

CHAPTER

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75-EFFECTIVE PAGES			75-00-00 Config 2			75-00-00 Config 2 (cont)		
1 thru 10	NOV 01/2017		1	Mar 01/2015		O 620	Nov 01/2017	
75-CONTENTS			2	Mar 01/2015		O 621	Nov 01/2017	
1	Nov 01/2015		3	Mar 01/2015		O 622	Nov 01/2017	
2	Nov 01/2015		4	Mar 01/2015		75-20-00 Config 1		
3	Nov 01/2015		5	Mar 01/2015		1	Mar 01/2015	
4	Nov 01/2015		6	Mar 01/2015		2	Mar 01/2015	
O 5	Nov 01/2017		7	Mar 01/2015		3	Mar 01/2015	
6	Nov 01/2015		8	Mar 01/2015		4	Mar 01/2015	
7	Nov 01/2015		9	Mar 01/2015		5	Mar 01/2015	
8	Nov 01/2015		10	Mar 01/2015		6	Mar 01/2015	
O 9	Nov 01/2017		11	Mar 01/2015		75-20-00 Config 2		
10	Nov 01/2015		12	Mar 01/2015		1	Mar 01/2015	
11	Mar 01/2015		13	Mar 01/2015		2	Mar 01/2015	
12	Nov 01/2015		14	Mar 01/2015		3	Mar 01/2015	
13	Nov 01/2015		15	Mar 01/2015		4	Mar 01/2015	
O 14	Nov 01/2017		16	Mar 01/2015		5	Mar 01/2015	
15	Mar 01/2017		75-00-00 Config 2			6	Mar 01/2015	
16	Nov 01/2015		601	Mar 01/2015		7	Mar 01/2015	
17	Mar 01/2015		602	Mar 01/2015		8	Mar 01/2015	
18	Nov 01/2015		603	Mar 01/2015		75-21-00 Config 2		
19	Nov 01/2015		604	Mar 01/2015		1	Mar 01/2015	
20	Nov 01/2015		605	Mar 01/2015		2	Mar 01/2015	
O 21	Nov 01/2017		606	Mar 01/2015		75-21-01 Config 2		
22	Mar 01/2017		607	Mar 01/2015		O 401	Nov 01/2017	
23	Mar 01/2017		608	Mar 01/2015		O 402	Nov 01/2017	
24	Mar 01/2017		609	Mar 01/2015		403	Mar 01/2015	
75-00-00 Config 1			610	Mar 01/2015		404	Mar 01/2015	
1	Mar 01/2015		611	Mar 01/2015		O 405	Nov 01/2017	
2	Mar 01/2015		612	Mar 01/2015		O 406	Nov 01/2017	
3	Mar 01/2015		613	Mar 01/2015		O 407	Nov 01/2017	
4	Mar 01/2015		614	Mar 01/2015		408	Mar 01/2015	
5	Mar 01/2015		615	Mar 01/2015		409	Mar 01/2015	
6	Mar 01/2015		616	Mar 01/2015		410	BLANK	
7	Mar 01/2015		617	Mar 01/2015		75-21-13 Config 1		
8	Mar 01/2015		618	Mar 01/2015		O 401	Nov 01/2017	
			619	Mar 01/2015		O 402	Nov 01/2017	

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75-21-13 Config 1 (cont)			75-22-01 Config 2 (cont)			75-22-03 Config 2 (cont)		
403	Mar 01/2015		O 418	Nov 01/2017		405	Mar 01/2015	
O 404	Nov 01/2017		419	Mar 01/2015		O 406	Nov 01/2017	
O 405	Nov 01/2017		420	Mar 01/2015		O 407	Nov 01/2017	
406	Mar 01/2015		421	Mar 01/2015		O 408	Nov 01/2017	
75-21-13 Config 1			O 422	Nov 01/2017		O 409	Nov 01/2017	
601	Mar 01/2015		O 423	Nov 01/2017		O 410	Nov 01/2017	
602	Mar 01/2015		O 424	Nov 01/2017		75-22-04 Config 2		
603	Mar 01/2015		O 425	Nov 01/2017		1	Mar 01/2015	
604	BLANK		426	Mar 01/2015		2	Mar 01/2015	
75-22-00 Config 2			75-22-01 Config 2			75-22-04 Config 2		
1	Mar 01/2015		601	Mar 01/2015		401	Mar 01/2015	
2	Mar 01/2015		602	Mar 01/2015		402	Mar 01/2015	
3	Mar 01/2015		603	Mar 01/2015		403	Mar 01/2015	
4	Mar 01/2015		604	BLANK		404	Mar 01/2015	
5	Mar 01/2015		75-22-02 Config 2			O 405	Nov 01/2017	
6	Mar 01/2015		201	Mar 01/2015		O 406	Nov 01/2017	
7	Mar 01/2015		202	Mar 01/2015		O 407	Nov 01/2017	
8	BLANK		203	Mar 01/2015		408	Mar 01/2015	
75-22-01 Config 2			204	Mar 01/2015		409	Mar 01/2015	
401	Mar 01/2015		205	Mar 01/2015		410	Mar 01/2015	
O 402	Nov 01/2017		206	Mar 01/2015		411	Mar 01/2015	
O 403	Nov 01/2017		75-22-02 Config 2			O 412	Nov 01/2017	
404	Mar 01/2015		701	Mar 01/2015		O 413	Nov 01/2017	
405	Mar 01/2015		O 702	Nov 01/2017		O 414	Nov 01/2017	
406	Mar 01/2015		703	Mar 01/2015		75-22-04 Config 2		
407	Mar 01/2015		704	Mar 01/2015		501	Mar 01/2015	
408	Mar 01/2015		705	Mar 01/2015		O 502	Nov 01/2017	
409	Nov 01/2015		O 706	Nov 01/2017		O 503	Nov 01/2017	
O 410	Nov 01/2017		75-22-03 Config 2			O 504	Nov 01/2017	
O 411	Nov 01/2017		1	Mar 01/2015		505	Mar 01/2015	
O 412	Nov 01/2017		2	Mar 01/2015		506	Mar 01/2015	
O 413	Nov 01/2017		75-22-03 Config 2			507	Mar 01/2015	
O 414	Nov 01/2017		401	Mar 01/2015		508	BLANK	
O 415	Nov 01/2017		O 402	Nov 01/2017		75-22-05 Config 2		
O 416	Nov 01/2017		O 403	Nov 01/2017		401	Mar 01/2015	
O 417	Nov 01/2017		404	Mar 01/2015		402	Mar 01/2015	

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75-22-05 Config 2 (cont)			75-23-00 Config 1			75-23-00 Config 2 (cont)		
403	Mar 01/2015		201	Mar 01/2017		611	Mar 01/2015	
404	Mar 01/2015		202	Mar 01/2017		612	Mar 01/2015	
O 405	Nov 01/2017		203	Mar 01/2015		O 613	Nov 01/2017	
O 406	Nov 01/2017		204	Mar 01/2015		614	Mar 01/2015	
O 407	Nov 01/2017		75-23-00 Config 2			615	Mar 01/2015	
O 408	Nov 01/2017		501	Mar 01/2015		616	Mar 01/2015	
O 409	Nov 01/2017		O 502	Nov 01/2017		617	Mar 01/2015	
O 410	Nov 01/2017		O 503	Nov 01/2017		618	Mar 01/2015	
O 411	Nov 01/2017		O 504	Nov 01/2017		619	Mar 01/2015	
O 412	Nov 01/2017		O 505	Nov 01/2017		620	Mar 01/2015	
O 413	Nov 01/2017		506	Mar 01/2015		75-23-01 Config 2		
O 414	Nov 01/2017		507	Mar 01/2015		401	Mar 01/2015	
D 415	Nov 1/2017		508	Mar 01/2015		402	Mar 01/2015	
D 416	BLANK		509	Mar 01/2015		403	Mar 01/2015	
75-22-06 Config 2			510	Mar 01/2015		404	Mar 01/2015	
401	Mar 01/2015		511	Mar 01/2015		O 405	Nov 01/2017	
402	Mar 01/2015		O 512	Nov 01/2017		406	BLANK	
403	Mar 01/2015		O 513	Nov 01/2017		75-23-02 Config 1		
404	Mar 01/2015		O 514	Nov 01/2017		401	Mar 01/2015	
O 405	Nov 01/2017		515	Mar 01/2015		O 402	Nov 01/2017	
O 406	Nov 01/2017		516	Mar 01/2015		403	Mar 01/2015	
O 407	Nov 01/2017		517	Mar 01/2015		404	Mar 01/2015	
408	Mar 01/2015		518	Mar 01/2015		405	Mar 01/2015	
409	Mar 01/2015		519	Mar 01/2015		406	Mar 01/2015	
O 410	Nov 01/2017		520	BLANK		407	Mar 01/2015	
O 411	Nov 01/2017		75-23-00 Config 2			408	Mar 01/2015	
412	BLANK		601	Mar 01/2015		409	Mar 01/2015	
75-23-00 Config 1			602	Mar 01/2015		O 410	Nov 01/2017	
1	Mar 01/2017		603	Mar 01/2015		O 411	Nov 01/2017	
2	Mar 01/2015		604	Mar 01/2015		412	Mar 01/2015	
3	Mar 01/2015		605	Mar 01/2015		75-23-04 Config 1		
4	Mar 01/2015		606	Mar 01/2015		401	Mar 01/2015	
75-23-00 Config 2			607	Mar 01/2015		402	Mar 01/2015	
1	Mar 01/2015		608	Mar 01/2015		403	Mar 01/2015	
2	Mar 01/2015		609	Mar 01/2015		404	Mar 01/2015	
			610	Mar 01/2015		O 405	Nov 01/2017	

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406	BLANK		O 403	Nov 01/2017		O 407	Nov 01/2017	
75-23-04 Config 2			404	Mar 01/2015		O 408	Nov 01/2017	
O 401	Nov 01/2017		405	Mar 01/2015		A 409	Nov 01/2017	
O 402	Nov 01/2017		406	Mar 01/2015		A 410	BLANK	
O 403	Nov 01/2017		407	Mar 01/2015		75-23-13 Config 2		
404	Nov 01/2015		408	Mar 01/2015		401	Mar 01/2015	
405	Nov 01/2015		409	Mar 01/2015		O 402	Nov 01/2017	
406	Nov 01/2015		410	Mar 01/2015		O 403	Nov 01/2017	
407	Nov 01/2015		411	Mar 01/2015		404	Mar 01/2015	
408	Nov 01/2015		412	Mar 01/2015		405	Mar 01/2015	
409	Nov 01/2015		413	Mar 01/2015		406	Mar 01/2015	
O 410	Nov 01/2017		414	Mar 01/2015		407	Mar 01/2015	
O 411	Nov 01/2017		415	Mar 01/2015		408	Mar 01/2015	
O 412	Nov 01/2017		416	Mar 01/2015		409	Mar 01/2015	
75-23-05 Config 1			417	Nov 01/2015		410	Mar 01/2015	
201	Mar 01/2015		O 418	Nov 01/2017		411	Mar 01/2015	
O 202	Nov 01/2017		O 419	Nov 01/2017		412	Mar 01/2015	
203	Mar 01/2015		O 420	Nov 01/2017		413	Mar 01/2015	
204	Mar 01/2015		O 421	Nov 01/2017		414	Mar 01/2015	
O 205	Nov 01/2017		O 422	Nov 01/2017		O 415	Nov 01/2017	
206	BLANK		O 423	Nov 01/2017		O 416	Nov 01/2017	
75-23-05 Config 1			O 424	Nov 01/2017		O 417	Nov 01/2017	
401	Mar 01/2015		75-23-10 Config 2			O 418	Nov 01/2017	
402	Mar 01/2015		O 401	Nov 01/2017		75-23-14 Config 2		
403	Mar 01/2015		O 402	Nov 01/2017		O 401	Nov 01/2017	
404	Mar 01/2015		403	Mar 01/2015		O 402	Nov 01/2017	
O 405	Nov 01/2017		O 404	Nov 01/2017		O 403	Nov 01/2017	
406	Mar 01/2015		O 405	Nov 01/2017		O 404	Nov 01/2017	
75-23-05 Config 1			406	Mar 01/2015		405	Mar 01/2015	
501	Mar 01/2015		75-23-11 Config 2			406	Mar 01/2015	
502	Mar 01/2015		O 401	Nov 01/2017		407	Mar 01/2015	
503	Mar 01/2015		O 402	Nov 01/2017		408	Mar 01/2015	
504	Mar 01/2015		O 403	Nov 01/2017		409	Mar 01/2015	
75-23-08 Config 2			O 404	Nov 01/2017		410	Mar 01/2015	
401	Mar 01/2015		O 405	Nov 01/2017		411	Mar 01/2015	
402	Mar 01/2015		O 406	Nov 01/2017		412	Mar 01/2015	

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413	Mar 01/2015		406	Mar 01/2015		401	Mar 01/2015	
414	Mar 01/2015		75-23-18 Config 2			402	Mar 01/2015	
415	Mar 01/2015		401	Mar 01/2015		403	Mar 01/2015	
416	Mar 01/2015		402	Mar 01/2015		404	Mar 01/2015	
417	Mar 01/2015		403	Mar 01/2015	O	405	Nov 01/2017	
418	Mar 01/2015		404	Mar 01/2015		406	Mar 01/2015	
O 419	Nov 01/2017		405	Mar 01/2015		75-24-01 Config 1		
O 420	Nov 01/2017		406	Mar 01/2015		1	Mar 01/2015	
O 421	Nov 01/2017		O 407	Nov 01/2017		2	Mar 01/2015	
O 422	Nov 01/2017		408	Mar 01/2015		3	Mar 01/2015	
O 423	Nov 01/2017		409	Mar 01/2015		4	Mar 01/2015	
O 424	Nov 01/2017		410	Mar 01/2015		75-24-01 Config 1		
75-23-15 Config 2			411	Mar 01/2015		401	Mar 01/2015	
O 401	Nov 01/2017		412	Mar 01/2015		402	Mar 01/2015	
402	Mar 01/2017		413	Mar 01/2015		403	Mar 01/2015	
403	Mar 01/2015		414	Mar 01/2015		404	Mar 01/2015	
404	Mar 01/2017		415	Mar 01/2015		75-24-01 Config 1		
O 405	Nov 01/2017		O 416	Nov 01/2017		601	Mar 01/2015	
O 406	Nov 01/2017		75-23-19 Config 2			602	Mar 01/2015	
O 407	Nov 01/2017		401	Mar 01/2015		603	Mar 01/2015	
408	BLANK		402	Mar 01/2015		604	Mar 01/2015	
75-23-17 Config 1			403	Mar 01/2015		75-24-11 Config 1		
O 401	Nov 01/2017		404	Mar 01/2015		201	Mar 01/2015	
402	Mar 01/2015		405	Mar 01/2015		202	Mar 01/2015	
403	Mar 01/2015		406	Mar 01/2015		203	Mar 01/2015	
404	Mar 01/2015		407	Mar 01/2015		204	Mar 01/2015	
O 405	Nov 01/2017		408	Mar 01/2015		75-24-11 Config 1		
O 406	Nov 01/2017		O 409	Nov 01/2017		O 401	Nov 01/2017	
O 407	Nov 01/2017		410	Mar 01/2015		O 402	Nov 01/2017	
408	BLANK		75-23-21 Config 2			403	Mar 01/2015	
75-23-17 Config 2			401	Mar 01/2015		404	Mar 01/2015	
401	Mar 01/2015		402	Mar 01/2015		O 405	Nov 01/2017	
402	Mar 01/2015		403	Mar 01/2015		O 406	Nov 01/2017	
403	Mar 01/2015		404	Mar 01/2015		O 407	Nov 01/2017	
404	Mar 01/2015		405	Mar 01/2015		408	BLANK	
O 405	Nov 01/2017		406	BLANK				

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1	Mar 01/2015		403	Mar 01/2015		O 203	Nov 01/2017	
2	Mar 01/2015		404	Mar 01/2015		204	Mar 01/2015	
3	Mar 01/2015		O 405	Nov 01/2017		O 205	Nov 01/2017	
4	BLANK		406	Mar 01/2015		O 206	Nov 01/2017	
75-25-00 Config 2			O 407	Nov 01/2017		O 207	Nov 01/2017	
1	Mar 01/2015		O 408	Nov 01/2017		208	BLANK	
2	Mar 01/2015		O 409	Nov 01/2017		75-25-04 Config 1		
3	Mar 01/2015		O 410	Nov 01/2017		401	Mar 01/2015	
4	Mar 01/2015		O 411	Nov 01/2017		402	Mar 01/2015	
5	Mar 01/2015		O 412	Nov 01/2017		403	Mar 01/2015	
6	BLANK		O 413	Nov 01/2017		404	Mar 01/2017	
75-25-00 Config 2			O 414	Nov 01/2017		O 405	Nov 01/2017	
O 401	Nov 01/2017		O 415	Nov 01/2017		O 406	Nov 01/2017	
O 402	Nov 01/2017		O 416	Nov 01/2017		407	Mar 01/2017	
O 403	Nov 01/2017		O 417	Nov 01/2017		O 408	Nov 01/2017	
404	Mar 01/2015		O 418	Nov 01/2017		409	Mar 01/2015	
405	Mar 01/2015		A 419	Nov 01/2017		O 410	Nov 01/2017	
406	Mar 01/2015		A 420	BLANK		O 411	Nov 01/2017	
407	Mar 01/2015		75-25-01 Config 2			412	BLANK	
O 408	Nov 01/2017		501	Mar 01/2015		75-25-04 Config 2		
O 409	Nov 01/2017		502	Mar 01/2015		401	Mar 01/2015	
O 410	Nov 01/2017		503	Mar 01/2015		402	Mar 01/2015	
O 411	Nov 01/2017		504	Mar 01/2015		403	Mar 01/2015	
O 412	Nov 01/2017		505	Mar 01/2015		404	Nov 01/2015	
O 413	Nov 01/2017		506	BLANK		O 405	Nov 01/2017	
414	BLANK		75-25-01 Config 2			406	Mar 01/2015	
75-25-00 Config 2			O 601	Nov 01/2017		407	Mar 01/2015	
601	Mar 01/2015		602	Mar 01/2015		408	Mar 01/2015	
602	Mar 01/2015		603	Mar 01/2015		409	Mar 01/2015	
603	Mar 01/2015		604	BLANK		410	Nov 01/2015	
604	Mar 01/2015		75-25-02 Config 2			O 411	Nov 01/2017	
605	Mar 01/2015		401	Mar 01/2015		412	Mar 01/2015	
606	BLANK		402	BLANK		75-25-05 Config 2		
75-25-01 Config 2			75-25-04 Config 1			O 401	Nov 01/2017	
O 401	Nov 01/2017		O 201	Nov 01/2017		402	Mar 01/2015	
402	Mar 01/2015		O 202	Nov 01/2017		403	Mar 01/2015	

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404	Mar 01/2015		404	Mar 01/2015		601	Mar 01/2015	
405	Mar 01/2015	O	405	Nov 01/2017		602	Mar 01/2015	
406	Mar 01/2015	O	406	Nov 01/2017		603	Mar 01/2015	
407	Mar 01/2015	75-25-09 Config 2				604	Mar 01/2015	
408	Mar 01/2015	O	401	Nov 01/2017		75-26-07 Config 2		
O 409	Nov 01/2017	O	402	Nov 01/2017		201	Mar 01/2015	
O 410	Nov 01/2017		403	Mar 01/2015		202	Mar 01/2015	
O 411	Nov 01/2017		404	Nov 01/2015		203	Mar 01/2015	
412	BLANK	O	405	Nov 01/2017		204	Mar 01/2015	
75-25-06 Config 2			O 406	Nov 01/2017		205	Mar 01/2015	
401	Mar 01/2015	O	407	Nov 01/2017		206	Mar 01/2015	
402	Mar 01/2015		408	BLANK		O 207	Nov 01/2017	
403	Mar 01/2015	75-26-06 Config 2				208	BLANK	
404	Mar 01/2015		401	Mar 01/2015		75-30-00 Config 1		
75-25-07 Config 1			402	Mar 01/2015		1	Mar 01/2015	
401	Mar 01/2015		403	Mar 01/2015		2	Mar 01/2015	
402	Mar 01/2015		404	Mar 01/2015		75-30-00 Config 2		
403	Mar 01/2015	O	405	Nov 01/2017		1	Mar 01/2015	
404	Mar 01/2015	O	406	Nov 01/2017		2	Mar 01/2015	
405	Nov 01/2015		407	Mar 01/2015		75-31-00 Config 1		
O 406	Nov 01/2017		408	Mar 01/2015		1	Mar 01/2017	
O 407	Nov 01/2017		409	Mar 01/2015		2	Mar 01/2015	
408	BLANK		410	Mar 01/2015		3	Mar 01/2015	
75-25-07 Config 2			411	Mar 01/2015		4	Mar 01/2015	
401	Mar 01/2015		412	Mar 01/2015		5	Mar 01/2015	
402	Mar 01/2015	O	413	Nov 01/2017		6	BLANK	
403	Mar 01/2015	O	414	Nov 01/2017		75-31-00 Config 2		
O 404	Nov 01/2017		415	Mar 01/2015		1	Mar 01/2015	
405	Mar 01/2015		416	Mar 01/2015		2	Mar 01/2015	
406	Mar 01/2015		417	Mar 01/2015		3	Mar 01/2015	
407	Mar 01/2015		418	Mar 01/2015		4	Mar 01/2015	
O 408	Nov 01/2017	O	419	Nov 01/2017		5	Mar 01/2015	
75-25-08 Config 2			O 420	Nov 01/2017		6	BLANK	
O 401	Nov 01/2017		O 421	Nov 01/2017		75-31-01 Config 1		
402	Mar 01/2015		422	BLANK		201	Mar 01/2015	
403	Mar 01/2015					O 202	Nov 01/2017	

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75-31-01 Config 1 (cont)			75-31-01 Config 2			75-31-01 Config 2 (cont)		
O 203	Nov 01/2017		501	Mar 01/2015		607	Mar 01/2015	
O 204	Nov 01/2017		O 502	Nov 01/2017		608	Mar 01/2015	
205	Mar 01/2015		O 503	Nov 01/2017		609	Mar 01/2015	
O 206	Nov 01/2017		O 504	Nov 01/2017		O 610	Nov 01/2017	
O 207	Nov 01/2017		O 505	Nov 01/2017		O 611	Nov 01/2017	
O 208	Nov 01/2017		O 506	Nov 01/2017		O 612	Nov 01/2017	
209	Mar 01/2015		O 507	Nov 01/2017		O 613	Nov 01/2017	
210	BLANK		O 508	Nov 01/2017		614	BLANK	
75-31-01 Config 1			O 509	Nov 01/2017		75-31-02 Config 2		
O 401	Nov 01/2017		O 510	Nov 01/2017		501	Mar 01/2015	
O 402	Nov 01/2017		O 511	Nov 01/2017		O 502	Nov 01/2017	
403	Nov 01/2015		O 512	Nov 01/2017		O 503	Nov 01/2017	
404	Mar 01/2015		O 513	Nov 01/2017		O 504	Nov 01/2017	
405	Mar 01/2015		O 514	Nov 01/2017		O 505	Nov 01/2017	
406	Mar 01/2015		O 515	Nov 01/2017		O 506	Nov 01/2017	
O 407	Nov 01/2017		O 516	Nov 01/2017		507	Mar 01/2015	
O 408	Nov 01/2017		O 517	Nov 01/2017		508	Mar 01/2015	
O 409	Nov 01/2017		O 518	Nov 01/2017		509	Mar 01/2015	
O 410	Nov 01/2017		O 519	Nov 01/2017		510	Mar 01/2015	
75-31-01 Config 2			O 520	Nov 01/2017		75-31-03 Config 2		
O 401	Nov 01/2017		O 521	Nov 01/2017		501	Mar 01/2015	
O 402	Nov 01/2017		O 522	Nov 01/2017		502	Mar 01/2015	
O 403	Nov 01/2017		75-31-01 Config 1			O 503	Nov 01/2017	
404	Mar 01/2015		601	Mar 01/2015		O 504	Nov 01/2017	
405	Mar 01/2015		O 602	Nov 01/2017		O 505	Nov 01/2017	
406	Mar 01/2015		O 603	Nov 01/2017		506	Mar 01/2015	
407	Mar 01/2015		604	Mar 01/2015		507	Mar 01/2015	
408	Mar 01/2015		605	Mar 01/2015		O 508	Nov 01/2017	
409	Mar 01/2015		606	BLANK		509	Mar 01/2015	
O 410	Nov 01/2017		75-31-01 Config 2			510	Mar 01/2015	
			601	Mar 01/2015		511	Mar 01/2015	
O 411	Nov 01/2017		O 602	Nov 01/2017		512	Mar 01/2015	
O 412	Nov 01/2017		O 603	Nov 01/2017		513	Mar 01/2015	
O 413	Nov 01/2017		604	Mar 01/2015		514	Mar 01/2015	
O 414	Nov 01/2017		605	Mar 01/2015		515	Mar 01/2015	
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517	Mar 01/2015		201	Mar 01/2015		O 411	Nov 01/2017	
518	Mar 01/2015		O 202	Nov 01/2017		412	BLANK	
519	Mar 01/2015		O 203	Nov 01/2017		75-32-01 Config 1		
520	Mar 01/2015		204	Mar 01/2015		501	Mar 01/2015	
521	Mar 01/2015		O 205	Nov 01/2017		O 502	Nov 01/2017	
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75-31-04 Config 2			O 207	Nov 01/2017		O 504	Nov 01/2017	
501	Mar 01/2015		O 208	Nov 01/2017		505	Mar 01/2015	
O 502	Nov 01/2017		A 209	Nov 01/2017		506	BLANK	
O 503	Nov 01/2017		A 210	BLANK		75-32-01 Config 2		
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O 505	Nov 01/2017		O 401	Nov 01/2017		O 502	Nov 01/2017	
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O 510	Nov 01/2017		O 406	Nov 01/2017		507	Mar 01/2015	
511	Mar 01/2015		O 407	Nov 01/2017		508	Mar 01/2015	
512	Mar 01/2015		O 408	Nov 01/2017		O 509	Nov 01/2017	
513	Mar 01/2015		O 409	Nov 01/2017		O 510	Nov 01/2017	
514	Mar 01/2015		O 410	Nov 01/2017		O 511	Nov 01/2017	
515	Mar 01/2015		O 411	Nov 01/2017		O 512	Nov 01/2017	
516	Mar 01/2015		O 412	Nov 01/2017		O 513	Nov 01/2017	
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4	Mar 01/2015		O 402	Nov 01/2017		518	Mar 01/2015	
5	Mar 01/2015		O 403	Nov 01/2017		519	Mar 01/2015	
6	BLANK		404	Mar 01/2015		520	Mar 01/2015	
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1	Mar 01/2015		406	Mar 01/2015		601	Mar 01/2015	
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3	Mar 01/2015		O 408	Nov 01/2017		603	Mar 01/2015	
4	Mar 01/2015		O 409	Nov 01/2017		604	BLANK	

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404	Mar 01/2015		75-40-00 Config 1					
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<u>ENGINE AIR, FITS-AND-CLEARANCES - INSPECTION/CHECK</u>	75-00-00	2	601	FX 521-529, 577-580, 620, 621, 623, 624, 628, 631, 642-645	
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<u>ENGINE BEARING COOLING SYSTEM - DESCRIPTION AND OPERATION</u>	75-21-00	2	1	FX 521-529, 577-580, 620, 621, 623, 624, 628, 631, 642-645	
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REMOVAL OF THE LEFT HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE		2	401		FX 521-529, 577-580, 620, 621, 623, 624, 628, 631, 642-645
TASK 75-22-01-000-868					
INSTALLATION OF THE LEFT HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE		2	408		FX 521-529, 577-580, 620, 621, 623, 624, 628, 631, 642-645
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INSTALLATION OF THE HIGH PRESSURE TURBINE CASE COOLING COLLECTOR TASK 75-23-01-400-868		2	404		FX 521-529, 577-580, 620, 621, 623, 624, 628, 631, 642-645
MANIFOLD, LOW-PRESSURE-TURBINE COOLING - REMOVAL/INSTALLATION	75-23-02	1	401		FX 572-576, 582-599, 601-610, 612-619, 625
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REMOVAL OF THE NACELLE COOLING VALVE SOLENOID CONF-02B TASK 75-25-08-000-868			2	401	FX 521-529, 577-580, 620, 621, 623, 624, 628, 631, 642-645
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AIR - DESCRIPTION AND OPERATION

1. General

- A. This chapter includes the system description and operation, and the maintenance procedures and practices for the engine air system on the G.E. CF6-80C2D1F engines.
- B. The maintenance procedures and practices sections of this chapter supply data for the removal, installation, cleaning, inspection, and adjustment/test of the various engine air subsystems and components.
- C. The engine air system, includes the subsystems that control the airflows from the time the air goes into the engine inlet until it goes out of the engine exhaust. The three airflows are as follows:
 - The primary airflow (gas generator path)
 - The secondary airflow (fan bypass air)
 - The parasitic airflow (cooling and pressurizing air).
- D. The fan moves the air through the engine, where it is divided by a flow splitter into the primary and secondary airflows. The parasitic airflow is provided by the primary and secondary airflows. (Figure 1)

2. Primary Airflow

- A. The air that goes into the engine at the inlet cowl is divided by the airflow splitter into two airflows. The airflow that goes into the core engine near the fan rotor hub is called the primary airflow. (Figure 1)
- B. The primary airflow goes through the low pressure compressor (LPC), the high pressure compressor (HPC), and into the combustor for combustion. After combustion, the primary-air flows out of the engine exhaust as a hot gas and supplies approximately 20% of the total engine thrust. On its way out of the exhaust, the primary air turns the high pressure turbine (HPT), and low pressure turbine (LPT). The primary airflow is also used for internal engine cooling and operation of other aircraft systems.
- C. The functions of the primary airflow at different stages are as follows:
 - (1) LPC stage: At low engine speeds the LPC moves more air into the core engine than it can use. During low speed, the low compressor discharge supplies air to the core. Excess air is bled off through the variable bypass valves (VBV). The VBV bypass air is bled into the secondary airflow, also known as fan bypass air. At higher engine speeds the VBV's close so LPC (or booster) primary air goes into the core engine. The VBV's are scheduled as a function of corrected engine core speed and receive this signal from the electronic control unit (ECU).
 - (2) HPC Stage: As the primary airflow moves into the HPC the air continues to be compressed. To make sure that the air compression is smooth and continuous, the HPC has inlet guide vanes (IGV) and variable stator vanes (VSV). These vanes are scheduled as a function of HPC rotational speed (N2), and engine inlet total temperature (Tt). When the angle of these vanes are adjusted, the air compression increases smoothly and continuously throughout the HPC.
 - (3) Combustion Stage: When the compressed primary airflow goes into the combustor, the vanes of the swirl dome causes the airflow to swirl. This helps mix the fuel used by the fuel nozzles. A layer of cool primary airflow keeps the hot combustion gases from the surfaces of the combustor.
 - (4) HPT Stage: After combustion, the heated and accelerated primary airflow (gas stream) goes through the HPT where energy is used to drive the HPC.

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- (5) LPT Stage: The primary airflow (gas stream) continues through the LPT. The LPT uses energy from the gas stream to operate the fan and the LPC. The gas stream then goes through the turbine rear frame and the exhaust nozzle. The gas stream supplies approximately 20% of the total engine thrust.

3. Secondary Airflow

- A. The air that goes into the engine at the inlet cowl is divided by the airflow splitter into a primary and secondary airflow. The secondary airflow (bypass air) goes through the fan exit nozzle and flows around the core engine. It helps cool the external engine and components installed on the engine. Other engine cooling systems use parasitic air from the secondary airflow for their operation. The secondary airflow supplies approximately 80% of the total engine forward thrust and 100% of the reverse thrust.

4. Parasitic Airflow

- A. Parasitic air is all air bled from the primary or secondary airflows. After the air is used, some of the parasitic airflow will return to the engine primary and secondary airflows, and some of it will bleed overboard. Parasitic air is used as follows:

- Cools rotor cavities, turbine blades and vanes, combustor, and turbine and exhaust cases
- Cools components and accessories mounted on the engine
- Operates aircraft systems
- Pressurizes engine sumps and bore.

- B. The parasitic air operates the systems that follow:

- (1) Turbine Disk Cavity and Pressure Balance Seal Cooling: Parasitic air used from the 7th stage HPC bleed cools the LPT and HPT disk cavities as follows: (Figure 3) (Figure 4)

- (a) There are two air ducts, one on each side of the engine. The left duct (aft looking forward) is divided into 6 tubes while the right duct is divided into 7 tubes. The 13 tubes connect the 7th stage HPC bleed with the LPT stage 1 vanes at the forward end of the LPT stator case.
- (b) Turbine Disk Cavity Cooling: The 7th stage HPC cooling air from these tubes goes through passages in the LPT 1st stage stator vanes. The cooling air goes into the forward cavity of the 1st stage LPT nozzle to cool the forward side of the 1st stage LPT disk. The air continues to flow inward through the 1st stage nozzle cavity and into the HPT 2nd stage disk aft cavity where it cools the aft side of the 2nd stage disk.
- (c) Pressure Balance Seal Cooling: Parasitic air from the 7th stage HPC bleed goes through passages in the LPT 1st stage stator vanes and cools the forward face of the pressure balance seal. This seal is installed between the compressor-rear-frame/combustor module and the HPT module.

- (2) Core Compartment and Active Clearance Control: Parasitic air from the secondary airflow (fan bypass air) is used by the active clearance control (ACC) system to keep the external core engine and the outside of turbine cases cool. The system functions as follows: (Figure 2)

- (a) The parasitic air for the ACC system comes from the secondary airflow through two 4 in. (101.6 mm) ducts connected to ports in the fan frame radial bulkhead. The ports are located at the 3 o'clock and 9 o'clock positions of the bulkhead. The air supply ducts and the control valves are connected between these ports and the cooling manifolds on the turbine cases.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- (b) The upper control valve on the left side of the engine, installed at the Y-duct, controls the air to the core compartment cooling manifold. The lower control valve controls the air to the ACC manifolds on the left side of the turbine cases. The control valve on the right side of the engine controls the air to the ACC turbine case manifolds on the right side. A small quantity of cooling air released by this control valve is used for ignition lead cooling and the cooling of the lower HPC stator case.
 - (c) The active clearance control (ACC) valves are controlled by the ECU and operated by servo fuel from the hydro-mechanical unit (HMU). The ECU uses altitude and N2 speed inputs and calculates case growth. The ECU then directs the HMU to operate the ACC valves to variable positions.
 - (d) At low altitudes the opening on the core compartment control valve increases to supply more air for outer core engine and component cooling. At the same time, the turbine case control valve opening will decrease. At high altitudes the core compartment needs less cooling air and the turbine cases need more cooling for increased engine performance. The valves never fully close, but permits minimum airflow at all altitudes.
 - (e) The signals from the active clearance control valve increases the air to the core engine at altitudes below 20,000 ft. At altitudes above 20,000 ft, air to the turbine cases is increased.
 - (f) Increased cooling airflow to the turbine cases will cause the cases to decrease in temperature and become smaller. This decreases the blade-tip-to-case clearances and improves engine performance. Active clearance control makes sure that the clearances between the cases and the rotors make the engine function at its best performance at all times.
- (3) HPT Cooling (Passive Clearance Control): The temperature for the stationary parts of the HPT is controlled by parasitic airflow from the compressor discharge (PS3) and the 11th stage compressor. The stationary parts in the HPT section expand and contract faster than the rotor due to pressure and temperature changes. The rotor, however, has some radial expansion due to rotational forces. The passive clearance control decreases the expansion differences as follows:
- (a) The cooling air comes from the compressor discharge air and 11th stage air. This air flows through channels in the forward and aft stator support case flanges and the channels of pseudo flanges. This cooling air controls the expansion and contraction of the turbine case to adjust to the changes in the rotor. It keeps the turbine-case-to-rotor clearances in limits through all temperature ranges and conditions.
- (4) Aircraft Systems Operation. Parasitic air from the 8th stage bleed is used to operate aircraft systems. Air is moved through holes bored in the stator case at stage eight and collected at two flanged ports on the stator case. The air is then moved through aircraft manifolds connected to these ports and used for aircraft cabin pressurization and related functions.
- (5) Sump Pressurization and Bore Cooling. Parasitic air from the booster discharge area is used for sump pressurization and engine bore cooling. The inner flow-path of this air flows between seals and bearings, pressurizes the sumps and provides a path for bore cooling air to pass into the HPC rotor spool. The airflow goes through holes in the LPT disk and into the aft LPT rotor cavity. This airflow is then mixed with the turbine rear frame (hub) heating air and passes aft through the LPT stage five disk and then back into the primary airflow.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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5. Maintenance Procedures

- A. The procedures in this chapter are for components or assemblies, that are installed with standard hardware such as bolts, nuts, washers, screws, etc. They include removal and installation, cleaning, inspection, repair, servicing, and adjustment/test of components, assemblies, and subsystems. If special handling or precautionary steps are required, they are included as notes, cautions, or warnings. Special handling procedures are frequently included as steps of the job sequence.
- B. When special tools or procedures are necessary for a procedure, they are identified at the start of the procedure in the paragraph "Job Set-Up". If consumables are used during the procedure they are identified in the paragraph "Consumables". If expendables are used during the procedure they are identified in the paragraph "Expendables".
- C. The use of alternative parts is not permitted unless approved.

6. Safety Instructions

- A. Safety instructions that are necessary for safe maintenance are included in all procedures as cautions, warnings or steps of the job. These instructions are given to prevent injury to persons or damage to equipment.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

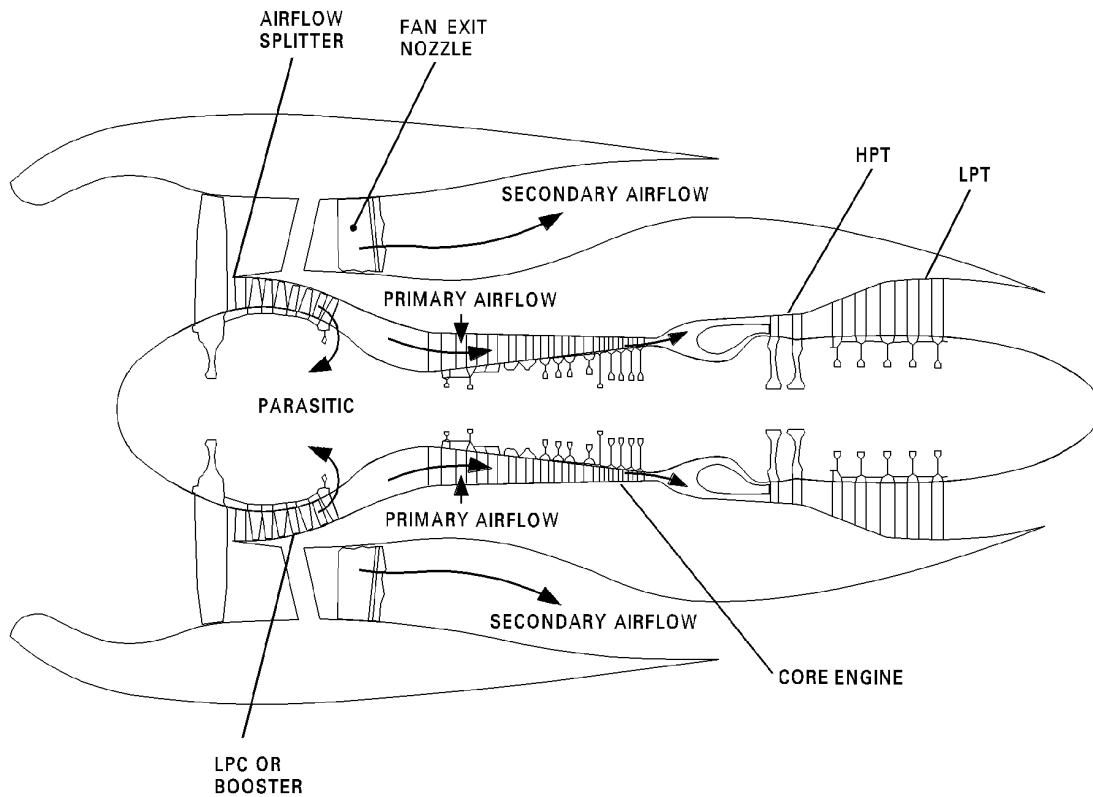
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CAG(IGDS)

DB2-75-0174A

Engine Airflow - Description and Operation
Figure 1/75-00-00-990-806

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

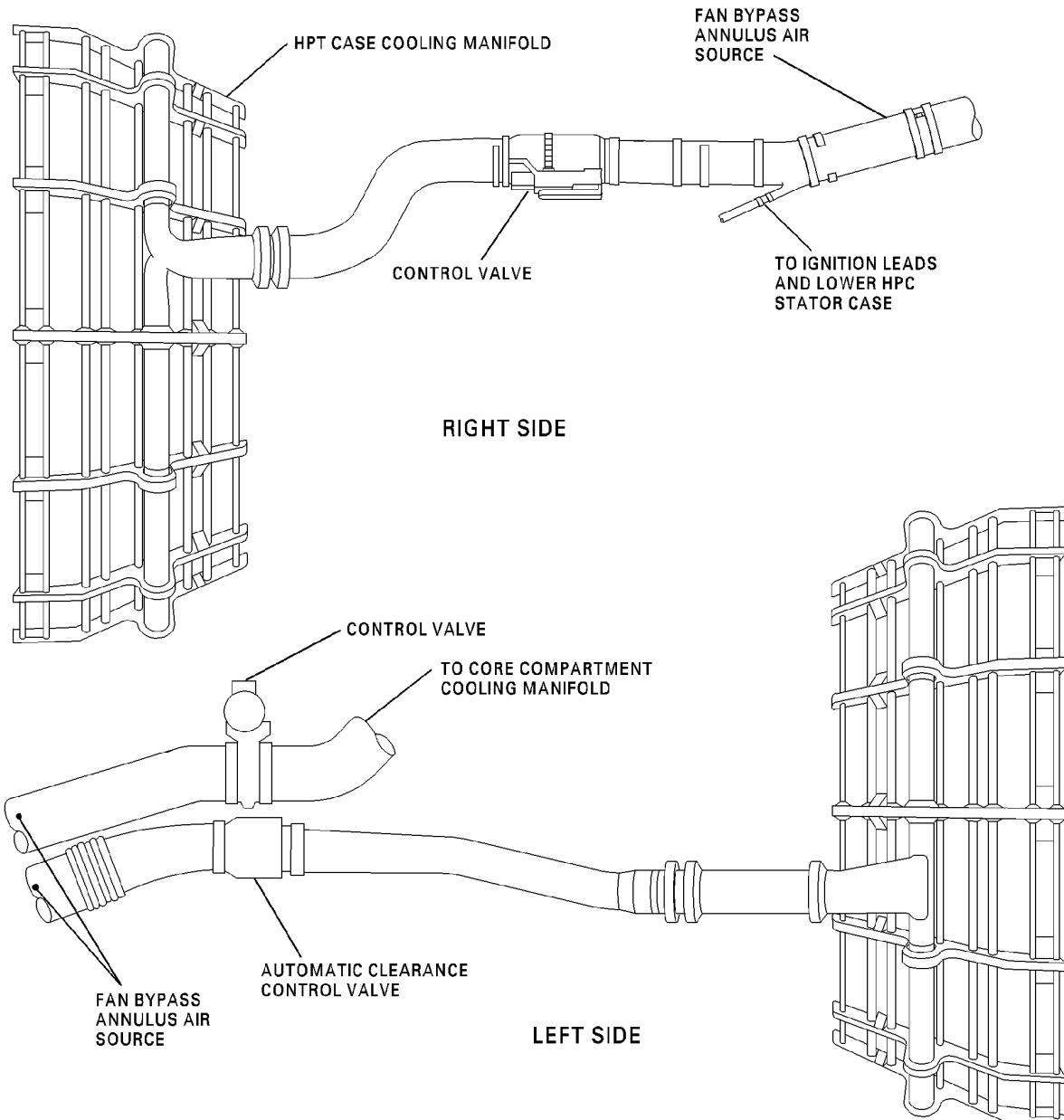
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CAG(IGDS)

DB2-75-0175A

Active Clearance Control System - Description and Operation
Figure 2/75-00-00-990-802

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

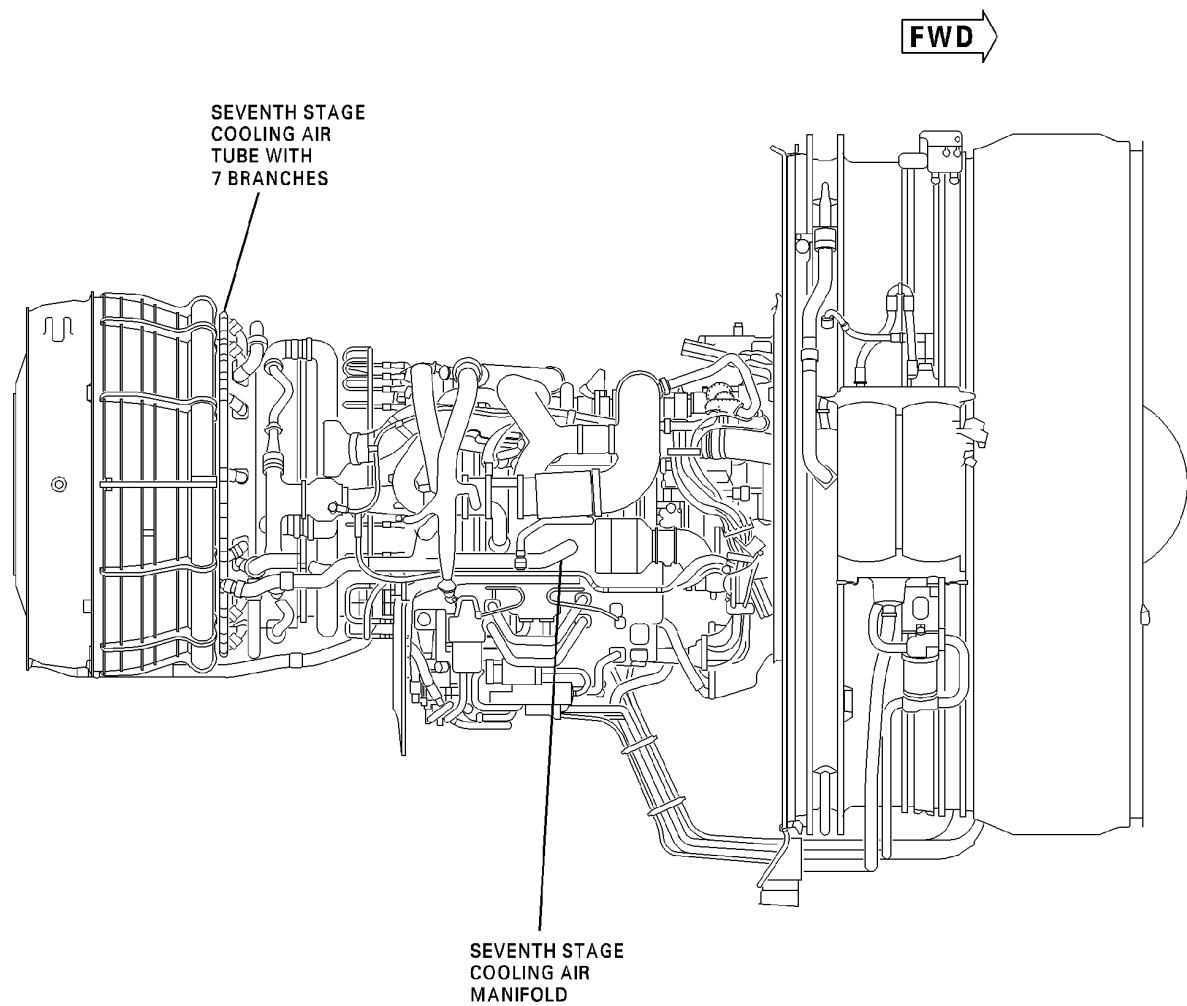
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CAG(IGDS)

DB2-75-0177A

Seventh Stage Cooling Air Tubes, Right Side
Figure 3/75-00-00-990-804

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

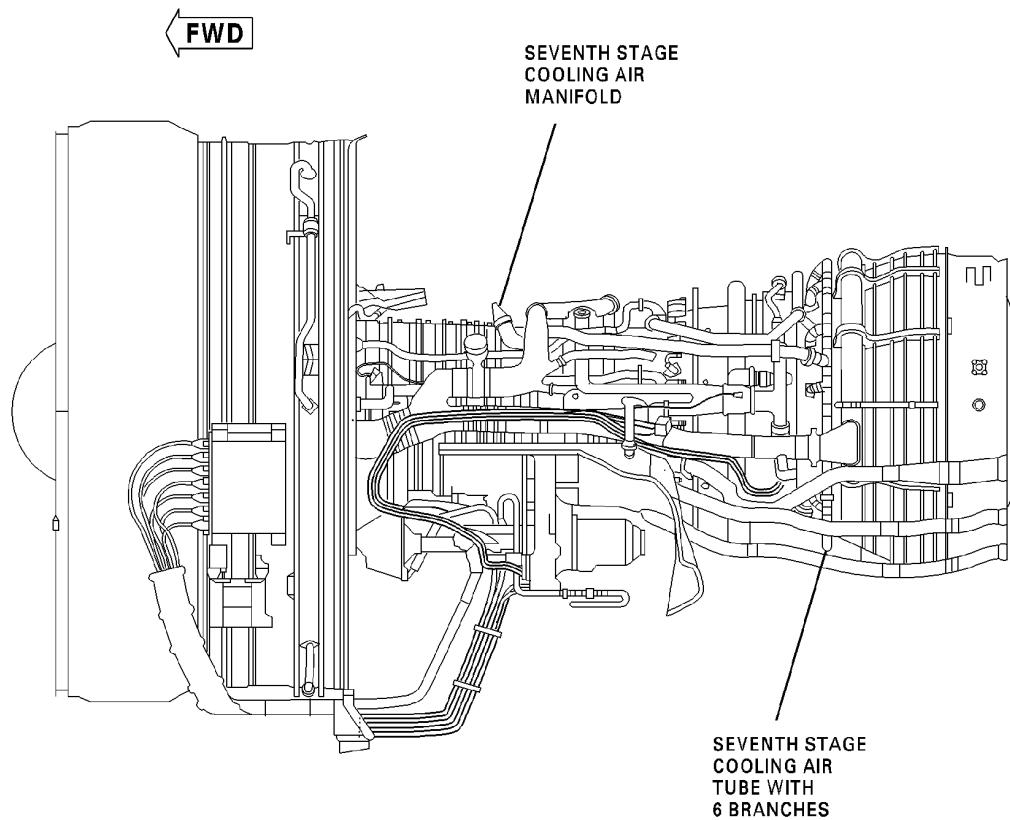
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CAG(IGDS)

DB2-75-0178A

Seventh Stage Cooling Air Tubes, Left Side
Figure 4/75-00-00-990-805

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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AIR - DESCRIPTION AND OPERATION

1. General

- A. This chapter includes the description and operation, maintenance procedures and practices for the engine air system on the Pratt & Whitney PW4460/4462 and PW4460/4462-3 engines.
- B. The maintenance procedures and practices sections of this chapter has the information for the removal, installation, cleaning, inspection, and adjustment/test of the various engine air subsystems and components.
- C. The engine air system, includes the subsystems that control the airflows from the time the air goes into the engine inlet until it goes out of the engine exhaust. The three airflows are as follows:
 - The primary airflow (gas generator path)
 - The secondary airflow (fan bypass airstream)
 - The parasitic airflow (cooling and pressurizing air).
- D. After the air is moved into the inlet by the fan, it is divided by the flow splitter into primary and secondary airflows (see The air for the parasitic airflow is removed from the primary and secondary airflows. (Figure 1)

2. Primary Airflow

- A. The air that goes into the engine at the inlet cowl is divided by the airflow splitter into primary and secondary airflows. The air that goes into the core engine near the fan rotor hub is called the primary airflow . (Figure 1)
- B. The primary airflow goes through the low pressure compressor (LPC) and the high pressure compressor (HPC) for compression, and into the combustor for combustion. After combustion, the primary airflow goes out of the engine exhaust as a hot gas and supplies approximately 22% of the total engine thrust. On its way out of the combustor, the primary airflow turns the high pressure turbines (HPT) and the low pressure turbines (LPT). In addition to its main purpose to supply combustion and cooling air, the primary airflow is used to operate other aircraft systems.
- C. The functions of the primary airflow at different stages are as follows:
 - (1) LPC Stage: At low engine speeds the LPC sends more primary air into the HPC than it can use. To align the low compressor discharge airflow with the core requirements at low speed, excess 4th stage LPC air is bled off through the 2.5 bleed valve ports. The 2.5 bleed discharge air is bled into the secondary airflow (fan bypass airstream). At higher engine speeds the 2.5 bleed valve ports are closed so that all LPC (booster) primary air goes into the core engine. The 2.5 bleed valve is scheduled as a function of the corrected engine core speed (N2). The 2.5 bleed valve actuator gets its commands from the electronic engine control (EEC). (Figure 2) (Figure 3)
 - (2) HPC Stage: As the primary airflow moves into the HPC the air continues to be compressed. To make sure that the air compression is slow and continuous, the HPC has inlet guide vanes (IGV) and variable stator vanes (VSV). These vanes are scheduled as a function of LPC rotational speed (N1), HPC rotational speed (N2), and engine inlet total temperature (Tt). When the angle of these vanes are adjusted, the air compression increases slowly and continuously throughout the HPC. (Figure 4) (Figure 5)
 - (3) Ninth-Stage Compressor Bleed Valves: The 2.9 start bleed valve is installed at the 1 o'clock position on the HPC. The 2.9 stability bleed valve is installed at the 10 o'clock position on the HPC. The HPC uses the valves to release excessive 9th stage air into the secondary airflow (fan bypass airstream). The two compressor bleed valves help increase compressor stability during engine start, transient, and reverse thrust operation as follows:

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631, 642-645

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- (a) To make sure that the compression in the HPC is correct at all times, the 2.9 bleed valves operate with the 2.5 bleed valve during engine start and transient operation. When the LPC supplies too much air during transient engine operation, the 2.9 stability bleed valve will bleed excess 9th stage air into the bypass airstream. When the 2.9 start bleed valve is open, the 2.5 bleed valve also opens. The bleed valves are scheduled by the full-authority digital-electronic control (FADEC) and the EEC.
- (b) The FADEC/EEC controls the 2.9 stability–bleed valve as a function of corrected N2, altitude, and total temperature at the compressor inlet (T2). The FADEC/EEC controls the 2.9 start–bleed valve as a function of corrected N2 and T2. FADEC/EEC is connected with both compressor bleed valves through two redundant coil solenoid valve assemblies. (Figure 6) (Figure 7)
- (4) Combustion Stage: The compressed primary airflow that goes into the combustor is mixed with fuel for combustion. Some of the primary air that goes into the diffuser-and-combustor case is used to cool the combustor, and the turbine vanes and blades.
- (5) HPT Stage: After combustion, the compressed, heated and accelerated primary airflow (gas stream) goes through the HPT where energy is removed to turn the HPC.
- (6) LPT Stage: The primary airflow (gas stream) continues through the LPT. The LPT removes energy from the gasflow to drive the fan and the LPC. The gas is then released through the exhaust and supplies approximately 22% of the total engine thrust.

3. Secondary Air Flow

- A. The air that goes into the engine at the inlet cowl is divided by the airflow splitter into two airflows, the primary and secondary airflow. The air that goes between the core engine and the nacelle cowling is called the secondary airflow or fan bypass airstream. The secondary airflow goes around the core engine and keeps the external engine and components cool. Other engine cooling systems use parasitic air from the secondary airflow for their operation. The secondary airflow supplies approximately 78% of the total engine forward thrust.

4. Parasitic Airflow

- A. Parasitic air is any amount of air removed from the primary or secondary airflows. After the air is used, some of the parasitic airflow will go back into the engine primary and secondary airflows, and some of it will bleed overboard. Parasitic air is used as follows:
 - To cool the rotor cavities, turbine blades and vanes, combustion case, and turbine and exhaust cases
 - To cool the components and accessories mounted on the engine.
- B. The parasitic air operates the cooling systems that follow:
 - (1) Turbine Case Cooling: The turbine case cooling (TCC) valves are part of the automatic turbine rotor clearance control (ATRCC) system. The HPT TCC and the LPT TCC air shutoff valves are installed on the LPT case at the 2 o'clock position. The TCC valves works with the TCC air valve actuator, a control cable, and air manifolds mounted on the HPT/LPT case. The system works as follows.: (Figure 8)
 - (a) The system uses parasitic air from the secondary airflow (fan bypass airstream) to cool the HPT/LPT case. The external cooling of the turbine case decreases the size of the turbine cases and decreases the turbine tip clearance during takeoff, climb, and cruise operation. This results in better fuel consumption and increases the life of the turbine case.

EFFECTIVITY	FX 521-529, 577-580, 620, 621, 623, 624, 628, 631, 642-645
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- (b) The TCC air shut-off valves are controlled by the FADEC/EEC to a schedule set by altitude and N2. The EEC sends command signals to the fuel operated hydraulic air valve actuator. The actuator opens or closes the LPT and HPT TCC shut-off valves which controls the temperatures of the turbine cases.

NOTE: The data that follows is for engines before Conf-02B.

- (2) **Nacelle Core Compartment Cooling:** The system has two cooling air ducts (spray bars) and two nacelle cooling valves, installed on the inside of each thrust reverser door. The system works as follows: (Figure 9)

- (a) The nacelle cooling valves open when the valve receives a signal from the FADEC/EEC. The valve is solenoid operated by 15th stage air (PS3) and is energized with a barometric switch. The valve opens at altitudes below 25,000 ft (7620 m) and closes above 25,000 ft (7620 m).
- (b) Parasitic air is removed from the secondary airflow (fan bypass airstream). The purpose of the nacelle core compartment cooling system is to move cooling air throughout the space between the engine core and the nacelle cowling.

NOTE: The data that follows is for Conf-02B engines.

- (3) Nacelle core compartment cooling on the MD-11 aircraft is done through the nacelle cooling system. This system uses two nacelle cooling valves, muscle lines, a solenoid shutoff valve and an electronic simulator installed on each thrust reverser door. The nacelle cooling valves, when open supply engine fan air to the engine core compartment for cooling.

- (a) The system uses two nacelle cooling valves (poppet type) which are opened and closed by the solenoid shutoff valve. The solenoid shutoff valve is connected to the nacelle cooling valves with muscle lines. During takeoffs and climbs the engine electronic control (EEC) uses the electronic simulator to find the position of the solenoid shutoff valve. The EEC then energizes and opens the solenoid shutoff valve. When the solenoid shutoff valve opens, ECS high pressure air is sent through the muscle lines and opens the nacelle shutoff valves. When the nacelle shutoff valves open, air from the fan stream is sent to the engine core compartment. (Figure 10)

NOTE: The data that follows is for engines before and after Conf-02B.

- (4) **Turbine Vane and Blade Cooling:** The turbine vane and blade cooling air (TVBCA) valves on the before PHASE-3 engines are installed at the 9 o'clock and 3 o'clock positions on the HPC rear case. The TVBCA valves on the after PHASE-3 engines are installed at the 9 o'clock, 2 o'clock, and 3 o'clock positions on the HPC rear case. The TVBCA valves work as follows:

- (a) The TVBCA valves, together with two solenoid valves and valve position switches cool the HPT, second stage vanes which improves engine performance during engine cruise.
- (b) During normal engine operation, fifteenth stage parasitic air is used for internal cooling of the HPT blades. During cruise the TVBCA system uses 12th stage air for internal cooling of the HPT 2nd stage vanes.
- (c) The FADEC/EEC receives position feedback signals from the TVBCA valves. With this input the FADEC/EEC calculates the engine's necessary cooling temperatures and operates the TVBCA valves to a schedule determined by altitude and N2. (Figure 11) (Figure 12)

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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5. Maintenance Procedures

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- C. The use of alternative parts is not permitted unless approved.

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- A. Safety instructions that are necessary for safe maintenance are included in all procedures as cautions, warnings or steps of the job. These instructions are given to prevent injury to persons or damage to equipment.

EFFECTIVITY

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642-645

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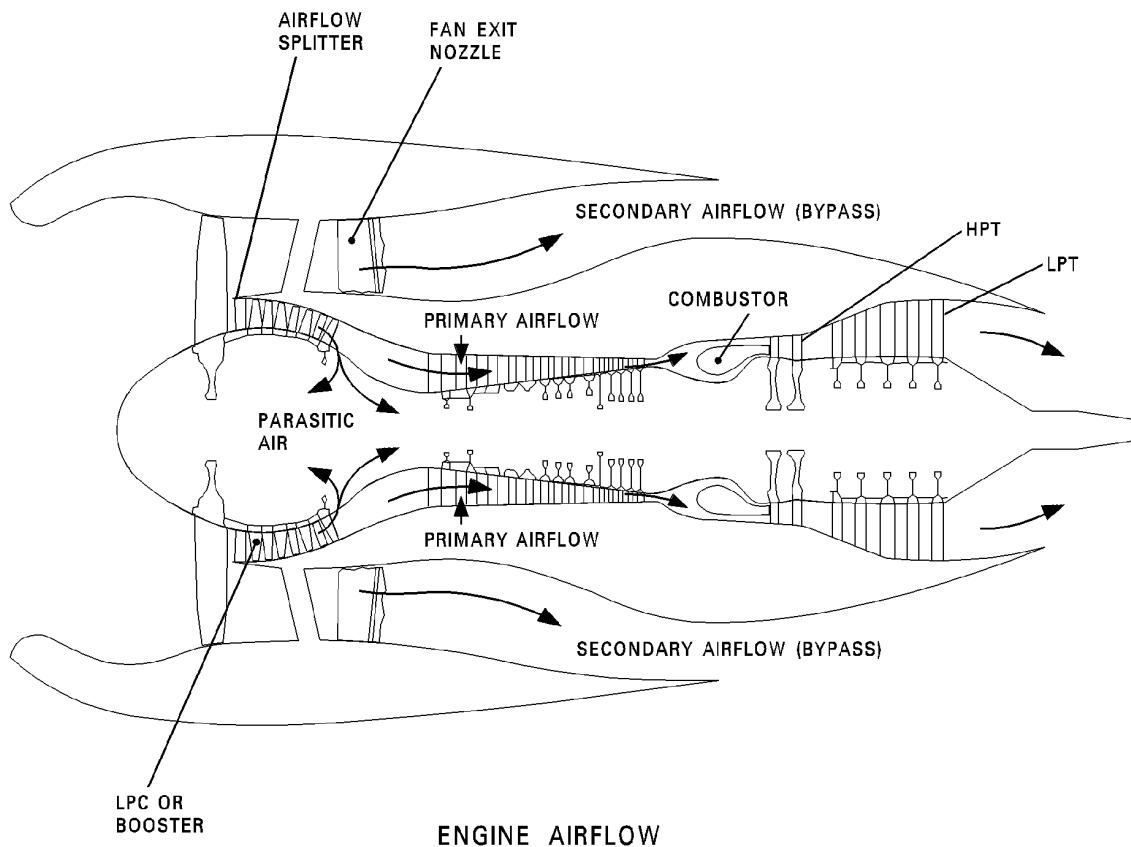
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CAG(IGDS)

DB2-75-0194A

Engine Air Flow
Figure 1/75-00-00-990-881

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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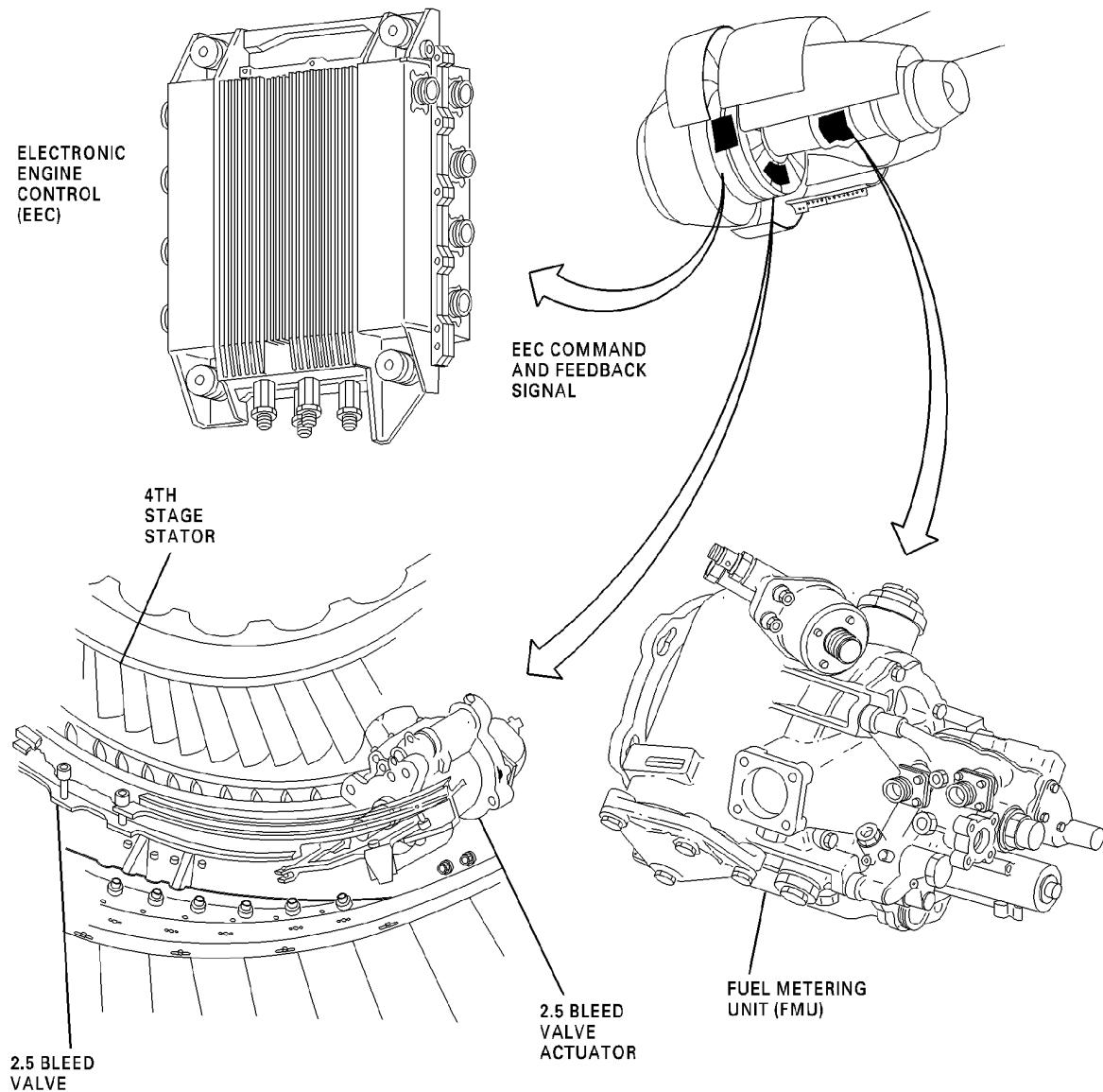
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CAG(IGDS) L-A3199

DB2-75-0171A

2.5 Compressor Bleed System
Figure 2/75-00-00-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

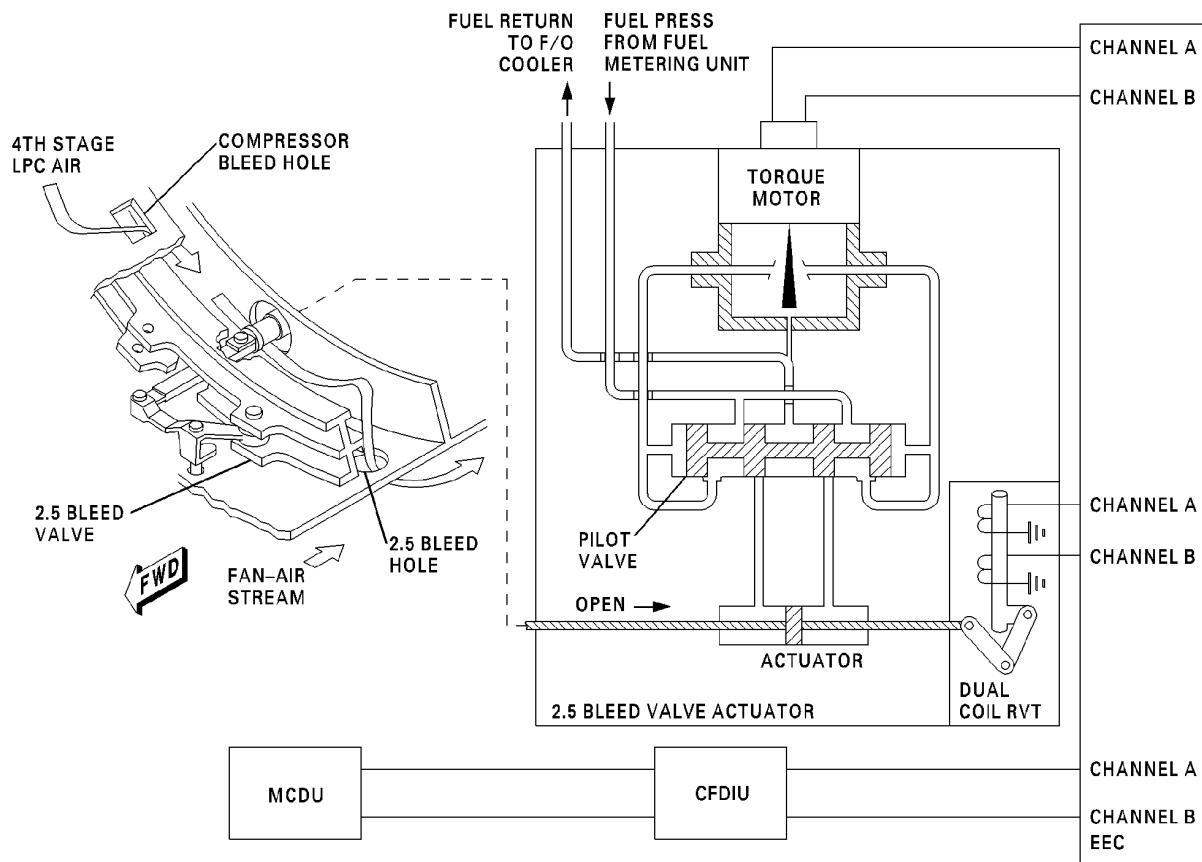
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DB2-75-0196

2.5 Compressor Bleed Diagram
Figure 3/75-00-00-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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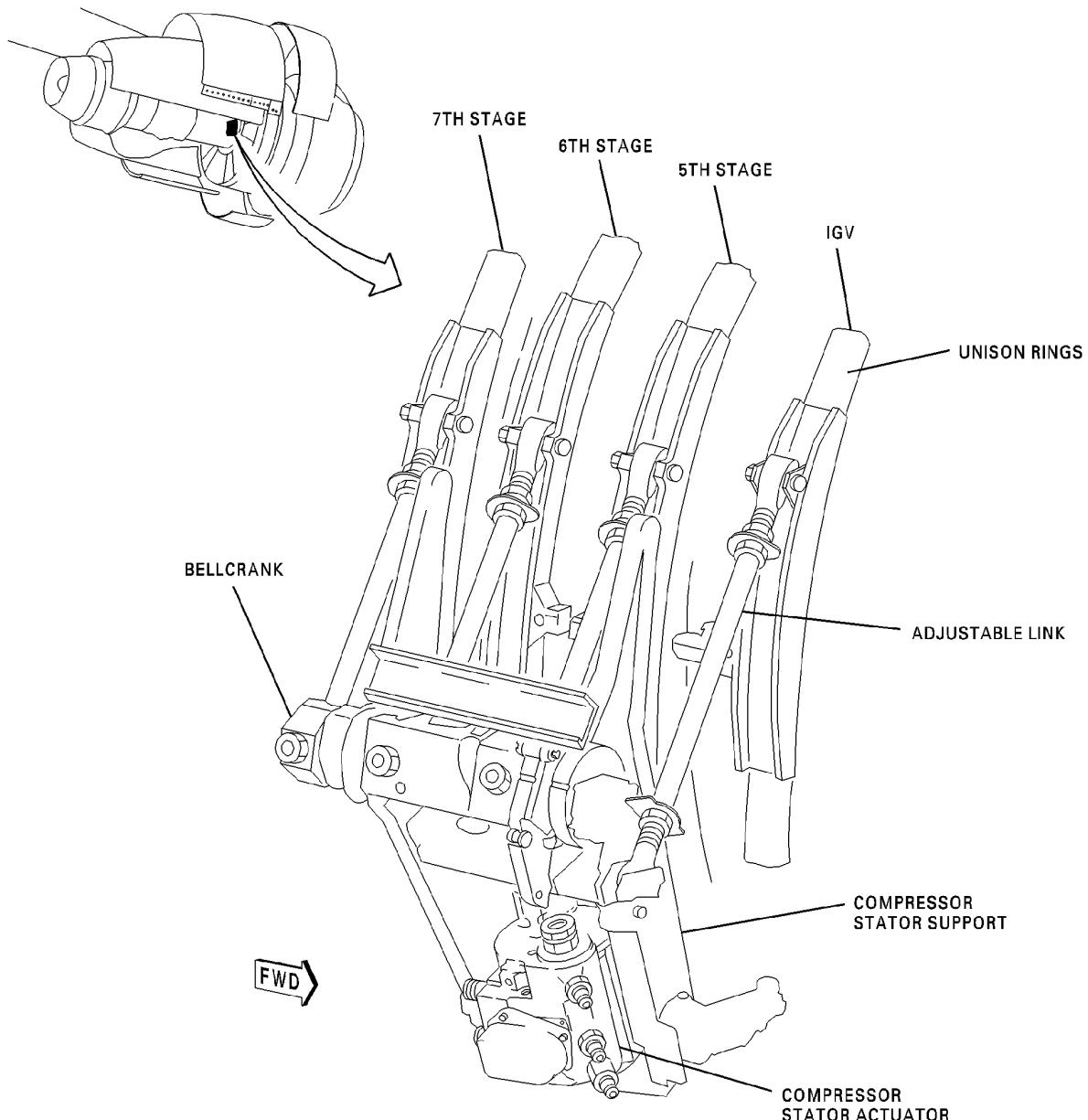
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DB2-75-0149

Variable Stator Vane System
Figure 4/75-00-00-990-871

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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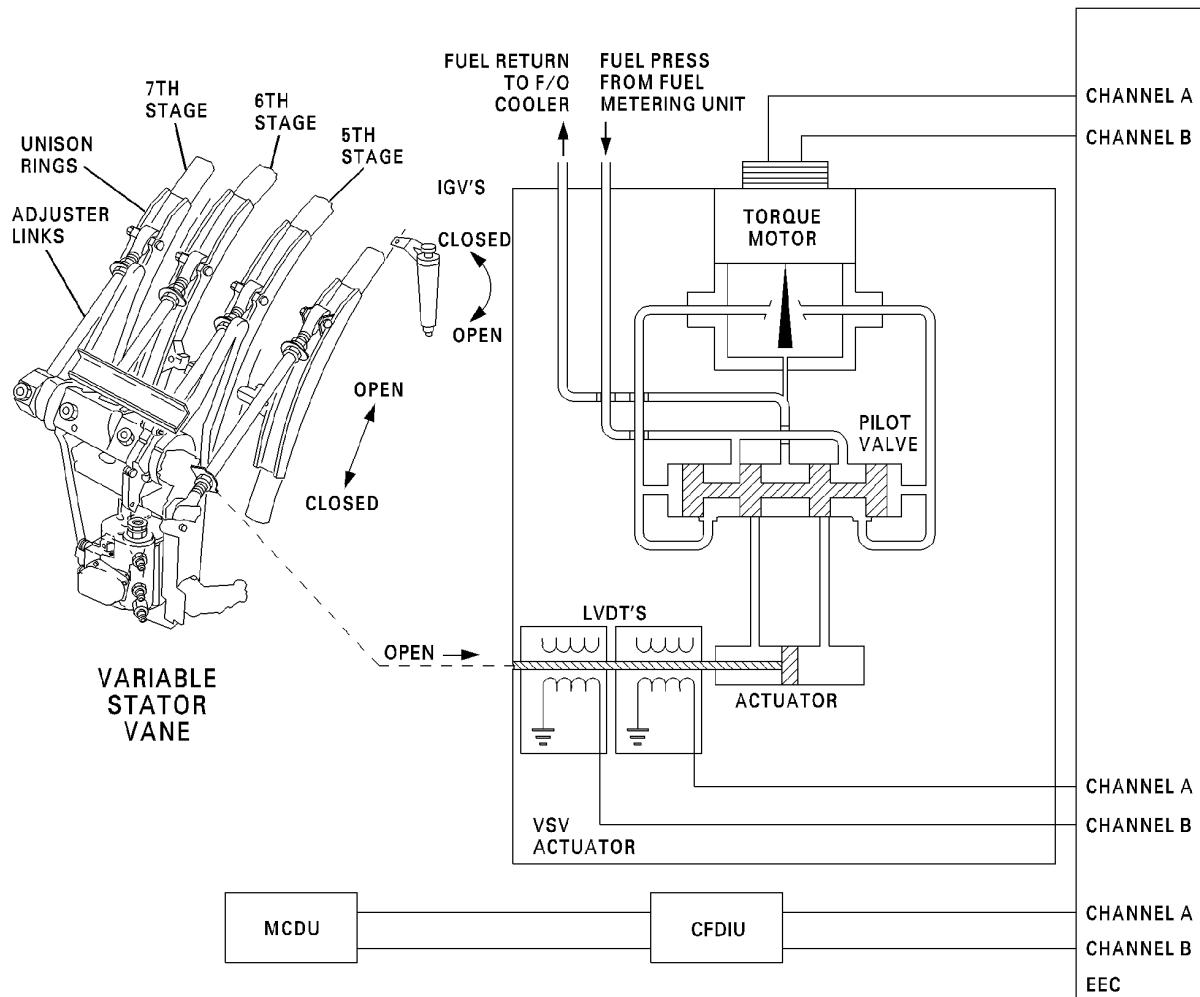
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DB2-75-0197

Variable Stator Vane Operation Diagram
Figure 5/75-00-00-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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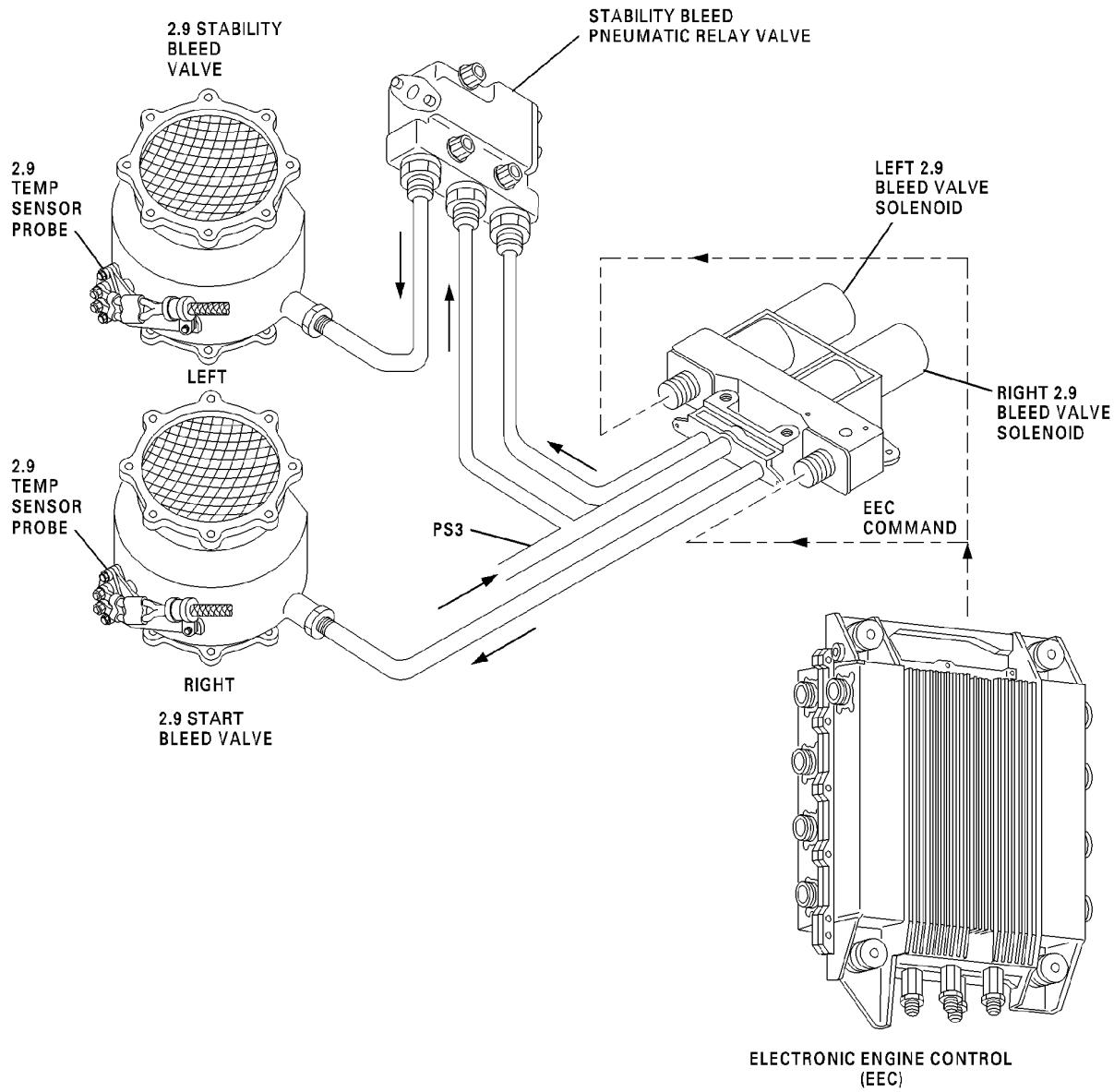
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ELECTRONIC ENGINE CONTROL
(EEC)

DB2-75-0179B

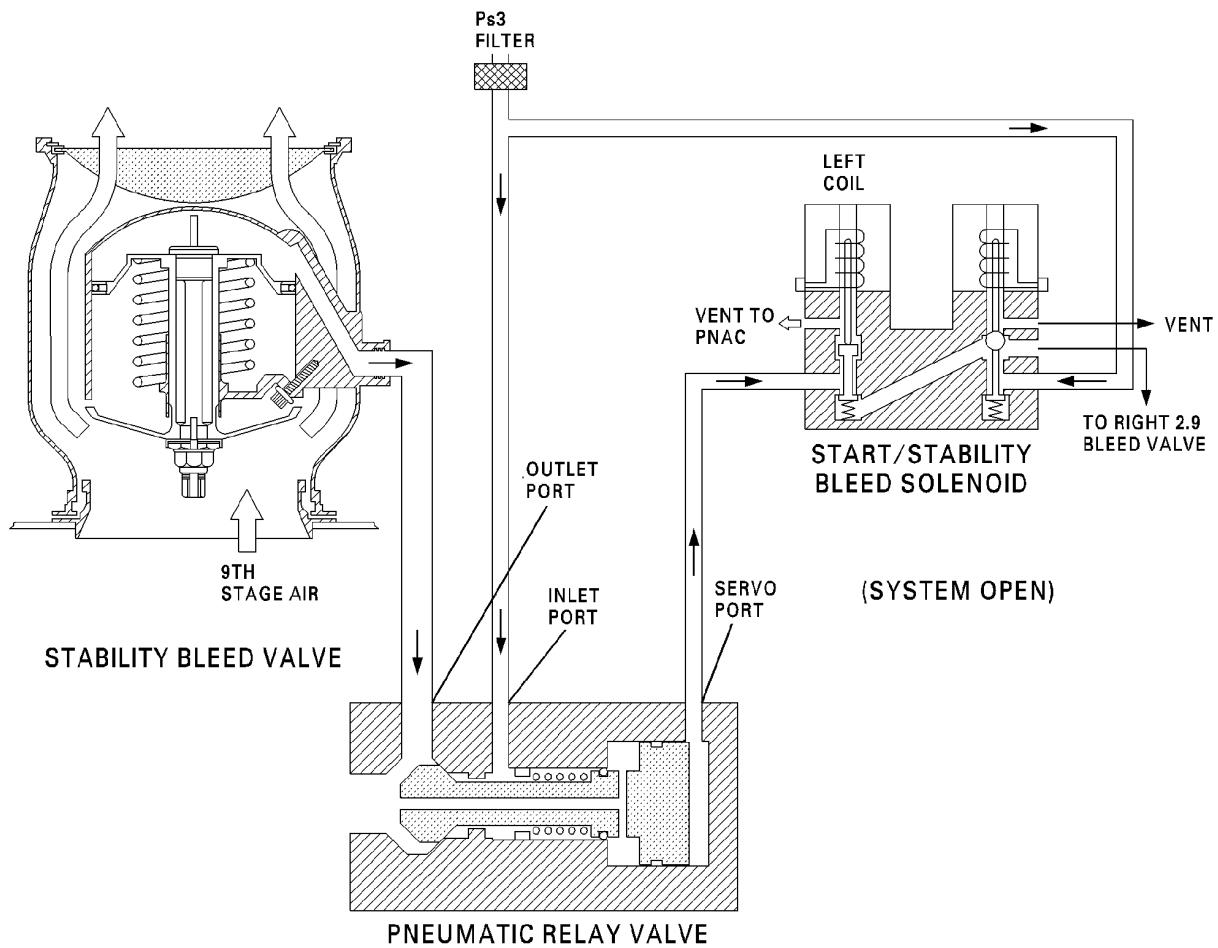
2.9 Compressor Bleed System
Figure 6/75-00-00-990-873

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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CAG(IGDS)

DB2-75-0198

2.9 Compressor Bleed Diagram
Figure 7/75-00-00-990-874

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

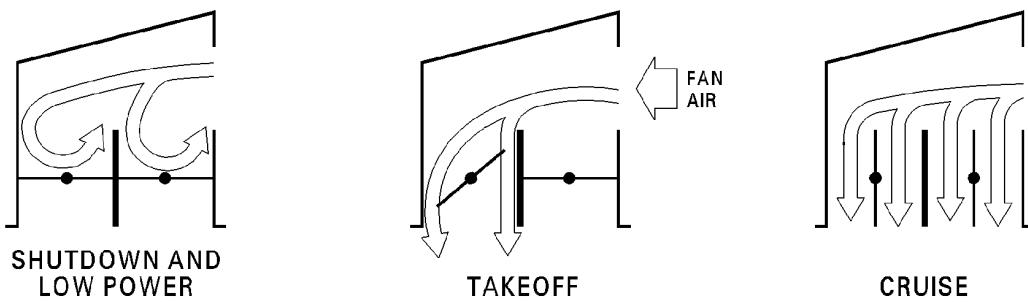
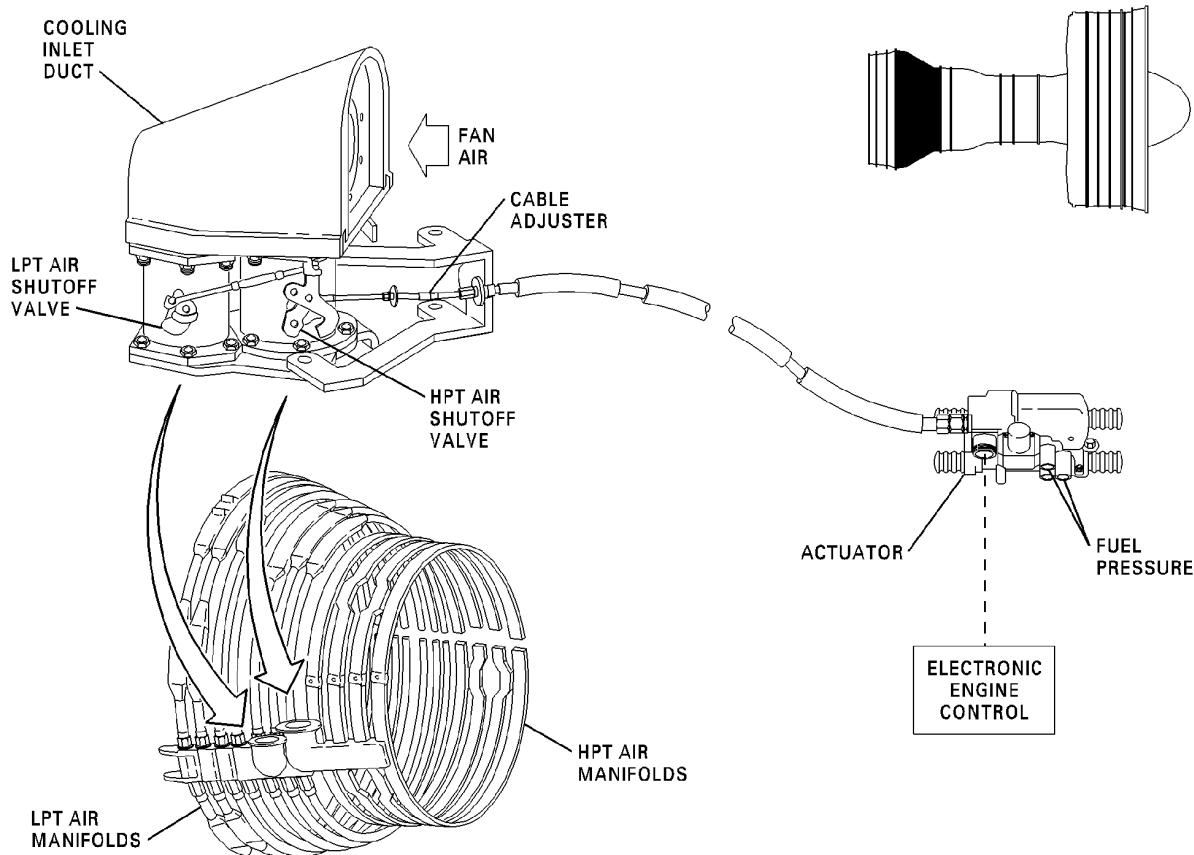
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CAG(IGDS)

DB2-75-0170

Turbine Case Cooling System
Figure 8/75-00-00-990-876

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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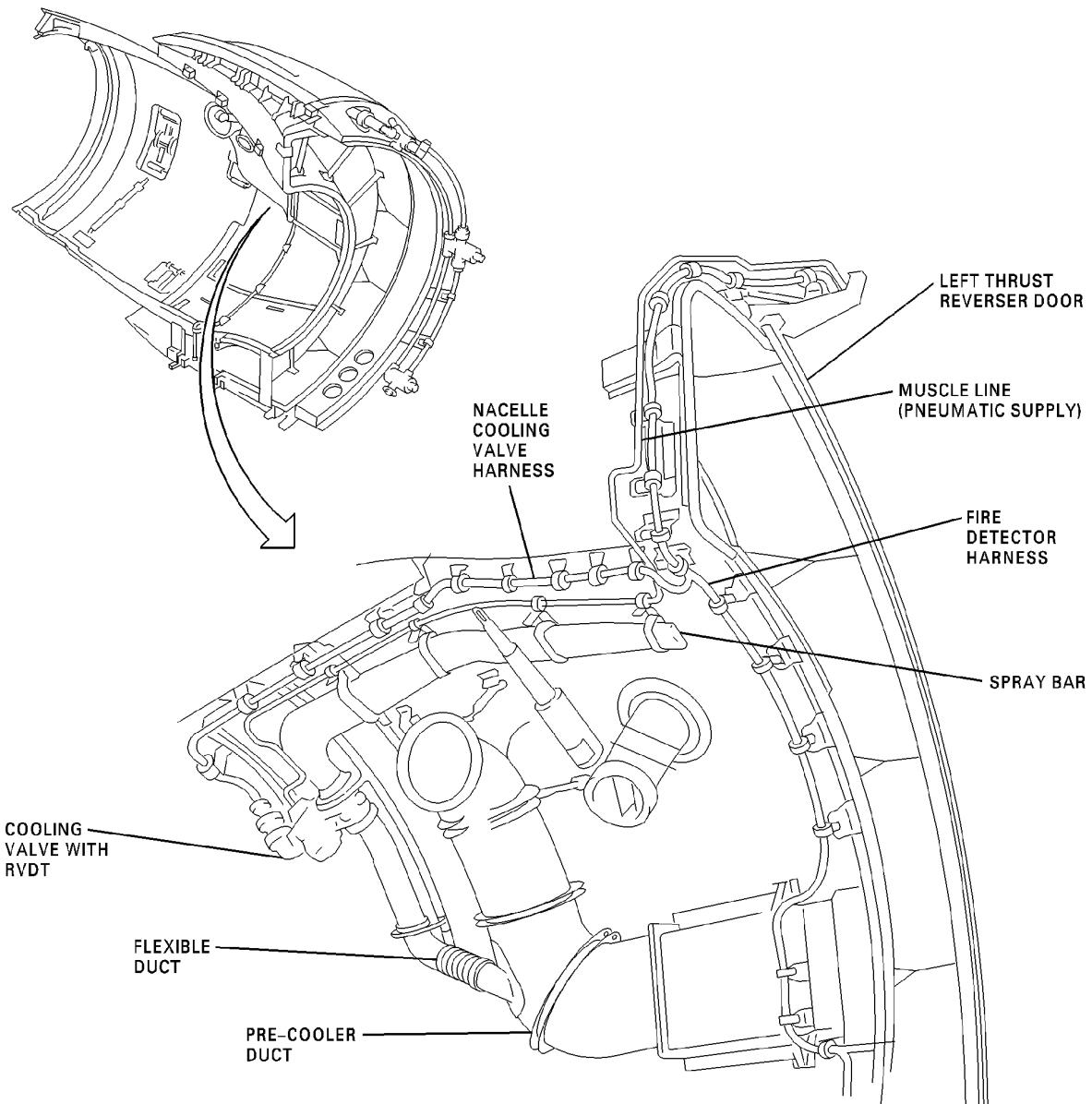
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SYSTEM BREAKDOWN
(BEFORE CONFIG-02B)

CAG(IGDS)

DB2-75-0153C

Nacelle Core Compartment Cooling
Figure 9/75-00-00-990-877

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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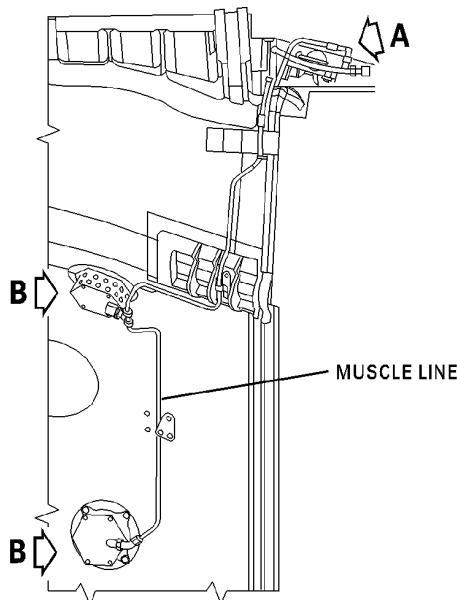
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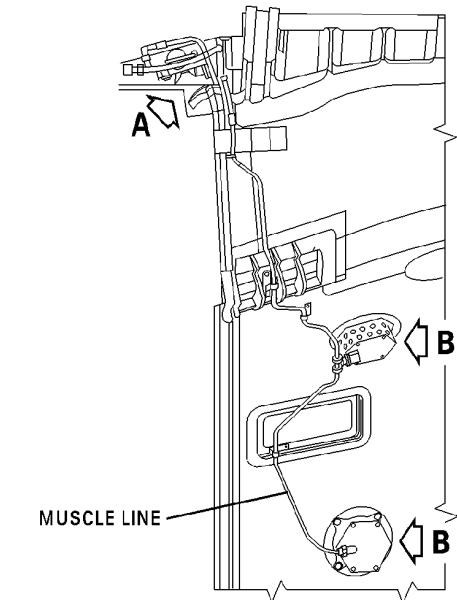
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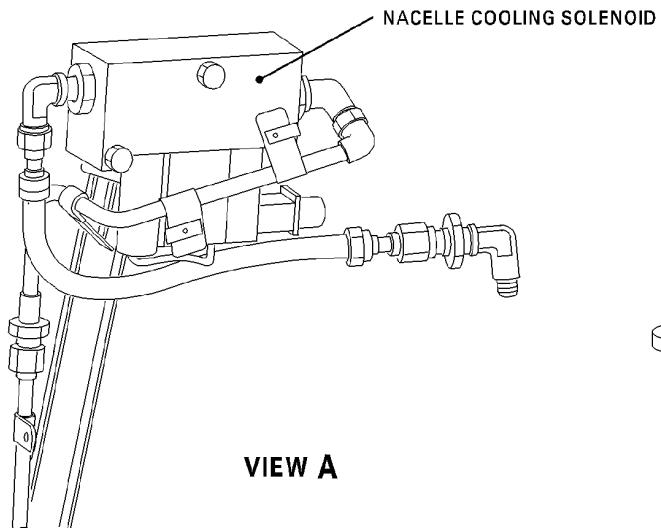
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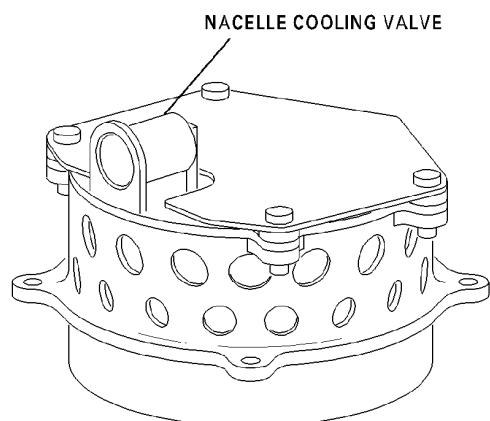
LEFT THRUST REVERSER DOOR
(VIEW FROM INBOARD)



RIGHT THRUST REVERSER DOOR
(VIEW FROM INBOARD)



CAG(IGDS)



CONF-02B

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Nacelle Core Compartment Cooling
Figure 10/75-00-00-990-884

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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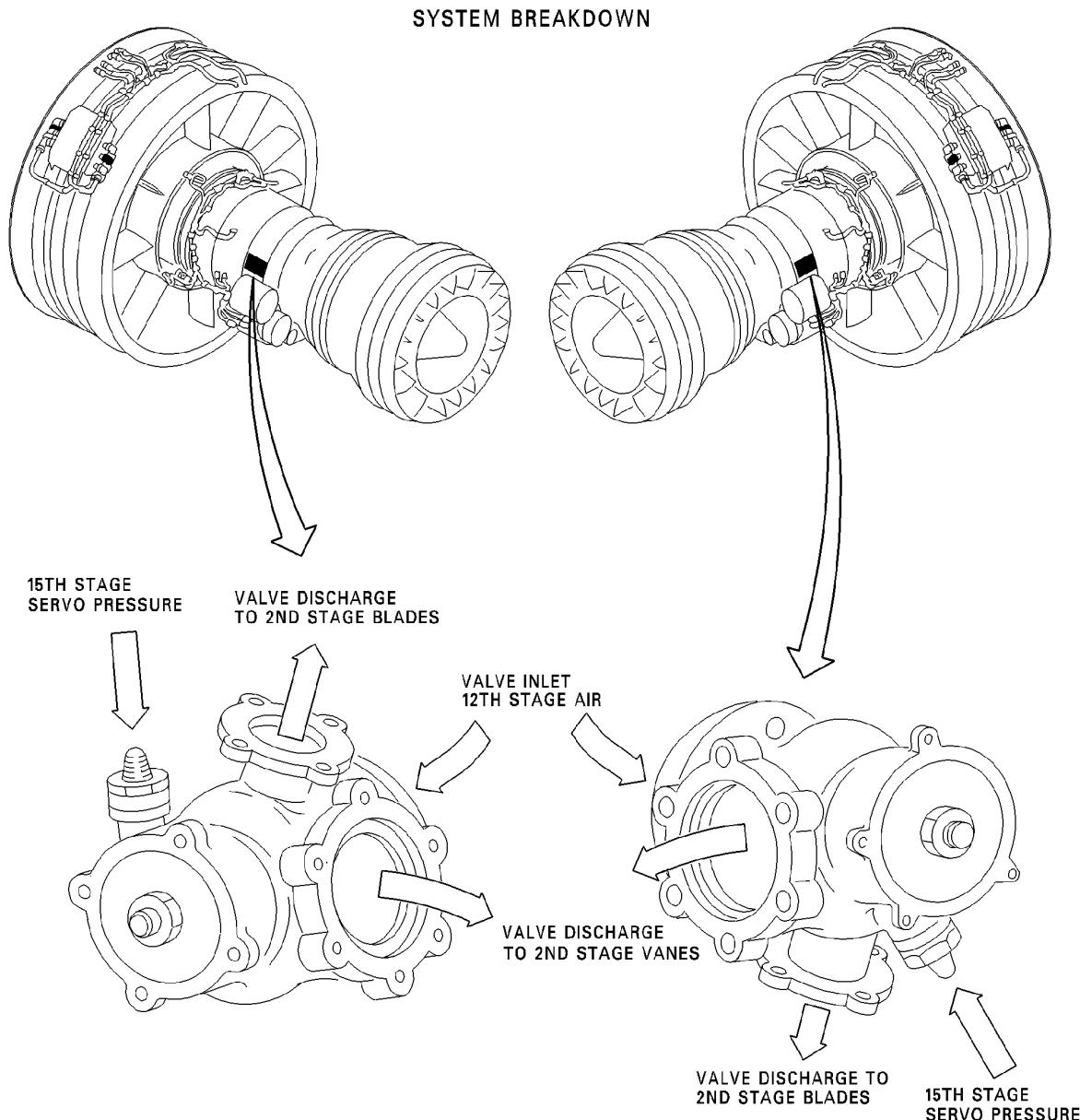
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CAG(IGDS)

DB2-75-0193

Turbine Blade And Vane Cooling Air
Figure 11/75-00-00-990-878

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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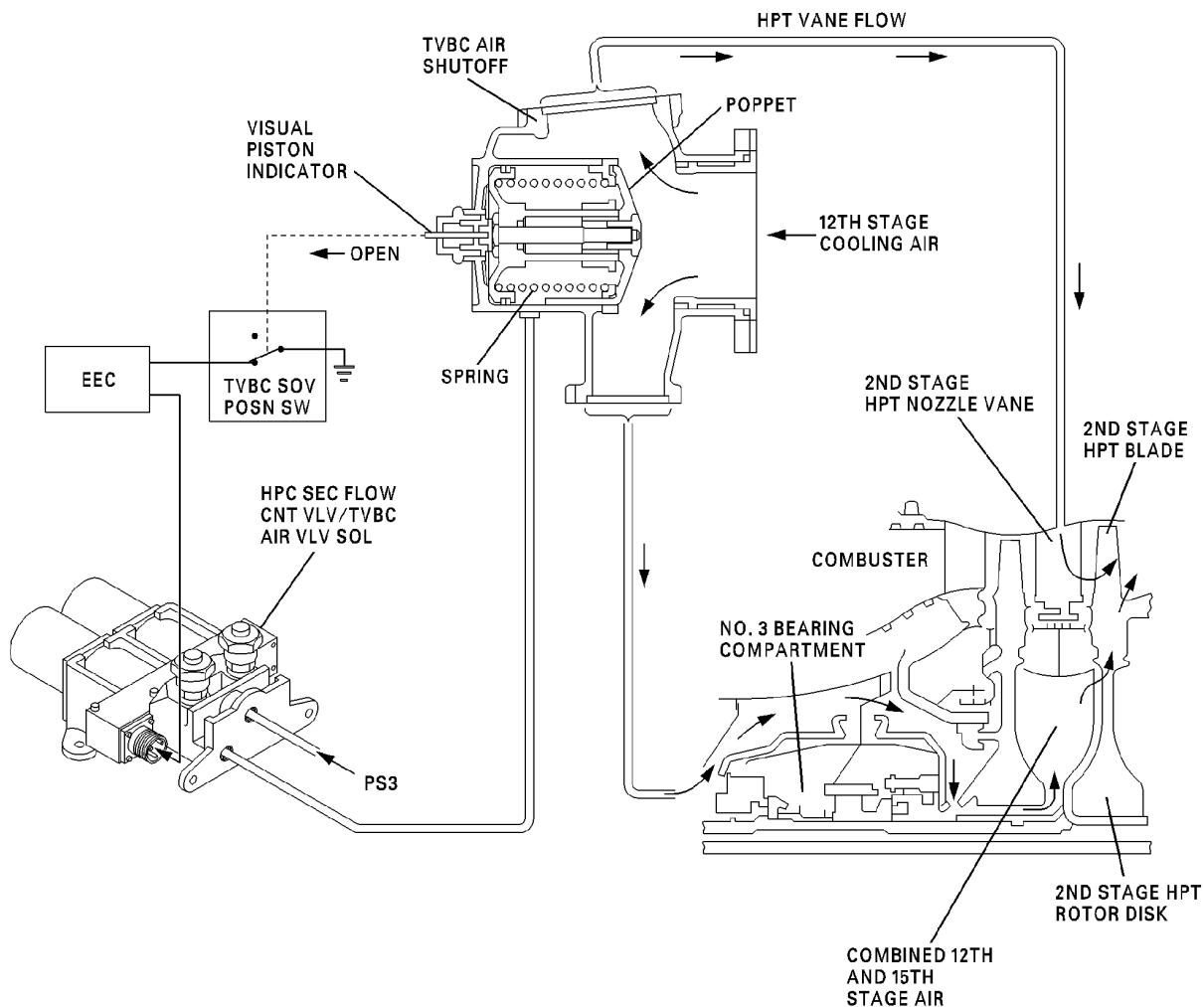
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CAG(IGDS)

DB2-75-0195

Turbine Blade And Vane Cooling Air Diagram
Figure 12/75-00-00-990-879

EFFECTIVITY
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ENGINE AIR, FITS-AND-CLEARANCES - INSPECTION/CHECK

1. General

- A. This procedure has the procedures to measure and calculate necessary fits and clearances for parts/assemblies of the engine air system. The procedure also includes inspection procedures for the engine air system external tubes.
- B. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-00-00-200-870

2. FITS-AND-CLEARANCES - ENGINE AIR

A. References

Reference	Title
75-21-01-400-868	INSTALLATION OF THE NO. 3 BEARING BUFFER AIR COOLER (P/B 401)
75-23-00-700-868	ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG) (P/B 501)
75-23-00-700-869	ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (COMPLETE RIG) (P/B 501)
75-23-17-400-868	INSTALLATION OF THE TURBINE VANE AND BLADE COOLING AIR VALVE POSITION SWITCH (P/B 401)
75-23-18-400-868	INSTALLATION OF THE TURBINE CASE COOLING AIR VALVE CONTROL CABLE (P/B 401)
75-31-01-400-868	INSTALLATION OF THE VARIABLE STATOR VANE ACTUATOR (P/B 401)
75-32-01-700-869	ADJUSTMENT OF THE 2.5 BLEED VALVE ACTUATOR - MANUAL (P/B 501)

B. Job Set-up Information - Engine Air Fits-And-Clearances Calculation

SUBTASK 75-00-00-941-270

- (1) Reference Numbers. The illustrations in this procedure show numbers that are the reference numbers in the Fits-and-Clearances Measurement Chart. Each number gives the technician the minimum and maximum dimensions of a part/assembly and the permitted fits-and-clearance.
- (2) How to measure. To calculate fits and clearances between parts they are measured at two opposite points on each part. As necessary, these opposite points can be internal or external dimensions.
- (3) Inspection Frequency Requirement (IFR). The IFR codes A, B, or C, identify the type and frequency of inspection recommended for the item. The codes are applicable to usual repairs. The code definitions are as follows:
 - (a) Code A - Calculate the fit-and-clearance of a new or serviceable part at the time of installation of the part on the LRU. Measurements made during inspection can be used for calculation of the fit-and-clearance during installation.
 - (b) Code B - Make an estimate of the fit-and-clearance at each installation of the part. Assemble the parts to test the fit and make an estimate of the fit-and-clearance. Calculate the fit-and-clearance only when you have the subsequent conditions:
 - 1) The estimate shows that a fit or clearance is not in the specified tolerance.

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- 2) One or more related parts have been repaired or replaced in an area that effects the fit-and-clearance.
- (c) Code C - (For fits-and-clearances that do not change during usual engine operation.) To measure the part and calculate the fits-and-clearance is necessary only if:
 - The repair or replacement of the part could effect the fits-and-clearance
 - The repaired or replaced part is located in an area that could effect the fits-and-clearance.
- (4) New Part Reference Dimensions. These dimensions are found in the Fits-and-Clearances Measurement Chart and are used as follows:
 - (a) The dimensions in this column are given as an aid only. The measured dimension could be anything between the minimum and maximum values given in the chart.
 - (b) The dimensions in the New Part Reference Dimension column give the minimum and maximum production values in inches and millimeters.
- (5) Dimension Limits. The limits given in the Fits-and-Clearances Chart are applicable to new or used parts.
 - (a) The LIMITS column in the Fits-and-Clearances Chart gives the permitted minimum and maximum range of the fit-and-clearance. The fit-and-clearance is given in inches and millimeters.
 - (b) The NEW PART REFERENCE DIMENSIONS column of the Fits-and-Clearances Chart has the limits of the minimum and maximum values of new parts.
 - (c) An asterisk is placed adjacent to the value of the limit that was changed to more or less than the standard.
 - (d) The letter "T" after a limit refers to a tight fit.
 - (e) Special Limits. There is a second set of limits that permits a higher deviation from the standard limits. This set of limits is for engines that are scheduled for in-between refurbishments. These limits are clearly identified by a frame drawn around the limit values.

C. Procedure - Engine Air Fits-And-Clearances Calculation

SUBTASK 75-00-00-941-271

- (1) Example fits-and-clearances calculation. The examples that follow show three possible ways to find the fit of a bearing in its support (housing).

Table 601 EXAMPLE NUMBER 1 (Standard fit calculation)

REF NO.	IFR	DESCRIPTION	NEW PART REFERENCE DIMENSIONS		LIMITS	
			MIN	MAX	MIN	MAX
1812						
		Bearing	0.508 in. (12.903 mm)	0.512 in. (13.005 mm)		
		Support	0.517 in. (13.132 mm)	0.527 in. (13.386 mm)	0.005 in. (0.127 mm)	0.019 in. (0.483 mm)

NOTE: Compare the bearing and support dimensions in example #1 to determine the fit-and-clearance as follows:

		0.517 in. (13.132 mm) (-) 0.512 in. (13.005 mm) = 0.005 in. (0.127 mm)
		0.527 in. (13.386 mm) (-) 0.508 in. (12.903 mm) = 0.019 in. (0.483 mm)

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Table 602 EXAMPLE NUMBER 2 (Less restrictive, tighter fit permitted)

REF NO.	IFR	DESCRIPTION	NEW PART REFERENCE DIMENSIONS		LIMITS	
			MIN	MAX	MIN	MAX
1812						
		Bearing	0.508 in. (12.903 mm)	0.512 in. (13.005 mm)		
		Support	0.517 in. (13.132 mm)	0.527 in. (13.386 mm)	0.005 in. (0.127 mm)	0.020 in. (0.508 mm) ^[1]

*[1] The less restrictive maximum value in example #2.

EXAMPLE NUMBER 3 (Less restrictive for selective use only)

REF NO.	IFR	DESCRIPTION	NEW PART REFERENCE DIMENSIONS		LIMITS	
			MIN	MAX	MIN	MAX
1812						
		Bearing	0.508 in. (12.903 mm)	0.512 in. (13.005 mm)		
		Support	0.517 in. (13.132 mm)	0.527 in. (13.386 mm)	0.005 in. (0.127 mm)	0.019 in. (0.483 mm)
					0.005 in. (0.127 mm)	0.022 in. (0.559 mm) ^[1]

*[1] The less restrictive maximum value in example #3 . These dimensions are used for selective applications only.

SUBTASK 75-00-00-910-267

(2) Fits-and-Clearances Measurement Chart.

REF NO.	IFR	DESCRIPTION	NEW PART REFERENCE DIMENSIONS		LIMITS	
			MIN	MAX	MIN	MAX
492	B	1. Self Retaining Pin (Bleed Valve Linkage) Bleed Valve Connecting Link Bearing. (Figure 601)				
		PIN	0.248 in. (6.299 mm)	0.249 in. (6.325 mm)		
		BEARING	0.2495 in. (6.337 mm)	0.2500 in. (6.350 mm)	0.0005 in. (0.0127 mm)	0.002 in. (0.051 mm)
493	B	2. Side Clearance, Bleed Valve Connecting Link Bearing, and Bleed Valve Linkage Rod Assembly . (Figure 601)				
		BEARING	0.338 in. (8.585 mm)	0.343 in. (8.712 mm)		
		ROD	0.344 in. (8.738 mm)	0.346 in. (8.788 mm)	0.001 in. (0.025 mm)	0.008 in. (0.203 mm)
505	B	3. Bleed Valve Connecting Link Pin Self-Retaining Pin (Bleed Valve Linkage) and Bleed Valve Linkage Rod Assembly. (Figure 601)				
		PIN	0.248 in. (6.299 mm)	0.249 in. (6.325 mm)		

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(Continued)

REF NO.	IFR	DESCRIPTION	NEW PART REFERENCE DIMENSIONS		LIMITS	
			MIN	MAX	MIN	MAX
		ROD	0.2495 in. (6.3373 mm)	0.2505 in. (6.3627 mm)	0.0005 in. (0.0127 mm)	0.0025 in. (0.0635 mm)
584	C	4. Bolt, Inlet HPC Lever. (Figure 602) (Figure 603)				
		BOLT	0.3380 in. (8.5852 mm)	0.3382 in. (8.590 mm)		
		LEVER	0.3374 in. (8.5700 mm)	0.3380 in. (8.5852 mm)	0.0008T in. (0.0203T mm)	0.0000 in. (0.0000 mm)
585	C	5. Bolt, HPC Level Set. (Figure 602) (Figure 603)				
		BOLT	0.3380 in. (8.5852 mm)	0.3382 in. (8.5903 mm)		
		LEVER	0.3374 in. (8.5700 mm)	0.3380 in. (8.5852 mm)	0.0008T in. (0.0203T mm)	0.0000 in. (0.0000 mm)
586	C	6. HPC Lever Set and Inlet Level. (Figure 602) (Figure 603)				
		LEVER SET	1.772 in. (45.009 mm)	1.773 in. (45.034 mm)		
		INLET LEVER	1.773 in. (45.034 mm)	1.775 in. (45.085 mm)	0.0000 in. (0.0000 mm)	0.003 in. (0.076 mm)
587	C	7. Inlet HPC Lever Bearing. (Figure 602) (Figure 603)				
		LEVER SET	1.772 in. (45.009 mm)	1.773 in. (45.034 mm)		
		BEARING	1.7712 in. (44.9885 mm)	1.7717 in. (45.0012 mm)	0.0015T in. (0.038T mm)	0.0005T in. (0.013T mm)
588	B	8. Bearing, Compressor Stator lever Support. (Figure 602) (Figure 603)				
		BEARING	2.676 in. (67.970 mm)	2.677 in. (67.996 mm)		
		SUPPORT	2.6774 in. (68.0060 mm)	2.6779 in. (68.0187 mm)	0.0002 in. (0.0051 mm)	0.0022 in. (0.0559 mm)
607	A	9. Radial Clearance. (Figure 604) (Figure 605) (Figure 606) (Figure 607)				
		ROD END SPHERICAL BEARING			0.000	
612	C	10. Bold HPC Synchronizing Ring Cesis Assembly. (Figure 604)				
		BOLT	0.4345 in. (11.0363 mm)	0.4355 in. (11.0617 mm)		
		RING	0.437 in. (11.100 mm)	0.438 in. (11.125 mm)	0.0015 in. (0.0381 mm)	0.0035 in. (0.0889 mm)
613	C	11. Bolt, Rod-end Bearing. (Figure 604)				

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REF NO.	IFR	DESCRIPTION	NEW PART REFERENCE DIMENSIONS		LIMITS	
			MIN	MAX	MIN	MAX
		BOLT	0.3109 in. (7.8969 mm)	0.3119 in. (7.9223 mm)		
		BEARING	0.3120 in. (7.9248 mm)	0.3125 in. (7.9375 mm)	0.0001 in. (0.0025 mm)	0.0016 in. (0.0406 mm)
614	C	12. Blot, HPC Synchronizing Ring Clevis Assembly. (Figure 604)				
		BOLT	0.3109 in. (7.8969 mm)	0.3119 in. (7.9223 mm)		
		RING	0.3120 in. (7.9248 mm)	0.3125 in. (7.9375 mm)	0.0001 in. (0.0025 mm)	0.0016 in. (0.0406 mm)
604	C	13. Bolt, HPC Synchronizing Ring Clevis Assembly. (Figure 605) (Figure 607)				
		BOLT	0.4345 in. (11.0363 mm)	0.4355 in. (11.0617 mm)		
		RING	0.437 in. (11.100 mm)	0.438 in. (11.125 mm)	0.0015 in. (0.0381 mm)	0.0035 in. (0.0889 mm)
605	C	14. Bolt, HPC Synchronizing Ring Clevis Assembly. (Figure 605) (Figure 607)				
		BOLT	0.3109 in. (7.8969 mm)	0.3119 in. (7.9223 mm)		
		RING	0.3120 in. (7.9248 mm)	0.3125 in. (7.9375 mm)	0.0001 in. (0.0025 mm)	0.0016 in. (0.0406 mm)
606	C	15. Bolt, Stage 5 and 7 Rod-end Bearing. (Figure 605) (Figure 607)				
		BOLT	0.3109 in. (7.8969 mm)	0.3119 in. (7.9223 mm)		
		BEARING	0.3120 in. (7.9248 mm)	0.3125 in. (7.9375 mm)	0.0001 in. (0.0025 mm)	0.0016 in. (0.0406 mm)
609	C	16. Bolt, HPC Clevis. (Figure 605)				
		BOLT	0.4345 in. (11.0363 mm)	0.4355 in. (11.0617 mm)		
		CLEVIS	0.437 in. (11.100 mm)	0.438 in. (11.125 mm)	0.0015 in. (0.0381 mm)	0.0035 in. (0.0889 mm)
610	C	17. Bolt, Rod-end Bearing. (Figure 605)				
		BOLT	0.3109 in. (7.8969 mm)	0.3119 in. (7.9223 mm)		
		BEARING	0.3120 in. (7.9248 mm)	0.3125 in. (7.9375 mm)	0.0001 in. (0.0025 mm)	0.0016 in. (0.0406 mm)
611	C	18. Bolt, HPC Clevis. (Figure 605)				
		BOLT	0.3109 in. (7.8969 mm)	0.3119 in. (7.9223 mm)		

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REF NO.	IFR	DESCRIPTION	NEW PART REFERENCE DIMENSIONS		LIMITS	
			MIN	MAX	MIN	MAX
		CLEVIS	0.3120 in. (7.9248 mm)	0.3125 in. (7.9375 mm)	0.0001 in. (0.0025 mm)	0.0016 in. (0.0406 mm)
582	C	19. Bolt, Stage 6 Rod End Bearing. (Figure 606)				
		BOLT	0.3109 in. (7.8969 mm)	0.3119 in. (7.9223 mm)		
		BEARING	0.3120 in. (7.9248 mm)	0.3125 in. (7.9375 mm)	0.0001 in. (0.0025 mm)	0.0016 in. (0.0406 mm)
583	C	20. Bolt, Stage 6 Synchronizing Ring Assembly. (Figure 606)				
		BOLT	0.3109 in. (7.8969 mm)	0.3119 in. (7.9223 mm)		
		RING	0.3120 in. (7.9248 mm) mm)	0.3125 in. (7.9375 mm)	0.0001 in. (0.0025 mm)	0.0016 in. (0.0406 mm)
589	C	21. Bolt, HPC Synchronizing Ring, Clevis Assembly. (Figure 606)				
		BOLT	0.4345 in. (11.0363 mm)	0.4355 in. (11.0617 mm)		
		RING	0.437 in. (11.100 mm)	0.438 in. (11.125 mm)	0.0015 in. (0.0381 mm)	0.0035 in. (0.0889 mm)
592	C	22. Bolt, Cylinder Stop. (Figure 608)				
		BOLT	0.216 in. (5.486 mm)	0.217 in. (5.512 mm)		
		STOP	0.218 in. (5.537 mm)	0.220 in. (5.588 mm)	0.001 in. (0.025 mm)	0.004 in. (0.102 mm)
593	B	23. Bearing, Compressor Stator Cylinder Support. (Figure 608)				
		BEARING	1.4360 in. (36.4744 mm)	1.4375 in. (36.5125 mm)		
		SUPPORT	1.438 in. (36.525 mm)	1.439 in. (36.551 mm)	0.0005 in. (0.0127 mm)	0.0030 in. (0.0762 mm)
599	C	24. Compressor Cylinder Bearing. (Figure 608)				
		CYLINDER	0.7487 in. (19.0170 mm)	0.7490 in. (19.0246 mm)		
		BEARING	0.7495 in. (19.0373 mm)	0.7500 in. (19.0500 mm)	0.0005 in. (0.0127 mm)	0.0013 in. (0.0330 mm)
600	C	25. Bolt, HPC Lever Set. (Figure 609)				
		BOLT	0.497 in. (12.624 mm)	0.498 in. (12.649 mm)		
		LEVER	0.4995 in. (12.6873 mm)	0.5005 in. (12.7127 mm)	0.0015 in. (0.0381 mm)	0.0035 in. (0.0889 mm)

EFFECTIVITY
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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(Continued)

REF NO.	IFR	DESCRIPTION	NEW PART REFERENCE DIMENSIONS		LIMITS	
			MIN	MAX	MIN	MAX
601	C	26. Bolt, HPC Lever Set. (Figure 609)				
		BOLT	0.3739 in. (9.4971 mm)	0.3744 in. (9.5098 mm)		
		LEVER	0.3745 in. (9.5123 mm)	0.3755 in. (9.5377 mm)	0.0001 in. (0.0025 mm)	0.0016 in. (0.0406 mm)
602	C	27 Bolt, Rod-end Bearing Assembly. (Figure 609)				
		BOLT	0.3739 in. (9.4971 mm)	0.3744 in. (9.5098 mm)		
		BEARING	0.3745 in. (9.5123 mm)	0.3750 in. (9.5250 mm)	0.0001 in. (0.0025 mm)	0.0011 in. (0.0279 mm)
603	C	28. Bearing, Rod-end. (Figure 609)				
		BEARING	0.8120 in. (20.6248 mm)	0.8125 in. (20.6375 mm)		
		ROD	0.8123 in. (20.6324 mm)	0.8128 in. (20.6451 mm)	0.0002T in. (0.0051T mm)	0.0008 in. (0.0203 mm)
837	B	29. Support Link Shoulder Bolts. (Figure 610)				
		BOLT	0.2494 in. (6.3348 mm)	0.2499 in. (6.3475 mm)		
		BRACKET	0.2500 in. (6.3500 mm)	0.2510 in. (6.3754 mm)	0.0001 in. (0.0025 mm)	0.0016 in. (0.0406 mm)
838	B	30. Support Link Soulder Bolts. Support Link Rod-end Bearings. (Figure 610)				
		BOLT	0.2494 in. (6.3348 mm)	0.2499 in. (6.3475 mm)		
		BEARING	0.2495 in. (6.3373 mm)	0.2500 in. (6.3500 mm)	0.0006 in. (0.0152 mm)	0.004T in. (0.0102T mm)
839	B	Side Clearance. Support Link Rod-end Bearings. No. 3 Bearing Air Cooler Assembly Support Brackets. (Figure 610)				
		BEARING	0.432 in. (10.973 mm)	0.437 in. (11.100 mm)		
		BRACKET	0.4375 in. (11.1125 mm)	0.4395 in. (11.1633 mm)	0.0005 in. (0.0127 mm)	0.0075 in. (0.1905 mm)

SUBTASK 75-00-00-910-268

(3) Special Assembly Procedures

Table 603

REF. NO.	IFR	DESCRIPTION		
750	A	1.	Bleed Valve Rigging Procedure. (Figure 601) (ADJUSTMENT OF THE 2.5 BLEED VALVE ACTUATOR - MANUAL, TASK 75-32-01-700-869)	

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Table 603 (Continued)

REF. NO.	IFR	DESCRIPTION	
760	A	2.	Turbine Vane and Blade Cooling Air Valve Position Switch. (INSTALLATION OF THE TURBINE VANE AND BLADE COOLING AIR VALVE POSITION SWITCH, TASK 75-23-17-400-868)
1004	A	3.	Assembly of the No. 3 Bearing Air Cooler Assembly Midspan Support. (Figure 610) (INSTALLATION OF THE NO. 3 BEARING BUFFER AIR COOLER, TASK 75-21-01-400-868)
2010		4.	Turbine Case Cooling (TCC) Actuation System Assembly and Rigging Procedure. Refer to the procedures that follow: (Figure 611) (ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG), TASK 75-23-00-700-868) (ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (COMPLETE RIG), TASK 75-23-00-700-869) (INSTALLATION OF THE TURBINE CASE COOLING AIR VALVE CONTROL CABLE, TASK 75-23-18-400-868)

SUBTASK 75-00-00-910-269

(4) Special Torques

REF. NO.	IFR	DESCRIPTION
730	A	1. Nut, Variable Stator Clevis Retaining. (INSTALLATION OF THE VARIABLE STATOR VANE ACTUATOR, TASK 75-31-01-400-868) (Figure 604) (Figure 605) (Figure 606) (Figure 607)
731	A	2. Nut, Bellcrank Spacer Clevis Retaining. (INSTALLATION OF THE VARIABLE STATOR VANE ACTUATOR, TASK 75-31-01-400-868) (Figure 604)
733	A	3. Nut, Actuating Cylinder Retaining. (INSTALLATION OF THE VARIABLE STATOR VANE ACTUATOR, TASK 75-31-01-400-868) (Figure 609)

— END OF TASK —

— EFFECTIVITY —

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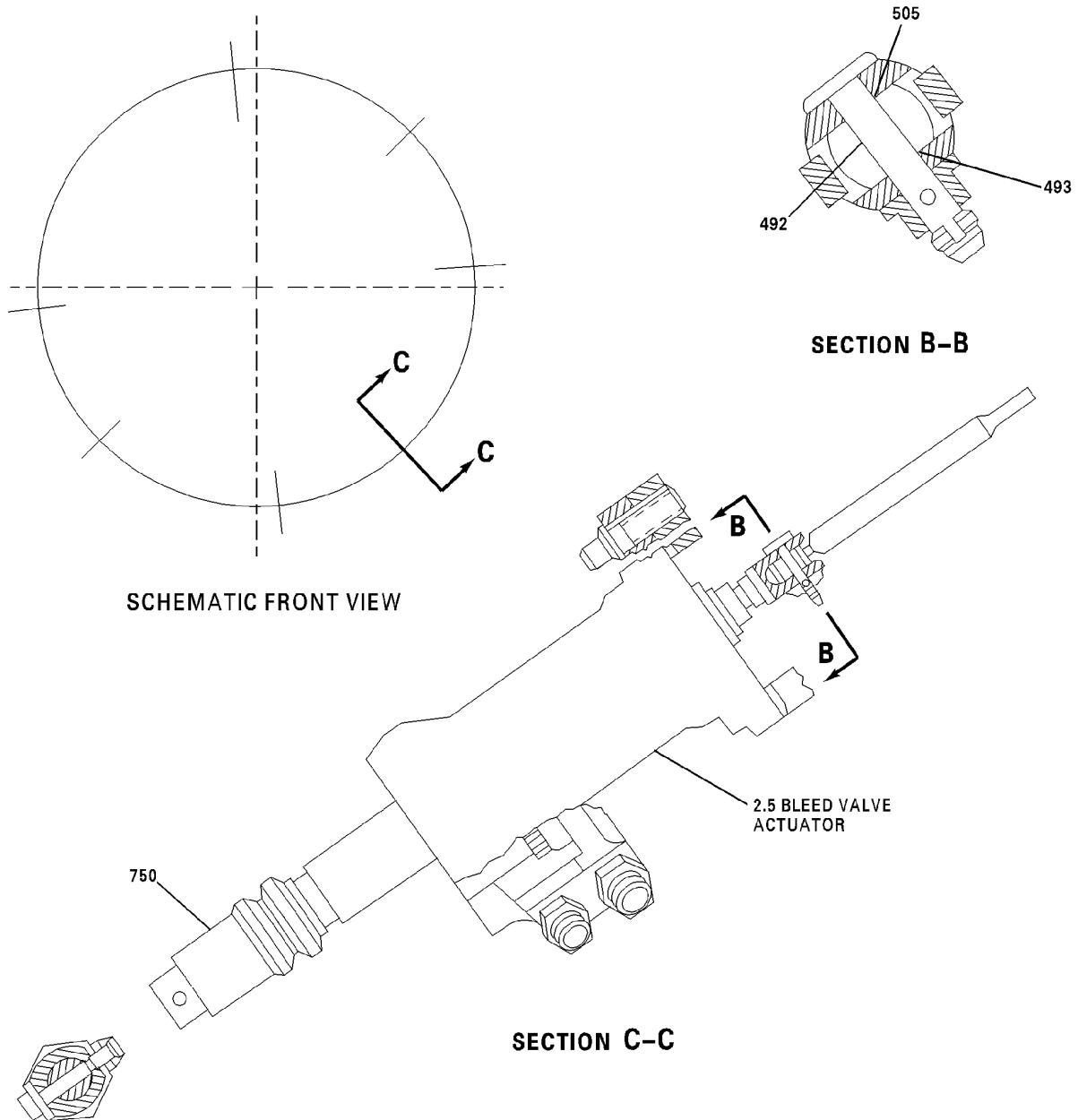
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CAG(IGDS) L-A3295

DB2-75-0151

2.5 Bleed Valve Actuator
Figure 601/75-00-00-990-896

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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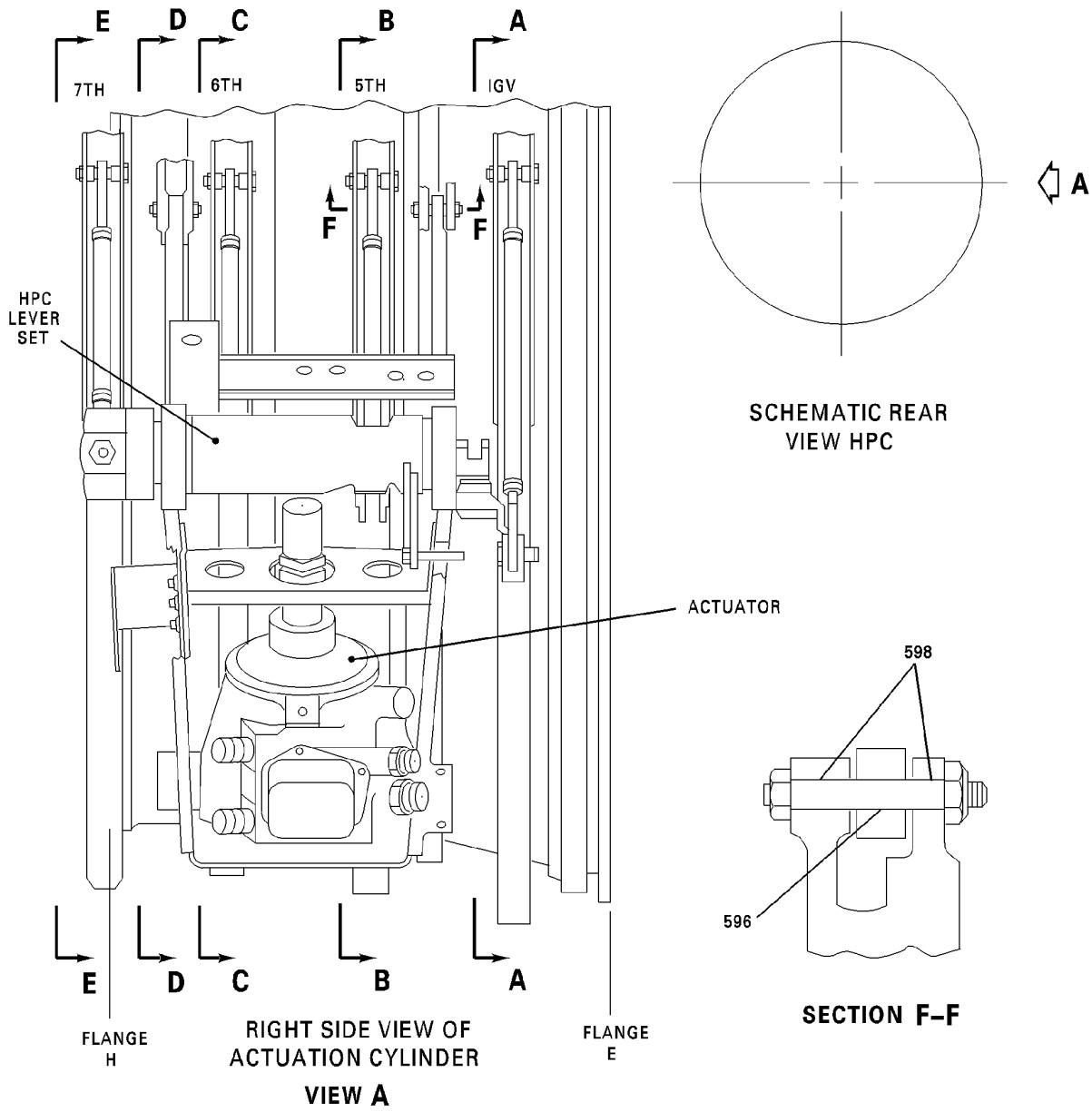
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CAG(IGDS) L-A3299

DB2-75-0154

HPC Stator Vane Actuator And Linkage Assembly (Sheet 1)
Figure 602/75-00-00-990-897

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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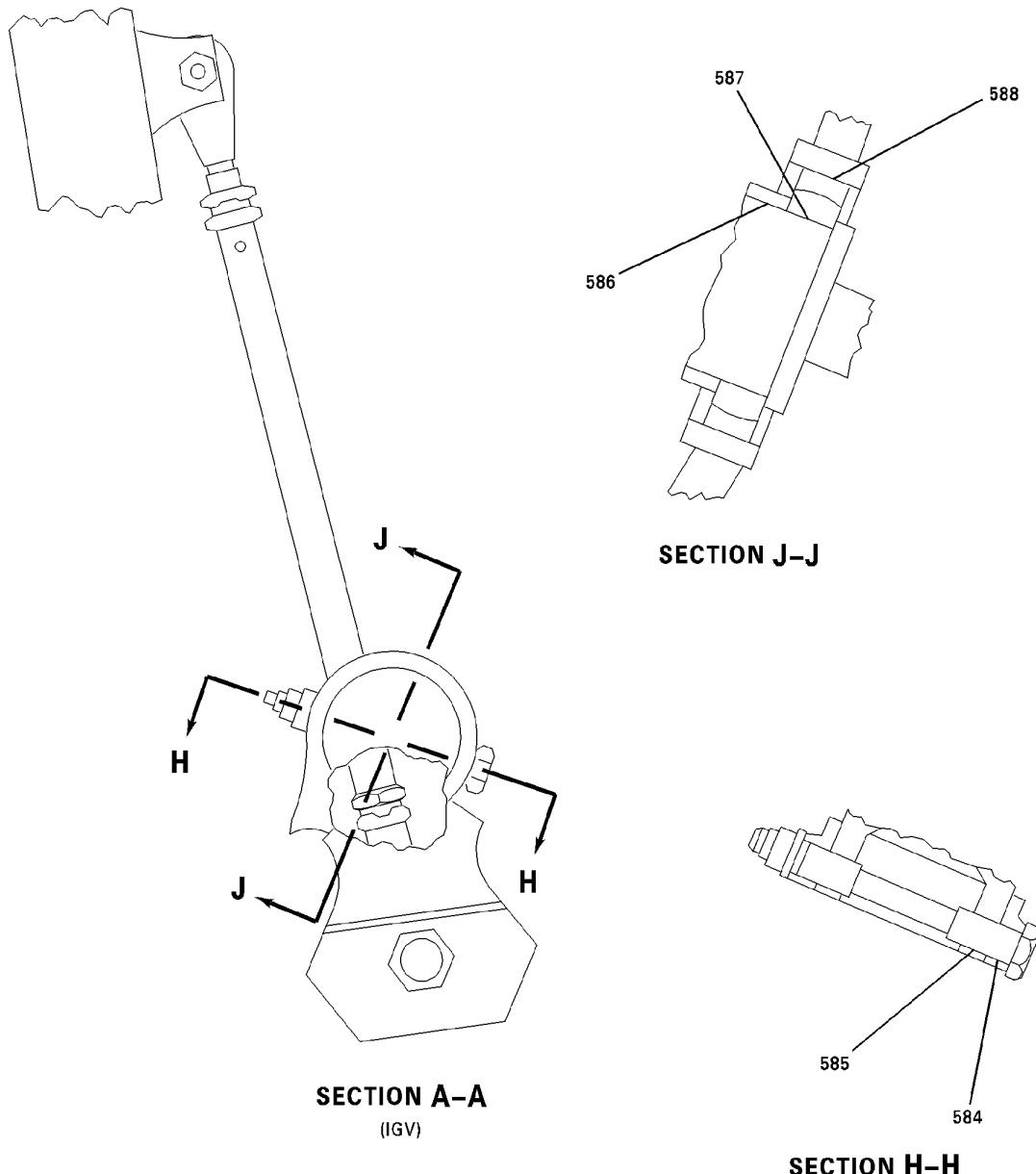
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CAG(IGDS) L-A3300

DB2-75-0155

HPC Stator Vane Actuator And Linkage Assembly (Sheet 2)
Figure 603/75-00-00-990-882

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

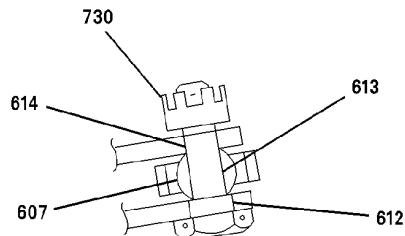
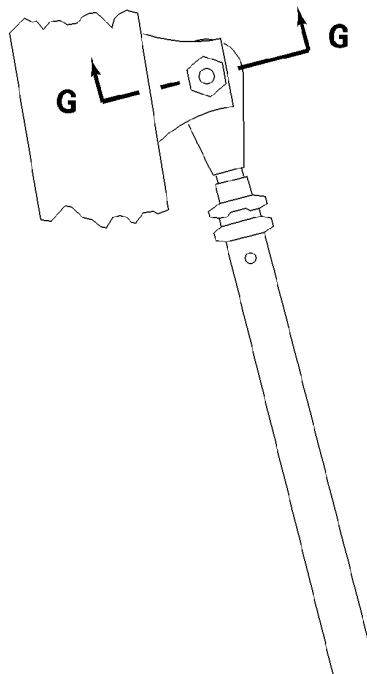
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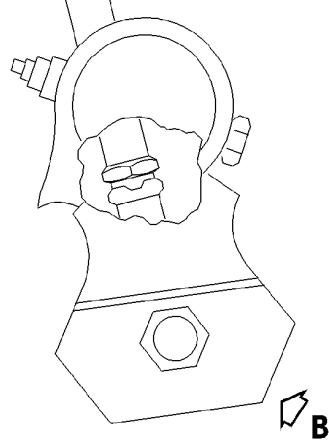
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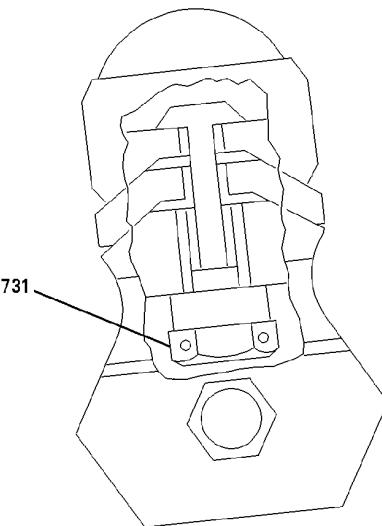


SECTION G-G



SECTION A-A

(IGV)
(CONTINUED)



VIEW B

CAG(IGDS) L-A3301

DB2-75-0156

HPC Stator Vane Actuator And Linkage Assembly (Sheet 3)
Figure 604/75-00-00-990-880

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

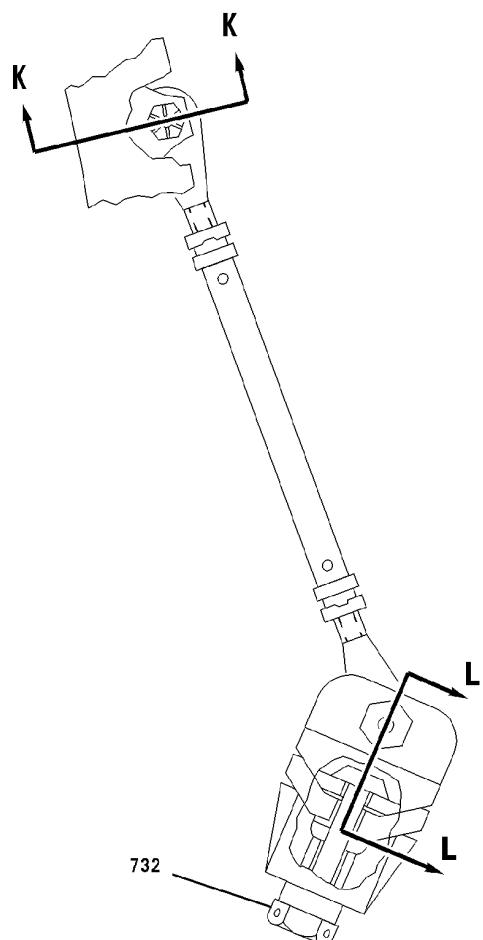
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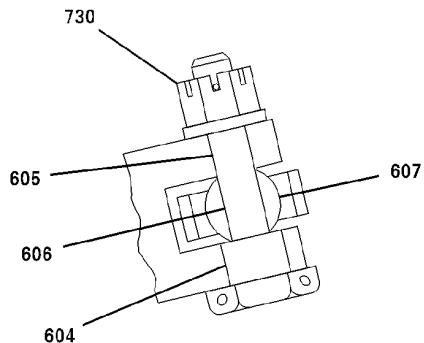
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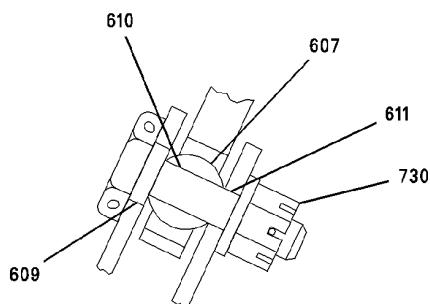
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SECTION B-B
(STAGE 5)



SECTION K-K
(2 LOCATIONS)



SECTION L-L
(TYPICAL AT IGV, AND
STAGES 5, 6, AND 7)

CAG(IGDS) L-A3311

DB2-75-0163

HPC Stator Vane Actuator And Linkage Assembly (Sheet 4)
Figure 605/75-00-00-990-883

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

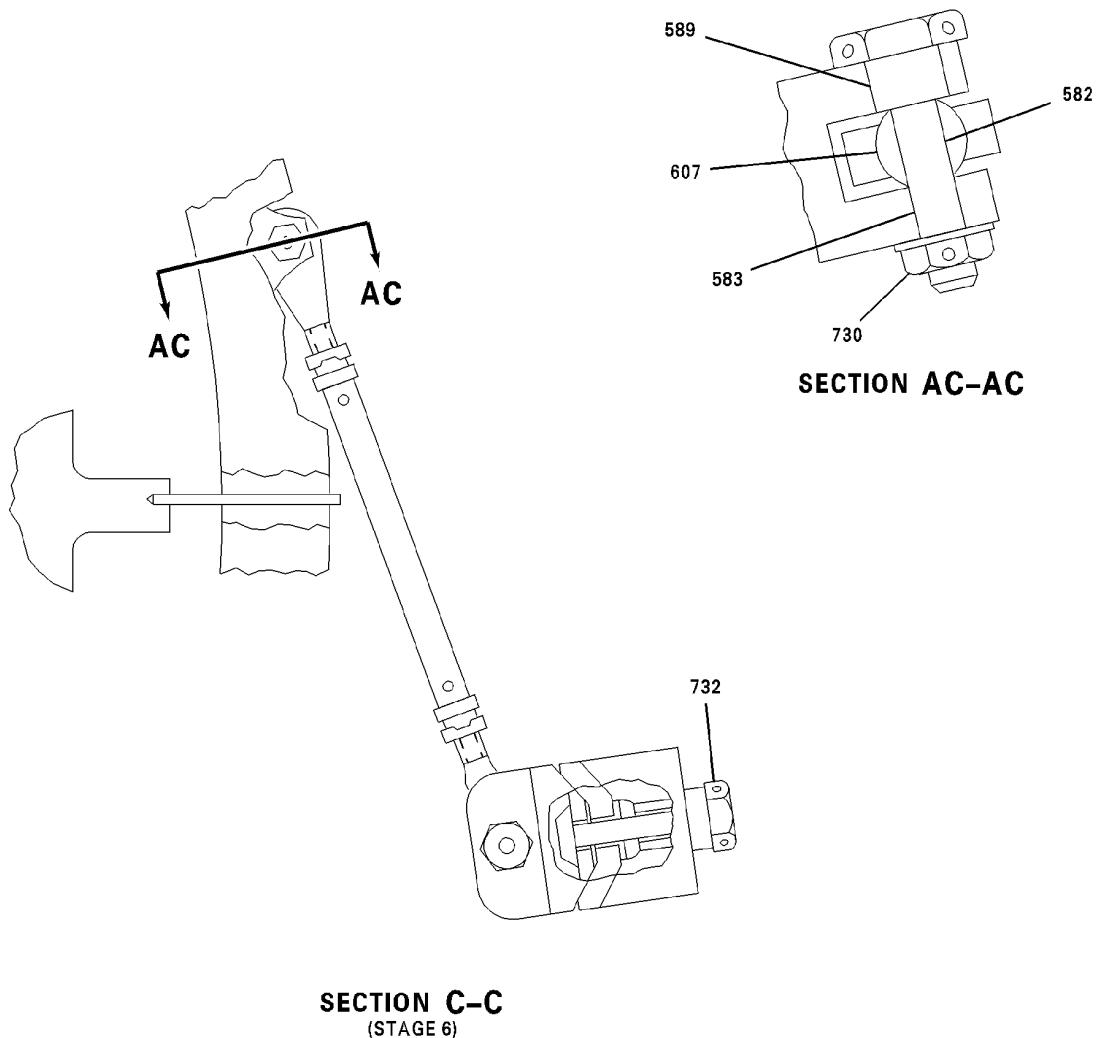
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SECTION C-C
(STAGE 6)

CAG(IGDS) L-A3310

DB2-75-0162

HPC Stator Vane Actuator And Linkage Assembly (Sheet 5)
Figure 606/75-00-00-990-891

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

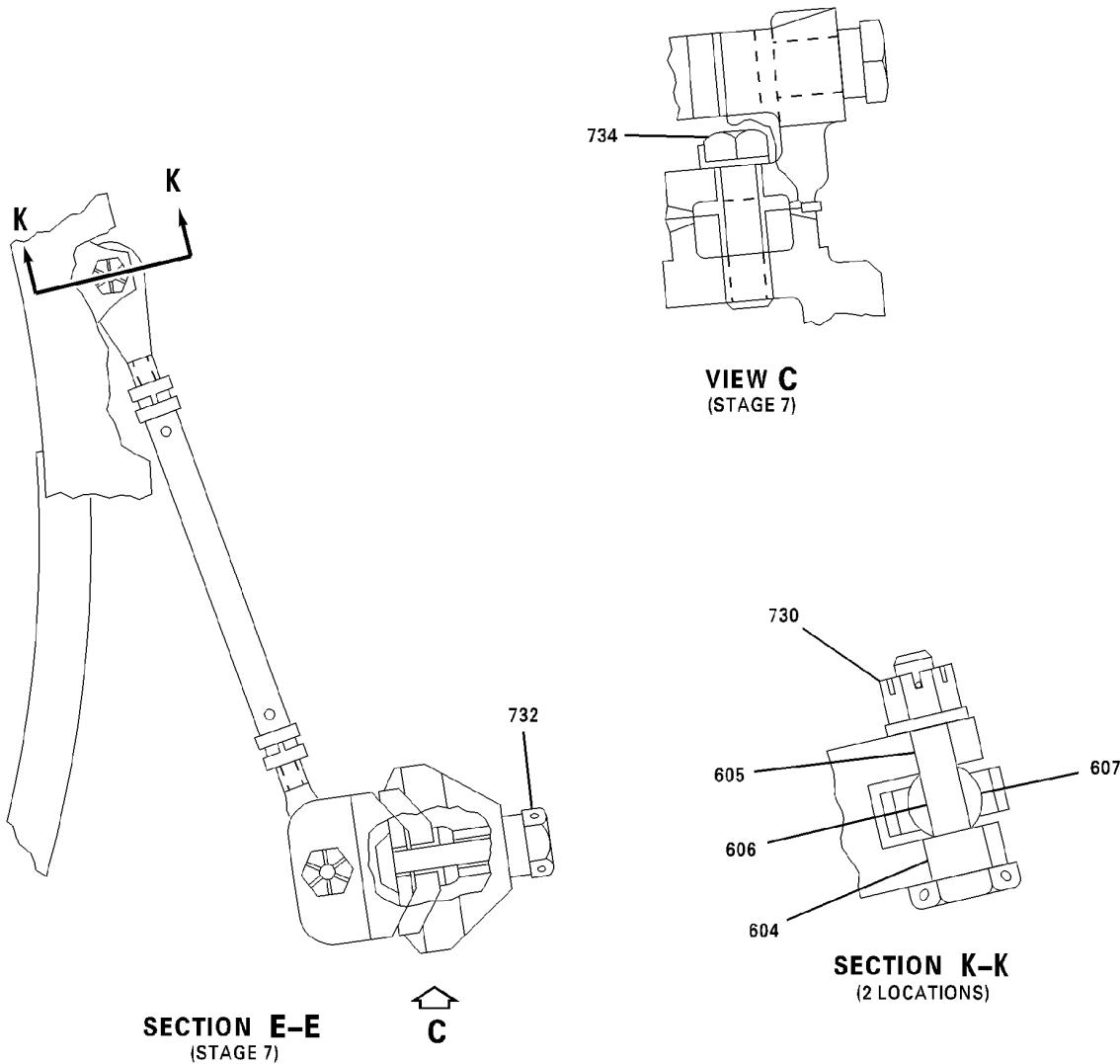
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CAG(IGDS) L-A3306

DB2-75-0158

HPC Stator Vane Actuator And Linkage Assembly (Sheet 6)
Figure 607/75-00-00-990-892

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

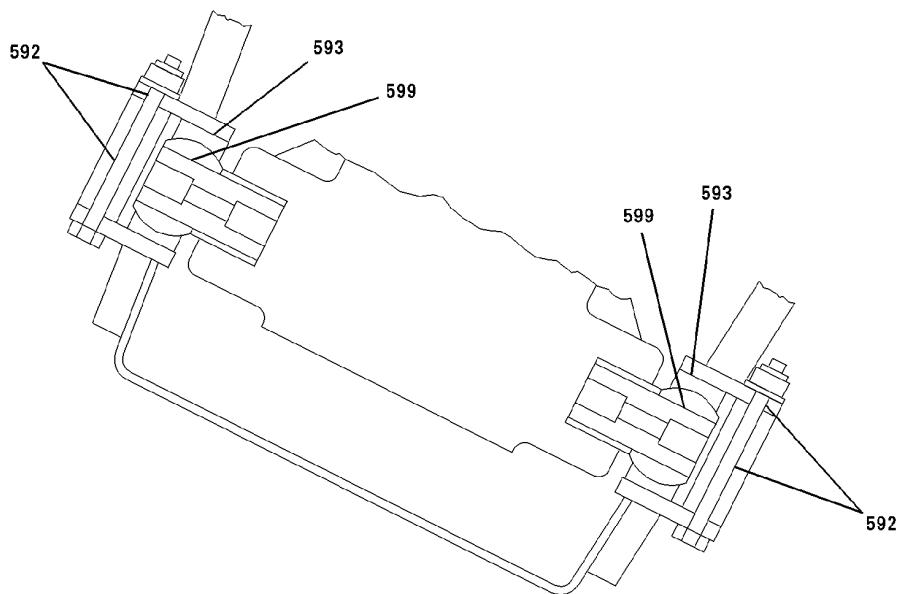
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SECTION U-U

CAG(IGDS) L-A3308

DB2-75-0160

HPC Stator Vane Actuator And Linkage Assembly (Sheet 7)
Figure 608/75-00-00-990-893

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

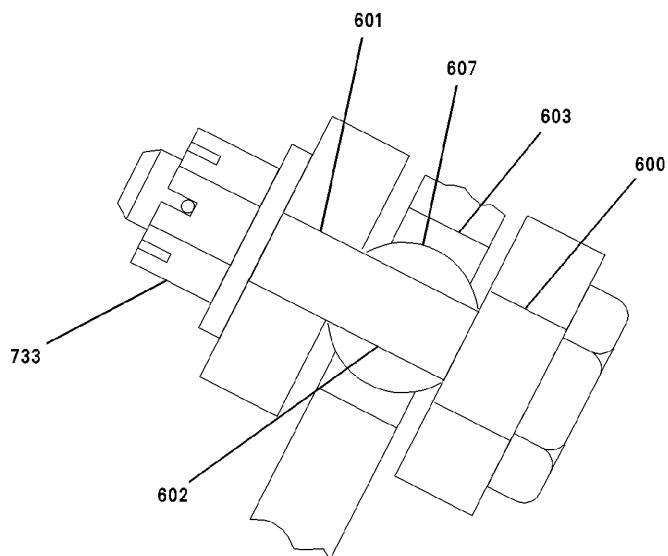
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SECTION R-R

CAG(IGDS) L-A3307

DB2-75-0159

HPC Stator Vane Actuator And Linkage Assembly (Sheet 8)
Figure 609/75-00-00-990-894

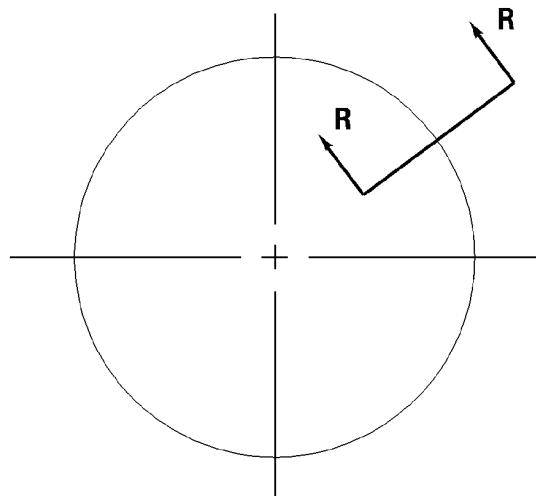
EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

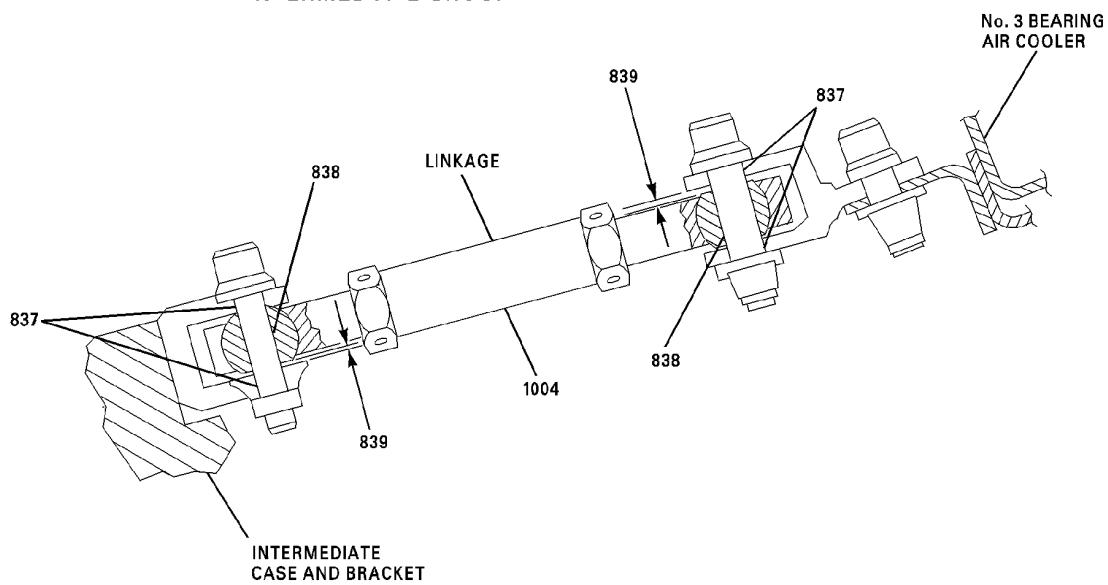
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SCHEMATIC REAR VIEW
INTERMEDIATE GROUP



CAG(IGDS) L-A3296, L-A0989

DB2-75-0343

No. 3 Bearing Air Cooler Linkage/Brackets
Figure 610/75-00-00-990-895

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

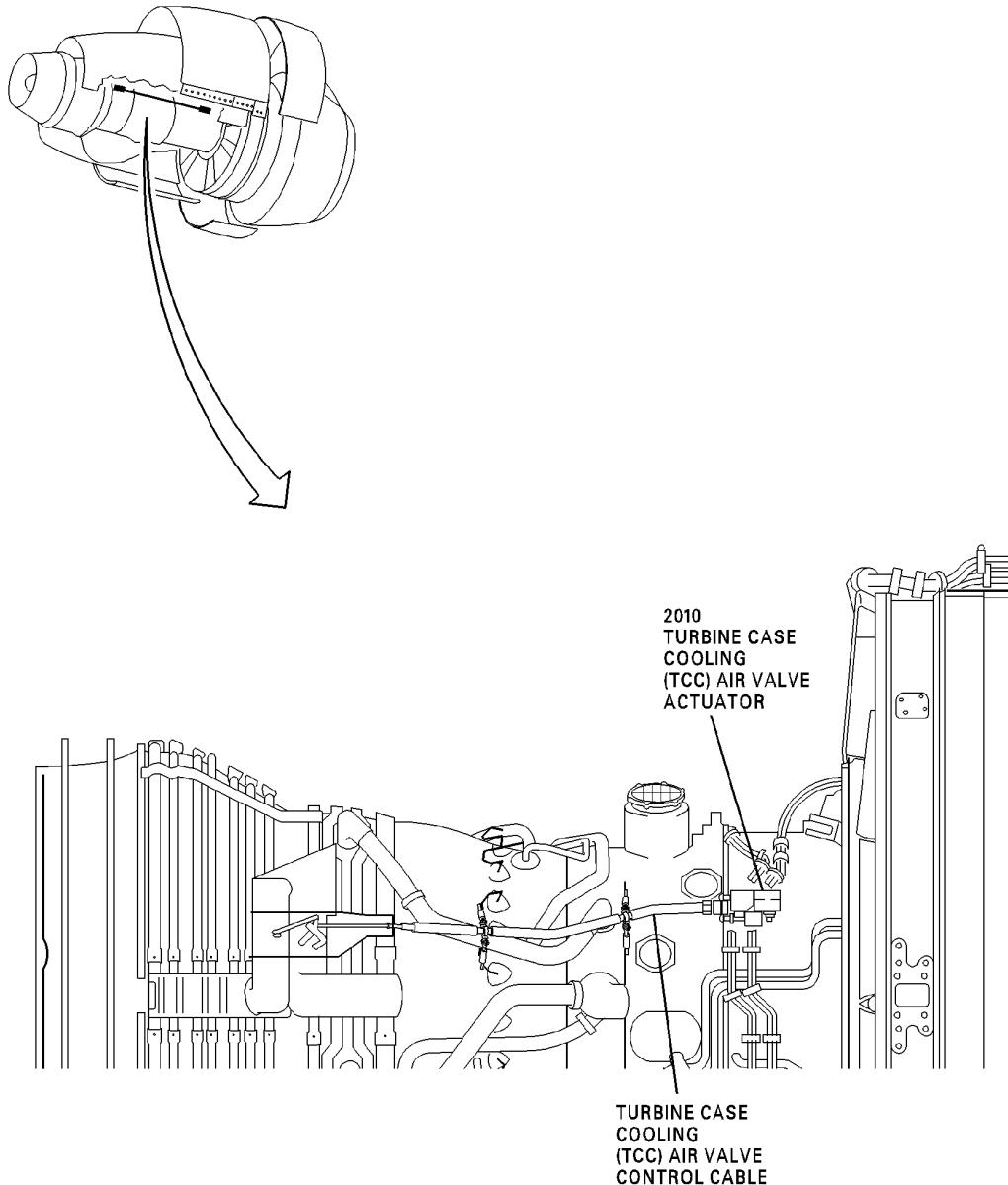
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CAG(IGDS) L-A3297

DB2-75-0278

TCC Valve Actuator
Figure 611/75-00-00-990-900

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-00-00-200-871

3. INSPECTION OF THE ENGINE AIR SYSTEM EXTERNAL TUBES

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 604

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-868	OPEN THE FAN COWL DOORS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-868	CLOSE THE FAN COWL DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Inspect Engine Air System External Tubes

SUBTASK 75-00-00-865-267



MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.



TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

OVERHEAD, BATTERY BUS

Row	Col	Number	Name
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

SUBTASK 75-00-00-010-267

- (2) Open the fan cowl doors. (OPEN THE FAN COWL DOORS, TASK 71-10-00-010-868)

SUBTASK 75-00-00-010-268

- (3) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
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D. Procedure - Engine Air System External Tubes Inspection

SUBTASK 75-00-00-210-267

- (1) Visually examine the engine air system external tubes for damage.

NOTE: This inspection procedure does not require tube removal in order to inspect and verify acceptable tube condition. Air system tube dents are to be considered acceptable for continued service if, visually, the tube Outside Diameter (OD) is seen not to be decreased by more than 20 percent at any particular location.

- (2) The following Inspection Reference Chart is intended to serve as an aid for identifying certain areas and conditions whenever maintenance time permits inspection. Tube inspection should not be accomplished solely on the basis of this chart. The chart does not imply that items or conditions listed are all-inclusive. Experience and judgement will continue to be an important part of any inspection program.

Table 605

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
Cracks	Up to 180 degrees circumferentially or 6.0 in. (152.400 mm) axially if the crack is stop drilled and does not permit air to blow on the case or flange. Up to two cracks per tube or collector. If tubes are found cracked, the TCC system tubes must be inspected for loose and worn clamps. Loose clamps must be tightened and worn clamps must be replaced before the next flight.	Cracked tubes must be replaced at the next A-check.
Holes	Up to 0.05 in. (1.270 mm) diameter permitted if the air exiting the hole does not blow directly on the turbine case or flange. Up to four holes per tube or collector.	Tubes with holes that are more than 0.05 in. (1.270 mm) must be replaced at the next A-check.
Corrosion and Stains	Permitted without restriction.	
Loose Tube Nuts	None permitted.	
Loose or Broken Lockwire	None permitted.	
Nicks, Scratches, Chafing and Pitting	Nicks, scratches, chafing and pitting are permitted with no limit until air leakage occurs. If there is air leakage, treat it as a hole.	
Dents (without sharp edges or corners)	Permitted if the tubing OD is not decreased by more than 20 percent at each location. No dents permitted within 0.25 in. (6.35 mm) or less from the tube ferrule.	
Dents (with sharp edges or corners)	Dents with or without sharp edges or corners are permitted with no limit as long as the tubing OD is decreased by not more than 20 percent at each location.	Tubes dented more than 20 percent must be replaced at the next A-check.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (a) Visually examine the external air system tubes for 0.125 in. (3.175 mm) minimum clearance to adjacent tubes or structure.

NOTE: Minimum clearance between any two adjacent tubes or between one single tube and any other adjacent engine part shall be 0.125 in. (3.175 mm) unless otherwise specified. Exceptions to this clearance requirement are permitted at specific locations where adjacent tubes are clipped together or where other local constraints will prevent tube contact at clearances below 0.125 in. (3.175 mm) minimum.

NOTE: Minimum clearance refers only to clearance relative to tube and not to fittings or other attached hardware.

- (b) Examine the tubes to make sure they are correctly attached at all support locations.
- 1) Replace all worn clamps.
 - 2) Tighten all loose clamp bolts and brackets at all support points along the tube length.
 - 3) Tighten all loose tube fittings.
- (c) Examine the air system tube connections, tube or manifold to component connections, and tube to case boss connections for leaks and loose connections.
- 1) No leaks or loose connections permitted.
 - 2) Make all corrections as necessary.

E. Job Close-up - Engine Air System External Tubes Inspection

SUBTASK 75-00-00-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-00-00-410-267

- (2) Close the fan cowl doors. (CLOSE THE FAN COWL DOORS, TASK 71-10-00-410-868)

SUBTASK 75-00-00-410-268

- (3) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-00-00-865-268

- (4) Remove the safety tags and close these circuit breakers:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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ENGINE COOLING - DESCRIPTION AND OPERATION

1. General

- A. The engine cooling system is used for compressor blade tip clearance which improves engine performance. The system is also used to lower the temperatures in the nacelle area which prevents damage to engine components. The system includes the turbine case cooling system, the high-pressure-compressor (HPC) bore cooling system, and the nacelle compartment cooling system.

2. Turbine Case Cooling

- A. The turbine clearance control system is monitored by the electronic control unit (ECU) and controlled by the hydromechanical unit (HMU). The system uses a high pressure turbine clearance control (HPTCC) valve and a low pressure turbine clearance control (LPTCC) valve. (Figure 1) (Figure 2)
- B. The system controls fan discharge air used for cooling the HPT and LPT cases. The HPT cooling air flows down the right side of the engine through the HPTCC valve to a manifold surrounding the HPT case. The LPT cooling air flows down the left side of the engine through the LPTCC valve to a manifold that goes around the LPT case. Small holes in the inboard side of the manifold blow the fan discharge air against the case.

3. High Pressure Compressor Bore Cooling

- A. The HPC bore cooling system controls the air temperature that flows through the engine bore cavity. This controls the HPC blade clearances. Airflow to the bore (center of the rotor group) is controlled by three solenoid-operated valves. If the valve fails, it will fail in the open position for maximum airflow. Maximum airflow is necessary to prevent blade tip rub when the engine is in operation at low altitudes and maximum power. (Figure 3)
- B. System components are: The fan frame struts, the cooling air valves, air tubes, and the ECU. The ECU monitors the altitude, the fan speed, the compressor inlet temperature, and compressor discharge temperature. The ECU can signal 1 to 3 valves to open or close to maintain blade clearances.

4. Nacelle Core Compartment Cooling

- A. The core compartment cooling system uses fan discharge air to cool the nacelle compartments and engine components. A control valve and an air manifold supply cool air to specified components and locations. The ECU automatically controls the airflow. (Figure 4)

5. Operation

- A. **Turbine Case Cooling:** During engine operation, the ECU receives input about the HPTCC and LPTCC valve positions and other operating parameters. The ECU transmits electrical signals to the HMU. The HMU then changes the electrical signals into a hydraulic command signal which meters fuel that operates the HPTCC and LPTCC valves. The HPTCC and LPTCC valves then modulate the supply of air to the case cooling manifolds. At low altitude operations, minimum airflow is supplied to the case cooling manifolds. At higher altitude operation, the airflow to the manifolds is increased, which causes the HPT case to cool and shrink. This shrinkage closes blade tip to shroud clearances, and increases engine performance.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-20-00

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- B. HPT Bore Compartment Cooling: The bore cooling system uses airflow that enters the leading edge slots of five fan frame struts (No. 1, 4, 6, 9, and 10). A constant airflow flows to the engine bore cavity through struts No. 1 and No. 9. Airflow to the outer fan frame goes through struts No. 4, No. 6 and No. 10. On the outside of the fan frame, the airflow flows into pipes and then through the three independently controlled air valves. The airflow from strut No. 4 goes to strut No. 2. Airflow from strut No. 6 goes into strut No. 8. Strut No. 10 airflow goes to strut No. 12. The airflow from struts No. 8, No. 10, and No. 12 goes to the engine bore cavity. There are four levels of airflow: all valves closed, all valves open, and one or two valves open.
- C. Core Compartment Cooling: Fan discharge air is moved to the core compartment for cooling. Core compartment cooling is reduced at high altitude by the cooling air control valve. The normal position of the valve is full open. Air pressure which is controlled by an electrical solenoid valve is used to move the valve to the reduced airflow position. The electrical signal and solenoid valve also operates the 11th stage bleed control valve. In case of system failure, the valve goes to the high flow position to permit maximum cooling flow to the core compartment. This air bleeds overboard from the compartments through the engine thrust reverser and core cowl doors.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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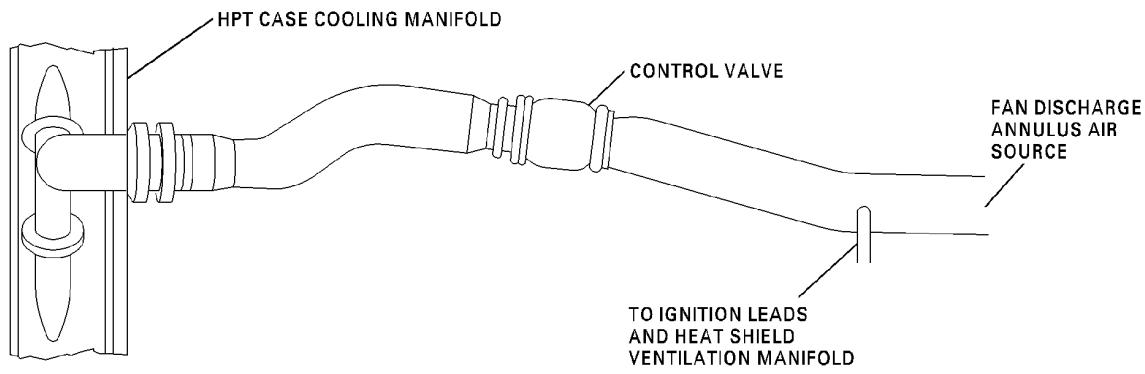
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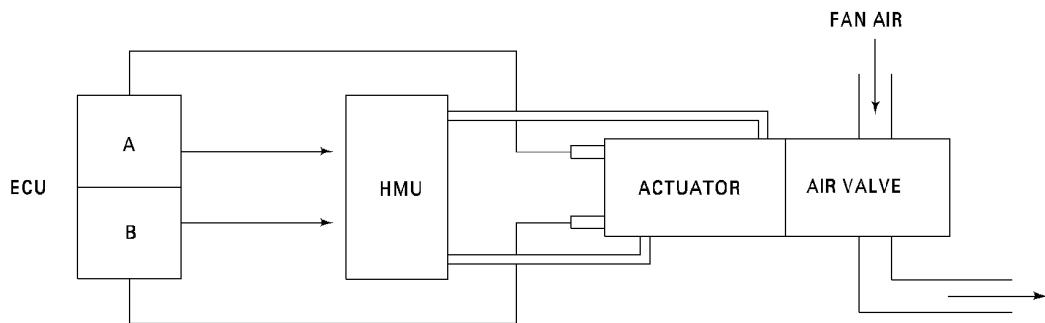
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RIGHT SIDE



CAG(IGDS)

DB2-75-0204

Turbine Case Cooling Diagram
Figure 1/75-20-00-990-801

EFFECTIVITY
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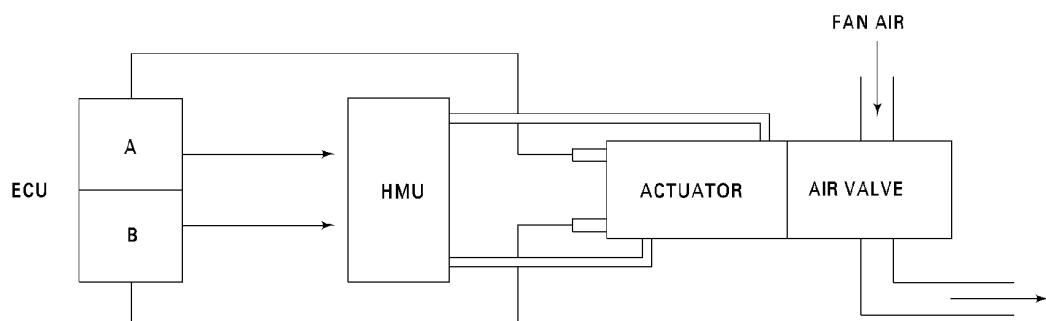
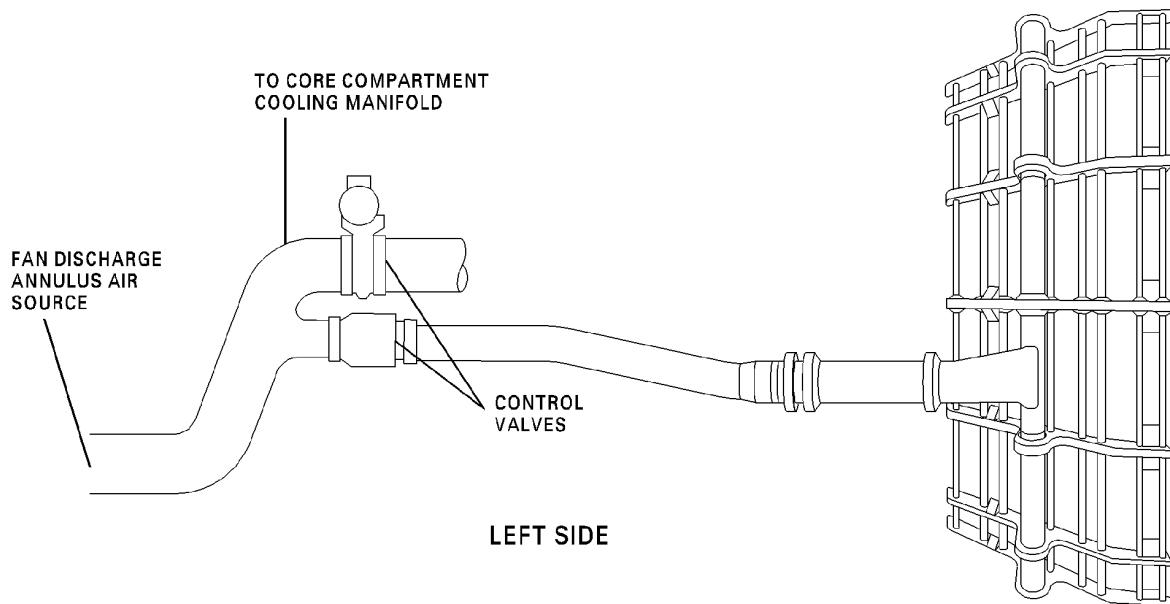
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CAG(IGDS)

DB2-75-0205

Turbine Case Cooling Diagram
Figure 2/75-20-00-990-802

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-20-00

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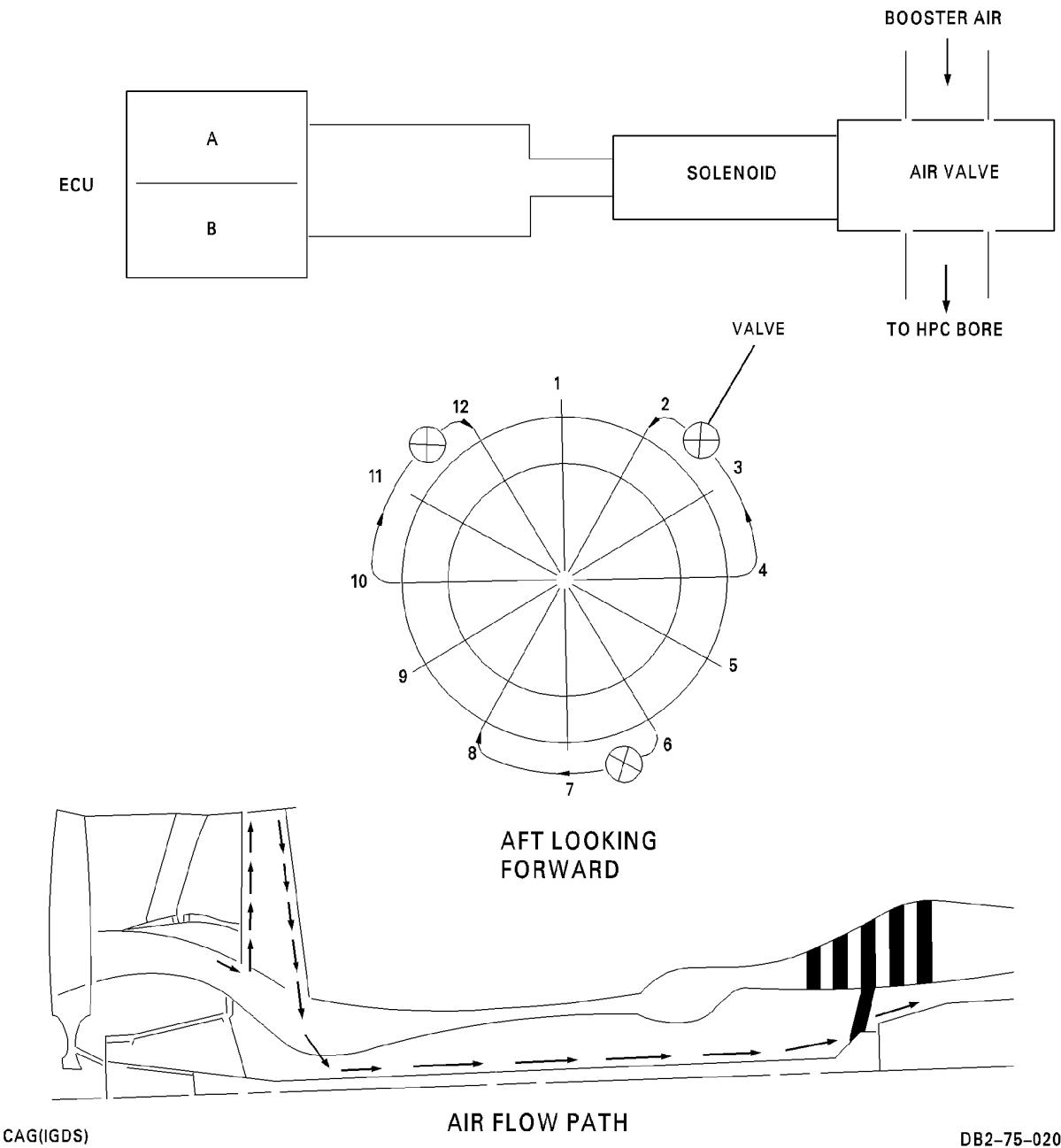
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HPC Bore Cooling
Figure 3/75-20-00-990-803

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

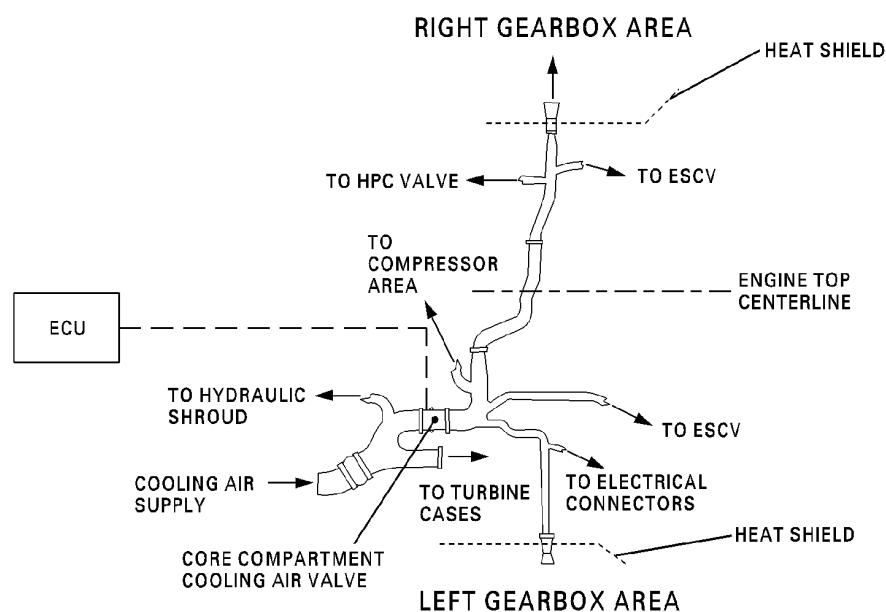
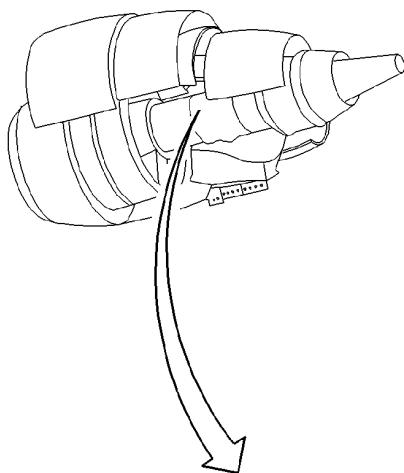
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CAG(IGDS)

DB2-75-0199A

Core Compartment Cooling
Figure 4/75-20-00-990-804

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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COOLING - DESCRIPTION AND OPERATION

1. General

- A. The engine cooling air flow is used to improve compressor and turbine blade tip clearance for increased engine performance over a wide range of operations. The system uses a high pressure compressor (HPC) secondary flow control, turbine case cooling (TCC), nacelle core compartment cooling, turbine blade and vane cooling (TBAV), and the No. 3 bearing buffer air cooler.

2. HPC Secondary Flow Control System

- A. The HPC secondary flow control system supplies high temperature compressor air to the high compressor drum rotor compartment. This airflow is used to improve compressor blade tip clearance. The system has two HPC secondary flow control valves, two HPC secondary flow control solenoid valves and two 15th stage air (PS3) filters. The left solenoid valve controls the left HPC secondary flow control valve and the turbine vane and blade cooling air valve. The right solenoid controls the right HPC secondary flow control valve and the integrated-drive-generator-system (IDGS) air/oil heat exchanger valve. The two solenoid valves receive control signals, as a function of high rotational speed (N2) and altitude, from the electronic engine control (EEC). (Figure 1)

3. Engine Turbine Case Cooling System (TCCS)

- A. The turbine case cooling system (TCCS) uses fan discharge air pointed at the outside of the high and low pressure turbine cases to improve engine operation and performance. The TCCS air valves are mechanically operated by an electronic engine control (EEC) controlled hydraulic actuator. The hydraulic actuator sends a position feedback signal to the EEC. This signal gives a system alert to the crew if the actuator is in the open valve position when scheduled to be closed. If it is in the closed position when it is scheduled to be open, a message is kept in the EEC. (Figure 2)

4. Nacelle Core Compartment Cooling

NOTE: The data that follows is for engines before Conf-02B.

- A. Nacelle core compartment cooling uses an axial spray bar ventilation system. The system has two cooling air ducts (spray bars) and two valves, one installed on each thrust reverser inner barrel. The function of the system is to supply engine fan air throughout the engine core. (Figure 3) (Figure 4)

NOTE: The data that follows is for engines after Conf-02B.

- B. Nacelle core compartment cooling uses nacelle cooling valves, muscle lines and a solenoid valve installed on each thrust reverser door to cool the core compartment. The solenoid valve is installed at the top of the thrust reverser door and is connected to two nacelle cooling valves with muscle lines. The nacelle core compartment cooling system uses engine fan air to cool the engine core compartment during climbs and takeoffs. (Figure 5)

NOTE: The data that follows is for engines before and after Conf-02B.

5. Engine Bearing Cooling System

- A. No. 3 bearing compartment cooling uses a No. 3 bearing compartment heat shield and a buffer bearing cooling system. The system has a No. 3 bearing buffer air cooler. The air cooler is installed in the intermediate case at the 2 o'clock position. The buffer cooling system supplies cool, pressurized air to the front and rear carbon seal of the No. 3 bearing. (Figure 6)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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6. System Operation

- A. HPC Secondary Flow Control: The EEC sets a schedule to close the valve by the N2 speed and altitude input signals. The valves close during climb as N2 decreases and altitude increases. The valves are spring-loaded open and stay open with loss of pneumatic pressure or EEC power. The two HPC secondary flow control valves will close with 28 vdc power and a minimum of 3 PSI (20.6 kPa) pressure from 15th stage air. As the HPC secondary flow control valve opens, 9th stage air released from the HPC goes in the rear of the HPC rotor. This air makes the rotor cool and prevents compressor blade-tip rub with the HPC case.
- B. Turbine Case Cooling: The TCCS air valve actuator is hydraulically operated and mechanically modulates the high and low pressure TCC air butterfly valves. The valve actuator linear control is transmitted to the valve by a (push-pull) control cable. The high pressure turbine (HPT) and low pressure turbine (LPT) TCCS air shutoff valves supply cooling air externally to the HPT and LPT cases. The cooling air improves turbine blade-to-case clearances and lowers LPT case temperature at takeoff power settings.

NOTE: The data that follows is for engines before Conf-02B.

- C. Nacelle Core Compartment Cooling (before Conf-02B): The intake to the left spray bar is an outtake of the precooler duct. The right side has an intake in the upper quadrant of the inner barrel. The supply of engine fan air to each spray bar is controlled by a pneumatically-actuated solenoid-operated shutoff valve. The valve is spring loaded (failed) to the closed position. Pneumatic pressure to open the valve is supplied by the 15th stage engine bleed air when the shutoff valve solenoid is energized by the electronic engine control (EEC). The EEC gives the logic to open the nacelle cooling valve.

NOTE: The data that follows is for engines after Conf-02B.

- D. Nacelle Core Compartment Cooling (after Conf-02B): The nacelle core compartment cooling system is controlled by the engine electronic control (EEC). The EEC energizes and opens the solenoid valve during takeoffs and climbs. When the solenoid valve opens, ECS high pressure air flows through the solenoid valve and muscle lines to the nacelle shutoff valves. The high pressure air opens the nacelle cooling valves and air from the fan stream is sent through the nacelle cooling valves to cool the core compartment. When the solenoid is de-energized, the valve is closed by a return spring and stops the ECS high pressure air to the nacelle shutoff valves. When the ECS high air pressure is removed, the nacelle shutoff valves open and close with fan duct pressure.

NOTE: The data that follows is for engines before and after Conf-02B.

- E. No. 3 Bearing Buffer Air Cooler: The No. 3 bearing buffer air cooler receives 12th stage HPC bleed air and moves it through a heat exchanger that is cooled by fan discharge air. The cooled air then goes back to the diffuser case to cool and insulate the No. 3 bearing compartment.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-20-00

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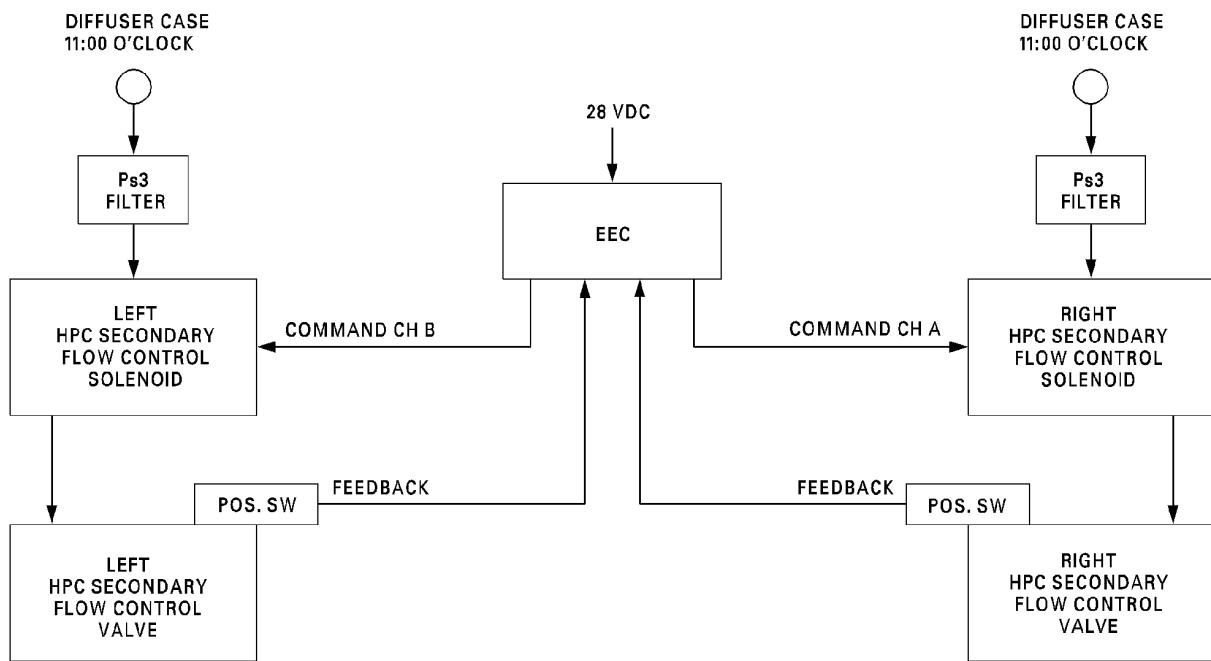
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CAG(IGDS)

DB2-75-0183

HPC Secondary Flow Control Diagram
Figure 1/75-20-00-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-20-00

Config 2

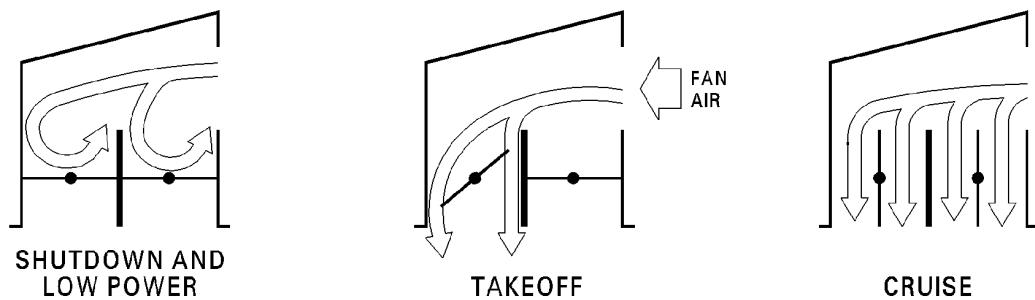
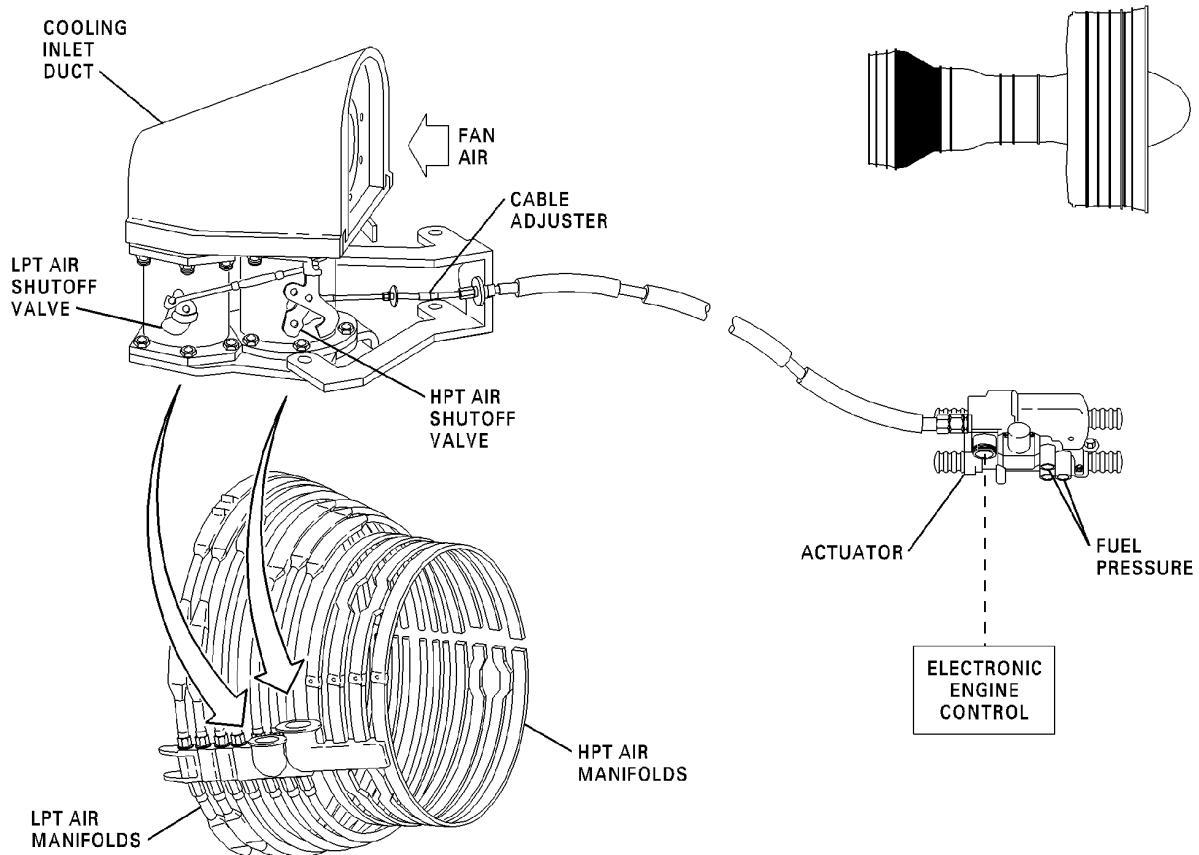
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CAG(IGDS)

DB2-75-0170

Turbine Case Cooling Air Control
Figure 2/75-20-00-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-20-00

Config 2

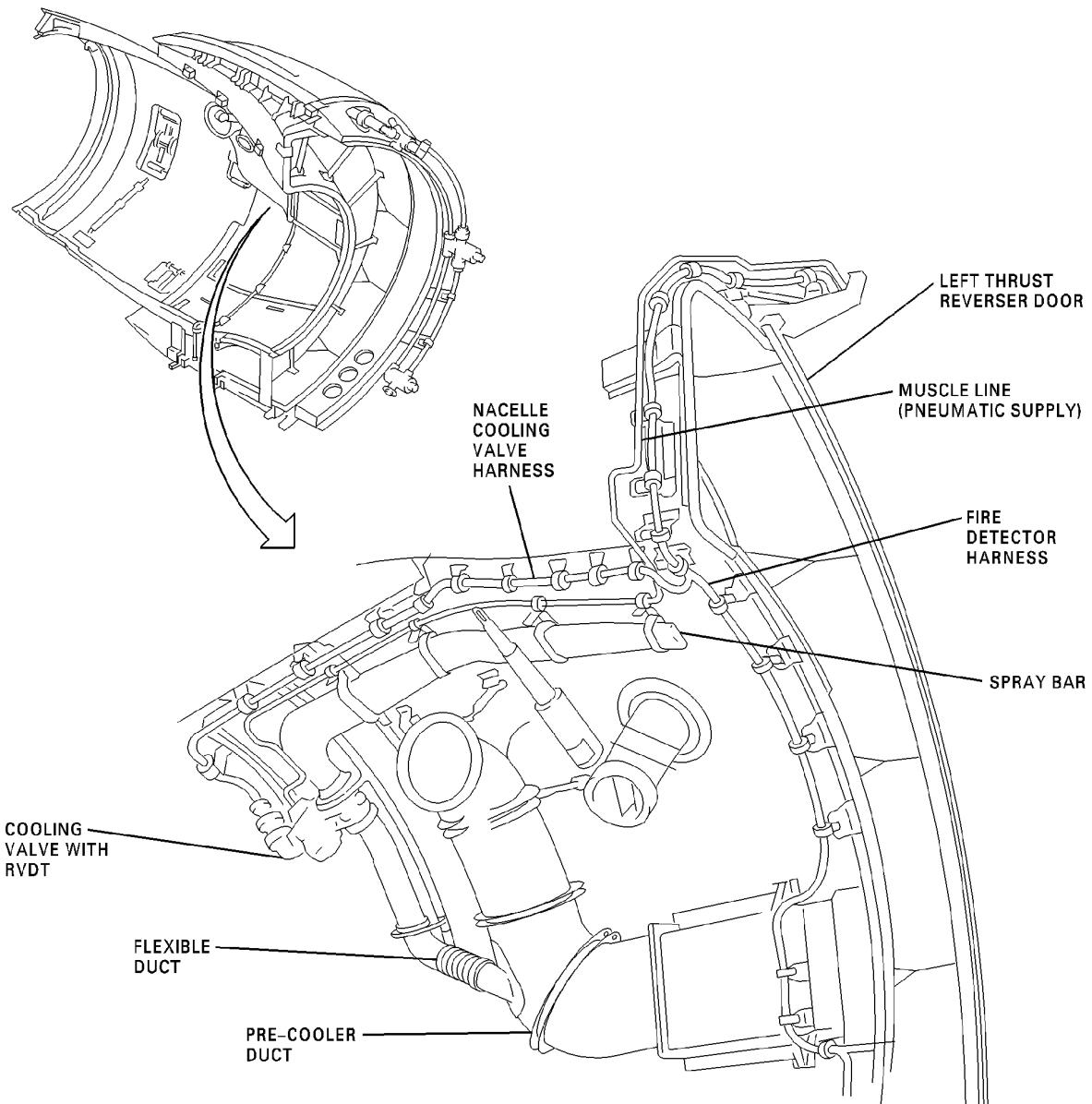
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CAG(IGDS)

DB2-75-0153C

Left Nacelle Core Compartment Cooling System
Figure 3/75-20-00-990-871

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

75-20-00

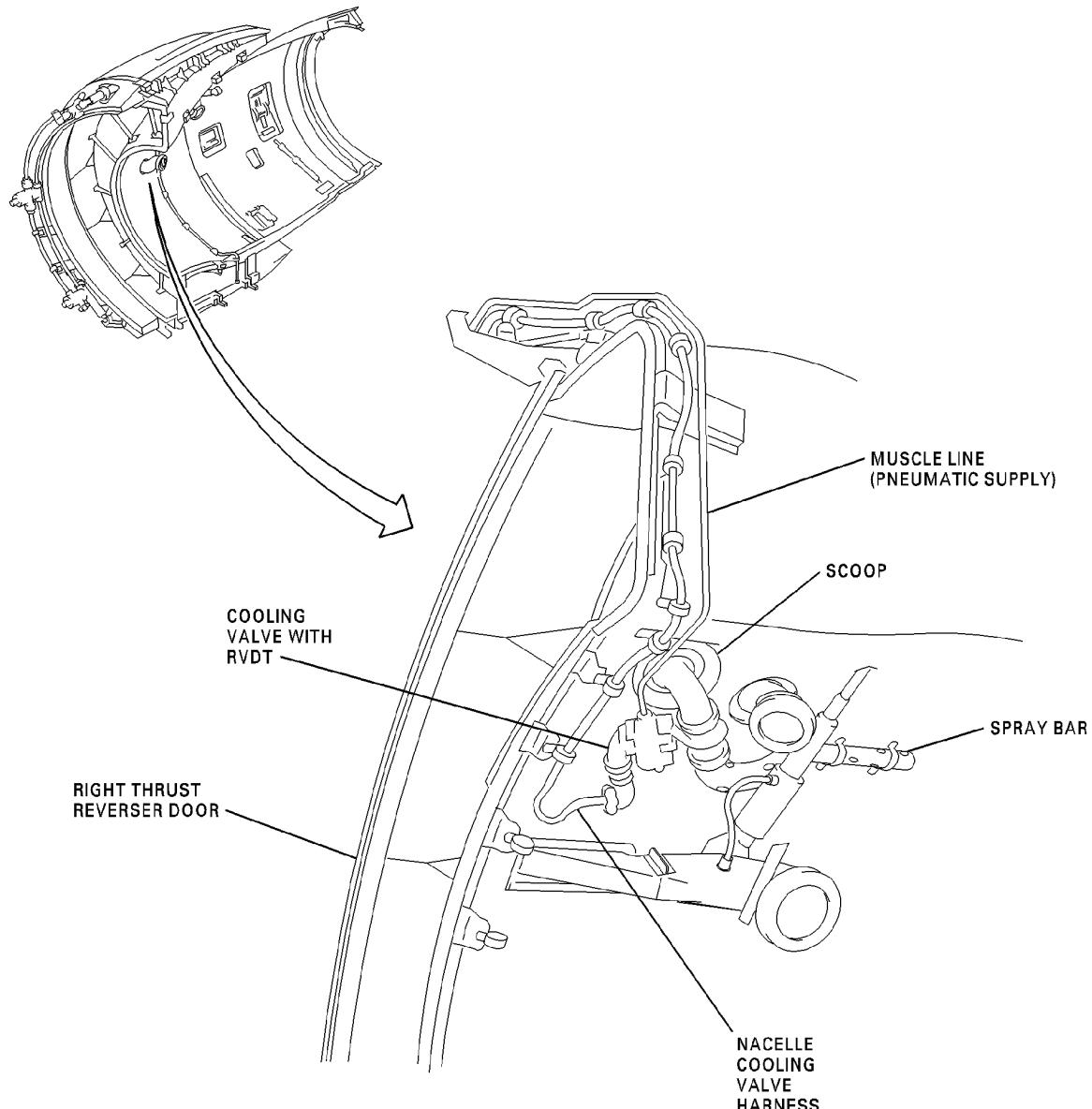
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CAG(IGDS)

DB2-75-0157C

Right Nacelle Core Compartment Cooling System
Figure 4/75-20-00-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

75-20-00

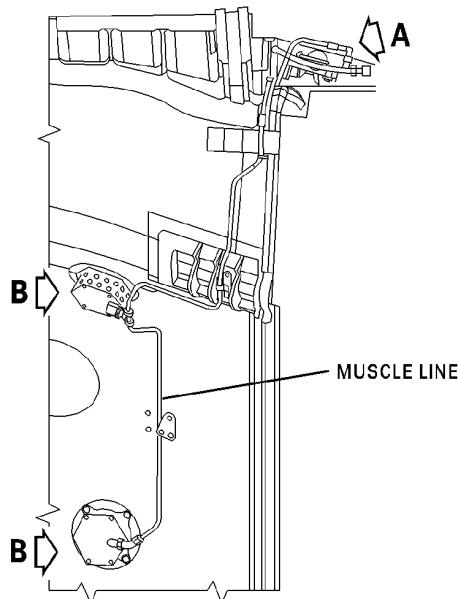
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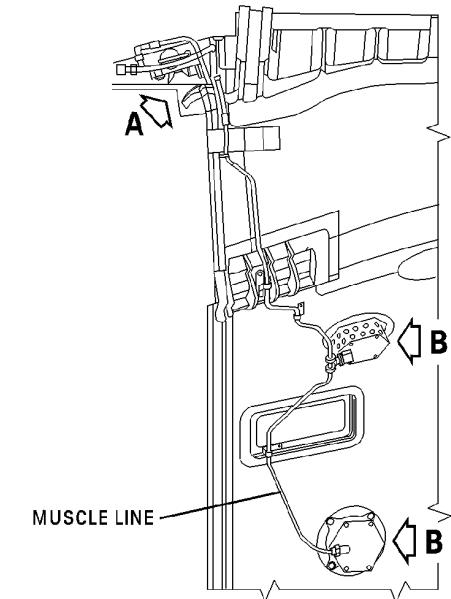
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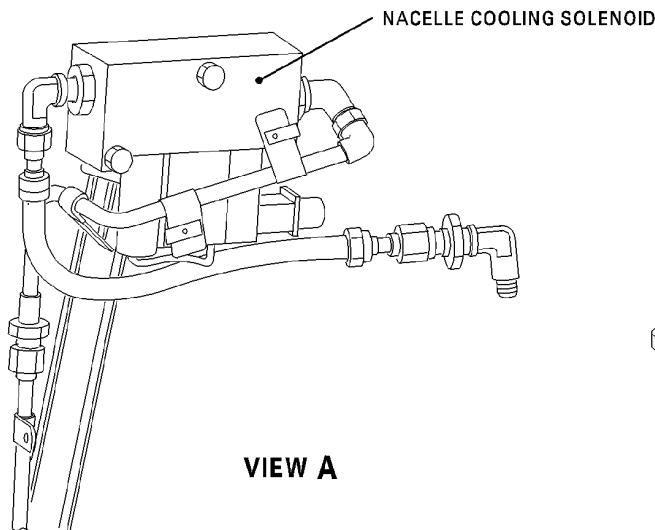
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LEFT THRUST REVERSER DOOR
(VIEW FROM INBOARD)

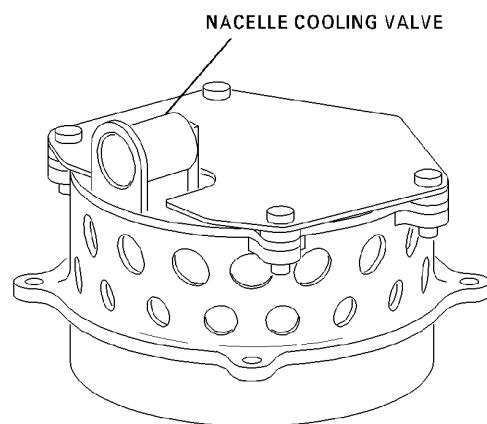


RIGHT THRUST REVERSER DOOR
(VIEW FROM INBOARD)



CAG(IGDS)

VIEW A



CONF-02B

VIEW B

DB2-75-0302B

Nacelle Core Compartment Cooling System
Figure 5/75-20-00-990-873

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

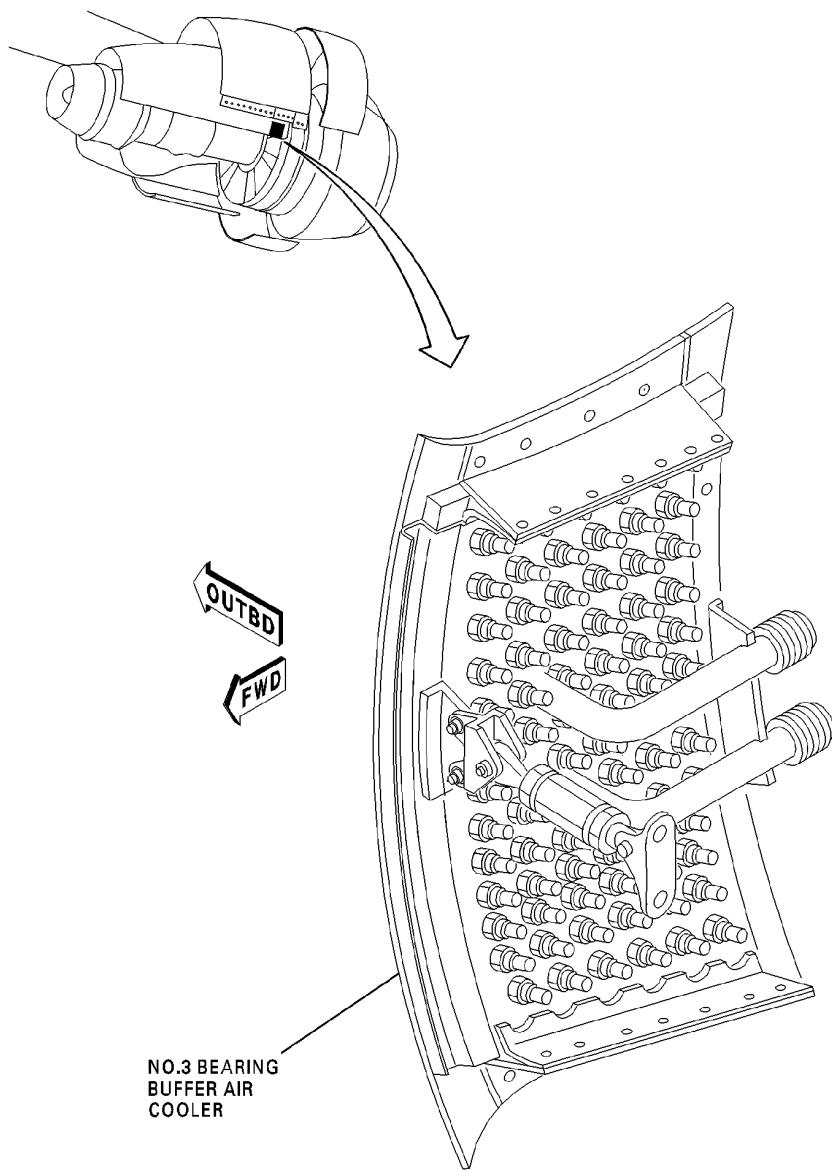
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CAG(IGDS)

DB2-75-0229

No. 3 Bearing Buffer Air Cooler
Figure 6/75-20-00-990-874

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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ENGINE BEARING COOLING SYSTEM - DESCRIPTION AND OPERATION

1. General

- A. The No. 3 bearing compartment heat shield and buffer system are used to cool the No. 3 bearing compartment. The No. 3 bearing compartment heat shield and buffer system includes the No. 3 bearing buffer air cooler.

2. No. 3 Bearing Buffer Air Cooler

- A. The No. 3 bearing buffer air cooler is installed on the intermediate case at the 2 o'clock position. The cooler is attached to the intermediate case with eight screws and a midspan support. Classified spacers are installed between the cooler and the intermediate case to give the cooler an even fit. The cooler is sealed at the edges after installation with silicone rubber sealant. (Figure 1)

3. System Operation

- A. The cooler receives 12th-stage high pressure compressor (HPC) bleed air and sends it through a heat exchanger that is cooled by fan discharge air. The cooled 12th-stage air then goes back to the diffuser case where it is cooled and used to from its environment of HPC discharge air. Without cooled air, the bearing compartment can have temperatures as high as 1000°F (538°C). As the buffer air goes into the bearing compartment outer cavity, it is cooled again as it scrubs the sump wall. The air then goes into the bearing compartment inner cavity where it is mixed with 15th-stage air.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631, 642-645

75-21-00

Config 2

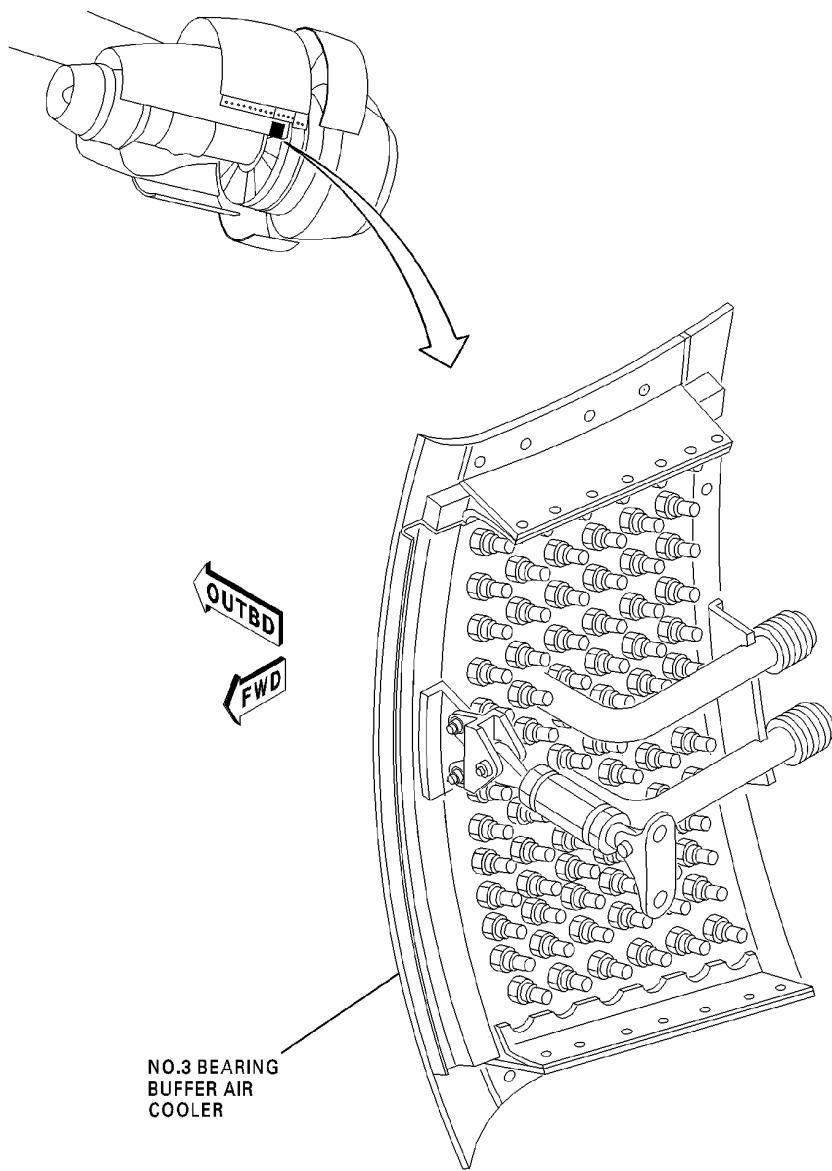
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CAG(IGDS)

DB2-75-0229

No. 3 Bearing Buffer Air Cooler
Figure 1/75-21-00-990-890

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-21-00

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AIR COOLER, NO. 3 BEARING BUFFER - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the No. 3 bearing buffer air cooler. The cooler is installed in the intermediate case at the 2 o'clock position. Access to the air cooler is through the right thrust-reverser door.
- B. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-21-01-000-868

2. REMOVAL OF THE NO. 3 BEARING BUFFER AIR COOLER

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs
Not specified	Non-metallic scraper

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - No. 3 Bearing Buffer Air Cooler Removal

SUBTASK 75-21-01-010-267

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - No. 3 Bearing Buffer Air Cooler Removal

SUBTASK 75-21-01-020-267

- (1) Remove the No. 3 bearing buffer air cooler (1) as follows: (Figure 401)



WARNING DO NOT TOUCH THE COMPONENT WHEN YOU DO A TEST FOR HEAT.
THE COMPONENT WILL BE VERY HOT. IF YOU TOUCH THE
COMPONENT, IT CAN CAUSE BAD BURNS TO YOUR SKIN.

- (a) Let the engine cool after shutdown then test the No. 3 bearing air cooler (1) and tube nuts (2) and tubes for heat.
- (b) If there is sealant (PWA 36003-2) around the edges of the No. 3 bearing buffer air cooler (1), cut the sealant.
- (c) Disconnect the two tube nuts (2) from the cooler (1). Install the protective caps and plugs.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (d) Remove the eight screws (3) that attach the cooler (1) to the intermediate case.
- (e) Remove the two bolts (4) and the nuts (4A) that attach the cooler (1) to the mount bracket (5). Remove the cooler and classified spacer (6) from the engine.
NOTE: Keep the classified spacer with the cooler assembly.
- (f) Using a non-metallic scraper, remove the remaining sealant from the cooler (1) and the intermediate case.

SUBTASK 75-21-01-030-267

- (2) If necessary, remove the midspan support (7) as follows: (Figure 401)
 - (a) Remove the bolt (8) and nut (8A) that attach the outer rod end bearing (9) to the mount bracket (5). Remove the mount bracket.
 - (b) Loosen the outer nut (10) and remove the outer rod end (9) from the strut (11). Remove the outer nut from the outer rod end.
 - (c) Loosen the inner nut (12) and remove the strut (11). Remove the nut from the inner rod end (13).
 - (d) Remove the nut and bolt (14 and 15) that attach the inner rod end bearing (13) to the bracket (16) on the intermediate case.

SUBTASK 75-21-01-030-268

- (3) (Post SB PW4ENG 72-433). If necessary, remove the axial supports (18) along the axial edge of the cooler (1) as follows: (Figure 401)
 - (a) Remove the fourteen bolts (19) and nuts (20) that attach the axial supports (18) to the cooler (1).
 - (b) Remove the axial supports (18).

SUBTASK 75-21-01-410-267

- (4) If the No. 3 bearing buffer air cooler (1) is not installed immediately, or weather conditions make it necessary, close the access doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ———

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-21-01

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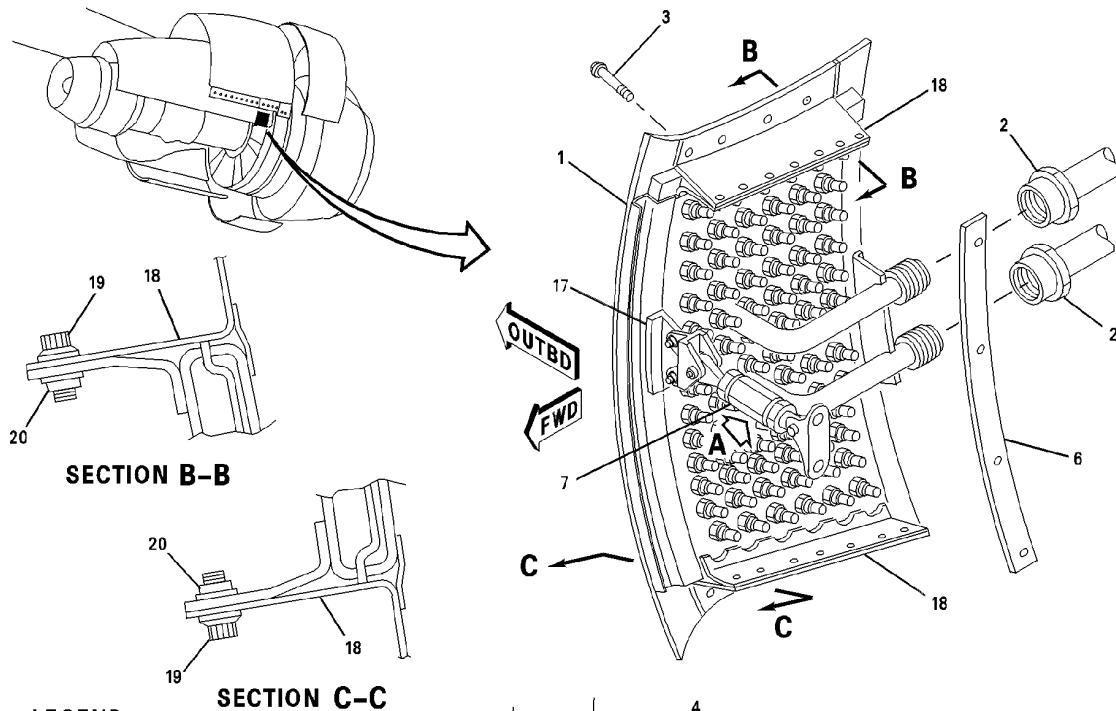
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LEGEND:

- 1. AIR COOLER
- 2. TUBE NUT
- 3. SCREW
- 4. BOLT
- 4A. NUT
- 5. MOUNT BRACKET
- 6. CLASSIFIED SPACER
- 7. MIDSPAN SUPPORT
- 8. BOLT
- 8A. NUT
- 9. OUTER ROD END BEARING
- 10. OUTER NUT
- 11. STRUT
- 12. INNER NUT
- 13. INNER ROD END BEARING
- 14. NUT
- 15. BOLT
- 16. MOUNT BRACKET
- 17. MOUNT BRACKET
- 18. AXIAL BRACKET SUPPORT
- 19. BOLT
- 20. NUT

CAG(IGDS)

DB2-75-0227A

No. 3 Bearing Buffer Air Cooler - Removal/Installation
Figure 401/75-21-01-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-21-01-400-868

3. INSTALLATION OF THE NO. 3 BEARING BUFFER AIR COOLER

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 5-150 in-lb (0.56-17.0 N·m)
Not specified	Torque wrench, 150-1000 in-lb (17.0-113.0 N·m)

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)
P06-003	Compound, antigalling (PWA 586)
P09-027	Sealant, silicone rubber (PWA 36003-2)
P11-014	Alcohol, isopropyl
P05-036	Cheesecloth, unsized
AS3214-02	Lockwire

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-01-700-868	ENGINE PNEUMATIC SYSTEM LEAK TEST, PRIMARY (ADJ/TEST 01) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - No. 3 Bearing Buffer Air Cooler Installation

SUBTASK 75-21-01-010-271

- (1) If necessary, open the access doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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E. Procedure - No. 3 Bearing Buffer Air Cooler Installation

SUBTASK 75-21-01-420-267

- (1) Install the No. 3 bearing buffer air cooler (1) as follows: (Figure 402)
 - (a) If a new cooler (1) is being installed, do the steps that follow:
 - 1) Attach the classified spacer (6) from the removed cooler (1) and the new cooler to the intermediate case.
NOTE: Use work screws to attach the classified spacer and the cooler until the correct spacer is found. Work screws are not used in the completed installation.
 - 2) Measure the distance between the trailing edge of the cooler (1) and the intermediate case. These surfaces must be even within 0.080 in (2.032 mm). Use the classified spacer (6) that gives the correct measurement.
 - 3) Remove the cooler (1), and the spacer (6) from the intermediate case.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) (Post SB PW4ENG 72-433). If removed, lubricate the threads of the bolts (19) with engine oil (P03-001). Attach the two axial supports (18) to the cooler (1) with the bolts (19) and nuts (20). Tighten the nuts and bolts with your hand. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868) (Figure 401)
- (c) Lubricate the threads of the inner rod end bearing (13) with the engine oil (P03-001).
- (d) Assemble the strut (11), inner rod end bearing (13) and the inner nut (12).
- (e) Adjust the inner rod end bearing (13) to 1.0 in. (25.40 mm). Tighten the inner nut (12) with your hand.
- (f) Lubricate the threads of the bolt (15) with the engine oil (P03-001). Install the inner rod end bearing (13) on the mount bracket (16) with the bolt and nut (14). Torque the nut (14) to 85–95 in-lb (9.6–10.7 N·m).
- (g) Remove the protective caps and plugs from the cooler (1) and the tube nuts (2).
- (h) Lubricate the threads of the bolts (4) with the engine oil (P03-001). Attach the mount bracket (5) to the mount bracket (17) on the cooler (1) with the bolts (4) and nuts (4A). Tighten the bolts with your hand.
- (i) (Pre SB PW4ENG 72-433). Put the cooler (1) and the classified spacer (6) in the correct position on the intermediate case.
 - 1) Lubricate the threads of the screws (3) with the engine oil (P03-001). Attach the cooler (1) to the intermediate case with the eight screws. Torque the screws to 36–40 in-lb (4.1–4.5 N·m).
 - 2) Measure the distance between the trailing edge of the cooler (1) and the intermediate case. These surfaces must be even within 0.080 in. (2.032 mm). Use the classified spacer (6) that gives the correct measurement.
- (j) Lubricate the threads of the outer rod end bearing (9) with the engine oil (P03-001).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (k) Install the outer rod end bearing (9) and the outer nut (10) on the strut (11). Tighten the outer nut with your hand.
- (l) Lubricate the threads of the bolt (8) with the engine oil (P03-001). Install the outer rod end bearing (9) on the mount bracket (5) with the bolt (8) and nut (8A). Tighten the bolt with your hand.
- (m) Examine the inspection holes in the strut (11). Blockage indication of the holes by the rod end bearings (9 and 13) shows correct installation.
- (n) Torque the nuts (10 and 12) to 75-85 in-lb (8.5-9.6 N·m). Safety the nuts with lockwire (AS3214-02). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (o) Torque the bolt (8) that attaches the outer rod end bearing (9) to the bracket (5) to 85-95 in-lb (9.6-10.7 N·m).
- (p) Torque the bolts (4) that attach the mount bracket (5) to the mount bracket (17) to 85-95 in-lb (9.6-10.7 N·m).
- (q) (Post SB PW4ENG 72-433). For coolers (1) with bolts (19) and nuts (20) in the axial brackets (18), do the steps that follow: (Figure 401) (Figure 403)
 - 1) Loosen the fourteen bolts and nuts (19 and 20) on the axial brackets (18) of the cooler (1).
 - 2) Attach the classified spacer (6) and the cooler (1) to the intermediate case.
 - 3) Measure the distance between the trailing edge of the cooler (1) and the intermediate case. These surfaces must be even within 0.080 in. (2.032 mm). If necessary, get a new classified spacer (6) to get the correct fit.
 - 4) Torque the bolts and nuts (19 and 20) to 85-95 in-lb (9.6-10.7 N·m)
 - 5) Lubricate the eight screws (3) with engine oil (P03-001). Attach the cooler (1) to the intermediate case with the eight screws. Torque the screws to 36-40 in-lb (4.1-4.5 N·m).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1022, SILICONE RTV (DMS QPL 1799)

HAZMAT 1000, REFER TO MSDS

- (r) Apply silicone rubber sealant (P09-027) at the sides and trailing edge of the cooler (1) as follows: (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1030, ISOPROPYL ALCOHOL (DPM 530)

HAZMAT 1000, REFER TO MSDS

- 1) Make a piece of cheesecloth (P05-036) wet with alcohol (P11-014). Clean the edges of the cooler (1). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- 2) Make sure the cleaned areas of the cooler (1) dry fully before you put on the sealant.
- 3) Fill the space between the cooler (1) and the intermediate case with the silicone rubber sealant (P09-027).

NOTE: The sealant must be applied in less than two hours from the time you cleaned the air cooler and intermediate case. Cure the sealant in air that has a minimum of 25 percent relative humidity for eight hours before you run the engine.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1178, COMPOUND/ANTI-GALLING

HAZMAT 1000, REFER TO MSDS

- (s) Lubricate the tube nut threads (2) with antigalling compound (P06-003). Attach the cooling air tube nuts to the air cooler (1). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (t) Torque the tube nuts (2) to 825–900 in-lb (93.2–101.6 N·m). Safety the tube nuts with lockwire (AS3214-02).

SUBTASK 75-21-01-710-269

- (2) Do an engine ground operation and check for pneumatic leaks on the No. 3 Bearing Buffer Air Cooler. Shutdown the engine. (ENGINE PNEUMATIC SYSTEM LEAK TEST, PRIMARY (ADJ/TEST 01), TASK 71-02-01-700-868)

F. Job Close-up - No. 3 Bearing Buffer Air Cooler Installation

SUBTASK 75-21-01-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the work area is clean.

SUBTASK 75-21-01-410-268

- (2) Close the right thrust-reverser door. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-21-01

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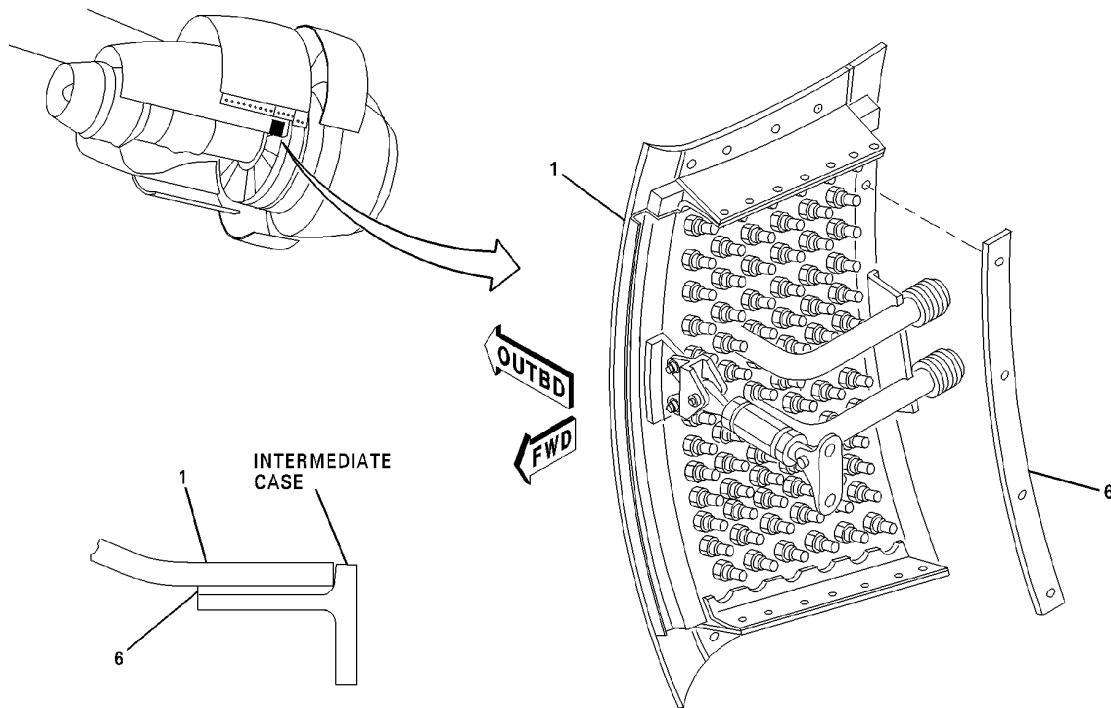
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SPACER PLATE THICKNESS	
CLASS	INCH (mm)
1	0.022 – 0.028 (0.559 – 0.711)
2	0.036 – 0.044 (0.914 – 1.118)
3	0.058 – 0.068 (1.473 – 1.727)
4	0.075 – 0.085 (1.905 – 2.157)
5	0.095 – 0.105 (2.413 – 2.667)
6	0.120 – 0.130 (3.048 – 3.302)

LEGEND:

- 1. AIR COOLER
- 6. CLASSIFIED SPACER

CAG(IGDS)

DB2-75-0228

No. 3 Bearing Buffer Air Cooler Classified Spacer Thickness
Figure 402/75-21-01-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

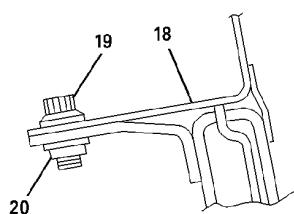
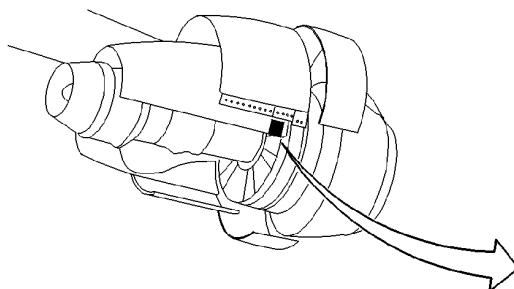
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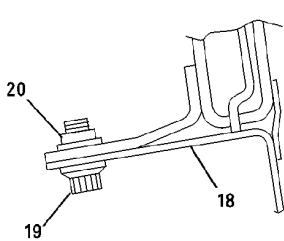
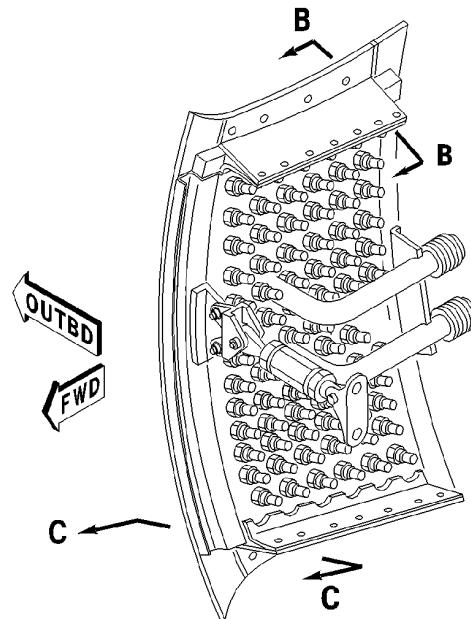
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SECTION B-B



SECTION C-C

LEGEND:

18. AXIAL BRACKET

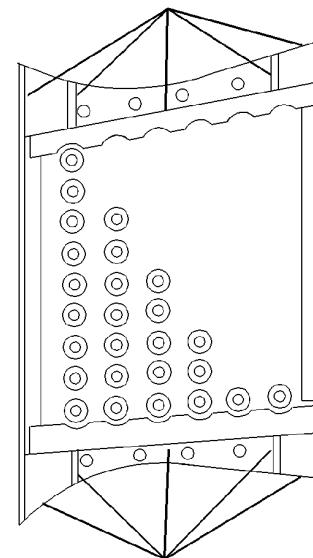
19. BOLT

20. NUT

APPLY SEAINT

CAG(IGDS)

APPLY SEAINT



DB2-75-0230

No. 3 Bearing Buffer Air Cooler Axial Brackets
Figure 403/75-21-01-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SENSOR, T3 TEMPERATURE - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the T3 temperature sensor. Access to the T3 temperature sensor is through the left thrust-reverser door. The T3 temperature sensor is installed on the compressor rear-frame flange.
- B. Unless different instructions are given, these procedures are the same for the three G.E. CF6-80C2D1F engines.

TASK 75-21-13-000-801

2. REMOVAL OF THE T3 TEMPERATURE SENSOR

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector
Not specified	Protective cover for compressor rear frame mount pad

B. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - T3 Temperature Sensor Removal

SUBTASK 75-21-13-865-001



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3
H	19	B1-47	FADEC GND TEST PWR ENG 1 CHAN A
H	20	B1-48	FADEC GND TEST PWR ENG 1 CHAN B

UPPER MAIN, ENGINE DC BUS 2

Row	Col	Number	Name
J	15	B1-592	REVERSING CONTROL ENG 2

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-21-13

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(Continued)

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	19	B1-59	FADEC GND TEST PWR ENG 2 CHAN A
J	20	B1-60	FADEC GND TEST PWR ENG 2 CHAN B

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	19	B1-408	FADEC GND TEST PWR ENG 3 CHAN A
K	20	B1-409	FADEC GND TEST PWR ENG 3 CHAN B

SUBTASK 75-21-13-010-003

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

D. Procedure - T3 Temperature Sensor Removal

SUBTASK 75-21-13-030-001

- (1) Remove the T3 temperature sensor (1) as follows: (Figure 401)
 - (a) Remove the bolts (2), washers (3) and the nuts (4) that attach the sensor conduit clips (5) to the mount brackets (6 and 7).
 - (b) Disconnect the J-1 electrical connector (8) and the J-2 electrical connector (9). Put protective dust caps on the connectors.
 - (c) Remove the two nuts (10) and two bolts (11) that attach the T3 temperature sensor electrical connector (12) to the bracket (13).
 - (d) Remove the four bolts (14) and the four washers (15) that attach the T3 temperature sensor (1) to the compressor rear frame mount pad.
 - (e) Carefully remove the T3 temperature sensor (1), and the sensor electrical connector (12). Remove and discard the gasket (16). Put a protective cover on the compressor rear frame mount pad.

SUBTASK 75-21-13-410-009

- (2) If the T3 temperature sensor (1) is not installed immediately, or weather conditions make it necessary, close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

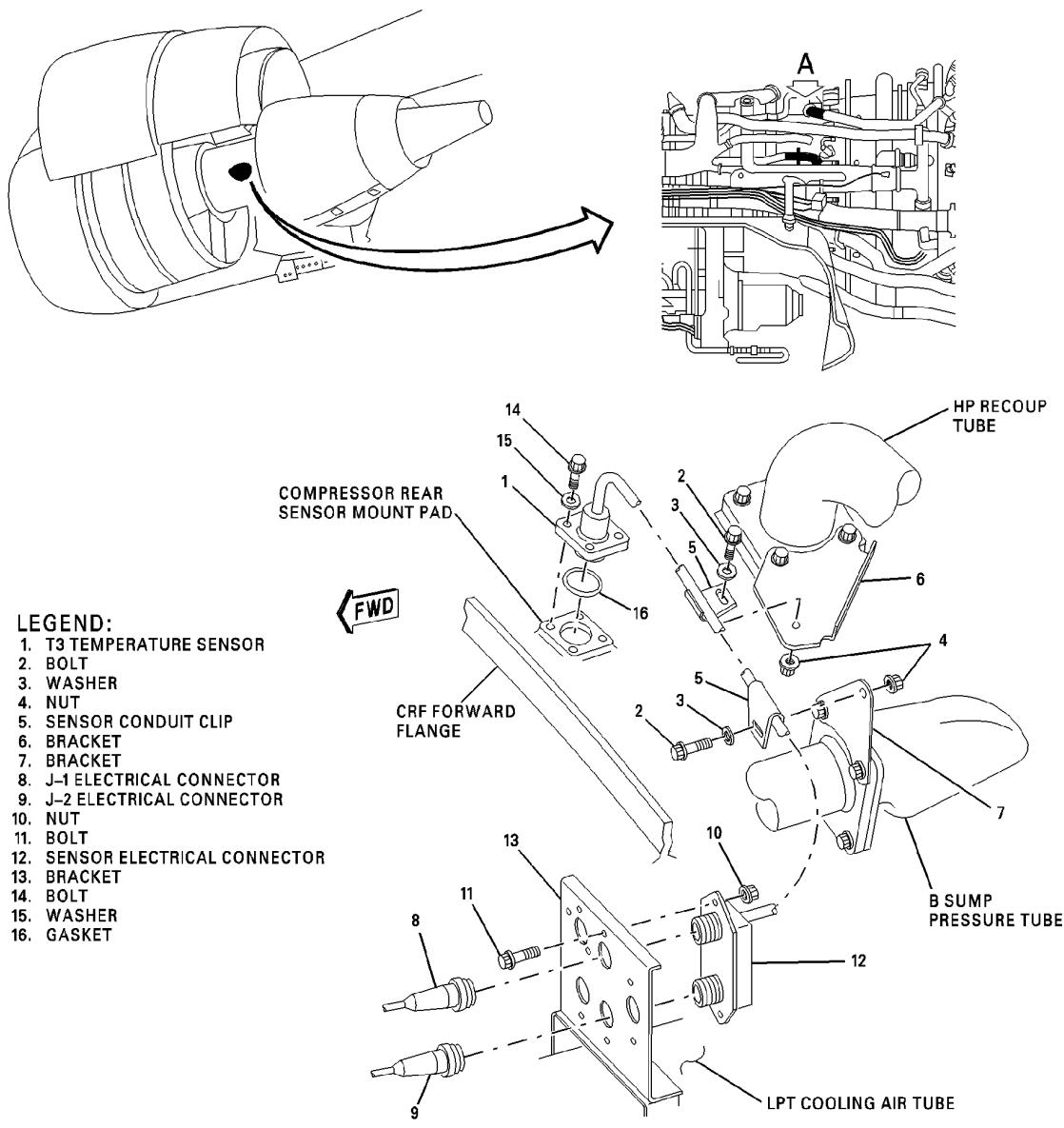
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CAG(IGDS)

CF8-6906-00-A

CF8-D4523-00-B

DB2-75-0338

T3 Temperature Sensor - Removal/Installation
Figure 401/75-21-13-990-801

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-21-13-400-801

3. INSTALLATION OF THE T3 TEMPERATURE SENSOR

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Torque wrench, 0-150 in-lb (0-16.9 N·m)
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

Table 403

REFERENCE	DESIGNATION
C10-071	Lockwire, stainless steel,

C. Expendable Parts

- (1) Expendable Parts

Table 404

REFERENCE	DESIGNATION	IPC
16	Gasket	IPC 77-21-10-01-80

D. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

E. Job Set-up - T3 Temperature Sensor Installation

SUBTASK 75-21-13-865-002



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that these circuit breakers are open and have safety tags:

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	19	B1-47	FADEC GND TEST PWR ENG 1 CHAN A
H	20	B1-48	FADEC GND TEST PWR ENG 1 CHAN B

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	15	B1-592	REVERSING CONTROL ENG 2
J	19	B1-59	FADEC GND TEST PWR ENG 2 CHAN A
J	20	B1-60	FADEC GND TEST PWR ENG 2 CHAN B

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	19	B1-408	FADEC GND TEST PWR ENG 3 CHAN A
K	20	B1-409	FADEC GND TEST PWR ENG 3 CHAN B

SUBTASK 75-21-13-010-009

- (2) If necessary, open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

F. Procedure - T3 Temperature Sensor Installation

SUBTASK 75-21-13-420-001

- (1) Install the T3 temperature sensor as follows: (Figure 401)
 - (a) Remove the protective covers
 - (b) Install the gasket (16) between the mount pad and the sensor (1).
 - (c) Carefully install the sensor on the mount pad with the four bolts (14) and the four washers (15). Do not tighten the bolts at this time.
 - (d) Install the T3 temperature sensor electrical connector (12) on the bracket (13) with the two bolts (11) and two nuts (10). Do not tighten the bolts and the nuts at this time.
 - (e) Install the sensor conduit clips (5), bolts (2) and washers (3). Torque the nuts (4) to 24-27 in-lb (2.7-3.0 N·m).
 - (f) Torque the bolts (14) that attach the T3 temperature sensor (1) to 55-70 in-lb (6.2-7.9 N·m). Safety the bolts (14) with lockwire (C10-071). (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
 - (g) Tighten the nuts (10) and the bolts (11) that attach the T3 temperature sensor electrical connector (12) to the bracket (13). Torque the nuts (10) to 24-27 in-lb (2.7-3.0 N·m).
 - (h) Connect the J-1 electrical connector (8) and the J-2 electrical connector (9) to the T3 sensor electrical connector (12). Tighten the connectors (8 and 9) by hand.

G. Job Close-up - T3 Temperature Sensor Installation

SUBTASK 75-21-13-942-001

- (1) Remove all the tools and equipment from the work area. Make sure that the area is clean.

SUBTASK 75-21-13-410-001

- (2) Close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SUBTASK 75-21-13-865-003

- (3) Remove the safety tags and close these circuit breakers:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3
H	19	B1-47	FADEC GND TEST PWR ENG 1 CHAN A
H	20	B1-48	FADEC GND TEST PWR ENG 1 CHAN B

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	15	B1-592	REVERSING CONTROL ENG 2
J	19	B1-59	FADEC GND TEST PWR ENG 2 CHAN A
J	20	B1-60	FADEC GND TEST PWR ENG 2 CHAN B

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	19	B1-408	FADEC GND TEST PWR ENG 3 CHAN A
K	20	B1-409	FADEC GND TEST PWR ENG 3 CHAN B

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SENSOR, T3 TEMPERATURE - INSPECTION/CHECK

1. General

- A. This procedure has the inspection instructions for the T3 temperature sensor. Access to the T3 temperature sensor is through the left thrust-reverser door. The T3 temperature sensor is installed on the compressor rear-frame flange.
- B. Unless different instructions are given, these procedures are the same for the three G.E. CF6-80C2D1F engines.

TASK 75-21-13-200-801

2. INSPECTION OF THE T3 TEMPERATURE SENSOR

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 601

REFERENCE	DESIGNATION
Not specified	Work platform, No. 1 and 3 engines, 4 ft (1.2 m), minimum
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-21-13-000-801	REMOVAL OF THE T3 TEMPERATURE SENSOR (P/B 401)
75-21-13-400-801	INSTALLATION OF THE T3 TEMPERATURE SENSOR (P/B 401)

C. Job Set-up - T3 Temperature Sensor Inspection

SUBTASK 75-21-13-010-007

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

D. Procedure - T3 Temperature Sensor Inspection

SUBTASK 75-21-13-210-002

- (1) Make an inspection of the T3 temperature sensor as follows: (Figure 601)

Table 602

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1) Examine the mount flanges for:		
(a) Cracks around mount holes	None permitted	Replace sensor
(2) The connector for:		
(a) Crossed threads	None permitted	Replace sensor
(b) Bent pins	None permitted	Replace sensor

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SUBTASK 75-21-13-420-002

- (2) If necessary, replace the T3 temperature sensor if defects are out of limits. (REMOVAL OF THE T3 TEMPERATURE SENSOR, TASK 75-21-13-000-801) (INSTALLATION OF THE T3 TEMPERATURE SENSOR, TASK 75-21-13-400-801)

E. Job Close-up - T3 Temperature Sensor Inspection

SUBTASK 75-21-13-942-002

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-21-13-410-005

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

— EFFECTIVITY —
FX 572-576, 582-599, 601-610, 612-619, 625

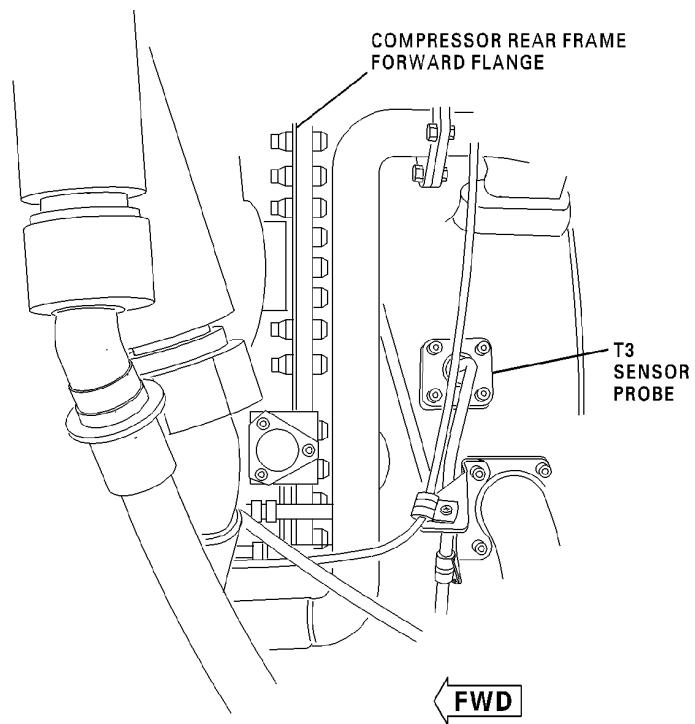
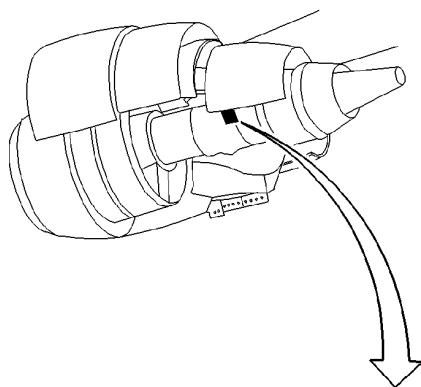
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CAG(IGDS)

DB2-75-0287

T3 Temperature Sensor - Inspection
Figure 601/75-21-13-990-802

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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HPC SECONDARY FLOW CONTROL SYSTEM - DESCRIPTION AND OPERATION

1. General

- A. The high pressure compressor (HPC) secondary flow control system lets high temperature compressor air flow to the high compressor drum rotor compartment. This airflow is used for compressor blade tip clearance. The system uses two HPC secondary flow control valves, two HPC secondary flow control solenoid valves and two 15th stage air (PS3) filters. The left solenoid valve controls the left HPC secondary flow control valve and the turbine vane and blade cooling air valve. The right solenoid controls the right HPC secondary flow control valve and the IDGS air/oil heat exchanger valve. The two solenoid valves receive control signals, as a function of high rotational speed (N_2) and altitude, from the electronic engine control (EEC).

2. HPC Secondary Flow Control Valve

- A. The left HPC secondary flow control valve is installed at the 9 o'clock position on the "J" flange. The right control valve is also installed on the "J" flange at the 3 o'clock position. The valve has a spring loaded piston. If an electrical power failure, or a loss of pneumatic pressure occurs, the spring pressure in the valve pushes the valve open. This lets 9th stage air continue to flow through the valve. Each HPC secondary flow control valve has 5 ports. The ports are as follows:
- 9th stage inlet pressure port
 - 15th stage pressure inlet
 - Air supply port
 - Pneumatic servo pressure inlet
 - Pneumatic servo pressure outlet.

3. HPC Secondary Flow Control Valve Solenoids

- A. The two HPC secondary flow control solenoids are four way solenoid valves, controlled by the EEC. The solenoids operate the left and right HPC secondary flow control valves. The HPC secondary flow control valve, IDGS air/oil heat exchanger override solenoid (right) is installed at the 1 o'clock position on the intermediate case. (Figure 3)
The HPC secondary flow control valve, turbine vane and blade cooling air valve solenoid (left) is installed at the 11 o'clock position on the intermediate case. (Figure 4)
- B. The HPC secondary flow control solenoid has one common inlet port, two outlet ports, two vents, two solenoids, two electrical connections and two test connections. Each valve has two sections. One section is used to actuate the HPC secondary flow control valve (left and right). On the right valve, the second section controls the override of the IDGS air/oil cooler shutoff valve. The second section of the left valve controls the turbine vane and blade (TVAB) cooling air valve. The HPC secondary flow control solenoids are a single-coil design. The IDGS and TVAB solenoids have redundant coils that energize the solenoid.

4. Servo Air Filter

- A. The air filter assembly has a case which houses a cylindrical type filter element. The filter element and the case are installed in the head assembly. The head assembly has a bypass valve, which uses a poppet, spring and valve head. (Figure 5)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631, 642-645

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5. Operation

- A. The Electronic Engine Control (EEC) gets 28 vdc from the ground test power switch on the maintenance panel (before engine operation). The EEC sets a schedule to close the HPC secondary flow control valve by the N2 speed and altitude input signals. The valves close during climb as the N2 decreases and altitude increases. The valves are spring-loaded open and stay open with loss of pneumatic pressure or EEC power. The two HPC secondary flow control valves will close with 28 vdc power and a minimum of 3 PSI (20.6 kPa) pressure from the 15th stage air. As the HPC secondary flow control valve opens, 9th stage air released from the HPC goes in the rear of the HPC rotor. This air makes the rotor cool and prevents compressor blade-tip rub with the HPC case.
- B. When the EEC calculates climbout and cruise (altitude higher than 15,000 ft (4572 m) and N2 is between 77% and 92%), the HPC secondary flow control valves are commanded to close. The EEC will supply 28 vdc power to the HPC secondary flow control valve solenoids. The single coil solenoids energize to permit filtered 15th stage air to flow to the valves. The 15th stage air pushes the valves closed. The flow of 9th stage air then stops and will not make the rotor cool. The natural thermal growth of the rotor decreases clearance between the rotor and the HPC for greater efficiency.
- C. The EEC receives a feedback input from the left HPC secondary flow control valve. This input completes the control circuit. If a valve stays closed when commanded open, the EEC will make a record of the fault and will make sure the second HPC valve stays open at all times.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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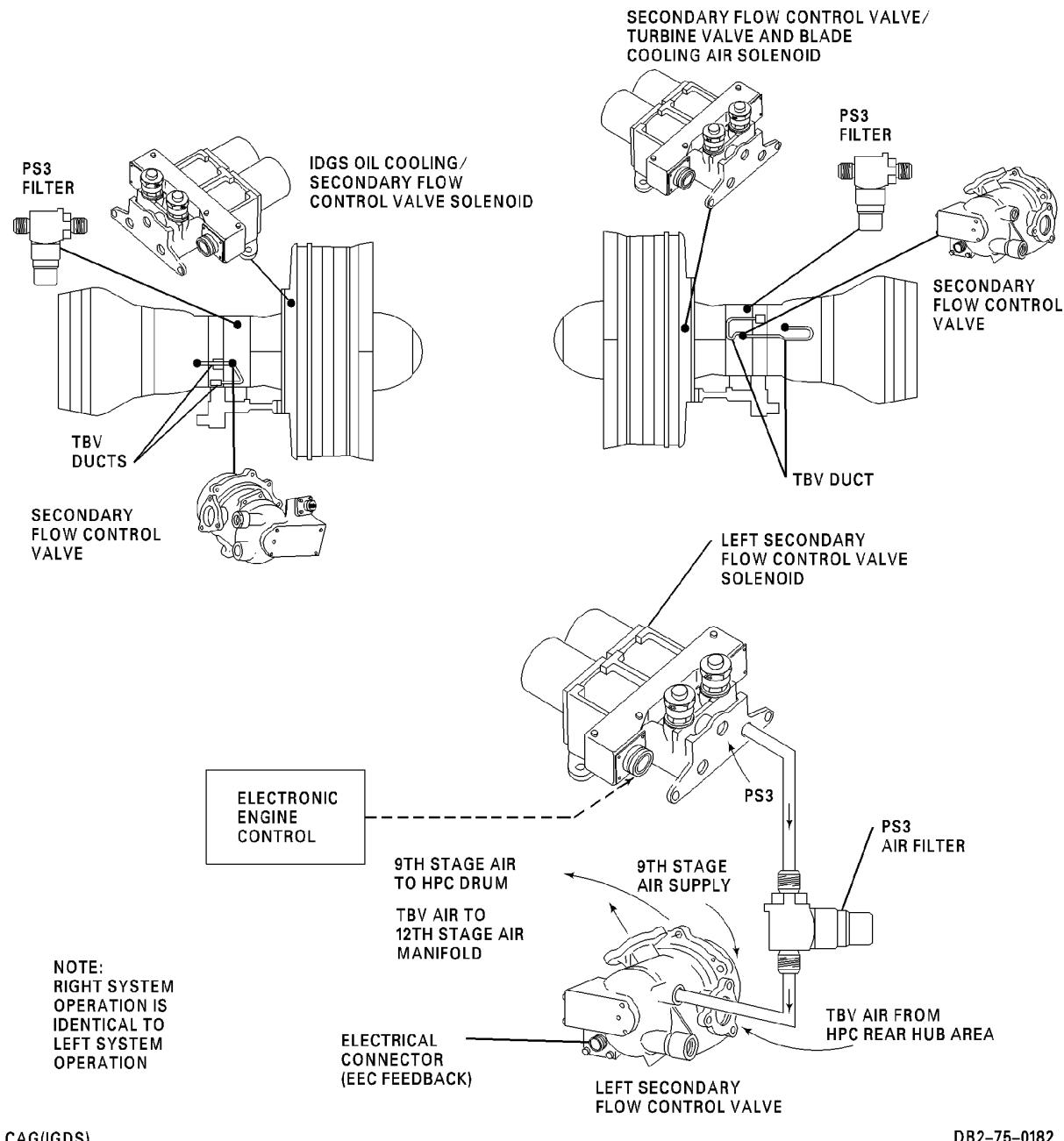
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HPC Secondary Flow Control System
Figure 175-22-00-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-22-00

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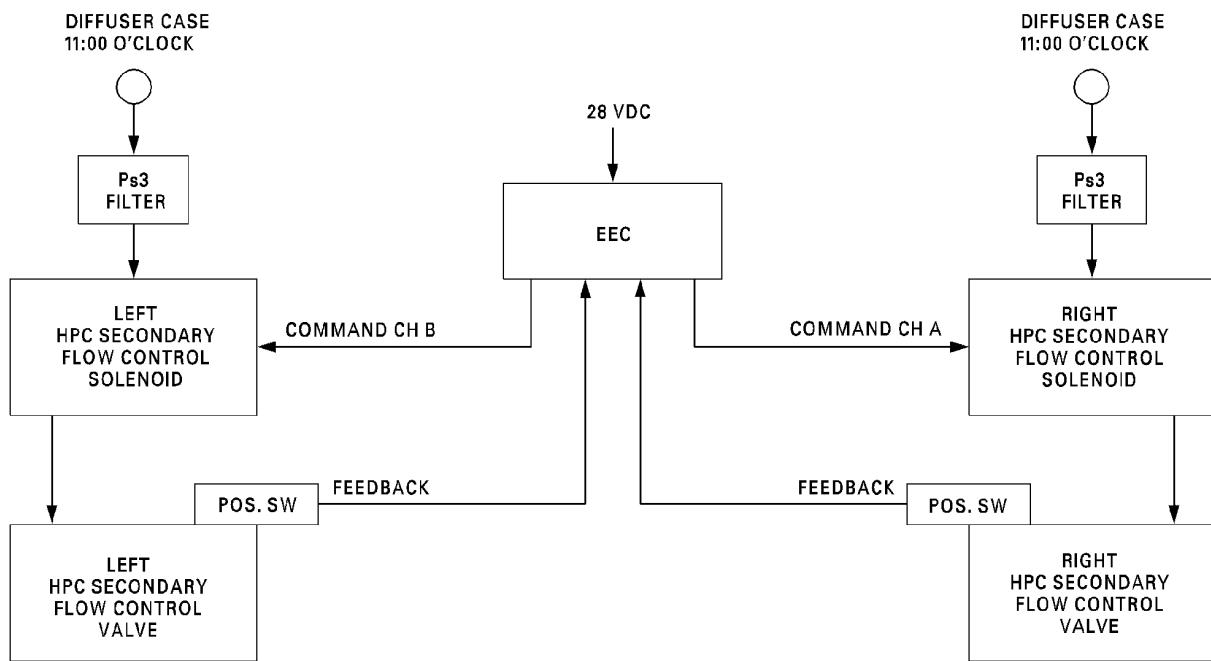
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CAG(IGDS)

DB2-75-0183

HPC Secondary Flow Control Diagram
Figure 2/75-22-00-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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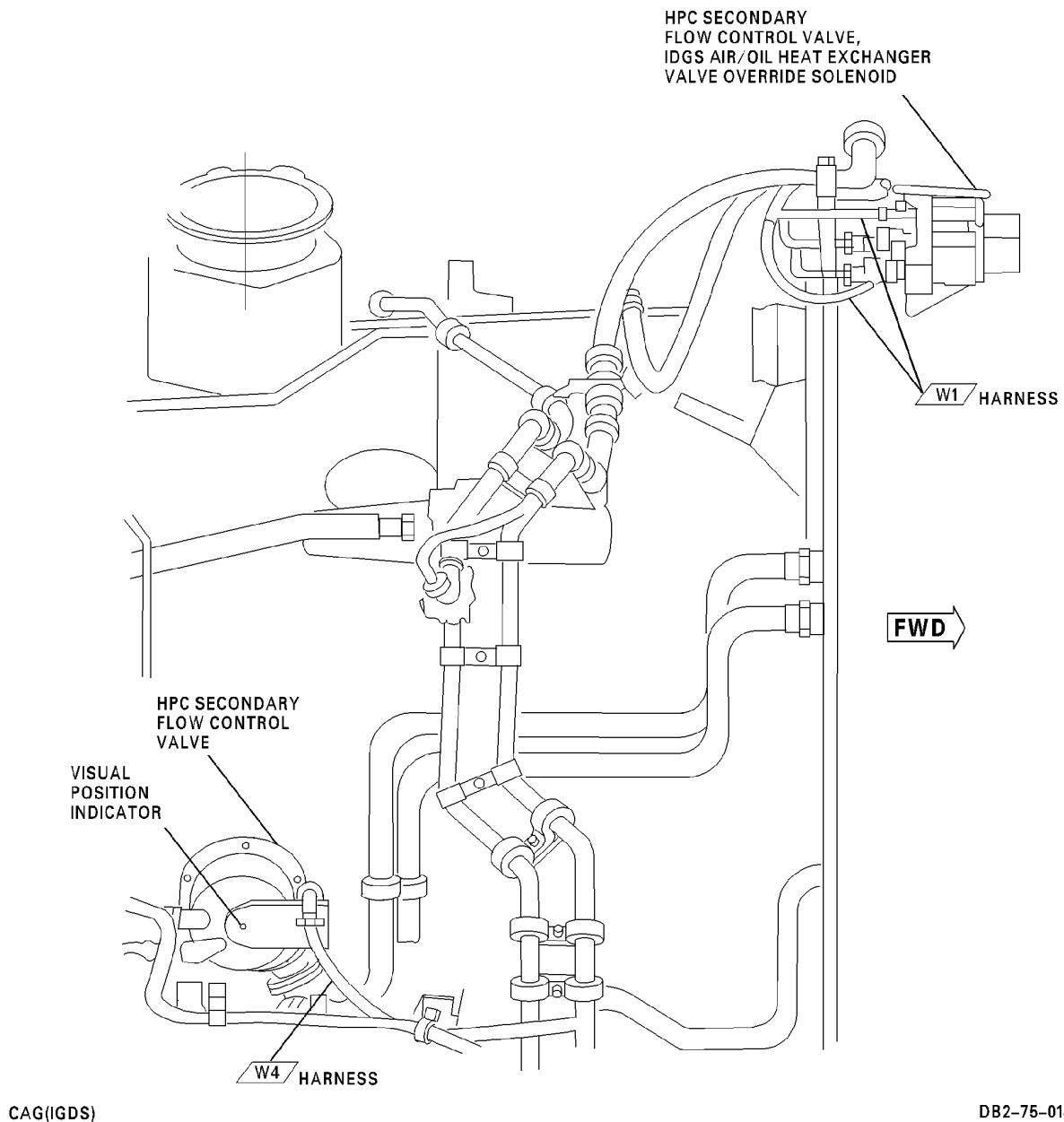
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HPC Secondary Flow Control - Right Side
Figure 3/75-22-00-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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75-22-00

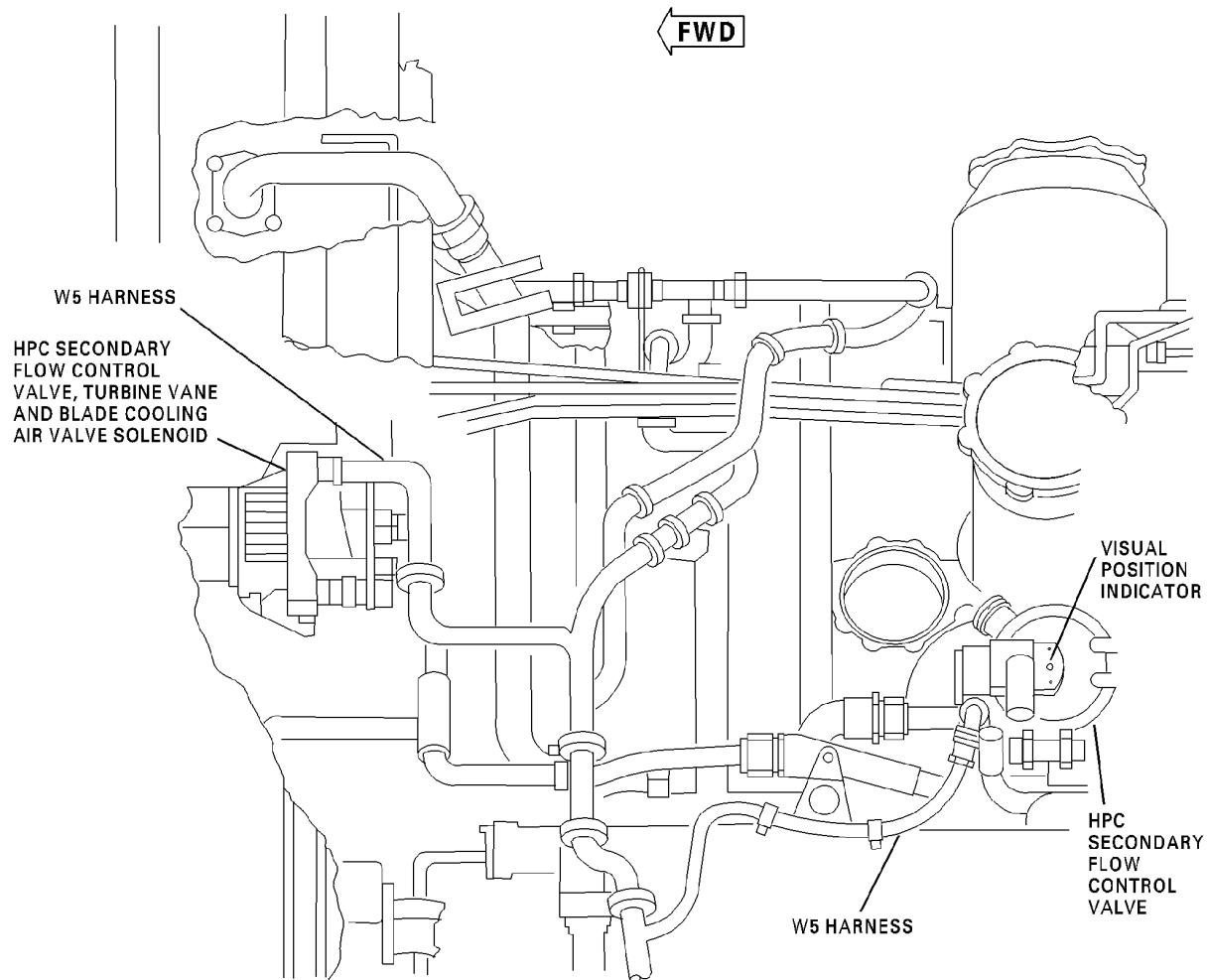
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CAG(IGDS) L-A4448

DB2-75-0185

HPC Secondary Flow Control - Left Side
Figure 4/75-22-00-990-871

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

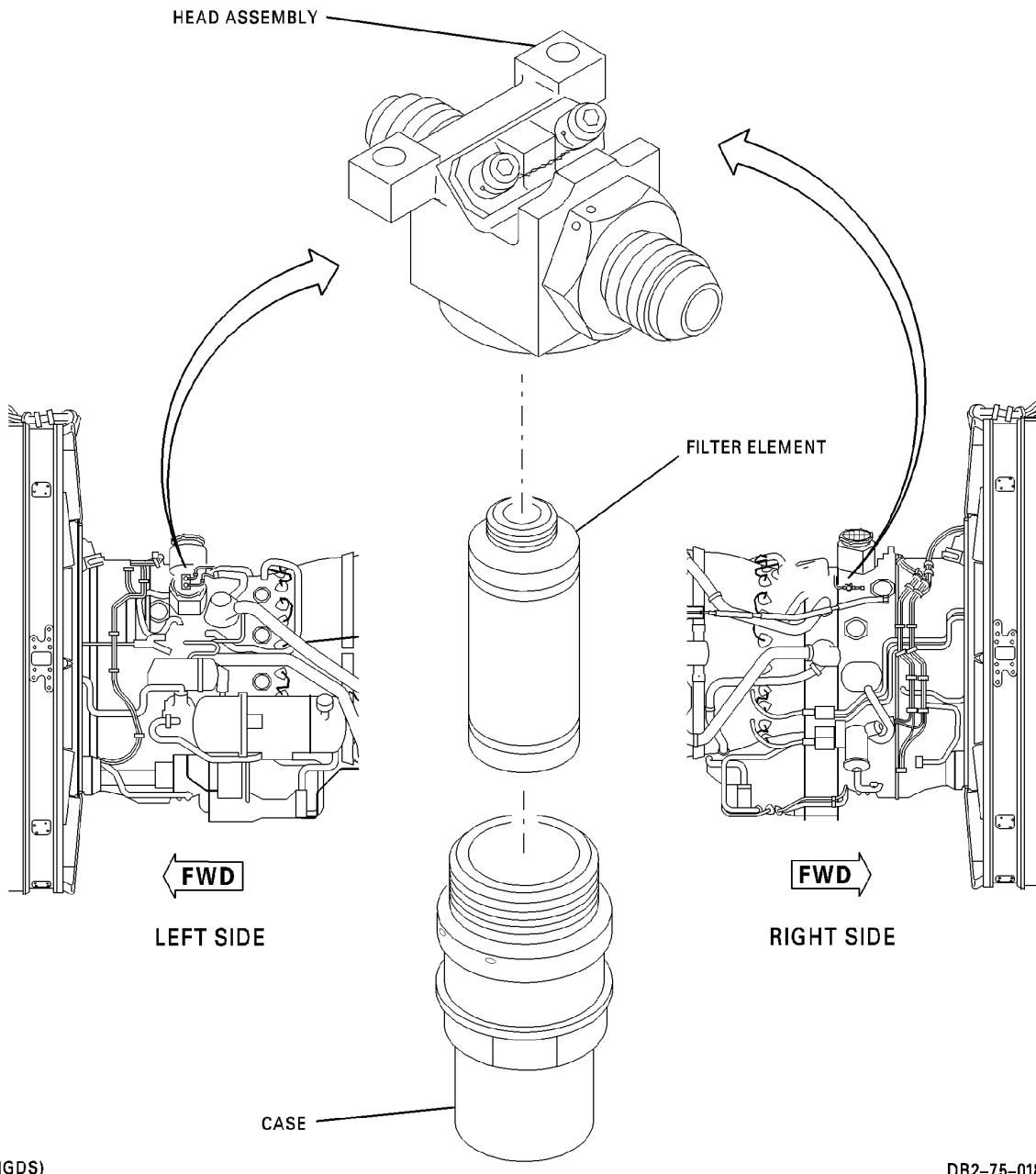
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CAG(IGDS)

DB2-75-0186

HPC Secondary Flow Control Filter
Figure 5/75-22-00-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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VALVE, HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the high pressure compressor (HPC) secondary flow control (SFC) valves. Access to the left and right HPC secondary flow control valves is through the thrust reverser doors.

NOTE: PHASE-3 engines have no HPCSFC valves. In its place they have one additional turbine vane and blade cooling air valve (TVBCAV) on the HPC rear case at the 2 o'clock position.

- B. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-22-01-000-868

2. REMOVAL OF THE LEFT HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector
MIL-C-5501	Protective caps and plugs
Not specified	Tags, "DO NOT OPERATE" (2 necessary)
Not specified	Tags, "DO NOT PRESSURIZE THE PNEUMATIC SYSTEMS" (2 necessary)
Not specified	Spanner wrench, wig-o-flex

NOTE: Service Bulletin PW4ENG 75-52 ..

NOTE: Service Bulletin PW4ENG 75-79 installs again the high pressure compressor (HPC) secondary airflow control (SAC) plumbing. This let valve operation as scheduled by the EEC. It also installs the W1 and W2 EEC harness assemblies for the operation of the FADEC.

NOTE: Service Bulletin PW4ENG 75-106 removes the high pressure compressor (HPC) secondary flow control (SFC) valve position indicator switch. If the HPCSFC valve has to be replaced, make sure to replace with the correct part number.

NOTE: PHASE-3 engines have no HPCSFC valves. In its place they have one additional turbine vane and blade cooling air valve (TVBCAV) on the HPC rear case at the 2 o'clock position.

B. References

Reference	Title
36-11-03-000-802	REMOVAL OF THE HIGH-PRESSURE BLEED-AIR CONTROL VALVE (P/B 401)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)

EFFECTIVITY
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

75-22-01

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(Continued)

Reference	Title
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Left High Pressure Compressor Secondary Flow Control Valve Removal

SUBTASK 75-22-01-941-267

- (1) Attach the "DO NOT OPERATE" tags to the components that follow:
 - (a) To the applicable thrust reverser lever.
 - (b) To the auxiliary power unit control panel.
 - (c) To the pneumatic ground connector access panels.

SUBTASK 75-22-01-865-267



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE

CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY

- (2) Open these circuit breakers and install safety tags:

OVERHEAD, LEFT EMER AC BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
G	7	B1-309	ISOL VALVE CONTROL 1 TO 3

OVERHEAD, RIGHT EMER AC BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
G	25	B1-311	ISOL VALVE CONTROL 1 TO 2

UPPER MAIN, CABIN PRESS & PNEUMATICS DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	7	B1-297	APU VALVE CONTROL
H	8	B1-582	PNEU PRESS REG VLV ENG 3
H	9	B1-291	PNEU SYS CONTRLR DIGIT SYS 1

UPPER MAIN, CABIN PRESS & PNEUMATICS DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	7	B1-298	PNEU SYS CONTRLR ANALOG SYS 2
J	8	B1-580	PNEU PRESS REG VLV ENG 1
J	9	B1-299	PNEU SYS CONTRLR DIGIT SYS 2

UPPER MAIN, CABIN PRESS & PNEUMATICS DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	8	B1-581	PNEU PRESS REG VLV ENG 2
K	9	B1-280	PNEU SYS CONTRLR ANALOG SYS 1
K	11	B1-572	MANF FAIL S/O CONTROL

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-22-01-010-268

- (3) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-22-01-010-274

- (4) Remove the high pressure bleed air control valve. (REMOVAL OF THE HIGH-PRESSURE BLEED-AIR CONTROL VALVE, TASK 36-11-03-000-802)

D. Procedure - Left High Pressure Compressor Secondary Flow Control Valve Removal

SUBTASK 75-22-01-020-267

- (1) Remove the left HPC secondary flow control valve (1) as follows: (Figure 401)
- Remove the couplings (2, 3 and 4). (Figure 402)
 - Remove the nut (5), washer (6) and the bolt (7) that attaches the collector duct (8) to the support link.
 - Remove the bushing (9) from the support link rod-end.
 - Remove the collector duct (8) from the engine.
 - Discard the seals (10, 11 and 12).



**PUT COVERS ON OPEN PNEUMATIC DUCTS IMMEDIATELY.
PROTECTIVE COVERS PREVENT UNWANTED OBJECTS IN THE
DUCTS AND DAMAGE TO THE DUCT FLANGE.**

- Install the protective caps and plugs.
NOTE: The step that follows is for engines before S/B PW4ENG 75-106.
- Disconnect the W5P10 harness connector (13) from the HPC secondary flow control valve (1). Install the protective caps and plugs. (Figure 403)
NOTE: The steps that follow are for all engines.
- Remove the bolt (14) and nut (15) that attaches the tube clamp (16) and tube (17) to the bracket (18).
NOTE: The information that follows is for engines after S/B PW4ENG 75-79.
- Disconnect the signal tube (19) coupling nut (20) from the adapter (21). Install the protective caps and plugs.
NOTE: If the cap assembly was removed by the service bulletin PW4ENG 75-79, the HPC air valve signal tube is installed.
- Disconnect the coupling body (22) on the cooling tube (23) from the coupling nut (24).
- Remove the snap retainer (25), preformed packings (26), washers (27), coupling body (22) and the coupling nut (24). Discard the preformed packings and install the protective caps and plugs.
NOTE: The information that follows is for the aircraft after S/B PW4ENG 79-52.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (l) Remove the nut (28), bolt (29) from the clamp (30) that attach the tube (31) to the bracket (32).
NOTE: The information that follows is for the aircraft before S/B PW4ENG 79-52.
- (m) Remove the six bolts (33) that attach the HPC secondary flow control valve (1) to the engine. Remove the gasket (34) and install protective caps and plugs on the control valve.
NOTE: The information that follows is for the aircraft after S/B PW4ENG 79-52.
- (n) Remove the six bolts (33) that attach the bracket (32) and the HPT secondary flow control valve (1) to the engine.
- (o) Remove the HPC secondary flow control valve (1). Discard the gasket (34) and install the protective caps and plugs.

SUBTASK 75-22-01-840-267

- (2) If necessary, remove the hardware for installation on the new HPC secondary flow control valve (1) as follows: (Figure 403)

NOTE: The information that follows is for the aircraft before S/B PW4ENG 75-79.

- (a) Remove the cap assembly (35) from the adapter (21).

NOTE: If the HPC air valve signal tube was removed by the alert service bulletin PW4ENG 75-62 R2, a cap assembly is installed.

- (b) Remove the adapter (21) from the HPC secondary flow control valve (1). Discard the gasket (36) and install the protective caps and plugs.
- (c) Remove the plug (37) from the HPC secondary flow control valve (1). Discard the gasket (38) and install the protective caps and plugs.
- (d) Remove the three bolts (39) that attach the plain cover (40) to the HPC secondary flow control valve (1). Remove the cover and install the protective caps and plugs.
- (e) Remove the three bolts (41) that attach the vented cover (42) and the bracket (18) to the HPC secondary flow control valve (1). Remove the cover and the bracket. Install the protective caps and plugs.

SUBTASK 75-22-01-410-267

- (3) If the left HPC secondary flow control valve (1) is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

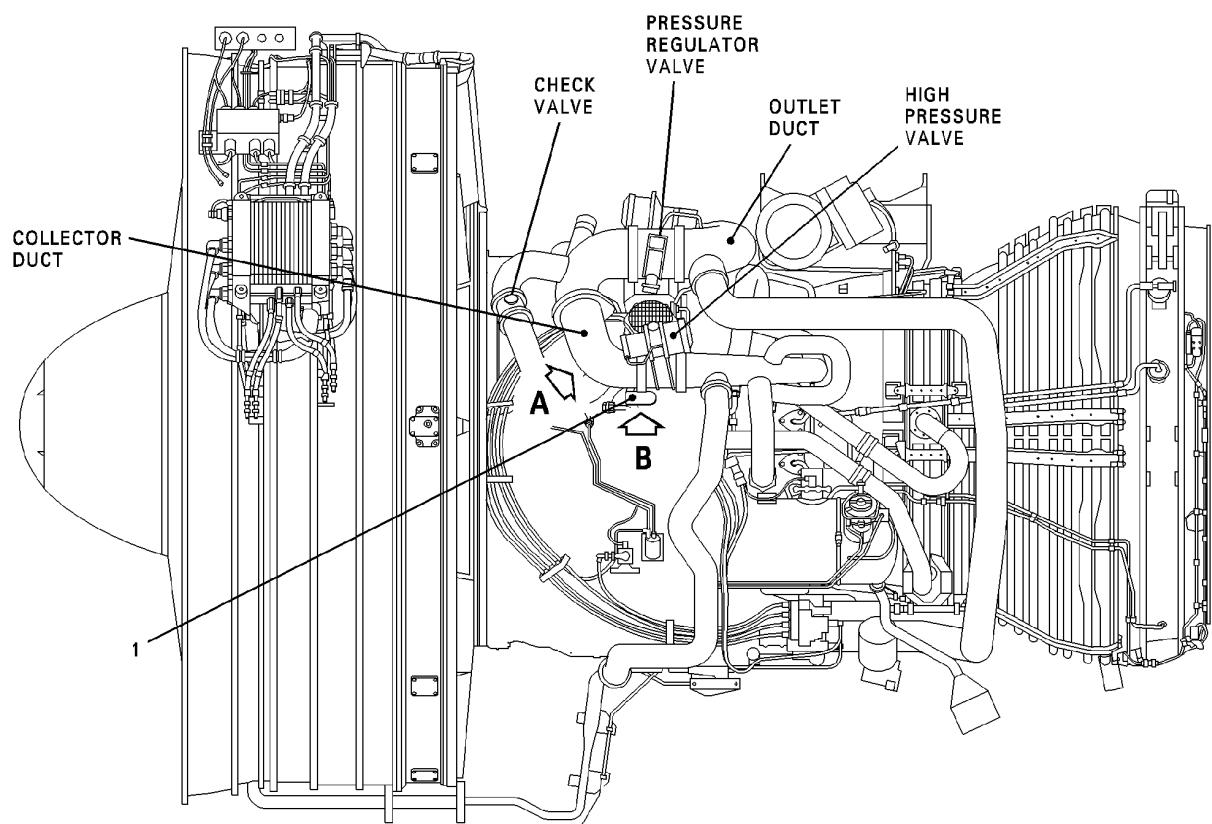
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LEGEND:

1. LEFT HPC SECONDARY FLOW CONTROL VALVE

CAG(IGDS)

DB2-75-0247

HPC Secondary Flow Control Valve - Left
Figure 401/75-22-01-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

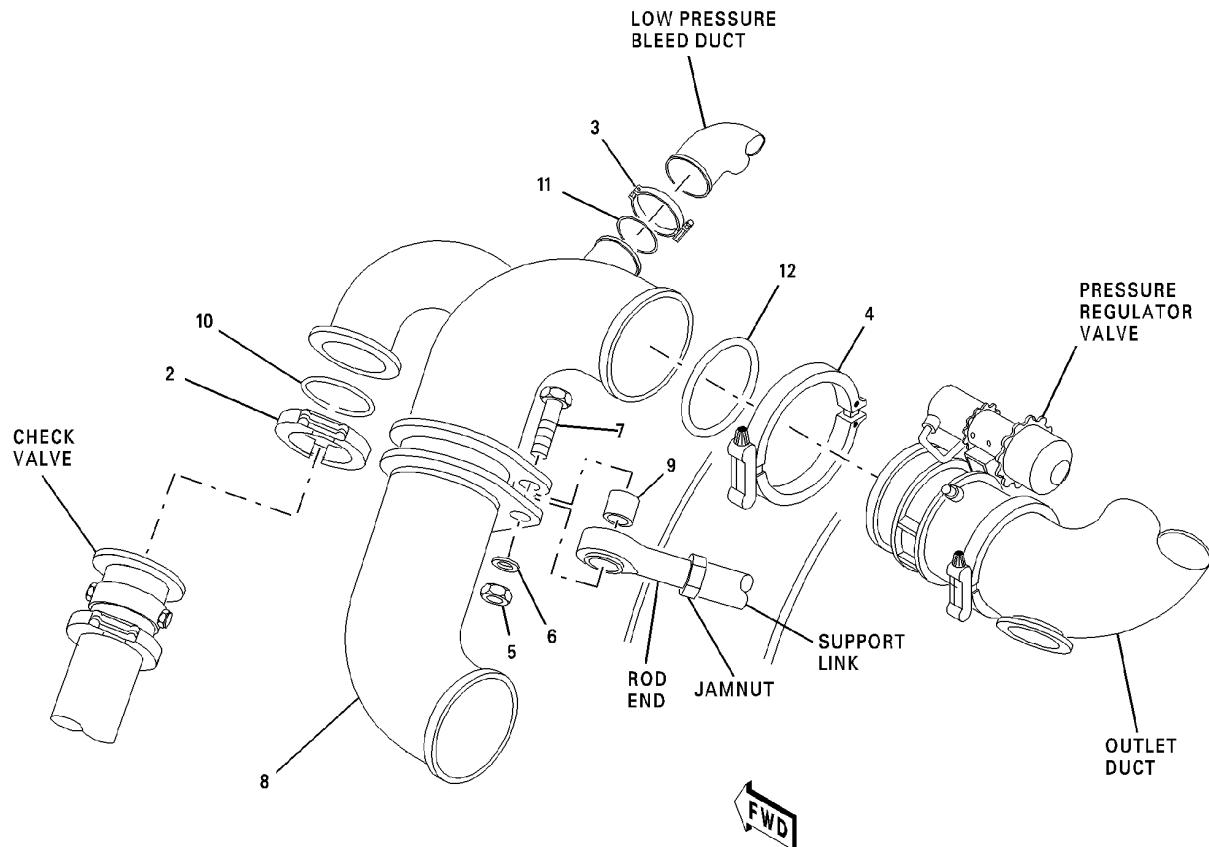
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LEGEND:

- 2. COUPLING
- 3. COUPLING
- 4. COUPLING
- 5. NUT
- 6. WASHER
- 7. BOLT
- 8. COLLECTOR DUCT
- 9. BUSHING
- 10. SEAL
- 11. SEAL
- 12. SEAL

VIEW A

CAG(IGDS)

DB2-75-0248

HPC Secondary Flow Control Valve - Left
Figure 402/75-22-01-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

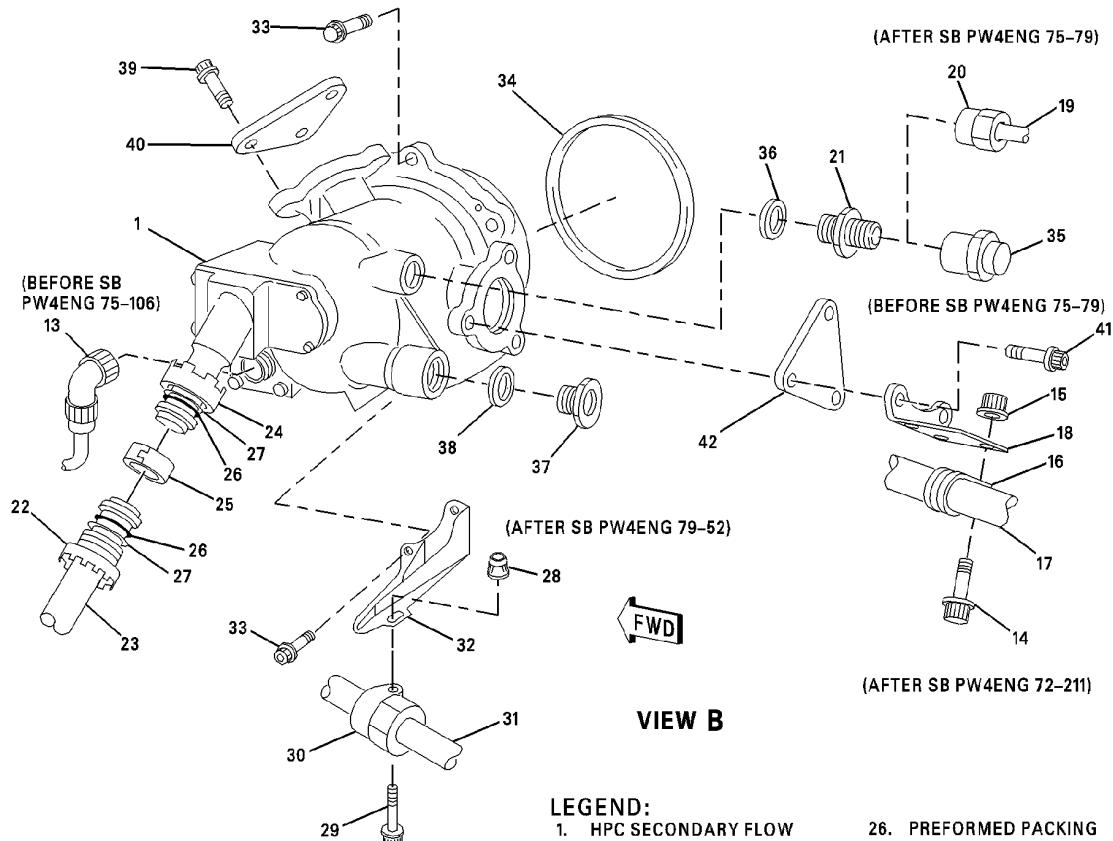
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LEGEND:

- | | |
|---|-----------------------|
| 1. HPC SECONDARY FLOW CONTROL VALVE | 26. PREFORMED PACKING |
| 13. W5P10 HARNESS CONNECTOR | 27. WASHER |
| 14. BOLT | 28. NUT |
| 15. NUT | 29. BOLT |
| 16. CLAMP | 30. CLAMP |
| 17. TUBE | 31. TUBE |
| 18. BRACKET | 32. BRACKET |
| 19. SIGNAL TUBE | 33. BOLT |
| 20. COUPLING NUT | 34. GASKET |
| 21. ADAPTER | 35. CAP ASSEMBLY |
| 22. COUPLING BODY | 36. GASKET |
| 23. HPT SECONDARY FLOW CONTROL VALVE COOLING TUBE | 37. PLUG |
| 24. COUPLING NUT | 38. GASKET |
| 25. SNAP RETAINER | 39. BOLT |
| | 40. PLAIN COVER |
| | 41. BOLT |
| | 42. VENTED COVER |

CAG(IGDS)

DB2-75-0249B

HPC Flow Control Valve - Left
Figure 403/75-22-01-990-871

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-22-01-400-868

3. INSTALLATION OF THE LEFT HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–150 in-lb (0.5–17.0 N·m)
Not specified	Torque wrench 0–300 in-lb (0–34.0 N·m)
Not specified	Torque wrench 150–1000 in-lb (17.0–113.0 N·m)
Not specified	Spanner wrench wig-o-flex
Not specified	Strap wrench (glenair TG-70)
Model M303, M305 or M307	Crimper, Bergen Mechanical (optional)

B. Consumable Materials

(1) Consumable Materials

NOTE: Some materials in the Consumable Materials chart may not be permitted to be used in your location. Persons in each area location must make sure they are permitted to use these materials. All persons must obey all applicable federal, state, local and provincial regulations for their location.

NOTE: Equivalent replacements are permitted for the items that follow.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)
P05-059	Wax, paraffin (PMC 9552)
P06-002	Petrolatum, white (PMC 9609)
P06-054	Paste, antiseize (PWA 36246)
P06-013	Lubricant, solid film
P05-288	Lockwire (AS3214-01)
P05-289	Lockwire (AS3214-02)
P05-291	Cable, safety (optional)
P05-292	Ferrule, safety cable (optional)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
Fig. 402/10	Seal	IPC 36-14-75-10-080
Fig. 402/11	Seal	IPC 36-14-75-10-090
Fig. 402/12	Seal	IPC 36-14-75-10-085
Fig. 403/26	Packing, preformed	IPC 75-23-45-10-250
Fig. 403/34	Gasket	IPC 75-33-10-10
Fig. 403/36, 38	Gasket	IPC 75-33-10-10-070

D. References

Reference	Title
36-11-03-400-802	INSTALLATION OF THE HIGH-PRESSURE BLEED-AIR CONTROL VALVE (P/B 401)
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 36-14-75-10-080	Illustrated Parts Catalog
IPC 36-14-75-10-085	Illustrated Parts Catalog
IPC 36-14-75-10-090	Illustrated Parts Catalog
IPC 75-23-45-10-250	Illustrated Parts Catalog
IPC 75-33-10	Illustrated Parts Catalog
IPC 75-33-10-10	Illustrated Parts Catalog
IPC 75-33-10-10-070	Illustrated Parts Catalog

E. Job Set-up - Left High Pressure Compressor Secondary Flow Control Valve Installation

SUBTASK 75-22-01-941-268

- (1) Make sure the tags are attached to the components that follow:
 - (a) Make sure a "DO NOT OPERATE" tag is attached to the thrust reverser lever.
 - (b) Make sure a "DO NOT OPERATE" tag is attached to the auxiliary power unit control panel.
 - (c) Make sure the two "DO NOT PRESSURIZE THE PNEUMATIC SYSTEMS" tags are attached to the pneumatic ground connector access panels.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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SUBTASK 75-22-01-865-268



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Make sure that these circuit breakers are open and have safety tags:

OVERHEAD, LEFT EMER AC BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
G	7	B1-309	ISOL VALVE CONTROL 1 TO 3

OVERHEAD, RIGHT EMER AC BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
G	25	B1-311	ISOL VALVE CONTROL 1 TO 2

UPPER MAIN, CABIN PRESS & PNEUMATICS DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	7	B1-297	APU VALVE CONTROL
H	8	B1-582	PNEU PRESS REG VLV ENG 3
H	9	B1-291	PNEU SYS CONTRLR DIGIT SYS 1

UPPER MAIN, CABIN PRESS & PNEUMATICS DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	7	B1-298	PNEU SYS CONTRLR ANALOG SYS 2
J	8	B1-580	PNEU PRESS REG VLV ENG 1
J	9	B1-299	PNEU SYS CONTRLR DIGIT SYS 2

UPPER MAIN, CABIN PRESS & PNEUMATICS DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	8	B1-581	PNEU PRESS REG VLV ENG 2
K	9	B1-280	PNEU SYS CONTRLR ANALOG SYS 1
K	11	B1-572	MANF FAIL S/O CONTROL

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-22-01-010-270

- (3) If necessary, Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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F. Procedure - Left High Pressure Compressor Secondary Flow Control Valve Installation

SUBTASK 75-22-01-430-267

- (1) If it is necessary to install a new left HPC secondary flow control valve (1), do the subsequent procedure: (IPC 75-33-10) (Figure 403)

NOTE: If the engine is a before PHASE-3 engine, make sure that a HPC secondary flow control valve is installed that has the same part number. This valve can be of two configurations: With a position indication switch (before S/B PW4ENG 75-106). Without a position indication switch (after S/B PW4ENG 75-106).

- (a) Put the left HPC secondary flow control valve (1) on a bench as shown in the referenced task. Remove the protective caps and plugs. (Figure 403)
- (b) Install the gasket (38) on the plug (37).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (c) Lubricate the plug (37) threads with the engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (d) Put the plug (37) in the bottom outboard hole of the left HPC secondary flow control valve (1).
- (e) Torque the plug (37) to 110–120 in–lb (12.4–13.6 N·m). Safety the plug with the lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (f) Lubricate the three bolt (41) threads with the engine oil (P03–001).
- (g) Put the vented cover (42) and the bracket (18) on the rear inboard hole on the left HPC secondary flow control valve (1). Install the bolts (41).
- (h) Torque the bolts (41) to 85–95 in–lb (9.6–10.7 N·m). Safety the bolts with the lockwire (P05-289), or safety cable (P05–291) and safety cable ferrule (P05-292).
- (i) Lubricate the three bolt (39) threads with the engine oil (P03–001).
- (j) Put the plain cover (40) on the top forward hole on the left HPC secondary flow control valve (1). Install the bolts (39).
- (k) Torque the bolts (39) to 85–95 in–lb (9.6–10.7 N·m). Safety the bolts with the lockwire (P05-289), or safety cable (P05–291) and safety cable ferrule (P05-292).
- (l) Install the gasket (36) on the adapter (21).
- (m) Lubricate the threads of the adapter (21) with the engine oil (P03–001).
- (n) Put the adapter (21) into the top outboard hole of the left HPC secondary flow control valve (1).
- (o) Torque the adapter (21) to 110–120 in–lb (12.4–13.6 N·m).

NOTE: The information that follows is for the aircraft before S/B PW4ENG 75-79.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (p) Put the cap assembly (35) on the adapter (21).
NOTE: If the HPC air valve signal tube was removed by the alert service bulletin PW4ENG 75-62 R2, a cap assembly is installed.
NOTE: The information that follows is for the aircraft before S/B PW4ENG 75-79.
- (q) Torque the cap assembly (35) to 270–300 in-lb (30.5–33.9 N·m). Safety the cap assembly with the lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
NOTE: Hold the adapter with a wrench at the HPC secondary flow control valve while the cap assembly is tightened.

SUBTASK 75-22-01-420-270

- (2) Install the Left HPC secondary flow control valve (1) as follows: (Figure 402) (Figure 403)
- (a) Install the gasket (34) on the left HPC secondary flow control valve (1).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1230, PARAFFIN/REFINED/STANDARD (DPM 589-1)

HAZMAT 1000, REFER TO MSDS

- (b) Hold the gasket (34) in position with the paraffin wax (P05-059). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Lubricate the six bolt (33) threads with the engine oil (P03-001).
NOTE: The information that follows is for the aircraft before S/B PW4ENG 79-52.
- (d) Install the left HPC secondary flow control valve (1) on the engine with the bolts (33).
NOTE: The information that follows is for the aircraft after S/B PW4ENG 79-52.
- (e) Install the left HPT secondary flow control valve (1) and the bracket (32) to the engine with the bolts (33).
- (f) Torque the six bolts (33) to 85–95 in-lb (9.6–10.7 N·m). Tighten the bolts again to the same torque value until all bolts are correctly torqued.
NOTE: The information that follows is for the aircraft after S/B PW4ENG 79-52.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (g) Lubricate the bolt (29) threads with the engine oil (P03-001).
NOTE: The information that follows is for the aircraft after S/B PW4ENG 79-52.
- (h) Attach the tube (31) and clamp (30) to the bracket (32) with the bolt and nut (29 and 28).
NOTE: The information that follows is for the aircraft after S/B PW4ENG 79-52.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (i) Torque the nut (28) to 36–40 in-lb (4.1–4.5 N·m).
- (j) Lubricate the bolt (14) threads with the engine oil (P03–001).
- (k) Attach the tube (17) and the clamp (16) to the bracket (18) with the bolt (14) and the nut (15).
- (l) Torque the nut (15) to 36–40 in-lb (4.1–4.5 N·m).

NOTE: The information that follows is for the aircraft after S/B PW4ENG 75–79.



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- (m) Lubricate the adapter (21) threads with the antiseize paste (P06–054). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

NOTE: The information that follows is for the aircraft after S/B PW4ENG 75–79.

- (n) Install the signal tube (19) on the adapter (21) with your hand.

NOTE: If the cap assembly was removed by the service bulletin PW4ENG 75-79, the HPC air valve signal tube will be installed.

NOTE: Hold the adapter with a wrench at the HPC secondary flow control valve while the coupling nut is tightened.

NOTE: The information that follows is for the aircraft after S/B PW4ENG 75–79.

- (o) Torque the coupling nut (20) to 200–225 in-lb (22.6–25.4 N·m). Safety the coupling nut with the lockwire (P05–289), or safety cable (P05-291) and safety cable ferrule (P05-292).

- (p) Connect the W5P10 harness connector (13) to the HPC secondary flow control valve (1).



MAKE SURE YOU USE THE CORRECT INSTALLATION PROCEDURE AND TOOLS WHEN YOU INSTALL THE HARNESS CONNECTOR. IF AN INCORRECT PROCEDURE OR TOOL IS USED, IT CAN CAUSE DAMAGE TO THE CONNECTOR OR LOOSEN IT. A LOOSE CONNECTOR CAUSES VIBRATION TO OCCUR AND THE CONTACTS TO WEAR. THIS CAN CAUSE UNSATISFACTORY LIGHTNING PROTECTION.

- (q) Torque the W5P10 harness connector (13) to 21–26 in-lb (2.4–2.9 N·m). Safety the W5P10 harness connector with the lockwire (AS3214–01). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1082, PETROLATUM/WHITE (DPM 675)

HAZMAT 1000, REFER TO MSDS

- (r) Lubricate the preformed packing (26) with the white petrolatum (P06-002).
- (s) Install the coupling nut (24), washer (27) and preformed packing (26) on the HPC secondary flow control valve (1).
- (t) Install the coupling body (22), washer (27) and preformed packing (26) on the HPC secondary flow control valve cooling tube (23).
- (u) Connect the HPT cooling tube (23) to the HPT control valve (1) with the snap retainer (25).
- (v) Connect the coupling nut (24) to the coupling body (22) and torque to 65-79 in-lb (7.3–8.9 N·m). Safety with the lockwire (P05-289).
- (w) Remove the protective caps and plugs from the ducts and valves.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1272, LUBRICANT/DRY FILM (DMS QPL 1762 TYPE 7E)

HAZMAT 1000, REFER TO MSDS

- (x) Apply lubricant (P06-013) to the inner surface of the couplings (2, 3 and 4). (Figure 402)



CAUTION

IF THE VALVE HAS A COUPLING INDEX FINGER, INSTALL THE COUPLING WITH THE COUPLING HINGE GAP OVER THE FINGER. IF THE COUPLING IS NOT INSTALLED CORRECTLY, IT CAN CAUSE COUPLING FAILURE.



CAUTION

MAKE SURE THE VALVE AND DUCT CENTERLINE OFFSET ARE NOT MORE THAN 0.06 IN. (1.52 MM). THE ANGULAR DISTANCE BETWEEN MATING SURFACES MUST NOT BE MORE THAN 0.5 DEG. (0.009 RAD). IF THE VALVE AND DUCTS ARE NOT INSTALLED CORRECTLY, IT CAN CAUSE COUPLING SEAL FAILURE.

- (y) Hold the collector duct (8) in position and put a new seal (12) between the pressure regulator valve and the collector duct. Install the coupling (4) with your hand.
- (z) Put a new seal (10) between the check valve and the collector duct (8). Install the coupling (2) with your hand.
- (aa) Put a new seal (11) between the low pressure bleed duct and the collector duct (8). Install the coupling (3) with your hand.

EFFECTIVITY
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CAUTION

MAKE SURE THE SLIDE END OF THE COUPLING IS INSTALLED BETWEEN THE COUPLING BODY AND THE NUT. FAILURE TO CLOSE THE COUPLING CORRECTLY WILL CAUSE THE COUPLING TO BECOME DAMAGED.

- (ab) Torque the three couplings (2, 3 and 4) to 120 in-lb (13.6 N·m).

SUBTASK 75-22-01-420-269

- (3) Install the high pressure bleed air control valve. (INSTALLATION OF THE HIGH-PRESSURE BLEED-AIR CONTROL VALVE, TASK 36-11-03-400-802)

SUBTASK 75-22-01-830-268

- (4) Adjust the collector duct (8) support link as follows: (Figure 402)
- Loosen the support link jamnut and install the bushing (9) in the support link rod end.
 - Adjust the rod end until the bolt (7) is installed without a load on the collector duct (8).
 - Remove the bolt (7) and turn the rod end in (shorter) one half turn. Torque the support link jamnut to 100–140 in-lb (11.3–15.8 N·m).
 - Attach the support link to the collector duct (8) with the bolt (7), washer (6) and nut (5).
 - Torque the nut (5) to 480–690 in-lb (54.2–78.0 N·m).

SUBTASK 75-22-01-942-271

- (5) Remove the "DO NOT OPERATE" tags that follow:
- From the applicable thrust reverser lever.
 - From the auxiliary power unit control panel.
 - From the pneumatic ground connector access panels.

SUBTASK 75-22-01-865-273

- (6) Remove the safety tags and close these circuit breakers:

OVERHEAD, LEFT EMER AC BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
G	7	B1-309	ISOL VALVE CONTROL 1 TO 3

OVERHEAD, RIGHT EMER AC BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
G	25	B1-311	ISOL VALVE CONTROL 1 TO 2

UPPER MAIN, CABIN PRESS & PNEUMATICS DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	7	B1-297	APU VALVE CONTROL
H	8	B1-582	PNEU PRESS REG VLV ENG 3
H	9	B1-291	PNEU SYS CONTRLR DIGIT SYS 1

UPPER MAIN, CABIN PRESS & PNEUMATICS DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	7	B1-298	PNEU SYS CONTRLR ANALOG SYS 2
J	8	B1-580	PNEU PRESS REG VLV ENG 1
J	9	B1-299	PNEU SYS CONTRLR DIGIT SYS 2

EFFECTIVITY
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UPPER MAIN, CABIN PRESS & PNEUMATICS DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	8	B1-581	PNEU PRESS REG VLV ENG 2
K	9	B1-280	PNEU SYS CONTRLLR ANALOG SYS 1
K	11	B1-572	MANF FAIL S/O CONTROL

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

G. Job Close-up - Left High Pressure Compressor Secondary Flow Control Valve Installation

SUBTASK 75-22-01-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-22-01-410-273

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-22-01-710-269

- (3) Do the engine test. (ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870) (ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873)

———— END OF TASK ————

TASK 75-22-01-000-869

4. REMOVAL OF THE RIGHT HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 405

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector
MIL-C-5501	Protective caps and plugs
Not specified	Spanner wrench, Wig-o-flex

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Right High Pressure Compressor Secondary Flow Control Valve Removal

SUBTASK 75-22-01-865-271



TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

Row	Col	Number	Name
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

Row	Col	Number	Name
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-22-01-010-272

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Right High Pressure Compressor Secondary Flow Control Valve Removal

SUBTASK 75-22-01-020-268

- (1) Remove the right HPC secondary flow control valve (1) as follows: (Figure 404)
- Disconnect the coupling body (2) on the cooling tube (3) from the coupling nut (4). (Figure 405)
 - Remove the snap retainer (5), preformed packings (6), washers (7), coupling body (2) and the coupling nut (4). Discard the preformed packings and install the protective caps and plugs.
 - Disconnect the W4P10 harness connector (8) from the right HPC secondary flow control valve (1). Install the protective caps and plugs.
 - Remove the bolt (9), nut (10) and washer (11) that attach the tube clamp (12) and the tube to the bracket (13).
 - Remove the bolt (14), nut (15) and washer (16) that attach the bracket to the bracket (13).

NOTE: The data that follows is for the aircraft after S/B PW4ENG 75-79 and before S/B PW4ENG 75-116.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (f) Disconnect the signal tube (17) coupling nut (18) from the adapter (19). Install the protective caps and plugs.
- NOTE: In service bulletin PW4ENG 75-79, the air valve signal tube was re-installed and the caps on the air filter and HPC air valve are removed.
- NOTE: The data that follows is for the aircraft before S/B PW4ENG 75-79 and S/B PW4ENG 75-116.
- (g) Remove the cap assembly (22) from the adapter (19).
- NOTE: In alert service bulletin PW4ENG 75-62, the air valve signal tube was removed and the air filter and HPC air valve is capped.
- NOTE: The data that follows is for the aircraft before and after S/B PW4ENG 75-79 and S/B PW4ENG 75-116.
- (h) Remove the six bolts (20) that attach the right HPC secondary flow control valve (1) and the bracket (13) to the engine.
- (i) Remove the right HPC secondary flow control valve (1). Discard the gasket (21). Install the protective caps and plugs.

SUBTASK 75-22-01-840-270

- (2) If necessary, remove the hardware for installation on the new HPC secondary flow control valve (1) as follows: (Figure 405)
- Remove the adapter (19) from the right HPC secondary flow control valve (1). Discard the gasket (23) and install the protective caps and plugs.
 - Remove the plug (24) from the right HPC secondary flow control valve (1). Discard the gasket (25) and install the protective caps and plugs.
 - Remove the three bolts (26) that attach the plain cover (27) to the right HPC secondary flow control valve (1). Remove the cover and install the protective caps and plugs.
 - Remove the three bolts (28) that attach the vented cover (29) to the right HPC secondary flow control valve (1). Remove the cover and install the protective caps and plugs.

SUBTASK 75-22-01-410-268

- (3) If the right HPC secondary flow control valve is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

— END OF TASK —

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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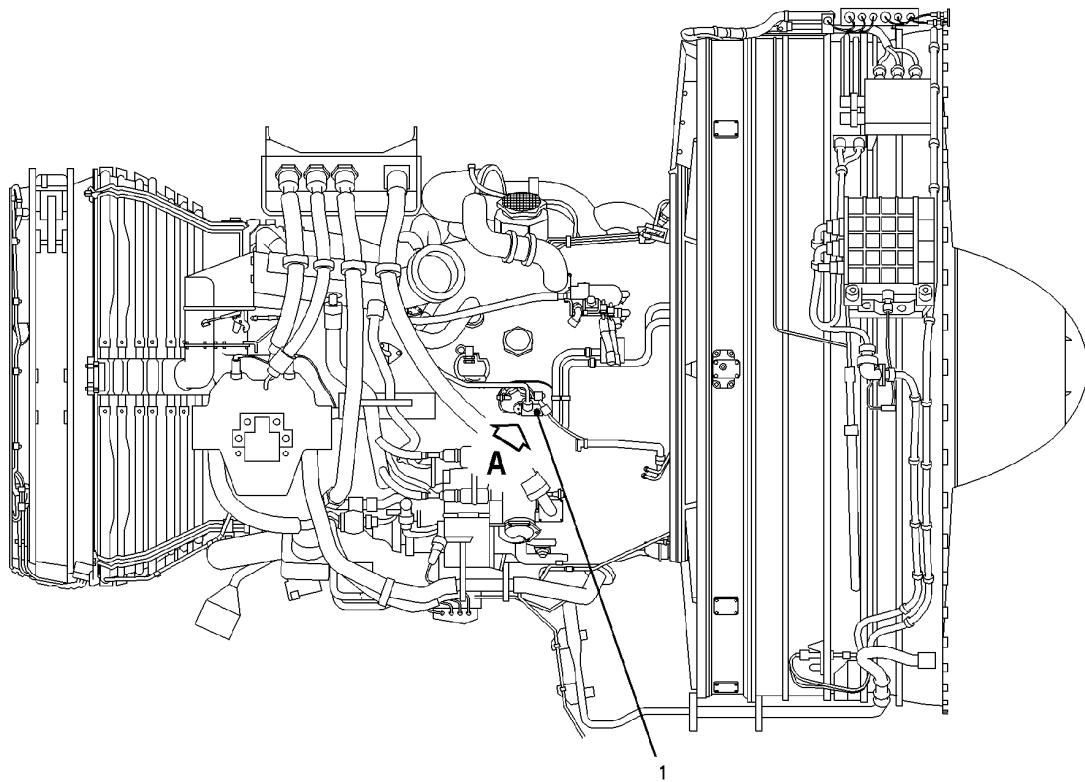
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LEGEND:

1. RIGHT HPC SECONDARY FLOW CONTROL VALVE

CAG(IGDS)

DB2-75-0250

HPC Flow Control Valve - Right
Figure 404/75-22-01-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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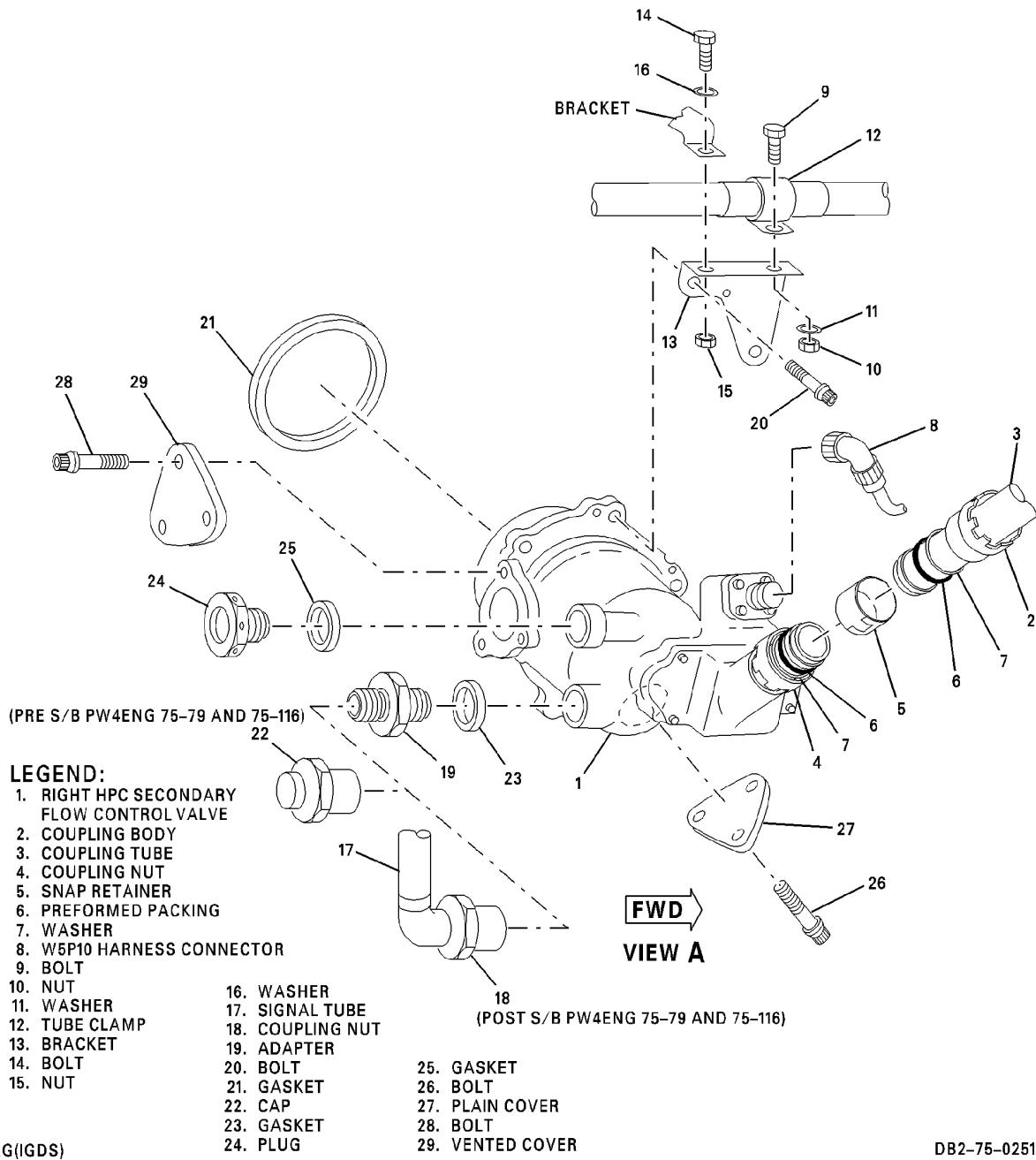
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HPC Flow Control Valve - Right
Figure 405/75-22-01-990-873

EFFECTIVITY
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TASK 75-22-01-400-869

5. INSTALLATION OF THE RIGHT HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 406

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 5–150 in-lb (0.5–17.0 N·m)
Not specified	Torque wrench 0–300 in-lb (0–34.0 N·m)
Not specified	Spanner wrench, Wig-o-flex
Not specified	Strap wrench (glenair TG-70)

B. Consumable Materials

(1) Consumable Materials

NOTE: Some materials in the Consumable Materials chart may not be permitted to be used in your location. Persons in each area location must make sure they are permitted to use these materials. All persons must obey all applicable federal, state, local and provincial regulations for their location.

NOTE: Equivalent replacements are permitted for the items that follow.

Table 407

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)
P05-059	Wax, paraffin (PMC 9552)
P06-002	Petrolatum, white (PMC 9609)
P06-054	Paste, antiseize (PWA 36246)
P05-288	Lockwire (AS3214-01)
P05-289	Lockwire (AS3214-02)
P05-291	Cable, safety (optional)
P05-292	Ferrule, safety cable (optional)

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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C. Expendable Parts

(1) Expendable Parts

Table 408

REFERENCE/ITEM	DESIGNATION	IPC
Fig. 405/6	Packing, preformed	IPC 75-23-45-10-250
Fig. 405/21	Gasket	IPC 75-33-10-10
Fig. 405/23, 25	Gasket	IPC 75-33-10-10-070

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-23-45-10-250	Illustrated Parts Catalog
IPC 75-33-10	Illustrated Parts Catalog
IPC 75-33-10-10	Illustrated Parts Catalog
IPC 75-33-10-10-070	Illustrated Parts Catalog

E. Job Set-up - Right High Pressure Compressor Secondary Flow Control Valve Installation

SUBTASK 75-22-01-865-270



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that these circuit breakers are open and have safety tags:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-22-01-010-273

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
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F. Procedure - Right High Pressure Compressor Secondary Flow Control Valve Installation

SUBTASK 75-22-01-430-268

- (1) If it is necessary to install a new right HPC secondary flow control valve (1), do the subsequent procedure: (IPC 75-33-10) (Figure 405)
 - (a) Put the HPC secondary flow control valve (1) on a bench as shown in the referenced task. Remove the protective caps and plugs. (Figure 405)
 - (b) Install the gasket (25) on the plug (24).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (c) Lubricate the plug (24) threads with the engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (d) Put the plug (24) in the top outboard hole of the right HPC secondary flow control valve (1).
- (e) Torque the plug (24) to 110–120 in-lb (12.4–13.6 N·m). Safety the plug with the lockwire (P05-289) or the safety cable (P05-291) and cable ferrule (P05-292).
- (f) Lubricate the three bolt (28) threads with the engine oil (P03-001).
- (g) Put the vented cover (29) on the rear inboard hole on the right HPC secondary flow control valve (1). Install the bolts (28).
- (h) Torque the bolts (28) to 85–95 in-lb (9.6–10.7 N·m). Safety the bolts with the lockwire (P05-289).
- (i) Lubricate the three bolt (26) threads with the engine oil (P03-001).
- (j) Put the plain cover (27) on the bottom forward hole on the right HPC secondary flow control valve (1). Install the bolts (26).
- (k) Torque the bolts (26) to 85–95 in-lb (9.6–10.7 N·m). Safety the bolts with the lockwire (P05-289).
- (l) Install the gasket (23) on the adapter (19).
- (m) Lubricate the threads of the adapter (19) with the engine oil (P03-001).
- (n) Put the adapter (19) into the bottom outboard hole of the right HPC secondary flow control valve (1).
- (o) Torque the adapter (19) to 110–120 in-lb (12.4–13.6 N·m).
NOTE: The data that follows is for the aircraft before S/B PW4ENG 75-79 and S/B PW4ENG 75-116.
- (p) Put the cap assembly (22) on the adapter (19).
NOTE: In alert service bulletin PW4ENG 75-62, the air valve signal tube was removed and the air filter and HPC air valve is capped.

EFFECTIVITY
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- (q) Torque the cap assembly (22) to 270–300 in-lb (30.5–33.9 N·m). Safety the cap assembly with the lockwire (P05-289) or safety cable (P05-291) and cable ferrule (P05-292).

NOTE: Hold the adapter with a wrench at the HPC secondary flow control valve while the cap assembly is tightened.

SUBTASK 75-22-01-420-271

NOTE: The data that follows is for the aircraft before and after S/B PW4ENG 75-79 and S/B PW4ENG 75-116.

- (2) Install the right HPC secondary flow control valve (1) as follows: (Figure 405)
- (a) Install the gasket (21) on the right HPC secondary flow control valve (1).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1230, PARAFFIN/REFINED/STANDARD (DPM 589-1)

HAZMAT 1000, REFER TO MSDS

- (b) Hold the gasket (21) in position with the paraffin wax (P05-059).
- (c) Lubricate the six bolt (20) threads with the engine oil (P03-001).
- (d) Install the right HPC secondary flow control valve (1) and the bracket (13) on the engine with the bolts (20).
- (e) Torque the six bolts (20) to 85–95 in-lb (9.6–10.7 N·m). Tighten the bolts again to the same torque value until all bolts are correctly torqued.
- (f) Lubricate the bolt (9) threads with the engine oil (P03-001).
- (g) Attach the tube and the clamp (12) to the bracket (13) with the bolt (9), washer (11) and the nut (10).
- (h) Torque the nut (10) to 36–40 in-lb (4.1–4.5 N·m).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (i) Lubricate the bolt (14) threads with the engine oil (P03-001).
- (j) Attach the bracket to the bracket (13) with the bolt (14), washer (16) and nut (15).
- (k) Torque the nut (15) to 85–95 in-lb (9.6–10.7 N·m).

NOTE: The data that follows is for the aircraft after S/B PW4ENG 75-79 and S/B PW4ENG 75-116.

EFFECTIVITY
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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- (l) Lubricate the signal tube (17) threads with the antiseize paste (P06-054).

NOTE: In service bulletin PW4ENG 75-79, the air valve signal tube was re-installed and the caps on the air filter and HPC air valve are removed.

- (m) Install the signal tube (17) on the adapter (19) with your hand.

- (n) Torque the signal tube (17) coupling nut (18) to 200-225 in-lb (22.6–25.4 N·m). Safety the coupling nut with the lockwire (P05-289) or the safety cable (P05-291) and cable ferrule (P05-292). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

NOTE: Hold the adapter with a wrench at the HPC secondary flow control valve while the signal tube is tightened.

NOTE: The data that follows is for the aircraft before and after S/B PW4ENG 75–79 and S/B PW4ENG 75-116.

- (o) Connect the W4P10 harness connector (8) to the right HPC secondary flow control valve (1).



MAKE SURE YOU USE THE CORRECT INSTALLATION PROCEDURE AND TOOLS WHEN YOU INSTALL THE HARNESS CONNECTOR. IF AN INCORRECT PROCEDURE OR TOOL IS USED, IT CAN CAUSE DAMAGE TO THE CONNECTOR OR LOOSEN IT. A LOOSE CONNECTOR CAUSES VIBRATION TO OCCUR AND THE CONTACTS TO WEAR. THIS CAN CAUSE UNSATISFACTORY LIGHTNING PROTECTION.

- (p) Torque the W4P10 harness connector (8) to 21–26 in-lb (2.4–2.9 N·m). Safety the W4P10 harness connector with the lockwire (P05-288).



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1082, PETROLATUM/WHITE (DPM 675)

HAZMAT 1000, REFER TO MSDS

- (q) Lubricate the preformed packings (6) with the white petrolatum (P06-002).

- (r) Install the coupling nut (4), washer (7) and preformed packing (6) on the right HPC secondary flow control valve (1).

- (s) Install the coupling body (2), washer (7) and preformed packing (6) on the right HPC secondary flow control valve cooling tube (3).

- (t) Connect the HPT cooling tube (3) to the right HPT secondary flow control valve (1) with the snap retainer (5).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (u) Connect the coupling nut (4) to the coupling body (2) and torque to 65-79 in-lb (7.3–8.9 N·m). Safety with the lockwire (P05-289)).

SUBTASK 75-22-01-865-274

- (3) Remove the safety tags and close these circuit breakers:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

G. Job Close-up - Right High Pressure Compressor Secondary Flow Control Valve Installation

SUBTASK 75-22-01-942-270

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-22-01-410-274

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-22-01-710-268

- (3) Do the engine test. (ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870) (ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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INDICATOR PIN, HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE – INSPECTION/CHECK

1. General

- A. This procedure has the inspection instructions for the high pressure compressor secondary flow control (HPCSFC) air valve. There are two valves, a left and a right. The left valve is mounted on the HPC rear case at the 9:00 o'clock position and the right valve at the 3:30 o'clock position. Inspection of the valve position indicator pins is the same for the left and the right valve assemblies. Access to the HPC secondary flow control air valves is through the thrust-reverser doors.

NOTE: A retracted position of the indicator pin on the HPCSFC valve is an indication that the valve has failed. The valve is in the closed position.

NOTE: When the HPCSFC valve does not operate correctly it will cause high operation temperatures in the HPT and LPT modules. Continuous operation of engines with failed valves will decrease the life of the life-limited parts of the turbine modules.

- B. The HPCSFC valve supplies cooling airflow to the HPC and LPT areas. It also supplies seal pressurization air for the No. 1.5 bearing and No. 2 bearing front carbon seals. If there is an electrical failure to a valve, the valve will fail-safe to the open position.
- C. Unless different instructions are given, these procedures are the same for all three Pratt & Whitney PW4460/4462 engines.

TASK 75-22-01-200-868

2. INSPECTION OF THE HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE INDICATOR PIN

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 601

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-22-01-000-868	REMOVAL OF THE LEFT HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE (P/B 401)
75-22-01-000-869	REMOVAL OF THE RIGHT HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE (P/B 401)
75-22-01-400-868	INSTALLATION OF THE LEFT HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE (P/B 401)
75-22-01-400-869	INSTALLATION OF THE RIGHT HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE (P/B 401)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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C. Job Set-up - High Pressure Compressor Secondary Flow Control Valve Indicator Pin Inspection

SUBTASK 75-22-01-010-271

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - High Pressure Compressor Secondary Flow Control Valve Indicator Pin Inspection

SUBTASK 75-22-01-210-267

- (1) Examine the indicator pins (2) of the two high pressure compressor secondary flow control (HPCSFC) valves (1) as follows: (Figure 601)

Table 602

INDICATOR PIN POSITION	VALVE CONDITION
The position indicator pin on the valve is in the extended position.	Valve is functional (valve is open)
<p><u>NOTE:</u> The indicator pin is in the extended position when the top of the pin is level with the valve housing.</p> <p>The position indicator pin on the valve is in retracted position.</p>	<p>Valve has failed (valve is closed)</p> <p>Replace the defective valve as soon as possible, but not later than 500 hours after the inspection.</p>
<p><u>NOTE:</u> The referenced Task shows the HPCSFC valve on the left side of the engine. The HPCSFC valve installation for the right side of the engine is equivalent. Primary difference: the valve assembly is turned 180 degrees on its horizontal axis. (Figure 601)</p>	

SUBTASK 75-22-01-210-268

- (2) If applicable, replace the defective HPCSFC valve. (REMOVAL OF THE LEFT HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE, TASK 75-22-01-000-868)(INSTALLATION OF THE LEFT HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE, TASK 75-22-01-400-868)(REMOVAL OF THE RIGHT HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE, TASK 75-22-01-000-869)(INSTALLATION OF THE RIGHT HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE, TASK 75-22-01-400-869)

E. Job Close-up - High Pressure Compressor Secondary Flow Control Valve Indicator Pin Inspection

SUBTASK 75-22-01-942-268

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-22-01-410-271

- (2) Close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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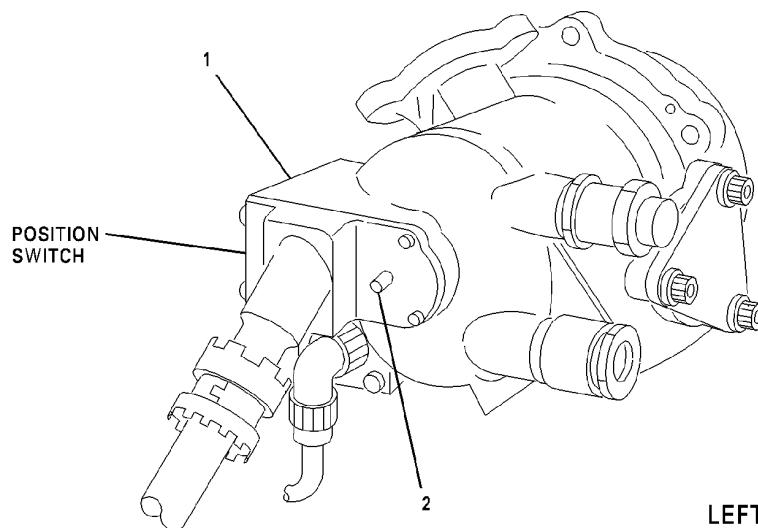
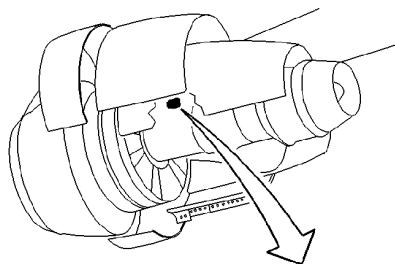
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LEFT SIDE SHOWN
RIGHT SIDE OPPOSITE

LEGEND:

1. HPC/SFC VALVE
2. POSITION INDICATOR PIN

CAG(IGDS)

DB2-75-0263

HPC Secondary Flow Control Valve - Left Side
Figure 601/75-22-01-990-874

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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FILTER ELEMENT, HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE -
MAINTENANCE PRACTICES

1. General

- A. This procedure has the maintenance practices for the High Pressure Compressor (HPC) secondary flow control valve filter element. The procedure includes:
 - Removal of the HPC secondary flow control valve filter element
 - Installation of the HPC secondary flow control valve filter element
 - Inspection of the HPC flow control valve filter element
- B. There are two filter elements, one on the left side and one on the right side of the engine. The procedure for the removal and installation of the two filter elements are the same.
- C. Unless different instructions are given, these maintenance procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-22-02-000-868

2. REMOVAL OF THE HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE FILTER ELEMENT

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 201

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - High Pressure Compressor Secondary Flow Control Valve Filter Element Removal

SUBTASK 75-22-02-010-268

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - High Pressure Compressor Secondary Flow Control Valve Filter Element Removal

SUBTASK 75-22-02-020-267

- (1) Remove the secondary flow control valve filter element (1) as follows: (Figure 201)
 - (a) Loosen and remove the filter case (2) from the filter head assembly (3).
 - (b) Loosen and remove the filter element (1) from the filter head assembly (3).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (c) Install the protective caps and plugs on the filter head assembly (3).

SUBTASK 75-22-02-410-267

- (2) If the HPC filter element is not installed immediately, or weather conditions make it necessary, close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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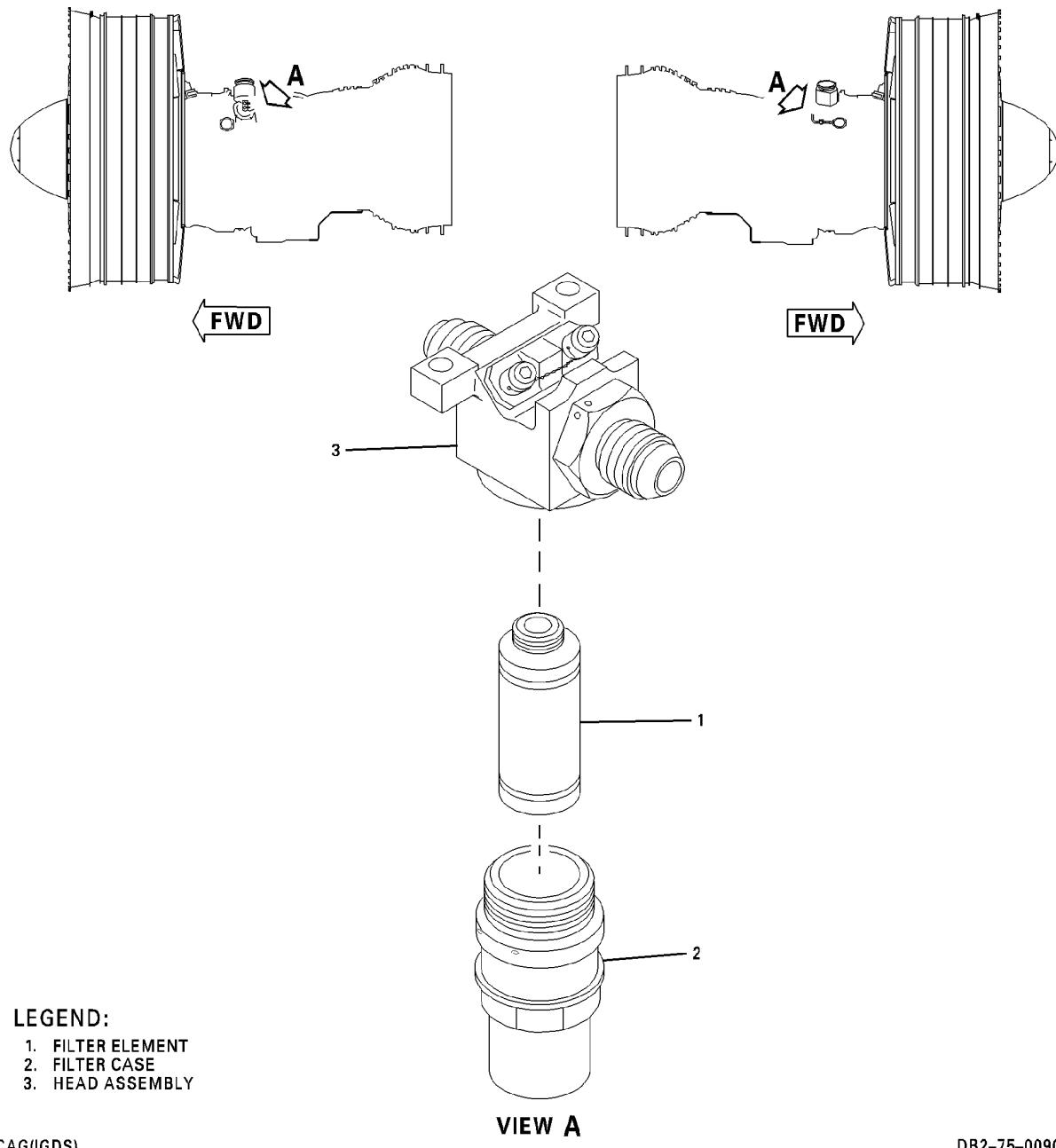
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HPC Flow Control Valve Filter Element - Removal/Installation
Figure 201/75-22-02-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-22-02-400-868

3. INSTALLATION OF THE HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE FILTER ELEMENT

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 202

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.20–2.40 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–500 in-lb (0–56.5 N·m)
Model M303, M305 or M307	Crimper, Bergen Mechanical (optional)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

Table 203

REFERENCE	DESIGNATION
P05-289	Lockwire (AS3214-02)
P05-291	Cable, safety (optional)
P05-292	Ferrule, safety cable (optional)

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - High Pressure Compressor Secondary Flow Control Valve Filter Element Installation

SUBTASK 75-22-02-010-270

- (1) If necessary, open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - High Pressure Compressor Secondary Flow Control Valve Filter Element Installation

SUBTASK 75-22-02-420-267

- (1) Install the High Pressure Compressor (HPC) secondary flow control valve filter element (1) as follows: (Figure 201)
- Remove the protective caps and plugs from the filter head assembly (3).
 - Turn the filter element (1) on to the head assembly (3).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (c) Tighten the filter element (1) with your hand.
- (d) Install the filter case (2) on to the filter head assembly (3).
- (e) Torque the filter case (2) to 240–300 in-lb (27.1–33.9 N·m).
- (f) Safety the filter case (2) to the filter head (3) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

F. Job Close-up - High Pressure Compressor Secondary Flow Control Valve Filter Element Installation

SUBTASK 75-22-02-942-267

- (1) Remove all the tools and equipment from the work area. Make sure that the area is clean.

SUBTASK 75-22-02-410-268

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

TASK 75-22-02-200-868

4. INSPECTION OF THE HIGH PRESSURE COMPRESSOR FLOW CONTROL VALVE FILTER ELEMENT

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 204

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-22-02-100-869	CLEANING OF THE HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE FILTER ELEMENT (P/B 701)

C. Job Set-up - High Pressure Compressor Secondary Flow Control Valve Filter Element Inspection

SUBTASK 75-22-02-010-272

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-22-02-020-268

- (2) Remove the HPC secondary flow control valve filter element. (REMOVAL OF THE HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE FILTER ELEMENT, TASK 75-22-02-000-868)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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D. Procedure - High Pressure Compressor Secondary Flow Control Valve Filter Inspection

SUBTASK 75-22-02-210-267

- (1) Examine the High Pressure Compressor (HPC) secondary flow control valve filter element (1) as follows: (Figure 201)
 - (a) Do a visual inspection of the HPC secondary flow control valve filter element (1) for signs of unwanted material.
 - (b) If necessary, clean the filter element. (CLEANING OF THE HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE FILTER ELEMENT, TASK 75-22-02-100-869)

E. Job Close-up - High Pressure Compressor Secondary Flow Control Valve Filter Inspection

SUBTASK 75-22-02-420-268

- (1) Install the HPC secondary flow control valve filter element. (INSTALLATION OF THE HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE FILTER ELEMENT, TASK 75-22-02-400-868)

SUBTASK 75-22-02-942-268

- (2) Remove all the tools and equipment from the work area. Make sure that the area is clean.

SUBTASK 75-22-02-410-270

- (3) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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**FILTER ELEMENT, HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL AND TURBINE
VANE AND BLADE COOLING AIR VALVES - CLEANING/PAINTING**

1. General

- A. This procedure has the cleaning tasks for the High Pressure Compressor (HPC) secondary flow control valve and Turbine Vane and Blade (TVB) cooling air filter elements.
- B. There are four filter elements, two on the left side and two on the right side of the engine. The two right filter housing assemblies and the lower left filter housing assembly are part of the HPC Secondary Flow Control system. The upper left filter housing assembly is part of the Turbine Vane and Blade Cooling Air system. The left filter housing assemblies are mounted on a J-flange bracket at the 11:00 o'clock position. The right filter housing assemblies are mounted on a J-flange bracket at the 1:00 o'clock position. The procedure for the cleaning of the two filter elements are the same.
- C. Unless different instructions are given, these maintenance procedures are the same for the three (Before Phase III) Pratt & Whitney PW4460/4462 engines.

TASK 75-22-02-100-869

**2. CLEANING OF THE HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE
FILTER ELEMENT**

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 701

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Air, dry-filtered, 20 psig (138 kPa gage)

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 702

REFERENCE	DESIGNATION
P05-005	Cloth, lint-free
P11-004	Solvent, cleaning (P-D-680) type II
P05-058	Brush, stiff bristle nonmetallic

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-22-02-000-868	REMOVAL OF THE HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE FILTER ELEMENT (P/B 201)
75-22-02-400-868	INSTALLATION OF THE HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE FILTER ELEMENT (P/B 201)

D. Job Set-up - High Pressure Compressor Secondary Flow Control Valve Filter Element Cleaning

SUBTASK 75-22-02-010-275

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-22-02-020-271

- (2) Remove the HPC secondary flow control valve filter element. (REMOVAL OF THE HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE FILTER ELEMENT, TASK 75-22-02-000-868)

E. Procedure - High Pressure Compressor Secondary Flow Control Valve Filter Element Cleaning

SUBTASK 75-22-02-140-268

- (1) Clean the high pressure compressor secondary flow control valve filter element (1) as follows: (Figure 701)

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1179, SOLVENT/P-D-680 TYPE 2

HAZMAT 1000, REFER TO MSDS

- (a) Remove the unwanted material from the filter element (1) with the brush (P05-058) and the cleaning solvent (P11-004). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)



MAKE SURE YOU USE THE APPROVED SAFETY EQUIPMENT FOR YOUR EYES WHEN YOU USE COMPRESSED AIR. DO NOT LET THE AIR BLOW IN YOUR EYES OR ON YOUR SKIN. THIS WILL HELP PREVENT INJURY TO PERSONS.

- (b) Dry the filter element (1) with the cloth (P05-005) or with dry filtered compressed air at 20 psi (138 kPa) maximum. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Clean the filter element (1) again if the unwanted material stays on the filter.

NOTE: If the contamination stays on the filter element, replace the filter element.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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SUBTASK 75-22-02-420-270

- (2) Install the high pressure compressor secondary flow control valve filter element.
(INSTALLATION OF THE HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE FILTER ELEMENT, TASK 75-22-02-400-868)

F. Job Close-up - High Pressure Compressor Secondary Flow Control Valve Filter Element Cleaning

SUBTASK 75-22-02-942-270

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-22-02-410-274

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

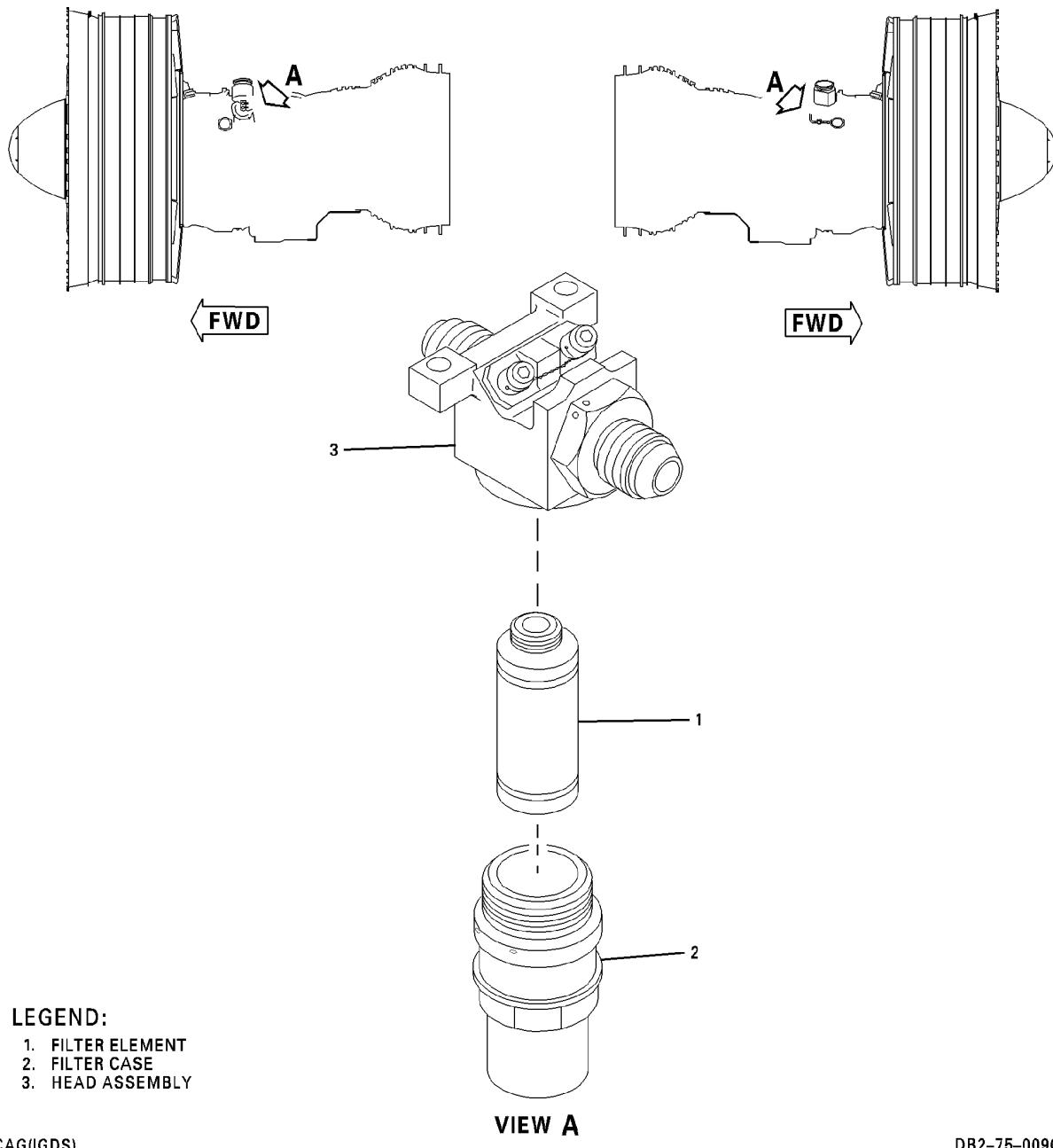
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HPC Flow Control and TVB Cooling Air Valve Filter Element
Figure 701/75-22-02-990-869

EFFECTIVITY
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AIRCRAFT MAINTENANCE MANUAL

TASK 75-22-02-100-870

3. CLEANING OF THE TVB COOLING AIR VALVE FILTER ELEMENT

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 703

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Air, dry-filtered, 20 psig (138 kPa gage)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 704

REFERENCE	DESIGNATION
P05-005	Cloth, lint-free
P11-004	Solvent, cleaning (P-D-680) type II
P05-058	Brush, stiff bristle nonmetallic

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-22-05 P/B 401 Config 2	FILTER HOUSING ASSEMBLIES, PW4460/4462 (BEFORE PHASE-3) HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL AND TURBINE VANE AND BLADE COOLING AIR VALVES – REMOVAL/INSTALLATION
75-22-06 P/B 401 Config 2	FILTER HOUSING ASSEMBLIES, PW4460/4462-3 (PHASE-3) TURBINE VANE AND BLADE COOLING AIR VALVE - REMOVAL/INSTALLATION

D. Job Set-up - TVB Cooling Air Valve Filter Element Cleaning

SUBTASK 75-22-02-010-276

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-22-02

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SUBTASK 75-22-02-020-272

- (2) Remove the TVB Cooling Air valve filter element. (FILTER HOUSING ASSEMBLIES, PW4460/4462 (BEFORE PHASE-3) HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL AND TURBINE VANE AND BLADE COOLING AIR VALVES – REMOVAL/INSTALLATION, PAGEBLOCK 75-22-05/401 Config 2) or (FILTER HOUSING ASSEMBLIES, PW4460/4462-3 (PHASE-3) TURBINE VANE AND BLADE COOLING AIR VALVE - REMOVAL/INSTALLATION, PAGEBLOCK 75-22-06/401 Config 2)

E. Procedure - TVB Cooling Air Valve Filter Element Cleaning

SUBTASK 75-22-02-140-269

- (1) Clean the TVB Cooling Air valve filter element (1) as follows:

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

WARNING !
THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1179, SOLVENT/P-D-680 TYPE 2

HAZMAT 1000, REFER TO MSDS

- (a) Remove the unwanted material from the filter element (1) with the brush (P05-058) and the cleaning solvent (P11-004). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

!
WARNING MAKE SURE YOU USE THE APPROVED SAFETY EQUIPMENT FOR YOUR EYES WHEN YOU USE COMPRESSED AIR. DO NOT LET THE AIR BLOW IN YOUR EYES OR ON YOUR SKIN. THIS WILL HELP PREVENT INJURY TO PERSONS.

- (b) Dry the filter element (1) with the cloth (P05-005) or with dry filtered compressed air at 20 psi (138 kPa) maximum. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

- (c) Clean the filter element (1) again if the unwanted material stays on the filter.

NOTE: If the contamination stays on the filter element, replace the filter element.

SUBTASK 75-22-02-420-271

- (2) Install the TVB Cooling Air valve filter element. (FILTER HOUSING ASSEMBLIES, PW4460/4462 (BEFORE PHASE-3) HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL AND TURBINE VANE AND BLADE COOLING AIR VALVES – REMOVAL/INSTALLATION, PAGEBLOCK 75-22-05/401 Config 2) or (FILTER HOUSING ASSEMBLIES, PW4460/4462-3 (PHASE-3) TURBINE VANE AND BLADE COOLING AIR VALVE - REMOVAL/INSTALLATION, PAGEBLOCK 75-22-06/401 Config 2)

F. Job Close-up - TVB Cooling Air Valve Filter Element Cleaning

SUBTASK 75-22-02-942-271

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-22-02-410-275

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-22-02

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AIRCRAFT MAINTENANCE MANUAL

HPC SECONDARY FLOW CONTROL VALVE/IDGS AIR-OIL HEAT EXCHANGER VALVE OVERRIDE SOLENOID, AND PHASE-3 TURBINE VANE COOLING AIR VALVE/IDGS HEAT EXCHANGER VALVE OVERRIDE SOLENOID - DESCRIPTION AND OPERATION

1. General

- A. This two coil, four way solenoid valve assembly is installed on the right side of the engine. Its function is to operate the cooling air valves. The solenoid assembly gets its signals from the FADEC/EEC. The FADEC/EEC calculates the aircraft altitude and engine high rotor speed (N2) inputs and transmits them to the solenoid assembly. The solenoid assembly sends muscle pressure to open or close the cooling air valves to control the airflow to the HPT and/or the LPT.
- B. The same solenoid valve assembly is used on the "before" PHASE-3 (PW4460/4462) and the "after" PHASE-3 (PW4460/4462 -3) engine configurations. The differences between the functions of the solenoids before and after PHASE-3 are as follows: (Figure 1)

Before PHASE-3 (PW4460/4462) the solenoid operates:

1. The right HPC secondary airflow control valve
2. The IDGS air/oil heat exchanger valve override-pressure switch.

After PHASE-3 (PW4460/4462 -3) the solenoid operates:

1. The lower-right turbine vane cooling air valve
2. The IDGS air/oil heat exchanger valve override-pressure switch.

NOTE: After-PHASE-3 engines have no HPC secondary airflow control valves. These engines have a turbine vane cooling air valve (upper right) installed on the HPC rear case at the 2 o'clock position.

- C. The chart that follows compares the "before" and the "after" PHASE-3 configurations:

BEFORE-PHASE-3	AFTER-PHASE-3	RIGHT SOLENOID ASSEMBLY OPERATES
x		The right HPC Secondary Airflow control valve
x	x	The IDGS air/oil heat exchanger valve override pressure switch
	x	The lower-right turbine vane-and-blade coolingair valve

- D. When the right solenoid coil has a failure, it will automatically send fail safe air pressure to the valves. This air pressure will actuate the valves to the open position to continue the cooling airflow.

BEFORE-PHASE-3	AFTER-PHASE-3	FAIL SAFE PRESSURE TO
x		The right HPC Secondary Airflow Control valve
	x	The lower-right turbine vane-and-blade cooling air valve

- E. When the valves are open, the position indicator pins of the valves will extend above the valve housings. In the open position, the valves flow air to cool the HPC or the HPT turbine vanes and/or blades.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-22-03

Config 2

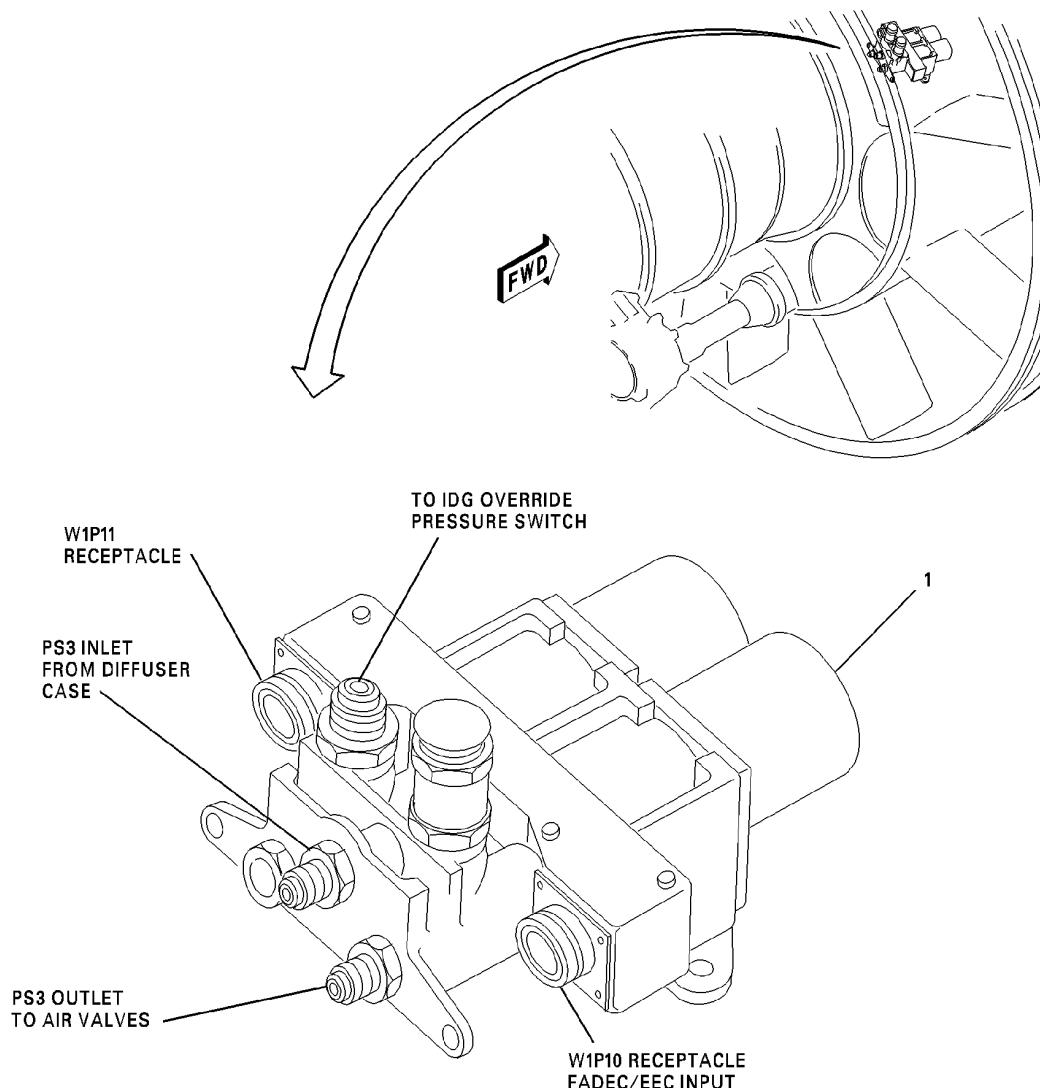
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LEGEND:

1. PW4460/4462 RIGHT HPC FLOW CONTROL VALVE, IDGS AIR/OIL HEAT EXCHANGER VALVE OVERRIDE SOLENOID
OR
PW4460/4462 -3 RIGHT TURBINE VANE-AND-BLADE COOLING AIR VALVE, IDGS AIR/OIL HEAT EXCHANGER VALVE OVERRIDE SOLENOID

CAG(IGDS)

DB2-75-0261

HPC and Turbine Cooling Solenoid - Right
Figure 1/75-22-03-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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AIRCRAFT MAINTENANCE MANUAL

**SOLENOID, PW4460/4462 HPC SECONDARY FLOW CONTROL VALVE OR PW4460/4462-3 TURBINE
VANE AND BLADE COOLING AIR VALVE - REMOVAL/INSTALLATION**

1. General

- A. This procedure has the removal and installation instructions for the solenoid configurations that follow:

- PW4460/4462, BEFORE PHASE III:
 - HPC secondary flow control valve, IDGS Air/Oil Heat
 - Exchanger Valve Solenoid.
- PW4460/4462 -3, AFTER PHASE III:
 - Turbine Vane and Blade Cooling Air Valve, IDGS Air/Oil Heat
 - Exchanger Valve Solenoid.

NOTE: The solenoids of the before and after PHASE-3 configurations are internally the same. They are only different in name, function and part number.

- B. The solenoid is installed on the right side of the engine. Access to the solenoid is through the inner rear fan exit liner segment at the 1 o'clock position. Access to the liner segment is through the right thrust reverser door.
- C. Unless different instructions are given, these procedures are the same for all three Pratt & Whitney PW4460/4462 and PW4460/4462 -3 engines.

TASK 75-22-03-000-868

**2. REMOVAL OF THE PW4460/4462 HPC SECONDARY FLOW CONTROL VALVE OR, PW4460/4462 -3
TURBINE VANE AND BLADE COOLING AIR VALVE SOLENOID**

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No.1 and No.3 engines 4-8 ft high (1.22-2.44 m)
Not specified	Aerial boom, manlift No. 2 Engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
72-33-02-000-869	REMOVAL OF THE FAN EXIT LINER INNER REAR SEGMENTS (P/B 401)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-22-03

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C. Job Set-up - PW4460/4462 HPC Flow Control Valve Solenoid or PW4460/4462 –3 Turbine Vane and Blade Cooling Air Valve Solenoid Removal

SUBTASK 75-22-03-865-270



WARNING

MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	15	B1-592	REVERSING CONTROL ENG 2

SUBTASK 75-22-03-010-273

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-22-03-010-276

- (3) Remove the 1 o'clock position, inner rear fan exit liner segment and the spacer plate. (REMOVAL OF THE FAN EXIT LINER INNER REAR SEGMENTS, TASK 72-33-02-000-869)

NOTE: Be very careful when you remove or install a liner segment. The classified washers that are attached with adhesive to the liner bracket can become disconnected and fall off. Also be careful not to hit the edge of the liner against other parts of the engine. This can cause delamination of the liner.

D. Procedure - PW4460/4462 HPC Flow Control Valve Solenoid or PW4460/4462 –3 Turbine Vane and Blade Cooling Air Valve Solenoid Removal

SUBTASK 75-22-03-020-270

- (1) Remove the solenoid (1) as follows: (Figure 401)



CAUTION

MAKE SURE THAT YOU USE ONLY PLUG PLIERS TO DISCONNECT OR CONNECT THE PLUGS. WHEN YOU INSTALL THE PLUG, DO NOT TIGHTEN TOO MUCH. THIS WILL PREVENT DAMAGE TO THE PLUG.

- (a) Disconnect and tag electrical connectors (2 and 3) from the solenoid (1). Install the protective caps and plugs.
- (b) Disconnect the tube nuts (4 and 5) from the adapters (6 and 7) on the rear of the solenoid (1). Install the protective caps and plugs.
- (c) Disconnect the coupling nuts (8 and 9) from the pressure switch (10) and the solenoid (1) and remove the tube. Install the protective caps and plugs.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (d) Remove the four bolts (11) that attach the solenoid (1) to the engine.
- (e) Remove the two bolts (12) that attach the pressure switch bracket (13) and clamp bracket (14) to the engine. Remove the pressure switch bracket (13).
- (f) Remove the solenoid (1) from below the clamp bracket (14) and from the engine.

SUBTASK 75-22-03-420-270

- (2) If a new solenoid will be installed, continue as follows: (Figure 401)
 - (a) Remove the protective caps and plugs from the solenoid (1).
 - (b) Remove the two adapters (6 and 7) and the plug (15) from the rear of the solenoid (1).
 - (c) Remove the two gaskets (16 and 17) from the adapters (6 and 7). Discard the two gaskets (16 and 17).
 - (d) Remove the gasket (17) from the plug (15). Discard the gasket (17).
 - (e) Remove the cap (19) from the adapter (20) on the top of the solenoid (1).
 - (f) Remove the two adapters (20 and 21) from the top of the solenoid (1).
 - (g) Remove the two gaskets (22) from the adapters (20 and 21). Discard the gaskets (22).
 - (h) Install protective caps and plugs.

SUBTASK 75-22-03-410-270

- (3) If the solenoid (1) is not installed immediately, or weather conditions make it necessary, close the left and right thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ———

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-22-03

Config 2

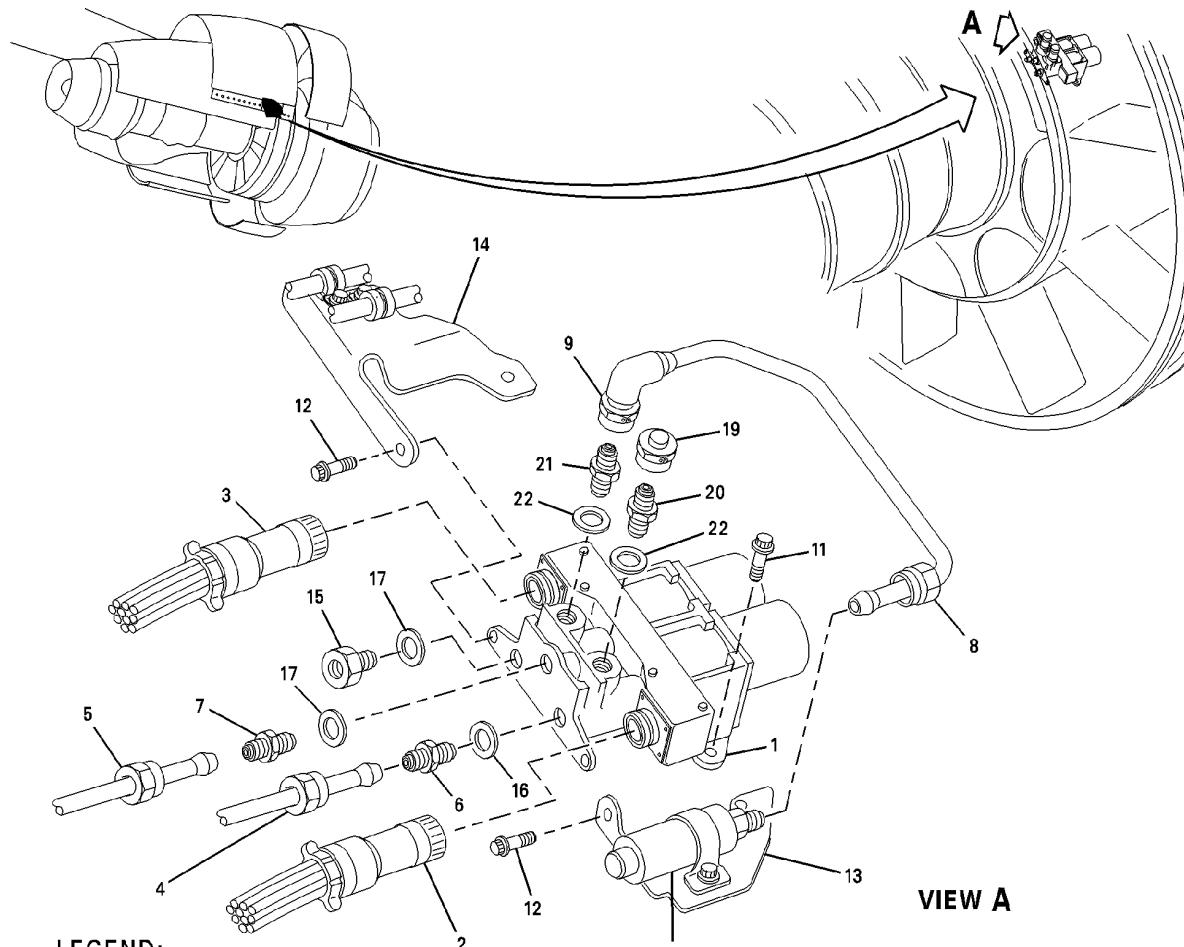
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LEGEND:

- | | |
|--|-----------------------------|
| 1. HPC SECONDARY FLOW CONTROL SOLENOID (PW4460/4462) OR TURBINE VANE AND BLADE COOLING AIR SOLENOID (PW4460/4462 -3) | 11. BOLT |
| 2. ELECTRICAL CONNECTOR | 12. BOLT |
| 3. ELECTRICAL CONNECTOR | 13. PRESSURE SWITCH BRACKET |
| 4. COUPLING NUT | 14. CLAMP BRACKET |
| 5. COUPLING NUT | 15. PLUG |
| 6. ADAPTER | 16. GASKET |
| 7. ADAPTER | 17. GASKET |
| 8. COUPLING NUT | 19. CAP |
| 9. COUPLING NUT | 20. ADAPTER |
| 10. PRESSURE SWITCH | 21. ADAPTER |
| | 22. GASKET |

CAG(IGDS) L-A3666

DB2-75-0116B

Secondary Flow Control or Turbine Vane and Blade Valve Solenoid
Figure 401/75-22-03-990-873

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-22-03-400-868

3. INSTALLATION OF THE PW4460/4462 HPC SECONDARY FLOW CONTROL VALVE OR, PW4460/4462 -3 TURBINE VANE AND BLADE COOLING AIR VALVE SOLENOID

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No.1 and 3 engines 4-8 ft high (1.22-2.44 m)
Not specified	Aerial boom, manlift No. 2 engine
Model M303, M305 or M307	Crimper, Bergen Mechanical (optional)
Not specified	Torque wrench 0-300 in-lb (0-34.0 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P05-289	Lockwire (AS3214-02)
P03-001	Oil, engine lubricating (PWA 521B)
P06-054	Paste, antiseize (PWA 36246)
P05-291	Cable, safety (optional)
P05-292	Ferrule, safety cable (optional)

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
16	Gasket	IPC 75-33-15-10-080
17	Gasket	IPC 75-33-15-10-075
22	Gasket	IPC 75-33-15-10-110

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
72-33-02-400-869	INSTALLATION OF NEW FAN EXIT LINER INNER REAR SEGMENTS (P/B 401)
IPC 75-33-15	Illustrated Parts Catalog
IPC 75-33-15-10-075	Illustrated Parts Catalog
IPC 75-33-15-10-080	Illustrated Parts Catalog
IPC 75-33-15-10-110	Illustrated Parts Catalog

E. Job Set-up - PW4460/4462 HPC Flow Control Valve or PW4460/4462 –3 Turbine Vane and Blade Cooling Air Valve Solenoid Installation

SUBTASK 75-22-03-865-273



WARNING

MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that these circuit breakers are open and have safety tags:

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

Row	Col	Number	Name
J	15	B1-592	REVERSING CONTROL ENG 2

SUBTASK 75-22-03-010-281

- (2) If necessary, open the left and right thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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F. Procedure - PW4460/4462 HPC Flow Control Valve or PW 4460/4462 –3 Turbine Vane and Blade Cooling Air Valve Solenoid Installation

SUBTASK 75-22-03-420-273

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (1) Prepare the new solenoid (1) for installation as follows: (IPC 75-33-15) (Figure 401)
 - (a) Remove protective covers from all openings on the solenoid (1).
 - (b) Lubricate the threads of the two adapters (20 and 21) with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (c) Install the gaskets (22) on the adapters (20 and 21). Install the two adapters on the top two ports of the solenoid (1).
 - (d) Torque the two adapters (20 and 21) to 65–75 in-lb (7.3–8.5 N·m).
 - (e) Lubricate the threads of the cap (19) with the engine oil (P03-001).
 - (f) Install the cap (19) on the right adapter (20).
 - (g) Torque the cap (19) to 90–100 in-lb (10.2–11.3 N·m). Safety the cap (19) with the lockwire.
 - (h) Lubricate the threads of the two adapters (6 and 7) with engine oil (P03-001).
 - (i) Install the gasket (16) on the adapter (6). Install the gasket (17) on the adapter (7).
 - (j) Install the adapter (7) in the center rear hole on solenoid (1).
 - (k) Install the adapter (6) in the right hole in the rear of the solenoid (1).
 - (l) Torque the adapter (7) to 150–170 in-lb (17.0–19.2 N·m). Torque the adapter (6) to 110–120 in-lb (12.4–13.6 N·m).
 - (m) Lubricate the threads of the plug threads (15) with engine oil (P03-001) and install the gasket (17) on the plug (15).
 - (n) Install the plug (15) in the left port at the rear of the solenoid (1). Torque the plug (15) to 110–120 in-lb (12.4–13.6 N·m).

SUBTASK 75-22-03-420-277

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- (2) Install the solenoid (1) as follows:

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (a) Lubricate the threads of the four bolts (11) with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (b) Put the solenoid (1) on the engine below the clamp bracket (14) with the two adapters (6 and 7) to the rear.
- (c) Install the pressure switch (10) and bracket (13) to the solenoid (1).
- (d) Attach the solenoid (1), the bracket (13) to the engine with the four bolts (11).
- (e) Torque the four bolts (11) to 85–95 in-lb (9.6–10.7 N·m).
- (f) If the tube clamp on the bracket (14) was loosened for the solenoid (1) removal, torque the clamp bolt to 36–40 in-lb (4.0–5.0 N·m).
- (g) Lubricate the threads of the adapter (7) with antiseize paste (P06-054).
- (h) Connect the coupling nut (5) on the adapter (7) with your hand.
- (i) Torque the coupling nut (5) to 225–250 in-lb (25.4–28.2 N·m).
- (j) Lubricate the threads on the adapter (6) with the engine oil (P03-001).
- (k) Connect the coupling nut (4) on the adapter (6) with your hand.
- (l) Torque the coupling nut (4) to 270–300 in-lb (30.5–33.9 N·m).
- (m) Safety the two coupling nuts (4 and 5) with the lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (n) Lubricate the elbow end of the pressure switch tube coupling nut (9) with engine oil (P03-001). Lubricate the straight end (8) of the pressure switch tube with antiseize paste (P06-054).
- (o) Install the coupling nut (8) to the solenoid (1). Torque the coupling nut to 65–75 in-lb (7.3–8.5 N·m).
- (p) Install the coupling nut (9) to the solenoid adapter (21). Torque the coupling nut (9) to 90–100 in-lb (10.2–11.3 N·m).
- (q) Safety the two coupling nuts (8 and 9) with the lockwire (P05-289), or safety cable (P05-291) and safety ferrule (P05-292).



CAUTION

MAKE SURE YOU USE THE CORRECT INSTALLATION PROCEDURE AND TOOLS WHEN YOU INSTALL THE HARNESS CONNECTOR. IF AN INCORRECT PROCEDURE OR TOOL IS USED, IT CAN CAUSE DAMAGE TO THE CONNECTOR OR LOOSEN IT. A LOOSE CONNECTOR CAUSES VIBRATION TO OCCUR AND THE CONTACTS TO WEAR. THIS CAN CAUSE UNSATISFACTORY LIGHTNING PROTECTION.



CAUTION

MAKE SURE THE HARNESS CONNECTOR AND INTERFACED COMPONENT DO NOT HAVE BENT PINS. ALSO EXAMINE THE PINS FOR CONTAMINATION. IF NECESSARY, CLEAN THE PINS AND MAKE THEM STRAIGHT.

- (r) Remove the protective caps and plugs from the electrical connectors (2 and 3).
- (s) Connect the electrical connectors (2 and 3) to the solenoid (1).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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SUBTASK 75-22-03-420-278

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.



WARNING

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- (3) Install the pressure switch tube assembly as follows:

- (a) Wipe clean the conical surface of the tube assembly and the mating adapters.
- (b) Examine the conical seats of the tube assembly and the adapters for damage such as nicks, burrs, or wear. Replace as necessary.
- (c) (Pre SB PW4ENG 75-155) Lubricate the threads of the tube nuts as follows:
 - 1) Lubricate the threads at the elbow end of the tube with engine oil (P03-001).
 - 2) Lubricate the threads at the straight end of the tube with anti-seize paste (P06-054).
- (d) (Post SB PW4ENG 75-155) Lubricate the threads of both tube nuts with anti-seize paste (P06-054).



CAUTION

YOU CAN DAMAGE THE TUBE ASSEMBLY IF YOU TWIST IT. DO NOT APPLY FORCE THAT CAN TWIST OR BEND THE TUBE ASSEMBLY AS YOU INSTALL IT. HOLD THE TUBE ASSEMBLY AS YOU LOOSEN AND TIGHTEN THE CONNECTIONS TO PREVENT DAMAGE TO THE TUBE ASSEMBLY AND THE ENGINE COMPONENTS.

- (e) Loosen the two bolts that attach the IDGS air/oil heat exchanger valve override pressure switch (called pressure switch) to the pressure switch bracket. Do not remove the bolts at this time.
- (f) Make sure that the ferrule at the straight end of the tube assembly is fully engaged to its conical seat. Engage the tube nut onto the adapter. Tighten the nut with your hand.
- (g) Make sure that the nut at the elbow end of the tube assembly is fully engaged to its adapter. Tighten the nut with your hand.
- (h) Make sure that the tube nuts are tighten with your hand and that the tube conical seat has full contact with the adapter conical seat. To make sure, tighten each nut with a wrench until you feel the seat make contact, then loosen the nut 1/4 turn.
- (i) Make sure that the new tube assembly is in the correct position, is not bent, and that the tube-ends align with the mating adapters.



CAUTION

DO NOT USE A 12 POINT CROWSFOOT TO TORQUE THE TUBE ENDS. TORQUE INDICATION CAN BE INCORRECT IF THE CROWSFOOT HITS THE ADJACENT PARTS WHICH COULD RESULT IN A LOWER SEAL PRESSURE.

- (j) Remove the two pressure switch mounting bolts and apply engine oil (P03-001) to the threads. Install and torque the two bolts to 36 - 40 in-lb (4.067-4.519 N·m).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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CAUTION

DO NOT USE A 12 POINT CROWSFoot TO TORQUE THE TUBE ENDS.
TORQUE INDICATION CAN BE INCORRECT IF THE CROWSFoot HITS
THE ADJACENT PARTS WHICH COULD RESULT IN A LOWER SEAL
PRESSURE.

- (k) (Pre SB PW4ENG 75-155) hold the solenoid adapter while you torque the nut on the elbow end to the solenoid adapter to 90-100 in-lb (10.169-11.298 N·m).
- (l) (Post SB PW4ENG 75-155) Hold the solenoid adapter while you torque the nut on the elbow end to the solenoid adapter to 65- 75 in-lb (7.344-8.474 N·m).
- (m) (Pre and Post SB PW4ENG 75-155) Hold the wrench flat on the pressure switch while you torque the nut on the straight end of the tube assembly to 65-75 in-lb (7.344-8.474 N·m).
- (n) Examine the tube ends for any twist or damage adjacent to the tube fittings. Replace parts as necessary.
- (o) Install the lockwire (P05-289) or safety cable (P05-291) and safety cable ferrule (P05-292) to both ends of the tube and to the cap assembly.

SUBTASK 75-22-03-410-281

- (4) Install the 1 o'clock position rear inner liner and the spacer plate. (INSTALLATION OF NEW FAN EXIT LINER INNER REAR SEGMENTS, TASK 72-33-02-400-869)

SUBTASK 75-22-03-865-276

- (5) Remove the safety tags and close these circuit breakers:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	15	B1-592	REVERSING CONTROL ENG 2

G. Job Close-up - PW4460/4462 HPC Flow Control Valve or PW4460/4462 –3 Turbine Vane and Blade Cooling Air Valve Solenoid Installation

SUBTASK 75-22-03-942-275

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-22-03-410-275

- (2) Close the left and right thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-22-03-720-270

- (3) Do the necessary engine tests. (ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870) (ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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MD-11 AIRCRAFT MAINTENANCE MANUAL

HPC SECONDARY FLOW CONTROL VALVE/TURBINE VANE-AND-BLADE COOLING AIR VALVES SOLENOID, AND PHASE-3 TURBINE VANE/TURBINE VANE-AND-BLADE COOLING AIR VALVES SOLENOID - DESCRIPTION AND OPERATION

1. General

- A. This two coil, four way solenoid valve assembly is installed on the left side of the engine. Its function is to operate the cooling air valves. The solenoid assembly gets its signals from the FADEC/EEC. The FADEC/EEC makes an analysis of the aircraft altitude and engine high rotor speed (N2) inputs and transmits them to the solenoid assembly. The solenoid assembly sends muscle pressure to open or close the cooling air valves which controls the airflow to the HPT and/or the LPT.
- B. The same solenoid valve assembly is used on the before PHASE-3 (PW4460/4462) and the after PHASE-3 (PW4460/4462 -3) configurations. (Figure 1)

The differences between the functions of the solenoids before and after PHASE-3 are as follows:

Before PHASE-3 (PW4460/4462) the solenoid operates:

1. The left HPC secondary airflow control valve
2. The left and the right turbine vane-and-blade cooling air valves.

After PHASE-3 (PW4460/4462 -3) the solenoid operates:

1. The left turbine vane-and-blade cooling air valve
2. The turbine vane cooling air valve (upper right).

NOTE: After PHASE-3 engines have no HPC secondary airflow control valves. These engines have a turbine vane cooling air valve (upper right) installed on the HPC rear case at the 2 o'clock position.

- C. The chart that follows compares the "before" and the "after" PHASE-3 configurations:

BEFORE-PHASE-3	AFTER-PHASE-3	LEFT SOLENOID ASSEMBLY OPERATES
X		The left and right Turbine Vane-And-Blade Cooling Air valves
X		The left HPC secondary airflow control valve
	X	The left turbine vane-and-blade cooling air valve
	X	The turbine vane cooling air valve(upper right)

- D. When the left solenoid has a failure, it will automatically send fail safe air pressure to the valves. This air pressure moves the valves to the open position to continue the airflow that cools the engine internally.

BEFORE-PHASE-3	AFTER-PHASE-3	FAIL SAFE PRESSURE TO
X		The left HPC secondary airflow control valve
X		The left and the right turbine vane-and-blade cooling air valves
	X	The left turbine vane-and-blade cooling air valve
	X	The turbine vane cooling air valve (upper right)

- E. The position indicator pins of the valves will extend above the valve housings when the valves are open. In the open position, the valves flow air to cool the high pressure compressor and/or the turbine vanes and/or blades.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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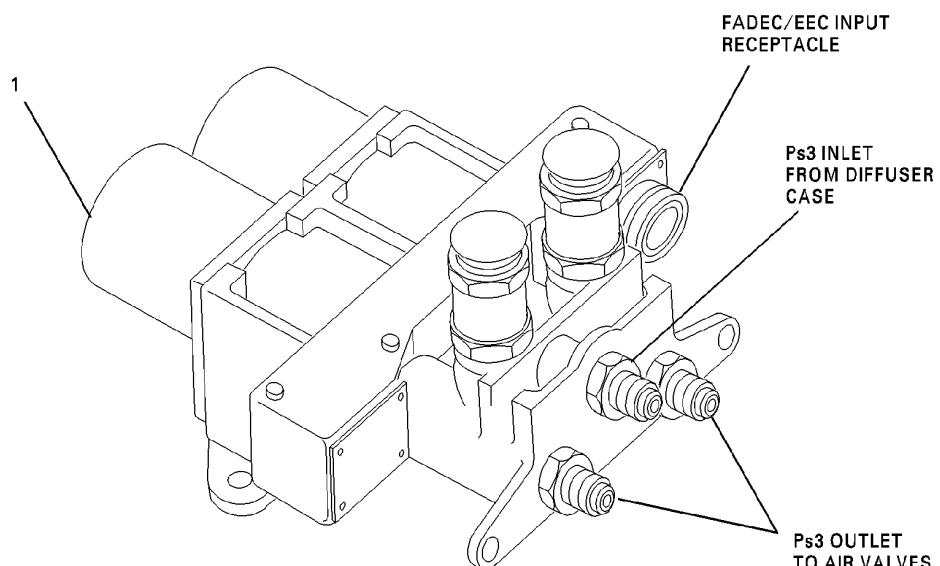
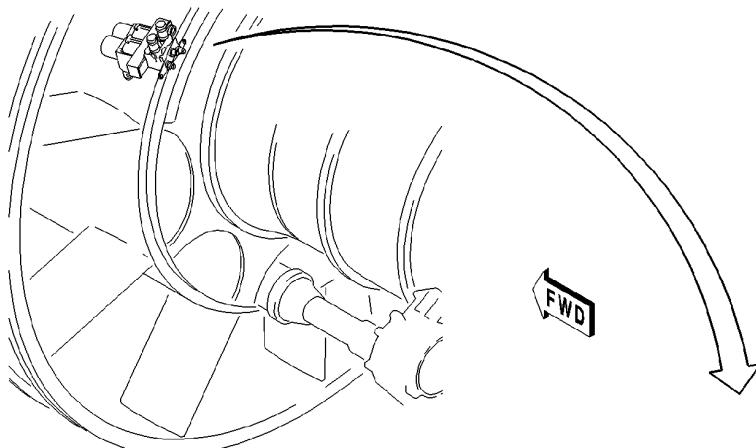
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LEGEND:

1. PW4460/4462 LEFT HPC FLOW CONTROL VALVE, LEFT/RIGHT TURBINE VANE-AND-BLADE COOLING AIR VALVES SOLENOID OR
PW4460/4462 -3 LEFT TURBINE VANE-AND-BLADE, RIGHT TURBINE VANE COOLING AIR VALVE SOLENOID

CAG(IGDS) L-A3666

DB2-75-0260

HPC and Turbine Cooling Solenoid - Left
Figure 1/75-22-04-990-873

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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AIRCRAFT MAINTENANCE MANUAL

**SOLENOID, HPC SECONDARY FLOW CONTROL/TURBINE VANE-AND-BLADE COOLING AIR VALVE
(BEFORE PHASE-3) OR TURBINE VANE AND TURBINE VANE AND BLADE COOLING AIR VALVE
(AFTER PHASE-3) - REMOVAL/INSTALLATION**

1. General

- A. This procedure has the removal and installation instructions for the:
 - (Before Phase -3) HPC secondary flow control/turbine vane and-blade cooling air valve solenoid.
 - (After Phase -3) Turbine vane/turbine vane and blade cooling air valve solenoid.
- B. Access to the solenoid assembly is through the left thrust reverser door.
- C. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 and PW4460/4462 -3 engines.

TASK 75-22-04-000-868

2. REMOVAL OF THE (BEFORE PHASE -3) HPC SECONDARY FLOW CONTROL VALVE/TURBINE VANE AND BLADE COOLING AIR VALVE SOLENOID

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
72-33-02-000-869	REMOVAL OF THE FAN EXIT LINER INNER REAR SEGMENTS (P/B 401)

C. Job Set-up - HPC Secondary Flow Control Valve/Turbine Vane And Blade Cooling Air Valve Solenoid Removal

SUBTASK 75-22-04-010-268

- (1) Open the thrust reverser door. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-22-04-010-269

- (2) Remove the rear inner liner and the spacer plate. (REMOVAL OF THE FAN EXIT LINER INNER REAR SEGMENTS, TASK 72-33-02-000-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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AIRCRAFT MAINTENANCE MANUAL

D. Procedure - HPC Secondary Flow Control Valve/Turbine Vane And Blade Cooling Air Valve Solenoid Removal

SUBTASK 75-22-04-020-267

- (1) Remove the HPC secondary flow control valve/turbine vane and blade air valve solenoid (1) as follows: (Figure 401)
 - (a) Disconnect the W3P12 harness from the connector (2) on the HPC air valve solenoid (1). Install the protective caps and plugs.
 - (b) Disconnect the three tube coupling nuts (3) from the adapters (4 and 5) on the rear of the HPC air valve solenoid (1). Install the protective caps and plugs.
 - (c) Remove the four bolts (6) that attach the HPC air valve solenoid (1) and the bracket (7) to the engine.
 - (d) Remove the HPC air valve solenoid (1) from below the bracket (7) and from the engine.

SUBTASK 75-22-04-030-267

- (2) If necessary to get access to the solenoid (1), continue as follows: (Figure 401)
 - (a) Loosen the bolt (9) and the nut (10) that attaches the tube clamp (8) to the bracket (7).

SUBTASK 75-22-04-410-267

- (3) If the HPC air valve solenoid (1) is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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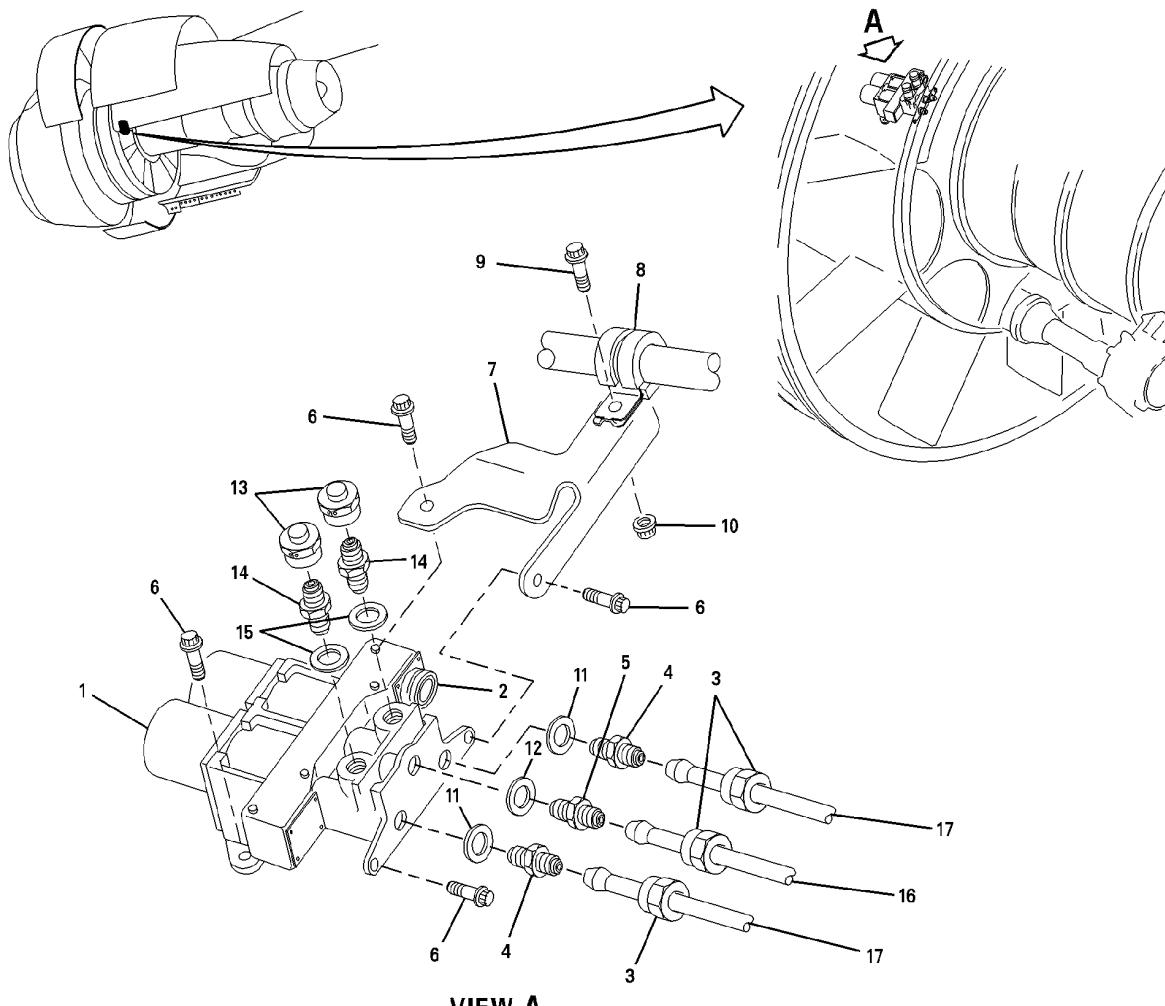
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LEGEND:

- | | |
|--|-----------------|
| 1. HPC SECONDARY FLOW CONTROL SOLENOID | 10. NUT |
| 2. W3P12 HARNESS CONNECTOR | 11. GASKET |
| 3. TUBE COUPLING NUT | 12. GASKET |
| 4. ADAPTER | 13. CAP |
| 5. ADAPTER | 14. ADAPTER |
| 6. BOLT | 15. GASKET |
| 7. BRACKET | 16. SUPPLY TUBE |
| 8. CLAMP | 17. SIGNAL TUBE |
| 9. BOLT | |

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DB2-75-0097A

HPC Secondary Flow/Turbine Vane and Blade Cooling Air Solenoid
Figure 401/75-22-04-990-869

EFFECTIVITY
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TASK 75-22-04-400-868

3. INSTALLATION OF THE (BEFORE PHASE -3) HPC SECONDARY FLOW CONTROL VALVE/TURBINE VANE AND BLADE COOLING AIR VALVE SOLENOID

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.20–2.40 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0-300 in-lb (0-34.0 N·m)
Not specified	Pliers, soft-jawed
Not specified	Wrench, strap
Model M303, M305 or M307	Crimper, Bergen Mechanical (optional)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)
P06-054	Paste, antiseize (PWA 36246)
P05-289	Lockwire (AS3214-02)
P05-291	Cable, safety (optional)
P05-292	Ferrule, safety cable (optional)

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE	DESIGNATION	IPC
15	Gasket, copper (AS3332-04)	IPC 75-33-15-10-015
11	Gasket, copper (AS3332-06)	IPC 75-33-15-10-035

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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Table 404 (Continued)

REFERENCE	DESIGNATION	IPC
12	Gasket, copper (AS3332-07)	IPC 75-33-15-10-030

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-07-700-874	ELECTRONIC ENGINE CONTROL STATIC TEST (ADJ/TEST 07) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
72-33-02-400-869	INSTALLATION OF NEW FAN EXIT LINER INNER REAR SEGMENTS (P/B 401)
IPC 75-33-15	Illustrated Parts Catalog
IPC 75-33-15-10-015	Illustrated Parts Catalog
IPC 75-33-15-10-030	Illustrated Parts Catalog
IPC 75-33-15-10-035	Illustrated Parts Catalog

E. Job Set-up - HPC Secondary Flow Control Valve/Turbine Vane And Blade Cooling Air Valve Solenoid Installation

SUBTASK 75-22-04-010-271

- (1) Open the thrust reverser door. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-22-04-420-267

- (2) If it is necessary to install a new solenoid (1), do the steps that follow: (IPC 75-33-15) (Figure 401)



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1233, LUBRICANT/OIL/JET ENGINE (DPM 339)

HAZMAT 1000, REFER TO MSDS

- (a) Remove the protective caps and plugs from the solenoid.
- (b) Lubricate the threads of the two adapters (4) and the adapter (5) with the engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Install the new gaskets (11) on the adapters (4). Install the new gasket (12) on the larger adapter (5).
- (d) Install the two adapters (4) in the outer holes in the rear of the HPC air valve solenoid (1) with your hand.
- (e) Install the larger adapter (5) in the center rear hole on the HPC air valve solenoid (1) with your hand.
- (f) Torque the center adapter (5) to 150–170 in-lb (17.0–19.2 N·m). Torque the two outer adapters (4) to 110–120 in-lb (12.4–13.6 N·m).
- (g) Lubricate the threads of the two adapters (14) with the engine oil (P03-001).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (h) Install the new gaskets (15) on the adapters (14). Install the two adapters in the top two holes on the HPC air valve solenoid (1) with your hand.
- (i) Torque the two adapters (14) to 65–75 in-lb (7.3–8.5 N·m).
- (j) Lubricate the threads of the two caps (13) with the engine oil (P03-001).
- (k) Install the two caps (13) on the two adapters (14) with your hand.
- (l) Torque the two caps (13) to 90–100 in-lb (10.2–11.3 N·m). Safety the caps with the lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).

F. Procedure - HPC Secondary Flow Control Valve/Turbine Vane And Blade Cooling Air Valve Solenoid Installation

SUBTASK 75-22-04-420-268

- (1) Install the HPC secondary flow control/turbine vane and blade air valve solenoid (1) as follows: (IPC 75-33-15) (Figure 401)



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1233, LUBRICANT/OIL/JET ENGINE (DPM 339)

HAZMAT 1000, REFER TO MSDS



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- (a) Lubricate the four bolts (6) with the engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (b) Put the HPC air valve solenoid (1) on the engine below the bracket (7) with the three adapters (4 and 5) to the rear.
- (c) Attach the HPC air valve solenoid (1) and the bracket (7) to the engine with the four bolts (6).
- (d) Torque the four bolts (6) to 85–95 in-lb (10.0–11.0 N·m).
- (e) If the tube clamp (8) was loosened for the HPC air valve solenoid (1) removal, torque the clamp bolt (9) to 36–40 in-lb (4.0–5.0 N·m).
- (f) Lubricate the threads of the adapter (5) with the antiseize paste (P06-054). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (g) Install the supply tube (16) on the center adapter (5) with your hand.
- (h) Torque the coupling nut (3) on the supply tube (16) to 225–250 in-lb (25.0–28.0 N·m).
- (i) Lubricate the two adapter threads (4) with the engine oil (P03-001).
- (j) Install the signal tubes (17) on to the adapters (4) with your hand.

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- (k) Torque the coupling nuts (3) on the signal tubes (17) to 270–300 in-lb (31.0–34.0 N·m).
- (l) Safety the three coupling nuts (3) with the lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).



MAKE SURE YOU USE THE CORRECT INSTALLATION PROCEDURE AND TOOLS WHEN YOU INSTALL THE HARNESS CONNECTOR. IF AN INCORRECT PROCEDURE OR TOOL IS USED, IT CAN CAUSE DAMAGE TO THE CONNECTOR OR LOOSEN IT. A LOOSE CONNECTOR CAUSES VIBRATION TO OCCUR AND THE CONTACTS TO WEAR. THIS CAN CAUSE UNSATISFACTORY LIGHTNING PROTECTION.



MAKE SURE THE HARNESS CONNECTOR AND INTERFACED COMPONENT DO NOT HAVE BENT PINS. ALSO EXAMINE THE PINS FOR CONTAMINATION. IF NECESSARY, CLEAN THE PINS AND MAKE THEM STRAIGHT.

- (m) Remove the protective caps and plugs from the W3P12 connector (2).
- (n) Connect the W3P12 harness connector to the connector (2) on the HPC air valve solenoid (1).
- (o) Tighten the W3P12 harness connector coupling nut with your hand until you cannot see the witness band.
NOTE: The witness color band is the first band on the connector receptacle. It can not be seen when you tighten the coupling nut.
- (p) Use the soft-jawed pliers or the strap wrench to torque the W3P12 connector coupling nut fully against the receptacle (2) (metal to metal).
NOTE: When you use the soft-jawed pliers or the strap wrench correctly, the connector and the receptacle contacts are sufficiently engaged and the connector is tight. If you use too much force, the tools will turn on the connector coupling nut. This will prevent too much torque.

SUBTASK 75-22-04-410-275

- (2) Install the rear inner liner and spacer plate. (INSTALLATION OF NEW FAN EXIT LINER INNER REAR SEGMENTS, TASK 72-33-02-400-869)

SUBTASK 75-22-04-710-271

- (3) Do the EEC static test. (ELECTRONIC ENGINE CONTROL STATIC TEST (ADJ/TEST 07), TASK 71-02-07-700-874)

G. Job Close-up - HPC Secondary Flow Control Valve/Turbine Vane And Blade Cooling Air Valve Solenoid Installation

SUBTASK 75-22-04-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-22-04-410-269

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ———

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-22-04-000-869

4. REMOVAL OF THE (PHASE-3) TURBINE VANE/TURBINE VANE AND BLADE COOLING AIR VALVE SOLENOID

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 405

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
72-33-02-000-869	REMOVAL OF THE FAN EXIT LINER INNER REAR SEGMENTS (P/B 401)

C. Job Set-up - Turbine Vane/Turbine Vane-and-Blade Cooling Air Valve Solenoid Removal

SUBTASK 75-22-04-010-276

- (1) Open the thrust reverser door. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-22-04-010-277

- (2) Remove the rear inner liner and the spacer plate. (REMOVAL OF THE FAN EXIT LINER INNER REAR SEGMENTS, TASK 72-33-02-000-869)

D. Procedure - Turbine Vane/Turbine Vane and Blade Cooling Air Valve Solenoid Removal

SUBTASK 75-22-04-020-268

- (1) Remove the turbine vane/turbine vane and blade cooling air valve solenoid (21) as follows: (Figure 402)
 - (a) Disconnect the W3P12 harness from the connector receptacle (22) on the solenoid (21). Install the protective caps and plugs.
 - (b) Remove lockwire from the three coupling nuts (23) on the rear of the solenoid valve (1). Disconnect the three coupling nuts (23). Install the protective caps and plugs.
 - (c) Remove the four bolts (26) that attach the solenoid (21) and the bracket (27) to the engine.

SUBTASK 75-22-04-030-268

- (2) If necessary, loosen the bolt (29) and the nut (30) that attaches the tube clamp (28) to the bracket (27).

SUBTASK 75-22-04-020-269

- (3) Remove the solenoid assembly (21) from below the bracket (27) and remove from the engine.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-22-04-410-272

- (4) If the solenoid (21) is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

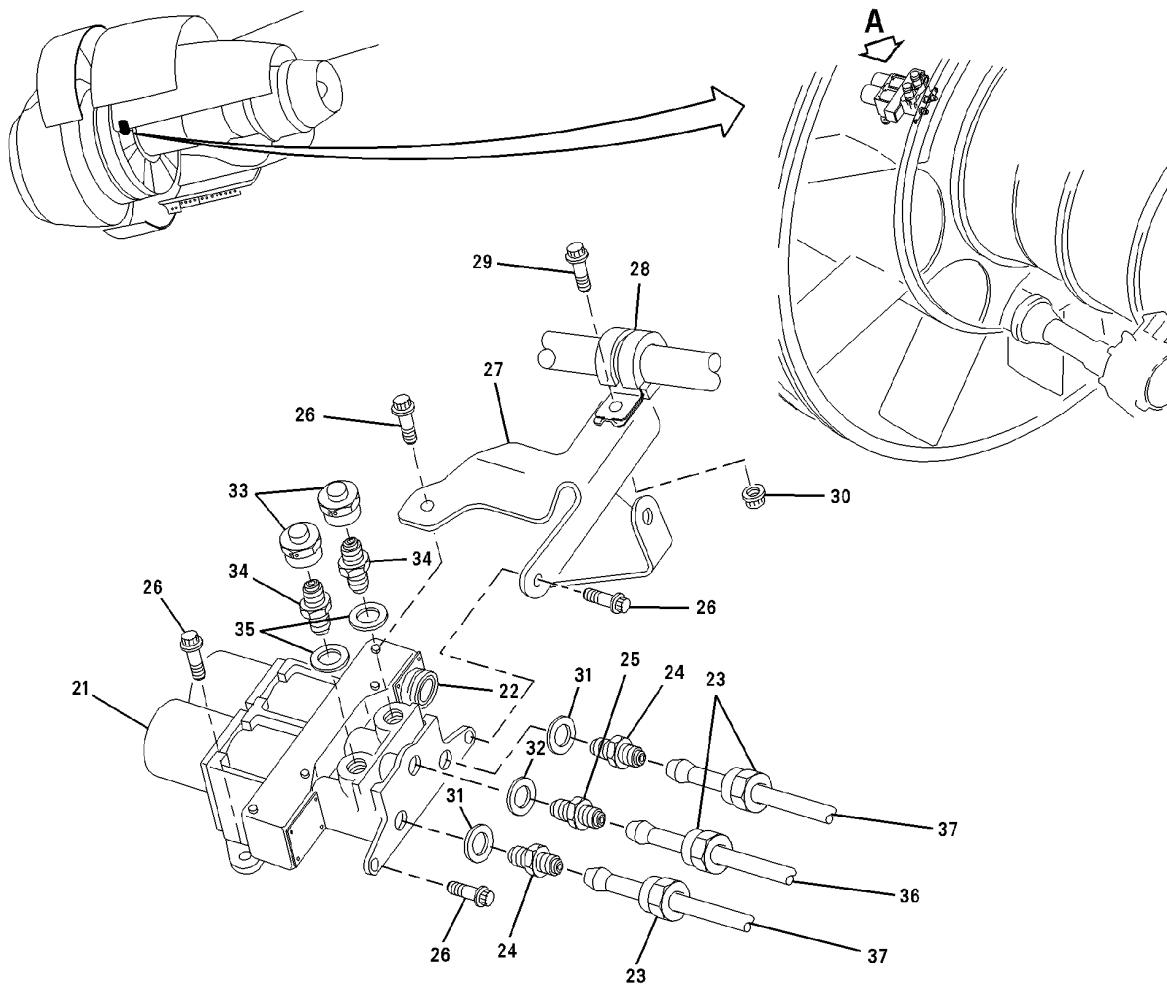
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LEGEND:

- | | |
|--|-----------------|
| 21. TURBINE VANE COOLING AND TURBINE
VANE-AND-BLADE COOLING AIR
VALVE SOLENOID | 29. BOLT |
| 22. W3P12 HARNESS CONNECTOR | 30. NUT |
| 23. TUBE COUPLING NUT | 31. GASKET |
| 24. ADAPTER | 32. GASKET |
| 25. ADAPTER | 33. CAP |
| 26. BOLT | 34. ADAPTER |
| 27. BRACKET | 35. GASKET |
| 28. CLAMP | 36. SUPPLY TUBE |
| | 37. SIGNAL TUBE |

CAG(IGDS) L-A3666

DB2-75-0275

Turbine Vane/Blade Cooling Valve Solenoid (Phase -3)
Figure 402/75-22-04-990-874

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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TASK 75-22-04-400-869

5. INSTALLATION OF THE (PHASE -3) TURBINE VANE/TURBINE VANE AND BLADE COOLING AIR VALVE SOLENOID

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 406

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.20–2.40 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–300 in-lb (0–34.0 N·m)
Not specified	Pliers, soft-jawed
Not specified	Wrench, strap
Model M303, M305 M307	Crimper, Bergen Mechanical (optional)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 407

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)
P06-054	Paste, antiseize (PWA 36246)
P05-289	Lockwire (AS3214-02)
P05-291	Cable, safety (optional)
P05-292	Ferrule, safety cable (optional)

C. Expendable Parts

(1) Expendable Parts

Table 408

REFERENCE	DESIGNATION	IPC
35	Gasket, copper (AS3332-04)	IPC 75-33-15-10-015
31	Gasket, copper (AS3332-06)	IPC 75-33-15-10-035

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Table 408 (Continued)

REFERENCE	DESIGNATION	IPC
32	Gasket, copper (AS3332-07)	IPC 75-33-15-10-030

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-07-700-874	ELECTRONIC ENGINE CONTROL STATIC TEST (ADJ/TEST 07) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
72-33-02-400-869	INSTALLATION OF NEW FAN EXIT LINER INNER REAR SEGMENTS (P/B 401)
IPC 75-33-15	Illustrated Parts Catalog
IPC 75-33-15-10-015	Illustrated Parts Catalog
IPC 75-33-15-10-030	Illustrated Parts Catalog
IPC 75-33-15-10-035	Illustrated Parts Catalog

E. Job Set-up - Turbine Vane/Turbine Vane-and-Blade Cooling Air Valve Solenoid Installation

SUBTASK 75-22-04-010-278

- (1) Open the thrust reverser door. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-22-04-420-270

- (2) If it is necessary to install a new solenoid (21), do the steps that follow: (IPC 75-33-15) (Figure 402)
 - (a) Remove the protective caps and plugs from the solenoid (21).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the threads of the two adapters (34) with the engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Install the two gaskets (35) on the adapters (34). Install the two adapters in the top two holes on the solenoid (21) with your hand.
- (d) Torque the two adapters (34) to 65–75 in-lb (7.3–8.5 N·m).
- (e) Lubricate the threads of the two caps (33) with the engine oil (P03-001).
- (f) Install the two caps (33) on the two adapters (34) with your hand.
- (g) Torque the two caps (33) to 90–100 in-lb (10.2–11.3 N·m). Safety the caps with the lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (h) Lubricate the threads of the two adapters (24) and the one adapter (25) with the engine oil (P03-001).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (i) Install the two adapters (24) with gaskets (31) and the adapter (25) with gasket (32) on the rear of the solenoid (21). Install by hand.
- (j) Torque the center adapter (25) to 150–170 in-lb (17.0–19.2 N·m). Torque the two outer adapters (24) to 110–120 in-lb (12.4–13.6 N·m).

F. Procedure - Turbine Vane/Turbine Vane-and-Blade Cooling Air Valve Solenoid Installation

SUBTASK 75-22-04-420-271

- (1) Install the turbine vane/turbine vane and blade cooling air valve solenoid as follows: (IPC 75-33-15) (Figure 402)



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1233, LUBRICANT/OIL/JET ENGINE (DPM 339)

HAZMAT 1000, REFER TO MSDS



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- (a) Lubricate the four bolts (26) with the engine oil (P03-001).
- (b) Put the solenoid (21) on the engine below the bracket (27) with the three adapters (24 and 25) to the rear.
- (c) Attach the solenoid (21) and the bracket (27) to the engine with the four bolts (26).
- (d) Torque the four bolts (26) to 85–95 in-lb (9.6–10.7 N·m).
- (e) If the tube clamp (28) was loosened for the solenoid removal, torque the clamp bolt (29) to 36–40 in-lb (4.1–4.5 N·m).
- (f) Lubricate the threads of the adapter (25) with the antiseize paste (P06-054). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (g) Install the supply tube (36) on the center adapter (25) with your hand.
- (h) Torque the coupling nut (23) on the supply tube (36) to 225–250 in-lb (25.4–28.2 N·m).
- (i) Lubricate the threads of the two adapters (24) with engine oil (P03-001).
- (j) Install the signal tubes (37) on to the adapters (24) with your hand.
- (k) Torque the two coupling nuts (23) on the signal tubes (37) to 270–300 in-lb (30.5–33.9 N·m).
- (l) Safety the three coupling nuts (23) with the lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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CAUTION

MAKE SURE YOU USE THE CORRECT INSTALLATION PROCEDURE AND TOOLS WHEN YOU INSTALL THE HARNESS CONNECTOR. IF AN INCORRECT PROCEDURE OR TOOL IS USED, IT CAN CAUSE DAMAGE TO THE CONNECTOR OR LOOSEN IT. A LOOSE CONNECTOR CAUSES VIBRATION TO OCCUR AND THE CONTACTS TO WEAR. THIS CAN CAUSE UNSATISFACTORY LIGHTNING PROTECTION.



CAUTION

MAKE SURE THE HARNESS CONNECTOR AND INTERFACED COMPONENT DO NOT HAVE BENT PINS. ALSO EXAMINE THE PINS FOR CONTAMINATION. IF NECESSARY, CLEAN THE PINS AND MAKE THEM STRAIGHT.

- (m) Remove the protective cap from the W3P12 connector receptacle (22).
- (n) Connect the W3P12 harness connector to the connector receptacle (22) on the solenoid (21).
- (o) Tighten the W3P12 harness connector coupling nut with your hand until you can not see the witness band.
NOTE: The witness color band is the first band on the connector receptacle. It can not be seen when you tighten the coupling nut.
- (p) Use the soft-jawed pliers or the strap wrench to torque the W3P12 connector coupling nut fully against the connector receptacle (22) (metal to metal).
NOTE: When you use a soft-jawed pliers or a strap wrench the torque will be correct. If too much force is used, the tool will turn on the connector coupling nut and will prevent too much torque. The connector and the receptacle contacts will be sufficiently engaged and the connector will be tight.

SUBTASK 75-22-04-410-273

- (2) Install the rear inner liner and spacer plate. (INSTALLATION OF NEW FAN EXIT LINER INNER REAR SEGMENTS, TASK 72-33-02-400-869)

SUBTASK 75-22-04-710-270

- (3) Do an EEC static test. (ELECTRONIC ENGINE CONTROL STATIC TEST (ADJ/TEST 07), TASK 71-02-07-700-874)

G. Job Close-up - Turbine Vane/Turbine Vane-and-Blade Cooling Air Valve Solenoid Installation

SUBTASK 75-22-04-942-269

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-22-04-410-274

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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**SOLENOID-VALVE, TURBINE VANE AND BLADE COOLING AIR/HPC SECONDARY FLOW CONTROL -
ADJUSTMENT/TEST**

1. General

- A. This procedure has the adjustment/test instructions for the turbine vane and blade cooling air valve/high pressure compressor secondary flow control (TVBCAV/HPCSFC) solenoid assembly that is mounted on the left side of the engine. This procedure applies only to engines with a PS3 air system configuration before S/B PW4ENG 75-102.
- B. The left solenoid valve assembly is installed on the intermediate rear case at the 10 o'clock position.
- C. The right solenoid valve assembly is installed on the intermediate rear case at the 1 o'clock position. This solenoid-valve assembly does not have to be tested for this procedure.
- D. The left solenoid-valve assembly has two solenoids mounted side by side on the valve housing. The left solenoid of this assembly controls the left and right TVBCAV's, the right solenoid of this assembly controls the left HPCSFC valve.
- E. Failure of the left solenoid of the assembly will cause both TVBCA valves not to operate. Extended engine operation with both TVBCAV's not in operation can result in reduction of certified life of the HPT and LPT. PHASE-3 Service Bulletins will delete the HPCSFC, and convert the TVBCAV system. But until the related Service Bulletins are done, the left solenoid assembly and the valves it controls have to be tested/inspected at regular intervals.
- F. Do the functional check of the left solenoid assembly at the first "C" check after the issue date of S/B PW4ENG 75-101. Do the functional check again at every "C" check that follows, until S/B PW4ENG 75-102 has been done.
- G. Do the initial inspection of the TVBCAV's and the HPCSFC valves at the first "A" check after the issue date of S/B PW4ENG 75-101. Do the inspection again at every other "A" check.
- H. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-22-04-720-868

2. FUNCTIONAL TEST OF THE TVBCAV/HPCSFC SOLENOID-VALVE

NOTE: This Task is for engines before S/B PW4ENG 75-102

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 501

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Air bottle, portable, 100–500 psi (689.5–3447.4 kPa)

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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Reference	Title
75-22-04-000-868	REMOVAL OF THE (BEFORE PHASE -3) HPC SECONDARY FLOW CONTROL VALVE/TURBINE VANE AND BLADE COOLING AIR VALVE SOLENOID (P/B 401)
75-22-04-400-868	INSTALLATION OF THE (BEFORE PHASE -3) HPC SECONDARY FLOW CONTROL VALVE/TURBINE VANE AND BLADE COOLING AIR VALVE SOLENOID (P/B 401)

C. Job Set-up - TVBCAV/HPCSFC Solenoid-Valve Functional Test

SUBTASK 75-22-04-865-267



MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.



TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	15	B1-592	REVERSING CONTROL ENG 2

SUBTASK 75-22-04-010-275

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - TVBCAV/HPCSFC Solenoid-Valve Functional Test

SUBTASK 75-22-04-710-269

- (1) Do a functional test of the TVBCA/HPCSFC solenoid-valve assembly as follows: (Figure 501) (Figure 502) (Figure 503)
 - (a) Loosen the clamp (7) on the tube (6). Do not remove the bolt and nut from the clamp (7).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (b) Disconnect the B-nut of the inlet tube (6) from the fitting (5) at the solenoid (4). Push the tube (6) away from the fitting (5) to make it possible to connect the test air flex-hose.



MAKE SURE YOU USE THE APPROVED SAFETY EQUIPMENT FOR YOUR EYES WHEN YOU USE COMPRESSED AIR. DO NOT LET THE AIR BLOW IN YOUR EYES OR ON YOUR SKIN. THIS WILL HELP PREVENT INJURY TO PERSONS.

- (c) Connect a shop-air or portable pressure bottle flex-hose with reducer adapter PWA 86621 to the fitting (5) on the solenoid assembly (4). Make sure the shop-air is filtered. Pressurize the solenoid assembly (4) to 100-500 psi (689.5–3447.4 kPa).
- (d) While the solenoid valve is pressurized, examine the position indicator pins (2 and 2A) on the TVBCA valves (1 and 1A). Make sure the position indicator pins do not move.

SUBTASK 75-22-04-080-267

- (2) Remove the test flex hose and connect the solenoid inlet tube (6) as follows: (Figure 503)
- Release the air pressure.
 - Disconnect the shop-air or portable pressure-bottle flex-hose from the reducer adapter PWA 86621 on the fitting (5).
 - Connect the inlet tube (6) B-nut to the fitting (5) on the solenoid (4). Torque the B-nut.
 - Tighten the screw of the clamp (7). Make sure the tubes do not rub against each other or other parts of the engine.

SUBTASK 75-22-04-420-269

- (3) If TVBCA/HPCSFC valves solenoid has failed, replace the solenoid assembly. As applicable see the referenced tasks: (REMOVAL OF THE (BEFORE PHASE -3) HPC SECONDARY FLOW CONTROL VALVE/TURBINE VANE AND BLADE COOLING AIR VALVE SOLENOID, TASK 75-22-04-000-868) (INSTALLATION OF THE (BEFORE PHASE -3) HPC SECONDARY FLOW CONTROL VALVE/TURBINE VANE AND BLADE COOLING AIR VALVE SOLENOID, TASK 75-22-04-400-868)

SUBTASK 75-22-04-970-267



CAUTION

IF A TURBINE COOLING/HPC SECONDARY-FLOW CONTROL VALVE SOLENOID IS DEFECTIVE, DO NOT CONTINUE TO OPERATE THE ENGINE. REMOVE THE ENGINE BEFORE 50 HOURS OR 5 CYCLES HAS OCCURRED. THEN REPLACE THE SECOND-STAGE AIRSEAL. THIS WILL HELP PREVENT ENGINE FAILURE.

- (4) If the engine was operated with a failed TVBCA/HPCSFC solenoid, the HPT second stage airseal must be scheduled for replacement. The limits for necessary replacement are 50 hours or five cycles after solenoid failure. Use the limit that occurs first.

SUBTASK 75-22-04-865-268

- (5) Remove the safety tags and close these circuit breakers:

OVERHEAD, BATTERY BUS

Row	Col	Number	Name
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	15	B1-592	REVERSING CONTROL ENG 2

E. Job Close-up - TVBCAV/HPCSFC Solenoid-Valve Functional Test

SUBTASK 75-22-04-942-268

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-22-04-410-271

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-22-04

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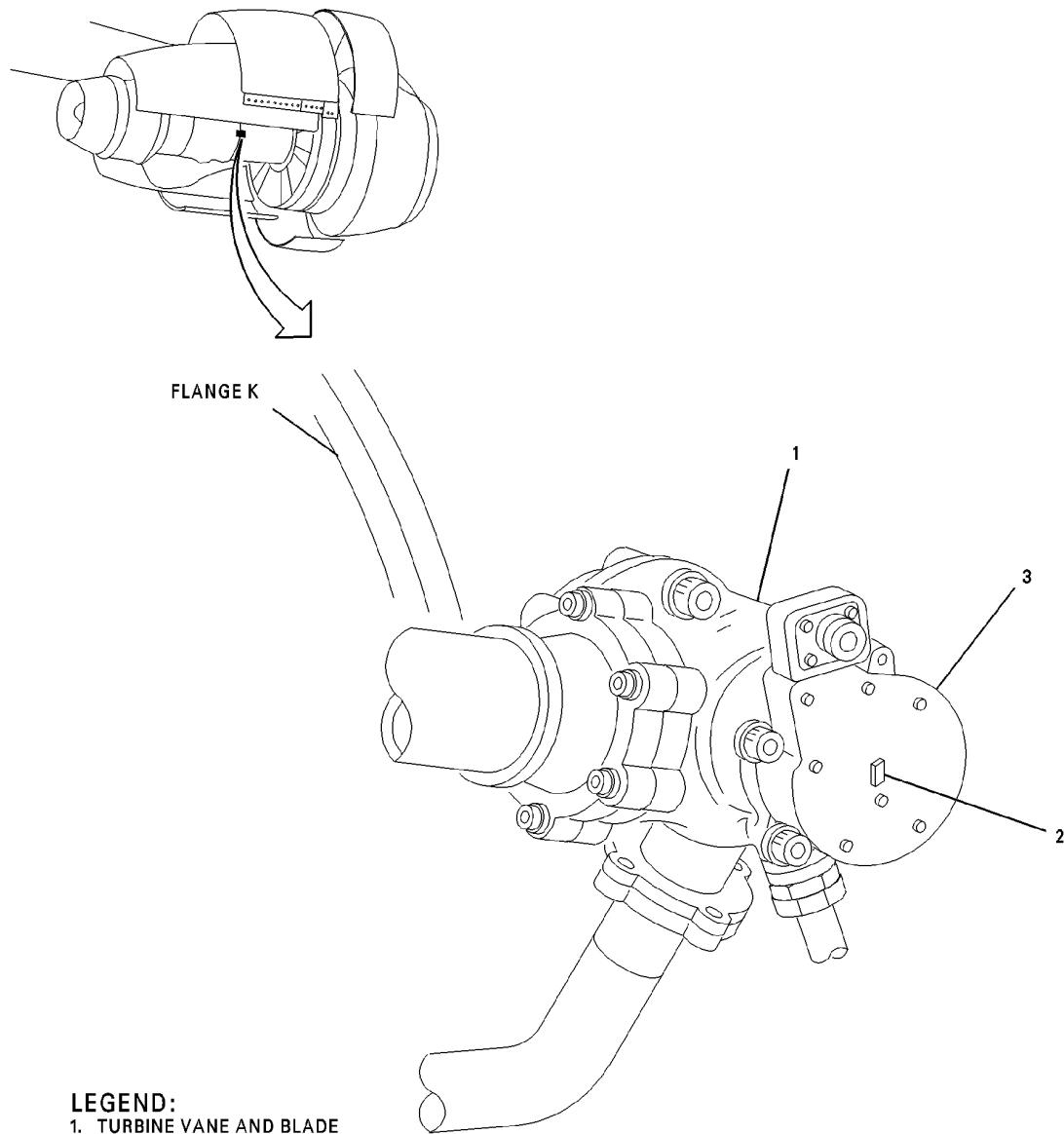
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CAG(IGDS)

DB2-75-0264

Turbine Vane and Blade Cooling Air Valve - Right Side
Figure 501/75-22-04-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

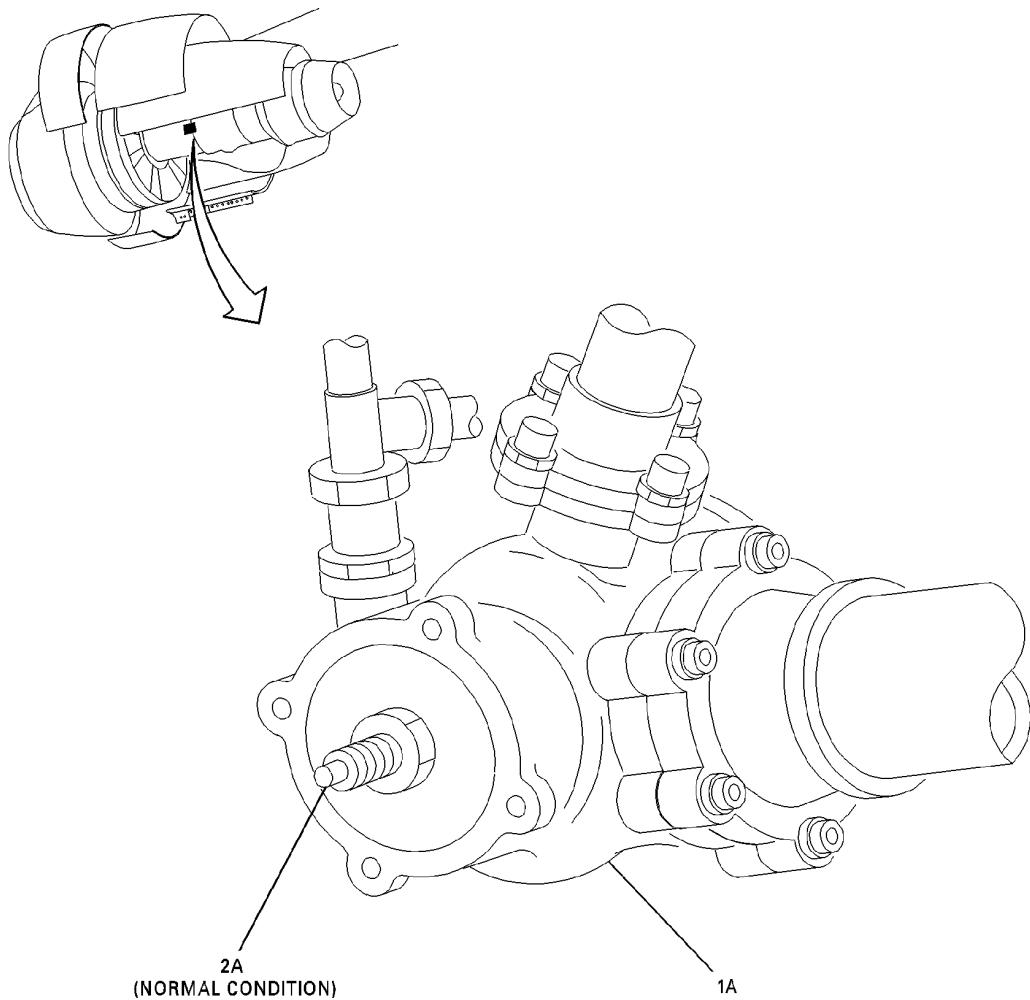
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LEGEND:

- 1A. TURBINE VANE AND BLADE
COOLING AIR (TVBCA) VALVE
- 2A. POSITION INDICATOR PIN

CAG(IGDS)

DB2-75-0265

Turbine Vane and Blade Cooling Air Valve - Left Side
Figure 502/75-22-04-990-871

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

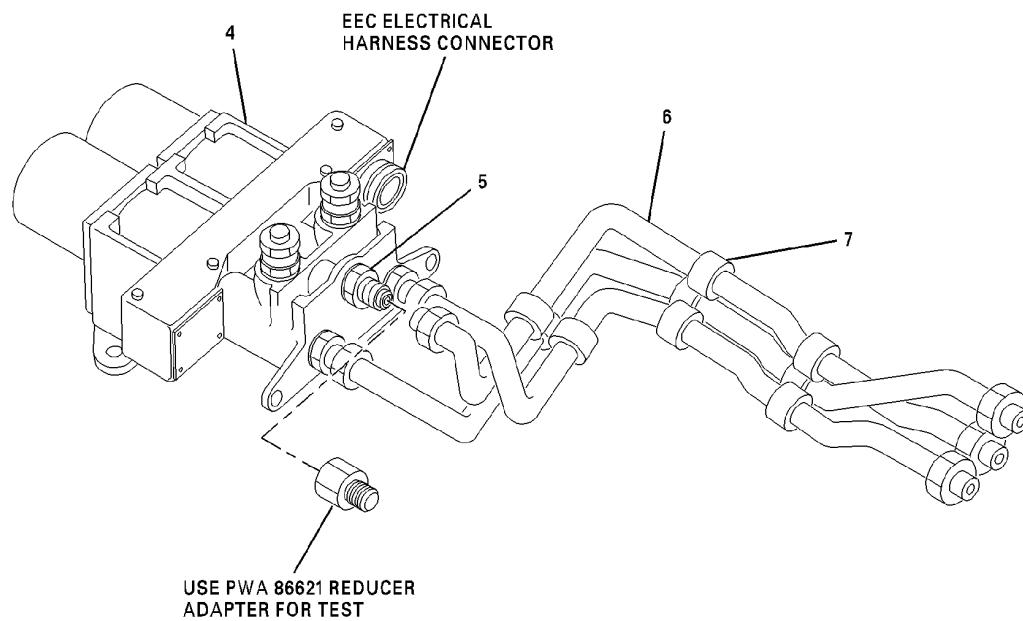
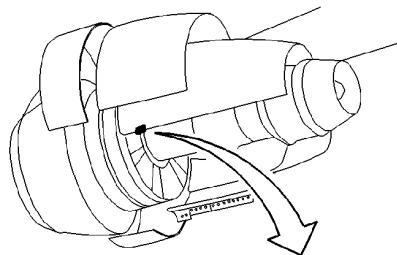
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LEGEND:

- 4. SOLENOID VALVE
- 5. FITTING
- 6. TUBE
- 7. CLAMP

CAG(IGDS)

DB2-75-0266A

Solenoid-Valve Assembly - Functional Test
Figure 503/75-22-04-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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**FILTER HOUSING ASSEMBLIES, PW4460/4462 (BEFORE PHASE-3) HIGH PRESSURE COMPRESSOR
SECONDARY FLOW CONTROL AND TURBINE VANE AND BLADE COOLING AIR VALVES – REMOVAL/
INSTALLATION**

1. General

- A. This procedure has the instructions for the (Before Phase-3) removal/installation of the HPC secondary flow-control and TVB Cooling-Air valves filter housing assemblies.
- B. There are four filter housing assemblies, two on the left side and two on the right side of the engine. The two right filter housing assemblies and the lower left filter housing assembly are part of the HPC Secondary Flow Control system. The upper left filter housing assembly is part of the Turbine Vane and Blade Cooling Air system. The left filter housing assemblies are mounted on a J-flange bracket at the 11:00 o'clock position. The right filter housing assemblies are mounted on a J-flange bracket at the 1:00 o'clock position.
- C. Unless different instructions are given, these maintenance procedures are the same for the three Pratt & Whitney PW4460/4462 (Before Phase-3) engines.

TASK 75-22-05-000-868

**2. REMOVAL OF THE LEFT PW4460/4462 (BEFORE PHASE-3) HIGH PRESSURE COMPRESSOR
SECONDARY FLOW CONTROL VALVE FILTER HOUSING ASSEMBLY**

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - PW4460/4462 Left High Pressure Compressor Secondary Flow Control Valve Filter Housing Assembly Removal

SUBTASK 75-22-05-010-267

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - PW4460/4462 Left High Pressure Compressor Secondary Flow Control Filter Housing Assembly Removal

SUBTASK 75-22-05-020-267

- (1) Remove the lower left HPC secondary flow control valve filter housing (1) as follows:
(Figure 401)

NOTE: The step that follows is for engines after SB PW4ENG 75-79.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (a) Remove the lockwire from the B-nut of the tube (2) and the B-nut of tube (3). Disconnect the tube (2) and the HPC air valve signal tube (3).

NOTE: The step that follows is for engines before SB PW4ENG 75-79 or after ALERT SB PWENG 75-62 R2.

- (b) Remove the lockwire from the tube (2) B-nut and disconnect the tube.
(c) Remove the two bolts (5).
(d) Install the protective caps on the disconnected tubing. Seal all open fittings of the filter housing (1) with protective caps.

SUBTASK 75-22-05-410-267

- (2) If the HPC filter housing is not installed immediately, or weather conditions make it necessary, close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

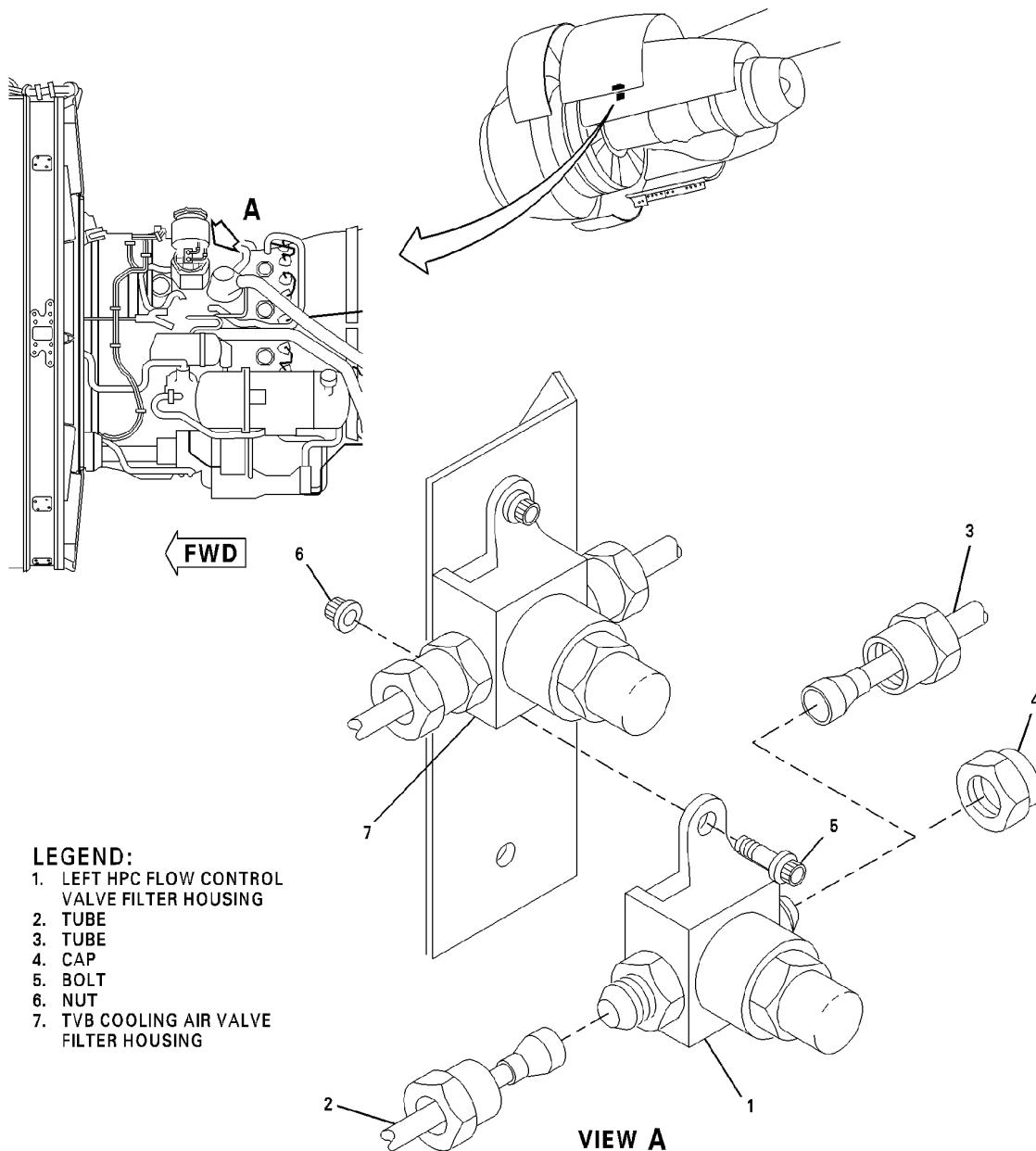
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LEGEND:

1. LEFT HPC FLOW CONTROL VALVE FILTER HOUSING
2. TUBE
3. TUBE
4. CAP
5. BOLT
6. NUT
7. TVB COOLING AIR VALVE FILTER HOUSING

CAG(IGDS)

DB2-75-0267

HPC Secondary Flow Control Valve Filter Housing - Left
Figure 401/75-22-05-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-22-05-400-868

**3. INSTALLATION OF THE LEFT PW4460/4462 (BEFORE PHASE-3) HIGH PRESSURE COMPRESSOR
SECONDARY FLOW CONTROL VALVE FILTER HOUSING ASSEMBLY**

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
AS3214-02	Lockwire
P03-001	Oil, engine lubricating (PWA 521B)
P06-054	Paste, antiseize (PWA 36246)

C. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - PW4460/4462 Left High Pressure Compressor Secondary Flow Control Valve Filter Housing Assembly Installation

SUBTASK 75-22-05-010-268

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - PW4460/4462 Left High Pressure Compressor Secondary Flow Control Filter Housing Assembly Installation

SUBTASK 75-22-05-420-267

- (1) Install the lower left HPC secondary flow control valve filter housing (1) as follows: (Figure 401)
(a) Align the mount flanges of the filter housing (1) with the holes in the bracket on the J-Flange at the 11:00 o'clock position.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-22-05

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the bolt (5) threads with engine oil (P03-001). Insert the two bolts (5) through the filter housing flanges and the J-Flange bracket.
- (c) Install the two nuts (6). Torque the two bolts (5) to 36–40 in-lb (4.1–4.5 N·m).
- (d) Remove the protective caps from the filter housing (1) and the air tubes (2) and (3).

NOTE: The step that follows is for engines after SB PW4ENG 75-79.



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (e) Lubricate the threads of the filter housing fittings with antiseize paste (P06-054). Connect the tubes (2) and (3) to the fittings on the filter housing (1) and torque the B-nuts to 200-225 in-lb (22.6-25.4 N·m). Safety the tube (2) B-nut with lockwire to the forward hex fitting on the filter housing. Safety the tube (3) B-nut with lockwire to the filter cover.
NOTE: The step that follows is for engines before SB PW4ENG 75-79.
- (f) Lubricate the threads of the cap (4) with engine oil (P03-001). Install the cap on the aft fitting of the filter housing (1). Torque the cap to 270-300 in-lb (30.5-33.9 N·m). Safety the cap (4) with lockwire to the filter cover.
- (g) Lubricate the threads of the forward filter housing fitting with antiseize paste (P06-054). Connect the tube (2) to the fitting on the filter housing (1) and torque the B-nut to 200-225 in-lb (22.6-25.4 N·m). Safety the tube (2) with lockwire to the forward hex fitting on the filter housing. Safety the tube (3) B-nut with lockwire to the filter cover.

F. Job Close-up - PW4460/4462 Left High Pressure Compressor Secondary Flow Control Filter Housing Assembly Installation

SUBTASK 75-22-05-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-22-05-410-268

- (2) Close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

TASK 75-22-05-000-869

4. REMOVAL OF THE LEFT PW4460/4462 (BEFORE PHASE-3) TURBINE VANE AND BLADE COOLING AIR VALVE FILTER HOUSING ASSEMBLY

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 404

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - PW4460/4462 Left Turbine Vane and Blade Cooling Air Valve Filter Housing Assembly Removal

SUBTASK 75-22-05-010-270

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - PW4460/4462 Left Turbine Vane and Blade Cooling Air Valve Filter Housing Assembly Removal

SUBTASK 75-22-05-020-271

- (1) Remove the upper left vane and blade cooling air valve filter housing as follows: (Figure 402)
 - (a) Remove the lockwire from the B-nuts of tubes (8) and (9), and the filter housing (7). Disconnect the tubes.
 - (b) Remove the two bolts (5) and the two nuts (6) from the filter housing (7). Remove housing assembly from the engine.
 - (c) Install the protective caps on the disconnected tubing. Seal all open fittings of the filter housing (7) with protective caps.

SUBTASK 75-22-05-410-271

- (2) If the turbine vane and blade cooling air valve filter housing is not installed immediately, or weather conditions make it necessary, close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-22-05

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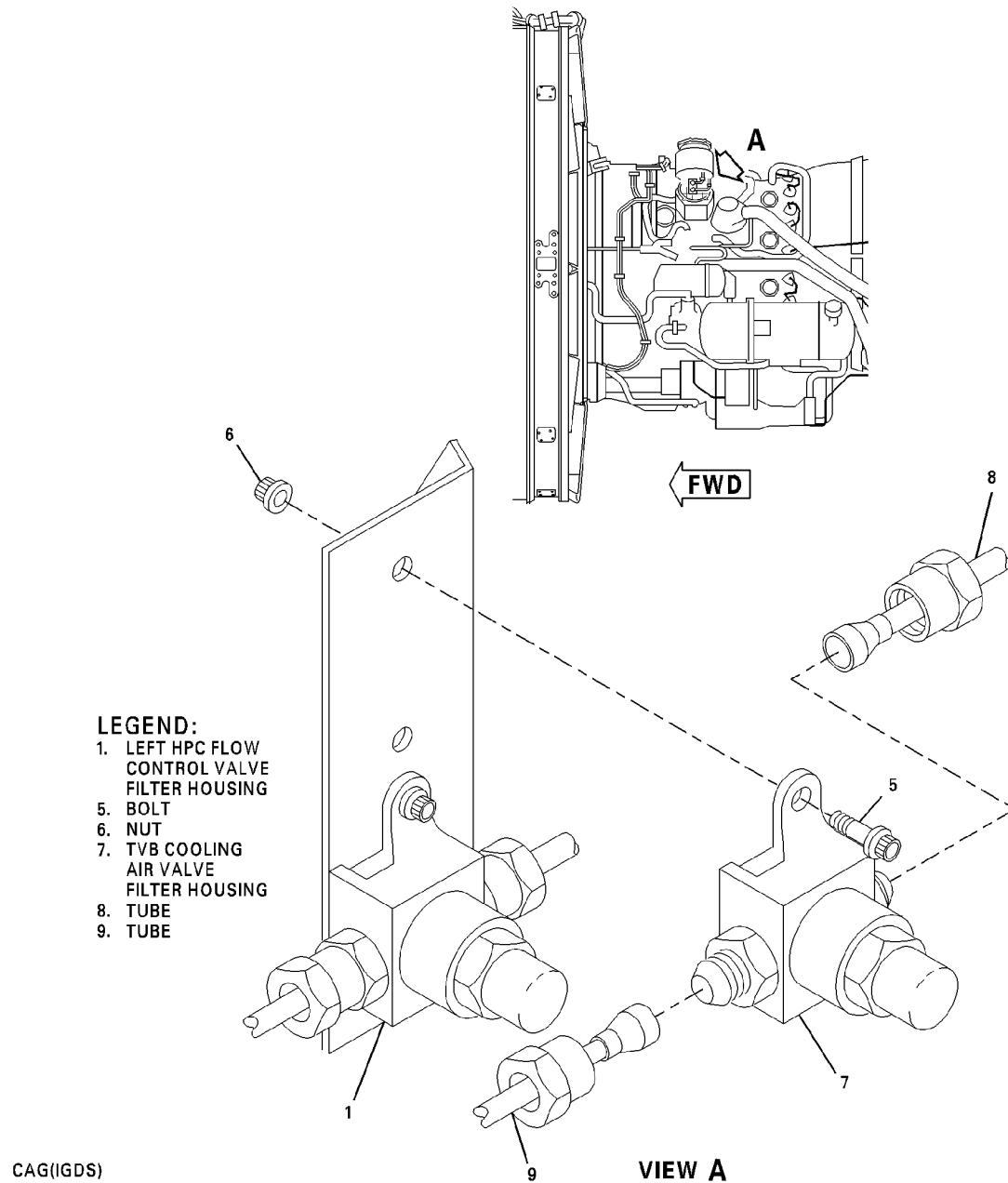
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CAG(IGDS)

VIEW A

DB2-75-0271

Turbine Vane and Blade Cooling Air Valve Filter Housing - Left
Figure 402/75-22-05-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-22-05-400-869

5. INSTALLATION OF THE LEFT PW4460/4462 (BEFORE PHASE-3) TURBINE VANE AND BLADE COOLING AIR VALVE FILTER HOUSING ASSEMBLY

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 405

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 406

REFERENCE	DESIGNATION
AS3214-02	Lockwire
P03-001	Oil, engine lubricating (PWA 521B)
P06-054	Paste, antiseize (PWA 36246)

C. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - PW4460/4462 Left Turbine Vane and Blade Cooling Air Valve Filter Housing Assembly Installation

SUBTASK 75-22-05-010-271

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - PW4460/4462 Left Turbine Vane and Blade Cooling Air Valve Filter Housing Assembly Installation

SUBTASK 75-22-05-420-269

- (1) Install the left turbine vane and blade Cooling air valve filter housing (7) as follows:
(Figure 402)
- (a) Align the mount flanges of the filter housing (7) with the holes in the bracket on the J-Flange at the 11:00 o'clock position.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the bolt threads with engine oil (P03-001) and insert through the filter housing flanges and the J-Flange bracket.
- (c) Install the two nuts (6). Torque the two bolts (5) to 36-40 in-lb (4.1-4.5 N·m).
- (d) Remove the protective caps from the filter housing (7) and the tubes (8) and (9).



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- (e) Lubricate the threads of the filter housing fittings with antiseize paste (P06-054). Connect the tubes (8) and (9) to the fittings on the filter housing (7) and torque the B-nuts to 200-225 in-lb (22.6-25.4 N·m).
 - 1) Safety the tube (9) B-nut with lockwire to the forward hex fitting on the filter housing. Safety the tube (8) B-nut with lockwire to the filter cover.

F. Job Close-up - PW4460/4462 Left Turbine Vane and Blade Cooling Air Valve Filter Housing Assembly Installation

SUBTASK 75-22-05-942-269

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-22-05-410-272

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

TASK 75-22-05-000-870

6. REMOVAL OF THE RIGHT PW4460/4462 (BEFORE PHASE-3) HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE FILTER HOUSING ASSEMBLIES

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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Table 407

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - PW4460/4462 Right High Pressure Compressor Secondary Flow Control Valve Filter Housing Assemblies Removal

SUBTASK 75-22-05-010-269

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - PW4460/4462 Right High Pressure Compressor Secondary Flow Control Filter Housing Assemblies Removal

SUBTASK 75-22-05-020-268

- (1) Remove the lower right HPC secondary flow control valve filter housing (10) as follows: (Figure 403)

NOTE: The step that follows is for engines after SB PW4ENG 75-79.

- (a) Remove the lockwire from the B-nuts of the HPC air valve signal tube (13) and the tube (12). Disconnect the tubes.

NOTE: The step that follows is for engines before SB PW4ENG 75-79 or after ALERT SB PWENG 75-62 R2.

- (b) Remove the lockwire from the B-nut of tube (12) and disconnect the tube.
- (c) Remove the two bolts (15) and the two nuts (17) from the lower filter housing (10).
- (d) Install the protective caps on the disconnected tubing. Seal all open fittings of the filter housing (10) with protective caps.

SUBTASK 75-22-05-020-269

- (2) Remove the upper right HPC secondary flow control valve filter housing (11) as follows: (Figure 403)

- (a) Remove the lockwire from the B-nuts of tubes (16) and (18) and disconnect the tubes.
- (b) Remove the two bolts (15) and two nuts (17) from the upper filter housing (11).
- (c) Install the protective caps on the disconnected tubing. Seal all open fittings of the filter housing (11) with protective caps.

SUBTASK 75-22-05-410-269

- (3) If the HPC filter housings are not installed immediately, or weather conditions make it necessary, close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-22-05

Config 2

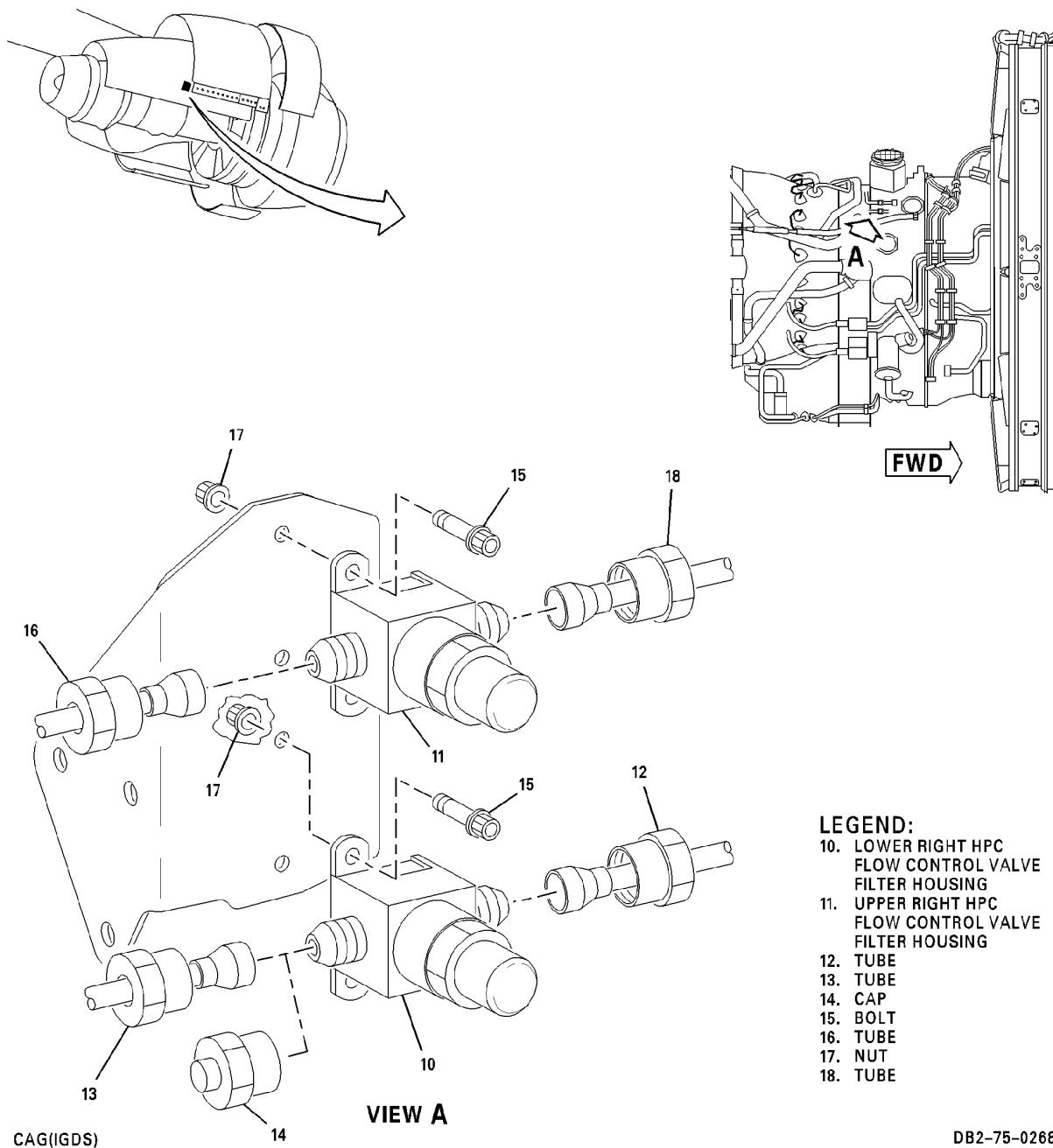
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HPC Secondary Flow Control Valve Filter Holdings - Right
Figure 403/75-22-05-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-22-05-400-870

7. INSTALLATION OF THE RIGHT PW4460/4462 (BEFORE PHASE-3) HIGH PRESSURE COMPRESSOR SECONDARY FLOW CONTROL VALVE FILTER HOUSING ASSEMBLIES

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 408

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 409

REFERENCE	DESIGNATION
AS3214-02	Lockwire
P03-001	Oil, engine lubricating (PWA 521B)
P06-054	Paste, antiseize (PWA 36246)

C. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - PW4460/4462 Right High Pressure Compressor Secondary Flow Control Valve Filter Housing Assemblies Installation

SUBTASK 75-22-05-010-272

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - PW4460/4462 Right High Pressure Compressor Secondary Flow Control Filter Housing Assemblies Installation

SUBTASK 75-22-05-420-268

- (1) Install the lower right HPC secondary flow control valve filter housing (10) as follows: (Figure 403)
- (a) Align the mount flanges of the filter housing (10) with the holes in the J-Flange bracket at the 1:00 o'clock position.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the threads of the two bolts (15) with engine oil (P03-001).
- (c) Insert the two bolts through the filter housing flanges and the J-Flange bracket.
- (d) Install the two nuts (17). Torque the two bolts (15) to 36–40 in-lb (4.1–4.5 N·m).
- (e) Remove the protective caps from the filter housing (10), and the tubing.

NOTE: The step that follows is for engines after SB PW4ENG 75-79.



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (f) Lubricate the threads of the filter housing (10) fittings with antiseize paste (P06-054).
 - (g) Connect the tubes (12) and (13) to the fittings on the filter housing (10) and torque the B-nuts to 200–225 in-lb (22.6–25.4 N·m). Safety the tube (12) B-nut with lockwire to the forward hex fitting on the filter housing. Safety the tube (13) B-nut with lockwire to the filter cover.
- NOTE: The step that follows is for engines before SB PW4ENG 75-79.
- (h) Lubricate the threads of the cap (14) with engine oil (P03-001). Install the cap on the aft fitting of the lower filter housing (10). Torque the cap to 270–300 in-lb (30.5–33.9 N·m). Safety the cap (14) with lockwire to the filter cover.
 - (i) Lubricate the threads of the forward filter housing fitting with antiseize paste (P06-054). Connect the tube (12) to the forward fitting on the filter housing and torque the B-nut to 200–225 in-lb (22.6–25.4 N·m). Safety the tube (12) B-nut with lockwire to the forward hex fitting on the filter housing.

SUBTASK 75-22-05-020-270

- (2) Install the upper right HPC secondary flow control valve filter housing (11) as follows:
(Figure 403)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (a) Align the mount flanges of the filter housing (11) with the holes in the bracket on the J-Flange at the 1:00 o'clock position.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the threads of the two bolts (15) with engine oil (P03-001). Insert the two bolts through the filter housing flanges and the J-Flange bracket.
- (c) Install the two nuts (17). Torque the two bolts (15) to 36–40 in-lb (4.1–4.5 N·m).
- (d) If applicable remove the protective caps from the filter housing (11) and the tubing.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- (e) Lubricate the threads of the filter housing (11) fittings with antiseize paste (P06-054).
- (f) Connect the tubes (16) and (18) to the fittings on the filter housing (11) and torque the B-nuts to 200-225 in-lb (22.6-25.4 N·m). Safety the tube (18) B-nut with lockwire to the forward hex fitting on the filter housing. Safety the tube (16) B-nut with lockwire to the filter cover.

F. Job Close-up - PW4460/4462 Right High Pressure Compressor Secondary Flow Control Filter Housing Assemblies Installation

SUBTASK 75-22-05-942-268

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-22-05-410-270

- (2) Close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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**FILTER HOUSING ASSEMBLIES, PW4460/4462-3 (PHASE-3) TURBINE VANE AND BLADE COOLING AIR
VALVE - REMOVAL/INSTALLATION**

1. General

- A. This procedure has the instructions for the removal/installation of the PHASE-3 turbine vane and blade cooling air valve filter housing assemblies.
- B. There are four filter housing assemblies, two on the left side and two on the right side of the engine. The left filter housing assemblies are mounted on a J-flange bracket at the 11:00 o'clock position. The right filter housing assemblies are mounted on a J-flange bracket at the 1:00 o'clock position.
- C. Unless different instructions are given, these maintenance procedures are the same for the three Pratt & Whitney PW4460/4462 -3 (PHASE-3) engines.

TASK 75-22-06-000-869

**2. REMOVAL OF THE LEFT PW4460/4462 -3 (PHASE-3) TURBINE VANE AND BLADE COOLING AIR
VALVE FILTER HOUSING ASSEMBLIES**

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - PW4460/4462 -3 Left Turbine Vane and Blade Cooling Air Valve Filter Housing Assemblies Removal

SUBTASK 75-22-06-010-267

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - PW4460/4462 -3 Left Turbine Vane and Blade Cooling Air Valve Filter Housing Assemblies Removal

SUBTASK 75-22-06-020-267

- (1) If applicable, remove the lower left turbine vane and blade cooling air valve filter housing (1) as follows: (Figure 401)
 - (a) Remove the lockwire from the B-nuts of tubes (3) and (4). Disconnect the tubes.
 - (b) Remove the two bolts (5) and nuts (6). Remove the housing assembly (1) from the engine.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (c) Install the protective caps on the disconnected tubing. Seal all open fittings on the filter housing (1) with protective caps.

SUBTASK 75-22-06-020-268

- (2) If applicable, remove the upper left turbine vane and blade cooling air valve filter housing (2) as follows: (Figure 401)
- (a) Remove the lockwire from the B-nuts of tubes (7) and (8). Disconnect the tubes.
 - (b) Remove the two bolts (5) and the nuts (6). Remove the housing assembly (2) from the engine.
 - (c) Install the protective caps on the disconnected tubes. Seal all open fittings on the filter housing (2) with protective caps.

SUBTASK 75-22-06-410-267

- (3) If the filter housings are not installed immediately, or weather conditions make it necessary, close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

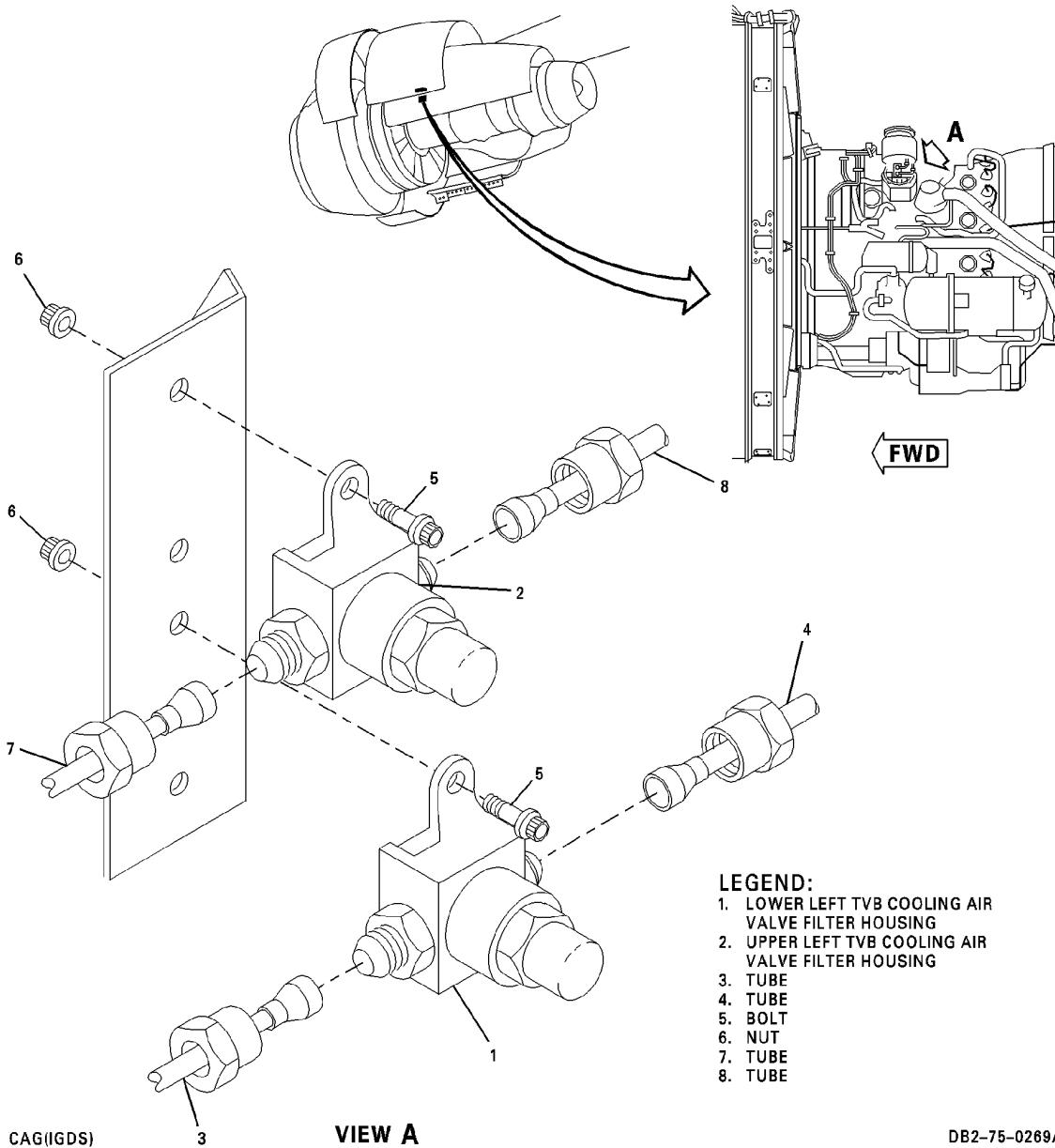
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LEGEND:

1. LOWER LEFT TVB COOLING AIR VALVE FILTER HOUSING
2. UPPER LEFT TVB COOLING AIR VALVE FILTER HOUSING
3. TUBE
4. TUBE
5. BOLT
6. NUT
7. TUBE
8. TUBE

CAG(IGDS)

VIEW A

DB2-75-0269A

Turbine Vane and Blade Cooling Air Valve Filter Housings - Left
Figure 401/75-22-06-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-22-06-400-869

3. INSTALLATION OF THE LEFT PW4460/4462 -3 (PHASE-3) TURBINE VANE AND BLADE COOLING AIR VALVE FILTER HOUSING ASSEMBLIES

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Model M303, M305 or M307	Crimper, Bergen Mechanical
Not Specified	Torque wrench, 0-250 in-lb (0-28.2 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P05-289	Lockwire (AS3214-02)
P05-291	Cable, safety
P05-292	Ferrule, safety cable
P03-001	Oil, engine lubricating (PWA 521B)
P06-021	Compound, antigalling (PWA 550-3)

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-33-10	Illustrated Parts Catalog

D. Job Set-up - PW4460/4462 -3 Left Turbine Vane and Blade Cooling Air Valve Filter Housing Assemblies Installation

SUBTASK 75-22-06-010-268

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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E. Procedure - PW4460/4462 -3 Left Turbine Vane and Blade Cooling Air Valve Filter Housing Assemblies Installation

SUBTASK 75-22-06-420-267

- (1) If applicable, install the Lower Left Turbine Vane and Blade Cooling Air Valve Filter Housing (1). (IPC 75-33-10) (Figure 401)

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (a) Align the mount flanges of the filter housing (1) with the holes in the bracket on the J-Flange at the 11:00 o'clock position.
- (b) Lubricate the two bolt (5) threads with engine oil (P03-001) and insert through the filter housing (1) flanges and the J-Flange bracket. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Install the two nuts (6). Torque the two bolts (5) to 36–40 in-lb (4.1–4.5 N·m).
- (d) If applicable remove the protective caps from the filter housing (1) and the air tubes (3) and (4).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1178, COMPOUND/ANTI-GALLING

HAZMAT 1000, REFER TO MSDS

- (e) Lubricate the threads of the filter housing (1) fittings with antigalling compound (P06-021). Connect the tubes (3) and (4) to the fittings on the filter housing (1). Torque the B-nuts to 200-225 in-lb (22.6-25.4 N·m). Safety the tube (3) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292) to the forward hex fitting on the filter housing. Safety the tube (4) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292) to the filter cover.

SUBTASK 75-22-06-420-268

- (2) If applicable, install the upper left turbine vane and blade cooling air valve filter (2) housing as follows: (IPC 75-33-10) (Figure 401)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1178, COMPOUND/ANTI-GALLING

HAZMAT 1000, REFER TO MSDS

- (a) Align the mount flanges of the filter housing (2) with the holes in the bracket on the J-Flange at the 11:00 o'clock position.
- (b) Lubricate the two bolts (5) threads with engine oil (P03-001) and insert through the filter housing (2) flanges and the J-Flange bracket. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Install the two nuts (6). Torque the two bolts (5) to 36–40 in-lb (4.1–4.5 N·m).
- (d) If applicable remove the protective caps from the filter housing (2) and the air tubes (7) and (8).
- (e) Lubricate the threads of the filter housing (2) fittings with antigalling compound (P06-021). Connect the tubes (7) and (8) to the fittings on the filter housing (2) and torque the B-nuts to 200-225 in-lb (22.6-25.4 N·m). Safety the tube (7) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292) to the forward hex fitting on the filter housing. Safety the tube (8) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292) to the filter cover.

SUBTASK 75-22-06-410-268

- (3) Close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

F. Job Close-up - PW4460/4462 -3 Left Turbine Vane Blade Cooling Air Valve Filter Housing Assemblies Installation

SUBTASK 75-22-06-942-268

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

———— END OF TASK ————

TASK 75-22-06-000-870

4. REMOVAL OF THE RIGHT PW4460/4462 -3 (PHASE-3) TURBINE VANE AND BLADE COOLING AIR VALVE FILTER HOUSING ASSEMBLIES

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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AIRCRAFT MAINTENANCE MANUAL

Table 404

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - PW4460/4462 -3 Right Turbine Vane and Blade Cooling Air Valve Filter Housing Assemblies Removal

SUBTASK 75-22-06-010-269

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - PW4460/4462 -3 Right Turbine Vane and Blade Cooling Air Valve Filter Housing Assemblies Removal

SUBTASK 75-22-06-020-269

- (1) If applicable, remove the lower right turbine vane and blade cooling air valve filter housing (9) as follows: (Figure 402)
 - (a) Remove the lockwire from the B-nuts of tubes (11) and (12). Disconnect the tubes.
 - (b) Remove the two bolts (13) and the nuts (14). Remove the housing assembly (9) from the engine.
 - (c) Install the protective caps on the disconnected tubes. Seal all open fittings on the filter housing (9) with protective caps.

SUBTASK 75-22-06-020-270

- (2) If applicable, remove the upper right turbine vane and blade cooling air valve filter housing (10) as follows: (Figure 402)
 - (a) Remove the lockwire from the B-nuts of tubes (15) and (16). Disconnect the tubes.
 - (b) Remove the two bolts (13) and the nuts (14). Remove the housing assembly (10) from the engine.
 - (c) Install the protective caps on the disconnected tubes. Seal all open fittings on the filter housing (10) with protective caps.

SUBTASK 75-22-06-410-271

- (3) If the turbine vane and blade cooling air valve filter housing is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-22-06

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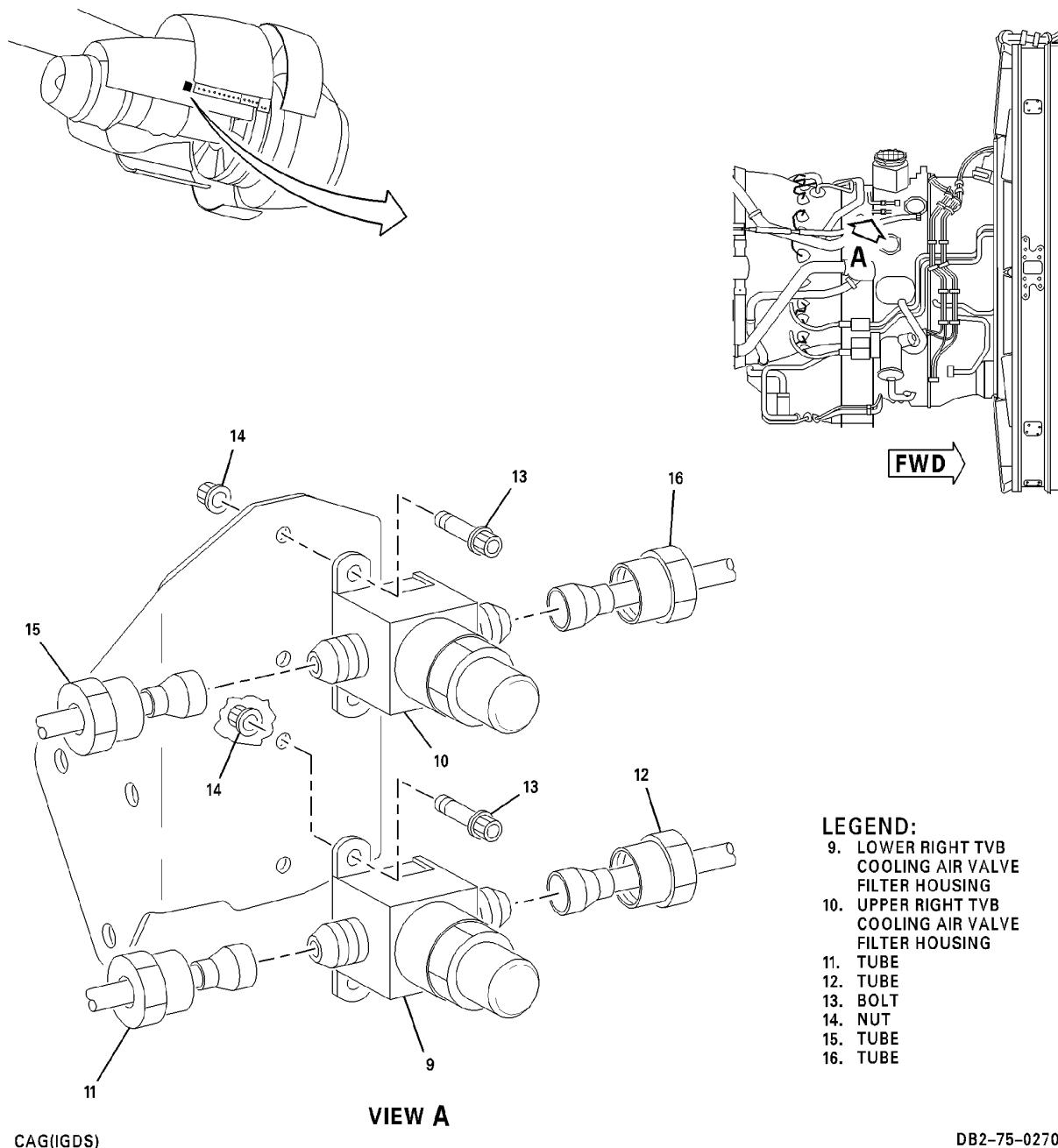
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LEGEND:

- 9. LOWER RIGHT TVB COOLING AIR VALVE FILTER HOUSING
- 10. UPPER RIGHT TVB COOLING AIR VALVE FILTER HOUSING
- 11. TUBE
- 12. TUBE
- 13. BOLT
- 14. NUT
- 15. TUBE
- 16. TUBE

Turbine Vane and Blade Cooling Air Valve Filter Housing - Right
Figure 402/75-22-06-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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TASK 75-22-06-400-870

5. INSTALLATION OF THE RIGHT PW4460/4462 -3 (PHASE-3) TURBINE VANE AND BLADE COOLING AIR VALVE FILTER HOUSING ASSEMBLIES

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 405

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Model M303, M305 or M307	Crimper, Bergen Mechanical
Not specified	Torque wrench, 0-250 in-lb (0-28.2 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 406

REFERENCE	DESIGNATION
P05-289	Lockwire (AS3214-02)
P05-291	Cable, safety
P05-292	Ferrule, safety cable
P03-001	Oil, engine lubricating (PWA 521B)
P06-021	Compound, antigalling (PWA 550-3)

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-33-10	Illustrated Parts Catalog

D. Job Set-up - PW4460/4462 -3 Right Turbine Vane and Blade Cooling Air Valve Filter Housing Assemblies Installation

SUBTASK 75-22-06-010-270

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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E. Procedure - PW4460/4462 -3 Right Turbine Vane and Blade Cooling Air Valve Filter Housing Assemblies Installation

SUBTASK 75-22-06-420-269

- (1) If applicable, install the lower right turbine vane and blade cooling air valve filter housing (9). (IPC 75-33-10) (Figure 402)

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1178, COMPOUND/ANTI-GALLING

HAZMAT 1000, REFER TO MSDS

- (a) Align the mount flanges of the filter housing (9) with the holes in the bracket on the J-Flange at the 1:00 o'clock position.
- (b) Lubricate the threads of the bolts (13) with engine oil (P03-001) and insert through the filter housing (9) flanges and the J-Flange bracket. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Install the two nuts (14). Torque the two bolts (13) to 36–40 in-lb (4.1–4.5 N·m).
- (d) If applicable remove the protective caps from the filter housing (9) and the air tubes (11) and (12).
- (e) Lubricate the threads of the filter housing (9) fittings with antigalling compound (P06-021). Connect the tubes (11) and (12) to the fittings on the filter housing (9) and torque the B-nuts to 200–225 in-lb (22.6–25.4 N·m). Safety the tube (12) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292) to the forward hex fitting on the filter housing. Safety the tube (11) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292) to the filter cover.

SUBTASK 75-22-06-420-270

- (2) If applicable, install the upper right turbine vane and blade cooling air valve filter housing (10) as follows: (IPC 75-33-10) (Figure 402)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1178, COMPOUND/ANTI-GALLING

HAZMAT 1000, REFER TO MSDS

- (a) Align the mount flanges of the filter housing (10) with the holes in the bracket on the J-Flange at the 1:00 o'clock position.
- (b) Lubricate the threads of the two bolts (13) with engine oil (P03-001) and insert the bolts through the filter housing (10) flanges and the J-Flange bracket. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Install the two nuts (14). Torque the two bolts (13) to 36–40 in-lb (4.1–4.5 N·m).
- (d) If applicable remove the protective caps from the filter housing (10) and the air tubes (15) and (16).
- (e) Lubricate the threads of the filter housing (10) fittings with antigalling compound (P06-021). Connect the tubes (15) and (16) to the fittings on the filter housing (10) and torque the B-nuts to 200–225 in-lb (22.6–25.4 N·m). Safety the tube (16) with lockwire (P05–289), or safety cable (P05–291) and safety cable ferrule (P05–292) to the forward hex fitting on the filter housing. Safety the tube (15) with lockwire (P05–289), or safety cable (P05–291) and safety cable ferrule (P05–292) to the filter cover.

SUBTASK 75-22-06-410-269

- (3) Close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

F. Job Close-up - PW4460/4462 -3 Right Turbine Vane and Blade CoolingAir Valve Filter Housing Assemblies Installation

SUBTASK 75-22-06-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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ENGINE TURBINE CASE COOLING - DESCRIPTION AND OPERATION

1. General

- A. The Turbine Case Cooling (TCC) system uses fan discharge air to keep the temperature of the High Pressure Turbine (HPT) and Low Pressure Turbine (LPT) cases low. Small holes on the inboard side of the air manifolds blow cooling air against the turbine cases during engine operation.
- B. The TCC system has a high pressure turbine clearance control (HPTCC) valve and a low pressure turbine clearance control (LPTCC) valve. The TCC system is monitored by the Electronic Control Unit (ECU) and controlled by the Hydro-Mechanical Unit (HMU). The HPTCC and LPTCC valves modulate air to the turbine case cooling manifolds which keeps the turbine cases cooler during operation and increases the engine's efficiency.

2. HPT and LPT Clearance Control Valves

- A. The HPTCC valve is installed between two ducts of the HPT air manifold, at the 2 o'clock position of the core engine. It connects to the HPT cooling air manifold which is installed around the HPT case. The LPTCC valve is installed between two ducts of the LPT air manifold, at the 9 o'clock position of the HPT stator case. It connects to the LPT cooling air manifold which is installed around the LPT case. Small holes on the inboard side of the manifolds blow cooling air against the turbine cases. (Figure 1)
- B. Each HPTCC and LPTCC valve assembly includes the components that follow: (Figure 2)
 - Valve, two-way, continuously-variable
 - Actuator, fuel-hydraulic energized
 - Sensors, dual, Linear Variable Differential Transformer (LVDT) position feedback.
 - (1) The HPTCC and LPTCC valves are butterfly type valves which have manual stops. These stops let the valve open to no more than 90° (1.57 rad).
 - (2) The valve actuator assembly is installed on the valve assembly. It is a single ended hydraulic piston. Hydraulic pressure is used to open or close the valves. The actuator is spring loaded to the closed position. This makes sure the valve closes in case of hydraulic pressure loss.
 - (3) The dual LVDT position feedback sensors on the HPTCC and LPTCC valves monitor the position of the valve actuator piston. The actuator readout is equivalent to the position of the butterfly valve inside the HPTCC and LPTCC valves.
 - (a) The sensors of the LVDT transmit electrical signals to the ECU. These signals identify the position of the actuator piston or butterfly valve. Each LVDT is electronically isolated so that an open or shorted circuit in one channel will not cause failure of the other channel.
 - (b) The LVDT sensors have two channels which transmit signals to and receive signals from the ECU. The LVDT sensor that receives the excitation signal from the ECU channel-A processor, sends feedback about the valve's position to that same processor. The LVDT sensor that receives the excitation signal from the ECU channel-B processor, sends feedback about the valve's position to that same processor.
 - (4) To make sure that the valve is installed correctly, each valve assembly has an airflow direction arrow on both sides of the housing. It also has alignment pins to prevent incorrect installation.

3. Electronic Control Unit

- A. During engine operation, the ECU sends excitation signals to each of the LVDT sensors on the HPTCC and LPTCC valves. In reply, the sensors give feedback to the ECU about the positions of the butterfly valves inside the HPTCC and LPTCC air valves.
- B. The ECU also receives input about fan inlet temperature (T1.2), core speed (N2), compressor discharge pressure (PS3) and compressor discharge temperature (T3). It uses this data to calculate the needed HPTCC and LPTCC valve positions.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- C. The ECU transmits the calculated (-300 to +300 milliamp DC) control signal to the electro-hydro-mechanical servo valve in the HMU. This causes the HMU to release the correct fuel pressure to operate the HPTCC and LPTCC valve actuator pistons and the butterfly valves. The position of the butterfly valves will be in proportion to all the engine data collected and calculated by the ECU.
- 4. Hydro Mechanical Unit**
- A. The HMU changes the electrical signals from the ECU into hydraulic command signals which meter the fuel to operate the HPTCC and LPTCC valves. As the HPTCC and LPTCC butterfly valves change position they modulate the correct supply of air to the turbine case cooling manifolds.
 - B. The HMU supplies fuel at regulated reference pressure (RRP) to the rod-end and modulated servo pressure (MSP) to the head-end of the HPTCC/LPTCC valve actuator pistons.
 - (1) Fuel pressure to the rod-end of the actuator will close the butterfly valve. Fuel pressure to the head-end of the actuator opens the butterfly valve.
 - (2) The RRP to the rod-end of the actuator is constant.
 - (3) The MSP to the head-end of the actuator is controlled by the ECU. When the MSP is more than the RRP, the valve opens. When the MSP is less than the RRP, the valve closes.
 - (4) When the LPT and HPT pressures are constant, the input signal from the ECU to the electro-hydraulic servo valve in the HMU will be approximately -30 milliamps. At these pressures, the HPTCC and LPTCC butterfly valve positions are held constant. This is referred to as the null state.
 - (5) When the LPT and HPT pressures decrease, the input signal from the ECU to the electro-hydraulic servo valve in the HMU will be less than -30 milliamps. During a decrease in pressure, the HMU flows higher modulated servo pressure to the head-end (open) of the actuator piston. This decrease in pressure causes the actuator to open the butterfly valve and increase turbine case cooling.
 - (6) When LPT and HPT pressures increase, the input signal from the ECU to the electro-hydraulic servo valve in the HMU will be greater than -30 milliamps. During an increase in pressure, the HMU flows lower modulated servo pressure to the head-end (open) of the actuator piston. This increase in pressure causes the actuator to close the butterfly valve and decrease turbine case cooling.

5. System Operation

- A. The turbine case cooling system uses fan discharge air to keep the temperatures of the HPT and LPT cases in the permitted limits. At low altitude operations or higher turbine case pressures, a minimum airflow is supplied to the turbine case cooling manifolds. At higher altitude operations or lower turbine case pressures, the airflow to the manifolds is increased. The decrease and increase of the amount of cooling air prevents the turbine cases to expand or shrink too much during flight. It keeps the blade-tip-to-shroud clearances in the permitted limits, which increases engine efficiency.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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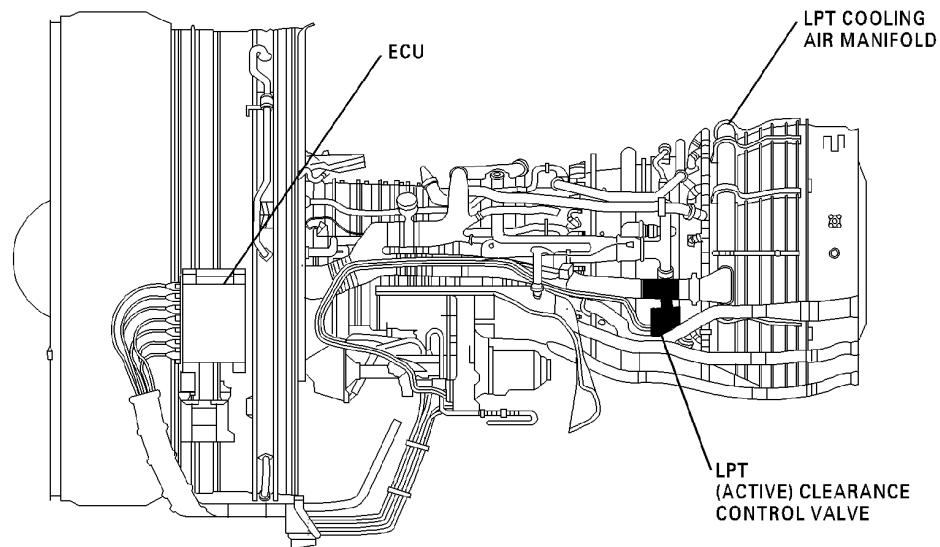
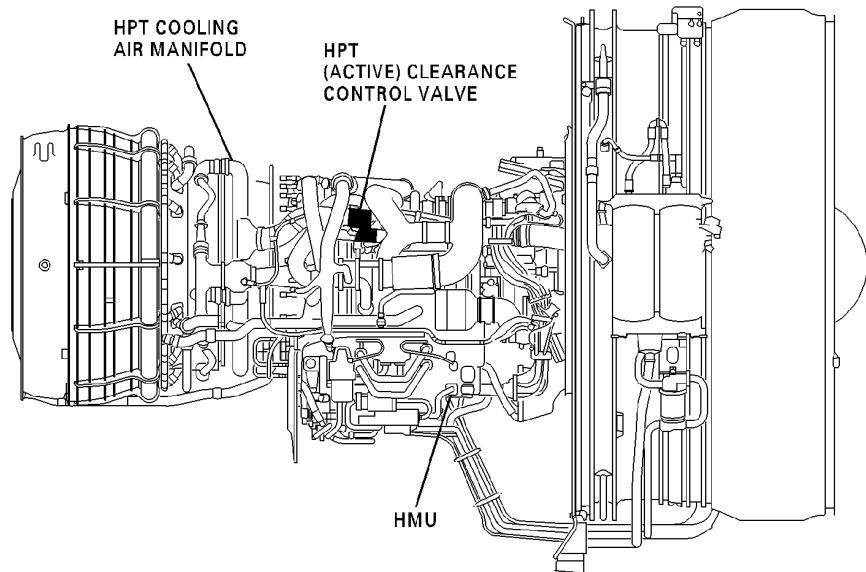
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CAG(IGDS)

DB2-75-0200B

HPT Clearance Control Valve and Ducting
Figure 1/75-23-00-990-885

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

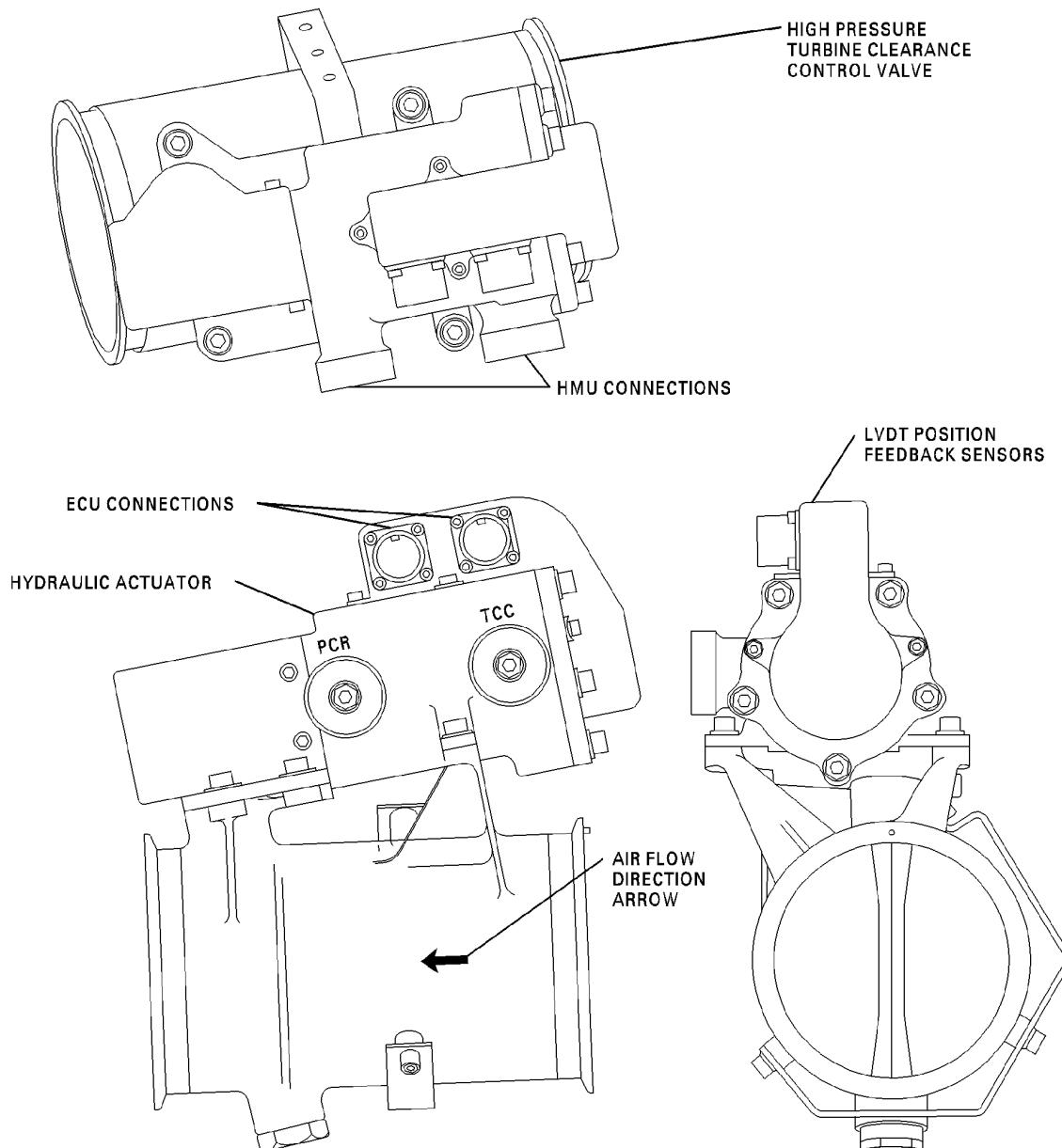
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CAG(IGDS)

DB2-75-0202

HPTCC And LPTCC Valves
Figure 2/75-23-00-990-887

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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ENGINE TURBINE CASE COOLING - DESCRIPTION AND OPERATION

1. General

- A. The turbine case cooling system (TCCS) supplies fan discharge air to the outside of the high pressure turbine (HPT) and the low pressure turbine (LPT) cases to improve engine performance. The TCCS air valves are mechanically operated by a hydraulic actuator and controlled by the electronic engine control (EEC). The hydraulic actuator sends a position feedback signal to the EEC. This signal is used to supply system alerts to the crew if the actuator is in the open valve position when scheduled to be closed. If it is in the closed position when it is scheduled to be open, a message is stored in the EEC.

2. TCCS Air Valve Actuator And Control Cable

- A. The TCCS air valve actuator is fuel pressure operated and mechanically modulates the high and low pressure TCCS air butterfly valves. The valve actuator linear control is transmitted to the valve by a (push-pull) control cable. The actuator unit has a dual coil torque motor, pilot valve, actuator, and dual electrical transducers (LVDT). The LVDT's supply redundant feedback signals of the actuator position to the EEC. (Figure 1)
- B. The torque motor and pilot valve controls fuel pressure to the actuator. The actuator rod positions are then transmitted to the TCCS valves through a flexible shaft (push-pull cable).
- C. The torque motor has dual coils, which are independently controlled by each channel in the EEC. If the electrical power fails, the torque motor will cause the TCC air valve to close.

3. TCCS Air Valves (LPT and HPT)

- A. The high and low pressure turbine TCCS air shutoff valves apply cooling air externally to the HPT and LPT cases. The cooling air improves turbine blade-to-case clearances and decreases LPT case temperature at takeoff power settings.
- B. The HPT 4.5 in. (114.3 mm) and LPT 3.75 in. (95.25 mm), butterfly valves control air flow from fan discharge to the manifolds that surround the LPT and HPT cases. Air bleed holes in the manifolds move cooling air externally on the case. This keeps thermal expansion of the case at a minimum.
- C. The TCC air valves are mechanically connected through a ratio linkage system. The valves are fully modulated by a flexible shaft (push-pull cable) connected to a hydraulic (fuel) actuator.

4. System Operation

- A. The TCCS uses fan discharge air to decrease the temperature of the LPC and HPC cases which improves turbine blade-to-case clearance. The TCCS air valves control the discharge of air to the LPT and HPT cases. One air valve is installed for the LPT, and one air valve is installed for the HPT. The air valves are mechanically operated, fully modulated, spring loaded closed butterfly valves, installed on a common manifold inlet.
- B. The TCCS air valve actuator has dual independent-winding linear variable differential transformers (LVDT's) that send the EEC the actuators position. The actuator is controlled by the EEC to a schedule set by altitude and high rotor speed (N2). The actuator is hydraulically operated by fuel pressure. The EEC sends command signals to the actuator to move the air valves to a position calculated by the EEC. The actuator is connected to the two valves through a control cable. The relative schedule of each valve is controlled by a single fixed geometry mechanical linkage (air valve control cable). The actuator moves the air valves with the control cable. During operation the actuator will start to open the LPT air valve before the HPT air valve starts to open. If the loss of electrical power or hydraulic pressure occurs the valve automatically goes closed.

EFFECTIVITY

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642-645

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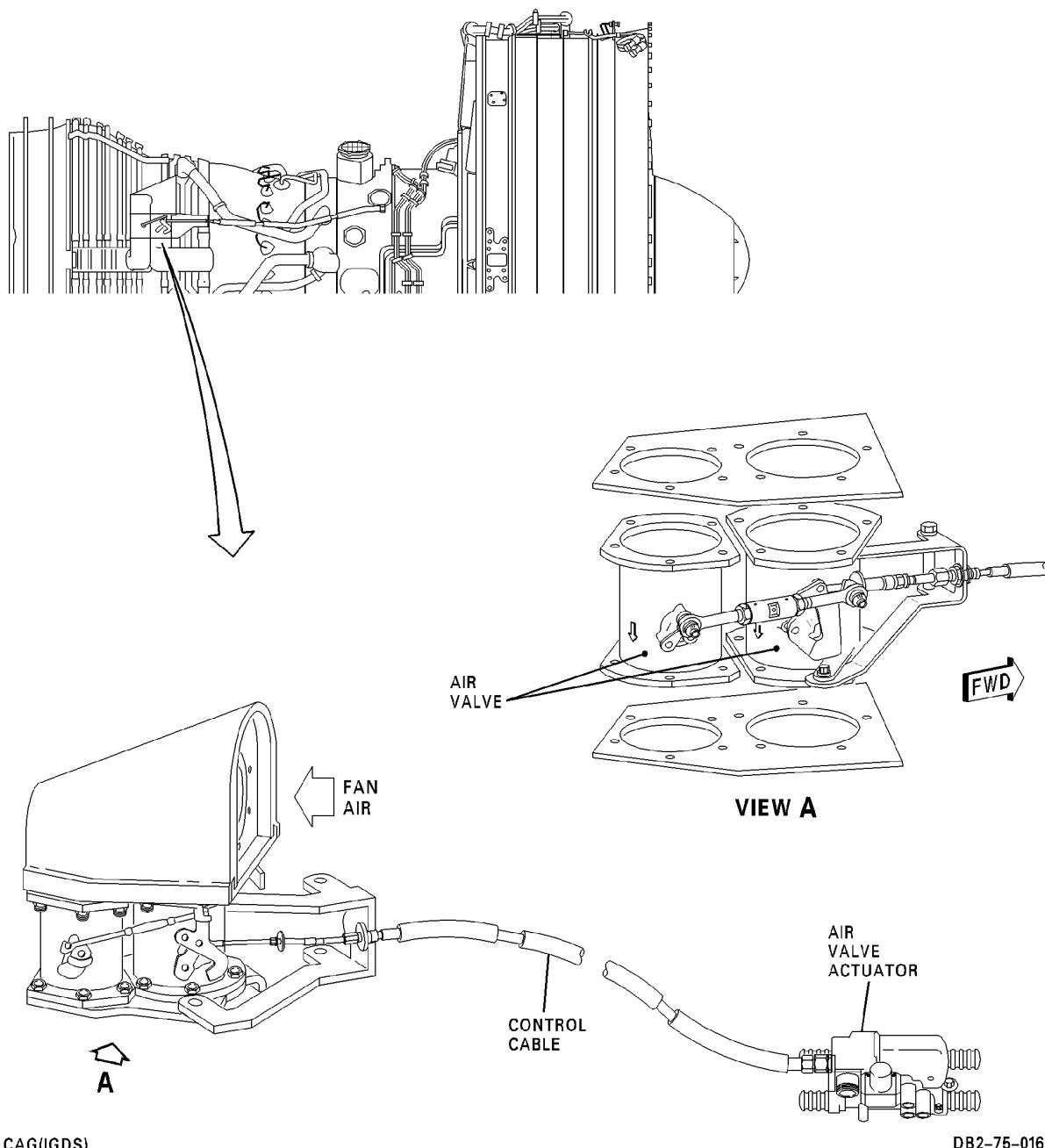
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Turbine Case Cooling System
Figure 1/75-23-00-990-801

EFFECTIVITY
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VALVE, LOW PRESSURE TURBINE CLEARANCE CONTROL DEACTIVATION /ACTIVATION -
MAINTENANCE PRACTICES

1. General

- A. This procedure has the maintenance practices low pressure turbine clearance control valve. The procedure includes:
 - Deactivation of the low pressure turbine clearance control valve.
 - Activation of the low pressure turbine clearance control valve.
- B. The low pressure turbine control valve is at the 9 o'clock position. Access to the TCC valve is through the left thrust reverser door.
- C. Unless different instructions are given, these procedures are the same for the three GE CF6-80C2D1F engines.

TASK 75-23-00-040-801

2. DEACTIVATION OF THE LOW PRESSURE TURBINE CLEARANCE CONTROL VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment.

NOTE: Equivalent replacements are permitted for the items that follow:

REFERENCE	DESIGNATION
Not specified	Maintenance platform No. 1 and 3 engines, 4-8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector
MIL-C-5501 (Types 1 through 15)	

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow:

REFERENCE	DESIGNATION
Not specified	Tape, high temperature

C. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - Low Pressure Turbine Clearance Control Valve Deactivation

SUBTASK 75-23-00-010-274

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

E. Procedure - Low Pressure Turbine Clearance Control Valve Deactivation

SUBTASK 75-23-00-040-001

- (1) Deactivate the turbine clearance control valve (1) as follows: Figure 201

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- (a) Disconnect the two electrical connectors (2) and (3) from the low pressure turbine clearance control valve (1). Install the protective caps and plugs.
- (b) Keep the two electrical connectors (2) and (3) in a stable position with the high temperature tape. (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)

F. Job Close-up Procedure - Low Pressure Turbine Clearance Control Valve Deactivation

SUBTASK 75-23-00-942-272

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-00-410-275

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

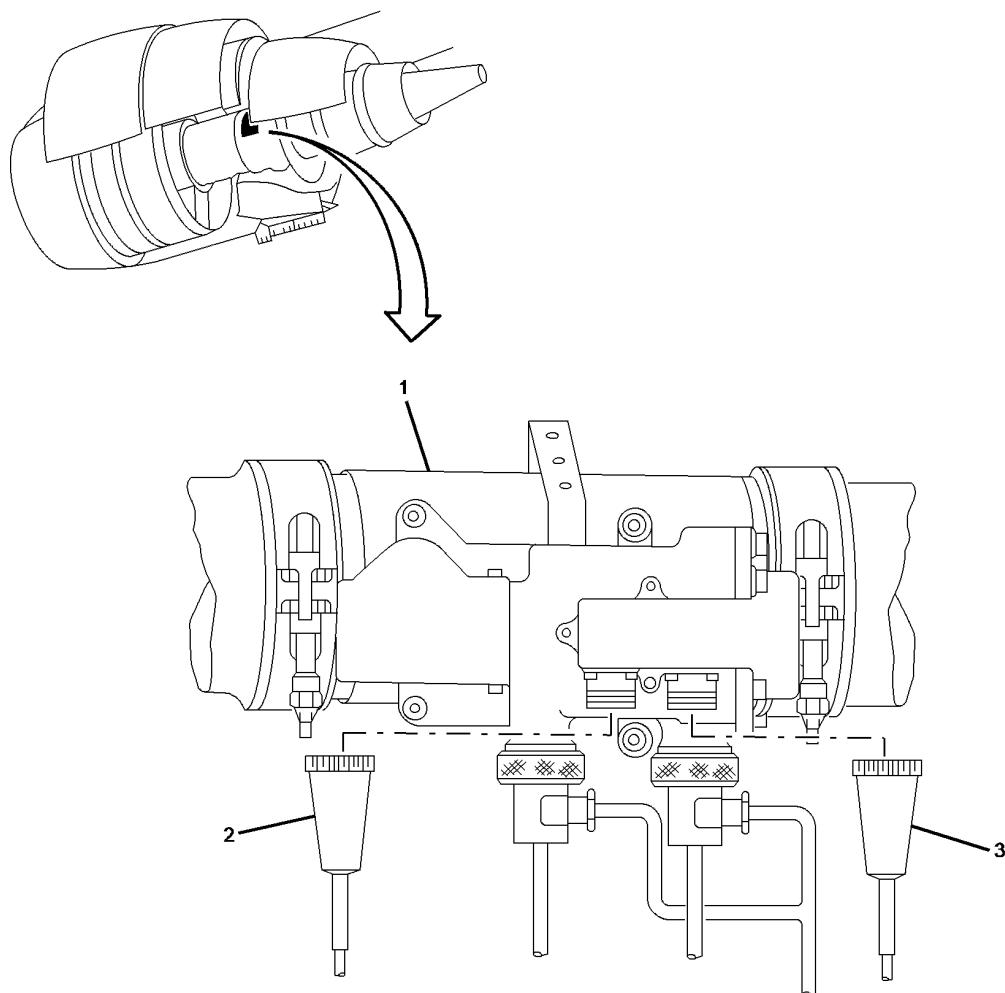
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LEGEND:

1. TURBINE CLEARANCE
CONTROL VALVE
2. ELECTRICAL CONNECTOR
3. ELECTRICAL CONNECTOR

DB2-75-0361
S0000464037V1

Low Pressure TCC Valve - Deactivation/Activation
Figure 201/75-23-00-990-902

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-23-00-440-801

3. ACTIVATION OF THE LOW PRESSURE TURBINE CLEARANCE CONTROL VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment.

NOTE: Equivalent replacements are permitted for the items that follow:

REFERENCE	DESIGNATION
Not Specified	Maintenance platform No. 1 and 3 engines, 4-8 (1.2-2-4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
73-21-02-741-802	RETURN-TO-SERVICE TEST OF THE ELECTRONIC CONTROL UNIT (P/B 501)

C. Job Set-up - Low Pressure Turbine Clearance Control Valve Activation

SUBTASK 75-23-00-010-275

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

D. Procedure - Low Pressure Turbine Clearance Control Valve Activation

SUBTASK 75-23-00-440-001

- (1) Activate the turbine clearance control valve (1) as follows: Figure 201
 - (a) Remove the high temperature tape, the protective caps and the plugs from the two electrical connectors (2) and (3).
 - (b) Connect the two electrical connectors (2) and (3) to the turbine clearance control valve (1). Tighten the electrical connectors by hand and listen for the sound of a click. Make sure the lock indicator shows in the connector window.

SUBTASK 75-23-00-741-001

- (2) Do the ECU return-to-service test. (RETURN-TO-SERVICE TEST OF THE ELECTRONIC CONTROL UNIT, TASK 73-21-02-741-802)

E. Job Close-up - Low Pressure Turbine Clearance Control Valve Activation

SUBTASK 75-23-00-942-273

- (1) Remove all the tools and equipment from the work area. Make sure the work area is clean.

SUBTASK 75-23-00-410-276

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
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TURBINE CASE COOLING CONTROL SYSTEM - ADJUSTMENT/TEST

1. General

- A. This procedure has the adjustment instructions for the turbine case cooling (TCC) control system. This procedures is for engines prior to phase 3 and also phase 3 engines.
- B. There are two types of adjustment procedures for the turbine case cooling (TCC) control system. One is the partial rig procedure, and the other is the complete rig procedure.
- C. Use the partial rig procedure as a general check of the TCC control system. Also use the partial rig procedure for the adjustment of the TCC control system after the replacement of one of the components that follow:
 - TCC high pressure turbine air shutoff valve
 - TCC low pressure turbine air shutoff valve
 - TCC air shutoff valve actuator.
- D. Use the complete rig procedure if the TCC control system cannot be rigged with the partial rig procedure. Also use the complete rig procedure after the replacement of the TCC air valve cable.
- E. Unless different instruction are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-23-00-700-868

2. ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG)

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

B. Job Set-up Information - Turbine Case Cooling Control System Adjustment

SUBTASK 75-23-00-941-001

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow:

NOTE: The rigging pins that follow can be found in the PWA 85675 rigging pin kit.

Table 501

REFERENCE	DESIGNATION
Not specified	Maintenance platform, o. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 Engine
PWA 85465	Pin, rig
PWA 86069	Pin, rig undersize (2 required)
Not specified	Torque wrench 0-100 in-lb (0-11.3 N·m)

EFFECTIVITY
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

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Table 501 (Continued)

REFERENCE	DESIGNATION
PWA 101418	Pusher, machine screw
Not specified	Mechanical crimper, Bergen model M303, M305 or M307

(2) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 502

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating
P05-289	Lockwire, (AS3214-02)
P05-291	Cable, safety
P05-292	Ferrule, safety cable

C. Job Set-up - Turbine Case Cooling Control System Adjustment

SUBTASK 75-23-00-865-270

WARNING  MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING  TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Open these circuit breakers and install safety tags:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	15	B1-591	REVERSING CONTROL ENG 1

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(Continued)

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	15	B1-592	REVERSING CONTROL ENG 2

SUBTASK 75-23-00-010-271

- (2) Open the applicable engine thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Turbine Case Cooling Control System Adjustment

SUBTASK 75-23-00-830-269

- (1) Do the partial rig procedure of the TCC control system as follows: (Figure 501) (Figure 502) (Figure 503) (Figure 504) (Figure 505)
 - (a) Install a PWA 101418 pusher machine screw into the threaded positioning hole (3) on the rear of the TCC air valve actuator (1). Turn the PWA 101418 pusher machine screw in and align the piston shaft rig hole with the hole in the actuator housing.



CAUTION
MAKE SURE YOU USE THE CORRECT LENGTH POSITIONING BOLT.
DO NOT USE A LONGER BOLT THAN SPECIFIED. A LONGER BOLT CAN
CAUSE DAMAGE TO THE ACTUATOR IF IT TOUCHES BOTTOM.

- (b) If necessary, use a standard hex-head bolt with a 8/32 X 1.5 in. (38.1 mm) thread length positioning bolt as an alternate to the PWA 101418 pusher machine screw.

NOTE: The positioning bolt is a quality standard hex-head bolt with a 8/32 X 1.5 in. (38.1 mm) thread length. With a 1.5 in. (38.1 mm) length bolt and when the rig pin touches bottom (fully seated), approximately 0.125 in. (3.175 mm) of the bolt threads will show.
- (c) Install a PWA 85465 rig pin in the rig hole (2). Make sure the rig pin is fully engaged into the rig hole (2).
- (d) Hold the HPT valve lever arm (4) against the idler arm (5) during the full rig check. Permit no clearance between the idler and HPT valve lever arms.
- (e) Install a PWA 86069 rig pin through the HPT valve lever arm rig hole (6) and into the valve housing rig hole (7).
 - 1) If you cannot install the PWA 86069 rig pin into the valve housing rig hole (7), do the referenced Subtask. (SUBTASK 75-23-00-830-271)
- (f) Install a PWA 86069 rig pin through the LPT valve lever arm (8) and into the valve housing rig hole (9).
 - 1) If you can install the PWA 86069 rig pin into the valve housing rig hole (9), the rigging of the system is satisfactory. If the system rigging is satisfactory continue with step (n). If the system rigging is unsatisfactory continue with step (g).
- (g) Remove the nut (10) and bolt (11) that attach the adjuster rod end (14) to the LPT valve lever arm (8).
- (h) Align the LPT valve lever arm (8) with the valve housing rig hole (9) in the valve housing. Install a PWA 86069 rig pin into the valve housing rig hole (9).

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- (i) Loosen the two adjuster jammuts (12). Turn the adjuster (13) and align the adjuster rod end (14) with the bolt hole in the LPT valve lever arm (8).
- (j) Make sure the adjuster rod end (14) threads are seen through both inspection holes in the adjuster (13).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (k) Lubricate the threads of the bolt (11) with engine oil (P03-001).
- (l) Install the bolt (11) and nut (10) that attach the adjuster rod end (14) to the LPT valve lever arm (8). Install the bolt (11) from the inside of the LPT valve lever arm (8). Torque the nut to 36-40 in-lb (4.1–4.6 N·m).
- (m) Tighten and torque the two jammuts (12) to 14-16 in-lb (1.6–1.8 N·m). Safety the two jammuts with lockwire (P05-289) or safety cable (P05-291) and safety ferrule (P05-292).
- (n) Remove all three rig pins.
- (o) After the removal of the three rig pins, remove the PWA 101418 pusher machine screw or the positioning bolt from the threaded position hole (3) on the rear of the TCC air valve actuator (1).

NOTE: No engine functional tests are necessary if no adjustments were made to the TCC Control System.

SUBTASK 75-23-00-830-271

- (2) If you cannot install the PWA 86069 rig pin through the HPT valve lever arm (4) and into the valve housing rig hole (6), do the TCC control system complete rig procedure. (ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (COMPLETE RIG), TASK 75-23-00-700-869)

E. Job Close-up - Turbine Case Cooling Control System Adjustment

SUBTASK 75-23-00-942-270

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-00-410-274

- (2) Close the applicable engine thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-23-00-865-271

- (3) Remove the safety tags and close these circuit breakers:

OVERHEAD, BATTERY BUS

Row	Col	Number	Name
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	15	B1-592	REVERSING CONTROL ENG 2

SUBTASK 75-23-00-730-270

- (4) If rig adjustments were made to TCC control system, do the EEC idle test and the engine ground test at idle power. (ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873) (ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870)

NOTE: The engine functional tests are not necessary if no adjustments were made to the TCC Control System.

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

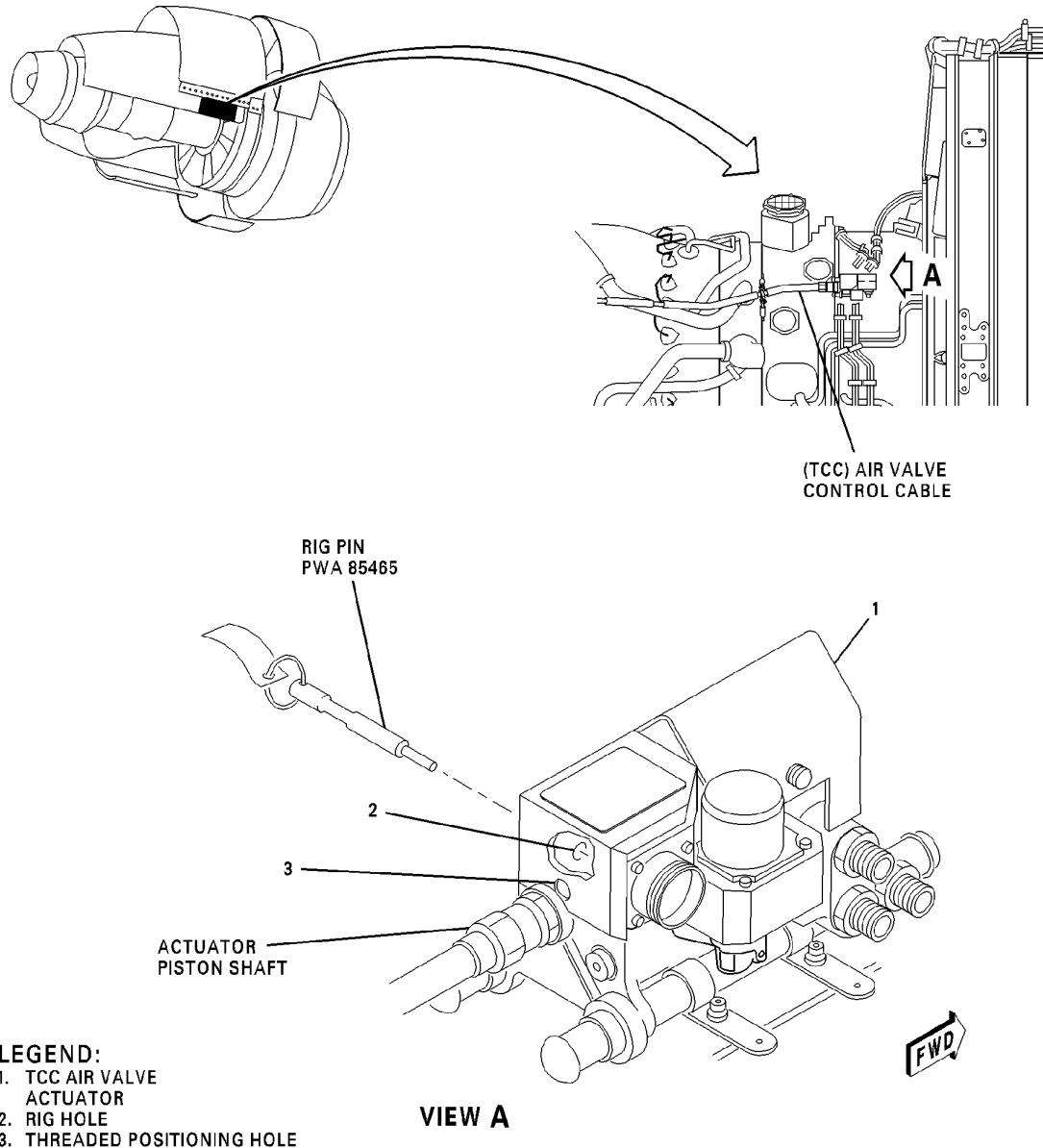
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LEGEND:

1. TCC AIR VALVE ACTUATOR
2. RIG HOLE
3. THREADED POSITIONING HOLE

VIEW A

CAG(IGDS)

DB2-75-0222A

Turbine Case Cooling Control System - Adjustment
Figure 501/75-23-00-990-893

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

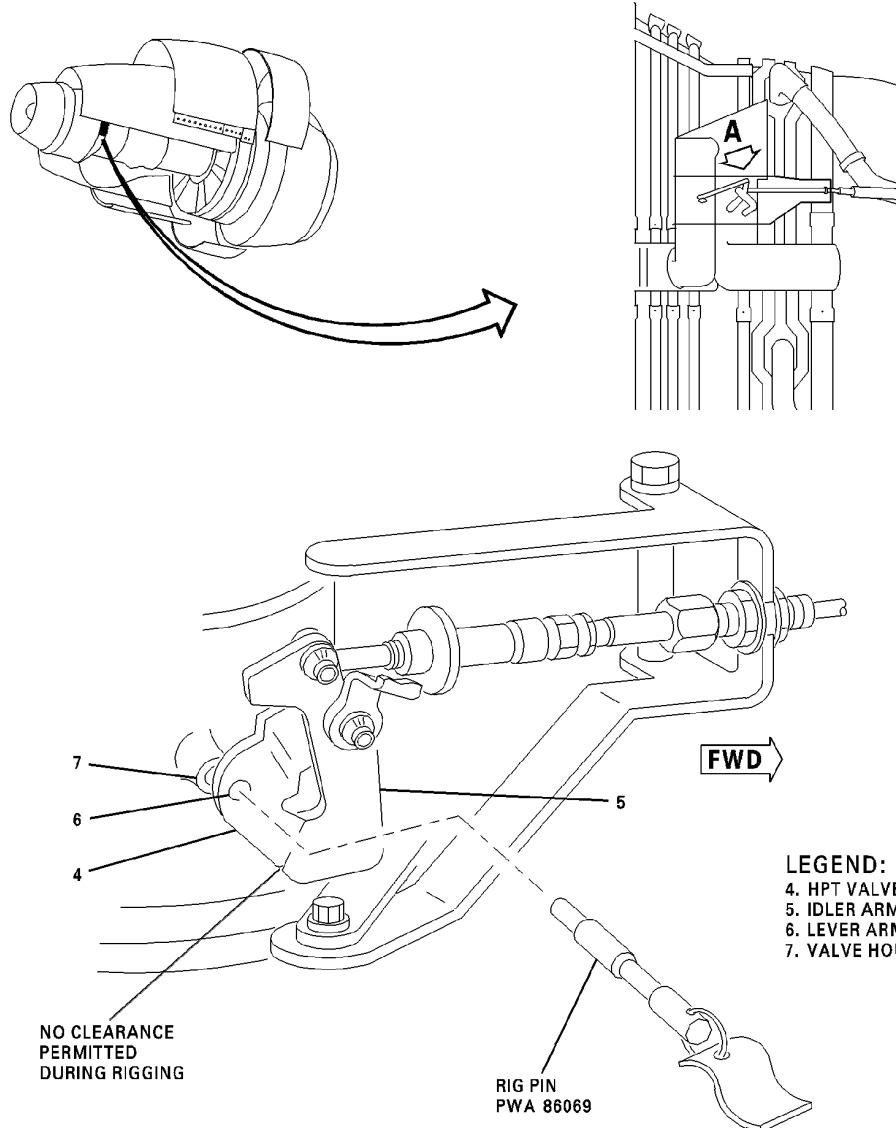
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BEFORE PHASE 3 ENGINES

CAG(IGDS)

DB2-75-0223C

Turbine Case Cooling Control System - Adjustment
Figure 502/75-23-00-990-894

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

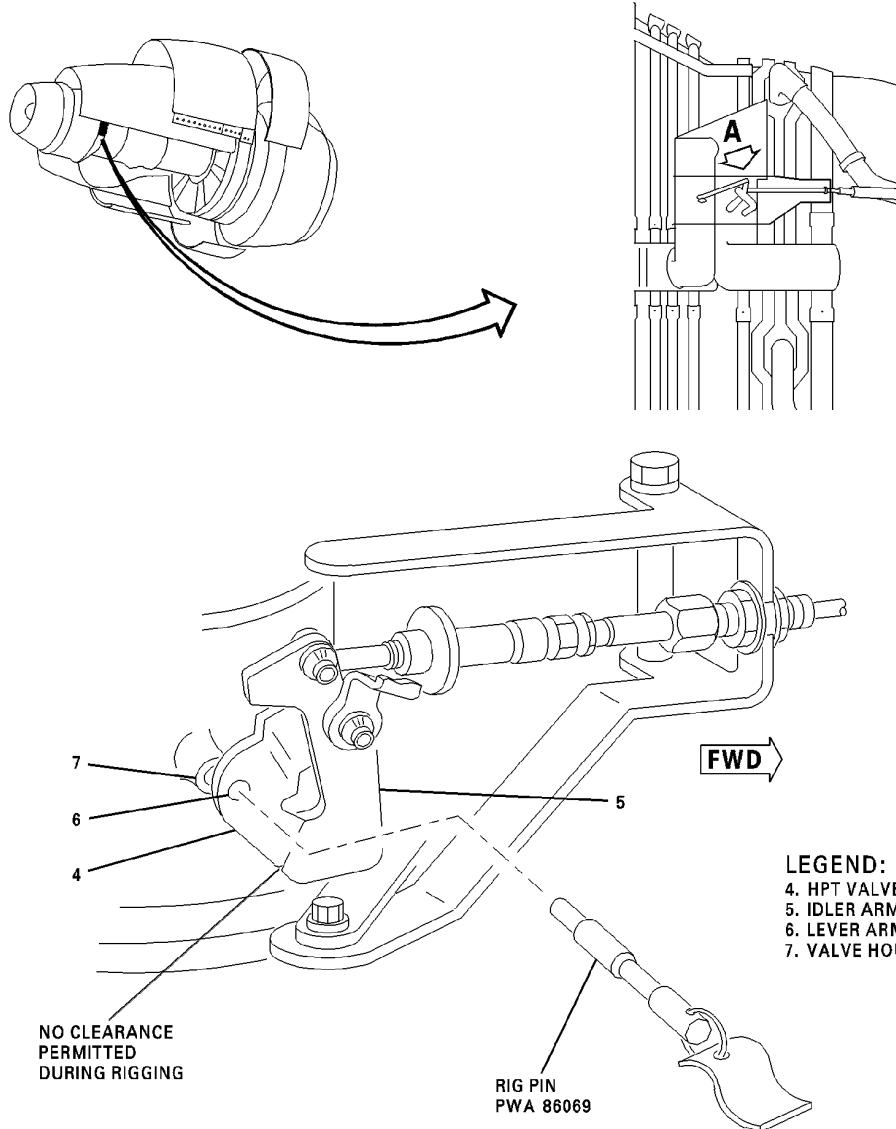
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PHASE 3 ENGINES

CAG(IGDS)

DB2-75-0326

Turbine Case Cooling Control System - Adjustment
Figure 503/75-23-00-990-898

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

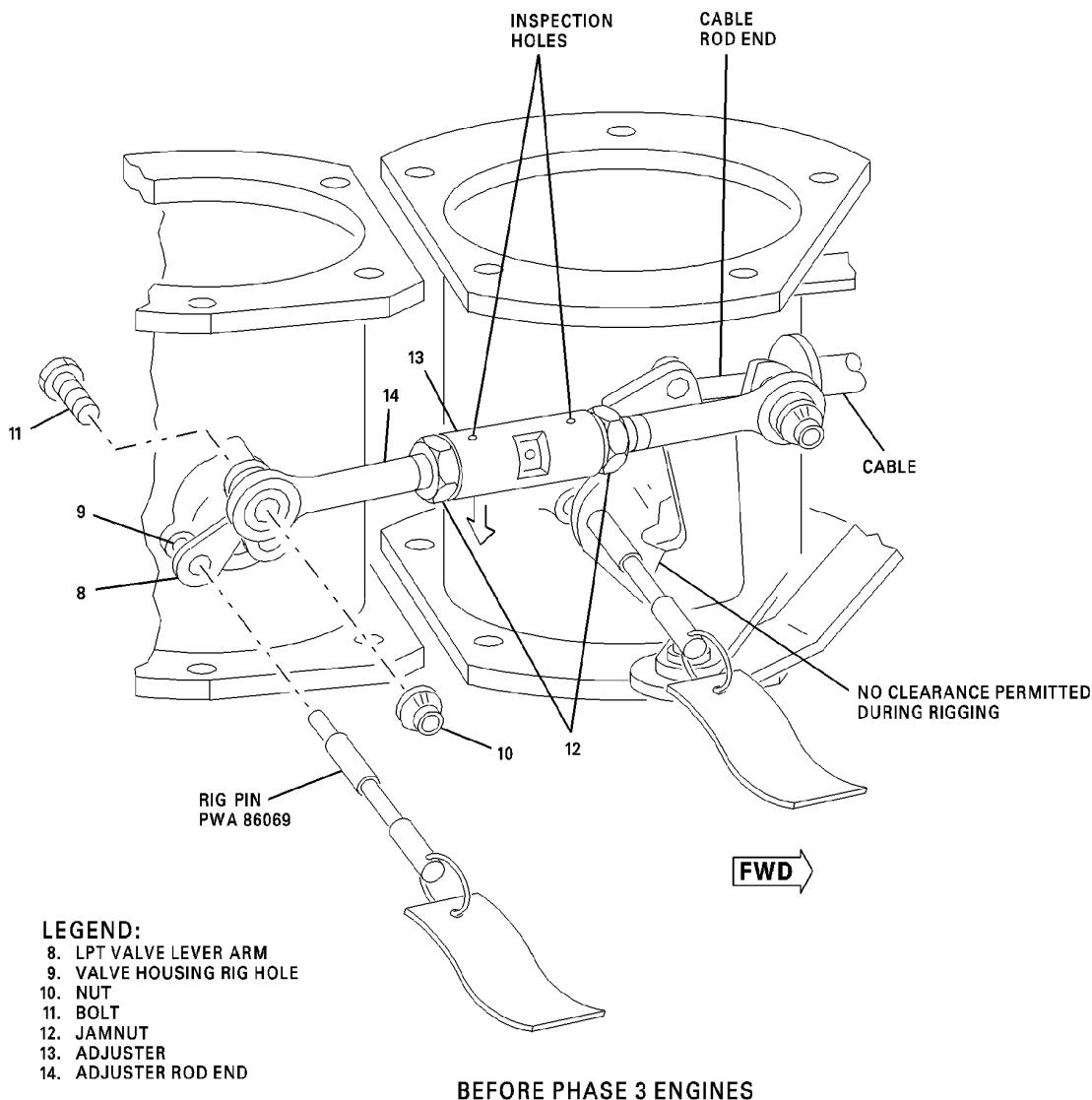
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CAG(IGDS) L-A5735

DB2-75-0224C

Turbine Case Cooling Control System - Adjustment
Figure 504/75-23-00-990-895

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

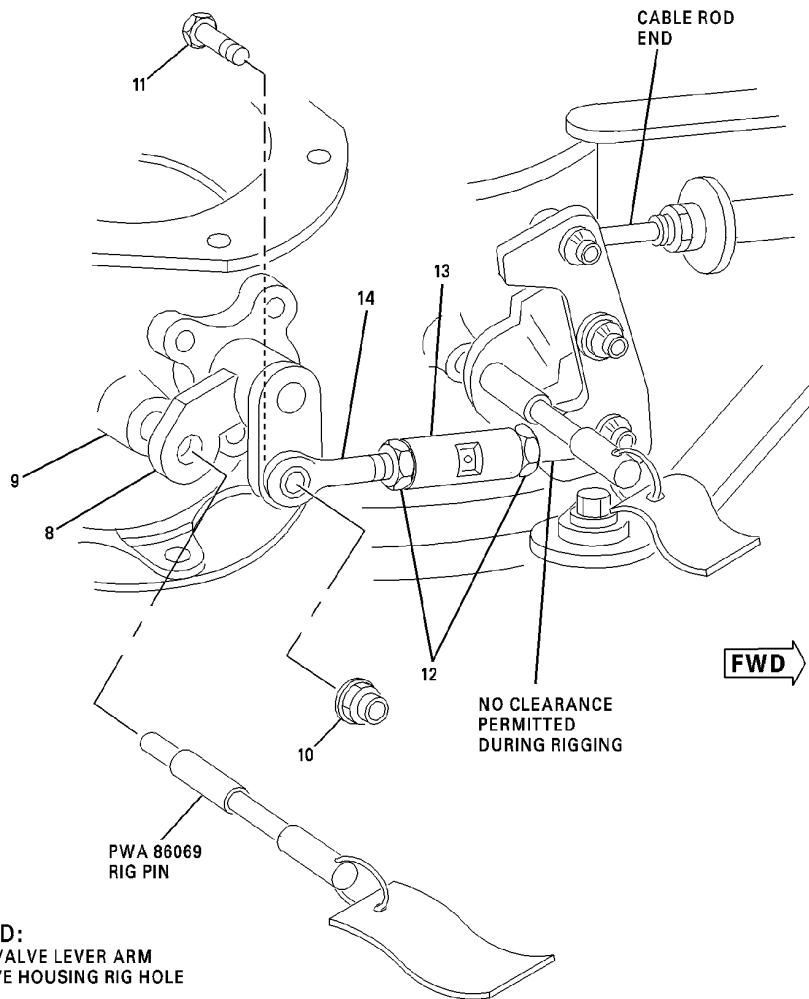
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PHASE 3 ENGINES

CAG(IGDS)

DB2-75-0327

Turbine Case Cooling Control System - Adjustment
Figure 505/75-23-00-990-899

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-23-00-700-869

3. ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (COMPLETE RIG)

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow:

NOTE: The rigging pins that follow can be found in the PWA 85675 rigging pin kit.

Table 503

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 Engine
PWA 85465	Pin, rig
PWA 86069	Pin, rig (2 required)
PWA 101418	Pusher, machine screw
Not specified	Torque wrench, 0-100 in-lb (0-11.3 N·m)
Not specified	Mechanical crimper, Bergen model M303, M305 or M307

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 504

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating
P05-289	Lockwire, (AS3214-02)
P05-291	Cable, safety
P05-292	Ferrule, safety cable

C. References

Reference	Title
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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D. Job Set-up - Turbine Case Cooling Control System Adjustment

SUBTASK 75-23-00-865-272



WARNING

MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	15	B1-592	REVERSING CONTROL ENG 2

SUBTASK 75-23-00-010-273

- (2) Open the applicable engine thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - Turbine Case Cooling Control System Adjustment

SUBTASK 75-23-00-830-270

- (1) Do the complete rig procedure of the TCC control system as follows: (Figure 501) (Figure 502) (Figure 503) (Figure 504) (Figure 505) (Figure 506) (Figure 507) (Figure 508) (Figure 509)
 - (a) If the TCC air valve control cable was not replaced or disassembled, do the steps 1) and 2) that follow.
 - 1) Remove the nut (15) and bolt (16) that attach the cable rod end (17).
 - 2) Remove the two nuts (10 and 18), bolts (11 and 19) and the bushing (20) that attach the adjuster rod ends (14).
 - (b) Install a PWA 101418 pusher machine screw into the threaded positioning hole (3) on the rear of the actuator (1). Turn the PWA 101418 pusher machine screw in and align the piston shaft rig hole with the hole in the actuator housing. (Figure 501)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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**MAKE SURE YOU USE THE CORRECT LENGTH POSITIONING BOLT.
DO NOT USE A LONGER BOLT THAN SPECIFIED. A LONGER BOLT CAN
CAUSE DAMAGE TO THE ACTUATOR IF IT TOUCHES BOTTOM.**

- (c) If necessary, use a standard hex-head bolt with a 8/32 by 1.5 in. (38.1 mm) thread length positioning bolt as an alternate to the PWA 101418 pusher machine screw.
- NOTE: The positioning bolt is a quality standard hex-head bolt with a 8/32 by 1.5 in. (38.1 mm) thread length. With a 1.5 in. (38.1 mm) length bolt and when the rig pin touches bottom (fully seated), approximately 0.125 in. (3.175 mm) of the bolt threads will show.
- (d) Install a PWA 85465 rig pin in the rig hole (2). Make sure the rig pin is fully engaged into the rig hole (2).
- (e) Align the rig hole in the HPT valve lever arm (4) with the hole in the valve housing rig hole (6). Install a rig pin (PWA 86069) through the rig hole.
- (f) Pull the cable rod end (17) aft and see if the rod end bolt hole and the idler arm (5) bolt hole align.
- (g) Hold the idler arm (5) bolt hole against the HPT valve lever arm (4) during the procedure. Permit no clearance between the arms.
- (h) If the bolt hole aligns, install the bolt (16) that attaches the cable rod end (17) to the idler arm (5) bolt hole. Install the bolt (14) from the inside. Go to step (k).
- (i) If the bolt hole does not align, loosen the rod end jamnut (21) and adjust the cable rod end (17) to align with the idler arm bolt hole (5).
- (j) Install the bolt (16) from the inside of the idler arm. Torque the rod end jamnut (21) to 32–36 in-lb (3.6–4.0 N·m). Safety the jamnut (21) with lockwire (P05-289) or safety cable (P05-291) and safety cable ferrule (P05-292).



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (k) Lubricate the threads of the bolt (16) with engine oil (P03–001).
- (l) Install the nut (15) on the bolt (16) Torque the nut (15) to 36–40 in-lb (4.1–4.6 N·m).
- (m) Align the LPT valve lever arm (8) with the valve housing rig hole (9) in the valve housing. Install a rig pin (PWA 86069) into the valve housing rig hole (9).
- (n) Lubricate the threads of the bolt (19) with engine oil (P03–001).
- (o) Install the forward adjuster rod end (14) with the bolt (19), bushing (20) and nut (18). Install the bolt (19) from the inside and the bushing (20) between the idler arm (5) and the adjuster rod end (14). Do not torque the nut (18) at this time.
- (p) Pull the cable rod end (17) rearward. Make sure the rear adjuster rod end (14) and the LPT valve lever arm (8) bolt hole align.
- (q) If the bolt hole aligns, lubricate the threads of the bolt (11) with engine oil (P03-001).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (r) Install the bolt (11) from the inside and attach the rear adjuster rod end (14). Install the nut (10).
- (s) Torque the two nuts (10 and 18) to 36–40 in-lb (4.0–4.5 N·m). Go to step (x).
- (t) If the bolt hole does not align, do the steps that follow:
 - 1) Loosen the two adjuster jammnuts (12).
 - 2) Turn the adjuster (13) and align the adjuster rod end (14) with the LPT valve lever arm (8).
 - 3) Make sure the adjuster rod end (14) threads are seen through both sight holes in the adjuster (13).
- (u) Lubricate the threads of the bolt (11) with engine oil (P03–001).
- (v) Attach the adjuster rod end (14) with the bolt (11) and nut (10). Torque the two nuts (10 and 18) to 36–40 in.lb (4.0–4.5 N·m).
- (w) Torque the two jammnuts (12) to 14–16 in-lb (1.6–1.8 N·m). Safety the two jammnuts (12) with lockwire (P05-289) or safety cable (P05-291) and safety cable ferrule (P05-292).
- (x) Remove all three rig pins.
- (y) After the removal of the three rig pins, remove the PWA 101418 Pusher machine screw or the alternate positioning bolt from the threaded position hole (3) on the rear of the actuator (1).

F. Job Close-up - Turbine Case Cooling Control System Adjustment

SUBTASK 75-23-00-942-271

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-00-410-272

- (2) Close the applicable engine thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-23-00-865-273

- (3) Remove the safety tags and close these circuit breakers:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	15	B1-592	REVERSING CONTROL ENG 2

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-23-00-730-271

- (4) Do the electronic engine control idle test and the engine ground test at idle power.
(ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873)
(ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

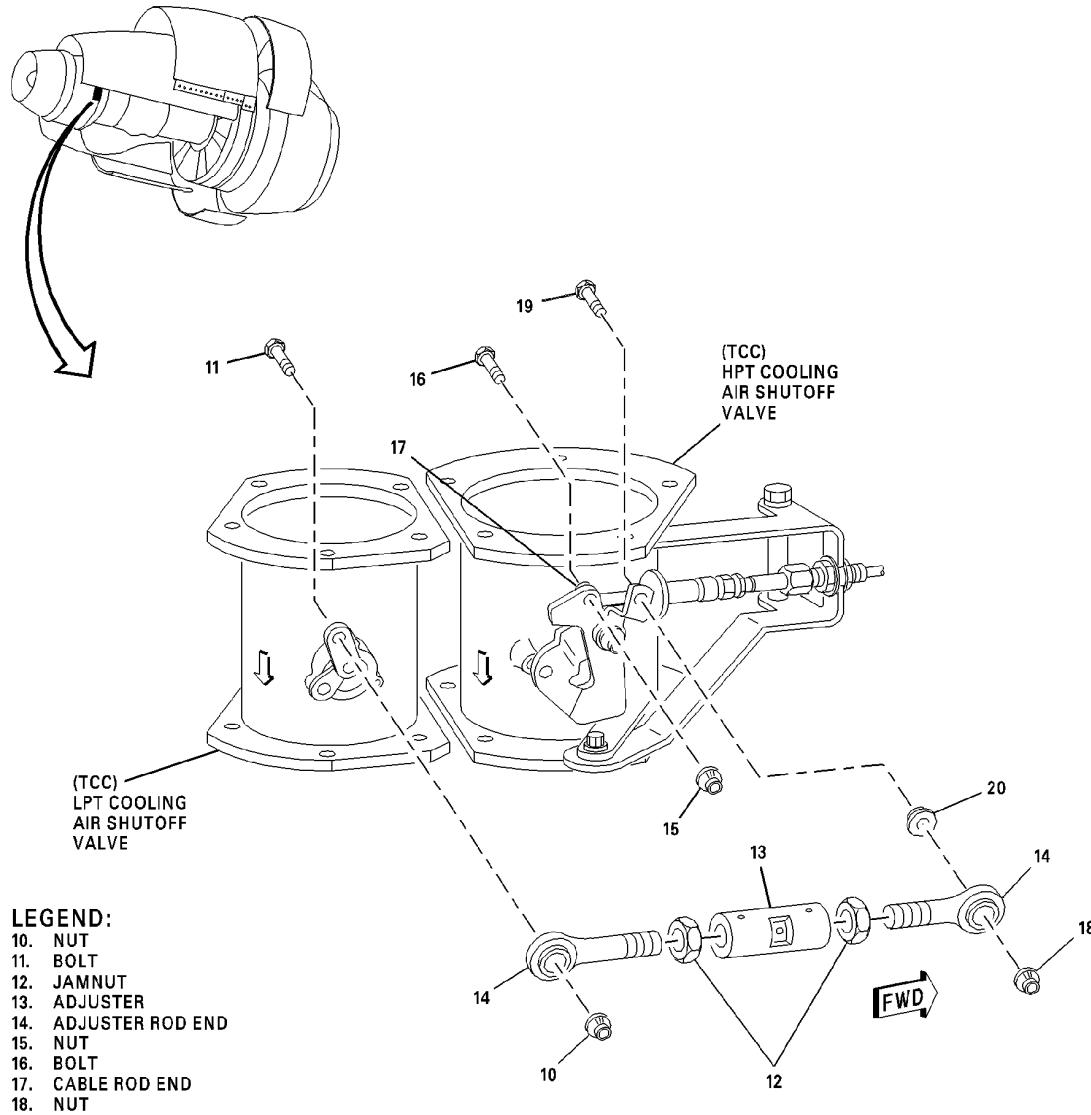
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BEFORE PHASE 3 ENGINES

CAG(IGDS) L-A4564

DB2-75-0225B

Turbine Case Cooling Control System - Adjustment
Figure 506/75-23-00-990-891

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

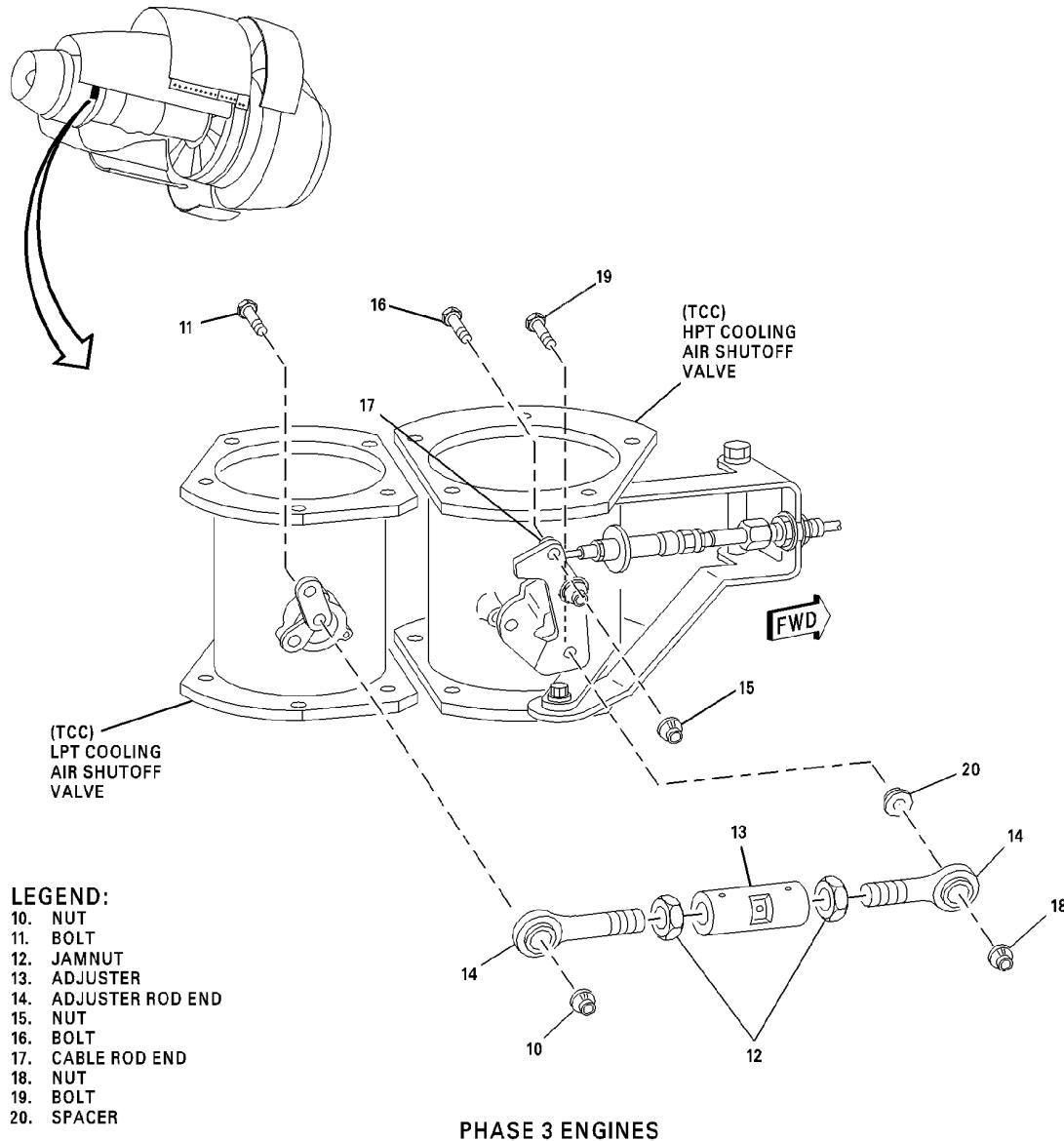
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CAG(IGDS)

DB2-75-0328

Turbine Case Cooling Control System - Adjustment
Figure 507/75-23-00-990-900

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

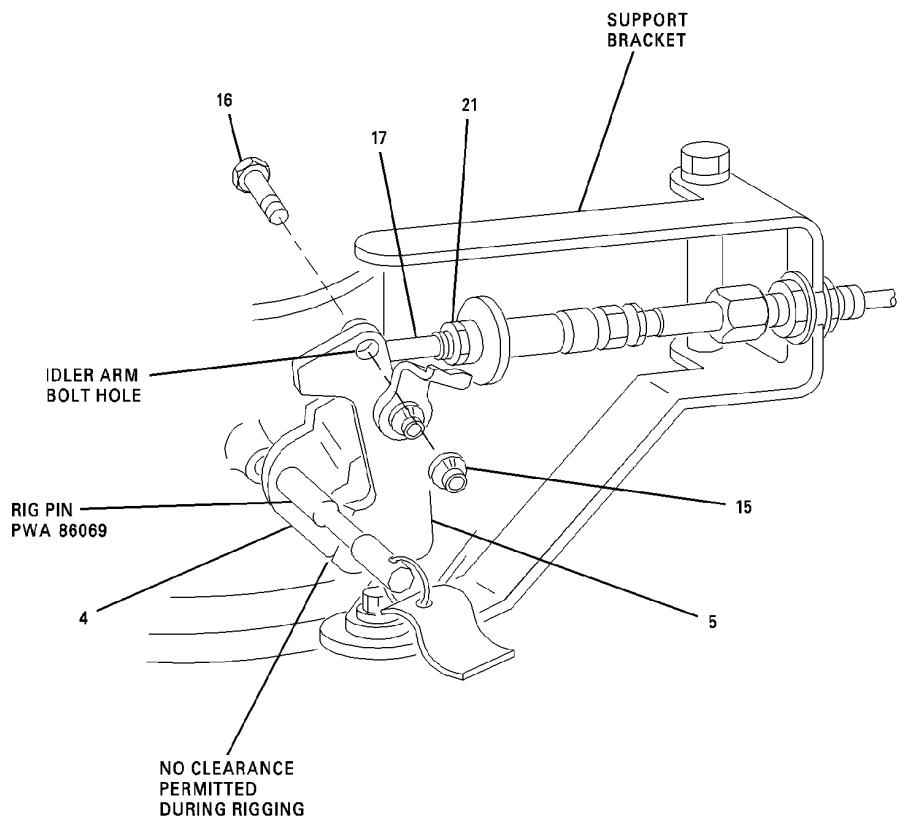
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LEGEND:

- 4. HPT VALVE LEVER ARM
- 5. IDLER ARM
- 15. NUT
- 16. BOLT
- 17. CABLE ROD END
- 21. JAM NUT

BEFORE PHASE 3 ENGINES

CAG(IGDS)

DB2-75-0226D

Turbine Case Cooling Control System - Adjustment
Figure 508/75-23-00-990-892

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

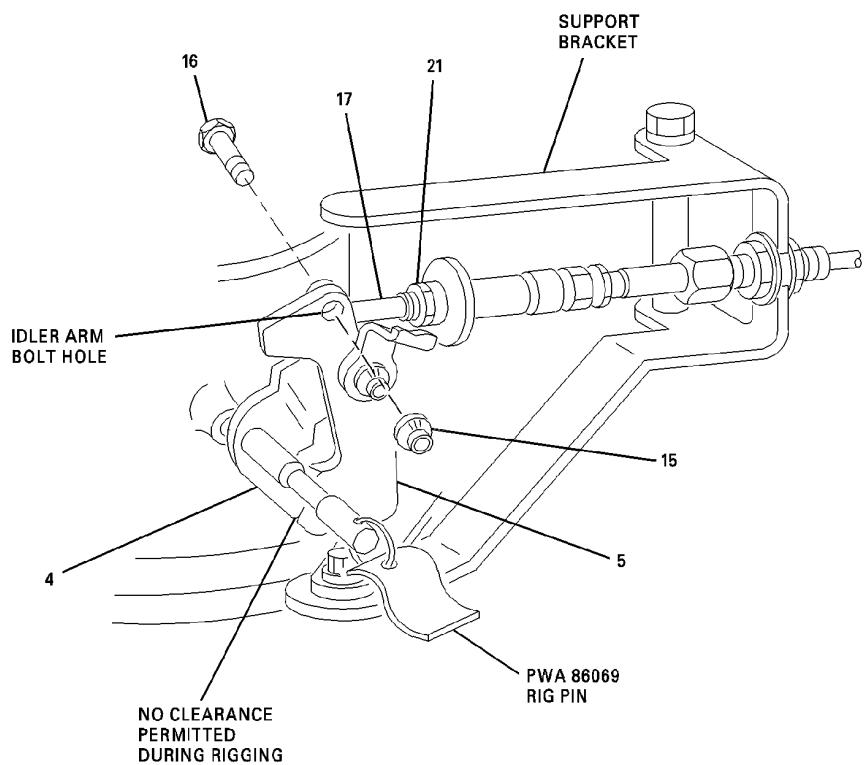
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LEGEND:

- 4. HPT VALVE LEVER ARM
- 5. IDLER ARM
- 15. NUT
- 16. BOLT
- 17. CABLE ROD END
- 21. JAM NUT

PHASE 3 ENGINES

CAG(IGDS)

DB2-75-0329

Turbine Case Cooling Control System - Adjustment
Figure 509/75-23-00-990-901

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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CONTROL SYSTEM, AUTOMATIC TURBINE ROTOR CLEARANCE - INSPECTION/CHECK

1. General

- A. This procedure has the inspection instructions and operation limits for the turbine cooling air and turbine case cooling systems. Access to these systems is through the thrust reverser doors.
- B. Unless different instructions are given, these procedures are the same for all three Pratt & Whitney PW4460/4462 engines.
- C. This procedure provides inspection information and operating time limits for surface damage, cracked or severed turbine cooling air tubes (turbine vane cooling air ducts).

TASK 75-23-00-200-868

2. INSPECTION OF THE TURBINE COOLING AIR SYSTEM

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
72-00-04-200-888	INSPECTION OF THE ENGINE AFTER EXHAUST GAS TEMPERATURE OVERTEMPERATURE (P/B 601)
75-23-08-000-868	REMOVAL OF THE PW4460/4462 AND PW4460/4462 -3 TURBINE VANE COOLING AIR DUCTS (P/B 401)
75-23-08-400-868	INSTALLATION OF THE PW4460/4462 AND PW4460/4462 -3 TURBINE VANE COOLING AIR DUCTS (P/B 401)
75-26-06-000-868	REMOVAL OF THE PW4460/4462 and PW4460/4462 -3 LEFT TURBINE VANE AND BLADE COOLING AIR VALVE (P/B 401)
75-26-06-400-868	INSTALLATION OF THE PW4460/4462 and PW4460/4462 -3 LEFT TURBINE VANE AND BLADE COOLING AIR VALVE (P/B 401)

B. Tools/Equipment

Reference	Description
STD-113	Boom - Aerial
STD-660	Platform - Maintenance, 4 to 8 ft (1.2 to 2.4 m) High

C. Job Set-up - Turbine Cooling Air System Inspection

SUBTASK 75-23-00-490-001

- (1) Put a 4 to 8 ft (1.2 to 2.4 m) high maintenance platform, STD-660 or a aerial boom, STD-113 into position.

SUBTASK 75-23-00-010-268

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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D. Procedure - Turbine Cooling Air System Inspection

SUBTASK 75-23-00-210-267

- (1) Examine the turbine cooling air (TCA) system manifolds and ducts as follows: (Figure 601) (Figure 602)

NOTE: This inspection procedure does not require tube removal in order to do an inspection and verify acceptable tube condition. Turbine Cooling Air System (TCA) manifold and tube dents are to be considered acceptable for continued service if, visually, the tube outer diameter (OD) is seen to not be decreased by more than 20 percent at any particular location.

NOTE: The Inspection Reference Table that follows is intended to serve as an aid to identify certain areas and conditions whenever maintenance time permits inspection. Manifold or tube inspection should not be done only on the basis of this table. This table does not imply that items or conditions listed are all-inclusive. Experience and judgement will continue to be an important part of all inspection programs.

Table 601

INSPECT/CHECK		CONTINUE IN-SERVICE LIMITS
(1) Continue-in-service limits for the Turbine Cooling Air (TCA) System Tubes:		
(a)	Cracks	None Permitted
(b)	Corrosion and Stains	Permitted if it can be removed by light polishing with crocus cloth
(c)	Loose Tube Nuts	None Permitted
(d)	Loose or Broken Lockwire	None Permitted
(e)	Nicks, Scratches, Chafing and Pitting	0.003 inch (0.076 mm) maximum depth permitted in all locations
(f)	Dents (without sharp edges or corners)	Permitted if the tubing OD is not decreased by more than 20 percent at each location. No dents permitted within 0.25 inch (6.35 mm) or less from the tube ferrule.
(g)	Dents (with sharp edges or corners)	None Permitted

Table 602

INSPECT/CHECK		MAXIMUM SERVICEABLE LIMITS	REMARKS
(2) Examine all areas of the turbine vane cooling air ducts for:			
(a)	Cracks	A crack less than 270° around the duct or 6 in. (152.4 mm) long. No holes in the crack, and no record of high nacelle temperature or fire warnings on the last flight.	Replace the cracked duct prior to the next flight. See extention limits.
(b)	Cracks	A crack more than 270° around the duct or 6 in. (152.4 mm) long. No holes in the crack and no record of high nacelle temperature or fire warning on the last flight.	Remove the engine for HPT inspection immediately. See extention limits.
(c)	Dents	No limit.	Dents must be round-bottom and have no sharp edges or corners.

- (2) Refer to the engine limit extensions to see if engine operation is permitted. (INSPECTION OF THE ENGINE AFTER EXHAUST GAS TEMPERATURE OVERTEMPERATURE, TASK 72-00-04-200-888)

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-23-00-280-267

- (3) The engine can be operated with defects on the turbine vane cooling air ducts. The limit extensions that follow permit temporary engine operation until repairs are made.

Table 603

CONDITION	MAXIMUM EXTENSION
A crack no less than 270° around the duct or 6 in. (152.4 mm) long. No holes in the crack and no record of high nacelle temperature or fire warning on the last flight. No replacement part is available.	Isolate the broken duct and operate the engine no more than 50 hours or 5 cycles. The one that is less.
A crack more than 270° around the duct and 6 in. (152.4 mm) long. A hole in the crack with an indication of high nacelle temperature. A fire warning light on the last flight and the part was replaced.	The engine may be operated for no more than 50 hours or 5 cycles, the one that is less. This will permit the aircraft to return to a maintenance base that can perform an engine removal and HPT inspection.

- (4) If necessary, replace the turbine cooling air ducts. (REMOVAL OF THE PW4460/4462 AND PW4460/4462 -3 TURBINE VANE COOLING AIR DUCTS, TASK 75-23-08-000-868)
(INSTALLATION OF THE PW4460/4462 AND PW4460/4462 -3 TURBINE VANE COOLING AIR DUCTS, TASK 75-23-08-400-868)
- (5) Examine the valves, solenoids, and actuators as follows: (Figure 603) (Figure 604)
 - (a) Examine the supports and brackets for:
 - 1) Looseness - not permitted on any support or bracket that attaches to any valve/switch. Remove and replace or tighten any support or bracket as necessary
 - (b) Examine the general condition of the valve, solenoid, and actuator.
 - (c) Examine the position indication pin on the turbine vane and blade cooling air valves as follows: (Figure 605)

NOTE: Valves are spring loaded open when not in operation.

 - 1) An extended pin shows the valve is fully open. (Satisfactory condition).
 - 2) If the pin is not fully extended, the valve is not fully open.
 - 3) If the pin is retracted the valve is in the closed position.

Table 604

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1) Examine the turbine vane and blade cooling air valve for:		
(a) Stuck valves	One valve stuck in the closed position.	Replace the valve as soon as possible.
(b)	Two valves stuck in the closed position	Replace the valve or solenoid before the next flight. See extension limits.

- (6) Refer to the engine limit extensions to see if engine operation is permitted. (INSPECTION OF THE ENGINE AFTER EXHAUST GAS TEMPERATURE OVERTEMPERATURE, TASK 72-00-04-200-888)

SUBTASK 75-23-00-280-268

- (7) The limit extensions that follow permit temporary engine operation until repairs are made.
(8) If you find defects on the turbine vane and blade cooling air valve the extensions that follow apply:

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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Table 605

CONDITION	MAXIMUM EXTENSION
Two valves stuck in the closed position and a replacement part is not available.	The engine can be operated for no more than 50 hours or 5 cycles, the one that is less. This will permit the aircraft to return to a maintenance base.

- (9) If necessary, replace the turbine vane and blade cooling air valve. (REMOVAL OF THE PW4460/4462 and PW4460/4462 -3 LEFT TURBINE VANE AND BLADE COOLING AIR VALVE, TASK 75-26-06-000-868) (INSTALLATION OF THE PW4460/4462 and PW4460/4462 -3 LEFT TURBINE VANE AND BLADE COOLING AIR VALVE, TASK 75-26-06-400-868)

E. Job Close-up - Turbine Cooling Air System Inspection

SUBTASK 75-23-00-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-00-410-267

- (2) If necessary close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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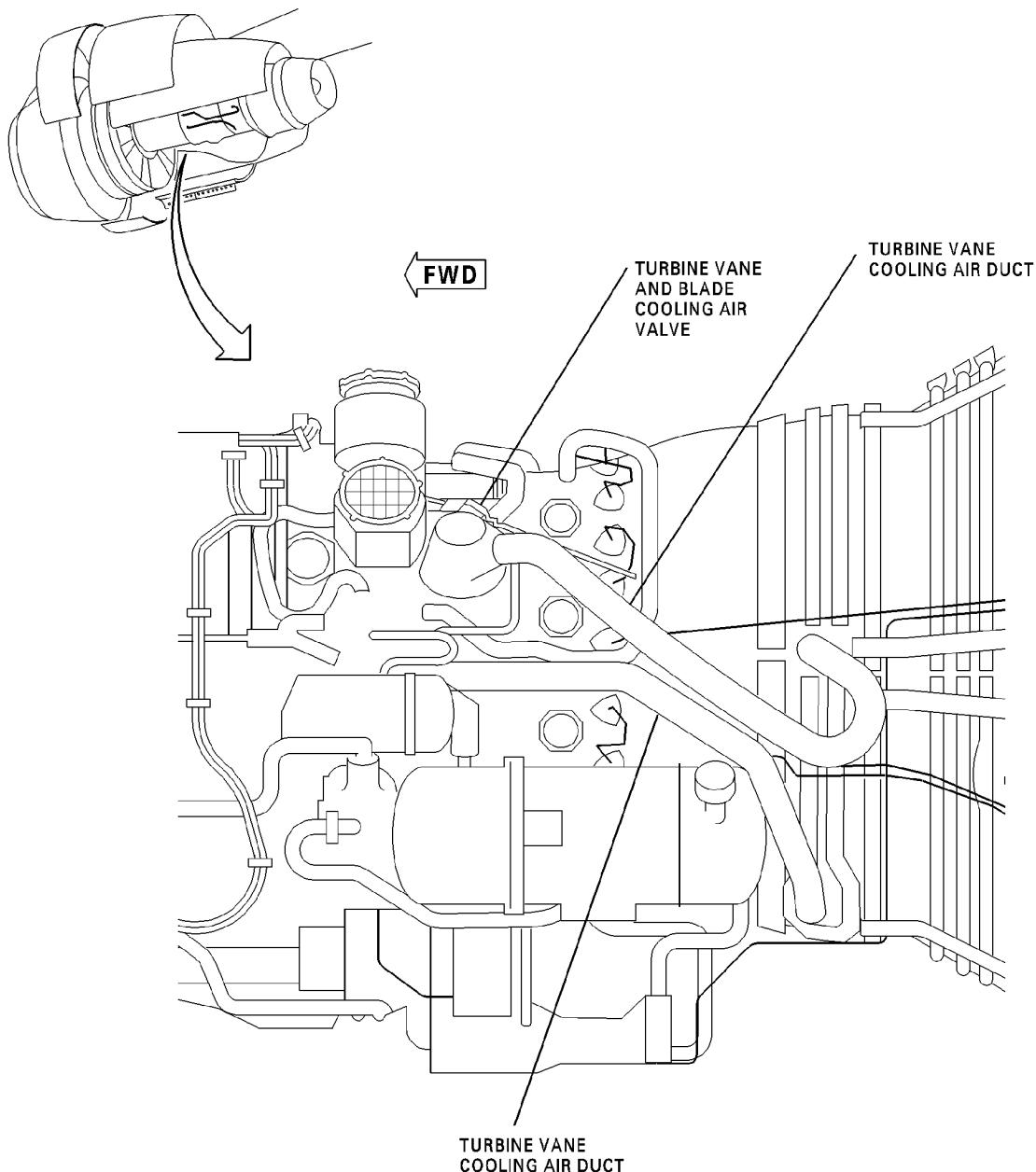
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CAG(IGDS) L-A4671

DB2-75-0119

Turbine Vane Cooling Air Ducts - Left Side
Figure 601/75-23-00-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

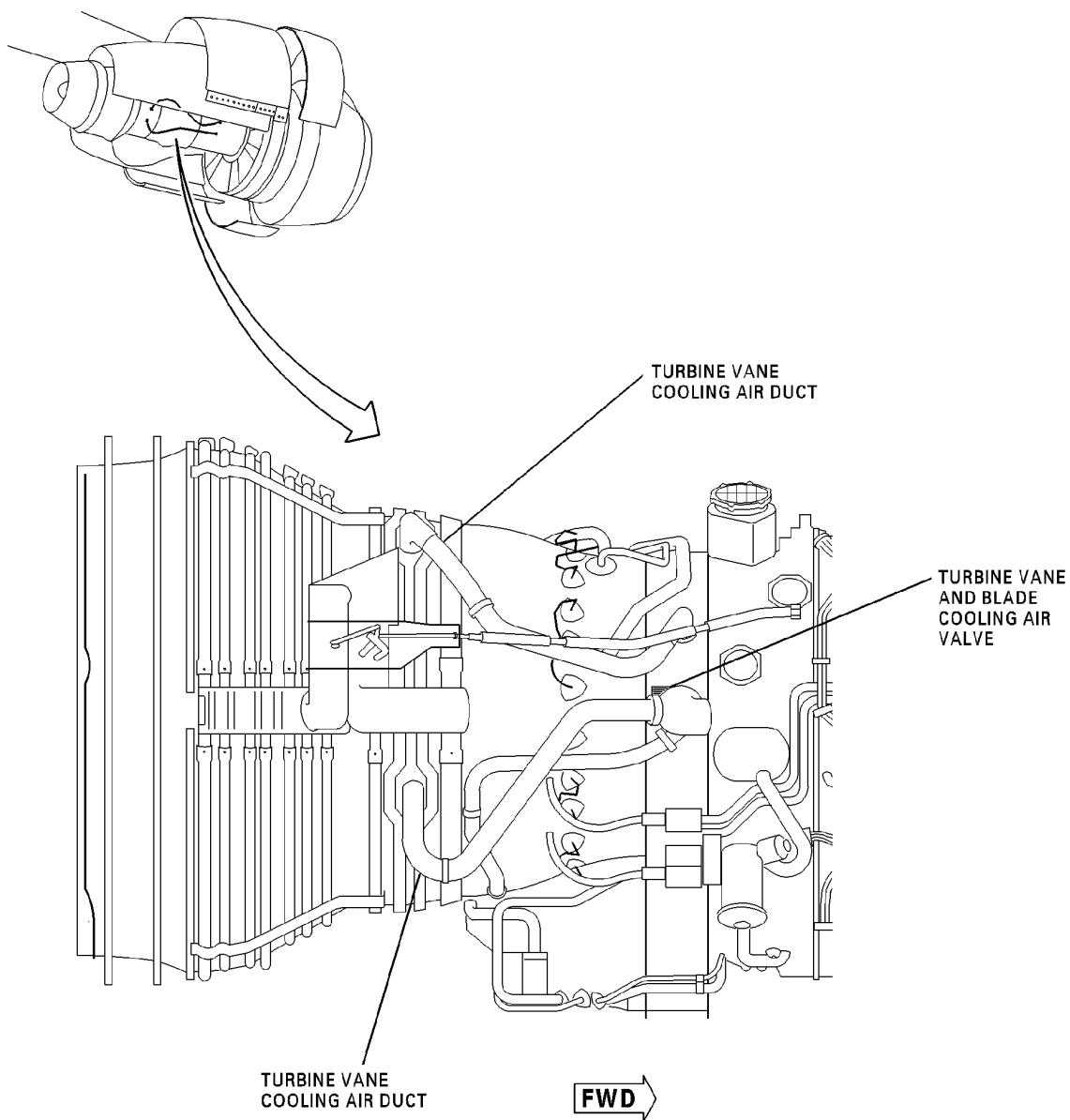
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CAG(IGDS) L-A4670

DB2-75-0120

Turbine Vane Cooling Air Ducts - Right Side
Figure 602/75-23-00-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

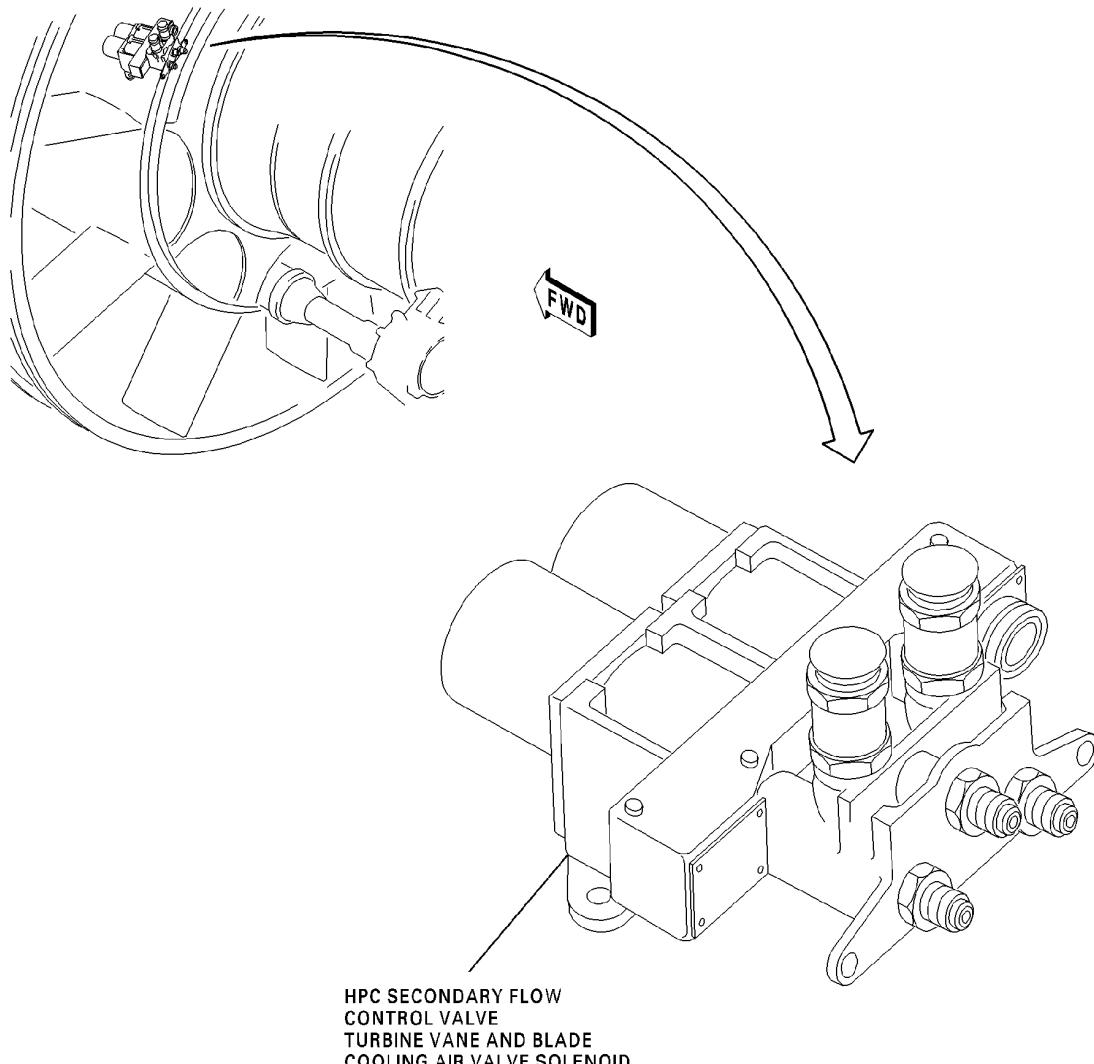
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HPC SECONDARY FLOW
CONTROL VALVE
TURBINE VANE AND BLADE
COOLING AIR VALVE SOLENOID

CAG(IGDS) L-A3666

DB2-75-0121

HPC Secondary Flow Control Valve
Figure 603/75-23-00-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

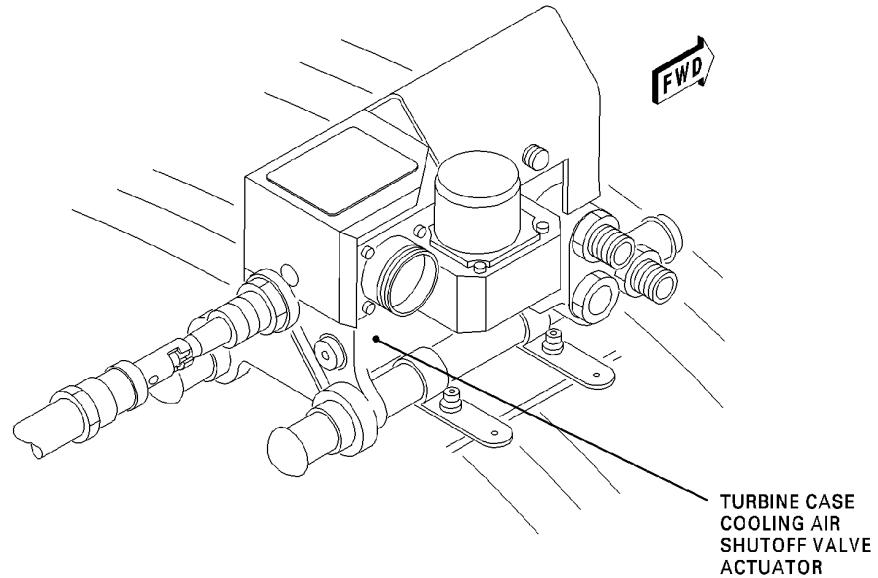
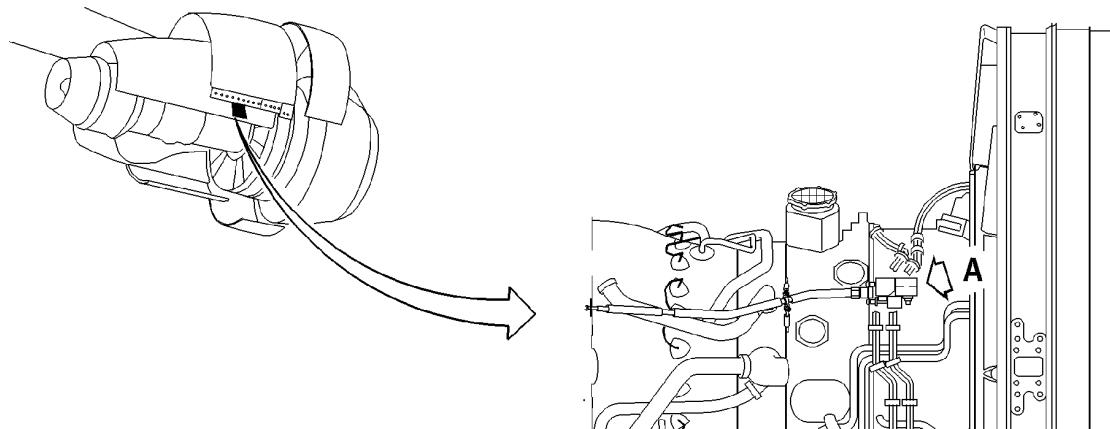
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VIEW A

CAG(IGDS) L-A3211

DB2-75-0144

HPC Secondary Flow Control Actuator
Figure 604/75-23-00-990-871

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

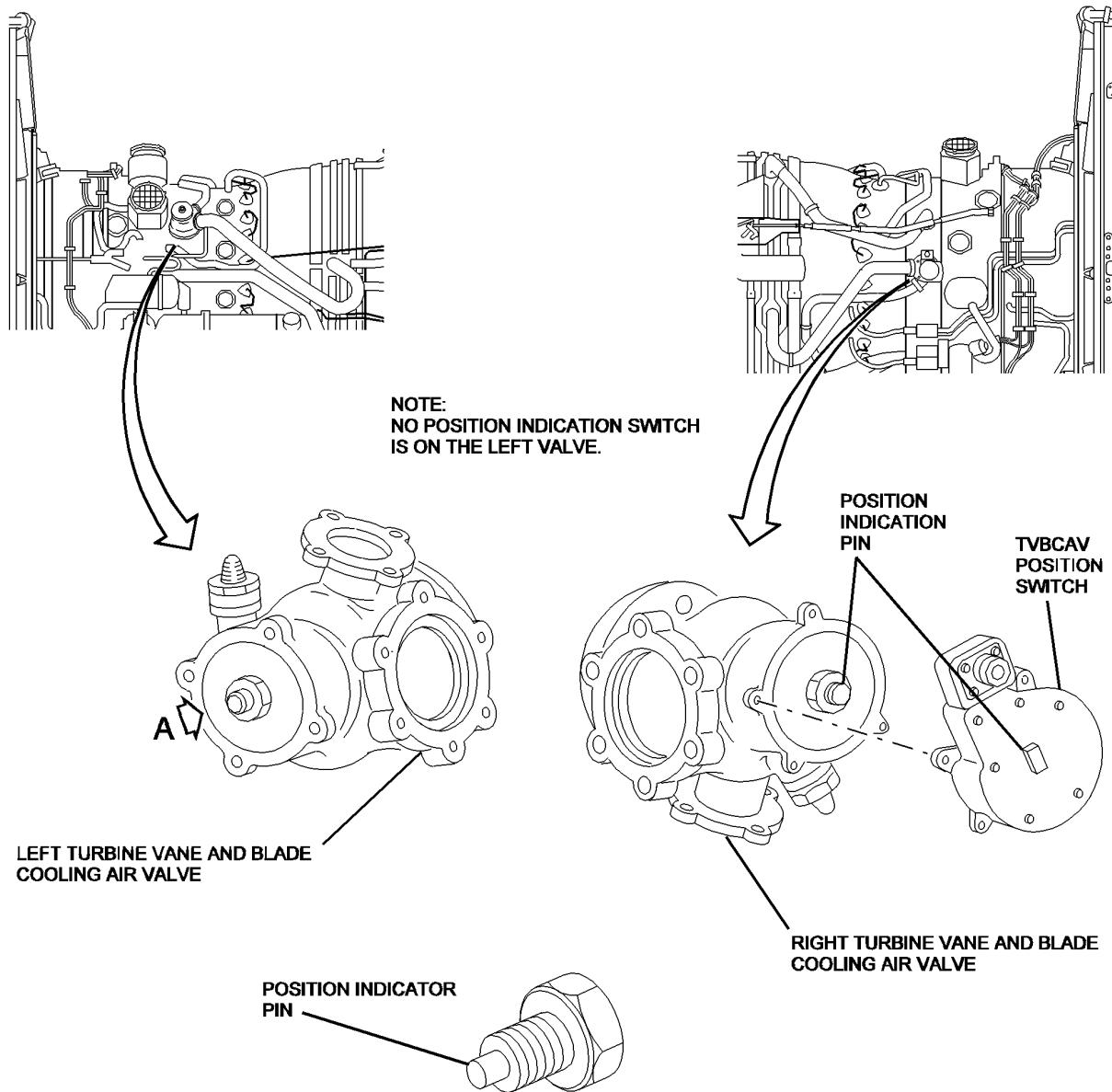
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VIEW A
(NORMAL CONDITION)

L-A4572
DB2-75-0122A
S0006280795V2

Turbine Vane and Blade Cooling Air Valves and Solenoid
Figure 605/75-23-00-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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TASK 75-23-00-200-869

3. INSPECTION OF THE TURBINE COOLING CASE SYSTEM

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-00-700-868	ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG) (P/B 501)
75-23-04-000-868	REMOVAL OF THE HIGH PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE (P/B 401)
75-23-04-400-868	INSTALLATION OF THE HIGH PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE (P/B 401)
75-23-10-000-868	REMOVAL OF THE LOW PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE (P/B 401)
75-23-10-400-868	INSTALLATION OF THE LOW PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE (P/B 401)
75-23-11-000-868	REMOVAL OF THE TURBINE CASE COOLING AIR VALVE ACTUATOR (P/B 401)
75-23-11-400-868	INSTALLATION OF THE TURBINE COOLING CASE AIR VALVE ACTUATOR (P/B 401)
75-23-14-000-868	REMOVAL OF THE HIGH PRESSURE TURBINE CASE COOLING AIR MANIFOLDS (P/B 401)
75-23-14-400-868	INSTALLATION OF THE HIGH PRESSURE TURBINE CASE COOLING AIR MANIFOLDS (P/B 401)
75-23-18-000-868	REMOVAL OF THE TURBINE CASE COOLING AIR VALVE CONTROL CABLE (P/B 401)
75-23-18-400-868	INSTALLATION OF THE TURBINE CASE COOLING AIR VALVE CONTROL CABLE (P/B 401)

B. Tools/Equipment

Reference	Description
STD-113	Boom - Aerial
STD-660	Platform - Maintenance, 4 to 8 ft (1.2 to 2.4 m) High
STD-6839	Wrench - Torque (0-100 in-lbs) with Dial Indicator or Digital Readout

C. Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of the necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Reference	Description	Specification
D60064	Oil - Turbine	DPM 3564 (MIL-PRF-23699)

EFFECTIVITY
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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D. Job Set-up - Turbine Cooling Case System Inspection

SUBTASK 75-23-00-490-002

- (1) Put a 4 to 8 ft (1.2 to 2.4 m) high maintenance platform, STD-660 or a aerial boom, STD-113 into position.

SUBTASK 75-23-00-010-270

- (2) If necessary, open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - Turbine Cooling Case System Inspection

SUBTASK 75-23-00-210-268

- (1) Examine the turbine cooling case (TCC) system manifolds (1) and ducts (2) as follows:
(Figure 606) (Figure 607) (Figure 608)

Table 606

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1) Examine the manifolds (1) and ducts (2) for:		
(a) Cracks	Up to a maximum of 180° circumferentially or 6 in. (152.40 mm) axially with a crack stop drill hole, if that hole does not blow air directly on the turbine case or the flange. Only two such cracks are permitted.	If the cracks are not more than the limits, replace the cracked manifold or duct at the next A-check. If the cracks are more than the limits, replace the manifold or the duct immediately.
	If the ducts are cracked, you must examine the TCC system ducts for loose and worn or damaged clamps.	Loose clamps must be tightened and worn or damaged clamps must be replaced before the next flight.
(b) Holes	Hole up to a maximum of 0.150 in. (3.810 mm) diameter is permitted, if the air does not blow directly on the turbine case or the flange.	If the hole is more than 0.150 in. (3.810 mm) in diameter, or the air directly blows on the turbine case or the flange, replace the duct at the next A-check.
	Up to four holes for each duct or collector is permitted, if the total area is not more than 0.071 in ² (45.806 mm ²).	Ducts or collector with four holes more than 0.071 in ² (45.806 mm ²) in area or ducts with a hole diameter of more than 0.150 in. (3.810 mm) must be replaced at the next A-check.
(c) Corrosion and stains	Permitted without limits.	
(d) Loose duct nuts	None permitted.	
(e) Loose or broken lockwire	None permitted.	
(f) Nicks, scratches, chafing and pitting	Nicks, scratches, chafing, and pitting is permitted with no limit until air leakage occurs. If there is an air leak, treat it as a hole.	
(g) Dents (without sharp edges or corners)	Permitted if the duct outside diameter is not decreased by more than 20 percent at each location. No dents are permitted within 0.25 in. (6.35 mm) or less from the duct ferrule.	If duct is dented within 0.25 in. (6.35 mm) or less from the ferrule, it must be replaced immediately.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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Table 606 (Continued)

INSPECT/CHECK		MAXIMUM SERVICEABLE LIMITS	REMARKS
(h)	Dents (with sharp corners or edges)	Dents with or without sharp edges or corners are permitted with no limit as long as the duct outside diameter is decreased by more than 20 percent at each location.	Tubes dented more than 20 percent must be replaced at the next A-Check.
(2) Examine the (TCC) manifold supports (3) and clamps (4) for:			
(a)	Looseness	Not permitted.	Replace the support or clamp.
NOTE: The cushion material for the turbine case cooling (TCC) manifolds and tubes are located at all support locations, 360 degrees around the low pressure turbine (LPT) and high pressure turbine (HPT) cases.			
(b)	Cracks	Not permitted.	Replace the support or clamp.
(c)	Cushion material damage on clamps	No limit unless looseness or chafing occurs.	Replace the clamp.

- (2) If necessary, replace the turbine cooling case ducts. (REMOVAL OF THE HIGH PRESSURE TURBINE CASE COOLING AIR MANIFOLDS, TASK 75-23-14-000-868) (INSTALLATION OF THE HIGH PRESSURE TURBINE CASE COOLING AIR MANIFOLDS, TASK 75-23-14-400-868)
- (3) Examine the turbine cooling case (TCC) control system and linkage as follows: (Figure 609) (Figure 610) (Figure 611)

NOTE: See step (5) when you suspect incorrect operation of the system.

Table 607

INSPECT/CHECK		MAXIMUM SERVICEABLE LIMITS	REMARKS
(1) Examine the (TCC) control system and linkage for:			
(a)	Looseness, wear, and cracks on the clamps (6) that attach the actuator (5) to the bracket	Not permitted.	Replace the clamps.
(b)	Looseness, wear, and cracks on the clamps (7) that attach the control cable (8) to the bracket	Not permitted.	Replace the clamps.
(c)	Wear on the cable rod end (9) and the adjuster rod end (10)	Not permitted.	Replace the rod end and do the adjustment/ test of the (TCC) system.

SUBTASK 75-23-00-820-270

- (4) If necessary, do an adjustment of the turbine control system linkage. (ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG), TASK 75-23-00-700-868)
- (5) Examine the turbine case cooling (TCC) control system and linkage as follows:
 - Be sure the linkage and valves move freely
 - Find any secondary damage caused by a known defective component
 - Find the cause of damage to a component
 - Examine incorrect operation of the system
- (a) Examine the air valves (11) to make sure that they are in the full closed (shut-down) position.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (b) Remove the bolt (12) and nut (13) that attach the cable rod end (9) to the idler arm (14).
- (c) Manually pull the cable rod end (9) rearward. If the cable rod end separates from the cable (8), the shear pin (15) is defective. If necessary, replace the cable. (REMOVAL OF THE TURBINE CASE COOLING AIR VALVE CONTROL CABLE, TASK 75-23-18-000-868) (INSTALLATION OF THE TURBINE CASE COOLING AIR VALVE CONTROL CABLE, TASK 75-23-18-400-868)
- (d) Remove the two bolts (16), nuts (17), and front bushing (18) that attach the adjuster (19) to the valve lever arms.
- (e) Examine the adjuster rod end (10) bearings for wear and freedom of movement. If necessary replace the rod ends as follows:
 - 1) Loosen the jamnut (20). Replace the rod end (10) and jamnut.
 - 2) Adjust the system. (ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG), TASK 75-23-00-700-868)
- (f) Examine the idler arm (14) for wear and freedom of movement on the valve shaft. If necessary replace the idler arm or bearing (22) as follows:
 - 1) Remove the nut (21) that attaches the idler arm (14) with the bearing (22) and lock ring (23). Remove the arm (14). If assembled with a spacer (24).
NOTE: The information that follows is for the aircraft before S/B PW4Eng 75-74.
 - 2) Replace the nut on the shaft and tighten by hand.
 - 3) Remove the lock ring (23) and bearing (22) from the idler arm (14).
 - 4) Replace the defective part and install the bearing (22) in the arm (14). Install the lock ring (23).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- 5) Remove the nut (21) from the shaft. Install the arm (14) and if supplied, the spacer (24) in position. Lubricate the nut with turbine oil, D60064 (P03-001). Install and torque the nut to 36–40 in-lb (4.1–4.5 N·m) with a torque wrench, STD-6839. Adjust the system. (ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG), TASK 75-23-00-700-868) (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (g) Manually turn the HPT and LPT valve lever arms clockwise to the full open position. Release the lever arms and be sure that they go back to the full closed position. If the lever arm does not go back or does not turn freely, replace the defective valve. (REMOVAL OF THE HIGH PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE, TASK 75-23-04-000-868) (INSTALLATION OF THE HIGH PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE, TASK 75-23-04-400-868) (REMOVAL OF THE LOW PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE, TASK 75-23-10-000-868) (INSTALLATION OF THE LOW PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE, TASK 75-23-10-400-868)
- (h) If the control cable (8) and the actuator (5) are thought to be binding, do these steps:

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- 1) Remove the actuator (5). Use a soft drift and manually push the piston shaft in the actuator (5). If the shaft does not move freely or does not go back, replace the actuator. (REMOVAL OF THE TURBINE CASE COOLING AIR VALVE ACTUATOR, TASK 75-23-11-000-868) (INSTALLATION OF THE TURBINE COOLING CASE AIR VALVE ACTUATOR, TASK 75-23-11-400-868)
- 2) Manually push and pull the control cable (8) to check for freedom of movement. If the cable does not move freely, replace the cable. (REMOVAL OF THE TURBINE CASE COOLING AIR VALVE CONTROL CABLE, TASK 75-23-18-000-868) (INSTALLATION OF THE TURBINE CASE COOLING AIR VALVE CONTROL CABLE, TASK 75-23-18-400-868)
 - (i) If the adjustment of the system is thought to be out of adjustment, re-adjust the system. (ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG), TASK 75-23-00-700-868)
 - (j) Install the adjuster assembly (19) as follows:
 - 1) Install the bushing (22) (flange outward) to the outside of the idler arm bolt hole.
 - 2) Position the adjuster assembly (19) to the two valve lever arms and idler arm (14).
 - 3) Lubricate two bolt (16) threads, with (P03-001) engine oil. Attach the adjuster (19) with the two bolts, front bushing (18) and nuts (17). Torque the nuts to 36–40 in-lb (4.1–4.5 N·m).

NOTE: The bolt is installed from the inside of the arms.
- (k) Attach the cable rod end (9) to the inside of the idler arm (14) with the bolt (12), lubricate the threads with engine oil (P03-001). Install the nut (21) and torque it to 36–40 in-lb (4.1–4.5 N·m).

NOTE: Install the bolt (16) from the inside of the rod end (9).
- (l) Examine the electrical harnesses for signs of rub, wear, and/or loose connectors. Repair or replace as necessary.

F. Job Close-up - Turbine Case Cooling System Inspection

SUBTASK 75-23-00-942-268

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-00-410-269

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ———

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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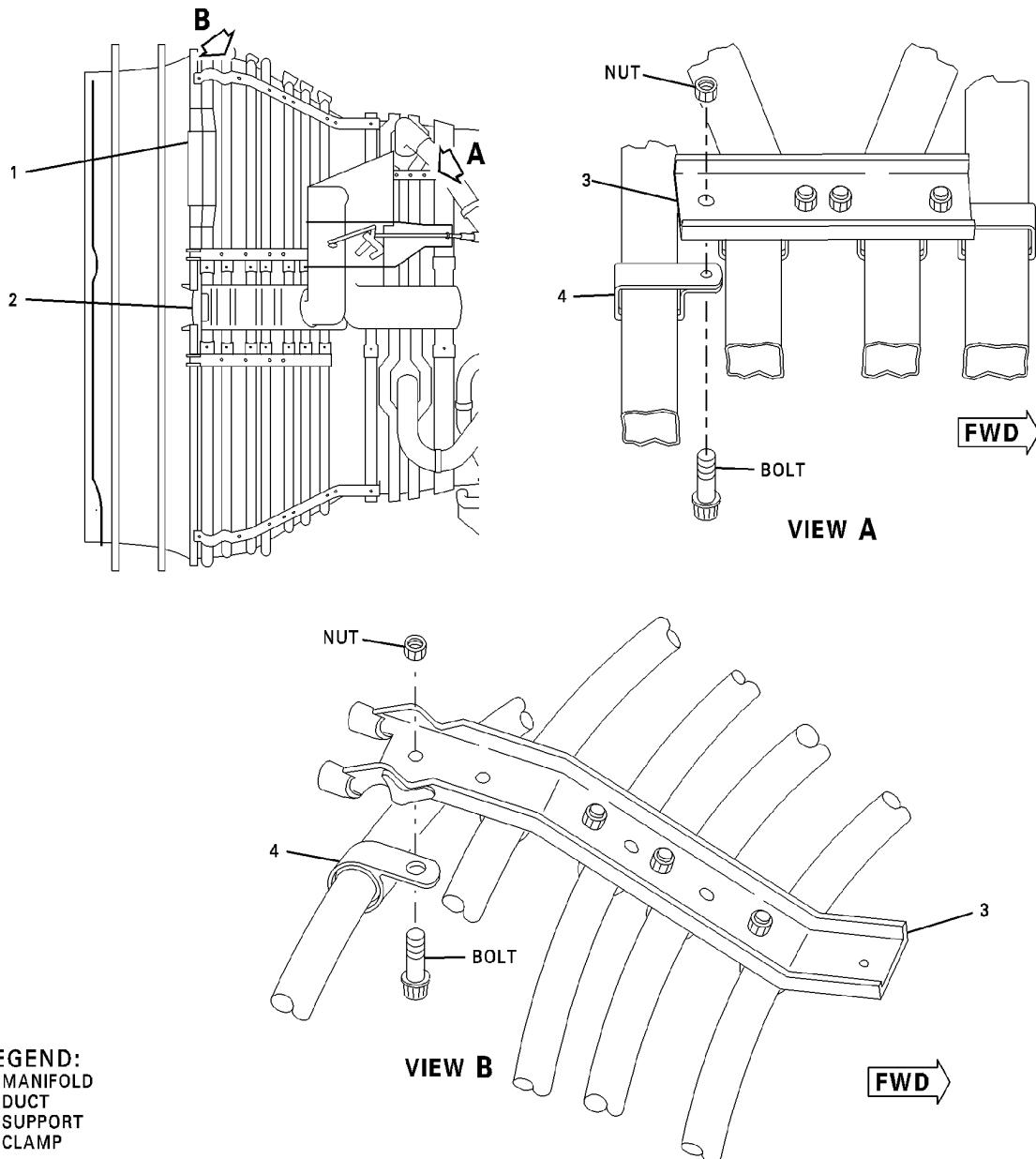
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LEGEND:
1. MANIFOLD
2. DUCT
3. SUPPORT
4. CLAMP

CAG(IGDS) L-A3201

DB2-75-0123

Turbine Case Cooling Air System Manifolds - Inspection
Figure 606/75-23-00-990-873

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

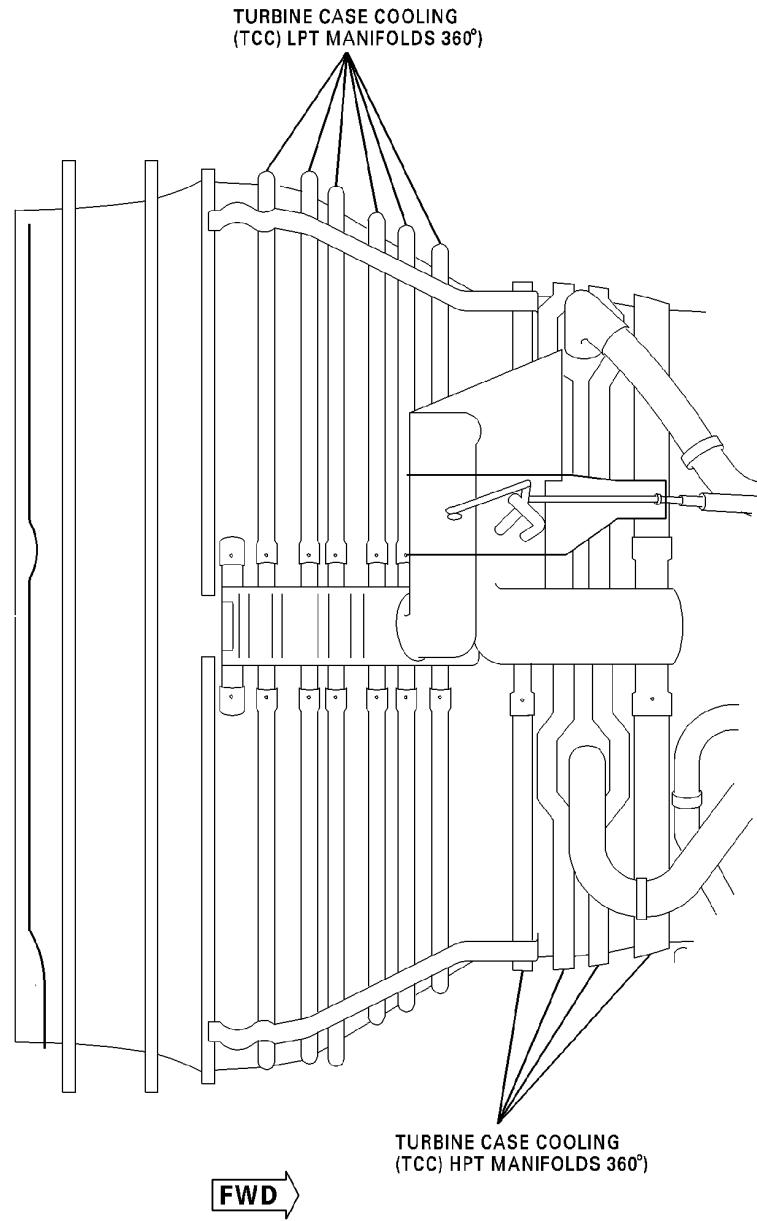
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CAG(IGDS)

DB2-75-0317

Turbine Case Cooling (TCC) Manifolds - Right
Figure 607/75-23-00-990-896

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

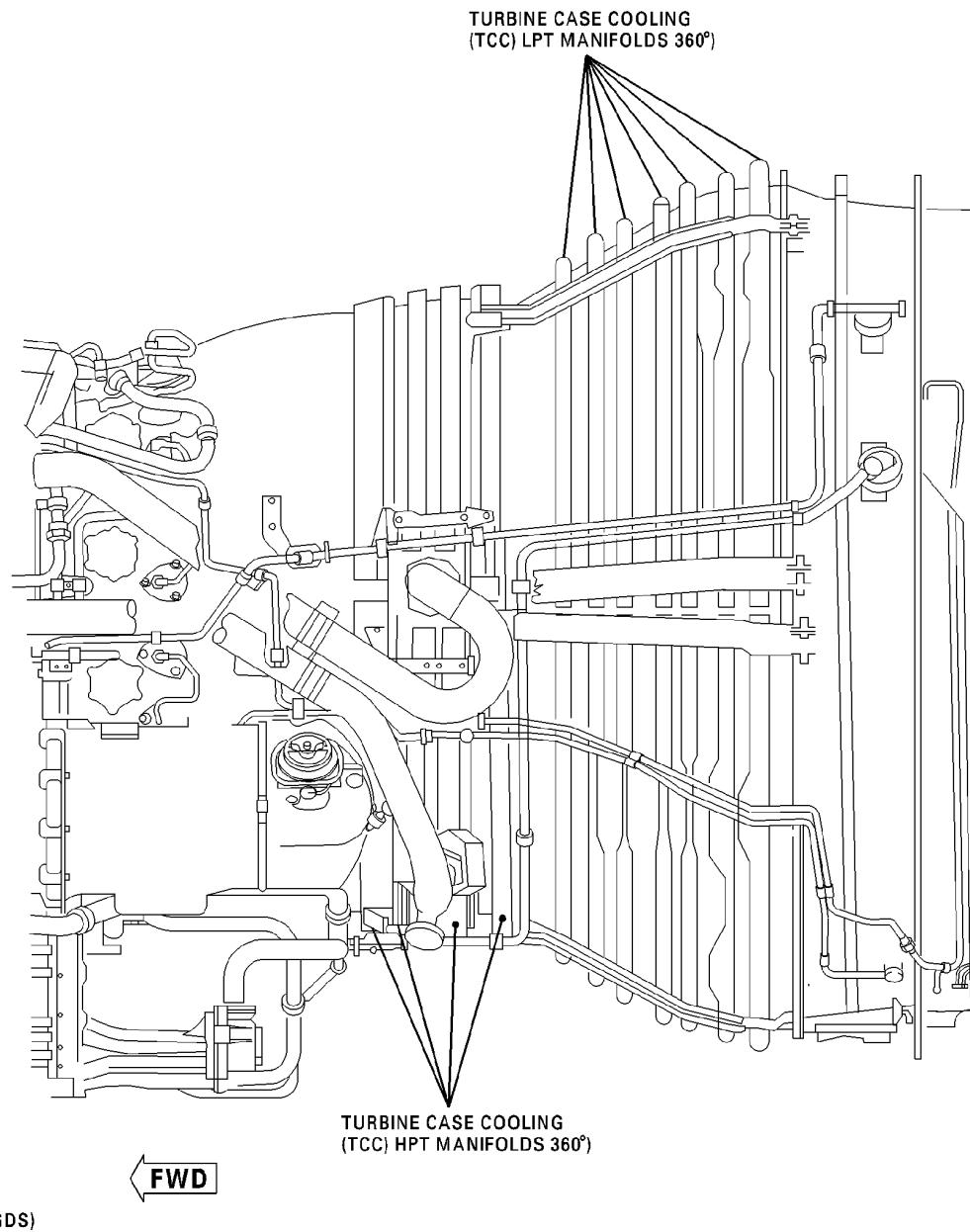
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Turbine Case Cooling (TCC) Manifolds - Left
Figure 608/75-23-00-990-897

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

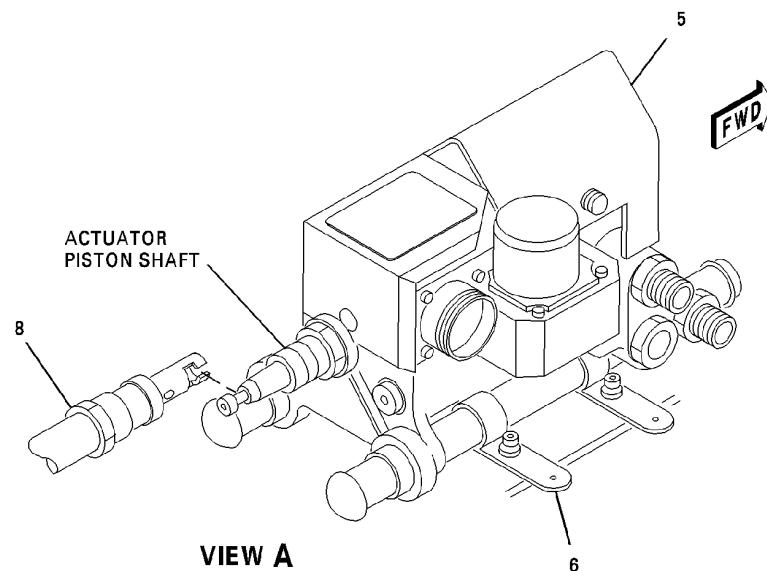
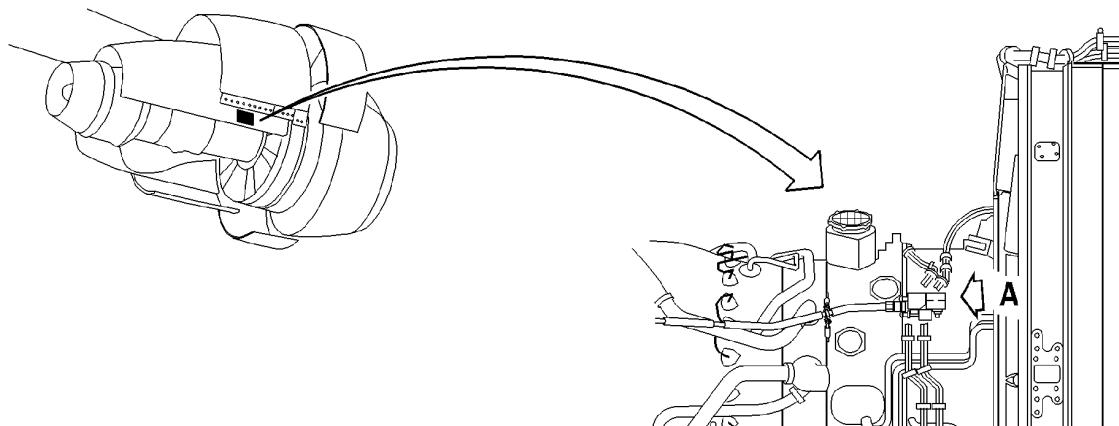
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LEGEND:
5. ACTUATOR
6. CLAMP
8. CONTROL CABLE

CAGT(IGDS) L-A3211

DB2-75-0124

Turbine Case Cooling System Linkage - Inspection
Figure 609/75-23-00-990-874

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

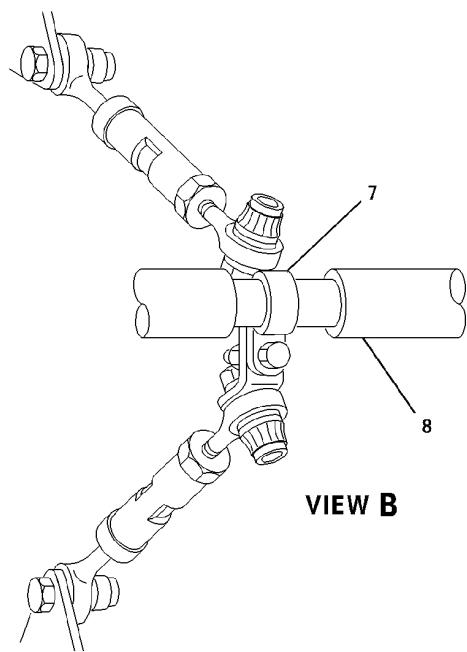
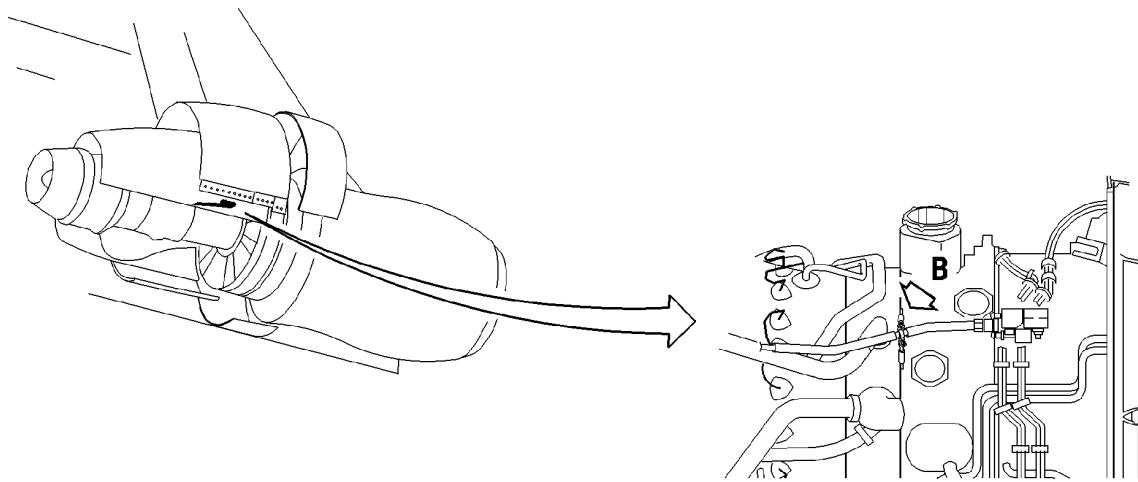
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LEGEND:

- 7. CLAMP
- 8. CONTROL CABLE

CAG(IGDS) L-A2792

DB2-75-0145

Turbine Case Cooling System Linkage - Inspection
Figure 610/75-23-00-990-875

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

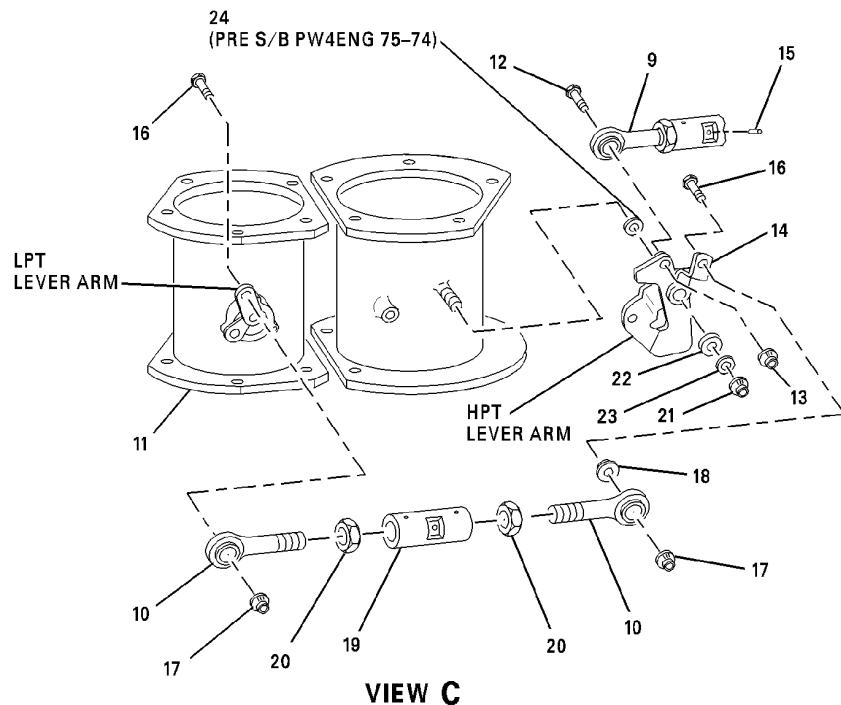
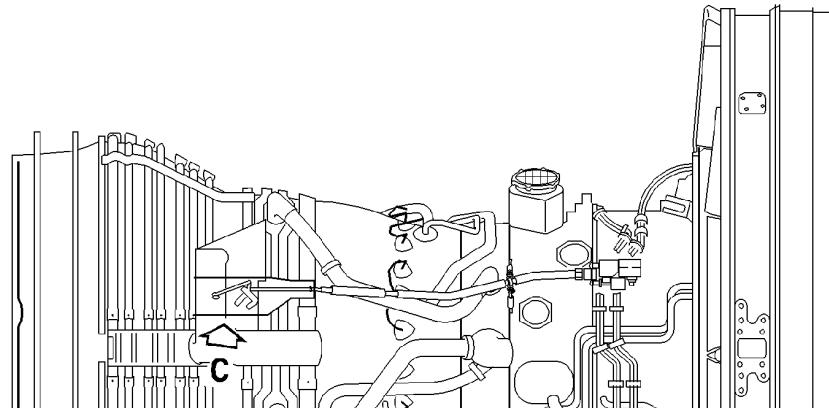
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LEGEND:

- 9. CABLE ROD END
- 10. ADJUSTER ROD END
- 11. AIR VALVE
- 12. BOLT
- 13. NUT
- 14. IDLER ARM
- 15. SHEAR PIN
- 16. BOLT
- 17. NUT
- 18. BUSHING
- 19. ADJUSTER
- 20. JAMNUT
- 21. NUT
- 22. BEARING
- 23. LOCK RING
- 24. SPACER

CAG(IGDS) L-A5449, L-A5730

DB2-75-0146A

Turbine Case Cooling System Linkage - Inspection
Figure 611/75-23-00-990-876

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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COLLECTOR, HIGH PRESSURE TURBINE CASE COOLING - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the high pressure turbine case cooling (HPTCC) collector.
- B. The HPTCC collector is attached to the engine at the 3 o'clock position on the HPT case. Access to the collector is through the right thrust-reverser door.
- C. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-23-01-000-868

2. REMOVAL OF THE HIGH PRESSURE TURBINE CASE COOLING COLLECTOR

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow:

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-04-000-868	REMOVAL OF THE HIGH PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE (P/B 401)
75-23-08-000-868	REMOVAL OF THE PW4460/4462 AND PW4460/4462 -3 TURBINE VANE COOLING AIR DUCTS (P/B 401)

C. Job Set-up - High Pressure Turbine Case Cooling Collector Removal

SUBTASK 75-23-01-010-268

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-23-01-010-270

- (2) Remove the high pressure turbine case cooling air shutoff valve. (REMOVAL OF THE HIGH PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE, TASK 75-23-04-000-868)

SUBTASK 75-23-01-010-271

- (3) Remove the (lower right) turbine vane cooling air duct. (REMOVAL OF THE PW4460/4462 AND PW4460/4462 -3 TURBINE VANE COOLING AIR DUCTS, TASK 75-23-08-000-868)

D. Procedure - High Pressure Turbine Case Cooling Collector Removal

SUBTASK 75-23-01-020-267

- (1) Remove the HPTCC collector (1) as follows: (Figure 401)

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (a) Remove the manifold bolts (2) that attach the HPTCC air manifolds to the HPTCC collector (1).
- (b) Move the upper and lower HPTCC air manifolds around the HPT case as necessary to make clearance for the collector (1).
- (c) Remove the bolt (3) and nut (4) that attach the clamp (5) to the bracket (6) on the collector (1). Remove the collector.
- (d) Install protective caps and plugs to the upper and lower HPTCC air manifolds and collector openings.

SUBTASK 75-23-01-410-267

- (2) If the HPTCC collector (1) is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

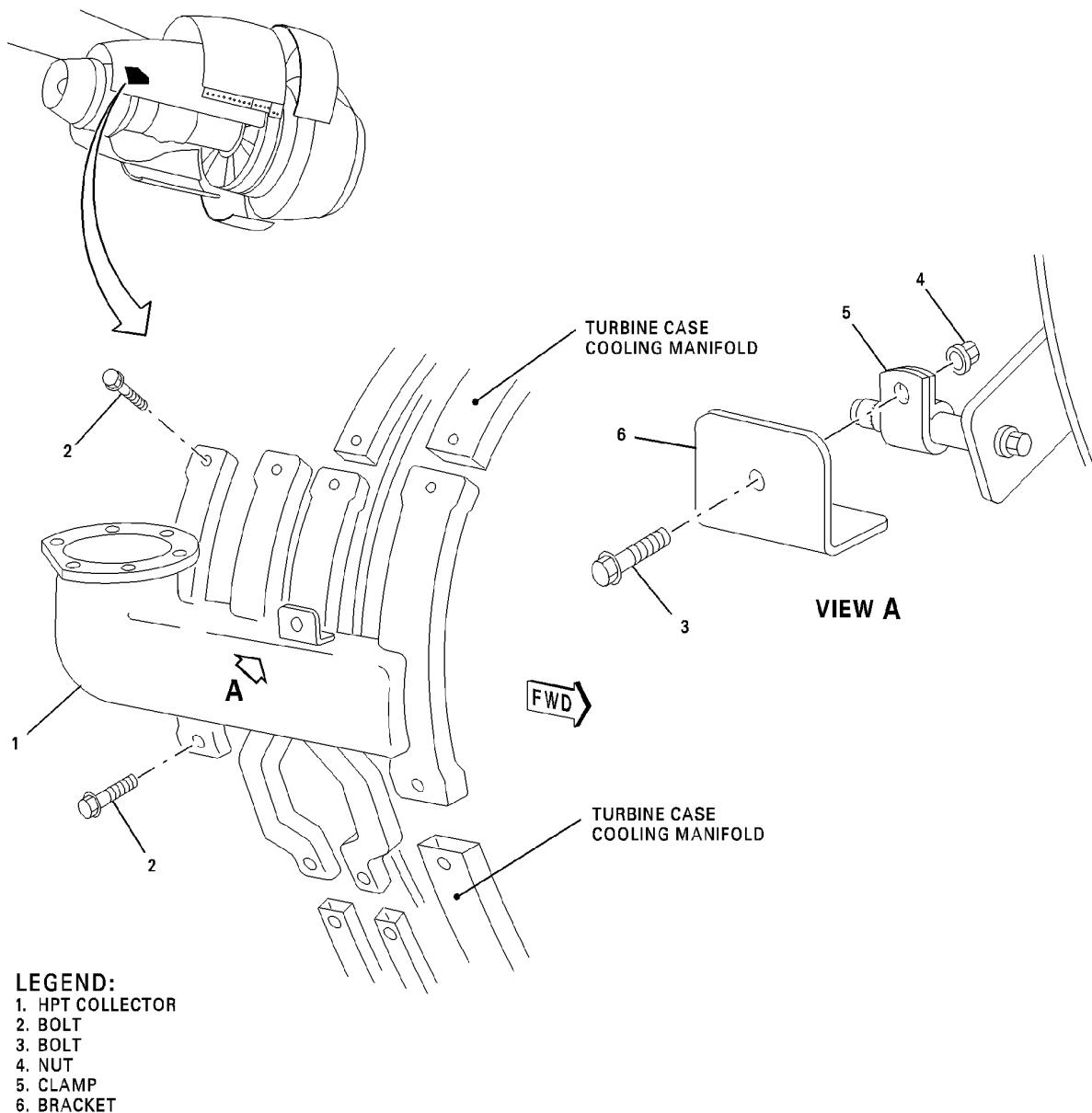
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LEGEND:

- 1. HPT COLLECTOR
- 2. BOLT
- 3. BOLT
- 4. NUT
- 5. CLAMP
- 6. BRACKET

CAG(IGDS)

DB2-75-0234

High Pressure TCC Collector - Removal/Installation
Figure 401/75-23-01-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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TASK 75-23-01-400-868

3. INSTALLATION OF THE HIGH PRESSURE TURBINE CASE COOLING COLLECTOR

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow:

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–100 in-lb (0–11.3 N·m)
Model M303, M305 or M307	Crimper, Bergen Mechanical

B. Consumable Materials

(1) Consumable Materials

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine (PWA 521B)
P05-289	Lockwire (AS3214-02)
P05-291	Cable, safety
P05-292	Ferrule, safety cable

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-04-400-868	INSTALLATION OF THE HIGH PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE (P/B 401)
75-23-08-400-868	INSTALLATION OF THE PW4460/4462 AND PW4460/4462 -3 TURBINE VANE COOLING AIR DUCTS (P/B 401)

D. Job Set-up - High Pressure Turbine Case Cooling Collector Installation

SUBTASK 75-23-01-010-275

- (1) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER
DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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E. Procedure - High Pressure Turbine Case Cooling Collector Installation

SUBTASK 75-23-01-410-270

- (1) Install the HPTCC collector (1) as follows: (Figure 401)
 - (a) Remove the protective caps and plugs.



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the threads of bolts (2 and 3) with the engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Move the upper and lower HPTCC air manifolds around the high pressure turbine case. Attach them to the HPTCC collector (1) with the bolts (2).
- (d) Torque the bolts (2) to 36-40 in-lb (4.1-5.0 N·m).
- (e) Attach the clamp (5) to the bracket (6) with the bolt (3) and nut (4). Tighten the bolt and nut handtight.
- (f) Torque the bolt (3) to 36-40 in-lb (4.1-5.0 N·m).

SUBTASK 75-23-01-420-267

- (2) Install the (lower right) turbine vane cooling air duct. (INSTALLATION OF THE PW4460/4462 AND PW4460/4462 -3 TURBINE VANE COOLING AIR DUCTS, TASK 75-23-08-400-868)

SUBTASK 75-23-01-420-268

- (3) Install the high pressure turbine case cooling air shutoff valve. (INSTALLATION OF THE HIGH PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE, TASK 75-23-04-400-868)

SUBTASK 75-23-01-410-271

- (4) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

F. Job Close-up - High Pressure Turbine Case Cooling Collector Installation

SUBTASK 75-23-01-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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MANIFOLD, LOW-PRESSURE-TURBINE COOLING - REMOVAL/INSTALLATION

1. General

- A. These procedures have the removal and installation instructions for the low pressure turbine (LPT) cooling manifold.
- B. The LPT cooling manifold is in twelve segments attached circumferentially around the low-pressure-turbine.
- C. Unless different instructions are given, these procedures are the same for the three CF6-80C2D1F engines.

TASK 75-23-02-000-801

2. REMOVAL OF THE LOW PRESSURE TURBINE COOLING MANIFOLD

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-803	OPENING OF THE CORE COWL DOORS (P/B 201)
71-10-00-410-803	CLOSING OF THE CORE COWL DOORS (P/B 201)

C. Job Set-up - Low Pressure Turbine Cooling Manifold Removal

SUBTASK 75-23-02-010-268

- (1) Open the core cowl doors. (OPENING OF THE CORE COWL DOORS, TASK 71-10-00-010-803)

D. Procedure - Low Pressure Turbine Cooling Manifold Removal

SUBTASK 75-23-02-020-001

- (1) Remove the LPT cooling air manifold (1) as follows: (Figure 401)

NOTE: You can replace the LPT cooling air manifold segments individually, as necessary.

- (a) Disconnect the T5 electrical leads (2) from the T5 sensor (3).
- (b) On the LPT cooling air manifold (1), disconnect the T5 electrical lead (2) from the electrical attachments (5). Remove sufficient T5 electrical lead to permit the removal of the LPT cooling air manifold. (Figure 402)

NOTE: The T5 electrical lead is attached at the LPT case bracket at one location and the LPT cooling manifold at five locations.

- (c) Carefully move the T5 electrical lead (2) to the side to get access to the LPT cooling air manifold (1).
- (d) To remove the manifold segments, start at the 3 o'clock position (segment C) and move counterclockwise on the LPT. (Figure 403)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-23-02

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**CAUTION**

DO NOT REMOVE THE RETAINING BOLTS THAT ATTACH THE FORWARD AND AFT MANIFOLD BRACKETS TO THE LOW PRESSURE TURBINE CASE. IF YOU REMOVE THESE BOLTS, THE INNER BRACKET CAN FALL INTO THE ENGINE CASE. IF THE BRACKET FALLS INTO THE ENGINE, DAMAGE TO THE ENGINE WILL OCCUR AND YOU MUST REMOVE THE ENGINE.

- (e) On the LPT case aft bracket (8), remove the two nuts (9), bolts (10) and the manifold clips (11), from the LPT case bracket. (Figure 404)
NOTE: The information that follows is for engines before SB 75-122.
- (f) Remove the clamps (24) from the main tube of each manifold segment. (Figure 407)
NOTE: The information that follows is for engines before and after S/B 75-122.
- (g) On the LPT case, forward bracket (12), remove the nut (13), spacer (14), and bolt (15).
- (h) On the adjacent manifold segment (segment D), loosen the bolts (10) and nuts (9) on the aft manifold clips (11). Make sure the clips are free of the LPT case aft brackets (8).
- (i) On the forward end of the adjacent manifold segments, remove the nut (13), the spacer (14), and the bolts (15) to the LPT case, forward brackets (12).
- (j) Carefully pull manifold segment C out to remove the feeder tubes from the adjacent manifold segments. Move the manifold segment aft until clear of the 7th stage cooling air manifold (4). (Figure 401)
- (k) Carefully pull manifold segment D out and turn it clockwise to disconnect the cooling air feeder tubes from segment E. Move the manifold segment aft until clear of the 7th stage cooling air manifold (4). (Figure 403) (Figure 401)
- (l) On the three LPT recoup tubes (16), remove the four bolts (17) that attach the three LPT recoup tubes to the exhaust nozzle pads (18). (Figure 405)
- (m) On the three LPT recoup tubes (16), loosen the two bolts (19), four washers (20), and two nuts (21) attached to the exhaust nozzle bracket. (Figure 406)
- (n) Loosen the v-band clamp (6) that attaches the LPT cooling air manifold (1) with the LPT inlet manifold (7) and disengage it from the tube joint. (Figure 402)
- (o) Carefully pull the LPT cooling air manifold (1) segment out and disengage the cooling feeder tubes from the adjacent manifold segment. Move the LPT cooling air manifold segment aft until it is clear of the 7th stage cooling air manifold (4). (Figure 401)
- (p) Continue to work in a counterclockwise direction to remove the other necessary LPT manifold segments.

SUBTASK 75-23-02-410-267

- (2) If the LPT cooling manifold segments are not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE CORE COWL DOORS, TASK 71-10-00-410-803)

———— END OF TASK ———

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

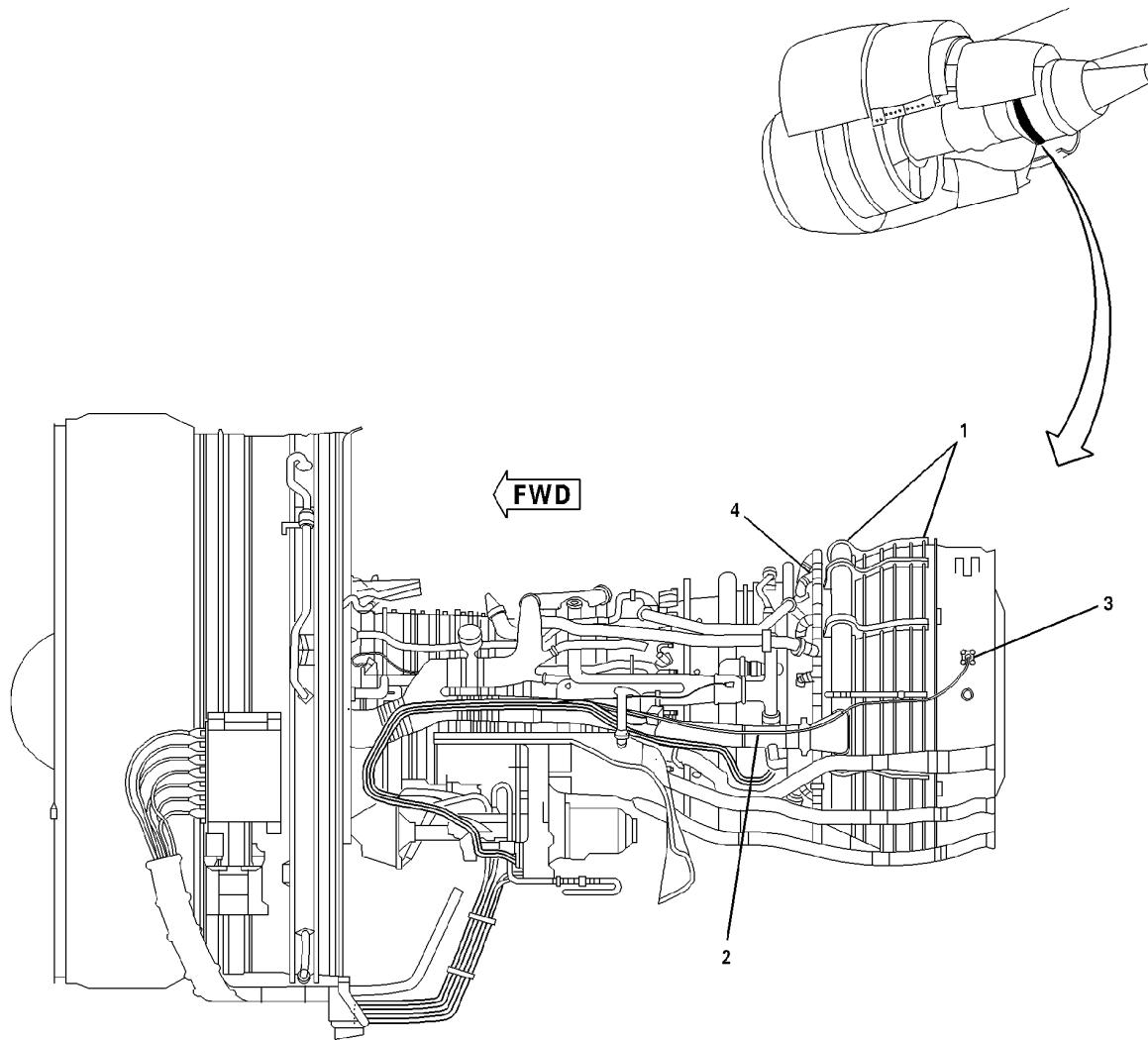
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LEGEND:

1. LOW PRESSURE TURBINE COOLING AIR MANIFOLD
2. T5 ELECTRICAL LEAD
3. T5 SENSOR
4. 7th STAGE COOLING AIR MANIFOLD

CAG(IGDS)

DB2-75-0053A

LPT Cooling Air Manifold - Removal/Installation
Figure 401/75-23-02-990-801

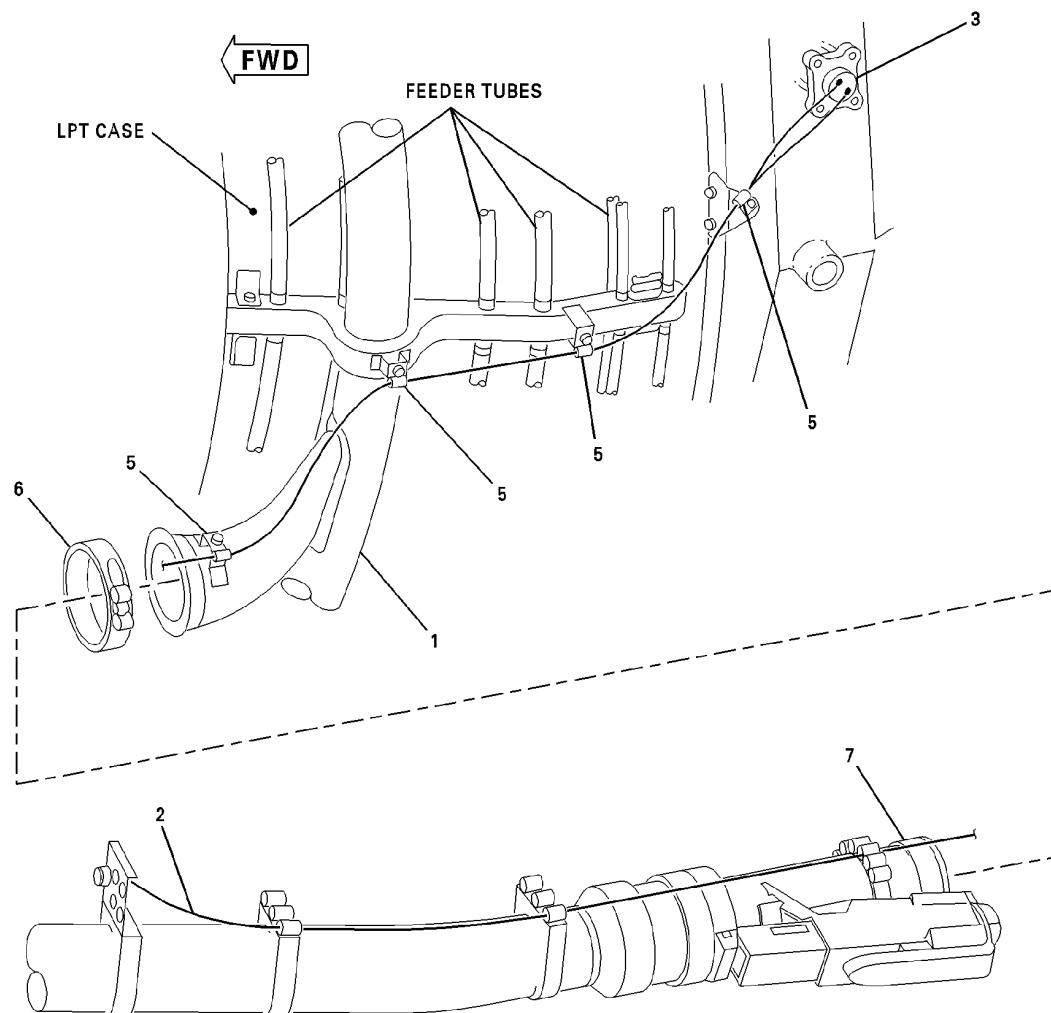
EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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**LEGEND:**

1. LOW PRESSURE TURBINE COOLING AIR MANIFOLD
2. T5 ELECTRICAL LEAD
3. T5 SENSOR
5. ELECTRICAL ATTACHMENT
6. V-BAND CLAMP
7. LOW PRESSURE TURBINE INLET MANIFOLD

CAG(IGDS)

DB2-75-0055C

LPT Cooling Air Manifold - Removal/Installation
Figure 402/75-23-02-990-802

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

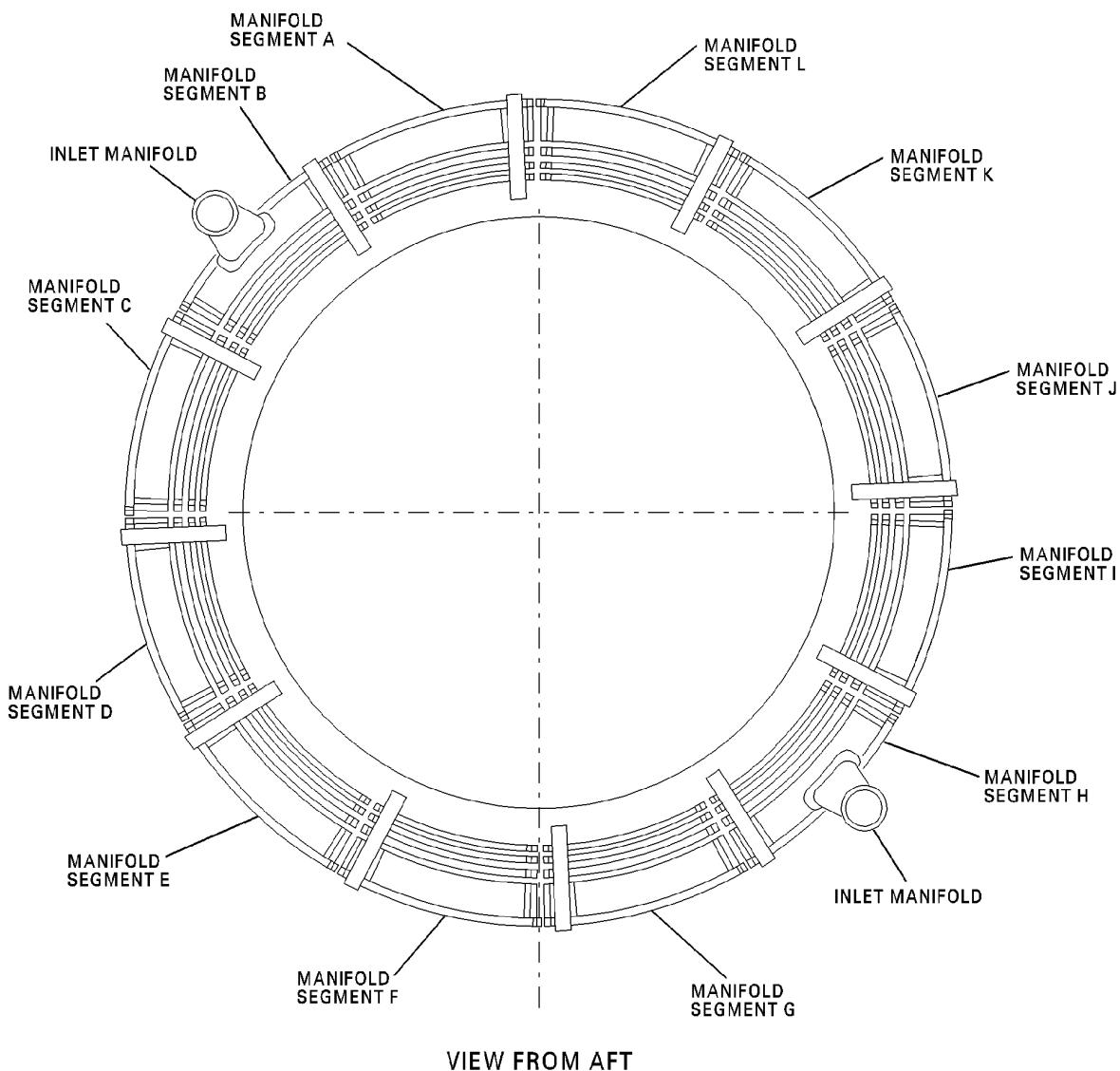
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CAG(IGDS)

DB2-75-0054A

LPT Cooling Air Manifold - Removal/Installation
Figure 403/75-23-02-990-803

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

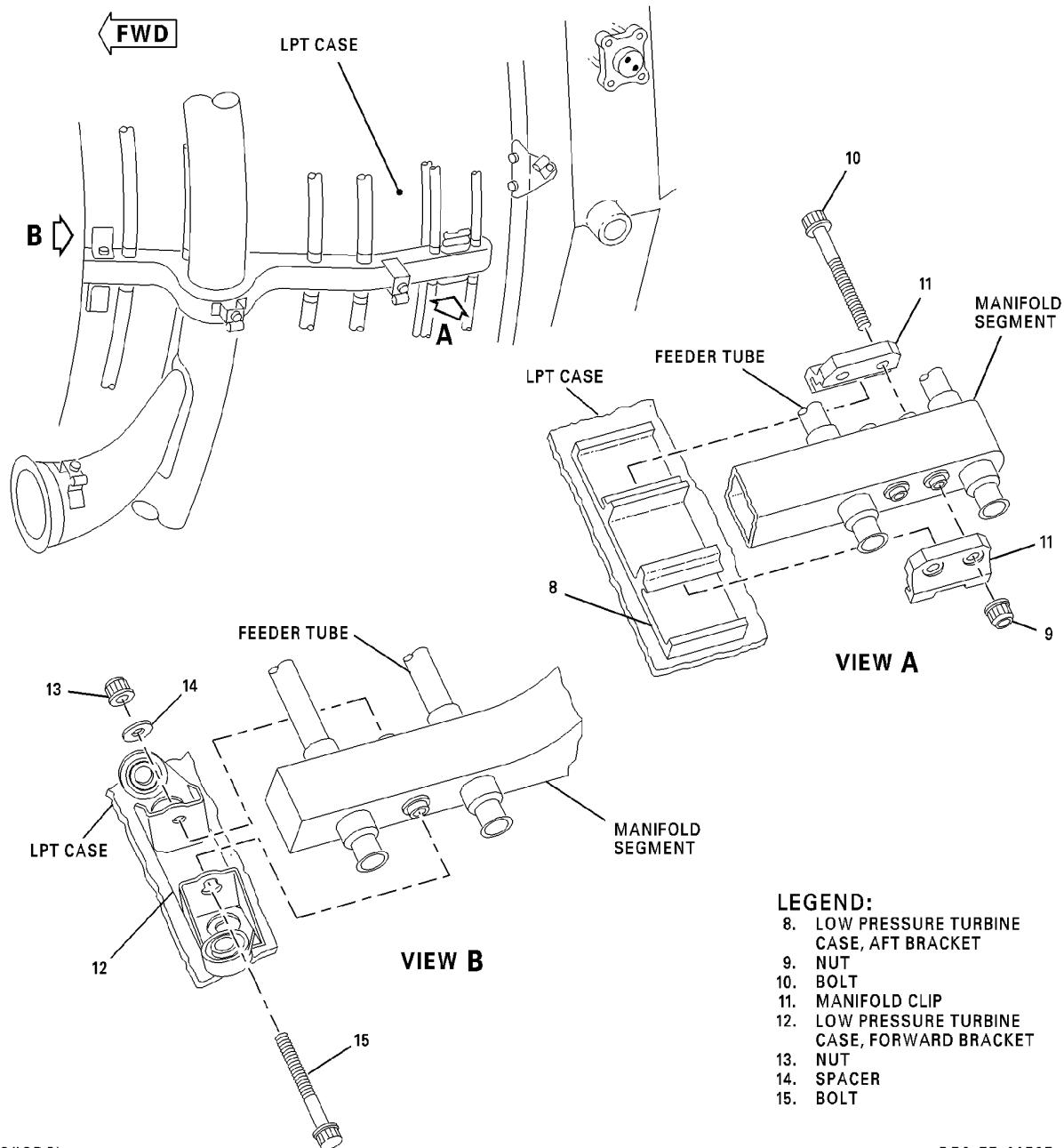
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CAG(IGDS)

DB2-75-0056B

LPT Cooling Air Manifold - Removal/Installation
Figure 404/75-23-02-990-804

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

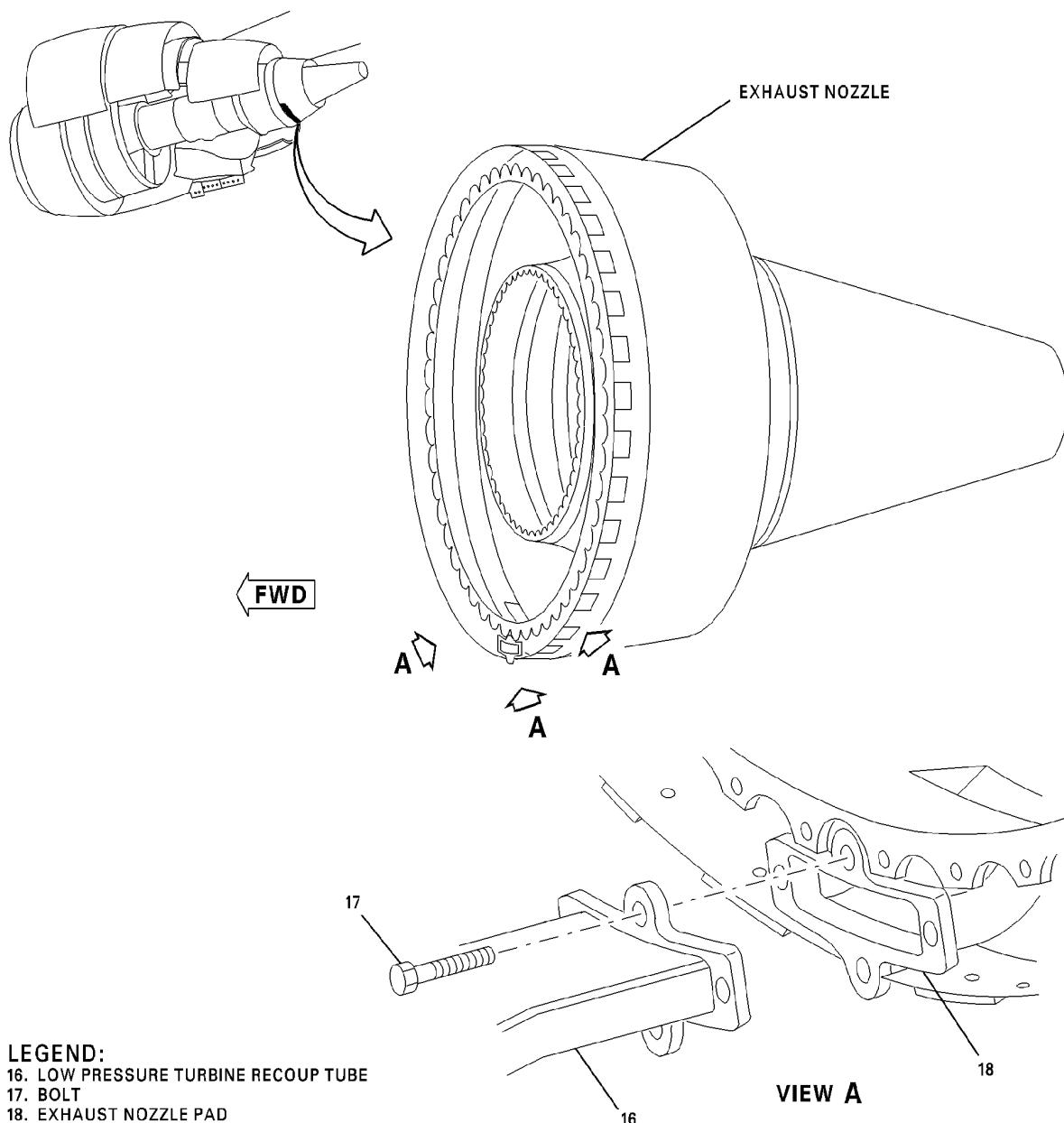
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CAG(IGDS)

DB2-75-0057B

Low Pressure Turbine Recoup Tube - Removal/Installation
Figure 405/75-23-02-990-805

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

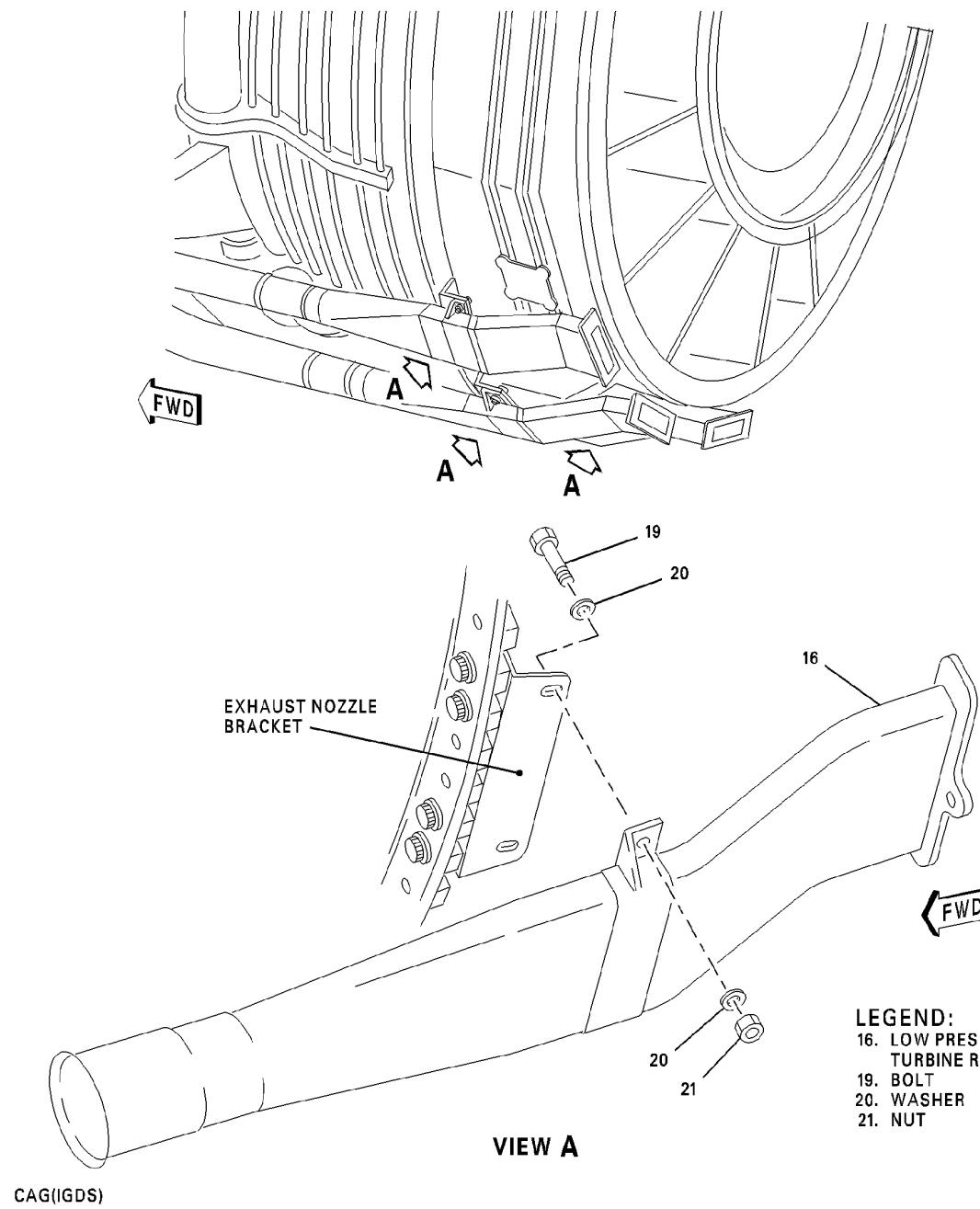
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Low Pressure Turbine Recoup Tube - Removal/Installation
Figure 406/75-23-02-990-806

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-23-02-400-801

3. INSTALLATION OF THE LOW PRESSURE TURBINE COOLING MANIFOLD

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Wrench, torque 0-100 in-lb (0-11.21 N·m)

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
C02-002	Compound, anti-seize
C02-023	Lubricant, petrolatum

C. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-803	OPENING OF THE CORE COWL DOORS (P/B 201)
71-10-00-410-803	CLOSING OF THE CORE COWL DOORS (P/B 201)

D. Job Set-up - Low Pressure Turbine Cooling Manifold Installation

SUBTASK 75-23-02-010-270

- (1) If necessary, open the engine access doors. (OPENING OF THE CORE COWL DOORS, TASK 71-10-00-010-803)

E. Procedure - Low Pressure Turbine Cooling Manifold Installation

SUBTASK 75-23-02-420-001

- (1) Install the low pressure turbine (LPT) cooling air manifold (1) as follows: (Figure 401)

NOTE: The information that follows is for engines after S/B 75-122.

NOTE: The modified manifolds and manifold inlet are installed as a complete set. Do not use the old manifolds with the new manifolds.

NOTE: The information that follows is for engines before and after S/B 75-122.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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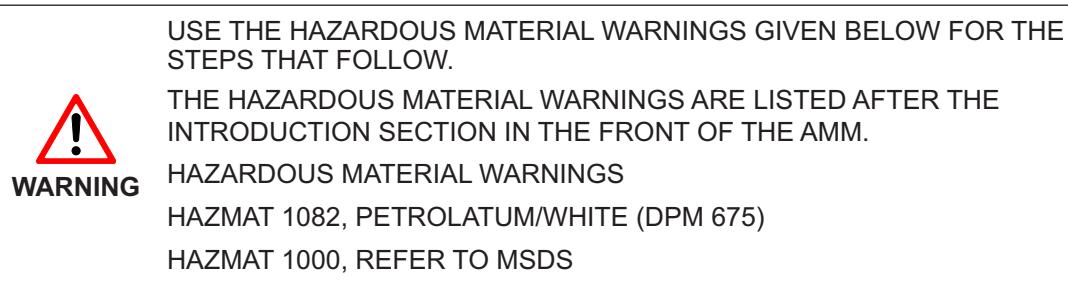
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- (a) Align the LPT cooling air manifold (1), segment B or segment H with the LPT inlet manifold (7) as follows: (Figure 402) (Figure 403)
- 1) Install the v-band clamp (6) around the tube joint of the LPT manifold (1). Do not tighten the clamp at this time.
 - 2) Align the aft end of the manifold segment with the LPT case, aft brackets (8). (Figure 404)
 - 3) Install the manifold clips (11), bolts (10), and nuts (9) into the LPT case, aft bracket (8) and the manifold segment. Do not torque the nuts or bolts at this time.

NOTE: The information that follows is for engines before SB 75-122.



- (b) Lubricate the ten assorted piston rings (22) and (23) with white petrolatum (C02-023). (CONSUMABLE MATERIALS, TASK 70-30-00-910-801) (Figure 407)
- (c) Install the piston rings (22) on the feeder tubes and the piston rings (23) on the main tube of each manifold segment.
- NOTE: The information that follows is for engines after SB 75-122.
- (d) Install the clamp (24) on the main tube of the manifold segment.
- NOTE: The piston rings on the feeder tubes and the main tube of the LPT manifold are not installed on engines after SB 75-122. The preceding step is applicable only on engines before SB 75-122.
- (e) Put the next LPT manifold segment into position. Engage and align the feeder tubes and the LPT case, forward brackets (12) and aft brackets (8). (Figure 404)
- NOTE: Work in a clockwise direction.
- (f) On the LPT case, forward bracket (12), install the bolt (15), spacer (14), and nut (13). Do not torque the nuts or bolts at this time.
- (g) Continue to install the manifold segments with the hardware until all manifold segments are installed.
- (h) Torque the v-band clamps (6) at each inlet of the LPT tube joint to 50 in-lb (5.6 N·m). (Figure 402)
- (i) Torque the nuts (13) on the forward LPT, case brackets (12) to 65 in-lb (7.3 N·m). (Figure 404)
- (j) Torque the aft LPT, case bracket (8) nuts (9) to 25 in-lb (2.8 N·m).
- NOTE: The information that follows is for engines after SB 75-122.
- (k) Torque the clamps (24) on the main tube of the LPT manifold to 30–40 in-lb (3.3–4.5 N·m). (Figure 407)
- NOTE: The information that follows is for engines before and after S/B 75-122.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1023, GREASE/THREAD COMPOUND LUBRICATING
(DPM 376)

HAZMAT 1000, REFER TO MSDS

- (l) Lubricate the two bolts (19) threads with anti-seize compound (C02-002). (CONSUMABLE MATERIALS, TASK 70-30-00-910-801) (Figure 406)
- (m) Attach the LP recoup tubes (16) to the exhaust nozzle bracket with the two lubricated bolts (19), washers (20) and nuts (21). Torque the bolts to 55–70 in-lb (6.2–7.9 N·m).
- (n) Lubricate the four bolts (17) threads with anti-seize compound (C02-002). (Figure 405)
- (o) Install the four bolts (17) that attach the LP recoup tubes (16) to the exhaust nozzle pads (18). Torque the two four to 55–70 (6.2–7.9 N·m).
- (p) Attach the T5 electrical lead (2) to the T5 sensor (3). Connect the T5 electrical lead to the electrical attachments (5) on the LPT manifold (5 places). (Figure 402)
- (q) Torque the smaller lead nut on the T5 sensor (3) to 12–14 in-lb (1.3–3.4 N·m).
- (r) Torque the larger lead nut on the T5 sensor (3) to 20–30 in-lb (2.3–3.4 N·m)
- (s) Torque the electrical attachment nuts (5) to 33–37 in-lb (3.7–4.2 N·m).

F. Job Close-up - Low Pressure Turbine Cooling Manifold Installation

SUBTASK 75-23-02-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-02-410-275

- (2) Close the core cowl doors. (CLOSING OF THE CORE COWL DOORS, TASK 71-10-00-410-803)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

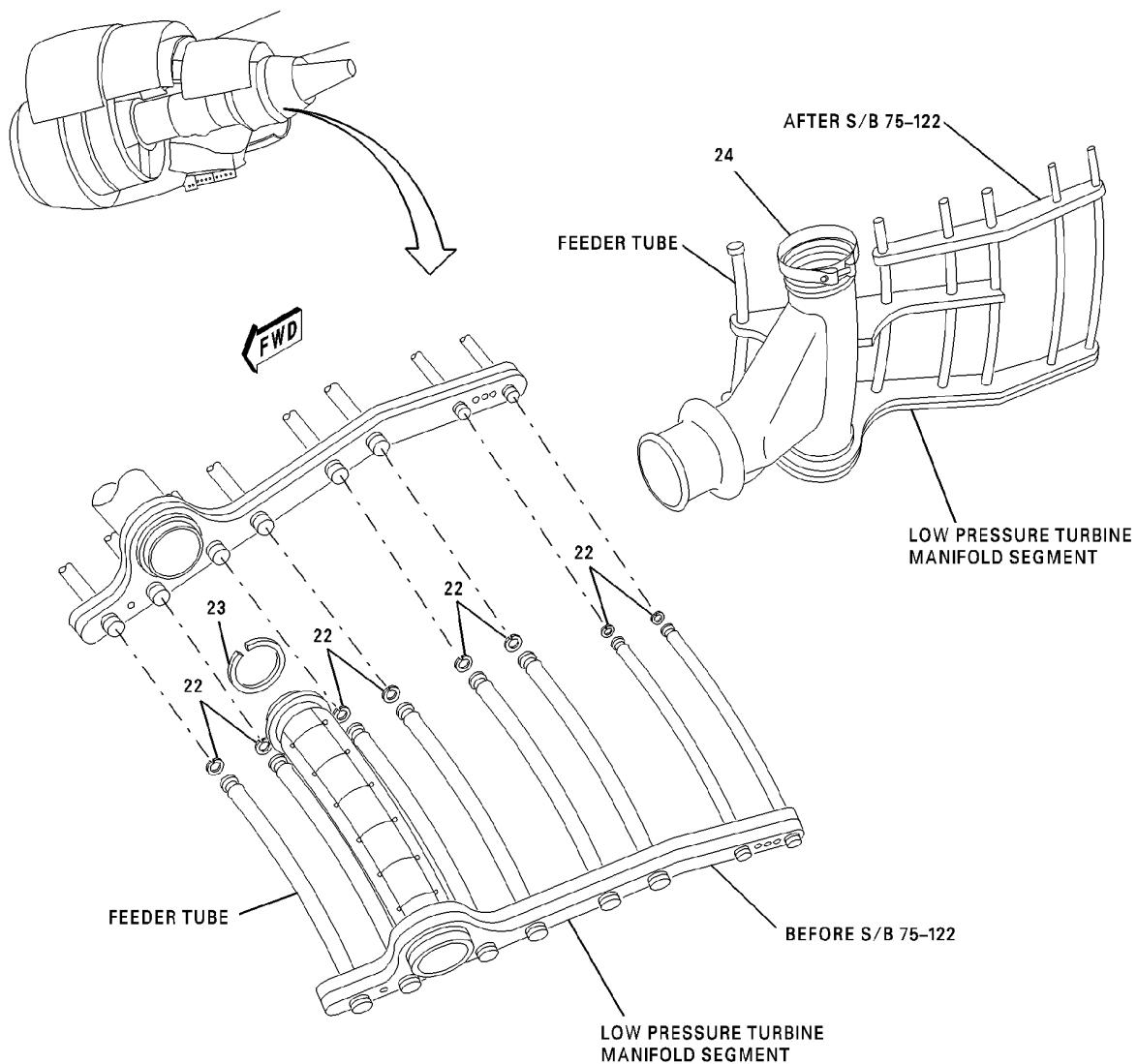
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LEGEND:

- 22. PISTON RING
- 23. PISTON RING
- 24. CLAMP

CAG(IGDS)

DB2-75-0065C

LPT Cooling Air Manifold Piston Rings
Figure 407/75-23-02-990-807

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-23-02

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SOLENOID, ELEVENTH STAGE COOLING VALVE - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the eleventh stage cooling valve solenoid. The eleventh stage cooling valve solenoid is at the left side of the accessory drive gearbox heat shield.
- B. Unless different instructions are given, these procedures are the same for the three GE CF6-80C2D1F engines.

TASK 75-23-04-000-801

2. REMOVAL OF THE ELEVENTH STAGE COOLING VALVE SOLENOID

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs
MS90376	Dust caps, electrical connector

B. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Eleventh Stage Cooling Valve Solenoid Removal

SUBTASK 75-23-04-010-003

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

D. Procedure - Eleventh Stage Cooling Valve Solenoid Removal

SUBTASK 75-23-04-020-002

- (1) Remove the eleventh stage cooling valve solenoid (1) as follows: (Figure 401)
 - (a) Disconnect the electrical connectors (2) from the eleventh stage cooling valve solenoid (1). Install dust caps on the electrical connectors and receptacles.
 - (b) Disconnect the air inlet tube (3) and the air outlet tube (4) from the eleventh stage cooling valve solenoid (1). Install protective caps and plugs on the air tubes and on the solenoid.
 - (c) Remove the four bolts (5) and washers (6) and then remove the eleventh stage cooling valve solenoid (1) from the bracket (7).
 - (d) Remove the two union fittings (8) from the eleventh stage cooling valve solenoid (1). Remove and discard the two preformed packings (9).

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SUBTASK 75-23-04-410-004

- (2) If the eleventh stage cooling valve solenoid (1) is not installed immediately, or weather conditions make it necessary, close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

— EFFECTIVITY —
FX 572-576, 582-599, 601-610, 612-619, 625

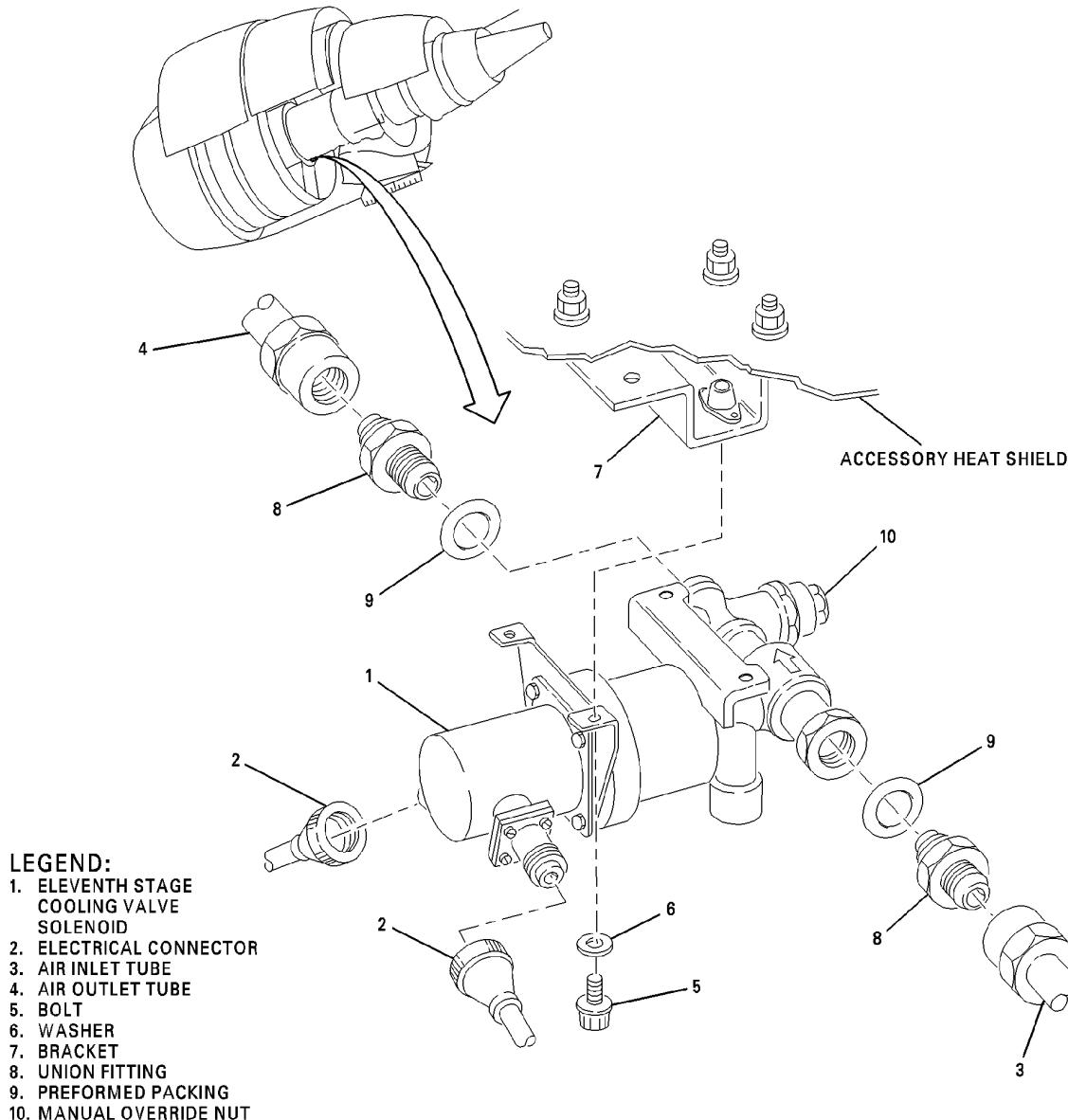
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CF8-8A6232-00-A

DB2-75-0006B

Eleventh Stage Cooling Valve Solenoid
Figure 401/75-23-04-990-804

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-23-04-400-801

3. INSTALLATION OF THE ELEVENTH STAGE COOLING VALVE SOLENOID

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-350 in-lb (0-39.5 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
C02-001	Lubricant, anti-seize

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
9	Packing, preformed (P/N J221P906)	IPC 75-24-00

D. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)
71-00-00-700-809	ADJUSTMENT AND TEST PROCEDURES (P/B 501)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-24-00	Illustrated Parts Catalog

E. Job Set-up - Eleventh Stage Cooling Valve Solenoid Installation

SUBTASK 75-23-04-010-009

- (1) Make sure the thrust reverser doors are open. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-23-04

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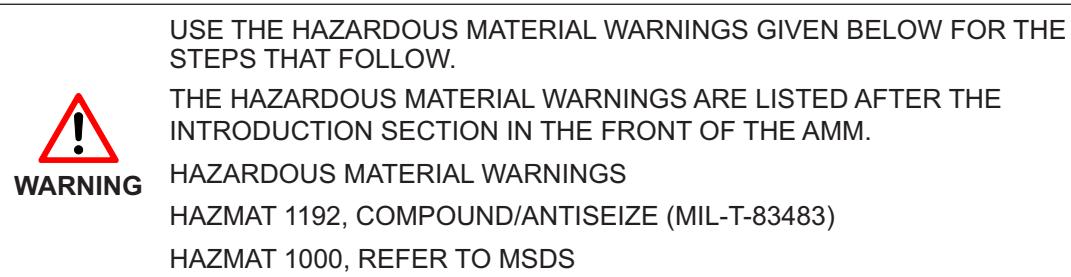


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F. Procedure - Eleventh Stage Cooling Valve Solenoid Installation

SUBTASK 75-23-04-420-009

- (1) Install the eleventh stage cooling valve solenoid (1) as follows: (Figure 401)



- (a) Apply a thin layer of anti-seize lubricant (C02-001) to the two union fittings (8). Install the preformed packings (9) on the union fittings (8). (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
- (b) Install the two union fittings (8) in the eleventh stage cooling valve solenoid (1). Torque the unions to 180-200 in-lb (20.3-22.6 N·m).
- (c) Install the eleventh stage cooling valve solenoid (1) on the bracket (7). Install the four bolts (5) and washers (6). Torque the bolts to 33-37 in-lb (3.7-4.2 N·m).
NOTE: For the solenoid P/N V14100-386 make sure the manual override nut is turned clockwise until it is in the STOWED position. Make sure the indicator pin is flush with the override nut.
- (d) Remove the protective caps from the air tubes. Connect the air inlet tube (3) and the air outlet tube (4) to the eleventh stage cooling valve solenoid (1). Torque the tube nuts to 270-300 in-lb (30.5-33.9 N·m).
- (e) Remove the dust caps from the electrical connectors (2) and the receptacles.
- (f) Connect the electrical connectors (2) to the eleventh stage cooling valve solenoid (1). Tighten the electrical connector by hand.

SUBTASK 75-23-04-410-009

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

SUBTASK 75-23-04-720-009

- (3) Do the applicable test(s) shown in the adjustment and test procedures. (ADJUSTMENT AND TEST PROCEDURES, TASK 71-00-00-700-809)

G. Job Close-up - Eleventh Stage Cooling Valve Solenoid Installation

SUBTASK 75-23-04-942-001

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-23-04

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VALVE, HIGH-PRESSURE TURBINE-CASE COOLING AIR SHUTOFF - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the high-pressure turbine-case cooling air shutoff valve.
- B. Access to the high pressure turbine-case cooling air shutoff valve is through the right thrust-reverser door.
- C. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-23-04-000-868

2. REMOVAL OF THE HIGH PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-10-000-868	REMOVAL OF THE LOW PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE (P/B 401)

C. Job Set-up - High Pressure Turbine Case Cooling Air Shutoff Valve Removal

SUBTASK 75-23-04-865-267



MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT
BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS
WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER
OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO
EQUIPMENT.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-23-04

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(WARNING PRECEDES)

**WARNING**

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open this circuit breaker and install safety tag:

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

SUBTASK 75-23-04-010-268

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-23-04-030-269

- (3) Remove the low pressure turbine cooling air valve. (REMOVAL OF THE LOW PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE, TASK 75-23-10-000-868)

D. Procedure - High-Pressure Turbine-Case Cooling Air Shutoff Valve Removal

SUBTASK 75-23-04-030-267

**CAUTION**

IF THE HIGH PRESSURE TURBINE CASE COOLING VALVE IS TO BE RETURNED TO STORAGE FOR FUTURE SPARE PARTS USE, SEND THE HPTCC VALVE TO THE SHOP FOR PRESERVATION. REFER TO THE COMPONENT MAINTENANCE MANUAL INSTRUCTIONS, IF YOU DO NOT, INTERNAL CORROSION AND DAMAGE TO THE HPTCC VALVE CAN OCCUR, WHICH CAN CAUSE DECREASED PERFORMANCE, INCREASED FLUID LEAKAGE AND FAILURE OF THE PART.

- (1) Remove the high pressure turbine case cooling (HPTCC) air shutoff valve (1) as follows:
(Figure 401) (Figure 402)
 - (a) Remove the nut (2) and bolt (3) that connects the control cable (4) to the valve idler-arm interface point (5).
 - (b) Remove the bolt (6) that attaches the support-link (7) and HPTCC air shutoff-valve (1) to the top bracket (8).
 - (c) Move the top support-link (7) away from the shutoff valves.
 - (d) Remove the bolts (9) that attach the shutoff valve (1) to the top bracket (8).
 - (e) Remove the nuts (10) and bolts (6) that attach the lower support-link (11) and shutoff valve (1) to the bracket (12).
 - (f) Remove the bolts (9) that attach the lower flange of the shutoff valve (1) to the lower bracket (12).
 - (g) Remove the nut (14), bolt (15) and the bushing (16). Remove the turnbuckle rod (17) from the shutoff valve lever (18).
 - (h) Move the shutoff valve (1) rearward and out. Remove the shutoff valve. Install the protective caps and plugs.

NOTE: The step that follows is for engines before SB PW4ENG 75-136.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (i) If valve is to be replaced, remove nut (20) securing idler arm (19) to valve lever (18) and remove idler arm (19) and, if necessary, the spacer (21) from valve lever. (Figure 403) (Figure 405)

NOTE: The step that follows is for engines after SB PW4ENG 75-136.

- (j) If the valve must be replaced, remove the bearing sleeve assembly (22) that attaches the idler arm (19) to the valve lever (18) and remove the arm and, if equipped, the spacer from the valve lever. (Figure 404) (Figure 406)

NOTE: For additional information concerning detailed maintenance of this component see Turbine Case Cooling Air Valve (HPT) Component Maintenance Manual, 75-24-09 (Parker Hannifin).

SUBTASK 75-23-04-410-267

- (2) If the HPTCC air shutoff valve is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

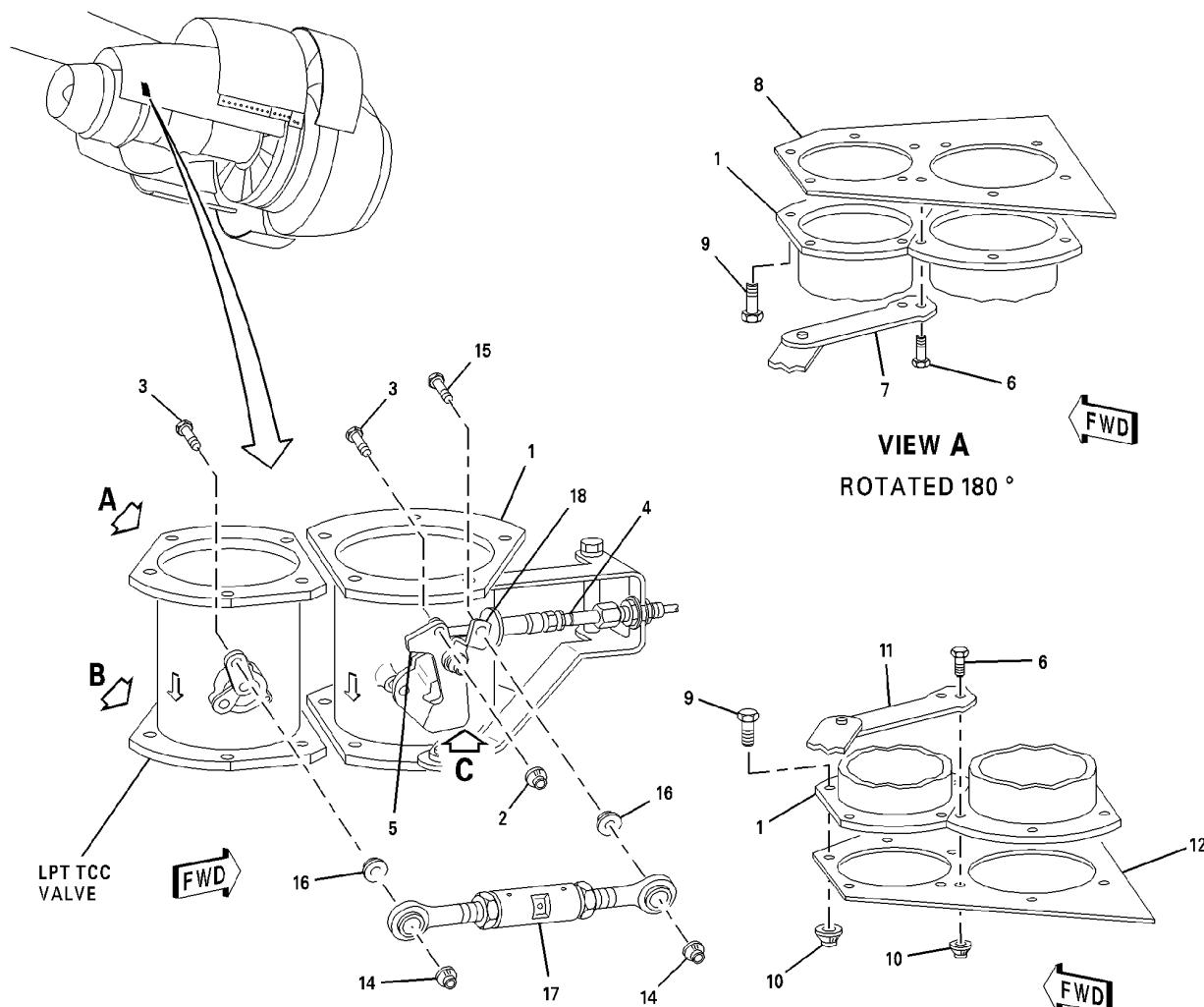
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LEGEND:

- | | |
|--------------------------------------|-----------------------------|
| 1. HPT TCC COOLING AIR SHUTOFF VALVE | 9. BOLT |
| 2. NUT | 10. NUT |
| 3. BOLT | 11. LOWER SUPPORT LINK |
| 4. CONTROL CABLE | 12. LOWER SUPPORT BRACKET |
| 5. IDLER ARM INTERFACE POINT | 14. NUT |
| 6. BOLT | 15. BOLT |
| 7. TOP SUPPORT LINK | 16. BUSHING |
| 8. TOP SUPPORT BRACKET | 17. TURNBUKLE ROD |
| | 18. SHUTOFF VALVE LEVER ARM |

CAG(IGDS) L-A0162

VIEW B
ROTATED 180 °

DB2-75-0140A

HPT Case Cooling Air Shutoff Valve - Removal/Installation
Figure 401/75-23-04-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

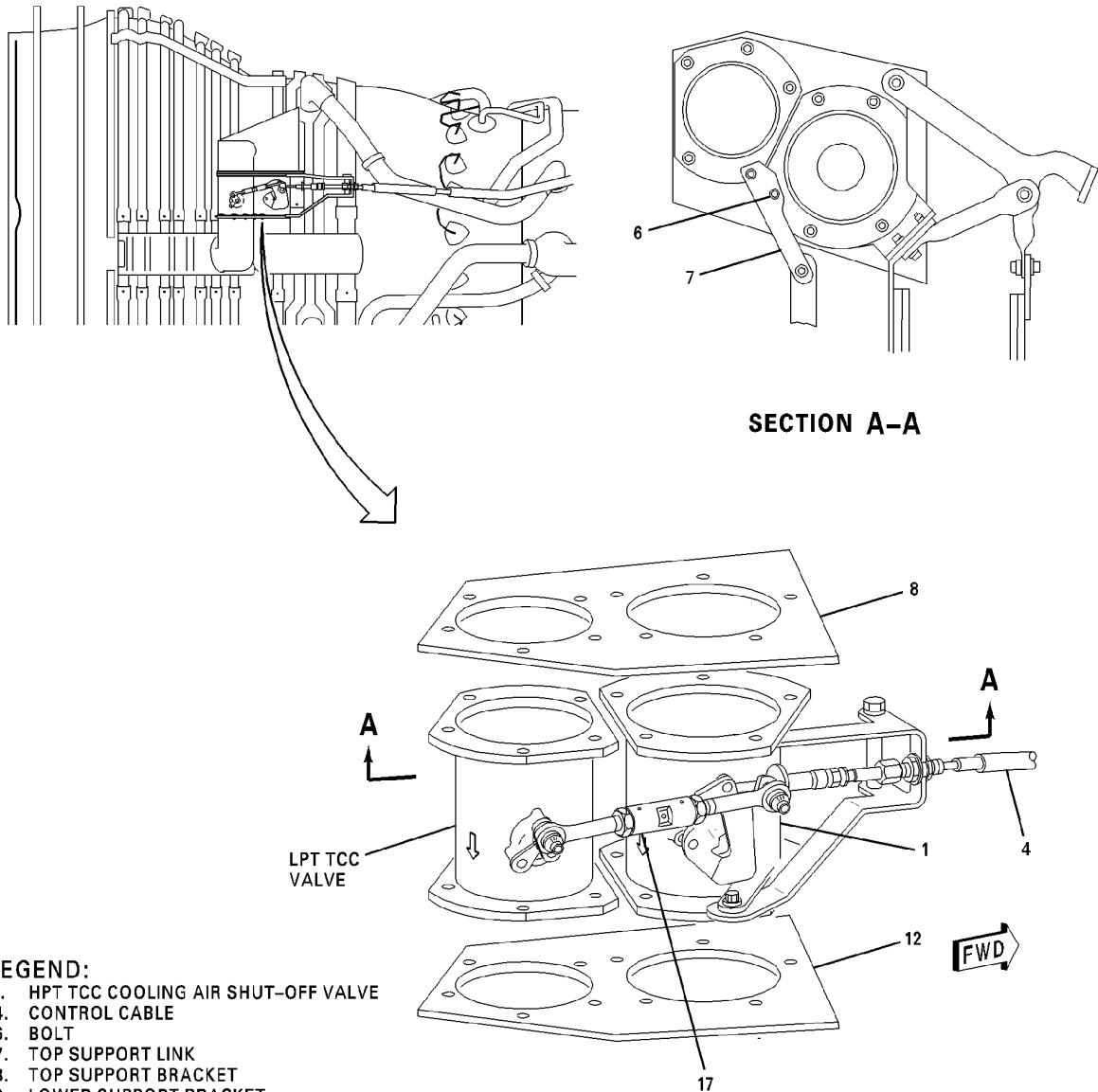
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LEGEND:

1. HPT TCC COOLING AIR SHUT-OFF VALVE
4. CONTROL CABLE
6. BOLT
7. TOP SUPPORT LINK
8. TOP SUPPORT BRACKET
12. LOWER SUPPORT BRACKET
17. TURNBUCKLE ROD

CAG(IGDS) L-A0162

DB2-75-0141

HPT/LPT Case Cooling Air Shutoff Valves
Figure 402/75-23-04-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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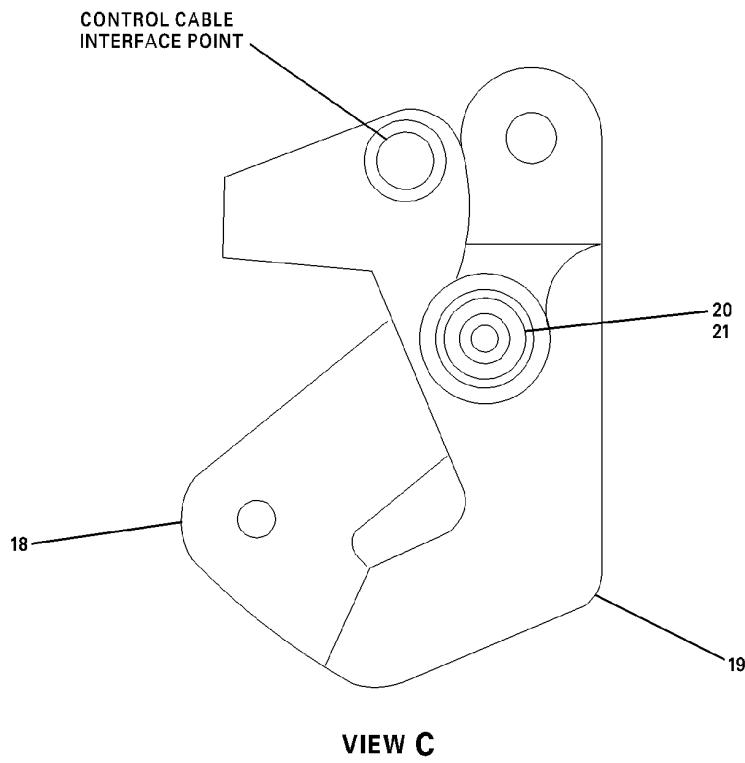
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LEGEND:

- 18. SHUTOFF VALVE LEVER ARM
- 19. SHUTOFF VALVE IDLER ARM
- 20. NUT
- 21. SPACER (BEFORE SB PW4ENG 75-74)

BEFORE SB PW4ENG 75-136

CAG(IGDS) L-A0741 1290

DB2-75-0318

HPT (TCC) Air Shutoff Valve Idler
Figure 403/75-23-04-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

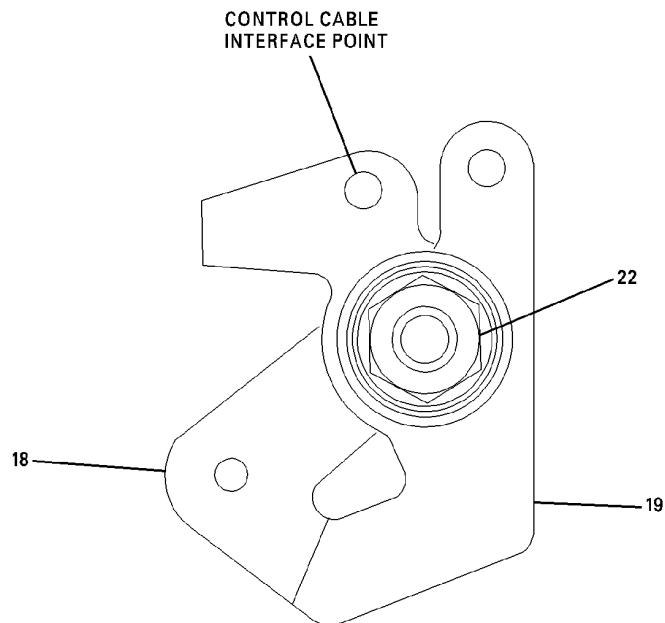
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VIEW C

LEGEND:

- 18. SHUTOFF VALVE LEVER ARM
- 19. SHUTOFF VALVE IDLER ARM
- 22. BEARING SLEEVE ASSEMBLY

AFTER SB PW4ENG 75-136

CAG(IGDS) L-B7115 (1298)

DB2-75-0319

HPT (TCC) Air Shutoff Valve Idler Arm
Figure 404/75-23-04-990-871

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

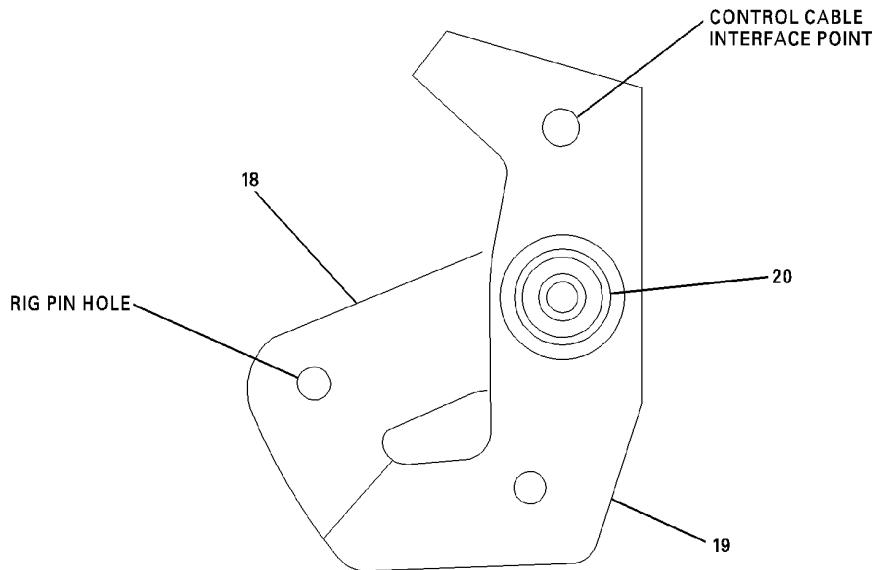
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VIEW C

LEGEND:

- 18. SHUTOFF VALVE LEVER ARM
- 19. SHUTOFF VALVE IDLER ARM
- 20. NUT

PHASE 3 ENGINES BEFORE SB PW4ENG 75-136

CAG(IGDS) L-A9849 (0000)

DB2-75-0320

HPT (TCC) Air Shutoff Valve Idler Arm
Figure 405/75-23-04-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

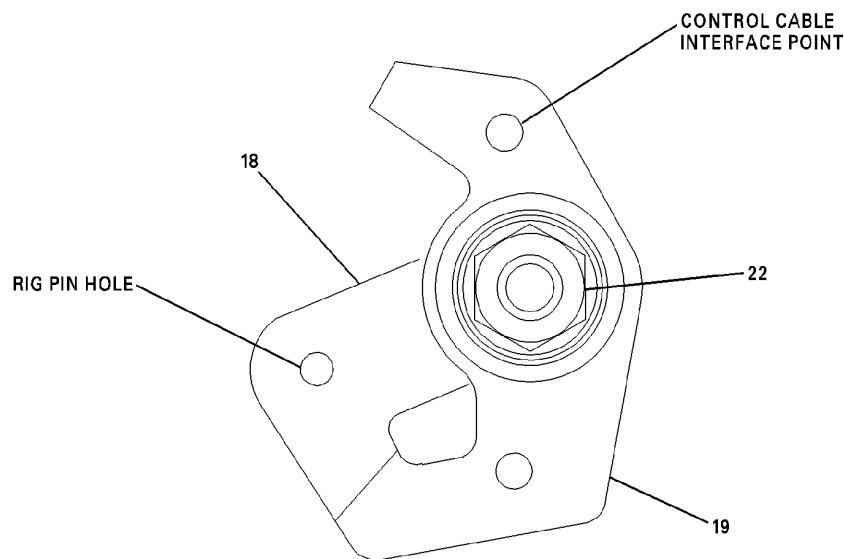
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VIEW C

LEGEND:

- 18. SHUTOFF VALVE LEVER ARM
- 19. SHUTOFF VALVE IDLER ARM
- 22. BEARING SLEEVE ASSEMBLY

PHASE 3 ENGINES AFTER SB PW4ENG 75-136

CAG(IGDS) L-B7116 (1298) PWV

DB2-75-0321

HPT (TCC) Air Shutoff Valve Idler Arm
Figure 406/75-23-04-990-873

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-23-04-400-868

3. INSTALLATION OF THE HIGH PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–100 in-lb (0–11.3 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-00-700-868	ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG) (P/B 501)
75-23-10-400-868	INSTALLATION OF THE LOW PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE (P/B 401)

D. Job Set-up - High Pressure Turbine Case Cooling Air Shutoff Valve Installation

SUBTASK 75-23-04-865-268



MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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AIRCRAFT MAINTENANCE MANUAL

(WARNING PRECEDES)



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that this circuit breaker is open and has safety tag:

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

SUBTASK 75-23-04-010-270

- (2) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - High-Pressure Turbine-Case Cooling Air Shutoff Valve Installation

SUBTASK 75-23-04-420-267

- (1) Install the high-pressure turbine-case cooling (HPTCC) air shutoff valve (1) as follows: (Figure 401) (Figure 402)

- (a) Remove the protective caps and plugs from the shutoff valve (1).
- (b) Move the shutoff valve (1) into position between the top support bracket (8) and the bottom support bracket (12).

NOTE: Make sure that the flow arrows on the HPTCC air shutoff valve are pointed down.

- (c) Align the shutoff valve (1) with the top and the bottom support brackets (8 and 12).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (d) Lubricate the threads of bolts (6 and 9) with the engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (e) Attach the top flange of the shutoff valve (1) and the top support-link (7) to the support-bracket (8) with the bolts (6 and 9).
- (f) Make sure that the two longer bolts (6) are used to attach the top and bottom support links (7 and 11) to the support brackets (8 and 12).
- (g) Torque the bolts (6 and 9) to 85–95 in-lb (10.0–11.0 N·m).
- (h) Lubricate the threads of bolts (6 and 9) with the engine oil (P03-001).
- (i) Attach the bottom flange of the HPTCC shutoff-valve (1) and bottom support link (11) to the bottom support bracket (12) with the bolts (6 and 9) and nuts (10).
- (j) Torque the bolts (6 and 9) to 85–95 in-lb (10.0–11.0 N·m).

NOTE: The step that follows is for engines before SB PW4ENG 75-136.

- (k) Install the shutoff valve idler arm (19) on the shutoff valve lever arm (18) shaft and, if equipped, with a spacer (Pre SB PW4ENG 75-74). (Figure 403) (Figure 405)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (l) Lubricate the threads of the nut (20) with engine oil (P03-001).
- (m) Install and torque the nut (20) to 36-40 in-lb (4.1-4.5 N·m).
NOTE: The steps that follow are for engines after SB PW4ENG 75-136.
- (n) Install the shutoff valve idler arm (19) on the shutoff valve lever arm (18). (Figure 404) (Figure 406)
- (o) Lubricated the threads of bearing sleeve assembly (22) with engine oil (P03-001).
- (p) Install and torque the bearing sleeve assembly (22) to 36–40 in-lb (4.1-4.5 N·m).

SUBTASK 75-23-04-410-270

- (2) Install the low pressure turbine case cooling air shutoff valve. (INSTALLATION OF THE LOW PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE, TASK 75-23-10-400-868)

NOTE: Do not install the high pressure turbine case cooling air shutoff valve turnbuckle rod and control cable. The linkage is installed as a step of the adjustment/test.

SUBTASK 75-23-04-820-275

- (3) Do the adjustment of the turbine case cooling control system. (ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG), TASK 75-23-00-700-868)

F. Job Close-up - High Pressure Turbine Case Cooling Air Shutoff Valve Installation

SUBTASK 75-23-04-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-04-410-269

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-23-04-865-269

- (3) Remove the safety tag and close this circuit breaker:

OVERHEAD, BATTERY DIRECT BUS

Row	Col	Number	Name
B	9	B1-467	ENG IGNITION OVERRIDE

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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AIR VALVE, ELEVENTH STAGE COOLING - MAINTENANCE PRACTICES

1. General

- A. This procedure has the deactivation and activation instructions for the eleventh stage cooling air valve.
- B. This procedure is for engines without CF6-80C2 S/B 75-067 and without CF6-80C2 S/B 75-135. S/B 75-067 removes and caps the right and left side signal air tubes, also removes the internal components from the eleventh stage cooling air valves (ESCV), and remove the ESCV electrical connectors from the W7 and W8 electrical cables. This S/B 75-135 replaces the ESCV with an air duct.
- C. The eleventh stage cooling air valves (ESCV) are installed at the 3 o'clock and 9 o'clock positions on the core engine.
- D. Unless different instructions are given, these procedures are the same for the three G.E. CF6-80C2D1F engines.

TASK 75-23-05-040-801

2. DEACTIVATION OF THE ELEVENTH STAGE COOLING AIR VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 201

REFERENCE	DESIGNATION
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
AN-806-6	Plug
Not specified	Torque wrench, 0-600 in-lb (0-67.7 N·m)

B. Consumable Materials

- (1) Consumable Materials

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

NOTE: Equivalent replacements are permitted for the items that follow.

Table 202

REFERENCE	DESIGNATION
C02-058	Antiseize compound

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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C. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - Eleventh Stage Cooling Air Valve Deactivation

SUBTASK 75-23-05-010-012

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

E. Procedure - Eleventh Stage Cooling Air Valve Deactivation

SUBTASK 75-23-05-040-001

- (1) Deactivate the eleventh stage cooling air valve (1) as follows: (Figure 201)

NOTE: The procedure to deactivate the left and right eleventh stage cooling air valves are the same for each valve. You must do this procedure for each valve.

- (a) Disconnect the eleventh stage signal tube (2) from the union (3) on the valve (1).
- (b) Remove the union (3) from the eleventh stage cooling air valve (1) and discard the seal (4).

NOTE: Keep the union for the activation of the eleventh stage cooling air valve.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1023, GREASE/THREAD COMPOUND LUBRICATING (DPM 376)

HAZMAT 1000, REFER TO MSDS

- (c) Apply a thin layer of antiseize compound (C02-058) to the threads on the plug (5).
- (d) Install the plug (5) in the eleventh stage signal tube (2).
- (e) Torque the tube nut (6) to 270-300 in-lb (30.5-33.8 N·m).
- (f) Make sure the eleventh stage signal tubes (2) are not free to move.
- (g) Apply a thin layer of antiseize compound (C02-058) to the threads of the plug (7) and on the seal (4).
- (h) Install the seal (4) on the plug (7).
- (i) Install the plug (7) into the port of the eleventh stage air valve (1).
- (j) Torque the plug (7) to 180-200 in-lb (20.4-22.6 N·m).

F. Job Close-up - Eleventh Stage Cooling Air Valve Deactivation

SUBTASK 75-23-05-942-002

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-05-410-015

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

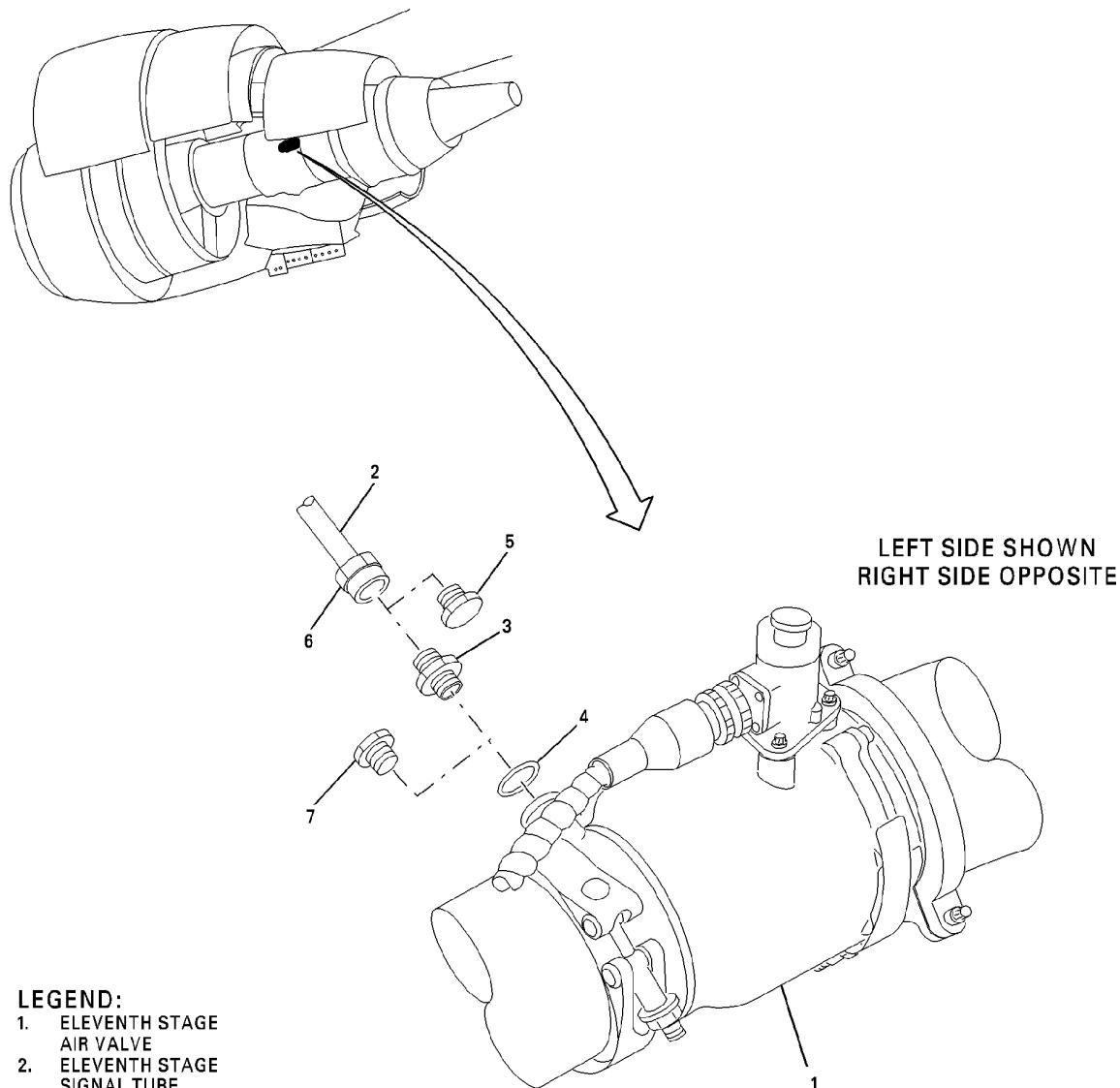
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LEGEND:

1. ELEVENTH STAGE AIR VALVE
2. ELEVENTH STAGE SIGNAL TUBE
3. UNION
4. SEAL
5. PLUG
6. TUBE NUT
7. PLUG

CAG(IGDS)

DB2-75-0295A

Eleventh Stage Cooling Air Valve - Deactivation/Activation
Figure 201/75-23-05-990-806

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-23-05-440-801

3. ACTIVATION OF THE ELEVENTH STAGE COOLING AIR VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 203

REFERENCE	DESIGNATION
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-600 in-lb (0-67.7 N·m)

B. Consumable Materials

- (1) Consumable Materials

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

NOTE: Equivalent replacements are permitted for the items that follow.

Table 204

REFERENCE	DESIGNATION
C02-058	Antiseize compound

C. Expendable Parts

- (1) Expendable Parts

Table 205

REFERENCE/ITEM	DESIGNATION	IPC
4	Seal	IPC 75-23-15-01-415

D. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-23-15-01-415	Illustrated Parts Catalog

E. Job Set-up - Eleventh Stage Cooling Air Valve Activation

SUBTASK 75-23-05-010-013

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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F. Procedure - Eleventh Stage Cooling Air Valve Activation

SUBTASK 75-23-05-440-001

- (1) Activate the eleventh stage air valve (1) as follows: (Figure 201)

NOTE: The procedure to activate the left and right eleventh stage cooling air valves are the same for each valve. You must do this procedure for each valve.

- (a) Remove the plug (5) from the eleventh stage signal tube (2).
- (b) Remove the plugs (7) from the eleventh stage air valve (1).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1383, COMPOUND/ANTISEIZE (GRAPHITE PRODUCTS CORP.)

HAZMAT 1000, REFER TO MSDS

- (c) Apply a thin layer of antiseize compound (C02-058) to the seal (4) and install the seal on the union (3). (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
- (d) Install the union (3) in the union port of the eleventh stage cooling air valve (1). Torque the union to 180-200 in-lb (20.3–22.6 N·m).
- (e) Connect the eleventh stage signal tube (2) to the union (3). Torque the tube nut (6) to 270-300 in-lb (30.5–33.9 N·m).

G. Job Close-up - Eleventh Stage Cooling Air Valve Activation

SUBTASK 75-23-05-942-003

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-05-410-016

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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VALVE, ELEVENTH STAGE COOLING AIR - REMOVAL/INSTALLATION

1. General

- A. On engines with CF6-80C2 S/B 75-067, the eleventh stage cooling air valves (ESCV) are installed on the engine, but are disconnected. This will prevent a failure from the ESCV's.
- B. On engines with CF6-80C2 S/B 75-135 the ESCV's are removed from the engines and are replaced with an air duct.
- C. The eleventh stage cooling air valves (ESCV) are installed at the 3 o'clock and 9 o'clock positions on the core engine. This procedure has the removal and installation instructions for the ESCV before and after CF6-80C2 S/B 75-067 and CF6-80C2 S/B 75-070.
- D. On engine with CF6-80C2 S/B 75-156 the ESCVs and air ducts are replaced with a continuous flow cooling system.
- E. Unless different instructions are given, these procedures are the same for the three G.E. CF6-80C2D1F engines.

TASK 75-23-05-000-801

2. REMOVAL OF THE ELEVENTH STAGE COOLING AIR VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-17-000-801	REMOVAL OF THE ELEVENTH STAGE COOLING AIR VALVE POSITION INDICATING SWITCH (P/B 401)

C. Job Set-up - Eleventh Stage Cooling Air Valve Removal

SUBTASK 75-23-05-010-003

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

SUBTASK 75-23-05-030-005

- (2) Remove the eleventh stage cooling air valve position indicating switch. (REMOVAL OF THE ELEVENTH STAGE COOLING AIR VALVE POSITION INDICATING SWITCH, TASK 75-23-17-000-801)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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D. Procedure - Eleventh Stage Cooling Air Valve Removal

SUBTASK 75-23-05-020-001

- (1) Remove the eleventh stage cooling air valve (ESCV) (1) as follows: (Figure 401)

NOTE: Figure 75-23-05-990-801 shows the ESCV on the left side of the engine. The ESCV installation for the right side of the engine is the same except that the ESCV is turned clockwise. The position indicating switch connection for the right side ESCV is located at the lower right side of the ESCV.

NOTE: On the ESCV, after CF6-80C2 S/B 75-067, the signal tube is disconnected from the valve and the signal tube and the ESCV are sealed with plugs (17) and (18). This deactivates the valve.

NOTE: The steps that follow are for engines before CF6-80C2 S/B 75-067.

- (a) Disconnect the signal tube (14) from the union fitting (15) at the forward end of the ESCV (1).
- (b) Install a protective cap on the signal air tube (14).
- (c) Remove the union fitting (15) from the ESCV (1) and discard the seal (16).
NOTE: The steps that follow are for engines after CF6-80C2 S/B 75-067.
- (d) Remove the port plug (17) and seal (16) from the ESCV (1). Discard the seal.
NOTE: The steps that follow are for all engines.
- (e) Remove the two nuts (8) and bolts (7) from the ESCV (1) forward clamp halves (5).
- (f) Remove the two clamp halves (5) and the strap bracket (10) from the ESCV (1) and the cooling air duct (3).
- (g) Remove the two nuts (8) and bolts (7) from the ESCV (1) aft clamp halves (5) and (6).
- (h) Remove the two nuts (12, 8) and bolts (11) from the two support links (13) at the inner clamp-half (6). Move the support links (13) away from the inner clamp-half (6), and remove the clamp halves (5) and (6).
- (i) Remove the ESCV (1) from the engine.
NOTE: The step that follows is for engines after CF6-80C2 S/B 75-070.
- (j) Discard the two ring seals (4) and (9).
NOTE: The steps that follow are for all engines after CF6-80C2 S/B/ 75-067.
- (k) Remove the plug (18) from the eleventh stage cooling air valve.
- (l) Remove the seal (16) from the plug (18).
- (m) Install protective caps on the HPT manifold (2), and the cooling air duct (3).
NOTE: The steps that follow are for all engines.
- (n) Install protective caps on all openings of the ESCV (1).

SUBTASK 75-23-05-410-013

- (2) If the ESCV is not installed immediately, or weather conditions make it necessary, close the access doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

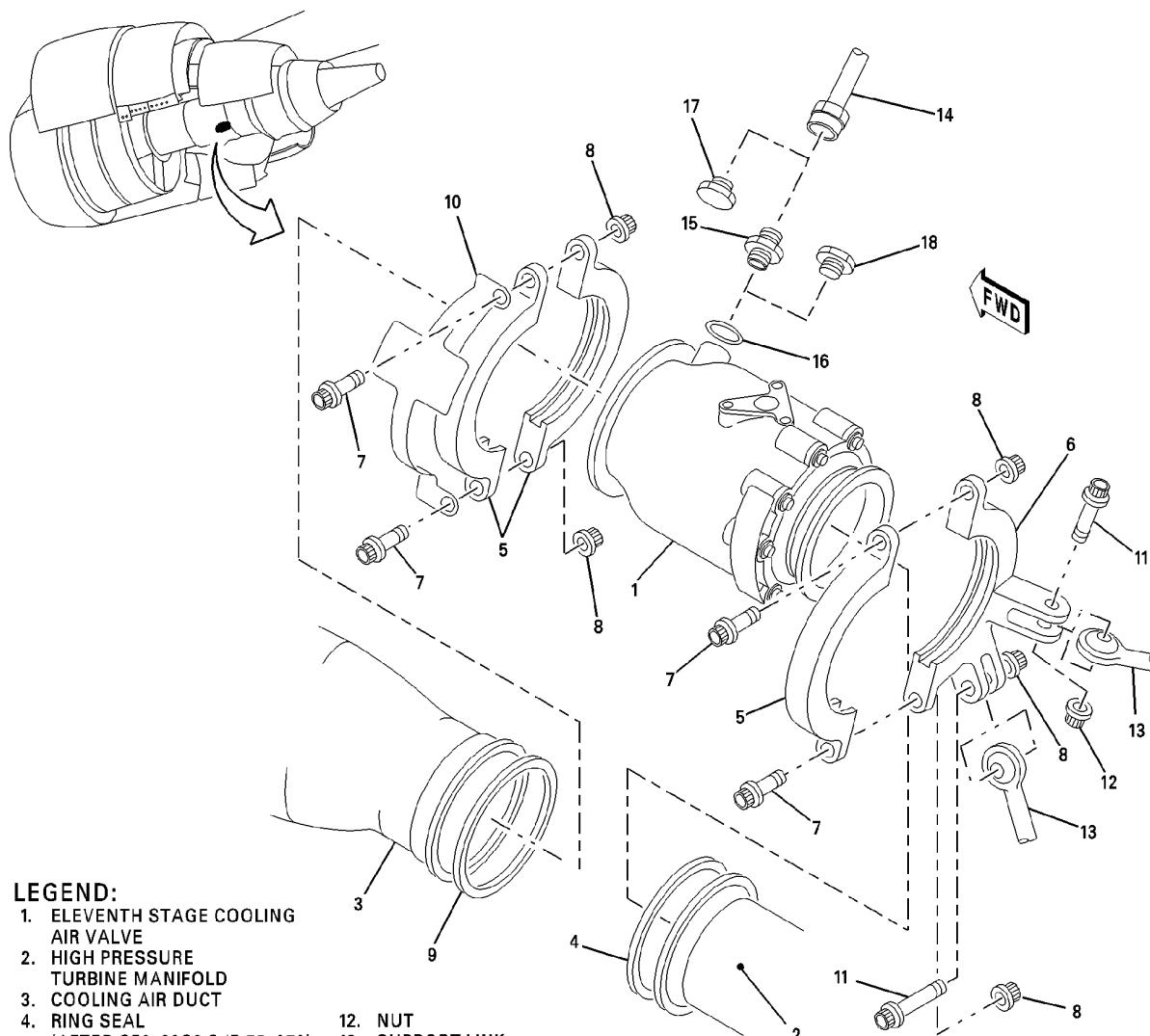
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LEGEND:

- | | |
|---|---|
| 1. ELEVENTH STAGE COOLING AIR VALVE | 12. NUT |
| 2. HIGH PRESSURE TURBINE MANIFOLD | 13. SUPPORT LINK |
| 3. COOLING AIR DUCT | 14. SIGNAL TUBE
(BEFORE CF6-80C2 S/B 75-067) |
| 4. RING SEAL
(AFTER CF6-80C2 S/B 75-070) | 15. UNION FITTING
(BEFORE CF6-80C2 S/B 75-067) |
| 5. CLAMP HALF | 16. SEAL |
| 6. CLAMP HALF WITH CLEVIS | 17. PLUG
(AFTER CF6-80C2 S/B 75-067) |
| 7. BOLT | 18. PLUG
(AFTER CF6-80C2 S/B 75-067) |
| 8. NUT | |
| 9. SEAL RING
(AFTER CF6-80C2 S/B 75-070) | |
| 10. STRAP BRACKET | |
| 11. BOLT | |

CAG(IGDS)

DB2-75-0010J

Eleventh Stage Cooling Air Valve - Removal/Installation
Figure 401/75-23-05-990-801

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-23-05-400-801

3. INSTALLATION OF THE ELEVENTH STAGE COOLING AIR VALVE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0-350 in-lb (0-39.5 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

NOTE: Equivalent replacements are permitted for the items that follow.

Table 403

REFERENCE	DESIGNATION
C02-058	Anti-seize Compound

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
4	Seal, ring P/N: J1128P10 (after CF6-80C2 S/B 75-070)	IPC 75-23-15-01-052
9	Seal, ring P/N: J1128P10 (after CF6-80C2 S/B 75-070)	IPC 75-23-15-01-052
16	Seal	IPC 75-23-15-01-395

D. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)
71-00-00-700-809	ADJUSTMENT AND TEST PROCEDURES (P/B 501)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-17-400-801	INSTALLATION OF THE ELEVENTH STAGE COOLING AIR VALVE POSITION INDICATING SWITCH (P/B 401)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-23-05

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(Continued)

Reference	Title
IPC 75-23-15	Illustrated Parts Catalog
IPC 75-23-15-01-052	Illustrated Parts Catalog
IPC 75-23-15-01-395	Illustrated Parts Catalog

E. Job Set-up - Eleventh Stage Cooling Air Valve Installation

SUBTASK 75-23-05-010-007

- (1) If necessary, open the engine access doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

F. Procedure - Eleventh Stage Cooling Air Valve Installation

SUBTASK 75-23-05-420-001

- (1) Install the eleventh stage cooling air valve (ESCV) (1) as follows: (IPC 75-23-15) (Figure 401)

NOTE: Make sure that you install an ESCV that has the same part number as the ESCV you removed.

- (a) Remove the protective caps from the ESCV (1).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1383, COMPOUND/ANTISEIZE (GRAPHITE PRODUCTS CORP.)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the seal (16) with anti-seize compound (C02-058). (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
NOTE: The information that follows is for engines before CF6-80C2 S/B 75-067.
 - (c) Put the seal (16) on the union fitting (15). Install the union fitting (15) on the ESCV (1). Torque the union fitting to 180 in-lb (20.3 N·m)–200 in-lb (22.6 N·m).
NOTE: The information that follows is for engines after CF6-80C2 S/B 75-067.
 - (d) Apply a thin layer of antiseize compound (C02-058) to the threads on the plug (18) and on the seal (16).
 - (e) Install the seal (16) on the plug (18).
 - (f) Install the plug (18) into the port of the eleven stage air valve (1). Torque the plug (18) to 180 in-lb (20.3 N·m)–200 in-lb (22.6 N·m).
 - (g) If not installed, install the plug (17) into the signal tube (14). Torque the plug (17) to 270 in-lb (30.5 N·m)–300 in-lb (33.9 N·m).
NOTE: The step that follows is for all engines.
 - (h) Remove the protective caps from the HPT manifold (2) and the air duct (3).
 - (i) Align the ESCV (1) between the HPT manifold (2) and air duct (3).
NOTE: The step that follows is for engines after CF6-80C2 S/B 75-070.
 - (j) Align the ring seal (9) between the forward flange of the ESCV (1) and the duct (3).
NOTE: The step that follows is for all engines.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- (k) Install the two ESCV (1) forward clamp halves (5) and the strap bracket (10) with the two bolts (7) and nuts (8). Do not tighten the bolts at this time.
NOTE: The strap bracket is installed over the outboard clamp half.
NOTE: The step that follows is for engines after CF6-80C2 S/B 75-070.
- (l) Align the ring seal (4) between the aft flange of the ESCV (1) and the HPT manifold (2).
NOTE: The steps that follow are for all engines.
- (m) Install the clamp half (6) on the aft inboard side of the ESCV (1). Install the clamp half (5) on the outboard side of the ESCV. Install the two bolts (7) and nuts (8). Do not torque the bolts at this time.
NOTE: The step that follows is for engines before CF6-80C2 S/B 75-067.
- (n) Connect the signal tube (14) to the union fitting (15). Do not torque at this time.
NOTE: The steps that follow are for all engines.
- (o) Attach the two support links (13) with the two bolts (11), and nuts (12, 8). Torque the bolts to 55 in-lb (6.2 N·m)-70 in-lb (7.9 N·m).
- (p) Torque the bolts (7) on the forward clamp halves (5) and the bolts (7) on the aft clamp halves (5 and 6) to 55 in-lb (6.2 N·m)-70 in-lb (7.9 N·m).
NOTE: The step that follows is for engines before CF6-80C2 S/B 75-067.
- (q) Hold the union fitting (15) with an open end wrench and torque the signal tube (14) nut to 270 in-lb (30.5 N·m)-300 in-lb (33.9 N·m).

SUBTASK 75-23-05-410-014

- (2) Install the eleventh stage cooling air valve position indicating switch. (INSTALLATION OF THE ELEVENTH STAGE COOLING AIR VALVE POSITION INDICATING SWITCH, TASK 75-23-17-400-801)

G. Job Close-up - Eleventh Stage Cooling Air Valve Installation

SUBTASK 75-23-05-942-001

- (1) Remove all the tools and equipment from the work area. Make sure that the area is clean.

SUBTASK 75-23-05-410-001

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

SUBTASK 75-23-05-720-002

- (3) Do the applicable test(s) shown in the adjustment and test procedures. (ADJUSTMENT AND TEST PROCEDURES, TASK 71-00-00-700-809)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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VALVE, ELEVENTH STAGE COOLING - ADJUSTMENT/TEST

1. General

- A. This procedure has the functional test instructions for the eleventh stage cooling valve (ESCV) actuation during engine operation. Test results are shown on the centralized fault display system (CFDS).
- B. This procedure can be used after replacement of the eleventh stage cooling valve, solenoid, switch or troubleshooting the ESCV position faults.
- C. Unless different instructions are given, these procedures are the same for the three G.E. CF6-80C2D1F engines.

TASK 75-23-05-720-801

2. FUNCTIONAL TEST OF THE ELEVENTH STAGE COOLING VALVE ACTUATION

A. References

Reference	Title
24-40-00-861-801	ENERGIZE AIRCRAFT ELECTRICAL POWER SYSTEM (P/B 201)
24-40-00-862-801	REMOVE ELECTRICAL POWER (P/B 201)
71-00-00-700-803	MINIMUM AND APPROACH IDLE POWER (ADJ/TEST 02) (P/B 501)

B. Job Set-up - Eleventh Stage Cooling Valve Functional Test

SUBTASK 75-23-05-861-001

- (1) If necessary, energize the aircraft electrical power. (ENERGIZE AIRCRAFT ELECTRICAL POWER SYSTEM, TASK 24-40-00-861-801)

C. Procedure - Eleventh Stage Cooling Valve Functional Test

SUBTASK 75-23-05-720-001

- (1) Do a functional test of the eleventh stage cooling valve as follows:
 - (a) Start the applicable engine and stabilize the engine at approach idle for a minimum of 2 minutes. (MINIMUM AND APPROACH IDLE POWER (ADJ/TEST 02), TASK 71-00-00-700-803)
 - (b) Push the applicable ENG SELECT/ALTN switch (1) to on then to the off position. (Figure 501)
NOTE: Do not put the ENG SELECT/ALTN switch to the on position for more than 2 seconds. The functional test is complete in thirty seconds. There is no indication when the functional test is in progress or when the test is complete.
 - (c) Stop for a minimum of thirty seconds and do the preceding step again.
NOTE: When the applicable ENG SELECT/ALTN switch is pushed the second time, the ESCV solenoid is functioned with both A and B channels.
 - (d) After the applicable ENG SELECT/ALTN switch (1) is pushed to the off position, stop for thirty seconds.
 - (e) After the thirty second limit, stop the engine. (MINIMUM AND APPROACH IDLE POWER (ADJ/TEST 02), TASK 71-00-00-700-803)

SUBTASK 75-23-05-865-001

- (2) Make sure the circuit breakers that follow are closed:

EFFECTIVITY

FX 572-576, 582-599, 601-610, 612-619, 625

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- (a) Close only the circuit breakers for the applicable engine.

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	19	B1-47	FADEC GND TEST PWR ENG 1 CHAN A
H	20	B1-48	FADEC GND TEST PWR ENG 1 CHAN B

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	19	B1-59	FADEC GND TEST PWR ENG 2 CHAN A
J	20	B1-60	FADEC GND TEST PWR ENG 2 CHAN B

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	19	B1-408	FADEC GND TEST PWR ENG 3 CHAN A
K	20	B1-409	FADEC GND TEST PWR ENG 3 CHAN B

SUBTASK 75-23-05-740-001

- (3) Do a CFDS fault review as follows:

Table 501

STEP	OPERATION	VISUAL INSPECTION
On the maintenance panel (2):		
1	Put the applicable FADEC GND TEST PWR switch ENG 1, ENG 2, or ENG 3 (3) to the ON position.	Make sure the applicable ON light comes on.
On the multifunction control display unit (MCDU) (4):		
2	If necessary, push the MENU key (5).	The MENU display comes into view.
3	Push the line select key (LSK) (6) adjacent to CFDS.	The CFDS INITIAL MENU comes into view.
4	Push the LSK (6) adjacent to LRU MAINTENANCE.	The CFDS LRU MAINTENANCE menu comes into view. If necessary, page forward until the applicable ECU-XA or ECU-XB comes into view.
NOTE: To page forward and review the next page of the CFDS LRU MAINTENANCE menu, the "PAGE" key on the MCDU must be pushed. The X in ECU-XA and ECU-XB is engine 1, 2 or 3.		
5	Push the LSK (6) adjacent to applicable ECU-XA or ECU-XB.	The applicable ECU-XA or ECU-XB MAINTENANCE menu comes into view.
6	Push the LSK (6) adjacent to MAINT/FAULT REVIEW.	The FAULT REVIEW screens come into view.
NOTE: The ESCV system is serviceable when no faults are shown or when all ESCV faults are corrected.		
7	Push the LSK (6) adjacent to RETURN.	The applicable ECU-XA or ECU-XB MAINTENANCE menu comes into view.
8	Push the LSK (6) adjacent to RETURN.	The CFDS LRU MAINTENANCE menu comes into view.
9	Push the LSK (6) adjacent to RETURN.	The CFDS INITIAL menu comes into view.
10	Push the MENU key (5).	The MENU display comes into view.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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Table 501 (Continued)

STEP	OPERATION	VISUAL INSPECTION
On the maintenance panel (2):		
11	Put the applicable FADEC GND TEST PWR switch ENG 1, ENG 2, or ENG 3 (3) to the OFF position.	Make sure the applicable OFF light goes off.

D. Job Close-up - Eleventh Stage Cooling Valve Functional Test

SUBTASK 75-23-05-862-002

- (1) If necessary, remove the aircraft electrical power. (REMOVE ELECTRICAL POWER, TASK 24-40-00-862-801)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

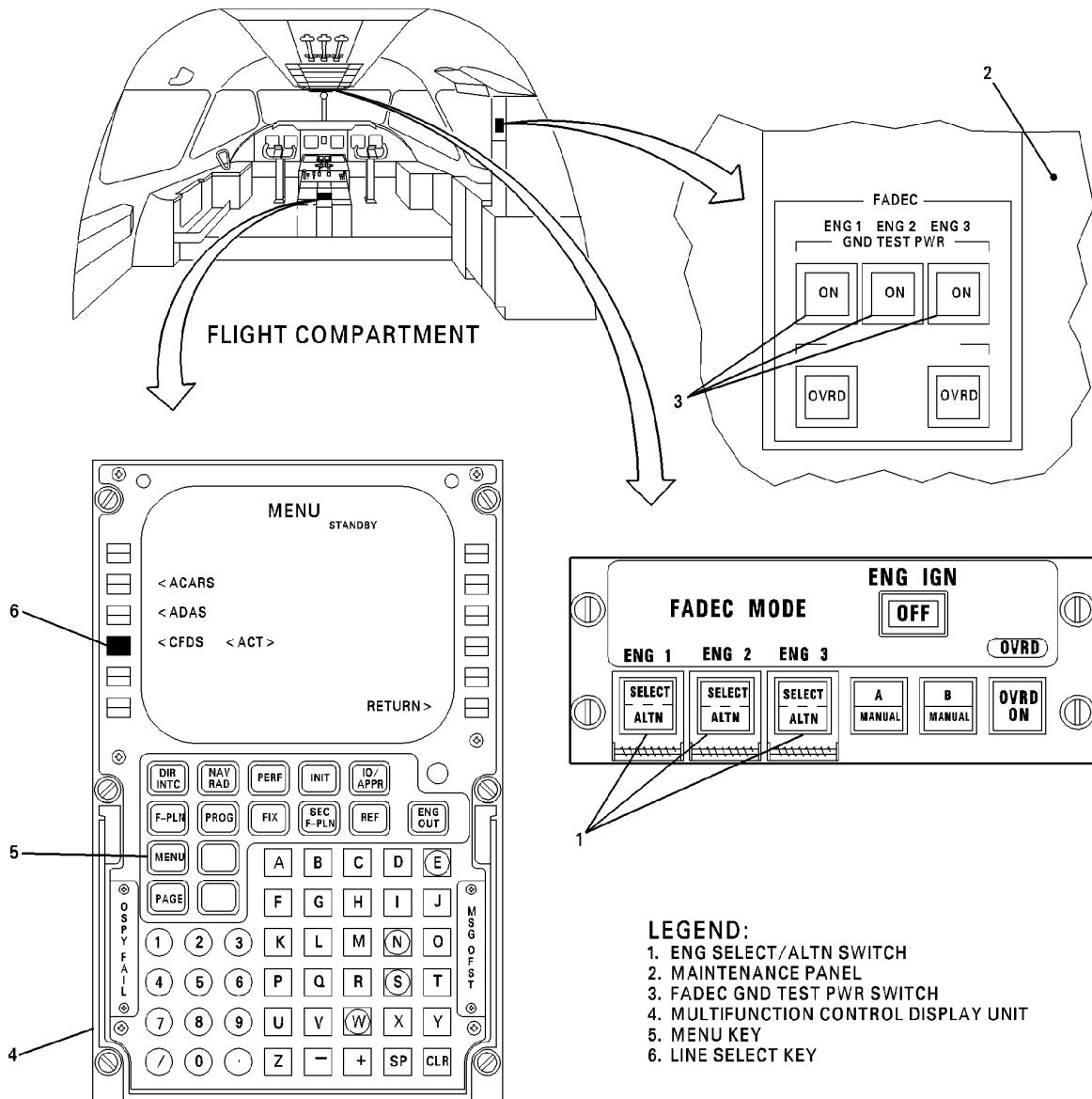
75-23-05

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CAG(IGDS)

DB2-75-0252A

Eleventh Stage Cooling Valve Functional Test
Figure 501/75-23-05-990-802

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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DUCTS, TURBINE VANE COOLING AIR - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the turbine vane cooling air ducts.
- B. Access to the turbine vane cooling air ducts is through the thrust reverser doors.
- C. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 and PW4460/4462 -3 (PHASE-3) engines.

TASK 75-23-08-000-868

2. REMOVAL OF THE PW4460/4462 AND PW4460/4462 -3 TURBINE VANE COOLING AIR DUCTS

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Jackscrew, (0.190-32 thread)
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-15-000-868	REMOVAL OF THE TURBINE CASE COOLING DUCT ASSEMBLY (P/B 401)

C. Job Set-up - PW4460/4462 and PW4460/4462 -3 Turbine Vane Cooling Air Ducts Removal

SUBTASK 75-23-08-010-268

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-23-08-010-269

- (2) If necessary, remove the turbine case cooling (TCC) (1B) duct assembly. (Figure 401)
(REMOVAL OF THE TURBINE CASE COOLING DUCT ASSEMBLY, TASK 75-23-15-000-868)

D. Procedure - PW4460/4462 and PW4460/4462 -3 Turbine Vane Cooling Air Ducts Removal

SUBTASK 75-23-08-020-267

- (1) Remove the upper right turbine vane cooling air duct (1) from the high pressure turbine (HPT), and compressor (HPC) case as follows: (Figure 401) (Figure 402)

NOTE: The steps that follow are for engines before PW4460/4462 -3 (PHASE-3) configuration.

- (a) Remove the six bolts (3) that attach the rear flange of the turbine cooling air duct (1) to the boss on the HPT case.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (b) (Before SB PW4ENG 75-114): Remove the six non-silver plated bolts (2) that attach the front flange of the air duct (1) and the bracket (4) to the turbine vane cooling air valve on the HPC case.
- (c) (After SB PW4ENG 75-114): Remove the six silver plated bolts (2) that attach the front flange of the air duct (1) and the bracket (4) to the turbine vane cooling air valve on the HPC case.
- (d) Remove the two bolts (5) that attach the clamp (6) to the support (7) on the diffuser case. Remove the clamp (6).
- (e) Remove the upper right turbine vane cooling air duct (1) from the engine. Install the protective caps and plugs.
- (f) Remove and discard the gasket (8) from the boss on the HPC case.
- (g) (Before SB PW4ENG 72-315 but after SB PW4ENG 75-57): Remove and discard the gasket (9) from the boss on the HPT case.
- (h) (After SB PW4ENG 72-315): Remove and discard the metering orifice seal plate (10).

SUBTASK 75-23-08-020-271

NOTE: The steps that follow are for engines after PW4460/4462 -3 (PHASE-3) configuration.

- (2) Remove the upper right turbine vane cooling air duct (1) from the high pressure turbine (HPT), and compressor (HPC) case as follows: (Figure 403) (Figure 404)
 - (a) Remove the six bolts (3) from the aft mounting flange of the upper turbine cooling air duct (1) at the HPT case.
 - (b) Remove the six bolts (2) from the front flange and the upper TVBCAV on the HPC case.
 - (c) Remove the two bolts (5) that attach the clamp (6) to the support (7) on the diffuser case. Remove the clamp (6).
 - (d) Remove the upper right turbine vane cooling air duct (1) from the engine. Install the protective caps and plugs on the duct (1).
 - (e) Remove and discard the gasket (8A) from the front flange of the upper right TVB cooling air duct (1).
 - (f) Remove and discard the metering orifice seal plate (10) at the aft mounting flange of the duct (1).
 - (g) Install protective covers on the TVBCAV and the openings on the engine.

SUBTASK 75-23-08-020-268

NOTE: The step that follows is for all engines.

- (3) Remove the lower right turbine vane cooling air duct (11) from the HPT case and the turbine vane air valve as follows: (Figure 405)

NOTE: The step that follows is for engines before PW4460/4462 -3 (PHASE-3) configuration.

- (a) Remove the six bolts (12) that attach the lower right cooling air duct (11) rear flange and bracket (13) to the HPT case. (Figure 406)

NOTE: The step that follows is for engines after PW4460/4462 -3 (PHASE-3) configuration.

- (b) Remove the six bolts (12) that attach the lower right cooling air duct (11) rear flange to the HPT case. (Figure 406)

NOTE: The steps that follow are for all engines.

- (c) Remove the six bolts (14) that attach the lower right cooling air duct (11) forward flange to the turbine vane cooling air valve on the HPC case.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (d) Remove the two bolts (15), nuts (16) and the clamp (17) that attach the duct (11) to the flange M bracket.
- (e) Remove the lower right cooling air duct (11) from the engine.
- (f) Remove and discard the gaskets (18) and (19 or 19A).
- (g) Install protective covers on the removed duct and all the openings on the engine.

SUBTASK 75-23-08-020-269

- (4) Remove the upper left turbine vane cooling air duct (21) from the HPT case and the turbine vane air valve as follows: (Figure 407)
 - (a) Remove the six bolts (22) that attach the upper left cooling air duct (21) forward flange to the turbine vane cooling air valve on the HPC case.. (Figure 408)
 - (b) Remove the six bolts (23) that attach the upper left cooling air duct (21) rear flange to the HPT case.
 - (c) Remove the two bolts (24), nuts (25) and the clamp (26) that attach the duct (21) to the bracket (27) on the diffuser case.
 - (d) Remove the upper left cooling air duct (21) from the engine.
 - (e) Remove and discard the gaskets (28) and (29). Install the protective caps and plugs.

SUBTASK 75-23-08-020-270

- (5) Remove the lower left turbine vane cooling air duct (31) from the HPT and the HPC case as follows: (Figure 409)
 - (a) (Before SB PW4ENG 79-54): Remove the six bolts (34) that attach the front flange of the air duct (31) and the bracket (33). Loosen the clamp bolt (35) and slide the bracket clear. (Figure 410)
 - (b) (After SB PW4ENG 79-52): Remove the bolt (32) that attaches the No. 3 bearing pressure manifold to the bracket (33).

NOTE: The spray shield for the manifold can stay with the clamp.



MAKE SURE YOU REMOVE THE BORESCOPE PLUG FROM THE LOWER LEFT TURBINE VANE COOLING AIR DUCT BEFORE YOU REMOVE THE DUCT. IF THE PLUG IS NOT REMOVED FIRST, DAMAGE TO THE PLUG CAN OCCUR.

- (c) Remove the three bolts (36) that attach the borescope plug (37) to the rear elbow (38) and remove the borescope plug. Install the protective caps and plugs.
NOTE: If necessary use two jackscrews (.190-32 thread) to remove the borescope plug smoothly.
- (d) Remove the four bolts (39) that attach the air duct rear elbow (38) to the boss on the HPT case.
- (e) Remove the two bolts (40), nuts (41) and the clamp (42) that attach the duct (31) to the bracket (27) on the diffuser case. (Figure 411)
- (f) Remove the lower left cooling air duct (31) from the engine.
- (g) (After SB PW4ENG 72-315): Remove and discard the gasket (43) from the boss on the HPC case.

NOTE: The steps that follow are for engines before PW4460/4462 -3 (PHASE-3) configuration.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (h) (Before SB PW4ENG 72-315): Remove and discard the gasket (44) (installed after SB PW4ENG 75-57) from the boss on the HPT case. Install the protective caps and plugs. (Figure 410) (Figure 412)
- (i) (After SB PW4ENG 72-315): Remove and discard the metering orifice seal plate (45) from the boss on the HPT case. (Figure 410) (Figure 412)
NOTE: The step that follows is for engines after PW4460/4462 -3 (PHASE-3) configuration.
- (j) Remove and discard the metering orifice seal plate (45) from the boss on the HPT case.
NOTE: The steps that follow are for all engines.
- (k) Install the protective caps and plugs.

SUBTASK 75-23-08-410-267

- (6) If the turbine vane cooling air ducts (1, 11, 21 and 31) are not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

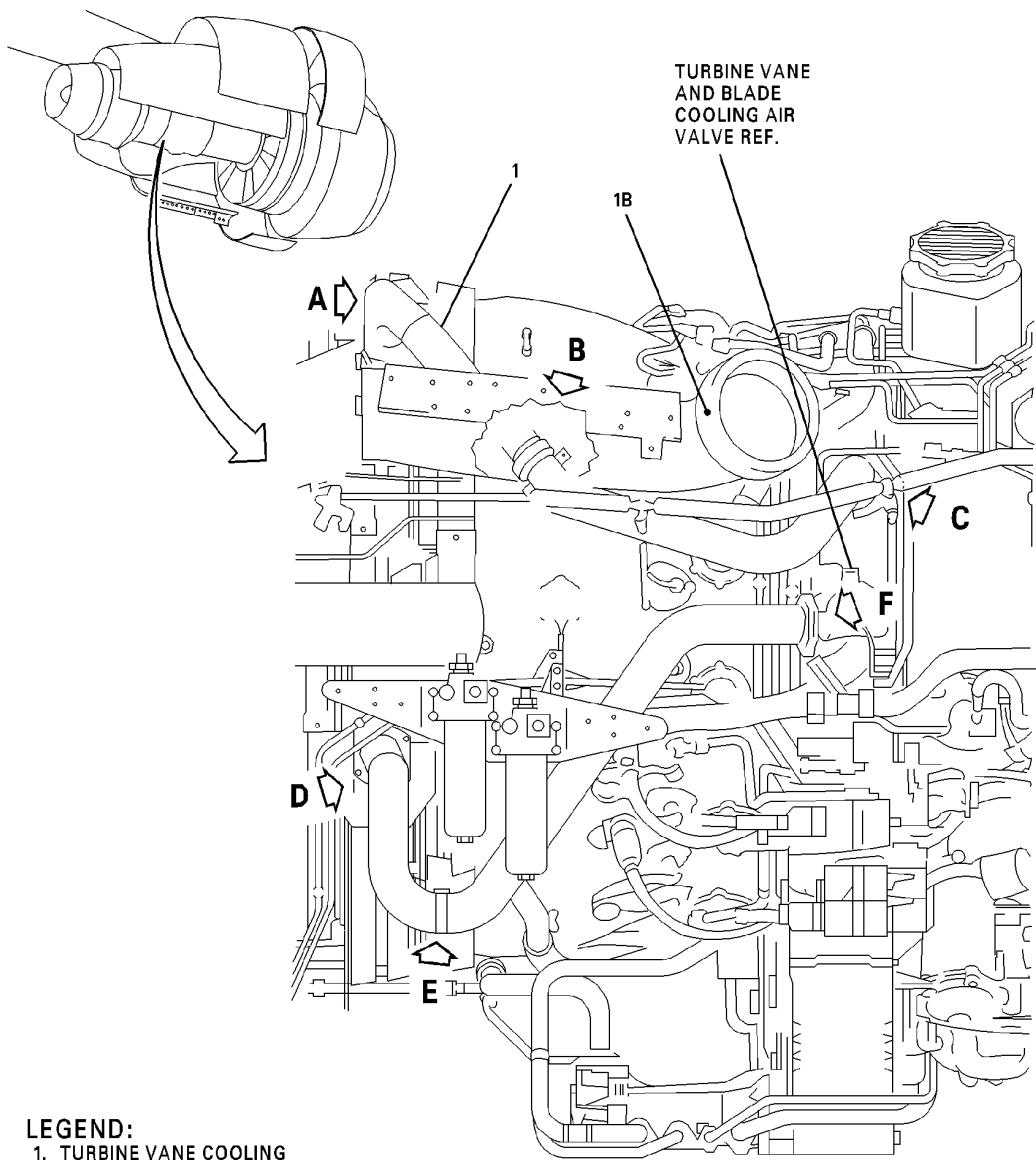
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LEGEND:

1. TURBINE VANE COOLING AIR DUCT (UPPER RIGHT)
- 1B. TURBINE CASE COOLING (TCC) DUCT

CAG(IGDS)

DB2-75-0103A

PW4460/4462 Turbine Vane Cooling Air Ducts - Right
Figure 401/75-23-08-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

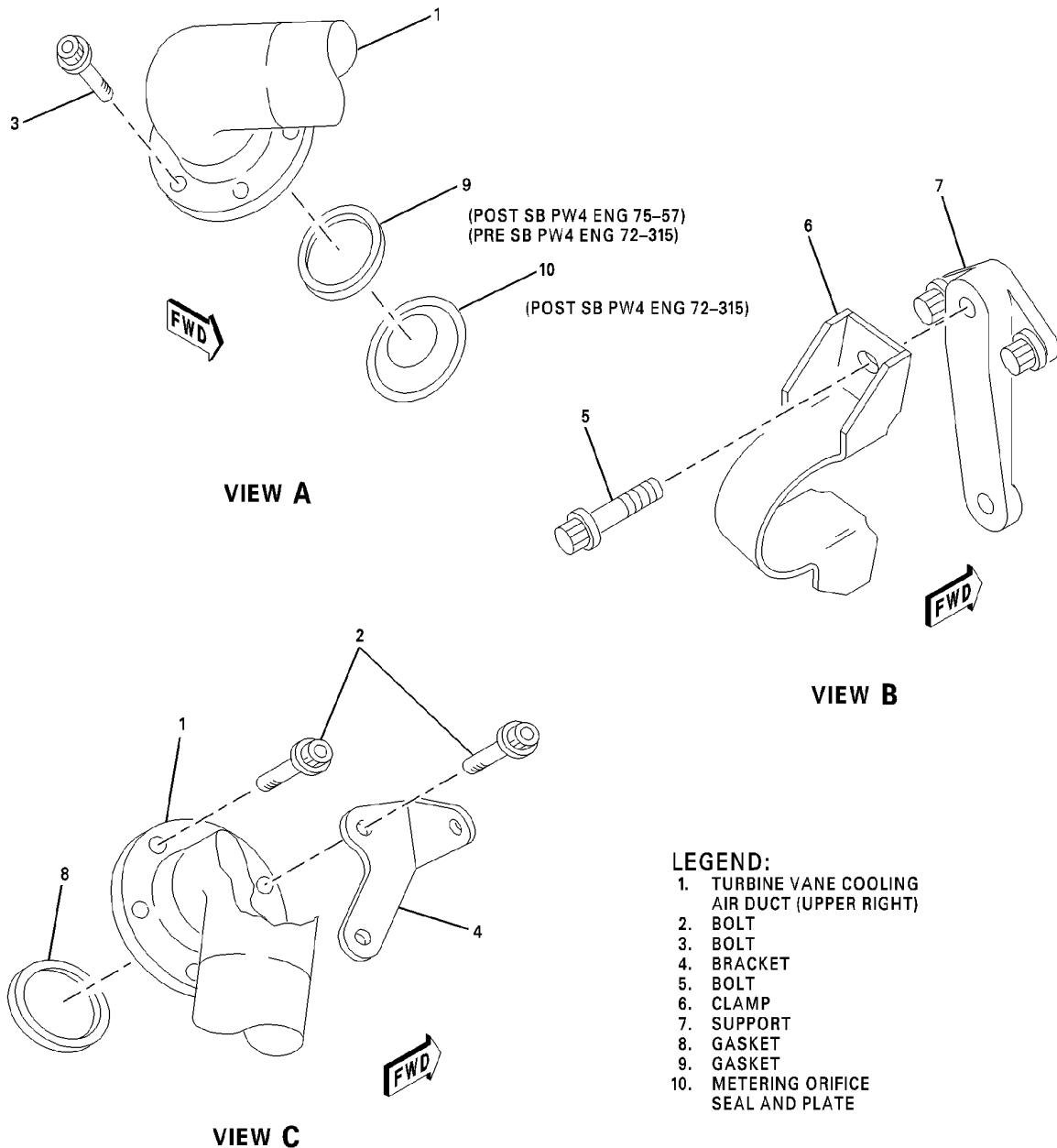
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CAG(IGDS)

DB2-75-0104A

PW4460/4462 Turbine Vane Cooling Air Ducts - Right
Figure 402/75-23-08-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

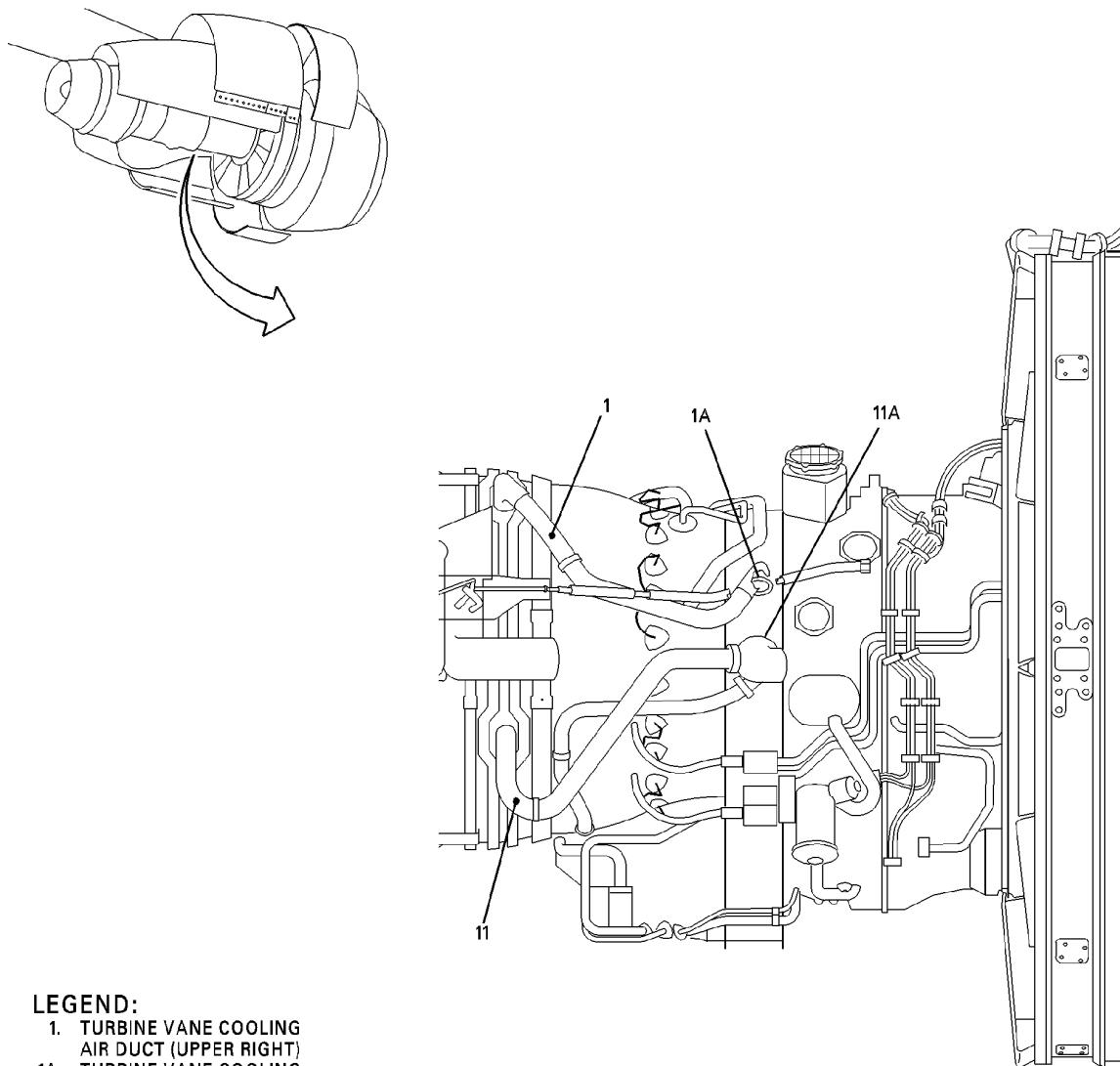
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LEGEND:

1. TURBINE VANE COOLING AIR DUCT (UPPER RIGHT)
- 1A. TURBINE VANE COOLING AIR VALVE
11. TURBINE VANE COOLING AIR DUCT (LOWER RIGHT)
- 11A. TURBINE VANE AND BLADE COOLING AIR VALVE

CAG(IGDS)

DB2-75-0273

PW4460/4462 -3 Turbine Vane Cooling Air Ducts - Right
Figure 403/75-23-08-990-878

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

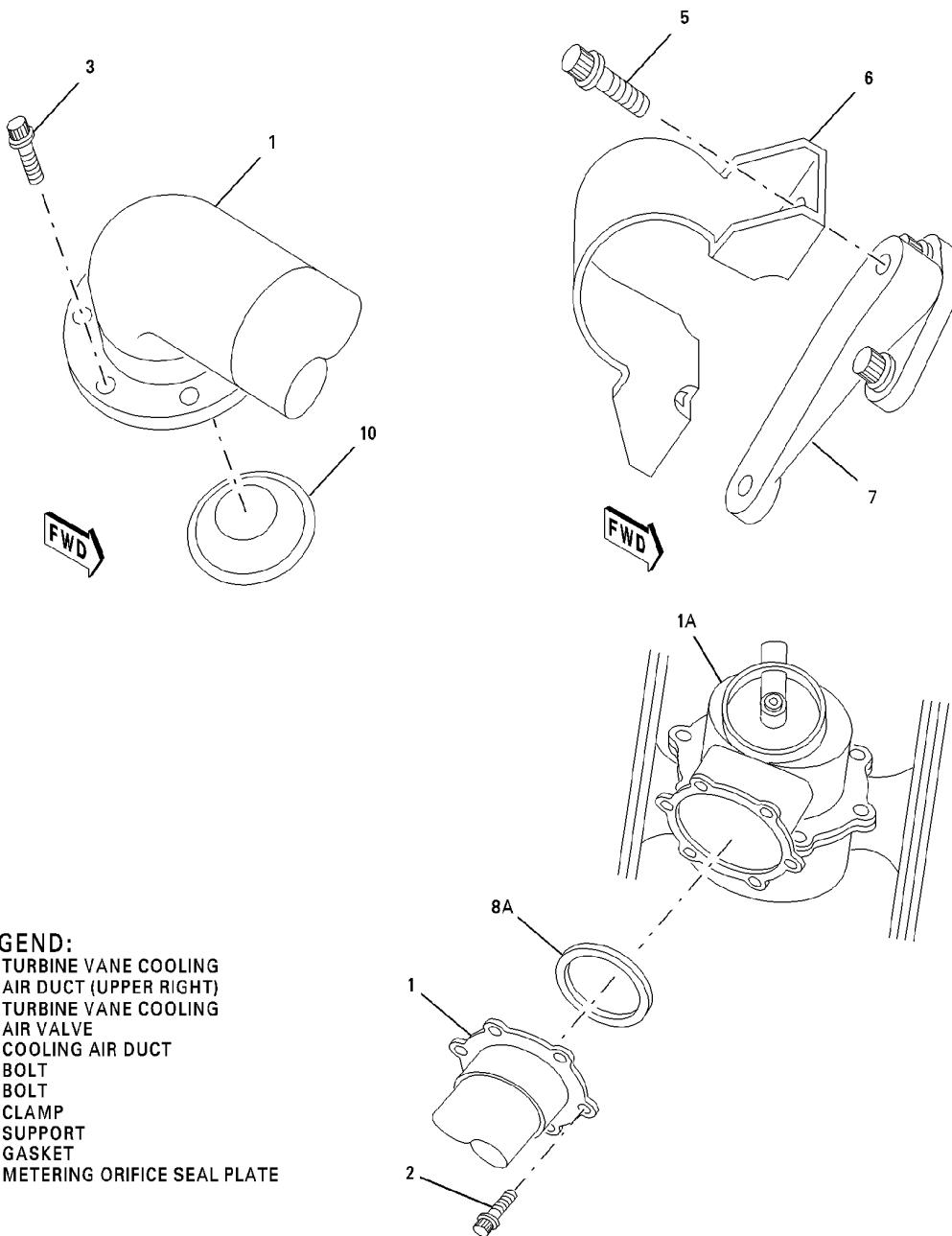
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CAG(IGDS)

DB2-75-0274

PW4460/4462 -3 Turbine Vane Cooling Air Ducts - Right
Figure 404/75-23-08-990-879

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

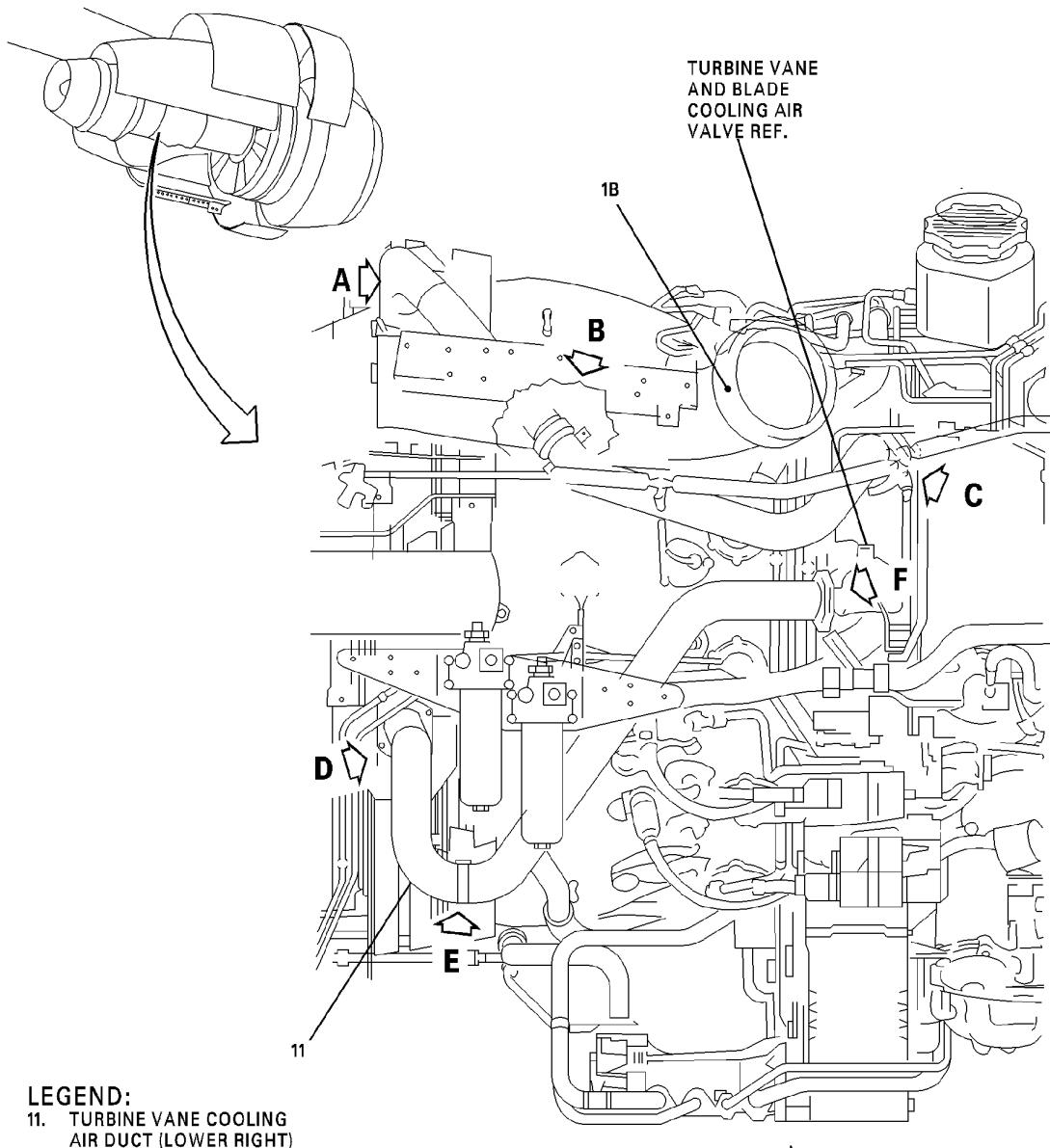
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LEGEND:

- 11. TURBINE VANE COOLING AIR DUCT (LOWER RIGHT)
- 1B. TURBINE CASE COOLING (TCC) DUCT

CAG(IGDS)

DB2-75-0105A

PW4460/4462 Turbine Vane Cooling Air Ducts - Right
Figure 405/75-23-08-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

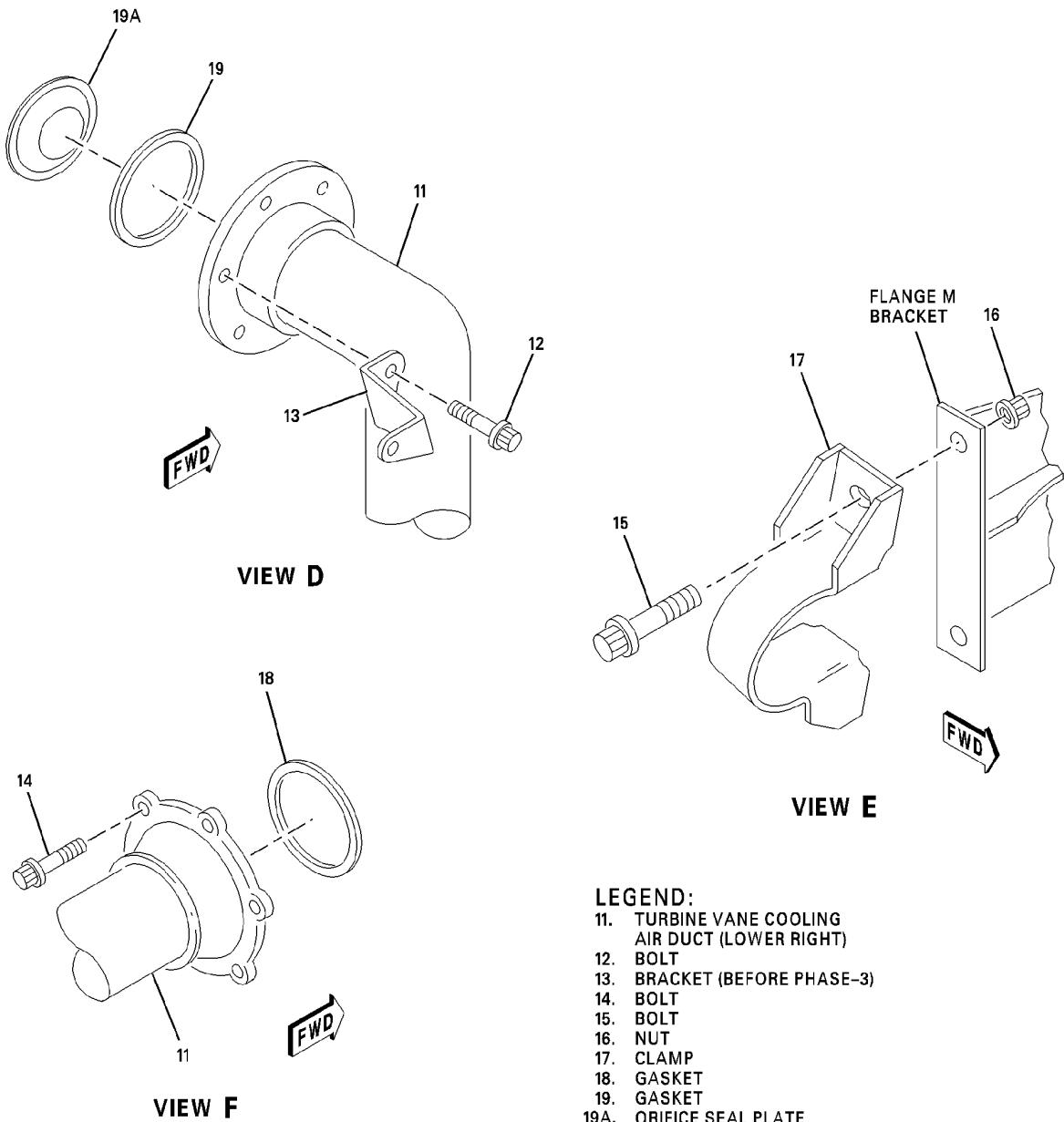
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CAG(IGDS)

DB2-75-0106C

PW4460/4462 and PW4460/4462 -3 Air Ducts - Right
Figure 406/75-23-08-990-871

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

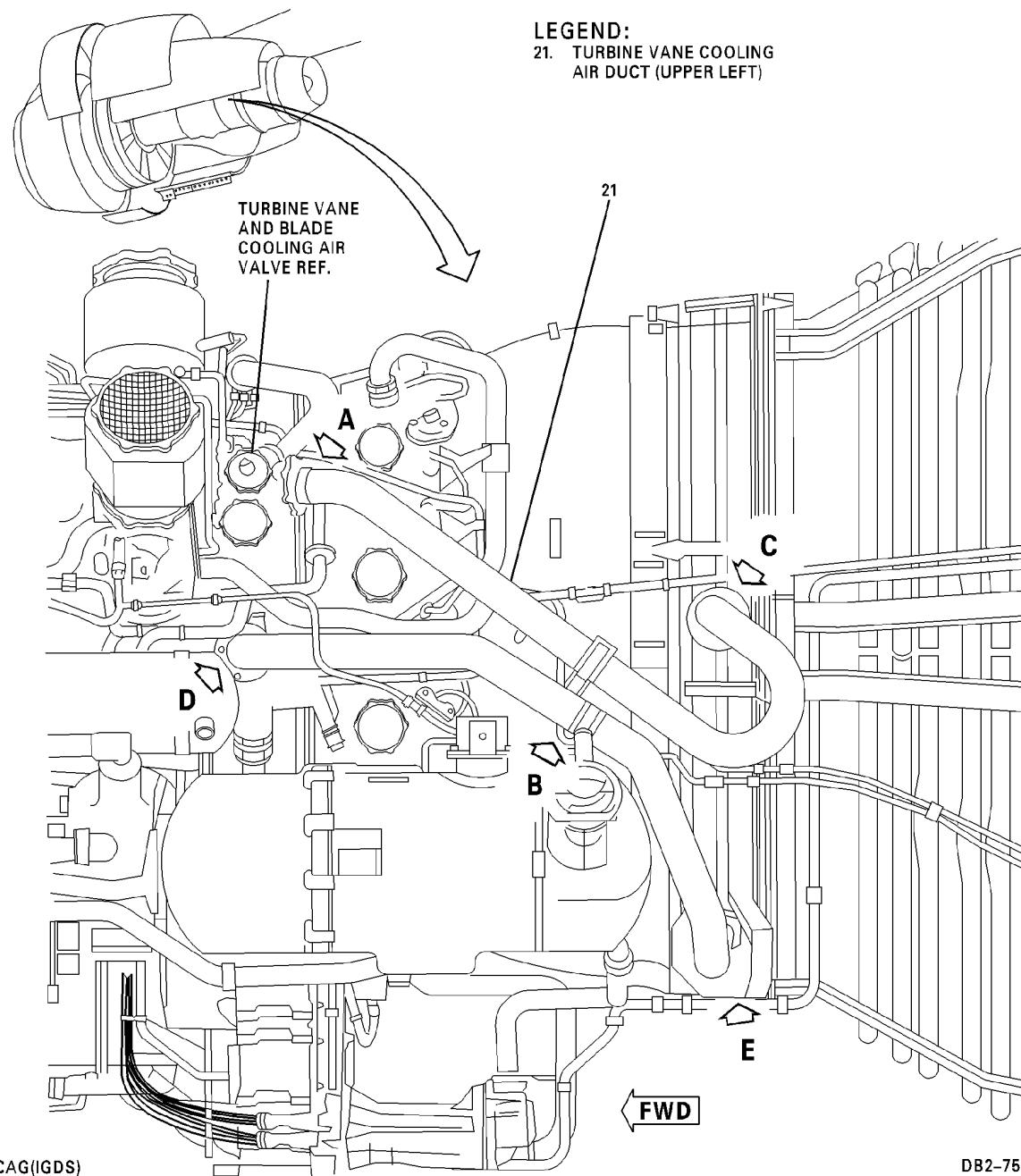
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PW4460/4462 and PW4460/4462 -3 Air Ducts - Left
Figure 407/75-23-08-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

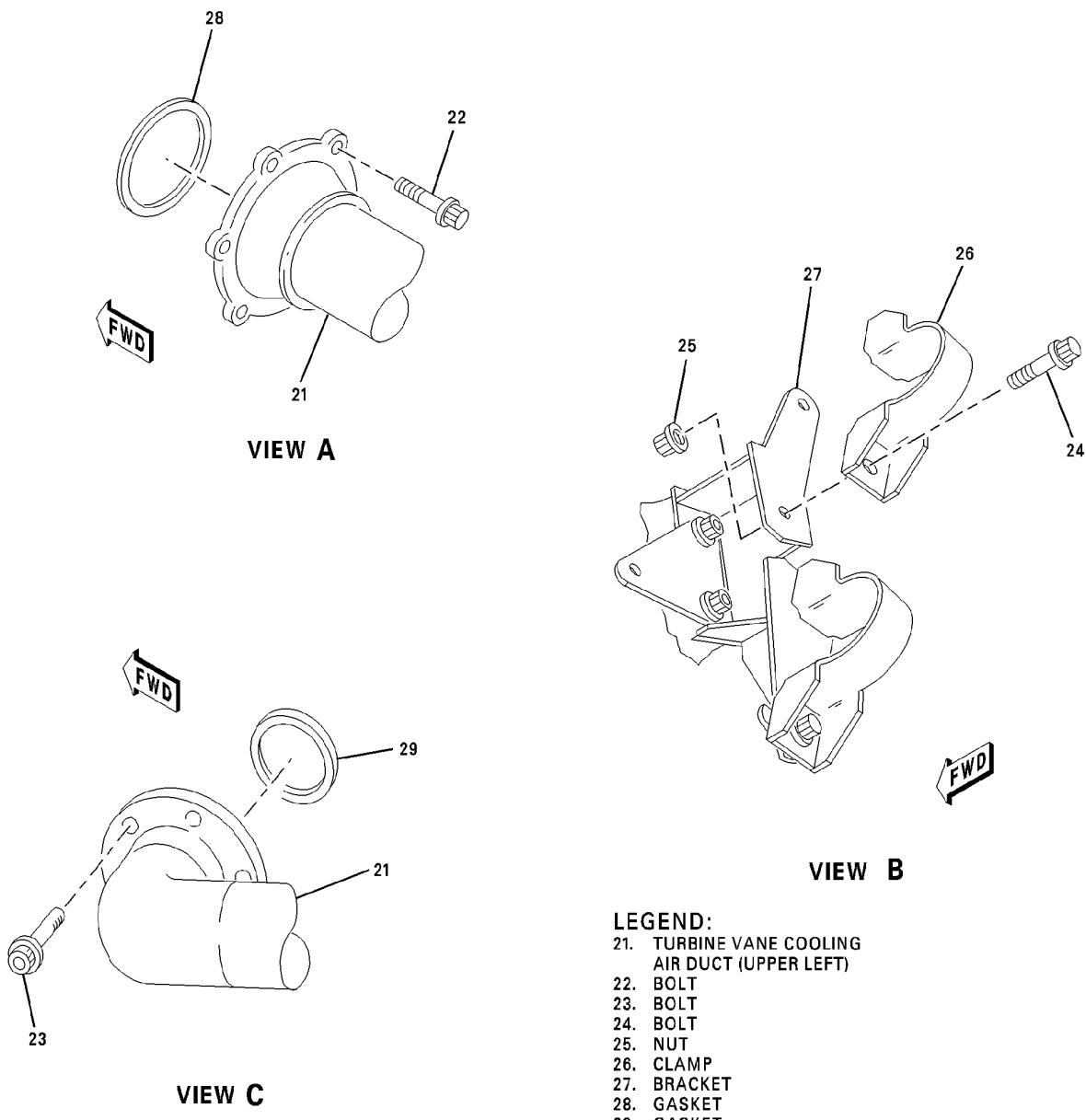
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LEGEND:

- 21. TURBINE VANE COOLING AIR DUCT (UPPER LEFT)
- 22. BOLT
- 23. BOLT
- 24. BOLT
- 25. NUT
- 26. CLAMP
- 27. BRACKET
- 28. GASKET
- 29. GASKET

CAG(IGDS)

DB2-75-0108A

PW4460/4462 and PW4460/4462 -3 Air Ducts - Left
Figure 408/75-23-08-990-873

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

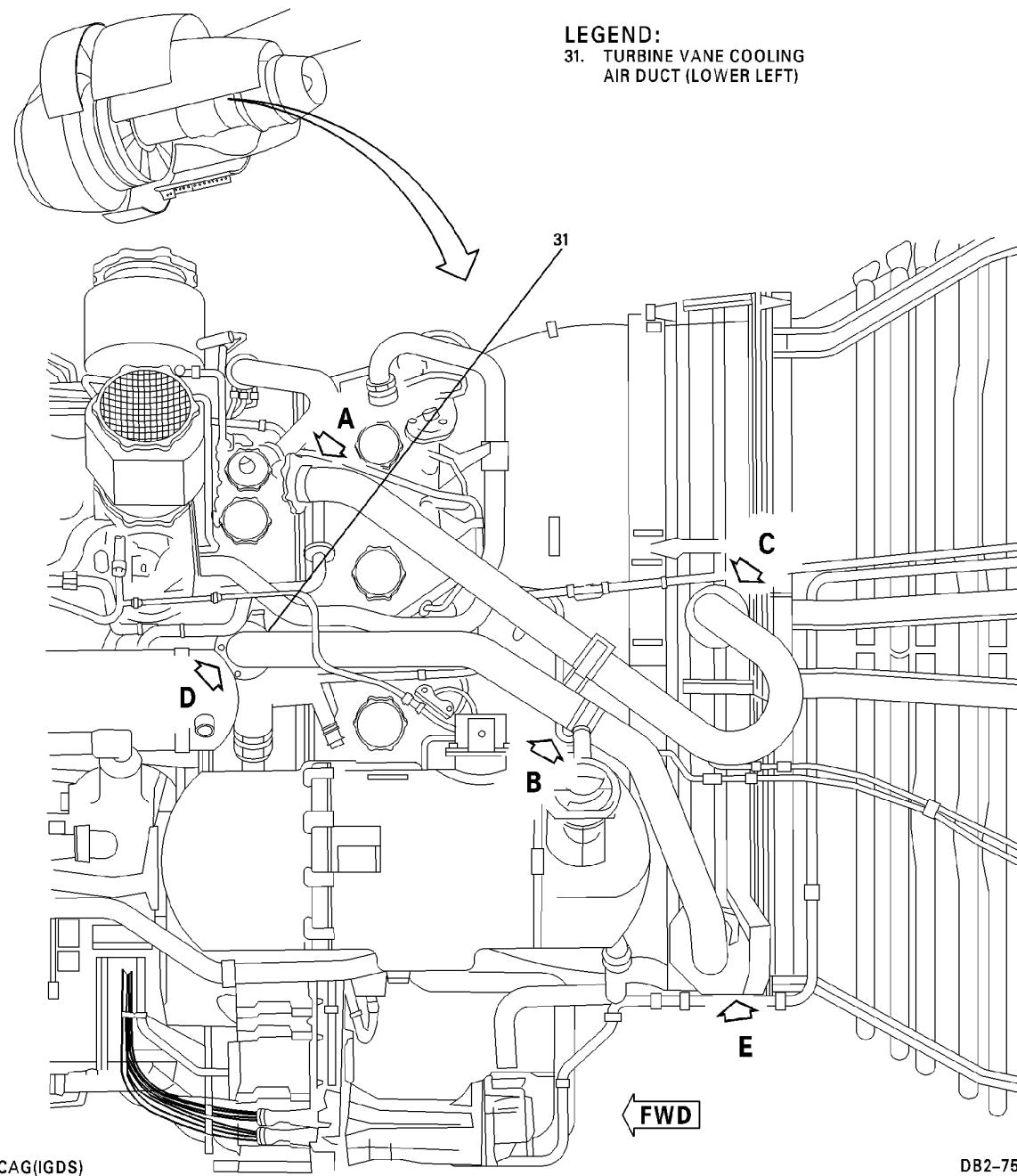
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PW4460/4462 and PW4460/4462 -3 Air Ducts - Left
Figure 409/75-23-08-990-874

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

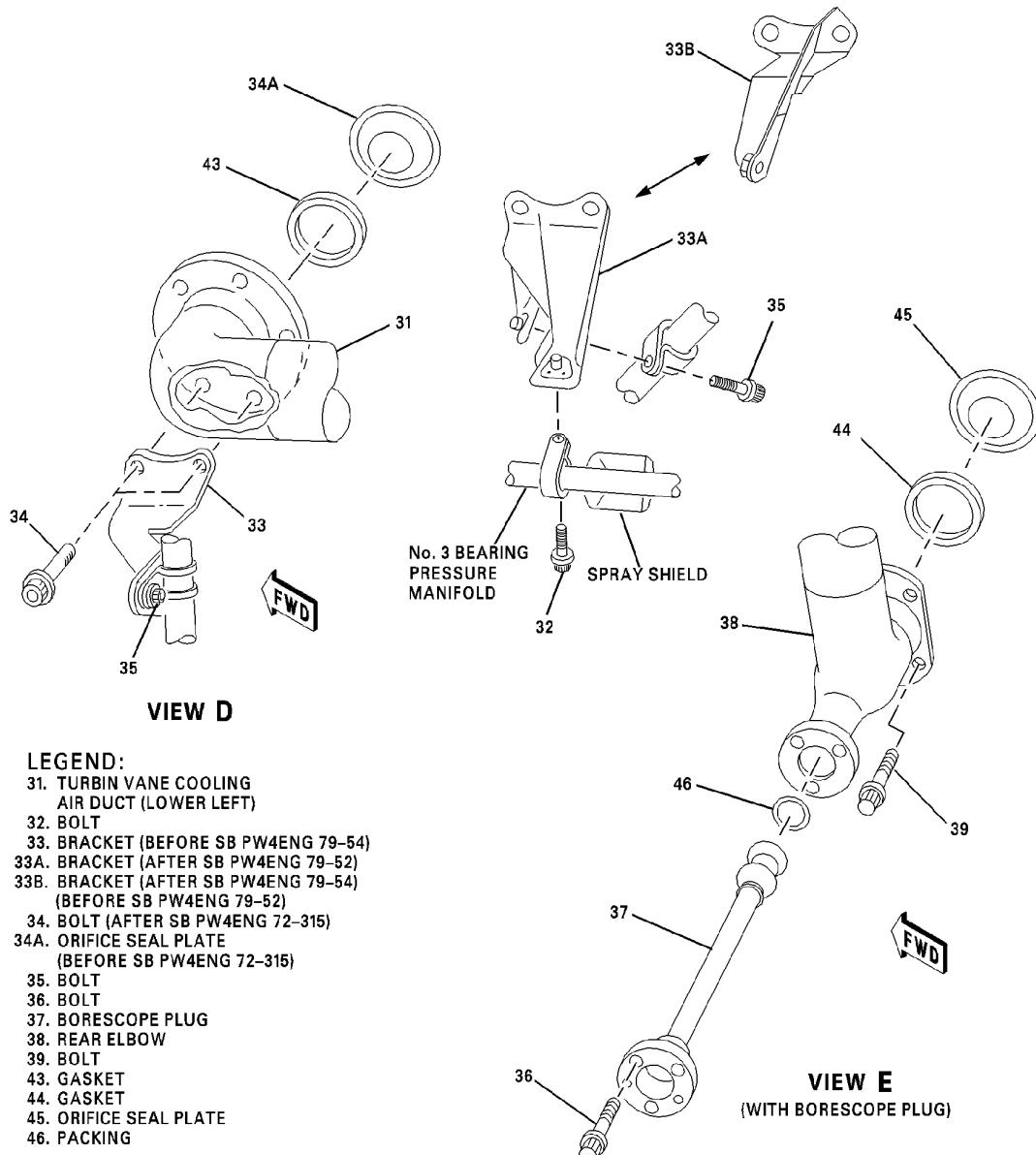
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CAG(IGDS)

DB2-75-0342

PW4460/4462 and PW4460/4462 -3 Air Ducts - Left
Figure 410/75-23-08-990-875

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

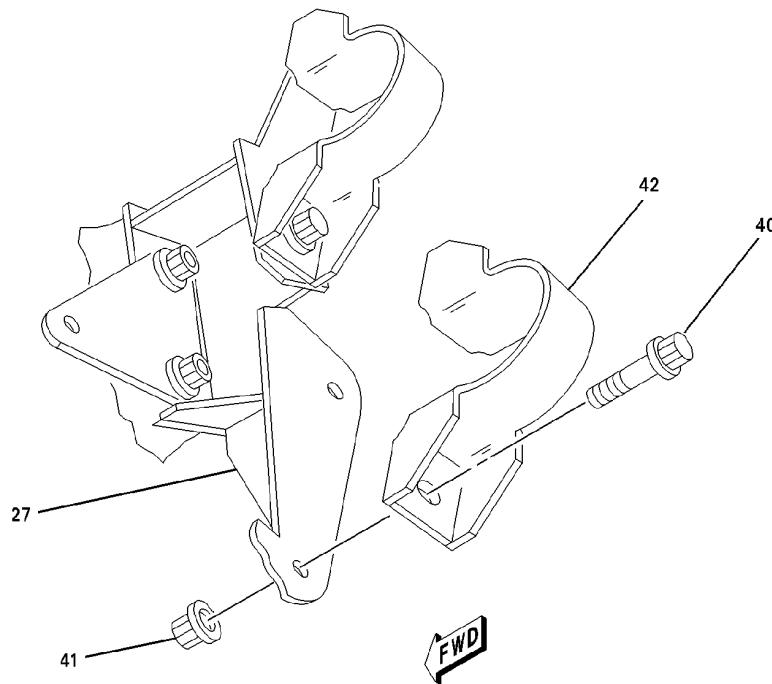
75-23-08

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VIEW B

LEGEND:

- 27. BRACKET
- 40. BOLT
- 41. NUT
- 42. CLAMP

CAG(IGDS)

DB2-75-011A

PW4460/4462 and PW4460/4462 -3 Air Ducts - Left
Figure 411/75-23-08-990-876

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

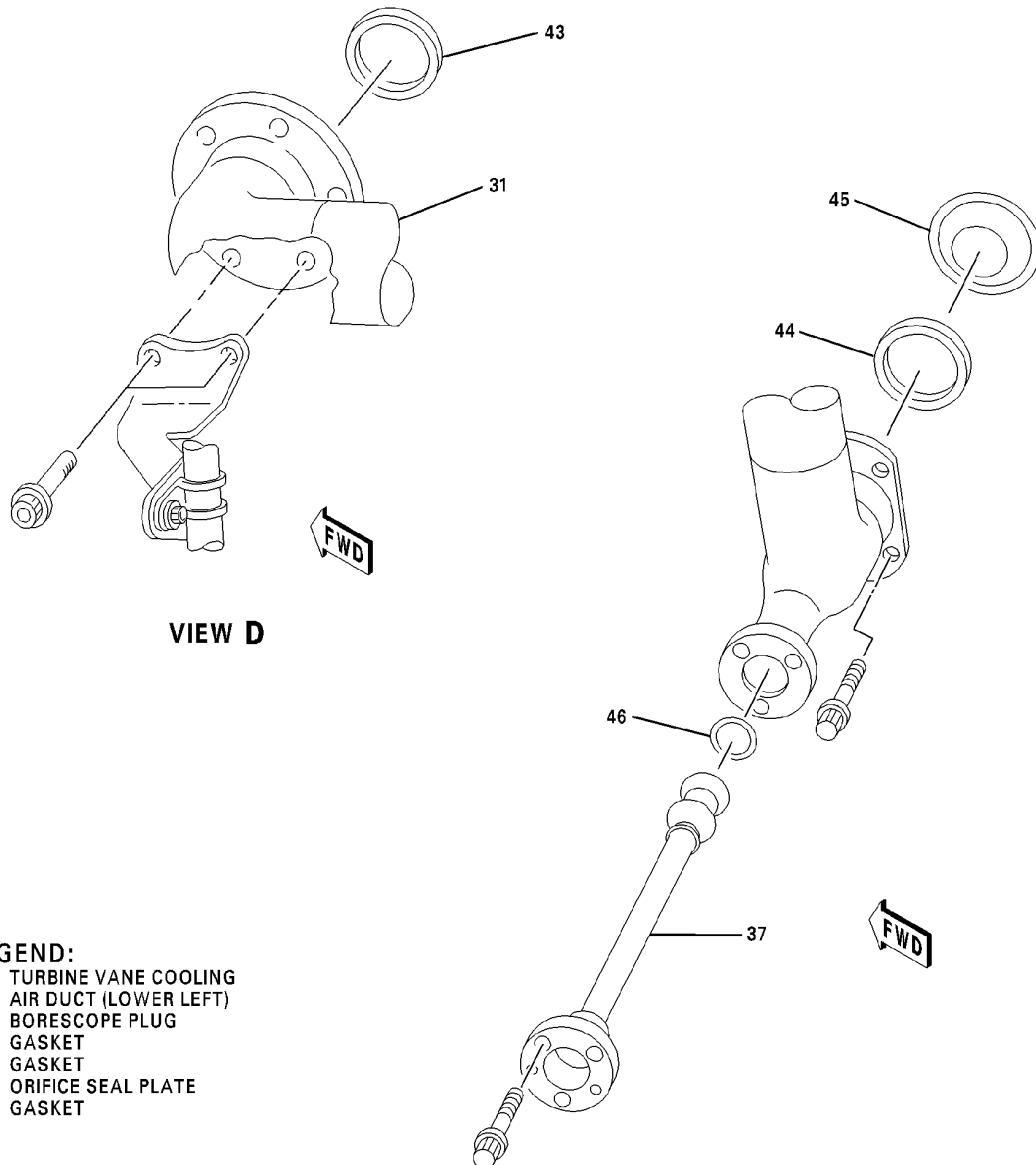
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LEGEND:

- 31. TURBINE VANE COOLING AIR DUCT (LOWER LEFT)
- 37. BORESCOPE PLUG
- 43. GASKET
- 44. GASKET
- 45. ORIFICE SEAL PLATE
- 46. GASKET

CAG(IGDS)

VIEW E
(WITH BORESCOPE PLUG)

DB2-75-0112B

PW4460/4462 and PW4460/4462 -3 Air Ducts - Left
Figure 412/75-23-08-990-877

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-23-08-400-868

3. INSTALLATION OF THE PW4460/4462 AND PW4460/4462 -3 TURBINE VANE COOLING AIR DUCTS

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–300 in–lb (0–34.0 N·m)
Model M303, M305 or M307	Crimper, Bergen Mechanical

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)
P05-059	Wax, paraffin (PMC 9552)
P05-289	Lockwire (AS3214-02)
P05-291	Cable, safety
P05-292	Ferrule, safety cable

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE	DESIGNATION	IPC
8, 19, 29, 44	Gasket	IPC 75-23-10-10-135
8A	Gasket	IPC 75-23-10-10
9, 43	Gasket	IPC 75-23-10-10-146
10	Orifice	IPC 75-23-10-10
18, 28	Gasket	IPC 75-23-10-10-135

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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Table 404 (Continued)

REFERENCE	DESIGNATION	IPC
19A	Orifice	IPC 75-23-10-10
45	Orifice	IPC 75-23-10-10-150
46	Gasket	IPC 75-23-10-10

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-15-400-868	INSTALLATION OF THE TURBINE CASE COOLING DUCT ASSEMBLY (P/B 401)
IPC 75-23-10-10	Illustrated Parts Catalog
IPC 75-23-10-10-135	Illustrated Parts Catalog
IPC 75-23-10-10-146	Illustrated Parts Catalog
IPC 75-23-10-10-150	Illustrated Parts Catalog

E. Job Set-up - PW4460/4462 and PW4460/4462 -3 Turbine Vane Cooling Air Ducts Installation

SUBTASK 75-23-08-010-271

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - PW4460/4462 and PW4460/4462 -3 Turbine Vane Cooling Air Ducts Installation

SUBTASK 75-23-08-420-267

- (1) Install the upper right turbine vane cooling air duct (1) on the HPT and HPC case as follows: (Figure 401)

NOTE: The steps that follow are for engines before PW4460/4462 -3 (PHASE-3) configuration.

- (a) Remove the protective caps and plugs.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1230, PARAFFIN/REFINED/STANDARD (DPM 589-1)

HAZMAT 1000, REFER TO MSDS

- (b) Hold the gasket (8) to the HPC case with the paraffin wax (P05-059) at approximately the 2 o'clock position. (Figure 402) (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) (Before SB PW4ENG 72-315): Hold the gasket (9) to the HPT case with the paraffin wax (P05-059) at approximately the 1 o'clock position.
- (d) (After SB PW4ENG 72-315): Install a new metering orifice seal plate (10), convex side outward, on the HPT case with paraffin wax (P05-059) at the 1 o'clock position.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (e) Lubricate the threads of the six bolts (2) and six bolts (3) with engine oil (P03-001).
- (f) Hold the cooling air duct (1) in position and attach the air duct to the HPT case with the six bolts (3). Tighten the bolts with your hand.
- (g) (Before SB PW4ENG 75-114): Attach the cooling air duct (1) and the bracket (4) to the HPC case with non-silver six bolts (2). Tighten the bolts with your hand.
- (h) (After SB PW4ENG 75-114): Attach the cooling air duct (1) and the bracket (4) to the HPC with six silver plated bolts (2). Tighten the bolts with your hand.
- (i) Lubricate the threads of the two bolts (5) with engine oil (P03-001).
- (j) Attach the air duct (1) to the support (7) on the diffuser case with the two bolts (5) and the clamp (6).
- (k) Torque the two bolts (5) to 65–85 in-lb (7.3–9.6 N·m).
- (l) Safety the two bolts (5) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (m) Torque the six bolts (2) to 85–95 in-lb (9.6–10.7 N·m). Torque them again to the same torque value until they are correctly torqued.
- (n) Safety the six bolts (2) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (o) Torque the six bolts (3) to 180–200 in-lb (20.3–22.6 N·m). Torque them again to the same torque value until they are correctly torqued.
- (p) Safety the six bolts (3) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).

SUBTASK 75-23-08-420-272

NOTE: The steps that follow are for engines after PW4460/4462 -3 (PHASE-3) configuration.

- (2) Install the upper right turbine vane cooling air duct (1) on the HPT and HPC case as follows: (Figure 403) (Figure 404) (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (a) Remove the protective caps and plugs.



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1230, PARAFFIN/REFINED/STANDARD (DPM 589-1)

HAZMAT 1000, REFER TO MSDS

- (b) Apply paraffin wax (P05-059) to the gasket (8A). Install the gasket (8A) between the turbine vane cooling air duct (1) and the upper turbine vane cooling air valve (1A).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (c) Apply paraffin wax (P05-059) to a metering orifice seal plate (10). Install the orifice seal plate (10) with the convex side outward between the duct (1) and the HPT case pad.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (d) Lubricate the six bolts (3) with engine oil (P03-001).
- (e) Hold the air duct (1) in position and attach the air duct to the HPT case with the six bolts (3). Tighten the bolts with your hand.
- (f) Lubricate the threads of the six bolts (2) with engine oil (P03-001).
- (g) (Before SB PW4ENG 75-114): Attach the air duct (1) to the turbine vane cooling air valve (1A) with six non-silver plated bolts (2). Tighten the bolts with your hand.
- (h) (After SB PW4ENG 75-114): Attach the air duct (1) to the turbine vane cooling air valve (1A) with six silver plated bolts (2). Tighten the bolts with your hand.
- (i) Lubricate the threads of the two bolts (5) with engine oil (P03-001).
- (j) Attach the air duct (1) to the support (7) on the diffuser case with the two bolts (5) and the clamp (6).
- (k) Torque the two bolts (5) to 65–85 in-lb (7.3–9.6 N·m).
- (l) Safety the two bolts (5) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (m) Torque the six bolts (2) at the front flange of duct (1) to 85–95 in-lb (9.6–10.7 N·m). Torque the bolts again in a diagonally opposite sequence until the torque holds at the correct value.
- (n) Safety the six bolts (2) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (o) Torque the six bolts (3) at the rear flange of duct (1) to 180–200 in-lb (20.3–22.5 N·m). Torque the bolts again in a diagonally opposite sequence until the torque holds at the correct value.
- (p) Safety the six bolts (3) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).

SUBTASK 75-23-08-420-268

NOTE: The steps that follow are for all engines.

- (3) Install the lower right turbine vane cooling air duct (11) on the HPT case and the turbine vane air valve as follows: (Figure 405)
- (a) Remove the protective caps and plugs.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1230, PARAFFIN/REFINED/STANDARD (DPM 589-1)

HAZMAT 1000, REFER TO MSDS

- (b) Hold the gasket (18) to the flange of the turbine vane cooling air valve with paraffin wax (P05-059). (Figure 406) (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Hold the gasket (19) to the HPT case with paraffin wax (P05-059) at approximately the 4 o'clock position.



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (d) Lubricate the threads of the six bolts (12) with engine oil (P03-001).
NOTE: The step that follows is for engines before PW4460/4462 -3 (PHASE-3) configuration.
- (e) Hold the air duct (11) in position and attach the air duct and the bracket (13) with the six bolts (12) to the HPT case. Tighten the bolts with your hand.
NOTE: The step that follows is for engines after PW4460/4462 -3 (PHASE-3) configuration.
- (f) Hold the air duct (11) in position. Attach the air duct (11) with the six bolts (12) to the HPT case. Tighten the bolts with your hand.
NOTE: The steps that follow are for all engines.
- (g) Lubricate the threads of the six bolts (14) with engine oil (P03-001).
- (h) Attach the air duct (11) forward flange to the turbine vane cooling air valve with the six bolts (14). Tighten the bolts with your hand.
- (i) Lubricate the threads of the two bolts (15) with engine oil (P03-001).
- (j) Attach the air duct (11) to the flange M bracket with the clamp (17) and the two bolts (15) and the nuts (16).
- (k) Torque the two bolts (15) to 85–95 in-lb (9.6–10.7 N·m).
- (l) Torque the six bolts (14) to 85–95 in-lb (9.6–10.7 N·m). Torque them again to the same torque value until they are correctly torqued.
- (m) Torque the six bolts (12) to 180–200 in-lb (20.3–22.6 N·m). Torque them again to the same torque value until they are correctly torqued.
- (n) Safety the six bolts (12) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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SUBTASK 75-23-08-420-269

- (4) Install the upper left air duct (21) on the HPT case and the turbine vane cooling air valve as follows: (Figure 407)
 - (a) Remove the protective caps and plugs.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1230, PARAFFIN/REFINED/STANDARD (DPM 589-1)

HAZMAT 1000, REFER TO MSDS

- (b) Hold the gasket (28) to the flange of the turbine vane cooling air valve with paraffin wax (P05-059). (Figure 408) (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Hold gasket (29) to the HPT case with paraffin wax (P05-059) at approximately the 9 o'clock position.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (d) Lubricate the threads of the six bolts (22) with engine oil (P03-001).
- (e) Hold the air duct (21) in position and attach the air duct to the turbine vane air valve with the six bolts (22). Tighten the bolts with your hand.
- (f) Lubricate the threads of the six bolts (23) threads with the engine oil (P03-001).
- (g) Attach the air duct (21) to the HPT case with bolts (23). Tighten the bolts with your hand.
- (h) Lubricate the threads of the two bolts (24) with engine oil (P03-001).
- (i) Attach the air duct (21) to the bracket (27) on the diffuser case with the two bolts (24), nuts (25) and the clamp (26).
- (j) Torque the two bolts (24) to 85–95 in-lb (9.6–10.7 N·m). Torque them again to the same torque value until they are correctly torqued.
- (k) Torque the six bolts (22) to 85–95 in-lb (9.6–10.7 N·m). Torque them again to the same torque value until they are correctly torqued.
- (l) Torque the six bolts (23) to 180–200 in-lb (20.3–22.6 N·m). Torque them again to the same torque value until they are correctly torqued.
- (m) Safety the six bolts (23) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).

SUBTASK 75-23-08-420-270

- (5) Install the turbine case cooling (TCC) duct assembly. (INSTALLATION OF THE TURBINE CASE COOLING DUCT ASSEMBLY, TASK 75-23-15-400-868)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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SUBTASK 75-23-08-420-271

- (6) Install the lower left air duct (31) to the HPC case and the HPT case as follows: (Figure 409)
- (a) Remove the protective caps and plugs.



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1230, PARAFFIN/REFINED/STANDARD (DPM 589-1)

HAZMAT 1000, REFER TO MSDS

- (b) Hold the gasket (43) to the HPT case with paraffin wax (P05-059) at approximately the 3 o'clock position. (Figure 412) (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- NOTE: The step that follows is for engines before PW4460/4462 -3 (PHASE-3) configuration.
- (c) (Before SB PW4ENG 72-315): Hold a new gasket (44) on the HPT pad with paraffin wax (P05-059) at approximately the 7 o'clock position.
- (d) (After SB PW4ENG 72-315): Install a new orifice seal plate (45), convex side outward, on the pad at the 7 o'clock position on the HPT case with paraffin wax (P05-059).
- NOTE: The step that follows is for engines after PW4460/4462 -3 (PHASE-3) configuration.
- (e) Install a new orifice seal plate (45), convex side outward, on the pad at the 7 o'clock position on the HPT case with paraffin wax (P05-059).
- NOTE: The steps that follow are for all engines.



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (f) Lubricate the threads of six bolts (34) with engine oil (P03-001). (Figure 410)
- (g) Hold the air duct (31) in position and attach the air duct and the bracket (33) to the HPC case with the six bolts (34). Tighten the bolts with your hand.
- (h) Lubricate the threads of the six bolts (39) with engine oil (P03-001).
- (i) Attach the air duct rear elbow (38) to the HPT case with the four bolts (39). Tighten the bolts with your hand.
- (j) Lubricate the threads of the two bolts (40) with engine oil (P03-001). (Figure 411)
- (k) Attach the air duct (31) to the bracket (27) on the diffuser case with the two bolts (40), nuts (41) and the clamp (42).
- (l) Torque the two bolts (40) to 85–95 in-lb (9.6–10.7 N·m).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (m) Torque the six bolts (34) to 85–95 in–lb (9.6–10.7 N·m). Torque them again to the same torque value until they are correctly torqued.
- (n) Safety the six bolts (34) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (o) Torque the four bolts (39) at the rear flange to 180–200 in–lb (20.3–22.6 N·m). Torque them again to the same torque value until they are correctly torqued.
- (p) Safety the four bolts (39) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (q) (Before SB PW4ENG 79-54): Torque the clamp bolt (35) to 36–40 in–lb (4.0–4.5 N·m).
- (r) (After SB PW4ENG 79-52): Lubricate the threads of the bolt (32) with engine oil (P03-001). Install the bolt (32) and the clamp that attaches the No. 3 bearing pressure manifold to the bracket (33A).
- (s) (After SB PW4ENG 79-52): Adjust the spray shield on the inboard side manifold and torque the bolt to 36-40 in-lb (4.1-4.5 N·m).
- (t) Install the gasket (46) on the borescope plug (37). (Figure 412)
- (u) Lubricate the threads of the three bolts (36) with engine oil (P03-001)
- (v) Install the borescope plug (37) into the rear elbow (38) with the bolts (36).
- (w) Safety the three bolts (36) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).

G. Job Close-up - PW4460/4462 and PW4460/4462 -3 Turbine Vane Cooling Air Ducts Installation

SUBTASK 75-23-08-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-08-410-268

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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VALVE, LOW PRESSURE TURBINE CASE COOLING AIR SHUTOFF - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the low pressure turbine case cooling (TCC) air shutoff valve. Access to the low pressure TCC air shutoff valve is through the right thrust-reverser door.
- B. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-23-10-000-868

2. REMOVAL OF THE LOW PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE

A. **Fixtures, Tools, Test and Support Equipment**

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 Thru 15)	Protective caps and plugs

B. **References**

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. **Job Set-up - Low Pressure Turbine Case Cooling Air Shutoff Valve Removal**

SUBTASK 75-23-10-865-270



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

OVERHEAD, BATTERY BUS

Row	Col	Number	Name
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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UPPER MAIN, ENGINE DC BUS 2

Row Col Number Name

J 15 B1-592 REVERSING CONTROL ENG 2

SUBTASK 75-23-10-010-274

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Low Pressure Turbine Case Cooling Air Shutoff Valve Removal

SUBTASK 75-23-10-030-267



IF THE LOW PRESSURE TURBINE CASE COOLING VALVE IS TO BE RETURNED TO STORAGE FOR FUTURE SPARE PARTS USE, SEND THE LPTCC VALVE TO THE SHOP FOR PRESERVATION. REFER TO THE COMPONENT MAINTENANCE MANUAL INSTRUCTIONS, IF YOU DO NOT, INTERNAL CORROSION AND DAMAGE TO THE LPTCC VALVE CAN OCCUR, WHICH CAN CAUSE DECREASED PERFORMANCE, INCREASED FLUID LEAKAGE AND FAILURE OF THE PART.

- (1) Remove the low pressure turbine case cooling (LPTCC) air shutoff valve (1) as follows: (Figure 401)
- Remove the bolts (2) and the nuts (3) that attach the bottom support link (4) to the valves (1 and 5).
 - Move the bottom support link (4) away from the valves (1 and 5).
 - Remove the nuts (6) and the bolts (7) that attach the valve (1) to the bottom support bracket (8).
 - Remove the bolts (2) that attach the top support link (9) to the valves (1 and 5).
 - Remove the bolts (10) that attach the top flange of the valve (1) to the top support bracket (11).
 - Remove the nut (12), bolt (13) and the bushing (14). Remove the push-pull rod (15) from the HPT air shutoff valve lever (16).
 - Move the valve (1) rearward and out. Install the protective caps and plugs.

SUBTASK 75-23-10-410-267

- (2) If the LPT air shutoff valve is not installed immediately, or weather conditions make it necessary, close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

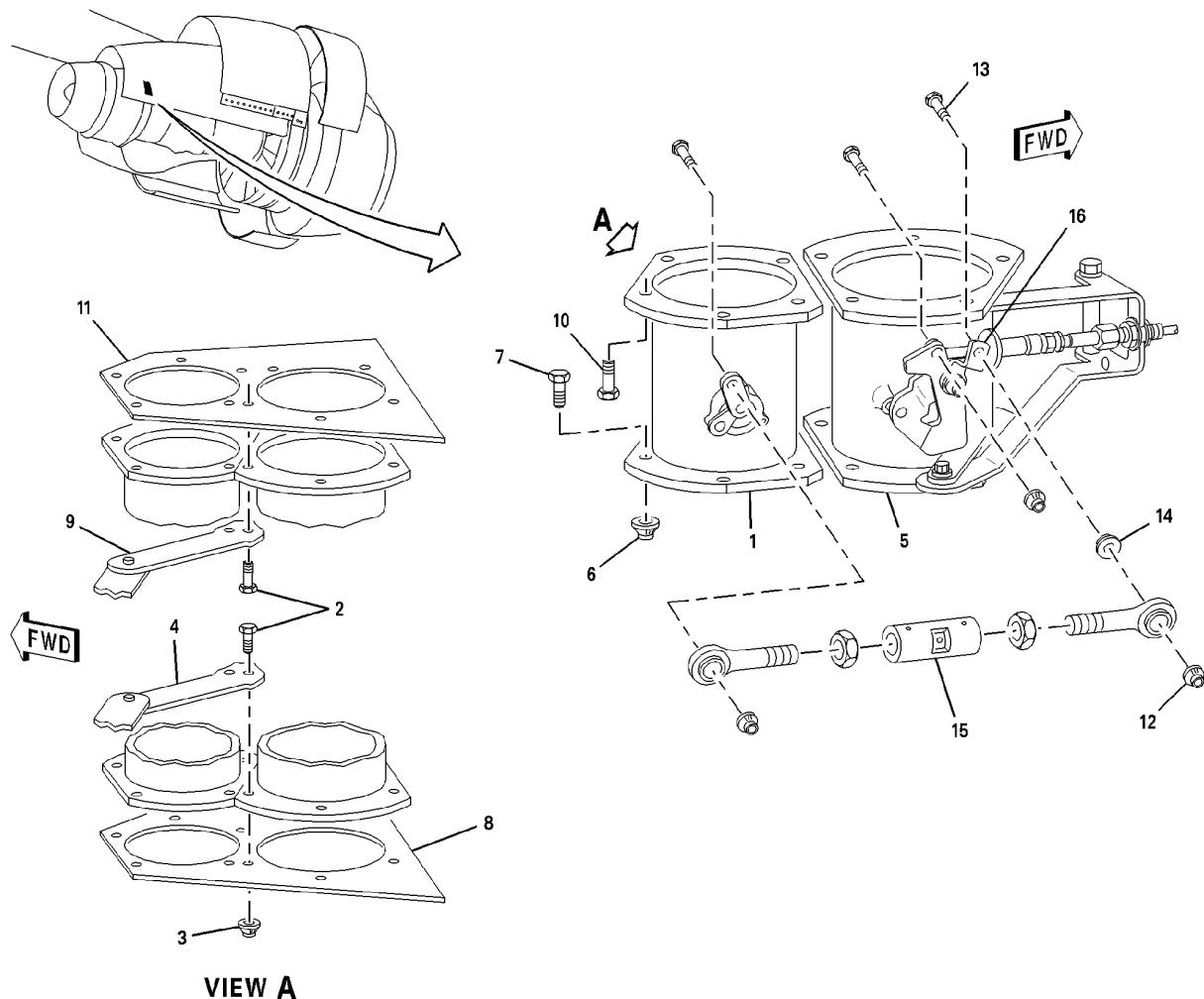
EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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VIEW A

LEGEND:

- | | |
|----------------------------------|-------------------------|
| 1. LPT COOLING AIR SHUTOFF VALVE | 9. TOP SUPPORT LINK |
| 2. BOLT | 10. BOLT |
| 3. NUT | 11. TOP SUPPORT BRACKET |
| 4. BOTTOM SUPPORT LINK | 12. NUT |
| 5. HPT COOLING AIR SHUTOFF VALVE | 13. BOLT |
| 6. NUT | 14. BUSHING |
| 7. BOLT | 15. PUSH-PULL ROD |
| 8. BOTTOM SUPPORT BRACKET | 16. SHUTOFF VALVE LEVER |

CAG(IGDS)

DB2-75-0073

LPTCC Air Shutoff Valve - Removal/Installation
Figure 401/75-23-10-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-23-10-400-868

3. INSTALLATION OF THE LOW PRESSURE TURBINE CASE COOLING AIR SHUTOFF VALVE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.22–2.44 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–100 in-lb (0–11.3 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-00-700-868	ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG) (P/B 501)

D. Job Set-up - Low Pressure Turbine Case Cooling Air Shutoff Valve Installation

SUBTASK 75-23-10-865-271



TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that these circuit breakers are open and have safety tags:

OVERHEAD, BATTERY BUS

Row	Col	Number	Name
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	15	B1-592	REVERSING CONTROL ENG 2

SUBTASK 75-23-10-010-275

- (2) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - Low Pressure Turbine Case Cooling Air Shutoff Valve Installation

SUBTASK 75-23-10-420-267

- (1) Install the low pressure turbine case cooling (LPTCC) air shutoff valve (1) as follows: (Figure 401)
- Remove the protective caps and plugs from the valve (1).
 - Move the valve (1) into position between the top support bracket (11) and the bottom support bracket (8).
- NOTE: Make sure that the flow arrows on the valve are pointed down.
- Align the valve (1) with the top and the bottom support brackets (11 and 8).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- Lubricate the bolts (10) with the engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - Attach the top flange of the valve (1) and the top support link (9) to the top support bracket (11) with the bolts (10).
- NOTE: Make sure that the two longer bolts are used to attach the top support link to the top support bracket.
- Torque the bolts (10) to 85–95 in-lb (10.0–11.0 N·m).
 - Lubricate the bolts (7) with the engine oil (P03-001).
 - Attach the bottom flange of the valve (1) and the bottom support link (4) to the bottom support bracket (8) with the bolts (7) and the nuts (6).
 - Torque the nuts and the bolts (6 and 7) to 85–95 in-lb (10.0–11.0 N·m).
- NOTE: Do not install the low pressure TCC valve linkage. The linkage is installed as a step of the adjustment.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-23-10-710-270

- (2) Do the adjustment of the low pressure TCC air shutoff valve. (ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG), TASK 75-23-00-700-868)

F. Job Close-up - Low pressure Turbine Case Cooling Air Shutoff Valve LPT Installation

SUBTASK 75-23-10-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-10-410-269

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-23-10-865-275

- (3) Remove the safety tags and close these circuit breakers:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	15	B1-592	REVERSING CONTROL ENG 2

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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ACTUATOR, TURBINE CASE COOLING AIR VALVE - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the Turbine Case Cooling (TCC) air valve actuator.
- B. Access to the TCC air valve actuator is through the right thrust reverser door.
- C. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-23-11-000-868

2. REMOVAL OF THE TURBINE CASE COOLING AIR VALVE ACTUATOR

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4 ft (1 m) – 8 ft (2 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Container, 5 gal (19 l)
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs
Not specified	Pliers, soft-jawed
Not specified	Wrench, strap

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Turbine Case Cooling Air Valve Actuator Removal

SUBTASK 75-23-11-040-001



WARNING

DO NOT MOVE THE FIRE CONTROL HANDLE TO THE AGENT 1 OR AGENT 2 POSITIONS. THIS WILL CAUSE THE FIREX AGENT CONTAINERS TO OPERATE, AND CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Pull the applicable (No. 1, 2 or 3 engine) fire-control handle down and forward to the FUEL & HYD OFF position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-23-11-010-268

- (2) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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D. Procedure - Turbine Case Cooling Air Valve Actuator Removal

SUBTASK 75-23-11-030-267

- (1) Remove the TCC air valve actuator (1) as follows: (Figure 401), (Figure 402)
 - (a) Disconnect the electrical connector (2) from the TCC air valve actuator (1). Install the protective caps and plugs.
 - (b) Remove the nut (3) and the bolt (4). Disconnect the cable rod end bearing (5) from the turbine case cooling air shutoff valve idler arm (6).
 - (c) Disconnect the cable coupling nut (7) from the TCC air valve actuator (1). Install the protective caps and plugs.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1044, JET FUELS A AND A-1 (JP-5 FUEL)

HAZMAT 1000, REFER TO MSDS

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1045, JET FUEL B (JP-4 FUEL)

HAZMAT 1000, REFER TO MSDS



WARNING

USE PROTECTION FOR YOUR EYES WHEN YOU ARE NEAR THE FUEL.
IF THE REMAINING FUEL IS BLOWN FROM THE TUBE, IT CAN CAUSE INJURIES TO PERSONS.

- (d) Put the container below the TCC air valve actuator (1) and disconnect the pressure hose (8), return hose (9) and the drain hose (25). After all the fuel drain from the hoses install the protective caps and plugs.
NOTE: The actuator can contain as much as 1 gal. (3.8 l) of fuel.
- (e) Remove the bolt (10) that connects the ground strap (11) to the TCC air valve actuator (1).
- (f) Remove the two bolts (12) and the two hinge clamps (13) from the TCC air valve actuator (1).
- (g) Lift the TCC air valve actuator (1) clear of the two bracket pins (16) and the stop (17).
- (h) Disconnect the cable end (18) from the actuator piston shaft (19). Remove the TCC air valve actuator (1) from the engine.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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SUBTASK 75-23-11-410-267

- (2) If the TCC air valve actuator is not installed immediately, or weather conditions make it necessary, close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

75-23-11

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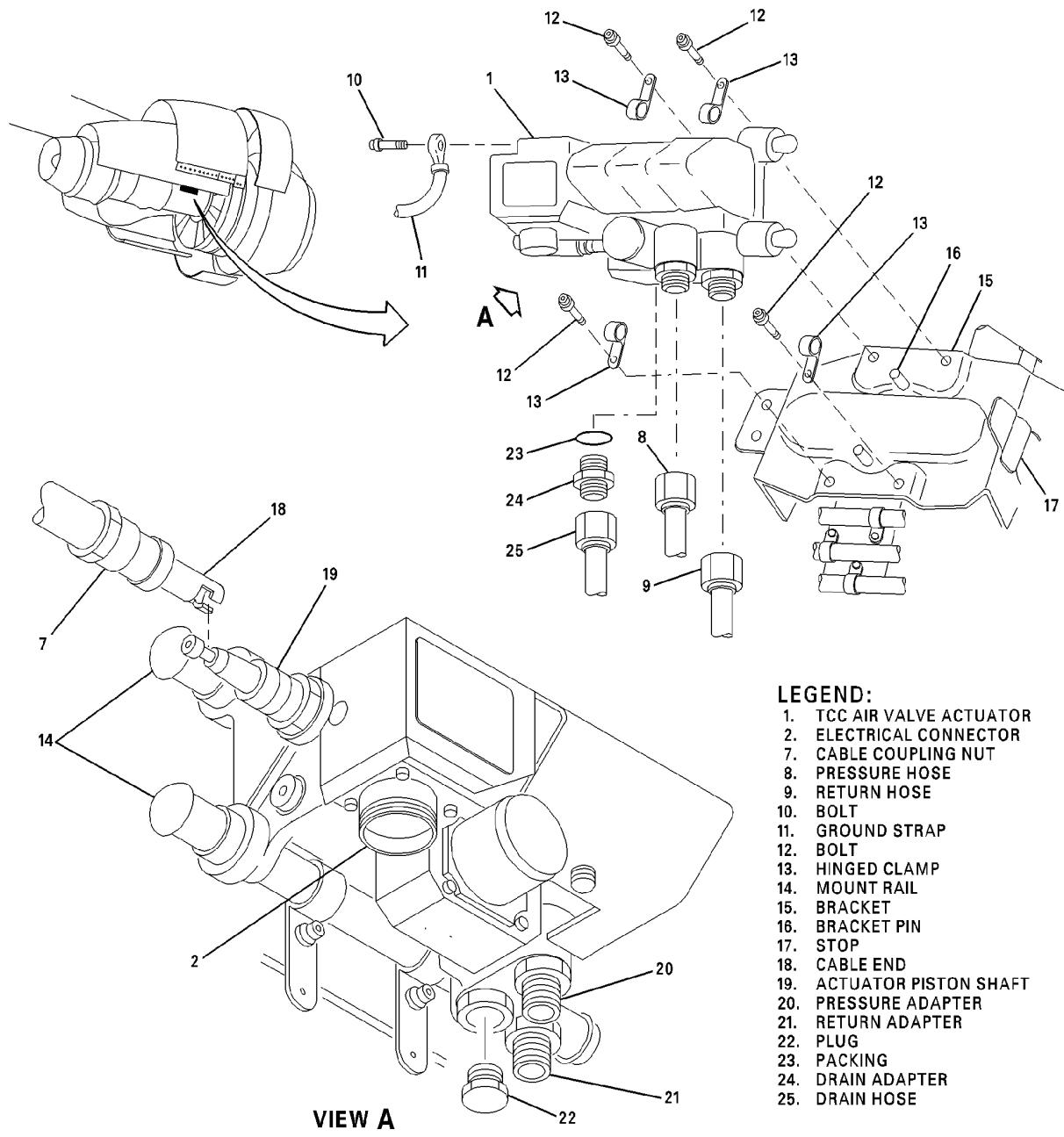
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CAG(IGDS)

DB2-75-0066B

Turbine Case Cooling Air Valve Actuator - Removal/Installation
Figure 401/75-23-11-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

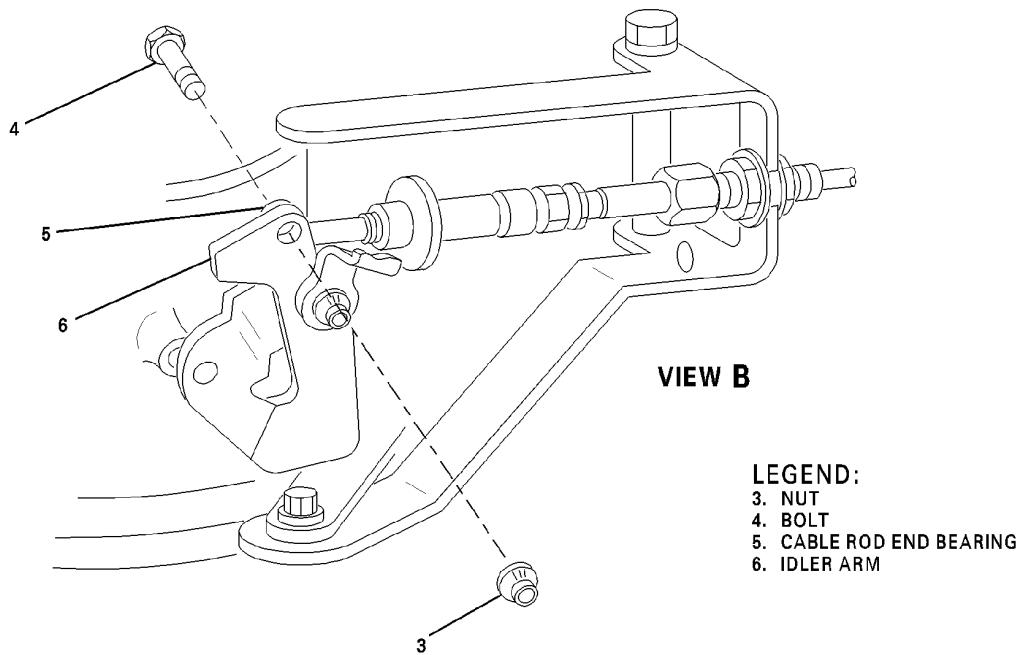
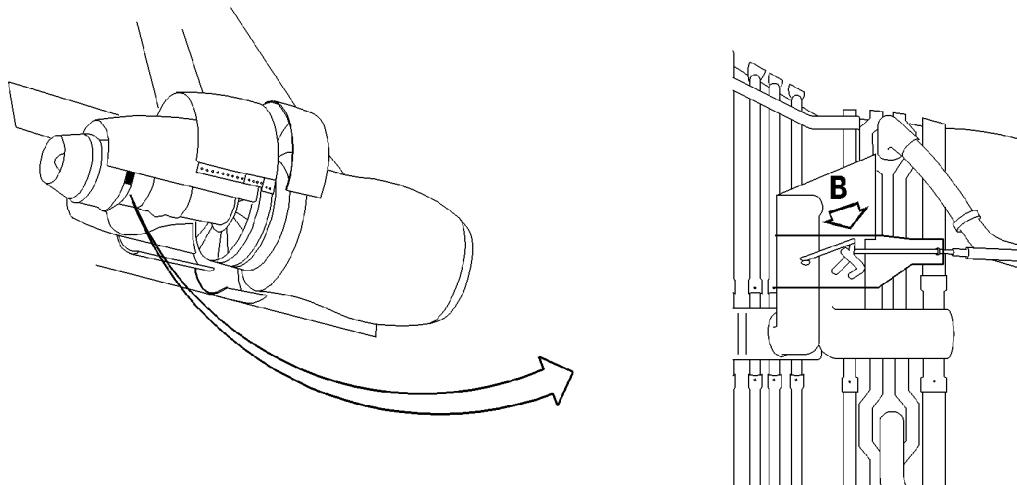
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CAG(IGDS)

DB2-75-0067A

TCC Air Valve Control Cable - Removal/Installation
Figure 402/75-23-11-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

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TASK 75-23-11-400-868

3. INSTALLATION OF THE TURBINE COOLING CASE AIR VALVE ACTUATOR

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4 ft (1 m) - 8 ft (2 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0 in-lb (0 N·m) - 100 in-lb (11 N·m)
Not specified	Torque wrench, 100 in-lb (11 N·m) - 600 in-lb (68 N·m)
Model M303, M305 or M307	Crimper, Bergen Mechanical

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)
P05-289	Lockwire (AS3214-02)
P05-291	Cable, safety
P05-292	Ferrule, safety cable

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE	DESIGNATION	IPC
23	Packing, preformed (MS9966-05)	IPC 75-23-30

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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(Continued)

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-00-700-868	ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG) (P/B 501)
IPC 75-23-30	Illustrated Parts Catalog

E. Job Set-up - Turbine Case Cooling Air Valve Actuator Installation

SUBTASK 75-23-11-040-002



WARNING

DO NOT MOVE THE FIRE CONTROL HANDLE TO THE AGENT 1 OR AGENT 2 POSITIONS. THIS WILL CAUSE THE FIREX AGENT CONTAINERS TO OPERATE, AND CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Pull the applicable (No. 1, 2 or 3 engine) fire-control handle down and forward to the FUEL & HYD OFF position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-23-11-010-270

- (2) If necessary, open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - Turbine Case Cooling Air Valve Actuator Installation

SUBTASK 75-23-11-420-267

- (1) If it is necessary to install a new TCC air valve actuator (1), do the subsequent procedure: (Figure 401)
 - (a) Make sure the TCC air valve actuator (1) moves freely on the mount rails (14).
 - (b) Remove the protective caps and plugs from the pressure and return adapters (20 and 21), the drain plug (22) hole, and the electrical connector (2).



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (c) Lubricate the packing (23) with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (d) Install the packing (23) on the drain adapter (24).
- (e) Lubricate the threads of the drain adapter (24) with engine oil (P03-001).
- (f) Install the drain adapter (24) in the bottom aft hole of the TCC air valve actuator (1).
- (g) Torque the drain adapter (24) to 90 in-lb (10 N·m) - 100 in-lb (11 N·m).

SUBTASK 75-23-11-420-268

- (2) Install the TCC air valve actuator (1) as follows: (Figure 401) (Figure 402)

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (a) Remove the protective caps and plugs from the pressure hose (8), return hose (9), and drain hose (25).
 - (b) Install the two hinged clamps (13) on each of the two actuator mount rails (14). If the two hinged clamps (13) have lockwire holes, safety the hinged clamps (13) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
 - (c) Hold the TCC air valve actuator (1) above the two mount bracket pins (16). Connect the cable end (18) to the actuator piston shaft (19).
 - (d) Put the TCC air valve actuator (1) on the bracket (15) with the two mount bracket pins (16) engaged in the holes in the TCC air valve actuator (1).
 - (e) Lubricate the threads of the two bolts (12) with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (f) Attach the TCC air valve actuator (1) to the bracket (15) with the two bolts (12).
 - (g) Torque the two bolts (12) to 85 in-lb (10 N·m) - 95 in-lb (11 N·m).
 - (h) Lubricate the threads of the bolt (10) with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (i) Connect the ground strap (11) to the TCC air valve actuator (1) with the bolt (10).
 - (j) Torque the bolt (10) to 85 in-lb (10 N·m) - 95 in-lb (11 N·m).
 - (k) Remove the drain plug (22) from the TCC air valve actuator (1).
- NOTE: New actuator has a plug in the drain hole. This plug must be removed and an adapter installed in the hole.
- (l) Lubricate the packing (23) with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (m) Install the packing (23) on the drain adapter (24).
 - (n) Install the drain adapter (24) into the drain hole on the TCC air valve actuator (1).
 - (o) Torque the drain adapter (24) to 90 in-lb (10 N·m) - 100 in-lb (11 N·m).
 - (p) Lubricate the nut threads of the pressure hose (8), return hose (9), and drain hose (25) with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (q) Connect the pressure hose (8), return hose (9) and drain hose (25) to the pressure, return and drain adapters (20, 21 and 24).
 - (r) Torque the pressure hose (8) nut to 450 in-lb (51 N·m) - 500 in-lb (56 N·m), the return hose (9) nut to 270 in-lb (31 N·m) - 300 in-lb (34 N·m) and the drain hose (25) to 90 in-lb (10 N·m) - 100 in-lb (11 N·m). Safety the pressure, return and drain hose (8, 9 and 25) nuts with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
 - (s) Lubricate the cable coupling nut (7) with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (t) Connect the cable coupling nut (7) to the TCC air valve actuator (1).
 - (u) Torque the cable coupling nut (7) to 100 in-lb (11 N·m) - 125 in-lb (14 N·m). Safety the cable coupling nut (7) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
 - (v) Lubricate the threads of the bolt (4) with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (w) Connect the cable rod end bearing (5) to the idler arm (6) with the bolt (4) and the nut (3).
 - (x) Torque the nut (3) to 36 in-lb (4 N·m) - 40 in-lb (5 N·m).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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CAUTION

MAKE SURE THE HARNESS CONNECTOR AND INTERFACED COMPONENT DO NOT HAVE BENT PINS. ALSO EXAMINE THE PINS FOR CONTAMINATION. IF NECESSARY, CLEAN THE PINS AND MAKE THEM STRAIGHT.

- (y) Connect the electrical connector (2) to the TCC air valve actuator (1).
- (z) Tighten the electrical connector (2) coupling nut with your hand until you can not see the witness band.

NOTE: The witness color band is the first band on the connector receptacle. It can not be seen when you tighten the coupling nut.

- (aa) Use the soft-jawed pliers or the strap wrench to torque the electrical connector (2).

SUBTASK 75-23-11-830-267

- (3) Do the automatic turbine rotor clearance control system rig check. (ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG), TASK 75-23-00-700-868)
 - (a) If the partial rig check is satisfactory, do the electronic engine control at idle power. (ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873)

G. Job Close-up - Turbine Case Cooling Air Valve Actuator Installation

SUBTASK 75-23-11-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-11-840-001

- (2) Put the fire control handle in the NORM position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-23-11-410-269

- (3) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-23-11

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MANIFOLDS, LOW PRESSURE TURBINE CASE COOLING - REMOVAL/INSTALLATION

1. General

- A. These procedures have the removal and installation instructions for the low pressure turbine (LPT) turbine case cooling (TCC) manifolds.
- B. The TCC manifolds are located on the circumference of the turbine case. Access to the TCC manifolds are through the left and right thrust reverser doors.
- C. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 or PW4460/4462 -3 (Phase III) engines.

TASK 75-23-13-000-868

2. REMOVAL OF THE LOW PRESSURE TURBINE CASE COOLING MANIFOLDS

A. **Fixtures, Tools, Test and Support Equipment**

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. **References**

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
73-21-07-000-868	REMOVAL OF THE ELECTRONIC ENGINE CONTROL (EEC) ELECTRICAL HARNESS W6 (P/B 401)

C. **Job Set-up - Low Pressure Turbine Case Cooling Manifolds Removal**

SUBTASK 75-23-13-010-268

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-23-13-010-269

- (2) Remove the EEC thermocouple and the W6 airframe cable. (REMOVAL OF THE ELECTRONIC ENGINE CONTROL (EEC) ELECTRICAL HARNESS W6, TASK 73-21-07-000-868)

D. **Procedure - Low Pressure Turbine Case Cooling Manifolds Removal**

SUBTASK 75-23-13-020-267

- (1) Remove the left pylon drain tube (1) as follows: (Figure 401)
 - (a) Disconnect the tube coupling nut (2) from the union (3).
 - (b) Remove the bolt (4), washer (5), nut (6), and clamp (7) from the bracket (8).
 - (c) Remove the bolt (9), washer (10), nut (11), and clamp (12) from the PWA bracket.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (d) Disconnect the tube coupling nut (13) from the union (14). Remove the tube (1) from the engine. Install the protective caps and plugs.

SUBTASK 75-23-13-020-268

- (2) Remove the right pylon drain tubes (15 and 16) from engines No. 1 and 3 as follows: (Figure 402)
- Remove the bolts (17), washers (18), nuts (19), and clamps (20) that attach the drain tubes (15 and 16) to the PWA brackets.
 - Disconnect the tube coupling nuts (21) that attach the drain tube to the unions (22).
 - Disconnect the tube coupling nuts (23) that attach the drain tube to the unions (24).
 - Remove the drain tubes (15 and 16) from the engine. Install the protective caps and plugs.

SUBTASK 75-23-13-020-269

- (3) Remove the aft No. 4 bearing oil pressure tube (24) assembly as follows: (Figure 403) (Figure 404)
- Remove the hose clamp (25) from the tube connection spray shield (26) at the exhaust case 10:30 o'clock position. Remove the shield from the engine. Disconnect the tube coupling nut (27) from the strainer housing.
 - Remove the hose clamps (28) from the front tube connection spray shield (29) at the 10 o'clock position forward of flange M. Remove the shield from the engine. Disconnect the tube coupling nut (30) from the coupling.
 - Remove the nuts (31), bolts (32), and clamps (33) that attach the tube (24) to flange M, N, and P brackets. (Figure 405)
 - Remove the nut (34), bolt (35), clamps (36), and spacer (37) from the tubes (24 and 38). These items are aft of flange N. Remove the tube from the engine and install protective caps and plugs.

SUBTASK 75-23-13-020-270

- (4) Remove the aft No. 4 bearing scavenge tube (38) assembly as follows: (Figure 406)
- Disconnect the aft scavenge tube coupling nut (40) at the exhaust case internal tube at the 10 o'clock position.
 - Remove the nut (41), bolt (42), and clamp (43) that attach the sprayshield (44) to the flange M bracket. Remove the hose clamp (45) that attach the forward end of the spray shield to the tube. Remove the sprayshield.
 - Disconnect the coupling nut (46) at flange M from the tube adapter. Remove the nut (47), bolt (48), and clamp (49) that attach the tube (38) to the bracket on flange P. Remove the nuts (50), bolts (51), and clamps (52) that attach the tube to the brackets on flange N. Remove the tube from the engine and install protective caps and plugs. (Figure 407)

SUBTASK 75-23-13-020-274



CAUTION DO NOT USE LUBRICANTS ON EEC SENSING TUBES, ADAPTERS, OR PACKINGS. THIS WILL PREVENT CONTAMINATION OF THE EEC OR SCU.

- (5) Remove the aft No. 3 bearing oil vent line (53) and EEC PT4.95 tube (54) assemblies as follows: (Figure 408)
- Disconnect the coupling nut (55) from the oil vent tube elbow (56) on the exhaust case at the 7 o'clock position aft of flange P.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (b) Disconnect the tube coupling nut (57) at the tube adapter from behind flange M.
- (c) Loosen the tube coupling nut (58) and remove the PT 4.95 pressure tube (54) assembly from the PT4.95 manifold aft of flange P at the 7 o'clock position.
- (d) Disconnect the tube coupling nut (59) from the tube adapter aft of flange N.
- (e) Remove the nuts (60), bolts (61), and clamps (62) that attach the tubes (53 and 54) to the flange P and flange N brackets. Remove the tubes from the engine and install protective caps and plugs.

SUBTASK 75-23-13-020-276

- (6) Remove the low pressure turbine (LPT) case cooling manifolds (63 and 64) as follows: (Figure 409)

NOTE: The 7th low pressure turbine cooling manifold collector position is sealed with a cap on engines that are not Phase III.

NOTE: The step that follows is for PW4460/4462 (Not phase III) engines.

- (a) Remove the bolts (65) that attach the manifolds (63 and 64) and the cover assemblies (66) to the top and bottom sides of the collector (67). Remove the cover assemblies (66) from the rear collector tubes. Install the protective caps and plugs.

NOTE: The step that follows is for PW4460 -3/PW4462 -3 (Phase III) engines.

- (b) Remove the bolts (65) that attach the manifolds (63 and 64) to the top and bottom sides of the collector (67).

- (c) Remove the nuts (67), bolts (68), clamps (69), and spacers (70) that attach the manifolds (63 and 64) to the brackets on flange P. (Figure 410)

- (d) Remove the nuts (71), and bolts (72) that attach the cooling air manifold brackets to the brackets on flange N.

NOTE: The bolt and nut at approximately 8 o'clock position attach the clamp that holds a HPT tube.

- (e) Move the bottom cooling air manifolds (64) down and away from the collector (66). Install the protective caps and plugs.

- (f) Move the top cooling air manifolds (63) up and away from the collector (67). Install the protective caps and plugs.

SUBTASK 75-23-13-410-267

- (7) If the LPT cooling air manifolds (63 and 64) are not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ———

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-23-13

Config 2

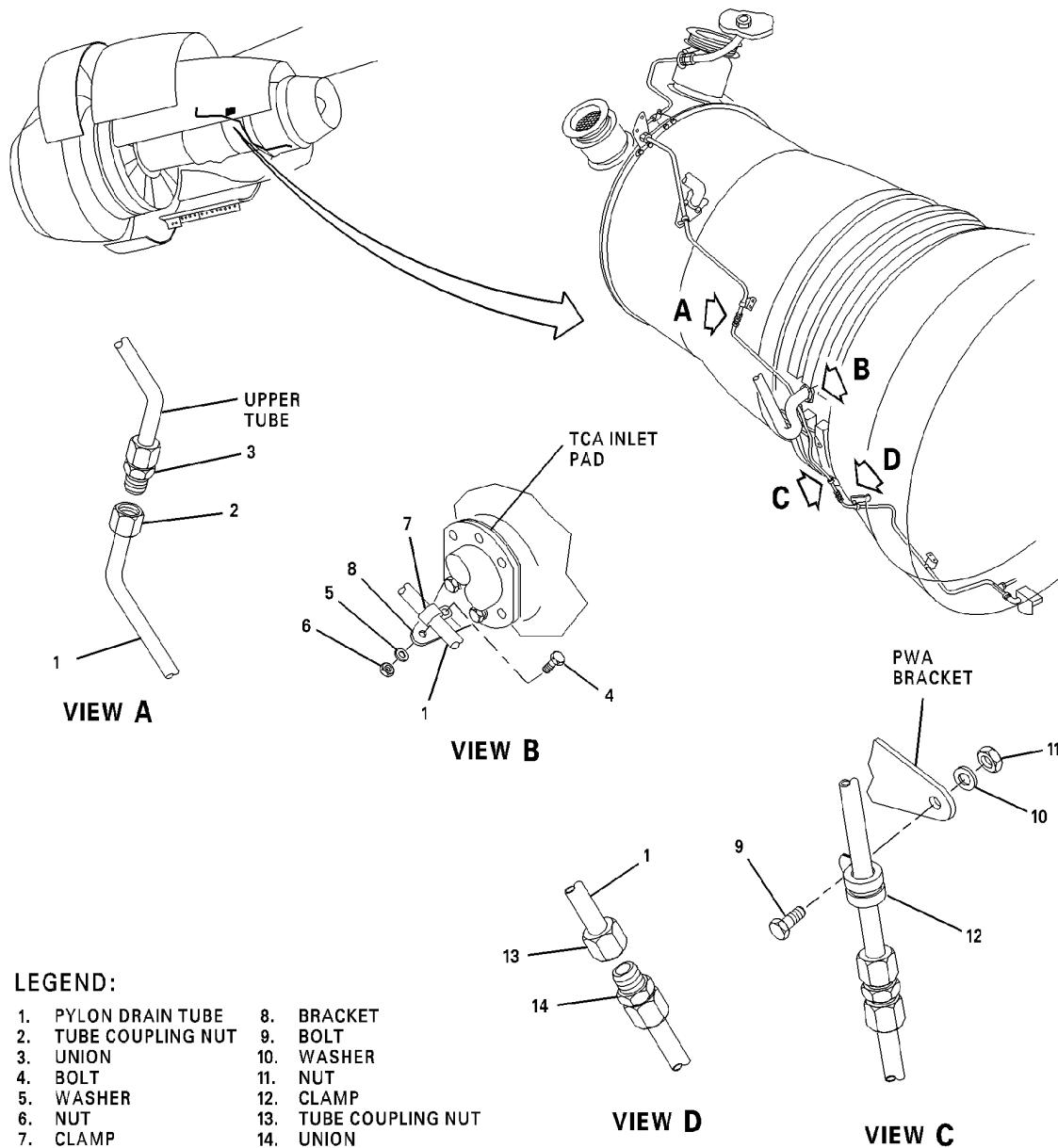
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AIRCRAFT MAINTENANCE MANUAL



LEGEND:

- | | |
|----------------------|-----------------------|
| 1. PYLON DRAIN TUBE | 8. BRACKET |
| 2. TUBE COUPLING NUT | 9. BOLT |
| 3. UNION | 10. WASHER |
| 4. BOLT | 11. NUT |
| 5. WASHER | 12. CLAMP |
| 6. NUT | 13. TUBE COUPLING NUT |
| 7. CLAMP | 14. UNION |

CAG(IGDS) L-M151R

DB2-75-0236

Left Pylon Drain Tube - Removal/Installation
Figure 401/75-23-13-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

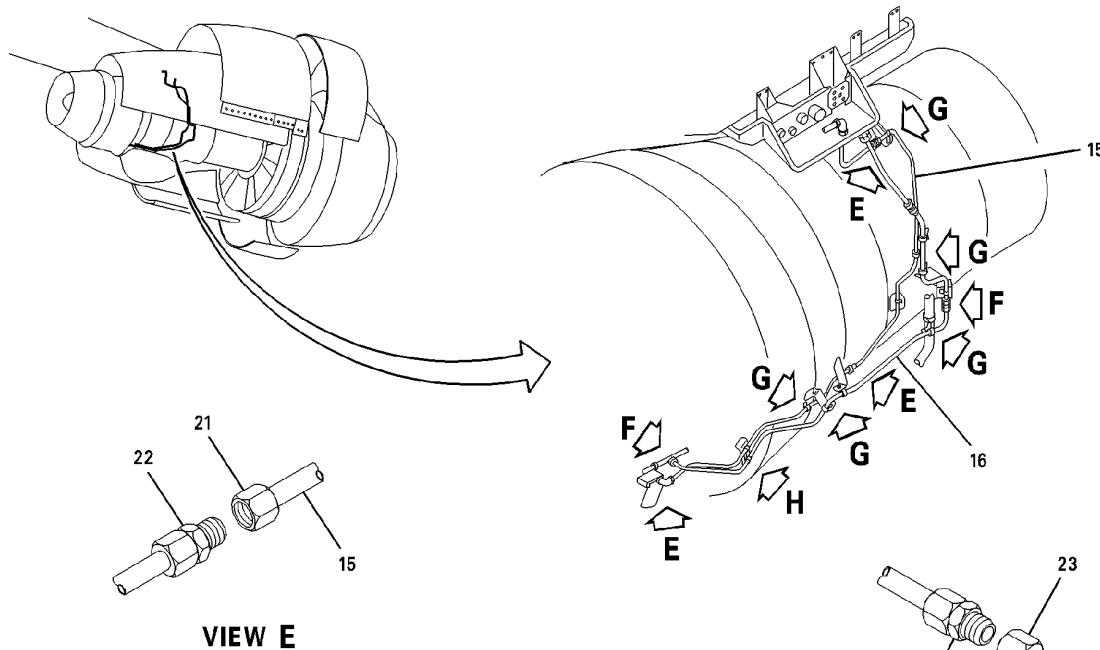
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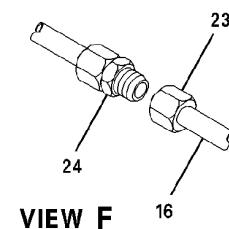
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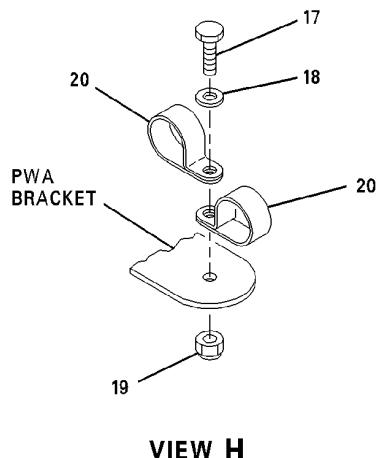
MD-11
AIRCRAFT MAINTENANCE MANUAL



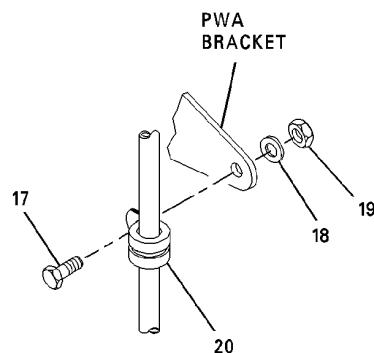
VIEW E



VIEW F



VIEW H



VIEW G

LEGEND:
15. PYLON DRAIN TUBE
16. PYLON DRAIN TUBE
17. BOLT
18. WASHER
19. NUT
20. CLAMP
21. COUPLING NUT
22. UNION
23. COUPLING NUT
24. UNION

CAG(IGDS)

DB2-75-0237

Right Pylon Drain Tubes - Removal/Installation
Figure 402/75-23-13-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

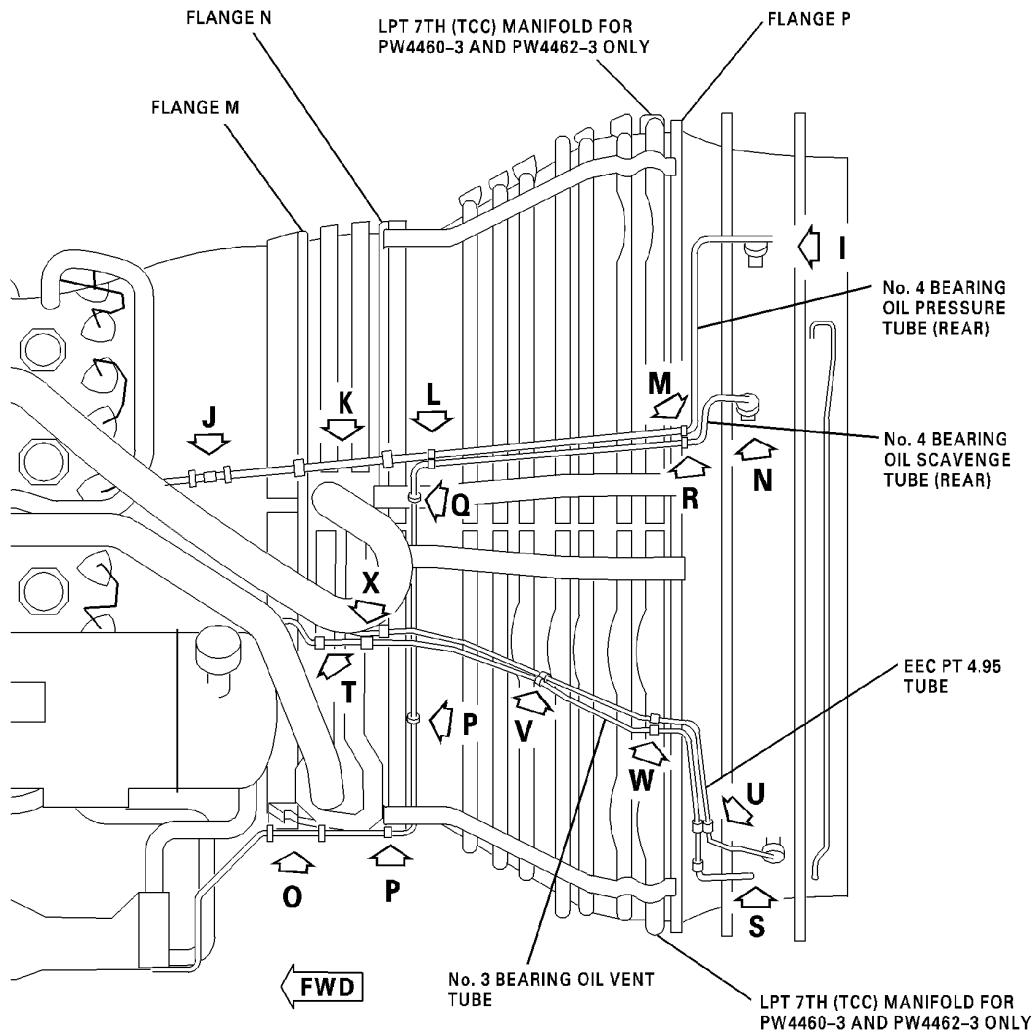
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AIRCRAFT MAINTENANCE MANUAL



CAG(IGDS)

DB2-75-0349

External Tubes - Removal/Installation
Figure 403/75-23-13-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

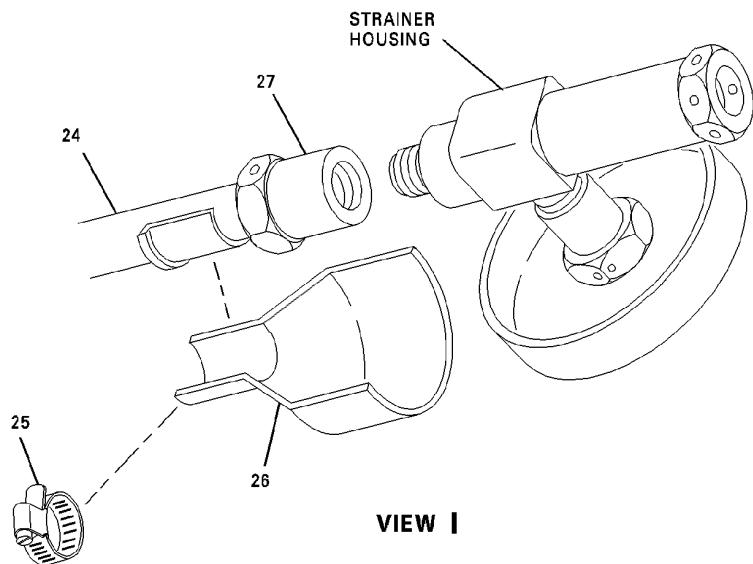
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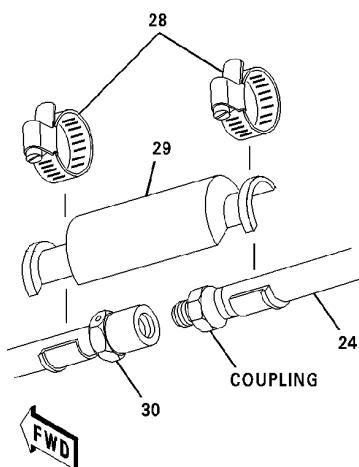
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VIEW I



VIEW J

CAG(IGDS)

DB2-75-0350

External Tubes - Removal/Installation
Figure 404/75-23-13-990-871

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

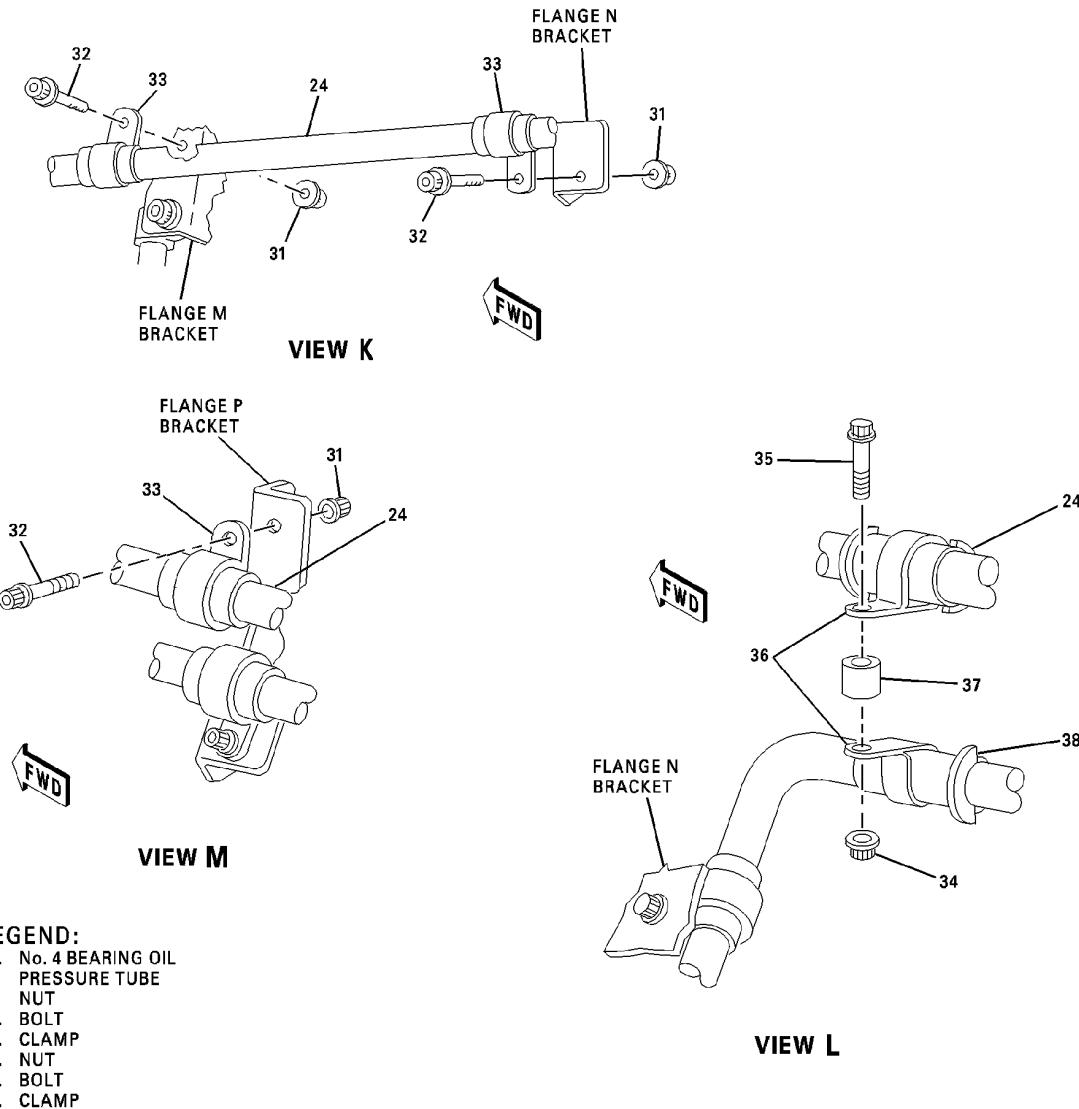
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CAG(IGDS)

DB2-75-0351

External Tubes - Removal/Installation
Figure 405/75-23-13-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

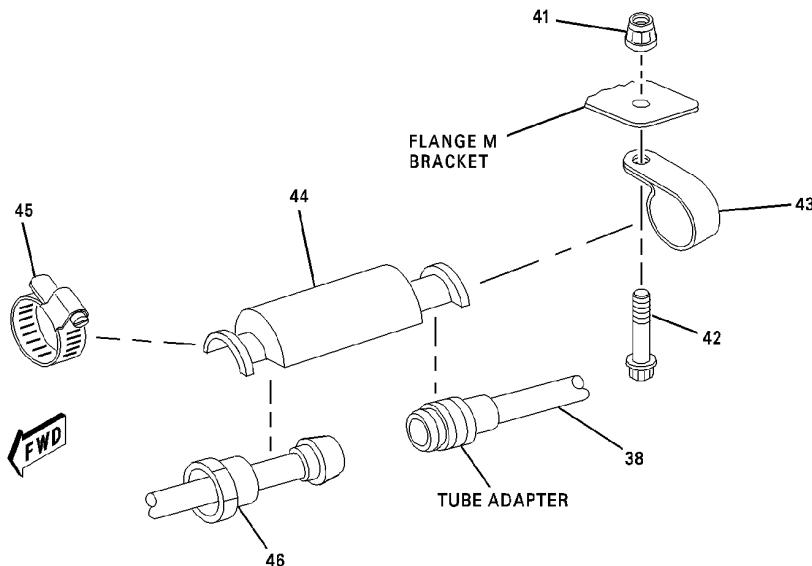
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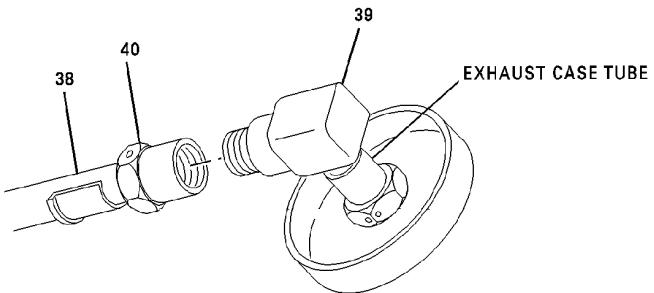
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VIEW O



VIEW N

LEGEND:

- 38. No. 4 BEARING OIL SCAVENGE TUBE
- 39. SCAVENGE TUBE ELBOW
- 40. COUPLING NUT
- 41. NUT
- 42. BOLT
- 43. CLAMP
- 44. SPRAY SHIELD
- 45. CLAMP
- 46. COUPLING NUT

CAG(IGDS)

DB2-75-0352

External Tubes - Removal/Installation
Figure 406/75-23-13-990-873

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

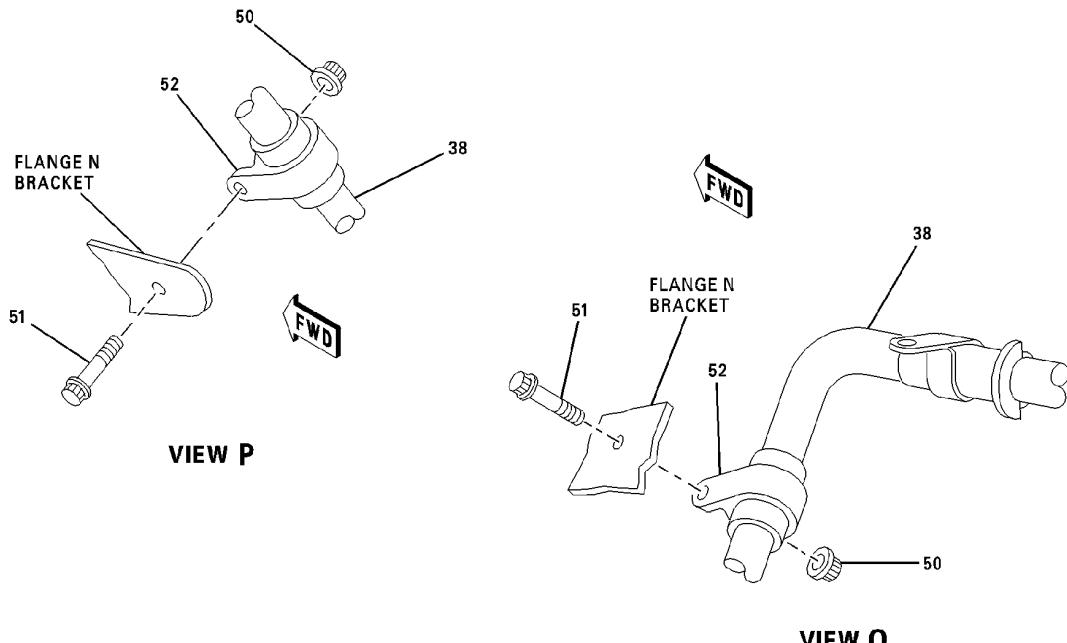
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LEGEND:
38. No. 4 BEARING OIL
SCAVENGE TUBE
47. NUT
48. BOLT
49. CLAMP
50. NUT
51. BOLT
52. CLAMP

CAG(IGDS)

DB2-75-0353

External Tubes - Removal/Installation
Figure 407/75-23-13-990-874

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

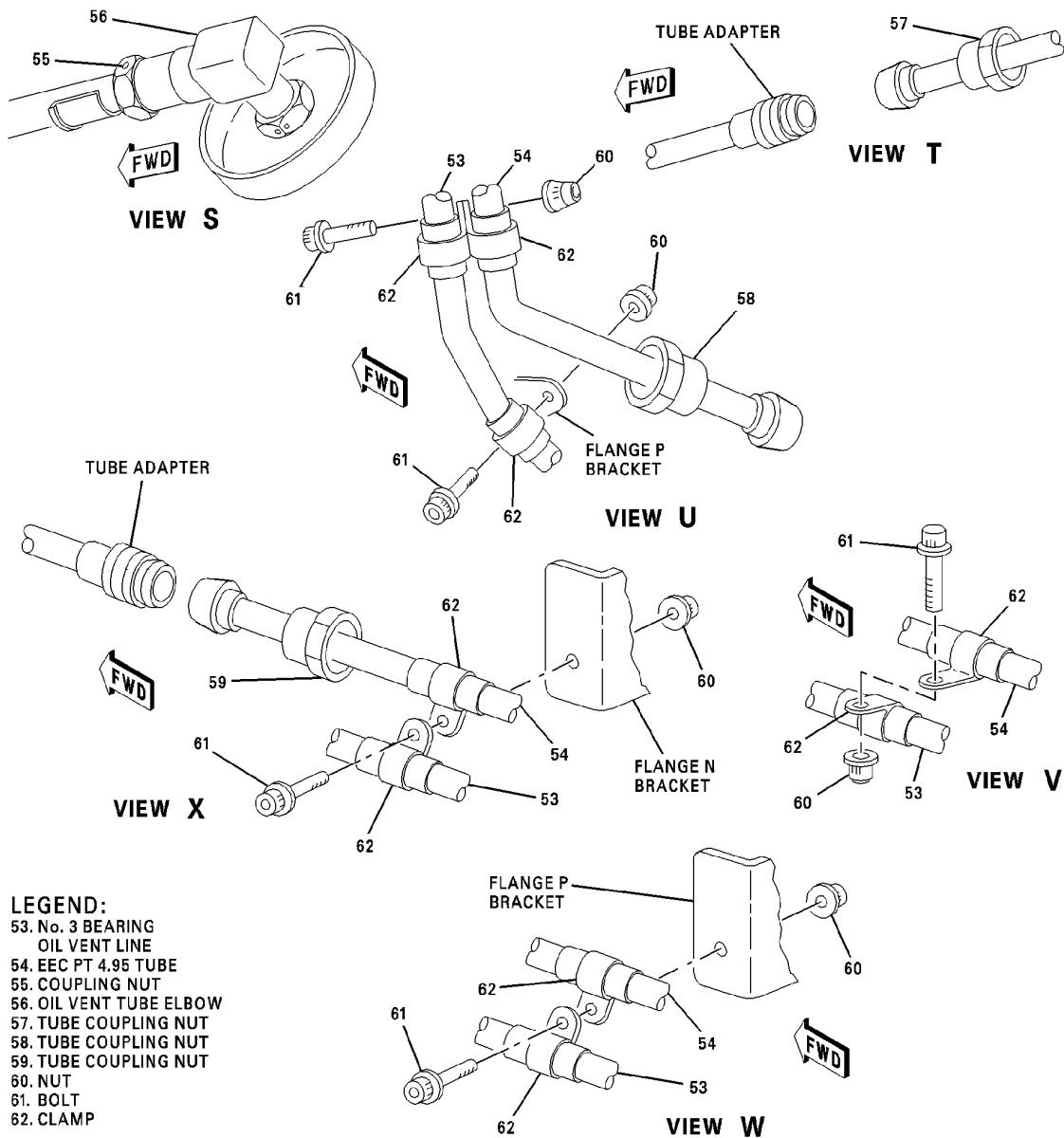
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LEGEND:

- 53. No. 3 BEARING
- OIL VENT LINE
- 54. EEC PT 4.95 TUBE
- 55. COUPLING NUT
- 56. OIL VENT TUBE ELBOW
- 57. TUBE COUPLING NUT
- 58. TUBE COUPLING NUT
- 59. TUBE COUPLING NUT
- 60. NUT
- 61. BOLT
- 62. CLAMP

CAG(IGDS)

DB2-75-0354

External Tubes - Removal/Installation
Figure 408/75-23-13-990-875

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

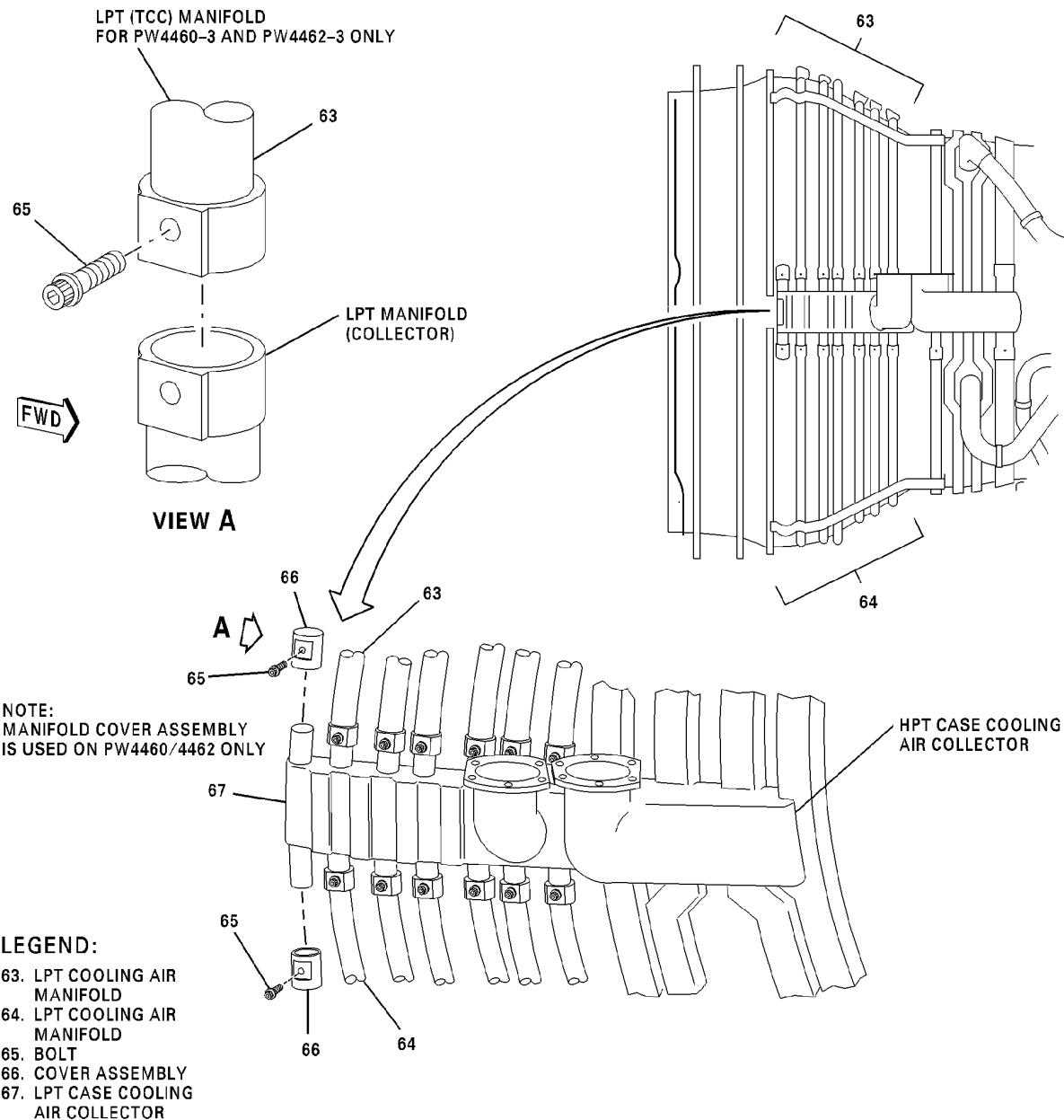
75-23-13

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CAG(IGDS) L-A6044

DB2-75-0244A

LPT Case Cooling Manifolds - Removal/Installation
Figure 409/75-23-13-990-876

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

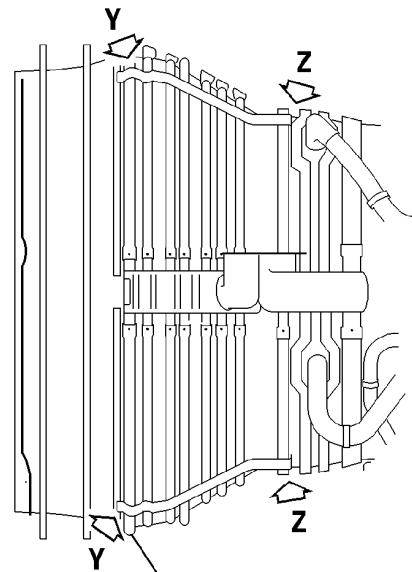
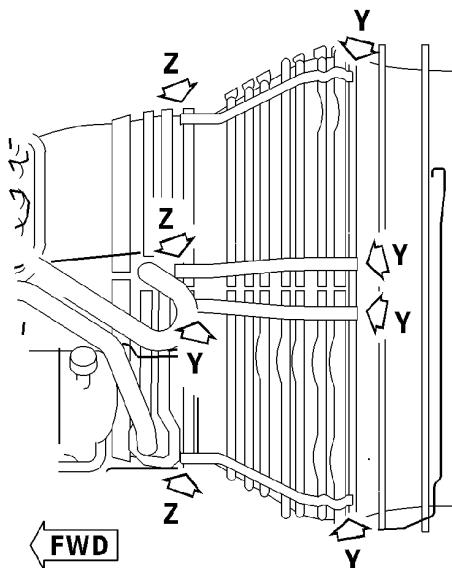
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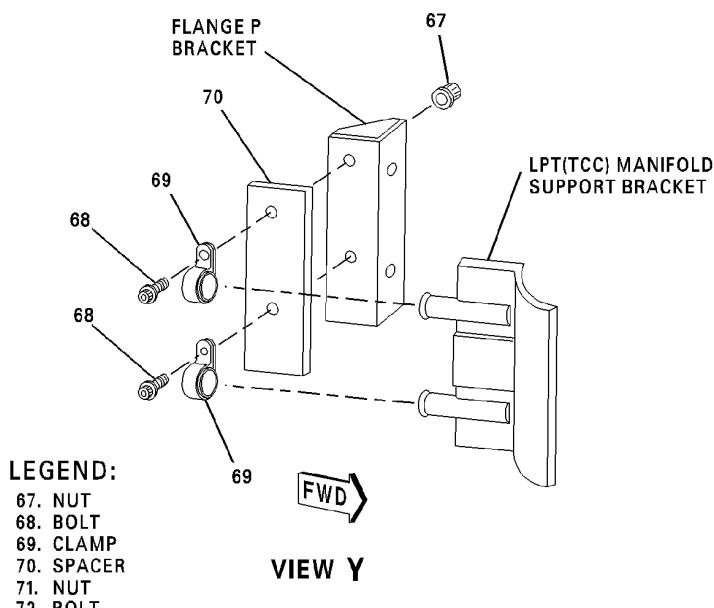
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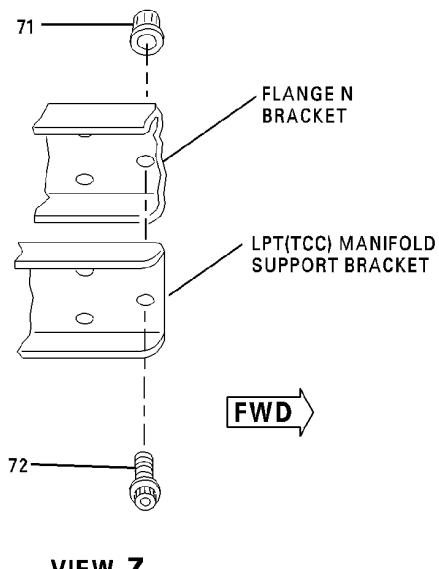
LPT 7TH (TCC) MANIFOLD FOR
PW4460-3 AND PW4462-3 ONLY



LEGEND:
67. NUT
68. BOLT
69. CLAMP
70. SPACER
71. NUT
72. BOLT

FWD

VIEW Y



72

FWD

VIEW Z

CAG(IGDS) L-A6044, L-A5614

DB2-75-0245A

LPT Case Cooling Manifolds - Removal/Installation
Figure 410/75-23-13-990-877

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-23-13-400-868

3. INSTALLATION OF THE LOW PRESSURE TURBINE CASE COOLING MANIFOLDS

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 5–150 in-lb (0.56–17 N·m)
Not specified	Torque wrench 0–300 in-lb (0–34.0 N·m)
Model M303, M305 or M307	Crimper, Bergen Mechanical

B. Consumable Materials

(1) Consumable Materials

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)
P05-289	Lockwire (AS3214-02)
P06-003	Compound, anti-galling (PWA 586)
P05-291	Cable, safety
P05-292	Ferrule, safety cable

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
73-21-07-400-868	INSTALLATION OF THE ELECTRONIC ENGINE CONTROL (EEC) ELECTRICAL HARNESS W6 (P/B 401)

D. Job Set-up - Low Pressure Turbine Case Cooling Manifolds Installation

SUBTASK 75-23-13-010-270

- (1) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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E. Procedure - Low Pressure Turbine Case Cooling Manifolds Installation

SUBTASK 75-23-13-410-268

- (1) Install the low pressure turbine (LPT) case cooling air manifolds (63 and 64) as follows:
(Figure 409)

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (a) Position the upper and lower manifold (63 and 64) on the low pressure turbine (LPT) case. Lubricate the bolts (65) threads with engine oil (PO3-001). Install the upper cooling air manifolds (63) into the collector (67). Install the bolts (65) by hand into the upper manifold (63). Do not torque the bolts at this time. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (b) Install the lower cooling air manifold (64) tubes into the collector (67) tubes. Lubricate the bolts (65) threads with engine oil (PO3-001). Install the bolts (65) by hand into the lower manifold (64). Do not torque the bolts at this time.
NOTE: The step that follows is for PW4460/4462 (Not phase III) engines.
- (c) Install the cover assemblies (66) on the rear collector tubes. Lubricate the bolts (65) threads with engine oil (PO3-001). Install the bolts (65) by hand. Do not torque the bolts at this time.
NOTE: The 7th low pressure turbine cooling manifold collector position is sealed with a cap on engines that are not Phase III.
- (d) Lubricate the bolts (72) with engine oil (PO3-001). Attach the cooling air manifold support brackets to the brackets at flange N and LPT case. Install the bolts and nuts (71) by hand. Do torque the bolts at this time. (Figure 410)
NOTE: The bolt and nut at approximately 8 o'clock position attach the clamp that holds a HPT tube.
- (e) Lubricate the bolts (68) with engine oil (PO3-001). Install the clamps (69) on the rear cooling air manifold support brackets. Attach the clamps to the brackets on flange P with the bolts, nuts (67), and spacer (70). Do not torque the bolts at this time.
- (f) Torque all the bolts as follows:
- 1) Torque the top and bottom cooling air manifolds and cover assembly bolts (65) to 36–40 in-lb (4.1–4.5 N·m).
 - 2) Torque the bolts (72) that attach the front mount to the brackets on flange N to 36–40 in-lb (4.1–4.5 N·m).
 - 3) Torque the bolts (68) that attach the rear of the collector to the brackets on flange P to 36–40 in-lb (4.1–4.5 N·m).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-23-13-420-273



CAUTION

DO NOT USE LUBRICANTS ON EEC SENSING TUBES, ADAPTERS, OR PACKINGS. THIS WILL PREVENT CONTAMINATION OF THE EEC OR SCU.

- (2) Install the aft EEC PT4.95 pressure tube (54) as follows:

- Remove the protective caps and plugs.
- On the EEC PT4.95 pressure tube (54), attach the tube nut (57) to the tube adapter just aft of flange M. Tighten the tube nut (57) with your hand. (Figure 403) (Figure 408)
- Attach the PT4.95 pressure tube nut (58) to the PT4.95 manifold adapter aft of flange P at the 7 o'clock position. Tighten the tube nut (58) with your hand.

SUBTASK 75-23-13-420-269

- (3) Install the aft No. 3 bearing oil vent tube (53) assembly as follows:



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1178, COMPOUND/ANTI-GALLING

HAZMAT 1000, REFER TO MSDS

- Lubricate the adapter threads of the coupling nut (57) aft of flange M with anti-galling compound (P06-003). Install the oil vent tube (53) by hand to the tube adapter on the exhaust case just aft of flange M. Tighten the adapters with your hand. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868) (Figure 403) (Figure 408)
- Lubricate the adapter threads of the coupling nut (55) aft of flange M with anti-galling compound (P06-003). Install the coupling nut (55) by hand on the oil vent tube elbow (56) on the exhaust case at the 7 o'clock position aft of flange P.
- Install the clamps (62) to the tube (53) and adjacent EEC PT4.95 tube (54). Attach the tube to the brackets on flange N and P with the bolts (61) and nuts (60). Tighten the bolts and nuts with your hand.
- Torque all the clamp nuts (60) to 36–40 in-lb (4.1–4.5 N·m).
- Torque both No. 3 bearing oil vent tube nuts (55 and 57) to 200–225 in-lb (22.6–25.4 N·m). Safety the tube nuts with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- Torque the EEC PT4.95 tube nuts (58 and 59) to 270–300 in-lb (30.5–33.9 N·m). Safety the tube nuts with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).

SUBTASK 75-23-13-420-270

- (4) Install the aft No. 4 bearing scavenge tube (38) assembly as follows: (Figure 403) (Figure 406) (Figure 407)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS
HAZMAT 1178, COMPOUND/ANTI-GALLING
HAZMAT 1000, REFER TO MSDS

- (a) Lubricate the elbow adapter (39) and coupling nut (40) threads with anti-galling compound (P06-003). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS
HAZMAT 1016, OIL/LUBRICATING (DPM 3564)
HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the bolts (41, 42, 48, 51) threads with engine oil (P03-001).
- (c) Install the aft scavenge tube nut (46) to the tube adapter on the internal tube at the exhaust case by hand.
- (d) Install the clamp (49) on the tube and attach the tube on flange P with the bolts (48) and nuts (47). Tighten the nut with your hand.
- (e) Install the clamps (52) on the tube and attach the tube on flange N with the bolts (51) and nuts (50). Tighten the nuts (50) with your hand.
- (f) Torque the clamp bolts (48 and 51) to 36–40 (4.1–4.5 N·m).
- (g) Hold the scavenge tube elbow (39) in position and torque the tube nut (40) 200–225 in-lb (22.6–25.4 N·m). Safety the tube nut with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (h) Torque the tube nut (46) 475–525 in-lb (53.7–59.3 N·m). Safety the tube nut with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (i) Position the spray shield (44) to the inboard side of flange M. Attach the forward end with the clamp (45). Torque the clamp to 15–18 in-lb (1.7–2.1 N·m).
- (j) Install the clamp (43) to the aft end of the spray shield (44) over the tube. Attach the clamp to the flange M bracket with bolt (42) and nut (41). Torque the bolt to 36–40 in-lb (4.1–4.5 N·m).

SUBTASK 75-23-13-420-271

- (5) Install the No. 4 bearing oil pressure tube (36) assembly as follows: (Figure 403) (Figure 404) (Figure 405)

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (a) Lubricate the bolts (32 and 35) and tube nut (27 and 30) threads with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (b) Install the tube (24) coupling nut (27) to the No. 4 bearing strainer housing, and the tube coupling (30) forward of flange M. Tighten the tube nuts with your hand.
- (c) Install the clamps (33) that attach the tube (24) to the flange M, N, and P brackets with the bolts (32) and nuts (31). Torque the clamp nuts 36–40 in-lb (4.0–4.5 N·m).
- (d) Attach the tube to the No. 4 bearing oil scavenge tube with the clamp (36), bolt (35), spacer (37), and nut (34). These items are aft of flange N. Torque the bolt to 36–40 in-lb (4.0–4.5 N·m).
- (e) Torque both tube nuts (27 and 30) to 450–500 in-lb (50.8–56.5 N·m). Safety the tube nuts with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (f) Install the spray shield (26) to the inboard side of the pressure tube connection at flange P. Attach the spray shield with the hose clamp (25). Torque the clamp to 15–18 in-lb (1.7–2.0 N·m).
- (g) Install the spray shield (29) to the inboard side of the pressure tube forward of flange M. Attach the spray shield to the pressure tube with the hose clamps (28). Torque the hose clamps to 15–18 in-lb (1.7–2.0 N·m).

SUBTASK 75-23-13-420-272

- (6) Install the pylon drain tube as follows: (Figure 401) (Figure 402)
 - (a) Attach the pylon drain tubes (1, 15, and 16) with the coupling nuts (2,13,21,23) and tighten them with your hand.
 - (b) Install the loop clamps (12 and 20) with the bolts (9 and 17), washers (10 and 18), and nuts (11 and 19). Torque the nuts to 20–25 in-lb (2.3–2.8 N·m). Torque the tube coupling nuts (2,13,21,23) to 450–500 in-lb (50.8–56.5 N·m).

F. Job Close-up - Low Pressure Turbine Case Cooling Manifolds Installation

SUBTASK 75-23-13-420-275

- (1) Install the EEC thermocouple and the W6 airframe cable. (INSTALLATION OF THE ELECTRONIC ENGINE CONTROL (EEC) ELECTRICAL HARNESS W6, TASK 73-21-07-400-868)

SUBTASK 75-23-13-942-267

- (2) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-13-410-275

- (3) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

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MANIFOLDS, HIGH PRESSURE TURBINE CASE COOLING AIR - REMOVAL/INSTALLATION

1. General

- A. These procedures have the removal and installation instructions for the high pressure turbine case cooling (HPTCC) air manifolds.
- B. The HPTCC air manifolds are installed on the high pressure turbine case. Access to the HPTCC air manifolds is through the thrust reverser doors.
- C. Unless different instructions are given, the maintenance procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-23-14-000-868

2. REMOVAL OF THE HIGH PRESSURE TURBINE CASE COOLING AIR MANIFOLDS

A. **Fixtures, Tools, Test and Support Equipment**

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. **References**

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
73-21-07-000-868	REMOVAL OF THE ELECTRONIC ENGINE CONTROL (EEC) ELECTRICAL HARNESS W6 (P/B 401)
80-12-03-000-868	REMOVAL OF THE ENGINE STARTER SHUTOFF VALVE (P/B 401)

C. **Job Set-up - High Pressure Turbine Case Cooling Air Manifolds Removal**

SUBTASK 75-23-14-865-267



WARNING MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

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(WARNING PRECEDES)

**WARNING**

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open this circuit breaker and install safety tag:

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

SUBTASK 75-23-14-010-268

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-23-14-010-269

- (3) Remove the EEC thermocouple and the W6 airframe cable. (REMOVAL OF THE ELECTRONIC ENGINE CONTROL (EEC) ELECTRICAL HARNESS W6, TASK 73-21-07-000-868)

SUBTASK 75-23-14-010-270

- (4) Remove the engine starter shutoff valve. (REMOVAL OF THE ENGINE STARTER SHUTOFF VALVE, TASK 80-12-03-000-868)

D. Procedure - High Pressure Turbine Case Cooling Air Manifolds Removal

SUBTASK 75-23-14-020-267

- (1) Remove the starter lower supply (1) duct as follows: (Figure 401)
 - (a) Remove the V-ring clamp (2) and pressure seal (3) that attaches the lower duct (1) to the intermediate duct (4). Discard the seal.
 - (b) Remove the V-ring clamp (2) and pressure seal (3) that attaches the lower duct (1) to the starter shut-off valve (5). Discard the pressure seal.
 - (c) Remove the nut (6), washer (7), and bolt (8) that attaches the lower duct (1) to the support link (9). Remove the lower duct (1).

SUBTASK 75-23-14-020-268

- (2) If necessary, remove the left pylon drain tube (10) as follows: (Figure 402)
 - (a) Disconnect the tube coupling nut (11) from the union (12) and remove the union from tube coupling nut (13).
 - (b) Remove the screw (14), washer (15), nut (16), and clamp (17) from the bracket (18) attached to the turbine cooling air (TCA) inlet pad (19).
 - (c) Remove the screw (20), washer (21), nut (22), and clamp (23) from the PWA bracket.
 - (d) Disconnect the tube coupling nut (24) from the union (25). Remove the pylon drain tube (10) from the engine.
 - (e) Disconnect the union (25) from the tube coupling nut (26).

SUBTASK 75-23-14-020-269

- (3) If necessary, remove the right pylon drain tubes (27 and 28) from engines No. 1 and 3 as follows: (Figure 403)
 - (a) Remove the screws (29), washers (30), and nuts (31), for the clamps that attach the tube assembly (27 and 28) to the PWA brackets.

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- (b) Disconnect the tube coupling nut (32) that attaches the tube assembly to the union (33).
- (c) Disconnect the tube coupling nut (34) that attaches the tube assembly to the unions (35).
- (d) Remove the tube assemblies (27 and 28) from the engine.

SUBTASK 75-23-14-020-270

- (4) Remove the aft No. 4 bearing oil pressure tube (36) as follows: (Figure 404) (Figure 405) (Figure 406)
 - (a) Remove the hose clamp (37) from the tube connection spray shield (38) at the exhaust case 10 o'clock position. Remove the shield from the engine. Disconnect the tube coupling nut (39) from the strainer housing.
 - (b) Remove the hose clamps (40) from the front tube connection spray shield (41) at the 10 o'clock position forward of flange M. Remove the shield from the engine. Disconnect the tube coupling nut (42) from the coupling.
 - (c) Remove the bolt (44), nut (43), clamps (45), and spacer (46) from the No. 4 bearing oil scavenge tube (47) installed along the bearing pressure tube (36). These items are aft of flange N.
 - (d) Remove the bolts (44), nuts (43), and clamps (45) that attach the tube to flange M, N, and P brackets. Remove the tube from the engine and install protective caps and plugs.

SUBTASK 75-23-14-020-273

- (5) Remove the aft No. 4 bearing oil scavenge tube (47) as follows: (Figure 404) (Figure 405) (Figure 406) (Figure 407)
 - (a) Disconnect the aft scavenge tube elbow (48) from the exhaust case tube adapter (49) at the 10 o'clock position.
 - (b) Remove the bolt (44), nut (43), and clamp (50) that attach the spray shield (51) to the flange M bracket. Remove the hose clamp (40) that attaches the forward end of the spray shield (51) to the tube and remove the spray shield.
 - (c) Disconnect the coupling nut (52) at flange M from the tube adapter. Remove the bolt (44), nut (43), and clamp (53) that attach the No. 4 bearing oil scavenge tube (47) to the bracket on flange P.
 - (d) Remove the bolts (44), nuts (43), and clamps (45) that attach the No. 4 bearing oil scavenge tube (47) to the brackets on flange N.
 - (e) Remove the No. 4 bearing oil scavenge tube (47) from the engine and install protective caps and plugs.

SUBTASK 75-23-14-020-274



CAUTION

DO NOT USE LUBRICANTS ON EEC SENSING TUBES, ADAPTERS, OR PACKINGS. THIS WILL PREVENT CONTAMINATION OF THE EEC OR SCU.

- (6) Remove the aft No. 3 bearing oil vent tube (54) and EEC PT4.95 tubes (54 and 55) as follows: (Figure 408)
 - (a) Disconnect the oil vent tube elbow (56) from the adapter (57) on the exhaust case at the 7 o'clock position.
 - (b) Disconnect the coupling nut (58) from the tube adapter (59) immediately aft of flange M.
 - (c) Loosen the tube nut and remove the EEC PT4.95 tube (55) assembly from the EEC PT4.95 manifold aft of flange P at the 7 o'clock position.
 - (d) Disconnect the tube nut from the tube adapter aft of flange N.

EFFECTIVITY
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- (e) Remove the bolts (44), nuts (43), and clamps (45) that attach the No. 3 bearing oil vent tube (54) and EEC PT4.95 tube (55) to the flange P and flange N brackets.
- (f) Remove the No. 3 bearing oil vent tube (54) and the EEC PT4.95 tube (55) from the engine and install protective caps and plugs.

SUBTASK 75-23-14-020-276

- (7) Remove the HPTCC air manifolds as follows: (Figure 409) (Figure 410) (Figure 411) (Figure 412) (Figure 413)
 - (a) Remove the bolts (61) that attach the upper and lower manifolds to the HPTCC collector detail tubes.
 - (b) Remove the bolts (62) and nuts (63) that attach the forward lower HPTCC manifold clamps (64) to the support brackets and remove the clamps. Remove the manifold (65) from the collector.
 - (c) Remove the bolts (62) and nuts (63) that attach the forward upper HPTCC air manifold clamps (64) to the brackets and remove the clamps. Remove the manifold (65) from the collector.
 - (d) Remove the center bolts (66) and nuts (67) from the bridge brackets (68). This disconnects the upper and lower center HPTCC air manifolds (69 and 70) from the bridge brackets.
 - (e) Remove the end bolts (71) and nuts (72) that attach the lower bridge brackets (68) to the flange M and N brackets. Remove the two lower center HPTCC air manifolds (69 and 70) from the collector and engine.
 - (f) Remove the end bolts (71) and nuts (72) that attach the upper bridge brackets (68) to the flange M and N brackets. Remove the two upper center HPTCC air manifolds (69 and 70) from the collector and engine.
 - (g) Remove the bolts (73), nuts (74), and clamps (75) that attach the aft upper and lower HPTCC air manifolds (76) to the brackets. Disengage the manifolds from the collector and move them aft to get access to the support brackets (79).
 - (h) Remove the bolts (77) and nuts (78) that attach the aft upper and lower HPTCC air manifold brackets (79) to the flange N bracket.
 - (i) Remove the flange N brackets as necessary to get clearance for the removal of the aft HPTCC air manifold (76). Remove the bolts (80) and nuts (81) that attach the LPT manifold support brackets to the flange N brackets.
 - (j) Remove the aft upper and lower HPTCC air manifolds (76). Install protective caps and plugs.

SUBTASK 75-23-14-410-267

- (8) If the HPTCC air manifolds are not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ———

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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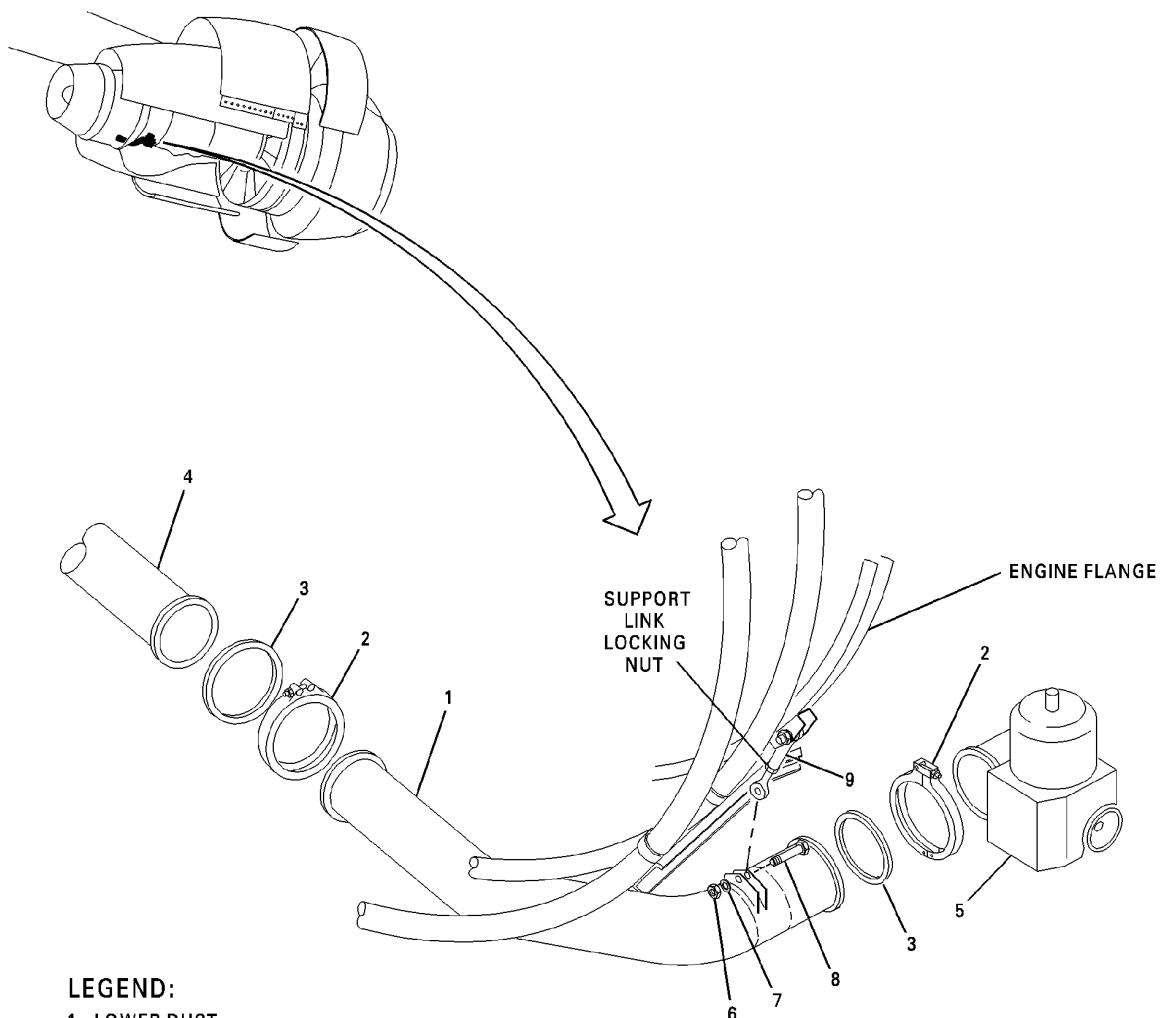
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LEGEND:

1. LOWER DUCT
2. V-RING CLAMP
3. PRESSURE SEAL
4. INTERMEDIATE DUCT
5. STARTER SHUT-OFF VALVE
6. NUT
7. WASHER
8. BOLT
9. SUPPORT LINK

CAG(IGDS) L-A089R

DB2-75-0068A

Starter Lower Supply Duct - Removal/Installation
Figure 401/75-23-14-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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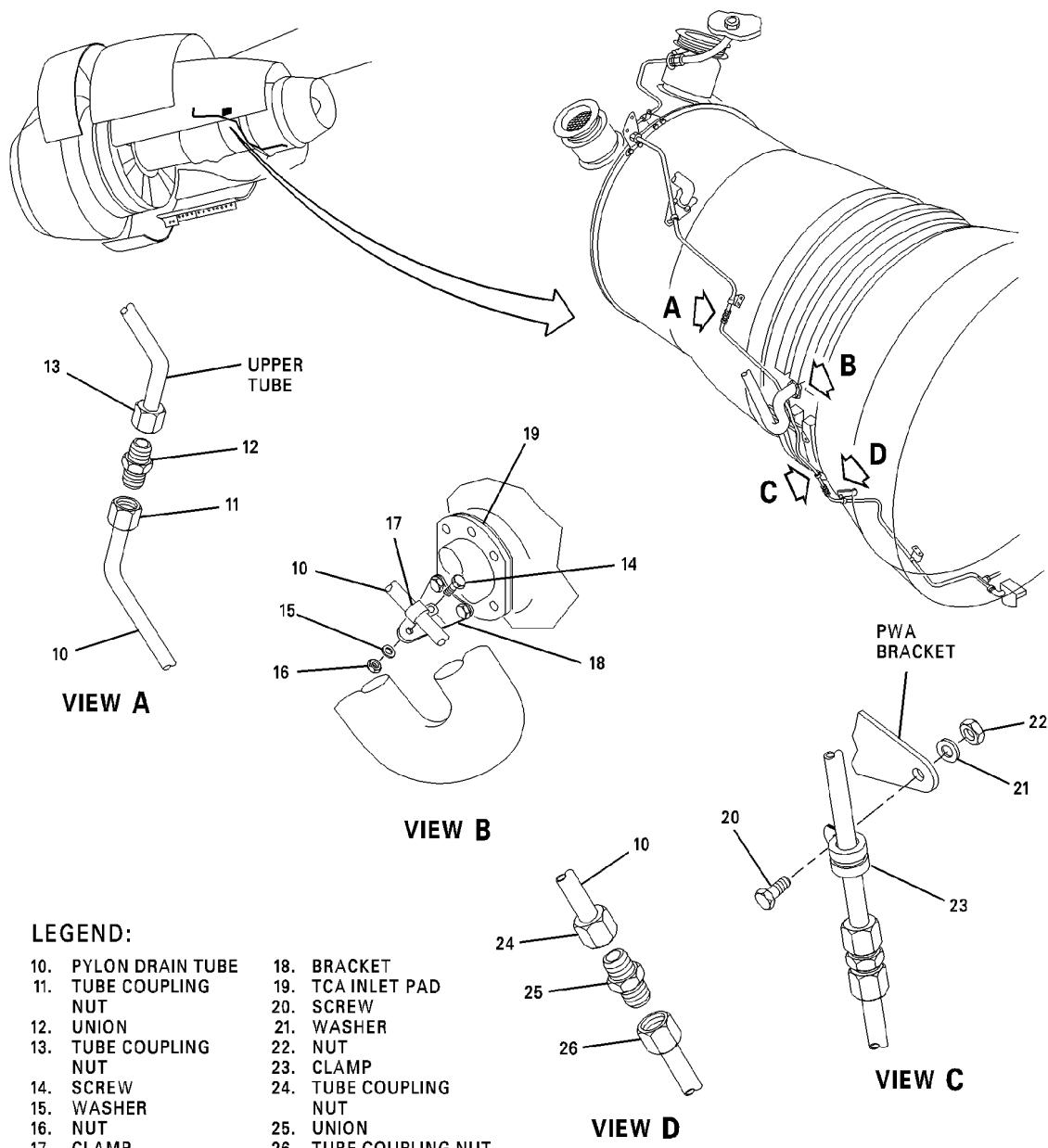
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LEGEND:

10. PYLON DRAIN TUBE	18. BRACKET
11. TUBE COUPLING NUT	19. TCA INLET PAD
12. UNION	20. SCREW
13. TUBE COUPLING NUT	21. WASHER
14. SCREW	22. NUT
15. WASHER	23. CLAMP
16. NUT	24. TUBE COUPLING NUT
17. CLAMP	25. UNION
	26. TUBE COUPLING NUT

CAG(IGDS) L-M151R

DB2-75-0069A

Pylon Drain Tube - Removal/Installation
Figure 402/75-23-14-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

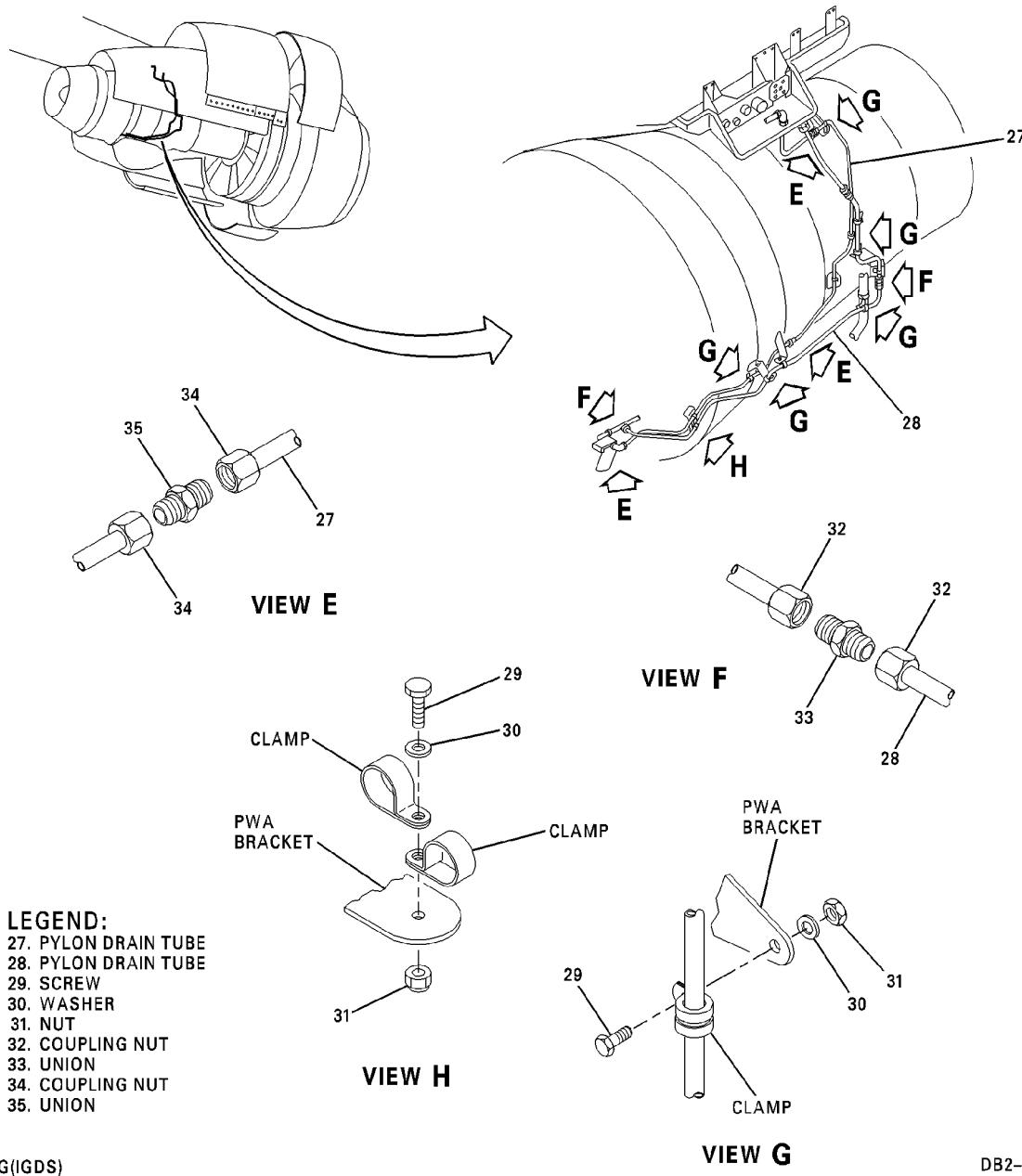
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CAG(IGDS)

DB2-75-0187A

Pylon Drain Tubes - Removal/Installation
Figure 403/75-23-14-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

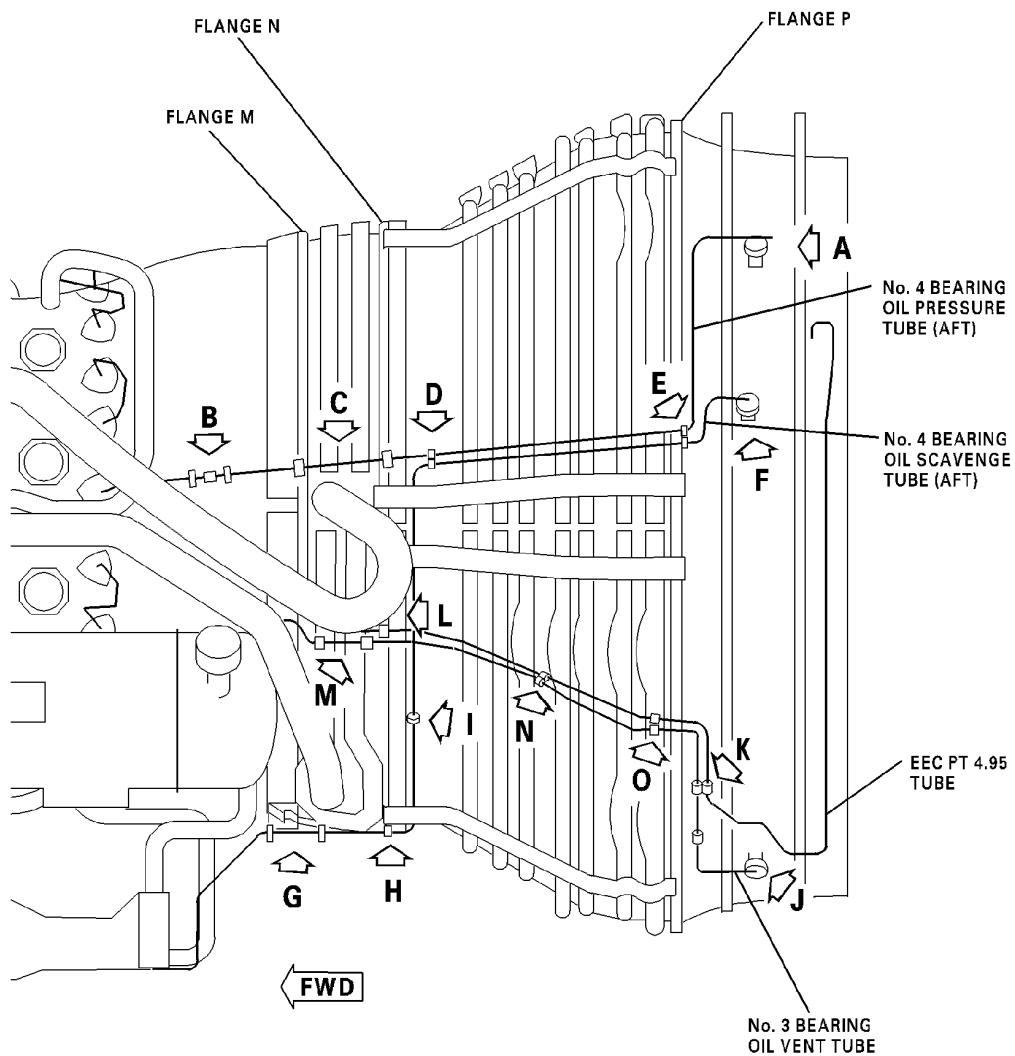
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CAG(IGDS)

DB2-75-0344

External Tubes - Removal/Installation
Figure 404/75-23-14-990-871

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

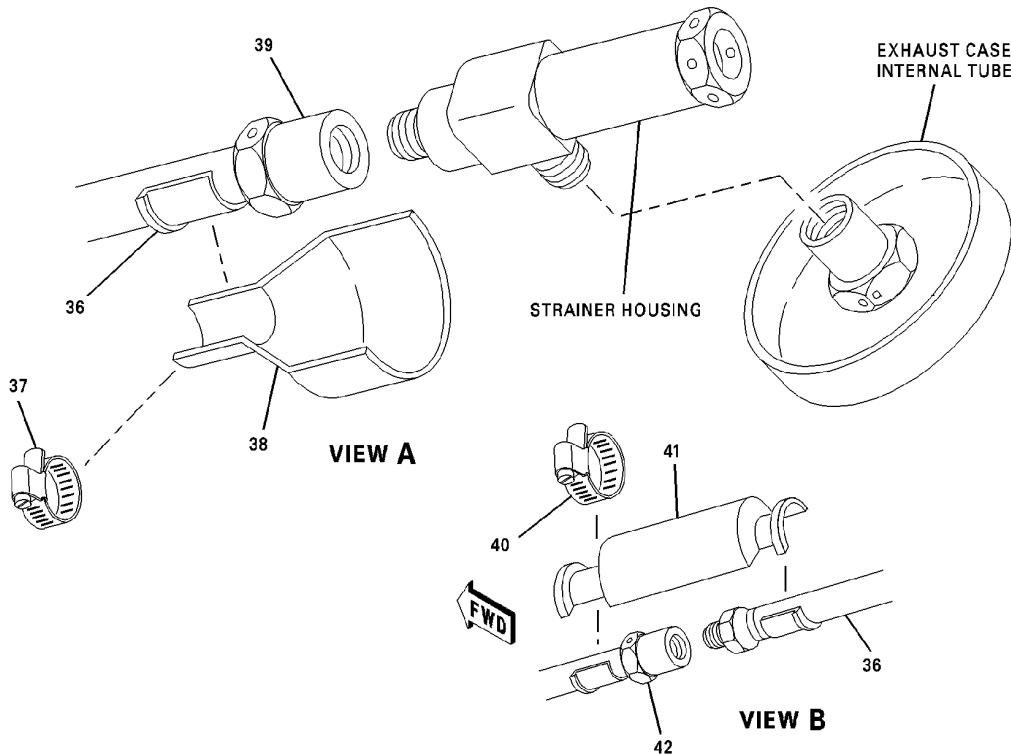
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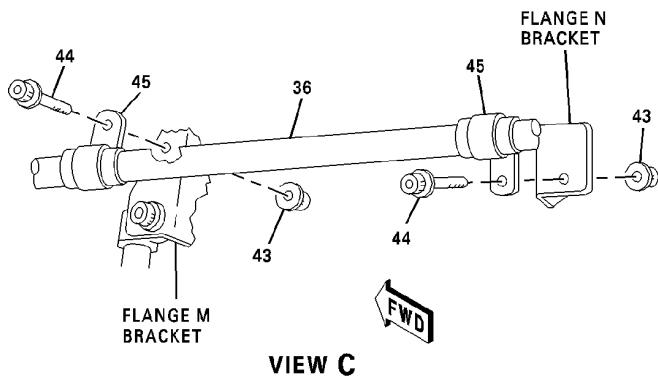
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LEGEND:

- 36. No. 4 BEARING OIL PRESSURE TUBE
- 37. HOSE CLAMP
- 38. SPRAY SHIELD
- 39. TUBE COUPLING NUT
- 40. HOSE CLAMP
- 41. SPRAY SHIELD
- 42. TUBE COUPLING NUT
- 43. NUT
- 44. BOLT
- 45. CLAMP

CAG(IGDS)



DB2-75-0345

External Tubes - Removal/Installation
Figure 405/75-23-14-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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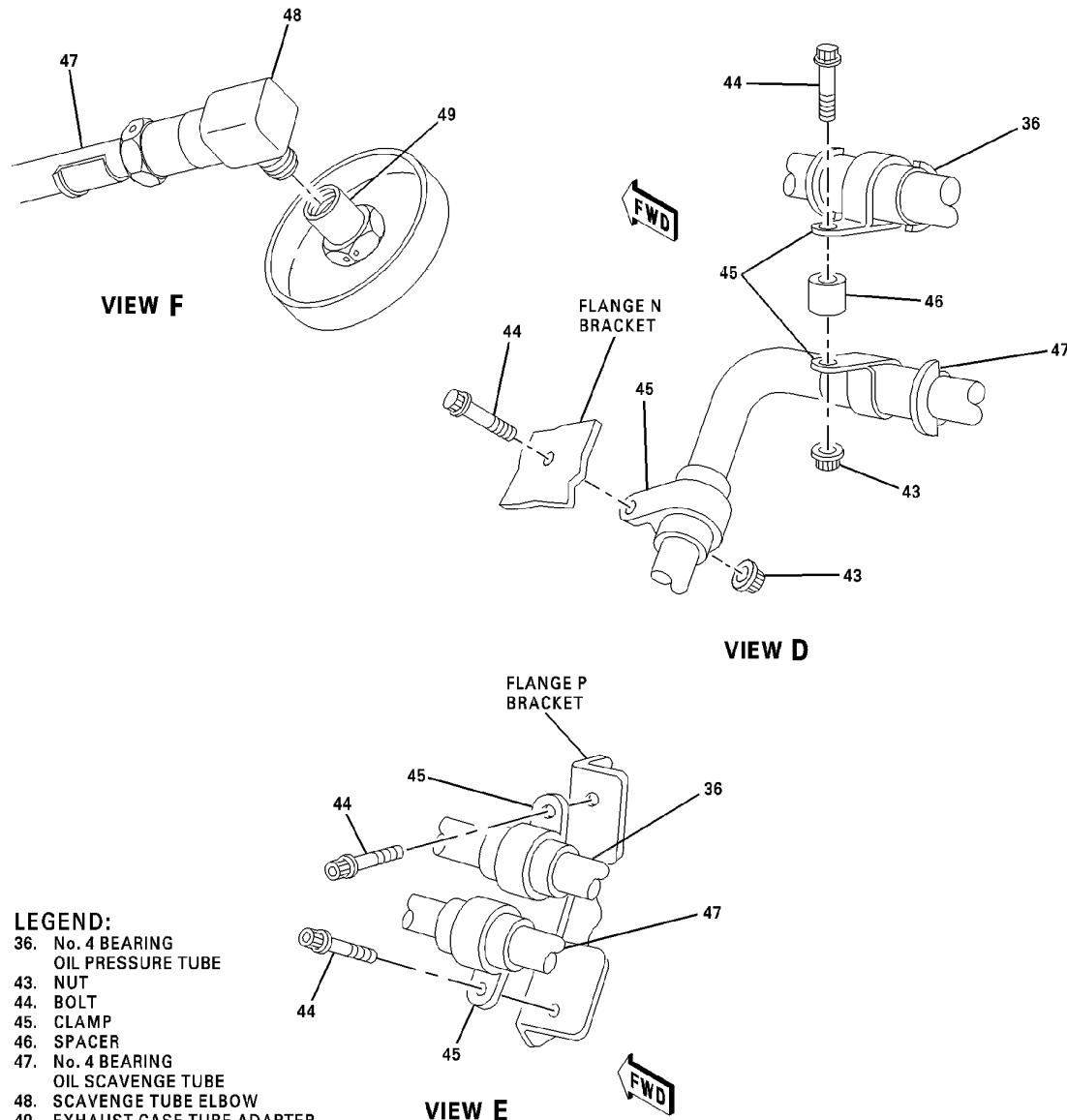
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LEGEND:

- 36. No. 4 BEARING OIL PRESSURE TUBE
- 43. NUT
- 44. BOLT
- 45. CLAMP
- 46. SPACER
- 47. No. 4 BEARING OIL SCAVENGE TUBE
- 48. SCAVENGE TUBE ELBOW
- 49. EXHAUST CASE TUBE ADAPTER

CAG(IGDS)

DB2-75-0346

External Tubes - Removal/Installation
Figure 406/75-23-14-990-873

EFFECTIVITY
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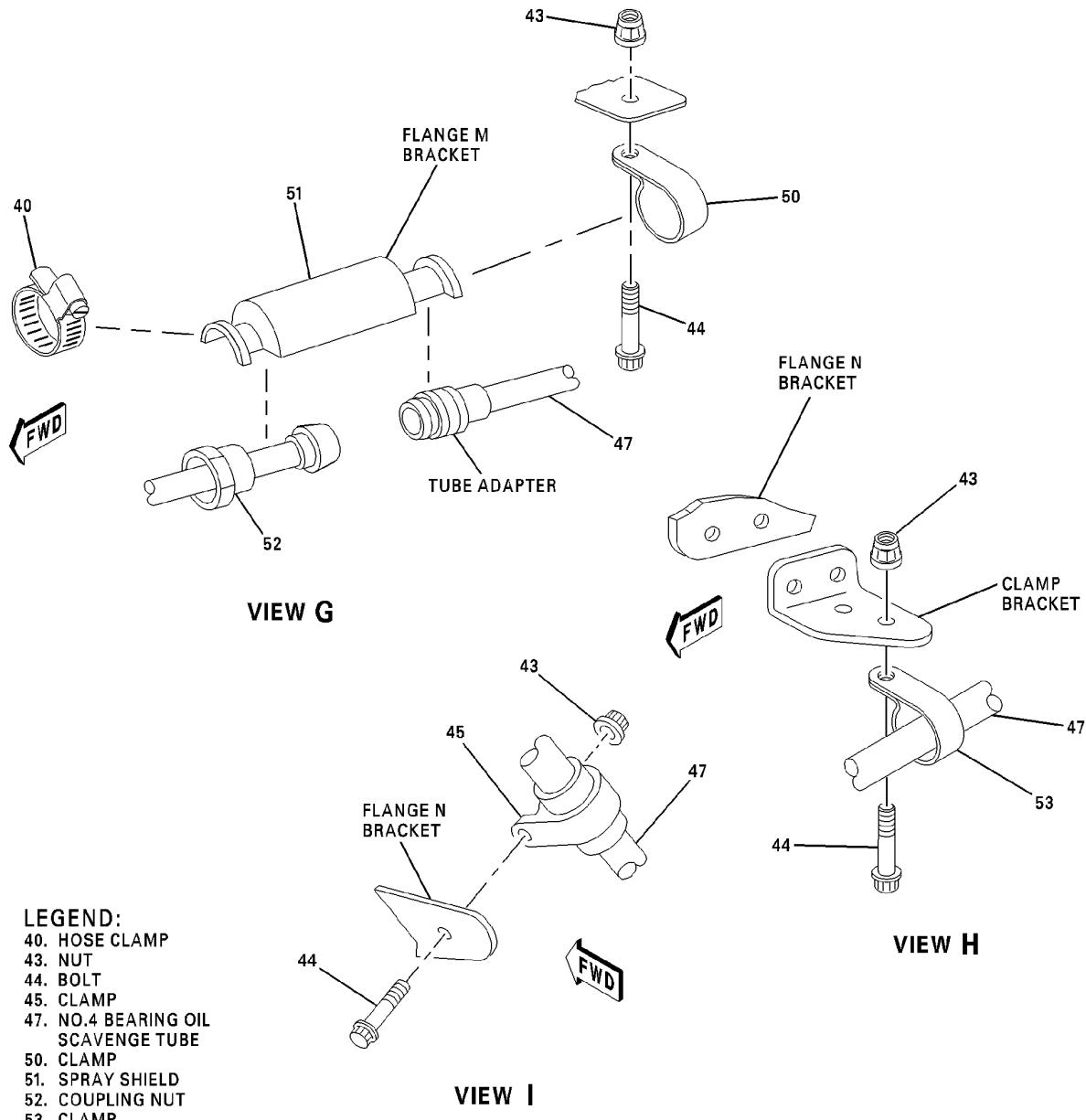
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LEGEND:

- 40. HOSE CLAMP
- 43. NUT
- 44. BOLT
- 45. CLAMP
- 47. NO.4 BEARING OIL SCAVENGE TUBE
- 50. CLAMP
- 51. SPRAY SHIELD
- 52. COUPLING NUT
- 53. CLAMP

CAG(IGDS)

DB2-75-0191A

External Tubes - Removal/Installation
Figure 407/75-23-14-990-874

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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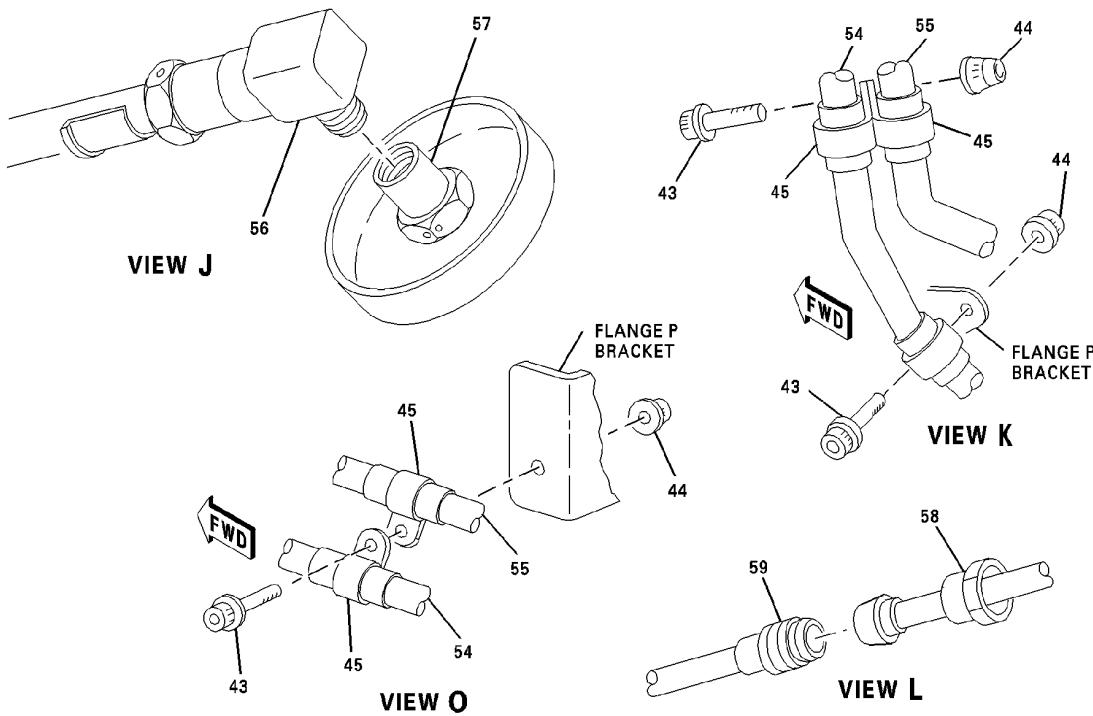
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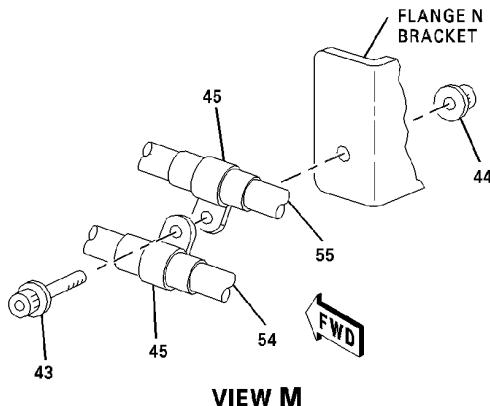
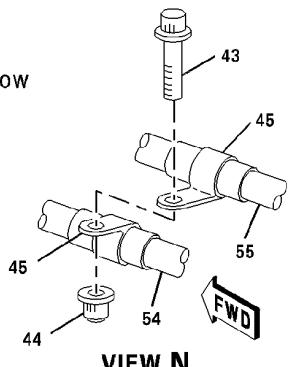


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LEGEND:

- 43. NUT
- 44. BOLT
- 45. CLAMP
- 54. No. 3 BEARING OIL VENT TUBE
- 55. EEC PT 4.95 TUBE
- 56. OIL VENT TUBE ELBOW
- 57. ADAPTER
- 58. COUPLING NUT
- 59. TUBE ADAPTER



CAG(IGDS)

DB2-75-0347

External Tubes - Removal/Installation
Figure 408/75-23-14-990-875

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

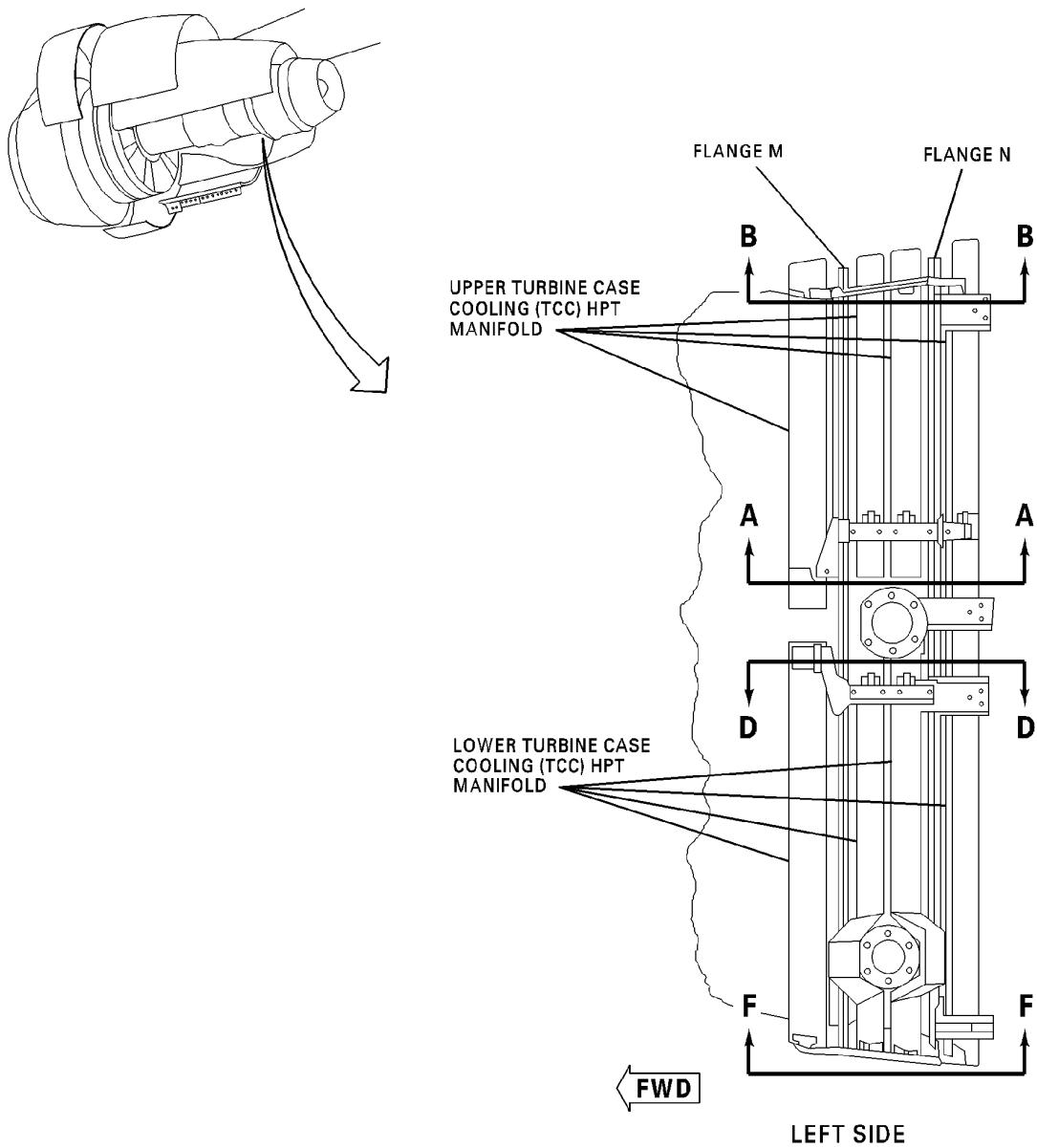
75-23-14

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CAG(IGDS) L-A3450

DB2-75-0208A

Left Side HPTCC Air Manifolds - Removal/Installation
Figure 409/75-23-14-990-876

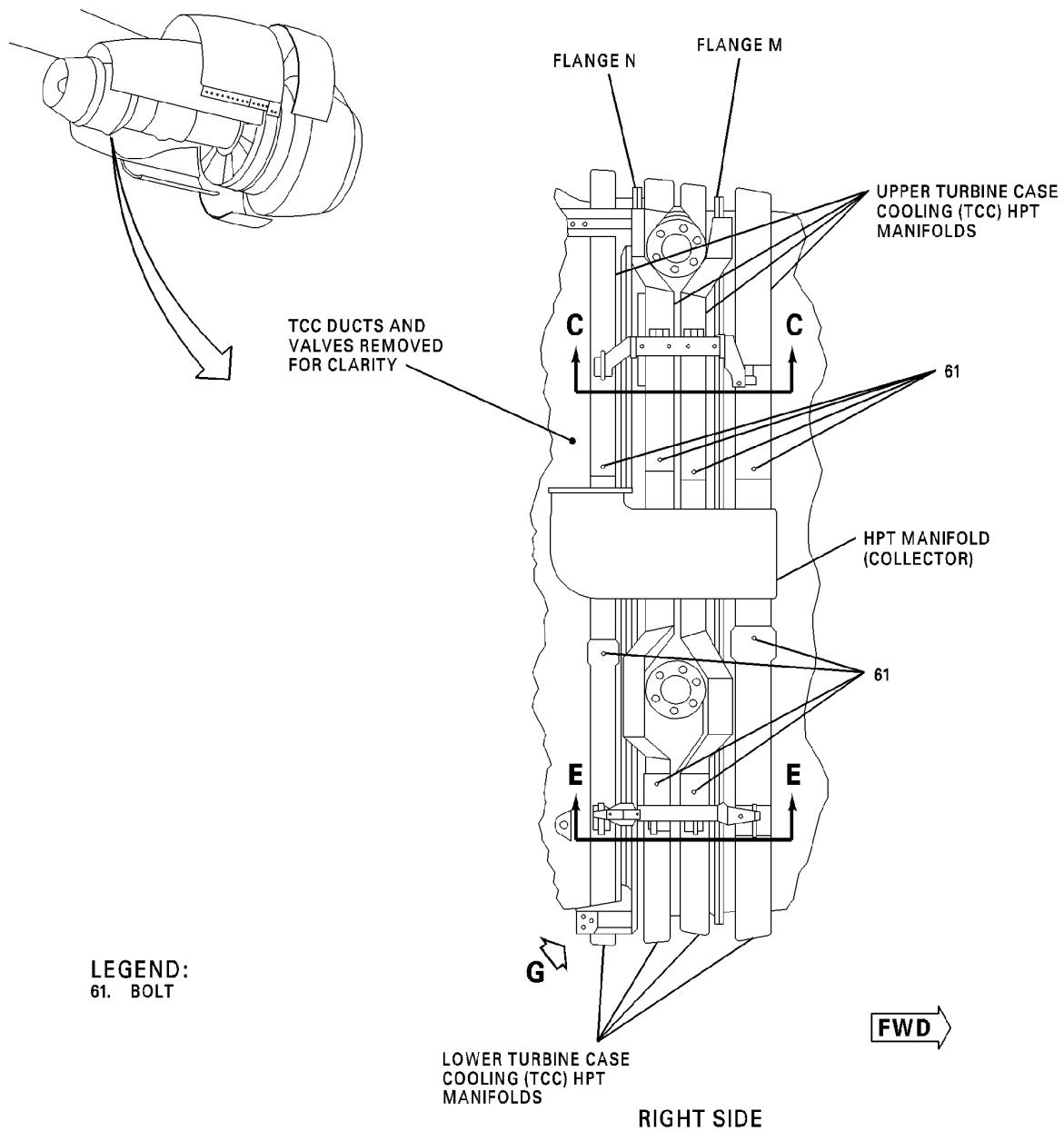
EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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CAG(IGDS) L-A5615

DB2-75-0209A

Right Side HPTCC Air Manifolds - Removal/Installation
Figure 410/75-23-14-990-877

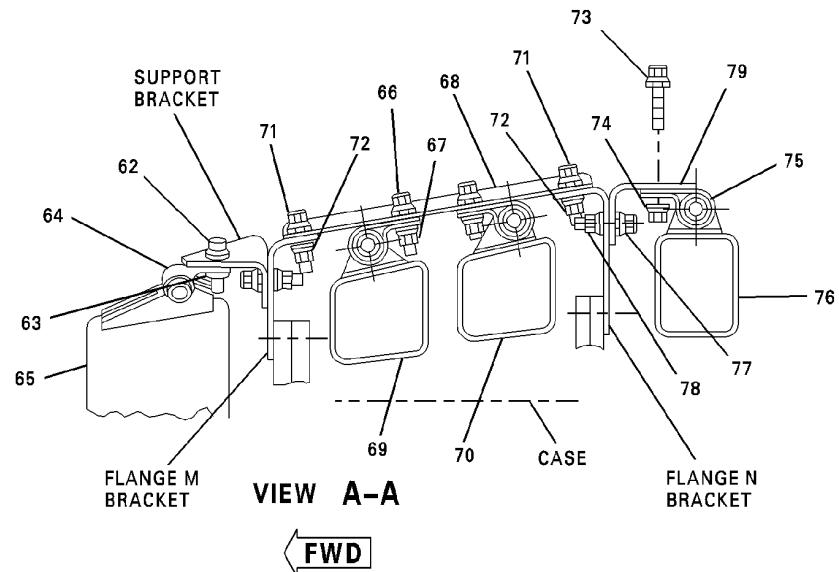
EFFECTIVITY
 FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
 642-645

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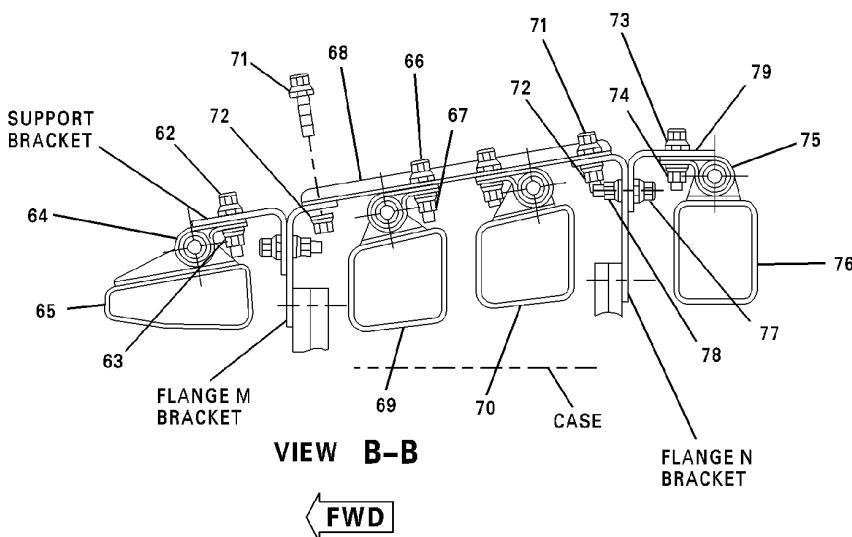


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LEGEND:

- 62. BOLT
- 63. NUT
- 64. CLAMP
- 65. MANIFOLD
- 66. BOLT
- 67. NUT
- 68. BRIDGE BRACKET
- 69. MANIFOLD
- 70. MANIFOLD
- 71. BOLT
- 72. NUT
- 73. BOLT
- 74. NUT
- 75. CLAMP
- 76. MANIFOLD
- 77. BOLT
- 78. NUT
- 79. BRACKET



CAG(IGDS) L-A3046

DB2-75-0211A

HPT Manifolds - Removal/Installation
Figure 411/75-23-14-990-878

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

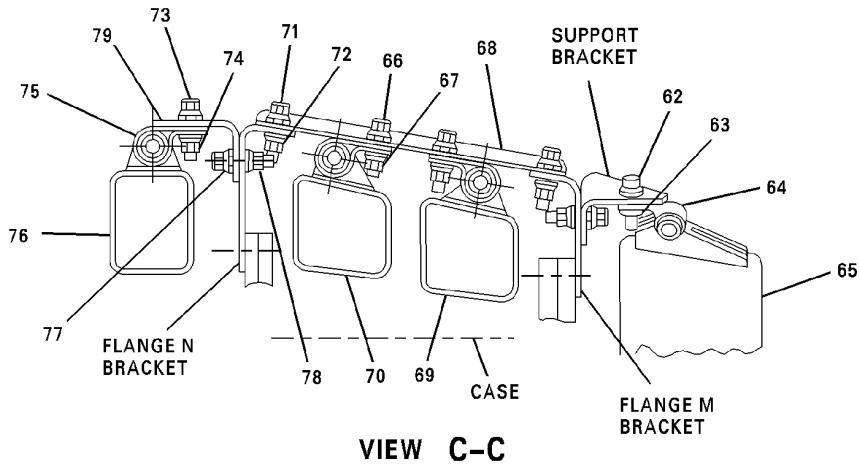
TP-11MM-FX

75-23-14

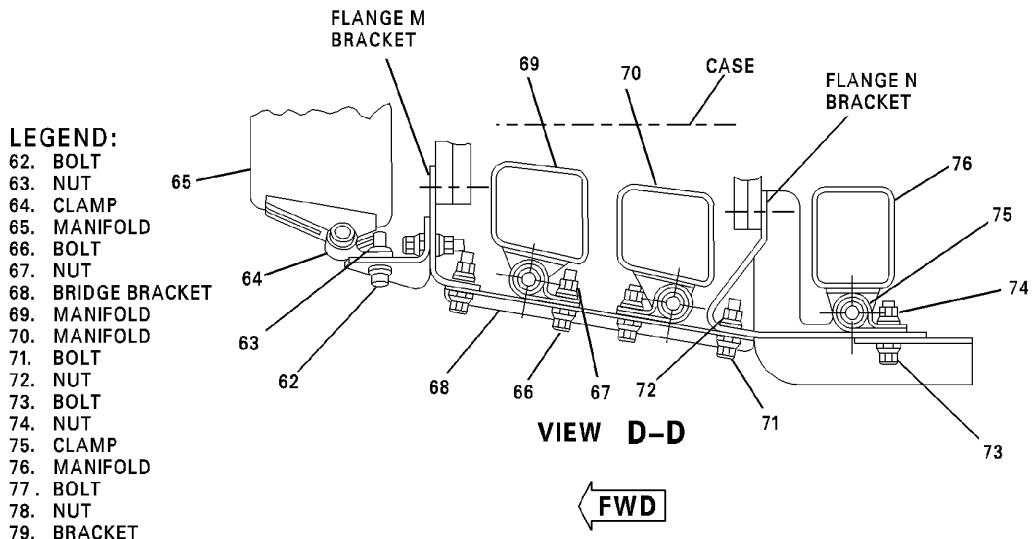
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FWD



FWD

CAG(IGDS) L-A3047

DB2-75-0212A

HPT Manifolds - Removal/Installation
Figure 412/75-23-14-990-879

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

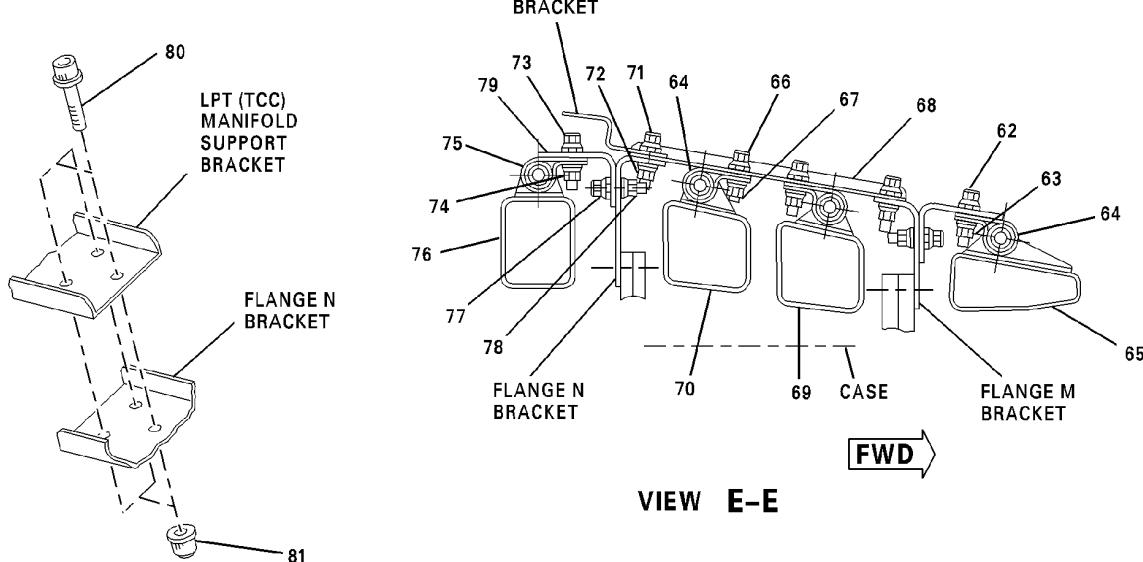
75-23-14

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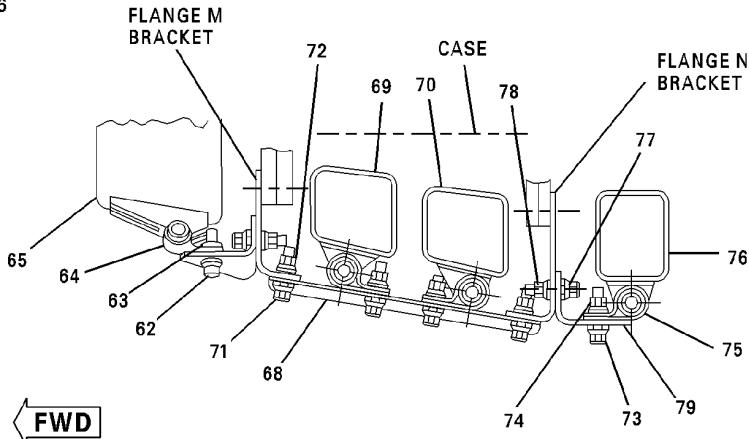
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VIEW G L-A5616

LEGEND:

- 62. BOLT
- 63. NUT
- 64. CLAMP
- 65. MANIFOLD
- 66. BOLT
- 67. NUT
- 68. BRIDGE BRACKET
- 69. MANIFOLD
- 70. MANIFOLD
- 71. BOLT
- 72. NUT
- 73. BOLT
- 74. NUT
- 75. CLAMP
- 76. MANIFOLD
- 77. BOLT
- 78. NUT
- 79. BRACKET
- 80. BOLT
- 81. NUT



VIEW F-F

L-A3048

CAG(IGDS)

DB2-75-0213A

HPT Manifolds - Removal/Installation
Figure 413/75-23-14-990-880

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-23-14-400-868

3. INSTALLATION OF THE HIGH PRESSURE TURBINE CASE COOLING AIR MANIFOLDS

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Model M303, M305 or M307	Crimper, Bergen Mechanical

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine (PWA 521B)
P06-054	Paste, antiseize (PWA 36246)
P06-013	Lubricant, solid film MIL-L-23398
P05-289	Lockwire, (AS3214-02)
P05-291	Cable, safety
P05-292	Ferrule, safety cable

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE	DESIGNATION	IPC
401/3	Seal	IPC 80-12-05-10-100

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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(Continued)

Reference	Title
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
73-21-07-400-868	INSTALLATION OF THE ELECTRONIC ENGINE CONTROL (EEC) ELECTRICAL HARNESS W6 (P/B 401)
80-12-03-400-868	INSTALLATION OF THE ENGINE STARTER SHUTOFF VALVE (P/B 401)
IPC 80-12-05	Illustrated Parts Catalog
IPC 80-12-05-10-100	Illustrated Parts Catalog

E. Job Set-up - High Pressure Turbine Case Cooling Air Manifolds Installation

SUBTASK 75-23-14-865-268



WARNING

MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that this circuit breaker is open and has safety tag:

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

SUBTASK 75-23-14-010-271

- (2) If necessary, open the engine access doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - High Pressure Turbine Case Cooling Air Manifolds Installation

SUBTASK 75-23-14-420-267

- (1) Install the HPTCC air manifolds as follows: (IPC 80-12-05) (Figure 409) (Figure 410) (Figure 411) (Figure 412) (Figure 413)
 - (a) Remove all of the protective caps and plugs.
 - (b) Put the aft upper and lower HPTCC air manifolds (76) around the turbine case with the open ends towards the collector. Do not attach them at this time.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS
HAZMAT 1016, OIL/LUBRICATING (DPM 3564)
HAZMAT 1000, REFER TO MSDS

- (c) Lubricate all bolt threads with engine oil (P03-001).
(CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (d) Install the support brackets (79) to the flange N bracket with the nuts (78) and bolts (77). Torque the nuts to 36–40 in-lb (4.067–4.519 N·m).
- (e) Install the LPTCC manifold support brackets to flange N with the nuts (81) and bolts (80). Torque the flange N nuts to 180–200 in-lb (20.337–22.597 N·m).
- (f) Put the aft upper and lower HPTCC air manifolds (76) around the case and engage the ends to the HPTCC collector. Attach the HPT cooling air manifolds to the HPTCC collector with the bolts (61). Tighten the bolts hand tight.
- (g) Install the clamps (75) to the brackets on the aft lower HPTCC air manifold (76). Attach the manifold to flange N at the support bracket (79) with the bolts (73) and nuts (74). Tighten the bolts and nuts hand tight.
- (h) Install the two upper center HPTCC air manifolds (70 and 69) to the collector with the bolts (61). Tighten the bolts hand tight.
- (i) Install the upper bridge brackets (68) to the support brackets on flanges M and N with the bolts (71) and nuts (72). Tighten the bolts and nuts hand tight.
- (j) Install the two upper center manifolds (70 and 69) to the upper bridge brackets (68) with the bolts (66), clamps (64), and nuts (67). Tighten the bolts and nuts hand tight.
- (k) Install the two lower center HPTCC air manifolds (70 and 69) to the collector with the bolts (61). Tighten the bolts hand tight.
- (l) Install the lower bridge brackets (68) to the support brackets on flanges M and N with the bolts (71) and nuts (72). Tighten the bolts and nuts hand tight.
- (m) Install the two lower center HPTCC tubes (70 and 69) to the lower bridge brackets (68) with the bolts (66), clamps (64), and nuts (67). Tighten the bolts and nuts hand tight.
- (n) Install the forward upper and lower HPTCC air manifolds (65) to the collector with the bolts (61). Tighten the bolts hand tight.
- (o) Install the clamps (64) to the upper and lower cooling air manifold brackets with the bolts (62) and nuts (63). Tighten the bolts and nuts hand tight.
- (p) Torque the nuts and bolts to the subsequent values:
 - 1) Torque the bolts (61) that attach the upper and lower HPT cooling manifolds to the collector to 36–40 in-lb (4.1–4.5 N·m).
 - 2) Torque the bolts (71) and nuts (72) that attach the bridge brackets to the support brackets on flanges M and N to 36–40 in-lb (4.1–4.5 N·m).
 - 3) Torque the bolts (74) and nuts (73) that attach the forward and aft HPTCC air manifolds to the support brackets to 36–40 in-lb (4.1–4.5 N·m).

SUBTASK 75-23-14-420-273

- (2) Install the aft EEC PT4.95 pressure tube (55) as follows: (Figure 408)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (a) Remove the protective caps and plugs.
- (b) On the EEC PT4.95 pressure tube, attach the tube coupling nut (58) to the tube adapter just aft of flange N. Tighten the tube coupling nut hand tight.
- (c) Attach the PT4.95 pressure tube coupling nut to the PT4.95 manifold adapter aft of flange P at the 7 o'clock position. Tighten the tube coupling nut hand tight.

SUBTASK 75-23-14-420-269

- (3) Install the aft No. 3 bearing oil vent tube (54) assembly as follows: (Figure 408)

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- (a) Lubricate the adapter (57) threads with antiseize paste (P06-054). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (b) Install the oil vent tube elbow (56) to the adapters (57) on the exhaust case at the forward end of the tube to the front oil vent tube just aft of flange M. Tighten the adapters hand tight.
- (c) Install the clamps (45) to the tube and adjacent EEC PT4.95 tube. Attach the tube to the brackets on flange N and P with the bolts (44) and nuts (43). Tighten the bolts and nuts hand tight.
- (d) Install the clamps (45) to the tube and adjacent EEC PT4.95 tube. Attach the tubes and clamps (45) to flange P and both tubes together at the LPT cooling manifold. Tighten the bolts (44) and nuts (43) hand tight.
- (e) Torque all the clamp bolts (44) to 36–40 in-lb (4.1–4.5 N·m).
- (f) Torque both No. 3 bearing oil vent tube coupling nuts (56 and 58) to 200–225 in-lb (22.6–25.4 N·m). Safety the tube coupling nuts with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (g) Torque the EEC PT4.95 tube coupling nuts to 270–300 in-lb (30.5–33.9 N·m). Safety the tube coupling nuts with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).

SUBTASK 75-23-14-420-270

- (4) Install the aft No. 4 bearing scavenge tube (47) assembly as follows: (Figure 404) (Figure 405) (Figure 406) (Figure 407)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- (a) Lubricate the scavenge tube elbow (48) and exhaust case tube adapter (49) threads with antiseize paste (P06-054). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the bolt (44) threads with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Install the aft scavenge tube nut to the tube adapter (49) on the internal tube at the exhaust case. And to the adapter (52) on the front scavenge tube. Tighten the tube coupling nuts hand tight.
- (d) Install the clamp (45) on the tube and attach the tube on flange P with the bolts (44) and nuts (43). Tighten the nut and bolt hand tight.
- (e) Install the clamps (53) on the tube and attach the tube on flange N with the bolts (44) and nuts (43). Tighten the nut and bolt hand tight.
- (f) Torque the clamp bolts (44) to 36–40 (4.1–4.5 N·m).
- (g) Torque the tube nut at the exhaust case to 200–225 in–lb (22.6–25.4 N·m). Safety the tube coupling nut (52) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (h) Torque the tube coupling nut (52) at the flange N connection to 475–525 in–lb (53.7–59.3 N·m). Safety the tube coupling nut with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (i) Position the spray shield (51) to the inboard side of flange M. Attach the forward end with the hose clamp (40). Torque the clamp to 15–18 in–lb (1.7–2.1 N·m).
- (j) Install the clamp (50) to the aft end of the spray shield (51) over the tube. Attach the clamp to the flange N bracket with bolt (44) and nut (43). Torque the bolt to 36–40 in–lb (4.1–4.5 N·m).

SUBTASK 75-23-14-420-271

- (5) Install the No. 4 bearing oil pressure tube (36) assembly as follows: (Figure 405)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (a) Lubricate the bolts (44) and tube coupling nuts (39 and 42) threads with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (b) Install the tube coupling nut (39) to the No. 4 bearing strainer housing and the tube coupling (42) forward of flange M. Tighten the tube nuts with your hand.
- (c) Install the clamps (45) that attach the tube (36) to the flange M, flange N, and flange P brackets with the bolts (44). Torque the clamp bolts to 36–40 in-lb (4.0–4.5 N·m).
- (d) Attach the tube to the No. 4 bearing oil scavenge tube with the clamp (45), bolt (44), spacer (46), and nut (43). These items are aft of flange N. Torque the bolt to 36–40 in-lb (4.0–4.5 N·m).
- (e) Torque the tube coupling nuts (39 and 42) to 450–500 in-lb (50.8–56.5 N·m). Safety the tube nuts with lockwire (P05–289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (f) Install the spray shield (38) to the inboard side of the pressure tube connection at flange P. Attach the spray shield with the hose clamp (37). Torque the clamp to 15–18 in-lb (1.7–2.0 N·m).
- (g) Install the spray shield (41) to the inboard side of the pressure tube forward of flange M. Attach the spray shield to the pressure tube with the hose clamp (40). Torque the hose clamp to 15–18 in-lb (1.7–2.0 N·m).

SUBTASK 75-23-14-420-272

- (6) Install the pylon drain tube as follows: (Figure 402)
 - (a) Attach the pylon drain tubes (10, 27, and 28) with the coupling nuts. Tighten the nuts hand tight.
 - (b) Install the loop clamps (23) with the bolts (29), washers (30), and nuts (31). Torque the nuts to 20–25 in-lb (2.3–2.8 N·m) and the tube coupling nuts (32 and 34) to 450–500 in-lb (50.8–56.5 N·m).

SUBTASK 75-23-14-420-274

- (7) Install the starter lower supply duct (1) as follows: (Figure 401)
 - (a) Make sure the support link (9) is set at a length of 3.1 in. (78.7 mm).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1237, LUBRICANT/SOLID FILM/CORROSION-INHIBITING (DMS QPL 2170)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the inside surface of the couplings (2) with solid film lubricant (P06-013). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Attach the lower duct (1) to the intermediate duct (4) and to the starter shut-off valve (5). Attach the ducts with the v-ring clamps (2) and seals (3). Do not torque the clamps (2) at this time.
- (d) Adjust and connect the support link (9) to the duct lower (1) with the bolt (8), washer (7), and nut (6). Make sure there is no load on the links, bushings, bolts, washers, and nuts, when the duct is installed.
- (e) Torque the nuts (6) to 50–70 in-lb (5.7–7.9 N·m).
- (f) If necessary, torque the support link (9) locking nut to 100–140 in-lb (11.3–11.5 N·m).
- (g) Torque the v-ring clamp (2) to the value shown on the clamps. Lightly hit the outer perimeter of the clamps with a plastic mallet while it is torqued.

G. Job Close-up - High Pressure Turbine Case Cooling Air Manifolds Installation

SUBTASK 75-23-14-420-275

- (1) Install the EEC thermocouple and the W6 airframe cable. (INSTALLATION OF THE ELECTRONIC ENGINE CONTROL (EEC) ELECTRICAL HARNESS W6, TASK 73-21-07-400-868)

SUBTASK 75-23-14-420-276

- (2) Install the starter shut-off valve. (INSTALLATION OF THE ENGINE STARTER SHUTOFF VALVE, TASK 80-12-03-400-868)

SUBTASK 75-23-14-942-267

- (3) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-14-410-275

- (4) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-23-14-865-269

- (5) Remove the safety tag and close this circuit breaker:

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

SUBTASK 75-23-14-710-270

- (6) Do the electronic engine control idle test and the engine ground test at idle power. (ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870) (ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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DUCT ASSEMBLY, TURBINE CASE COOLING - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the turbine case cooling (TCC) duct assembly.
- B. Access to the TCC duct assembly is through the right thrust-reverser door.
- C. Unless different instruction are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-23-15-000-868

2. REMOVAL OF THE TURBINE CASE COOLING DUCT ASSEMBLY

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-21-000-869	REMOVAL OF THE TURBINE CASE COOLING BELLOWS (P/B 401)

C. Job Set-up - Turbine Case Cooling Duct Assembly Removal

SUBTASK 75-23-15-865-267



WARNING

MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

OVERHEAD, BATTERY BUS

Row	Col	Number	Name
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-23-15

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OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	15	B1-592	REVERSING CONTROL ENG 2

SUBTASK 75-23-15-010-269

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-23-15-030-267

- (3) Remove the turbine case cooling bellows. (REMOVAL OF THE TURBINE CASE COOLING BELLOWS, TASK 75-23-21-000-869)

D. Procedure - Turbine Case Cooling Duct Assembly Removal

SUBTASK 75-23-15-020-267

- (1) Remove the turbine case cooling (TCC) duct assembly (1) as follows: (Figure 401)
 - (a) Remove the four bolts (2), washers (3) and nuts (4) that attach the bracket (5) to the TCC duct assembly (1). If necessary, loosen the hose clamps that attach the hoses to the TCC duct bracket (5). Pull the bracket away from the TCC duct assembly.
NOTE: It is not necessary to disconnect the hoses that are attached to the TCC duct assembly bracket.
 - (b) Remove the upper hose clamp (6) that attaches the forward cooling air tube (7) to the bottom of the TCC duct assembly (1). Disconnect the cooling tube (7).
 - (c) Disconnect the two aft cooling air tube connectors (8 and 9) from the TCC duct assembly (1). Remove and discard the packings (10 and 11).
 - (d) Remove the two bolts (12), washers (13) and nuts (14) that attach the TCC duct assembly (1) to the bracket (15) on flange K.
 - (e) Remove the eight bolts (16) and washers (17) that attach the TCC duct assembly (1) to the TCC valve. Remove the TCC duct assembly (1) from the engine.
NOTE: The step that follows is for engine after SB PW4MD11 71-80.
 - (f) (Post SB PW4MD11 71-80) Remove and discard the gasket (18).

SUBTASK 75-23-15-410-267

NOTE: The steps that follow are for engines before/after SB PW4MD11 71-80.

- (2) If the turbine case cooling duct assembly (1) is not installed immediately, or weather conditions make it necessary, close the access doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-23-15

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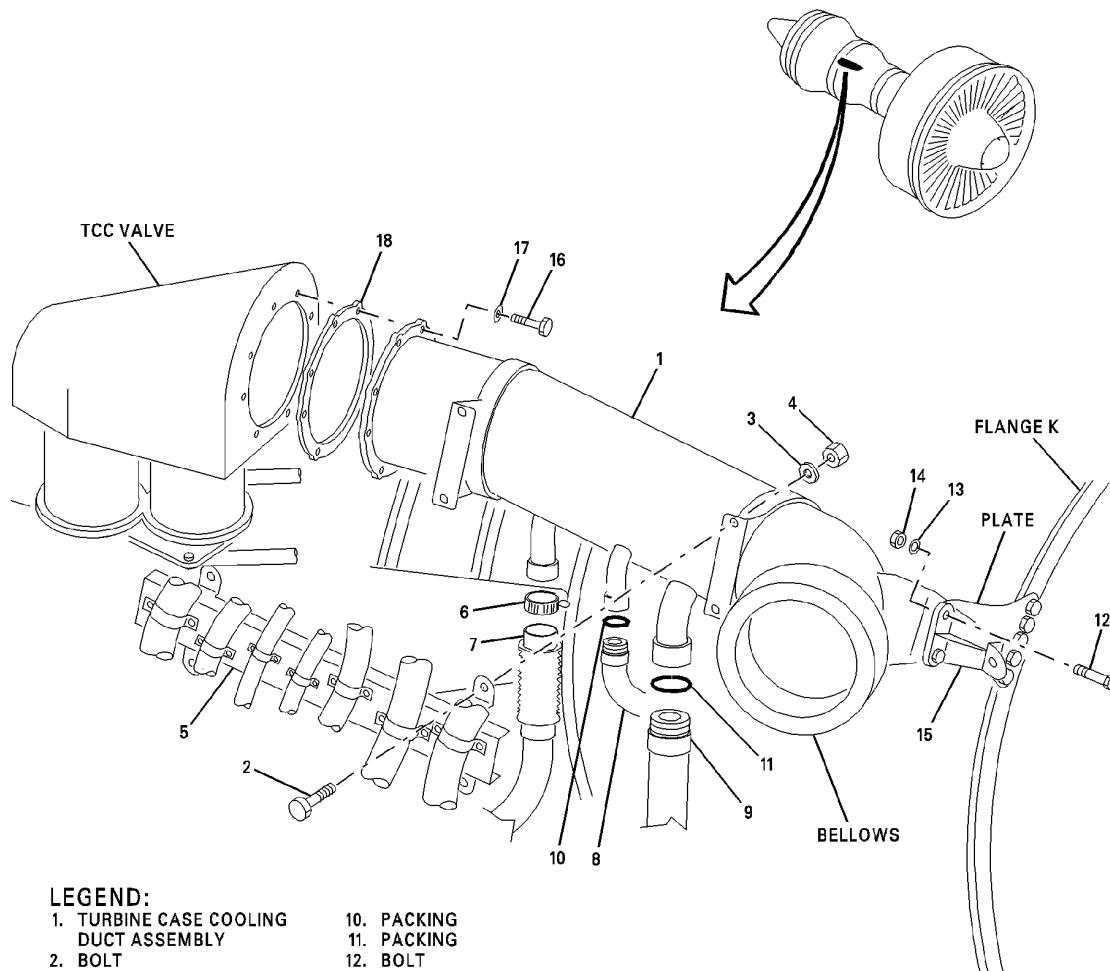
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LEGEND:

- | | |
|---------------------------------------|-------------|
| 1. TURBINE CASE COOLING DUCT ASSEMBLY | 10. PACKING |
| 2. BOLT | 11. PACKING |
| 3. WASHER | 12. BOLT |
| 4. NUT | 13. WASHER |
| 5. BRACKET | 14. NUT |
| 6. CLAMP | 15. BRACKET |
| 7. COOLING AIR TUBE | 16. BOLT |
| 8. COOLING AIR TUBE | 17. WASHER |
| 9. COOLING AIR TUBE | 18. GASKET |

CAG(IGDS) L-M614R

DB2-75-0254A

Turbine Case Cooling Duct Assembly - Removal/Installation
Figure 401/75-23-15-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-23-15-400-868

3. INSTALLATION OF THE TURBINE CASE COOLING DUCT ASSEMBLY

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No.1 and 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-250 in-lb (0-30.0 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P06-020	Lubricant, bolt, molybdenum disulfide
Not specified	Lockwire

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
10	Packing	IPC 75-23-45-10-150
11	Packing	IPC 75-23-45-10-255
18	Gasket (Post SB PW4MD11 71-80)	IPC 75-23-45

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-21-400-869	INSTALLATION OF THE TURBINE CASE COOLING BELLOWS (P/B 401)
IPC 75-23-00	Illustrated Parts Catalog

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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(Continued)

Reference	Title
IPC 75-23-45	Illustrated Parts Catalog
IPC 75-23-45-10-150	Illustrated Parts Catalog
IPC 75-23-45-10-255	Illustrated Parts Catalog

E. Job Set-up - Turbine Case Cooling Duct Assembly Installation

SUBTASK 75-23-15-865-268



WARNING

MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that these circuit breakers are open and have safety tags:

OVERHEAD, BATTERY BUS

Row	Col	Number	Name
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

OVERHEAD, BATTERY DIRECT BUS

Row	Col	Number	Name
B	9	B1-467	ENG IGNITION OVERRIDE

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

Row	Col	Number	Name
J	15	B1-592	REVERSING CONTROL ENG 2

SUBTASK 75-23-15-010-267

- (2) If necessary, open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - Turbine Case Cooling Duct Assembly Installation

SUBTASK 75-23-15-420-267

- (1) Install the turbine case cooling (TCC) duct assembly (1) as follows: (IPC 75-23-00) (Figure 401)

NOTE: The step that follows is for engines after SB PW4MD11 71-80.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-23-15

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- (a) (Post SB PW4MD11 71-80) Position the gasket (18) between the TCC valve and the TCC duct (1) mating surfaces.

NOTE: The steps that follow are for engines before/after SB PW4MD11 71-80.

WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1135, LUBRICANT/MOLYBDENUM DISULFIDE SILICONE (DPM 5782)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the threads of the eight bolts (16) with bolt lubricant (PO6-020). Install the aft end of the TCC duct assembly (1) on the TCC valve with the eight bolts (16) and washers (17). Torque the eight bolts (16) to 85-95 in-lb (9.6-10.7 N·m). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Attach the forward end of the TCC duct assembly (1) to the bracket (15) with the two bolts (12), washers (13) and nuts (14). Torque the two nuts (14) to 100-120 in-lb (11.3-13.6 N·m).
- (d) Connect the cooling air tube (8) with the packings (10). Torque the coupling nut to 100-120 in-lb (11.3-13.6 N·m). Safety the coupling nut with lockwire.
- (e) Connect the cooling air tube (9) with the packings (11). Torque the coupling nut to 215-240 in-lb (24.3-27.1 N·m). Safety the coupling nut with lockwire.
- (f) Connect the forward cooling air tube (7) with the hose clamp (6).
- (g) Install the bracket (5) on the TCC duct assembly (1) with the four bolts (2), and washers (3). Torque the four bolts (2) to 50-70 in-lb (5.7-7.9 N·m). If necessary, tighten the hose clamps for the hoses that are attached to the TCC duct bracket (5).

G. Job Close-up - Turbine Case Cooling Duct Assembly Installation

SUBTASK 75-23-15-430-267

- (1) Install the turbine case cooling bellows. (INSTALLATION OF THE TURBINE CASE COOLING BELLOWS, TASK 75-23-21-400-869)

SUBTASK 75-23-15-942-267

- (2) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-15-410-268

- (3) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-23-15-865-269

- (4) Remove the safety tags and close these circuit breakers:

OVERHEAD, BATTERY BUS

Row	Col	Number	Name
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	15	B1-592	REVERSING CONTROL ENG 2

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-23-15

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SWITCH, ELEVENTH STAGE COOLING AIR VALVE POSITION INDICATING - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the left or right eleventh stage cooling air valve position (ESCV) indicating switches. Access to the switches is through the left or right core-cowl door.
- B. On engines with CF6-80C2 S/B 75-135, ESVC position indicating switches are removed from the engine. They are replaced by an air duct with a dummy connector.
- C. Unless different instruction are given, these procedures are the same for the three G.E. CF6-80C2D1F engines.

TASK 75-23-17-000-801

2. REMOVAL OF THE ELEVENTH STAGE COOLING AIR VALVE POSITION INDICATING SWITCH

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-803	OPENING OF THE CORE COWL DOORS (P/B 201)
71-10-00-410-803	CLOSING OF THE CORE COWL DOORS (P/B 201)

C. Job Set-up - Eleventh Stage Cooling Air Valve Position Indicating Switch Removal

SUBTASK 75-23-17-010-002

- (1) Open the core-cowl doors. (OPENING OF THE CORE COWL DOORS, TASK 71-10-00-010-803)

SUBTASK 75-23-17-865-001



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Open these circuit breakers and install safety tags:

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
H	19	B1-47	FADEC GND TEST PWR ENG 1 CHAN A
H	20	B1-48	FADEC GND TEST PWR ENG 1 CHAN B

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	19	B1-59	FADEC GND TEST PWR ENG 2 CHAN A
J	20	B1-60	FADEC GND TEST PWR ENG 2 CHAN B

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	19	B1-408	FADEC GND TEST PWR ENG 3 CHAN A
K	20	B1-409	FADEC GND TEST PWR ENG 3 CHAN B

D. Procedure - Eleventh Stage Cooling Air Valve Position Indicating Switch Removal

SUBTASK 75-23-17-020-001

NOTE: The removal procedure that follows is for the aircraft before G.E. CF6-80C2 S/B 75-135, which removes the valve.

- (1) Remove the eleventh stage cooling air valve position indicating switch (1) as follows: (Figure 401)

NOTE: The information that follows is for the aircraft before S/B 75-065.

- (a) Remove the three bolts (2) that attach the switch cover (3) to the cooling air tube bracket (4). Remove the switch cover.

NOTE: The information that follows is for the aircraft after S/B 75-065.

- (b) Remove the four bolts (2) that attach the switch cover (3) to the cooling air tube bracket (4). Remove the switch cover.

- (c) Disconnect the position indicating switch electrical connector (5). Install the dust caps.

The information that follows is for the aircraft before S/B 75-065

- (d) Remove the two bolts (6) that attach the cooling air tube bracket (4) to the position indicating switch (1). Move the bracket away from the valve.

The information that follows is for the aircraft after S/B 75-065

- (e) Remove the three bolts (6) that attach the cooling air tube bracket (4) to the position indicating switch (1). Move the bracket away from the valve.

NOTE: The information that follows is for the aircraft before S/B 75-065.

- (f) Remove the bolt (7) and spacer (8) that attach the position indicating switch (1) to the eleventh stage cooling air valve.

NOTE: The information that follows is for the aircraft before S/B 75-048 and S/B 75-065.

- (g) Remove the position indicating switch (1) from the eleventh stage cooling air valve. Install the protective caps and plugs.

NOTE: The information that follows is for the aircraft after S/B 75-048 and S/B 75-065.

- (h) Remove the position indicating switch (1) and the gasket (9) from the eleventh stage cooling air valve. Discard the gasket and install the protective caps and plugs.

SUBTASK 75-23-17-410-001

- (2) If the eleventh stage cooling air valve position indicating switch (1) is not installed immediately, or weather conditions make it necessary, close the access doors. (CLOSING OF THE CORE COWL DOORS, TASK 71-10-00-410-803)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

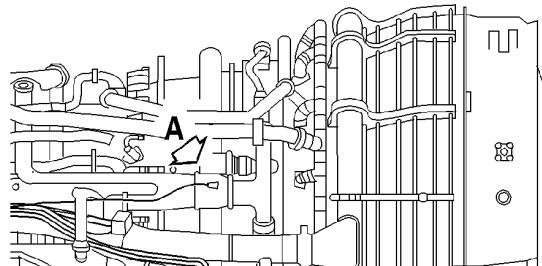
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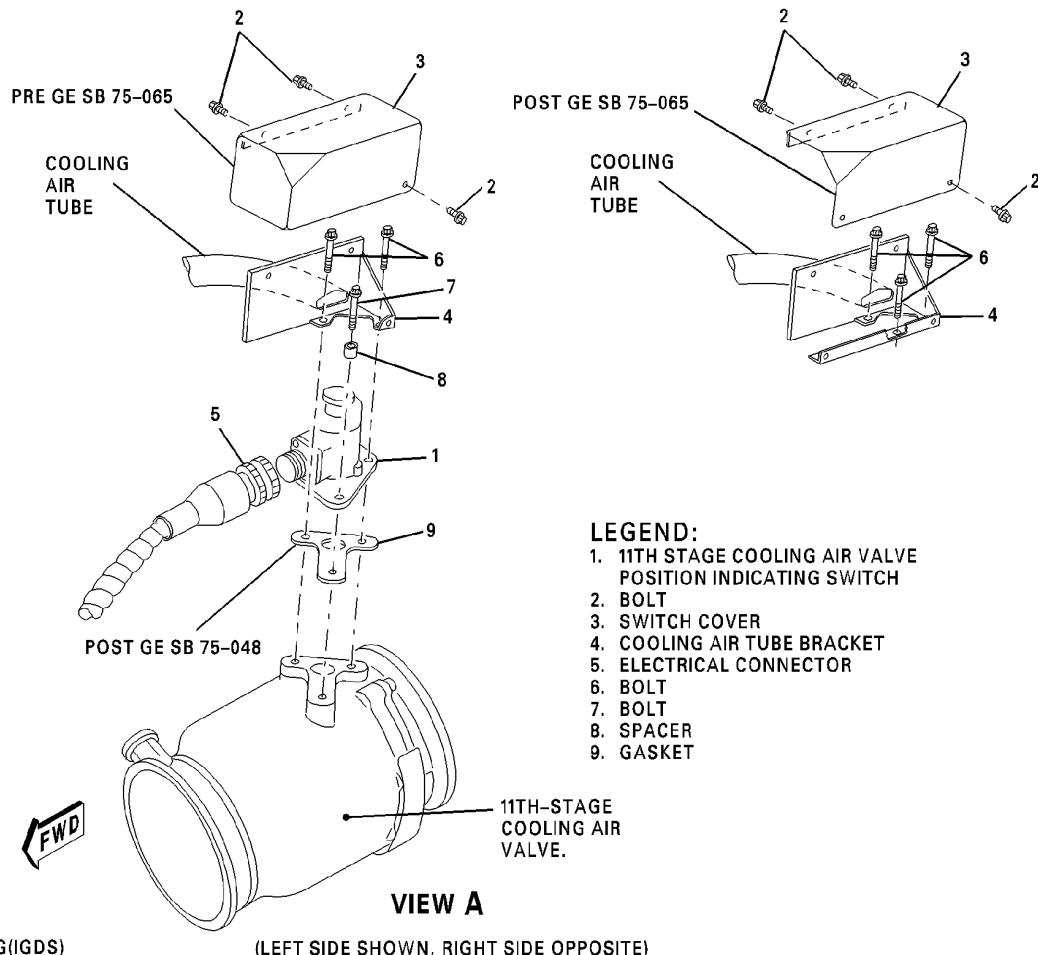
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LEFT SIDE



CAG(IGDS)

(LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE)

DB2-75-0142A

Eleventh Stage Cooling Air Valve Position Indicating Switch
Figure 401/75-23-17-990-801

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-23-17-400-801

3. INSTALLATION OF THE ELEVENTH STAGE COOLING AIR VALVE POSITION INDICATING SWITCH

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow:

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0-75 in-lb (0-8.5 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

NOTE: Equivalent replacements are permitted for the items that follow.

Table 403

REFERENCE	DESIGNATION
C02-058	Compound, antiseize GE spec A50TF201 class A

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
9	Gasket	IPC 75-23-15-01-062

D. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)
71-00-00-700-809	ADJUSTMENT AND TEST PROCEDURES (P/B 501)
71-10-00-010-803	OPENING OF THE CORE COWL DOORS (P/B 201)
71-10-00-410-803	CLOSING OF THE CORE COWL DOORS (P/B 201)
IPC 75-23-15-01-062	Illustrated Parts Catalog

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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E. Job Set-up - Eleventh Stage Cooling Air Valve Position Indicating Switch Installation

SUBTASK 75-23-17-865-002



TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that these circuit breakers are open and have safety tags:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	19	B1-47	FADEC GND TEST PWR ENG 1 CHAN A
H	20	B1-48	FADEC GND TEST PWR ENG 1 CHAN B

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	19	B1-59	FADEC GND TEST PWR ENG 2 CHAN A
J	20	B1-60	FADEC GND TEST PWR ENG 2 CHAN B

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	19	B1-408	FADEC GND TEST PWR ENG 3 CHAN A
K	20	B1-409	FADEC GND TEST PWR ENG 3 CHAN B

SUBTASK 75-23-17-010-004

- (2) If necessary, open the core-cowl doors. (OPENING OF THE CORE COWL DOORS, TASK 71-10-00-010-803)

F. Procedure - Eleventh Stage Cooling Air Valve Position Indicating Switch Installation

SUBTASK 75-23-17-420-001

NOTE: The installation procedure that follows is for the aircraft before G.E. CF6-80C2 S/B 75-135, which removes the valve.

- (1) Install the eleventh stage cooling air valve position indicating switch (1) as follows: (Figure 401)
(a) Remove the protective caps and plugs from the eleventh stage cooling air valve.
NOTE: The information that follows is for the aircraft before S/B 75-065.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1196, ANTISEIZE/HIGH TEMPERATURE (DPM 377)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the threads of the bolts (6 and 7) with antiseize compound (C02-001 or C02-058). (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)

NOTE: The information that follows is for the aircraft before S/B 75-065.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- (c) Install the spacer (8) under the head of bolt (7). Install the bolt and spacer on the eleventh stage cooling air valve switch (1).
NOTE: The information that follows is for the aircraft before S/B 75-048 and S/B 75-065.
- (d) Install the bolt (7) into the eleventh stage cooling air valve. Tighten the bolt with your hand.
NOTE: The information that follows is for the aircraft after S/B 75-048 and before S/B 75-065.
- (e) Install the gasket (9) between the eleventh stage cooling air valve switch (1) and the valve. Install the bolt (7) into the valve. Tighten the bolt with your hand.
NOTE: The information that follows is for the aircraft after S/B 75-065.
- (f) Lubricate the threads of the bolts (6) with antiseize compound (C02-001 or C02-058). (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
NOTE: The information that follows is for the aircraft before S/B 75-065
- (g) Install the bracket (4) and the eleventh stage cooling air valve switch (1) to the valve with the two bolts (6).
NOTE: The information that follows is for the aircraft before S/B 75-065.
- (h) Torque the bolts (6 and 7) to 33–37 in-lb (3.7–4.2 N·m).
NOTE: The information that follows is for the aircraft after S/B 75-048 and after S/B 75-065.
- (i) Install the gasket (9) between the eleventh stage cooling air valve switch (1) and the valve. Install the bracket (4) and the eleventh stage cooling air valve switch (1) to the valve with the three bolts (6).
NOTE: The bracket must be installed on top of the switch. Do not install the bracket between the switch and the gasket or the eleventh stage cooling valve.
NOTE: The information that follows is for the aircraft after S/B 75-065.
- (j) Torque the bolts (6) to 33–37 in-lb (3.7–4.2 N·m).
- (k) Remove the dust caps from the eleventh stage cooling air valve switch (1) and electrical connector (5). Install the electrical connector on the eleventh stage cooling air valve switch.
- (l) Lubricate the threads of bolts (2) with antiseize compound (C02-001 or C02-058).
- (m) Install the switch cover (3) with the three bolts (2). Torque the bolts to 33-37 in-lb (3.7-4.2 N·m).

G. Job Close-up - Eleventh Stage Cooling Air Valve Position Indicating Switch Installation

SUBTASK 75-23-17-942-001

- (1) Remove all the tools and equipment from the work area. Make sure the work area is clean.

SUBTASK 75-23-17-410-002

- (2) Close the core cowl doors. (CLOSING OF THE CORE COWL DOORS, TASK 71-10-00-410-803)

SUBTASK 75-23-17-865-003

- (3) Remove the safety tags and close these circuit breakers:

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
-----	-----	--------	------

H	19	B1-47	FADEC GND TEST PWR ENG 1 CHAN A
---	----	-------	---------------------------------

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-23-17

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(Continued)

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	20	B1-48	FADEC GND TEST PWR ENG 1 CHAN B

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	19	B1-59	FADEC GND TEST PWR ENG 2 CHAN A
J	20	B1-60	FADEC GND TEST PWR ENG 2 CHAN B

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	19	B1-408	FADEC GND TEST PWR ENG 3 CHAN A
K	20	B1-409	FADEC GND TEST PWR ENG 3 CHAN B

SUBTASK 75-23-17-720-001

- (4) Do the applicable test(s) shown in the adjustment and test procedures. (ADJUSTMENT AND TEST PROCEDURES, TASK 71-00-00-700-809)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SWITCH, TURBINE VANE AND BLADE COOLING AIR VALVE POSITION - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the turbine vane and blade cooling air valve (TVBCAV) position switch. The TVBCAV switch is used only on engines before S/B PW4ENG 75-106. The TVBCAV position switch is installed on the right TVBCAV at the 3 o'clock position on the high pressure compressor. Access to the TVBCAV position switch is through the right thrust reverser door.

NOTE: The information in this procedure is for engines before S/B PW4ENG 75-106.

- B. Unless different instructions are given, these maintenance procedures are the same for all three Pratt and Whitney PW4460/4462 engines.

TASK 75-23-17-000-868

2. REMOVAL OF THE TURBINE VANE AND BLADE COOLING AIR VALVE POSITION SWITCH

NOTE: The information in this Task is for engines before S/B PW4ENG 75-106, S/B PW4ENG 72-757, and S/B PW4ENG 75-147.

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines, 4-8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 Engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs
MS90376	Dust caps, electrical connector

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Turbine Vane and Blade Cooling Air Valve Position Switch Removal

SUBTASK 75-23-17-010-268

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Turbine Vane and Blade Cooling Air Valve Position Switch Removal

SUBTASK 75-23-17-020-267

- (1) Remove the turbine vane and blade control air valve (TVBCAV) position switch (1) as follows:
(Figure 401)
- Disconnect the W4P21 harness connector (2) from the position switch (1).
 - Install a protective cover over the W4P21 harness connector (2) and W4P21 harness receptacle (3).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (c) Remove the two hose clamps (4) and the hose (5) from the position switch (1).
- (d) Remove the four bolts (6) that attach the position switch (1) to the TVBCAV (7) and remove the position switch.

SUBTASK 75-23-17-410-267

- (2) If the TVBCAV position switch is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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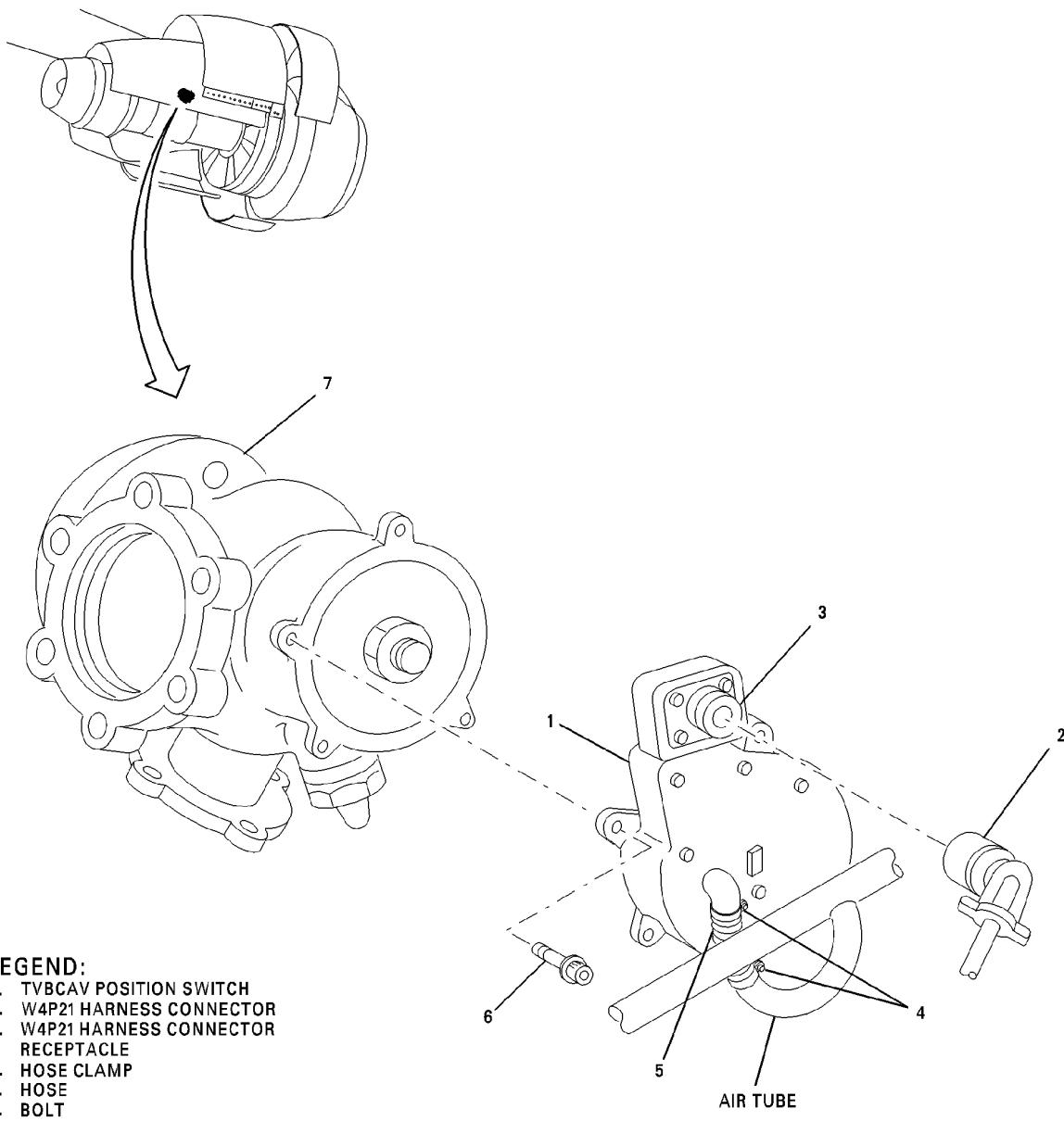
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LEGEND:

1. TVBCAV POSITION SWITCH
2. W4P21 HARNESS CONNECTOR
3. W4P21 HARNESS CONNECTOR RECEPTACLE
4. HOSE CLAMP
5. HOSE
6. BOLT
7. TVBCAV

CAG(IGDS)

DB2-75-0060B

**TVBCAV Position Switch - Removal/Installation (Pre SB PW4ENG 75-106) (Pre SB PW4ENG 72-757)
(Pre SB PW4ENG 75-147)**
Figure 401/75-23-17-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-23-17-400-868

3. INSTALLATION OF THE TURBINE VANE AND BLADE COOLING AIR VALVE POSITION SWITCH

NOTE: The information in this Task is for engines before S/B PW4ENG 75-106, S/B PW4ENG 72-757, and S/B PW4ENG 75-147.

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines, 4-8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-100 in-lb (0-11.3 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine (PWA 521B)
AS3214-01	Lockwire

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - Turbine Vane and Blade Cooling Air Valve Position Switch Installation

SUBTASK 75-23-17-010-270

- (1) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - Turbine Vane and Blade Cooling Air Valve Position Switch Installation

SUBTASK 75-23-17-420-267

- (1) Install the turbine vane and blade cooling air valve (TVBCAV) position switch (1) as follows:
(Figure 401)

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (a) Put the position switch (1) in position on the TVBCAV (7) and align the bolt holes.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the bolt (6) threads with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Attach the position switch (1) to the TVBCAV (7) with the four bolts (6). Torque the bolts to 36-40 in-lb (4.07–4.52 N·m).
- (d) Install the two hose clamps (4) and the hose (5) on the position switch (1) and air tube. Torque the clamps to 25–30 in-lb (2.8–3.3 N·m).
- (e) Remove the protective cover on the connector receptacle (3) and attach the W4P21 harness connector (2) to the connector receptacle.
- (f) Torque the W4P21 harness connector (2) to 30–35 in-lb (3.4–4.0 N·m). Safety the W4P21 harness connector with lockwire (AS3214-01). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

SUBTASK 75-23-17-030-001

- (2) Remove the shipping pin and tag from the TVBCAV position switch face. (Figure 402)

F. Job Close-up - Turbine Vane and Blade Cooling Air Valve Position Switch Installation

SUBTASK 75-23-17-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-17-410-275

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-23-17-730-270

- (3) Do the electronic engine control idle test. (ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-23-17

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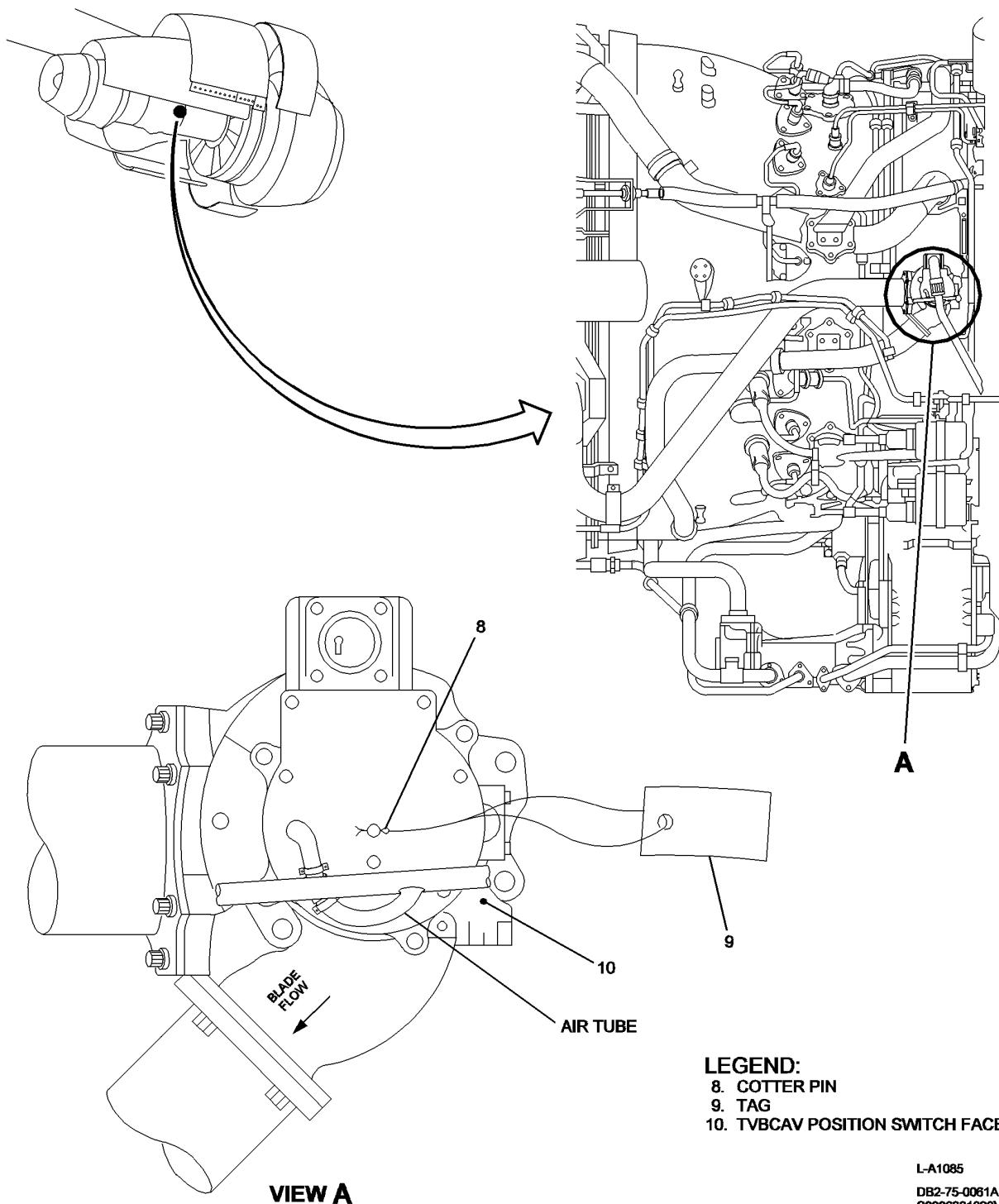
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TVBCAV Position Switch - Removal/Installation
Figure 402/75-23-17-990-802

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-23-17

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CABLE, TURBINE CASE COOLING AIR VALVE CONTROL - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the turbine case cooling air valve control cable. This procedure also has the instructions to remove and install the ball joint assembly only.
- B. The cable is used to transmit control from the actuator to the valves. Access to the ball joint assembly and cable is through the right thrust reverser door.
- C. Unless different instructions are given, these procedures are the same for all three Pratt & Whitney PW4460/4462 engines.

TASK 75-23-18-000-868

2. REMOVAL OF THE TURBINE CASE COOLING AIR VALVE CONTROL CABLE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Turbine Case Cooling Air Valve Control Cable Removal

SUBTASK 75-23-18-010-268

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Turbine Case Cooling Air Valve Control Cable Removal

SUBTASK 75-23-18-030-267

- (1) Remove the turbine case cooling (TCC) air valve control cable (1) as follows: (Figure 401) (Figure 402) (Figure 403) (Figure 404) (Figure 405) (Figure 406)
 - (a) Disconnect the coupling nut (2) on the forward part of the cable (1) from the actuator (3). Remove the cable from the actuator piston shaft.
 - (b) Remove the nut (4) and bolt (5) from the cable rod end bearing on the HPT cooling air valve idler arm.
 - (c) Loosen the jamnuts (6 & 7) on the cable rear support bracket.
 - (d) Remove the bolt (8), nut (9), and clamp (10) from the cable (1) at the two adjustable brackets. Remove the cable from the engine.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-23-18

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SUBTASK 75-23-18-410-267

- (2) If the TCC air valve control cable is not installed immediately, or weather conditions make it necessary, close the engine access doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

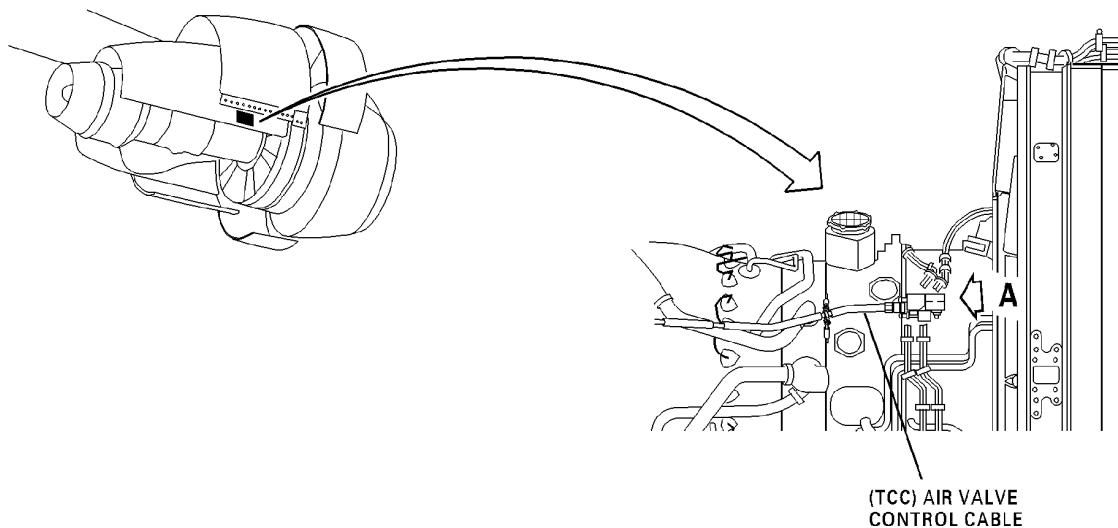
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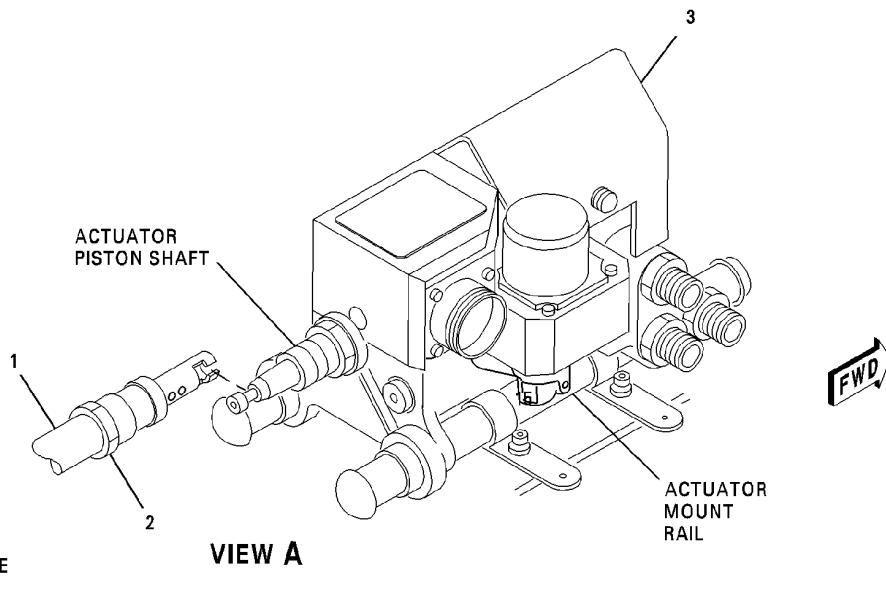
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(TCC) AIR VALVE
CONTROL CABLE



LEGEND:
1. TCC AIR VALVE
CONTROL CABLE
2. COUPLING NUT
3. TCC AIR VALVE
ACTUATOR

VIEW A

CAGT(GDS) L-A2794, L-A4569

DB2-75-0130

TCC Air Valve Control Cable - Removal/Installation
Figure 401/75-23-18-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

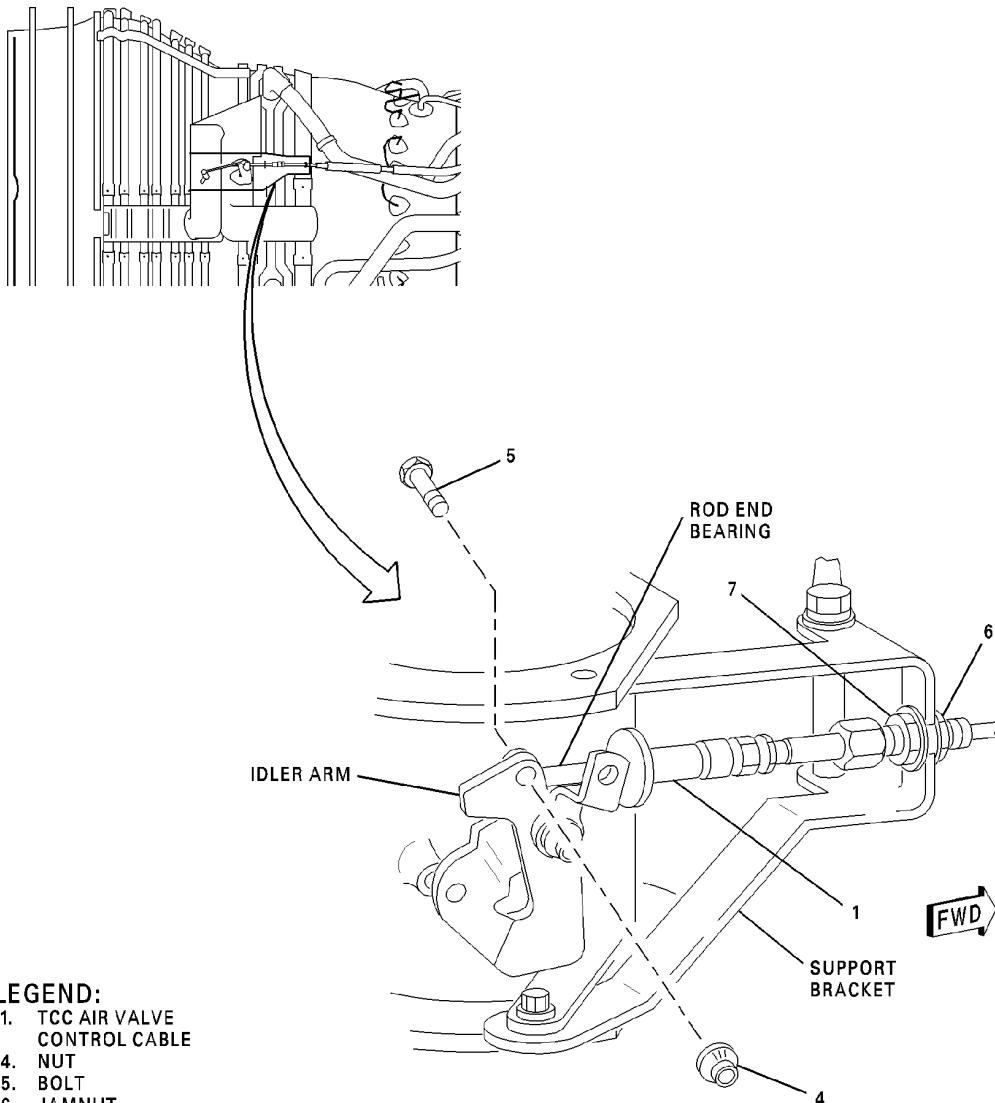
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AIRCRAFT MAINTENANCE MANUAL



LEGEND:

1. TCC AIR VALVE CONTROL CABLE
2. IDLER ARM
3. NUT
4. BOLT
5. JAMNUT
6. JAMNUT
7. ROD END BEARING

CAG(IGDS) L-A2794, L-A4568

DB2-75-0131

TCC Air Valve Control Cable - Removal/Installation
Figure 402/75-23-18-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

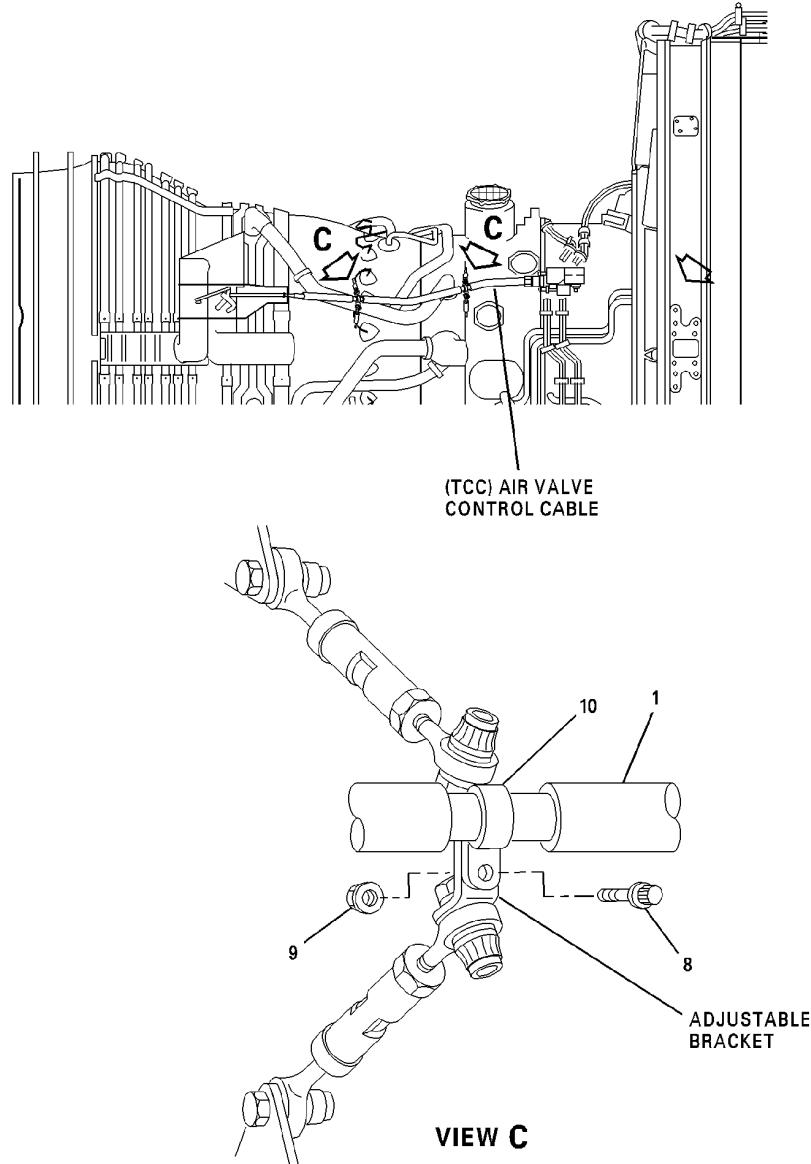
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AIRCRAFT MAINTENANCE MANUAL



LEGEND:

- 1. TCC AIR VALVE CONTROL CABLE
- 8. BOLT
- 9. NUT
- 10. CLAMP

CAG(IGDS) L-A2794

DB2-75-0132

TCC Air Valve Control Cable - Removal/Installation
Figure 403/75-23-18-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-23-18-400-868

3. INSTALLATION OF THE TURBINE CASE COOLING AIR VALVE CONTROL CABLE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.20–2.40 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 5–150 in-lb (6–17 N·m)
Not specified	Torque wrench 0–300 in-lb (0–34.0 N·m)
Not specified	Torque wrench 150–1000 in-lb (17–113 N·m)
Model M303, M305 or M307	Crimper, Bergen Mechanical (optional)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)
P05-289	Lockwire (AS3214-02)
P05-291	Cable, safety
P05-292	Ferrule, safety cable

C. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-00-700-868	ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG) (P/B 501)
IPC 75-23-30	Illustrated Parts Catalog

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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D. Job Set-up - Turbine Case Cooling Air Valve Control Cable Installation

SUBTASK 75-23-18-010-270

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - Turbine Case Cooling Air Valve Control Cable Installation

SUBTASK 75-23-18-420-267

- (1) Install the turbine case cooling (TCC) air valve control cable (1) as follows: (IPC 75-23-30) (Figure 404)
 - (a) Make sure that the bushing (11) in the rear of the cable (1) is engaged as follows:
 - (b) Torque the nut (12) to 150–200 in-lb (16.9–22.6 N·m). Hold the cable with a wrench when you torque the nut. The bushing is engaged when the resistance to torque load is increased. Torque is not to be more than 300 in-lb. Loosen the nut one-quarter to one-half turn.
 - (c) Loosen the bolts (14) and clamps (15) that attach the actuator (3) to the mount rails and move the actuator forward until it touches the stop on the forward mount bracket. (Figure 405)

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (d) Lubricate the threads of the coupling nut (2) with engine oil. Install the forward part of the cable on the actuator piston shaft. Tighten the coupling nut hand-tight and loosen one-quarter to one-half turn. (Figure 401) (Figure 402)
- (e) Use the jamnuts (6 & 7) to turn the cable (1) until it is fully engaged in the slot in the rear support bracket.

NOTE: You must install a jamnut and a washer on each side of the slot in the rear support bracket.
- (f) Make sure that the actuator (3) is against the forward bracket stop and the coupling nut (2) turns freely. If the nut does not turn freely, do steps (b), (c), and (d) again.
- (g) Tighten the forward jamnut (6) against the rear support bracket hand-tight.
- (h) Tighten the rear jamnut (7) against the rear support bracket hand-tight. Hold the rear jamnut with a wrench and torque the forward jamnut to 675–750 in-lb (76.3–84.7 N·m). Safety the jamnuts with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (i) Make sure that the actuator (3) is against the forward bracket stop and the coupling nut (2) turns freely. If the nut does not turn freely, do steps (b) thru (g) again.
- (j) Torque the cable coupling nut (2) to 100–175 in-lb (11.3–14.1 N·m) and safety the nut with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (k) Install the clamps (10) on the cable (1). Lubricate the bolts (8) with engine oil. Attach the cable to the adjustable brackets with the bolts, nuts (9), and clamps. Torque the bolts to 85–95 in-lb (9.6–10.7 N·m). (Figure 406)

NOTE: Do not apply force to the cable when you attach the clamps to the adjustable brackets. If necessary, loosen the jambnus and adjust the brackets.

- (l) If the brackets were adjusted, lubricate the jambnut (16) threads with engine oil and torque the jambnus to 14–16 in-lb (1.6–1.8 N·m). Safety the jambnus with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).

- (m) Torque the bolts (14) that attach the actuator (3) to the mount rails to 85–95 in-lb (9.6–10.7 N·m).

NOTE: The rear cable rod end will be installed as part of the adjustment/test procedure.

SUBTASK 75-23-18-820-267

- (2) Adjust the automatic turbine rotor clearance control system. (ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG), TASK 75-23-00-700-868)

F. Job Close-up - Turbine Case Cooling Air Valve Control Cable Installation

SUBTASK 75-23-18-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-18-410-269

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-23-18

Config 2

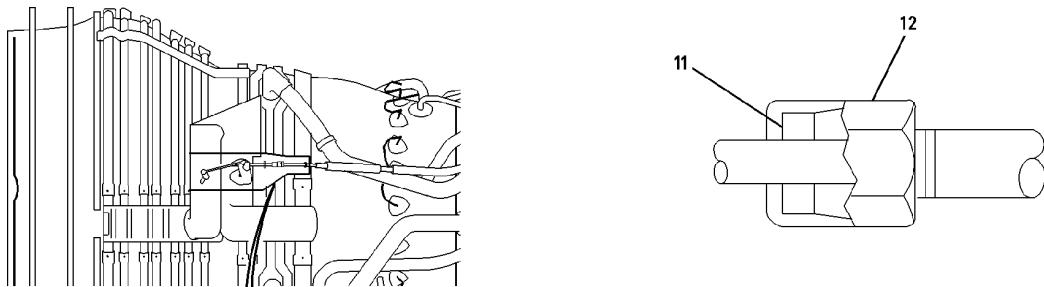
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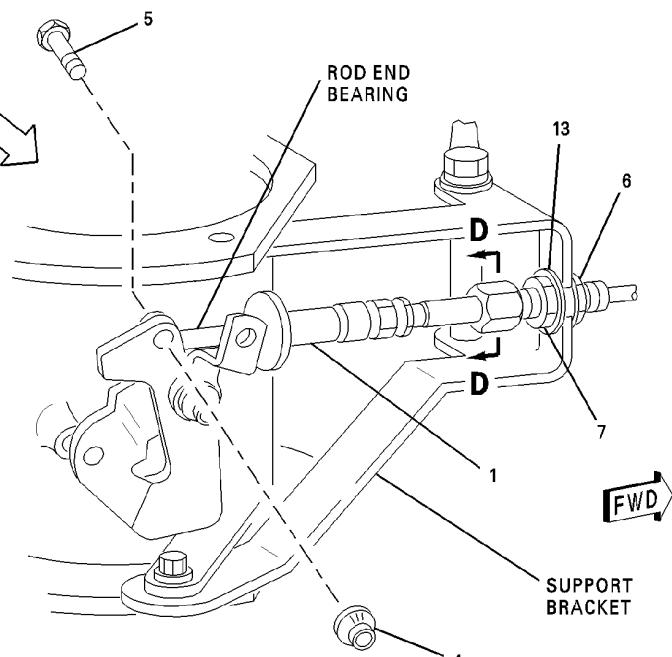
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AIRCRAFT MAINTENANCE MANUAL



SECTION D-D



LEGEND:

1. TCC AIR VALVE CONTROL CABLE
4. NUT
5. BOLT
6. JAMNUT
7. JAMNUT
11. BUSHING
12. NUT
13. WASHER

CAG(IGDS) L-A4568

DB2-75-0133

TCC Air Valve Control Cable - Removal/Installation
Figure 404/75-23-18-990-871

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

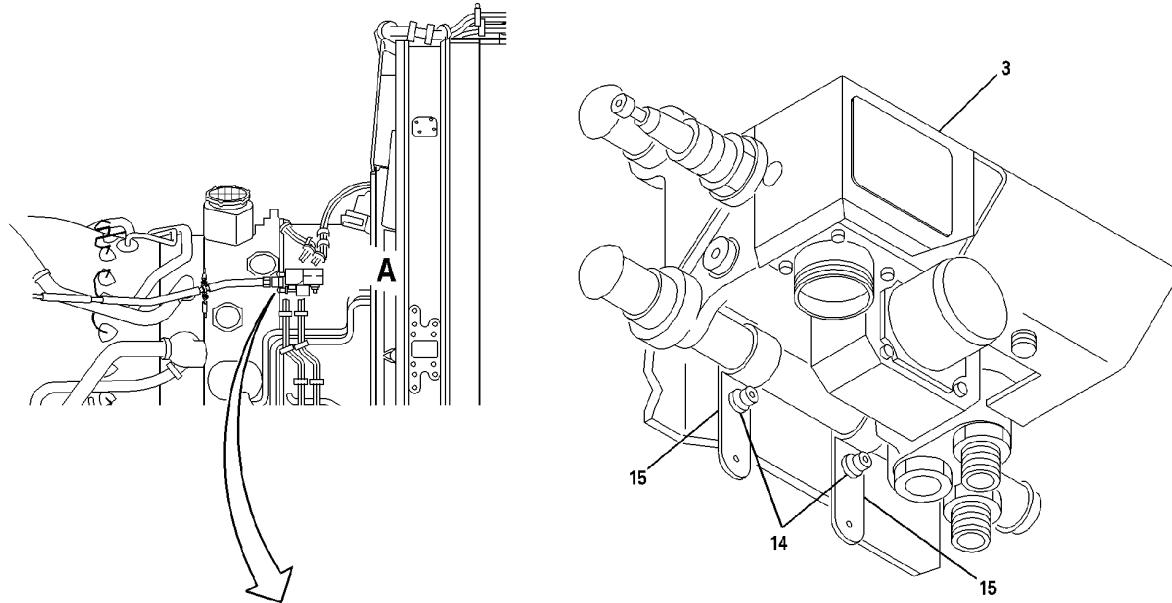
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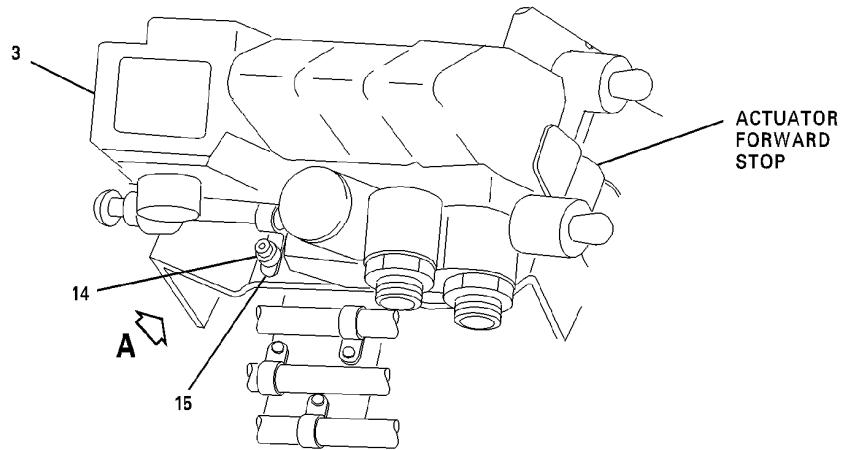
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VIEW A



LEGEND:

- 3. TCC AIR VALVE ACTUATOR
- 14. BOLT
- 15. CLAMP

CAG(IGDS)

DB2-75-0134

TCC Air Valve Control Cable - Removal/Installation
Figure 405/75-23-18-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

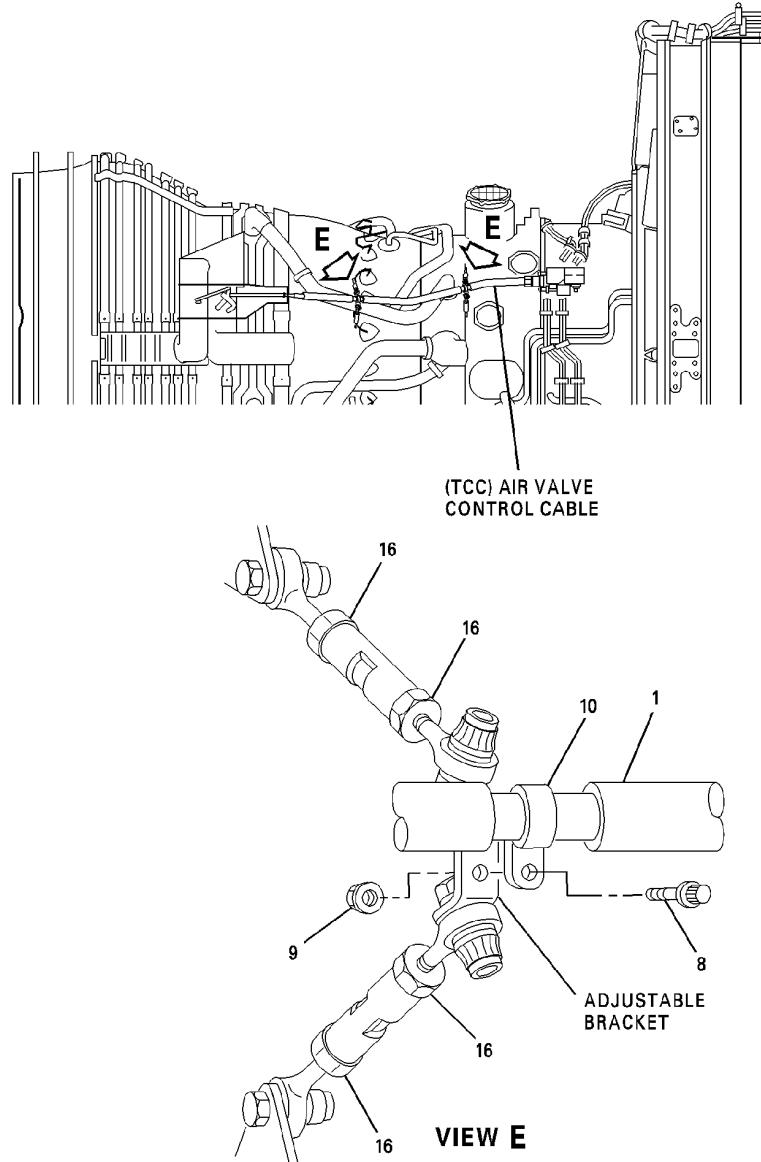
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LEGEND:

- 1. TCC AIR VALVE CONTROL CABLE
- 8. BOLT
- 9. NUT
- 10. CLAMP
- 16. JAMNUT

CAG(IGDS) L-A2791

DB2-75-0139

TCC Air Valve Control Cable - Removal/Installation
Figure 406/75-23-18-990-873

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-23-18-000-869

4. REMOVAL OF THE TURBINE CASE COOLING CONTROL CABLE BALL JOINT ASSEMBLY

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 404

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Turbine Case Cooling Control Cable Ball Joint Assembly Removal

SUBTASK 75-23-18-010-271

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Turbine Case Cooling Control Cable Ball Joint Assembly Removal

SUBTASK 75-23-18-030-268

- (1) Remove the turbine case cooling (TCC) control cable ball joint assembly (17) as follows: (Figure 407) (Figure 408)

- (a) Put a mark on the control cable ball joint assembly (17) and the attaching hardwares prior to the removal.

NOTE: The marks are to aid in the installation of the control cable ball joint assembly in the approximate same location.

- (b) Remove the nut (4) and bolt (5) from the cable rod end bearing (18) on the high pressure turbine (HPT) cooling air valve idler arm.

- (c) Remove the lockwire or safety cable from the jamnut (19) and flange of control cable ball joint assembly (17).

- (d) Remove the rod end bearing (18) with the jamnut (19) from the control cable ball joint assembly (17). Do not move the jamnut (19) from the rod end bearing (18).

- (e) Remove the lockwire or safety cable from the control cable ball joint assembly (17) and jamnut (20).

- (f) Remove control cable ball joint assembly (17). Do not move the jamnut (20) from the end rod of TCC air valve control cable (1).

SUBTASK 75-23-18-410-271

- (2) If the TCC air control cable ball joint assembly is not installed immediately, or weather conditions make it necessary, close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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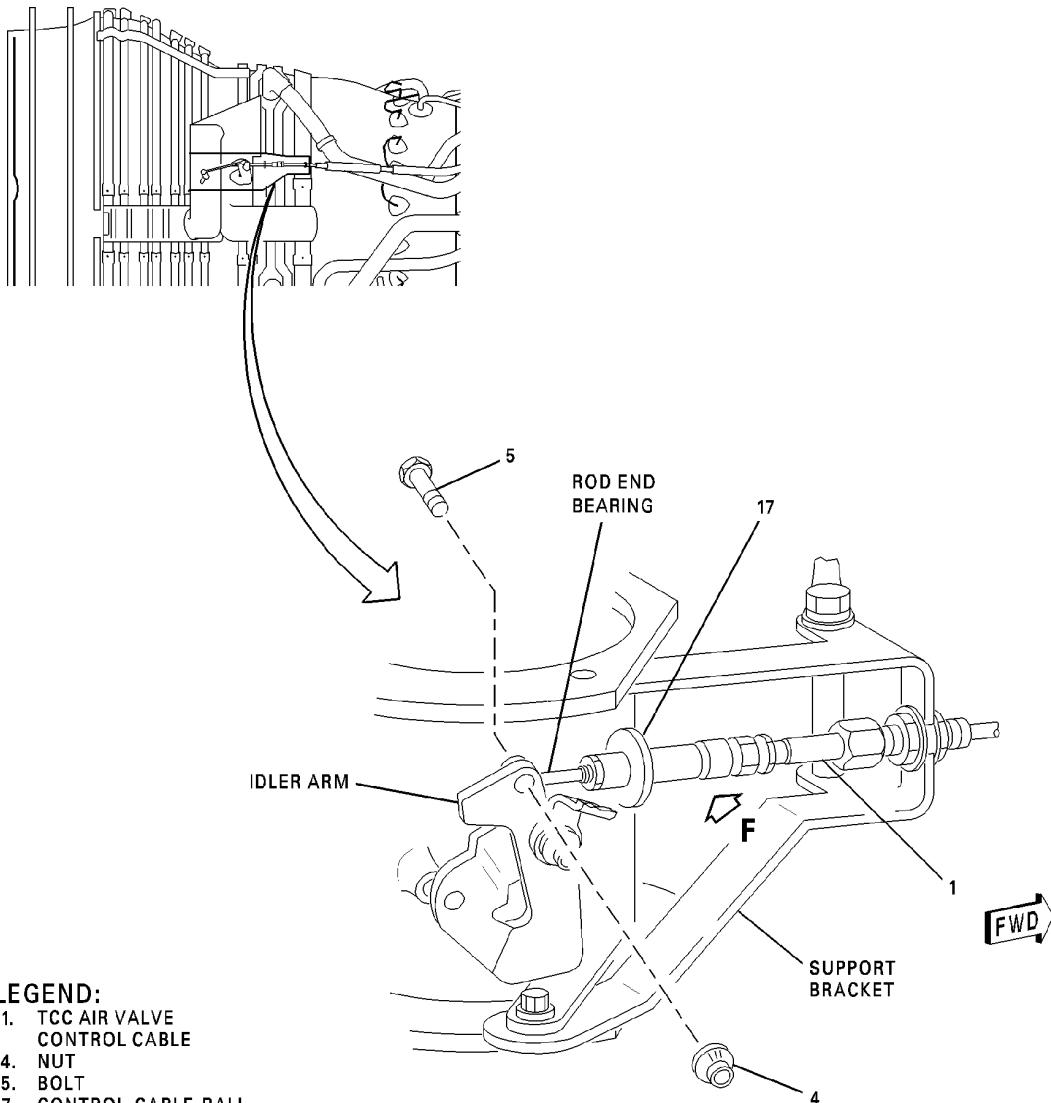
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LEGEND:

- 1. TCC AIR VALVE CONTROL CABLE
- 4. NUT
- 5. BOLT
- 17. CONTROL CABLE BALL JOINT ASSEMBLY

CAG(IGDS) L-A2794, L-A4568

DB2-75-0309

TCC Control Cable Ball Joint Assembly - Removal/Installation
Figure 407/75-23-18-990-874

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

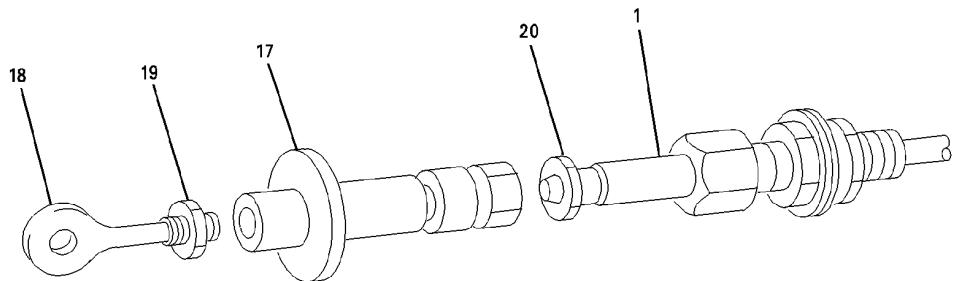
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VIEW F

LEGEND:

- 1. TCC AIR VALVE CONTROL CABLE
- 17. CONTROL CABLE BALL JOINT ASSEMBLY
- 18. ROD END BEARING
- 19. JAMNUT
- 20. JAMNUT

CAG(IGDS)

DB2-75-0310

TCC Control Cable Ball Joint Assembly - Removal/Installation
Figure 408/75-23-18-990-875

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-23-18-400-869

5. INSTALLATION OF THE TURBINE CASE COOLING CONTROL CABLE BALL JOINT ASSEMBLY

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 405

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.20–2.40 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–100 in-lb (0–11.0 N·m)
Model M303, M305 or M307	Crimper, Bergen Mechanical

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 406

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)
P05-289	Lockwire (AS3214-02)
P05-291	Cable, safety
P05-292	Ferrule, safety cable

C. Expendable Parts

(1) Expendable Parts

Table 407

REFERENCE	DESIGNATION	IPC
17	Ball joint assembly	IPC 75-23-30-10-089

D. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-00-700-868	ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG) (P/B 501)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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(Continued)

Reference	Title
IPC 75-23-30	Illustrated Parts Catalog
IPC 75-23-30-10-089	Illustrated Parts Catalog

E. Job Set-up - Turbine Case Cooling Control Cable Ball Joint Assembly Installation

SUBTASK 75-23-18-010-273

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - Turbine Case Cooling Control Cable Ball Joint Assembly Installation

SUBTASK 75-23-18-420-270

- (1) Install the turbine case cooling (TCC) control cable ball joint assembly (17) as follows: (See IPC 75-23-30) (Figure 407) (Figure 408)



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (a) Apply engine oil on all the threaded parts before installation.
NOTE: Use the marks made at removal to aid in the installation of the control cable ball joint assembly.
- (b) Install the control cable ball joint assembly (17) in the cable assembly until the jamnut (20) touch the end rod of the TCC air valve control cable (1)..
- (c) Tighten and torque the jamnut (20) to 32-36 in-lb (3.6-4.07 N·m).
- (d) Safety the control cable ball joint assembly (17) to the jamnut (20) with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (e) Install rod end bearing (18) with the jamnut (19) on the control cable ball joint assembly (17). Do the safety when you do the Adjustment/Test procedure.

SUBTASK 75-23-18-820-268

- (2) Adjust the automatic turbine rotor clearance control system. (ADJUSTMENT OF THE TURBINE CASE COOLING CONTROL SYSTEM (PARTIAL RIG), TASK 75-23-00-700-868)

G. Job Close-up - Turbine Case Cooling Control Cable Ball Joint Assembly Installation

SUBTASK 75-23-18-942-269

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-18-410-274

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ———

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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COLLECTOR, LOW PRESSURE TURBINE CASE COOLING - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the low pressure turbine (LPT) case cooling collector.
- B. The LPT case cooling collector is attached to the engine at the 3 o'clock position on the LPT cooling air manifolds. Access to the LPT case cooling collector is through the right thrust-reverser door.
- C. Unless different instructions are given, these procedures are the same for all three Pratt & Whitney PW4460/4462.

TASK 75-23-19-000-868

2. REMOVAL OF THE LOW PRESSURE TURBINE CASE COOLING COLLECTOR

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Low Pressure Turbine Case Cooling Collector Removal

SUBTASK 75-23-19-010-268

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Low Pressure Turbine Case Cooling Collector Removal

SUBTASK 75-23-19-020-267

- (1) Remove the low pressure turbine (LPT) case cooling air collector (1) as follows: (Figure 401) (Figure 402) (Figure 403) (Figure 404) (Figure 405)
 - (a) Remove the 12 bolts (2) that attach the cooling air manifolds (3) to the top and bottom sides of the cooling collector (1).
 - (b) Remove the two bolts (4), two nuts (5), two clamps (6), and two spacers (7) that attach the manifolds (3) to each of the brackets on flange P.
 - (c) Remove the three bolts (8), and the three nuts (9) that attach the cooling air manifold brackets to the brackets on flange N.
 - (d) Move the six bottom cooling air manifolds (3) down and away from the collector (1). Install the protective caps and plugs.
 - (e) Move the six top cooling air manifolds (3) up and away from the collector (1). Install the protective caps and plugs.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (f) Remove the top and bottom cover assemblies (10) from the rear collector tubes. Install the protective caps and plugs.
- (g) Remove the bolts (11) and nuts (12) that attach the collector (1) to the LPT cooling air valve (2) and support brackets.
- (h) Remove the two bolts (13) and the two clamps (14) that attach the inboard bracket of the collector (1) to the bracket on flange N.
- (i) Remove the four bolts (15) and the four clamps (16) that attach the rear of the collector (1) to the brackets on flange P.
- (j) Remove the collector (1) from the engine. Install the protective caps and plugs.

SUBTASK 75-23-19-410-267

- (2) If the LPT case cooling collector is not installed immediately, or weather conditions make it necessary, close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

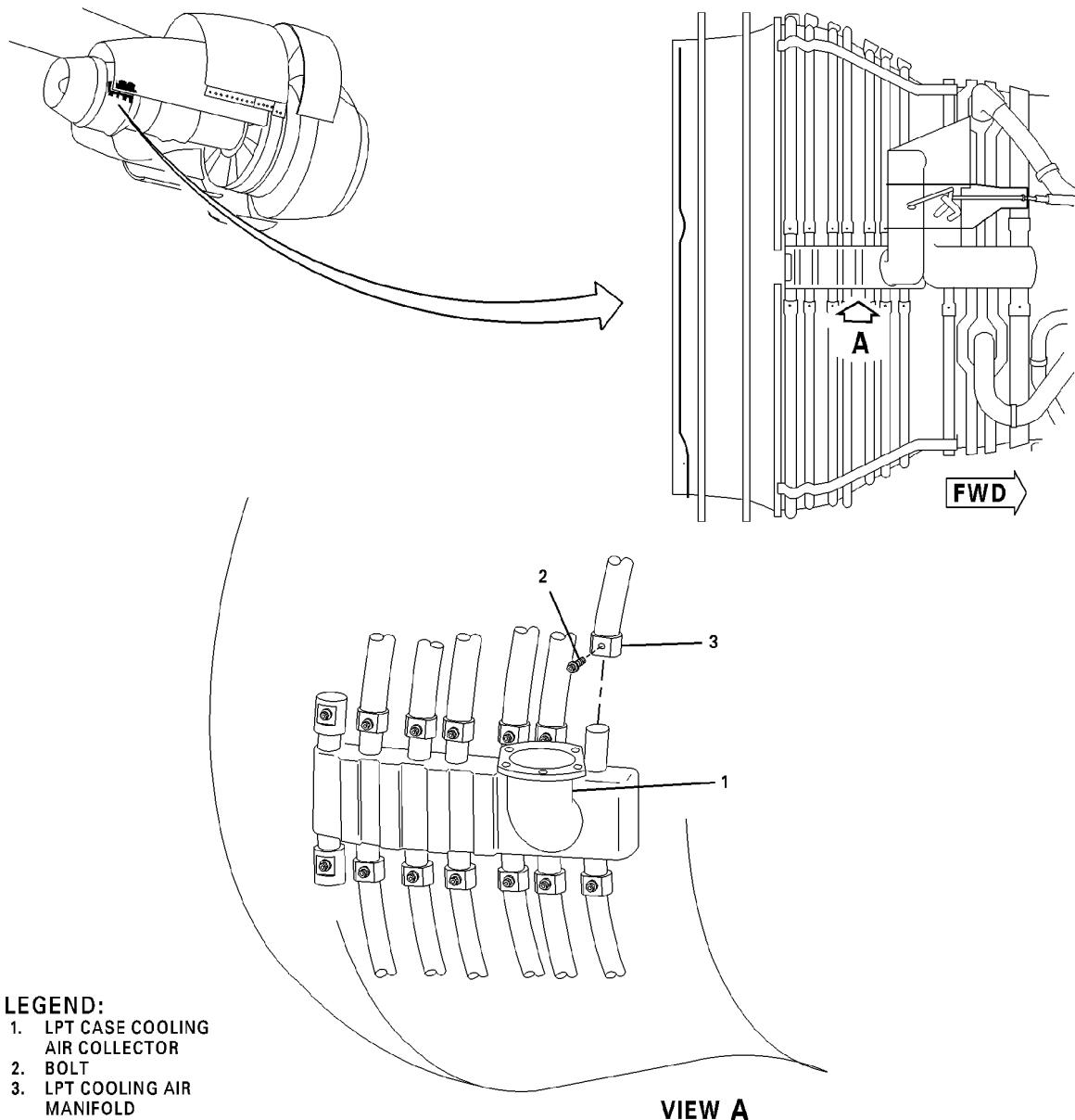
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LEGEND:

1. LPT CASE COOLING AIR COLLECTOR
2. BOLT
3. LPT COOLING AIR MANIFOLD

CAG(IGDS) L-A6044

DB2-75-0125A

LPT Case Cooling Collector - Removal/Installation
Figure 401/75-23-19-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

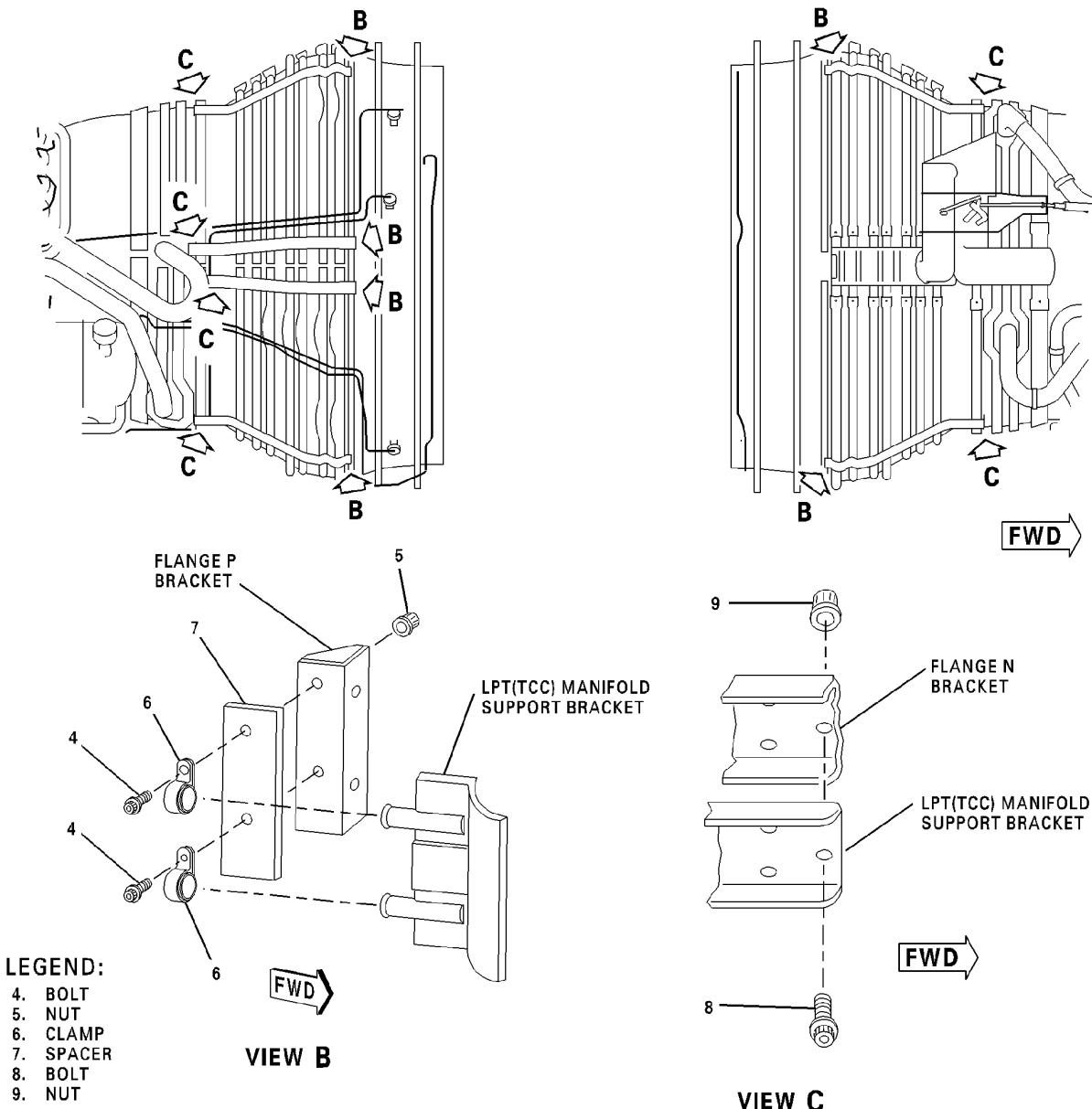
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CAG(IGDS) L-A6044, L-A5614

DB2-75-0126

LPT Case Cooling Collector - Removal/Installation
Figure 402/75-23-19-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

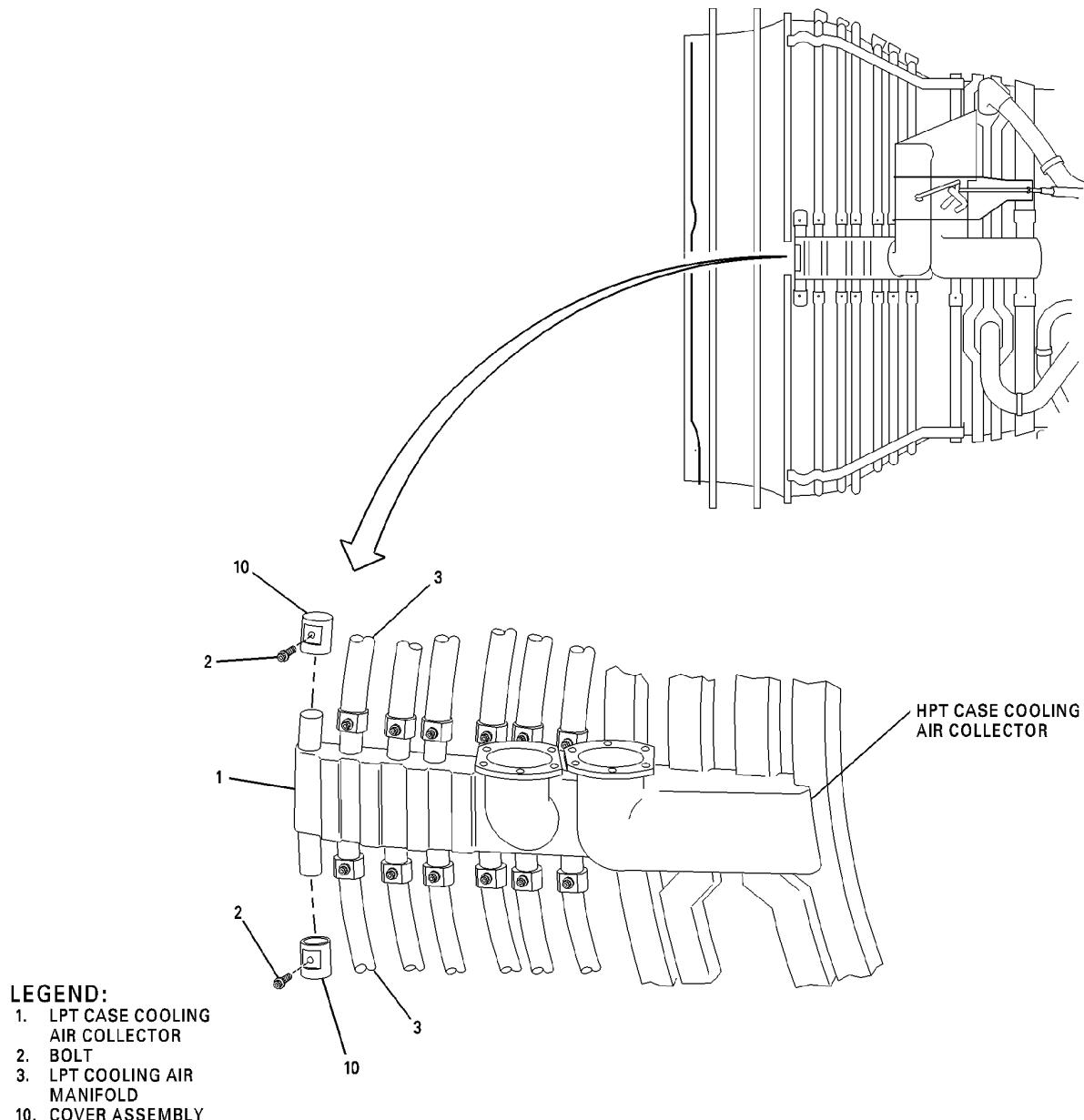
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LEGEND:

1. LPT CASE COOLING AIR COLLECTOR
2. BOLT
3. LPT COOLING AIR MANIFOLD
10. COVER ASSEMBLY

CAG(IGDS) L-A6044

DB2-75-0127A

LPT Case Cooling Collector - Removal/Installation
Figure 403/75-23-19-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

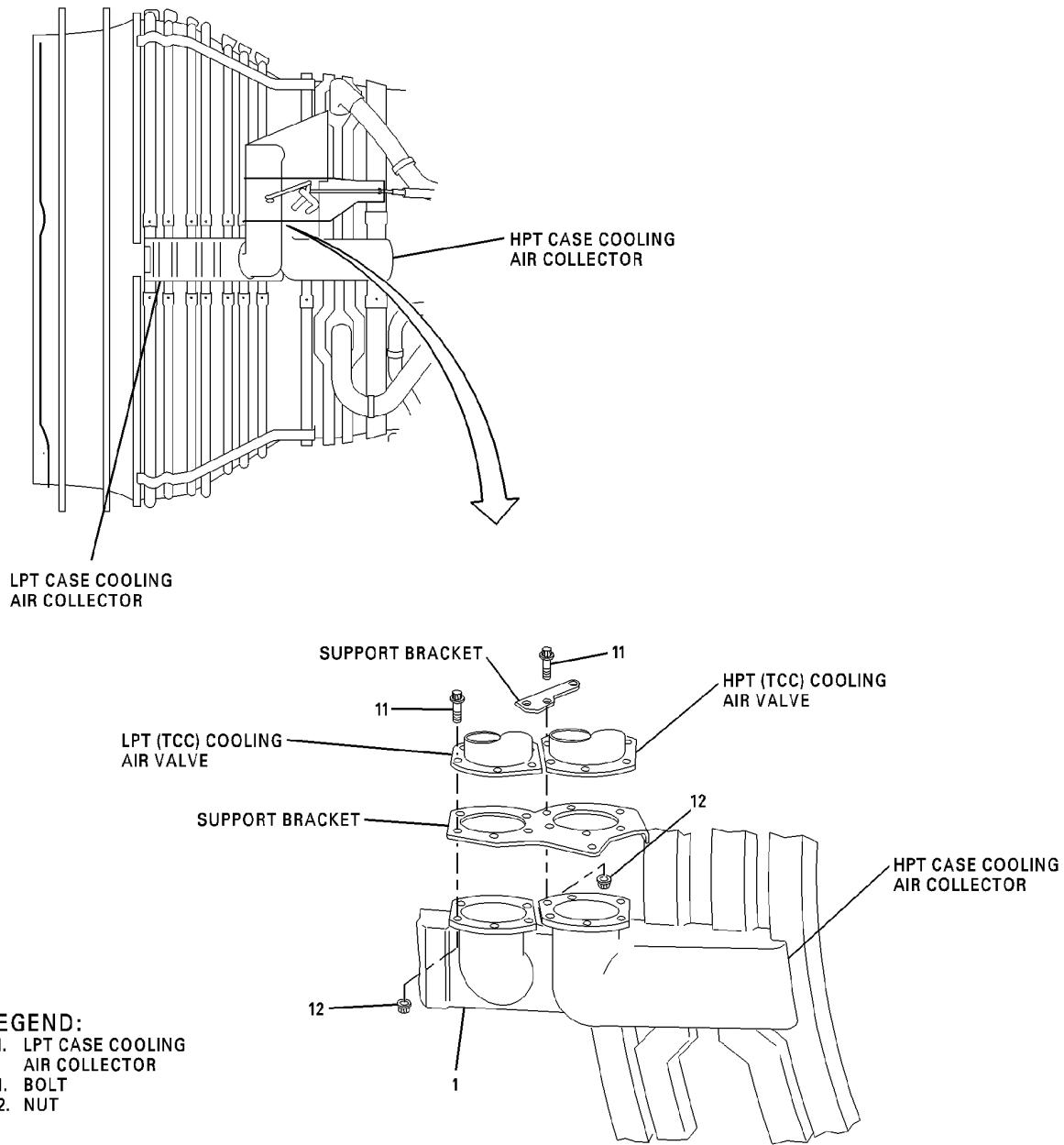
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LEGEND:

- 1. LPT CASE COOLING AIR COLLECTOR
- 11. BOLT
- 12. NUT

CAG(IGDS) L-A6044, L-A5592

DB2-75-0128

LPT Case Cooling Collector - Removal/Installation
Figure 404/75-23-19-990-871

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

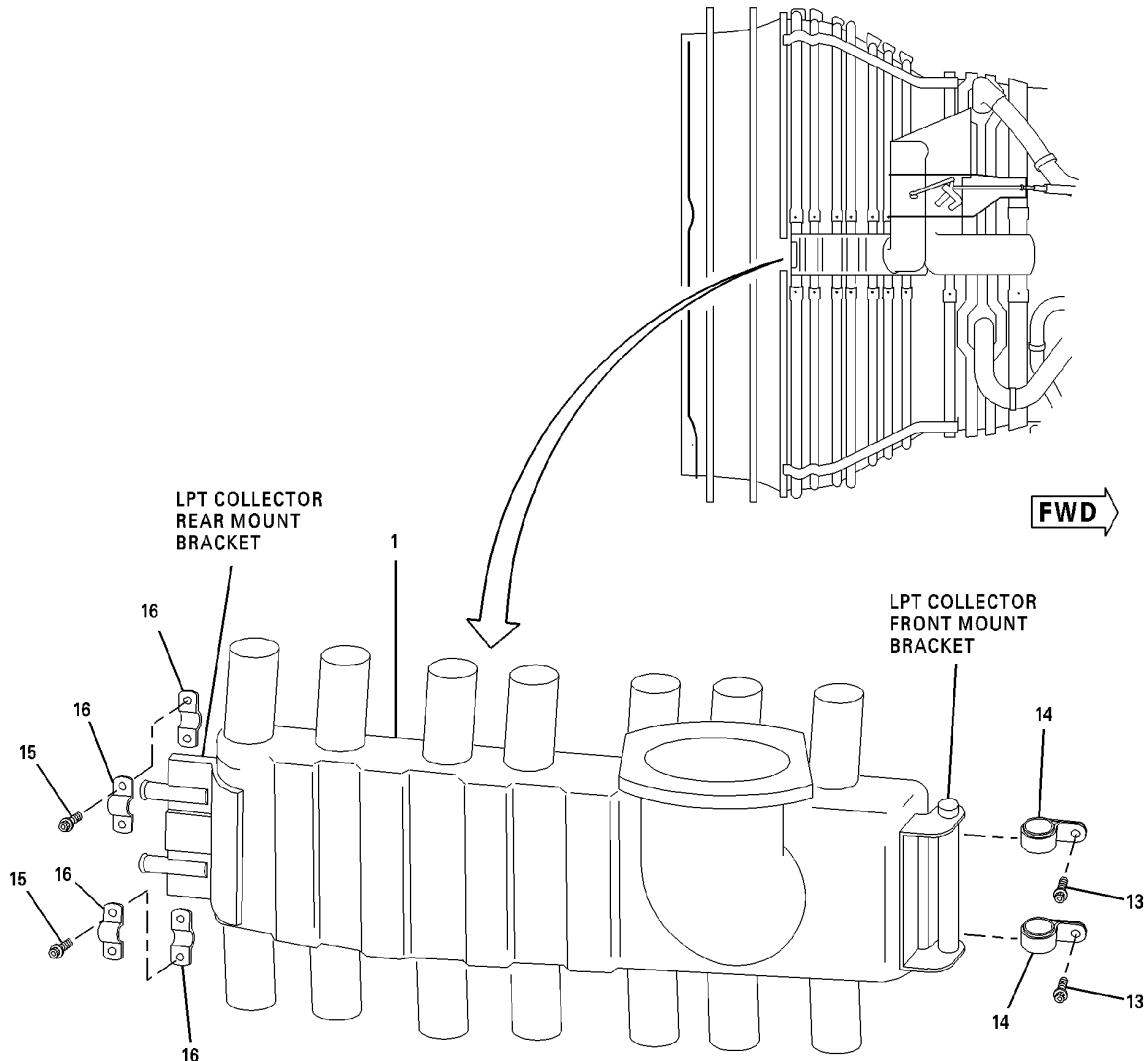
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LEGEND:

- 1. LPT CASE COOLING AIR COLLECTOR
- 13. BOLT
- 14. CLAMP
- 15. BOLT
- 16. CLAMP

CAG(IGDS) L-A6044

DB2-75-0129

LPT Case Cooling Collector - Removal/Installation
Figure 405/75-23-19-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-23-19-400-868

3. INSTALLATION OF THE LOW PRESSURE TURBINE CASE COOLING COLLECTOR

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–100 in-lb (0–11.0 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - Low Pressure Turbine Case Cooling Collector Installation

SUBTASK 75-23-19-010-270

- (1) If necessary, open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - Low Pressure Turbine Case Cooling Collector Installation

SUBTASK 75-23-19-410-268

- (1) Install the low pressure turbine (LPT) case cooling collector (1) as follows: (Figure 401) (Figure 402) (Figure 403) (Figure 404) (Figure 405)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (a) Lubricate the threads of bolt (11) with engine oil (PO3-001). Remove the protective caps and plugs. Install the LPT case cooling collector (1) on the cooling air valve. Install the bolts (11) and nuts (12). Do not torque the bolts (11) at this time. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (b) Lubricate the threads of the two bolts (13) with engine oil (PO3-001). Install the two clamps (14) on the front collector mount. Install the two bolts (13) in the bracket at flange N. Do not torque the two bolts (13) at this time.
- (c) Lubricate the threads of the four bolts (15) with engine oil (PO3-001). Install the four clamps (16) on the rear collector mount. Install the four bolts (15) in the brackets at flange P. Do not torque the four bolts (15) at this time.
- (d) Lubricate the threads of the 12 bolts (2) with engine oil (PO3-001). Move the bottom cooling air manifolds (3) up and engage with the collector tubes. Install the 12 bolts (2). Do not torque the 12 bolts (2) at this time.
- (e) Move the top cooling air manifolds (3) down and engage with the collector tubes and tighten the 12 bolts (2). Do not torque the 12 bolts (2) at this time.
- (f) Install the two cover assemblies (10) on the rear collector tubes and install the two bolts (2). Do not torque the two bolts (2) at this time.
- (g) Lubricate the threads of the three bolts (8) with engine oil (PO3-001). Attach the cooling air manifold support brackets to the brackets at flange N and LPT case. Install the three bolts (8) and three nuts (9). Do not torque the bolts (8) at this time.
- (h) Lubricate the threads of the two bolts (4) with engine oil (PO3-001). Install the two clamps (6) on the rear cooling air manifold brackets. Attach the two clamps (6) to the brackets on flange P with the two bolts (4), nuts (5), and spacer (7). Do not torque the two bolts (4) at this time.
- (i) Torque all the bolts as follows:
 - 1) Torque the bolts (11) that attach the collector to the valve and support bracket to 85–95 in-lb (9.6–10.7 N·m).
 - 2) Torque the two bolts (13) that attach the front collector mount clamps to the brackets on flange N to 36–40 in-lb (4.1–4.5 N·m).
 - 3) Torque the four bolts (15) that attach the rear collector mount clamps to the brackets on flange P to 36–40 in-lb (4.1–4.5 N·m).
 - 4) Torque the 12 top and bottom cooling air manifolds and cover assembly bolts (2) to 36–40 in-lb (4.1–4.5 N·m).
 - 5) Torque the three bolts (8) that attach the front mount to the brackets on flange N to 36–40 in-lb (4.1–4.5 N·m).
 - 6) Torque the two bolts (4) that attach the rear of the collector to the brackets on flange P to 36–40 in-lb (4.1–4.5 N·m).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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F. Job Close-up - Low Pressure Turbine Case Cooling Collector Removal

SUBTASK 75-23-19-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-19-410-269

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-23-19-710-267

- (3) Do an engine ground operational test at idle power. (ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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AIRCRAFT MAINTENANCE MANUAL

BELLOWS, TURBINE CASE COOLING - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the turbine case cooling bellows. The turbine case cooling bellows is attached to the high-pressure-compressor (HPC) case at the 3 o'clock position.
- B. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-23-21-000-869

2. REMOVAL OF THE TURBINE CASE COOLING BELLOWS

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. Consumable Materials

- (1) Consumable Materials

Table 402

REFERENCE	DESIGNATION
Not specified	Protective covers

C. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - Turbine Case Cooling Bellows Removal

SUBTASK 75-23-21-010-270

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - Turbine Case Cooling Bellows Removal

SUBTASK 75-23-21-020-268

- (1) Remove the turbine case cooling (TCC) bellows (1) as follows: (Figure 401)
 - (a) Remove the eight nuts (2) and washers (3) that attach the bellows seal (1) to the inlet duct (4) flange holes.
 - (b) Remove the bellows seal (1).
NOTE: The step that follows is for engines after S/B PW4MD11 71-80.
 - (c) Remove and discard the gasket (5).
NOTE: The steps that follow are for engines before/after S/B PW4MD11 71-80.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (d) Place a protective cover over the opening in the high-pressure-compressor case (HPC).

SUBTASK 75-23-21-410-271

- (2) If the turbine case cooling bellows are not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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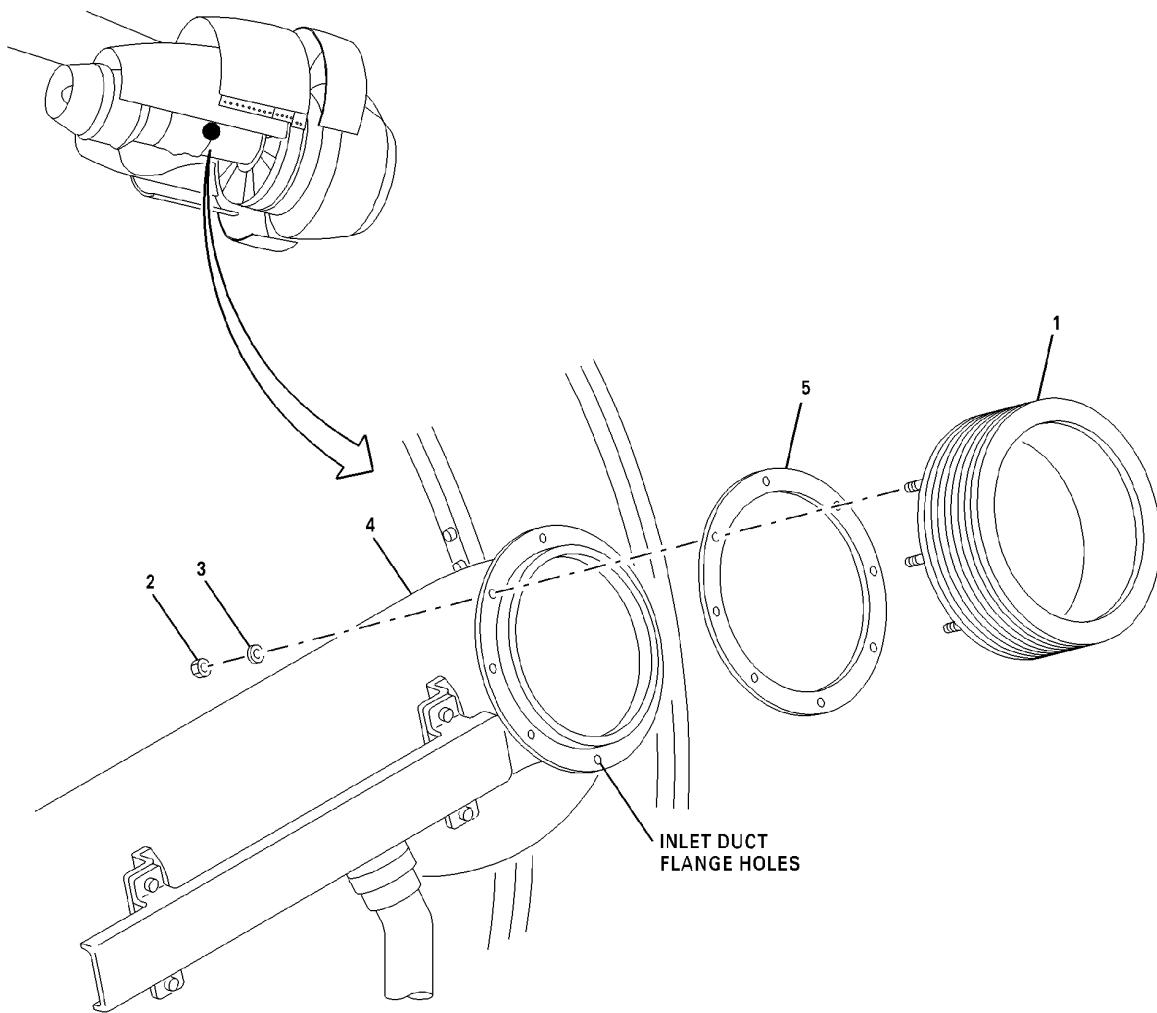
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LEGEND:

1. TURBINE CASE
COOLING INLET
DUCT BELLows SEAL
2. NUT
3. WASHER
4. INLET DUCT
5. GASKET (POST SB PW4MD11 71-80)

CAG(IGDS)

DB2-75-0064A

Turbine Case Cooling Bellows - Removal/Installation
Figure 401/75-23-21-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-23-21-400-869

3. INSTALLATION OF THE TURBINE CASE COOLING BELLOWS

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 403

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0-100 in-lb (0-11.3 N·m)

B. Expendable Parts

- (1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
5	Gasket (Post SB PW4MD11 71-80)	IPC 75-25-02

C. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-23-00	Illustrated Parts Catalog
IPC 75-25-02	Illustrated Parts Catalog

D. Job Set-up - Turbine Case Cooling Bellows Installation

SUBTASK 75-23-21-010-271

- (1) If necessary, open the engine access doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - Turbine Case Cooling Bellows Installation

SUBTASK 75-23-21-410-272

- (1) Install the turbine case cooling bellows (1) as follows: (IPC 75-23-00) (Figure 401)

NOTE: The step that follows is for engines after S/B PW4MD11 71-80.

- (a) Position gasket (5) between the bellows (1) and the TCC duct mating surfaces.

NOTE: The steps that follow are for engines before/after S/B PW4MD11 71-80.

- (b) Put the bellows seal (1) on the inlet duct flange with the studs through the duct flange holes.

- (c) Install the eight washers (3) and nuts (2) on the studs. Torque the nuts (2) to 50-75 in-lb (5.7-8.5 N·m).

F. Job Close-up Turbine Case Cooling Bellows Installation

SUBTASK 75-23-21-942-268

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-23-21-410-273

- (2) Close the right thrust reverser door. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

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TUBES, COOLING OIL QUANTITY TRANSMITTER - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the oil transmitter cooling tubes. The oil quantity transmitter cooling tubes are on the lower section of the engine.
- B. Unless different instructions are given, these procedures are the same for all three Pratt & Whitney PW4460/4462 and PW4460/4462-3 (PHASE-3) engines.

TASK 75-23-23-000-868

2. REMOVAL OF THE OIL QUANTITY TRANSMITTER COOLING TUBES

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 Engine
Not specified (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Oil Quantity Transmitter Cooling Tubes Removal

SUBTASK 75-23-23-010-267

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Oil Quantity Transmitter Cooling Tubes Removal

SUBTASK 75-23-23-020-267

- (1) Remove the oil quantity transmitter cooling tubes (1) as follows: (Figure 401)

NOTE: The step that follows is for engines before S/B PW4MD11 71-80.

- (a) Disconnect the coupling nut (2) from the tee fitting (3) on the cooling tube (1).

NOTE: The step that follows is for engines after S/B PW4MD11 71-80.

- (b) Disconnect the coupling nut (4) from the cooling tube (1).

NOTE: The steps that follow are for engines before and after S/B PW4MD11 71-80.

- (c) Loosen the two clamps (5) that attaches the aft section of the cooling tube (1) and the hose (6) to the cooling shroud.

- (d) Remove the nut (7), washer (8) and screw (9) from the two clamps (10) and remove the aft cooling tube (1) from the engine.

- (e) Remove the hose (6) from the cooling tube (1).

NOTE: The steps that follow are for engines before S/B PW4MD11 71-80.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (f) On the turbine rotor control valve (TRC), loosen the coupling nut (11) from the coupling body (12). Remove the snap retainer halves (13), packings (14), washers (15) coupling nut (11) and coupling body (12).
- (g) Discard the packings (14). Keep the snap retainer halves (13), washers (15) coupling nut (11) and coupling body (12) for the installation.
NOTE: The steps that follow are for engines before and after S/B PW4MD11 71-80.
- (h) Remove the two clamps (5) from the forward section of the cooling tubes (1) and the hose (6). Remove the hose from the cooling tubes.
- (i) Remove the two clamps (10), screws (9), washers (8) and nuts (7) from the forward section of the cooling tubes (1).

SUBTASK 75-23-23-410-267

- (2) Install protective caps and plugs on all openings of the oil quantity transmitter cooling tubes (1).

SUBTASK 75-23-23-410-268

- (3) If the oil quantity transmitter cooling tubes are not installed immediately, or weather conditions make it necessary, close the engine access doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

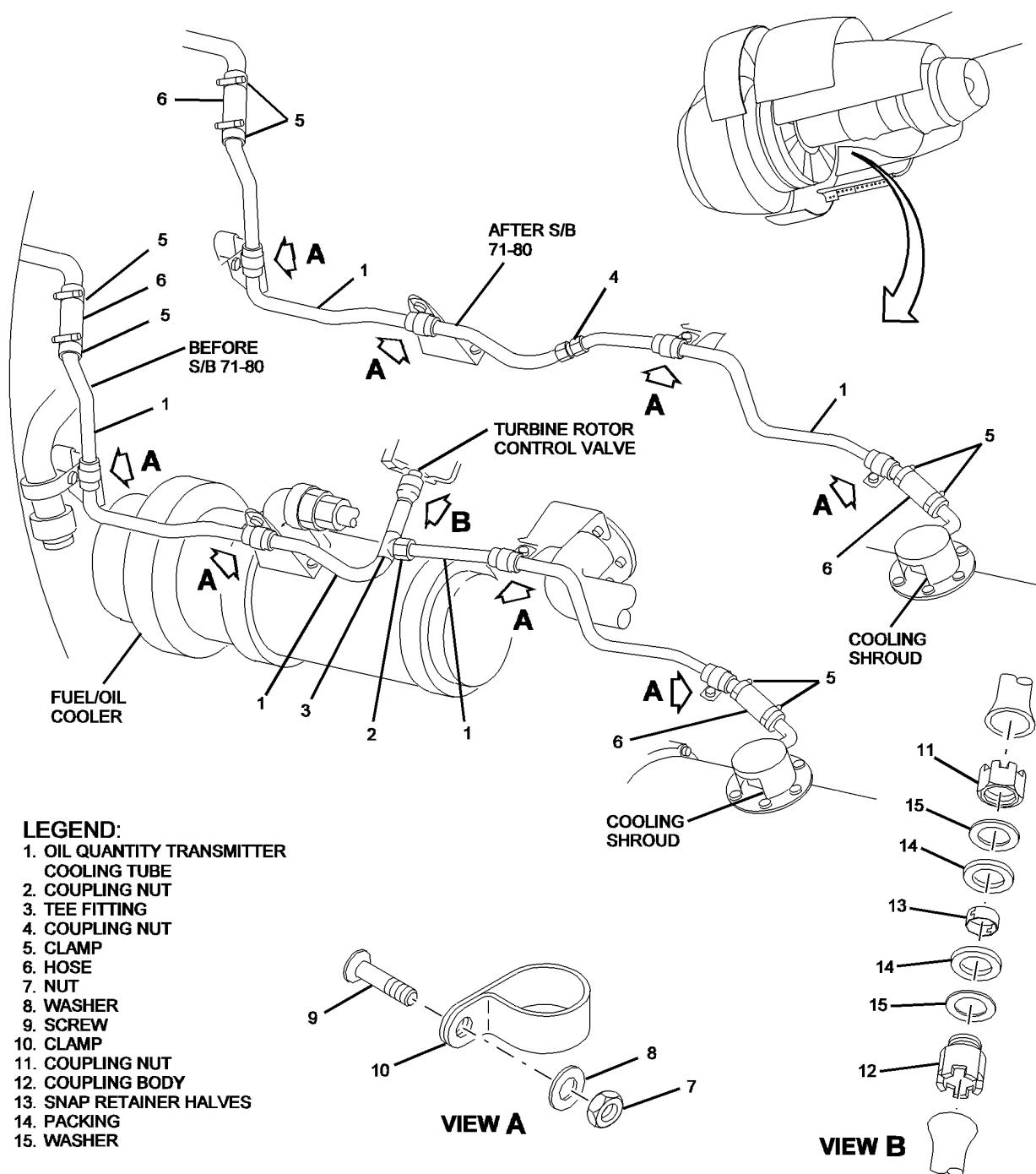
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DB2-75-0292B
S0006281076V2

Oil Quantity Transmitter Cooling Tube - Removal/Installation
Figure 401/75-23-23-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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TASK 75-23-23-400-868

3. INSTALLATION OF THE OIL QUANTITY TRANSMITTER COOLING TUBES

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No.1 and No.3 engines 4-8 ft high (1.22-2.44 m)
Not specified	Aerial boom, manlift No. 2 Engine
Not specified	Torque wrench 0-600 in-lb (0-68 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart can not be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
NOTE: The material that follows is for engines before S/B PW4MD11 71-80.	
P06-002	Petrolatum, white
AS3214-02	Lockwire

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
14	Packing, preformed	IPC 75-23-45-10-065

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-23-45-10-065	Illustrated Parts Catalog

E. Job Set-up - Oil Quantity Transmitter Cooling Tubes Installation

SUBTASK 75-23-23-010-268

- (1) If necessary, open the engine access doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
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F. Procedure - Oil Quantity Transmitter Cooling Tubes Installation

SUBTASK 75-23-23-420-001

- (1) Install the oil quantity transmitter cooling tubes (1) as follows: (Figure 401)

NOTE: The steps that follow are for engines before S/B PW4MD11 71-80.

- (a) Install the coupling nut (11) on the TRC valve and the coupling body (12) on the cooling tube (1) with washers (15). Do not connect the coupling nut (11) to the coupling body (12) at this time.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1082, PETROLATUM/WHITE (DPM 675)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the two packings (14) with petrolatum (P06-002). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Install the two packings (14) on the TRC valve and the cooling tube (1).
- (d) Install the two snap retainer halves (13) on the TRC and the cooling tube (1).
- (e) Pull the coupling nut (11) and coupling body (12) onto the snap retainer halves (13) and tighten the coupling nut an coupling body handtight. Do not torque the coupling at this time.
- NOTE: The step that follows is for engines after S/B PW4MD11 71-80.
- (f) Connect the coupling nut (4) to the cooling tube (1). Tighten the coupling nut handtight. Do not torque the coupling nut at this time.
- NOTE: The steps that follow are for engines before and after S/B PW4MD11 71-80.
- (g) Install the hose (6) on the cooling tubes (1) with the two clamps (5). Torque the clamps to 25-30 in-lb (2.8-3.4 N·m).
- (h) Install the hose (6) on the cooling shroud with the two clamps (5). Torque the clamps to 25-30 in-lb (2.8-3.4 N·m).
- NOTE: The steps that follow are for engines before S/B PW4MD11 71-80.
- (i) Torque the coupling nut (11) and the coupling body (12) on the cooling tube (1) and TRC valve to 64.8-79.2 in-lb (7.3–8.9 N·m).
- (j) Safety the coupling nut (11) to the coupling body (12) with lockwire.
- (k) Install the coupling nut (2) on the tee fitting (3) of the forward cooling tube (1) and tighten handtight.
- NOTE: The steps that follow are for engines before and after S/B PW4MD11 71-80.
- (l) Install the forward two clamps (10), screws (9), washers (8), and nuts (7) on the cooling tubes (1). Torque the nuts to 20-25 in-lb (2.3-2.8 N·m).
- (m) Install the two clamps (10), screws (9), washers (8) and nuts (7) on the aft section of the cooling tubes (1). Torque the nuts to 20-25 in-lb (2.3-2.8 N·m).
- NOTE: The step that follows is for engines before S/B PW4MD11 71-80.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (n) Torque the coupling nut (2) on the tee fitting (3) to 450–500 in-lb (50.8–56.4 N·m).
NOTE: The step that follows is for engines after S/B PW4MD11 71-80.
- (o) Torque the coupling nut (4) on the cooling tubes (1) to 500–520 in-lb (56.5–58.7 N·m).

G. Job Close-up Oil Quantity Transmitter Cooling Tubes Installation

SUBTASK 75-23-23-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-23-23-410-269

- (2) Close the thrust reverser door. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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ENGINE COMPRESSOR COOLING - DESCRIPTION AND OPERATION

1. General

- A. The engine compressor cooling system supplies added booster discharge cooling air to control the temperatures of the high pressure compressor (HPC) core compartment. This system makes sure that during engine operation the HPC clearances between rotor blades and the compressor case stay in the permitted limits.
- B. The engine compressor cooling system has three solenoid-operated cooling-air valves. These valves are called core compartment cooling air valves (CAV) and are installed on the fan frame. The solenoids are attached to the CAV's and receive signals from the Electronic Control Unit (ECU). If a CAV fails, it will fail in the open position to make sure the maximum cooling airflow will continue. A maximum cooling airflow is necessary to prevent blade-tip-rub when the engine operates at high temperatures. (Figure 1)

2. HPC Core Compartment Cooling Air Valves

- A. There are three independently operated HPC core compartment cooling air valves (CAV). They are mounted on the fan frame at the 2 o'clock, 5:30 o'clock, and 11 o'clock positions. The CAV's have a translating sleeve, an actuation chamber, and a ball valve. The ball valve is controlled by the solenoid which is mounted on the valve assembly. The solenoid receives signals from the ECU.
- B. The CAV's are spring loaded in the open position and supply added cooling air to the HPC core compartment. During high power engine operation, more air is necessary when the engine temperatures increase. During low power engine operation, when less air is necessary, the core compartment CAV's close, and decrease the workload on the HPC. This condition improves the engine specific fuel consumption.

3. Core Compartment Cooling Air Valve Solenoids

- A. The solenoids receive their signals from the ECU and operate the core compartment CAV's as follows:
 - Operates one, two, or all three CAV's
 - Fully opens the CAV's
 - Fully closes the CAV's
 - Operates the CAV's to specified positions set by the ECU.

4. Fan Frame Struts

- A. The function of the fan frame struts is to move booster discharge air to different areas of the engine. The booster discharge air is collected by scoops on five of the leading edge fan frame struts. Booster discharge air from the air scoops on struts No. 1 and No. 9 go directly to the HPC core compartment. The air from the other three struts is moved radially out, through the CAV's, and then back into the engine through different struts. The CAV's and the air tubes are attached to the outside circumference of the fan frame. (Figure 2)

5. Electronic Control Unit

- A. During engine operation the electronic control unit (ECU) makes an analysis of the inputs that follow:
 - Fan speed (N1)
 - Fan compartment pressure (PO)
 - Engine core speed (N2)
 - Compressor inlet temperature (T2.5)
 - Compressor discharge temperature (T3)
 - Other engine parameters.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- (1) With the parameters from the list above, the ECU computer calculates the current HPC core compartment temperature. It then sends a signal to the ECU core compartment CAV position decoder. The ECU CAV position decoder transmits a 16 vdc electrical position command signal to one, two, or all three of the CAV's. The number of CAV's operated agree with the calculated HPC core compartment temperature. The higher the core compartment temperature, the larger the CAV's will open. The lower the temperature of the HPC core compartment, the smaller the CAV's will open. If necessary, all three CAV's will open or close.
- (2) When the ECU CAV position decoder finds that the calculated HPC core compartment temperature is too high, the ECU will send no electrical position command signal to the CAV solenoid. This opens CAV one, CAV two or all three CAV's. The CAV's will stay open and the additional cooling air will go into the HPC core compartment.
- (3) When the ECU CAV position decoder finds that the calculated HPC core compartment temperature is in the permitted limits, the ECU sends an electrical position command signal to the solenoid. The CAV one, CAV two, or all three CAV's will close and no more discharge cooling air will go into the HPC core compartment. If necessary, all three CAV's will close or open.
- (4) The HPC core compartment CAV's will open and close continuously as the engine parameters become stable. When stable, the CAV's will stay open or closed until the engine parameters get out of balance again.

6. System Operation

- A. The fan discharge air flows through five leading edge slots of the fan frame struts (No. 1, 4, 6, 9, and 10). The fan discharge air that flows through fan struts No. 1 and No. 9 goes directly to the engine core compartment cavity. This airflow is continuous and is not controlled by a valve. The air that flows through the leading edge slots of struts No. 4, No. 6, and No. 10 goes radially out to the circumference of the fan frame. Here the air flows through air tubes attached to the outside of the fan frame. The cooling airflow then goes through the CAV's on its way to the fan frame strut and down to the HPC core compartment.
- B. The fan discharge air from strut No. 4 flows through external tubing to CAV A and then to strut No. 2. The fan discharge air from strut No. 6 flows through the external tubing and to CAV B and then to strut No. 8. The fan discharge air from strut 10 flows through the external tubing to CAV C and then to strut No. 12. The airflow from struts No. 2, 8, and 12 then flows to the HPC core compartment cavity.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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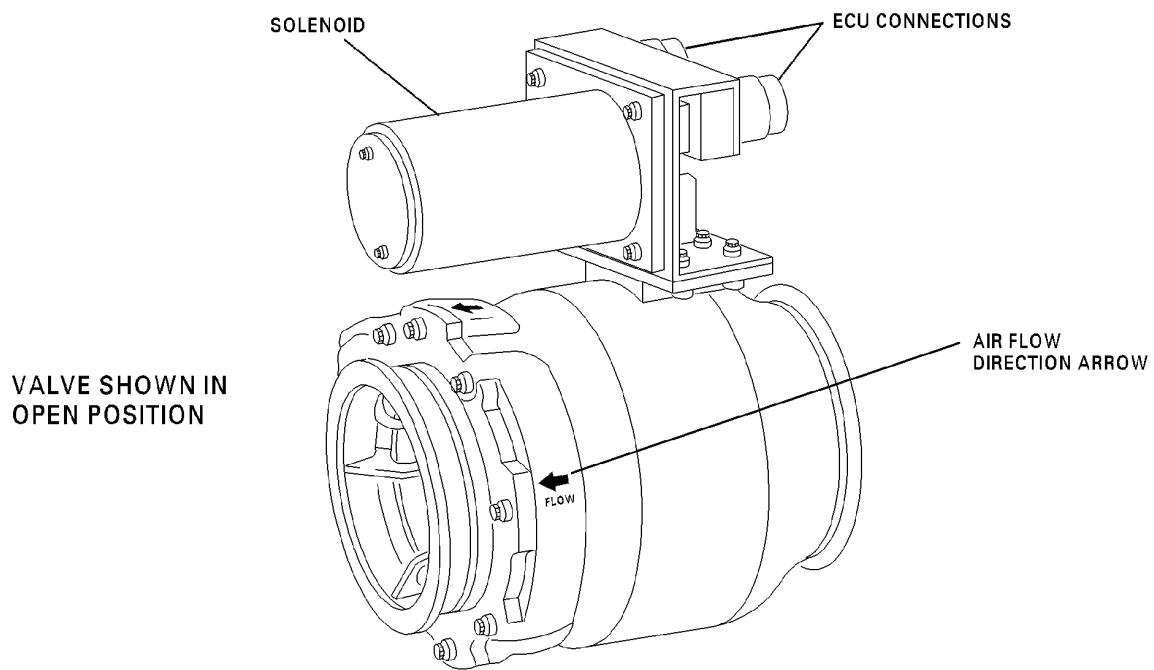
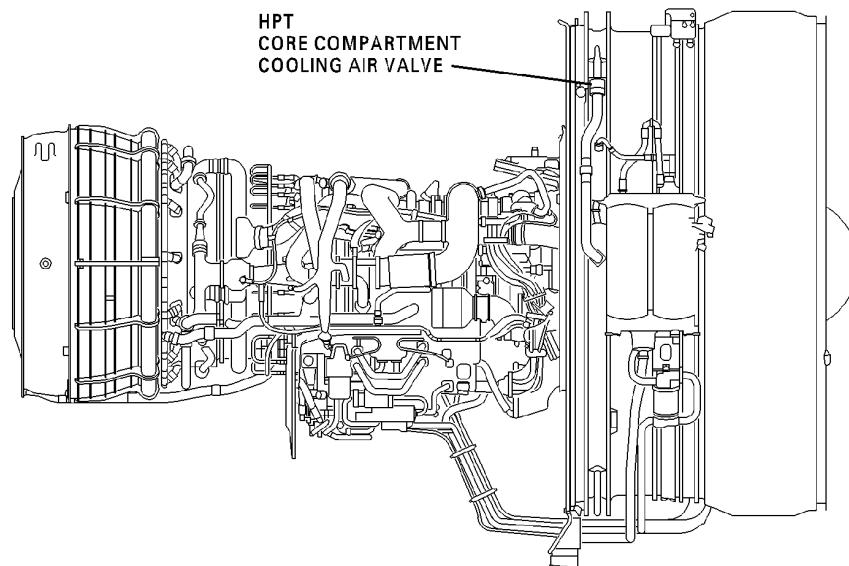
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CAG(IGDS)

DB2-75-0281

HPT Core Compartment Cooling Air Valve
Figure 1/75-24-01-990-806

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

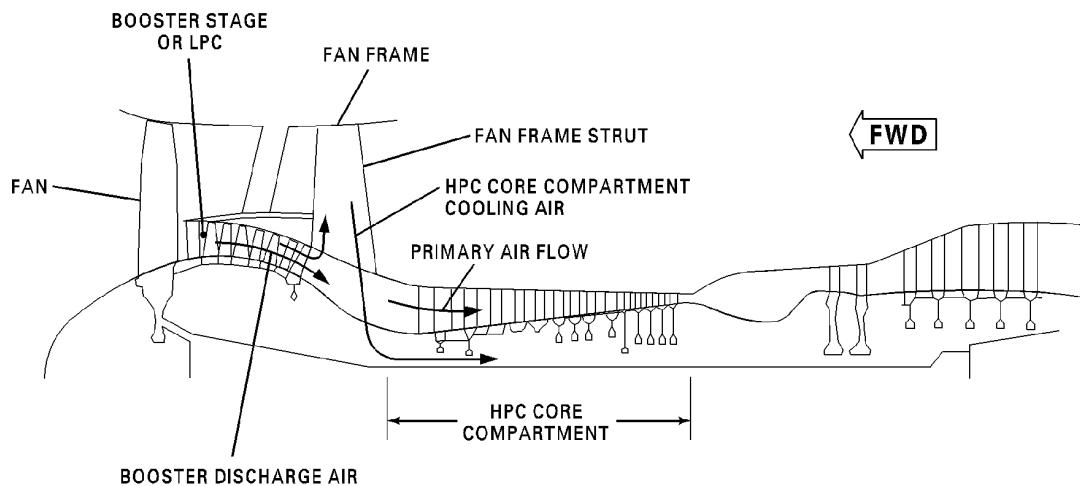
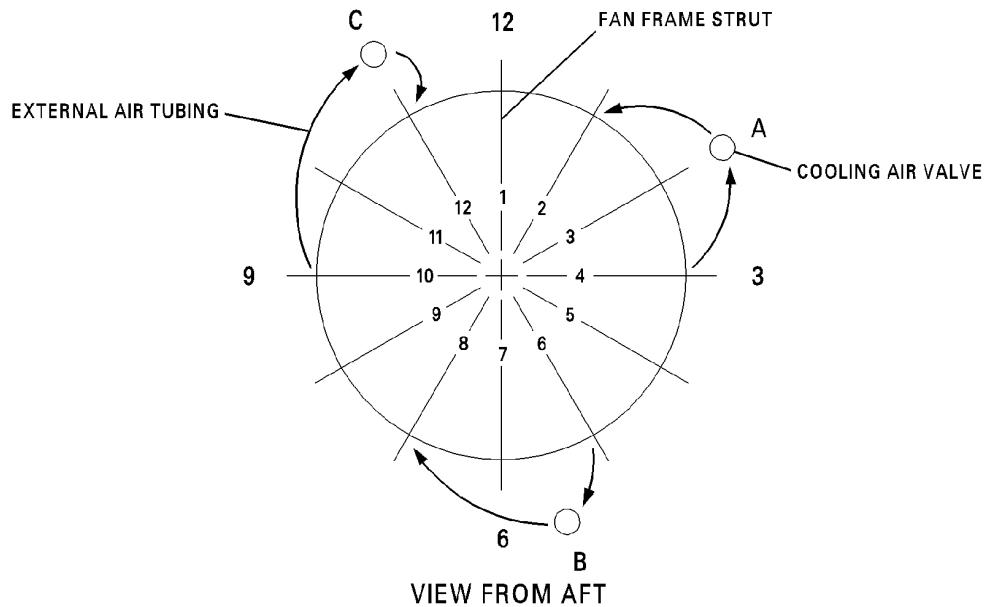
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CAG(IGDS)

DB2-75-0280

Fan Frame Strut and Cooling Air Valve Locations
Figure 2/75-24-01-990-805

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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VALVE, BORE COOLING - REMOVAL/INSTALLATION

1. General

- A. This procedures has the removal and installation instructions for the three bore cooling valves.
- B. The bore cooling valves are on the fan case at the 2, 5:30 and 11 o'clock positions. Access to the three bore cooling valves is through the left and right fan-cowl doors.
- C. Unless different instructions are given, these procedures are the same for the three G.E. CF6-80C2D1F engines.

TASK 75-24-01-000-801

2. REMOVAL OF THE BORE COOLING VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-801	OPENING OF THE FAN COWL DOORS (P/B 201)
71-10-00-410-801	CLOSING OF THE FAN COWL DOORS (P/B 201)

C. Job Set-up - Bore Cooling Valve Removal

SUBTASK 75-24-01-010-001

- (1) Open the fan cowl doors. (OPENING OF THE FAN COWL DOORS, TASK 71-10-00-010-801)

D. Procedure - Bore Cooling Valve Removal

SUBTASK 75-24-01-020-002

- (1) Remove the bore cooling valve (1) as follows:
 - (a) Disconnect the two electrical connectors (2) from the bore cooling valve (1). Install the protective dust caps. (Figure 401)
 - (b) Remove the grooved clamps (3) on each side of the bore cooling valve (1).
 - (c) Remove the bore cooling valve (1). Install the protective caps and plugs.

SUBTASK 75-24-01-410-006

- (2) If the bore cooling valve (1) is not installed immediately, or weather conditions make it necessary, close the engine access doors. (CLOSING OF THE FAN COWL DOORS, TASK 71-10-00-410-801)

———— END OF TASK ————

EFFECTIVITY

FX 572-576, 582-599, 601-610, 612-619, 625

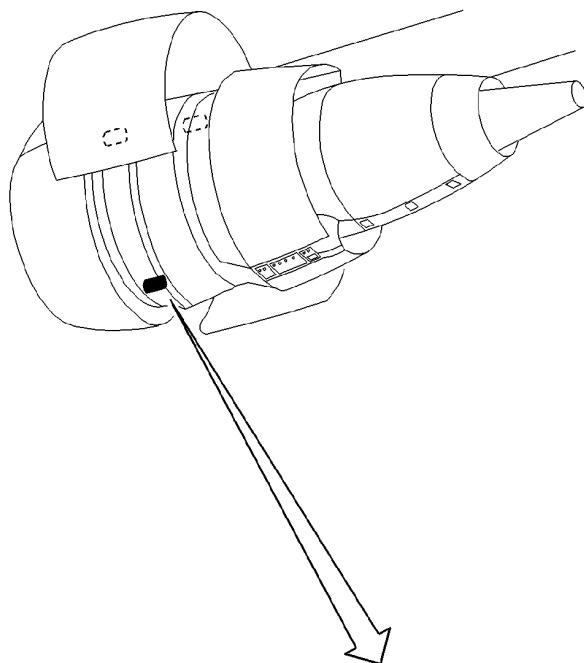
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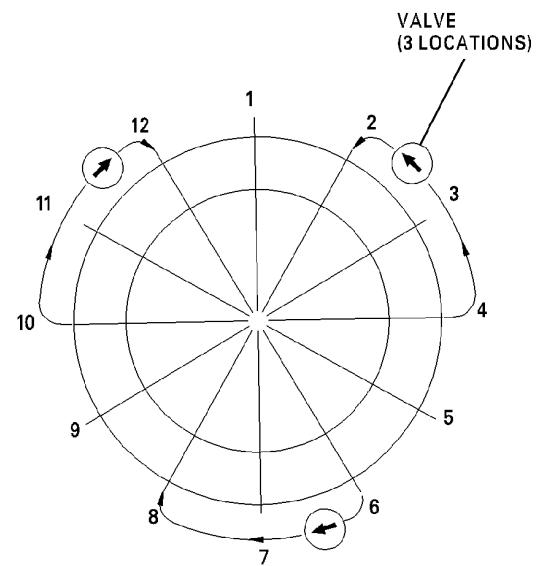


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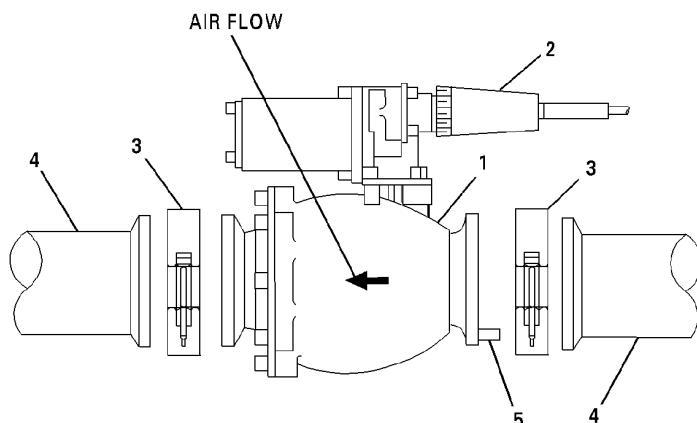


LEGEND:

1. BORE COOLING VALVE
2. ELECTRICAL CONNECTOR
3. GROOVED CLAMP
4. AIR TUBE
5. ALIGNMENT PIN



VALVE POSITIONS
(VIEW FROM AFT)



CAG(IGDS)

DB2-75-0005B

Bore Cooling Valve - Removal/Installation
Figure 401/75-24-01-990-804

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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AIRCRAFT MAINTENANCE MANUAL

TASK 75-24-01-400-801

3. INSTALLATION OF THE BORE COOLING VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-75 in-lb (0-8.5 N·m)

B. References

Reference	Title
71-00-00-700-809	ADJUSTMENT AND TEST PROCEDURES (P/B 501)
71-10-00-010-801	OPENING OF THE FAN COWL DOORS (P/B 201)
71-10-00-410-801	CLOSING OF THE FAN COWL DOORS (P/B 201)

C. Job Set-up - Bore Cooling Valve Installation

SUBTASK 75-24-01-010-005

- (1) If necessary, open the fan cowl doors. (OPENING OF THE FAN COWL DOORS, TASK 71-10-00-010-801)

D. Procedure - Bore Cooling Valve Installation

SUBTASK 75-24-01-420-001

- (1) Install the bore cooling valve (1) as follows: (Figure 401)
- Remove the protective caps and plugs from the air tubes (4) and the bore cooling valve (1).
 - Position the bore cooling valve (1) between the air tubes (4). Make sure the alignment pin (5) is engaged in the air tube.
NOTE: The bore cooling valves have an arrow to show direction of the air flow. Make sure the bore cooling valve is installed with the air flow in the correct direction.
 - Install the grooved clamps (3) and torque the nuts of the grooved clamps to 22-27 in-lb (2.5-3.1 N·m).
 - With a small amount of force, hit the grooved clamps (3) with a plastic mallet at the outer circular area. Make sure all the circular areas of the grooved clamps (3) are engaged at the valve (1) and the air tubes (4). Torque the nuts of the grooved clamps to 40 in-lb (4.5 N·m).
 - With a small amount of force, hit the grooved clamps (3) again with a plastic mallet at the outer circular area. Torque the nuts of the grooved clamps again to 40 in-lb (4.5 N·m).
 - Connect the electrical connectors (2) to the bore cooling valve (1). Tighten the electrical connectors by hand but not more than 20 degrees after the connectors are fully engaged.

E. Job Close-up - Bore Cooling Valve Installation

SUBTASK 75-24-01-942-001

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

EFFECTIVITY

FX 572-576, 582-599, 601-610, 612-619, 625

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SUBTASK 75-24-01-410-001

- (2) Close the fan cowl doors. (CLOSING OF THE FAN COWL DOORS, TASK 71-10-00-410-801)

SUBTASK 75-24-01-741-001

- (3) Do the applicable test(s) shown in the adjustment and test procedures. (ADJUSTMENT AND TEST PROCEDURES, TASK 71-00-00-700-809)

———— END OF TASK ——

— EFFECTIVITY —
FX 572-576, 582-599, 601-610, 612-619, 625

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VALVE, BORE COOLING - INSPECTION/CHECK

1. General

- A. This maintenance procedure has the inspection/check instructions for the translating sleeve position of the three bore cooling valves. The bore cooling valves are on the fan case at the 2 o'clock, 5:30 o'clock, and 11 o'clock positions.
- B. Unless different instructions are given, these procedures are the same for the three G.E CF6-80C2D1F engines on the MD-11 aircraft.

TASK 75-24-01-200-801

2. INSPECTION OF THE BORE COOLING VALVE

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
71-10-00-010-801	OPENING OF THE FAN COWL DOORS (P/B 201)
71-10-00-410-801	CLOSING OF THE FAN COWL DOORS (P/B 201)
75-24-01-000-801	REMOVAL OF THE BORE COOLING VALVE (P/B 401)
75-24-01-400-801	INSTALLATION OF THE BORE COOLING VALVE (P/B 401)

B. Job Set-up Information - Bore Cooling Valve Inspection

SUBTASK 75-24-01-941-001

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 601

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Pins, 0.080 in. (0.203 cm), Steel type valve
Not Specified	Pins 0.060 in. (0.152cm), composite type valve

C. Job Set-up - Bore Cooling Valve Inspection

SUBTASK 75-24-01-010-004

- (1) Open the fan-cowl doors. (OPENING OF THE FAN COWL DOORS, TASK 71-10-00-010-801)

D. Procedure - Bore Cooling Valve Inspection

SUBTASK 75-24-01-211-001

- (1) Do a visual inspection of the 11:00 valve and the 5:30 valve bore cooling valves (1) as follows:
(Figure 601)

NOTE: The procedure that follows is for steel valves on GE Engines CF6-80C2D1F before S/B 72-722.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- (a) Put a 0.080 in. (0.203 cm) pin into the position indication hole (2) on the valve body of the bore cooling valve (1). Make sure that the pin goes into the position indication hole a minimum distance of 0.32 in. (0.81 cm).

NOTE: When electrical power is removed from the integrally attached solenoid, the bore cooling valve must move freely to the open position. If the pin cannot be put into the position indication hole, the translating sleeve is in the closed position and the valve must be replaced.

NOTE: The follow procedure is for composite valves on GE Engines CF6-80C2D1F after S/B 72-722.

- (b) Put a 0.060 in. (0.152 cm) pin into the position indication hole (2) on the valve body of the bore cooling valve (1). Make sure that the pin goes into the position indication hole a minimum distance of 0.30 in. (0.76 cm).

NOTE: When electrical power is removed from the integrally attached solenoid, the bore cooling valve must move freely to the open position. If the pin cannot be put into the position indication hole, the translating sleeve is in the closed position and the valve must be replaced.

NOTE: The steps that follow are for all engines.

- (c) Remove the pin from the position indication hole (2).

- (d) If the pin did not go in the minimum distance, replace the bore cooling valve (1).
(REMOVAL OF THE BORE COOLING VALVE, TASK 75-24-01-000-801)
(INSTALLATION OF THE BORE COOLING VALVE, TASK 75-24-01-400-801)

SUBTASK 75-24-01-211-002

- (2) Do a visual inspection of the 2:00 bore cooling valve (1) as follows: (Figure 601)

- (a) Remove the 2:00 bore cooling valve. (REMOVAL OF THE BORE COOLING VALVE, TASK 75-24-01-000-801)

NOTE: The step that follows is for steel valves on GE Engines CF6-80C2D1F before S/B 72-722.

- (b) Put a 0.080 in. (0.203 cm) pin into the position indication hole (2) on the valve body of the bore cooling valve (1). Make sure that the pin goes into the position indication hole a minimum distance of 0.32 in. (0.81 cm).

NOTE: When electrical power is removed from the integrally attached solenoid, the bore cooling valve must move freely to the open position. If the pin cannot be put into the position indication hole, the translating sleeve is in the closed position and the valve must be replaced.

NOTE: The step that follows is for composite valves on GE Engines CF6-80C2D1F after S/B 72-722.

- (c) Put a 0.060 in. (0.152 cm) pin into the position indication hole (2) on the valve body of the bore cooling valve (1). Make sure that the pin goes into the position indication hole a minimum distance of 0.30 in. (0.76 cm).

NOTE: When electrical power is removed from the integrally attached solenoid, the bore cooling valve must move freely to the open position. If the pin cannot be put into the position indication hole, the translating sleeve is in the closed position and the valve must be replaced.

NOTE: The steps that follow are for all engines.

- (d) Remove the pin from the position indication hole (2).

- (e) If the pin did not go in the minimum distance, replace the bore cooling valve.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- (f) Install the 2:00 position bore cooling valve (1). (INSTALLATION OF THE BORE COOLING VALVE, TASK 75-24-01-400-801)

E. Job Close-up - Bore Cooling Valve Inspection

SUBTASK 75-24-01-942-002

- (1) Remove all the tools and equipment from the work area. Make sure the work area is clean.

SUBTASK 75-24-01-410-003

- (2) Close the fan-cowl doors. (CLOSING OF THE FAN COWL DOORS, TASK 71-10-00-410-801)

———— END OF TASK ————

— EFFECTIVITY —
FX 572-576, 582-599, 601-610, 612-619, 625

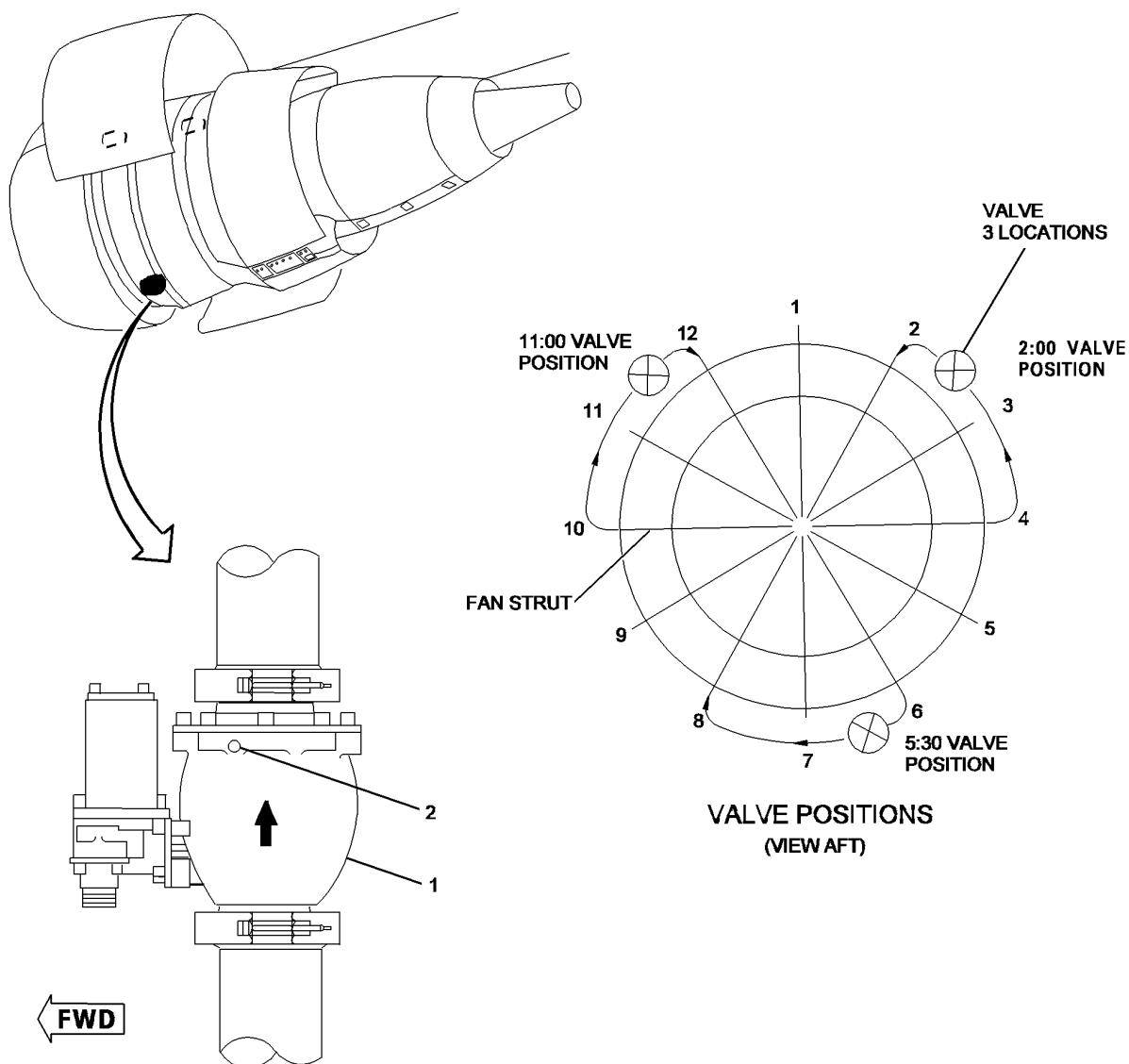
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LEGEND:

1. BORE COOLING VALVE
2. POSITION INDICATION HOLE

DB2-75-0339A
S0006281099V2

Bore Cooling Valves - Inspection
Figure 601/75-24-01-990-801

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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VALVE, HIGH PRESSURE TURBINE CLEARANCE CONTROL DEACTIVATION/ACTIVATION -
MAINTENANCE PRACTICES

1. General

- A. This procedure has the maintenance practices for the high pressure turbine clearance control valve.
The procedure includes:
 - Deactivation of the high pressure turbine clearance control valve
 - Activation of the high pressure turbine clearance control valve.
- B. The high pressure turbine clearance control valve is at the 1 o'clock position. Access to the TCC valve is through the right thrust-reverser door.
- C. Unless different instructions are given, these procedures are the same for the three G.E. CF6-80C2D1F engines.

TASK 75-24-11-040-801

2. DEACTIVATION OF THE HIGH PRESSURE TURBINE CLEARANCE CONTROL VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 201

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

Table 202

REFERENCE	DESIGNATION
Not specified	Tape, high temperature

C. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - High Pressure Turbine Clearance Control Valve Deactivation

SUBTASK 75-24-11-010-006

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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E. Procedure - High Pressure Turbine Clearance Control Valve Deactivation

SUBTASK 75-24-11-040-001

- (1) Deactivate the turbine clearance control valve (1) as follows: (Figure 201)
 - (a) Disconnect the two electrical connectors (2 and 3) from the high pressure turbine clearance control valve (1). Install the protective caps and plugs.
 - (b) Keep the two electrical connectors (2 and 3) in a stable position with the high temperature tape. (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)

NOTE: With the high pressure turbine clearance control valve deactivated there will be an approximate 0.45% fuel burn increase per engine.

F. Job Close-up Procedure - High Pressure Turbine Clearance Control Valve Deactivation

SUBTASK 75-24-11-942-003

- (1) Remove all the tools and equipment from the work area. Make sure the work area is clean.

SUBTASK 75-24-11-410-005

- (2) Close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

— EFFECTIVITY —
FX 572-576, 582-599, 601-610, 612-619, 625

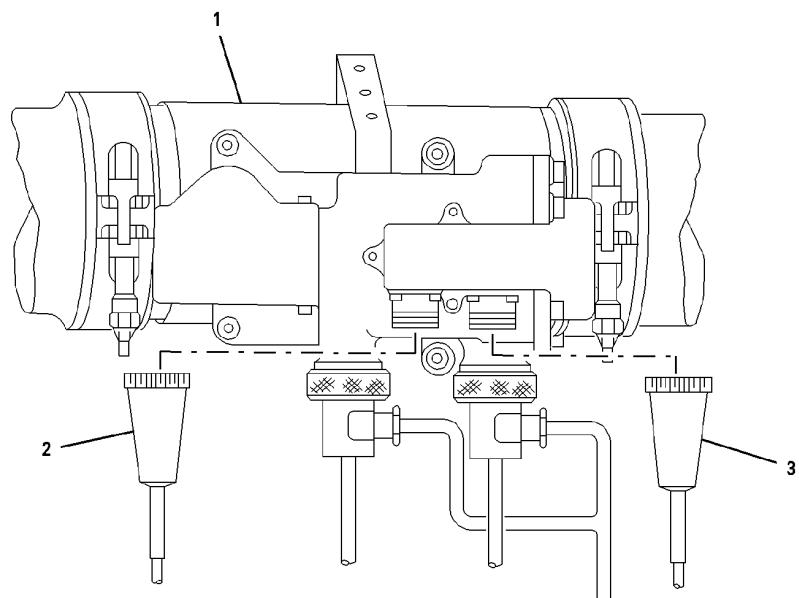
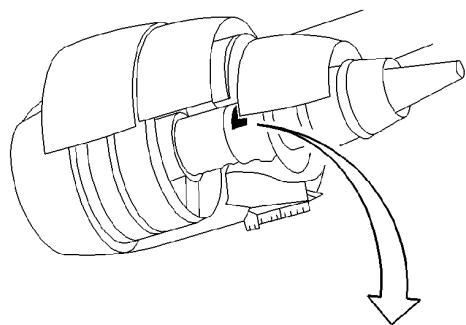
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LEGEND:

1. TURBINE CLEARANCE
CONTROL VALVE
2. ELECTRICAL CONNECTOR
3. ELECTRICAL CONNECTOR

CAG(IGDS) CF8-A6231-00-A

DB2-75-0231

High Pressure TCC Valve - Deactivation/Activation
Figure 201/75-24-11-990-803

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-24-11-440-801

3. ACTIVATION OF THE HIGH PRESSURE TURBINE CLEARANCE CONTROL VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 203

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
73-21-02-741-802	RETURN-TO-SERVICE TEST OF THE ELECTRONIC CONTROL UNIT (P/B 501)

C. Job Set-up Information - High Pressure Turbine Clearance Control Valve Activation

SUBTASK 75-24-11-010-008

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

D. Procedure - High Pressure Turbine Clearance Control Valve Activation

SUBTASK 75-24-11-440-001

- (1) Activate the turbine clearance control valve (1) as follows: (Figure 201)
 - (a) Remove the high temperature tape, the protective caps and the plugs from the two electrical connectors (2 and 3).
 - (b) Connect the two electrical connectors (2 and 3) to the turbine clearance control valve (1). Tighten the electrical connectors by hand and listen for the sound of a click. Make sure the lock indicator shows in the connector window.

SUBTASK 75-24-11-741-001

- (2) Do the ECU return-to-service test. (RETURN-TO-SERVICE TEST OF THE ELECTRONIC CONTROL UNIT, TASK 73-21-02-741-802)

E. Job Close-up - High Pressure Turbine Clearance Control Valve Activation

SUBTASK 75-24-11-942-002

- (1) Remove all the tools and equipment from the work area. Make sure the work area is clean.

SUBTASK 75-24-11-410-007

- (2) Close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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VALVE, TURBINE CLEARANCE CONTROL - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the two turbine clearance control (TCC) valves. The high pressure turbine clearance control valve is at the 1:00 o'clock position. The low pressure turbine clearance control valve is at the 8:00 o'clock position. Removal and installation instructions are the same for the two valves. Access to the TCC valves is through the thrust-reverser doors.
- B. Instructions are given in the text for the difference in the fuel tube leak test.
- C. Unless different instructions are given, these procedures are the same for the three G.E. CF6-80C2D1F engines.

TASK 75-24-11-000-801

2. REMOVAL OF THE TURBINE CLEARANCE CONTROL VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Container, 2 U.S. gal. (7.58 l)
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Turbine Clearance Control Valve Removal

SUBTASK 75-24-11-010-002

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

D. Procedure - Turbine Clearance Control Valve Removal

SUBTASK 75-24-11-030-001

- (1) Remove the turbine clearance control (TCC) valve as follows: (Figure 401)
 - (a) Disconnect the electrical connectors (5) from the turbine clearance control (TCC) valve (3).

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1044, JET FUELS A AND A-1 (JP-5 FUEL)

HAZMAT 1000, REFER TO MSDS



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1045, JET FUEL B (JP-4 FUEL)

HAZMAT 1000, REFER TO MSDS

- (b) Put the container under the fuel drain tubes (8 and 9) to catch the fuel. Disconnect the fuel drain tube (9) from the drain cans (10). Use a container to collect the remaining fuel.
- (c) Disconnect the drain can (10) knurled nuts. Slide the drain cans back to get to the fuel tubes (8).
- (d) Disconnect the fuel tubes (8) from the TCC valve (3).
- (e) Remove and discard the packings (11) from the drain can (10) knurled nuts.
- (f) Remove the grooved clamps (2) that attach the TCC valve (3) to the manifolds (1). Then remove the TCC valve.
NOTE: The step that follows is for engines after service bulletin S/B 75-084.
- (g) Remove and discard the ring seal (12).
NOTE: The steps that follow are for engines before and after service bulletin S/B 75-084.
- (h) Install protective caps and plugs on all the open fuel tubes, the open air manifolds, and the electrical connectors.
- (i) Remove the reducer fittings (7) from the TCC valve (3). Discard the preformed packings (6). Keep the reducer fittings for use on the replacement TCC valve.

SUBTASK 75-24-11-410-004

- (2) If the TCC valve is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

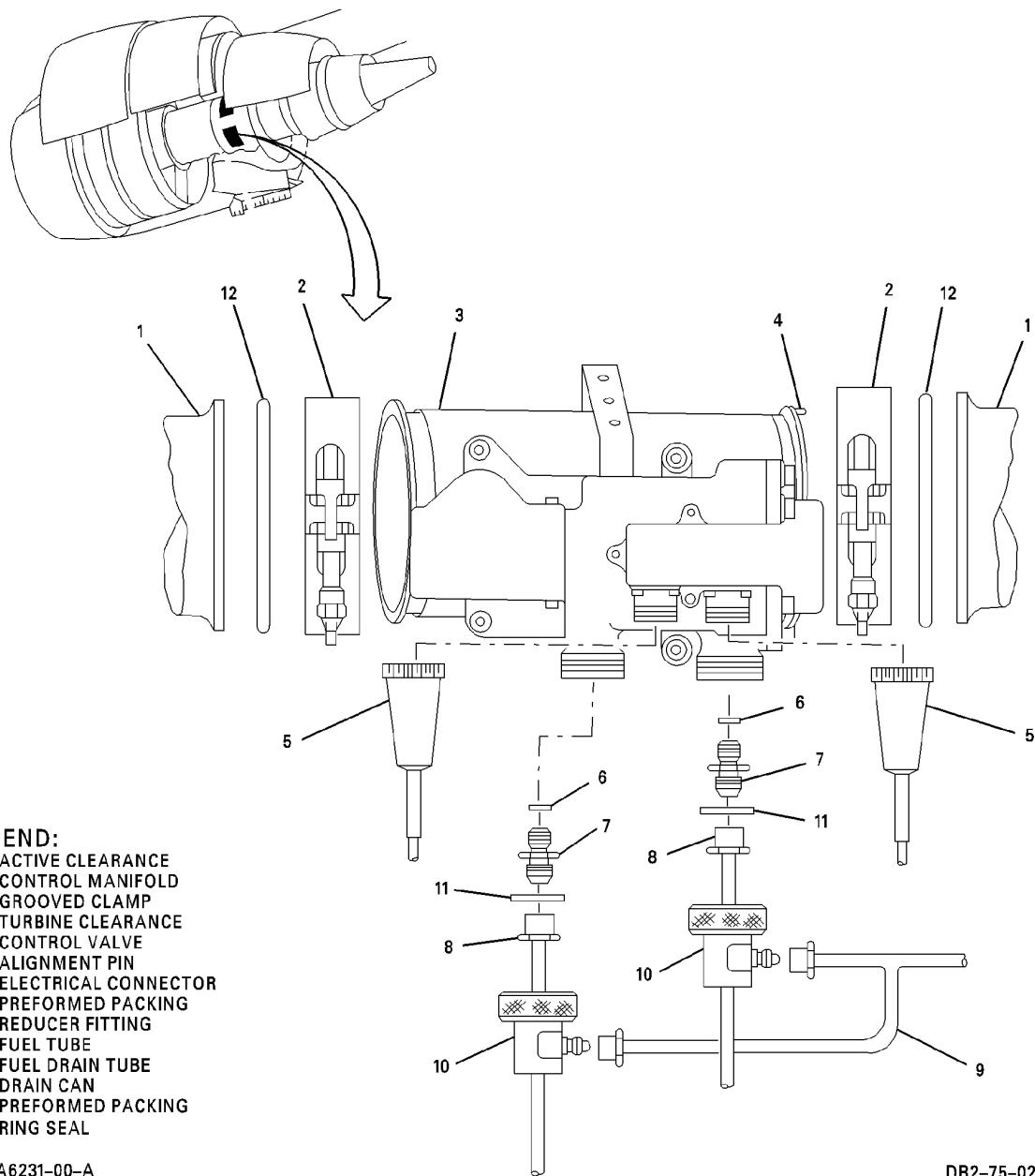
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LEGEND:

1. ACTIVE CLEARANCE CONTROL MANIFOLD
2. GROOVED CLAMP
3. TURBINE CLEARANCE CONTROL VALVE
4. ALIGNMENT PIN
5. ELECTRICAL CONNECTOR
6. PREFORMED PACKING
7. REDUCER FITTING
8. FUEL TUBE
9. FUEL DRAIN TUBE
10. DRAIN CAN
11. PREFORMED PACKING
12. RING SEAL

CF8-A6231-00-A

DB2-75-0220

Turbine Clearance Control Valve
Figure 401/75-24-11-990-802

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-24-11-400-801

3. INSTALLATION OF THE TURBINE CLEARANCE CONTROL VALVE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-350 in-lb (0-39.5 N·m).
Not specified	Air, dry-filtered, 200 psig (1378 kPa gage)
Not specified	Argon, 200 psig (1378 kPa gage)
Not specified	Nitrogen, 200 psig (1378 kPa gage)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
CO2-021	Oil, lubricating (MIL-L 6081C)
CO5-005	Leak-Tek
Not specified	Solution, soap
C10-071	Lockwire, 0.032 corrosion resistance steel

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
6	Packing, preformed (P/N J221P904)	IPC 75-00-00
11	Packing, preformed (P/N 9365M41P122)	IPC 75-00-00
12	Seal, ring (P/N J1128P11)	IPC 75-00-00

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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D. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)
71-00-00-700-809	ADJUSTMENT AND TEST PROCEDURES (P/B 501)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-00-00	Illustrated Parts Catalog

E. Job Set-up - Turbine Clearance Control Valve Installation

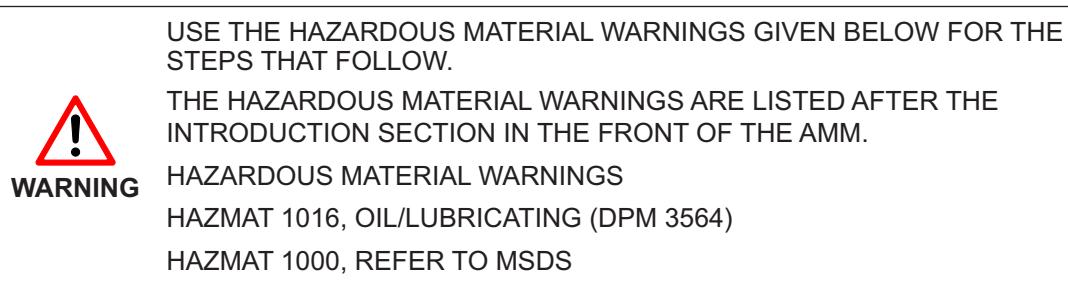
SUBTASK 75-24-11-010-004

- (1) If necessary, open the engine access doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

F. Procedure - Turbine Clearance Control Valve Installation

SUBTASK 75-24-11-030-006

- (1) Install the turbine clearance control (TCC) (1) as follows: (Figure 401)
 - (a) Remove the protective caps and plugs from the TCC valve (3), fuel tubes (8), and the active clearance control manifold (1).



- (b) Apply a thin layer of engine oil (CO2-021) to the packings (6). Put the preformed packings on the reducer fitting (7). Then install the reducer fittings in the TCC valve (3). Torque the reducer fitting to 135-150 in-lb (15.3–16.9 N·m). (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
NOTE: The step that follows is for engines after service bulletin S/B 75-0084.
- (c) Install the seal ring (12) on the TCC valve.
NOTE: The steps that follow are for engines before and after service bulletin S/B 75-0084.
- (d) Install the TCC valve (3). Make sure the alignment pins (4) are engaged in the active clearance control manifold (1). Install the grooved clamps (2). Torque the nuts of the grooved clamps to 27-35 in-lb (3.1-3.9 N·m).
- (e) With a small amount of force hit the grooved clamps (2) with a soft-face hammer at the outer perimeter. Make sure all the circular areas of the grooved clamps are engaged at the valve and the air manifold flanges. Torque the nuts of the grooved clamps to 55-70 in-lb (6.2-7.9 N·m). Do this procedure again and make sure the torque is 55-70 in-lb (6.2-7.9 N·m) at the clamp nuts.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-24-11

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (f) Apply a thin layer of engine oil (C02-021) to the packings (11). Install the packings in the grooves of the drain can (10) knurled nuts. (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
- (g) Connect the fuel tubes (8) to the reducer fittings (7) of the TCC valve (3). Hold the reducer fitting with an open-end wrench. Torque the fuel tube nuts to 270-300 in-lb (30.5-33.9 N·m).
- (h) Pressure leak test the TCCV fuel tubes (7) as follows: (Figure 401)
 - 1) With dry air, nitrogen, or argon, pressurize the fuel tubes (8) to 200 psig (1378 kPa gage) at the hydromechanical unit.
 - 2) Apply Leak-Tek (CO5-005) or soap solution to each of the fuel tube nuts (8) and each reducer fitting (7) at the TCC valve (3). (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
 - 3) Examine the fuel tube nuts (8) and the reducer fittings (7) for leaks. No leaks are permitted at the fuel tubes or the reducer fittings.
 - 4) If leakage occurs at the base of the reducer fitting (7), replace the packing (6) and do the leak test again.
 - 5) If leakage occurs at the fuel tube nut (8) and the reducer fitting (7), examine the fuel tube and the reducer fitting for damage. Replace the fitting or the fuel tube and do the leak test again.
- (i) Remove the protective caps from the drain tube (9) and the electrical connectors (5).
- (j) Connect the drain cans (10) to the TCC valve (3). Tighten the knurled nuts by hand. Safety the knurled nuts with lockwire. (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
- (k) Connect the fuel drain tubes (9) to the drain cans (10). Torque the drain tube nuts to 135-150 in-lb (15.3-16.9 N·m).
- (l) Connect the electrical connectors (5) to the TCC valve (3). Tighten the electrical connectors by hand and listen for the sound of a click. Make sure the lock indicator shows in the connector window.
- (m) Pressure test the drain cans (10) for leaks as follows:
 - 1) Disconnect the drain tube (9) from the overboard drain line at the drain mast.
 - 2) Pressurize the drain tube (9) to 55-60 psig (344-379 Kpa gage) with filtered dry air, nitrogen, or argon.
 - 3) At 55-60 psig (344-379 kPa gage) stop the supply pressure to permit the drain can pressure to decrease.
 - 4) Monitor the supply pressure gage for 2 minutes. Pressure is permitted to decrease 10 psig (69 kPa gage) maximum in that time.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- (n) If the pressure decrease is more than 10 psig (69 kPa gage) in that time continue as follows:

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

 **WARNING**

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1182, BUBBLE FLUID/LEAK TEST (DPM 6045)

HAZMAT 1000, REFER TO MSDS

- 1) Test all areas of the drain can (10) for leaks with Leak-Tek (C05-005) or a soap solution. (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
 - 2) Tighten the knurled nut by hand to stop a leak. Make sure the fuel drain tube (9) nut has the correct torque.
 - 3) Replace packings (6 or 11) as necessary to stop the leak.
 - 4) Do the leak test again if the packings (6 or 11) were replaced.
- (o) Connect the drain tube (9) to the overboard drain line. Torque the drain tube nut to 270-300 in-lb (30.5-33.9 N·m).
- NOTE: Fuel components that have Fluorocarbon (Viton) external seals (SB 73-079) can leak for a short period of time when they are below -29 F (-34 C). If a leak occurs, complete an idle leak check.
- If the fuel leakage stops in less than 5 minutes at idle, continue operation of the engine.
- If the fuel leakage continues after 5 minutes at idle, shut down the engine and repair the source of the leakage.

G. Job Close-up - Turbine Clearance Control Valve Installation

SUBTASK 75-24-11-942-001

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-24-11-410-001

- (2) Close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

SUBTASK 75-24-11-730-002

- (3) Do the applicable test(s) shown in the adjustment and test procedures. (ADJUSTMENT AND TEST PROCEDURES, TASK 71-00-00-700-809)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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NACELLE/CORE COMPARTMENT COOLING - DESCRIPTION AND OPERATION

1. General

- A. The nacelle/core compartment cooling system uses a core compartment cooling valve and a set of manifold air ducts. The valve uses a controlled amount of air, from the fan discharge airflow, and moves it, where necessary for cooling. The cooling valve is operated by 11th stage air which is controlled by the eleventh stage cooling valve (ESCV) solenoid. The ESCV solenoid receives signals from the electronic control unit (ECU).

2. Core Compartment Cooling Air Valve

- A. The core compartment cooling air valve is installed at the 10 o'clock position, adjacent to the high pressure compressor (HPC). The air valve controls the amount of air from the fan discharge airflow and keeps the nacelle area low in temperature.

3. Manifold Ducts

- A. The core compartment cooling air valve releases air into a set of manifold ducts. These ducts supply cool air to specified components and locations in the nacelle area. (Figure 1)

4. Eleventh Stage Cooling Valve Solenoid

- A. The eleventh stage cooling valve (ESCV) solenoid receives an electrical signal from the ECU. The ESCV then sends a controlled amount of air pressure to the core compartment cooling valve which opens or closes. In the fully closed position the valve continues to permit a 20% airflow.

5. Electronic Control Unit

- A. The electronic control unit (ECU) receives the necessary engine parameters to make the engine run correctly. One of its functions is to keep the temperatures in the nacelle area low during operation. It makes an analysis of specified engine parameters and calculates the correct amount of air necessary for nacelle cooling. It then transmits an electrical signal to the compartment cooling air valve and thus controls the airflow to the core compartment and the engine components.

6. System Operation

- A. The cooling air valve removes air from the fan discharge airflow and sends it to the core compartment. This cooling air controls the temperatures in the nacelle area during engine operation. The usual position of the cooling air valve is fully open. At high altitude, the cooling air valve slowly closes to decrease the amount of cooling air to the core compartment.
- B. Air pressure controlled by the 11th stage bleed control valve solenoid moves the cooling air valve to the decreased airflow position. In case of system failure, the valve goes to the high flow position to permit maximum cooling flow to the core compartment.
- C. During usual engine operation, air from the core compartment goes overboard through outlets at the thrust reverser cowl and the core cowl doors. In emergencies, when a large quantity of air is released into the nacelle area, air bleeds overboard through the blow-open-doors at the thrust reverser and the core cowl. (Figure 2)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-25-00

Config 1

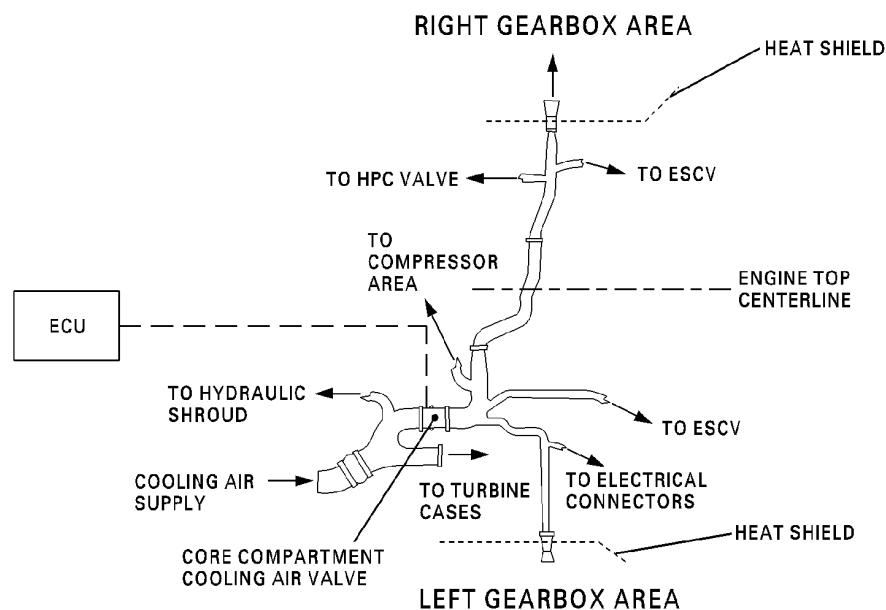
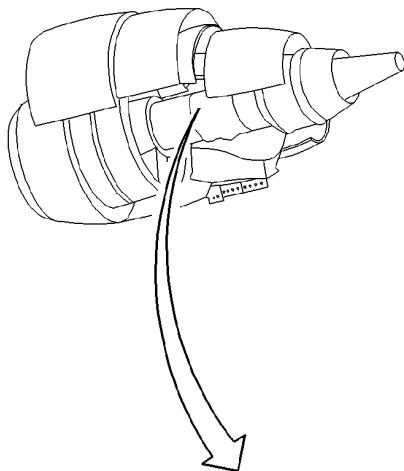
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CAG(IGDS)

DB2-75-0199A

Core Compartment Cooling
Figure 1/75-25-00-990-802

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-25-00

Config 1

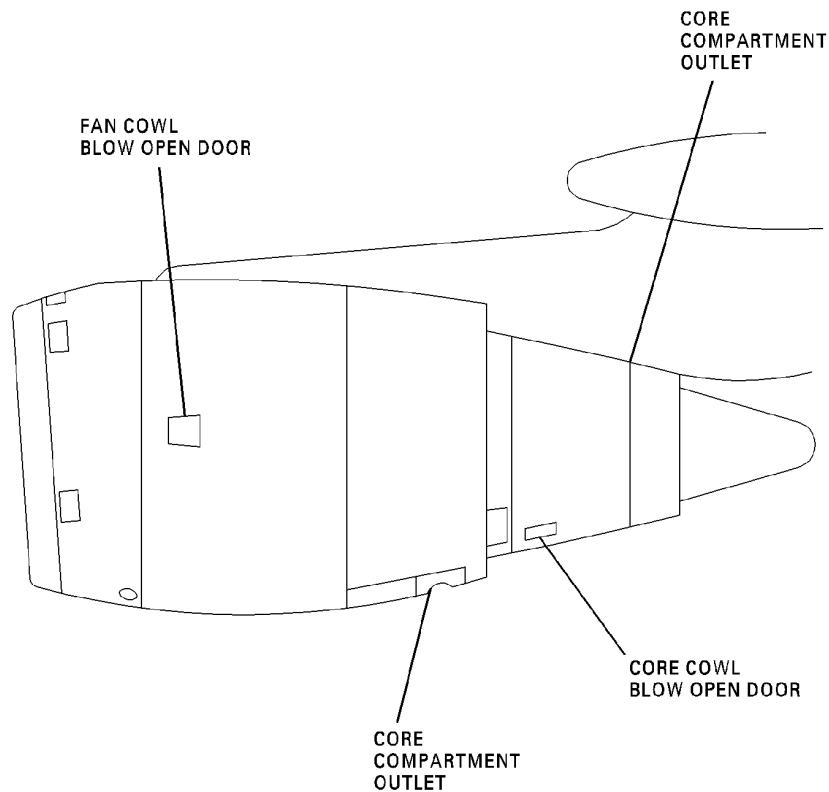
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CAG(IGDS)

DB2-75-0279

Air Outlets and Blow-Open Doors
Figure 2/75-25-00-990-803

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-25-00

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NACELLE/CORE COMPARTMENT COOLING - DESCRIPTION AND OPERATION

1. General

- A. There are two types nacelle cooling systems, one uses spray bar cooling and installed on engines before CONF-02B. The other uses poppet valve cooling and is installed on engines after CONF-02B.

2. Nacelle Cooling Before CONF-02B (Spray Bar Cooling, Before SB PW4MD11 78-70)

A. Description

- (1) Nacelle core compartment cooling is done through an axial spray bar ventilation system. The system has two cooling air ducts (spray bars) and two valves, one installed on each thrust reverser inner barrel. The function of the system is to supply engine fan air throughout the engine core compartment. (Figure 1) (Figure 2)
- (2) The precooler duct provides air to the left spray bar. The right side spray bar has a dedicated air intake in the upper quadrant of the thrust reverser inner barrel. The supply of engine fan air to each spray bar is controlled by a pneumatically-actuated solenoid-operated shutoff valve. The valve is spring loaded to the close position. Pneumatic pressure to open the valve is supplied by the ECS ducts in the engine pylons.
- (3) The cooling system is electrically controlled by the FADEC. Electrical power from the FADEC (channel A or B) is supplied by the EEC J-box to both control valves. Solenoids in the valves control high pressure ECS air to operate the valve butterfly mechanisms. Butterfly position is sent back to the EEC by dual coil rotational variable differential transformers (RVDT's) in each valve.

B. Operation

- (1) The pneumatic-actuated, solenoid-operated, butterfly shutoff valve is closed prior to engine start-up. When electrical power is applied, the solenoid is energized. Pneumatic pressure is supplied to the spray bar when the engine is started and the valve opens. Axial spray bar cooling is operative as long as the valve is open.
- (2) The axial spray bar cooling system remains in working during normal aircraft operation. Cooling is discontinued when the electrical power is removed. The shutoff valve will close by action of the spring.
- (3) The valve has a manual override that allows the valve to be locked in the closed position.
- (4) All electrical power to the cooling system for valve control and failure indication is routed through the fire handle interlock. In the event of a fire with the cooling system in operation, the valves will close when the fire handle is pulled. The system is monitored by the FADEC via the RVDT's.
- (5) Before the engine is started, the valve should be fully closed. A failure indicator will signal if the valve is open.

3. Nacelle Cooling After CONF-02B (Poppet Valve Cooling, After SB PW4MD11 78-70) System Operation

A. Description and Operation

- (1) Nacelle Cooling System
 - (a) The nacelle cooling system has two muscle assisted poppet valves and associated muscle lines and a solenoid operated pneumatic control valve and a cooling valve position electronic simulator on each thrust reverser door. The function of the nacelle cooling system is to cool the engine accessories by distributing engine fan air throughout the core compartment.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (b) Muscle lines are routed from the control valve at the upper track area of the inner barrel, along the inner barrel to the two poppet valves installed on each side of the thrust reverser. The poppet valves are located on the inner surface of each thrust reverser door and penetrate the inner thrust reverser inner barrel structure.
 - (c) The control valve unit controls ECS air to provide muscle pressure to the poppet valves. The control valve is controlled by the Engine Electronic Control (EEC) unit. Upon EEC command, the muscle line solenoid valve is energized via the EEC junction box relays. This allows pressure to assist poppet valve operation. The control valve is energized and open during takeoff and climb. Cooling air is then routed from the engine fan duct through the poppet valves for distribution to the core compartment. When electrical power to the control valve is removed by EEC command, the valve closes, removing ECS pressure to the poppet valves. The poppet valves operate in an unassisted passive mode when the solenoid operated control valves are closed. In this mode the poppet valves are operated by fan duct pressure. The fan duct pressure required to overcome the spring force of the poppet valves is 5.5 psi (37.9 kPa).
 - (d) When the EEC commands the system to energize, 28 VDC is applied to the muscle line control valve solenoid and the simulator. The simulator determines the air control valve position. When the 28 VDC is removed, the simulator output indicates a closed solenoid control valve.
- (2) Pneumatic Control Valve
- (a) The pneumatically actuated, solenoid operated shutoff valve is spring-loaded closed. The valve control (muscle) pneumatic pressure is supplied from the ECS regulating valve. The high pressure air passes through a relief valve before entering the valve actuator. With the valve solenoid energized, the valve is driven to the fully open position. When the valve is de-energized, the valve is closed by a return spring.
- (3) Nacelle Cooling Poppet Valve
- (a) The nacelle cooling system has four (4) cooling valves, two (2) on each door. The valves are pressure relief type. Pressure provided by the muscle lines ensure the valve will open when commanded. When open, the valves allow air from the stream into the engine core compartment. When no pressure exists in the muscle lines, the valves operate in a passive mode and are opened or closed by fan duct pressure. (Figure 3)
- (4) Muscle Lines
- (a) The muscle lines are solid tubing that distribute muscle pressure from the nacelle cooling control valve to the nacelle cooling poppet valves.
- (5) Electrical Simulator
- (a) The electronic simulator box contains two (2) identical circuit linked to channels A and B of the FADEC-EEC unit. The simulator determines the control valve position via the EEC voltage output.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-25-00

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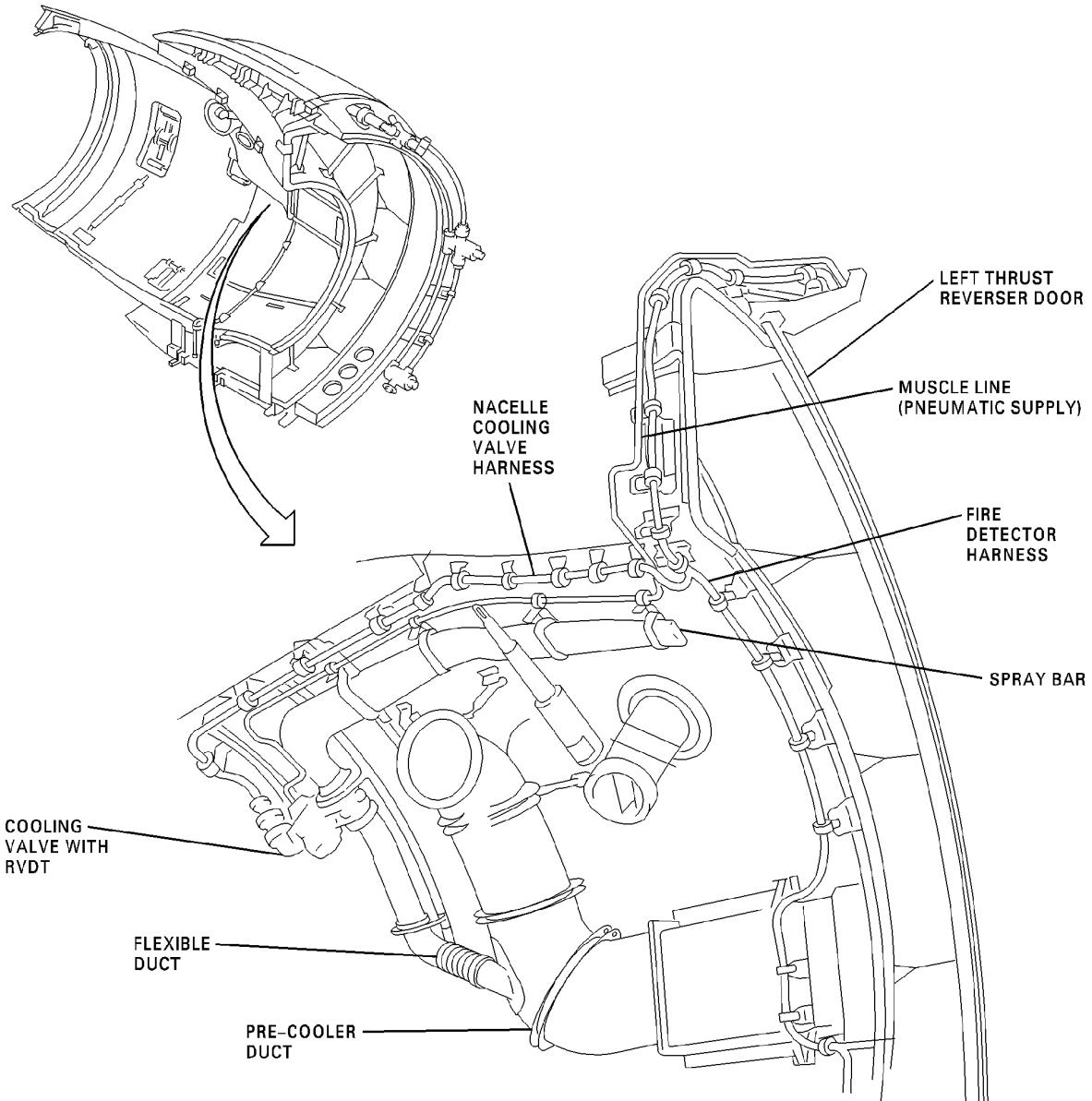
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CAG(IGDS)

DB2-75-0153C

Left Nacelle Core Compartment Cooling System
Figure 1/75-25-00-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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75-25-00

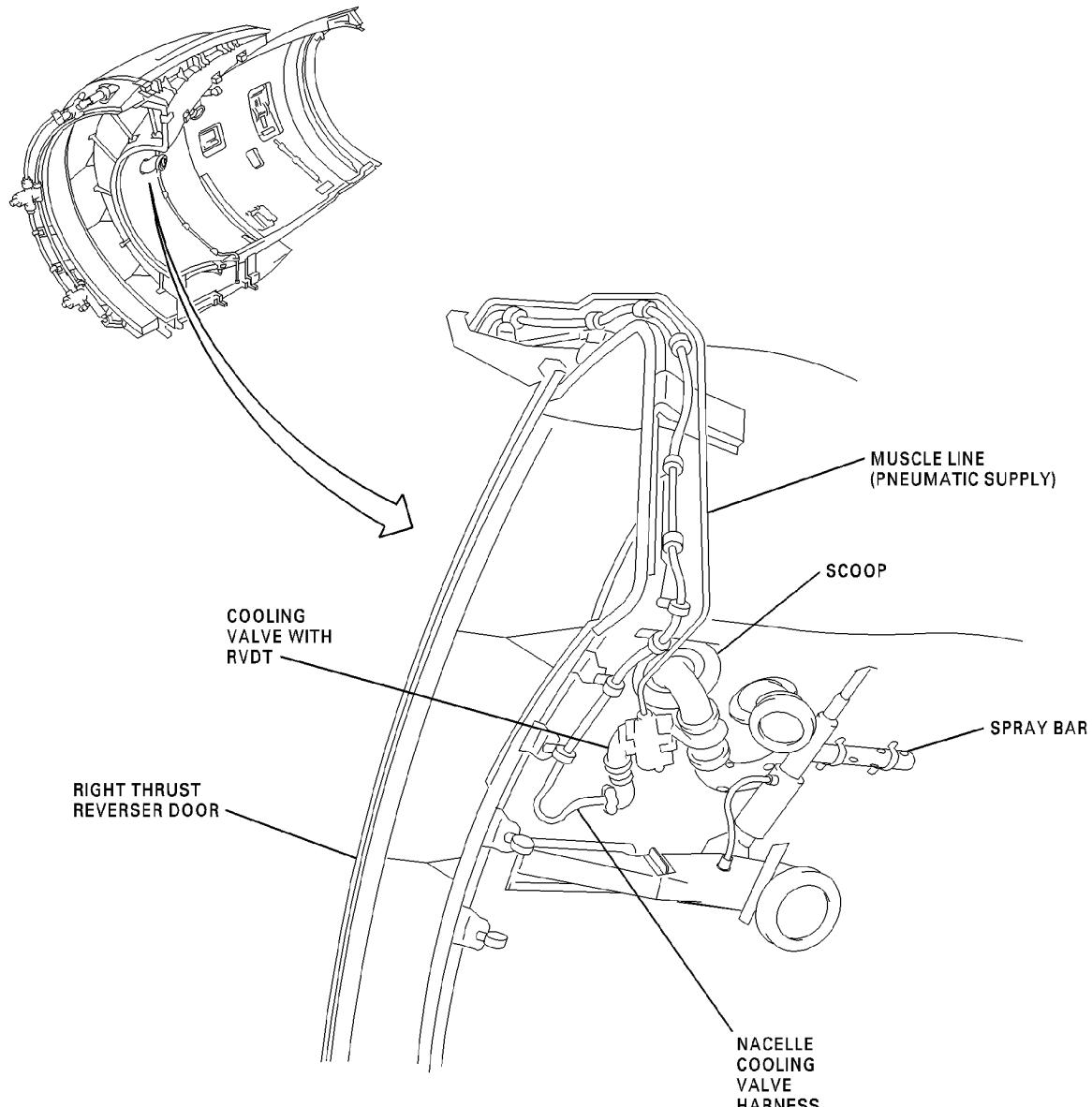
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CAG(IGDS)

DB2-75-0157C

Right Nacelle Core Compartment Cooling System
Figure 2/75-25-00-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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75-25-00

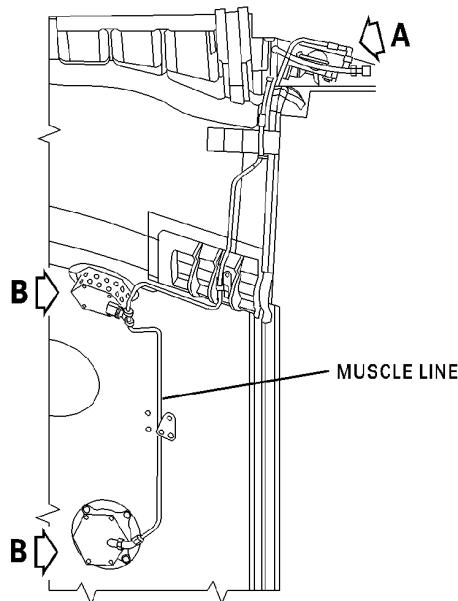
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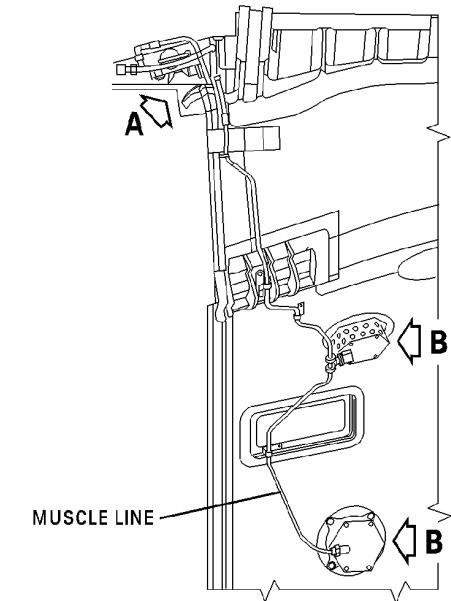
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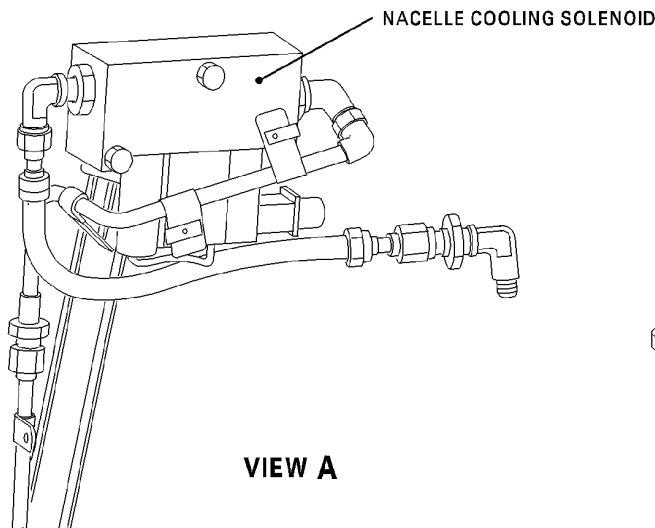
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LEFT THRUST REVERSER DOOR
(VIEW FROM INBOARD)

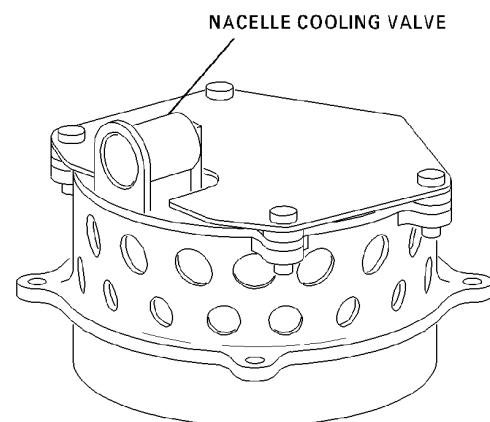


RIGHT THRUST REVERSER DOOR
(VIEW FROM INBOARD)



CAG(IGDS)

VIEW A



CONF-02B

DB2-75-0302B

Nacelle Core Compartment Cooling System
Figure 3/75-25-00-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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NACELLE COOLING SYSTEM - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the nacelle cooling system for configuration-02 engines. Access to the nacelle cooling system is through the thrust reverser doors.
- B. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-25-00-000-868

2. REMOVAL OF THE NACELLE COOLING SYSTEM CONF-02B

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m), high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Nacelle Cooling System Removal

SUBTASK 75-25-00-865-001



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

Row	Col	Number	Name
J	12	B1-1226	NAC COOLING ENG 2

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-25-00-010-001

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Nacelle Cooling System Removal

SUBTASK 75-25-00-030-001

- (1) Remove the nacelle cooling system from the left thrust reverser door as follows: (Figure 401) (Figure 402) (Figure 403)
- (a) On the lower nacelle cooling valve (1), disconnect the tube assembly (2) from the elbow (3).
 - (b) Remove the elbow (3), nut (4) and packing (5) from the lower nacelle cooling valve (1). Discard the packing and install a protective plug on the valve.
 - (c) Remove the four pins (6), collars (7) and washers (8) from the lower nacelle cooling valve (1). Remove the valve from the left thrust reverser door.
 - (d) On the upper nacelle cooling valve (9), disconnect the two tube assemblies (2 and 10) from the tee (11).
 - (e) Remove the nut (4), tee (11), and packing from the upper nacelle cooling valve (9). Discard the packing and install a protective plug on the valve.
 - (f) Remove the four pins (6), collars (7) and washers (8) from the upper nacelle cooling valve (9). Remove the valve from the thrust reverser door.
 - (g) Install the screw (13), washer (15) and nut (14) to hold the wiring harness in position. Tighten the nut by hand.
 - (h) Disconnect the tube assembly (10) from the tube assembly (12).
 - (i) On the fan duct, remove the screw (17), nut (18), washer (19) and clamp (20) from the bracket. Remove the tube assembly (10) from the thrust reverser door.
 - (j) On the left thrust reverser door between the nacelle cooling valves (1 and 9), remove the screw (17), nut (18), washer (19) and clamp (20) from the bracket. Remove the tube assembly (2) from the thrust reverser door.
 - (k) On the nacelle cooling valve solenoid (21), disconnect the hose assembly (25) from the elbow (26).
 - (l) Remove the elbow (26), nut (27) and packing (28) from the nacelle cooling valve solenoid (21). Discard the packing and install a protective plug in solenoid.
 - (m) Disconnect the tube assembly (12) from the elbow (22).
 - (n) Remove the elbow (22), nut (23) and packing (24) from the nacelle cooling valve solenoid (21). Discard the packing and install a protective plug in the solenoid.
 - (o) Disconnect the electrical connector (29) from the nacelle cooling valve solenoid (21). Install a dust cap on the electrical connector.
 - (p) On the nacelle cooling valve solenoid (21), remove the three bolts (30) and washers (31). Remove the solenoid from the thrust reverser door.

SUBTASK 75-25-00-030-002

- (2) Remove the nacelle cooling system from the right thrust reverser door as follows: (Figure 401) (Figure 402) (Figure 403)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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75-25-00

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- (a) On the lower nacelle cooling valve (1), disconnect the tube assembly (2) from the elbow (3).
- (b) Remove the elbow (3), nut (4) and packing (5) from the lower nacelle cooling valve (1). Discard the packing and install a protective plug on the valve.
- (c) Remove the four pins (6), collars (7) and washers (8) from the lower nacelle cooling valve (1). Remove the valve from the thrust reverser door.
- (d) On the upper nacelle cooling valve (9), disconnect the two tube assemblies (2 and 10) from the tee (11).
- (e) Remove the nut (4), tee (11), and packing (5) from the upper nacelle cooling valve (9). Discard the packing and install a protective plug on the valve.
- (f) Remove the four pins (6), collars (7) and washers (8) from the upper nacelle cooling valve (9). Remove the valve from the thrust reverser door.
- (g) On the thrust reverser door, adjacent to the nacelle cooling valve solenoid (21), remove the nut (14), washer (15), screw (13). Then remove the clamp (16) from the tube assembly (10) and the wiring harness.
- (h) Install the screw (13), washer (15) and nut (14) to hold the wiring harness in position. Tighten the nut by hand.
- (i) Disconnect the tube assembly (10) from the tube assembly (12).
- (j) On the right thrust reverser door, above the upper nacelle cooling valve (9), remove the screw (17), nut (18), washer (19) and clamp (20) from the bracket.
- (k) On the fan duct, remove the screw (17), nut (18), washer (19) and clamp (20) from the bracket. Remove the tube assembly (10) from the thrust reverser door.
- (l) On the turbine case cooling duct, remove the screw (17), nut (18), washer (19) and clamp (20) from the bracket. Remove the tube assembly (2) from the thrust reverser door.
- (m) On the nacelle cooling valve solenoid (21), disconnect the hose assembly (25) from the elbow (26).
- (n) Remove the elbow (26), nut (27) and packing (28) from the nacelle cooling valve solenoid (21). Discard the packing and install a protective plug in the solenoid.
- (o) Disconnect the tube assembly (12) from the elbow (22).
- (p) Remove the elbow (22), nut (23) and packing (24) from the nacelle cooling valve solenoid (21). Discard the packing and install a protective plug in the solenoid.
- (q) Disconnect the electrical connector (29) from the nacelle cooling valve solenoid (21). Install a dust cap on the electrical connector.
- (r) On the nacelle cooling valve solenoid (21), remove the three bolts (30) and washers (31). Remove the solenoid from the thrust reverser door.

SUBTASK 75-25-00-410-001

- (3) If the nacelle cooling system is not installed immediately, or weather conditions make it necessary, close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-25-00

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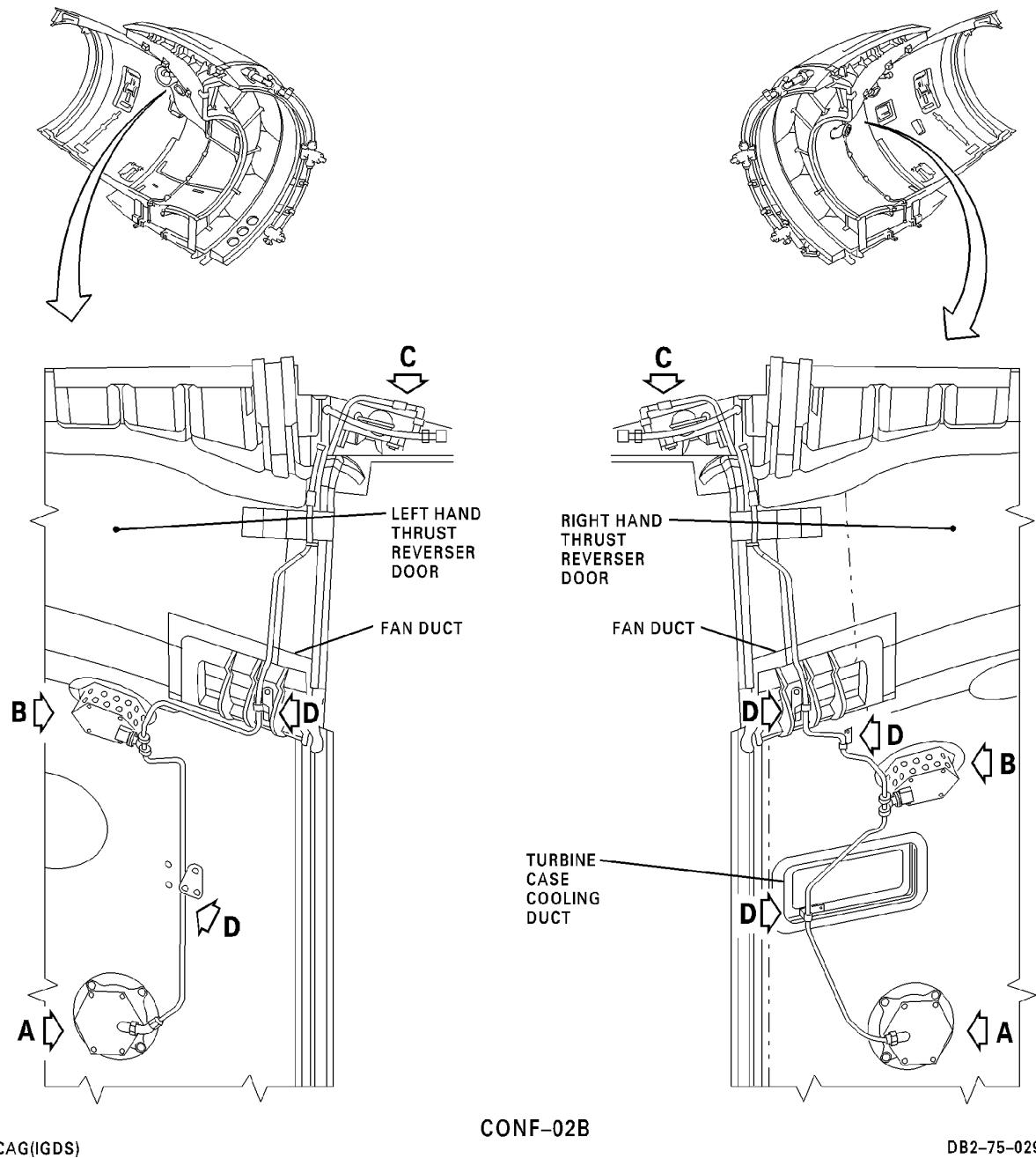
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Nacelle Cooling System - Removal/Installation
Figure 401/75-25-00-990-806

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

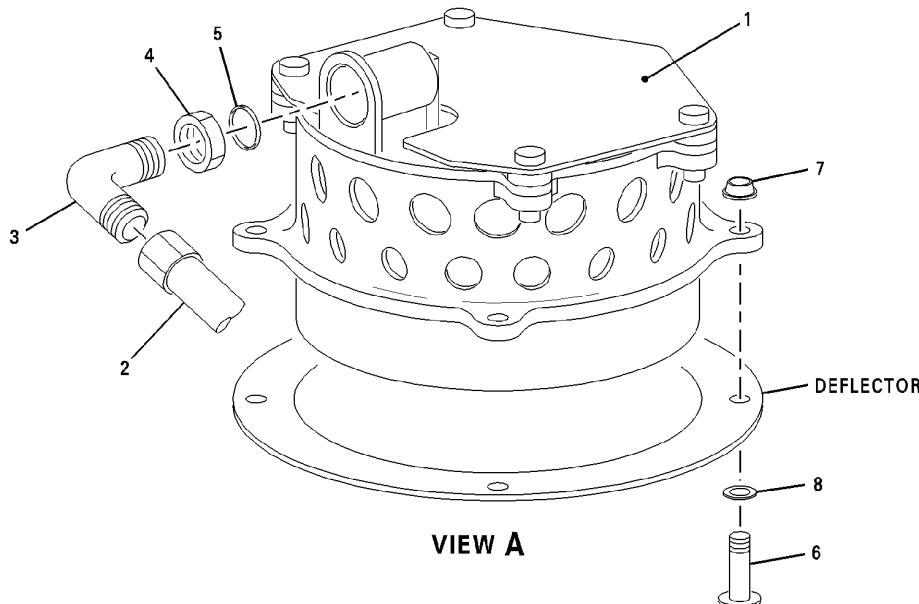
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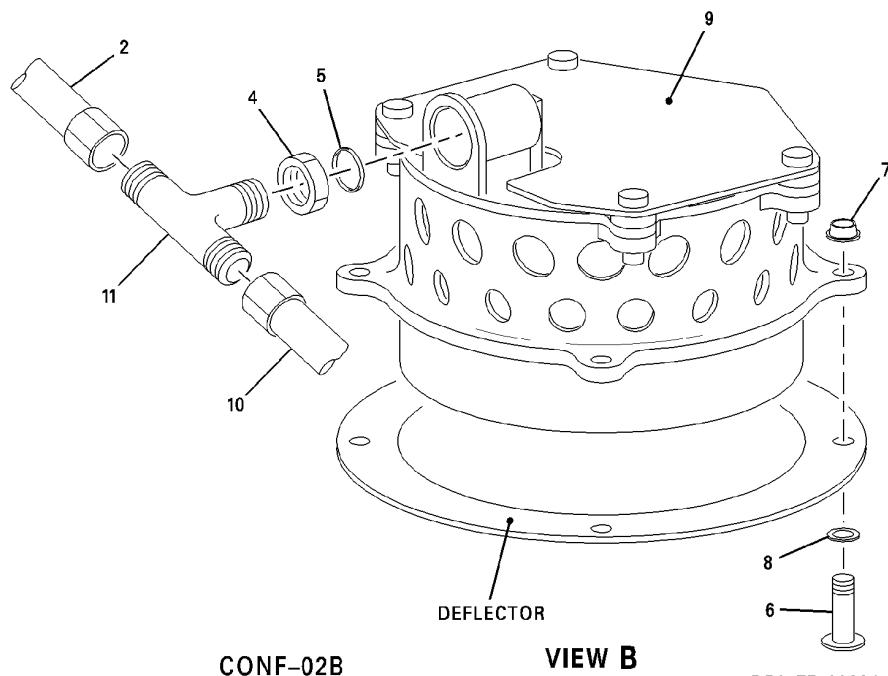
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VIEW A



CONF-02B

VIEW B

DB2-75-0299A

CAG(IGDS)

Nacelle Cooling System - Removal/Installation
Figure 402/75-25-00-990-807

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

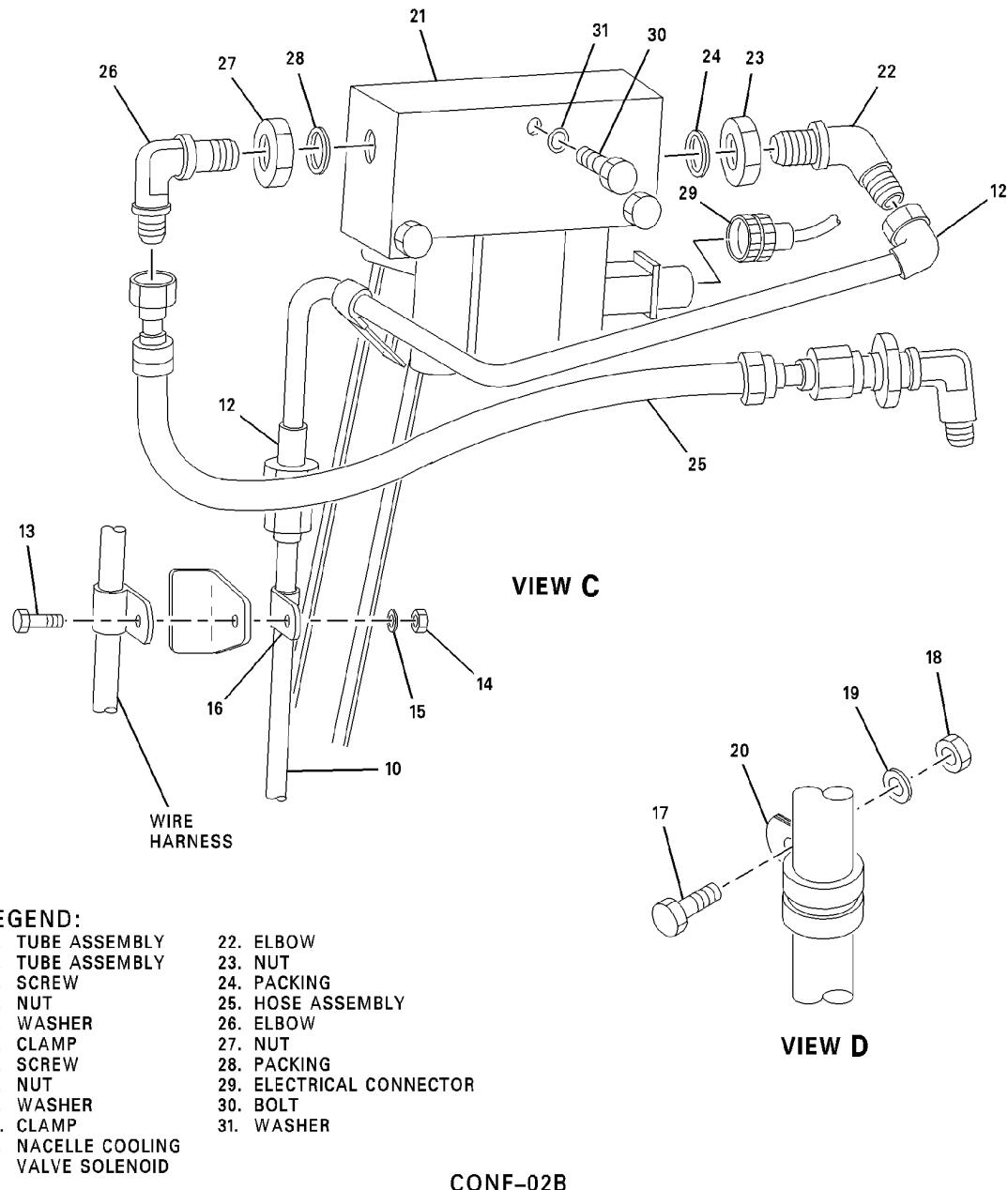
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CONF-02B

CAG(IGDS)

DB2-75-0300A

Nacelle Cooling System - Removal/Installation
Figure 403/75-25-00-990-808

EFFECTIVITY
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TASK 75-25-00-400-868

3. INSTALLATION OF THE NACELLE COOLING SYSTEM CONF-02B

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m), high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-300 in-lb (0-33.9 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
C02-019	Oil, engine lubricating
P05-288	Lockwire, 0.020 in. (0.0508 mm) dia.

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE	DESIGNATION	IPC
5	Packing (M83248/2-905)	IPC 75-25-03
6	Pin Right Thrust Reverser Door (HL13VAZ-5-16)	IPC 75-25-03
6	Pin Left Thrust Reverser Door (HL13VAZ-5-19)	IPC 75-25-03
7	Collar (HL94DU5)	IPC 75-25-03
24	Packing (M83248/2-905)	IPC 75-25-03
28	Packing (M83248/2-905)	IPC 75-25-05

D. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

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(Continued)

Reference	Title
75-25-01-700-868	FUNCTIONAL TEST OF THE NACELLE CORE COMPARTMENT COOLING CONF-02B (P/B 501)
IPC 75-25-03	Illustrated Parts Catalog
IPC 75-25-05	Illustrated Parts Catalog

E. Job Set-up - Installation of the Nacelle Cooling System

SUBTASK 75-25-00-865-002



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that these circuit breakers are open and have safety tags:

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

Row	Col	Number	Name
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

Row	Col	Number	Name
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-25-00-010-002

- (2) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - Installation of the Nacelle Cooling System

SUBTASK 75-25-00-420-001

- (1) Install the nacelle cooling system on the left thrust reverser door as follows: (Figure 401) (Figure 402) (Figure 403)
 - (a) Position the lower nacelle cooling valve (1) on the left thrust reverser door and align the deflector cutouts with the valve.
NOTE: The nacelle cooling valves are installed with the deflector cutouts aligned with the pins $\pm 2^\circ$ (0.034 rad).
 - (b) Install the four pins (6), washers (8) and collars (7) on the lower nacelle cooling valve (1). Torque the pins to 200-250 in-lb (22.58–28.23 N·m).

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (c) Lubricate the packing (5) and the threads of the elbow (3) with engine oil (P03–001). Install the elbow, nut (4) and packing on the lower nacelle cooling valve. Torque the nut to 130-140 in-lb (14.68–15.81 N·m).
- (d) Install the tube assembly (2) on the elbow (3). Torque the tube assembly nut to 200-210 in-lb (22.58–23.71 N·m).
- (e) Position the upper nacelle cooling valve (9) on the left thrust reverser door and align the deflector cutouts with the valve.
NOTE: The nacelle cooling valves are installed with the deflector cutouts aligned with the pins $\pm 2^\circ$ (0.034 rad).
- (f) Install the four pins (6), washers (8) and collars (7) on the upper nacelle cooling valve (9). Torque the pins to 200-250 in-lb (22.58–28.23 N·m).



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

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HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (g) Lubricate the packing (5) and the threads of the tee (11) with engine oil (P03–001). Install the tee, nut (4) and packing on the upper nacelle cooling valve (9). Torque the nut to 130-140 in-lb (14.68–15.81 N·m).
- (h) Install the two tube assemblies (2 and 10) on the tee (11) of the upper nacelle cooling valve (9). Torque the tube assembly nut to 200–210 in-lb (22.58–23.71 N·m).
- (i) Install the clamp (20) on the tube assembly (10). Attach the clamp to the bracket between the upper and lower nacelle cooling valves (1 and 9) with the screw (17), washer (19) and nut (18).
- (j) Torque nut (18) to 20-25 in-lb (2.3-2.8 N·m).
- (k) Install clamp (20) on tube assembly (10). Attach the clamp to the bracket on the fan duct with screw (17), washer (19) and nut (18).
- (l) Torque the nut (18) to 20-25 in-lb (2.3-2.8 N·m).
- (m) Position the nacelle cooling valve solenoid (21) on the left thrust reverser door and install the three bolts (30) and washers (31). Torque the bolts to 50-70 in-lb (5.65–7.90 N·m).

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HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (n) Lubricate the packing (24) and the threads of the elbow (22) with engine oil (P03-001).
- (o) Install the packing (24), nut (23) and elbow (22) on the nacelle cooling valve solenoid (21). Torque the nut to 130–140 in-lb (14.68–15.81 N·m).
- (p) Connect the tube assembly (12) to the elbow (22). Torque the tube assembly coupling nut to 200–210 in-lb (22.58–23.71 N·m).
- (q) Connect the tube assembly (12) to the tube assembly (10). Torque the tube assembly coupling nut to 200–210 in-lb (22.58–23.71 N·m).
- (r) Remove the nut (14), washer (15) and screw (13) from the clamp (16) on the wiring harness.
- (s) Install the clamp (16), screw (13), washer (15) and nut (14) on the wiring harness and tube assembly (10). Torque the nut to 20–25 in-lb (2.3–2.8 N·m).



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THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (t) Lubricate the packing (28) and the threads of the elbow (26) with engine oil (P03-001).
- (u) Install the packing (28), elbow (26), and nut (27) on the nacelle cooling valve solenoid (21). Torque the nut to 130–140 in-lb (14.68–15.81 N·m).
- (v) Connect the hose assembly (25) to the elbow (26). Torque the hose assembly coupling nut to 170–240 in-lb (19.19–27.01 N·m).
- (w) Connect the electrical connector (29) to the nacelle cooling valve solenoid (21). Tighten the connector by hand and then tighten the electrical connector again one-eighth turn. Safety the connector with lockwire (P05–288).

SUBTASK 75-25-00-420-002

- (2) Install the nacelle cooling system on the right thrust reverser door as follows: (Figure 401) (Figure 402) (Figure 403)
 - (a) Position the lower nacelle cooling valve (1) on the right thrust reverser door and align the deflector cutouts with the valve.
NOTE: The nacelle cooling valves are installed with the deflector cutouts aligned with the pins $\pm 2^\circ$ (0.034 rad).
 - (b) Install the four pins (6), washers (8) and collars (7) on the lower nacelle cooling valve (1). Torque the pins to 200–250 in-lb (22.58–28.23 N·m).

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HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (c) Lubricate the packing (5) and the threads of the elbow (3) with engine oil (P03–001). Install the elbow, nut (4) and packing on the lower nacelle cooling valve. Torque the nut to 130–140 in-lb (14.68–15.81 N·m).
- (d) Install the tube assembly (2) on the elbow (3) of the lower nacelle cooling valve (1). Torque the tube assembly nut to 200–210 in-lb (22.58–23.71 N·m).
- (e) Position the upper right nacelle cooling valve (9) on the thrust reverser door and align the deflector cutouts with the valve.
NOTE: The nacelle cooling valves are installed with the deflector cutouts aligned with the pins $\pm 2^\circ$ (0.034 rad).
- (f) Install the four pins (6), washers (8) and collars (7) on the left upper nacelle cooling valve (9). Torque the pins to 200–250 in-lb (22.58–28.23 N·m).



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HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (g) Lubricate the packing (5) and the threads of the tee (11) with engine oil (P03–001). Install the tee, nut (4) and packing on the right upper nacelle cooling valve (9). Torque the nut to 130–140 in-lb (14.68–15.81 N·m).
- (h) Install the two tube assemblies (2 and 10) on the tee (11) of the right upper nacelle cooling valve (9). Torque the tube assembly nuts to 200–210 in-lb (22.58–23.71 N·m).
- (i) Install the clamp (20) on tube assembly (10). Attach the clamp to the bracket on the turbine case cooling duct with the screw (17), washer (19) and nut (18). Torque the nut to 20–25 in-lb (2.3–2.8 N·m). (Figure 401) (Figure 403)
- (j) Install the clamp (20) on the tube assembly (10). Attach the clamp to the bracket between the upper and lower nacelle cooling valves (1 and 9) with the screw (17), washer (19) and nut (18).
- (k) Torque the nut (18) to 20–25 in-lb (2.3–2.8 N·m).
- (l) Install the clamp (20) on the tube assembly (10). Attach the clamp to the bracket on the fan duct with the screw (17), washer (19) and nut (18).
- (m) Torque the nut (18) to 20–25 in-lb (2.3–2.8 N·m).
- (n) Position the nacelle cooling valve solenoid (21) on the right thrust reverser door and install the three bolts (30) and washers (31). Torque the bolts to 50–70 in-lb (5.65–7.90 N·m).

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HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (o) Lubricate the packing (24) and the threads of the elbow (22) with engine oil (P03-001).
- (p) Install the packing (24), nut (23) and elbow (22) on the nacelle cooling valve solenoid (21). Torque the nut to 130–140 in-lb (14.68–15.81 N·m).
- (q) Connect the tube assembly (12) to the elbow (22). Torque the tube assembly coupling nut to 200–210 in-lb (22.58–23.71 N·m).
- (r) Connect the tube assembly (12) to the tube assembly (10). Torque the tube assembly coupling nut to 200–210 in-lb (22.58–23.71 N·m).
- (s) Remove the nut (14), washer (15) and screw (13) from the clamp (16) on the wiring harness.
- (t) Install the clamp (16), screw (13), washer (15) and nut (14) on the wiring harness and the tube assembly (10). Torque the nut to 20–25 in-lb (2.3–2.8 N·m).



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (u) Lubricate the packing (28) and the threads of the elbow (26) with engine oil (P03-001).
- (v) Install the packing (28), elbow (26), and nut (27) on the nacelle cooling valve solenoid (21). Torque the nut to 130–140 in-lb (14.68–15.81 N·m).
- (w) Connect the hose assembly (25) to the elbow (26). Torque the hose assembly coupling nut to 170–240 in-lb (19.19–27.01 N·m).
- (x) Connect the electrical connector (29) to the nacelle cooling valve solenoid (21). Tighten the electrical connector by hand and then tighten the connector again one-eighth turn.
- (y) Safety the connector with lockwire (P05–288).

G. Job Close-up - Nacelle Cooling System Installation

SUBTASK 75-25-00-865-003

- (1) Remove the safety tags and close these circuit breakers:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

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UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-25-00-410-002

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-25-00-710-002

- (3) Do a functional test of the nacelle core compartment cooling. (FUNCTIONAL TEST OF THE NACELLE CORE COMPARTMENT COOLING CONF-02B, TASK 75-25-01-700-868)

———— END OF TASK ————

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NACELLE COOLING TUBING AND HOSE - INSPECTION/CHECK

1. General

- A. This procedure has the inspection for the cooling tubing and hoses in the nacelle compartment. Unless different instructions are given, the procedures are the same for the PW4460/4462 and PW4460/4462-3 engines.

TASK 75-25-00-200-868

2. INSPECTION OF THE NACELLE COOLING TUBING AND HOSE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

Table 601

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow:

Table 602

REFERENCE	DESIGNATION
P05-224	Cloth, emery medium grit

C. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - Nacelle Cooling Tubing and Hose Inspection

SUBTASK 75-25-00-010-267

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - Nacelle Cooling Tubing and Hose Inspection

SUBTASK 75-25-00-210-267

- (1) Visually examine the nacelle cooling tubes for the conditions that follow: (Figure 601)

Table 603

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
1. Dents	Tube is serviceable if dent is less than 20% of the tube diameter.	Replace the tube if dent is more than 20%.
	Tube is unserviceable if dent or ding is found on heel of tubing.	Replace the tube.

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Table 603 (Continued)

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
2. Surface imperfections.	Tube is serviceable, if the tube has a surface imperfection with a dent, and the dent together with the imperfection is less than 20% of the tube diameter.	Replace the tube.
	Tube is unserviceable, if the tube has a surface imperfection with a dent in the heel of the tube.	Replace the tube.
3. Nicks and scratches on tubes that operate at pressures less than 500 psi (3447.5 kPa).	Tube is serviceable if nicks and scratches are less than 10% of the wall thickness of the tube.	To repair nicks and scratches, burnish the defects with emery cloth.
4. Nicks and scratches on tubes that operate at pressures greater than 500 psi (3447.5 kPa).	Tube is serviceable if nicks and scratches are less than 5% of the wall thickness of the tube.	To repair nicks and scratches, burnish the defects with emery cloth.
5. Nicks and scratches on flared ends on tubes.	Tube is serviceable if nicks and scratches are less than 5% of wall thickness of tube.	To repair nicks and scratches, burnish the defects with emery cloth.
	Tube is unserviceable if nicks and scratches are found on flare tangent points.	Replace tube.
	Tube is unserviceable if cracks, splits, or deformity is found on the flared ends.	Replace tube.
6. Nicks and scratches on aluminum alloy tubing.	Tube is unserviceable if nicks and scratches are found on the heel of the tube.	Replace tube.
	Tube is serviceable if nicks and scratches are less than 10% of tube wall thickness.	To repair nicks and scratches, burnish the defects with emery cloth.
7. Defective coupling nuts.	Tube is unserviceable if nut is cracked, split, has burrs, sharp edges, is cross threaded, or has missing threads.	Replace tube.
8. Dents and dings.	Tube is serviceable if depth of dent or ding is less than 0.050 in. (1.27 mm).	Replace tube if depth is greater than 0.050 in. (1.27 mm).
9. Defective precision mating surfaces.	No defects are permitted on precision mating surfaces.	Replace tube.

SUBTASK 75-25-00-210-268

- (2) Visually examine the nacelle cooling tubes and manifolds for an out of round condition. If an out of round condition is found, calculate the percentage of the out of round (OOR) as follows: (Figure 601)
- (a) Measure the largest outside diameter (LOD) of the tube, and then measure the smallest outside diameter (SOD) of the tube.
 - (b) Subtract the measurement of the SOD from the LOD.
 - (c) Find the specified outside diameter of the tube. Divide the specified tube diameter into the difference of the SOD and the LOD.

EFFECTIVITY

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- (d) Multiply the answer by 100. This calculation will give the percentage of the OOR. The tube is serviceable if the OOR is no more than 10% of the tubes' diameter.

NOTE: Use the example that follows to calculate the OOR for tubes and manifolds.

$$\text{OOR (\%)} = \frac{\text{LOD} - \text{SOD}}{\text{Specified OD}} \times 100$$

SUBTASK 75-25-00-210-269

- (3) Visually examine the hoses in the nacelle cooling for the conditions that follow: (Figure 602)

NOTE: When a hose with a bend is visually examined, do not try to straighten the hose. This will weaken the hose and cause the hose to leak.

Table 604

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
1. Kinked hose.	Hose is unserviceable if hose is kinked.	Replace hose.
2. Twisted hose.	Hose is unserviceable if inside wall of hose is collapsed.	Replace hose.
3. Braided hose.	Hose is unserviceable if abrasions are through the fiber strands.	Replace hose.
4. Defective coupling nuts.	Hose is unserviceable if hose nuts are cracked, split, has burrs, sharp edges, cross threaded, or has missing threads.	Replace hose.

F. Job Close-up - Nacelle Cooling Tubing and Hose Inspection

SUBTASK 75-25-00-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-25-00-410-267

- (2) Close the thrust reverser door. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY

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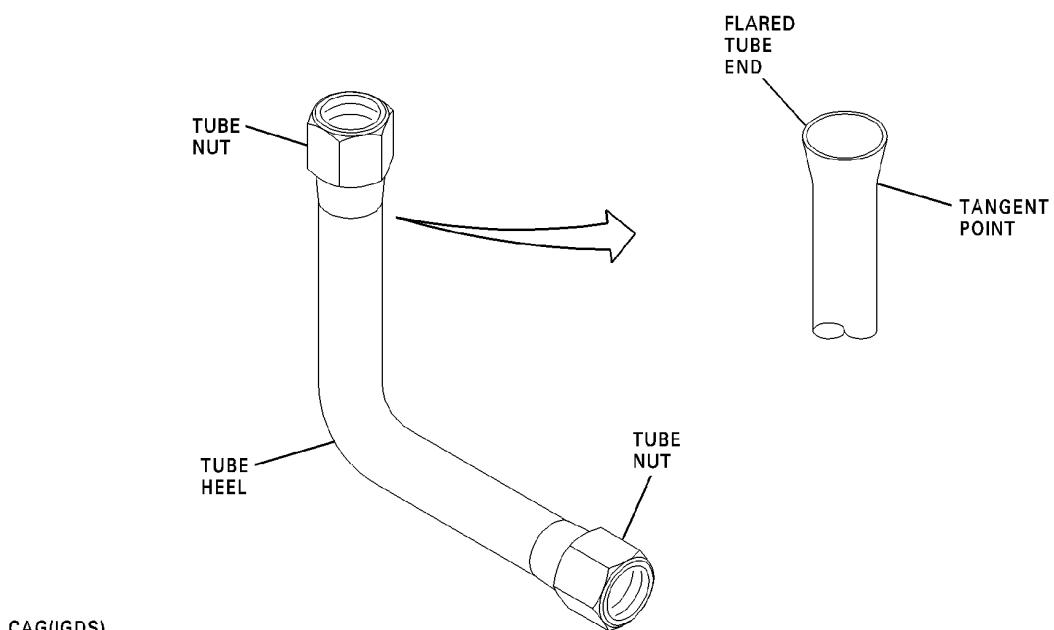
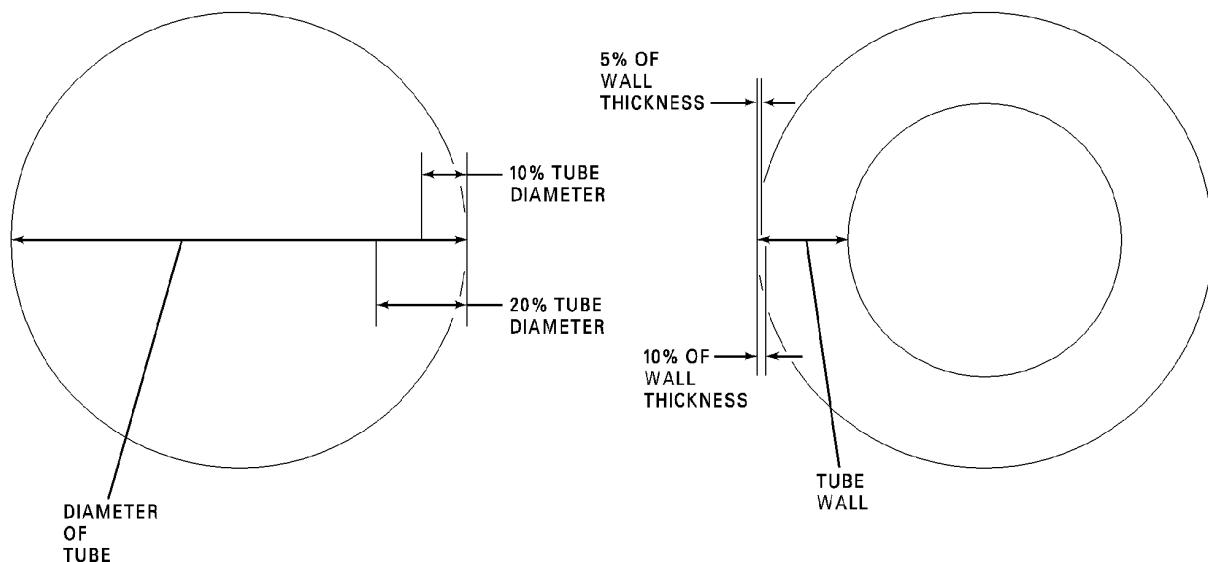
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Nacelle Cooling Tubing - Inspection
Figure 601/75-25-00-990-805

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

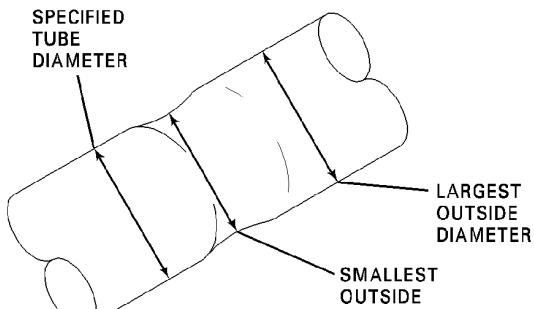
75-25-00

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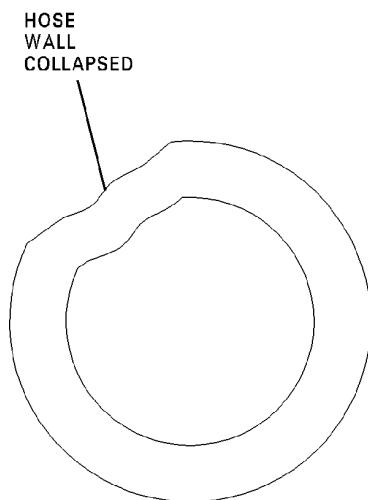
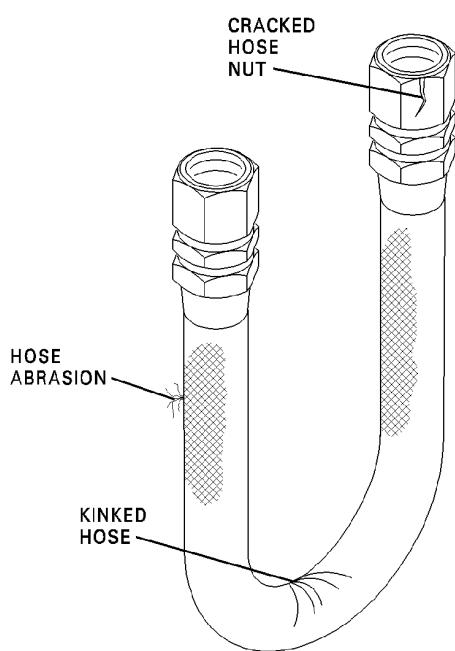
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OUT OF ROUND TUBE



CAG(IGDS)

DB2-75-0294

Nacelle Cooling Hose - Inspection
Figure 602/75-25-00-990-804

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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VALVE, NACELLE COOLING CONTROL - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the nacelle cooling control valves.
- B. The nacelle cooling valve before Conf-02B engines is installed between the spray bar and the nacelle cooling duct. There are two nacelle cooling valves installed on each engine, one on each thrust reverser inner barrel.
- C. The nacelle cooling valve after Conf-02B engines has an upper and lower valve installed on each thrust reverser half inner barrel. Access to the nacelle cooling control valves is through the thrust reverser doors.
- D. Unless different instruction are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-25-01-000-868

2. REMOVAL OF THE LEFT NACELLE COOLING CONTROL VALVE BEFORE CONF-02B

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m), high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Left Nacelle Cooling Control Valve Removal

SUBTASK 75-25-01-865-273



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
H	12	B1-1225	NAC COOLING ENG 1

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-25-01-010-269

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Left Nacelle Cooling Control Valve Removal

SUBTASK 75-25-01-030-267

- (1) Remove the left nacelle cooling control valve (1) as follows: (Figure 401)
 - (a) Disconnect the electrical connector (2) from the nacelle cooling control valve (1) and install protective caps and plugs.
 - (b) Disconnect the muscle tube (3) from the union (4) and install protective caps and plugs.
 - (c) Remove the coupling (5) that connects the spray bar (6) to the cooling valve (1).
 - (d) Remove the coupling (7) that connects the nacelle cooling duct (8) to the valve (1).
 - (e) Remove the nuts (9), the washers (10), and the bolts (11) that attach the valve (1) bracket on the lower end of the valve to the mount bracket (12).
 - (f) Remove the nut (14), and the washer (13) that attaches the valve (1) to the bracket (15).
 - (g) Remove the valve (1) and install protective covers on all openings.
 - (h) Remove the union (4), and packing (16) from the valve (1). Install protective caps and discard the packing.

SUBTASK 75-25-01-410-267

- (2) If the left nacelle cooling control valve is not installed immediately, or weather conditions make it necessary, close the access doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

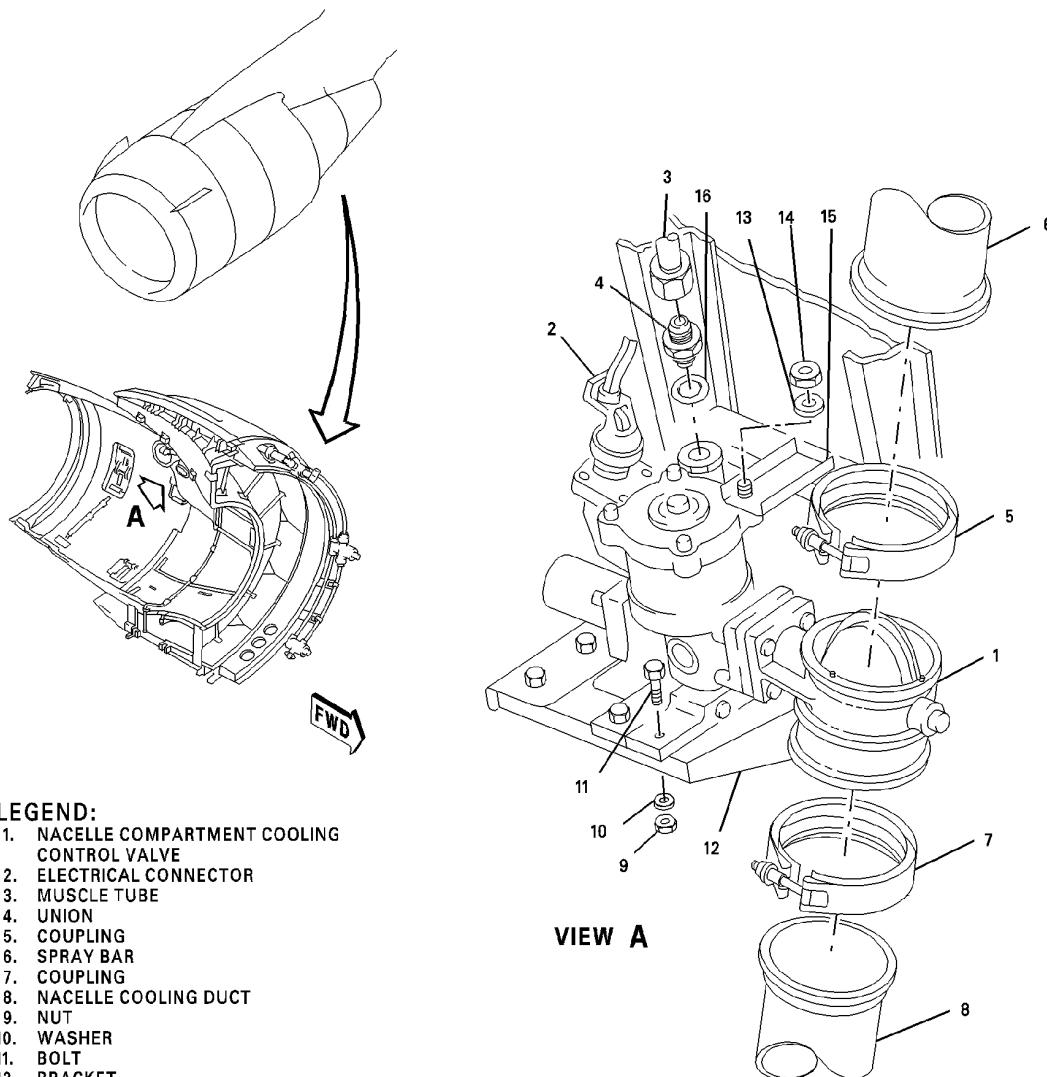
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LEGEND:

1. NACELLE COMPARTMENT COOLING CONTROL VALVE
2. ELECTRICAL CONNECTOR
3. MUSCLE TUBE
4. UNION
5. COUPLING
6. SPRAY BAR
7. COUPLING
8. NACELLE COOLING DUCT
9. NUT
10. WASHER
11. BOLT
12. BRACKET
13. WASHER
14. NUT
15. BRACKET
16. PACKING

CAG(IGDS) L-M107R

DB2-75-0164B

Left Nacelle Cooling Control Valve - Removal/Installation
Figure 401/75-25-01-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-25-01-400-868

3. INSTALLATION OF THE LEFT NACELLE COOLING CONTROL VALVE BEFORE CONF-02B

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines 4-8 ft (1.2-2.4 m), high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-200 in-lb (0-22.6 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

NOTE: Equivalent replacements are permitted for the items that follow.

Table 403

REFERENCE	DESIGNATION
P06-020	Anti-seize compound

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
401/16	Packing (P/N M83248-2-904)	IPC 75-25-01

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-23-50	Illustrated Parts Catalog
IPC 75-25-01	Illustrated Parts Catalog

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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E. Job Set-up - Left Nacelle Cooling Control Valve Installation

SUBTASK 75-25-01-865-274



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE

CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY
TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that these circuit breakers are open and have safety tags:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-25-01-010-270

- (2) Open the thrust reverser door. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - Left Nacelle Cooling Control Valve Installation

SUBTASK 75-25-01-020-267

- (1) Install the left nacelle cooling control valve (1) as follows: (IPC 75-23-50) (Figure 401)



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1192, COMPOUND/ANTISEIZE (MIL-T-83483)

HAZMAT 1000, REFER TO MSDS

- (a) Apply antiseize compound (P06-020) to the threads of union (4) and install the packing (16) on the union. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (b) Remove the protective caps and plugs. Install the union (4) and the packing (16) in the nacelle cooling control valve (1). Torque the union to 90–100 in-lb (10.2–11.3 N·m).
- (c) Set the valve (1) in position on the nacelle cooling duct (8). Attach the valve (1) upper end to the bracket (15) with the washer (13), and the nut (14). Torque the nut to 20–25 in-lb (2.3–2.9 N·m).
- (d) Attach the bracket at lower end of the valve (1) to the mount bracket (12) (two places) with the bolts (11), the washers (10) and the nuts (9). Torque the nuts (9) to 50–70 in-lb (5.7–7.9 N·m).
- (e) Apply antiseize compound (P06-020) to the coupling nut threads of the muscle tube (3). Attach the tube (3) to the union (4). Torque the coupling nut to 135–150 in-lb (15.3–17.0 N·m).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (f) Remove the protective dustcaps and connect the electrical connector (2) to the valve (1).
- (g) Connect the nacelle cooling duct (8) to the cooling valve (1) with the coupling (7). Do not fully tighten the couplings at this time.
- (h) Connect the spray bar (6) to the valve (1) with the coupling (5). Do not fully tighten the coupling at this time.
- (i) Torque the couplings (5 and 7) to 50 in-lb (5.6 N·m).

G. Job Close-up - Left Nacelle Cooling Control Valve Installation

SUBTASK 75-25-01-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-25-01-410-268

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-25-01-865-280

- (3) Remove the safety tags and close these circuit breakers:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

- (4) Do the engine ground test idle power. (ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870)

———— END OF TASK ————

TASK 75-25-01-000-869

4. REMOVAL OF THE RIGHT NACELLE COOLING CONTROL VALVE BEFORE CONF-02B

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 405

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m), high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs
MS90376	Dust caps, electrical connector

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Right Nacelle Cooling Control Valve Removal

SUBTASK 75-25-01-865-279



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

Row	Col	Number	Name
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

Row	Col	Number	Name
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-25-01-010-272

- (2) Open thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Right Nacelle Cooling Control Valve Removal

SUBTASK 75-25-01-030-268

- (1) Remove the right nacelle cooling control valve (1) as follows: (Figure 402)
 - (a) Disconnect the electrical connector (2) from the nacelle cooling valve (1) and install protective caps and plugs.
 - (b) Disconnect the muscle tube (3) from the union (4) and install protective caps and plugs.
 - (c) Remove the coupling (5) that connects the spray bar (6) to the cooling valve (1).
 - (d) Remove the coupling (7) that connects the nacelle cooling duct (8) to the valve (1).
 - (e) Remove the nuts (9), the washers (10), and the bolts (11) that attach the valve (1) bracket on the upper end of the valve to the mount bracket (12).
 - (f) Remove the nuts (13), and the washers (14) that attach the valve (1) to the bracket (15).
 - (g) Remove the valve (1) and install protective cover on all openings.
 - (h) Remove the union (4), and the packing (16) from the valve (1). Install protective caps and discard the packing.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-25-01-410-270

- (2) If the right nacelle cooling control valve is not installed immediately, or weather conditions make it necessary, close the access doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

75-25-01

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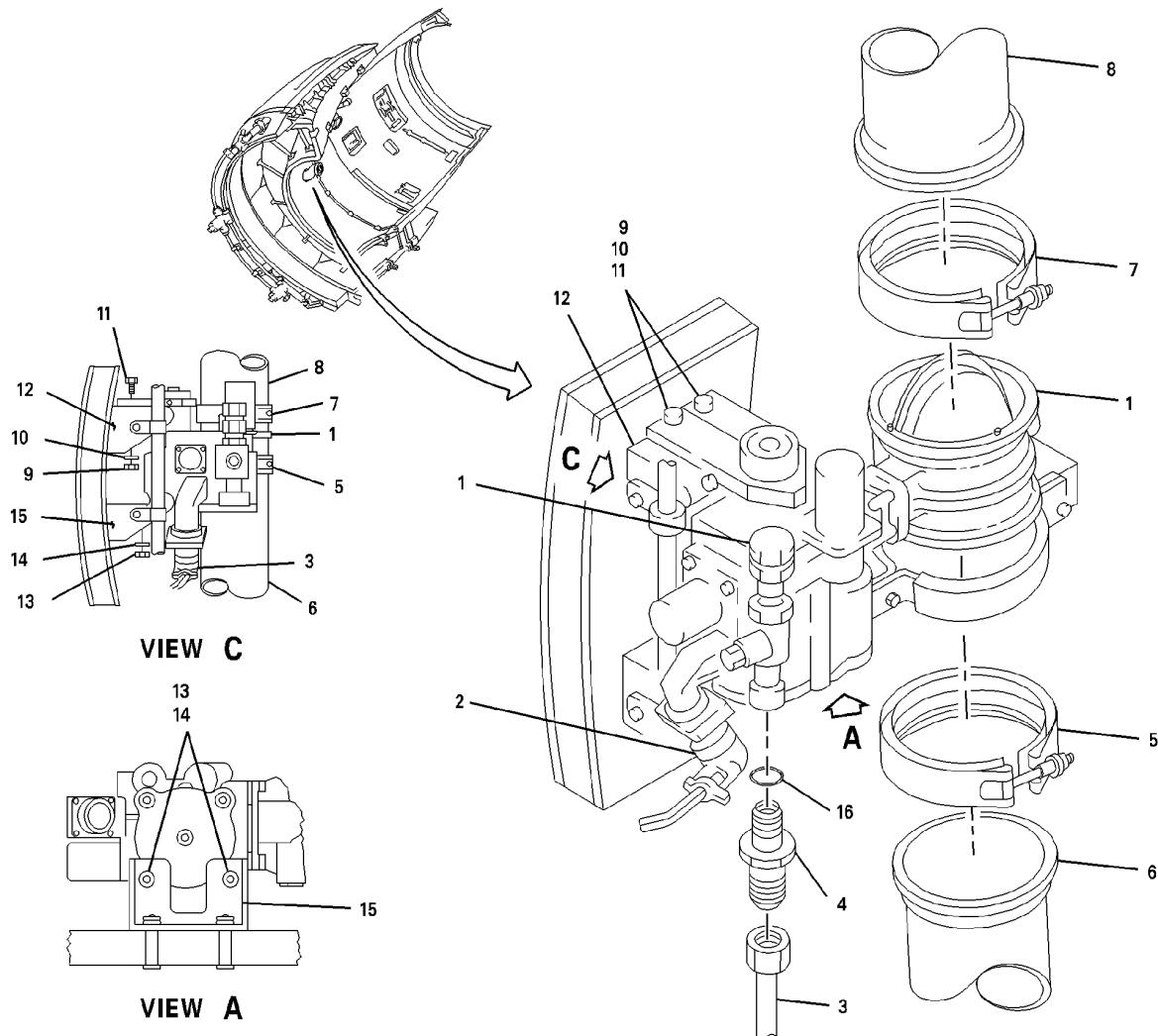
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LEGEND:

- | | |
|--|-------------------------|
| 1. NACELLE CORE COMPARTMENT
COOLING CONTROL VALVE | 8. NACELLE COOLING DUCT |
| 2. ELECTRICAL CONNECTOR | 9. NUT |
| 3. MUSCLE TUBE | 10. WASHER |
| 4. UNION | 11. BOLT |
| 5. COUPLING | 12. BRACKET |
| 6. SPRAY BAR | 13. NUT |
| 7. COUPLING | 14. WASHER |
| | 15. BRACKET |
| | 16. PACKING |

CAG(IGDS) L-M106R

DB2-75-0165A

Right Nacelle Cooling Control Valve - Removal/Installation
Figure 402/75-25-01-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-25-01-400-869

5. INSTALLATION OF THE RIGHT NACELLE COOLING CONTROL VALVE BEFORE CONF-02B

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 406

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines 4-8 ft (1.2-2.4 m), high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-200 in-lb (0-22.6 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

NOTE: Equivalent replacements are permitted for the items that follow.

Table 407

REFERENCE	DESIGNATION
P06-020	Antiseize compound

C. Expendable Parts

(1) Expendable Parts

Table 408

REFERENCE/ITEM	DESIGNATION	IPC
402/16	Packing (P/N M83248-2-904)	IPC 75-25-01

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-23-50	Illustrated Parts Catalog
IPC 75-25-01	Illustrated Parts Catalog

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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E. Job Set-up - Right Nacelle Cooling Control Valve Installation

SUBTASK 75-25-01-865-281



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE

CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY
TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that these circuit breakers are open and have safety tags:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-25-01-010-273

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - Right Nacelle Cooling Control Valve Installation

SUBTASK 75-25-01-030-269

- (1) Install the right nacelle cooling control valve (1) as follows: (IPC 75-23-50) (Figure 402)

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1192, COMPOUND/ANTISEIZE (MIL-T-83483)

HAZMAT 1000, REFER TO MSDS

- (a) Remove the protective caps and plugs. Apply antiseize compound (P06-020) to the threads of union (4) and install the packing (16) on the union (4). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (b) Install the union (4) and packing (16) in the nacelle cooling valve (1). Torque the union to 90–100 in-lb (10.2–11.3 N·m).
- (c) Set the valve (1) in position on the nacelle cooling duct (8). Attach the valve (1) lower end to the bracket (15) with the washers (14) and nuts (13). Torque the nuts (13) to 20–25 in-lb (2.3–2.9 N·m).
- (d) Attach the bracket at upper end of the valve (1) to the mount bracket (12) (two places) with the bolts (11), washers (10) and nuts (9). Torque the nuts (9) to 50–70 in-lb (5.7–7.9 N·m).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (e) Apply antiseize compound (P06-020) to the coupling nut threads of the muscle tube (3). Attach the tube (3) to the union (4). Torque the coupling nut to 135-150 in-lb (15.3-17.0 N·m).
- (f) Remove the protective dustcap and connect the electrical connector (2) to the valve (1).
- (g) Connect the nacelle cooling duct (8) to the cooling valve (1) with the coupling (7). Do not fully tighten the coupling at this time.
- (h) Connect the spray bar (6) to the valve (1) with the coupling (5). Do not fully tighten the coupling at this time.
- (i) Torque the couplings (5 and 7) to 50 in-lb (5.6 N·m).

G. Job Close-up - Right Nacelle Cooling Control Valve Installation

SUBTASK 75-25-01-942-268

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-25-01-410-271

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-25-01-865-285

- (3) Remove the safety tags and close these circuit breakers:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

- (4) Do the engine ground test idle power. (ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870)

———— END OF TASK ————

TASK 75-25-01-000-870

6. REMOVAL OF THE NACELLE COOLING CONTROL VALVE AFTER CONF-02B

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 409

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m), high
Not specified	Aerial boom, manlift No. 2 engine

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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Table 409 (Continued)

REFERENCE	DESIGNATION
MS90376	Dust caps, electrical connector
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Nacelle Cooling Control Valve Removal

SUBTASK 75-25-01-865-286



TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-25-01-010-279

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Nacelle Cooling Control Valve Removal

SUBTASK 75-25-01-030-270

- (1) Remove the lower nacelle cooling control valve (1) from the thrust reverser door as follows: (Figure 403)
 - (a) On the lower nacelle cooling control valve (1), disconnect the tube assembly (2) from the elbow (3).

NOTE: Muscle lines are connected to the upper cooling control valve with a tee. Muscle lines are connected to the lower cooling control valve with an elbow.
 - (b) Remove the nut (4), elbow (3), and packing (5). Discard the packing and install a protective plug on the valve and tube assembly.
 - (c) Remove the four pins (6), collars (7) and washers (8). Discard the pins and collars. Remove the valve (1) from the thrust reverser door.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-25-01-030-271

- (2) Remove the upper nacelle cooling control valve (9) from the thrust reverser door as follows: (Figure 403)
 - (a) On the upper nacelle cooling control valve (9), disconnect the tube assembly (2) and (10) from the elbow (12).
 - (b) Remove the nut (11), tee (12) and packing (13). Discard the packing and install a protective plug on the valve and tube assemblies.
 - (c) Remove the four pins (14), collars (15) and washers (16). Discard the pins and collars. Remove the upper nacelle cooling control valve (9) from the thrust reverser door.

SUBTASK 75-25-01-410-282

- (3) If the nacelle cooling control valve is not installed immediately, or weather conditions make it necessary, close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

75-25-01

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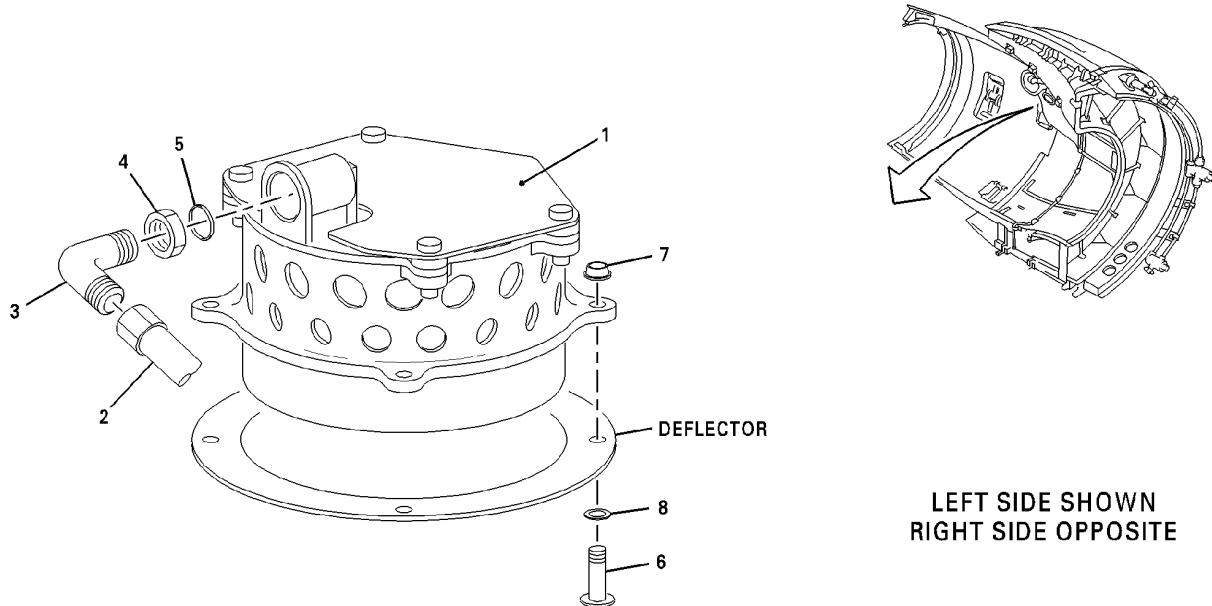
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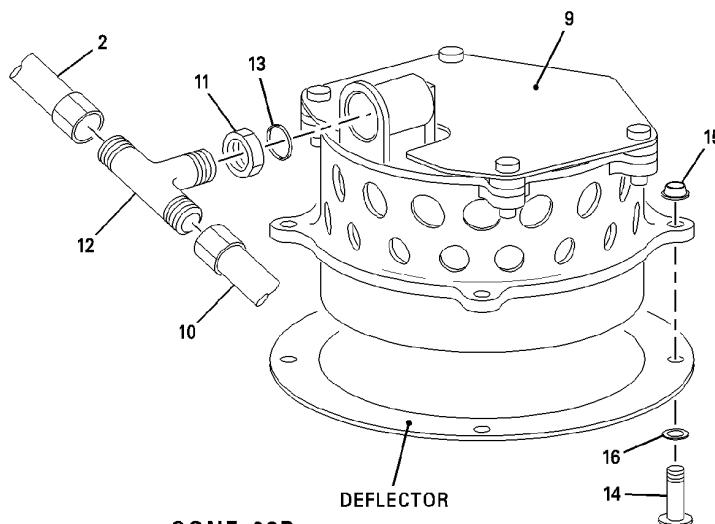
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LEFT SIDE SHOWN
RIGHT SIDE OPPOSITE

- LEGEND:**
- 1. LOWER NACELLE COOLING CONTROL VALVE
 - 2. TUBE ASSEMBLY
 - 3. ELBOW
 - 4. NUT
 - 5. PACKING
 - 6. PIN
 - 7. COLLAR
 - 8. WASHER
 - 9. UPPER NACELLE COOLING CONTROL VALVE
 - 10. TUBE ASSEMBLY
 - 11. NUT
 - 12. TEE
 - 13. PACKING
 - 14. PIN
 - 15. COLLAR
 - 16. WASHER

CAG(IGDS)



DB2-75-0304B

Nacelle Cooling Control Valve - Removal/Installation
Figure 403/75-25-01-990-877

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-25-01-400-870

7. INSTALLATION OF THE NACELLE COOLING CONTROL VALVE AFTER CONF-02B

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 410

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m), high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-300 in-lb (0-33.9 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 411

REFERENCE	DESIGNATION
C02-019	Oil, engine lubricating

C. Expendable Parts

(1) Expendable Parts

Table 412

REFERENCE	DESIGNATION	IPC
403/5	Packing (M83248/2-905)	IPC 75-25-03
403/6	Pin Right Thrust Reverser Door (HL13VAZ-5-16)	IPC 75-25-03
403/14	Pin Left Thrust Reverser Door (HL13VAZ-5-19)	IPC 75-25-03
403/7,15	Collar (HL94DU5)	IPC 75-25-03

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-25-01-700-868	FUNCTIONAL TEST OF THE NACELLE CORE COMPARTMENT COOLING CONF-02B (P/B 501)
IPC 75-25-03	Illustrated Parts Catalog

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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E. Job Set-up - Installation of the Nacelle Cooling Control Valve

SUBTASK 75-25-01-865-287



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE

CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY
TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that these circuit breakers are open and have safety tags:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-25-01-010-280

- (2) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - Installation of the Nacelle Cooling Control Valve

SUBTASK 75-25-01-420-267

- (1) Install the lower nacelle cooling control valve (1) on the thrust reverser door as follows: (Figure 403)
 - (a) Put the lower nacelle cooling control valve (1) on the thrust reverser door and align the deflector cutouts with the valve.
NOTE: The nacelle cooling control valve is installed with the deflector cutouts aligned with the pins $\pm 2^\circ$ (0.034 rad).
 - (b) Install the four new pins (6), washers (8) and new collars (7) on the upper nacelle cooling control valve (1).
 - (c) Torque the pins (6) to 200-250 in-lb (22.58–28.23 N·m).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (d) Remove the protective caps and plugs. Lubricate the new packing (5) and the threads of the elbow (3) with engine oil (P03-001). Install the elbow (3), nut (4) and packing (5) on the lower nacelle cooling control valve. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (e) Torque the nut (4) to 130–140 in-lb (14.68–15.81 N·m).

NOTE: Muscle lines are connected to the upper cooling control valve with a tee. Muscle lines are connected to the lower cooling control valve with an elbow.

- (f) Install the tube assembly (2) on the elbow (3) of the nacelle cooling control valve.

- (g) Torque the tube assembly (2) B nut to 200–210 in-lb (22.58–23.71 N·m).

SUBTASK 75-25-01-420-268

- (2) Install the upper nacelle cooling control valve (9) on the thrust reverser door as follows: (Figure 403)

- (a) Put the upper nacelle cooling control valve (9) on the thrust reverser door and align the deflector cutouts with the valve.

NOTE: The nacelle cooling control valve is installed with the deflector cutouts aligned with the pins $\pm 2^\circ$ (± 0.034 rad).

- (b) Install the four new pins (14), washers (16) and new collars (15) on the upper nacelle cooling control valve.

- (c) Torque the pins (14) to 200–250 in-lb (22.58–28.23 N·m).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (d) Remove the protective caps and plugs. Lubricate the new packing (13) and the threads of the tee (12) with engine oil (P03–001). Install the tee (12), nut (11) and packing (13) on the lower nacelle cooling control valve. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

- (e) Torque the nut (11) to 130–140 in-lb (14.68–15.81 N·m).

NOTE: Muscle lines are connected to the upper cooling control valve with a tee. Muscle lines are connected to the lower cooling control valve with an elbow.

- (f) Install the tube assembly (2) and (10) on the tee (12).

- (g) Torque the tube assembly (2) and (10) B nut to 200–210 in-lb (22.58–23.71 N·m).

G. Job Close-up - Nacelle Cooling Control Valve Installation

SUBTASK 75-25-01-865-288

- (1) Remove the safety tags and close these circuit breakers:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
------------	------------	---------------	-------------

K	12	B1-1227	NAC COOLING ENG 3
---	----	---------	-------------------

SUBTASK 75-25-01-410-283

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-25-01-710-267

- (3) Do the functional test of the nacelle core compartment cooling. (FUNCTIONAL TEST OF THE NACELLE CORE COMPARTMENT COOLING CONF-02B, TASK 75-25-01-700-868)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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NACELLE CORE COMPARTMENT COOLING - ADJUSTMENT/TEST

1. General

- A. This procedure has the functional test instructions for the nacelle core compartment cooling for conf-02B engines. Access to the core compartment is through the thrust reverser door.
- B. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/PW4462 engines.

TASK 75-25-01-700-868

2. FUNCTIONAL TEST OF THE NACELLE CORE COMPARTMENT COOLING CONF-02B

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

B. Tools/Equipment

Reference	Description
STD-113	Boom - Aerial
STD-370	Gauge - Dial, Push-pull 1-100 lbf (0-444.8N)
STD-660	Platform - Maintenance, 4 to 8 ft (1.2 to 2.4 m) High
STD-686	Power Supply - 28 VDC
STD-1014	Wrench - Torque, 0 to 150 in-lbs (0 to 16.9 N-m)
STD-6226	Caps - Protective, Polyvinyl Chloride, DPM 2696
STD-6638	Air Source - Compressed, Clean, Filtered, and Dry, 0 - 100 psi
STD-7394	Cap - Dust, Electrical Connector

C. Job Set-up - Information - Nacelle Core Compartment Cooling Functional Test

SUBTASK 75-25-01-490-002

- (1) Put a 4 to 8 ft (1.2 to 2.4 m) high maintenance platform, STD-660 or a aerial boom, STD-113 into position.

SUBTASK 75-25-01-010-281

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Information - Nacelle Core Compartment Cooling Functional Test

SUBTASK 75-25-01-720-267

- (1) Test the nacelle core compartment cooling as follows: (Figure 501) (Figure 502)

NOTE: The right and left nacelle core compartment cooling functional test procedures are the same, except for noted connectors. Test only one thrust reverser at a time.

- (a) Disconnect the applicable electrical connector. (Figure 501)
 - 1) For the left functional test, disconnect the electrical connector at location D5011.
 - 2) For the right functional test, disconnect the electrical connector at location D5008.
- (b) Install a dust cap, STD-7394 on the electrical connector.
- (c) Disconnect the coupling nut (3) from the elbow fitting (4). (Figure 502)
- (d) Install the protective cap, DPM 2696, STD-6226 in the coupling nut (3) of the ECS pressure line.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (e) Connect a 28 VDC power supply, STD-686 to the left or right nacelle cooling valve solenoid (2). Do not apply the 28 Vdc power to the nacelle cooling valve solenoid (2) at this time.
 - 1) For the left functional test - At connector location D5011, connect the 28 Vdc power supply to pin T and a grounding source to pin U.
 - 2) For the right functional test - At connector location D5008, connect the 28 Vdc power supply to pin T and a grounding source to pin U.
- (f) Connect a air source, STD-6638 that can supply 20-100 psig (138-690 kpag) to the elbow fitting (4). Do not apply the air to the nacelle cooling valve solenoid (2) at this time.
- (g) Do the nacelle core compartment cooling functional test as follows:

Table 501

STEP OPERATION	VISUAL INSPECTION
1. On the nacelle cooling valve solenoid (2):	
Adjust the air to 45-50 psig (310-345 kpag) and apply air to the nacelle cooling valve solenoid (2)	Compressed air applied.
Apply 28 Vdc power to the nacelle cooling valve solenoid (2)	Make sure the two nacelle cooling valves (5) open.
2. On the inboard side of the thrust reverser door:	
One nacelle cooling valve (5) stays closed or not fully open	Examine for defective nacelle cooling valve (5) and/or tube assembly (6). Replace the valve and/or tube assembly if defective.
	Examine the nacelle cooling valves (5) and/or tube assembly (6) for leaks. Replace the valve and/or tube assembly that leaks.
The two nacelle cooling valves (5) stay closed	Examine for defective nacelle cooling valve solenoid (2). Replace as necessary.
3. On the nacelle cooling valve solenoid (2):	
Remove 28 Vdc from the nacelle cooling valve solenoid (2):	Make sure the two nacelle cooling valves (5) close.
4. On the inboard side of the thrust reverser door:	
One of the nacelle cooling valves (5) stays open	Replace the defective nacelle cooling valve (5).
The two nacelle cooling valves (5) stay open	Examine for defective nacelle cooling valve solenoid (2). Replace if necessary.
(h) Remove the compressed air source from the elbow fitting (4) of the nacelle cooling valve solenoid (2).	
(i) Remove the protective plug and connect the coupling nut (3) to the elbow (4).	
(j) With a torque wrench, STD-1014, torque the coupling nut (3) to 100-140 in-lb (11.3-15.8 N·m).	
(k) Remove the 28 Vdc from the electrical receptacle at location D5011 (left) or D5008 (right).	
(l) Remove the dust cap and connect the applicable electrical connector to the receptacle at location D5011 or D5008.	
(m) Tighten the electrical connector by hand plus one-eighth of a turn.	

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (2) Measure the two nacelle cooling valve (5) minimum opening force as follows:
 - (a) Use a dial gauge, STD-370 and measure the opening force of the nacelle cooling valve (5). Make sure the opening force is 35 lbf (156 N) - 45 lbf (200 N).
 - (b) Replace the nacelle cooling valve (5) if the opening force is less than 35 lbf (156 N).
 - (c) Replace the nacelle cooling valve (5) if the opening force is more than 45 lbf (200 N).

E. Job Close-up - Information - Nacelle Core Compartment Cooling Functional Test

SUBTASK 75-25-01-942-269

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-25-01-410-272

- (2) Close the thrust reverser door. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

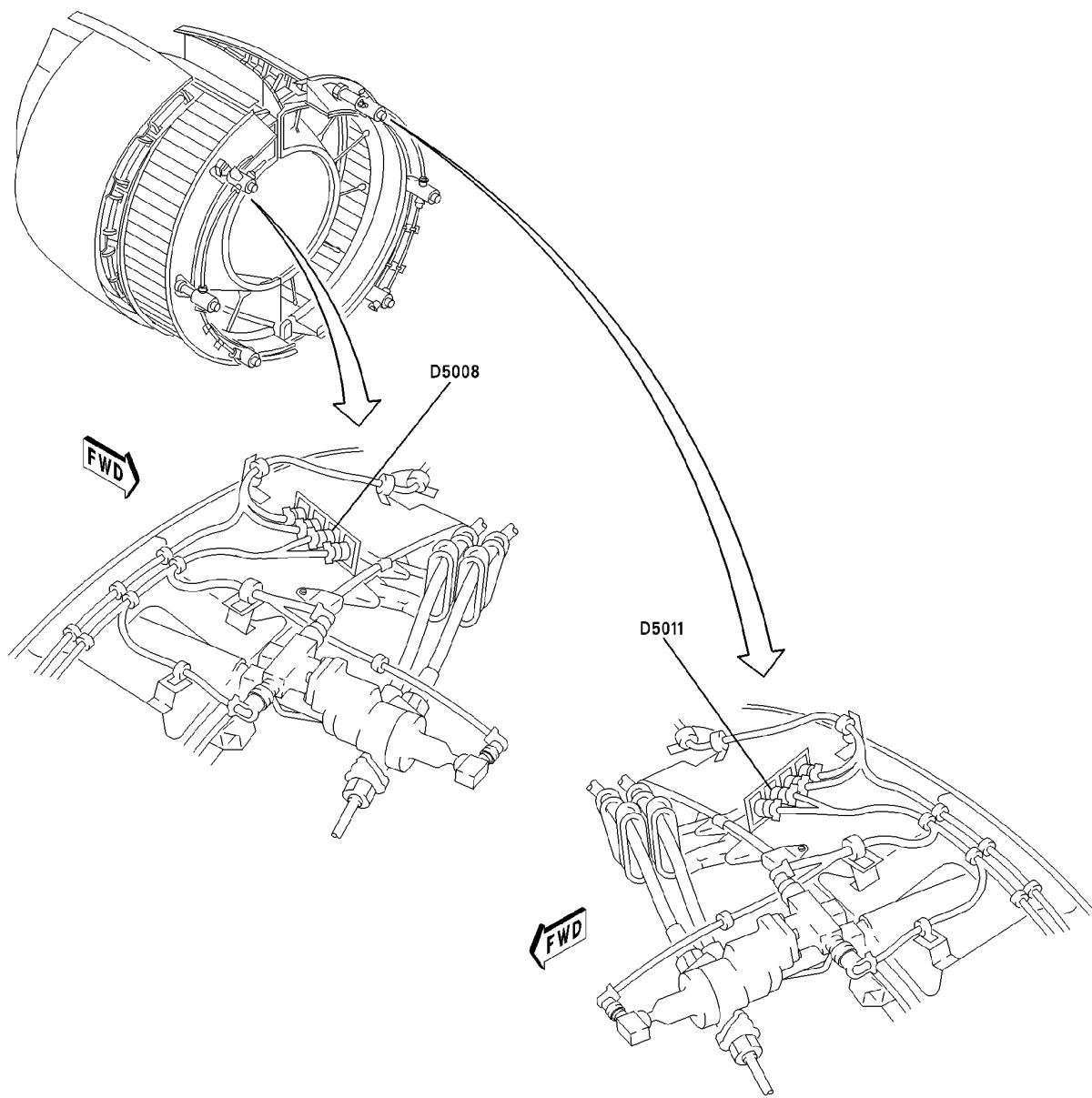
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CAG(IGDS)

DB2-75-0315

Nacelle Core Compartment Cooling - Functional Test
Figure 501/75-25-01-990-879

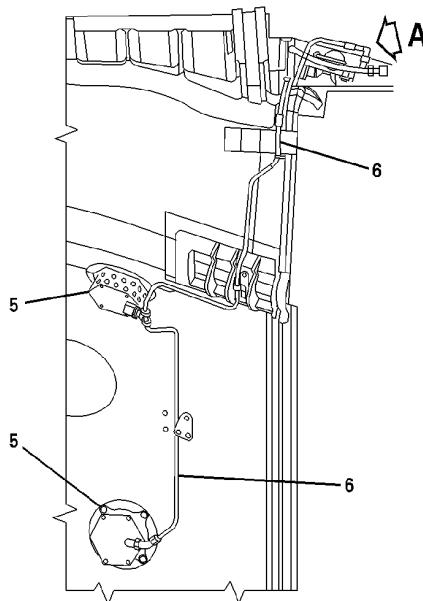
EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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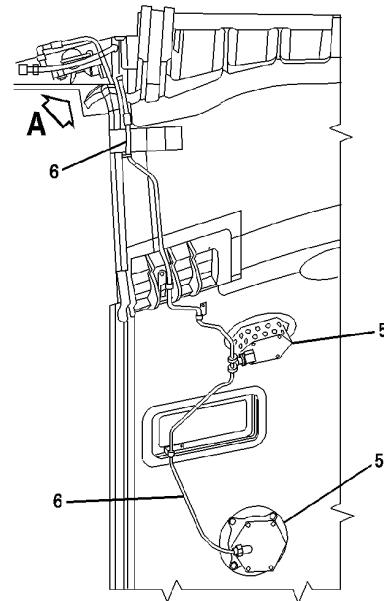
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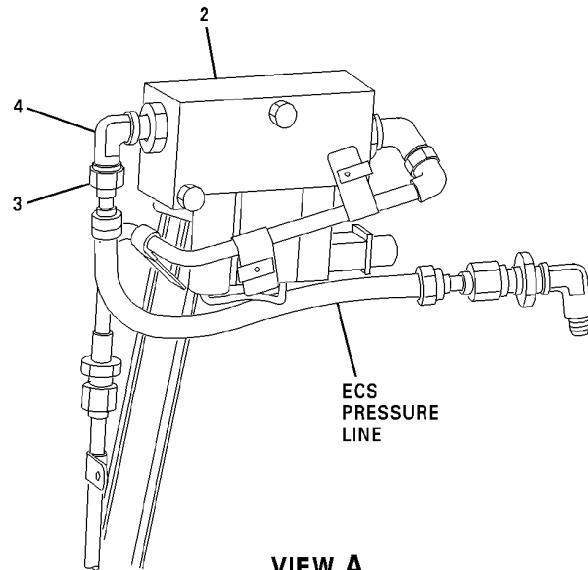
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LEFT THRUST REVERSER DOOR
(VIEW FROM INBOARD)



RIGHT THRUST REVERSER DOOR
(VIEW FROM INBOARD)



VIEW A
CONF-02B

CAG(IGDS)

DB2-75-0305A

Nacelle Core Compartment Cooling Functional Test
Figure 502/75-25-01-990-878

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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VALVE, NACELLE COOLING CONTROL - INSPECTION/CHECK

1. General

- A. This procedure has the inspection/check instructions for the nacelle cooling control valve. Access to the nacelle cooling control valves is through the thrust reverser doors.
- B. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 and PW4460/4462-3 engines.

TASK 75-25-01-200-868

2. INSPECTION OF THE NACELLE COOLING CONTROL VALVE

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-25-01-000-868	REMOVAL OF THE LEFT NACELLE COOLING CONTROL VALVE BEFORE CONF-02B (P/B 401)
75-25-01-000-869	REMOVAL OF THE RIGHT NACELLE COOLING CONTROL VALVE BEFORE CONF-02B (P/B 401)
75-25-01-400-868	INSTALLATION OF THE LEFT NACELLE COOLING CONTROL VALVE BEFORE CONF-02B (P/B 401)
75-25-01-400-869	INSTALLATION OF THE RIGHT NACELLE COOLING CONTROL VALVE BEFORE CONF-02B (P/B 401)

B. Tools/Equipment

Reference	Description
STD-113	Boom - Aerial
STD-660	Platform - Maintenance, 4 to 8 ft (1.2 to 2.4 m) High

C. Job Set-up - Nacelle Cooling Control Valve Inspection

SUBTASK 75-25-01-865-001



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

Row	Col	Number	Name
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

Row	Col	Number	Name
K	12	B1-1227	NAC COOLING ENG 3

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-25-01-490-001

- (2) Put a 4 to 8 ft (1.2 to 2.4 m) high maintenance platform, STD-660 or a aerial boom, STD-113 into position.

SUBTASK 75-25-01-010-001

- (3) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Nacelle Cooling Control Valve Inspection

SUBTASK 75-25-01-212-001

- (1) On the nacelle cooling control valve (1), visually examine the position indicator (2). Make sure the indicator is in the CLOSED position. (Figure 601)
- (2) If the position indicator (2) is in the OPEN position, remove and replace the applicable nacelle cooling control valve (1). As applicable, see the referenced tasks: ((REMOVAL OF THE LEFT NACELLE COOLING CONTROL VALVE BEFORE CONF-02B, TASK 75-25-01-000-868) ((INSTALLATION OF THE LEFT NACELLE COOLING CONTROL VALVE BEFORE CONF-02B, TASK 75-25-01-400-868) ((REMOVAL OF THE RIGHT NACELLE COOLING CONTROL VALVE BEFORE CONF-02B, TASK 75-25-01-000-869) ((INSTALLATION OF THE RIGHT NACELLE COOLING CONTROL VALVE BEFORE CONF-02B, TASK 75-25-01-400-869))

E. Job Close-up - Nacelle Cooling Control Valve Inspection

SUBTASK 75-25-01-865-002

- (1) Remove the safety tags and close these circuit breakers:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-25-01-410-001

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

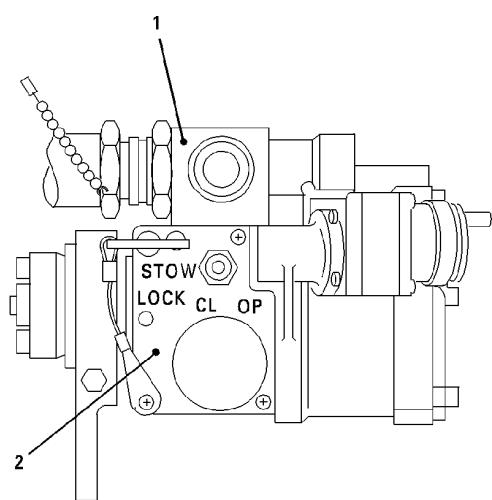
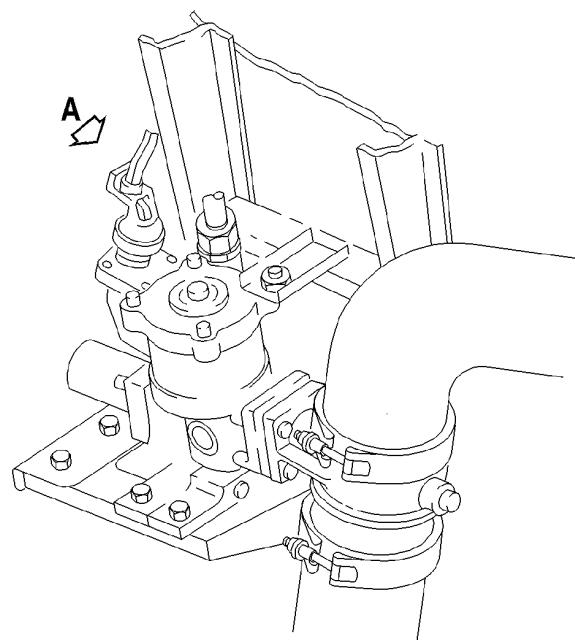
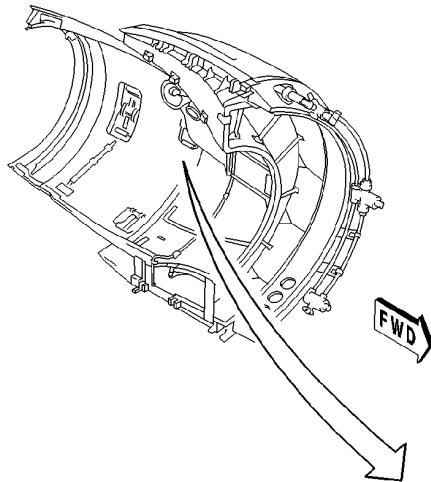
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VIEW A

LEGEND:

1. NACELLE COOLING CONTROL VALVE
2. POSITION INDICATOR

CAG(IGDS)

DB2-75-0297

Nacelle Cooling Control Valve - Inspection
Figure 601/75-25-01-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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BELLOWS, TURBINE CASE COOLING - REMOVAL/INSTALLATION

1. General

NOTE: This removal and installation procedure for the turbine case cooling bellows, has been moved to 75-23-21.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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VALVE, CORE COMPARTMENT COOLING AIR DEACTIVATION/ACTIVATION - MAINTENANCE
PRACTICES

1. General

- A. This procedure has the maintenance practices for the core compartment cooling air valve. This procedure includes:
 - Deactivation of the core compartment cooling air valve
 - Activation of the core compartment cooling air valve.
- B. The valve is found at the 9 o'clock position on the high pressure compressor stator case. Access to the valve is through the left thrust reverser door.
- C. Unless different instructions are given, these procedures are the same for the three G.E. CF6-80C2D1F engines.

TASK 75-25-04-040-801

2. DEACTIVATION OF THE CORE COMPARTMENT COOLING AIR VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 201

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
AN806-6	Plug
Not specified	Torque wrench, 0-600 in-lb (0-33.8 N·m)

B. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Open, Safety, and Tag the Circuit Breaker

SUBTASK 75-25-04-865-005



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
H	12	B1-1225	NAC COOLING ENG 1

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

D. Job Set-up - Core Compartment Cooling Air Valve Deactivation

SUBTASK 75-25-04-010-006

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

E. Procedure - Core Compartment Cooling Air Valve Deactivation

SUBTASK 75-25-04-040-001

- (1) Deactivate the core compartment cooling air valve (1) as follows: (Figure 201)
 - (a) Disconnect the 11th stage signal air tube (2) from the reducer fitting (3) in the valve (1).
 - (b) Remove the reducer fitting (3) from the valve (1). Discard the packing (4).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1023, GREASE/THREAD COMPOUND LUBRICATING (DPM 376)

HAZMAT 1000, REFER TO MSDS



DO NOT PUT A PLUG IN THE SIGNAL AIR PORT ON THE CORE COMPARTMENT COOLING AIR VALVE. THIS WILL HELP PREVENT DAMAGE TO THE ENGINE.

- (c) Lubricate and install the plug (5) in the 11th stage signal air tube (2) and torque the plug to 270–300 in-lb (30.5–33.0 N·m).

- (d) Make sure the override handle (6) on the core compartment cooling air valve (1) is in the OPEN position.

NOTE: If the core compartment cooling air valve is not in the OPEN position, do steps (e) and (f).

- (e) Remove the lock screw (7) from the storage hole on the core compartment cooling air valve (1). Make sure the valve is in the OPEN position.

- (f) Install the lockscrew (7) in the valve plate on top of the valve (1).

- (g) Install a warning notice in the Flight Compartment to tell the flight crew of the deactivation of the core compartment cooling air valve.

NOTE: With the core compartment cooling air valve deactivated there will be a 0.8% fuel burn increase.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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F. Job Close-up Procedure - Core Compartment Cooling Air Valve Deactivation

SUBTASK 75-25-04-942-003

- (1) Remove all the tools and equipment from the work area. Make sure the work area is clean.

SUBTASK 75-25-04-410-005

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS,
TASK 71-10-00-410-802)

SUBTASK 75-25-04-865-006

- (3) Remove the safety tags and close these circuit breakers:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

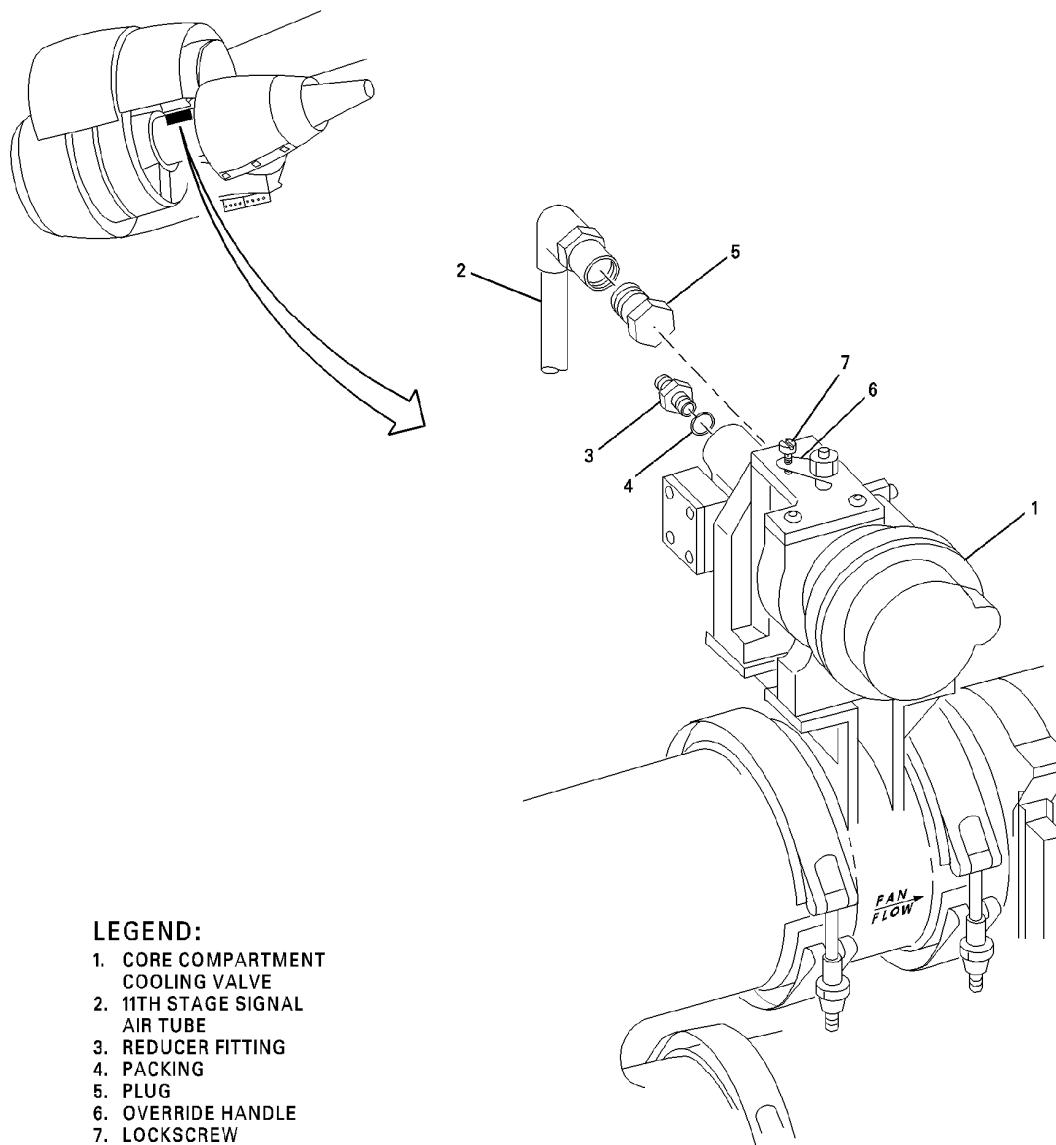
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LEGEND:

1. CORE COMPARTMENT COOLING VALVE
2. 11TH STAGE SIGNAL AIR TUBE
3. REDUCER FITTING
4. PACKING
5. PLUG
6. OVERRIDE HANDLE
7. LOCKSCREW

CAG(IGDS) CF8-6913-01-A

DB2-75-0232A

Core Compartment Valve - Deactivation/Activation
Figure 201/75-25-04-990-801

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-25-04-440-801

3. ACTIVATION OF THE CORE COMPARTMENT COOLING AIR VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 202

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-600 in-lb (0-33.8 N·m)

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 203

REFERENCE	DESIGNATION
C02-021	Oil, grade 1010
C10-071	Lockwire, 0.032 corrosion resistance steel

C. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up Information - Core Compartment Cooling Air Valve Activation

SUBTASK 75-25-04-865-007



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
H	12	B1-1225	NAC COOLING ENG 1

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-25-04-010-008

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

E. Procedure - Core Compartment Cooling Air Valve Activation

SUBTASK 75-25-04-440-001

- (1) Activate the core compartment cooling air valve (1) as follows: (Figure 201)
 - (a) Remove the plug (5) from the 11th stage signal air tube (2).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) Apply a thin layer of oil (C02-021) to the packing (4). Put the packing on the reducer fitting (3).
- (c) Install the reducer fitting (3) on the core compartment cooling air valve (1). Torque the reducer fitting to 155–175 in-lb (17.5–19.8 N·m).
- (d) Connect the 11th stage signal air tube (2) on the reducer fitting (3). Torque the tube to 270–300 in-lb (30.5 33.9 N·m).
- (e) Remove the lock screw (7) from the valve plate on top of the core compartment cooling valve (1).
- (f) Make sure the core compartment cooling valve (1) is in the OPEN position.
- (g) Install the lock screw (7) in the storage hole of the core compartment cooling air valve (1).
- (h) Safety the lock screw (7) with lockwire (C10-071).
- (i) Remove the warning notice from the Flight Compartment.

F. Job Close-up - Core Compartment Cooling Air Valve Activation

SUBTASK 75-25-04-942-002

- (1) Remove all the tools and equipment from the work area. Make sure that the work area is clean.

SUBTASK 75-25-04-410-008

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SUBTASK 75-25-04-865-004

- (3) Remove the safety tags and close these circuit breakers:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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VALVE, CORE COMPARTMENT COOLING AIR - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the core compartment cooling air valve. This procedure includes:
 - Removal of the Core Compartment Cooling Air Valve
 - Installation of the Core Compartment Cooling Air Valve
 - Removal of the Core Compartment Cooling Air Valve Signal Air Tube 40 Micron Filter
 - Installation of the Core Compartment Cooling Air Valve Signal Air Tube 40 Micron Filter
- B. The valve is at the 9 o'clock position on the high pressure compressor stator case. To gain access, open the thrust reverser doors.
- C. Unless different instructions are given, these procedures are the same for the three G.E. CF6-80C2D1F engines.

TASK 75-25-04-000-801

2. REMOVAL OF THE CORE COMPARTMENT COOLING AIR VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No.1 and 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Core Compartment Cooling Air Valve Removal

SUBTASK 75-25-04-010-002

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

D. Procedure - Core Compartment Cooling Air Valve Removal

SUBTASK 75-25-04-020-002

- (1) Remove the core compartment cooling valve (1) as follows: (Figure 401)

NOTE: The steps that follow are for the engine before GE S/B 75-070.

- (a) Disconnect the eleventh stage signal air tube (2) from the union (3).
- (b) Remove the two grooved clamps (6) that attach the valve (1) to the fan discharge air duct (7), and the compartment cooling manifold (5). Remove the valve.
- (c) Remove the reducer fitting (3) from the valve (1), and discard the packing (4).

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SUBTASK 75-25-04-020-003

NOTE: The steps that follow are for the engine after GE S/B 75-070, S/B 75-086, and S/B 75-116.

- (2) Remove the core compartment cooling air valve (1) as follows: (Figure 401)
 - (a) Disconnect the eleventh stage signal air tube (2) from the reducer fitting (3).
 - (b) Remove the two grooved clamps (6) that attach the valve (1) to the fan discharge air duct (7), and the compartment cooling manifold (5).
 - (c) Remove the valve (1) and the E-seals (9) from the compartment cooling manifold (5) and the fan discharge air duct (7).
 - (d) Remove the reducer fitting (3) from the valve (1), and discard the packing (4).

SUBTASK 75-25-04-030-003

- (3) Install protective caps on the open air duct, the open cooling manifold, and the eleventh stage air tube.

SUBTASK 75-25-04-410-001

- (4) If the core compartment cooling air valve is not installed immediately, or weather conditions make it necessary, close the access doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

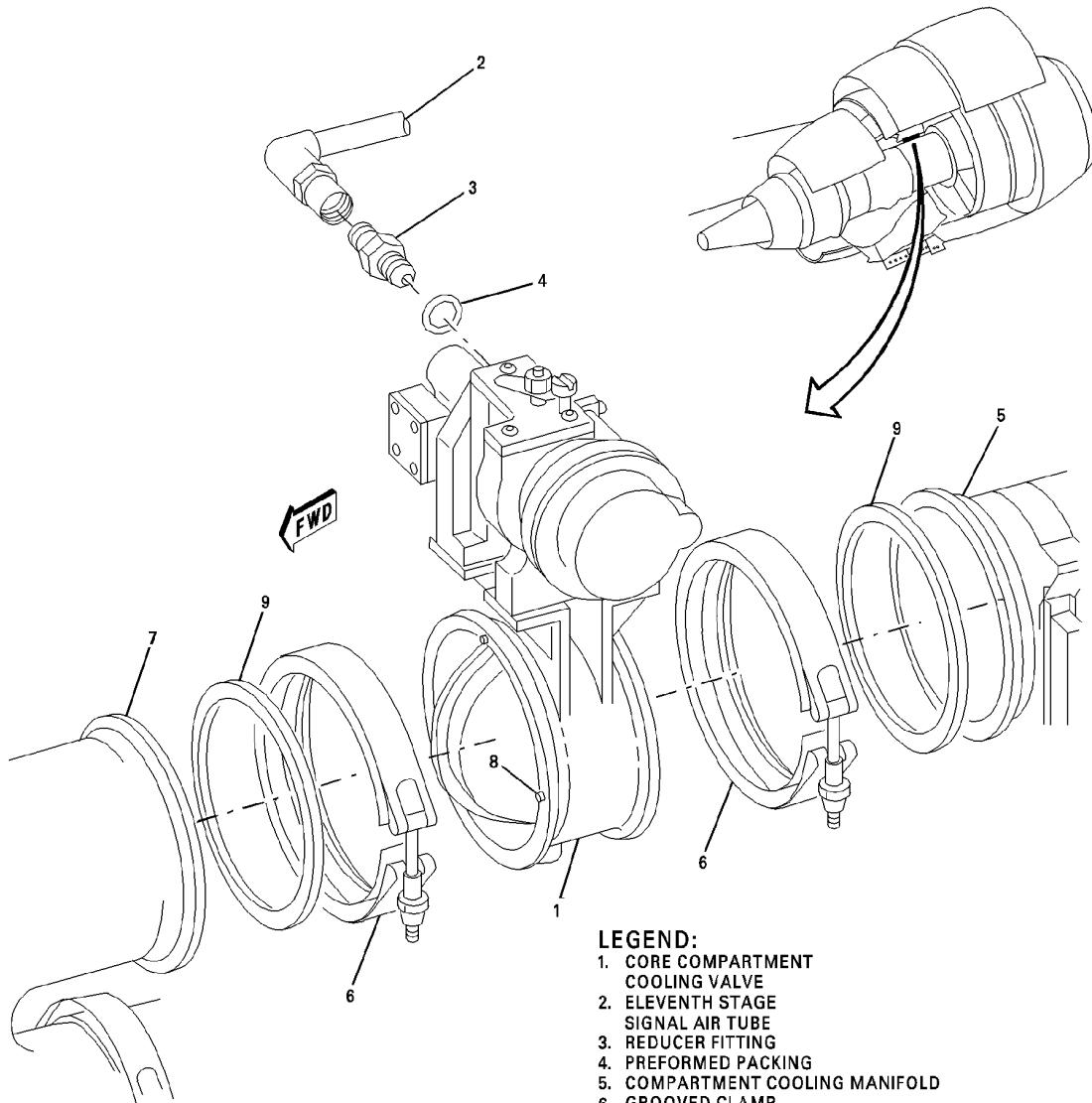
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LEGEND:

1. CORE COMPARTMENT COOLING VALVE
2. ELEVENTH STAGE SIGNAL AIR TUBE
3. REDUCER FITTING
4. PREFORMED PACKING
5. COMPARTMENT COOLING MANIFOLD
6. GROOVED CLAMP
7. FAN DISCHARGE AIR DUCT
8. ALIGNMENT PIN, BEFORE G.E S/B75-086, AND S/B 75-116
9. E-SEAL, AFTER G.E S/B 75-070

CF8-6913-01-A

DB2-75-0007C

Core Compartment Cooling Valve - Removal/Installation
Figure 401/75-25-04-990-805

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-25-04-400-801

3. INSTALLATION OF THE CORE COMPARTMENT COOLING AIR VALVE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No.1 and 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-350 in-lbs (0-39.5 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
C02-001	Compound, anti-seize

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
4	Packing	IPC 75-23-45-01

D. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)
71-00-00-700-803	MINIMUM AND APPROACH IDLE POWER (ADJ/TEST 02) (P/B 501)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-23-45-01	Illustrated Parts Catalog
IPC 75-23-50	Illustrated Parts Catalog

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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E. Job Set-up - Core Compartment Cooling Air Valve Installation

SUBTASK 75-25-04-010-004

- (1) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

F. Procedure - Core Compartment Cooling Air Valve Installation

SUBTASK 75-25-04-420-002

- (1) Install the core compartment cooling air valve (1) as follows: (IPC 75-23-50) (Figure 401)

NOTE: The steps that follow are for the engine before GE S/B 75-070, S/B 75-086, and S/B 75-116.



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1192, COMPOUND/ANTISEIZE (MIL-T-83483)

HAZMAT 1000, REFER TO MSDS

- (a) Apply a thin layer of anti-seize compound (C02-001) to the reducer fitting (3). Install the packing (4) on the reducer fitting (3). (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
- (b) Remove the protective caps from the valve (1), the air duct (7), the cooling manifold (5), and the eleventh stage signal air tube (2).
- (c) Install the reducer fitting (3) on the core compartment cooling valve (1). Torque the reducer fitting to 155–175 in-lbs (17.5–19.8 N·m).
- (d) Make sure that the alignment pins (8) are engaged in the fan discharge air duct (7). Install the grooved clamps (6) on the core compartment cooling valve (1) flanges.
- (e) Torque the nuts of the grooved clamps (6) to 25 in-lbs (2.8 N·m).
- (f) With a small amount of force, hit the grooved clamps (6) with a plastic mallet at the outer circular area. Make sure all of the circular areas of the grooved clamps are engaged at:
 - The valve (1)
 - At the air duct (7)
 - The cooling manifold (5).
- (g) Torque the nuts of the grooved clamps (6) to 50 in-lbs (5.6 N·m).
- (h) With a small amount of force, hit the grooved clamps (6) with a plastic mallet at the outer circular area.
- (i) Torque the nuts of the grooved clamps (6) again to 50 in-lbs (5.6 N·m).
- (j) Connect the eleventh stage signal air tube (2). Torque the nut of the signal air tube to 270–300 in-lbs (30.5–33.9 N·m).

SUBTASK 75-25-04-420-003

NOTE: The steps that follow are for the engine after GE S/B 75-070, S/B 75-086 and S/B 75-116.

- (2) Install the core compartment cooling air valve (1) as follows: (IPC 75-23-50) (Figure 401)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1192, COMPOUND/ANTISEIZE (MIL-T-83483)

HAZMAT 1000, REFER TO MSDS

- (a) Apply a thin layer of anti-seize compound (C02-001) to the reducer fitting (3). Install the packing (4) on the reducer fitting (3). (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
- (b) Remove the protective caps from the valve (1), the air duct (7), the cooling manifold (5), and the eleventh stage signal air tube (2).
- (c) Install the reducer fitting (3) on the core compartment cooling valve (1). Torque the reducer fitting to 155–175 in-lbs (17.5–19.8 N·m).
- (d) Install the two E-seals (9) on the compartment cooling manifold (5) and the fan discharge air duct (7).
- (e) Install the grooved clamps (6) on the core compartment cooling valve (1) flanges.
- (f) Torque the nuts of the grooved clamps (6) to 25 in-lbs (2.8 N·m).
- (g) With a small amount of force, hit the grooved clamps (6) with a plastic mallet at the outer circular area. Make sure all of the circular areas of the grooved clamps are engaged at:
 - The valve (1)
 - At the air duct (7)
 - The cooling manifold (5).
- (h) Torque the nuts of the grooved clamps (6) to 50 inch-pounds (5.6 N·m).
- (i) With a small amount of force, hit the grooved clamps (6) with a plastic mallet at the outer circular area.
- (j) Torque the nuts of the grooved clamps (6) again to 50 in-lbs (5.6 N·m).
- (k) Connect the eleventh stage signal air tube (2). Torque the nut of the signal air tube to 270–300 in-lbs (30.5–33.9 N·m).

SUBTASK 75-25-04-720-002

- (3) Do the functional test of the core compartment cooling air valve. (MINIMUM AND APPROACH IDLE POWER (ADJ/TEST 02), TASK 71-00-00-700-803)

G. Job Close-up - Core Compartment Cooling Air Valve Installation

SUBTASK 75-25-04-942-001

- (1) Remove all the tools and equipment from the work area. Make sure that the area is clean.

SUBTASK 75-25-04-410-003

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

— END OF TASK —

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-25-04-000-802

4. REMOVAL OF THE CORE COMPARTMENT COOLING AIR VALVE SIGNAL AIR TUBE 40 MICRON FILTER

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 405

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No.1 and 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

REFERENCE	DESIGNATION
C04-035	Alcohol, Isopropyl

C. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - Core Compartment Cooling Air Valve Signal Air Tube 40 Micron Filter Removal

SUBTASK 75-25-04-010-275

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

E. Procedure - Core Compartment Cooling Air Valve Signal Air Tube 40 Micron Filter Removal

SUBTASK 75-25-04-020-269

- (1) Remove the core compartment cooling air valve signal air tube 40 micron filter as follows: (Figure 402)
- Disconnect the eleventh stage signal air tube (2) from the reducer fitting (3).
 - Disconnect the signal air tube reducer fitting (3) and preformed packing (4) from the housing of the CCCV air valve. Discard the preformed packing.
 - Remove the B-nut fitting from the CCCV air valve housing.
 - If the internal threads of the filter housing contain dirt, debris or contamination, remove them with compressed air or soft-hair brush.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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IF YOU INSERT THE HEX KEY INTO THE FILTER WITH TOO MUCH FORCE, IT CAN DAMAGE THE FILTER.

CAUTION

- (e) Remove the 40 micron filter (5) from the housing with a hex key 1/4 in. that you turn counterclockwise.
- (f) Clean or replace the 40 micron filter (5).
- 1) If you keep the filter, clean with compressed air to remove dirt and sand.



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1030, ISOPROPYL ALCOHOL (DPM 530)

HAZMAT 1000, REFER TO MSDS

- (g) Clean the B-nut fitting with compressed air and isopropyl alcohol. (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
- (h) Blow out the signal air tube with compressed air.
- (i) Install a protective cap into the filter housing and the signal air tube (2).

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

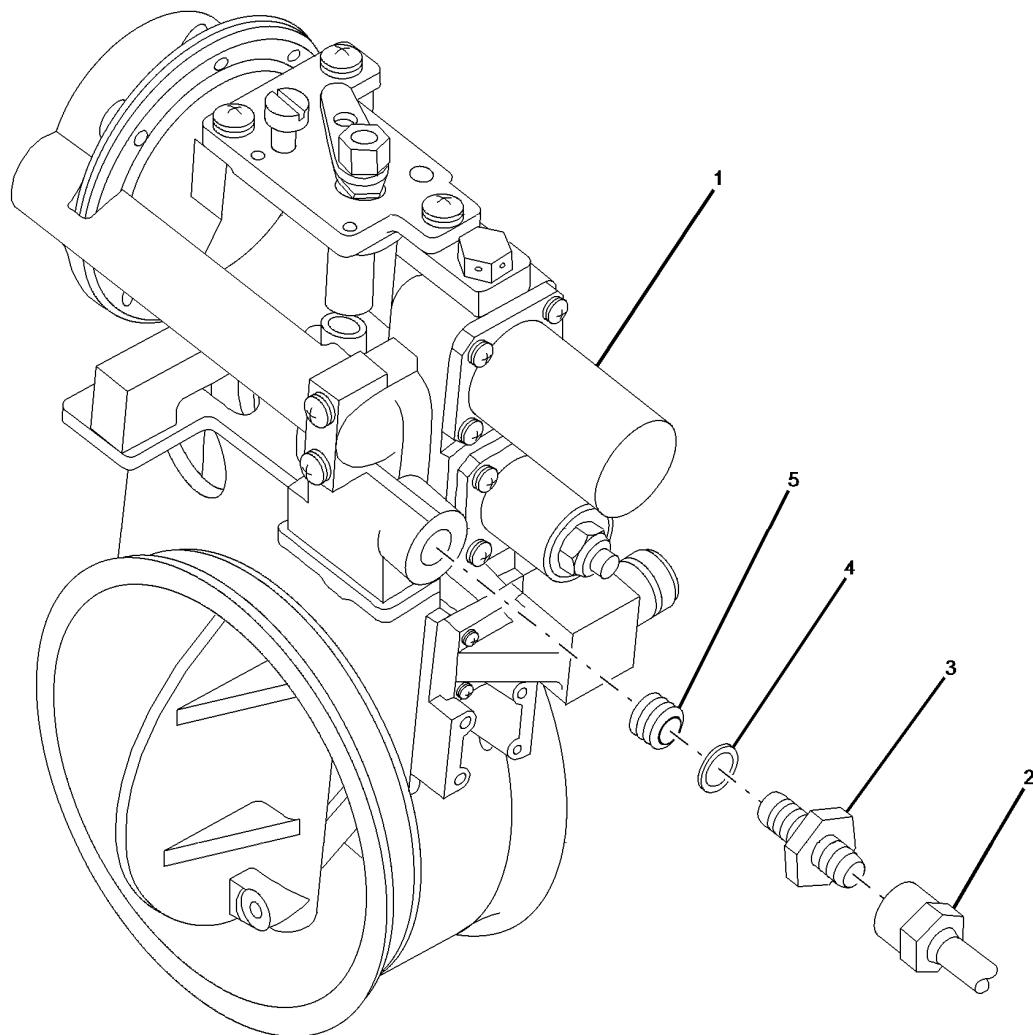
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LEGEND:

1. CORE COMPARTMENT COOLING VALVE
2. ELEVENTH STAGE SIGNAL AIR TUBE
3. REDUCER FITTING
4. PREFORMED PACKING
5. 40 MICRON FILTER

DB2-75-0362
S0000488798V1

Core Compartment Cooling Air Valve Signal Air Tube 40 Micron Filter
Figure 402/75-25-04-990-871

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-25-04-400-802

5. INSTALLATION OF THE CORE COMPARTMENT COOLING AIR VALVE SIGNAL AIR TUBE 40 MICRON FILTER

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 406

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No.1 and 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-350 in-lbs (0-39.5 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

REFERENCE	DESIGNATION
C02-019	Oil, engine lubricating

C. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)
71-00-00-700-809	ADJUSTMENT AND TEST PROCEDURES (P/B 501)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - Core Compartment Cooling Air Valve Signal Air Tube 40 Micron Filter Installation

SUBTASK 75-25-04-010-276

- (1) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

E. Procedure - Core Compartment Cooling Air Valve Signal Air Tube 40 Micron Filter Installation

SUBTASK 75-25-04-420-269

- (1) Install the core compartment Cooling Air Valve Signal Air Tube 40 Micron Filter as follows:
(Figure 402)
- (a) Remove the protective cap from the housing of the CCCV air valve.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-25-04

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IF YOU INSERT THE HEX KEY INTO THE FILTER WITH TOO MUCH FORCE, IT CAN DAMAGE THE FILTER.

- (b) Use hex key 1/4 in. to install the 40 micron filter (5) into the filter housing and turn clockwise.
- (c) Tighten the 40 micron filter (5) to 70 in-lb (8 N·m)-80 in-lb (9 N·m).



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

- WARNING** HAZARDOUS MATERIAL WARNINGS
HAZMAT 1016, OIL/LUBRICATING (DPM 3564)
HAZMAT 1000, REFER TO MSDS

- (d) Apply engine oil (C02-019) to a new preformed packing (4) and install it on the eleventh stage signal air tube reducer fitting (3). (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
- (e) Install the B-nut fitting into the CCCV filter housing.
- (f) Tighten the B-nut fitting to 70 in-lb (8 N·m)-80 in-lb (9 N·m).
- (g) Remove the protective cap from the eleventh stage signal air tube (2).
- (h) Install the eleventh stage signal air tube reducer fitting (3) in the housing of the CCCV filter.
- (i) Tighten the reducer fitting (3) to 70 in-lb (8 N·m)-80 in-lb (9 N·m).
- (j) Connect the eleventh stage signal air tube fitting to the reducer fitting (3).
- (k) Tighten the fitting to 180 in-lb (20.3 N·m)-200 in-lb (22.6 N·m).

SUBTASK 75-25-04-720-003

- (2) Do the applicable test(s) of the core compartment cooling air valve as shown in the adjustment and test procedures. (ADJUSTMENT AND TEST PROCEDURES, TASK 71-00-00-700-809)

F. Job Close-up - Core Compartment Cooling Air Valve Signal Air Tube 40 Micron Filter Installation

SUBTASK 75-25-04-942-269

- (1) Remove all the tools and equipment from the work area. Make sure that the area is clean.

SUBTASK 75-25-04-410-276

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ———

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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DUCT AND VALVE, NACELLE CORE COMPARTMENT COOLING - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instruction for the right and left nacelle core compartment cooling ducts and valves. The cooling ducts and valves are found on the inner barrel of the thrust reverser doors.
- B. Unless specified otherwise, this maintenance procedure is the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-25-04-000-868

2. REMOVAL OF THE RIGHT NACELLE CORE COMPARTMENT COOLING DUCT AND VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow:

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Protective caps and plugs
MS90376	Dust caps, electrical connector

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Right Nacelle Core Compartment Cooling Duct and Valve Removal

SUBTASK 75-25-04-010-268

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Right Nacelle Core Compartment Cooling Duct and Valve Removal

SUBTASK 75-25-04-020-267

- (1) Remove the right nacelle core compartment cooling duct spray bar (4) and nacelle cooling valve (2) as follows: (Figure 401)
 - (a) Remove the coupling (3) that connects the spray bar (4) to the nacelle cooling valve (2).
 - (b) Remove the nuts (18), washers (19), bolts (20), and clamps (8) that attach the spray bar (4) to the forward clamp bracket.
 - (c) Remove the nuts (7), washers (6), bolts (5), and clamps (9) that attach the spray bar (4) to the center and the aft clamp brackets.
 - (d) Remove the spray bar (4) from the nacelle cooling valve (2). Install the protective caps and plugs on the openings.
 - (e) Disconnect electrical connector (21) from the nacelle cooling valve (2). Install the dust caps on the connectors.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (f) Disconnect the tube segment (10) from the union (11) on the nacelle cooling valve (2).
- (g) Remove the union (11) from the nacelle cooling valve (2). Remove and discard the packing (17) from the union (11). Install protective caps and plugs on the openings.
- (h) Remove the coupling (3) that connects the nacelle cooling valve (2) to the nacelle cooling duct (1).
- (i) Remove the nuts (14), washers (13), and bolts (12) that attach the valve bracket on the top end to the mount bracket.
- (j) Remove the nuts (16) and washers (15) that attach the two studs on the lower end of the nacelle cooling valve (2) to the bracket.
- (k) Remove the nacelle cooling valve (2). Install the protective caps and plugs on the openings.

SUBTASK 75-25-04-410-267

- (2) If the right nacelle cooling valve (2) and spray bar (4) are not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

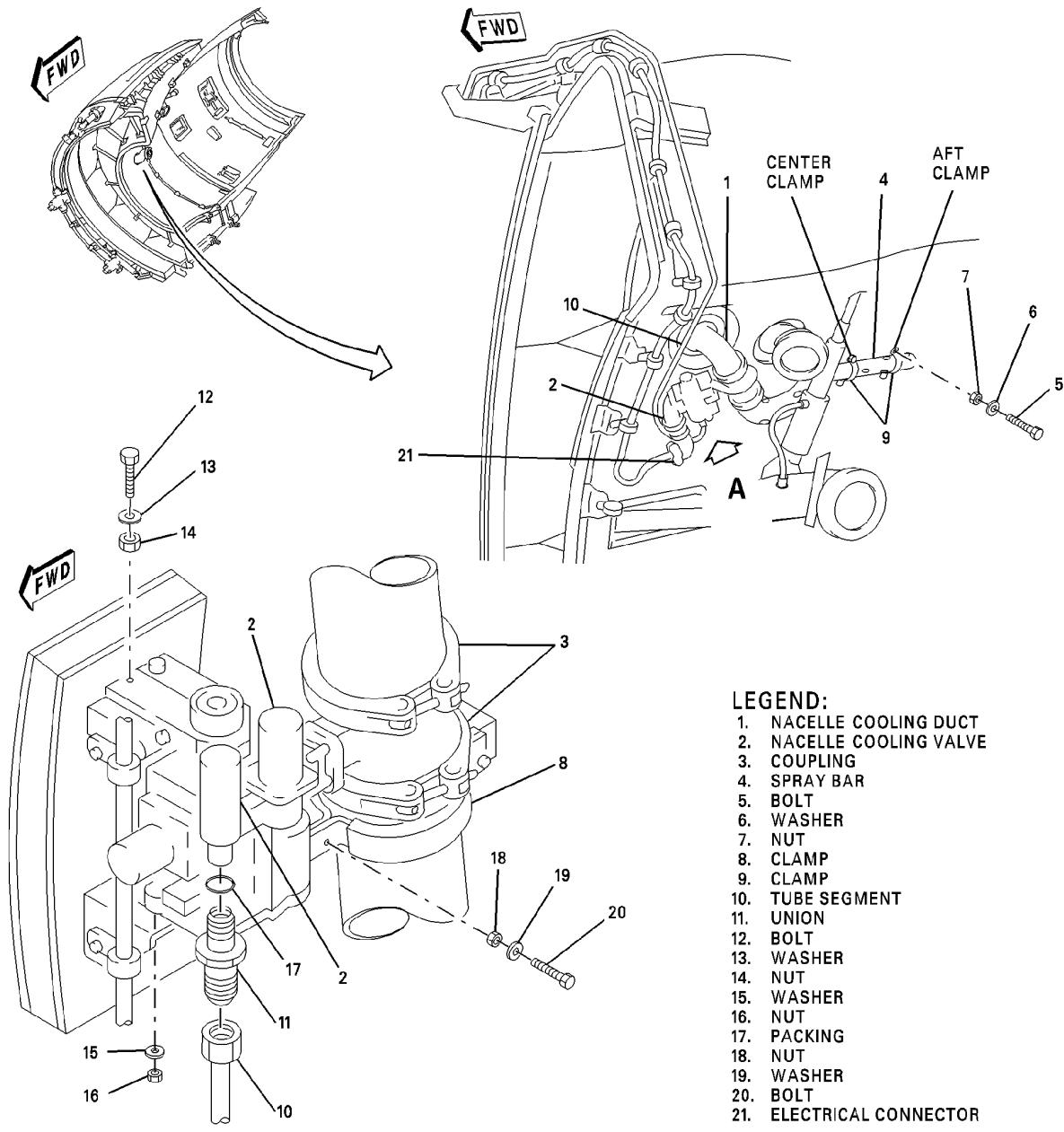
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CAG(IGDS)

VIEW A

DB2-75-0099B

Right Nacelle Cooling Duct And Valve Removal/Installation
Figure 401/75-25-04-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-25-04-400-868

3. INSTALLATION OF THE RIGHT NACELLE CORE COMPARTMENT COOLING DUCT AND VALVE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.22–2.44 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0–200 in-lb (0.0–23.0 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P06-020	Compound, antiseize

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE	DESIGNATION	IPC
17	Packing, preformed	IPC 75-25-10-10

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-25-10-10	Illustrated Parts Catalog

E. Job Set-up - Right Nacelle Core Compartment Cooling Duct and Valve Installation

SUBTASK 75-25-04-010-270

(1) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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F. Procedure - Right Nacelle Core Compartment Cooling Duct and Valve Installation

SUBTASK 75-25-04-420-267

- (1) Install the right nacelle core compartment cooling duct spray bar (4) and nacelle cooling valve (2) as follows: (Figure 401)

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1192, COMPOUND/ANTISEIZE (MIL-T-83483)

HAZMAT 1000, REFER TO MSDS

- (a) Remove the protective caps and plugs. Apply antiseize compound (P06-020) to the threads of the union (11). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (b) Install the union (11) and a packing (17) into the nacelle cooling valve (2). Torque the union 90–100 in-lb (10.2–11.3 N·m).
- (c) Remove the protective caps and plugs. Set the nacelle cooling valve (2) in position on the nacelle cooling duct (1).
- (d) Attach the two studs to the bracket with the washers (15) and nuts (16). Torque the nuts to 20–25 in-lb (2.3–2.8 N·m).
- (e) Attach the nacelle cooling valve (2) to the top mount brackets with the bolts (12), washers (13), and nuts (14). Torque the nuts to 50–70 in-lb (5.6–7.9 N·m).
- (f) Connect the nacelle cooling duct (1) to the nacelle cooling valve (2) with a coupling (3). Torque the coupling to 50 in-lb (5.6 N·m).
- (g) Apply antiseize compound (P06-020) to the coupling nut threads of the tube segment (10). Attach it to the union (11) on the nacelle cooling valve (2). Torque the coupling nut to 135–150 in-lb (15.3–16.9 N·m).
- (h) Remove the dust caps. Install the electrical connector (21) on the nacelle cooling valve (2).
- (i) Remove the protective caps and plugs. Put the spray bar (4) through the forward clamp bracket on the inner barrel structure and set it on the nacelle cooling valve (2).
- (j) Connect the spray bar (4) to the nacelle cooling valve (2) with the coupling (3). Do not fully torque the coupling at this time.
- (k) Attach the spray bar (4) to the forward clamp bracket with two clamps (8), bolts (20), washers (19), and nuts (18). Do not fully torque the nuts at this time.
- (l) Attach the spray bar (4) to the center and aft clamp brackets with four clamps (9), bolts (5), washers (6), and nuts (7). Do not fully torque the nuts at this time.
- (m) Torque the couplings (3) to 50 in-lb (5.6 N·m).
- (n) Torque the nuts (7 and 18) to 50–70 in-lb (5.6–7.9 N·m).

G. Job Close-up - Right Nacelle Core Compartment Cooling Duct and Valve Removal/Installation

SUBTASK 75-25-04-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-25-04-410-275

- (2) Close left and right thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

END OF TASK

TASK 75-25-04-000-869

4. REMOVAL OF THE LEFT NACELLE CORE COMPARTMENT COOLING DUCT AND VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 405

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Protective caps and plugs
MS90376	Dust caps, electrical connector

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Left Nacelle Core Compartment Cooling Duct and Valve Removal

SUBTASK 75-25-04-010-272

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Left Nacelle Core Compartment Cooling Duct and Valve Removal

SUBTASK 75-25-04-020-268

- (1) Remove the left nacelle core compartment cooling duct (1) and nacelle cooling valve (2) as follows: (Figure 402) (Figure 403)
- Remove the coupling (3) that connects the spray bar (4) to the nacelle cooling valve (2).
 - Remove the nuts (5), washers (6), bolts (7), and clamps (8) that attach the spray bar (4) to the top clamp bracket.
 - Remove the bolts (9), washers (10), clamp (12), and shims (11) that attach the clip (13) and spray bar (4) to the inner barrel.
 - Remove the collars (14), washers (16) and shims (15) from the pins (17) that attach the clips (13) and clamps (18) to the inner barrel.
 - Remove the spray bar (4) from the nacelle cooling valve (2). Install protective caps and plugs on the openings.
 - Disconnect electrical connector (32) from the nacelle cooling valve (2). Install the dust caps on the connectors.
 - Disconnect the tube segment (19) from the union (20) on the nacelle cooling valve (2).

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (h) Remove the union (20) from the nacelle cooling valve (2). Remove and discard the packing (21). Install protective caps and plugs on the openings.
- (i) Remove the coupling (3) that connects the nacelle cooling duct (1) to the nacelle cooling valve (2).
- (j) Remove the nuts (22), washers (23), and bolts (24) that attach the lower end of the nacelle cooling valve (2) to the mount bracket.
- (k) Remove the nut (25) and washer (26) that attach the stud on the top end of the nacelle cooling valve (2) to the bracket.
- (l) Remove the nacelle cooling valve (2). Install protective caps and plugs on the openings.
- (m) Remove the coupling (27) that connects the nacelle cooling duct (1) to the precooler duct.
- (n) Remove the nuts (28), washers (29), bolts (30), and clamps (31) that attach the nacelle cooling duct (1) to the lower clamp bracket.
- (o) Remove the nacelle cooling duct (1). Install protective caps and plugs on the openings.

SUBTASK 75-25-04-410-271

- (2) If the left nacelle cooling duct (1) and nacelle cooling valve (2) are not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ———

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

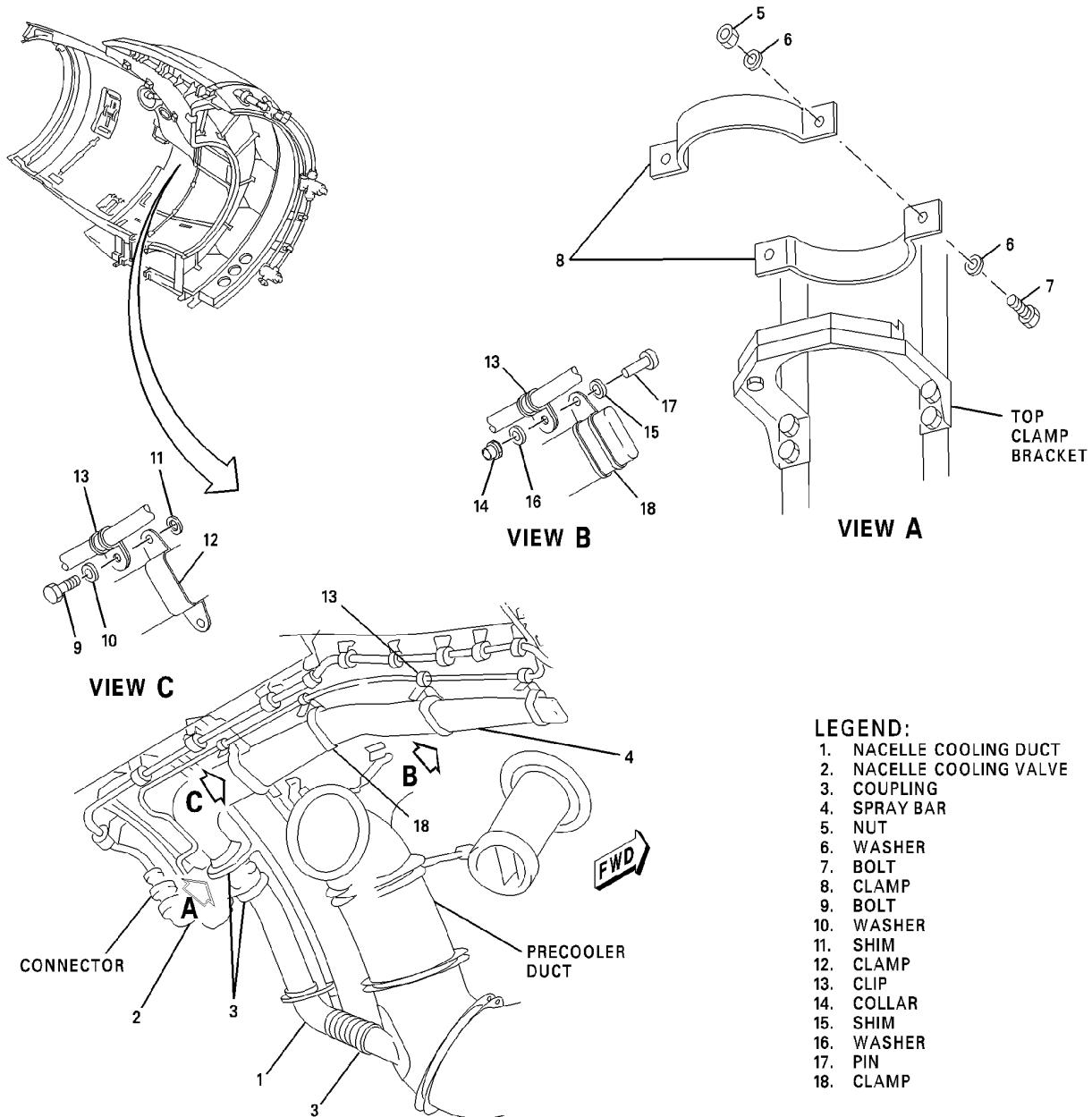
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Left Nacelle Cooling Duct and Valve Removal/Installation
Figure 402/75-25-04-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

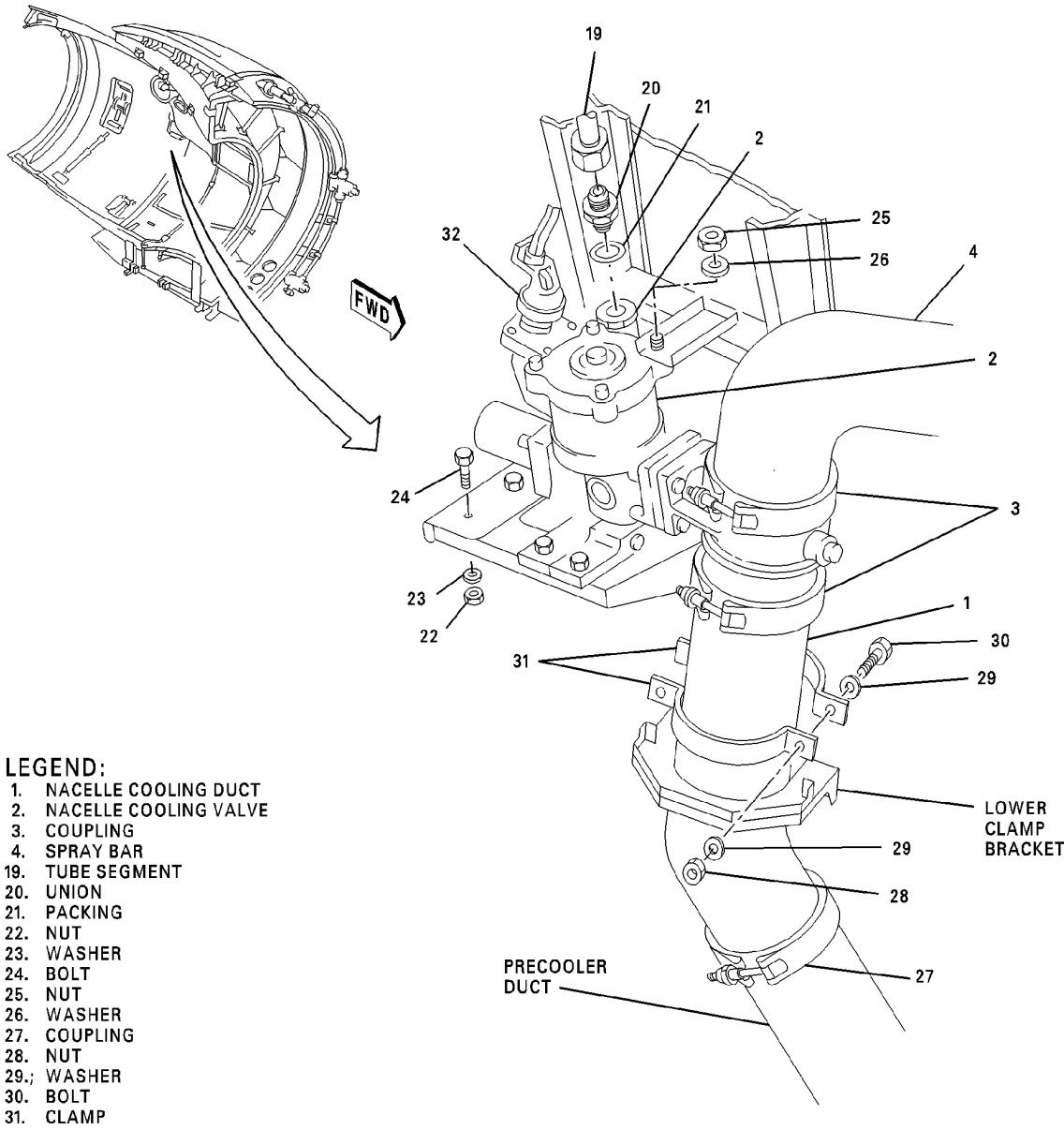
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Left Nacelle Cooling Duct and Valve Removal/Installation
Figure 403/75-25-04-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-25-04-400-869

5. INSTALLATION OF THE LEFT NACELLE CORE COOLING COMPARTMENT DUCT AND VALVE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 406

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.20–2.40 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–200 in-lb (0–34.0 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 407

REFERENCE	DESIGNATION
P06-020	Compound, anti-seize

C. Expendable Parts

(1) Expendable Parts

Table 408

REFERENCE	DESIGNATION	IPC
21	Packing, preformed	IPC 75-25-00-10

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-25-00-10	Illustrated Parts Catalog

E. Job Set-up - Left Nacelle Core Compartment Cooling Duct and Valve Installation

SUBTASK 75-25-04-010-274

(1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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F. Procedure - Left Nacelle Core Compartment Cooling Duct and Valve Installation

SUBTASK 75-25-04-420-268

- (1) Install the left nacelle core compartment cooling duct (1) and nacelle cooling valve (2) as follows: (Figure 402) (Figure 403)
 - (a) Remove the protective caps and plugs. Install the nacelle cooling duct (1) through the lower clamp bracket on the inner barrel and set it on the precooler duct.
 - (b) Attach the nacelle cooling duct (1) to the lower clamp bracket with two clamps (31), two bolts (30), four washers (29), and two nuts (28). Do not fully torque the nuts at this time.
 - (c) Connect the nacelle cooling duct (1) to the precooler duct with the coupling (27). Do not fully torque the coupling at this time.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1192, COMPOUND/ANTISEIZE (MIL-T-83483)

HAZMAT 1000, REFER TO MSDS

- (d) Remove the protective caps and plugs. Apply antiseize (P06-020) to the threads of the union (20). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (e) Install the union (20) and packing (21) in the nacelle cooling valve (2). Torque the union to 90–100 in-lb (10.2–11.3 N·m).
- (f) Remove the protective caps and plugs. Set the nacelle cooling valve (2) in position on the nacelle cooling duct (1).
- (g) Attach the stud to the bracket with a washer (26) and nut (25). Torque the nut to 20–25 in-lb (2.3–2.9 N·m).
- (h) Attach the nacelle cooling valve (2) to the lower mount brackets with two bolts (24), washers (23), and nuts (22). Torque the nuts to 50–70 in-lb (5.6–7.9 N·m).
- (i) Remove the protective caps and plugs. Apply antiseize compound (P06-020) to the coupling nut threads of the tube segment (19).
- (j) Attach the tube segment (19) to the union (20) on the nacelle cooling valve (2). Torque the nut on the tube segment (19) to 135–150 in-lb (15.3–16.9 N·m).
- (k) Remove the dust caps. Connect electrical connector (32) on to the nacelle cooling valve (2).
- (l) Remove the protective caps and plugs. Connect the nacelle cooling duct (1) to the nacelle cooling valve (2) with the coupling (3). Do not fully torque the coupling at this time.
- (m) Remove the protective caps and plugs. Put the spray bar (4) through the top clamp bracket on the inner barrel structure and set it on the nacelle cooling valve (2).
- (n) Connect the spray bar (4) to the nacelle cooling valve (2) with the coupling (3). Do not fully torque the coupling at this time.
- (o) Attach the spray bar (4) to the top clamp bracket with two clamps (8), two bolts (7), four washers (6), and two nuts (5). Do not fully torque the nuts at this time.
- (p) Attach the spray bar (4) and a clip (13) to the bracket on the inner barrel structure with shims (11), a clamp (12), washers (10), and bolts (9).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (q) Adjust the shims (11) to keep a clearance of 0.050–0.125 in. (1.3–3.2 mm) between the spray bar (4) and the z-frame. Torque the bolts (9) to 20–25 in-lb (2.3–2.8 N·m).
NOTE: The maximum thickness allowed for the shims is 0.25 in. (6.3 mm).
- (r) Attach the spray bar (4) and clips (13) to the inner barrel structure pins (17), shims (16), clamps (18), washers (15), and collars (14).
NOTE: Do not install more than one shim for each fastener.
- (s) Torque the couplings (3 and 27) to 50 in-lb (5.6 N·m).
- (t) Torque the nuts (5 and 28) to 50–70 in-lb (5.6–7.9 N·m).

G. Job Close-up - Left Core Compartment Cooling Duct and Valve Installation

SUBTASK 75-25-04-942-268

- (1) Remove all the tools and equipment from the work area. Make sure that the area is clean.

SUBTASK 75-25-04-410-273

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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TUBING, LEFT NACELLE CORE COMPARTMENT COOLING PNEUMATIC - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the left nacelle core compartment cooling pneumatic tubing. Access to the tubing is through the left thrust-reverser door.
- B. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-25-05-000-868

2. REMOVAL OF THE LEFT NACELLE CORE COMPARTMENT COOLING PNEUMATIC TUBING

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Left Nacelle Core Compartment Cooling Pneumatic Tubing Removal

SUBTASK 75-25-05-010-268

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-25-05-865-010



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Open these circuit breakers and install safety tags:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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D. Procedure - Left Nacelle Core Compartment Cooling Pneumatic Tubing Removal

SUBTASK 75-25-05-030-267

- (1) Remove the left nacelle core compartment cooling pneumatic tube segments (3, 4, 6, 16, 26, 43 and 52) as follows: (Figure 401) (Figure 404) (Figure 405)
 - (a) For the No. 1 and the No. 3 engines, disconnect the hose coupling nuts (1) from the pylon interface (2) and from the tube segment (3).
 - (b) Remove the hose (4). Install the protective caps and plugs.
 - (c) For the No. 2 engine, disconnect the hose coupling nuts (5) from the pylon interface (2) and from the tube segment (3).
 - (d) Remove the hose (6). Install the protective caps and plugs.
 - (e) Disconnect the two hose coupling nuts (7) from the two elbows (8).
 - (f) Remove the two nuts (9), the two washers (10) and the two bolts (11) and the two clamps (12) that attach the tube segment (3) to the bracket (13).
 - (g) Remove the tube segment (3). Install the protective caps and plugs.
 - (h) Disconnect the two hose coupling nuts (14) from the two elbows (8 and 15).
 - (i) Remove the hose (16). Install the protective caps and plugs.
 - (j) Remove the four screws (17) that attaches the seal block cover (18) to the seal block (19).
 - (k) Remove the seal block cover (18).
 - (l) Disconnect the coupling nuts (20) from the elbow (15) and the union (21). (Figure 403)
 - (m) Remove the nut (22), the washer (23), the bolt (24) and the clamp (25) that attaches the tube segment (26) to the bracket (27).
 - (n) Remove the nut (28), the washer (29), the bolt (30) and the clamp (31) that attaches the tube segment (26) to the clip (32).
 - (o) Remove the bolt (33) and the clamp (34) that attaches the tube segment (26) to the thrust-reverser upper bifurcation duct wall (35).
 - (p) Remove the tube segment (26). Install the protective caps and plugs.
 - (q) Remove the union (21) from the coupling nut (36). Install the protective caps and plugs.
 - (r) Disconnect the coupling nut (37) from the union (38).
 - (s) Remove the three nuts (39), the three washers (40), the three bolts (41) and the three clamps (42). Disconnect the tube segment (43) from the clips (44).
 - (t) Remove the tube segment (43). Install the protective caps and plugs.
 - (u) Remove the union (38) from the coupling nut (45). Install the protective caps and plugs.
 - (v) Disconnect the coupling nut (46) from the nacelle cooling valve (47).
 - (w) Remove the two nuts (48), the two washers (49), the two bolts (50) and the two clamps (51). Disconnect the tube segment (52) from the brackets (53).
 - (x) Remove the tube segment (52). Install the protective caps and plugs.

SUBTASK 75-25-05-410-267

- (2) If the left nacelle core compartment cooling pneumatic tubing is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-25-05

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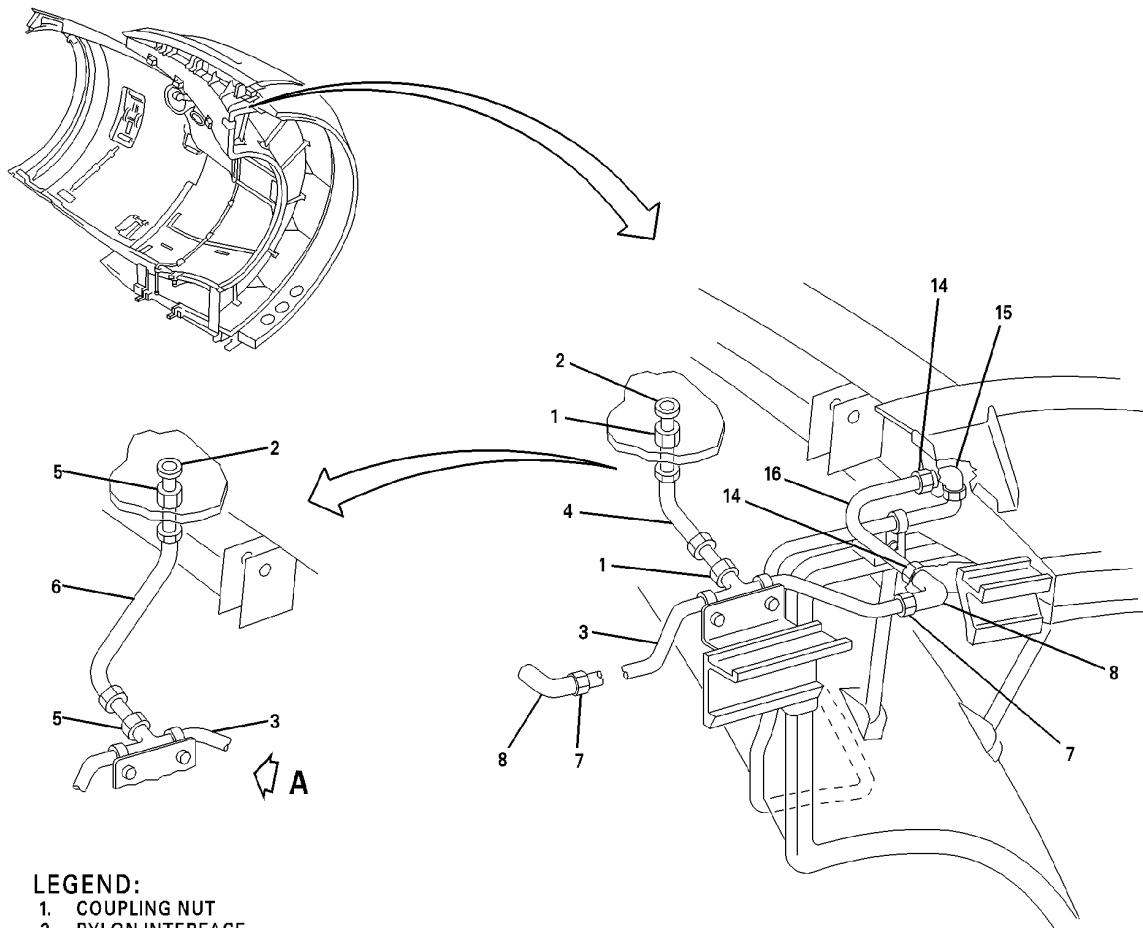
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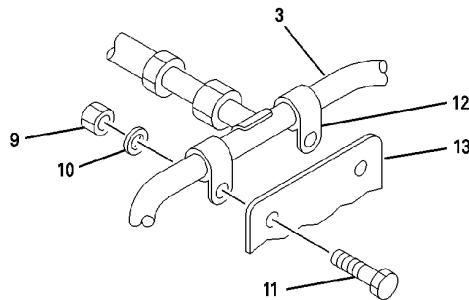


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LEGEND:

- 1. COUPLING NUT
- 2. PYLON INTERFACE
- 3. TUBE SEGMENT
- 4. HOSE SEGMENT
- 5. COUPLING NUT
- 6. HOSE SEGMENT
- 7. COUPLING NUT
- 8. ELBOW
- 9. NUT
- 10. WASHER
- 11. BOLT
- 12. CLAMP
- 13. BRACKET
- 14. COUPLING NUT
- 15. ELBOW
- 16. HOSE SEGMENT



CAG(IGDS)

VIEW A

DB2-75-0070

Left Nacelle Pneumatic Cooling Tubing - Removal/Installation
Figure 401/75-25-05-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

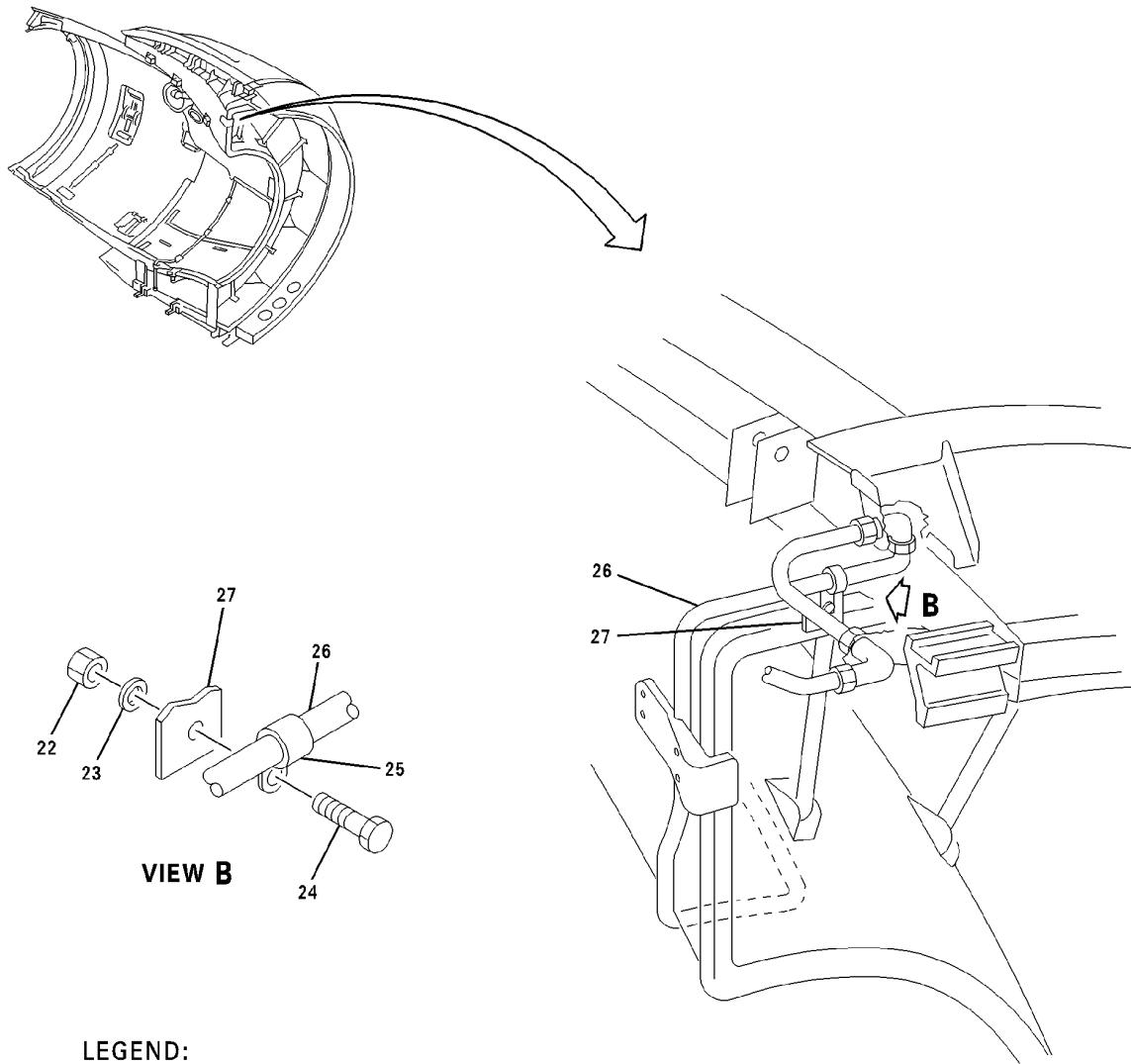
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LEGEND:

- 22. NUT
- 23. WASHER
- 24. BOLT
- 25. CLAMP
- 26. TUBE SEGMENT
- 27. BRACKET

CAG(IGDS)

DB2-75-0075

Left Nacelle Pneumatic Cooling Tubing - Removal/Installation
Figure 402/75-25-05-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

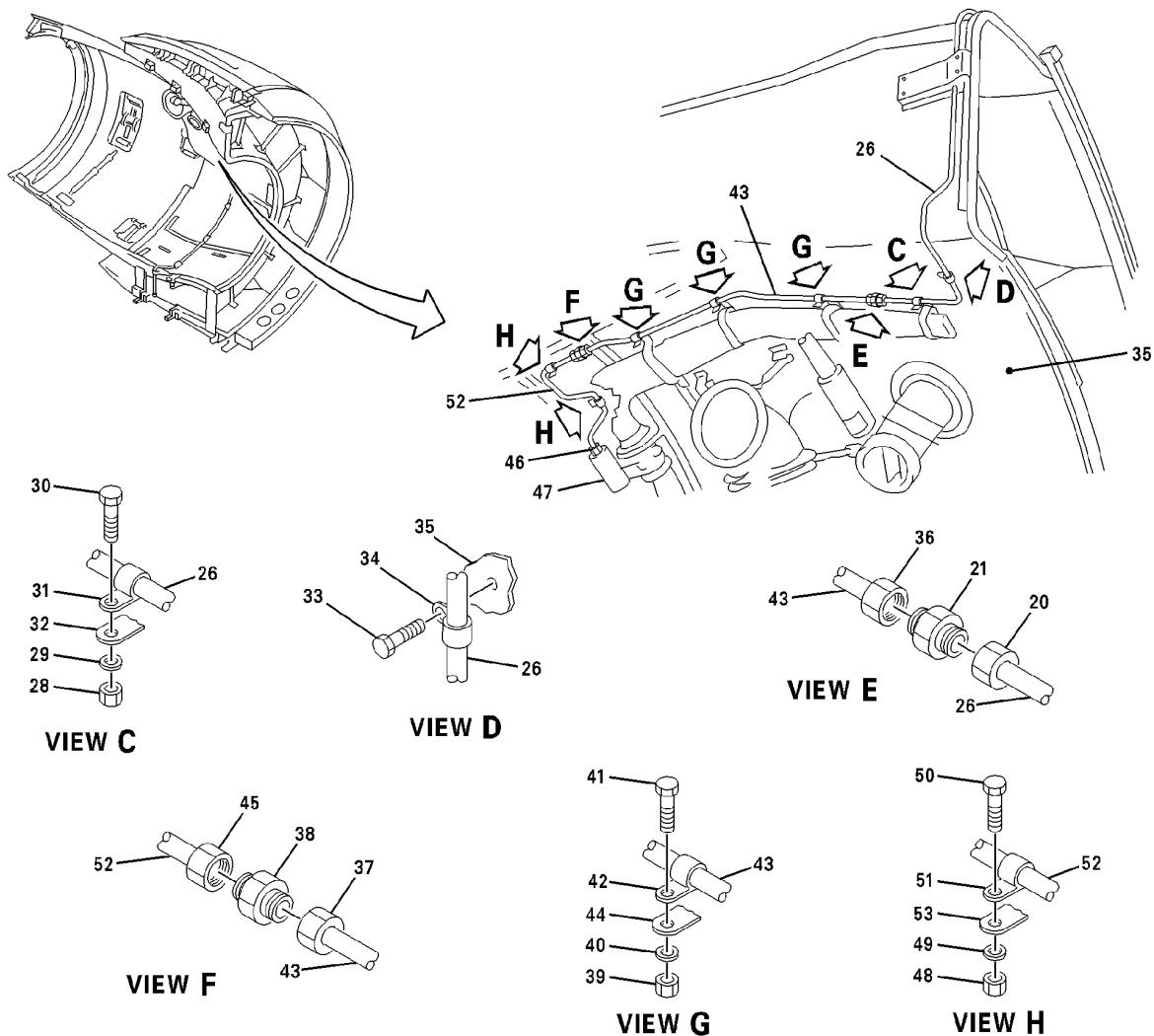
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LEGEND:

- | | | |
|------------------|---------------------------|---------------------------|
| 20. COUPLING NUT | 35. BIFURCATION DUCT WALL | 45. COUPLING NUT |
| 21. UNION | 36. COUPLING NUT | 46. COUPLING NUT |
| 26. TUBE SEGMENT | 37. COUPLING NUT | 47. NACELLE COOLING VALVE |
| 28. NUT | 38. UNION | 48. NUT |
| 29. WASHER | 39. NUT | 49. WASHER |
| 30. BOLT | 40. WASHER | 50. BOLT |
| 31. CLAMP | 41. BOLT | 51. CLAMP |
| 32. CLIP | 42. CLAMP | 52. TUBE SEGMENT |
| 33. BOLT | 43. TUBE SEGMENT | 53. BRACKET |
| 34. CLAMP | 44. CLIP | |

CAG(IGDS)

DB2-75-0076

Left Nacelle Pneumatic Cooling Tubing - Removal/Installation
Figure 403/75-25-05-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

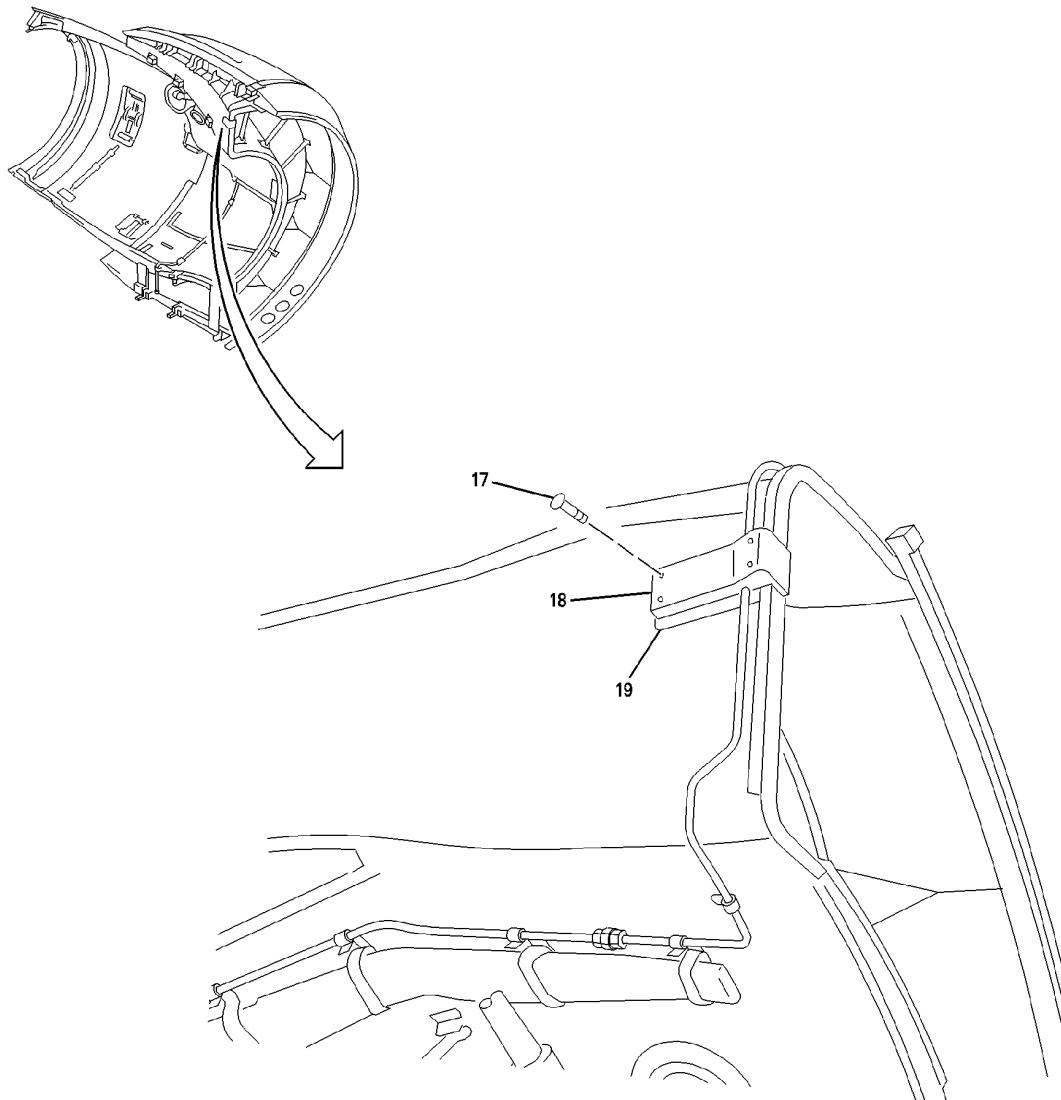
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LEGEND:

- 17. SCREW
- 18. SEAL BLOCK COVER
- 19. SEAL BLOCK

CAG(IGDS)

DB2-75-0071

Left Nacelle Pneumatic Cooling Tubing - Removal/Installation
Figure 404/75-25-05-990-871

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

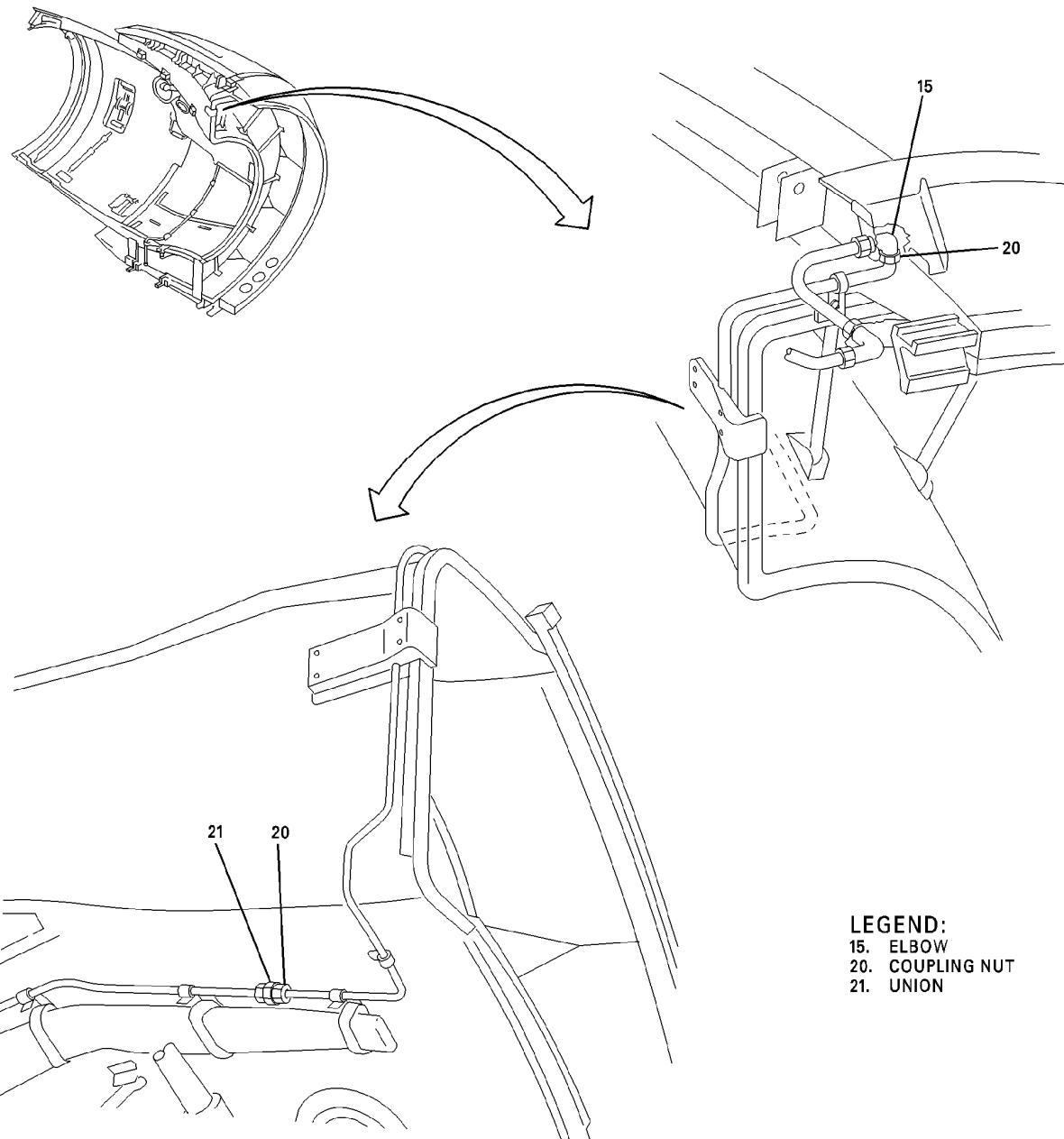
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LEGEND:
15. ELBOW
20. COUPLING NUT
21. UNION

CAG(IGDS)

DB2-75-0074

Left Nacelle Pneumatic Cooling Tubing - Removal/Installation
Figure 405/75-25-05-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-25-05-400-868

3. INSTALLATION OF THE LEFT NACELLE CORE COMPARTMENT COOLING PNEUMATIC TUBING

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–100 in–lb (0–11.3 N·m)
Not specified	Torque wrench 0–300 in–lb (0–33.9 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P05-191	Tape, electrical insulating, self adhering, high temperature
P06-020	Lubricant, bolt (PMC 9866) (MIL-L-25681)
P09-001	Sealant, silicone with catalyst (DC-90-006-2)

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-25-00	Illustrated Parts Catalog

D. Job Set-up - Left Nacelle Core Compartment Cooling Pneumatic Tubing Installation

SUBTASK 75-25-05-010-270

- (1) Open the left thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-25-05-865-013



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE

CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY
TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Make sure that these circuit breakers are open and have safety tags:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

E. Procedure - Left Nacelle Core Compartment Cooling Pneumatic Tubing Installation

SUBTASK 75-25-05-420-267

- (1) Install the left nacelle core compartment pneumatic cooling tube segments (3, 4, 6, 16, 26, 43, and 52) as follows: (IPC 75-25-00) (Figure 401) (Figure 404) (Figure 405)
- (a) Remove the protective caps and plugs from the coupling nuts (45 and 46).



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1023, GREASE/THREAD COMPOUND LUBRICATING (DPM 376)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the coupling nut threads (45 and 46) with the bolt lubricant (P06-020). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Remove the protective caps and plugs from the nacelle cooling valve (47).
- (d) Connect the tube segment (52) to the nacelle cooling valve (47). Tighten the coupling nut (46) with your hand.
- (e) Install the two clamps (51) on the tube segment (52).
- (f) Connect the two clamps (51) to the brackets (53). Install the two bolts (50), the two washers (49) the two nuts (48). Tighten the nuts with your hand.
- (g) Remove the protective caps and plugs from the union (38).
- (h) Connect the union (38) to the coupling nut (45). Tighten the union and the coupling nut with your hand.
- (i) Remove the protective caps and plugs from the coupling nut (37).
- (j) Lubricate the coupling nut threads (37) with the bolt lubricant (P06-020).
- (k) Connect the tube segment (43) to the union (38). Tighten the coupling nut (37) with your hand.
- (l) Install the three clamps (42) on the tube segment (43).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (m) Connect the three clamps (42) to the clips (44). Install the three bolts (41), the three washers (40) the three nuts (39) Tighten the nuts with your hand.
- (n) Remove the protective caps and plugs from the coupling nut (36).
- (o) Lubricate the coupling nut threads (36) with the bolt lubricant (P06-020).
- (p) Connect the union (21) to the tube segment (43). Tighten the coupling nut (36) and the union with your hand.
- (q) Remove the protective caps and plugs from the coupling nuts (20) and the elbow (15). (Figure 403)
- (r) Lubricate the coupling nut threads (20) with the bolt lubricant (P06-020).
- (s) Connect the tube segment (26) to the union (21) and the elbow (15). Tighten the coupling nuts (20) with your hand.
- (t) Spiral wrap the tube segment (26) with the tape (P05-191) where the tube segment goes through the seal block (19) and the seal block cover (18). (Figure 402) (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (u) Install the three clamps (25, 31 and 34) on the tube segment (26).
 - 1) Connect the clamp (31) to the clip (32). Install the bolt (30), the washer (29) and the nut (28) tighten the nut (28) with your hand.
 - 2) Connect the clamp (34) to the thrust-reverser upper bifurcation duct wall (35). Install the bolt (33). Tighten the bolt with your hand.
 - 3) Connect the clamp (25) to the bracket (27). Install the bolt (24), the washer (23) the nut (22). Tighten the nut with your hand.
- (v) Torque the coupling nuts (45 and 46) to 135–150 in-lb (15.3–16.9 N·m).
- (w) Torque the coupling nuts (20, 36 and 37) to 170–200 in-lb (19.2–23.0 N·m).
- (x) Torque the clamp nuts (22 and 28) to 20–25 in-lb (2.3–2.8 N·m).
- (y) Torque the thrust-reverser upper bifurcation duct wall clamp bolt (33) to 20–25 in-lb (2.3–2.8 N·m).
- (z) Connect the seal block cover (18) to the seal block (19) with the four screws (17). Torque the screws to 12–15 in-lb (1.0–2.0 N·m).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1148, SEALANT/SILICONE (DMS QPL 1799)

HAZMAT 1000, REFER TO MSDS

- (aa) Apply the sealant (P09-001) into the block (18 and 19) empty space. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (ab) Remove the protective caps and plugs from the coupling nuts (14) and the elbows (8 and 15).
- (ac) Lubricate the coupling nut threads (14) with the bolt lubricant (P06-020).
- (ad) Connect the hose (16) to the elbows (8 and 15). Torque the coupling nuts (14) to 170–200 in-lb (19.0–23.0 N·m).
- (ae) Remove the protective caps and plugs from the coupling nuts (7) and the elbows (8).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (af) Lubricate the coupling nut threads (7) with the bolt lubricant (P06–020).
- (ag) Connect the tube segment (3) to the elbows (8). Tighten the coupling nuts (7) with your hand.
- (ah) Install the two clamps (12) on the tube segment (3).
- (ai) Connect the two clamps (12) to the bracket (13) with the two bolts (11), the two washers (10) and the two nuts (9). Tighten the nuts with your hand.
- (aj) Torque the coupling nuts (7) to 170–200 in–lb (19.0–23.0 N·m).
- (ak) Torque the clamp nuts (9) to 20–25 in–lb (2.3–2.8 N·m).
- (al) For the No. 1 and the No. 3 engine, remove the protective caps and plugs from the coupling nuts (1), the pylon interface connection (2), and the tube segment (3).
- (am) Lubricate the coupling nut threads (1) with the bolt lubricant (P06–020).
- (an) Connect the hose segment (4) to the pylon interface connection (2) and the tube segment (3).
- (ao) Torque the coupling nuts (1) to 170–200 in–lb (19.0–23.0 N·m).
- (ap) For the No. 2 engine, remove the protective caps and plugs from the coupling nuts (5), the pylon interface connection (2), and the tube segment (3).
- (aq) Lubricate the coupling nut threads (5) with the bolt lubricant (P06–020).
- (ar) Connect the hose segment (6) to the pylon interface connection (2) and the tube segment (3).
- (as) Torque the coupling nut (5) to 170–200 in–lb (19.0–23.0 N·m).

F. Job Close-up - Left Nacelle Core Compartment Cooling Pneumatic Tubing Installation

SUBTASK 75-25-05-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-25-05-410-269

- (2) Close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-25-05-865-012

- (3) Remove the safety tags and close these circuit breakers:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-25-05

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RELAYS, NACELLE COOLING SYSTEM – REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the nacelle cooling system relays. Access to the relays is through the left fan-cowl door.
- B. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460 engines on the MD-11 aircraft.

TASK 75-25-06-000-868

2. REMOVAL OF THE NACELLE COOLING SYSTEM RELAYS

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-868	OPEN THE FAN COWL DOORS (P/B 201)
71-10-00-410-868	CLOSE THE FAN COWL DOORS (P/B 201)

C. Job Set-up - Nacelle Cooling System Relays Removal

SUBTASK 75-25-06-010-269

- (1) Open the fan-cowl doors. (OPEN THE FAN COWL DOORS, TASK 71-10-00-010-868)

D. Procedure - Nacelle Cooling System Relays Removal

SUBTASK 75-25-06-020-267

- (1) Remove the nacelle cooling system relays (1) as follows: (Figure 401)
 - (a) Remove the eight screws (2) and the eight washers (3) and remove the J-box cover (4) from the J-box (5).
 - (b) Remove the two nuts (6) and the two washers (7) from each relay (1).
 - (c) Remove the two relays (1) from the two electrical receptacles (8).

NOTE: To correct a NAC COOL VLV POSITION fault caused by defective relays, replacement of the two relays is recommended.

- (d) Install protective caps or plugs on the two relays (1) and the electrical receptacles (8).

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-25-06-410-267

- (2) If the nacelle cooling system relays are not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSE THE FAN COWL DOORS, TASK 71-10-00-410-868)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

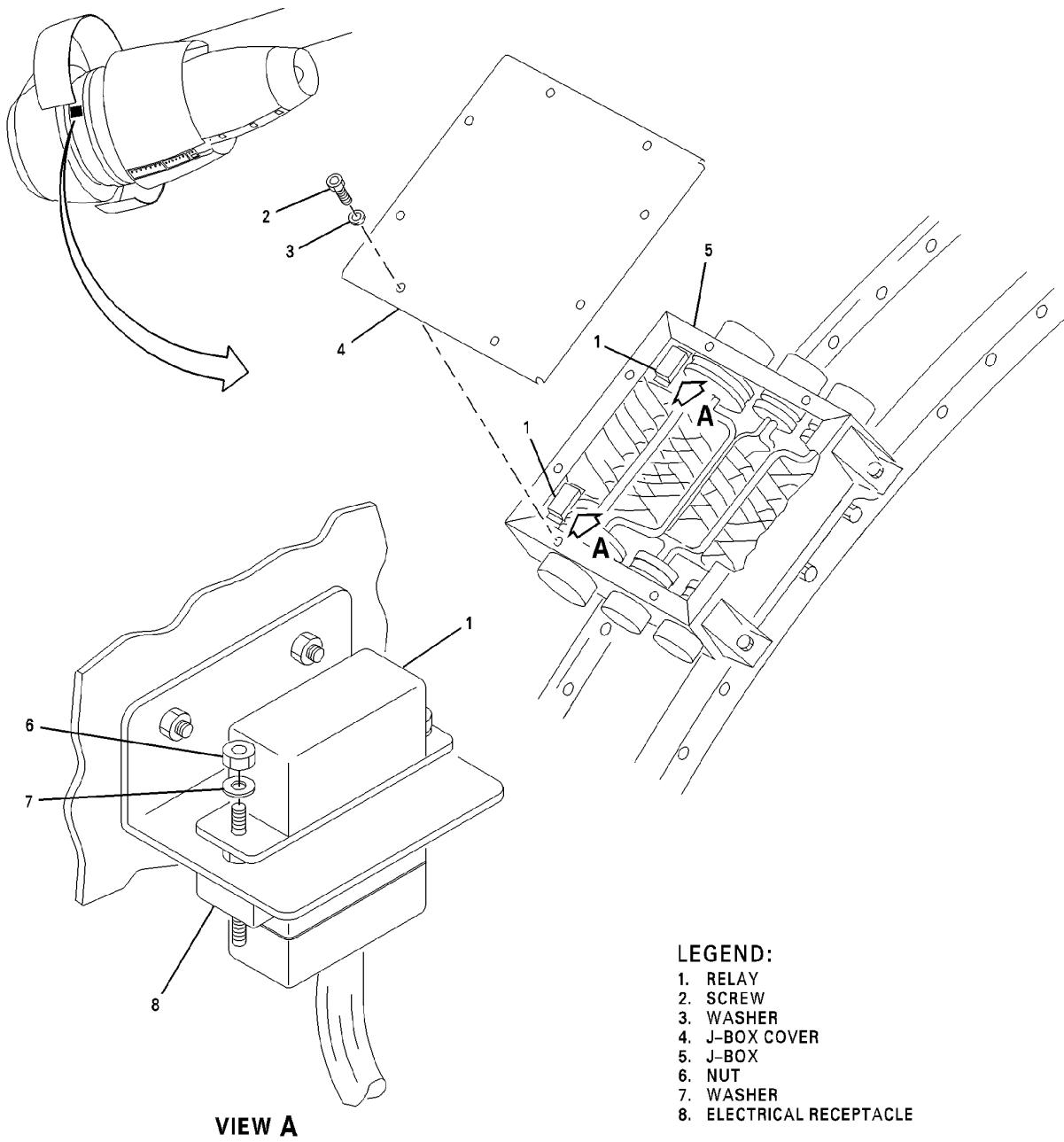
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CAG(IGDS)

DB2-75-0246A

Nacelle Cooling System Relays Removal/Installation
Figure 401/75-25-06-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-25-06-400-868

3. INSTALLATION OF THE NACELLE COOLING SYSTEM RELAYS

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-30 in-lb (0-3.4 N·m)

B. References

Reference	Title
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)
71-10-00-010-868	OPEN THE FAN COWL DOORS (P/B 201)
71-10-00-410-868	CLOSE THE FAN COWL DOORS (P/B 201)

C. Job Set-up - Nacelle Cooling System Relays Installation

SUBTASK 75-25-06-010-270

- (1) If necessary, open the fan-cowl doors. (OPEN THE FAN COWL DOORS, TASK 71-10-00-010-868)

D. Procedure - Nacelle Cooling System Relays Installation

SUBTASK 75-25-06-420-267

- (1) Install the nacelle cooling system relays (1) as follows:

- Remove the protective caps or plugs on the two relays (1) and the electrical receptacles (8).
- Put the two relays (1) on the two electrical receptacles (8) in the J-box (5).
- Install the two washers (7) and the two nuts (6) on each relay (1). Torque the nuts (6) to 2-3 in-lb (0.23–0.34 N·m).
- Align the J-box cover (4) on the J-box (5) and install the eight screws (2) and the eight washers (3). Torque the screws (2) to 22.5–25.0 in-lb (2.54–2.83 N·m).

E. Job Close-up - Nacelle Cooling System Relays Installation

SUBTASK 75-25-06-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-25-06-410-270

- (2) Close the fan-cowl doors. (CLOSE THE FAN COWL DOORS, TASK 71-10-00-410-868)

SUBTASK 75-25-06-741-268

- (3) Do the electronic engine control idle test (ADJ/TEST 06). (ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873)

———— END OF TASK ————

— EFFECTIVITY —

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-25-06

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AIRCRAFT MAINTENANCE MANUAL

MANIFOLD, CORE COMPARTMENT COOLING AIR - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the core compartment cooling air manifold. The core compartment cooling air manifold is on the right side of the engine.
- B. Unless different instructions are given, these procedures are the same for the three CF6-80C2 engines.

TASK 75-25-07-000-801

2. REMOVAL OF THE CORE COMPARTMENT COOLING AIR MANIFOLD

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Core Compartment Cooling Air Manifold Removal

SUBTASK 75-25-07-010-001

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

D. Procedure - Core Compartment Cooling Air Manifold Removal

SUBTASK 75-25-07-020-001

- (1) Remove the core compartment cooling air manifold (1) as follows: (Figure 401) (Figure 402)
 - (a) On the core compartment cooling air manifold (1), remove the bolt (2), nut (3) and washer (4) from the four support links (5).
 - (b) Remove the spherical bearing (6) from the four support links (5).
 - (c) Remove the two clamps (7) and the flex joint (8) from the air tube (9) on the core compartment cooling air manifold (1).
 - (d) Remove the v-band clamp (10) and the seal ring (11) from the upper segment of the core compartment cooling air manifold (1). Discard the seal ring.
NOTE: The information that follows is for engines after S/B 75-138.
 - (e) On the high pressure bleed valve cooling air tube (12), remove the two bolts (13) and nuts (14).

NOTE: The information that follows is for engines before and after S/B 75-138.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- (f) Remove the two hose clamps (15) and the rubber coupling (16) that connect the air curtain nozzle (17) to the core compartment cooling air manifold (1). Remove the core compartment cooling air manifold.

SUBTASK 75-25-07-410-001

- (2) Install protective caps and plugs on all openings of the core compartment cooling air manifold (1) and the air curtain nozzle (17).

SUBTASK 75-25-07-410-002

- (3) If the core compartment cooling air manifold is not installed immediately, or weather conditions make it necessary, close the engine access doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

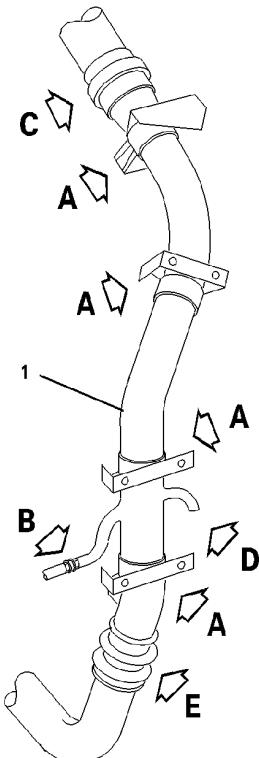
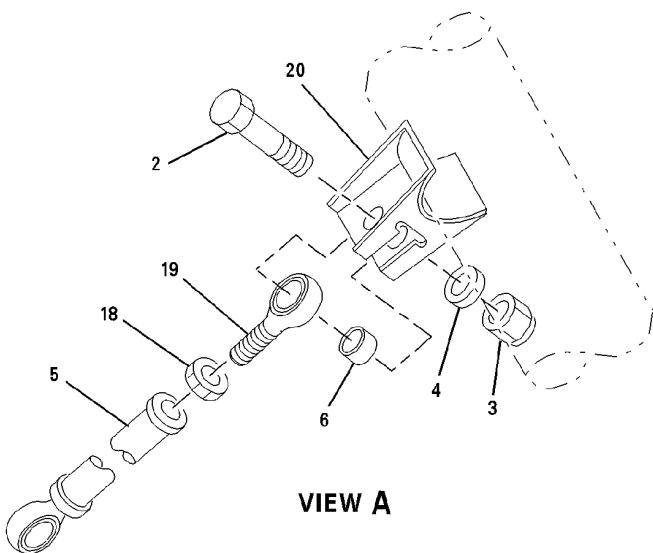
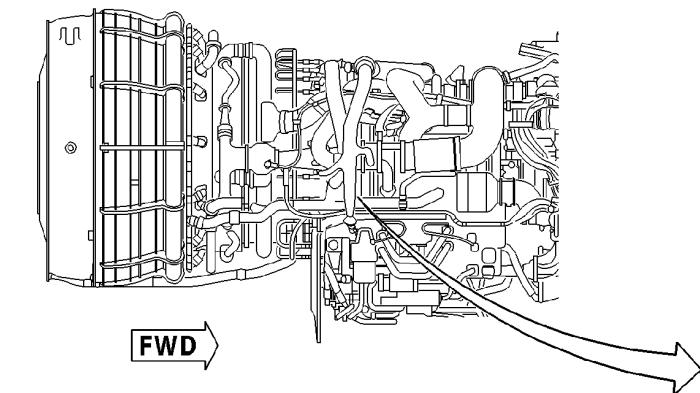
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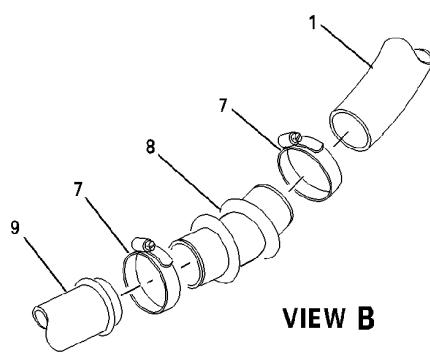
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LEGEND:

- 1. CORE COMPARTMENT COOLING AIR MANIFOLD
- 2. BOLT
- 3. NUT
- 4. WASHER
- 5. SUPPORT LINK
- 6. SPHERICAL BEARING
- 7. CLAMP
- 8. FLEX JOINT
- 9. AIR TUBE
- 18. JAMNUT
- 19. BEARING HOUSING
- 20. MOUNT BRACKET

CAG(IGDS)



DB2-75-0290

Core Compartment Cooling Air Manifold - Removal/Installation
Figure 401/75-25-07-990-801

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

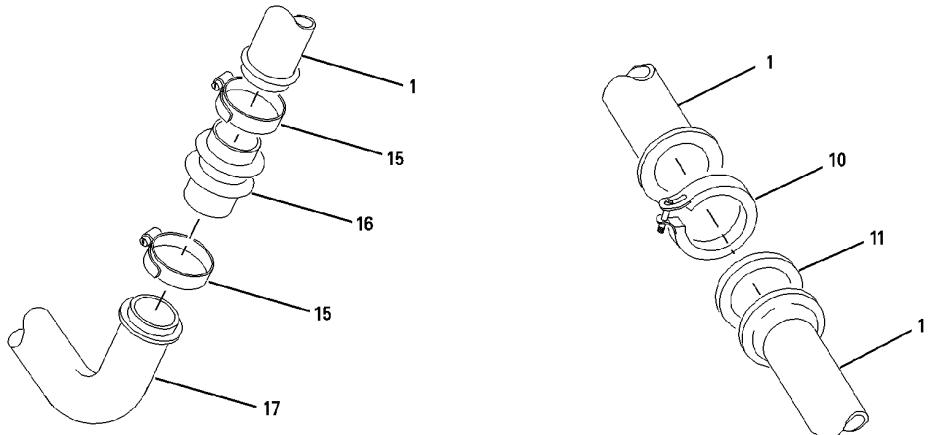
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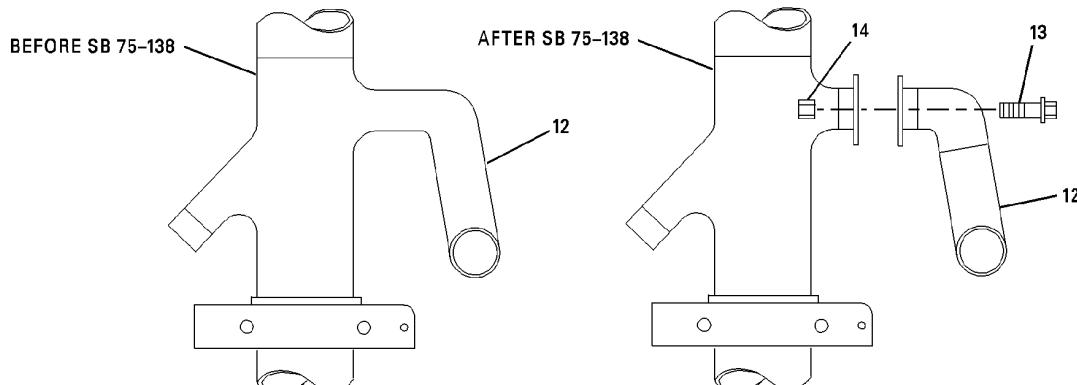


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VIEW E

VIEW C



VIEW D

LEGEND:

- | | |
|---|------------------------|
| 1. CORE COMPARTMENT MANIFOLD | 13. BOLT |
| 10. V-BAND CLAMP | 14. NUT |
| 11. SEAL RING | 15. HOSE CLAMP |
| 12. HIGH PRESSURE BLEED VALVE
COOLING AIR TUBE | 16. RUBBER COUPLING |
| | 17. AIR CURTAIN NOZZLE |

CAG(IGDS)

DB2-75-0291

Core Compartment Cooling Air Manifold - Removal/Installation
Figure 402/75-25-07-990-802

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-25-07-400-801

3. INSTALLATION OF THE CORE COMPARTMENT COOLING AIR MANIFOLD

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, (No. 1 and 3 engines, 4-8 ft 1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 Engine
Not specified	Torque wrench 0-300 in-lb (0-33.9 N·m)

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
C02-001	Compound, anti-seize
C10-071	Lockwire

C. Expendable Parts

- (1) Expendable Parts

Table 404

REFERENCE	DESIGNATION	IPC
11	Ring Seal	IPC 75-23-50-01

D. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-23-50-01	Illustrated Parts Catalog

E. Job Set-up - Core Compartment Cooling Air Manifold Installation

SUBTASK 75-25-07-010-002

- (1) If necessary, open the engine access doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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F. Procedure - Core Compartment Cooling Air Manifold Installation

SUBTASK 75-25-07-420-001

- (1) Install the core compartment cooling air manifold (1) as follows: (Figure 401) (Figure 402)
(CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
 - (a) Install the rubber coupling (16) on the air curtain nozzle (17).
 - (b) Put a hose clamp (15) on the lower end of the rubber coupling (16) and the air curtain nozzle (17).
 - (c) Tighten the hose clamp (15) by hand. Make sure the screw head on the hose clamp is in and points forward.
 - (d) Put a hose clamp (15) on the core compartment cooling air manifold (1).
 - (e) On the core compartment cooling air manifold (1), make sure the spherical bearings (6) are installed in the four support links (5).



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1023, GREASE/THREAD COMPOUND LUBRICATING
(DPM 376)

HAZMAT 1000, REFER TO MSDS

- (f) Lubricate the four bolts (2) threads with anti-seize compound (C02-001).
- (g) Install a bolt (2), washer (4) and nut (3) on each of the two upper support links (5). Tighten the bolt and nut by hand.
- (h) Install the rubber coupling (16) on the lower end of the core compartment cooling air manifold (1).
- (i) Move the other hose clamp (15) on the lower end of the core compartment cooling air manifold (1) and the rubber coupling (16).
- (j) Tighten the hose clamp (15) by hand. Make sure the screw head on the hose clamp is in and points forward.
- (k) Install a bolt (2), washer (4) and nut (3) on each of the two lower support links (5). Tighten the bolts and nuts by hand.
- (l) If necessary, adjust the support links (5) on the core cooling compartment air manifold (1) as follows:
 - 1) Loosen the jamnut (18) and adjust the bearing housing (19) to align with the mount bracket (20) on the core cooling compartment air manifold (1).
 - 2) Tighten the jamnut (18) by hand.
 - 3) Use 0.032 in. (0.813 mm) lockwire (C10-071) and try to put the lockwire through the sight hole in each support link (5).

NOTE: Use the sight hole on the support links found 0.250 in. (6.35 mm) from the adjustable end of the support links.

- 4) If the threads on the bearing housing (19) are sufficiently engaged, the lockwire cannot go through the sight hole.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- 5) Adjust each support link (5) until the core cooling compartment air manifold (1) aligns with each support link.
- 6) Do a check of each support link (5) with the lockwire.
- 7) Torque the jamnut (18) on each support link (5) to 100-130 in-lb (11.3–14.7 N·m).
- 8) Safety the jamnut (18) on each support link (5) to the sight hole with 0.032 in. (0.813 mm) lockwire (C10-071).

NOTE: The jamnut is safeted to the sight hole on the support link found 1 in. (25.4 mm) from the adjustable end of the support link.

- (m) Torque the nuts (3) on each support link (4 places) to 55-70 in-lb (6.2–7.9 N·m)
- (n) Install the seal ring (11) on the upper segment of the core cooling compartment air manifold (1).
- (o) Install the v-band clamp (10) on the seal ring (11) and torque the clamp to 50 in-lb (5.6 N·m).
NOTE: The information that follows is for engines after S/B 75-138.
- (p) Lubricate the bolts (13) threads with anti-seize compound (C02-001).
- (q) On the high pressure bleed valve cooling air tube (12), install the two bolts (13) and nuts (14).
- (r) Torque the nuts (14) to 55-70 in-lb (6.2–7.9 N·m).
NOTE: The information that follows is for engines before and after S/B 75–138.
- (s) Put one clamp (7) on the air tube (9) and one clamp (7) on the core cooling compartment air manifold (1).
- (t) Install the flex joint (8) on the air tube (9) and the core cooling compartment air manifold (1).
- (u) Install the two clamps (7) on the flex joint (8) and tighten the clamps by hand.

G. Job Close-up - Core Compartment Cooling Air Manifold Installation

SUBTASK 75-25-07-942-001

- (1) Remove all the tools and equipment from the work area. Make sure that the area is clean.

SUBTASK 75-25-07-410-003

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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AIRCRAFT MAINTENANCE MANUAL

BOXES, FAN CASE JUNCTION – REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the fan case junction boxes.
- B. There are two junction boxes on each engine. A linear variable displacement transducer (LVDT) junction box and thrust reverser junction box. Access to the LVDT junction box is through the left fan-cowl door and the thrust reverser is through the right fan-cowl door.
- C. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460 engines on the MD-11 aircraft.

TASK 75-25-07-000-868

2. REMOVAL OF THE FAN CASE LVDT JUNCTION BOX

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector

B. References

Reference	Title
71-10-00-010-868	OPEN THE FAN COWL DOORS (P/B 201)
71-10-00-410-868	CLOSE THE FAN COWL DOORS (P/B 201)

C. Job Set-up - Fan Case LVDT Junction Box Removal

SUBTASK 75-25-07-010-269

- (1) Open the applicable fan-cowl doors. (OPEN THE FAN COWL DOORS, TASK 71-10-00-010-868)

D. Procedure - Fan Case LVDT Junction Box Removal

SUBTASK 75-25-07-020-267

- (1) Remove the fan case LVDT junction box (1) as follows: (Figure 401)
 - (a) Break the lockwires and disconnect the electrical connectors (2) from the junction box (1). Install protective caps to the connectors and the receptacles.
 - (b) Remove the four screws (3) (4) and washers (5) that attach the junction box (1) to the flange and the bracket (6).
 - (c) Remove the junction box (1) and the bracket (6) from the fan case.

SUBTASK 75-25-07-410-267

- (2) If the nacelle cooling system relays are not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSE THE FAN COWL DOORS, TASK 71-10-00-410-868)

———— END OF TASK ————

EFFECTIVITY

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642-645**

75-25-07

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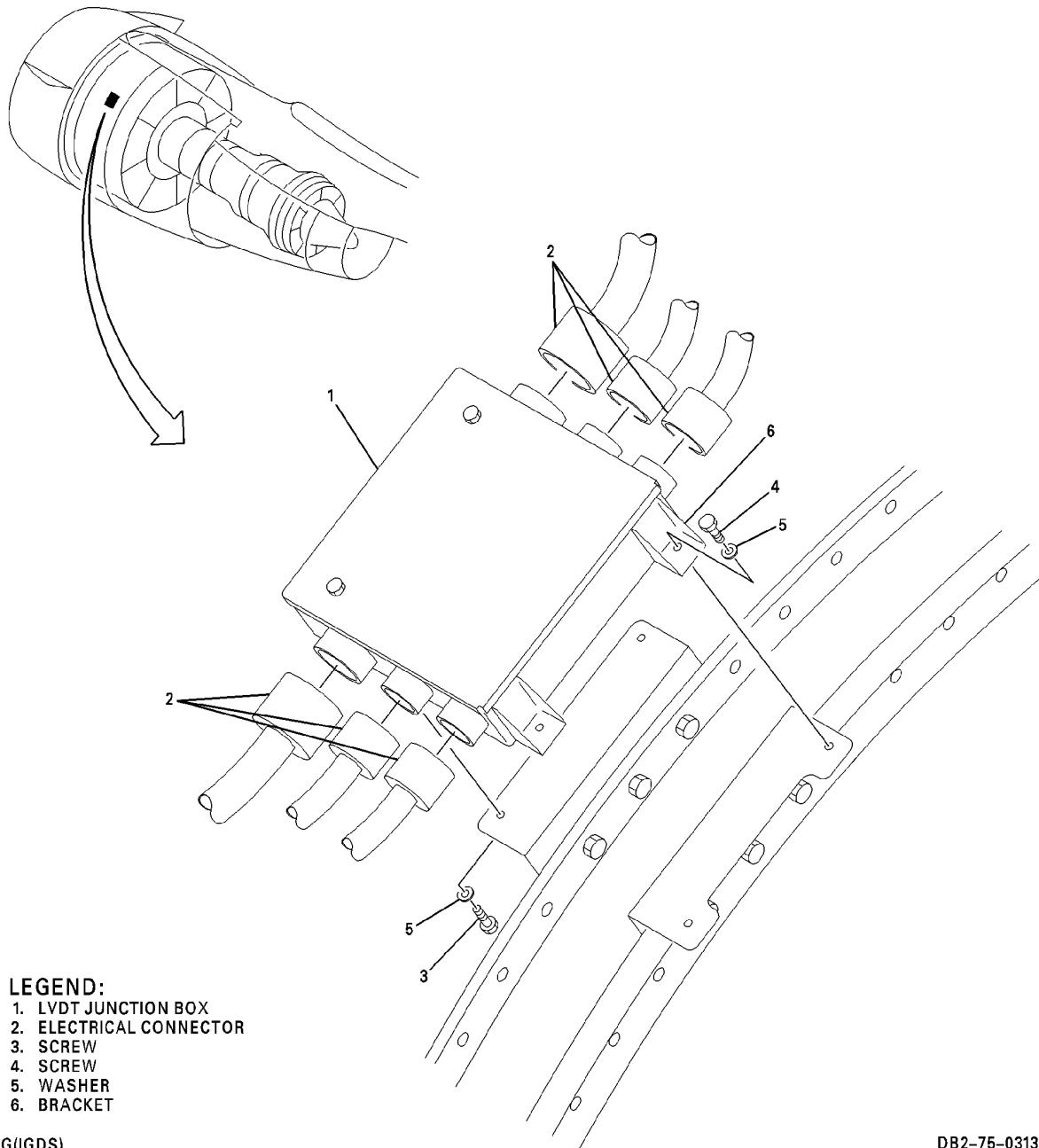
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LEGEND:

- 1. LVDT JUNCTION BOX
- 2. ELECTRICAL CONNECTOR
- 3. SCREW
- 4. SCREW
- 5. WASHER
- 6. BRACKET

CAG(IGDS)

DB2-75-0313

Fan Case LVDT Junction Box - Removal/Installation
Figure 401/75-25-07-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-25-07-400-868

3. INSTALLATION OF THE FAN CASE LVDT JUNCTION BOX

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-30 in-lb (0-3.4 N·m)
Not specified	Wrench, strap or Plier, soft-jawed

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P11-009 (DPM 514)	Alcohol, Denatured Ethyl
MS20995N20	Lockwire

C. References

Reference	Title
71-10-00-010-868	OPEN THE FAN COWL DOORS (P/B 201)
71-10-00-410-868	CLOSE THE FAN COWL DOORS (P/B 201)

D. Job Set-up - Fan Case LVDT Junction Box Installation

SUBTASK 75-25-07-010-270

- (1) If necessary, open the fan-cowl doors. (OPEN THE FAN COWL DOORS, TASK 71-10-00-010-868)

E. Procedure - Fan Case LVDT Junction Box Installation

SUBTASK 75-25-07-420-267

- (1) Install the fan case LVDT junction box (1) as follows: (Figure 401)
- Install the junction box (1) with the bracket (6) on the flange. Electrically bond the junction box (1) faying surface and the mounting bracket on the flanges.
 - Install the four screws (3) (4) and washers (5). Torque the screws to 50-70 in-lb (5.7-7.9 N·m).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1073, ETHYL ALCOHOL (DPM 514)

HAZMAT 1000, REFER TO MSDS

- (c) Remove the protective covers. If necessary, examine the electrical connectors (2) for bent pins and contaminations. Clean the connectors and receptacles with denatured ethyl alcohol and allow them to dry.
- (d) Install the electrical connectors (2) to the junction box (1). Make sure to tighten the connector coupling nuts by hand until you cover the witness (color) bands and the connector coupling nuts are tight.
NOTE: The witness (color) band is the first band on the receptacle that you cover when you tighten the connector coupling.
- (e) Use a strap wrench or a soft-jawed pliers and tighten the electrical connectors (2) coupling nuts correctly. Safety the electrical connectors with lockwire.

F. Job Close-up - Fan Case LVDT Junction Box Installation

SUBTASK 75-25-07-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-25-07-410-270

- (2) Close the fan-cowl doors. (CLOSE THE FAN COWL DOORS, TASK 71-10-00-410-868)

———— END OF TASK ————

TASK 75-25-07-000-869

4. REMOVAL OF THE FAN CASE THRUST REVERSER JUNCTION BOX

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 404

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector

B. References

Reference	Title
71-10-00-010-868	OPEN THE FAN COWL DOORS (P/B 201)
71-10-00-410-868	CLOSE THE FAN COWL DOORS (P/B 201)

EFFECTIVITY
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C. Job Set-up - Fan Case Thrust Reverser Junction Box Removal

SUBTASK 75-25-07-010-271

- (1) Open the applicable fan-cowl doors. (OPEN THE FAN COWL DOORS, TASK 71-10-00-010-868)

D. Procedure - Fan Case Thrust Reverser Junction Box Removal

SUBTASK 75-25-07-020-268

- (1) Remove the fan case thrust reverser junction box (1) as follows: (Figure 402)
 - (a) Break the lockwires and disconnect the electrical connectors (2) from the junction box (1). Install protective caps to the connectors and the receptacles.
 - (b) Remove the four screws (3) and washers (4) that attach the junction box (1) to the flange.
 - (c) Remove the junction box (1) from the fan case.

SUBTASK 75-25-07-410-268

- (2) If the nacelle cooling system relays are not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSE THE FAN COWL DOORS, TASK 71-10-00-410-868)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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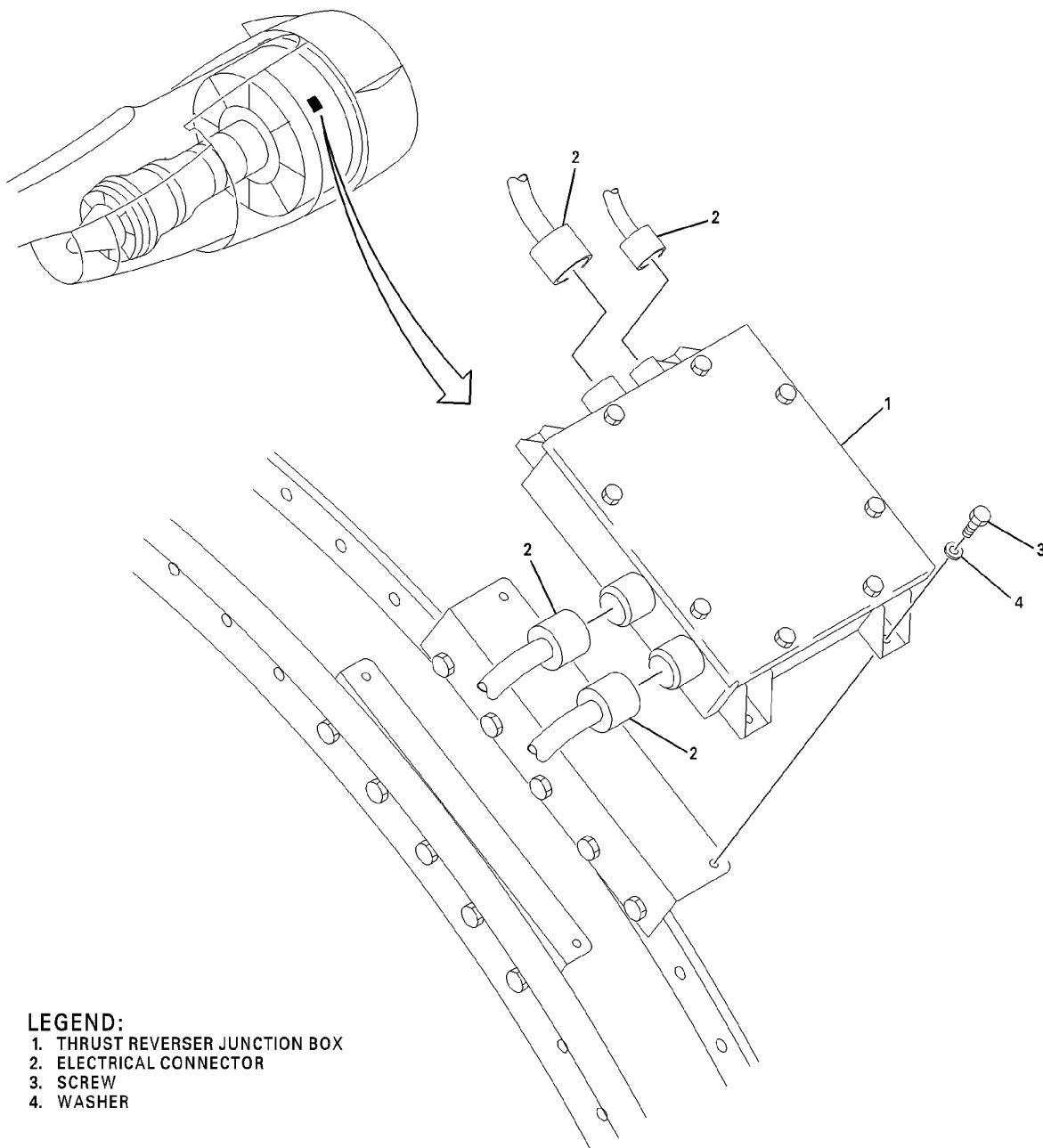
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Fan Case Thrust Reverser Junction Box - Removal/Installation
Figure 402/75-25-07-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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TASK 75-25-07-400-869

5. INSTALLATION OF THE FAN CASE THRUST REVERSER JUNCTION BOX

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 405

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-30 in-lb (0-3.4 N·m)
Not specified	Wrench, strap or Plier, soft-jawed

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 406

REFERENCE	DESIGNATION
P11-009 (DPM 514)	Alcohol, Denatured Ethyl
MS20995N20	Lockwire

C. References

Reference	Title
71-10-00-010-868	OPEN THE FAN COWL DOORS (P/B 201)
71-10-00-410-868	CLOSE THE FAN COWL DOORS (P/B 201)

D. Job Set-up - Fan Case Thrust Reverser Junction Box Installation

SUBTASK 75-25-07-010-272

- (1) If necessary, open the fan-cowl doors. (OPEN THE FAN COWL DOORS, TASK 71-10-00-010-868)

E. Procedure - Fan Case Thrust Reverser Junction Box Installation

SUBTASK 75-25-07-420-268

- (1) Install the fan case thrust reverser junction box (1) as follows: (Figure 402)
- Install the junction box (1) on the flange. Electrically bond the junction box faying surface and the flanges.
 - Install the four screws (3) and washers (4). Torque the screws to 50-70 in-lb (5.7-7.9 N·m).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1073, ETHYL ALCOHOL (DPM 514)

HAZMAT 1000, REFER TO MSDS

- (c) Remove the protective covers. If necessary, examine the electrical connectors (2) for bent pins and contaminations. Clean the connectors and receptacles with denatures ethyl alcohol and allow them to dry.
- (d) Install the electrical connectors (2) to the junction box (1). Make sure to tighten the connector coupling nuts by hand until you cover the witness (color) bands and the connector coupling nuts are tight.
NOTE: The witness (color) band is the first band on the receptacle that you cover when you tighten the connector coupling.
- (e) Use a strap wrench or a soft-jawed pliers to correctly tighten the electrical connectors (2) coupling nuts. Safety the electrical connectors with lockwire.

F. Job Close-up - Fan Case Thrust Reverser Junction Box Installation

SUBTASK 75-25-07-942-268

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-25-07-410-271

- (2) Close the fan-cowl doors. (CLOSE THE FAN COWL DOORS, TASK 71-10-00-410-868)

———— END OF TASK ————

EFFECTIVITY
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SOLENOID, NACELLE COOLING VALVE - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the nacelle cooling valve solenoid for configuration-02B engines. Access to the nacelle cooling valve solenoid is through the thrust reverser doors.
- B. Unless different instruction are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-25-08-000-868

2. REMOVAL OF THE NACELLE COOLING VALVE SOLENOID CONF-02B

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m), high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Nacelle Cooling Valve Solenoid Removal

SUBTASK 75-25-08-865-001



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-25-08-010-001

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Nacelle Cooling Valve Solenoid Removal

SUBTASK 75-25-08-030-001

- (1) Remove the nacelle cooling valve solenoid (1) from the thrust reverser door as follows:
(Figure 401)
- (a) On the nacelle cooling valve solenoid (1), disconnect the hose assembly (2) from the elbow (3).
 - (b) Remove the elbow (3), nut (4) and packing (5) from the nacelle cooling valve solenoid (1). Discard the packing and install a protective plug in the solenoid.
 - (c) Disconnect the tube assembly (6) from the elbow (7).
 - (d) Remove the elbow (7), nut (8) and packing (9) from the nacelle cooling valve solenoid (1). Discard the packing and install a protective plug in the solenoid.
 - (e) Disconnect the electrical connector (10) from the nacelle cooling valve solenoid (1). Install a dust cap on the electrical connector.
 - (f) On the nacelle cooling valve solenoid (1), remove the three bolts (11) and washers (12). Remove the solenoid from the thrust reverser door.

SUBTASK 75-25-08-410-001

- (2) If the nacelle cooling valve solenoid is not installed immediately, or weather conditions make it necessary, close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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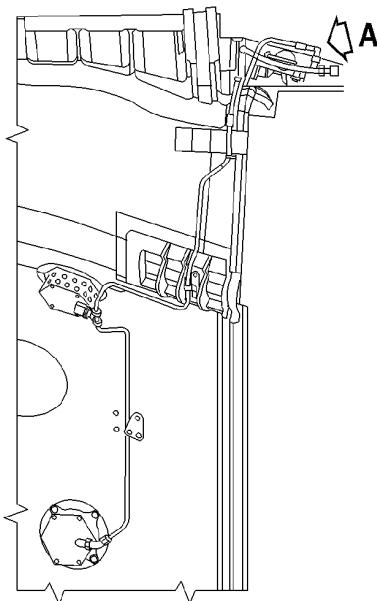
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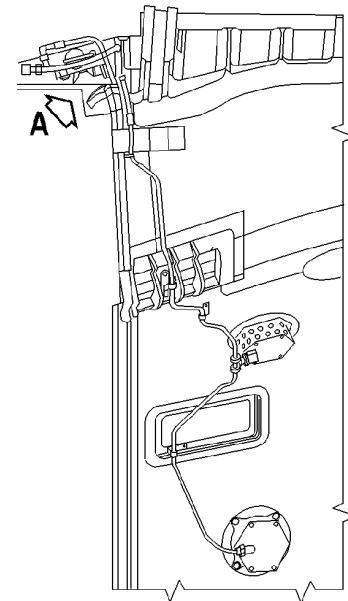
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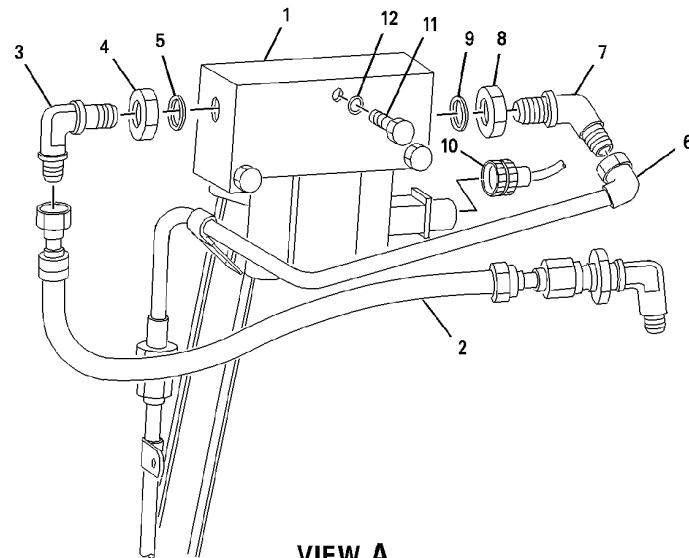
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LEFT THRUST REVERSER DOOR
(VIEW FROM INBOARD)



RIGHT THRUST REVERSER DOOR
(VIEW FROM INBOARD)



VIEW A
CONF-02B

CAG(IGDS)

DB2-75-0303B

Nacelle Cooling Valve Solenoid - Removal/Installation
Figure 401/75-25-08-990-801

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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TASK 75-25-08-400-868

3. INSTALLATION OF THE NACELLE COOLING VALVE SOLENOID CONF-02B

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m), high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-300 in-lb (0-33.9 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating
P05-288	Lockwire, 0.020 in. (0.0508 mm) dia.

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE	DESIGNATION	IPC
5	Packing (M83248/2-905)	IPC 78-31-80-11-065
9	Packing (M83248/2-905)	IPC 78-31-80-11-065

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-25-01-700-868	FUNCTIONAL TEST OF THE NACELLE CORE COMPARTMENT COOLING CONF-02B (P/B 501)
IPC 78-31-80-11-065	Illustrated Parts Catalog

EFFECTIVITY
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E. Job Set-up - Installation of the Nacelle Valve Cooling Solenoid

SUBTASK 75-25-08-865-002



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE

CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY
TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that these circuit breakers are open and have safety tags:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-25-08-010-002

- (2) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - Installation of the Nacelle Cooling Valve Solenoid

SUBTASK 75-25-08-420-001

- (1) Install the nacelle cooling valve solenoid (1) on the thrust reverser door as follows: (Figure 401)
- (a) Position the nacelle cooling valve solenoid (1) on the thrust reverser door and install the three bolts (11) and washers (12). Torque the bolts to 50-70 in-lb (5.65–7.90 N·m).



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the packing (9) and the threads of the elbow (7) with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Install the packing (9), nut (8) and elbow (7) on the nacelle cooling valve solenoid (1). Torque the nut to 130–140 in-lb (14.68–15.81 N·m).
- (d) Connect the tube assembly (6) to the elbow (7). Torque the tube assembly coupling nut to 200-210 in-lb (22.58–23.71 N·m).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS
HAZMAT 1016, OIL/LUBRICATING (DPM 3564)
HAZMAT 1000, REFER TO MSDS

- (e) Lubricate the packing (5) and the threads of the elbow (3) with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (f) Install the packing (5), elbow (3), and nut (4) on the nacelle cooling valve solenoid (1). Torque the nut to 130–140 in-lb (14.68–15.81 N·m).
- (g) Connect the hose assembly (2) to the elbow (3). Torque the hose assembly coupling nut to 170–240 in-lb (19.19–27.01 N·m).
- (h) Connect the electrical connector (10) to the nacelle cooling valve solenoid (1). Tighten the connector by hand and then tighten the electrical connector again one-eighth turn. Safety the connector with lockwire (P05-288). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

G. Job Close-up - Nacelle Cooling Solenoid Valve Removal

SUBTASK 75-25-08-865-003

- (1) Remove the safety tags and close these circuit breakers:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-25-08-942-001

- (2) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-25-08-410-002

- (3) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-25-08-710-001

- (4) Do the functional test of the nacelle core compartment cooling. (FUNCTIONAL TEST OF THE NACELLE CORE COMPARTMENT COOLING CONF-02B, TASK 75-25-01-700-868)

— END OF TASK —

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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AIRCRAFT MAINTENANCE MANUAL

SIMULATOR BOX, ELECTRONIC - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the electronic simulator box for Conf-02B engines. Access to the electronic simulator box is through the thrust reverser door.
- B. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/PW4462 Conf-02B engines.

TASK 75-25-09-000-868

2. REMOVAL OF THE ELECTRONIC SIMULATOR BOX CONF-02B

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.22-2.44 m), high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector

B. References

Reference	Title
29-00-00 P/B 201	POWER, HYDRAULIC – MAINTENANCE PRACTICES
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
78-31-02-800-868	MANUALLY LOCK AND UNLOCK THE HYDRAULIC CONTROL UNIT (P/B 201)

C. Job Set-up - Electronic Simulator Box Removal

SUBTASK 75-25-09-040-267

- (1) Manually lock the hydraulic control unit. (MANUALLY LOCK AND UNLOCK THE HYDRAULIC CONTROL UNIT, TASK 78-31-02-800-868)

SUBTASK 75-25-09-864-268

- (2) Remove hydraulic pressure from the applicable hydraulic system. (POWER, HYDRAULIC – MAINTENANCE PRACTICES, PAGEBLOCK 29-00-00/201)

SUBTASK 75-25-09-010-269

- (3) Open the thrust reverser door. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-25-09-865-270



MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

EFFECTIVITY
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(WARNING PRECEDES)

**WARNING**

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (4) Open these circuit breakers and install safety tags:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2
J	15	B1-592	REVERSING CONTROL ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

D. Procedure - Electronic Simulator Box Removal

SUBTASK 75-25-09-020-269

- (1) Remove the electronic simulator box (1) as follows: (Figure 401)
- Remove the electrical connector (2) from the electronic simulator box (1).
 - Install the dust cap on the electrical connector (2) and the receptacle on the electronic simulator box (1).
 - Remove the four nuts (3), washers (4) and the bolts (5). Remove the electronic simulator box (1) from the bracket (6).

SUBTASK 75-25-09-410-270

- (2) If the electronic simulator box is not installed immediately, or weather conditions make it necessary, close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

— END OF TASK —

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

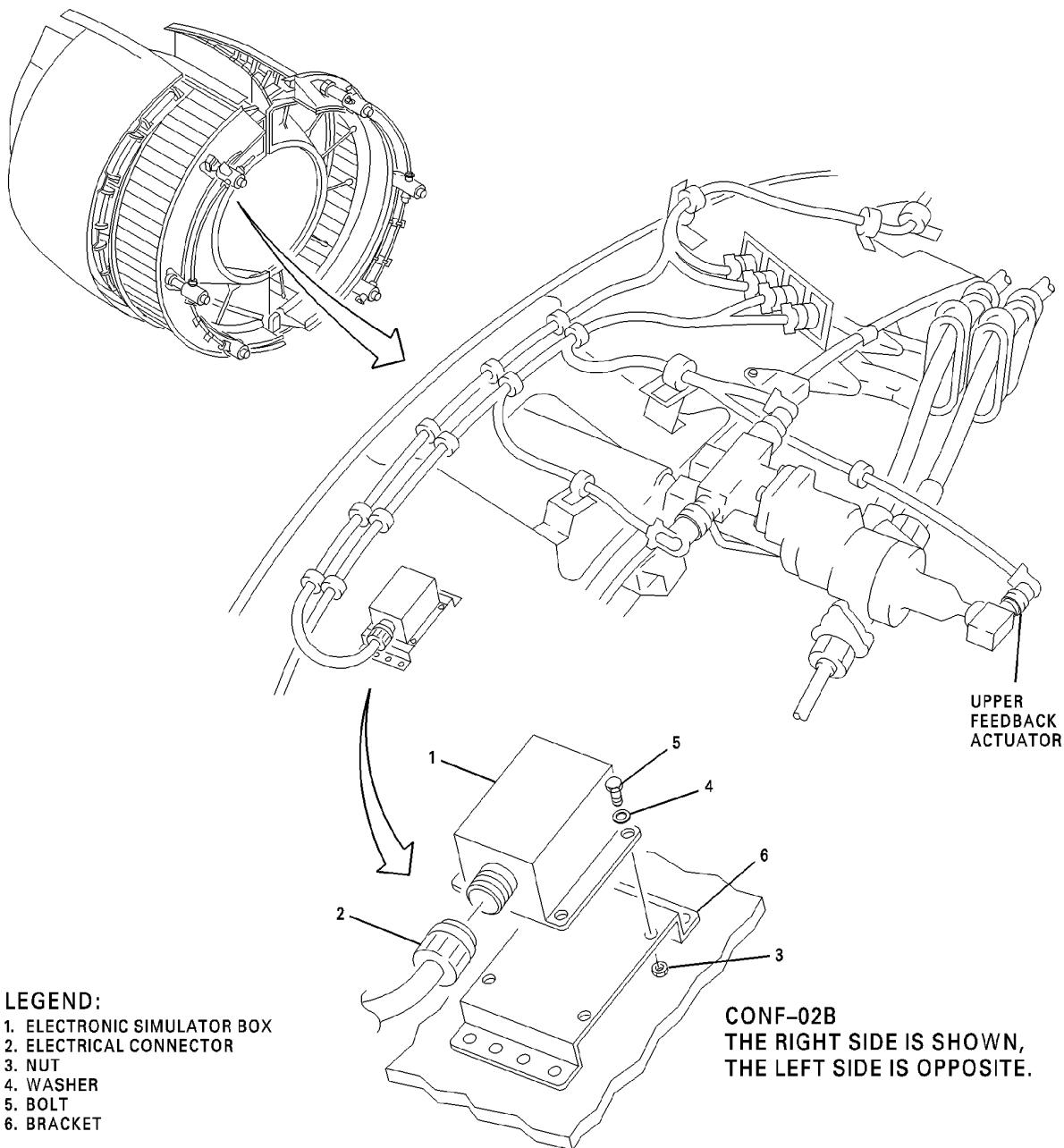
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CAG(IGDS)

DB2-75-0307

Electronic Simulator Box - Removal and Installation
Figure 401/75-25-09-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-25-09

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TASK 75-25-09-400-868

3. INSTALLATION OF THE ELECTRONIC SIMULATOR BOX CONF-02B

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines 4-8 ft high, (1.22-2.44 m)
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-15 in-lb (0-1.7 N·m)
Not specified	Ohmmeter

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
PDM 6380-1	Cleaner, handwipe
MIL-C-85043 (Type 11)	Cloth, cleaning (low lint)

C. References

Reference	Title
29-00-00 P/B 201	POWER, HYDRAULIC – MAINTENANCE PRACTICES
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
78-31-02-800-868	MANUALLY LOCK AND UNLOCK THE HYDRAULIC CONTROL UNIT (P/B 201)

D. Job Set-up - Electronic Simulator Box Installation

SUBTASK 75-25-09-040-268

- (1) Make sure the hydraulic control unit is manually in the lock position. (MANUALLY LOCK AND UNLOCK THE HYDRAULIC CONTROL UNIT, TASK 78-31-02-800-868)

SUBTASK 75-25-09-864-269

- (2) Make sure the applicable hydraulic system pressure is removed. (POWER, HYDRAULIC – MAINTENANCE PRACTICES, PAGEBLOCK 29-00-00/201)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-25-09-010-271

- (3) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-25-09-865-271

NOTE: Open only the circuit breakers for the applicable engine.



WARNING

MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (4) Make sure that these circuit breakers are open and have safety tags:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2
J	15	B1-592	REVERSING CONTROL ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

E. Procedure - Electronic Simulator Box Installation

SUBTASK 75-25-09-420-272

- (1) Install the electronic simulator box (1) as follows: (Figure 401)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1497, CLEANER/HANDWIPE (DPM 6380-1)

HAZMAT 1000, REFER TO MSDS

- (a) Prepare the faying surface of the simulator box (1) to electronically bond with the thrust reverser door as follows:
 - 1) Soak a clean cloth with solvent and clean the faying surface of the electronic simulator box (1) and the bracket (6).
 - 2) Make sure all the oil and unwanted material are removed from the faying surface.
- (b) Put the electronic simulator box (1) on the bracket (6) and install the four bolts (5), washers (4) and the nuts (3).
- (c) Torque the four nuts (3) to 5-7 in-lb (0.6-0.8 N·m).
- (d) Use an ohmmeter and do a resistance check across the mating surface. Make sure the resistance is less than 0.0025 Ohm.
- (e) Remove the dust caps from the electrical connector and the receptacle. Install the electrical connector (2) to the electronic simulator box (1).
- (f) Tighten the electrical connector (2) by hand then turn one-eighth of a turn more.

F. Job Close-up - Electronic Simulator Box Installation

SUBTASK 75-25-09-942-273

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-25-09-410-268

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-25-09-863-274

- (3) If necessary, pressurize the applicable hydraulic system. (POWER, HYDRAULIC – MAINTENANCE PRACTICES, PAGEBLOCK 29-00-00/201)

SUBTASK 75-25-09-040-269

- (4) Manually unlock the hydraulic control unit. (MANUALLY LOCK AND UNLOCK THE HYDRAULIC CONTROL UNIT, TASK 78-31-02-800-868)

SUBTASK 75-25-09-865-272

- (5) Remove the safety tags and close these circuit breakers:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1
H	15	B1-591	REVERSING CONTROL ENG 1
H	16	B1-593	REVERSING CONTROL ENG 3

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2
J	15	B1-592	REVERSING CONTROL ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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VALVES, TURBINE VANE AND BLADE COOLING AIR - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the left and right turbine vane and blade (TVB) cooling air valves.
- B. The TVB cooling air valves on the PW4460/PW4462 engines are installed at the 9 o'clock and 3 o'clock positions on the HPC rear case. The TVB cooling air valves on the PW4460/PW4462 -3 engines are installed at the 9 o'clock, 2 o'clock, and 3 o'clock positions on the HPC rear case. Access to the turbine vane/blade cool air valves is through the thrust reverser doors.
- C. Unless different instructions are given, these procedures are the same for all three Pratt & Whitney PW4460/4462 and PW4460/4462 -3 (PHASE-3) engines.

TASK 75-26-06-000-868

2. REMOVAL OF THE PW4460/4462 and PW4460/4462 -3 LEFT TURBINE VANE AND BLADE COOLING AIR VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 Engine
Not specified (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
80-12-05-000-868	REMOVAL OF THE PNEUMATIC STARTER SUPPLY DUCTS (P/B 401)

C. Job Set-up - PW4460/4462 and PW4460/4462 -3 Left Turbine Vane and Blade Cooling Air Valve Removal

SUBTASK 75-26-06-010-268

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-26-06-020-270

- (2) Remove the upper-pneumatic starter duct segment. (REMOVAL OF THE PNEUMATIC STARTER SUPPLY DUCTS, TASK 80-12-05-000-868)

NOTE: Remove only the upper-pneumatic starter duct. It is not necessary to remove the intermediate or bottom starter duct.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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D. Procedure - PW4460/4462 and PW4460/4462 -3 Left Turbine Vane and Blade Cooling Air Valve Removal

SUBTASK 75-26-06-020-271

- (1) Remove the left turbine vane and blade cooling air valve (TVBCAV) (1) as follows: (Figure 401)
 - (a) Loosen the B-nut (2) on the air-signal tube (3) from the TVBCAV (1).
 - (b) Remove the bolts (4) that attaches the flange of the duct assembly (5) to the rear flange of the TVBCAV (1). Discard the gasket (6).
 - (c) Remove the bolts (7) that attach the cool air tube assembly (8) to the top flange of the TVBCAV (1).
NOTE: The step that follows is for the engines before S/B PW4ENG 72-627.
 - (d) Remove the ring spacer (9) and discard the gaskets (10 and 11).
NOTE: The step that follows is for the engines after S/B PW4ENG 72-627.
 - (e) Remove the metering plate (9) and discard the gaskets (10 and 11).
NOTE: The steps that follow are for the engines before/after S/B PW4ENG 72-627.
 - (f) Remove the nut (12) and the bolt (13) that attaches the tube clamp (14) to the bracket (15).
 - (g) Remove the bolts (16) that attach the TVBCAV (1) to the engine boss and remove the bracket (15).
 - (h) Remove the left TVBCAV (1) from the engine boss and discard the metal gasket (17).
 - (i) Install protective caps and plugs on all openings of the TVBCAV (1) and the engine HPC case.

SUBTASK 75-26-06-410-267

- (2) If it is necessary to install a new TVBCAV (1), remove the adapter (18) and discard the gasket (19). (Figure 401)

SUBTASK 75-26-06-410-269

- (3) If the left TVBCAV is not installed immediately, or weather conditions make it necessary, close the engine access doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-26-06

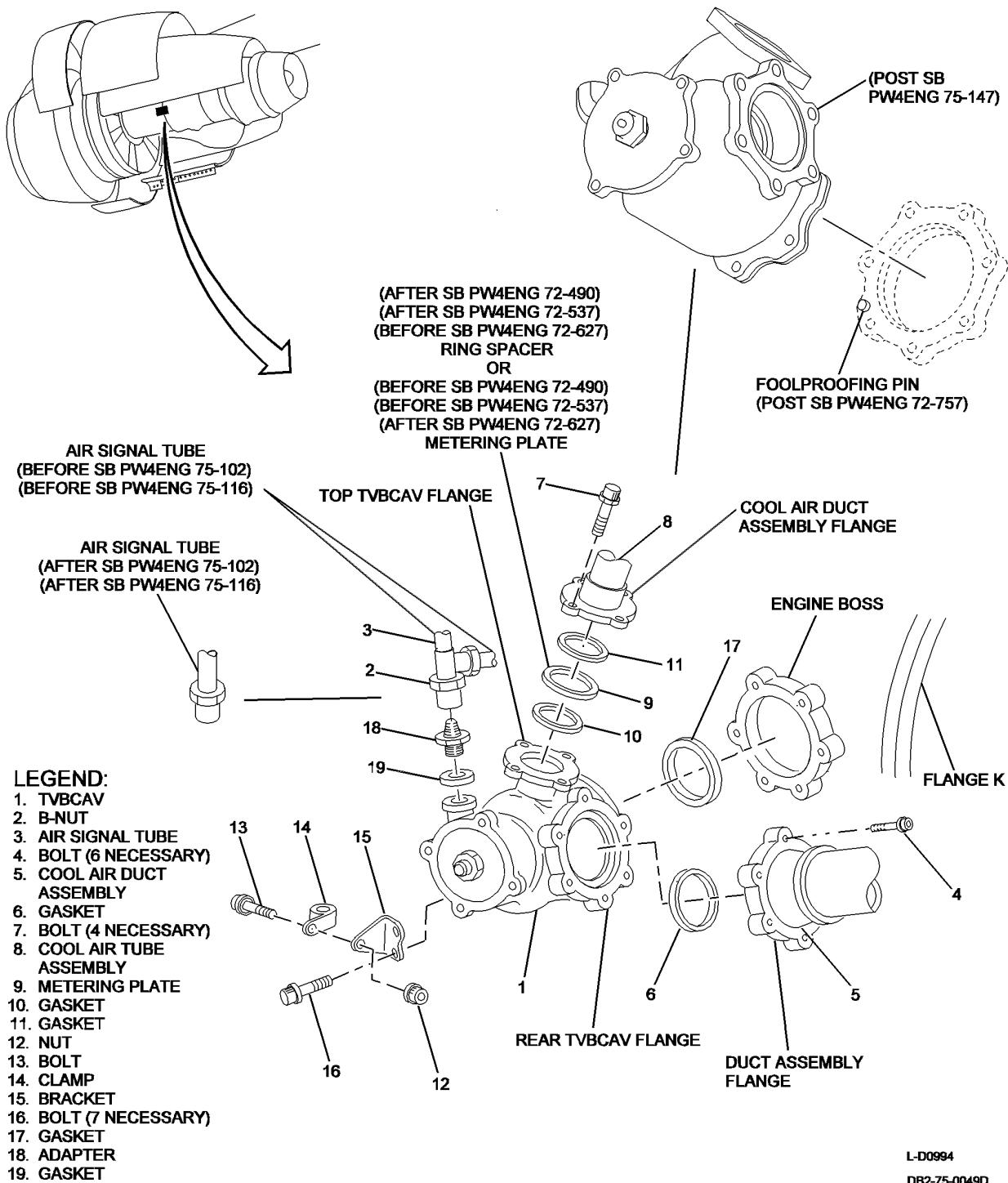
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DB2-75-0049D
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Left Turbine Vane and Blade Cooling Air Valve
Figure 401/75-26-06-990-873

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-26-06-400-868

3. INSTALLATION OF THE PW4460/4462 and PW4460/4462 -3 LEFT TURBINE VANE AND BLADE COOLING AIR VALVE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, o. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 Engine
Not specified	Torque wrench 0-400 in-lb (0-45.2 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, Engine lubricating (PWA 521B)
P05-059	Wax, paraffin (PMC 9552)
P06-003	Compound, antigalling (PWA 586)
P05-289	Lockwire, AS3214-02

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
6	Gasket	IPC 75-23-10-10-140
10	Gasket	IPC 75-24-15-10-055
11	Gasket	IPC 75-24-15-10-055
17	Gasket	IPC 75-23-05-10-025
19	Gasket	IPC 75-23-05-10-010

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
80-12-05-400-868	INSTALLATION OF THE STARTER PNEUMATIC SUPPLY DUCTS (P/B 401)
IPC 75-23-05	Illustrated Parts Catalog
IPC 75-23-05-10-010	Illustrated Parts Catalog
IPC 75-23-05-10-025	Illustrated Parts Catalog
IPC 75-23-10-10-140	Illustrated Parts Catalog
IPC 75-24-15-10-055	Illustrated Parts Catalog

E. Job Set-up - PW4460/4462 and PW4460/4462 -3 Left Turbine Vane and Blade Cooling Air Valve Installation

SUBTASK 75-26-06-010-271

- (1) If necessary, open the engine access doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - PW4460/4462 and PW4460/4462 -3 Left Turbine Vane and Blade Cooling Air Valve Installation

SUBTASK 75-26-06-420-268

- (1) If applicable, install signal air tube adapter (18) as follows: (Figure 401)
 - (a) Remove the protective caps and plugs.
 - (b) Install the gasket (19) on the tube adapter (18).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (c) Lubricate the adapter (18) threads with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (d) Install the adapter (18) on the TVBCAV (1). Torque the adapter to 110–120 in-lb (12.4–13.6 N·m).

SUBTASK 75-26-06-420-269

- (2) Install the left (TVBCAV) (1) as follows: (IPC 75-23-05) (Figure 401) (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

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FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.



HAZARDOUS MATERIAL WARNINGS

HAZMAT 1230, PARAFFIN/REFINED/STANDARD (DPM 589-1)

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1178, COMPOUND/ANTI-GALLING

HAZMAT 1000, REFER TO MSDS

- (a) Lubricate a metal gasket (17) with paraffin wax (P05–059). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- NOTE: If engine has the ring case style compressor (Post SB PW4ENG 72-757), install a turbine vane and blade cooling air valve (Post SB 75-147) with the foolproofing pin hole to match the pin on the flange boss.
- NOTE: There are seven bolts which attach the valve to the case. Make sure to use the longer bolts for the bracket locations on the valve.
- (b) Remove the protective caps and plugs from all openings of the TVBCAV (1) and the engine HPC case.
- (c) Install the gasket (17) on the engine boss on the high pressure compressor (HPC) case.
- (d) Lubricate the bolts (4, 7, 13 and 16), and B-nut (2) threads with engine oil (P03–001).
- (e) Put the TVBCAV (1) on the engine boss. Attach the TVBCAV and bracket (15) with the bolts (16). Torque the bolts (16) to 85–95 in–lb (9.6–10.7 N·m). Torque the bolts (16) again in a diagonally opposite sequence until the torque holds at the correct value.
- (f) Install the bolt (13) through the tube clamp (14) and the bracket (15) with the nut (12). Torque the bolt (13) to 36–40 in–lb (4.1–4.5 N·m).
- (g) Install the gasket (6) between the flange of the TVBCAV (1) and the duct assembly (5). Attach the duct assembly to the TVBCAV (1) with the bolts (4) and torque the bolts (4) to 85–95 in–lb (9.6–10.7 N·m). Torque the bolts (4) again in a diagonally opposite sequence until the torque holds at the correct value.
- NOTE: The step that follows is for engines before S/B PW4ENG 72-627.
- (h) Install the gasket (10) on the top flange of the TVBCAV (1) and the gasket (11) on the tube (8). Install the ring spacer (9) between the gaskets (10 and 11).
- NOTE: The step that follows is for engines after S/B PW4ENG 72-627.
- (i) Install the gasket (10) on the top flange of the TVBCAV (1) and the gasket (11) on the tube (8). Install the metering plate (9) between the gaskets (10 and 11).
- NOTE: The steps that follow are for engines before/after S/B PW4ENG 72–627.
- (j) Attach the tube (8) to the TVBCAV (1) with the bolts (7). Torque the bolts to 85–95 in–lb (9.6–10.7 N·m). Torque the bolts (7) again in a diagonally opposite sequence until the torque holds at the correct value.
- NOTE: The step that follows is for engines before PHASE-3 configuration.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (k) Lubricate the threads of the adapter (18) with antigalling compound (P06-003). Install the air-signal tube (3) to the TVBCAV (1) and torque the B-nut (2) to 200–225 in-lb (22.6–25.4 N·m). Safety the B-nut with lockwire (P05-289).

NOTE: The step that follows is for engines after PHASE-3 configuration.

- (l) Lubricate the threads of the adapter (18) with engine oil (P03-001). Connect the air-signal tube (3) to the TVBCAV (1) and torque the B-nut (2) to 270–300 in-lb (30.5–33.9 N·m). Safety the B nut with lockwire (P05-289).

NOTE: The steps that follow are for all engines.

G. Job Close-up - PW4460/4462 and PW4460/4462 -3 Left Turbine Vane and Blade Cooling Air Valve Installation

SUBTASK 75-26-06-410-271

- (1) Install the upper-pneumatic starter duct. (INSTALLATION OF THE STARTER PNEUMATIC SUPPLY DUCTS, TASK 80-12-05-400-868)

SUBTASK 75-26-06-720-267

- (2) Do the engine ground test at idle power. (ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870)

SUBTASK 75-26-06-410-277

- (3) Close the thrust reverser door. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-26-06-720-268

- (4) Do the electronic engine control test at idle power. (ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873)

SUBTASK 75-26-06-942-267

- (5) Remove all the tools and equipment from the work area. Make sure that the area is clean.

———— END OF TASK ————

TASK 75-26-06-000-869

4. REMOVAL OF THE PW4460/4462 and PW4460/4462 -3 LOWER RIGHT TURBINE VANE AND BLADE COOLING AIR VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 405

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 Engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

NOTE: Service Bulletin PW4ENG 75-106 removes the turbine vane and blade cooling air valve (TVBCAV) position indicator switch.

EFFECTIVITY
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

75-26-06

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B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-17-000-868	REMOVAL OF THE TURBINE VANE AND BLADE COOLING AIR VALVE POSITION SWITCH (P/B 401)

C. Job Set-up - PW4460/4462 and PW4460/4462 -3 Lower Right Turbine Vane and Blade Cooling Air Valve Removal

SUBTASK 75-26-06-010-270

NOTE: This Subtask is for all engines before/after S/B PW4ENG 75-106.

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-26-06-020-276

NOTE: This Subtask is for engines before S/B PW4ENG 75-106.

- (2) Remove the turbine vane and blade cooling air valve (TVBCAV) position switch. (REMOVAL OF THE TURBINE VANE AND BLADE COOLING AIR VALVE POSITION SWITCH, TASK 75-23-17-000-868)

D. Procedure - PW4460/4462 and PW4460/4462 -3 Lower Right Turbine Vane and Blade Cooling Air Valve Removal

SUBTASK 75-26-06-020-275

NOTE: The steps that follow are for all engines before/after S/B PW4ENG 75-106.

- (1) Remove the right turbine vane and blade cooling air valve (TVBCAV) (1) as follows: (Figure 402)
 - (a) Loosen the B-nut (3) on the air-signal tube (2).
 - (b) Remove the six bolts (4) that attach the duct assembly (5) to the rear flange of the TVBCAV (1). Discard the gasket (6).
 - (c) Remove the four bolts (7) that attach the bracket (8) and the turbine blade cooling-air tube (9) to the valve (1).

NOTE: The step that follows is for the engines before S/B PW4ENG 72-627.
 - (d) Remove the ring spacer (12) and discard the gaskets (10 and 11).

NOTE: The step that follows is for the engines after S/B PW4ENG 72-627.
 - (e) Remove the metering plate (12) and discard the gaskets (10 and 11).

NOTE: The steps that follow are for the engines before/after S/B PW4ENG 72-627.
 - (f) Remove the nuts (13 and 14) and the bolts (15 and 16) from the clamps (17 and 18) and the adjustable link (19). (Figure 403)
 - (g) Remove the bolts seven (21) that attach the right TVBCAV (1) to the engine boss. Remove the attached bracket (20). Discard the gasket (22).
 - (h) Install protective caps and plugs on the openings of the TVBCAV (1) and engine case.

SUBTASK 75-26-06-020-277

- (2) If it is necessary to install a new TVBCAV (1), remove the adapter (23) and discard the gasket (24). (Figure 403)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-26-06-410-270

- (3) If the right TVBCAV is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

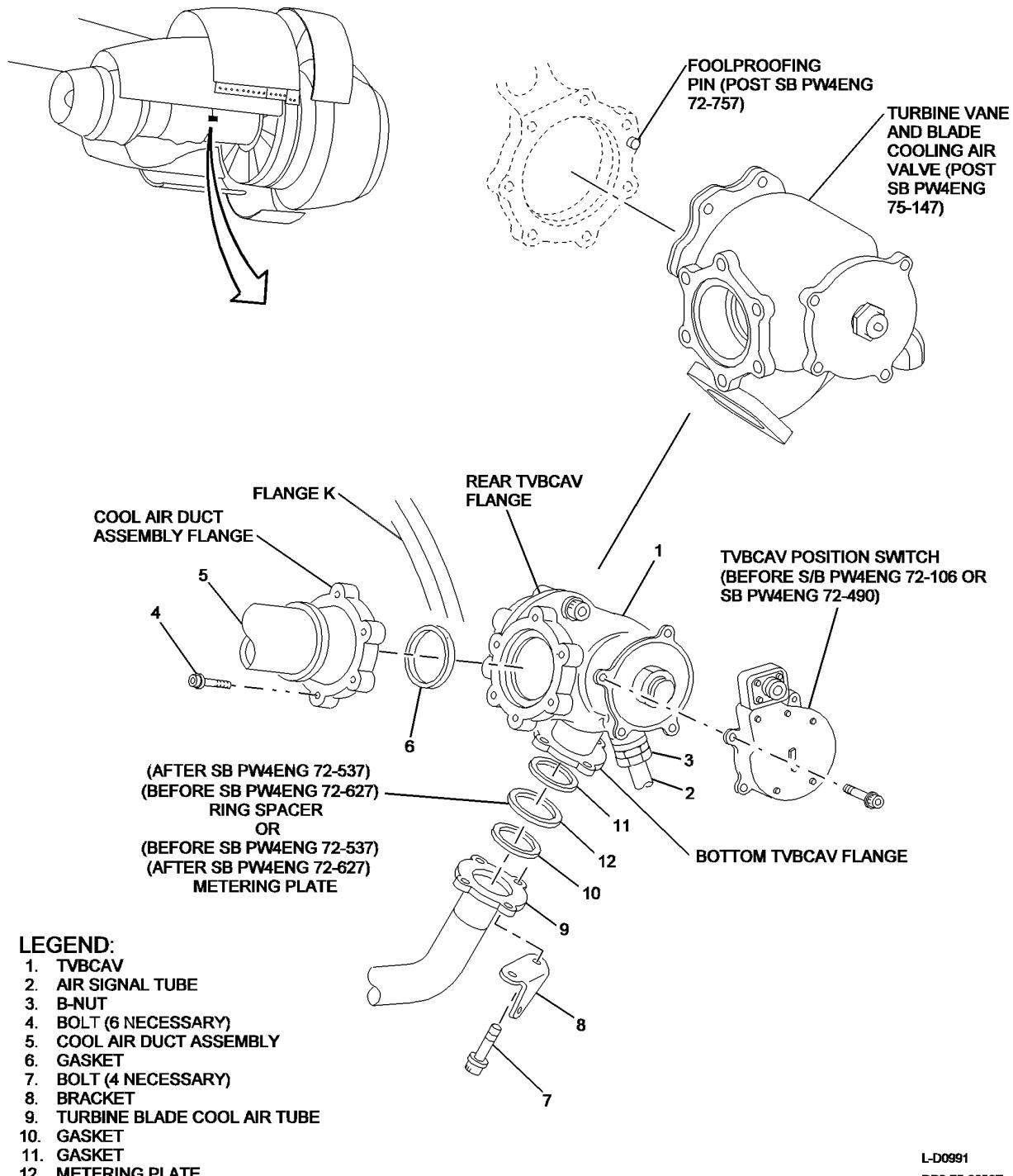
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Right Turbine Vane and Blade Cooling Air Valve
Figure 402/75-26-06-990-874

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

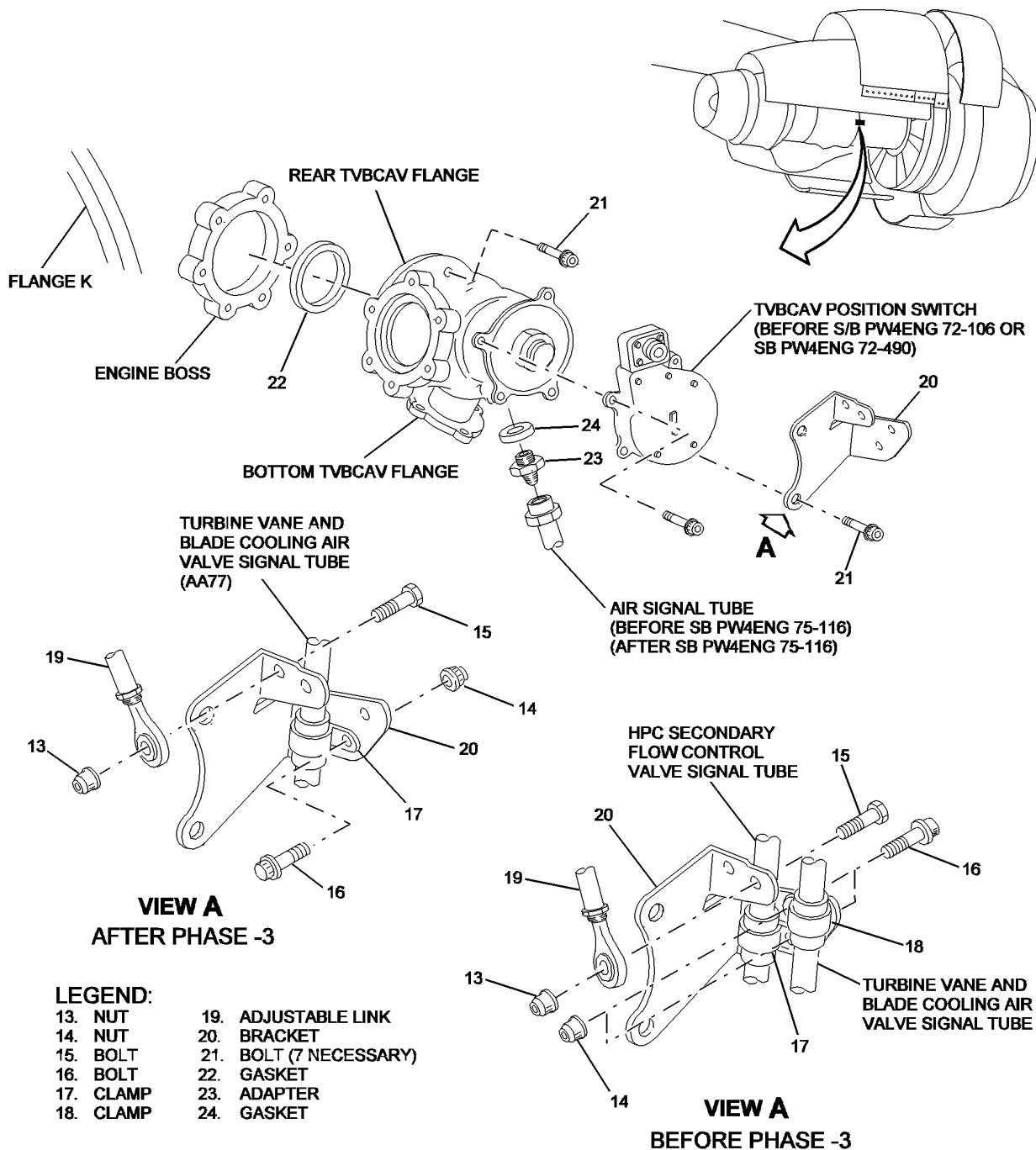
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EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-26-06-400-869

5. INSTALLATION OF THE PW4460/4462 and PW4460/4462 -3 LOWER RIGHT TURBINE VANE AND BLADE COOLING AIR VALVE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 406

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0-400 in-lb (0-45.2 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 407

REFERENCE	DESIGNATION
P03-001	Oil, Engine lubricating (PWA 521B)
P05-059	Wax, paraffin (PMC 9552)
P06-003	Compound, antigalling (PWA 586)
P05-289	Lockwire, AS3214-02

C. Expendable Parts

(1) Expendable Parts

Table 408

REFERENCE/ITEM	DESIGNATION	IPC
Fig. 402/6	Gasket	IPC 75-23-10-10-140
Fig. 402/10	Gasket	IPC 75-24-15-10-055
Fig. 402/11	Gasket	IPC 75-24-15-10-055
Fig. 403/22	Gasket	IPC 75-23-05-10-025
Fig. 403/24	Gasket	IPC 75-23-05-10-010

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-23-17-400-868	INSTALLATION OF THE TURBINE VANE AND BLADE COOLING AIR VALVE POSITION SWITCH (P/B 401)
IPC 75-23-05	Illustrated Parts Catalog
IPC 75-23-05-10-010	Illustrated Parts Catalog
IPC 75-23-05-10-025	Illustrated Parts Catalog
IPC 75-23-10-10-140	Illustrated Parts Catalog
IPC 75-24-15-10-055	Illustrated Parts Catalog

E. Job Set-up - PW4460/4462 and PW4460/4462 -3 Lower Right Turbine Vane and Blade Cooling Air Valve Installation

SUBTASK 75-26-06-010-272

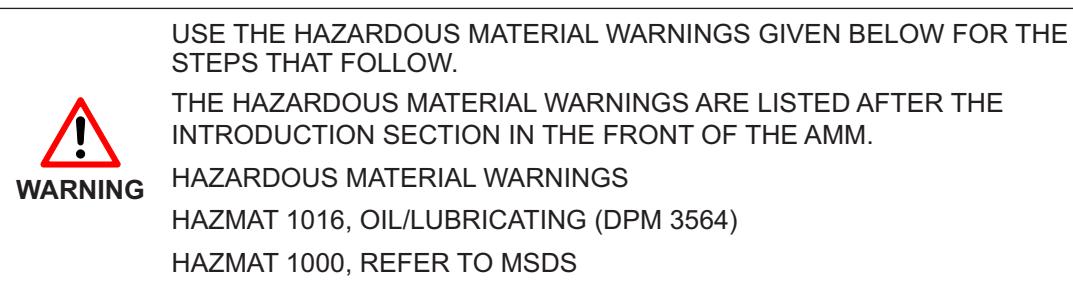
NOTE: The steps that follow are for engines before/after S/B PW4ENG 75-106.

- (1) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - PW4460/4462 and PW4460/4462 -3 Lower Right Turbine Vane and Blade Cooling Air Valve Installation

SUBTASK 75-26-06-420-270

- (1) If applicable, install signal air tube adapter (23) as follows: (Figure 402) (Figure 403)



- (a) Remove the protective caps and plugs.
- (b) Install the gasket (24) on the tube adapter (23).
- (c) Lubricate the adapter (23) threads with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (d) Install the adapter (23) in the TVBCAV (1). Torque the adapter to 110–120 in-lb (12.4–13.6 N·m).

SUBTASK 75-26-06-420-271

- (2) Install the lower right turbine vane and blade cooling air valve TVBCAV (1) as follows: (IPC 75-23-05) (Figure 402) (Figure 403)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.



HAZARDOUS MATERIAL WARNINGS

HAZMAT 1230, PARAFFIN/REFINED/STANDARD (DPM 589-1)

HAZMAT 1178, COMPOUND/ANTI-GALLING

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (a) Lubricate a gasket (22) with paraffin wax (P05-059). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

NOTE: If engine has the ring case style compressor (Post SB PW4ENG 72-757), install a turbine vane and blade cooling air valve (Post SB 75-147) with the foolproofing pin hole to match the pin on the flange boss.

NOTE: There are seven bolts which attach the valve to the case. Make sure to use the longer bolts for the bracket location on the valve.

- (b) Remove the protective caps and plugs from the openings of the TVBCAV (1) and the engine case.

- (c) Install a gasket (22) on the engine boss on the high pressure compressor (HPC) case.

- (d) Lubricate the bolts (4, 7, 15, 16 and 21) and the B-nut (3) threads with engine oil (P03-001).

- (e) Put the TVBCAV (1) and bracket (20) to the engine boss and attach with the bolts (21). Torque the bolts seven (21) to 85–95 in-lb (9.6–10.7 N·m). Torque the bolts (21) again in a diagonally opposite sequence until the torque holds at the correct value.

- (f) Install the bolts (15 and 16) onto the bracket (20) and through the clamps (17 and 18).

- (g) Attach the adjustable link (19) with bolt (15) and nut (13) to bracket (20). Install the nut (14) on the bolt (16). Torque the bolts (15 and 16) to 36–40 in-lb (4.1–4.5 N·m).

- (h) Install the gasket (6) between the rear flange of the TVBCAV (1) and the flange of the duct assembly (5) with the six bolts (4). Torque the bolts (4) to 85–95 in-lb (9.6–10.7 N·m). Torque the bolts (4) again in a diagonally opposite sequence until the torque holds at the correct value.

NOTE: The step that follows is for engines before S/B PW4ENG 72-627.

- (i) Install the gasket (11) on the bottom flange of the TVBCAV (1) and the gasket (10) on the tube (9). Install the ring spacer (12) between the gaskets (10 and 11).

NOTE: The step that follows is for engines after S/B PW4ENG 72-627.

- (j) Install the gasket (11) on the bottom flange of the TVBCAV (1) and the gasket (10) on the tube (9). Install the metering plate (12) between the gaskets (10 and 11).

NOTE: The steps that follow are for engines before/after S/B PW4ENG 72–627.

- (k) Attach the tube (9) and bracket (8) to the TVBCAV (1) with the four bolts (7). Torque the bolts (7) to 85–95 in-lb (9.6–10.7 N·m). Torque the bolts (7) again in a diagonally opposite sequence until the torque holds at the correct value.

NOTE: The step that follows is for engines before PHASE-3 configuration.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (l) Lubricate the threads of the adapter (23) with antigalling compound (P06-003). Install the air-signal tube (2) to the TVBCAV (1) and torque the B-nut (3) to 200–225 in-lb (22.6–25.4 N·m). Safety the B-nut with lockwire (P05-289).
NOTE: The step that follows is for engines after PHASE-3 configuration.
- (m) Lubricate the threads of the adapter (23) with engine oil (P03-001). Install the air-signal tube (2) to the TVBCAV (1) and torque the B-nut (3) to 270–300 in-lb (30.5–33.9 N·m). Safety the B nut with lockwire (P05-289).

SUBTASK 75-26-06-410-289

NOTE: The step that follows is for engines before S/B PW4ENG 75-106

- (3) If applicable, install the turbine vane and blade cooling air valve position switch.
(INSTALLATION OF THE TURBINE VANE AND BLADE COOLING AIR VALVE POSITION SWITCH, TASK 75-23-17-400-868)

SUBTASK 75-26-06-720-273

NOTE: The steps that follow are for all engines

- (4) Do the engine ground test at idle power. (ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870)

SUBTASK 75-26-06-410-282

- (5) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-26-06-720-274

- (6) Do the electronic engine control test at idle power. (ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873)

G. Job Close-up - PW4460/4462 and PW4460/4462 -3 Lower Right Turbine Vane and Blade Cooling Air Valve Installation

SUBTASK 75-26-06-942-268

- (1) Remove all the tools and equipment from the work area. Make sure that the area is clean.

———— END OF TASK ————

TASK 75-26-06-000-870

6. REMOVAL OF THE PW4460/4462 -3 UPPER RIGHT TURBINE VANE AND BLADE COOLING AIR VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 409

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 Engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - PW4460/4462 -3 Upper Right Turbine Vane and Blade Cooling Air Valve Removal

SUBTASK 75-26-06-010-273

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - PW4460/4462 -3 Upper Right Turbine Vane and Blade Cooling Air Valve Removal

SUBTASK 75-26-06-020-278

- (1) Remove the upper right turbine vane and blade cooling air valve (TVBCAV) (25) as follows: (Figure 404)
 - (a) Remove lockwire and disconnect the air signal tube (26) from the upper TVBCAV (25).
 - (b) Remove the six bolts (30) from the upper Turbine Vane and Blade (TVB) cooling air duct (29). Move the air duct away from the TVBCAV (25) and discard the gasket (31).
 - (c) Remove the bolt (33) and the nut (35) from the adjustable link (32) and the bracket (34).
 - (d) Remove the six bolts (36), and the bracket (34) from the TVBCAV (25).
 - (e) Remove the TVBCAV from the engine. Discard the gasket (37).
 - (f) Install protective caps and plugs on the openings of the TVBCAV (25) and the engine case.

SUBTASK 75-26-06-020-279

- (2) If it is necessary to install a new TVBCAV (25), remove the adapter (27) and discard the gasket (28). (Figure 404)

SUBTASK 75-26-06-410-290

- (3) If the TVBCAV is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

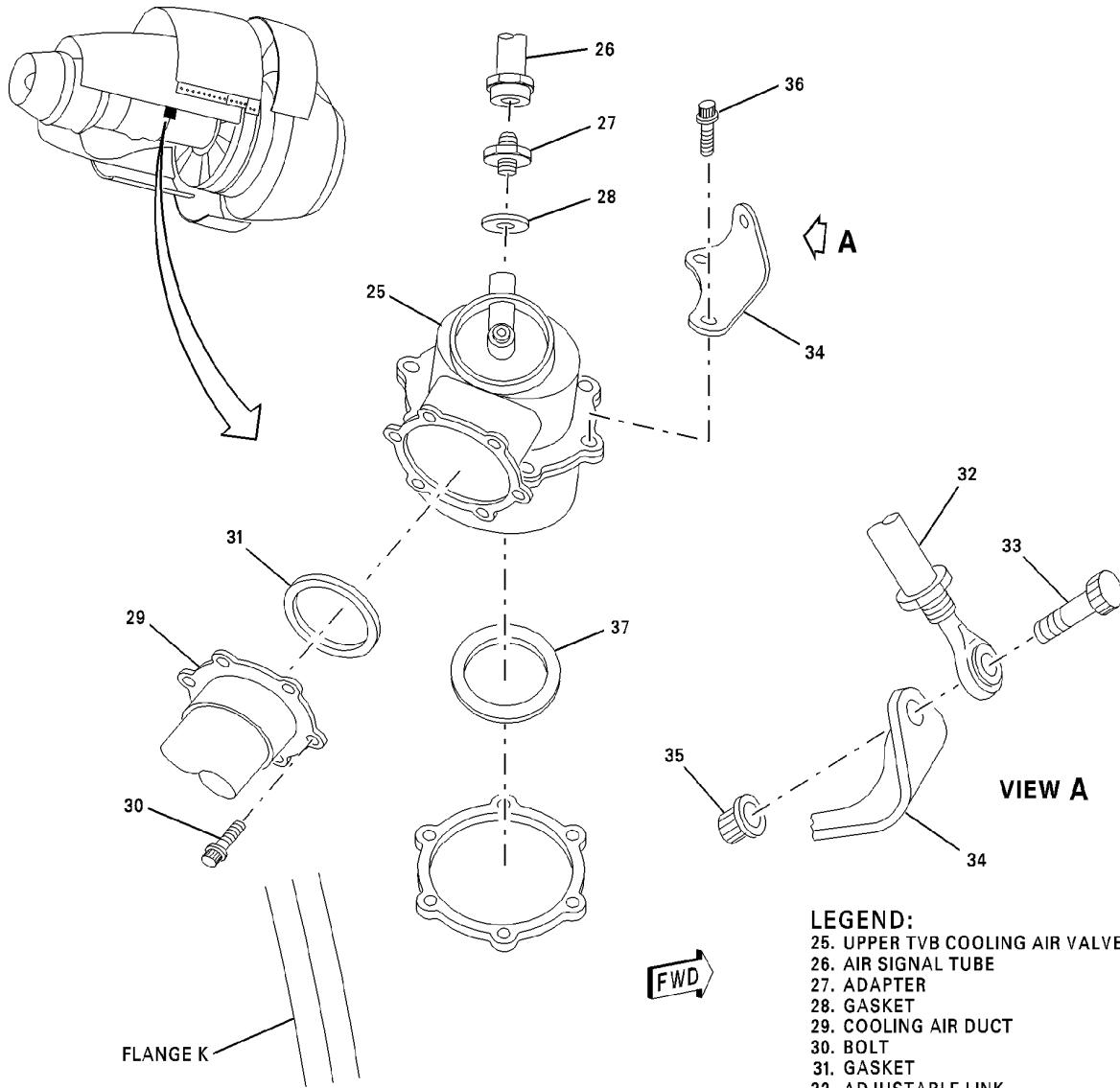
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LEGEND:

- 25. UPPER TVB COOLING AIR VALVE
- 26. AIR SIGNAL TUBE
- 27. ADAPTER
- 28. GASKET
- 29. COOLING AIR DUCT
- 30. BOLT
- 31. GASKET
- 32. ADJUSTABLE LINK
- 33. BOLT
- 34. BRACKET
- 35. NUT
- 36. BOLT
- 37. GASKET

CAG(IGDS)

DB2-75-0272A

Upper Right Turbine Vane and Blade Cooling Air Valve
Figure 404/75-26-06-990-876

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-26-06-400-870

7. INSTALLATION OF THE PW4460/4462 -3 UPPER RIGHT TURBINE VANE AND BLADE COOLING AIR VALVE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 410

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0-400 in-lb (0-45.2 N·m)
Model M303, M305 or M307	Crimper, Bergen Mechanical

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 411

REFERENCE	DESIGNATION
P03-001	Oil, Engine lubricating (PWA 521B)
P05-059	Wax, paraffin (PMC 9552)
P06-003	Compound, antigalling (PWA 586)
P05-289	Lockwire (AS3214-02)
P05-291	Cable, safety
P05-292	Ferrule, safety cable

C. Expendable Parts

(1) Expendable Parts

Table 412

REFERENCE/ITEM	DESIGNATION	IPC
28	Gasket	IPC 75-23-05-10-010
31	Gasket	IPC 75-23-10-10-140
37	Gasket	IPC 75-23-05-10-025

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-23-05	Illustrated Parts Catalog
IPC 75-23-05-10-010	Illustrated Parts Catalog
IPC 75-23-05-10-025	Illustrated Parts Catalog
IPC 75-23-10-10-140	Illustrated Parts Catalog

E. Job Set-up - PW4460/4462 -3 Upper Right Turbine Vane and Blade Cooling Air Valve Installation

SUBTASK 75-26-06-010-275

- (1) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - PW4460/4462 -3 Upper Right Turbine Vane and Blade Cooling Air Valve Installation

SUBTASK 75-26-06-420-273

- (1) If applicable, install signal air tube adapter (27) as follows: (Figure 404)
 - (a) Remove the protective caps and plugs.
 - (b) Install the gasket (28) on the tube adapter (27).



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (c) Lubricate the adapter (27) threads with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (d) Install the adapter (27) with the gasket (28) in the supply port of the TVBCAV (25). Torque the adapter to 110–120 in-lb (12.4–13.6 N·m).

SUBTASK 75-26-06-420-274

- (2) Install the upper TVBCAV (25) as follows: (IPC 75-23-05) (Figure 404)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1230, PARAFFIN/REFINED/STANDARD (DPM 589-1)

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (a) Lubricate a gasket (37) with paraffin wax (P05-059). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (b) Remove the protective caps and plugs from the openings of the TVBCAV (25) and the engine case.
- (c) Install the gasket (37) on the engine boss on the HPC at the 2 o'clock position.
- (d) Lubricate the threads of the six bolts (36) with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (e) Install a new gasket (31) against the flange of the air duct (29).
- (f) Align the TVBCAV (25) and the bracket (34) on the engine boss and against the flange of air duct (29).
- (g) Install the six bolts (36) and torque the bolts to 85–95 in-lb (9.6–10.7 N·m). Torque the bolts again in a diagonally opposite sequence until the torque holds at the correct value.

SUBTASK 75-26-06-420-275

- (3) Attach the turbine vane and blade (TVB) cooling air duct (29) to the TVBCAV (25) as follows: (Figure 404)
 - (a) Make sure the gasket (31) is still in place against the flange of the air duct (29).



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the six bolts (30) with engine oil (P03-001).
- (c) Insert the six bolts (30) between the rear flange of the TVBCAV (25) and the flange of the air duct (29). Torque the bolts to 85–95 in-lb (9.6–10.7 N·m). Torque the bolts again in a diagonally opposite sequence until the torque holds at the correct value.

SUBTASK 75-26-06-420-276

- (4) Attach the adjustable link (32) to the bracket (34) on the TVBCAV flange as follows: (Figure 404)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (a) Lubricate the bolt (33) with engine oil (P03-001).
- (b) Align the adjustable link (32) with the bracket (34). Insert the bolt (33) through the adjustable link and the bracket and install the nut (35).
- (c) Torque the bolt (33) to 36-40 in-lb (4.1–4.5 N·m).



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1178, COMPOUND/ANTI-GALLING

HAZMAT 1000, REFER TO MSDS

- (d) Lubricate the threads of the adapter (27) with engine oil (P03-001). Install the air-signal tube (26) to the adapter (27) on the TVBCAV (25). Torque the B-nut to 270–300 in-lb (30.5–33.9 N·m). Safety the B-nut with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

SUBTASK 75-26-06-720-271

- (5) Do the engine ground test at idle power. (ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870)

SUBTASK 75-26-06-410-279

- (6) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-26-06-720-272

- (7) Do the electronic engine control test at idle power. (ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873)

G. Job Close-up - PW4460/4462 -3 Upper Right Turbine Vane and Blade Cooling Air Valve Installation

SUBTASK 75-26-06-942-279

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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AIRCRAFT MAINTENANCE MANUAL

INDICATOR PIN, TURBINE VANE AND BLADE COOLING AIR VALVE – INSPECTION/CHECK

1. General

- A. This procedure has the inspection instructions for the turbine vane and blade cooling air (TVBCA) valves position indicator pins. The valves are installed on the HPC rear case at the 9:30 and 3:00 o'clock positions. The indicator pin for the left TVBCA valve is located on the valve housing. The indicator pin for the right TVBCA valve is located on the position switch. The right TVBCA indicator pin moves a valve position switch. This switch provides the FADEC/EEC with a position feedback signal.

NOTE: A retracted position indicator pin on a TBVCA valve is an indication that the valve has failed.
The valve is in the closed position.

NOTE: When a TBVCA valve does not operate correctly it will cause high operation temperatures in the HPT and LPT modules. Continuous operation of engines with failed valves will decrease the life of the life-limited parts of the turbine modules.

- B. Unless different instructions are given, these procedures are the same for all three Pratt & Whitney PW4460/4462 engines.

TASK 75-26-06-200-868

2. INSPECTION OF THE TURBINE VANE AND BLADE VALVE INDICATOR PIN

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 601

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-26-06-000-868	REMOVAL OF THE PW4460/4462 and PW4460/4462 -3 LEFT TURBINE VANE AND BLADE COOLING AIR VALVE (P/B 401)
75-26-06-000-869	REMOVAL OF THE PW4460/4462 and PW4460/4462 -3 LOWER RIGHT TURBINE VANE AND BLADE COOLING AIR VALVE (P/B 401)
75-26-06-400-868	INSTALLATION OF THE PW4460/4462 and PW4460/4462 -3 LEFT TURBINE VANE AND BLADE COOLING AIR VALVE (P/B 401)
75-26-06-400-869	INSTALLATION OF THE PW4460/4462 and PW4460/4462 -3 LOWER RIGHT TURBINE VANE AND BLADE COOLING AIR VALVE (P/B 401)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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C. Job Set-up - Turbine Vane and Blade Valve Indicator Pin Inspection

SUBTASK 75-26-06-010-274

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Turbine Vane and Blade Valve Indicator Pin Inspection

SUBTASK 75-26-06-210-267

- (1) Examine the position of the turbine vane and blade valves (TBVCA) (1 and 1A) position indicator Pins (2 and 2A) as follows: (Figure 601) (Figure 602)
 - (a) Make sure the position indicator pins (2 and 2A) are in the extended position. This will show that the valves are open.
 - (b) If a TBVCA position indicator pin is in the retracted position, the TBVCA valve has failed. The valve is in the closed position. Replace the defective TCA valve as soon as possible, but not later than ten days after the inspection. As applicable, see the referenced Tasks: (REMOVAL OF THE PW4460/4462 and PW4460/4462 -3 LEFT TURBINE VANE AND BLADE COOLING AIR VALVE, TASK 75-26-06-000-868) (INSTALLATION OF THE PW4460/4462 and PW4460/4462 -3 LEFT TURBINE VANE AND BLADE COOLING AIR VALVE, TASK 75-26-06-400-868) (REMOVAL OF THE PW4460/4462 and PW4460/4462 -3 LOWER RIGHT TURBINE VANE AND BLADE COOLING AIR VALVE, TASK 75-26-06-000-869) (INSTALLATION OF THE PW4460/4462 and PW4460/4462 -3 LOWER RIGHT TURBINE VANE AND BLADE COOLING AIR VALVE, TASK 75-26-06-400-869)

E. Job Close-up - Turbine Vane and Blade Valve Indicator Pin Inspection

SUBTASK 75-26-06-942-269

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-26-06-410-272

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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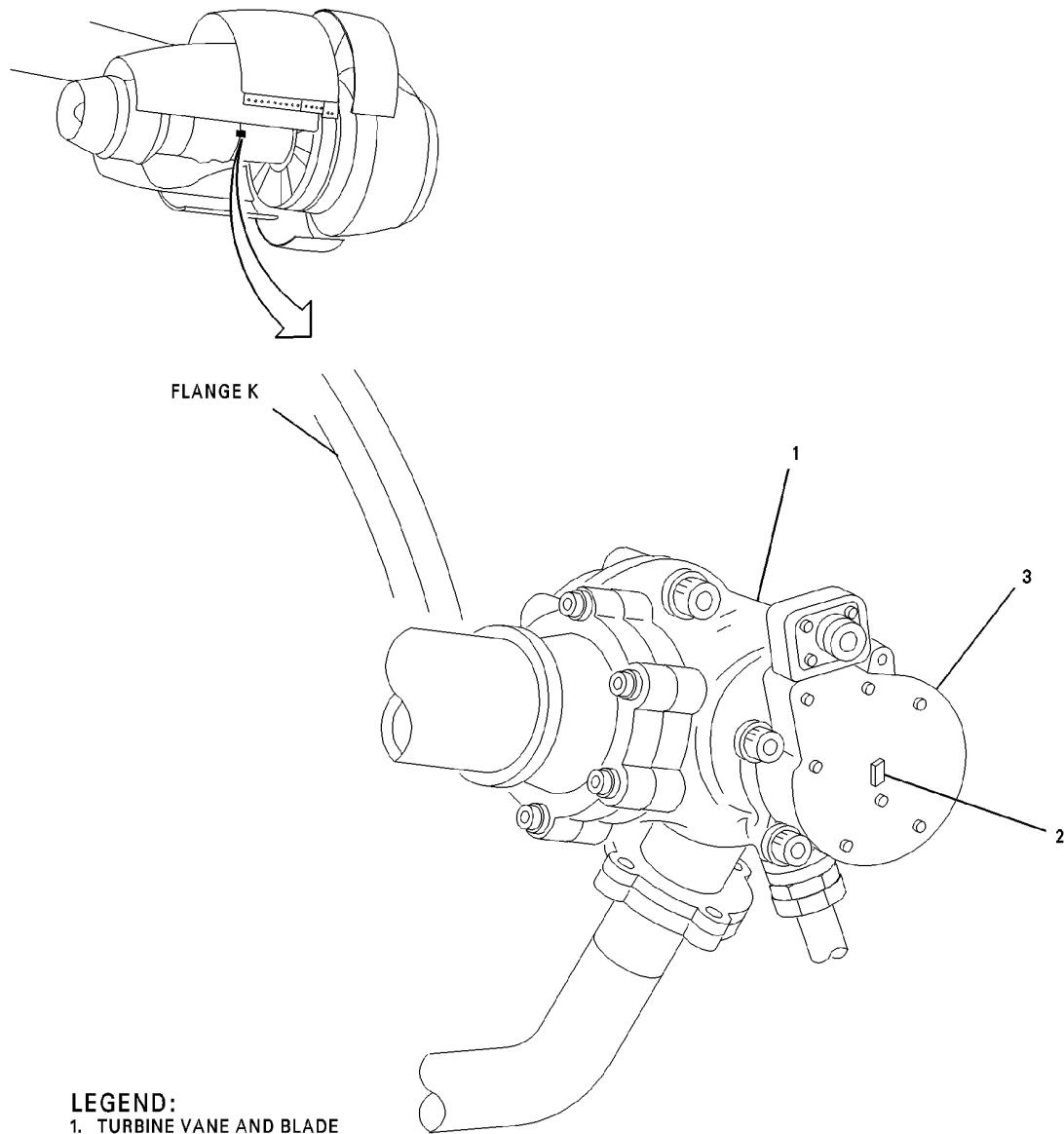
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CAG(IGDS)

DB2-75-0264

Turbine Vane and Blade Cooling Air Valve - Right Side
Figure 601/75-26-06-990-871

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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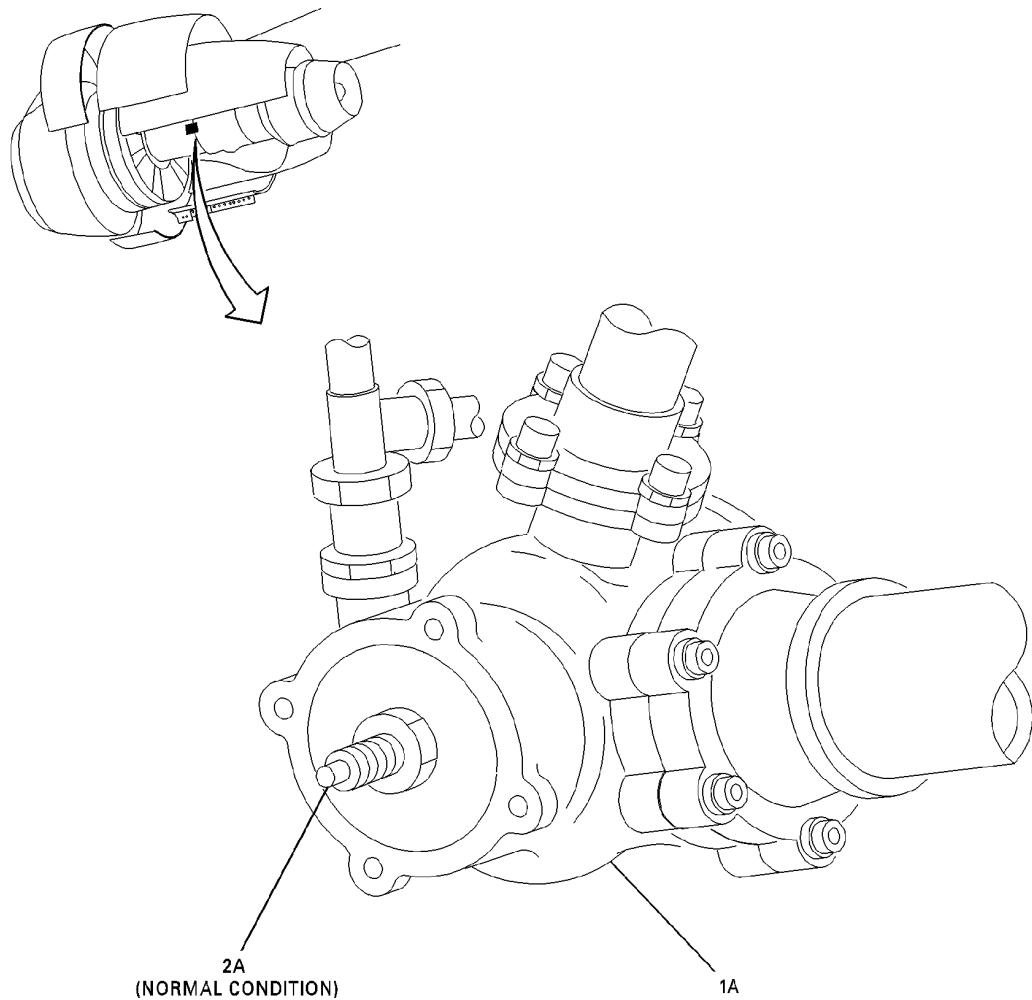
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LEGEND:

- 1A. TURBINE VANE AND BLADE
COOLING AIR (TVBCA) VALVE
- 2A. POSITION INDICATOR PIN

CAG(IGDS)

DB2-75-0265

Turbine Vane and Blade Cooling Air Valve - Left Side
Figure 602/75-26-06-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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FILTER ELEMENT, TURBINE VANE AND BLADE COOLING AIR VALVE - MAINTENANCE PRACTICES

1. General

- A. This procedure has the maintenance practices for the turbine vane and blade cooling air valve (TVBCAV) filter elements. Access to the TVBCAV filter elements is through the left and right thrust reverser doors. The maintenance practices for the filter elements on the left and the right side of the engine are the same. This procedure includes:
 - Removal of the TVBCAV filter element
 - Installation of the TVBCAV filter element
 - Inspection of the TVBCAV filter element
 - Cleaning of the TVBCAV filter element.
- B. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 and PW4460/4462 -3 engines.

TASK 75-26-07-000-868

2. REMOVAL OF THE TURBINE VANE AND BLADE COOLING AIR VALVE FILTER ELEMENT

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 201

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Turbine Vane and Blade Cooling Air Valve Filter Element Removal

SUBTASK 75-26-07-010-268

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Turbine Vane and Blade Cooling Air Valve Filter Element Removal

SUBTASK 75-26-07-020-267

- (1) Remove the turbine vane and blade cooling air valve (TVBCAV) filter element (1) as follows: (Figure 201)
 - (a) Remove the filter case (2) from the filter head assembly (3).
 - (b) Remove the filter element (1) from the filter head assembly (3).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (c) Install the protective caps and plugs on the filter head assembly (3).

NOTE: The procedure for the removal of the filter elements for the left and the right side of the engine is the same.

SUBTASK 75-26-07-410-267

- (2) If the TVBCAV filter element (1) is not installed immediately, or weather conditions make it necessary, close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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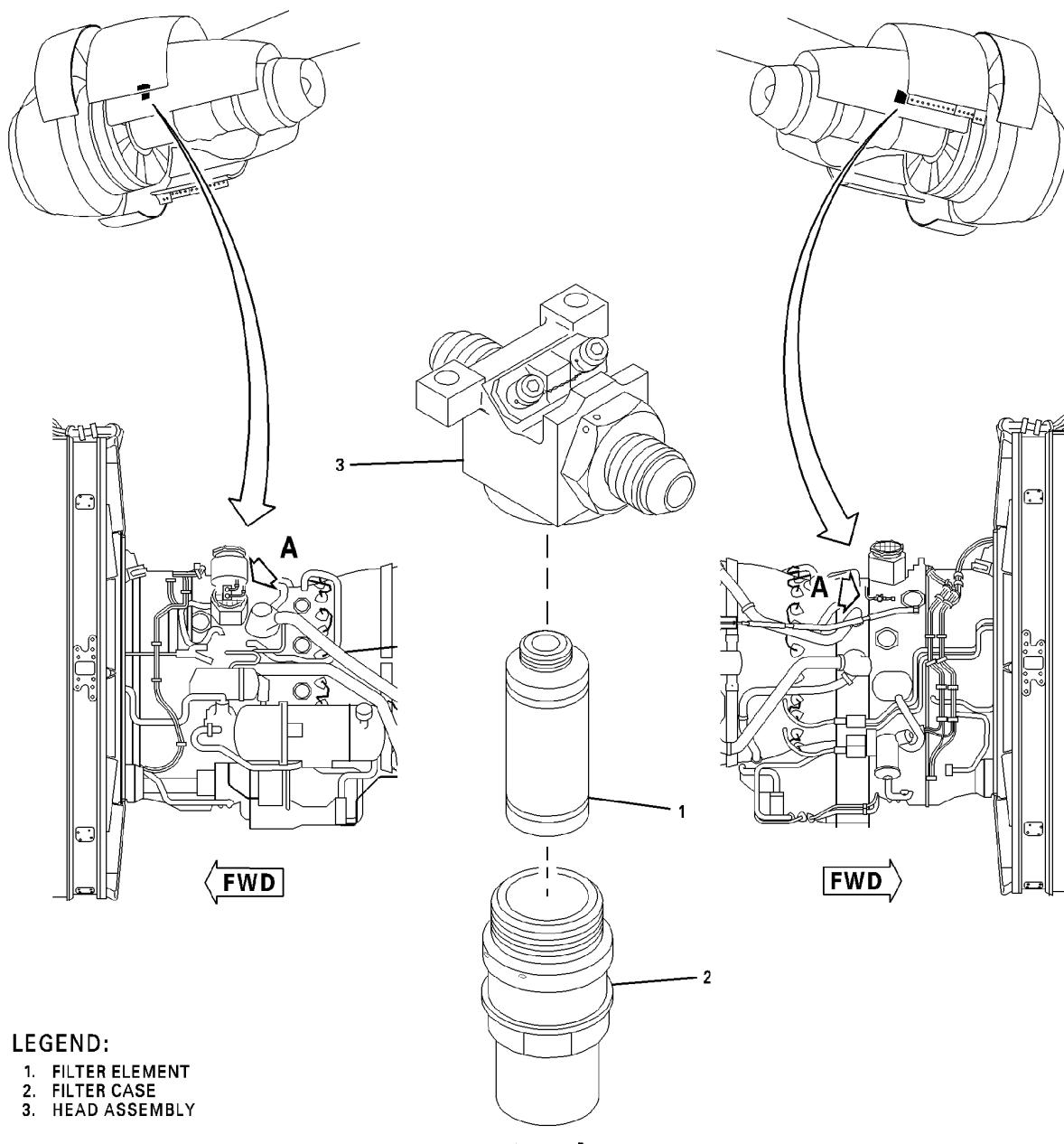
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LEGEND:

1. FILTER ELEMENT
2. FILTER CASE
3. HEAD ASSEMBLY

CAG(IGDS)

DB2-75-0118

TVBCAV Filter Element - Removal/Installation
Figure 201/75-26-07-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-26-07-400-868

3. INSTALLATION OF THE TURBINE VANE AND BLADE COOLING AIR VALVE FILTER ELEMENT

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 202

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0–350 in-lb (40 N·m)

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

Table 203

REFERENCE	DESIGNATION
P05-289	Lockwire (AS3214-02)

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - Turbine Vane and Blade Cooling Air Valve Filter Element Installation

SUBTASK 75-26-07-010-270

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - Turbine Vane and Blade Cooling Air Valve Filter Element Installation

SUBTASK 75-26-07-420-267

- (1) Install the turbine vane and blade cooling air valve filter element (1) as follows: (Figure 201)
- Remove the protective caps and plugs from the filter head assembly (3).
 - Turn the filter element (1) on the head assembly (3).
 - Tighten the filter element (1) with your hand.
 - Install the filter case (2) on to the filter head assembly (3).
 - Torque the filter case (2) to 240-300 in-lb (27.12-33.9 N·m).
 - Safety the filter case (2) to the filter head assembly (3) with lockwire (P05-289). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

NOTE: The procedure for the installation of the filter elements for the left and the right side of the engine is the same.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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F. Job Close-up - Turbine Vane and Blade Cooling Air Valve Filter Element Installation

SUBTASK 75-26-07-942-267

- (1) Remove all the tools and equipment from the work area. Make sure that the area is clean.

SUBTASK 75-26-07-410-268

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

TASK 75-26-07-200-868

4. INSPECTION OF THE TURBINE VANE AND BLADE COOLING AIR VALVE FILTER ELEMENT

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 204

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Turbine Vane and Blade Cooling Air Valve Filter Element Inspection

SUBTASK 75-26-07-010-272

- (1) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-26-07-020-268

- (2) Remove the turbine vane and blade cooling air valve (TVBCAV) filter element. (REMOVAL OF THE TURBINE VANE AND BLADE COOLING AIR VALVE FILTER ELEMENT, TASK 75-26-07-000-868)

D. Procedure - Turbine Vane and Blade Cooling Air Valve Filter Element Inspection

SUBTASK 75-26-07-210-267

- (1) Examine the TVBCAV filter element (1) for signs of unwanted material. (Figure 201)
- (2) If necessary, clean the TVBCAV filter element (1). (CLEANING OF THE TURBINE VANE AND BLADE COOLING AIR VALVE FILTER ELEMENT, TASK 75-26-07-100-868)

E. Job Close-up - Turbine Vane and Blade Cooling Air Valve Filter Element Inspection

SUBTASK 75-26-07-420-268

- (1) Install the TVBCAV filter element. (INSTALLATION OF THE TURBINE VANE AND BLADE COOLING AIR VALVE FILTER ELEMENT, TASK 75-26-07-400-868)

SUBTASK 75-26-07-942-268

- (2) Remove all the tools and equipment from the work area. Make sure the area is clean.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-26-07-410-270

- (3) If necessary, close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

END OF TASK

TASK 75-26-07-100-868

5. CLEANING OF THE TURBINE VANE AND BLADE COOLING AIR VALVE FILTER ELEMENT

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 205

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 206

REFERENCE	DESIGNATION
P05-005	Cloth, lint-free
P11-004	Solvent, cleaning (P-D-680) type II
P05-058	Brush, stiff bristle nonmetallic

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

D. Job Set-up - Turbine Vane and Blade Cooling Air Valve Filter Element Cleaning

SUBTASK 75-26-07-010-274

- (1) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-26-07-020-269

- (2) Remove the TVBCAV filter element. (REMOVAL OF THE TURBINE VANE AND BLADE COOLING AIR VALVE FILTER ELEMENT, TASK 75-26-07-000-868)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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E. Procedure - Turbine Vane and Blade Cooling Air Valve Filter Element Cleaning

SUBTASK 75-26-07-140-267

- (1) Clean the turbine vane and blade cooling air valve (TVBCAV) filter element (1) as follows: (Figure 201)

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1179, SOLVENT/P-D-680 TYPE 2

HAZMAT 1000, REFER TO MSDS

- (a) Remove the unwanted material from the filter element (1) with the brush (P05-058) and the cleaning solvent (P11-004). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)



MAKE SURE YOU USE THE APPROVED SAFETY EQUIPMENT FOR YOUR EYES WHEN YOU USE COMPRESSED AIR. DO NOT LET THE AIR BLOW IN YOUR EYES OR ON YOUR SKIN. THIS WILL HELP PREVENT INJURY TO PERSONS.

- (b) Dry the filter element (1) with the cloth (P05-005) or with dry filtered compressed air at 20 psig (138 kpa) maximum.
- (c) If necessary, install a new filter element (1).

F. Job Close-up - Turbine Vane and Blade Cooling Air Valve Filter Element Cleaning

SUBTASK 75-26-07-420-269

- (1) Install the TVBCAV filter element. (INSTALLATION OF THE TURBINE VANE AND BLADE COOLING AIR VALVE FILTER ELEMENT, TASK 75-26-07-400-868)

SUBTASK 75-26-07-942-269

- (2) Remove all the tools and equipment from the work area. Make sure that the area is clean.

SUBTASK 75-26-07-410-272

- (3) If necessary, close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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MD-11 AIRCRAFT MAINTENANCE MANUAL

COMPRESSOR AIRFLOW CONTROL - DESCRIPTION AND OPERATION

1. General

- A. The compressor airflow control system has the variable bypass valve (VBV) and the variable stator vane (VSV) systems. These two systems control the primary airflow that goes through the high pressure compressor (HPC). The VBV and the VSV systems continuously adjust the primary airflow which gives the best compressor performance during engine start, ground idle, take-off, and cruise. The VBV and VSV systems receive their command signals from the electronic control unit (ECU), and operational pressure from the hydro-mechanical unit (HMU).

2. Variable Bypass Valve System

- A. The VBV system controls the primary airflow that enters the high pressure compressor (HPC). When the airflow goes through the low pressure compressor (LPC) and is too high for entry into the HPC, the VBV's bleed the excessive air into the secondary air stream. (Figure 1)
- B. The VBV's open during low and unstable engine operation, and become fully open during rapid engine deceleration and thrust reverser operations. The VBV's close during take-off and cruise operations.

3. Variable Stator Vane System

- A. The variable stator vane (VSV) system controls the primary airflow quantity as it goes through the first five stages of the HPC. It changes the angles of the inlet guide vanes (IGV) and the VSV's to keep the pressure build-up in the first five stages in the correct proportion to the pressure build-up in aft stages of the HPC.
- B. The angle of the IGV's and the VSV's changes the effective angle at which the air flows over the rotor blades. The continuous adjustment of the IGV and VSV angles prevent excessive pressure build-up in the forward stages of the HPC. Too much pressure difference between the low and the high pressure stages of the HPC can cause compressor stall and damage to the HPC blades and stator vanes.

4. System Operation

- A. At low engine RPM the VSV's are in the closed position to allow minimum airflow through the HPC. At high engine RPM the VSV's are open to allow maximum airflow through the HPC. If the ECU finds that there is too much pressure build-up in the aft stages of the HPC, the vanes will begin to close. The actuator is electrically scheduled to open the vanes during engine failure.
- B. The VBV system operates as part of the engine primary air flow control. Signals from the ECU go to the VBV system. The VBV sends feedback signals to the ECU. The ECU sends signals to the HMU and the HMU supplies fuel pressure to open and close the VBV's. When the HPC has more air pressure than necessary for engine operation, the VBV's bleed the booster air into the secondary airstream. This causes a better balanced airflow through the HPC which improves engine performance.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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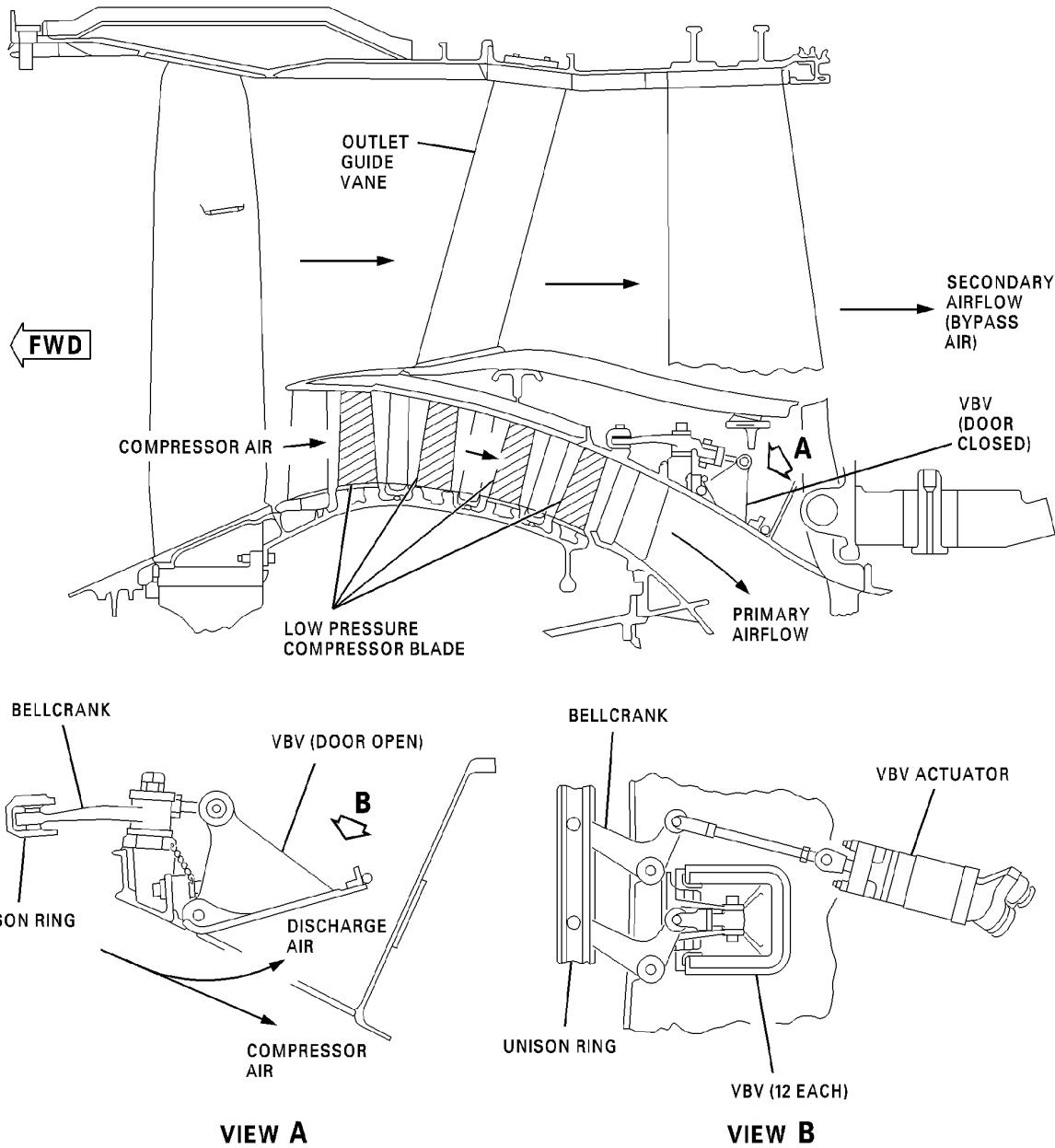
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VBV System Airflow
Figure 1/75-30-00-990-801

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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COMPRESSOR CONTROL - DESCRIPTION AND OPERATION

1. General

- A. The compressor control systems include the variable stator vane, 2.5 compressor bleed system, and 2.9 start/stability bleed system. (Figure 1)
- B. The compressor control systems operate the compressor during start, idle, takeoff, and cruise conditions. The systems operate automatically, as a function of low rotor speed (N1) and high rotor speed (N2), RPM, altitude, and inlet total temperature (T2), through the electronic engine control (EEC).

2. Variable Stator Vane System

- A. Variable geometry stator vanes are included on the inlet guide vanes (IGV) and the 5th, 6th and 7th stages of the high pressure compressor (HPC). The stator vane actuator position is scheduled as a function of the low speed rotor (N1), high speed rotor (N2) and engine inlet total temperature (T2). The electronic engine control (EEC) interfaces with the stator vane actuator through a pilot valve that is positioned by a dual coil torque motor in the VSV actuator.

3. Intercompressor (2.5) Bleed System

- A. The 2.5 bleed system supplies increased compressor stability during starting, transient, and reverse thrust operation.

4. Start/Stability (2.9) Bleed System

- A. The 2.9 bleed valves are installed at the 10 o'clock and 1 o'clock positions on the HPC. The valve is a normally-open, pneumatically-operated, poppet-type air shutoff valve. The valve is used to control the flow of HPC air that is bled to the fan stream.
- B. The two solenoid valves are remotely mounted on the intermediate case as part of a single assembly. The valves have two sections which actuate and control air flow to the bleed valve. The solenoids each have two coils, either of which can actuate the solenoid valve.

5. System Operation

- A. Variable Stator Vanes (VSV): The VSV's are automatically adjusted mechanically to supply adequate stall margins for engine starting, acceleration and partial power operations. At low engine RPM the VSV's are positioned in the closed direction to permit minimum airflow through the compressor. At high engine RPM the variable vanes are open to allow maximum airflow through the compressor. The EEC will close the VSV's if a surge may occur. The actuator is electrically fail-safe to open the vanes.
- B. The 2.5 Bleed System: The electronic-engine-control (EEC) modulates the 2.5 bleed-valve actuator to a schedule set by the thrust lever angle, low rotor (N1) RPM , high rotor (N2) RPM, mach number, engine inlet total temperature (T2) and altitude. The actuator piston motion is transmitted by mechanical linkage and a series of cams and rollers to position the 360° (2261.5 rad) translating ring 2.5 bleed valve. During engine start the bleed valve moves to the full open position and vents LPC discharge (4th stage) air into the fan stream. The valve is full open at idle. As engine power is increased the valve modulates to the closed position. The valve is commanded to the open position during rapid engine decelerations, reverse thrust, or if a surge may occur.
- C. The 2.9 Bleed System: The two 9th stage compressor bleed valves, (HPC 9th stage start/stability (2.9) bleed system) provide increased compressor stability during engine start and transient operation. The bleed valves are controlled as a function of high pressure rotor speed (N2) and engine inlet total temperature (T2). The electronic engine control (EEC) operates the compressor bleed valves through two redundant coil solenoid valve assemblies.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-30-00

Config 2

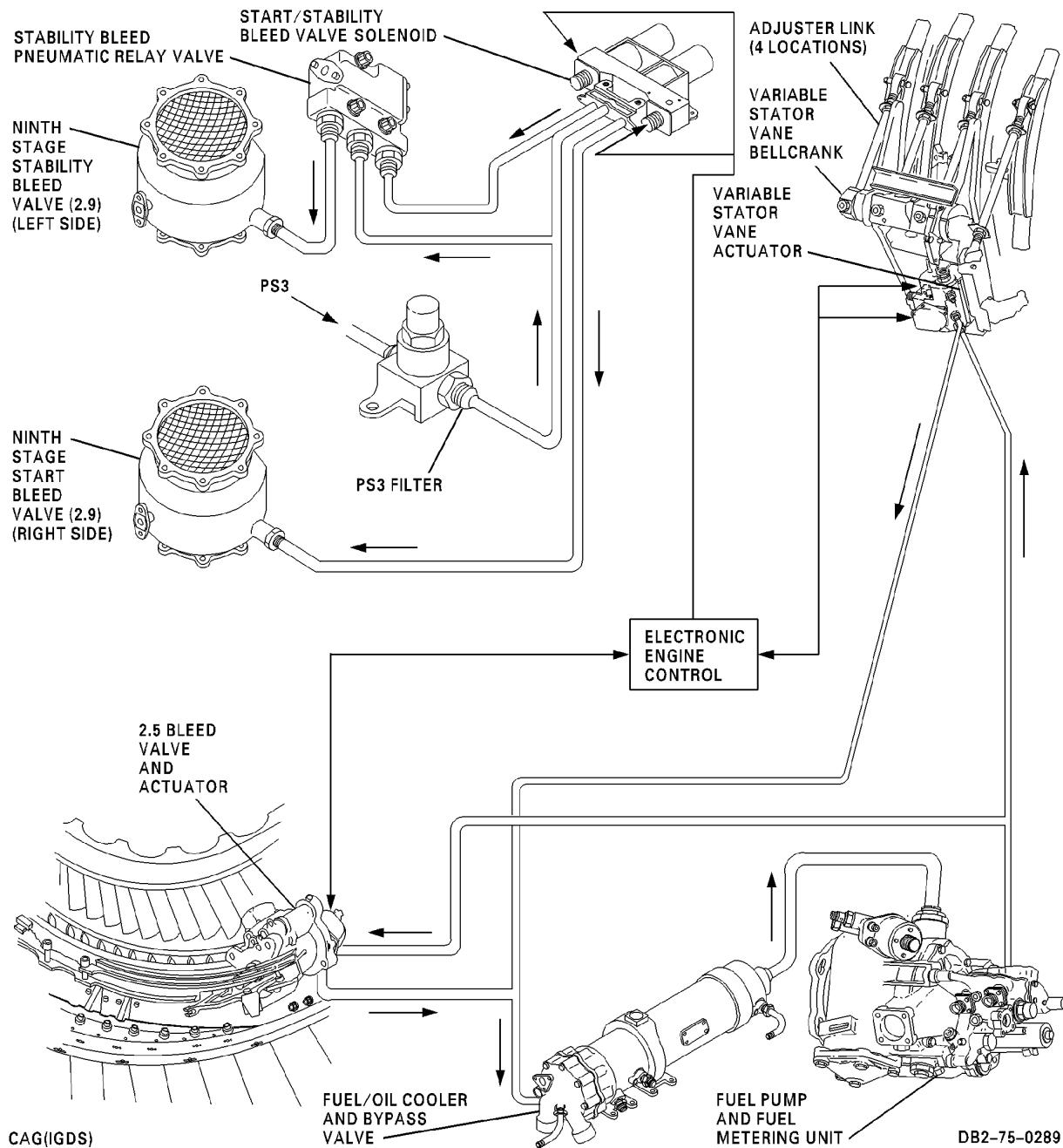
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Compressor Airflow Control System Diagram
Figure 1/75-30-00-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-30-00

Config 2

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VARIABLE STATOR VANE CONTROL SYSTEM - DESCRIPTION AND OPERATION

1. General

- A. The Variable Stator Vane (VSV) system controls the primary airflow through the High Pressure Compressor (HPC). The system changes the angle of the Inlet Guide Vane (IGV) and the five stages of the VSV. A change in vane angle changes the direction and speed of the airflow across the rotor blades. Blade angle changes are necessary to control the airflow and the air pressure in the compressor.
- B. The angles of the IGV and the first five stages of the HPC continuously change during engine operation. This continuous change is necessary to make sure that the pressure build-up in the HPC is kept in proportion throughout all stages. The IGV/VSV control system functions with the help of the assemblies and components that follow: (Figure 1)
 - One stage of inlet guide vanes (IGV)
 - Five stages of variable stator vanes (VSV)
 - The electronic control unit (ECU)
 - The Hydro-Mechanical Unit (HMU)
 - Two fuel-hydraulic IGV/VSV actuators
 - Two linear variable differential transformers (LVDT)
 - A mechanical control system (levers, links, actuation rings).

2. Inlet Guide Vanes and Variable Stator Vanes

- A. The inlet guide vanes (IGV) and the variable stator vanes (VSV) continuously change their angular position during engine operation. The synchronized angular motion of the IGV's and the VSV's make sure that there is a slow and continuous air pressure build-up throughout the HPC. For smooth engine operation it is necessary that the compressed air does not buffet between the HPC stages. It is also necessary for the air pressure build-up not to become too high for the aft stages of the HPC. This can cause the HPC to stall. Air buffet or compressor stall can cause serious damage to the compressor vanes and blades. The continuous angular adjustment of the stator blades makes sure that the airflow is aerodynamically correct for smooth engine operation.
- B. The IGV stage is operated by the same actuators and actuation levers that operate the VSV stages. Its angular position is monitored by the Electronic Control Unit (ECU) and operated by fuel pressure controlled by the HMU. (Figure 1)

3. Electronic Control Unit

- A. The ECU continuously calculates the IGV/VSV actuator position, compressor inlet temperature (CIT), ambient pressure (Po), and the core engine speed (N2) and adjusts the angles of the IGV's and the VSV's until the engine inputs stabilize.
- B. The feedback sensors in the IGV/VSV actuator gives the ECU a continuous update about the actuator piston position. (Figure 3) The sensor in the left side actuator uses channel A to send the feedback signal to the ECU. The sensor in the right side actuator uses channel B to send the feedback signal to the ECU. When the ECU finds an error between the scheduled VSV position and the actual position, it sends a signal to the HMU. The HMU adjusts the fuel pressure to the head-ends and rod-ends of the actuators until the position of the IGV's and VSV's agree with the schedule calculated by the ECU.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-31-00

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4. Hydro Mechanical Unit

- A. The HMU has a two stage torque motor/servo valve to position the IGV/VSV actuators. The torque motor has two electrically isolated and independent coils. One for channel A and the other for channel B of the ECU. A servo valve supplies pressurized fuel to the IGV/VSV actuators. When there is no electrical input signal, the HMU torque motor causes the vanes to move to the closed position.

5. Fuel-Hydraulic IGV/VSV Actuators

- A. The two IGV/VSV actuators are attached to brackets at the 3 o'clock and 9 o'clock positions. (Figure 3) on the aft side of the fan-frame. The rod-ends of the actuators are attached to the actuation levers on both sides of the engine (Figure 1) The two VSV actuators are hydraulically operated by high pressure fuel controlled by a servo in the HMU.
- B. The actuator piston rod-end cap has a dual stage seal, a wiper ring, and a fuel drain port . (Figure 3) The wiper ring cleans the piston rod on the retract stroke, this keeps the piston rod dirt-free. If fuel leakage occurs in the dual stage seal, the fuel drains through the drain port to the engine drain mast. The outer seal of the dual stage seal prevents fuel leakage from the piston rod to the compressor case area.
- C. The piston has a preformed packing to prevent fuel leakage across the head of the piston. (Figure 3) The piston stroke is controlled by internal stops. The piston rod has internal threads to attach an adjustable rod-end bearing.

6. Linear Variable Differential Transformer

- A. The linear variable differential transformer (LVDT) is a position feedback sensor that tells the ECU the position of the piston. It is housed in the IGV/VSV actuator. The LVDT has a primary wire coil and two secondary wire coils and a probe in the center. The probe is connected to the piston, and it moves with the piston. The probe turns as it moves in or out of the coil. The electrical connector at the clevis end of the actuator connects the LVDT to the ECU. (Figure 3)
- B. There are two IGV/VSV actuation levers, one on each side of the engine. The aft end of the lever is attached to a pivot bolt opposite the 10th-stage stator vanes. At the forward end is a pin that goes through the rod-end bearing of the IGV/VSV actuator. (Figure 1)

7. Mechanical Control System

- A. There are six, two-piece, 360° degree actuation rings. (Figure 1) The actuation rings are connected at the 3 o'clock and 9 o'clock positions. The IGV/VSV actuators mechanically move the actuation rings which synchronizes the angular changes of the IGV and VSV stator blades.
- B. Six adjustable interstage links connect the IGV/VSV actuator levers to the actuation rings. (Figure 1) When pushed or pulled by the IGV/VSV actuators, the rings turn circumferentially around the horizontal axis of the compressor. Each vane is connected to the actuation rings by a lever.

8. System Operation

- A. The ECU sends signals to the HMU to move the variable stator vanes to a set position. High-pressure fuel from the HMU goes to the actuators to move the vanes. The LVDT in the actuator monitors the movement of the actuator and sends a feed-back signal to the ECU.
- B. High-pressure fuel, supplied to the head end of each IGV/VSV actuator, causes the piston rods to extend. The left actuation lever moves down and the right actuation lever moves up. This movement turns the actuation rings and moves the levers that opens the IGV's and the VSV's.
- C. High-pressure fuel, supplied to the rod end of the VSV actuators, causes the piston rods to retract. The left actuation lever moves up and the right actuation lever moves down. This movement turns the actuation rings and moves the levers to close the IGV's and the VSV's.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-31-00

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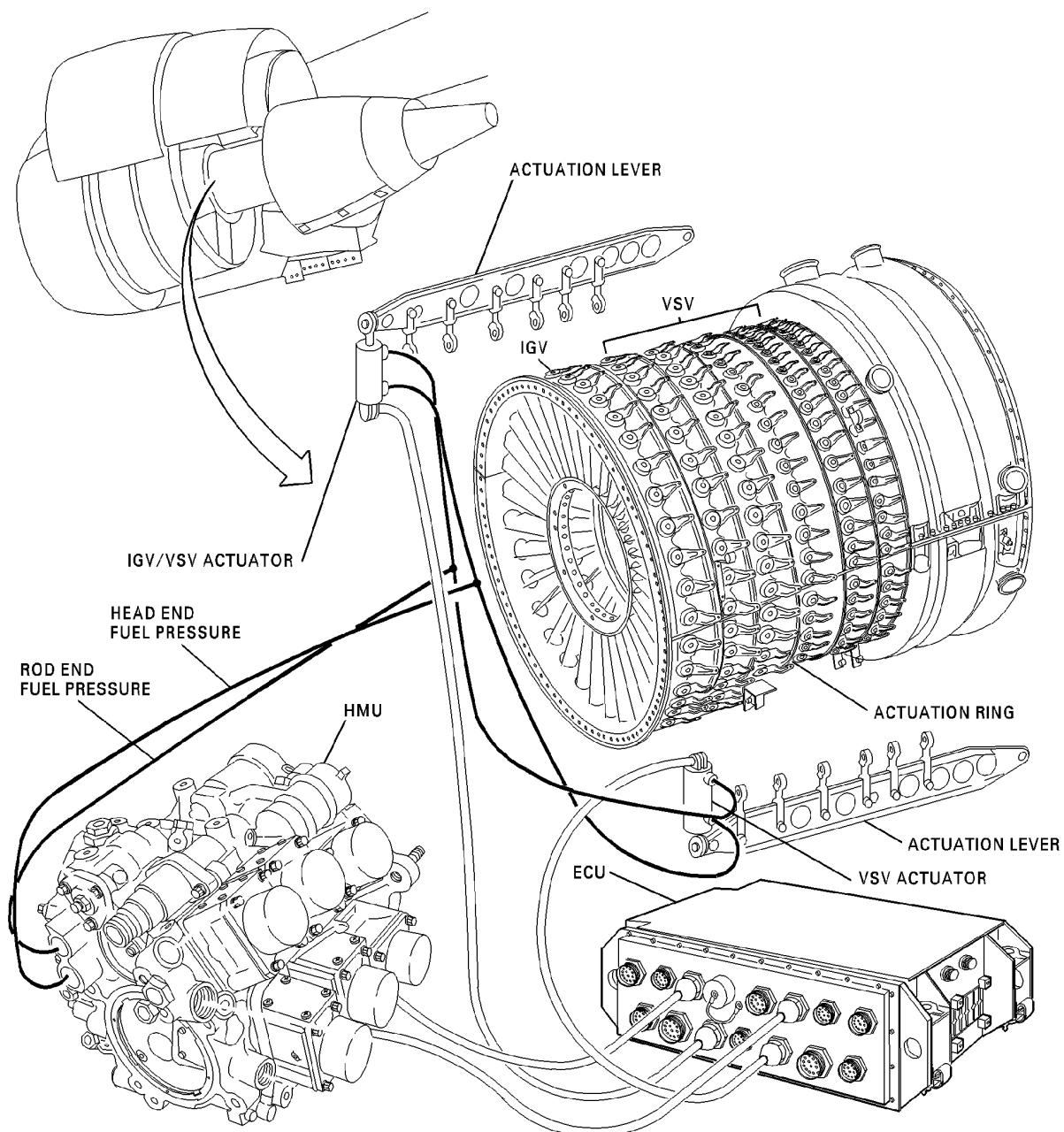
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DB2-75-0014A

Variable Stator Vane System
Figure 1/75-31-00-990-805

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

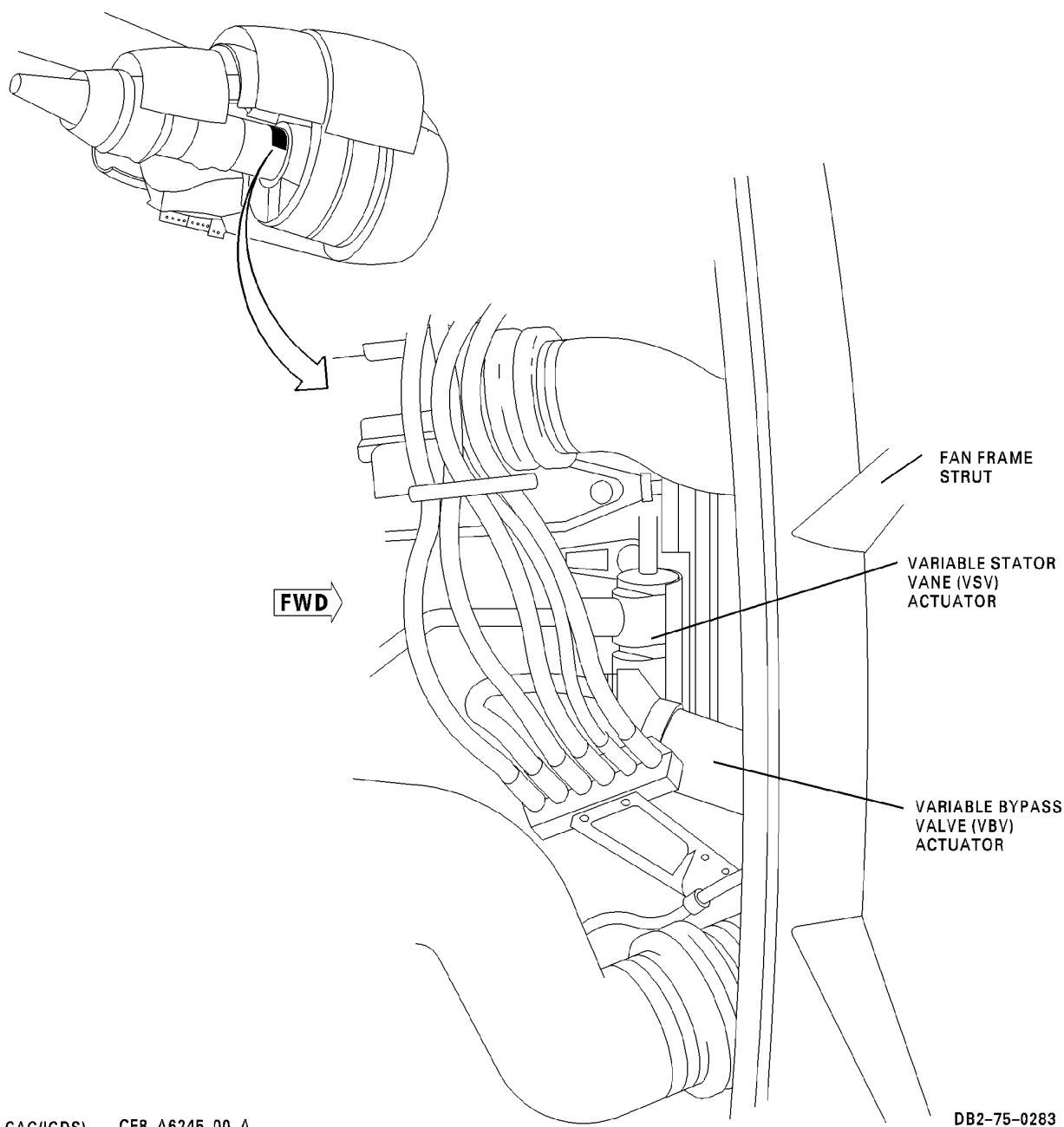
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Variable Stator Vane Actuator Location
Figure 2/75-31-00-990-806

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

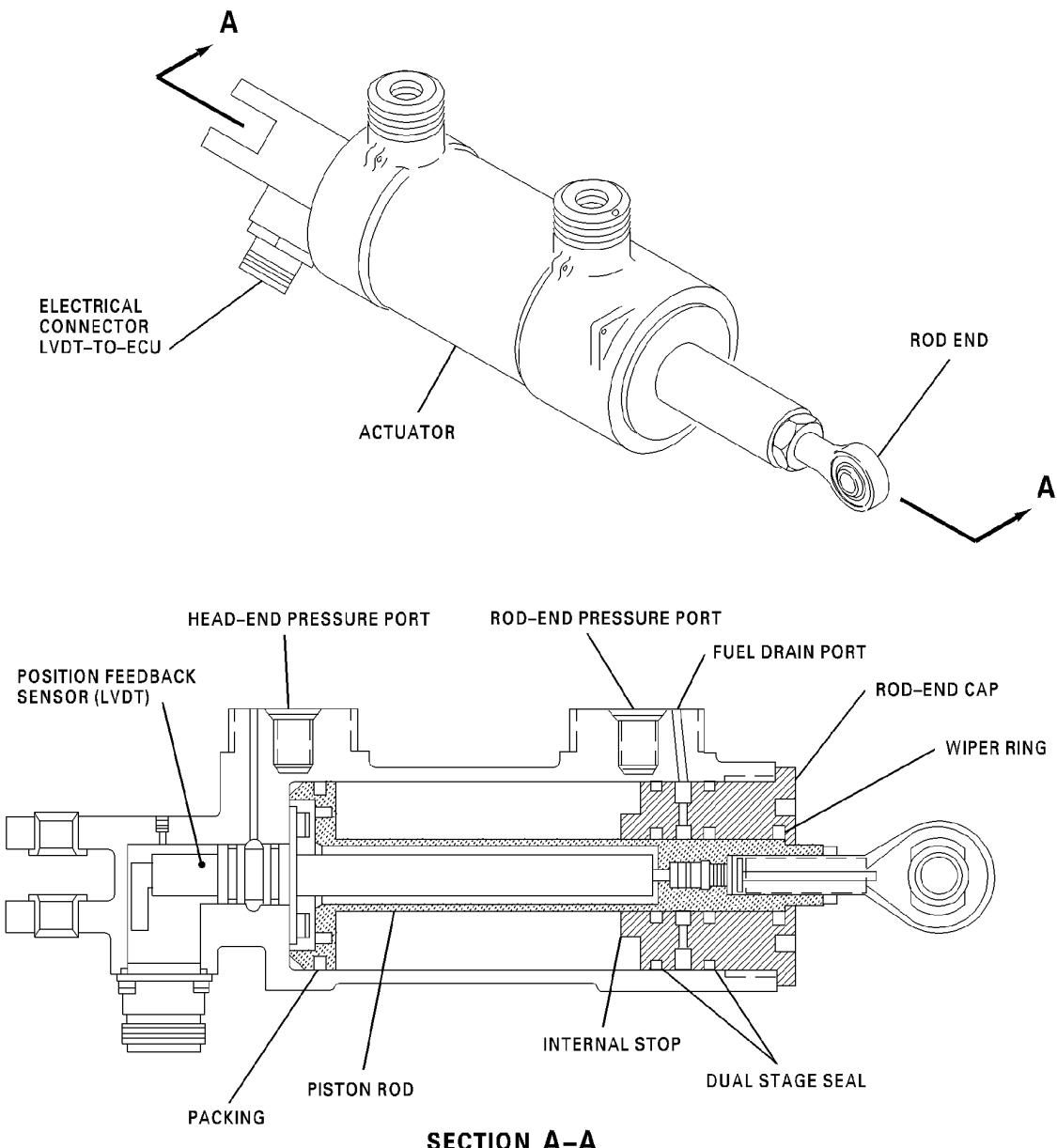
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CAG(IGDS) CF8-A6249-00-A

DB2-75-0016B

Variable Stator Vane Section View
Figure 3/75-31-00-990-807

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-31-00

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MD-11 AIRCRAFT MAINTENANCE MANUAL

VARIABLE STATOR VANE CONTROL SYSTEM - DESCRIPTION AND OPERATION

1. General

- A. The variable stator vane (VSV) system is used to change the compressor airflow. The variable stator vanes are automatically adjusted mechanically to supply adequate stall margins for engine starting, acceleration and partial power operations.
- B. At low engine RPM the variable vanes move in the closed direction to permit minimum airflow through the compressor. At high engine RPM the variable vanes open to permit maximum airflow through the compressor. If a possible compressor surge may occur, the electronic engine control (EEC) will begin to close the vanes. A VSV actuator connected to the EEC is used to open and close the vanes. The actuator is electrically fail-safe to open the vanes.
- C. Variable geometry stator vanes are used on the inlet guide vanes (IGV) and the 5th, 6th and 7th stages of the high pressure compressor (HPC). The stator vane actuator is scheduled as a function of the low speed rotor (N1), high speed rotor (N2) and engine inlet total temperature (T2). The EEC interfaces with the stator vane actuator through a pilot valve that is set by a dual coil torque motor installed in the VSV actuator.

2. Variable Stator Vanes

- A. The four variable vane stages are made of nickel alloy and are solid. The vane stages are installed in a split front HPC case that is bolted together during assembly. The outer trunnion of each variable vane is mechanically attached through the front HPC case to a synchronizing ring assembly for each stage. The four synchronizing ring assemblies are then connected through a bellcrank assembly to a variable stator vane actuator. Attached to the inside diameter (I.D.) of the variable vanes are abradable rub strips axially aligned with the knife edge seals on the drum rotor. Attached to the I.D. of the front HPC case are abradable rub strips axially aligned with the stage 5, 6, and 7 blade tips.

3. Mechanical Linkage

- A. The relative schedule of the four stator vane stages is controlled by a fixed geometry linkage which is moved by the VSV actuator. The VSV actuator linear motion is transmitted to the variable stator vanes through a mechanical linkage which includes one bellcrank assembly, four adjustable links (one per stage), four unison rings (one per stage) and 230 connector links (one per vane). (Figure 1)

4. Variable Stator Vane Actuator

- A. The stator vane actuator (SVA) is installed on the right side of the high pressure compressor (HPC) case. It is a hydraulically (engine fuel) operated unit that uses a fuel metering unit (FMU) with filtered inlet pressure to position the HPC stator vanes. (Figure 2)
- B. The SVA is controlled through a pilot valve which is positioned by an EEC electrical signal to a dual torque motor. The torque motor and pilot valve are an integral part of the SVA. A dual linear variable differential transformer (LVDT) core assembly senses actuator position and sends a feedback signal to the EEC. Each channel of the LVDT uses separate wiring and electrical connectors. In the event of power loss, the torque motor causes the pilot valve to move the SVA to the fully open position. (Figure 2)

5. System Operation

- A. The variable stator vane control system supplies maximum compressor performance and prevents compressor surge. The control system makes engine start easier.

The variable stator vane actuator uses the bellcrank, the unison rings, and the adjuster links to set the:

- Inlet guide vanes
- 5th, 6th, and 7th stage variable vanes.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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The EEC controls the actuator's dual coil torque motor (TM) to put the vanes in correct position as a result of the:

- Low pressure compressor rotor (N1) speed
 - High pressure compressor rotor (N2) speed
 - Compressor inlet temperature.
- B. At engine start the VSV's are in the open position until the engine speed is at 15% N2. Then the VSV's close. The VSV's move to the open position as N1 and N2 speed increases. Takeoff and climb power settings set the VSV's to the fully open position. The EEC closes the VSV's when a possible compressor surge may occur. The LVDT sends the position data for the VSV's to the EEC.
- C. The fuel metering unit (FMU) supplies fuel pressure to the VSV actuator. The fuel goes into the actuator to move a pilot valve into position. The pilot valve causes the actuator piston rod to move to the open position, which opens the VSV's. The pilot valve position changes when pressure on each end of the valve is not equal. The torque motor (T/M) controls this pressure. (Figure 3)
- D. The T/M receives inputs from the EEC. As the T/M receives inputs from the EEC, it moves a flapper valve, which lets fuel pressure to the pilot valve. When the flapper valve moves to the right, the pilot valve moves to the left and causes the actuator to move to the open position. When the flapper valve moves to the left, the pilot valve moves to the right and causes the actuator to move to the closed position.
- E. A linear variable differential transducer (LVDT) transmits a signal in relation to the actuator position to the EEC. If power from channel A or B of the EEC stops, the T/M and the pilot valve move to a neutral position. The VSV's will then open and stay open. The EEC also monitors the condition of the T/M or actuator and transmits these failures to the centralized fault display system (CFDS) on the multifunction control display unit (MCDU).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-31-00

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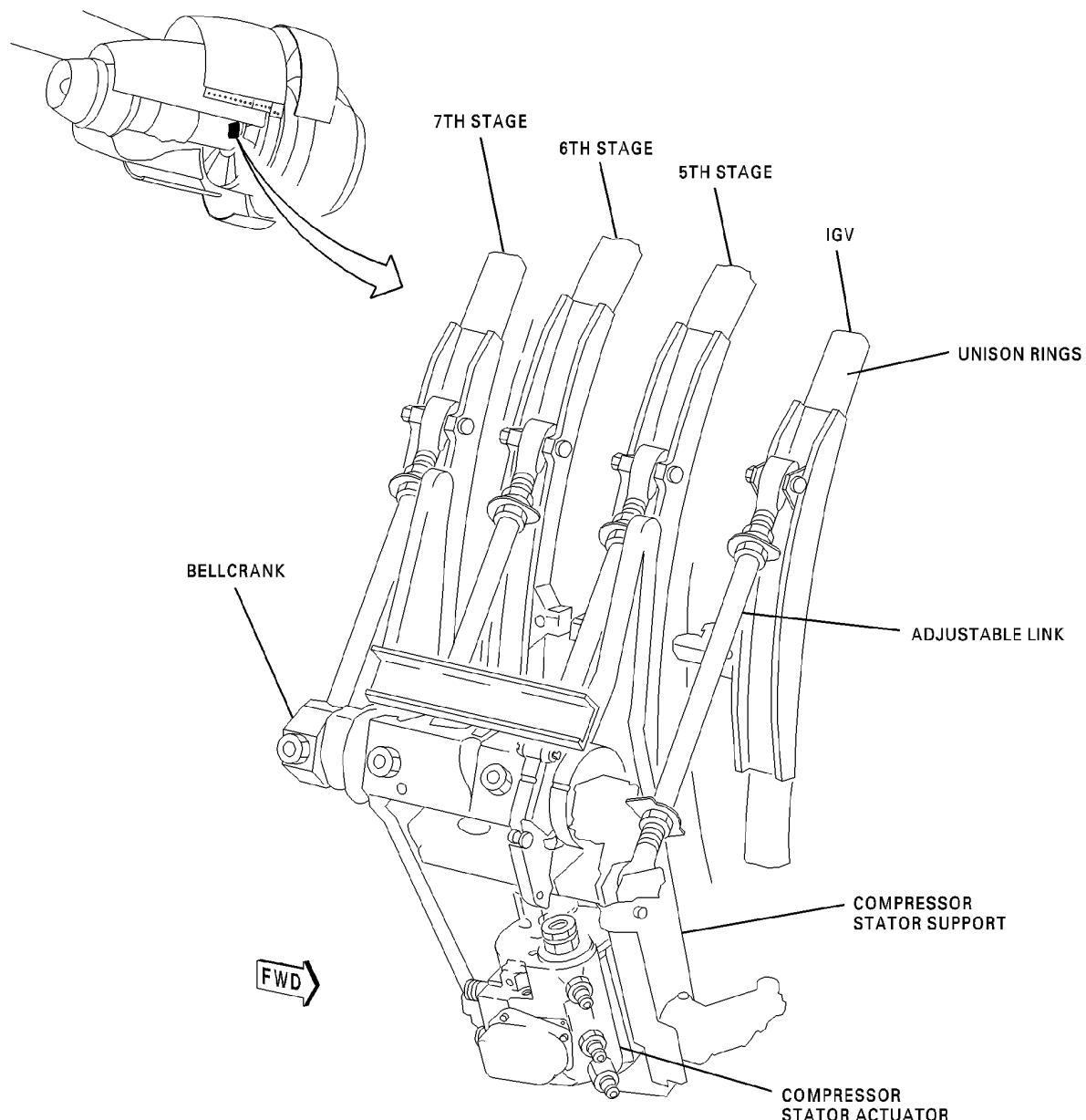
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CAG(IGDS)

DB2-75-0149

Variable Stator Vane Mechanical Linkage
Figure 175-31-00-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

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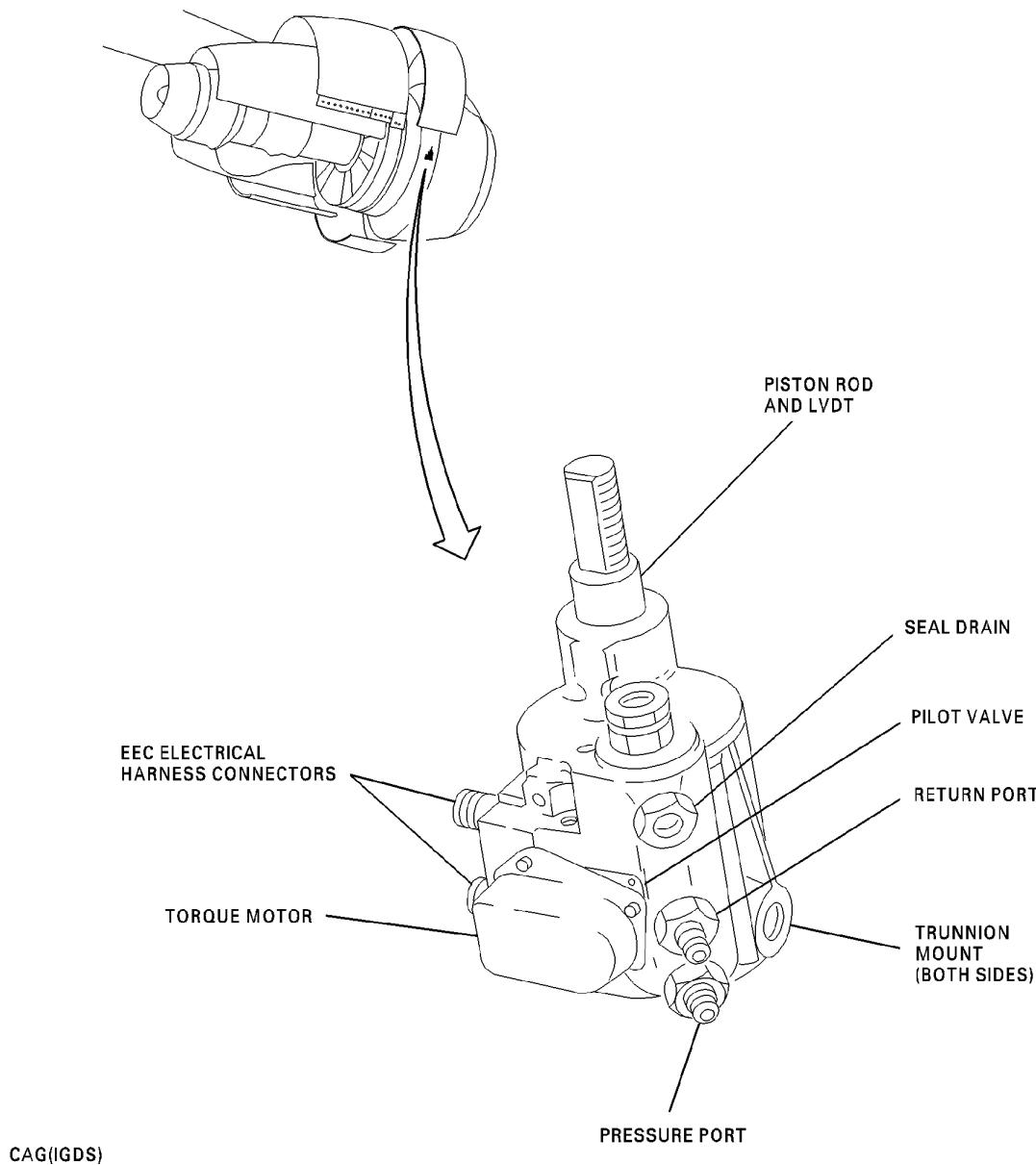
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Variable Stator Vane Actuator
Figure 2/75-31-00-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-31-00

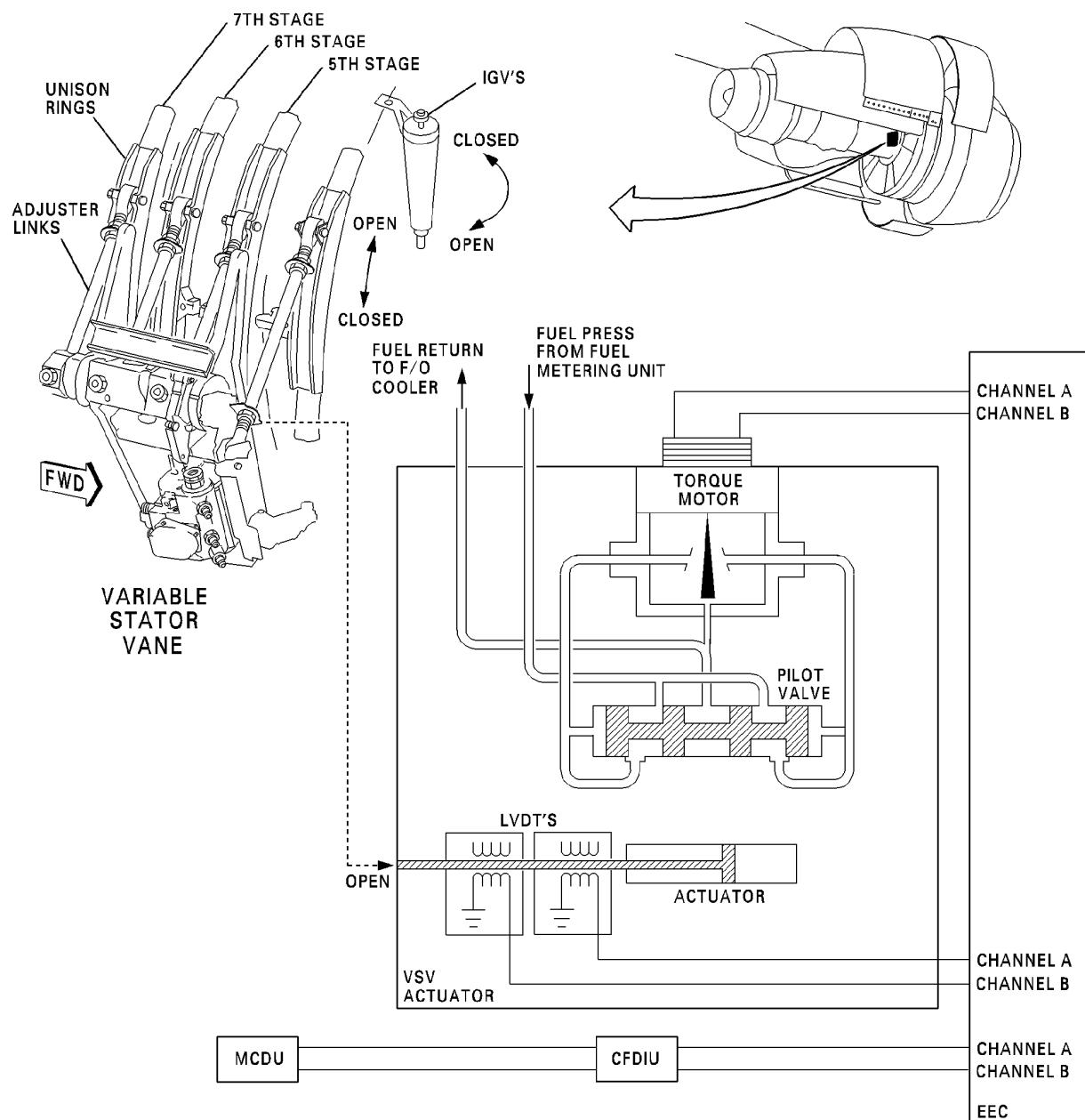
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CAG(IGDS)

DB2-75-0288

Variable Stator Vane Control System
Figure 3/75-31-00-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-31-00

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VANES, VARIABLE STATOR – MAINTENANCE PRACTICES

1. General

- A. These procedures have the instructions to open and close the variable stator vanes (VSV).
- B. Unless different instructions are given, this procedure is the same for the three G.E. CF6-80C2DIF engines.

TASK 75-31-01-010-801

2. OPENING OF THE VARIABLE STATOR VANES

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test, and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 201

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engine, 4–8 feet (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Actuator, hydraulic, air or oil, ground support
Not specified	Container, 5 U.S. gal (19 l.)
Not specified	Plugs, high pressure (2000 psi)

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 202

REFERENCE	DESIGNATION
C02-021	Oil, grade 1010
Not specified	Source, dry air, nitrogen, or argon - 300 psig (2068 kPa)

C. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-31-01

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D. Job Set-up - Variable Stator Vanes Opening

SUBTASK 75-31-01-865-001



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	11	B1-121	FUEL CONTROL ENG 1
B	12	B1-122	FUEL CONTROL ENG 2
B	13	B1-123	FUEL CONTROL ENG 3

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

OVERHEAD, LEFT EMER AC BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
G	3	B1-469	ENGINE IGNITION A IGNITORS ENG 1
G	4	B1-473	ENGINE IGNITION A IGNITORS ENG 2
G	5	B1-477	ENGINE IGNITION A IGNITORS ENG 3

OVERHEAD, RIGHT EMER AC BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
G	27	B1-468	ENGINE IGNITION B IGNITORS ENG 1
G	28	B1-472	ENGINE IGNITION B IGNITORS ENG 2
G	29	B1-476	ENGINE IGNITION B IGNITORS ENG 3

SUBTASK 75-31-01-010-008

- (2) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

E. Procedure - Variable Stator Vanes Opening

SUBTASK 75-31-01-010-009



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

WARNING HAZARDOUS MATERIAL WARNINGS
HAZMAT 1045, JET FUEL B (JP-4 FUEL)
HAZMAT 1000, REFER TO MSDS

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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(WARNING PRECEDES)



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1044, JET FUELS A AND A-1 (JP-5 FUEL)

HAZMAT 1000, REFER TO MSDS

- (1) Place the container below the HMU to catch the fluid that is in the disconnected lines.
- (2) Disconnect the variable stator vane (VSV) rod-end tube (1) and the head-end tube (2) from the hydromechanical unit (HMU). (Figure 201)

SUBTASK 75-31-01-490-001



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1347, GAS/NITROGEN/DRY (DPM 154-2)

HAZMAT 1000, REFER TO MSDS



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1108, GAS/ARGON (DPM 150)

HAZMAT 1000, REFER TO MSDS

- (3) Connect the disconnected VSV rod-end tube (1) to the ground support hose assembly (5) with the adapter (3). (Figure 201)
- (4) Connect the disconnected VSV head-end tube (2) to the ground support hose assembly (6) with the adapter (4). (Figure 201)
- (5) Install high pressure caps on the HMU fittings (7) and (8). Torque the caps to prevent fuel leakage during the procedure. (Figure 201)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SUBTASK 75-31-01-010-010



CAUTION

DO NOT USE MORE THAN 300 PSIG (2068 KPA) OF PRESSURE. TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE MECHANISM.

(6) Increase the pressure of the ground support actuator to 200-300 psig (1379-2068 kPa gage).

(7) Supply pressure to the head-end tube (2).

NOTE: Pressure applied during testing/rigging procedure will not hold because of a bleed hole in the VSV actuator piston.

(8) Make sure the pressure has moved the VSV to the full open position.

———— END OF TASK ————

— EFFECTIVITY —
FX 572-576, 582-599, 601-610, 612-619, 625

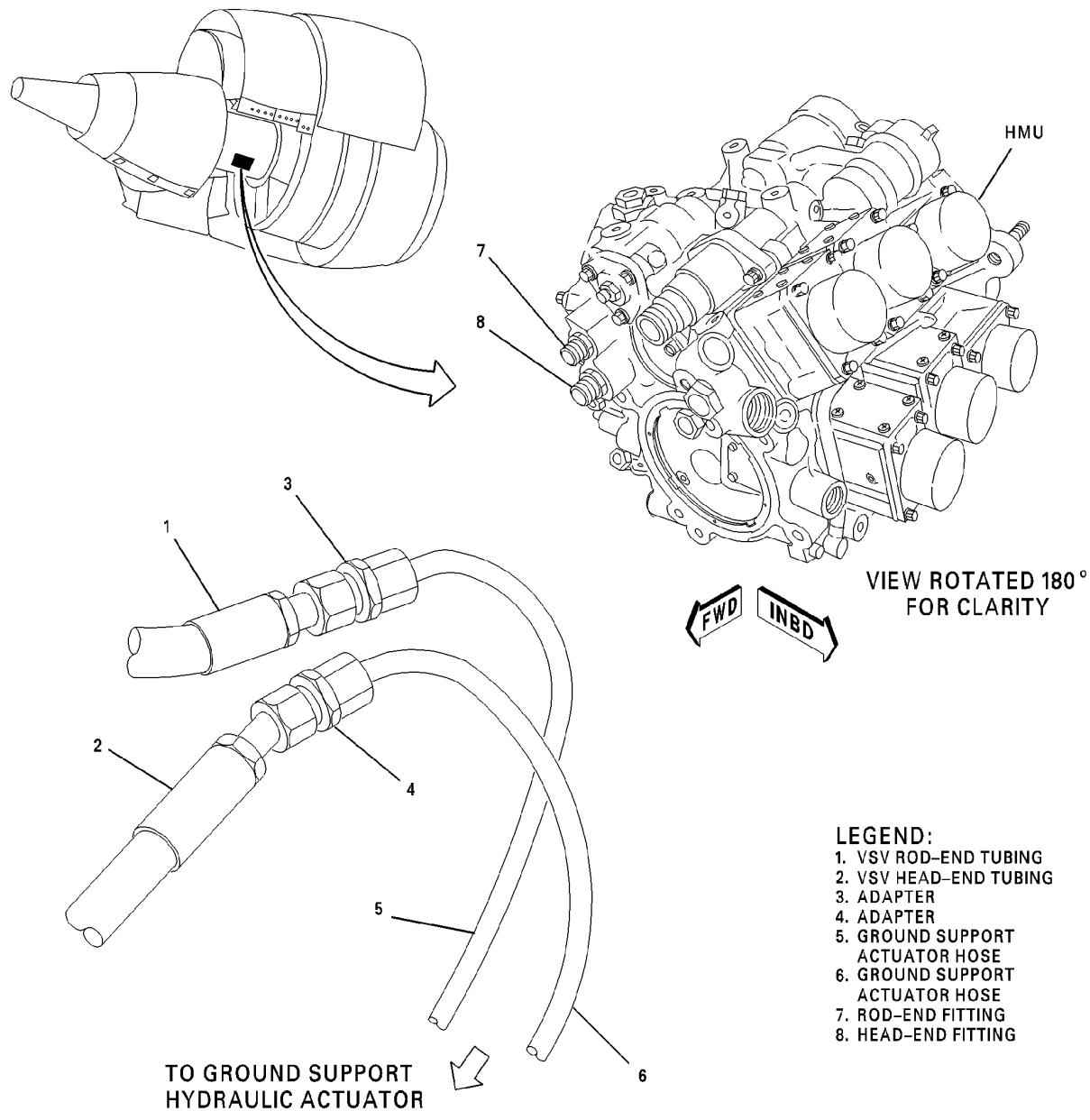
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CAG(IGDS)

DB2-75-0256

Variable Stator Vanes (VSV) Ground Operation Connections
Figure 201/75-31-01-990-801

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-31-01-410-801

3. CLOSING OF THE VARIABLE STATOR VANES

A. References

Reference	Title
71-00-00-700-803	MINIMUM AND APPROACH IDLE POWER (ADJ/TEST 02) (P/B 501)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

B. Job Set-up - Variable Stator Vanes Closing

SUBTASK 75-31-01-865-002



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that these circuit breakers are open and have safety tags:

OVERHEAD, BATTERY BUS

Row	Col	Number	Name
B	8	B1-1271	ENG START OVERRIDE
B	11	B1-121	FUEL CONTROL ENG 1
B	12	B1-122	FUEL CONTROL ENG 2
B	13	B1-123	FUEL CONTROL ENG 3

OVERHEAD, BATTERY DIRECT BUS

Row	Col	Number	Name
B	9	B1-467	ENG IGNITION OVERRIDE

OVERHEAD, LEFT EMER AC BUS

Row	Col	Number	Name
G	3	B1-469	ENGINE IGNITION A IGNITORS ENG 1
G	4	B1-473	ENGINE IGNITION A IGNITORS ENG 2
G	5	B1-477	ENGINE IGNITION A IGNITORS ENG 3

OVERHEAD, RIGHT EMER AC BUS

Row	Col	Number	Name
G	27	B1-468	ENGINE IGNITION B IGNITORS ENG 1
G	28	B1-472	ENGINE IGNITION B IGNITORS ENG 2
G	29	B1-476	ENGINE IGNITION B IGNITORS ENG 3

SUBTASK 75-31-01-010-011

- (2) If necessary, open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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C. Procedure - Variable Stator Vanes Closing

SUBTASK 75-31-01-010-012

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.



HAZARDOUS MATERIAL WARNINGS

HAZMAT 1045, JET FUEL B (JP-4 FUEL)

HAZMAT 1044, JET FUELS A AND A-1 (JP-5 FUEL)

HAZMAT 1000, REFER TO MSDS

- (1) Place the container below the HMU to catch the fluid that is in the disconnected lines.
- (2) Disconnect the variable stator vane (VSV) rod-end tube (1) and the VSV head-end tube (2) from the Hydro-Mechanical Unit (HMU). (Figure 201)

SUBTASK 75-31-01-490-002

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.



HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1347, GAS/NITROGEN/DRY (DPM 154-2)

HAZMAT 1108, GAS/ARGON (DPM 150)

HAZMAT 1000, REFER TO MSDS

- (3) Connect the disconnected VSV rod-end tube (1) to the ground support actuator hose (5) with adapter (3). (Figure 201)
- (4) Connect the disconnected VSV head-end tube (2) to the ground support actuator hose (6) with adapter (4). (Figure 201)
- (5) Install high pressure caps on the HMU fittings (7) and (8). Torque the caps to prevent fuel leakage during the operation. (Figure 201)

SUBTASK 75-31-01-410-008



DO NOT USE MORE THAN 300 PSIG (2068 KPA) OF PRESSURE. TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE MECHANISM.

- (6) Increase the pressure of the ground support actuator to 200-300 psig (1379-2068 kPa gage).
 - (7) Supply pressure to the rod-end tube (1).
- NOTE: Pressure applied during testing/rigging procedure will not hold because of a bleed hole in the VSV actuator piston.
- (8) Make sure the pressure has moved the VSV's to the fully closed position.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SUBTASK 75-31-01-090-001



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

- HAZMAT 1016, OIL/LUBRICATING (DPM 3564)
- HAZMAT 1347, GAS/NITROGEN/DRY (DPM 154-2)
- HAZMAT 1108, GAS/ARGON (DPM 150)
- HAZMAT 1000, REFER TO MSDS

- (9) Place the container below the HMU to catch the fluid that is in the disconnected line.
- (10) Decrease the pressure to the ground support actuator to 0.0 psig (0.0 kPa gage).
- (11) Disconnect the ground support actuator supply/return hoses (5) and (6) from the VSV rod-end tube (1) and head-end tube (2).

SUBTASK 75-31-01-410-009

- (12) Remove the caps from the HMU fittings (7) and (8). Connect the VSV rod-end tube (1) and head-end tube (2) to the fittings (7 and 8) on the HMU.

SUBTASK 75-31-01-865-003

- (13) Remove the safety tags and close these circuit breakers:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	11	B1-121	FUEL CONTROL ENG 1
B	12	B1-122	FUEL CONTROL ENG 2
B	13	B1-123	FUEL CONTROL ENG 3

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

OVERHEAD, LEFT EMER AC BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
G	3	B1-469	ENGINE IGNITION A IGNITORS ENG 1
G	4	B1-473	ENGINE IGNITION A IGNITORS ENG 2
G	5	B1-477	ENGINE IGNITION A IGNITORS ENG 3

OVERHEAD, RIGHT EMER AC BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
G	27	B1-468	ENGINE IGNITION B IGNITORS ENG 1
G	28	B1-472	ENGINE IGNITION B IGNITORS ENG 2
G	29	B1-476	ENGINE IGNITION B IGNITORS ENG 3

- (14) Do the engine minimum idle procedure and check for leaks. (MINIMUM AND APPROACH IDLE POWER (ADJ/TEST 02), TASK 71-00-00-700-803)

EFFECTIVITY
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D. Job Close-up - Variable Stator Vanes Closing

SUBTASK 75-31-01-942-003

- (1) Remove all the tools and equipment from the work area. Make sure that the area is clean.

SUBTASK 75-31-01-410-010

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS,
TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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ACTUATOR, VARIABLE STATOR VANE - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the variable stator vane actuator.
- B. The variable stator vane actuators are installed at the aft fan frame, at the 3 o'clock and 9 o'clock positions.
- C. Unless different instructions are given, these procedures are the same for the three G.E. CF6-80C2D1F engines.

TASK 75-31-01-000-801

2. REMOVAL OF THE VARIABLE STATOR VANE ACTUATOR

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Container, 2 U.S. gal (7.57 l)
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs
MS90376	Dust caps, electrical connector
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Variable Stator Vane Actuator Removal

SUBTASK 75-31-01-040-003



DO NOT MOVE THE FIRE CONTROL HANDLE TO THE AGENT 1 OR AGENT 2 POSITIONS. THIS WILL CAUSE THE FIREX AGENT CONTAINERS TO OPERATE, AND CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Pull the applicable (No. 1, 2 or 3 engine) fire-control handle down and forward to the FUEL & HYD OFF position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-31-01-010-002

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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D. Procedure - Variable Stator Vane Actuator Removal

SUBTASK 75-31-01-030-001



CAUTION

IF THE VSV ACTUATOR IS TO BE RETURNED TO STORAGE FOR FUTURE SPARE PARTS USE, SEND THE VSV ACTUATOR TO THE SHOP FOR PRESERVATION. REFER TO THE COMPONENT MAINTENANCE MANUAL INSTRUCTIONS. IF YOU DO NOT, INTERNAL CORROSION AND DAMAGE TO THE VSV ACTUATOR CAN OCCUR, WHICH CAN CAUSE DECREASED PERFORMANCE, INCREASED FLUID LEAKAGE AND FAILURE OF THE PART.

- (1) Remove the variable stator vane (VSV) actuator (1) as follows. (Figure 401) (Figure 402)
 - (a) Disconnect the electrical connector (2) from the VSV actuator (1). Install a protective cap on the electrical connector (2).



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1044, JET FUELS A AND A-1 (JP-5 FUEL)

HAZMAT 1000, REFER TO MSDS

- (b) Disconnect the fuel drain tubes (3) from the fuel drain cans (4). Use a container to collect the remaining fuel.
- (c) Loosen the drain cans (4), then move the drain cans away from the VSV actuator (1).
- (d) Disconnect the fuel tubes (5) from the union fittings (6). Use a container to collect the remaining fuel.
- (e) Remove the clevis bolt (7) and the nut (8) from the bracket assembly (9). Move the VSV actuator (1) away from the engine.
- (f) Remove the bracket bolts (10) and (11) that attach the bracket assembly (9) to the fan frame (12). Remove the nut (13) from the bracket bolt (14), then remove the bracket bolt.

NOTE: If access to the bracket bolts is not possible, do the steps that follow: 1) thru 6).

 - 1) On the actuator lever mount (19), remove the aft nut (20) and washer (21).
 - 2) Move the aft end of the actuator lever (16) away from the actuator lever mount (19).
 - 3) Remove the spacer (22).

NOTE: Keep the spacer for the installation.



CAUTION

KEEP THE PUSHROD/ROD-END BEARING SAFETYWIRE IN ONE PIECE IN ITS POSITION. IF THE LENGTH OF THE PUSHROD/ROD-END BEARING POINTS IS MOVED OR ADJUSTED, DO A RIGGING CHECK OF THE STAGE-TO-STAGE.

- 4) Remove the bolt (23), nut (24), two washers (25) and sleeve bushing (26) that attach the IGV through 5th stage rod end bearings (27) to the connecting links (28).
- 5) Move the actuator lever (16) aft to disengage it from the VSV actuator guide (15).

NOTE: Catch the actuator lever guide when the actuator lever is disengaged.
- 6) Remove the VSV actuator (1) from the actuator lever (16).

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- (g) Move the bracket assembly (9) up or down to disconnect the bracket from the actuator guide (15).
- (h) Turn the actuator guide (15) one quarter turn, and remove the actuator guide from the actuator lever (16).
- (i) Remove the VSV actuator (1) from the actuator lever (16).
- (j) Remove the union fittings (6) from the VSV actuator (1). Remove and discard the packings (17). Keep the union fittings for use on the new VSV actuator.
- (k) Remove and discard the packings (18) from the drain can (4) knurled nuts.
- (l) Install protective caps on the VSV actuator (1) electrical connector, and the fuel and drain tube openings.

SUBTASK 75-31-01-410-004

- (2) If the VSV actuator is not installed immediately, or weather conditions make it necessary, close the access doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

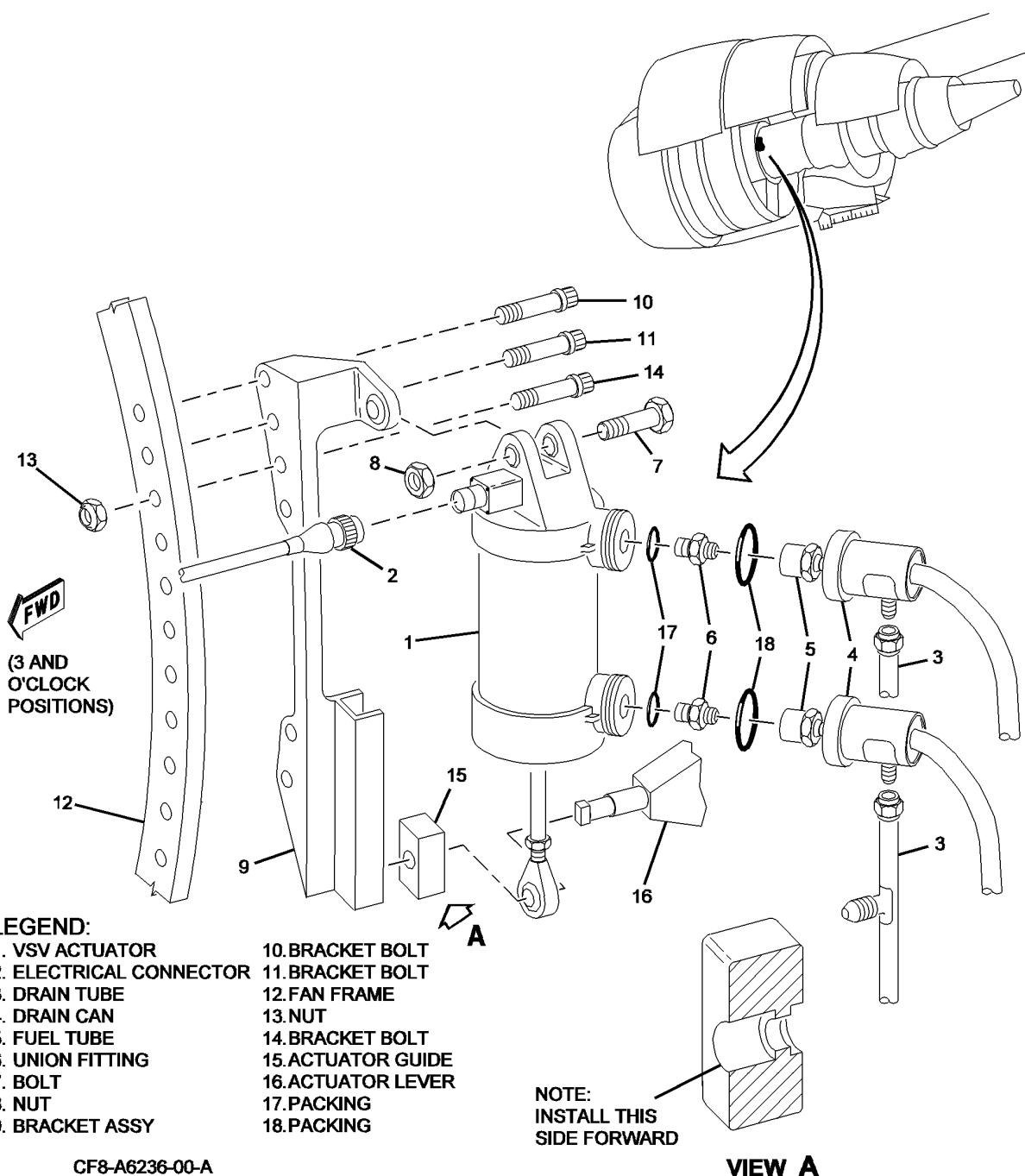
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CF8-A6236-00-A

VIEW A

DB2-75-0009C
S0006281411V2

Variable Stator Vane Actuator - Removal/Installation
Figure 401/75-31-01-990-804

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

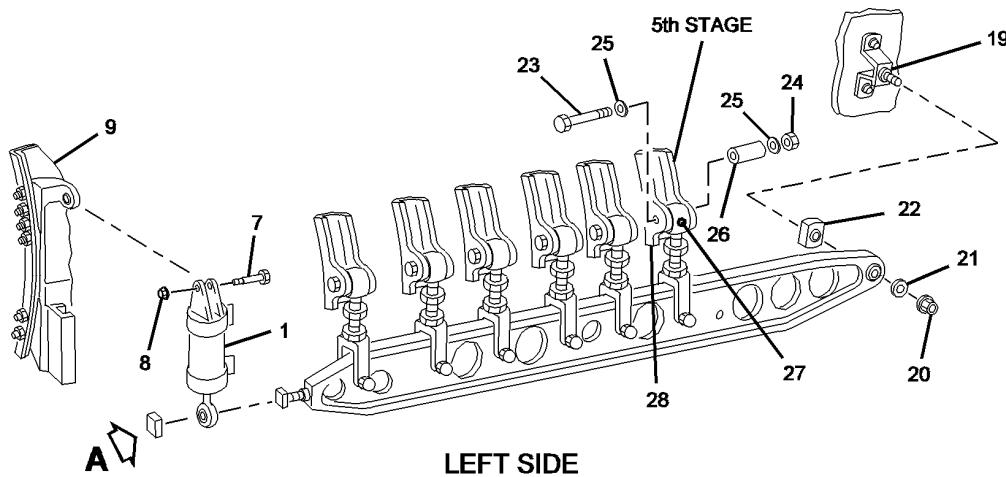
75-31-01

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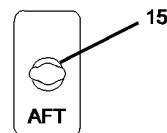
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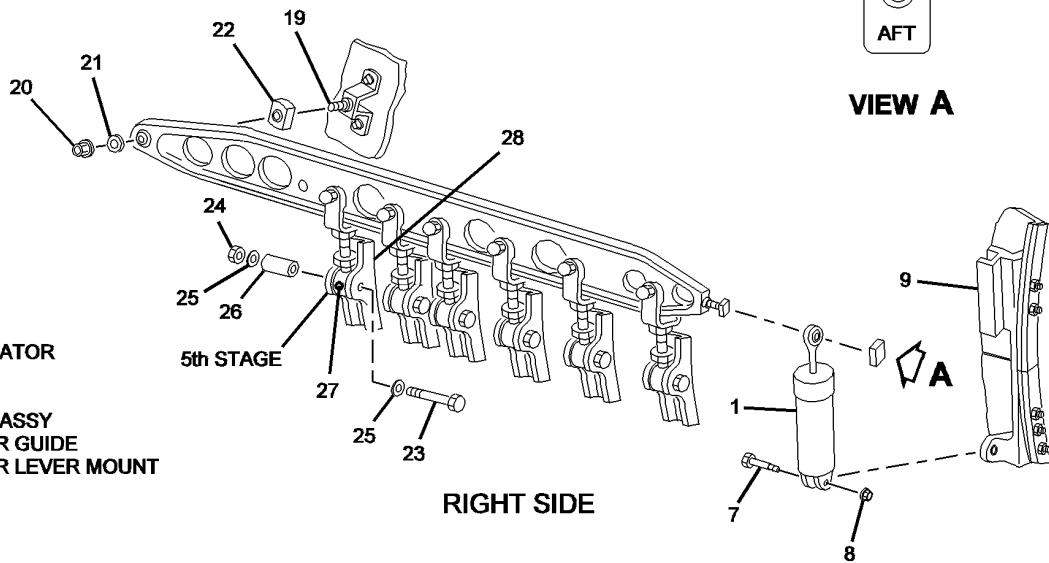
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LEFT SIDE



VIEW A



RIGHT SIDE

LEGEND:

- 1. VSV ACTUATOR
- 2. BOLT
- 3. NUT
- 4. BRACKET ASSY
- 15. ACTUATOR GUIDE
- 19. ACTUATOR LEVER MOUNT
- 20. NUT
- 21. WASHER
- 22. SPACER
- 23. BOLT
- 24. NUT
- 25. WASHER
- 26. SLEEVE BUSHING
- 27. ROD END BEARING
- 28. CONNECTING LINK

DB2-75-0296A
S0006281412V2

Variable Stator Vane Actuator - Removal/Installation
Figure 402/75-31-01-990-808

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-31-01-400-801

3. INSTALLATION OF THE VARIABLE STATOR VANE ACTUATOR

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Torque wrench 0-1000 in-lb (0-113 N·m)
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
CO2-021	Oil, lubricating (MIL-L-6081C)
CO5-005	Leak-Tek 160X
MS20995C32	Lockwire

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
17	Packing, preformed	IPC 72-50-30-01-025
18	Packing, preformed	IPC 73-11-05-01-020

D. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)
71-00-00-700-809	ADJUSTMENT AND TEST PROCEDURES (P/B 501)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 72-50-30	Illustrated Parts Catalog
IPC 72-50-30-01-025	Illustrated Parts Catalog

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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(Continued)

Reference	Title
IPC 73-11-05	Illustrated Parts Catalog
IPC 73-11-05-01-020	Illustrated Parts Catalog

E. Job Set-up - Variable Stator Vane Actuator Installation

SUBTASK 75-31-01-040-004



WARNING

DO NOT MOVE THE FIRE CONTROL HANDLE TO THE AGENT 1 OR AGENT 2 POSITIONS. THIS WILL CAUSE THE FIREX AGENT CONTAINERS TO OPERATE, AND CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Pull the applicable (No. 1, 2 or 3 engine) fire-control handle down and forward to the FUEL & HYD OFF position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-31-01-010-007

- (2) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

F. Procedure - Variable Stator Vane Actuator Installation

SUBTASK 75-31-01-420-005

- (1) Install the variable stator vane (VSV) actuator (1) as follows: (IPC 72-50-30) (IPC 73-11-05) (Figure 401) (Figure 402)
 - (a) Remove all the protective caps and plugs.



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the packings (17) with oil (C02-021). Then put the packings on the union fittings (6). (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
- (c) Install the union fittings (6) on the VSV actuator (1). Torque the unions to 135-150 in-lb (15.3-16.9 N·m).
- (d) Put the VSV actuator (1) on the actuator lever (16).



CAUTION

MAKE SURE THE ACTUATOR GUIDE IS INSTALLED WITH THE DEEP COUNTERBORE TO THE FRONT OF THE ENGINE. INCORRECT ASSEMBLY CAN STOP THE FREE MOVEMENT OF THE ACTUATOR SYSTEM.

- (e) Install the actuator guide (15), on the actuator lever (16). Turn the guide one quarter turn to lock on the actuator lever.

NOTE: If access to the bracket bolts are not accessible, do the steps that follow: 1) thru 9).

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- 1) Move the actuator lever (16) forward to engage the VSV actuator guide (15) with the track on the bracket assembly (9).
- 2) Install the IGV through 5th stage rod-end bearings (27) on the connecting links (28) with the bolt (23), nut (24), two washers (25) and the sleeve bushing (26). Tighten by hand.
- 3) Install the spacer (22) on the actuator lever mount (19).
- 4) Put the aft end of the actuator lever (16) on the actuator lever mount (19).
- 5) Install the washer (21) and the nut (20) on the actuator lever mount (19).
- 6) Torque the nut (20) to 190-230 in-lb (21.5-26.0 N·m).
- 7) Torque the nut (24) on the IGV through 5th stage rod end bearings (27) to 55-70 in-lb (6.2-7.9 N·m).
- 8) Install the bolt (7) and nut (8) that attaches the clevis on the VSV actuator (1) to the bracket assembly (9) as follows:

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- a) Lubricate the nut (8) threads with engine oil (C02-021).
 - b) Install the bolt (7) and nut (8). Make sure that the bolt head is aft.
- 9) Torque the nut (8) from 65 in-lb (7 N·m) to 75 in-lb (8 N·m).

NOTE: Maximum torque not more than 100 in-lb (11 N·m).

- (f) Move the bracket assembly (9) up or down to engage the actuator guide (15).
- (g) Align the bracket assembly (9) on the fan frame (12).
- (h) Install the bolt (14) and the nut (13). Torque the nut (13) to 210-230 in-lbs (23.7-26.0 N·m).
- (i) Install the bolts (10 and 11). Torque the bolts (11) to 380-420 in-lbs (42.9-47.4 N·m). Torque the bolt (10) to 580-620 in-lbs (65.5-70.0 N·m).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (j) Apply a thin layer of engine oil (CO2-021) to the preformed packings (18). Put the packings inside the drain cans (4).
- (k) Connect the fuel tubes (5) to the union fittings (6).

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- (I) Do not permit the union fitting (6) to turn, when the fuel tubes nuts (5) are torqued. Hold the union fitting (6) with an open end wrench. Torque the fuel tube nuts to 270-300 in-lbs (30.5-33.9 N·m).

SUBTASK 75-31-01-430-010

- (2) Pressure leak test the fuel tubes (5) as follows:



MAKE SURE YOU USE THE APPROVED SAFETY EQUIPMENT FOR YOUR EYES WHEN YOU USE COMPRESSED AIR. DO NOT LET THE AIR BLOW IN YOUR EYES OR ON YOUR SKIN. THIS WILL HELP PREVENT INJURY TO PERSONS.

- (a) Pressurize the fuel tubes with dry air, nitrogen, or argon to 200 psig (1378 kPa gage). Apply the pressure to the fuel tubes at the fuel manifold.



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1182, BUBBLE FLUID/LEAK TEST (DPM 6045)

HAZMAT 1000, REFER TO MSDS

- (b) Apply fluid (CO5-005) or soap solution to each of the fuel tube nuts (5), and the union fittings (6).
- (c) Examine the fuel tube nuts (5) and the union fittings (6) at the VSV actuator (1) for leaks. No leakage permitted.
- (d) If leakage occurs at the bottom of the union fitting (6), replace the packing (17) and do the leak test again.
- (e) If leakage occurs at the fuel tube nut (5) and the union fitting (6). Examine the fuel tube nut, and the union fitting for damage. Replace the fitting or the fuel tube, and do the leak test again.

SUBTASK 75-31-01-430-012

- (3) Connect the drain cans (4) to the VSV actuator (1) and tighten the knurled nuts hand tight. Safety the drain cans with lockwire.

SUBTASK 75-31-01-430-013

- (4) Connect the drain tubes (3) to the drain cans (4). Torque the drain tube nuts to 270-300 in-lb (30.5-33.9 N·m).

SUBTASK 75-31-01-430-020

- (5) Do a pressure leak test of the drain cans (4) for leakage as follows: (Figure 401)
- (a) Pressurize the drain cans (4) with dry air, nitrogen, or argon to 50–55 PSI (344–379 kPa). Apply the pressure at the drain manifold.
- (b) At the correct pressure, stop the supply pressure to permit the drain can (4) pressure to decrease.
- (c) Monitor the supply pressure gage for two minutes. Pressure is permitted to decrease 10 PSI (69 kPa) maximum.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1182, BUBBLE FLUID/LEAK TEST (DPM 6045)

HAZMAT 1000, REFER TO MSDS

- (d) If the pressure decrease is more than 10 PSI (69 kPa), test all areas of the two drain cans (4) for leakage with Leak Tek (C05-005). Torque the drain can nuts by hand to stop leaks. Replace packings (18) as necessary to stop the leakage.
- (e) Do the leak test again if the packings (18) are replaced.
- (f) If necessary, connect the drain tube (3) to the drain manifold. Torque the drain tube nut to 270-300 in-lb (30.5–33.9 N·m).
- (g) Remove the protective caps from the electrical connector at the VSV actuator (1) and the electrical connector (2).
- (h) Connect the electrical connector (2) to the VSV actuator (1). Tighten the electrical connector by hand and until a click sound is heard. Make sure the lock indicator shows in the connector window.

SUBTASK 75-31-01-410-011

- (6) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

SUBTASK 75-31-01-710-002

- (7) Do the applicable test(s) shown in the adjustment and test procedures. (ADJUSTMENT AND TEST PROCEDURES, TASK 71-00-00-700-809)

G. Job Close-up - Variable Stator Vane Actuator Installation

SUBTASK 75-31-01-942-001

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-31-01-840-002

- (2) Put the fire control handle in the NORM position. The control handle is on the center-overhead panel in the flight compartment.

— END OF TASK —

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-31-01

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AIRCRAFT MAINTENANCE MANUAL

ACTUATOR, VARIABLE STATOR VANE - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the Variable Stator Vane (VSV) actuator. Access to the VSV actuator is through the right thrust reverser door.
- B. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines and the PW4460/4462-3 engines.

TASK 75-31-01-000-868

2. REMOVAL OF THE VARIABLE STATOR VANE ACTUATOR

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Container, 5 U.S. gal (19.0 l)
PWA 85688	Puller, jackscrew
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs
MS90376	Dust caps, electrical connector

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Variable Stator Vane Actuator Removal

SUBTASK 75-31-01-040-001



WARNING DO NOT MOVE THE FIRE CONTROL HANDLE TO THE AGENT 1 OR AGENT 2 POSITIONS. THIS WILL CAUSE THE FIREX AGENT CONTAINERS TO OPERATE, AND CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Pull the applicable (No. 1, 2 or 3 engine) fire-control handle down and forward to the FUEL & HYD OFF position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-31-01-010-291

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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D. Procedure - Variable Stator Vane Actuator Removal

SUBTASK 75-31-01-020-291

- (1) Remove the variable stator vane actuator (1) as follows: (Figure 401)
 - (a) Disconnect the W5P7 and the W4P3 electrical connectors (2 and 3) from the VSV actuator (1) electrical receptacles (4 and 5). Install the protective dust caps.
 - (b) Remove the nut (6), the washer (7), the bolt (8) and the clamp (9) that attaches the drain tube (10) to the bracket.
 - (c) Hold the drain tube (10) drain adapter (11) with a wrench. Disconnect the drain tube coupling nuts (12) from the VSV actuator (1) and the cross tee connection. Remove the drain tube and install the protective caps and plugs.
 - (d) Put a container below the VSV actuator (1).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1044, JET FUELS A AND A-1 (JP-5 FUEL)

HAZMAT 1000, REFER TO MSDS

- (e) Hold the return and pressure tube (13 and 14), hydraulic return adapter (15) and the hydraulic pressure adapter (16) with a wrench. Disconnect the return and the pressure tube coupling nuts (17 and 18) from the tube adapters. Drain the fuel and install the protective caps and plugs.
- (f) Remove the bolt (19) that attaches the ground cable (20) to the VSV actuator (1). Move the ground cable away from the VSV actuator. (Figure 402)
NOTE: The step that follows is for the engine before S/B PW4ENG 72-498.
- (g) Remove the two cotter pins (21), nuts (22), bolts (23) and the bearing stop (24) from the forward and aft support brackets. Discard the cotter pins.
NOTE: The step that follows is for the engine after S/B PW4ENG 72-498.
- (h) Remove the two cotter pins (21), nuts (22), bolts (23), the washers (25), and the bearing stop (24) from the forward and aft support brackets. Discard the cotter pins.
NOTE: The steps that follow are not changed by S/B PW4ENG 72-498.
- (i) Thread the jackscrew (26) on the bearing pin (27). Place the puller (28) in the puller sleeve (29) and thread the puller on the jackscrew. Tighten with your hand. (Figure 403)
- (j) Hold the jackscrew (26) with a hex (Allen) wrench. Turn the puller (28) on the jackscrew until the bearing pin (27) is clear of the support bracket bearing (30).
NOTE: The steps for the removal of the bearing pin is the same for the forward and aft bearing pins.
- (k) Remove the cotter pin (31), nut (32) and the washer (33) from the shoulder bolt (34). Discard the cotter pin and remove the shoulder bolt from the lever set bellcrank. (Figure 404)
- (l) Remove the VSV actuator (1) from the forward and aft support brackets on the engine.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-31-01-030-295

- (2) If a new VSV actuator (1) is to be installed, remove the attach hardware as follows:
(Figure 405)
 - (a) Remove the drain adapter (11), the hydraulic pressure adapter(16) and the hydraulic return adapter (15). Discard the preformed packings (35, 36 and 37). Install the protective caps and plugs.
 - (b) Loosen the jamnut (38) and remove the rodend bearing (39) from the VSV actuator (1).
 - (c) Remove the key-washer (40) and the jamnut (38) from the VSV actuator (1) piston rod. Discard the key-washer.

SUBTASK 75-31-01-210-290

- (3) Do a visual inspection of the rodend bearing (39). If the rod-end bearing is serviceable, keep it to use on the actuator installation.

SUBTASK 75-31-01-410-290

- (4) If the VSV actuator is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

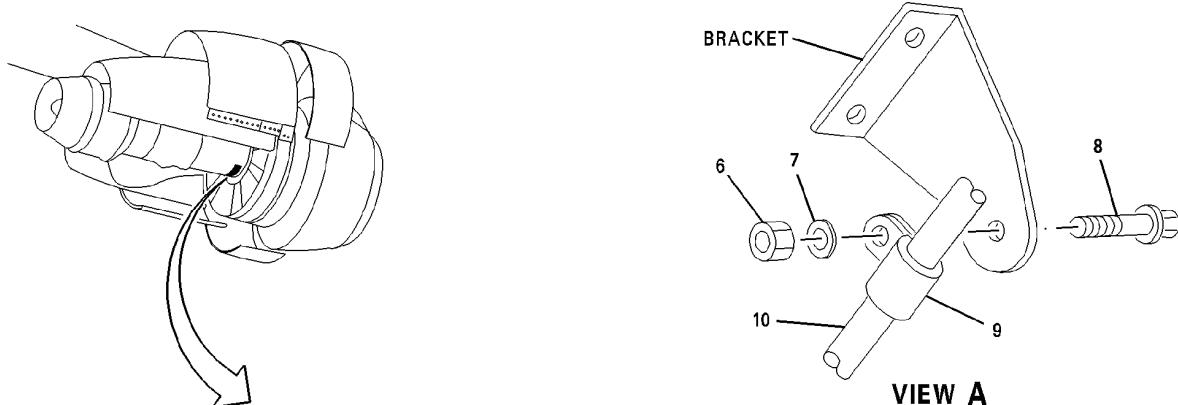
EFFECTIVITY
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

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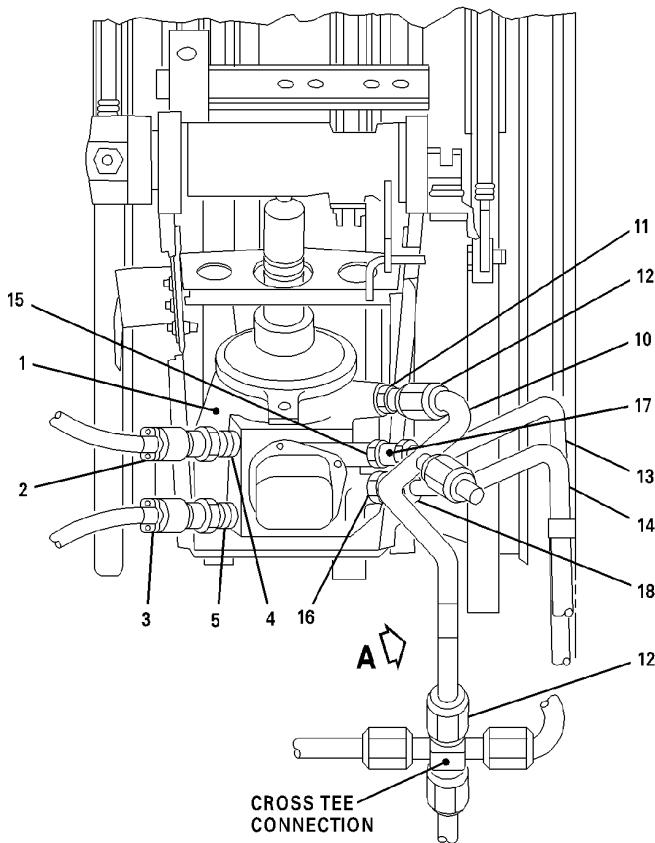


- LEGEND:**
- 1. VSV ACTUATOR
 - 2. W5P7 CONNECTOR
 - 3. W4P3 CONNECTOR
 - 4. ELECTRICAL RECEPTACLE
 - 5. ELECTRICAL RECEPTACLE
 - 6. NUT
 - 7. WASHER
 - 8. BOLT
 - 9. CLAMP
 - 10. DRAIN TUBE
 - 11. DRAIN ADAPTER
 - 12. COUPLING NUT
 - 13. RETURN TUBE
 - 14. PRESSURE TUBE
 - 15. HYDRAULIC RETURN ADAPTER
 - 16. HYDRAULIC PRESSURE ADAPTER
 - 17. COUPLING NUT
 - 18. COUPLING NUT

CAG(IGDS)

CROSS TEE CONNECTION

DB2-75-0034D



Variable Stator Vane Actuator - Removal/Installation
Figure 401/75-31-01-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

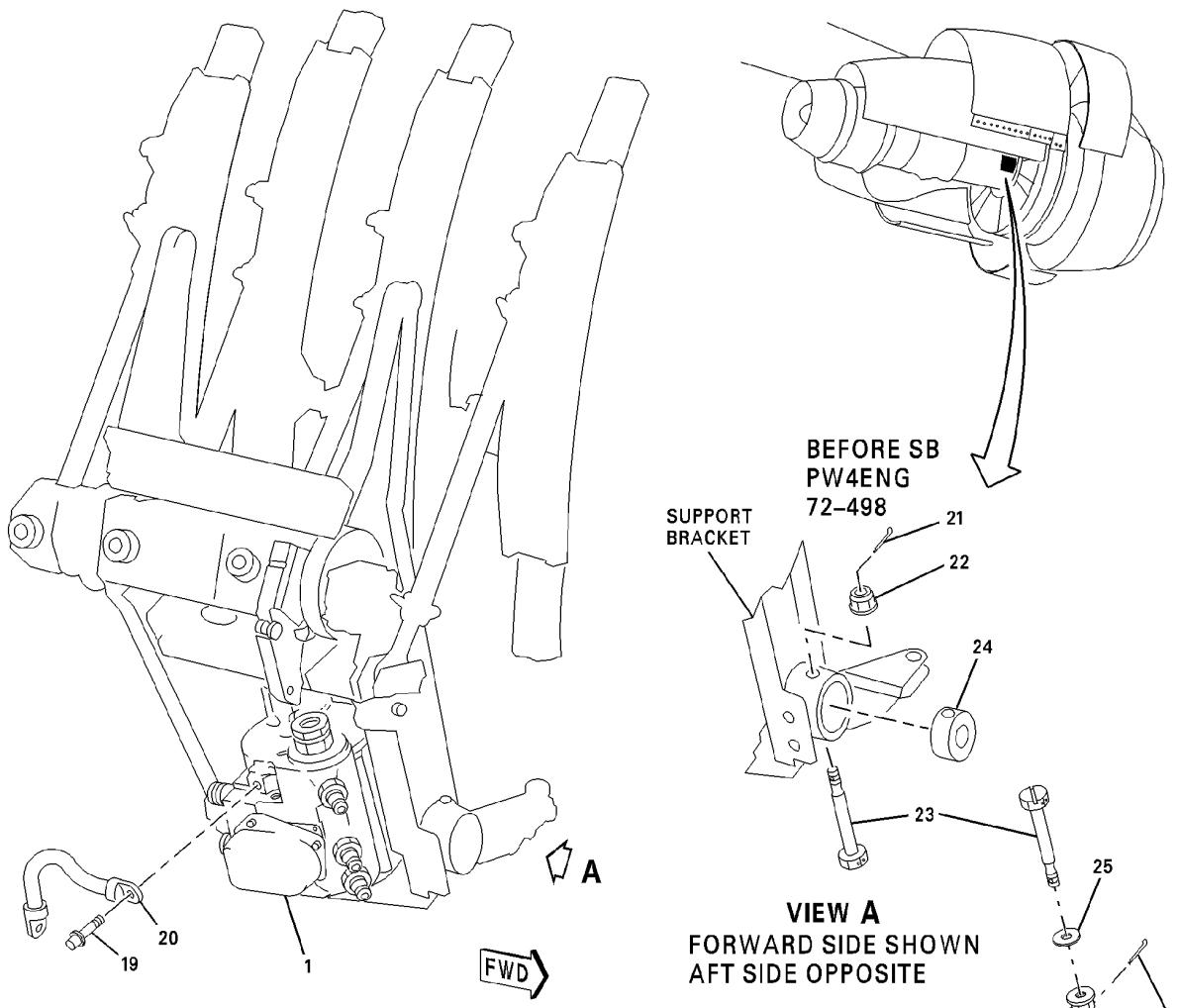
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LEGEND:

- 1. VSV ACTUATOR
- 19. BOLT
- 20. GROUND CABLE
- 21. COTTER PIN
- 22. NUT
- 23. BOLT
- 24. BEARING STOP
- 25. WASHER

CAG(IGDS)

DB2-75-0037C

Variable Stator Vane Actuator - Removal/Installation
Figure 402/75-31-01-990-879

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

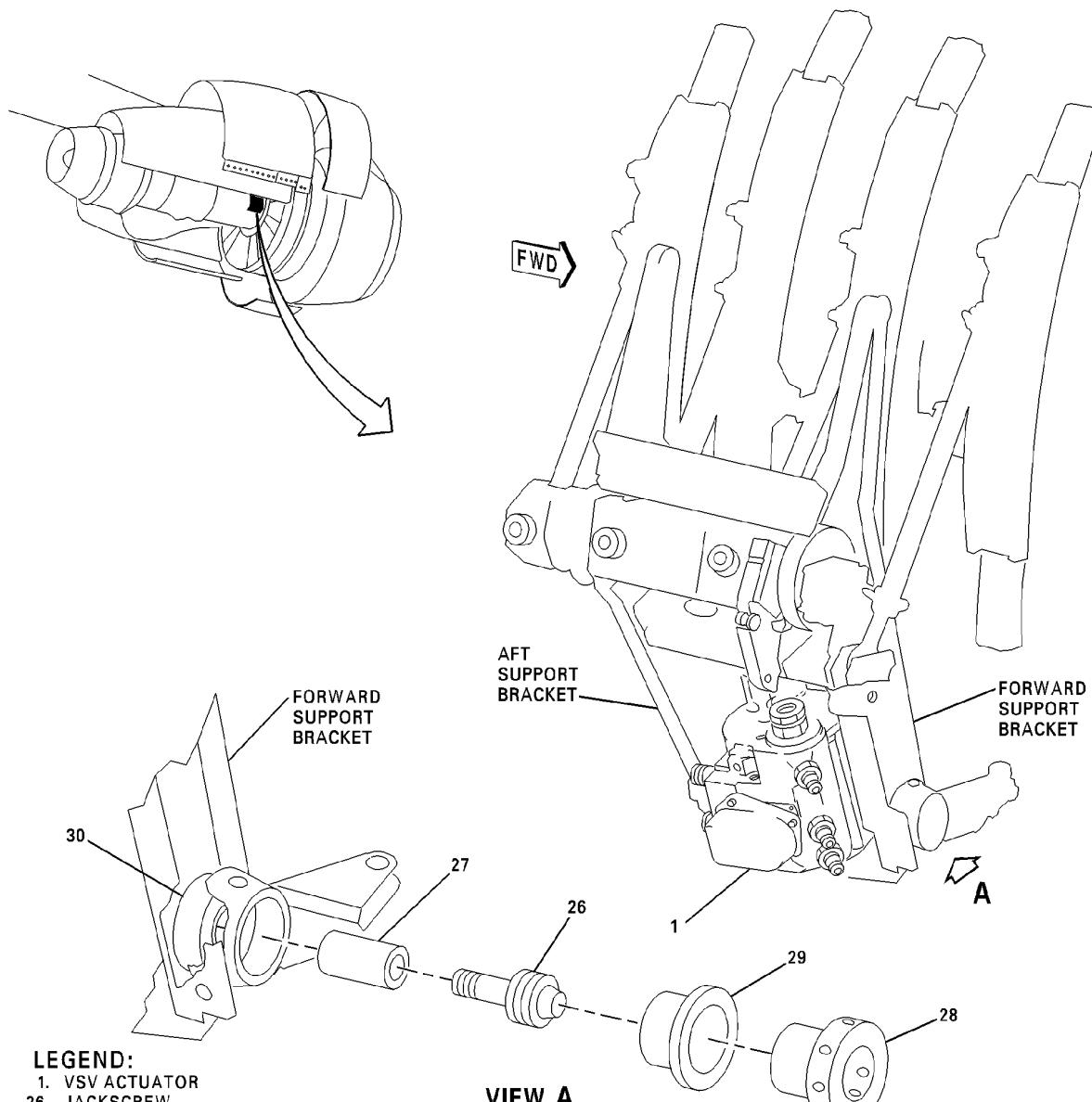
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LEGEND:

1. VS ACTUATOR
26. JACKSCREW
27. BEARING PIN
28. PULLER
29. PULLER SLEEVE
30. BEARING

CAG(IGDS)

VIEW A
FORWARD SIDE SHOWN
AFT SIDE OPPOSITE

DB2-75-0038C

Variable Stator Vane Actuator - Removal/Installation
Figure 403/75-31-01-990-877

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

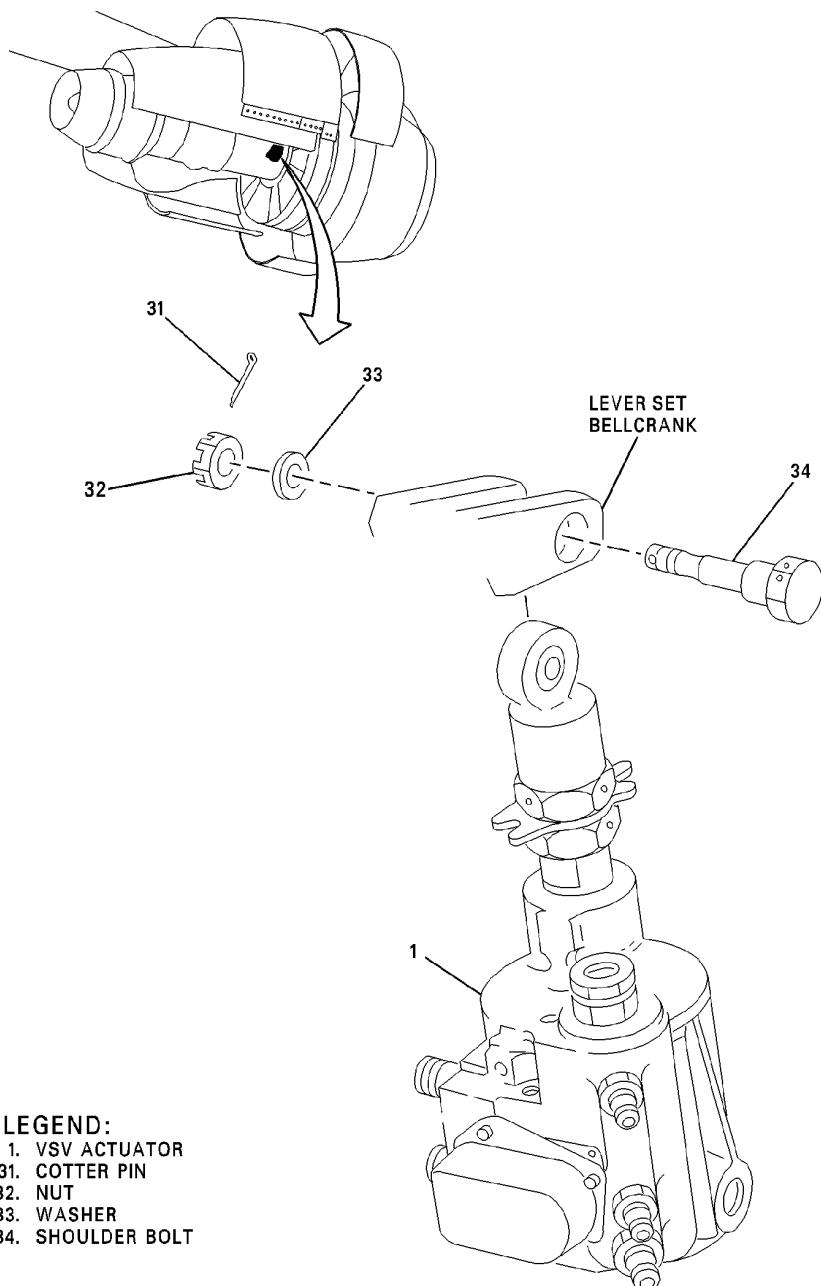
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LEGEND:

- 1. VSV ACTUATOR
- 31. COTTER PIN
- 32. NUT
- 33. WASHER
- 34. SHOULDER BOLT

CAG(IGDS)

DB2-75-0036C

Variable Stator Vane Actuator - Removal/Installation
Figure 404/75-31-01-990-880

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

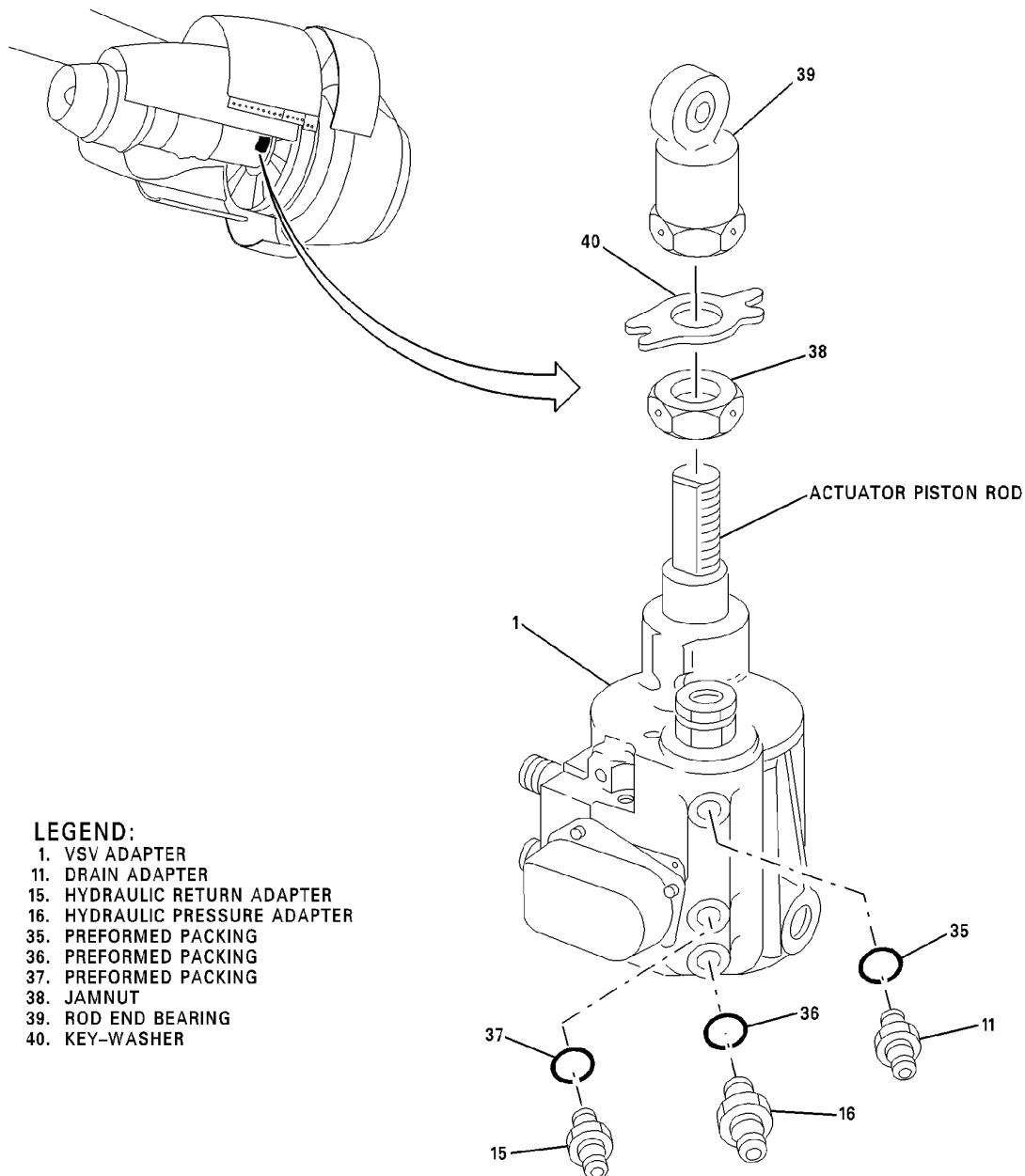
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CAG(IGDS)

DB2-75-0039D

Variable Stator Vane Actuator - Removal/Installation
Figure 405/75-31-01-990-873

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-31-01-400-868

3. INSTALLATION OF THE VARIABLE STATOR VANE ACTUATOR

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–300 in–lb (0–33.9 N·m)
Not specified	Soft-face hammer
Model M303, M305 or M307	Crimper, Bergen Mechanical

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)
P06-002	White petrolatum (PMC 9609)
P06-054	Paste, antiseize (PWA 36246)
P06-005	Lubricant (PWA 587)
P06-037	Compound, anti-galling (PWA 36053-4)
P05-289	Lockwire (AS3214-02)
P05-291	Cable, safety (optional)
P05-292	Ferrule, safety cable (optional)

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
(Figure 402) /21	Pin, cotter	IPC 75-32-05-10-005

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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Table 404 (Continued)

REFERENCE/ITEM	DESIGNATION	IPC
(Figure 404) /31	Pin, cotter	IPC 75-31-01-10-115
(Figure 405) /35	Packing, preformed (M83248-1-906)	IPC 75-32-05-10-105
(Figure 405) /36	Packing, preformed	IPC 75-32-05-10-100
(Figure 405) /37	Packing, preformed	IPC 75-32-05-10-095
(Figure 405) /40	Washer, key	IPC 75-32-05-10-065

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-15-700-883	TEST OF THE ENGINE CONTROL SYSTEM ACTUATORS (ADJ/TEST 15) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-31-01-700-868	ADJUSTMENT AND TEST OF THE VARIABLE STATOR VANE ACTUATOR - HYDRAULIC (P/B 501)
75-31-02-700-869	MECHANICAL ADJUSTMENT OF THE VARIABLE STATOR VANE ACTUATOR (P/B 501)
IPC 75-31-01-10-115	Illustrated Parts Catalog
IPC 75-32-05	Illustrated Parts Catalog
IPC 75-32-05-10-005	Illustrated Parts Catalog
IPC 75-32-05-10-065	Illustrated Parts Catalog
IPC 75-32-05-10-095	Illustrated Parts Catalog
IPC 75-32-05-10-100	Illustrated Parts Catalog
IPC 75-32-05-10-105	Illustrated Parts Catalog

E. Job Set-up - Variable Stator Vane Actuator Installation

SUBTASK 75-31-01-040-002



DO NOT MOVE THE FIRE CONTROL HANDLE TO THE AGENT 1 OR AGENT 2 POSITIONS. THIS WILL CAUSE THE FIREX AGENT CONTAINERS TO OPERATE, AND CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Pull the applicable (No. 1, 2 or 3 engine) fire-control handle down and forward to the FUEL & HYD OFF position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-31-01-010-298

- (2) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - Variable Stator Vane Actuator Installation

SUBTASK 75-31-01-430-295

- (1) If a new VSV actuator (1) is to be installed, install the attach hardware as follows: (IPC 75-32-05) (Figure 405)
 - (a) Remove the protective caps and plugs from the VSV actuator (1).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1082, PETROLATUM/WHITE (DPM 675)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the preformed packings (35, 36 and 37) with a thin layer of white petrolatum (P06-002). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Remove the protective caps and install the preformed packings (35, 36 and 37) on the drain adapter (11), the hydraulic pressure adapter (16) and the hydraulic return adapter (15).



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1233, LUBRICANT/OIL/JET ENGINE (DPM 339)

HAZMAT 1000, REFER TO MSDS

- (d) Lubricate the threads of the drain adapter (11), hydraulic pressure adapter (16) and the hydraulic return adapter (15) with engine oil (P03-001).
- (e) Install the adapters (11, 16 and 15) into the VSV actuator (1).
- (f) Torque the drain and hydraulic return adapters (11 and 15) to 110–120 in-lb (12.4–13.6 N·m). Torque the hydraulic pressure adapter (16) to 150–170 in-lb (16.9–19.2 N·m). Install the protective caps on the pressure and return tube adapters.
- (g) Lubricate the threads of the VSV actuator (1) piston rod with engine oil (P03-001).
- (h) Install the jambnut (38), the keywasher (40) and the rod-end bearing (39) on the VSV actuator (1) piston rod.

NOTE: Do not torque the jamnut or bend the tabs on the keywasher at this time.

SUBTASK 75-31-01-420-297

- (2) Install the VSV actuator (1) as follows: (IPC 75-32-05) (Figure 403)
 - (a) Put the VSV actuator (1) between the forward and the aft support brackets.
NOTE: Make sure the VSV actuator piston rod is through the center hole of the support bracket.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1192, COMPOUND/ANTISEIZE (MIL-T-83483)
HAZMAT 1096, LUBRICANTS/SYNTHETIC
HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the bearing pin (27) with lubricant (P06-005) or anti-seize compound (P06-037). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Install the bearing pin (27) into the bearings (30) on the forward and the aft support brackets.
- (d) Align the mount holes in the side of the VSV actuator (1) with the bearing pin (27).
- (e) With a small amount of force, hit the forward bearing pin with a soft-face hammer. Start the bearing pin into the VSV actuator (1) mount hole. With a small amount of force hit the aft bearing pin with a soft-face hammer. Continue to hit the two bearing pins until they are fully engaged in the VSV actuator mount holes.
- (f) Install the two bearing stops (24) with the bearing stop bolt hole aligned with the bolt hole in the support brackets. (Figure 402)
- (g) Lubricate the threads of the two bolts (23) with engine oil (P03-001).
NOTE: The step that follows is for the engine before S/B PW4ENG 72-498.
- (h) Install the two bolts (23) into the forward and the aft support brackets. Install the two nuts (22) on the bolts.
NOTE: The step that follows is for the engine after S/B PW4ENG 72-498.
- (i) Install the two washers (25) on the bolts (23) into the forward and the aft support brackets. Install the two nuts (22) on the bolts.
NOTE: The steps that follow are not changed by S/B PW4ENG 72-498.
NOTE: The bolt holes in the bearing stops are not always large enough to allow for satisfactory installation of the bolt. If this occurs, see Service Bulletin PW4ENG 75-38 for the necessary procedure.
- (j) Torque the two nuts (22) to 36–40 in-lb (4.1–4.5 N·m). Safety with the two cotter pins (21).
- (k) Lubricate the threads of the rod end bearing (39) shoulder bolt (34) with engine oil (P03-001). (Figure 404) (Figure 405)
- (l) Temporarily connect the rod end bearing (39) to the lever set bellcrank with the shoulder bolt (34).
- (m) Install the shoulder bolt (34) into the level set bellcrank. Install the washer (33) and the nut (32) on the bolt. (Figure 404)
- (n) Tighten the nut (32) with your hand and make sure the shoulder bolt (34) head stays against the surface of the lever set bellcrank. Safety the nut (32) with cotter pin (31).
- (o) Lubricate the threads of the bolt (19) with engine oil (P03-001). (Figure 402)
- (p) Connect the ground cable (20) to the VSV actuator (1) with the bolt (19).
- (q) Torque the bolt (19) to 75–85 in-lb (8.5–9.6 N·m).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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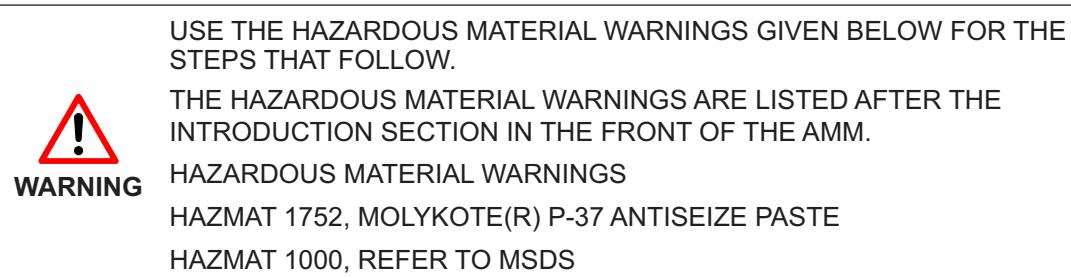
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SUBTASK 75-31-01-828-269

- (3) Do the variable stator vane actuator adjustment/test as follows:
 - (a) (Preferred) ADJUSTMENT AND TEST OF THE VARIABLE STATOR VANE ACTUATOR - HYDRAULIC, TASK 75-31-01-700-868
 - (b) (Optional) MECHANICAL ADJUSTMENT OF THE VARIABLE STATOR VANE ACTUATOR, TASK 75-31-02-700-869

SUBTASK 75-31-01-420-298

- (4) Complete the installation of the variable stator vane actuator (1) as follows: (IPC 75-32-05) (Figure 401)



- (a) Remove the protective caps and plugs from the cross tee connection and the drain tube (10) coupling nuts (12). Lubricate the threads of the drain adapter (11), cross tee connection and the drain tube coupling nuts with anti-seize paste (P06-054). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (b) Connect the two coupling nuts (12) to the VSV actuator (1) drain adapter (11) and the cross tee connection. Tighten the drain tube coupling nuts with your hand.
- (c) Hold the drain tube (10) drain adapter (11) and the cross tee connection with an open-end wrench. Torque the drain tube coupling nuts (12) to 270–300 in-lb (30.5–33.9 N·m).
- (d) Remove the protective caps and plugs from the hydraulic pressure adapter (16). Lubricate the threads of the pressure tube (14) with anti-seize paste (P06-054).
- (e) Connect the pressure tube (14) to the hydraulic pressure adapter (16) and tighten the pressure tube nut (18) by hand. Torque the tube nut to 225–250 in-lb (25.42–28.24 N.m). Safety the tube nut with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).
- (f) Remove the protective caps and plugs from the return tube (13). Lubricate the threads of the hydraulic return adapter (15) with anti-seize paste (P06-054).
- (g) Connect the return tube (13) to the hydraulic return adapter (15) and tighten the return tube nut (17) by hand. Torque the tube nut to 200–225 in-lb (22.59–25.42 N.m). Safety the tube nut with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1233, LUBRICANT/OIL/JET ENGINE (DPM 339)

HAZMAT 1000, REFER TO MSDS

- (h) Lubricate the threads of the bolt (8) with engine oil (P03-001).
- (i) Install the clamp (9) on the drain tube (10).
- (j) Attach the clamp (9) to the bracket with the bolt (8), the washer (7) and the nut (6).
- (k) Torque the nut (6) to 20–25 in-lb (2.3-2.8 N·m).
- (l) Remove the dust caps from the electrical connectors (2 and 3) and the electrical receptacles (4 and 5).
- (m) Connect the W5P7 connector (2) to the electrical receptacle (4). Connect the W4P3 connector (3) to the electrical receptacle (5).

G. Job Close-up - Variable Stator Vane Actuator Installation

SUBTASK 75-31-01-942-290

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-31-01-840-001

- (2) Put the fire control handle in the NORM position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-31-01-410-297

- (3) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-31-01-730-298

- (4) Do a test of the engine control system actuators. (TEST OF THE ENGINE CONTROL SYSTEM ACTUATORS (ADJ/TEST 15), TASK 71-02-15-700-883)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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ACTUATOR, VARIABLE STATOR VANE (HYDRAULIC) - ADJUSTMENT/TEST

1. General

- A. This procedure has the adjustment instructions for the variable stator vane (VSV) actuator. Access to the variable stator vane actuator is through the right thrust reverser door.
- B. Unless different instructions are given, these instructions are the same for the three Pratt & Whitney PW4460/4462 and the PW4460/4462-3 (Phase-3) engines.

TASK 75-31-01-700-868

2. ADJUSTMENT AND TEST OF THE VARIABLE STATOR VANE ACTUATOR - HYDRAULIC

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 501

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
PWA 29451	Adapter
PWA 49030	Cart, hydraulic (pneumatic)
CTE5100	Cart, hydraulic (pneumatic) (optional to PWA 49030)
PWA 85675	Kit, rig pin
PWA 86317	Switch box, electrical
Not specified	Container, 5 U.S. gal (19.0 l)
MS90376	Dust caps, electrical connector
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs
Not specified	Torque wrench 0-600 in-lb (0-67.8 N·m)
Not specified	Soft-jawed pliers

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

EFFECTIVITY

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Table 502

REFERENCE	DESIGNATION
P05-289	Lockwire (AS3214-02)
P03-001	Oil, engine (PWA 521B)
P03-003	Fluid, calibrating
P06-054	Paste, antiseize (PWA 36246)

C. Expendable Parts

(1) Expendable Parts

Table 503

REFERENCE/ITEM	DESIGNATION	IPC
Fig. 509/33	Pin, cotter	IPC 75-31-01-10-005
Fig. 509/37	Washer-key	IPC 75-32-05-10-095
Fig. 513/50	Seal-lead	IPC 75-32-05-10-075

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-31-01-200-869	RIG INSPECTION OF THE VARIABLE STATOR VANE CONTROL SYSTEM MCDU/FADEC PROCEDURE - FOR AIRCRAFT WITH ADAS (P/B 601)
IPC 75-31-01-10-005	Illustrated Parts Catalog
IPC 75-32-05-10-075	Illustrated Parts Catalog
IPC 75-32-05-10-095	Illustrated Parts Catalog

E. Job Set-up - Variable Stator Vane Actuator Adjustment/Test, Hydraulic

SUBTASK 75-31-01-010-268

- (1) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-31-01-030-267

- (2) If necessary, disconnect the VSV actuator (1) pressure and return tubes (2 and 3) as follows: (Figure 501)

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1045, JET FUEL B (JP-4 FUEL)

HAZMAT 1000, REFER TO MSDS

- (a) Put a container under the VSV actuator (1).
- (b) Put an open-end wrench on the return adapter (4). Disconnect the return tube coupling nut (5) from the adapter. Drain the fuel into the container and install the protective plug on the coupling nut.
- (c) Put an open-end wrench on the pressure adapter (6). Disconnect the pressure tube coupling nut (7) from the adapter. Drain the fuel into the container and install the protective plug on the coupling nut.
- (d) Put a container under the fuel pressure manifold (8) and the fuel return manifold (9). (Figure 502)
- (e) Disconnect the return tube coupling nut (10) from the fuel return manifold (9). Drain the fuel into the container and install the protective caps and plugs on the coupling nut and manifold.
- (f) Disconnect the pressure tube coupling nut (11) from the fuel pressure manifold (8). Drain the fuel into the container and install the protective caps and plugs on the coupling nut and manifold.
- (g) Loosen the two bolts (12) that attaches the pressure and return tubes (2 and 3) clamps (13) to the flange E bracket (14). Move the pressure and return tubes away from the VSV actuator (1). (Figure 503)

SUBTASK 75-31-01-480-267

- (3) Connect the hydraulic cart (15) to the VSV actuator (1) as follows: (Figure 504)
 - (a) If necessary, remove the protective cap from the pressure adapter (6). Install the tool adapter (PWA 29451) (16) on the pressure adapter with your hand.
 - (b) Hold the pressure adapter (6) with an open-end wrench and torque the tool adapter (16) to 225–250 in-lb (25.4–28.2 N·m).



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1382, FLUID/CALIBRATING/MIL-C-7024D
(ASHLAND CHEMICAL CO.)

HAZMAT 1000, REFER TO MSDS

- (c) Remove the protective caps and plugs from the hydraulic cart (15) pressure and return hoses (17 and 18).
- (d) If necessary, remove the protective cap from the return adapter (4). Connect the hydraulic cart (15) pressure and return hose (17 and 18) coupling nuts (19) to the tool adapter (16) and the return adapter (4).

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- (e) Hold the tool and the return adapters (16 and 4) with an open-end wrench. Torque the pressure and return hose (17 and 18) coupling nuts (19) to 200-225 in-lb (22.6–25.4 N·m).

SUBTASK 75-31-01-710-267

- (4) Before the air supply hose (20) is connected to the hydraulic cart (15), do the steps that follow:
- Put the control handle (21) in the (center) NEUTRAL position. (Figure 505)
 - Put the hydraulic valve handle (22) in the CLOSE position. (Figure 506)
 - Put the air valve handle (23) in the CLOSE position. (Figure 507)
 - Turn the small adjustment knob (24) fully clockwise until it stops.

SUBTASK 75-31-01-480-269

- (5) Examine the oil fill (25) and make sure the hydraulic cart (15) is full of fluid. If necessary, service the hydraulic cart with calibrating fluid (P03-003). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

SUBTASK 75-31-01-480-270

- (6) Connect the electrical switch box (26) to the VSV actuator (1) as follows: (Figure 508)
- If necessary, disconnect the W5P7 and W4P3 harness connectors (27 and 28) from the J7 and J3 electrical receptacles (29 and 30). Install the dust caps on the harness connectors and the J3 electrical receptacles.
 - If necessary, remove the dust caps from the electrical switch box (26) connector (31) and the J7 electrical receptacle (29). Connect the electrical switch box connector to the J7 electrical receptacle on the VSV actuator (1).

SUBTASK 75-31-01-830-282

- (7) Do the initial adjustment of the VSV actuator (1) rod-end bearing (32) as follows: (Figure 509)
- If necessary, remove the cotter pin (33) from the VSV actuator (1) rod-end bearing (32) shoulder bolt (34). Remove the nut (35), the washer (36) and the shoulder bolt from the VSV actuator rod-end bearing. Discard the cotter pin.
 - If necessary, make the key-washer (37) tabs straight. Loosen the jamnut (38) and remove the rod-end bearing (32). Discard the key-washer.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (c) Lubricate the threads of the rod-end bearing (32) with engine oil (P03-001). Install the washer-key (37) and the actuator rod-end bearing on the actuator rod (39). Adjust the rod-end bearing to the initial adjustment of 0.6 in. (15.2 mm). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

NOTE: The initial adjustment is measured from the rod-end bearing hex area to the flat area of the actuator rod.

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- (d) Lubricate the threads of the rod-end bearing (32) shoulder bolt (34) with engine oil. Temporarily connect the rod-end bearing to the lever set (bellcrank) (40). Install the washer (36) and the nut (35) on the shoulder bolt. Tighten the nut by hand and make sure the bolt head stays against the surface of the lever set (bellcrank).

SUBTASK 75-31-01-863-267

- (8) Pressurize the hydraulic cart (15) as follows: (Figure 510) (Figure 511)
- (a) Connect the air supply hose (20) to the hydraulic cart (15) at the air valve (41). Supply a minimum of 30 psi (207.0 kPa) of air pressure to the valve.



WARNING DO NOT PUT YOUR FINGERS NEAR THE LINKAGES, UNISON RINGS, OR LEVER SET WHEN YOU APPLY HYDRAULIC PRESSURE. IF THE LINKAGES, UNISON RINGS, OR LEVER SET MOVE, INJURY TO PERSONS CAN OCCUR.



CAUTION WHEN YOU APPLY HYDRAULIC PRESSURE WITHOUT ELECTRICAL POWER, MAKE SURE THE ACTUATOR MOVE TO AND STAYS IN THE OPEN POSITION.

- (b) Put the air valve handle (23) on the air valve (41) in the OPEN position.
- (c) Lift and turn the large adjustment knob (42) clockwise to increase the air pressure to 25-30 psi (172.0-207.0 kPa).
- NOTE: The pump ratio is 1 to 10. (30 psi air equals 300 psi hydraulic), (207.0 kPa air equals 2069.0 kPa hydraulic).
- (d) Put the hydraulic valve handle (22) in the OPEN position.
- (e) Turn the small adjustment knob (24) slowly counterclockwise until the air motor operates.
- NOTE: The smaller adjustment knob controls the speed of the actuator and the hydraulic pressure to become stable after actuation. Adjust as necessary to maintain hydraulic pressure after movement of the actuator.
- NOTE: With the hydraulic control handle in the NEUTRAL position, the hydraulic pressure gage will show 0 psi (0 kPa).
- (f) Put the control handle (21) in the ADVANCE position. Read the hydraulic pressure gage (43). If necessary, adjust the hydraulic pressure to 250-300 psi (1724–2069 kPa). (Figure 505)
- (g) Connect the electrical switch box (26) AC power plug (44) to a 115 Vac power source.
- (h) Push the power switch (45) on the electrical switch box (26) to the ON position. Push the actuation switch (46) on the electrical switch box to the EXTEND position.
- NOTE: The VSV actuator rod will move to the FULLY (EXTENDED) OPEN position.

F. Procedure - Variable Stator Vane Actuator Adjustment/Test, Hydraulic

SUBTASK 75-31-01-820-267

- (1) Adjust the VSV actuator (1) as follows: (Figure 511) (Figure 512) (Figure 513)



CAUTION MAKE SURE THE ADJUSTMENTS IN THIS PROCEDURE ARE OBEYED. THESE ARE IMPORTANT PRECISION ADJUSTMENTS. INCORRECT ADJUSTMENTS CAN CAUSE UNSATISFACTORY ENGINE PERFORMANCE AND ENGINE FAILURE.

EFFECTIVITY
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(CAUTION PRECEDES)



CAUTION

MAKE SURE YOU USE THE CORRECT RIG CHECK PIN. THE LARGE RIG CHECK PIN IS FOR THE PRE-SERVICE BULLETIN PW4ENG 72-246 ENGINES. THE SMALL RIG CHECK PIN IS FOR THE POST-SERVICE BULLETIN PW4ENG 72-246 ENGINES. IF AN INCORRECT RIG CHECK PIN IS USED, IT CAN CAUSE ERRORS IN THE LEVER SET ADJUSTMENT. AN ERROR IN THE LEVER SET ADJUSTMENT CAN CAUSE UNSATISFACTORY ENGINE PERFORMANCE AND ENGINE FAILURE.

- (a) Make sure the VSV actuator (1) rod (39) is fully extended. Adjust the rod-end bearing (32) and put the rig pin (47) into the lever set (bellcrank) rig pin slot (48). Make sure the rig pin goes through the lever set (bellcrank) slot and the two holes (49) in the support bracket.
NOTE: If small adjustments are needed to install the rig pin, the hydraulic pressure must be reduced to 0 psi (0 kPa). The actuator rod will not turn with the hydraulic pressure on.
- (b) Torque the jambnut (38) to 460-510 in-lb (52.0-57.6 N·m). Do not bend the key-washer (37) tabs at this time.



CAUTION

MAKE SURE YOU REMOVE THE RIG PINS BEFORE YOU CONTINUE. IF THE PINS ARE NOT REMOVED, DAMAGE CAN OCCUR TO THE LEVER SET, THE SUPPORT BRACKET, OR THE UNISON RINGS.

- (c) Remove the rig pin (47) from the lever set (bellcrank) rig pin slot (48).
- (d) Push the actuation switch (46) on the electrical switch box (26) to the EXTEND and RETRACT positions two or three times. Stop the operation of the VSV actuator (1) with the actuator rod (39) in the fully extended (vanes open) position.
- (e) Make sure the VSV actuator rod (39) is fully extended (vanes open) position. Put the rig pin (47) into the lever set (bellcrank) rig pin slot (48) and the two holes (49) in the support bracket.
- (f) If the rig pin (47) is fully installed, the lever set (bellcrank) adjustment is satisfactory. If the rig pin cannot be installed, do steps (a) through (e) again.
- (g) Bend one set of the key-washer (37) tabs on a flat of the rod-end bearing (32). Bend the other set of the key-washer tabs on a flat of the jambnut (38). Safety the jambnut with lockwire (P05-289) and install a lead seal (83280) (50). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (h) Torque the nut (35) on the VSV actuator (1) rod-end bearing (32) shoulder bolt (34) to a minimum of 15 in-lb (1.7 N·m). Continue to torque the nut until the nut slot aligns with the hole in the shoulder bolt. Do not torque the nut more than 22 in-lb (2.5 N·m). Install the cotter pin (33). (Figure 509)



CAUTION

MAKE SURE YOU REMOVE THE RIG PINS BEFORE YOU CONTINUE. IF THE PINS ARE NOT REMOVED, DAMAGE CAN OCCUR TO THE LEVER SET, THE SUPPORT BRACKET, OR THE UNISON RINGS.

- (i) Remove the rig pin (47) from the lever set (bellcrank) rig pin slot (48) and the support bracket rig pin hole (49).

EFFECTIVITY
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SUBTASK 75-31-01-080-267

- (2) Disconnect the hydraulic cart (15) from the VSV actuator (1) as follows: (Figure 503) (Figure 504) (Figure 505) (Figure 510)
 - (a) Move the air valve handle (23) to the CLOSED position.
 - (b) Disconnect the air supply hose (20) from the air valve (41). Install the protective caps and plugs.
 - (c) Move the control handle (21) to the NEUTRAL (center) position.
 - (d) Put a container under the VSV actuator (1).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1382, FLUID/CALIBRATING/MIL-C-7024D
(ASHLAND CHEMICAL CO.)

HAZMAT 1000, REFER TO MSDS

- (e) Put an open-end wrench on the return adapter (4). Disconnect the return hose coupling nut (19) from the adapter. Drain the calibrating fluid into the container and install the protective plug on the coupling nut.
- (f) Put an open-end wrench on the pressure adapter (6). Disconnect the pressure hose coupling nut (19) from the tool adapter (16). Drain the calibrating fluid into the container and install the protective plug on the coupling nut.

SUBTASK 75-31-01-080-270

- (3) Disconnect the electrical switch box (26) as follows: (Figure 508) (Figure 511)
 - (a) Push the power switch (45) on the electrical switch box (26) to the OFF position.
 - (b) Disconnect the electrical switch box connector (31) from the J7 receptacle (29) on the VSV actuator (1). Install the dust cap on the electrical switch box connector.
 - (c) Remove the dust caps on the W5P7 and W4P3 (27 and 28) harness connectors. Remove the dust cap from the J3 receptacle (30) on the VSV actuator (1).



CAUTION

MAKE SURE YOU USE THE CORRECT INSTALLATION PROCEDURE AND TOOLS WHEN YOU INSTALL THE HARNESS CONNECTOR. IF AN INCORRECT PROCEDURE OR TOOL IS USED, IT CAN CAUSE DAMAGE TO THE CONNECTOR OR LOOSEN IT. A LOOSE CONNECTOR CAUSES VIBRATION TO OCCUR AND THE CONTACTS TO WEAR. THIS CAN CAUSE UNSATISFACTORY LIGHTNING PROTECTION.

- (d) Connect the W5P7 and the W4P3 (27 and 28) harness connectors to the J7 and J3 (29 and 30) receptacles.
- (e) Tighten the two harness connector (27 and 28) coupling nut with your hand until you cannot see the witness color band.

NOTE: The witness color band is the first band on the connector receptacle. You cannot see it when the coupling nut is tight.

EFFECTIVITY
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- (f) Use the soft-jawed pliers to tighten the two connectors (27 and 28) coupling nut fully against the VSV actuator (1) connectors (29 and 30) (metal to metal).

NOTE: When you use the soft-jawed pliers correctly, the connector and the receptacle contacts are sufficiently engaged and the connector is tight. If you use too much force, the tool will turn on the connector coupling nut. This will prevent too much torque.

SUBTASK 75-31-01-430-021

- (4) Install the pressure tube (2) and the return tube (3) as follows: (Figure 501) (Figure 502) (Figure 503)(Figure 504)

- (a) Hold the pressure adapter (6) at the VSV actuator (1) with an open-end wrench. Remove the tool adapter (16) from the pressure adapter.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the threads of the pressure and return (6 and 4) adapters at the VSV actuator (1) with antiseize paste (P06-054). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Remove the protective caps from the pressure and return (8 and 9) manifolds. Lubricate the threads of the pressure and return manifolds with antiseize paste (P06-054).
- (d) Connect the pressure tube (2) coupling nuts (7 and 11) to the VSV actuator pressure adaptor (6) and the pressure manifold (8). Tighten the coupling nuts with your hand.
- (e) Hold the pressure manifold (8) with an open-end wrench. Torque the tube coupling nut (11) to 225-250 in-lb (25.4-28.2 N·m). Hold the pressure adapter (6) at the VSV actuator (1) with an open-end wrench. Torque the pressure tube coupling nut (7) to 225-250 in-lb (25.4-28.2 N·m).
- (f) Connect the return tube (3) coupling nuts (5 and 10) to the VSV actuator return adapter (4) and the return manifold (9). Tighten the coupling nuts with your hand.
- (g) Hold the return manifold (9) with an open-end wrench. Torque the tube coupling nut (10) to 225-250 in-lb (25.4-28.2 N·m). Hold the return adapter (4) at the VSV actuator (1) with an open-end wrench. Torque the tube coupling nut (5) to 225-250 in-lb (25.4-28.2 N·m). Safety the tube nuts with lockwire (P05-289). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (h) Lubricate the threads of the two clamp bolts (12) with engine oil (P03-001).

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- (i) Torque the two clamp bolts (12) to 36-40 in-lb (4.1–4.5 N·m).

SUBTASK 75-31-01-710-268

- (5) For aircraft that have auxiliary data acquisition system (ADAS), examine the rigging of the variable stator vane actuator with the MCDU/FADEC procedure. (RIG INSPECTION OF THE VARIABLE STATOR VANE CONTROL SYSTEM MCDU/FADEC PROCEDURE - FOR AIRCRAFT WITH ADAS, TASK 75-31-01-200-869)

G. Job Close-up - Variable Stator Vane Actuator Adjustment/Test, Hydraulic

SUBTASK 75-31-01-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-31-01-410-267

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-31-01-730-270

- (3) Do an engine ground test. (ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870)

———— END OF TASK ————

EFFECTIVITY
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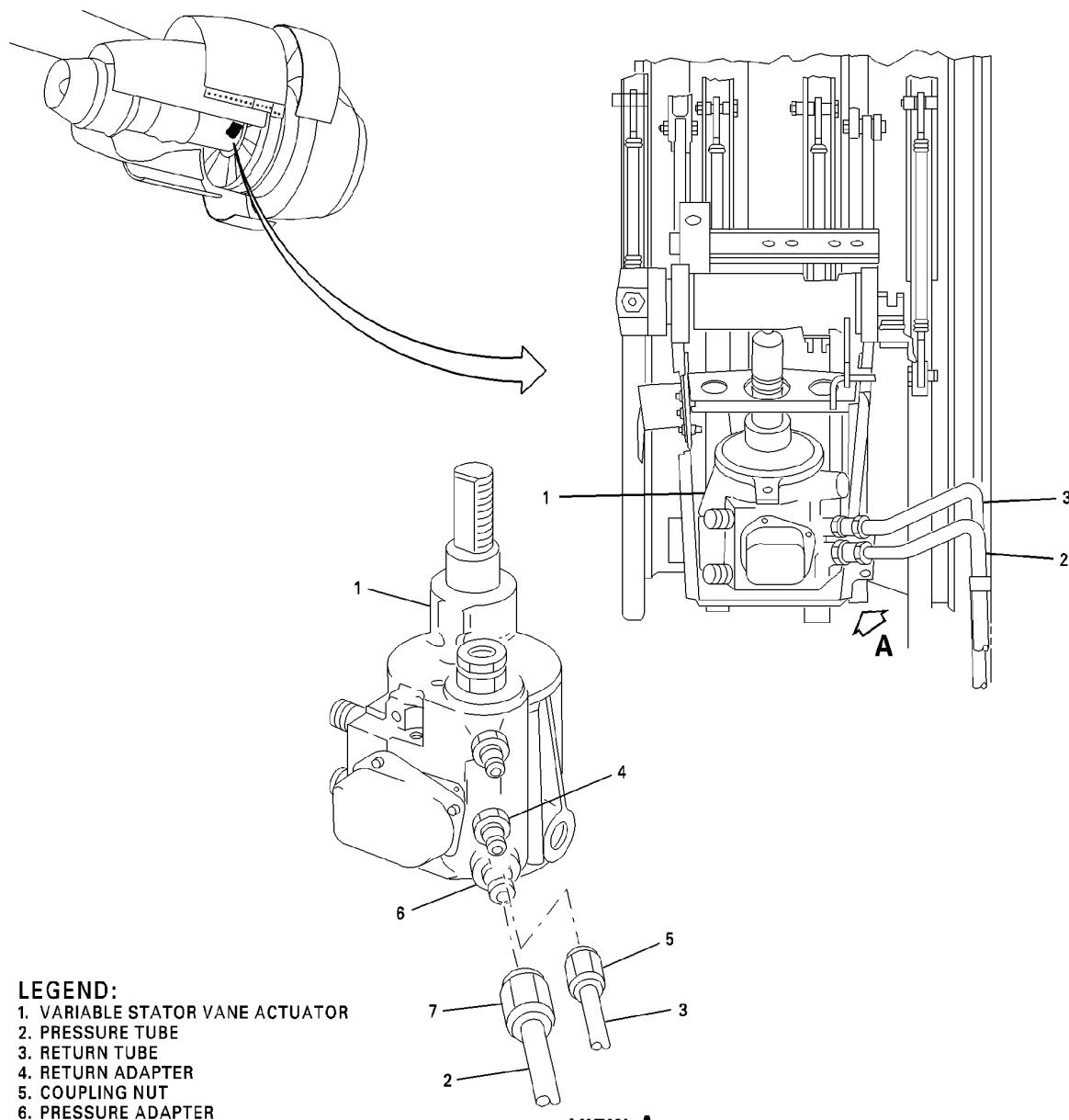
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LEGEND:

1. VARIABLE STATOR VANE ACTUATOR
2. PRESSURE TUBE
3. RETURN TUBE
4. RETURN ADAPTER
5. COUPLING NUT
6. PRESSURE ADAPTER
7. COUPLING NUT

VIEW A

CAG(IGDS)

DB2-75-0080A

Variable Stator Vane Actuator Adjustment/Test
Figure 501/75-31-01-990-890

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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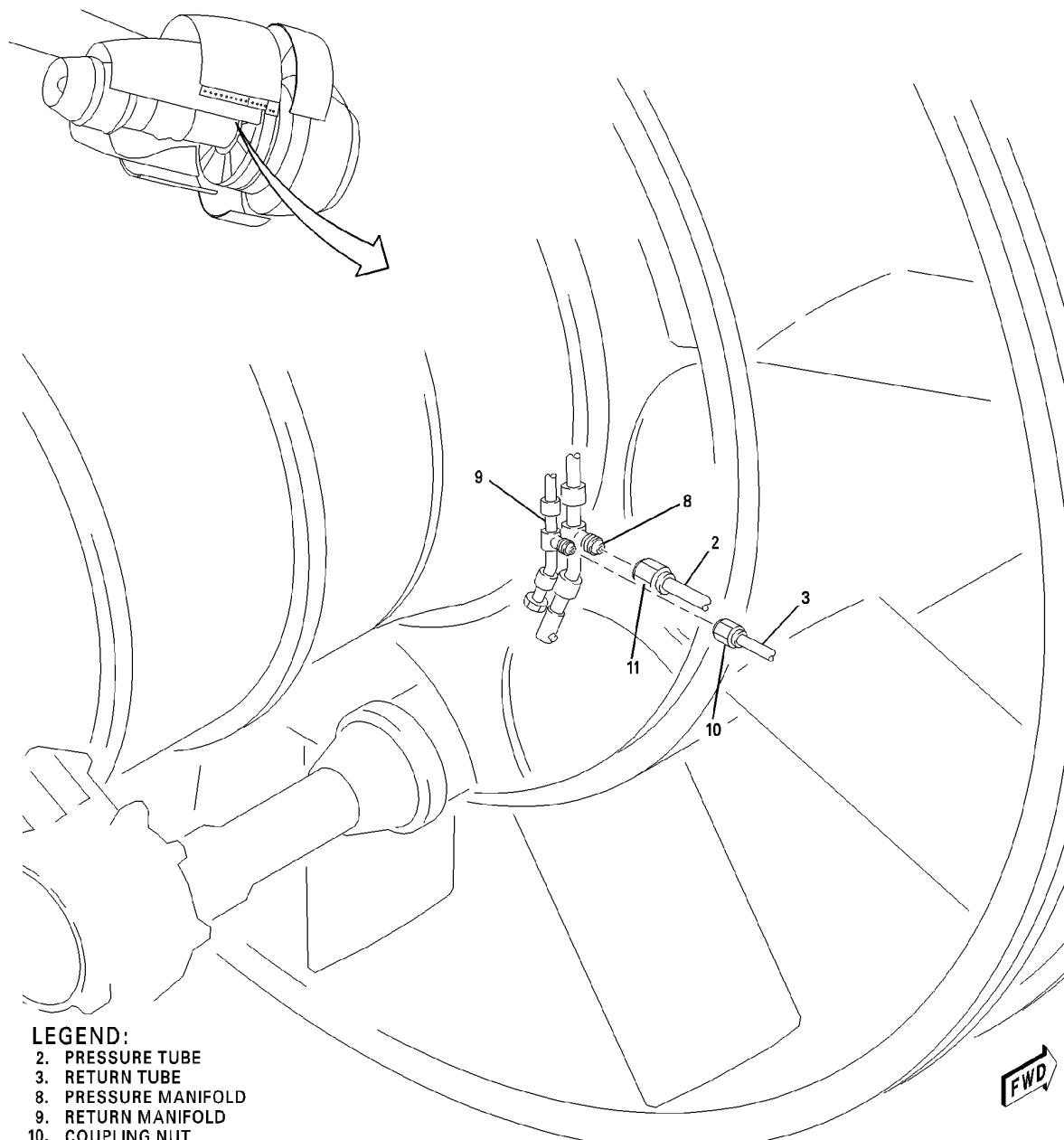
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LEGEND:

- 2. PRESSURE TUBE
- 3. RETURN TUBE
- 8. PRESSURE MANIFOLD
- 9. RETURN MANIFOLD
- 10. COUPLING NUT
- 11. COUPLING NUT

CAG(IGDS)

DB2-75-0081A

Variable Stator Vane Actuator Adjustment/Test
Figure 502/75-31-01-990-876

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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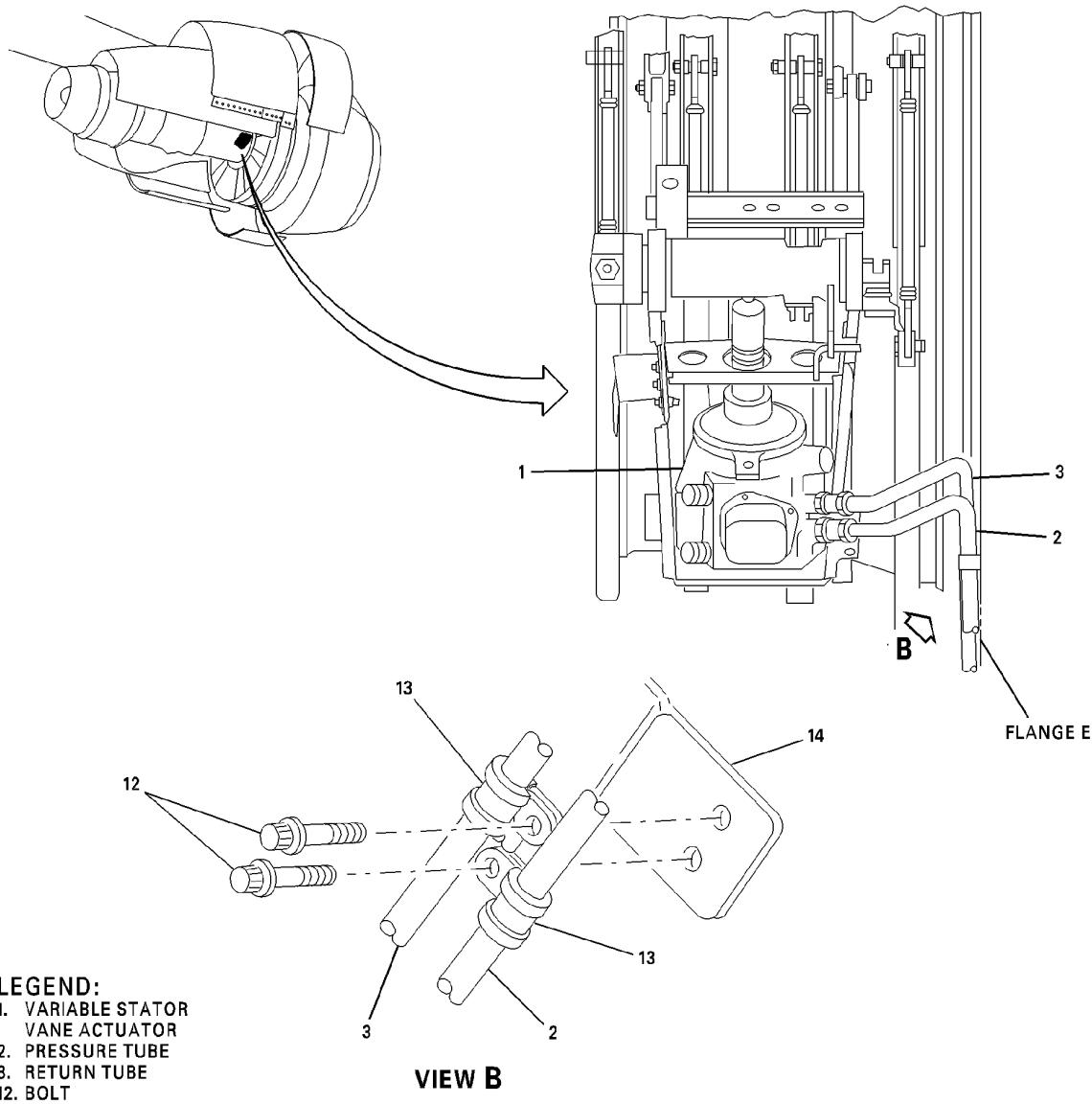
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LEGEND:

- 1. VARIABLE STATOR VANE ACTUATOR
- 2. PRESSURE TUBE
- 3. RETURN TUBE
- 12. BOLT
- 13. TUBE CLAMP
- 14. FLANGE E BRACKET

CAG(IGDS)

DB2-75-0077A

Variable Stator Vane Actuator Adjustment/Test
Figure 503/75-31-01-990-892

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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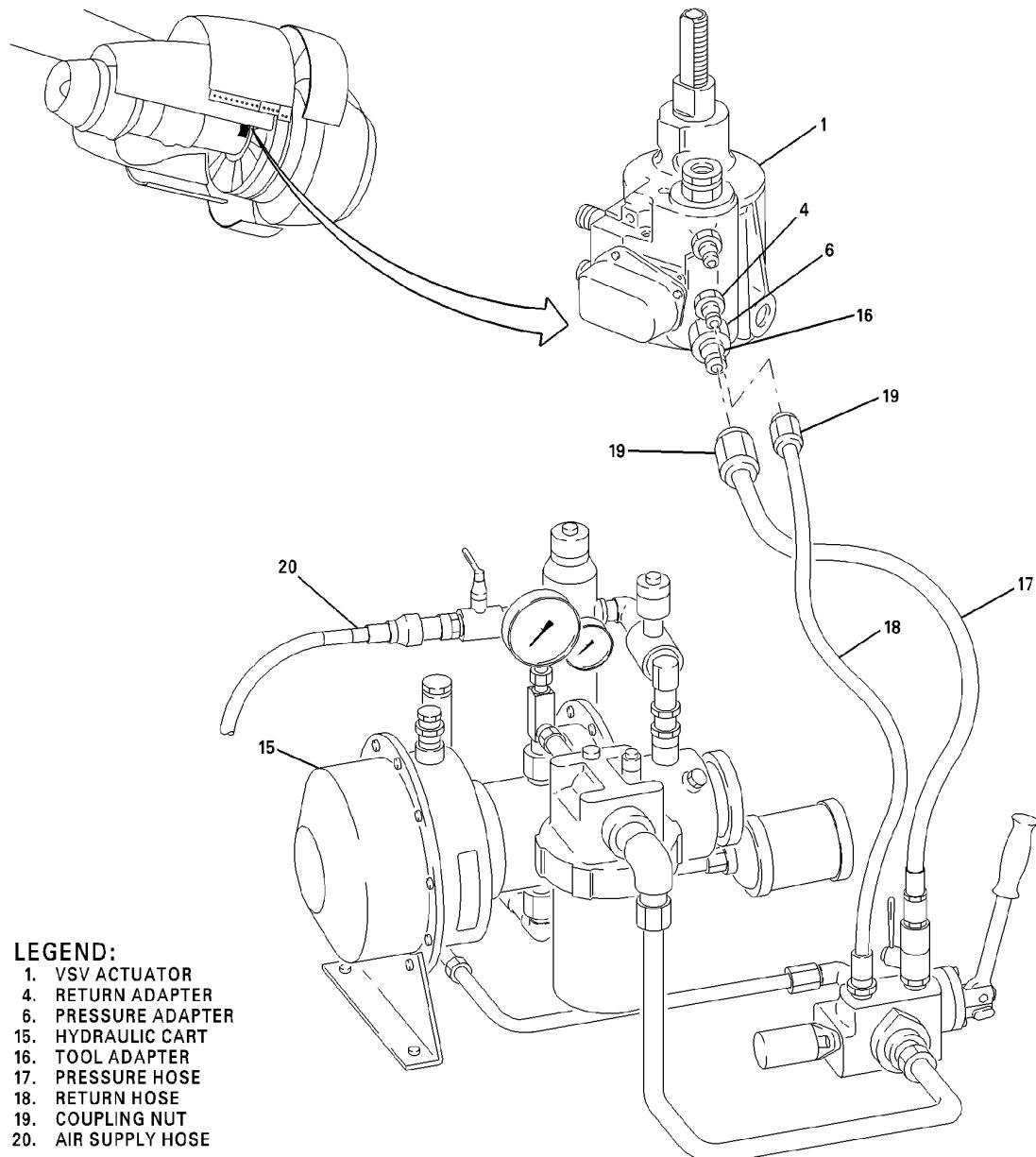
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CAG(IGDS)

DB2-75-0082A

Hydraulic Cart Installation
Figure 504/75-31-01-990-893

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

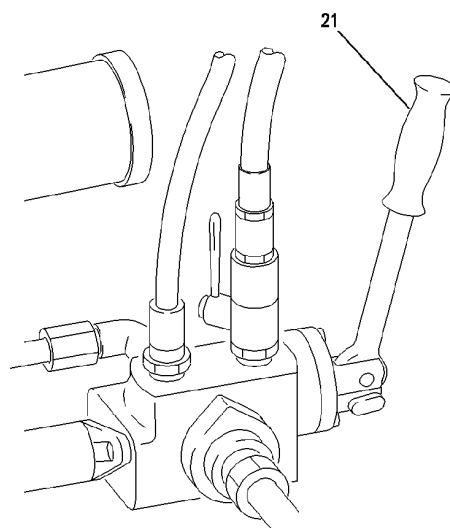
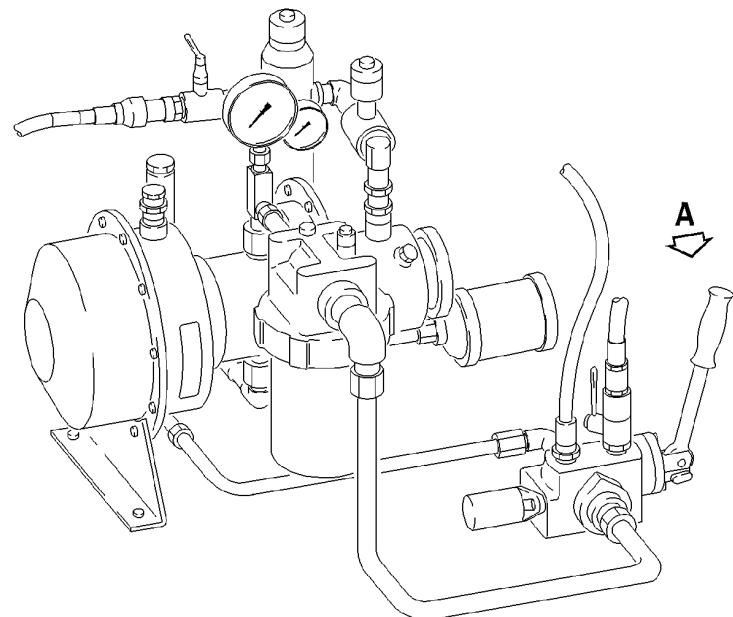
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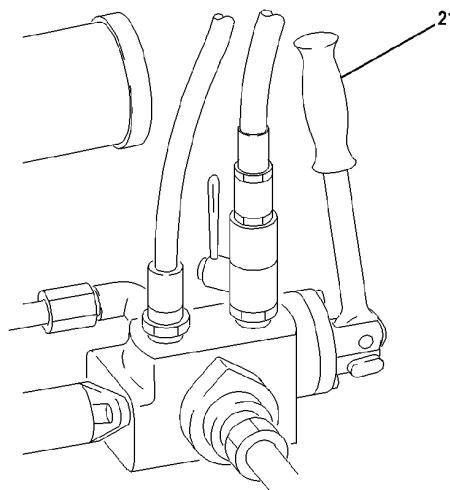


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LEGEND:
21. CONTROL HANDLE



**CONTROL HANDLE
NEUTRAL POSITION**



**CONTROL HANDLE
ADVANCE POSITION**

VIEW A

CAG(IGDS)

DB2-75-0083A

Hydraulic Cart Control Handle Position
Figure 505/75-31-01-990-894

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

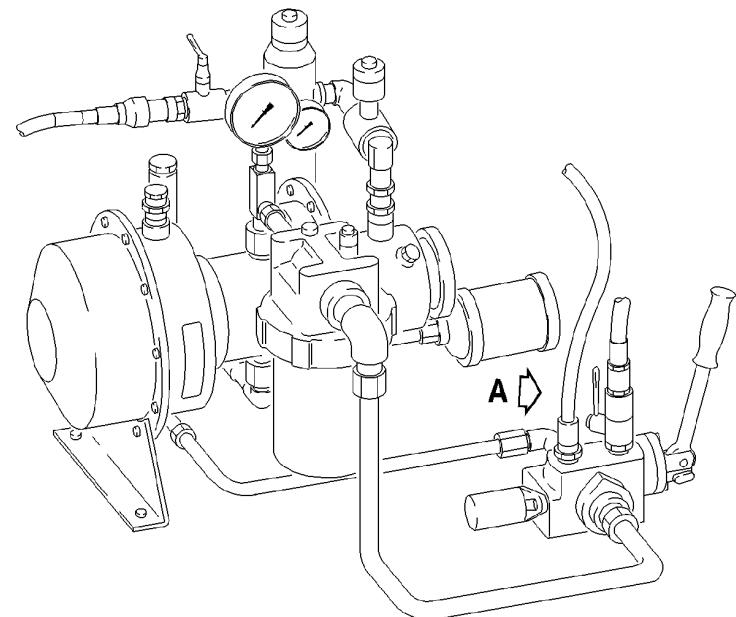
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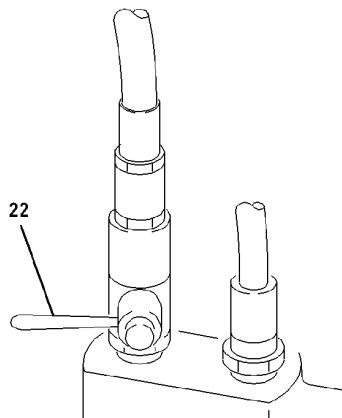
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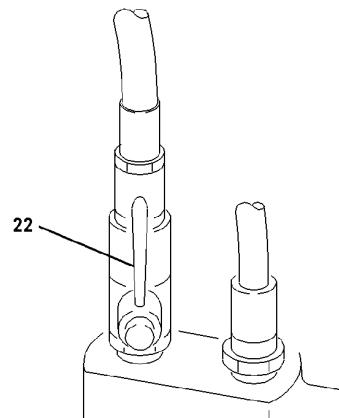
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LEGEND:
22. HYDRAULIC VALVE HANDLE



HYDRAULIC VALVE HANDLE
CLOSE POSITION



HYDRAULIC VALVE HANDLE
OPEN POSITION

VIEW A

CAG(IGDS)

DB2-75-0084A

Hydraulic Cart Hydraulic Valve Handle Position
Figure 506/75-31-01-990-895

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

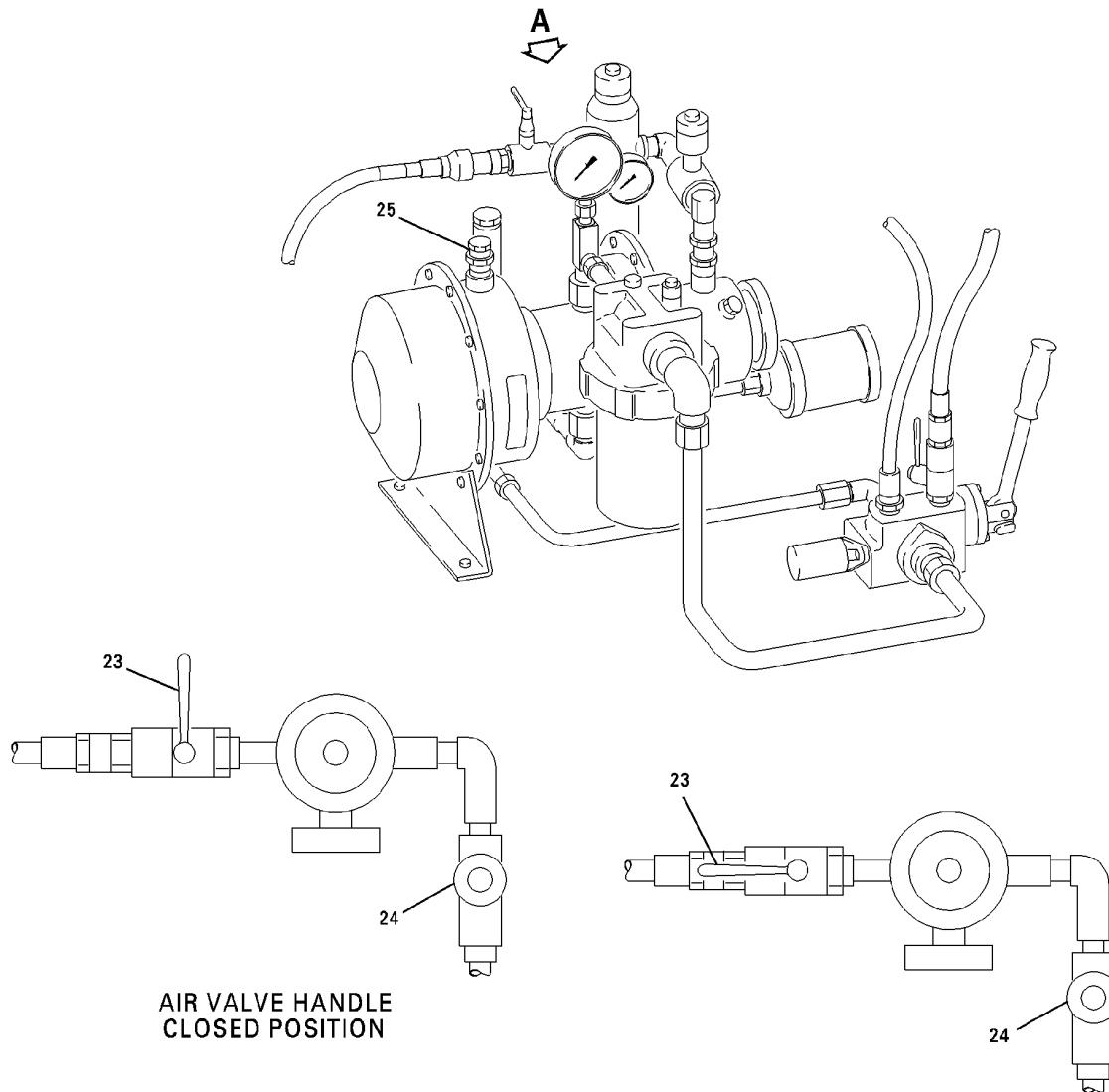
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LEGEND:

- 23. AIR VALVE HANDLE
- 24. SMALL ADJUSTMENT KNOB
- 25. OIL FILL

VIEW A

**AIR VALVE HANDLE
OPEN POSITION**

CAG(IGDS)

DB2-75-0085A

Hydraulic Cart Air Valve Handle Position
Figure 507/75-31-01-990-896

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

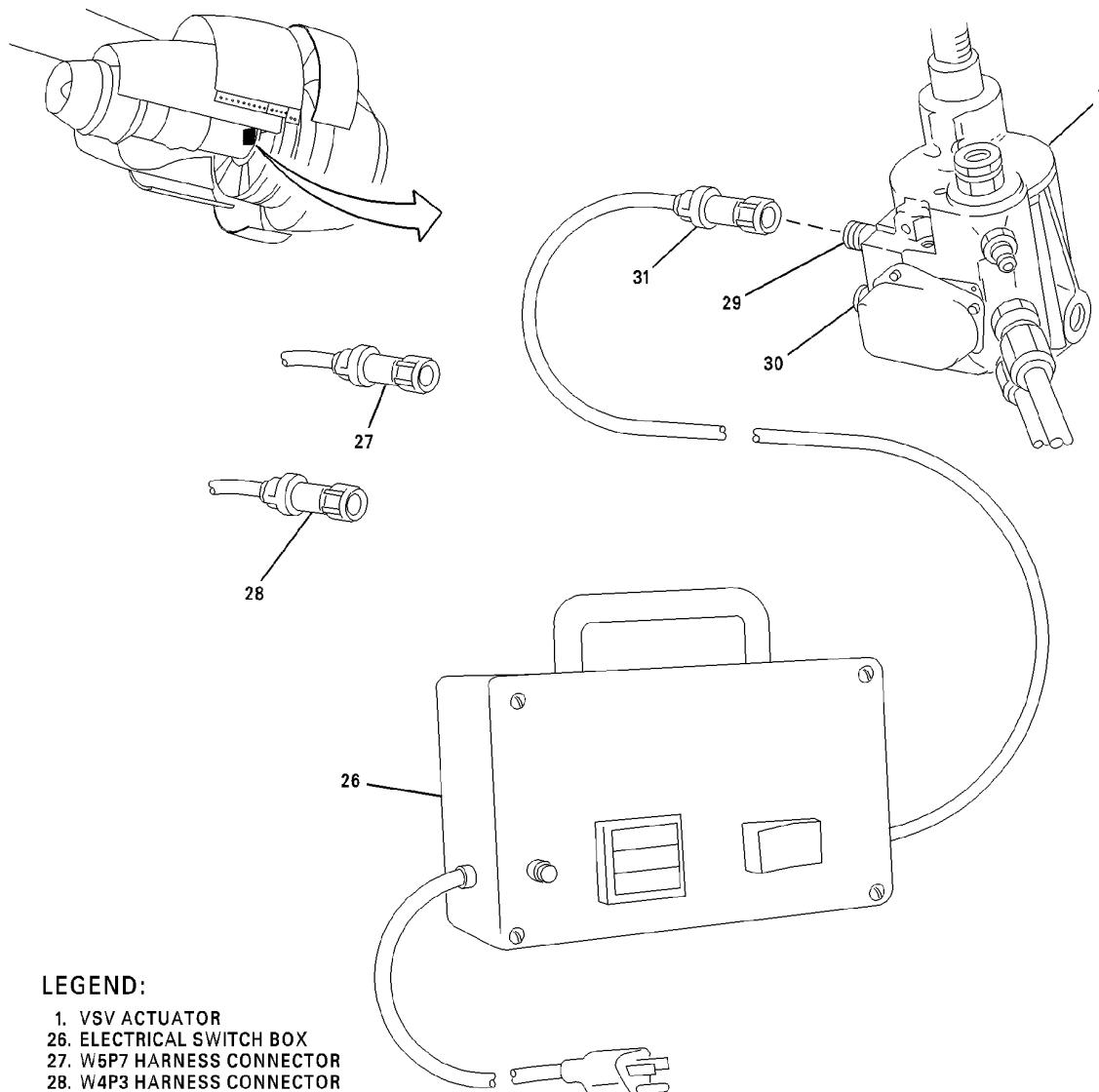
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LEGEND:

- 1. VSV ACTUATOR
- 26. ELECTRICAL SWITCH BOX
- 27. W5P7 HARNESS CONNECTOR
- 28. W4P3 HARNESS CONNECTOR
- 29. J7 RECEPTACLE
- 30. J3 RECEPTACLE
- 31. SWITCH BOX CONNECTOR

CAG(IGDS)

DB2-75-0086A

Electrical Switch Box Installation
Figure 508/75-31-01-990-897

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

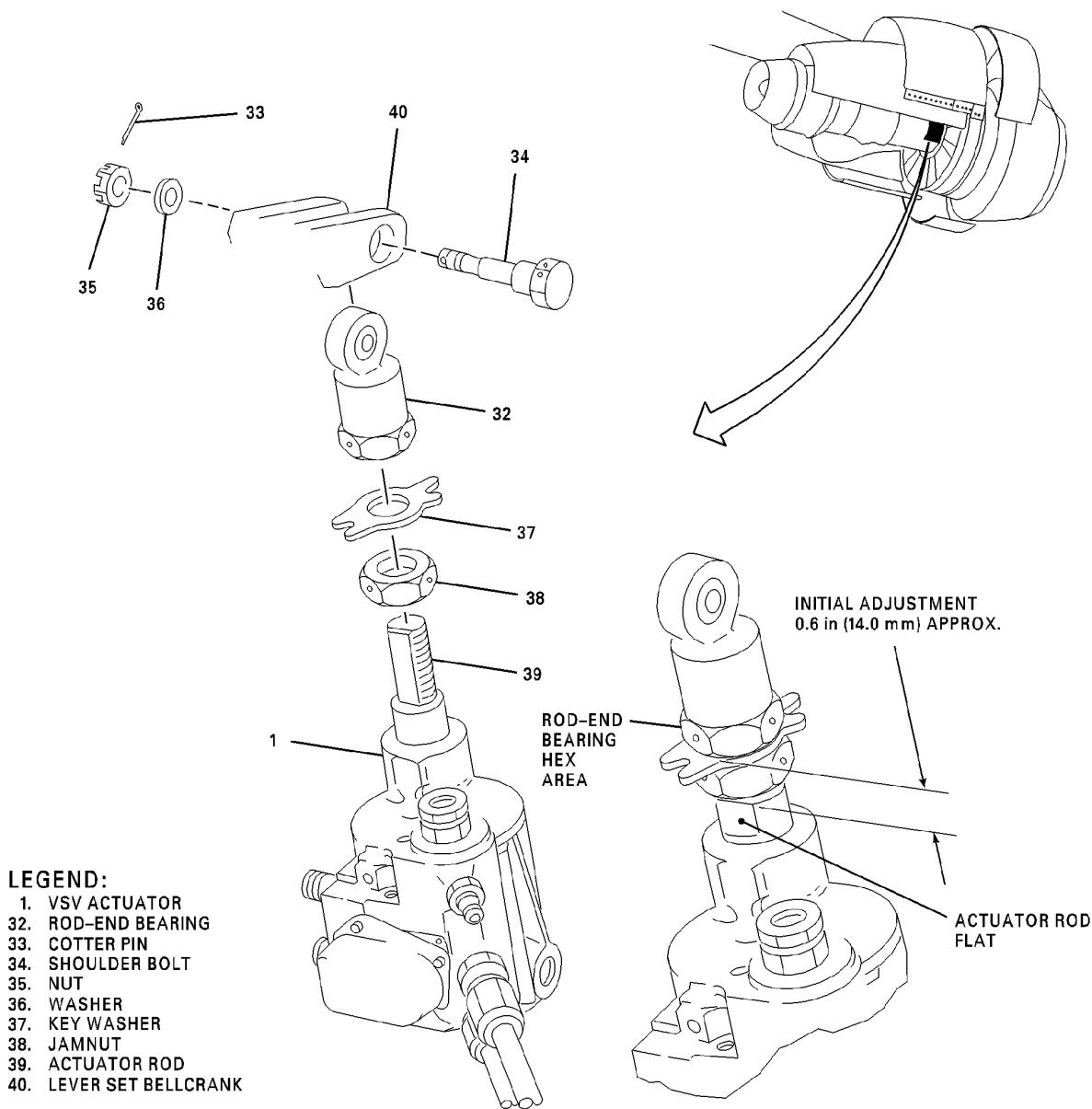
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CAG(IGDS)

DB2-75-0089A

Variable Stator Vane Actuator Adjustment/Test
Figure 509/75-31-01-990-878

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

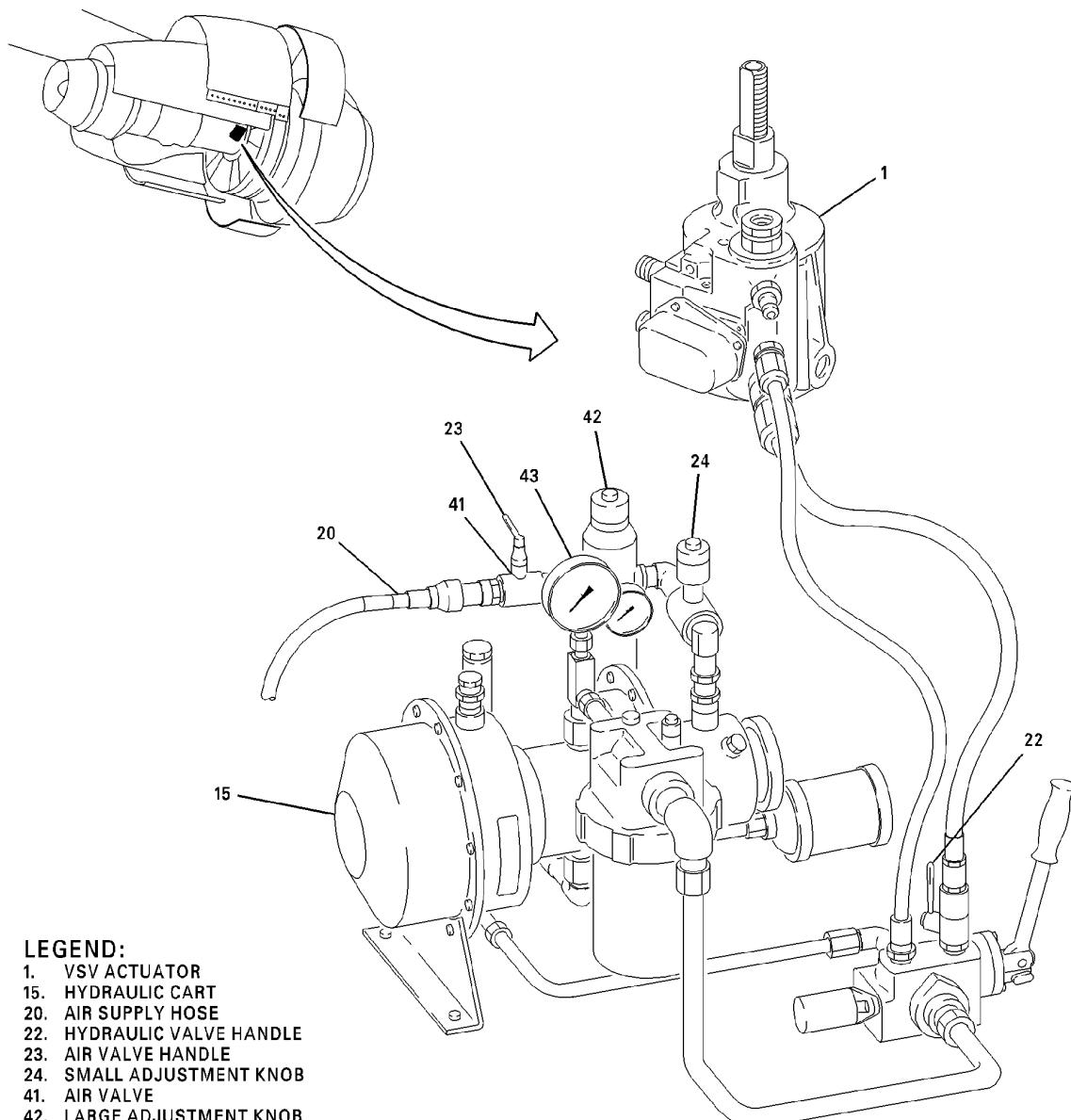
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LEGEND:

- 1. VSV ACTUATOR
- 15. HYDRAULIC CART
- 20. AIR SUPPLY HOSE
- 22. HYDRAULIC VALVE HANDLE
- 23. AIR VALVE HANDLE
- 24. SMALL ADJUSTMENT KNOB
- 41. AIR VALVE
- 42. LARGE ADJUSTMENT KNOB
- 43. HYDRAULIC PRESSURE GAGE

CAG(IGDS)

DB2-75-0078A

Variable Stator Vane Actuator Hydraulic Cart Connections
Figure 510/75-31-01-990-898

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

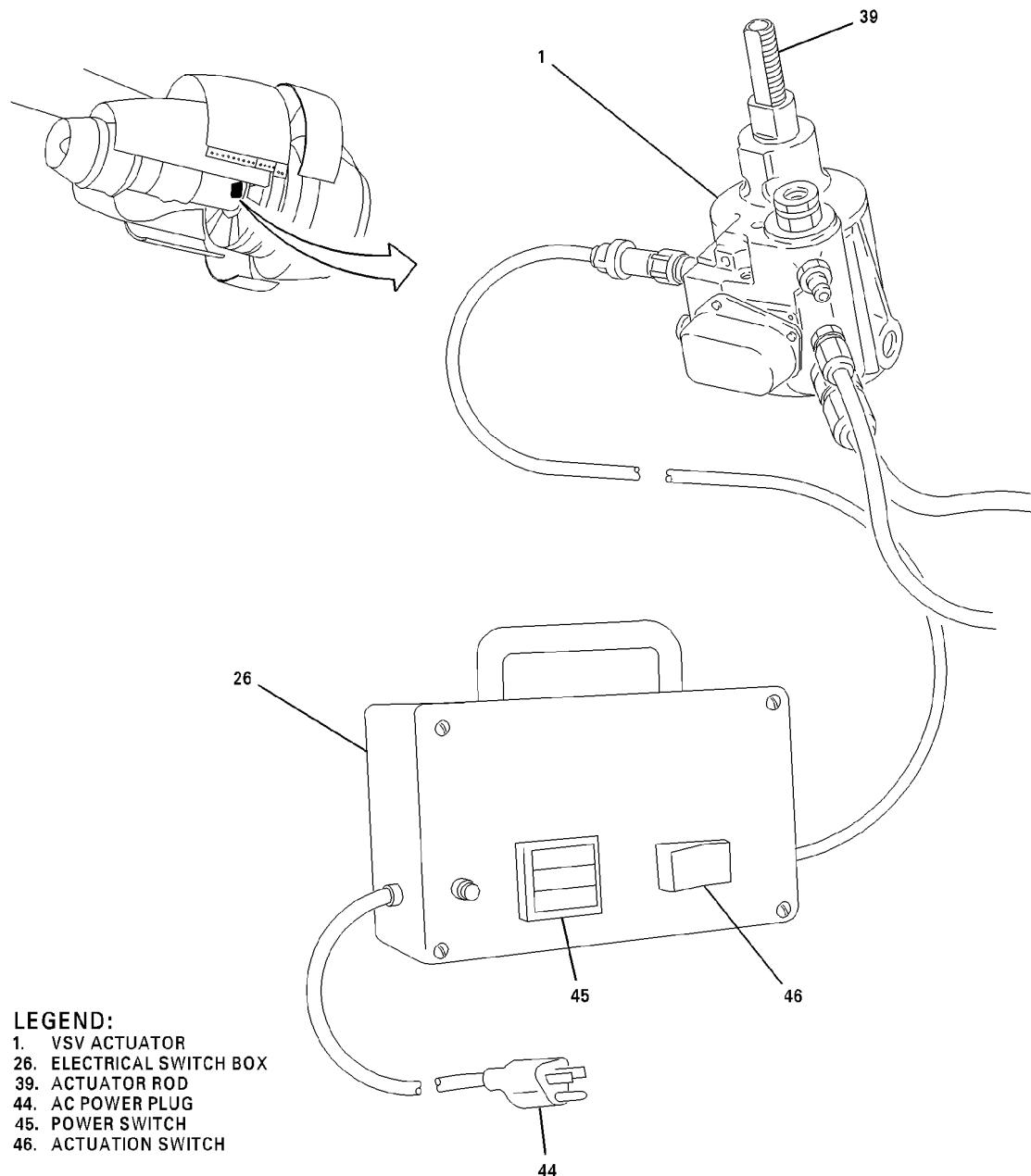
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CAG(IGDS)

DB2-75-0079A

Electrical Switch Box Installation
Figure 511/75-31-01-990-874

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

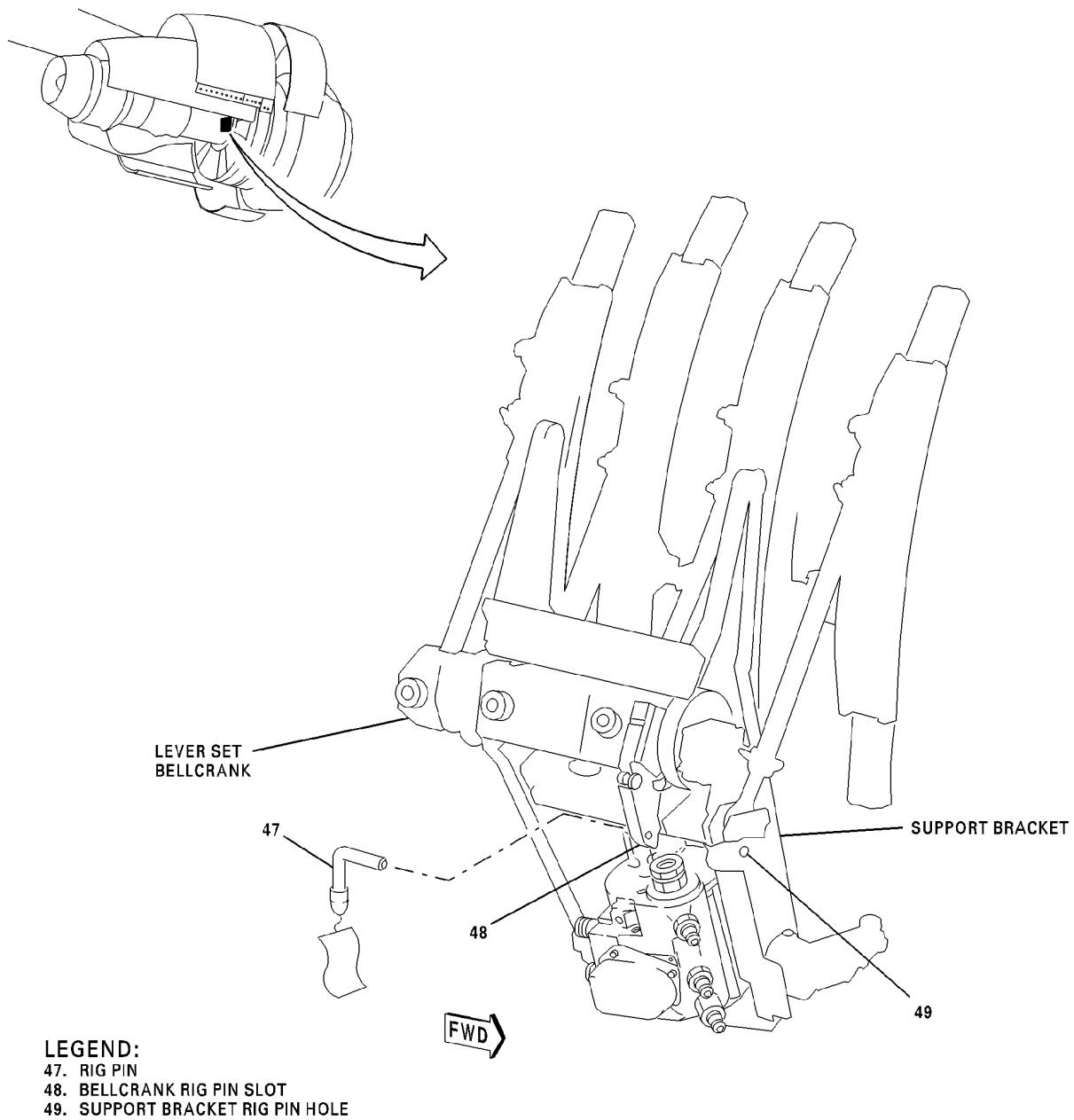
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CAG(IGDS)

DB2-75-0088A

Lever Set (Bellcrank) Rig Pin Installation
Figure 512/75-31-01-990-912

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

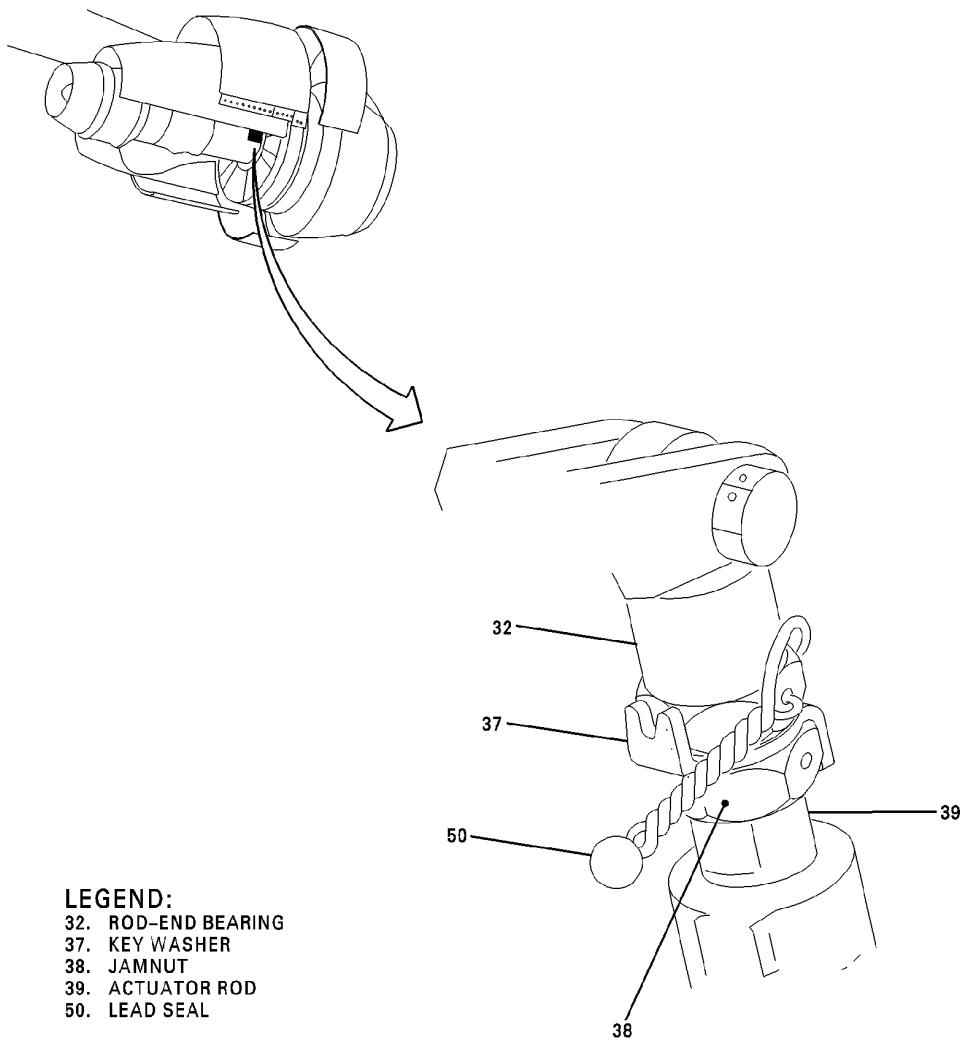
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LEGEND:

- 32. ROD-END BEARING
- 37. KEY WASHER
- 38. JAMNUT
- 39. ACTUATOR ROD
- 50. LEAD SEAL

CAG(IGDS)

DB2-75-0253A

Variable Stator Vane Actuator Adjustment/Test
Figure 513/75-31-01-990-913

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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ACTUATOR, VARIABLE STATOR VANE - INSPECTION/CHECK

1. General

- A. This procedure has the inspection/check instructions for the variable stator vane actuator. The variable stator vane actuators are on the aft fan frame at the 3 o'clock and 9 o'clock positions.
- B. Unless different instructions are given, this procedure is the same for the three GE CF6-80C2D1F engines on the MD-11 aircraft.

TASK 75-31-01-200-801

2. INSPECTION OF THE VARIABLE STATOR VANE ACTUATOR

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 601

REFERENCE	DESIGNATION
Not specified	Brush, soft bristle

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 602

REFERENCE	DESIGNATION
CO4-002	Solvent, Stoddard, P-D-680 Type 2
MIL-C-85043 (Type II)	Cloth, (low lint)

C. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-31-01-000-801	REMOVAL OF THE VARIABLE STATOR VANE ACTUATOR (P/B 401)
75-31-01-400-801	INSTALLATION OF THE VARIABLE STATOR VANE ACTUATOR (P/B 401)

D. Job Set-up - Variable Stator Vane Actuator Inspection

SUBTASK 75-31-01-010-006

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SUBTASK 75-31-01-020-006

- (2) Remove the variable stator vane (VSV) actuator if necessary for more inspection or if damaged. (REMOVAL OF THE VARIABLE STATOR VANE ACTUATOR, TASK 75-31-01-000-801)

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1089, SOLVENT

HAZMAT 1000, REFER TO MSDS

- (3) Remove dirt and contaminants from the VSV actuator with a soft bristle brush and solvent. Dry the solvent with a clean dry low lint cloth.

E. Procedure - Variable Stator Vane Actuator Inspection

SUBTASK 75-31-01-210-001

- (1) Do a visual inspection of the variable stator vane (VSV) actuator as follows: (Figure 601)

Table 603

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(1) Examine the variable stator vane actuator housing (1) for:		
(a) Leakage	None permitted	Replace the VSV actuator
(b) Dents, nicks, heat damage	Color other than gray will show heat damage. Burnt gray color, nicks or dents.	Replace the VSV actuator
(2) Examine the end cap (2) and piston rod (3) for:		
(a) Leakage	None permitted	Replace the VSV actuator
(3) Examine the piston rod (3) for:		
(a) Scratches, wear bent rod	Chrome finish worn from the piston rod, scratches or a bent piston rod.	Replace the VSV actuator
(4) Examine the piston rod-end bearing (6) for:		
(a) Nicks and scratches	None permitted	Replace the VSV actuator
(b) Loose in socket	None permitted	Replace the VSV actuator
(c) Binding	None permitted	Replace the VSV actuator
(5) Examine the lockwire holes (4) for:		
(a) Damage	None permitted	Replace the VSV actuator
(6) Examine the internal and external threads (5) for:		
(a) Damage	If the damage is more than the initial depth of the thread	Replace the VSV actuator
(b) Nicks	Permitted	Use a thread repair tool to repair nicks in the threads
(7) Examine the locking nut (10) and locking key (11) for:		

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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Table 603 (Continued)

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
(a) Locking nut (10) loose or worn or missing lockwire	None permitted	Replace the VSV actuator
(b) Locking key (11) worn or missing	None permitted	Replace the VSV actuator
(c) Locking nut (10) and key (11) rigged incorrectly	None permitted	Replace the VSV actuator
(d) Locking nut (10) and key (11) installed incorrectly	None permitted	Replace the VSV actuator
(8) Examine the electrical connector (7) and receptacle (9) for:		
(a) Burned, loose or damage	None permitted	Replace the VSV actuator
(b) Damaged external threads	If damage is more than the initial depth of the thread	Replace the VSV actuator
(c) Nicked threads	Permitted	Use a thread repair tool to repair nicks in the threads

F. Job Close-up - Variable Stator Vane Actuator Inspection

SUBTASK 75-31-01-430-019

- (1) Install the VSV actuator if it was removed. (INSTALLATION OF THE VARIABLE STATOR VANE ACTUATOR, TASK 75-31-01-400-801)

SUBTASK 75-31-01-942-002

- (2) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-31-01-410-005

- (3) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

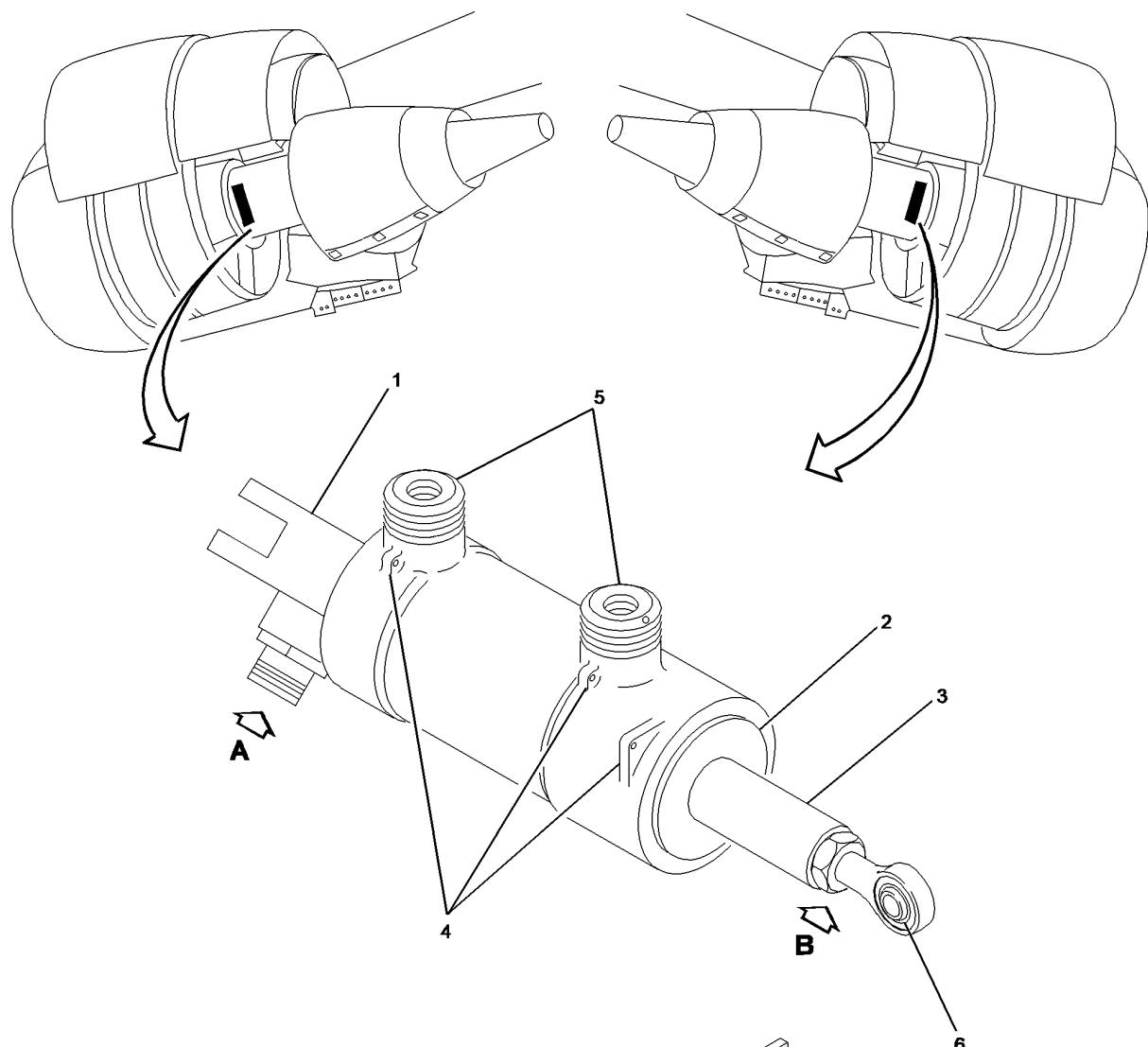
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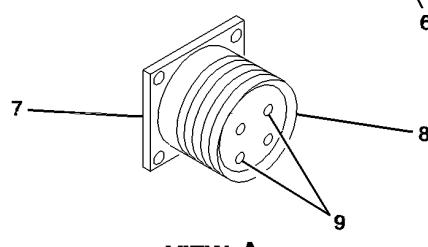


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LEGEND:

1. ACTUATOR HOUSING
2. END CAP
3. PISTON ROD
4. LOCKWIRE HOLES
5. INTERNAL, EXTERNAL THREADS
6. ROD END BEARING
7. ELECTRICAL CONNECTOR
8. EXTERNAL THREADS
9. SOCKET CONNECTOR



VIEW A

DB2-75-0013B
S0006281457V2

Variable Stator Vane Actuator - Inspection
Figure 601/75-31-01-990-802 (Sheet 1 of 2)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

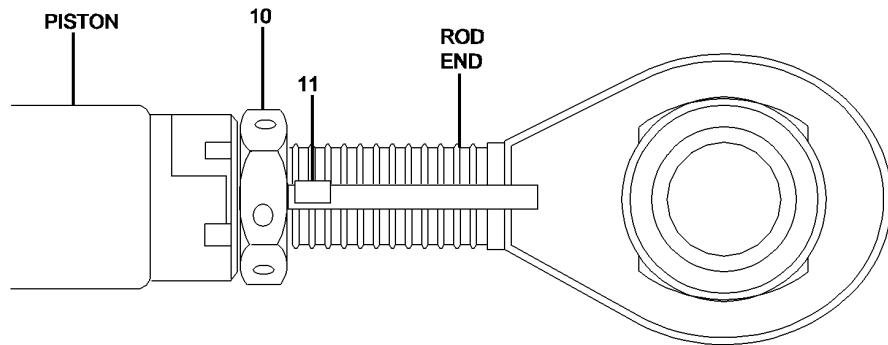
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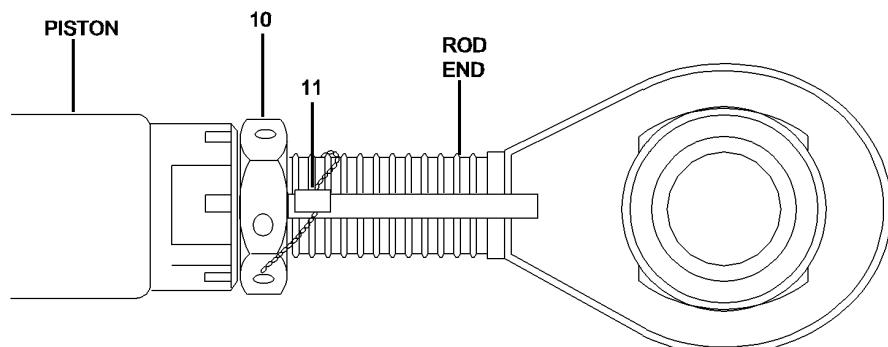
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VIEW B
INCORRECT KEY INSTALLATION
LOCKWIRE MISSING



VIEW B
CORRECT KEY INSTALLATION
LOCKWIRE INSTALLED

LEGEND:

10. NUT
11. KEY

DB2-75-0359
S0000283196V1

Variable Stator Vane Actuator - Inspection
Figure 601/75-31-01-990-802 (Sheet 2 of 2)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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CONTROL SYSTEM, VARIABLE STATOR VANE - INSPECTION/CHECK

1. General

- A. This procedure has the inspection instructions that follow:
 - Rig Inspection of the variable stator vane control
 - system (mechanical procedure)
 - Rig Inspection of the variable stator vane control
 - system (MCDU/FADEC procedure) for aircraft with ADAS
 - Assembly Inspection
- B. Access to the control system is through the right thrust-reverser door.
- C. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-31-01-200-868

2. RIG INSPECTION OF THE VARIABLE STATOR VANE CONTROL SYSTEM, MECHANICAL PROCEDURE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 601

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Holder, rigging PWA 86344
Not specified	Pin, rig (3 required) PWA 86331
Not specified	Pin, rig PWA 86332
Not specified	Pin, rig PWA 86333
Not specified	Pin, rig PWA 86334
Not specified	Torque wrench 0-600 in-lb (0.0-68.0 N·m)

NOTE: The PW86335 rigging check pin kit contains the necessary smaller dimension rig pins for only a check of the variable stator vane control system. Do not rig the control system with these rig pins. The rig check pins used in this check procedure have a smaller diameter than the rig pins used in the manual adjustment/test of the variable stator vane control system. This will permit a satisfactory check on the system with some wear from the engines being operated.

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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(Continued)

Reference	Title
75-31-04-700-869	ADJUSTMENT OF THE VARIABLE STATOR VANE CONTROL SYSTEM - MANUAL OPERATION (P/B 501)

C. Job Set-up - Variable Stator Vane Control System Rig Inspection, Mechanical Procedure

SUBTASK 75-31-01-010-265

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Variable Stator Vane Control System Rig Inspection, Mechanical Procedure

SUBTASK 75-31-01-210-267

- (1) Check the variable stator vane (VSV) control system mechanical rigging as follows:



DO THE MECHANICAL RIGGING CHECK WITH PRECISION. BAD RIGGING CAN CAUSE HIGH-PRESSURE COMPRESSOR BLADE FATIGUE, ENGINE DAMAGE OR FAILURE.

- (a) Turn the VSV lever set bellcrank (1) with a torque wrench attached to a crowsfoot open-end wrench. Position the crowsfoot open-end wrench at the flats adjacent to the 5th stage adjuster (2). (Figure 601)



DO NOT PUT YOUR FINGERS NEAR THE LINKAGES, UNISON RINGS, OR LEVER SET WHEN YOU APPLY HYDRAULIC PRESSURE. IF THE LINKAGES, UNISON RINGS, OR LEVER SET MOVE, INJURY TO PERSONS CAN OCCUR.



DO NOT TORQUE MORE THAN THE APPROVED TORQUE VALUES. THIS WILL HELP PREVENT DAMAGE TO THE EQUIPMENT.

- (b) Pull down on the torque wrench and hold 300–400 in-lb (34.0–45.0 N·m) of torque on the VSV bellcrank (1). Make sure the VSV actuator piston rod (3) is fully extended and is against the actuator internal stop. Hold the piston rod against the internal stop and install the holder PWA 86344 (4). (Figure 602)



MAKE SURE YOU REMOVE THE RIG CHECK PINS AND THE HOLDER BEFORE YOU MOVE THE VARIABLE STATOR VANE SYSTEM. IF THE PINS AND HOLDER ARE NOT REMOVED, DAMAGE CAN OCCUR TO THE COMPRESSOR STATOR VANE CONTROL SYSTEM.

- (c) Insert the holder PWA 86344 (4) between the VSV actuator rod-end bearing jambnut (5) and the top of the VSV actuator housing (6). Torque the lock bolt (7) on the holder PWA 86344 to 8–10 in-lb (0.9–1.0 N·m). Tighten the lock bolt jambnut (8) with your hand.

NOTE: The information that follows is for the aircraft before S/B PW4ENG 72-246.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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CAUTION

MAKE SURE YOU USE THE CORRECT RIG CHECK PIN. THE LARGE RIG CHECK PIN IS FOR THE PRE-SERVICE BULLETIN PW4ENG 72-246 ENGINES. THE SMALL RIG CHECK PIN IS FOR THE POST-SERVICE BULLETIN PW4ENG 72-246 ENGINES. IF AN INCORRECT RIG CHECK PIN IS USED, IT CAN CAUSE ERRORS IN THE LEVER SET ADJUSTMENT. AN ERROR IN THE LEVER SET ADJUSTMENT CAN CAUSE UNSATISFACTORY ENGINE PERFORMANCE AND ENGINE FAILURE.

- (d) Install the VSV bellcrank rig check pin PWA 86333 (9) into the VSV bellcrank arm slot (10) and into the bottom holes of the support bracket (11). (Figure 603)
NOTE: The information that follows is for the aircraft after S/B PW4ENG 72-246.
- (e) Install the VSV bellcrank rig check pin PWA 86334 (9) into the VSV bellcrank arm slot (10) and into the bottom holes of the support bracket (11).
- (f) If you cannot install the bellcrank rig check pin PWA 86333 or PWA 86334, adjust the variable stator vane control system. (ADJUSTMENT OF THE VARIABLE STATOR VANE CONTROL SYSTEM - MANUAL OPERATION, TASK 75-31-04-700-869)
- (g) Make sure that the VSV bellcrank actuator rod (3) is fully extended and the VSV bellcrank rig check pin (9) is fully installed.
- (h) Install the three rig check pins PWA 86331 (12) in the inlet guide vane (IGV) (13), the 5th stage (14) and the 6th stage (15) unison ring rig pin holes. Install the rig check pin PWA 86332 (16) in the 7th stage unison ring (17) rig pin hole. Make sure all the rig check pins are fully engaged in the compressor case. (Figure 604)
- (i) If you can install all of the rig check pins (9, 12, and 16) in the unison rings (13, 14, 15, and 17), and the VSV bellcrank arm slot (10), remove the rig check pins and the holder (4). The variable stator vane control system mechanical rigging check is satisfactory.
- (j) If you can not install any of the unison ring rig check pins (9, 12 and 16), adjust the variable stator vane control system. (ADJUSTMENT OF THE VARIABLE STATOR VANE CONTROL SYSTEM - MANUAL OPERATION, TASK 75-31-04-700-869)

E. Job Close-up - Variable Stator Vane Control System Rig Inspection, Mechanical Procedure

SUBTASK 75-31-01-942-266

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-31-01-410-266

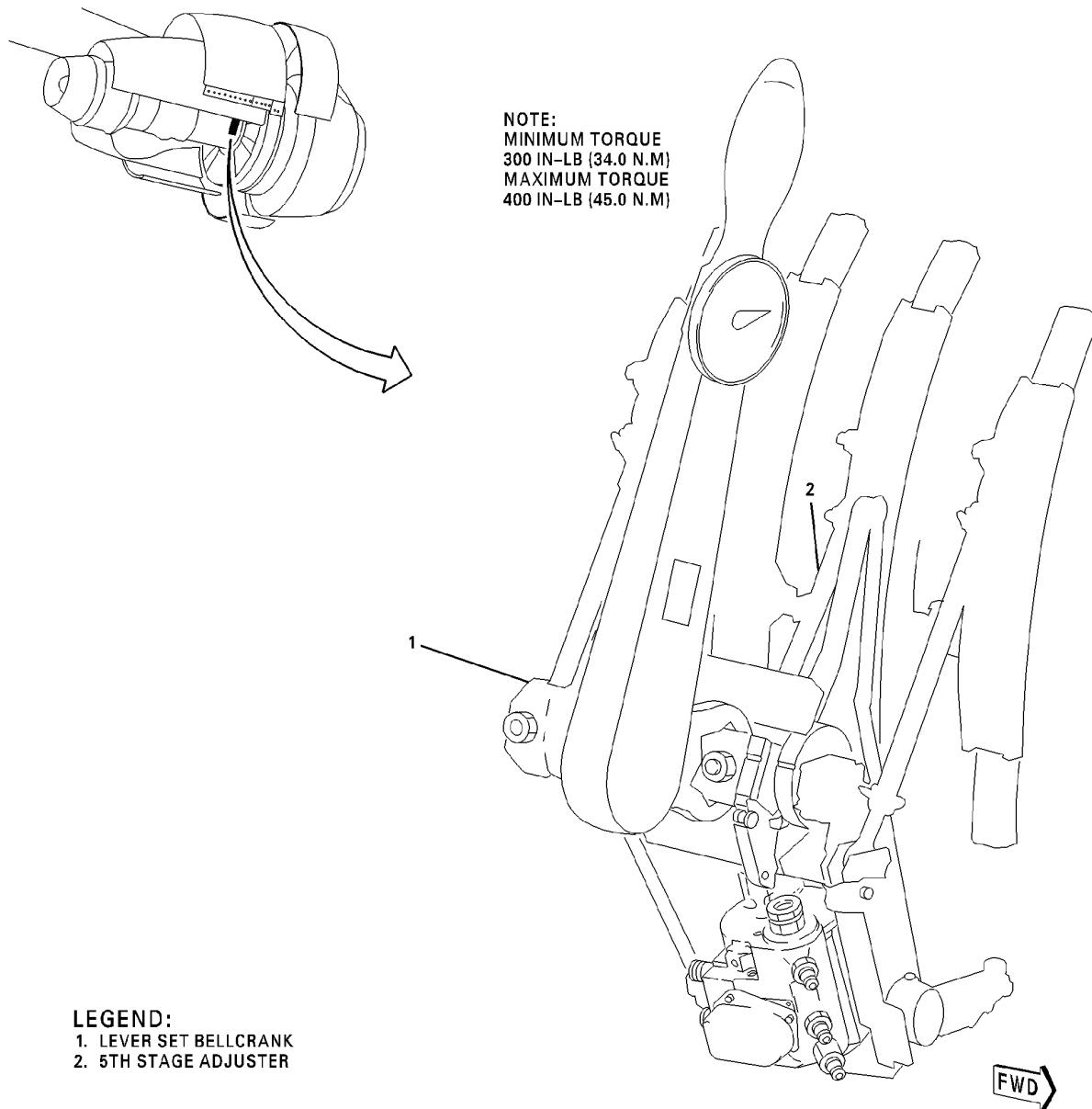
- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645



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CAG(IGDS)

DB2-75-0092

Variable Stator Vane Control System - Inspection
Figure 601/75-31-01-990-908

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

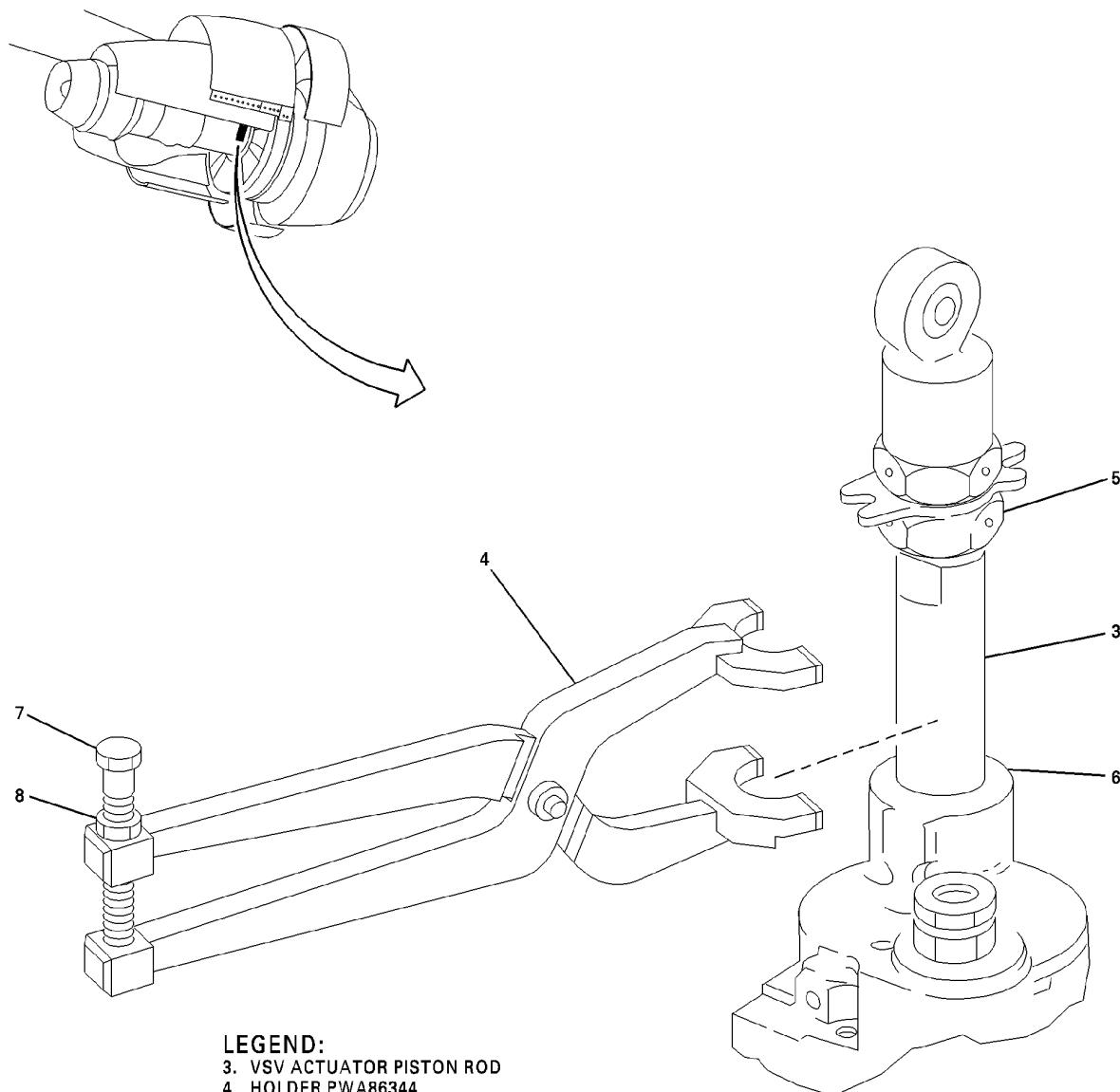
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LEGEND:

- 3. VSV ACTUATOR PISTON ROD
- 4. HOLDER PWA86344
- 5. JAMNUT
- 6. VSV ACTUATOR HOUSING
- 7. LOCK BOLT
- 8. LOCK BOLT JAMNUT

CAG(IGDS)

DB2-75-0093

Variable Stator Vane Control System - Inspection
Figure 602/75-31-01-990-910

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

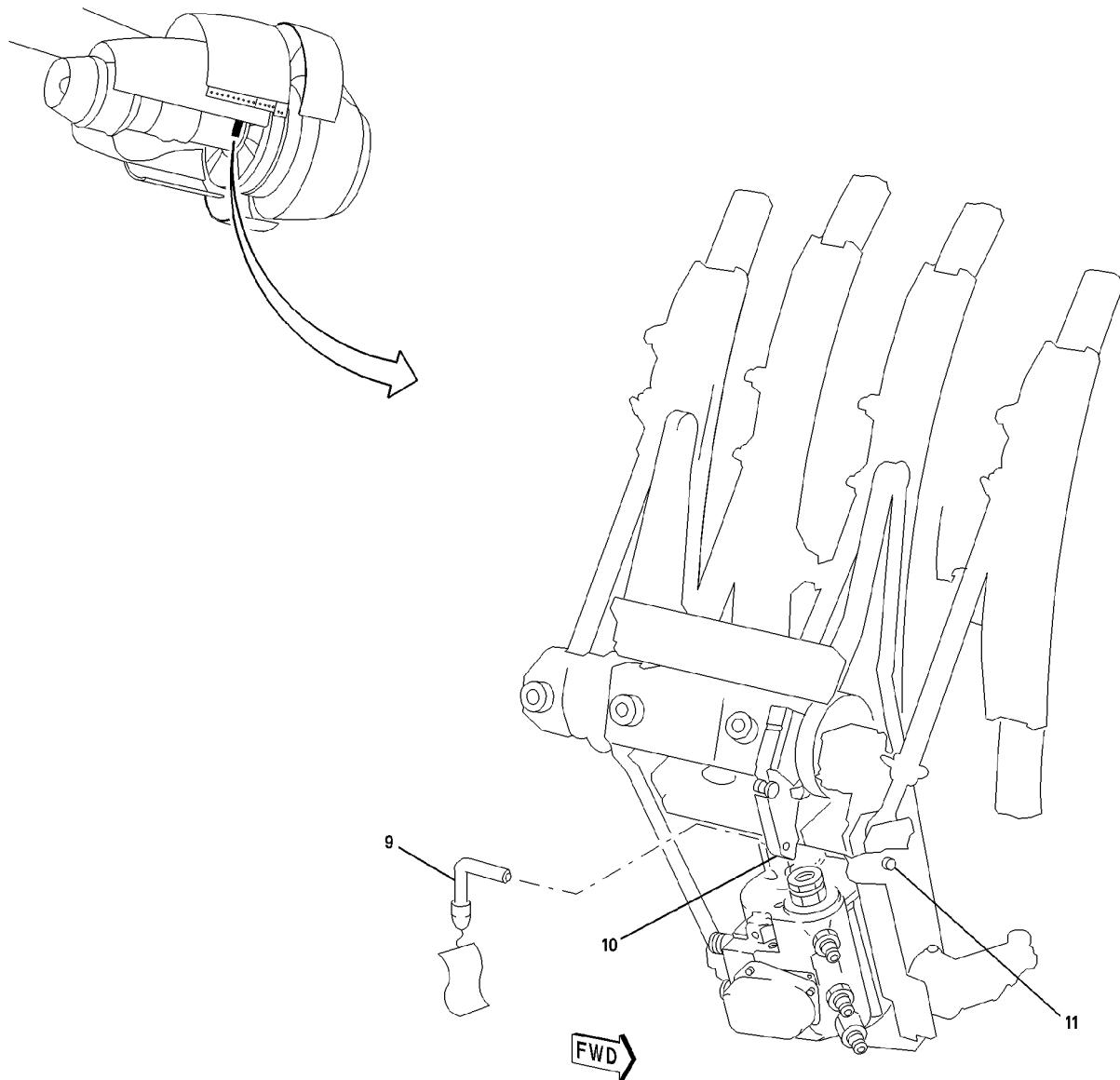
TP-11MM-FX

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LEGEND:

9. PWA 86333 OR 86334 RIG CHECK PIN
10. VSV BELLCRANK ARM SLOT
11. SUPPORT BRACKET RIG PIN HOLE

CAG(IGDS)

DB2-75-0094

Variable Stator Vane Control System - Inspection
Figure 603/75-31-01-990-909

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

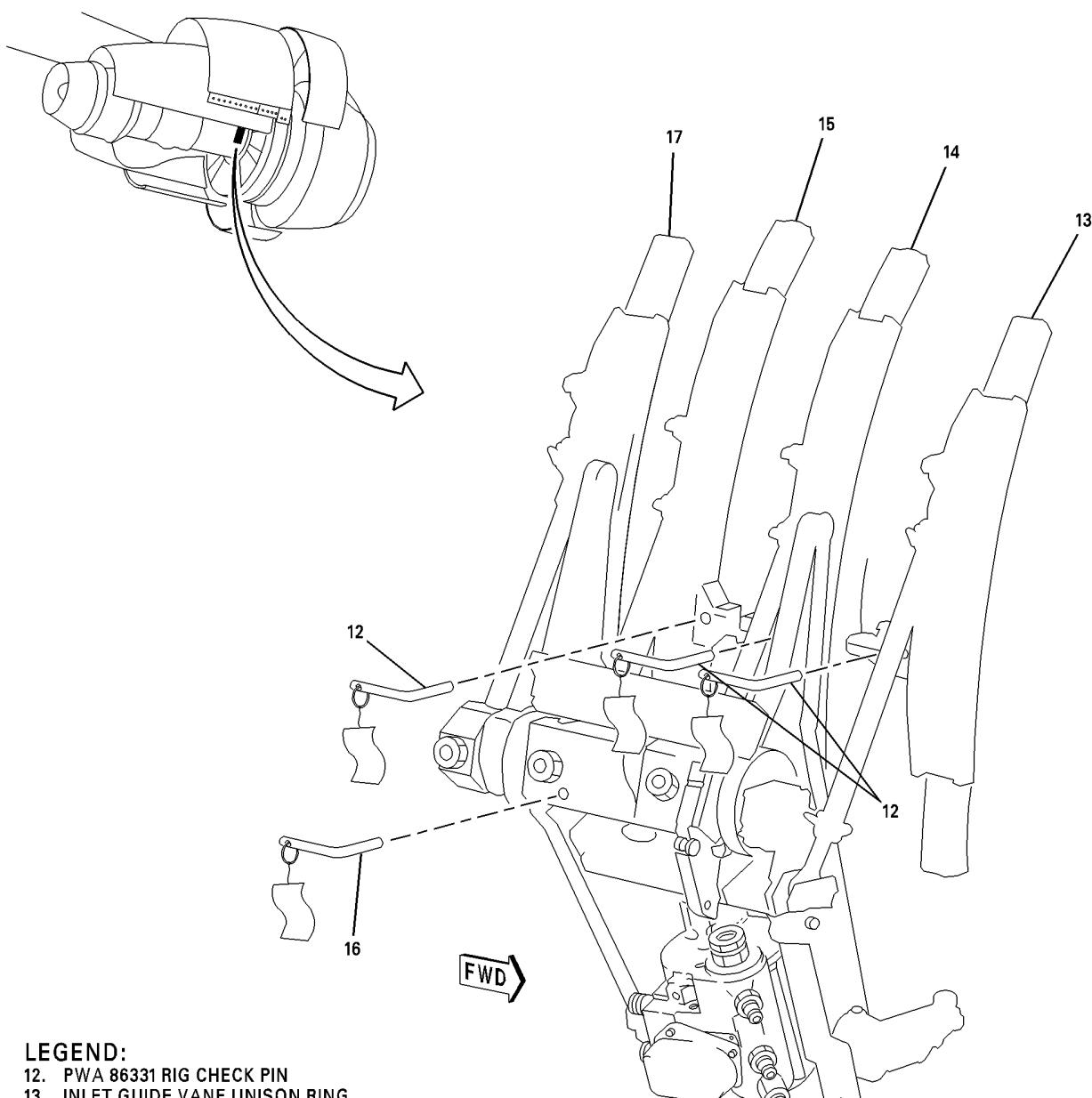
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LEGEND:

- 12. PWA 86331 RIG CHECK PIN
- 13. INLET GUIDE VANE UNISON RING
- 14. 5TH STAGE UNISON RING
- 15. 6TH STAGE UNISON RING
- 16. PWA 86332 RIG CHECK PIN
- 17. 7TH STAGE UNISON RING

CAG(IGDS)

DB2-75-0095

Variable Stator Vane Control System - Inspection
Figure 604/75-31-01-990-911

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

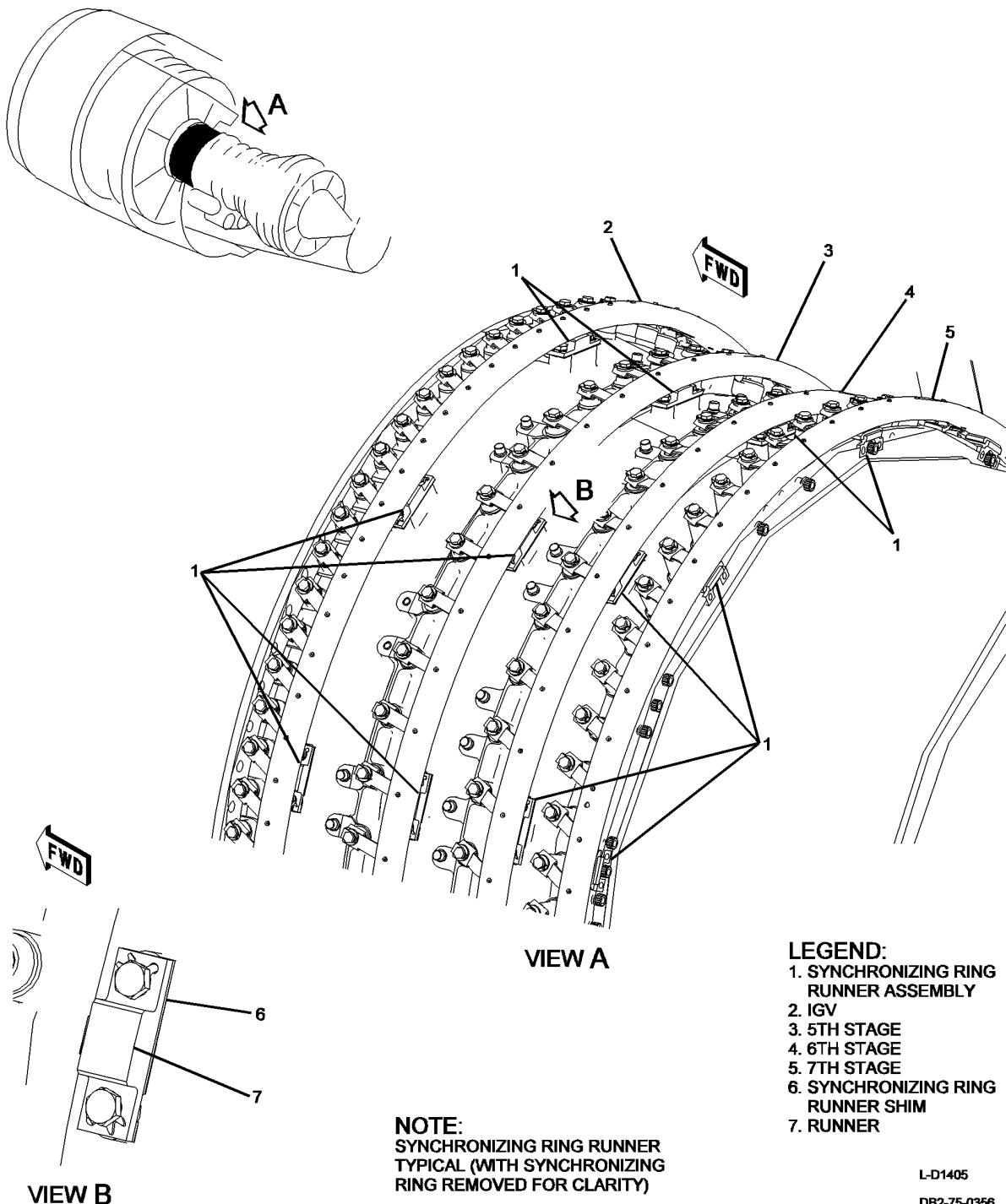
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LEGEND:
1. SYNCHRONIZING RING
RUNNER ASSEMBLY
2. IGV
3. 5TH STAGE
4. 6TH STAGE
5. 7TH STAGE
6. SYNCHRONIZING RING
RUNNER SHIM
7. RUNNER

L-D1405
DB2-75-0356
S0000211066V1

Synchronizing Ring Runner Assembly - Inspection
Figure 605/75-31-01-990-914

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-31-01-200-869

**3. RIG INSPECTION OF THE VARIABLE STATOR VANE CONTROL SYSTEM MCDU/FADEC
PROCEDURE - FOR AIRCRAFT WITH ADAS**

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 602

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Pin, rig check PWA 86333
Not specified	Pin, rig check PWA 86334

NOTE: The PW86335 rig check kit also contains the rig check pins in the list above. The pins in the list above are smaller in diameter than the pins used for the rig procedures. The pins in the list above must only be used to do the inspection of the variable stator vane control system.

B. References

Reference	Title
24-40-00-861-801	ENERGIZE AIRCRAFT ELECTRICAL POWER SYSTEM (P/B 201)
24-40-00-862-801	REMOVE ELECTRICAL POWER (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-31-01-000-868	REMOVAL OF THE VARIABLE STATOR VANE ACTUATOR (P/B 401)
75-31-01-400-868	INSTALLATION OF THE VARIABLE STATOR VANE ACTUATOR (P/B 401)
75-31-03-700-868	ADJUSTMENT OF THE VARIABLE STATOR VANE CONTROL SYSTEM - HYDRAULIC OPERATION (P/B 501)
75-31-04-700-869	ADJUSTMENT OF THE VARIABLE STATOR VANE CONTROL SYSTEM - MANUAL OPERATION (P/B 501)

C. Job Set-up - Variable Stator Vane Control System Rig Inspection, MCDU/FADEC Procedure

SUBTASK 75-31-01-010-269

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS,
TASK 71-10-00-010-869)

SUBTASK 75-31-01-861-267

- (2) Energize the aircraft electrical power system. (ENERGIZE AIRCRAFT ELECTRICAL POWER
SYSTEM, TASK 24-40-00-861-801)

SUBTASK 75-31-01-970-267

- (3) On the ground test panel, push the FADEC ground test power to ON. Make sure the FADEC
GND TEST PWR ON shows on the secondary engine display of the systems display (SD).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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D. Procedure - Variable Stator Vane Control System Rig Inspection, MCDU/FADEC Procedure

SUBTASK 75-31-01-210-268



WARNING

DO NOT PUT YOUR FINGERS NEAR THE LINKAGES, UNISON RINGS, OR LEVER SET WHEN YOU APPLY HYDRAULIC PRESSURE. IF THE LINKAGES, UNISON RINGS, OR LEVER SET MOVE, INJURY TO PERSONS CAN OCCUR.

- (1) Turn the bellcrank (1) down and insert the correct rig check pin (9) in the bellcrank as follows:
 - (a) Position a standard open-end wrench at the flats adjacent to the 5th stage adjuster (2). Turn the lever set bellcrank (1) with the wrench in a down movement. The unison rings 13, 14, 15, and 17 will move up. The VSV's will be in the open position. (Figure 601) (Figure 602) (Figure 603) (Figure 604)

NOTE: The substep that follows is for the engines before S/B PW4ENG 72-246.



CAUTION

MAKE SURE YOU USE THE CORRECT RIG CHECK PIN. THE LARGE RIG CHECK PIN IS FOR THE PRE-SERVICE BULLETIN PW4ENG 72-246 ENGINES. THE SMALL RIG CHECK PIN IS FOR THE POST-SERVICE BULLETIN PW4ENG 72-246 ENGINES. IF AN INCORRECT RIG CHECK PIN IS USED, IT CAN CAUSE ERRORS IN THE LEVER SET ADJUSTMENT. AN ERROR IN THE LEVER SET ADJUSTMENT CAN CAUSE UNSATISFACTORY ENGINE PERFORMANCE AND ENGINE FAILURE.

- (b) Install the VSV bellcrank rig check pin PWA 86333 (9) into the VSV bellcrank arm slot (10) and into the bottom holes of the support bracket (11).
NOTE: The substep that follows is for the engines after S/B PW4ENG 72-246.
- (c) Install the VSV bellcrank rig check pin PWA 86334 (9) into the VSV bellcrank arm slot (10) and into the bottom holes of the support bracket (11).
- (d) If you cannot install the bellcrank rig check pin PWA 86333 or PWA 86334, adjust the variable stator vane control system. (ADJUSTMENT OF THE VARIABLE STATOR VANE CONTROL SYSTEM - MANUAL OPERATION, TASK 75-31-04-700-869)
- (e) Make sure that the VSV bellcrank actuator rod (3) is fully extended and the VSV bellcrank rig check pin (9) is fully installed.

SUBTASK 75-31-01-970-269

- (2) Start the MCDU on the console and monitor the variable stator vane (VSV) actuator position on the display screen. Make sure both FADEC channels show the VSV actuator is 93.6% to 95.6 % open.

SUBTASK 75-31-01-970-269



WARNING

DO NOT PUT YOUR FINGERS NEAR THE LINKAGES, UNISON RINGS, OR LEVER SET WHEN YOU APPLY HYDRAULIC PRESSURE. IF THE LINKAGES, UNISON RINGS, OR LEVER SET MOVE, INJURY TO PERSONS CAN OCCUR.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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(WARNING PRECEDES)



CAUTION

MAKE SURE YOU REMOVE THE RIG CHECK PINS AND THE HOLDER BEFORE YOU MOVE THE VARIABLE STATOR VANE SYSTEM. IF THE PINS AND HOLDER ARE NOT REMOVED, DAMAGE CAN OCCUR TO THE COMPRESSOR STATOR VANE CONTROL SYSTEM.

- (3) Remove the rig check pin (9) from the bellcrank (1), and move the bellcrank up. Keep your hands clear from the linkages and the unison rings. (Figure 603)

SUBTASK 75-31-01-970-270

- (4) On the MCDU monitor the variable stator vane (VSV) actuator position on the display screen. Make sure both FADEC channels show the VSV actuator is -6.4 % to -4.4 % closed.

SUBTASK 75-31-01-970-271

- (5) If the MCDU readout is not correct or if the VSV control system is not easy to operate continue as follows:
- (a) Visually examine the stator vane unison rings and linkage for damage and repair the problem. If no damage can be found, adjust the VSV control system and/or replace the VSV actuator. See the referenced procedures. (ADJUSTMENT OF THE VARIABLE STATOR VANE CONTROL SYSTEM - HYDRAULIC OPERATION, TASK 75-31-03-700-868) (ADJUSTMENT OF THE VARIABLE STATOR VANE CONTROL SYSTEM - MANUAL OPERATION, TASK 75-31-04-700-869) (REMOVAL OF THE VARIABLE STATOR VANE ACTUATOR, TASK 75-31-01-000-868) (INSTALLATION OF THE VARIABLE STATOR VANE ACTUATOR, TASK 75-31-01-400-868)

E. Job Close-up - Variable Stator Vane Control System Rig Inspection, MCDU/FADEC Procedure

SUBTASK 75-31-01-970-272

- (1) On the ground test panel, push the FADEC ground test power switch to the OFF position.

SUBTASK 75-31-01-862-267

- (2) Remove the ground electrical power from the aircraft. (REMOVE ELECTRICAL POWER, TASK 24-40-00-862-801)

SUBTASK 75-31-01-942-268

- (3) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-31-01-410-269

- (4) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

TASK 75-31-01-200-870

4. ASSEMBLY INSPECTION OF THE VARIABLE STATOR VANE CONTROL SYSTEM

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 603

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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Table 603 (Continued)

REFERENCE	DESIGNATION
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-00-01-000-868	REMOVAL OF THE NO. 1 OR NO. 3 ENGINE (P/B 401)
71-00-01-400-868	INSTALLATION OF THE NO. 1 OR NO. 3 ENGINE - PROCEDURE (P/B 401)
71-00-02-000-868	REMOVAL OF THE NO. 1 OR NO. 3 ENGINE - PRIMARY PROCEDURE (P/B 401)
71-00-02-400-868	INSTALLATION OF THE NO. 1 OR NO. 3 ENGINE - PRIMARY PROCEDURE (P/B 401)
71-00-03-000-868	REMOVAL OF THE NO. 2 ENGINE - PROCEDURE (P/B 401)
71-00-03-400-868	INSTALLATION OF THE NO. 2 ENGINE - PROCEDURE (P/B 401)
71-00-04-000-868	REMOVAL OF THE NO. 2 ENGINE - PRIMARY PROCEDURE (P/B 401)
71-00-04-400-868	INSTALLATION OF THE NO. 2 ENGINE - PRIMARY PROCEDURE (P/B 401)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-00-00-200-870	FITS-AND-CLEARANCES - ENGINE AIR (P/B 601)
75-31-01 P/B 401 Config 2	ACTUATOR, VARIABLE STATOR VANE - REMOVAL/INSTALLATION
75-31-03-700-868	ADJUSTMENT OF THE VARIABLE STATOR VANE CONTROL SYSTEM - HYDRAULIC OPERATION (P/B 501)
75-31-04-700-869	ADJUSTMENT OF THE VARIABLE STATOR VANE CONTROL SYSTEM - MANUAL OPERATION (P/B 501)

C. Job Set-up - Variable Stator Vane Control Assembly Inspection

SUBTASK 75-31-01-010-299

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Variable Stator Vane Control Assembly Inspection

SUBTASK 75-31-01-210-291

- (1) Examine the variable stator vane actuator for leakage. If leakage is found, replace the variable stator vane actuator. (ACTUATOR, VARIABLE STATOR VANE - REMOVAL/INSTALLATION, PAGEBLOCK 75-31-01/401 Config 2)

SUBTASK 75-31-01-210-292

- (2) Examine the variable stator vane actuation linkage for play and damage. No play or wear is permitted in the spherical rod-end bearings of the connecting rods between the lever sets and the unison rings (13), (14), (15), and (17). (Figure 604) (FITS-AND-CLEARANCES - ENGINE AIR, TASK 75-00-00-200-870)

SUBTASK 75-31-01-210-293

- (3) Examine the variable stator vane arms attached to the unison rings (13), (14), (15), and (17) to find loose or disengaged stator vane arms. Examine as follows: (Figure 604)

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (a) If loose stator vane arms are found:
 - Replace the unison ring to which the loose stator vane arm is attached
 - Replace the loose stator vane arm.
- (b) If disengaged stator vane arm is found replace the engine. (REMOVAL OF THE NO. 1 OR NO. 3 ENGINE, TASK 71-00-01-000-868) (INSTALLATION OF THE NO. 1 OR NO. 3 ENGINE - PROCEDURE, TASK 71-00-01-400-868) (REMOVAL OF THE NO. 1 OR NO. 3 ENGINE - PRIMARY PROCEDURE, TASK 71-00-02-000-868) (INSTALLATION OF THE NO. 1 OR NO. 3 ENGINE - PRIMARY PROCEDURE, TASK 71-00-02-400-868) (REMOVAL OF THE NO. 2 ENGINE - PROCEDURE, TASK 71-00-03-000-868) (INSTALLATION OF THE NO. 2 ENGINE - PROCEDURE, TASK 71-00-03-400-868) (REMOVAL OF THE NO. 2 ENGINE - PRIMARY PROCEDURE, TASK 71-00-04-000-868) (INSTALLATION OF THE NO. 2 ENGINE - PRIMARY PROCEDURE, TASK 71-00-04-400-868)

NOTE: A disengaged stator vane has one or more of the conditions that follow:

- Loss of rivet pin attachment to the unison ring
- Incorrect assembly on the vane trunion
- Not attached to the vane trunion.

SUBTASK 75-31-01-210-294

- (4) Examine the High Pressure Compressor (HPC) synchronizing ring runners. (Figure 605)
 - (a) The engine may continue in service for the specified continued service cycles if one or more of these inspection results are met as follows:
 - 1) If the maximum of 1 runner is missing or loose per stage, replace the runner at the next scheduled aircraft maintenance.
 - 2) If the maximum of 3 runners are missing or loose per engine with no more than 1 missing or loose per stage, replace the runners at the next scheduled aircraft maintenance.
 - 3) If the maximum of 3 runners are missing or loose per engine with no more than 3 missing or loose per stage and no more than 2 adjacent runners missing or loose per stage, replace the runners in 50 flight cycles.
 - 4) If more than 3 runners are missing or loose per stage or more than 2 adjacent runners missing or loose per stage, replace the runners immediately.

SUBTASK 75-31-01-830-283

- (5) If any parts were replaced because of any one of the above inspection procedures, rig the stator vane control system. (ADJUSTMENT OF THE VARIABLE STATOR VANE CONTROL SYSTEM - HYDRAULIC OPERATION, TASK 75-31-03-700-868) (ADJUSTMENT OF THE VARIABLE STATOR VANE CONTROL SYSTEM - MANUAL OPERATION, TASK 75-31-04-700-869)

E. Job Close-up - Variable Stator Vane Control Assembly Inspection

SUBTASK 75-31-01-942-291

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-31-01-410-270

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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ACTUATOR, VARIABLE STATOR VANE - ADJUSTMENT/TEST

1. General

- A. This procedure has the mechanical adjustment instructions for the variable stator vane (VSV) actuator. The adjustment is made with the rod-end bearing that connects the VSV actuator with the bellcrank lever set. Access to the VSV actuator is through the right thrust-reverser door.
- B. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-31-02-700-869

2. MECHANICAL ADJUSTMENT OF THE VARIABLE STATOR VANE ACTUATOR

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 501

REFERENCE	DESIGNATION
PWA 86344	Holder
PWA 85395	Rig pin (large) (Before SB PW4ENG 72-246)
PWA 86097	Rig pin (small) (After SB PW4ENG 72-246)
Not specified	Torque wrench 0-100 in-lb (0-11.3 N·m)
Not specified	Torque wrench 100-600 in-lb (11.3-67.8 N·m)

NOTE: Rig pin kit, (PWA 85675) contains the necessary rig pins.

B. Consumable Materials

- (1) Consumable Materials

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

NOTE: Equivalent replacements are permitted for the items that follow.

Table 502

REFERENCE	DESIGNATION
MS20995C32	Lockwire
PO3-001	Oil, engine (PWA 521B)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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C. Expendable Parts

(1) Expendable Parts

Table 503

REFERENCE/ITEM	DESIGNATION	IPC
13	Cotter pin MS9245-24	IPC 75-32-05-10-065
18	Washer-key 1A4445	IPC 75-32-05-10-065
Not specified	Seal, lead	IPC 75-31-00

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-04-700-871	ENGINE POWER ACCELERATION-DECELERATION TEST (ADJ/TEST 04) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-31-01-200-869	RIG INSPECTION OF THE VARIABLE STATOR VANE CONTROL SYSTEM MCDU/FADEC PROCEDURE - FOR AIRCRAFT WITH ADAS (P/B 601)
IPC 75-31-00	Illustrated Parts Catalog
IPC 75-32-05-10-065	Illustrated Parts Catalog

E. Job Set-up - Variable Stator Vane Actuator Mechanical Adjustment

SUBTASK 75-31-02-010-268

- (1) Open the thrust-reverser cowl doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - Variable Stator Vane Actuator Mechanical Adjustment

SUBTASK 75-31-02-710-267

- (1) Operate the Variable Stator Vane (VSV) bellcrank lever set as follows: (Figure 501)



DO NOT TORQUE MORE THAN THE APPROVED TORQUE VALUES.
THIS WILL HELP PREVENT DAMAGE TO THE EQUIPMENT.

CAUTION

- (a) Turn the bellcrank lever set (4) with a torque wrench attached to a crowsfoot (3) open-end wrench. Position the crowsfoot open-end wrench at the flats adjacent to the 5th stage adjuster (1). Turn the bellcrank lever set (4) two or three times from the fully closed position to the fully open position. Push up on the wrench until the position slots (2) are almost aligned. When the position slots are almost aligned, the VSVs are in the closed position. (Figure 501)
- (b) Pull down on the wrench until the VSV actuator piston rod is fully extended and is against the VSV actuator internal stop. The VSVs are now in the open position. Apply and hold a minimum of 300 in-lb (33.8 N·m), but no more than 400in-lb (45.2 N·m) of torque to the bellcrank (4). Hold the VSVs in the open position and install the holder (7). (Figure 501) (Figure 502)
- (c) Insert the holder (7) between the rod-end bearing jamnut (5) and the top of the VSV actuator housing (6). Torque the lock bolt (8) on the holder to 8-10 in-lb (0.90-1.1 N·m). Tighten the lock bolt jamnut (9) by hand. (Figure 502)

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SUBTASK 75-31-02-720-268



CAUTION

MAKE SURE YOU USE THE CORRECT RIG CHECK PIN. THE LARGE RIG CHECK PIN IS FOR THE PRE-SERVICE BULLETIN PW4ENG 72-246 ENGINES. THE SMALL RIG CHECK PIN IS FOR THE POST-SERVICE BULLETIN PW4ENG 72-246 ENGINES. IF AN INCORRECT RIG CHECK PIN IS USED, IT CAN CAUSE ERRORS IN THE LEVER SET ADJUSTMENT. AN ERROR IN THE LEVER SET ADJUSTMENT CAN CAUSE UNSATISFACTORY ENGINE PERFORMANCE AND ENGINE FAILURE.

- (2) Install the rig pin (10) into the bellcrank lever set slot (11) and the two holes (12) in the support bracket as follows: (Figure 503)

NOTE: For engines before S/B PW4ENG 72-246 use PWA 85395 rig pin.

NOTE: For engines after S/B PW4ENG 72-246 use PWA 86097 rig pin.

- (a) If the rig pin (10) goes through the slot (11) and the two holes (12) in the support bracket, the bellcrank lever set adjustment is satisfactory. If the bellcrank lever set adjustment is satisfactory, continue with the Job Close-up.
- (b) If the rig pin (10) will not go through the slot (11) and the support bracket, adjust the actuator rod-end bearing (17).

SUBTASK 75-31-02-720-269



CAUTION

MAKE SURE YOU REMOVE THE RIG PINS BEFORE YOU CONTINUE. IF THE PINS ARE NOT REMOVED, DAMAGE CAN OCCUR TO THE LEVER SET, THE SUPPORT BRACKET, OR THE UNISON RINGS.

- (3) Remove the rig pin (10) from the lever set bellcrank slot (11).

SUBTASK 75-31-02-720-270

- (4) Remove the holder tool (7) from the VSV actuator piston rod. (Figure 502)

SUBTASK 75-31-02-830-267

- (5) Adjust the VSV actuator rod-end bearing as follows: (Figure 504)

- (a) Disconnect the actuator rod-end bearing (17). Remove and discard the cotter pin (13) from the actuator rod-end bearing shoulder bolt (16). Remove the nut (14), the washer (15), and the shoulder bolt (16) from the actuator rod-end bearing (17).
- (b) Make the washer-key (18) tabs straight. Loosen the jamnut (5) and remove the rod-end bearing (17). Discard the key-washer (18).



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

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(WARNING PRECEDES)



CAUTION
MAKE SURE THE ADJUSTMENTS IN THIS PROCEDURE ARE OBEYED.
THESE ARE IMPORTANT PRECISION ADJUSTMENTS. INCORRECT
ADJUSTMENTS CAN CAUSE UNSATISFACTORY ENGINE
PERFORMANCE AND ENGINE FAILURE.

- (c) Lubricate the threads of the rod-end bearing (17) with engine oil. Install new washer-key (18) and install the actuator rod-end bearing (17). Turn the actuator rod-end bearing on the actuator piston rod (19) to the initial adjustment. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

NOTE: The initial adjustment is measured from the rod-end bearing hex area to the flat area of the actuator rod.

- (d) Lubricate the threads of the rod-end bearing shoulder bolt (16) with engine oil. Temporarily connect the rod-end bearing (17) to the bellcrank lever set (4). Install the washer (15) and nut (14) on the shoulder bolt (16). Tighten the nut by hand to make sure the bolt head stays against surface of the bellcrank lever set.

SUBTASK 75-31-02-710-268

- (6) Operate the VSV bellcrank lever set as follows:



CAUTION
DO NOT TORQUE MORE THAN THE APPROVED TORQUE VALUES.
THIS WILL HELP PREVENT DAMAGE TO THE EQUIPMENT.

- (a) Turn the bellcrank lever set one or two times from the fully open position to the fully closed position. Pull on the torque wrench and hold 300-400 in-lb (33.9-45.2 N·m) of torque on the bellcrank. Make sure the actuator piston rod is fully extended and is against the actuator internal stop. Hold the piston rod against the internal stop and install the holder tool (7). (Figure 501) (Figure 502)
- (b) Insert the holder tool (7) between the rod-end bearing jamnut (5) and the top of the actuator housing (6). Torque the lock bolt (8) on the holder to 8.0-10.0 in-lb (0.90–1.1 N·m). Tighten the lock bolt jamnut (9) by hand. (Figure 502)

SUBTASK 75-31-02-720-271

- (7) Examine the position of the bellcrank lever set (4) as follows: (Figure 501)



CAUTION
MAKE SURE YOU USE THE CORRECT RIG CHECK PIN. THE LARGE RIG CHECK PIN IS FOR THE PRE-SERVICE BULLETIN PW4ENG 72-246 ENGINES. THE SMALL RIG CHECK PIN IS FOR THE POST-SERVICE BULLETIN PW4ENG 72-246 ENGINES. IF AN INCORRECT RIG CHECK PIN IS USED, IT CAN CAUSE ERRORS IN THE LEVER SET ADJUSTMENT. AN ERROR IN THE LEVER SET ADJUSTMENT CAN CAUSE UNSATISFACTORY ENGINE PERFORMANCE AND ENGINE FAILURE.

- (a) With the holder tool installed, put the rig pin (10) into the bellcrank slot (11) and the two holes (12) in the support bracket. (Figure 503)

NOTE: If small adjustments are necessary to install the rig pin, remove the holder and turn the actuator piston rod.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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**MAKE SURE THE ADJUSTMENTS IN THIS PROCEDURE ARE OBEYED.
THESE ARE IMPORTANT PRECISION ADJUSTMENTS. INCORRECT
ADJUSTMENTS CAN CAUSE UNSATISFACTORY ENGINE
PERFORMANCE AND ENGINE FAILURE.**

- (b) If the rig pin (10) goes through the slot (11) and the two holes (12) in the support bracket, the adjustment is satisfactory. Remove the rig pin and finish the installation of the rod-end bearing.

SUBTASK 75-31-02-720-272



**MAKE SURE YOU REMOVE THE RIG PINS BEFORE YOU CONTINUE. IF THE
PINS ARE NOT REMOVED, DAMAGE CAN OCCUR TO THE LEVER SET, THE
SUPPORT BRACKET, OR THE UNISON RINGS.**

- (8) Remove the rig pin (10) from the bellcrank lever set slot (11). (Figure 503)

SUBTASK 75-31-02-720-273

- (9) Remove the holder (7) from the actuator. (Figure 502)

SUBTASK 75-31-02-430-267



**DO NOT TORQUE MORE THAN THE APPROVED TORQUE VALUES. THIS
WILL HELP PREVENT DAMAGE TO THE EQUIPMENT.**

- (10) Torque the nut (14) on the actuator rod-end bearing shoulder bolt (16) to a minimum of 15 in-lb (1.7 N·m). Continue to torque the nut until the nut slot aligns with the cotter pin hole in the bolt. Do not torque the nut more than 22 in-lb (2.5 N·m) plus the nut run-on torque. Install a cotter pin (13) in the shoulder bolt. (Figure 504)

SUBTASK 75-31-02-430-268



**DO NOT TORQUE MORE THAN THE APPROVED TORQUE VALUES. THIS
WILL HELP PREVENT DAMAGE TO THE EQUIPMENT.**

- (11) Torque the jamnut (5) to 460-510 in-lb (52.0-57.6 N·m). Do not bend the key-washer (18) tabs at this time. (Figure 504)

SUBTASK 75-31-02-710-269

- (12) Operate the VSV bellcrank lever set as follows:



**DO NOT TORQUE MORE THAN THE APPROVED TORQUE VALUES.
THIS WILL HELP PREVENT DAMAGE TO THE EQUIPMENT.**

- (a) Use the torque wrench with the crowsfoot open-end wrench to turn the lever set. Turn the bellcrank lever set one or two times from the fully open position to the fully closed position. Pull on the torque wrench and hold 300-400 in-lb (33.9-45.2 N·m) of torque on the bellcrank. Make sure the actuator piston rod is fully extended and is against the actuator internal stop. Hold the piston rod against the internal stop and install the holder tool (7). (Figure 501)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (b) Insert the holder tool (7) between the rod-end bearing jamnut (5) and the top of the actuator housing (6). Torque the lock bolt (8) on the holder to 8.0-10.0 in-lb (0.90-1.1 N·m). Tighten the lock bolt jamnut (9) by hand. (Figure 502)

SUBTASK 75-31-02-830-268



CAUTION

MAKE SURE YOU USE THE CORRECT RIG CHECK PIN. THE LARGE RIG CHECK PIN IS FOR THE PRE-SERVICE BULLETIN PW4ENG 72-246 ENGINES. THE SMALL RIG CHECK PIN IS FOR THE POST-SERVICE BULLETIN PW4ENG 72-246 ENGINES. IF AN INCORRECT RIG CHECK PIN IS USED, IT CAN CAUSE ERRORS IN THE LEVER SET ADJUSTMENT. AN ERROR IN THE LEVER SET ADJUSTMENT CAN CAUSE UNSATISFACTORY ENGINE PERFORMANCE AND ENGINE FAILURE.

- (13) Put the rig pin (10) through the slot (11) and the two holes (12) in the support bracket. If the adjustment is satisfactory, continue with the installation of the rod-end bearing. (Figure 503)

SUBTASK 75-31-02-830-269



CAUTION

MAKE SURE YOU REMOVE THE RIG PINS BEFORE YOU CONTINUE. IF THE PINS ARE NOT REMOVED, DAMAGE CAN OCCUR TO THE LEVER SET, THE SUPPORT BRACKET, OR THE UNISON RINGS.

- (14) Remove the rig pin (10) from the bellcrank lever set slot (11), and remove the holder tool (7). (Figure 503)
- (15) Bend one set of washer-key (18) tabs on a flat of the rod-end bearing (17). Bend the other set of the washer-key tabs on the jamnut (5). Safety the jamnut (5) with lockwire and install a lead seal.

SUBTASK 75-31-02-710-271

- (16) For aircraft that have auxiliary data acquisition system (ADAS), examine the rigging of the variable stator vane actuator with the MCDU/FADEC procedure. (RIG INSPECTION OF THE VARIABLE STATOR VANE CONTROL SYSTEM MCDU/FADEC PROCEDURE - FOR AIRCRAFT WITH ADAS, TASK 75-31-01-200-869)

G. Job Close-up - Variable Stator Vane Actuator Mechanical Adjustment

SUBTASK 75-31-02-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-31-02-410-267

- (2) Close the thrust-reverser cowl doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-31-02-710-270

- (3) Do an engine power acceleration and deceleration test. (ENGINE POWER ACCELERATION-DECELERATION TEST (ADJ/TEST 04), TASK 71-02-04-700-871)

END OF TASK

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-31-02

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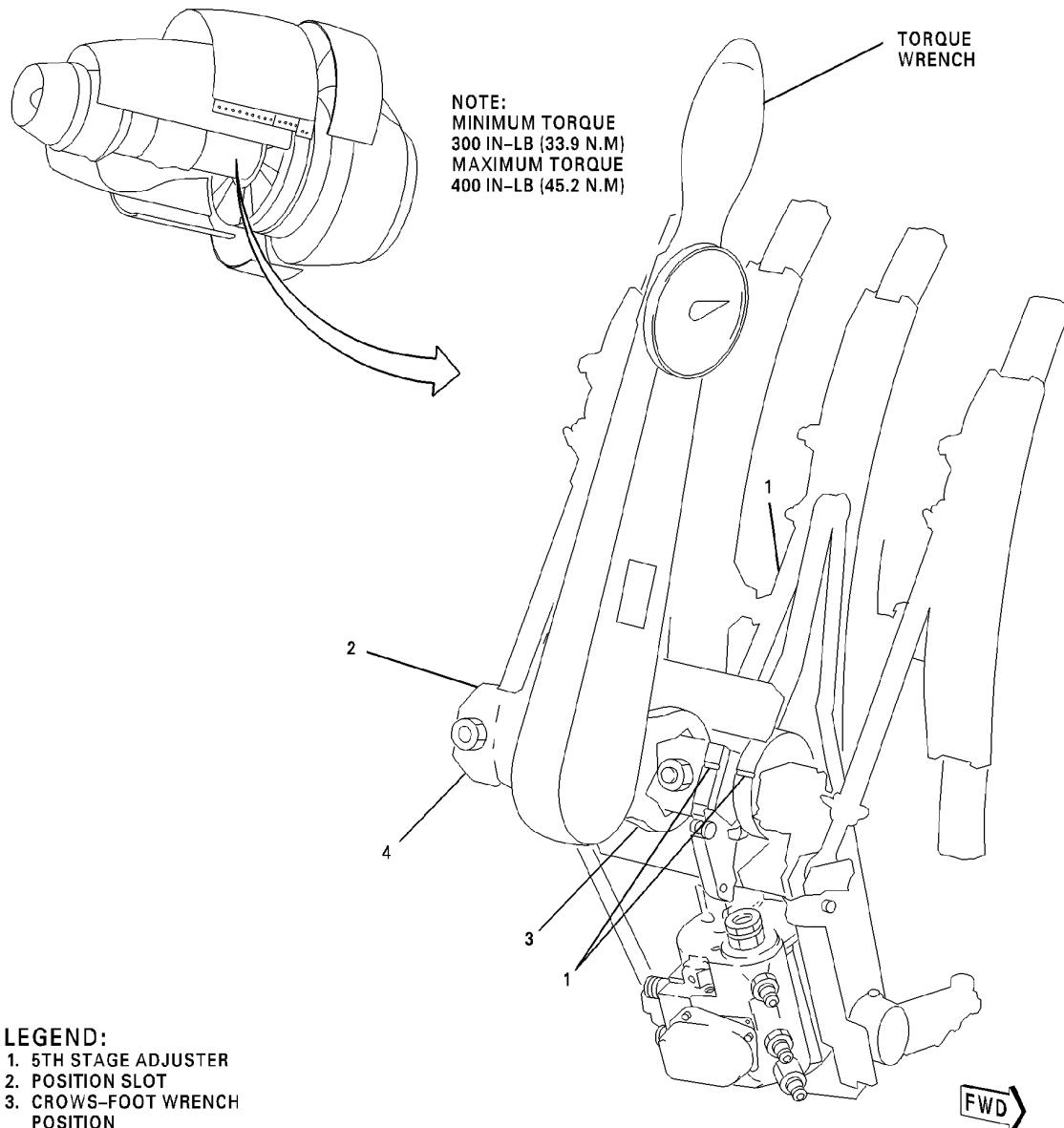
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LEGEND:

1. 5TH STAGE ADJUSTER
2. POSITION SLOT
3. CROWS-FOOT WRENCH POSITION
4. BELLCRANK LEVER SET

CAG(IGDS)

DB2-75-0041A

Variable Stator Vane - Adjustment
Figure 501/75-31-02-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

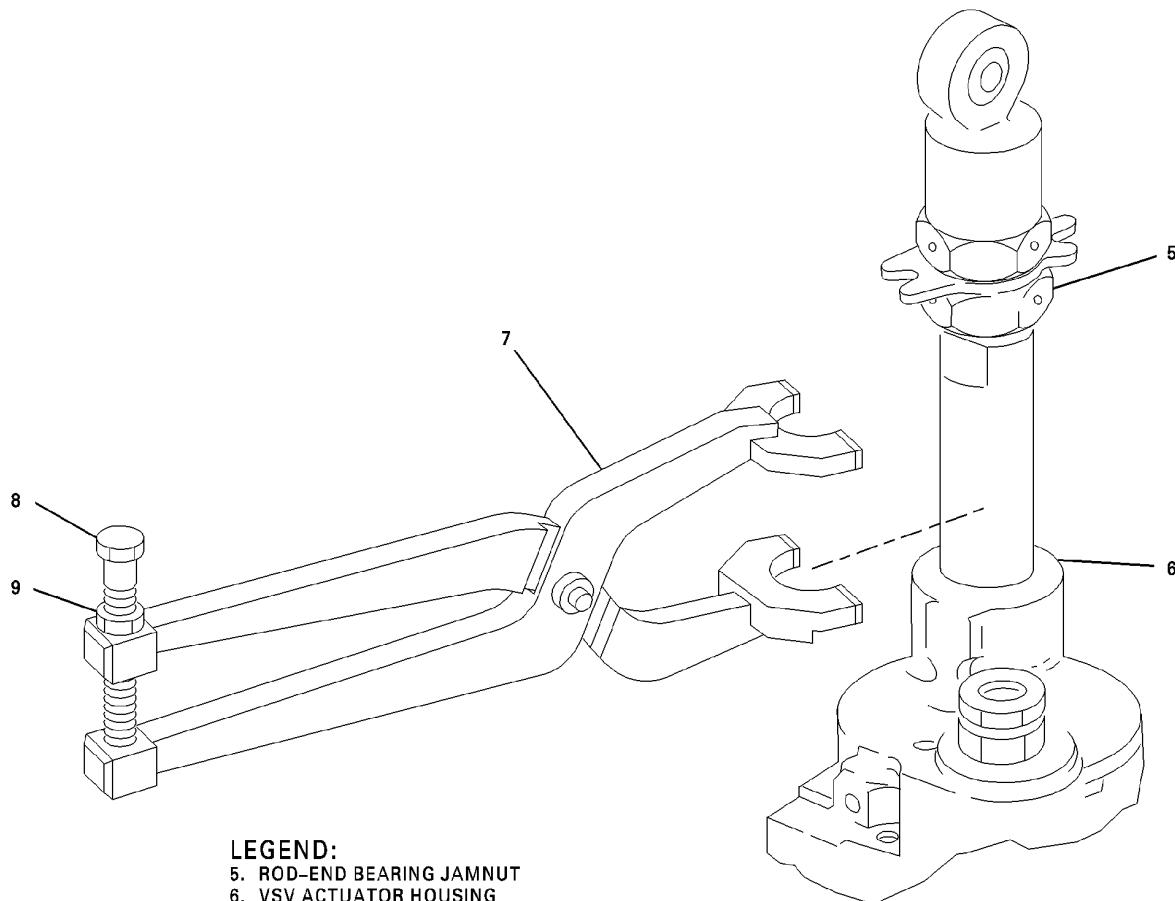
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LEGEND:

- 5. ROD-END BEARING JAMNUT
- 6. VSV ACTUATOR HOUSING
- 7. HOLDER
- 8. LOCK BOLT
- 9. LOCK BOLT JAMNUT

CAG(IGDS)

DB2-75-0042

Variable Stator Vane - Adjustment
Figure 502/75-31-02-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

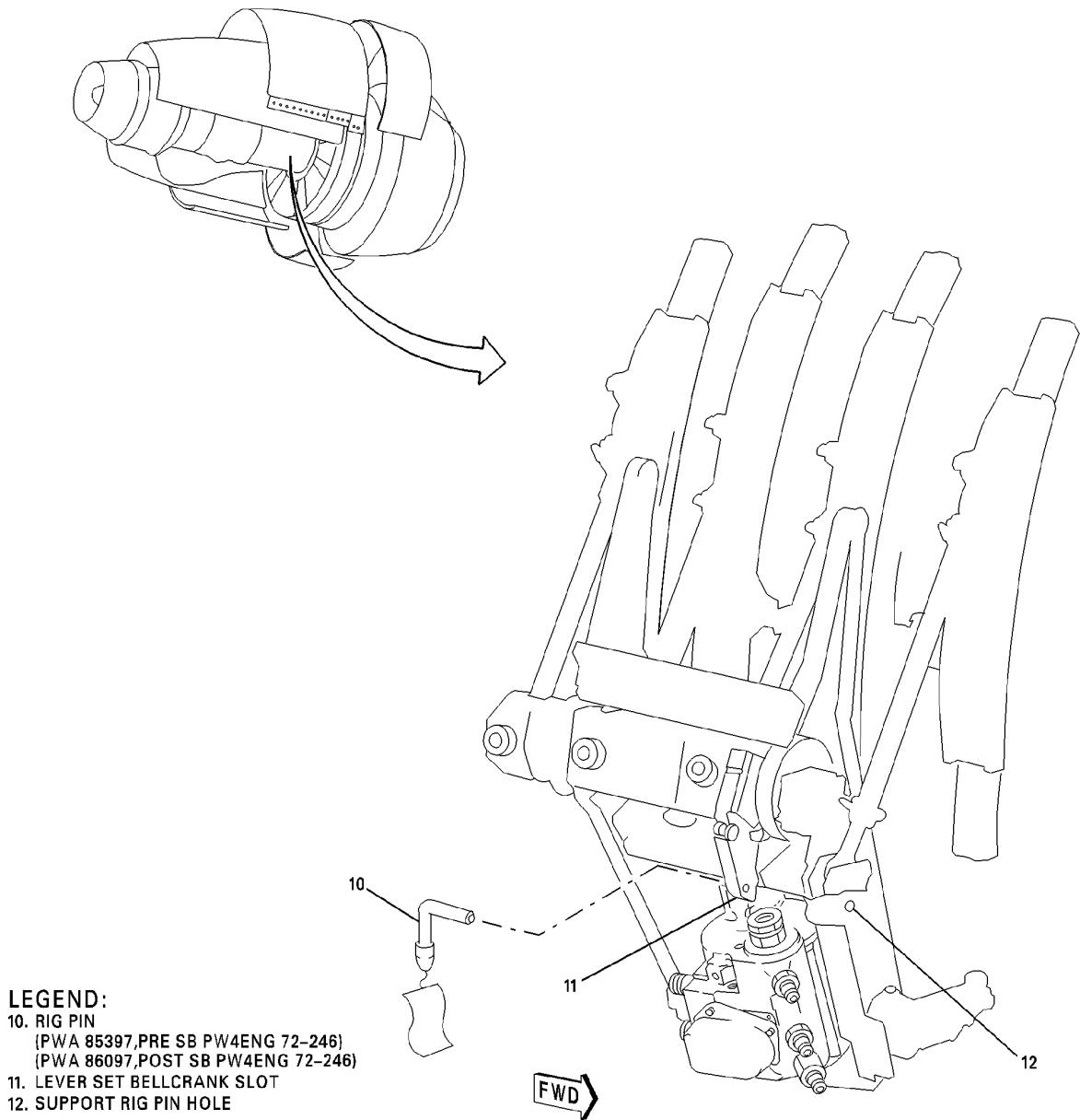
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LEGEND:

- 10. RIG PIN
(PWA 85397, PRE SB PW4ENG 72-246)
(PWA 86097, POST SB PW4ENG 72-246)
- 11. LEVER SET BELLCRANK SLOT
- 12. SUPPORT RIG PIN HOLE

CAG(IGDS)

DB2-75-0043A

Variable Stator Vane - Adjustment
Figure 503/75-31-02-990-879

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

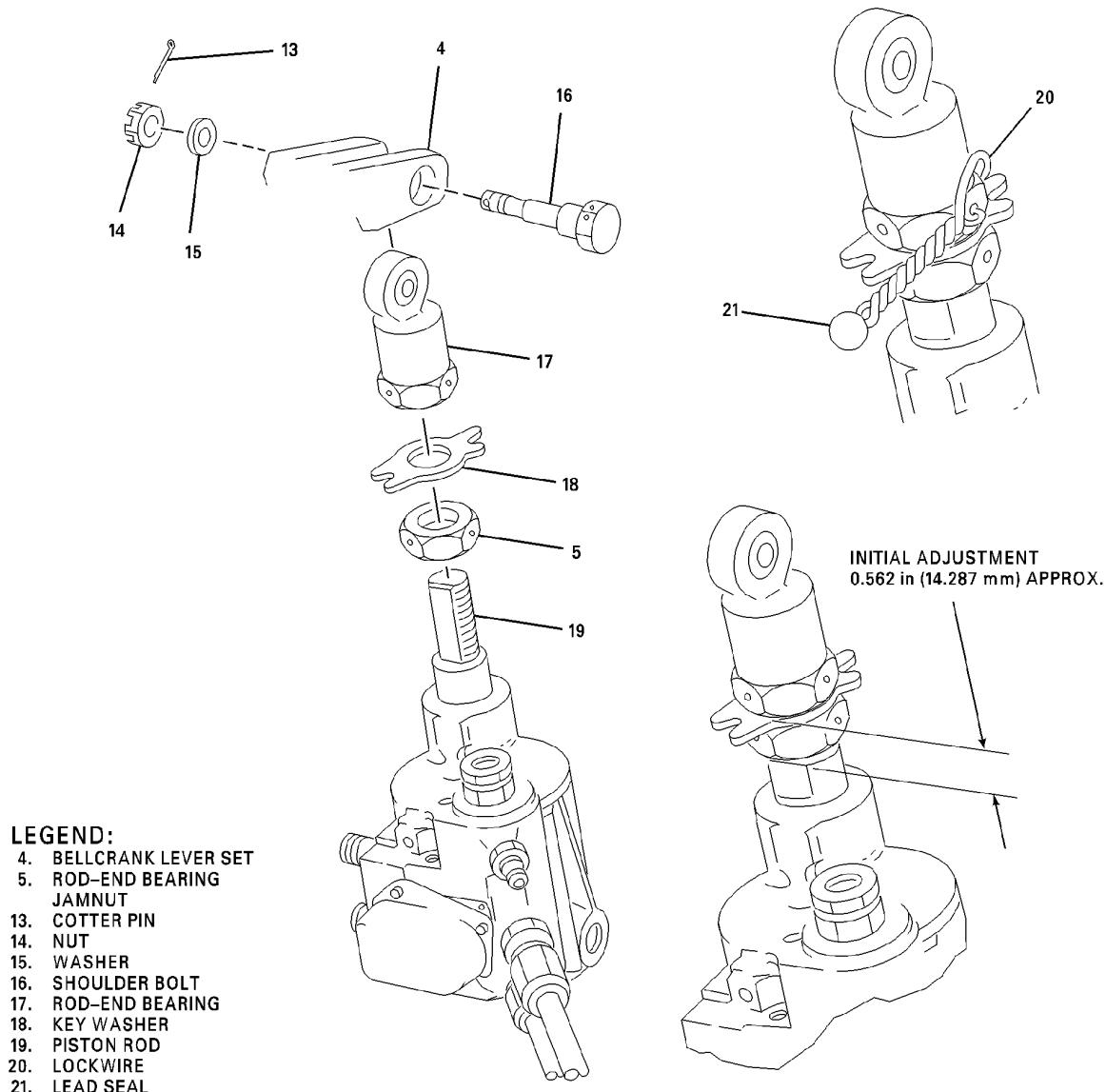
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CAG(IGDS)

DB2-75-0044

Variable Stator Vane - Adjustment
Figure 504/75-31-02-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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CONTROL SYSTEM, VARIABLE STATOR VANE, HYDRAULIC - ADJUSTMENT/TEST

1. General

- A. This procedure has the adjustment instructions for the variable stator vane (VSV) control system. In this procedure the actuator, bellcrank and linkage are moved by hydraulic pressure.
- B. This procedure has the instructions to make precision adjustments to the position of the VSV lever set, and the VSV unison rings. Access to the stator vane control system is through the right thrust reverser door.
- C. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines and the PW4460/4462-3 engines.

TASK 75-31-03-700-868

2. ADJUSTMENT OF THE VARIABLE STATOR VANE CONTROL SYSTEM - HYDRAULIC OPERATION

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 501

REFERENCE	DESIGNATION
PWA 29451	Adapter
PWA 49030	Hydraulic cart (Pneumatic)
PWA 85393	Rig pins (3 necessary)
PWA 85394	Rig pin
PWA 85395	Rig pin (before SB PW4ENG 72-246)
PWA 86097	Rig pin (after SB PW4ENG 72-246)
PWA 86317	Electrical switch box
Not Specified	Container, 5 U.S. gal. (19.0 l)
Not specified	Protective caps and plugs
Not specified	Torque wrench 0-100 in-lb (0-11.3 N·m)
Not specified	Torque wrench 100-600 in-lb (11.3-67.8 N·m)
Model M303, M305 or M307	Crimper, Bergen Mechanical

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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Table 502

REFERENCE	DESIGNATION
P05-289	Lockwire (AS3214-02)
P05-291	Cable, safety
P05-292	Ferrule, safety cable
P03-001	Oil, engine (PWA 521B)
P03-003	Fluid calibrating
P06-054	Paste, antiseize (PWA 36246)

C. Expendable Parts

(1) Expendable Parts

Table 503

REFERENCE/ITEM	DESIGNATION	IPC
30	Cotter pin	IPC 75-32-05-10-010
34	Lead seal	IPC 75-32-05-10-075
35	Key-washer	IPC 75-32-05-10-065
37	Cotter pin	IPC 75-32-15-10-010
41	Cotter pin	IPC 75-32-15-10-010
44	Lead seal	IPC 75-32-15-10-005
45	Key-washer	IPC 75-32-15-10-045
48	Lead seal	IPC 75-32-15-10-005
49	Key-washer	IPC 75-32-15-10-045

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-31-01-200-869	RIG INSPECTION OF THE VARIABLE STATOR VANE CONTROL SYSTEM MCDU/FADEC PROCEDURE - FOR AIRCRAFT WITH ADAS (P/B 601)
IPC 75-32-05-10-010	Illustrated Parts Catalog
IPC 75-32-05-10-065	Illustrated Parts Catalog
IPC 75-32-05-10-075	Illustrated Parts Catalog
IPC 75-32-15-10-005	Illustrated Parts Catalog
IPC 75-32-15-10-010	Illustrated Parts Catalog
IPC 75-32-15-10-045	Illustrated Parts Catalog

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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E. Job Set-up - Variable Stator Vane Control System Adjustment – Hydraulic Operation

SUBTASK 75-31-03-010-268

- (1) Open the engine access doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-31-03-030-267

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.



HAZARDOUS MATERIAL WARNINGS

HAZMAT 1044, JET FUELS A AND A-1 (JP-5 FUEL)

HAZMAT 1045, JET FUEL B (JP-4 FUEL)

HAZMAT 1000, REFER TO MSDS

- (2) Disconnect the compressor stator hydraulic pressure tube (2) and the hydraulic return tube (3) as follows: (Figure 501) (Figure 502)

- (a) Disconnect the hydraulic return tube (3) and the hydraulic pressure tube (2) at each end. Install protective caps on the open tubes (2 and 3).
 - (b) Loosen the two bolts (8) and the two clamps (7) from the flange bracket (6).
 - (c) Position the hydraulic pressure tube (2) and the hydraulic return tube (3) away from the actuator (1).

SUBTASK 75-31-03-480-268

- (3) Connect the hydraulic cart (PW 49030) as follows: (Figure 503)

- (a) Install the adapter (PWA 29451) (13) on the pressure adapter (12) in the "PF" port on the actuator (1).
 - (b) Torque the adapter (PWA 29451) (13) to 225-250 in-lb (25.42–28.24 N·m).
 - (c) Connect the hydraulic pressure hose (14) to the adapter (PWA 29451) (13).
 - (d) Connect the return hose (15) to the return adapter (11) in the "PFR" port.
 - (e) Torque the pressure hose (14) and the return hose (15) to 200–225 in-lb (22.59–25.42 N·m).
 - (f) Remove the hoses attached to the top of the pump reservoir. Do a check of the fluid level in the pump reservoir. If necessary, fill the reservoir with fluid (P03-003).

SUBTASK 75-31-03-480-270

- (4) If the electrical switch box (PWA 86317) is available connect the box as follows. If the electrical switch box (PWA 86317) is not available go to SUBTASK 75-31-03-863-267. (Figure 507)
 - (a) Disconnect the two electrical connectors (22) and (23) from the actuator (1). Install protective caps on the two electrical connectors (22) and (23).
 - (b) Connect the electrical switch box connector (24) to the top adapter (25) on the actuator (1).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-31-03-863-267



WARNING

DO NOT PUT YOUR FINGERS NEAR THE LINKAGES, THE UNISON RINGS, OR THE LEVER SET WHEN YOU PRESSURIZE THE HYDRAULIC SYSTEM. MOVEMENT OF THE LINKAGES, THE UNISON RINGS, AND THE LEVER SET CAN CAUSE INJURY TO PERSONS.

- (5) Pressurize the hydraulic cart (PWA 49030) and extend the stator vanes to the full open position as follows: (Figure 503) (Figure 504) (Figure 505) (Figure 506)
- Put the control handle (16) in the neutral position.
 - Put the hydraulic control handle (17) in the closed position.
 - Put the air supply control handle (18) in the closed position.
 - Turn the knob (19) clockwise to stop.
 - Connect the air supply hose (21) to the air inlet.
 - Put the air supply control handle (18) in the open position.
 - Lift and turn the adjustment knob (20) clockwise and adjust the air pressure to 25-30 psig (172.37-206.85 kPa).
 - Put the hydraulic control handle (17) in the open position.
 - Turn the knob (19) counterclockwise until the air motor operates.
- NOTE: The smaller adjustment knob controls the speed of the actuator and the pressure recovery after actuation.
- NOTE: With the control valve in the neutral position the hydraulic pressure will be 0 psig (0 kPa) on the gauge.

F. Procedure - Variable Stator Vane Control System Adjustment – Hydraulic Operation

SUBTASK 75-31-03-830-001

- (1) Adjust the variable stator vane (VSV) control system as follows: (Figure 503) (Figure 507) (Figure 508) (Figure 509)
- If the electrical box (PWA 86317) is available close the stator vanes as follows. If the electrical box is not available go to step (b).
 - Push the power switch (26) on the electrical switch box (PWA 86317) to the ON position.
 - Push the actuation switch (27) on the electrical switch box (PWA 86317) to the RETRACT position. Make sure the actuator (1) rod retracts and the vanes close.
 - Push the actuation switch (27) on the electrical switch box to the EXTEND and RETRACT positions two or three times. Make sure the actuator moves from the full open to the full closed position. Stop the actuator (1) in the extended position.
 - If the electrical box (PWA 86317) is not available close the stator vanes as follows:
 - Put the air supply control handle (18) in the closed position. Make sure the hydraulic pressure bleeds off.
 - Use a wrench and push up on the bellcrank (28), move the bellcrank (28) to the closed position.
 - Pressurize the hydraulic cart (PWA 49030) to 250-300 psig (1723.75–2068.50 kPa) and move the stator actuator vane to the full open position. Do this step two or three times.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-31-03-830-011

- (2) Rig the variable stator control system as follows: (Figure 510)

NOTE: The step that follows is for engines before SB PWENG 72-246.



CAUTION

MAKE SURE YOU USE THE CORRECT RIG CHECK PIN. THE LARGE RIG CHECK PIN IS FOR THE PRE-SERVICE BULLETIN PW4ENG 72-246 ENGINES. THE SMALL RIG CHECK PIN IS FOR THE POST-SERVICE BULLETIN PW4ENG 72-246 ENGINES. IF AN INCORRECT RIG CHECK PIN IS USED, IT CAN CAUSE ERRORS IN THE LEVER SET ADJUSTMENT. AN ERROR IN THE LEVER SET ADJUSTMENT CAN CAUSE UNSATISFACTORY ENGINE PERFORMANCE AND ENGINE FAILURE.

- (a) With the actuator (1) rod fully extended, install the rig pin (PWA 85395) in the bellcrank arm and support.

NOTE: The step that follows is for engines after SB PWENG 72-246.

- (b) With the actuator (1) rod fully extended, install the rig pin (PWA 86097) in the bellcrank arm and support.

NOTE: The steps that follow are for engines before and after SB PWENG 72-246.

- (c) If the rig pin goes into the bellcrank and the support go to step (4)(a).

- (d) If the rig pin will not go into the bellcrank and the arm support adjust the actuator rod-end (29).

SUBTASK 75-31-03-830-002

- (3) Adjust the rod-end (29) as follows: (Figure 503) (Figure 511)

- (a) Put the air supply control handle (18) in the closed position.

- (b) Remove and discard the cotter pin (30). Remove the nut (31), the washer (32) and the bolt (33) from the rod-end (29).

- (c) Remove and discard the lockwire and the lead seal (34). Bend the key-washer (35) tabs straight. Loosen the jamnut (36) and remove the rod-end (29). Discard the key-washer (35).



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (d) Lubricate the threads of the rod-end (29) with engine oil (P03-001). Install the key-washer (35) and install the rod-end (29). Turn the rod-end (29) until the flat surface below the hex is approximately 0.56 in. (14.28 mm) from the flat surface below the rod-end (29) threads. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

NOTE: This is an approximate initial adjustment only.

- (e) Align the rod-end (29) and install the bolt (33). Make sure the bolt (33) stays against the surface of the bellcrank. Do not permit the bolt (33) to move out of the bolt hole.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (f) Pressurize the hydraulic cart (PWA 49030) to 250-300 psig (1723.75–2068.50 kPa) and move the stator actuator vanes to the full open position.
NOTE: The step that follows is for engines before SB PWENG 72-246.
- (g) Adjust the rod-end (29) until you can install the rig pin (PWA 85395) in the bellcrank arm. Make sure the hydraulic pressure is on.
NOTE: The step that follows is for engines after SB PWENG 72-246.
- (h) Adjust the rod-end (29) until you can install the rig pin (PWA 86097) in the bellcrank arm. Make sure the hydraulic pressure is on.
- (i) Lubricate the threads of the bolt (33) with engine oil (P03-001). Install the washer (32) and the nut (31). Torque the nut (31) to a minimum of 15 in-lb (1.695 N·m). Align the nut (31) with the cotter pin hole on the bolt (33). Make sure not to torque the nut (31) more than 22 in-lb (2.48 N·m). Safety the nut (31) with the cotter pin (30).
- (j) Torque the jamnut (36) to 460-510 in-lb (51.97-57.62 N.m).
NOTE: The step that follows is for engines before SB PWENG 72-246.
- (k) Remove the rig pin (PWA 85395).
NOTE: The step that follows is for engines after SB PWENG 72-246.
- (l) Remove the rig pin (PWA 86097).
NOTE: The steps that follow are for engines before and after SB PWENG 72-246.
- (m) If the electrical switch box is available, move the actuator (1) from retract to extend two or three times. Stop the operation when the actuator (1) is fully extended. Go to step (n)3.
- (n) If the electrical switch box is not available move the actuator from retract to extend two or three times as follows:
 - 1) Put the air supply control handle (18) in the closed position.
 - 2) Use a wrench and push up on the bellcrank (28), move the bellcrank (28) to the closed position.
 - 3) Pressurize the hydraulic cart (PWA 49030) to 250-300 psig (1723.75- 2068.50 kPa) and fully extend the actuator (1).
NOTE: The step that follows is for engines before SB PWENG 72-246.
- (o) Install the rig pin (PWA 85395). Make sure the adjustment is correct. If necessary, adjust the rod-end (29) again.
NOTE: The step that follows is for engines after SB PWENG 72-246.
- (p) Install the rig pin (PWA 86097). Make sure the adjustment is correct. If necessary, adjust the rod-end (29) again.
NOTE: The steps that follow are for engines before and after S/B PWENG 72-246.
- (q) Tighten the jamnut (36) and bend the tabs on the key-washer (35), Bend one on the rod-end (29) and the other on the jamnut (36). Install the lockwire and the lead seal (34).

SUBTASK 75-31-03-830-270

- (4) Adjust the unison rings as follows: (Figure 503) (Figure 512) (Figure 513)
 - (a) Install the rig pins (PWA 85393) into the IGV 5th and 6th stage unison ring rig pin holes. Install the rig pin (PWA 85394 or PWA 86197) into the 7th stage unison ring rig pin hole.
 - (b) If all of the rig pins are installed go to step (b)16). Remove all of the rig pins. If all of the rig pins are not installed then adjust the unison rings as follows:
 - 1) Put the hydraulic cart control handle (16) in the neutral position.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- 2) Put the air supply control handle (18) in the closed position.
- 3) If necessary, remove and discard the cotter pin (37). Remove the nut (38), the washer (39) and the bolt (40). Disconnect the 5th or the 7th stage unison ring linkage.
- 4) If necessary, remove and discard the cotter pin (41). Remove the nut (42) and the bolt (43). Disconnect the 6th stage unison ring linkage.
- 5) If necessary, remove and discard the lead seal (44). Bend the tabs on the key-washer (45) straight. Loosen the jamnut (46) and remove the rod-end (47). Install the key-washer (45) and the rod-end (47).
- 6) If necessary, remove and discard the lead seal (48). Bend the tabs on key-washer (49) straight. Loosen the jamnut (50) and remove the rod-end (51). Install the key-washer (49) and the rod-end (51).
- 7) If necessary, install the bolt (40), the washer (39) and the nut (38) and connect the 5th or the 7th stage unison ring linkage.
- 8) If necessary, install the bolt (43) and the nut (42) and connect the 6th stage unison ring linkage.

NOTE: The step that follows is for engines before SB PWENG 72-246.
- 9) Install the rig pin (PWA 85395).

NOTE: The step that follows is for engines after SB PWENG 72-246.
- 10) Install the rig pin (PWA 86097).

NOTE: The steps that follow are for engines before and after S/B PWENG 72-246.
- 11) Turn the applicable adjuster (52) until you can install the rig pins (PWA 85394) and (PWA 85393 or 86197).
- 12) If necessary, torque the nut (38) to 15-22 in-lb (1.69–2.48 N·m). Safety the nut (38) with the cotter pin (37).
- 13) If necessary, torque the nut (42) to 15-22 in-lb (1.69–2.48 N·m). Safety the nut (42) with the cotter pin (41).
- 14) Do a check of the applicable adjuster (52) and install a wire into the end of each adjuster (52). If the wire goes through the ends the adjuster (52) you must adjust the adjuster (52) again.
- 15) Torque the applicable jamnut (48) or (50) on the adjuster (52) to 115-150 in-lb (12.99-16.95 N·m).
- 16) Remove all of the rig pins.
- 17) Pressurize the hydraulic cart (PWA 49030) to 250-300 psig (1723.75–2068.50 kPa).
- 18) If the electrical box is available retract and extend the actuator (1) two or three times. Stop the actuator (1) in the fully extended position.
- 19) If the electrical box is not available, use a wrench on the bellcrank (28) and push the bellcrank (28) to the closed position. Retract and extend the actuator (1) two or three times. Stop the actuator (1) in the full open position.

NOTE: The step that follows is for engines before SB PWENG 72-246.
- 20) Install the rig pin (PWA 85395).

NOTE: The step that follows is for engines after SB PWENG 72-246.
- 21) Install the rig pin (PWA 86097).

NOTE: The steps that follow are for engines before and after S/B PWENG 72-246.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- 22) Install the four rig pins (PWA 85394) and (PWA 85393 or 86197). If you can not install all of the rig pins adjust the unison rings again.
- 23) Remove all of the rig pins.
- 24) If necessary, bend the tabs of the key-washer (45) onto the adjuster (52) and the jamnut (46). Safety the jamnut (46) and install the lead seal (44).
- 25) If necessary, bend the tabs of the key-washer (49) onto the adjuster (52) and the jamnut (50). Safety the jamnut (50) and install the lead seal (48).
- 26) Depressurize the hydraulic cart (PWA 49030).

G. Job Close-up - Variable Stator Vane Control System Adjustment – Hydraulic Operation

SUBTASK 75-31-03-080-267

- (1) Disconnect the hydraulic cart (PWA 49030) as follows: (Figure 503) (Figure 505) (Figure 506)
 - (a) Put the air supply control handle (18) in the closed position.
 - (b) Put the control handle (16) in the neutral position.
 - (c) Disconnect the air supply hose (21) from the hydraulic cart.
 - (d) Disconnect the pressure hose (14) and the return hose (15) from the actuator (1).
 - (e) Remove the adapter (PWA 29451) (13) from the pressure adapter (12) "PF" port on the actuator (1).

SUBTASK 75-31-03-030-269

- (2) Install the compressor stator hydraulic pressure tube (2) and hydraulic return tube (3) as follows: (Figure 501) (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- (a) Lubricate the tube adapter threads at each end with antiseize paste (P06-054).
- (b) Connect the hydraulic pressure tube (2) and the hydraulic return tube (3) to the actuator (1). Torque the tube nuts to 225-250 in-lb (25.4-28.3 N·m). Safety the tube nuts with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292).



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (c) Lubricate bolts (8) with engine oil (P03-001). Install the clamps (7) at bracket (6). Torque the bolts (8) to 36-40 in-lb (4.1–4.5 N·m).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-31-03-080-269

- (3) If necessary, disconnect the electrical connector (24) and remove the electrical switch box. (Figure 507)

SUBTASK 75-31-03-030-272

- (4) Remove the protective caps. Connect the two electrical connectors (22) and (23). (Figure 507)

SUBTASK 75-31-03-710-270

- (5) For aircraft that have auxiliary data acquisition system (ADAS), examine the rigging of the variable stator vane control system with the MCDU/FADEC procedure. (RIG INSPECTION OF THE VARIABLE STATOR VANE CONTROL SYSTEM MCDU/FADEC PROCEDURE - FOR AIRCRAFT WITH ADAS, TASK 75-31-01-200-869)

SUBTASK 75-31-03-942-267

- (6) Remove all the tools and equipment from the work area. Make sure that the area is clean.

SUBTASK 75-31-03-730-267

- (7) Do an engine leak test with the cowl doors open. (ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870)

SUBTASK 75-31-03-410-267

- (8) Close the engine access doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

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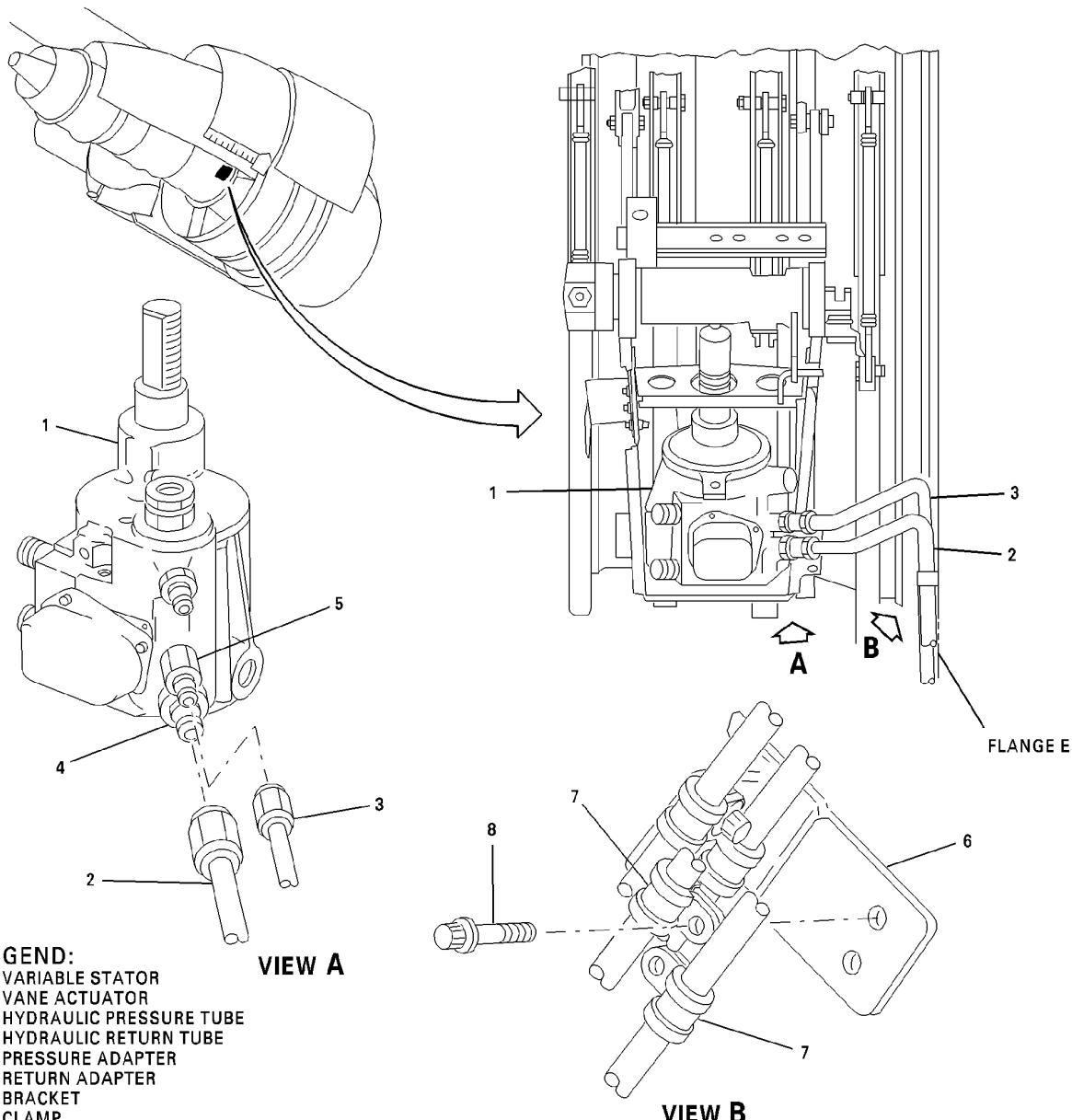
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CAG(IGDS)

DB2-75-0022A

Variable Stator Vane Control System - Adjustment
Figure 501/75-31-03-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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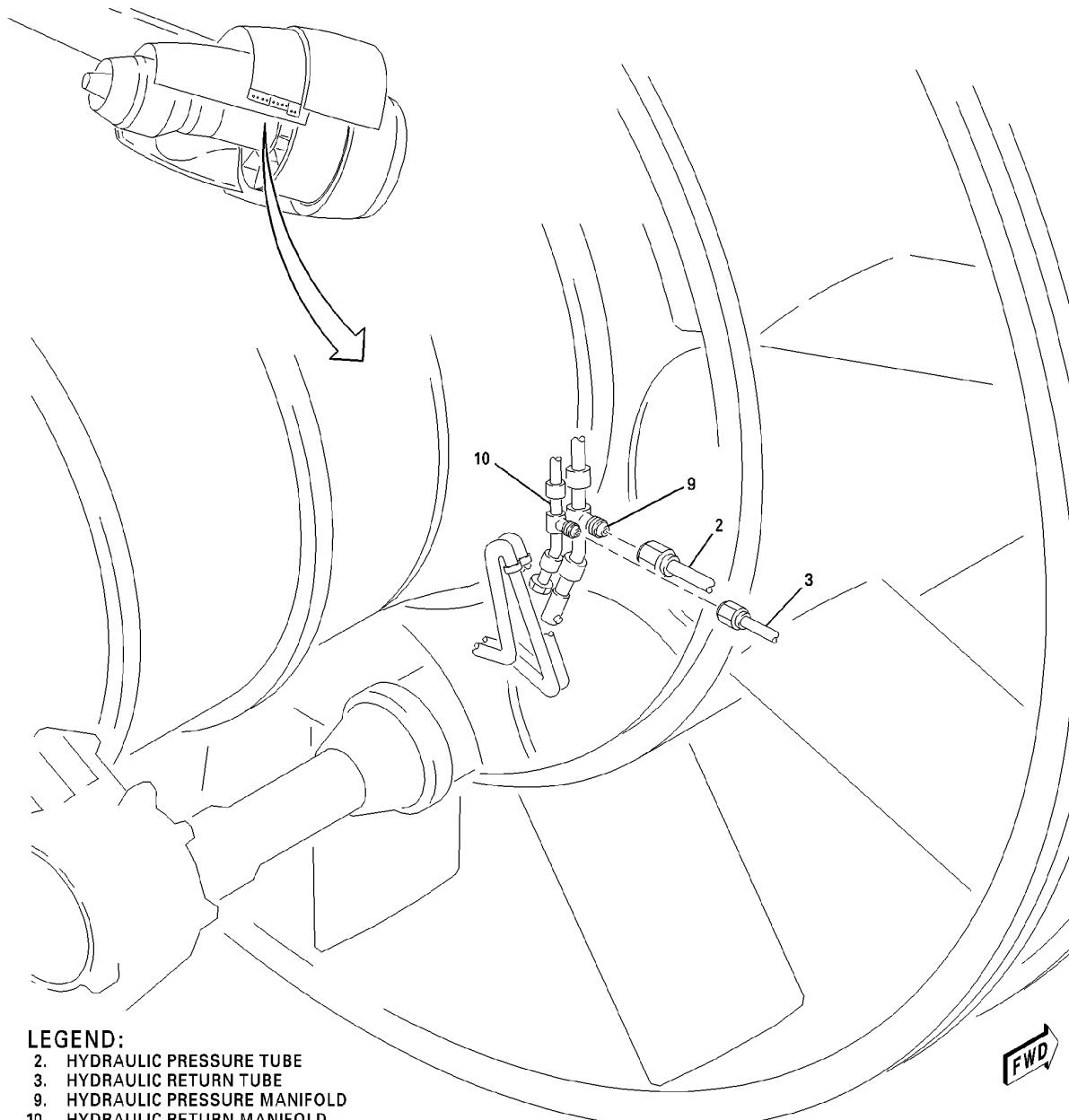
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LEGEND:

- 2. HYDRAULIC PRESSURE TUBE
- 3. HYDRAULIC RETURN TUBE
- 9. HYDRAULIC PRESSURE MANIFOLD
- 10. HYDRAULIC RETURN MANIFOLD

CAG(IGDS)

DB2-75-0023

Variable Stator Vane Actuator Hydraulic Tubes
Figure 502/75-31-03-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

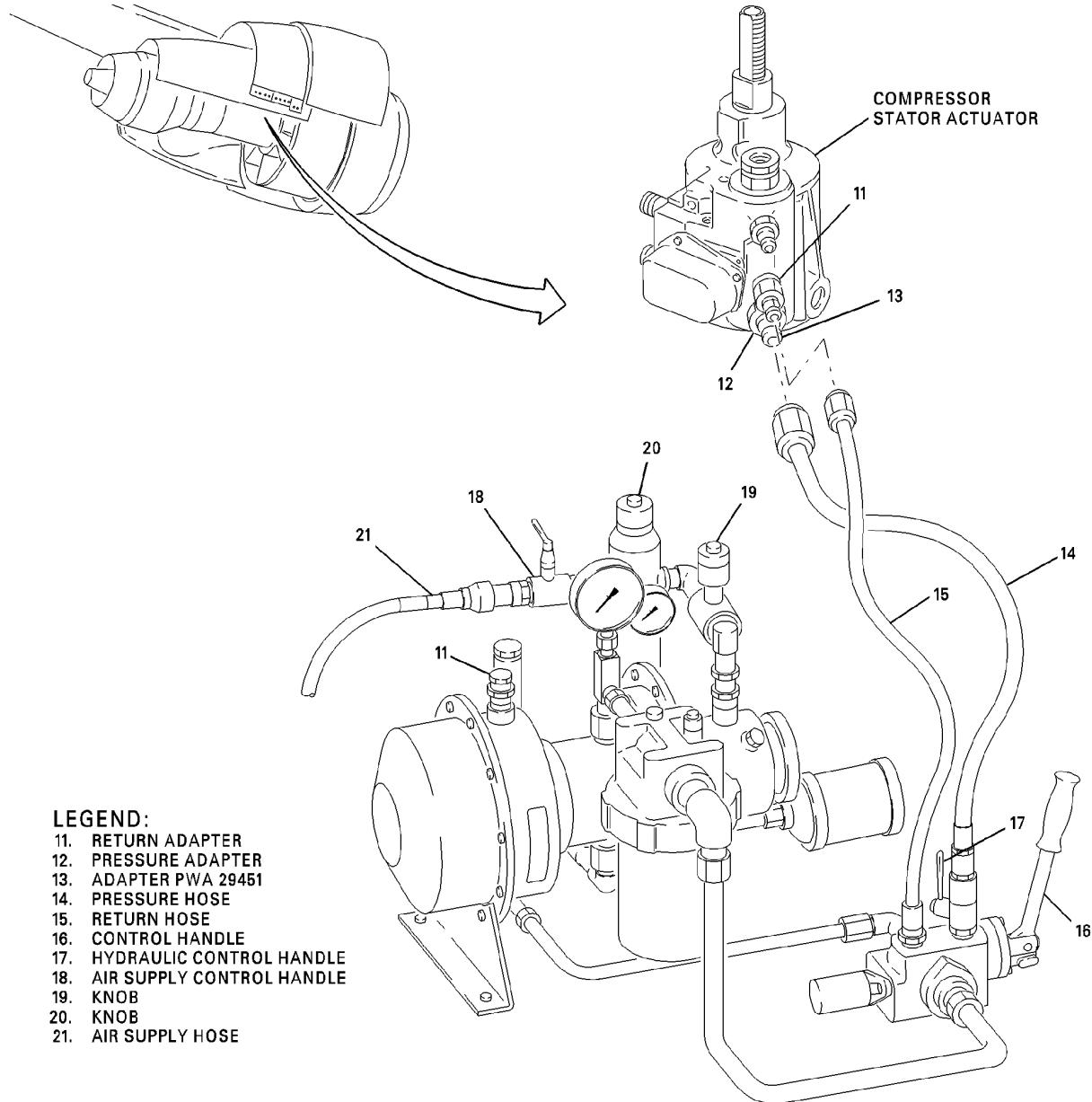
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CAG(IGDS)

DB2-75-0024A

Hydraulic Cart - Installation
Figure 503/75-31-03-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

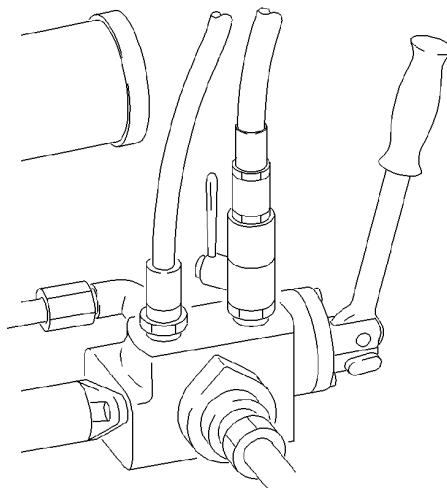
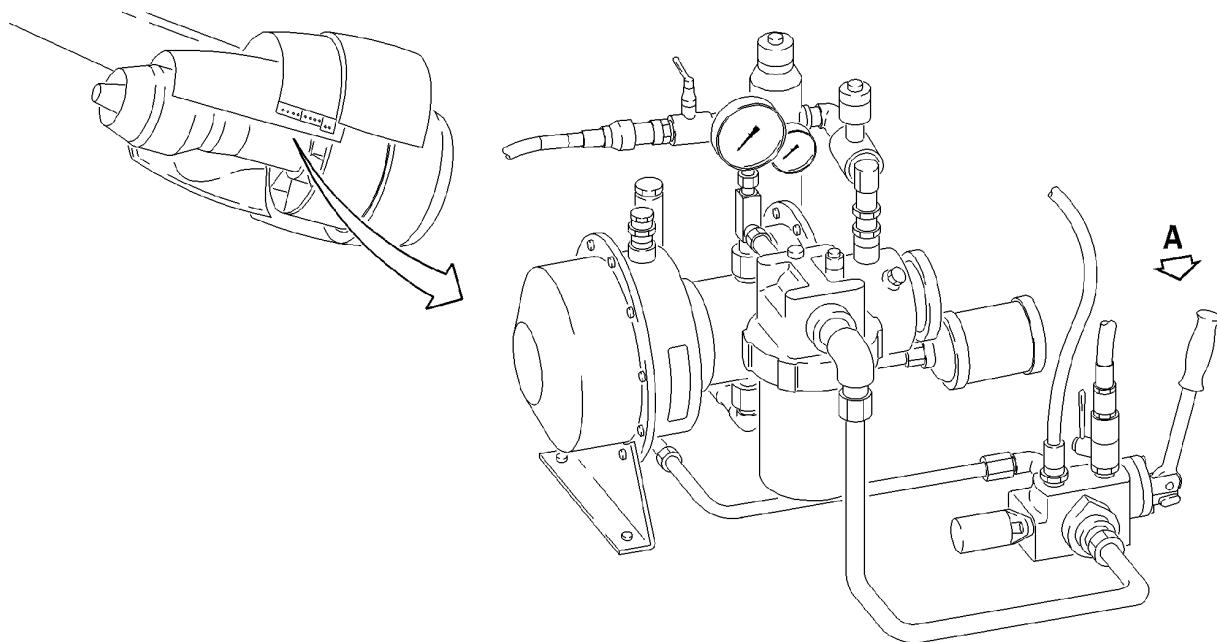
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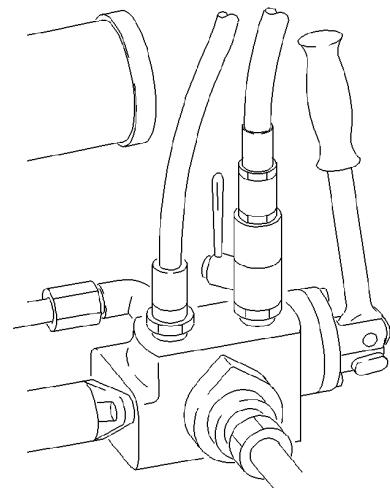
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**CONTROL HANDLE
NEUTRAL POSITION**



**CONTROL HANDLE
ADVANCE POSITION**

VIEW A

CAG(IGDS)

DB2-75-0025A

Hydraulic Cart (PWA 49030)
Figure 504/75-31-03-990-871

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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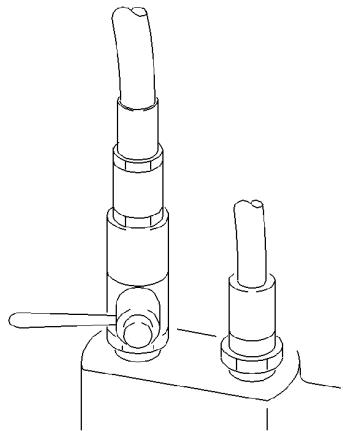
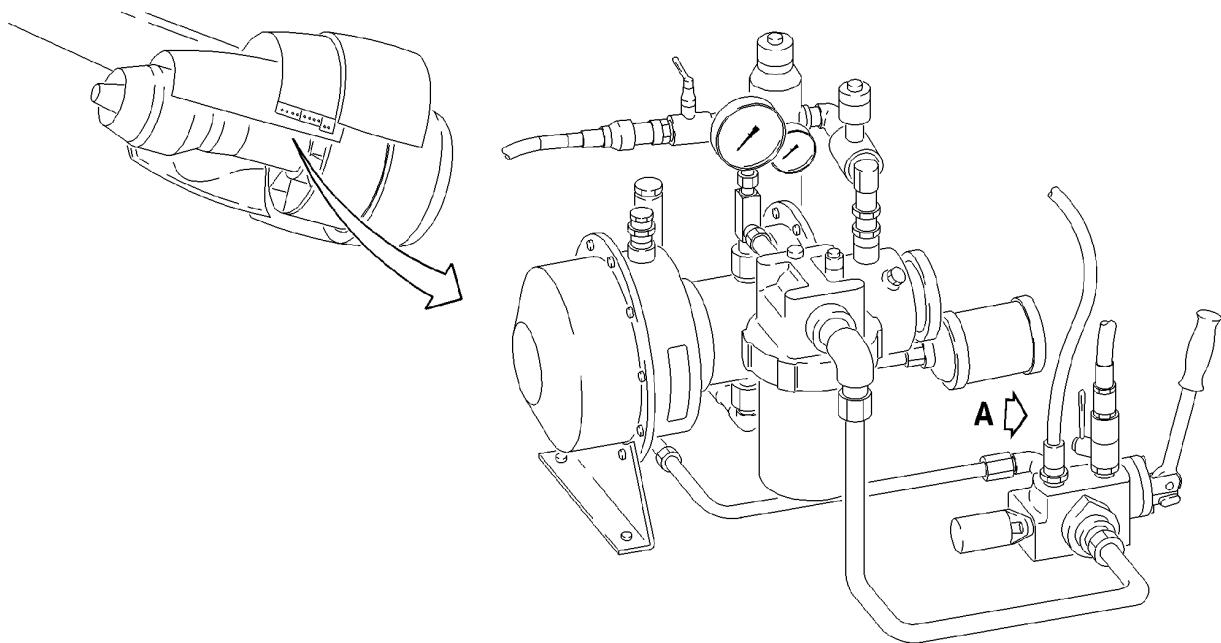
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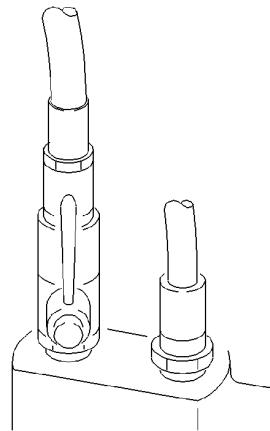
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**HYDRAULIC VALVE HANDLE
OFF POSITION**



**HYDRAULIC VALVE HANDLE
ON POSITION**

VIEW A

CAG(IGDS)

DB2-75-0026A

Hydraulic Cart (PWA 49030)
Figure 505/75-31-03-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

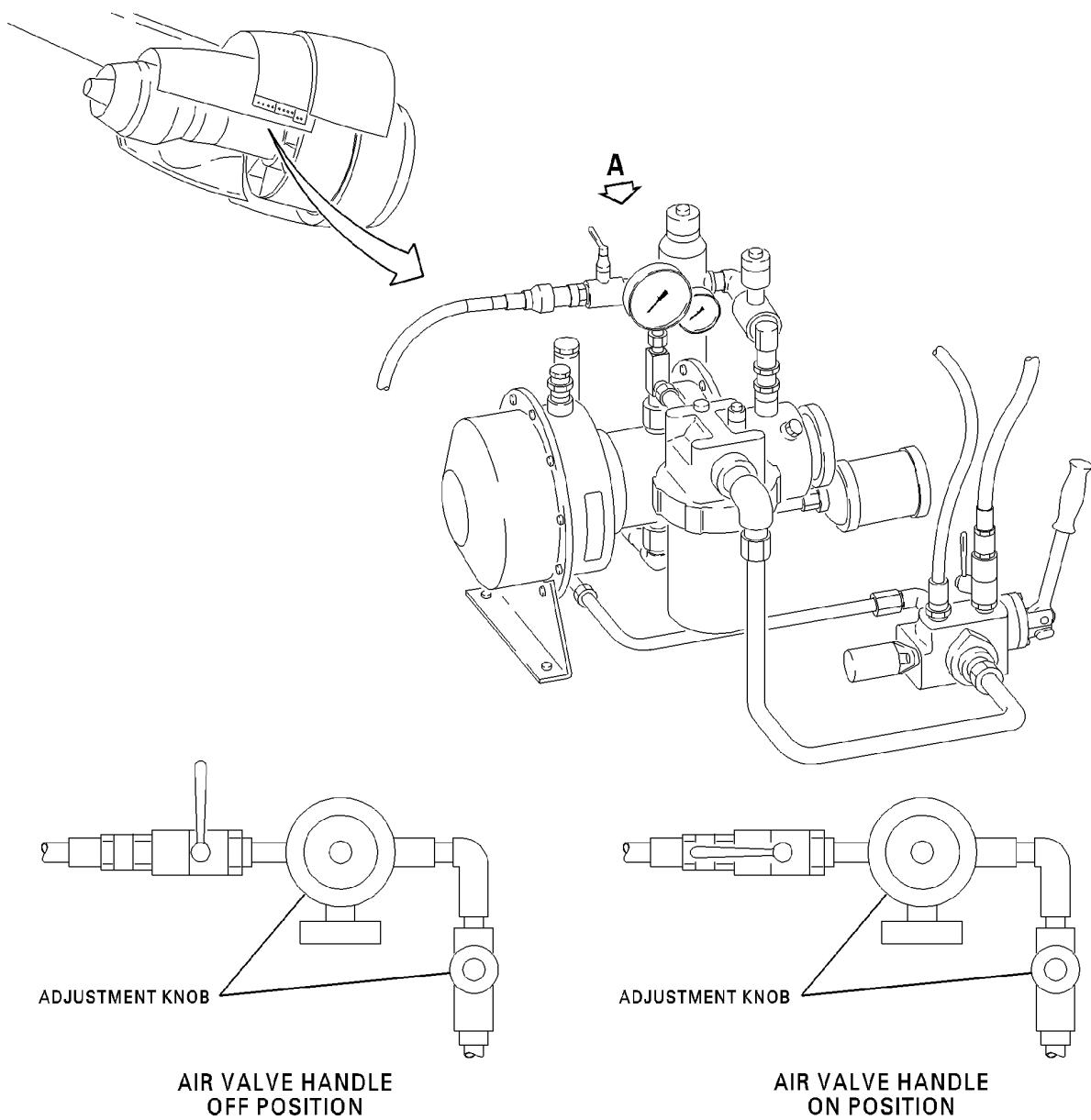
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Hydraulic Cart (PWA 49030)
Figure 506/75-31-03-990-873

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

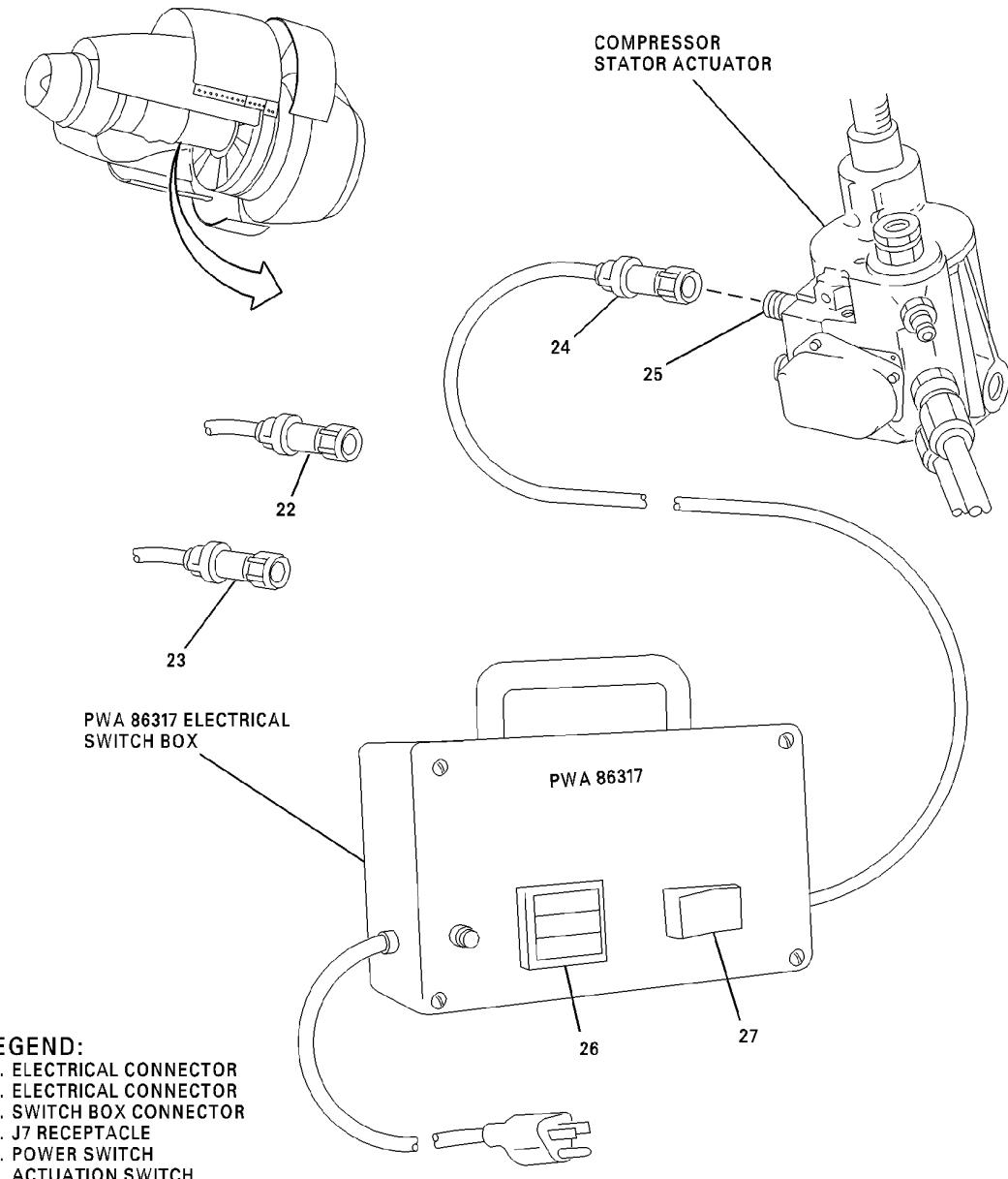
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CAG(IGDS)

DB2-75-0028A

Electrical Switch Box (PWA 86317)
Figure 507/75-31-03-990-874

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

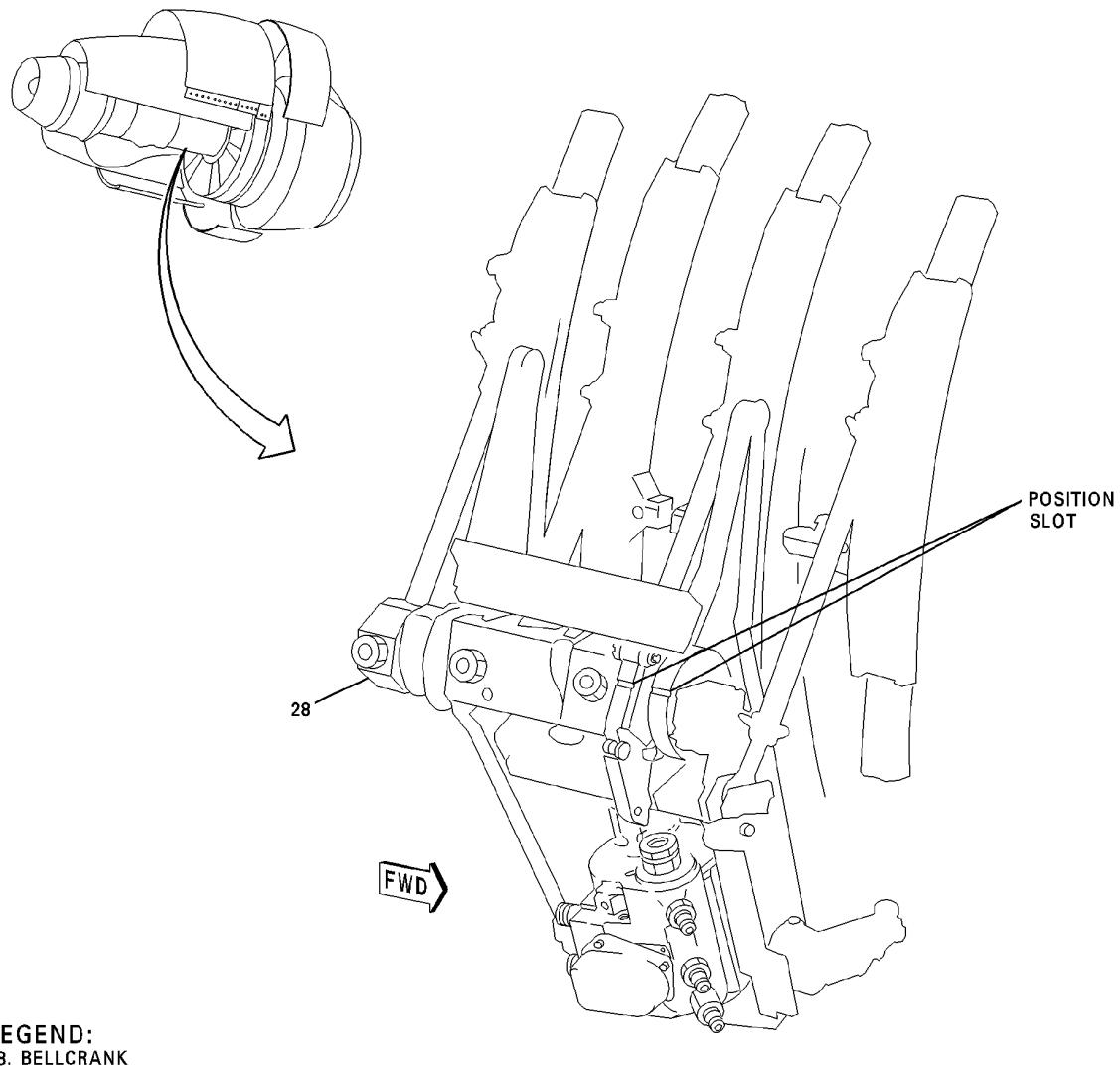
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CAG(IGDS)

DB2-75-0029A

Variable Stator Vane Control System - Adjustment
Figure 508/75-31-03-990-875

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

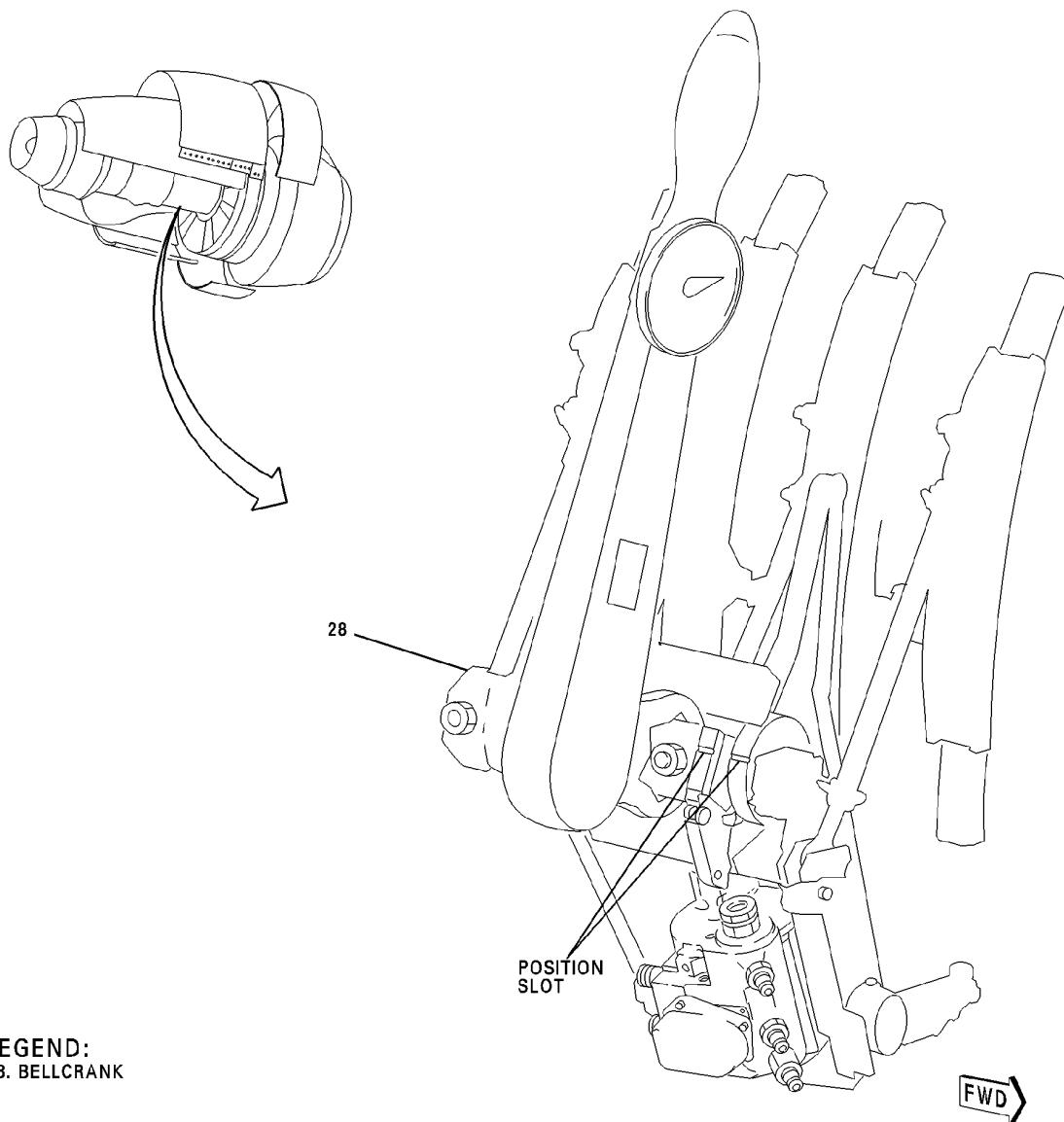
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CAG(IGDS)

DB2-75-0040A

Variable Stator Vane Control System - Adjustment
Figure 509/75-31-03-990-876

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

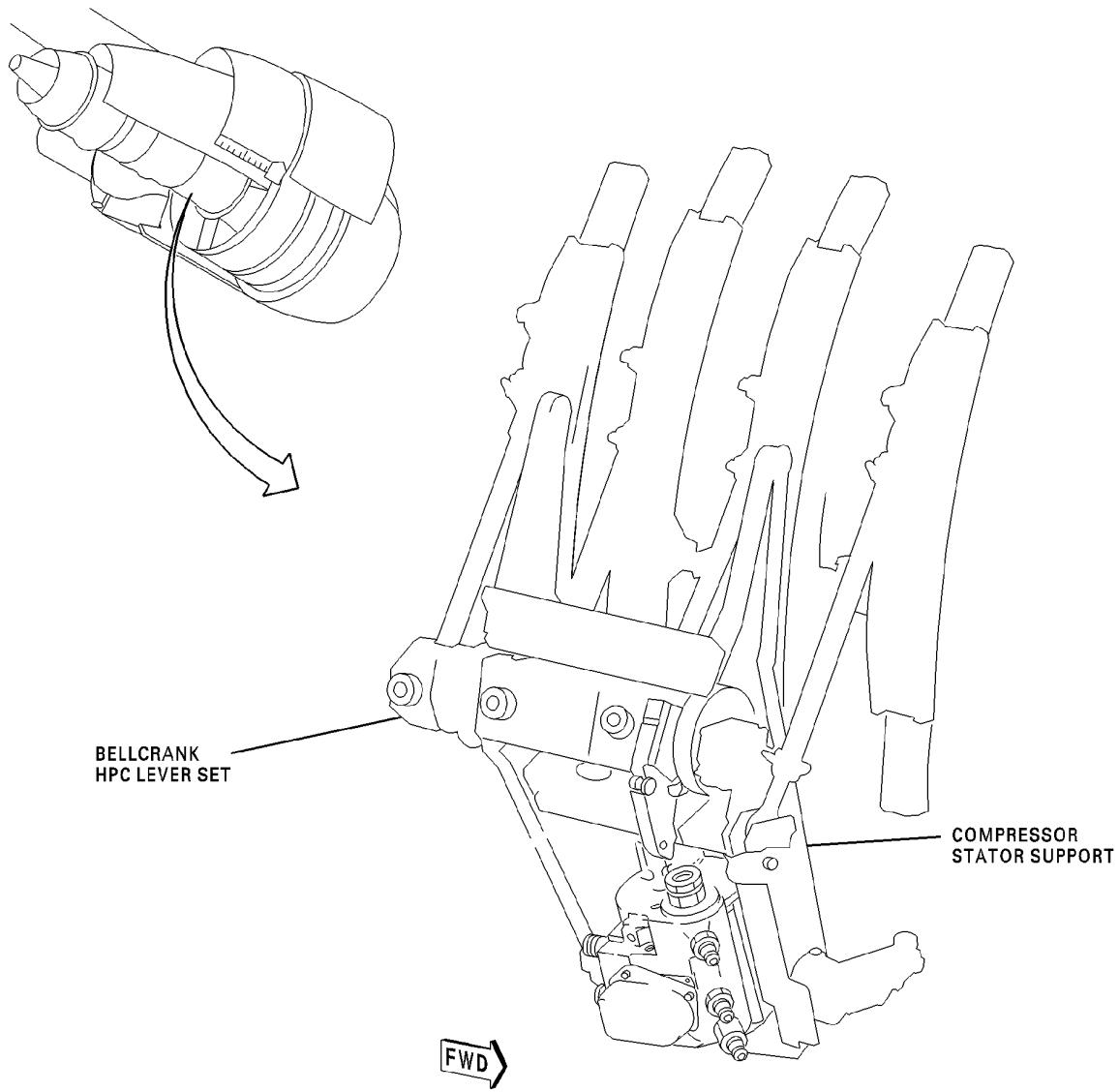
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CAG(IGDS)

DB2-75-0030A

Variable Stator Vane Control System - Adjustment
Figure 510/75-31-03-990-877

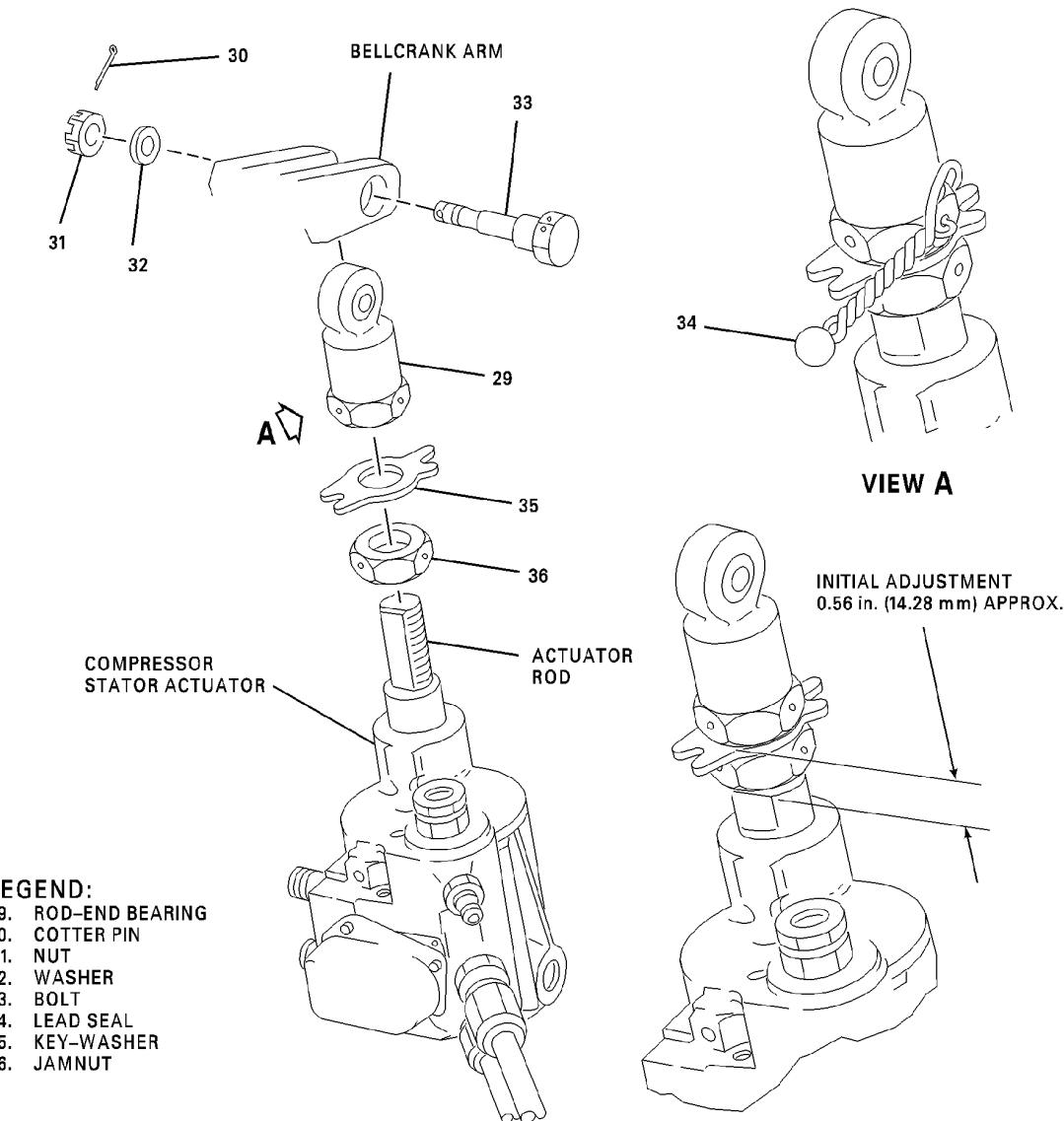
EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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CAG(IGDS)

DB2-75-0031B

Variable Stator Vane Control System - Adjustment
Figure 511/75-31-03-990-878

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

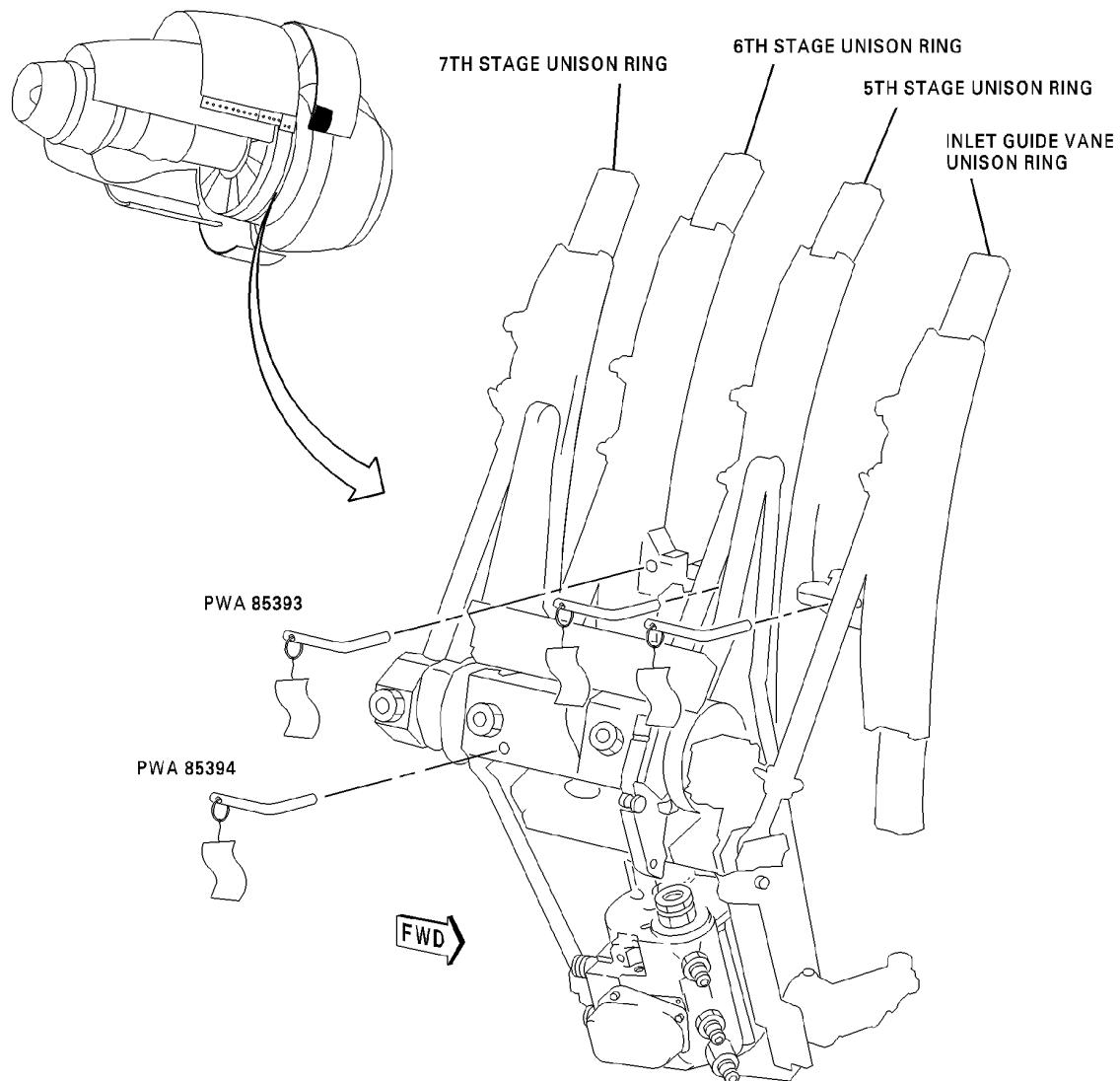
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CAG(IGDS)

DB2-75-0032A

Variable Stator Vane Control System - Adjustment
Figure 512/75-31-03-990-879

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

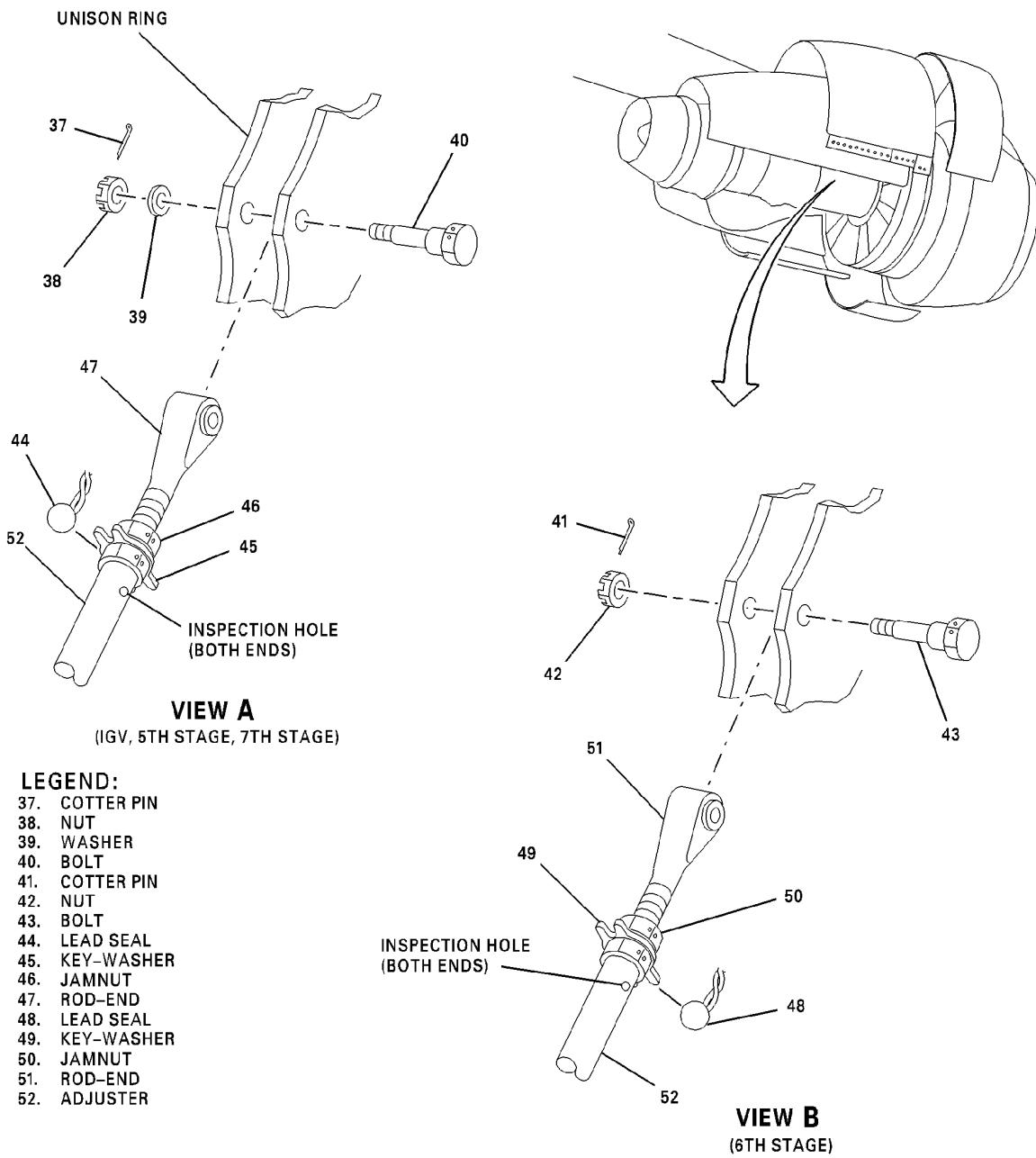
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CAG(IGDS)

DB2-75-0033B

Variable Stator Vane Control System - Adjustment
Figure 513/75-31-03-990-880

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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CONTROL SYSTEM, VARIABLE STATOR VANE, MANUAL - ADJUSTMENT/TEST

1. General

- A. This procedure has the adjustment instructions for the variable stator vane (VSV) control system. In this procedure the actuator, bellcrank and linkage are moved by hand with a torque wrench.
- B. This procedure has the instructions to make precision adjustments to the position of the VSV lever set and the VSV unison rings. Access to the stator vane control system is through the right thrust reverser door.
- C. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 and PW4460/4462-3 engines.

TASK 75-31-04-700-869

2. ADJUSTMENT OF THE VARIABLE STATOR VANE CONTROL SYSTEM - MANUAL OPERATION

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 501

REFERENCE	DESIGNATION
PWA 86344	Holder
PWA 85393	Rig pin (3 required)
PWA 85394	Rig pin
PWA 85395	Rig pin (Pre SB PW4ENG 72-246) (large rig pin)
PWA 86097	Rig pin (Post SB PW4ENG 72-246) (small rig pin)
Not specified	Torque wrench 0-100 in-lb (0-12.0 N·m)
Not specified	Torque wrench 0-600 in-lb (0-68 N·m)
Model M303, M305 or M307	Crimper, Bergen Mechanical
CTE5100	Cart, hydraulic (pneumatic) (optional to PWA 49030)

NOTE: Rig pin kit (PWA 85675) contains the necessary rig pins.

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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Table 502

REFERENCE	DESIGNATION
P05-289	Lockwire (AS3214-02)
P03-001	Oil, engine (PWA 521B)
Not specified	Seal, lead

C. Expendable Parts

(1) Expendable Parts

Table 503

REFERENCE/ITEM	DESIGNATION	IPC
28	Cotter pin MS9245-25	IPC 75-32-05-10-010
13	Cotter pin MS9245-24	IPC 75-32-05-10-065
18	Washer-key 1A4445	IPC 75-32-05-10-065
34	Washer-key 613949	IPC 75-32-15-10-045

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-04-700-871	ENGINE POWER ACCELERATION-DECELERATION TEST (ADJ/TEST 04) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-32-05-10-010	Illustrated Parts Catalog
IPC 75-32-05-10-065	Illustrated Parts Catalog
IPC 75-32-15-10-045	Illustrated Parts Catalog

E. Job Set-up - Variable Stator Vane Control System Adjustment – Manual Operation

SUBTASK 75-31-04-010-268

- (1) Open the engine access doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - Variable Stator Vane Control System Adjustment – Manual Operation

SUBTASK 75-31-04-710-267

- (1) Operate the Variable Stator Vane (VSV) (VSV) lever set (bellcrank) as follows: (Figure 501)



DO NOT TORQUE MORE THAN THE APPROVED TORQUE VALUES.
THIS WILL HELP PREVENT DAMAGE TO THE EQUIPMENT.

CAUTION

- (a) Turn the lever set (bellcrank) (4) with a torque wrench attached to a crowsfoot open-end wrench. Position the crowsfoot open-end wrench at the flats (3) adjacent to the 5th stage adjuster (1). Turn the lever set two or three times from the fully closed position to the fully open position. Push up on the wrench until the position slots (2) are almost aligned. When the position slots are almost aligned the VSVs are in the closed position.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (b) Pull down on the wrench until the VSV actuator piston rod is fully extended. Make sure the piston rod is against the VSV actuator internal stop. The VSVs are in the open position. Apply and hold a minimum of 300 in-lb (33.8 N·m) and no more than 400 in-lb (45.2 N·m) of torque to the bellcrank. Hold the VSVs in the open position and install the holder (7).
- (c) Insert the holder (7) between the rod-end bearing jamnut (5) and the top of the VSV actuator housing (6). Torque the lock bolt (8) on the holder to 8.0-10.0 in-lb (0.9-1.1 N·m). Tighten the lock bolt jamnut (9) by hand. (Figure 502)

SUBTASK 75-31-04-720-268

**CAUTION**

MAKE SURE YOU USE THE CORRECT RIG CHECK PIN. THE LARGE RIG CHECK PIN IS FOR THE PRE-SERVICE BULLETIN PW4ENG 72-246 ENGINES. THE SMALL RIG CHECK PIN IS FOR THE POST-SERVICE BULLETIN PW4ENG 72-246 ENGINES. IF AN INCORRECT RIG CHECK PIN IS USED, IT CAN CAUSE ERRORS IN THE LEVER SET ADJUSTMENT. AN ERROR IN THE LEVER SET ADJUSTMENT CAN CAUSE UNSATISFACTORY ENGINE PERFORMANCE AND ENGINE FAILURE.

- (2) Examine the position of the lever set (bellcrank) as follows: (Figure 503)

NOTE: The step that follows is for engines before SB PWENG 72-246.

- (a) With the actuator (1) rod fully extended, install the rig pin (10) (PWA 85395) in the bellcrank arm and support.

NOTE: The step that follows is for engines after SB PWENG 72-246.

- (b) With the actuator (1) rod fully extended, install the rig pin (10) (PWA 86097) in the bellcrank slot (11) and the support rig pin holes (12).

NOTE: The steps that follow are for engines before and after S/B PWENG 72-246.

- (c) If the rig pin (10) goes through the bellcrank slot (11) and the two holes (12) in the support bracket, the lever set (bellcrank) adjustment is satisfactory. If the lever set (bellcrank) adjustment is satisfactory, examine the position of the unison rings.

- (d) If the rig pin (10) will not go through the slot (11) and the support bracket, adjust the actuator rod-end bearing.

SUBTASK 75-31-04-720-269

**CAUTION**

MAKE SURE YOU REMOVE THE RIG PINS BEFORE YOU CONTINUE. IF THE PINS ARE NOT REMOVED, DAMAGE CAN OCCUR TO THE LEVER SET, THE SUPPORT BRACKET, OR THE UNISON RINGS.

- (3) Remove the rig pin (10) from the lever set (bellcrank) slot (11).

SUBTASK 75-31-04-720-270

- (4) Remove the holder (7) from the actuator. (Figure 502)

SUBTASK 75-31-04-830-267

- (5) Adjust the actuator rod-end bearing as follows: (Figure 504)

- (a) Disconnect the actuator rod-end bearing (17). Remove and discard the cotter pin (13) from the actuator rod-end bearing shoulder bolt (16). Remove the nut (14), the washer (15), and the shoulder bolt (16) from the actuator rod-end bearing (17).

- (b) Make the washer-key (18) tabs straight. Loosen the jamnut (5) and remove the rod-end bearing (17). Discard the washer-key.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS



MAKE SURE THE ADJUSTMENTS IN THIS PROCEDURE ARE OBEYED.
THESE ARE IMPORTANT PRECISION ADJUSTMENTS. INCORRECT
ADJUSTMENTS CAN CAUSE UNSATISFACTORY ENGINE
PERFORMANCE AND ENGINE FAILURE.

- (c) Lubricate the threads of the rod-end bearing (17) with engine oil. Install new washer-key (18) and install the actuator rod-end bearing (17). Turn the actuator rod-end bearing on the actuator piston rod (19) threaded shaft to the initial adjustment. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- NOTE: The initial adjustment is measured from the rod-end bearing hex area to the flat area of the actuator rod.
- (d) Lubricate the threads of the rod-end bearing shoulder bolt (16) with engine oil. Temporarily connect the rod-end bearing (17) to the lever set (bellcrank) (4). Install the washer (15) and nut (14) on the shoulder bolt (16). Tighten the nut by hand to make sure the bolt head stays against surface of the lever set (bellcrank).

SUBTASK 75-31-04-710-268

- (6) Operate the VSV lever set (bellcrank) as follows:



DO NOT TORQUE MORE THAN THE APPROVED TORQUE VALUES.
THIS WILL HELP PREVENT DAMAGE TO THE EQUIPMENT.

- (a) Turn the lever set (bellcrank) one or two times from the fully open position to the fully closed position. Pull on the torque wrench and hold 300-400 in-lb (33.9-45.2 N·m) of torque on the bellcrank. Make sure the actuator piston rod is fully extended and is against the actuator internal stop. Hold the piston rod against the internal stop and install the holder (7). (Figure 501)
- (b) Insert the holder (7) between the rod-end bearing jamnut (5) and the top of the actuator housing (6). Torque the lock bolt (8) on the holder to 8.0-10.0 in-lb (0.90-1.1 N·m). Tighten the lock bolt jamnut (9) by hand. (Figure 502)

SUBTASK 75-31-04-720-271

- (7) Examine the position of the lever set (bellcrank) as follows:

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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CAUTION

MAKE SURE YOU USE THE CORRECT RIG CHECK PIN. THE LARGE RIG CHECK PIN IS FOR THE PRE-SERVICE BULLETIN PW4ENG 72-246 ENGINES. THE SMALL RIG CHECK PIN IS FOR THE POST-SERVICE BULLETIN PW4ENG 72-246 ENGINES. IF AN INCORRECT RIG CHECK PIN IS USED, IT CAN CAUSE ERRORS IN THE LEVER SET ADJUSTMENT. AN ERROR IN THE LEVER SET ADJUSTMENT CAN CAUSE UNSATISFACTORY ENGINE PERFORMANCE AND ENGINE FAILURE.

- (a) With the holder installed put the rig pin (10) (PWA 85395 for pre-SB PW4ENG 72-246 or PWA 86097 for post SB PW4ENG 72-246) into the bellcrank slot (11) and the two holes in the support bracket (12). (Figure 503)
NOTE: If small adjustments are necessary to install the rig pin, remove the holder and turn the actuator piston rod.
- (b) If the rig pin (10) goes through the slot (11) and the two holes in the support bracket (12), the adjustment is satisfactory. Remove the rig pin and finish the installation of the rod-end bearing.

SUBTASK 75-31-04-720-272



CAUTION

MAKE SURE YOU REMOVE THE RIG PINS BEFORE YOU CONTINUE. IF THE PINS ARE NOT REMOVED, DAMAGE CAN OCCUR TO THE LEVER SET, THE SUPPORT BRACKET, OR THE UNISON RINGS.

- (8) Remove the rig pin (10) from the lever set (bellcrank) slot (11).

SUBTASK 75-31-04-720-273

- (9) Remove the holder (7) from the actuator. (Figure 502)

SUBTASK 75-31-04-430-267

- (10) Torque the nut (14) on the actuator rod-end bearing shoulder bolt (16) to a minimum of 15 in-lb (1.7 N·m). Continue to torque the nut until the nut slot aligns with the cotter pin hole in the bolt. Do not torque the nut more than 22 in-lb (2.5 N·m) plus the nut run-on torque. Install a cotter pin (13) in the shoulder bolt. (Figure 504)

SUBTASK 75-31-04-430-268

- (11) Torque the jamnut (5) to 460-510 in-lb (52.0-57.6 N·m). Do not bend the washer-key (18) tabs at this time. (Figure 504)

SUBTASK 75-31-04-710-269

- (12) Operate the VSV lever set (bellcrank) as follows:



CAUTION

DO NOT TORQUE MORE THAN THE APPROVED TORQUE VALUES.
THIS WILL HELP PREVENT DAMAGE TO THE EQUIPMENT.

- (a) Use the torque wrench with the crowsfoot open-end wrench to turn the lever set. Turn the lever set (bellcrank) one or two times from the fully open position to the fully closed position. Pull on the torque wrench and hold 300-400 in-lb (33.9-45.2 N·m) of torque on the bellcrank. The piston rod is fully extended and against the actuator internal stop. Hold the piston rod against the internal stop and install the holder (7). (Figure 501)
- (b) Insert the holder (7) between the rod-end bearing jamnut (5) and the top of the actuator housing (6). Torque the lock bolt (8) on the holder to 8.0-10.0 in-lb (0.90-1.1 N·m). Tighten the lock bolt jamnut (9) by hand. (Figure 502)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-31-04-830-268



CAUTION

MAKE SURE YOU USE THE CORRECT RIG CHECK PIN. THE LARGE RIG CHECK PIN IS FOR THE PRE-SERVICE BULLETIN PW4ENG 72-246 ENGINES. THE SMALL RIG CHECK PIN IS FOR THE POST-SERVICE BULLETIN PW4ENG 72-246 ENGINES. IF AN INCORRECT RIG CHECK PIN IS USED, IT CAN CAUSE ERRORS IN THE LEVER SET ADJUSTMENT. AN ERROR IN THE LEVER SET ADJUSTMENT CAN CAUSE UNSATISFACTORY ENGINE PERFORMANCE AND ENGINE FAILURE.

- (13) Put the rig pin (10) (PWA 85395 for pre-SB PW4ENG 72-246 or PWA 86097 for post SB PW4ENG 72-246) through the slot (11) and the two holes in the support bracket (12). If the adjustment is satisfactory, continue with the installation of the rod-end bearing. (Figure 503)

SUBTASK 75-31-04-830-269



CAUTION

MAKE SURE YOU REMOVE THE RIG PINS BEFORE YOU CONTINUE. IF THE PINS ARE NOT REMOVED, DAMAGE CAN OCCUR TO THE LEVER SET, THE SUPPORT BRACKET, OR THE UNISON RINGS.

- (14) Remove the rig pin (10) from the lever set (bellcrank) slot (11), and remove the holder (7). (Figure 503)
- (15) Bend one set of key-washer (18) tabs on a flat of the rod-end bearing (17). Bend the other set of the key-washer tabs on the jamnut (5). Safety the jamnut (5) with lockwire and install a lead seal.

SUBTASK 75-31-04-720-274

- (16) Examine the position of the unison rings as follows: (Figure 505)



CAUTION

DO NOT TORQUE MORE THAN THE APPROVED TORQUE VALUES.
THIS WILL HELP PREVENT DAMAGE TO THE EQUIPMENT.

- (a) Use the torque wrench with the crowsfoot open-end wrench to turn the lever set. Turn the lever set (bellcrank) one or two times from the fully open position to the fully closed position. Pull on the torque wrench and hold 300-400 in-lb (33.9-45.2 N·m) of torque on the bellcrank. The piston rod is fully extended and against the actuator internal stop. Hold the piston rod against the internal stop and install the holder (7). (Figure 501)
- (b) Insert the holder (7) between the rod-end bearing jamnut (5) and the top of the actuator housing (6). Torque the lock bolt (8) on the holder to 8-10 in-lb (0.90-1.1 N·m). Tighten the lock bolt jamnut (9) by hand. (Figure 502)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-31-04-430-269



CAUTION

MAKE SURE YOU USE THE CORRECT RIG CHECK PIN. THE LARGE RIG CHECK PIN IS FOR THE PRE-SERVICE BULLETIN PW4ENG 72-246 ENGINES. THE SMALL RIG CHECK PIN IS FOR THE POST-SERVICE BULLETIN PW4ENG 72-246 ENGINES. IF AN INCORRECT RIG CHECK PIN IS USED, IT CAN CAUSE ERRORS IN THE LEVER SET ADJUSTMENT. AN ERROR IN THE LEVER SET ADJUSTMENT CAN CAUSE UNSATISFACTORY ENGINE PERFORMANCE AND ENGINE FAILURE.

- (17) With the holder installed put the rig pin (10) (PWA 85395 for pre-SB PW4ENG 72-246 or PWA 86097 for post SB PW4ENG 72-246) into the bellcrank slot (11) and the two holes in the support bracket (12).

SUBTASK 75-31-04-830-270

- (18) Examine the position of the four unison rings as follows: (Figure 505)

- Install the rig pins (26) (PWA 85393) in the inlet guide vane (IGV) (25) and the 5th stage (24) unison rings. Install a rig pin (26) (PWA 85393) in the 6th stage unison ring (23). Install a rig pin (27) (PWA 85394 or 86197) in the 7th stage unison ring (22). Make sure all the rig pins are fully engaged in the compressor case.
- If you can put all four rig pins in the unison rings, the stator vane adjustment is satisfactory. Remove the rig pins from the unison rings and the lever set (bellcrank). Continue the adjustment and test procedure with job close up.
- If you cannot put all four rig pins in the unison rings, you must adjust the applicable rings.

SUBTASK 75-31-04-830-271



CAUTION

MAKE SURE YOU REMOVE THE RIG PINS BEFORE YOU CONTINUE. IF THE PINS ARE NOT REMOVED, DAMAGE CAN OCCUR TO THE LEVER SET, THE SUPPORT BRACKET, OR THE UNISON RINGS.

- (19) Remove all rig pins from the unison rings.

SUBTASK 75-31-04-830-272

- (20) To adjust the VSV unison ring continue as follows: (Figure 506)

- Disconnect the rod-end bearing (32) from the applicable unison ring. Remove and discard the cotter pin (28). Remove the nut (29) the washer (30) and the shoulder bolt (31).

NOTE: The washer is not installed on the 6th stage unison ring rod-end bearing shoulder bolt. The other three unison ring rod-end bearing shoulder bolts have the washers.

- Move the tabs of the washer-key (34) away from the jamnut (33) and the adjuster (37).
- Loosen the jamnut (33), remove the rod-end bearing (32) and discard the washer-key (34).

NOTE: The adjuster has right and left hand threads. At engine assembly the adjuster left hand thread rod-end bearing is attached to the lever set. It is possible to change the length of the adjuster with an adjustment to only the top rod-end bearing.

NOTE: It is not necessary to remove the lower rod-end bearing from the lever set (bellcrank), unless the bearing is replaced.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-31-04-830-273

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (21) Lubricate the threads of the rod-end bearings with engine oil. Assemble the adjuster (37), the jamnuts (33) a washer-key (34), and the rod-end bearings (32). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

SUBTASK 75-31-04-430-270

- (22) Install the rig pins (26) (PWA 85393) in the inlet guide vane (IGV) (25) and the 5th stage (24) unison rings. Install a rig pin (26) (PWA 85393) in the 6th stage unison ring (23). Install a rig pin (27) (PWA 85394 or 86197) in the 7th stage unison ring (22). Make sure all the rig pins are fully engaged in the compressor case. (Figure 505)

SUBTASK 75-31-04-830-274

- (23) Adjust the length of the adjuster and install it as follows: (Figure 506)



CAUTION

MAKE SURE THE ADJUSTMENTS IN THIS PROCEDURE ARE OBeyed.
THESE ARE IMPORTANT PRECISION ADJUSTMENTS. INCORRECT
ADJUSTMENTS CAN CAUSE UNSATISFACTORY ENGINE
PERFORMANCE AND ENGINE FAILURE.

- (a) Turn the rod-end clockwise to decrease the length or counterclockwise to increase the length. Adjust the length so that the bolt hole in the rod-end bearing (32) is aligned with the bolt hole in the unison ring.
- (b) Make sure that the minimum number of rod-end bearing threads are engaged in the adjuster. Try to put 0.032 lockwire through the inspection hole (38) at each end of the adjuster (8). The wire must not go through the inspection hole. Adjust the rod-end bearing as necessary for the rod-end bearing threads to block the inspection holes.



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (c) Lubricate the threads of the unison ring, rod-end bearing shoulder bolt (31) with engine oil. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (d) Install the shoulder bolt (31), the washer (30), and the nut (29) at the unison ring. Torque the nut (29) to a minimum of 15 in-lb (1.7 N·m). Continue to torque nut until nut slot aligns with the cotter pin hole in the bolt. Do not torque the nut too much. The maximum torque on the nut is 22 in-lb (2.5 N·m) plus the nut run-on torque. Install a cotter pin (28) in the shoulder bolt (31).

NOTE: The washer is not installed on the 6th stage unison ring rod-end bearing shoulder bolt. The other three unison ring rod-end bearing shoulder bolts have the washers.

SUBTASK 75-31-04-430-271

- (24) Position and hold the rod-end bearing (5) near the center position. Torque the jammuts (6) and, if necessary (9), to 115-150 in-lb (13.0-17.0 N·m).

SUBTASK 75-31-04-830-275



CAUTION MAKE SURE YOU REMOVE THE RIG PINS BEFORE YOU CONTINUE. IF THE PINS ARE NOT REMOVED, DAMAGE CAN OCCUR TO THE LEVER SET, THE SUPPORT BRACKET, OR THE UNISON RINGS.

- (25) Remove all rig pins from the unison rings. Remove the rig pin from the bellcrank. (Figure 503) (Figure 505)

SUBTASK 75-31-04-030-280

- (26) Remove the holder (7) from the actuator. (Figure 502)

SUBTASK 75-31-04-710-270

- (27) Operate the VSV lever set (bellcrank) for a final test of the system as follows:



CAUTION DO NOT TORQUE MORE THAN THE APPROVED TORQUE VALUES. THIS WILL HELP PREVENT DAMAGE TO THE EQUIPMENT.

- (a) Use the torque wrench with the crowsfoot open-end wrench to turn the lever set. Turn the lever set (bellcrank) one or two times from the fully open position to the fully closed position. Pull on the torque wrench and hold 300-400 in-lb (33.9-45.2 N·m) of torque on the bellcrank. Make sure the actuator piston rod is fully extended and is against the actuator internal stop. Hold the actuator piston rod against the actuator internal stop and install the holder (7).
- (b) Insert the holder (7) between the rod-end bearing jammun (5) and the top of the actuator housing (6). Torque the lock bolt (8) on the holder to 8-10 in-lb (0.90-1.1 N·m). Tighten the lock bolt jammun (9) by hand. (Figure 501) (Figure 502)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-31-04-830-276



CAUTION

MAKE SURE YOU USE THE CORRECT RIG CHECK PIN. THE LARGE RIG CHECK PIN IS FOR THE PRE-SERVICE BULLETIN PW4ENG 72-246 ENGINES. THE SMALL RIG CHECK PIN IS FOR THE POST-SERVICE BULLETIN PW4ENG 72-246 ENGINES. IF AN INCORRECT RIG CHECK PIN IS USED, IT CAN CAUSE ERRORS IN THE LEVER SET ADJUSTMENT. AN ERROR IN THE LEVER SET ADJUSTMENT CAN CAUSE UNSATISFACTORY ENGINE PERFORMANCE AND ENGINE FAILURE.

- (28) Put the rig pin (10) through the lever set slot (11) and the two holes in the support bracket (12). Put rig pins (26) PWA 85393 in the IGV (25), the 5th stage (24), and the 6th stage unison rings. Put rig pin (27) PWA 85394 in the 7th stage (22) unison rings. Make sure all the rig pins are fully engaged in the rig pin holes on the compressor case. When all the rig pins are installed the adjustment and test of the system is satisfactory. (Figure 503) (Figure 505)

SUBTASK 75-31-04-830-277



CAUTION

MAKE SURE YOU REMOVE THE RIG PINS BEFORE YOU CONTINUE. IF THE PINS ARE NOT REMOVED, DAMAGE CAN OCCUR TO THE LEVER SET, THE SUPPORT BRACKET, OR THE UNISON RINGS.

- (29) Remove all rig pins from the unison rings. Remove the rig pin from the bellcrank. (Figure 504) (Figure 506)

SUBTASK 75-31-04-030-281

- (30) Remove the holder from the actuator. (Figure 503)
- (31) Bend one set of key-washer (34) tabs on a flat of the rod-end bearing jamnut (33). Bend the other set of the key-washer tabs on the adjuster (32). Safety the jamnut with lockwire (20) and install a lead seal (21).

G. Job Close-up - Variable Stator Vane Control System Adjustment – Manual Operation

SUBTASK 75-31-04-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-31-04-410-267

- (2) Close the engine access doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-31-04-730-267

- (3) Do an engine power acceleration and deceleration test. (ENGINE POWER ACCELERATION-DECELERATION TEST (ADJ/TEST 04), TASK 71-02-04-700-871)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-31-04

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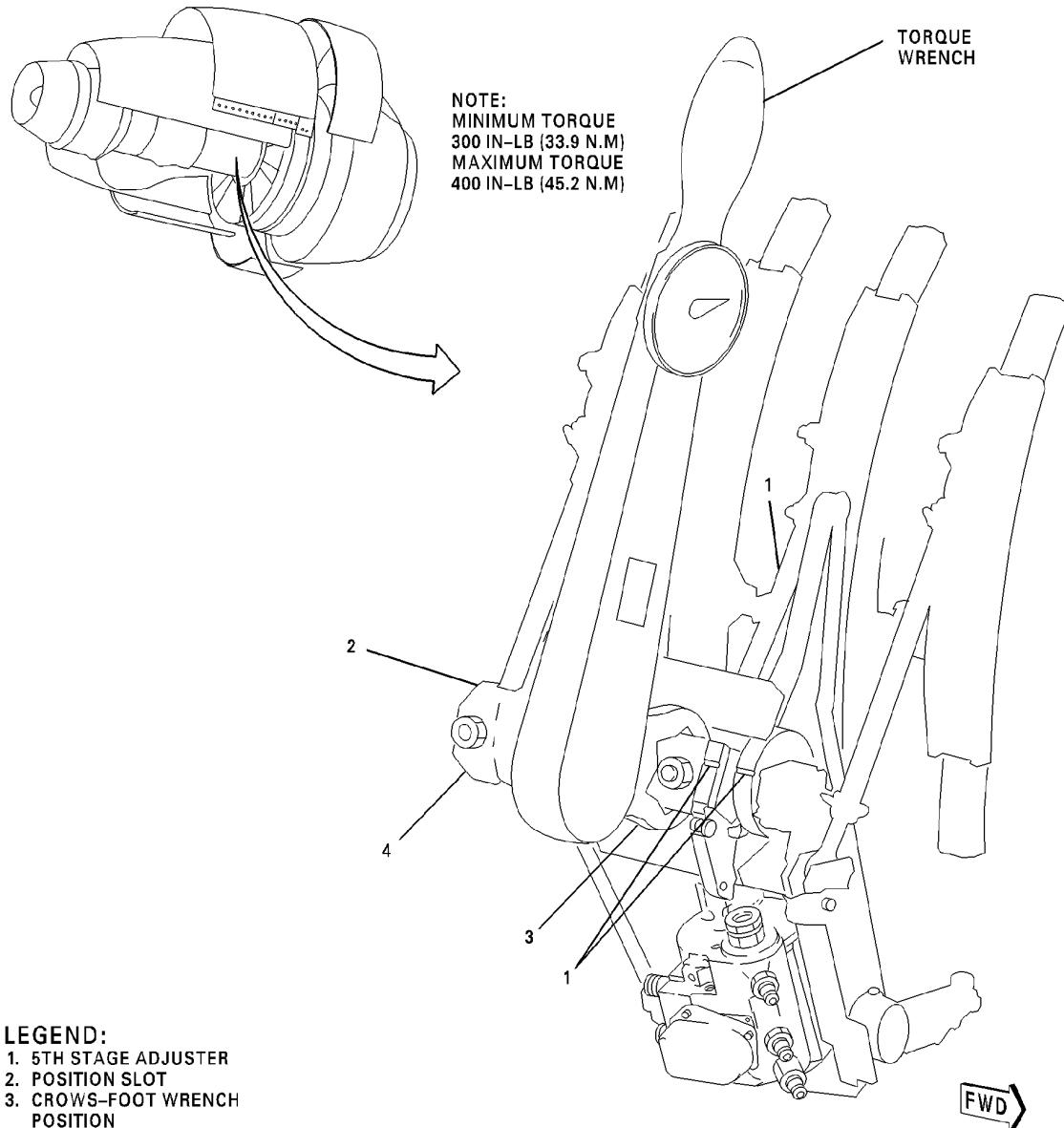
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LEGEND:

1. 5TH STAGE ADJUSTER
2. POSITION SLOT
3. CROWS-FOOT WRENCH POSITION
4. BELLCRANK LEVER SET

CAG(IGDS)

DB2-75-0041A

Variable Stator Vane - Adjustment
Figure 501/75-31-04-990-890

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

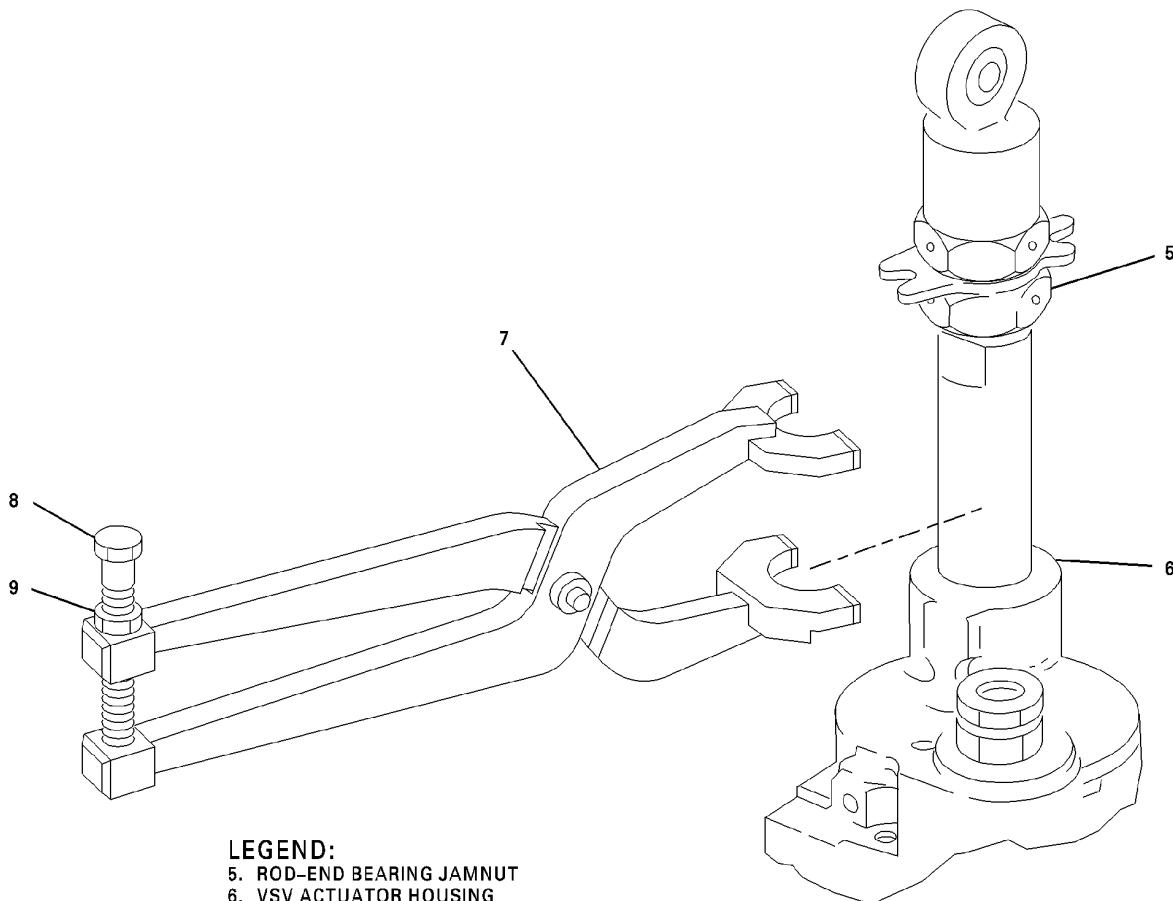
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LEGEND:

- 5. ROD-END BEARING JAMNUT
- 6. VSV ACTUATOR HOUSING
- 7. HOLDER
- 8. LOCK BOLT
- 9. LOCK BOLT JAMNUT

CAG(IGDS)

DB2-75-0042

Variable Stator Vane - Adjustment
Figure 502/75-31-04-990-891

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

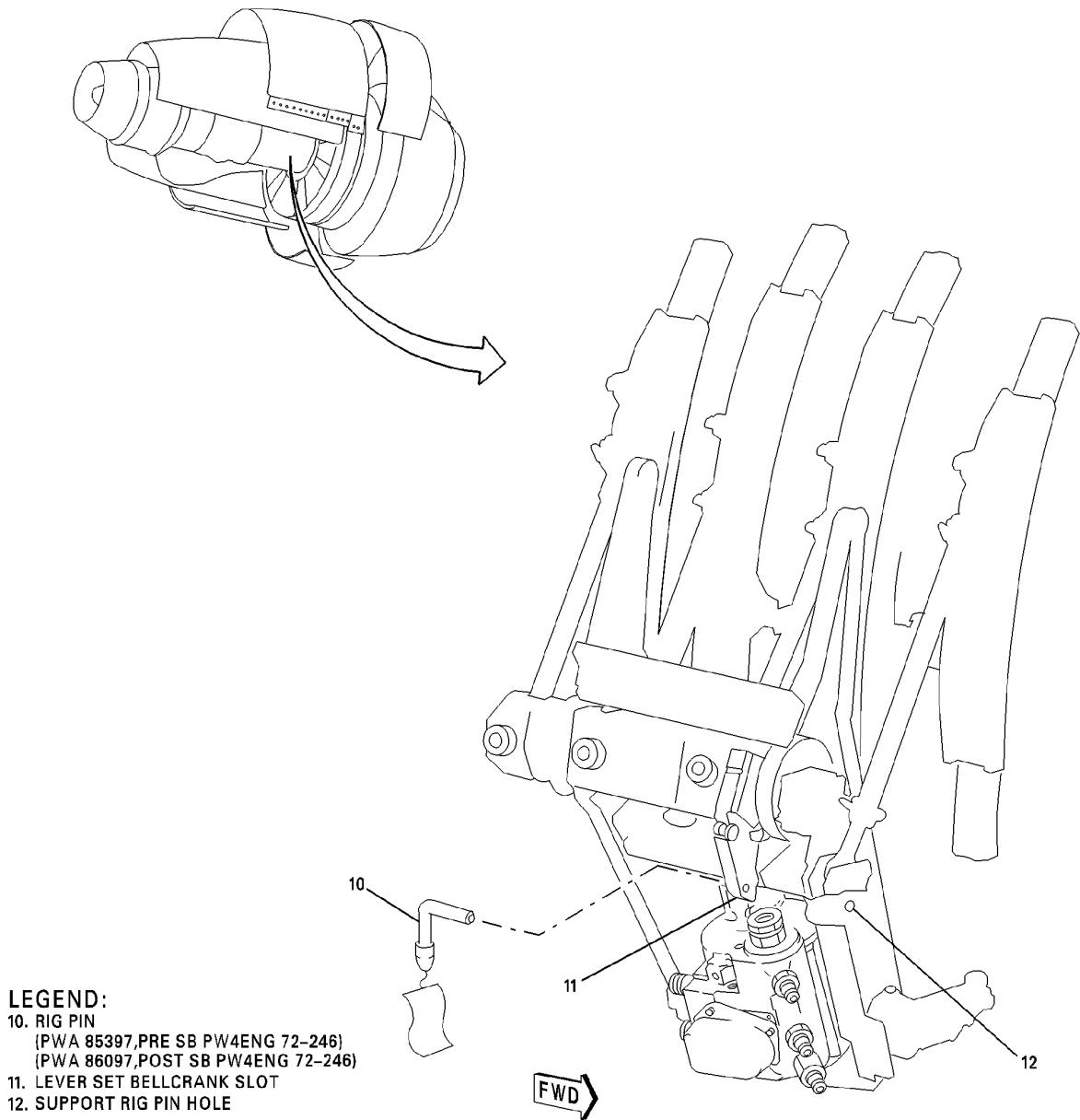
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CAG(IGDS)

DB2-75-0043A

Variable Stator Vane - Adjustment
Figure 503/75-31-04-990-892

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

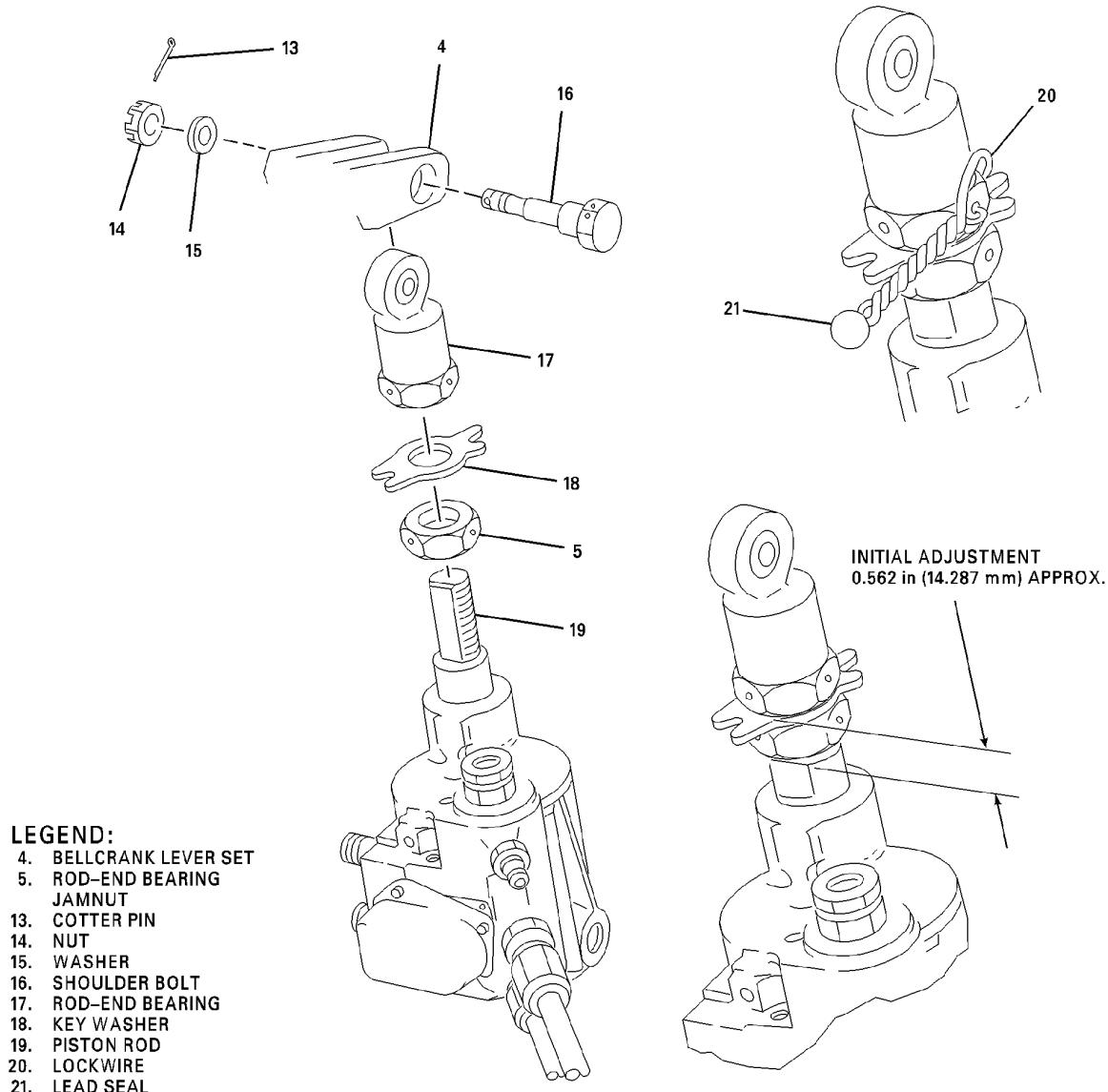
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LEGEND:

- 4. BELLCRANK LEVER SET
- 5. ROD-END BEARING JAMNUT
- 13. COTTER PIN
- 14. NUT
- 15. WASHER
- 16. SHOULDER BOLT
- 17. ROD-END BEARING
- 18. KEY WASHER
- 19. PISTON ROD
- 20. LOCKWIRE
- 21. LEAD SEAL

CAG(IGDS)

DB2-75-0044

Variable Stator Vane - Adjustment
Figure 504/75-31-04-990-893

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

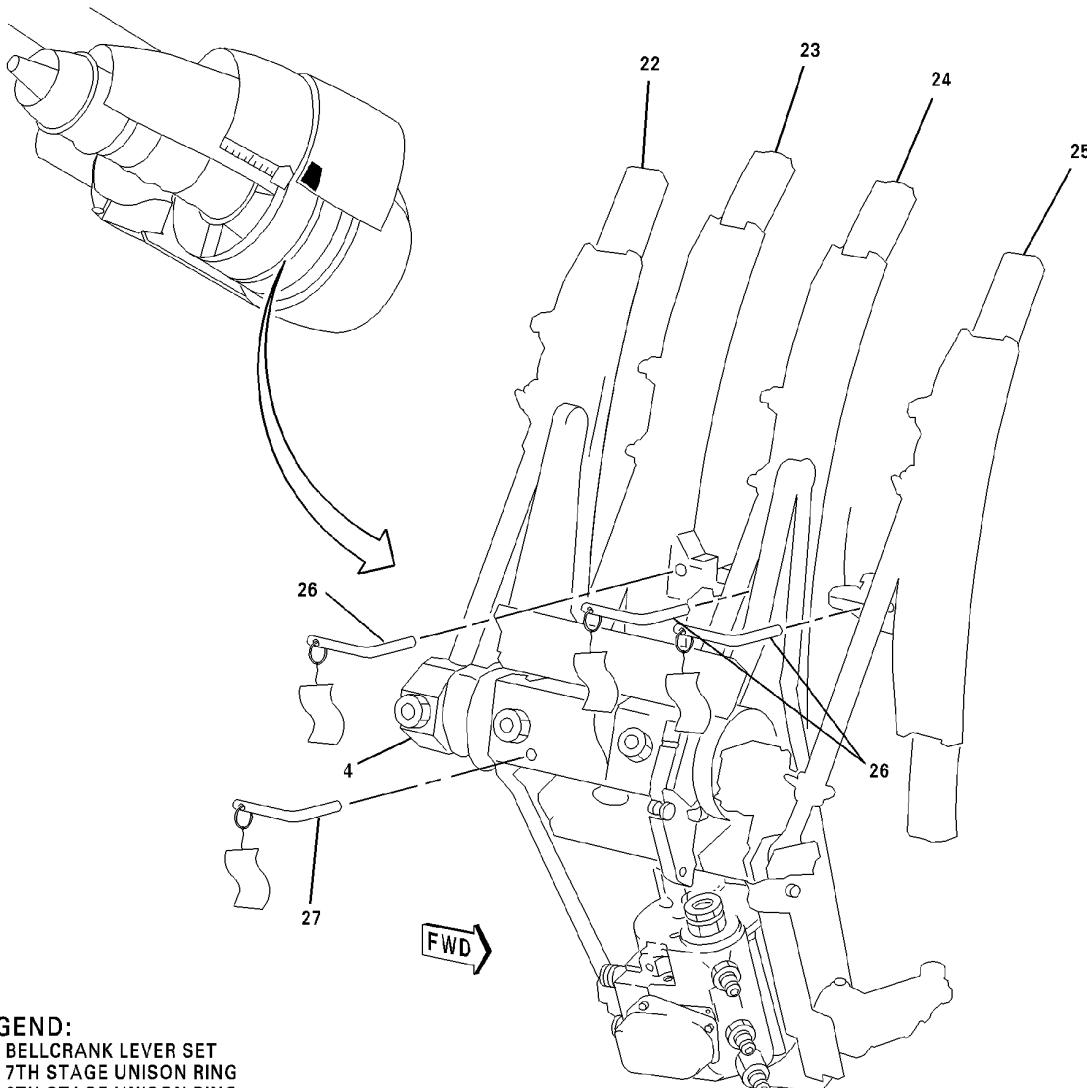
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LEGEND:

- 4. BELLCRANK LEVER SET
- 22. 7TH STAGE UNISON RING
- 23. 6TH STAGE UNISON RING
- 24. 5TH STAGE UNISON RING
- 25. INLET GUIDE VANE UNISON RING
- 26. RIG PIN
- 27. RIG PIN

CAG(IGDS)

DB2-75-0045

Variable Stator Vane - Adjustment
Figure 505/75-31-04-990-894

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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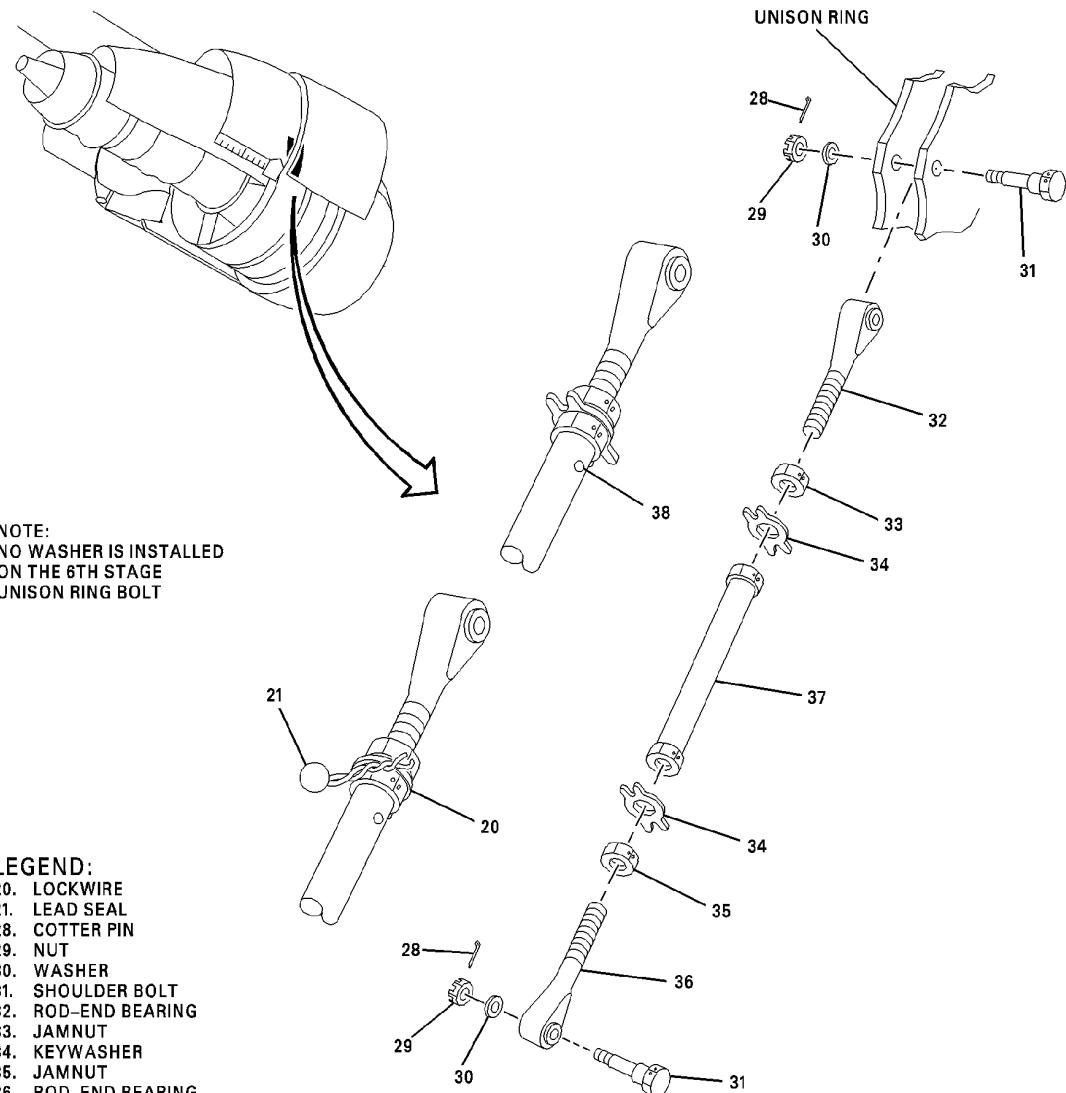
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LEGEND:

- 20. LOCKWIRE
- 21. LEAD SEAL
- 28. COTTER PIN
- 29. NUT
- 30. WASHER
- 31. SHOULDER BOLT
- 32. ROD-END BEARING
- 33. JAMNUT
- 34. KEYWASHER
- 35. JAMNUT
- 36. ROD-END BEARING
- 37. ADJUSTER
- 38. INSPECTION HOLE

CAG(IGDS)

DB2-75-0341

Variable Stator Vane - Adjustment
Figure 506/75-31-04-990-895

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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VARIABLE BLEED VALVE CONTROL - DESCRIPTION AND OPERATION

1. General

- A. The variable bleed valve (VBV) control system automatically schedules the amount of air bled into the secondary (bypass) airflow. It opens and closes the VBV doors in response to electronic control unit (ECU) command signals. (Figure 1)
- B. The VBV doors are installed on the fan frame between every two fan frame struts. The VBV fuel-hydraulic actuators are attached to the engine core and the unison ring bellcrank between struts 4 and 5 and struts 10 and 11 in the fan frame area.
- C. The VBV system operates with the help of the assemblies and components that follow:
 - The electronic control unit (ECU)
 - The hydro-mechanical unit (HMU)
 - Twelve VBV Doors
 - Two VBV actuators (operated by pressurized fuel)
 - Two linear variable differential transformers (LVDT)
 - A mechanical transmission system
 - An electric feedback cable from the VBV actuator LVDT's to the ECU.

2. Electronic Control Unit

- A. The ECU is connected by an electric feedback cable to the two VBV actuator LVDT's. From these LVDT's the ECU gets its input about the VBV actuator (door) position. With this information and the information the ECU gets about the compressor inlet temperature (CIT), the core engine speed (N2), and the angular setting of the VSV's, it calculates the amount of air that is released through the VBV's. To do this, the VBV's open and close the doors which control the amount of air that reaches the HPC for compression.

3. Hydro-Mechanical Unit

- A. The HMU has an internal servo unit that schedules when the VBV's will open and close. This is a function of the angular setting of the VSV's. The HMU receives the signal commands from the ECU. The HMU changes these commands into a signal to the servo valve, which releases fuel pressure that operates the VBV's.

4. Variable Bleed Valve Door

- A. The VBV doors are not fully open at low speeds, but are fully open during fast decelerations. The VBV doors are closed during takeoff and cruise operations.

5. Variable Bleed Valve Actuator

- A. The two VBV actuators are single-ended, hydraulic cylinders which move in both directions by high pressure fuel controlled by a servo in the HMU. The VBV actuators mechanically move the unison ring which controls the position of the VBV doors.
- B. Fuel pressure from the HMU goes into the head-end pressure port of the actuator and keeps constant pressure at the rod-end pressure port. The change in differential pressure on the piston causes the piston rod to extend or retract. This changes the position of the VBV doors.
- C. The actuator piston stroke is controlled by internal stops. A preformed packing prevents cross piston leakage and the dual stage seal prevents rod-end leakage. The wiper ring makes sure that the piston rod is dirt-free as it moves through the dual stage seals. (Figure 3)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-32-00

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6. Linear Variable Differential Transformer

- A. The linear variable differential transformer (LVDT) is part of the VBV actuator. It monitors the amount of VBV actuator rod movement and sends a VBV position feedback signal directly to the ECU. The right side VBV/LVDT is installed between the 4th and 5th fan frame struts. This LVDT receives excitation signals from the ECU and sends feedback signals to the ECU control channel B. The left side VBV/LVDT is installed between the 10th and 11th fan frame struts. This LVDT receives excitation signals from the ECU and sends feedback signals back to the ECU control channel A.
- B. The LVDT has a primary wire coil, two secondary wire coils and a probe in the center. The probe is connected to the piston and moves with the piston. The electrical connector at the head-end of the actuator connects the LVDT to the ECU.

7. Mechanical Transmission System

- A. Pushrods connect the VBV actuators to the bellcranks which turn the unison ring. The unison ring turns and operates the 12 bypass valve bellcranks which open or close the VBV's.

8. Electric Feedback Cable

- A. The ECU is connected by an electric feedback cable to the two VBV actuator LVDT's. The LVDT's monitor the amount of VBV actuator rod movement and send a VBV position feedback signal directly to the ECU. (Figure 2) (Figure 3)

9. System Operation

- A. The VBV system operates as part of the engine primary air flow control. Signals from the ECU go to the VBV system. The VBV sends feedback signals to the ECU. The ECU sends signals to the HMU and the HMU supplies fuel pressure to open and close the VBV's.
- B. The VBV actuators can open, close, or modulate the 12 VBV's to a middle position as commanded by signals from the ECU. The unison ring keeps the valves synchronized during operation.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-32-00

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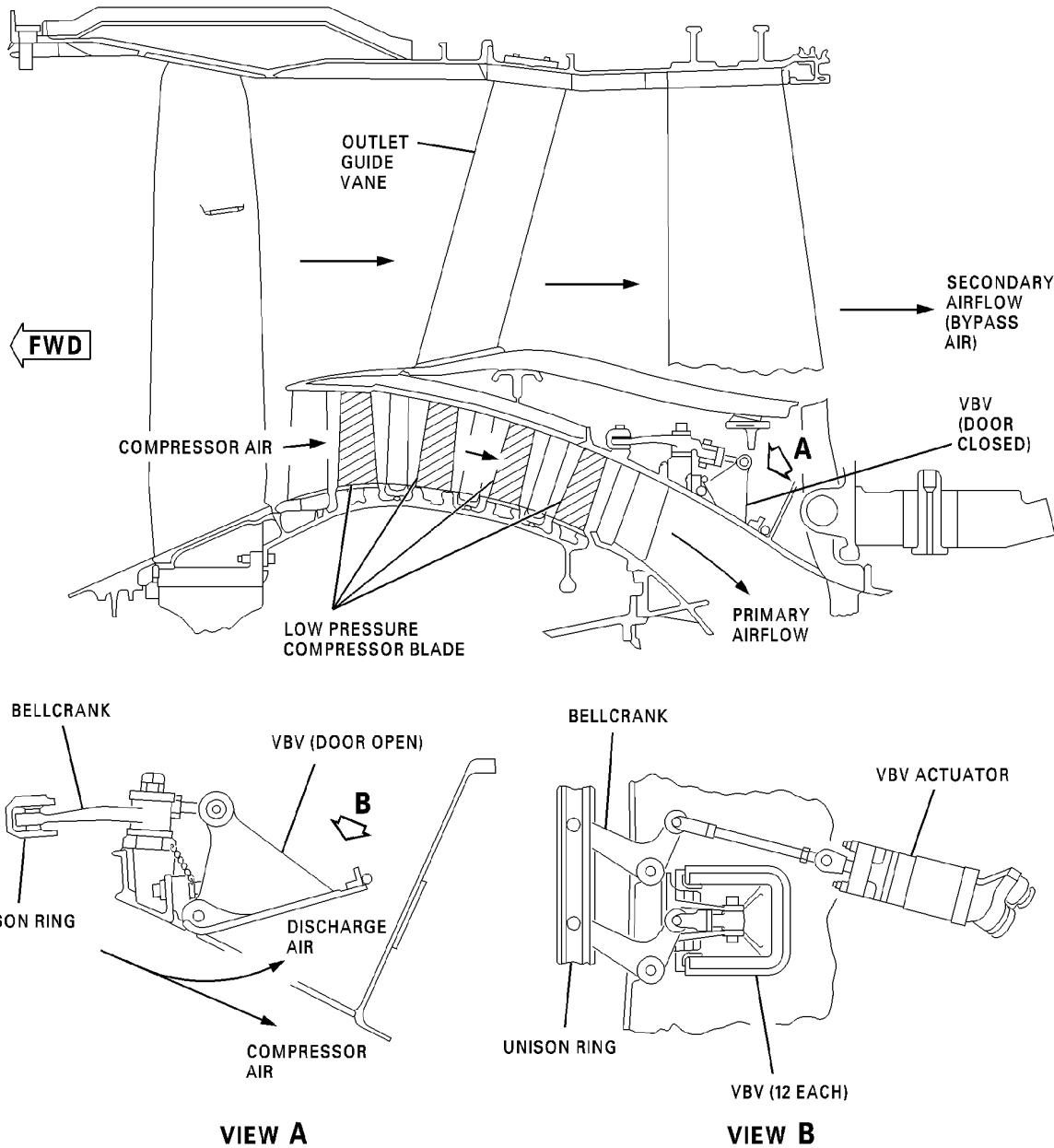
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CAG(IGDS) CF8-A6246-01-A

DB2-75-0020A

VBV System Air Flow
Figure 1/75-32-00-990-805

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

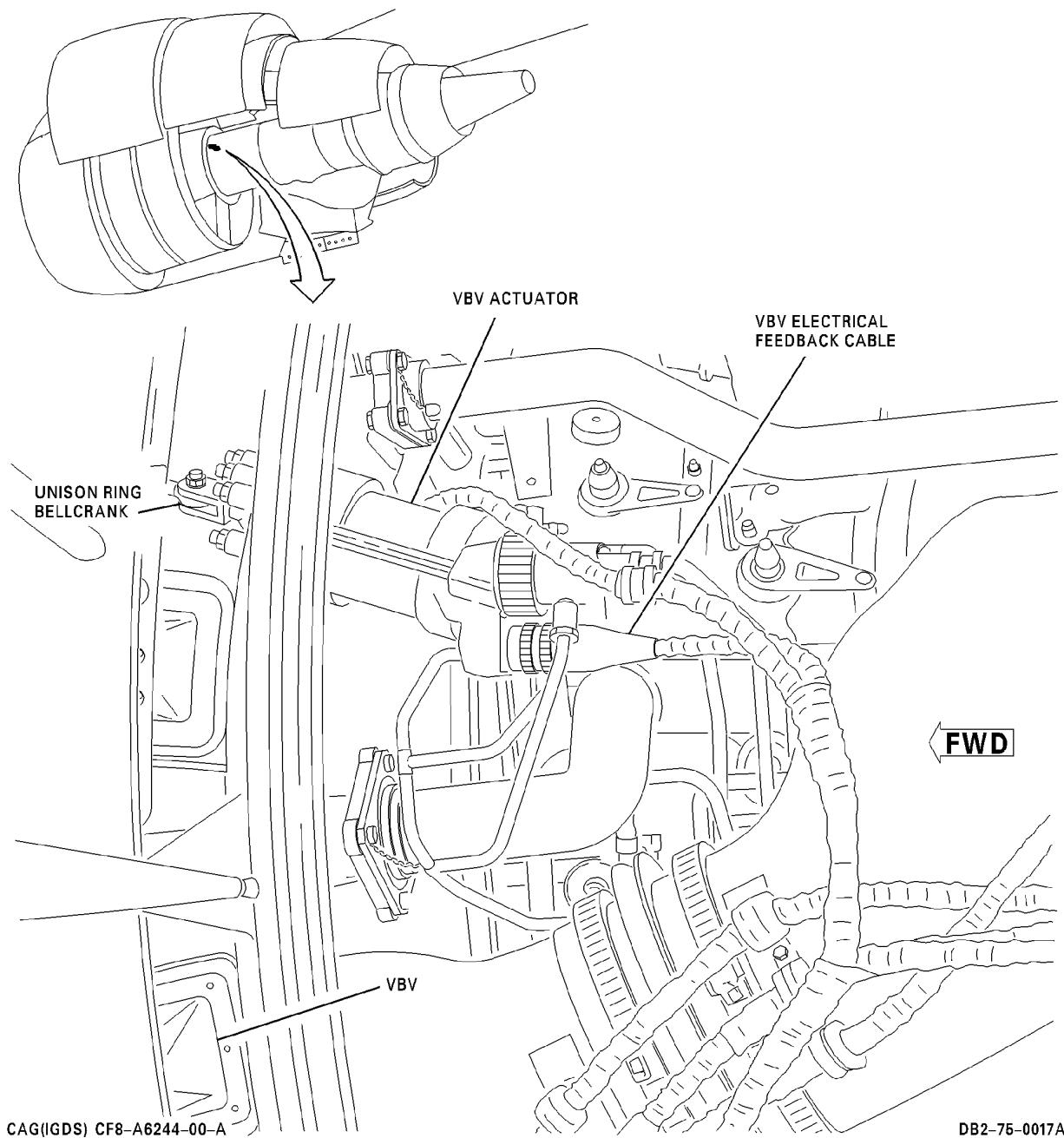
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VBV Actuator, Feedback Cable and Unison Ring Bellcrank
Figure 2/75-32-00-990-801

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

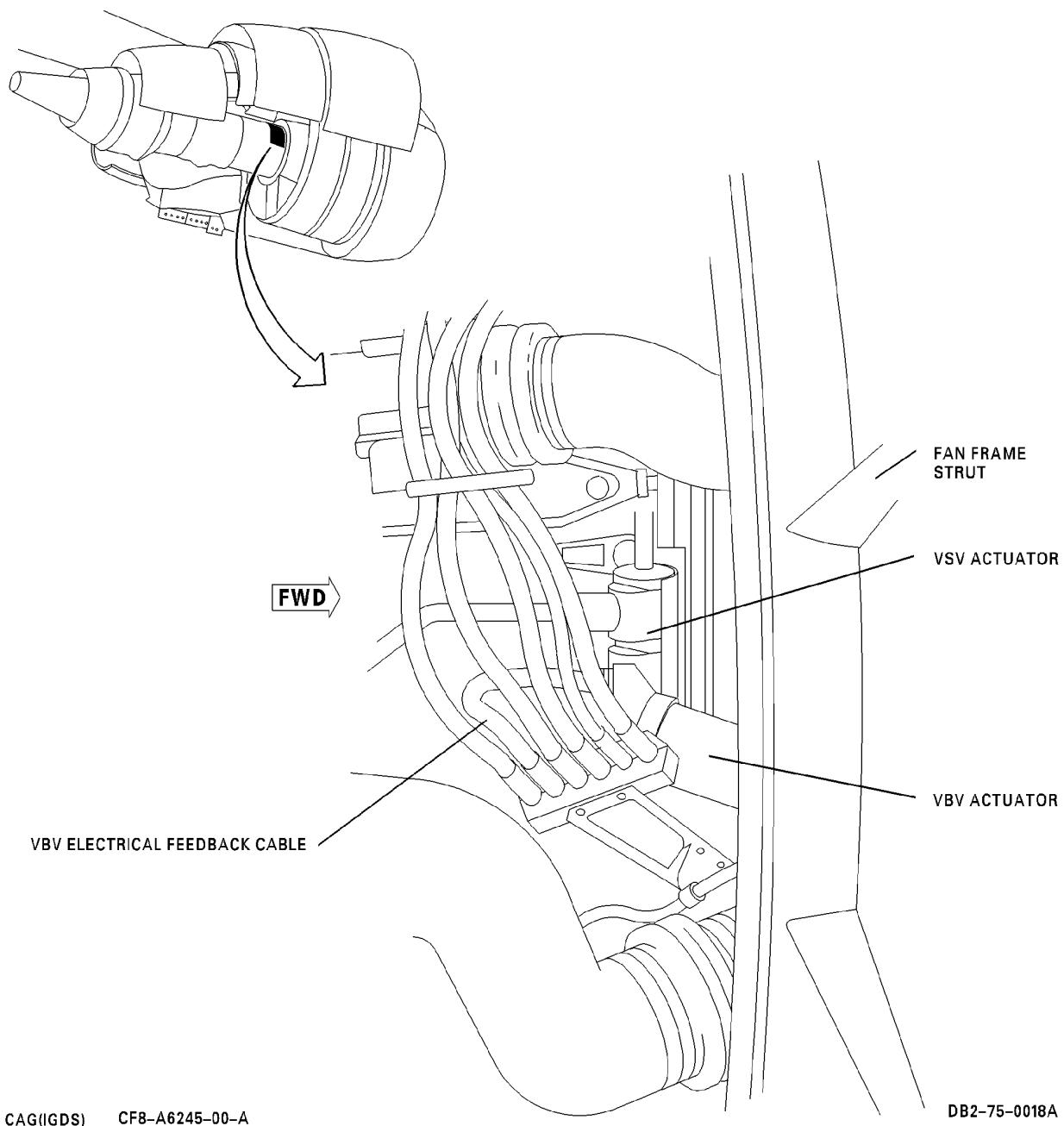
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VBV and VSV Actuators, and Feedback Cable
Figure 3/75-32-00-990-802

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-32-00

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VARIABLE BLEED CONTROL - DESCRIPTION AND OPERATION

1. General

- A. The 2.5 bleed valve and actuator controls the quantity of air that goes into the high pressure compressor (HPC). At low engine RPM, the low pressure compressor (LPC) supplies more air than is necessary for operation. The 2.5 bleed valve bleeds this unwanted 4th stage air into the fan discharge secondary airflow. The valve closes when the engine RPM is sufficient to let the full flow of fan air go into the N2 compressor. This makes the compressor more stable at start, during transient operation, and during reverse thrust operation.
- B. The components of the 2.5 bleed valve system are as follows:
 - Electronic engine control (EEC)
 - 2.5 bleed valve actuator
 - 2.5 bleed valve
 - Fuel pump/Fuel metering unit (FMU)

2. 2.5 Bleed Valve Actuator

- A. The actuator is installed at approximately the 7 o'clock position on the rear of the fan exit case. It is a hydraulically operated unit that uses FMU filtered fuel pressure to position the intercompressor bleed ring.
- B. The unit has a pilot valve, actuator piston, torque motor, and a dual rotary-variable-transducer (RVT). The actuator piston in the actuator has a fixed orifice that lets cool air into the actuator, which keeps the actuator cool. The unit has three ports: supply (Pf), return (pfr), and an overboard drain (SD) for the actuator rod seal drain.
- C. The compressor bleed ring is controlled through an EEC controlled torque motor that positions the pilot valve. The Pf and Pfr ports on the pilot valve are used to supply and release pressure on the actuator piston. This causes the actuator rod to move to the necessary position. A change in actuator rod position is sensed through an electrical signal by an RVT and is sent to the EEC.
- D. The torque motor has two electrically independent coils. Each coil is energized by a separate channel of the EEC. If a power loss occurs, the actuator will move the bleed ring to the open position.

3. System Operation

- A. The EEC modulates the 2.5 bleed-valve actuator to a schedule calculated by thrust lever angle, low rotor speed (N1), high rotor (N2) speed, mach number, engine inlet total temperature (T2) and altitude. (Figure 1)
The actuator piston motion is transmitted by mechanical linkage and a series of cams and rollers to position the 360° (6.2 rad) translating ring type 2.5 bleed valve. Figure 2 (Figure 3)
- B. During engine start the bleed valve moves to the full open position which vents the LPC discharge (4th stage) air into the fan stream. The valve is full open at idle. At approximately 70% N2 engine speed, the valve starts to close and is fully closed at 84% N2. It is commanded to its open position during rapid engine decelerations, reverse thrust, or if a possible surge may occur.
- C. The EEC interfaces with the intercompressor (2.5) bleed actuator through a pilot valve positioned by a redundant coil motor. The EEC gets input from the RVT on the position of the intercompressor (2.5) bleed actuator. The pilot valve, torque motor and RVT's are part of the intercompressor (2.5) bleed actuator assembly. The actuator is operated by hydraulic (fuel) pressure supplied by the FMU. If the loss of electrical signal occurs to the actuator, the system is designed to open the 2.5 bleed valve.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-32-00

Config 2

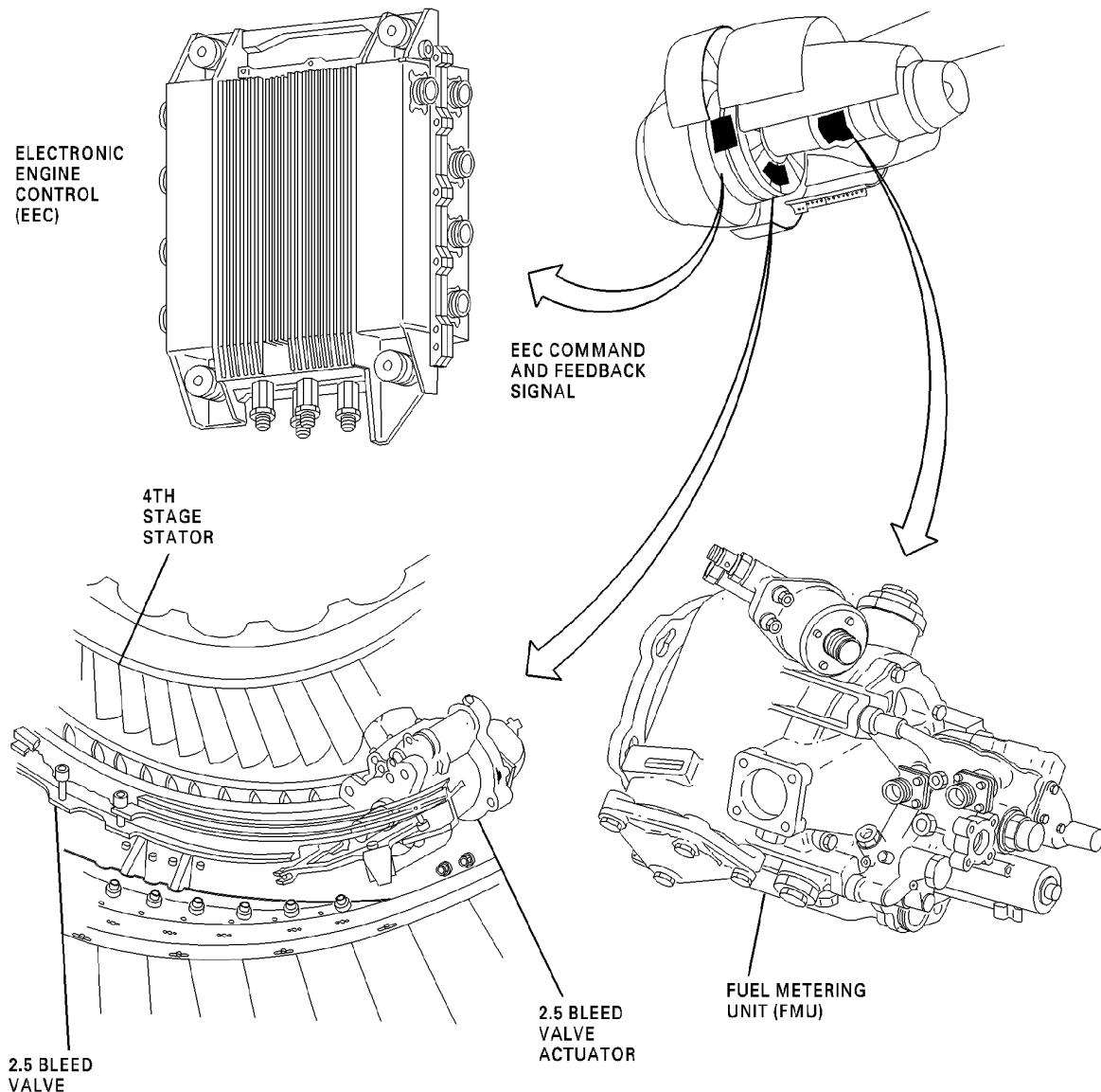
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CAG(IGDS) L-A3199

DB2-75-0171A

Intercompressor (2.5) Bleed Valve System
Figure 1/75-32-00-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-32-00

Config 2

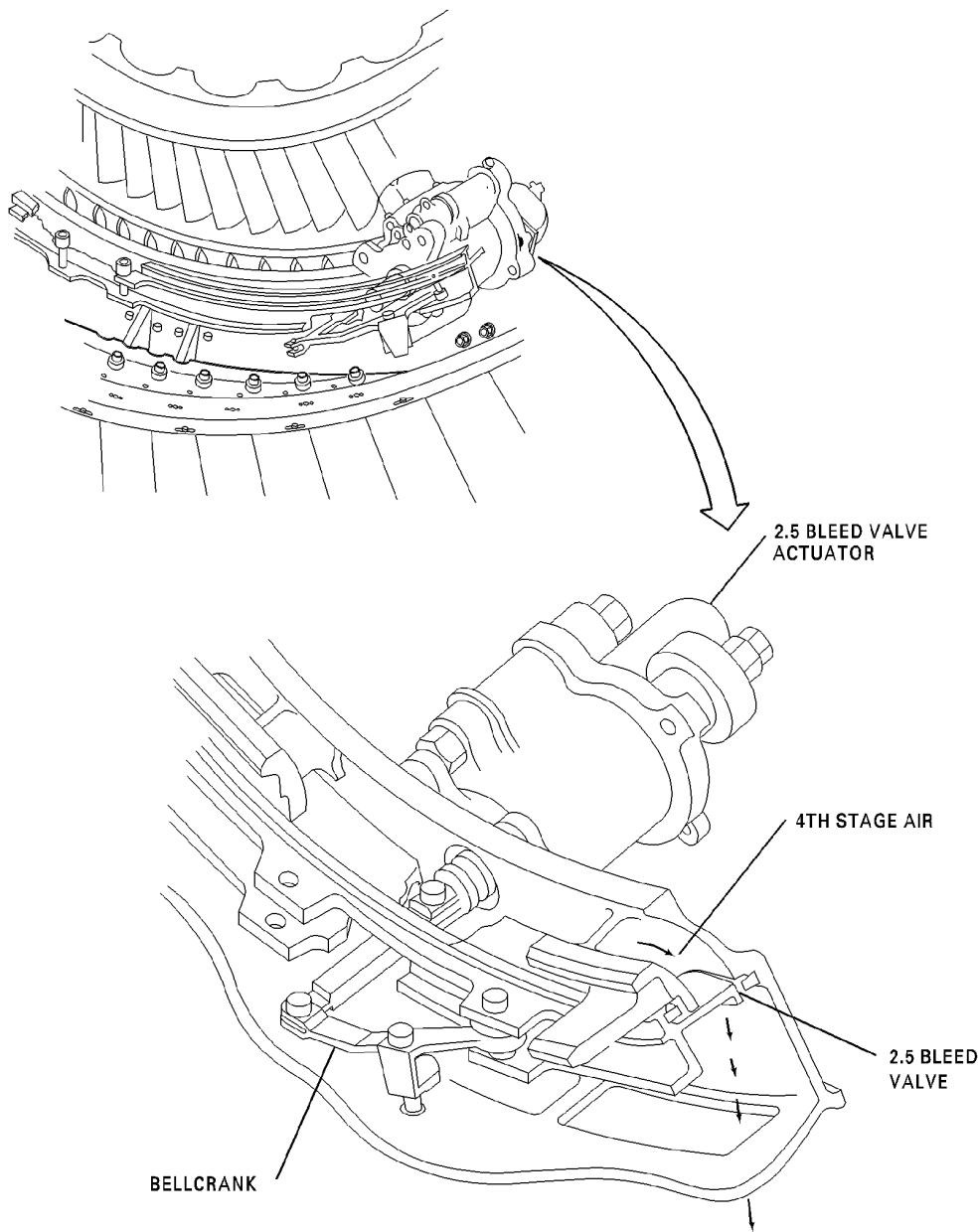
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DB2-75-0172

2.5 Bleed Valve Mechanism
Figure 2/75-32-00-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-32-00

Config 2

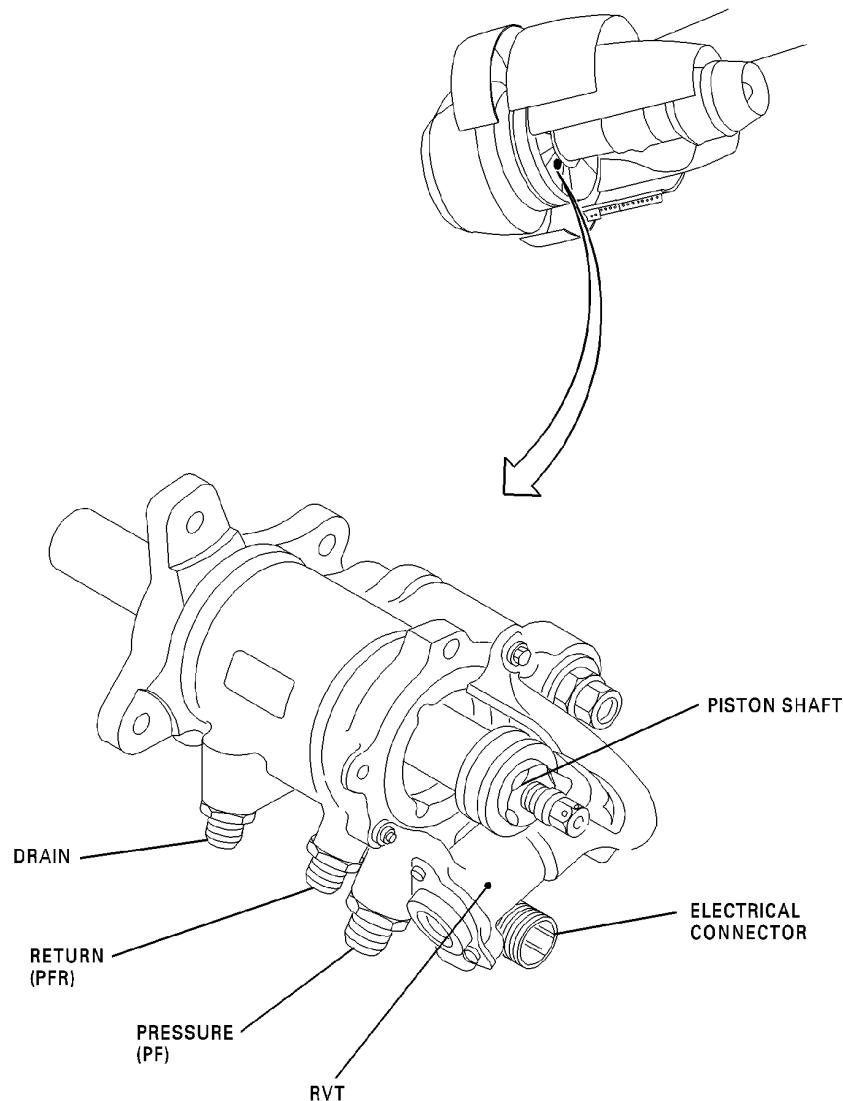
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CAG(IGDS) L-A1092

DB2-75-0173A

2.5 Bleed Valve Actuator
Figure 3/75-32-00-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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VALVE, VARIABLE BYPASS – MAINTENANCE PRACTICES

1. General

- A. These procedures have the instructions to open and close the variable bypass valves (VBV).
- B. Unless different instructions are given, this procedure is the same for the three G.E. CF6-80C2DIF engines.

TASK 75-32-01-410-801

2. CLOSING OF THE VARIABLE BYPASS VALVES

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test, and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 201

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engine, 4–8 feet (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Actuator, hydraulic, air or oil, ground support
Not specified	Plugs, high pressure (2000 psi)

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 202

REFERENCE	DESIGNATION
C02-021	Oil, grade 1010
Not specified	Source, dry air, nitrogen, or argon - 300 psig (2068 kPa)

C. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-32-01

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D. Job Set-up - Closing of the Variable Bypass Valves

SUBTASK 75-32-01-865-001



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE

CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY
TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that these circuit breakers are open and have safety tags:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	11	B1-121	FUEL CONTROL ENG 1
B	12	B1-122	FUEL CONTROL ENG 2
B	13	B1-123	FUEL CONTROL ENG 3

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

OVERHEAD, LEFT EMER AC BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
G	3	B1-469	ENGINE IGNITION A IGNITORS ENG 1
G	4	B1-473	ENGINE IGNITION A IGNITORS ENG 2
G	5	B1-477	ENGINE IGNITION A IGNITORS ENG 3

OVERHEAD, RIGHT EMER AC BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
G	27	B1-468	ENGINE IGNITION B IGNITORS ENG 1
G	28	B1-472	ENGINE IGNITION B IGNITORS ENG 2
G	29	B1-476	ENGINE IGNITION B IGNITORS ENG 3

SUBTASK 75-32-01-010-008

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

E. Procedure - Variable Bypass Valves Closing

SUBTASK 75-32-01-010-009

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

- HAZMAT 1045, JET FUEL B (JP-4 FUEL)
HAZMAT 1044, JET FUELS A AND A-1 (JP-5 FUEL)
HAZMAT 1000, REFER TO MSDS

- (1) Place the container below the Hydro-Mechanical Unit (HMU) to catch the fluid that is in the disconnected lines.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-32-01

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- (2) Disconnect the variable bypass valve (VBV) rod-end tube (1) and the head-end tube (2) from the HMU. (Figure 201)

SUBTASK 75-32-01-490-004

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.



WARNING

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1347, GAS/NITROGEN/DRY (DPM 154-2)

HAZMAT 1108, GAS/ARGON (DPM 150)

HAZMAT 1000, REFER TO MSDS

- (3) Connect the disconnected VBV rod-end tube (1) to the ground support hose assembly (5) with the adapter (3). (Figure 201)
- (4) Connect the disconnected VBV head-end tube (2) to the ground support hose assembly (6) with the adapter (4). (Figure 201)
- (5) Install high pressure caps on the HMU fittings (7) and (8). Torque the caps to prevent fuel leakage during the procedure. (Figure 201)

SUBTASK 75-32-01-410-008



CAUTION

DO NOT USE MORE THAN 300 PSIG (2068 KPA) OF PRESSURE. TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE MECHANISM.

- (6) Increase the pressure on the ground support actuator to 200-300 psig (1379-2068 kPa gage).
- (7) Apply pressure to the rod-end tube (1).
NOTE: Pressure applied during testing/rigging procedure will not hold because of a bleed hole in the VSV actuator piston.
- (8) Make sure the pressure has moved the VBV in the full closed position.

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

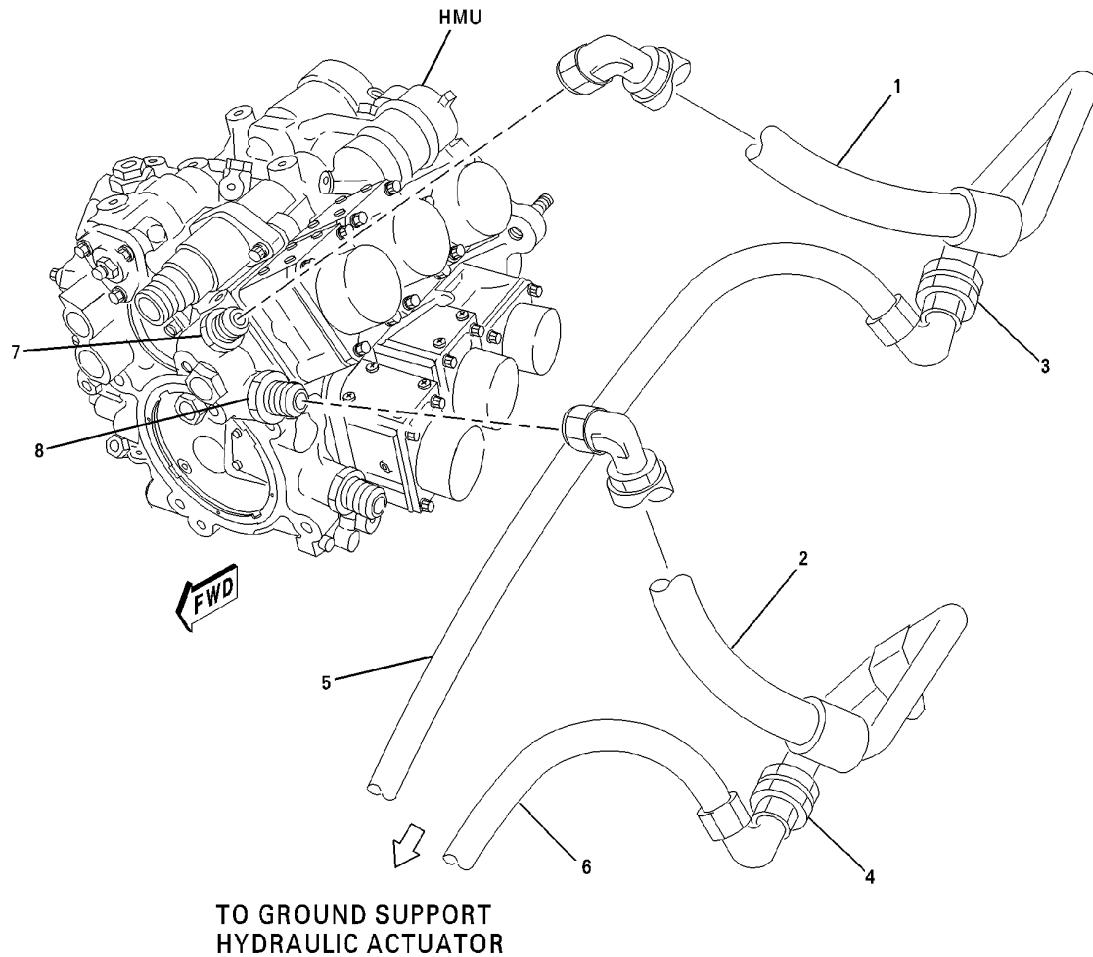
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LEGEND:

1. VBV ROD-END TUBING
2. VBV HEAD-END TUBING
3. ADAPTER
4. ADAPTER
5. GROUND SUPPORT ACTUATOR HOSE
6. GROUND SUPPORT ACTUATOR HOSE
7. ROD-END FITTING
8. HEAD-END FITTING

DB2-75-0257

Variable Bypass Valve (VBV) Ground Operation Connections
Figure 201/75-32-01-990-803

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-32-01-010-801

3. OPENING OF THE VARIABLE BYPASS VALVES

A. References

Reference	Title
71-00-00-700-803	MINIMUM AND APPROACH IDLE POWER (ADJ/TEST 02) (P/B 501)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

B. Job Set-up - Variable Bypass Valves Opening

SUBTASK 75-32-01-865-002



WARNING TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that these circuit breakers are open and have safety tags:

OVERHEAD, BATTERY BUS

Row	Col	Number	Name
B	8	B1-1271	ENG START OVERRIDE
B	11	B1-121	FUEL CONTROL ENG 1
B	12	B1-122	FUEL CONTROL ENG 2
B	13	B1-123	FUEL CONTROL ENG 3

OVERHEAD, BATTERY DIRECT BUS

Row	Col	Number	Name
B	9	B1-467	ENG IGNITION OVERRIDE

OVERHEAD, LEFT EMER AC BUS

Row	Col	Number	Name
G	3	B1-469	ENGINE IGNITION A IGNITORS ENG 1
G	4	B1-473	ENGINE IGNITION A IGNITORS ENG 2
G	5	B1-477	ENGINE IGNITION A IGNITORS ENG 3

OVERHEAD, RIGHT EMER AC BUS

Row	Col	Number	Name
G	27	B1-468	ENGINE IGNITION B IGNITORS ENG 1
G	28	B1-472	ENGINE IGNITION B IGNITORS ENG 2
G	29	B1-476	ENGINE IGNITION B IGNITORS ENG 3

SUBTASK 75-32-01-010-010

- (2) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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C. Procedure - Variable Bypass Valves Opening

SUBTASK 75-32-01-010-011

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1045, JET FUEL B (JP-4 FUEL)

HAZMAT 1000, REFER TO MSDS

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1044, JET FUELS A AND A-1 (JP-5 FUEL)

HAZMAT 1000, REFER TO MSDS

- (1) Place the container below the HMU to catch the fluid that is in the disconnected lines.
- (2) Disconnect the variable bleed valve (VBV) rod-end tube (1) and the VBV head-end tube (2) from the hydromechanical unit (HMU). (Figure 201)

SUBTASK 75-32-01-490-005

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1347, GAS/NITROGEN/DRY (DPM 154-2)

HAZMAT 1000, REFER TO MSDS

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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(WARNING PRECEDES)



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1108, GAS/ARGON (DPM 150)

HAZMAT 1000, REFER TO MSDS

- (3) Connect the disconnected VBV rod-end tube (1) to the ground support actuator hose (5) with adapter (3). (Figure 201)
- (4) Connect the disconnected VBV head-end tube (2) to the ground support actuator hose (6) with adapter (4). (Figure 201)
- (5) Install high pressure caps on the HMU fittings (7 and 8). Torque the caps to prevent fuel leakage during the operation. (Figure 201)

SUBTASK 75-32-01-010-012



CAUTION

DO NOT USE MORE THAN 300 PSIG (2068 KPA) OF PRESSURE. TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE MECHANISM.

- (6) Increase the pressure of the ground support actuator to 200-300 psig (1379–2068 kPa gage).
 - (7) Supply pressure to the head-end tube (2).
- NOTE: Pressure applied during testing/rigging procedure will not hold because of a bleed hole in the VSV actuator piston.
- (8) Make sure the pressure has moved the the VBV in the full open position.

SUBTASK 75-32-01-090-002



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1347, GAS/NITROGEN/DRY (DPM 154-2)

HAZMAT 1000, REFER TO MSDS

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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(WARNING PRECEDES)



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1108, GAS/ARGON (DPM 150)

HAZMAT 1000, REFER TO MSDS

- (9) Place the container below the HMU to catch the fluid that is in the disconnected line.
- (10) Disconnect the ground support actuator supply/return hoses (5 and 6) from the VBV rod-end tube (1) and head-end tube (2).

SUBTASK 75-32-01-410-009

- (11) Remove the caps from the HMU fittings (7) and (8). Connect the VBV rod-end tube (1) and head-end tube (2) to the fittings. Torque the B-nuts of tubes (1 and 2).

SUBTASK 75-32-01-865-003

- (12) Remove the safety tags and close these circuit breakers:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	11	B1-121	FUEL CONTROL ENG 1
B	12	B1-122	FUEL CONTROL ENG 2
B	13	B1-123	FUEL CONTROL ENG 3

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

OVERHEAD, LEFT EMER AC BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
G	3	B1-469	ENGINE IGNITION A IGNITORS ENG 1
G	4	B1-473	ENGINE IGNITION A IGNITORS ENG 2
G	5	B1-477	ENGINE IGNITION A IGNITORS ENG 3

OVERHEAD, RIGHT EMER AC BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
G	27	B1-468	ENGINE IGNITION B IGNITORS ENG 1
G	28	B1-472	ENGINE IGNITION B IGNITORS ENG 2
G	29	B1-476	ENGINE IGNITION B IGNITORS ENG 3

- (13) Do the engine minimum idle procedure and check for leaks. (MINIMUM AND APPROACH IDLE POWER (ADJ/TEST 02), TASK 71-00-00-700-803)

D. Job Close-up - Variable Bypass Valves Opening

SUBTASK 75-32-01-942-002

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SUBTASK 75-32-01-410-011

- (2) Close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS,
TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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ACTUATOR, VARIABLE BYPASS VALVE - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the variable bypass valve actuator and the variable bypass valve.
- B. Two VBV actuators are installed on the fan frame between the fourth and fifth fan frame struts and between the tenth and eleventh fan frame struts.
- C. Twelve variable bypass valves are installed around the hub of the fan frame and case assembly. Access to the VBV actuators and the variable bypass valves are through the thrust reverser doors.
- D. Unless different instructions are given, these procedures are the same for the three GE CF6-80C21F engines.

TASK 75-32-01-000-801

2. REMOVAL OF THE VARIABLE BYPASS VALVE ACTUATOR

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs
Not specified	Container, 2 U.S. gal. (7.58 l)

B. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Variable Bypass Valve Actuator Removal

SUBTASK 75-32-01-040-003



DO NOT MOVE THE FIRE CONTROL HANDLE TO THE AGENT 1 OR AGENT 2 POSITIONS. THIS WILL CAUSE THE FIREX AGENT CONTAINERS TO OPERATE, AND CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Pull the applicable (No. 1, 2 or 3 engine) fire-control handle down and forward to the FUEL & HYD OFF position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-32-01-010-003

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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D. Procedure - Variable Bypass Valve Actuator Removal

SUBTASK 75-32-01-030-001



CAUTION

IF THE VBV ACTUATOR IS TO BE RETURNED TO STORAGE FOR FUTURE SPARE PARTS USE, SEND THE VBV ACTUATOR TO THE SHOP FOR PRESERVATION. REFER TO THE COMPONENT MAINTENANCE MANUAL INSTRUCTIONS. IF YOU DO NOT, INTERNAL CORROSION AND DAMAGE TO THE VBV ACTUATOR CAN OCCUR, WHICH CAN CAUSE DECREASED PERFORMANCE, INCREASED FLUID LEAKAGE AND FAILURE OF THE PART.

- (1) Remove the variable bypass valve (VBV) actuator (1) as follows: (Figure 401)
 - (a) Disconnect the electrical connector (2) from the variable bypass valve (VBV) actuator (1).
 - (b) Install protective caps on the VBV actuator (1) electrical connector (2) and the receptacle.



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1044, JET FUELS A AND A-1 (JP-5 FUEL)

HAZMAT 1000, REFER TO MSDS



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1045, JET FUEL B (JP-4 FUEL)

HAZMAT 1000, REFER TO MSDS

- (c) Put the container below the fuel tubes (3) to catch the fuel.
- (d) Disconnect the fuel drain tube (4) from the fuel drain cans (5).
- (e) Disconnect the drain cans (5), and move the drain cans away from the VBV actuator (1).
- (f) Disconnect the fuel tubes (3) from the reducer fittings (6). Use a container to collect the remaining fuel.
- (g) Remove the nut (7), and bolt (8) from the rod end clevis (9).
- (h) Remove the four nuts (11), and washers (12), then remove the VBV actuator (1).
- (i) Remove the reducer fittings (6) from the VBV actuator (1). Remove and discard the packings (13).
- (j) Remove and discard the two packings (14) from the drain cans (5).
- (k) Install protective caps on the open fuel tubes (3) and the open drain tubes (4).

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SUBTASK 75-32-01-410-015

- (2) If the variable bypass valve actuator is not installed, or weather makes it necessary, close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

— EFFECTIVITY —
FX 572-576, 582-599, 601-610, 612-619, 625

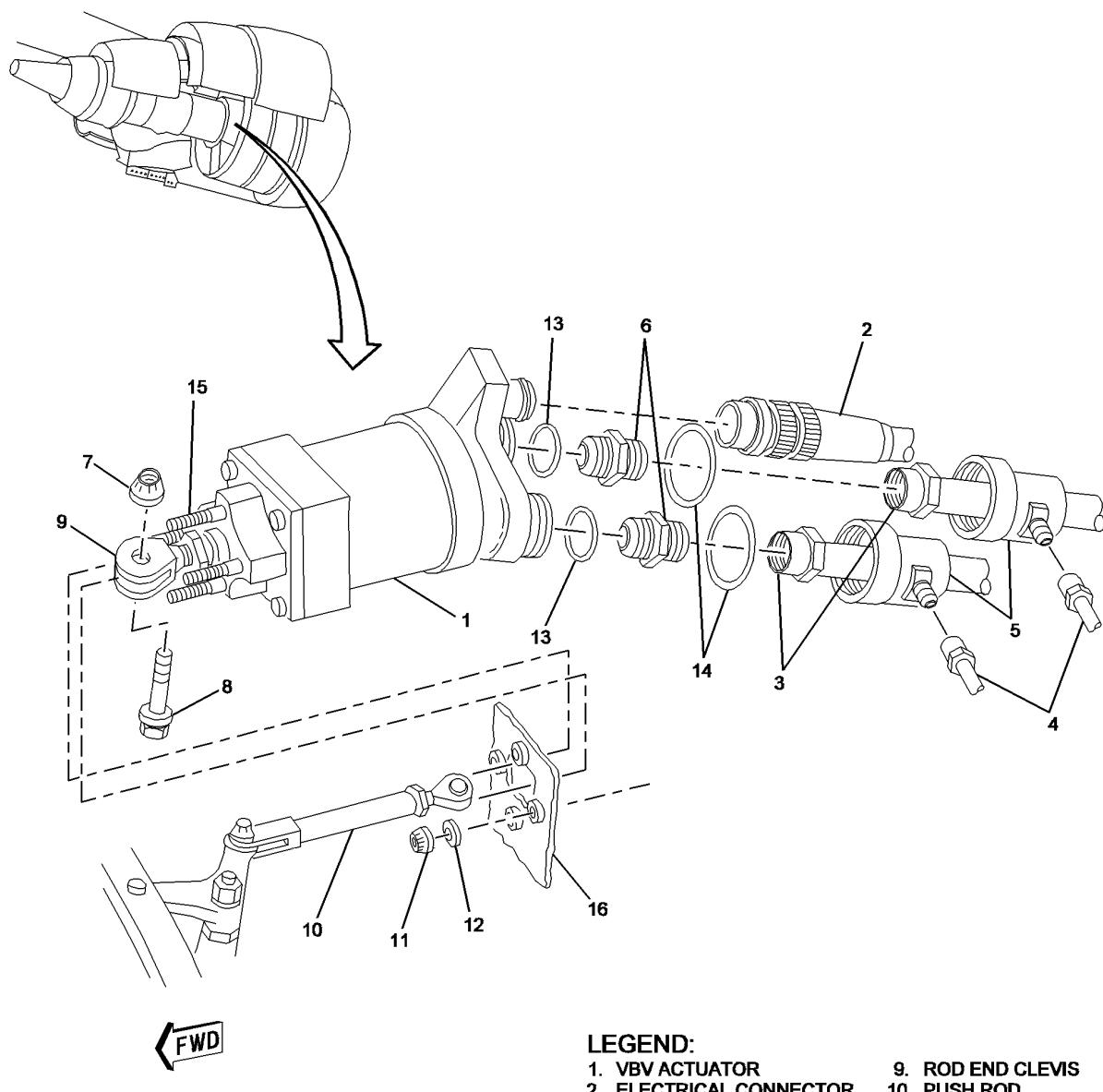
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LEGEND:

- | | |
|-------------------------|-----------------------|
| 1. VBV ACTUATOR | 9. ROD END CLEVIS |
| 2. ELECTRICAL CONNECTOR | 10. PUSH ROD |
| 3. FUEL TUBE | 11. NUT |
| 4. DRAIN TUBE | 12. WASHER |
| 5. DRAIN CAN | 13. PREFORMED PACKING |
| 6. REDUCER FITTING | 14. PREFORMED PACKING |
| 7. NUT | 15. VBV ACTUATOR STUD |
| 8. BOLT | 16. FAN FRAME |

DB2-75-0011B
S0006281535V2

Variable Bypass Valve Actuator - Removal/Installation
Figure 401/75-32-01-990-801

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-32-01-400-801

3. INSTALLATION OF THE VARIABLE BYPASS VALVE ACTUATOR

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-600 in-lb (0-67.8 N·m)
Not specified	Gage, pressure, 0-200 PSI (0-1379 kPa)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
C02-006	Lubricant, Everlube ESNA 382
C02-020	Oil, High Temp Lubricating
C02-021	Oil, Lubricating
C10-071	Lockwire, 0.032 Corrosion Resistant Steel
C05-005	Leak-Tek

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
14	Packing (J221P904)	IPC 73-31-15-01-055
13	Packing	IPC 73-31-15-01-035

D. References

Reference	Title
71-00-00-700-809	ADJUSTMENT AND TEST PROCEDURES (P/B 501)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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(Continued)

Reference	Title
IPC 73-31-15-01-035	Illustrated Parts Catalog
IPC 73-31-15-01-055	Illustrated Parts Catalog

E. Job Set-up - Variable Bypass Valve Actuator Installation

SUBTASK 75-32-01-040-005



WARNING

DO NOT MOVE THE FIRE CONTROL HANDLE TO THE AGENT 1 OR AGENT 2 POSITIONS. THIS WILL CAUSE THE FIREX AGENT CONTAINERS TO OPERATE, AND CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Pull the applicable (No. 1, 2 or 3 engine) fire-control handle down and forward to the FUEL & HYD OFF position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-32-01-010-015

- (2) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

F. Procedure - Variable Bypass Valve Actuator Installation

SUBTASK 75-32-01-430-001



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1135, LUBRICANT/MOLYBDENUM DISULFIDE SILICONE (DPM 5782)

HAZMAT 1213, LUBRICANT/ESNALUBE 382

HAZMAT 1233, LUBRICANT/OIL/JET ENGINE (DPM 339)

HAZMAT 1000, REFER TO MSDS

- (1) Install the variable bypass valve (VBV) actuator (1) as follows: (Figure 401)
 - (a) Apply a thin layer of lubricating oil (C02-021) to the two packings (13). Install the packings on the reducer fittings (6).
 - (b) Install the reducer fittings (6) on the VBV actuator (1). Torque the reducer fittings to 135-150 in-lb (15.3-16.9 N·m).
 - (c) Apply a thin layer of lubricant (C02-006) or (CO2-020) to the VBV actuator studs (15).
 - (d) Install the VBV actuator (1) on the fan frame (16). Install the four washers (12), and nuts (11). Torque the nuts to 55-70 in-lb (6.2-7.9 N·m).
 - (e) Align the bolt holes of the rod end clevis (9) and the push rod (10) radially outward to the fan strut and connect the push rod to the rod end clevis with the bolt (8) and nut (7).
 - (f) Make sure that the head of the bolt (8) points inboard to the engine fan hub.
 - (g) Torque the nut (7) to 100-130 in-lbs (11.3-14.7 N·m).
 - (h) Remove the protective caps from the two fuel tubes (3), and the drain tubes (4).

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- (i) Apply a thin layer of lubricating oil (C02-021) to the two packings (14). Put the packings in the two knurled nuts on the drain cans (5).
- (j) Hold the two reducer fittings (6) with an open end wrench. Do not permit the reducer fittings to turn, when the fuel tubes nuts (3) are torqued.
- (k) Connect the two fuel tubes (3) to the reducer fittings (6). Torque the fuel tube nuts to 270-300 in-lb (30.5-33.9 N·m).

SUBTASK 75-32-01-430-008

- (2) Pressure leak test the fuel tubes (3) as follows: (Figure 401)
 - (a) Pressurize the fuel tubes (3) with dry air, nitrogen, or argon to 200 PSI (1378 kPa). Apply the pressure to the fuel tubes at the hydromechanical unit (HMU).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1182, BUBBLE FLUID/LEAK TEST (DPM 6045)

HAZMAT 1000, REFER TO MSDS

- (b) Apply fluid (C05-005) or soap solution to the two fuel tube (3) nuts, and the reducer fittings (6).
- (c) Examine the two fuel tube (3) nuts and the reducer fittings (6) at the VBV actuator (1) for leaks. Leakage is not permitted.
- (d) If leakage occurs at the base of the reducer fitting (6), replace the packing (13) and do the leak test again.
- (e) If leakage occurs at the fuel tube (3) nut and the reducer fitting (6), examine the fuel tube, and the reducer fitting for damage. Replace the fitting or the fuel tube, and do the leak test again.
- (f) Connect the fuel tubes (3) at the HMU. Torque the fuel tube nut connected to the rod end of the actuator to 270-300 in-lb (30.5-33.9 N·m).
- (g) Torque the fuel tube (3) connected to the head of the actuator (1) to 450–500 in-lb (50.8-56.4 N·m).

SUBTASK 75-32-01-430-010

- (3) Connect the drain cans (5) and tubes (4) as follows: (Figure 401)
 - (a) Connect the two drain cans (5) to the VBV actuator (1). Torque the drain cans hand tight. Safety the drain cans with lockwire.
 - (b) Connect the two drain tubes (4) to the drain can (5). Torque the drain tube nuts to 135-150 in-lb (15.3-16.9 N·m).

SUBTASK 75-32-01-430-012

- (4) Do a pressure test of the drain cans (5) for leakage as follows: (Figure 401)
 - (a) Pressurize the drain tubes (5) with dry air, nitrogen, or argon to 50–55 PSI (344-379 kPa). Apply the pressure at the drain manifold.
 - (b) At the correct pressure, stop the supply pressure to permit the drain can (5) pressure to decrease.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- (c) Monitor the supply pressure gage for two minutes. Pressure is permitted to decrease 10 PSI (69 kPa) maximum.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1182, BUBBLE FLUID/LEAK TEST (DPM 6045)

HAZMAT 1000, REFER TO MSDS

- (d) If the pressure decrease is more than 10 PSI (69 kPa), test all areas of the two drain cans (5) for leakage with Leak Tek (C05-005). Torque the drain can nuts by hand to stop leaks. Make sure the fuel tube (4) nuts has the correct torque. Replace packings (14) as necessary to stop the leakage.
- (e) Do the leak test again if the packings (14) are replaced.
- (f) Connect the drain tube (4) to the drain manifold. Torque the drain tube nut to 270-300 in-lb (30.5-33.9 N·m).
- (g) Remove the protective caps from the electrical connector (2) at the VBV actuator (1), and the electrical connector.
- (h) Connect the electrical connector (2) to the VBV actuator (1). Tighten the electrical connector by hand and listen for the sound of a click. Make sure the lock indicator shows in the connector window.

G. Job Close-up - Variable Bypass Valve Actuator Installation

SUBTASK 75-32-01-942-001

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-32-01-840-002

- (2) Put the fire control handle in the NORM position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-32-01-410-001

- (3) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

- (4) Do the applicable test(s) as shown in the adjustment and test procedures. (ADJUSTMENT AND TEST PROCEDURES, TASK 71-00-00-700-809)

— END OF TASK —

TASK 75-32-01-000-802

4. REMOVAL OF THE VARIABLE BYPASS VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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Table 405

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine

B. References

Reference	Title
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
72-33-01-020-801	REMOVAL OF THE FAN STATOR AFT INNER FLOWPATH LINER SEGMENTS (P/B 401)

C. Job Set-up - Variable Bypass Valve Removal

SUBTASK 75-32-01-040-004



WARNING DO NOT MOVE THE FIRE CONTROL HANDLE TO THE AGENT 1 OR AGENT 2 POSITIONS. THIS WILL CAUSE THE FIREX AGENT CONTAINERS TO OPERATE, AND CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Pull the applicable (No. 1, 2 or 3 engine) fire-control handle down and forward to the FUEL & HYD OFF position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-32-01-010-013

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

SUBTASK 75-32-01-010-014

- (3) Remove the necessary liner segments to get access to the variable bypass valve. (REMOVAL OF THE FAN STATOR AFT INNER FLOWPATH LINER SEGMENTS, TASK 72-33-01-020-801)

D. Procedure - Variable Bypass Valve Removal

SUBTASK 75-32-01-020-001

- (1) Remove the variable bypass valve (1) as follows: (Figure 402)
 - (a) Remove the nut (2), two washers (3), and bolt (4) from the rod-end bearing (5) and the by-pass valve (1).
 - (b) Remove the two nuts (6), washers (7), and bolts (8) from the bypass valve hinge (9) and the fan frame.
 - (c) Remove the nut (10), washer (11), shouldered bushings (12), sleeve bushing (13), and screw (14) from the bypass valve (1).

SUBTASK 75-32-01-410-016

- (2) If the variable bypass valve is not installed immediately, or weather conditions make it necessary, close the thrust reverser door. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

— END OF TASK —

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

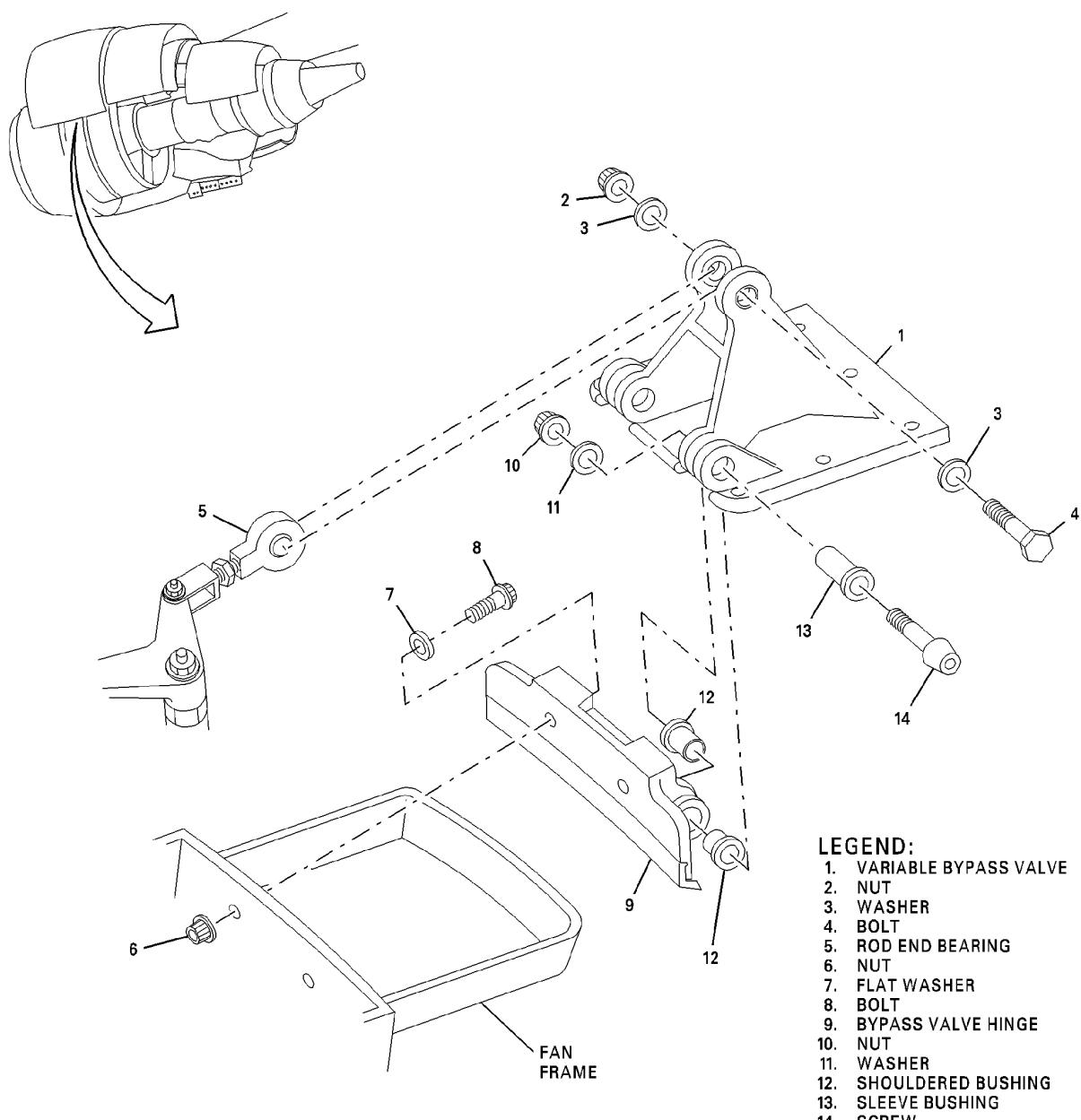
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LEGEND:

1. VARIABLE BYPASS VALVE
2. NUT
3. WASHER
4. BOLT
5. ROD END BEARING
6. NUT
7. FLAT WASHER
8. BOLT
9. BYPASS VALVE HINGE
10. NUT
11. WASHER
12. SHOULDERED BUSHING
13. SLEEVE BUSHING
14. SCREW

CAG(IGDS) CF8-A4946-00-B

DB2-75-0301

Variable Bypass Valve - Removal/Installation
Figure 402/75-32-01-990-805

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-32-01-400-802

5. INSTALLATION OF THE VARIABLE BYPASS VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 406

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.44 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-100 in-lb (0-11.3 N·m)

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 407

REFERENCE	DESIGNATION
C02-006	Lubricant, everlube ESNA 382
C02-020	Oil, lubricating high temp silicone base
C10-013	Compound, release agent fluorocarbon

C. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
72-33-01-420-801	INSTALLATION OF THE FAN STATOR AFT INNER FLOWPATH LINER SEGMENTS (P/B 401)
75-32-01-700-801	FUNCTIONAL TEST OF THE VARIABLE BYPASS VALVE SYSTEM (P/B 501)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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D. Job Set-up - Variable Bypass Valve Installation

SUBTASK 75-32-01-040-006



DO NOT MOVE THE FIRE CONTROL HANDLE TO THE AGENT 1 OR AGENT 2 POSITIONS. THIS WILL CAUSE THE FIREX AGENT CONTAINERS TO OPERATE, AND CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Pull the applicable (No. 1, 2 or 3 engine) fire-control handle down and forward to the FUEL & HYD OFF position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-32-01-010-016

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

E. Procedure - Variable Bypass Valve Installation

SUBTASK 75-32-01-410-012

- (1) Install the variable bypass valve (1) as follows: (Figure 401)

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.



HAZARDOUS MATERIAL WARNINGS

HAZMAT 1023, GREASE/THREAD COMPOUND LUBRICATING (DPM 376)

HAZMAT 1213, LUBRICANT/ESNALUBE 382

HAZMAT 1000, REFER TO MSDS

- (a) Lubricate the threads on screw (14) with lubricant (C02-006 or C02-020). (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)
- (b) Install the two sleeves (13) on the screws (14) with the flange of the sleeve against the head of the screw.
- (c) Attach the valve (1) to the bypass valve hinge (9). Use the two screws (14), sleeve bushings (13), shouldered bushings (12), washers (11) and nuts (10). Make sure that the head of the screws (14) point out.
- (d) Torque the two nuts (10) to 33-37 in-lbs (3.7-4.2 N·m).
- (e) Lubricate the threads of the two bolts (8) with lubricant C02-006.
- (f) Put the valve (1) on the fan frame. Install the two bolts (8), washers (7), and nuts (6). Make sure that the head of the bolts point aft.
- (g) Torque the two nuts (6) to 55-70 in-lb (6.2-7.8 N·m).

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1184, MOLD RELEASE/FLUOROCARBON (DPM 3494)

HAZMAT 1000, REFER TO MSDS

- (h) Apply the agent (C10-013) with a spray gun. Apply spray to the seal around the valve (1), the hinge (9) and the mating surface of the fan frame.
- (i) Connect the rod-end bearing (5) to the bypass valve (1) with bolt (4), two washers (3) and nut (2).
- (j) Torque the nut to 55-70 in-lb (6.2-7.8 N·m).

F. Close-up - Variable Bypass Valve Installation

SUBTASK 75-32-01-410-013

- (1) Install the aft inner flowpath liner segments. (INSTALLATION OF THE FAN STATOR AFT INNER FLOWPATH LINER SEGMENTS, TASK 72-33-01-420-801)

SUBTASK 75-32-01-730-001

- (2) If necessary, do a test of the variable bypass valve system. (FUNCTIONAL TEST OF THE VARIABLE BYPASS VALVE SYSTEM, TASK 75-32-01-700-801)

SUBTASK 75-32-01-942-003

- (3) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-32-01-840-003

- (4) Put the fire control handle in the NORM position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-32-01-410-014

- (5) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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ACTUATOR, 2.5 BLEED VALVE - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the 2.5 bleed valve actuator. Access to the 2.5 bleed valve actuator is through the left thrust reverser door.
- B. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460 engines.

TASK 75-32-01-000-868

2. REMOVAL OF THE 2.5 BLEED VALVE ACTUATOR

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Container, 1 U.S. gal (3.8 l)
MS90376	Dust caps, electrical connector
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
72-33-02-000-869	REMOVAL OF THE FAN EXIT LINER INNER REAR SEGMENTS (P/B 401)

C. Job Set-up - 2.5 Bleed Valve Actuator Removal

SUBTASK 75-32-01-040-001



WARNING DO NOT MOVE THE FIRE CONTROL HANDLE TO THE AGENT 1 OR AGENT 2 POSITIONS. THIS WILL CAUSE THE FIREX AGENT CONTAINERS TO OPERATE, AND CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the applicable (No. 1, 2 or 3 engine) fire-control handle is down and forward to the FUEL & HYD OFF position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-32-01-010-268

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-32-01-010-269

- (3) Remove the fan exit liner inner rear segment. (REMOVAL OF THE FAN EXIT LINER INNER REAR SEGMENTS, TASK 72-33-02-000-869)

D. Procedure - 2.5 Bleed Valve Actuator Removal

SUBTASK 75-32-01-030-267

- (1) Remove the 2.5 bleed valve actuator (1) as follows: (Figure 401)
 - (a) Disconnect the W3P15 harness connector (2) from the 2.5 bleed valve actuator (1). Install the dust caps.
 - (b) Remove the nut (3) and bolt (4) that attaches the W3P15 harness loop clamp (5) to the bracket (6).
 - (c) Put a container below the 2.5 bleed valve actuator (1).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1044, JET FUELS A AND A-1 (JP-5 FUEL)

HAZMAT 1000, REFER TO MSDS

- (d) Disconnect the tube coupling nuts (7 and 8) from the pressure and return tube adapters (9 and 10). Catch the fuel in the container. Install the protective caps and plugs. (Figure 402)

NOTE: The actuator can contain as much as 0.50 pints (0.25 l) of fuel.

- (e) Disconnect the overboard drain tube coupling nut (11) from the drain adapter (12) on the 2.5 bleed valve actuator (1). Remove the drain adapter and packing (13). Discard the packing and install protective plug.

NOTE: The step that follows is for the aircraft after S/B PW4ENG 75-84.

- (f) Remove the three bolts (14) and nuts (15) that attach the support bracket (16) to the flange E bracket.

NOTE: The step that follows is for the aircraft after S/B PW4ENG 75-84.

- (g) Remove the two bolts (17) that attach the support bracket (16) to the 2.5 bleed valve actuator (1). Remove the support bracket from the actuator.

- (h) Remove the sealant from each end of the cotter pin (18) and the head of the shoulder bolt (19).



CAUTION

DO NOT LET THE ACTUATOR PISTON SHAFT HEX TURN WHEN YOU TURN THE SHOULDER BOLT. THE SHOULDER BOLT HAS A LEFT-HANDED THREAD. THIS WILL HELP PREVENT DAMAGE TO THE SHOULDER BOLT.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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(CAUTION PRECEDES)



CAUTION

MAKE SURE THE CRIMPED LOCKING CUP AND RETAINING NUT DO NOT LOOSEN WHEN THE SHOULDER BOLT IS REMOVED OR THE PISTON SHAFT HEX IS TURNED. IF THE RETAINING NUT MOVES OR LOOSENS, THE INTERNAL ADJUSTMENT CAN CHANGE. THIS CAN CAUSE DAMAGE TO THE ACTUATOR OR ENGINE.

- (i) Remove the cotter pin (18) used to safety the shoulder bolt (19) to the bleed valve rod end clevis (20). Remove the shoulder bolt.
- (j) Remove the four bolts (21) and washers (22) that attach the 2.5 bleed valve actuator (1) to the intermediate case.



CAUTION

MAKE SURE THE CRIMPED LOCKING CUP AND RETAINING NUT DO NOT LOOSEN WHEN THE SHOULDER BOLT IS REMOVED OR THE PISTON SHAFT HEX IS TURNED. IF THE RETAINING NUT MOVES OR LOOSENS, THE INTERNAL ADJUSTMENT CAN CHANGE. THIS CAN CAUSE DAMAGE TO THE ACTUATOR OR ENGINE.

- (k) Turn the piston shaft hex (23) counterclockwise to disengage the piston shaft threads from the rod end clevis (20). Remove the 2.5 bleed valve actuator from the intermediate case.

NOTE: If a new 2.5 bleed valve actuator is installed, keep the adapters to use on the actuator installation. When the adapters are removed, protective caps and plugs must be installed on the adapters and the actuator.

SUBTASK 75-32-01-410-267

- (2) If the 2.5 bleed valve actuator is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

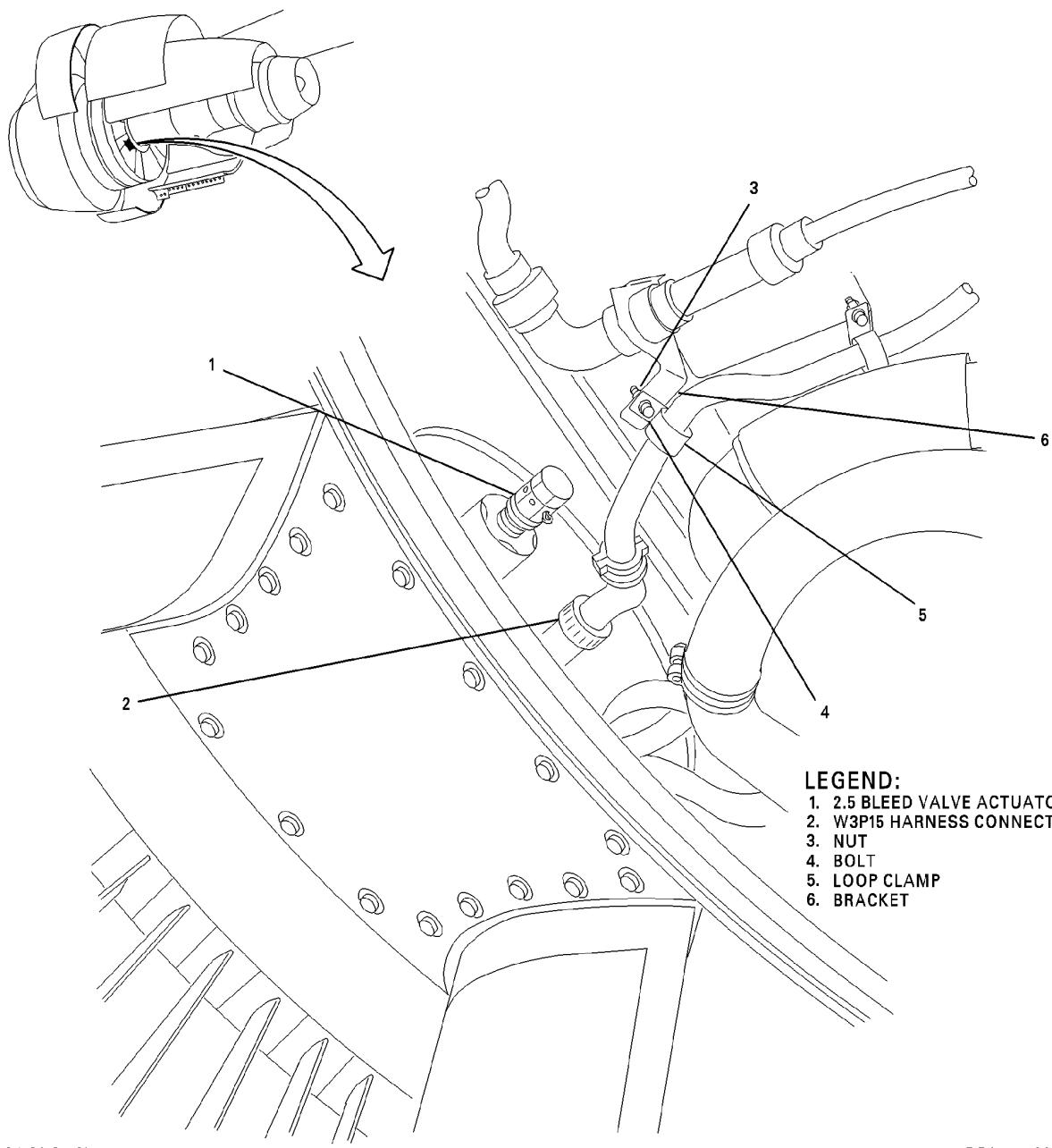
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CAG(IGDS)

DB2-75-0063A

2.5 Bleed Valve Actuator Removal/Installation
Figure 401/75-32-01-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

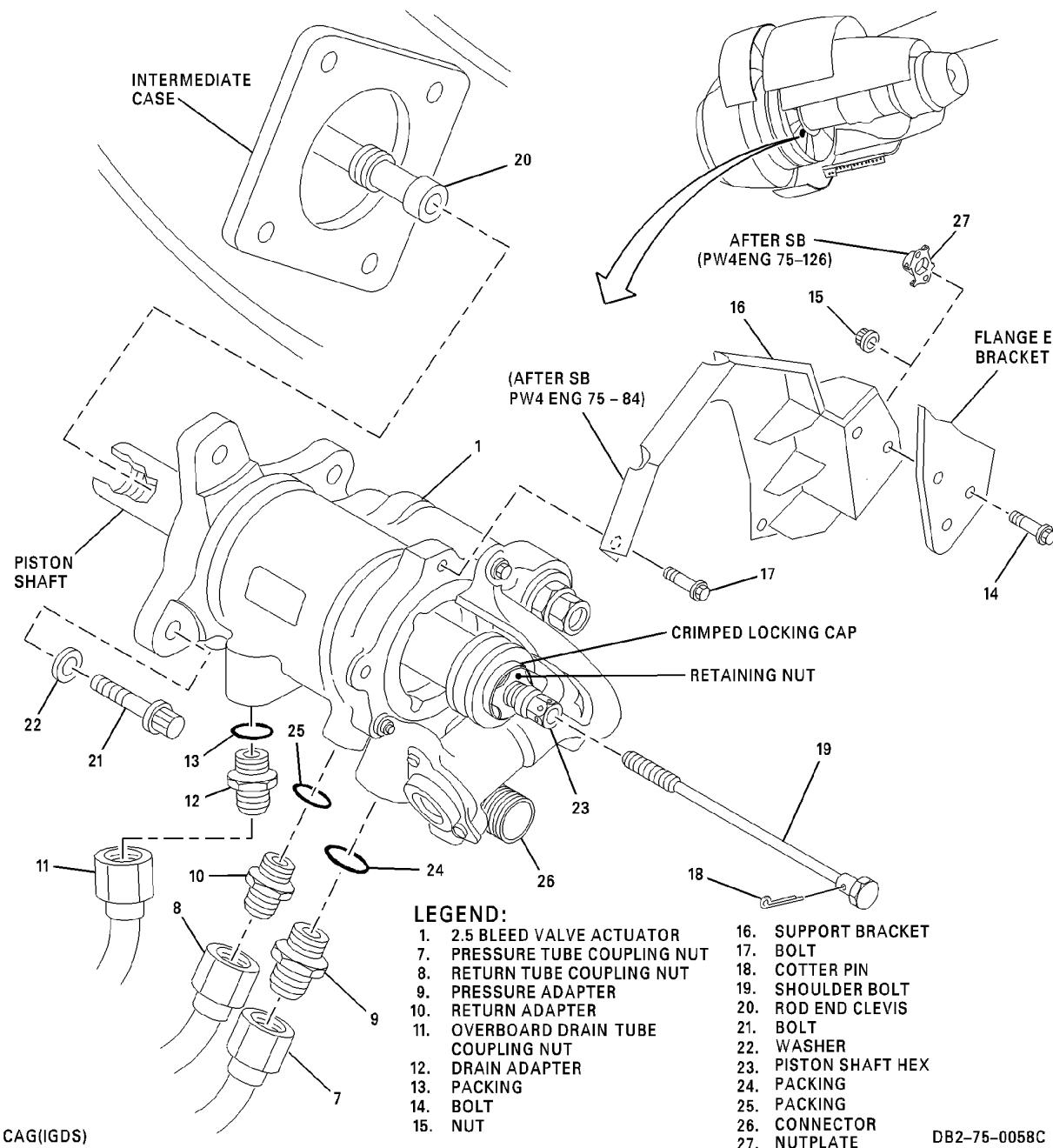
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DB2-75-0058C

2.5 Bleed Valve Actuator Removal/Installation
Figure 402/75-32-01-990-874

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-32-01-400-868

3. INSTALLATION OF THE 2.5 BLEED VALVE ACTUATOR

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0–300 in–lb (0–33.9 N·m)
Not specified	Torque adapter (PWA 85928)
Not specified	Soft-jawed pliers (Glenair TG-69)
Model M303, M305 M307	Crimper, Bregen Mechanical (optional)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)
P05-289	Lockwire (AS3214-02)
P06-003	Compound, anti-galling (PWA 586)
P05-291	Cable, safety (optional)
P05-292	Ferrule, safety cable (optional)
P06-005	Compound, Antigallant Metal Assembly Paste
DPM 5753	Molykote G-n paste
P06-054	Paste, Anti-seize (PWA 36246)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE	DESIGNATION	IPC
13	Packing, preformed	IPC 75-33-05-10-020
24	Packing, preformed	IPC 75-33-05-10-020
25	Packing, preformed	IPC 75-33-05-10-025

D. References

Reference	Title
70-10-03-900-870	TORQUE DEVICES (P/B 201)
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
72-33-02-400-871	REINSTALLATION OF THE FAN EXIT LINER INNER REAR SEGMENTS (P/B 401)
75-32-01-700-869	ADJUSTMENT OF THE 2.5 BLEED VALVE ACTUATOR - MANUAL (P/B 501)
IPC 75-33-05-10-020	Illustrated Parts Catalog
IPC 75-33-05-10-025	Illustrated Parts Catalog

E. Job Set-up - 2.5 Bleed Valve Actuator Installation

SUBTASK 75-32-01-040-002



WARNING

DO NOT MOVE THE FIRE CONTROL HANDLE TO THE AGENT 1 OR AGENT 2 POSITIONS. THIS WILL CAUSE THE FIREX AGENT CONTAINERS TO OPERATE, AND CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the applicable (No. 1, 2 or 3 engine) fire-control handle is down and forward to the FUEL & HYD OFF position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-32-01-010-271

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - 2.5 Bleed Valve Actuator Installation

SUBTASK 75-32-01-420-267

- (1) If it is necessary to install a new 2.5 bleed valve actuator (1), do the subsequent procedure: (Figure 402)
 - (a) Remove the protective plugs from the pressure, return, and drain adapters (9, 10 and 12) holes on the 2.5 bleed valve actuator (1).
 - (b) Remove the protective caps from the pressure, return, and drain adapters (9, 10 and 12). Discard the packings (13, 24 and 25).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (c) Lubricate the packings (13, 24 and 25) with engine oil (P03-001). Install the packings on the adapters (9, 10 and 12). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (d) Lubricate the adapter (9, 10 and 12) threads with engine oil (P03-001). Install the adapters on the 2.5 bleed valve actuator (1).
- (e) Torque the adapter (9) to 150–170 in-lb (16.9–19.2 N·m). Torque the adapter (10) to 110–120 in-lb (12.4–13.6 N·m).
- (f) Torque the adapter (12) to 25–140 in-lb (2.8–15.8 N·m).
- (g) Remove the protective plugs from the fuel pressure, fuel return and overboard drain tube coupling nuts (7, 8 and 11).
- (h) Lubricate the return tube coupling nut (8) with the engine oil (P03-001).
- (i) Install the return tube coupling nut (8) on the return adapter (10).



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1178, COMPOUND/ANTI-GALLING

HAZMAT 1000, REFER TO MSDS

- (j) Lubricate the pressure tube coupling nut (7) with anti-galling compound (P06-003). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (k) Install the pressure tube coupling nut (7) on the pressure adapter (9).
- (l) Hold the adapter (10) with a wrench and torque the return tube coupling nut (8) to 270–300 in-lb (30.5–33.9 N·m). Safety the return tube coupling nut with lockwire (AS3214-02). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (m) Hold the adapter (9) with a wrench and torque the pressure tube coupling nut (7) to 270–300 in-lb (30.5–33.9 N·m). Safety the pressure tube coupling nut with lockwire (AS3214-02).
- (n) Install the overboard drain tube coupling nut (11) on the drain adapter (12).
- (o) Hold the adapter (12) with a wrench and torque the drain tube coupling nut (11) to 270–300 in-lb (30.5–33.9 N·m). Safety the drain tube coupling nut with lockwire.

SUBTASK 75-32-01-420-268

- (2) Install the 2.5 bleed valve actuator (1) as follows:

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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DO NOT TURN THE BLEED VALVE ROD END CLEVIS. IF THE CLEVIS TURNS, DAMAGE CAN OCCUR TO THE BLEED VALVE LINKAGE.

- (a) Lubricate the external threads of rod end clevis as follows:



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- 1) Lubricate the external (OD) threads of the rod end clevis with engine oil (P03-001).

NOTE: This step is for the engine Pre SB PW4ENG 75-84.



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- 2) Lubricate the external threads of the rod end clevis with anti-seize paste (P06-054).

Apply the paste to the entire area of the external threads and to a maximum of 0.250 inch (6.350 mm) more than both ends of the threads.

NOTE: This step is for the engine Post SB PW4ENG 75-84.

- (b) Slide the hollow piston shaft of the actuator over the lubricated rod end clevis. Turn the piston shaft hex (23) clockwise. Engage the outer diameter threads of the rod end clevis (20) with the inner diameter threads of the piston shaft. Continue to turn the piston shaft hex until the actuator (1) connects with the intermediate case.

NOTE: The shoulder bolt and cotter pin are installed after the adjustment of the actuator is complete. The shoulder bolt and cotter pin must be removed to adjust the actuator.

- (c) Lubricate the threads of the four bolts (21) with engine oil (P03-001).



TORQUE ADAPTERS CHANGE THE CORRECT TORQUE WRENCH INDICATION. TOO MUCH TORQUE CAN CAUSE DAMAGE TO THE THREADED PARTS.

- (d) Attach the actuator (1) to the intermediate case with the four bolts (21) and washers (22). With the torque adapter (PWA 85928), torque the bolts to 180–200 in-lb (20.3–22.6 N·m). (TORQUE DEVICES, TASK 70-10-03-900-870)

- (e) Lubricate the threads of the two bolts (17) with engine oil (P03-001).

NOTE: This step is for the engine Post SB PW4ENG 75-84.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (f) Attach the support bracket (16) to the actuator (1) with the two bolts (17). Tighten the bolts with your hand.
 - (g) Align the three bolt holes in the support bracket (16) with the three bolt holes in the flange E bracket.
 - (h) Lubricate the threads of the three bolts (14) with engine oil (P03-001).
 - (i) Attach the support bracket (16) to the flange E bracket with the three bolts (14) and nuts (15). Tighten the bolts with your hand.
 - 1) Attach the support bracket (16) to the flange E bracket and the nutplates (27) with the three bolts (14). Tighten the bolts with your hand.
- NOTE: This step is for the enginePost SB PW4ENG 75-84 and PW4ENG 75-126.
- (j) Torque the two bolts (17) to 65-85 in-lb (7.3-9.6 N·m). Safety the bolts with lockwire (P05-289) or safety cable (P05-291) and safety cable ferrule (P05-292).
 - (k) Torque the three nuts (15) to 85-95 in-lb (9.6-10.7 N·m).



CAUTION

MAKE SURE YOU USE THE CORRECT INSTALLATION PROCEDURE AND TOOLS WHEN YOU INSTALL THE HARNESS CONNECTOR. IF AN INCORRECT PROCEDURE OR TOOL IS USED, IT CAN CAUSE DAMAGE TO THE CONNECTOR OR LOOSEN IT. A LOOSE CONNECTOR CAUSES VIBRATION TO OCCUR AND THE CONTACTS TO WEAR. THIS CAN CAUSE UNSATISFACTORY LIGHTNING PROTECTION.

- (l) Connect the W3P15 harness connector (2) to the 2.5 bleed valve actuator connector (26). (Figure 401)
- (m) Tighten the W3P15 harness connector (2) coupling nut with your hand until you cannot see the witness color band.

NOTE: The witness color band is the first band on the connector receptacle. You cannot see it when the coupling nut is tight.
- (n) Use the soft-jawed pliers to tighten the W3P15 connector (2) coupling nut fully against the actuator connector (26) (metal to metal).

NOTE: When you use the soft-jawed pliers correctly, the connector and the receptacle contacts are sufficiently engaged and the connector is tight. If you use too much force, the tools will turn on the connector coupling nut. This will prevent too much torque.
- (o) Lubricate the thread of the bolt (4) with engine oil (P03-001).
- (p) Attach the W3P15 harness and clamp (5) with the bolt (4) and nut (3) to the outer side of the leg on the bracket (6). Install the bolt with head in the down position.
- (q) Torque the nut (3) to 36-40 in-lb (4.1-4.5 N·m).

G. Job Close-up - 2.5 Bleed Valve Actuator Installation

SUBTASK 75-32-01-410-268

- (1) Install the rear inner liner and spacer plate. (REINSTALLATION OF THE FAN EXIT LINER INNER REAR SEGMENTS, TASK 72-33-02-400-871)

SUBTASK 75-32-01-830-267

- (2) Adjust the 2.5 bleed valve actuator. (ADJUSTMENT OF THE 2.5 BLEED VALVE ACTUATOR - MANUAL, TASK 75-32-01-700-869)

SUBTASK 75-32-01-942-267

- (3) Remove all the tools and equipment from the work area. Make sure that the area is clean.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-32-01-840-001

- (4) Put the fire control handle in the NORM position. The control handle is on the center-overhead panel in the flight compartment.

SUBTASK 75-32-01-410-270

- (5) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

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VARIABLE BYPASS VALVE SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure gives instructions for an operational and functional test of the variable bypass valve (VBV) system.
- B. Unless different instructions are given, these procedures are the same for the three G.E. CF6-80C2D1F engines.

TASK 75-32-01-700-801

2. FUNCTIONAL TEST OF THE VARIABLE BYPASS VALVE SYSTEM

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 501

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engine, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-L-5501 (Types 1 thru 15)	Protective caps and plugs
Not specified	Container, 5 U.S. gal. (19.0 l)
2C6395G05	Actuator, hydraulic
Not specified	Torque wrench, 0-350 in-lb (0-39.5 N·m)
Not specified	Torque wrench, 0-600 in-lb (0-67.8 N·m)

B. Consumable Materials

- (1) Consumable materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 502

REFERENCE	DESIGNATION
C02-021	Oil - Grade 1010 (MIL-L-6081)
C04-002	Solvent, stoddard (P-D-680, Type 1)
C10-071	Lockwire, stainless steel (AMS 5689)

C. References

Reference	Title
70-30-00-910-801	CONSUMABLE MATERIALS (P/B 201)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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(Continued)

Reference	Title
71-00-00-700-803	MINIMUM AND APPROACH IDLE POWER (ADJ/TEST 02) (P/B 501)
71-10-00-010-802	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-802	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-32-01-010-801	OPENING OF THE VARIABLE BYPASS VALVES (P/B 201)
75-32-01-410-801	CLOSING OF THE VARIABLE BYPASS VALVES (P/B 201)

D. Job Set-up - Variable Bypass Valve System Functional Test

SUBTASK 75-32-01-010-006

- (1) Open the left and right thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

E. Procedure - Variable Bypass Valve System Functional Test

SUBTASK 75-32-01-680-001

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1044, JET FUELS A AND A-1 (JP-5 FUEL)

HAZMAT 1000, REFER TO MSDS

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



WARNING

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1045, JET FUEL B (JP-4 FUEL)

HAZMAT 1000, REFER TO MSDS

- (1) Put a container below the hydromechanical unit (HMU) to catch the fuel when the fuel lines are disconnected.

SUBTASK 75-32-01-030-009

- (2) Disconnect the VBV head-end and rod-end tubing (2 and 1) from the HMU. Install protective caps on the HMU fittings (7 and 8). (Figure 501)

SUBTASK 75-32-01-490-001

- (3) Connect the hydraulic actuator supply and return hoses to the VBV head-end and rod-end tubing (2 and 1).

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SUBTASK 75-32-01-720-001



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1097, SOLVENT/MIL-PRF-680 TYPE 1 (DPM 518)

HAZMAT 1000, REFER TO MSDS



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS



CAUTION

DO NOT SUPPLY MORE THAN 300 PSIG OF PRESSURE TO THE ACTUATOR ROD-END. THIS WILL PREVENT DAMAGE TO THE COMPONENTS.

- (4) Use clean, filtered oil or solvent in the hydraulic actuator and apply a 200-300 psig (1400-2100 kPa gage) pressure to the rod-end tubing (1). This will operate the VBV door system to the closed position (VBV actuator rod retracted). (CLOSING OF THE VARIABLE BYPASS VALVES, TASK 75-32-01-410-801) (CONSUMABLE MATERIALS, TASK 70-30-00-910-801)

NOTE: You can use a dry air, nitrogen, or argon source that will produce 300 psig (2100 kPa gage) to operate the system if a hydraulic actuator is not available.

SUBTASK 75-32-01-720-002



CAUTION

DO NOT SUPPLY MORE THAN 300 PSIG OF PRESSURE TO THE ACTUATOR ROD-END. THIS WILL PREVENT DAMAGE TO THE COMPONENTS.

- (5) Use clean, filtered oil or solvent in the hydraulic actuator and apply a 200-300 psig (1400-2100 kPa gage) pressure to the head-end tubing (2). This will operate the VBV door system to the open position (VBV actuator rod extended). (OPENING OF THE VARIABLE BYPASS VALVES, TASK 75-32-01-010-801)

NOTE: You can use a dry air, nitrogen, or argon source that will produce 300 psig (2100 kPa gage) to operate the system if a hydraulic actuator is not available.

SUBTASK 75-32-01-210-001

- (6) Replace the actuators if the leakage rate exceeds 9.1 cu. in./min (150 cc/minute).

NOTE: Because two actuators are checked at the same time, the total leakage is measured.
Make sure the total leakage rate does not exceed 9.1 cu. in./min (150 cc/minute).
Make sure sufficient time is permitted to let the tubing and actuators fill.

NOTE: Each actuator can exceed 4.6 cu in./min (75 cc/minute), but the total shall not exceed 9.1 cu in./min (150 cc/minute).

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SUBTASK 75-32-01-030-010

- (7) Bleed off the pressure and disconnect the hydraulic actuator supply and return hoses from the VBV head-end and rod-end (2 and 1) tubing.

SUBTASK 75-32-01-490-002

- (8) Remove the protective caps from the head-end fitting (8) on the HMU. Connect the VBV head-end tubing (2) coupling nut. Torque the coupling nut to 450-500 in-lb (50.9-56.5 N·m) and safety with lockwire.

SUBTASK 75-32-01-490-003

- (9) Remove the protective caps from the rod-end fitting (7) on the HMU. Connect the VBV rod-end tubing (1) coupling nut. Torque the coupling nut to 270-300 in-lb (30.5-33.9 N·m) and safety with lockwire.

SUBTASK 75-32-01-410-005

- (10) Close the left and right thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

SUBTASK 75-32-01-710-001

- (11) Do the engine idle operation procedure. (MINIMUM AND APPROACH IDLE POWER (ADJ/TEST 02), TASK 71-00-00-700-803)

SUBTASK 75-32-01-010-004

- (12) Open the left and right thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-802)

SUBTASK 75-32-01-210-003

- (13) Examine the VBV head-end and rod-end connections at the HMU for leaks.

F. Job Close-up - Variable Bypass Valve System Functional Test

SUBTASK 75-32-01-942-271

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-32-01-410-007

- (2) Close the left and right thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-802)

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

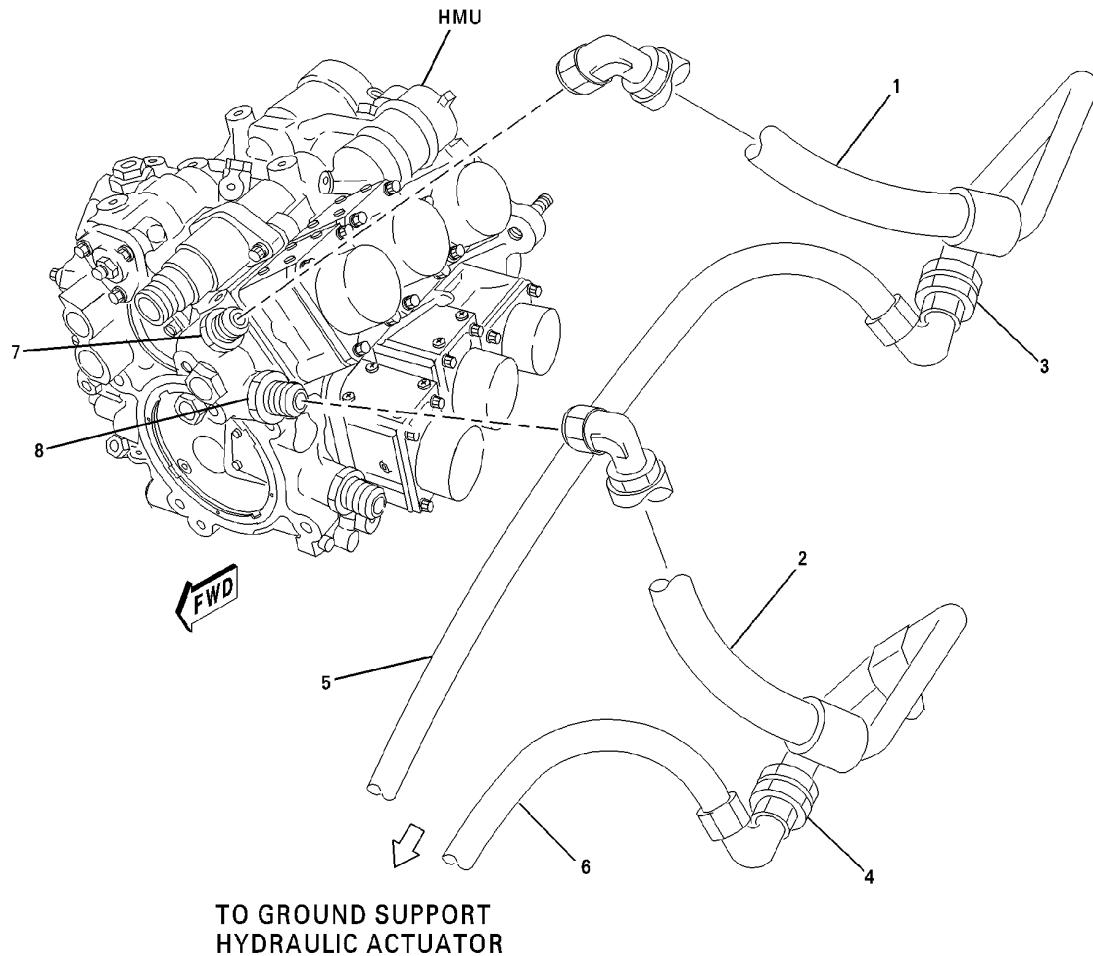
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LEGEND:

1. VBV ROD-END TUBING
2. VBV HEAD-END TUBING
3. ADAPTER
4. ADAPTER
5. GROUND SUPPORT ACTUATOR HOSE
6. GROUND SUPPORT ACTUATOR HOSE
7. ROD-END FITTING
8. HEAD-END FITTING

DB2-75-0257

Variable Bypass Valve - Adjustment/Test
Figure 501/75-32-01-990-802

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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ACTUATOR, 2.5 BLEED VALVE – ADJUSTMENT/TEST

1. General

- A. This procedure has the adjustment instructions for the 2.5 bleed valve actuator, adjustment can be made by manual procedure or hydraulic procedure.
- B. The actuator is installed at the 7 o'clock position on the rear of the fan exit case. Access to the actuator is through the left thrust reverser door.
- C. Unless different instruction are given, these procedures are the same for the three Pratt & Whitney PW4460 engines on the MD-11 aircraft.

TASK 75-32-01-700-869

2. ADJUSTMENT OF THE 2.5 BLEED VALVE ACTUATOR - MANUAL

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 501

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-300 in-lb (0-34.0 N·m)

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 502

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)
P05-038	Cheesecloth, unsized (GA-100-11)
P09-014	Sealant, silicon rubber (PWA 36003)
P11-005	Solvent, methyl ethyl ketone (MEK) (PMC 9076)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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C. Expendable Parts

(1) Expendable Parts

Table 503

REFERENCE/ITEM	DESIGNATION	IPC
2	Pin, cotter	IPC 75-33-05-10-030

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)
71-02-15-700-883	TEST OF THE ENGINE CONTROL SYSTEM ACTUATORS (ADJ/TEST 15) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-33-05-10-030	Illustrated Parts Catalog

E. Job Set-up - 2.5 Bleed Valve Actuator Adjustment - Manual

SUBTASK 75-32-01-010-273

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - 2.5 Bleed Valve Actuator Adjustment - Manual

SUBTASK 75-32-01-820-267

- (1) Do the adjustment of the 2.5 bleed valve actuator (1) as follows:
 - (a) If necessary, remove the cotter pin (2) from the shoulder bolt (3) and the piston shaft hex (4). (Figure 501) (Figure 502)



CAUTION DO NOT LET THE ACTUATOR PISTON SHAFT HEX TURN WHEN YOU TURN THE SHOULDER BOLT. THE SHOULDER BOLT HAS A LEFT-HANDED THREAD. THIS WILL HELP PREVENT DAMAGE TO THE SHOULDER BOLT.



CAUTION MAKE SURE THE CRIMPED LOCKING CUP AND RETAINING NUT DO NOT LOOSEN WHEN THE SHOULDER BOLT IS REMOVED OR THE PISTON SHAFT HEX IS TURNED. IF THE RETAINING NUT MOVES OR LOOSENS, THE INTERNAL ADJUSTMENT CAN CHANGE. THIS CAN CAUSE DAMAGE TO THE ACTUATOR OR ENGINE.

- (b) Hold the piston shaft (5) and remove the shoulder bolt (3).



CAUTION DO NOT USE FORCE WHEN YOU TURN THE PISTON SHAFT. THIS CAN CAUSE DAMAGE TO THE ACTUATOR.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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(CAUTION PRECEDES)



CAUTION

MAKE SURE THE CRIMPED LOCKING CUP AND RETAINING NUT DO NOT LOOSEN WHEN THE SHOULDER BOLT IS REMOVED OR THE PISTON SHAFT HEX IS TURNED. IF THE RETAINING NUT MOVES OR LOOSENS, THE INTERNAL ADJUSTMENT CAN CHANGE. THIS CAN CAUSE DAMAGE TO THE ACTUATOR OR ENGINE.

- (c) Put a speed handle and socket on the hex (4) end of the piston shaft (5). Turn the piston shaft clockwise, as seen from the rear, until the piston shaft stops.
- (d) Turn the piston shaft (5) counterclockwise, as seen from the rear, four turns.



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (e) Lubricate the threads of the shoulder bolt (3) with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)



CAUTION

DO NOT LET THE ACTUATOR PISTON SHAFT HEX TURN WHEN YOU TURN THE SHOULDER BOLT. THE SHOULDER BOLT HAS A LEFT-HANDED THREAD. THIS WILL HELP PREVENT DAMAGE TO THE SHOULDER BOLT.

- (f) Hold the piston shaft hex (4) and install the shoulder bolt (3). Torque the shoulder bolt to 50-70 in-lb (5.6–7.9 N·m).
- (g) Install the cotter pin (2) to safety the shoulder bolt (3).

NOTE: The shoulder bolt can be turned clockwise or counterclockwise 30 degrees maximum to install the cotter pin. This can cause satisfactory torque not in the approved torque range.



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1079, METHYL ETHYL KETONE (DPM 535)

HAZMAT 1000, REFER TO MSDS

- (h) Clean the shoulder bolt (3) cotter pin (2) area at each end with a clean cheesecloth (P05-038) dampened with solvent (P11-005). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

NOTE: Surfaces must be fully dried in ambient temperatures. The time to become dry must be sufficient to remove all solvent that can damage the sealant.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1032, SEALANT/ADHESIVE (DPM 5811)

HAZMAT 1000, REFER TO MSDS

- (i) Apply the sealant (P09-014) to each end of the cotter pin (2). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

G. Job Close-up - 2.5 Bleed Valve Actuator Adjustment - Manual

SUBTASK 75-32-01-942-268

- (1) Remove all the tools and equipment from the work area. Make sure the work area is clean.

SUBTASK 75-32-01-410-272

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-32-01-710-268

- (3) Do the engine ground test idle power procedure. (ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870)

SUBTASK 75-32-01-710-269

- (4) Do the electronic engine control idle test procedure. (ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873)

SUBTASK 75-32-01-710-270

- (5) Do the engine control system actuators test procedure. (TEST OF THE ENGINE CONTROL SYSTEM ACTUATORS (ADJ/TEST 15), TASK 71-02-15-700-883)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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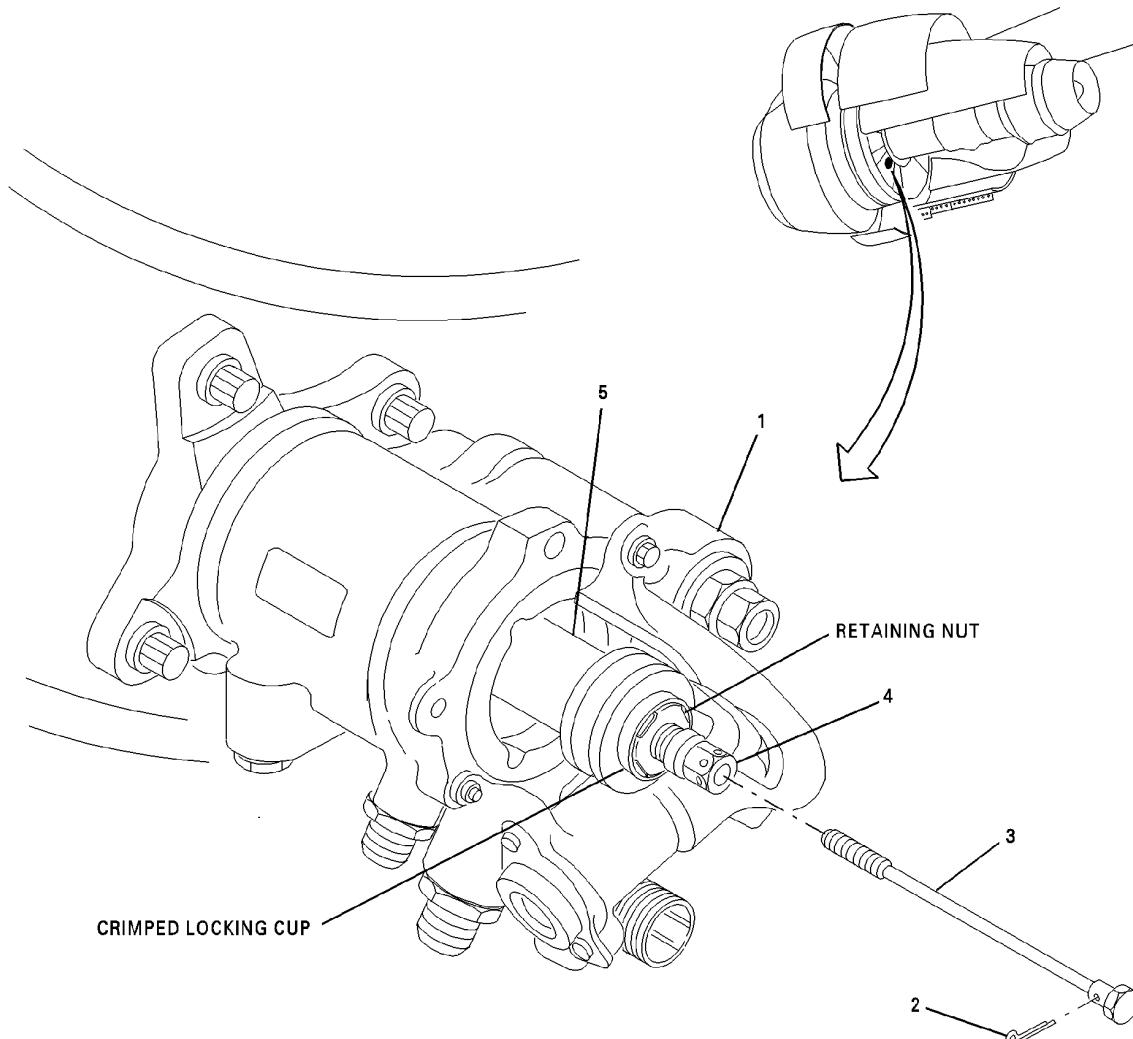
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LEGEND:

1. 2.5 BLEED VALVE ACTUATOR
2. COTTER PIN
3. SHOULDER BOLT
4. HEX
5. PISTON SHAFT

NOTE:

SHOULDER BOLT IS A
LEFT-HAND THREAD

CAG(IGDS)

DB2-75-0147A

2.5 Bleed Valve Actuator Adjustment
Figure 501/75-32-01-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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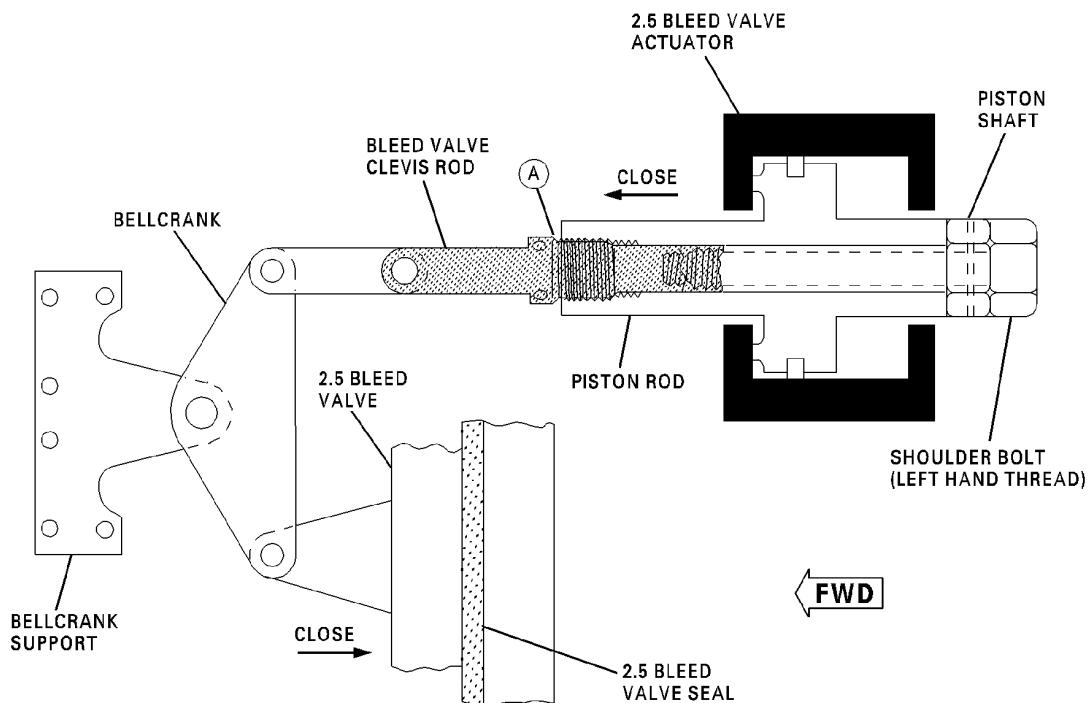
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CAG(IGDS)

DB2-75-0330

2.5 Bleed Valve Actuator Adjustment
Figure 502/75-32-01-990-876

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-32-01-700-870

3. ADJUSTMENT OF THE 2.5 BLEED VALVE ACTUATOR - HYDRAULIC

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 504

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-300 in-lb (0-34.0 N·m)
Not specified	Mechanical crimper, Bergen model M303, M305 or M307
Not specified	Depth Micrometer, 0-6 in
Not specified	Pump Adapter, PWA 29451
Not specified	Hydraulic Pump (Optional to CTE 5100) PWA 49030
Not specified	Hydraulic Pump (Optional to PWA 49030) CTE 5100
Not specified	Electrical Control Box PWA 85842
Not specified	Pump Adapter (Elbow) (2 necessary) PWA 101618
Not specified	Fluid Drain Collector/ Container

NOTE: Make sure the correct adapters are with the Hydraulic Pump. You can use the PWA 101618 Adapter Elbows or the equivalent No. 6 standard elbows. The elbows are necessary to connect the hoses to the adapters on the actuator.

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 505

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B, TYPE II)
P03-003	Calibrating Fluid
P05-038	Cheesecloth, unsized (GA-100-11)
P05-289	Lockwire, (AS3214-02)
P05-291	Cable, Safety

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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Table 505 (Continued)

REFERENCE	DESIGNATION
P05-292	Ferrule, Safety Cable
P06-054	Paste, antiseize (PWA 36246)
P09-014	Sealant, silicon rubber (PWA 36003, RTV 159)
P11-005	Solvent, Methyl Ethyl Ketone (MEK) (PMC9076)

C. Expendable Parts

(1) Expendable Parts

Table 506

REFERENCE/ITEM	DESIGNATION	IPC
2	Pin, cotter	IPC 75-33-05-10-030

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-03-700-870	ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03) (P/B 501)
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)
71-02-15-700-883	TEST OF THE ENGINE CONTROL SYSTEM ACTUATORS (ADJ/TEST 15) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-33-05-10-030	Illustrated Parts Catalog

E. Job Set-up - 2.5 Bleed Valve Actuator Adjustment - Hydraulic

SUBTASK 75-32-01-010-277

- (1) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - 2.5 Bleed Valve Actuator Adjustment - Hydraulic

SUBTASK 75-32-01-820-268

- (1) Do the adjustment of the 2.5 bleed valve actuator (1) as follows: (Figure 503) (Figure 504) (Figure 505)
- (a) Use soft-jawed pliers or a strap wrench to disconnect the electrical connector (8) from the actuator.
 - (b) Put a fluid drain collector/collector under the actuator.
 - (c) Remove pressure from the hydraulic tubes as follows:
 - 1) Remove the lockwire or safety cable from the tube nuts at both ends of each tube (6) and (7).
 - 2) While holding the tee with a wrench, disconnect the hydraulic pressure tube (7) at the (10) tee to remove any pressure.
 - 3) While holding the tee (9) with a wrench, disconnect the hydraulic return tube (6) at the (9) tee to remove any pressure.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (d) Remove the bleed valve actuator hydraulic pressure tube (7) and return tube (6) as follows:
- 1) Hold the adapters with a wrench and disconnect the tube nuts from the actuator.
NOTE: It is not necessary to disconnect the drain manifold from the actuator.
- (e) Connect the hoses from the PWA 49030 or CTE 5100 Hydraulic pump as follows:
- 1) Install the PWA 29451 Pump Adapter to the actuator rear adapter.
 - 2) Hold the rear adapter with a wrench and tighten the Pump Adapter.
 - 3) Connect the two elbows to the two pump hoses (pressure and return).
 - 4) Tighten the hoses to the elbows.
 - 5) Connect the return hose elbow to the forward adapter.
 - 6) Hold the forward adapter with a wrench and tighten the elbow.
 - 7) Connect the pressure hose elbow to the Pump Adapter.
 - 8) Hold the Pump Adapter with a wrench and tighten the elbow.
- (f) With the power OFF, connect the PWA 85842 Electrical Control Box Connector to the actuator receptacle.
- (g) If necessary, remove the cotter pin (2) from the shoulder bolt (3) and the piston shaft hex (4). (Figure 501) (Figure 502)



CAUTION DO NOT LET THE ACTUATOR PISTON SHAFT HEX TURN WHEN YOU TURN THE SHOULDER BOLT. THE SHOULDER BOLT HAS A LEFT-HANDED THREAD. THIS WILL HELP PREVENT DAMAGE TO THE SHOULDER BOLT.



CAUTION MAKE SURE THE CRIMPED LOCKING CUP AND RETAINING NUT DO NOT LOOSEN WHEN THE SHOULDER BOLT IS REMOVED OR THE PISTON SHAFT HEX IS TURNED. IF THE RETAINING NUT MOVES OR LOOSENS, THE INTERNAL ADJUSTMENT CAN CHANGE. THIS CAN CAUSE DAMAGE TO THE ACTUATOR OR ENGINE.

- (h) Hold the piston shaft (5) and remove the shoulder bolt (3).



CAUTION DO NOT USE FORCE WHEN YOU TURN THE PISTON SHAFT. THIS CAN CAUSE DAMAGE TO THE ACTUATOR.



CAUTION MAKE SURE THE CRIMPED LOCKING CUP AND RETAINING NUT DO NOT LOOSEN WHEN THE SHOULDER BOLT IS REMOVED OR THE PISTON SHAFT HEX IS TURNED. IF THE RETAINING NUT MOVES OR LOOSENS, THE INTERNAL ADJUSTMENT CAN CHANGE. THIS CAN CAUSE DAMAGE TO THE ACTUATOR OR ENGINE.

- (i) Put a speed handle and socket on the hex (4) end of the piston shaft (5). Turn the piston shaft clockwise, as seen from the rear, until the piston shaft stops.
NOTE: Do not use too much force. This will tighten the piston shaft against the bleed valve clevis rod until bottomed.
- (j) Connect the hydraulic pump to a power source.
- (k) Supply 100 psig to the actuator aft pressure adapter.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- (l) Set the POWER switch on the PWA 85842 Electrical Control Box to the ON position.
- (m) Use the Electrical Box to cycle the bleed valve back and forth between open and closed positions to make sure the 2.5 bleed valve assembly moves freely.
- (n) After cycling the bleed valve, leave the bleed valve in the closed (actuator piston shaft forward) position.
- (o) All actuation of the bleed system to the valve open or valve closed positions should now be done using the PWA 85842 Electrical Control Box OPEN/CLOSE switch.
- (p) Keep 100 psig pressure to the actuator during all measurements.
- (q) Measure the length of the piston travel as follows: (Figure 506) (Figure 507) (Figure 508)
NOTE: All measurements must be made with 100 psig at the actuator with a depth micrometer and from the piston shaft to the same location on the housing.
 - 1) Establish a stationary reference point on the actuator housing to be used for all piston travel measurements which follow.
 - 2) Make sure the bleed valve is in the closed (actuator piston shaft forward) position.
 - 3) Measure the distance from the piston shaft end to the reference point on the actuator housing.
 - 4) Record as Dimension No. 1.
 - 5) Actuate the bleed system to the valve open (actuator piston shaft rearward) position.
 - 6) Measure the distance from the piston shaft end to the reference point on the actuator housing.
 - 7) Record as Dimension No. 2.
 - 8) Determine piston travel by subtracting Dimension No. 1 from Dimension No. 2.
 - 9) Record the result as Dimension No. 3.
 - 10) Piston travel should be $2.28 +0.04/-0.00$ in. ($57.91 + 1.02/-0.00$ mm)
- (r) If the piston travel is not within limits, repeat the measurement.
- (s) If the piston travel is still not within limits, check to make sure the piston shaft is fully against the bleed valve clevis rod as follows:
 - 1) Remove pressure to the actuator.
 - 2) Turn the piston shaft hex clockwise (from rear) only until the shaft stops. Do not use too much force. This will tighten the piston shaft against the bleed valve clevis rod until bottomed.
- (t) Supply 100 psig to the actuator and do the piston travel check again.
 - 1) If the piston travel is still not within the limits, replace the actuator.
- (u) Make the initial bleed valve compression adjustment as follows:
 - 1) Remove the pressure from the actuator (0 psig).
 - 2) Turn the piston shaft one turn counterclockwise.
 - 3) Supply 100 psig pressure to the actuator again.
 - 4) Actuate the bleed system to the valve closed (actuator piston shaft forward) position.
 - 5) Measure the adjusted dimension between the piston shaft end and the established reference point on the actuator housing.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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- 6) Record the result as Dimension No. 4.
 - 7) Dimension No. 4 should be 0.015 in. (0.381 mm) minimum greater than Dimension No. 1.
- (v) If Dimension No. 4 is not within the limits, do as follows:
- 1) Actuate the bleed system to the valve open (actuator piston shaft rearward) position.
 - 2) Remove pressure to the actuator.
 - 3) Turn the piston one more full turn counterclockwise.
 - 4) Supply 100 psig pressure to the actuator again.
 - 5) Actuate the bleed system again to the valve closed (actuator piston shaft forward) position.
 - 6) Measure the adjusted dimension again between the piston shaft end and the established housing reference point.
 - 7) The adjusted Dimension No. 4 should be 0.015 in. (0.381 mm) minimum greater than Dimension No. 1.
 - 8) If Dimension No. 4 is still not within the limits, do this step again only enough times until Dimension No. 4 is within the limits.
- (w) Make the final compression adjustment as follows:
- 1) Actuate the bleed system to the valve open (actuator piston shaft rearward) position.
 - 2) Remove pressure to the actuator.
 - 3) Turn the piston shaft 1/4 turn (90 degrees) clockwise.
 - 4) Supply 100 psig pressure to the actuator again.
 - 5) Actuate the bleed system again to the valve closed (actuator piston shaft forward) position.
 - 6) Measure the dimension between the end of the piston shaft to the established reference point on the actuator housing.
 - 7) Record this measurement as Dimension No. 5.
 - 8) Compare Dimension No. 5 with Dimension No. 1. Dimension No. 5 should be within 0.005 in. (0.127 mm) of Dimension No. 1.
- (x) If Dimension No. 5 is not within 0.005 in. (0.127 mm) of Dimension No. 1, do as follows:
- 1) Actuate the bleed system to the valve open (actuator piston shaft rearward) position.
 - 2) Remove pressure to the actuator.
 - 3) Turn the piston another 1/4 turn (90 degrees) clockwise.
 - 4) Supply 100 psig pressure to the actuator again.
 - 5) Actuate the bleed system again to the valve closed (actuator piston shaft forward) position.
 - 6) Measure Dimension No. 5 again.
 - 7) Dimension No. 5 should be within 0.005 in. (0.127 mm) of Dimension No. 1.
 - 8) If Dimension No. 5 is still not within the limits, do this step again only enough times until Dimension No. 5 is within the limits.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (y) Cycle the bleed valve between the open and closed positions to verify that the 2.5 bleed valve assembly can be moved freely.
- (z) Remove pressure to the actuator.
- (aa) Remove power from the pump.
- (ab) Set the POWER switch on PWA 85842 electrical control box to the OFF position.
- (ac) Install the (LEFT-HAND THREAD) shoulder bolt (3) to the piston shaft as follows:

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (ad) Lubricate the threads of the shoulder bolt (3) with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)



DO NOT LET THE ACTUATOR PISTON SHAFT HEX TURN WHEN YOU TURN THE SHOULDER BOLT. THE SHOULDER BOLT HAS A LEFT-HANDED THREAD. THIS WILL HELP PREVENT DAMAGE TO THE SHOULDER BOLT.

- (ae) Hold the piston shaft hex (4) and install the shoulder bolt (3). Torque the shoulder bolt to 50-70 in-lb (5.6-7.9 N·m).
- (af) Install the cotter pin (2) to safety the shoulder bolt (3).

NOTE: The shoulder bolt can be turned clockwise or counterclockwise 30 degrees maximum to install the cotter pin. This can cause satisfactory torque not in the approved torque range.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1079, METHYL ETHYL KETONE (DPM 535)

HAZMAT 1000, REFER TO MSDS

- (ag) Clean the shoulder bolt (3) cotter pin (2) area at each end with a clean cheesecloth (P05-038) dampened with solvent (P11-005). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

NOTE: Surfaces must be fully dried in ambient temperatures. The time to become dry must be sufficient to remove all solvent that can damage the sealant.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1032, SEALANT/ADHESIVE (DPM 5811)

HAZMAT 1000, REFER TO MSDS

- (ah) Apply the sealant (P09-014) to each end of the cotter pin (2). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (ai) Disconnect electrical control box connector from the actuator (1) receptacle.
- (aj) Connect the self-locking electrical connector (8) to the actuator (1) receptacle as follows:
 - 1) Examine, align, and install the connector.
 - 2) Use soft-jawed pliers or a strap wrench and tighten the connector against the receptacle.
 - 3) While tightening, push the connector in and from side to side.
 - 4) Make sure you feel the ratchet feature.
 - 5) Tighten the connector until the pliers or strap wrench slip on the connector ring.
- (ak) While holding the adapters with a wrench, disconnect the two hose elbows from the actuator.
- (al) While holding the adapter with a wrench, remove the PWA 29451 Pump Adapter from the aft actuator adapter.
- (am) Install the hydraulic pressure tube (7) and the hydraulic return tube (6) as follows:



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- 1) Apply antiseize paste (P06-054) to the nut threads and the backs of the ferrules on both tubes.
- 2) Connect the hydraulic return tube (6) to the forward adapter on the actuator and the (9) tee.
- 3) While holding the adapter and tee with a wrench, torque the tube nuts at each end to 200-225 in-lb (22.6-25.4 N·m).
- 4) Safety the nuts on both tubes at both ends with lockwire (P05-289) or safety cable (P05-291) and safety cable ferrule (P05-292).

G. Job Close-up - 2.5 Bleed Valve Actuator Adjustment - Hydraulic

SUBTASK 75-32-01-942-272

- (1) Remove all the tools and equipment from the work area. Make sure the work area is clean.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-32-01-410-276

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-32-01-710-271

- (3) Do the engine ground test idle power procedure. (ENGINE GROUND TEST, MINIMUM-IDLE POWER (ADJ/TEST 03), TASK 71-02-03-700-870)

SUBTASK 75-32-01-710-272

- (4) Do the electronic engine control idle test procedure. (ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873)

SUBTASK 75-32-01-710-273

- (5) Do the engine control system actuators test procedure. (TEST OF THE ENGINE CONTROL SYSTEM ACTUATORS (ADJ/TEST 15), TASK 71-02-15-700-883)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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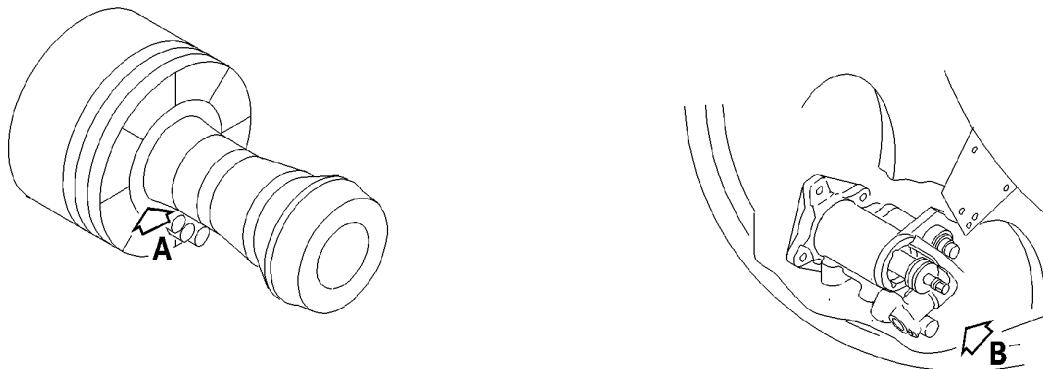
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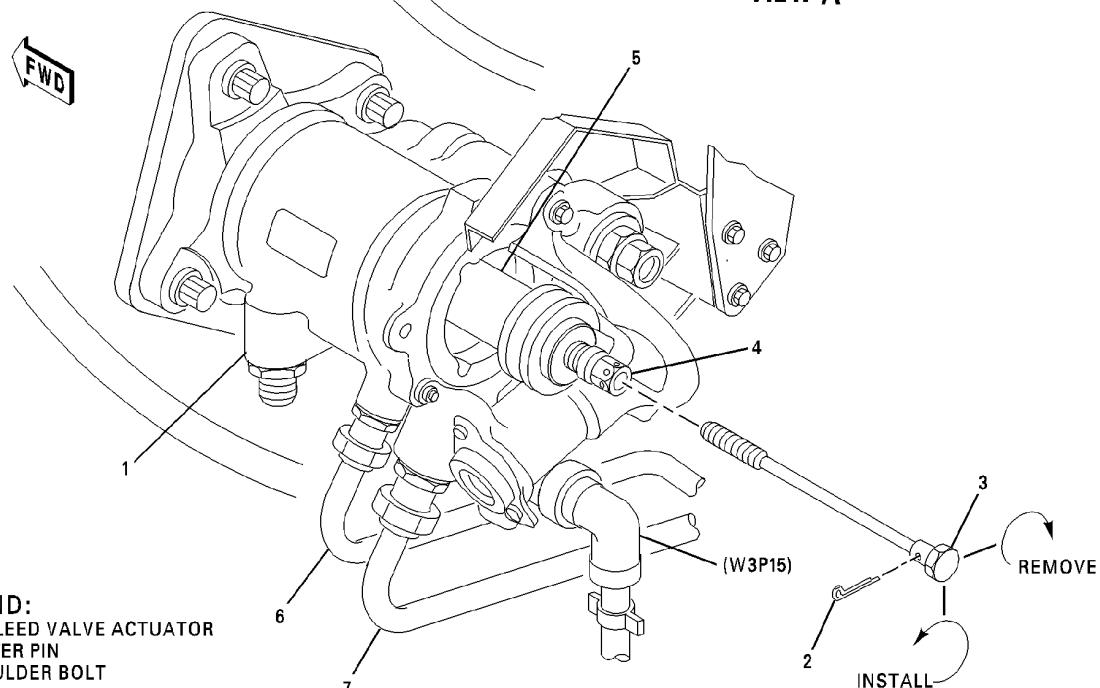
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VIEW A



LEGEND:

1. 2.5 BLEED VALVE ACTUATOR
2. COTTER PIN
3. SHOULDER BOLT
4. HEX
5. PISTON SHAFT
6. HYDRAULIC RETURN TUBE
7. HYDRAULIC PRESSURE TUBE

VIEW B

NOTE:
SHOULDER BOLT IS A
LEFT-HAND THREAD.

CAG(IGDS)

DB2-75-0331

2.5 Bleed Valve Actuator Adjustment
Figure 503/75-32-01-990-877

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

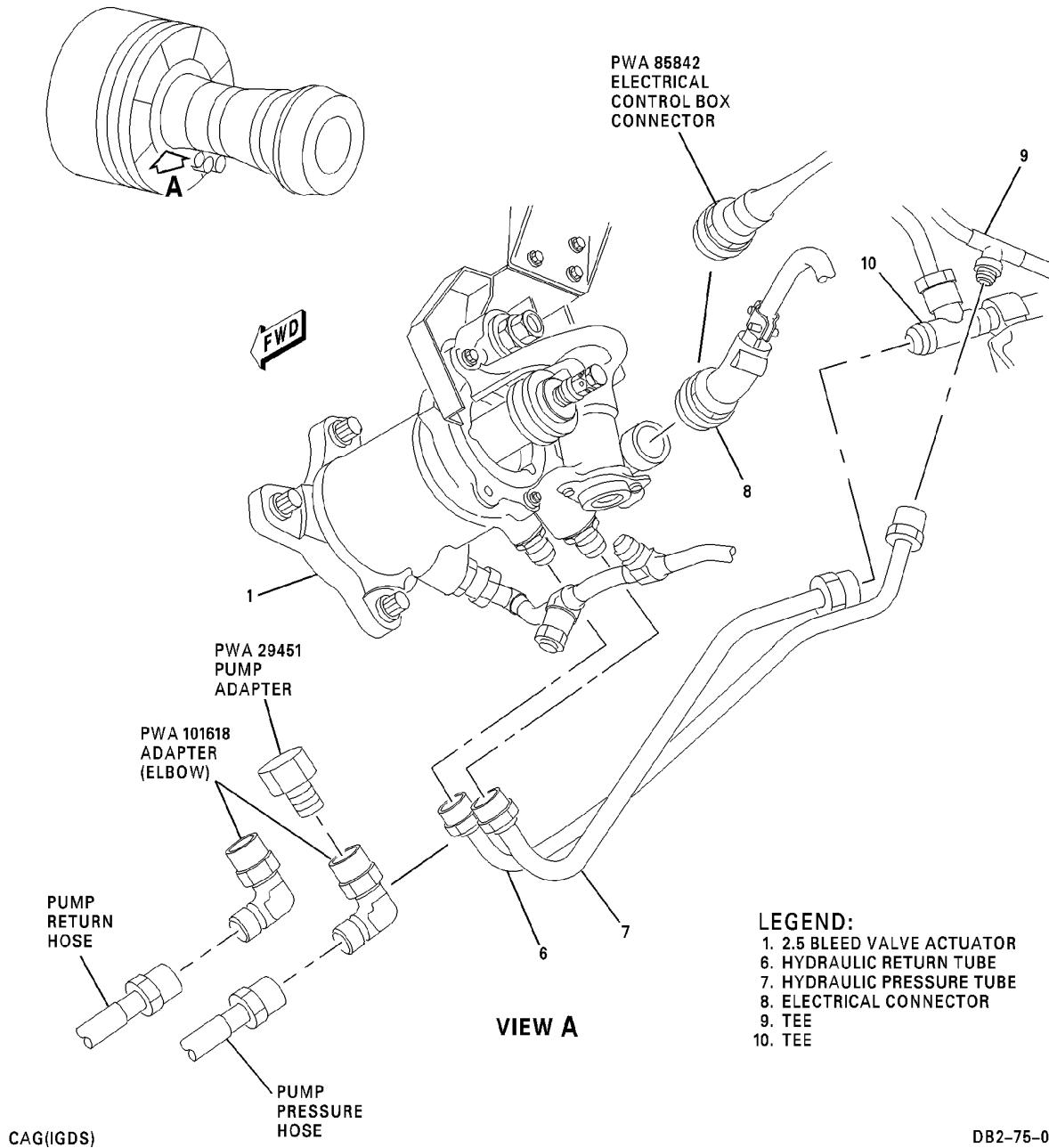
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2.5 Bleed Valve Actuator Adjustment
Figure 504/75-32-01-990-878

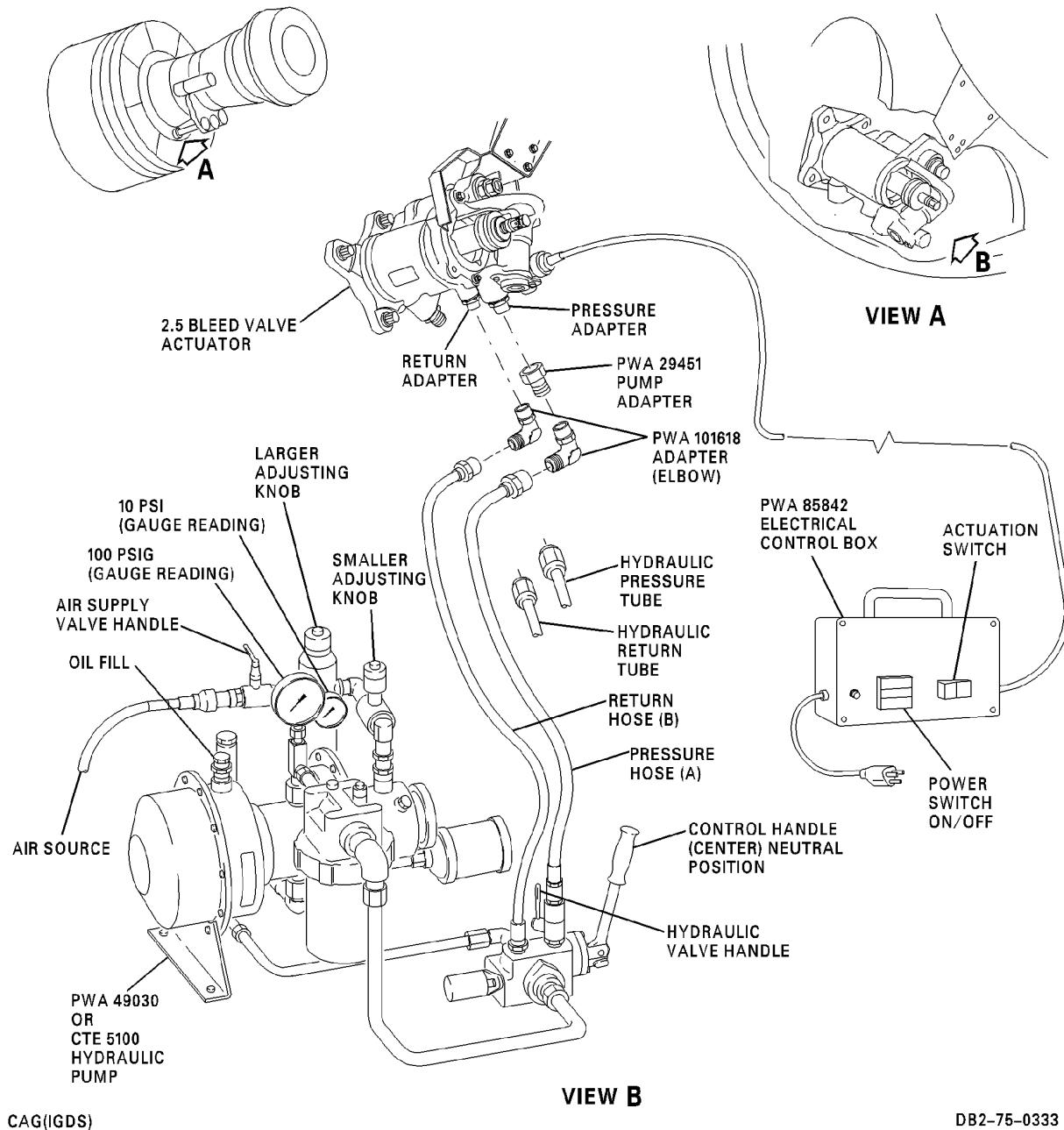
EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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VIEW B

CAG(IGDS)

DB2-75-0333

2.5 Bleed Valve Actuator Adjustment
Figure 505/75-32-01-990-879

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

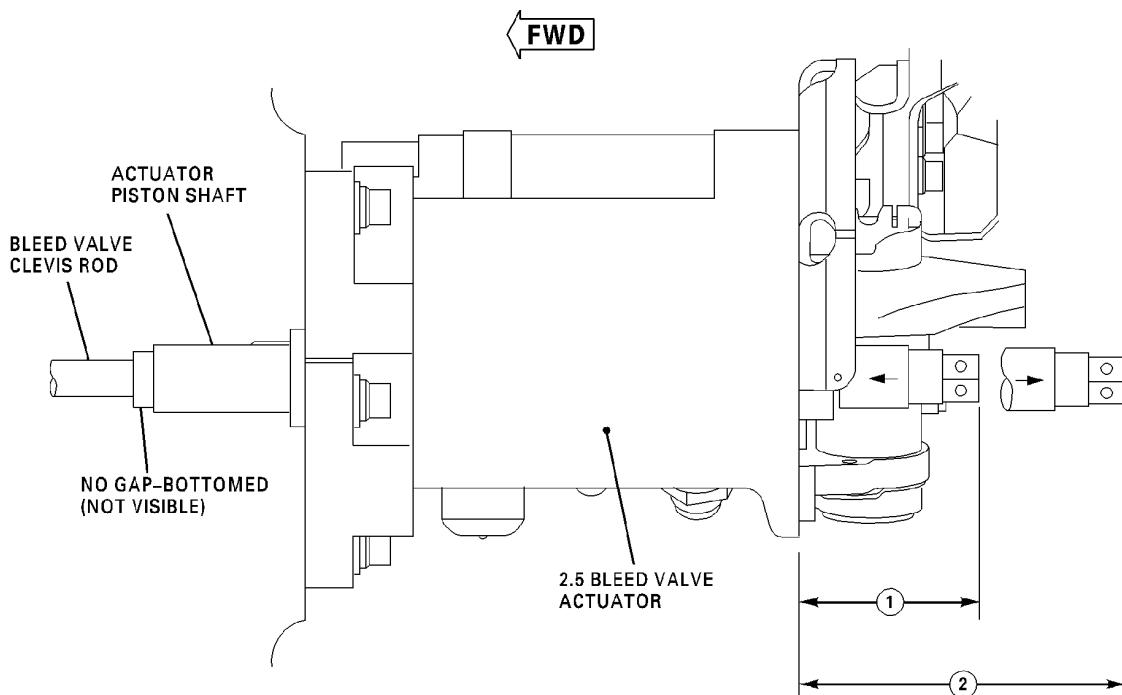
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PISTON TRAVEL CHECK

PISTON REARWARD.....DIMENSION ① _____
PISTON FORWARD.....DIMENSION ② _____
SUBTRACT _____
PISTON TRAVEL.....DIMENSION ③ _____

CAG(IGDS)

DB2-75-0334

2.5 Bleed Valve Actuator Adjustment - Piston Travel Check
Figure 506/75-32-01-990-880

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

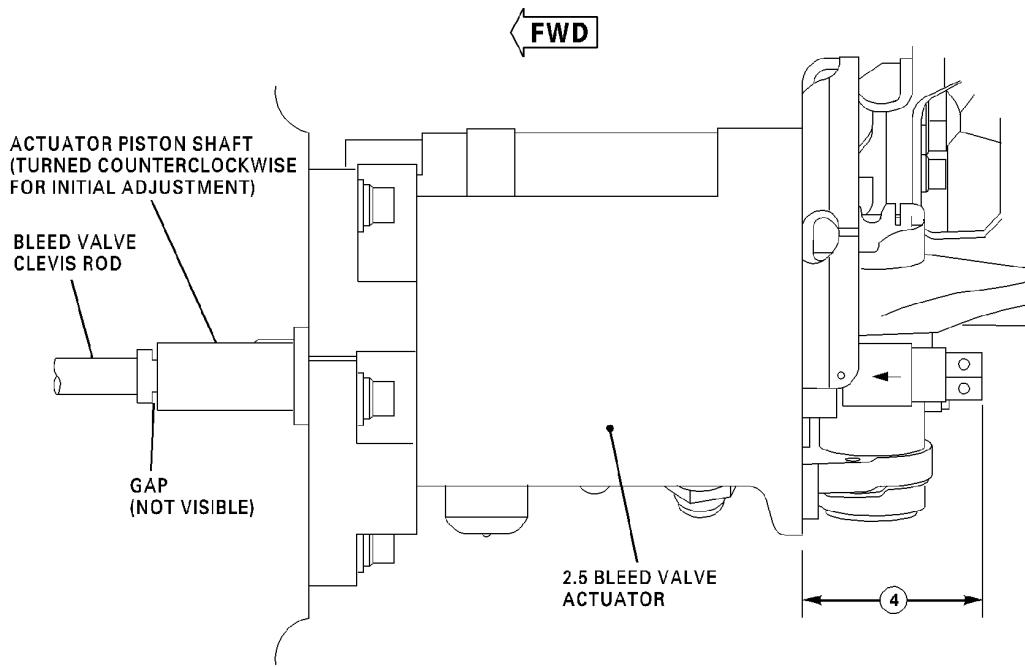
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INITIAL COMPRESSION ADJUSTMENT

NUMBER OF TURNS COUNTERCLOCKWISE FROM BOTTOMED _____

PISTON FORWARD
(AFTER INITIAL ADJUSTMENT).....DIMENSION ④ _____

DIMENSION ① _____

SUBTRACT — _____

INITIAL DIFFERENCE _____

CAG(IGDS)

DB2-75-0335

2.5 Bleed Valve Actuator Adjustment - Initial Compression
Figure 507/75-32-01-990-881

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

TP-11MM-FX

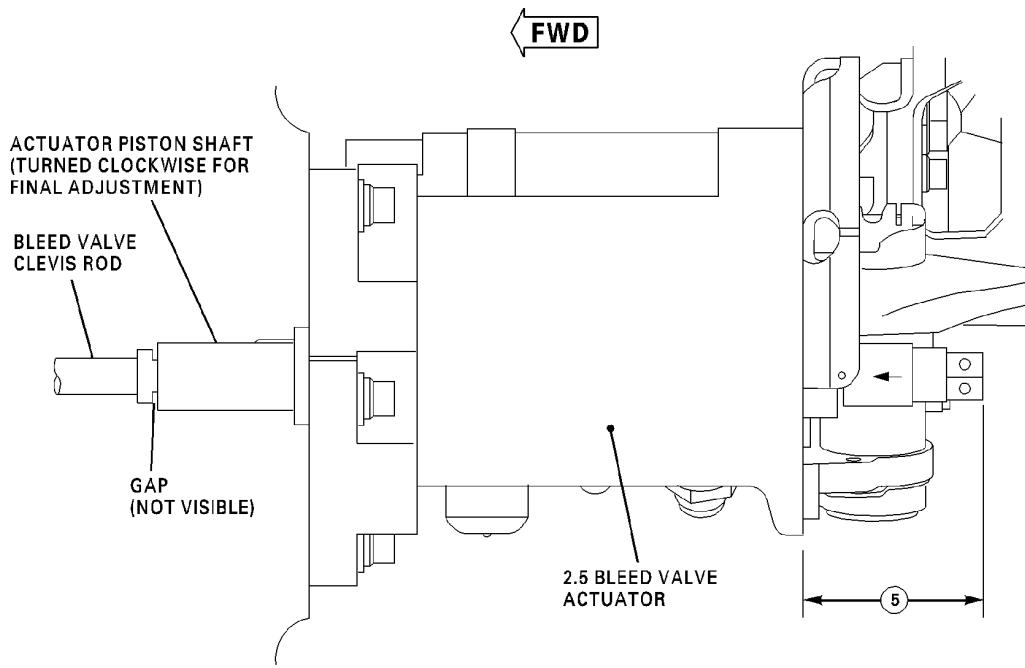
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FINAL COMPRESSION ADJUSTMENT

NUMBER OF TURNS CLOCKWISE FROM INITIAL ADJUSTMENT _____

PISTON FORWARD
(AFTER FINAL ADJUSTMENT).....DIMENSION ⑤ _____

DIMENSION ① _____

SUBTRACT — _____

FINAL DIFFERENCE _____

(NOTE: IF DIMENSION ① IS MORE THEN DIMENSION ⑤, SUBTRACT
DIMENSION ⑤ FROM DIMENSION ① TO DETERMINE THE DIFFERENCE.)

CAG(IGDS)

DB2-75-0336

2.5 Bleed Valve Actuator Adjustment - Final Compression
Figure 508/75-32-01-990-882

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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AIRCRAFT MAINTENANCE MANUAL

ACTUATOR, VARIABLE BYPASS VALVE - INSPECTION/CHECK

1. General

- A. This procedure has the inspection instructions for the variable bypass valve actuator.
- B. Unless different instructions are given, this procedure is the same for the three G.E. CF6-80C2D1F engines.

TASK 75-32-01-210-801

2. INSPECTION OF THE VARIABLE BYPASS VALVE ACTUATOR

A. References

Reference	Title
71-10-00 P/B 201 Config 1	COWL DOOR OPENING AND CLOSING PROCEDURES - MAINTENANCE PRACTICES
71-10-00 P/B 201 Config 2	DOORS, OPEN AND CLOSE OF ENGINE COWL - MAINTENANCE PRACTICES

B. Tools/Equipment

Reference	Description
STD-113	Boom - Aerial
STD-660	Platform - Maintenance, 4 to 8 ft (1.2 to 2.4 m) High

C. Job Set-up - Variable Bypass Valve Actuator Inspection

SUBTASK 75-32-01-941-001

- (1) Put a 4 to 8 ft (1.2 to 2.4 m) high maintenance platform, STD-660 or an aerial boom, STD-113 into position.

SUBTASK 75-32-01-010-278

- (2) Open the thrust reverser doors. (COWL DOOR OPENING AND CLOSING PROCEDURES - MAINTENANCE PRACTICES, PAGEBLOCK 71-10-00/201 Config 1 or DOORS, OPEN AND CLOSE OF ENGINE COWL - MAINTENANCE PRACTICES, PAGEBLOCK 71-10-00/201 Config 2)

D. Procedure - Variable Bypass Valve Actuator Inspection

SUBTASK 75-32-01-212-001

- (1) Do a visual inspection of the following:

Inspection of the Variable Bypass Valve Actuator

COMPONENT	INSPECT/CHECK FOR:	MAXIMUM SERVICEABLE LIMITS	CORRECTIVE ACTION
End cap	Fuel Leakage	Not Serviceable	Replace Actuator
Actuator Housing	Deformation, dents	Not Serviceable	Replace Actuator
	Nicks, scratches	Any amount that does not cause the housing to be deformed	Replace Actuator
	Loose coating	No loose coating or metal you can see is permitted	Repair. Refer to approved repairs

EFFECTIVITY
FX ALL

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Inspection of the Variable Bypass Valve Actuator (Continued)

COMPONENT	INSPECT/CHECK FOR:	MAXIMUM SERVICEABLE LIMITS	CORRECTIVE ACTION
Threaded Connectors. Removal of supply tubes is necessary	Stripped threads Nicks, dents in thread	Not Serviceable Any amount not to full depth of thread. No high metal permitted	Replace Actuator Chase threads or replace Actuator
Piston Rod	Scoring Bending Stripped threads	Not Serviceable Not Serviceable Not Serviceable	Replace Actuator Replace Actuator Replace Actuator

SUBTASK 75-32-01-212-002

- (2) Do a visual inspection of the following:

Visual Inspection of the Variable Bypass Valve Actuator Electrical Connector

COMPONENT	INSPECT/CHECK FOR:	MAXIMUM SERVICEABLE LIMITS	CORRECTIVE ACTION
Electrical Connector	Bent, broken or loose pins Burns, evidence of arcing Cracks or crossed threads Nicks, dents in threads Dirt, contamination	Not Serviceable Not Serviceable Not Serviceable Any amount not to full depth of thread	Replace Actuator Replace Actuator Replace Actuator Chase threads or replace actuator Clean with soft bristle brush and solvent C04-002

E. Job Close-up - Variable Bypass Valve Actuator Inspection

SUBTASK 75-32-01-942-273

- (1) Remove all the tools and the equipment from the work area. Make sure that the work area is clean.

SUBTASK 75-32-01-410-277

- (2) Close the thrust reverser doors. (COWL DOOR OPENING AND CLOSING PROCEDURES - MAINTENANCE PRACTICES, PAGEBLOCK 71-10-00/201 Config 1 or DOORS, OPEN AND CLOSE OF ENGINE COWL - MAINTENANCE PRACTICES, PAGEBLOCK 71-10-00/201 Config 2)

———— END OF TASK ————

— EFFECTIVITY —

FX ALL

TP-11MM-FX

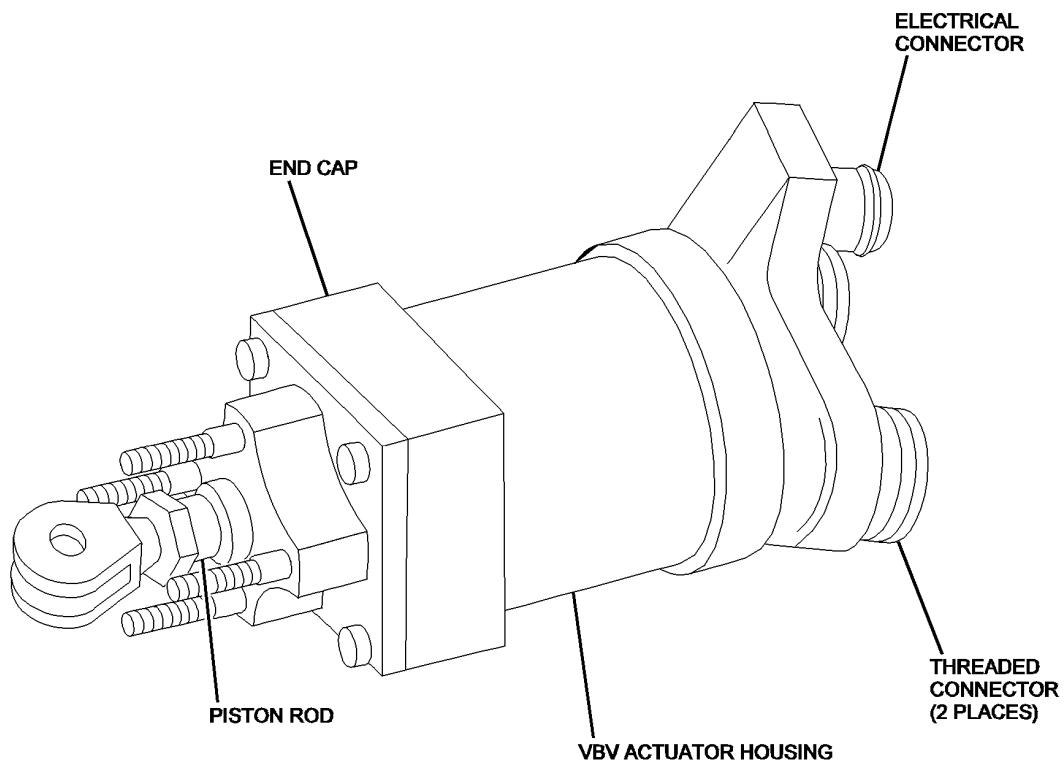
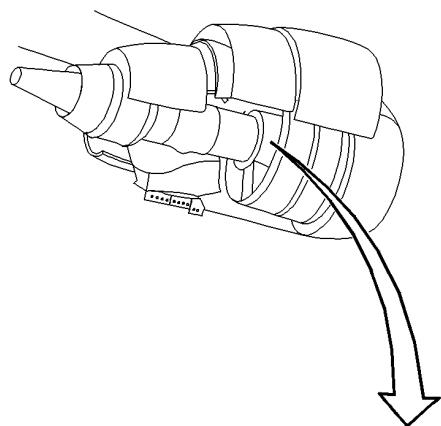
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DB2-75-0360
S0000402202V1

Variable Bypass Valve Acutator - Inspection
Figure 601/75-32-01-990-884

EFFECTIVITY
FX ALL

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ACTUATOR, INTERCOMPRESSOR (2.5) BLEED VALVE - INSPECTION/CHECK

1. General

- A. This procedure has the inspection instructions for the intercompressor 2.5 bleed valve actuator. Access to the actuator is through the left thrust reverser door.
- B. Unless different instruction are given, these procedures are the same for the three Pratt & Whitney PW4460 engines.

TASK 75-32-01-200-868

2. INSPECTION OF THE INTERCOMPRESSOR (2.5) BLEED VALVE ACTUATOR

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-32-01-000-868	REMOVAL OF THE 2.5 BLEED VALVE ACTUATOR (P/B 401)
75-32-01-400-868	INSTALLATION OF THE 2.5 BLEED VALVE ACTUATOR (P/B 401)

B. Tools/Equipment

Reference	Description
STD-113	Boom - Aerial
STD-573	Light - Explosion-proof
STD-600	Mirror - Inspection
STD-660	Platform - Maintenance, 4 to 8 ft (1.2 to 2.4 m) High

C. Job Set-up - Intercompressor (2.5) Bleed Valve Actuator Inspection

SUBTASK 75-32-01-865-270



WARNING

MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

OVERHEAD, BATTERY BUS

Row	Col	Number	Name
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

UPPER MAIN, ENGINE DC BUS 1

Row	Col	Number	Name
H	12	B1-1225	NAC COOLING ENG 1

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

SUBTASK 75-32-01-490-006

- (2) Put a 4 to 8 ft (1.2 to 2.4 m) high maintenance platform, STD-660 or a aerial boom, STD-113 into position.

SUBTASK 75-32-01-010-276

- (3) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Intercompressor (2.5) Bleed Valve Actuator Inspection

SUBTASK 75-32-01-211-267

- (1) Inspect the intercompressor (2.5) bleed valve actuator (1) as follows: (Figure 601) (Figure 602) (REMOVAL OF THE 2.5 BLEED VALVE ACTUATOR, TASK 75-32-01-000-868) (INSTALLATION OF THE 2.5 BLEED VALVE ACTUATOR, TASK 75-32-01-400-868)

Table 601

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
1. Internal seals.		
Drain port (FD19) for fuel leakage. 20 fuel dr/min (60 ml/hr).		
NOTE: A one time flyback limit of 120 drops/min (360 ml/hr) to nearest maintenance base that can replace the actuator is permitted.		
2. External surface.		
Actuator for fuel leakage.	None permitted.	If leakage is found, replace actuator.
3. Linkage assembly.		
Use a explosion-proof light, STD-573 (fluorescent light) and inspection mirror, STD-600 to make a visual inspection of the 2.5 bleed valve linkage assembly (2) through the two bleed duct ports (3) on each side of the No. 7 case strut (4).	Too much wear or damage could cause incorrect operation of the bleed system.	Repair or replace as necessary.
4. Examine the bellcrank -to-bracket pivot pins.		
See pins through the access ports. Apply finger pressure to the forward position and visually examine for broken and worn pins.		
Broken Pins.	0.250 in. (6.350 mm) Maximum movement of pin head permitted.	Continue in service limitation of 350 hours. SEE S/B PW4ENG A75-51.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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Table 601 (Continued)

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
5. Examine the 2.5 Bleed System Seals.		
NOTE: The 2.5 bleed system seals are orange in color. You cannot see the seals all the way around. Inspect the areas that you can see.		
Loss of Attachment or Loss of Seal Material	Missing (any amount) seal material or disbonded seal material	Bleed system is serviceable with any amount of missing seal material. Bleed system is serviceable after disbonded seal material is removed.
6. Examine the 2.5 Bleed Valve Screen.		
Screen Distortion	Any amount is permitted	Bleed screen is serviceable.
Missing Screen Material	Any amount is permitted	Full screens can be missing. Remove loose or about to be loose or broken off pieces.
NOTE: Before you do any maintenance, use tape over ports where screen material is missing.		
7. Examine the 2.5 Bleed Valve Linkage		
NOTE: Use a fluorescent white light and a mirror to examine the 2.5 bleed valve linkage for the missing cam followers, rubber damper rollers, and bearing pads.		
Missing Cam Followers	No more than two cam followers are permitted missing at the locations. This condition is permitted until the engine is scheduled for removal. At that time, Pratt and Whitney recommends that you do SB PW4ENG 72-659 and SB PW4ENG 72-660	Replace the missing cam followers.
Rubber Damper Rollers	The pieces of rubber or the total rubber can be missing in all the rubber damper locations. This condition is permitted until the engine is scheduled for removal. At that time, Pratt and Whitney recommends that you do SB PW4ENG 72-659 and SB PW4ENG 72-660.	Replace the rubber damper rollers at the subsequent engine removal.
Bearing Pads	An quantity of bearing pads can be missing at the locations installed. This condition is permitted until the engine is scheduled for removal. At that time, Pratt and Whitney recommends that you do SB PW4ENG 72-659 and SB PW4ENG 72-660.	Replace the bearing pads at the subsequent engine removal.

E. Job Close-up - Intercompressor (2.5) Bleed Valve Actuator Inspection

SUBTASK 75-32-01-942-270

- (1) Remove all the tools and equipment from the work area. Make sure that the work area is clean.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631, 642-645

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SUBTASK 75-32-01-410-274

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-32-01-865-272

- (3) Remove the safety tags and close these circuit breakers:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

UPPER MAIN, ENGINE DC BUS 2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
J	12	B1-1226	NAC COOLING ENG 2

UPPER MAIN, ENGINE DC BUS 3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
K	12	B1-1227	NAC COOLING ENG 3

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

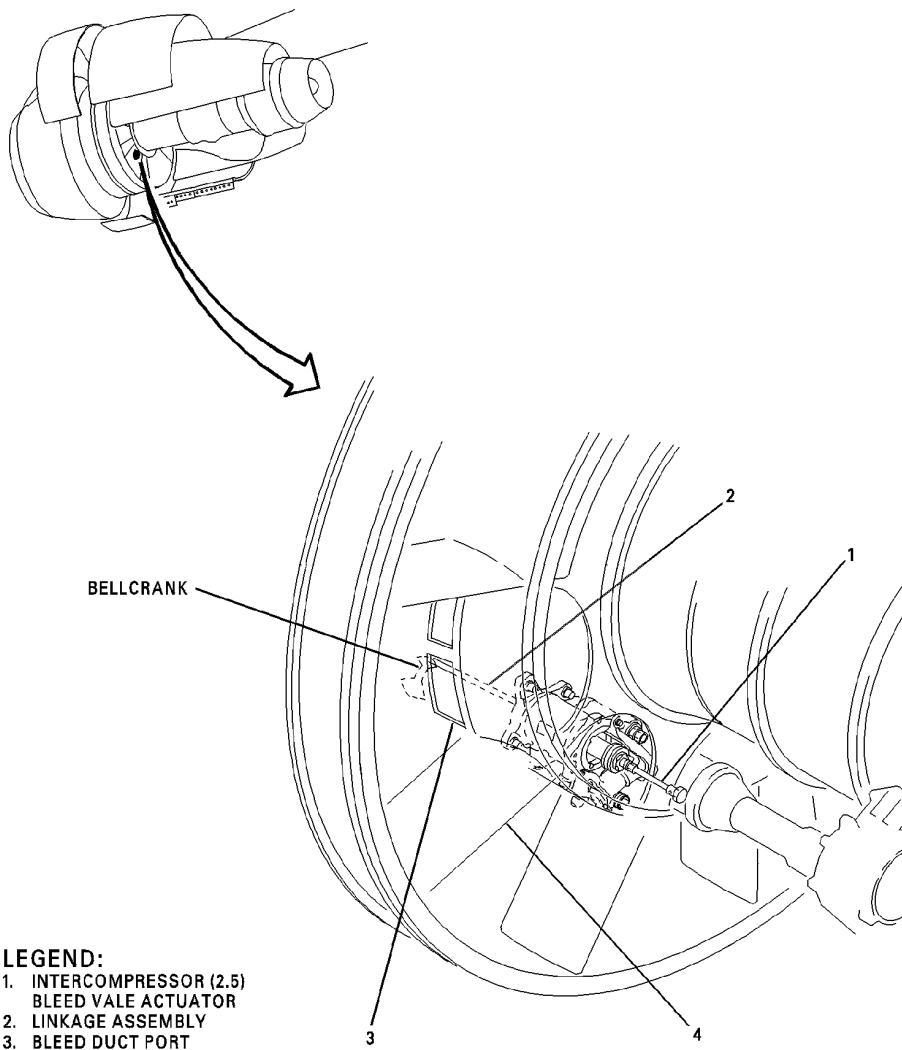
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CAG(IGDS)

DB2-75-0348

Intercompressor (2.5) Bleed Valve Actuator Inspection
Figure 601/75-32-01-990-873

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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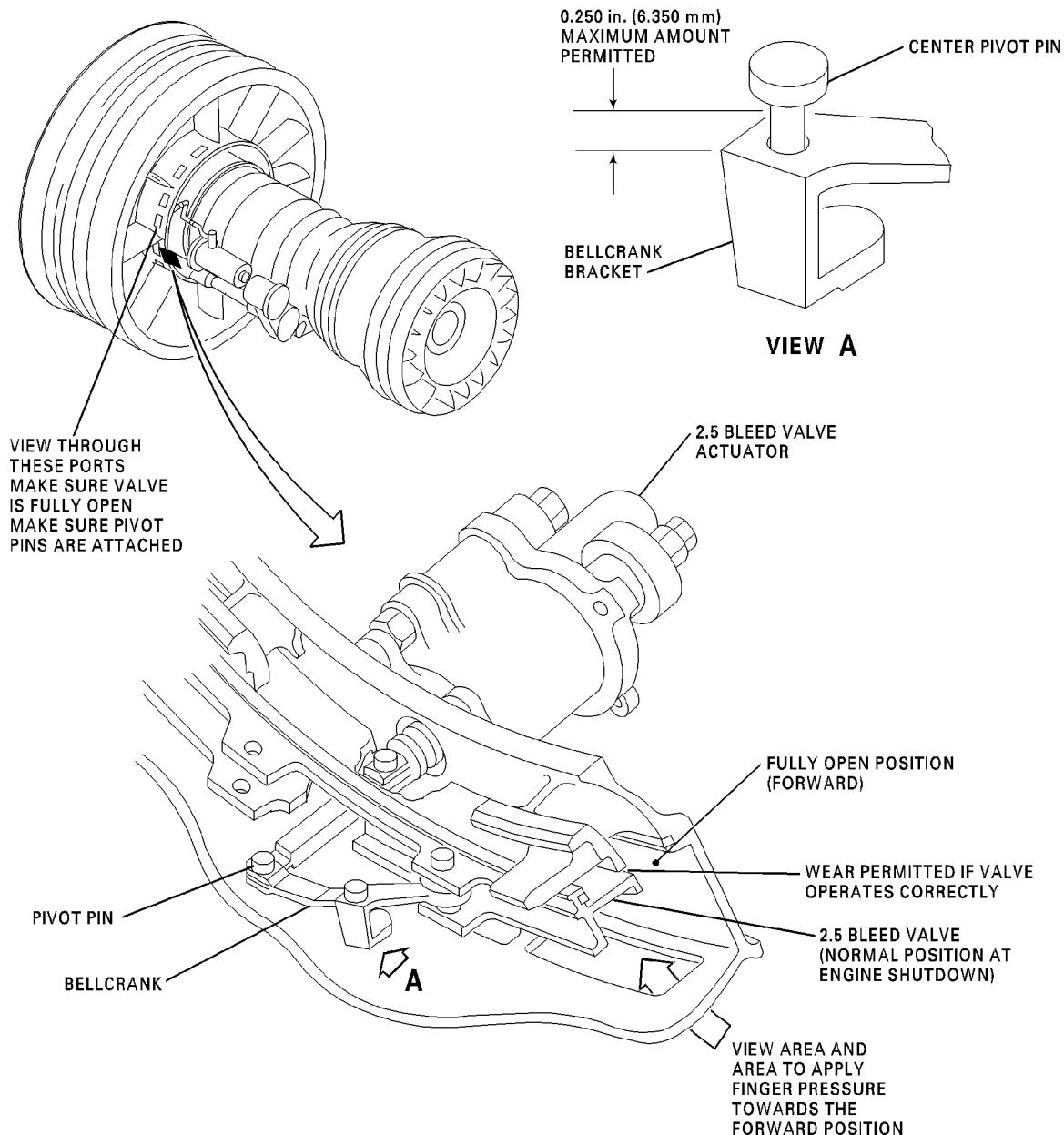
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CAG(IGDS)

DB2-75-0311

Intercompressor (2.5) Bleed Valve Inspection
Figure 602/75-32-01-990-875

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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HPC NINTH STAGE START/STABILIZATION - DESCRIPTION AND OPERATION

1. General

- A. The two 9th stage compressor bleeds, (HPC 9th stage start/stability (2.9) bleed system) gives increased compressor stability during engine start, decelerations, and shutdown. The valves bleed 9th stage air from the engine compressor. This gives smoother accelerations to idle during start, and prevents possible compressor surges or stalls during operation.
- B. The bleeds are controlled as a function of high rotor speed (N2) and engine inlet total temperature (T2). The electronic engine control (EEC) interfaces with the compressor bleed valves through two redundant coil solenoid valve assemblies. (Figure 1)

2. Bleed Valves

- A. The 2.9 bleed valves are installed at the 10 o'clock and 1 o'clock positions on the high pressure compressor (HPC). The 9th stage bleed valve has one flange-mounted inlet port, one flange-mounted outlet port and one threaded servo port. The valve is a normally-open, pneumatically-operated, poppet-type air shutoff valve. The valve opens and closes and permits HPC air to bleed into the fanstream. (Figure 2)

3. Bleed Valve Solenoid

- A. The two solenoid valves are remotely mounted on the intermediate case as part of a single assembly. The 9th stage bleed valve solenoids use one common inlet port, and two outlet, vent, and test ports, two solenoids, and two electrical connectors. The valves have two sections which actuate and control air flow to the bleed valve. The solenoids each have two coils, either of which can actuate the solenoid valve. (Figure 3)

4. System Operation

- A. During most of the engine start cycle, both 9th stage compressor bleeds are commanded open, which vents 9th stage compressor air into the fan stream. The two bleeds close at approximately 2% N2 below idle. The start 2.9 bleed (right bleed) stays closed during all engine operations. When the engine speed decreases to less than 81% N2 speed, if altitude is between 16,000 ft (4876.8 m) and 20,000 ft (6096 m), the left valve opens. The stability 2.9 bleed (left bleed) is opened for a maximum of 2 seconds if the engine is decelerated to below eighty-one percent N2 and is also opened if an impending engine surge is detected.
- B. The No. 1 solenoid controls 15th stage muscle air to the right (start) 2.9 bleed valve and also the inlet port of the No. 2 solenoid. The No. 2 solenoid controls the supply of muscle air pressure to the left (stability) bleed valve. Solenoid No. 1 is open when de-energized while solenoid No. 2 is closed when de-energized. The inlet port of solenoid No. 2 is only pressurized when solenoid No. 1 is de-energized.
- C. Each valve is a fail-safe (spring loaded) open piston valve assembly. The valves are pneumatically actuated to the closed position when a minimum of 10 PSI (68.9 kPa), 15th stage air is supplied to one side of the piston through the 2.9 bleed valve solenoid.
- D. The temperature sensor for the 2.9 bleed valve sends an electrical signal to the EEC. The EEC uses the signal to find the 2.9 bleed valve position. The sensor is a signal chromel/alumel thermocouple. When the valve opens and closes, the temperature in the valve housing changes. The EEC receives data about the temperature changes and finds the valve position.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631, 642-645

75-35-00

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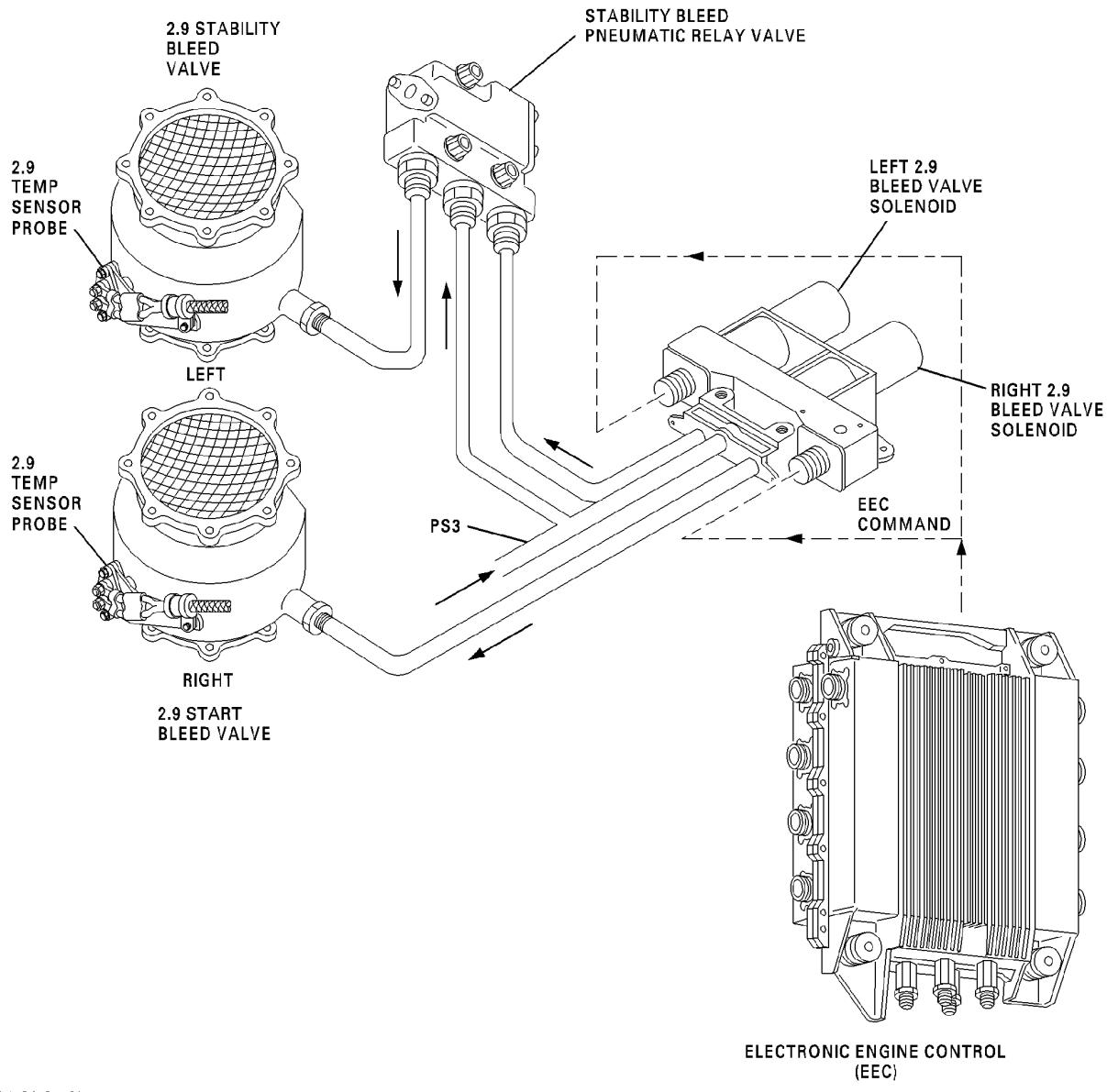
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CAG(IGDS)

ELECTRONIC ENGINE CONTROL
(EEC)

DB2-75-0179B

HPC 9th Stage Start/Stability (2.9) Bleed System
Figure 175-35-00-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-35-00

Config 2

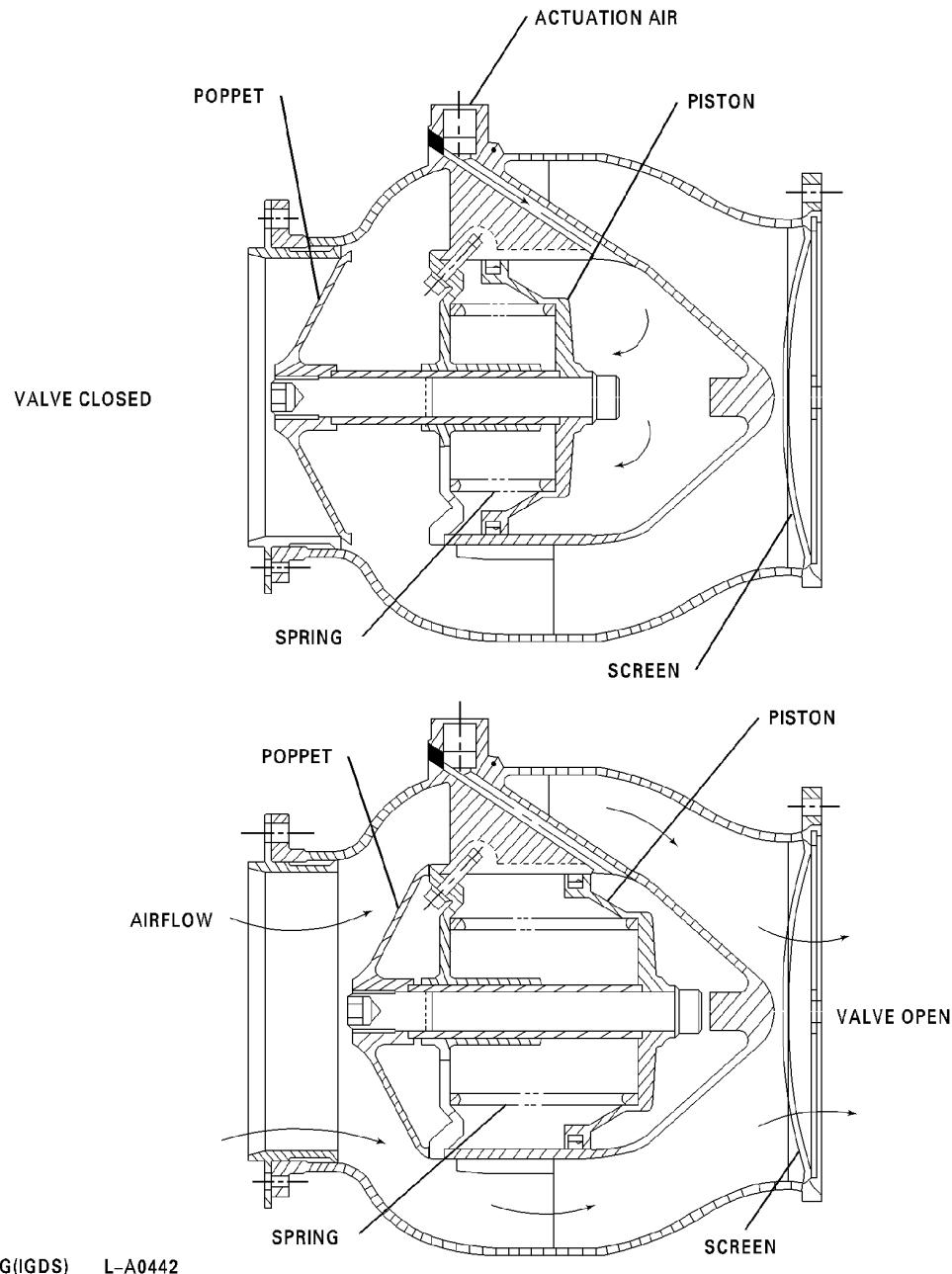
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CAG(IGDS) L-A0442

DB2-75-0180

9th Stage Start/Stability Bleed Valve
Figure 2/75-35-00-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-35-00

Config 2

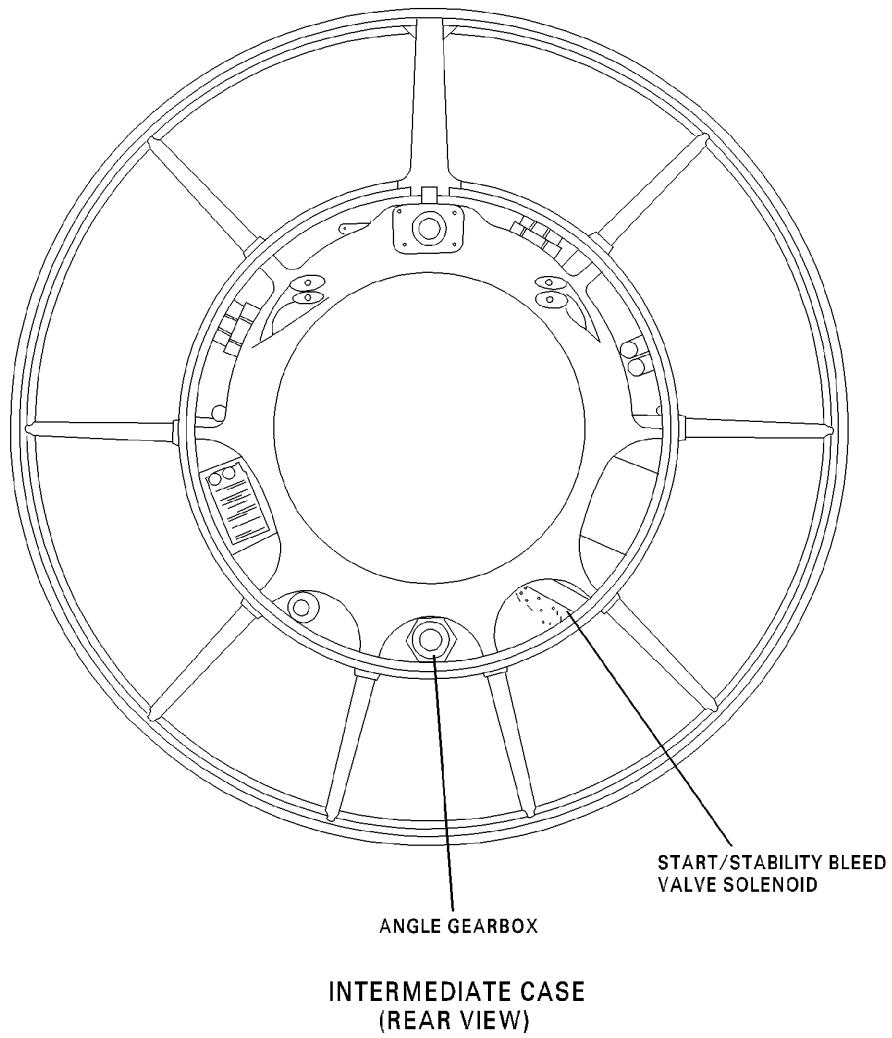
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CAG(IGDS)

DB2-75-0181

Start/Stability Bleed Solenoid Location
Figure 3/75-35-00-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-35-00

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VALVES, NINTH STAGE START/STABILITY (2.9) BLEED - REMOVAL/INSTALLATION

1. **General**

- A. This procedure has the removal and installation instructions for the ninth stage start/stability (2.9) bleed valves.
- B. The bleed valves are at the 10 o'clock and the 1 o'clock positions on the high pressure compressor (HPC) rear case.
- C. Access to the valves is through the thrust reverser doors.
- D. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-35-03-000-868

2. **REMOVAL OF THE NINTH STAGE START/STABILITY (2.9) BLEED VALVE**

A. **Fixtures, Tools, Test and Support Equipment**

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs
Not specified	Torque adapter (PWA 85436)

B. **References**

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-35-04-000-868	REMOVAL OF THE 2.9 BLEED VALVE BELLOWS ASSEMBLY (P/B 401)
75-35-07-000-868	REMOVAL OF THE RIGHT 2.9 BLEED VALVE THERMOCOUPLE PROBE (P/B 401)
75-35-07-000-869	REMOVAL OF THE LEFT 2.9 BLEED VALVE THERMOCOUPLE PROBE (P/B 401)

C. **Job Set-up - Ninth Stage Start/Stability (2.9) Bleed Valve Removal**

SUBTASK 75-35-03-010-268

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-35-03-010-269

- (2) Remove the right 2.9 bleed valve thermocouple probe. (REMOVAL OF THE RIGHT 2.9 BLEED VALVE THERMOCOUPLE PROBE, TASK 75-35-07-000-868)
- (3) Remove the left 2.9 bleed valve thermocouple probe. (REMOVAL OF THE LEFT 2.9 BLEED VALVE THERMOCOUPLE PROBE, TASK 75-35-07-000-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-35-03

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SUBTASK 75-35-03-010-270

- (4) Remove the bleed valve bellows seal. (REMOVAL OF THE 2.9 BLEED VALVE BELLOWS ASSEMBLY, TASK 75-35-04-000-868)

D. Procedure - Ninth Stage Start/Stability (2.9) Bleed Valve Removal

SUBTASK 75-35-03-020-267

- (1) Remove the ninth stage start/stability (2.9) bleed valve (1) as follows: (Figure 401)
 - (a) Disconnect the supply tube (2) from the bleed valve (1).
 - (b) Use the torque adapter (PWA 85436) and remove the eight bolts (3) that attach the bleed valve (1) to the high pressure compressor rear case. Remove the bleed valve (1) from the engine and discard the gasket (4).
 - (c) Remove the union (5) from the bleed valve (1) and discard the gasket (6). Install the protective caps and plugs.

SUBTASK 75-35-03-410-267

- (2) If the ninth stage start/stability (2.9) bleed valve is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-35-03

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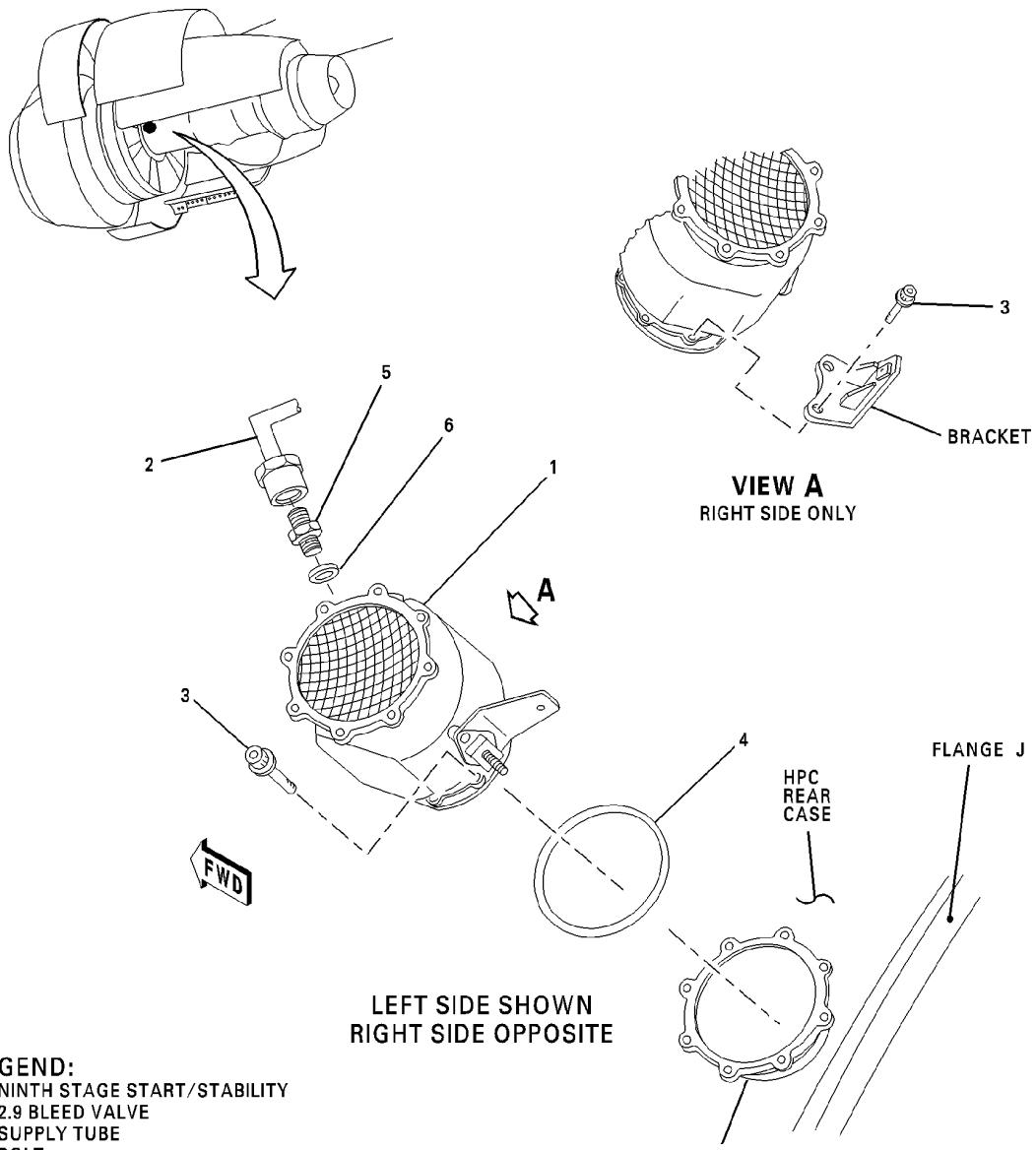
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LEGEND:

1. NINTH STAGE START/STABILITY
2. 2.9 BLEED VALVE
2. SUPPLY TUBE
3. BOLT
4. GASKET
5. UNION
6. GASKET

CAG(IGDS)

DB2-75-0137A

Ninth Stage Start/Stability Bleed Valve - Removal/Installation
Figure 401/75-35-03-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-35-03-400-868

3. INSTALLATION OF THE NINTH STAGE START/STABILITY (2.9) BLEED VALVE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–100 in-lb (0–11.0 N·m)
Not specified	Torque wrench 0–300 in-lb (0–34.0 N·m)
Not specified	Torque adapter (PWA 85436)
Model M303, M305 or M307	Crimper, Bergen Mechanical (optional)

B. Consumable Materials

(1) Consumable Materials

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)
P05-289	Lockwire (AS3214-02)
P06-054	Paste, antiseize (PWA 36246)
P05-291	Cable, safety (optional)
P05-292	Ferrule, safety cable (optional)

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE	DESIGNATION	IPC
4	Gasket	IPC 75-35-10-10-030
6	Gasket	IPC 75-35-10-10-010

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-35-04-400-868	INSTALLATION OF THE 2.9 BLEED VALVE BELLOWS ASSEMBLY (P/B 401)
75-35-07-400-868	INSTALLATION OF THE RIGHT 2.9 BLEED VALVE THERMOCOUPLE PROBE (P/B 401)
75-35-07-400-869	INSTALLATION OF THE LEFT 2.9 BLEED VALVE THERMOCOUPLE PROBE (P/B 401)
IPC 75-35-10	Illustrated Parts Catalog
IPC 75-35-10-10-010	Illustrated Parts Catalog
IPC 75-35-10-10-030	Illustrated Parts Catalog

E. Job Set-up - Ninth Stage Start/Stability (2.9) Bleed Valve Installation

SUBTASK 75-35-03-010-272

- (1) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - Ninth Stage Start/Stability (2.9) Bleed Valve Installation

SUBTASK 75-35-03-420-267

- (1) Install the ninth stage start/stability (2.9) bleed valve (1) as follows: (IPC 75-35-10) (Figure 401)
 - (a) Remove the protective caps and plugs. Install the gasket (6) on the union (5).



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the threads of the union (5) with engine oil (P03-001). Install the union (5) in the bleed valve (1). Torque the union (5) to 110–120 in-lb (12.4–13.6 N·m). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Install a gasket (4) in the groove of the boss. Install the bleed valve (1) on the boss and align the union (5) with the supply tube (2) elbow.
NOTE: The supply tube elbow aligns with the union on the forward side of the left valve and aft side of right valve.
- (d) Lubricate the threads of the eight bolts (3) with engine oil (P03-001). Install the eight bolts (3) that attach the bleed valve (1) to the engine. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
NOTE: The right valve has a bracket that is installed on the valve flange with the bolts.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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CAUTION
TORQUE ADAPTERS CHANGE THE CORRECT TORQUE WRENCH INDICATION. TOO MUCH TORQUE CAN CAUSE DAMAGE TO THE THREADED PARTS.

- (e) Use torque adapter (PWA 85436) and torque the eight bolts (3) to 85–95 in-lb (9.6–10.7 N·m). Do this step again until no torque drop is indicated.



USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- (f) Lubricate the threads of the union (5) with antiseize paste (P06-054). Install the supply tube (2) on the union (5). Torque the tube nut to 200–225 in-lb (22.6–25.4 N·m). Safety the tube nut with lockwire (P05-289), or safety cable (P05-291) and safety cable ferrule (P05-292). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)

G. Job Close-up - Ninth Stage Start/Stability (2.9) Bleed Valve Installation

SUBTASK 75-35-03-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-35-03-410-277

- (2) Install the right 2.9 bleed valve thermocouple probe. (INSTALLATION OF THE RIGHT 2.9 BLEED VALVE THERMOCOUPLE PROBE, TASK 75-35-07-400-868)

- (3) Install the left 2.9 bleed valve thermocouple probe. (INSTALLATION OF THE LEFT 2.9 BLEED VALVE THERMOCOUPLE PROBE, TASK 75-35-07-400-869)

SUBTASK 75-35-03-410-278

- (4) Install the bleed valve bellows seal. (INSTALLATION OF THE 2.9 BLEED VALVE BELLows ASSEMBLY, TASK 75-35-04-400-868)

SUBTASK 75-35-03-410-280

- (5) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-35-03-710-001

- (6) Do a operational check of the 2.9 bleed valve. (ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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BELLOWS, 2.9 BLEED VALVE ASSEMBLY – REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the left and right 2.9 bleed valve bellows assemblies.
- B. Unless different instruction are given, these procedures are the same on the three Pratt & Whitney PW4460/4462 engines.

TASK 75-35-04-000-868

2. REMOVAL OF THE 2.9 BLEED VALVE BELLows ASSEMBLY

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 Engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - 2.9 Bleed Valve Bellows Assembly Removal

SUBTASK 75-35-04-010-269

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-35-04-865-267

WARNING 
MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING 
TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Open this circuit breaker and install safety tag:

OVERHEAD, BATTERY DIRECT BUS

Row	Col	Number	Name
B	9	B1-467	ENG IGNITION OVERRIDE

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-35-04

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D. Procedure - 2.9 Bleed Valve Bellows Assembly Removal

SUBTASK 75-35-04-020-267

- (1) Remove the 2.9 bleed valve bellows (1) as follows: (Figure 401) (Figure 402)
 - (a) For the left bellows, remove the bolts (2 and 3) and washers (4) that attach the brackets (5 and 6) and the bellows (1) to the engine port.
 - (b) For the right bellows, remove the bolt (2, 3 and 7) and washer (4) that attach the brackets (8, 9 and 10) and the bellows (1) to the engine port.
 - (c) Remove the bellows (1). Put a protective cover on the engine bleed port.

SUBTASK 75-35-04-410-267

- (2) If the 2.9 bleed valve bellows assembly is not installed immediately, or weather conditions make it necessary, close the access doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-35-04

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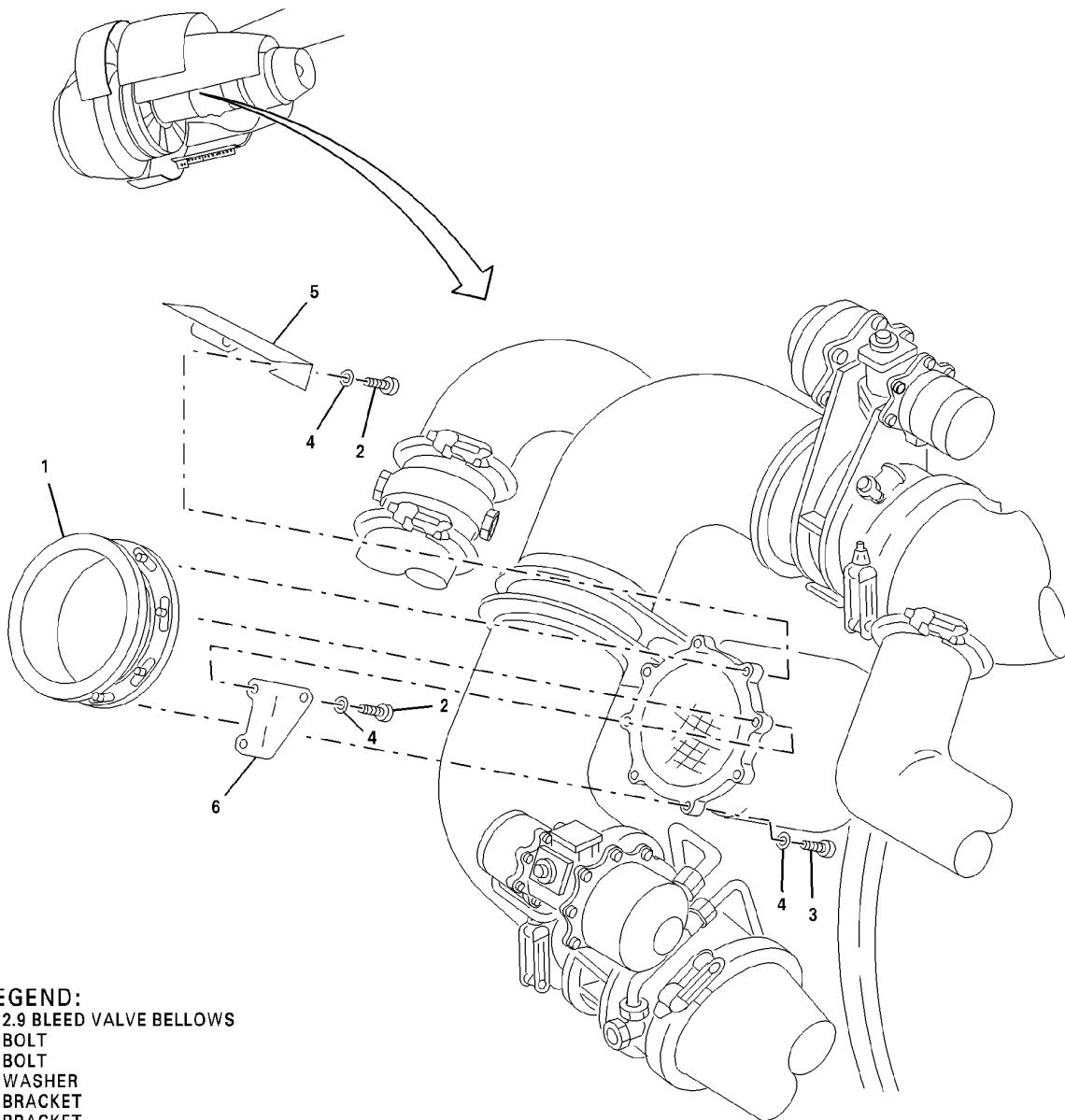
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LEGEND:

- 1. 2.9 BLEED VALVE BELLOWS
- 2. BOLT
- 3. BOLT
- 4. WASHER
- 5. BRACKET
- 6. BRACKET

CAG(IGDS)

DB2-75-0216

Right 2.9 Bleed Valve Bellows - Removal/Installation
Figure 401/75-35-04-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

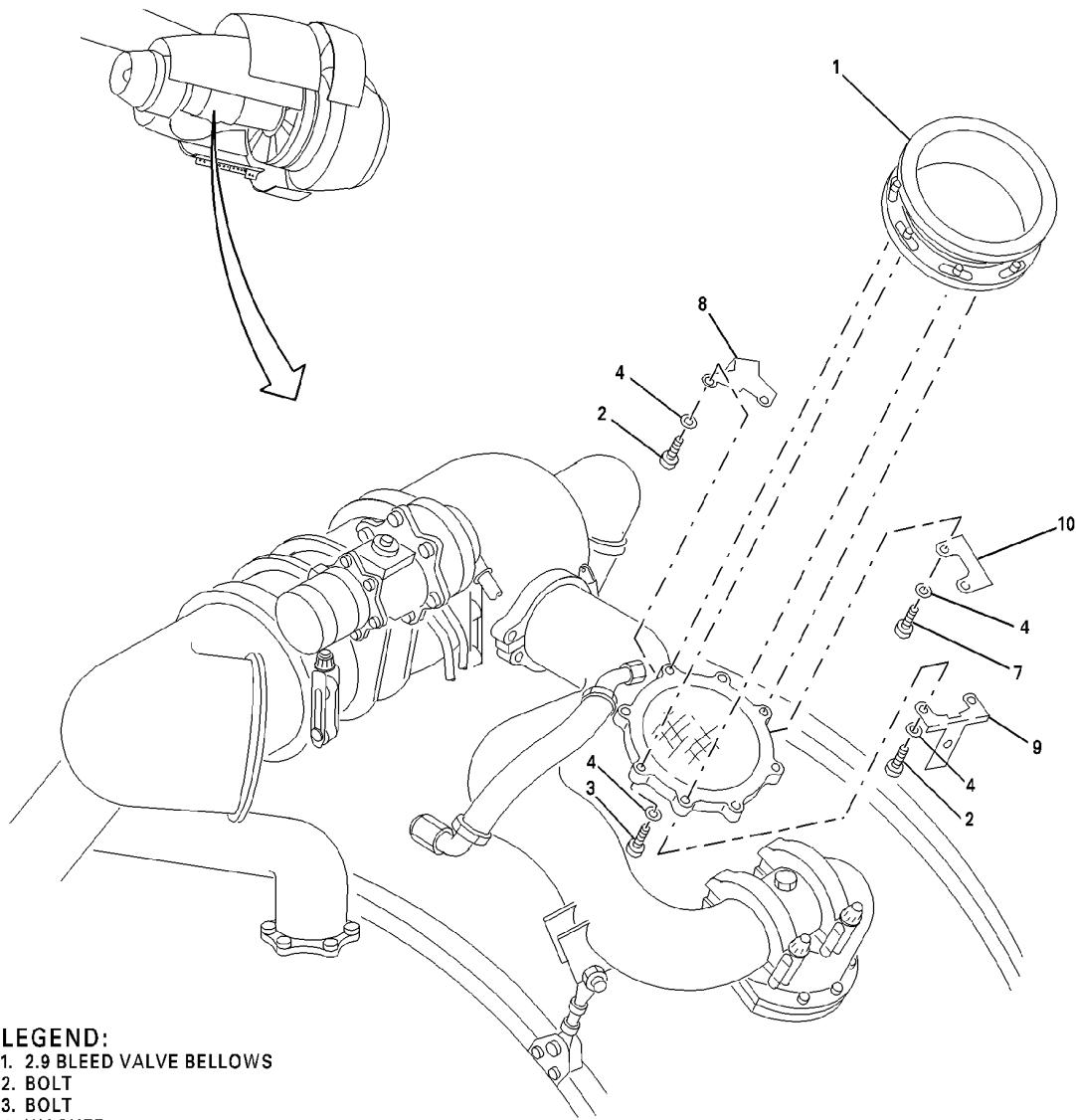
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LEGEND:

- 1. 2.9 BLEED VALVE BELLOWS
- 2. BOLT
- 3. BOLT
- 4. WASHER
- 7. BOLT
- 8. BRACKET
- 9. BRACKET
- 10. BRACKET

CAG(IGDS)

DB2-75-0217

Left 2.9 Bleed Valve Bellows - Removal/Installation
Figure 402/75-35-04-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-35-04

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TASK 75-35-04-400-868

3. INSTALLATION OF THE 2.9 BLEED VALVE BELLOWS ASSEMBLY

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0-100 in-lb (0-11.0 N·m)

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - 2.9 Bleed Valve Bellows Assembly Installation

SUBTASK 75-35-04-865-268



MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.



TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that this circuit breaker is open and has safety tag:

OVERHEAD, BATTERY DIRECT BUS

Row	Col	Number	Name
B	9	B1-467	ENG IGNITION OVERRIDE

SUBTASK 75-35-04-010-268

- (2) If necessary, open the engine access doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - 2.9 Bleed Valve Bellows Assembly Installation

SUBTASK 75-35-04-420-268

- (1) Install the 2.9 bleed valve bellows (1) as follows: (Figure 401) (Figure 402)
- Remove the protective cover from the bleed port. Put the bellows (1) on the engine bleed port.
 - For the left bellows, install the bolts (2 and 3) and washers (4) that attach the brackets (5 and 6) and the bellows (1) to the engine port.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-35-04

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- (c) For the right bellows, install the bolt (2, 3 and 7) and washer (4) that attach the brackets (8, 9 and 10) and the bellows (1) to the engine port.
- (d) Torque the bolts (2, 3 and 7) to 62-72 in-lb (7.0-8.2 N·m).

E. Job Close-up - 2.9 Bleed Valve Bellows Assembly Installation

SUBTASK 75-35-04-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-35-04-410-269

- (2) Close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

SUBTASK 75-35-04-865-269

- (3) Remove the safety tag and close this circuit breaker:

OVERHEAD, BATTERY DIRECT BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	9	B1-467	ENG IGNITION OVERRIDE

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SOLENOID, START/STABILITY BLEED VALVE – REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the start/stability bleed valve solenoid.
- B. Access to the solenoid is through the right thrust-reverser door.
- C. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-35-05-000-868

2. REMOVAL OF THE START/STABILITY BLEED VALVE SOLENOID

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.22-2.44 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
72-33-02-000-869	REMOVAL OF THE FAN EXIT LINER INNER REAR SEGMENTS (P/B 401)

C. Job Set-up - Start/Stability Bleed Valve Solenoid Removal

SUBTASK 75-35-05-010-268

- (1) Open the right thrust-reverser door. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-35-05-030-270

- (2) Remove the fan exit liner inner rear segment. (REMOVAL OF THE FAN EXIT LINER INNER REAR SEGMENTS, TASK 72-33-02-000-869)

D. Procedure - Start/Stability Bleed Valve Solenoid Removal

SUBTASK 75-35-05-020-267

- (1) Remove the start/stability bleed valve solenoid (1) as follows: (Figure 401)
 - (a) Disconnect the two electrical connectors (6 and 7) from the solenoid (1). Install protective caps and plugs.
 - (b) Disconnect the three bleed valve supply tubes (8, 9, and 10). Remove the three nuts (11) and three screws (12) from the tube clamps. Remove the tubes from the rear of the solenoid (1). Install protective caps and plugs.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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- (c) Remove the four bolts (15) and the bracket (16) that attach the solenoid (1) to the mount bracket on the intermediate case. Remove the solenoid (1) from the engine. (Figure 402)
- (d) If it is necessary to replace the solenoid (1) do as follows:
 - 1) Put the solenoid (1) on a bench with the adaptor cap (17) up and the solenoids to the right.
 - 2) Remove the two adapters (18 and 19), plug (20), and the three gaskets (21, 22, and 23) from the rear of the solenoid (1). Discard the three gaskets (21, 22, and 23).
 - 3) Remove the cap (17) from the adapter on the top of the solenoid (1).
 - 4) Remove the two adapters (24 and 25) and the two gaskets (26 and 27) from the top of the solenoid (1). Discard the two gaskets (26 and 27).
 - 5) Install protective caps on the openings of the solenoid (1).

SUBTASK 75-35-05-410-267

- (2) If the start/stability bleed valve solenoid is not installed immediately, close the access doors.
(CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

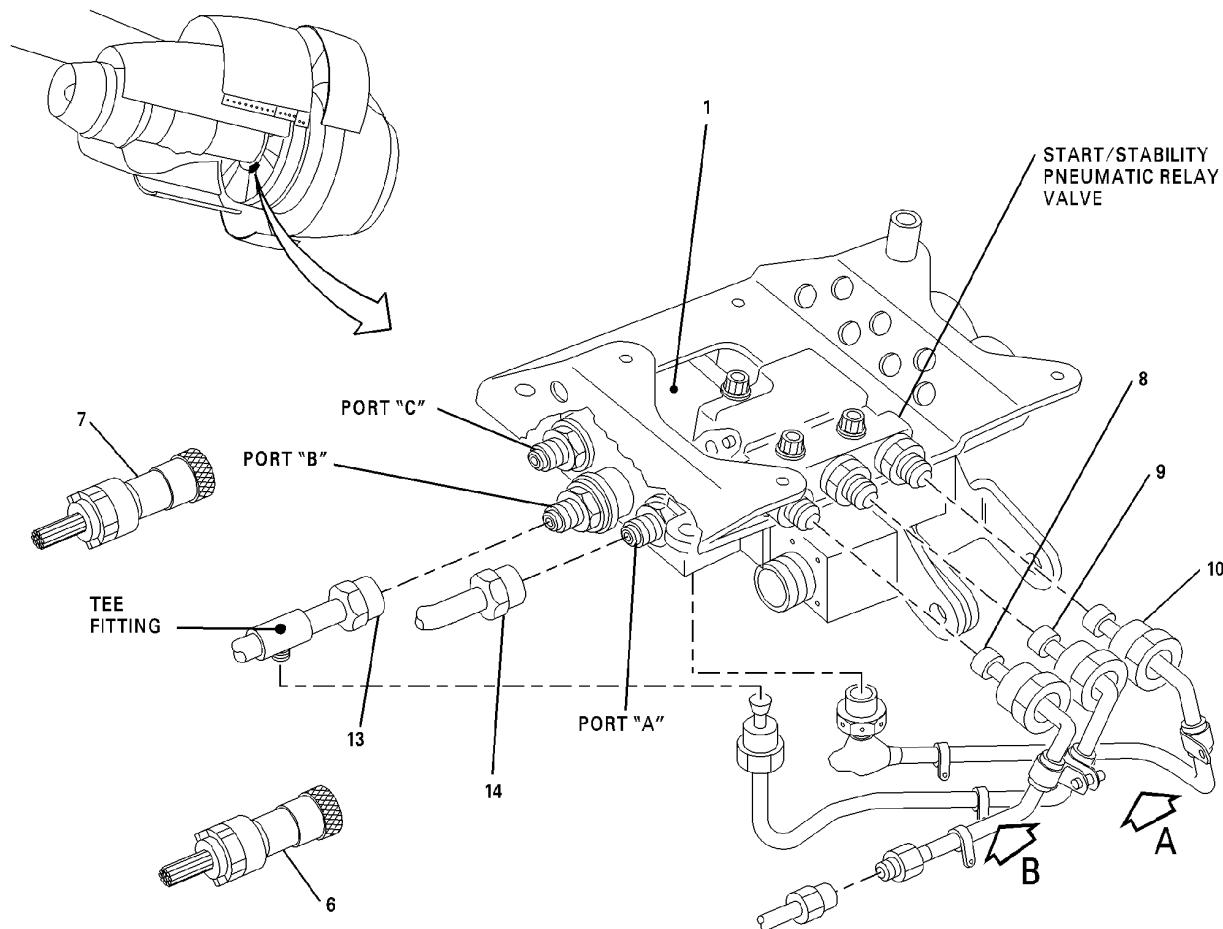
———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

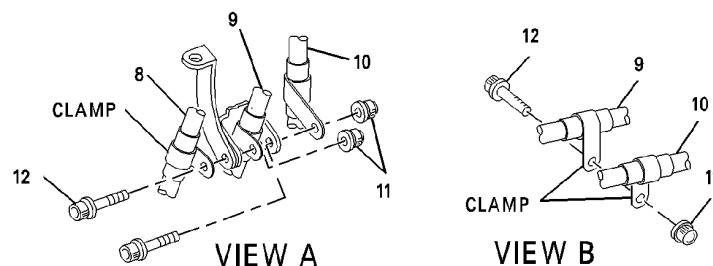
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LEGEND:

1. START/STABILITY BLEED VALVE SOLENOID
6. HARNESS CONNECTOR
7. HARNESS CONNECTOR
8. SUPPLY TUBE
9. SUPPLY TUBE
10. SUPPLY TUBE
11. NUT
12. BOLT
13. SUPPLY TUBE
14. SUPPLY TUBE



CAG(IGDS)

DB2-75-0114

Start/Stability Bleed Valve Solenoid - Removal/Installation
Figure 401/75-35-05-990-871

EFFECTIVITY
 FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
 642-645

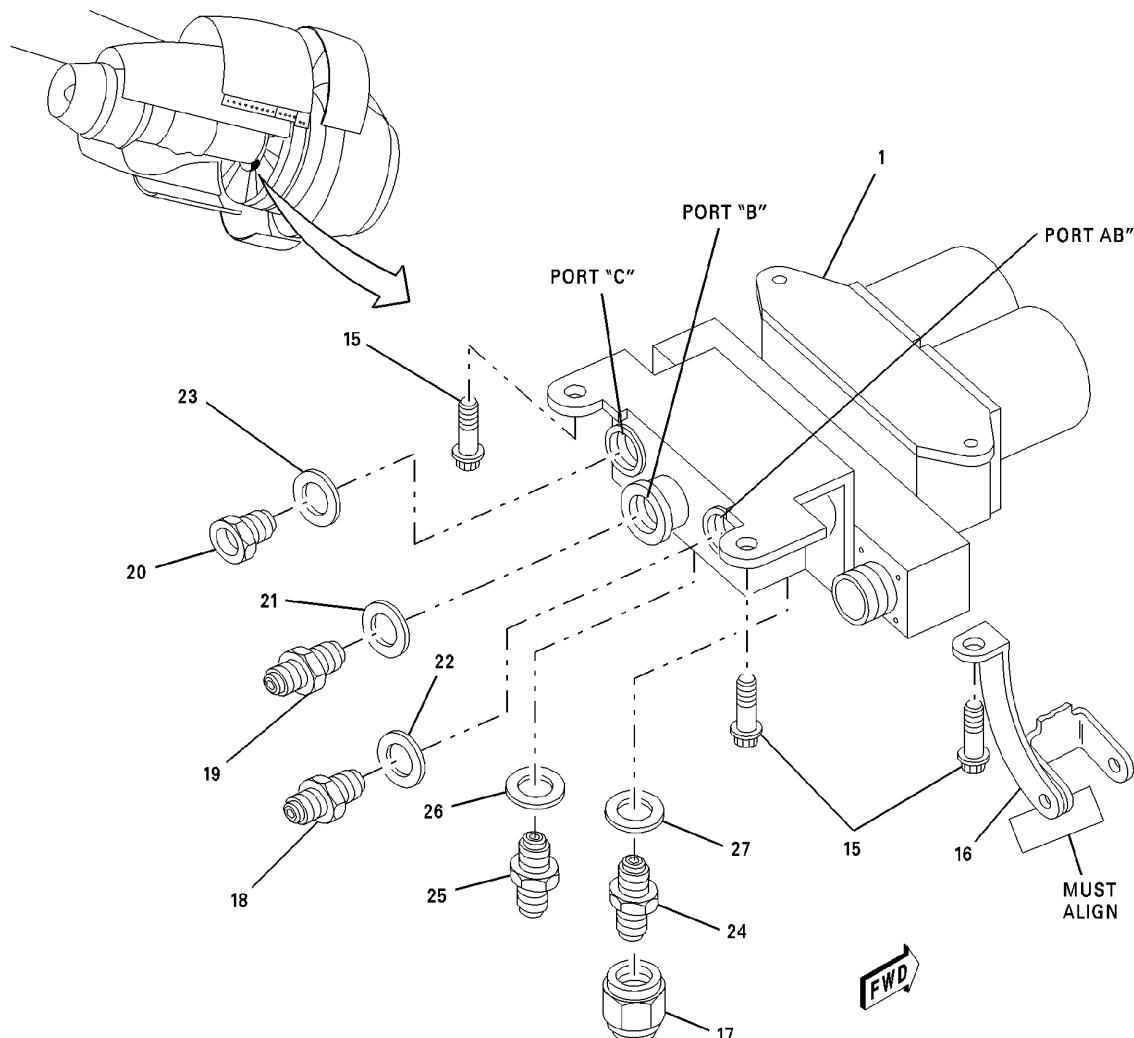
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LEGEND:

1. START/STABILITY BLEED VALVE SOLENOID	20. PLUG
15. BOLT	21. GASKET
16. BRACKET	22. GASKET
17. CAP	23. GASKET
18. ADAPTER	24. ADAPTER
19. ADAPTOR	25. ADAPTER
	26. GASKET
	27. GASKET

CAG(IGDS)

DB2-75-0115A

Start/Stability Bleed Valve Solenoid - Removal/Installation
Figure 402/75-35-05-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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TASK 75-35-05-400-868

3. INSTALLATION OF THE START/STABILITY BLEED VALVE SOLENOID

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.22-2.44 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-300 in-lb (0-33.9 N·m)

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)
P05-289	Lockwire (AS3214-02)
P06-054	Paste, antiseize (PWA 36246)

C. Expendable Parts

- (1) Expendable Parts

Table 404

REFERENCE	DESIGNATION	IPC
21	Gasket	IPC 75-35-30-10-100
22,23	Gasket	IPC 75-35-30-10-095
26,27	Gasket	IPC 75-35-30-10-090

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
72-33-02-400-869	INSTALLATION OF NEW FAN EXIT LINER INNER REAR SEGMENTS (P/B 401)

EFFECTIVITY
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(Continued)

Reference	Title
IPC 75-35-30-10-090	Illustrated Parts Catalog
IPC 75-35-30-10-095	Illustrated Parts Catalog
IPC 75-35-30-10-100	Illustrated Parts Catalog

E. Job Set-up - Start/Stability Bleed Valve Solenoid Installation

SUBTASK 75-35-05-010-269

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - Start/Stability Bleed Valve Solenoid Installation

SUBTASK 75-35-05-420-267

- (1) Install the start/stability bleed valve solenoid (1) as follows: (Figure 401) (Figure 402)
 - (a) If the solenoid (1) is to be replaced do the subsequent:
 - 1) Put the solenoid (1) on a bench with the two ports that have a thread up. Put the solenoids to the right.
 - 2) Remove the protective caps from all the ports on the solenoid (1).



WARNING

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- 3) Lubricate the threads of the two adapters (24 and 25) with engine oil (P03-001). Install the two adapters (24 and 25) and gaskets (26 and 27) in the top ports of the solenoid (1). Torque the two adapters (24 and 25) to 65–75 in-lb (7.3–8.5 N·m). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - 4) Lubricate the threads of the cap (17) with engine oil (P03-001). Install the cap (17) on to the adapter (24). Torque the cap (17) to 90–100 in-lb (10.2–11.3 N·m). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - 5) Lubricate the threads of the two adapters (18 and 19) with engine oil (P03-001). Install the adapter (19), and the gasket (21) in port 'B' in the rear of the solenoid (1). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - 6) Install adapter (18), and the gasket (22), in port 'A' in the rear of the solenoid (1). Torque the adapter (18) to 110–120 in-lb (12.4–13.5 N·m). Torque the adapter (19) to 150–170 in-lb (12.4–13.5 N·m).
 - 7) Lubricate the threads of the plug (20) with engine oil (P03-001). Install the plug (20) and the gasket (23) in port 'C' in the rear of the solenoid (1). Torque the plug (20) to 110–120 in-lb (12.4–13.5 N·m). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (b) Lubricate the threads of the four bolts (15) with engine oil (P03-001). Install the solenoid (1) to the bracket (16) on the intermediate case. Make sure the two electrical connectors (6 and 7) point rearward. Align the four bolts (15) and the bracket (16). Torque the four bolts (15) to 85–95 in-lb (9.6–10.7 N·m).

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1752, MOLYKOTE(R) P-37 ANTISEIZE PASTE

HAZMAT 1000, REFER TO MSDS

- (c) Lubricate the threads of the adapter (19) with antiseize paste (P06-054). Connect the supply tube (13) to the adapter (19). Torque the tube nut to 225–250 in-lb (25.4–28.2 N·m). (Figure 401) (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (d) Lubricate the threads of the adapter (18) with antiseize paste (P06-054). Connect the supply tube (14) to the adapter (18). Torque the tube nut to 200–225 in-lb (22.6–25.4 N·m). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (e) Safety the two supply tubes (13 and 14) and the plug (20) with lockwire (P05-289). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (f) Lubricate the threads of the supply tube (10) at the elbow end with engine oil (P03-001). Lubricate the threads at the straight end with antiseize paste (P06-054). Connect the supply tube (10) to the adapter (25) at the bottom of the solenoid (1) and to the relay valve forward adapter. (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (g) Lubricate the threads of the bolt (12) with engine oil (P03-001). Install the three bolts (12) and the three nuts (11). Torque the three nuts (11) to 36–40 in-lb (4.1–4.5 N·m). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (h) Connect the supply tube (10) nut to the adapter (25). Torque the nut to 90–100 in-lb (10.5–11.3 N·m). Safety the nut to the cap (17) with lockwire (P05-289). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (i) Torque the supply tube (10) nut to 65–75 in-lb (7.3–8.5 N·m).
 - (j) Lubricate the threads of the bleed valve supply tube (8) with antiseize paste (P06-054). Connect supply tube (8) to the pneumatic relay valve and torque the nut to 225–250 in-lb (25.4–28.2 N·m). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (k) Lubricate the threads of the bleed valve supply tube (9) with antiseize paste (P06-054). Connect the supply tube (9) to the pneumatic relay and the supply tube (13) tee fitting. Torque the nuts to 200–225 in-lb (22.6–25.4 N·m). Safety the nuts with lockwire (P05-289). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (l) Connect the two electrical connectors (6 and 7) to the bleed valve solenoid (1).
- (2) Install the fan exit liner inner rear segment. (INSTALLATION OF NEW FAN EXIT LINER INNER REAR SEGMENTS, TASK 72-33-02-400-869)

G. Job Close-up - Start/Stability Bleed Valve Solenoid Installation

SUBTASK 75-35-05-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the work area is clean.

SUBTASK 75-35-05-410-268

- (2) Close the thrust-reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

— END OF TASK —

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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VALVE, STABILITY BLEED PNEUMATIC RELAY - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the stability bleed pneumatic relay.
- B. The relay is found at the 5 o'clock position attached to a bracket on the intermediate case.
- C. Unless different instructions are given, these procedures are the same for all three Pratt & Whitney PW4460/4462 engines and the PW4460/4462-3 (Phase-3) engines.

TASK 75-35-06-000-868

2. REMOVAL OF THE STABILITY BLEED PNEUMATIC RELAY VALVE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-35-05-000-868	REMOVAL OF THE START/STABILITY BLEED VALVE SOLENOID (P/B 401)

C. Job Set-up - Stability Bleed Pneumatic Relay Valve Removal

SUBTASK 75-35-06-010-268

- (1) Open the right thrust reverser cowl door. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-35-06-010-269

- (2) Remove the start stability bleed valve solenoid. (REMOVAL OF THE START/STABILITY BLEED VALVE SOLENOID, TASK 75-35-05-000-868)

D. Procedure - Stability Bleed Pneumatic Relay Valve Removal

SUBTASK 75-35-06-020-268

- (1) Remove the stability bleed pneumatic relay valve (1) as follows: (Figure 401)
 - (a) Remove the three bolts (10) and nuts (2) that attach the relay valve (1) to the intermediate case bracket at the 5 o'clock position.
 - (b) Remove the relay valve (1) from the bracket (3). Install protective caps and plugs.
 - (c) If necessary, remove the three adapters (5, 7, and 8) and gaskets (4, 6, and 9) from the relay valve (1).
 - (d) Install protective caps and plugs.

EFFECTIVITY
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SUBTASK 75-35-06-410-267

- (2) If the stability bleed pneumatic relay valve is not installed immediately, or weather conditions make it necessary, close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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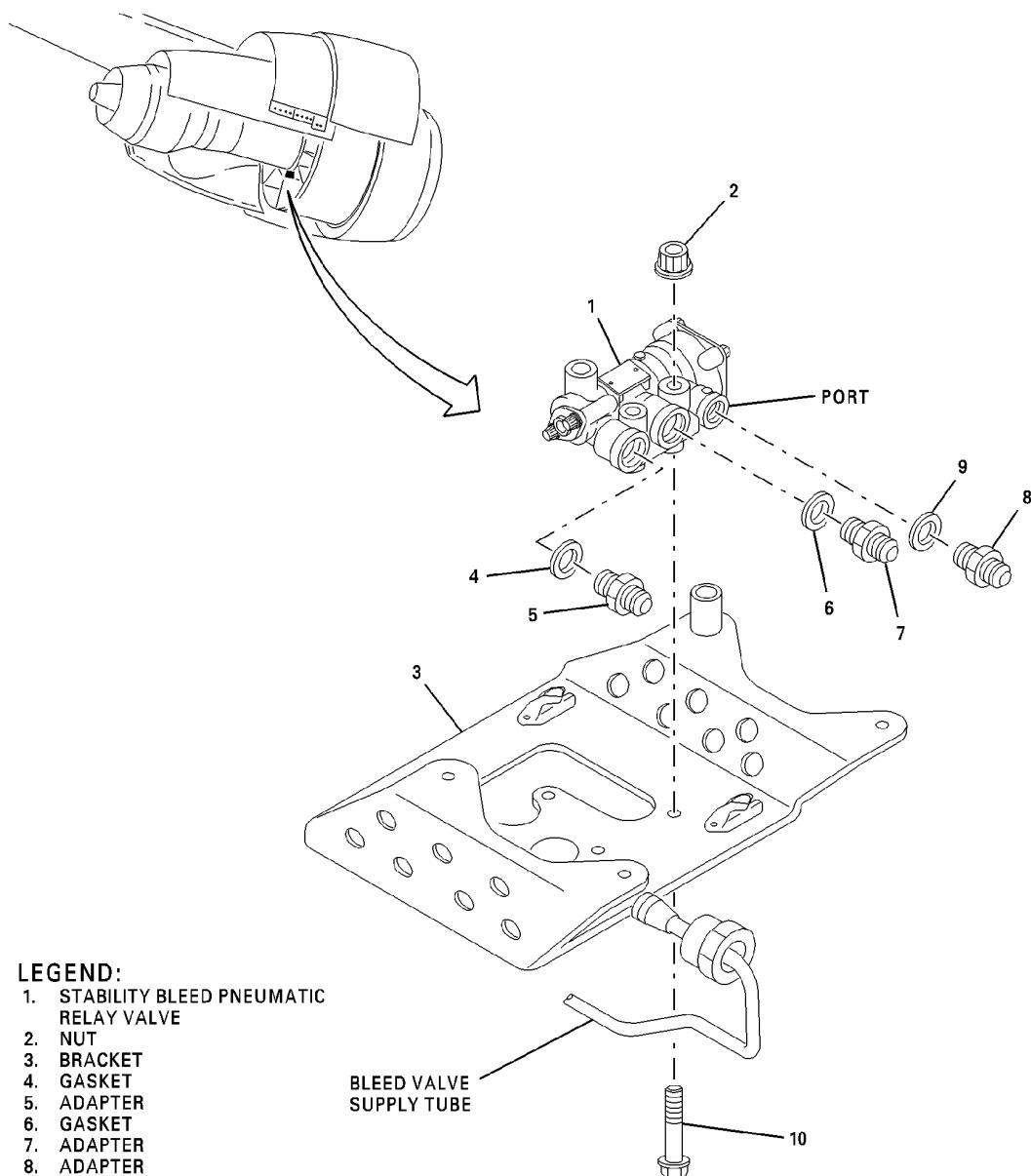
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LEGEND:

- 1. STABILITY BLEED PNEUMATIC RELAY VALVE
- 2. NUT
- 3. BRACKET
- 4. GASKET
- 5. ADAPTER
- 6. GASKET
- 7. ADAPTER
- 8. ADAPTER
- 9. GASKET
- 10. BOLT

CAG(IGDS)

DB2-75-0048A

Stability Bleed Pneumatic Relay Valve - Removal/Installation
Figure 401/75-35-06-990-868

EFFECTIVITY
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TASK 75-35-06-400-868

3. INSTALLATION OF THE STABILITY BLEED PNEUMATIC RELAY VALVE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0-300 in-lb (0-33.9 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, Engine lubricating (PWA 521B)

C. Expendable Parts

(1) Expendable Parts

Table 404

REFERENCE/ITEM	DESIGNATION	IPC
4	Gasket	IPC 75-35-30-10-090
6	Gasket	IPC 75-35-30-10-095
9	Gasket	IPC 75-35-30-10-100

D. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-02-06-700-873	ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06) (P/B 501)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-35-05-400-868	INSTALLATION OF THE START/STABILITY BLEED VALVE SOLENOID (P/B 401)
IPC 75-35-30	Illustrated Parts Catalog
IPC 75-35-30-10-090	Illustrated Parts Catalog

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Reference	Title
IPC 75-35-30-10-095	Illustrated Parts Catalog
IPC 75-35-30-10-100	Illustrated Parts Catalog

E. Job Set-up - Stability Bleed Pneumatic Relay Valve Installation

SUBTASK 75-35-06-010-271

- (1) If necessary, open the right thrust reverser cowl door. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

F. Procedure - Stability Bleed Pneumatic Relay Valve Installation

SUBTASK 75-35-06-420-267

- (1) Install the stability bleed pneumatic relay valve (1). (IPC 75-35-30) (Figure 401)
 - (a) Remove the protective caps and plugs from the valve (1).

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) If necessary, lubricate the threads of the three adapters (5, 7, and 8) and gaskets (4, 6, and 9) with engine oil (P03-001). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) If necessary, install the gaskets (4, 6, and 9) to the adapters (5, 7, and 8) and install the adapters to the ports on the relay valve (1).
- (d) Torque the adapter (5) to 150-170 in-lb (16.9–19.2 N·m).
- (e) Torque the adapter (7) to 110-120 in-lb (12.4–13.5 N·m).
- (f) Torque the adapter (8) to 65-75 in-lb (7.3-8.4 N·m).
- (g) Put the relay valve (1) on the intermediate case bracket (3) at the 5 o'clock position with the adapters (5, 7, and 8) up.

USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.



THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (h) Lubricate the threads of the bolts (10) and nuts (2) with engine oil (P03-001).
- (i) Attach the relay valve (1) with the three bolts (10) and nuts (2).
- (j) Torque the three bolts (10) to 85-95 in-lb (9.6-10.7 N·m)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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SUBTASK 75-35-06-420-269

- (2) Install the start/stability bleed valve solenoid. (INSTALLATION OF THE START/STABILITY BLEED VALVE SOLENOID, TASK 75-35-05-400-868)

G. Job Close-up Stability Bleed Pneumatic Relay Valve Installation

SUBTASK 75-35-06-090-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-35-06-720-267

- (2) Do a electronic engine control idle test. (ELECTRONIC ENGINE CONTROL IDLE TEST (ADJ/TEST 06), TASK 71-02-06-700-873)

SUBTASK 75-35-06-410-271

- (3) Close the thrust reverser door. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
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AIRCRAFT MAINTENANCE MANUAL

PROBES, 2.9 BLEED VALVE THERMOCOUPLE - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the left and right 2.9 bleed valve thermocouple probes.
- B. The thermocouple probes are found in the 2.9 bleed valves at the 10:00 and 1:00 o'clock position on the high pressure compressor. Access to the probes is through the thrust-reverser doors.
- C. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-35-07-000-868

2. REMOVAL OF THE RIGHT 2.9 BLEED VALVE THERMOCOUPLE PROBE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Right 2.9 Bleed Valve Thermocouple Probe Removal

SUBTASK 75-35-07-010-268

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Right 2.9 Bleed Valve Thermocouple Probe Removal

SUBTASK 75-35-07-020-267

- (1) Remove the right 2.9 bleed valve thermocouple (1) as follows: (Figure 401)
 - (a) Remove the nuts (2 and 3) that attach the harness lead to the thermocouple probe (1).
 - (b) Remove the bolt (4) that attaches the harness lead and ground cable to the bracket (6).
 - (c) Remove the two bolts (5), the bracket (6), and the thermocouple probe (1) from the bleed valve.
 - (d) Install the protective plug on the bleed valve.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-35-07

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SUBTASK 75-35-07-410-267

- (2) If the right 2.9 bleed valve thermocouple probe is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

75-35-07

Config 2

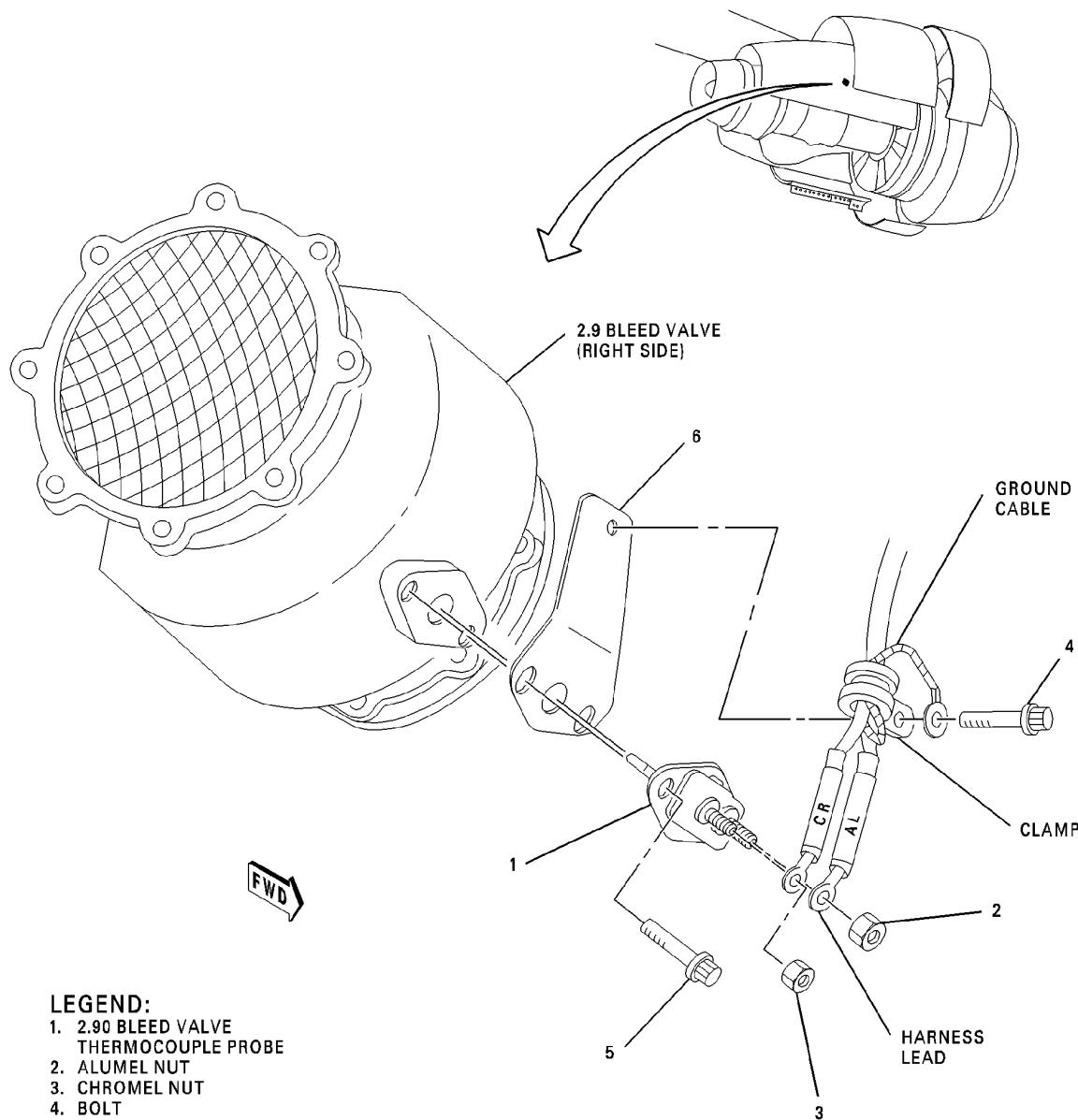
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LEGEND:

1. 2.90 BLEED VALVE THERMOCOUPLE PROBE
2. ALUMEL NUT
3. CHROMEL NUT
4. BOLT
5. BOLT
6. BRACKET

CAG(IGDS) L-A7371

DB2-75-0135A

Right 2.9 Bleed Valve Thermocouple Probe Removal/Installation
Figure 401/75-35-07-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-35-07-400-868

3. INSTALLATION OF THE RIGHT 2.9 BLEED VALVE THERMOCOUPLE PROBE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–100 in-lb (0–11.3 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 403

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-35-10	Illustrated Parts Catalog

D. Job Set-up - Right 2.9 Bleed Valve Thermocouple Probe Installation

SUBTASK 75-35-07-010-270

- (1) If necessary, open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - Right 2.9 Bleed Valve Thermocouple Probe Installation

SUBTASK 75-35-07-420-267

- (1) Install the right 2.9 bleed valve thermocouple probe (1) as follows: (IPC 75-35-10) (Figure 401)
(a) Remove the protective plug from the bleed valve.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-35-07

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the two bolts (5) with engine oil (P03-001). Install the thermocouple probe (1) and the bracket (6) on the 2.9 bleed valve with the two bolts (5). Torque the bolts to 85–95 in-lb (9.6–10.7 N·m). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) Lubricate the clamp bolt (4) with engine oil (P03-001). Attach the ground cable and the clamp to the bracket (6) with the bolt (4). Torque the bolt to 36–40 in-lb (4.1–4.5 N·m).
- (d) Install the harness to the thermocouple probe (1) with the two nuts (2 and 3).
- (e) Torque the nut (2) on the alumel (larger) stud of the thermocouple probe to 18–22 in-lb (2.0–2.5 N·m).
- (f) Torque the nut (3) on the chromel (smaller) stud of the thermocouple probe to 15–18 in-lb (1.7–2.0 N·m).

F. Job Close-up - Right 2.9 Bleed Valve Thermocouple Probe Installation

SUBTASK 75-35-07-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-35-07-410-268

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

— END OF TASK —

TASK 75-35-07-000-869

4. REMOVAL OF THE LEFT 2.9 BLEED VALVE THERMOCOUPLE PROBE

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 404

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MIL-C-5501 (Types 1 thru 15)	Protective caps and plugs

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-35-07

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C. Job Set-up - Left 2.9 Bleed Valve Thermocouple Probe Removal

SUBTASK 75-35-07-010-272

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Left 2.9 Bleed Valve Thermocouple Probe Removal

SUBTASK 75-35-07-020-268

- (1) Remove the left 2.9 bleed valve thermocouple probe (1) as follows: (Figure 402)
 - (a) Remove the nuts (6 and 7) that attach the harness lead to the thermocouple probe (1).
 - (b) (Pre SB PW4ENG 72-293) remove the bolt (8) or (Post SB PW4ENG 72-293) remove the nut (9), that attaches the harness lead and the ground cable to the bracket.
 - (c) Remove the bolts (10), the bracket, and the thermocouple probe (1) from the bleed valve.
 - (d) Install the protective plug on the bleed valve.

SUBTASK 75-35-07-410-270

- (2) If the left 2.9 bleed valve thermocouple probe is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-35-07

Config 2

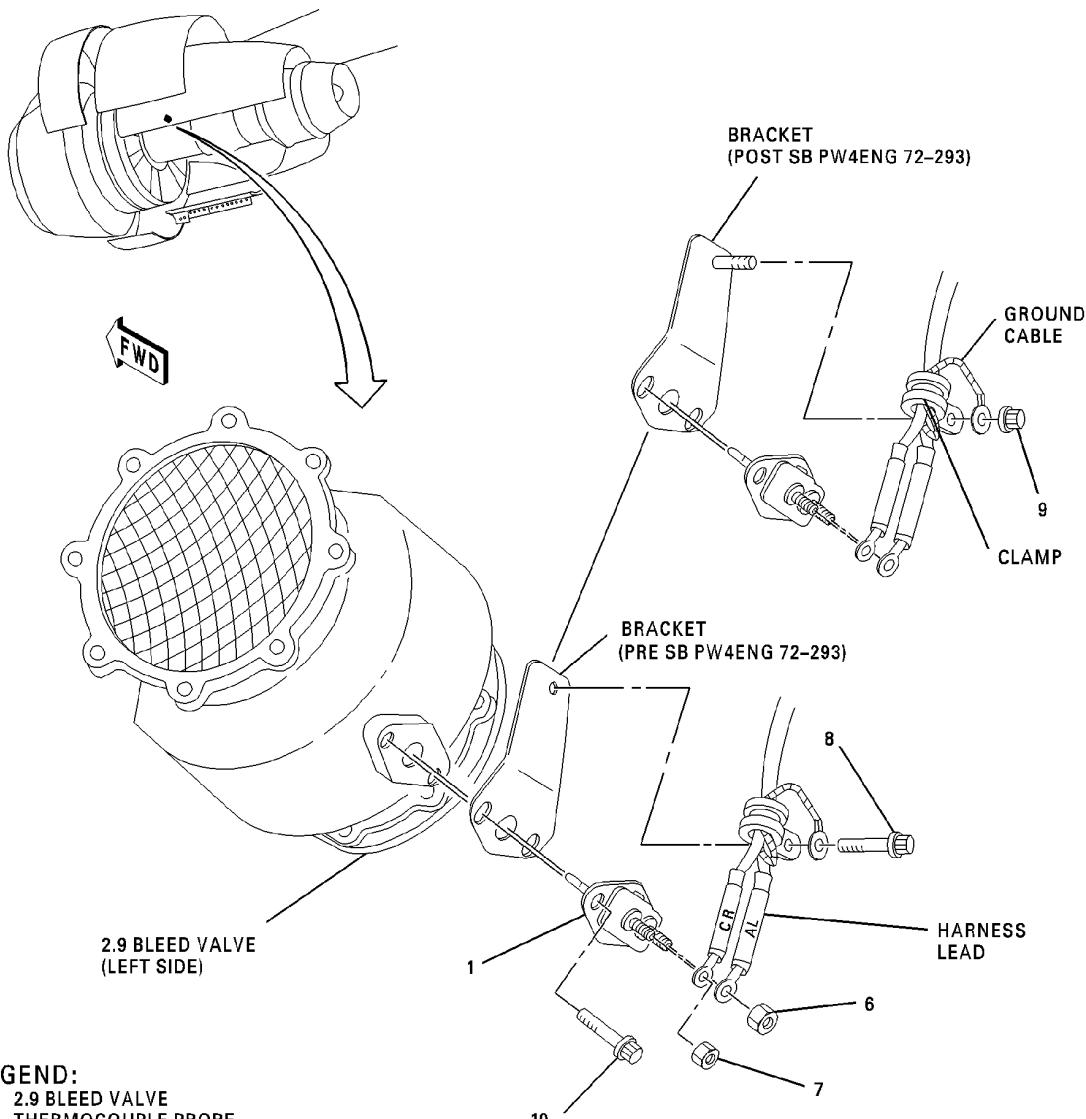
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LEGEND:

1. 2.9 BLEED VALVE THERMOCOUPLE PROBE
6. ALUMEL NUT
7. CHROMEL NUT
8. BOLT (PRE SB PW4ENG 72-293)
9. NUT (POST SB PW4ENG 72-293)
10. BOLT

CAG(IGDS) L-A7372

DB2-75-0136

Left 2.9 Bleed Valve Thermocouple Probe Removal/Installation
Figure 402/75-35-07-990-869

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-35-07-400-869

5. INSTALLATION OF THE LEFT 2.9 BLEED VALVE THERMOCOUPLE PROBE

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 405

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–100 in-lb (0–11.3 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 406

REFERENCE	DESIGNATION
P03-001	Oil, engine lubricating (PWA 521B)

C. References

Reference	Title
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
IPC 75-35-10	Illustrated Parts Catalog

D. Job Set-up - Left 2.9 Bleed Valve Thermocouple Probe Installation

SUBTASK 75-35-07-010-274

- (1) If necessary, open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - Left 2.9 Bleed Valve Thermocouple Probe Installation

SUBTASK 75-35-07-420-268

- (1) Install the left 2.9 bleed valve thermocouple probe (1) as follows: (IPC 75-35-10) (Figure 402)
(a) Remove the protective plug from the bleed valve.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-35-07

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USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

HAZARDOUS MATERIAL WARNINGS

HAZMAT 1016, OIL/LUBRICATING (DPM 3564)

HAZMAT 1000, REFER TO MSDS

- (b) Lubricate the two bolts (10) with engine oil (P03-001). Install the thermocouple probe (1) and the bracket on the 2.9 bleed valve with the bolts (10). Torque the bolts to 85–95 in-lb (9.6–10.7 N·m). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
- (c) (Pre SB PW4ENG 72-293) lubricate the clamp bolt (8) with engine oil (P03-001). Attach the harness lead, the ground cable and the clamp to the bracket (10) with the bolt (8). Torque the bolt to 36–40 in-lb (4.1–4.5 N·m).
- (d) (Post SB PW4ENG 72-293) lubricate the welded bolt with engine oil (P03-001). Attach the harness lead, the ground cable and the clamp to the bracket with the nut (9). Torque the nut to 36–40 in-lb (4.1–4.5 N·m).
- (e) Install the harness to the thermocouple probe (1) with the two nuts (6 and 7).
- (f) Torque the nut (6) on the alumel (larger) stud of the thermocouple probe to 18–22 in-lb (2.0–2.5 N·m).
- (g) Torque the nut (7) on the chromel (smaller) stud of the thermocouple probe to 15–18 in-lb (1.7–2.0 N·m).

F. Job Close-up - Left 2.9 Bleed Valve Thermocouple Probe Installation

SUBTASK 75-35-07-942-268

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-35-07-410-271

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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SCREEN, NINTH STAGE START/STABILITY (2.9) BLEED VALVE - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the ninth stage start/stability (2.9) bleed valve screen.
- B. The bleed valves are installed at the 10 o'clock and the 1 o'clock positions on the high pressure compressor (HPC) rear case.
- C. Access to the valves is through the thrust reverser doors.
- D. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines

TASK 75-35-08-000-869

2. REMOVAL OF THE NINTH STAGE START/STABILITY (2.9) BLEED VALVE SCREEN

A. **Fixtures, Tools, Test and Support Equipment**

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Protective caps and plugs

B. **References**

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-35-04-000-868	REMOVAL OF THE 2.9 BLEED VALVE BELLows ASSEMBLY (P/B 401)

C. **Job Set-up - Ninth Stage Start/stability (2.9) Bleed Valve Screen Removal**

SUBTASK 75-35-08-010-267

- (1) Open the thrust-reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

SUBTASK 75-35-08-010-268

- (2) Remove the bleed valve bellows seal. (REMOVAL OF THE 2.9 BLEED VALVE BELLows ASSEMBLY, TASK 75-35-04-000-868)

D. **Procedure - Ninth Stage Start/stability (2.9) Bleed Valve Screen Removal**

SUBTASK 75-35-08-020-267

- (1) Remove the bleed valve screen (1) from the ninth stage start/stability (2.9) bleed valve as follows: (Figure 401)
 - (a) Remove the screw (2) and the washer (3) from the center of the bleed valve screen (1).
 - (b) Remove the 12 screws (4) that attach the screen (1) to the ninth stage start/stability (2.9) bleed valve. Remove the screen (1) and install a protective cap.

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-35-08-410-267

- (2) If the bleed valve screen is not installed immediately, or weather conditions make it necessary, close the engine doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645**

75-35-08

Config 2

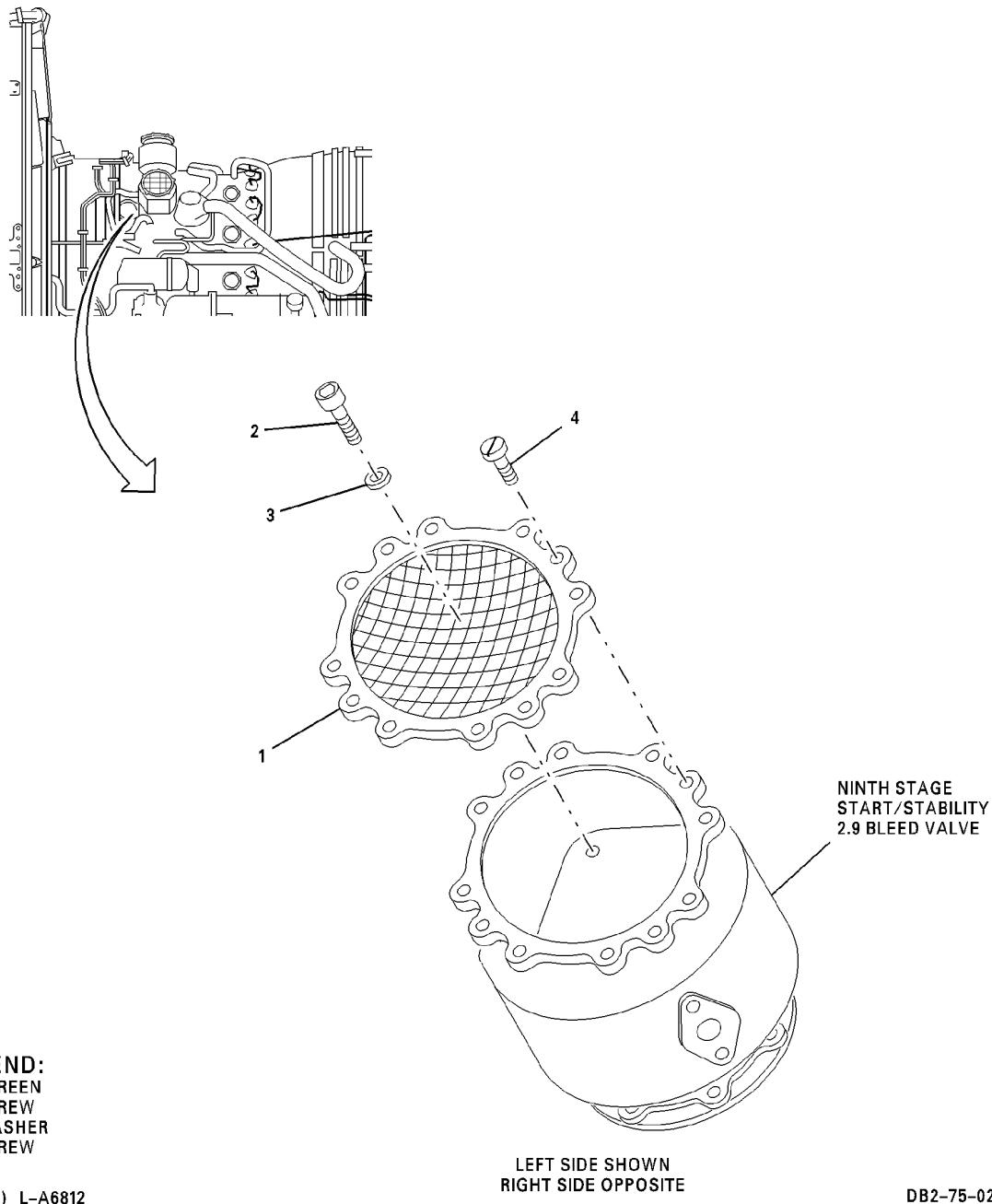
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LEGEND:

- 1. SCREEN
- 2. SCREW
- 3. WASHER
- 4. SCREW

CAG(IGDS) L-A6812

LEFT SIDE SHOWN
RIGHT SIDE OPPOSITE

DB2-75-0215

Bleed Valve Screen - Removal/Installation
Figure 401/75-35-08-990-868

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-35-08-400-868

3. INSTALLATION OF THE NINTH STAGE START/STABILITY (2.9) BLEED VALVE SCREEN

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and 3 engines, 4–8 ft (1.2–2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0–100 in-lb (0–11.0 N·m)

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
75-35-04-400-868	INSTALLATION OF THE 2.9 BLEED VALVE BELLOWS ASSEMBLY (P/B 401)

C. Job Set-up - Ninth Stage Start/stability (2.9) Bleed Valve Screen Installation

SUBTASK 75-35-08-010-269

- (1) If necessary, open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

D. Procedure - Ninth Stage Start/stability (2.9) Bleed Valve Screen Installation

SUBTASK 75-35-08-420-267

- (1) Install the bleed valve screen (1) on the ninth stage start/stability (2.9) bleed valve as follows: (Figure 401)
- Remove the protective cap from the ninth stage start/stability (2.9) bleed valve.
 - Put the bleed valve screen (1) on the ninth stage start/stability (2.9) bleed valve.
 - Install the 12 screws (4) and torque the 12 screws (4) to 32–36 in-lb (3.6–4.0 N·m).
 - Install the screw (2) and the washer (3) in the center hole of the bleed valve screen (1). Torque the screw (2) to 25–30 in-lb (2.8–3.4 N·m).

SUBTASK 75-35-08-410-268

- (2) Install the bleed valve bellows seal. (INSTALLATION OF THE 2.9 BLEED VALVE BELLOWS ASSEMBLY, TASK 75-35-04-400-868)

E. Job Close-up - Ninth Stage Start/stability (2.9) Bleed Valve Screen Installation

SUBTASK 75-35-08-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the area is clean.

SUBTASK 75-35-08-410-269

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

EFFECTIVITY

FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

75-35-08

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INDICATING - DESCRIPTION AND OPERATION

1. General

- A. This system monitors the temperatures in the area between the core engine and the nacelle cowling. The temperatures are shown on the secondary engine page of the systems display in the flight compartment.

2. Nacelle Compartment Temperature Indicating

- A. Core compartment temperatures are monitored to show pneumatic duct failure or core engine related failure. Related engine failure is an increase in engine temperature that can possibly cause an engine fire or other unsafe engine condition.

3. System Operation

- A. The core compartment temperature transducer is supplied with 28 vdc input. As the core compartment temperature increases, the output voltage to the miscellaneous systems controller (MSC) decreases. The output voltage is monitored by the aircraft data system and the temperature is shown on the secondary engine page of the Systems Display (SD) as NAC TEMP. (Figure 1)

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-40-00

Config 1

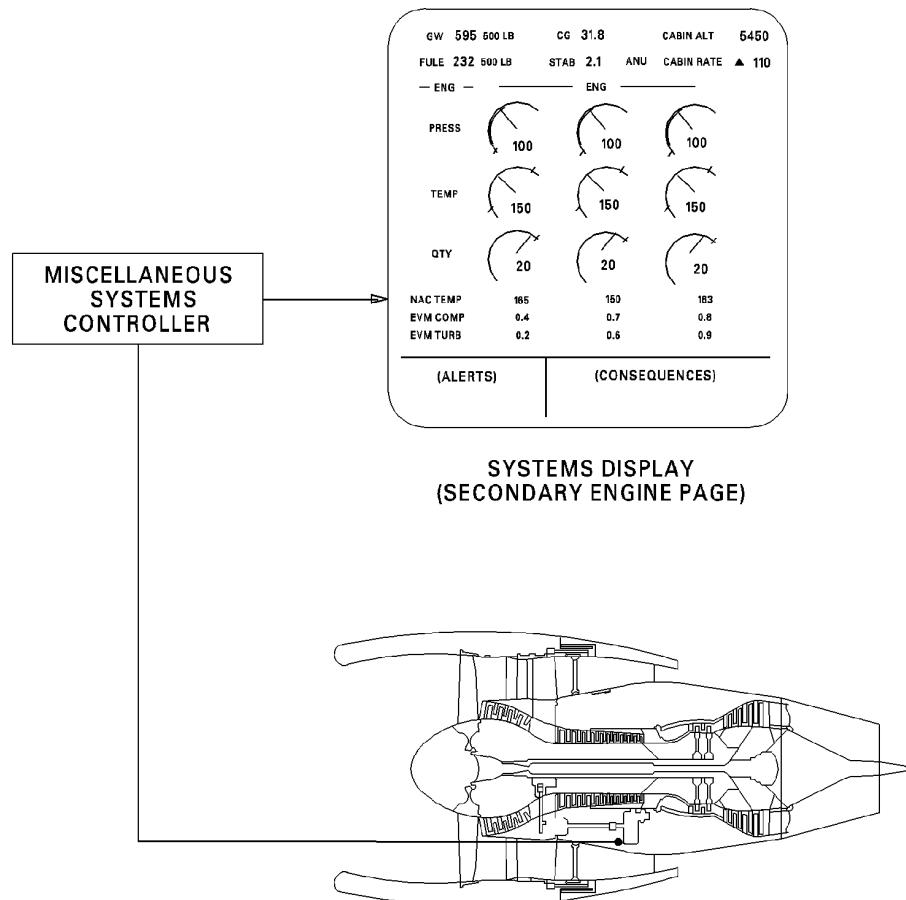
Page 1

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CAG(IGDS)

DB2-75-0340

Engine Indicating System
Figure 1/75-40-00-990-801

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-40-00

Config 1

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NACELLE COMPARTMENT TEMPERATURE INDICATING - DESCRIPTION AND OPERATION

1. General

- A. The nacelle temperature transducer is installed at the 6 o'clock position on the inner surface of the right thrust reverser door. The transducer extends approximately 2 in. (51 mm) into the core cowl cavity. Access to the transducer is through the blowout and air vent doors.
- B. This system monitors the temperatures in the area between the core engine and the nacelle cowling. The temperatures are displayed on the secondary engine page of the systems display (SD).
- C. Core compartment temperatures are monitored to detect pneumatic duct failure or core engine related failure. A related engine failure is anything that causes the engine temperatures to increase. This condition can possibly cause an engine fire or other unsafe engine condition.
- D. The nacelle temperature monitoring system operates with the help of the assemblies and components that follow:
 - Nacelle temperature transducer
 - Miscellaneous Systems Controller (MSC)
 - Systems display (SD) secondary engine page.

2. Transducer

- A. Temperature in the cavity between the compressor casing and the fan reverser cowl is measured by the transducer. The transducer is supplied with 28 vdc input. The transducer is a variable resistance device. As the temperature increases, the resistance of the transducer also increases, and the output voltage decreases.
- B. The transducer sends these temperature measurements to the MSC, which changes the signal and shows them on the SD as NAC TEMP. (Figure 1)

3. Miscellaneous Systems Control System

- A. The MSC receives the temperature analog signals from the temperature transducer and changes them to digital signals before they are sent to the SD.

4. Systems Display, Secondary Engine Page

- A. The secondary engine page on the SD shows the nacelle temperatures for all three engines. The secondary page also shows the ALERTS and CONSEQUENCES faults at the bottom of the page. (Figure 1)

5. System Operation

- A. The temperature transducer is supplied with 28 vdc input. The output voltage is monitored by the MSC which changes the analog signals to digital signals. These signals are then shown on the secondary engine page of the SD, as NAC TEMP.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-41-00

Config 1

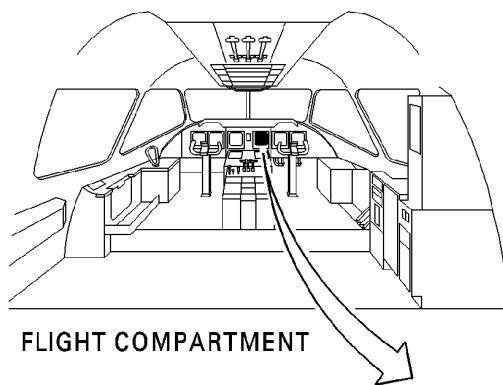
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FLIGHT COMPARTMENT

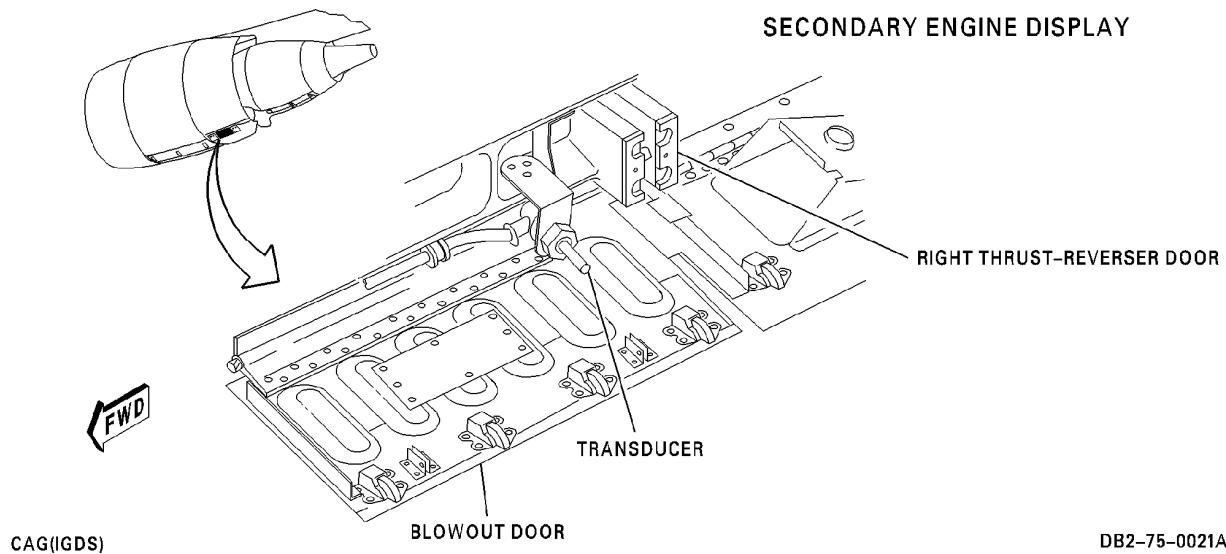
NACELLE
TEMPERATURE

GW 595 ₅₀₀ LB		CG 31.8	CABIN ALT	5450
FUEL 232 ₅₀₀ LB		STAB 10.1	ANUCABIN RATE	▼110
OIL	ENG			APU
PRESS	104	54	75	N1 107
TEMP	118	76	89	EGT 485
QTY	18	14	9	N2 101
NAC TEMP	165	140	235	OIL 3.4
EVM COMP	0.4	10.0	1.1	
EVM TURB	0.2	11.3	0.8	

ALERTS

CONSEQUENCES

SECONDARY ENGINE DISPLAY



CAG(IGDS)

DB2-75-0021A

Nacelle Temperature Transducer
Figure 175-41-00-990-803

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

75-41-00

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TRANSDUCER, NACELLE TEMPERATURE - REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the nacelle temperature transducer. The transducer is on the inner surface of the right thrust-reverser door, above the blowout door.
- B. Unless different instructions are given, these procedures are the same for the three G.E. CF6-80C2D1F engines.

TASK 75-41-01-000-801

2. REMOVAL OF THE NACELLE TEMPERATURE TRANSDUCER

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector
Not specified	Tags, DO NOT OPERATE

B. Access Panels

Number Name/Location

- | | |
|-------|-----------------------|
| 434BR | LEFT (No. 1) NACELLE |
| 454BR | PYLON AND NACELLE |
| 484BR | RIGHT (No. 3) NACELLE |

C. Job Set-up - Nacelle Temperature Transducer Removal

SUBTASK 75-41-01-865-001



MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.



TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open these circuit breakers and install safety tags:

OVERHEAD, BATTERY BUS

Row Col Number Name

- | | | | |
|---|----|---------|--------------------|
| B | 8 | B1-1271 | ENG START OVERRIDE |
| B | 10 | B1-594 | ENG START CONTROL |

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SUBTASK 75-41-01-800-001

- (2) Install the DO NOT OPERATE tag on the applicable thrust reverser lever.

SUBTASK 75-41-01-010-002

- (3) Open the applicable access doors that follow:

<u>Number</u>	<u>Name/Location</u>
434BR	LEFT (No. 1) NACELLE
454BR	PYLON AND NACELLE
484BR	RIGHT (No. 3) NACELLE

D. Procedure - Nacelle Temperature Transducer Removal

SUBTASK 75-41-01-020-003

- (1) Remove the nacelle temperature transducer as follows: (Figure 401)
 - (a) Disconnect the electrical connector (1) from the temperature transducer (3).
 - (b) Install a protective cap on the electrical connector and the temperature transducer.
 - (c) Remove the nut (2) and remove the temperature transducer (3) from the bracket (4).

SUBTASK 75-41-01-410-004

- (2) If the transducer is not installed immediately, or weather conditions make it necessary, close the access doors.

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

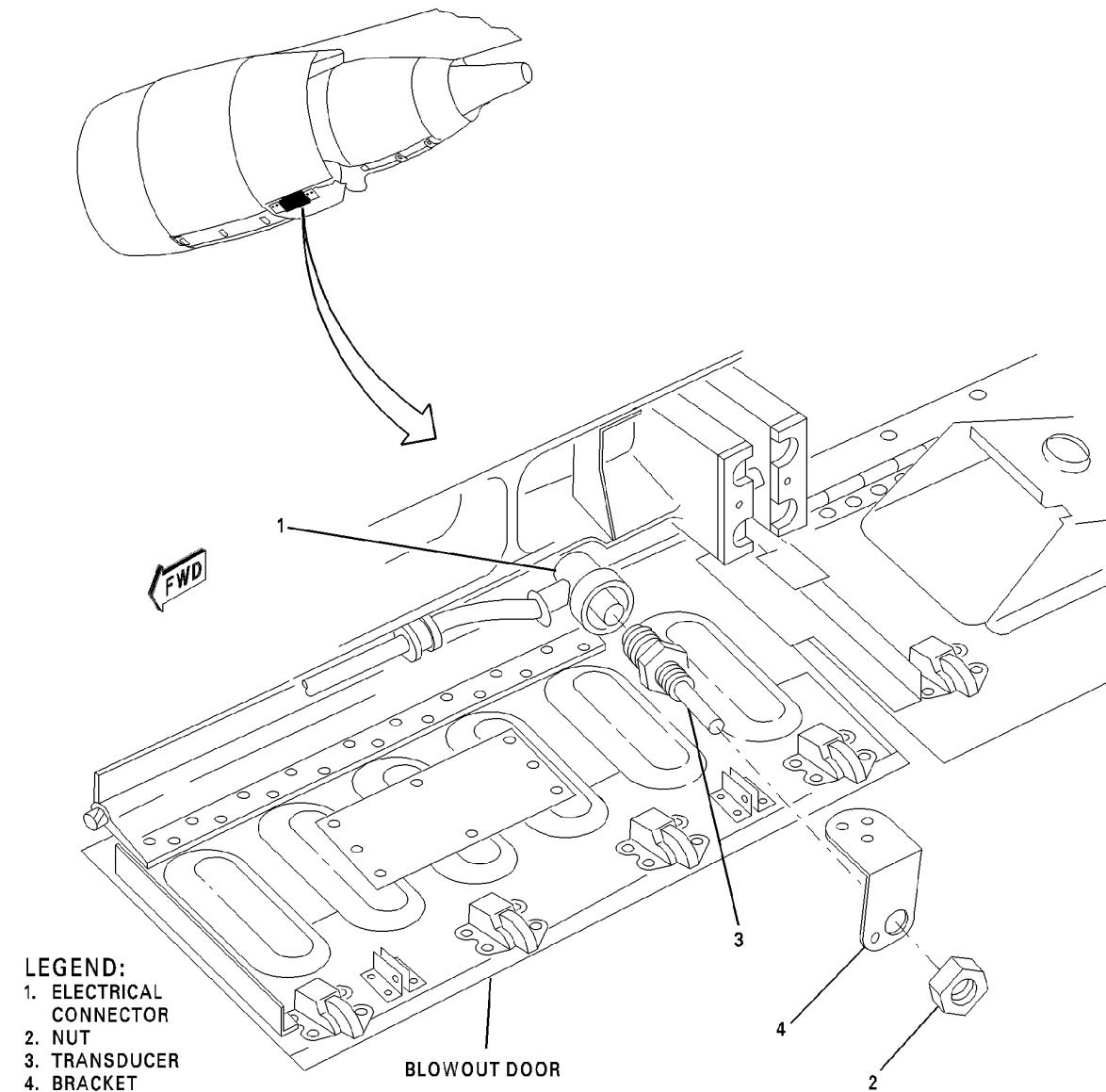
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LEGEND:

1. ELECTRICAL CONNECTOR
2. NUT
3. TRANSDUCER
4. BRACKET

BLOWOUT DOOR

CAG(IGDS)

DB2-75-0012A

Nacelle Temperature Transducer - Removal/Installation
Figure 401/75-41-01-990-801

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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TASK 75-41-01-400-801

3. INSTALLATION OF THE NACELLE TEMPERATURE TRANSDUCER

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench, 0-600 in-lb (0-67.7 N·m)
Not specified	Tags, DO NOT OPERATE

B. Consumable Materials

- (1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

Table 403

REFERENCE	DESIGNATION
C10-071	Lockwire, 0.032 corrosion resistance steel

C. Access Panels

Number	Name/Location
434BR	LEFT (No. 1) NACELLE
454BR	PYLON AND NACELLE
484BR	RIGHT (No. 3) NACELLE

D. Job Set-up - Nacelle Temperature Transducer Installation

SUBTASK 75-41-01-865-002



MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.



TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that these circuit breakers are open and have safety tags:

OVERHEAD, BATTERY BUS

Row	Col	Number	Name
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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SUBTASK 75-41-01-800-002

- (2) Make sure that the thrust reverser lever has the DO NOT OPERATE tag attached.

SUBTASK 75-41-01-010-006

- (3) Make sure these access panels are open:

<u>Number</u>	<u>Name/Location</u>
434BR	LEFT (No. 1) NACELLE
454BR	PYLON AND NACELLE
484BR	RIGHT (No. 3) NACELLE

E. Procedure - Nacelle Temperature Transducer Installation

SUBTASK 75-41-01-420-001

- (1) Install the temperature transducer (3) in the bracket (4) as follows. (Figure 401)
 - (a) Install the temperature transducer (3) in the bracket (4).
 - (b) Install the nut (2). Torque the nut to 490-570 in-lb (55.4–64.4 N·m). Safety the nut with lockwire.
 - (c) Remove protective caps from the electrical connector (1) and the temperature transducer (2).
 - (d) Connect the electrical connector (1) to the temperature transducer (2). Tighten the connector by hand and listen for the sound of the click. Make sure the lock indicator shows in the connector window.

SUBTASK 75-41-01-212-001

- (2) Do a check of the nacelle temperature indication as follows: (Figure 402)
 - (a) Push the ENG button (1) on the Systems Control Panel.
 - 1) Make sure that the Secondary Engine Page (2) is shown on the System Display.
 - (b) Make sure that the applicable ENG 1, ENG 2, or ENG 3 nacelle temperature (3) is shown.

F. Job Close-up - Nacelle Temperature Transducer Installation

SUBTASK 75-41-01-942-001

- (1) Remove all the tools and equipment from the work area. Make sure that the area is clean.

SUBTASK 75-41-01-410-001

- (2) Close the applicable access doors:

<u>Number</u>	<u>Name/Location</u>
434BR	LEFT (No. 1) NACELLE
454BR	PYLON AND NACELLE
484BR	RIGHT (No. 3) NACELLE

SUBTASK 75-41-01-865-003

- (3) Remove the safety tags and close these circuit breakers:

OVERHEAD, BATTERY BUS

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	B1-1271	ENG START OVERRIDE
B	10	B1-594	ENG START CONTROL

SUBTASK 75-41-01-800-003

- (4) Remove the DO NOT OPERATE tag from the thrust reverser lever.

———— END OF TASK ————

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

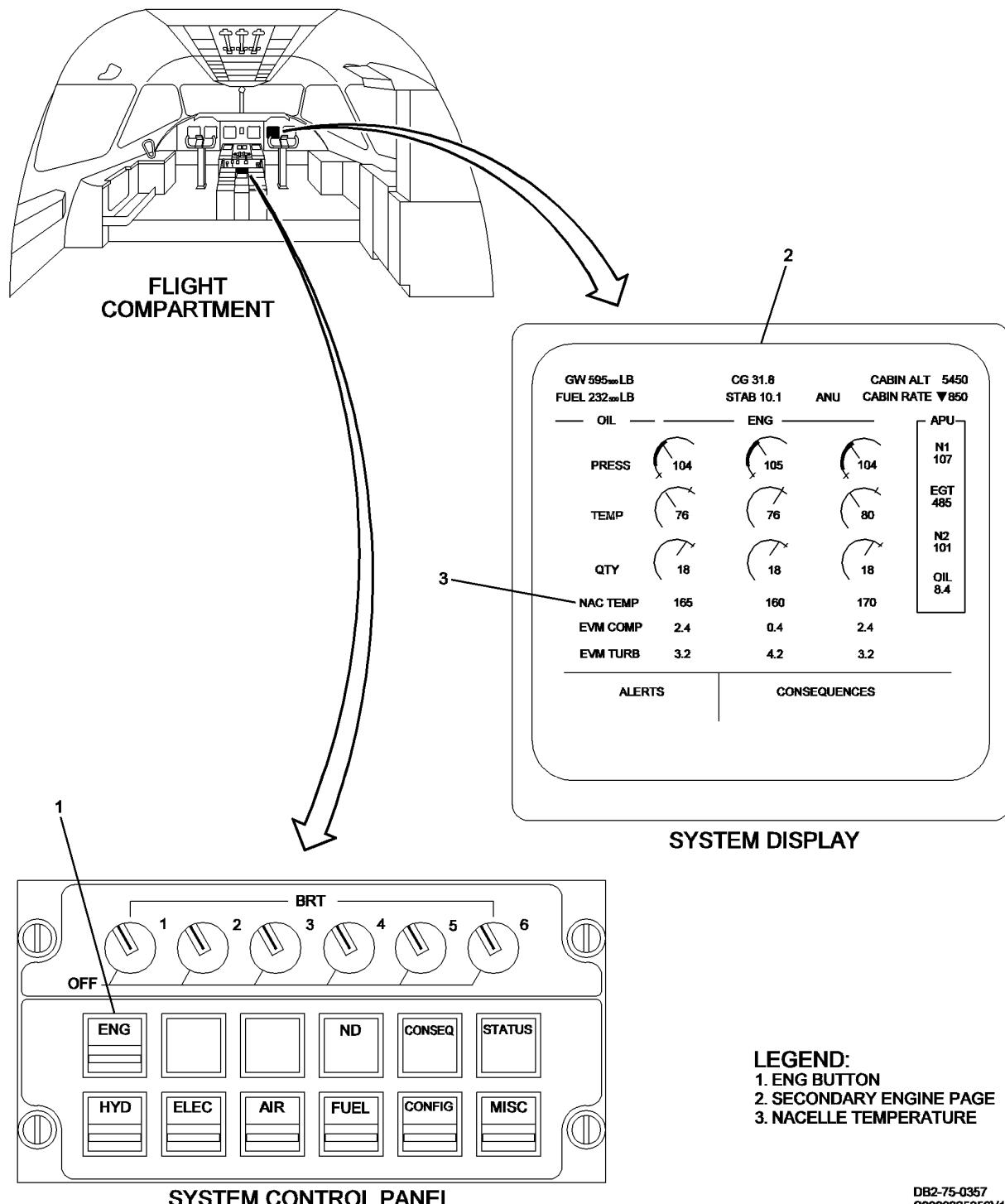
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DB2-75-0357
S0000225356V1

Nacelle Temperature Indication
Figure 402/75-41-01-990-871

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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MD-11 AIRCRAFT MAINTENANCE MANUAL

SENSOR, ENGINE CORE COMPARTMENT TEMPERATURE – REMOVAL/INSTALLATION

1. General

- A. This procedure has the removal and installation instructions for the engine core compartment temperature sensor.
- B. Access to the engine core temperature sensor is through the left thrust reverser door.
- C. Unless different instructions are given, these procedures are the same for the three Pratt & Whitney PW4460/4462 engines.

TASK 75-41-01-000-868

2. REMOVAL OF THE ENGINE CORE COMPARTMENT TEMPERATURE SENSOR

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 401

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
MS90376	Dust caps, electrical connector

B. References

Reference	Title
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)

C. Job Set-up - Engine Core Compartment Temperature Sensor Removal

SUBTASK 75-41-01-865-267



MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.



TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Open this circuit breaker and install safety tag:

UPPER MAIN, ENGINE DC BUS 1

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
H	12	B1-1225	NAC COOLING ENG 1

SUBTASK 75-41-01-010-269

- (2) Open the thrust reverser doors. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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D. Procedure - Engine Core Compartment Temperature Sensor Removal

SUBTASK 75-41-01-020-267



WARNING

DO NOT DO MAINTENANCE IN THE FAN CASE AREA UNTIL THE HOLD-OPEN RODS ARE ENGAGED ON THE HOLD-OPEN ROD BRACKETS. IF THE DOOR LOWERS, IT CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Remove the engine core compartment temperature sensor (1) as follows: (Figure 401)
 - (a) Disconnect the electrical connector (2) from the core compartment sensor (1).
 - 1) Install electrical dust caps on the electrical connector (2) and the core compartment sensor (1).
 - (b) Remove the nut (3), and washer (4) that holds the temperature sensor (1) to the bracket.
 - (c) Remove the temperature sensor (1).

SUBTASK 75-41-01-410-267

- (2) If the engine core compartment temperature sensor (1) is not installed immediately, or weather conditions make it necessary, close the access doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ————

— EFFECTIVITY —
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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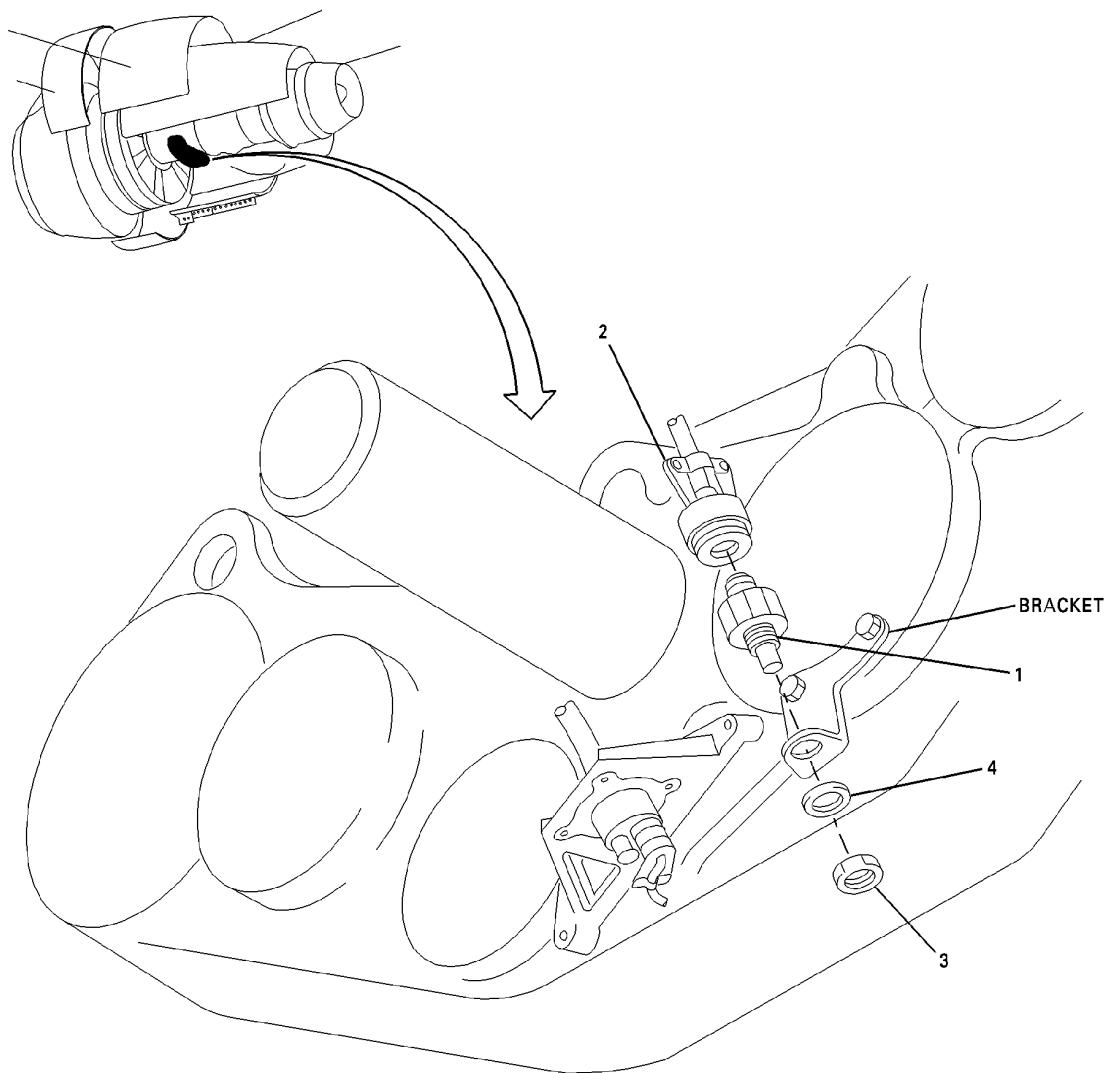
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LEGEND:

1. CORE COMPARTMENT TEMPERATURE SENSOR
2. DT595 CONNECTOR
3. NUT
4. WASHER

CAG(IGDS)

DB2-75-0117

Core Compartment Temperature Sensor - Removal/Installation
Figure 401/75-41-01-990-870

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TASK 75-41-01-400-868

3. INSTALLATION OF THE ENGINE CORE COMPARTMENT TEMPERATURE SENSOR

A. Fixtures, Tools, Test and Support Equipment

(1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 402

REFERENCE	DESIGNATION
Not specified	Maintenance platform, No. 1 and No. 3 engines 4-8 ft (1.2-2.4 m) high
Not specified	Aerial boom, manlift No. 2 engine
Not specified	Torque wrench 0-100 in-lb (0-11.3 N·m)

B. Consumable Materials

(1) Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

Table 403

REFERENCE	DESIGNATION
P05-289	Lockwire, (AS3214-02)

C. References

Reference	Title
24-40-00-861-801	ENERGIZE AIRCRAFT ELECTRICAL POWER SYSTEM (P/B 201)
70-30-00-910-868	CONSUMABLE MATERIALS (P/B 201)
71-10-00-010-869	OPENING OF THE THRUST REVERSER DOORS (P/B 201)
71-10-00-410-869	CLOSING OF THE THRUST REVERSER DOORS (P/B 201)
SWPM 20-31-00	ELECTRICAL CONNECTORS - MAINTENANCE PRACTICES

D. Job Set-up - Engine Core Compartment Temperature Sensor Installation

SUBTASK 75-41-01-865-268



MAKE SURE YOU OPEN, TAG, AND SAFETY THE APPLICABLE CIRCUIT BREAKERS BEFORE YOU START THE MAINTENANCE PROCEDURES. THIS WILL PREVENT ACCIDENTAL ENGINE START OR THRUST REVERSER OPERATION WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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(WARNING PRECEDES)



WARNING

TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure that this circuit breaker is open and has safety tag:

UPPER MAIN, ENGINE DC BUS 1

Row Col Number Name

H	12	B1-1225	NAC COOLING ENG 1
---	----	---------	-------------------

SUBTASK 75-41-01-010-270

- (2) Make sure that the thrust reverser doors are open. (OPENING OF THE THRUST REVERSER DOORS, TASK 71-10-00-010-869)

E. Procedure - Engine Core Compartment Temperature Sensor Installation

SUBTASK 75-41-01-420-267



WARNING

DO NOT DO MAINTENANCE IN THE FAN CASE AREA UNTIL THE HOLD-OPEN RODS ARE ENGAGED ON THE HOLD-OPEN ROD BRACKETS. IF THE DOOR LOWERS, IT CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Install the engine core compartment temperature sensor (1) as follows: (Figure 401)
 - (a) Install the temperature sensor (1) in the bracket with the washer (4) and the nut (3).
 - (b) Torque the nut (3) from 50 in-lb (6 N·m) to 70 in-lb (8 N·m).
 - 1) Safety the nut (3) with lockwire (P05-289). (CONSUMABLE MATERIALS, TASK 70-30-00-910-868)
 - (c) Connect the electrical connector (2) to the temperature sensor (1) as follows:
 - 1) Remove the electrical dust caps from the connector (2) and temperature sensor (1).
 - 2) Examine the electrical connector (2) and temperature sensor (1) for damage and unwanted material. (ELECTRICAL CONNECTORS - MAINTENANCE PRACTICES, SWPM 20-31-00)
 - 3) Connect the electrical connector (2) to the temperature sensor (1).
 - a) Tighten the connector (2) hand tight plus one-eighth turn.

SUBTASK 75-41-01-865-269

- (2) Remove the safety tag and close this circuit breaker:

UPPER MAIN, ENGINE DC BUS 1

Row Col Number Name

H	12	B1-1225	NAC COOLING ENG 1
---	----	---------	-------------------

SUBTASK 75-41-01-820-001

- (3) Energize the aircraft electrical power system. (ENERGIZE AIRCRAFT ELECTRICAL POWER SYSTEM, TASK 24-40-00-861-801)
 - (a) Set the Electronic Instrument System (EIS) controls as follows:
 - 1) Turn the six BRT knobs on the systems Display Unit (DU) to the middle position.
 - a) Make sure that the six DU are displayed.

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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SUBTASK 75-41-01-710-001

- (4) Do an operational test of the applicable engine core compartment temperature sensor as follows: (Figure 402)
 - (a) Push the ENG cue switchlight on the Systems Control Panel (SCP).
 - 1) Make sure that the Secondary Engine Display (SED) is shown on the Systems Display (SD).
 - 2) Make sure that the NAC TEMP is shown on the SED.
 - 3) Make sure that the NAC TEMP shows ambient temperature.

F. Job Close-up - Engine Core Compartment Temperature Sensor Installation

SUBTASK 75-41-01-942-267

- (1) Remove all the tools and equipment from the work area. Make sure the work area is clean.

SUBTASK 75-41-01-410-269

- (2) Close the thrust reverser doors. (CLOSING OF THE THRUST REVERSER DOORS, TASK 71-10-00-410-869)

———— END OF TASK ———

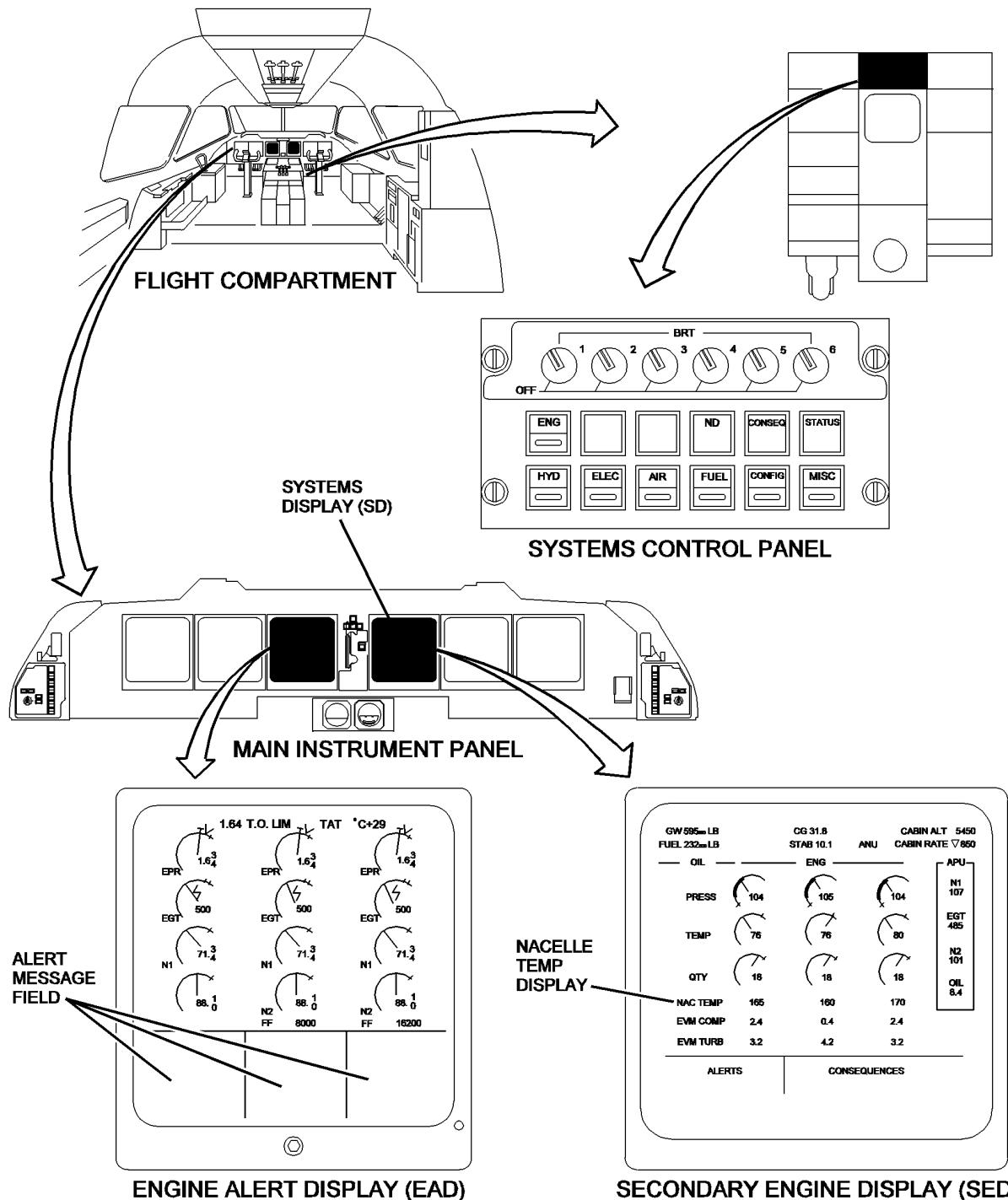
— EFFECTIVITY —
**FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
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DB2-75-0358
S0000234047V1

Core Compartment Temperature Sensor - System Displays
Figure 402/75-41-01-990-872

EFFECTIVITY
FX 521-529, 577-580, 620, 621, 623, 624, 628, 631,
642-645

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TRANSDUCER, NACELLE TEMPERATURE - INSPECTION/CHECK

1. General

- A. This procedure has the inspection/check instructions for nacelle temperature transducer. The nacelle temperature transducer is on the right thrust-reverser door at the 6 o'clock position.
- B. Unless different instructions are given, this procedure is the same for the three G.E. CF6-80C2D1F engines on the MD-11 aircraft.

TASK 75-41-01-200-801

2. INSPECTION OF THE NACELLE TEMPERATURE TRANSDUCER

A. Fixtures, Tools, Test and Support Equipment

- (1) Fixtures, Tools, Test and Support Equipment

NOTE: Equivalent replacements are permitted for the items that follow.

Table 601

REFERENCE	DESIGNATION
Not specified	Ohmmeter
Not specified	Megger, 100-vdc
Not specified	Liquid bath

B. References

Reference	Title
75-41-01-000-801	REMOVAL OF THE NACELLE TEMPERATURE TRANSDUCER (P/B 401)
75-41-01-400-801	INSTALLATION OF THE NACELLE TEMPERATURE TRANSDUCER (P/B 401)

C. Job Set-up - Nacelle Temperature Transducer Inspection

SUBTASK 75-41-01-020-002

- (1) Remove the nacelle temperature transducer. (REMOVAL OF THE NACELLE TEMPERATURE TRANSDUCER, TASK 75-41-01-000-801)

D. Procedure - Nacelle Temperature Transducer Inspection

SUBTASK 75-41-01-211-001

- (1) Do a visual inspection of the nacelle temperature transducer as follows:

Table 602

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
1 Examine the electrical connector for:		
Damaged insulator (has cracks or chips)	Not serviceable.	Replace the transducer.
Bent, broken or corrosion on the pins	Not serviceable.	Replace the transducer.
Out of round damage	Not serviceable.	Replace the transducer.

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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Table 602 (Continued)

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
Thread damage	One full thread gone after thread repair.	Repair with thread tool or replace the transducer.
2 Examine the probe for:		
Nicks, wear and scratches	No limit, not more than 0.005 inch (0.13 mm) deep and 0.10 inch (2.5 mm) long.	Replace the transducer.
Cracks or broken open	Not serviceable.	Replace the transducer.
Bent probe	Not serviceable.	Replace the transducer.
3 Examine the body of the probe for:		
Cracks or out of round damage	Not serviceable.	Replace the transducer.
Thread damage	30% on first entrance thread, or 10% of each of the first two entrance threads.	Smooth the repair.
Damage to hex nut corners	No limit if you can correctly torque the nut.	Replace the transducer.

(2) Operational test procedure.

(a) Do the insulation resistance test as follows:

- 1) Measure the insulation resistance between the external case and each connector pin. Do this at room temperature with a Megger 100-vdc.
- 2) The insulation resistance must test 50 megohms minimum.

NOTE: To do this test, make sure the surface between the pins and the external case is dry.

(b) Do the function resistance test as follows:

- 1) Put the temperature transducer in a shake type liquid bath as deep as the top of the external case threads.
- 2) Decrease the liquid bath temperature to 32°F (0°C). Measure the resistance between pins A and B. The resistance must be 90.38 ± 0.40 ohms.
- 3) Increase the liquid bath temperature to 212°F (100°C). Measure the resistance between pins A and B. The resistance must be 128.85 ± 0.50 ohms.

NOTE: When a complete test of the transducer is necessary, use the chart that follows:

Table 603

Bath Temperature (Degrees Centigrade)	Resistance - Ohms	Tolerance - Ohms
300°	242.70	± 1.50
250°	208.00	± 1.00
200°	177.95	± 1.00
150°	151.91	± 0.60
100°	128.85	± 0.50
50°	108.39	± 0.40
0°	90.38	± 0.40
-20°	83.77	± 0.40

EFFECTIVITY
FX 572-576, 582-599, 601-610, 612-619, 625

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- (3) If the nacelle temperature transducer does not operate within these parameters, replace the transducer. (REMOVAL OF THE NACELLE TEMPERATURE TRANSDUCER, TASK 75-41-01-000-801) (INSTALLATION OF THE NACELLE TEMPERATURE TRANSDUCER, TASK 75-41-01-400-801)

E. Job Close-Up - Nacelle Temperature Transducer Inspection

SUBTASK 75-41-01-420-002

- (1) Install the nacelle temperature transducer. (INSTALLATION OF THE NACELLE TEMPERATURE TRANSDUCER, TASK 75-41-01-400-801)

SUBTASK 75-41-01-942-002

- (2) Remove all the tools and equipment from the work area. Make sure the area is clean.

———— END OF TASK ————

— EFFECTIVITY —
FX 572-576, 582-599, 601-610, 612-619, 625

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