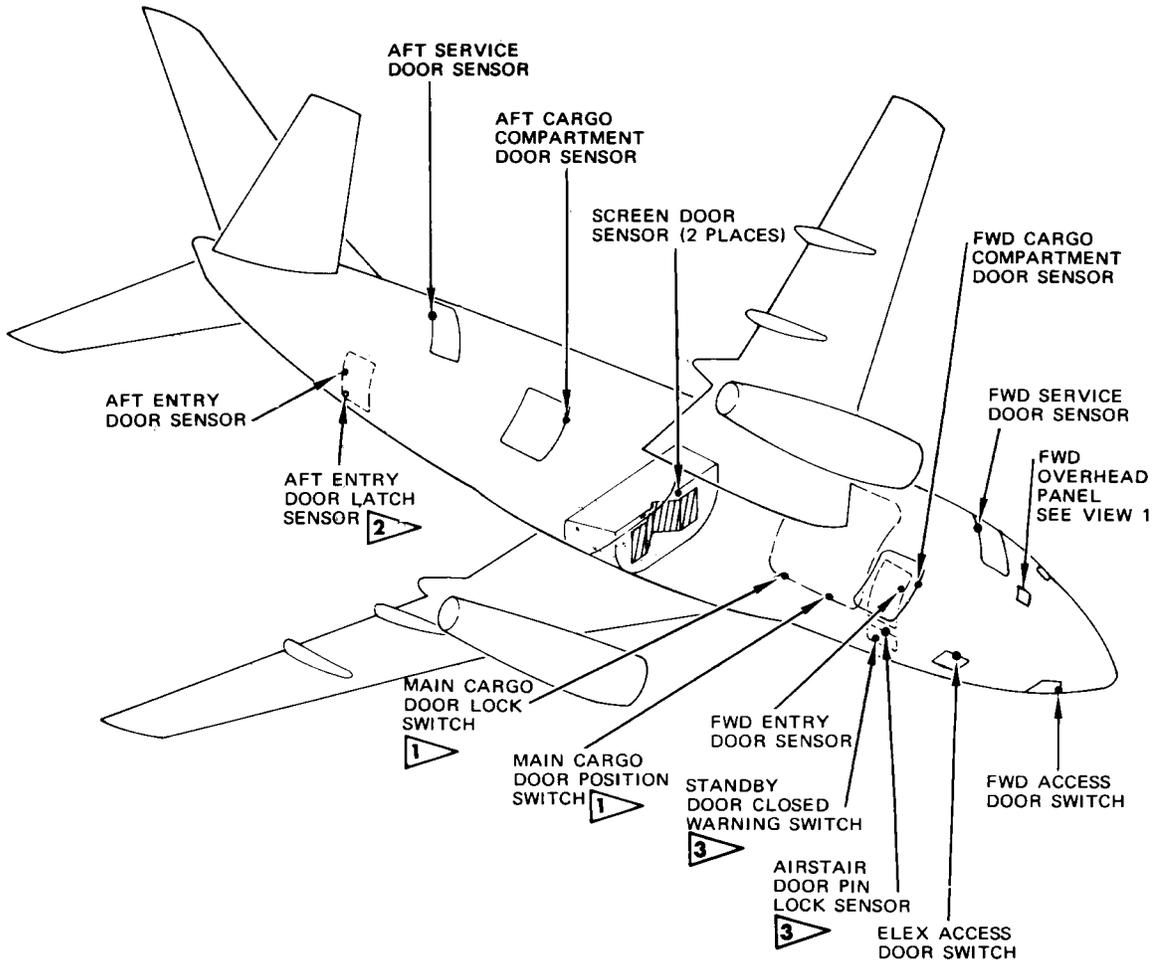
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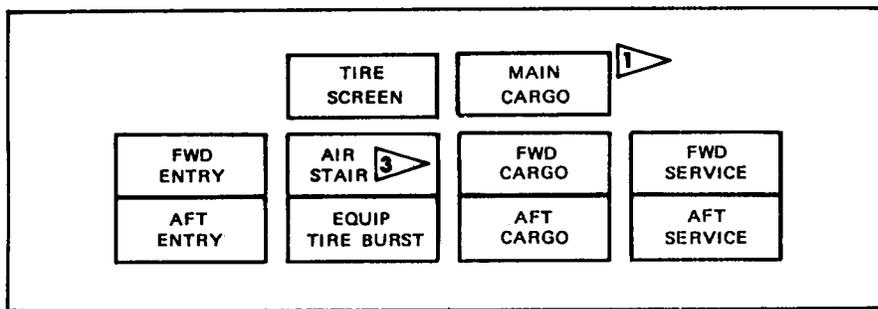
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- 1** PASSENGER/CARGO CONVERTIBLE AIRPLANES
- 2** AIRPLANES WITH AFT AIRSTAIRS
- 3** AIRPLANES WITH FORWARD AIRSTAIR



**P5 20 DOOR WARNING MODULE  
ON FORWARD OVERHEAD PANEL  
VIEW 1**

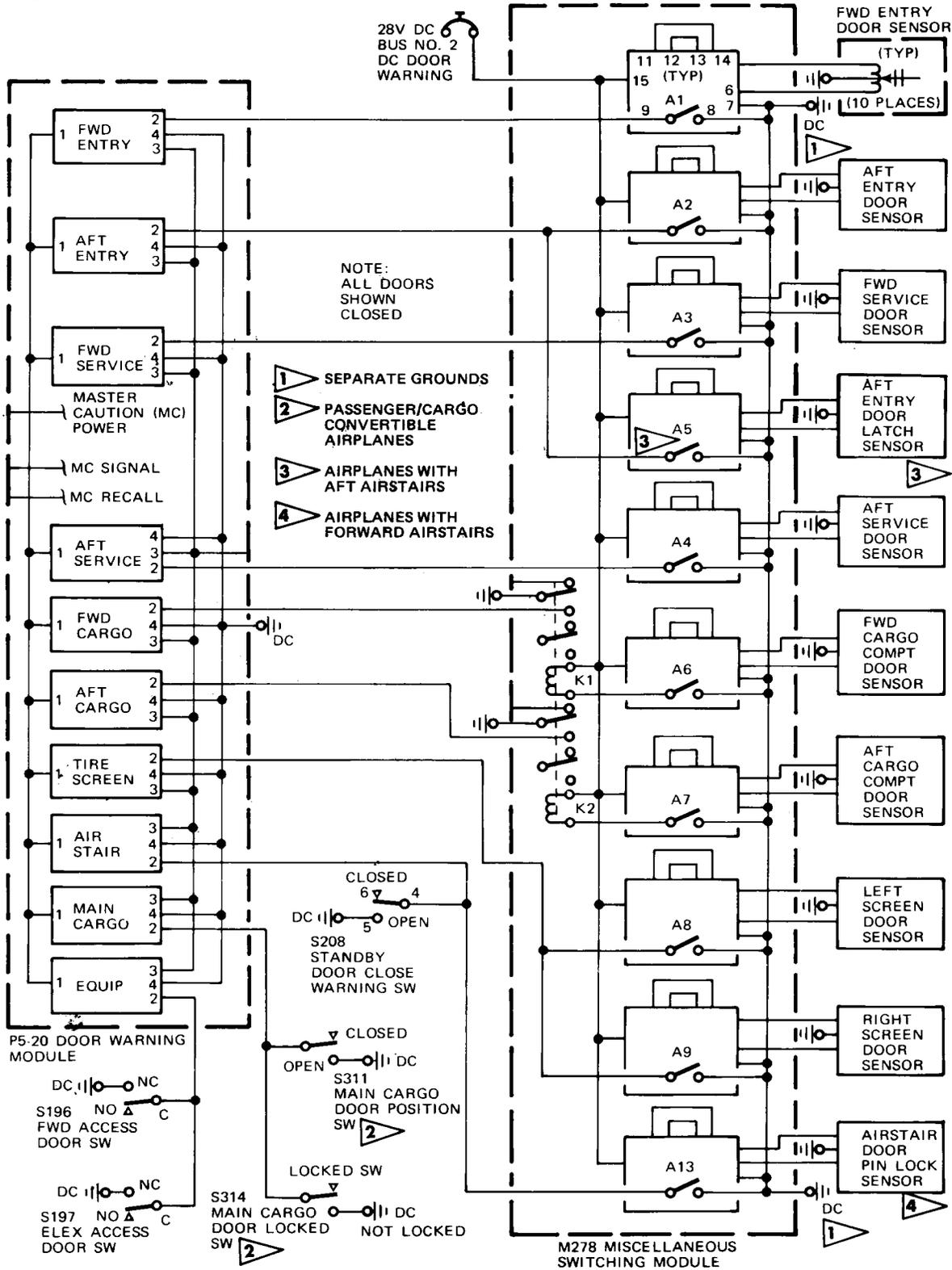
Door Warning System Switch and Sensor Location  
Figure 1

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Door Warning System Circuit  
Figure 2

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DOOR WARNING SYSTEM – TROUBLESHOOTING

1. General

- A. The door warning system troubles will be indicated by faulty indications on the Door Warning Module and/or Master Caution Annunciator. The various combinations of faulty indications that can be caused by a fault in the door warning circuits are listed in the following troubleshooting chart.
- B. Since the circuits controlling the various lamps on the door warning module are all similar in operation, a specific light malfunction is referred to as a Door Warning light in the fault column of the chart. An incorrect indication of the MASTER CAUTION or DOORS lights on the Master Caution Annunciator is referred to as a Master Caution light in the chart. Therefore, when performing an isolation procedure for a specific light fault, refer to the table for the specific light and its corresponding circuit isolation points referred to in the isolation procedure.
- C. If a new Door Warning Module or its printed circuit board is installed, the complete Door Warning Circuits Test must be performed. Refer to Adjustment/Test procedure. If a microswitch, door sensor or a M278 Misc switching module printed circuit board is replaced, only that portion of the door warning circuits test affected by the replaced component must be performed. However, if the M278 Misc switching module is replaced, the complete Door Warning Circuits Test must be performed and the following portions of AMM 32-09-100, Landing Gear Electrical Module test procedure. Test APU fire horn function of landing gear electrical module and test landing gear position indicating and warning function of landing gear electrical module.

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2. Door Warning System Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Door warning light and master caution lights do not illuminate when door is open		On E3-2 electrical shelf check for continuity between applicable pin and ground. See table for proper connector and pin. IF -	
		Continuity present, check for continuity at applicable pin of door warning module connector and ground. See table for proper connector and pin. IF -	
	Door warning module faulty	Continuity ok.	Replace door warning module
	Airplane wiring is faulty	No continuity wiring.	Repair airplane
		Open circuit is present, test applicable sensor or microswitch. Refer to AMM 52-71-0, Door Warning Sensor Test for sensor test or check continuity of microswitch. IF -	
	Door warning sensor or microswitch faulty	Faulty sensor or microswitch.	Re-adjust or replace sensors or microswitches
Door warning sensor printed circuit board in M278 miscellaneous switching module faulty	Sensor or microswitch not faulty.	Replace applicable printed circuit board or repair wiring. See table for applicable printed circuit board	

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Master caution lights illuminate when door is closed		Check for open circuit between pin 2 of D4212P and ground. IF -	
	Master caution circuits faulty	Open circuit present, master caution circuits faulty.	Troubleshoot master caution circuits (AMM 33-15-0, Master Warning and Caution Lights)
	Door warning module printed circuit board faulty	No open circuit.	Replace door warning module printed circuit board
Master caution lights will not illuminate when door is open		Check for continuity between pin 2 of D4212P and ground. IF -	
	Door warning module printed circuit board or wiring faulty	No continuity.	Replace printed circuit board or repair wiring
	Master caution circuits faulty	Continuity OK.	Troubleshoot master caution circuits (AMM 33-15-0, Master Warning and Caution Lights)

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Door warning light and master caution lights will not extinguish when door is closed		On E3-2 electrical shlef check for open circuit between applicable pin and ground. See table for proper connector and pin. IF -	
		Open circuit is present, check for continuity at applicable pin of door warning module connector per table. IF -	
	Door warning module faulty	No continuity.	Replace door warning module
	Airplane wiring is faulty	Continuity OK.	Repair airplane wiring
		No open circuit, test sensor or microswitch. See table for proper sensor or microswitch. Refer to AMM 52-71-0, Door Warning Sensor Test for checking sensors. Check continuity of microswitches. IF -	
	Door Warning Sensor or Microswitch faulty	Sensor or microswitch faulty.	Adjust or replace sensor or microswitches
Door Warning Sensor printed circuit board faulty	Sensors ok, applicable printed circuit is faulty.	Replace applicable printed circuit board	

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Master caution lights do not extinguish when master caution reset is depressed		Remove door warning module. IF -	
	Door warning module or printed circuit board faulty	Master caution lights extinguish.	Replace printed circuit board or module
	Master caution circuits faulty	Lights remain illuminated	Troubleshoot master caution circuits (AMM 33-15-0, Master and Warning and Caution Lights)
Master caution lights do not illuminate when doors light is depressed to recall an indicated fault		Remove door warning module and check for momentary continuity at pin 10 of D482 while master caution annunciator is depressed. IF -	
		No continuity, check for continuity between pin 10 of module plug and pin 8 of printed circuit plug. IF -	
	Door warning printed circuit board	Continuity present.	Replace door warning printed circuit board
	Door warning module faulty	No continuity.	Replace or repair module
	Master caution circuits faulty	Continuity present.	Troubleshoot master caution circuits (AMM 33-15-0, Master Warning and Caution Circuits)

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TROUBLE	PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
Lights on door warning module do not light pressed to test		Remove door warning module and check for 28V dc between pins 5 and round pin 7 on D482. IF -	
	Door Warning module	Voltage ok.	Replace door warning module
	Airplane wiring is faulty	No voltage.	Repair airplane wiring between module and master circuit breakers, Bus 1 and Bus 2

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3. Door Warning Circuit Troubleshooting Table

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DOOR WARN MODULE LAMPS	DOOR WARNING MODULE CONN D1406	E3-2 ELECT SHELF CONN D4532P	APPLICABLE SWITCH AND/OR SENSOR(S) & PC BOARDS
FWD ENTRY	pin 8	pin 7	Forward Entry Sensor (A1)
AIRSTAIR	D482 pin 4	pin 9	Airstair Door Pinlock Sensor (A13), Door Close Warning Switch
AFT SERVICE	pin 3	pin 4	Aft Service Door Sensor (A4)
TIRE SCREEN	pin 7	D4542P pin 19	Left Screen Door Sensor (A8) Right Screen Door Sensor (A9)
EQUIP	pin 6	pin 31	Forward Access Door Switch, Electronic Access Door Switch
AFT ENTRY	pin 5	pin 8	Aft Entry Door Sensor (A2), Aft Entry Door Latch Sensor
FWD CARGO	pin 1	pin 5	Forward Cargo Door Sensor (A6)
AFT CARGO	D482 pin 12	pin 6	Aft Cargo Door Sensor (A7)
FWD SERVICE	pin 2	pin 3	Forward Service Door Sensor (A3)
MAIN CARGO	pin 4		Main Cargo Door Locked Switch, Door Position Switch

Passenger/Cargo Convertible Airplanes  
Airplanes with Aft Airstairs  
Airplanes with Forward Airstairs

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DOOR WARNING SYSTEM – ADJUSTMENT/TEST

1. Door Warning System Adjustment

A. General

(1) Adjustments for the door warning system are described in the following paragraphs of this section. Adjustment is accomplished by mechanically positioning individual sensors or switches. Adjustment of a sensor consists of moving the sensor closer or further from the sensor actuator to meet the specified gap requirements. On doors where microswitches are employed, adjustments consist of varying the amount of the projection of the switch plunger or plunger actuator arm. After adjustment of any sensor, perform the Door Warning Sensor Test (Ref par. 2.B.)

B. Forward and Aft Service Door Sensors Adjustment

(1) Adjust forward and aft service door sensor.

(a) Loosen nuts (Fig. 502, 503, 504) attaching sensor (3) to bracket (1) and move sensor so that gap between sensor and sensor actuator (2) is 0.08 +0.02 inch. Tighten nuts.

C. Forward and Aft Cargo Compartment Door Sensor Adjustment

(1) Equipment and Materials

(a) Shim – 65-67304-3

(b) Shim – 65-67304-4

(2) Adjust forward and aft cargo compartment door sensor (sensor installations with slide-by mode of actuation, Fig. 502, 503, 504).

(a) Remove nut (Fig. 502, 503, 504) connecting actuator (7) to latch roller arm (9).

(b) Remove actuator and add or remove 65-67304-3 shims (12) so that gap between actuator and sensor (8) is 0.08 +0.02 inch.

(c) If gap requirements cannot be met remove bolts (6) attaching sensor to bracket (10) and remove sensor. Add or remove 65-67304-4 shims (11) to meet gap requirements.

(d) Replace sensor and actuator and tighten nuts and bolts.

(3) Adjust forward and aft cargo compartment door sensor (sensor installations with head-on mode of actuation, Fig. 502, 503, 504).

(a) Use laminated shims if and as required between sensor and mounting bracket or bracket and fitting to meet gap requirements shown in Fig. 501. Remove laminations as required.

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## MAINTENANCE MANUAL

- (b) Use laminated shims if and as required between sensor and mounting bracket or bracket and fitting to meet gap requirements shown in Fig. 502, 503, 504. Remove laminations as required.
- D. Tire Burst Protector Screen Door Sensor Adjustment (Right and Left Doors)
  - (1) Loosen bolts (16, Detail C, Fig. 501), attaching sensor support (15) to screen support (18) and position sensor (14) so that the gap between actuator (20) and the sensor is  $0.12 +0.05/-0.05$  inch (Sec C-C). Tighten bolts.
- E. Forward Entry Door Sensor Adjustment
  - (1) Adjust forward entry door sensor.
    - (a) Loosen screws (25, Detail D, Fig. 501) attaching sensor (23) to bracket (24) and move sensor until gap between sensor and sensor actuator (22) is  $0.08 +0.02$  inch. Tighten screws.
- F. Details E and F (Deleted)
- G. Airstair Door Lockpin Sensor Adjustment (Airplanes with Forward Airstair)
  - (1) Adjust forward airstair door lockpin sensor.
    - (a) Loosen screws (33, Detail G, Fig. 501) on bracket (32) and move bracket so that it is  $0.08 \pm 0.02$  inch from sensor (31) when lockpin (30) is in fully extended position. Tighten screws.
- H. Standby Door Closed Warning Switch Adjustment (Airplanes with Forward Airstair)
  - (1) Adjust forward airstair door closed switch.
    - (a) Loosen nuts (34, Detail H, Fig. 501) holding switch (37) in bracket (36) and adjust switch so that plunger (35) is depressed  $0.11 +0.00/-0.04$  inch when door is operated to door closed position. Tighten nuts, cycle door, and recheck plunger travel.
- I. Main Cargo Door Position Switch Adjustment (Ref 52-32-131, Main Cargo Door Position Switch) (Passenger/Cargo Convertible Airplanes Only)
- J. Main Cargo Door Lock Switch Adjustment (Ref 52-32-121, Main Cargo Door Locked Switch) (Passenger/Cargo Convertible Airplanes Only)
- K. Aft Entry Door Latch Sensor Adjustment (Passenger/Cargo Convertible Airplanes Only)
  - (1) Equipment and Materials
    - (a) Laminated Shim - BACS40R08C20F
  - (2) Adjust aft entry door latch sensor.
    - (a) Remove bolts (41, Detail K, Fig. 501) and nuts attaching proximity sensor (38) to mounting bracket. Remove proximity sensor and laminated shim (40). Add or remove 0.003-inch lamination from BACS40R08C20F shim until gap between proximity sensor and sensor plate (42) is  $0.08 \pm 0.02$  inch when stop pin (39) is in latched position. Replace shim, proximity sensor, bolts and nuts. Tighten nuts.
- L. Aft Entry Door Sensor Adjustment (Passenger/Cargo Convertible Airplanes Only)
  - (1) Adjust aft entry door sensor.
    - (a) Loosen screws (44, Detail L, Fig. 501) and move actuator (43) so that gap between actuator and sensor (45) is  $0.08 \pm 0.02$  inch. Tighten screws.

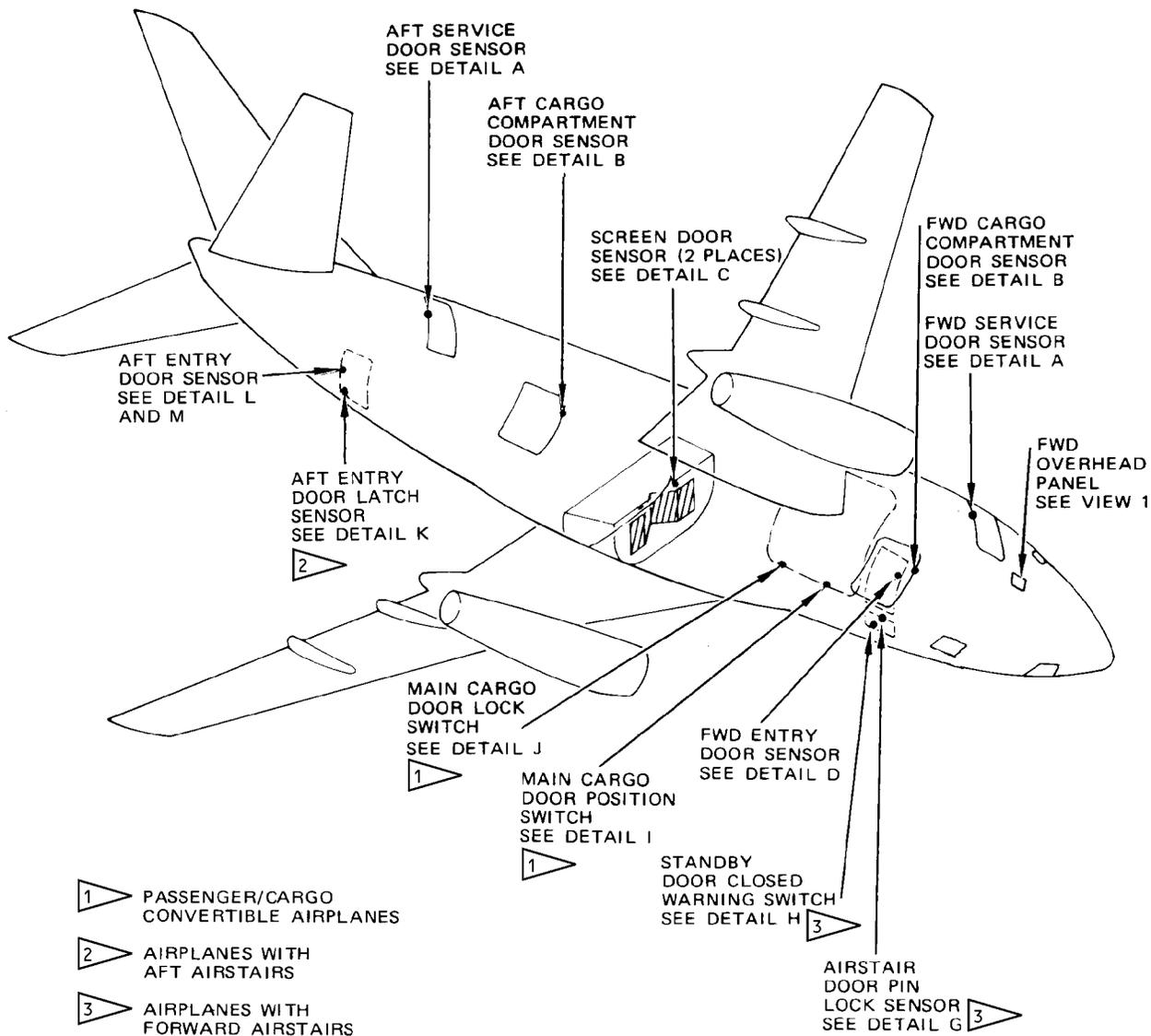
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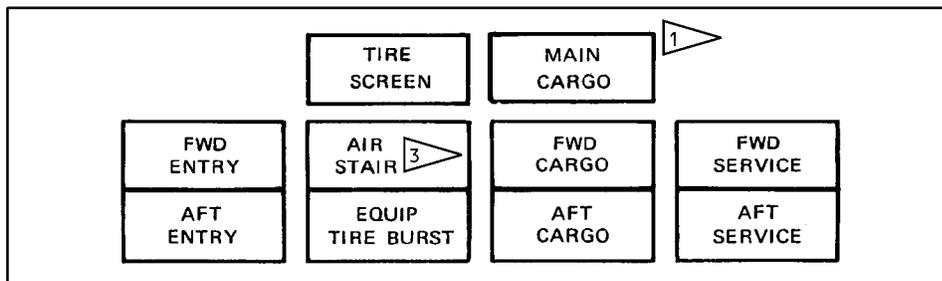
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**MAINTENANCE MANUAL**



- 1 PASSENGER/CARGO CONVERTIBLE AIRPLANES
- 2 AIRPLANES WITH AFT AIRSTAIRS
- 3 AIRPLANES WITH FORWARD AIRSTAIRS

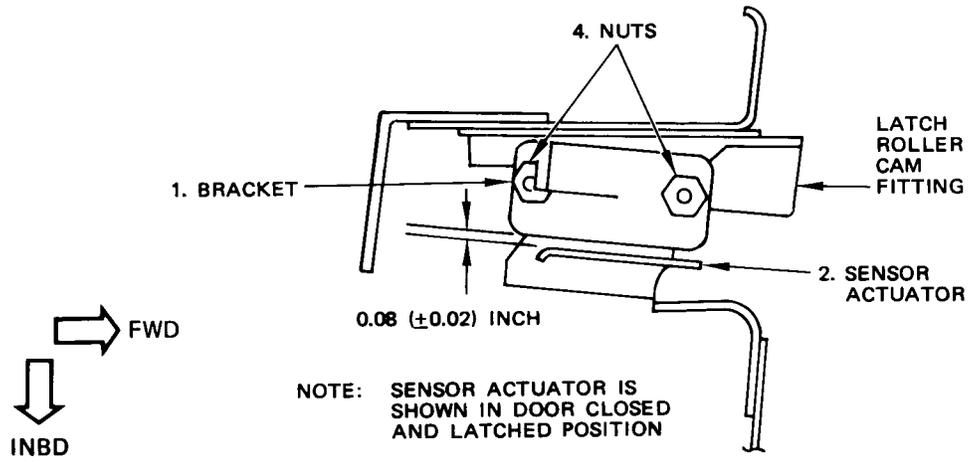


P5-20 DOOR WARNING MODULE  
ON FORWARD OVERHEAD PANEL

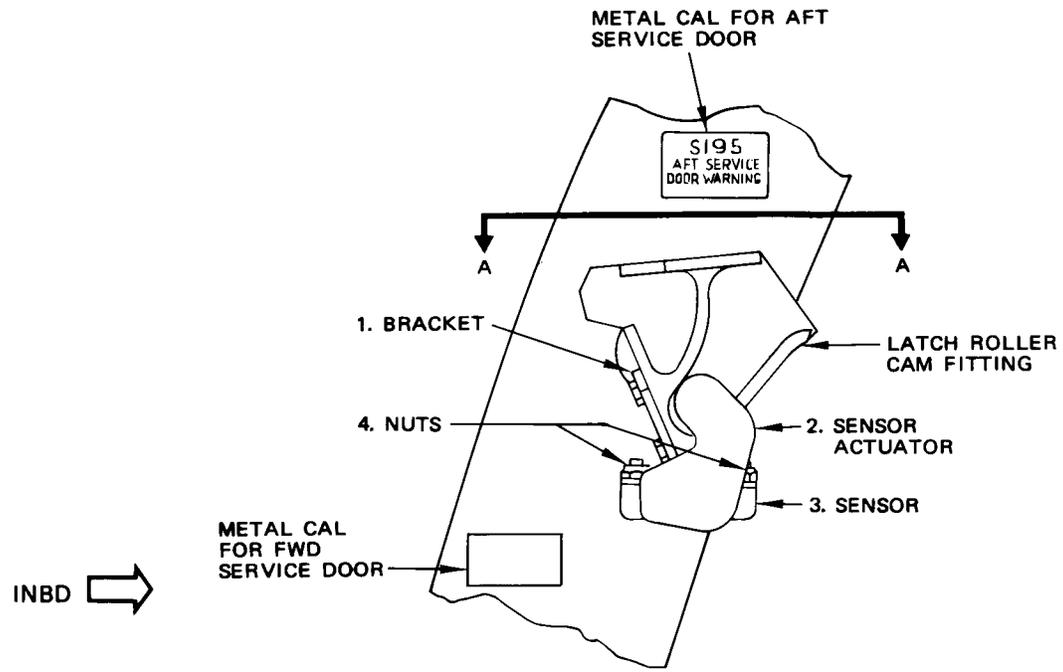
VIEW 1

Door Warning System Switch and Sensor Adjustment  
Figure 501 (Sheet 1)

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SECTION A-A



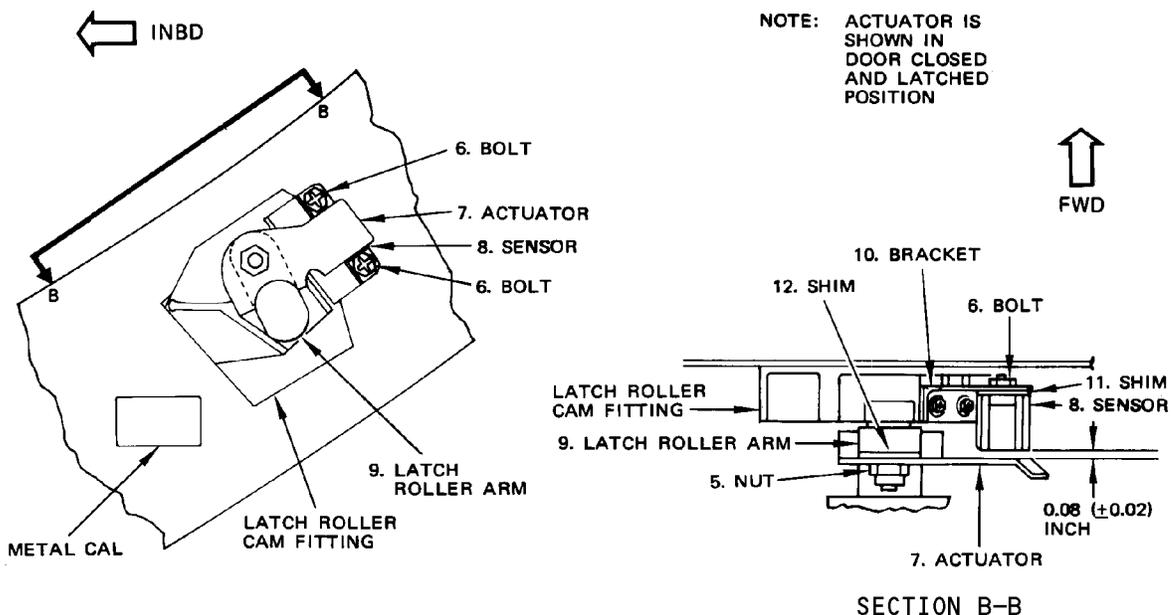
FORWARD AND AFT SERVICE DOOR SENSOR  
 DETAIL A

Door Warning System Switch and Sensor Adjustment  
 Figure 501 (Sheet 2)

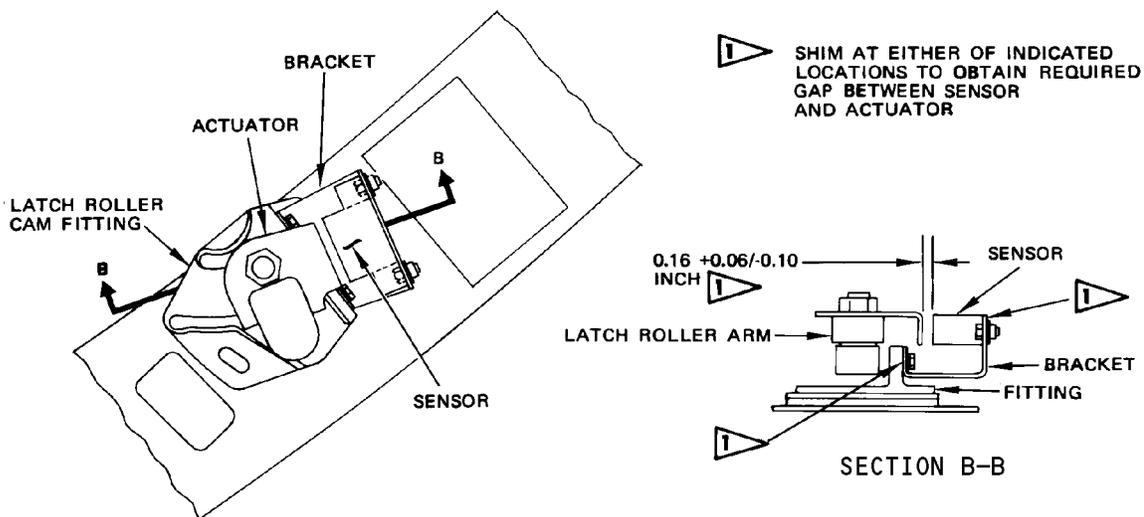
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SLIDE-BY MODE OF ACTUATION INSTALLATION



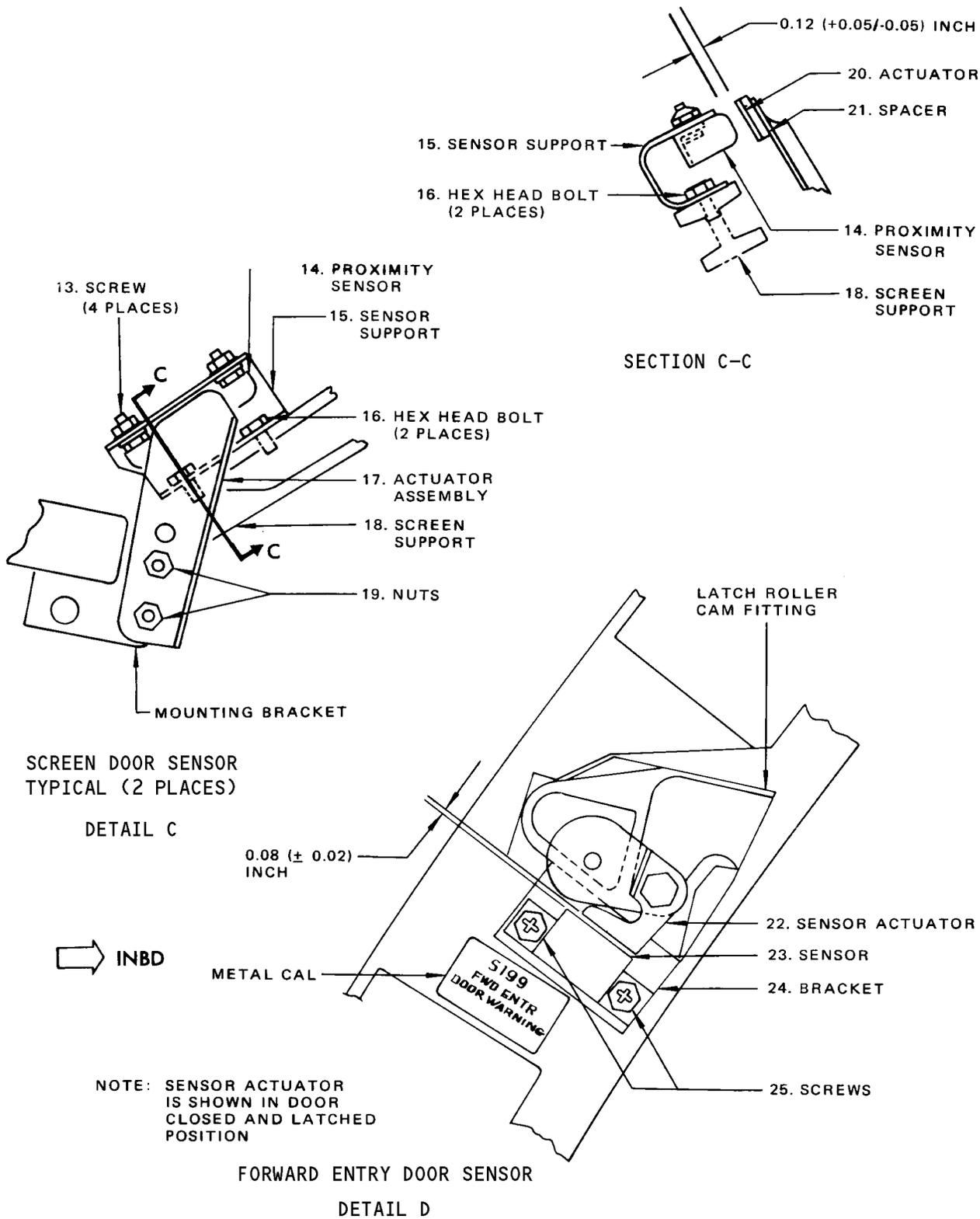
HEAD-ON MODE OF ACTUATION INSTALLATION

FORWARD AND AFT CARGO COMPARTMENT DOOR SENSOR  
 DETAIL B

Door Warning System Switch and Sensor Adjustment  
 Figure 501 (Sheet 3)

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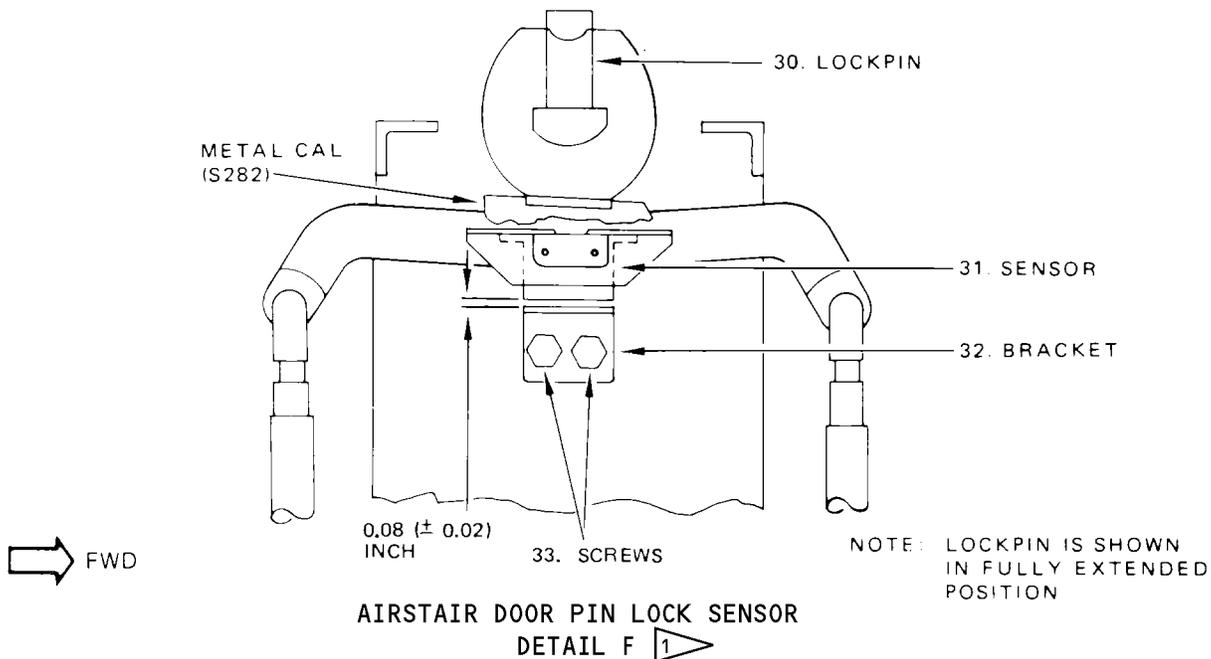
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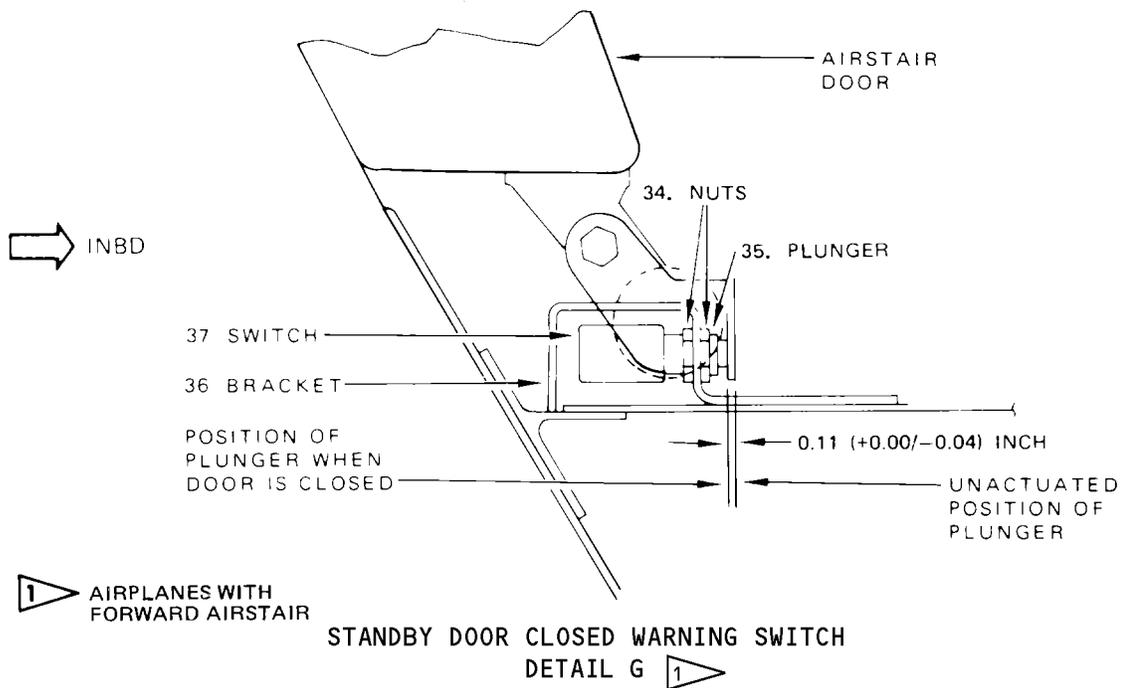
Door Warning System Switch and Sensor Adjustment  
 Figure 501 (Sheet 4)

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 AIRPLANES WITH FORWARD AIRSTAIR

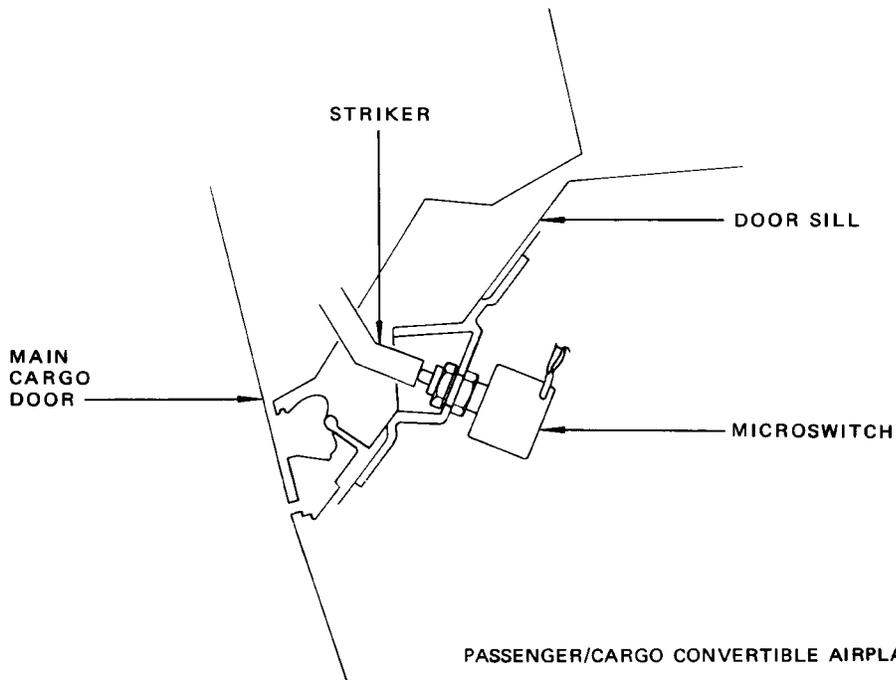


 AIRPLANES WITH FORWARD AIRSTAIR

Door Warning System Switch and Sensor Location  
 Figure 502

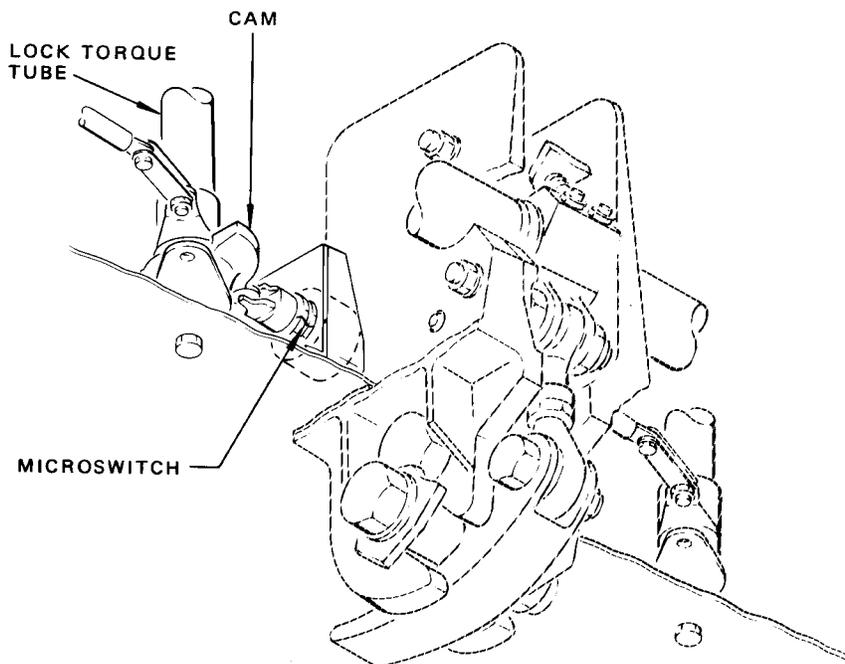
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PASSENGER/CARGO CONVERTIBLE AIRPLANES ONLY

MAIN CARGO DOOR POSITION SWITCH  
 DETAIL I



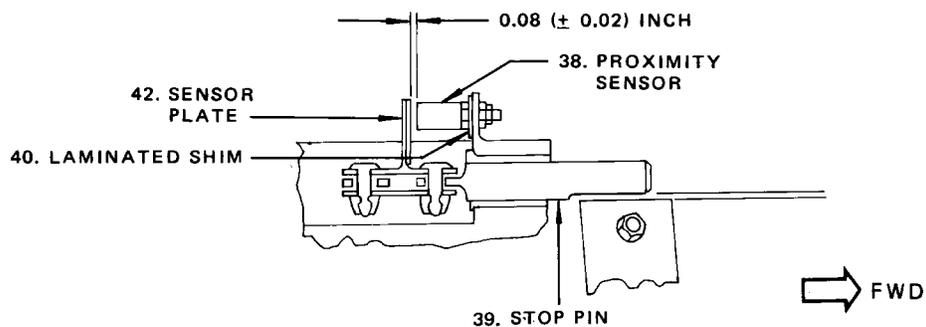
PASSENGER/CARGO CONVERTIBLE AIRPLANES ONLY

MAIN CARGO DOOR LOCK SWITCH  
 DETAIL J

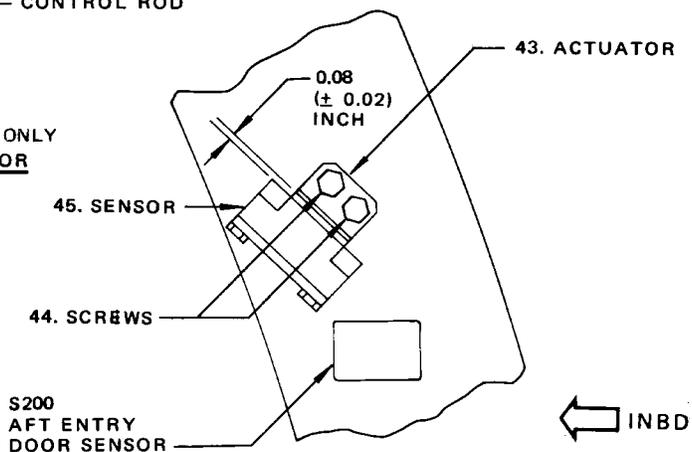
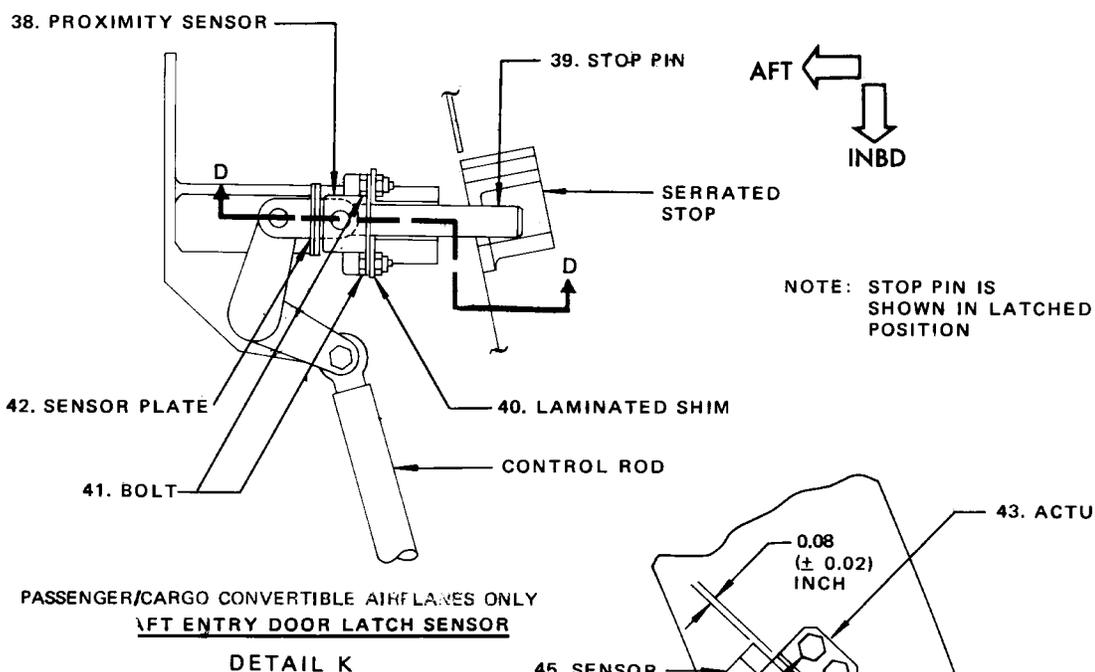
Door Warning System Switch and Sensor Adjustment  
 Figure 503 (Sheet 1)

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SECTION D-D



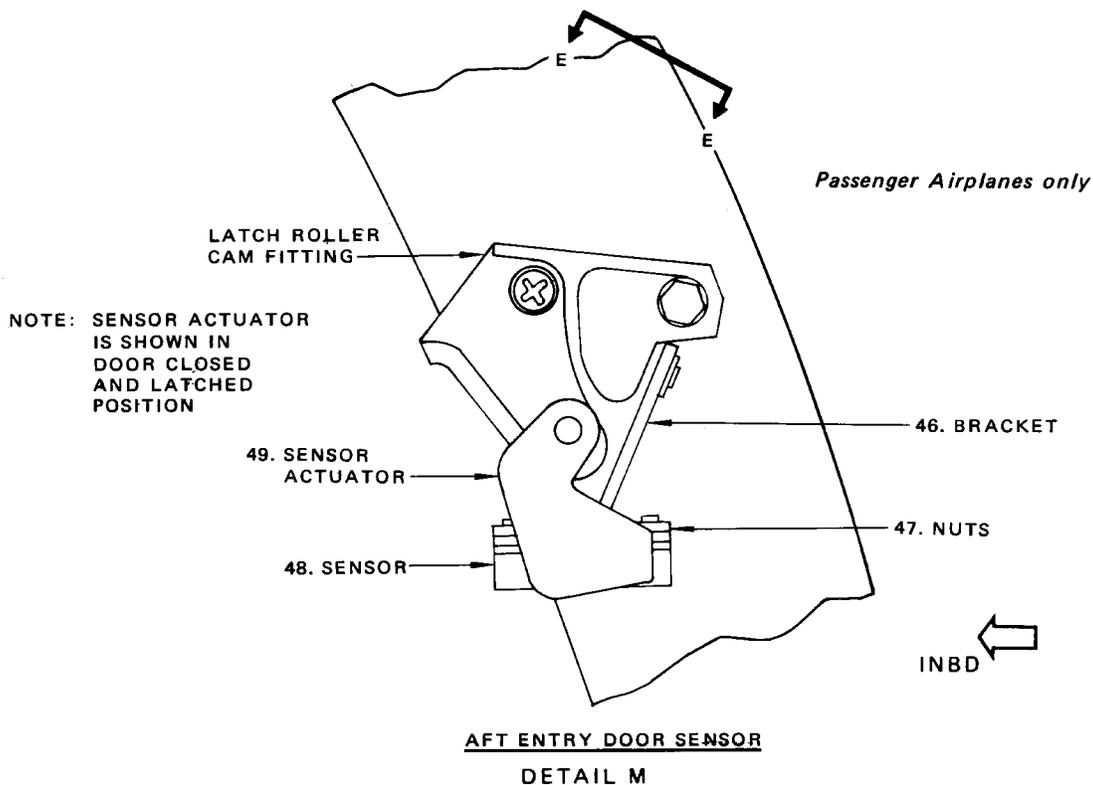
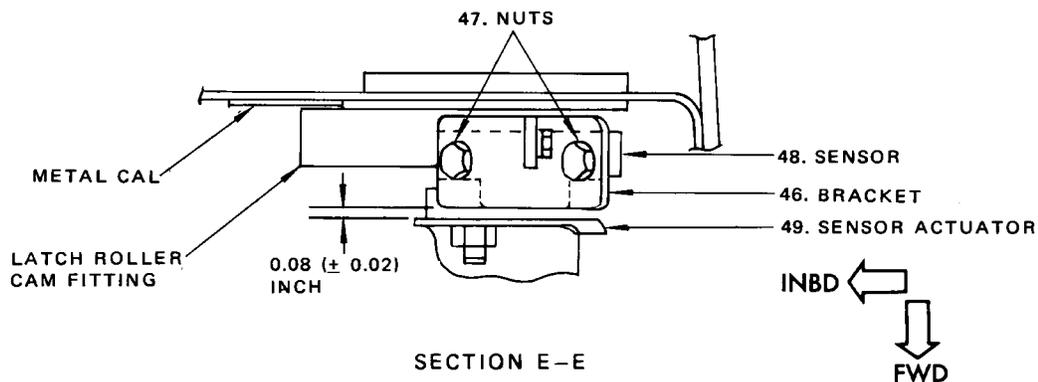
NOTE: ACTUATOR IS SHOWN  
 IN DOOR CLOSED  
 POSITION

PASSENGER/CARGO CONVERTIBLE AIRPLANES ONLY  
AFT ENTRY DOOR SENSOR  
 DETAIL L

Door Warning System Switch and Sensor Adjustment  
 Figure 503 (Sheet 2)

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Door Warning System Switch and Sensor Adjustment  
 Figure 503 (Sheet 3)

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M. Aft Entry Door Sensor Adjustment (Passenger Airplanes Only)

- (1) Adjust aft entry door sensor.
  - (a) Loosen nuts (47, detail M, figure 501) attaching sensor (48) to bracket (46) and move sensor so that gap between sensor and sensor actuator (49) is 0.08 ( $\pm 0.02$ ) inch. Tighten nuts.

2. Door Warning System Test

A. General

- (1) Door warning sensor and door warning circuit tests are described in the following paragraphs. The door sensor test checks that the sensors in the system are adjusted correctly, whereas, the circuit tests checks that each door warning circuit is operating correctly. The circuit test will not necessarily indicate the applicable sensor is adjusted within the limits specified.

B. Door Warning Sensors Test

- (1) General
  - (a) The door warning sensor test is applicable to any sensor in the door warning system and should be performed after any door sensor is adjusted. Also, the applicable portion of the system test should be performed after the sensor test. The door sensor test can also be used as an isolation procedure during trouble shooting to confirm a sensor adjustment.
- (2) Equipment and Materials
  - (a) Door Proximity Sensor/Actuator Gap Test Set - F80165-42 consisting of F80165-2 chassis, F80165-19 cable, F80165-43 test box and spacers F80165-28, -29, -32 and -33.
- (3) Test Door Warning Sensor
  - (a) Open DOOR WARNING DC circuit breaker on panel P6 and remove miscellaneous switching module from E3-2 electrical shelf.
  - (b) Install F80165-2 chassis assembly in module position and connect adapter cable F80165-19 between chassis assembly and F80165-43 test box.
  - (c) Close DOOR WARNING DC circuit breaker and turn switch on test box to ON.
  - (d) Position selector switch on chassis assembly to applicable switch designation as referenced on door warning wiring diagram.
  - (e) Turn dial on test box fully clockwise.

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- (f) Open applicable door and place spacer assembly on sensor. Use F80165-28 spacer assembly for all doors except tire screen doors. Use F80165-32 spacer assembly for the right and left tire screen doors.

**NOTE:** The spacer assembly can be taped to sensor temporarily while testing sensor. The spacer assembly consists of an actuator slug and a spacer bonded together. The spacer side of the spacer assembly is placed against the sensor to be tested.

- (g) Turn dial on test box counterclockwise until the light on the box illuminates.
- (h) Remove the spacer assembly. The light shall extinguish.
- (i) Close and lock the door. The light shall not illuminate.
- 1) If light illuminates, it indicates the sensor is too close to actuator and should be readjusted.
- (j) Open door and place spacer assembly between slug and sensor. Use F80165-29 spacer assembly for all doors except tire screen doors. Use F80165-33 spacer assembly for right and left tire screen doors.
- (k) Turn dial on test box counterclockwise until light illuminates, then clockwise until light extinguishes.
- (l) Remove spacer assembly. The light shall remain extinguished.
- (m) Close and lock door. The light shall illuminate.
- 1) If light does not illuminate, door sensor is adjusted too far from actuator and should be readjusted.
- (n) Remove F80165-2 chassis assembly and reinstall miscellaneous switching module.

### C. Door Warning Circuits Test

#### (1) General

- (a) The complete door warning system test should be performed in the sequence given during periodic system tests or after the door warning module or door warning module printed circuit board is replaced. Otherwise, only that portion of the system test applicable to the affected door circuit needs to be performed to assure proper operation after adjustment.

**CAUTION:** TO LESSEN THE POSSIBILITY OF HEAT DAMAGE, AND AT THE SAME TIME PROLONG LAMP LIFE ON ALL INDICATORS, THE MASTER SWITCH SHOULD BE PLACED IN THE "DIM" POSITION DURING EXTENDED PERIODS OF GROUND OPERATION.

**NOTE:** Doors not being tested should be closed and locked or simulated locked so the associated lights on the door-warning module are extinguished.

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- (2) Equipment and Materials
  - (a) Steel plate (10 - 20), 0.05 by 0.50 by 1.2 inches or equivalent
- (3) Prepare to test door-warning circuits.
  - (a) Provide electrical power to airplane.
  - (b) Check that the following circuit breakers on panel P6 are closed.
    - 1) MASTER CAUTION BUS-BAT.
    - 2) DOOR WARNING DC.
    - 3) DIM AND TEST.
    - 4) Nine circuit breakers under heading INDICATOR-MASTER DIM.
  - (c) Depress left master caution annunciator cap on P7.
  - (d) Check that both MASTER CAUTION lights and all of lamps in both master caution annunciators come on when cap is depressed and all lamps go out when cap is released.
  - (e) Open MASTER CAUTION BUS-BAT circuit breaker.
  - (f) Close MASTER CAUTION BUS - NO. 1 circuit breaker on P6.
  - (g) Depress right master caution annunciator cap.
  - (h) Check that both MASTER CAUTION lights and all of the lamps in both master caution annunciators come on when cap is depressed and all lamps go out when cap is released.
- (4) Test Door Warning Circuits.
  - (a) Forward entry door warning circuit test.
    - 1) With forward airstairs door closed, unlock forward entry door.
    - 2) Check that the following lights come on.
      - a) FWD ENTRY light on P5
      - b) AIR STAIR light on P5
      - c) Both MASTER CAUTION lights
      - d) DOORS lamp of master caution annunciator
    - 3) Lock forward entry door and check that lights go out.
  - (b) Forward Galley Service Door Warning Circuit Test
    - 1) Unlock forward galley service door.
    - 2) Check that the following lights come on.
      - a) FWD SERVICE light on P5
      - b) Both MASTER CAUTION lights

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- c) DOORS lamp of master caution annunciator
- 3) Position LIGHTS TEST switch on P2-1 to DIM.
- 4) Check that the above lights dim.
- 5) Position LIGHTS TEST switch to BRT.
- 6) Check that the above lights return to original brightness.
- 7) Depress left MASTER CAUTION light cap.
- 8) Check that both MASTER CAUTION lights and DOORS light go out and FWD SERVICE LIGHT REMAINS ON.
- 9) Depress and release left master caution annunciator cap.
  - a) Check that while cap is depressed, all master caution annunciator lamps and both MASTER CAUTION lights come on.
  - b) Check that when cap is released, DOORS lamp of master caution annunciator, both MASTER CAUTION lights and FWD SERVICE light remains on.
- 10) Depress right MASTER CAUTION light cap.
- 11) Check that both MASTER CAUTION lights and DOORS light go out and FWD SERVICE light remains on.
- 12) Repeat step (9) for right master caution annunciator cap.
- 13) Lock forward galley service door and check that the following lights go out.
  - a) FWD SERVICE
  - b) Both MASTER CAUTION lights
  - c) DOORS
- (c) Aft Galley Service Door Warning Circuit Test
  - 1) Unlock aft galley service door.
  - 2) Check that both MASTER CAUTION lights, DOORS lamp and AFT SERVICE light come on.
  - 3) Lock aft galley service door.
  - 4) Check that all lights go out.
- (d) Forward Cargo Compartment Door Warning Circuit Test
  - 1) Repeat step (c) for forward cargo compartment door.
- (e) Aft Cargo Compartment Door Warning Circuit Test
  - 1) Repeat step (c) for aft cargo compartment door.
- (f) Lower Nose Compartment Access Door Warning Circuit Test
  - 1) Repeat step (c) for lower nose compartment access door.

**NOTE:** Lower nose compartment access door and electronic equipment compartment external access door share the EQUIP warning light.

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- (g) Electronic Equipment Compartment External Access Door Warning Circuit Test
- 1) Repeat step (c) for electronic equipment compartment external access door.
- NOTE:** The electronic equipment compartment external access door and lower nose compartment access door share the EQUIP warning light.
- (h) Left Tire Burst Protector Screen Door Warning Circuit Test (If installed)
- 1) Repeat step (c) for left tire burst protector screen door.
- NOTE:** The left and right tire burst protector screen doors share the TIRE SCREEN warning light.
- (i) Right Tire Burst Protector Screen Door Warning Circuit Test (If installed)
- 1) Repeat step (c) for right tire burst protector screen door.
- NOTE:** The right and left tire burst protector screen doors share the TIRE SCREEN warning light.
- (j) Forward Airstair Door Warning Circuit Test (Airplanes with Forward Airstair)
- 1) Open airstair door (Ref 52-61-0 D&O).
  - 2) Check that forward entry door is closed and locked.
  - 3) Check that the following lights are on:
    - a) AIR STAIR on Door Warning Module
    - b) Both MASTER CAUTION lights
    - c) DOORS lamps on master caution annunciator
  - 4) Close and lock airstair door.
  - 5) Check that all lights go out.
- (k) Aft Entry Door Warning Circuit Test (Passenger Airplanes Only)
- 1) Test aft entry door warning circuit.
    - a) Repeat step (c) for aft entry door.
- (l) Aft Entry Door Warning Circuit Test (Passenger/Cargo Convertible Airplanes)
- 1) Open Aft Entry Door (Ref 52-14-0 D&O).

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- 2) Check that AFT ENTRY light on door warning module, both MASTER CAUTION lights and the DOORS light on the master caution annunciator illuminate.
  - 3) Remove the fiberglass access panel in the aft lower doorway and place a piece of 10-20 steel plate, or equivalent, a minimum size of 0.05 by 0.50 by 1.2 inches on the face of the sensor located behind the access door.
  - 4) Check that the lights listed in step 2) remain on.
  - 5) Remove the steel plate from the lower sensor and place it on the face of the sensor located in the aft upper doorway.
  - 6) Check that the lights listed in step 2) remain on.
  - 7) Remove steel plate from sensor and install the fiberglass access panel.
  - 8) Close and lock aft entry door (Ref 52-14-0 D&O).
  - 9) Check that the AFT ENTRY light on the P5 panel and both MASTER CAUTION lights and the DOORS light of the master caution annunciator go out.
- (m) Main Cargo Door Warning Circuit Test (Passenger/Cargo Convertible Airplanes)
- 1) Prepare main cargo door warning circuit for test.
    - a) Close the following circuit breakers on load control center P6.
      - 1 The nine circuit breakers under the heading, INDICATOR -MASTER DIM BUS
      - 2 ..... MAIN CARGO DOOR CONTROL
      - 3 ..... LANDING GEAR FAILURE WARNING & PARKING BRAKE
      - 4 ..... LANDING GEAR INDICATING LIGHTS
    - b) Check that control valve indicator is at POS #2.
    - c) With the forward entry door open, override the door open switch and close the remaining entry doors and the lower cargo doors.
    - d) Check that the door caution light, pilot's center panel, is out.
    - e) Operate main cargo door external lock handle to the unlocked position.
    - f) Check that the following lights are on:
      - 1 Main cargo door control panel light
      - 2 Door caution light on center panel
      - 3 MAIN CARGO door warning light on the P5 overhead panel
    - g) Apply parking brake.
    - h) Pressurize hydraulic system B.
    - i) Open lift actuator access panel.
    - j) Fold main cargo door forward and aft hatrack sections to the up and locked position.

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- 2) Test main cargo door warning circuit (ALL EXCEPT airplanes incorporating SB 52-1060).
  - a) Place door control switch No. 1 to UP TO CANOPY position. Release switch when door has opened approximately 12 inches.
  - b) Close the cargo door, but keep the door lock open. Door warning lights should remain lit.
  - c) Move external lock handle to locked position and check that the door warning lights extinguish.
  - d) Disconnect the two wires from terminal 11 of terminal strip T259 and unlock door.

NOTE: Terminal strip T259 is located behind the ceiling panel, inboard of the aft section of the main cargo door hinge line. For removal of ceiling panel, refer to Chapter 25, Passenger Cabin Lining and Insulation.

- e) Check that door warning light remains extinguished.
  - f) Open cargo door a minimum of 10 inches and check that door warning lights illuminate.
  - g) Close door and lock external lock handle.
  - h) Check that door warning lights extinguish.
  - i) Reconnect wires to terminal 11 of terminal strip T259.
  - j) Unlock cargo door and check that door warning lights illuminate.
  - k) Lock cargo door external handle.
- 3) Test main cargo door warning circuit (airplanes incorporating SB 52-1060)
    - a) Repeat steps 2)a), 2)b), 2)c).
    - b) Disconnect wire from terminal 10 of terminal strip T259 and unlock door. Check that door unlocked light and main cargo door warning light on forward overhead panel P5 are extinguished.

NOTE: Terminal strip T259 is located behind ceiling panel inboard of aft section of main cargo door hinge line. For removal of ceiling panel, refer to Chapter 25, Passenger Cabin Lining and Insulation.

- c) Using switch No. 1, open main cargo door a minimum of 10 inches. Check that door unlocked light illuminates.

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- d) Reconnect wire to terminal 10 and terminal 11 of terminal strip T259. Actuate door position switch on doorsill, lockpin switch at No. 3 door latch, and lockpin switch at No. 6 door latch. Check that main cargo door warning light extinguishes and that lights at No. 2 and 7 latch viewing windows are illuminated.
  - e) Release No. 3 door latch lockpin switch. Check that light at No. 2 latch viewing window extinguishes, that light at No. 7 latch viewing window remains illuminated, and that main cargo door warning light illuminates.
  - f) Actuate No. 3 door latch lockpin switch and release No. 6 door latch lockpin switch. Check that light at No. 7 latch viewing window is extinguished, that light at No. 2 latch viewing window is illuminated, and that main cargo door warning light is illuminated.
  - g) Actuate No. 6 door latch lockpin switch. Check that main cargo door warning light extinguishes.
  - h) Release door position switch. Check that main cargo door warning light illuminates.
  - i) Release No. 3 and 6 door latch lockpin switches, close door and lock handle. Check that door unlocked light and main cargo door warning light are extinguished, and that lights at No. 2 and 7 latch viewing windows are illuminated.
  - j) Unlock door. Check that door unlocked light and main cargo door warning light are illuminated, and that lights at No. 2 and 7 latch viewing windows are extinguished. Lock door handle.
- (5) Restore airplane to normal.

**CAUTION:** TO LESSEN THE POSSIBILITY OF HEAT DAMAGE, AND AT THE SAME TIME PROLONG LAMP LIFE ON ALL INDICATORS, THE MASTER SWITCH SHOULD BE PLACED IN THE "DIM" POSITION DURING EXTENDED PERIODS OF GROUND OPERATION.

- (a) Determine if there is further need for electrical power. If not remove power.

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MISCELLANEOUS SWITCHING MODULE - REMOVAL/INSTALLATION

1. Miscellaneous Switching Module Removal
  - A. Make sure there is no electrical power on the airplane.
  - B. Loosen the clamp that holds the module to the E3-2 rack.
  - C. Pull the module out of the E3-2 rack.
2. Miscellaneous Switching Module Installation
  - A. General
    - (1) The Miscellaneous Switching Module (M278) contains printed circuit cards. These cards operate with proximity sensors to act as switches. The function of each card and sensor is written on the cover of the module.
    - (2) When the M278 module is installed on the E3-2 rack it is necessary to do a test of each of the card/sensors. Refer to 52-71-31/501 for this test.
  - B. Install the Miscellaneous Switching Module (M278).
    - (1) Make sure there is no electrical power on the airplane.
    - (2) Put the M278 module in its position on the E3-2 rack.
      - (a) Tighten the clamp on the module.
    - (3) Supply electrical power (Ref 24-22-00/201).
    - (4) Do the test of the M278 module (Ref 52-71-31/501).

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MISCELLANEOUS SWITCHING MODULE – ADJUSTMENT/TEST

1. Miscellaneous Switching Module Test

A. General

- (1) This test is to make sure the circuits through the Miscellaneous Switching Module (M278) operate correctly. The name of the circuit for each card is on the cover of the module.
- (2) It is only necessary to do this test if you replace the entire M278 module. If you replace an individual card in the module, do a test of that card and its circuit only.

B. Provide electrical power (Ref 24-22-00/201).

C. Do the test of the Door Warning Circuits (Ref 52-71-00/501).

D. Do a test of the APU horn driver.

- (1) Make sure these circuit breakers are closed:
  - (a) FIRE PROTECTION DETECTION, APU
  - (b) MASTER WARNING AND CONTROL
  - (c) LANDING GEAR, LIGHTS
  - (d) FIRE PROTECTION DETECTION, ENG NO. 1
  - (e) FIRE PROTECTION DETECTION, ENG NO. 2
- (2) Open the OVHT WHL WELL WNG BDY circuit breaker on the P6 panel.
- (3) Put the TEST switch on the Engine and APU Fire Control Panel (P8-1) in the OVHT/FIRE position.
- (4) See that these indications occur:
  - (a) The red lights on the P7 panel come on
  - (b) The lights in the APU fire handle come on
  - (c) The fire bell in the control cabin comes on
  - (d) The horn and the warning light in the right main wheel well comes on.

NOTE: The fire warning for the engines will also operate. The horn in the wheel well will come on and go off repeatedly.

- (5) Press the bell cutout switch on the P8-1 panel.
  - (a) Make sure the fire bell and the horn make no noise.
  - (b) Make sure the red lights on the P7 panel go off.
- (6) Put the TEST switch in the OFF position.
- (7) Put the TEST switch in the OVHT/FIRE position.
- (8) Push the captain's fire warning light on the P7 panel.
  - (a) Make sure the fire bell and the horn do not operate.
  - (b) Make sure the red lights on the P7 panel go off.
- (9) Put the TEST switch in the OFF position.
- (10) Put the TEST switch in the OVHT/FIRE position.
- (11) Push the first officer's fire warning light on the P7 panel.
  - (a) Make sure the fire bell and the horn do not operate.
  - (b) Make sure the red lights on the P7 panel go off.

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- (12) Put the TEST switch in the OFF position.
  - (13) Put the TEST switch in the OVHT/FIRE position.
  - (14) Push the horn cutout on the APU Ground Control Panel (P28) in the right wheel well.
    - (a) Make sure the fire bell and the horn do not operate.
    - (b) Make sure the red lights on the P7 panel go off.
  - (15) Put the TEST switch in the OFF position.
  - (16) Pull down the squat switch at the right main landing gear.
  - (17) Put the TEST switch in the OVHT/FIRE position.
  - (18) Make sure the warning light on the APU Ground Control Panel (P28) comes on.
  - (19) Make sure the APU fire horn does not come on.
  - (20) Put the TEST switch in the OFF position.
  - (21) Release the squat switch at the right main landing gear.
  - (22) Close the OVHT WHL WELL WNG BDY circuit breaker on the P6 panel.
- E. On Airplanes With Landing Gear Indication Cards, and Without Landing Gear Auxiliary Lights on the P5 Panel; do a test of the Landing Gear Indication.
- (1) Equipment and Materials
    - (a) A piece of copper, 0.04 to 0.06 inch thick, approximately 1.5 inches wide and 2.5 inches long
  - (2) On the P6-2 Panel, make sure these circuit breakers are closed:
    - (a) LANDING GEAR LIGHTS
    - (b) AURAL WARNING
  - (3) Put the landing gear lever in the DWN position.
  - (4) Make sure the thrust levers are at the idle position.
  - (5) Do a test of the indication for the right main landing gear.
    - (a) See that the three green indicator lights are on.
    - (b) See that the three red indicator lights are off.
    - (c) Put the copper shield between the secondary downlock sensor and the actuator on the right main landing gear.
    - (d) See that the green light for the right main gear goes off.
    - (e) See that the red light for the right main gear comes on.
    - (f) Make sure that the continuous aural warning horn sounds.
    - (g) Remove the shield from the secondary downlock sensor.
    - (h) See that the three green lights are on.
    - (i) See that the three red lights are off.
    - (j) Make sure that the continuous aural warning horn goes off.
  - (6) Do a test of the indication for the left main landing gear.
    - (a) Put the copper shield between the secondary downlock sensor and the actuator on the left main landing gear.
    - (b) See that the green light for the left main gear goes off.
    - (c) See that the red light for the left main gear comes on.
    - (d) Make sure that the continuous aural warning horn sounds.
    - (e) Remove the shield from the secondary downlock sensor.
    - (f) See that the three green lights are on.

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- (g) See that the three red lights are off.
- (h) Make sure that the continuous aural warning horn goes off.
- (7) On Airplanes With a Card For The Nose Landing Gear; do a test of the nose gear indication.
  - (a) Put the copper shield between the secondary downlock sensor and the actuator on the nose landing gear.
  - (b) See that the green light for the nose landing gear goes off.
  - (c) See that the red light for the nose landing gear comes on.
  - (d) Make sure that the continuous aural warning horn sounds.
  - (e) Remove the shield from the secondary downlock sensor.
  - (f) See that the three green lights are on.
  - (g) See that the three red lights are off.
  - (h) Make sure that the continuous aural warning horn goes off.
- F. On Airplanes with Landing Gear Indication Cards, and With Landing Gear Auxiliary Lights on the P5 Panel; do a test of the Landing Gear Indication.
  - (1) Equipment and Materials
    - (a) A piece of copper, 0.04 to 0.06 inch thick, approximately 1.5 inches wide and 2.5 inches long.
  - (2) On the P6-2 Panel, make sure this circuit breaker is closed:
    - (a) AUX GEAR SWITCHES
  - (3) Do a test of the indication for the right main landing gear secondary downlock sensors.
    - (a) Make sure that the right main gear auxiliary light is on.
    - (b) Put the copper shield between the secondary downlock sensor and the actuator on the right main gear.
    - (c) Make sure that the right main gear auxiliary light goes off.
    - (d) Remove the shield from the secondary downlock sensor.
    - (e) Make sure that the right main gear auxiliary light goes on.
  - (4) Do a test of the indication for the left main landing gear secondary downlock sensors.
    - (a) Make sure that the left main gear auxiliary light is on.
    - (b) Put the copper shield between the secondary downlock sensor and the actuator on the left main gear.
    - (c) Make sure that the left main gear auxiliary light goes off.
    - (d) Remove the shield from the secondary downlock sensor.
    - (e) Make sure that the left main gear auxiliary light goes on.
  - (5) Do a test of the indication for the nose landing gear secondary downlock sensors (if installed).
    - (a) Make sure that the nose gear auxiliary light is on.
    - (b) Put the copper shield between the secondary downlock sensor and the actuator on the nose gear.
    - (c) Make sure that the nose gear auxiliary light goes off.
    - (d) Remove the shield from the secondary downlock sensor.
    - (e) Make sure that the nose gear auxiliary light goes on.

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MAIN LANDING GEAR DOORS – DESCRIPTION AND OPERATION

1. General

A. The main landing gear doors consist of the inner, center and out board door assemblies. (See figure 1.) The doors close the spanwise wing cavity when the main gear is retracted. The inner door is situated on the lower part of the shock strut above the outboard main landing gear and is hinged to the center door. The inner door also is supported by an actuating rod that is connected to the main gear lower side brace universal assembly. The center door is attached to the main gear shock strut and drag link. The outboard door is hinged to wing structure and also is supported by a rod assembly that is connected to an actuation fitting that links door operation to the main landing gear. When the main gear is in down position the outboard door is positioned outboard of the center door for the necessary door clearance. The hinges, linkage and actuating rods are arranged so that operation of the main landing gear doors is slaved to operation of the main landing gear. The body wheel well cavity is closed by the retracted gear tire and main gear wheel well seal. For information on operation of the main landing gear and the seal, refer to Landing Gear and Main Gear Wheel Well Seal, Chapter 32.

2. Inner Door

A. The inner main landing gear door is hinged to the center door and is connected by an actuating rod to the main gear lower side brace universal assembly. Three support rods extend from brackets attached to the inner surface of the door, opposite the fairing support, to brackets located on the inner surface of the door near the seal support web. An actuation fitting and an aluminum alloy block insert are attached to the door near the center support rod upper bracket. The actuating rod is connected to the actuation fitting. The rod is adjusted to fair the door with the wing profile and body fairing when the main gear is retracted.

B. The inner door is of aluminum alloy honeycomb core construction with structurally bonded aluminum alloy skin. The fairing support, seal support brackets, fairing end closures, web support angles, seal retainers, and seal support web are fabricated of clad alloy sheet. Doublers, end channels, clips, door seal depressor fairing, spacers, end channels and radius fillers are of tempered clad alloy sheet. Angles and tee clips, located near the ends of the support rods, are tempered aluminum alloy extrusions. The actuation fitting is fabricated from a tempered aluminum alloy bar.

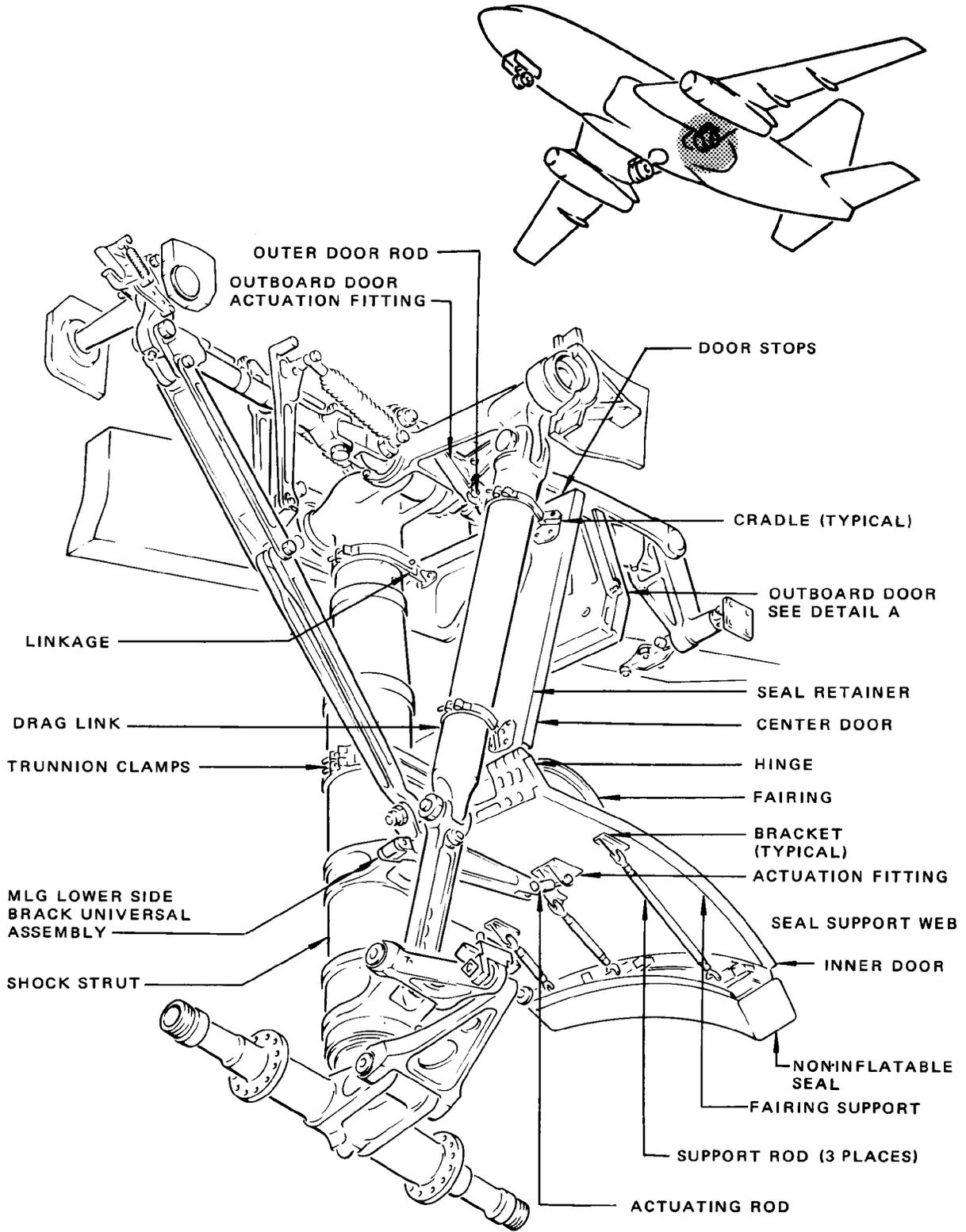
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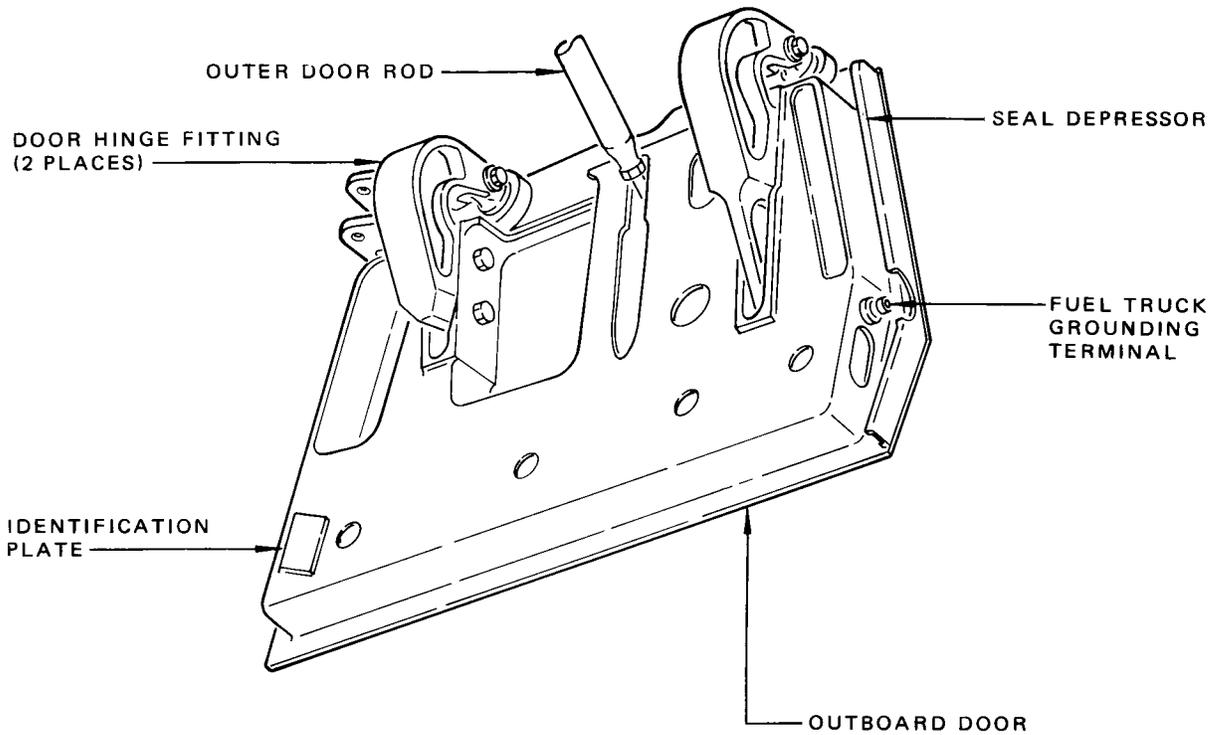


Main Landing Gear Doors  
 Figure 1 (Sheet 1)

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DETAIL A

Main Landing Gear Doors  
 Figure 1 (Sheet 2)

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### 3. Center Door

- A. The center main landing gear door is attached to the shock strut and drag link and hinged to the inner main landing gear door. The door is attached to the shock strut by a fixed cradle and two trunnion clamps with tee bolt clamps, located near the hinged edge on the door, and by a cradle assembly, brackets, and linkage that is situated near the opposite end of the door. The door is attached to the drag link by two cradle assemblies with attached rod end bearing linkage and brackets. Door stops are located on the door edge near the adjacent outboard door. A rub strip is provided along the aft channel.
- B. The center door is of aluminum alloy honeycomb core construction with structurally bonded aluminum alloy skin. Channels, seal angles and seal retainer are fabricated from tempered clad sheet. Hinge fittings and insert blocks are tempered aluminum alloy plate. The cradles and brackets are fabricated from tempered aluminum alloy bar. The linkage at the hinged cradle is tempered aluminum alloy sheet. The straps and components of the clamp assemblies are corrosion resistant steel. Rod end bearings are self-lubricated.

### 4. Outboard Door

- A. The outboard main landing gear door hinges down from its position on the wing lower surface when the gear is extended. Two inboard landing gear beam stabilizer assemblies, attached to the landing gear beam and the wing rear spar, are connected by special bolts and plain bushings to forward and aft door hinge fittings that are bolted to the door. The outer door rod assembly, connected near the center of the door and to the outboard door actuation fitting which is bolted to a bracket on the trunnion link, slaves the door to the main landing gear. The rod is adjusted to fair the door with the wing profile when the main gear is retracted. Electrical bonding is provided and a fuel truck grounding terminal is situated near the forward edge of the door. A seal depressor is attached along the forward edge of the door.
- B. The outboard door is machined from an aluminum alloy casting. The forward and aft hinge fittings are tempered aluminum alloy plate. The outer door rod assembly is a normalized swaged steel tube with self-lubricated rod end bearings. The actuation fitting is fabricated from a tempered aluminum alloy bar. The seal depressor is aluminum alloy sheet.

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NOSE LANDING GEAR DOORS – DESCRIPTION AND OPERATION

1. General

- A. The nose landing gear doors consist of single clamshell doors actuated by a simple actuator rod linkage system. (See figure 1.) The doors hinge down from the outboard edges of the nose wheel well structure. Hinge arms attached to brackets located near the edge of the wheel well structure are connected to each door. The door operator system is a self-aligning adjustable actuation mechanism that consists of linkage which slaves the doors to the nose gear upper drag brace. An adjustable rod in the linkage is connected to each door by a hinge assembly located approximately midway between the forward and aft edges of each door.
- B. Each door is of epoxy reinforced glass fabric laminate faced honeycomb core construction. The skins, doublers, fillers, and blocks are of epoxy preimpregnated fiberglass fabric. Hinges are normal to the door contour. The outer surface of the doors is coated with flame-sprayed aluminum.
- C. The door operator system is arranged so that the doors open to allow the nose landing gear to leave the wheel well when the gear is extended and close when the gear is retracted. When the gear is retracted the door operator system closes the doors so that the outer surface of the doors fair with the lower surface of the fuselage. For information on operation of the nose landing gear, refer to Landing Gear, Chapter 32.

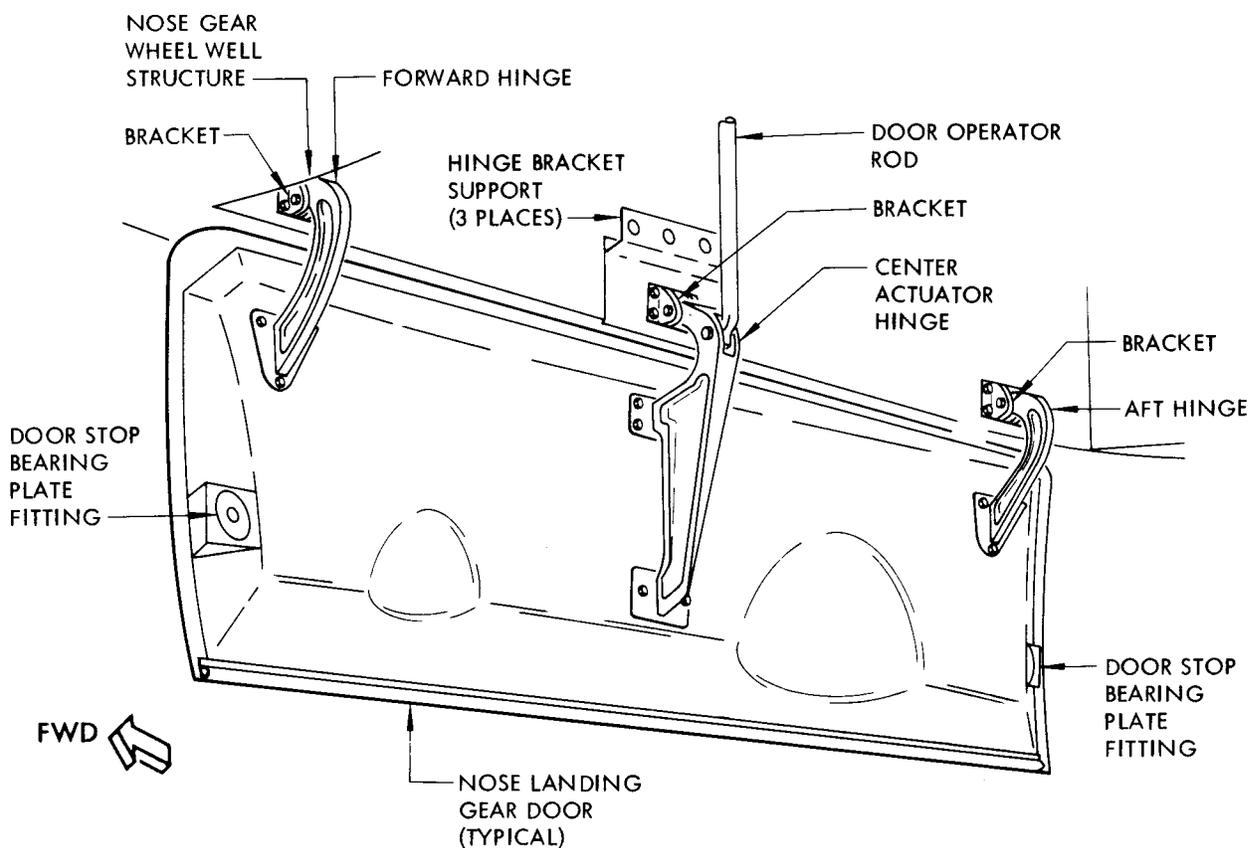
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Nose Landing Gear Doors  
 Figure 1

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