

CHAPTER

28

FUEL



**737-600/700/800/900
AIRCRAFT MAINTENANCE MANUAL**

**CHAPTER 28
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EFFECTIVE PAGES			28-00-00 (cont)			28-00-00 (cont)		
1 thru 11	Jun 15/2009		210	Feb 15/2009		916	Feb 15/2008	
12	BLANK		211	Oct 15/2008		917	Feb 15/2008	
28-CONTENTS			212	Oct 15/2008		918	Feb 15/2008	
1	Feb 15/2009		213	Oct 15/2008		919	Feb 15/2008	
2	Feb 15/2008		214	Oct 15/2008		920	Feb 15/2008	
3	Feb 15/2008		215	Feb 15/2009		921	Feb 15/2008	
4	Feb 15/2009		216	Oct 15/2008		922	Feb 15/2008	
5	Oct 15/2008		R 217	Jun 15/2009		923	Feb 15/2008	
6	Feb 15/2009		218	Feb 15/2009		924	Feb 15/2008	
7	Jun 15/2008		219	Feb 15/2009		925	Feb 15/2008	
8	Feb 15/2008		220	Oct 10/2007		926	Feb 15/2008	
9	Feb 15/2008		221	Oct 10/2007		927	Feb 15/2008	
10	Feb 15/2009		222	Oct 10/2007		928	Feb 15/2008	
O 11	Jun 15/2009		223	Oct 15/2008		929	Feb 15/2008	
12	Feb 15/2009		224	Oct 10/2007		930	Feb 15/2008	
13	Feb 15/2009		225	Oct 10/2007		28-10-00		
14	Jun 15/2008		226	Oct 10/2007		201	Oct 10/2007	
15	Feb 15/2009		227	Oct 10/2007		202	Oct 10/2007	
16	Feb 15/2009		228	Oct 10/2007		203	Oct 10/2007	
O 17	Jun 15/2009		229	Oct 15/2008		204	Oct 10/2007	
18	Feb 15/2009		R 230	Jun 15/2009		205	Oct 10/2007	
19	Feb 15/2008		231	Oct 15/2008		206	Feb 10/2006	
20	Feb 15/2008		232	BLANK		207	Jun 10/2005	
21	Jun 15/2008		28-00-00			208	Feb 10/2006	
22	Feb 15/2008		901	Jun 10/2005		209	Jun 10/2005	
23	Feb 15/2009		902	Feb 15/2009		210	Feb 10/2006	
24	Feb 15/2008		903	Feb 15/2009		211	Oct 15/2008	
25	Feb 15/2008		904	Feb 15/2008		R 212	Jun 15/2009	
26	BLANK		905	Feb 15/2008		213	Oct 15/2008	
28-00-00			906	Feb 15/2008		214	Oct 15/2008	
201	Feb 15/2009		907	Feb 15/2008		215	Oct 15/2008	
202	Feb 15/2009		908	Feb 15/2008		216	Oct 15/2008	
203	Feb 15/2009		909	Feb 15/2008		217	Oct 15/2008	
204	Feb 15/2009		910	Feb 15/2008		218	Oct 15/2008	
205	Feb 15/2009		911	Feb 15/2008		219	Oct 15/2008	
206	Oct 10/2005		912	Feb 15/2008		220	Oct 15/2008	
207	Oct 10/2005		913	Feb 15/2008		221	Oct 15/2008	
208	Feb 15/2009		914	Feb 15/2008		222	Oct 15/2008	
209	Oct 15/2008		915	Feb 15/2008		R 223	Jun 15/2009	

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28-10-00 (cont)			28-11-00 (cont)			28-11-00 (cont)		
224	Oct 15/2008		236	Feb 15/2009		630	Feb 15/2009	
225	Oct 15/2008		237	Feb 15/2009		R 631	Jun 15/2009	
226	BLANK		238	Feb 15/2009		R 632	Jun 15/2009	
28-11-00			239	Feb 15/2009		28-11-00		
R 201	Jun 15/2009		R 240	Jun 15/2009		701	Oct 10/2005	
R 202	Jun 15/2009		241	Feb 15/2009		702	Oct 15/2008	
O 203	Jun 15/2009		242	Feb 15/2009		703	Oct 15/2008	
R 204	Jun 15/2009		243	Feb 15/2009		704	Oct 15/2008	
R 205	Jun 15/2009		244	BLANK		705	Oct 15/2008	
R 206	Jun 15/2009		28-11-00			706	Oct 15/2008	
O 207	Jun 15/2009		601	Feb 15/2009		707	Oct 15/2008	
R 208	Jun 15/2009		602	Oct 10/2005		708	Oct 15/2008	
O 209	Jun 15/2009		603	Oct 10/2003		709	Oct 15/2008	
O 210	Jun 15/2009		604	Oct 10/2003		710	Jun 10/2005	
R 211	Jun 15/2009		605	Oct 10/2003		711	Jun 10/2005	
R 212	Jun 15/2009		606	Oct 10/2003		712	Jun 10/2005	
213	Feb 15/2009		607	Oct 10/2003		713	Jun 10/2005	
214	Feb 15/2009		608	Oct 10/2003		714	Jun 10/2005	
215	Feb 15/2009		609	Oct 10/2003		28-11-00		
216	Feb 15/2009		610	Oct 10/2004		801	Feb 10/2007	
217	Feb 15/2009		611	Jun 15/2008		802	Feb 10/2007	
218	Feb 15/2009		612	Oct 10/2006		803	Oct 10/2003	
219	Feb 15/2009		613	Oct 10/2006		804	Oct 10/2003	
220	Feb 15/2009		614	Oct 10/2006		805	Feb 15/2009	
221	Feb 15/2009		615	Oct 10/2006		R 806	Jun 15/2009	
222	Feb 15/2009		616	Oct 10/2006		R 807	Jun 15/2009	
R 223	Jun 15/2009		617	Oct 10/2006		R 808	Jun 15/2009	
224	Feb 15/2009		618	Oct 10/2006		809	Oct 15/2008	
225	Feb 15/2009		619	Oct 10/2006		R 810	Jun 15/2009	
226	Feb 15/2009		620	Oct 10/2003		811	Oct 15/2008	
227	Feb 15/2009		621	Oct 10/2003		R 812	Jun 15/2009	
228	Feb 15/2009		622	Oct 10/2003		R 813	Jun 15/2009	
229	Feb 15/2009		623	Oct 10/2003		R 814	Jun 15/2009	
230	Feb 15/2009		624	Oct 10/2003		R 815	Jun 15/2009	
231	Feb 15/2009		625	Jun 10/2006		O 816	Jun 15/2009	
232	Feb 15/2009		626	Feb 10/2006		817	Oct 10/2003	
233	Feb 15/2009		627	Feb 10/2006		818	Oct 10/2003	
234	Feb 15/2009		628	Feb 10/2006		819	Oct 10/2003	
235	Feb 15/2009		629	Feb 10/2006		820	Feb 10/2004	

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28-11-00 (cont)			28-11-11 (cont)			28-11-31 (cont)		
821	Jun 10/2006		409	Feb 15/2009		407	Feb 15/2009	
R 822	Jun 15/2009		R 410	Jun 15/2009		408	Feb 15/2009	
823	Feb 10/2004		R 411	Jun 15/2009		R 409	Jun 15/2009	
824	Oct 10/2003		R 412	Jun 15/2009		R 410	Jun 15/2009	
825	Oct 10/2003		R 413	Jun 15/2009		R 411	Jun 15/2009	
826	Oct 10/2003		414	Feb 15/2009		R 412	Jun 15/2009	
827	Oct 10/2003		415	Feb 15/2009		28-11-41		
828	Oct 10/2003		R 416	Jun 15/2009		401	Jun 10/2006	
829	Feb 10/2004		417	Oct 15/2008		402	Oct 10/2003	
830	Oct 10/2003		R 418	Jun 15/2009		403	Oct 10/2003	
831	Oct 10/2003		419	Oct 15/2008		404	Oct 10/2003	
832	Feb 10/2004		420	Feb 15/2009		405	Jun 10/2006	
833	Oct 10/2003		R 421	Jun 15/2009		406	Jun 10/2006	
834	Feb 15/2009		R 422	Jun 15/2009		28-11-61		
835	Feb 15/2009		423	Feb 15/2009		201	Oct 10/2003	
836	Feb 15/2008		424	BLANK		202	Feb 15/2009	
837	Feb 15/2008		28-11-11			203	Feb 15/2008	
838	Feb 15/2008		801	Feb 15/2009		204	Oct 10/2003	
839	Feb 15/2008		802	Feb 15/2009		205	Oct 10/2003	
840	Jun 10/2005		803	Feb 15/2009		206	Feb 15/2009	
841	Jun 10/2005		804	Feb 15/2009		207	Oct 10/2003	
842	Jun 10/2005		805	Oct 15/2008		208	Oct 10/2003	
843	Jun 10/2005		806	Oct 15/2008		28-13-11		
844	Jun 10/2005		807	Oct 15/2008		401	Oct 15/2008	
845	Jun 10/2005		808	Oct 15/2008		402	Oct 10/2003	
846	Jun 10/2005		28-11-21			403	Oct 10/2003	
847	Jun 10/2005		401	Feb 15/2009		404	Feb 15/2009	
848	Jun 10/2005		402	Oct 10/2003		405	Oct 15/2008	
849	Jun 10/2005		403	Oct 10/2003		406	BLANK	
850	BLANK		404	Feb 15/2009		28-13-31		
28-11-11			405	Jun 15/2008		401	Oct 10/2004	
401	Feb 15/2009		406	BLANK		R 402	Jun 15/2009	
402	Feb 15/2009		28-11-31			403	Jun 15/2008	
403	Feb 15/2009		401	Feb 15/2009		R 404	Jun 15/2009	
404	Oct 10/2007		402	Feb 15/2009		R 405	Jun 15/2009	
405	Oct 10/2003		403	Feb 15/2009		R 406	Jun 15/2009	
R 406	Jun 15/2009		R 404	Jun 15/2009		R 407	Jun 15/2009	
R 407	Jun 15/2009		R 405	Jun 15/2009		R 408	Jun 15/2009	
R 408	Jun 15/2009		R 406	Jun 15/2009				

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28-13-31			28-21-00 (cont)			28-21-32 (cont)		
R 601	Jun 15/2009		506	Oct 10/2003		404	Oct 15/2008	
R 602	Jun 15/2009		507	Oct 10/2003		28-21-41		
R 603	Jun 15/2009		508	BLANK		401	Oct 10/2003	
R 604	Jun 15/2009		28-21-00			402	Oct 10/2003	
A 605	Jun 15/2009		601	Jun 10/2004		403	Oct 10/2003	
A 606	BLANK		602	Oct 10/2003		404	Oct 10/2003	
28-13-31			603	Oct 10/2003		405	Oct 15/2008	
701	Feb 15/2009		604	Oct 10/2003		406	Feb 15/2008	
702	Feb 15/2009		R 605	Jun 15/2009		28-21-51		
703	Oct 10/2003		606	Oct 15/2008		401	Feb 15/2008	
704	Oct 10/2003		607	Oct 15/2008		402	Feb 15/2008	
28-13-41			608	Jun 10/2004		403	Oct 10/2003	
401	Oct 15/2008		28-21-11			404	Oct 10/2003	
402	Oct 15/2008		401	Oct 10/2003		405	Oct 15/2008	
403	Oct 10/2003		402	Jun 10/2005		406	Feb 15/2008	
404	Oct 15/2008		403	Oct 10/2003		28-21-51		
R 405	Jun 15/2009		404	Oct 10/2003		R 601	Jun 15/2009	
406	Oct 15/2008		405	Feb 15/2009		602	Feb 15/2009	
407	Feb 15/2008		406	Jun 15/2008		603	Feb 10/2007	
408	BLANK		28-21-11			604	BLANK	
28-13-41			601	Feb 15/2009		28-21-71		
601	Feb 15/2009		602	Feb 15/2009		401	Feb 15/2009	
602	Feb 15/2009		603	Feb 10/2007		402	Feb 15/2008	
603	Jun 10/2004		604	Feb 10/2007		403	Feb 15/2008	
604	Jun 10/2004		28-21-21			404	Feb 15/2008	
605	Jun 10/2004		401	Oct 10/2003		405	Jun 10/2007	
606	Oct 10/2003		402	Oct 10/2003		406	Jun 10/2007	
R 607	Jun 15/2009		403	Jun 10/2005		407	Jun 10/2007	
O 608	Jun 15/2009		404	Oct 10/2003		408	Jun 10/2007	
O 609	Jun 15/2009		405	Oct 10/2003		409	Jun 10/2007	
R 610	Jun 15/2009		406	Oct 10/2003		410	Jun 10/2007	
O 611	Jun 15/2009		407	Feb 15/2009		411	Jun 10/2007	
612	Feb 10/2007		408	Jun 10/2007		412	Jun 10/2007	
28-21-00			409	Jun 10/2007		413	Jun 10/2007	
501	Oct 10/2003		410	BLANK		414	Jun 10/2007	
502	Oct 10/2003		28-21-32			415	Jun 10/2007	
503	Oct 10/2003		401	Oct 10/2003		416	Jun 10/2007	
504	Oct 10/2003		402	Oct 10/2003		417	Feb 15/2009	
505	Oct 10/2003		403	Oct 10/2003		418	Jun 10/2007	

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28-21-71 (cont)			28-21-71 (cont)			28-22-00 (cont)		
419	Jun 10/2007		R 458	Jun 15/2009		O 522	Jun 15/2009	
420	Jun 10/2007		O 459	Jun 15/2009		O 523	Jun 15/2009	
421	Jun 10/2007		460	BLANK		O 524	Jun 15/2009	
422	Jun 10/2007		28-21-71			R 525	Jun 15/2009	
423	Jun 10/2007		601	Feb 15/2009		O 526	Jun 15/2009	
424	Feb 15/2009		602	Feb 15/2009		R 527	Jun 15/2009	
425	Feb 15/2009		603	Feb 15/2009		O 528	Jun 15/2009	
426	Feb 15/2009		604	Feb 15/2009		O 529	Jun 15/2009	
427	Feb 15/2009		28-21-81			R 530	Jun 15/2009	
428	Feb 15/2009		201	Jun 10/2005		O 531	Jun 15/2009	
429	Feb 15/2009		202	Feb 10/2005		O 532	Jun 15/2009	
430	Feb 15/2009		203	Oct 10/2003		O 533	Jun 15/2009	
431	Feb 15/2009		204	Jun 15/2008		O 534	Jun 15/2009	
432	Feb 15/2009		205	Jun 10/2005		O 535	Jun 15/2009	
433	Feb 15/2009		206	Jun 15/2008		R 536	Jun 15/2009	
434	Feb 15/2009		207	Oct 10/2003		R 537	Jun 15/2009	
R 435	Jun 15/2009		208	BLANK		R 538	Jun 15/2009	
436	Feb 15/2009		28-22-00			R 539	Jun 15/2009	
437	Feb 15/2009		501	Feb 15/2009		R 540	Jun 15/2009	
438	Feb 15/2009		502	Feb 15/2009		R 541	Jun 15/2009	
439	Feb 15/2009		503	Feb 15/2009		R 542	Jun 15/2009	
440	Feb 15/2009		504	Feb 15/2009		R 543	Jun 15/2009	
441	Feb 15/2009		505	Feb 15/2009		R 544	Jun 15/2009	
442	Feb 15/2009		506	Feb 15/2008		R 545	Jun 15/2009	
443	Feb 15/2009		507	Feb 15/2009		R 546	Jun 15/2009	
444	Feb 15/2009		508	Oct 10/2005		O 547	Jun 15/2009	
445	Feb 15/2009		509	Oct 10/2005		O 548	Jun 15/2009	
R 446	Jun 15/2009		510	Oct 10/2005		O 549	Jun 15/2009	
447	Feb 15/2009		511	Oct 10/2005		O 550	Jun 15/2009	
R 448	Jun 15/2009		512	Oct 10/2005		R 551	Jun 15/2009	
449	Feb 15/2009		513	Oct 10/2005		O 552	Jun 15/2009	
450	Feb 15/2009		514	Oct 10/2005		O 553	Jun 15/2009	
R 451	Jun 15/2009		515	Feb 15/2009		O 554	Jun 15/2009	
R 452	Jun 15/2009		516	Jun 15/2008		O 555	Jun 15/2009	
R 453	Jun 15/2009		517	Feb 15/2008		O 556	Jun 15/2009	
R 454	Jun 15/2009		R 518	Jun 15/2009		A 557	Jun 15/2009	
R 455	Jun 15/2009		R 519	Jun 15/2009		A 558	Jun 15/2009	
R 456	Jun 15/2009		O 520	Jun 15/2009		A 559	Jun 15/2009	
R 457	Jun 15/2009		O 521	Jun 15/2009		A 560	BLANK	

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28-22-00			28-22-11 (cont)			28-22-11 (cont)		
601	Feb 15/2009		408	Feb 15/2009		447	Feb 15/2009	
602	Feb 15/2009		409	Feb 15/2009		448	Feb 15/2009	
603	Oct 15/2008		410	Feb 15/2009		449	Feb 15/2009	
604	Feb 15/2009		411	Feb 15/2009		450	Feb 15/2009	
605	Feb 15/2008		412	Feb 15/2009		451	Feb 15/2009	
606	Feb 15/2008		413	Feb 15/2009		452	Feb 15/2009	
607	Feb 15/2008		414	Feb 15/2009		453	Feb 15/2009	
608	Feb 15/2008		415	Feb 15/2009		454	Jun 10/2007	
609	Feb 15/2008		416	Feb 15/2009		455	Feb 15/2009	
R 610	Jun 15/2009		R 417	Jun 15/2009		456	Feb 10/2007	
R 611	Jun 15/2009		418	Feb 15/2009		457	Feb 10/2007	
612	Feb 15/2009		R 419	Jun 15/2009		458	Feb 10/2007	
R 613	Jun 15/2009		R 420	Jun 15/2009		459	Feb 10/2007	
R 614	Jun 15/2009		R 421	Jun 15/2009		460	Feb 10/2007	
R 615	Jun 15/2009		R 422	Jun 15/2009		461	Feb 10/2007	
O 616	Jun 15/2009		423	Feb 15/2009		462	Feb 15/2009	
617	Feb 15/2009		424	Oct 15/2008		463	Feb 15/2009	
618	Feb 15/2009		425	Oct 10/2007		464	Feb 15/2009	
619	Feb 15/2008		426	Oct 10/2007		R 465	Jun 15/2009	
620	Feb 15/2008		427	Oct 10/2007		466	Feb 15/2009	
621	Feb 15/2009		428	Oct 10/2007		467	Feb 15/2009	
622	Feb 15/2009		429	Oct 10/2007		468	Feb 15/2009	
623	Feb 15/2009		430	Oct 10/2007		R 469	Jun 15/2009	
624	BLANK		431	Oct 10/2007		470	BLANK	
28-22-11			432	Feb 15/2009		28-22-11		
R 201	Jun 15/2009		433	Feb 15/2008		R 601	Jun 15/2009	
202	Feb 15/2009		434	Oct 10/2007		602	Feb 15/2009	
R 203	Jun 15/2009		435	Oct 10/2007		603	Feb 15/2009	
R 204	Jun 15/2009		436	Oct 10/2007		604	Feb 15/2009	
205	Feb 15/2009		437	Feb 15/2009		605	Feb 15/2009	
206	Feb 15/2009		438	Feb 15/2009		606	BLANK	
28-22-11			439	Feb 15/2009		28-22-13		
401	Feb 15/2009		440	Feb 15/2009		401	Jun 10/2005	
402	Oct 10/2007		441	Feb 15/2009		402	Oct 10/2003	
403	Oct 10/2007		442	Feb 15/2009		403	Jun 15/2008	
404	Oct 10/2007		443	Feb 15/2009		404	Jun 10/2005	
405	Oct 15/2008		444	Feb 15/2009		405	Oct 10/2003	
406	Oct 15/2008		R 445	Jun 15/2009		406	Jun 15/2008	
407	Oct 15/2008		446	Feb 15/2009		407	Oct 15/2008	

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28-22-13 (cont)			28-22-15 (cont)			28-22-17 (cont)		
408	Oct 15/2008		408	Oct 10/2003		404	Feb 15/2009	
409	Oct 10/2003		409	Oct 10/2003		405	Oct 15/2008	
410	Oct 10/2003		410	Feb 15/2009		406	Feb 15/2009	
411	Oct 15/2008		411	Feb 15/2009		407	Feb 15/2009	
412	Oct 15/2008		412	Feb 15/2009		408	Oct 15/2008	
413	Oct 10/2003		R 413	Jun 15/2009		28-22-21		
414	Oct 10/2003		414	Oct 15/2008		401	Feb 15/2009	
415	Feb 15/2009		415	Feb 15/2009		402	Oct 10/2007	
416	Feb 15/2009		416	Feb 15/2009		403	Oct 10/2007	
417	Jun 15/2008		417	Feb 15/2009		404	Oct 10/2007	
418	Feb 15/2009		418	Feb 15/2009		405	Oct 15/2008	
419	Oct 15/2008		419	Feb 15/2009		406	Oct 15/2008	
420	Feb 15/2009		420	BLANK		407	Oct 15/2008	
421	Jun 15/2008		28-22-15			408	Feb 15/2009	
422	Jun 15/2008		R 601	Jun 15/2009		409	Feb 15/2009	
28-22-13			602	Feb 15/2009		410	Feb 15/2009	
601	Feb 15/2009		603	Feb 15/2009		411	Feb 15/2009	
602	Oct 15/2008		604	Feb 15/2009		412	Feb 15/2009	
603	Feb 15/2008		605	Feb 15/2009		413	Feb 15/2009	
604	Oct 10/2007		606	Feb 15/2009		R 414	Jun 15/2009	
605	Oct 10/2007		607	Feb 15/2009		R 415	Jun 15/2009	
606	Feb 15/2009		608	Feb 15/2009		R 416	Jun 15/2009	
607	Oct 15/2008		609	Feb 15/2009		R 417	Jun 15/2009	
608	Oct 10/2007		610	Feb 15/2009		R 418	Jun 15/2009	
609	Oct 10/2007		611	Feb 15/2009		419	Feb 15/2009	
610	Oct 10/2007		612	Feb 15/2009		420	Oct 15/2008	
28-22-14			613	Feb 15/2009		421	Oct 15/2008	
401	Feb 15/2009		614	BLANK		422	Oct 10/2007	
402	Feb 15/2009		28-22-16			423	Oct 10/2007	
403	Oct 10/2005		401	Oct 15/2008		424	Oct 10/2007	
404	BLANK		402	Feb 15/2009		425	Oct 10/2007	
28-22-15			403	Oct 10/2003		426	Feb 15/2009	
401	Oct 15/2008		404	Oct 10/2003		427	Jun 15/2008	
402	Feb 15/2009		405	Feb 15/2009		428	Oct 10/2007	
403	Feb 15/2009		406	Feb 15/2009		429	Oct 10/2007	
404	Oct 10/2003		28-22-17			430	Oct 10/2007	
405	Oct 10/2003		401	Jun 10/2006		431	Feb 15/2009	
406	Oct 10/2003		402	Oct 10/2003		432	Feb 15/2009	
407	Oct 10/2003		403	Oct 10/2003		433	Feb 15/2009	

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434	Feb 15/2009		R 602	Jun 15/2009		O 434	Jun 15/2009	
435	Feb 15/2009		R 603	Jun 15/2009		O 435	Jun 15/2009	
436	Feb 15/2009		R 604	Jun 15/2009		O 436	Jun 15/2009	
437	Feb 15/2009		A 605	Jun 15/2009		O 437	Jun 15/2009	
438	Feb 15/2009		A 606	BLANK		O 438	Jun 15/2009	
439	Feb 15/2009		28-22-41			O 439	Jun 15/2009	
440	Feb 15/2009		401	Jun 15/2008		O 440	Jun 15/2009	
441	Feb 15/2009		R 402	Jun 15/2009		A 441	Jun 15/2009	
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445	Feb 15/2009		R 406	Jun 15/2009		502	Feb 15/2009	
446	Feb 15/2009		407	Feb 15/2008		503	Feb 15/2009	
447	Jun 10/2007		408	Feb 15/2008		504	Feb 15/2009	
448	Feb 15/2009		409	Jun 15/2008		505	Feb 15/2009	
449	Feb 10/2007		410	Feb 15/2008		506	BLANK	
450	Feb 10/2007		411	Feb 15/2008		28-22-43		
451	Feb 10/2007		412	Feb 15/2008		401	Feb 15/2009	
452	Feb 10/2007		413	Feb 15/2008		402	Feb 15/2009	
453	Feb 10/2007		414	Feb 15/2008		403	Oct 10/2003	
454	Feb 10/2007		415	Jun 15/2008		404	Oct 10/2003	
455	Feb 15/2009		416	Feb 15/2008		405	Oct 10/2003	
456	Feb 10/2007		417	Feb 15/2008		406	Feb 15/2009	
457	Feb 15/2009		418	Jun 15/2008		407	Feb 15/2009	
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465	Oct 10/2007		O 426	Jun 15/2009		402	Oct 15/2008	
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468	Feb 15/2009		R 429	Jun 15/2009		405	Oct 10/2003	
469	Feb 15/2009		O 430	Jun 15/2009		406	Feb 15/2009	
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401	Oct 10/2003		602	Feb 15/2009		404	Oct 10/2003	
402	Oct 15/2008		603	Feb 10/2007		405	Feb 15/2009	
403	Oct 10/2003		604	Feb 10/2007		406	Jun 10/2007	
404	Oct 15/2008		28-25-04			28-25-07		
405	Oct 10/2003		401	Oct 10/2003		401	Jun 10/2004	
406	BLANK		402	Oct 10/2003		402	Oct 10/2003	
28-22-71			403	Oct 10/2003		403	Jun 10/2004	
401	Oct 10/2003		404	Oct 10/2003		404	Oct 10/2007	
402	Oct 15/2008		405	Oct 10/2003		405	Oct 10/2007	
403	Oct 15/2008		406	Oct 10/2003		406	BLANK	
404	Oct 10/2003		407	Oct 10/2003		28-26-00		
405	Oct 10/2003		408	Oct 10/2003		201	Oct 10/2003	
406	Feb 15/2009		409	Oct 10/2003		202	Oct 10/2007	
407	Oct 15/2008		410	Feb 15/2009		203	Jun 15/2008	
408	Oct 15/2008		411	Feb 10/2007		204	Oct 10/2007	
28-25-00			412	Jun 10/2004		R 205	Jun 15/2009	
501	Feb 15/2009		413	Jun 10/2004		206	Feb 15/2009	
502	Oct 10/2003		414	Jun 10/2004		207	Oct 15/2008	
503	Oct 10/2003		415	Jun 10/2004		208	Oct 15/2008	
504	Oct 10/2003		416	Jun 10/2004		R 209	Jun 15/2009	
505	Oct 10/2003		417	Jun 10/2004		R 210	Jun 15/2009	
506	BLANK		418	BLANK		211	Feb 15/2009	
28-25-02			28-25-05			212	Oct 15/2008	
401	Oct 10/2003		401	Feb 15/2009		213	Oct 15/2008	
402	Jun 10/2005		402	Feb 15/2009		214	Jun 15/2008	
403	Oct 10/2003		403	Feb 15/2009		215	Jun 15/2008	
404	Oct 10/2003		404	Oct 10/2003		216	Jun 15/2008	
405	Feb 15/2009		405	Oct 10/2003		217	Jun 15/2008	
406	Jun 15/2008		406	Oct 10/2003		218	Jun 15/2008	
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409	Jun 15/2008		409	Oct 10/2003		221	Feb 15/2009	
410	Oct 10/2003		410	Feb 15/2009		222	Feb 15/2009	
411	Oct 10/2003		411	Oct 15/2008		223	Jun 15/2008	
412	Feb 15/2009		412	Oct 10/2003		224	BLANK	
413	Jun 10/2005		28-25-06			28-26-11		
414	BLANK		401	Oct 15/2008		401	Jun 10/2005	
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404	Oct 10/2003		409	Feb 15/2008		414	Feb 10/2007	
405	Feb 15/2009		410	Feb 15/2008		28-41-42		
406	Feb 15/2008		28-41-21			501	Feb 15/2009	
407	Feb 15/2008		501	Oct 15/2008		R 502	Jun 15/2009	
408	Oct 10/2003		502	Oct 15/2008		R 503	Jun 15/2009	
409	Oct 10/2003		503	Oct 15/2008		504	Feb 15/2009	
410	Feb 15/2009		504	Oct 15/2008		505	Feb 15/2009	
411	Feb 15/2008		505	Oct 15/2008		506	BLANK	
412	Feb 15/2008		506	Oct 10/2003		28-41-44		
413	Feb 15/2008		507	Oct 10/2003		401	Oct 10/2005	
414	Oct 10/2003		508	Oct 10/2003		402	Oct 10/2006	
415	Oct 10/2003		509	Oct 15/2008		403	Oct 10/2005	
416	Jun 10/2005		510	Oct 15/2008		404	Oct 10/2006	
417	Feb 15/2009		511	Oct 15/2008		405	Oct 10/2006	
418	Feb 15/2008		512	Oct 15/2008		406	Feb 10/2005	
28-41-00			28-41-21			28-41-44		
501	Feb 15/2009		701	Feb 10/2004		601	Feb 15/2009	
502	Oct 15/2008		702	Jun 15/2008		602	Feb 15/2009	
503	Oct 15/2008		28-41-41			603	Feb 15/2009	
504	Oct 10/2003		401	Jun 10/2006		604	Feb 10/2007	
505	Oct 10/2003		402	Oct 10/2006		605	Feb 10/2007	
506	Oct 10/2003		403	Oct 10/2003		606	Feb 10/2007	
507	Oct 10/2003		404	Oct 10/2006		607	Feb 10/2007	
508	Oct 10/2003		405	Oct 15/2008		608	Feb 10/2007	
509	Oct 10/2003		406	Jun 10/2006		609	Feb 15/2009	
510	Oct 15/2008		28-41-42			610	Feb 15/2009	
511	Oct 15/2008		401	Jun 10/2006		611	Feb 15/2009	
512	Oct 15/2008		402	Oct 15/2008		612	Feb 15/2009	
513	Oct 15/2008		403	Oct 15/2008		613	Feb 15/2009	
514	BLANK		404	Oct 10/2006		614	Feb 15/2009	
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401	Jun 10/2005		406	Oct 10/2006		616	Feb 15/2009	
402	Oct 10/2003		407	Oct 15/2008		617	Feb 15/2009	
403	Oct 10/2003		408	Oct 10/2006		618	Feb 15/2009	
404	Oct 10/2003		409	Oct 10/2006		619	Feb 15/2009	
405	Oct 10/2003		R 410	Jun 15/2009		620	Feb 15/2009	
406	Oct 10/2003		411	Oct 15/2008		28-41-61		
407	Feb 15/2009		412	Feb 15/2009		401	Feb 10/2006	
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403	Feb 10/2006		503	Jun 10/2004				
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406	Feb 15/2009		506	Oct 10/2003				
407	Feb 15/2009		507	Feb 10/2004				
408	BLANK		508	Feb 10/2004				
28-41-81			509	Oct 10/2003				
401	Oct 10/2003		510	BLANK				
402	Jun 10/2005		28-43-11					
403	Oct 10/2003		401	Jun 10/2005				
404	Oct 10/2003		402	Oct 10/2003				
405	Feb 15/2009		403	Oct 10/2003				
406	Oct 10/2003		404	Feb 15/2009				
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401	Oct 10/2003		401	Oct 10/2003				
402	Feb 15/2009		402	Oct 10/2003				
403	Feb 15/2009		403	Oct 10/2003				
404	Feb 15/2009		404	BLANK				
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406	Feb 15/2009		401	Jun 10/2006				
407	Jun 15/2008		402	Oct 10/2003				
408	Feb 15/2008		403	Oct 10/2003				
409	Feb 15/2008		404	Oct 10/2003				
410	Feb 15/2008		405	Jun 15/2008				
411	Jun 15/2008		406	Oct 10/2003				
412	Feb 15/2009		407	Oct 10/2003				
413	Feb 15/2009		408	Jun 10/2006				
414	Feb 15/2009		409	Oct 10/2003				
415	Jun 15/2008		410	BLANK				
416	Feb 15/2009		28-44-11					
417	Feb 15/2009		801	Oct 10/2003				
418	Jun 15/2008		802	Oct 10/2003				
419	Feb 15/2009		803	Oct 10/2003				
420	Feb 15/2009		804	Oct 10/2003				
421	Jun 15/2008		805	Oct 10/2003				
422	BLANK		806	Oct 10/2003				
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FUEL

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FUEL SYSTEM - MAINTENANCE PRACTICES

1. General

A. This procedure contains scheduled maintenance task data.

TASK 28-00-00-910-801

2. Airworthiness Limitation Precautions

A. General

(1) Critical Design Configuration Control Limitations (CDCCLs)

(a) All occurrences of CDCCLs found in this chapter of the AMM are identified by this note after each applicable CDCCL design feature:

1) NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

(b) Design features that are CDCCLs are defined and controlled by Special Federal Aviation Regulation (SFAR) 88, and can be found in Section 9 of the Maintenance Planning Data (MPD) document. CDCCLs are a means of identifying certain design configuration features intended to preclude a fuel tank ignition source for the operational life of the airplane. CDCCLs are mandatory and cannot be changed or deleted without the approval of the FAA office that is responsible for the airplane model Type Certificate, or applicable regulatory agency. A critical fuel tank ignition source prevention feature may exist in the fuel system and its related installation or in systems that, if a failure condition were to develop, could interact with the fuel system in such a way that an unsafe condition would develop without this limitation. Strict adherence to configuration, methods, techniques, and practices as prescribed is required to ensure the CDCCL is complied with. Any use of parts, methods, techniques or practices not contained in the applicable CDCCL must be approved by the FAA office that is responsible for the airplane model Type Certificate, or applicable regulatory agency.

(2) Airworthiness Limitation Instructions (ALIs)

(a) All occurrences of fuel tank system ALIs found in this chapter of the AMM are identified by this step after the General section in the applicable ALI inspection task:

1) ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on airworthiness limitation instructions (ALIs).

(b) Inspection tasks that are ALIs are defined and controlled by Special Federal Aviation Regulation (SFAR) 88, and can be found in Section 9 of the Maintenance Planning Data (MPD) document. These ALIs identify inspection tasks related to fuel tank ignition source prevention which must be done to maintain the design level of safety for the operational life of the airplane. These ALIs are mandatory and cannot be changed or deleted without the approval of the FAA office that is responsible for the airplane model Type Certificate, or applicable regulatory agency. Strict adherence to methods, techniques and practices as prescribed is required to ensure the ALI is complied with. Any use of methods, techniques or practices not contained in these ALIs must be approved by the FAA office that is responsible for the airplane model Type Certificate, or applicable regulatory agency.

B. Location Zones

Zone	Area
100	Lower Half of Fuselage
200	Upper Half of Fuselage
500	Left Wing

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Zone	Area
600	Right Wing

C. Critical Design Configuration Control Limitations (CDCCLs)

SUBTASK 28-00-00-910-001

WARNING: OBEY THE MANUFACTURER'S PROCEDURES WHEN YOU DO MAINTENANCE THAT HAS AN EFFECT ON A CDCCL. IF YOU DO NOT OBEY THE PROCEDURES, IT CAN INCREASE THE RISK OF A SOURCE OF FUEL TANK IGNITION. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR IF THERE IS A FIRE OR EXPLOSION.

- (1) Make sure you follow the procedures for items identified as CDCCLs.

D. Airworthiness Limitation Instructions (ALIs)

SUBTASK 28-00-00-910-002

WARNING: OBEY THE MANUFACTURER'S PROCEDURES WHEN YOU DO ANY MAINTENANCE THAT MAY AFFECT AN ALI. IF YOU DO NOT FOLLOW THE PROCEDURES, IT CAN INCREASE THE RISK OF A FUEL TANK IGNITION SOURCE.

- (1) Make sure you follow the procedures for items identified as ALIs.

END OF TASK

TASK 28-00-00-200-801

3. Electrical Bonding Jumpers in the Fuel System - Inspection

A. General

- (1) This task has visual and mechanical inspections of the bonding jumpers in the fuel system.
- (2) Do not flex, bend or kink the bonding jumper more than is necessary. If the bonding jumpers are moved too much, it can cause the loss of tin plating on the wire braid of the bonding jumper.
- (3) When you inspect the bonding jumpers, you may see black or brown deposits on the wire braid. This can occur when there is a deterioration of the tin plating on the bonding jumper and the copper in the wire reacts with any sulfur compounds. This is not a problem unless the wire braid has broken strands. If the bonding jumper has broken strands, then you must replace the bonding jumper.
- (4) When you inspect the bonding jumpers, inspect for loose clamps and corrosion.

B. References

Reference	Title
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
SWPM 20-20-00	Electrical Bonds and Grounds

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C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Prepare for the Inspection

SUBTASK 28-00-00-010-001

WARNING: CAREFULLY DO ALL OF THE SAFETY PROCEDURES TO PREPARE TO GO INTO THE FUEL TANK. IF YOU DO NOT OBEY THE SAFETY PROCEDURES, YOU CAN CAUSE AN EXPLOSION. AN EXPLOSION WILL CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

- (1) Go into the fuel tank (TASK 28-11-00-910-802).
 - (a) Remove the applicable access doors to get access to the fuel tank (TASK 28-11-11-000-801, TASK 28-11-31-000-801).

E. Electrical Bonding Jumper Visual Inspection

SUBTASK 28-00-00-210-006

- (1) Visually inspect the bonding jumper and clamp for color and deterioration.
 - (a) If the bonding jumper is silver in color and is free from black or brown deposits, then the bonding jumper is satisfactory.
 - (b) If the wire braid on the bonding jumper has black or brown deposits, then inspect the bonding jumper for broken strands.
 - 1) If the wire braid does not have broken strands, then the bonding jumper is satisfactory.
 - 2) If the bonding jumper braid has broken strands, then do this task: Electrical Bonding Jumpers in the Fuel System - Replacement, TASK 28-00-00-960-801.

F. Electrical Bonding Jumper Mechanical Inspection

SUBTASK 28-00-00-280-001

- (1) Try to turn the bonding jumper lugs and tube clamps, if applicable, with light finger pressure.

SUBTASK 28-00-00-280-002

- (2) If the bonding jumper is loose, rework the electrical bonding path (SWPM 20-20-00).

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-00-00-410-001

- (1) If it is not necessary for subsequent tasks, go out of and close the fuel tank (Fuel Tank Closure, TASK 28-11-00-410-801).
 - (a) Install the access doors you removed (Main Tank Access Door Installation, TASK 28-11-11-400-801, TASK 28-11-31-400-801).

————— **END OF TASK** —————

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TASK 28-00-00-960-801

4. Electrical Bonding Jumpers in the Fuel System - Replacement

A. General

- (1) This task contains steps for the bonding jumpers in the system to:
 - (a) Replace the electrical bonding jumpers
 - (b) Do a check of the electrical integrity of the electrical bond path.

B. References

Reference	Title
SWPM 20-20-00	Standard Wiring Practices Manual

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Replacement of the Bonding Jumpers in the Fuel System

SUBTASK 28-00-00-020-004

- (1) Remove the bonding jumper.
 - (a) Keep all the parts necessary for the installation of the bonding jumper.

SUBTASK 28-00-00-020-005

- (2) For the bonding jumpers used to bond electrical equipment, follow the applicable installation procedure in the AMM.

SUBTASK 28-00-00-020-006

- (3) For the bonding jumpers used to bond mechanical equipment or tubing, install the new bonding jumper and hardware (SWPM 20-20-00).
 - (a) Make sure the mating surfaces are correctly prepared.
 - (b) Make sure bonding jumper installation gives sufficient clearance from the structure, tubing or all fuel system parts.

NOTE: This will prevent abrasion.
 - (c) Do the "Electrical Integrity Check of the Fuel System Bond Path" procedure.

E. Electrical Integrity Check of the Fuel System Bond Path

NOTE: (SWPM 20-20-00) defines the measurement processes necessary for installation of electrical bonding hardware. The fuel system tubing and components often incorporate multiple electrical bonds in series between the component and the primary structure. The measurement of the tubing or component bond is a separate requirement.

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SUBTASK 28-00-00-760-003

- (1) For bonding jumper hardware installations, do the resistance measurement for electrical integrity (SWPM 20-20-00).

SUBTASK 28-00-00-760-004

- (2) For the fuel system tubing or components, do these steps:
 - (a) Measure the total resistance from the tubing or component, to the adjacent primary structure (SWPM 20-20-00).
 - (b) Make sure the resistance is not more than 0.10 ohms.

————— **END OF TASK** —————

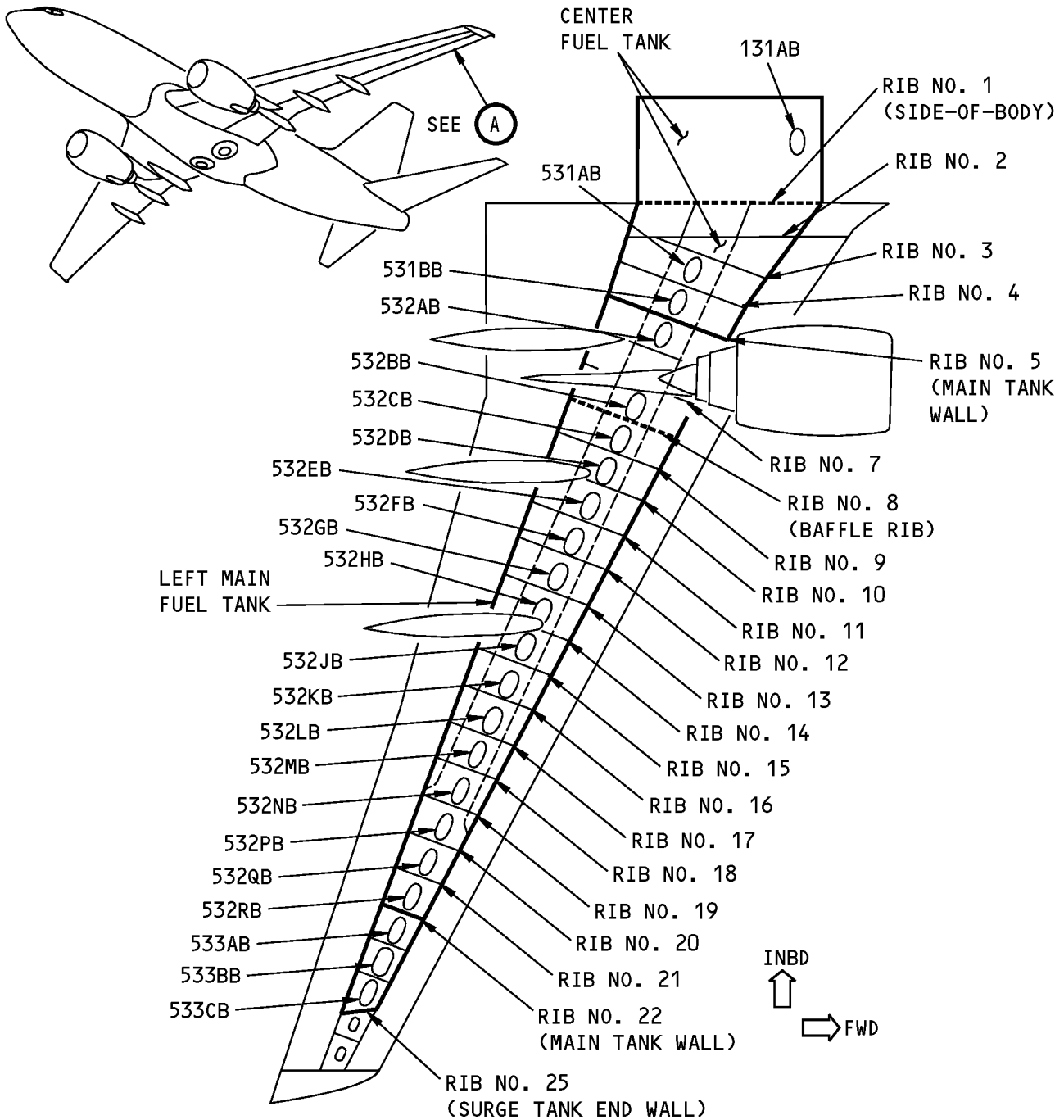
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**FUEL TANK ACCESS DOORS
(LEFT WING, BOTTOM VIEW)**

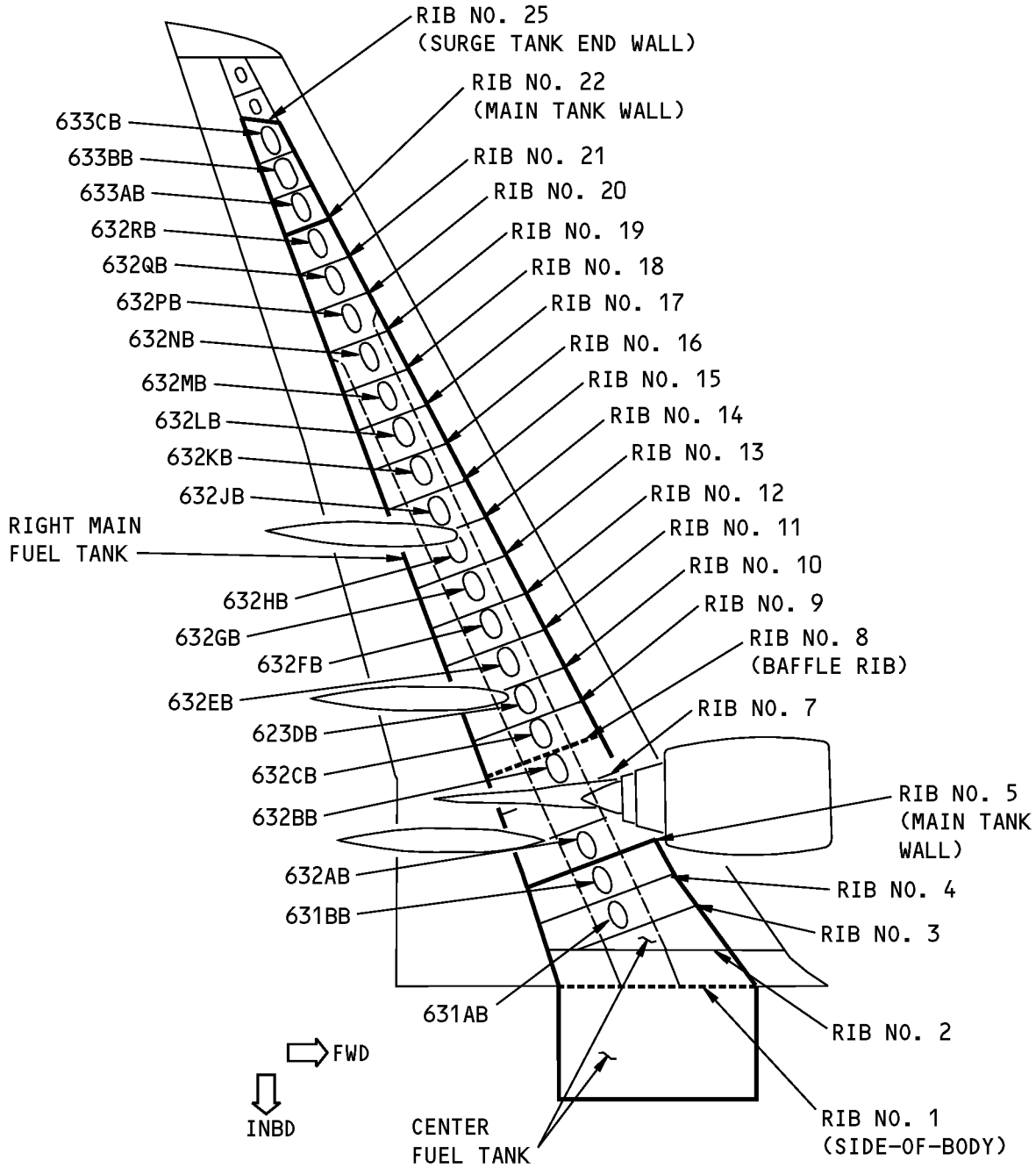
(A)

**Fuel Tank - Left Wing
Figure 201/28-00-00-990-805**

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**FUEL TANK ACCESS DOORS
(RIGHT WING, BOTTOM VIEW)**

(A)

**Fuel Tank - Right Wing
Figure 202/28-00-00-990-816**

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TASK 28-00-00-280-801

5. Fuel System Static Bond Path No. 1 Tank - Inspection

(Figure 201 or Figure 202)

A. General

(1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
06-43-00-800-801	Engine and Nacelle Strut Access Doors and Panels (P/B 201)
06-44-00-800-801	Finding an Access Door or Panel on the Wings (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)

C. Location Zones

Zone	Area
434	Engine 1 - Aft Strut Fairing
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50

D. Access Panels

Number	Name/Location
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
532AB	Main Tank Access Door - Wing Station 216
532AZ	Main Tank Inner Access at Rib 6
532BB	Main Tank Access Door - Wing Station 265
532BZ	Main Tank Inner Access at Rib 6
532CB	Main Tank Access Door - Wing Station 290
532PB	Main Tank Access Door - Wing Station 576

E. Procedure

SUBTASK 28-00-00-280-004

(1) For the area in the No. 1 fuel tank between rib No. 5 (inboard tank end) and rib No. 7, do these steps:

(a) Remove this access panel:

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

(b) Go into the opening for:

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216

(c) For the area in the No. 1 fuel tank between rib No. 6 and rib No. 7, remove only one of these access panels on rib No. 6 (unless the engine is removed):

Number	Name/Location
532AZ	Main Tank Inner Access at Rib 6
532BZ	Main Tank Inner Access at Rib 6

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To do this, do this task: Finding an Access Door or Panel on the Wings, TASK 06-44-00-800-801.

- (d) For all bonding jumpers between Rib No. 5 and Rib No. 7, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801.
- (e) If it is removed and access is not necessary for subsequent tasks, install the applicable access panel(s) on rib No. 6:

<u>Number</u>	<u>Name/Location</u>
532AZ	Main Tank Inner Access at Rib 6
532BZ	Main Tank Inner Access at Rib 6

To do this, do this task: Finding an Access Door or Panel on the Wings, TASK 06-44-00-800-801.

- (f) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532AB	Main Tank Access Door - Wing Station 216

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

SUBTASK 28-00-00-280-005

- (2) For the area in the No. 1 fuel tank between rib No. 7 and rib No. 8, do these steps:

- (a) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1

(Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801).

- (b) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532BB	Main Tank Access Door - Wing Station 265

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

- (c) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532BB	Main Tank Access Door - Wing Station 265

- (d) For all bonding jumpers between Rib No. 7 and Rib No. 8, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801.

- (e) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532BB	Main Tank Access Door - Wing Station 265

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

- (f) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1

(Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801).

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SUBTASK 28-00-00-280-006

(3) For the area in the No. 1 fuel tank between rib No. 8 and rib No. 9, do these steps:

(a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532CB	Main Tank Access Door - Wing Station 290

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

(b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532CB	Main Tank Access Door - Wing Station 290

(c) For all bonding jumpers between Rib No. 8 and Rib No. 9, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801.

(d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532CB	Main Tank Access Door - Wing Station 290

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

SUBTASK 28-00-00-280-017

(4) For the area in the No. 1 fuel tank between rib No. 19 and rib No. 20, do these steps:

(a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532PB	Main Tank Access Door - Wing Station 576

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

(b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532PB	Main Tank Access Door - Wing Station 576

(c) For all bonding jumpers between Rib No. 19 and Rib No. 20, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801.

(d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532PB	Main Tank Access Door - Wing Station 576

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

END OF TASK

TASK 28-00-00-280-802

6. Fuel System Static Bond Path No. 2 Tank - Inspection

(Figure 201 or Figure 202)

A. General

(1) This procedure is a scheduled maintenance task.

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B. References

Reference	Title
06-43-00-800-801	Engine and Nacelle Strut Access Doors and Panels (P/B 201)
06-44-00-800-801	Finding an Access Door or Panel on the Wings (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)

C. Location Zones

Zone	Area
444	Engine 2 - Aft Strut Fairing
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Access Panels

Number	Name/Location
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2
632AB	Main Tank Access Door - Wing Station 216
632AZ	Main Tank Inner Access at Rib 6
632BB	Main Tank Access Door - Wing Station 265
632BZ	Main Tank Inner Access at Rib 6
632CB	Main Tank Access Door - Wing Station 290
632DB	Main Tank Access Door - Wing Station 313
632EB	Main Tank Access Door - Wing Station 337
632FB	Main Tank Access Door - Wing Station 367
632PB	Main Tank Access Door - Wing Station 576

E. Procedure

SUBTASK 28-00-00-280-020

- (1) For the area in the No. 2 fuel tank between rib No. 5 (inboard tank end) and rib No. 7, do these steps:

- (a) Remove this access panel:

Number	Name/Location
632AB	Main Tank Access Door - Wing Station 216

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

- (b) Go into the opening for:

Number	Name/Location
632AB	Main Tank Access Door - Wing Station 216

- (c) For the area in the No. 2 fuel tank between rib No. 6 and rib No. 7, remove only one of these access panels on rib No. 6 (unless the engine is removed):

Number	Name/Location
632AZ	Main Tank Inner Access at Rib 6
632BZ	Main Tank Inner Access at Rib 6

To do this, do this task: Finding an Access Door or Panel on the Wings, TASK 06-44-00-800-801.

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- (d) For all bonding jumpers between Rib No. 5 and Rib No. 7, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801
- (e) If it is removed and access is not necessary for subsequent tasks, install the applicable access panel(s) on rib No. 6:

<u>Number</u>	<u>Name/Location</u>
632AZ	Main Tank Inner Access at Rib 6
632BZ	Main Tank Inner Access at Rib 6

To do this, do this task: Finding an Access Door or Panel on the Wings, TASK 06-44-00-800-801.

- (f) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632AB	Main Tank Access Door - Wing Station 216

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

SUBTASK 28-00-00-280-021

- (2) For the area in the No. 2 fuel tank between rib No. 7 and rib No. 8, do these steps:

- (a) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2

(Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801).

- (b) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632BB	Main Tank Access Door - Wing Station 265

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

- (c) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632BB	Main Tank Access Door - Wing Station 265

- (d) For all bonding jumpers between Rib No. 7 and Rib No. 8, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801.

- (e) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632BB	Main Tank Access Door - Wing Station 265

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

- (f) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2

(Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801).

SUBTASK 28-00-00-280-022

- (3) For the area in the No. 2 fuel tank between rib No. 8 and rib No. 9, do these steps:

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- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632CB	Main Tank Access Door - Wing Station 290

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632CB	Main Tank Access Door - Wing Station 290

- (c) For all bonding jumpers between Rib No. 8 and Rib No. 9, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801.

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632CB	Main Tank Access Door - Wing Station 290

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

SUBTASK 28-00-00-280-023

- (4) For the area in the No. 2 fuel tank between rib No. 9 and rib No. 10, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632DB	Main Tank Access Door - Wing Station 313

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632DB	Main Tank Access Door - Wing Station 313

- (c) For all bonding jumpers between Rib No. 9 and Rib No. 10, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801.

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632DB	Main Tank Access Door - Wing Station 313

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

SUBTASK 28-00-00-280-024

- (5) For the area in the No. 2 fuel tank between rib No. 10 and rib No. 11, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632EB	Main Tank Access Door - Wing Station 337

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632EB	Main Tank Access Door - Wing Station 337

- (c) For all bonding jumpers between Rib No. 10 and Rib No. 11, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801.

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- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632EB	Main Tank Access Door - Wing Station 337

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

SUBTASK 28-00-00-280-025

- (6) For the area in the No. 2 fuel tank between rib No. 11 and rib No. 12, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632FB	Main Tank Access Door - Wing Station 367

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632FB	Main Tank Access Door - Wing Station 367

- (c) For all bonding jumpers between Rib No. 11 and Rib No. 12, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801.

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632FB	Main Tank Access Door - Wing Station 367

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

SUBTASK 28-00-00-280-033

- (7) For the area in the No. 2 fuel tank between rib No. 19 and rib No. 20, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632PB	Main Tank Access Door - Wing Station 576

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632PB	Main Tank Access Door - Wing Station 576

- (c) For all bonding jumpers between Rib No. 19 and Rib No. 20, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801.

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632PB	Main Tank Access Door - Wing Station 576

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

————— **END OF TASK** —————

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TASK 28-00-00-280-803

7. Fuel System Static Bond Center Tank - Inspection

(Figure 201 or Figure 202)

A. General

(1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)

C. Location Zones

Zone	Area
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Access Panels

Number	Name/Location
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
531BB	Center Tank Access Door - Wing Station 192
631AB	Center Tank Access Door - Wing Station 168
631BB	Center Tank Access Door - Wing Station 192

E. Procedure

SUBTASK 28-00-00-280-036

(1) For the area in the center tank on the left side between rib No. 4 and rib No. 5 (tank end), do these steps:

(a) Remove this access panel:

Number	Name/Location
531BB	Center Tank Access Door - Wing Station 192

To do this, do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801

(b) Go into the opening for:

Number	Name/Location
531BB	Center Tank Access Door - Wing Station 192

(c) For all bonding jumpers between Rib No. 4 and Rib No. 5, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801

(d) If access is not necessary for subsequent tasks, install this access panel:

Number	Name/Location
531BB	Center Tank Access Door - Wing Station 192

To do this, do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801

SUBTASK 28-00-00-280-037

(2) For the area in the center tank on the left side between rib No. 1 (side of body rib) and rib No. 4, do these steps:

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- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

To do this, do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

- (c) For all bonding jumpers between Rib No. 1 and Rib No. 4, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

To do this, do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801

SUBTASK 28-00-00-280-038

- (3) For the area in the center tank on the right side between rib No. 4 and rib No. 5 (tank end), do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
631BB	Center Tank Access Door - Wing Station 192

To do this, do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
631BB	Center Tank Access Door - Wing Station 192

- (c) For all bonding jumpers between Rib No. 4 and Rib No. 5, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
631BB	Center Tank Access Door - Wing Station 192

To do this, do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801

SUBTASK 28-00-00-280-039

- (4) For the area in the center tank on the right side between rib No. 1 (side of body rib) and rib No. 4, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
631AB	Center Tank Access Door - Wing Station 168

To do this, do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
631AB	Center Tank Access Door - Wing Station 168

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- (c) For all bonding jumpers between Rib No. 1 and Rib No. 4, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801
- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
631AB	Center Tank Access Door - Wing Station 168

To do this, do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801

SUBTASK 28-00-00-280-040

- (5) For the area of the center tank in the center wing section, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

To do this, do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

- (c) For all bonding jumpers in the center wing section of the center fuel tank, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

To do this, do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801

————— **END OF TASK** —————

TASK 28-00-00-760-801

8. Fuel System Fault Current, Left Side - Inspection

(Figure 203, Figure 204, Figure 205, Figure 207)

A. General

- (1) This procedure is a scheduled maintenance task.

B. References

<u>Reference</u>	<u>Title</u>
27-11-00-820-802	Pogo and Power Control Unit (PCU) Adjustment (P/B 501)
27-81-00-860-803	Leading Edge Flaps and Slats Extension (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
SWPM 20-20-00	Electrical Bonds and Grounds

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

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Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)
SPL-1585	Kit - Rigging Pins, All Systems (Part #: F70207-109, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Location Zones

Zone	Area
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5

E. Procedure

SUBTASK 28-00-00-760-005

- (1) Do these steps to do an inspection of the aft boost pump for the No. 1 tank:
 - (a) To get access to the motor impeller of the aft fuel boost pump for the No. 1 tank, go through the applicable left main shock strut door.
 - (b) Do a check of the electrical bond between the aft fuel boost pump for the No. 1 tank and the airplane structure with an electrical bonding meter, COM-1550 (SWPM 20-20-00).
 - 1) Make sure the resistance is 0.001 ohm (1 milliohm) or less.

SUBTASK 28-00-00-760-006

- (2) Do these steps to do an inspection of the forward boost pump for the No. 1 tank:

WARNING: MAKE SURE THAT PERSONNEL AND EQUIPMENT STAY AWAY FROM THE LEADING EDGE FLAPS AND SLATS, TRAILING EDGE FLAPS, AND DRIVE MECHANISMS. THE FLAPS, SLATS, AND DRIVE MECHANISMS MOVE QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

 - (a) To get access to the motor impeller of the forward fuel boost pump for the No. 1 tank, do this task: Leading Edge Flaps and Slats Extension, TASK 27-81-00-860-803.
 - (b) Do a check of the electrical bond between the forward fuel boost pump for the No. 1 tank and the airplane structure (SWPM 20-20-00).
 - 1) Make sure the resistance is 0.001 ohm (1 milliohm) or less.

SUBTASK 28-00-00-760-007

- (3) Do these steps to do an inspection of the left center boost pump:

WARNING: MAKE SURE THAT THE DOWNLOCK PINS ARE INSTALLED ON ALL THE LANDING GEAR. WITHOUT THE DOWNLOCK PINS, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONS, AND DAMAGE TO EQUIPMENT.

 - (a) If downlock pins are not installed, do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.
 - (b) To get access to the left center tank fuel boost pump, do these additional steps:
 - 1) Remove the pin [28], nut [27], washer [26], bushing [24], washers [22], and bolts [23] to disconnect the pogo [21] from the power control unit [25]:

NOTE: Be careful not to change the length of the pogo. If you change the length of the pogo, it will be necessary to re-adjust the length when you re-install it.

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- 2) Remove the bolts [29] and washers [30] to disconnect the bracket assembly from the power control unit [1].
- 3) Pull the pogo [21] aft, away from the rear spar of the center tank to get access to the left center tank boost pump.

NOTE: It is not necessary to remove the bolt at the left of the pogo that attaches the pogo to the aileron feel and centering unit.

- (c) Do a check of the electrical bond between the left center fuel boost pump and the airplane structure (SWPM 20-20-00).

- 1) Make sure the resistance is 0.001 ohm (1 milliohm) or less.

- (d) Do these steps to install the pogo [21]:

NOTE: Be careful not to change the length of the pogo.

- 1) Connect the bracket assemblies to the power control unit [25] with bolts [29] and washers [30].
- 2) Connect the pogo [21] to the power control unit [25] with bolt [23], washer [22], bushing [24], washer [26], nut [27] and pin [28].

NOTE: You must install the bolt [23] with the bolt head up.

- 3) Make sure you can easily install and remove the rig pin A/S-4, from the rig pin kit, SPL-1585, in the aileron bus drum (TASK 27-11-00-820-802).
- 4) If you cannot easily install and remove the rig pin A/S-4, do this task: Pogo and Power Control Unit (PCU) Adjustment, TASK 27-11-00-820-802.

NOTE: This step should not be necessary if the length of the pogo was not changed while it was removed.

————— **END OF TASK** —————

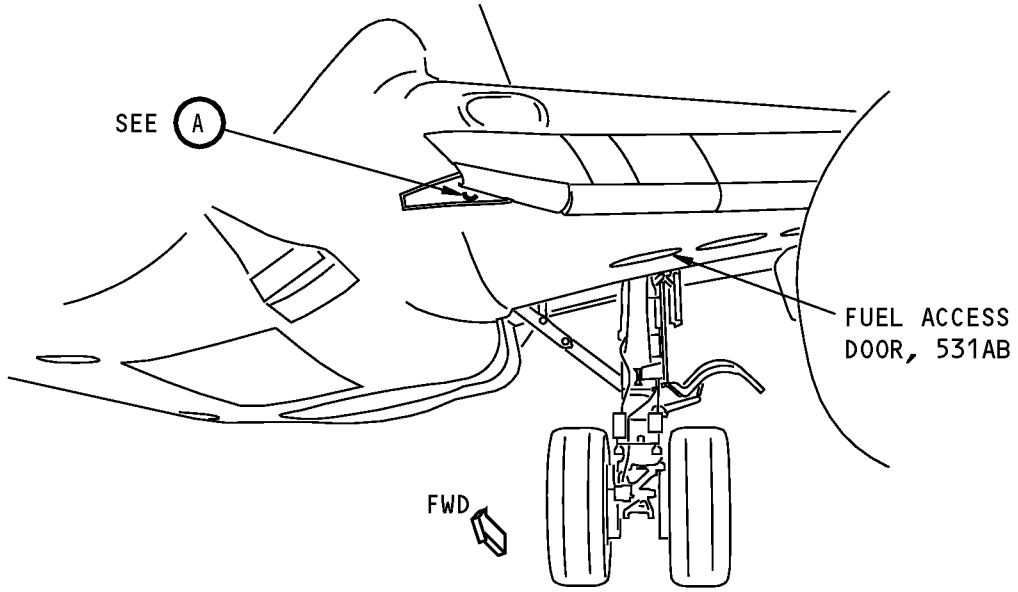
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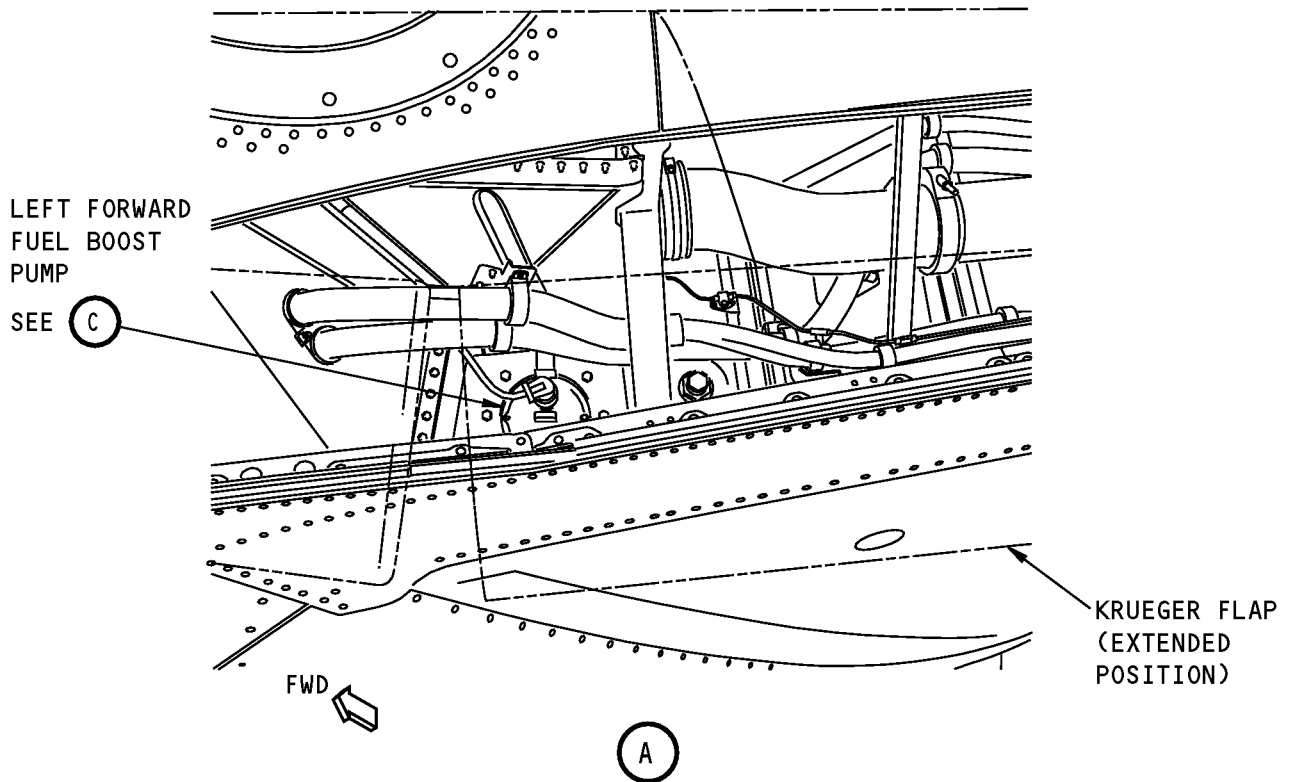
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**LEFT WING
(RIGHT WING IS OPPOSITE)**



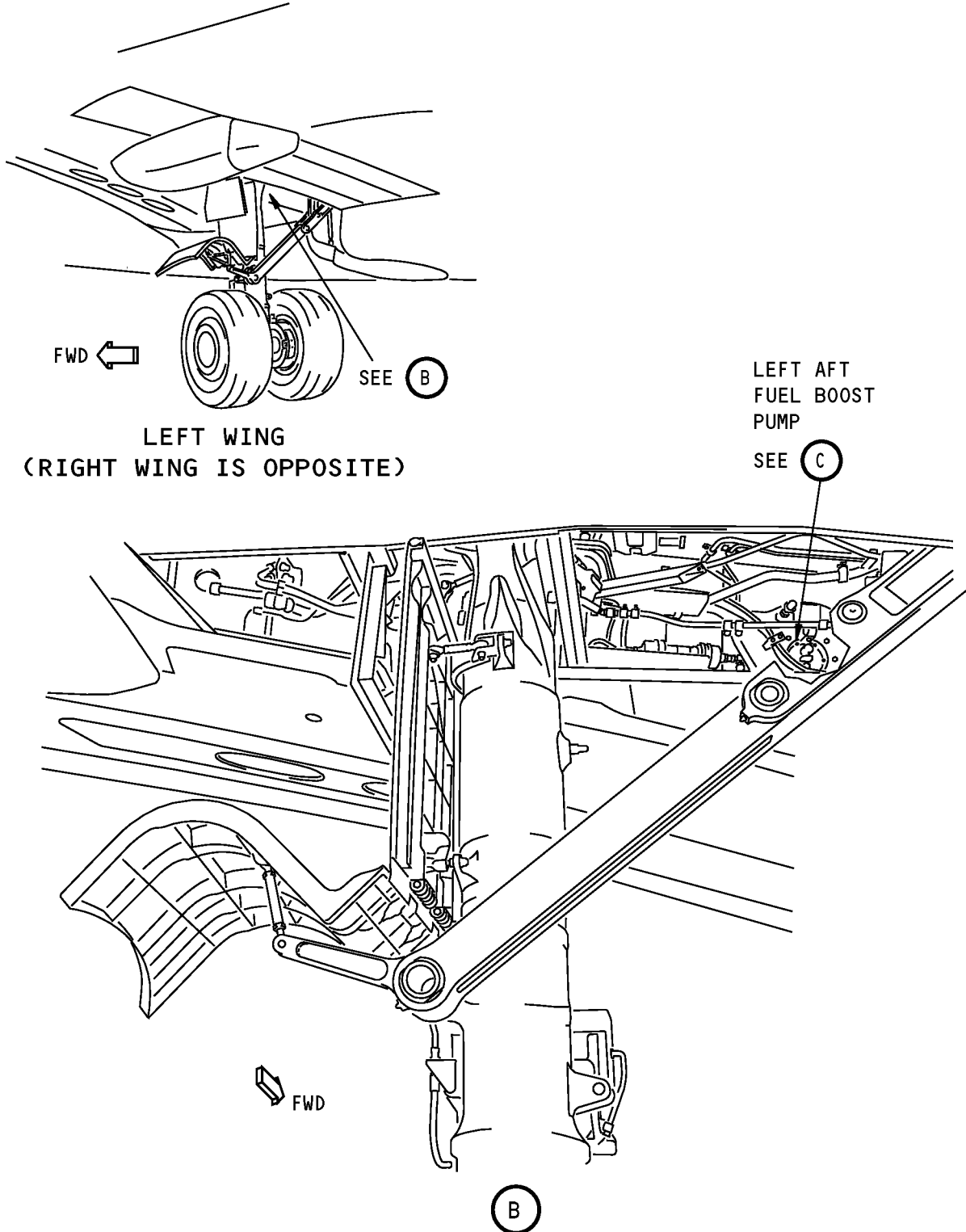
**No. 1 or 2 Tank Fuel Boost Pump Location
Figure 203 (Sheet 1 of 3)/28-00-00-990-817**

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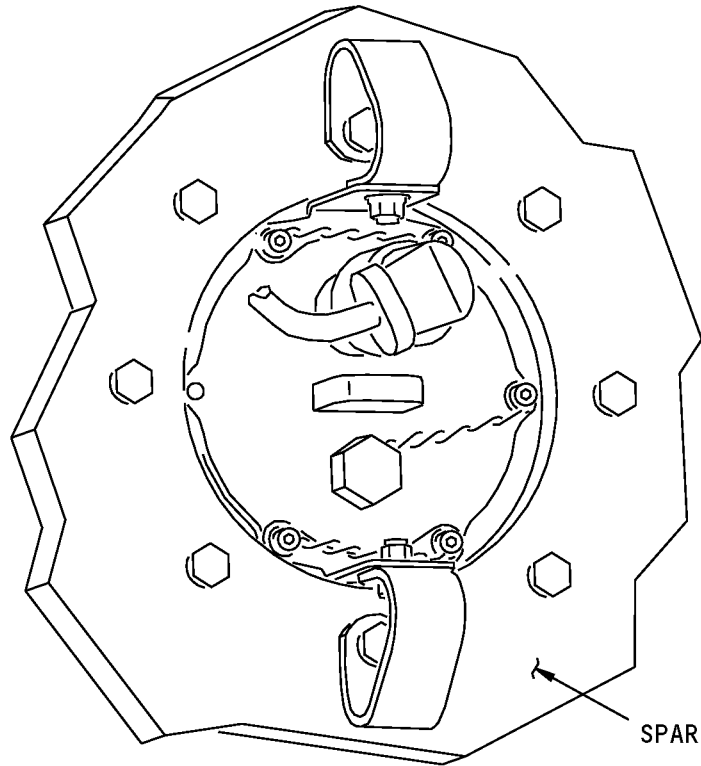
**No. 1 or 2 Tank Fuel Boost Pump Location
Figure 203 (Sheet 2 of 3)/28-00-00-990-817**

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**FUEL BOOST PUMP
(EXAMPLE)**

(C)

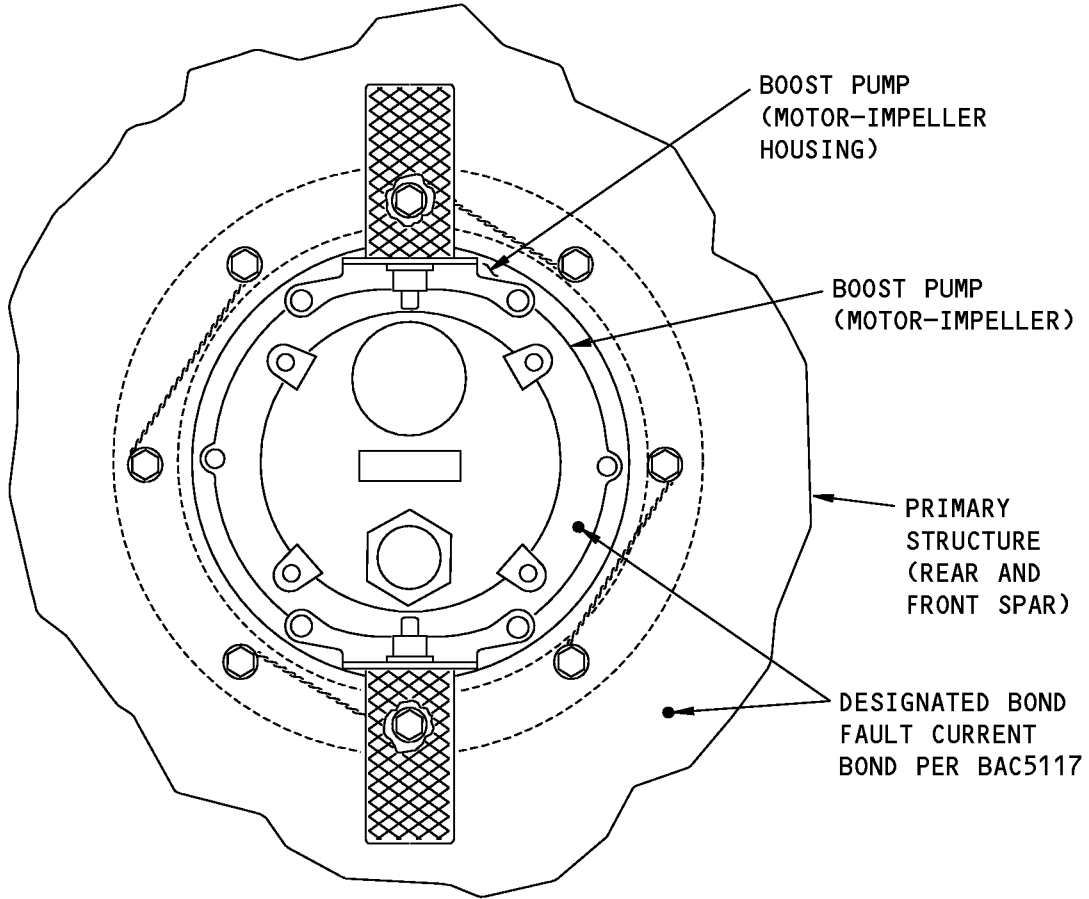
**No. 1 or 2 Tank Fuel Boost Pump Location
Figure 203 (Sheet 3 of 3)/28-00-00-990-817**

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NOTE: MEASURE RESISTANCE PER BAC5117. MEASURE PUMP MOTOR-IMPELLER AT POINTS INDICATED TO PRIMARY STRUCTURE $<0.001\Omega$.

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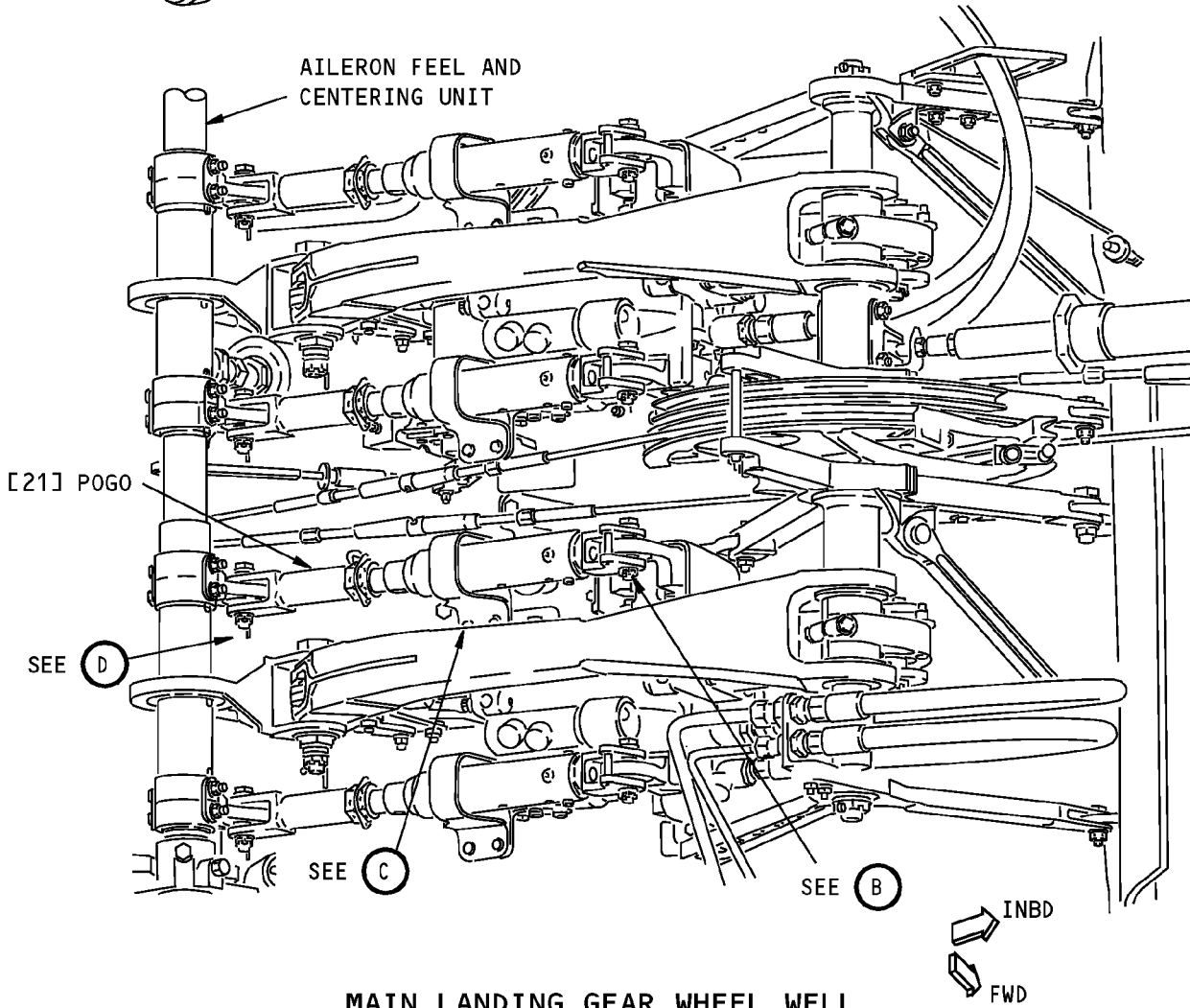
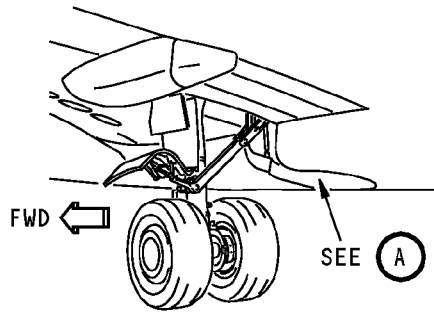
**No. 1 or No. 2 Tank Boost Pump Resistance Measurement - Probe Locations
Figure 204/28-00-00-990-818**

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**MAIN LANDING GEAR WHEEL WELL
(LEFT SIDE)**

A

**Left Center Tank Fuel Boost Pump Access
Figure 205 (Sheet 1 of 3)/28-00-00-990-819**

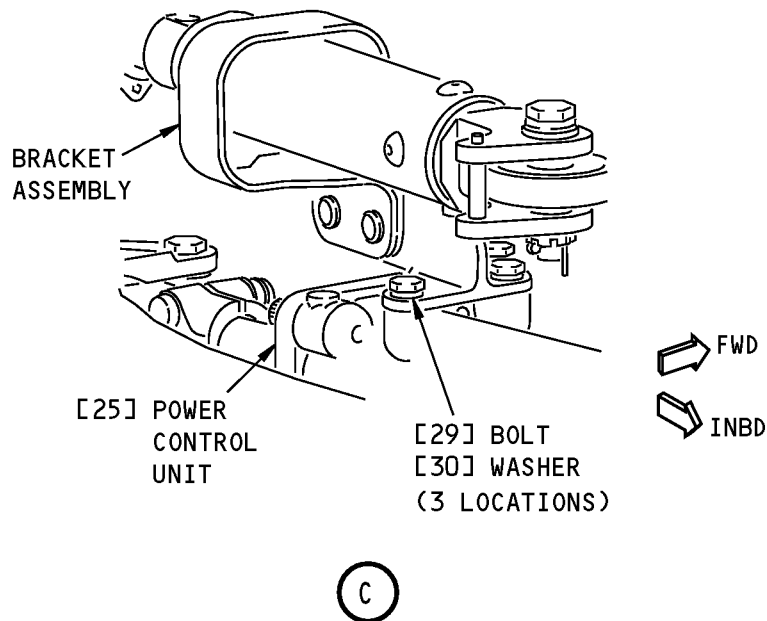
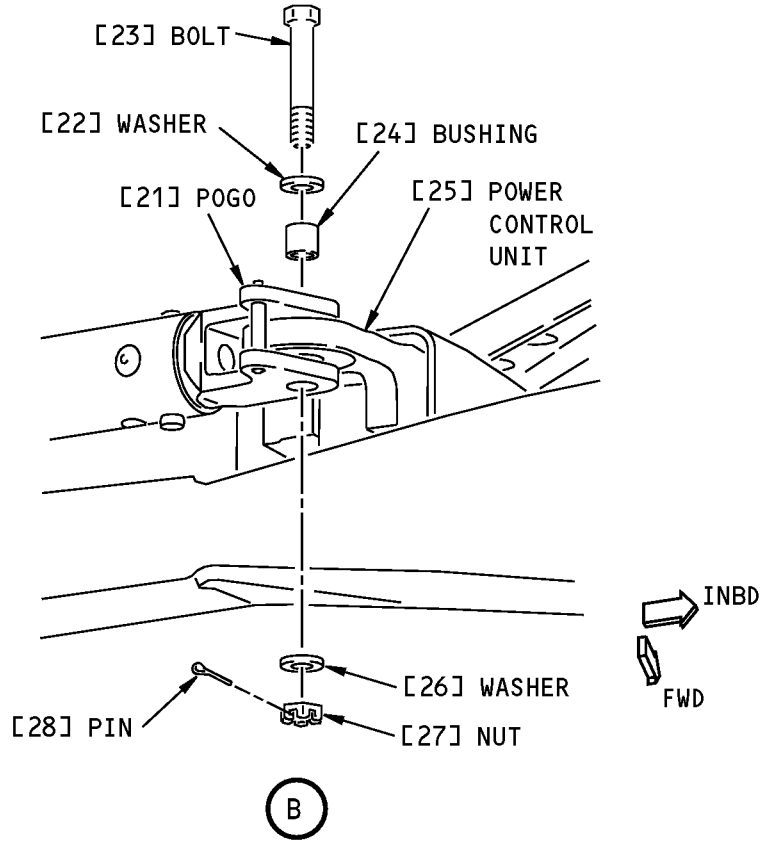
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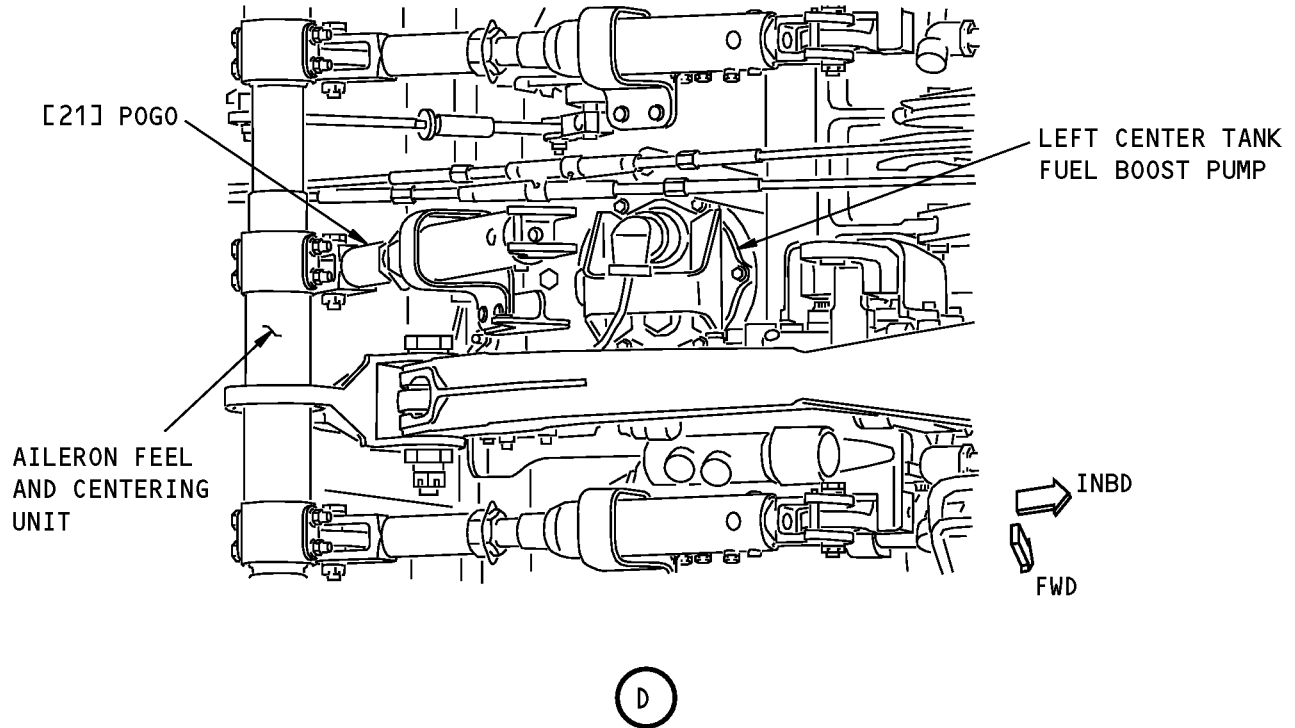
**Left Center Tank Fuel Boost Pump Access
Figure 205 (Sheet 2 of 3)/28-00-00-990-819**

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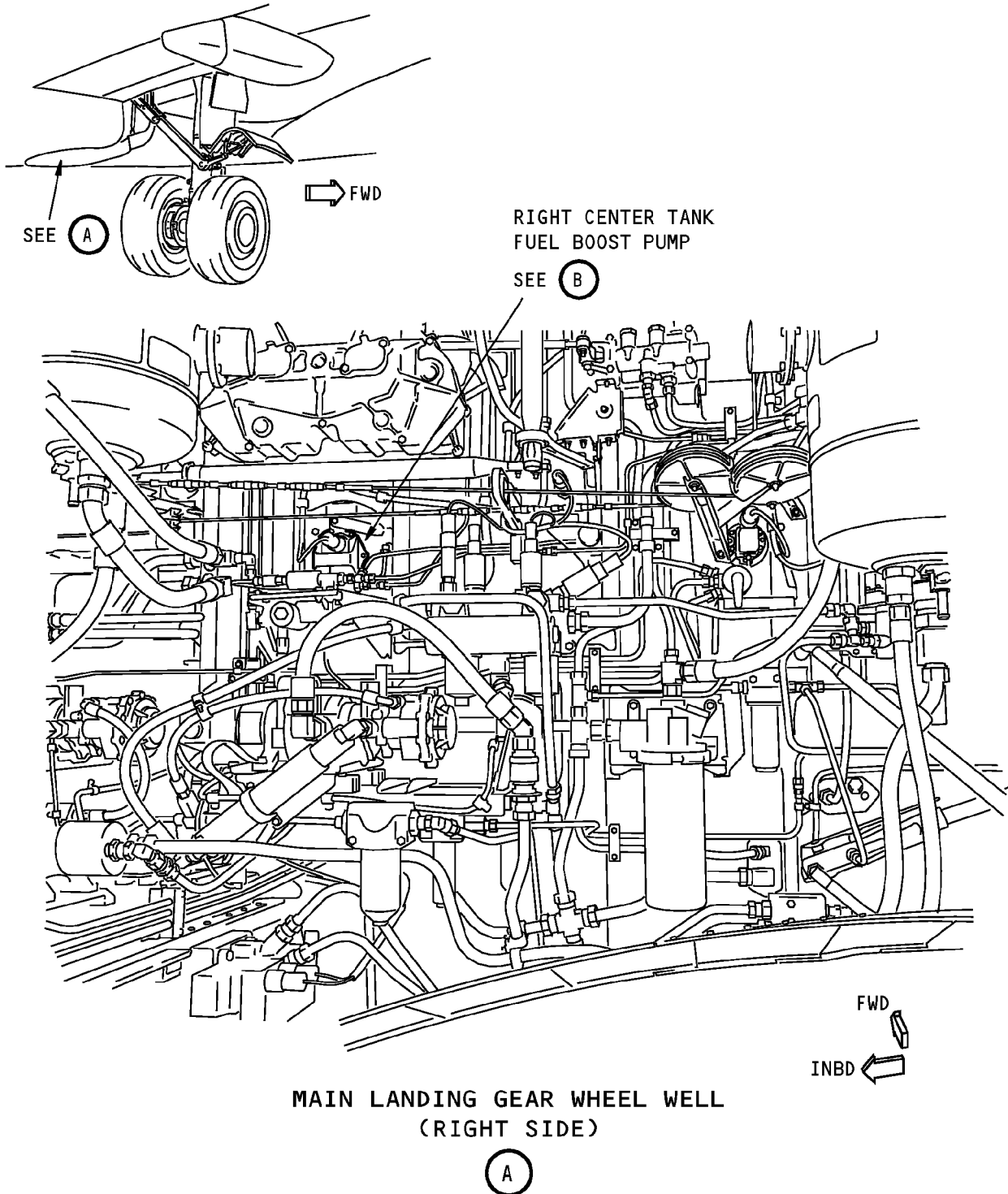
**Left Center Tank Fuel Boost Pump Access
Figure 205 (Sheet 3 of 3)/28-00-00-990-819**

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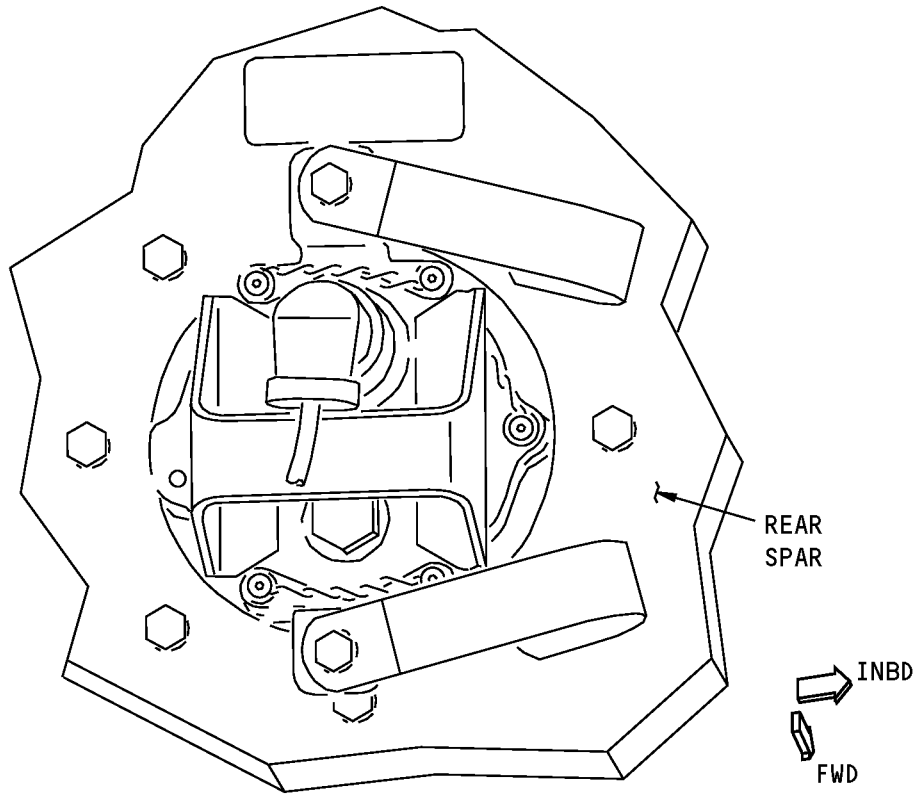
**Right Center Tank Fuel Boost Pump Location
Figure 206 (Sheet 1 of 2)/28-00-00-990-820**

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RIGHT CENTER TANK FUEL BOOST PUMP

B

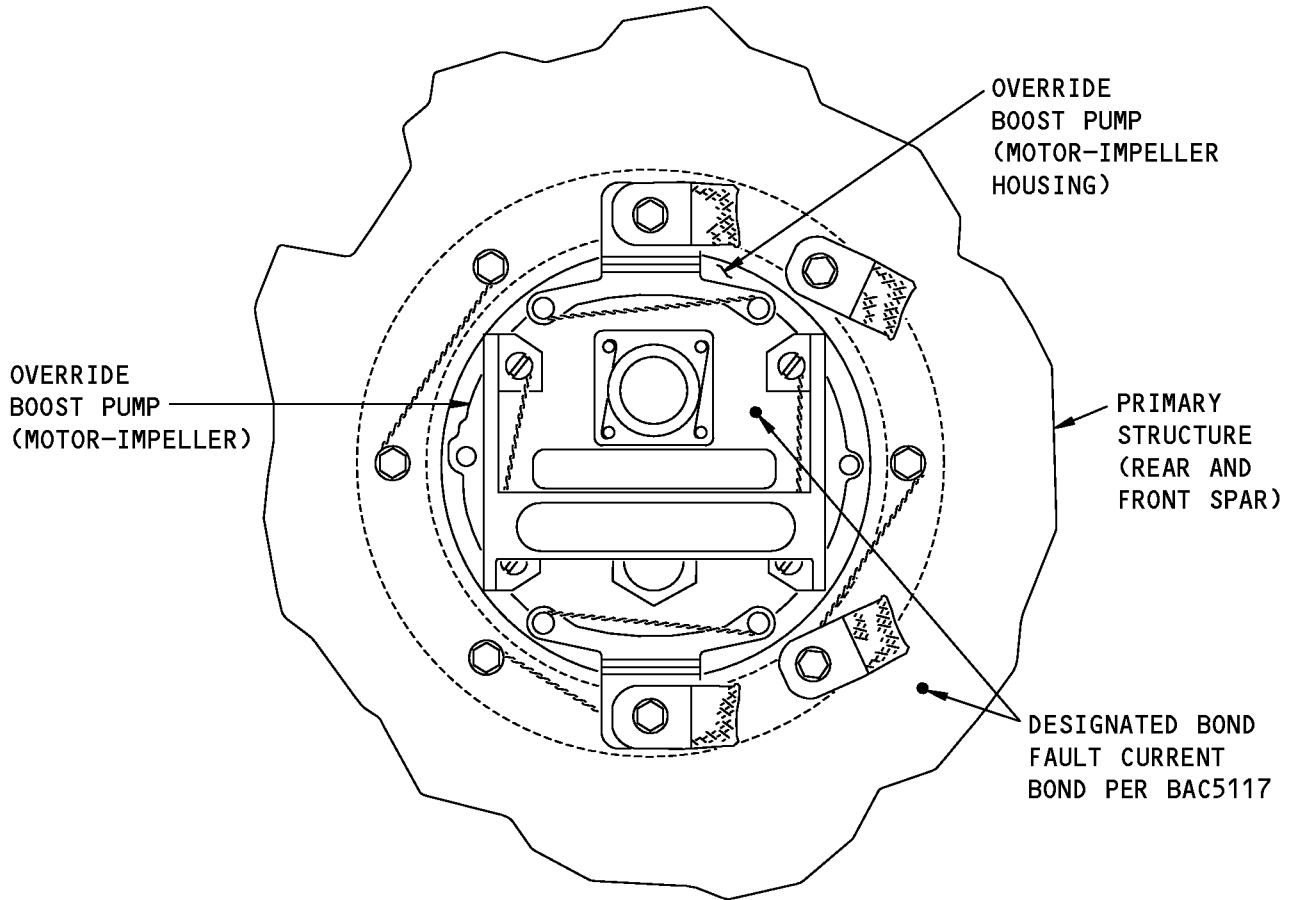
**Right Center Tank Fuel Boost Pump Location
Figure 206 (Sheet 2 of 2)/28-00-00-990-820**

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NOTE: MEASURE RESISTANCE PER BAC5117. MEASURE IMPELLER MOTOR AT POINTS INDICATED TO THE PRIMARY STRUCTURE $<0.001\Omega$.

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**Center Tank Boost Pump Resistance Measurement - Probe Locations
Figure 207/28-00-00-990-821**

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TASK 28-00-00-760-802

9. Fuel System Fault Current, Right Side - Inspection

(Figure 203, Figure 204, Figure 206, Figure 207)

A. General

- (1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
27-81-00-860-803	Leading Edge Flaps and Slats Extension (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
SWPM 20-20-00	Electrical Bonds and Grounds

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)

D. Location Zones

Zone	Area
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

E. Procedure

SUBTASK 28-00-00-760-008

- (1) Do these steps to do an inspection of the aft boost pump for the No. 2 tank:
 - (a) To get access to the motor impeller of the aft fuel boost pump for the No. 2 tank, go through the applicable right main shock strut door.
 - (b) Do a check of the electrical bond between the aft fuel boost pump for the No. 2 tank and the airplane structure with an electrical bonding meter, COM-1550 (SWPM 20-20-00).
 - 1) Make sure the resistance is 0.001 ohm (1 milliohm) or less.

SUBTASK 28-00-00-760-009

- (2) Do these steps to do an inspection of the forward boost pump for the No. 2 tank:

WARNING: MAKE SURE THAT PERSONNEL AND EQUIPMENT STAY AWAY FROM THE LEADING EDGE FLAPS AND SLATS, TRAILING EDGE FLAPS, AND DRIVE MECHANISMS. THE FLAPS, SLATS, AND DRIVE MECHANISMS MOVE QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (a) To get access to the motor impeller of the forward fuel boost pump for the No. 2 tank, do this task: Leading Edge Flaps and Slats Extension, TASK 27-81-00-860-803
- (b) Do a check of the electrical bond between the forward fuel boost pump for the No. 2 tank and the airplane structure (SWPM 20-20-00).
 - 1) Make sure the resistance is 0.001 ohm (1 milliohm) or less.

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SUBTASK 28-00-00-760-010

(3) Do these steps to do an inspection of the right center boost pump:

WARNING: MAKE SURE THAT THE DOWNLOCK PINS ARE INSTALLED ON ALL THE LANDING GEAR. WITHOUT THE DOWNLOCK PINS, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONS, AND DAMAGE TO EQUIPMENT.

- (a) If downlock pins are not installed, do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.
- (b) Do a check of the electrical bond between the right center fuel boost pump and the airplane structure (SWPM 20-20-00).
 - 1) Make sure the resistance is 0.001 ohm (1 milliohm) or less.

————— **END OF TASK** —————

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FUEL SYSTEM - DDG MAINTENANCE PROCEDURES

1. General

- A. This procedure has the maintenance tasks for the Master Minimum Equipment List (MMEL) maintenance requirements as shown in the Dispatch Deviations Procedures Guide (DDPG). These tasks prepare the airplane for flight with systems/components that are inoperative.
- B. This procedure also has tasks that put the airplane back to its usual condition.
- C. These are the tasks for the components in the fuel system:
 - (1) MMEL 28-1 (DDPG) Preparation - Fuel Boost Pump Inoperative
 - (2) MMEL 28-1 (DDPG) Restoration - Fuel Boost Pump Inoperative
 - (3) MMEL 28-4 (DDPG) Preparation - APU Fuel Valve Inoperative
 - (4) MMEL 28-4 (DDPG) Restoration - APU Fuel Valve Inoperative
 - (5) MMEL 28-5 (DDPG) Preparation - Crossfeed Lights Inoperative
 - (6) MMEL 28-5 (DDPG) Restoration - Crossfeed Lights Inoperative
 - (7) MMEL 28-6 (DDPG) Preparation - Flight Deck Fuel Quantity Indicators (Main Tanks) Inoperative
 - (8) MMEL 28-6 (DDPG) Restoration - Flight Deck Fuel Quantity Indicators (Main Tanks) Inoperative
 - (9) MMEL 28-7 (DDPG) Preparation - Flight Deck Fuel Quantity Indicators (Center Tank) Inoperative
 - (10) MMEL 28-7 (DDPG) Restoration - Flight Deck Fuel Quantity Indicators (Center Tank) Inoperative
 - (11) MMEL 28-10 (DDPG) Preparation - Pressure Fueling System Inoperative
 - (12) MMEL 28-10 (DDPG) Restoration - Pressure Fueling System Inoperative
 - (13) MMEL 28-12 (DDPG) Preparation - Refueling Control Panel Quantity Indicators Inoperative
 - (14) MMEL 28-12 (DDPG) Restoration - Refueling Control Panel Quantity Indicators Inoperative
 - (15) MMEL 28-16 (DDPG) Preparation - Fuel Measuring Stick Inoperative
 - (16) MMEL 28-16 (DDPG) Restoration - Fuel Measuring Stick Inoperative
 - (17) MMEL 28-22 (DDPG) Preparation - SPAR VALVE CLOSED Lights Inoperative
 - (18) MMEL 28-22 (DDPG) Restoration - SPAR VALVE CLOSED Lights Inoperative

TASK 28-00-00-040-817

2. MMEL 28-1 (DDPG) Preparation - Fuel Boost Pump Inoperative

- A. General: This task is for the operation of an aircraft with an inoperative fuel boost pump.
- B. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right

C. Fuel Boost Pump Deactivation

SUBTASK 28-00-00-040-005

- (1) Put the applicable fuel boost pump switch to the OFF position, on the P5 overhead panel:
 - (a) FUEL PUMP TANK 1 - AFT
 - (b) FUEL PUMP TANK 1 - FWD
 - (c) FUEL PUMP TANK 2 - AFT
 - (d) FUEL PUMP TANK 2 - FWD
- (2) Install an INOP placard at the applicable boost pump switch.

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SUBTASK 28-00-00-040-006

(3) Open these circuit breakers and install safety locks:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP ALL			

————— **END OF TASK** —————

TASK 28-00-00-440-807

3. MMEL 28-1 (DDPG) - Restoration - Fuel Boost Pump Inoperative

- A. General: This task restores an aircraft with an inoperative fuel boost pump
- B. Location Zones

<u>Zone</u>	<u>Area</u>
211	Flight Compartment - Left
212	Flight Compartment - Right

C. Fuel Boost Pump Restoration

SUBTASK 28-00-00-440-002

(1) Remove the safety locks and close these circuit breakers:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

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HAP 037-054, 101-999 (Continued)

Row	Col	Number	Name
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT

HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD

HAP ALL

SUBTASK 28-00-00-741-001

- (2) Remove the INOP placard from the applicable boost pump switch.

END OF TASK

TASK 28-00-00-040-805

4. MMEL 28-4 (DDPG) Preparation - APU Fuel Valve Inoperative

(Figure 901)

A. General

- (1) This task is for the operation of an airplane with an inoperative APU fuel valve (also referred to as "the APU Fuel Shutoff Valve").

B. References

Reference	Title
20-10-44-400-801	Lockwires Installation (P/B 401)
32-00-01-080-801	Landing Gear Downlock Pins Removal (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

C. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
211	Flight Compartment - Left
212	Flight Compartment - Right

D. APU Fuel Shutoff Valve Deactivation

SUBTASK 28-00-00-210-001

WARNING: MAKE SURE THAT THE GROUND LOCKS ARE INSTALLED IN ALL OF THE LANDING GEAR. WITHOUT THE GROUND LOCKS, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

- (1) Do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

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SUBTASK 28-00-00-860-019

(2) On the P5 panel, make sure the APU master switch is set to OFF.

SUBTASK 28-00-00-040-001

(3) Do these steps to deactivate the APU fuel shutoff valve:

(a) Open these circuit breakers and install safety locks:

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	19	C01344	APU FIRE SW POWER

F/O Electrical System Panel, P6-4

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	14	C00033	AUX POWER UNIT CONT

(b) Remove, cap, and stow the electrical connector, D920, for the APU fuel shutoff valve.

(c) Move the manual override handle on the valve actuator to the CLOSED position if it is not in the closed position.

(d) Install lockwire on the manual override handle to hold it in the CLOSED position (TASK 20-10-44-400-801).

SUBTASK 28-00-00-210-002

WARNING: OBEY THE PROCEDURE FOR THE REMOVAL OF THE DOWNLOCK PINS. IF YOU MOVE THE CONTROL LEVER FOR THE LANDING GEAR TO THE UP POSITION, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(4) Do this task: Landing Gear Downlock Pins Removal, TASK 32-00-01-080-801.

END OF TASK

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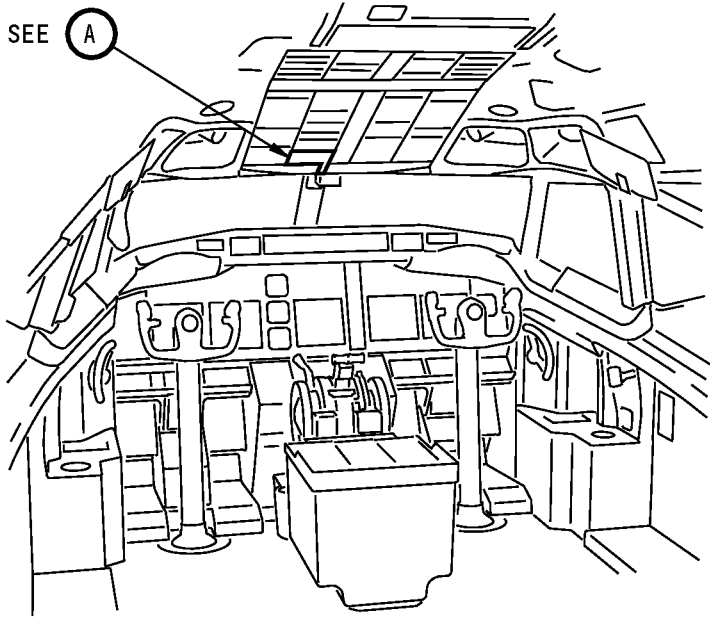
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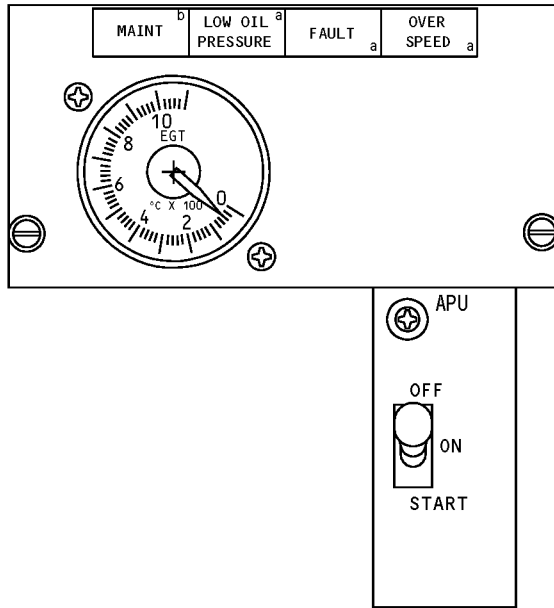
AIRCRAFT MAINTENANCE MANUAL

APU START SWITCH
AND INDICATORS

SEE (A)



FLIGHT COMPARTMENT



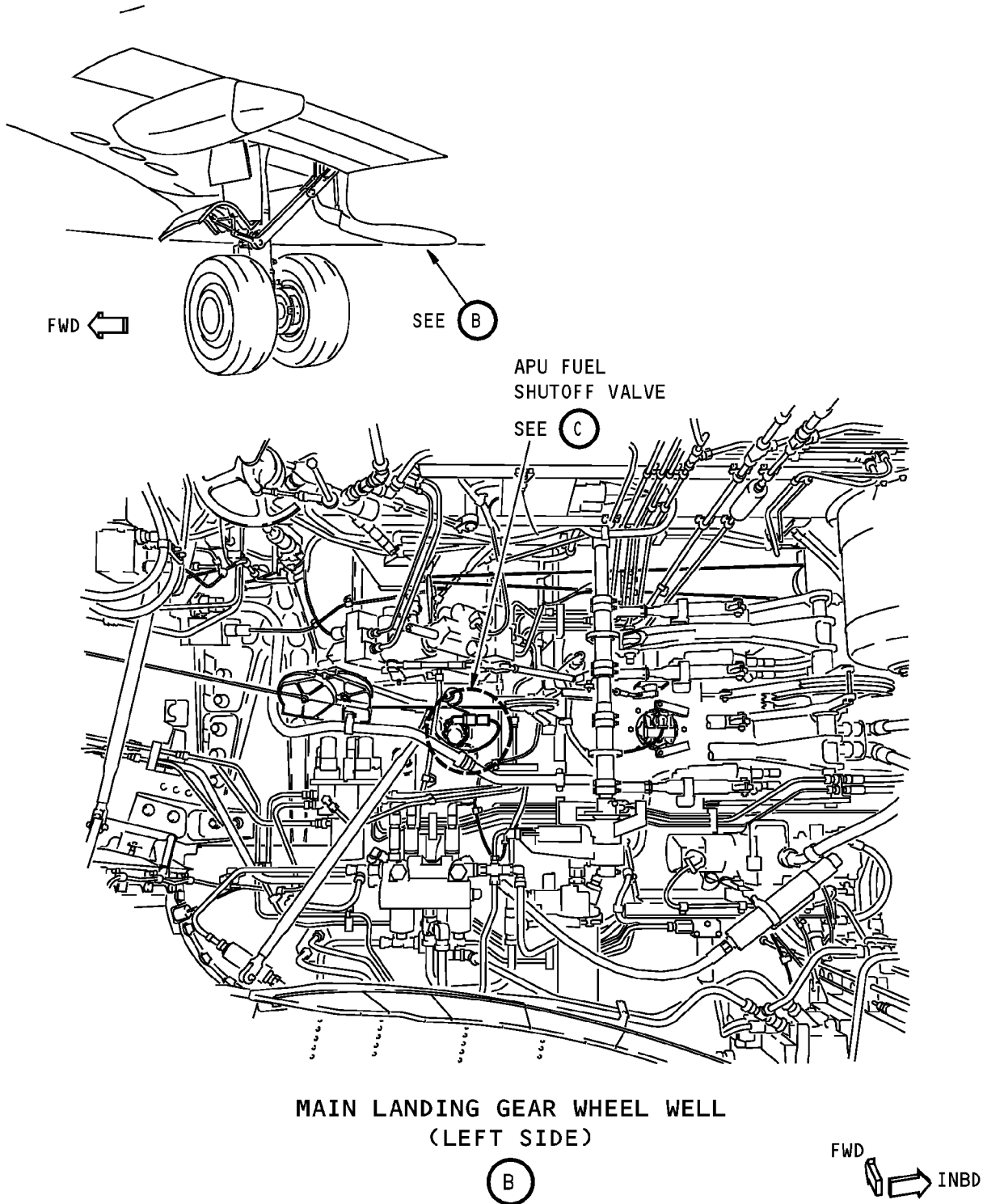
APU START SWITCH AND INDICATORS

(A)

**APU Fuel Feed System Components
Figure 901 (Sheet 1 of 3)/28-00-00-990-813**

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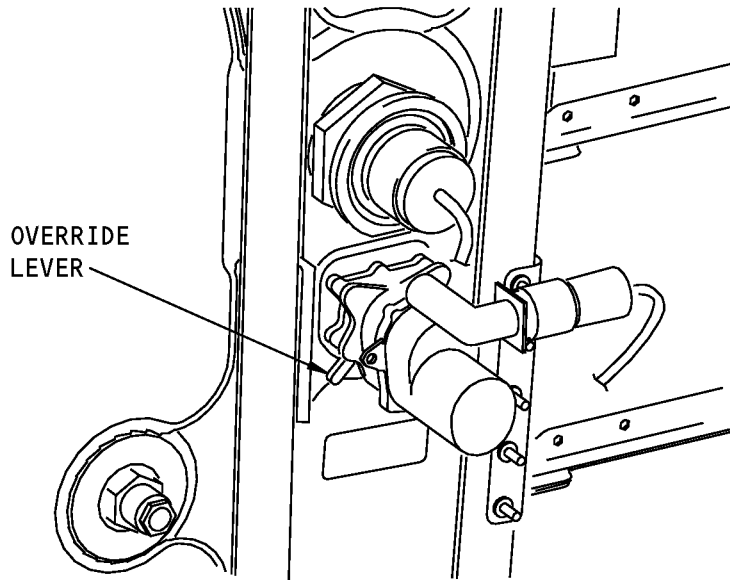
**APU Fuel Feed System Components
Figure 901 (Sheet 2 of 3)/28-00-00-990-813**

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APU FUEL SHUTOFF VALVE



**APU Fuel Feed System Components
Figure 901 (Sheet 3 of 3)/28-00-00-990-813**

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TASK 28-00-00-440-801

5. M MEL 28-4 (DDPG) Restoration - APU Fuel Valve Inoperative

(Figure 901)

A. General

- (1) This task restores an airplane with an inoperative APU fuel valve (also referred to as "the APU Fuel Shutoff Valve").

B. References

Reference	Title
20-10-44-000-801	Lockwires Removal (P/B 401)
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
32-00-01-080-801	Landing Gear Downlock Pins Removal (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
49-61-00-700-801	APU BITE Procedure (P/B 201)

C. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
211	Flight Compartment - Left
212	Flight Compartment - Right

D. APU Fuel Shutoff Valve Restoration

SUBTASK 28-00-00-860-020

- (1) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-00-00-210-003

WARNING: MAKE SURE THAT THE GROUND LOCKS ARE INSTALLED IN ALL OF THE LANDING GEAR. WITHOUT THE GROUND LOCKS, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

- (2) Do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

SUBTASK 28-00-00-860-021

- (3) On the P5 panel, make sure the APU master switch is set to OFF.

SUBTASK 28-00-00-440-001

- (4) Do these steps to activate the APU fuel shutoff valve:
 - (a) Remove the lockwire on the manual override handle of the APU fuel shutoff valve (TASK 20-10-44-000-801).
 - (b) Connect the electrical connector, D920, to the APU fuel shutoff valve actuator.
 - (c) Remove the safety locks and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	19	C01344	APU FIRE SW POWER

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	14	C00033	AUX POWER UNIT CONT

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- (d) Do this task: APU BITE Procedure, TASK 49-61-00-700-801.
- (e) Do the applicable corrective action for the fault(s) shown.

SUBTASK 28-00-00-210-004

WARNING: OBEY THE PROCEDURE FOR THE REMOVAL OF THE DOWNLOCK PINS. IF YOU MOVE THE CONTROL LEVER FOR THE LANDING GEAR TO THE UP POSITION, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

- (5) Do this task: Landing Gear Downlock Pins Removal, TASK 32-00-01-080-801.

SUBTASK 28-00-00-860-022

- (6) If electrical power is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812

END OF TASK

TASK 28-00-00-040-806

6. MMEL 28-5 (DDPG) Preparation - Crossfeed VALVE OPEN Lights Inoperative

(Figure 902)

A. General

- (1) This task is for the operation of an airplane with an inoperative VALVE OPEN light for the crossfeed valve on the Fuel System Panel (P5).

B. Location Zones

Zone	Area
521	Left Wing - Leading Edge to Front Spar
621	Right Wing - Leading Edge to Front Spar

C. Access Panels

Number	Name/Location
621EB	Defuel Access Panel - Slat Station 95.15
621GB	Refuel Access Panel - Slat Station 143.27

D. Crossfeed VALVE OPEN light Deactivation

SUBTASK 28-00-00-720-001

- (1) Do these steps to make sure the crossfeed valve opens and closes correctly:
 - (a) Open this access panel:

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27
 - (b) On the wing fueling panel, P15, put the switch for the fueling shutoff valve for the No. 2 tank in the OPEN position.
 - (c) Do these steps to open the defuel valve:
 - 1) Open this access panel:

Number	Name/Location
621EB	Defuel Access Panel - Slat Station 95.15
 - 2) Set the defueling valve handle to OPEN.

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- (d) On the P5 Overhead Panel, set the CROSSFEED valve switch to the OPEN position.
- 1) Make sure the override handle on the crossfeed valve moves fully to the open position.
- (e) Push the L FWD PUMP switch, on the P5 Overhead Panel, to the ON position.
- 1) Make sure a minimum of 200 LB (100 KG) of fuel is transferred from the left main tank to the right main tank.
- NOTE: The fuel will transfer in approximately 2 minutes.
- (f) Push the L FWD PUMP switch, on the P5 Overhead Panel, to the OFF position.
- (g) Set the CROSSFEED switch, on the P5 Overhead Panel, to the CLOSED position.
- 1) Make sure the manual override handle on the crossfeed valve moves fully to the closed position.
- (h) Set the L FWD PUMP switch, on the P5 Overhead Panel, to the ON position.
- 1) Make sure no fuel is transferred, as shown on the fuel quantity indicators, from the No. 1 tank to the No. 2 tank.
- NOTE: Three minutes is sufficient time to make sure there is no fuel transfer.
- (i) Set the L FWD PUMP switch, on the P5 Overhead Panel, to the OFF position.
- (j) On the wing fueling panel, P15, set the switch for the fueling shutoff valve for the No. 2 tank to the CLOSED position.
- (k) Close this access panel:
- | <u>Number</u> | <u>Name/Location</u> |
|---------------|---|
| 621GB | Refuel Access Panel - Slat Station 143.27 |
- (l) Put the defuel valve handle to the closed position.
- (m) Close this access panel:
- | <u>Number</u> | <u>Name/Location</u> |
|---------------|--|
| 621EB | Defuel Access Panel - Slat Station 95.15 |

————— **END OF TASK** —————

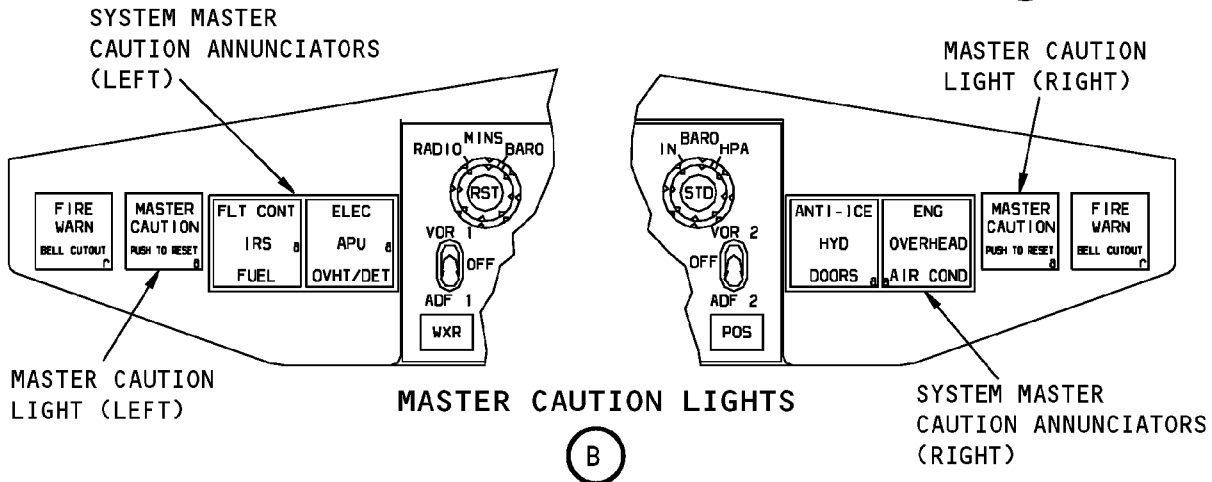
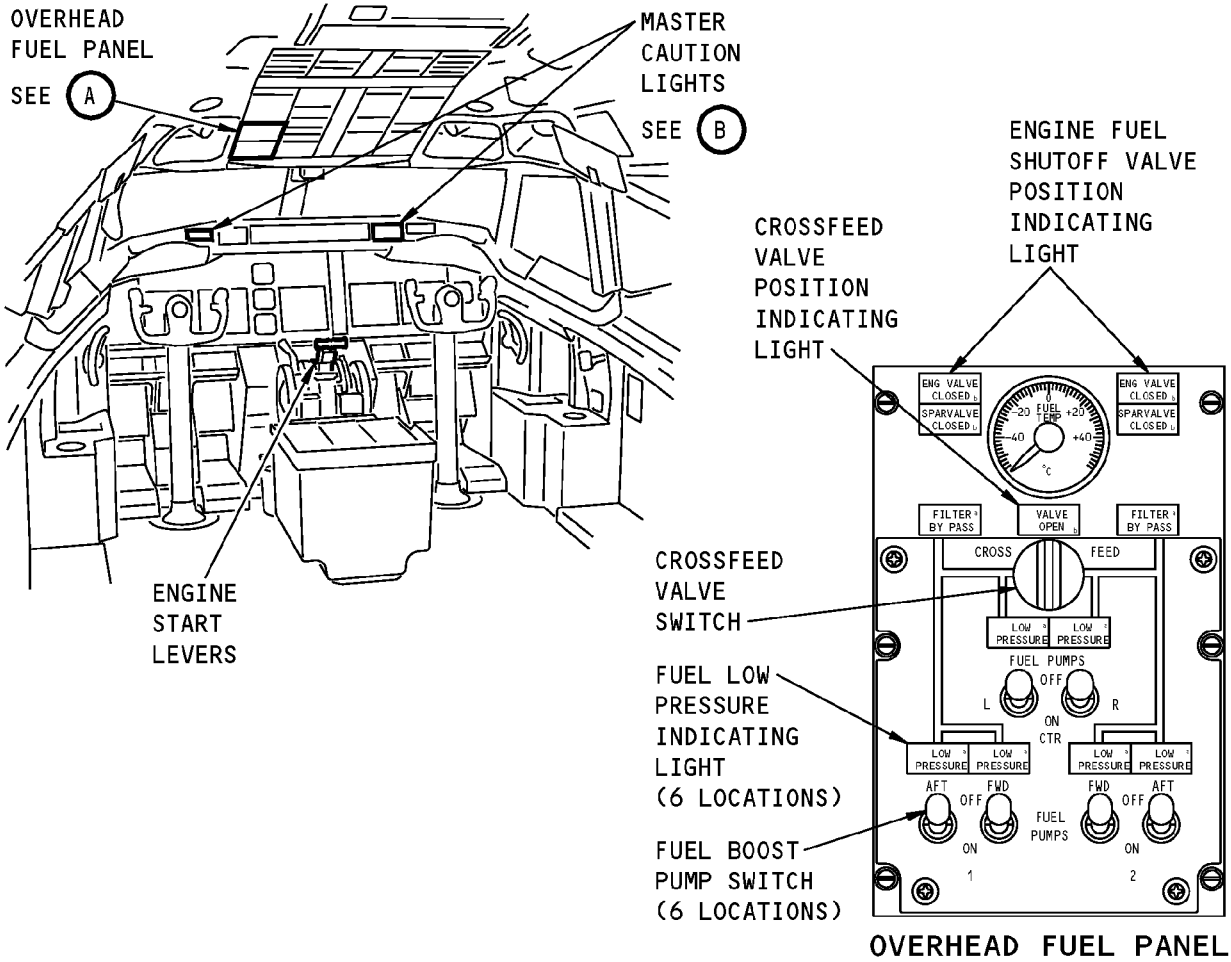
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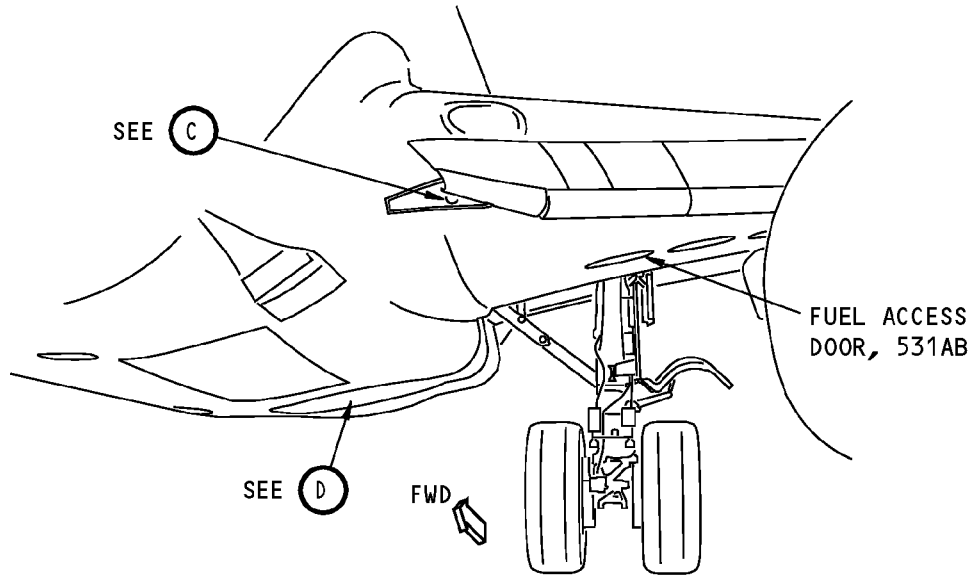


Engine Fuel Feed System Components
Figure 902 (Sheet 1 of 4)/28-00-00-990-812

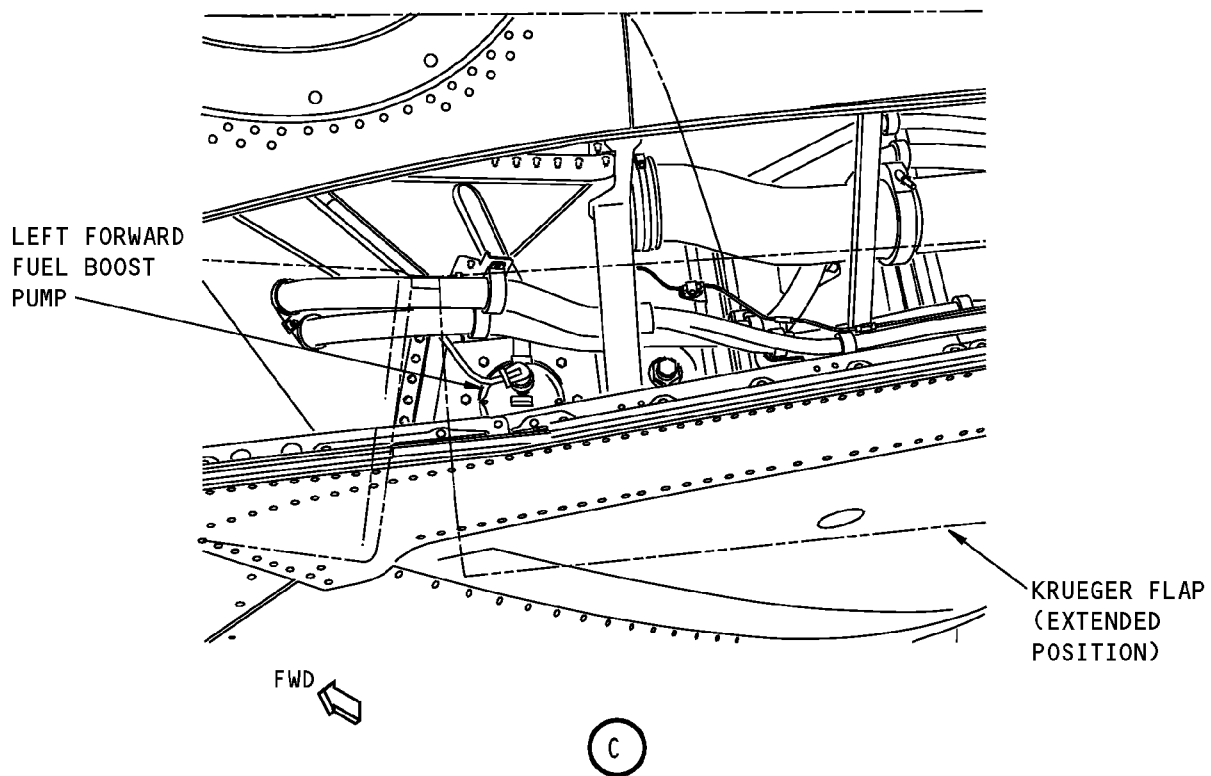
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**LEFT WING
(RIGHT WING IS OPPOSITE)**



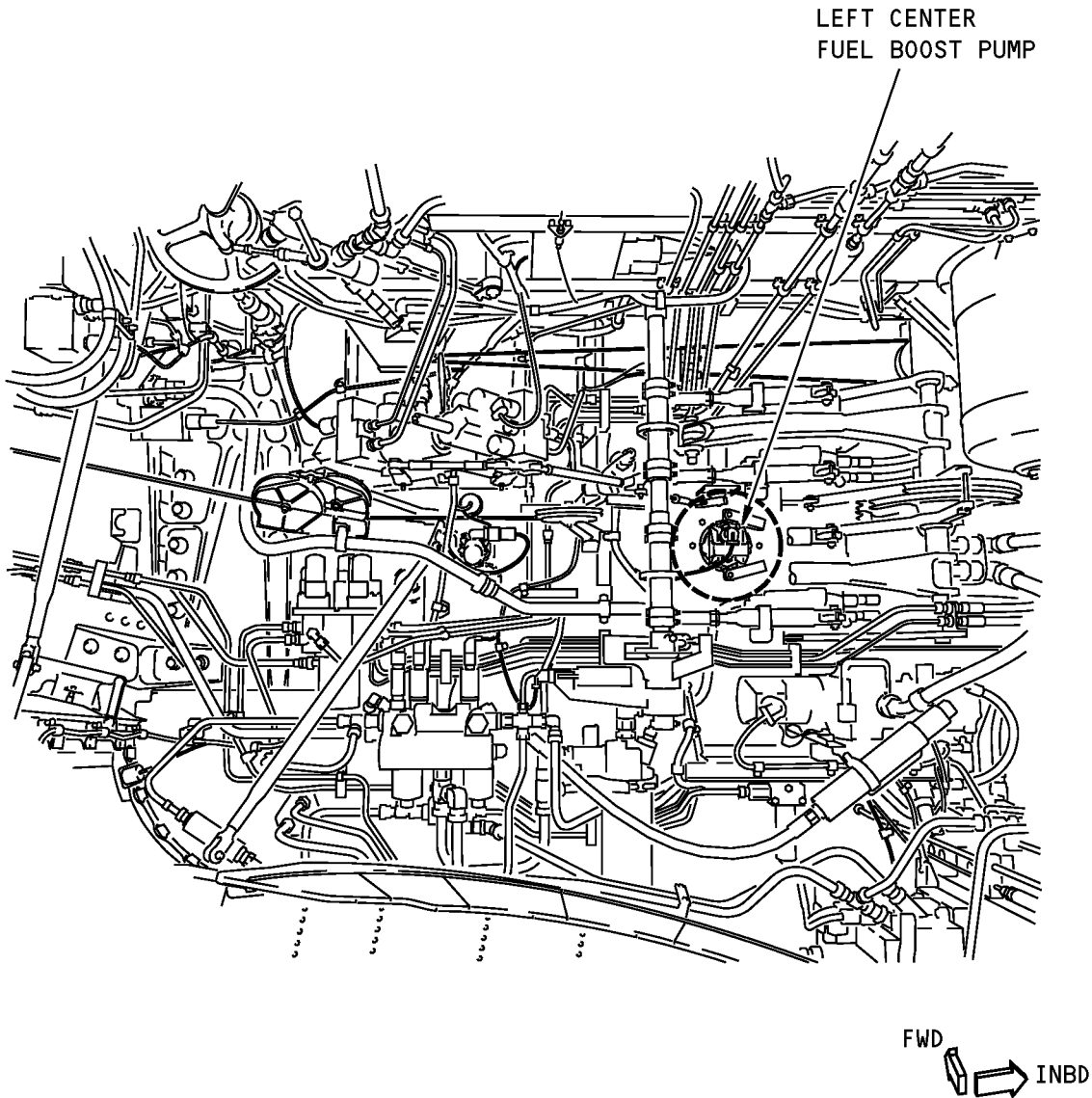
**Engine Fuel Feed System Components
Figure 902 (Sheet 2 of 4)/28-00-00-990-812**

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**MAIN LANDING GEAR WHEEL WELL
(LEFT SIDE IS SHOWN, RIGHT SIDE IS EQUIVALENT)**

D

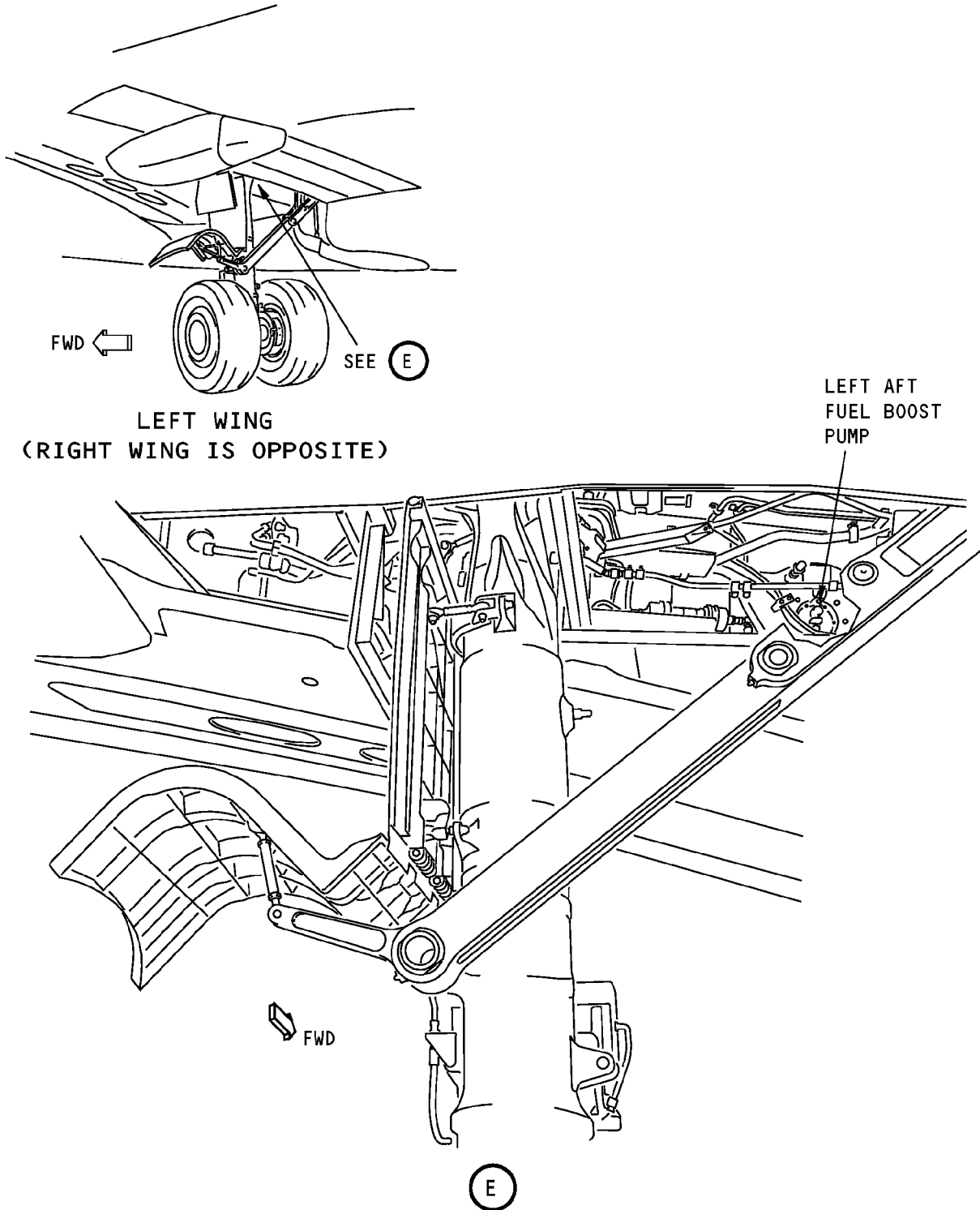
**Engine Fuel Feed System Components
Figure 902 (Sheet 3 of 4)/28-00-00-990-812**

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Engine Fuel Feed System Components
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TASK 28-00-00-440-802

7. M MEL 28-5 (DDPG) Restoration - Crossfeed VALVE OPEN Light Inoperative

(Figure 902)

A. General

- (1) This task restores an airplane with an inoperative VALVE OPEN light for the crossfeed valve on the Fuel System Panel (P5).

B. References

Reference	Title
FIM 28-22 TASK 808	VALVE OPEN Light for the Crossfeed Valve Does Not Come On During Valve Transit - Fault Isolation

C. Location Zones

Zone	Area
521	Left Wing - Leading Edge to Front Spar
621	Right Wing - Leading Edge to Front Spar

D. Crossfeed VALVE OPEN light Restoration

SUBTASK 28-00-00-810-001

- (1) Do this task: FIM 28-22 TASK 808.

————— END OF TASK —————

TASK 28-00-00-040-807

8. M MEL 28-6 (DDPG) Preparation - Flight Deck Fuel Quantity Indicators (Main Tank) Inoperative

(Figure 903)

A. General

- (1) This task is for operation of the airplane with an inoperative (blank) fuel quantity indicator display (Main Tank) on the Center Instrument Panel in the Flight Compartment.

B. References

Reference	Title
12-11-00-650-803	Refuel Operation When the Fuel Quantity Indicating System Does not Operate (P/B 301)

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Flight Deck Fuel Quantity Indicator Deactivation (Main Tank)

SUBTASK 28-00-00-650-001

- (1) Do this step to put the correct quantity of fuel into the tank with the blank display:

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- (a) Do this task: Refuel Operation When the Fuel Quantity Indicating System Does not Operate, TASK 12-11-00-650-803.

————— **END OF TASK** —————

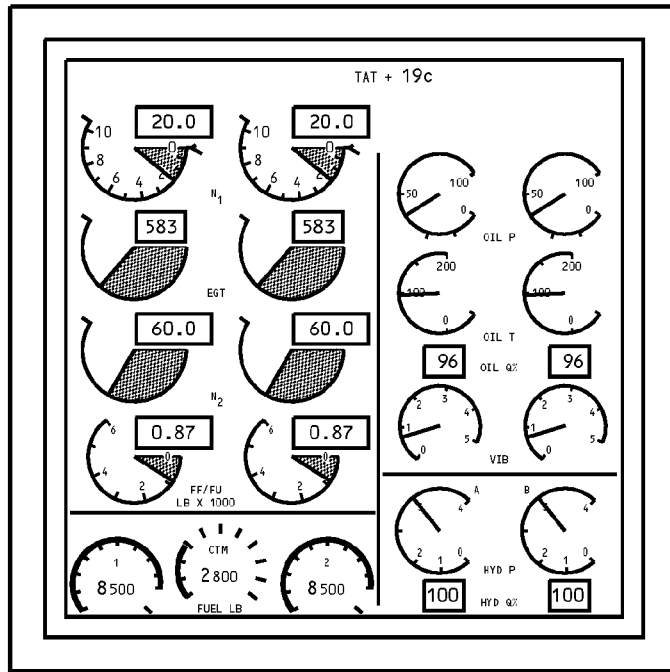
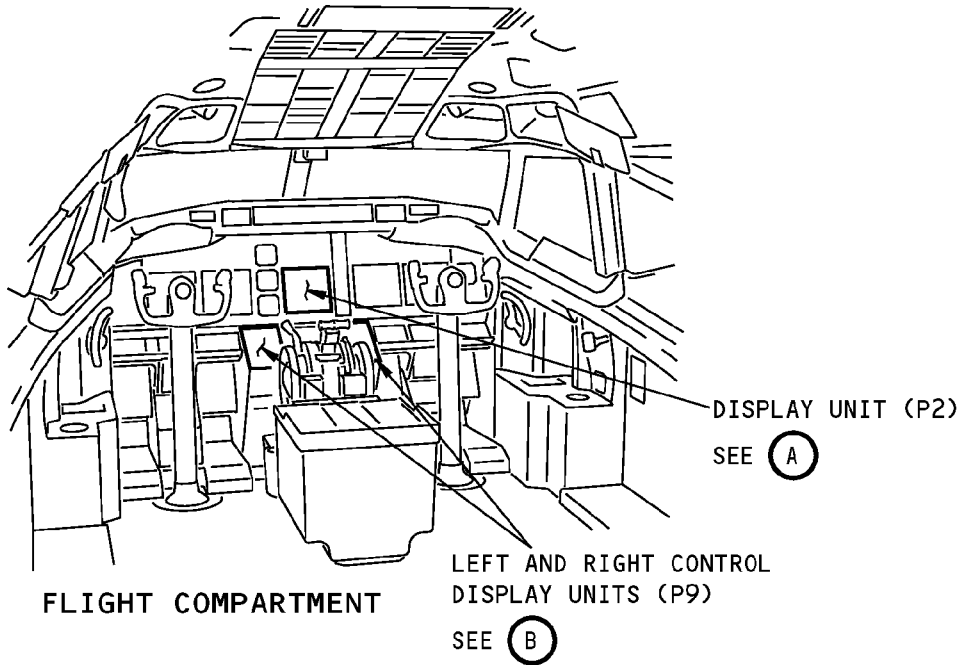
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DISPLAY UNIT (P2)

(A)

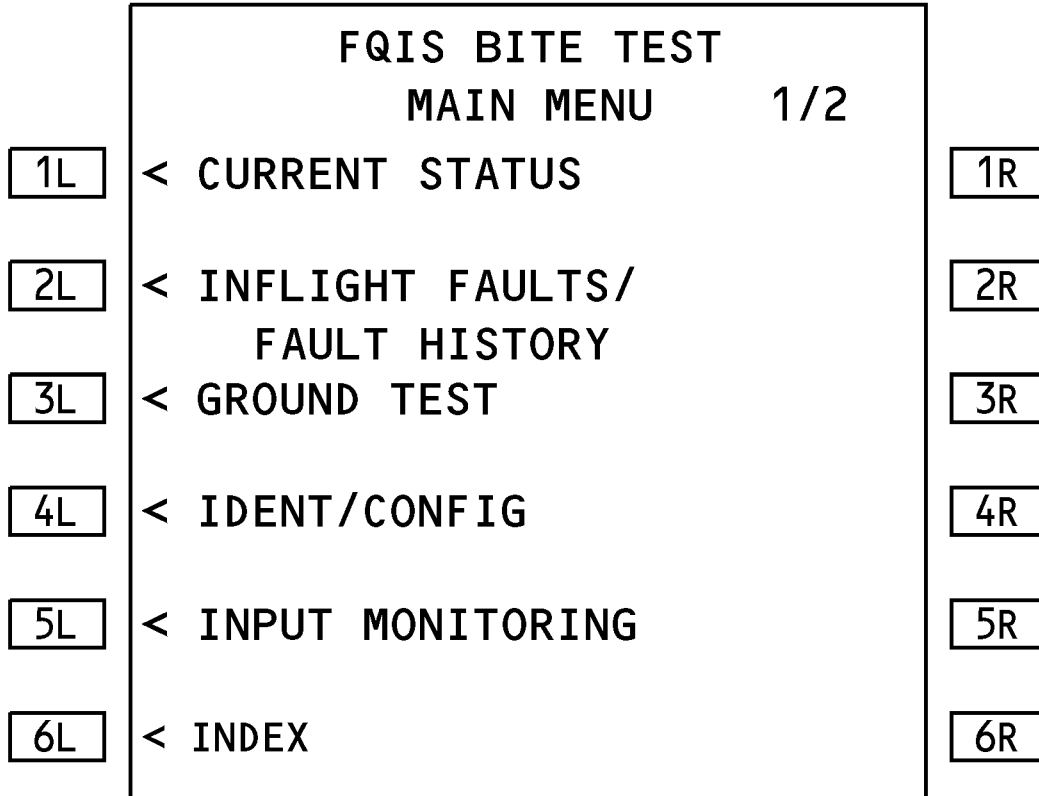
**Fuel Quantity Indicating System Components
Figure 903 (Sheet 1 of 2)/28-00-00-990-814**

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NEXT PREV

CONTROL DISPLAY UNIT (P9)



Fuel Quantity Indicating System Components
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TASK 28-00-00-440-803

9. M MEL 28-6 (DDPG) Restoration - Flight Deck Fuel Quantity Indicators (Main Tank) Inoperative

Figure 903

A. General

- (1) This task restores an airplane with an inoperative (blank) fuel quantity indicator display (Main Tank) on the Display Unit (P2) in the Flight Compartment.

B. References

Reference	Title
FIM 28-41 TASK 801	FQIS BITE Procedure

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Flight Deck Fuel Quantity Indicator Restoration

SUBTASK 28-00-00-740-001

- (1) Do this task: FIM 28-41 TASK 801.

SUBTASK 28-00-00-810-002

- (2) Do the applicable fault correction for the fault shown by the FQIS BITE test.

END OF TASK

TASK 28-00-00-040-808

10. M MEL 28-7 (DDPG) Preparation - Flight Deck Fuel Quantity Indicators (Center Tank) Inoperative

(Figure 903)

A. General

- (1) This task is for operation of the airplane with an inoperative (blank) fuel quantity indicator display (Center Tank) on the Display Unit (P2) in the Flight Compartment.

B. References

Reference	Title
12-11-00-650-803	Refuel Operation When the Fuel Quantity Indicating System Does not Operate (P/B 301)

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50

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(Continued)

Zone	Area
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Flight Deck Fuel Quantity Indicator Display Deactivation (Center Tank)

SUBTASK 28-00-00-650-002

- (1) Do this step to put the correct quantity of fuel into the center tank with the blank display:
 - (a) Do this task: Refuel Operation When the Fuel Quantity Indicating System Does not Operate, TASK 12-11-00-650-803.

————— **END OF TASK** —————

TASK 28-00-00-440-804

11. M MEL 28-7 (DDPG) Restoration - Flight Deck Fuel Quantity Indicators (Center Tank) Inoperative

(Figure 903)

A. General

- (1) This task restores an airplane with an inoperative (blank) fuel quantity indicator display (Center Tank) on the Display Unit (P2) in the Flight Compartment.

B. References

Reference	Title
FIM 28-41 TASK 801	FQIS BITE Procedure

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Flight Deck Fuel Quantity Indicator Display Restoration (Center Tank)

SUBTASK 28-00-00-740-002

- (1) Do this task: FIM 28-41 TASK 801.

SUBTASK 28-00-00-810-003

- (2) Do the applicable fault correction for the fault shown by the FQIS BITE test.

————— **END OF TASK** —————

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TASK 28-00-00-040-809

12. M MEL 28-10 (DDPG) Preparation - Pressure Fueling System, Fueling Manifold Check Valve(s) Inoperative

(Figure 904)

A. General

- (1) This task is for the operation of an airplane with inoperative fueling manifold check valves.

B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
28-11-00-300-801	Analysis of the Fuel Leak Type (P/B 601)

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Pressure Fueling System, Fueling Manifold Check Valve Deactivation

SUBTASK 28-00-00-710-001

- (1) Make sure the fueling shutoff valves operate correctly.
 - (a) Set the switch for the fueling shutoff valve for the No. 1 tank to OPEN.
 - (b) Make sure the indication light for the fueling shutoff valve for the No. 1 tank comes on.
 - (c) Set the switch for the fueling shutoff valve for the No. 1 tank to CLOSE.
 - (d) Make sure the refuel valve light for the fueling shutoff valve for the No. 1 tank goes off.
 - (e) Set the switch for the fueling shutoff valve for the No. 2 tank to OPEN.
 - (f) Make sure the refuel valve light for the fueling shutoff valve for the No. 2 tank comes on.
 - (g) Set the switch for the fueling shutoff valve for the No. 2 tank to CLOSE.
 - (h) Make sure the refuel valve light for the fueling shutoff valve for the No. 2 tank goes off.
 - (i) Set the switch for the fueling shutoff valve for the center tank to OPEN.
 - (j) Make sure the refuel valve light for the fueling shutoff valve for the center tank comes on.
 - (k) Set the switch for the fueling shutoff valve for the center tank to CLOSE.
 - (l) Make sure the refuel valve light for the fueling shutoff valve for the center tank goes off.

SUBTASK 28-00-00-650-003

- (2) Do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

SUBTASK 28-00-00-210-005

- (3) After you disconnect the refueling nozzle, do a visual check for fuel leakage.
 - (a) If there is fuel leakage, do this task: Analysis of the Fuel Leak Type, TASK 28-11-00-300-801

————— END OF TASK —————

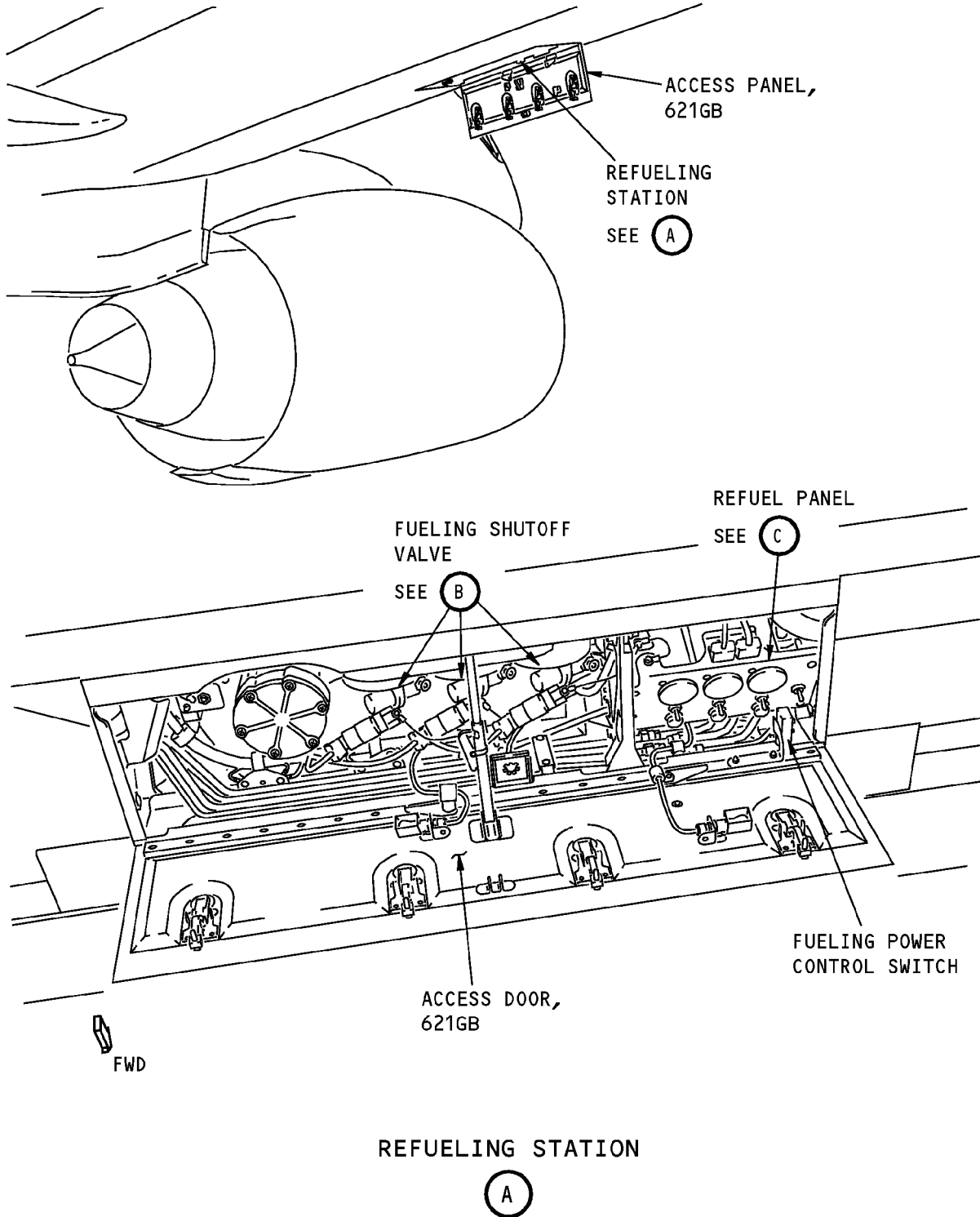
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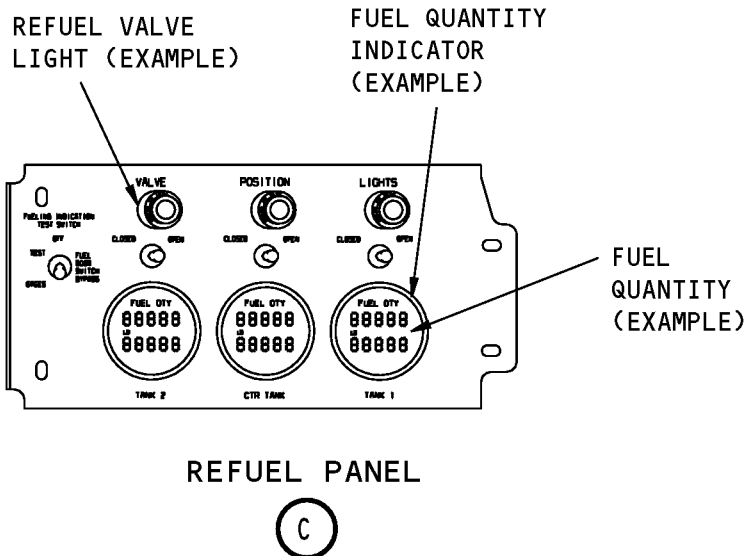
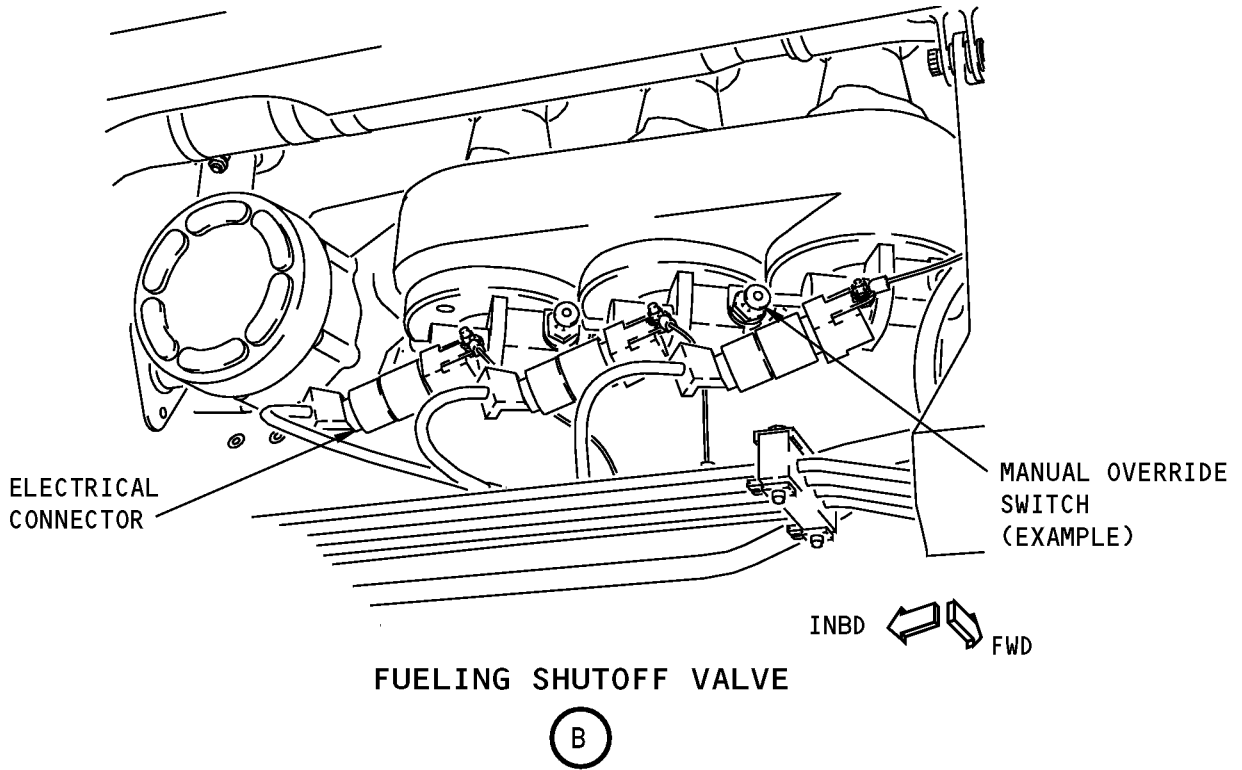


**Pressure Fueling System
Figure 904 (Sheet 1 of 2)/28-00-00-990-815**

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Pressure Fueling System
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TASK 28-00-00-040-810

13. M MEL 28-10 (DDPG) Restoration - Pressure Fueling System, Fueling Manifold Check Valve(s) Inoperative

(Figure 904)

A. General

(1) This task is for the restoration of an airplane with inoperative fueling manifold check valves.

B. References

Reference	Title
28-21-32-000-801	Fueling Check Valve Removal (P/B 401)
28-21-32-400-801	Fueling Check Valve Installation (P/B 401)

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Pressure Fueling System, Fueling Shutoff Valve Restoration

SUBTASK 28-00-00-960-001

(1) Replace the bad fueling check valve(s).

These are the tasks:

Fueling Check Valve Removal, TASK 28-21-32-000-801,

Fueling Check Valve Installation, TASK 28-21-32-400-801.

END OF TASK

TASK 28-00-00-040-815

14. M MEL 28-10 (DDPG) Preparation - Pressure Fueling System, Fueling Shutoff Valve(s) Inoperative

(Figure 904)

A. General

(1) This task is for the operation of an airplane with inoperative fueling shutoff valves.

B. References

Reference	Title
12-11-00-650-806	Pressure Refueling Operation For A Refuel Valve That Does Not Open Electrically (P/B 301)
28-11-00-300-801	Analysis of the Fuel Leak Type (P/B 601)

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Pressure Fueling System, Fueling Shutoff Valve Deactivation

SUBTASK 28-00-00-710-002

(1) Make sure the fuel load(s) for the applicable fuel tank(s) is not more than its full capacity.

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SUBTASK 28-00-00-650-008

- (2) Make sure you stop the refueling source at the correct quantity for the applicable tank.

NOTE: There is no overfill protection. The pressure fueling system will not stop the refuel operation at a set fuel quantity, a fuel spill can occur.

SUBTASK 28-00-00-650-006

- (3) For the applicable tank(s), do this task: Pressure Refueling Operation For A Refuel Valve That Does Not Open Electrically, TASK 12-11-00-650-806.

SUBTASK 28-00-00-210-007

- (4) After you disconnect the refueling nozzle, do a visual check for fuel leakage.
 - (a) If there is fuel leakage, do this task: Analysis of the Fuel Leak Type, TASK 28-11-00-300-801.

————— **END OF TASK** —————

TASK 28-00-00-040-816

15. M MEL 28-10 (DDPG) Restoration - Pressure Fueling System, Fueling Shutoff Valve(s) Inoperative

(Figure 904)

A. General

- (1) This task is for the restoration of an airplane with inoperative fueling shutoff valves.

B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
28-21-51-000-801	Remove the Fueling Shutoff Valve (P/B 401)
28-21-51-400-801	Install the Fueling Shutoff Valve (P/B 401)
FIM 28-21 TASK 807	Fueling Shutoff Valve Position Indicator Light Does not Come on When The Valve Switch Is Set to OPEN - Fault Isolation
FIM 28-21 TASK 808	Fuel Does Not Flow Into The Fuel Tank With Fueling Shutoff Valve Switch in the OPEN Position and Refueling Manifold Pressurized

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Pressure Fueling System, Fueling Shutoff Valve Restoration

SUBTASK 28-00-00-960-002

- (1) Replace the applicable fueling shutoff valve control unit(s).

These are the tasks:

Remove the Fueling Shutoff Valve, TASK 28-21-51-000-801,

Install the Fueling Shutoff Valve, TASK 28-21-51-400-801.

SUBTASK 28-00-00-860-023

- (2) Set the switch for the applicable fueling shutoff valve(s) to the OPEN position.
 - (a) If the blue refuel valve light(s) for the applicable tank(s) does not come on, then, do this task: FIM 28-21 TASK 807.

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SUBTASK 28-00-00-650-007

- (3) Add fuel to the applicable tank(s). To do this, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.
- (a) If fuel does not go into the applicable tank(s), then, do this task: FIM 28-21 TASK 808.

————— END OF TASK —————

TASK 28-00-00-040-811

16. M MEL 28-12 (DDPG) Preparation - Refuel Control Panel Quantity Indicators Inoperative

Figure 904

A. General

- (1) This task is for operation of the airplane with inoperative (blank) refuel control panel quantity indicators.

B. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Refuel Control Panel Quantity Indicator Deactivation

SUBTASK 28-00-00-650-004

- (1) If the fuel quantity display is available on the Center Instrument Display panel, P2, in the flight compartment, then you can use it to find the fuel quantity in the tank(s) with the bad refuel control panel quantity indicator.

SUBTASK 28-00-00-650-005

- (2) If the fuel quantity display is not available on the Center Instrument Display panel, P2, in the flight compartment, then refer to DDG 28-6 or DDG 28-7 as applicable.

————— END OF TASK —————

TASK 28-00-00-440-805

17. M MEL 28-12 (DDPG) Restoration - Refueling Control Panel Quantity Indicators Inoperative

(Figure 904)

A. General

- (1) This task restores an airplane with an inoperative (or blank) refueling control panel quantity indicator.

B. References

Reference	Title
FIM 28-41 TASK 801	FQIS BITE Procedure

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C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Refueling Control Quantity Indicator Display Restoration (Center Tank)

SUBTASK 28-00-00-740-003

(1) Do this task: FIM 28-41 TASK 801.

SUBTASK 28-00-00-810-004

(2) Do the applicable fault correction for the fault shown by the FQIS BITE test.

END OF TASK

TASK 28-00-00-040-812

18. MMEL 28-16 (DDPG) Preparation - Fuel Measuring Sticks

A. General

(1) This task is for the operation of an airplane with an inoperative, broken, or missing fuel measuring stick.

B. References

Reference	Title
28-11-00-300-801	Analysis of the Fuel Leak Type (P/B 601)

C. Location Zones

Zone	Area
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Fuel Measuring Stick Deactivation

SUBTASK 28-00-00-040-003

(1) Look for indications of fuel leakage in the area around the fuel measuring stick that has the problem (TASK 28-11-00-300-801).

SUBTASK 28-00-00-790-001

(2) If you find fuel leakage, make sure the leakage is within the specified limits for airplane operation (TASK 28-11-00-300-801).

END OF TASK

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TASK 28-00-00-040-813

19. MMEL 28-16 (DDPG) Restoration - Fuel Measuring Sticks

A. General

- (1) This task is for the restoration of an airplane with an inoperative, broken, or missing fuel measuring stick.

B. References

Reference	Title
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-44-11-000-801	Fuel Measuring Stick Removal (P/B 401)
28-44-11-360-802	Replacement of the O-Ring Seal Between the Housing and the Base Assembly (P/B 801)
28-44-11-400-801	Fuel Measuring Stick Installation (P/B 401)

C. Location Zones

Zone	Area
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Fuel Measuring Stick Restoration

SUBTASK 28-00-00-360-001

- (1) Replace the fuel measuring stick that has the problem.

These are the tasks:

- Fuel Measuring Stick Removal, TASK 28-44-11-000-801,
- Fuel Measuring Stick Installation, TASK 28-44-11-400-801.

SUBTASK 28-00-00-360-002

- (2) If there is leakage, repair the leakage at the fuel measuring stick housing (TASK 28-44-11-360-802) or repair the leakage in the tank structure (TASK 28-11-00-300-803).

————— **END OF TASK** —————

TASK 28-00-00-040-814

20. MMEL 28-22 (DDPG) Preparation - SPAR VALVE CLOSED Light

A. General

- (1) This task is for operation of an airplane with an inoperative SPAR VALVE CLOSED light for the spar valve on the Fuel System Panel (P5).

B. References

Reference	Title
28-22-00-720-804	Engine Fuel Spar Valve Installation - Test (P/B 501)

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C. Location Zones

Zone	Area
521	Left Wing - Leading Edge to Front Spar
621	Right Wing - Leading Edge to Front Spar

D. SPAR VALVE CLOSED Light Deactivation

SUBTASK 28-00-00-720-004

(1) Do these steps to test the electrical operation of the spar valve with the inoperative SPAR VALVE CLOSED light:

- (a) Make sure the engine start levers on the control stand are in the CUTOFF position.
- (b) Make sure the Engine START switches are in the OFF position, on the P5 overhead panel.
- (c) Put a DO-NOT-OPERATE placard on the left and right engine START switches, on the P5 overhead panel.
- (d) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

- (e) On the P8 Aisle Stand, put the applicable engine start lever (ENG 1 START LEVER or ENG 2 START LEVER) to the IDLE position.
- (f) Examine the position of the manual override lever on the spar valve to make sure the valve is open.

CAUTION: DO NOT TURN THE FIRE HANDLE. THE FIRE EXTINGUISHING AGENT WILL BE DISCHARGED.

- (g) Pull the L and R FIRE HANDLE to the FIRE position, on the P8 Aisle Stand.
- (h) Examine the position of the manual override lever on the spar valve to make sure the valve is closed.

CAUTION: DO NOT TURN THE FIRE HANDLE. THE FIRE EXTINGUISHING AGENT WILL BE DISCHARGED.

- (i) Push the L and R FIRE HANDLE to the NORMAL position, on the P8 Aisle Stand.
- (j) Examine the position of the manual override lever on the spar valve to make sure the valve is open.
- (k) Put the ENG 1 START LEVER and the ENG 2 START LEVER to the CUTOFF position, on the P8 Aisle Stand.
- (l) Examine the position of the manual override lever on the spar valve to make sure the valve is closed.
- (m) Remove the DO-NOT-OPERATE placards from the left and right engine START switches, on the P5 overhead panel.

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 28-00-00-040-004

(2) Do this step to make sure the spar valve closes correctly and there is not a problem with the adapter shaft:

(a) For the spar valve with the bad SPAR VALVE CLOSED light, do this task: Engine Fuel Spar Valve Installation - Test, TASK 28-22-00-720-804

END OF TASK

TASK 28-00-00-440-806

21. MMEL 28-22 (DDPG) Restoration - FUEL/SPAR VALVE CLOSED Lights

A. General

(1) This task restores an airplane with an inoperative SPAR VALVE CLOSED light for the spar valve on the Fuel System Panel (P5).

B. References

Reference	Title
FIM 28-22 TASK 809	Engine No. 1 SPAR VALVE CLOSED Light Stays on Bright - Fault Isolation
FIM 28-22 TASK 810	Engine No. 2 SPAR VALVE CLOSED Light Stays on Bright - Fault Isolation
FIM 28-22 TASK 811	Engine No. 1 SPAR VALVE CLOSED Light Does Not Come On Bright During Valve Transit or Dim When the Valve is Closed - Fault Isolation
FIM 28-22 TASK 812	Engine No. 2 SPAR VALVE CLOSED Light Does Not Come On Bright During Valve Transit or Dim When the Valve is Closed - Fault Isolation

C. Location Zones

Zone	Area
521	Left Wing - Leading Edge to Front Spar
621	Right Wing - Leading Edge to Front Spar

D. SPAR VALVE CLOSED Light Restoration

SUBTASK 28-00-00-720-005

(1) Do the applicable fault isolation for the SPAR VALVE CLOSED light that is inoperative:

- (a) Do this task: FIM 28-22 TASK 811.
- (b) Do this task: FIM 28-22 TASK 812.
- (c) Do this task:FIM 28-22 TASK 809.
- (d) Do this task:FIM 28-22 TASK 810.

END OF TASK

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STORAGE - MAINTENANCE PRACTICES

1. General

A. This procedure has these tasks:

- (1) Detection Test for Microbial Growth
- (2) Treatment of Fuel Tanks Contaminated with Microbial Growth
- (3) Biocide Treatment of Fuel Tanks - Metered Injection Cart
- (4) Microbial Growth Removal - Manual Removal Method
- (5) Microbial Growth Removal - Pressure Washer Method.

TASK 28-10-00-200-802

2. Detection Test for Microbial Growth

A. General

- (1) Use a microbial detection kit or laboratory standard test to check the fuel/water samples taken from each fuel tank. A positive result for microbial contamination requires action that may include a biocide treatment or physical removal of the growth from the fuel tanks.
- (2) These are the approved test kits:
 - (a) FUELSTAT
 - (b) Easicult Combi
 - (c) MicrobMonitor 2
 - (d) HY-LiTE Jet A-1 Fuel Test
 - (e) The fuel samples can also be sent to a laboratory for testing. IP385 is the Institute for Petroleum's test for microbial contamination
- (3) All instructions supplied with the detection kits should be followed closely. It is important to retest if a detection test shows microbial contamination. Differences in the fuel/water sample and the ability of the detection kits to consistently measure the level of microbial growth make it important to retest and verify test results. Do not compare the test results between the different types of detection kits.
- (4) All time intervals listed in this task are recommendations. There is no MMEL or scheduled maintenance requirements for testing for microbial contamination.

B. Equipment

- (1) Microbial Contamination Test Kits: Use one of these:
 - (a) MicrobMonitor2
Hemel Hempstead, UK
Tel: + 44 (0) 1442 225711
Fax: + 44 (0) 1442 223960
Email: microbmonitor2@bp.com
 - (b) Fuelstat Resinae
Conidia Bioscience (Manufacturer)
Bakeham Lane, Egham, Surrey, TW20 9TY, UK
Tel: + 44 (0) 1491 829012
Fax: + 44 (0) 1491 829100
Email: info@conidia.com

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or

SATAIR A/S - Amagerlandevej 147A, 2770 Kastrup, Denmark

SATAIR USA Inc - 4260 Frontage Rd, Atlanta, Georgia USA

SATAIR ASIA PTE Ltd - 8 Loyang Link, Singapore

Transworld Aviation Ltd - Jebel Ali Free Zone, Dubai, UAE

(c) Easicult Combi

Orion Diagnostica (Manufacturer)

P.O. Box 83, 02101 Espoo, Finland

Tel: 358-9-429-2888

Fax: 358-9-429-2794

or

Metalworking Chemicals & Equipment Co., Inc

P.O. Box 990, 34 Main Street, Lake Placid

New York USA 12946

Tel: (518) 523-2355

Fax: (518) 523-2821

(d) FQS HY-LiTE Jet A-1 Fuel Test

Merck KGaA, Germany

Distributor: Fuel Quality Services Inc.

P.O. Box 1380

Flowery Branch, GA 30542

Tel USA: 1-800-827-9790

Fax USA: 770-967-9982

www.fqsinc.com

(2) Use one of these:

(a) Fuel Sampling Kit, P/N 100-1028-04 (or equivalent)

Shaw Aero Devices, Inc.

3580 Shaw Boulevard

Naples, Florida 34117-8408

Tel: (941) 304-1000

Fax: (941) 304-1088

Email: www.shawaero.com

(b) A12001-14 Fuel Sampling Equipment

(3) Fuel sample bottle - glass or fuel-resistant plastic

(4) Protective equipment:

(a) Eye protection

(b) Clean fuel resistant gloves

(c) Clean protective outerwear.

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C. References

Reference	Title
12-11-00-680-801	Fuel System Sumping (P/B 301)

D. Consumable Materials

Reference	Description	Specification
B00130	Alcohol - Isopropyl	TT-I-735
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

F. Clean the Fuel Sampling Equipment

SUBTASK 28-10-00-280-018

- (1) You must wear protective equipment when you clean, sample and test for microbial growth. Protective equipment includes:
 - (a) Clean fuel resistant gloves
 - (b) Clean protective outerwear.

SUBTASK 28-10-00-280-019

- (2) Do these steps to clean the fuel sampling equipment:
 - (a) Mix a solution of one part tap water to three to four parts alcohol, B00130.
 - (b) Clean these items with the alcohol solution and cotton wiper, G00034:
 - 1) Sump drain tool
 - 2) Fuel sample container (if reused)
 - (c) Air dry the fuel sampling equipment
 - (d) Make sure the fuel sampling equipment is free from residue alcohol.
 - (e) Protect the containers from contamination.

SUBTASK 28-10-00-280-020

- (3) Do these steps to clean the sump drain area:
 - (a) Mix a solution of one part water to three to four parts isopropyl alcohol.
 - (b) Thoroughly clean the exterior area of the fuel sump drain with the alcohol solution.

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- (c) Air dry the sump area.
- (d) Repeat for each sump drain

G. Collect the Fuel Sample

SUBTASK 28-10-00-280-021

- (1) Make sure the sump drain container and the fuel sample container are clean and dry.

SUBTASK 28-10-00-280-022

- (2) Do these steps to collect a fuel sample:

NOTE: Each fuel sample must be collected separately for each fuel tank and stored in separate sample containers.

- (a) Use the fuel sump drain to get a fuel sample:
 - 1) Do this task: Fuel System Sumping, TASK 12-11-00-680-801.
- (b) Fill the sump drain container with approximately one quart (one liter) of fuel.
- (c) If possible, make sure the fuel sample contains some visible water (free water) and some fuel
- (d) Pour the fuel from the sump drain container into the fuel sample container.
- (e) Do not add any additives, such as food coloring, to identify the presence of water.

SUBTASK 28-10-00-280-023

- (3) After you collect the fuel sample, do these steps:

- (a) Install the cover on the sample container.
- (b) Label each fuel sample with a date, airplane and fuel tank identification.
- (c) Protect the fuel samples from contamination.

SUBTASK 28-10-00-280-024

- (4) Continue to collect fuel samples for the remaining tanks.

- (a) Clean the fuel sampling equipment again before you collect a new sample.
- (b) Make sure to collect a fuel sample from each tank.

H. Microbial Growth Detection Test

SUBTASK 28-10-00-280-025

- (1) Test the sample within 6 hours of collection if possible, but no more than 24 hours after collection.

NOTE: After you collect the fuel sample, any microbial growth in the sample will start to die.

SUBTASK 28-10-00-280-026

- (2) Use one of the approved test kits to test the fuel samples.

SUBTASK 28-10-00-280-027

- (3) Follow all instructions supplied with the test kit.

NOTE: Some test kits will not function correctly if fuel is tested. Even traces of fuel can coat the test slide and prevent the microbes from growing. Other test kits can test either fuel or free water, but free water is recommended.

I. Initial Test Results

SUBTASK 28-10-00-280-028

- (1) Use the data supplied with the test kit to define the level of microbial growth:
 - (a) Negligible contamination

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- (b) Moderate contamination
- (c) Heavy contamination

SUBTASK 28-10-00-280-029

- (2) If the test confirms negligible levels of contamination, then do these steps:
 - (a) Continue with the usual operations.
 - (b) Continue to test the aircraft at the usual intervals.

SUBTASK 28-10-00-280-030

- (3) If the initial test results are positive for moderate or heavy levels of microbial contamination, then do these steps:
 - (a) Within 10 days (after receipt of test results) get a new fuel sample.
 - (b) Repeat the microbial detection test with the same test method.
 - (c) Confirm the level of microbial contamination.

J. Retest Results

SUBTASK 28-10-00-280-031

- (1) If the retest confirms negligible levels of microbial contamination, then do these steps:
 - (a) Continue with the usual operations.
 - (b) Continue to test the aircraft at the usual intervals.

SUBTASK 28-10-00-280-032

- (2) If the retest confirms moderate levels of microbial contamination, then do these steps:
 - (a) Within 10 days (after receipt of test results) schedule a biocide treatment to kill the microbial growth.
 - (b) Do the subsequent task for moderate levels of contamination.

SUBTASK 28-10-00-280-033

- (3) If the retest confirms heavy levels of microbial contamination, then do these steps:
 - (a) Within 10 days (after receipt of test results) schedule a task to go into the fuel tank(s) to inspect and remove the microbial growth.
 - (b) Do the subsequent task for heavy levels of microbial contamination.

————— **END OF TASK** —————

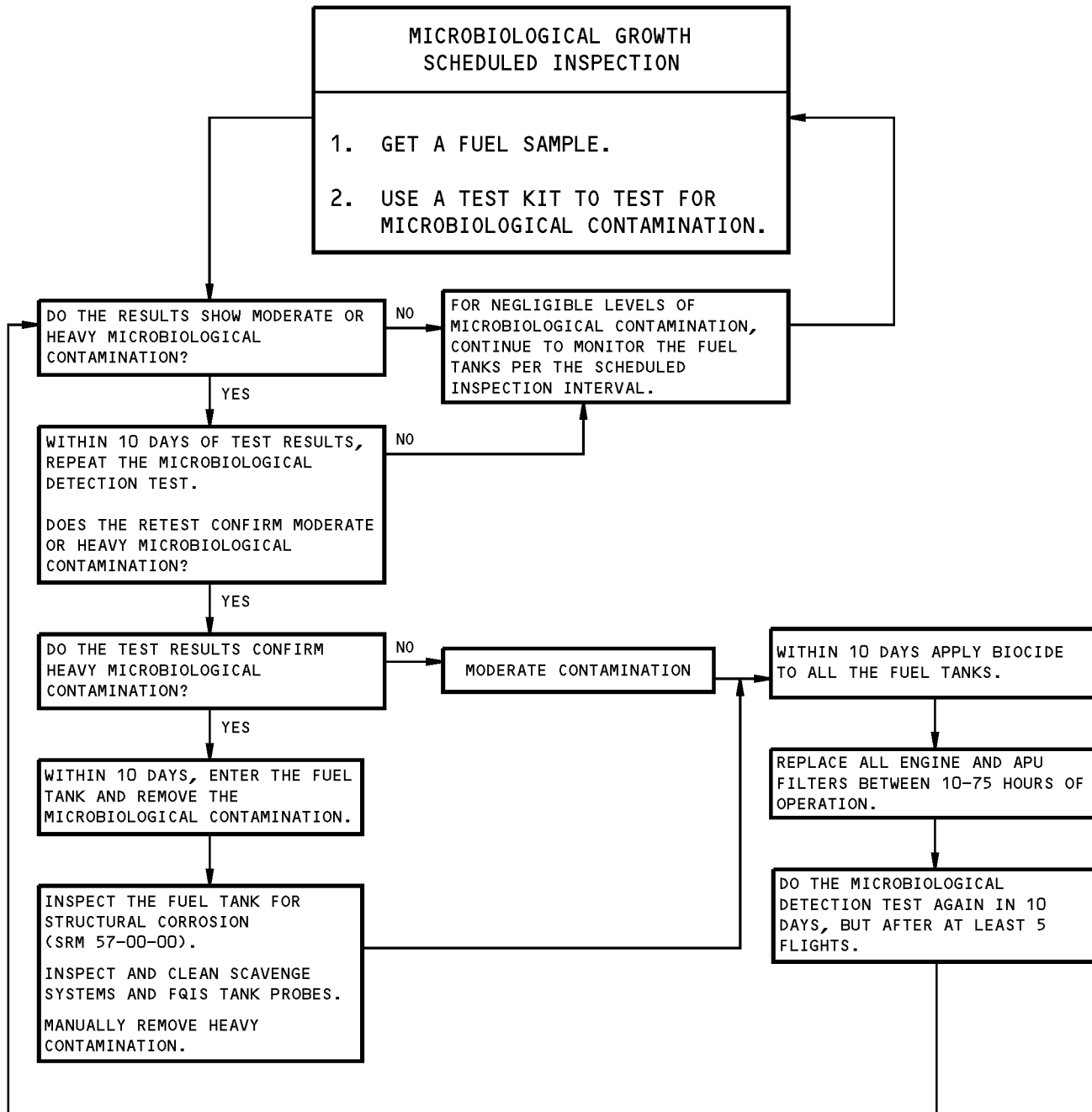
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NOTE: IF THE DETECTION TEST SHOWS MICROBIAL GROWTH, THEN DO THE SCHEDULED INSPECTION TEST MORE OFTEN.

NOTE: AFTER A TREATMENT WITH BIOCIDES, DON'T TEST AGAIN UNTIL YOU FLY AT LEAST 5 FLIGHTS. THIS IS TO MAKE SURE THE FUEL TREATED WITH BIOCIDES IS FULLY REMOVED FROM THE FUEL TANKS BEFORE THE NEXT TEST.

NOTE: IF THE BIOCIDES TREATMENT IS NOT EFFECTIVE USING A 1/3 FUEL LOAD, USE A BIOCIDES TREATMENT WITH A FULL FUEL LOAD AND USE THE MAXIMUM SOAK TIME. THE CONTAMINATION MAY BE TOWARDS THE TOP OF THE TANK.

**Microbial Growth - In Fuel Tanks
Figure 201/28-10-00-990-802**

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TASK 28-10-00-600-804

3. Treatment of Fuel Tanks Contaminated with Microbial Growth

A. General

- (1) A positive result for moderate or heavy levels of microbial contamination requires action that may include a biocide treatment or physical removal of the growth from the fuel tanks.
- (2) All time intervals listed in this task are recommendations. There is no MEL or scheduled maintenance requirements for testing for microbial contamination.

B. Equipment

- (1) Protective outer clothing to prevent skin contact with microbial contamination:
 - (a) Fuel and solvent resistant gloves
 - (b) Saranex suit
 - (c) Neoprene boots
 - (d) Respirator - Half face canister style respirators (minimum), U.S. Bureau of Mines Approved or equivalent

C. References

Reference	Title
28-11-00-910-801	Purging and Fuel Tank Entry Precautions (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
49-31-21-000-801	Inlet Fuel Filter Element Removal (P/B 401)
49-31-21-400-801	Inlet Fuel Filter Element Installation (P/B 401)
73-11-02-000-801-F00	Fuel Filter Removal (P/B 401)
73-11-02-400-801-F00	Fuel Filter Installation (P/B 401)

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

E. Treatment of Fuel Tanks with Moderate Levels of Microbial Contamination

NOTE: It is recommended to apply biocide to all tanks within 10 days after positive results for moderate levels of microbial contamination.

SUBTASK 28-10-00-280-034

- (1) Within 10 days (after receipt of positive test results) do these steps:

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- (a) Do a biocide treatment for all of the fuel tanks.
- (b) Return the airplane to service.
- (c) Make sure all of the biocide treated fuel has been burned through the engines (a minimum of five flights).
- (d) After 10 to 75 hours replace these items:
 - 1) Engine fuel filter element,
(Fuel Filter Removal, TASK 73-11-02-000-801-F00)
(Fuel Filter Installation, TASK 73-11-02-400-801-F00)
 - 2) APU fuel filter element.
(Inlet Fuel Filter Element Removal, TASK 49-31-21-000-801)
(Inlet Fuel Filter Element Installation, TASK 49-31-21-400-801)

SUBTASK 28-10-00-280-035

- (2) After the biocide treatment do these steps:
 - (a) Wait for 10 days after the biocide treatment.
 - (b) Get a new fuel sample for each tank.
 - (c) If the tests show that the biocide treatment was not successful, do these steps:
 - 1) Completely fill the fuel tanks with biocide treated fuel.
 - 2) Use the maximum soak time:
 - a) Biobor JF - 72 Hours
 - b) Kathon FP 1.5 - 24 Hours
 - (d) If the tests show that the biocide treatment was successful, then continue to test the aircraft at the usual intervals.

F. Treatment of Fuel Tanks with Heavy Levels of Microbial Contamination

NOTE: If the detection test (and retest) confirms heavy levels of microbial contamination, then do this procedure. It is recommended to do a fuel tank entry within 10 days after positive results for heavy levels of microbial contamination.

SUBTASK 28-10-00-280-036

- (1) Within 10 days (after receipt of test results) schedule a task to inspect the fuel tank(s) for microbial growth.

SUBTASK 28-10-00-280-037

- (2) Do these steps to prepare for the fuel tank inspection:

WARNING: DO THE PURGING AND FUEL TANK ENTRY PROCEDURE. FAILURE TO FOLLOW THE PURGING AND FUEL TANK ENTRY PROCEDURE COULD CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) Defuel and drain the applicable fuel tank(s) (TASK 28-26-00-650-801).
- (b) Prepare for a fuel tank entry:
Purging and Fuel Tank Entry, TASK 28-11-00-910-802,
Purging and Fuel Tank Entry Precautions, TASK 28-11-00-910-801.
- (c) Make sure the fuel tank has a sufficient flow of air.
- (d) Put on this protective gear to prevent contact with microbial growth:
 - 1) Respirator - Half face canister style respirators (minimum)

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- 2) Eye protection
- 3) Fuel resistant gloves
- 4) Saranex suit
- 5) Neoprene boots
- (e) Go into the fuel tank.
(Purging and Fuel Tank Entry, TASK 28-11-00-910-802)
(Purging and Fuel Tank Entry Precautions, TASK 28-11-00-910-801)

SUBTASK 28-10-00-280-038

- (3) Examine the fuel tank for microbial growth:
 - (a) Microbial growth usually occurs at the fuel/water interface in the fuel tanks.
 - (b) Microbial growth can also occur in other areas such as vertical surfaces and convex shapes such as fuel tubing.
 - (c) Microbial growth can appear in a variety of colors.
 - (d) If a tank is wet with fuel, the microbial growth can appear as a smooth slimy transparent gel material.
 - (e) If a tank is dry, the microbial growth can appear as a dark solid material on the tank surfaces.
 - (f) Microbial growth can cause the tank protective primer coating to appear stained.

SUBTASK 28-10-00-280-039

- (4) Microbial growth is usually found in these areas:
 - (a) The bottom of the tank where water collects.
 - (b) The lower surfaces of the wing structure (stringers, spars, ribs etc).
 - (c) The top surfaces of the tubing.
 - (d) The flow holes and the drain tubes.
 - (e) Areas where water is possibly trapped.
 - (f) Inside or around fuel system components.

SUBTASK 28-10-00-280-040

- (5) Do these steps if you find microbial growth:
 - (a) Do the applicable task to remove the microbial growth:
 - 1) Microbial Growth Removal - Manual Removal Method
 - 2) Microbial Growth Removal - Pressure Washer Removal Method
 - (b) Examine the fuel tank structure for corrosion (SRM Chapter 57).

SUBTASK 28-10-00-280-041

- (6) Do these steps after you clean the fuel tank:
 - (a) Do the inspection for the remaining tanks that have tested positive for microbial growth.
 - (b) Do the "Go Out of and Close the Fuel Tank" procedure in this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.
 - (c) Do a biocide treatment of the fuel tanks.
 - (d) Return the airplane to service.

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- (e) Within 10 days, get a new fuel/water sample and do the microbial detection test again.

NOTE: This test is necessary to make sure the microbial growth removal and biocide treatment processes have reduced the level of microbial contamination to an acceptable level.

- (f) Make sure all of the biocide treated fuel has been burned through the engines (a minimum of five flights).
- (g) After 10 to 75 hours replace these items:
- 1) Engine fuel filter element,
(Fuel Filter Removal, TASK 73-11-02-000-801-F00)
(Fuel Filter Installation, TASK 73-11-02-400-801-F00)
 - 2) APU fuel filter element.
(Inlet Fuel Filter Element Removal, TASK 49-31-21-000-801)
(Inlet Fuel Filter Element Installation, TASK 49-31-21-400-801)

SUBTASK 28-10-00-280-042

- (7) After the biocide treatment do these steps:
- (a) Wait for 10 days after the biocide treatment.
 - (b) Get a new fuel sample for each tank.
 - (c) Do the microbial growth detection test again.
 - (d) If the tests show that the biocide treatment was not successful, do these steps:
 - 1) Completely fill the fuel tanks with biocide treated fuel.
 - 2) Use the maximum soak time:
 - a) Biobor JF - 72 Hours
 - b) Kathon FP 1.5 - 24 Hours
 - (e) If the tests show that the biocide treatment was successful, then continue to test the aircraft at the usual intervals.

————— **END OF TASK** —————

TASK 28-10-00-600-803

4. Biocide Treatment of Fuel Tanks - Metered Injection Cart

A. General

- (1) Use this task to add biocide treatment to the fuel tanks.
- (2) There are two types of metered-injection carts:
 - (a) Adjustable metered injection cart
 - (b) Non-adjustable metered injection cart
- (3) ADJUSTABLE METERED INJECTION CART;
 - (a) This type of metered injection cart is equipped with an adjustable concentration setting. You can adjust the concentration setting from tank to tank.
- (4) NON-ADJUSTABLE METERED INJECTION CART;

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- (a) This type of metered injection cart is not field adjustable. You cannot adjust the concentration setting from tank to tank. You can recalibrate the cart (in a maintenance shop) to achieve the desired 270 ppm concentration for Biobor JF or 100 ppm concentration for Kathon FP 1.5. To account for the typical fuel remaining on-board after a flight, a procedure is given to recalibrate the cart to 1.5 times the usual setting. This method will allow the correct concentration of treated fuel to be added to the fuel tanks.
- (5) Biocide treatment is used to kill microbial growth within the fuel tank. The process requires that the biocide be mixed at a specified concentration with fuel and allowed to soak for a period of time. After soaking, the biocide treated fuel may be burned through the engines.
- (6) Two biocidal fuel additives are certified by the airframe and engine manufactures. These are:
 - (a) Biobor JF - manufactured by Hammonds
 - (b) Kathon FP 1.5 - manufactured by Rohm & Haas Company

NOTE: Biobor JF and Kathon FP 1.5 have not been approved in some geographic areas. Local regulatory agencies should be consulted with respect to approval status.

- (7) Obey all Health and Safety precautions specified by the manufacturer related to the use of biocide.
- (8) It is recommended to do this task with no fuel or a minimum fuel load (after a flight, before fuel servicing). It is not necessary to defuel the aircraft before you begin the biocide treatment.

B. Equipment

- (1) portable biocide injection hydrant cart, COM-1781

C. Consumables

- (1) Biocide - Use one of these fuel additives:
 - (a) Biobor JF additive, G00452
 - (b) Kathon FP1.5 biocide, G02347, Rohm and Haas Company, Pennsylvania, USA (215) 592-3000
Distributor for Kathon FP 1.5,
Fuel Quality Services, Inc.
Georgia, USA
(770) 967-9790
(770) 967-9982 (Fax number)

D. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
12-11-00-680-801	Fuel System Sumping (P/B 301)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)
49-31-21-000-801	Inlet Fuel Filter Element Removal (P/B 401)
49-31-21-400-801	Inlet Fuel Filter Element Installation (P/B 401)
73-11-02-000-801-F00	Fuel Filter Removal (P/B 401)
73-11-02-400-801-F00	Fuel Filter Installation (P/B 401)

E. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

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Reference	Description
COM-1781	Cart - Hydrant, Portable, Biocide Injection (Part #: 69-10-04-999, Supplier: 1X7Q9, A/P Effectivity: 737-ALL) (Part #: MODEL 600 HC, Supplier: 47186, A/P Effectivity: 737-ALL) (Part #: MODEL 800 HC, Supplier: 47186, A/P Effectivity: 737-ALL)

F. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5
G00452	Additive, Fuel - Biobor JF	
G02347	Biocide - Fuel - Kathon FP1.5	

G. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

H. Biocide Precautions

SUBTASK 28-10-00-620-025

(1) Obey these personnel precautions:

WARNING: DO NOT BREATHE BIOCIDES FUMES, OR TOUCH THE BIOCIDES FUEL ADDITIVE. READ THE MANUFACTURERS MSDS. THE BIOCIDES FUEL ADDITIVE CAN CAUSE HEALTH PROBLEMS (INJURIES TO PERSONNEL).

- (a) Do not breathe or touch the biocide fuel additive.
- (b) During maintenance with biocide fuel additives, wear these protective equipment items:
 - 1) Eye protection
 - 2) Fuel resistant gloves
 - 3) Protective outerwear
- (c) Do not sump the fuel tanks when biocide has been added to the fuel tank(s). A high concentration of biocide will be present at the sump drain.

SUBTASK 28-10-00-620-026

(2) Obey these biocide additive precautions:

- (a) Obey all requirements specified by the manufacturer related to the use of the biocide.

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CAUTION: DO NOT ADD MORE THAN THE MAXIMUM CONCENTRATION OF BIOCIDES. DAMAGE TO THE ENGINES CAN OCCUR IF THE BIOCIDES CONCENTRATION IS HIGHER THAN THE MAXIMUM LIMIT.

- (b) Do not exceed the maximum allowable concentration of biocide (parts per million) in a fuel tank.
(c) If the concentration exceeds the limit, then add more untreated fuel to dilute the biocide concentration.
(d) If you exceed the maximum allowable concentration of biocide in a fuel tank and you cannot dilute the concentration with untreated fuel, then contact the engine manufacturer for corrective action.
(e) If you spill biocide, then do these steps:
1) Immediately contain the spill area.
2) Use a cotton wiper, G00034 and water to clean the area.
3) Use the correct procedures to dispose of the material.

I. Prepare for the Biocide Treatment

SUBTASK 28-10-00-680-001

- (1) Sump the fuel tanks (TASK 12-11-00-680-801).

SUBTASK 28-10-00-620-027

- (2) Do one of these procedures:
(a) Apply the Biocide to the Fuel Tanks - Adjustable Metered.
(b) Apply the Biocide to the Fuel Tanks - Non-adjustable Metered Injection.

J. Apply the Biocide to the Fuel Tanks - Adjustable Metered Injection

SUBTASK 28-10-00-620-028

- (1) Obey the biocide precautions.

SUBTASK 28-10-00-620-029

- (2) Do these steps to calculate the metered injection setting:
(a) Use Table 201 to determine the final biocide concentration.

NOTE: Table 201 gives the final concentration of biocide allowed in the fuel tank. This is the maximum concentration of biocide that can be run through the engines. You must adjust the metered injection setting to achieve the correct concentration of biocide.

NOTE: If you add a biocide concentration that is much lower than the maximum concentration, the biocide treatment must soak longer and is not as effective in killing the microbial growth.

- (b) Use Table 202 to calculate the biocide concentration setting for each fuel tank.
(c) The metered injection cart setting depends on these variables:
1) Type of biocide used.
2) Quantity of untreated fuel in the fuel tank
3) Quantity of treated fuel to be uplifted into the fuel tank.

Table 201/28-10-00-993-804 Biocide Concentration

Table with 2 columns: BIOCIDES, CONCENTRATION

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(Continued)

BIOBOR JF	270 ppm by weight
KATHON FP 1.5	100 ppm by volume

Table 202/28-10-00-993-805 Metered Injection Cart Setting

BIOBOR JF	KATHON FP 1.5
$C(uf) = \frac{270 (FOB + UPLIFT)}{UPLIFT}$	$C(uf) = \frac{100 (FB + UPLIFT)}{UPLIFT}$

C(uf) = Concentration of fuel to be uplifted

FOB = Untreated fuel quantity on-board

UPLIFT = Fuel quantity with metered biocide to be added

Fill each tank to a minimum of 1/3 full.

SUBTASK 28-10-00-620-030

- (3) Adjust the metered injection cart:
 - (a) Use the instructions provided with the metered injection cart to adjust the cart.
 - (b) Set the injection setting to achieve the desired biocide concentration.

SUBTASK 28-10-00-620-031

- (4) Plan the refueling operation:
 - (a) Each tank must be filled to a minimum of 1/3 full.

SUBTASK 28-10-00-620-032

- (5) Do these steps to add the biocide:
 - (a) Open the refuel valve(s) for one tank only (TASK 12-11-00-650-802).
 - (b) Begin the refuel operation (TASK 12-11-00-650-802).
 - (c) Make sure the correct biocide concentration is mixed with the fuel and added to the fuel tank.
 - (d) Refuel the tank to the desired fuel load.
 - (e) Make sure the tank is filled a minimum of 1/3 full.
 - (f) Stop the refuel operation (TASK 12-11-00-650-802).
 - (g) Do the biocide calculation again and adjust the injection cart setting for the next tank (Table 202).
 - (h) Continue to apply the treated fuel to all fuel tanks.

SUBTASK 28-10-00-620-033

- (6) Do this procedure: Biocide Treatment Soak Time

K. NO FUEL ON-BOARD; Apply the Biocide to the Fuel Tanks - Non-Adjustable Metered Injection

SUBTASK 28-10-00-620-034

- (1) Do this procedure if all of the fuel tanks are empty before you begin to add the biocide treated fuel.

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SUBTASK 28-10-00-620-035

- (2) Obey the biocide precautions.

SUBTASK 28-10-00-620-036

- (3) Do these steps to calibrate the metered injection cart:
 - (a) Use the instructions provided with the metered injection cart to calibrate the equipment.

NOTE: The equipment is not field adjustable. The calibration must be done in a maintenance shop.

- (b) Calibrate the concentration setting to the applicable value:
 - 1) Biobor JF - 270 ppm by weight
 - 2) Kathon FP 1.5 - 100 ppm by volume
- (c) Use the instructions provided with the metered injection cart to connect the cart to the refueling equipment.

SUBTASK 28-10-00-620-037

- (4) Plan the refueling operation:
 - (a) Plan the refuel operation to maintain the center of gravity within the limits per the weight and balance manual.
 - (b) Each tank must be filled to a minimum of 1/3 full.

SUBTASK 28-10-00-620-038

- (5) Do these steps to add the biocide:
 - (a) Open the refuel valves in sequence to maintain the airplane within the center of gravity limits.
 - (b) Begin the refuel operation (TASK 12-11-00-650-802).
 - (c) The correct biocide concentration is mixed with the fuel and added to the fuel tank.
 - (d) Fill each fuel tank to a minimum of 1/3 full.
 - (e) Stop the refueling operation (TASK 12-11-00-650-802).

SUBTASK 28-10-00-620-039

- (6) Do this procedure: Biocide Treatment Soak Time

L. UNTREATED FUEL ON-BOARD; Apply the Biocide to the Fuel Tanks - Non-Adjustable Metered Injection

SUBTASK 28-10-00-620-040

- (1) Do this procedure if there is less than 5754 lb (2610 kg) of untreated fuel on-board before you begin to add the biocide treated fuel.

SUBTASK 28-10-00-620-041

- (2) Obey the biocide precautions.

SUBTASK 28-10-00-620-042

- (3) Do these steps to distribute the untreated on-board fuel:
 - (a) Transfer all of the fuel in equal quantities to each of the two main tanks (TASK 28-26-00-650-802).
 - (b) If necessary, refuel the main tanks with untreated fuel until each tank is 1/3 full, 2877 lb (1305 kg) (TASK 12-11-00-650-802).

SUBTASK 28-10-00-620-044

- (4) Do these steps to add the biocide:

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- (a) Open the refuel valves for the main tanks only (TASK 12-11-00-650-802).
- (b) Begin the refuel operation (TASK 12-11-00-650-802).
- (c) Completely fill the two main tanks with treated fuel.
- (d) After the treated and untreated fuel is mixed in the tanks, the concentration of biocide will be correct.
- (e) Distribute the biocide treated fuel in the main tanks to the center tank (TASK 28-26-00-650-802).
- (f) Make sure each fuel tank is a minimum of 1/3 full.

SUBTASK 28-10-00-620-045

- (5) Do this procedure: Biocide Treatment Soak Time

M. Biocide Treatment Soak Time

SUBTASK 28-10-00-620-046

- (1) Obey the biocide precautions.

SUBTASK 28-10-00-620-047

- (2) Allow the biocide treatment to soak per the applicable minimum time given in Table 203.

Table 203/28-10-00-993-806 Biocide Soak Time

BIOCIDE	SOAK TIME
BIOBOR JF	36 - 72 HOURS
KATHON FP 1.5	12 - 24 HOURS

SUBTASK 28-10-00-620-048

- (3) These factors affect how quickly the biocide kills the microbial growth:
 - (a) The longer the soak time, the better the biocide will work.
 - (b) Additional soak time may be necessary for low temperatures.
 - (c) A low concentration of biocide is not as effective in killing microbial growth.

NOTE: If the concentration of biocide is too low, the microbes can become resistant to the biocide.

SUBTASK 28-10-00-620-049

- (4) During the soak time, do not move the airplane or operate the fuel pumps or APU pumps.

N. Post-Biocide Treatment Maintenance Actions

SUBTASK 28-10-00-620-050

- (1) After the biocide soak time, return the airplane to service.

NOTE: The biocide treated fuel is burned through the engines.

SUBTASK 28-10-00-620-051

- (2) After 10 to 75 hours, replace these filters:

NOTE: If one engine filter shows high levels of particulates, replace the other filters before the next flight.

- (a) Engine fuel filter element.
 - (Fuel Filter Removal, TASK 73-11-02-000-801-F00)
 - (Fuel Filter Installation, TASK 73-11-02-400-801-F00)
- (b) APU fuel filter element.

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(Inlet Fuel Filter Element Removal, TASK 49-31-21-000-801)

(Inlet Fuel Filter Element Installation, TASK 49-31-21-400-801)

SUBTASK 28-10-00-620-052

(3) Within 10 days, but after at least five flights, do the microbial growth detection test again.

SUBTASK 28-10-00-620-053

(4) If the tests show that the biocide treatment was not successful, then do these steps:

- (a) Completely fill the fuel tanks with biocide treated fuel.
- (b) Use the maximum soak time:
 - 1) Biobor JF - 72 Hours
 - 2) Kathon FP 1.5 - 24 Hours

————— END OF TASK —————

TASK 28-10-00-100-803

5. Microbial Growth Removal - Manual Removal Method

A. General

- (1) There are two methods to remove the microbial growth. If the fuel tank inspection shows that the area that is contaminated is small, then do this task to manually remove the contamination.
- (2) If the fuel tank inspection shows that the contamination area is large or the area is inaccessible (manual removal is not practical), then do this task: Microbial Growth Removal - Pressure Washer Method.

B. Equipment

- (1) Protective outer clothing to prevent skin contact with microbial contamination:
 - (a) Saranex suit
 - (b) Fuel and alcohol resistant gloves
 - (c) Eye protection
 - (d) Neoprene boots

C. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
SRM 57-00-00	Structural Repair Manual

D. Consumable Materials

Reference	Description	Specification
B00130	Alcohol - Isopropyl	TT-I-735
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5

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Zone	Area
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

F. Prepare to Remove the Microbial Growth

SUBTASK 28-10-00-620-054

- (1) Do this procedure after you have completed this task: Microbial Growth Fuel Tank Inspection.

SUBTASK 28-10-00-620-055

WARNING: DO THE PURGING AND FUEL TANK ENTRY PROCEDURE. FAILURE TO FOLLOW THE PURGING AND FUEL TANK ENTRY PROCEDURE COULD CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Prepare the fuel tank for a tank entry Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-10-00-620-056

WARNING: MAKE SURE THAT THERE IS A GOOD FLOW OF AIR IN THE FUEL TANK WHERE YOU WILL REMOVE THE MICROBIAL GROWTH. A GOOD FLOW OF AIR WILL PREVENT THE BUILD-UP OF ISOPROPYL ALCOHOL FUMES. ISOPROPYL ALCOHOL IS FLAMMABLE AND POISONOUS. INJURIES TO PERSONNEL CAN OCCUR.

- (3) Make sure the fuel tank has a sufficient flow of air.

SUBTASK 28-10-00-620-057

WARNING: PUT ON AN APPROVED RESPIRATOR AND PROTECTIVE CLOTHING BEFORE YOU GO INTO A FUEL TANK THAT HAS MICROBIAL GROWTH CONTAMINATION. DO NOT BREATHE AIR THAT HAS MICROBIAL GROWTH RESIDUE. DO NOT GET THE MICROBIAL GROWTH ON YOUR SKIN. HEALTH PROBLEMS CAN OCCUR. MICROBIAL CONTAMINATION CAN CAUSE INJURIES TO PERSONNEL.

- (4) Put on this protective gear to prevent contact with microbial growth:

- (a) Fuel and alcohol resistant gloves
- (b) Eye protection
- (c) Neoprene boots

G. Remove the Microbial Growth - Manual Method

SUBTASK 28-10-00-620-058

- (1) Go into the fuel tank Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-10-00-620-059

- (2) Do these steps to remove the microbial growth:

- (a) Use a fiber brush to loosen the contamination.
- (b) Apply alcohol, B00130 to a cotton wiper, G00034.
- (c) Use the minimum amount of isopropyl alcohol that is necessary.
- (d) Use the wiper to remove the microbial growth.

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- (e) Put the used cotton wiper, G00034 in a plastic bag to decrease the isopropyl alcohol fumes in the tank.
- (f) Use an air hose or a wire to make sure the flow hole areas are free of unwanted material.
- (g) Use an air hose with a nozzle (90 psi maximum) to blow any material from the inlet screen on the water and fuel scavenge pumps.

SUBTASK 28-10-00-620-060

- (3) Do a visual check of the fuel tank structure for corrosion.
 - (a) If you find corrosion, then repair the damage SRM 57-00-00.

H. Put the Airplane Back to the Usual Condition

SUBTASK 28-10-00-410-005

- (1) Install any panels or structure that you removed.

SUBTASK 28-10-00-620-061

- (2) Do this task: Fuel Tank Closure Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

————— END OF TASK —————

TASK 28-10-00-100-804

6. Microbial Growth Removal - Pressure Washer Method

A. General

- (1) There are two methods to remove the microbial growth. If the fuel tank inspection shows that the area that is contaminated is small, then do this task: Microbial Growth Removal - Manual Removal Method, TASK 28-10-00-100-803.
- (2) If the fuel tank inspection shows that the contamination area is large or the area is inaccessible (manual removal is not practical), then use the pressure washer method to remove the contamination.
- (3) If you use a pressure washer you must remove all of the in-tank FQIS components and use care not to damage the fuel tank sealant. After you finish the procedure make sure all the water is removed and the tank is completely dried.

B. Equipment

- (1) Gloves - applicable for hot water cleaning
- (2) Protective Clothing - Waterproof pants, boots, jacket with hood
- (3) Pressure Washer - Hot Water - Surface impact requirement (Maximum):
 - Temperature: 160°F (71°C)
 - Pressure: 100 psi (689 kPa)
 - Flow: 3 gal (11 l) to 5 gal (19 l)per minute
- (4) Respirator - Full face canister style respirators (minimum), U.S. Bureau of Mines Approved or equivalent
- (5) Source of hot water
- (6) Vacuum cleaner - air powered, wet/dry

C. References

Reference	Title
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-00-600-801	Apply the Corrosion Resistant Finish (Topcoat) (P/B 701)
28-11-00-790-801	Fuel Leak Detection Procedures (P/B 601)

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Reference	Title
28-11-00-910-801	Purging and Fuel Tank Entry Precautions (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-11-11-000-802	Surge Tank Access Door - Removal (P/B 401)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-11-400-802	Surge Tank Access Door - Installation (P/B 401)
28-11-21-000-801	Surge Tank Fuel Sump Drain Valve Removal (P/B 401)
28-11-21-400-801	Surge Tank Fuel Sump Drain Valve Installation (P/B 401)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-11-41-000-801	Sump Drain Valve Removal (P/B 401)
28-11-41-400-801	Sump Drain Valve Installation (P/B 401)
28-11-61-000-801	Main Tank Fuel Sump Drain Valve Removal (P/B 201)
28-11-61-400-801	Main Tank Fuel Sump Drain Valve Installation (P/B 201)
28-22-17-000-801	Fuel Scavenge Jet Pump - Removal (P/B 401)
28-22-17-400-801	Fuel Scavenge Jet Pump - Installation (P/B 401)
28-41-21-000-801	Remove the Tank Unit or the Compensator Unit (P/B 401)
28-41-21-400-801	Install the Tank Unit or Compensator Unit (P/B 401)
28-41-44-400-801	FQIS Wire Harness Replacement (P/B 401)

D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

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F. Hot Water Pressure Washer - Precautions

SUBTASK 28-10-00-860-001

WARNING: OBEY THESE PRECAUTIONS WHEN YOU CLEAN THE FUEL TANK WITH A HOT-WATER PRESSURE WASHER. HOT WATER CAN BURN YOU AND HIGH TEMPERATURES IN THE TANK CAN CAUSE HEAT-RELATED HEALTH PROBLEMS. USE THE PRESSURE WASHER CORRECTLY TO PREVENT DAMAGE TO THE FUEL TANK SEALS. HOT WATER AND HEAT CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) The person in the fuel tank must have these items for protection:
 - (a) Heat protective gloves
 - (b) Water-proof outer gloves
 - (c) Water-proof coat and pants
 - (d) Water-proof and heat protective hood
 - (e) A full face mask
 - (f) Protective gear to protect against breathing or touching microbial growth
 - (g) A hot water line that closes automatically when you release it ("deadman" control switch).

SUBTASK 28-10-00-910-018

- (2) The fuel tank observer must monitor the person in the tank for signs of health problems related to overheating.

SUBTASK 28-10-00-860-002

- (3) Use air movers to have a good flow of air in the tanks.

SUBTASK 28-10-00-910-019

- (4) While you clean, continue to move air through the tank.

SUBTASK 28-10-00-160-008

- (5) Make sure to use the correct pressure washer technique:
 - (a) Use a spray of approximately 100 psi (689 kPa) maximum at the tank surface.
 - (b) Keep the time you point the nozzle at one position to a minimum
 - (c) Move the spray through an area at approximately 6 in. (152 mm) per second.
 - (d) Many fast passes are better than one slow pass.
 - (e) Do not point the spray at the feathered edge of the seal compound.

NOTE: This loosens the joint.

- (f) If you put heat or water pressure on the sealant for a long time, you can damage the sealant.

G. Prepare the Tank for the Hot Water Pressure Washing

SUBTASK 28-10-00-910-020

WARNING: DO THE PURGING AND FUEL TANK ENTRY PROCEDURE. FAILURE TO FOLLOW THE PURGING AND FUEL TANK ENTRY PROCEDURE COULD CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Prepare to go into the fuel tank.
Purging and Fuel Tank Entry Precautions, TASK 28-11-00-910-801
Purging and Fuel Tank Entry, TASK 28-11-00-910-802

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SUBTASK 28-10-00-020-003

- (2) Remove the applicable access doors for the fuel tank in the area that you must clean.

Main Tank Access Door Removal, TASK 28-11-11-000-801

Surge Tank Access Door - Removal, TASK 28-11-11-000-802

Center Tank Access Door - Removal, TASK 28-11-31-000-801

SUBTASK 28-10-00-020-004

- (3) Remove the necessary fuel tank equipment and support brackets to get access to the area that you must clean.

SUBTASK 28-10-00-910-021

WARNING: PUT ON AN APPROVED RESPIRATOR AND PROTECTIVE CLOTHING BEFORE YOU GO INTO A FUEL TANK THAT HAS MICROBIAL GROWTH CONTAMINATION. DO NOT BREATHE AIR THAT HAS MICROBIAL GROWTH RESIDUE. DO NOT GET THE MICROBIAL GROWTH ON YOUR SKIN. HEALTH PROBLEMS CAN OCCUR. MICROBIAL CONTAMINATION CAN CAUSE INJURIES TO PERSONNEL.

- (4) Put on this protective gear to prevent contact with microbial growth:

- (a) Respirator - Half face canister style respirators (minimum)
- (b) Fuel resistant gloves
- (c) Saranex coveralls
- (d) Neoprene boots

SUBTASK 28-10-00-020-005

- (5) Remove these components for the tank(s) to be cleaned:

NOTE: Make a component removal record.

- (a) Sump drain valve

Main Tank Fuel Sump Drain Valve Removal, TASK 28-11-61-000-801,

Surge Tank Fuel Sump Drain Valve Removal, TASK 28-11-21-000-801,

Center Tank Sump Drain Valve Removal, TASK 28-11-41-000-801.

- (b) FQIS tank units

Remove the Tank Unit or the Compensator Unit, TASK 28-41-21-000-801

- (c) Fuel scavenge jet pump.

Fuel Scavenge Jet Pump - Removal, TASK 28-22-17-000-801

SUBTASK 28-10-00-910-022

- (6) Put a protective cover on these fuel system components and attach a REMOVE BEFORE FLIGHT TAG:

- (a) Fuel pump inlets
- (b) Scavenge and water ejector pump inlets
- (c) By-pass valve inlets

SUBTASK 28-10-00-110-002

- (7) Use the applicable manufacturer's recommendations to clean these components:

- (a) Fuel scavenge jet pump
- (b) Tank units and compensator unit

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H. Pressure Wash the Fuel Tank

SUBTASK 28-10-00-110-003

WARNING: OBEY THESE PRECAUTIONS WHEN YOU CLEAN THE FUEL TANK WITH A HOT-WATER PRESSURE WASHER. HOT WATER CAN BURN YOU AND HIGH TEMPERATURES IN THE TANK CAN CAUSE HEAT-RELATED HEALTH PROBLEMS. USE THE PRESSURE WASHER CORRECTLY TO PREVENT DAMAGE TO THE FUEL TANK SEALS. HOT WATER AND HEAT CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Put on this protective gear to protect against the hot water pressure spray:
 - (a) Respirator - Full face canister style respirators (minimum)
 - (b) Heat protective gloves
 - (c) Water-proof outer gloves
 - (d) Water-proof pants, coat and boots
 - (e) Water-proof and heat protective hood
 - (f) A full face mask.

SUBTASK 28-10-00-160-009

- (2) Use the pressure washer to clean the fuel tank:
 - (a) Start at the outboard end of the tank.
 - (b) Hold the nozzle at a distance between 6 in. (152 mm) and 10 in. (254 mm) from the tank surface.
 - (c) Position the nozzle at a 45° arc (1 rad) angle to the tank surface.
 - (d) Point the nozzle in the direction of the access opening and the drain valve opening.
 - (e) Continue to clean in the direction of the drain valve opening and the access opening.
 - (f) Only use enough spray to remove the microbial growth.
 - (g) Use short bursts, not a continuous flow.
 - (h) Move the loose microbial growth and any unwanted material to the inboard end of the tank and out of the openings.
 - (i) Complete the pressure washing of the fuel tank.

SUBTASK 28-10-00-160-010

- (3) After you pressure wash the fuel tank, do these steps:

CAUTION: MAKE SURE THAT YOU REMOVE ALL OF THE WASTE PARTICLES AFTER YOU CLEAN THE FUEL TANK. THE UNWANTED MATERIAL CAN CAUSE A BLOCKAGE OF THE EJECTOR AND SCAVENGE PUMPS. PARTICLES CAN STOP THE OPERATION OF THESE SYSTEMS.

- (a) Use an air hose with a nozzle (90 psi maximum) to blow any material from the inlet screen on the water and fuel scavenge pumps.
- (b) Use an air hose or a wire to make sure the flow hole areas are free of loosened microbial growth or unwanted material.
- (c) For the outboard main tanks, make sure that the drain hole in the midspar web is clear.

SUBTASK 28-10-00-160-011

- (4) Repeat these steps to pressure wash the remaining tanks as necessary.

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I. Restore the Fuel Tank

SUBTASK 28-10-00-160-012

- (1) Remove the water from the fuel tank:
 - (a) Continue to have a good flow of air until the tank is dry.
 - (b) Use an air-powered vacuum cleaner to remove the water.
 - (c) Mop-up any water that remains with a cotton wiper, G00034.
 - (d) Continue to move air through the fuel tanks until all moisture is removed.

SUBTASK 28-10-00-210-006

- (2) Do a check of the fuel tank for damage:
 - (a) Do a visual check of the fuel tank structure for corrosion.
 - 1) If you find corrosion, then repair the damage (SRM 57-00-00).
 - (b) Do a visual check for missing or damaged fuel tank sealant.
 - 1) If there is damage, repair the sealant (TASK 28-11-00-300-803).
 - (c) Do a visual check for missing or loose fuel tank protective finish (topcoat).
 - 1) If there is loose finish, do this task: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 28-10-00-080-001

- (1) Remove the fuel tank cleaning equipment and material.

SUBTASK 28-10-00-410-006

- (2) Install these components:
 - (a) Sump drain valve
Main Tank Fuel Sump Drain Valve Installation, TASK 28-11-61-400-801,
Surge Tank Fuel Sump Drain Valve Installation, TASK 28-11-21-400-801,
Center Tank Sump Drain Valve Installation, TASK 28-11-41-400-801
 - (b) FQIS Tank Units
FQIS Wire Harness Replacement, TASK 28-41-44-400-801,
Install the Tank Unit or Compensator Unit, TASK 28-41-21-400-801
 - (c) Fuel Scavenge Jet Pumps
Fuel Scavenge Jet Pump - Installation, TASK 28-22-17-400-801

SUBTASK 28-10-00-410-007

- (3) Install the support brackets and the fuel tank equipment that you removed.

SUBTASK 28-10-00-080-002

- (4) Remove the protective covers from these fuel system components:
 - (a) Fuel pump inlets
 - (b) Fuel scavenge system inlets
 - (c) Bypass valve inlets

K. Put the Airplane Back to the Usual Condition

SUBTASK 28-10-00-410-008

- (1) Install any panels or tank structure removed for access.

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Main Tank Access Door Installation, TASK 28-11-11-400-801,
Surge Tank Access Door - Installation, TASK 28-11-11-400-802,
Center Tank Access Door - Installation, TASK 28-11-31-400-801

SUBTASK 28-10-00-910-023

- (2) Do the steps to "Go Out of and Close the Fuel Tank" in this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-10-00-210-007

- (3) Make sure there is no fuel leakage (TASK 28-11-00-790-801).

SUBTASK 28-10-00-620-062

- (4) Do this task: Biocide Treatment of Fuel Tanks - Metered Injection Cart, TASK 28-10-00-600-803.

————— **END OF TASK** —————

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FUEL TANKS - MAINTENANCE PRACTICES

1. General

- A. This procedure contains these tasks:
 - (1) Purging and Fuel Tank Entry Precautions
 - (2) Purging and Fuel Tank Entry
 - (3) Fuel Tank Closure
- B. If you make a decision not to do this recommended procedure, you must have an approved alternate procedure. Make sure the conditions during the purging and fuel tank entry operations give sufficient protection to the persons and equipment used in this procedure. It is possible that local fire codes, and standards make it necessary to use more restrictive procedures or more procedures than those given in the subsequent steps.
- C. The safety, fire and health limits in this procedure are used by Boeing at the manufacturing sites in the state of Washington. For fuel tank and confined space entry, Boeing is required to have an aircraft confined space entry program. This program is established to control the entry into confined spaces to protect the safety and health of persons who go into fuel tanks and other closed areas. Important requirements of the program include:
 - (1) Identification and Warning Sign Placement
 - (2) Observer Communication with Persons inside Confined Spaces
 - (3) Entry Permit Requirements
 - (4) Pre-entry Procedures
 - (5) Entry Procedures
 - (6) Emergency and Rescue Service
 - (7) Fuel Tank Closure.
- D. It is recommended that a fuel tank entry program which complies with the local, state and national regulations be followed.

TASK 28-11-00-910-801

2. Purging and Fuel Tank Entry Precautions

- A. General
 - (1) This procedure contains the precautions you must obey before you purge and enter the fuel tanks for maintenance. This task contains these procedures:
 - (a) Purging and Fuel Tank Entry - Definitions
 - (b) Purging and Fuel Tank Entry - Airplane Precautions
 - (c) Purging and Fuel Tank Entry - Electrical Equipment Precautions
 - (d) Purging and Fuel Tank Entry - Equipment Precautions
 - (e) Purging and Fuel Tank Entry - Personnel Precautions
 - (f) Purging and Fuel Tank Entry - Adverse Weather Conditions Precautions
 - (2) The next task, Purging and Fuel Tank Entry, contains the steps you must follow to purge and enter a fuel tank.
- B. References

Reference	Title
12-11-01 P/B 301	FUEL TANK - PRESSURE REFUELING
28-26-00 P/B 201	DEFUELING - MAINTENANCE PRACTICES

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C. Tools/Equipment

Reference	Description
STD-1129	Coveralls - Tyvek/Saranex 23-p (Approved Cotton Substitute), No Pockets
STD-7374	Gloves - Fuel and Solvent Resistant
STD-7380	Respirator - U.S. Bureau of Mines Approved (or Equivalent)

D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

E. Purging and Fuel Tank Entry - Definitions

SUBTASK 28-11-00-910-003

(1) Approved Persons:

- (a) Persons who are trained and understand the dangers and procedures for fuel tank entry and are responsible to make sure the airplane, equipment and the environment is safe for maintenance operations.

SUBTASK 28-11-00-910-004

(2) Approved Persons for Fuel Tank Entry:

- (a) Persons who are trained and understand the dangers and procedures for fuel tank entry.

SUBTASK 28-11-00-910-005

(3) Class I, Division 1, Hazardous Locations (or equivalent standard):

- (a) Locations where ignitable concentrations of flammable gases or vapors can exist under standard operational conditions.
- (b) Locations where ignitable concentrations of flammable gases or vapors may exist frequently because of repair or maintenance operations.
- (c) Locations where ignitable concentrations of flammable gases or vapors can exist because of leakage.
- (d) Locations where equipment problems or incorrect operation of equipment or processes can release ignitable concentrations of flammable gases or vapor, and can also cause failure of electrical equipment at the same time.

SUBTASK 28-11-00-910-006

(4) Class I, Division 2, Hazardous Locations (or equivalent standard):

- (a) Locations where flammable liquids or gases are handled, processed or used, but where the liquid, vapors, or gases will usually be in closed containers or closed systems. The containers or systems will not allow the release of liquid, gas or vapor in sufficient quantity to produce an ignitable fuel and air mixture unless the container or system fails or is damaged.

SUBTASK 28-11-00-910-007

(5) Explosion-Proof Equipment:

- (a) Equipment contained in a case that will not be damaged by an internal explosion caused by explosive vapors inside the unit.
- (b) Equipment which will not cause explosive vapors around the unit to ignite even when sparks, flashes or an explosion of vapor occurs inside the unit.

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- (c) Equipment which operates at an external temperature which will not cause explosive vapors around the unit to ignite.
- (d) Equipment which has been approved by an independent test laboratory such as Underwriters Laboratories (UL) or Factory Mutual, for use in Class I Division 1 hazardous locations (or an equivalent standard).

SUBTASK 28-11-00-910-008

- (6) Fire-Safe Condition:
10% or less of the lower explosive limit (LEL).

Table 201/28-11-00-993-850

FIRE-SAFE CONDITION
A FIRE-SAFE CONDITION OCCURS WHEN THE VAPOR CONCENTRATION IS LESS THAN 10 PERCENT OF THE LOWER EXPLOSIVE LIMIT (LEL)

SUBTASK 28-11-00-910-009

- (7) Health-Safe Condition:
 - (a) An atmosphere where oxygen content is a minimum of 19.5% to a maximum of 23.5% by volume at sea level, and the vapor concentrations are below the permissible exposure limits (PEL).
 - (b) Because kerosene has a low vapor pressure, the concentrations are usually within the limits needed for a Health-Safe condition. Thus, you usually get very low (safe) values at usual temperatures (less than approximately 70°F (21°C)). At tank temperatures of approximately 90°F (32°C), it is possible to get gas concentrations more than the Health-Safe value with kerosene. At tank temperatures of more than 90°F (32°C), it is possible to get gas concentrations more than the Fire-Safe value. It is also possible that a different type of fuel was kept in a tank that usually contains kerosene. If the purging procedure was not done, this causes high concentration values when you use the combustible gas indicator.

WARNING: DO NOT BREATHE THE FUMES FROM THIS MATERIAL. PUT ON A RESPIRATOR WHEN YOU USE THIS MATERIAL. MAKE SURE THAT THERE IS SUFFICIENT AIRFLOW. THIS MATERIAL CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

- (c) Before you go into a fuel tank that contained JP-4 or JET B, wear a full-mask respirator with an attached breathing supply.

Table 202/28-11-00-993-851

HEALTH-SAFE CONDITION		
A HEALTH-SAFE CONDITION OCCURS WHEN THE OXYGEN CONTENT IS A MINIMUM OF 19.5% TO A MAXIMUM OF 23.5% BY VOLUME AT SEA LEVEL, AND THE VAPOR CONCENTRATIONS ARE BELOW THESE PERMISSIBLE EXPOSURE LIMITS:		
Fuel	Permissible Exposure Level Total Hydrocarbons TWA ^{*[1]} (ppm)	Lower Explosive Level (percent)
Aviation Gasoline	300	1.0
Jet A	160	0.7
Jet A-1	160	0.7
JP-5	160	0.7

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HEALTH-SAFE CONDITION		
JP-8	160	0.7

*[1] TWA - Time Weighted Average

SUBTASK 28-11-00-910-010

(8) Lower Explosive Limits (LEL):

- (a) The minimum concentration of flammable vapors in air below which propagation of flame does not occur on contact with a source of ignition.

SUBTASK 28-11-00-910-011

(9) Permissible Exposure Level (PEL):

- (a) The time weighted average airborne concentrations of substances at which it is believed that nearly all workers may be repeatedly exposed 8 hours a day, 40 hours a week, without adverse health effects.

NOTE: The PEL limits used in this procedure are the PEL limits used by Boeing personnel during fuel tank entry. If the local PEL limits are more restrictive than the ones given in this procedure, use the equivalent local PEL limits.

SUBTASK 28-11-00-910-012

(10) Purging or Purged (for Fuel Tank Entry):

- (a) Purging an aircraft fuel tank is defined as the removal of any fuel or fuel vapor that remains after the fuel tanks are sumped. A purged fuel tank contains a nonflammable atmosphere that can be maintained by mechanical ventilation.

SUBTASK 28-11-00-910-013

(11) Unwanted Sources of Ignition:

- (a) Unwanted sources of ignition include:
 - 1) open flames (matches, cigarette lighters)
 - 2) electrical equipment (lights, motors, sparks from engine exhaust)
 - 3) frictional hot spots
 - 4) electromagnetic energy (radio transmissions or radars)
 - 5) static electricity
 - 6) lightning.

F. Purging and Fuel Tank Entry - Airplane Precautions

SUBTASK 28-11-00-910-014

- (1) Do the maintenance on the fuel tanks in areas which allow the free movement of air, fire fighting equipment and other emergency equipment.

SUBTASK 28-11-00-910-015

- (2) A rope barrier must be placed around the airplane, to identify the Class I, Division 1 hazardous locations. See Figure 201 for the distance requirements. The rope barrier must include signs or placards which state: DANGER - OPEN FUEL TANKS.

SUBTASK 28-11-00-910-016

- (3) The airplane must be correctly grounded to an approved ground before you defuel the airplane or open any fuel tanks.

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SUBTASK 28-11-00-910-017

WARNING: DO NOT USE AIRPLANE ELECTRICAL POWER WHEN FUEL TANK ACCESS DOORS ARE OPEN. SPARKS FROM ELECTRICAL EQUIPMENT CAN CAUSE IGNITION OF FUEL VAPOR AND CAUSE A FIRE OR EXPLOSION. A FIRE OR EXPLOSION CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (4) Before the fuel tank access doors are opened, all of the electrical power to and from the airplane must be removed. Placards which state that power should not be restored on the airplane until the fuel tank(s) are closed should be attached to applicable locations.

SUBTASK 28-11-00-910-018

- (5) The main, and APU batteries must be disconnected. Placards which state not to connect the batteries until the fuel tanks are closed should be attached to all disconnected battery locations.

SUBTASK 28-11-00-910-019

- (6) All safety, support and maintenance equipment must be in place before you open the fuel tank access doors. Movement of equipment can cause sparks which can cause fuel vapors to ignite.

SUBTASK 28-11-00-910-020

- (7) No painting operations are permitted on airplanes with open fuel tanks.

G. Purging and Fuel Tank Entry - Electrical Equipment Precautions

SUBTASK 28-11-00-910-021

WARNING: FOLLOW THE SUBSEQUENT RADIO AND RADAR LIMITS. FAILURE TO FOLLOW THE SUBSEQUENT RADIO AND RADAR LIMITS CAN CAUSE A FIRE OR EXPLOSION. A FIRE OR EXPLOSION CAN CAUSE SERIOUS INJURY OR DEATH TO PERSONS AND CAN CAUSE DAMAGE TO EQUIPMENT.

- (1) No radio or radar equipment should operate nearer to an open fuel tank than the distances specified in Table 203.

Table 203/28-11-00-993-842

POWER (EIRP ^{*[1]}) OF EQUIPMENT TRANSMITTING RADAR OR RADIO ^{*[2]}	SEPARATION DISTANCE (FT,M)	
	MAINTENANCE WITH OPEN FUEL TANKS PURGED	MAINTENANCE WITH OPEN FUEL TANKS NOT PURGED (or during purging)
More than 100 watts	200 FT (61 M)	200 FT (61 M)
25 to 100 watts	50 FT (15 M)	50 FT (15 M)
Less than 25 watts ^{*[3]}	10 FT (3 M)	50 FT (15 M)
Radiating ground approach control or pattern surveillance radar	300 FT (91 M)	300 FT (91 M)
Open flame, heat sources, lighted smoking material, and any other potential ignition sources	50 FT (15 M)	50 FT (15 M)

*[1] EIRP is Effective Isotropic Radiated Power in watts.

*[2] This separation distance does not apply to airplane installed radio transmitters. Any limits on operations for the airplane VHF, SATCOM, HF, weather radar, etc., are listed in the airplane operations manuals.

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*[3] This category includes mobile phones, pagers, two-way radios, etc. There are low power (explosion proof) radios that are approved for use in Class I division 1 hazardous locations that can be used safely in the vicinity of open, not purged, fuel cells and other areas containing fuel vapors.

SUBTASK 28-11-00-910-022

- (2) Fuel in the beam of operational high-powered radar which can produce a peak power density that exceeds 5 watts per square centimeter is hazardous. Electromagnetic energy of this intensity can ignite fuel vapors and cause a fire.

SUBTASK 28-11-00-910-023

WARNING: DURING OPEN FUEL TANK OPERATIONS, THE ENTIRE AREA AROUND THE AIRPLANE AND ANY ADJACENT AREAS THAT COULD COLLECT FUEL VAPORS ARE CLASSIFIED AS CLASS I DIVISION 1 HAZARDOUS LOCATIONS. THE HAZARDOUS LOCATION CLASSIFICATION APPLIES TO AIRPLANES BEFORE AND AFTER A FUEL TANK IS PURGED.

THE CLASS I DIVISION 1 HAZARDOUS LOCATION EXTENDS FROM THE GROUND UP TO 18 INCHES ABOVE THE GROUND. ONLY USE ELECTRICAL EQUIPMENT WHICH IS APPROVED FOR THE APPLICABLE HAZARDOUS LOCATION.

- (3) Electrical equipment which is energized or operated within 50 ft (15 m) horizontally and 18 in. (457 mm) or less above the ground of an open fuel tank, must be rated explosion-proof for Class I, Division 1 hazardous locations. This includes energized plugs and receptacles. For radio and radar equipment (transmitting equipment), see Table 203 for separation distance requirements.

SUBTASK 28-11-00-910-024

- (4) Figure 201 shows the different classification of hazardous locations around airplanes with open fuel tanks.

SUBTASK 28-11-00-910-025

- (5) Only use approved explosion-proof flashlight that operate correctly in the fuel tanks.

NOTE: The use of explosion-proof lights in or near an open fuel tank is permitted only by approved persons. The air in the fuel tank must be 10 percent or less of the lower explosive limit (LEL).

SUBTASK 28-11-00-910-026

- (6) Only use explosion-proof flood extension lights and power cords which are approved to supply external light.

SUBTASK 28-11-00-910-027

- (7) Do not connect or disconnect electrical equipment from energized outlets (within 100 ft (30 m) of an open fuel tank) unless the equipment is fitted with explosion-proof plugs.

SUBTASK 28-11-00-910-028

- (8) Do not use electrical test equipment which can cause sparks in a fuel tank.

H. Purging and Fuel Tank Entry - Equipment Precautions

SUBTASK 28-11-00-910-029

- (1) All metal work platforms or stands used for entry into the fuel tanks or located within a 50 ft (15 m) radius of an open fuel tank (before and after the fuel tank purging) must be bonded to the airplane and grounded to an approved earth ground.

SUBTASK 28-11-00-910-030

- (2) Before you use ventilation equipment, make sure the blower or venturi is connected to the airplane ground. The ventilation blower or the venturi must be explosion-proof.

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SUBTASK 28-11-00-910-031

- (3) Air ducts must be bonded to form a continuous electrical conductor, and grounded in at least one place to a static electrical ground.

SUBTASK 28-11-00-910-032

- (4) If you use the ventilation equipment to exhaust fuel vapors from the tank, static build-up on or in the air ducts can reach a level where a spark can ignite the vapors and an explosion can occur. It is strongly recommended that the air ducts be coated inside and out with a conductive coating. Each section of the air duct must be correctly bonded to each other. Air ducts made from vinyl fabric are not recommended because vinyl is an insulator of static charges. If the air duct uses a metal helical wire to create a non-collapsible duct, make sure the wire is permanently attached to a metal or conductive plastic connection on each end of the duct section.

SUBTASK 28-11-00-910-033

- (5) Equipment used to ventilate the fuel tanks or provide warm or cool air must not be turned off with the air duct in the fuel tank. The fuel vapor from the fuel tank can enter the air duct and cause an explosion at the motor. Make sure the blower is on before you put the air duct in the fuel tank. Make sure the blower remains on until the air duct is removed from the fuel tank.

SUBTASK 28-11-00-910-034

- (6) When you remove an air duct from the fuel tank or disconnect the air duct at the blower, turn the duct 180 degrees away from the purging area. This will stop the flow of fuel vapor into the air duct line.

SUBTASK 28-11-00-910-035

- (7) During fuel tank maintenance, make sure there is continuous mechanical ventilation. The fresh air flow from the ventilation equipment must maintain the oxygen levels between 19.5% and 23.5% by volume and the fuel vapor levels below 10% LEL (fire safe limit).

SUBTASK 28-11-00-910-036

- (8) Use a combustible gas indicator to monitor the environment inside the fuel tank. The indicator must be designed for Class I, Division 1 hazardous locations and calibrated for the correct type of jet fuel. The indicator must be securely attached to a ladder or stand at the fuel tank entry location. As an alternate procedure, you can take an additional combustible gas indicator into the fuel tank to monitor the environment where you will do the maintenance.

SUBTASK 28-11-00-910-037

- (9) Obey these precautions for equipment used to do maintenance in the fuel tanks:
 - (a) Always use a checklist to record all equipment, tooling, and material that you bring into the fuel tank. Use the checklist to make sure that all maintenance items are removed before you close the fuel tank.
 - (b) Do not use steel wool in the fuel tank. A piece of wire from steel wool is a potential ignition source.
 - (c) Only use approved non-static plastic containers with rounded corners to hold tools and supplies.
 - (d) Keep all sharp edged tools in the container at all times when not in use. Sharp edged tools can cause damage to equipment and sealant.
 - (e) Only use a cotton wiper, G00034 in open fuel tanks. When you wipe up fuel in the fuel tank, use a clean cotton wiper, G00034.

NOTE: Do not use paper towels or other paper products.

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- (f) Solvents, sealants, or other materials used in the fuel tank can be a health and fire hazard. Use the correct protective equipment for the solvent or material that is used. Protective equipment includes: respirators, eye protection, protective clothes, gloves etc.
- (g) Keep the quantity of solvents that you use to a minimum. Only bring enough solvent in the tank to complete the maintenance. Apply the solvent to a clean cotton wiper, G00034, not the airplane structure or sealant. After you finish with the cotton wiper, G00034, put it in a polyethylene bag or remove the cotton wiper, G00034 from the airplane. This will keep the solvent vapor to a minimum.
- (h) Powered tools must be air-driven.

WARNING: ONLY USE SHOP AIR OR BOTTLED AIR AS THE SOURCE OF GAS TO POWER AIR DRIVEN EQUIPMENT. GASES OTHER THAN SHOP OR BOTTLED AIR CAN REMOVE OXYGEN FROM A CLOSED AREA. IF YOU GO INTO A CLOSED AREA WITHOUT ENOUGH OXYGEN , YOU CAN BECOME UNCONSCIOUS OR IT CAN KILL YOU.

- (i) Only use shop air or bottled air as a gas source for air-driven tools. Do not use nitrogen, oxygen, carbon dioxide (CO₂) or any other non-air source of gas.

I. Purging and Fuel Tank Entry - Personnel Precautions

(Figure 202)

SUBTASK 28-11-00-910-038

- (1) Make sure the persons who will go into fuel tanks are approved persons for fuel tank entry.

SUBTASK 28-11-00-910-039

- (2) Make sure observers who will watch persons in the fuel tank(s) are approved as fuel tank entry observers.

SUBTASK 28-11-00-910-040

- (3) The fuel vapors in and from the fuel tank are explosive and hazardous to your health. The fuel tanks must be in a fire-safe condition when an initial fuel tank entry is made. You must wear an approved respirator with a breathing-air supply when you go into a fuel tank that is in a fire-safe condition. It is necessary to have a good flow of air through the fuel tank to get a fire-safe condition. The air must flow continuously during the fuel tank entry procedure.

SUBTASK 28-11-00-910-041

- (4) The fuel tank must be in a health-safe condition before you can go into the fuel tank without a breathing-air supply. When the fuel tank is in a health-safe condition, at a minimum, it is recommended that a half-mask respirator with an organic vapor filter be used. It is necessary to have a good flow of air through the fuel tank to get a health-safe condition. The air must flow continuously during the fuel tank entry procedure.

HAP 047-053, 106-999

SUBTASK 28-11-00-910-088

WARNING: DO NOT BREATHE THE AIR FROM THE FUEL TANK UNTIL YOU MAKE IT SAFE. THE NITROGEN GENERATION SYSTEM DECREASES THE OXYGEN IN THE AIR. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR. DANGEROUS HEALTH CONDITIONS INCLUDE NAUSEA, UNCONSCIOUSNESS, AND CONVULSIONS. IF THE OXYGEN LEVEL OF THE AIR THAT YOU BREATHE IS VERY LOW, IT CAN KILL YOU.

- (5) The nitrogen generation system decreases the oxygen content of the center fuel tank. Obey these precautions before you breathe the air inside a fuel tank:

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HAP 047-053, 106-999 (Continued)

- (a) The nitrogen generation system uses nitrogen-enriched air (NEA) to decrease the flammability of the center wing tank. NEA is a hazard in a confined space. NEA increases the nitrogen content and decreases the oxygen. If you breathe air without enough oxygen, it can have serious and immediate effects.
- (b) Table 204 shows the physiological effects of a low oxygen content environment

Table 204/28-11-00-993-854 Physiological Effects of a Low Oxygen Environment

	Sea Level Oxygen Content %	7000 FT Oxygen Content %
Decrease in night vision Increase in breathing volume Increase in heartbeat rate (pulse)	17 -19%	19.5 - 21%
Increase in breathing and pulse rates Decrease in muscular coordination	13 -16%	16 - 19%
Emotional upset Unusual fatigue Trouble breathing	11 -12%	13 - 15%
Nausea, vomiting Unable to do tasks Loss of consciousness	7 - 10%	9 - 12%
Intermittent breathing Unable to move Convulsions Death in minutes	0 - 6%	0 - 8%

- (c) If a person breathes air with a very low oxygen content, 4 to 6%, it can cause the person to become unconscious in 40 seconds. The person must be rescued and given oxygen immediately. Even after the person is given oxygen, critical health problems can still occur.
- (d) The low oxygen content air will remain in the fuel tank even when the nitrogen generation system is not active. The nitrogen-enriched air (NEA) is designed to flow into the center wing tank only. The flow path of the NEA is from vent channels in the center wing tank to the surge tanks. From the surge tanks, the NEA is vented overboard. An oxygen level, below health-safe limits, can exist in the fuel tank. You must always fully ventilate the fuel tank before you do a fuel tank entry. Mechanical ventilation will remove the NEA from the fuel tank and supply air with an oxygen content within health-safe limits.
- (e) A person that breathes air with a low oxygen content cannot sense that the oxygen level is too low. You must use an oxygen sensor to detect a hazardous low oxygen environment. Do not go into a fuel tank if you hear the aural alarm for the oxygen sensor.
- (f) Fully ventilate the applicable fuel tank before you do a fuel tank entry.
- (g) Before you go into a fuel tank, open and collar the nitrogen generation system circuit breakers. You must also install the manual lock bolt into the NGS shutoff valve in the closed position.

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HAP 047-053, 106-999 (Continued)

- (h) Continuously monitor the oxygen sensor (aural alarm and % oxygen) on the combustible gas indicator. Make sure the oxygen level in the fuel tank remains between 19.5% and 23.5% by volume. Make sure there is an oxygen sensor at the fuel tank entry location for the observer, and one oxygen sensor at the location of the person(s) inside the fuel tank. Get out of the fuel tank immediately if the ventilation equipment stops or you hear the oxygen sensor alarm.
- (i) An organic vapor filter respirator is helpful for fuel vapor, but will not help you breathe in a low oxygen environment.
- (j) If you are the observer and the person in the tank does not respond, do not enter the tank before additional help is available. Make sure that medical help is alerted. Do not try to rescue a person in the fuel tank without a breathing-air supply respirator and a lifeline.

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SUBTASK 28-11-00-910-042

- (6) Hydrocarbon fuels that touch the skin can remove protective oils. Without protective oils, the skin can become dry, chapped, cracked, or possibly become infected. If a person breathes too much fuel vapor, the person can become dizzy, get a headache or lose his or her coordination. Jet fuel is composed of many different kinds of hydrocarbon molecules. Exposure to some of these molecules for a long time is known to cause cancer.

SUBTASK 28-11-00-910-043

- (7) Vapors from fuel or other materials (solvents etc.) used for fuel tank maintenance can replace oxygen from a confined area such as a fuel tank or dry bay. If a person goes into a confined area that contains fuel vapor (or other vapors) without an air supply, the person may not get enough oxygen. This may cause unconsciousness or death. Make sure the environment is continuously monitored with a approved combustible gas indicator.

SUBTASK 28-11-00-910-044

- (8) No one is permitted to go into or remain in a fuel tank if:
 - (a) the flammable vapor concentration is more than 10% of the lower explosive limit
 - (b) the oxygen content of the fuel tank is below 19.5% or above 23.5%
 - (c) the air ventilation system fails
 - (d) a strong fuel odor is noticed
 - (e) a person feels any physical problems, such as trouble breathing, dizziness, irritation, confusion, light-headedness, fullness in the head, ringing sensation on the ears, nausea, headache, difficulty in breathing, sensation of apparent suffocation, immobility, unusual behavior, failure to respond to communication, or other signs of illness.
 - (f) there is an observed or reported hazard which may reduce the level of safety.

SUBTASK 28-11-00-910-045

- (9) Persons who work in or near an open fuel tank must not
 - (a) Slide metal objects, such as tool boxes, ladders, etc.
 - (b) Carry matches or pocket warmers.
 - (c) Wear shoes with metal clips or exposed nails.
 - (d) Wear or use battery-operated devices such as hearing aids, electrical pacemakers or watches, pocket radios, cellular phones or paging equipment unless it is explosion-proof and permitted by approved persons.

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- (e) Use the tank wiring harnesses as handholds.

SUBTASK 28-11-00-910-046

- (10) Persons who work in an open fuel tank must wear approved fuel tank protective clothing. Protective clothing includes:
 - (a) Cotton coveralls with non-sparking zippers or buttons. Do not wear wool, silk, nylon or other synthetic clothing.

WARNING: MAKE SURE THAT THE TEMPERATURE IN THE FUEL TANK DOES NOT GET TOO HOT. SARANEX 23P COVERALLS WILL KEEP BODY HEAT IN. IF THE FUEL TANK TEMPERATURE GETS TOO HOT, PERSONNEL CAN BECOME TOO HOT.

- (b) Saranex coveralls are also approved for use in fuel tanks.
- (c) Clean cotton boot socks or fuel cell boots.

NOTE: It is recommended that boot socks be worn over fuel cell boots when you stand in a fuel tank. This will reduce the chance that you will slip and fall down.

- (d) Clean cotton head cover (doctor-type hats) with tie strings or a lint free shower-type cap with an attached elastic headband.
- (e) Cotton or rubber gloves.

SUBTASK 28-11-00-100-006

- (11) If a fuel tank entry is necessary before two flights after a biocide treatment, do one of these:
 - (a) Flush the fuel tank with untreated fuel a minimum of two times (PAGEBLOCK 12-11-01/301, PAGEBLOCK 28-26-00/201).

NOTE: After a biocide treatment, the concentration of biocide decreases to a lower level after the fuel tank is refueled two times.

- (b) Or, move the treated fuel to a different fuel tank or defuel the applicable fuel tank (PAGEBLOCK 28-26-00/201).

WARNING: DO NOT GET THIS MATERIAL IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THIS MATERIAL. PUT ON A RESPIRATOR, EYE PROTECTION (GOGGLES, OR OTHER APPROVED PROTECTION) AND GLOVES WHEN YOU USE THIS MATERIAL. MAKE SURE THAT THERE IS SUFFICIENT AIRFLOW. KEEP THIS MATERIAL AWAY FROM SPARKS, FLAME, AND HEAT. THIS MATERIAL CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- 1) Before fuel tank entry, put on this specific equipment: a full face respirator, STD-7380, coverall (approved cotton substitute), STD-1129, and gloves, STD-7374.

NOTE: The biocide manufacturers Material Safety Data Sheet (MSDS) has information regarding the handling of the product. However, the MSDS is intended for the product before it is diluted in fuel. Once diluted, the concentration is greatly reduced.

SUBTASK 28-11-00-910-047

- (12) Persons who work in or near an open fuel tank must not remove or change clothes near an open fuel tank. You can create sufficient static electricity in the clothes to cause fuel vapor to ignite.

SUBTASK 28-11-00-910-048

- (13) Persons who work in fuel tanks must wear the correct respiratory protection for the fuel tank conditions.

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- (a) Persons that use respiratory protection must be trained and know the correct use and limitations of respiratory protection.
- (b) An approved respirator with an attached breathing-air supply is necessary for each person who goes into a fuel tank that is in a fire-safe condition.
- (c) An approved half-mask respirator with a organic vapor filter, at a minimum, is recommended for each person who goes into a fuel tank that is in a health-safe condition.
- (d) Airline Hoods (or equivalent) should be worn by persons if the respirator does not fit correctly due to facial hair or other facial configurations.

SUBTASK 28-11-00-910-049

- (14) At each fuel tank entry location there must be an observer who is outside of the fuel tank. The observer's responsibility is to make sure that person(s) in the fuel tank are safe. The observer must remain outside of the fuel tank in visual contact with the access opening. The observer must be able to communicate with the person(s) inside the fuel tank at all times.
 - (a) There are two ways the observer and the person(s) in the fuel tank can communicate:
 - 1) A confined space communication system designed for aircraft fuel tank use.
 - 2) The observer and the person who will go into the tank can agree on a communication plan such as tugs on the safety rope at a set time interval.

SUBTASK 28-11-00-910-050

- (15) The observer must also keep a report that shows who is in the fuel tank and when that person comes out. A sign attached to the ladder or support equipment which states, "CAUTION - PERSONNEL INSIDE - MOVE NO EQUIPMENT", must be placed at the location of a fuel tank entry. When the personnel in the tank come out, the observer should remove the sign or place it where it does not show.

SUBTASK 28-11-00-910-051

- (16) Many local, state and national regulatory agencies require a confined space entry permit to be signed and approved before a person goes into a fuel tank. A pre-entry checklist is often required by the confined space entry permit. It is recommended that a pre-entry checklist be used before you go into a fuel tank. Figure 206 is an example of a pre-entry checklist used at Boeing facilities.

J. Purging and Fuel Tank Entry - Adverse Weather Conditions

SUBTASK 28-11-00-910-052

- (1) When thunderstorms or lightning are within a 10 mile radius of the immediate area, open fuel tank maintenance procedures should stop. Persons inside of the fuel tanks should get out. Air ducts inside the fuel tanks should be removed and the power for all support equipment should be switched off. The fuel tank access openings must be closed.

SUBTASK 28-11-00-910-053

- (2) Strong wind conditions can cause a build-up of static electricity. Large charges of static electricity can develop on support equipment while parked as a result of the movement of dust particles and air currents during strong wind conditions. Strong wind conditions can also cause the unwanted movement of items or equipment which can hit the airplane or injure persons. Wind gusts can damage the airplane structure. Fueling, defueling or open fuel tank maintenance procedures should stop if strong wind conditions are present.

————— END OF TASK —————

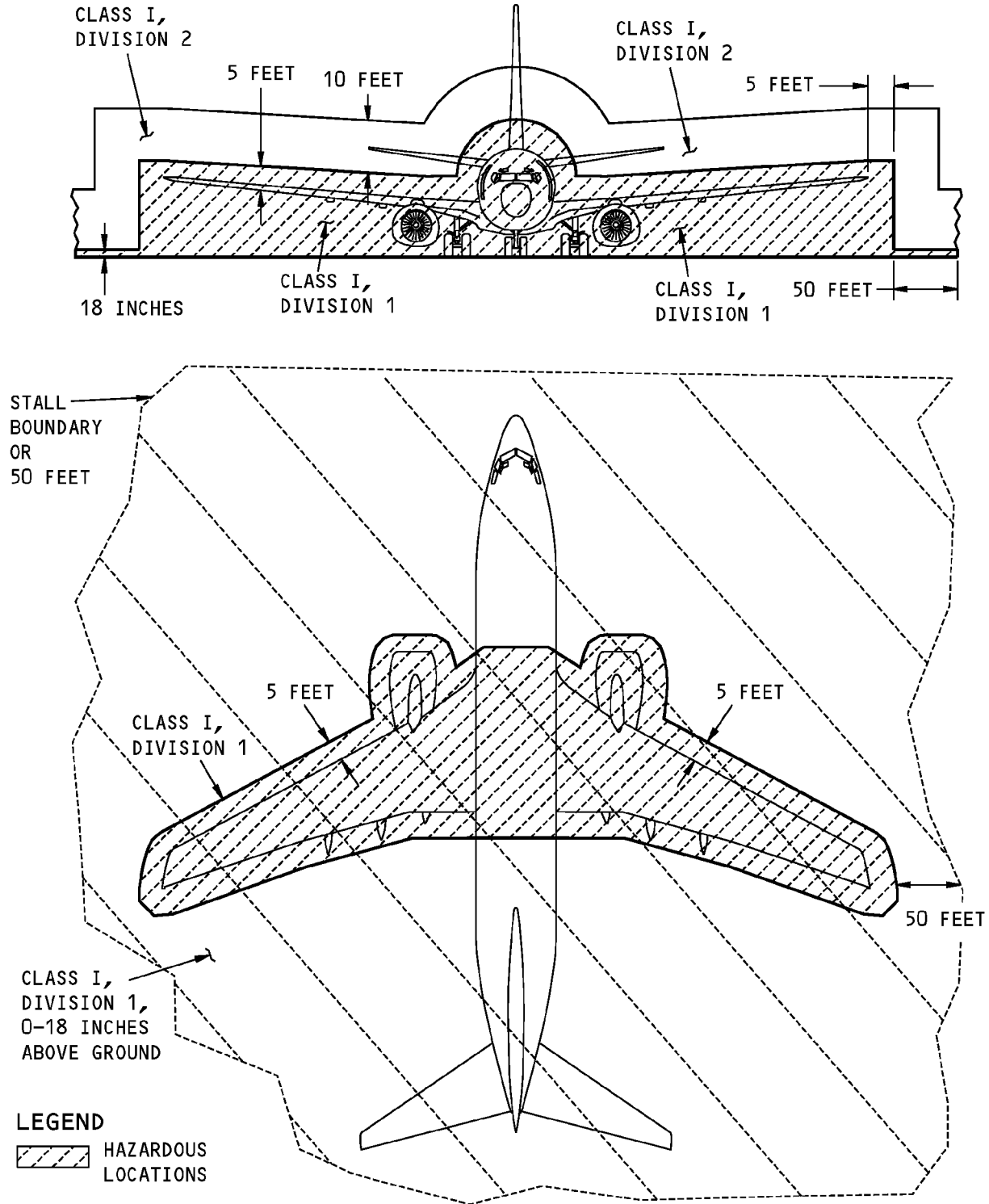
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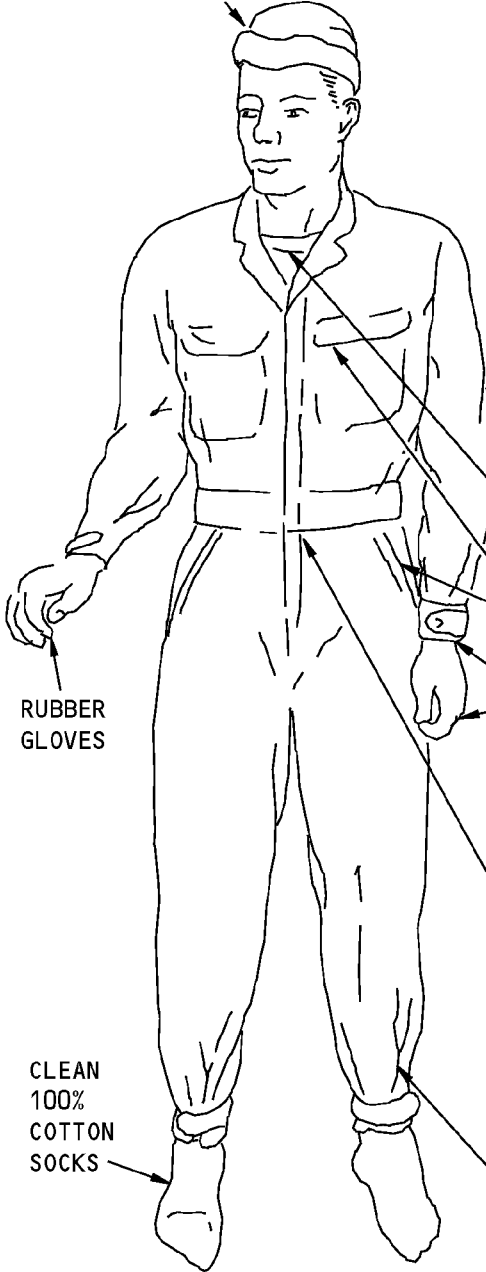
Hazardous Locations - Open Fuel Tank(s)
Figure 201/28-11-00-990-850

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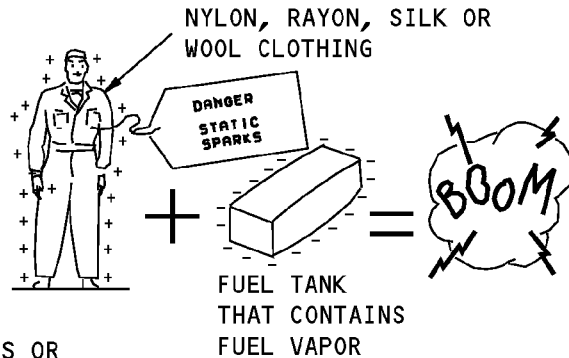
CLEAN 100% COTTON CAP
(WITHOUT VISOR)



DO NOT PUT SHARP TOOLS IN THE FUEL TANK

USE APPLICABLE BOX FOR TOOL PARTS WHILE IN THE FUEL TANKS. USE FLUID RESISTIVE AND STATIC SAFE TOOLS AND CONTAINERS

- WEAR ONLY 100% COTTON CLOTHING
- WEAR ONLY COTTON SHORTS AND COTTON TEE SHIRTS WITHOUT POCKETS UNDER COVERALLS
- NO POCKETS (IF THERE ARE POCKETS, REMOVE ALL CONTENTS FROM POCKETS AND SEW CLOSED)
- REMOVE ALL RINGS AND WATCHES



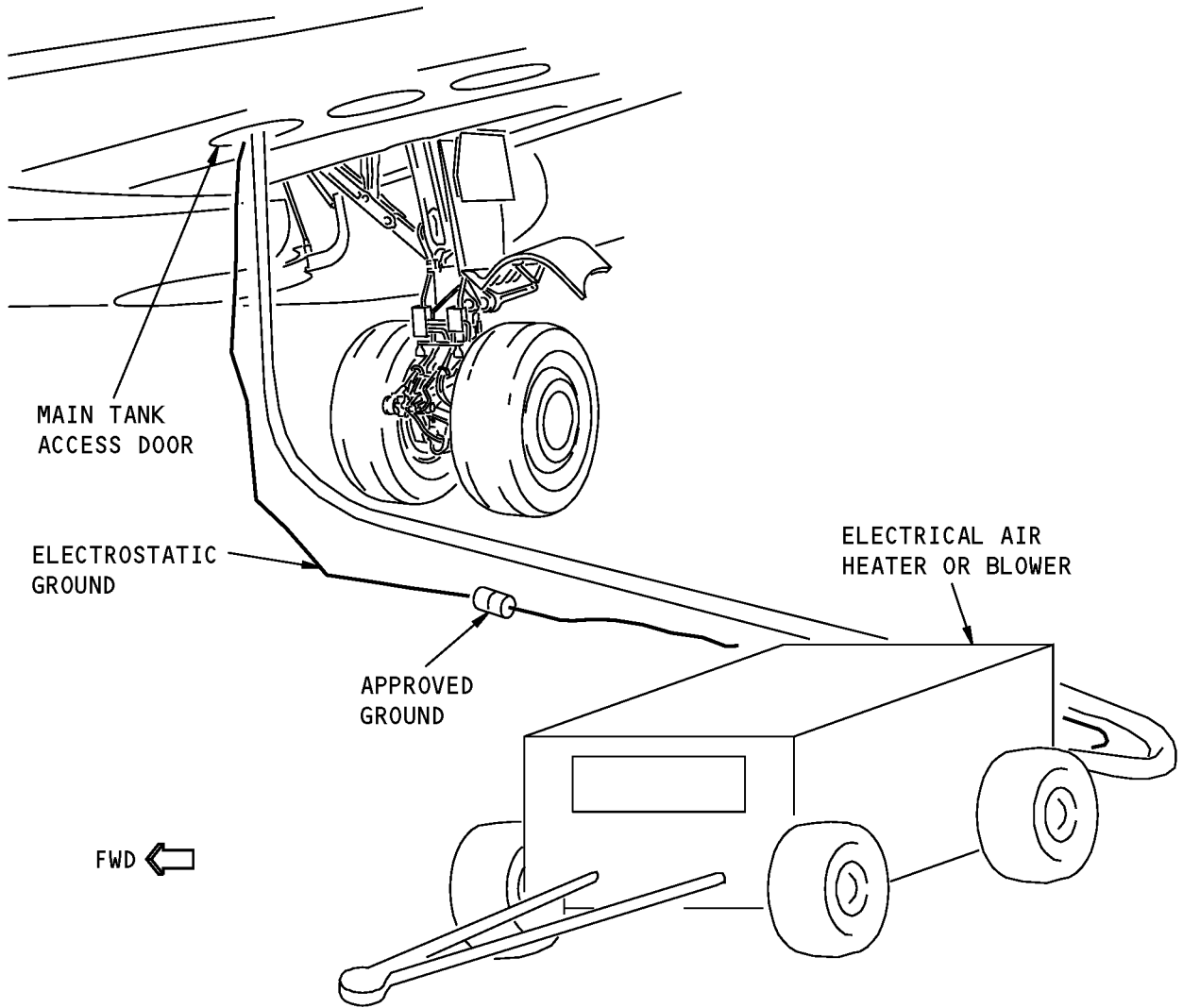
NO BUTTONS OR ZIPPERS SHOWN

WARNING: DO NOT WEAR WOOL, SILK, OR NYLON CLOTHING. WEAR A 100% COTTON COVERALL, FITTED SNUGLY AT WRIST AND ANKLES, WITH NON-SPARKING ZIPPER OR BUTTONS. WOOL, SILK OR NYLON CLOTHING CAN RELEASE STATIC ELECTRICITY AND CAUSE AN EXPLOSION.

Fuel Tank Entry Precautions
Figure 202/28-11-00-990-851

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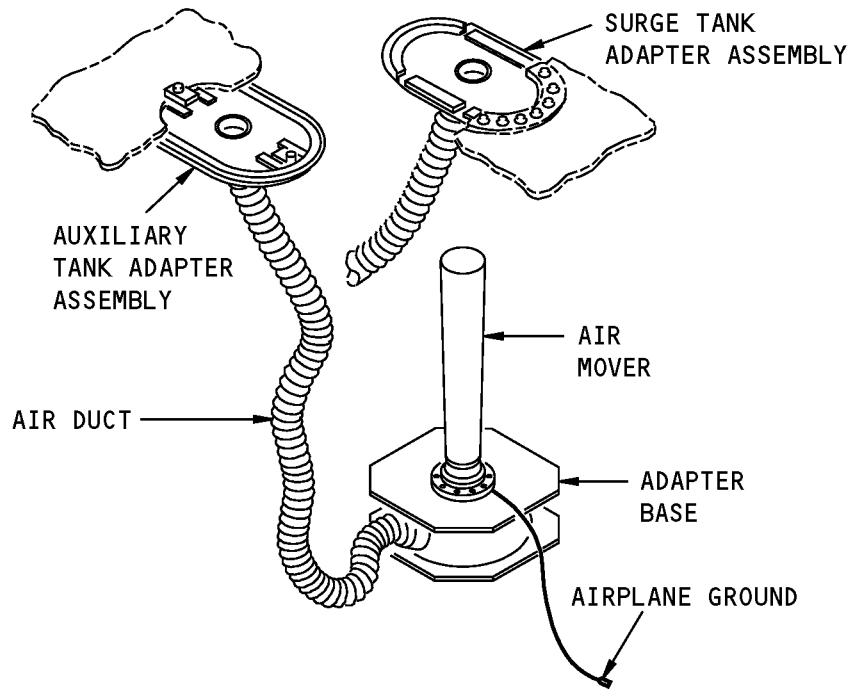
**Tank Ventilation Equipment
Figure 203 (Sheet 1 of 5)/28-11-00-990-803**

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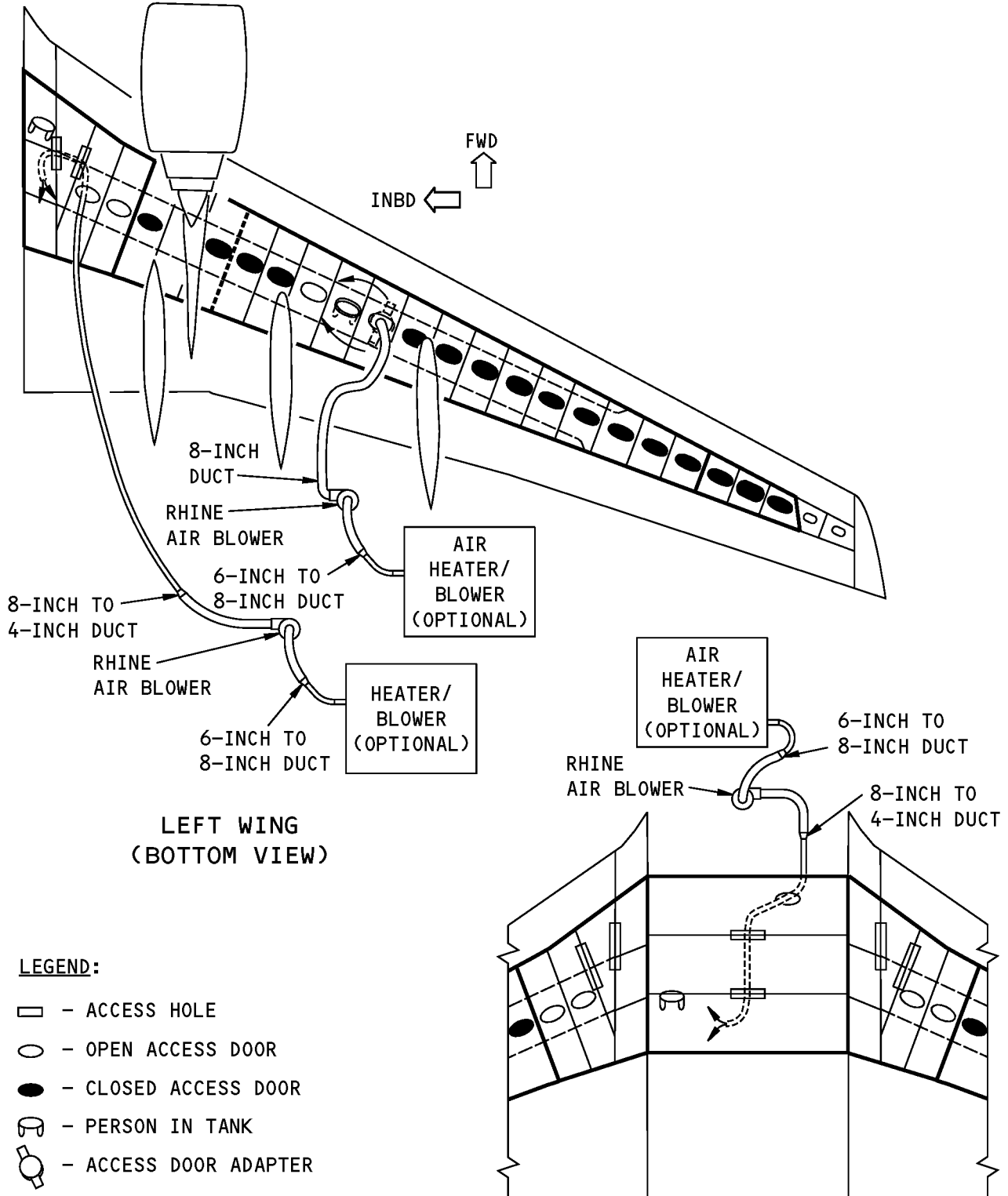
**Tank Ventilation Equipment
Figure 203 (Sheet 2 of 5)/28-11-00-990-803**

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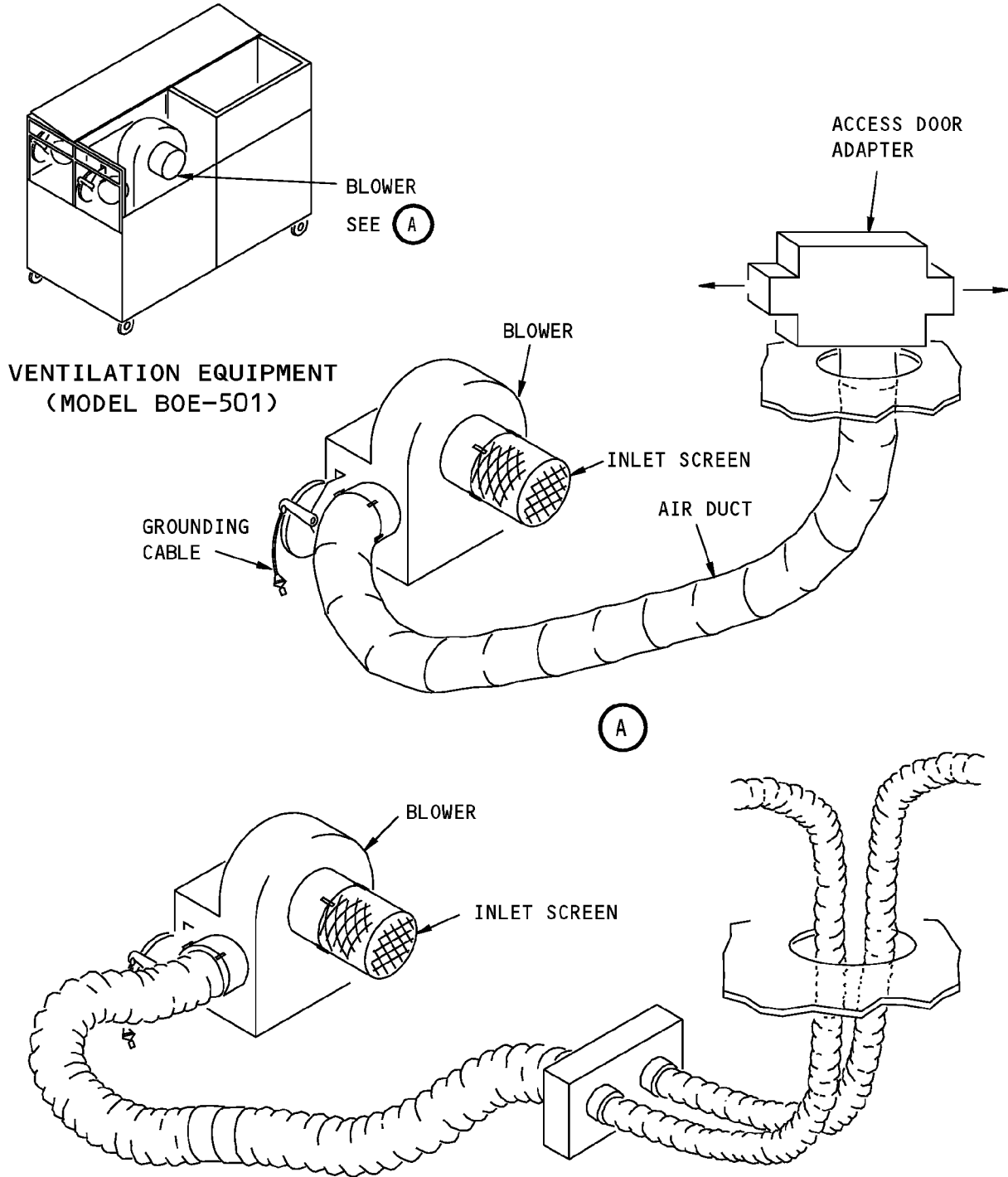
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Tank Ventilation Equipment
Figure 203 (Sheet 3 of 5)/28-11-00-990-803

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**EXAMPLE CONFIGURATION FOR
VENTILATION EQUIPMENT (MODEL BOE-501)**

**Tank Ventilation Equipment
Figure 203 (Sheet 4 of 5)/28-11-00-990-803**

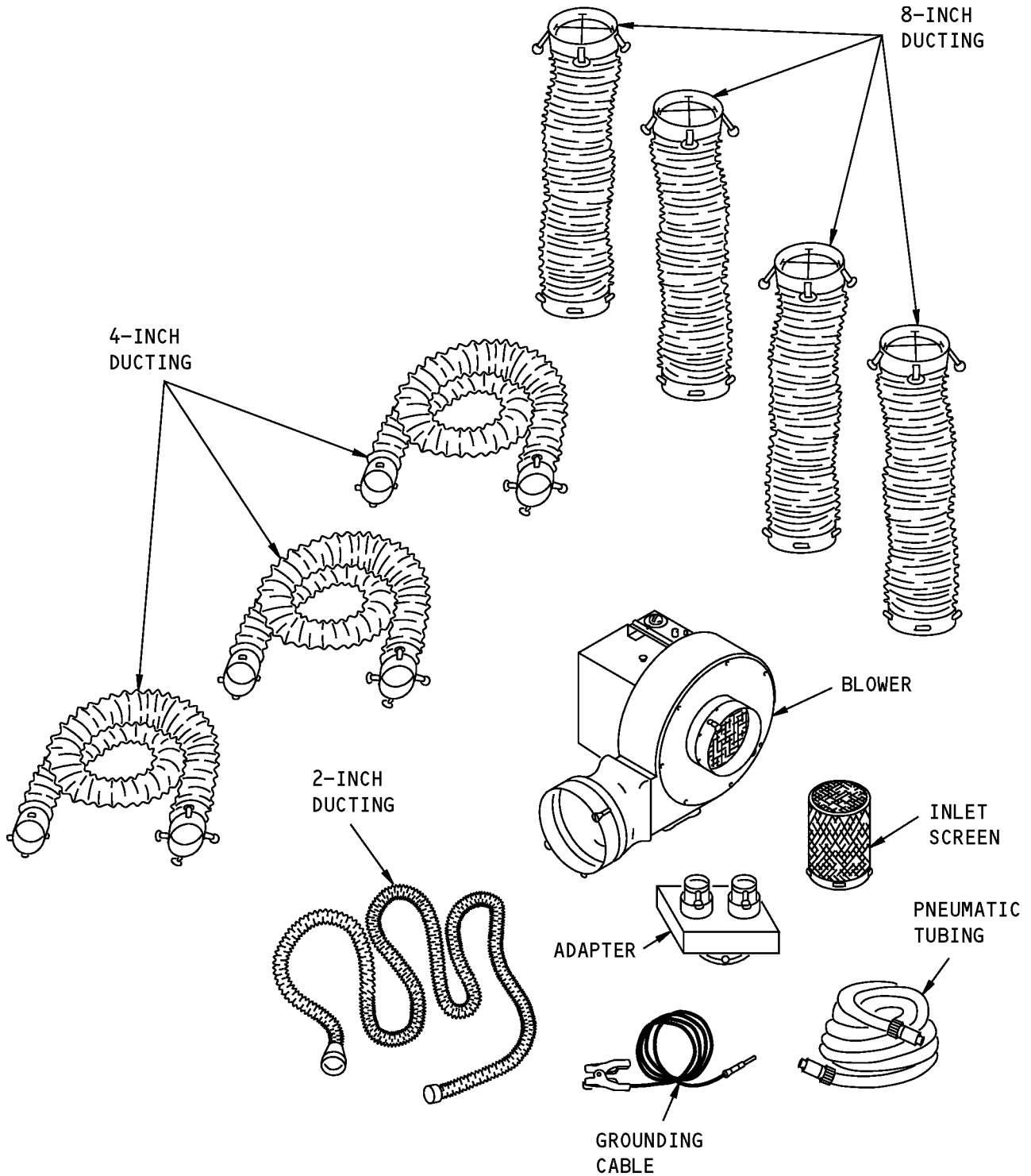
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AVAILABLE VENTILATION EQUIPMENT

Tank Ventilation Equipment
Figure 203 (Sheet 5 of 5)/28-11-00-990-803

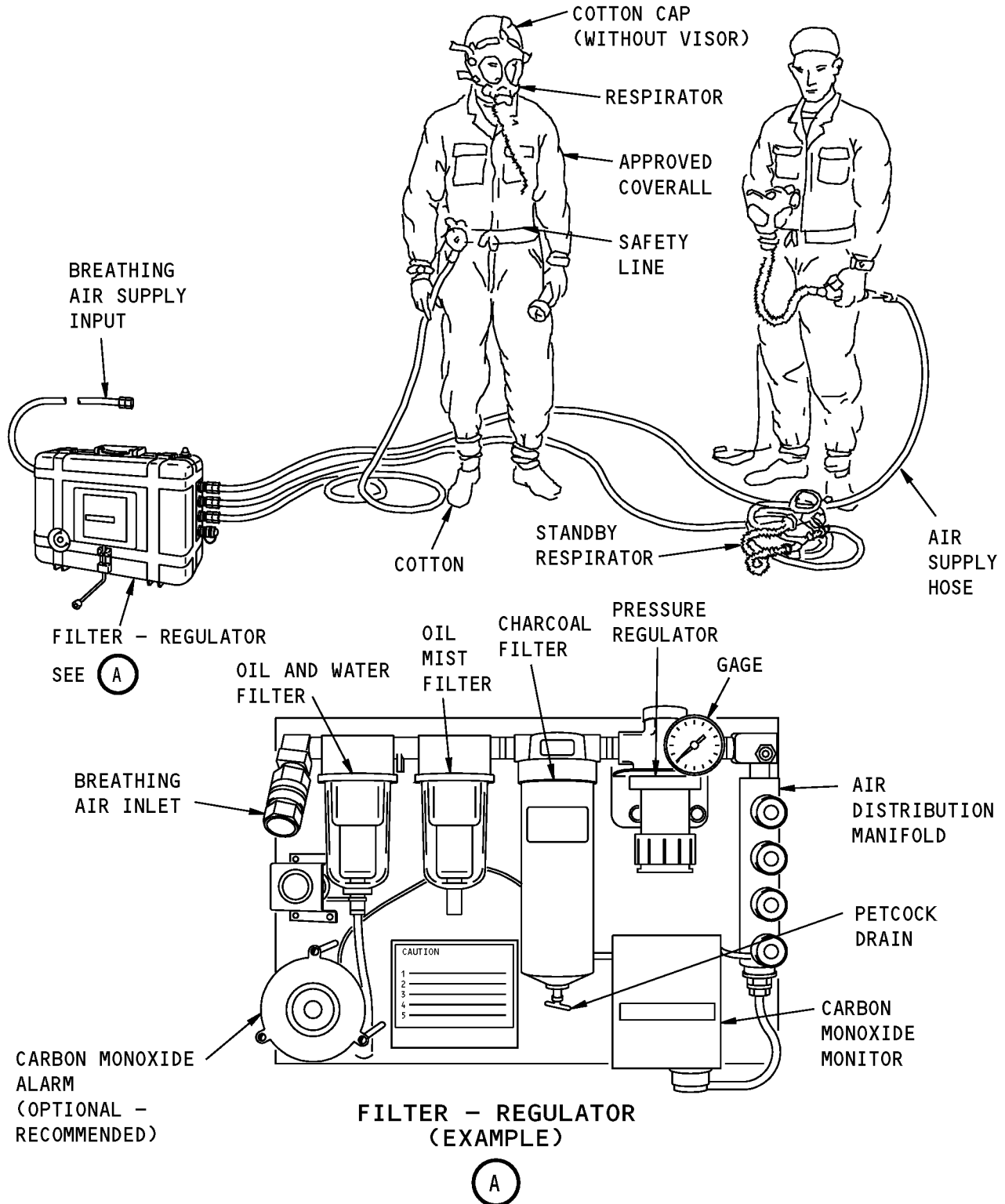
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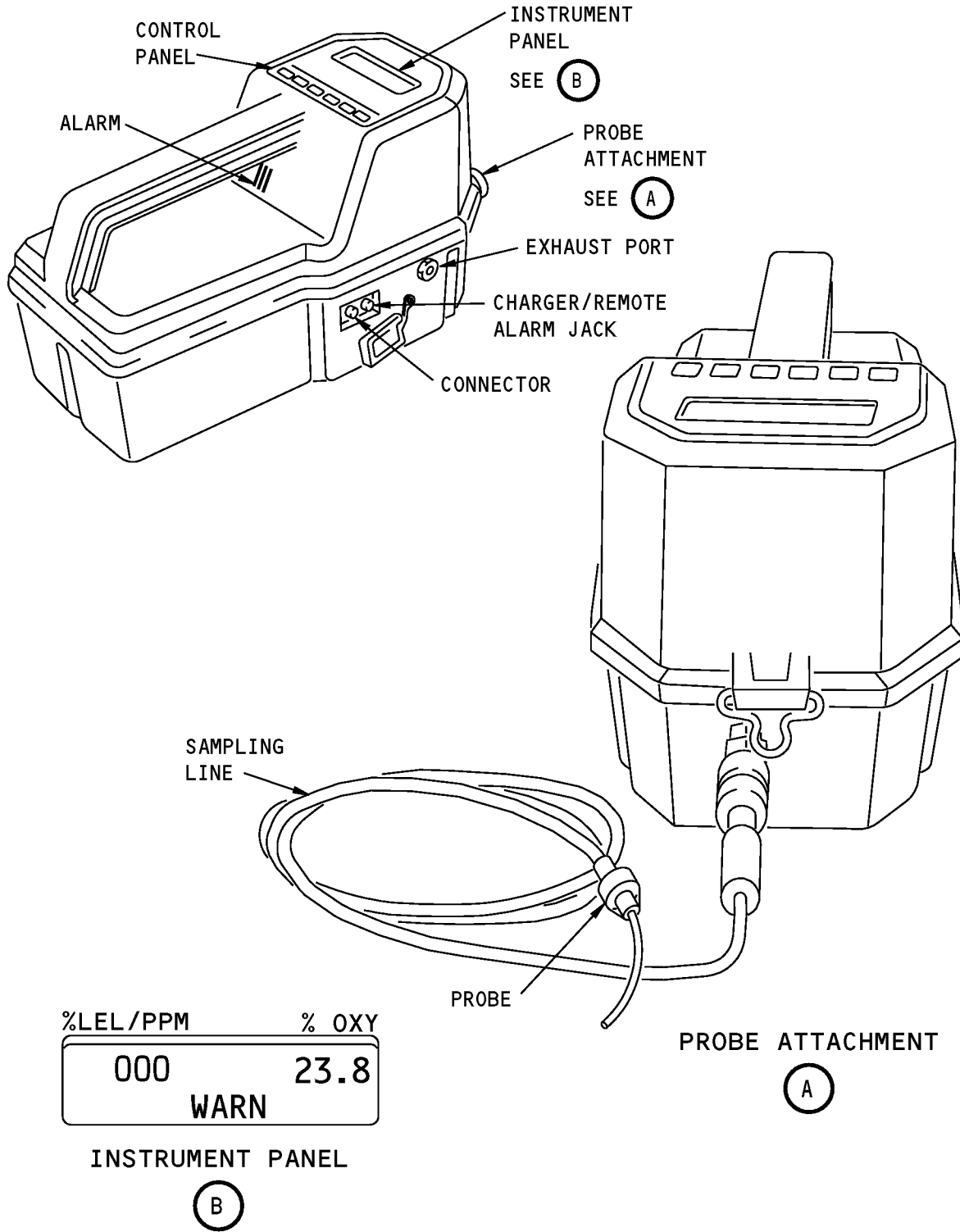


Respiratory Equipment and Clothing (Example)
Figure 204/28-11-00-990-804

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Combustible Gas Indicator (Example)
Figure 205/28-11-00-990-805

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EXAMPLE OF A WET FUEL CELL PRE-ENTRY CHECKLIST

This checklist must be completed prior to start of wet fuel cell entry and/or at shift change PRIOR to work assignment for the continuation of tank work started by a previous shift.

Wet Fuel Cell Entry Location

Area or Building: _____ Stall: _____ Airplane: _____ Tank: _____
Shift: _____ Date: _____ Supervisor: _____

- 1. Airplane and adjacent equipment properly grounded.
- 2. Area secured and warning signs positioned.
- 3. Boost pump switches off and circuit breakers pulled and placarded.
- 4. No power on airplane: battery disconnected, external Power Cord disconnected from airplane, and external power receptacle placarded.
- 5. Radio and radar equipment off (see separation distance requirements).
- 6. Only approved explosion proof equipment and tools will be used for fuel cell entry (lights, blowers, pressure and test equipment, etc.).
- 7. Ensure requirements listed on Aircraft Confined Space Entry Permit are complied with, including appropriate personal protective equipment: OSH class 110 respirator at a minimum, approved coveralls, caps and foot coverings, and eye protection.
- 8. Trained attendant and confined space logsheet required for all wet fuel cell entries.
- 9. Aerators checked for cleanliness prior to use.
- 10. Sponges available for residual fuel mop out.
- 11. All plugs used have streamers attached.
- 12. Mechanical ventilation (venturis or blowers) installed to ventilate all open fuel cells.
NOTE: Ventilation system must remain in operation at all times while fuel cells are open. If ventilation system fails or any ill effects such as dizziness, irritation, or excessive odors are noted, all work shall stop and fuel cells must be evacuated.
- 13. Shop personnel entering cells and standby observers have current "fuel cell entry" certification cards. Certification requires the following training:
 - Aircraft Confined Space Entry Safety
 - Respirator Use and Maintenance
 - Wet Fuel Cell Entry
- 14. Fire Department notified.

Meter Readings

- 15. Oxygen reading (%): _____ By: _____
- 16. Fuel vapor level reading (ppm): _____ By: _____
- 17. Combustible gas meter (LEL) reading: _____ By (FD): _____

I confirm that all entry requirements were met prior to any entry.

Signature of Supervisor or Designee

Date

Fuel Tank Pre-Entry Checklist (Example)
Figure 206/28-11-00-990-839

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TASK 28-11-00-910-802

3. Purging and Fuel Tank Entry

A. General

- (1) This task contains these procedures:
 - (a) Prepare the Airplane for Fuel Tank Purging
 - (b) Prepare the Equipment for Fuel Tank Purging
 - (c) Fuel Tank Purging
 - (d) Fuel Tank Entry
- (2) Make sure you read and obey the precautions in this task: Purging and Fuel Tank Entry Precautions, TASK 28-11-00-910-801.

B. References

Reference	Title
06-44-00-800-801	Finding an Access Door or Panel on the Wings (P/B 201)
12-11-00-650-804	Drain the Fuel from the Sumps after Defueling (P/B 301)
20-40-11-910-801	Static Grounding (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
24-31-11-000-802-002	Battery Removal (P/B 401)
27-51-00-040-801	Trailing Edge Flap System Deactivation (P/B 201)
27-81-00-040-801	Deactivate the Leading Edge Flaps and Slats (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-22-14-000-801	Emergency Fuel Shutoff Battery - Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
SPL-1778	Equipment - Ventilation, Fuel Tank (Part #: A28003-44, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: APV-1, Supplier: 58501, A/P Effectivity: 737-ALL) (Part #: APV-2, Supplier: 58501, A/P Effectivity: 737-ALL) (Part #: MAC-1, Supplier: 58501, A/P Effectivity: 737-ALL) (Part #: MAV-1C, Supplier: 58501, A/P Effectivity: 737-ALL) (Opt Part #: A28003-33, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Opt Part #: BOE-501, Supplier: 58501, A/P Effectivity: 737-ALL)
I SPL-10805	Protective Ring - Wing, Lower Panel Access Door (Optional GSE) (Part #: C28013-3, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

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D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
500	Left Wing
600	Right Wing

F. Access Panels

Number	Name/Location
531BB	Center Tank Access Door - Wing Station 192
532AZ	Main Tank Inner Access at Rib 6
532BZ	Main Tank Inner Access at Rib 6
631BB	Center Tank Access Door - Wing Station 192
632AZ	Main Tank Inner Access at Rib 6
632BZ	Main Tank Inner Access at Rib 6

G. Equipment

SUBTASK 28-11-00-910-068

- (1) Air Compressor-Explosion-proof, for use with the Lamb Air Mover (commercially available)

SUBTASK 28-11-00-910-069

- (2) Blower - Air Heater/Blower, Explosion-proof,
Coats Model GH75-2
CAM Industries Inc.,
Kent, Washington

SUBTASK 28-11-00-910-070

- (3) Combustible gas indicator - explosion-proof. Use one of these indicators or equivalent:
 - (a) Gastech GT series indicator
 - (b) Gastech 1314 Super Surveyor
 - (c) Gastech 1314 SMPN Super Surveyor
 Available from:
Gastech Inc.
8407 Central Avenue,
Newark, California, USA

SUBTASK 28-11-00-910-071

- (4) Confined Space Communication System - use one of these systems (or equivalent):
CSI-1000 or CSI-2000 Intrinsically Safe System
CON-SPACE COMMUNICATIONS INC.
P.O. BOX 1540

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1160 Yew Ave.

Blaine, Washington, USA

SUBTASK 28-11-00-910-072

- (5) Containers, plastic - Non-static material and rounded corners, used to hold tools or absorb fuel in the fuel tank

SUBTASK 28-11-00-910-073

- (6) Coveralls - use one of these approved coveralls:

- (a) Cotton (100%) clothing (Figure 202, Figure 204)

Aramark, Uniform Services

P. O. Box 3556

Seattle, Washington 98124

- (b) Saranex 23P, Film Laminated Tyvex Coverall

Grainger

District Sales Office,

6725 Todd Boulevard, Seattle, Washington, USA

98188-4771

SUBTASK 28-11-00-800-001

- (7) Boots - Neoprene, Part Number RB135 (or equivalent)

Safety and Supply Co.

Seattle, Washington, USA

Phone (206) 762-8500

SUBTASK 28-11-00-910-074

- (8) Fire Extinguisher - 150 pounds, portable, wheeled (commercially available). Use one of these types of fire extinguishers: 1) dry chemical, 2) carbon dioxide, 3) Halon

SUBTASK 28-11-00-910-075

- (9) Flashlight - Explosion-proof (commercially available)

SUBTASK 28-11-00-910-076

- (10) Light - Explosion-proof, Model EP-300 026 (or equivalent)

KH Industries

P.O. BOX 312

Angola, New York, USA

SUBTASK 28-11-00-910-077

- (11) Respiratory equipment (use the applicable equipment) (Figure 204):

- (a) Air Supply Hoses - commercially available

- (b) Breathing Air Supply - 125 psig maximum output

Compressed Gas Association Commodity Specification G-7.1-1966 Grade D

(or equivalent)

- (c) Regulator Unit - Biosystems Travelpanel 50 (or equivalent)

Biosystems Inc.

P. O. Box 158

Rock Fall, Connecticut, USA

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- (d) Respirator - Full Face, Supplied Air Type
North 85200 Series Full Facepiece continuous flow airline respirator (or equivalent)
- (e) Respirator - Half-Face, Organic Filter Type
North 7700 Series Half Mask,
North N7500-1 Organic Vapors Cartridge
(or equivalent)
- (f) Respirator - Airline Hood
North 85300 Series Disposable Airline Hood
(or equivalent)

SUBTASK 28-11-00-910-078

- (12) Thermometer, alcohol (commercially available)

SUBTASK 28-11-00-910-079

- (13) Ventilation Equipment - use one of these (or equivalent):

- (a) Ventilation System - Fuel Cell, (MAV-1C), fuel tank ventilation equipment, SPL-1778
Rhine Air Incorporated
Santee, California, USA 92071
Telephone: (619) 460-5928
- (b) Ventilation System - Fuel Cell - (BOE-501)
Rhine Air Incorporated
Santee, California, USA 92071
Telephone: (619) 460-5928
- (c) Lamb Air Mover - Venturi 3-inch diameter,
Mine Safety Appliances Company
Pittsburgh, Pennsylvania

SUBTASK 28-11-00-910-094

- (14) Door Assembly - Purging, Center Integral Wing Fuel Tank, Part Number F80145-4 (Optional)

H. Prepare the Airplane for Fuel Tank Purging

SUBTASK 28-11-00-940-027

- (1) Read and obey the tank entry precautions in this task: Purging and Fuel Tank Entry Precautions, TASK 28-11-00-910-801.

SUBTASK 28-11-00-650-018

- (2) Do this task: Fuel Tank Defueling, TASK 28-26-00-650-801.

SUBTASK 28-11-00-650-019

- (3) Drain the fuel tank sumps (TASK 12-11-00-650-804).

SUBTASK 28-11-00-940-028

- (4) Make sure the airplane is correctly grounded to an approved and identified ground (TASK 20-40-11-910-801).

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SUBTASK 28-11-00-480-011

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE TRAILING EDGE FLAP BEFORE YOU DO WORK ON THE FLAP SYSTEM. THE FLAPS MOVE QUICKLY. THEY CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(5) Do this task: Trailing Edge Flap System Deactivation, TASK 27-51-00-040-801.

SUBTASK 28-11-00-480-012

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE LEADING EDGE FLAPS. THE ACCIDENTAL MOVEMENT OF THE FLAPS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(6) Do this task: Deactivate the Leading Edge Flaps and Slats, TASK 27-81-00-040-801.

SUBTASK 28-11-00-480-013

WARNING: OBEY THE PROCEDURE FOR THE REMOVAL OF THE DOWNLOCK PINS. IF YOU MOVE THE CONTROL LEVER FOR THE LANDING GEAR TO THE UP POSITION, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(7) Make sure the downlocks are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-11-00-940-029

(8) Put ropes around the airplane to identify the hazardous location areas (Figure 201), and attach these signs with words you can see clearly written on both sides:

- (a) DANGER - OPEN FUEL TANKS - NO SMOKING
- (b) AUTHORIZED PERSONNEL ONLY

SUBTASK 28-11-00-860-006

(9) Make sure the fuel pump LOW PRESSURE lights on the overhead panel, P5, are OFF.

- (a) Attach DO-NOT-OPERATE tags to the fuel pump switches.

SUBTASK 28-11-00-860-007

(10) Open these circuit breakers and install safety tags:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 001-013, 015-026, 028-036			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

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HAP 001-013, 015-026, 028-036 (Continued)

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 001-013, 015-026, 028-036			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP ALL			

SUBTASK 28-11-00-860-008

(11) Open the applicable circuit breakers for the system on which you will do maintenance.

SUBTASK 28-11-00-940-030

(12) Look at the maintenance history of the airplane.

(a) Open the applicable circuit breakers for any system(s) that show a problem with wiring or electrical faults.

SUBTASK 28-11-00-860-009

(13) Remove the electrical power from the airplane before you remove the fuel tank access doors (TASK 24-22-00-860-812).

SUBTASK 28-11-00-940-031

WARNING: DO NOT USE AIRPLANE ELECTRICAL POWER WHEN FUEL TANK ACCESS DOORS ARE OPEN. SPARKS FROM ELECTRICAL EQUIPMENT CAN CAUSE IGNITION OF FUEL VAPOR AND CAUSE A FIRE OR EXPLOSION. A FIRE OR EXPLOSION CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(14) Do not supply electrical power again until you have completed this task: Fuel Tank Closure, TASK 28-11-00-410-801.

SUBTASK 28-11-00-860-010

(15) Disconnect these airplane batteries:

- (a) Main (TASK 24-31-11-000-802-002)
- (b) Fuel spar valve (TASK 28-22-14-000-801).

SUBTASK 28-11-00-940-032

(16) Attach this sign to each of the battery locations:

(a) OPEN FUEL TANKS - DO NOT CONNECT

SUBTASK 28-11-00-940-033

(17) Attach this sign to the external power receptacle:

(a) OPEN FUEL TANKS - DO NOT PUT POWER ON

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I. Prepare the Equipment for Fuel Tank Purging

SUBTASK 28-11-00-910-083

- (1) Read and obey the precautions in this task: Purging and Fuel Tank Entry Precautions, TASK 28-11-00-910-801.

SUBTASK 28-11-00-940-034

- (2) Make sure one of these portable fire extinguishers is available:
 - (a) one - 150 pound dry chemical wheeled extinguisher
 - (b) one - 150 pound CO2 wheeled extinguisher
 - (c) one - 150 pound Halon wheeled extinguisher

SUBTASK 28-11-00-940-035

- (3) Make sure the electrical equipment is approved and is appropriate for the hazardous location as shown in Figure 201.

SUBTASK 28-11-00-860-011

- (4) Make sure all radio or radar equipment is off and locked out if it is closer than the minimum separation distance permitted in Table 203.

SUBTASK 28-11-00-940-036

- (5) Do these steps to prepare metal support equipment such as work platforms/stands, ladders etc:

NOTE: These steps apply to all metal support equipment within a 50 ft (15 m) radius of an open fuel tank.

- (a) All support equipment must be in place before you begin the fuel purging procedure.
- (b) Bond the support equipment at an approved airplane bonding location.
- (c) Ground the support equipment to the same earth ground as the airplane.

SUBTASK 28-11-00-480-014

- (6) VENTURI TYPE VENTILATION EQUIPMENT; Do these steps to prepare the air ventilation equipment for purging:

- (a) Assemble these ventilation equipment components (Figure 203):

- 1) tank adapter assembly - (P/N A28003-34)
- 2) air mover assembly (P/N 28003-2)
- 3) air supply hose

- (b) Make sure each flexible air duct section is attached correctly and that each section is bonded correctly.

WARNING: MAKE SURE THAT THE AIR MOVER ASSEMBLY IS AWAY FROM THE AIRPLANE. POINT THE EXHAUST AIR FROM THE EXHAUST HORN OF THE AIR MOVER AWAY FROM THE AIRPLANE STRUCTURE. EXHAUST AIR FLOW ON THE AIRPLANE STRUCTURE CAUSES STATIC ELECTRICITY. STATIC ELECTRICITY CAN CAUSE THE IGNITION OF THE FUEL FUMES AND AN EXPLOSION. AN EXPLOSION WILL CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

- (c) Set-up the air mover assembly (P/N A28003-2) away from the airplane.
- (d) Ground the air mover assembly (A28003-2) to the airplane ground.
- (e) Put the portable air compressor a minimum of 100 ft (30 m) from the fuel tank that will be opened, unless the air compressor is explosion-proof.
- (f) Connect the air compressor to the air mover assembly (A28003-2) with the air hose.
- (g) Connect a power supply to the air compressor.

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SUBTASK 28-11-00-480-015

- (7) AIR BLOWER TYPE VENTILATION EQUIPMENT (BOE-501 OR EQUIVALENT); Do these steps to prepare the air ventilation equipment for purging (Figure 203):
- (a) Set-up the ventilation blower(s) in an area where the fuel tank entry will be made.
 - 1) Make sure the ventilation blower will be in an area free from fuel vapor when the access doors are open.
 - (b) Attach the static grounding cable on the ventilation blower(s) to an approved ground source.
 - (c) Do these steps to connect an air supply to the ventilation blower:
 - 1) If shop air is used, connect an air supply hose to the ventilation blower.
 - 2) If a portable air compressor is used, do these steps:
 - a) Put the air compressor a minimum of 100 ft (30 m) from the fuel tank that will be opened, unless the air compressor is explosion-proof.
 - b) Connect an air supply hose from the air compressor to the ventilation blower.
 - c) Connect the portable air compressor to a power source.
 - (d) Do these steps to connect the air ducts to the ventilation blower.
 - 1) Connect the 8 in. (203 mm) air duct to the ventilation blower outlet port.
 - 2) Connect enough air duct segments to get to the access door where you will do maintenance.
 - 3) Use the attached bonding connections to electrically bond each air duct segment.
 - (e) FOR MAIN TANK MAINTENANCE; Attach the access door adapter to the end of the air duct.
 - (f) FOR CENTER TANK MAINTENANCE; Do these steps to prepare the air ducts that will go inside the fuel tank:

NOTE: The air ducts will be positioned inside the fuel tank at the location where you will do the maintenance.

- 1) Attach an adapter/reducer to the end of the 8 in. (203 mm) air duct segments.
- 2) Attach the 4 in. (102 mm) air ducts.
- 3) Use the attached bonding connections to electrically bond each air duct segment.
- 4) Make sure you have enough segments to route the air ducts to the maintenance area.

SUBTASK 28-11-00-480-016

- (8) HEATER AIR/BLOWER EQUIPMENT; Do these steps to prepare the heater/air blower equipment for purging (if it is necessary):

NOTE: The use of a heater/air blower is for the comfort of persons in the fuel tank. It is not part of the air ventilation equipment which is used to remove hazardous fuel vapor during the fuel purging procedure.

- (a) Set-up the heater/air blower in the area where the fuel tank entry will be made.
 - 1) Make sure the heater/air blower will be in an area free from fuel vapor when the access doors are open.
- (b) Attach the static grounding cable on the heater/air blower(s) to an approved ground source.
- (c) Do these steps to connect an air supply to the blower:
 - 1) If shop air is used, connect an air supply hose to the heater/air blower.

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- 2) If a portable air compressor is used, do these steps:
 - a) Put the air compressor a minimum of 100 ft (30 m) from the fuel tank that will be opened, unless the air compressor is explosion-proof.
 - b) Connect an air supply hose from the air compressor to the heater/air blower.
 - c) Connect the portable air compressor to a power source.
- (d) Do these steps to connect the air ducts to the heater/air blower.
 - 1) Connect the air duct to the heater/air blower outlet port.
 - 2) Connect enough air duct segments to get to the maintenance area.
 - 3) Connect the air duct segments to the inlet port on the ventilation blower (if it is necessary for your ventilation system set-up).
 - 4) Use the attached bonding connections to electrically bond each air duct segment.
- (e) Connect a power supply to the heater/air blower.
- (f) FOR MAIN TANK MAINTENANCE; Attach the access door adapter to the end of the air duct.
- (g) FOR CENTER TANK MAINTENANCE; Do these steps to prepare the air ducts that will go inside the fuel tank:

NOTE: The air ducts will be positioned inside the fuel tank at the location where you will do the maintenance.

- 1) Attach an adapter/reducer to the end of the 8 in. (203 mm) air duct segments.
- 2) Attach the 4 in. (102 mm) air ducts.
- 3) Use the attached bonding connections to electrically bond each air duct segment.
- 4) Make sure you have enough segments to route the air ducts to the maintenance area.
- 5) Attach the access door adapter (F80145-4) to the end of the air duct (Optional).

NOTE: Do not use the air supply until the fuel vapor concentration (indicated by a combustible gas indicator) is less than 25% of the lower explosive limit.

SUBTASK 28-11-00-480-017

WARNING: MAKE SURE THE FLAMMABLE GAS INDICATOR IS EXPLOSION-PROOF (CLASS I, DIVISION 1 OR EQUIVALENT STANDARD) AND IS SATISFACTORY FOR USE IN A FUEL TANK. IF YOU USE A FLAMMABLE GAS INDICATOR THAT IS NOT FOR USE IN A FUEL TANK, AN EXPLOSION CAN OCCUR. AN EXPLOSION CAN CAUSE SERIOUS INJURY OR DEATH TO PERSONS AND DAMAGE TO EQUIPMENT.

- (9) Do these steps to prepare the combustible gas indicator (Figure 205):

NOTE: These steps are for the combustible gas indicators called out in the equipment section of this procedure. If you use a different combustible gas indicator, use the instruction manual supplied with the indicator.

- (a) Make sure the indicator is calibrated for each of these scales:

NOTE: Make sure the GASTECH GT-series combustible gas indicators are labeled for calibration with hexane gas, and that the ppm range in the channel set-up menu is set to 5000 ppm hexane.

- 1) Oxygen
- 2) Lower Explosive Limit (LEL)
- 3) Parts Per Million (PPM)

- (b) Make sure the calibration on the combustible scales are specific to hexane gas.

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- (c) Make sure the alarm values are set to these limits:
 - 1) 160 PPM
 - 2) 10% of the LEL
 - 3) 19.5% oxygen by volume.
- (d) Do these steps to make sure the combustible gas indicator operates correctly:
 - 1) Make sure the indicator, sampling line, and sampling probe (with dust filter) are clean and not damaged.
 - 2) Put the indicator switch to the ON position.
 - 3) Make sure there is enough charge on the battery for the scheduled time in the fuel tank.
 - 4) Let the indicator warm-up for 20 minutes before you look at the readings.
 - 5) Adjust the indicator to zero in clean air for these scales:
 - a) Oxygen
 - b) PPM
 - c) LEL
 - 6) If there is a negative value during the use of the indicator, adjust the indicator scale(s) to zero in clean air.

NOTE: Do not turn the indicator off before you adjust the scales.
- (e) Do these steps to check the alarms:
 - 1) To do a check of the oxygen alarm, blow across the probe until the alarm comes on (19.5%).
 - 2) To do a check of the PPM and LEL scales, hold the tip of the probe over a solvent bottle or some solvent on a cotton wiper, G00034 until the alarm comes on.
- (f) Put the combustible gas indicator on a stand or ladder next to the access door where you will enter the fuel tank.
 - 1) To prevent the accidental movement of the combustible gas indicator, safely attach the indicator to the stand or ladder.

J. Fuel Tank Purging

SUBTASK 28-11-00-910-084

- (1) Read and obey the precautions in this task: Purging and Fuel Tank Entry Precautions, TASK 28-11-00-910-801.

SUBTASK 28-11-00-480-018

- (2) VENTURI TYPE VENTILATION EQUIPMENT: Do these steps to install the air ventilation equipment (Figure 203):
 - (a) For the main fuel tanks, do these steps:
 - 1) Remove one or more main tank access doors to have a good flow of air through the fuel tank (TASK 28-11-11-400-801).
 - 2) Install a protective ring, SPL-10805, around the openings of the main tank access doors.
 - 3) Start the air supply connected to the air mover.
 - (b) For the surge tanks, do these steps:
 - 1) Remove the surge tank access doors (TASK 28-11-11-400-801).
 - 2) Install a protective ring, SPL-10805, around the openings of the surge tank access doors.

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- 3) Install the tank adapter assembly (A28003-34) to one of the surge tank access doors (Figure 203).
- 4) Start the air supply connected to the air mover.
- (c) For the center fuel tank, do these steps:
 - 1) Remove all of the center tank access doors (TASK 28-11-31-000-801).
 - 2) Install the air mover assembly (A28003-2) to one of these center tank access doors:

<u>Number</u>	<u>Name/Location</u>
531BB	Center Tank Access Door - Wing Station 192
631BB	Center Tank Access Door - Wing Station 192
 - 3) Start the air supply connected to the air mover.

SUBTASK 28-11-00-480-019

- (3) AIR BLOWER TYPE VENTILATION EQUIPMENT (BOE-501 OR EQUIVALENT); Do these steps to install the air ventilation equipment (Figure 204):

WARNING: DO NOT STOP OR START THE VENTILATION BLOWER WHILE THE AIR DUCT IS IN THE FUEL TANK. THE FUEL FUMES FROM THE FUEL TANK CAN CAUSE AN EXPLOSION AT THE BLOWER MOTOR. AN EXPLOSION CAN KILL PERSONNEL OR CAUSE INJURIES, AND DAMAGE TO EQUIPMENT.

- (a) Start the ventilation blower before you put the air duct in the fuel tank.
- (b) FOR THE SURGE TANK AND MAIN TANK OUTBOARD OF THE ENGINE; Do these steps:
 - 1) At the location where you will do maintenance, remove three adjacent access doors (TASK 28-11-11-000-801), (TASK 28-11-31-000-801).

NOTE: Usually the middle access door is the door where you will go into the fuel tank.
 - 2) Install a protective ring, SPL-10805, around the openings of the main tank and surge tank access doors.
 - 3) Install the access door adapter to the access door (the outboard access door is the preferred door).
 - 4) Bond the access door adapter to the airplane structure.
 - 5) Make sure there will be a flow of air into the area where you will do the maintenance.
- (c) FOR THE MAIN TANK INBOARD OF THE ENGINE; Do these steps:
 - 1) Remove the access door where you will do the maintenance (TASK 28-11-11-000-801).
 - 2) Install protective ring, SPL-10805, around the openings of the main tank access doors.
 - 3) Put the air duct inside the open access door.
 - 4) Use the pigtail on the end of the air duct to bond the duct to the airplane structure.
 - 5) Make sure there will be a flow of air into the area where you will do the maintenance.
- (d) FOR THE CENTER FUEL TANK: Do these steps:
 - 1) Remove all of the center tank access doors (TASK 28-11-31-000-801).
 - 2) Put the 4 in. (102 mm) air duct inside the open access door where you will do the maintenance.
 - 3) Use the pigtail on the end of the air duct to bond the air duct to the airplane structure.
 - 4) Make sure there will be a flow of air into the area where you will do the maintenance.

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SUBTASK 28-11-00-480-020

- (4) After the air supply has operated for approximately 30 minutes, put the sampling line of the combustible gas indicator (Figure 205) as far into the fuel tank as possible.

NOTE: It is recommended that you take the combustible gas indicator value regardless of the type of fuel that was contained in the fuel tank. If the fuel tank had contained kerosene only, then the combustible gas indicator should show zero. This shows that the tank atmosphere is in fire-safe and health-safe condition.

SUBTASK 28-11-00-480-021

- (5) Wait one minute for each foot of sampling line before you take a reading.

SUBTASK 28-11-00-480-022

- (6) Use Table 205 to convert the values on the combustible gas indicator to the actual levels.

NOTE: If you use a combustible gas indicator that is not listed below, follow the manufacturer's instructions to get the actual values.

Table 205/28-11-00-993-843

COMBUSTIBLE GAS INDICATOR	FOR PPM, MULTIPLY VALUE BY:	FOR LEL, MULTIPLY VALUE BY:
GASTECH 1314	2	3
GASTECH 1314SMPN	2	3
GASTECH GT SERIES	2	3

SUBTASK 28-11-00-480-023

WARNING: DO NOT USE A HEATER/AIR BLOWER UNTIL THE FUEL FUME CONCENTRATION IS 10% OR LESS OF THE LOWER EXPLOSIVE LIMIT. IF THE FUEL FUME CONCENTRATION IS NOT 10% OR LESS OF THE LOWER EXPLOSIVE LIMIT, IGNITION OF THE FUEL FUME COULD OCCUR.

- (7) When the combustible gas indicator shows the fuel vapor concentration is 10% or less of the lower explosive limit, you can put warm or cool air in the fuel tank through the tank access opening with an explosion-proof heater/air blower.

NOTE: The use of warm or cool air is for the comfort of persons in the fuel tank. It is not part of the purging procedure.

SUBTASK 28-11-00-480-024

WARNING: DO NOT STOP OR START THE HEATER/AIR BLOWER WHILE THE AIR DUCT IS IN THE FUEL TANK. THE FUEL FUMES FROM THE FUEL TANK COULD CAUSE AN EXPLOSION AT THE HEATER OR BLOWER MOTOR. A FIRE OR EXPLOSIONS CAN KILL OR CAUSE INJURIES TO PERSONNEL AND CAN CAUSE DAMAGE TO EQUIPMENT.

- (8) Start the heater/air blower before you put the air duct in the fuel tank.

SUBTASK 28-11-00-480-025

- (9) Put the air duct for the heater/air blower in the fuel tank through the tank access opening.

SUBTASK 28-11-00-480-026

- (10) Bond the air duct to the airplane structure.

SUBTASK 28-11-00-940-037

- (11) Continue to have a good flow of air through the fuel tank with the air mover until you prepare to close the fuel tank.

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- (a) Read the combustible gas indicator values every half hour or less.

SUBTASK 28-11-00-940-038

- (12) If fuel vapors get into the fuel tank that was in a fire-safe condition, get all persons out of the fuel tank until you make sure the air in the fuel tank is in a fire-safe condition again.

SUBTASK 28-11-00-940-039

- (13) Go into the fuel tank per the "Fuel Tank Entry" procedure to do maintenance.

K. Fuel Tank Entry

SUBTASK 28-11-00-910-085

- (1) Read and obey the precautions in this task: Purging and Fuel Tank Entry Precautions, TASK 28-11-00-910-801.

SUBTASK 28-11-00-970-004

- (2) Complete the confined space entry permit (if it is a requirement).

SUBTASK 28-11-00-970-005

- (3) Use the pre-entry checklist (an example is given in Figure 206).

SUBTASK 28-11-00-480-027

- (4) Do these steps to prepare the respirators for fuel tank entry:

- (a) Use Table 207 to find out what level of respiratory protection is necessary .
(b) If the fuel tank is in a fire-safe condition, wear a full-face respirator with an attached breathing-air supply.

WARNING: DO NOT BREATHE THE FUMES FROM THIS MATERIAL. PUT ON A RESPIRATOR WHEN YOU USE THIS MATERIAL. MAKE SURE THAT THERE IS SUFFICIENT AIRFLOW. THIS MATERIAL CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

- (c) If the fuel tank contained JP-4 or JET B, wear a full-face respirator with an attached breathing-air supply.

NOTE: There is not a health-safe limit for JP-4 or JET B.

- (d) If the fuel tank is in a health-safe condition, wear a full face respirator with an attached breathing-air supply, or at a minimum, a half-face respirator with an organic vapor filter.

- (e) Connect the subsequent respirators to the air supply (Figure 204):

- 1) One respirator for the person who goes into the fuel tank.
2) Two emergency rescue respirators.

- (f) Make sure air gets to the respirators.

- (g) Make sure the respirator system (regulator, mask etc.) is clean.

NOTE: When you use the respirator, you should regularly drain moisture from the filter on the regulator. If you drain dirt or oil from the filter, or if the air in the respirator smells bad, replace the filter.

- (h) Make sure the emergency air supply and respirators operate correctly.

Table 206/28-11-00-993-852

FIRE-SAFE CONDITION

A FIRE-SAFE CONDITION OCCURS WHEN THE VAPOR CONCENTRATION

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IS LESS THAN 10 PERCENT OF THE LOWER EXPLOSIVE LIMIT (LEL)

Table 207/28-11-00-993-844

HEALTH SAFE CONDITION

A HEALTH SAFE CONDITION OCCURS WHEN THE OXYGEN CONTENT IS A MINIMUM OF 19.5% TO A MAXIMUM OF 23.5% BY VOLUME AT SEA LEVEL, AND THE VAPOR CONCENTRATIONS ARE BELOW THESE PERMISSIBLE EXPOSURE LIMITS:

Fuel	Permissible Exposure Level Total Hydrocarbons TWA ^{*[1]} (ppm)	Lower Explosive Level (percent)
Aviation Gasoline	300	1.0
Jet A	160	0.7
Jet A-1	160	0.7
JP-5	160	0.7
JP-8	160	0.7

*[1] TWA - Time Weighted Average

SUBTASK 28-11-00-940-040

- (5) Remove these items before you go into a fuel tank:
 - (a) all jewelry - rings, bracelets, wrist watches etc.
 - (b) matches
 - (c) pocket warmers
 - (d) hearings aid devices or other battery operated equipment.

SUBTASK 28-11-00-940-041

- (6) Remove any clothes made of this material:
 - (a) wool
 - (b) silk
 - (c) nylon
 - (d) synthetic clothing.

SUBTASK 28-11-00-940-042

- (7) Put on these approved protective clothes (Figure 202):
 - (a) cotton or SARANEX 23P coveralls (non-sparking zippers or buttons)
 - (b) clean cotton head cover
 - (c) approved cotton or rubber gloves
 - (d) safety glasses or face shield

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CAUTION: DO NOT PUT ON THE COTTON SOCKS UNTIL IMMEDIATELY BEFORE YOU GO INTO THE FUEL TANK. IF THE COTTON SOCKS ARE NOT CLEAN, YOU CAN CAUSE DAMAGE TO THE FUEL TANK.

- (e) 100% cotton socks and/or fuel cell boots
- (f) Put rubber bands around your wrists and ankles to hold clothes tight.

SUBTASK 28-11-00-480-028

- (8) Attach a safety line to the person who goes into the fuel tank.

SUBTASK 28-11-00-940-043

- (9) Make sure the person who goes into the fuel tank and the person who watches agree on safety signals.

SUBTASK 28-11-00-940-044

- (10) If a confined space communication system is used, attach the system.

- (a) Do a check to make sure the system operates correctly.

SUBTASK 28-11-00-480-029

- (11) Put on the necessary respiration protection.

SUBTASK 28-11-00-280-014

- (12) Make sure the respirator operates.

SUBTASK 28-11-00-910-086

- (13) Do these steps if you are the observer:

- (a) Make sure the confined space entry permit is complete and approved (if this is a requirement).
- (b) Make a record that shows the time and who is inside the fuel tank.
- (c) Attach this sign at the fuel tank entry location where it can be seen:
 - 1) CAUTION - PERSONNEL INSIDE - MOVE NO EQUIPMENT
- (d) Make sure you and the person(s) who will go into the tank agree that the checklist items are complete.
- (e) Make sure you and the person(s) who will go into the tank agree on communication signals and set a communication time interval.
- (f) Look at the filter-regulator to make sure the supplied air system operates correctly.
- (g) Keep visual contact with the fuel tank entry location.
- (h) Keep constant communication with the person(s) the fuel tank.
- (i) Look at the combustible gas indicator to make sure the air in the fuel tank is at 10% or less of the lower explosive limit.
- (j) Do not put your head in the fuel tank access hole unless you have the correct respirator on, for the condition of the tank, and there is another observer to watch you.

NOTE: This is considered the same as a fuel tank entry.

- (k) Look out for any changes which could cause a dangerous condition.
- (l) Make sure person(s) in the fuel tank get out if there is a dangerous condition.

SUBTASK 28-11-00-940-045

- (14) Persons with respirators must touch the identified airplane ground to release static electricity before they go into the fuel tank.

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SUBTASK 28-11-00-480-030

(15) Go into the fuel tank.

- (a) To get access to the area in the No. 1 tank between rib No. 6 and rib No. 7, remove only one of these access panels on rib No. 6 (unless the engine is removed):

<u>Number</u>	<u>Name/Location</u>
532AZ	Main Tank Inner Access at Rib 6
532BZ	Main Tank Inner Access at Rib 6

To do this, do this task: Finding an Access Door or Panel on the Wings, TASK 06-44-00-800-801.

- (b) To get access to the area in the No. 2 tank between rib No. 6 and rib No. 7, remove only one of these access panels on rib No. 6 (unless the engine is removed):

<u>Number</u>	<u>Name/Location</u>
632AZ	Main Tank Inner Access at Rib 6
632BZ	Main Tank Inner Access at Rib 6

To do this, do this task: Finding an Access Door or Panel on the Wings, TASK 06-44-00-800-801.

SUBTASK 28-11-00-480-031

(16) As an alternate procedure, you can take an additional combustible gas indicator into the fuel tank to monitor the environment where you will do the maintenance.

SUBTASK 28-11-00-480-032

(17) If it is necessary for your air ventilation system, route the air duct to the maintenance area (Figure 204).

- (a) Bond the air duct to the airplane structure.

SUBTASK 28-11-00-940-046

WARNING: DO NOT BREATHE THE FUMES FROM THIS MATERIAL. PUT ON A RESPIRATOR WHEN YOU USE THIS MATERIAL. MAKE SURE THAT THERE IS SUFFICIENT AIRFLOW. THIS MATERIAL CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

WARNING: MAKE SURE THAT THE TEMPERATURE IN THE FUEL TANK DOES NOT GET TOO HOT. SARANEX 23P COVERALLS WILL KEEP BODY HEAT IN. IF THE FUEL TANK TEMPERATURE GETS TOO HOT, PERSONNEL CAN BECOME TOO HOT.

(18) The observer must keep in communication with person(s) in the tank and watch for changes in conditions or a signal of danger.

SUBTASK 28-11-00-680-002

WARNING: MAKE SURE THAT THERE IS A GOOD FLOW OF AIR WHEN YOU ARE IN THE FUEL TANK. DO NOT REMOVE THE RESPIRATOR WHILE YOU ARE IN THE FUEL TANK. DO NOT DO MAINTENANCE IN THE FUEL TANK UNTIL YOU REMOVE ALL FUEL FROM THE AREA. FUEL FUMES CAN KILL YOU.

(19) Do these steps to remove any fuel that remains in the fuel tank:

- (a) Put the cotton wipers, G00034, on the bottom of the fuel tank to absorb any fuel that remains in the tank.
- (b) Count the number of cotton wipers, G00034, as they are put into the fuel tank.
- (c) Remove the cotton wipers, G00034, when they are soaked.

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- (d) Count the number of cotton wipers, G00034, as they are removed from the fuel tank.
- (e) Make sure the counts agree.
- (f) Make sure you remove all cotton wipers, G00034, from the fuel tank.

WARNING: OBEY THE APPROVED PROCEDURES FOR FUEL-SOAKED COTTON WIPERS, G00034. PUT FUEL-SOAKED COTTON WIPERS, G00034 IN APPROVED BARRELS ONLY. COTTON WIPERS, G00034 THAT YOU USE TO CLEAN THE FUEL TANK CAN CAUSE FIRES. FIRES CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (g) Follow approved procedures to dispose of or clean the fuel soaked cotton wipers, G00034.

SUBTASK 28-11-00-360-009

- (20) Do the necessary repair or maintenance procedures.

SUBTASK 28-11-00-080-026

- (21) After you complete the maintenance, do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

END OF TASK

TASK 28-11-00-410-801

4. Fuel Tank Closure

A. General

- (1) After you do maintenance, do this task to close the fuel tank.
- (2) Make sure that you read and obey the precautions in this task: Purging and Fuel Tank Entry Precautions, TASK 28-11-00-910-801.

B. References

Reference	Title
06-44-00-800-801	Finding an Access Door or Panel on the Wings (P/B 201)
24-31-11-400-802-002	Battery Installation (P/B 401)
27-51-00-440-801	Trailing Edge Flap System Reactivation (P/B 201)
27-81-00-440-801	Reactivate the Leading Edge Flaps and Slats (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-11-400-802	Surge Tank Access Door - Installation (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-14-400-801	Emergency Fuel Shutoff Battery - Installation (P/B 401)

C. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
500	Left Wing
600	Right Wing

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E. Access Panels

Number	Name/Location
532AZ	Main Tank Inner Access at Rib 6
532BZ	Main Tank Inner Access at Rib 6
632AZ	Main Tank Inner Access at Rib 6
632BZ	Main Tank Inner Access at Rib 6

F. Clean the Fuel Tank

WARNING: REMOVE ALL MAINTENANCE ITEMS, AND UNWANTED MATERIAL FROM THE FUEL TANK BEFORE YOU CLOSE IT. EQUIPMENT, TOOLS, LOOSE PARTS, OR CONTAMINATION CAN CAUSE DAMAGE TO THE FUEL SYSTEM. UNWANTED FLAMMABLE MATERIALS ARE POSSIBLE IGNITION SOURCES. AN IGNITION SOURCE IN A FUEL TANK CAN CAUSE A FIRE OR EXPLOSION.

SUBTASK 28-11-00-090-001

- (1) Each time you go into a fuel tank, you must examine the fuel tank very carefully before you close it.

SUBTASK 28-11-00-200-002

- (2) Remove all of the equipment used to perform maintenance (for example, tools, solvent, containers, plugs, brushes and other equipment).

NOTE: Keep a written record of all the tools, equipment, materials, and persons when they go into the tank. Before you close the tank, make sure that the records show that there are no unwanted items in the tank.

SUBTASK 28-11-00-100-005

- (3) Use a cotton wiper, G00034 to clean any unwanted solvents, liquids or grease.

SUBTASK 28-11-00-490-001

WARNING: GROUND ALL OF THE EQUIPMENT AND HOSES THAT YOU USE IN THE FUEL TANK. IF YOU DO NOT GROUND ALL OF THE EQUIPMENT AND HOSES, AN EXPLOSION CAN OCCUR. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (4) Make sure that all hoses and equipment used in the maintenance are grounded.

SUBTASK 28-11-00-100-004

WARNING: WHEN YOU DO WORK IN A FUEL TANK, MAKE SURE YOU USE ONLY FILTERED SHOP/COMPRESSED AIR TO OPERATE AIR-DRIVEN TOOLS AND VACUUMS. DO NOT USE DRY NITROGEN OR OTHER GASES. THIS WILL HELP PREVENT DEATH AND INJURY TO PERSONS.

- (5) Use only shop air or bottled air as a gas source for air-driven tools. Do not use nitrogen (N2), oxygen (O2), carbon dioxide (CO2), or another non-air source of gas.
- (6) Use an air-driven vacuum to remove unwanted particles and pieces of used sealant.

G. Inspect the Fuel Tank

SUBTASK 28-11-00-212-001

- (1) Examine all the repairs, sealant and finishes to make sure that they are correct and complete.

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WARNING: REMOVE ALL CONTAMINATION, UNWANTED PARTICLES, AND MATERIALS FROM THE FUEL TANK. UNWANTED MATERIALS CAN COLLECT IN THE FUEL TANK. THIS CAN CAUSE A BLOCKAGE, OR CAUSE THE SYSTEM TO OPERATE INCORRECTLY. MATERIALS CAN BE AN IGNITION SOURCE. THIS CAN CAUSE A FIRE OR EXPLOSION.

- (2) Make sure that these components are free from unwanted material or objects:
 - (a) Fuel and water drain holes and paths
 - (b) Fuel quantity indicating system components
 - (c) Fuel scavenge system components.

SUBTASK 28-11-00-211-002

- (3) Do a check of the areas of the fuel tank that were accessed for any damage to in-tank components, bonding jumpers, wiring and structure.
 - (a) Repair all problems that you find.
- (4) Do a final inspection of the fuel tank to make sure that you removed all unwanted materials and equipment.

NOTE: Make sure that the necessary approved persons do an inspection of the tank before you close it.

- (5) Do a check of the record to make sure that no unwanted items remain in the tank.

H. Close the Fuel Tank

SUBTASK 28-11-00-090-006

- (1) If you used an air duct at the maintenance area, move the air duct to the access door opening.

SUBTASK 28-11-00-410-024

- (2) Install these components (if removed):
 - (a) If removed, install the applicable access panel on rib No. 6 in the No. 1 fuel tank:

<u>Number</u>	<u>Name/Location</u>
532AZ	Main Tank Inner Access at Rib 6
532BZ	Main Tank Inner Access at Rib 6

To do this, do this task: Finding an Access Door or Panel on the Wings, TASK 06-44-00-800-801.

- (b) If removed, install the applicable access panel on rib No. 6 in the No. 2 tank:

<u>Number</u>	<u>Name/Location</u>
632AZ	Main Tank Inner Access at Rib 6
632BZ	Main Tank Inner Access at Rib 6

To do this, do this task: Finding an Access Door or Panel on the Wings, TASK 06-44-00-800-801.

SUBTASK 28-11-00-910-089

- (3) Go out of the fuel tank.

SUBTASK 28-11-00-970-009

- (4) If you are the observer, do these steps:
 - (a) Make a report that shows the time and that all persons are out of the tank.
 - (b) Remove the sign that states: CAUTION - PERSONNEL INSIDE TANK - MOVE NO EQUIPMENT.

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SUBTASK 28-11-00-090-002

WARNING: DO NOT STOP OR START THE VENTILATION BLOWER WHILE THE AIR DUCT IS IN THE FUEL TANK. THE FUEL FUMES FROM THE FUEL TANK CAN CAUSE AN EXPLOSION AT THE BLOWER MOTOR. AN EXPLOSION CAN KILL PERSONNEL OR CAUSE INJURIES, AND DAMAGE TO EQUIPMENT.

- (5) If you used a heater or ventilation blower, do these steps:
 - (a) Remove the air duct from the fuel tank.
 - (b) Turn the air duct 180 degrees away from the open fuel tank.
 - (c) Stop the heater/air and ventilation blower, if used.
 - (d) Stop the air compressor.
 - (e) Disconnect the air supply hose from the air mover or blower(s).

SUBTASK 28-11-00-090-003

- (6) VENTURI TYPE VENTILATION EQUIPMENT, do these steps:
 - (a) Remove the air mover from the adapter base .
 - (b) Remove the ground from the air mover.
 - (c) Remove the tank adapter assembly from the opening where you installed it.

SUBTASK 28-11-00-090-004

- (7) AIR BLOWER TYPE VENTILATION EQUIPMENT, do these steps:
 - (a) Remove the air blower equipment.
 - (b) Remove the ground from the airplane to the ventilation blower.

SUBTASK 28-11-00-410-025

- (8) Install the applicable access doors (Main Tank Access Door Installation, TASK 28-11-11-400-801, Surge Tank Access Door - Installation, TASK 28-11-11-400-802, Center Tank Access Door - Installation, TASK 28-11-31-400-801).

SUBTASK 28-11-00-910-090

- (9) Follow approved procedures to clean and return all respiratory equipment.

I. Put the Airplane Back to the Usual Condition

SUBTASK 28-11-00-866-001

- (1) Do this task: Trailing Edge Flap System Reactivation, TASK 27-51-00-440-801.

SUBTASK 28-11-00-440-001

- (2) Do this task: Reactivate the Leading Edge Flaps and Slats, TASK 27-81-00-440-801.

SUBTASK 28-11-00-865-001

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

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

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HAP 037-054, 101-999 (Continued)

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 001-013, 015-026, 028-036			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 001-013, 015-026, 028-036			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT

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SUBTASK 28-11-00-865-002

- (4) Close any other circuit breakers that you opened in this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-11-00-861-001

- (5) Connect these airplane batteries:
 - (a) Main (TASK 24-31-11-400-802-002)
 - (b) Fuel spar valve (TASK 28-22-14-400-801).

SUBTASK 28-11-00-910-091

- (6) Remove all precautionary signs and placards.

SUBTASK 28-11-00-090-007

- (7) Remove all support equipment, stands, ladders, ropes etc.

————— **END OF TASK** —————

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FUEL TANK LEAKS - INSPECTION/CHECK

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains these tasks.
 - (1) Analysis of Fuel Leak Type
 - (2) Analysis of Fuel Leak Cause
 - (3) Fuel Leak Detection Procedures
 - (4) Surge Tank Access Door Leak Test Procedure
 - (5) Helitest Leak Detection Procedure
 - (6) Fuel Tank Closure Leak Check
 - (7) General Visual Inspection of the Fuel Tanks
 - (8) External Wires Over the Center Tank Inspection.
- C. After you have identified the leaks, refer to these procedures to repair the fuel tanks:
 - (1) To make sealant repairs in the fuel tank, do this task: Repair of Sealant Leaks in the Fuel Tank Structure, TASK 28-11-00-300-803.
 - (2) For cleaning and painting of the fuel tank, do the applicable tasks: Clean the Fuel Tanks Contaminated with Red Dye, TASK 28-11-00-100-802, Microbial Growth Removal - Manual Removal Method, TASK 28-10-00-100-803, Microbial Growth Removal - Pressure Washer Method, TASK 28-10-00-100-804 or Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

TASK 28-11-00-300-801

2. Analysis of the Fuel Leak Type

(Figure 601, Figure 602)

A. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

B. Procedure

SUBTASK 28-11-00-790-001

- (1) Fuel leakage is divided into four groups to calculate flight safety.

NOTE: The dimension patterns of fuel leaks (Figure 601, Figure 602) are based on an examination 15 minutes after the leak area was rubbed clean.

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SUBTASK 28-11-00-220-002

(2) The four groups are stain, seep, heavy seep, and running leak and are defined as follows (Figure 601):

- (a) A stain is a leak where the wetted area is not more than 1 1/2 inches (38.1 mm) wide after the time interval noted above.
- (b) A seep is a leak where the wetted area is not more than 4 inches (101.6 mm) wide after the time interval noted above.
- (c) A heavy seep is a leak where the wetted area is not larger than 6 inches (152.4 mm) wide after the time interval noted above.
- (d) A running leak is all fuel leaks that are larger than 6 inches (152.4 mm) wide after the time interval noted above.

NOTE: Fuel will usually come into view again immediately after being wiped dry and can run or drip from the surface.

SUBTASK 28-11-00-790-002

(3) Examine the wet area around the leak source to find the group of the fuel leak.

SUBTASK 28-11-00-790-003

(4) After you examine the leak area, rub the area clean and examine the leak area again.

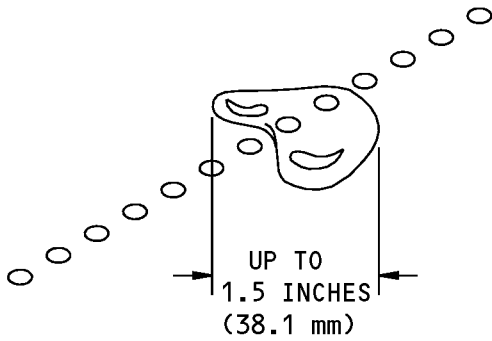
————— **END OF TASK** —————

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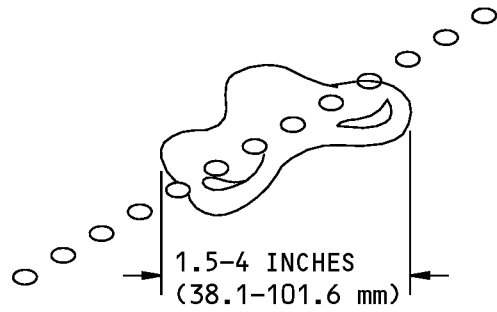
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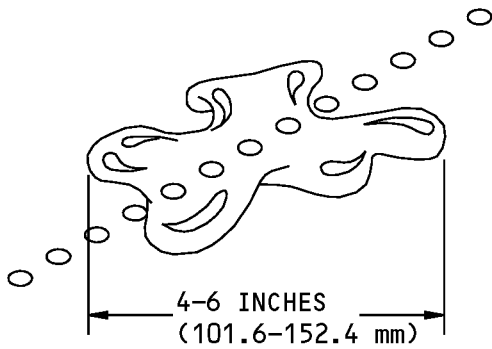
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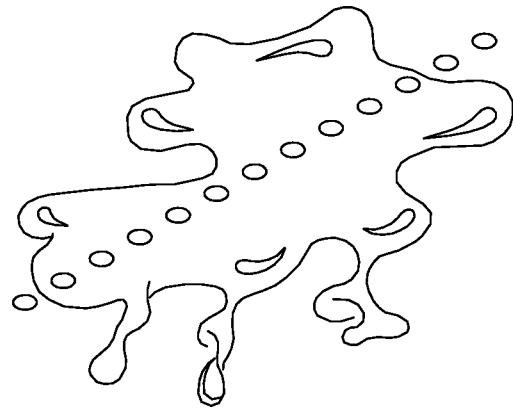
STAIN



SEEP



HEAVY SEEP



RUNNING LEAK

**Fuel Leak Types
Figure 601/28-11-00-990-806**

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LEAKAGE LOCATION	STAIN	SEEP	HEAVY SEEP	RUNNING LEAK
Open areas with a good flow of air where fuel leakage cannot move to a possible fire source. Example: upper and lower wing surfaces that do not have fairings.	1	1	2	3
Areas that are not fully closed and do not have a good flow of air. Example: rear spar at the trailing edge flaps and wheel wells.	1	2 Two Locations maximum	3	3
Closed areas without a flow of air. Example: wing lower surface with fairings, air conditioning bay, wing/body fairings, front and rear spar, and the refueling station(s).	2	3	3	3
Pressurized area of the center fuel tank.	4	4	4	4

- 1 No repair procedure is necessary; examine the fuel leak frequently to make sure it does not get larger.
- 2 It is not necessary to repair the fuel leak immediately. Examine the fuel leak frequently to make sure it does not get larger. Make the necessary repairs during the next scheduled maintenance.
- 3 Repair the fuel leak immediately to a minimum of 1 or 2 classification.
- 4 Repair the fuel leak immediately. No fuel leakage is permitted.

Fuel Leak Evaluation
Figure 602/28-11-00-990-807

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TASK 28-11-00-200-801

3. Analysis of Fuel Leak Cause

(Figure 603)

A. General

- (1) This task lists the causes of the fuel leaks and discusses leak path analysis.
- (2) The cause of fuel tank leaks is usually incorrect fitting installations, damaged sealant, incorrectly installed or damaged O-rings, or loose fasteners.
- (3) Before you defuel a fuel tank which has a leak, try to find all of the leaks in the fuel tank.
- (4) Repair all leaks each time a fuel tank is defueled to repair leaks.
- (5) The causes of most of the fuel leaks in the fuel tank structure are:
 - (a) Surfaces are prepared incorrectly
 - (b) Sealants are mixed or kept incorrectly
 - (c) Sealants are applied incorrectly
 - (d) Fasteners are loose
 - (e) Fittings and connections are installed incorrectly.

B. References

Reference	Title
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

D. Procedure - Fuel Leak Causes

SUBTASK 28-11-00-280-001

- (1) Surfaces are prepared incorrectly.
 - (a) The surfaces must not contain unwanted materials such as grease, metal particles, hair, loose paint or wax.
 - (b) Unwanted materials can cause the sealant not to bond correctly.

SUBTASK 28-11-00-280-002

- (2) Sealants are mixed or kept incorrectly (TASK 28-11-00-300-803).
 - (a) Synthetic rubber makes the base for most sealing compounds.

NOTE: The manufacturer adds ingredients to control strength, cure time, plasticity, usable life, and fuel resistance.

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- (b) Sealants are supplied in two parts; base material and accelerator.

NOTE: You must be very careful to make sure the correct proportions of the base material and the accelerator recommended by the manufacturer are used. If you do not obey the manufacturer's instructions, you can change the physical properties of the mixture which can cause a seal failure and a fuel tank leak.

- (c) Sealing compounds have a specified shelf life.

NOTE: After the specified time, you must do a test of the sealing compounds to find out if you can use them.

- (d) You can keep some sealants in refrigeration for a short time after they are mixed with the accelerator.

NOTE: You must discard these sealants after the specified time.

SUBTASK 28-11-00-280-003

- (3) Sealants are applied incorrectly (TASK 28-11-00-300-803).

- (a) If you do not do the subsequent steps, fuel leaks can occur:

- 1) Follow all manufacturer's instructions.
- 2) Use a brush to apply precoat when recommended.
- 3) Do all the steps to apply the sealant.
- 4) Make sure there are no air bubbles in the sealant.
- 5) Make sure you fill all the spaces completely with sealant.
- 6) Make sure you do not make an overlap with the sealants.
- 7) Make sure the sealant touches all the surfaces.

SUBTASK 28-11-00-280-004

- (4) The fasteners are loose.

- (a) Loose fasteners start fuel leaks because they let attached surfaces move.
- (b) Faying surface seals get cracks and let fuel leak through the seal plane (TASK 28-11-00-300-803).
- (c) Loose rivets are not self-sealing.
- (d) Sealant or metal seal covers do not bond with loose fasteners.

SUBTASK 28-11-00-280-005

- (5) Fittings and connections are installed incorrectly.

- (a) Fittings and connections attached to or that go through the fuel tank structure are sealed with O-rings.

NOTE: Damaged or incorrectly installed O-rings can cause fuel leaks.

E. Leak Path Analysis

SUBTASK 28-11-00-790-004

- (1) After you find the external leak point and the internal leak source, find the point where fuel goes through the seal plane.

- (a) The internal area where you see the bubble or dye usually shows the point where fuel goes through the seal plane.
- (b) If there is an injection, prepack or hidden seal failure, the fuel can move along the tank structure and leak at a point far from the leak source.

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- (c) If you repair the internal area where you see the bubble or dye and do not repair the injection, prepack or hidden seal failure, you can only temporarily repair the leak.
- (d) You must find all possible leak paths between the external leak point and internal leak source to repair the seal failure.

NOTE: You can increase the height of the seal plane as an alternative to a repair of the seal.

SUBTASK 28-11-00-210-004

- (2) The seal plane stops the fuel leaks from the fuel tank.
 - (a) When there is a seal plane failure, the mating surfaces of the tank structure, external to the seal plane, get wet.

NOTE: The area that gets wet extends in all directions from the point fuel goes through until it finds an injection, faying surface, prepack or hidden seal.

- (b) There are no seals on the external side of the seal plane and fuel that goes through the seal plane follows the path of least resistance.
 - 1) For example, a row of fasteners in a groove are wet but only one fastener has a leak.
 - 2) If the fastener with the leak is sealed, then the fastener with the subsequent least resistance will leak.
- (c) If you find the leak path you can see how fuel gets from the internal leak source to the external leak point.
- (d) To understand the leak, examine the tank structure and sealant.

————— **END OF TASK** —————

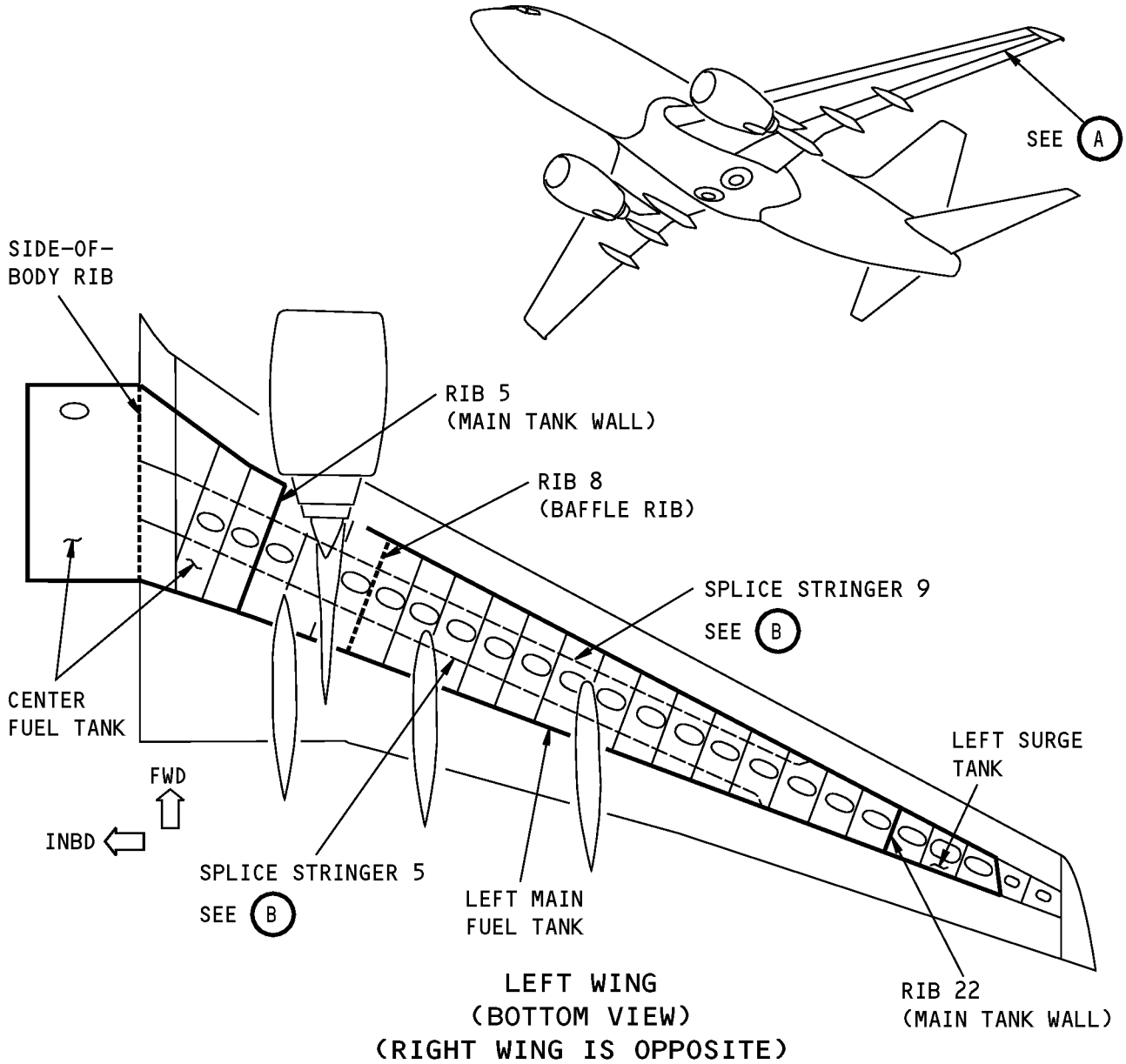
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LEGEND:

- SPLICE STRINGER
(COVERS A SKIN JOINT)
- BAFFLE RIB
(LIMITS FUEL FLOW)
- PRIMARY SEAL SURFACE
(FUEL TANK BOUNDARY)

**Skin Joints and Fillet Seals of the Wing
Figure 603 (Sheet 1 of 2)/28-11-00-990-808**

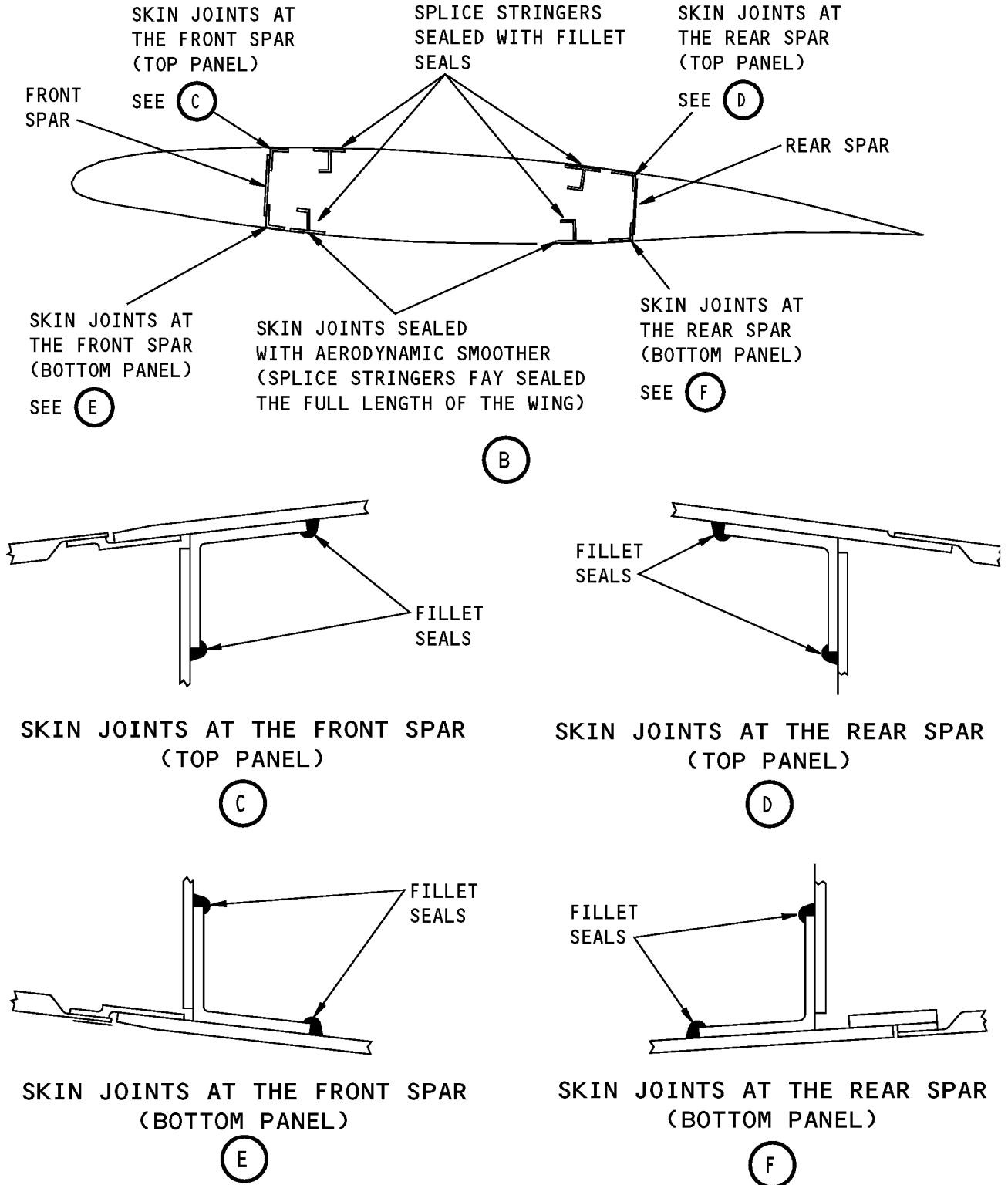
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Skin Joints and Fillet Seals of the Wing
Figure 603 (Sheet 2 of 2)/28-11-00-990-808

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TASK 28-11-00-790-801

4. Fuel Leak Detection Procedures

(Figure 604)

A. General

(1) This task contains procedures used to find a leak as follows:

NOTE: The procedures recommended to find the leak and the leak paths are "Find the External Leaks with Talcum Powder" and the "Air Pressure and Bubble Solution (Backblowing)" procedures.

- (a) Find the External Leaks with Talcum Powder
- (b) Air Pressure and Bubble Solution (Backblowing) procedure
- (c) Air Bubble Hollow Bolt procedure

NOTE: This procedure finds leaks in areas with complex structure.

- (d) Dye Injection with Hollow Bolt

NOTE: This procedure finds leaks in areas with complex structure.

- (e) Dye Injection procedure

NOTE: This procedure puts dye into the leak from outside the fuel tank and looks for dye inside the fuel tank.

- (f) Internal Pressure procedure

NOTE: This procedure pressurizes the fuel tank to help find leaks on the outside of the fuel tank with soap solution. After the leaks are found, the backblowing procedure can be used to find the internal leaks. This procedure can help find leaks after the other procedures have been tried and when there is no fuel in the fuel tanks.

- (g) Fuel Tank Access Doors

NOTE: This procedure gives fuel quantities to find access doors that leak.

- (h) Leak Check

NOTE: This check fuels the airplane to make sure the leak is corrected.

B. References

Reference	Title
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-11-11-000-802	Surge Tank Access Door - Removal (P/B 401)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-11-400-802	Surge Tank Access Door - Installation (P/B 401)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-13-31-000-801	Flame Arrestor Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

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Reference	Description
SPL-1761	Tracer - Leakage, Integral Tank Leakage Test (Part #: F71329, Supplier: 81205, A/P Effectivity: 737-100, -200, -200C, -300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-1774	Manometer - Water, Test Equipment (Part #: F72951-1, Supplier: 81205, A/P Effectivity: 737-100, -200, -200C, -300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
STD-77	Air Source - Regulated, Dry Filtered, 0-50 psig
STD-123	Brush - Soft Bristle
STD-1081	Flashlight - Explosion Proof
STD-3940	Air Source - Regulated, Dry Filtered, 0 to 150 psig

D. Consumable Materials

Reference	Description	Specification
C00070	Dye, Liquid Leak Detection For Fuel Systems	MIL-D-81298
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5
G00091	Compound - Oxygen System Leak Detection - Snoop Leak Detector	MIL-PRF-25567

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

F. Access Panels

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

G. Find External Leaks with Talcum Powder

SUBTASK 28-11-00-150-001

(1) Remove aerodynamic smoother if applied over the applicable seam or joint.

SUBTASK 28-11-00-160-001

(2) Rub the leak dry with an absorbent cotton wiper, G00034.

SUBTASK 28-11-00-360-001

(3) With a soft-bristle or camel-hair soft bristle brush, STD-123, apply talcum powder on the area you think contains the leak.

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SUBTASK 28-11-00-210-005

- (4) Look at the area with the talcum powder and see if the talcum powder changes color.

SUBTASK 28-11-00-930-001

- (5) Make a mark on each leak and do the same procedure again until each external leak is found.

H. Prepare to Find the Leaks

SUBTASK 28-11-00-650-006

- (1) Do this task: Fuel Tank Defueling, TASK 28-26-00-650-801.

SUBTASK 28-11-00-650-007

- (2) Do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-11-00-010-003

- (3) To remove the applicable main tank access doors, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

SUBTASK 28-11-00-010-004

- (4) To remove the applicable center tank access doors, do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801.

SUBTASK 28-11-00-010-005

- (5) To remove the applicable surge tank access doors, do this task: Surge Tank Access Door - Removal, TASK 28-11-11-000-802.

SUBTASK 28-11-00-210-006

- (6) Visual Procedure
 - (a) Examine the area you think contains a leak for seal defects such as cracked or loose fillets, pinholes, or loose fasteners.

NOTE: If it is necessary, use mirrors to examine seals which are difficult to see.

CAUTION: HOLD THE AIR HOSE 1/2 INCH (13 MM) MINIMUM FROM THE AIRPLANE STRUCTURE. IF YOU DO NOT HOLD THE AIR HOSE 1/2 INCH (13 MM) MINIMUM FROM THE AIRPLANE STRUCTURE, DAMAGE TO THE SEALS CAN OCCUR.

- (b) Do a check of the fillet seals that you think have a bad bond.
- (c) Rub the edges with a pencil eraser, or supply air at a maximum of 100 psig (690 kPa) and at least 1/2 inch (13 mm) from seal.
- (d) Look at the tank structure for cracks or distortion.

I. Air Pressure and Bubble Solution (Backblowing) Procedure

NOTE: This procedure gives good results for leak detection.

SUBTASK 28-11-00-280-006

- (1) Two persons are necessary to do this task:
 - (a) One person must be out of the fuel tank at the external location of the leak.
 - (b) One person must go into the fuel tank(s) and find the internal leak location(s).
 - 1) The person(s) that goes into the fuel tank must have these items:
 - a) An explosion-proof explosion proof flashlight, STD-1081
 - b) Non-corrosive soap Snoop Leak Detector compound, G00091 or bubble bath
 - c) Marking pen (Berol Filmograph or equivalent)

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- (c) If the external leak location is near a tank boundary or the side-of-body rib, the leak can be on one side of the rib or the other.

NOTE: It can be faster to put one person in each fuel tank to find the leaks.

SUBTASK 28-11-00-700-001

- (2) The two persons must agree on a procedure to communicate.
- (a) The person that is out of the fuel tank can knock on the airplane skin to make it easier for the person in the fuel tank to find the correct location.
- (b) The person in the fuel tank must tell the person out of the fuel tank when to blow air through the external leak.
- (c) Agree on a system of knocks.

NOTE: For example, the person in the fuel tank can knock one time to start blowing air, two times if he finds a leak, and three times if the leak is not found.

SUBTASK 28-11-00-700-002

- (3) The person in the fuel tank must apply the soap solution to a large area near the external leak location.

NOTE: The internal leak can easily be as far as 3 feet (1 meter) or more from the external location of the leak. Examine the internal surface of the tank for loose sealant or bad sealant or a bad fastener. This can help you make a decision about where to look for the internal leak. If the external leak is a fastener, find the fastener in the fuel tank. Examine this fastener before you try to find leaks in a different location.

- (a) If the external leak location is in a skin joint (Figure 603), examine the fillet seal on the nearest splice stringer.

NOTE: Splice stringers are stringers that cover the joints of the airplane skin. There are three splice stringers in each wing. Faying surface seals (isolation seals) are applied full length along the splice stringers. These seals are applied between the splice stringers and the airplane skin. The purpose of these faying surface seals are to provide a secondary seal if the fillet seals fail and to limit a fastener leak path to the fastener itself.

- (b) If the external leak location is the front or rear spar, examine the fillet seals on the internal surface of the applicable spar.
- (c) If the external leak location is at rib 5 or rib 1 (side-of-body) examine both sides of these ribs for leakage.

NOTE: Examine the full length of the fillet seals in the fuel tank. It is possible for the head pressure of the fuel in the fuel tank to cause the fuel to show at an external location that is higher than the internal leak location.

SUBTASK 28-11-00-700-003

CAUTION: HOLD THE AIR HOSE 1/2 INCH (13 MM) MINIMUM FROM THE AIRPLANE STRUCTURE. IF YOU DO NOT HOLD THE AIR HOSE 1/2 INCH (13 MM) MINIMUM FROM THE AIRPLANE STRUCTURE, DAMAGE TO THE SEALS CAN OCCUR.

- (4) The person out of the fuel tank must use an 0-50 psig dry filtered regulated air source, STD-77 with a nozzle to blow air through the external location of the leak (Figure 604).
- (a) If the leak is small, it can be necessary to use the maximum pressure (100 psi or 690 kPa).
- (b) If the leak is larger, it is easier to find the leak with less pressure (for example 50 psi or 345 kPa).

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SUBTASK 28-11-00-700-004

- (5) Have the person(s) in the fuel tank look for bubbles.
 - (a) Look for bubbles that show the location of the leak.
 - (b) It is also possible to feel for blowing air to find the leak.
 - (c) Find all the leak locations on the internal surface of the fuel tank.

NOTE: It is possible that three or four internal leaks are related to one external leak. Make a signal to the person out of the fuel tank to stop the blowing of air when you find all of the leaks.

- (d) Make a mark on these leak locations with a marking pen.

NOTE: If you are not sure you found the correct leak path, you can apply the bubble solution to the external leak location and blow air through the internal leaks. If the air blows through the external leak location, you found the correct leak path.

SUBTASK 28-11-00-700-005

- (6) If you see bubbles, make a mark in and out of the fuel tank at the area where you see bubbles.

SUBTASK 28-11-00-700-006

- (7) After you do a check on the full area, do a check again on the areas where you saw bubbles to make sure you isolate the leaks.

SUBTASK 28-11-00-700-007

- (8) Clean the bubble solution in the fuel tank.

SUBTASK 28-11-00-700-008

- (9) Repair the leaks that you find (TASK 28-11-00-300-803).

J. Air Bubble with Hollow Bolt Procedure

(Figure 605, Figure 606)

SUBTASK 28-11-00-280-007

- (1) Remove the fastener.

NOTE: Refer to the structural repair manual for fastener removal.

SUBTASK 28-11-00-280-008

- (2) Install the hollow bolt assembly.

SUBTASK 28-11-00-700-009

WARNING: BLOW INTO THE MANOMETER AND MAKE SURE THE WATER LEVEL CHANGES TO MAKE SURE THE WATER MANOMETER OPERATES SAFELY. MAKE SURE THE OPEN END OF THE MANOMETER IS CLEAR. IF THE WATER MANOMETER DOES NOT OPERATE CORRECTLY, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

- (3) Connect the water water manometer, SPL-1774 to the hollow bolt.

SUBTASK 28-11-00-700-010

- (4) Apply the noncorrosive soap solution to the area in the fuel tank that you think contains the leak.

SUBTASK 28-11-00-700-011

CAUTION: DO NOT USE MORE THAN A MAXIMUM PRESSURE OF 4.0 PSIG (27 KPA). IF YOU USE MORE PRESSURE, YOU CAN CAUSE DAMAGE TO EQUIPMENT.

- (5) Supply air pressure with an 0 to 150 psig dry filtered regulated air source, STD-3940 to the hollow bolt and look for air bubbles in the fuel tank.

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SUBTASK 28-11-00-700-012

(6) Make a mark at the locations where you see air bubbles in the fuel tank.

SUBTASK 28-11-00-700-013

(7) Remove the hollow bolt assembly.

SUBTASK 28-11-00-700-014

(8) Install the fastener.

NOTE: Refer to the structural repair manual for fastener installation.

SUBTASK 28-11-00-700-015

(9) Clean the bubble solution from the fuel tank.

K. Dye Injection with Hollow Bolt Procedure

(Figure 605, Figure 606)

NOTE: Use this procedure only after you use the Air Bubble with Hollow Bolt Procedure.

SUBTASK 28-11-00-280-009

(1) Remove the fastener.

NOTE: Refer to the structural repair manual for fastener removal.

SUBTASK 28-11-00-280-010

(2) Install the hollow bolt assembly.

SUBTASK 28-11-00-700-016

(3) Connect the integral fuel tank leak integral tank leakage tracer, SPL-1761, to the hollow bolt.

SUBTASK 28-11-00-700-017

(4) Make sure you monitor the dye container, gage, and equipment while they are in position.

SUBTASK 28-11-00-700-018

(5) Add dye, C00070, through the hollow bolt.

SUBTASK 28-11-00-700-019

(6) Remove the integral fuel tank leak tracing device.

SUBTASK 28-11-00-700-020

(7) Remove the hollow bolt assembly.

SUBTASK 28-11-00-700-021

(8) Install the fastener.

NOTE: Refer to the structural repair manual for fastener removal.

SUBTASK 28-11-00-700-022

(9) Make a mark at the location where you first see the dye.

SUBTASK 28-11-00-700-023

(10) Use a cotton wiper, G00034 to remove all the dye.

SUBTASK 28-11-00-700-024

(11) To repair or replace the sealant, do this task: Repair of Sealant Leaks in the Fuel Tank Structure, TASK 28-11-00-300-803.

L. Dye Injection Procedure

NOTE: This method injects dyed fuel through the external leak point to find the internal leak source. You can use dye in maximum concentrations of 2 fluid ounces per 100 gallons of fuel (0.16 liters dye per 100 liters of fuel).

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SUBTASK 28-11-00-280-011

- (1) Put the integral fuel tank leak integral tank leakage tracer, SPL-1761, in position near external leak (Figure 605).

SUBTASK 28-11-00-790-005

- (2) Use the leak tracing tool to add dye, C00070, through the external leak.

SUBTASK 28-11-00-790-006

- (3) Continue to add pressure until the dye shows in the fuel tank.

SUBTASK 28-11-00-790-007

- (4) Make a mark at the point where dye is first seen.

SUBTASK 28-11-00-790-008

- (5) Remove the leak tracing tool.

SUBTASK 28-11-00-790-009

- (6) Use a cotton wiper, G00034 to remove all the dye.

SUBTASK 28-11-00-790-010

- (7) To repair or replace the sealant, do this task: Repair of Sealant Leaks in the Fuel Tank Structure, TASK 28-11-00-300-803.

M. Internal Pressure and Bubble Procedure

NOTE: Use this method after all other methods are tried. When it is difficult to find the leaks on the outside surface of the wing, the fuel tank can be pressurized and a bubble solution applied to the wing. Bubbles will show the external leak points.

NOTE: This procedure can also be used to do a leak repair check without refueling the airplane.

SUBTASK 28-11-00-480-002

- (1) Do these steps to install the surge tank pressure test equipment, C28008:

- (a) Remove the seven screws [1] from this access panel:

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679

(Figure 607).

- (b) With the seven screws [1] that you removed, install the tank cover assembly C28008-2 over this access panel:

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679

- (c) Remove the seven screws [1] from this access panel:

<u>Number</u>	<u>Name/Location</u>
633BB	Surge Tank Access Door - Wing Station 679

(Figure 607).

- (d) With the seven screws [1] that you removed, install the tank cover assembly C28008-3 over this access panel:

<u>Number</u>	<u>Name/Location</u>
633BB	Surge Tank Access Door - Wing Station 679

- (e) Make sure the tank cover assemblies C28008-2 and C28008-3 have a good seal over the surge tank access doors.

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SUBTASK 28-11-00-410-005

- (2) Install all other fuel tank access doors that are removed. To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801
or, do this task: Surge Tank Access Door - Installation, TASK 28-11-11-400-802.

SUBTASK 28-11-00-480-003

WARNING: BLOW INTO MANOMETER HOSE AND MAKE SURE THAT THE WATER LEVEL CHANGES TO MAKE SURE THAT THE WATER MANOMETER ASSEMBLY OPERATES SAFELY. MAKE SURE THAT OPEN END OF MANOMETER IS COMPLETELY FREE OF ANY OBSTRUCTION. IF THE MANOMETER IS NOT CLEAR, IT COULD CAUSE INJURY OR DAMAGE.

- (3) Connect water manometer, SPL-1774, assembly to the adapter on the tank cover assembly, C28008-2 (Figure 606).

SUBTASK 28-11-00-780-001

WARNING: DO NOT GO INTO A FUEL TANK THAT IS PRESSURIZED. DO NOT USE MORE THAN THE MAXIMUM SAFE PRESSURE OF 5.20 PSIG (35.85 KPA). IF YOU GO INTO A PRESSURIZED FUEL TANK OR USE MORE THAN THE MAXIMUM SAFE PRESSURE, YOU COULD CAUSE INJURY OR DAMAGE.

- (4) Supply 4.0 psig (27.6 kPa) air pressure to fuel tank.

SUBTASK 28-11-00-700-025

- (5) Apply the bubble solution to the area out of the fuel tank that you think contains the leak.

SUBTASK 28-11-00-210-007

- (6) Watch the area that you think contains the leak for bubbles.

NOTE: The size of the leak can cause the bubbles to show very slowly. It can be necessary to constantly watch to see the leak.

SUBTASK 28-11-00-200-001

- (7) Make a mark at the locations where you see bubbles.

SUBTASK 28-11-00-100-001

- (8) Use a moist cotton wiper, G00034 to remove the bubble solution from the external surface of the fuel tank.

SUBTASK 28-11-00-780-002

- (9) Remove the pressure from the fuel tank.

SUBTASK 28-11-00-080-004

- (10) Do these steps to remove the pressure test equipment, C28008:

- (a) Disconnect the water manometer from the surge tank access cover, C28008-2.
(b) To remove the cover C28008-2, do this step:

Remove the seven screws [1] that attach the surge tank access cover to this access panel:

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679

- (c) Put the seven screws [1] that you removed back into their positions in this access panel:

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679

- (d) Tighten each bolt to a torque of 30-40 pound-inches (3.4-4.5 newton-meters).

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- (e) To remove the cover C28008-3, do this step:
Remove the seven screws [1] that attach the surge tank access cover to this access panel:

<u>Number</u>	<u>Name/Location</u>
633BB	Surge Tank Access Door - Wing Station 679

- (f) Put the seven screws [1] that you removed back into their positions in this access panel:

<u>Number</u>	<u>Name/Location</u>
633BB	Surge Tank Access Door - Wing Station 679

- (g) Tighten each bolt to a torque of 30-40 pound-inches (3.4-4.5 newton-meters).

SUBTASK 28-11-00-700-026

- (11) Use one of the procedures given above to find the internal leak source.

SUBTASK 28-11-00-700-027

- (12) Repair or replace the sealant as necessary (TASK 28-11-00-300-803).

N. Find the Leaks at the Fuel Tank Access Doors

SUBTASK 28-11-00-650-008

- (1) Fill the applicable fuel tank to a level which will cover the access door that you think has a fuel leak (Table 601, Table 602).

NOTE: The fuel quantities in Tables 601 and 602 are approximate values when the airplane is at the nominal attitude of -1.14 degrees pitch and 0 degrees wing roll. The fuel quantities required to cover the access doors will increase or decrease at different attitudes. For the most outboard access doors in the main fuel tanks fill the tanks to volumetric shutoff (VSO). The fuel quantities required to cover these access doors will change due to changes in fuel density and the quantity of expansion space in each main fuel tank.

Table 601/28-11-00-993-813

TABLE 601. Fuel Necessary to Cover the Center Tank Access Doors		
ACCESS DOORS LEFT/RIGHT	FUEL (LBS)	FUEL (KGS)
131AB	818	371
531AB/631AB	9197	4172
531BB/631BB	13722	6224

Table 602/28-11-00-993-814

TABLE 602. Fuel Necessary to Cover the No. 1 or No. 2 Tank Access Doors		
ACCESS DOORS LEFT/RIGHT	FUEL (LBS)	FUEL (KGS)
532AB/632AB	60	27
532BB/632BB	699	317
532CB/632CB	1167	529
532DB/632DB	1765	801
532EB/632EB	2583	1172
532FB/632FB	3402	1543

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(Continued)

TABLE 602. Fuel Necessary to Cover the No. 1 or No. 2 Tank Access Doors		
ACCESS DOORS LEFT/RIGHT	FUEL (LBS)	FUEL (KGS)
532GB/632GB	4230	1919
532HB/632HB	4940	2241
532JB/632JB	5665	2570
532KB/632KB	6192	2809
532LB/632LB	6710	3044
532MB/632MB	7139	3238
532NB/632NB	7570	3434
532PB/632PB	7966	3613
532QB/632QB	8262	3747
532RB/632RB	8545	3876

SUBTASK 28-11-00-280-012

(2) Examine the access door for leaks using Find External Leaks with Talcum Powder Procedure.

SUBTASK 28-11-00-280-013

(3) Repair or replace the access door as applicable. To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

or, do this task: Surge Tank Access Door - Installation, TASK 28-11-11-400-802.

SUBTASK 28-11-00-790-023

(4) The access doors for the surge tank that contain the vent scoop and pressure relief valve contains a weep hole:

(Figure 608)

Number Name/Location

533BB Surge Tank Access Door - Wing Station 679

633BB Surge Tank Access Door - Wing Station 679

- (a) The purpose of the weep hole is to supply venting for the cavity in the door casting at this location.
- (b) If there is leakage in the seals around the vent scoop and the flame arrestor in the vent scoop, fuel can collect in the cavity in the door casting and come out of the weep hole.
- (c) If fuel drips or flows from this weep hole, do these steps:
 - 1) For the applicable surge tank access door, do this task: Surge Tank Access Door - Removal, TASK 28-11-11-000-802
 - 2) Examine the seals and sealant around the vent scoop and flame arrestor (TASK 28-13-31-000-801).
 - 3) Re-seal the vent scoop to repair the leakage (TASK 28-11-00-300-803).
 - 4) For the applicable surge tank door, do this task: Surge Tank Access Door - Installation, TASK 28-11-11-400-802

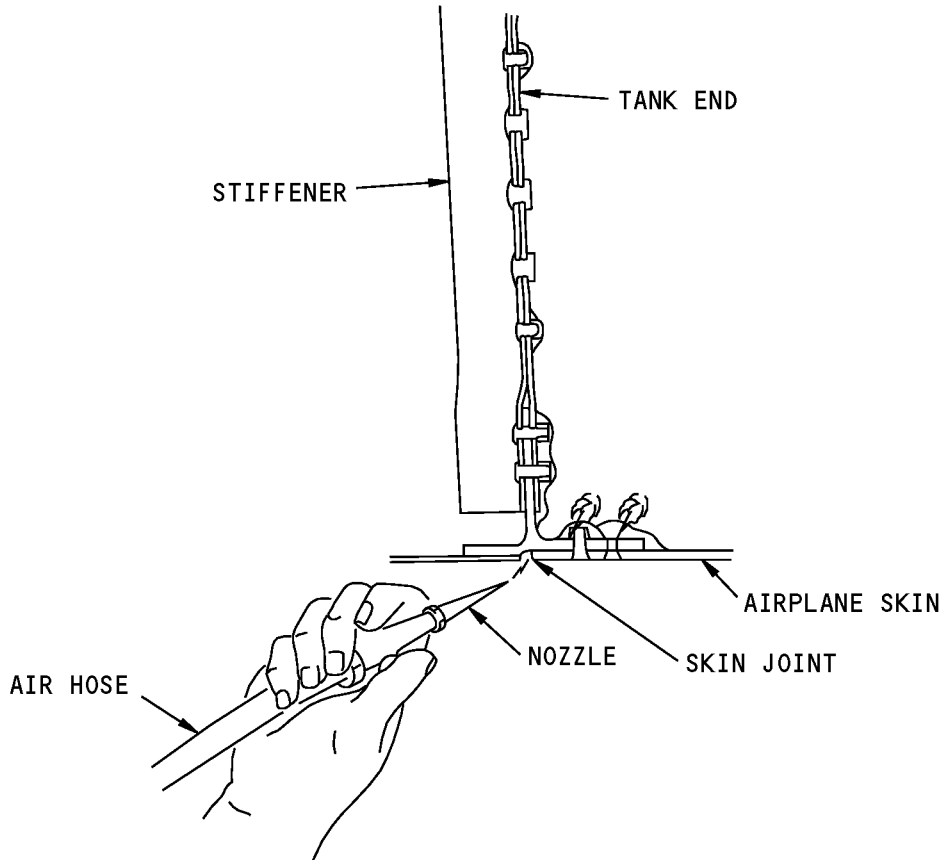
————— END OF TASK —————

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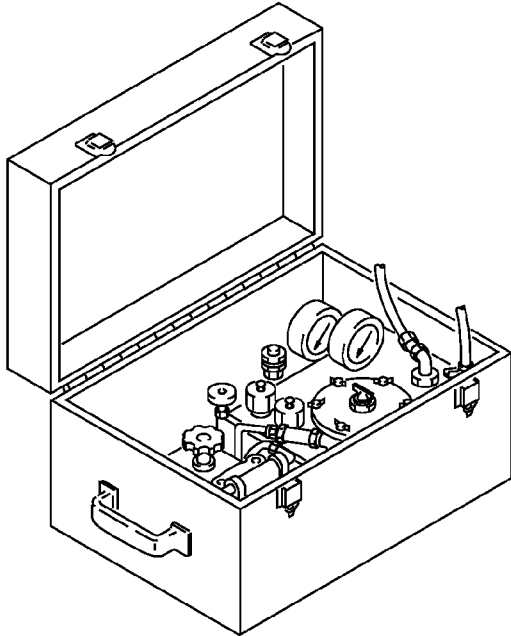


**Backblowing Procedure (Example)
Figure 604/28-11-00-990-809**

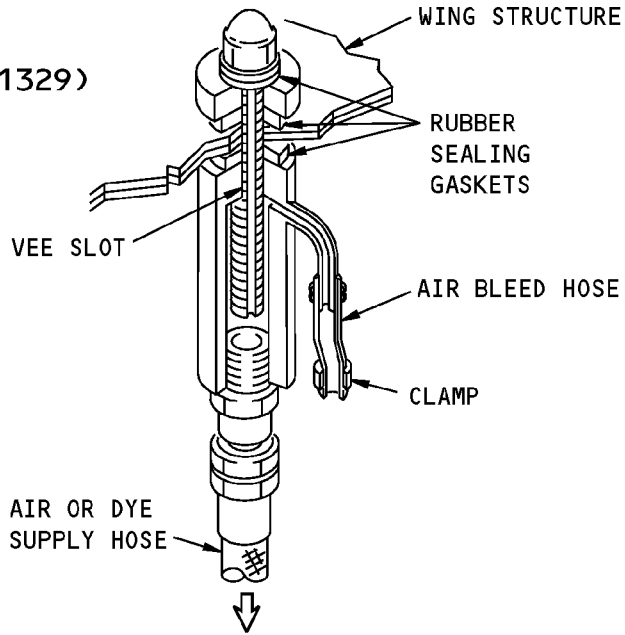
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LEAK TRACING DEVICE (F71329)



TO THE DYE PRESSURE CONNECTION OF THE SPECIAL
LEAK TRACING DEVICE OR AN EQUIVALENT DEVICE 1

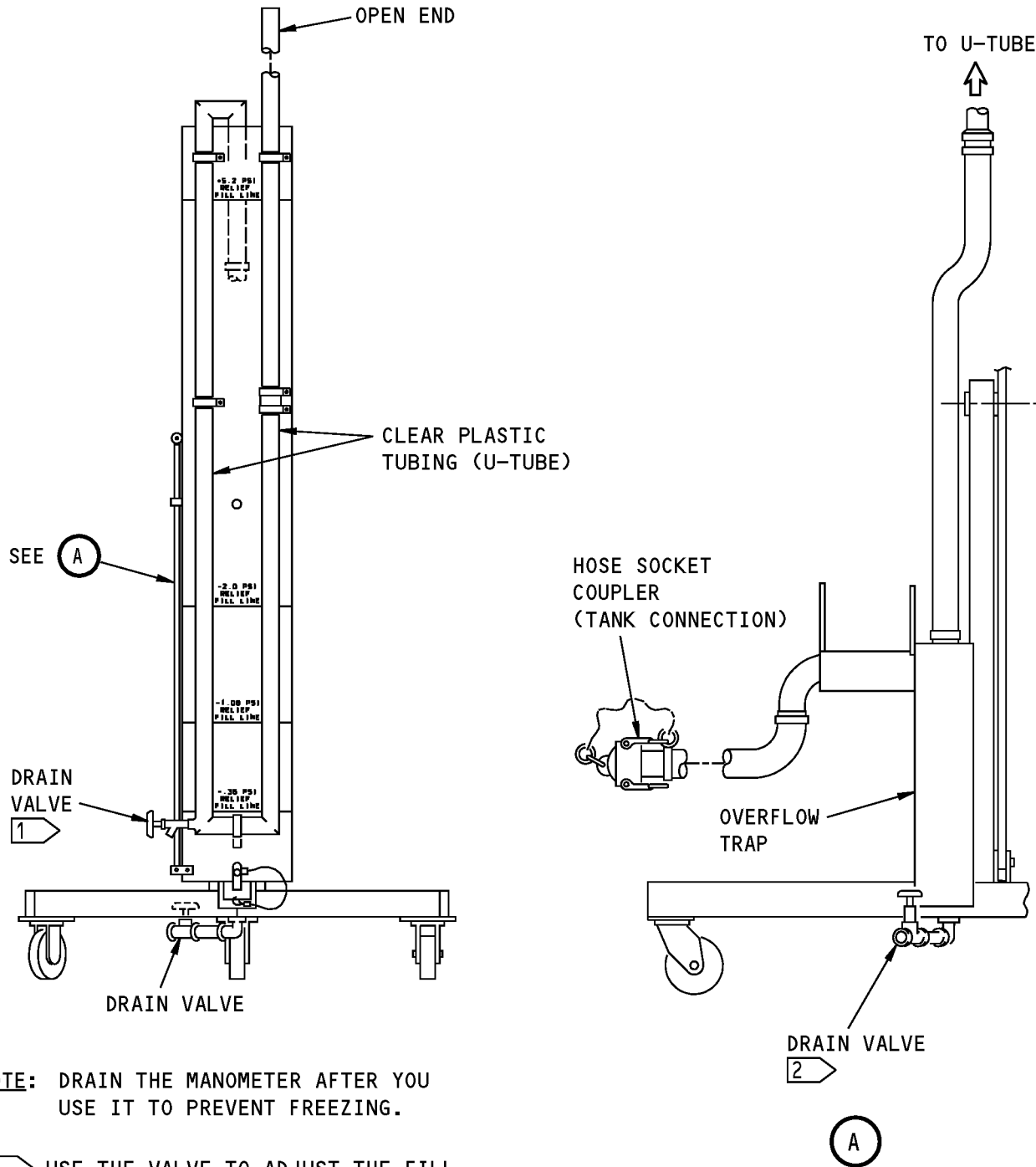
ADAPTER ASSEMBLY – FUEL LEAK TRACING HOLLOW BOLT (F70206-1)

1 MONITOR THE PRESSURE EQUIPMENT CONSTANTLY
TO MAKE SURE THE PRESSURE IS NOT MORE
THAN THE MAXIMUM SAFE PRESSURE

**Hollow Bolt for Areas With Complex Structure
Figure 605/28-11-00-990-810**

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NOTE: DRAIN THE MANOMETER AFTER YOU USE IT TO PREVENT FREEZING.

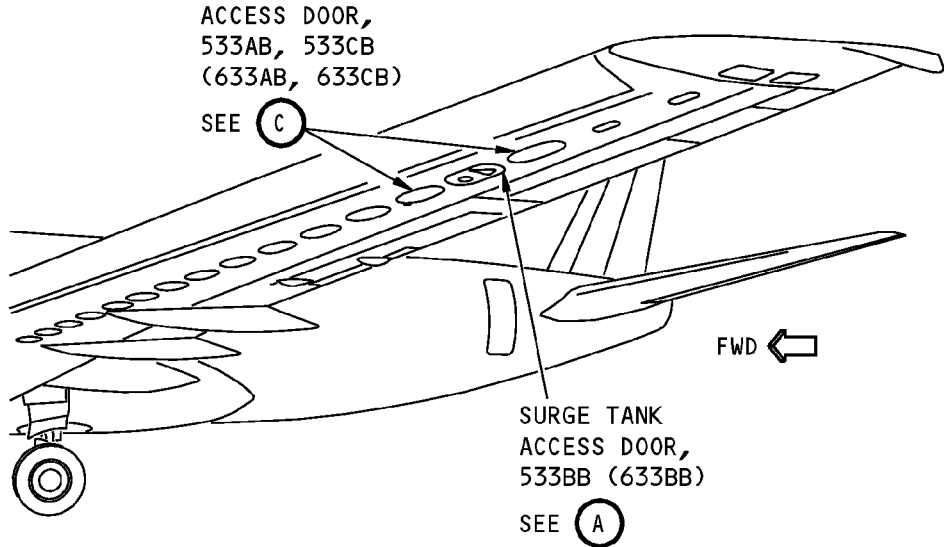
- 1 USE THE VALVE TO ADJUST THE FILL LEVEL AND TO DRAIN THE TUBING
- 2 USE THE VALVE TO DRAIN THE OVERFLOW TRAP

**Water Manometer Assembly
Figure 606/28-11-00-990-811**

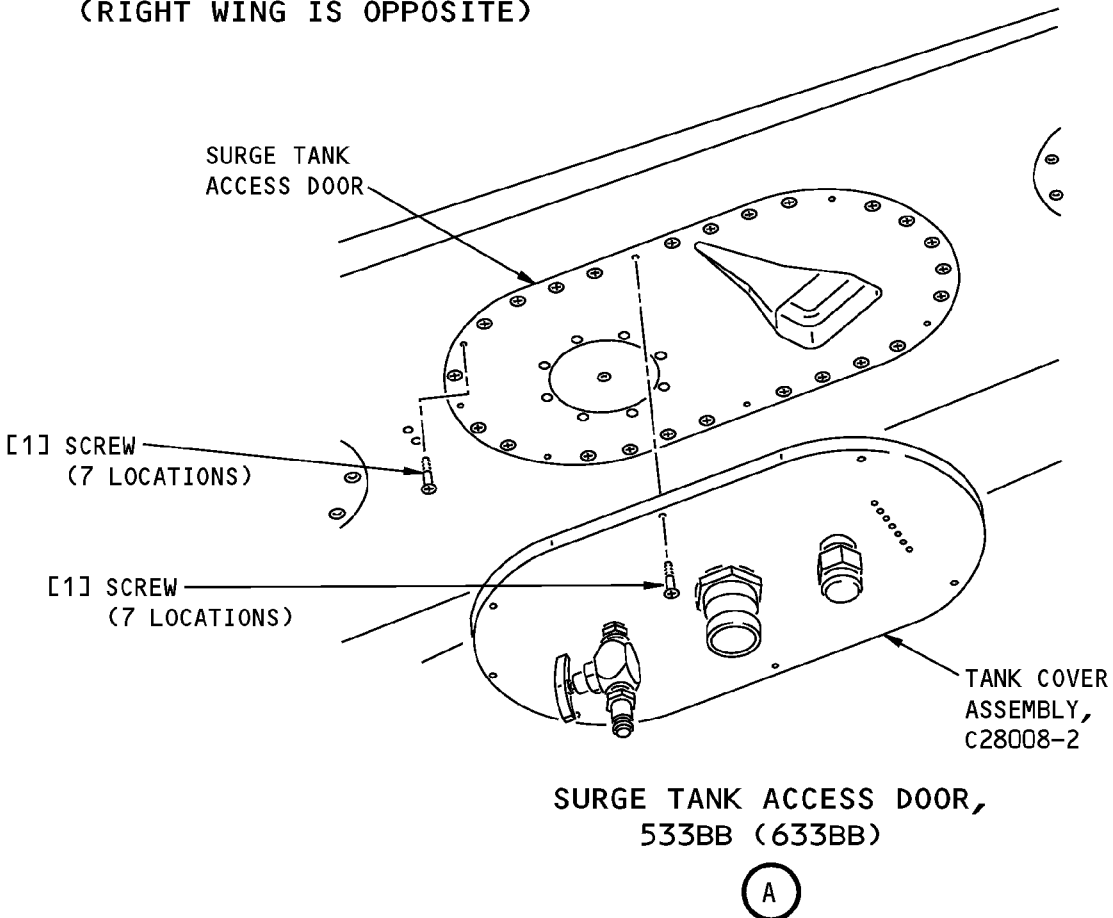
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**LEFT WING
(RIGHT WING IS OPPOSITE)**

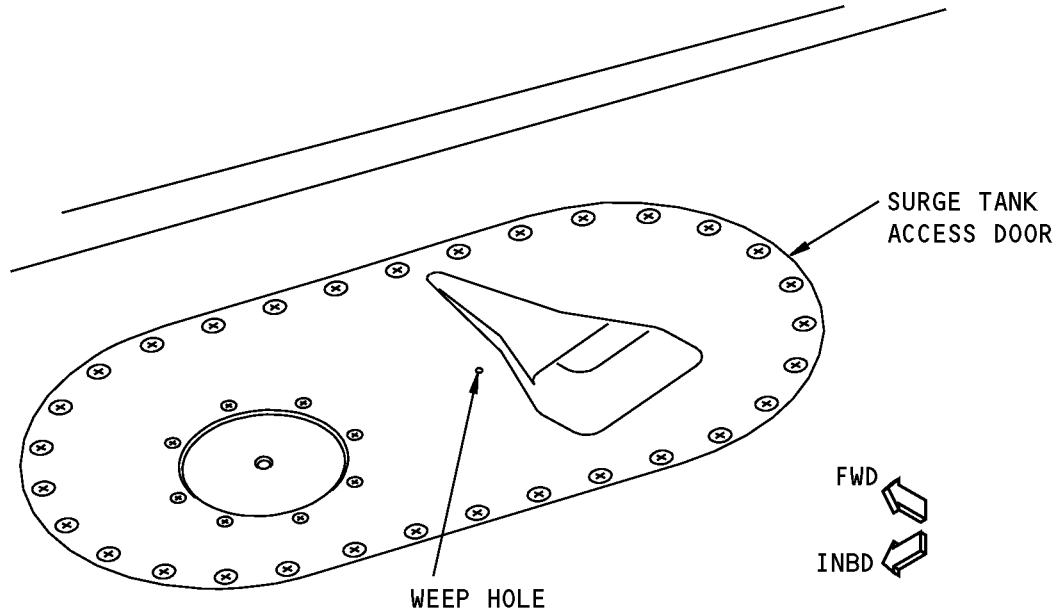


**Integral Fuel Tanks - Inspection/Check
Figure 607/28-11-00-990-812**

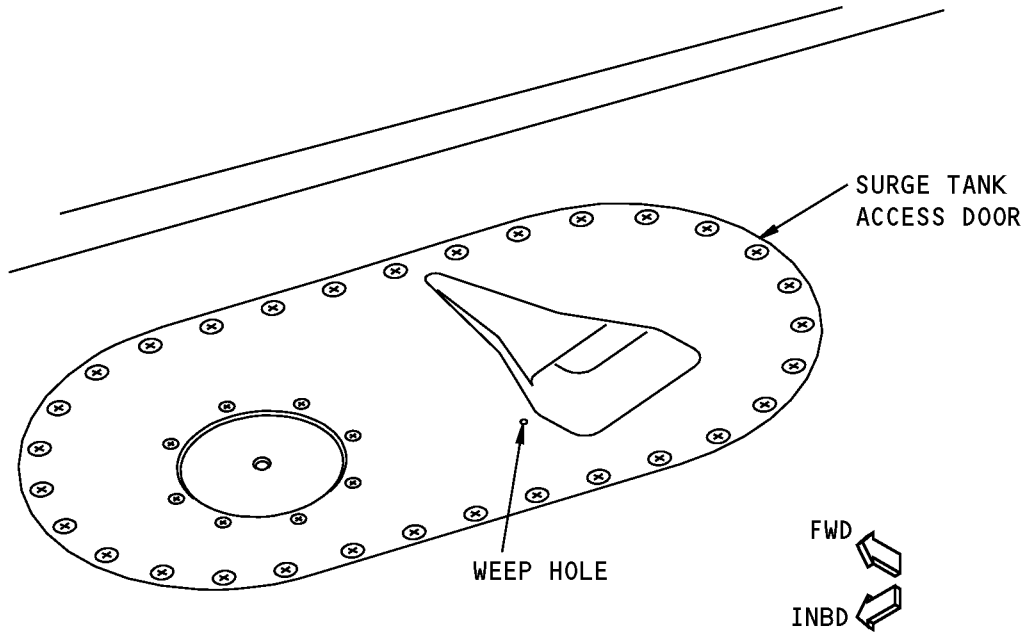
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WEEP HOLE LOCATION 1



WEEP HOLE LOCATION 2

**Surge Tank Weep Hole
Figure 608/28-11-00-990-847**

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TASK 28-11-00-790-803

5. Surge Tank Access Door Leak Test Procedure

A. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

B. Location Zones

Zone	Area
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

C. Procedure

SUBTASK 28-11-00-650-024

- (1) To do a leak test of the No. 1 surge tank doors, fill the No. 1 tank to its full capacity (to automatic shutoff). To do this, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802

SUBTASK 28-11-00-650-025

- (2) To do a leak test of the No. 2 surge tank doors, fill the No. 2 tank to its full capacity (to automatic shutoff). To do this, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802

SUBTASK 28-11-00-790-024

- (3) Slowly add 235 lb (107 kg) of fuel at a fuel density of 6.7 pounds/gallon (0.8029 kilograms/liter) to the applicable main tank (the No. 1 tank or the No. 2 tank) to cover the surge tank access doors with fuel.

NOTE: Push the red Manual Override Button adjacent to the solenoid of the applicable fueling shutoff valve to add fuel beyond the automatic shutoff quantity.

NOTE: Adjust the fuel quantity if the fuel density is different. Make sure you do not exceed the capacity of the surge tank.

SUBTASK 28-11-00-790-026

- (4) Permit the fuel to stay in the surge tank for a minimum of one hour.

SUBTASK 28-11-00-280-017

- (5) Examine the applicable access door for leaks using Find External Leaks with Talcum Powder Procedure.

SUBTASK 28-11-00-790-027

- (6) Make sure there is no leakage from the applicable surge tank access door.

SUBTASK 28-11-00-650-030

- (7) To remove the fuel from the applicable surge tank, do one of these tasks for the applicable main tank (No. 1 for the No. 1 surge tank, No. 2 for the No. 2 surge tank):
 - (a) Transfer sufficient fuel to another tank to let the fuel drain from the surge tank into the main tank. To do this, do this task: Tank to Tank Fuel Transfer, TASK 28-26-00-650-802.

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(b) Defuel sufficient fuel from the No. 1 or No. 2 tank to let the fuel drain from the surge tank into the main tank. To do this, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801.

SUBTASK 28-11-00-650-026

(8) If it is necessary, adjust the fuel quantities in the fuel tanks. To do this, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802

or, do this task: Tank to Tank Fuel Transfer, TASK 28-26-00-650-802

————— **END OF TASK** —————

TASK 28-11-00-790-802

6. Helitest Leak Detection Procedure

A. References

Reference	Title
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

B. Consumable Materials

Reference	Description	Specification
B01002	Solvent - General Cleaning Of Solvent Resistant Organic Coatings (AMM 20-30-82/201) - Series 82	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5
G00252	Film, Plastic Sheeting, Polyethylene	L-P-512
G02329	Tape - Aluminum Foil, Pressure Sensitive - Vibration Damping Tape 434	
G50004	Tape - Vacuum - SM5126 or SM5127	

C. Equipment

SUBTASK 28-11-00-800-002

(1) HeliTest Wing Kit - Varian Vacuum Products, Inc. - 121 Hartwell Avenue, Lexington, MA 02173, Phone: 1-800-882-7426 (USA only)

SUBTASK 28-11-00-800-003

(2) Scissors - razor knife

SUBTASK 28-11-00-800-004

(3) Helium - compressed, industrial grade, standard cylinder

SUBTASK 28-11-00-800-005

(4) Regulator - pressure, and gage for helium cylinder

SUBTASK 28-11-00-800-006

(5) Ventilation equipment - positive and negative to control and evacuate helium

SUBTASK 28-11-00-800-007

(6) Source - compressed air, to blow areas dry

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D. Procedure

SUBTASK 28-11-00-790-011

- (1) Do these steps to find the external leaks and to make a map of them:

NOTE: You must make a precise map of the leaks for this procedure to find the leakage.

- (a) Clean the external wing surface around the area where you think the leak is.
- (b) Use solvent to remove the grease from the area.
- (c) Dry the area.
- (d) Apply a mapping agent to the area.
 - 1) Use talcum powder or a similar powder for a mapping agent.
- (e) For running leaks, do these steps:
 - 1) Find the origin of the leak.
 - 2) Stop the fuel flow with mastic or tape to make sure that there are no other paths for fuel flow.
- (f) When the leak is found, remove the seal from the leak site and find the origin of the leak precisely within the seal.

SUBTASK 28-11-00-790-012

- (2) Defuel the tank that has the leak. To do this, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801
or, do this task: Tank to Tank Fuel Transfer, TASK 28-26-00-650-802

SUBTASK 28-11-00-860-019

- (3) For the tank with the leak, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802

SUBTASK 28-11-00-100-002

- (4) Apply compressed air to the external leak point to force back the fuel faster and to dry the area.

SUBTASK 28-11-00-100-003

- (5) Completely clean and dry the external leak point with Series 82 solvent, B01002 to provide the best adhesion of tape.

NOTE: This step is important for successful leak detection.

SUBTASK 28-11-00-480-040

- (6) Do one of these two steps:
- (a) Build a custom compression chamber around the external leak point with plastic film
 - (b) If it is possible, install one of the pressure cups supplied in the HeliTest Wing Kit to contain the pressure of helium on the outer surface of the tank.

SUBTASK 28-11-00-480-041

- (7) Install SM5126 or SM5127 tape, G50004 around the leak area or the pressure cup.
- (a) Work the tape to stick it to the surface.

SUBTASK 28-11-00-480-042

- (8) If you build a custom chamber, do these steps:
- (a) Cut a piece of film, G00252 to the size of the chamber formed by the SM5126 or SM5127 tape, G50004.
 - (b) Set the plastic over the vacuum tape.
 - (c) Work the plastic to make sure it sticks well to the vacuum tape.

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- (d) Make sure the chamber is as small as possible.

NOTE: A small chamber can contain more helium pressure than a larger one.

- (e) Trim the plastic with a razor knife to follow the outline of the vacuum tape.

SUBTASK 28-11-00-480-043

- (9) Do these steps to connect the helium supply to the custom chamber:

- (a) Wrap the helium injection tube with vacuum tape to form a 2 inch (5 cm) diameter flange 1 to 2 inches (2.5 to 5 cm) from the end of the tube.

- (b) Slice a small hole in the plastic chamber and put the helium tube in the hole.

- (c) Work the vacuum tape flange on the injection tube so it sticks well and seals the plastic chamber.

SUBTASK 28-11-00-480-044

- (10) If you use a pressure cup, attach the helium injection tube to the cup with the fittings supplied with the kit.

SUBTASK 28-11-00-480-045

- (11) Apply Vibration Damping Tape 434 tape, G02329 or equivalent over the plastic chamber or pressure cup and work it well for the best adhesion.

- (a) Use a sufficiently large quantity of Vibration Damping Tape 434 tape, G02329 to reinforce the plastic helium chamber so it can handle more pressure.

SUBTASK 28-11-00-480-046

- (12) Set up the HeliTest Wing Kit and purge the lines with helium to remove air.

NOTE: Refer to the instructions supplied with the kit.

SUBTASK 28-11-00-790-013

- (13) Carefully and slowly apply about 0.2 psig (1.4 kPa) helium pressure to the chamber.

NOTE: Start with low pressure and then slowly increase the pressure. Less helium is necessary for larger leaks than for smaller leaks. Too much helium will flood the fuel tank. Inspect the chamber or rubber cup to make sure there is no leakage. If it leaks too much, rebuild the chamber because the helium can interfere with the detector.

SUBTASK 28-11-00-790-014

- (14) Put negative ventilation around the helium chamber to draw away leaking helium to make sure it does not interfere with the detector by drifting into the tank.

NOTE: This step is important for successful leak detection. Use positive pressure if negative pressure is not available, but make sure the helium is removed from the area and does not go into the tank where the detector probe is used.

SUBTASK 28-11-00-790-015

- (15) Permit the helium to soak into the leak path for 10 to 15 minutes before you go into the tank.

NOTE: Time is necessary to push the remaining fuel out of the leak path and start the flow of helium from the external leak point to the internal leak point.

SUBTASK 28-11-00-790-016

WARNING: KEEP THE DETECTOR AND THE PUMP AWAY FROM THE TANK. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (16) The HeliTest detector and the auxiliary pump must be kept away from the open fuel tank at all times.

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SUBTASK 28-11-00-790-017

(17) Go into the tank with the HeliTest Visual Probe (intrinsically safe for Class I, Div I areas).

SUBTASK 28-11-00-790-018

(18) Slowly interrogate the inside of the tank around the area where you expect to find the leak.

NOTE: Patience is important. With a systematic approach, slowly move away from the area where you expect to find the leak until you find the exact location of the leak.

SUBTASK 28-11-00-790-019

CAUTION: DO NOT PUT THE PROBE INTO FUEL PUDDLES. IT CAN CAUSE DAMAGE TO THE INSTRUMENT.

(19) If there is a puddle of fuel in the area where you expect to find the leak, use compressed air to dry the area.

- (a) Assemble the cotton wiper, G00034 to soak up the fuel.
- (b) Completely dry hidden areas.
- (c) If fuel is drawn into the HeliTest probe, immediately remove it to a safe area and permit it to operate until all the fuel is vaporized.
 - 1) Disconnect the Visual Probe gas line and permit it to run dry also.
 - 2) Replace the wet filter on the visual probe tip with a dry filter.
 - 3) Do not shut the HeliTest off while it is contaminated with fuel because permanent damage can occur.

SUBTASK 28-11-00-790-020

(20) If you do not find the leak, increase the helium pressure to 0.6 psig, and then 1.2 psig.

- (a) Continue to increase the helium pressure in similar increments until the leak is found.

NOTE: The compression chamber can hold 2 to 5 psig maximum. The maximum pressure depends on the size of the chamber. A smaller chamber can hold a larger pressure.

SUBTASK 28-11-00-360-008

(21) When you find the leak, repair it with the applicable repair procedure (TASK 28-11-00-300-803).

SUBTASK 28-11-00-790-021

(22) After the leak repair, do another test of the leak with the Helitest equipment before you remove the helium chamber from the outside of the tank.

NOTE: This procedure makes sure the leak was repaired correctly.

SUBTASK 28-11-00-110-007

(23) Do these steps to put the area back to its usual condition:

- (a) Remove the pressure chamber or pressure cup and the tape.
- (b) Clean the area around the leak with Series 82 solvent, B01002.

SUBTASK 28-11-00-790-022

(24) Do this same procedure with the HeliTest equipment for other leaks.

————— **END OF TASK** —————

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TASK 28-11-00-400-801

7. Fuel Tank Closure Leak Check

A. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-11-400-802	Surge Tank Access Door - Installation (P/B 401)

B. Procedure

SUBTASK 28-11-00-700-029

(1) Do these steps to do a check for fuel leaks after the repairs are finished:

- (a) Remove all materials from the fuel tank and go out of the tank (TASK 28-11-00-410-801).
- (b) Install the applicable fuel tank access doors (TASK 28-11-11-400-801, TASK 28-11-11-400-802).
- (c) To refuel the applicable fuel tank(s), do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.
- (d) Examine the external leak area regularly for one hour.

NOTE: You can monitor the leak area for a longer time to make sure the leak repair is OK.

- (e) Make sure there are no leaks in the area of repair.

NOTE: Make sure the leakage area is maintained, at a minimum, to the leakage limits shown in Figure 602 after the 1 hour inspection.

————— **END OF TASK** —————

TASK 28-11-00-210-801

8. General Visual Inspection of the Fuel Tanks

(Figure 603)

A. General

(1) This procedure is a scheduled maintenance task.

B. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

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C. Procedure

SUBTASK 28-11-00-210-024

- (1) Regularly inspect (general visual) the main and center fuel tank (wing) lower surfaces for obvious leaks, condition, and security.
 - (a) Make sure you do an inspection of each of these components:
 - 1) Tank vents
 - 2) Sump drain valves
 - 3) Skin lap joints

————— END OF TASK —————

TASK 28-11-00-211-801

9. External Wires Over the Center Tank Inspection

A. General

- (1) This procedure is a scheduled maintenance task.
- (2) ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on airworthiness limitation instructions (ALIs).

B. References

Reference	Title
24-22-00 P/B 201	MANUAL CONTROL - MAINTENANCE PRACTICES
24-22-00-860-812	Remove Electrical Power (P/B 201)
25-22-00 P/B 401	PASSENGER SEATS - REMOVAL/INSTALLATION
25-24-15 P/B 401	PARTITIONS - REMOVAL/INSTALLATION
25-27-15 P/B 401	CARPETS - REMOVAL/INSTALLATION
25-27-31 P/B 401 Config 1	FLOOR PROXIMITY LIGHTING RACEWAY - REMOVAL/INSTALLATION
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
53-21-00 P/B 401	PASSENGER CABIN FLOORS - REMOVAL/INSTALLATION
SWPM 20-10-11	Standard Wiring Practices Manual

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

D. Prepare for the Inspection

SUBTASK 28-11-00-010-011

- (1) To get access to the top of the center tank from Station 540 to Station 664 and left and right body buttock line 24.82, do these steps:
 - (a) Remove the seats (PAGEBLOCK 25-22-00/401).
 - (b) Remove the partitions (PAGEBLOCK 25-24-15/401).
 - (c) Remove the floor covering (PAGEBLOCK 25-27-15/401).

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HAP 001-013, 015-026, 028-030

- (d) Remove the floor proximity lighting raceway (PAGEBLOCK 25-27-31/401 Config 1).

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- (e) Remove the passenger cabin floors (PAGEBLOCK 53-21-00/401).

E. External Wires Over the Center Tank Inspection

SUBTASK 28-11-00-211-001

- (1) Do a detailed inspection of the wire bundles routed on the main deck over the center tank and under the floor beams between Station 540 and Station 664 and left and right body buttock line 24.82.

- (a) Look for these items:

- 1) Damaged clamps,
- 2) Wire chafing,
- 3) Wire bundles that are in contact with the surface of the center tank.

SUBTASK 28-11-00-210-041

- (2) If you found a problem, do these steps:

- (a) Remove electrical power from the airplane (TASK 24-22-00-860-812).
- (b) Do the applicable repair (SWPM 20-10-11).

F. Put the Airplane Back to Its Usual Condition

SUBTASK 28-11-00-410-016

- (1) Install the passenger cabin floors (PAGEBLOCK 53-21-00/401).

HAP 001-013, 015-026, 028-030

SUBTASK 28-11-00-410-018

- (2) Install the floor proximity lighting raceway (PAGEBLOCK 25-27-31/401 Config 1).

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SUBTASK 28-11-00-410-019

- (3) Install the floor covering (PAGEBLOCK 25-27-15/401).

SUBTASK 28-11-00-410-020

- (4) Install the partitions (PAGEBLOCK 25-24-15/401).

SUBTASK 28-11-00-410-022

- (5) Install the seats (PAGEBLOCK 25-22-00/401).

SUBTASK 28-11-00-860-025

- (6) Supply electrical power to the airplane if it is necessary (PAGEBLOCK 24-22-00/201).

————— END OF TASK —————

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FUEL TANKS - CLEANING/PAINTING

1. General

A. This procedure contains these tasks:

- (1) Apply the Corrosion Resistant Finish (Topcoat)
 - (a) Repair or replace bad sealant in the fuel tank before you apply the topcoat (TASK 28-11-00-300-803).
- (2) Clean the Fuel Tanks Contaminated with Red Dye

TASK 28-11-00-600-801

2. Apply the Corrosion Resistant Finish (Topcoat)

A. General

- (1) Corrosion resistant finish (topcoat) is applied to prevent corrosion to the internal structural and tubing surfaces, especially the bottom and lower sides, of the fuel tank. BMS 10-20 Type II and MIL-C-27725 are two types of corrosion resistant material which are approved for internal fuel tank use. An advantage of BMS 10-20 Type II finish material is that you can make additional BMS 5-45 sealant repairs, if necessary, after you apply the finish material if it is fully heat cured before sealant is applied. The MIL-C-27725 material can only be used as a topcoat after the sealant installation is complete.

B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
20-40-11-910-801	Static Grounding (P/B 201)
28-10-00-100-803	Microbial Growth Removal - Manual Removal Method (P/B 201)
28-10-00-100-804	Microbial Growth Removal - Pressure Washer Method (P/B 201)
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-00-790-801	Fuel Leak Detection Procedures (P/B 601)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-11-400-802	Surge Tank Access Door - Installation (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1064	Scraper - Phenolic, Hard Resin
STD-1080	Brush - Paint
STD-1119	Blower - Air, Explosion Proof, 90-100 Cubic Feet per Minute, Includes sufficient hose to reach all areas of Fuel Tanks
STD-1120	Fan - Exhaust, Centrifugal, Explosion Proof, 125-150 Cubic Feet per Minute, Includes 75 feet of 3 Inch suction hose and sufficient delivery hose to carry air out of work area

D. Consumable Materials

Reference	Description	Specification
B00102	Abrasive - Aluminum Oxide Coated Cloth	ANSI B74.18
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7

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Reference	Description	Specification
B01001	Solvent - General Cleaning Of All Organic Coatings (AMM 20-30-81/201) - Series 81	
B01002	Solvent - General Cleaning Of Solvent Resistant Organic Coatings (AMM 20-30-82/201) - Series 82	
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
C00064	Coating - Aluminum Chemical Conversion	BAC5719, Type II, Class A (MIL-C-5541, Class A)
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20, Type II
C00321	Coating - Corrosion Preventive Coating For Aircraft Integral Fuel Tanks	AMS-C-27725 (Supersedes MIL-C-27725)
C50104	Powder - Alodine 600	MIL-C-81706
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5
G00270	Tape - Scotch Flatback Masking 250	ASTM D6123 (Supersedes A-A-883)
G02088	Abrasive - Silicon Carbide, Waterproof Paper	ANSI B74.18

E. Location Zones

Zone	Area
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

F. Prepare to Apply the Corrosion Resistant Finish (Topcoat)

SUBTASK 28-11-00-650-015

(1) Do this task: Fuel Tank Defueling, TASK 28-26-00-650-801.

SUBTASK 28-11-00-650-016

WARNING: OBEY THE FUEL TANK PURGING AND ENTRY PRECAUTIONS. IF YOU DO NOT OBEY THE FUEL TANK PURGING AND ENTRY PRECAUTIONS INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

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SUBTASK 28-11-00-480-038

WARNING: MAKE SURE THERE IS AN ELECTRICAL GROUND FOR ALL VENTILATION EQUIPMENT IN OR NEAR AN OPEN FUEL TANK. SPARKS IN OR NEAR AN OPEN FUEL TANK COULD CAUSE A FIRE OR EXPLOSION.

- (3) Connect the hoses and nozzles to an electrical ground (TASK 20-40-11-910-801).

SUBTASK 28-11-00-480-039

- (4) Set up the air explosion proof, 90-100 CFM air blower, STD-1119, and the flexible hose to have a good flow of air in the fuel tank.

SUBTASK 28-11-00-160-007

CAUTION: MAKE SURE THE CAPACITY OF THE EXHAUST FAN IS MORE THAN THE CAPACITY OF THE AIR BLOWER. THE CAPACITY OF THE EXHAUST FAN MUST BE MORE THAN THE CAPACITY OF THE AIR BLOWER TO MAKE SURE THERE IS A GOOD FLOW OF AIR.

- (5) Use the exhaust explosion proof 125-150 CFM exhaust fan, STD-1120, and hoses to move exhaust air from the fuel tank to an open space away from the work area or hangar.

SUBTASK 28-11-00-210-014

- (6) Examine the internal fuel tank and tubing surfaces for fungus (mildew) and corrosion.

NOTE: A slimy, black layer on the inner surfaces of the fuel tank, soon after defueling, shows fungus contamination. As it dries, the layer becomes solid and turns light brown in color.

- (a) If there is fungus or corrosion, clean the fuel tank (Microbial Growth Removal - Manual Removal Method, TASK 28-10-00-100-803 or Microbial Growth Removal - Pressure Washer Method, TASK 28-10-00-100-804).

SUBTASK 28-11-00-140-003

- (7) Remove all loose finish with a wood or plastic hard resin phenolic scraper, STD-1064 and sand the surface with aluminum oxide abrasive cloth, B00102, paper or disks.

- (a) Do a check for loose finish on the surfaces adjacent to those with loose finish and other areas you are not sure about.
 - 1) Apply a strip of pressure sensitive Scotch Flatback Masking Tape 250, G00270, to the applicable surface.
 - 2) Push on the pressure sensitive Scotch Flatback Masking Tape 250, G00270, with constant and hard pressure.
 - 3) Pull the pressure sensitive Scotch Flatback Masking Tape 250, G00270, off the surface with a quick movement, vertical to the surface.
 - 4) Examine the surface and the pressure sensitive Scotch Flatback Masking Tape 250, G00270, for signs of loose finish.
 - a) If there are signs of loose finish, remove the loose finish.

SUBTASK 28-11-00-120-002

- (8) Use wet abrasive, G02088, paper to make all finish areas and adjacent areas you will apply a layer to, rough.

SUBTASK 28-11-00-160-008

- (9) Use cotton wiper, G00034, soaked in cleaning Series 81 solvent, B01001, and rub all unwanted materials from the applicable surfaces.

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SUBTASK 28-11-00-160-009

(10) Use a clean cotton wiper, G00034, to make the surfaces dry.

SUBTASK 28-11-00-160-010

(11) Remove by suction all unwanted materials from the fuel tank.

SUBTASK 28-11-00-370-007

(12) If alodine metal surface treatment is worn or damaged, do the "Alodine Metal Surface Treatment" procedure before you apply the finish.

SUBTASK 28-11-00-390-014

(13) If sealant is damaged by removal of corrosion resistant finish, do this task: Repair of Sealant Leaks in the Fuel Tank Structure, TASK 28-11-00-300-803.

SUBTASK 28-11-00-210-015

(14) Make sure all equipment used to apply the corrosion resistant finish is clean.

- (a) If you are not sure, clean the equipment in solvent, B00148, or Series 81 solvent, B01001, before you apply the corrosion resistant finish.

SUBTASK 28-11-00-210-016

(15) Make sure that all surfaces of the fuel tank that you apply corrosion resistant finish to are clean.

- (a) If you are not sure, clean the surfaces of the fuel tank with BMS 11-7 solvent, B00184, before you apply the corrosion resistant finish.

SUBTASK 28-11-00-210-017

(16) Make sure the storage life of the corrosion resistant compounds that are not mixed is not expired.

- (a) The storage life of BMS 10-20 coating, C00307, Type II, Class A is 12 months at 40°F (4°C) to 90°F (32°C) from the date of manufacture.
- (b) The storage life of MIL-C-27725 corrosion resistant finish coating, C00321, is as follows:
 - 1) For DeSoto 823-011 or 823-730 the storage life is 12 months at 50°F (10°C) to 90°F (32°C) from the date of manufacture.
 - 2) For Products Research Company PR-1560M, PR-1560MC, PR-1560MK the storage life is 6 months at 50°F (10°C) to 90°F (32°C) from the date of manufacture.

SUBTASK 28-11-00-210-018

(17) Make sure there is sufficient corrosion resistant material to apply the corrosion resistant finish.

SUBTASK 28-11-00-950-001

CAUTION: REMOVE ALL MASKING TAPE AFTER YOU APPLY THE CORROSION RESISTANT FINISH. FAILURE TO REMOVE ALL THE MASKING TAPE COULD BLOCK THE SUCTION INLETS OF THE FUEL BOOST PUMP.

(18) Apply Scotch Flatback Masking Tape 250, G00270, to all non structural equipment areas in the fuel tank which are near the surfaces that you apply the corrosion resistant finish (topcoat) to.

NOTE: Do not apply the corrosion resistant finish (topcoat) to electrical bonding surfaces, clamps, O-rings, valves, fuel measuring sticks, tank units, wiring, pumps, filler caps or other non structural equipment.

SUBTASK 28-11-00-220-003

(19) Make sure you keep the corrosion resistant finish at 50°F (10°C) to 100°F (38°C) with less than 85 percent relative humidity while you apply it.

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G. Alodine Metal Surface Treatment

SUBTASK 28-11-00-370-008

- (1) If alodine metal surface treatment is worn or damaged, do the steps that follow before you apply topcoat:

WARNING: DO NOT GET ALODINE 600 POWDER OR PREPARED SOLUTION IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE ALODINE POWDER OR SOLUTION. PUT ON A RESPIRATOR, GOGGLES, RUBBER OR NEOPRENE GLOVES, BOOTS AND OUTER CLOTHING. SOAK ALL MATERIALS USED TO APPLY OR REMOVE ALODINE SOLUTION IN WATER AFTER USE. ALODINE IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) To prepare the alodine coating, C00064, do the steps that follow:

- 1) Measure 1 gal (4 l) of distilled water, or water with a solids content of less than 50 ppm, into a clean, stainless steel container.
- 2) Add 3 oz (85 g) of alodine 600 powder, C50104.

NOTE: Mix the powder before use.

- 3) Mix the powder in the water until you make a solution.

NOTE: A small quantity of powder may not become a liquid.

- 4) Let the alodine solution stand a minimum of 1 hour before use.

- (b) To apply the alodine coating, C00064, do the steps that follow:

- 1) Remove all burrs or particles from the surface and make nicks or scratches smooth.

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

- 2) Clean the surfaces with Series 88 solvent, B01008.
- 3) Apply the alodine coating, C00064, to metal surfaces with a hard resin phenolic scraper, STD-1064, brush, swab, spray gun, or cotton wiper, G00034.

NOTE: If the alodine coating, C00064, does not apply smoothly, the metal surface is not cleaned correctly.

- 4) Keep the surface continuously moist with the alodine coating, C00064, until a layer is made.

NOTE: It can take 1 to 5 minutes to make a layer. The time is related to the temperature.

- 5) Flush with clean water or carefully rub with a soft cotton wiper, G00034, to remove the unwanted alodine coating, C00064.

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H. Apply the Corrosion Resistant Finish (Topcoat)

WARNING: HAVE A GOOD FLOW OF AIR IN THE AREA THAT YOU APPLY THE CORROSION RESISTANT FINISH (TOPCOAT). DO NOT GET THE CORROSION RESISTANT FINISH IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THE CORROSION RESISTANT FINISH. KEEP THE CORROSION RESISTANT FINISH AWAY FROM SPARKS, FLAME AND HEAT. THE CORROSION RESISTANT FINISH IS A POISONOUS AND FLAMMABLE COMPOUND WHICH CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

SUBTASK 28-11-00-620-002

WARNING: MAKE SURE THERE IS A GOOD FLOW OF AIR IN THE AREA WHERE YOU MIX THE CORROSION RESISTANT FINISH. ONLY QUALIFIED PERSONS WHO WEAR RESPIRATORS CAN MIX THE CORROSION RESISTANT FINISH OR BE IN THE AREA. THE CORROSION RESISTANT FINISH IS A POISONOUS AND FLAMMABLE COMPOUND WHICH CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) To mix the corrosion resistant finish, do the steps that follow:
 - (a) Make sure the materials are at 60°F (16°C) to 90°F (32°C) before you mix them.
 - (b) Shake the base component for 10 minutes in a shaker.
 - (c) Measure proportional volumes of base and catalyst, and reducer or thinner if you want to apply the corrosion resistant finish with a spray gun, refer to the table below (Table 701).
 - (d) Mix the base and the catalyst.
 - (e) Add a reducer if it is necessary.

Table 701/28-11-00-993-840 Corrosion Resistant Mixing Proportions

Manufacturer	Component	METHOD OF APPLICATION						
		SPRAY			BRUSH			
		Manufacturer Designation	Parts By Volume	Viscosity Zahn No. 1 72° ± 2° F	Manufacturer Designation	Parts By Volume		
Bostik West (BMS 10-20 Type II)	Base	454-1	3	31-40 seconds	454-1	3		
	Catalyst	CA109	1				CA-109	1
	Reducer	TL-52	approx 1					
Desoto (MIL-C-27725)	Base	823-011	4	31-40 seconds	823-011	4		
	Activator	910-099	1				910-099	1
	Reducer	020-037	approx 4					
	Base	823-730	4	31-40 seconds	823-730	4		
	Activator	910-702	1				910-702	1
	Reducer	020-707	approx 4					
Products Research (MIL-C-27725)	----	Part A	1	31-40 seconds	Part A	1		
	----	Part B	2				Part B	2

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SUBTASK 28-11-00-620-003

- (2) Do not use the corrosion resistant finish until a minimum of 1 hour after you mix it.

NOTE: The maximum usable life of the corrosion resistant finish is 8 hours at $75 \pm 5^{\circ}\text{F}$ ($24 \pm 3^{\circ}\text{C}$).

- (a) Immediately after you mix the corrosion resistant finish, write the date, the time you mixed the finish, and the usable life expiration on the containers.
- 1) Keep the containers with the corrosion resistant finish tightly closed until you use it or the finish will become thicker.

SUBTASK 28-11-00-620-004

- (3) To apply the corrosion resistant finish, use the brush procedure or spray gun procedure as follows:

- (a) For the brush procedure (applicable for small areas), do the steps that follow:

- 1) Apply a thin layer of corrosion resistant finish (approximately 0.0005 in. (0.0013 cm)) with a soft bristle paint brush, STD-1080, to apply the finish.

NOTE: Move the brush in one direction as much as possible.

- a) To prevent air bubbles, spaces and removal of finish already applied, do not move the brush quickly or too many times when you apply the corrosion resistant finish.
- 2) Let the corrosion resistant finish dry for a minimum of 30 minutes.
- 3) Apply a second thin layer like the first layer.
- 4) Make sure the corrosion resistant finish you applied makes an overlap with all adjacent topcoat applied before.

- (b) For the spray gun procedure (recommended for large areas), do the steps that follow:

- 1) Set the spray gun to 40 psi air pressure and 5 to 10 psi fluid pressure.
- 2) Apply the corrosion resistant finish with a spray gun on the surface.
- 3) Let the corrosion resistant finish dry for a minimum of 30 minutes.
- 4) Apply the second layer like the first layer.
- 5) Make sure the corrosion resistant finish you applied makes an overlap with all adjacent topcoat applied before.

SUBTASK 28-11-00-110-006

- (4) Clean the equipment and tools after you apply the corrosion resistant finish (topcoat).

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

- (a) Clean the equipment with Series 81 solvent, B01001, immediately after use.
- (b) Soak the brushes in Series 81 solvent, B01001, immediately after use.

NOTE: Discard the brushes when the bristles become rigid.

SUBTASK 28-11-00-620-005

- (5) Cure the corrosion resistant finish.

- (a) Cure all finish layers, refer to the table below (Table 702).
- (b) The cure time can decrease if you increase the temperatures and, with some finish compounds, increase relative humidity (Figure 701, Figure 702, Figure 703, Figure 704).

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- (c) Do the Series 82 solvent, B01002, or fuel resistance check that follows to make sure the cure is complete.
 - 1) Soak a cotton wiper, G00034, with solvent or fuel.
 - 2) Apply the cotton wiper, G00034, to the surface you check and let the solvent or fuel soak the area.
 - 3) Use hard pressure and rub the area 100 strokes.

NOTE: Count each movement in one direction as a stroke.
 - 4) Look and see if the corrosion resistant finish is removed.

NOTE: If you can see metal, the corrosion resistant finish is removed.

 - a) If you do not see metal, the cure is satisfactory.

Table 702/28-11-00-993-841 Corrosion Resistant Finish Cure Time

CORROSION RESISTANT FINISH (BY MFGR.)	CURE TIME BEFORE FUEL EXPOSURE ^{*[1]}	CURE TIME BEFORE TRAFFIC	CURE TIME BEFORE ASSEMBLY ^{*[1]}	CURE TIME BEFORE SEALING ^{*[2]}
Bostick West (BMS 10-20 TYPE II)	12 hours at 65°F (18°C) or higher or Fig. 702. ^{*[3]}	12 hours at 65°F (18°C) or higher, or Fig. 702 ^{*[3]}	12 hours at 65°F (18°C) or higher, or Fig. 702 ^{*[3]}	Fig. 702 ^{*[3]}
Desoto (MIL-C-27725)	Fig. 703 ^{*[3]}	24 hrs at 65°F (18°C) or higher,	Fig. 704 or 240 Hrs at 65°F (18°C) or higher ^{*[3]}	Not Applicable
Products Research (MIL-C-27725)	Fig. 705	24 hours at 65°F (18°C) or higher	240 Hrs at 75°F (24°C) and minimum of 30 percent relative humidity	Not Applicable

- *[1] Do the fuel resistance check to make sure the cure is completed.
- *[2] Do the solvent resistance check to make sure the cure is completed.
- *[3] Let the finish dry a minimum of 30 minutes at the temperature you applied it at, before you cure the finish at a higher temperature.

I. Return the Airplane to Its Usual Configuration

SUBTASK 28-11-00-950-002

- (1) Make sure all the Scotch Flatback Masking Tape 250, G00270, is removed from the fuel tank and tank equipment.

SUBTASK 28-11-00-410-010

- (2) Install all substructure, support brackets, and fuel tank equipment removed for access.

SUBTASK 28-11-00-210-019

- (3) Make sure all tools, cotton wiper, G00034, air movers, hoses, and other equipment are removed from the fuel tank.

SUBTASK 28-11-00-410-011

- (4) To install the applicable access doors:
 - (a) Do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.
 - (b) Do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801.
 - (c) Do this task: Surge Tank Access Door - Installation, TASK 28-11-11-400-802.

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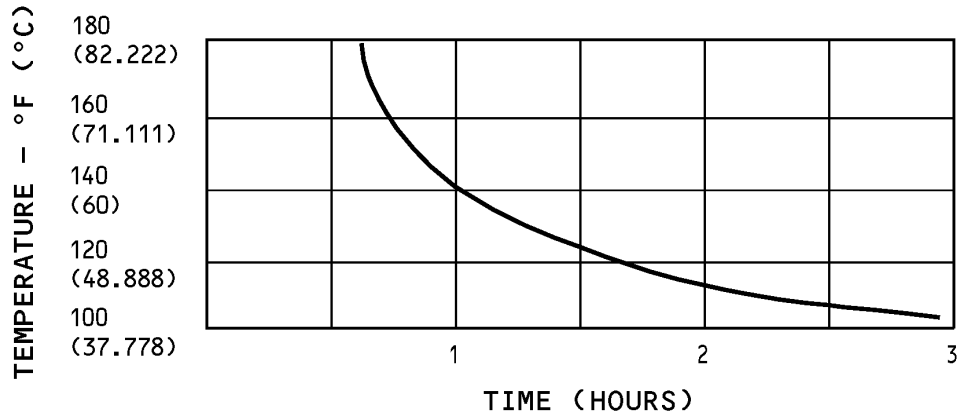
SUBTASK 28-11-00-650-017

(5) Do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

SUBTASK 28-11-00-210-020

(6) Make sure there are no fuel leaks, do this task: Fuel Leak Detection Procedures, TASK 28-11-00-790-801.

————— END OF TASK —————



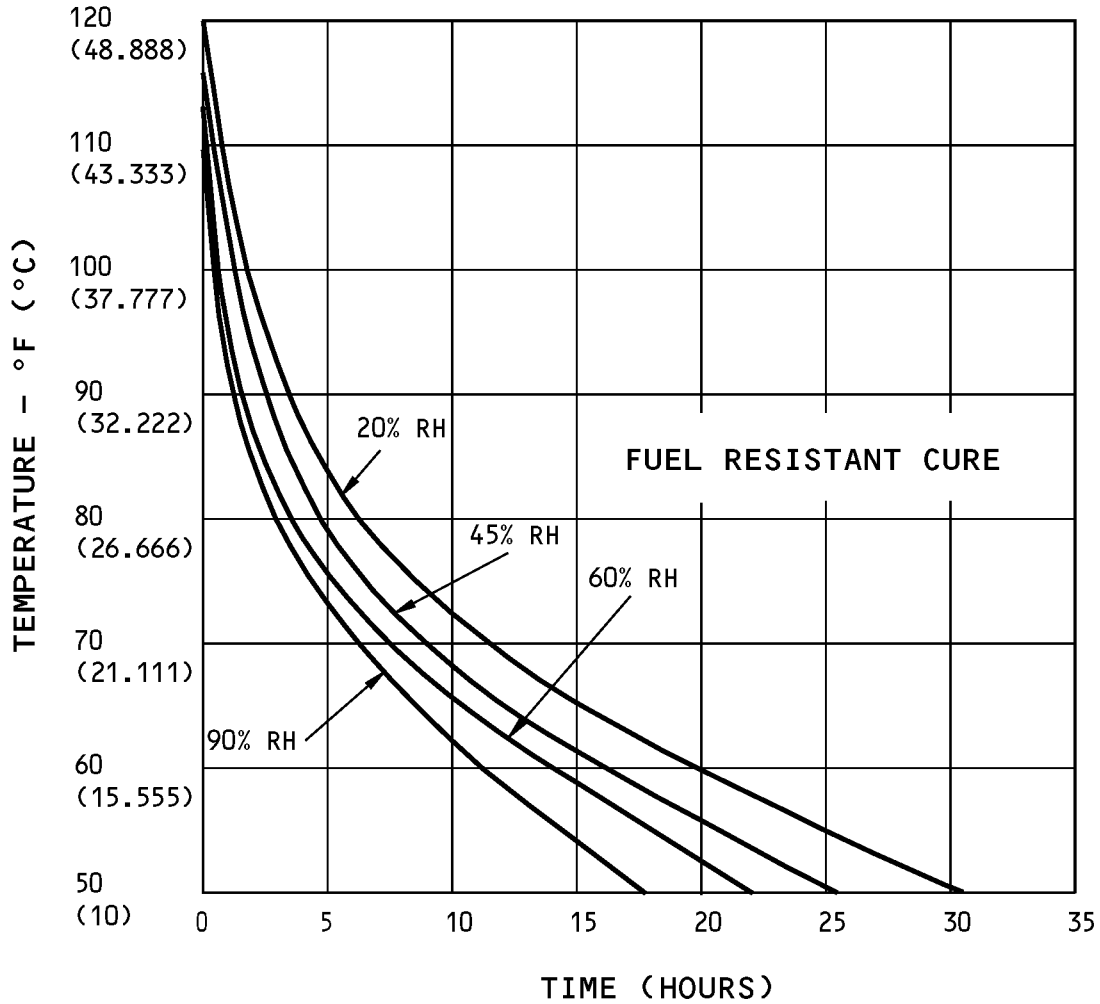
Bostik-Finch (BMS 10-20 Type II) Compound Cure Time Versus Temperature
Figure 701/28-11-00-990-835

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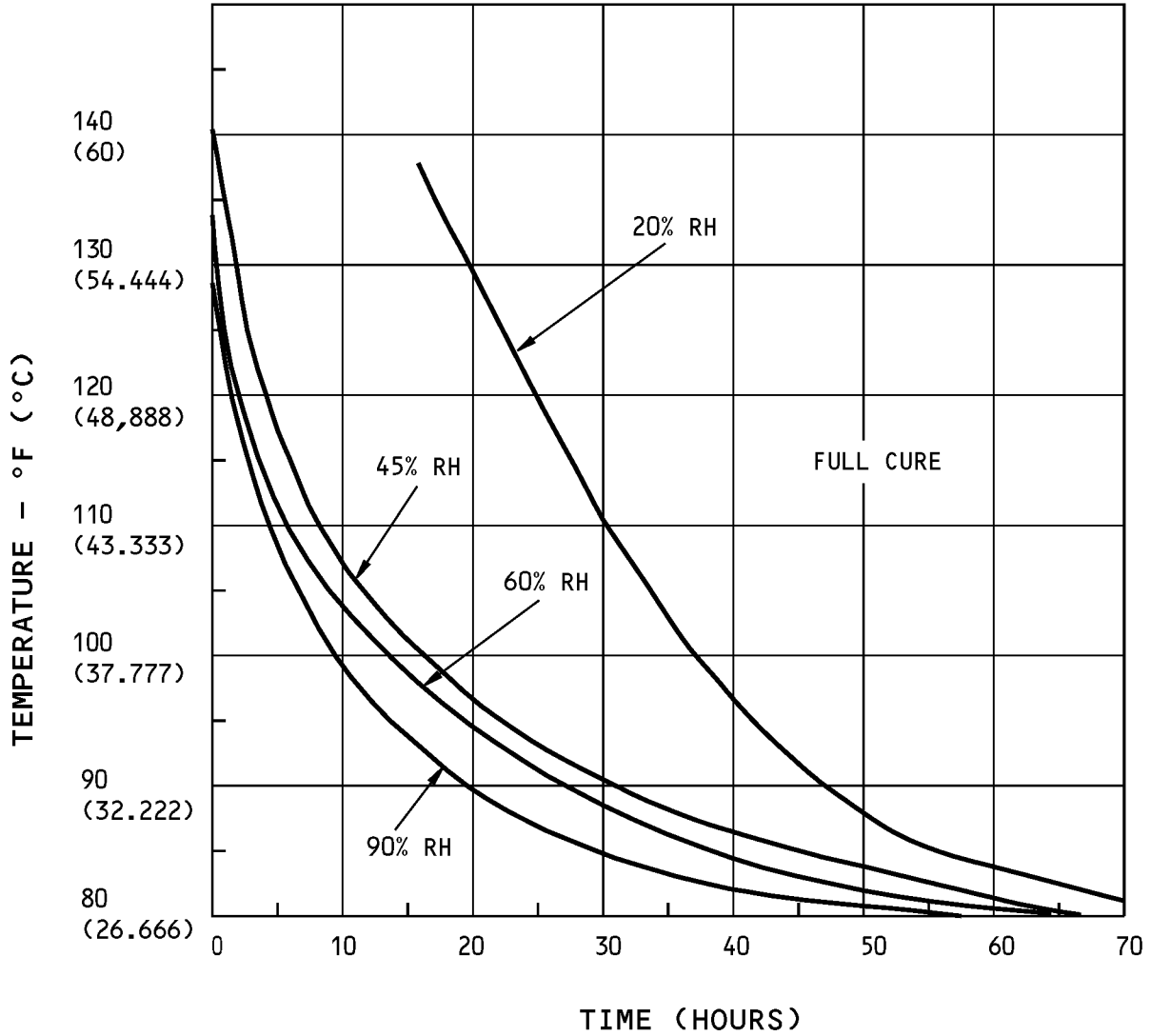
**DeSoto (MIL-C-27725) Compound Fuel Resistant Cure Time Versus Temperature and Relative Humidity (RH)
Figure 702/28-11-00-990-836**

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**DeSoto (MIL-C-27725) Compound Full Cure Time Versus Temperature and Relative Humidity (RH)
Figure 703/28-11-00-990-837**

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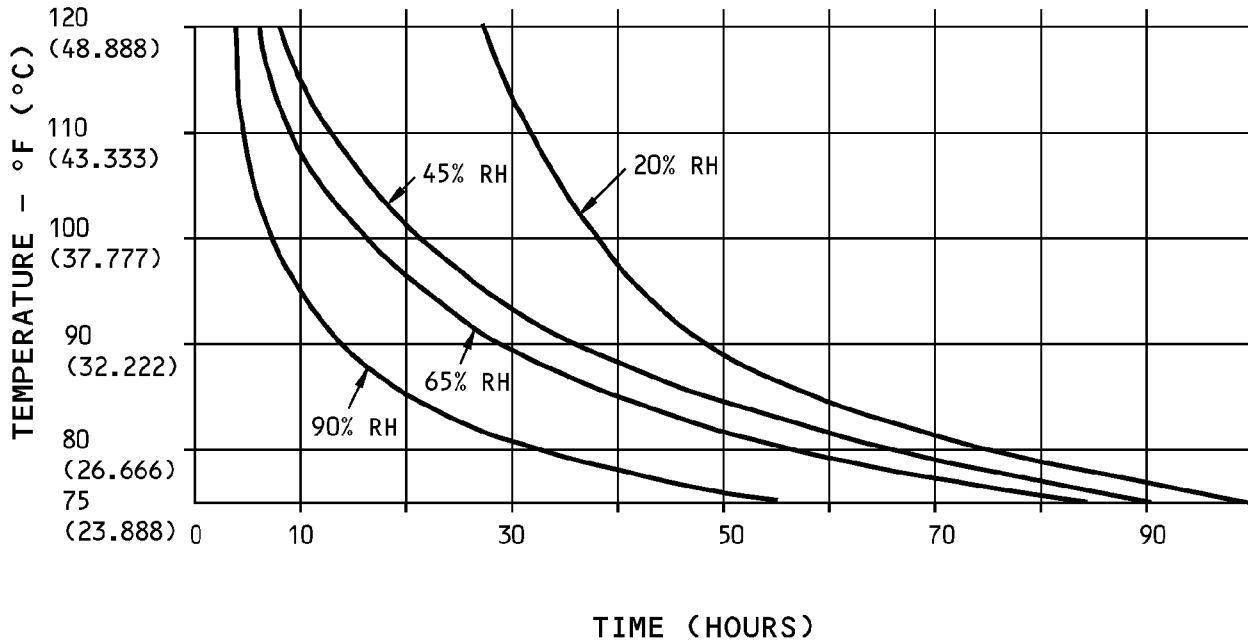
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% RELATIVE HUMIDITY (RH)	TEMPERATURE - °F (°C)	
	65 (18.333)	70 (21.111)
20	392	228
45	376	212
65	344	184
90	240	124



Products Research (MIL-C-27725) Compound Cure Time Versus Temperature and Relative Humidity (RH)

Figure 704/28-11-00-990-838

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TASK 28-11-00-100-802

3. Clean the Fuel Tanks Contaminated with Red Dye

A. General

- (1) The service criteria and reporting requirements for red dye concentrations can be found in the Boeing service letter 737-SL-28-053, Aircraft Use of Fuels Contaminated with Dye.
- (2) Do the procedure that follows if:
 - (a) The concentration of red dye is more than 0.28 milligrams per liter as indicated by the JT-100S analyzer or equivalent.

B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
12-11-00-650-804	Drain the Fuel from the Sumps after Defueling (P/B 301)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
49-11-00-860-801	APU Starting and Operation (P/B 201)
49-11-00-860-802	APU Usual Shutdown (P/B 201)
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)
73-11-02-000-801-F00	Fuel Filter Removal (P/B 401)
73-11-02-400-801-F00	Fuel Filter Installation (P/B 401)

C. Procedure

SUBTASK 28-11-00-860-016

- (1) Do not start or operate the engines or the APU.

SUBTASK 28-11-00-650-020

- (2) Defuel the fuel tanks to the fuel tank sump levels. To defuel them, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801.

SUBTASK 28-11-00-650-021

- (3) Drain the fuel tank sumps and leave only trapped fuel.

NOTE: To drain them, do this task: Drain the Fuel from the Sumps after Defueling, TASK 12-11-00-650-804.

SUBTASK 28-11-00-020-005

- (4) Remove the fuel filter, do this task: Fuel Filter Removal, TASK 73-11-02-000-801-F00.

SUBTASK 28-11-00-020-006

- (5) Do a check of the engine fuel filter and the fuel filter bowl for signs of contamination of the fuel.
 - (a) Replace the filter if you think that there is contamination. To replace it, do this task: Fuel Filter Installation, TASK 73-11-02-400-801-F00.
 - (b) If there is no contamination, install the same filter. To install it, do this task: Fuel Filter Installation, TASK 73-11-02-400-801-F00.

SUBTASK 28-11-00-650-022

- (6) Refuel the fuel tanks with new clean fuel. To refuel them, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

NOTE: For most airplane fuel tanks, this will give a dilution ratio of new fuel to trapped fuel in the range of 1,000:1 to 10,000:1.

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SUBTASK 28-11-00-210-025

- (7) Take a sample of the fuel from the tank sumps.

NOTE: To take a sample, do this task: Drain the Fuel from the Sumps after Defueling, TASK 12-11-00-650-804.

- (a) If you see signs of continued contamination, repeat the defueling and refueling steps above.
- 1) If the contamination continues, remove all fuel from the tank, including trapped fuel. To remove the trapped fuel from the tank, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.
- (b) If the samples from the fuel tank sumps do not show signs of contamination, do the subsequent steps:
- 1) Start the engines, do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.
 - 2) Start the APU, do this task: APU Starting and Operation, TASK 49-11-00-860-801.
 - 3) Let them operate until the dirty fuel is flushed from the fuel system.
 - 4) Make sure that the engine and its controls operate correctly in all standard power settings.
 - 5) Stop the engines, do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.
 - 6) Stop the APU, do this task: APU Usual Shutdown, TASK 49-11-00-860-802.
 - 7) Speak to the engine and APU manufacturers about more inspections or tests.

SUBTASK 28-11-00-020-007

- (8) After you operate the engine and the APU, remove the fuel filter. To remove it, do this task: Fuel Filter Removal, TASK 73-11-02-000-801-F00.

SUBTASK 28-11-00-210-027

- (9) Do a check of the engine fuel filter and the fuel filter bowl for signs of contamination of the fuel.
- (a) If you do not see signs of contamination, do these steps:
- 1) Install the filter, do this task: Fuel Filter Installation, TASK 73-11-02-400-801-F00.
 - 2) Operate the airplane as usual.
- (b) If you see signs of contamination, do these steps:
- 1) Clean the filter bowl.
 - 2) Replace the filter, do this task: Fuel Filter Installation, TASK 73-11-02-400-801-F00.
 - 3) Apply the full procedure described above again.

SUBTASK 28-11-00-860-018

- (10) If the engines do not operate correctly, or if contamination continues, you will possibly have to do more engine inspections and tests.

NOTE: Speak to the engine and APU manufacturer for more procedures for their equipment.

SUBTASK 28-11-00-280-016

- (11) If you operated the engines for a long time with contaminated fuel, you must fully examine the engine fuel system, its components, and the turbine blades.

NOTE: Speak to the engine and APU manufacturer for the procedures for their equipment.

————— **END OF TASK** —————

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FUEL TANKS - REPAIRS

1. General

A. This procedure contains three tasks as follows:

- (1) Repair of Fuel Tank Corrosion
- (2) Repair of Sealant Leaks in the Fuel Tank Structure
- (3) Approved Repairs of the Secondary Fuel Barrier Sealant.

B. This procedure contains the task to do small corrosion repairs. Corrosion can make the structure weak. Before you do a corrosion repair, refer to the Structural Repair Manual to calculate if the structure is weak.

CAUTION: MAKE SURE THE NEW SEALANT AND SURFACE FINISH THAT YOU USE IN THE FUEL TANK ARE RECOMMENDED MATERIALS. IF THE MATERIALS ARE NOT COMPATIBLE, DAMAGE TO THE FUEL TANK COULD OCCUR.

C. This procedure also contains information on how to prepare, use and cure the sealant materials. The sealant and finish materials recommended for use in this procedure and in 28-11-00/701 can be used with each other (mutually compatible). Do not apply sealant over an old primer coating unless you know the primer is compatible with the new sealant.

D. Before you repair a leak, make an analysis of the source and cause of the leak with the Fuel Leak Detection procedure (TASK 28-11-00-790-801).

E. If the cause of the fuel leak is a result of structural damage, do the structural repair. Refer to the Structural Repair Manual before you apply sealant.

TASK 28-11-00-300-802

2. Repair of Fuel Tank Corrosion

A. General

WARNING: MAKE SURE YOU HAVE GOOD FLOW OF AIR IN THE AREA. OBEY ALL FIRE SAFETY PRECAUTIONS. POISONOUS AND FLAMMABLE MATERIALS ARE USED THAT CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) To repair fuel tank corrosion, the applicable surfaces in the fuel tank must be cleaned and treated. Corrosion resistant finish (topcoat) is then applied to the surfaces to prevent more corrosion. Be careful to clean and treat all corners, crevices and other limited access areas.

B. References

Reference	Title
28-11-00-600-801	Apply the Corrosion Resistant Finish (Topcoat) (P/B 701)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
CPM 20-40-00, Part I	General
SRM 51-10-02	Structural Repair Manual

C. Consumable Materials

Reference	Description	Specification
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7

D. Repair of the Fuel Tank Corrosion

SUBTASK 28-11-00-650-009

- (1) Do this task: Fuel Tank Defueling, TASK 28-26-00-650-801.

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SUBTASK 28-11-00-650-010

WARNING: OBEY THE PURGING AND FUEL TANK ENTRY PROCEDURE PRECAUTIONS. FAILURE TO OBEY THE PURGING AND FUEL TANK ENTRY PROCEDURE PRECAUTIONS COULD CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-11-00-140-001

(3) Look for corrosion on all structural surfaces of the fuel tank.

CAUTION: REFER TO THE STRUCTURAL REPAIR MANUAL TO CALCULATE IF THE STRUCTURE IS WEAK. CORROSION CAN MAKE THE STRUCTURE WEAK.

(a) To find and repair damage, do the procedures specified in (SRM 51-10-02) and (CPM 20-40-00, Part I).

SUBTASK 28-11-00-110-001

(4) With solvent, B00184, clean the applicable fuel tank surfaces that have corrosion, (Figure 801, Figure 802).

SUBTASK 28-11-00-170-001

(5) Flush the surface with water.

SUBTASK 28-11-00-370-001

(6) To apply the alodine treatment, do this task: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

NOTE: Refer to the Alodine Metal Surface Treatment procedure.

SUBTASK 28-11-00-390-001

(7) To repair all sealant damaged or removed when you remove corrosion, do this task: Repair of Sealant Leaks in the Fuel Tank Structure, TASK 28-11-00-300-803.

SUBTASK 28-11-00-370-002

(8) To apply topcoat, do this task: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

SUBTASK 28-11-00-410-006

(9) Do the Fuel Tank Close procedure (TASK 28-11-00-910-802).

————— **END OF TASK** —————

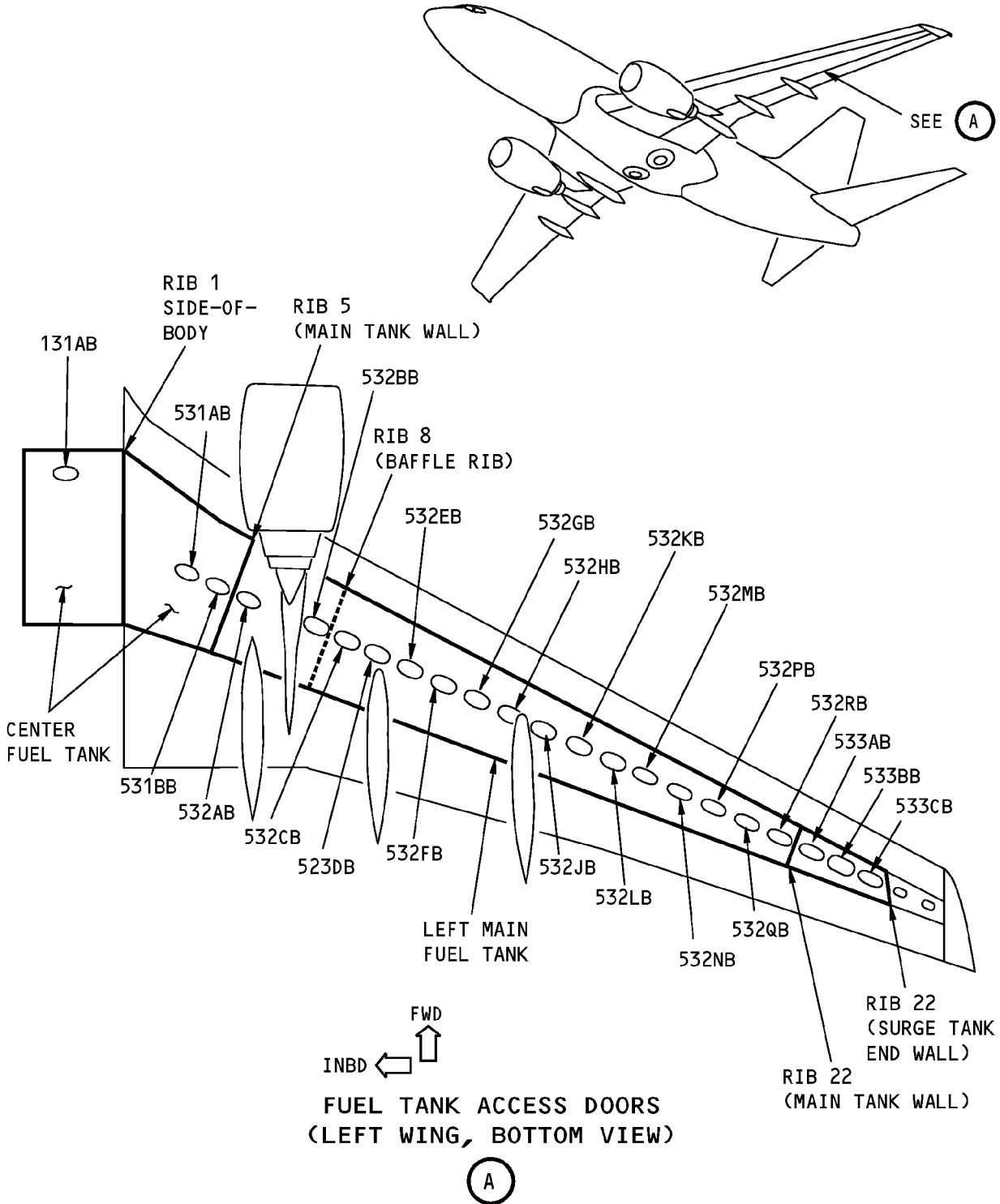
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**Fuel Tank - Left Wing
Figure 801/28-11-00-990-815**

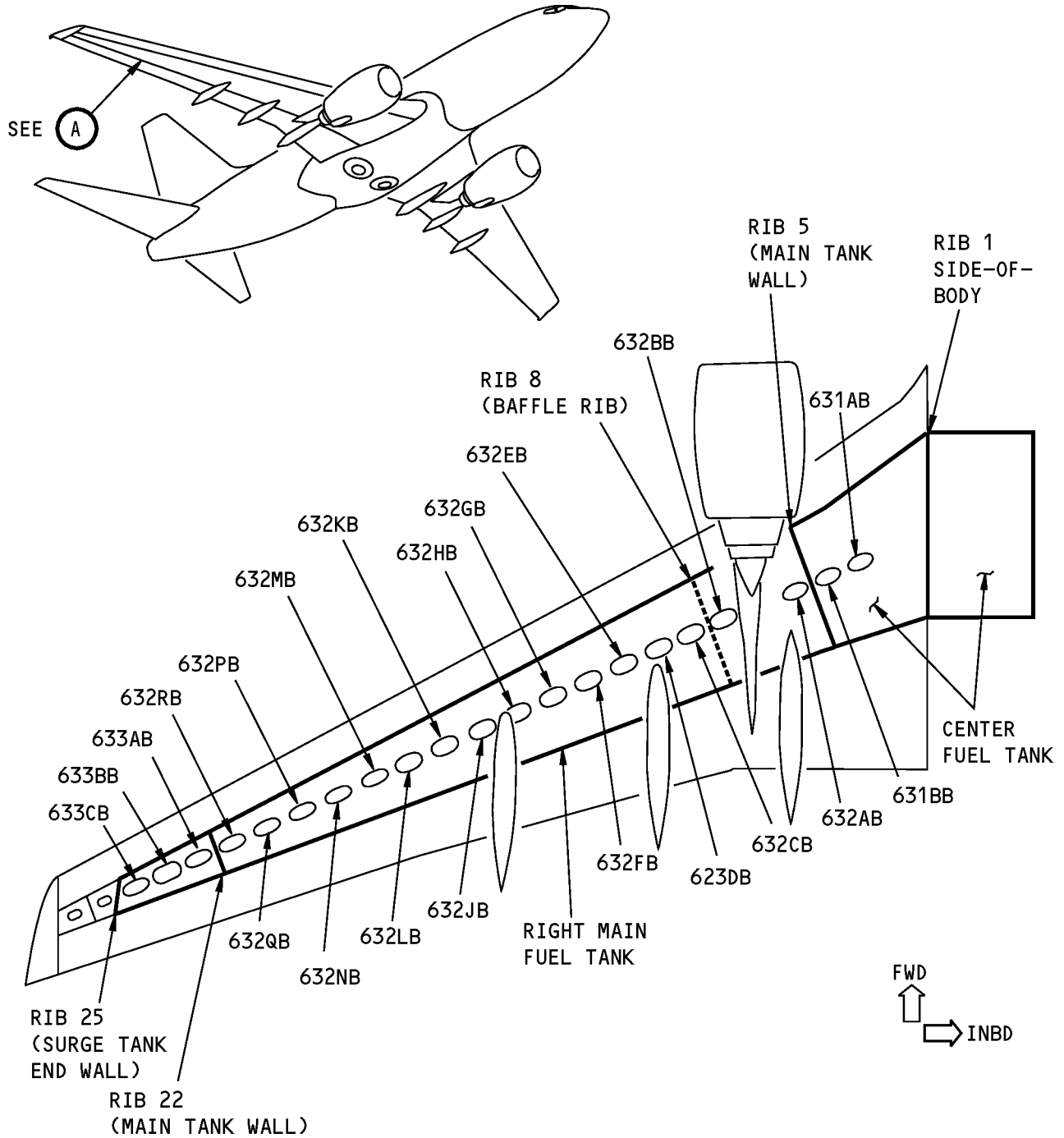
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**FUEL TANK ACCESS DOORS
(RIGHT WING, BOTTOM VIEW)**

A

**Fuel Tank - Right Wing
Figure 802/28-11-00-990-816**

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TASK 28-11-00-300-803

3. Repair of Sealant Leaks in the Fuel Tank Structure

A. General

WARNING: MAKE SURE YOU HAVE A GOOD FLOW OF AIR IN THE AREA. OBEY ALL FIRE SAFETY PRECAUTIONS. POISONOUS AND FLAMMABLE MATERIALS ARE USED THAT CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) It is necessary to use materials that are poisonous and flammable when you repair the sealant. You must have a good flow of air in the area. You must obey all fire safety precautions.

B. References

Reference	Title
20-30-93-910-801	Final Cleaning Prior to Fuel Tank Sealing (Series 93) (P/B 201)
28-11-00-300-801	Analysis of the Fuel Leak Type (P/B 601)
28-11-00-600-801	Apply the Corrosion Resistant Finish (Topcoat) (P/B 701)
28-11-00-790-801	Fuel Leak Detection Procedures (P/B 601)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
SRM 51-40-00	Structural Repair Manual
SRM 57-00-00	Structural Repair Manual

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
SPL-1762	Tool - Sealing, Fuel Tank Rivet (Part #: F70230-1, Supplier: 81205, A/P Effectivity: 737-100, -200, -200C, -300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: J28006-1, Supplier: 81205, A/P Effectivity: 737-100, -200, -200C, -300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
STD-449	Gun - Sealant
STD-9933	Gun, Rivet

D. Consumable Materials

Reference	Description	Specification
A00436	Sealant - Fuel Tank	BMS5-45 (Supersedes BMS 5-26)
A00767	Sealant - Fuel Tank	BMS5-45
A01019	Sealant - Integral Fuel Tank (Quick Repair)	AMS-S-83318A (MIL-S-83318)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
B01013	Solvent - Final Cleaning Prior To Fuel Tank Sealing (AMM 20-30-93/201) - Series 93	
C00064	Coating - Aluminum Chemical Conversion	BAC5719, Type II, Class A (MIL-C-5541, Class A)

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Reference	Description	Specification
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20, Type II
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5
G50653	Kit - Semco Click-Patch Kit, Sealant Type (Patch Kit Assembly P/N 231255, 231231, 231230)	
G50654	Kit - Semco Click-Patch Kit, Fast Set Epoxy Type (Patch Kit Assembly P/N 231256, 231232, 231265)	

E. Prepare for Fuel Tank Repair

SUBTASK 28-11-00-650-023

(1) For the applicable fuel tank, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801.

SUBTASK 28-11-00-860-020

(2) Do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-11-00-810-001

(3) To find the leak source, do this task: Fuel Leak Detection Procedures, TASK 28-11-00-790-801.

SUBTASK 28-11-00-150-004

(4) Use the sealant cutting tools (Figure 803) to remove the bad sealant.

(a) To cut sealant away from a fillet seal, refer to Figure 805.

- 1) Cut the ends of the bad sealant at a slope such that the new sealant makes an overlap with the remaining sealant.
- 2) Make sure you cut the sealant smoothly.

(b) If the fillet seal bond is good, it is not necessary to cut the sealant to the bare metal (Figure 805).

- 1) Make sure you remove all sealant that is loose.

(c) If the bad sealant includes fasteners with fillet seals, do the steps that follow:

- 1) Cut around the bottom of the fastener with a sealant cutting tool (Figure 803).
- 2) Use pliers and pull the sealant from the fastener.

NOTE: It is not necessary to remove small quantities of the sealant that bond to the fastener.

(d) If there is a bad injection seal, do the steps that follow:

- 1) Remove the bad sealant from short injection channels with hooked wire and small cutting tools.

NOTE: You must disassemble long injection channels (SRM 57-00-00). You can repair bad injection seals if you raise the new seal plane above the old seal plane to isolate the bad seal from the fuel.

- 2) Make sure the injection channel is clean.

NOTE: If air is caught in the injection channel, new sealant cannot fully fill the channel.

- 3) Be careful not to cause damage to the tank structure.

SUBTASK 28-11-00-360-002

(5) For a bad prepack or faying surface seal, do the steps these steps:

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- (a) Disassemble the structure around the bad sealant (SRM 57-00-00).
 - 1) If you do not want to disassemble the structure, you can repair the leak if you raise the new seal plane above the old seal plane to isolate the bad sealant from the fuel.

NOTE: The area of bad sealant must be small.

- (b) Remove the bad sealant with cutting tools and scrapers.

SUBTASK 28-11-00-150-005

- (6) If there is topcoat on the surface, remove all the topcoat from the sealant repair area unless you know the topcoat is a coating, C00307, of BMS 10-20, Type II finish material.

- (a) Use abrasive paper and remove the used topcoat until either bare metal or sealant shows (in good condition).

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- (b) Use clean cotton wiper, G00034, soaked with Series 93 solvent, B01013, to clean all surfaces, also sealant, from which you removed topcoat (TASK 20-30-93-910-801).
- (c) Rub the surface cleaned with Series 93 solvent, B01013, with a clean cotton wiper, G00034, until it is dry (TASK 20-30-93-910-801).
- (d) Continue to clean and dry the surfaces until the dry cotton wiper, G00034, stays clean.

SUBTASK 28-11-00-150-006

- (7) Remove all used sealant precoat from the repair area unless it is known that precoat is sealant, A00767, or sealant, A00436, material in good condition.

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- (a) Remove the used precoat with an abrasive pad and Series 93 solvent, B01013 (TASK 20-30-93-910-801).
- (b) Clean the surface with a clean brush and cotton wiper, G00034, soaked with Series 93 solvent, B01013 (TASK 20-30-93-910-801).

NOTE: The area you clean must make an overlap with the adjacent area. Make the total area a minimum of two times as large as the area you apply the sealant to.

- (c) Rub dry with a clean, dry cotton wiper, G00034.
- (d) Continue to clean and dry the surface until the dry cotton wiper, G00034, stays clean.

SUBTASK 28-11-00-210-008

- (8) Make sure that all fasteners in the sealant repair area are installed and tightened, unless you must install the fastener after you apply the faying surface sealant.

NOTE: You cannot install and tighten most fasteners after you apply the sealant.

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SUBTASK 28-11-00-110-002

- (9) If the alodine metal surface treatment is worn or damaged, you must apply an alodine coating, C00064, to the metal surface before you apply the new sealant or finish material.

SUBTASK 28-11-00-110-003

- (10) Refer to the Alodine Metal Surfaces procedure to apply alodine to the surfaces that are worn, damaged or where metal shows (TASK 28-11-00-600-801).

SUBTASK 28-11-00-110-004

- (11) Immediately before you apply the sealant, clean the surface with solvent, B00184, and rub dry.

NOTE: Do not let the solvent dry on the surface. Do not touch the area with your fingers.

F. Prepare, Apply, and Cure Sealants

NOTE: It is very important to mix, use and keep sealants correctly. You must follow approved procedures to prevent damage or injury. Fully mix all components, refer to the manufacturer's instructions. Do not mix sealants that you apply with a brush until you use them. Do not put thinners in the sealant. Keep the sealants covered when not in use.

SUBTASK 28-11-00-390-002

CAUTION: DISCARD ALL SEALANT THAT DOES NOT APPLY SMOOTHLY. IF YOU APPLY THE SEALANT INCORRECTLY, IT CAN CAUSE LEAKAGE.

- (1) Storage of Sealant Compound that is not Mixed

NOTE: You should keep sealant at temperatures between $65 \pm 15^{\circ}\text{F}$ ($18 \pm 9^{\circ}\text{C}$).

- (a) Do a test of sealant that is kept for 6 months or more.
- (b) Mix a sample of the sealant base material and the curing compound in a container, at room temperature.
- (c) Apply a fillet seal to a sample piece of structure to find the time necessary before a sample of the sealant is not tacky.
- (d) Compare this time with maximum permitted tack-free time given in the applicable sealant specification.
- (e) If this time is more than the maximum permitted time, discard the sealant.

SUBTASK 28-11-00-390-003

- (2) Mix the Sealant Compound

WARNING: MAKE SURE THERE IS A GOOD FLOW OF AIR IN THE AREA THAT YOU MIX THE SEALANT COMPOUNDS. SEALANT COMPOUNDS ARE POISONOUS.

- (a) Mix only the quantity of sealant necessary for the job to be done.

NOTE: Identify the necessary sealant for the repair before you mix it. The use of premeasured Semkits (purchased from the vendor) is recommended for small repairs.

- (b) Make sure all equipment used to mix the sealant is clean.
- (c) Mix the sealant compounds as shown in the manufacturer's instructions.

NOTE: Always use the curing compound with the base compound from the same repair kit. Do not mix the contents of one repair kit with that of a different kit. Do not mix the sealant too much or the time you can apply the sealant will decrease.

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CAUTION: MAKE SURE NO AIR BUBBLES ARE IN THE SEALANT WHEN YOU MIX IT. IF THERE ARE AIR BUBBLES IN THE SEALANT, IT WILL NOT BOND CORRECTLY.

- (d) Mix the curing compound and base compound until the sealant is of a constant, equal color.
 - 1) If a mixing machine is not available, use a clean spatula.
- (e) Put the sealant in a container cleaned with Series 93 solvent, B01013 (TASK 20-30-93-910-801).

CAUTION: DO NOT FREEZE MIXED SEALANT AFTER YOU THAW IT. THE SEALANT IS NOT USABLE IF IT IS FROZEN MORE THAN ONCE.

- (f) If you do not use the mixed sealant, A00767, immediately, you can keep the sealant for a longer time if it is refrigerated.
 - 1) Put the sealant in a sealed container.
 - 2) Write the date you mix the sealant, sealant type, class, supplier, and date when the sealant cannot be used.
 - 3) Discard all sealant kept more than 21 days at -40°F (-40°C).
 - 4) Discard all sealant kept more than 7 days at -20°F (-29°C).

SUBTASK 28-11-00-390-004

(3) Sealant application time (Figure 806)

- (a) The time in which you can apply the mixed sealant, A00767, Class B-1/2 sealant is 1/2 hour at 77°F (25°C) and 50% relative humidity.
- (b) The time in which you can apply the mixed sealant, A00767, Class B-2 sealant is 2 hours at 77°F (25°C) and 50% relative humidity.
- (c) The time in which you can apply the mixed sealant, A01019 (Pro-Seal 860 B 1/6), is 10 minutes at 77°F (25°C) and 50% relative humidity.

SUBTASK 28-11-00-390-005

(4) Sealant squeeze-out life:

- (a) Squeeze-out life is the length of time you can use the sealant for structure assembly when you apply faying surface seals.
- (b) The time, shown in Figure 806, is the maximum time between when you start to thaw the sealant or mix sealant that is not frozen and the final attachment of mating surfaces.

SUBTASK 28-11-00-390-006

(5) Sealant curing

- (a) You must let the sealant cure for the minimum time (Figure 806) before you continue maintenance operations in the fuel tank or refuel the fuel tank.
- (b) Pro-Seal 860, B 1/6 sealant can touch fuel after 2 hours and has a cure time of 4 hours.

WARNING: DO NOT START OR STOP THE BLOWER EQUIPMENT WITH THE AIR HOSE IN THE FUEL TANK. OBEY ALL SAFETY PRECAUTIONS WHEN YOU USE WARM AIR. FAILURE TO OBEY THE SAFETY PRECAUTIONS COULD CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION: DO NOT APPLY SEALANT WHEN THE STRUCTURE TEMPERATURE IS LESS THAN 50°F (10°C) OR MORE THAN 140°F (60°C). THE SEALANT WILL NOT CURE CORRECTLY IF THE STRUCTURE TEMPERATURE IS OUT OF RANGE.

- (c) The best conditions to cure the sealant are at an ambient temperature of 77°F (25°C) and a relative humidity of 50 ±5 percent, with a good flow of air in the area.

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- 1) Relative humidity is an important factor in the cure time for sealants.
 - a) You must know the relative humidity at all times during the sealant operations.
 - b) If the relative humidity is less than 40 percent it slows the cure of the sealant.
 - c) To increase the relative humidity, let moist, warm air, at a temperature of less than 120°F (49°C), flow above the repair area.

NOTE: In hot, dry climates if you put a pan of water in the fuel tank near the repair area it could add the necessary humidity.

- d) Make sure the water added to the air contains less than 100 parts per million of total solids and less than 10 parts per million of chlorides.
- 2) If warm, moist air, at a temperature of less than 120°F (49°C), flows over the sealant, it decreases the curing time.
- 3) If you increase the temperature of the tank structure, but not more than 120°F (49°C), it decreases the curing time.

CAUTION: MAKE SURE THE TEMPERATURE OF THE TANK SURFACE THAT YOU APPLY THE SEALANT TO IS AT A TEMPERATURE EQUAL TO OR MORE THAN THE AMBIENT TEMPERATURE. IF THE RELATIVE HUMIDITY IS LARGE, CONDENSATION FORMS IF THE TEMPERATURE OF THE METAL SURFACE IS LESS THAN THE AMBIENT TEMPERATURE. THE TANK SURFACE MUST BE DRY TO APPLY THE SEALANT.

- 4) For the sealant, if you keep the humidity constant, the times, shown in (Figure 806), change as follows for each 20°F (11°C) change in temperature:
 - a) Tack-free times are approximately one-half as long for each 20°F (11°C) increase in temperature.
 - b) Tack-free times are approximately double for each 20°F (11°C) decrease in temperature.

SUBTASK 28-11-00-360-003

(6) To apply a new fillet seal, do the steps that follow:

- (a) BMS 5-45 Class B sealant is used to apply all fillet seals after a precoat of sealant, A00436, Class A.

NOTE: Precoat is optional when you use Pro-Seal 860, B 1/6 sealant. A special adhesion promoter is recommended before the use of Pro-Seal 860, B1/6.

- (b) Examine the seal area to make sure you have the correct selection of tools for the job.
 - (c) Apply a precoat of correctly mixed sealant to the surface with a stiff bristled brush (Figure 807).
 - 1) Make sure you apply precoat into all crevices and the full length of the area that you will apply sealant to.
 - 2) Apply the precoat at a width of 0.5 in. (12.7 mm) on each side of seams.
 - 3) Make sure the precoat is applied smoothly.
 - (d) If you let the precoat become hard, clean with Series 93 solvent, B01013, before you apply the fillet seal (TASK 20-30-93-910-801).

NOTE: It is not necessary to let the precoat cure. A minimum tack-free time of 15 to 20 minutes is recommended.

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CAUTION: MAKE SURE YOU APPLY THE FILLET SEAL CAREFULLY TO PREVENT AIR BUBBLES IN THE SEALANT. THE FILLET SEAL WILL NOT BOND CORRECTLY IF THERE ARE AIR BUBBLES IN THE SEALANT.

- (e) Apply a small fillet seal of sealant, A00767, Class B sealant or equivalent with the sealant gun, STD-449 (Figure 808).
 - 1) When you use a nozzle tip, point the nozzle tip into the seam, almost perpendicular to the direction of travel. Keep a bead of solvent in front of the nozzle tip.
- (f) Use a sealant fairing tool and push the first fillet seals tightly into position (Figure 809, Figure 810).
 - 1) Apply all the first fillet seals.
 - 2) Make sure all sealant fairing tools are clean.
 - 3) Do not use solutions or lubricants to help the fairing tools move over the sealant.
 - 4) Clean the fairing tools frequently with a clean cotton wiper, G00034.
- (g) If the first fillet seal is hard, but is not clean, then it must be cleaned before you apply the second fillet seal.
- (h) Apply sealant, A00767, Class B sealant, or equivalent, a second time to make a full bodied fillet seal.

NOTE: Use a larger nozzle for the second fillet seal.

- 1) If you use an extruded nozzle, do the steps that follow:
 - a) Cut the nozzle to make a fit of the dimensions shown in Figure 810.
 - b) Push the nozzle head against the surfaces such that the fillet seal you apply is thickest in the middle of the surfaces.

NOTE: Keep the nozzle of the sealing gun near the surface to prevent air bubbles.

- 2) If you do not use an extruded nozzle, use a sealant fairing tool to make a full bodied fillet seal.
- 3) Remove all air bubbles and re-entrant fillet seal edges.
- (i) Apply corrosion resistant finish (topcoat) if it is necessary.

NOTE: You must apply alodine and a topcoat of BMS 10-20, Type II primer is necessary if bare metal is open to fuel after the repair. Follow the procedure in the Apply Corrosion Resistant Finish paragraph.

SUBTASK 28-11-00-390-007

(7) Repair of the fastener seals

- (a) Repair self-sealing rivets.
 - 1) Self-sealing rivets are used a lot in skin panels in the fuel tank area. If you find a fuel leak at a rivet, you must replace the rivet to make a permanent repair. You can make a temporary repair if you make a permanent repair the next time you go into the fuel tank, refer to (SRM 51-40-00).
 - 2) To make a temporary repair of a self-sealing rivet, use one of the procedures that follows:
 - a) Apply sealant to a self-sealing rivet with a sealing tool (Figure 811).
 - b) Apply sealant to a self-sealing rivet with a temporary repair tool (Figure 812).
 - c) Install a Click Patch.

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- 3) Apply sealant to a self-sealing rivet with a sealing tool (Figure 804, Figure 811).

NOTE: Use this procedure for fuel leaks at mechanically sealed rivets only.

- a) Clean the surface of the adapter with emery cloth if it is necessary.
- b) Remove the paint from around the rivet that leaks.

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- c) Clean the surface with Series 93 solvent, B01013 (TASK 20-30-93-910-801).

NOTE: Do not touch the surface with your fingers after you clean it.

WARNING: DO NOT GET THE ADHESIVE IN YOUR EYES OR ON YOUR SKIN. WEAR SAFETY GLASSES TO PROTECT YOUR EYES. WEAR POLYETHYLENE GLOVES TO PROTECT YOUR HANDS. INJURIES TO PERSONNEL COULD OCCUR.

- d) Use a cotton-tipped stick to apply a thin layer of Eastman 910 adhesive to the surface of the adapter, Step 1, (Figure 811).
- e) Put the adapter over the center of the rivet and tightly push against the wing surface for 10 seconds, Step 2, (Figure 811).
- f) Release your hold on the adapter.
- g) Do not touch the adapter for 15 minutes.
- h) Remove the screw from the sealant loading port (Figure 804).
- i) Turn the screw in the sealant bleed port until only one more turn will remove it.
- j) Remove the pressure bolt.
- k) Drain all collected fuel.
- l) Install the pressure bolts (approximately 12 turns or 0.5 in. (12.7 mm)).
- m) Put sealant, A00436, Class A in the sealant loading port until it comes out of the sealant bleed port, Step 3, (Figure 811).
- n) Install the screw in the sealant loading port.
- o) Tighten the screw in the sealant bleed port.
- p) Tighten the pressure bolt to 5 in-lb (0.565 N·m) and hold for 5 minutes.
- q) Hit the sides of the adapter lightly with a small hammer or mallet, Step 4, (Figure 811), to remove the adapter.
- r) Examine the repair for fuel leaks.
- s) If the fuel leak continues, do the procedure again.
- t) If you must replace the self-sealing rivet, refer to the structural repair manual.
- u) Clean the sealant from the wing surface and the adapter with Series 93 solvent, B01013 (TASK 20-30-93-910-801).
- v) Do not try to clean the adhesive from the wing surface.

NOTE: The adhesive wears off in 1 to 2 weeks.

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- 4) Apply sealant to a self-sealing rivet with a temporary repair tool (Figure 812).
 - a) Remove paint from around the rivet that leaks with an approved emery cloth.

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- b) Clean the temporary repair tool and the wing surface with Series 93 solvent, B01013 (TASK 20-30-93-910-801).

NOTE: Do not touch the wing surface with your fingers after you clean it.

- c) Make a mark on the wing surface to show the position of the temporary repair tool while it is in use (Figure 812).
 - d) Fill the temporary repair fuel tank rivet sealing tool, SPL-1762, with mixed sealant, A00436, Class A sealant.
 - e) Put the temporary repair tool into a small rivet gun, STD-9933.
 - f) Put the O-ring of the temporary repair tool on the wing surface at the marked location.

CAUTION: ALWAYS KEEP THE TEMPORARY REPAIR TOOL PERPENDICULAR TO THE WING SURFACE. IF YOU DO NOT KEEP THE TEMPORARY REPAIR TOOL PERPENDICULAR TO THE WING SURFACE, DAMAGE TO THE WING SURFACE COULD OCCUR.

- g) Operate the rivet gun, STD-9933, until sealant is applied around the rivet that leaks.
 - h) Examine the repair for fuel leaks.
 - i) If the fuel leak continues, do the procedure again.
 - j) If you must replace the self-sealing rivet, refer to the structural repair manual.
 - k) Clean the sealant from the temporary repair tool and the wing surface with Series 93 solvent, B01013 (TASK 20-30-93-910-801).

NOTE: Make sure you do not touch the area with the new sealant.

- 5) Install a Click Patch.

- a) You can use either a, Semco sealant click-patch kit, G50653, or Semco fast-set epoxy Click-Patch Kit, G50654, to repair fuel leaks through Class C (Heavy Seep) Fuel Leak - Isolation procedure (TASK 28-11-00-300-801).
 - b) Click Patch kits contain flat disks for fasteners that do not come out of the surface and hatted disks for rivets or bolts that are above the wing surface. The disks are put on the fasteners that leak.
 - c) The subsequent limits apply to Click Patch repairs:
 - d) You can install a Click Patch only after you make sure there are no structural crack in the applicable area of the fuel leak.
 - e) The maximum size of a Click Patch is 1.25 in. (31.75 mm).
 - f) A Click Patch is a temporary repair and you must make a permanent repair when possible.

- (b) Apply a fillet seal to a sealed fastener.

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- 1) Apply a precoat of correctly accelerated sealant, A00767, to the fastener and the area 0.5 in. (12.7 mm) in width in all directions from the fastener.

NOTE: Precoat is optional when you use Pro-Seal 860, B 1/6 sealant.

- a) Use a stiff, bristled brush to apply the precoat on the surfaces and into crevices.
- 2) Let the precoat dry until it is not tacky.
 - 3) Use a sealing gun or spatula and apply a layer of sealant, A00767, Class B or Pro-Seal 860, B 1/6 sealant around and on the fastener.
 - 4) Move the sealant with a sealant fairing tool until you get the dimensions shown in (Figure 813) for the fillet seal.
 - 5) Examine the sealant for holes, bubbles, or spaces.
 - a) If there are holes, bubbles or spaces, do the procedure again.
 - 6) Apply corrosion resistant finish (topcoat).

NOTE: Follow the procedure in the Apply Corrosion Resistant Finish (Topcoat) procedure.

- (c) Repair fasteners with metal seal covers.

- 1) Use a sealant cutting tool to cut around and below the metal seal cover and to move apart the sealant from the structure.
- 2) Hold the metal seal cover with pliers and pull away from the fastener.

NOTE: This will remove most of the sealant.

- 3) Cut and remove the remaining sealant.

NOTE: You do not have to remove small quantities of the sealant that bond tightly to the fastener.

- 4) Clean the metal seal covers, fastener ends, and structure with cleaning solvent.
- 5) Apply precoat to the area with sealant, A00767, Class A.

NOTE: Precoat is optional when you use Pro-Seal 860, B 1/6 sealant.

- a) Apply the precoat smoothly and equally into all the crevices.
- 6) Fill a metal seal cover, of the correct size and shape, two-thirds full of sealant, A00767, Class B or Pro-Seal 860, B 1/6 sealant with a sealing gun or a clean spatula (Figure 814).
 - 7) Make sure there is sufficient sealant to be extruded around the base and through the hole in the top of the metal seal cover.
 - 8) Push the sealant in the metal seal cover to make sure there are no holes.
 - 9) Push the metal seal cover on the fastener until the metal seal cover touches the structure (Figure 814).
 - 10) Move the extruded sealant around the top of the metal seal cover and remove the unwanted sealant.

NOTE: Use clean cheesecloth to rub the sealant fairing tool.

- 11) Hold the metal seal cover in its position and move the extruded sealant around the base.
 - a) Keep the metal seal cover on the center of the bolt.
 - b) Do not let the metal seal cover move.

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- c) If there is not sufficient clearance with adjacent metal seal covers, structures, or fillet seal, you can remove 25 percent or less of the area of the metal seal cover.
 - d) Make sure the metal seal cover has the dimensions shown in (Figure 815)
- 12) If it is necessary, do this task: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

SUBTASK 28-11-00-390-008

- (8) Apply an injection seal.

NOTE: You could raise the seal plane of the new sealant to isolate the bad seal from the fuel as an alternative to a new injection seal.

- (a) Make sure you have these tools: pipe cleaners, a sealant fairing tool, and a sealing gun with an injection nozzle attached.
- (b) Make sure the channel is clean.
- (c) Apply a precoat of sealant, A00767, Class A to the channel surfaces with pipe cleaners or a long, bristled pencil brush.

NOTE: If the channel cross-section is 0.07 in. (1.78 mm) or less, it is not necessary to apply precoat.

- 1) Make sure you do not seal the channel with the precoat of sealant, A00767, Class A.

NOTE: If you seal the channel, it will prevent the flow of the sealant into the channel.

- (d) Put sealant, A00767, Class B, or equivalent, into one end of the channel and fill until sealant comes out of all other openings (Figure 816).
- (e) Fill all slots, joggles and channels where continuity of a seal or a block-off seal is necessary.

CAUTION: MAKE SURE THERE IS SUFFICIENT SEALANT IN THE SEALING GUN FOR A FULL SEAL. IF YOU STOP AND START WHEN YOU APPLY THE SEAL, AIR BUBBLES CAN GET INTO THE SEAL AND IT WILL NOT BOND CORRECTLY.

- (f) Slowly and continuously move the sealant into the area that you apply a fillet seal.
- (g) Remove unwanted sealant with the sealant fairing tool.
- (h) Make the ends of the seal smooth.
- (i) Examine the seal for a bad bond or air bubbles.
 - 1) If the seal has a bad bond or air bubbles, do the procedure again.
 - 2) If it is necessary, do this task: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

SUBTASK 28-11-00-360-004

- (9) Apply a prepack seal.

- (a) Apply a layer of sealant, A00767, Class B to one of the parts (Figure 817).
- (b) Use a sealant fairing tool to move the sealant such that it is in the shape of the cavity.
- (c) Make sure you apply sufficient sealant to completely fill the parts.
- (d) Assemble the parts in the sealant usable time (Figure 806).
 - 1) If it is necessary, do this task: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

SUBTASK 28-11-00-360-005

- (10) Apply a faying surface seal.

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- (a) Apply a layer of sealant, A00767, Class B sealant to one faying surface with a sealing gun or spatula (Figure 818).
- (b) Move the sealant on all of the surface to get an equal layer approximately 0.03 in. (0.76 mm) thick (Figure 818).
- (c) Assemble the parts in the sealant usable time.
- (d) Make the extruded sealant smooth along the joint.

NOTE: You must apply sufficient sealant to make sure there is continuous extruded sealant on the two sides of the joint.

- 1) If it is necessary, do this task: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

SUBTASK 28-11-00-360-006

(11) Increase the seal plane above the initial seal plane (Figure 819).

- (a) You can replace an injection, prepack, or faying surface seal, or you can increase the seal plane to isolate a bad seal from the fuel.

NOTE: Because you add a large quantity of sealant when you increase the seal plane above the initial seal plane, it is better to replace the bad seal.

- 1) Examine the structure around the bad seal to find where to increase the seal plane.
- 2) Apply a new fillet seal around the structure with the applicable seals and fasteners to increase the seal plane (Figure 819).
- 3) If it is necessary, do this task: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

————— **END OF TASK** —————

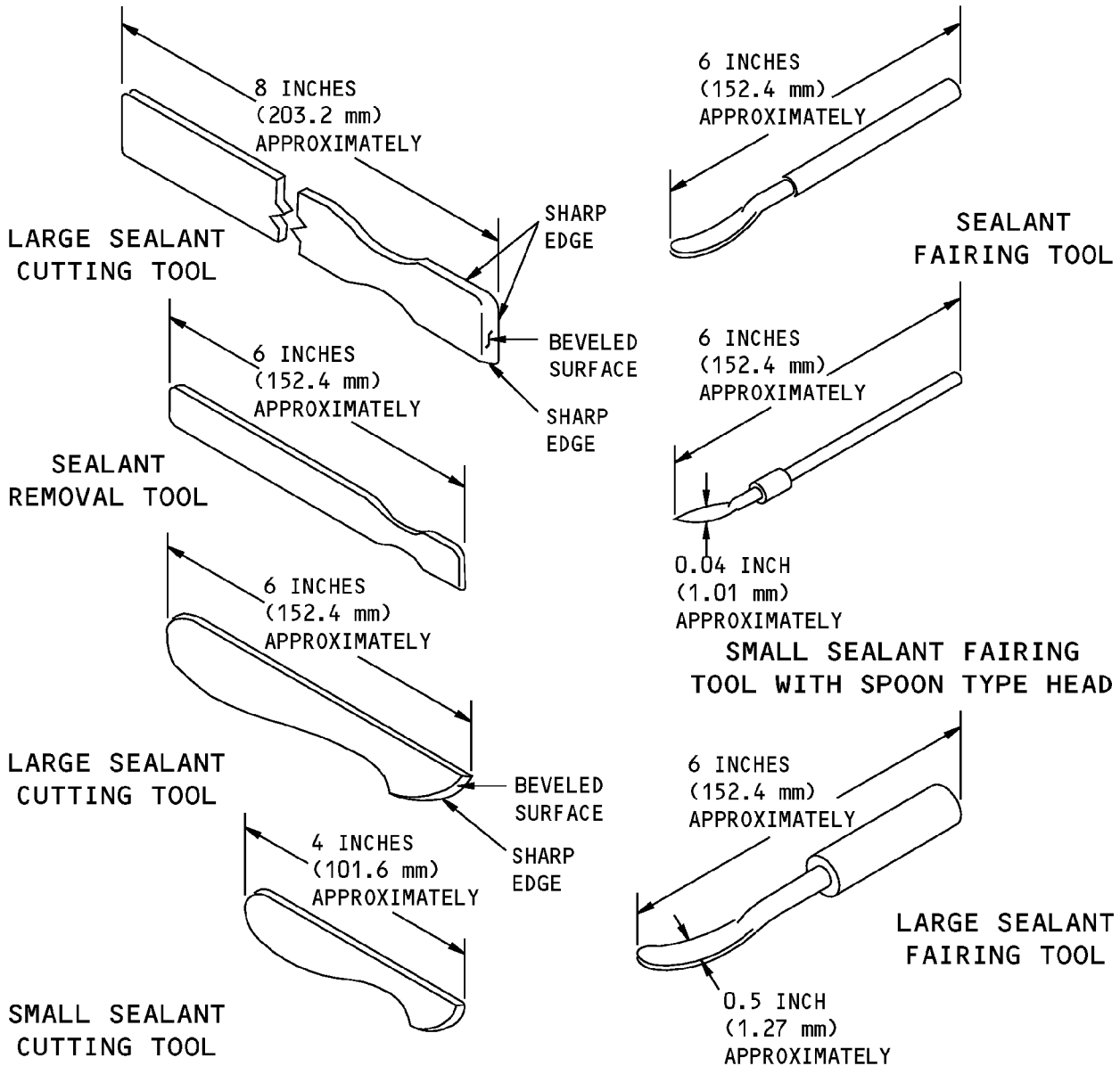
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NOTE: THESE TOOLS SHOULD BE MADE OF PLASTIC, HARDWOOD, OR METAL NO HARDER THAN 2024-T3 ALUMINUM TO REDUCE THE POSSIBILITY OF DAMAGE TO THE STRUCTURE (PLASTIC AND HARDWOOD TOOLS ARE RECOMMENDED).

NOTE: THESE TOOLS CAN BE MADE OF 0.25 INCH (6.35 mm) DIA BRONZE OR STEEL WELDING ROD AND CAN BE PLATED TO IMPROVE THE SMOOTHNESS

SEALANT REMOVAL AND CUTTING TOOLS

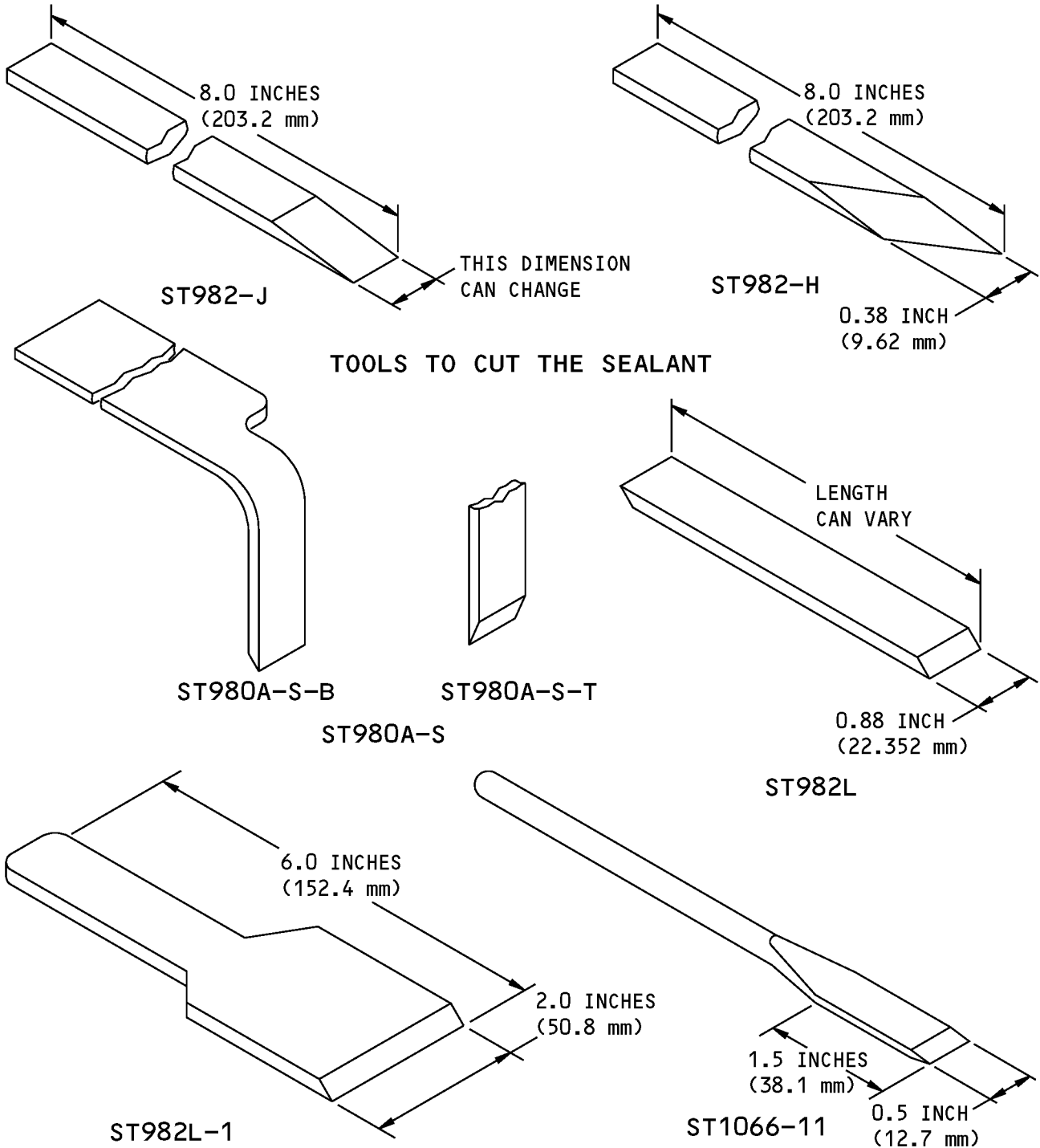
SEALANT FAIRING TOOLS

**Sealant Removal, Cutting and Fairing Tools
Figure 803 (Sheet 1 of 2)/28-11-00-990-817**

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TOOLS TO CUT THE SEALANT

TOOLS TO REMOVE UNWANTED SEALANT (SCRAPERS)

**Sealant Removal, Cutting and Fairing Tools
Figure 803 (Sheet 2 of 2)/28-11-00-990-817**

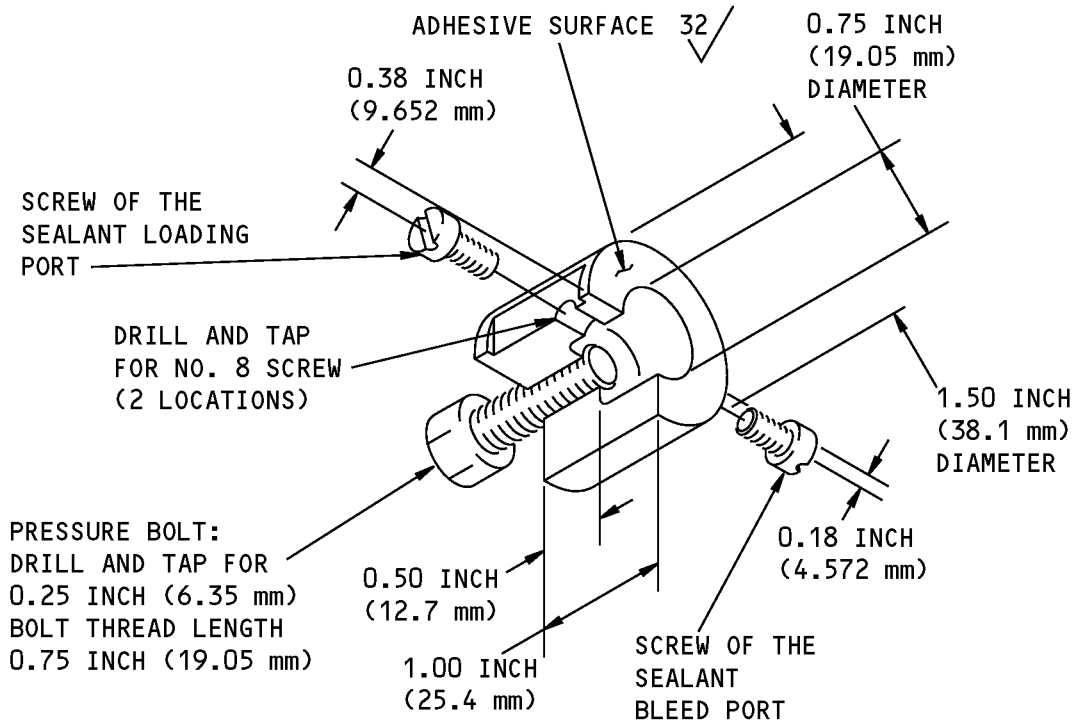
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MATERIAL: MILD STEEL CADMIUM PLATED

Sealing Tool for Rivets that Leak
 Figure 804/28-11-00-990-818

EFFECTIVITY
 HAP ALL

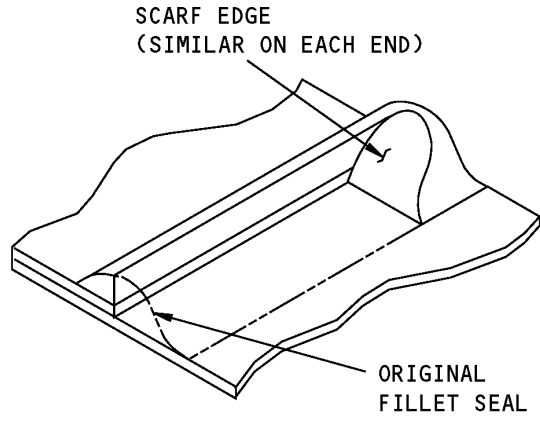
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**Fillet Seal Removal
Figure 805/28-11-00-990-819**

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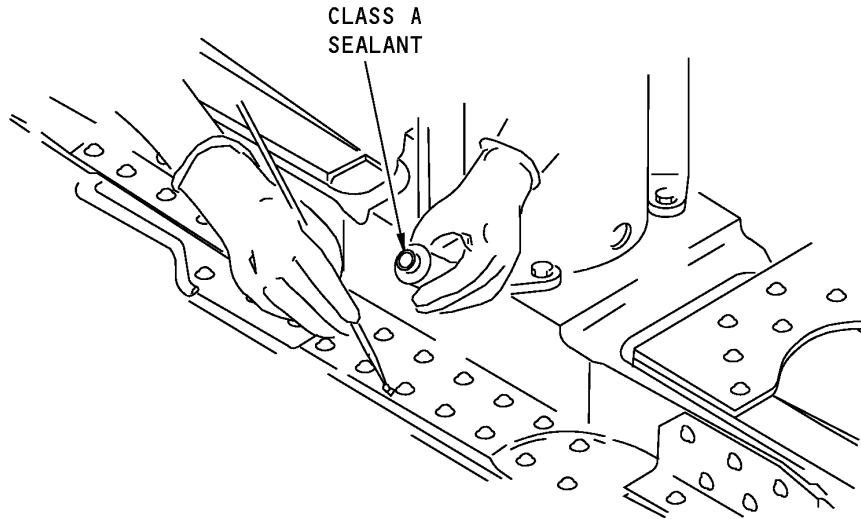
SEALANT	CLASS	APPLICATION TIME (MINIMUM) HOURS ¹	TACK-FREE TIME (MINIMUM) HOURS ¹	SQUEEZE-OUT LIFE (MINIMUM) HOURS ¹	CURING TIME (MINIMUM) HOURS ¹
Proseal 860 ³	B-1/6	1/6	1.5 ²	--	4
PR-1826 ⁴	B-1/4	1/4	1	--	2
PR-1828 ⁴ ⁶	B-1/2	1/2	2.5	--	3
BMS 5-45	A-2 (Grade 1)	2	36	--	72
	A-2 (Grade 2)	2	24	--	48
	B-1/2 ⁷	1/2	10	--	12
	B-2	2	12	6	24
	C-24 ⁵	8	--	24	168
	C-48 ⁵	12	--	48	336
	C-168 ⁵	48	--	168	1,344

- ¹ At 77°F (25°C) and 50% relative humidity ambient conditions. Other temperature and relative humidity conditions will change the times.
- ² Do not let fuel touch the sealant until it is not tacky for a minimum of 2 hours.
- ³ When you use Proseal 860, no precoat is necessary. Proseal 860 is recommended for small repairs only, due to its short application time. Available from Courtaulds Aerospace, Glendale, California.
- ⁴ Used to repair fillet seals of BMS 5-45. Available from Courtaulds Aerospace, Glendale, California.
- ⁵ Used with faying surface seals that have a long squeeze-out life
- ⁶ This sealant is white. Thus, it is easy to see the repaired area.
- ⁷ Mix BMS 5-45, Class B-2 sealant with a 20:100 accelerator/base ratio by weight or get this sealant pre-mixed.

Sealant Usable Time
Figure 806/28-11-00-990-820

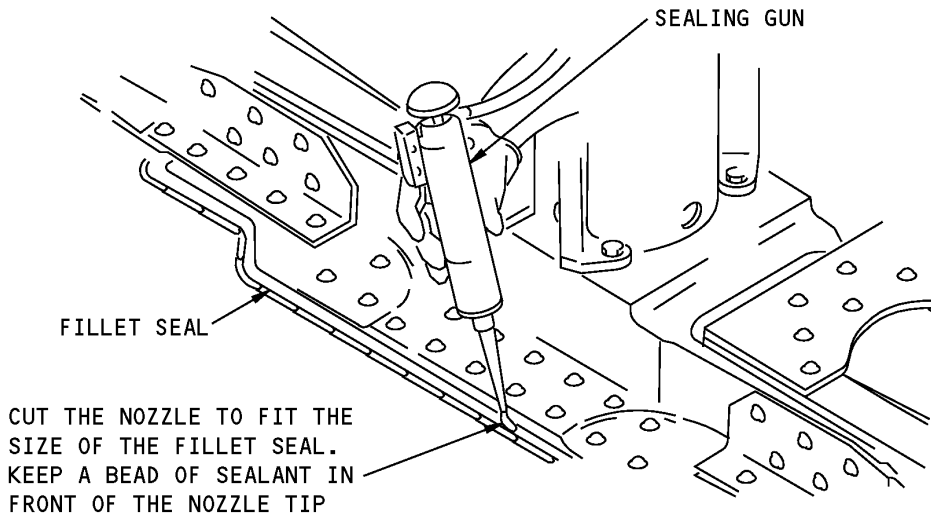
EFFECTIVITY
HAP ALL

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F57619 S0006571270_V2

**Apply the Precoat
Figure 807/28-11-00-990-821**



CUT THE NOZZLE TO FIT THE
SIZE OF THE FILLET SEAL.
KEEP A BEAD OF SEALANT IN
FRONT OF THE NOZZLE TIP

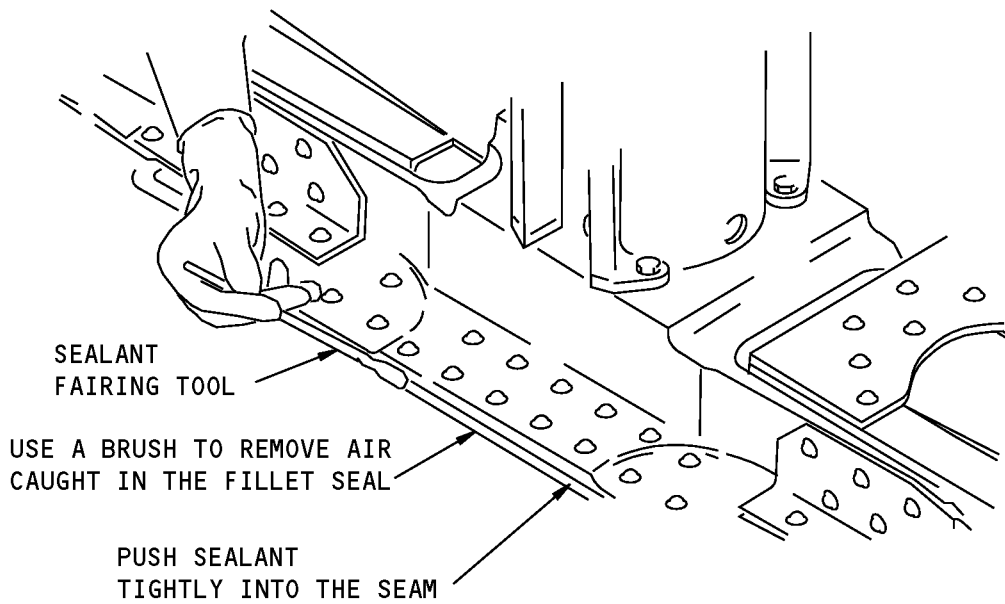
**Apply a Fillet Seal
Figure 808/28-11-00-990-822**

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**Push the First Fillet Seal into the Seam
Figure 809/28-11-00-990-823**

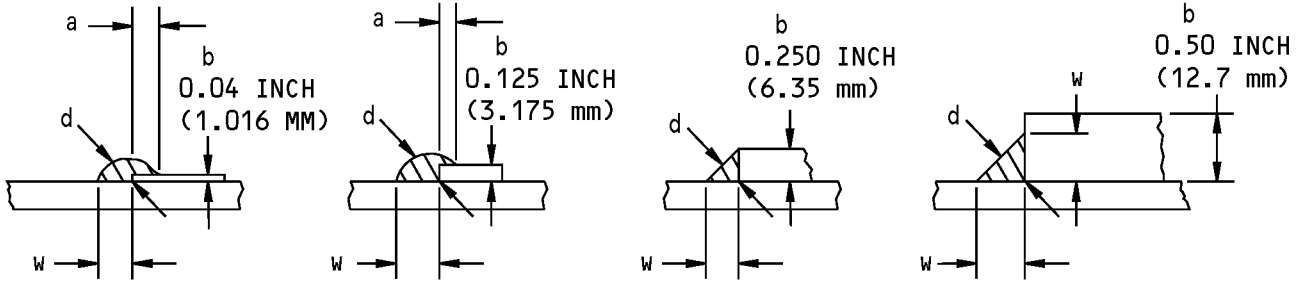
EFFECTIVITY
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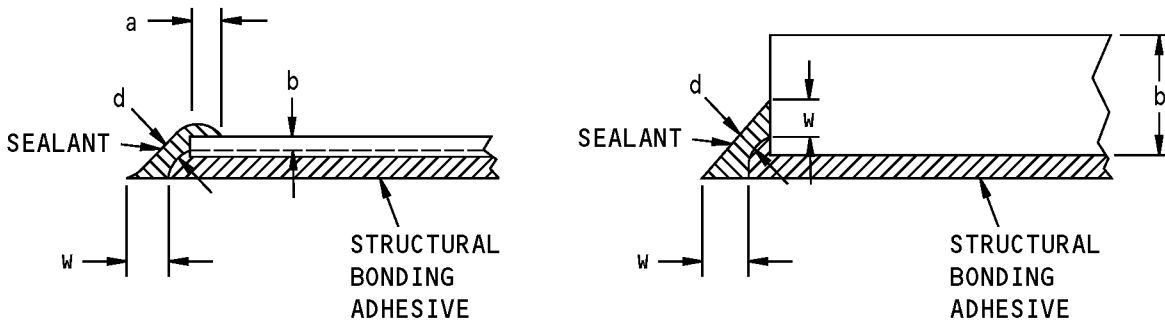
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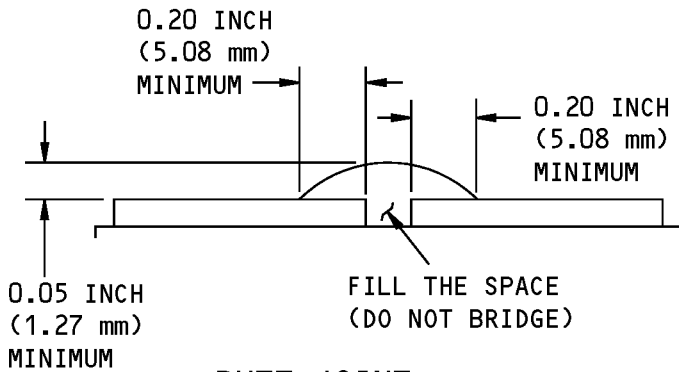


NON-BONDED SURFACES

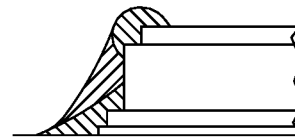


BONDED SURFACES

$d = 0.15 \text{ INCH (3.83 mm) MINIMUM}$
 $w = 0.25\text{--}0.50 \text{ INCH (6.35--12.7 mm)}$
 $a+b = w$, EXCEPT $a = \text{ZERO}$ WHEN $b = 0.25 \text{ INCH (6.35 mm) OR MORE}$



BUTT JOINT



MORE THAN ONE FILLET SEAL

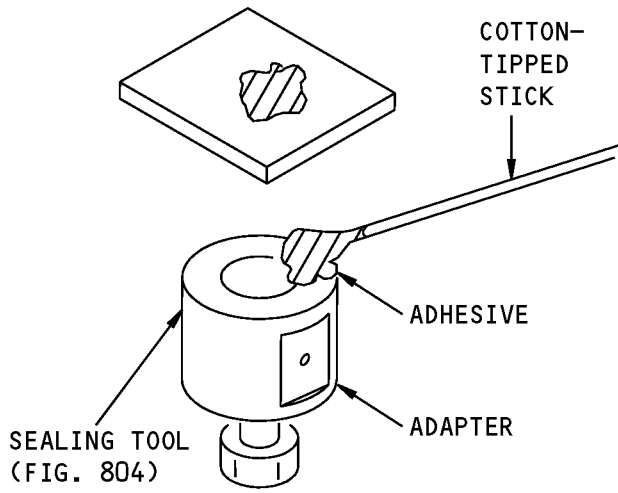
**Re-Entrant Fillet Seal and Dimensions of Full Bodied Fillet Seals
 Figure 810/28-11-00-990-824**

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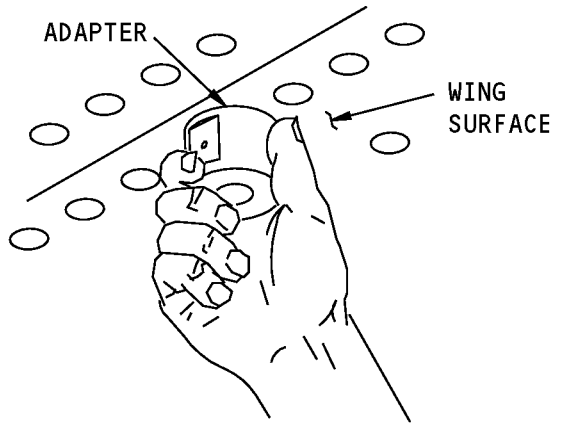
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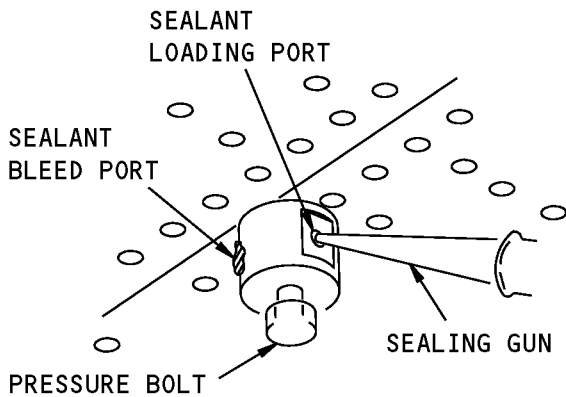
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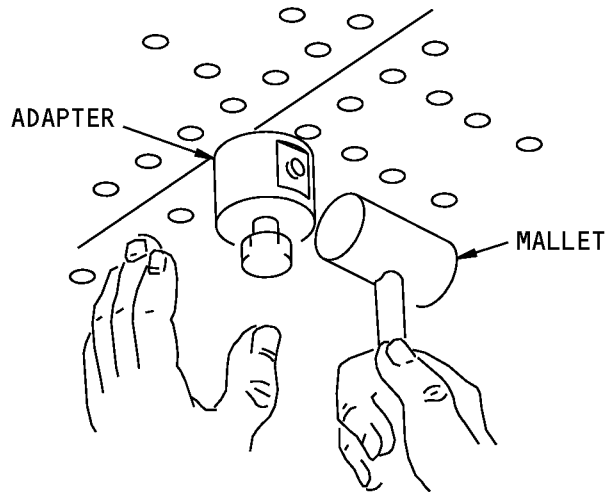
STEP 1



STEP 2



STEP 3

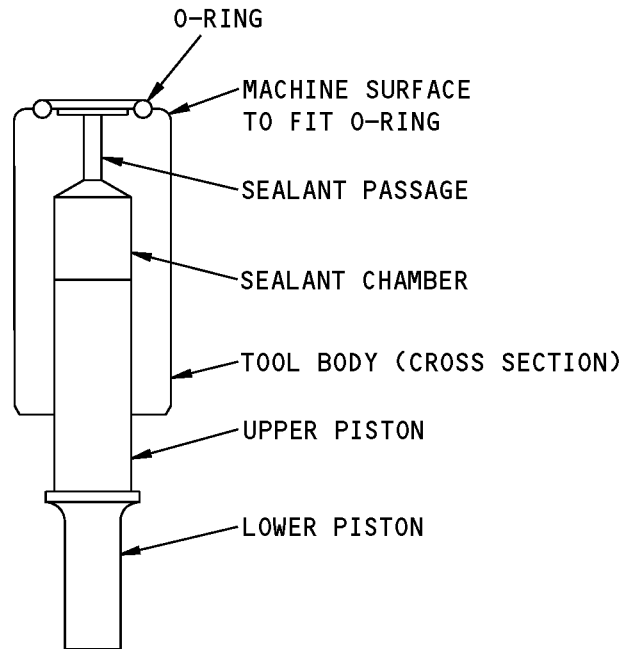


STEP 4

**Temporary Repair of Self-Sealing Rivets
Figure 811/28-11-00-990-825**

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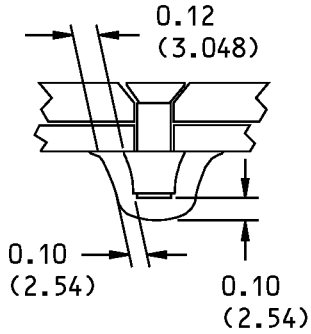


**Temporary Repair Tool (F70230) for Self-Sealing Rivets
Figure 812/28-11-00-990-826**

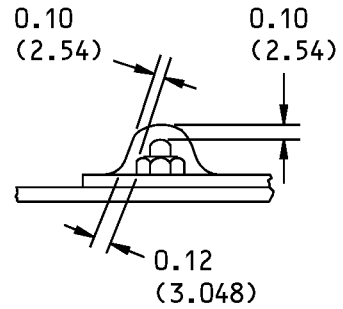
EFFECTIVITY
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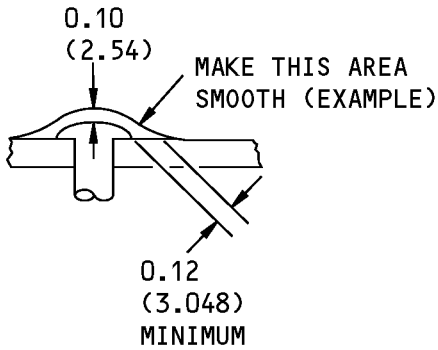
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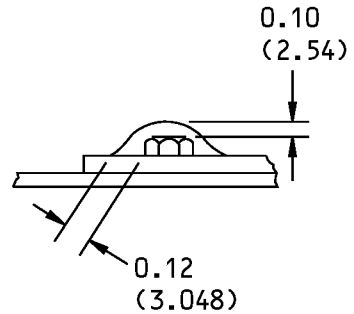
RIVET



BOLT



RIVET



BOLT

NOTE: ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES).

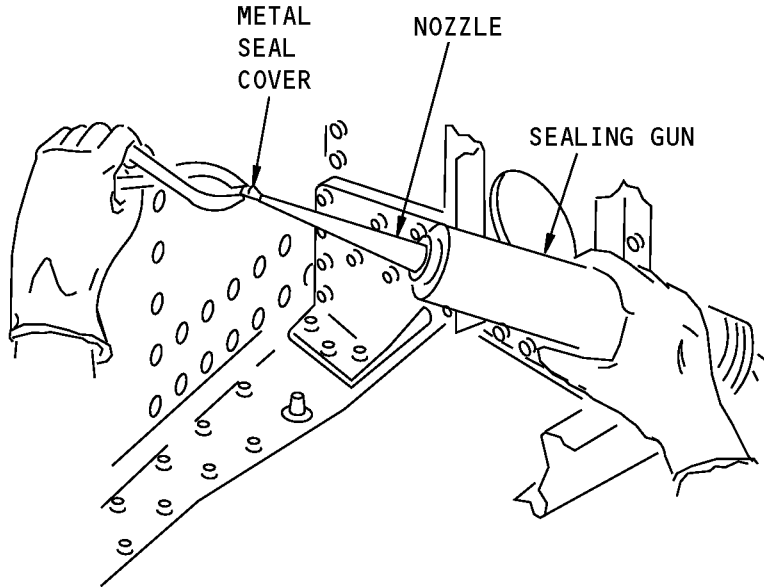
**Dimensions of Fillet Seals (Inches) for Fasteners
Figure 813/28-11-00-990-827**

EFFECTIVITY
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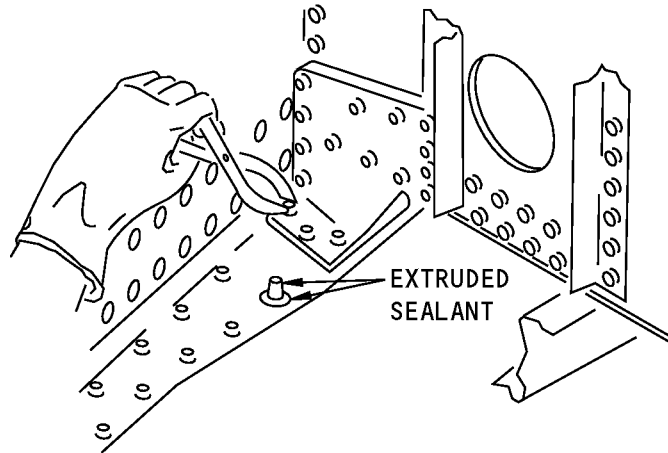
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FILL THE METAL SEAL COVER

NOTE: THE NOZZLE SIZE
DEPENDS ON THE
SIZE OF THE
METAL SEAL COVER.



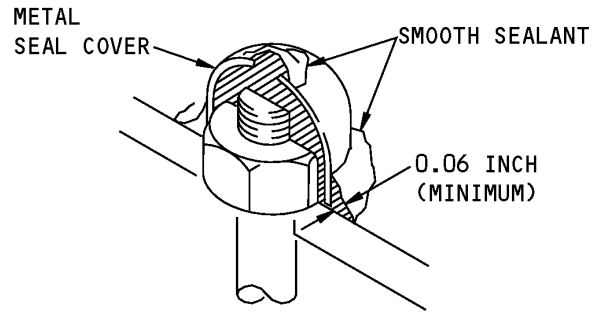
**PUSH THE METAL SEAL COVER
INTO POSITION**

**Metal Seal Cover Installation
Figure 814/28-11-00-990-828**

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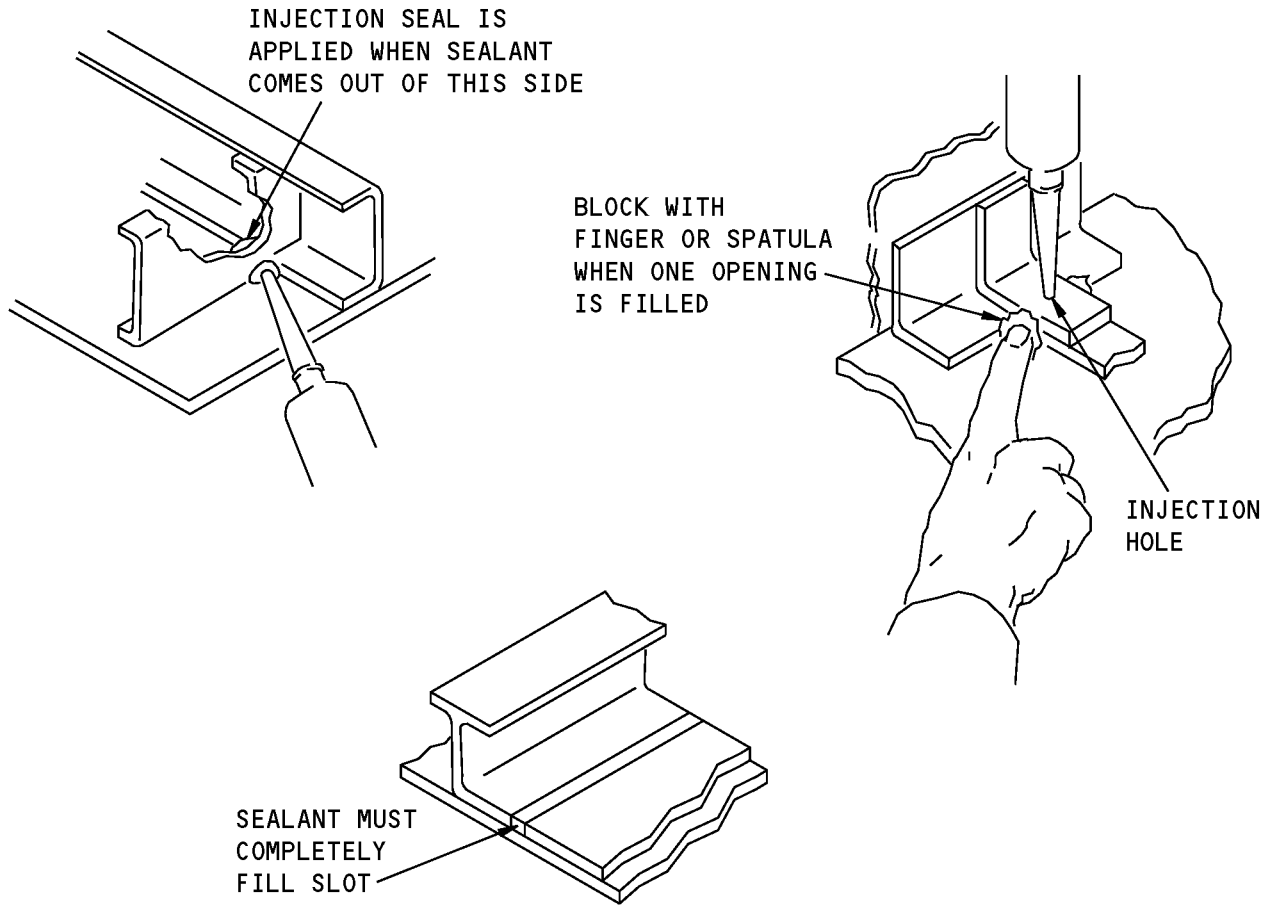


**Installed Metal Seal Cover
Figure 815/28-11-00-990-829**

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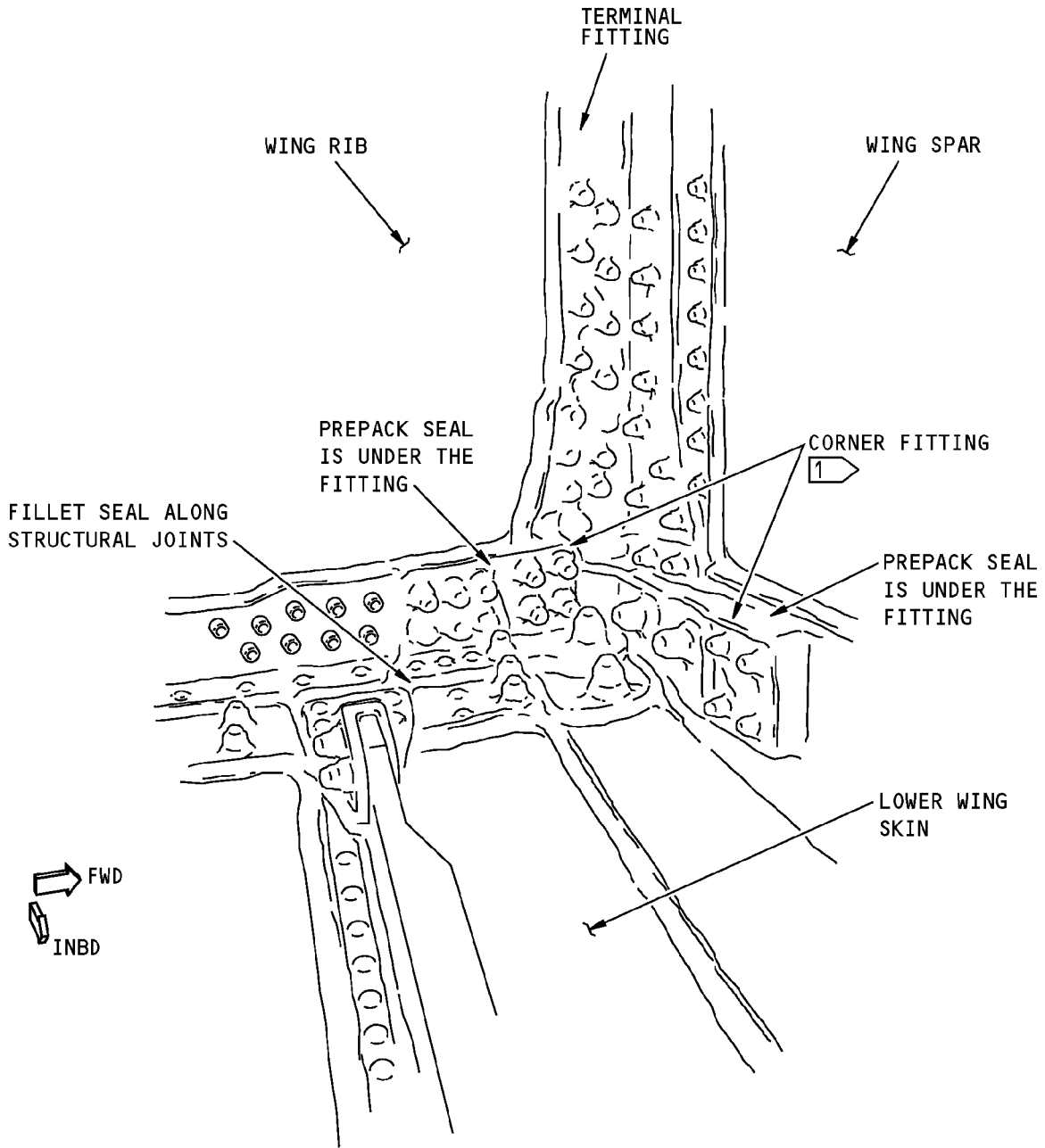
**Apply an Injection Seal
Figure 816/28-11-00-990-830**

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1 THE FITTING MUST BE TEMPORARILY REMOVED AND CLEANED OF USED SEALANT BEFORE YOU APPLY A NEW PREPACK SEAL

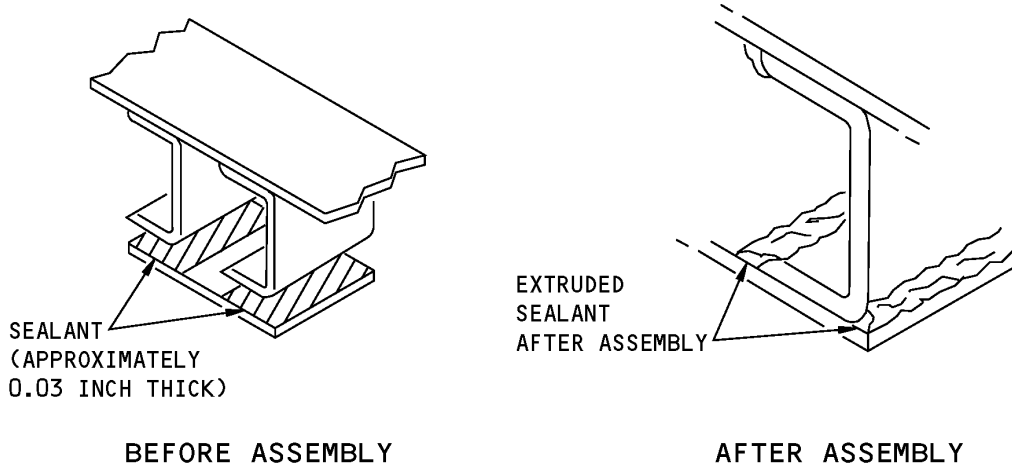
**Example of a Combination of Prepack Seal and Fillet Seals
Figure 817/28-11-00-990-831**

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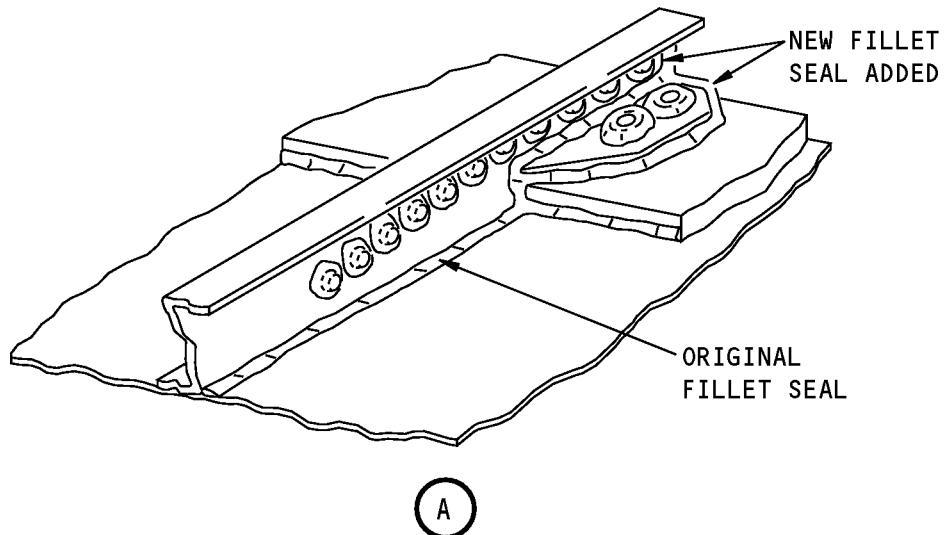
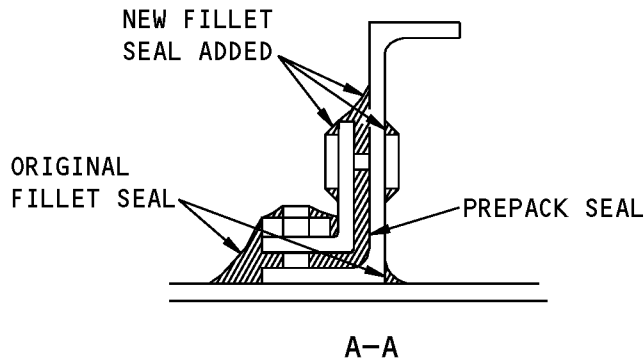
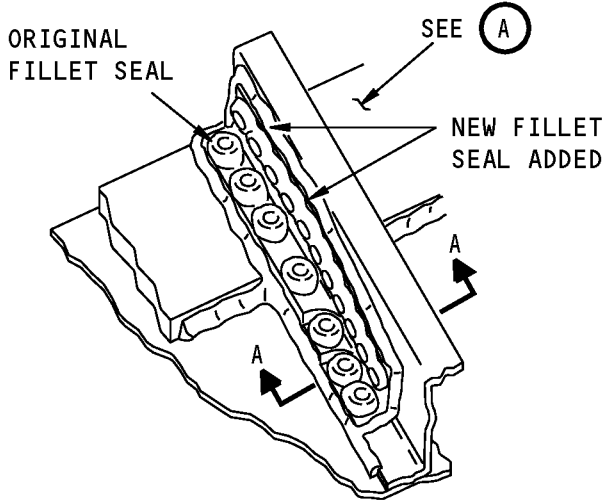
**Faying Surface Seal
Figure 818/28-11-00-990-832**

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Prepack Seal Repair
Figure 819/28-11-00-990-833

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TASK 28-11-00-300-804

4. Approved Repair of the Secondary Fuel Barrier Sealant

(Figure 820)

A. General

- (1) Secondary fuel barrier sealant is a polyurethane (Type II) material applied to the front spar and top exterior surface of the center fuel tank.

HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-57-1250

- (2) Inspect the Wing Center Section, Top Panel, and Front Spar for missing, peeling, non-transparent, non-continuous, too thin or too thick Secondary Fuel Vapor-Barrier Application.

For Secondary Fuel Vapor-Barrier Applications that are found to be too thin, too thick, missing, peeling, non-transparent, or non-continuous, prepare the applicable area and apply Secondary Fuel Vapor-Barrier. Refer to SB 737-57-1250 for the correct procedure to apply the Secondary Fuel Vapor-Barrier.

HAP ALL

B. References

Reference	Title
28-11-00-600-801	Apply the Corrosion Resistant Finish (Topcoat) (P/B 701)
51-21-21-370-801	Prepare the Surface to be Painted (P/B 701)
51-21-41-370-802	Apply Alodine 600, 1200 or 1200S Solution (P/B 701)
51-31-00-390-804	Fillet Seal Application (P/B 201)

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1595	Instrument - Thickness Measurement, Eddy Current Test Method (Part #: 602-816, Supplier: 61325, A/P Effectivity: 737-ALL) (Part #: 603-693, Supplier: 61325, A/P Effectivity: 737-ALL) (Part #: 603-694, Supplier: 61325, A/P Effectivity: 737-ALL) (Opt Part #: 602-814, Supplier: 61325, A/P Effectivity: 737-ALL)
COM-1596	Probe - Thickness Measurement, Pencil-Type, Model ETA3.3H (Part #: 602-128, Supplier: 61325, A/P Effectivity: 737-ALL)
STD-1080	Brush - Paint

D. Consumable Materials

Reference	Description	Specification
A00015	Sealant - Secondary Fuel Barrier, 2 Part Polyurethane	BMS5-81, Type II
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS 5-95
A00436	Sealant - Fuel Tank	BMS5-45 (Supersedes BMS 5-26)
A00767	Sealant - Fuel Tank	BMS5-45
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7

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(Continued)

Reference	Description	Specification
B00666	Solvent - Methyl Propyl Ketone	BMS 11-9
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

F. Repair of the Secondary Fuel Barrier Sealant

SUBTASK 28-11-00-120-001

- (1) Where the BMS5-81 secondary fuel barrier sealant or both the BMS5-81 sealant and BMS10-11 primer have damage, do these steps:
 - (a) Remove any disbanded BMS5-81 sealant and BMS10-11 primer with cutting tools (Figure 803).
 - (b) To refinish bare metal surfaces, if it is necessary do these steps:
 - 1) Do this task: Prepare the Surface to be Painted, TASK 51-21-21-370-801.
 - 2) Apply alodine 600. To do this, do this task: Apply Alodine 600, 1200 or 1200S Solution, TASK 51-21-41-370-802

WARNING: DO NOT BREATHE THE FUMES FROM THE SECONDARY FUEL BARRIER SEALANT (BMS 5-81, TYPE II). KEEP THE SEALANT AWAY FROM SPARKS, FLAME OR HEAT. THE SEALANT IS POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE.

CAUTION: DO NOT APPLY THE SECONDARY FUEL BARRIER SEALANT (BMS 5-81, TYPE II), IF THE AIR TEMPERATURE IS LESS THAN 65°F (18°C) OR THE RELATIVE HUMIDITY IS MORE THAN 95 PERCENT. THE SEALANT WILL NOT CURE CORRECTLY IF THE TEMPERATURE AND RELATIVE HUMIDITY CONDITIONS ARE NOT IN THE LIMITS.

- (c) To make areas smooth that have sharp or rough edges, one of these types of fuel tank or body sealants were applied to certain surfaces of the fuel tank:

NOTE: The exact application of these sealants is specified in drawings 110A0003, 110A3111, and 110A3114.

- 1) sealant, A00436
- 2) sealant, A00767
- 3) sealant, A00247
- 4) sealant, A02315
- (d) Before you apply the primer, C00259 and sealant, A00015, it may be necessary to repair or replace this sealant to make areas smooth that have sharp or rough edges (TASK 51-31-00-390-804).

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- (e) Clean a minimum of 1.5 inches along the edge of the cured BMS5-81 coating with a clean cotton wiper, G00034, soaked with one of these solvents:
 - 1) solvent, B00184
 - 2) solvent, B00148
 - 3) solvent, B00666
- (f) Rub the area dry with a clean, dry cotton wiper, G00034.
- (g) Break the edge of the cured BMS5-81 sealant as shown in (Figure 821) with aluminum oxide abrasive paper (180 to 400 grit) or a plastic bristled bottle brush.
- (h) Rub the BMS5-81 coating with aluminum oxide abrasive paper (180 to 400 grit) a minimum of 0.5 inch beyond the edge to be joined to make the surface rough.
 - 1) As an alternative to sanding, you can wipe the BMS5-81 coating with solvent, B00666.

NOTE: This solvent sufficiently softens the surface of the BMS5-81 to add more sealant. Other solvents cannot be used to do this.
- (i) If you used sandpaper, clean the area of the particles left by the sanding with a clean cotton wiper, G00034, soaked with one of these solvents:
 - 1) solvent, B00184
 - 2) solvent, B00148
 - 3) solvent, B00666
- (j) Rub the area dry with a clean, dry cotton wiper, G00034.
- (k) Continue to clean and dry the area until there are no particles shown on the dry cotton wiper, G00034.
- (l) Apply one coat of the primer, C00259 (yellow) with a paint brush, STD-1080 up to the existing edge of cured BMS5-81 with the tolerances shown in Figure 821.
 - 1) Spray application of primer, C00259 can be used for large areas. To do this, do this task: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801
- (m) Air dry the primer as shown in this table (Table 801) before you apply sealant, A00015.

Table 801/28-11-00-993-849

BMS10-11 TYPE I, PRIMER	BMS5-81 TYPE II, SEALANT	OVERCOAT TIME ^{*[1]} ^{*[2]}	
		MINIMUM	MAXIMUM ^{*[3]}
Grade A	Class 1	30 min.	48 hours ^{*[4]}
Grade E	Class 1	30 min.	48 hours ^{*[4]}
Grade A	Class 2	30 min.	3.5 hours ^{*[4]}
Grade E	Class 2	30 min.	3.5 hours ^{*[4]}

*[1] Overcoat time is for freshly applied BMS10-11 or reactivated BMS10-11.
 *[2] If the surface is cured beyond 48 hours, clean and reactivate the cured surface to be coated (AMM 51-21-21/701).
 *[3] You must do the reactivation of the primer if BMS5-81 is not applied before the maximum overcoat time, or if it has contamination.

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*[4] To do reactivation of contaminated BMS10-11 that is not fully cured, you must permit the primer to cure to a state of solvent resistance. Solvent resistance is when the primer can not be removed from the base coating when you rub it 15 times with heavy pressure and a large force with acotton wiper, G00034, soaked with cleaning solvent BMS11-7.

SUBTASK 28-11-00-360-007

(2) Prepare the sealant, A00015 as follows:

- (a) The material must be supplied in pre-measured kits with the correct mix ratio.
- (b) Make sure the base resin and catalyst are each homogeneous, free from lumps or jelled particles.
- (c) Make sure the base component is clear. If the base component becomes cloudy, do these steps:
 - 1) Heat the material in an oven at a temperature between 120 and 130 degrees F for 60 to 70 minutes.
 - 2) At the end of the exposure time, take the material out of the oven.
 - 3) Let the material cool to a temperature between 60 and 80 degrees F before you use it.
- (d) At any time when a base container is opened, and the base material will not be used, discard the container.

CAUTION: BE CAREFUL WHEN YOU MIX AND MAKE THE SEALANT SMOOTH TO KEEP AIR BUBBLES TO A MINIMUM. AIR BUBBLES CAN MAKE THE SEALANT DIFFICULT TO APPLY.

- (e) Before you combine the necessary quantities of base resin and accelerator, mix the base resin and the accelerator, each in its container, to make sure each is homogeneous.
- (f) Carefully combine the total contents of the base and accelerator containers.
 - 1) Stir the mixture slowly until it is completely mixed.

SUBTASK 28-11-00-390-011

(3) Do these steps to apply sealant, A00015:

CAUTION: DO NOT ADD ANY THINNER BUT METHYL ETHYL KETONE. PROBLEMS WITH THE SECONDARY FUEL BARRIER CAN OCCUR IF YOU USE A DIFFERENT THINNER.

- (a) If it is necessary to make the sealant, A00015 thinner, add solvent, B00148.
 - 1) Do not add solvent, B00148 in a quantity more than 40 percent by volume of the mixed unthinned sealant.
- (b) Do not apply sealant, A00015 when the air temperature or temperature of the structure to be sealed is less than 65 degrees Fahrenheit (19 degrees Celsius).
- (c) Make sure that sealant, A00015 that has not been cured does not get colder than 60 degrees Fahrenheit (17 degrees Celsius) until the cured dry-through time (Table 802).

CAUTION: DO NOT PERMIT THE THICKNESS OF THE APPLIED SEALANT AND PRIMER LAYER TO BE MORE THAN 0.022 INCH (0.56 MM) OR LESS THAN 0.007 INCH (0.18 MM). DAMAGE TO EQUIPMENT CAN OCCUR.

- (d) Make sure the combined thickness of the applied sealant and the primer layer is 0.012 to 0.017 inch (0.30 mm to 0.43 mm). (These dimensions include a 0.002 inch (0.05 mm) layer of primer.)

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(e) In some cases, dry sealant thickness of more than 0.015 inch (0.38 mm) or less than 0.010 inch (0.25 mm) can occur. These conditions are acceptable, but the thickness must not be less than 0.007 inch (0.18 mm) or more than 0.022 inch (0.56 mm). (These dimensions include a 0.002 inch (0.05 mm) layer of primer.)

(f) Apply a minimum of two layers of sealant, A00015, with a flat, bristle brush.

NOTE: At 77 ±5°F (25 ±2.8°C) and 50 ±5 percent relative humidity, the approximate application time of sealant, A00015, Class 1 is 120 minutes. The approximate application time of sealant, A00015, Class 2 is 30 minutes. Higher temperatures make the application time shorter. Lower temperatures make the application time longer.

1) Apply an overlap of sealant, A00015 over the existing barrier coat of cured sealant, A00015 to a minimum of 1.0 inch (25.4 mm) as shown in (Figure 821).

2) For large areas, sealant, A00015 can also be applied with a spray application.

a) If multiple coats are applied, permit a flash-off time of 15-45 minutes between coats to prevent solvent entrapment and bubble formation.

b) In difficult spray areas or where fade-out of the sealant is necessary, you can apply one coat with a flat bristle brush to get smooth coverage over the area. Wait for a flash-off time of 15-45 minutes before you apply the subsequent coat with a spray application.

(g) For horizontal surfaces, let the sealant dry a minimum of 1/2 hour between layers.

(h) For vertical surfaces, let the sealant dry a minimum of 2 hours between layers.

(i) thickness measurement instrument, COM-1595 and thickness measurement probe, COM-1596 can be used to make sure the sealant and primer layer has the correct thickness.

NOTE: It is not possible to measure the thickness of the sealant layer without the primer layer.

SUBTASK 28-11-00-390-012

(4) Let the sealant dry.

(a) The cure rates of the sealant are shown in the table below (Table 802):

NOTE: A cure temperature of more than 80°F (26.7°C) is recommended for the best results.

1) Let the sealant cure to the dry-through condition shown in the table.

Table 802/28-11-00-993-846

Table with 5 columns: CURE TEMPERATURE, DRY HARD (HOURS) TYPE II, CLASS 1, DRY HARD (HOURS) TYPE II, CLASS 2, DRY THROUGH (HOURS) TYPE II, CLASS 1, DRY THROUGH (HOURS) TYPE II, CLASS 2. Rows include temperatures like 75 +/- 5 deg. F and 100 +/- 5 deg. F.

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(Continued)

CURE TEMPERATURE	CURE CONDITIONS			
	DRY HARD (HOURS) ^{*[1]}		DRY THROUGH (HOURS) ^{*[2]}	
	TYPE II, CLASS 1	TYPE II, CLASS 2	TYPE II, CLASS 1	TYPE II, CLASS 2
150 +/- 5 deg. F 65.6 +/- 2.8 deg. C	2.5	1.5	5	2

*[1] Condition where metal particles do not bond to the sealant.

*[2] Condition where sealant is sufficiently hard to prevent damage when walked on with boot socks.

SUBTASK 28-11-00-750-001

- (5) Do these steps to do a test to make sure the secondary fuel barrier is in dry-through condition:
- (a) On a horizontal section of structure, put your thumb horizontally on the newly applied secondary fuel barrier with your arm in a vertical straight line from the wrist to the shoulder.
 - (b) While you put as much pressure on your thumb as possible with your arm, turn your thumb through an angle of 90 degrees in the plane of the barrier.
 - (c) If there is no loosening, detachment, wrinkling or other distortion of the barrier, then the film is in dry-through condition.

————— **END OF TASK** —————

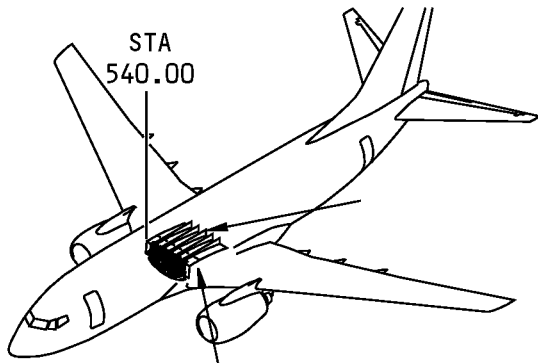
EFFECTIVITY
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LEGEND:



CONTINUOUS COATING OF SECONDARY FUEL VAPOR-BARRIER.

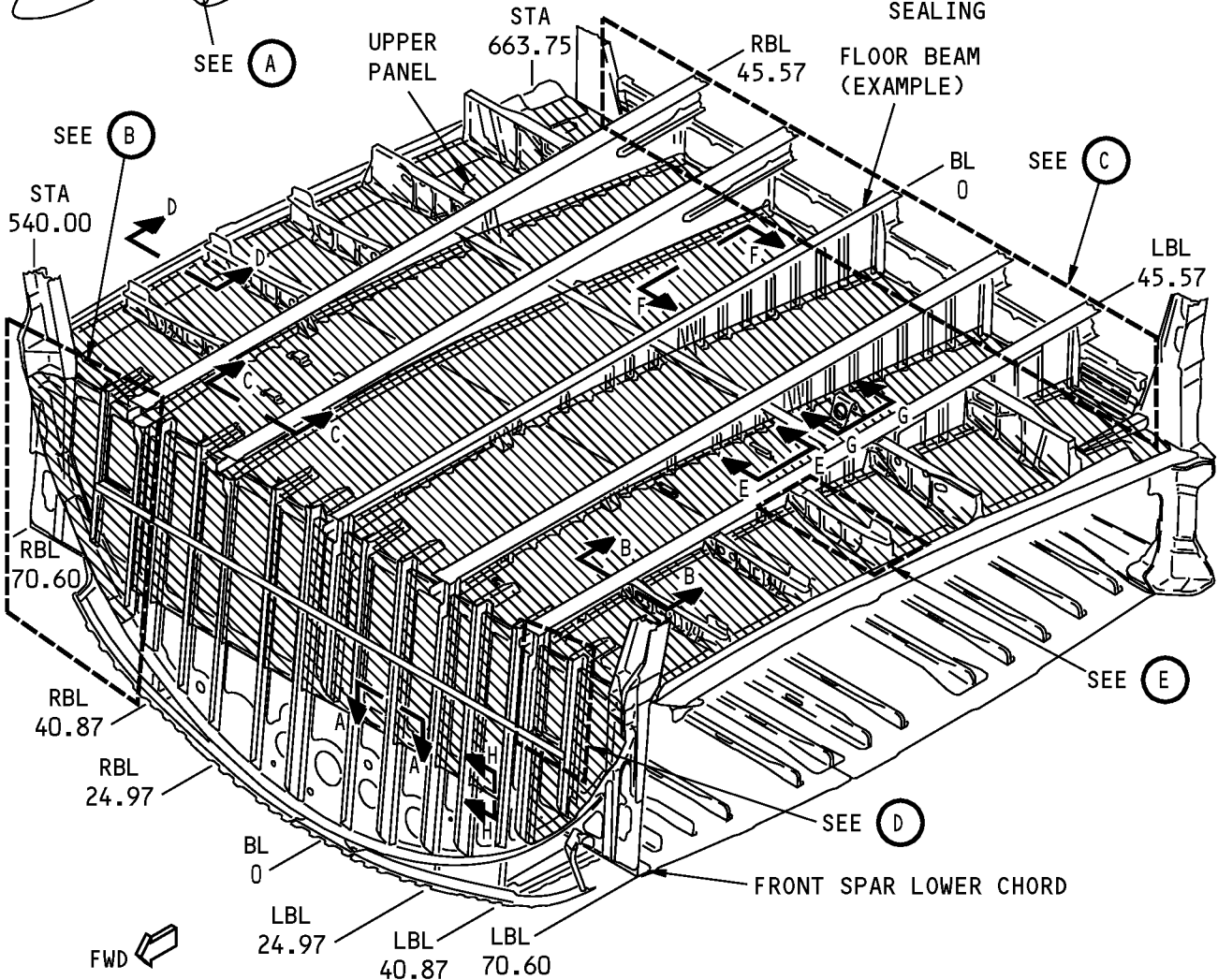


MINIMUM DISTANCE FOR COVERAGE OF SECONDARY FUEL VAPOR-BARRIER.



SEALANT: BMS 5-45 FOR INTERNAL SEALING

BMS 5-142 FOR EXTERNAL SEALING



FRONT SPAR AND WING CENTER SECTION (EXAMPLE)

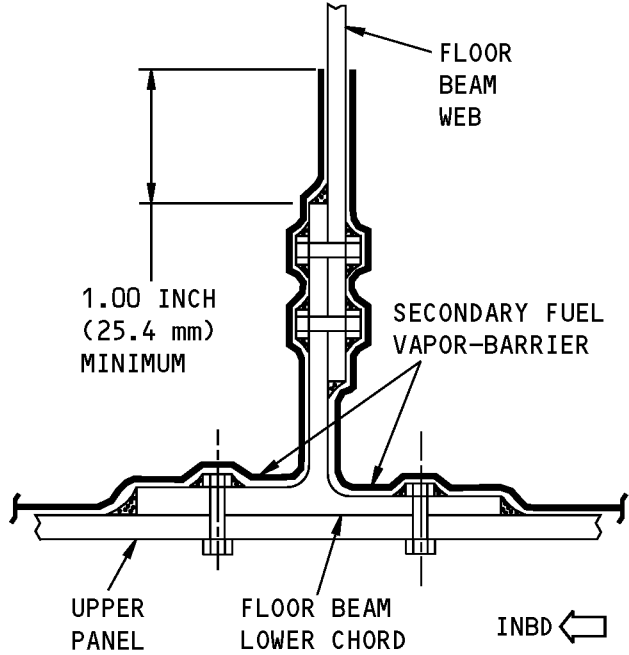
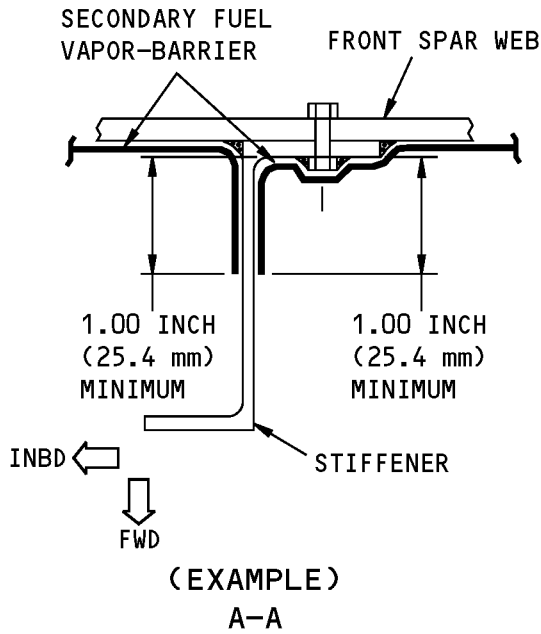


Secondary Fuel Vapor-Barrier
Figure 820 (Sheet 1 of 9)/28-11-00-990-845

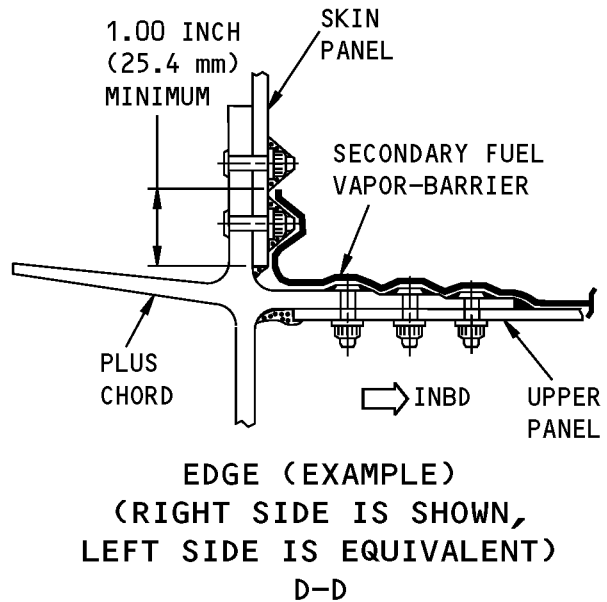
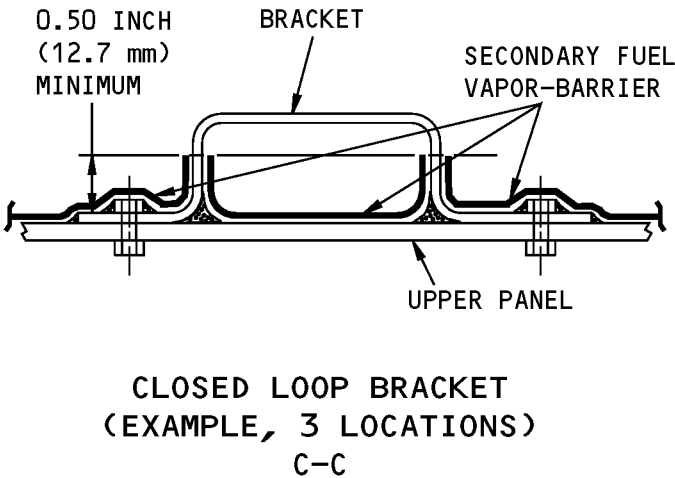
EFFECTIVITY
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FLOOR BEAM LOWER CHORD
TO UPPER PANEL
(EXAMPLE, 5 LOCATIONS)
B-B



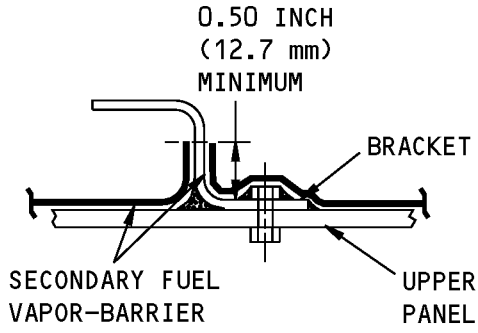
Secondary Fuel Vapor-Barrier
Figure 820 (Sheet 2 of 9)/28-11-00-990-845

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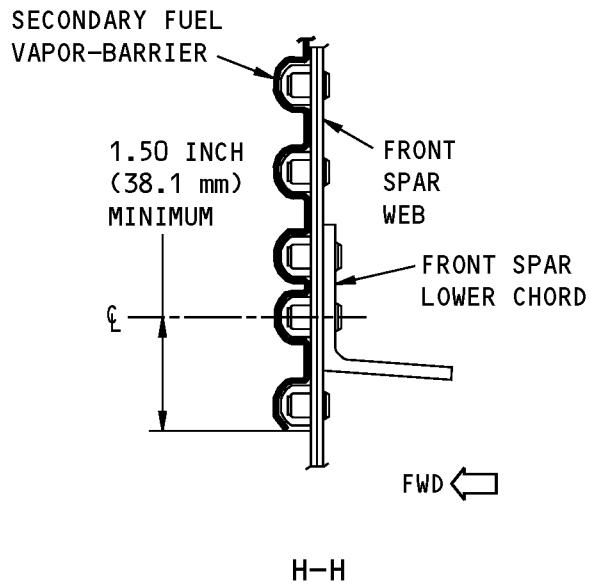
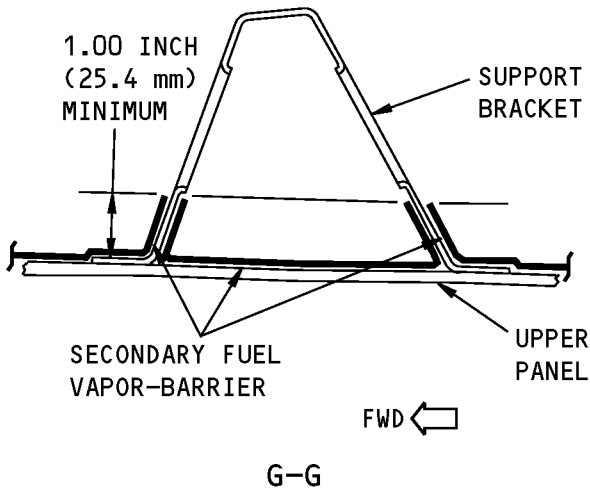
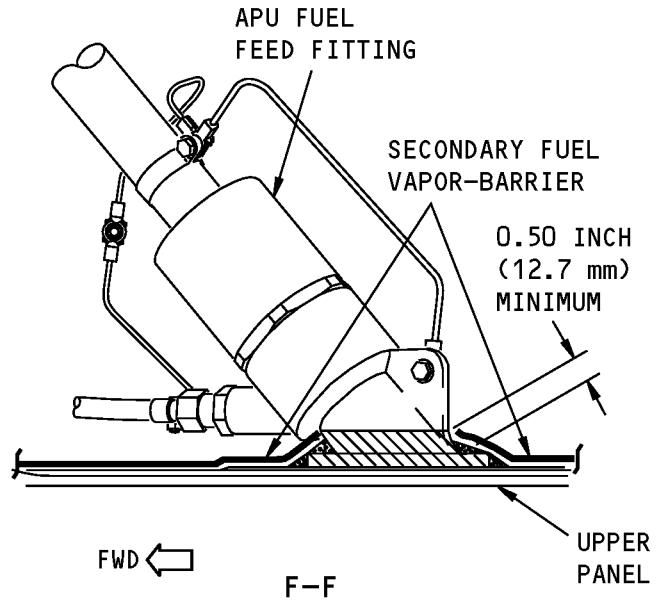
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**RISER BRACKET
(EXAMPLE, 3 LOCATIONS)
E-E**



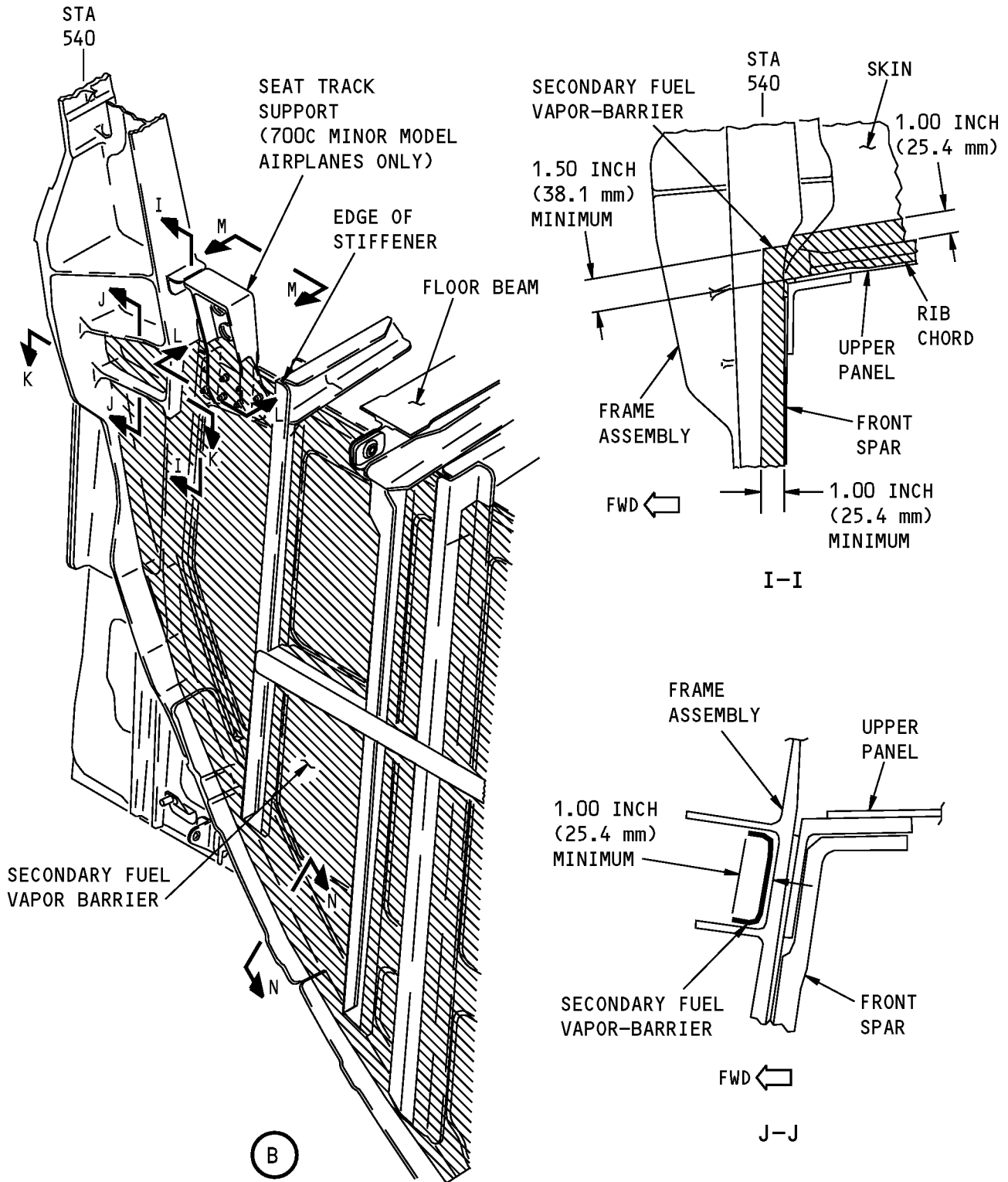
**Secondary Fuel Vapor-Barrier
Figure 820 (Sheet 3 of 9)/28-11-00-990-845**

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Secondary Fuel Vapor-Barrier
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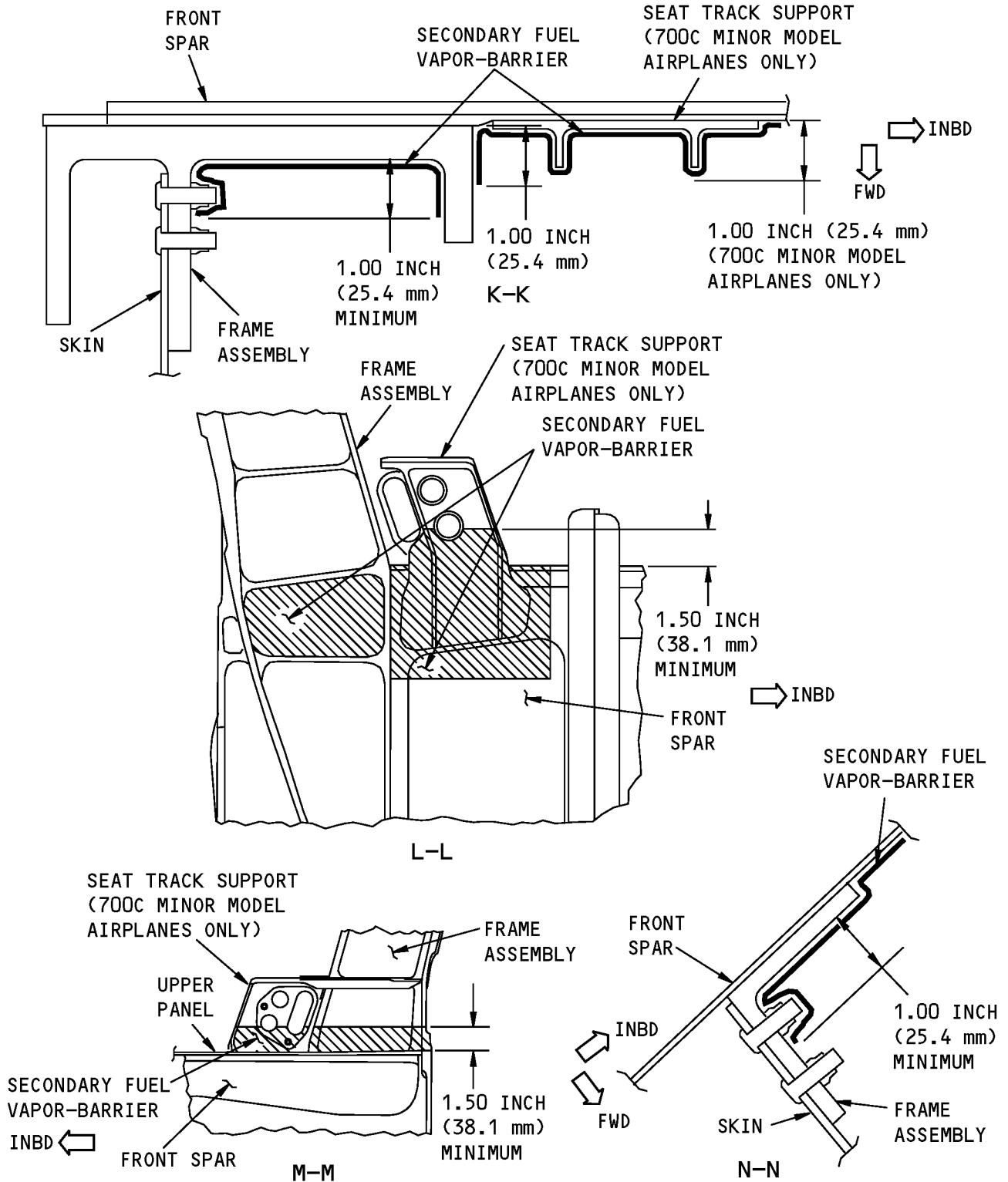
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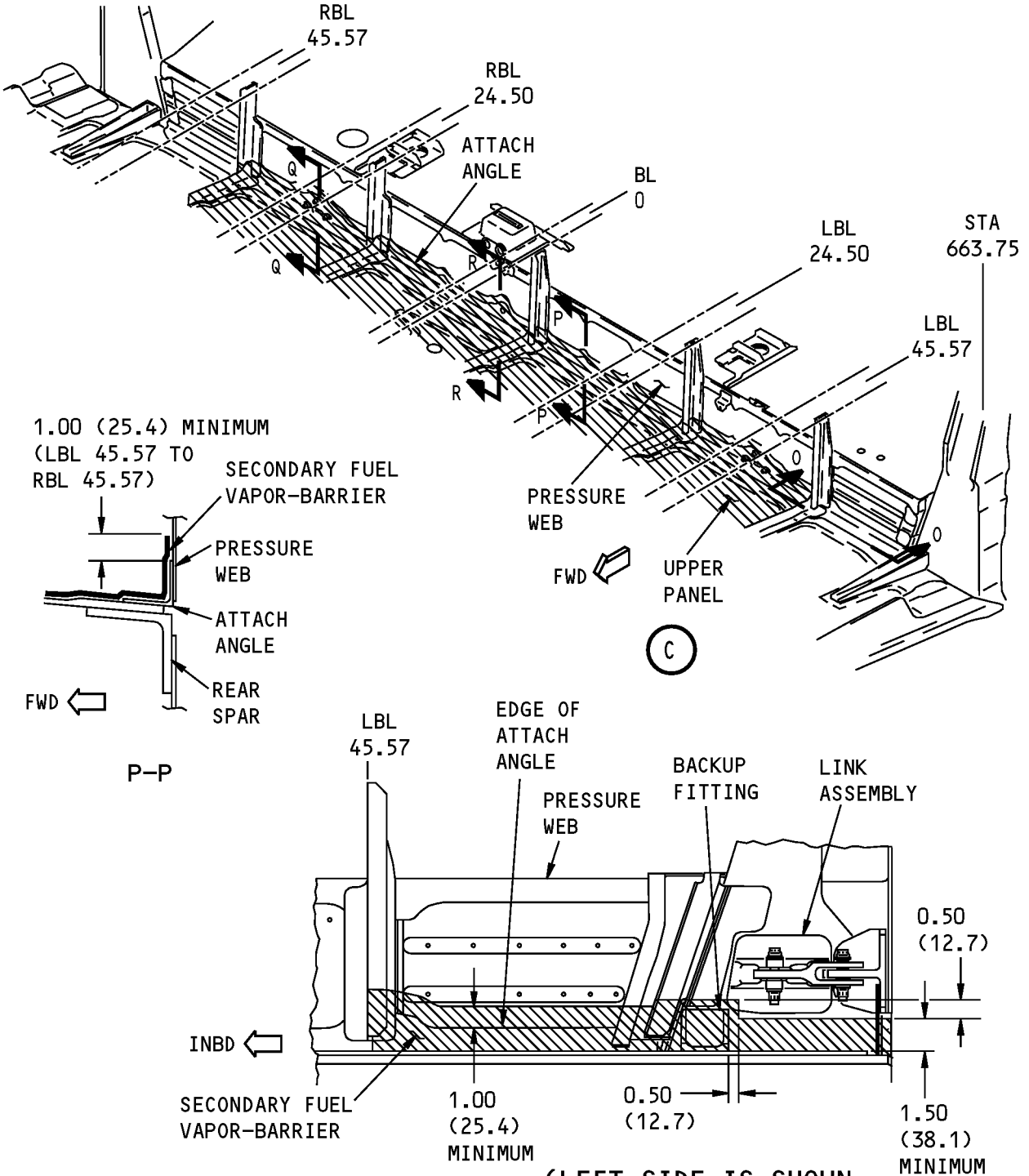
Secondary Fuel Vapor-Barrier
Figure 820 (Sheet 5 of 9)/28-11-00-990-845

EFFECTIVITY
HAP ALL

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NOTE: ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES).

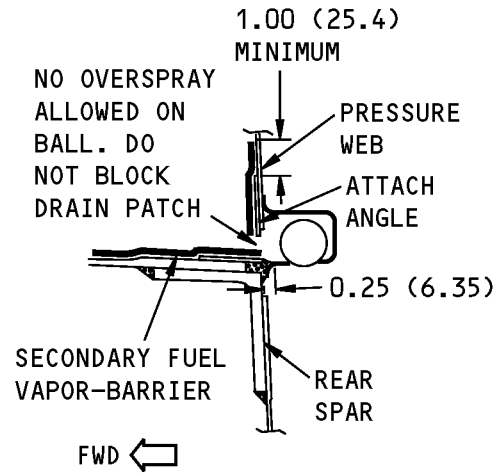
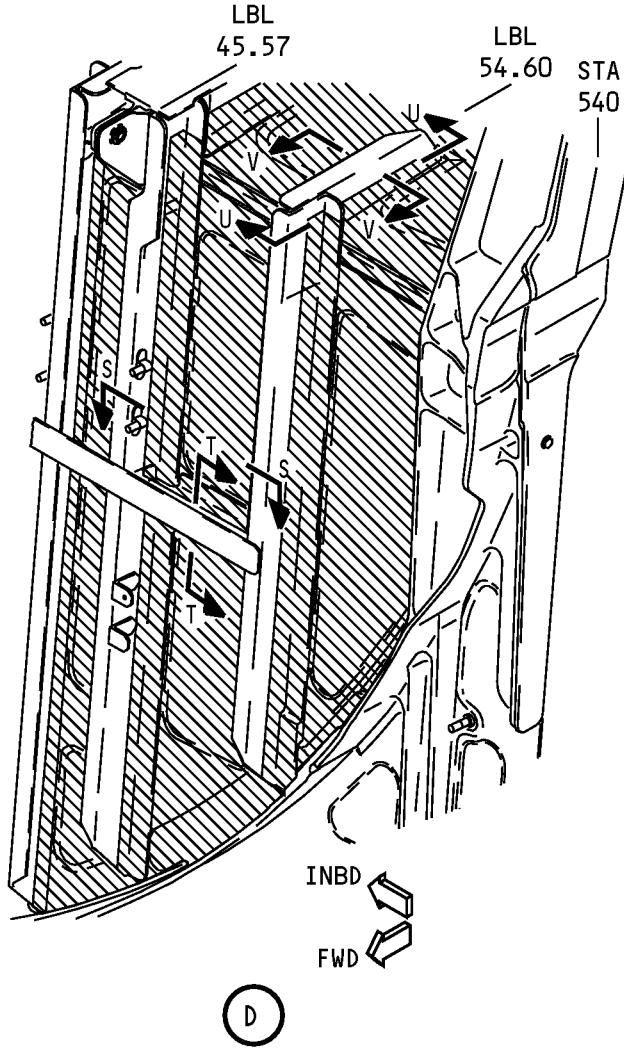
(LEFT SIDE IS SHOWN,
RIGHT SIDE IS OPPOSITE)
0-0

Secondary Fuel Vapor-Barrier
Figure 820 (Sheet 6 of 9)/28-11-00-990-845

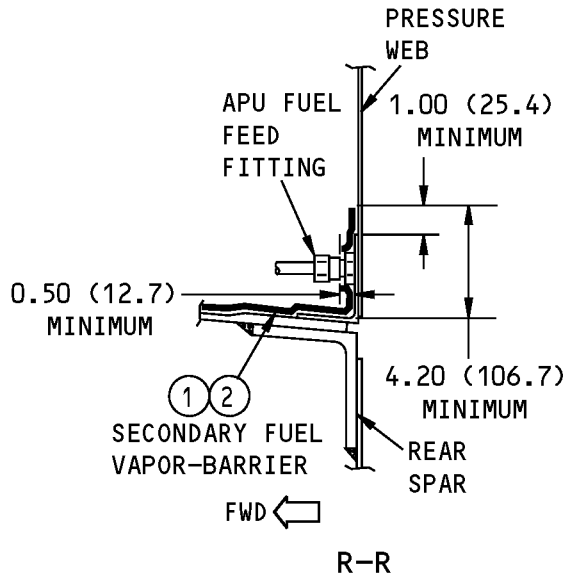
EFFECTIVITY
HAP ALL

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(EXAMPLE, 2 LOCATIONS)
Q-Q



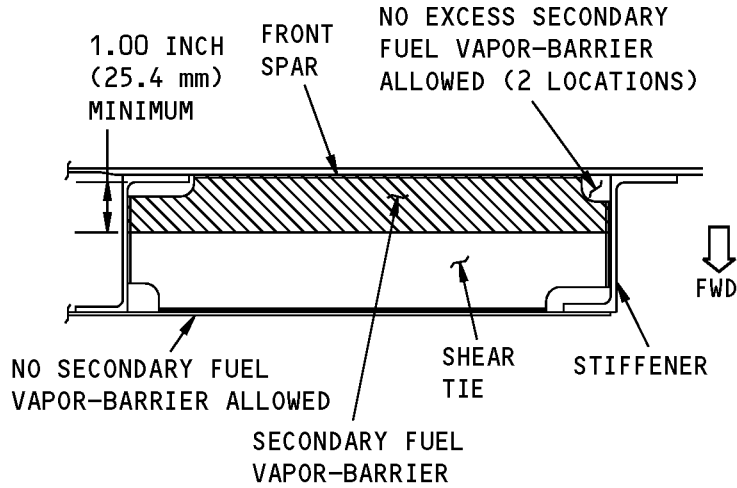
NOTE: ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES).

**Secondary Fuel Vapor-Barrier
Figure 820 (Sheet 7 of 9)/28-11-00-990-845**

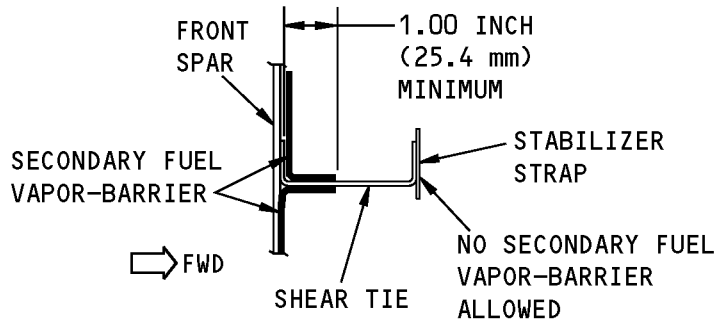
EFFECTIVITY
HAP ALL

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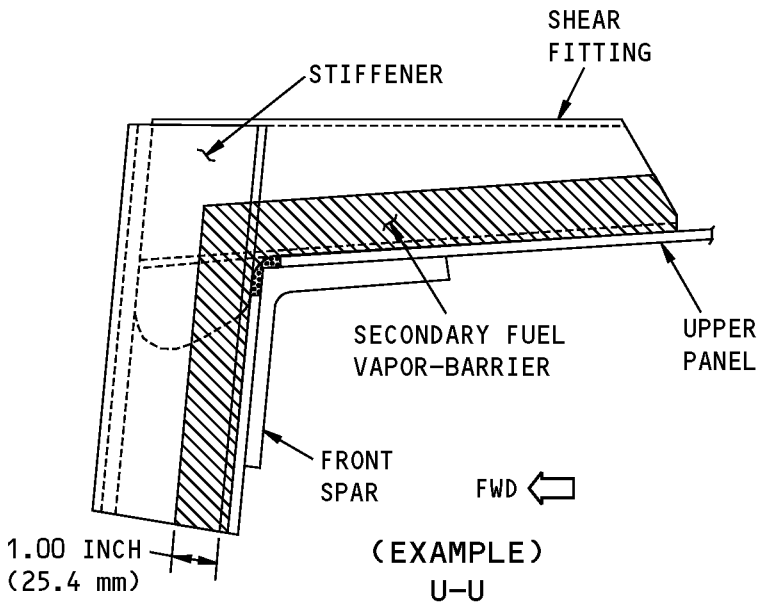
AIRCRAFT MAINTENANCE MANUAL



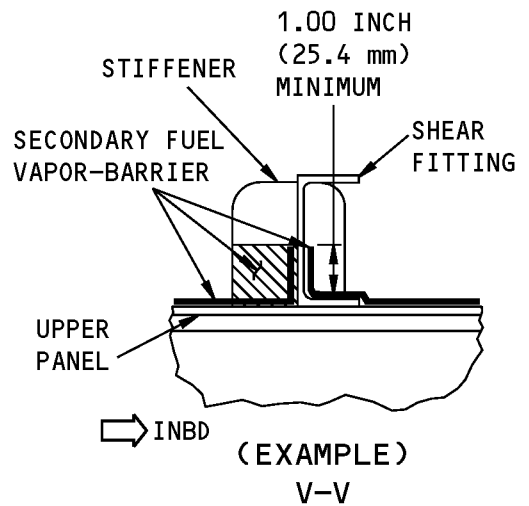
(EXAMPLE)
S-S



(EXAMPLE)
T-T



(EXAMPLE)
U-U



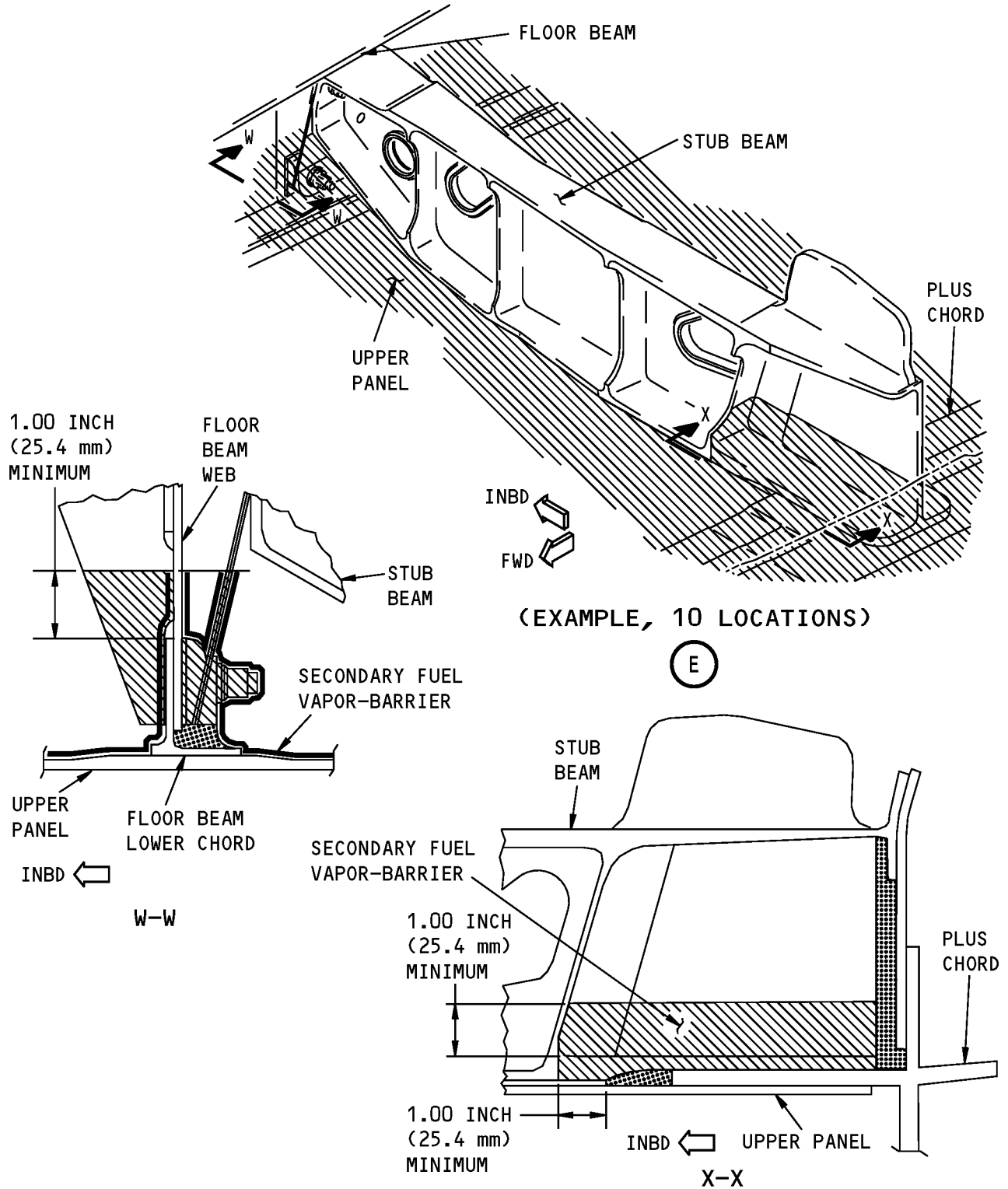
(EXAMPLE)
V-V

Secondary Fuel Vapor-Barrier
Figure 820 (Sheet 8 of 9)/28-11-00-990-845

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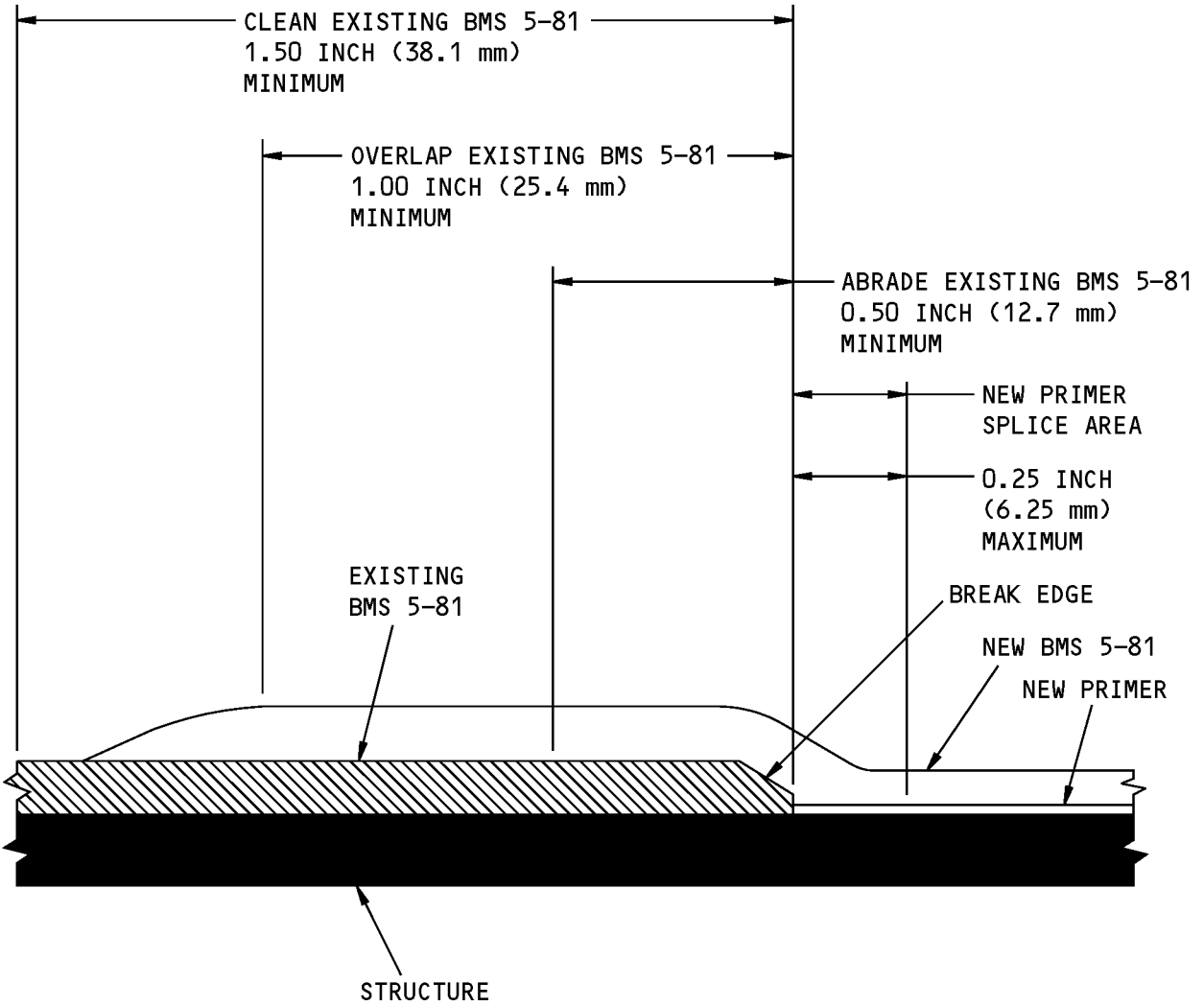
**Secondary Fuel Vapor-Barrier
Figure 820 (Sheet 9 of 9)/28-11-00-990-845**

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Splice Surface Area Preparation for Secondary Fuel Barrier
Figure 821/28-11-00-990-848

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WING FUEL TANK ACCESS PANELS - REMOVAL/INSTALLATION

1. General

- A. Each main fuel tank has 16 elliptical shaped access doors installed in the lower wing surface. The access doors let you go into the main fuel tanks.
- B. Each surge tank has three access doors installed in the lower wing surface. A pressure relief valve and a vent scoop and flame arrestor are installed on the surge tank access doors 533BB and 633BB.
- C. This procedure contains four tasks:
 - (1) Main tank access door removal
 - (2) Main tank access door installation
 - (3) Surge tank access door removal
 - (4) Surge tank access door installation

TASK 28-11-11-000-801

2. Main Tank Access Door Removal

(Figure 401)

A. References

Reference	Title
06-43-00-800-801	Engine and Nacelle Strut Access Doors and Panels (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)

B. Consumable Materials

Reference	Description	Specification
B00083	Solvent - Aliphatic Naphtha (For Acrylic Plastics)	TT-N-95 Type II, ASTM D-3735 Type III

C. Location Zones

Zone	Area
434	Engine 1 - Aft Strut Fairing
444	Engine 2 - Aft Strut Fairing
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Procedure

SUBTASK 28-11-11-650-001

- (1) To defuel the applicable fuel tank, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801.

SUBTASK 28-11-11-940-001

WARNING: OBEY THE PRECAUTIONS FOR PURGING, AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

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SUBTASK 28-11-11-010-001

- (3) For access doors 532BB and 632BB, remove the applicable aft fairing panel on the strut, 434CL or 444CR, to get full access to the door (TASK 06-43-00-800-801)(Figure 401).

SUBTASK 28-11-11-020-010

- (4) Hold the clamp ring [5] and remove the mounting bolt [6] for the applicable access door [1], access door [6], or access door [8].

SUBTASK 28-11-11-020-011

- (5) Remove the clamp ring [5] and the aluminum gasket [3].
 - (a) Discard the aluminum gasket [3]

SUBTASK 28-11-11-420-004

CAUTION: DO NOT USE A LEVER (PRY) ON THE MAIN TANK ACCESS DOOR. THE LOWER SURFACE OF THE ACCESS DOOR FLANGE AND THE TOP SURFACE OF THE WING SKIN AROUND THE ACCESS DOORS ARE SEAL SURFACES. IF YOU ARE NOT CAREFUL, SCRATCHES OR DAMAGE TO THE SEAL SURFACE CAN OCCUR. BE CAREFUL WHEN YOU REMOVE THE MAIN TANK ACCESS DOORS WITH THE FUEL MEASURING STICKS. IF THE FUEL MEASURING STICKS TOUCH THE STRINGERS AT THE TOP OF THE FUEL TANK, DAMAGE TO THE FUEL MEASURING STICKS CAN OCCUR.

- (6) On the main tank access doors [1] and access doors [8] without the fuel measuring sticks, push up on the access door.
 - (a) If the main tank access door [1] or access door [8] does not move freely, use a rubber mallet and lightly hit around the access door [1] or access door [8].

SUBTASK 28-11-11-020-002

- (7) On the main tank access doors [6] with the fuel measuring sticks, push up and put the access doors at an angle so the fuel measuring sticks do not touch the stringers at the top of the fuel tank.
 - (a) If the main tank access door [6] or does not move freely, use a rubber mallet and lightly hit around the main tank.

SUBTASK 28-11-11-020-003

CAUTION: BE CAREFUL WHEN YOU REMOVE AN ACCESS DOORS WITH A FUEL MEASURING STICK INSTALLED ON THE ACCESS DOOR. IF YOU ARE NOT CAREFUL WHEN YOU REMOVE THESE ACCESS DOORS, DAMAGE TO THE FUEL MEASURING STICK CAN OCCUR.

- (8) Remove the main tank access door [1], access door [6], or access door [8] from the fuel tank.
 - (a) These access doors have fuel measuring stick assemblies that attach to the inner surface of the door:

Table 401/28-11-11-993-801

LEFT MAIN TANK	RIGHT MAIN TANK
532CB	632CB
532FB	632FB
532JB	632JB
532LB	632LB
532NB	632NB

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(Continued)

LEFT MAIN TANK	RIGHT MAIN TANK
532QB	632QB

SUBTASK 28-11-11-110-001

(9) Clean the inner side and the outer side of the access opening with solvent, B00083.

SUBTASK 28-11-11-410-001

(10) Install a rubber protector in the access door opening.

————— **END OF TASK** —————

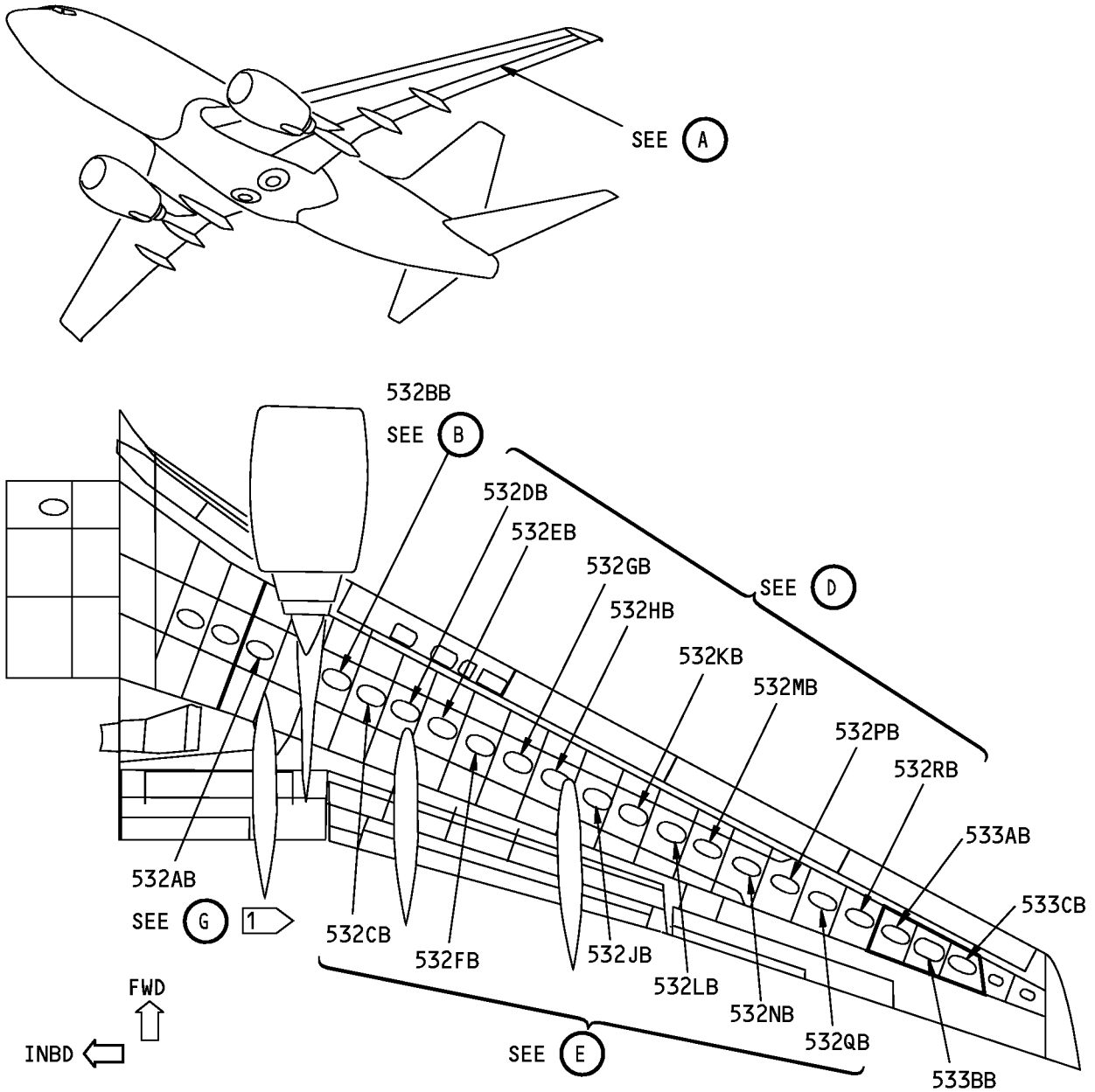
EFFECTIVITY
HAP ALL

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**FUEL TANK ACCESS DOORS
(LEFT WING, BOTTOM VIEW
RIGHT WING IS OPPOSITE)**

(A)

**Main Tank Access Door Installation
Figure 401 (Sheet 1 of 5)/28-11-11-990-802**

1 HIGH IMPACT
RESISTANT ACCESS
DOOR

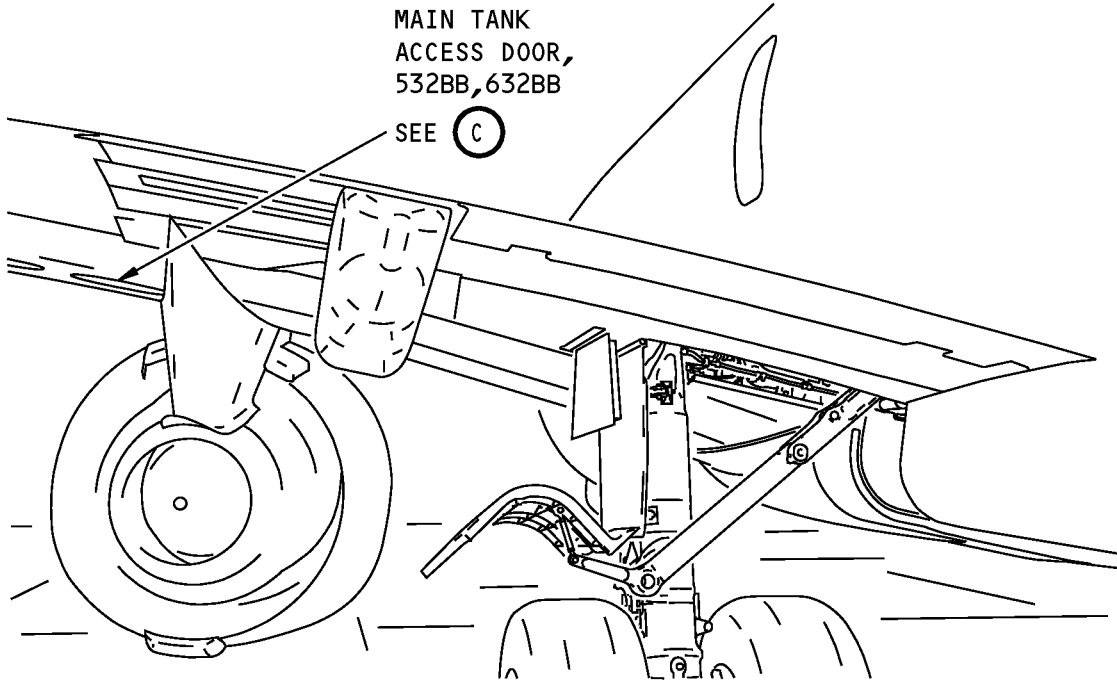
EFFECTIVITY
HAP ALL

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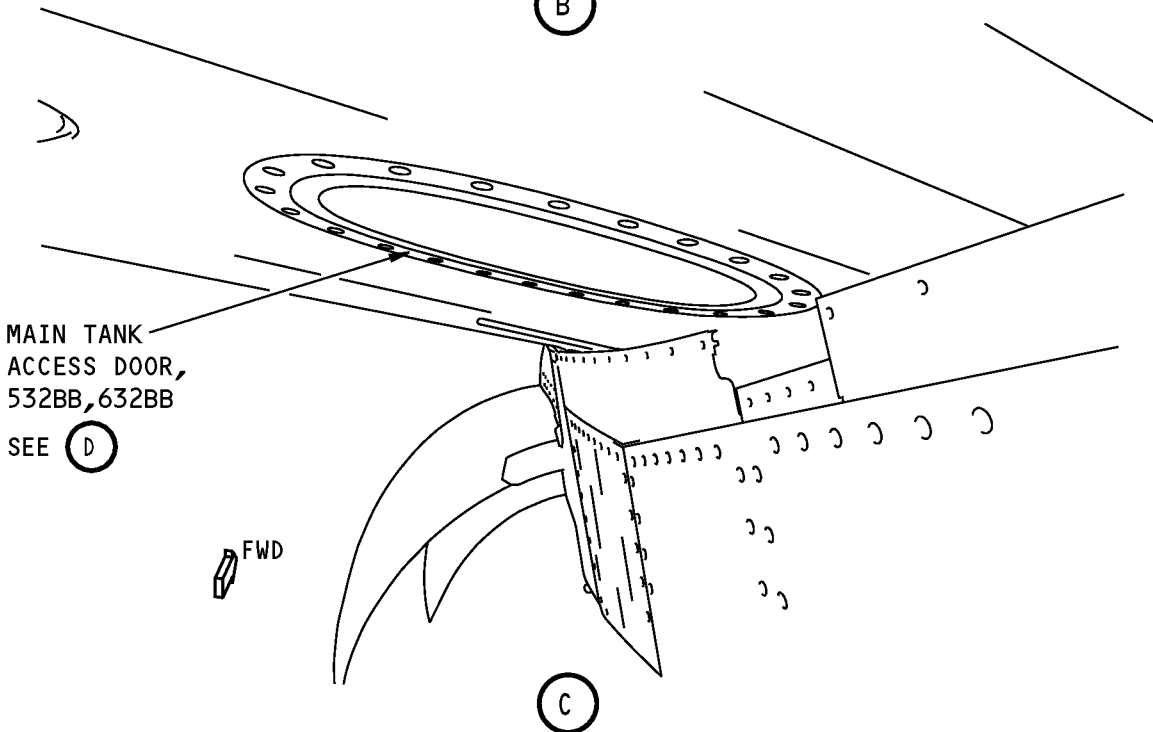
MAIN TANK
ACCESS DOOR,
532BB, 632BB

SEE (C)



LEFT WING
(RIGHT WING IS OPPOSITE)

(B)



MAIN TANK
ACCESS DOOR,
532BB, 632BB

SEE (D)

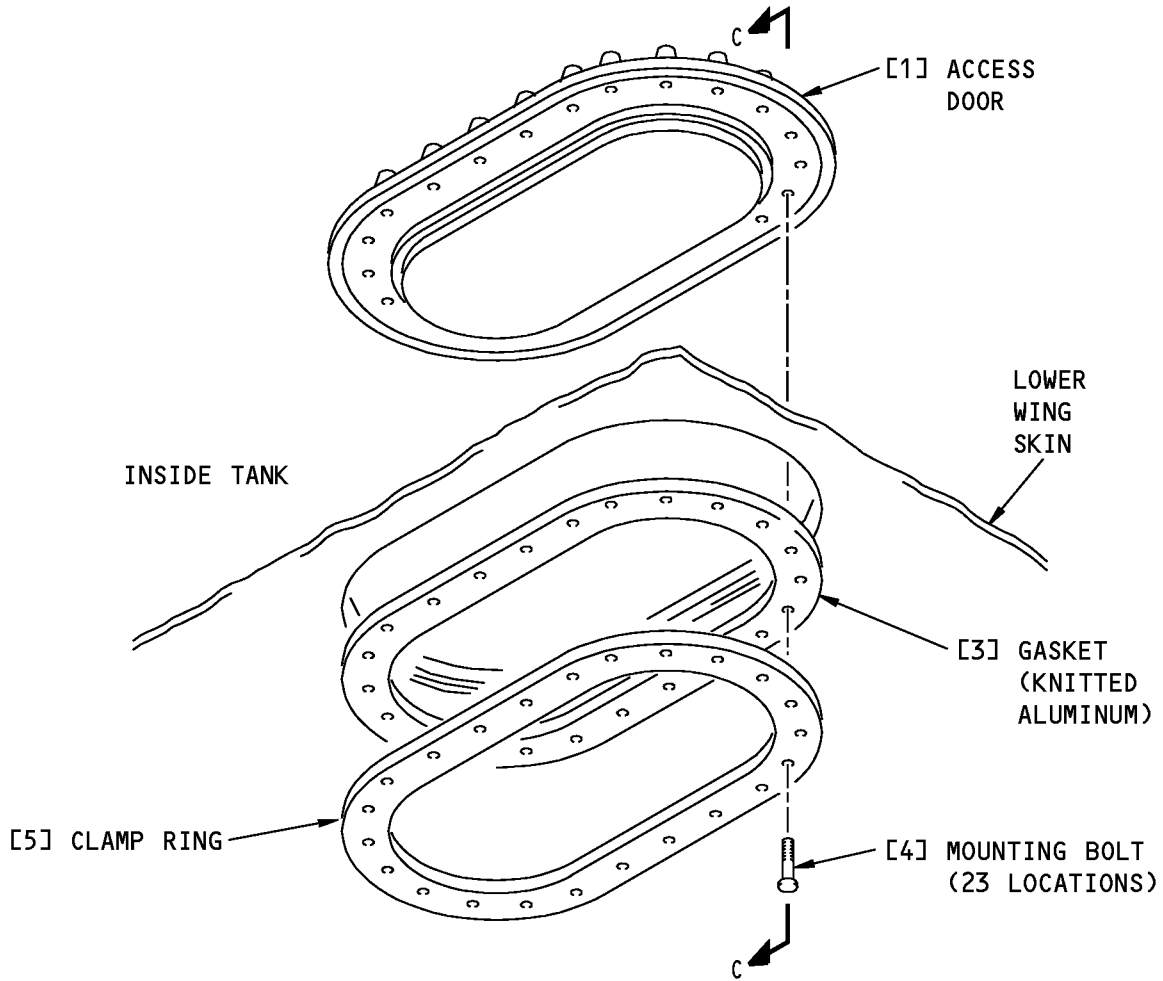
FWD

(C)

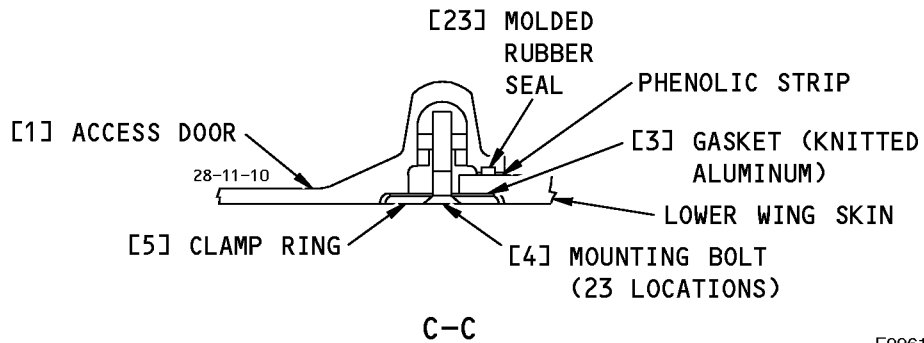
Main Tank Access Door Installation
Figure 401 (Sheet 2 of 5)/28-11-11-990-802

EFFECTIVITY
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(D)



F99615 S0006571303_V3

**Main Tank Access Door Installation
Figure 401 (Sheet 3 of 5)/28-11-11-990-802**

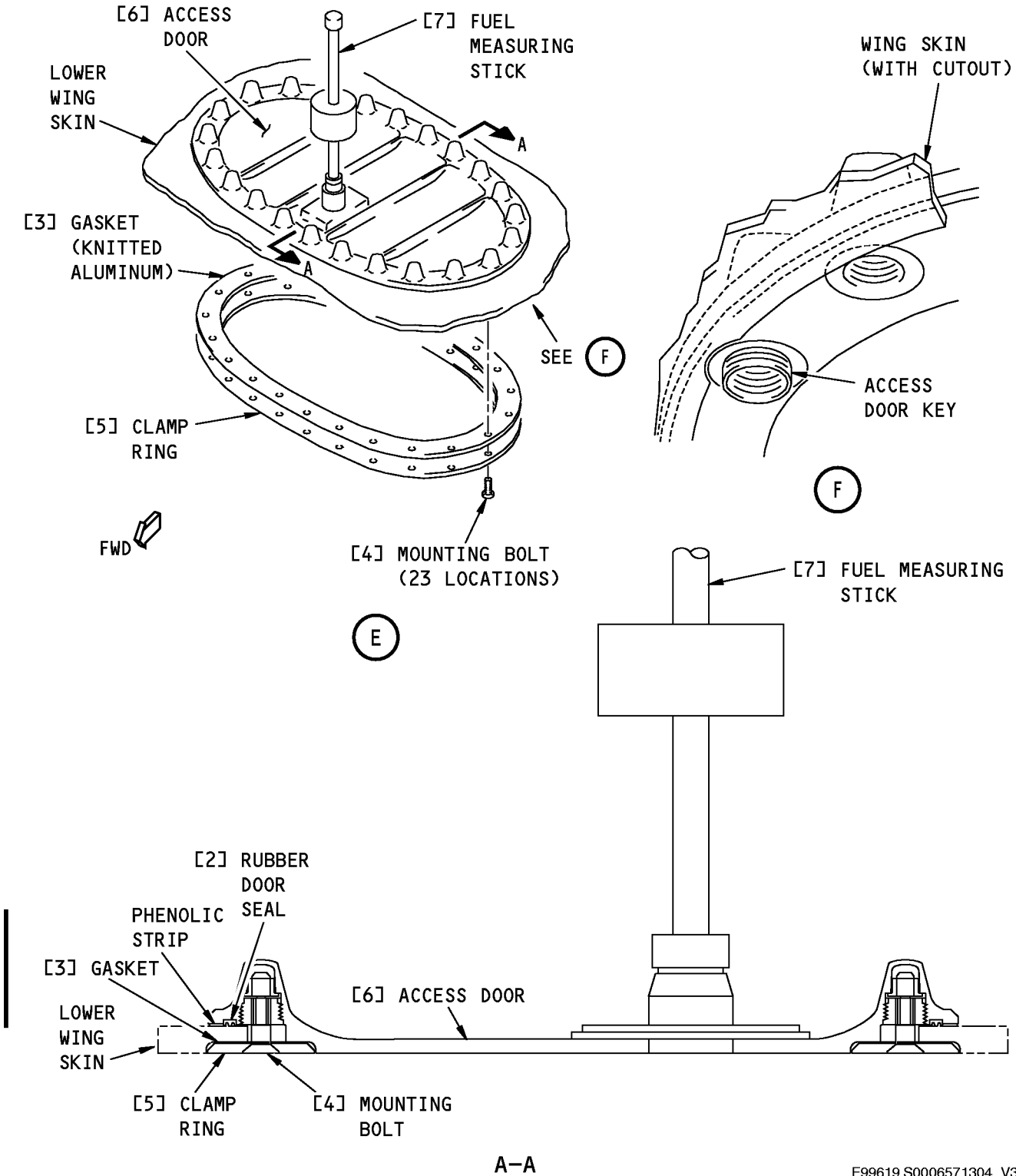
EFFECTIVITY
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F99619 S0006571304_V3

Main Tank Access Door Installation
Figure 401 (Sheet 4 of 5)/28-11-11-990-802

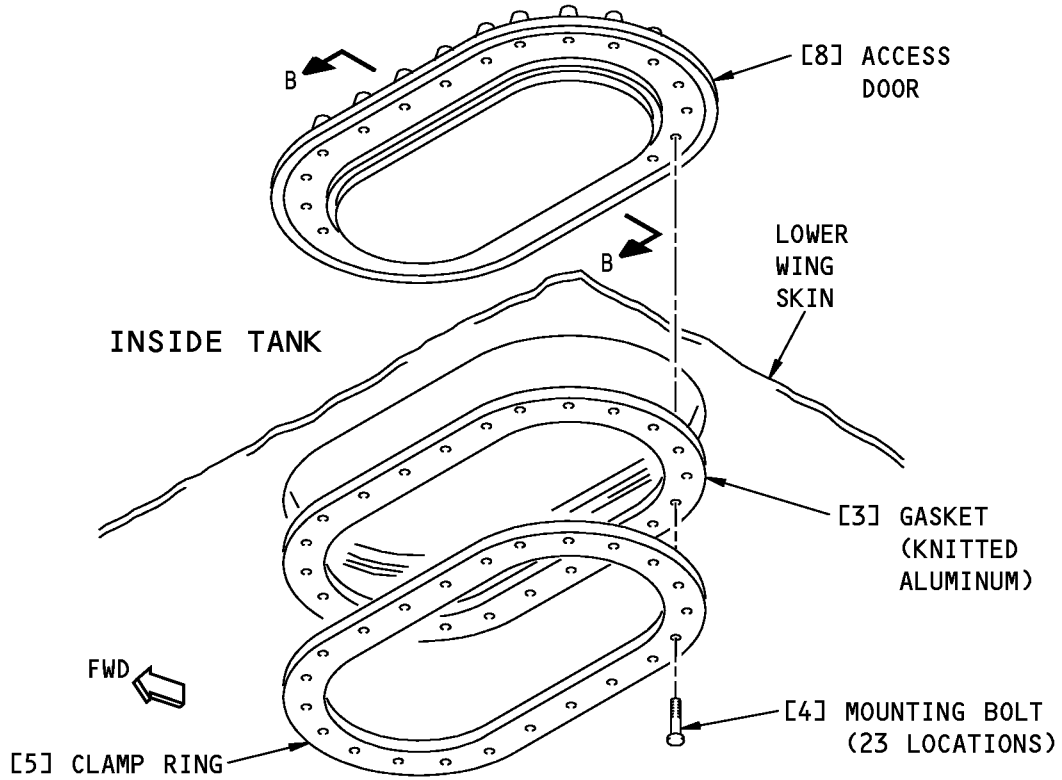
EFFECTIVITY
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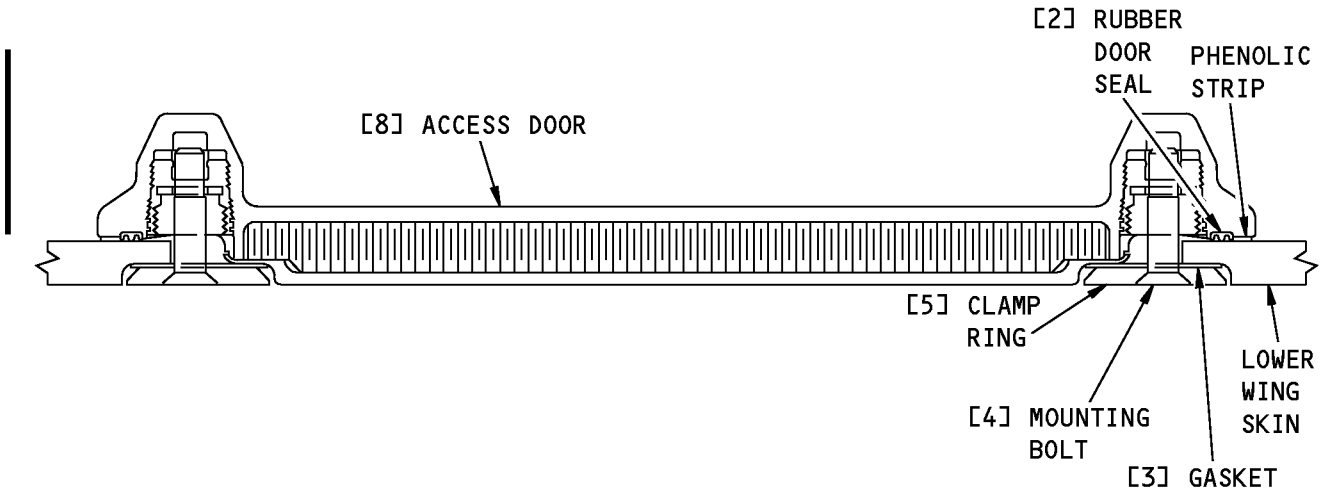
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IMPACT RESISTANT ACCESS DOOR

G



B-B

F99626 S0006571305_V3

**Main Tank Access Door Installation
Figure 401 (Sheet 5 of 5)/28-11-11-990-802**

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TASK 28-11-11-400-801

3. Main Tank Access Door Installation

(Figure 401)

A. General

- (1) BMS 3-38 is the recommended anti-corrosion compound for access door gasket installations. BMS 3-38 gives improved corrosion protection between the access door, mesh gasket and wing surfaces. Anti-corrosion compound, Aero Shell No. 14, can still be used for access door gaskets, but should be replaced with BMS 3-38 as soon as practical.
- (2) Do not mix the two types of anti-corrosion compounds, BMS 3-38 and Aero Shell No.14. If you replaced an Aero Shell No.14 filled gasket with a BMS 3-38 filled gasket, remove all Aero Shell No.14 anti-corrosion compound from the clamp ring and the access door structure on the airplane.
- (3) The main tank access doors shown below are high impact resistant doors and they must not be replaced with a standard door:

Table 402/28-11-11-993-802

THE LEFT WING	THE RIGHT WING
532AB	632AB

B. References

Reference	Title
06-43-00-800-801	Engine and Nacelle Strut Access Doors and Panels (P/B 201)
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-300-802	Repair of Fuel Tank Corrosion (P/B 801)
28-11-00-790-801	Fuel Leak Detection Procedures (P/B 601)
28-11-11-900-801	Rubber Door Seal - Replacement (P/B 801)
28-22-41-420-801	Fuel Boost Pump and Override Pump Priming (P/B 401)

C. Consumable Materials

Reference	Description	Specification
B00083	Solvent - Aliphatic Naphtha (For Acrylic Plastics)	TT-N-95 Type II, ASTM D-3735 Type III
D00020	Grease - Aircraft Oscillating Bearing	MIL-G-25537 (NATO G-365)
D00504	Grease - Petrolatum	VV-P-236
G50237	Compound - Corrosion Inhibiting, Non-drying - Cor-Ban 27L	BMS 3-38

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Access door	28-11-11-02-040	HAP 001-013, 015-026
		28-11-11-02-050	HAP 001-013, 015-026
		28-11-11-02-075	HAP 001-013, 015-026
		28-11-11-02-080	HAP 001-013, 015-026
		28-11-11-02-095	HAP 001-013, 015-026
		28-11-11-02-100	HAP 001-013, 015-026
		28-11-11-02-105	HAP 001-013, 015-026

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(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
1 (cont.)		28-11-11-02-110	HAP 001-013, 015-026
		28-11-11-02-125	HAP 001-013, 015-026
		28-11-11-02-130	HAP 001-013, 015-026
		28-11-11-02-135	HAP 001-013, 015-026
		28-11-11-02-155	HAP 001-013, 015-026
		28-11-11-02-160	HAP 001-013, 015-026
		28-11-11-02-175	HAP 001-013, 015-026
		28-11-11-02-180	HAP 001-013, 015-026
		28-11-11-02-195	HAP 001-013, 015-026
		28-11-11-02-200	HAP 001-013, 015-026
		28-11-11-02-215	HAP 001-013, 015-026
		28-11-11-02-220	HAP 001-013, 015-026
		28-11-11-02-235	HAP 001-013, 015-026
		28-11-11-02-240	HAP 001-013, 015-026
		28-11-11-02A-100	HAP 028-054, 101-999
		28-11-11-02A-140	HAP 028-054, 101-999
		28-11-11-02A-145	HAP 028-047, 054, 101-106
		28-11-11-02A-180	HAP 028-054, 101-999
		28-11-11-02A-200	HAP 028-054, 101-999
		28-11-11-02A-205	HAP 028-047, 054, 101-106
3	Aluminum gasket	28-11-11-02-270	HAP 001-013, 015-026
		28-11-11-02-305	HAP 001-013, 015-026
		28-11-11-02-310	HAP 001-013, 015-026
		28-11-11-02A-260	HAP 028-054, 101-999
		28-11-11-02A-300	HAP 028-054, 101-999
6	Access door	28-11-11-02A-305	HAP 028-054, 101-999
		28-11-11-02-085	HAP 001-013, 015-026
		28-11-11-02-090	HAP 001-013, 015-026
		28-11-11-02-115	HAP 001-013, 015-026
		28-11-11-02-120	HAP 001-013, 015-026
		28-11-11-02-145	HAP 001-013, 015-026
		28-11-11-02-150	HAP 001-013, 015-026
		28-11-11-02-165	HAP 001-013, 015-026
		28-11-11-02-170	HAP 001-013, 015-026
		28-11-11-02-185	HAP 001-013, 015-026
		28-11-11-02-190	HAP 001-013, 015-026
		28-11-11-02-205	HAP 001-013, 015-026
		28-11-11-02-210	HAP 001-013, 015-026
		28-11-11-02-215	HAP 001-013, 015-026
		28-11-11-02A-090	HAP 028-054, 101-999
28-11-11-02A-145	HAP 028-047, 054, 101-106		
28-11-11-02A-190	HAP 028-054, 101-999		
28-11-11-02A-205	HAP 028-047, 054, 101-106		

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AMM Item	Description	AIPC Reference	AIPC Effectivity
8	Access door	28-11-11-02-065	HAP 001-013, 015-026
		28-11-11-02-070	HAP 001-013, 015-026
		28-11-11-02A-210	HAP 028-054, 101-999

E. Location Zones

Zone	Area
434	Engine 1 - Aft Strut Fairing
444	Engine 2 - Aft Strut Fairing
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

F. Procedure

SUBTASK 28-11-11-020-004

(1) Remove the rubber protector from the access door opening.

SUBTASK 28-11-11-210-001

(2) Do an inspection for corrosion at the access door opening.

(a) If it is necessary, do this task: Repair of Fuel Tank Corrosion, TASK 28-11-00-300-802.

SUBTASK 28-11-11-210-002

(3) Make sure the areas on the access door [1], access door [6], or access door [8] and the wing skin, that the molded rubber seal [2] touches, are clean.

(a) Use solvent, B00083, to clean the surface if it is necessary.

SUBTASK 28-11-11-210-003

(4) Make sure the molded rubber seal [2] is in good condition and secure.

(a) To replace the molded rubber seal [2] if it is necessary, do this task: Rubber Door Seal - Replacement, TASK 28-11-11-900-801.

(b) Apply a thin layer of grease, D00504, to the molded rubber door seal.

NOTE: This will prevent damage to the rubber seal during subsequent access panel removal. It will also be easier to remove the access panel.

SUBTASK 28-11-11-210-010

(5) Make sure there is a phenolic strip around the access door that mates with the wing skin inside the tank.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

SUBTASK 28-11-11-420-005

(6) On the main tank access doors [1] and access doors [8] without fuel measuring sticks, put the access door [1] or access door [8] in the fuel tank and set the door in the opening.

SUBTASK 28-11-11-420-006

CAUTION: BE CAREFUL WHEN YOU INSTALL THE MAIN TANK ACCESS DOORS THAT HAVE FUEL MEASURING STICKS. IF THE MEASURING STICKS TOUCH THE STRINGERS AT THE TOP OF THE FUEL TANK, DAMAGE TO THE FUEL MEASURING STICKS CAN OCCUR.

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CAUTION: MAKE SURE THE ACCESS DOOR IS INSTALLED CORRECTLY. IF THE ACCESS DOOR IS NOT INSTALLED CORRECTLY A FUEL SPILL CAN OCCUR.

- (7) Put the access door [6] in the fuel tank at an angle so the fuel measuring stick [7] does not touch the stringers at top of the fuel tank and set the door in the opening.

NOTE: Access doors with fuel measuring sticks have a door key, View F (Figure 401). Make sure the key is installed correctly in the lower wing skin.

SUBTASK 28-11-11-100-001

- (8) Clean the clamp ring [5] surface with solvent, B00083.

SUBTASK 28-11-11-210-005

- (9) Apply BMS 3-38 Cor-Ban 27L Compound, G50237, (recommended) or Aero Shell No. 14 grease, D00020, to the aluminum mesh on the both sides of the new aluminum gasket [3] before you install it.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: If you do not fill the aluminum mesh with the Cor-Ban 27L Compound, G50237 anti-corrosion compound or Aero Shell grease, D00020, the spaces with no anti-corrosion compound or grease can collect water. Do not apply too much anti-corrosion compound or grease or it can move out to the wing surface.

NOTE: Do not mix Aero Shell No. 14 and BMS 3-38 anti-corrosion compounds.

SUBTASK 28-11-11-210-006

- (10) Make sure the clamp ring [5] and aluminum gasket [3] holes align.

NOTE: The holes are not symmetrical.

SUBTASK 28-11-11-640-001

CAUTION: DO NOT APPLY TOO MUCH GREASE TO THE LOWER SURFACE OF THE WING. YOU CAN CAUSE DAMAGE TO THE ACCESS DOOR WITH HYDRAULIC PRESSURE FROM THE GREASE WHEN YOU INSTALL THE MOUNTING BOLTS.

- (11) Apply a very thin layer of BMS 3-38 Cor-Ban 27L Compound, G50237, (recommended) or Aero Shell No. 14 grease, D00020, to the lower surface of the wing skin that touches the aluminum gasket [3] for the access door [1], access door [6], or access door [8].

NOTE: Do not mix Aero Shell No. 14 and BMS 3-38 anti-corrosion compounds.

SUBTASK 28-11-11-420-009

- (12) Set and hold the aluminum gasket [3] and the clamp ring [5] in the opening while you install the mounting bolts [4] for the access door [1], access door [6], or access door [8].

SUBTASK 28-11-11-420-010

- (13) Tighten the mounting bolts [4] to 35 ± 5 in-lb (4 ± 1 N-m).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- (a) Start at the centerline and tighten the mounting bolts [4] equally in both directions (Figure 403).

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SUBTASK 28-11-11-650-002

(14) Refuel the applicable fuel tank (TASK 12-11-00-650-802).

SUBTASK 28-11-11-210-007

(15) To make sure there are no leaks from the applicable access door [1], access door [6], or access door [8], refer to Fuel Leak Detection Procedures, TASK 28-11-00-790-801.

SUBTASK 28-11-11-650-004

(16) After you refuel the applicable tank and do the leak check, do this task: Fuel Boost Pump and Override Pump Priming, TASK 28-22-41-420-801.

SUBTASK 28-11-11-410-002

(17) For access door [1], 532BB or 632BB, install the aft fairing panel on the strut, 434CL or 444CR, that you removed to get access to the access door (TASK 06-43-00-800-801).

————— END OF TASK —————

TASK 28-11-11-000-802

4. Surge Tank Access Door - Removal

(Figure 402, Figure 403)

A. References

Reference	Title
12-11-00-650-804	Drain the Fuel from the Sumps after Defueling (P/B 301)
28-11-00-910-801	Purging and Fuel Tank Entry Precautions (P/B 201)

B. Consumable Materials

Reference	Description	Specification
B00083	Solvent - Aliphatic Naphtha (For Acrylic Plastics)	TT-N-95 Type II, ASTM D-3735 Type III

C. Location Zones

Zone	Area
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

D. Access Panels

Number	Name/Location
533AB	Surge Tank Access Door - Wing Station 655
533BB	Surge Tank Access Door - Wing Station 679
533CB	Surge Tank Access Door - Wing Station 703
633AB	Surge Tank Access Door - Wing Station 655
633BB	Surge Tank Access Door - Wing Station 679
633CB	Surge Tank Access Door - Wing Station 703

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E. Procedure

SUBTASK 28-11-11-650-003

WARNING: DO ALL THE SAFETY PROCEDURES TO DEFUEL THE TANK AND TO GO INTO IT. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF YOU DO NOT FOLLOW THE SAFETY PROCEDURES.

- (1) Drain the surge tank at the sump drain valve.

NOTE: (TASK 12-11-00-650-804).

SUBTASK 28-11-11-940-002

- (2) For the applicable surge tank, do this task: Purging and Fuel Tank Entry Precautions, TASK 28-11-00-910-801.

SUBTASK 28-11-11-020-012

- (3) Do these steps to remove these access doors [21]:

<u>Number</u>	<u>Name/Location</u>
533AB	Surge Tank Access Door - Wing Station 655
533CB	Surge Tank Access Door - Wing Station 703
633AB	Surge Tank Access Door - Wing Station 655
633CB	Surge Tank Access Door - Wing Station 703

- (a) Hold the clamp ring [5] and remove the mounting bolt [4].
- (b) Remove the clamp ring [5] and the aluminum gasket [3].
 - 1) Discard the aluminum gasket [3].

CAUTION: DO NOT USE A LEVER (PRY) ON THE ACCESS DOOR. THE LOWER SURFACE OF THE ACCESS DOOR FLANGE AND THE TOP SURFACE OF THE WING SKIN AROUND THE ACCESS DOORS ARE SEAL SURFACES. IF YOU ARE NOT CAREFUL, SCRATCHES OR DAMAGE TO THE SEAL SURFACE CAN OCCUR.

- (c) Push up on the access door [21].
 - 1) If the access door [21] does not move freely, use a rubber mallet and lightly hit around the access door.
- (d) Clean the inner side and the outer side of the access opening with solvent, B00083.
- (e) Install a rubber protector in the access door opening.

SUBTASK 28-11-11-020-005

- (4) Do these steps to remove these applicable access panels:
(Figure 402)

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

CAUTION: THIS ACCESS DOOR IS HELD IN ITS POSITION ONLY BY THE MOUNTING BOLTS. WHEN THE MOUNTING BOLTS ARE REMOVED, IT CAN FALL OUT OF THE OPENING AND BE DAMAGED.

- (a) Loosen and remove the mounting bolts [24].

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WARNING: DO NOT TOUCH THE PRESSURE RELIEF VALVE WHEN YOU REMOVE THE ACCESS PANEL. IF THE PRESSURE RELIEF VALVE OPENS ACCIDENTALLY, INJURIES TO PERSONNEL CAN OCCUR.

(b) Remove the access door [22] and the molded rubber seal from the surge tank.

SUBTASK 28-11-11-410-003

(5) Install a rubber protector in the access door opening.

————— **END OF TASK** —————

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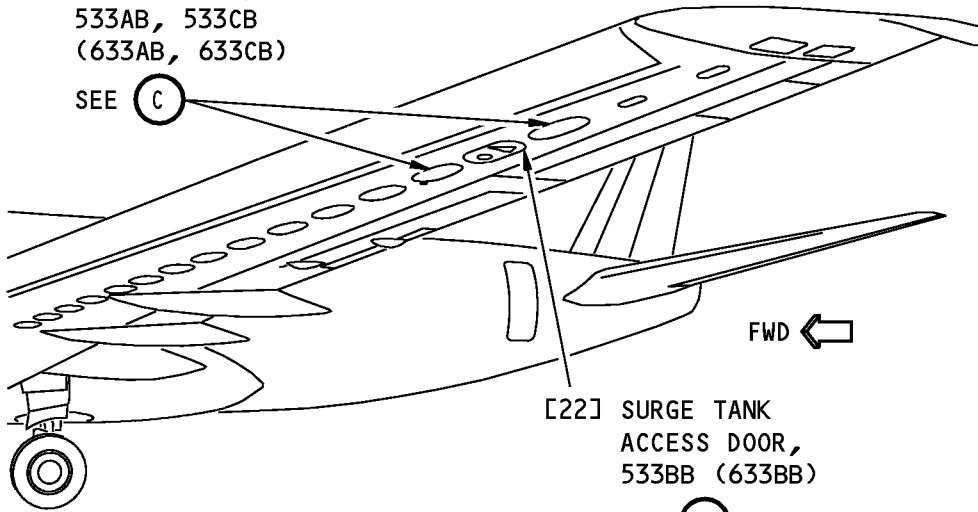
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[21] ACCESS DOOR,
533AB, 533CB
(633AB, 633CB)

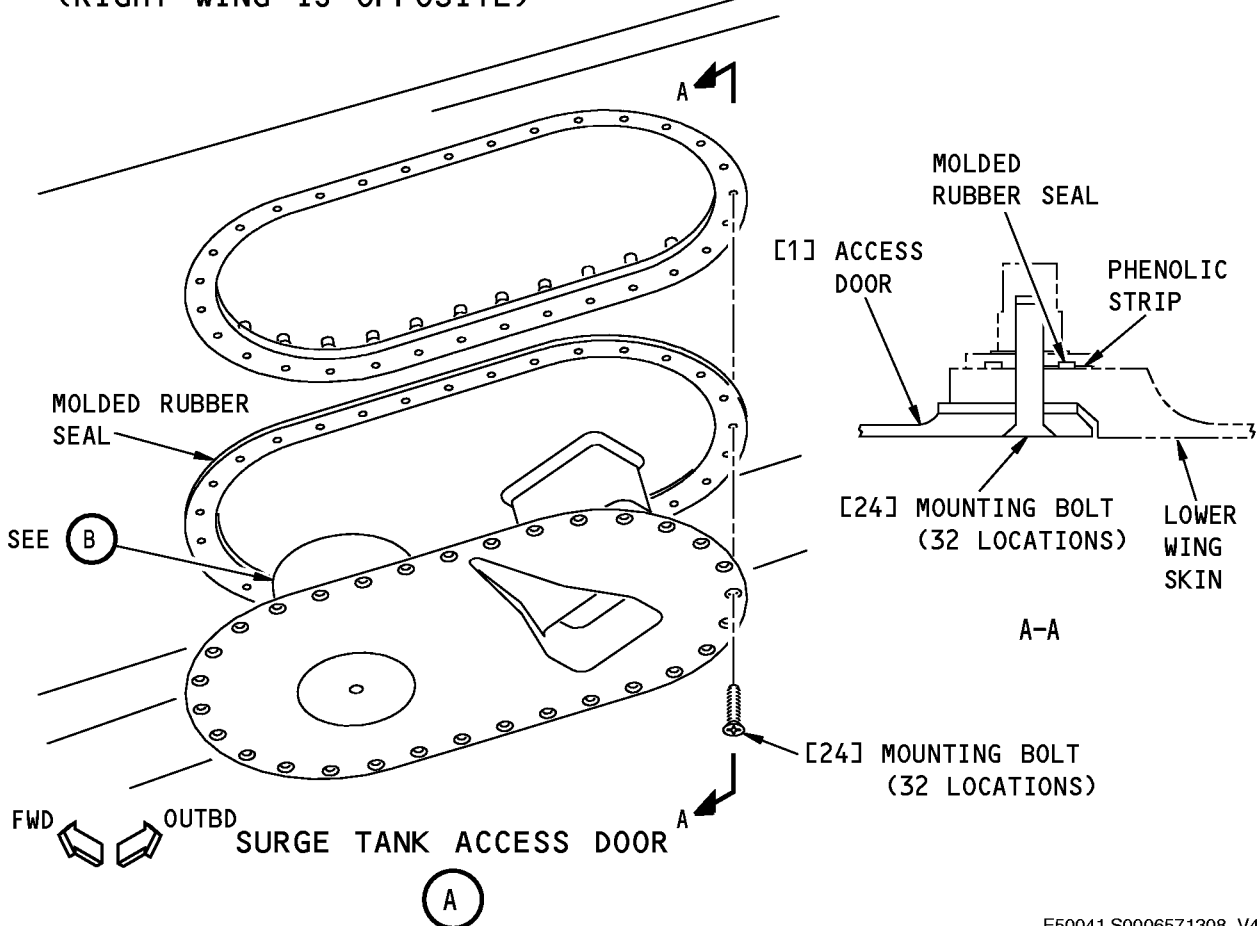
SEE (C)



[22] SURGE TANK
ACCESS DOOR,
533BB (633BB)

SEE (A)

LEFT WING
(RIGHT WING IS OPPOSITE)



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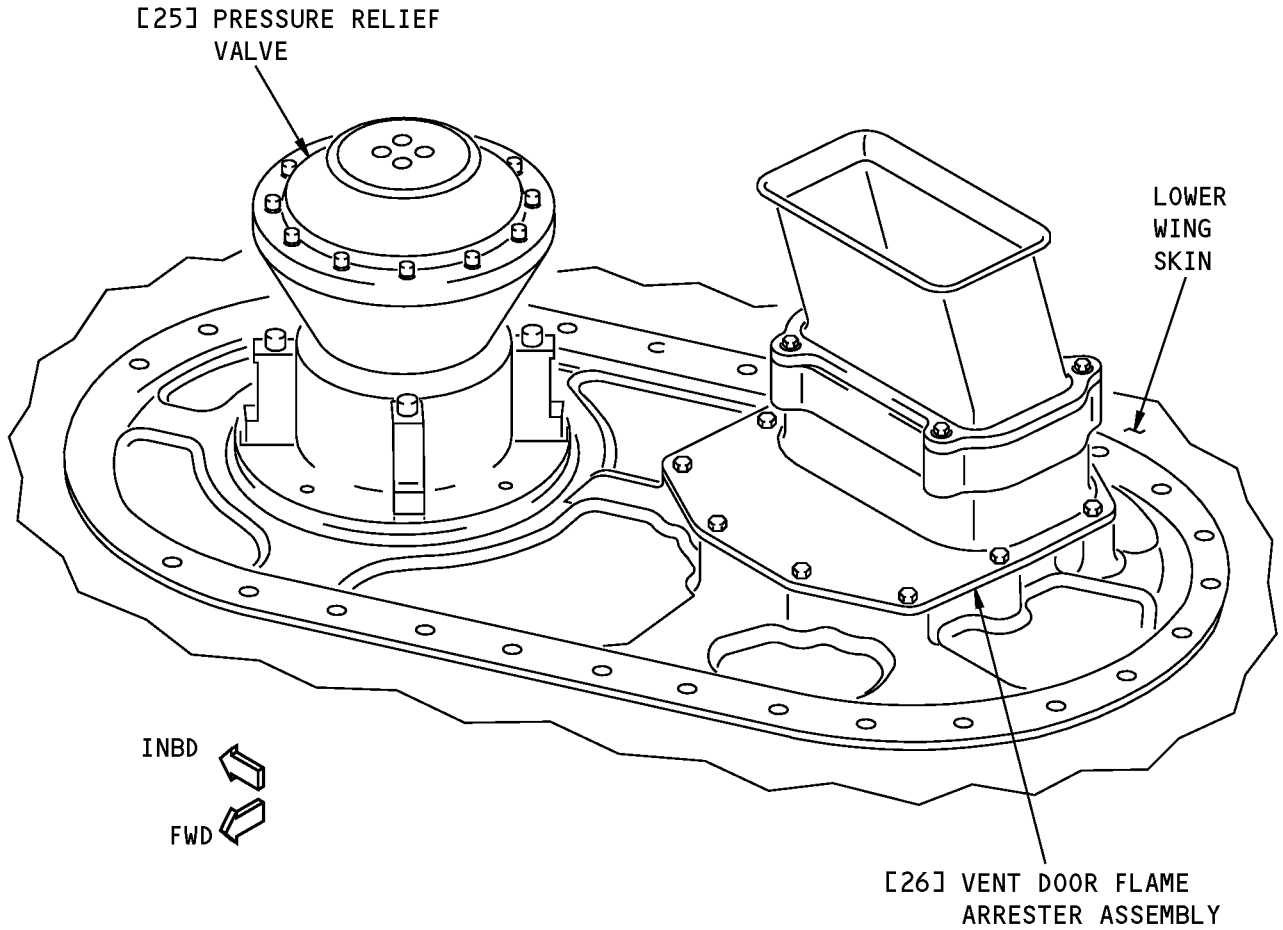
Surge Tank Access Door Installation
Figure 402 (Sheet 1 of 3)/28-11-11-990-803

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(B)

**Surge Tank Access Door Installation
Figure 402 (Sheet 2 of 3)/28-11-11-990-803**

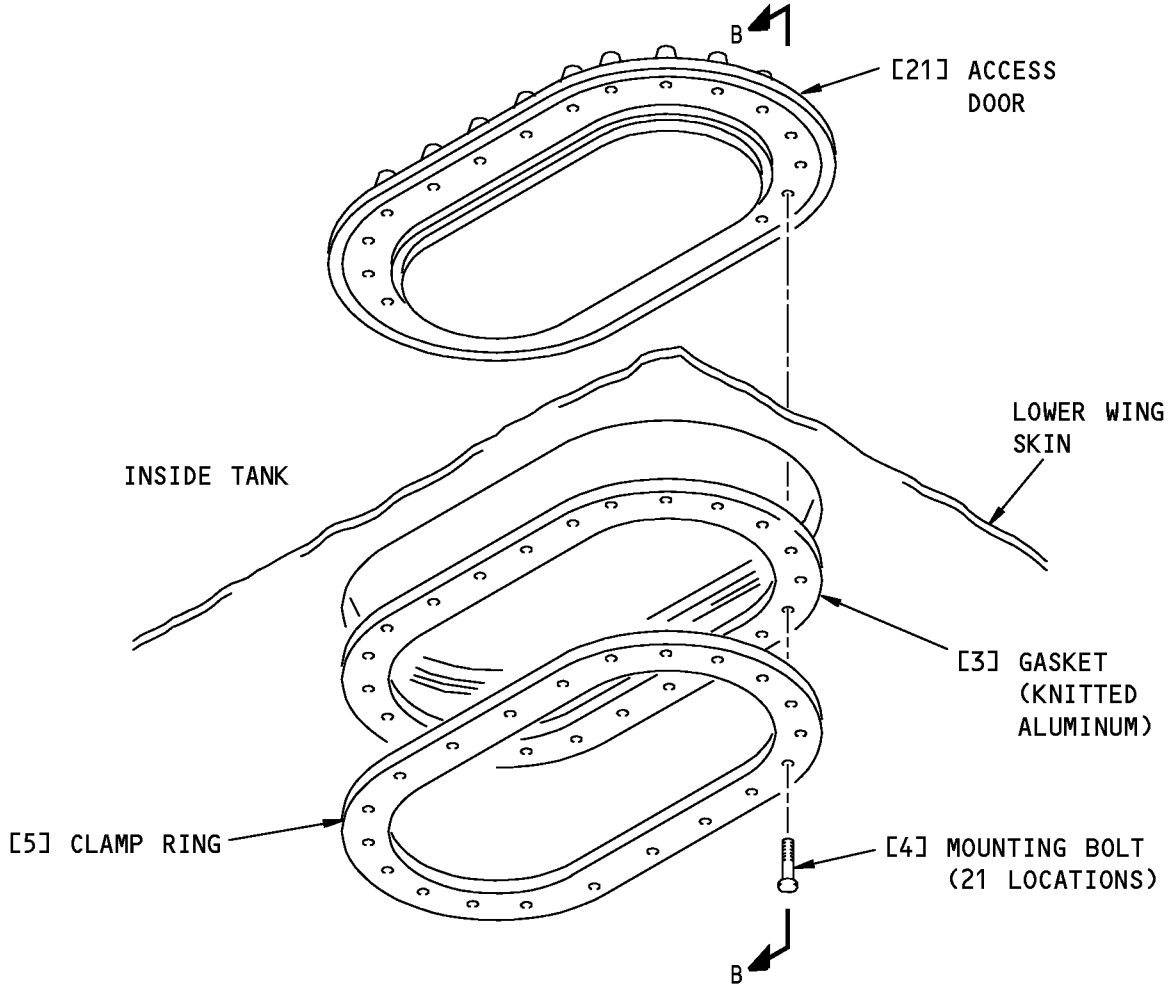
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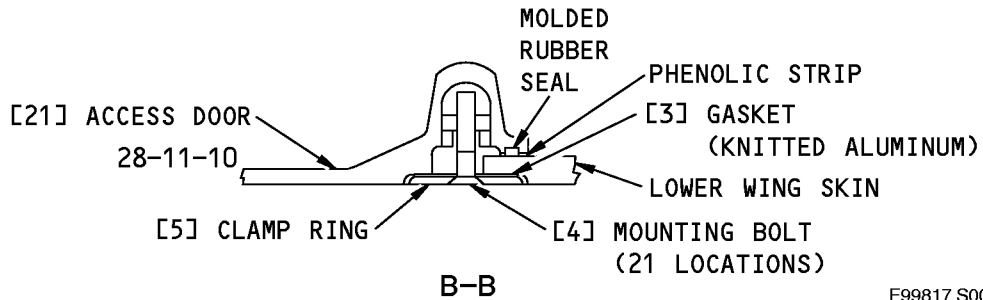
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**ACCESS DOOR,
533AB, 533CB
(633AB, 633CB)**

(C)



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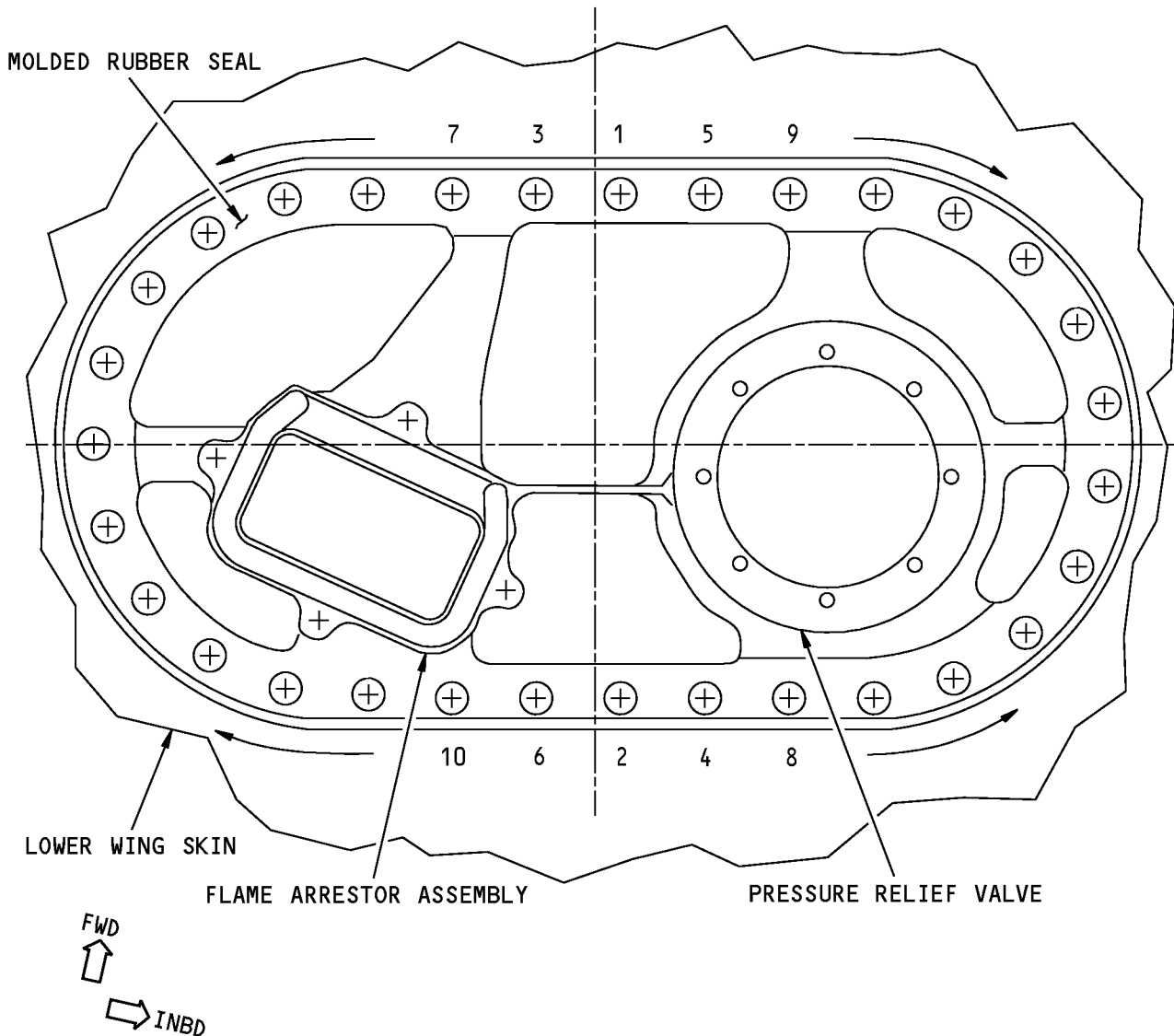
**Surge Tank Access Door Installation
Figure 402 (Sheet 3 of 3)/28-11-11-990-803**

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NOTE: TORQUE THE MOUNT BOLTS IN THE SEQUENCE SHOWN BY THE NUMBERS. THIS WILL MAKE SURE FUEL DOES NOT LEAK AROUND THE ACCESS PANEL.

PAY CAREFUL ATTENTION TO THE PROPER ORIENTATION OF THE MOLDED RUBBER SEAL. THE SEAL WILL LAY FLAT ON THE DOOR WHEN PROPERLY ALIGNED WITH THE FASTNER HOLES.

L45920 S0006571311_V2

**Access Panel Mount Bolt Torque Pattern
Figure 403/28-11-11-990-804**

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TASK 28-11-11-400-802

5. Surge Tank Access Door - Installation

(Figure 402, Figure 403)

A. General

- (1) BMS 3-38 is the recommended anti-corrosion compound for access door gasket installations. BMS 3-38 gives improved corrosion protection between the access door, mesh gasket and wing surfaces. Anti-corrosion compound, Aero Shell No. 14, can still be used for access door gaskets, but should be replaced with BMS 3-38 as soon as practical.
- (2) Do not mix the two types of anti-corrosion compounds, BMS 3-38 and Aero Shell No. 14. If you replaced an Aero Shell No. 14 filled gasket with a BMS 3-38 filled gasket, remove all Aero Shell No. 14 anti-corrosion compound from the clamp ring and the access door structure on the airplane.

B. References

Reference	Title
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-300-802	Repair of Fuel Tank Corrosion (P/B 801)
28-11-00-790-803	Surge Tank Access Door Leak Test Procedure (P/B 601)
28-11-11-900-801	Rubber Door Seal - Replacement (P/B 801)
28-13-31-400-801	Flame Arrestor Installation (P/B 401)
28-13-41-400-801	Pressure Relief Valve Installation (P/B 401)

C. Consumable Materials

Reference	Description	Specification
B00083	Solvent - Aliphatic Naphtha (For Acrylic Plastics)	TT-N-95 Type II, ASTM D-3735 Type III
D00020	Grease - Aircraft Oscillating Bearing	MIL-G-25537 (NATO G-365)
D00504	Grease - Petrolatum	VV-P-236
G50237	Compound - Corrosion Inhibiting, Non-drying - Cor-Ban 27L	BMS 3-38

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	Aluminum gasket	28-11-11-02-270	HAP 001-013, 015-026
		28-11-11-02-305	HAP 001-013, 015-026
		28-11-11-02-310	HAP 001-013, 015-026
		28-11-11-02A-260	HAP 028-054, 101-999
		28-11-11-02A-300	HAP 028-054, 101-999
		28-11-11-02A-305	HAP 028-054, 101-999

E. Location Zones

Zone	Area
542	Left Wing - Fairing Flap Support No. 3
642	Right Wing - Fairing Flap Support No. 6

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F. Access Panels

Number	Name/Location
533AB	Surge Tank Access Door - Wing Station 655
533BB	Surge Tank Access Door - Wing Station 679
533CB	Surge Tank Access Door - Wing Station 703
633AB	Surge Tank Access Door - Wing Station 655
633BB	Surge Tank Access Door - Wing Station 679
633CB	Surge Tank Access Door - Wing Station 703

G. Procedure

SUBTASK 28-11-11-020-006

(1) Do these steps to install the applicable access panels:

Number	Name/Location
533AB	Surge Tank Access Door - Wing Station 655
533CB	Surge Tank Access Door - Wing Station 703
633AB	Surge Tank Access Door - Wing Station 655
633CB	Surge Tank Access Door - Wing Station 703

- (a) Remove the rubber protector from the access door opening.
- (b) Do an inspection for corrosion at the access door opening.
 - 1) If it is necessary, do this task: Repair of Fuel Tank Corrosion, TASK 28-11-00-300-802.
- (c) Make sure the areas on the access door [21] and the wing skin, that the molded rubber seal touches, are clean.
 - 1) Use solvent, B00083, to clean the surface if it is necessary.
- (d) Make sure the molded rubber seal is in good condition.
 - 1) To replace the molded rubber seal if it is necessary, do this task: Rubber Door Seal - Replacement, TASK 28-11-11-900-801.
 - 2) Apply a thin layer of grease, D00504, to the molded rubber seal.

NOTE: This will prevent damage to the rubber seal during subsequent access panel removal. It will also be easier to remove the access panel.
- (e) Make sure there is a phenolic strip around the access door that mates with the wing skin inside the tank.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).
- (f) Put the access door [21] in the fuel tank and set the door in the opening.
- (g) Clean the clamp ring [5] surface with solvent, B00083.

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- (h) Make sure that the BMS 3-38 Cor-Ban 27L Compound, G50237, (recommended) or Aero Shell No. 14 grease, D00020, fills the aluminum mesh on the two sides of the new aluminum gasket [3] before you install it.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: If you do not fill the aluminum mesh with BMS 3-38 Cor-Ban 27L Compound, G50237 or Aero Shell No. 14 grease, D00020, the spaces with no anti-corrosion compound or grease can collect water. Do not apply too much anti-corrosion compound or grease or it can move out to the wing surface.

NOTE: Do not mix Aero Shell No. 14 and BMS 3-38 anti-corrosion compounds.

- (i) Make sure the clamp ring [5] and aluminum gasket [3] holes align.

NOTE: The holes are not symmetrical.

CAUTION: DO NOT APPLY TOO MUCH GREASE TO THE LOWER SURFACE OF THE WING. YOU CAN CAUSE DAMAGE TO THE ACCESS DOOR WITH HYDRAULIC PRESSURE FROM THE GREASE WHEN YOU INSTALL THE MOUNTING BOLTS.

- (j) Apply a very thin layer of BMS 3-38 Cor-Ban 27L Compound, G50237, (recommended) or Aero Shell No. 14 grease, D00020, to the lower surface of the wing skin that touches the aluminum gasket [3] for the access door [21].

NOTE: Do not mix Aero Shell No. 14 and BMS 3-38 anti-corrosion compounds.

- (k) Set and hold the aluminum gasket [3] and the clamp ring [5] in the opening while you install the mounting bolts [4] for the access door [21].

- (l) Start at the centerline and tighten the mounting bolts [4] in 17.5 ± 2.5 in-lb (2.0 ± 0.3 N·m) increments, equally in each direction, to a final torque of 35 ± 5 in-lb (4 ± 1 N·m) (Figure 403).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

SUBTASK 28-11-11-210-008

- (2) Do these steps to install the applicable access panels:

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

- (a) Make sure the areas on the door assembly [22] and the wing skin, that the molded rubber seal touches, are clean, View A-A (Figure 402).
 - 1) Use solvent, B00083, to clean the surfaces if it is necessary.
- (b) Make sure the molded rubber seal is in good condition.
 - 1) Replace the molded rubber seal if it is necessary.
- (c) Put the molded rubber seal on the access door with the holes aligned correctly (Figure 403).

NOTE: Make sure the molded rubber seal is in its correct position on the access door with the holes aligned correctly. If the seal is not installed correctly, a fuel spill can occur.

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- (d) Clean the countersinks on the access door.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- (e) Install the pressure pressure relief valve [25] on the access door [22], View B (TASK 28-13-41-400-801) if it was removed.
- (f) Install the flame flame arrestor assembly [26] on the access door [22] (TASK 28-13-31-400-801) if it was removed.

CAUTION: MAKE SURE THE ACCESS DOOR IS INSTALLED CORRECTLY. IF THE ACCESS DOOR IS NOT INSTALLED CORRECTLY A FUEL SPILL CAN OCCUR.

- (g) Put the access door [22] in the opening of the surge tank.
- 1) Make sure the access door [22] is in the correct orientation (Figure 402) (View A).
 - 2) Install the mounting bolts [24] (conductive fasteners).
 - 3) Start at the centerline and tighten the mounting bolts [24] (conductive fasteners) in 17.5 ± 2.5 in-lb (2.0 ± 0.3 N·m) increments, equally in each direction, to a final torque of 35 ± 5 in-lb (4 ± 1 N·m) (Figure 403).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

SUBTASK 28-11-11-790-001

- (3) To do a leak test for one of the surge tank access doors, do this task: Surge Tank Access Door Leak Test Procedure, TASK 28-11-00-790-803.

————— **END OF TASK** —————

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WING FUEL TANK ACCESS DOORS - REPAIRS

1. General

- A. This procedure has one task. This task replaces the rubber door seal for each of the fuel tank access doors.
- B. Do not use this procedure to replace the rubber door seal on Surge Tank Access Door - Wing Station 679, 533BB or Surge Tank Access Door - Wing Station 679, 633BB. No adhesive or sealant are necessary for the rubber seal ring on these panels.

TASK 28-11-11-900-801

2. Rubber Door Seal - Replacement

(Figure 801)

A. References

Reference	Title
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-11-400-802	Surge Tank Access Door - Installation (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-2481	Tool - Sealant Removal, BAC5000, PSD 6-184 Approved (Part #: 1-6390-A, Supplier: 63318, A/P Effectivity: 737-ALL) (Part #: 10810, Supplier: \$0855, A/P Effectivity: 737-ALL) (Part #: 234350, Supplier: \$0857, A/P Effectivity: 737-ALL) (Part #: 311, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: 411B60, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: 411B90, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: DAD5013, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: DFD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: J5-0275-2010, Supplier: 435R8, A/P Effectivity: 737-ALL) (Part #: SCD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: ST982LF, Supplier: 3Z323, A/P Effectivity: 737-ALL) (Part #: TS1275-4, Supplier: 1DWR5, A/P Effectivity: 737-ALL)
STD-124	Brush - Stiff Bristle, Non-Metallic
STD-197	Container - Plastic, Polyethylene or Polypropylene

C. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
A50052	Sealant - PR-1826 Class B Rapid Curing Fuel Tank Sealant	SAE AMS3277, Class B
A50084	Sealant - Polysulfide Pro Seal 860, Class B	AMS-S-83318A
B00068	Alcohol - Ethyl (Denatured)	AMS 3002F (MIL-E-51454, Type II)
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5
G00624	Bag - Plastic, General Purpose	
G50078	Abrasive - Aluminum Oxide Paper, 320 grit or finer	

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Reference	Description	Specification
G50140	Gloves - Protective, Latex or Nitrile	

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

E. Access Panels

Number	Name/Location
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
531BB	Center Tank Access Door - Wing Station 192
532AB	Main Tank Access Door - Wing Station 216
532BB	Main Tank Access Door - Wing Station 265
532CB	Main Tank Access Door - Wing Station 290
532DB	Main Tank Access Door - Wing Station 313
532EB	Main Tank Access Door - Wing Station 337
532FB	Main Tank Access Door - Wing Station 367
532GB	Main Tank Access Door - Wing Station 390
532HB	Main Tank Access Door - Wing Station 417
532JB	Main Tank Access Door - Wing Station 443
532KB	Main Tank Access Door - Wing Station 470
532LB	Main Tank Access Door - Wing Station 496
532MB	Main Tank Access Door - Wing Station 523
532NB	Main Tank Access Door - Wing Station 549
532PB	Main Tank Access Door - Wing Station 576
532QB	Main Tank Access Door - Wing Station 602
532RB	Main Tank Access Door - Wing Station 629
533AB	Surge Tank Access Door - Wing Station 655
533CB	Surge Tank Access Door - Wing Station 703
631AB	Center Tank Access Door - Wing Station 168
631BB	Center Tank Access Door - Wing Station 192
632AB	Main Tank Access Door - Wing Station 216
632BB	Main Tank Access Door - Wing Station 265
632CB	Main Tank Access Door - Wing Station 290
632DB	Main Tank Access Door - Wing Station 313
632EB	Main Tank Access Door - Wing Station 337

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Number	Name/Location
632FB	Main Tank Access Door - Wing Station 367
632GB	Main Tank Access Door - Wing Station 390
632HB	Main Tank Access Door - Wing Station 417
632JB	Main Tank Access Door - Wing Station 443
632KB	Main Tank Access Door - Wing Station 470
632LB	Main Tank Access Door - Wing Station 496
632MB	Main Tank Access Door - Wing Station 523
632NB	Main Tank Access Door - Wing Station 549
632PB	Main Tank Access Door - Wing Station 576
632QB	Main Tank Access Door - Wing Station 602
632RB	Main Tank Access Door - Wing Station 629
633AB	Surge Tank Access Door - Wing Station 655
633CB	Surge Tank Access Door - Wing Station 703

F. Prepare for the Replacement of the Rubber Door Seal

SUBTASK 28-11-11-010-002

(1) Open the applicable access doors:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
531BB	Center Tank Access Door - Wing Station 192
532AB	Main Tank Access Door - Wing Station 216
532BB	Main Tank Access Door - Wing Station 265
532CB	Main Tank Access Door - Wing Station 290
532DB	Main Tank Access Door - Wing Station 313
532EB	Main Tank Access Door - Wing Station 337
532FB	Main Tank Access Door - Wing Station 367
532GB	Main Tank Access Door - Wing Station 390
532HB	Main Tank Access Door - Wing Station 417
532JB	Main Tank Access Door - Wing Station 443
532KB	Main Tank Access Door - Wing Station 470
532LB	Main Tank Access Door - Wing Station 496
532MB	Main Tank Access Door - Wing Station 523
532NB	Main Tank Access Door - Wing Station 549
532PB	Main Tank Access Door - Wing Station 576
532QB	Main Tank Access Door - Wing Station 602
532RB	Main Tank Access Door - Wing Station 629
533AB	Surge Tank Access Door - Wing Station 655
533CB	Surge Tank Access Door - Wing Station 703
631AB	Center Tank Access Door - Wing Station 168
631BB	Center Tank Access Door - Wing Station 192
632AB	Main Tank Access Door - Wing Station 216
632BB	Main Tank Access Door - Wing Station 265
632CB	Main Tank Access Door - Wing Station 290
632DB	Main Tank Access Door - Wing Station 313
632EB	Main Tank Access Door - Wing Station 337
632FB	Main Tank Access Door - Wing Station 367

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<u>Number</u>	<u>Name/Location</u>
632GB	Main Tank Access Door - Wing Station 390
632HB	Main Tank Access Door - Wing Station 417
632JB	Main Tank Access Door - Wing Station 443
632KB	Main Tank Access Door - Wing Station 470
632LB	Main Tank Access Door - Wing Station 496
632MB	Main Tank Access Door - Wing Station 523
632NB	Main Tank Access Door - Wing Station 549
632PB	Main Tank Access Door - Wing Station 576
632QB	Main Tank Access Door - Wing Station 602
632RB	Main Tank Access Door - Wing Station 629
633AB	Surge Tank Access Door - Wing Station 655
633CB	Surge Tank Access Door - Wing Station 703

SUBTASK 28-11-11-020-001

- (2) Remove the seal [1] from the access door fully.

SUBTASK 28-11-11-140-001

CAUTION: DO NOT CAUSE DAMAGE TO THE FINISH WHEN YOU REMOVE THE SEALANT. TOO MUCH FORCE CAN REMOVE THE PAINT OR PRIMER.

- (3) Remove the remaining sealant, with a sealant removal tool, COM-2481, from the seal groove in the access door.

G. Prepare the New Rubber Door Seal

SUBTASK 28-11-11-913-001

- (1) Put on protective gloves, G50140.

NOTE: Wear gloves during this procedure to prevent contamination to the rubber seal.

SUBTASK 28-11-11-120-002

- (2) Abrade the bottom surface of the rubber door seal with a 320 grit or finer abrasive paper, G50078, to remove the parting agent.

SUBTASK 28-11-11-860-001

- (3) Obey all safety precautions when using solvents, special cleaning compounds, paint strippers (strong alkalies or acids), etchants (corrosion removers that contain acids) or conversion coating chemicals.

SUBTASK 28-11-11-110-002

WARNING: DO NOT GET THE SOLVENT IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM IT. PUT ON GOGGLES, AND GLOVES WHEN YOU USE IT. KEEP IT AWAY FROM SPARKS, FLAMES, AND HEAT. IT IS POISONOUS AND FLAMMABLE. THE SOLVENT CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

WARNING: DENATURED ETHYL ALCOHOL IS FLAMMABLE AND TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTACT WITH EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

- (4) Remove the unwanted material from the rubber door seal with a clean cotton wiper, G00034, moist with denatured alcohol, B00068.

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SUBTASK 28-11-11-550-001

- (5) Keep the rubber door seal in a clean plastic bag, G00624, or a clean sealed plastic container, STD-197, to prevent contamination of the rubber seal.

SUBTASK 28-11-11-420-011

- (6) Install the rubber door seal in 60 minutes or less

NOTE: Do the alcohol cleaning procedure if the rubber door seal is not installed in 1 hour.

H. Prepare the Seal Groove on the Door

SUBTASK 28-11-11-110-003

- (1) Clean the surface of the door groove with a clean, dry cotton wiper to remove wax, dirt, grease, oil or unwanted material.

SUBTASK 28-11-11-110-004

WARNING: DO NOT GET THE SOLVENT IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM IT. PUT ON GOGGLES, AND GLOVES WHEN YOU USE IT. KEEP IT AWAY FROM SPARKS, FLAMES, AND HEAT. IT IS POISONOUS AND FLAMMABLE. THE SOLVENT CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

WARNING: DENATURED ETHYL ALCOHOL IS FLAMMABLE AND TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTACT WITH EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

- (2) Clean the seal groove with a clean cotton wiper, G00034, moist with denatured alcohol, B00068.
 - (a) Continue to clean the groove until the cotton wiper, G00034, shows no contamination.
 - (b) Let the denatured alcohol, B00068, dry.

I. Rubber Door Seal Replacement

SUBTASK 28-11-11-640-002

- (1) Apply the sealant, A00767 to the full width of the seal groove with a stiff bristle non-metallic brush, STD-124

NOTE: An alternative to sealant, A00767 is sealant, A50084 or PR-1826 sealant, A50052

SUBTASK 28-11-11-420-012

- (2) Install the rubber door seal into the door groove.
 - (a) Make sure that the rubber door seal is tight against the seal groove.

SUBTASK 28-11-11-110-005

- (3) Clean off the unwanted sealant with a clean cotton wiper, G00034 and denatured alcohol, B00068

SUBTASK 28-11-11-490-001

- (4) Apply sufficient clamp pressure to make sure that the rubber door seal is fully installed in the seal groove.

SUBTASK 28-11-11-490-002

- (5) Continue to apply clamp pressure for a minimum of 2 hours at room temperature or 1 hour at 120°F (48.9°C)

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SUBTASK 28-11-11-780-001

(6) Do not stress the bond line until the sealant is fully cured.

NOTE: Sealant is fully cured at a minimum of 72 hours at 75 ±5°F (23.9 ±2.8°C) and 50 ±5 percent relative humidity.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 28-11-11-410-004

(1) Do the applicable installation procedure:

To install the applicable access doors:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
531BB	Center Tank Access Door - Wing Station 192
532AB	Main Tank Access Door - Wing Station 216
532BB	Main Tank Access Door - Wing Station 265
532CB	Main Tank Access Door - Wing Station 290
532DB	Main Tank Access Door - Wing Station 313
532EB	Main Tank Access Door - Wing Station 337
532FB	Main Tank Access Door - Wing Station 367
532GB	Main Tank Access Door - Wing Station 390
532HB	Main Tank Access Door - Wing Station 417
532JB	Main Tank Access Door - Wing Station 443
532KB	Main Tank Access Door - Wing Station 470
532LB	Main Tank Access Door - Wing Station 496
532MB	Main Tank Access Door - Wing Station 523
532NB	Main Tank Access Door - Wing Station 549
532PB	Main Tank Access Door - Wing Station 576
532QB	Main Tank Access Door - Wing Station 602
532RB	Main Tank Access Door - Wing Station 629
533AB	Surge Tank Access Door - Wing Station 655
533CB	Surge Tank Access Door - Wing Station 703
631AB	Center Tank Access Door - Wing Station 168
631BB	Center Tank Access Door - Wing Station 192
632AB	Main Tank Access Door - Wing Station 216
632BB	Main Tank Access Door - Wing Station 265
632CB	Main Tank Access Door - Wing Station 290
632DB	Main Tank Access Door - Wing Station 313
632EB	Main Tank Access Door - Wing Station 337
632FB	Main Tank Access Door - Wing Station 367
632GB	Main Tank Access Door - Wing Station 390
632HB	Main Tank Access Door - Wing Station 417
632JB	Main Tank Access Door - Wing Station 443
632KB	Main Tank Access Door - Wing Station 470
632LB	Main Tank Access Door - Wing Station 496
632MB	Main Tank Access Door - Wing Station 523
632NB	Main Tank Access Door - Wing Station 549
632PB	Main Tank Access Door - Wing Station 576
632QB	Main Tank Access Door - Wing Station 602
632RB	Main Tank Access Door - Wing Station 629

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<u>Number</u>	<u>Name/Location</u>
633AB	Surge Tank Access Door - Wing Station 655
633CB	Surge Tank Access Door - Wing Station 703

- (a) Main Tank Access Door Installation, TASK 28-11-11-400-801.
- (b) Center Tank Access Door - Installation, TASK 28-11-31-400-801.
- (c) Surge Tank Access Door - Installation, TASK 28-11-11-400-802.

————— **END OF TASK** —————

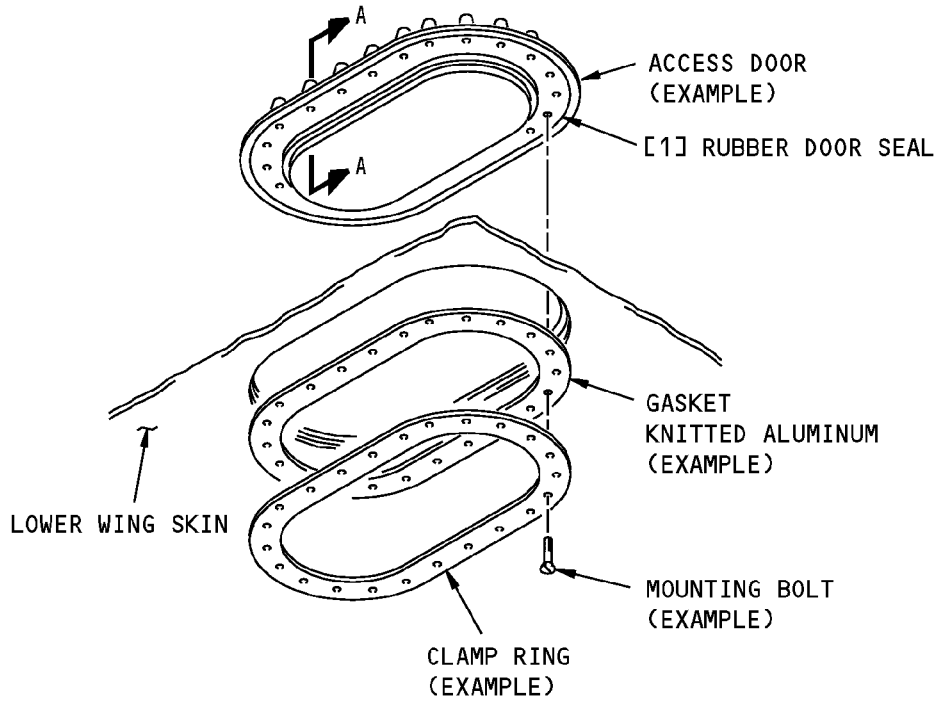
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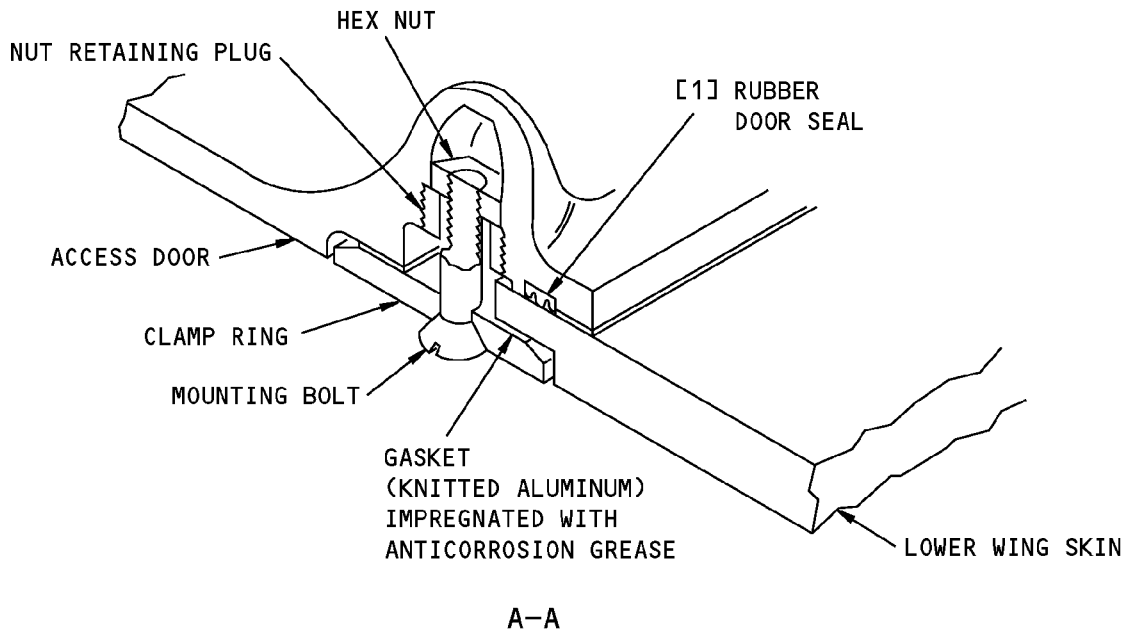
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**FUEL TANK ACCESS PANEL
(EXAMPLE)**



**Fuel Tank Access Door Repair
Figure 801/28-11-11-990-801**

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SURGE TANK FUEL SUMP DRAIN VALVE - REMOVAL/INSTALLATION

1. General

- A. This procedure has two tasks:
 - (1) a task to remove the sump drain valve for the surge tank
 - (2) a task to install the sump drain valve for the surge tank.
- B. The sump drain valves for the surge tank are installed in shrink-fit bushings. These bushings are installed in the skin on the bottom of each wing (Figure 401). If you must remove or install the valve, you must be careful not to cause damage to the threads.

TASK 28-11-21-000-801

2. Surge Tank Fuel Sump Drain Valve Removal

(Figure 401)

A. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
SPL-1764	Adapter - Removal/Installation, Sump Drain Valve (Part #: B28001-13, Supplier: 81205, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: B28001-18, Supplier: 81205, A/P Effectivity: 737-100, -200, -300, -400, -500, -600, -700, -700ER, -700QC, -800, -900, -900ER, -BBJ)

B. Location Zones

Zone	Area
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

C. Procedure

SUBTASK 28-11-21-480-001

- (1) Put the adapter, SPL-1764 into the drain valve assembly [1].

NOTE: Make sure the hexagonal surfaces of the tool touch the valve body correctly.

SUBTASK 28-11-21-020-001

- (2) Remove the drain valve [1] from the valve bushing.
 - (a) Push the tool up to prevent fuel leakage during this procedure.
 - (b) Loosen and remove the drain valve [1] from the valve bushing.
 - (c) Discard the O-ring [2].

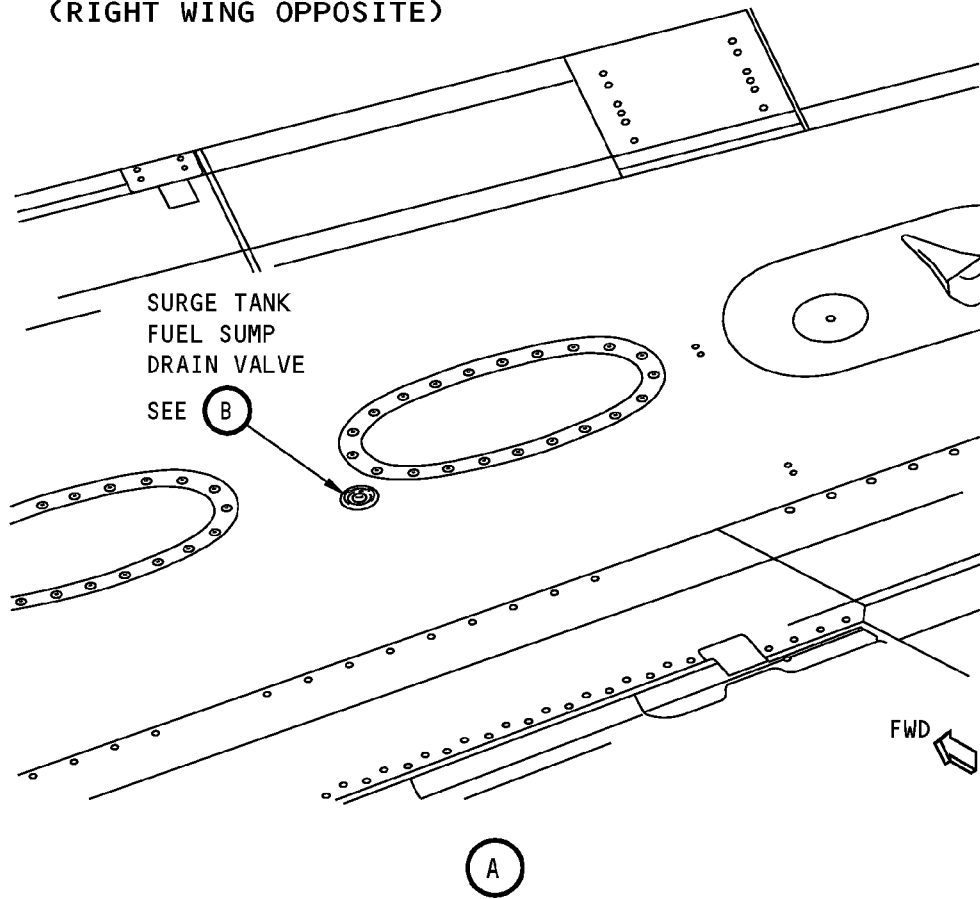
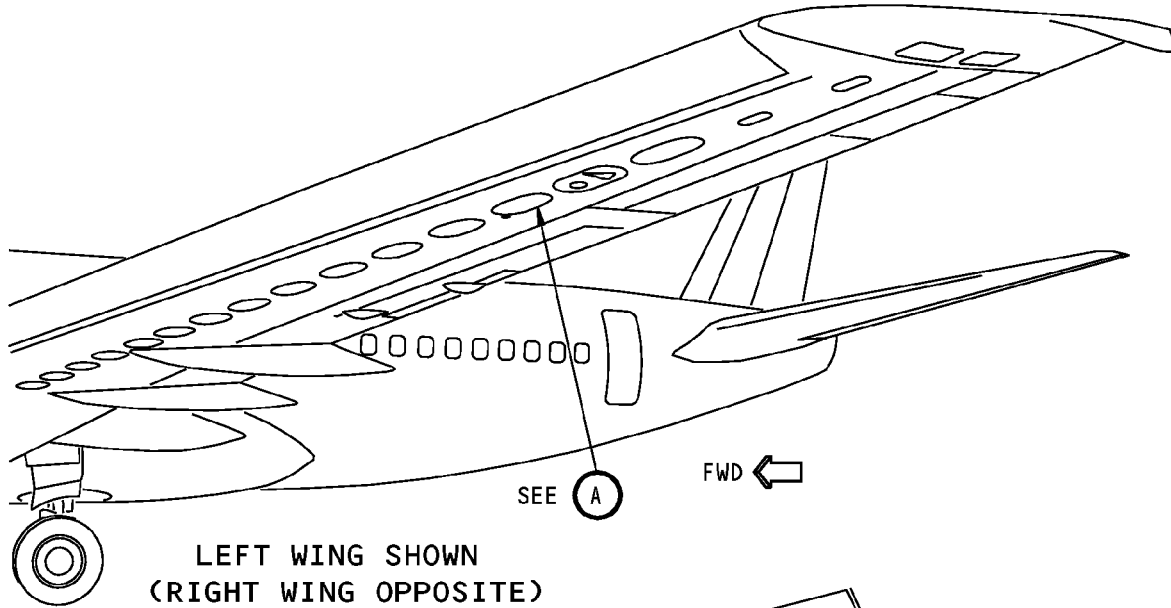
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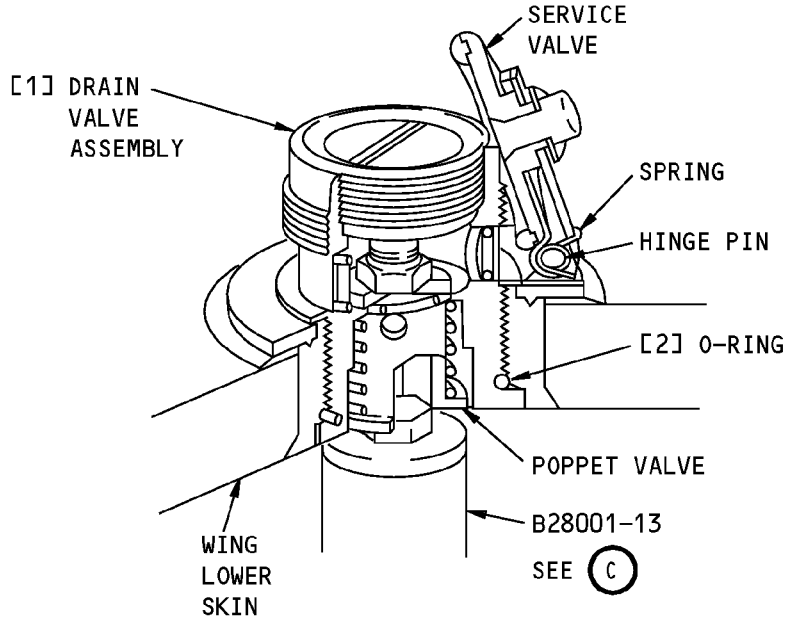


**Surge Tank Fuel Sump Drain Valve Installation
Figure 401 (Sheet 1 of 2)/28-11-21-990-801**

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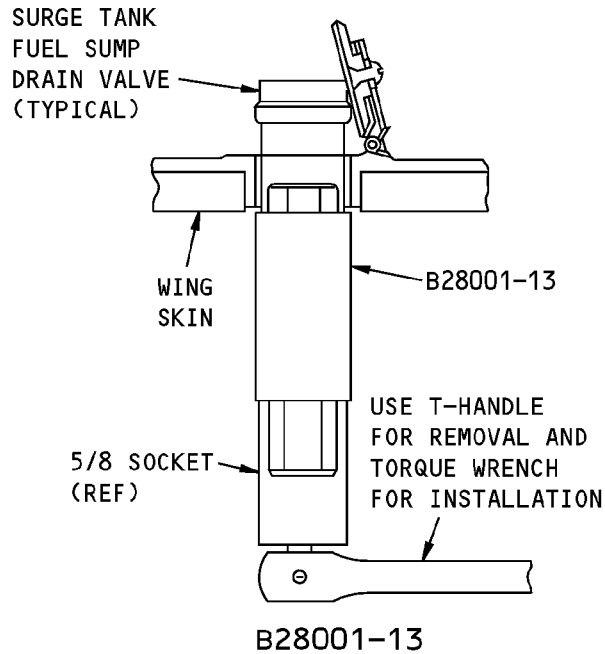
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SURGE TANK FUEL SUMP DRAIN VALVE

(B)



(C)

**Surge Tank Fuel Sump Drain Valve Installation
Figure 401 (Sheet 2 of 2)/28-11-21-990-801**

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TASK 28-11-21-400-801

3. Surge Tank Fuel Sump Drain Valve Installation

(Figure 401)

A. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Table with 2 columns: Reference, Description. Row 1: SPL-1764, Adapter - Removal/Installation, Sump Drain Valve (Part #: B28001-13, Supplier: 81205, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: B28001-18, Supplier: 81205, A/P Effectivity: 737-100, -200, -300, -400, -500, -600, -700, -700ER, -700QC, -800, -900, -900ER, -BBJ)

B. Consumable Materials

Table with 3 columns: Reference, Description, Specification. Row 1: B00083, Solvent - Aliphatic Naphtha (For Acrylic Plastics), TT-N-95 Type II, ASTM D-3735 Type III

C. Expendables/Parts

Table with 4 columns: AMM Item, Description, AIPC Reference, AIPC Effectivity. Row 1: 1, Drain valve, 28-11-61-01-060, HAP 001-013, 015-026, 028-030. Row 2: 2, O-ring, 28-11-61-02-040, HAP 031-054, 101-999. Row 3: 28-11-61-01-065, HAP 001-013, 015-026, 028-030. Row 4: 28-11-61-02-045, HAP 031-054, 101-999

D. Location Zones

Table with 2 columns: Zone, Area. Row 1: 533, Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75. Row 2: 633, Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

E. Procedure

SUBTASK 28-11-21-160-001

- (1) Clean the drain valve in the solvent, B00083 until the screen and the drain valve are free of all unwanted material.

SUBTASK 28-11-21-640-001

- (2) Lightly lubricate the new O-ring seal with some fuel.

SUBTASK 28-11-21-420-001

- (3) Put the O-ring [2] in the correct position on the drain valve [1].

SUBTASK 28-11-21-420-002

CAUTION: MAKE SURE YOU PUT THE THREADS OF THE VALVE AND THREADS OF THE BUSHING TOGETHER CORRECTLY. DAMAGE TO THE THREADS CAN OCCUR.

- (4) Carefully install the valve in the bushing and tighten it with your hand.

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SUBTASK 28-11-21-480-002

- (5) Put the adapter, SPL-1764 into the drain valve [1].

NOTE: Make sure the hexagonal surfaces of the tool touch the mating valve surfaces correctly.

SUBTASK 28-11-21-420-003

- (6) Tighten the drain valve [1] into the valve bushing.
- (a) Push the tool up to prevent fuel leakage during this procedure.
 - (b) Tighten the drain valve assembly [1] into the valve bushing with the drain valve tool.
 - (c) Continue to tighten the valve assembly to a torque of 200 - 220 pound-inches (22.6-24.9 newton-meters).

————— **END OF TASK** —————

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CENTER TANK ACCESS DOOR - REMOVAL/INSTALLATION

1. General

- A. There are five access doors for the center wing fuel tank. Two access doors are on the lower left wing surface (531AB, 531BB from inboard to outboard respectively). Two access doors are on the lower right wing surface (631AB, 631BB from inboard to outboard respectively). There is one access door (131AB) in the center wing section.
- B. This procedure contains two tasks. The first task removes a center tank access door. The second task installs a center tank access door.

TASK 28-11-31-000-801

2. Center Tank Access Door - Removal

(Figure 401, Figure 402, Figure 403)

A. References

Reference	Title
06-41-00-800-801	Finding an Access Door or Panel on the Lower Half of the Fuselage (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)

B. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

C. Access Panels

Number	Name/Location
131AB	Center Tank Access
192CL	Air Conditioning Access Door
531AB	Center Tank Access Door - Wing Station 168
531BB	Center Tank Access Door - Wing Station 192
631AB	Center Tank Access Door - Wing Station 168
631BB	Center Tank Access Door - Wing Station 192

D. Procedure

SUBTASK 28-11-31-650-001

- (1) Defuel the center fuel tank (TASK 28-26-00-650-801).

SUBTASK 28-11-31-010-001

- (2) Find the applicable access door [1] or access door [6] on the lower wing surface.

NOTE: There is no access between the center wing section and the left center fuel tank or the right center fuel tank. Make sure you open the applicable access door for the task that you are scheduled to do.

- (a) The access doors for the left center fuel tank are:

Number	Name/Location
531AB	Center Tank Access Door - Wing Station 168
531BB	Center Tank Access Door - Wing Station 192

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(b) The access doors for the right center fuel tank are:

<u>Number</u>	<u>Name/Location</u>
631AB	Center Tank Access Door - Wing Station 168
631BB	Center Tank Access Door - Wing Station 192

(c) The access door for the center wing section is:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

SUBTASK 28-11-31-010-002

(3) To remove the access door [8], do this step:

(a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
192CL	Air Conditioning Access Door

(TASK 06-41-00-800-801).

SUBTASK 28-11-31-940-001

(4) Do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-11-31-020-005

(5) Hold the clamp ring [4] on the access door [1], access door [6], or access door [8] and remove the mounting bolt [3].

SUBTASK 28-11-31-020-006

(6) Remove the clamp ring [4] and the gasket [2].

(a) Discard the gasket [2].

SUBTASK 28-11-31-020-001

CAUTION: BE CAREFUL WHEN YOU REMOVE AN ACCESS DOOR WITH A FUEL MEASURING STICK INSTALLED ON THE ACCESS DOOR. IF YOU ARE NOT CAREFUL WHEN YOU REMOVE THESE ACCESS DOORS, DAMAGE TO THE FUEL MEASURING STICK CAN OCCUR.

CAUTION: DO NOT USE A LEVER (PRY) ON THE FUEL TANK ACCESS DOORS. THE LOWER SURFACE OF THE ACCESS DOOR FLANGE AND THE UPPER SURFACE OF THE WING SKIN AROUND THE ACCESS DOORS ARE SEAL SURFACES. IF YOU ARE NOT CAREFUL, SCRATCHES OR DAMAGE TO THE SEAL SURFACE CAN OCCUR.

(7) Push up on the access door [1], access door [6], or access door [8].

(a) If the access door [1], access door [6], or access door [8] does not move freely, use a rubber mallet and hit lightly around the access door.

SUBTASK 28-11-31-020-002

(8) Remove the access door.

————— END OF TASK —————

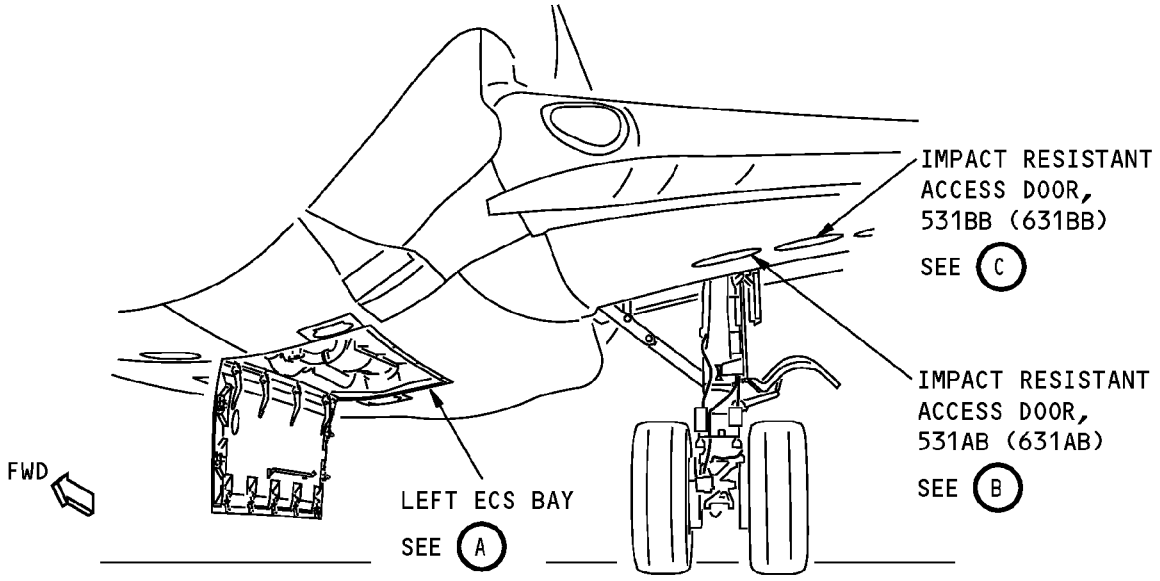
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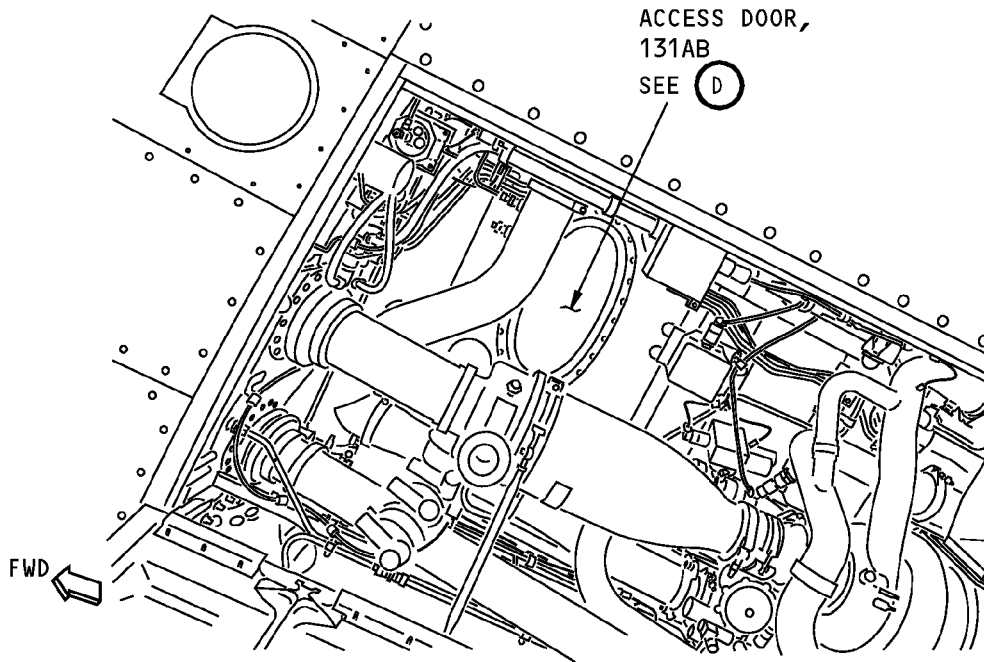
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**LEFT WING
(RIGHT WING IS OPPOSITE)**



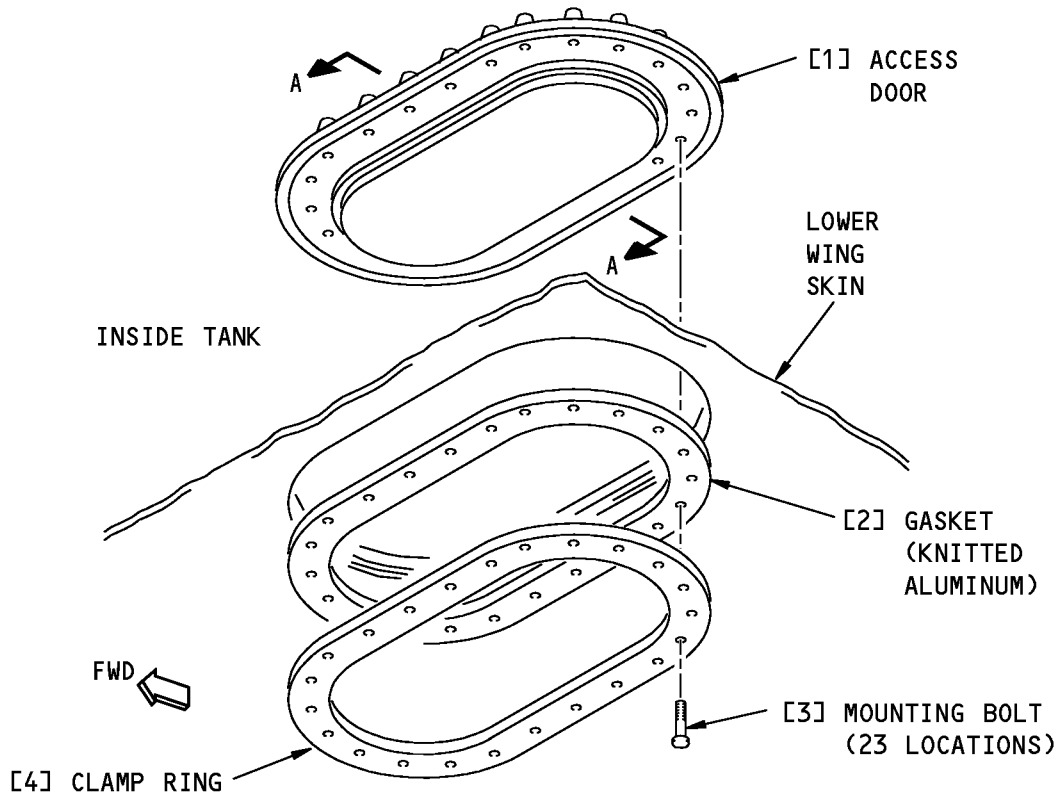
**LEFT ECS BAY
(A)**

**Center Tank Access Door Installation
Figure 401 (Sheet 1 of 4)/28-11-31-990-801**

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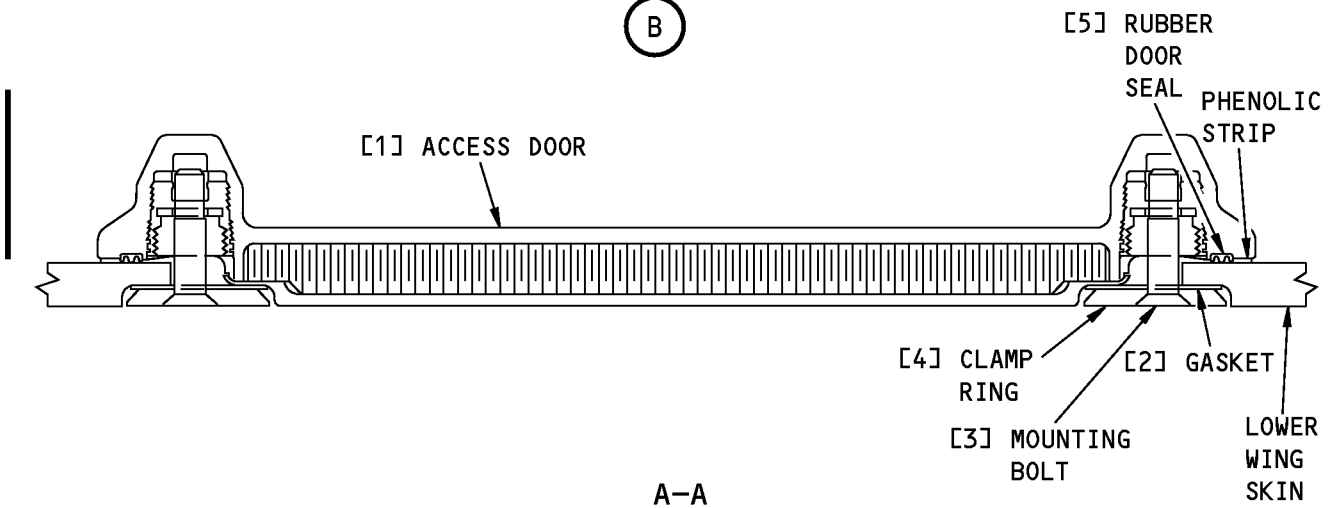
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**IMPACT RESISTANT ACCESS DOOR,
531AB (631AB)**

(B)



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**Center Tank Access Door Installation
Figure 401 (Sheet 2 of 4)/28-11-31-990-801**

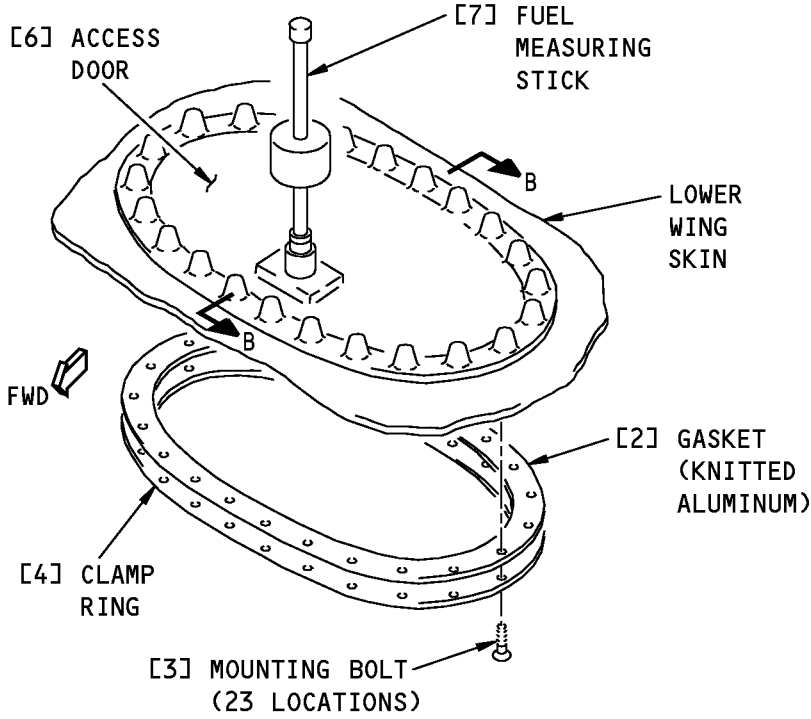
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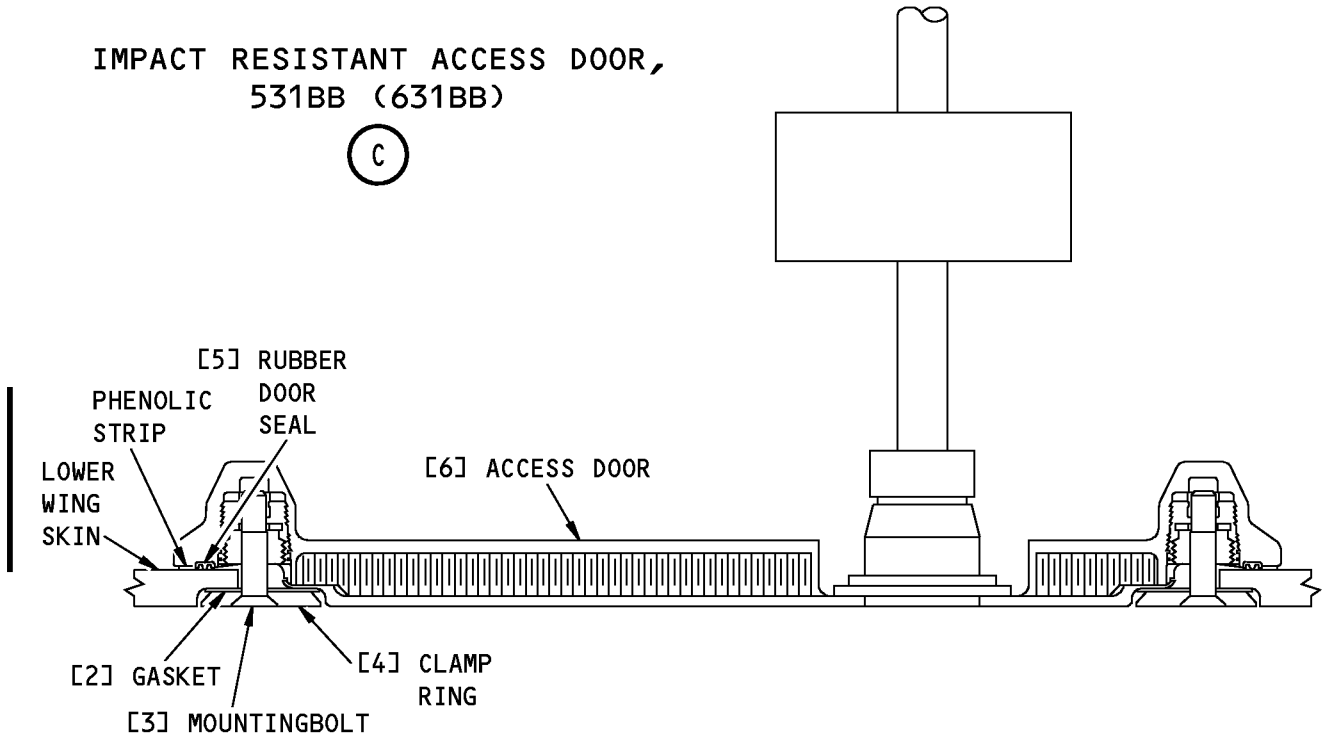
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**IMPACT RESISTANT ACCESS DOOR,
531BB (631BB)**

(C)



B-B

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**Center Tank Access Door Installation
Figure 401 (Sheet 3 of 4)/28-11-31-990-801**

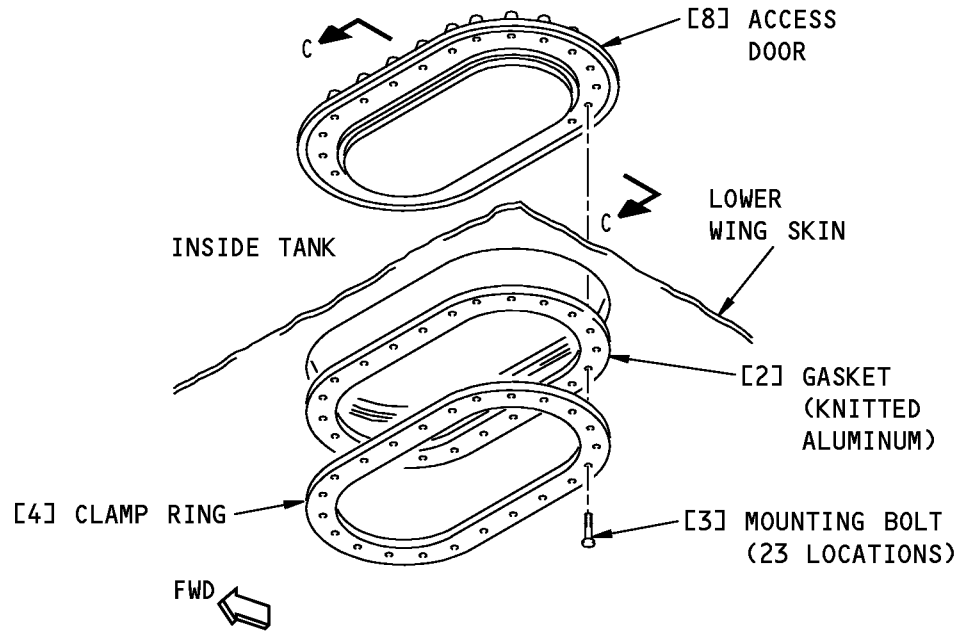
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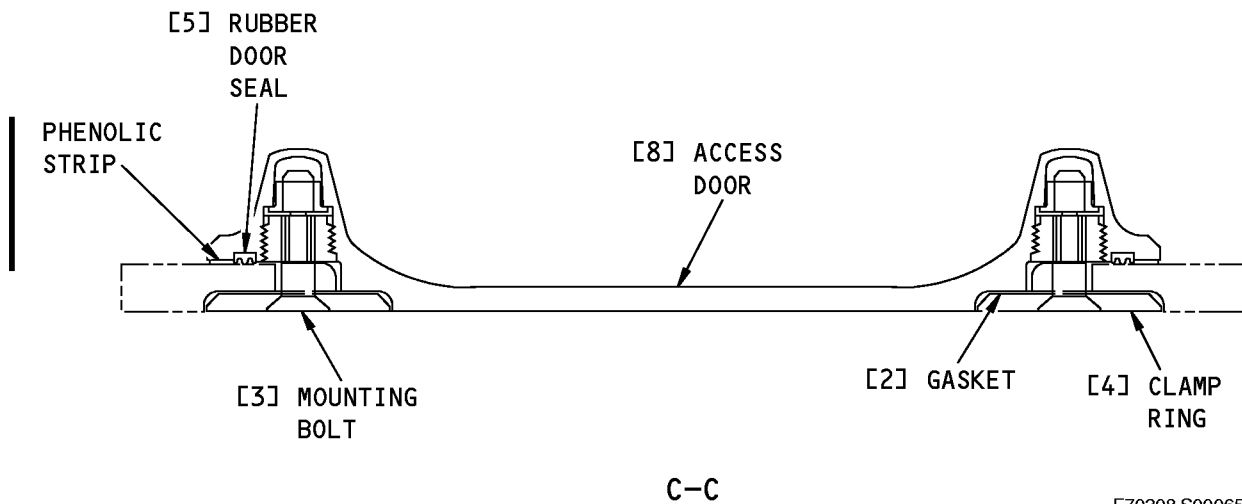
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CENTER TANK ACCESS DOOR, 131AB

(D)



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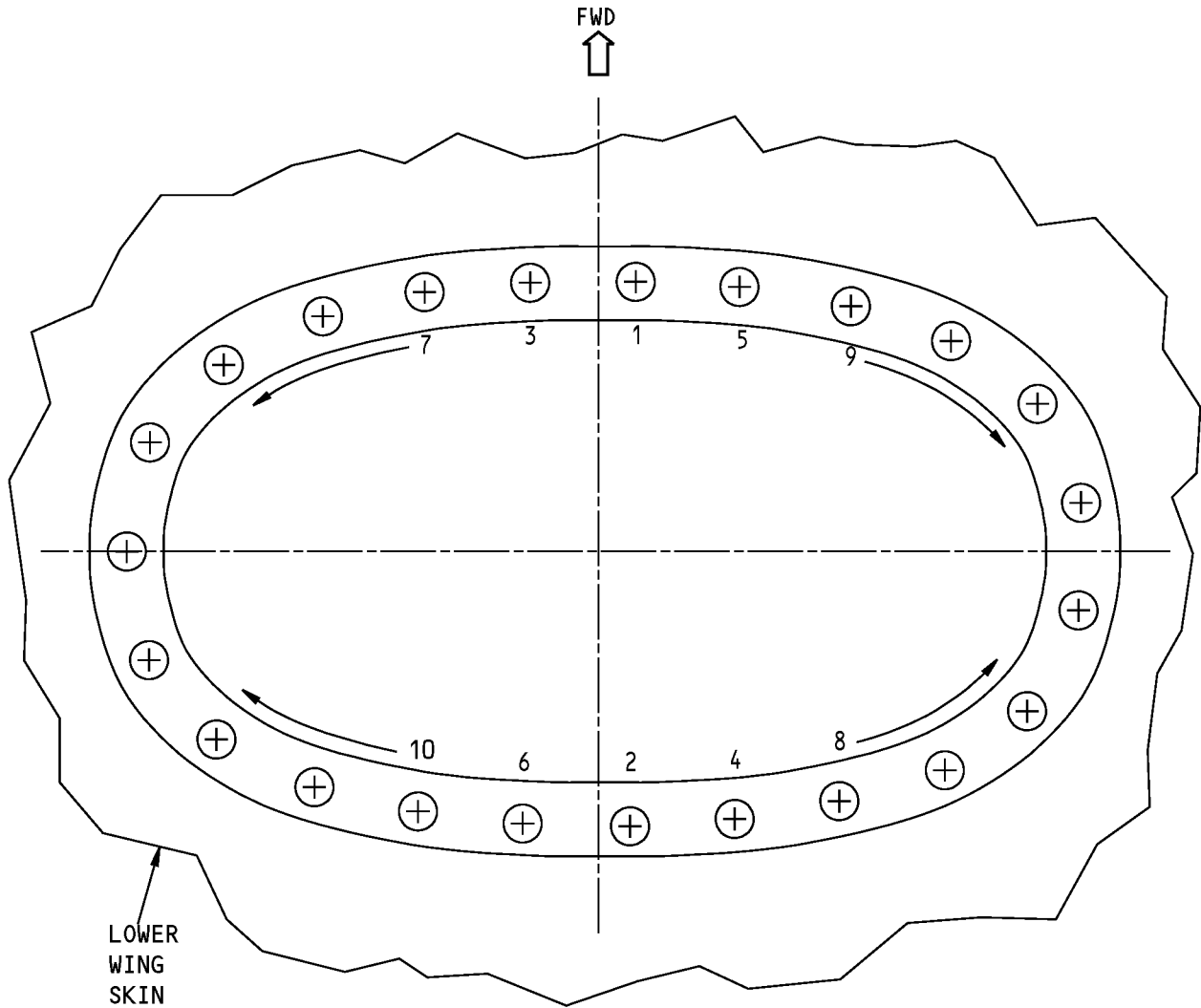
**Center Tank Access Door Installation
Figure 401 (Sheet 4 of 4)/28-11-31-990-801**

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NOTE: TORQUE THE MOUNT BOLTS IN THE SEQUENCE SHOWN BY THE NUMBERS. THIS WILL MAKE SURE FUEL DOES NOT LEAK AROUND THE ACCESS PANEL.

Access Panel Mount Bolt Torque Pattern
Figure 402/28-11-31-990-802

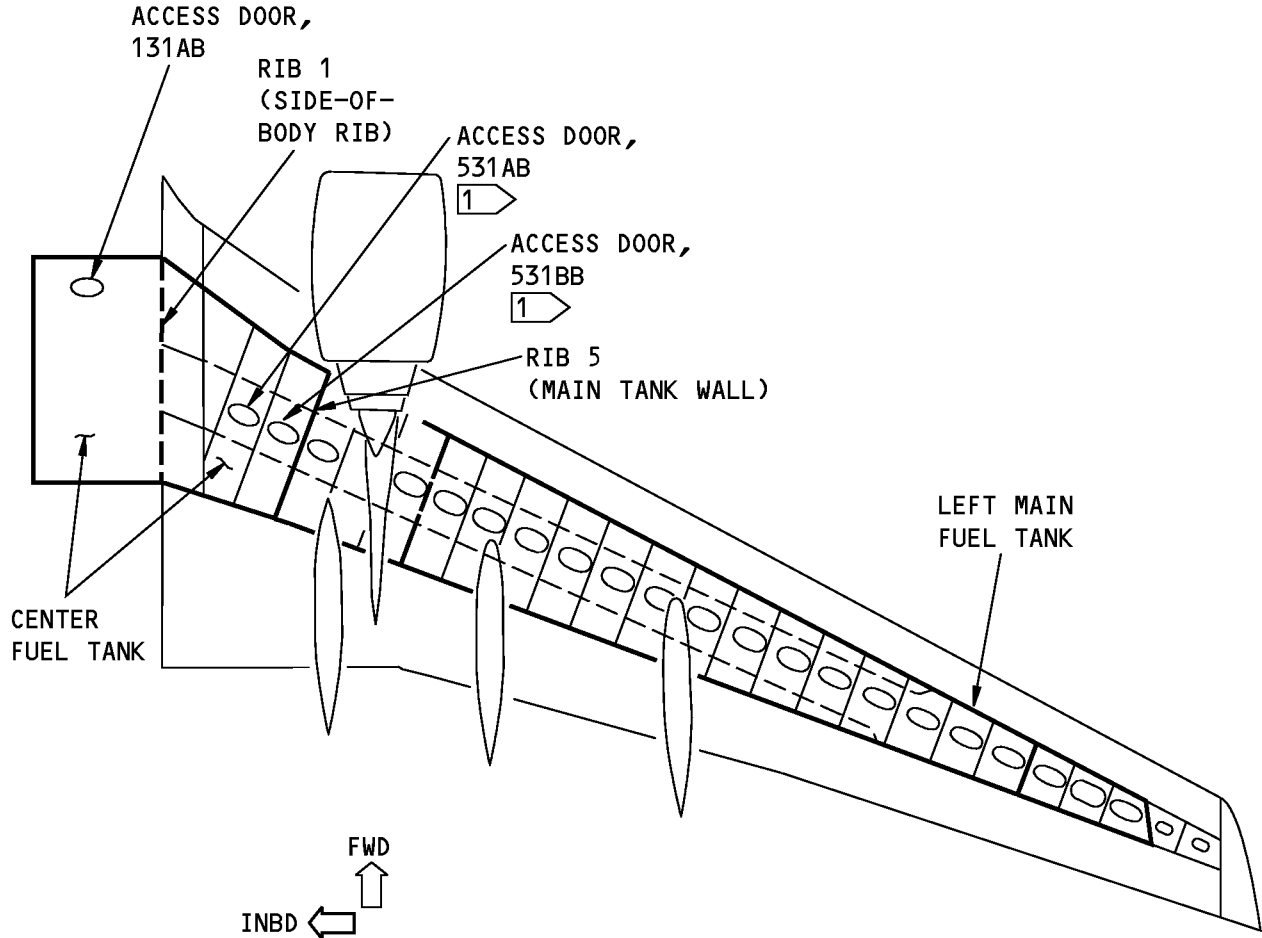
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**LEFT WING
(BOTTOM VIEW)
(RIGHT WING IS OPPOSITE)**

LEGEND:

- SPLICE STRINGER
(COVERS A SKIN JOINT)
- BAFFLE RIB
(LIMITS FUEL FLOW)
- _____ PRIMARY SEAL SURFACE
(FUEL TANK BOUNDARY)

1 HIGH IMPACT RESISTANT ACCESS DOOR

**Center Tank Access Doors - Plan View
Figure 403/28-11-31-990-803**

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TASK 28-11-31-400-801

3. Center Tank Access Door - Installation

(Figure 401, Figure 402)

A. General

- (1) BMS 3-38 is the recommended anti-corrosion compound for access door gasket installations. BMS 3-38 gives improved corrosion protection between the access door, mesh gasket and wing surfaces. Anti-corrosion compound, Aero Shell No. 14, can still be used for access door gaskets, but should be replaced with BMS 3-38 as soon as practical.
- (2) Do not mix the two types of anti-corrosion compounds, BMS 3-38 and Aero Shell No. 14. If you replaced an Aero Shell No.14 filled gasket with a BMS 3-38 filled gasket, remove all Aero Shell No.14 anti-corrosion compound from the clamp ring and the access door structure on the airplane.
- (3) The center tank access doors shown below are high impact resistant doors and they must not be replaced with a standard door:

Table 401/28-11-31-993-801

THE LEFT WING	THE RIGHT WING
531AB	631AB
531BB	631BB

B. References

Reference	Title
06-41-00-800-801	Finding an Access Door or Panel on the Lower Half of the Fuselage (P/B 201)
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-790-801	Fuel Leak Detection Procedures (P/B 601)
28-11-11-900-801	Rubber Door Seal - Replacement (P/B 801)
28-22-41-420-801	Fuel Boost Pump and Override Pump Priming (P/B 401)

C. Consumable Materials

Reference	Description	Specification
B00083	Solvent - Aliphatic Naphtha (For Acrylic Plastics)	TT-N-95 Type II, ASTM D-3735 Type III
D00020	Grease - Aircraft Oscillating Bearing	MIL-G-25537 (NATO G-365)
D00504	Grease - Petrolatum	VV-P-236
G50237	Compound - Corrosion Inhibiting, Non-drying - Cor-Ban 27L	BMS 3-38

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Access door	28-11-11-02A-230	HAP 028-054, 101-999
		28-11-11-02A-235	HAP 028-054, 101-999
6	Access door	28-11-11-02-055	HAP 001-013, 015-026
		28-11-11-02-060	HAP 001-013, 015-026
		28-11-11-02A-220	HAP 028-054, 101-999
		28-11-11-02A-225	HAP 028-054, 101-999

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(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
8	Access door	28-11-11-02-040	HAP 001-013, 015-026
		28-11-11-02-050	HAP 001-013, 015-026
		28-11-11-02-135	HAP 001-013, 015-026
		28-11-11-02A-240	HAP 028-054, 101-999

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

F. Access Panels

Number	Name/Location
131AB	Center Tank Access
192CL	Air Conditioning Access Door
531AB	Center Tank Access Door - Wing Station 168
531BB	Center Tank Access Door - Wing Station 192
631AB	Center Tank Access Door - Wing Station 168
631BB	Center Tank Access Door - Wing Station 192

G. Procedure

SUBTASK 28-11-31-210-001

- (1) Make sure the areas on the access door [1], access door [6], or access door [8] and the wing skin, that the rubber door seal [5] touches, are clean.
 - (a) Use solvent, B00083, to clean the surfaces if it is necessary.

SUBTASK 28-11-31-210-002

- (2) Make sure areas on the access door [1], access door [6], or access door [8] and the wing skin, that the aluminum gasket [2] touches, are clean.
 - (a) Use solvent, B00083 to clean the surfaces if it is necessary.

NOTE: This step makes sure there is good electrical contact between the door and the wing skin.

SUBTASK 28-11-31-210-003

- (3) Make sure the rubber door seal [5] is in good condition and secure.
 - (a) Replace the rubber door seal [5] if it is necessary (TASK 28-11-11-900-801).
 - (b) Apply a thin layer of grease, D00504, to the rubber door seal.

SUBTASK 28-11-31-210-009

- (4) Make sure there is a phenolic strip around the access door that mates with the wing skin inside the tank.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

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SUBTASK 28-11-31-420-001

CAUTION: BE CAREFUL WHEN YOU INSTALL AN ACCESS DOOR WITH A FUEL MEASURING STICK INSTALLED ON THE ACCESS DOOR. IF YOU ARE NOT CAREFUL WHEN YOU INSTALL THESE ACCESS DOORS, DAMAGE TO THE FUEL MEASURING STICK CAN OCCUR.

(5) Set the access door [1], access door [6], or access door [8] in the opening of the fuel tank.

SUBTASK 28-11-31-100-001

(6) Clean the clamp ring [4] surface with solvent, B00083.

SUBTASK 28-11-31-210-005

(7) Make sure the BMS 3-38 Cor-Ban 27L Compound, G50237, (recommended) or Aero Shell No. 14 grease, D00020, fills the aluminum mesh on the two sides of the new gasket [2] before you install it.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: If you do not fill the aluminum mesh with BMS 3-38 Cor-Ban 27L Compound, G50237 anti-corrosion compound or Aero Shell No. 14 grease, D00020, the spaces with no anti-corrosion compound or grease can collect water. Do not apply too much anti-corrosion compound or grease or it can move out to the wing surface.

NOTE: Do not mix Aero Shell No. 14 and BMS 3-38 anti-corrosion compounds.

SUBTASK 28-11-31-210-006

(8) Make sure the clamp ring [4] and gasket [2] holes align.

NOTE: The holes are not symmetrical.

SUBTASK 28-11-31-640-001

CAUTION: DO NOT APPLY TOO MUCH GREASE TO THE LOWER SURFACE OF THE WING. YOU CAN CAUSE DAMAGE TO THE ACCESS DOOR WITH HYDRAULIC PRESSURE FROM THE GREASE WHEN YOU INSTALL THE MOUNTING BOLTS.

(9) Apply a very thin layer of BMS 3-38 Cor-Ban 27L Compound, G50237, (recommended) or Aero Shell No. 14 grease, D00020, to the lower surface of the wing skin that touches the gasket [2] for the access door [1], access door [6], or access door [8].

NOTE: Do not mix Aero Shell No. 14 and BMS 3-38 anti-corrosion compounds.

SUBTASK 28-11-31-420-005

(10) Put the gasket [2] and the clamp ring [4] in the opening and install the mounting bolt [3].

SUBTASK 28-11-31-420-006

(11) Start at the centerline and tighten the mounting bolt [3] equally in both directions (Figure 402).

SUBTASK 28-11-31-420-007

(12) Tighten the mounting bolt [3] to 35 ± 5 in-lb (4 ± 1 N-m).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

SUBTASK 28-11-31-650-002

(13) Do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

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SUBTASK 28-11-31-210-007

- (14) To make sure there is no fuel leakage at the applicable access door, do this task: Fuel Leak Detection Procedures, TASK 28-11-00-790-801.

SUBTASK 28-11-31-650-003

- (15) After you refuel the applicable tank and do a check for leaks, do this task: Fuel Boost Pump and Override Pump Priming, TASK 28-22-41-420-801

SUBTASK 28-11-31-010-003

- (16) Examine the applicable access door [1], access door [6], or access door [8] on the lower wing surface.

- (a) The access doors for the left center fuel tank are:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168
531BB	Center Tank Access Door - Wing Station 192

- (b) The access doors for the right center fuel tank are:

<u>Number</u>	<u>Name/Location</u>
631AB	Center Tank Access Door - Wing Station 168
631BB	Center Tank Access Door - Wing Station 192

- (c) The access door for the part of the center fuel tank in the wing center section is:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

SUBTASK 28-11-31-410-001

- (17) If the access door [8] was removed, do this step:

- (a) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192CL	Air Conditioning Access Door

(TASK 06-41-00-800-801).

————— **END OF TASK** —————

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CENTER TANK SUMP DRAIN VALVE - REMOVAL/INSTALLATION

1. General

- A. The sump drain valve is a poppet type of check valve operated with a spring. It is installed in the center tank at the bottom of the second bay in the center of the bay.
- B. You operate the sump drain valve with a rod attached to the valve. The sump drain valve has a thread which attaches it to the valve bushing on the bottom surface of the center fuel tank. When the sump drain valve is removed, the flapper type service valve closes to prevent the fuel from draining. Thus, it is not necessary to drain the center tank to remove the sump drain valve. Access to the sump drain valve is through the wing to body fairing through the sump drain access door and the access hole in the left ECS bay.

TASK 28-11-41-000-801

2. Sump Drain Valve Removal

(Figure 401)

A. References

Reference	Title
20-10-17-000-801	O-Rings Removal (P/B 401)
20-10-44-000-801	Lockwires Removal (P/B 401)
36-13-01-000-801	Strut Pneumatic Duct Removal (P/B 401)

B. Location Zones

Zone	Area
139	Keel Beam, (Part) Body Station 540.00 to Body Station 727.00

C. Access Panels

Number	Name/Location
192CL	Air Conditioning Access Door
192G	Sump Drain Access Door

D. Procedure

SUBTASK 28-11-41-010-001

- (1) To get access to the bonding jumper [4] on the sump drain valve [1], do this step:

Open this access panel:

Number	Name/Location
192CL	Air Conditioning Access Door

SUBTASK 28-11-41-010-002

- (2) Remove the short section of pneumatic ducting to get access to the access hole in the left ECS bay (TASK 36-13-01-000-801).

SUBTASK 28-11-41-010-003

- (3) Look through the access hole to find the parts that attach the bonding jumper [4] to the sump drain valve [1].

SUBTASK 28-11-41-020-001

- (4) Remove the bolt [6], washers [7], and nut [8] that attach the bonding jumper to the sump drain valve.

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SUBTASK 28-11-41-010-004

(5) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
192G	Sump Drain Access Door

NOTE: The is in the wing to body fairing between the two ECS access doors.

SUBTASK 28-11-41-020-002

(6) Remove the bolts [10] that hold the cover plate [9] to the drain well structure.

SUBTASK 28-11-41-020-003

(7) Remove the lockwire that attaches the hexagonal fitting on the sump drain valve [1] to the cover plate [9] (TASK 20-10-44-000-801).

SUBTASK 28-11-41-020-004

(8) Remove the cover plate [9] from the sump drain valve [1].

SUBTASK 28-11-41-020-005

(9) Do these steps to remove the sump drain valve:

(a) Turn the sump drain valve counterclockwise to remove it from the bushing [3].

NOTE: You can use a deep socket wrench to turn the drain valve by a hex fitting on the bottom of the drain valve [1].

(b) Lower the sump drain valve [1] down in a straight line through the valve door opening to remove it.

NOTE: You can use one hand through the access hole to help to guide the valve.

(c) Remove and discard the O-ring [2] from the sump drain valve [1] (TASK 20-10-17-000-801).

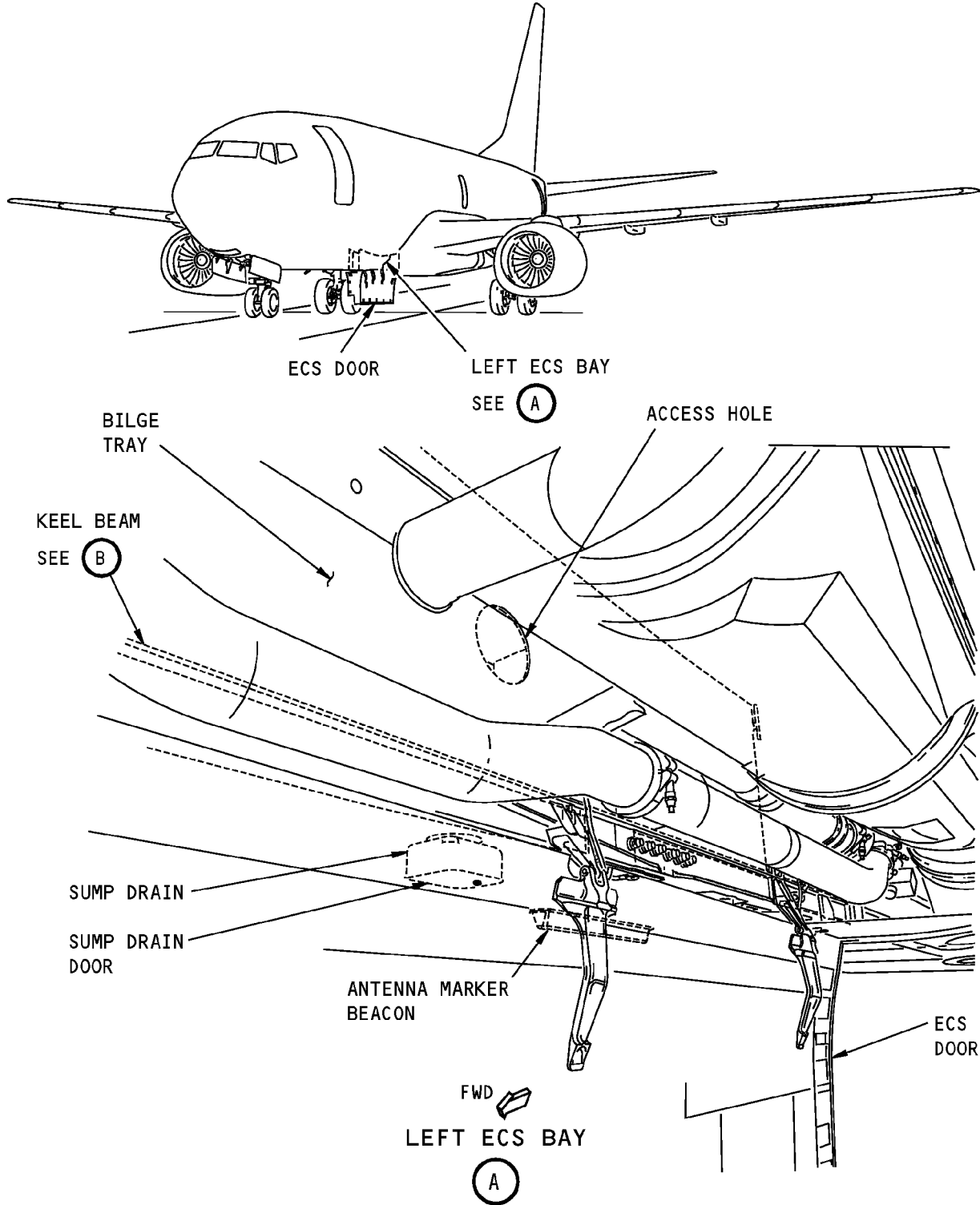
————— **END OF TASK** —————

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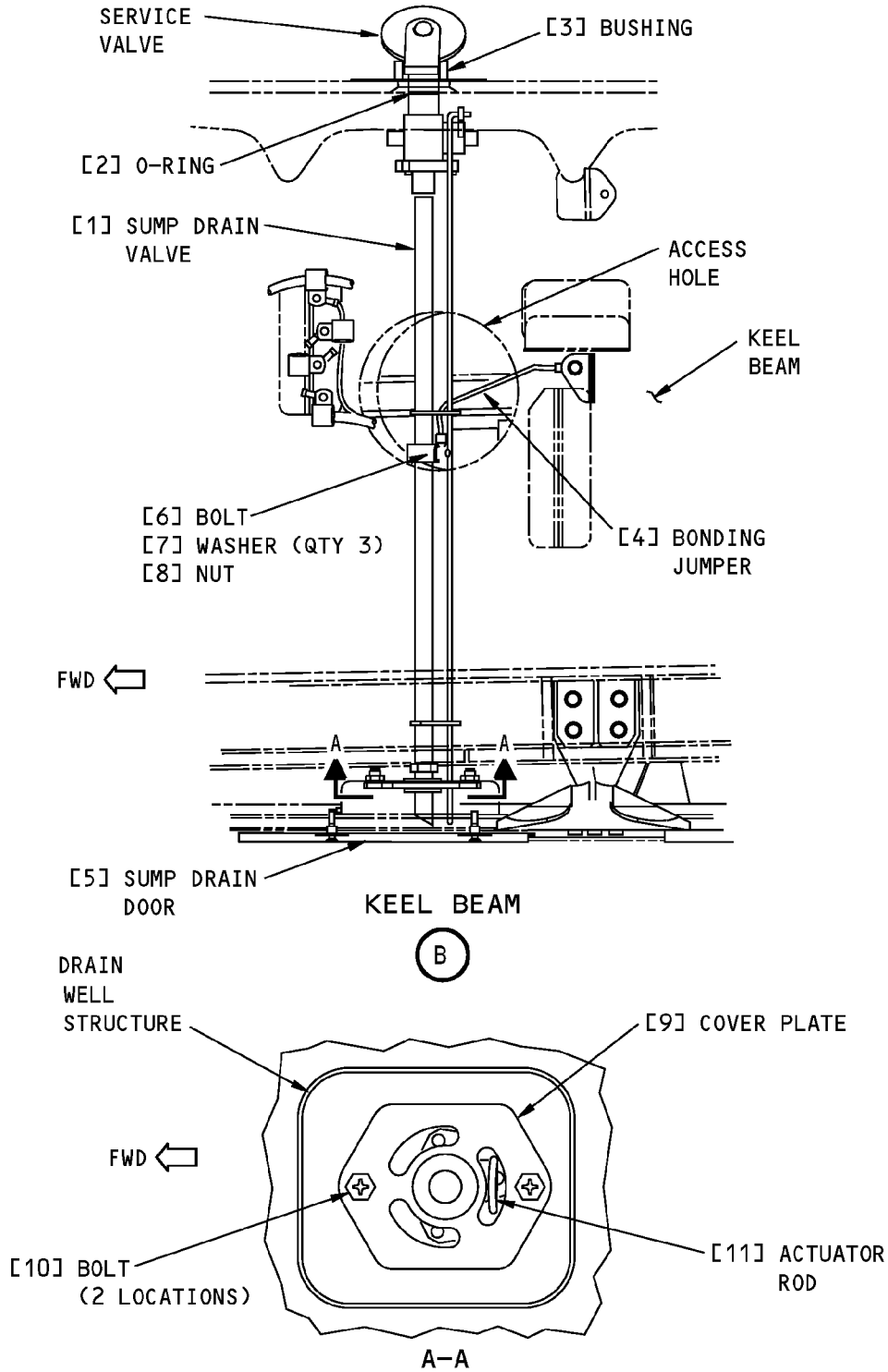


**Center Tank Sump Drain Valve installation
Figure 401 (Sheet 1 of 2)/28-11-41-990-802**

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**Center Tank Sump Drain Valve installation
Figure 401 (Sheet 2 of 2)/28-11-41-990-802**

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TASK 28-11-41-400-801

3. Sump Drain Valve Installation

(Figure 401)

A. References

Reference	Title
20-10-17-400-801	O-Rings Installation (P/B 401)
20-10-44-400-801	Lockwires Installation (P/B 401)
20-40-11-760-801	Electrical Bonding (P/B 201)
36-13-01-000-802	Strut Pneumatic Duct Installation (P/B 401)

B. Location Zones

Zone	Area
139	Keel Beam, (Part) Body Station 540.00 to Body Station 727.00

C. Access Panels

Number	Name/Location
192CL	Air Conditioning Access Door
192G	Sump Drain Access Door

D. Procedure

SUBTASK 28-11-41-420-001

- (1) Install a new O-ring [4], lightly lubricated with fuel, on the sump drain valve (TASK 20-10-17-400-801).

SUBTASK 28-11-41-420-002

- (2) Do these steps to install the sump drain valve in the bushing [3].

- (a) Open this access panel:

Number	Name/Location
192CL	Air Conditioning Access Door

- (b) Open this access panel:

Number	Name/Location
192G	Sump Drain Access Door

- (c) Move the drain valve up through the access door opening for the sump drain.

NOTE: You can use one hand through the access hole to help to guide the valve. You will feel the valve bushing when it touches the sump drain valve.

NOTE: The final lockwire procedure will be easier if you attach the lockwire to the hexagonal fitting before you put the valve assembly into the keel beam.

- (d) Turn the sump drain valve clockwise until it is against the bushing [3].
- (e) Use a deep socket wrench on the hexagonal fitting at the end of the sump drain valve to tighten the sump drain valve to a torque of 68-75 inch-pounds.
- (f) Make sure the actuator rod [11] can go through one of the three slots on the cover plate when the assembly is tight.

NOTE: The cover plate can be turned 180 degrees if necessary to make the actuator rod fit.

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SUBTASK 28-11-41-420-003

- (3) Attach the bonding jumper [4] to the sump drain valve [1] with the bolt [6], washers [7], and nut [8] that you removed before.

SUBTASK 28-11-41-420-004

- (4) Attach the hexagonal fitting on the sump drain valve to the cover plate [9] with a lockwire (TASK 20-10-44-400-801).

SUBTASK 28-11-41-420-005

- (5) Do these steps to install the cover plate on the drain well structure:
- (a) Make sure the grommet in the center hole of the cover plate is correctly seated
 - (b) Attach the cover plate [9] to the drain well structure with the two bolts [10] that you removed before.
 - (c) Make sure the grommet in the center hole of the cover plate stays correctly seated after installation.
 - (d) Make sure the actuator rod [11] goes through one of the three slots in the cover plate [9].

NOTE: The cover plate can be turned 180 degrees to make it possible for the actuator rod to go through the cover plate.

SUBTASK 28-11-41-280-001

- (6) Do a check of the electrical bond between the sump drain valve and the structure (TASK 20-40-11-760-801).
- (a) The resistance must not be more than 0.010 ohms.

SUBTASK 28-11-41-410-001

- (7) Install the section of pneumatic ducting removed for access to the keel beam access hole (TASK 36-13-01-000-802).

SUBTASK 28-11-41-410-002

- (8) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192CL	Air Conditioning Access Door

SUBTASK 28-11-41-710-001

- (9) Make sure the valve operates correctly.
- (a) Pull the actuator rod [11] to open the sump drain valve.
 - (b) Make sure the rod moves freely when you pull with a maximum force of five to ten pounds.
 - (c) If the tank contains some fuel, catch the fuel that flows from the sump drain valve in a container.

SUBTASK 28-11-41-410-003

- (10) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
192G	Sump Drain Access Door

————— END OF TASK —————

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MAIN TANK FUEL SUMP DRAIN VALVE - MAINTENANCE PRACTICES

1. General

A. This procedure has three tasks:

- (1) The removal of the sump drain valve for the main tank
- (2) The installation of the sump drain valve for the main tank
- (3) A task to replace the O-ring for the primary drain seal on the sump drain valve for the main tank.

B. The sump drain valves for the main tanks are installed in shrink-fit bushings in the skin on the bottom of the wing. When you remove the jam nut and washer from inside the tank, make sure you catch the valve body so that it is not damaged.

TASK 28-11-61-000-801

2. Main Tank Fuel Sump Drain Valve Removal

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)

B. Location Zones

Zone	Area
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Access Panels

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

D. Prepare for the Removal

SUBTASK 28-11-61-650-001

WARNING: CAREFULLY DO ALL THE SAFETY PROCEDURES TO DEFUEL THE FUEL TANK AND TO GO INTO IT. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF YOU DO NOT FOLLOW THE SAFETY PROCEDURES.

- (1) Prepare to go into the applicable fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-11-61-010-001

- (2) Open these access panels:

(TASK 28-11-11-000-801)

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

E. Removal Procedure

(Figure 201)

EFFECTIVITY HAP ALL	
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SUBTASK 28-11-61-020-001

CAUTION: MAKE SURE THE VALVE BODY DOES NOT FALL ON THE GROUND WHEN YOU REMOVE THE JAMNUT AND WASHER FROM INSIDE THE TANK. THIS CAN CAUSE DAMAGE TO THE VALVE BODY.

- (1) Do these steps to remove the drain valve:
 - (a) Remove the lockwire between the valve body [4] and the jamnut [1].
 - (b) Remove the jamnut [1] and the washer [2] that attach the valve body to the bushing [5].
 - (c) Remove the valve body [4].
 - (d) Discard the O-ring [3].

————— END OF TASK —————

TASK 28-11-61-400-801

3. Main Tank Fuel Sump Drain Valve Installation

(Figure 201)

A. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	O-ring	28-11-61-01-190	HAP 001-013, 015-026, 028-030
4	Valve body	28-11-61-02-170	HAP 031-054, 101-999
		28-11-61-01-105	HAP 001-013, 015-026, 028-030
		28-11-61-02-085	HAP 031-054, 101-999

C. Location Zones

Zone	Area
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Access Panels

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

E. Installation Procedure

(Figure 201)

SUBTASK 28-11-61-210-001

- (1) Make sure the seal surfaces of the valve body [4] and the bushing [5] are clean and in a good condition.

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SUBTASK 28-11-61-420-001

(2) Install new O-ring [3] on the valve body [4].

SUBTASK 28-11-61-420-002

(3) Put the valve body [4] into the bushing [5] and make sure it is held up until you install it.

SUBTASK 28-11-61-420-003

(4) Install the parts that attach the drain valve.

- (a) Go into the fuel tank.
- (b) Install the washer [2] and the jamnut [1].
- (c) Tighten the jamnut [1] to 50 pound-inches (5.6 newton-meters).
- (d) Install lockwire between the jamnut [1] and the airplane structure.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 28-11-61-410-001

(1) To close these access panels:

(TASK 28-11-11-400-801)

<u>Number</u>	<u>Name/Location</u>
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

SUBTASK 28-11-61-650-002

(2) Fill the applicable tank with fuel and do a check for leaks (TASK 12-11-00-650-802).

SUBTASK 28-11-61-650-003

(3) Drain a small quantity of fuel from the tank to make sure the valve operates correctly.

————— **END OF TASK** —————

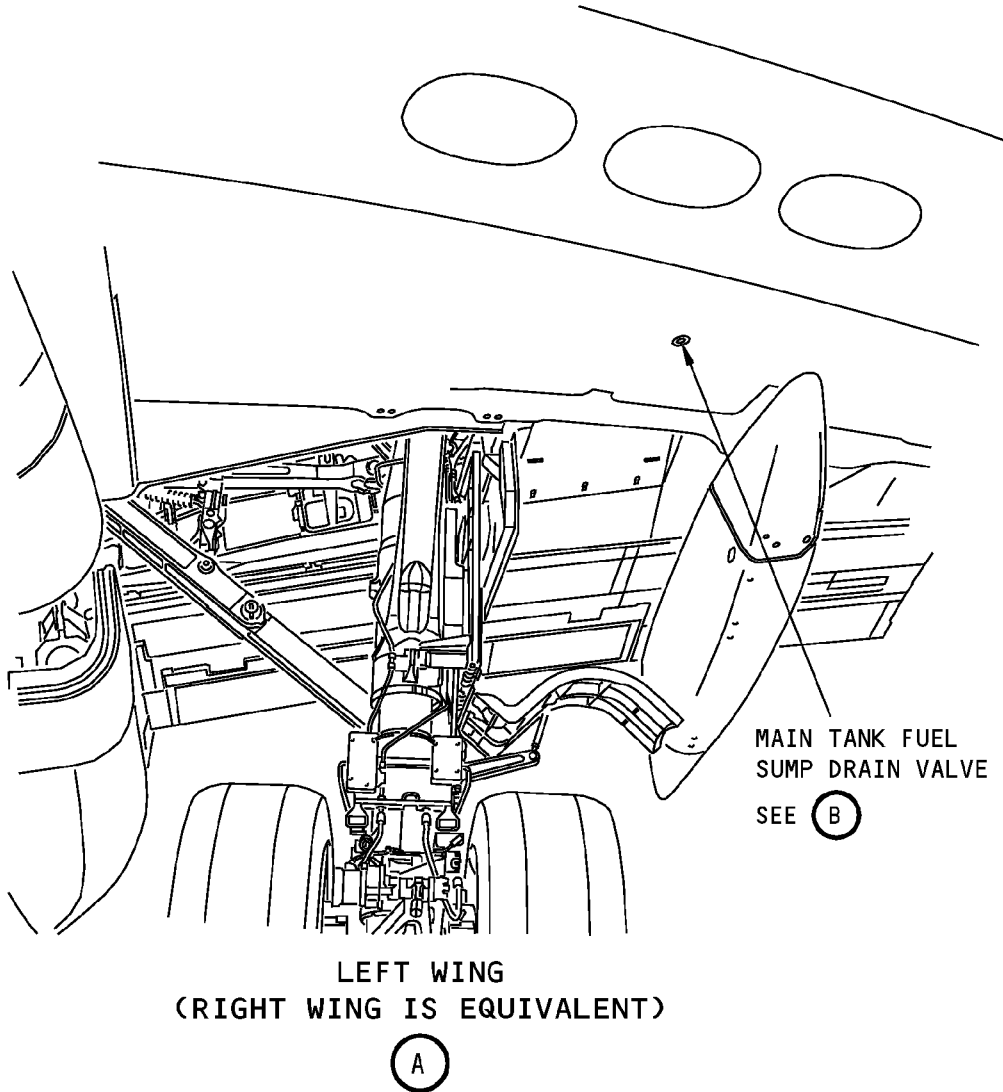
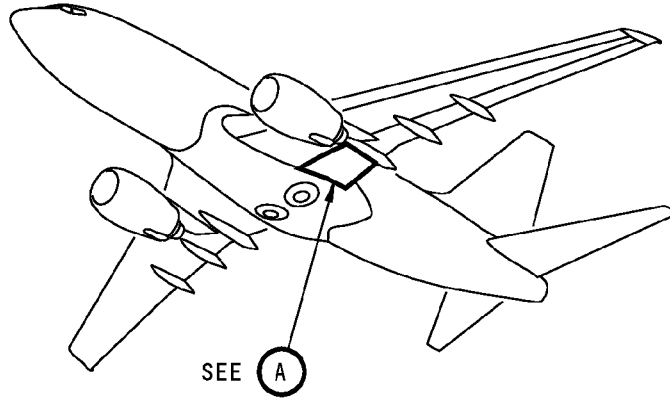
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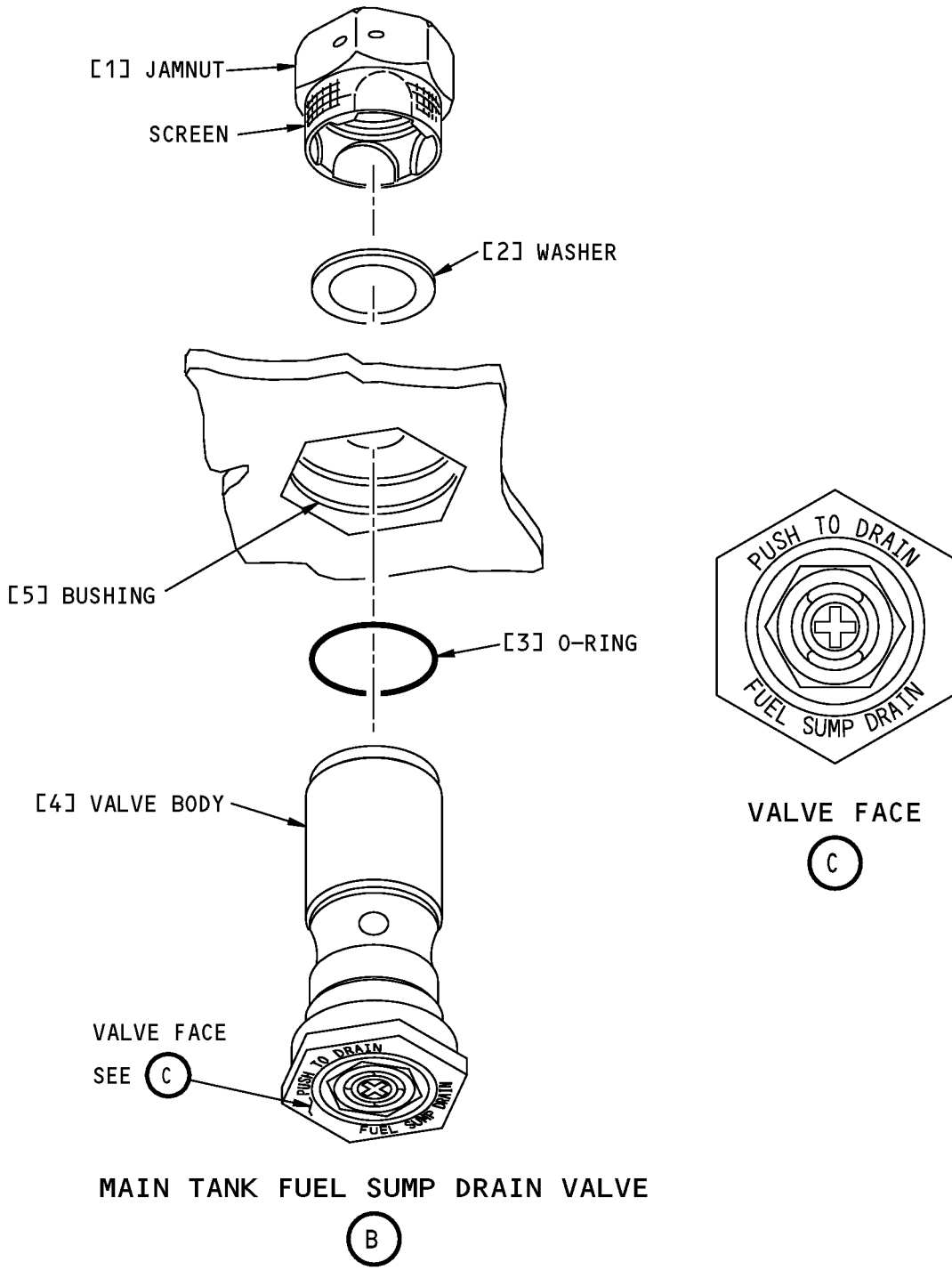
**Main Tank Fuel Sump Drain Valve Installation
Figure 201 (Sheet 1 of 2)/28-11-61-990-801**

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**Main Tank Fuel Sump Drain Valve Installation
Figure 201 (Sheet 2 of 2)/28-11-61-990-801**

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TASK 28-11-61-600-801

4. Primary Drain Seal O-ring Replacement

(Figure 202)

A. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
23	O-ring	28-11-61-01-145	HAP 001-013, 015-026, 028-030
24	O-ring	28-11-61-02-125	HAP 031-054, 101-999
		28-11-61-01-155	HAP 001-013, 015-026, 028-030
		28-11-61-02-135	HAP 031-054, 101-999

B. Location Zones

Zone	Area
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Procedure

(Figure 202)

SUBTASK 28-11-61-020-002

(1) Loosen and remove the valve core plug [22] and the valve poppet [21] with a socket wrench.

SUBTASK 28-11-61-020-003

(2) Remove and discard the valve core O-ring [23] and primary O-ring [24] on the valve poppet [21].

SUBTASK 28-11-61-420-004

(3) Install a new valve core O-ring [23] and a new primary O-ring [24].

SUBTASK 28-11-61-420-005

(4) Install the valve poppet [21] and the valve core plug [22].

(a) With the socket wrench, tighten the valve poppet to a maximum torque of 60-66 pound-inches (6.8-7.4 newton-meters) with the socket wrench.

SUBTASK 28-11-61-650-004

(5) Drain a small quantity of fuel from the tank to make sure the valve operates correctly and has a good seal.

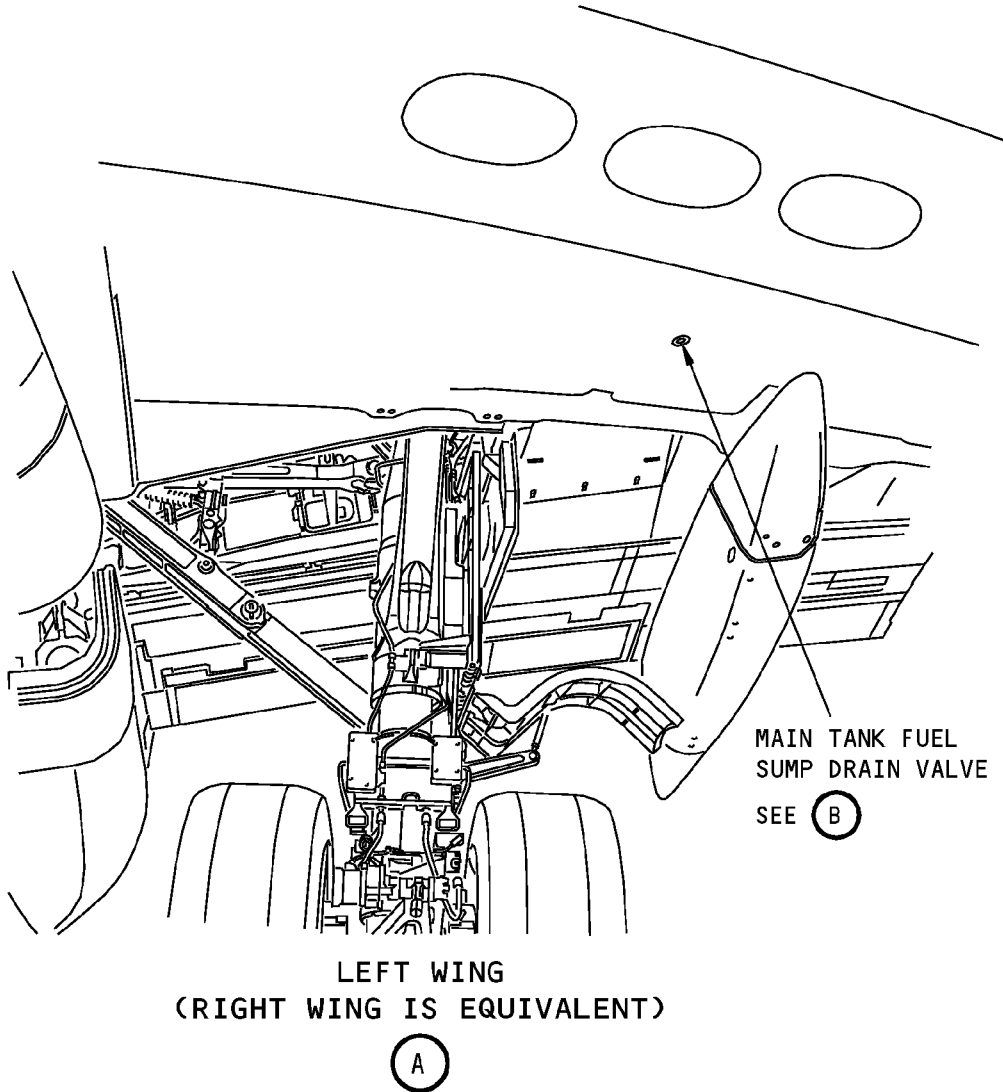
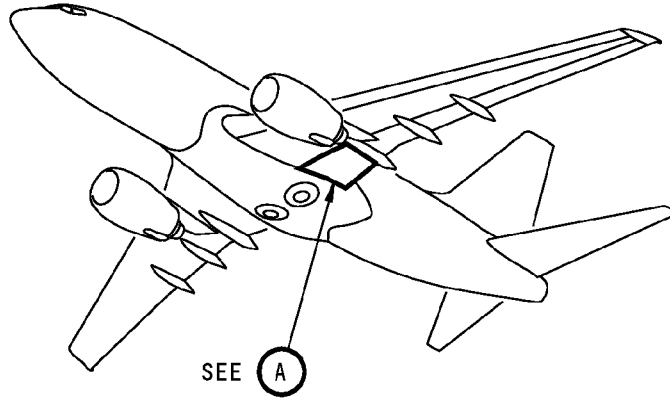
END OF TASK

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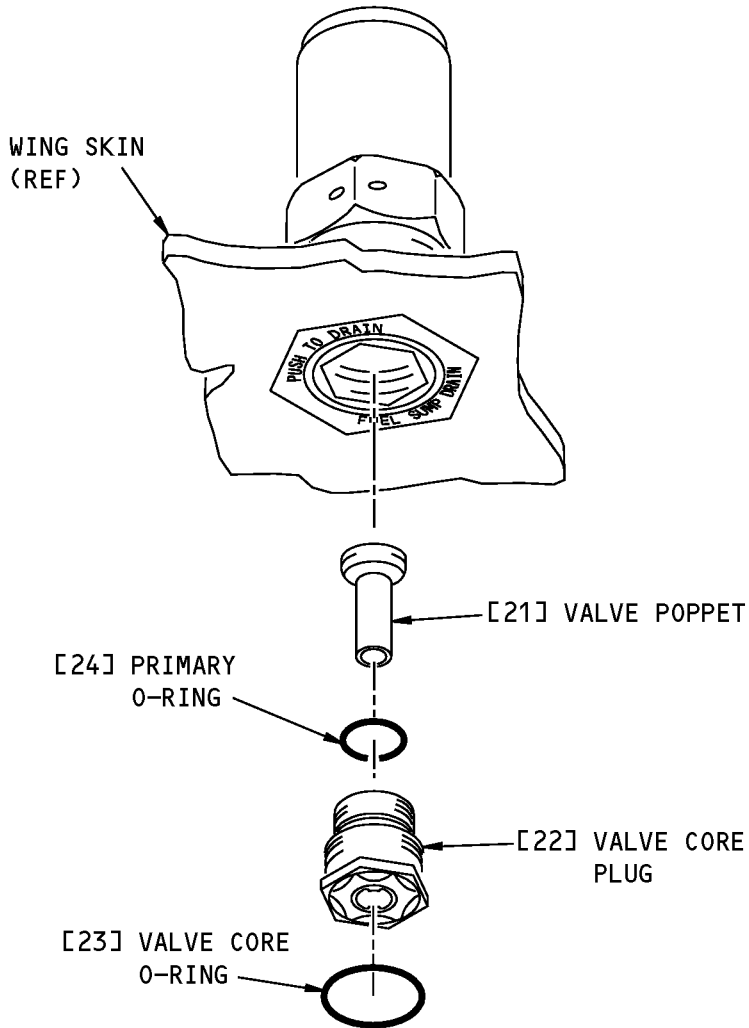
**Main Tank Fuel Sump Drain Valve Primary Drain Seal Replacement
Figure 202 (Sheet 1 of 2)/28-11-61-990-802**

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MAIN TANK FUEL SUMP DRAIN VALVE

B

**Main Tank Fuel Sump Drain Valve Primary Drain Seal Replacement
Figure 202 (Sheet 2 of 2)/28-11-61-990-802**

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FUEL VENT FLOAT VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

- (1) A task to remove the float valve for the fuel vent system
- (2) A task to install the float valve for the fuel vent system.

TASK 28-13-11-000-801

2. Fuel Vent Float Valve Removal

(Figure 401)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)

B. Location Zones

Zone	Area
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Access Panels

Number	Name/Location
532RB	Main Tank Access Door - Wing Station 629
632RB	Main Tank Access Door - Wing Station 629

D. Procedure

SUBTASK 28-13-11-650-001

WARNING: DO ALL THE SAFETY PROCEDURES TO DEFUEL THE TANK AND TO GO INTO IT. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF YOU DO NOT FOLLOW THE SAFETY PROCEDURES.

- (1) Prepare the applicable fuel tank for entry (TASK 28-11-00-910-802).

SUBTASK 28-13-11-010-001

- (2) Open these access panels:

Number	Name/Location
532RB	Main Tank Access Door - Wing Station 629
632RB	Main Tank Access Door - Wing Station 629

(TASK 28-11-11-000-801).

SUBTASK 28-13-11-020-001

- (3) Remove the bolts [2] that attach the float valve [1] to the structure.

SUBTASK 28-13-11-020-002

- (4) Remove the float valve [1].

————— **END OF TASK** —————

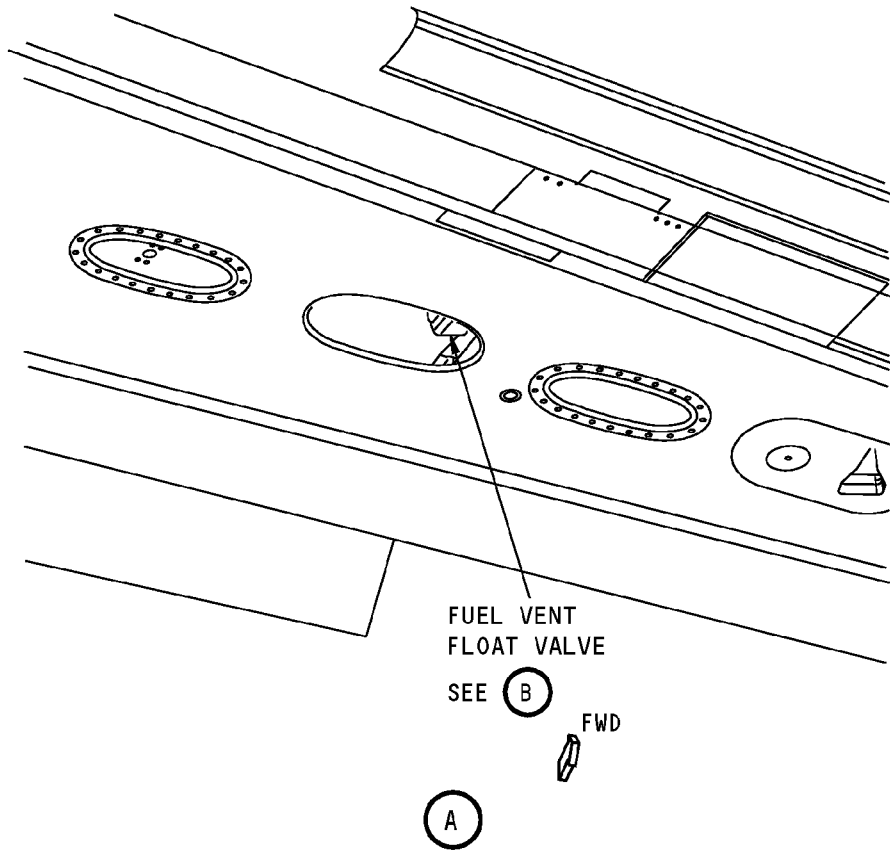
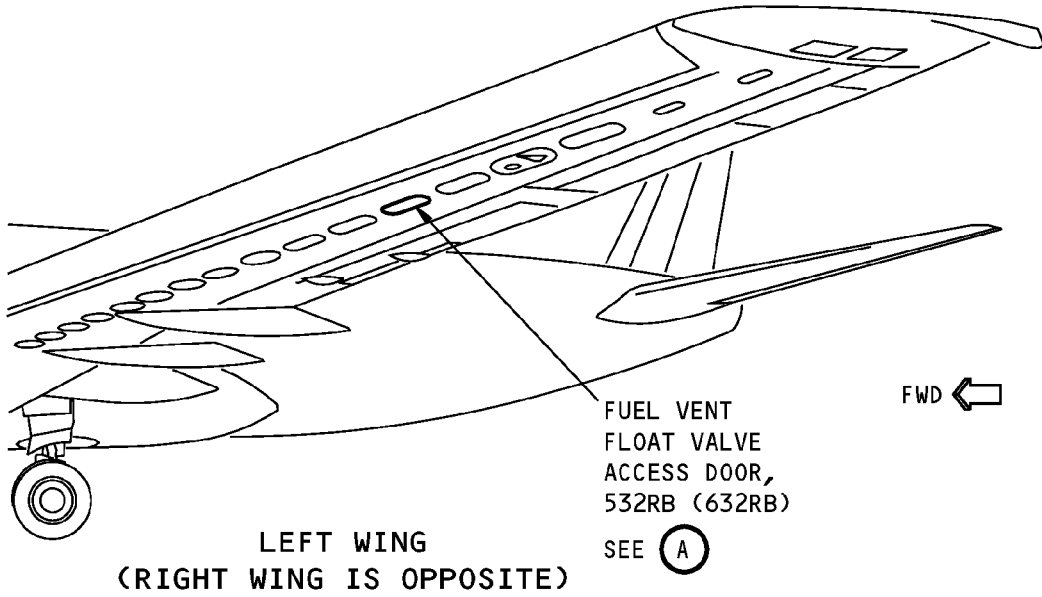
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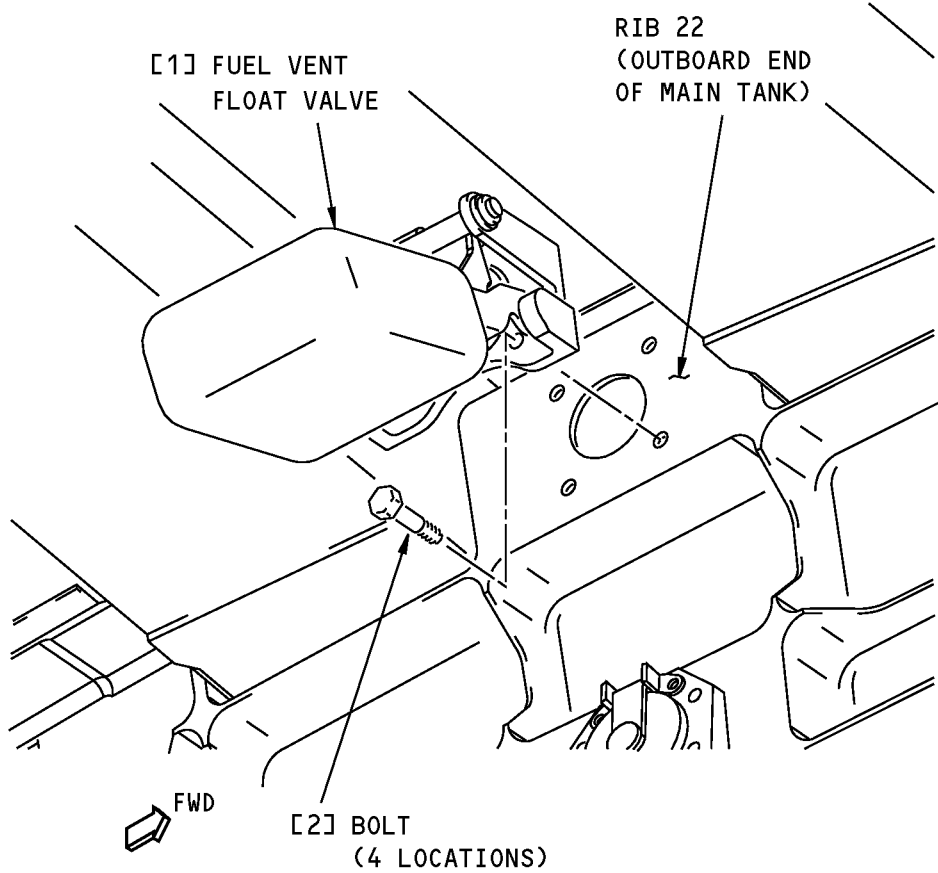
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**Fuel Vent Float Valve Installation
Figure 401 (Sheet 1 of 2)/28-13-11-990-801**

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FUEL VENT FLOAT VALVE

(B)

**Fuel Vent Float Valve Installation
Figure 401 (Sheet 2 of 2)/28-13-11-990-801**

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TASK 28-13-11-400-801

3. Fuel Vent Float Valve Installation

(Figure 401)

A. References

Reference	Title
20-30-93-910-801	Final Cleaning Prior to Fuel Tank Sealing (Series 93) (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
SWPM 20-20-00	Electrical Bonds and Grounds

B. Consumable Materials

Reference	Description	Specification
B01013	Solvent - Final Cleaning Prior To Fuel Tank Sealing (AMM 20-30-93/201) - Series 93	

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Float valve	28-13-11-01-010	HAP 001-013, 015-026, 028-030
		28-13-11-01A-015	HAP 031-054, 101-999

D. Location Zones

Zone	Area
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

E. Access Panels

Number	Name/Location
532RB	Main Tank Access Door - Wing Station 629
632RB	Main Tank Access Door - Wing Station 629

F. Procedure

SUBTASK 28-13-11-110-001

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Clean the faying surfaces of the float valve and the rib with Series 93 solvent, B01013 (TASK 20-30-93-910-801).

SUBTASK 28-13-11-420-001

- (2) Hold the float valve [1] in the correct position and install the bolts [2].

SUBTASK 28-13-11-280-001

- (3) Make sure the bonding resistance from the valve to the airplane structure is 0.01 ohms (10 milliohms) or less (SWPM 20-20-00).

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SUBTASK 28-13-11-210-001

(4) Make sure there is no color identification tape on the components in the fuel tank.

SUBTASK 28-13-11-210-002

(5) Make sure the tank is clean.

SUBTASK 28-13-11-410-001

(6) To close the applicable access panel:

<u>Number</u>	<u>Name/Location</u>
532RB	Main Tank Access Door - Wing Station 629

or close this access panel:

<u>Number</u>	<u>Name/Location</u>
632RB	Main Tank Access Door - Wing Station 629

(TASK 28-11-11-400-801).

————— **END OF TASK** —————

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AIRCRAFT MAINTENANCE MANUAL

AIR VENT SCOOP FLAME ARRESTOR - REMOVAL/INSTALLATION

1. General

- A. This procedure has two tasks:
 - (1) The removal of the flame arrestor for the air vent scoop
 - (2) The installation of the flame arrestor for the air vent scoop.
- B. If the flame arrestor cells are blocked with particles, you can clean the flame arrestor (TASK 28-13-31-100-801).
- C. If it is necessary to remove the flame arrestor, you must seal the mounting flange again when you install the flame arrestor.

TASK 28-13-31-000-801

2. Flame Arrestor Removal

(Figure 401)

A. References

Reference	Title
28-11-11-000-802	Surge Tank Access Door - Removal (P/B 401)

B. Tools/Equipment

Reference	Description
STD-200	Container - Fuel Resistant, 10 gallon (38 l)

C. Location Zones

Zone	Area
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

D. Access Panels

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

E. Procedure

SUBTASK 28-13-31-860-001

- (1) Make sure the airplane is correctly grounded to an approved and identified ground.

SUBTASK 28-13-31-860-002

- (2) Unless the fuel tank is defueled and prepared for entry, do these safety checks:
 - (a) Remove the electrical power from the airplane.
 - 1) Do not connect the power again until the fuel tank is closed and safe.
 - (b) Disconnect the battery and attach a sign that shows OPEN FUEL TANKS - DO NOT CONNECT.
 - (c) Put a rope around the outboard section of the wing and attach signs that you can see clearly that show DANGER - OPEN FUEL TANKS.
 - (d) Make sure there is no remaining fuel in the surge tank.

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- 1) Put a 10 gallon (38 l) fuel resistant container, STD-200 below the sump drain valve for the surge tank.
- 2) Open the sump drain valve for the surge tank.
- 3) Let the remaining fuel flow into the 10 gallon (38 l) fuel resistant container, STD-200.

SUBTASK 28-13-31-010-002

- (3) Remove or open the applicable access panels:

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

To do this, do this task: Surge Tank Access Door - Removal, TASK 28-11-11-000-802.

SUBTASK 28-13-31-150-001

- (4) With sealant removal tools, remove the sealant from the area around the mounting flange for the flame arrestor [2].

HAP 001, 006, 007

SUBTASK 28-13-31-020-002

- (5) Remove the screws [6], nuts [4], and washers [5] that attach the flame arrestor [2].

HAP 002-005, 008-013, 015-026, 028-054, 101-999

SUBTASK 28-13-31-020-004

- (6) Remove the screws [6] and washers [5] that attach the flame arrestor [2].

HAP ALL

SUBTASK 28-13-31-020-003

- (7) Remove the flame arrestor [2] from the lower air vent stack [3].

————— **END OF TASK** —————

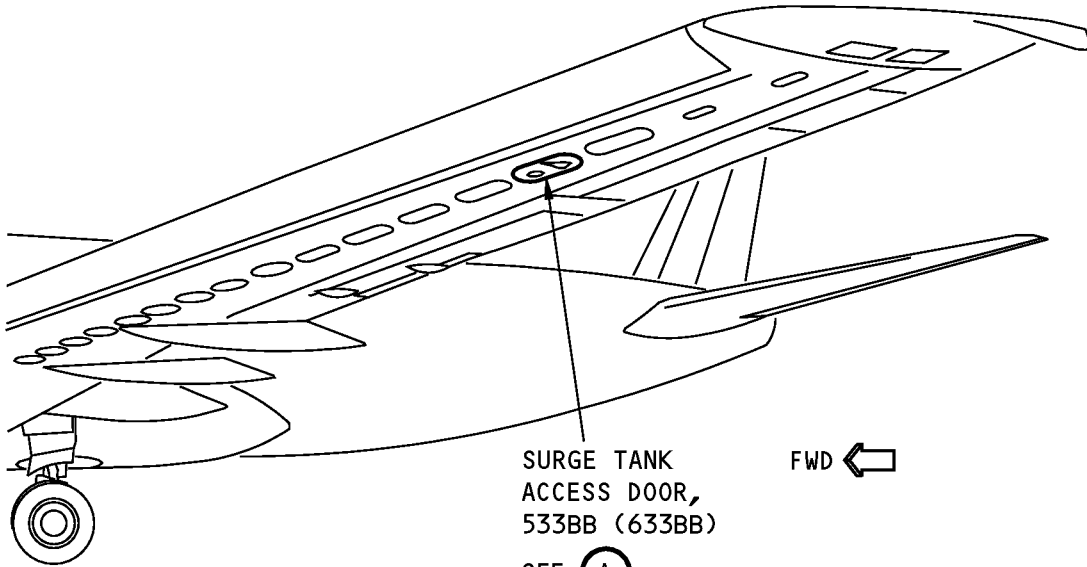
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HAP ALL

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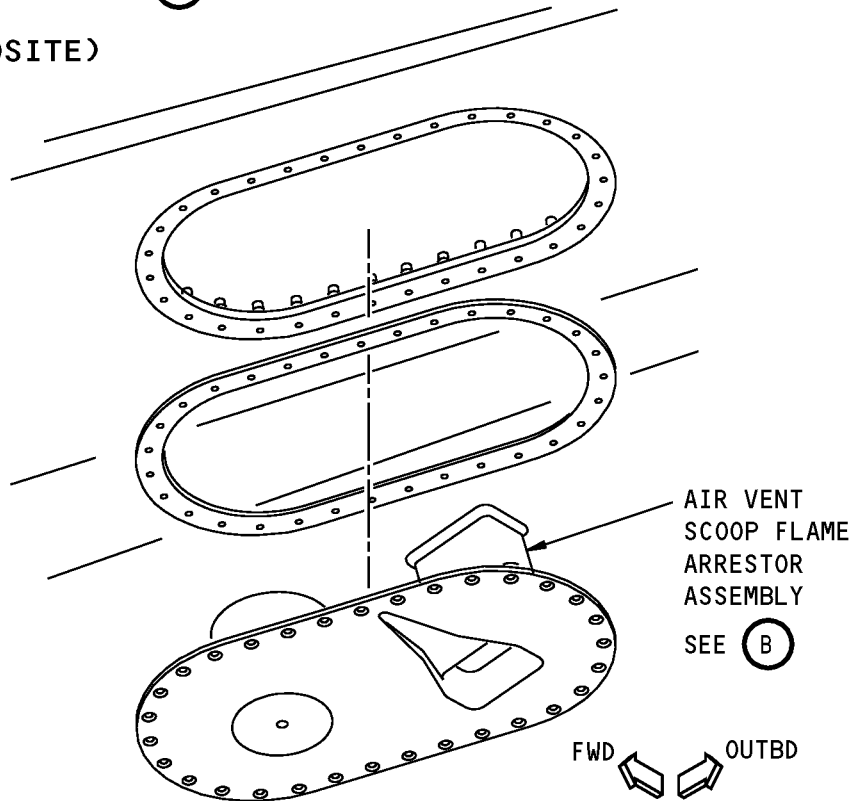
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**LEFT WING
(RIGHT WING IS OPPOSITE)**



SURGE TANK ACCESS DOOR

(A)

**Air Vent Scoop Flame Arrestor Installation
Figure 401 (Sheet 1 of 3)/28-13-31-990-802**

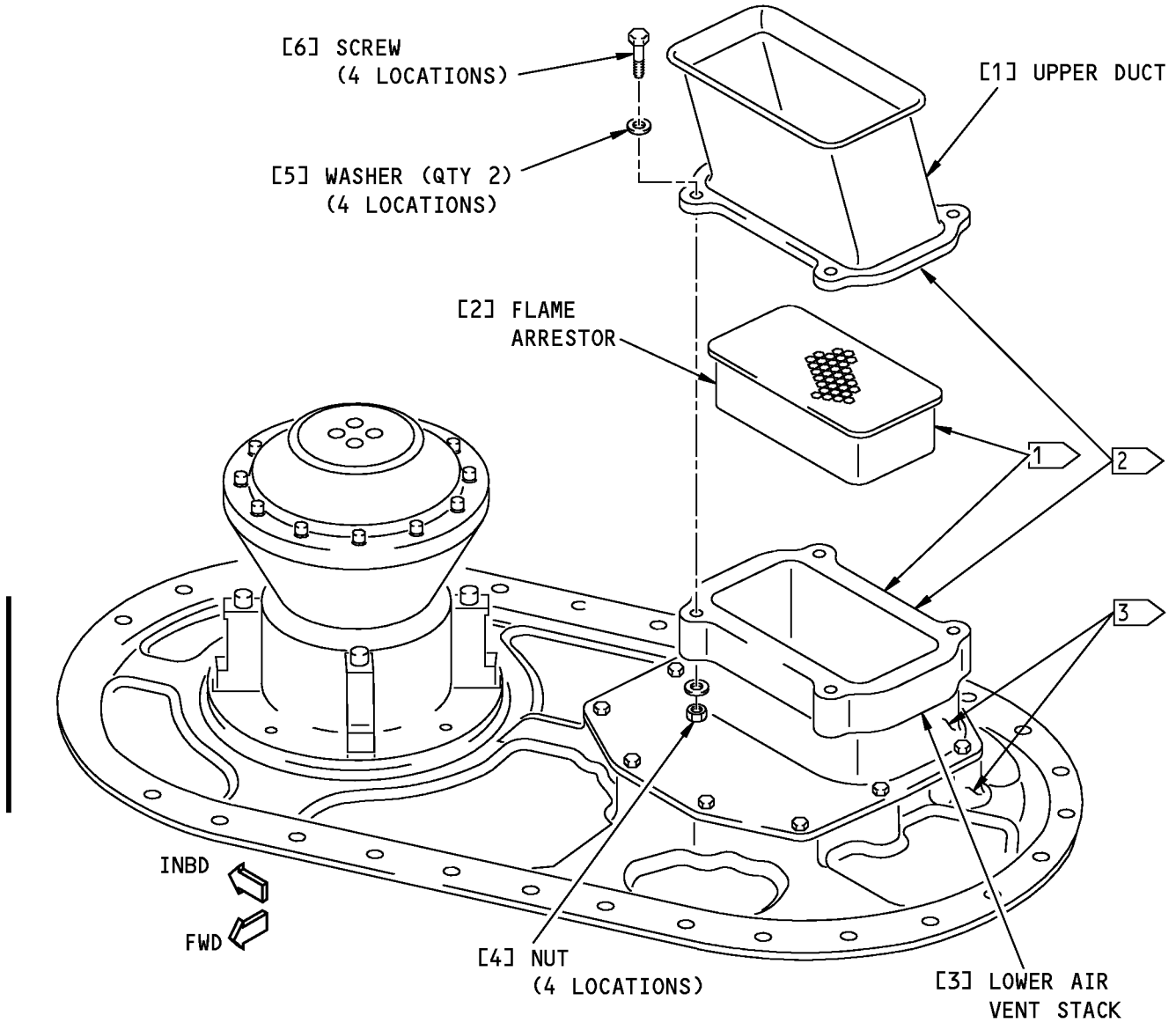
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AIR VENT SCOOP FLAME ARRESTOR ASSEMBLY

B

- 1 THE RESISTANCE FROM THE FLAME ARRESTOR TO THE FLANGE ON THE LOWER AIR VENT STACK IS 0.010 OHM OR LESS.
- 2 THE RESISTANCE FROM THE FLANGE ON THE LOWER AIR VENT STACK TO THE FLANGE ON THE UPPER DUCT IS 0.010 OHM OR LESS.
- 3 THE RESISTANCE FROM THE LOWER AIR VENT STACK TO THE SURGE TANK ACCESS DOOR IS 0.010 OHM OR LESS.

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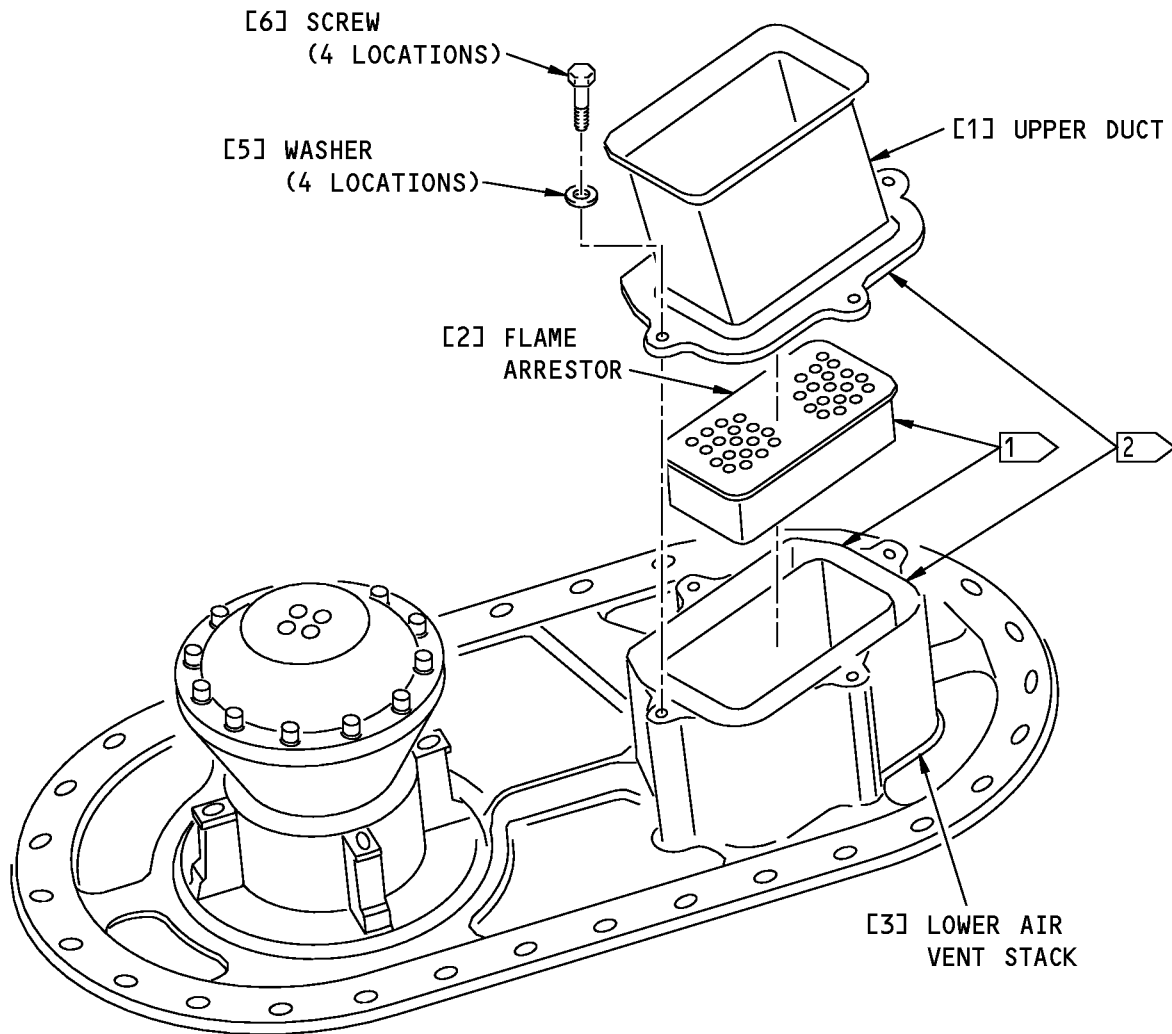
**Air Vent Scoop Flame Arrestor Installation
Figure 401 (Sheet 2 of 3)/28-13-31-990-802**

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INBD
 FWD

AIR VENT SCOOP FLAME ARRESTOR ASSEMBLY

(B)

- 1 THE RESISTANCE FROM THE FLAME ARRESTOR TO THE FLANGE ON THE LOWER AIR VENT STACK IS 0.010 OHM OR LESS.
- 2 THE RESISTANCE FROM THE FLANGE ON THE LOWER AIR VENT STACK TO THE FLANGE ON THE UPPER DUCT IS 0.010 OHM OR LESS.

1560850 S0000288819_V2

**Air Vent Scoop Flame Arrestor Installation
 Figure 401 (Sheet 3 of 3)/28-13-31-990-802**

EFFECTIVITY
 HAP 002-005, 008-013, 015-026, 028-054, 101-999

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TASK 28-13-31-400-801

3. Flame Arrestor Installation

(Figure 401)

A. References

Reference	Title
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-11-400-802	Surge Tank Access Door - Installation (P/B 401)
28-13-31-100-801	Air Vent Scoop Flame Arrestor Cleaning (P/B 701)
SWPM 20-20-00	Electrical Bonds and Grounds

B. Consumable Materials

Reference	Description	Specification
A00436	Sealant - Fuel Tank	BMS5-45 (Supersedes BMS 5-26)
A00767	Sealant - Fuel Tank	BMS5-45
B01013	Solvent - Final Cleaning Prior To Fuel Tank Sealing (AMM 20-30-93/201) - Series 93	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Flame arrestor	28-13-51-01-025	HAP ALL

D. Location Zones

Zone	Area
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

E. Access Panels

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

F. Procedure

SUBTASK 28-13-31-110-001

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) Remove the sealant with removal tools and clean the flanges with a clean, cotton wiper, G00034, and Series 93 solvent, B01013.

EFFECTIVITY HAP ALL

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SUBTASK 28-13-31-210-004

- (2) Make sure the cells of the flame arrestor [2] are not blocked to airflow.
 - (a) Clean the flame arrestor [2] if it is necessary (TASK 28-13-31-100-801).

SUBTASK 28-13-31-390-001

- (3) Apply a faying surface seal of the sealant, A00436, between these two surfaces (TASK 28-11-00-300-803):
 - (a) The upper surface of the flange of the lower air vent stack [3]
 - (b) The lower surface of the flange of the upper duct [1]

SUBTASK 28-13-31-390-003

- (4) Apply a thin layer of sealant, A00436, to the surfaces on the lower air vent stack [3] and the upper duct [1] that will touch the flame arrestor [2] (TASK 28-11-00-300-803).

SUBTASK 28-13-31-420-001

- (5) Install the flame arrestor [2] on the flange of the lower air vent stack [3].
 - (a) Put new washers [5] below the head of each screw [6].
 - (b) Install and tighten the screws [6] and washers [5] that attach the flame arrestor [2] to the lower air vent stack [3].

SUBTASK 28-13-31-280-001

- (6) Do a check of the electrical bond between the upper duct [1] and the flange on the lower air vent stack [3] (SWPM 20-20-00).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-17.

- (a) Make sure the resistance is 0.010 ohm (10 milliohms) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-17.

- (7) Do a check of the electrical bond between the flame arrestor [2] and the flange on the lower air vent stack [3] (SWPM 20-20-00).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-17.

- (a) Make sure the resistance is 0.010 ohm (10 milliohms) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-17.

HAP 001, 006, 007

- (8) Do a check of the electrical bond between the flange on the lower air vent stack [3] and the surge tank access door (SWPM 20-20-00).

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HAP 001, 006, 007 (Continued)

(a) Make sure the resistance is 0.010 ohm (10 milliohms) or less.

HAP ALL

SUBTASK 28-13-31-390-002

(9) After you apply the layer of the sealant, A00436, apply the sealant, A00767, or sealant, A00436, to make a fillet seal around the flange edge (Figure 401).

(a) Use a gun or a tube to apply the sealant (TASK 28-11-00-300-803).

SUBTASK 28-13-31-410-001

(10) Install or close the applicable access panels:

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

To do this, do this task: Surge Tank Access Door - Installation, TASK 28-11-11-400-802.

SUBTASK 28-13-31-860-003

(11) Connect the battery again, if you disconnected it before this step.

SUBTASK 28-13-31-080-001

(12) Remove all the warning signs that you installed before this step.

END OF TASK

EFFECTIVITY
HAP ALL

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AIR VENT SCOOP FLAME ARRESTOR - INSPECTION/CHECK

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains a functional check of the bonding resistance of the air vent scoop flame arrestor, lower air vent stack, and upper duct.

TASK 28-13-31-200-801

2. Air Vent Scoop - Bonding Resistance Check

(Figure 601)

A. General

- (1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
28-11-11-000-802	Surge Tank Access Door - Removal (P/B 401)
28-11-11-400-802	Surge Tank Access Door - Installation (P/B 401)
SWPM 20-20-00	Electrical Bonds and Grounds

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)
STD-200	Container - Fuel Resistant, 10 gallon (38 l)

D. Location Zones

Zone	Area
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

E. Access Panels

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

F. Prepare for the Procedure

SUBTASK 28-13-31-862-001

- (1) Make sure the airplane is correctly grounded to an approved and identified ground.

SUBTASK 28-13-31-210-005

- (2) Make sure there is no remaining fuel in the surge tank.
 - (a) Put a 10 gallon (38 l) fuel resistant container, STD-200, below the sump drain valve.

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HAP ALL	

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- (b) Open the applicable sump drain valve.
- (c) Let the remaining fuel flow into a 10 gallon (38 l) fuel resistant container, STD-200.

SUBTASK 28-13-31-010-004

- (3) Remove or open the applicable access panels:

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

To remove the access panel(s), do this task: Surge Tank Access Door - Removal, TASK 28-11-11-000-802.

G. Electrical Bonding Measurement

SUBTASK 28-13-31-765-001

- (1) Measure the electrical bonding resistance between the surge tank door and the lower air vent stack with a bonding meter, COM-1550 (SWPM 20-20-00).
 - (a) Make sure the resistance is 0.010 ohm (10 milliohms) or less.

SUBTASK 28-13-31-765-002

- (2) Measure the electrical bonding resistance between the flame arrestor and the flange on the lower air vent stack with a bonding meter, COM-1550 (SWPM 20-20-00).
 - (a) Make sure the resistance is 0.010 ohm (10 milliohms) or less.

HAP 001, 006, 007

SUBTASK 28-13-31-765-003

- (3) Measure the electrical bonding resistance between the flange on the lower air vent stack and the flange on the upper duct with a bonding meter, COM-1550 (SWPM 20-20-00).
 - (a) Make sure the resistance is 0.010 ohm (10 milliohms) or less.

HAP ALL

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-13-31-410-003

- (1) Install or close the applicable access panels:

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

To install the access panel(s), do this task: Surge Tank Access Door - Installation, TASK 28-11-11-400-802.

————— END OF TASK —————

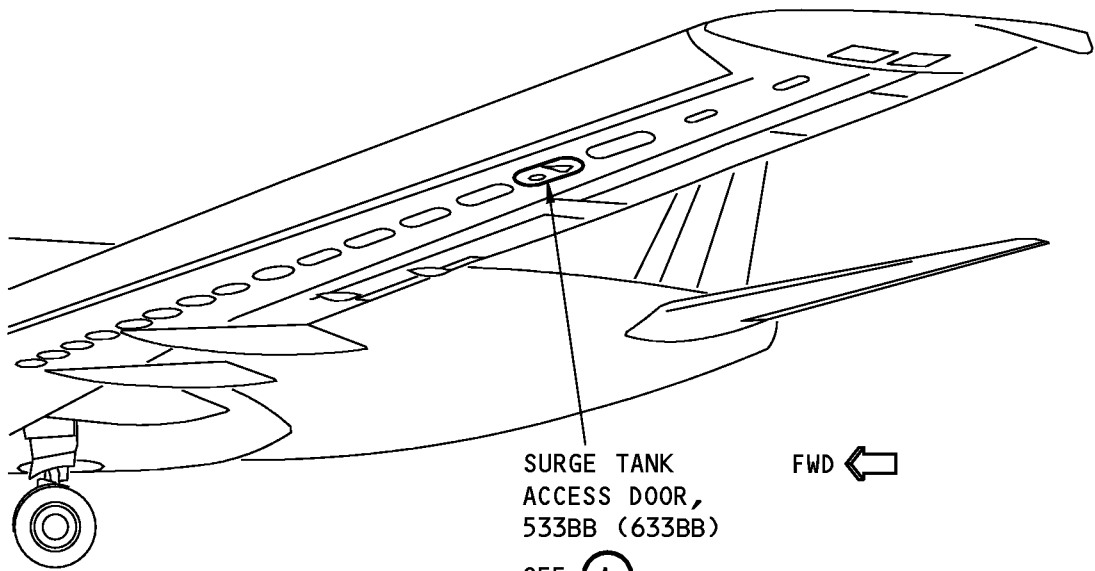
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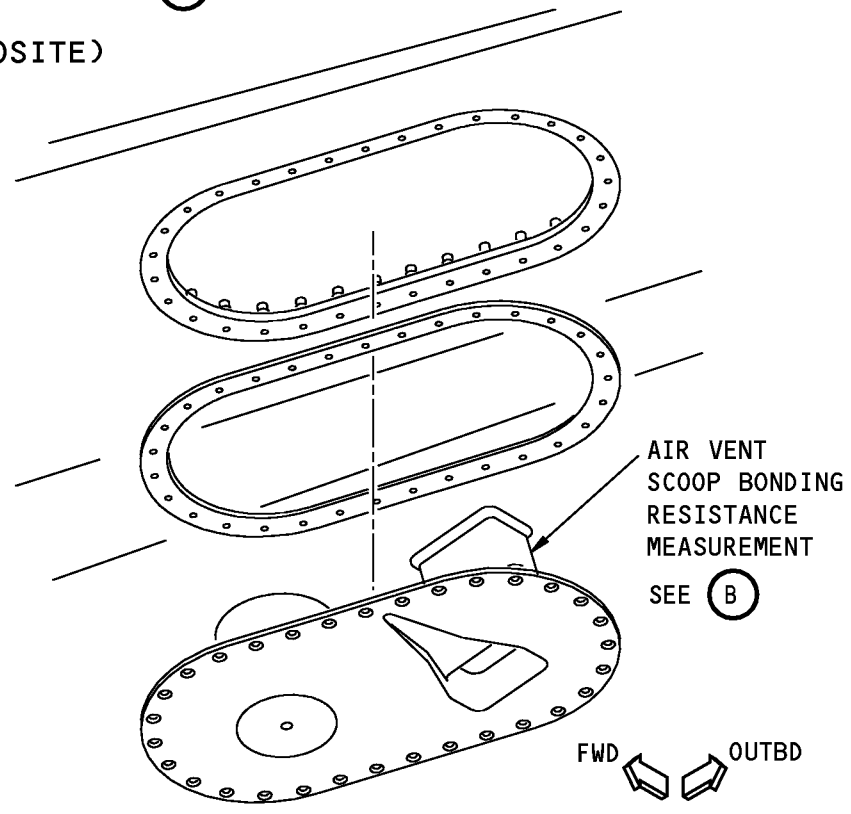


SURGE TANK
ACCESS DOOR,
533BB (633BB)

FWD ←

SEE (A)

LEFT WING
(RIGHT WING IS OPPOSITE)



AIR VENT
SCOOP BONDING
RESISTANCE
MEASUREMENT

SEE (B)

FWD OUTBD

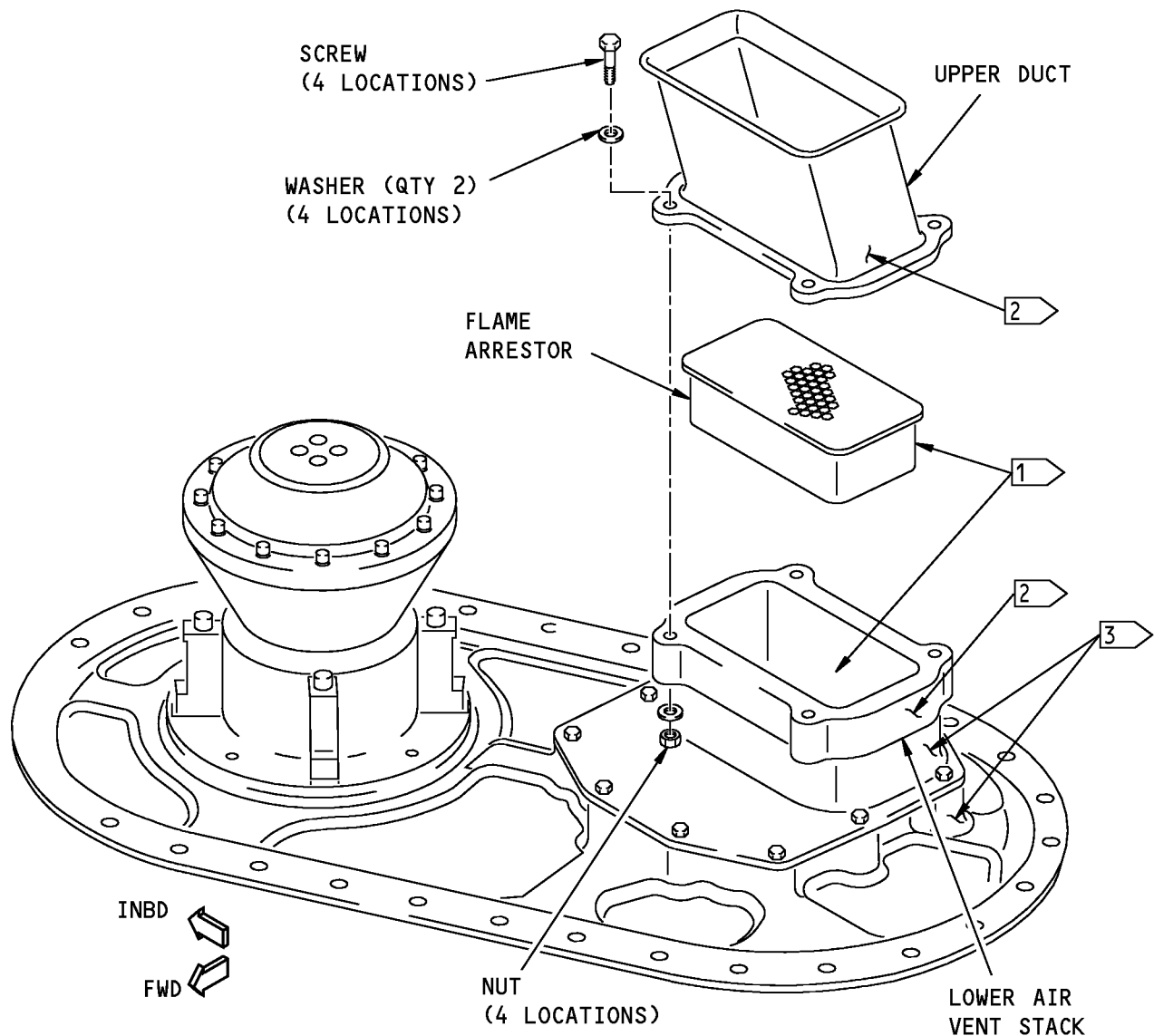
SURGE TANK ACCESS DOOR

(A)

Air Vent Scoop - Bonding Resistance Measurement
Figure 601 (Sheet 1 of 3)/28-13-31-990-803

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AIR VENT SCOOP BONDING RESISTANCE MEASUREMENT

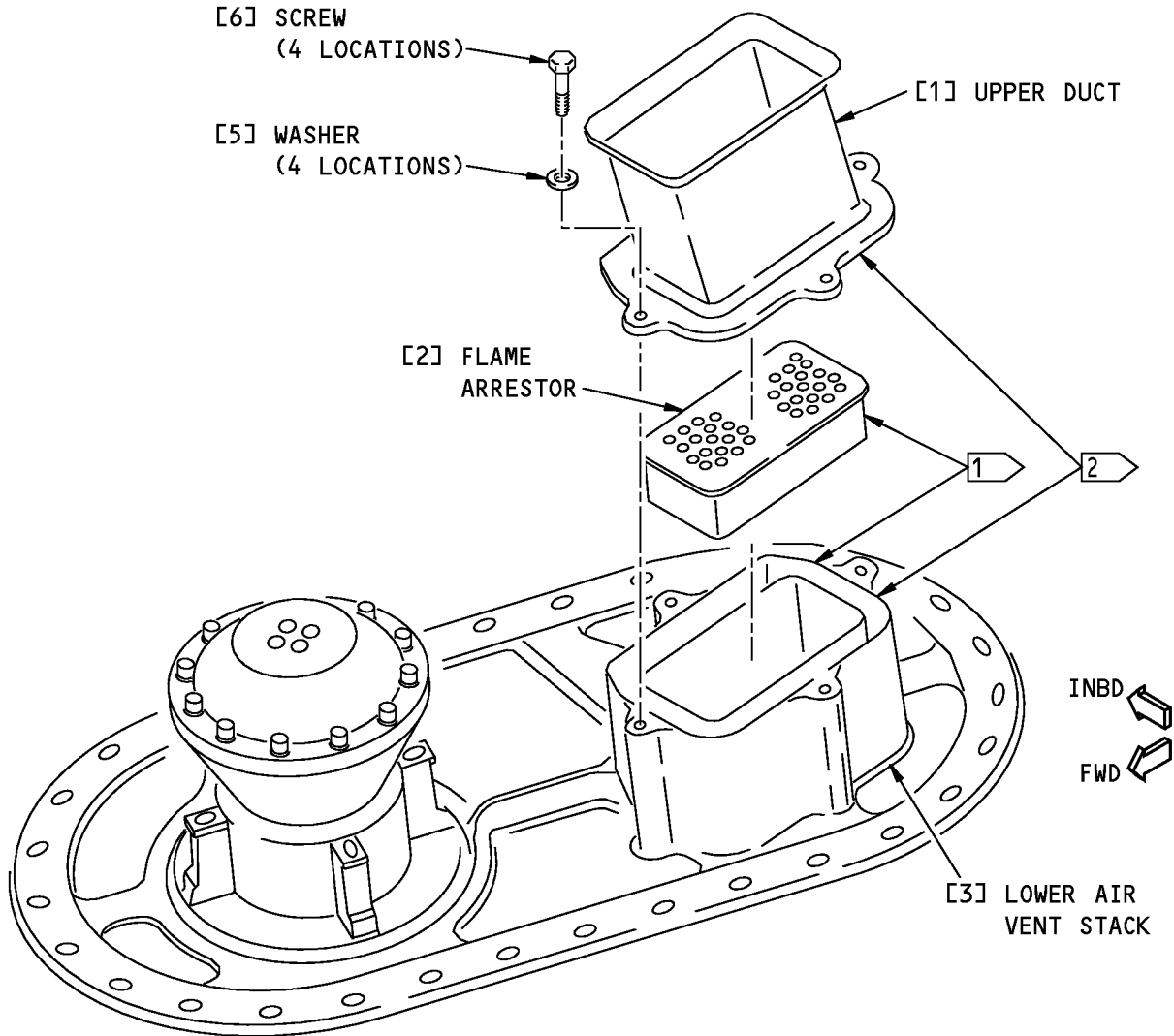
B

- 1 ELECTRICAL BONDING RESISTANCE MEASUREMENT FROM THE FLAME ARRESTOR TO THE FLANGE ON THE LOWER AIR VENT STACK.
- 2 ELECTRICAL BONDING RESISTANCE MEASUREMENT FROM THE FLANGE ON THE LOWER AIR VENT STACK TO THE FLANGE ON THE UPPER DUCT.
- 3 ELECTRICAL BONDING RESISTANCE MEASUREMENT FROM THE LOWER AIR VENT STACK TO THE SURGE TANK ACCESS DOOR.

Air Vent Scoop - Bonding Resistance Measurement
Figure 601 (Sheet 2 of 3)/28-13-31-990-803

EFFECTIVITY
HAP 001, 006, 007

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AIR VENT SCOOP BONDING RESISTANCE MEASUREMENT

(B)

- 1 THE RESISTANCE FROM THE FLAME ARRESTOR TO THE FLANGE ON THE LOWER AIR VENT STACK IS 0.010 OHM OR LESS.
- 2 THE RESISTANCE FROM THE FLANGE ON THE LOWER AIR VENT STACK TO THE FLANGE ON THE UPPER DUCT IS 0.010 OHM OR LESS.

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Air Vent Scoop - Bonding Resistance Measurement
Figure 601 (Sheet 3 of 3)/28-13-31-990-803

EFFECTIVITY
HAP 002-005, 008-013, 015-026, 028-054, 101-999

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AIR VENT SCOOP FLAME ARRESTOR - CLEANING/PAINTING

1. General

A. This procedure contains scheduled maintenance task data.

TASK 28-13-31-100-801

2. Air Vent Scoop Flame Arrestor Cleaning

(Figure 701)

A. General

(1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
28-11-11-000-802	Surge Tank Access Door - Removal (P/B 401)
28-11-11-400-802	Surge Tank Access Door - Installation (P/B 401)
28-13-31-000-801	Flame Arrestor Removal (P/B 401)
28-13-31-400-801	Flame Arrestor Installation (P/B 401)

C. Consumable Materials

Reference	Description	Specification
B00083	Solvent - Aliphatic Naphtha (For Acrylic Plastics)	TT-N-95 Type II, ASTM D-3735 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Flame arrestor	28-13-51-01-025	HAP ALL

E. Location Zones

Zone	Area
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

F. Access Panels

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

G. Procedure

SUBTASK 28-13-31-010-003

(1) Remove or open the applicable access panels:

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

To do this, do this task: Surge Tank Access Door - Removal, TASK 28-11-11-000-802.

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SUBTASK 28-13-31-211-001

- (2) Hold the surge tank access door up to a light and examine the flame arrestor [2] for unwanted particles and blocked holes.

SUBTASK 28-13-31-010-001

- (3) If there are unwanted particle or blocked holes, you must clean the flame arrestor [2].
 - (a) Do this task: Flame Arrestor Removal, TASK 28-13-31-000-801.

NOTE: It is possible to clean the flame arrestor without removing it from the vent stack. But it can be easier if it is removed from the vent stack.

- (b) Prepare a weak solution of water and detergent.
- (c) Clean the flame arrestor in the solution.
- (d) Dry the flame arrestor with an air gun.

SUBTASK 28-13-31-160-002

- (4) Clean the surfaces near the access panel opening with a clean cotton wiper, G00034 moist with solvent, B00083.

SUBTASK 28-13-31-160-003

- (5) Clean surfaces of access panel which will touch airplane skin with a clean cotton wiper, G00034 moist with solvent, B00083.

SUBTASK 28-13-31-210-002

- (6) Examine the open tank for unwanted objects, for example tools, broken pieces of metal, and other unwanted material.

SUBTASK 28-13-31-160-004

- (7) Clean the open tank, if it is necessary.

SUBTASK 28-13-31-210-003

- (8) If you removed the flame arrestor [2] for this procedure, do this task: Flame Arrestor Installation, TASK 28-13-31-400-801.

SUBTASK 28-13-31-410-002

- (9) Install or close the applicable access panels:

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

To do this, do this task: Surge Tank Access Door - Installation, TASK 28-11-11-400-802.

————— **END OF TASK** —————

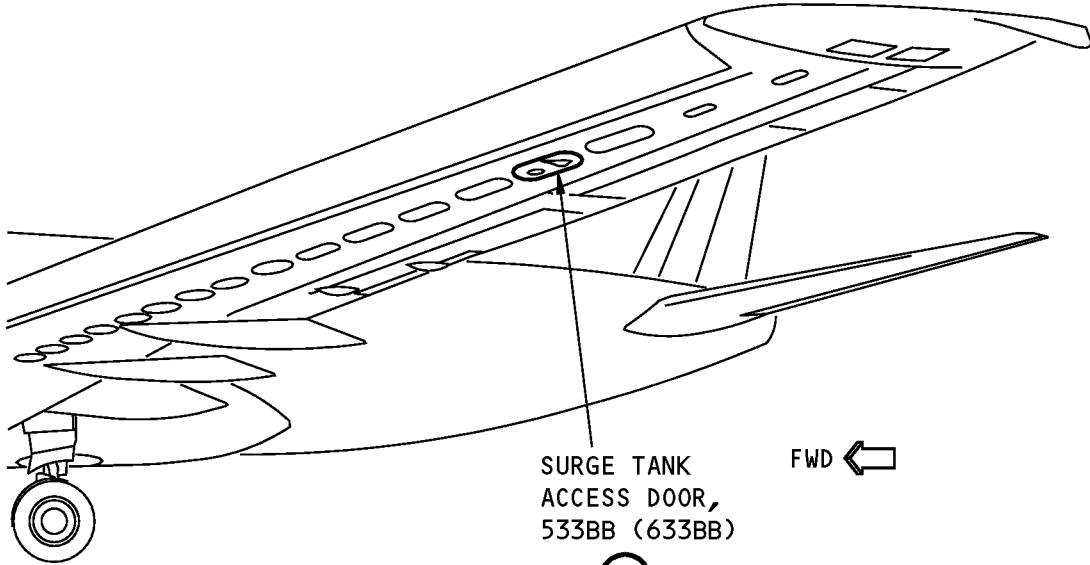
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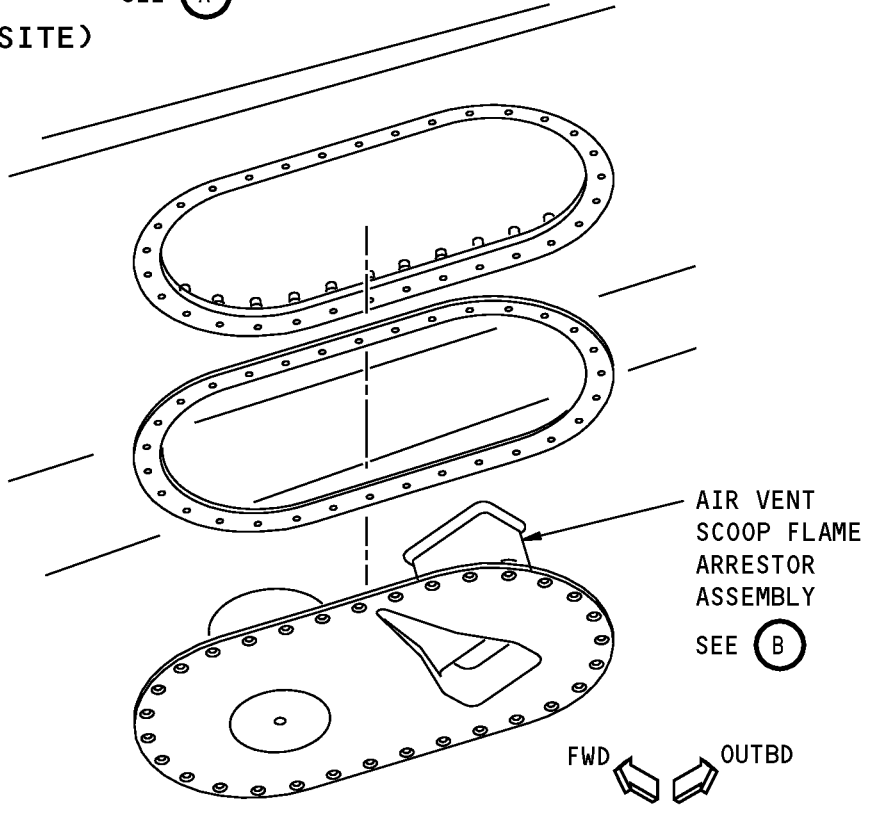


SURGE TANK
ACCESS DOOR,
533BB (633BB)

FWD ←

LEFT WING
(RIGHT WING IS OPPOSITE)

SEE (A)



AIR VENT
SCOOP FLAME
ARRESTOR
ASSEMBLY

SEE (B)

FWD →
OUTBD →

SURGE TANK ACCESS DOOR

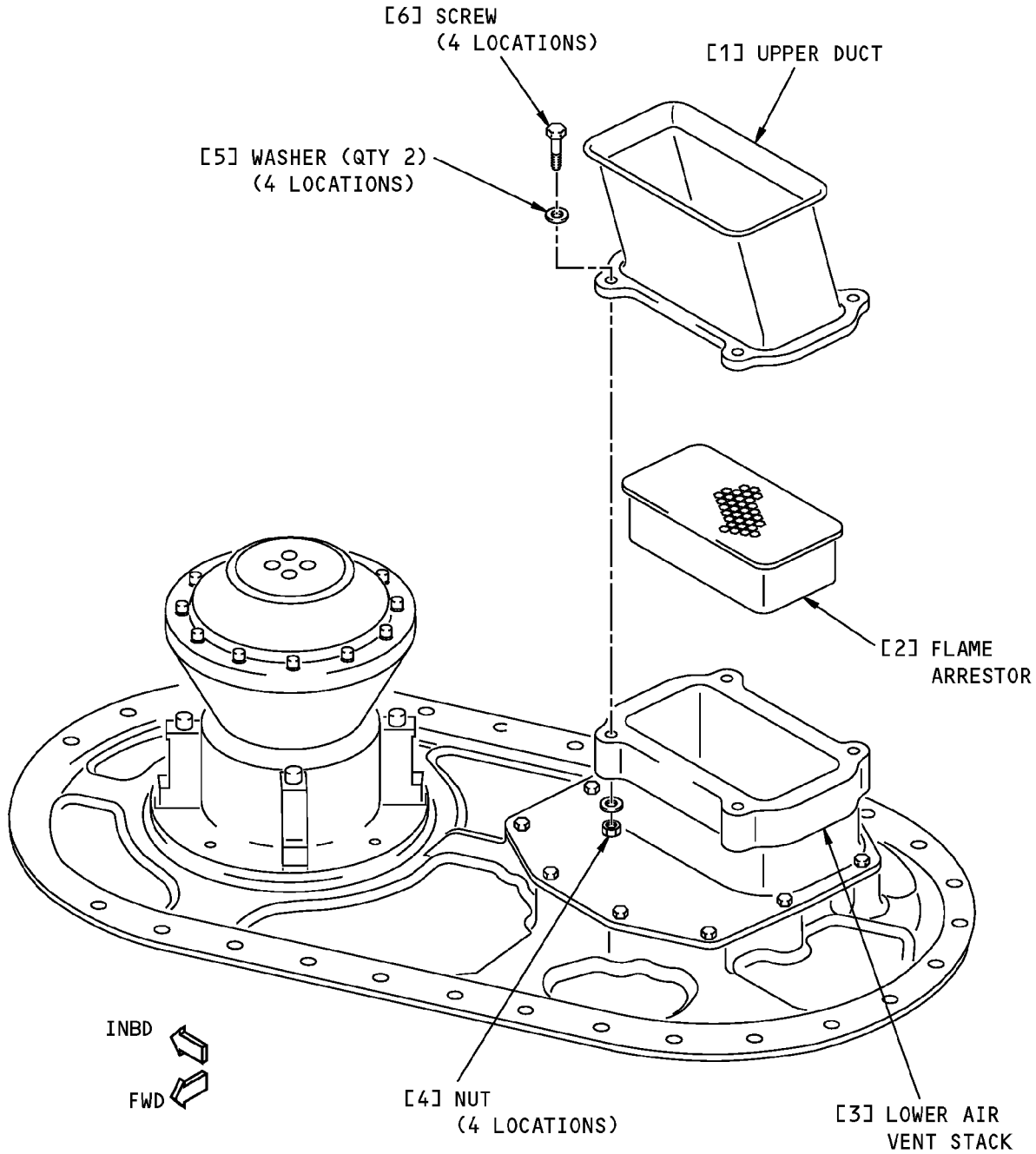
(A)

**Air Vent Scoop Flame Arrestor
Figure 701 (Sheet 1 of 2)/28-13-31-990-801**

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AIR VENT SCOOP FLAME ARRESTOR ASSEMBLY

(B)

**Air Vent Scoop Flame Arrestor
Figure 701 (Sheet 2 of 2)/28-13-31-990-801**

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SURGE TANK PRESSURE RELIEF VALVE - REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks:
 - (1) A task to remove the pressure relief valve
 - (2) A task to install the relief valve
- B. It is not necessary to remove the valve to make sure that the valve operates at the correct pressure difference.

TASK 28-13-41-000-801

2. Pressure Relief Valve Removal

(Figure 401)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-13-41-400-802	Pressure Relief Valve - Manual Operation (P/B 601)

B. Tools/Equipment

Reference	Description
STD-200	Container - Fuel Resistant, 10 gallon (38 l)

C. Location Zones

Zone	Area
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

D. Access Panels

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

E. Procedure

SUBTASK 28-13-41-650-001

WARNING: DO ALL THE SAFETY PROCEDURES TO DEFUEL THE TANK AND TO GO INTO IT. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF YOU DO NOT FOLLOW THE SAFETY PROCEDURES.

- (1) Defuel the applicable tank and prepare to go into it (TASK 28-11-00-910-802).

SUBTASK 28-13-41-680-001

- (2) Make sure there is no remaining fuel in the surge tank.
 - (a) Put a 10 gallon (38 l) fuel resistant container, STD-200 below the sump drain valve.
 - (b) Open the applicable sump drain valve.
 - (c) Let the remaining fuel flow into a 10 gallon (38 l) fuel resistant container, STD-200.

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SUBTASK 28-13-41-860-001

WARNING: MAKE SURE THAT THE RELIEF VALVE IS OPEN BEFORE YOU REMOVE THE ACCESS PANEL. THE SPRING THAT HOLDS THE VALVE CLOSED IS VERY STRONG. IF THE RELIEF VALVE OPENS SUDDENLY, IT CAN CAUSE INJURIES TO PERSONNEL.

- (3) Use a screwdriver to put the relief valve into the open position if it is not open (TASK 28-13-41-400-802).

SUBTASK 28-13-41-010-001

- (4) Remove the applicable access doors from the surge tank:
(TASK 28-11-11-000-801)

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

SUBTASK 28-13-41-020-001

- (5) Remove the eight mounting bolts that attach the pressure relief valve [1] to the access panel (Figure 401).

SUBTASK 28-13-41-020-002

- (6) Remove the pressure relief valve [1] from the access panel.

SUBTASK 28-13-41-020-003

- (7) Remove the O-ring seal [2] from the flange groove.

SUBTASK 28-13-41-020-004

- (8) Discard the O-ring seal [2].

————— **END OF TASK** —————

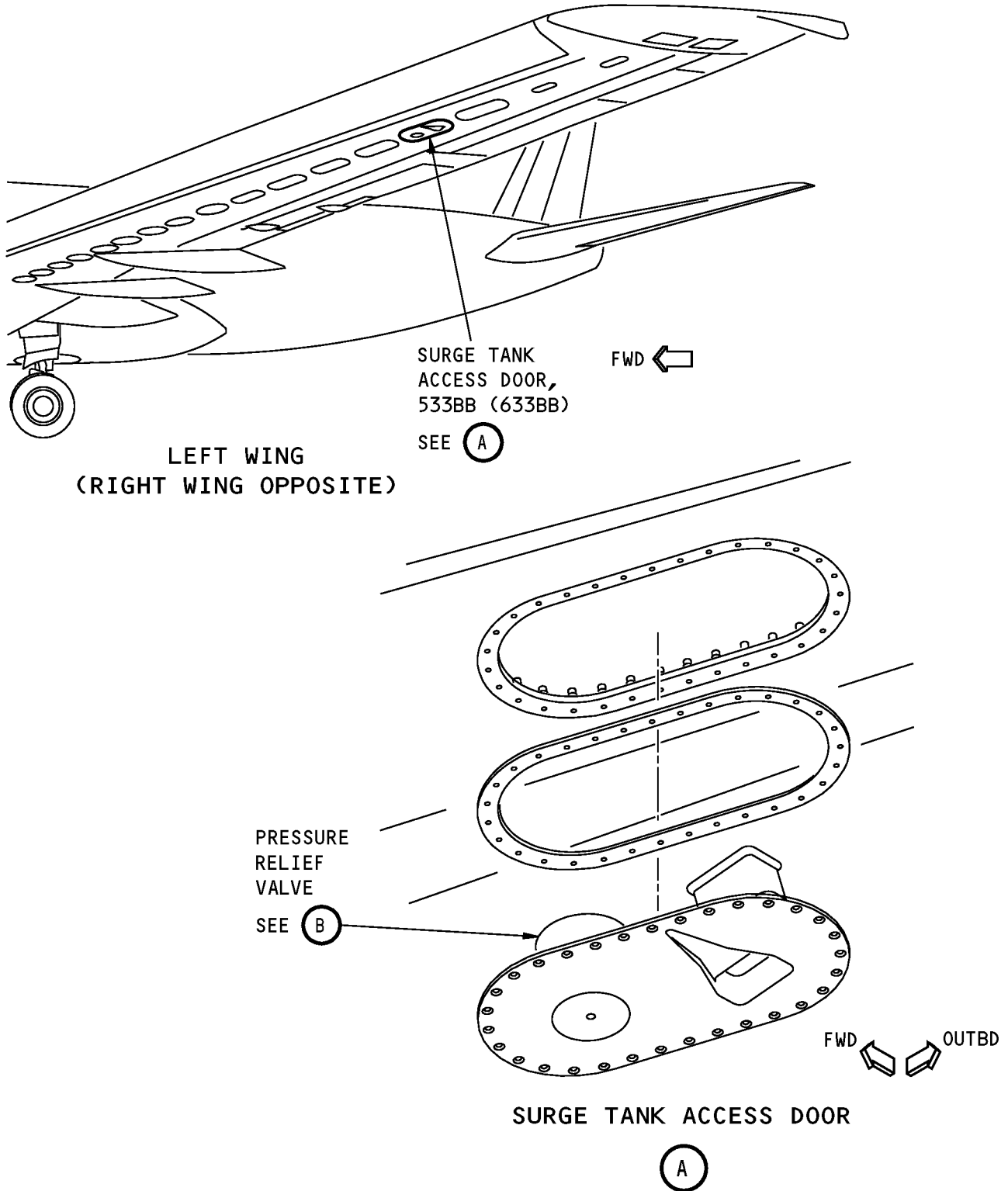
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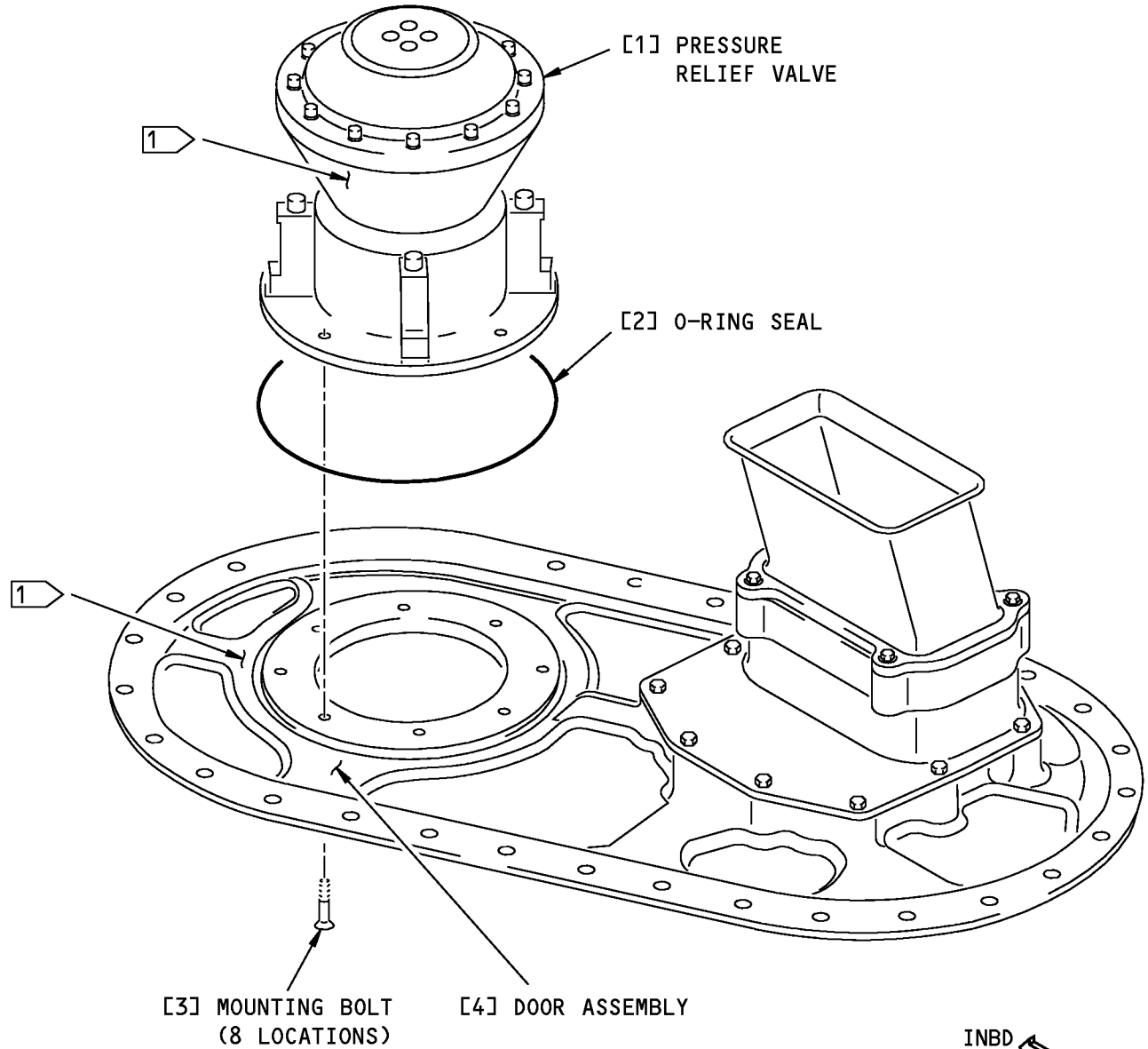
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**Surge Tank Pressure Relief Valve Installation
Figure 401 (Sheet 1 of 2)/28-13-41-990-801**

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PRESSURE RELIEF VALVE

(B)

1 THE RESISTANCE FROM THE PRESSURE RELIEF VALVE TO THE DOOR ASSEMBLY IS 10 MILLIOHMS OR LESS.

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**Surge Tank Pressure Relief Valve Installation
Figure 401 (Sheet 2 of 2)/28-13-41-990-801**

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TASK 28-13-41-400-801

3. Pressure Relief Valve Installation

(Figure 401)

A. References

Reference	Title
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-13-41-200-801	Pressure Relief Valve Pressure Check (P/B 601)
28-13-41-400-802	Pressure Relief Valve - Manual Operation (P/B 601)
SWPM 20-20-00	Electrical Bonds and Grounds

B. Consumable Materials

Reference	Description	Specification
B00083	Solvent - Aliphatic Naphtha (For Acrylic Plastics)	TT-N-95 Type II, ASTM D-3735 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Pressure relief valve	28-13-41-01-020	HAP 001-013, 015-026, 028-030
2	O-ring seal	28-13-41-01A-025	HAP 031-054, 101-999
		28-13-41-01-015	HAP 001-013, 015-026, 028-030
		28-13-41-01A-020	HAP 031-054, 101-999

D. Location Zones

Zone	Area
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

E. Access Panels

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

F. Procedure

SUBTASK 28-13-41-860-002

WARNING: MAKE SURE THE RELIEF VALVE IS OPEN WHEN YOU HOLD IT, MOVE IT, OR KEEP IT FOR A SUBSEQUENT INSTALLATION. THE DEVICE THAT OPENS THE VALVE CONTAINS A STRONG SPRING THAT CAN CAUSE INJURY TO YOUR FINGERS.

- (1) If the pressure relief valve is closed, use a screwdriver to open the pressure relief valve manually (TASK 28-13-41-400-802).

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SUBTASK 28-13-41-110-001

- (2) Fully clean these surfaces with a clean, cotton wiper, G00034, moist with solvent, B00083, and dry them:
 - (a) The O-ring groove on the pressure relief valve
 - (b) The mating surface of the pressure relief valve
 - (c) The mating surface of the access panel.

SUBTASK 28-13-41-420-001

- (3) Install a new O-ring seal [2], lightly lubricated with fuel, in the groove on the flange on the pressure relief valve.

SUBTASK 28-13-41-420-002

- (4) Put the pressure relief valve [1] in its correct position on the access panel.

SUBTASK 28-13-41-420-003

- (5) Attach the pressure relief valve [1] to the access panel with the 8 mounting bolts [3].

SUBTASK 28-13-41-420-004

- (6) Tighten the mounting bolts [3] equally and smoothly to a torque of 32.5 ± 2.5 in-lb (3.7 ± 0.3 N·m).

SUBTASK 28-13-41-765-001

- (7) Measure the resistance from the pressure relief valve [1] to the door assembly [4] (SWPM 20-20-00).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- (a) Make sure the resistance is 0.01 ohm (10 milliohms) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

SUBTASK 28-13-41-410-001

- (8) (TASK 28-11-11-400-801).

To install this access panel:

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679

or close this access panel:

<u>Number</u>	<u>Name/Location</u>
633BB	Surge Tank Access Door - Wing Station 679

SUBTASK 28-13-41-860-003

- (9) Pull the T-handle to close the pressure relief valve manually (TASK 28-13-41-400-802).

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SUBTASK 28-13-41-710-001

(10) Do this task: Pressure Relief Valve Pressure Check, TASK 28-13-41-200-801.

NOTE: You do not have to do this test if a new or servicable relief valve is installed.

————— **END OF TASK** —————

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SURGE TANK FLAME ARRESTOR PRESSURE RELIEF VALVE - INSPECTION/CHECK

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure has three tasks:
 - (1) Pressure relief valve - manual operation.
 - (2) The pressure check of the pressure relief valve.
 - (3) Pressure relief valve - bonding resistance check.
- C. If you open the relief valve, air will not go through the air vent scoop in the fuel vent system. The air usually goes out of the fuel vent system through the air vent scoop. Too much internal pressure or too much external pressure opens the valve. If the valve is open, you must close it manually.
- D. You can do a check of the pressure necessary to open the valve with the valve installed in the airplane. You can do this check with special equipment attached to the external airplane skin.
- E. You can do a bonding resistance check to make sure the electrical fay bonding surface between the pressure relief valve and the structure is within operational limits.

TASK 28-13-41-400-802

2. Pressure Relief Valve - Manual Operation

(Figure 601)

A. Location Zones

Zone	Area
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

B. Access Panels

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

C. Procedure

SUBTASK 28-13-41-210-001

- (1) Do a check to see if the relief valve is open.
 - (a) These are the access panels that contain the relief valve (Figure 601).

Find this access panel:

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679

or open this access panel:

Number	Name/Location
633BB	Surge Tank Access Door - Wing Station 679

- (b) Find the relief valve installed in the access panel.
- (c) If the valve is open, the T-handle is in the up position.

EFFECTIVITY HAP ALL

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SUBTASK 28-13-41-440-001

(2) Open the pressure relief valve manually (Figure 601).

(a) Put a small screwdriver into the pressure sense hole on this access panel:

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679

or open this access panel:

<u>Number</u>	<u>Name/Location</u>
633BB	Surge Tank Access Door - Wing Station 679

(b) Push up on the screwdriver.

(c) Make sure the pressure relief valve opens.

NOTE: There is a loud noise and the pressure relief valve moves away from the screwdriver when the pressure relief valve opens.

(d) Remove the screwdriver from the pressure sense hole.

SUBTASK 28-13-41-860-004

(3) To close the pressure relief valve, pull the T-handle down until the pressure relief valve closes.

————— **END OF TASK** —————

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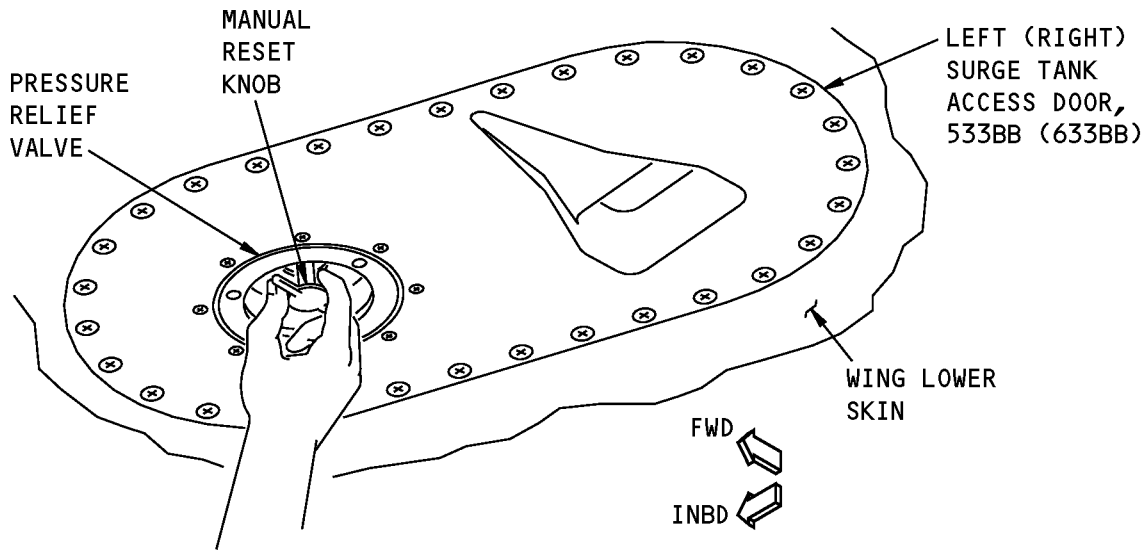
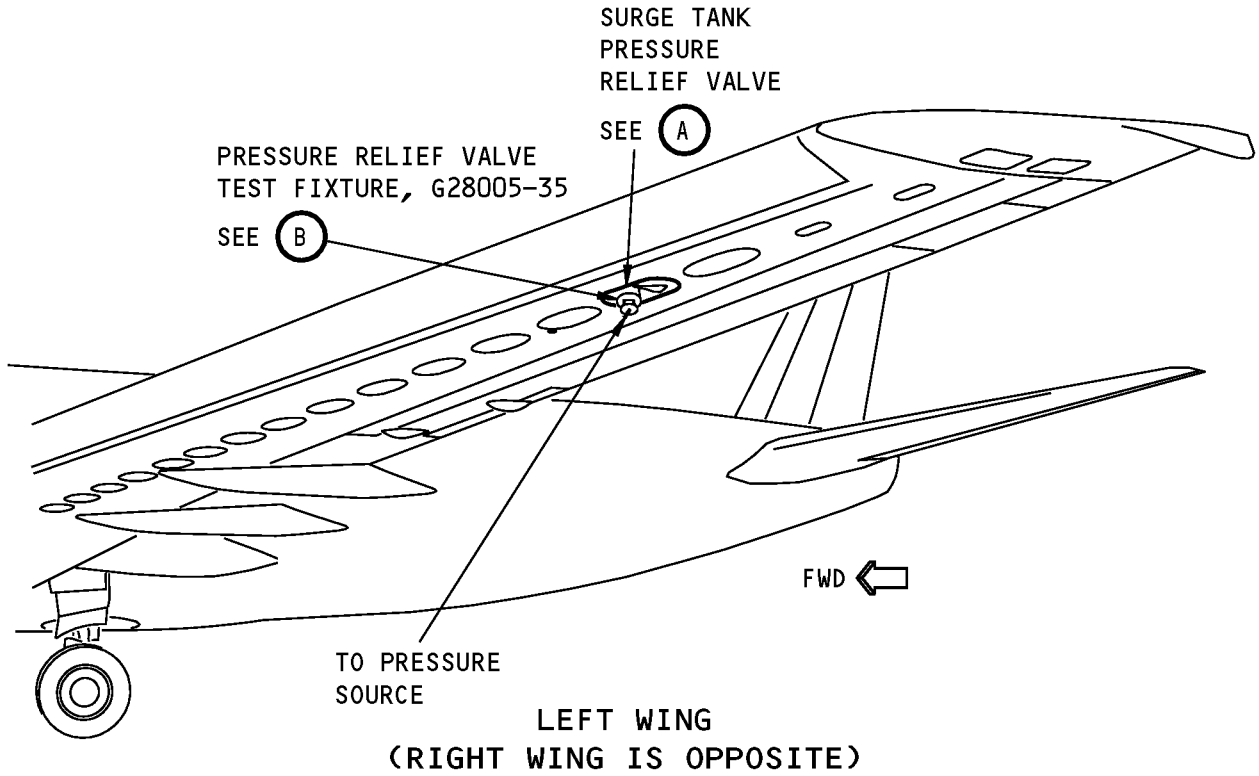
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**SURGE TANK PRESSURE RELIEF VALVE
(MANUAL RESET)**

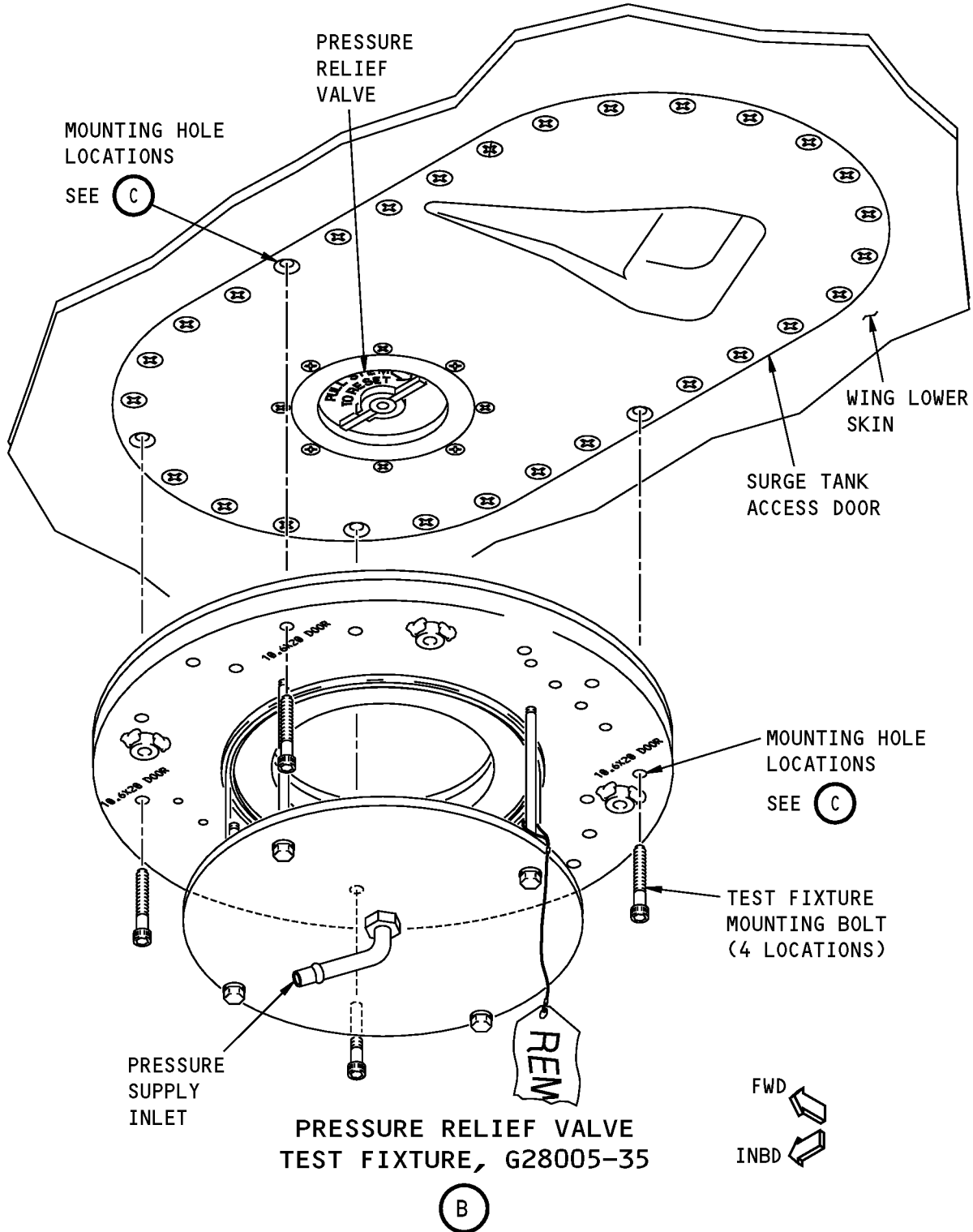
(A)

**Surge Tank Pressure Relief Valve Inspection with Test Fixture, G28005-35
Figure 601 (Sheet 1 of 3)/28-13-41-990-802**

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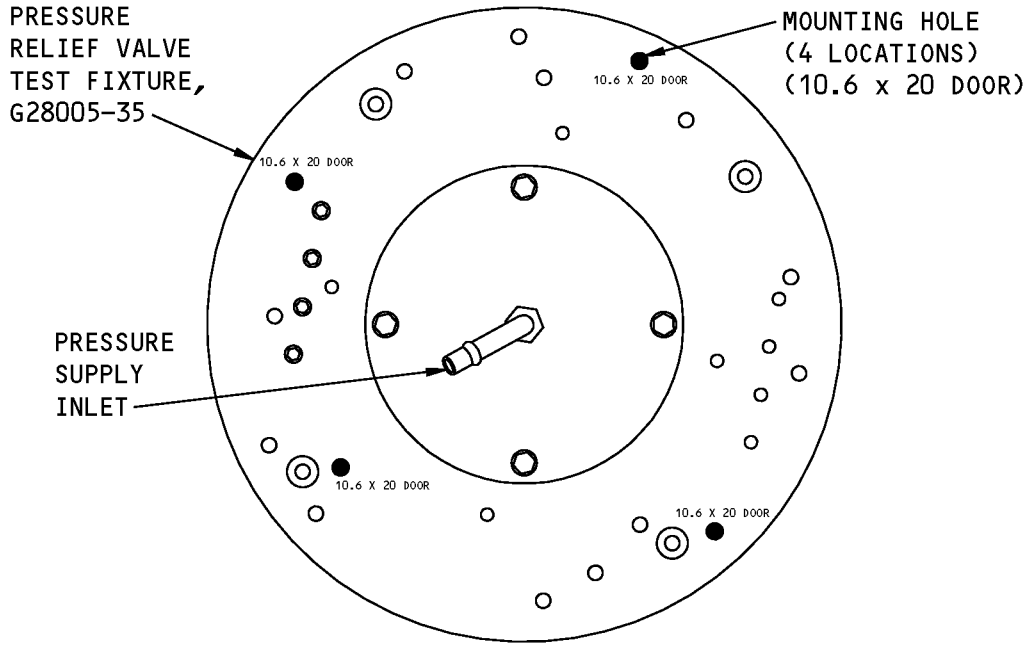


**Surge Tank Pressure Relief Valve Inspection with Test Fixture, G28005-35
Figure 601 (Sheet 2 of 3)/28-13-41-990-802**

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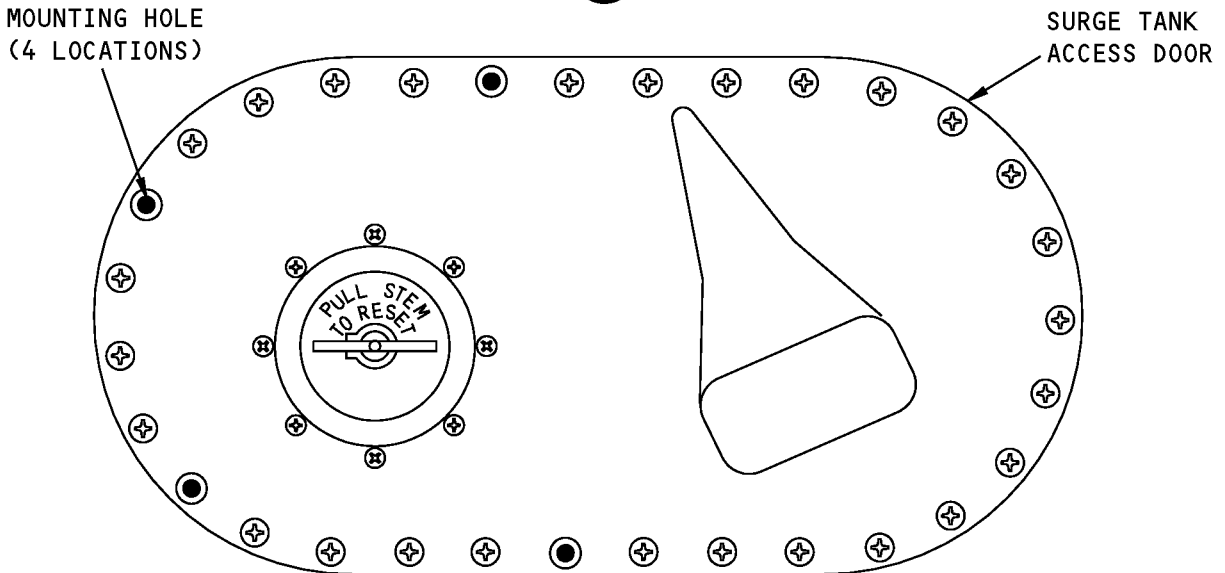
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**MOUNTING HOLE LOCATIONS
(TEST FIXTURE, G28005-35)**

(C)



**MOUNTING HOLE LOCATIONS
(SURGE TANK ACCESS DOOR)**

(C)

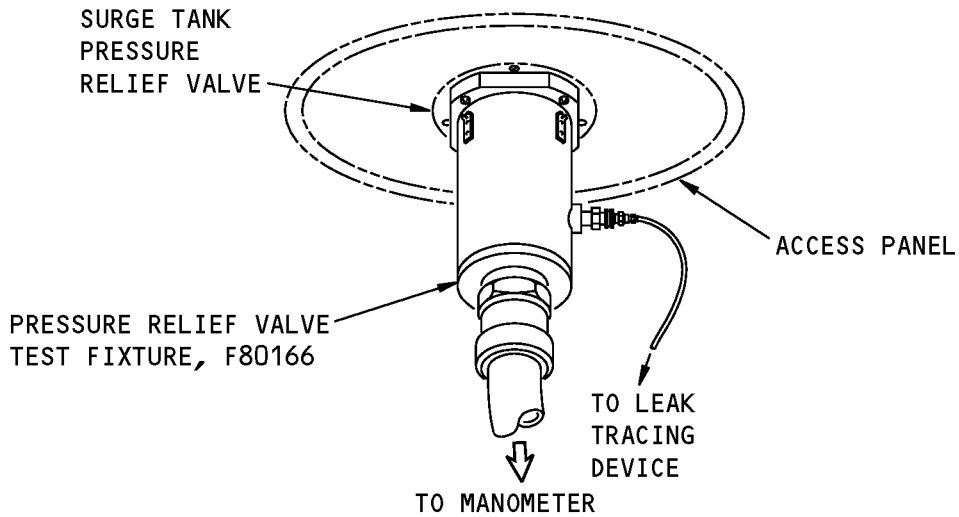
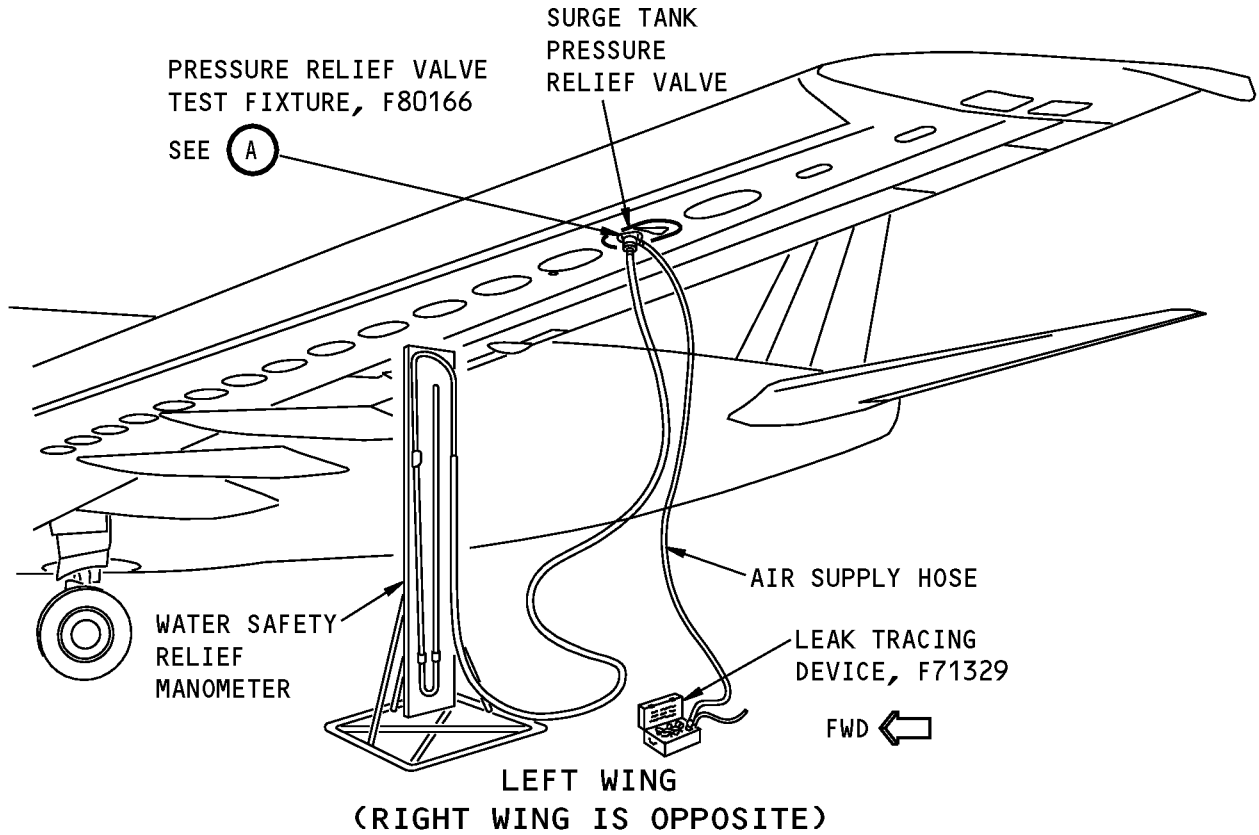
**Surge Tank Pressure Relief Valve Inspection with Test Fixture, G28005-35
Figure 601 (Sheet 3 of 3)/28-13-41-990-802**

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**PRESSURE RELIEF VALVE
TEST FIXTURE, F80166**

(A)

**Surge Tank Pressure Relief Valve Inspection with Test Fixture, F80166
Figure 602/28-13-41-990-803**

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TASK 28-13-41-200-801

3. Pressure Relief Valve Pressure Check

(Figure 601, Figure 602)

A. General

- (1) This procedure is a scheduled maintenance task.
- (2) If a pressure gage is used, it must have an accuracy of +/- .018 psig (+/- 0.5 inches of water) (+/- 0.12 kPa). One pressure gage that satisfies these requirements is the DigiMano 2000, available from Netech Corporation, 60 Bethpage Drive, Hicksville, NY 11801, USA. A pressure gage of less accuracy can be used if the results can be shown to satisfy the requirements in this procedure within a margin that accounts for the additional margin of error.

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
SPL-1774	Manometer - Water, Test Equipment (Part #: F72951-1, Supplier: 81205, A/P Effectivity: 737-100, -200, -200C, -300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-3899	Fixture - Test, Pressure Relief, Flame Arrestor Surge Tank (Part #: F80166-1, Supplier: 81205, A/P Effectivity: 737-200, -200C, -300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-8420	Check Fixture Equipment - Pressure Relief Valve (Part #: G28005-48, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Opt Part #: G28005-35, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Opt Part #: G28005-42, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
STD-1084	Gauge - Pressure, 0-10 PSIG (0-69 KPa)
STD-3939	Air Source - Regulated, Dry Filtered, 0 to 10 psig (0 to 69 kPa)
STD-3944	Vacuum Source 0 to -3.00 psig

C. Location Zones

Zone	Area
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

D. Access Panels

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

E. Prepare for the Pressure Check

SUBTASK 28-13-41-210-002

- (1) Make sure the pressure relief valve is closed.

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SUBTASK 28-13-41-440-002

- (2) If the pressure relief valve is open, pull down the T-handle to close the pressure relief valve(TASK 28-13-41-400-802).

SUBTASK 28-13-41-480-001

- (3) To install the pressure relief valve equipment, SPL-8420, on the relief valve (Figure 601), do these steps:
- (a) Remove the four bolts for the applicable access doors:

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

- (b) Put the test fixture against the pressure relief valve.
- 1) Make sure the O-ring seal is installed in the flange groove of the test fixture.
 - 2) Make sure the O-ring has a good seal in all positions.
- (c) Attach the test fixture to the relief valve.

NOTE: There are two sets of holes in the fixture for the mounting bolts. One set of holes is to be used on the left surge tank access door. The other set of holes is to be used on the right surge tank access door.

- 1) Put four bolts of the test fixture in the positions of the four mounting bolts for the access door that you removed.

SUBTASK 28-13-41-420-005

- (4) To install the fixture, SPL-3899, do these steps:

- (a) Remove four of the eight mounting screws which attach the relief valve to the access panel.
- 1) Remove these screws and make sure the remaining screws have equal angles of 90 degrees between them.

NOTE: The remaining screws are the corners of a square.

- (b) Put the fixture, SPL-3899, against the relief valve.

NOTE: The MS29513-154 O-ring seal is part of the test fixture assembly.

- 1) Make sure the O-ring has a good seal in all positions.

- (c) Attach the test fixture to the relief valve.

NOTE: The MS16998-31 screws are part of the test fixture assembly.

- 1) Put four MS16998-31 screws in the positions of the four mounting screws that you removed before this step.

SUBTASK 28-13-41-420-006

- (5) Connect water manometer, SPL-1774, (or equivalent) or the pressure gauge (0-10 PSIG) (0-69 KPa), STD-1084, to the 0 to 10 psig (0 to 69 kPa) dry filtered regulated air source, STD-3939, to monitor the pressure.

NOTE: If a pressure gage is used make sure it has sufficient accuracy.

SUBTASK 28-13-41-480-002

- (6) Connect the 0 to 10 psig (0 to 69 kPa) dry filtered regulated air source, STD-3939, to the test fixture.

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F. Pressure Check Procedure

SUBTASK 28-13-41-780-001

(1) Slowly and continuously supply a positive pressure of more than 1 psig (6.89 kPa) (27.7 inches of water) from an air source (0 psig (0 kPa) - 10 psig (69 kPa), which is regulated).

(a) Make sure the pressure relief valve [1] opens at a pressure between 1 psig (6.89 kPa) (27.7 inches of water) and 1.25 psig (8.62 kPa) (34.6 inches of water).

SUBTASK 28-13-41-080-001

(2) Put the pressure to 0 psig (0 kPa).

SUBTASK 28-13-41-080-002

(3) Remove the 0 to 10 psig (0 to 69 kPa) dry filtered regulated air source, STD-3939.

SUBTASK 28-13-41-080-003

(4) Remove the pressure relief valve equipment, SPL-8420, or fixture, SPL-3899.

SUBTASK 28-13-41-440-003

(5) Pull the T-handle to close the relief valve manually, do this task: Pressure Relief Valve - Manual Operation, TASK 28-13-41-400-802.

SUBTASK 28-13-41-480-003

(6) Install the test fixture on the pressure relief valve again.

SUBTASK 28-13-41-780-002

(7) Install a 0 to -3.00 psig vacuum source, STD-3944, on the test fixture.

SUBTASK 28-13-41-720-001

(8) Decrease the pressure (increase the suction) on the test fixture until the relief valve opens.

(a) Make sure the pressure relief [1] valve opens at a pressure between -2.5 psig (-17.24 kPa) and -2.75 psig (-18.96 kPa) (-69.25 and -76.18 inches of water).

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-13-41-860-005

(1) Set the pressure on the 0 to -3.00 psig vacuum source, STD-3944, to 0 psig (0 kPa).

SUBTASK 28-13-41-080-004

(2) Remove the 0 to -3.00 psig vacuum source, STD-3944, from the test fixture.

SUBTASK 28-13-41-080-005

(3) Do these steps to remove the pressure relief valve equipment, SPL-8420, if it was installed:

(a) Remove the four bolts of the test fixture from the access door.

(b) Install the four mounting bolts for the applicable access panels:

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

NOTE: These are the bolts that you removed at the start of this procedure.

SUBTASK 28-13-41-080-006

(4) Do these steps to remove the fixture, SPL-3899, if it was installed:

(a) Remove the test fixture from the relief valve.

(b) Put back the four usual mounting screws which attach the relief valve to the access panel.

NOTE: These are the screws that you removed at the start of this procedure if you used the fixture, SPL-3899.

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SUBTASK 28-13-41-440-004

(5) Pull down the T-handle to close the pressure relief valve (TASK 28-13-41-400-802).

END OF TASK

TASK 28-13-41-200-802

4. Pressure Relief Valve - Bonding Resistance Check

(Figure 603)

A. General

(1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
SWPM 20-20-00	Electrical Bonds and Grounds

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)
STD-200	Container - Fuel Resistant, 10 gallon (38 l)

D. Location Zones

Zone	Area
533	Left Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing BL 616.75
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

E. Access Panels

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

F. Prepare for the Procedure

SUBTASK 28-13-41-862-001

(1) Make sure the airplane is correctly grounded to an approved and identified ground.

SUBTASK 28-13-41-710-002

(2) Make sure there is no remaining fuel in the surge tank.

- (a) Put a 10 gallon (38 l) fuel resistant container, STD-200 below the sump drain valve.
- (b) Open the applicable sump drain valve.
- (c) Let the remaining fuel flow into a 10 gallon (38 l) fuel resistant container, STD-200.

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SUBTASK 28-13-41-560-001

WARNING: MAKE SURE THAT THE RELIEF VALVE IS OPEN BEFORE YOU REMOVE THE ACCESS PANEL. THE SPRING THAT HOLDS THE VALVE CLOSED IS VERY STRONG. IF THE RELIEF VALVE OPENS SUDDENLY, IT CAN CAUSE INJURIES TO PERSONNEL.

- (3) Use a screwdriver to put the relief valve into the open position if it is not open (TASK 28-13-41-400-802).

SUBTASK 28-13-41-010-002

- (4) Remove the applicable access doors from the surge tank:
(TASK 28-11-11-000-801)

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

G. Electrical Bonding Measurement

SUBTASK 28-13-41-765-002

- (1) Measure the electrical bonding resistance between the pressure relief valve and the door assembly with a bonding meter, COM-1550 (SWPM 20-20-00).
 - (a) Make sure the resistance is 0.010 ohm (10 milliohms) or less.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-13-41-410-002

- (1) (TASK 28-11-11-400-801).

To install this access panel:

<u>Number</u>	<u>Name/Location</u>
533BB	Surge Tank Access Door - Wing Station 679

or close this access panel:

<u>Number</u>	<u>Name/Location</u>
633BB	Surge Tank Access Door - Wing Station 679

SUBTASK 28-13-41-410-003

- (2) Pull the T-handle to close the pressure relief valve manually (TASK 28-13-41-400-802).

————— **END OF TASK** —————

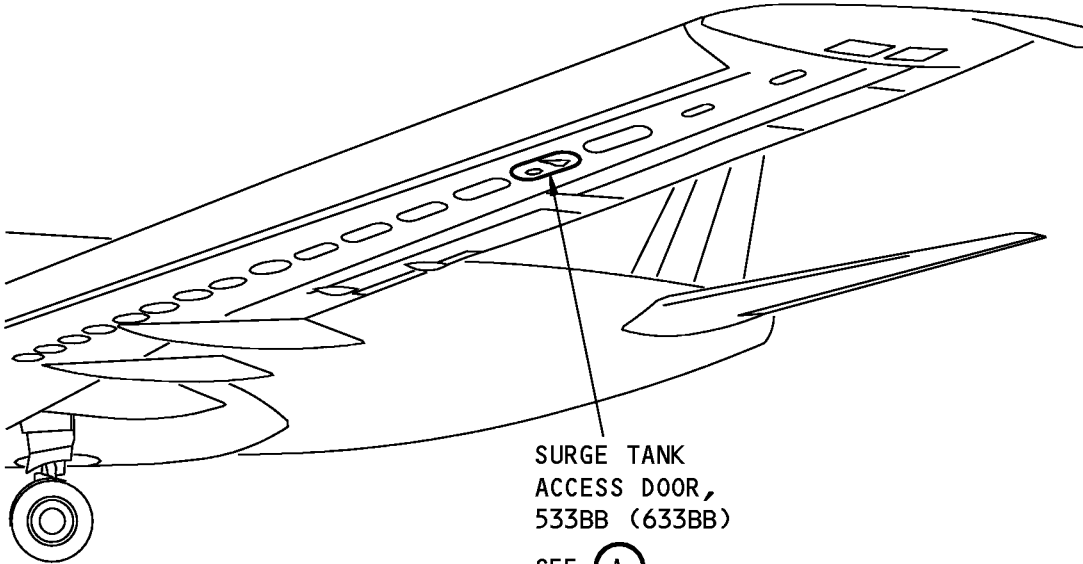
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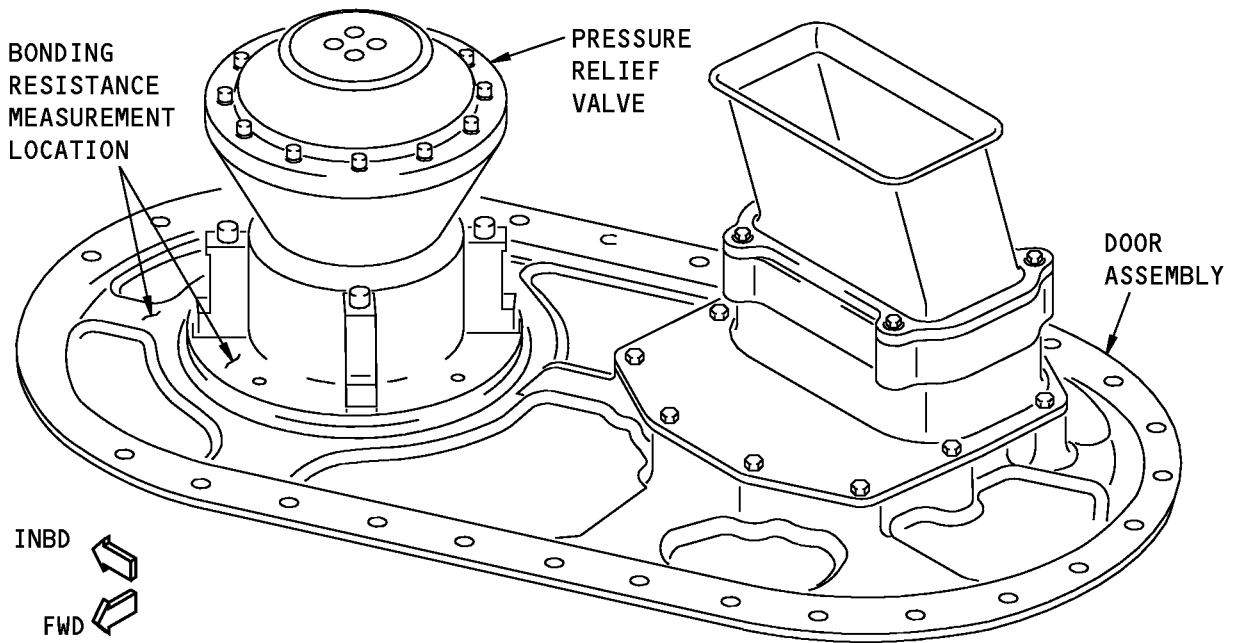
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**LEFT WING
(RIGHT WING OPPOSITE)**

**SURGE TANK
ACCESS DOOR,
533BB (633BB)**

SEE **(A)**



**BONDING
RESISTANCE
MEASUREMENT
LOCATION**

**PRESSURE
RELIEF
VALVE**

**DOOR
ASSEMBLY**

INBD
FWD

PRESSURE RELIEF VALVE

(A)

**Pressure Relief Valve - Bonding Resistance Measurement
Figure 603/28-13-41-990-804**

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PRESSURE FUELING SYSTEM - ADJUSTMENT/TEST

1. General

A. This procedure has one task, a test of the pressure fueling system.

TASK 28-21-00-700-801

2. Pressure Fueling System - Test

(Figure 501)

A. References

Reference	Title
20-40-11-910-801	Static Grounding (P/B 201)
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)

B. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

E. Procedure

SUBTASK 28-21-00-910-001

WARNING: MAKE SURE THE AIRPLANE AND THE FUELING SOURCE ARE ELECTRICALLY BONDED BEFORE FUELING OR DEFUELING. MAKE SURE THE AIRPLANE AND ALL WORK STANDS IN USE ARE GROUNDED AND BONDED BEFORE DOING FUEL TANK OR FUEL SYSTEM MAINTENANCE. REFER TO THE PARAGRAPHS ON STATIC GROUNDING PROCEDURE. CORRECT ELECTROSTATIC GROUNDING AND BONDING PREVENTS STATIC ELECTRICITY DISCHARGES AND POSSIBLE FIRE OR EXPLOSION.

(1) Make sure the airplane is grounded correctly (TASK 20-40-11-910-801).

SUBTASK 28-21-00-480-001

(2) Connect a grounding cable from the fueling source and other fuel equipment being used for tank maintenance to an approved and identified static ground.

SUBTASK 28-21-00-480-002

(3) Connect a bonding cable from the fueling vehicle to an approved electrical grounding or bonding connection on the airplane.

NOTE: If the fueling vehicle has a permanently attached V or Y grounding cable, connect one part of the V or Y to an approved identified ground. Then connect the other part of the V or Y cable to an approved electrical bonding or grounding point on the airplane.

SUBTASK 28-21-00-860-001

(4) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

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SUBTASK 28-21-00-710-001

(5) Make sure the equipment at the refuel station (the P15 panel) operates correctly.

(a) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

(b) Make sure the floodlights for the refuel nozzle come on.

(c) Make sure the refuel quantity indicators show the correct fuel quantity.

SUBTASK 28-21-00-710-002

(6) Push each indication light that shows the fueling valve position.

(a) Make sure the indication lights come on.

NOTE: The lights are PRESS-TO-TEST.

SUBTASK 28-21-00-710-003

(7) Make sure the refuel quantity indicators for these tanks operate correctly:

(a) The No. 1 fuel tank

(b) The No. 2 fuel tank

(c) The center tank.

(d) Hold the test switch for these indicators in the TEST GAGES position.

(e) Make sure the indicators operate correctly.

NOTE: The test blanks the fueling indicators display for two seconds, then all LED segments go on for two seconds. This sequence continues as long as you hold the TEST SWITCH. If you hold the TEST SWITCH for more than 20 seconds, the test mode will time out and the indicator will go back to its usual operating mode. If an internal fault is found during the test, the indicator will show Ind FAIL.

(f) Release the test switch.

SUBTASK 28-21-00-210-001

(8) Examine the fueling receptacle.

(a) Examine the fueling receptacle for damage that can cause the fuel nozzle not to have a good seal.

SUBTASK 28-21-00-710-004

(9) Make sure the poppet valve in the fueling receptacle operates correctly (Figure 501).

(a) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the fueling receptacle.

(b) Push the poppet valve in the receptacle.

1) Make sure the valve has a good seal.

2) Make sure it moves freely to open and to close.

SUBTASK 28-21-00-710-005

(10) Make sure the fueling shutoff valves operate correctly.

(a) Set the switch for the fueling shutoff valve for the No. 1 tank to OPEN.

(b) Make sure the indication light for the fueling shutoff valve for the No. 1 tank comes on.

(c) Set the switch for the fueling shutoff valve for the No. 1 tank to CLOSE.

(d) Make sure the indication light for the fueling shutoff valve for the No. 1 tank goes off.

(e) Set the switch for the fueling shutoff valve for the No. 2 tank to OPEN.

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- (f) Make sure the indication light for the fueling shutoff valve for the No. 2 tank comes on.
- (g) Set the switch for the fueling shutoff valve for the No. 2 tank to CLOSE.
- (h) Make sure the indication light for the fueling shutoff valve for the No. 2 tank goes off.
- (i) Set the switch for the fueling shutoff valve for the center tank to OPEN.
- (j) Make sure the indication light for the fueling shutoff valve for the center tank comes on.
- (k) Set the switch for the fueling shutoff valve for the center tank to CLOSE.
- (l) Make sure the indication light for the fueling shutoff valve for the center tank goes off.

SUBTASK 28-21-00-710-007

- (11) Make sure the floodlights go off when the refuel station door is closed.
- (a) Put a thin strip of steel between the magnet and the fueling power control switch on the refuel station door (Figure 501).
NOTE: This condition is equivalent to a closed door.
 - (b) Make sure these floodlights go out:
 - 1) The two floodlights for the refuel nozzle.
 - 2) The floodlight for the refuel panel.
 - (c) Set the test switch for the refuel quantity to FUELING POWER - CONTROL.
 - (d) Make sure the lights for the refuel station come on.
 - (e) Set the test switch to OFF again.
 - (f) Remove the metal strip that you used on the proximity switch.
 - (g) Make sure the distance between the magnet and the proximity switch is 0.08 ± 0.02 inches.

SUBTASK 28-21-00-480-003

WARNING: MAKE SURE THERE IS ELECTRICAL CONTINUITY BETWEEN THE FUEL SOURCE AND THE AIRPLANE. AN EXPLOSION CAN OCCUR.

- (12) Attach the bonding cable on the nozzle of the fuel hose to the ground jack on the wing.
- NOTE:** The bonding cable is not necessary if there is electrical continuity between the nozzle and the receptacle.

SUBTASK 28-21-00-480-004

- (13) Attach the nozzle on the fuel hose to the fueling receptacle.
- (a) Open the valve in the nozzle on the fuel hose.
 - (b) Make sure the nozzle and the fueling receptacle have a good seal.

SUBTASK 28-21-00-860-002

- (14) Make sure all of the fueling shutoff valves are closed.

SUBTASK 28-21-00-790-001

WARNING: MAKE SURE THE FUEL SOURCE DOES NOT HAVE MORE THAN A MAXIMUM PRESSURE OF 50 PSI. YOU CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (15) Do these steps to do a leak check of the pressure fueling system during the refuel operation:
- (a) Make sure all of the fueling shutoff valves are closed.
 - (b) Start the pump on the fuel truck or the fuel source.
 - (c) Monitor the fuel source to make sure the pressure is not more than 50 psi.

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- (d) Make sure there is no leakage at these locations:
 - 1) The seal between the fuel nozzle and the fueling receptacle
 - 2) The fueling receptacle
 - 3) The fittings on the manifold
 - 4) The fueling shutoff valves.
 - (e) With the manual override switch, slowly open each fueling shutoff valve and close it again.
 - 1) Make sure the fueling shutoff valves move freely.
- NOTE: The fueling shutoff valves must open and close freely with the conditions of pressure fueling.
- (f) Make sure all of the fueling shutoff valves are closed before you continue this procedure.
 - (g) The flowmeter on the fuel truck or the fuel source must show no fuel flow.

SUBTASK 28-21-00-860-003

- (16) Set the switch for the fueling shutoff valve for the No. 1 tank to OPEN.

SUBTASK 28-21-00-650-001

- (17) Fill the No. 1 tank with fuel.

SUBTASK 28-21-00-710-008

- (18) Examine these indicators to make sure that the refuel operation started:

- (a) The flowmeter on the fuel truck or the fuel source
- (b) The refuel quantity indicator for the No. 1 tank on the refuel panel (P15).

SUBTASK 28-21-00-650-002

- (19) Continue to put fuel in the tank until the DC float switch closes the fueling shutoff valve.

SUBTASK 28-21-00-860-005

- (20) Set the switch for the fueling shutoff valve for the No. 1 tank to CLOSE.

SUBTASK 28-21-00-860-006

- (21) Set the switch for the fueling shutoff valve for the No. 2 tank to OPEN.

SUBTASK 28-21-00-650-003

- (22) Fill the No. 2 tank with fuel.

SUBTASK 28-21-00-710-009

- (23) Examine these indicators to make sure that the refuel operation started:

- (a) The flowmeter on the fuel truck or the fuel source
- (b) The refuel quantity indicator for the No. 2 tank on the refuel panel (P15).

SUBTASK 28-21-00-710-010

- (24) Continue to put fuel in the tank until the DC float switch closes the fueling shutoff valve.

SUBTASK 28-21-00-860-008

- (25) Set the switch for the fueling shutoff valve for the No. 2 tank to CLOSE.

SUBTASK 28-21-00-860-009

- (26) Set the switch for the fueling shutoff valve for the center tank to OPEN.

SUBTASK 28-21-00-650-004

- (27) Fill the center tank with fuel.

SUBTASK 28-21-00-710-011

- (28) Examine these indicators to make sure that the refuel operation started:

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- (a) The flowmeter on the fuel truck or the fuel source
- (b) The refuel quantity indicator for the center tank on the refuel panel (P15).

SUBTASK 28-21-00-710-012

(29) Continue to put fuel in the tank until the DC float switch closes the fueling shutoff valve.

SUBTASK 28-21-00-860-011

(30) Set the switch for the fueling shutoff valve for the center tank to CLOSE.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 28-21-00-650-005

(1) Stop the fuel flow from the fuel truck or the fuel source.

SUBTASK 28-21-00-080-001

(2) Do these steps in this sequence to remove the fuel hose:

- (a) Close the valve on the nozzle of the fuel hose.
- (b) Disconnect the nozzle from the fueling receptacle.
- (c) Disconnect the bonding jumper from the ground jack (if you connected it at the start of this procedure).

SUBTASK 28-21-00-160-001

(3) Soak up the fuel that fell during the refuel operation if there is some unwanted fuel.

SUBTASK 28-21-00-410-001

(4) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-21-00-860-012

(5) If electrical power is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812.

————— END OF TASK —————

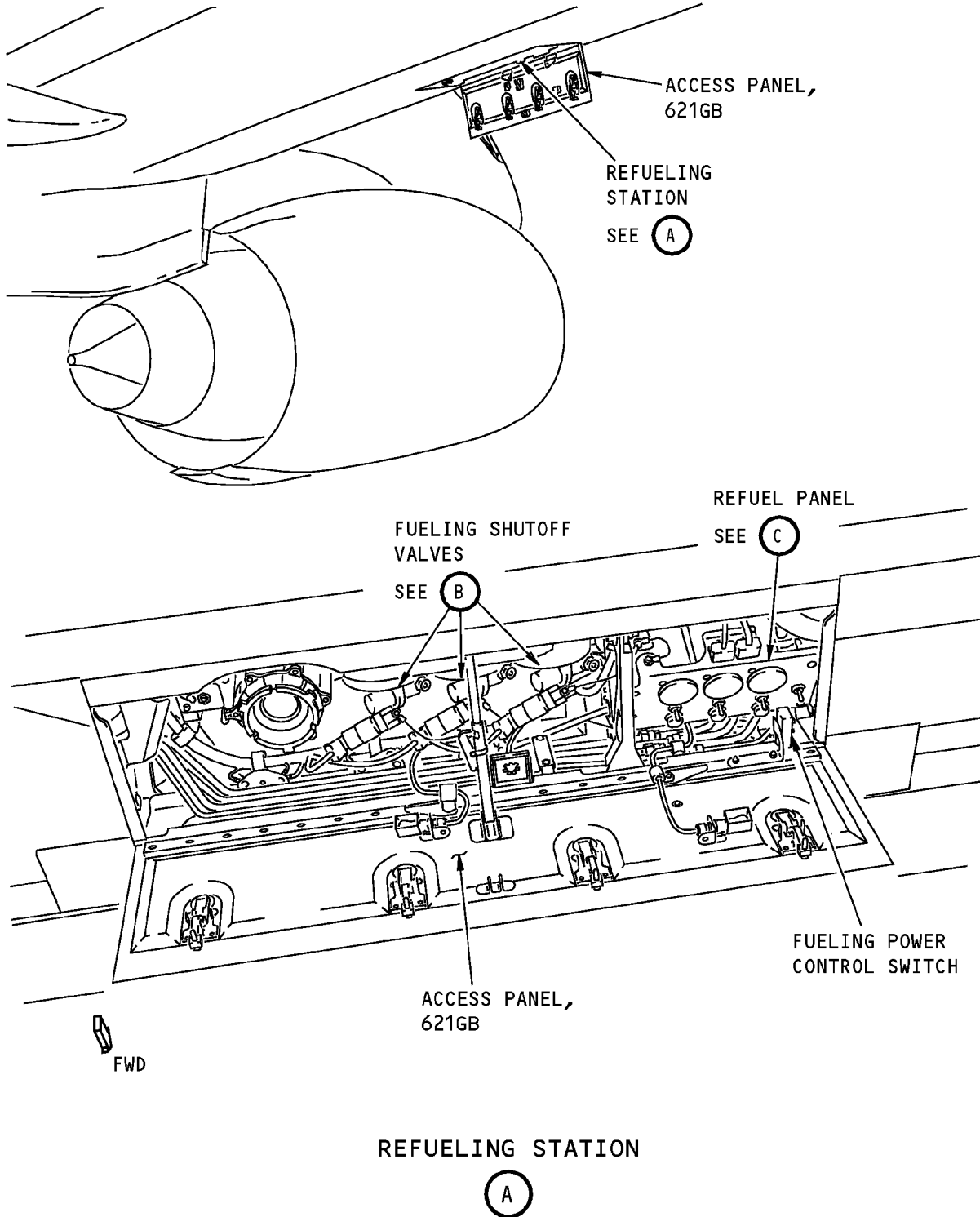
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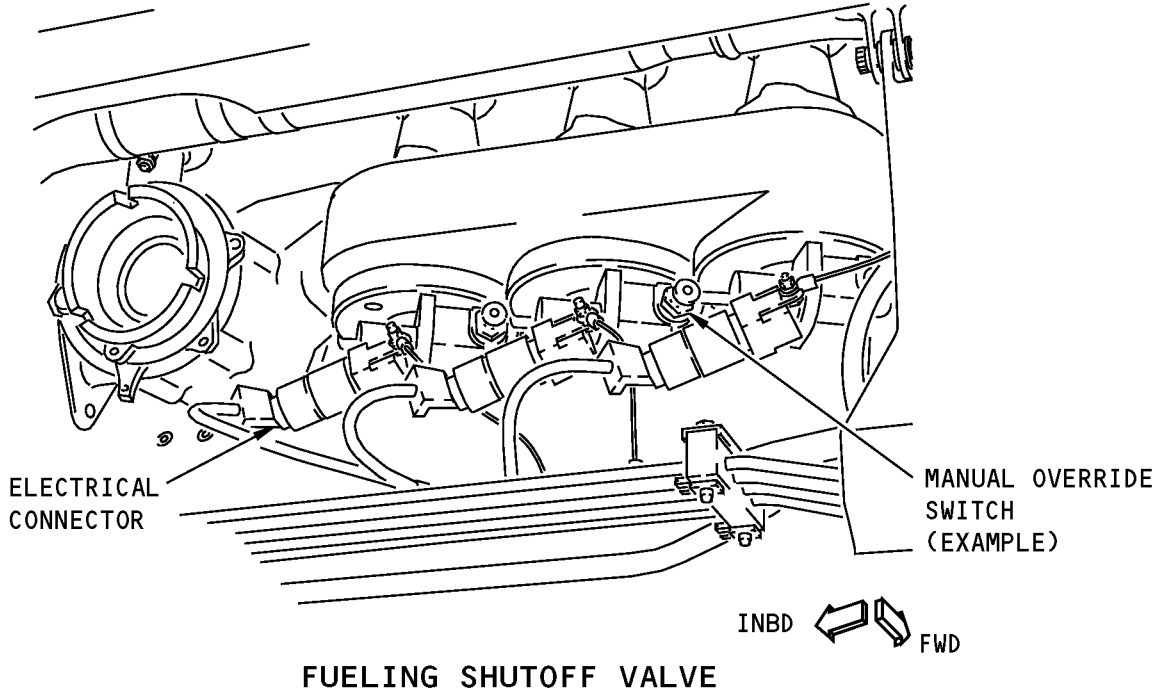


**Pressure Fueling System Test
Figure 501 (Sheet 1 of 2)/28-21-00-990-803**

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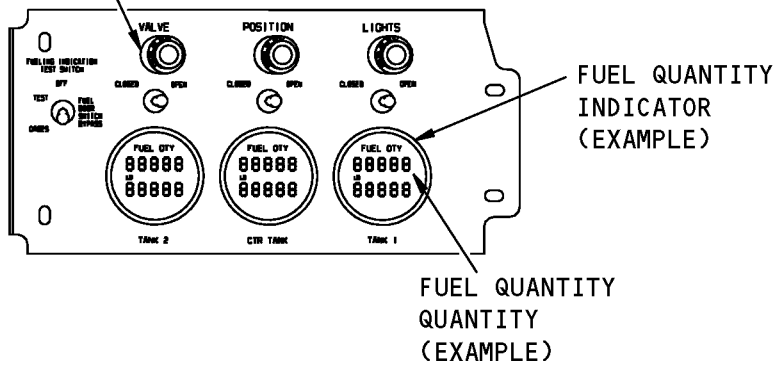
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FUELING SHUTOFF VALVE

(B)

REFUEL VALVE LIGHT (EXAMPLE)



REFUEL PANEL

(C)

**Pressure Fueling System Test
Figure 501 (Sheet 2 of 2)/28-21-00-990-803**

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PRESSURE FUELING SYSTEM - INSPECTION/CHECK

1. General

- A. This procedure contains instructions to do a check of the refuel receptacle adapter.
 - (1) If there is fuel leakage or damage at the refuel adapter, it must be replaced.
- B. This procedure also has a task to inspect the wire bundle for the refuel panel.

TASK 28-21-00-750-801

2. Refuel Receptacle Adapter Check

(Figure 601)

A. References

Reference	Title
28-21-11-000-801	Fueling Receptacle Removal (P/B 401)
28-21-11-400-801	Fueling Receptacle Installation (P/B 401)

B. Location Zones

Zone	Area
521	Left Wing - Leading Edge to Front Spar
621	Right Wing - Leading Edge to Front Spar

C. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

D. Tools and Equipment

SUBTASK 28-21-00-800-001

- (1) Wear Gauge, part number 61657-2 (recommended), JC Carter Company, Inc., 671 W. 17th Street, Costa Mesa, California 92627

E. Procedure

SUBTASK 28-21-00-010-001

- (1) Open this access panel:

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-21-00-750-001

- (2) Make sure the flange of the adapter is in these limits:

NOTE: Use of the wear gauge is recommended to measure these limits (View B).

- (a) The thickness of the three lugs of the flange is more than 0.224 inch (View C).
- (b) The width of the three lugs of the flange is more than 0.425 inch (View C).
- (c) The three slots of the flange must not be worn such that a pin, oblong with full circular ends of 0.305 inch width and 0.250 inch thickness, can be put into the slots a depth of 0.120 inch (View D).

SUBTASK 28-21-00-960-001

- (3) If the flange of the adapter is not in the correct limits, replace the refuel adapter.

These are the tasks:

Fueling Receptacle Removal, TASK 28-21-11-000-801,

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Fueling Receptacle Installation, TASK 28-21-11-400-801.

NOTE: Make sure a new flange is installed.

F. Put the Airplane Back to its Usual Condition

SUBTASK 28-21-00-860-019

CAUTION: MAKE SURE THE DEFUEL LEVER IS CORRECTLY POSITIONED IN THE RECESS ON REFUEL RECEPTACLE ADAPTER. IF THE DEFUEL LEVER IS NOT IN THE CORRECT POSITION, IT IS POSSIBLE TO DAMAGE THE REFUEL RECEPTACLE ASSEMBLY. IF THE REFUEL RECEPTACLE ASSEMBLY IS DAMAGED, A FUEL LEAK CAN OCCUR.

(1) Make sure the defuel lever is correctly positioned in the recess for refuel adapter.

SUBTASK 28-21-00-410-002

(2) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

————— **END OF TASK** —————

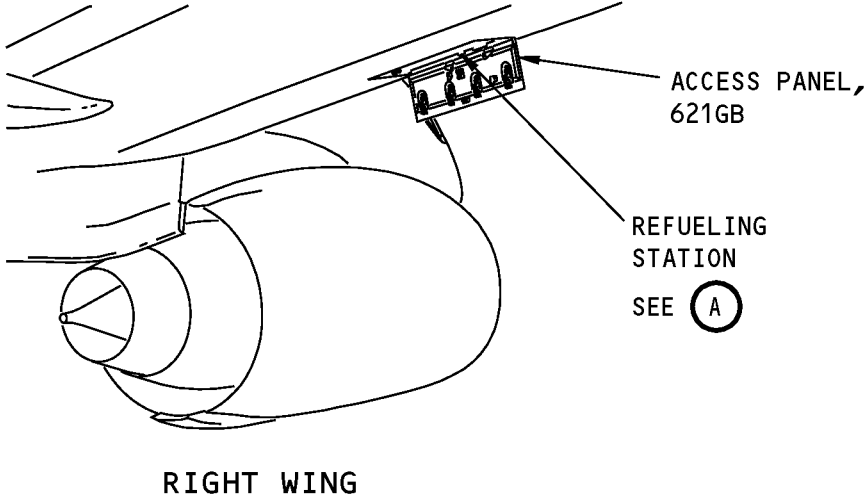
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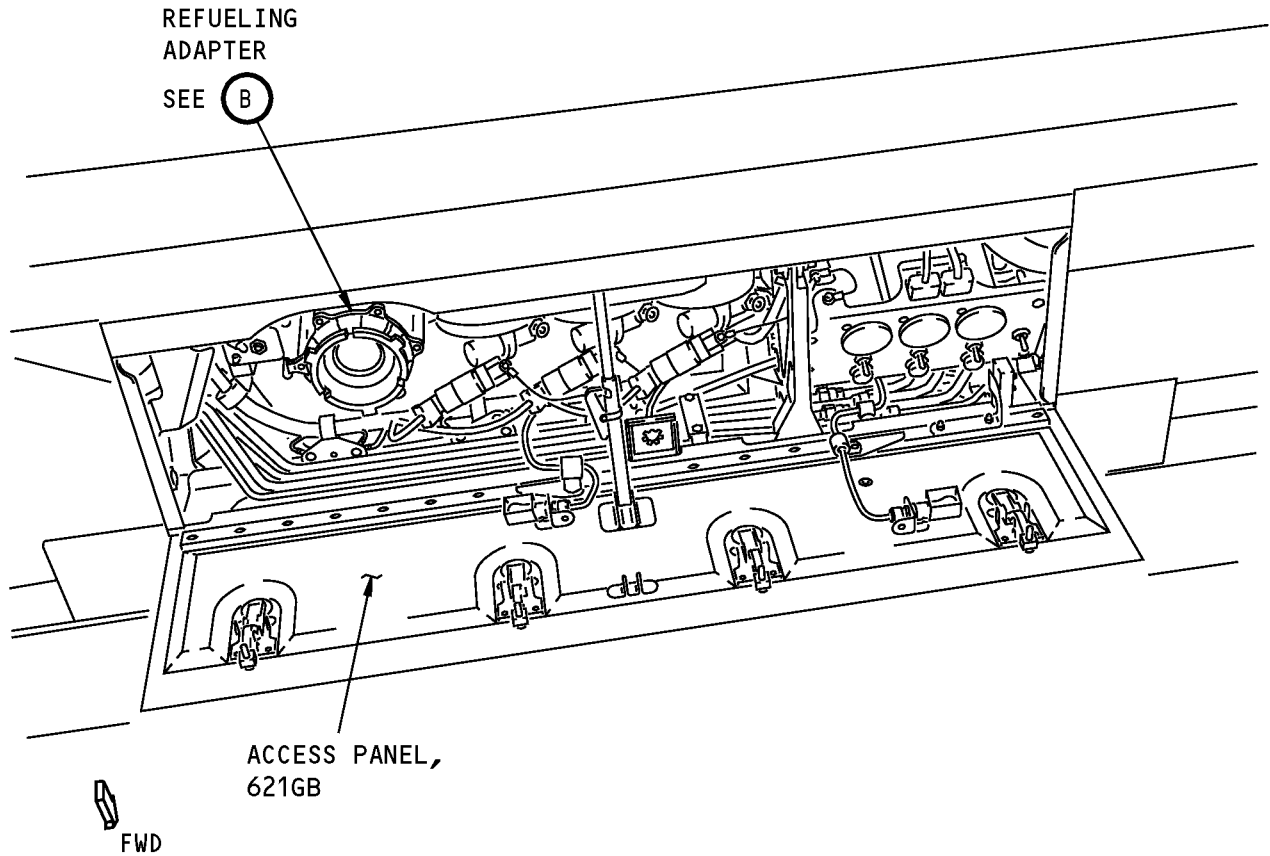
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RIGHT WING



REFUELING STATION

(A)

**Refuel Adapter Inspection
Figure 601 (Sheet 1 of 2)/28-21-00-990-804**

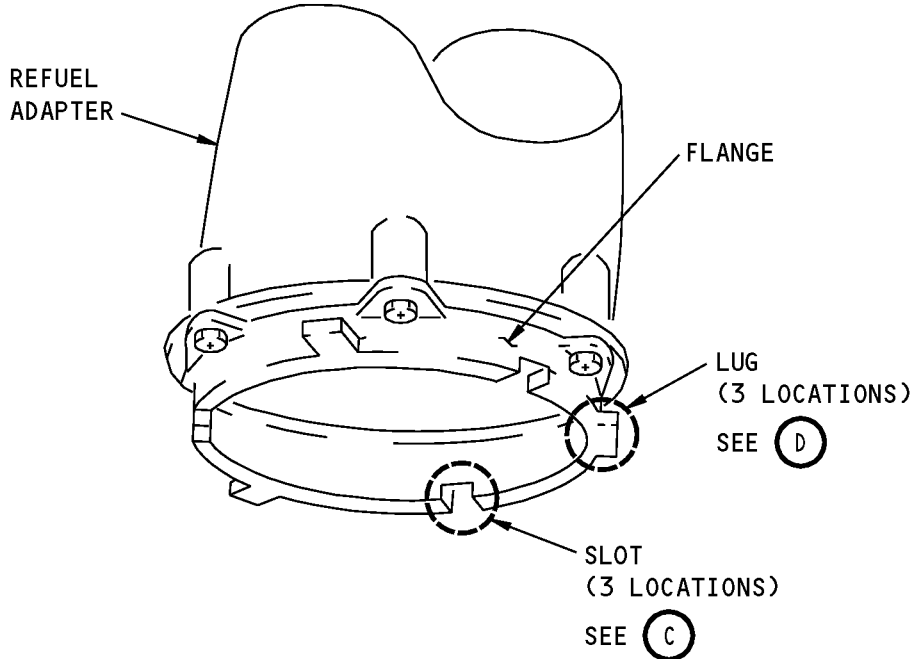
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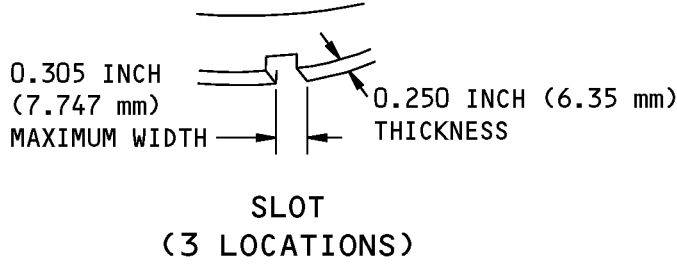
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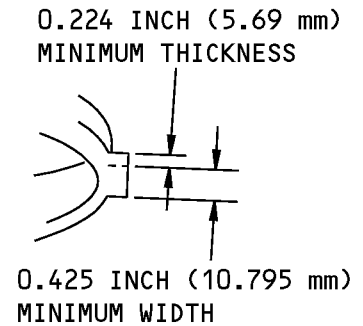


**REFUELING ADAPTER
(EXAMPLE)**

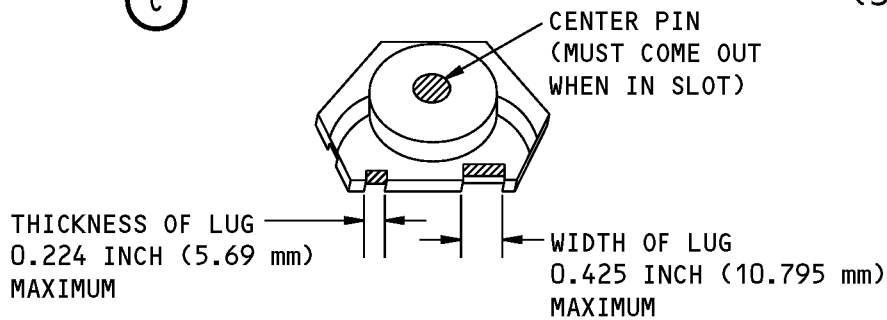
(B)



(C)



(D)



WEAR GAUGE

**Refuel Adapter Inspection
Figure 601 (Sheet 2 of 2)/28-21-00-990-804**

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TASK 28-21-00-211-801

3. Refuel Panel Wire Bundle Inspection

A. References

Reference	Title
SWPM 20-10-11	Standard Wiring Practices Manual
SWPM 20-10-13	Repair of Electrical Wire and Cable
SWPM 20-10-18	Standard Wiring Practices Manual
SWPM 20-20-00	Electrical Bonds and Grounds

B. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

C. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

D. Prepare for the Inspection

SUBTASK 28-21-00-865-001

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	3	C00032	FUEL FUELING CONT
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-21-00-010-002

- (2) Open this access panel:

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

if it is not open.

- (a) Remove the pins that attach the linkage assemblies to the access door.

SUBTASK 28-21-00-030-001

- (3) Remove the bolts and washers (4 locations) that attach the refuel panel to the wing structure.

SUBTASK 28-21-00-030-002

- (4) Remove the nut and washer to disconnect the bonding jumper from the refuel panel.

SUBTASK 28-21-00-211-001

- (5) Remove the refuel panel.

NOTE: You can also attach the panel to the support member for the leading edge to keep it safe during this procedure.

E. Inspection

SUBTASK 28-21-00-211-004

- (1) Visually examine the wires in wire bundle W0024 to connector D4578P on the back of the P15 panel.

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- (a) Look for indications of these types of problems:
 - 1) Chafed wires
 - 2) Damaged wires
 - 3) Arcing
 - 4) Loose wires with too much wire slack.
 - 5) Damage to the contact pins on connector D4578P or to the sockets on D4578J.

SUBTASK 28-21-00-211-002

- (2) Behind the P15 panel and inside the wing structure, do a check for any marks or indications where wire chafing occurred.
 - (a) Examine these types of surfaces behind the P15 panel and inside the wing structure:
 - 1) Flat edges on the rear of the P15 panel.
 - 2) Round edges on the backshells of the refuel quantity indicators.
 - 3) Any sharp edges or objects inside the wing structure behind the P15 panel.

SUBTASK 28-21-00-211-003

- (3) If you find wires with problems or damage, then repair or replace these wires:
 - (a) If there is any damage to contact pins in connector plug D4578P or to sockets in D4578J, replace those pins and sockets (SWPM 20-10-13).
 - (b) Move loose and untied wires away from sharp edges and objects behind the P15 panel and inside the wing structure (SWPM 20-10-11).
 - 1) Tie these wires to the main wire bundle W0024.
 - 2) Make sure that the wire bundle service loops have sufficient length and slack to permit the P15 panel to be pulled out and lowered from the wing structure for servicing of the refuel quantity indicators without complete removal of the panel.
 - (c) Make sure there is sufficient wire clearance and protection from chafing against edges of backshell connectors (D11318, D11320, D11322) and screws on the backs of the refuel quantity indicators.
 - 1) If it is necessary, loosen and turn the backshell connectors to give clearance from wires.

CAUTION: DO NOT USE HEAT ON THE TEFLON WRAPPING SLEEVE. THE TEFLON WRAPPING SLEEVE USED IN THIS LOCATION IS A NON-SHRINKABLE TYPE. HEAT CAN CAUSE DAMAGE TO THE WIRE INSULATION BELOW THE SLEEVE.

- (d) Install protective sleeving around wires where the wires are routed close to sharp edges and objects on the back of P15 panel (SWPM 20-10-18).
 - 1) Where it is necessary, replace Teflon wrapping sleeves and add new sleeves to protect wires from chafing.
 - 2) For additional protection, wires that are routed near sharp edges can be wrapped with one additional Teflon sleeve.

F. Install the Refuel Panel

SUBTASK 28-21-00-765-002

- (1) Prepare these surfaces for an electrical faying surface bond (SWPM 20-20-00):
 - (a) Contact surface of the refuel panel where the bonding jumper attaches.
 - (b) Contact surface of the bonding jumper and washer.

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SUBTASK 28-21-00-430-004

(2) Put the refuel panel in its correct position between the support members for the leading edge.

SUBTASK 28-21-00-430-001

(3) Install the bolts and washers (4 locations) in the refuel panel.

SUBTASK 28-21-00-430-002

(4) Install the nut and washer to attach the bonding jumper to the refuel panel.

SUBTASK 28-21-00-765-001

(5) Do these steps to do a check of the electrical bonding resistance (SWPM 20-20-00):

(a) Measure the electrical resistance between the refuel panel and the airplane structure.

1) Make sure the resistance is less than 0.002 ohm (2 milliohms).

SUBTASK 28-21-00-430-003

(6) Install the pins and the washers that attach the linkages to the access door.

G. Operational Test

SUBTASK 28-21-00-865-002

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

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	3	C00032	FUEL FUELING CONT
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-21-00-710-013

(2) Push each fueling valve position light.

(a) Make sure each fueling valve position light comes on.

NOTE: The lights are PRESS-TO-TEST.

SUBTASK 28-21-00-710-014

(3) Set the FUELING INDICATION TEST SWITCH on the refuel control panel to the TEST position.

(a) Make sure all of the refuel quantity indicators operate correctly.

NOTE: The test blanks the fueling indicators display for two seconds, then all LED segments go on for two seconds. This sequence continues as long as you hold the TEST SWITCH. If you hold the TEST SWITCH for more than 20 seconds, the test mode will time out and the indicator will go back to its usual operating mode. If an internal fault is found during the test, the indicator will show Ind FAIL.

SUBTASK 28-21-00-710-015

(4) Make sure the fueling shutoff valves operate correctly.

(a) Set the switch for the fueling shutoff valve for the No. 1 tank to OPEN.

(b) Make sure the indication light for the fueling shutoff valve for the No. 1 tank comes on.

(c) Set the switch for the fueling shutoff valve for the No. 1 tank to CLOSE.

(d) Make sure the indication light for the fueling shutoff valve for the No. 1 tank goes off.

(e) Set the switch for the fueling shutoff valve for the No. 2 tank to OPEN.

(f) Make sure the indication light for the fueling shutoff valve for the No. 2 tank comes on.

(g) Set the switch for the fueling shutoff valve for the No. 2 tank to CLOSE.

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- (h) Make sure the indication light for the fueling shutoff valve for the No. 2 tank goes off.
- (i) Set the switch for the fueling shutoff valve for the center tank to OPEN.
- (j) Make sure the indication light for the fueling shutoff valve for the center tank comes on.
- (k) Set the switch for the fueling shutoff valve for the center tank to CLOSE.
- (l) Make sure the indication light for the fueling shutoff valve for the center tank goes off.

SUBTASK 28-21-00-410-005

- (5) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

————— END OF TASK —————

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FUELING RECEPTACLE - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

- (1) A task to remove the fueling receptacle
- (2) A task to install the fueling receptacle.

TASK 28-21-11-000-801

2. Fueling Receptacle Removal

(Figure 401)

A. References

Reference	Title
24-22-00-860-812	Remove Electrical Power (P/B 201)

B. Tools/Equipment

Reference	Description
STD-195	Container - 1 Quart (1 l), Oil/Fuel Resistant

C. Location Zones

Zone	Area
620	Subzone - Right Wing: Leading Edge, Forward of Front Spar, Outboard of Nacelle Strut

D. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

E. Procedure

SUBTASK 28-21-11-010-001

- (1) For the refuel station, do this step:

Open this access panel:

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-21-11-860-001

- (2) Make sure the manual defueling valve is closed.

SUBTASK 28-21-11-860-002

- (3) If electrical power is connected, do this task: Remove Electrical Power, TASK 24-22-00-860-812.

SUBTASK 28-21-11-680-001

- (4) Drain the remaining fuel from the fueling receptacle [1].
 - (a) Put a 1 quart (1 l) oil/fuel resistant container, STD-195 below the fueling receptacle [1] to catch the fuel.
 - (b) Push the poppet valve [6] in the fueling receptacle [1].
 - (c) Let the fuel drain from the fueling receptacle [1] and the fueling manifold [2].

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SUBTASK 28-21-11-020-002

(5) Remove the mounting screws [3] from the fueling hose adapter.

SUBTASK 28-21-11-020-003

(6) Pull the fueling hose adapter [4] down in a straight line until the valve is out of the fueling manifold.

(a) Discard the O-ring [7]

————— **END OF TASK** —————

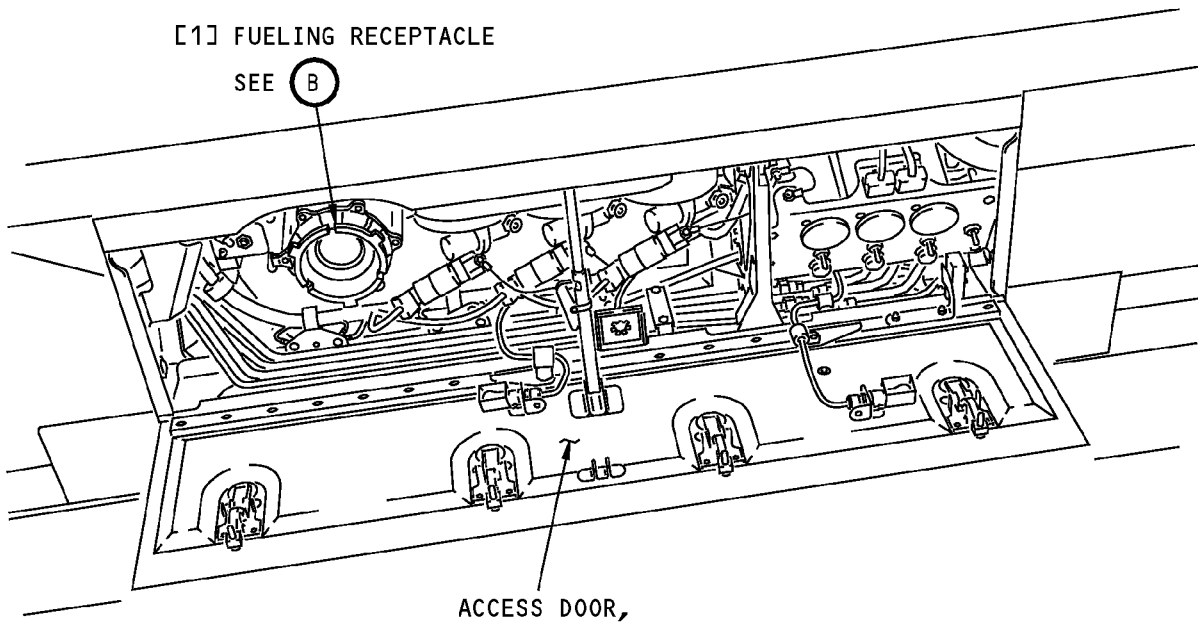
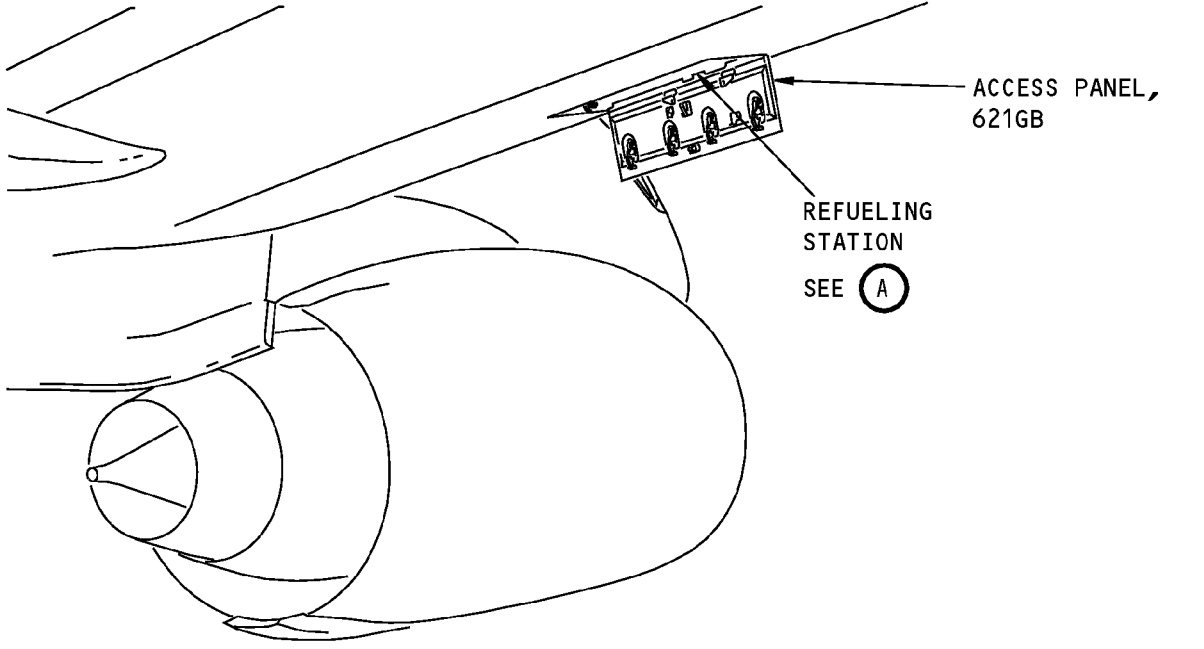
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FWD

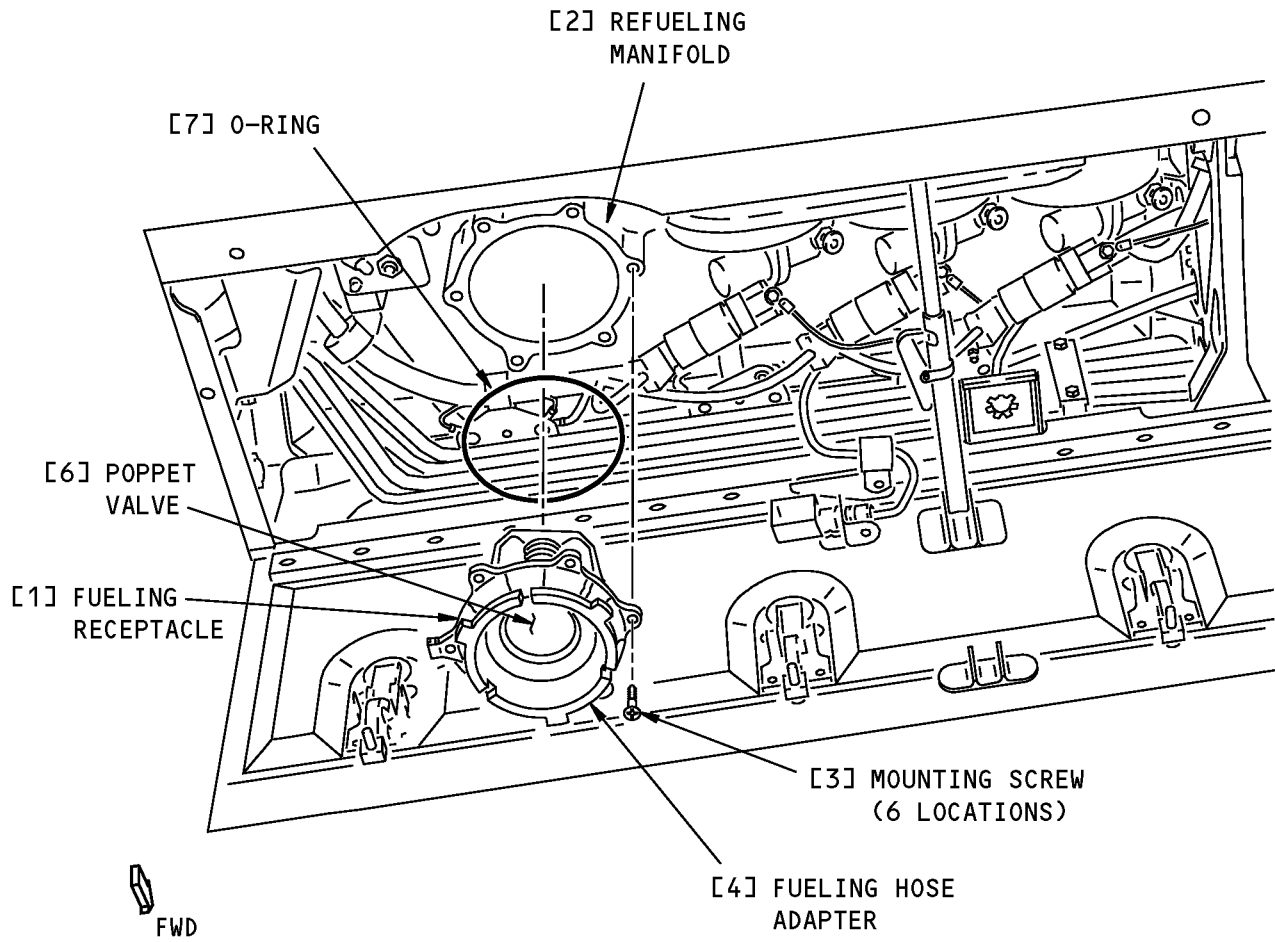
REFUELING STATION

(A)

**Fueling Receptacle Installation
Figure 401 (Sheet 1 of 2)/28-21-11-990-802**

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FUELING RECEPTACLE



**Fueling Receptacle Installation
Figure 401 (Sheet 2 of 2)/28-21-11-990-802**

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TASK 28-21-11-400-801

3. Fueling Receptacle Installation

(Figure 401)

A. Consumable Materials

Reference	Description	Specification
B00083	Solvent - Aliphatic Naphtha (For Acrylic Plastics)	TT-N-95 Type II, ASTM D-3735 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
4	Adapter	28-21-52-50-085	HAP 001-013, 015-026, 028-030
7	O-ring	28-21-52-51-055	HAP 031-054, 101-999
		28-21-52-50-080	HAP 001-013, 015-026, 028-030
		28-21-52-51-050	HAP 031-054, 101-999

C. Location Zones

Zone	Area
620	Subzone - Right Wing: Leading Edge, Forward of Front Spar, Outboard of Nacelle Strut

D. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

E. Procedure

SUBTASK 28-21-11-210-001

- (1) Clean these surfaces with solvent, B00083, dry with a cotton wiper, G00034.
 - (a) All of the machined surfaces on the fueling manifold [2].
 - (b) All of the O-ring grooves on the fueling manifold [2].
 - (c) All of the machined surfaces on the fueling hose adapter
 - (d) All of the O-ring grooves on the fueling hose adapter.

SUBTASK 28-21-11-420-001

- (2) Put a new O-ring [7], lightly lubricated with fuel, into the groove on the fueling hose adapter [4].

SUBTASK 28-21-11-420-002

- (3) Put the fueling hose adapter [4] into the fueling manifold [2].

SUBTASK 28-21-11-420-003

CAUTION: DO NOT LOOSEN THE O-RING OR PUSH IT OUT OF ITS CORRECT SHAPE WHEN YOU TURN THE FUELING HOSE ADAPTER. A FUEL LEAK CAN EASILY OCCUR.

- (4) Turn the fueling hose adapter [4] to align the screw holes with the holes in the fueling manifold.

SUBTASK 28-21-11-420-004

- (5) Install the mounting screws [3] for the fueling hose adapter.

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- (a) Tighten all of the mounting screws [3] equally to a torque of 30 pound-inches.
- (b) Make sure the flange of the fueling hose adapter is parallel to the flange of the manifold during this procedure.

SUBTASK 28-21-11-710-001

- (6) Make sure the poppet valve operates correctly.
 - (a) Push the poppet valve and make sure the valve opens freely.
 - (b) Make sure the poppet valve closes easily when you release it again.

SUBTASK 28-21-11-410-001

- (7) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

————— END OF TASK —————

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FUELING RECEPTACLE - INSPECTION/CHECK

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains a functional check of the bonding resistance between the structure and the fueling receptacle.

TASK 28-21-11-200-801

2. Fueling Receptacle - Bonding Resistance Check

(Figure 601)

A. General

- (1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
20-10-51-760-801	Electrical Resistance Specifications in the Fuel Tank Check (P/B 401)
24-22-00-860-812	Remove Electrical Power (P/B 201)

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)
STD-195	Container - 1 Quart (1 l), Oil/Fuel Resistant

D. Location Zones

Zone	Area
620	Subzone - Right Wing: Leading Edge, Forward of Front Spar, Outboard of Nacelle Strut

E. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

F. Prepare for the Procedure

SUBTASK 28-21-11-010-002

- (1) Open this access panel:

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-21-11-710-002

- (2) Make sure the manual defueling valve is closed.

SUBTASK 28-21-11-862-001

- (3) If there is electrical power, do this task: Remove Electrical Power, TASK 24-22-00-860-812.

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SUBTASK 28-21-11-616-001

- (4) Drain the remaining fuel from the fueling receptacle.
 - (a) Put a 1 quart (1 l) oil/fuel resistant container, STD-195 below the fueling receptacle to catch the fuel.
 - (b) Push the poppet valve in the fueling receptacle.
 - (c) Let the fuel drain from the fueling receptacle and the fueling manifold.

G. Electrical Bonding Measurement

SUBTASK 28-21-11-765-001

- (1) Measure the electrical bonding resistance between the fueling receptacle (manifold) and the structure with a bonding meter, COM-1550 (TASK 20-10-51-760-801).
 - (a) Make sure the electrical fay surface bonding resistance is less than 0.0025 ohm (2.5 milliohms).

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-21-11-410-002

- (1) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

————— **END OF TASK** —————

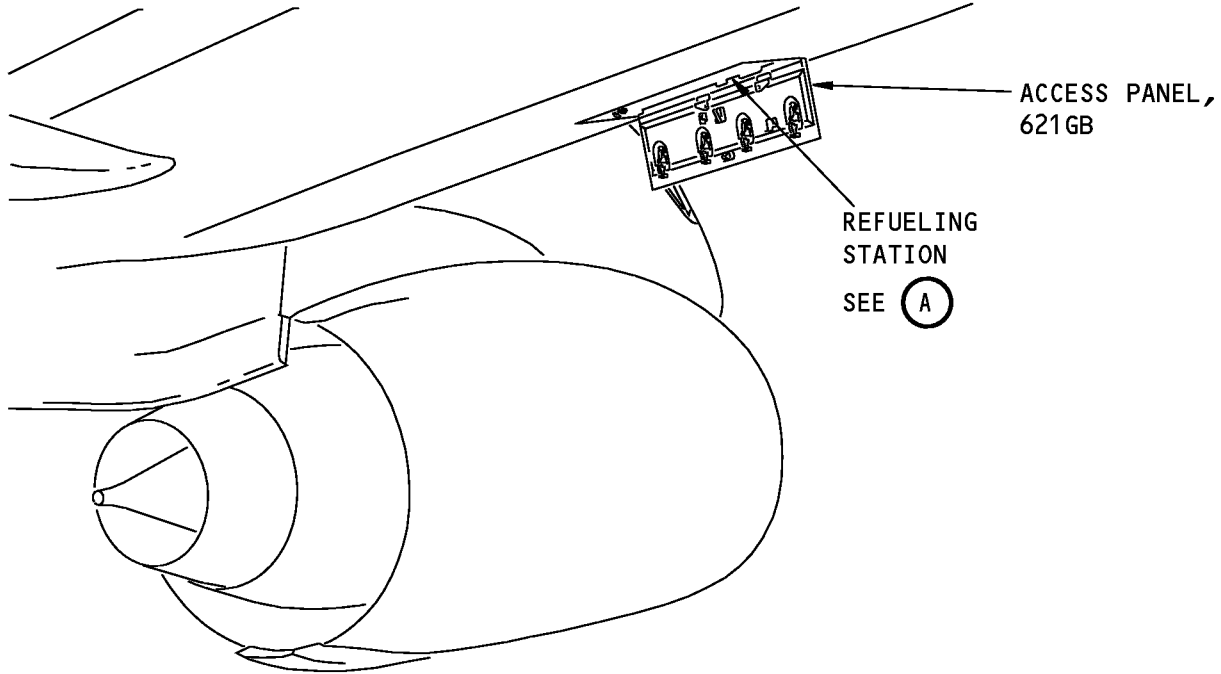
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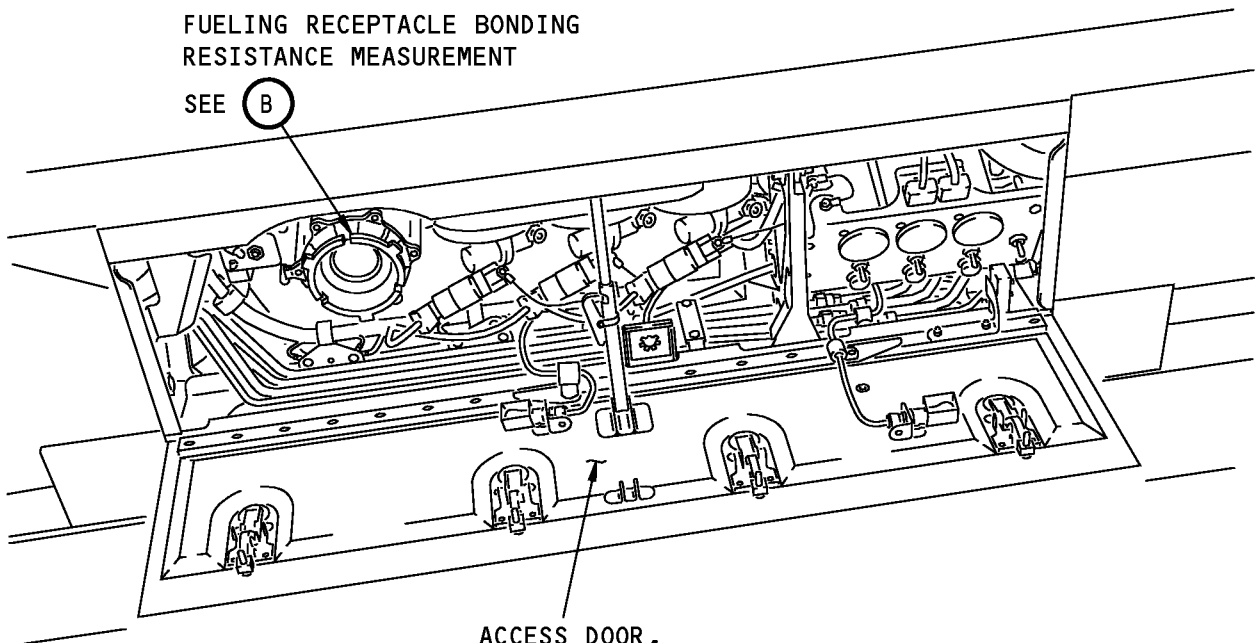
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FUELING RECEPTACLE BONDING
RESISTANCE MEASUREMENT

SEE (B)



ACCESS DOOR,
621GB

REFUELING STATION

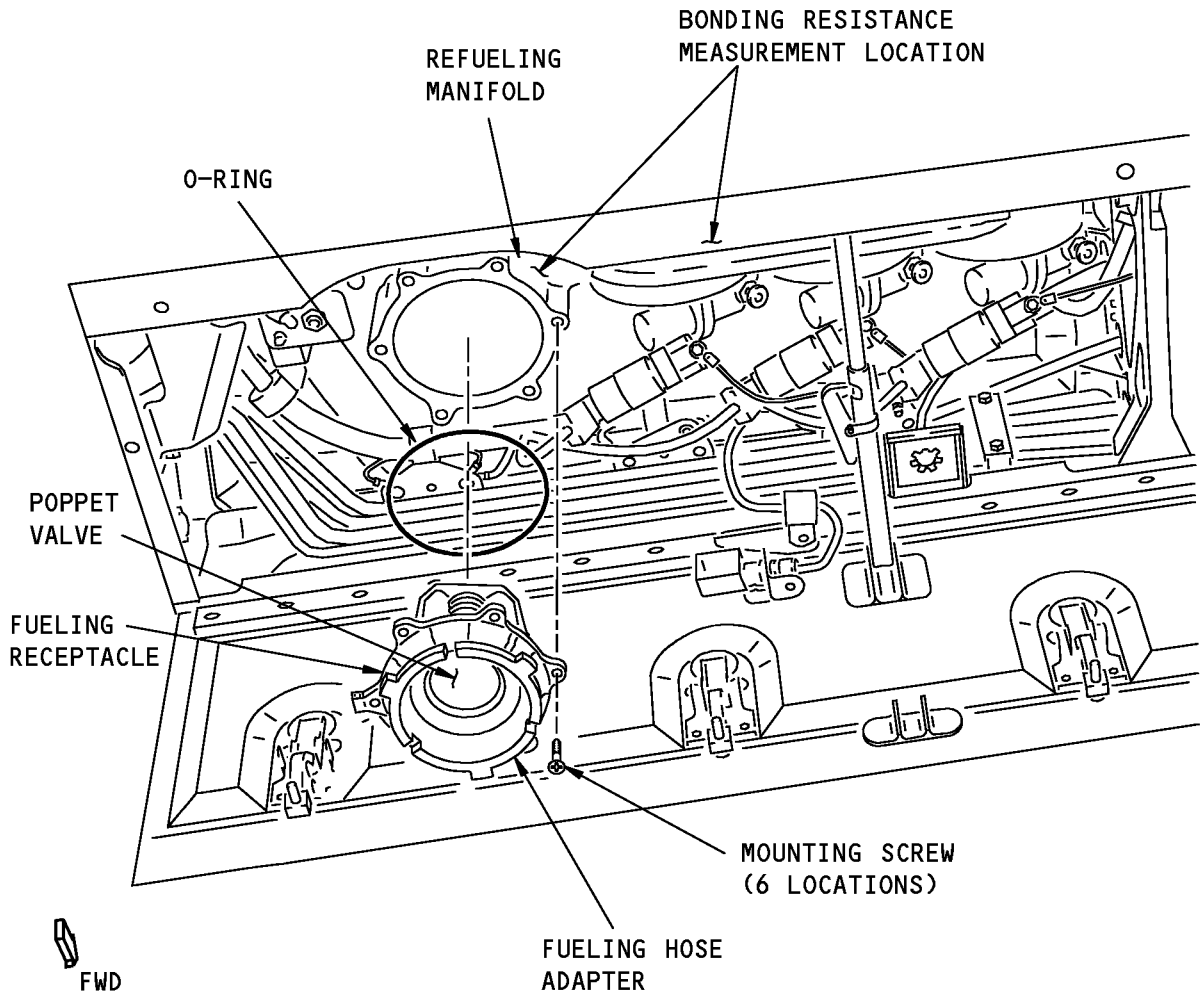
(A)

FWD

**Fueling Receptacle - Bonding Resistance Measurement
Figure 601 (Sheet 1 of 2)/28-21-11-990-803**

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FUELING RECEPTACLE BONDING RESISTANCE MEASUREMENT

B

**Fueling Receptacle - Bonding Resistance Measurement
Figure 601 (Sheet 2 of 2)/28-21-11-990-803**

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REFUELING MANIFOLD - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

- (1) A task to remove the refueling manifold
- (2) A task to install the refueling manifold.

TASK 28-21-21-000-801

2. Refueling Manifold Removal

A. References

Reference	Title
24-22-00-860-812	Remove Electrical Power (P/B 201)
28-21-11-000-801	Fueling Receptacle Removal (P/B 401)
28-21-51-000-801	Remove the Fueling Shutoff Valve (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)
28-26-11-010-801	Removal of the Actuator Handle Assembly (P/B 401)
28-41-61-000-801	Refuel Quantity Indicator Removal (P/B 401)

B. Tools/Equipment

Reference	Description
STD-195	Container - 1 Quart (1 l), Oil/Fuel Resistant

C. Location Zones

Zone	Area
620	Subzone - Right Wing: Leading Edge, Forward of Front Spar, Outboard of Nacelle Strut

D. Access Panels

Number	Name/Location
621EB	Defuel Access Panel - Slat Station 95.15
621GB	Refuel Access Panel - Slat Station 143.27
621HB	Lower Leading Edge Access Panel - Slat Station 170.21

E. Procedure

SUBTASK 28-21-21-860-001

- (1) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

SUBTASK 28-21-21-650-001

WARNING: CAREFULLY DO ALL OF THE SAFETY PROCEDURES TO DEFUEL THE FUEL TANK. AN EXPLOSION, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Defuel the No. 2 tank (TASK 28-26-00-650-801) or transfer fuel out of the No. 2 tank (TASK 28-26-00-650-802) to a fuel quantity less than 3,500 pounds (1,590 kilograms).
 - (a) The No. 2 tank must contain less than 3,500 pounds (1,590 kilograms) to do this procedure.

SUBTASK 28-21-21-010-001

- (3) Open this access panel:

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

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(Figure 401).

- (a) Remove the pins that attach the linkage assemblies to the access door.

SUBTASK 28-21-21-010-002

- (4) Do these steps to remove this access panel:

<u>Number</u>	<u>Name/Location</u>
621HB	Lower Leading Edge Access Panel - Slat Station 170.21

(outboard of the refuel station).

- (a) Remove the refuel quantity indicators from the refuel instrument panel (TASK 28-41-61-000-801).
 - 1) Make a mark on the fuel quantity indicators to install them again in the correct position.
- (b) Remove the screws that attach the refuel instrument panel to the wing structure.
- (c) Remove the refuel instrument panel to get access to the manifold support fitting [1].

NOTE: You can also attach the panel to the support member for the leading edge to keep it safe during this procedure.

SUBTASK 28-21-21-010-003

- (5) Remove the two bolts to remove the TAI duct shield [5].

SUBTASK 28-21-21-860-002

- (6) Do these steps to make sure the defueling valve is closed (TASK 28-26-11-010-801):

- (a) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
621EB	Defuel Access Panel - Slat Station 95.15

- (b) Make sure the manual defueling valve is closed.
- (c) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621EB	Defuel Access Panel - Slat Station 95.15

SUBTASK 28-21-21-680-001

- (7) Drain the fuel from the manifold.

- (a) Put a 1 quart (1 l) oil/fuel resistant container, STD-195 below the receptacle.
- (b) Push the poppet valve in the receptacle.
- (c) Let the remaining fuel drain from the receptacle and from the manifold.

SUBTASK 28-21-21-010-004

- (8) Remove the fueling shutoff valves (TASK 28-21-51-000-801).

NOTE: If you are scheduled to remove the fueling receptacle, refer to (TASK 28-21-11-000-801).

SUBTASK 28-21-21-020-001

- (9) Disconnect the bonding jumper installed on the aft inboard side of the fueling receptacle manifold [21] adjacent to the airplane structure.

SUBTASK 28-21-21-020-002

- (10) Remove the bolts [6] and washers [7] that attach the refueling manifold [21] to the defuel port [22].

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SUBTASK 28-21-21-010-005

- (11) Carefully move the electrical wiring to one side to permit the removal of the refueling manifold [21].

SUBTASK 28-21-21-020-003

- (12) Remove the screws [18], washers [19], and packings [20] that attach the refueling manifold [21] to the check valves [23].

SUBTASK 28-21-21-020-004

- (13) Hold the refueling manifold [21] up and remove the bolts [2,12], washers [3,13], and bushings [4,14] that attach the refueling manifold to the support members for the leading edge.

SUBTASK 28-21-21-020-005

- (14) Remove the refueling manifold [21] through this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

————— **END OF TASK** —————

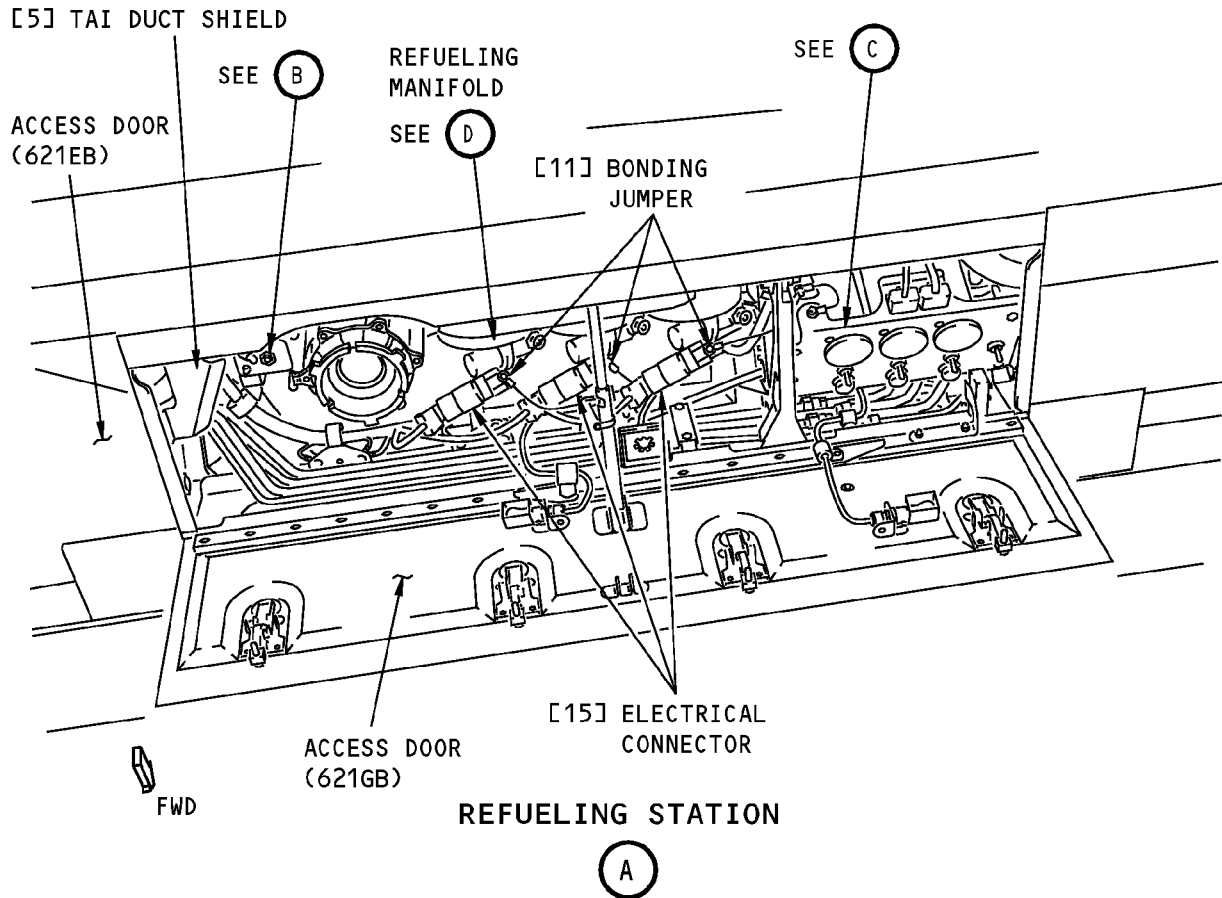
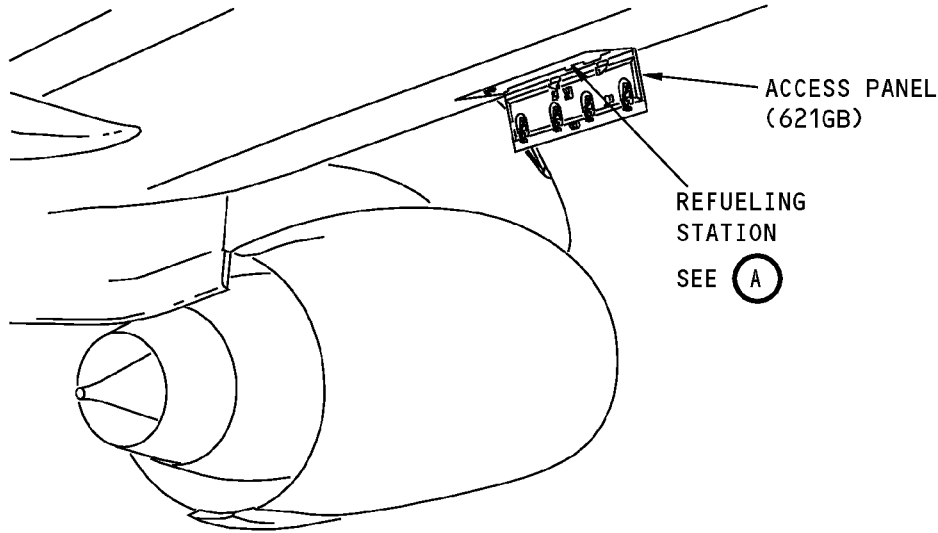
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**Refueling Manifold Installation
Figure 401 (Sheet 1 of 3)/28-21-21-990-802**

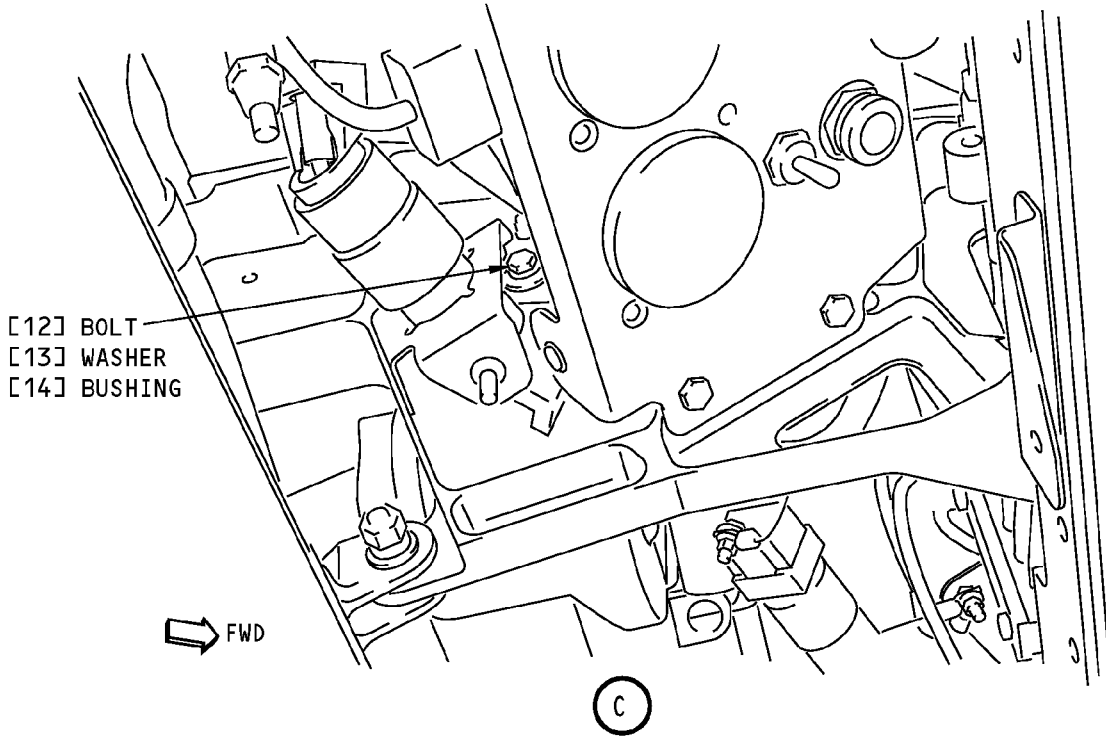
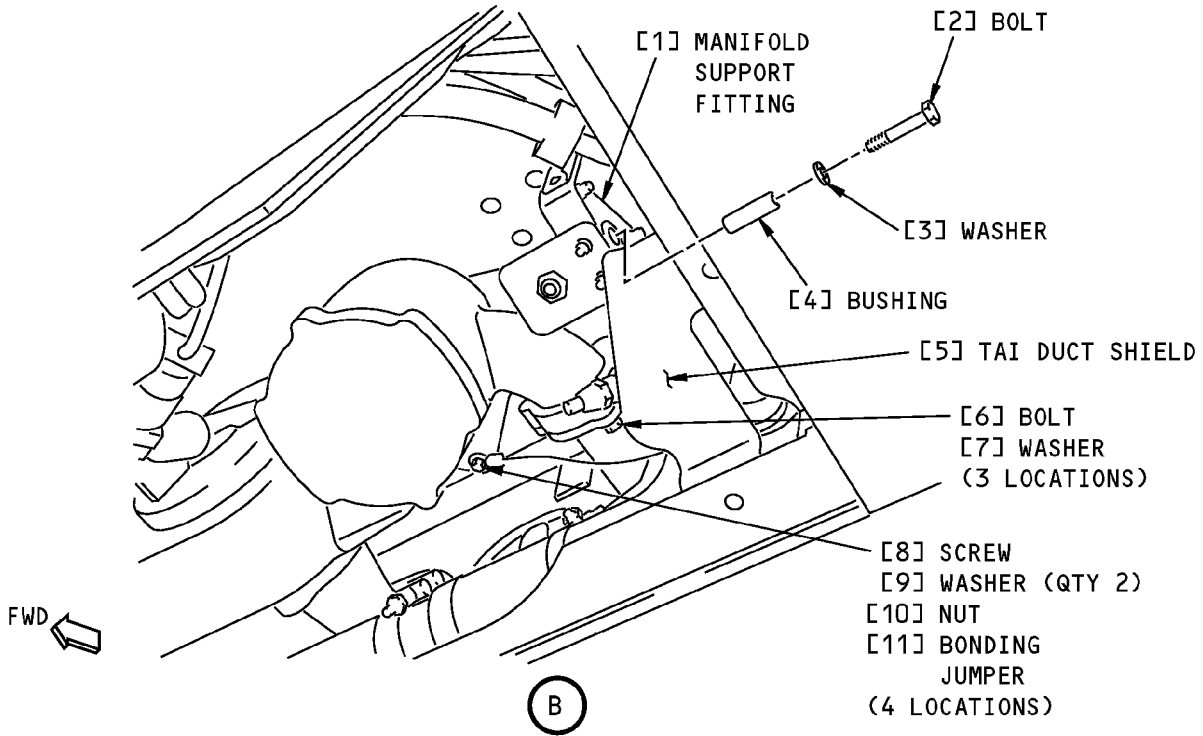
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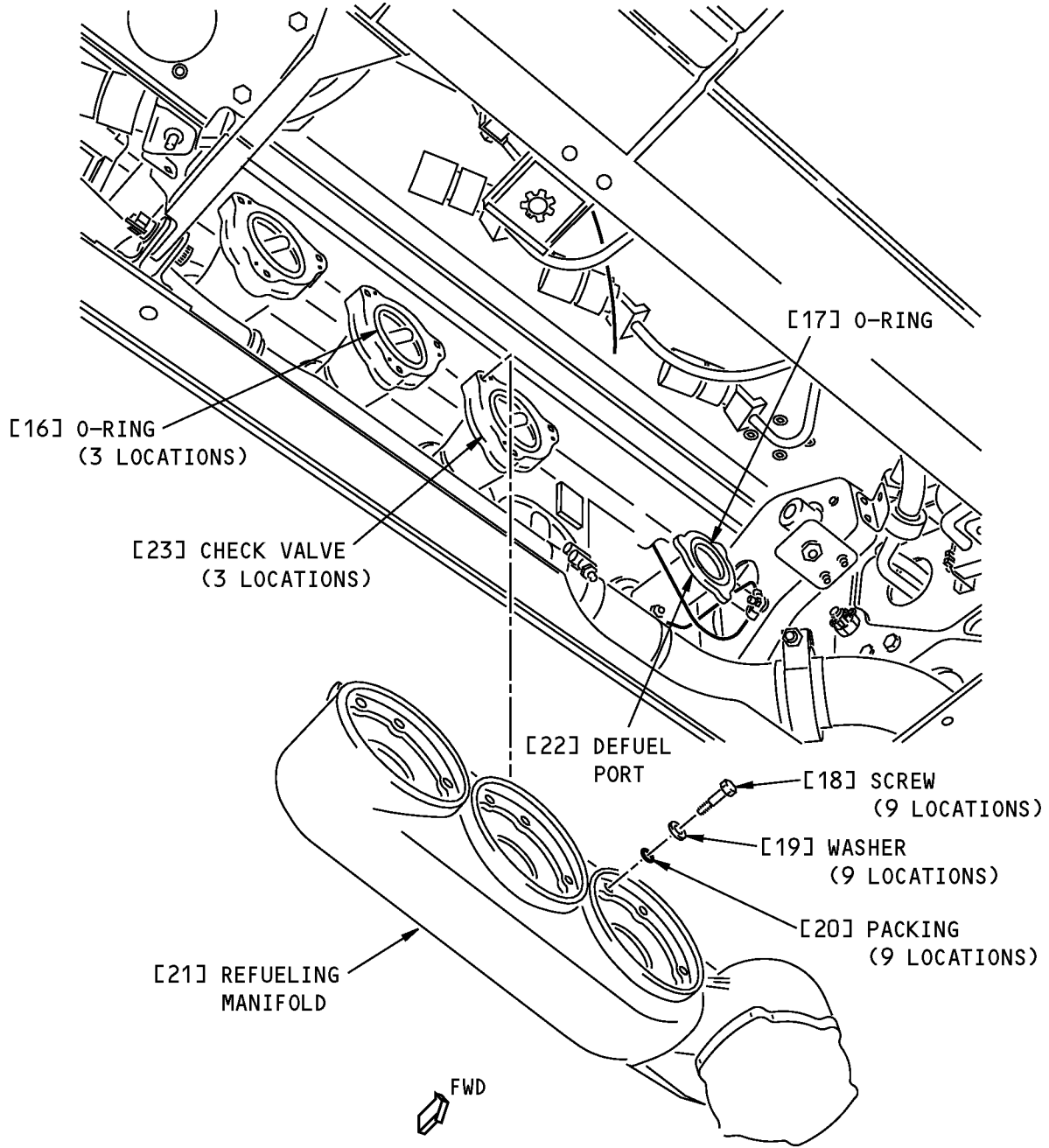
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**Refueling Manifold Installation
Figure 401 (Sheet 2 of 3)/28-21-21-990-802**

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MANIFOLD



Refueling Manifold Installation
Figure 401 (Sheet 3 of 3)/28-21-21-990-802

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TASK 28-21-21-400-801

3. Refueling Manifold Installation

A. References

Reference	Title
28-21-00-700-801	Pressure Fueling System - Test (P/B 501)
28-21-11-400-801	Fueling Receptacle Installation (P/B 401)
28-21-51-400-801	Install the Fueling Shutoff Valve (P/B 401)
28-41-61-400-801	Refuel Quantity Indicator Installation (P/B 401)
SWPM 20-20-00	Standard Wiring Practices Manual

B. Consumable Materials

Reference	Description	Specification
B00083	Solvent - Aliphatic Naphtha (For Acrylic Plastics)	TT-N-95 Type II, ASTM D-3735 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
21	Refueling manifold	28-21-52-01-110 28-21-52-01A-115	HAP 001-013, 015-026, 028-030 HAP 031-054, 101-999

D. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27
621HB	Lower Leading Edge Access Panel - Slat Station 170.21

E. Procedure

SUBTASK 28-21-21-160-001

- (1) Clean these surfaces with solvent, B00083 and dry with a cotton wiper, G00034.
 - (a) All of the machined surfaces on the refueling manifold [21]
 - (b) The O-ring grooves of the check valves [23]
 - (c) The O-ring grooves of the defuel port [22].

SUBTASK 28-21-21-420-001

- (2) Install new O-ring [16,17] lightly lubricated with fuel, on the check valves [23] and the defuel port [22].

SUBTASK 28-21-21-420-002

CAUTION: DO NOT LOOSEN THE O-RINGS OR PUSH THEM OUT OF THEIR CORRECT SHAPE WHEN YOU INSTALL THE MANIFOLD. A FUEL LEAK CAN EASILY OCCUR.

- (3) Install the refueling manifold [21].
 - (a) Put the refueling manifold [21] in its correct position between the support members for the leading edge.
 - (b) Engage the support bolts with your fingers.

NOTE: Do not install washers or bushings on the support bolts at this time.

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SUBTASK 28-21-21-420-003

(4) Engage the screws [18], washers [19], and packings [20] that attach the refueling manifold [21] to the check valves [23].

(a) Tighten all of the screws [18] equally.

SUBTASK 28-21-21-420-004

(5) Engage the bolt [6] and the washer [7] that attach the refueling manifold [21] to the defuel port [22].

(a) Tighten all of the bolts [6] equally.

SUBTASK 28-21-21-420-005

(6) Remove the support bolts [2,12] and install them again with the washers [3,13] and the bushings [4,14].

NOTE: Use the bushings [4,14] to make a good fit between the refueling manifold [21] and the support members for the leading edge when you tighten the bolts.

(a) Tighten the support bolts [2,12] to a final torque of 72-88 inch-pounds.

SUBTASK 28-21-21-410-001

(7) Install the fueling shutoff valves (TASK 28-21-51-400-801).

SUBTASK 28-21-21-410-002

(8) Install the fueling receptacle if you removed it (TASK 28-21-11-400-801).

SUBTASK 28-21-21-420-006

(9) Connect the bonding jumper on the aft inboard side of the refueling manifold to the airplane structure.

SUBTASK 28-21-21-420-007

(10) Make sure the bonding jumpers [11] from the fueling shutoff valves to the refueling manifold [21] are connected.

SUBTASK 28-21-21-760-001

(11) Do a check of the electrical bond between the refueling manifold [21] and the airplane structure (SWPM 20-20-00).

(a) The resistance must not be more than 0.001 ohm.

SUBTASK 28-21-21-420-008

(12) Connect the electrical connectors [15] to each of the fueling shutoff valves.

SUBTASK 28-21-21-010-006

(13) Install the TAI duct shield [5] with its two bolts.

SUBTASK 28-21-21-410-003

(14) Install the refuel instrument panel.

(a) Put the refuel instrument panel in its correct position between the support members for the leading edge.

(b) Put the screws in the refuel instrument panel.

SUBTASK 28-21-21-410-004

(15) Install the refuel quantity indicators in the refuel instrument panel (TASK 28-41-61-400-801).

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SUBTASK 28-21-21-410-005

(16) Install this access panel:

<u>Number</u>	<u>Name/Location</u>
621HB	Lower Leading Edge Access Panel - Slat Station 170.21

immediately outboard of this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-21-21-420-009

(17) Install the pins and the washers that attach the linkages to this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-21-21-710-001

(18) Do this task: Pressure Fueling System - Test, TASK 28-21-00-700-801.

SUBTASK 28-21-21-410-006

(19) Make sure this access panel is closed:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

————— **END OF TASK** —————

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FUELING CHECK VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

- (1) A task to remove the fueling check valve
- (2) A task to install the fueling check valve.

TASK 28-21-32-000-801

2. Fueling Check Valve Removal

(Figure 401)

A. References

Reference	Title
28-21-21-000-801	Refueling Manifold Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

B. Tools/Equipment

Reference	Description
STD-195	Container - 1 Quart (1 l), Oil/Fuel Resistant

C. Location Zones

Zone	Area
620	Subzone - Right Wing: Leading Edge, Forward of Front Spar, Outboard of Nacelle Strut

D. Procedure

SUBTASK 28-21-32-650-001

WARNING: CAREFULLY DO ALL OF THE SAFETY PROCEDURES TO DEFUEL THE FUEL TANK. AN EXPLOSION, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Defuel the No. 2 tank (TASK 28-26-00-650-801) or transfer fuel out of the No. 2 tank (TASK 28-26-00-650-802) to a fuel quantity less than 3,500 pounds (1,590 kilograms).
 - (a) The No. 2 tank must contain less than 3,500 pounds (1,590 kilograms) to do this procedure.

SUBTASK 28-21-32-860-001

- (2) Make sure the manual defueling valve is closed.

SUBTASK 28-21-32-010-001

- (3) Do this task: Refueling Manifold Removal, TASK 28-21-21-000-801.

SUBTASK 28-21-32-480-001

- (4) Put a 1 quart (1 l) oil/fuel resistant container, STD-195 below the check valve to catch fuel.

SUBTASK 28-21-32-020-001

- (5) Remove the screws [1] that attach the check valve [2].

SUBTASK 28-21-32-020-002

- (6) Remove the check valve [2].

————— **END OF TASK** —————

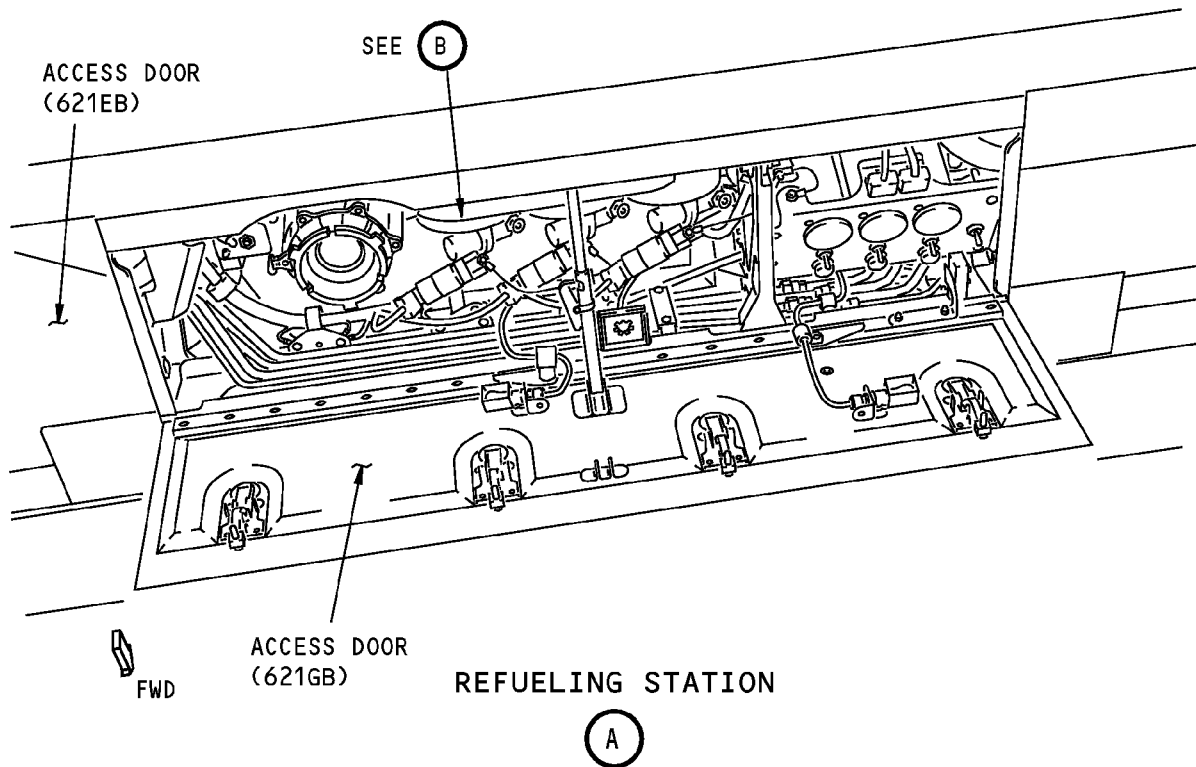
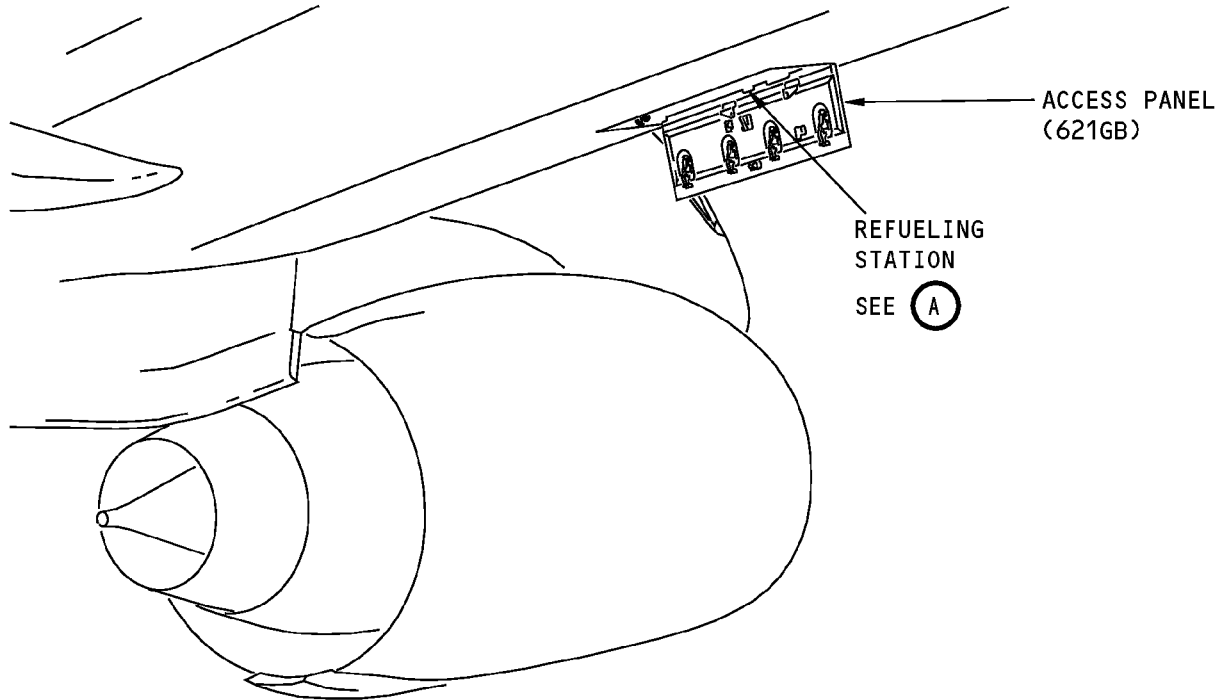
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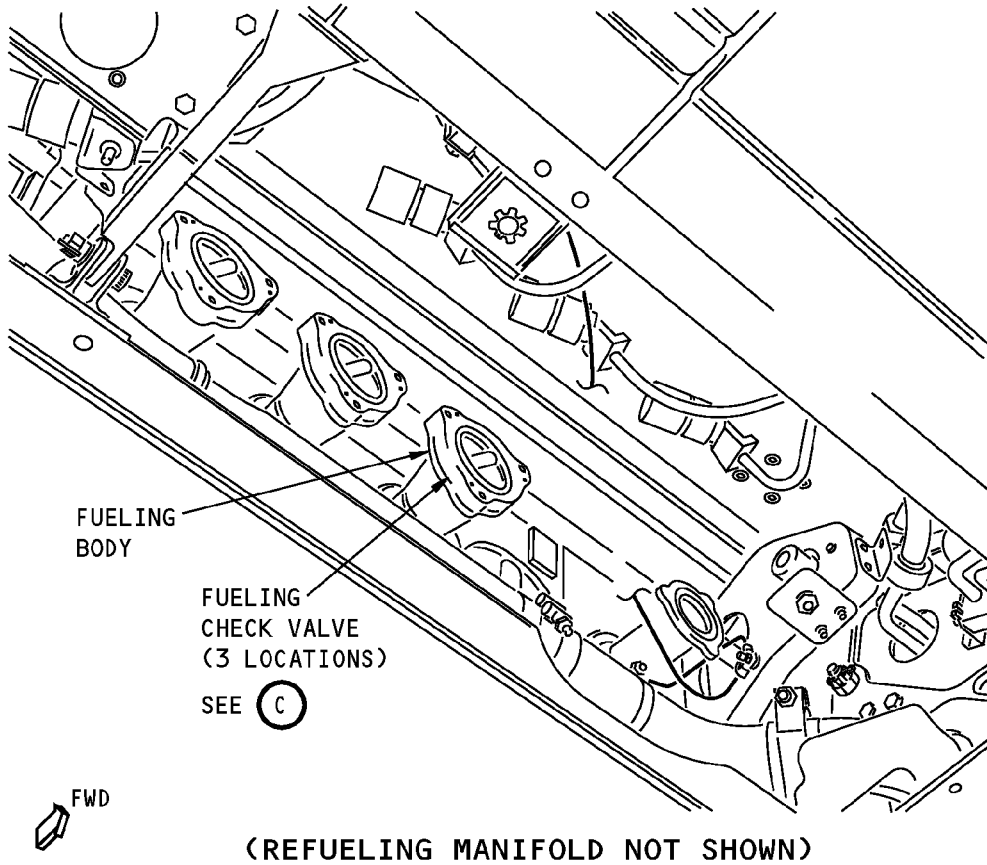
**Fueling Check Valve Installation
Figure 401 (Sheet 1 of 2)/28-21-32-990-801**

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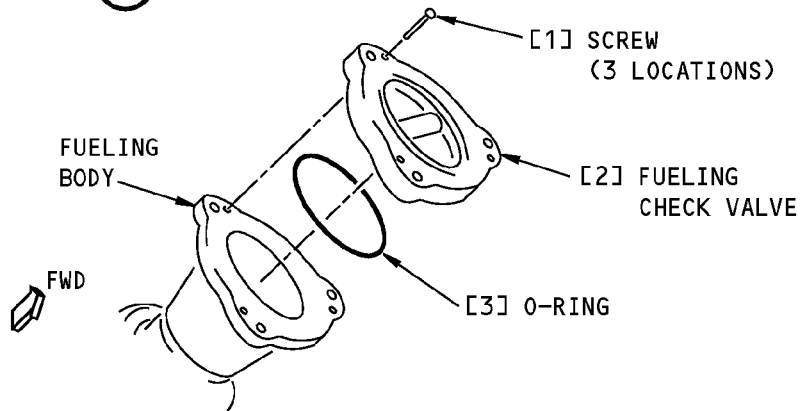
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(REFUELING MANIFOLD NOT SHOWN)

(B)



FUELING CHECK VALVE
(EXAMPLE)

(C)

**Fueling Check Valve Installation
Figure 401 (Sheet 2 of 2)/28-21-32-990-801**

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TASK 28-21-32-400-801

3. Fueling Check Valve Installation

A. References

Reference	Title
28-21-00-700-801	Pressure Fueling System - Test (P/B 501)
28-21-21-400-801	Refueling Manifold Installation (P/B 401)

B. Consumable Materials

Reference	Description	Specification
B00083	Solvent - Aliphatic Naphtha (For Acrylic Plastics)	TT-N-95 Type II, ASTM D-3735 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

C. Location Zones

Zone	Area
620	Subzone - Right Wing: Leading Edge, Forward of Front Spar, Outboard of Nacelle Strut

D. Procedure

SUBTASK 28-21-32-160-001

(1) Clean these surfaces with solvent, B00083 and dry with a cotton wiper, G00034.

- (a) The machined surface of the body assembly.
- (b) The O-ring groove of the check valve.

SUBTASK 28-21-32-420-001

(2) Install a new O-ring [3], lightly lubricated with fuel, on the check valve.

NOTE: Make sure you put the O-ring [3] on the side of the check valve [2] that has the poppet valve.

SUBTASK 28-21-32-420-002

CAUTION: DO NOT LOOSEN THE O-RING OR PUSH IT OUT OF ITS CORRECT SHAPE WHEN YOU INSTALL THE CHECK VALVE. YOU CAN CAUSE A FUEL LEAK.

- (3) Install the check valve [2].
 - (a) Put the check valve on the fueling body.
 - (b) Turn the check valve [2] to align the screw holes with the holes in the fueling body.
 - (c) Install the screws [1] in the check valve [2].
 - (d) Tighten all of the screws [1] equally to a final torque of 12-14 pound-inches.
 - (e) Make sure the check valve [2] is parallel to the flange of the body assembly.

SUBTASK 28-21-32-410-001

(4) Do this task: Refueling Manifold Installation, TASK 28-21-21-400-801.

SUBTASK 28-21-32-710-001

(5) If you did not do it during the refueling manifold installation, do this task: Pressure Fueling System - Test, TASK 28-21-00-700-801

————— **END OF TASK** —————

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FUELING BODY OR DEFUEL PORT ASSEMBLY - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

- (1) A task to remove the fueling body assembly or the defueling port assembly from the wing front spar
- (2) A task to install the fueling body assembly or the defueling port assembly on the wing front spar.

B. Three fueling body assemblies and one defueling port assembly are installed on the wing front spar. The procedure to remove and to install these parts is almost the same.

TASK 28-21-41-000-801

2. Fueling Body Assembly or Defueling Port Assembly Removal

(Figure 401)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-21-21-000-801	Refueling Manifold Removal (P/B 401)
28-22-15-000-801	Fuel Line, Fitting and Coupling - Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

B. Location Zones

Zone	Area
620	Subzone - Right Wing: Leading Edge, Forward of Front Spar, Outboard of Nacelle Strut

C. Access Panels

Number	Name/Location
632FB	Main Tank Access Door - Wing Station 367

D. Procedure

SUBTASK 28-21-41-650-001

WARNING: CAREFULLY DO ALL OF THE SAFETY PROCEDURES TO DEFUEL THE FUEL TANK AND TO GO INTO IT. AN EXPLOSION, INJURY TO PERSONS, AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Defuel the No. 2 fuel tank and prepare to go into it (TASK 28-11-00-910-802).

SUBTASK 28-21-41-650-002

- (2) If you are scheduled to remove the fueling body assembly for the center or the No. 1 tank, defuel the applicable tank (TASK 28-26-00-650-801) or (TASK 28-26-00-650-802).

SUBTASK 28-21-41-010-001

- (3) Do this task: Refueling Manifold Removal, TASK 28-21-21-000-801.

SUBTASK 28-21-41-010-002

- (4) Get access to the rear of the wing front spar.

- (a) Remove this access panel which is adjacent to the refuel station area:

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(TASK 28-11-11-000-801)

<u>Number</u>	<u>Name/Location</u>
632FB	Main Tank Access Door - Wing Station 367

SUBTASK 28-21-41-020-001

(5) Do these steps to remove the fueling body assembly or the defueling port assembly.

NOTE: Two persons are necessary to do this procedure.

- (a) One person in the tank must disconnect these parts that attach the applicable fueling body assembly or the defueling port assembly:
 - 1) The fueling line (or defueling line) [6] connected to the applicable fueling body assembly [1] or the defueling port assembly [2] (TASK 28-22-15-000-801).
 - 2) The mounting nut [5] at the rear of the front spar
 - 3) The washer [4] at the rear of the front spar.
- (b) A second person out of the tank must hold up the fueling body [1] or the defueling port assembly [2].
- (c) Then the second person removes the applicable fueling body [1] or the defueling port assembly [2].

————— **END OF TASK** —————

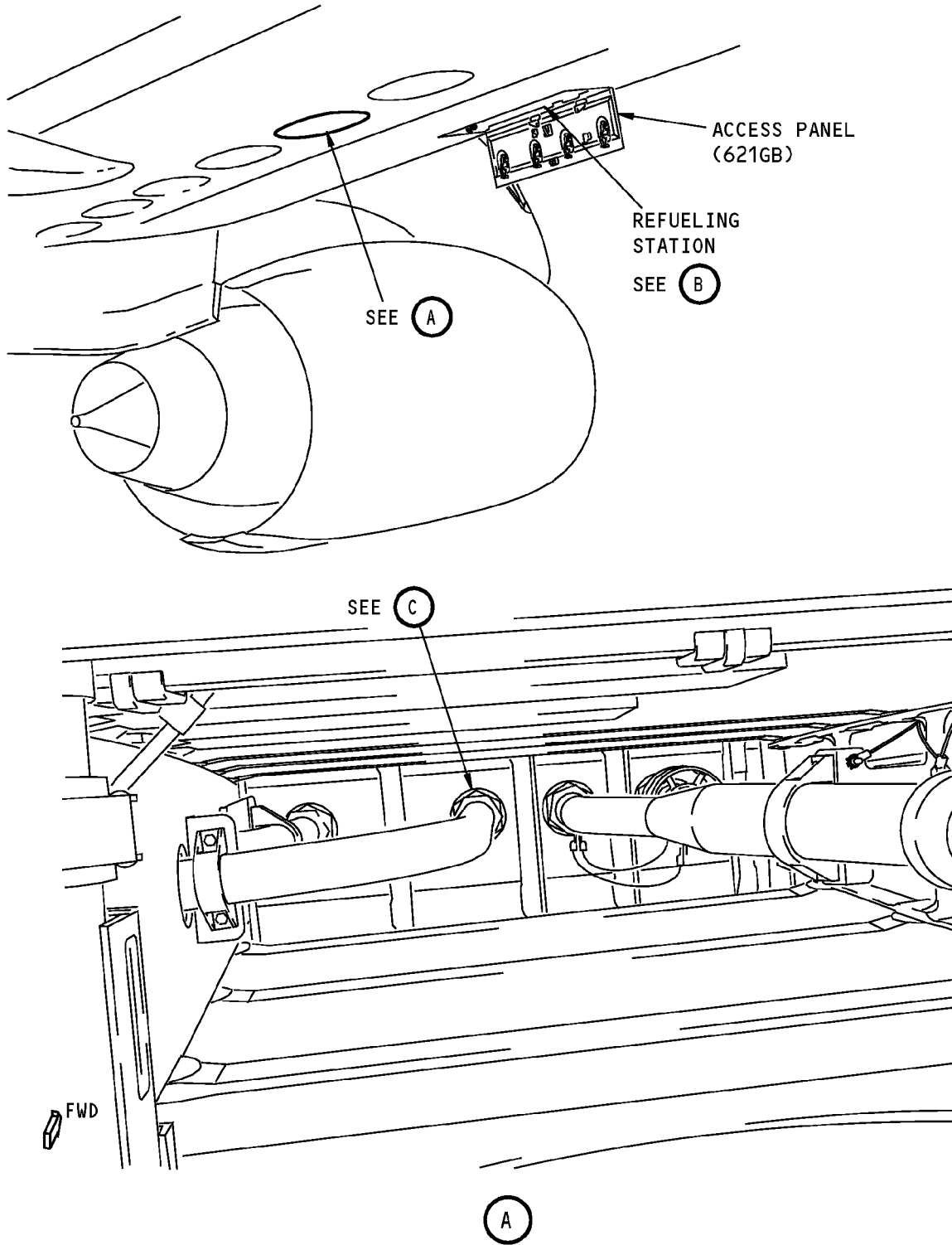
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**Fueling Body or Defueling Port Installation
Figure 401 (Sheet 1 of 2)/28-21-41-990-801**

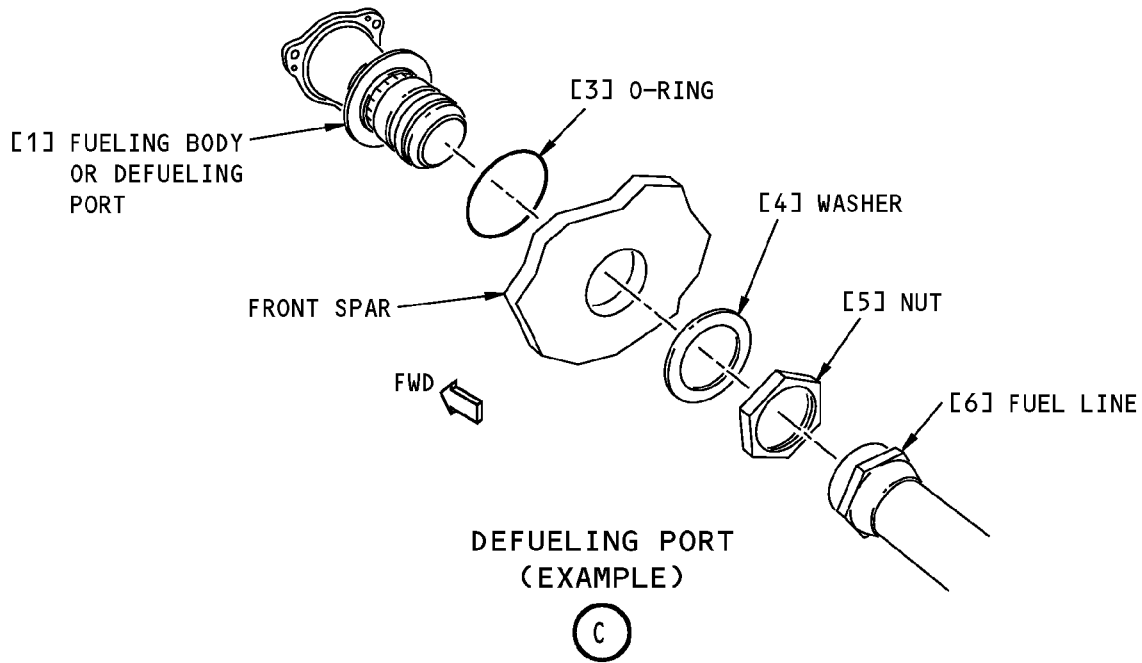
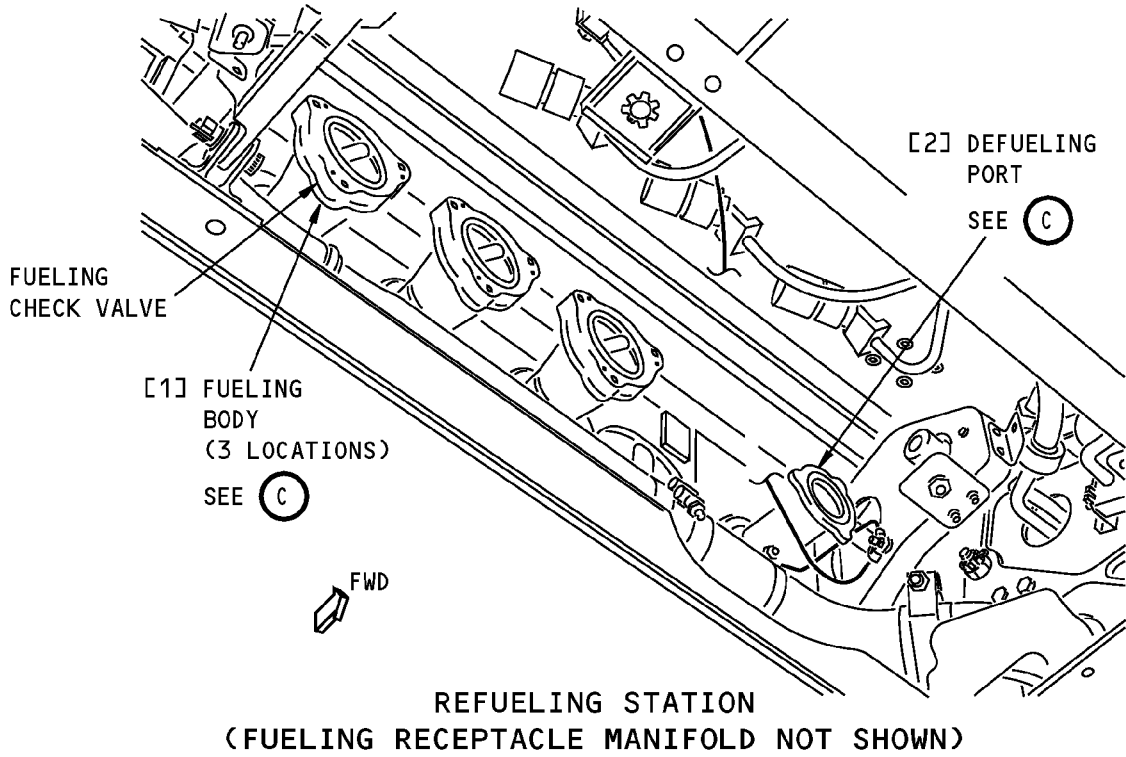
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Fueling Body or Defueling Port Installation
Figure 401 (Sheet 2 of 2)/28-21-41-990-801

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TASK 28-21-41-400-801

3. Fueling Body Assembly or Defueling Port Assembly Installation

(Figure 401)

A. References

Reference	Title
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-21-00-700-801	Pressure Fueling System - Test (P/B 501)
28-21-21-400-801	Refueling Manifold Installation (P/B 401)
28-21-32-400-801	Fueling Check Valve Installation (P/B 401)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)

B. Consumable Materials

Reference	Description	Specification
B00083	Solvent - Aliphatic Naphtha (For Acrylic Plastics)	TT-N-95 Type II, ASTM D-3735 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

C. Location Zones

Zone	Area
620	Subzone - Right Wing: Leading Edge, Forward of Front Spar, Outboard of Nacelle Strut

D. Access Panels

Number	Name/Location
632FB	Main Tank Access Door - Wing Station 367

E. Procedure

SUBTASK 28-21-41-160-001

- (1) Clean these surfaces with solvent, B00083 and dry with a cotton wiper, G00034:
 - (a) The O-ring grooves of the fueling body assembly or the defueling port assembly.
 - (b) The two sides of the front spar opening.

SUBTASK 28-21-41-420-001

- (2) Install a new O-ring [3], lightly lubricated with fuel, into the groove on the fueling body assembly [1] or the defueling port assembly [2].

SUBTASK 28-21-41-020-002

CAUTION: DO NOT LOOSEN THE O-RING OR PUSH IT OUT OF ITS CORRECT SHAPE WHEN YOU INSTALL THE FUELING BODY OR THE ELBOW ASSEMBLY. A FUEL LEAK CAN EASILY OCCUR.

- (3) Install the fueling body assembly [1] or the defueling port assembly [2].

NOTE: Two persons are necessary to do this procedure.

- (a) One person out of the tank must put the fueling body assembly [1] or the defueling port assembly [2] through the opening in the front spar.
- (b) A second person in the tank must connect these parts to attach the applicable fueling body assembly [1] or the defueling port assembly [2]:

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- 1) The washer [4] at the rear of the front spar.
 - 2) The mounting nut [5] at the rear of the front spar
- (c) Tighten the nut [5] with your fingers.

SUBTASK 28-21-41-410-001

- (4) Install the check valve assembly if you removed it (TASK 28-21-32-400-801).

SUBTASK 28-21-41-410-002

- (5) Do this task: Refueling Manifold Installation, TASK 28-21-21-400-801.

SUBTASK 28-21-41-420-002

- (6) Tighten the nut [5] on the fueling body assembly or the defueling port assembly to a torque of 855-945 inch-pounds (96.6-106.8 newton-meters).

SUBTASK 28-21-41-420-003

- (7) Attach the applicable fueling or defueling line to the fueling body [1] or defueling port assembly [2] (TASK 28-22-15-400-801).

SUBTASK 28-21-41-410-003

- (8) Install this access panel:

<u>Number</u>	<u>Name/Location</u>
632FB	Main Tank Access Door - Wing Station 367

(TASK 28-11-11-400-801).

SUBTASK 28-21-41-710-001

- (9) Do this task: Pressure Fueling System - Test, TASK 28-21-00-700-801.

————— **END OF TASK** —————

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FUELING SHUTOFF VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

- (1) A task to remove the fueling shutoff valve.
- (2) A task to install the fueling shutoff valve.

TASK 28-21-51-000-801

2. Remove the Fueling Shutoff Valve

(Figure 401)

A. References

Reference	Title
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

B. Tools/Equipment

Reference	Description
STD-195	Container - 1 Quart (1 l), Oil/Fuel Resistant

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

E. Prepare the Fueling Shutoff Valve for Removal

SUBTASK 28-21-51-650-001

- (1) Defuel the No. 2 tank (TASK 28-26-00-650-801) or transfer fuel out of the No. 2 tank (TASK 28-26-00-650-802) until the No. 2 tank contains less than 3500 lb (1588 kg).

SUBTASK 28-21-51-010-001

- (2) Open this access panel:

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-21-51-860-001

- (3) Make sure the manual defueling valve is closed.

SUBTASK 28-21-51-860-002

- (4) Make sure all the fueling shutoff valve switches at the fueling station are in the CLOSE position.

SUBTASK 28-21-51-860-003

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	3	C00032	FUEL FUELING CONT
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2

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<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	6	C00397	FUEL QTY 1

SUBTASK 28-21-51-680-001

(6) Put the 1 quart (1 l) oil/fuel resistant container, STD-195, below the receptacle to catch fuel.

SUBTASK 28-21-51-860-004

(7) Push the poppet valve in the receptacle.

(a) Let the remaining fuel drain from the receptacle and the manifold.

SUBTASK 28-21-51-020-002

(8) Disconnect the electrical connector [8] from the fueling shutoff valve [2].

(a) If more than one fueling shutoff valve [2] is replaced, install identification tags on the electrical connectors [8].

NOTE: This will help make sure the correct the electrical connector [8] is re-installed to the correct fueling shutoff valve [2].

SUBTASK 28-21-51-020-003

(9) Disconnect the bonding jumper [3] from the fueling shutoff valve [2].

SUBTASK 28-21-51-860-006

(10) Put the container below the fueling shutoff valve [2] to catch fuel.

F. Remove the Fueling Shutoff Valve

SUBTASK 28-21-51-020-004

(1) Hold the fueling shutoff valve [2] and remove the bolts [7] that attach the valve to the refueling manifold [9].

SUBTASK 28-21-51-020-005

(2) Remove the fueling shutoff valve [2] from the refueling manifold [9].

————— **END OF TASK** —————

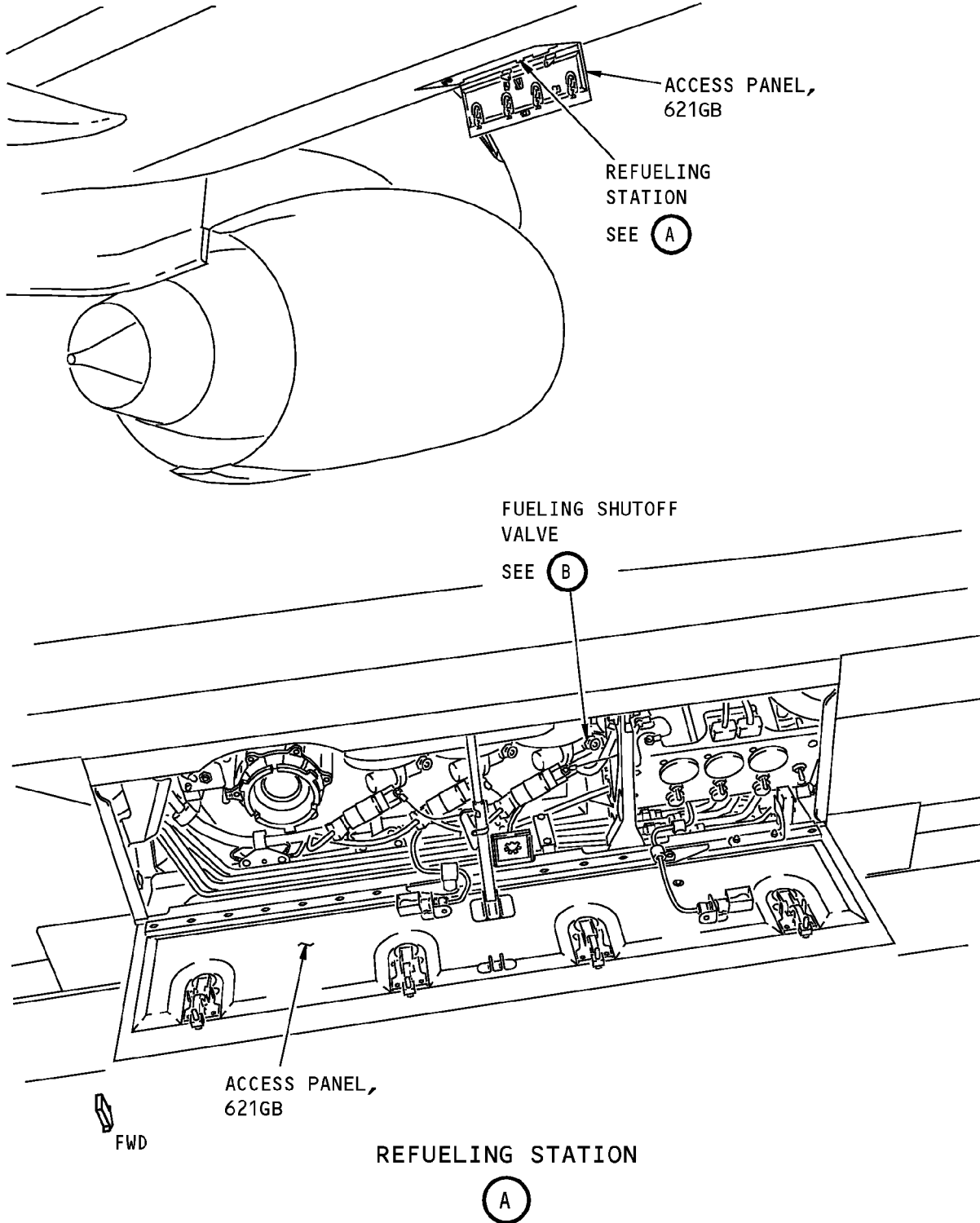
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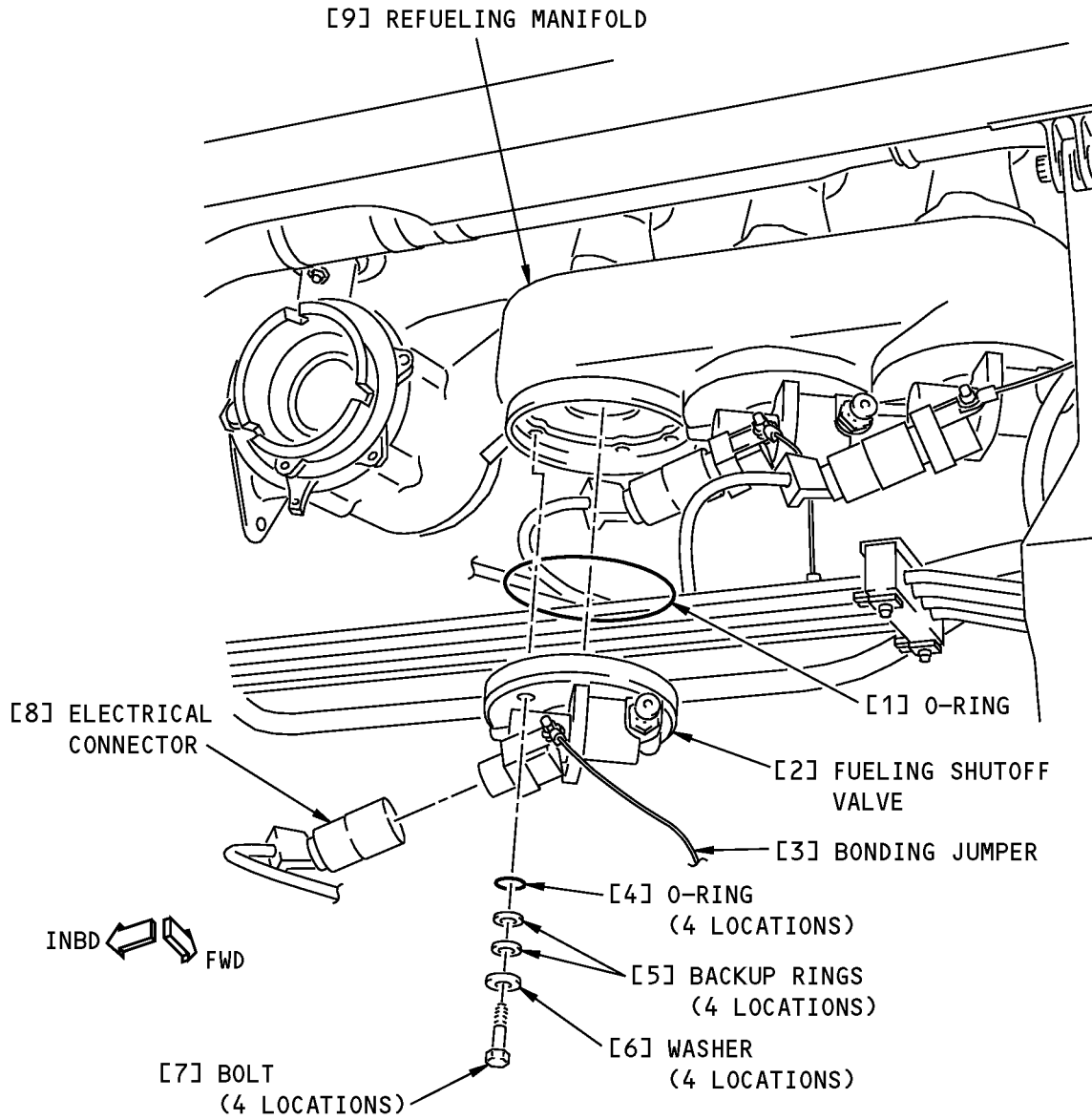
**Fueling Shutoff Valve Installation
Figure 401 (Sheet 1 of 2)/28-21-51-990-802**

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FUELING SHUTOFF VALVE

B

**Fueling Shutoff Valve Installation
Figure 401 (Sheet 2 of 2)/28-21-51-990-802**

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TASK 28-21-51-400-801

3. Install the Fueling Shutoff Valve

(Figure 401)

A. References

Reference	Title
20-10-51-760-801	Electrical Resistance Specifications in the Fuel Tank Check (P/B 401)
28-21-00-700-801	Pressure Fueling System - Test (P/B 501)

B. Consumable Materials

Reference	Description	Specification
B00083	Solvent - Aliphatic Naphtha (For Acrylic Plastics)	TT-N-95 Type II, ASTM D-3735 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

E. Prepare the Fueling Shutoff Valve for Installation

SUBTASK 28-21-51-110-001

(1) Clean the bolts [7], washers [6], and backup rings [5] with solvent, B00083.

SUBTASK 28-21-51-110-002

(2) Dry them with a cotton wiper, G00034.

SUBTASK 28-21-51-420-001

(3) Install the washer [6] and backup rings [5] on the bolts [7] that will attach the fueling shutoff valve [2].

SUBTASK 28-21-51-420-002

(4) Install a new O-ring [4], lightly lubricated with fuel, on the bolts [7].

SUBTASK 28-21-51-110-003

(5) Clean the machined surfaces of the manifold and the fueling shutoff valve with solvent.

SUBTASK 28-21-51-110-004

(6) Rub the surfaces dry with a cotton wiper, G00034.

SUBTASK 28-21-51-420-003

(7) Install a new O-ring [1], lightly lubricated with fuel, on the fueling shutoff valve.

F. Install the Fueling Shutoff Valve

SUBTASK 28-21-51-640-001

(1) Lightly lubricate the shutoff valve O-ring [1] with fuel.

SUBTASK 28-21-51-420-004

(2) Put the fueling shutoff valve [2] into the fueling manifold [9].

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SUBTASK 28-21-51-420-005

CAUTION: DO NOT REMOVE OR HOLD THE O-RING TOO TIGHTLY WHEN YOU TURN THE FUELING SHUTOFF VALVE. YOU CAN CAUSE DAMAGE TO THE O-RING IF YOU ARE NOT CAREFUL.

(3) Turn the fueling shutoff valve [2] until the bolt holes align with the holes in the refueling manifold [9].

SUBTASK 28-21-51-640-002

(4) Lightly lubricate the bolt O-rings [4] with fuel.

SUBTASK 28-21-51-420-006

(5) Install the bolts [7] and tighten them with your fingers while you hold the fueling shutoff valve [2] in its position.

SUBTASK 28-21-51-420-007

(6) Tighten all the bolts [7] equally in 4.5 ± 1.5 in-lb (0.5 ± 0.2 N·m) increments to a final torque of 24 in-lb (3 N·m).

SUBTASK 28-21-51-420-008

(7) Connect the bonding jumper [3] to the fueling shutoff valve [2].

SUBTASK 28-21-51-420-009

(8) Connect the electrical connector [8] to the fueling shutoff valve [2].

(a) If more than one fueling shutoff valve [2] is installed, make sure the correct electrical connector [8] is installed on the correct fueling shutoff valve [2].

1) Remove the identification tags from the electrical connectors [8].

SUBTASK 28-21-51-420-010

(9) Measure the electrical bond between the fueling shutoff valve [2] and the structure (TASK 20-10-51-760-801).

(a) Make sure the resistance is 0.0010 ohm (1.0 milliohm) or less.

SUBTASK 28-21-51-860-007

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

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	3	C00032	FUEL FUELING CONT
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-21-51-710-001

(11) Do this task: Pressure Fueling System - Test, TASK 28-21-00-700-801.

SUBTASK 28-21-51-410-002

(12) Make sure this access panel is closed:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

————— END OF TASK —————

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FUELING SHUTOFF VALVE - INSPECTION/CHECK

1. General

- A. This procedure contains scheduled maintenance task data.
B. This procedure contains a functional check of the bonding resistance between the fueling shutoff valve solenoid and the structure.

TASK 28-21-51-200-801

2. Fueling Shutoff Valve - Bonding Resistance Check

(Figure 601)

A. General

- (1) This procedure is a scheduled maintenance task.

B. References

Table with 2 columns: Reference, Title. Row: SWPM 20-20-00, Electrical Bonds and Grounds

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Table with 2 columns: Reference, Description. Row: COM-1550, Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)

D. Location Zones

Table with 2 columns: Zone, Area. Row: 621, Right Wing - Leading Edge to Front Spar

E. Access Panels

Table with 2 columns: Number, Name/Location. Row: 621GB, Refuel Access Panel - Slat Station 143.27

F. Prepare for the Procedure

SUBTASK 28-21-51-010-002

- (1) Open this access panel:

Table with 2 columns: Number, Name/Location. Row: 621GB, Refuel Access Panel - Slat Station 143.27

SUBTASK 28-21-51-710-002

- (2) Make sure the manual defueling valve is closed.

SUBTASK 28-21-51-710-003

- (3) Make sure all the fueling shutoff valve switches at the fueling station are in the CLOSED position.

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SUBTASK 28-21-51-865-001

(4) Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	3	C00032	FUEL FUELING CONT
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

G. Electrical Bonding Measurement

SUBTASK 28-21-51-862-001

(1) Disconnect the electrical connector from the fueling shutoff valve (three locations).

SUBTASK 28-21-51-765-001

(2) Measure the electrical bonding resistance between the fueling shutoff valve (at the electrical connector flange) and the spar with a bonding meter, COM-1550 (three locations)(SWPM 20-20-00).

(a) Make sure the bonding resistance is 0.008 ohm (8 milliohms) or less.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-21-51-861-001

(1) Connect the electrical connector to the fueling shutoff valve (three locations).

SUBTASK 28-21-51-865-002

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

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	3	C00032	FUEL FUELING CONT
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-21-51-410-003

(3) Make sure this access panel is closed:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

————— END OF TASK —————

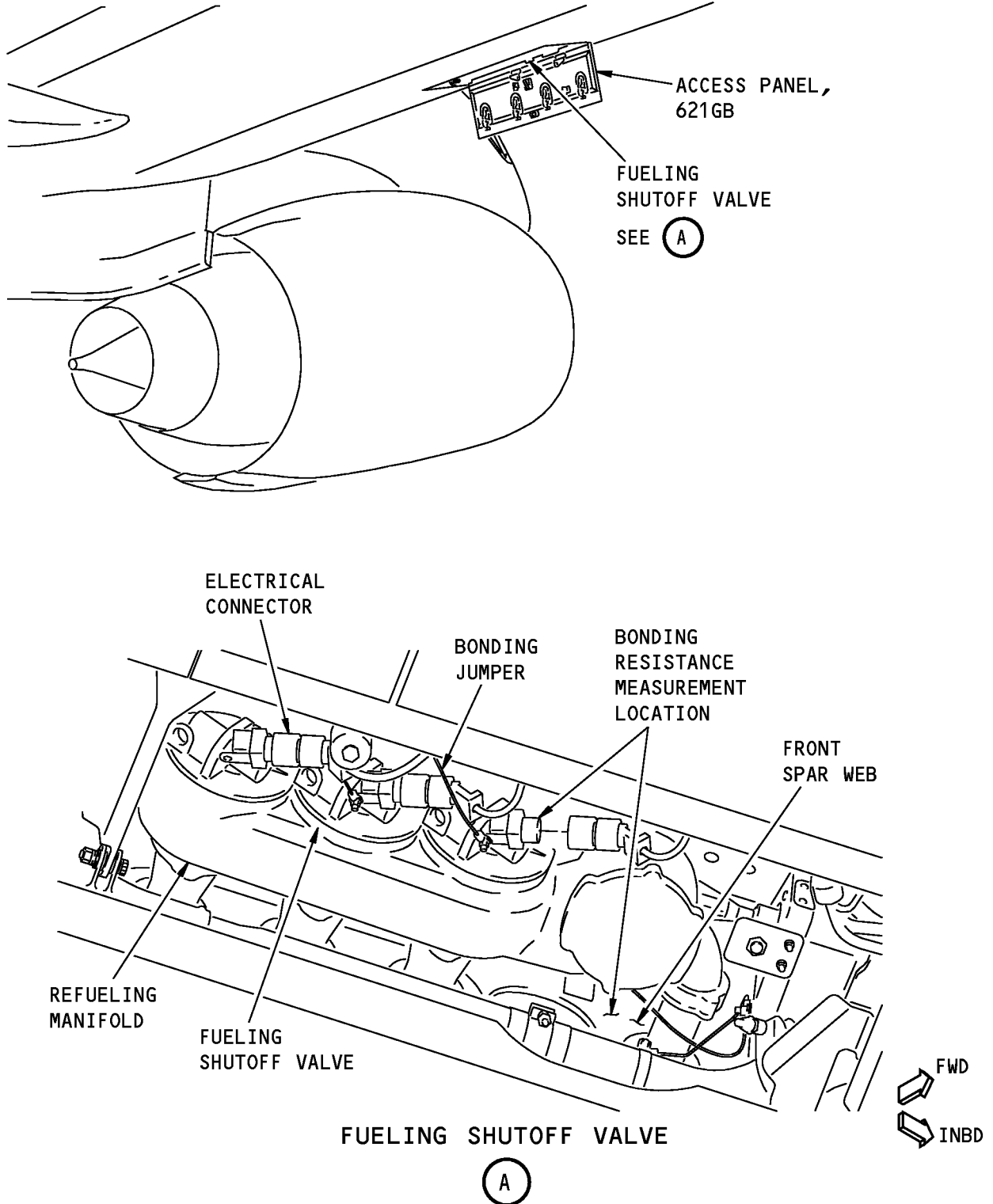
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**Fueling Shutoff Valve - Bonding Resistance Measurement
Figure 601/28-21-51-990-803**

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FUELING FLOAT SWITCH - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

HAP 001-013, 015-020, 025, 026 PRE SB 737-28A1142

- (1) A task to remove the float switch (Type I) in each fuel tank.
- (2) A task to install the float switch (Type I) in each fuel tank.

HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025, 026 POST SB 737-28A1142

- (3) A task to remove the float switch (Type II) in each fuel tank.
- (4) A task to install the float switch (Type II) in each fuel tank.

HAP ALL

- B. The fueling float switch is referred to as the float switch in this procedure.
- C. A float switch in each fuel tank monitors the level of the fuel during the refuel procedure. The float switch stops the refuel operation when the tank is full. The electrical wires that go to the switches are in a conduit with connections that fuel cannot go through. Some wire splices are installed adjacent to the applicable conduit bulkhead fitting at the wing front spar.

HAP 001-013, 015-020, 025, 026 PRE SB 737-28A1142

- D. The Type I float switch installation has an elbow joint immediately below the float switch (Figure 402). The conduit for the Type I float switch does not contain a liner. The Type I float switch has a red float shell. Service Bulletin 737-28-1142 replaces the Type I float switch installation with the Type II float switch installation.

HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025, 026 POST SB 737-28A1142

- E. The Type II float switch does not have an elbow joint below the float switch (Figure 407). The Type II float switch has a green float shell. In the No. 1 and No. 2 tanks, the Type II float switch conduit must be replaced if the float switch is replaced. In the center tank, the conduit for the Type II float switch contains a liner which must be replaced each time the float switch is replaced. Service Bulletin 737-28-1142 replaces the Type I float switch installation with the Type II float switch installation.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- F. The liner provides protection against chafing between the float switch wiring and the conduit. Additionally, the liner protects the conduit from rupturing, which can be caused by freezing water that condenses inside the conduit, by permitting instant drainage of such water.
- G. The convoluted tube assembly is referred to as the liner in this procedure.

HAP 001-013, 015-020, 025, 026 PRE SB 737-28A1142

TASK 28-21-71-000-801

2. Float Switch Removal

(Figure 401, Figure 402, Figure 403, Figure 404, Figure 405)

A. References

Reference	Title
24-22-00-860-812	Remove Electrical Power (P/B 201)
27-81-00-480-801	Leading Edge Flap and Slat Locks Installation (P/B 201)
27-81-00-860-803	Leading Edge Flaps and Slats Extension (P/B 201)

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HAP 001-013, 015-020, 025, 026 PRE SB 737-28A1142 (Continued)

(Continued)

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)

B. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Access Panels

Number	Name/Location
131AB	Center Tank Access
532PB	Main Tank Access Door - Wing Station 576
632PB	Main Tank Access Door - Wing Station 576

D. Preparation

SUBTASK 28-21-71-650-001

WARNING: CAREFULLY DO ALL OF THE SAFETY PROCEDURES TO DEFUEL THE FUEL TANK AND TO PREPARE TO GO INTO IT. AN EXPLOSION, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Prepare to go into the applicable fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-21-71-860-001

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE AND TRAILING EDGE FLAP DRIVE MECHANISMS. THE LEADING EDGE AND THE TRAILING EDGE CONTROL SURFACES CAN EXTEND AND RETRACT QUICKLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Do this task: Leading Edge Flaps and Slats Extension, TASK 27-81-00-860-803.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL THE LE SLAT SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) Do this task: Leading Edge Flap and Slat Locks Installation, TASK 27-81-00-480-801.

SUBTASK 28-21-71-860-002

- (3) Make sure the fueling shutoff valves at the refuel station are closed.

SUBTASK 28-21-71-860-003

- (4) If electrical power is connected, do this task: Remove Electrical Power, TASK 24-22-00-860-812.

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HAP 001-013, 015-020, 025, 026 PRE SB 737-28A1142 (Continued)

SUBTASK 28-21-71-010-001

- (5) Do these steps to get access to the float switches (Figure 402, Figure 403):
- (a) To get access to the float switch in the No. 1 tank, remove this access panel:
- | <u>Number</u> | <u>Name/Location</u> |
|---------------|--|
| 532PB | Main Tank Access Door - Wing Station 576 |
- (TASK 28-11-11-000-801).
- (b) To get access to the float switch in the No. 2 tank, remove this access panel:
- | <u>Number</u> | <u>Name/Location</u> |
|---------------|--|
| 632PB | Main Tank Access Door - Wing Station 576 |
- (TASK 28-11-11-000-801).
- (c) To get access to the float switch in the center tank (TASK 28-11-31-000-801).
Remove this access panel:
- | <u>Number</u> | <u>Name/Location</u> |
|---------------|----------------------|
| 131AB | Center Tank Access |

E. Fueling Float Switch Removal (TYPE I FLOAT SWITCH)

SUBTASK 28-21-71-020-001

- (1) Prepare to cut the wires that go to the float switch (Figure 401).
- (a) Go out of the fuel tank.
- (b) Separate the wires that go to the float switch from the wire bundle, forward of the wing front spar.
- (c) Find the splice in the wires that go to the float switch.

SUBTASK 28-21-71-020-002

- (2) Cut the wires at a good point adjacent to the splice.
- (a) Make sure the wire has a sufficient length for a new splice.
- (b) Put a tag on the wires to identify them.

SUBTASK 28-21-71-020-004

- (3) Do these steps to remove the float switch.
- (a) For the float switch in the No. 1 tank or the No. 2 tank, do these steps (Figure 402):
- 1) Disengage the mounting nut [26] for the float switch [21].
 - 2) Lift the float switch [21] up from the bracket [27].
 - 3) Move the switch out to the side of the bracket [27] to let the wires go through the hole in the bracket [27].
- NOTE:** For the No. 1 and No. 2 tank float switch [21], the conduit is filled with grease to prevent damage from water.
- 4) Install the mounting nut [26] and the washer [23] loosely in the bracket [26] again.
 - 5) Hold the float switch [21] and do not let it fall while you pull the wires for the float switch [21] out of the conduit.

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AIRCRAFT MAINTENANCE MANUAL

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CAUTION: IN THE CENTER TANK, DO NOT LET THE TOOLS OR THE TANK COMPONENTS FALL. DAMAGE TO THE FUEL CELL OR THE BOTTOM SKIN CAN EASILY OCCUR.

- (b) For the float switch [41] in the center tank, do these steps (Figure 403):
- 1) Loosen and disconnect the elbow [49] from the conduit [5].
 - 2) Remove the three bolts [45], washers [46,47], and nuts [48] that attach the bracket [52] to the bracket [44].
 - 3) Hold the float switch with its attaching parts and do not let it fall while you pull the wires for the float switch out of the conduit.
- (c) Make loops in the wire to make the wire and the float switch easy to move.
- (d) Remove the float switch from the fuel tank.
- (e) When it is necessary to remove the conduit [5] for the fueling float switch [21] in the wing tank, do these steps:
- 1) From out of the wing tank remove the conduit mounting nut [3] (Figure 401).
NOTE: Make sure the conduit is held from inside the tank while the bulkhead fitting is removed. This is to prevent the conduit and fitting from falling in the tank.
 - 2) Remove the washer [4].
 - 3) From inside the wing tank, loosen the bulkhead conduit captive nut [72] to remove the conduit at the bulkhead union [6] (Figure 404).
 - 4) Remove the bulkhead union [6].
 - 5) Remove the bulkhead union O-ring [71].
 - 6) Remove the conduit [5].

SUBTASK 28-21-71-020-015

- (4) When it is necessary to remove the conduit [5] for the fueling float switch [41] in the center tank, do these steps:
- (a) From out of the center tank remove the conduit mounting nut [3] (Figure 401).
NOTE: Make sure the conduit is held from inside the tank while the bulkhead fitting is removed. This is to prevent the conduit and fitting from falling in the tank.
- (b) Remove the washer [4].
- (c) From inside the center tank, loosen the bulkhead conduit captive nut [72] to remove the conduit at the bulkhead union [6] (Figure 404).
- (d) Remove the bulkhead union [6].
- (e) Remove the bulkhead union O-ring [71].
- (f) Remove the conduit [5].

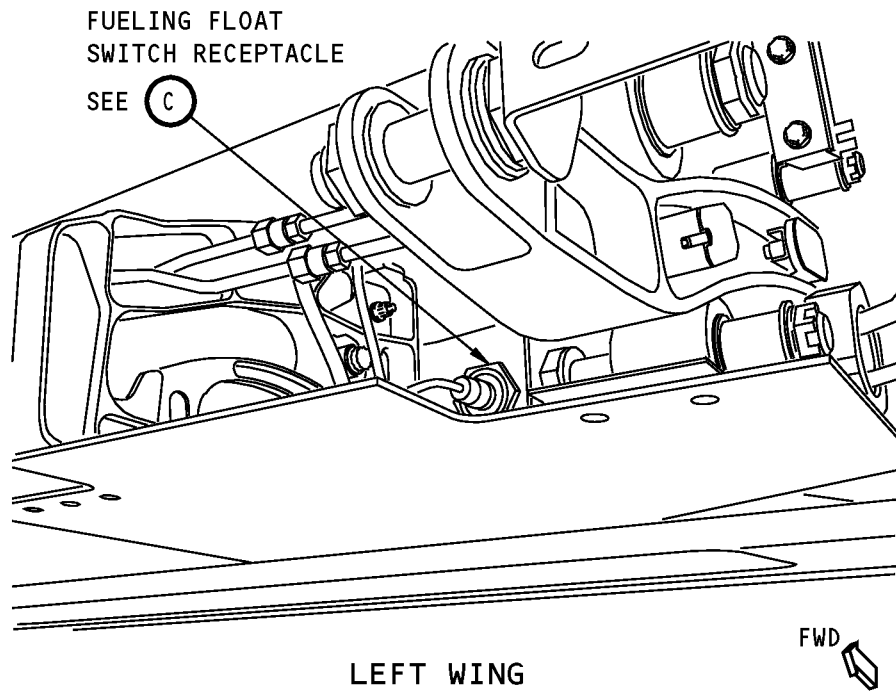
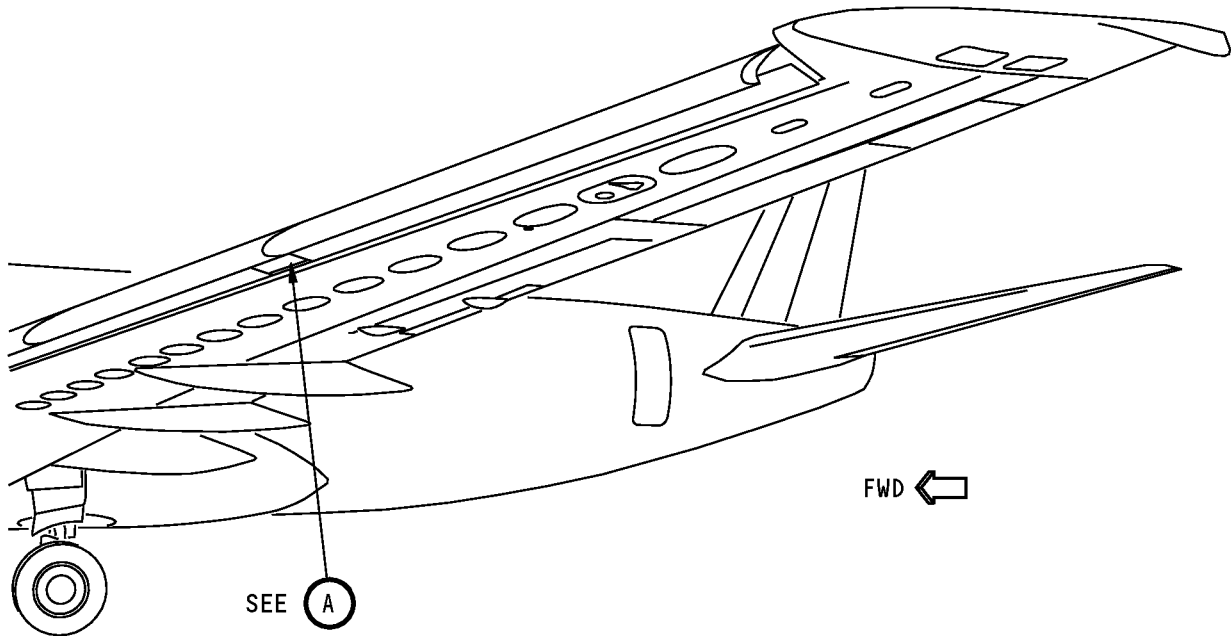
————— **END OF TASK** —————

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**LEFT WING
(RIGHT WING IS EQUIVALENT)**

A

**Fueling Float Switch Receptacle Installation (Type I)
Figure 401 (Sheet 1 of 3)/28-21-71-990-825**

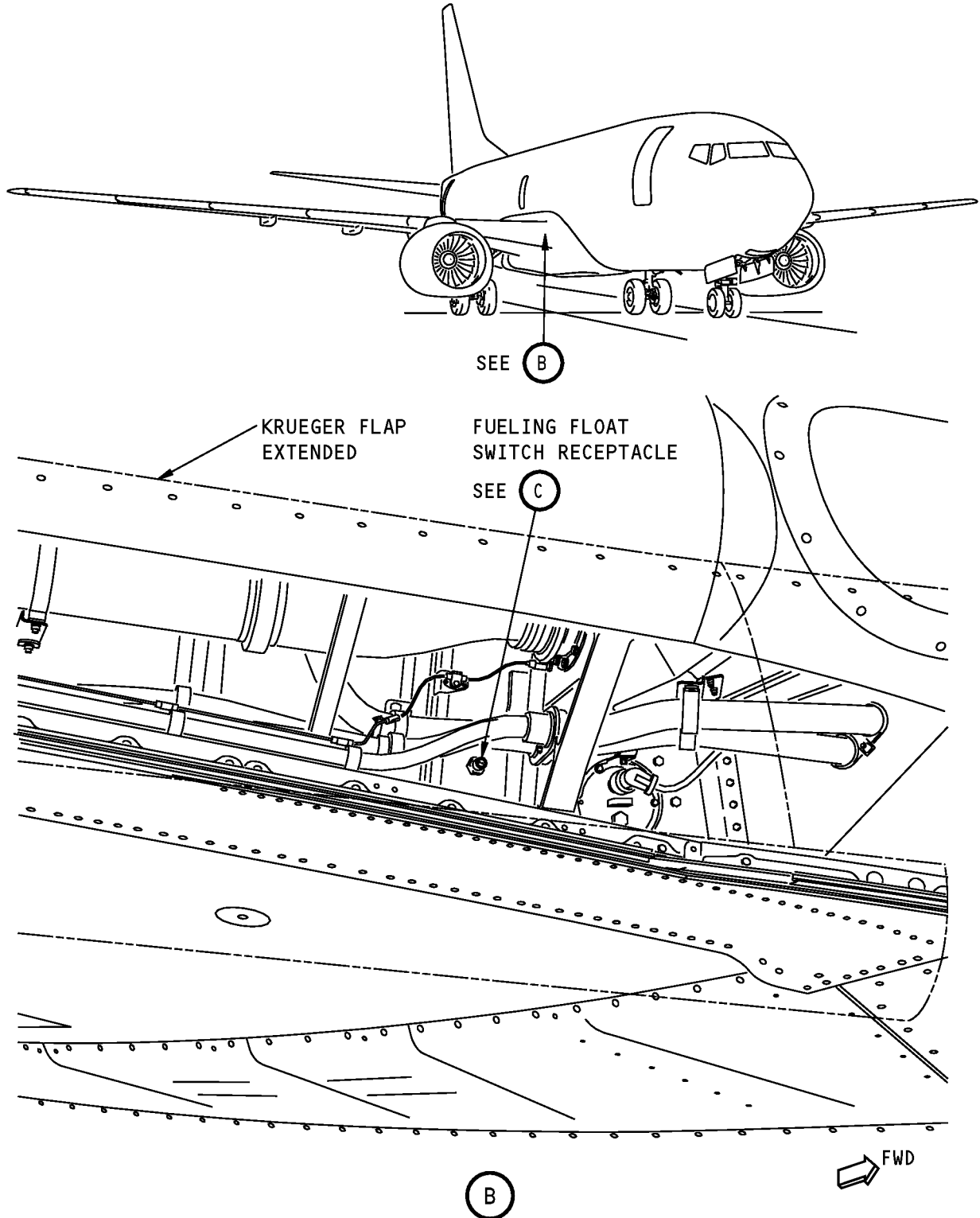
EFFECTIVITY
HAP 001-013, 015-020, 025, 026 PRE SB 737-28A1142

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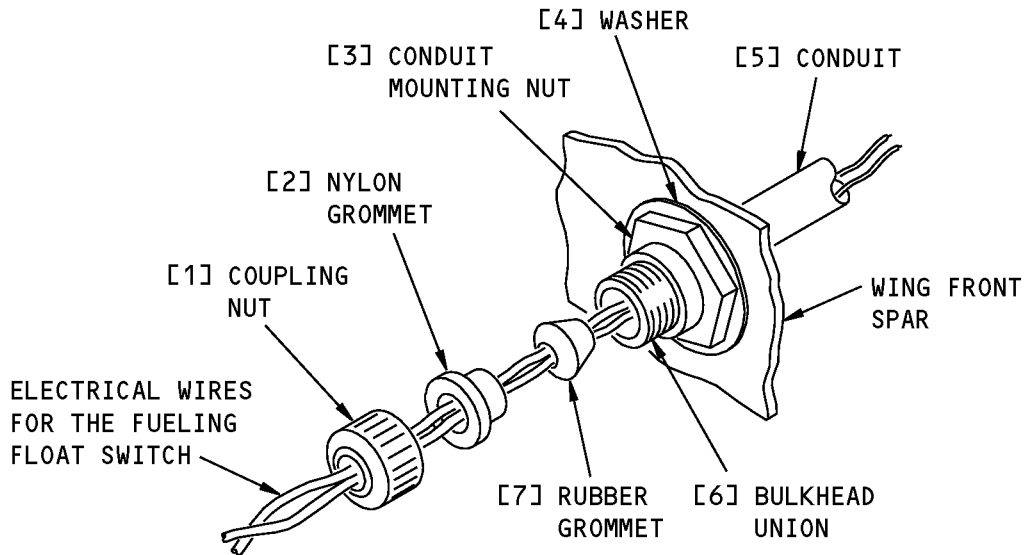
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**Fueling Float Switch Receptacle Installation (Type I)
Figure 401 (Sheet 2 of 3)/28-21-71-990-825**

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**FUELING FLOAT SWITCH RECEPTACLE
(EXAMPLE)**

(C)

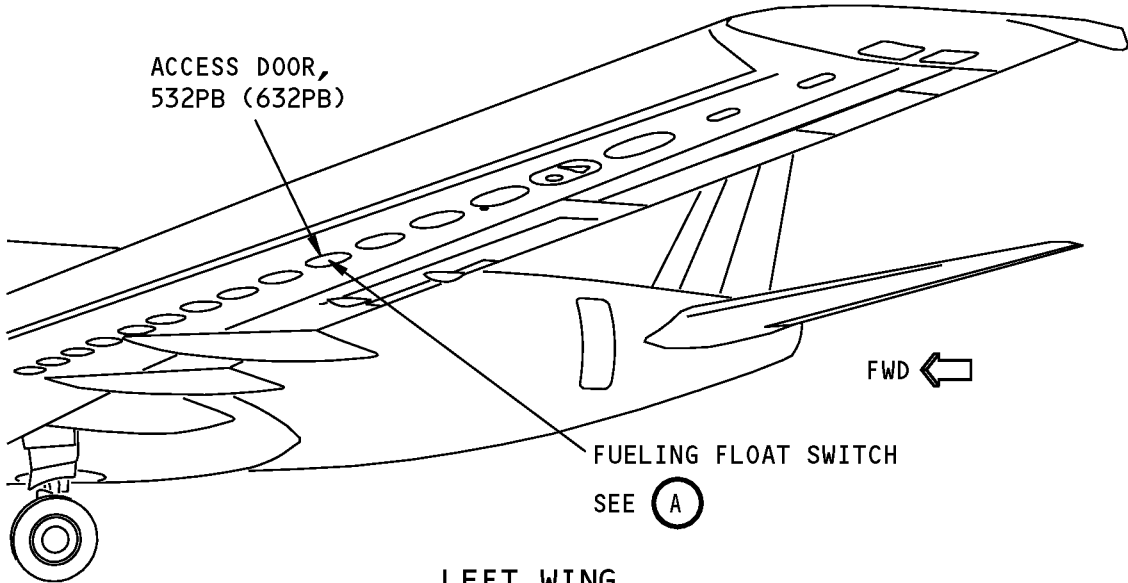
**Fueling Float Switch Receptacle Installation (Type I)
Figure 401 (Sheet 3 of 3)/28-21-71-990-825**

EFFECTIVITY
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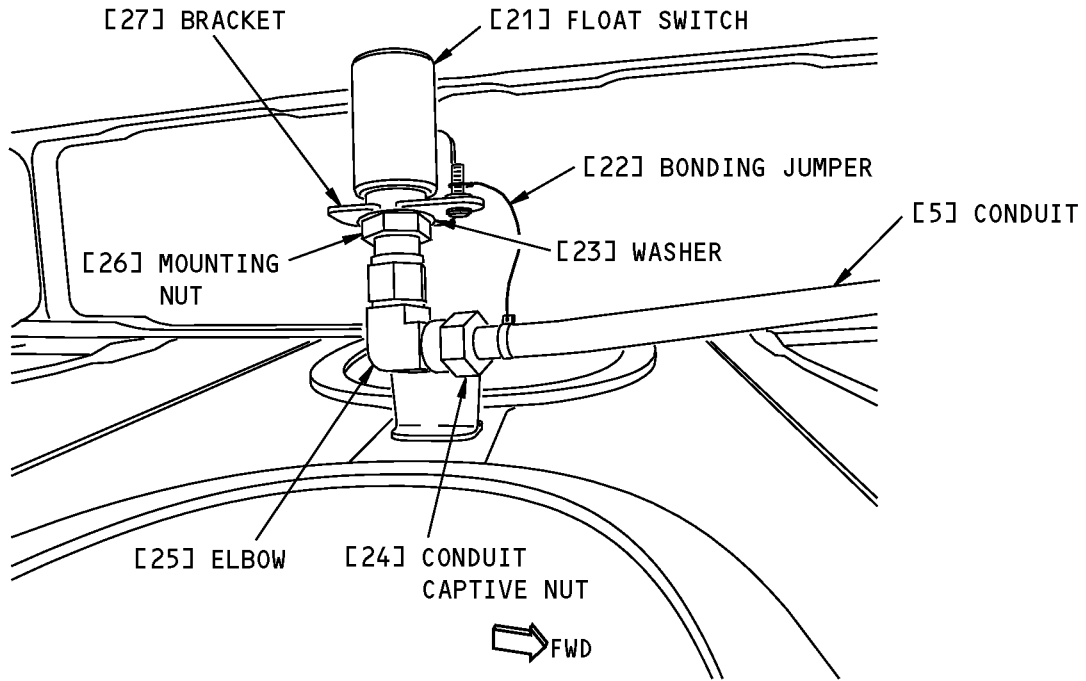
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**LEFT WING
(RIGHT WING IS EQUIVALENT)**



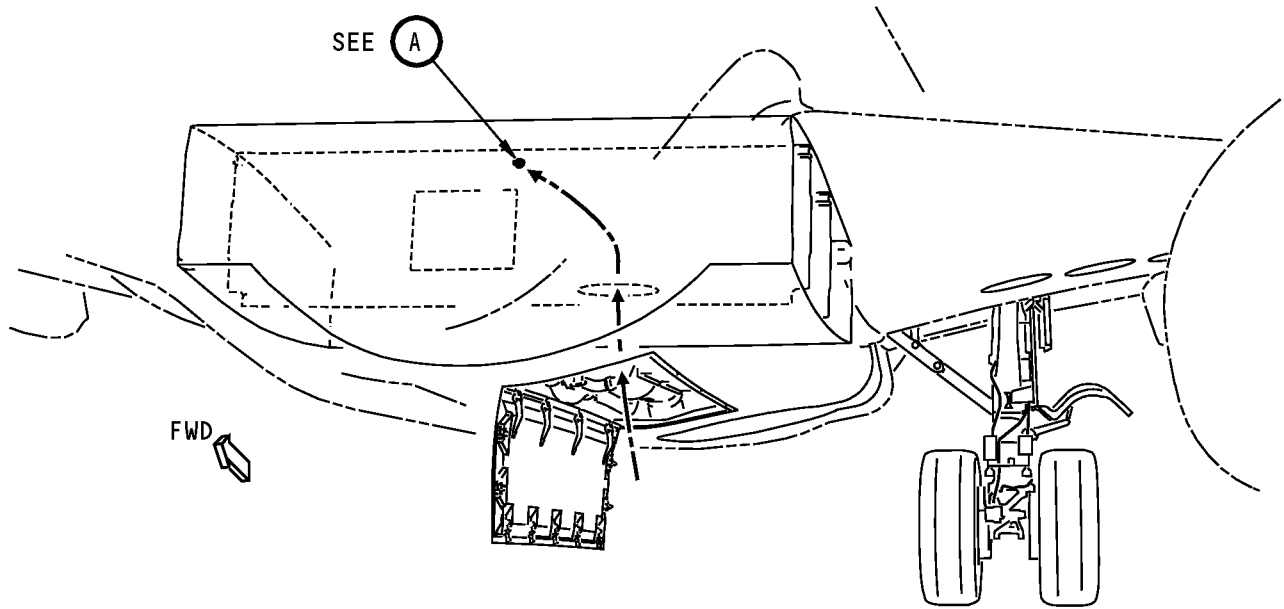
FUELING FLOAT SWITCH

(A)

**Main Tank Fueling Float Switch Installation (Type I)
Figure 402/28-21-71-990-826**

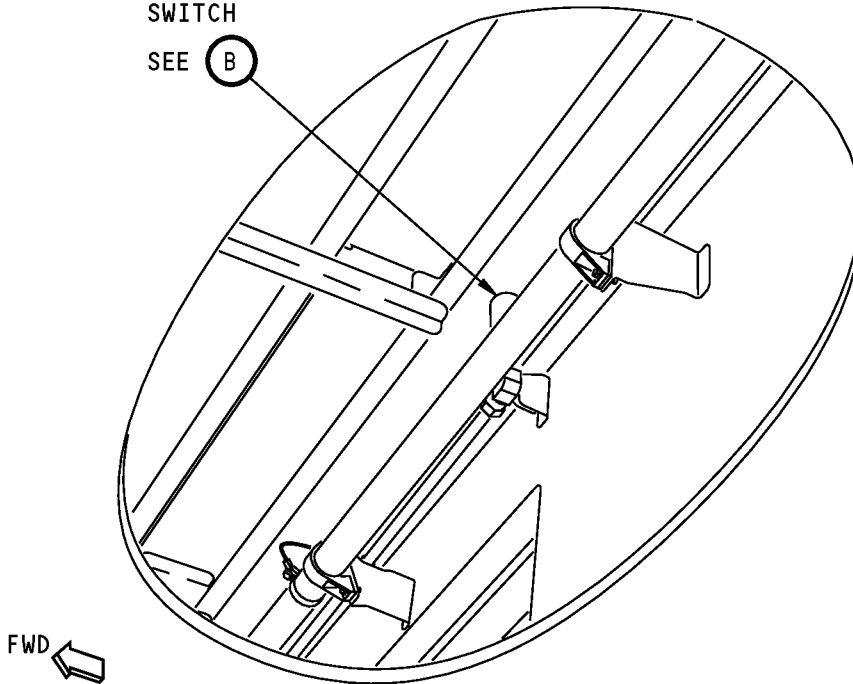
EFFECTIVITY
HAP 001-013, 015-020, 025, 026 PRE SB 737-28A1142

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FUELING
FLOAT
SWITCH

SEE (B)

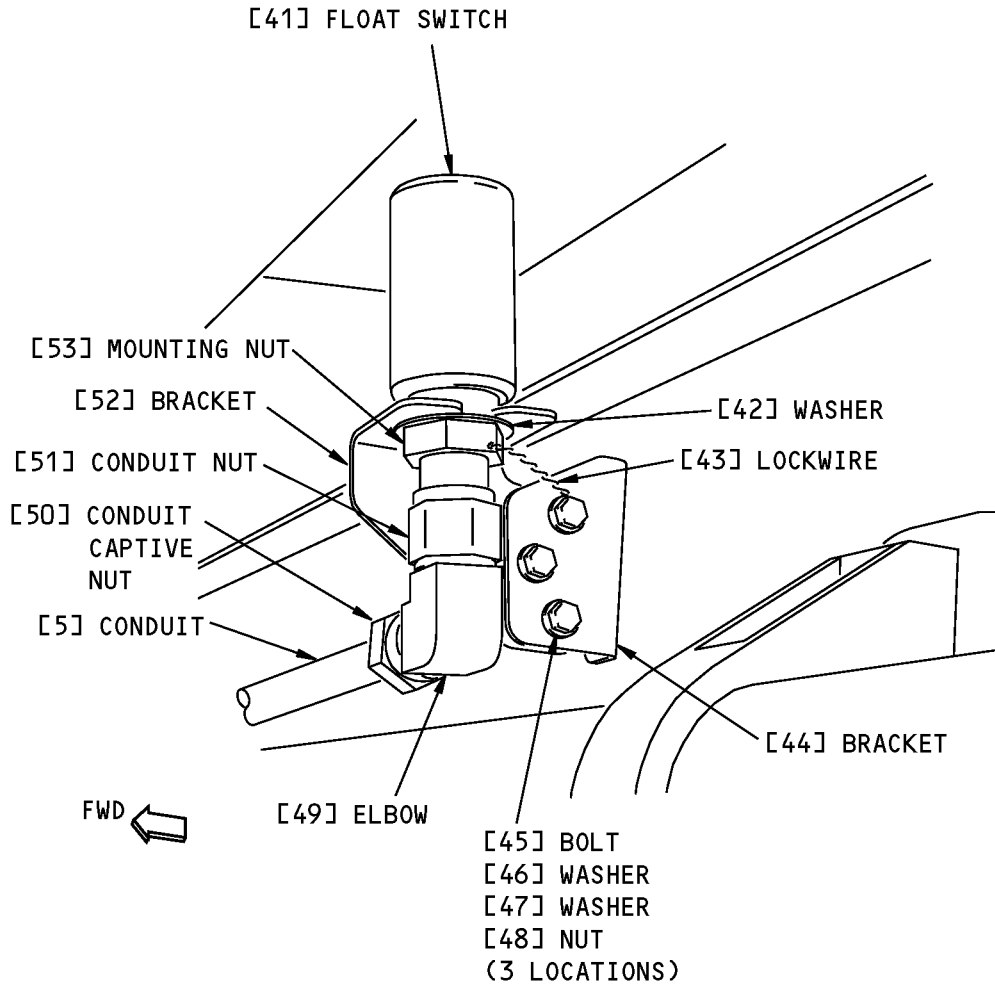


(A)

Center Tank Fueling Float Switch Installation (Type I)
Figure 403 (Sheet 1 of 2)/28-21-71-990-827

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FUELING FLOAT SWITCH

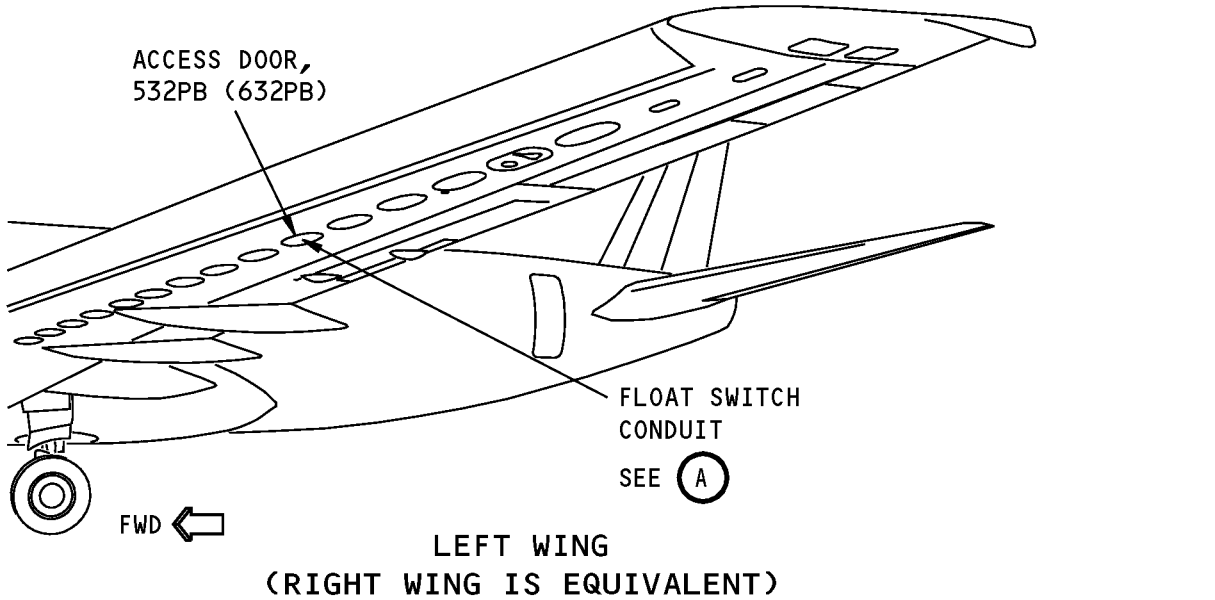
B

**Center Tank Fueling Float Switch Installation (Type I)
Figure 403 (Sheet 2 of 2)/28-21-71-990-827**

EFFECTIVITY
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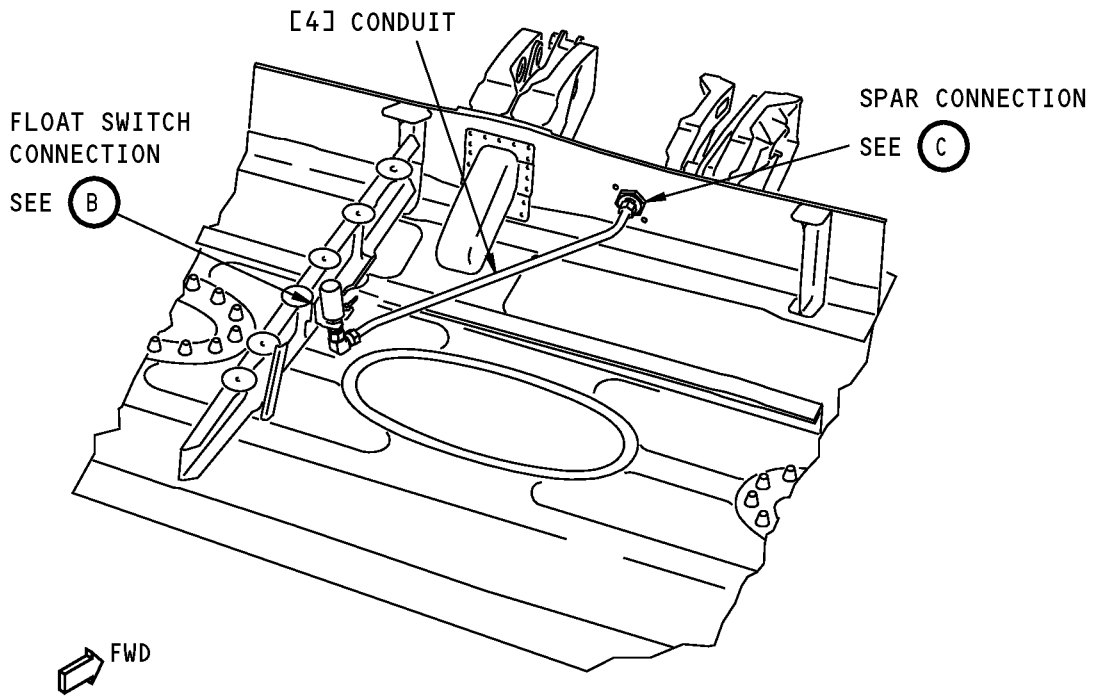
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FWD ←

LEFT WING
(RIGHT WING IS EQUIVALENT)



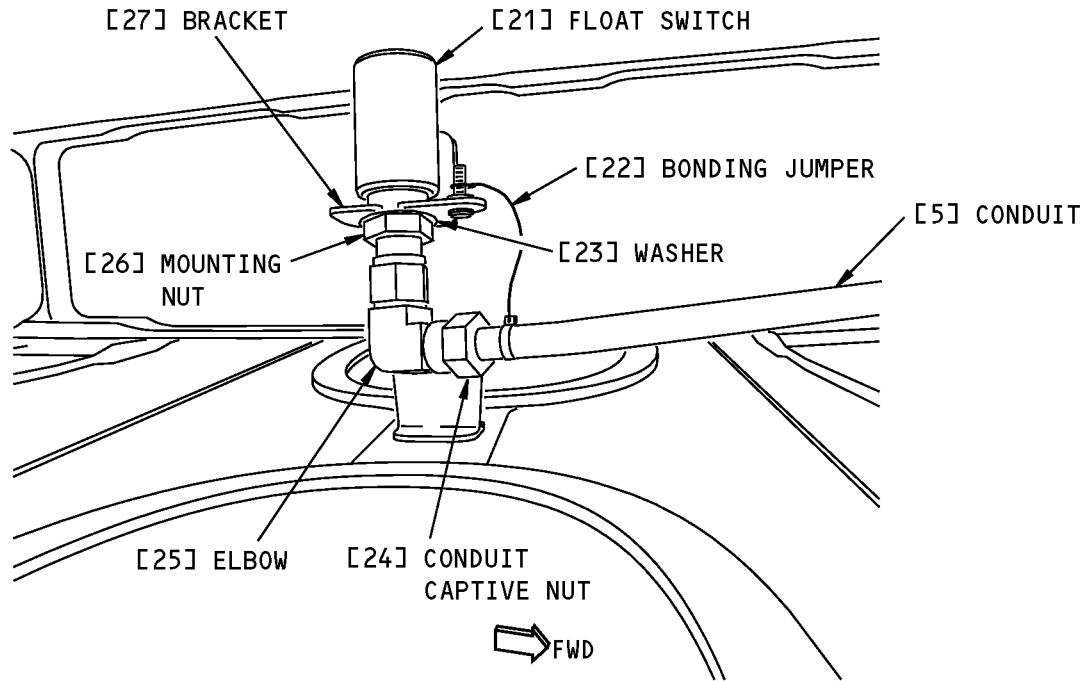
FLOAT SWITCH CONDUIT
(MAIN TANK 1 IS SHOWN,
MAIN TANK 2 IS EQUIVALENT)

(A)

**Main Fuel Tank Float Switch Conduit Installation (Type I)
Figure 404 (Sheet 1 of 3)/28-21-71-990-828**

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FLOAT SWITCH CONNECTION

(B)

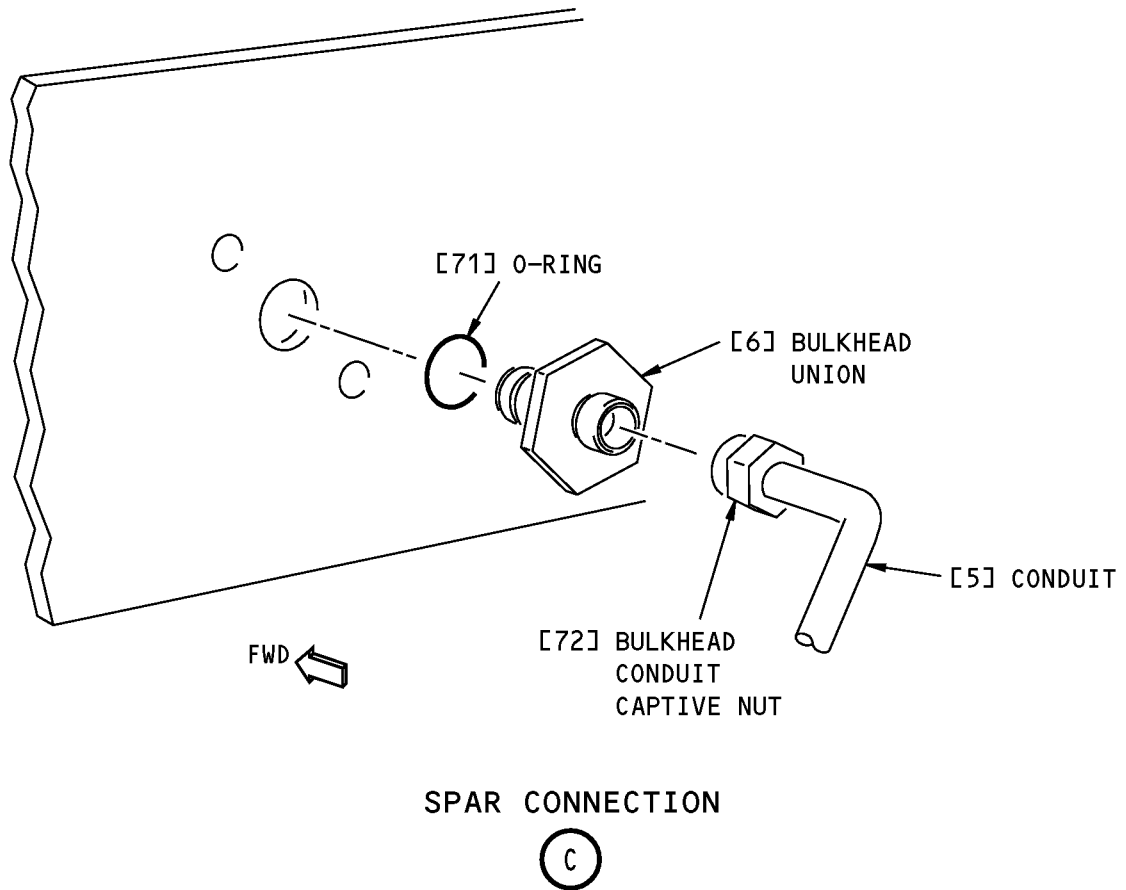
**Main Fuel Tank Float Switch Conduit Installation (Type I)
Figure 404 (Sheet 2 of 3)/28-21-71-990-828**

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**Main Fuel Tank Float Switch Conduit Installation (Type I)
Figure 404 (Sheet 3 of 3)/28-21-71-990-828**

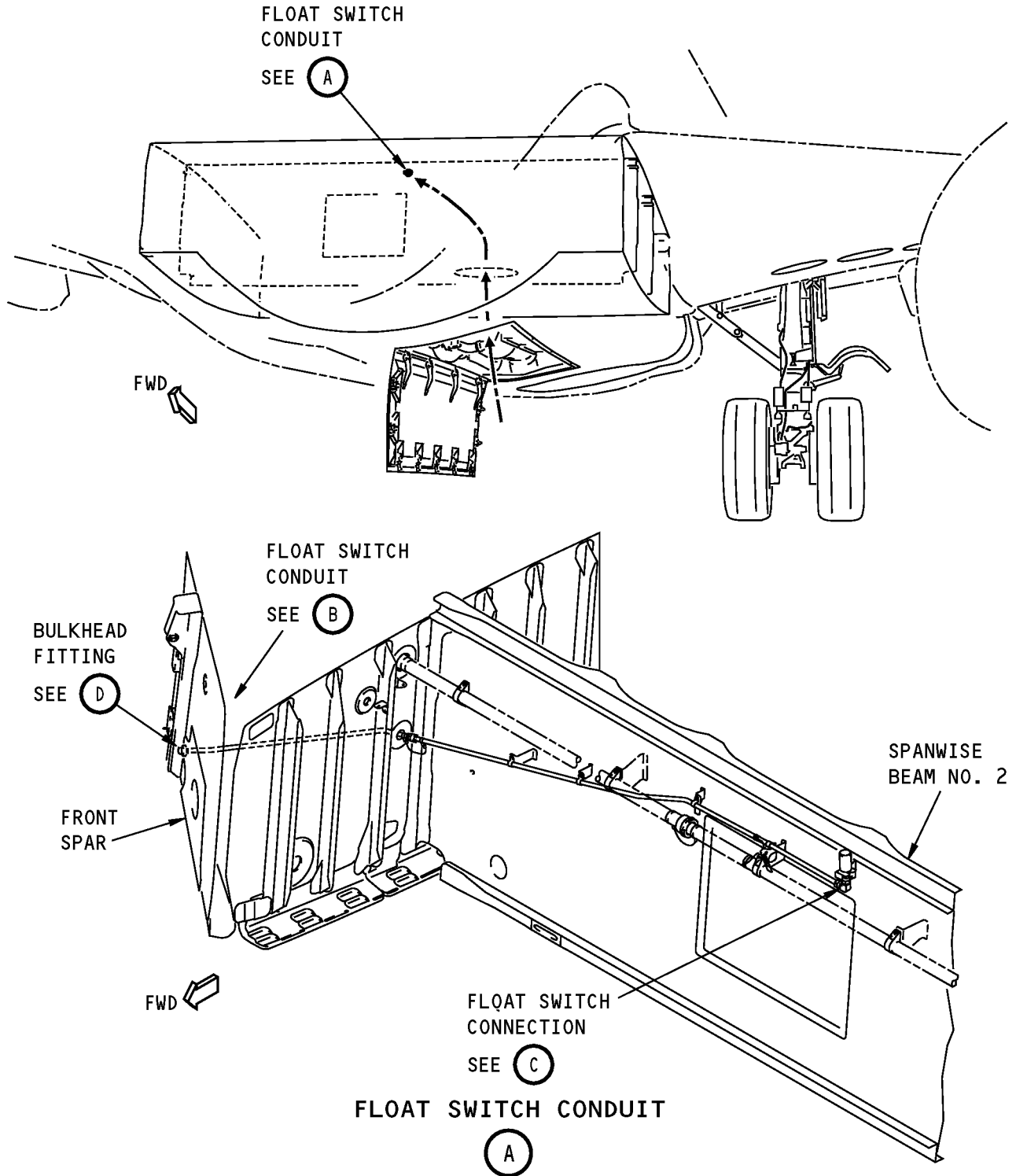
EFFECTIVITY
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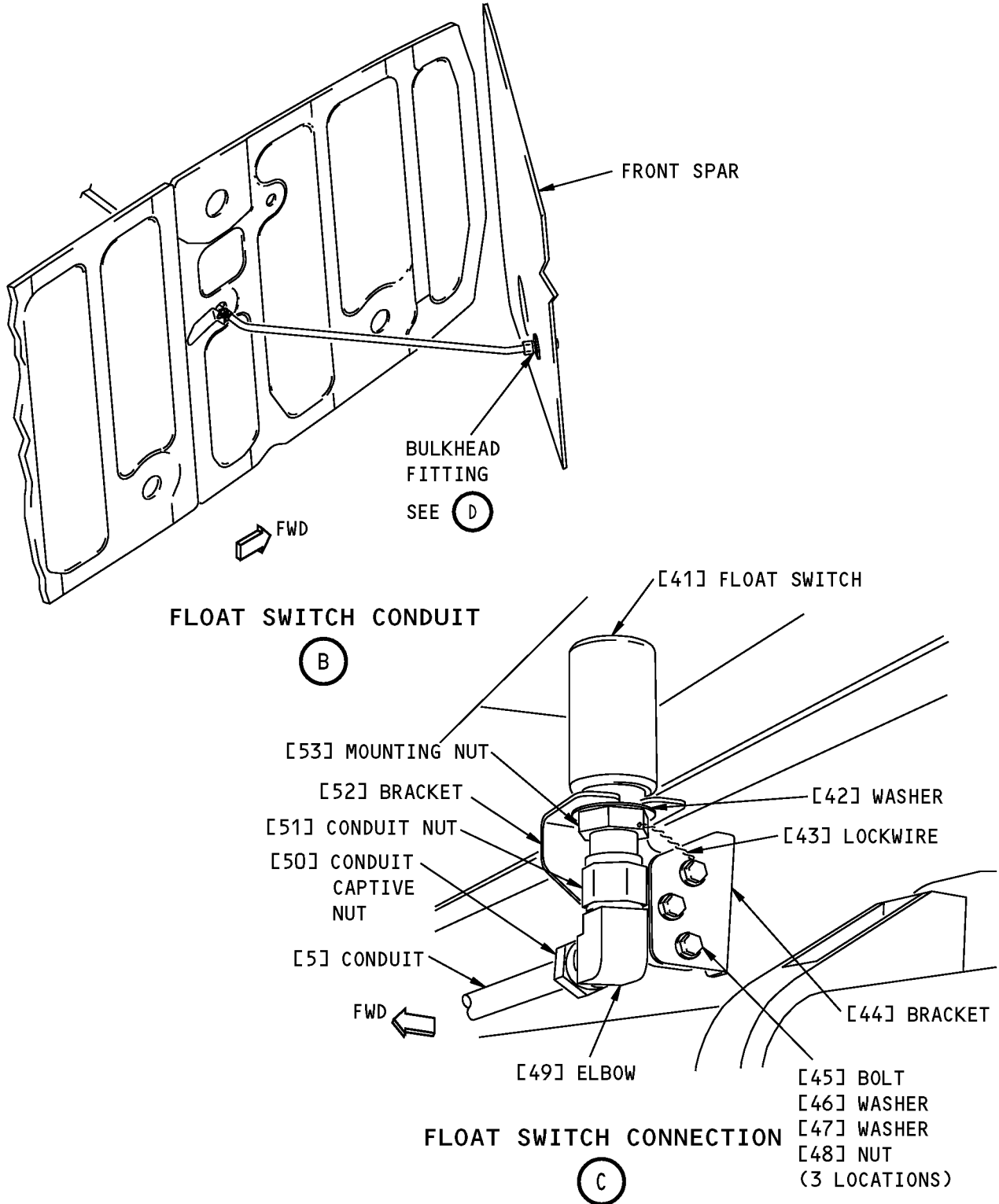
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**Center Fuel Tank Float Switch Conduit Installation (Type I)
Figure 405 (Sheet 1 of 3)/28-21-71-990-829**

EFFECTIVITY
HAP 001-013, 015-020, 025, 026 PRE SB 737-28A1142

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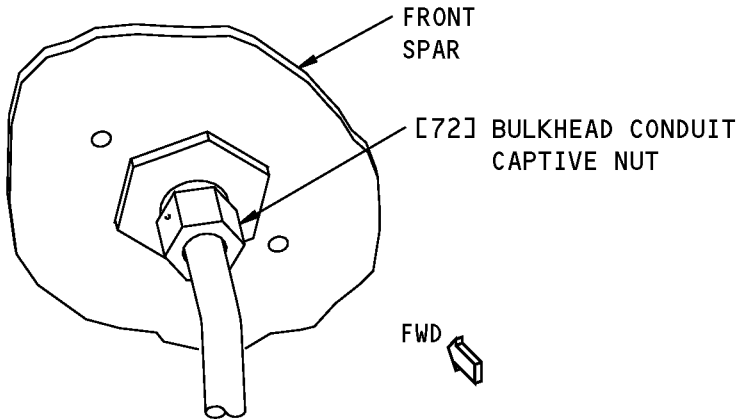


**Center Fuel Tank Float Switch Conduit Installation (Type I)
Figure 405 (Sheet 2 of 3)/28-21-71-990-829**

EFFECTIVITY
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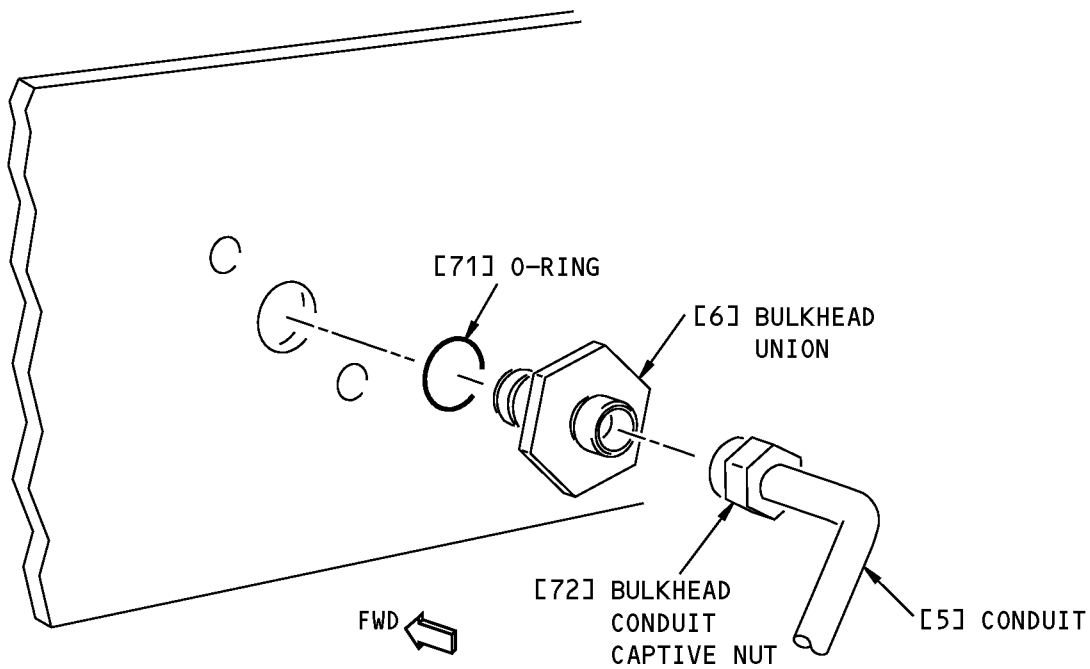
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**BULKHEAD FITTING
(ASSEMBLED)**

(D)



**BULKHEAD FITTING
(DISASSEMBLED)**

(D)

**Center Fuel Tank Float Switch Conduit Installation (Type I)
Figure 405 (Sheet 3 of 3)/28-21-71-990-829**

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TASK 28-21-71-400-801

3. Float Switch Installation

(Figure 401, Figure 402)

A. References

Reference	Title
27-81-00-080-801	Leading Edge Flap and Slat Locks Removal (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-21-00-700-801	Pressure Fueling System - Test (P/B 501)
SWPM 20-30-12	Assembly of Splices

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)
STD-1201	Gauge - Pressure, 0-75 PSIG (0-518 KPa)
STD-3940	Air Source - Regulated, Dry Filtered, 0 to 150 psig

C. Consumable Materials

Reference	Description	Specification
D00173	Grease - Aircraft and Instrument, Fuel And Oxidizer Resistant	MIL-PRF-27617 (Supersedes MIL-G-27617)

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

E. Access Panels

Number	Name/Location
131AB	Center Tank Access
532PB	Main Tank Access Door - Wing Station 576
632PB	Main Tank Access Door - Wing Station 576

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F. Conduit Air Leak Test (Type I Float Switch)

SUBTASK 28-21-71-790-002

CAUTION: DO NOT USE THIS LEAK TEST FOR THE TYPE II CONDUIT. DAMAGE TO THE CONDUIT CAN OCCUR.

- (1) Do these steps to do a leak test of the float switch electrical conduit:
 - (a) Use the necessary fittings to plug one end of the electrical conduit.
 - (b) At the other end of the electrical conduit, connect the 0 to 150 psig dry filtered regulated air source, STD-3940 and pressure pressure gauge, STD-1201.
 - 1) You must connect the pressure gauge, STD-1201 so that it shows the pressure in the electrical conduit, even when the air supply is shut off.
 - (c) Pressurize the electrical conduit to approximately 20 psig +/- 1 psig and shut off the supply of air.
 - (d) Make sure the pressure does not change by more than +/- 1 psig after five minutes.
 - (e) Release the air pressure.
 - (f) Remove the 0 to 150 psig dry filtered regulated air source, STD-3940 and pressure pressure gauge, STD-1201 and the plug fittings from each end of the conduit.

G. No. 1 or No. 2 Tank Float Switch Installation Procedure (Type I Float Switch)

SUBTASK 28-21-71-420-001

- (1) For the float switch [21] in the No. 1 or the No. 2 tank, do these steps to attach the washer and the mounting nut to the float switch (Figure 402):
 - (a) Put the wires on the float switch [21] through the washer [23] and the mounting nut [26].
 - (b) Install the washer [23] and the mounting nut [26] loosely on the float switch.

SUBTASK 28-21-71-420-003

- (2) Put the switch in its correct position in the fuel tank.

SUBTASK 28-21-71-420-004

- (3) If the conduit of the fueling float switch was removed, do these steps (Figure 401, Figure 404):
 - (a) Put a new O-ring [71] on the bulkhead union [6] (Figure 404).
 - (b) From inside the wing tank, put the bulkhead union [6] through the wing front spar.
 - (c) Make sure the bulkhead union [6] aligns with the retainer installed on the bulkhead.
 - (d) From out of the tank, install the washer [4] on the bulkhead union [6] (Figure 401).

NOTE: Make sure the bulkhead union is held from in the wing tank while the bulkhead washer is installed. This is to prevent the bulkhead union from falling in the wing tank.

- (e) Install the conduit mounting nut [3].
- (f) From inside the tank, loosely install the bulkhead conduit captive nut [72] on the bulkhead union [6] (Figure 404).

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SUBTASK 28-21-71-420-005

WARNING: MAKE SURE THE SPLICES ARE NOT IN THE CONDUIT AFTER YOU PULL THE WIRES THROUGH THE CONDUIT. AN EXPLOSION CAN OCCUR IF THE SPLICE TOUCHES THE CONDUIT.

- (4) Pull the wires for the float switch through the conduit.
 - (a) Attach the wire puller to the wires on the float switch.
 - (b) Pull the wires through the conduit until the ends of the wires come through the bulkhead fitting on the wing front spar.

NOTE: Be careful not to put kinks in the wires when you pull them through the conduit.

SUBTASK 28-21-71-420-006

- (5) Do these steps to install the float switch [21] (Figure 402):
 - (a) In the fuel tank, let the mounting nut [26] and the washer [23] go down on the wires that go to the float switch [21].
 - (b) Put the wires through the holes in the mounting bracket [27].
 - (c) Put the bottom of the float switch [21] in its correct position in the bracket [27].
 - (d) Install the washer [23] and the mounting nut [26].

NOTE: Make sure that one washer is on the top surface of the mounting bracket. Make sure the second washer is on the bottom surface of the mounting bracket.

- (e) Hold the float switch [21] and do not let it turn while you tighten the mounting nut [26].
 - 1) Do not let the wires twist when you tighten the mounting nut [26].
 - 2) Attach the mounting nut [26] with a lockwire.

SUBTASK 28-21-71-420-007

- (6) If the conduit [5] was removed, connect the electrical conduit [5] to the elbow [25].

SUBTASK 28-21-71-420-008

- (7) Attach the conduit captive nut [24] with a lockwire.

SUBTASK 28-21-71-420-009

- (8) If the conduit [5] was removed, do these steps (Figure 404):
 - (a) From inside the wing tank, tighten the conduit captive nut [72] at the bulkhead union [6].
 - (b) If loosened, tighten the conduit union connection.
 - (c) Secure the conduit nut [72] at the bulkhead union [6] with lockwire.
 - (d) Secure the conduit union connection with lockwire.
 - (e) From out of the wing tank at the wing front spar, tighten the conduit mounting nut [3] (Figure 401).

SUBTASK 28-21-71-620-001

- (9) Do these steps to fill the conduit with grease, D00173:

NOTE: This step prevents the collection of water in the conduit and subsequent damage from ice. This step is only applicable to the conduit for the float switch in the No. 1 tank or the No. 2 tank.

- (a) Put a flexible tube into the conduit to a length between 23.5 and 24 inches (597 mm and 610 mm).

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- (b) Hold the tube in this position while you put grease, D00173 through the tube into the empty space in the conduit.
- (c) Continue to put grease, D00173 into the conduit until you see grease come out of the end of the conduit.
- (d) Slowly remove the tube while you continue to put grease, D00173 into the conduit.
- (e) Make sure the conduit is completely filled with grease with no air spaces.

SUBTASK 28-21-71-420-010

- (10) Do these steps to install the rubber grommet [7], the nylon grommet [2], and the coupling nut [1] (Figure 401):
 - (a) Go out of the fuel tank.
 - (b) Put the wires for the float switch through the rubber grommet [7], the nylon grommet [2], and the coupling nut [1].
 - (c) Install the rubber grommet [7], the nylon grommet [2], and the coupling nut [1] on the end of the bulkhead fitting on the wing front spar.

SUBTASK 28-21-71-760-001

- (11) Use an bonding meter, COM-1550 to do a check of the continuity between the float switch and the wires that go to the float switch.
 - (a) Hold the float switch in the position it has when the fuel tank is full.
 - (b) Go out of the fuel tank.
 - (c) Make sure there is no electrical continuity between the float switch and the wires that go to the float switch.
 - (d) Let the float switch go back to the position for an empty fuel tank.

SUBTASK 28-21-71-420-011

- (12) Refer to (SWPM 20-30-12) to connect the wires that go to the float switch to the applicable airplane wires.
 - (a) Use the applicable crimp tool to connect the wires (SWPM 20-30-12).
 - (b) Put two layers of tape on the connection to give protection from water and fuel (Figure 401).

SUBTASK 28-21-71-420-012

- (13) Install clamps on the wires where it is necessary to attach the wires to the wire bundle forward of the wing front spar.
 - (a) Make sure these wires do not cause a problem with the movement of the leading edge flaps.

SUBTASK 28-21-71-410-001

- (14) Install the access panels that you removed to get access to the fuel tank.
 - (a) For the No. 1 tank or the No. 2 tank, do the procedure to install or close the applicable access panels:
(TASK 28-11-11-400-801)

<u>Number</u>	<u>Name/Location</u>
532PB	Main Tank Access Door - Wing Station 576
632PB	Main Tank Access Door - Wing Station 576

- (b) For center tank, do the procedure to install this access panel:

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(TASK 28-11-31-400-801)

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

SUBTASK 28-21-71-650-002

- (15) Fill the tank with fuel and make sure the float switch stops the refuel operation correctly (TASK 28-21-00-700-801).

SUBTASK 28-21-71-790-001

- (16) With fuel in the tank, do a check for fuel leakage at the bulkhead fitting for the conduit.
- (a) No leakage is permitted.

SUBTASK 28-21-71-080-001

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT REMOVE THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (17) Do this task: Leading Edge Flap and Slat Locks Removal, TASK 27-81-00-080-801.

SUBTASK 28-21-71-860-004

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS. THE LEADING EDGE AND THE TRAILING EDGE CONTROL SURFACES CAN EXTEND AND RETRACT QUICKLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (18) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

H. AIRPLANES WITH TYPE I FLOAT SWITCH; Center Tank Float Switch Installation Procedure

SUBTASK 28-21-71-420-043

- (1) Do these steps to assemble the center tank float switch [41] and the bracket [52] before you go into the tank (Figure 403):
- Let the mounting nut [53] and the washer [42] go down on the wires that go to the float switch.
 - Put the wires through the holes in the mounting bracket [52].
 - Put the bottom of the float switch [41] in its correct position in the bracket.
 - Install the washer [42] and the mounting nut [53].
 - Hold the float switch [41] and do not let it turn while you tighten the mounting nut [53].
 - Do not let the wires twist when you tighten the nut.

SUBTASK 28-21-71-420-044

- (2) Put the float switch [41] in its correct position in the fuel tank.

SUBTASK 28-21-71-420-045

- (3) If the conduit was removed, do these steps (Figure 401, Figure 404):
- Put a new O-ring [71] on the bulkhead union [6] (Figure 404).
 - From inside the wing tank, put the bulkhead union [6] through the wing front spar.
 - Make sure the bulkhead union [6] aligns with the retainer installed on the bulkhead.

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- (d) From out of the wing tank, install the washer [4] on the bulkhead union [6] (Figure 401).

NOTE: Make sure the bulkhead union is held from in the wing tank while the bulkhead washer is installed. This is to prevent the bulkhead union from falling in the wing tank.

- (e) Install the conduit mounting nut [3].
(f) From inside the tank, loosely install the bulkhead conduit captive nut [72] on the bulkhead union.

SUBTASK 28-21-71-420-046

WARNING: MAKE SURE THE SPLICES ARE NOT IN THE CONDUIT AFTER YOU PULL THE WIRES THROUGH THE CONDUIT. AN EXPLOSION CAN OCCUR IF THE SPLICE TOUCHES THE CONDUIT.

- (4) Pull the wires for the float switch through the conduit.
(a) Attach the wire puller to the wires on the float switch.
(b) Pull the wires through the conduit until the ends of the wires come through the bulkhead fitting on the wing front spar.

NOTE: Be careful not to put kinks in the wires when you pull them through the conduit.

SUBTASK 28-21-71-420-047

- (5) Do these steps to install the float switch [41] (Figure 403):

NOTE: The float switch and bracket were assembled before you went into the tank.

- (a) Install the three bolts [45], washers [46,47] and nuts [48] that attach the bracket [52] with the float switch [42] to the bracket [44].
(b) Install lockwire from the mounting nut [53] to the top bolt [45] on the bracket [44].

SUBTASK 28-21-71-420-048

- (6) Connect the electrical conduit [5] to the elbow [49].

SUBTASK 28-21-71-420-049

- (7) Attach the conduit nut [51] with a lockwire.

SUBTASK 28-21-71-420-050

- (8) If the conduit was removed, do these steps (Figure 405):

- (a) From inside the wing tank, tighten the bulkhead conduit captive nut [72] at the bulkhead union [6].
(b) If loosened, tighten the conduit union connection.
(c) Secure the conduit nut at the bulkhead union [6] with lockwire.
(d) Secure the conduit union connection with lockwire.
(e) From out of the tank at the front spar, tighten the conduit mounting nut [3] (Figure 401).

SUBTASK 28-21-71-420-051

- (9) Do these steps to install the rubber grommet [7], the nylon grommet [2], and the coupling nut [1] (Figure 401):

- (a) Go out of the fuel tank.
(b) Put the wires for the float switch through the rubber grommet [7], the nylon grommet [2], and the coupling nut [1].

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- (c) Install the rubber grommet [7], the nylon grommet [2], and the coupling nut [1] on the end of the bulkhead fitting on the front spar.

SUBTASK 28-21-71-760-005

- (10) Use an bonding meter, COM-1550 to do a check of the continuity between the float switch and the wires that go to the float switch.
 - (a) Hold the float switch in the position it has when the fuel tank is full.
 - (b) Go out of the fuel tank.
 - (c) Make sure there is no electrical continuity between the float switch and the wires that go to the float switch.
 - (d) Let the float switch go back to the position for an empty fuel tank.

SUBTASK 28-21-71-420-052

- (11) Refer to (SWPM 20-30-12) to connect the wires that go to the float switch to the applicable airplane wires.
 - (a) Use the applicable crimp tool to connect the wires (SWPM 20-30-12).
 - (b) Put two layers of tape on the connection to give protection from water and fuel (Figure 401).

SUBTASK 28-21-71-420-053

- (12) Install clamps on the wires where it is necessary to attach the wires to the wire bundle forward of the wing front spar.
 - (a) Make sure these wires do not cause a problem with the movement of the leading edge flaps.

SUBTASK 28-21-71-410-002

- (13) Install the access panels that you removed to get access to the fuel tank.
 - (a) For the No. 1 tank or the No. 2 tank, do the procedure to install or close the applicable access panels:
(TASK 28-11-11-400-801)

<u>Number</u>	<u>Name/Location</u>
532PB	Main Tank Access Door - Wing Station 576
632PB	Main Tank Access Door - Wing Station 576

- (b) For center tank, do the procedure to install this access panel:
(TASK 28-11-31-400-801)

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

SUBTASK 28-21-71-650-003

- (14) Fill the tank with fuel and make sure the float switch stops the refuel operation correctly (TASK 28-21-00-700-801).

SUBTASK 28-21-71-790-004

- (15) With fuel in the tank, do a check for fuel leakage at the bulkhead fitting for the conduit.
 - (a) No leakage is permitted.

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SUBTASK 28-21-71-080-002

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT REMOVE THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(16) Do this task: Leading Edge Flap and Slat Locks Removal, TASK 27-81-00-080-801.

SUBTASK 28-21-71-860-005

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS. THE LEADING EDGE AND THE TRAILING EDGE CONTROL SURFACES CAN EXTEND AND RETRACT QUICKLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(17) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

END OF TASK

HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025, 026 POST SB 737-28A1142

TASK 28-21-71-020-801

4. Float Switch Removal

(Figure 406, Figure 407, Figure 408, Figure 409)

A. General

- (1) CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).
(2) In the No. 1 and No. 2 tanks, the Type II float switch conduit must be replaced if the float switch is replaced. The float switch and conduit for the No. 1 or No. 2 tank are supplied as a single assembly. In the center tank, the conduit for the Type II float switch contains a liner which must be replaced each time the float switch is replaced.

B. References

Table with 2 columns: Reference, Title. Rows include: 24-22-00-860-812 Remove Electrical Power (P/B 201), 27-81-00-480-801 Leading Edge Flap and Slat Locks Installation (P/B 201), 27-81-00-860-803 Leading Edge Flaps and Slats Extension (P/B 201), 28-00-00-910-801 Airworthiness Limitation Precautions (P/B 201), 28-11-00-910-802 Purging and Fuel Tank Entry (P/B 201), 28-11-11-000-801 Main Tank Access Door Removal (P/B 401), 28-11-31-000-801 Center Tank Access Door - Removal (P/B 401)

C. Location Zones

Table with 2 columns: Zone, Area. Rows include: 131 Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left, 132 Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right, 532 Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50, 632 Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

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D. Access Panels

Number	Name/Location
131AB	Center Tank Access
532PB	Main Tank Access Door - Wing Station 576
632PB	Main Tank Access Door - Wing Station 576

E. Preparation

SUBTASK 28-21-71-650-004

WARNING: CAREFULLY DO ALL OF THE SAFETY PROCEDURES TO DEFUEL THE FUEL TANK AND TO PREPARE TO GO INTO IT. AN EXPLOSION, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Prepare to go into the applicable fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-21-71-860-006

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE AND TRAILING EDGE FLAP DRIVE MECHANISMS. THE LEADING EDGE AND THE TRAILING EDGE CONTROL SURFACES CAN EXTEND AND RETRACT QUICKLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Do this task: Leading Edge Flaps and Slats Extension, TASK 27-81-00-860-803.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL THE LE SLAT SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Leading Edge Flap and Slats Locks Installation, TASK 27-81-00-480-801.

SUBTASK 28-21-71-860-007

(3) Make sure the fueling shutoff valves at the refuel station are closed.

SUBTASK 28-21-71-860-008

(4) If electrical power is connected, do this task: Remove Electrical Power, TASK 24-22-00-860-812.

SUBTASK 28-21-71-010-002

(5) Do these steps to get access to the float switches:

(a) To get access to the float switch in the No. 1 tank, remove this access panel:

Number	Name/Location
532PB	Main Tank Access Door - Wing Station 576

(TASK 28-11-11-000-801).

(b) To get access to the float switch in the No. 2 tank, remove this access panel:

Number	Name/Location
632PB	Main Tank Access Door - Wing Station 576

(TASK 28-11-11-000-801).

(c) To get access to the float switch in the center tank (TASK 28-11-31-000-801).

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Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

F. No. 1 or No. 2 Tank Fueling Float Switch and Conduit Removal (TYPE II FLOAT SWITCH) (Figure 406, Figure 407)

SUBTASK 28-21-71-020-016

(1) Prepare to cut the wires that go to the float switch (Figure 406).

- (a) Go out of the fuel tank.
- (b) Separate the wires that go to the float switch from the wire bundle, forward of the wing front spar.
- (c) Find the splice in the wires that go to the float switch.

SUBTASK 28-21-71-020-017

(2) Cut the wires at a good point adjacent to the splice.

- (a) Make sure the wire has a sufficient length for a new splice.
- (b) Put a tag on the wires to identify them.

SUBTASK 28-21-71-020-018

(3) Do these steps to remove the float switch and conduit:

NOTE: It is necessary to remove the conduit each time you remove the float switch.

- (a) Loosen and remove the coupling nut [95] to permit the float switch cable to move freely (Figure 407).
- (b) With one person in the tank and one person out of the tank, loosen and remove the bolts [93], nuts [115], washers [122, 124, 125] and packing [123] that attach the retainer [119] (Figure 407).

NOTE: This step protects the retainer from damage while you loosen the conduit mounting nut [94].

- 1) Pull the retainer [119] back from the front spar.
- 2) From outside the tank, loosen and remove the conduit mounting nut [94] (Figure 406).
- 3) From inside the tank, loosen the bulkhead conduit captive nut [116] (Figure 407).
- 4) Disconnect the bonding jumper [104] from the ground stud of the float switch [102].
- 5) Disconnect the bonding jumper [103] from the conduit [101].
- 6) Loosen the mounting nut [107] for the float switch [102].
- 7) Separate the float switch [102] from the conduit [101] and from the conduit liner sufficiently to remove the float switch [102] and the conduit [101] from the bracket [109].
- 8) Move the switch out to the side of the bracket [109].
- 9) Disengage the conduit [101] from the bulkhead.
- 10) Pull the remaining wiring through the bulkhead and remove the float switch and the conduit from the tank as a unit.

G. Center Tank Fueling Float Switch Removal (TYPE II FLOAT SWITCH)

(Figure 406, Figure 408, Figure 409)

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SUBTASK 28-21-71-020-019

- (1) Prepare to cut the wires that go to the float switch (Figure 406).
 - (a) Go out of the fuel tank.
 - (b) Separate the wires that go to the float switch from the wire bundle, forward of the wing front spar.
 - (c) Find the splice in the wires that go to the float switch.

SUBTASK 28-21-71-020-020

- (2) Cut the wires at a good point adjacent to the splice.
 - (a) Make sure the wire has a sufficient length for a new splice.
 - (b) Put a tag on the wires to identify them.

SUBTASK 28-21-71-020-021

- (3) Loosen and remove the drain port [165] to permit the float switch electrical cable [160] to move freely (Figure 408).

SUBTASK 28-21-71-020-022

CAUTION: IN THE CENTER TANK, DO NOT LET THE TOOLS OR THE TANK COMPONENTS FALL. DAMAGE TO THE FUEL CELL OR THE BOTTOM SKIN CAN EASILY OCCUR.

- (4) Do these steps to remove the float switch in the center tank (Figure 408):
 - (a) Loosen the mounting nut [143] from the float switch [141].
 - (b) Remove the two screws [146], washers [147,148], and nuts [149] and the screw [154], washers [153], and nut [152] that attach the bracket [142] to the bracket [145].
 - (c) Hold the float switch with its attaching parts and do not let it fall while you pull the wires for the float switch out of the conduit [157].
 - (d) Make loops in the wire to make the wire and the float switch easy to move.
 - (e) Remove the float switch [141] from the fuel tank.
 - 1) If you are scheduled to install a different float switch, separate the float switch from the mounting bracket.
 - 2) Keep the mounting bracket [142] for subsequent installation of the float switch.
 - (f) Pull the formed section of the conduit liner [162] forward out of the conduit [157] with needle-nose pliers or a similar tool.
 - (g) Cut off the formed end of the conduit liner [162].

NOTE: This step makes it easier to pull the conduit liner out of the conduit from inside the tank.
 - (h) From inside the tank, pull the conduit liner [162] out of the conduit [157] from the end that was attached to the float switch [141].
 - (i) Remove the conduit liner [162] from the fuel tank.
 - 1) Discard the liner [162].

SUBTASK 28-21-71-020-023

- (5) Do these steps to remove the conduit for the float switch wiring (Figure 409):

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- (a) With one person in the tank and one person out of the tank, loosen and remove the bolts [93], nuts [211], washers [207, 209, 210], and packings [208] that attach the retainer [206].

NOTE: This step protects the retainer from damage while you loosen the conduit mounting nut [94].

- 1) Pull the retainer [206] back from the front spar.
- (b) Loosen and remove the screw [198], nut [202], and washers [199, 203] that attach the clamp [200].
- (c) Remove the clamp [200] and spacers [201].
- (d) Remove the bulkhead conduit captive nut [167] (Figure 409).
- (e) Loosen the screws [182], washers [183], and nuts [186] to disconnect the bonding jumper [184].
- (f) Cut the lockwire [188] and loosen the conduit captive nut [181].
- (g) Disconnect the forward section of the conduit [157] from the aft section of the conduit [157].
- (h) Remove the forward and the aft sections of the conduit [157] and retainer [206].
- (i) Loosen and remove the conduit mounting nut [94].
- (j) Remove the bulkhead union [91] and O-ring [205].

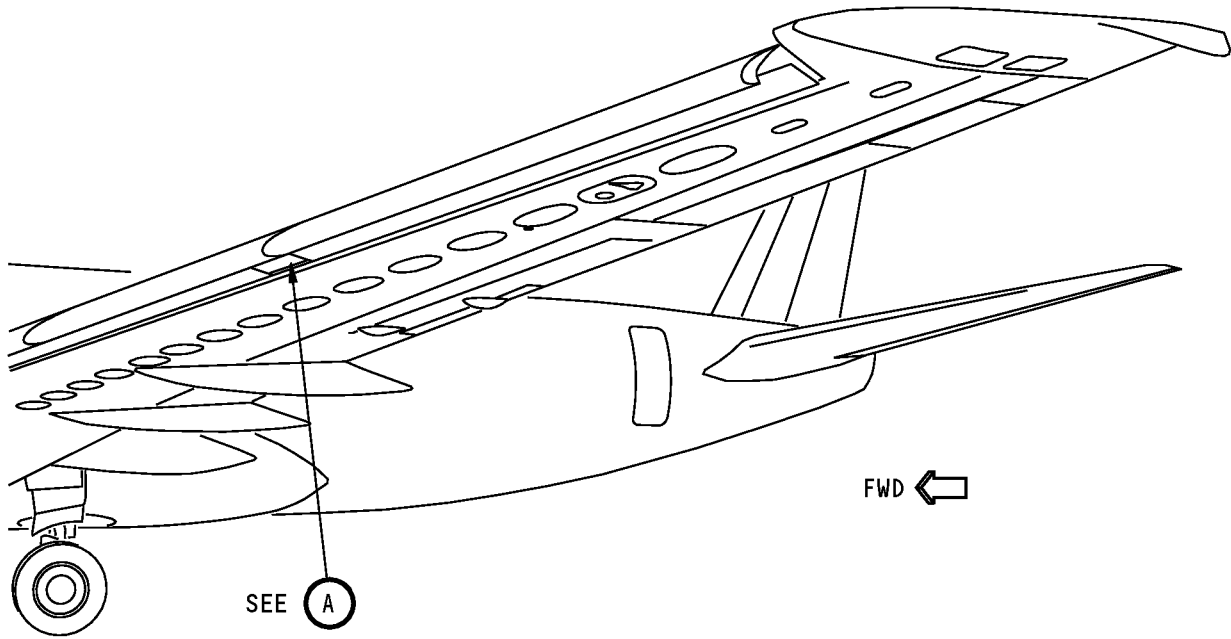
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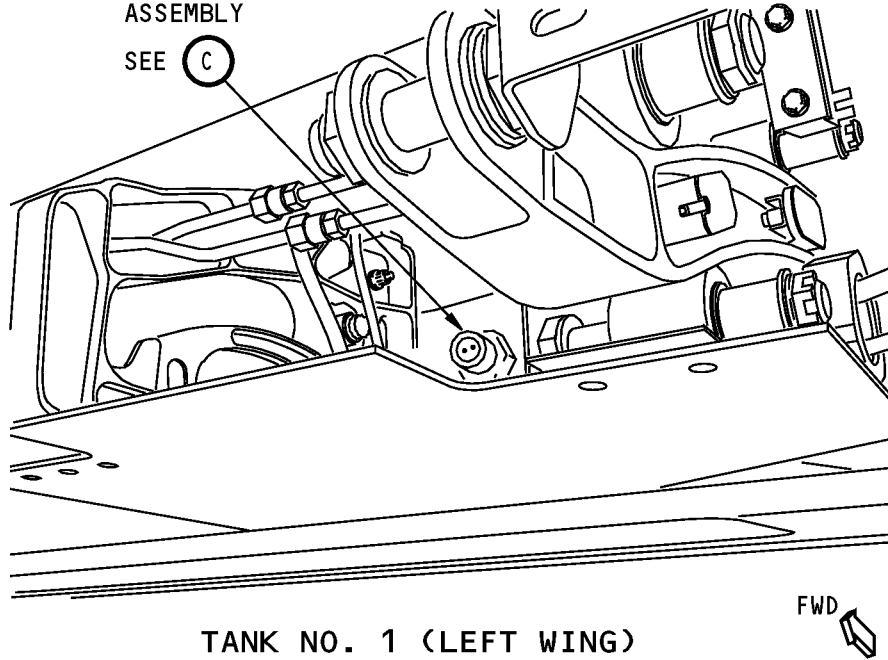
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SEE **A**

FUELING FLOAT SWITCH
WIRING CONDUIT FITTING
ASSEMBLY

SEE **C**



TANK NO. 1 (LEFT WING)
(TANK NO. 2 (RIGHT WING) IS EQUIVALENT)

A

**Fueling Float Switch Wiring Conduit Fitting Installation
Figure 406 (Sheet 1 of 4)/28-21-71-990-830**

EFFECTIVITY

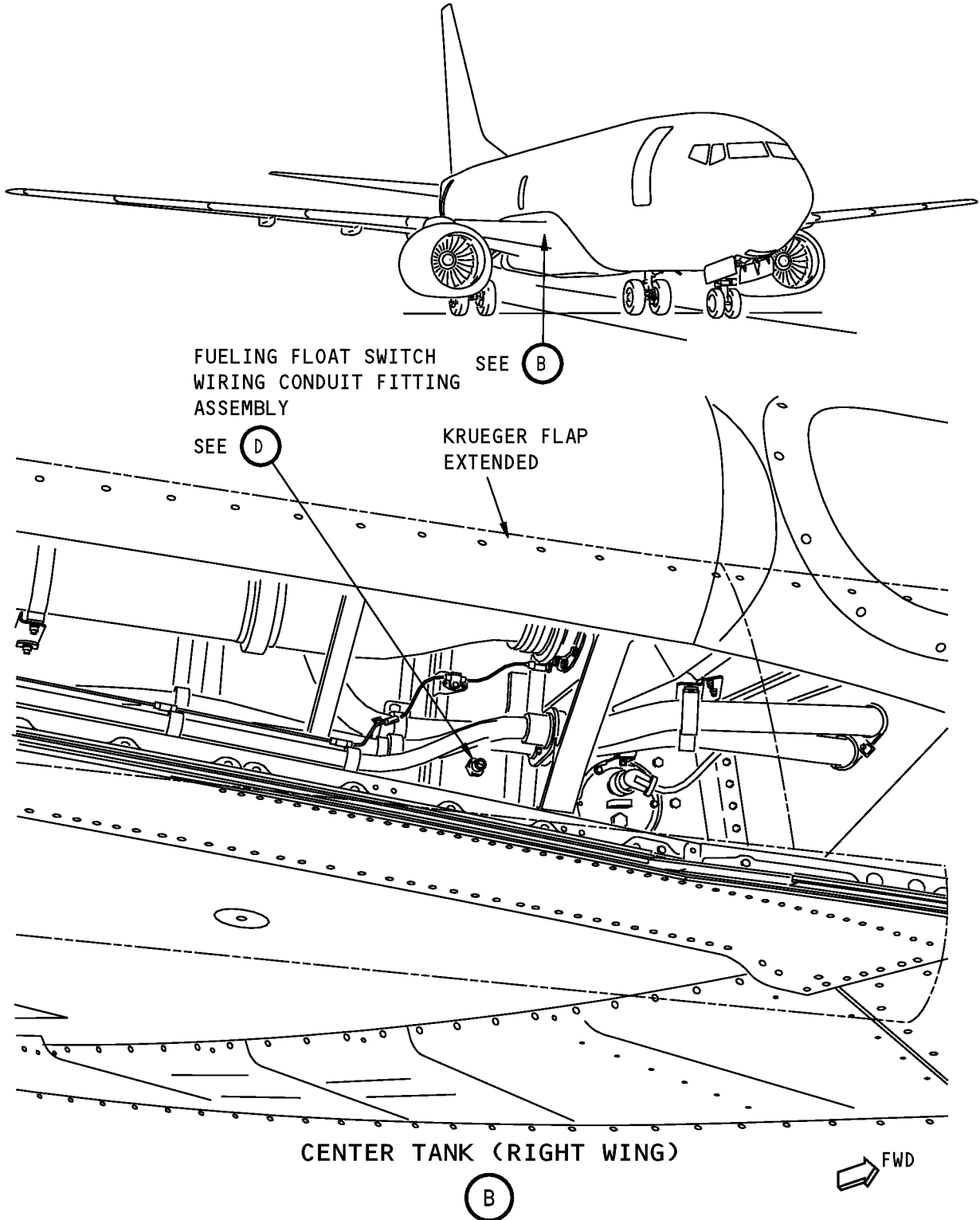
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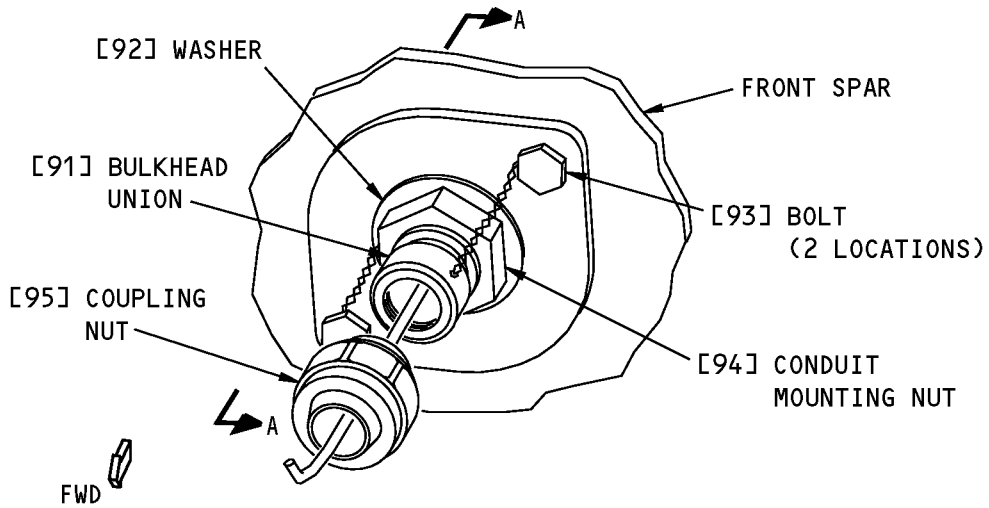


**Fueling Float Switch Wiring Conduit Fitting Installation
Figure 406 (Sheet 2 of 4)/28-21-71-990-830**

EFFECTIVITY
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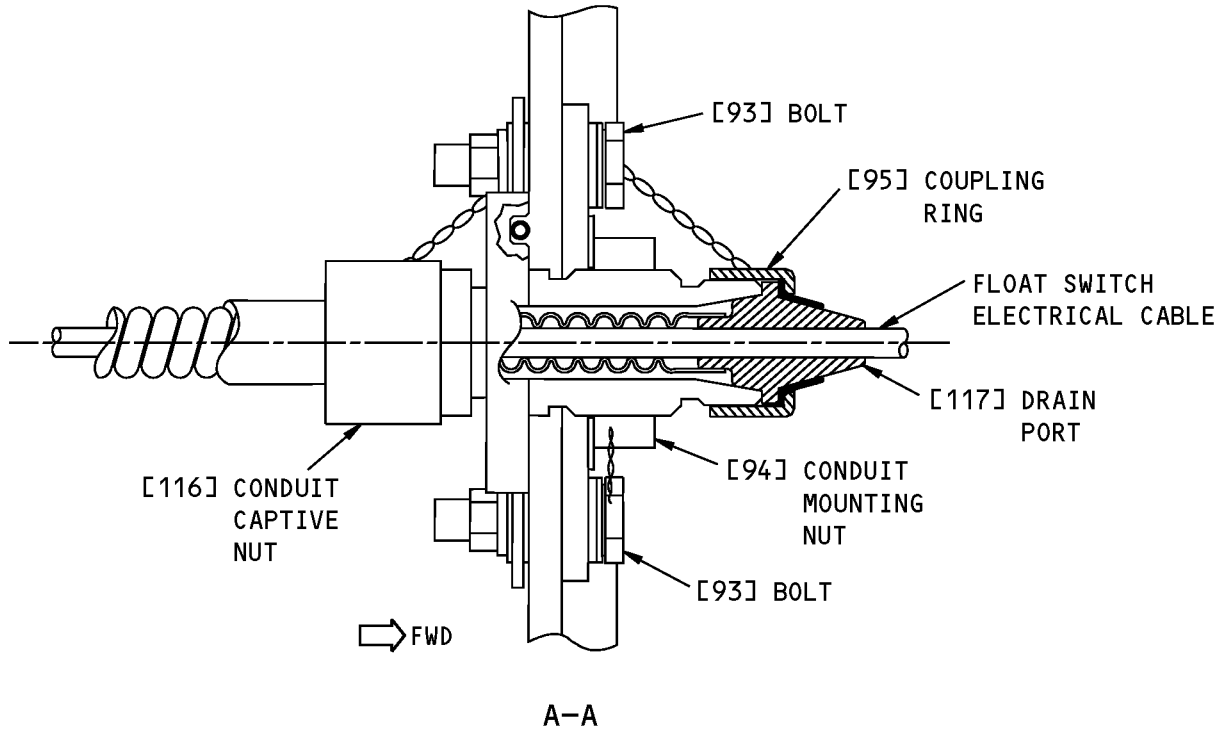
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**FUELING FLOAT SWITCH RECEPTACLE
(EXAMPLE)**

(C)



**Fueling Float Switch Wiring Conduit Fitting Installation
Figure 406 (Sheet 3 of 4)/28-21-71-990-830**

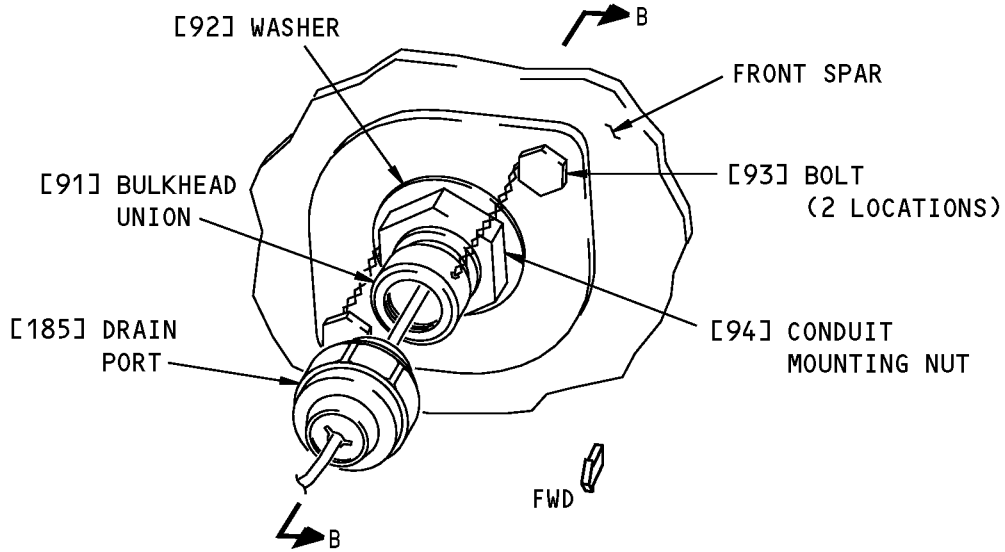
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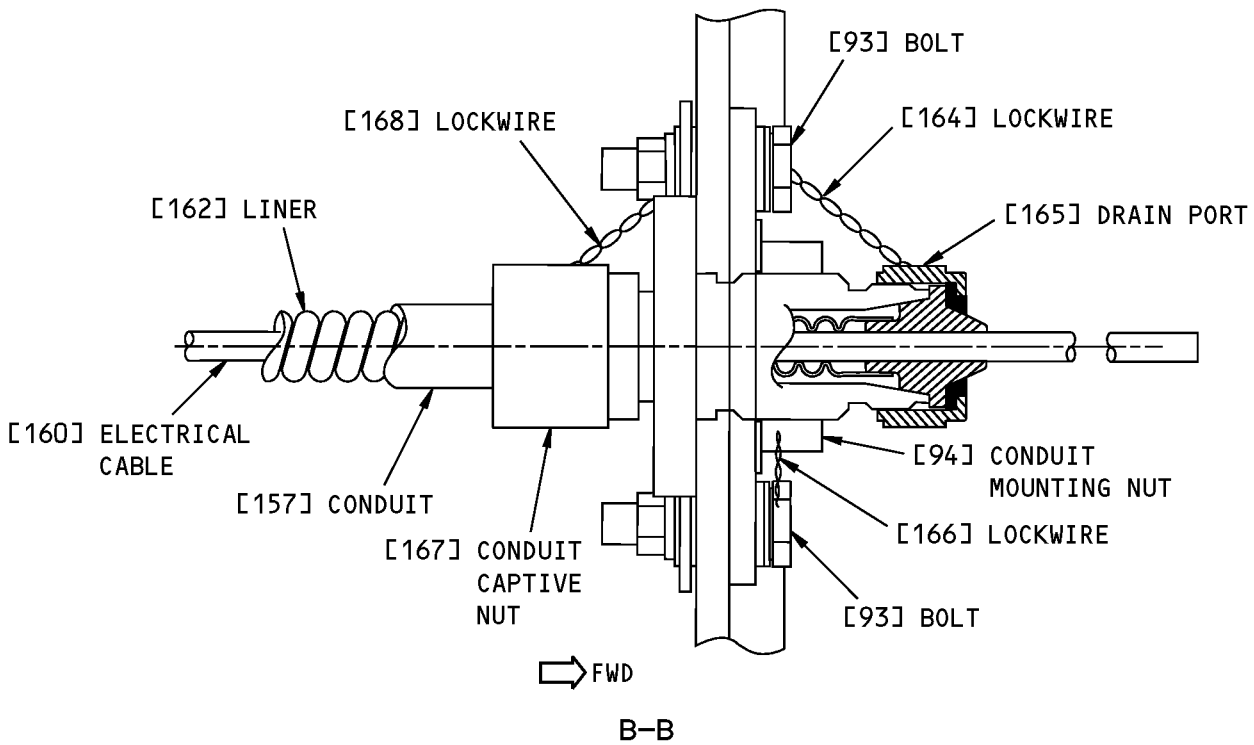
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**FUELING FLOAT SWITCH WIRING CONDUIT FITTING ASSEMBLY
(CENTER TANK)**

(D)



**Fueling Float Switch Wiring Conduit Fitting Installation
Figure 406 (Sheet 4 of 4)/28-21-71-990-830**

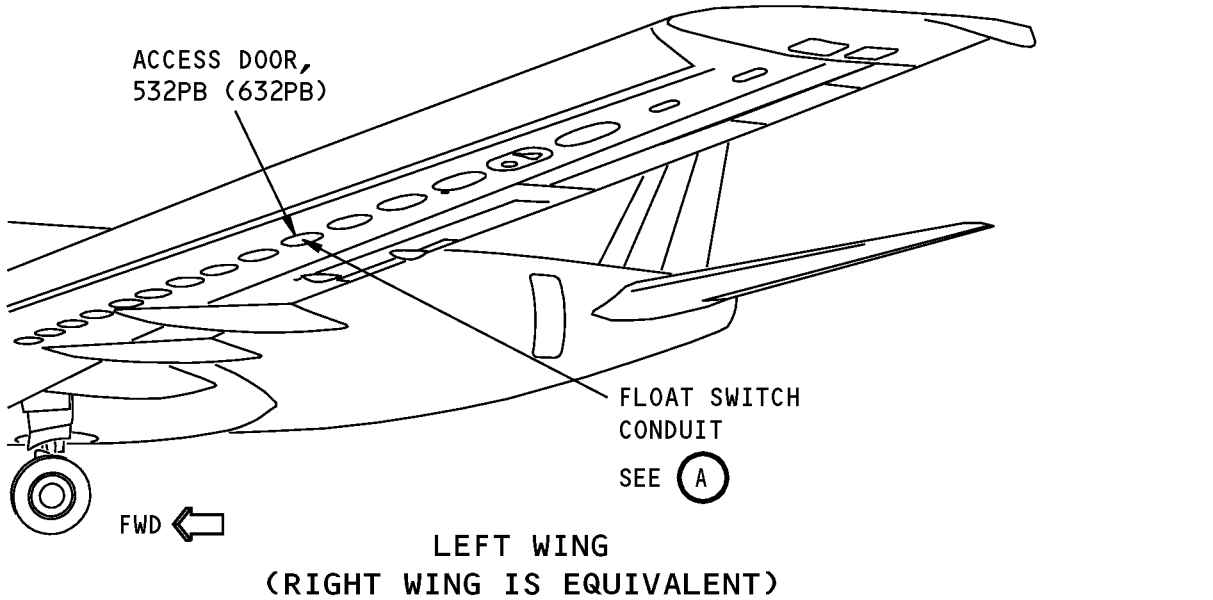
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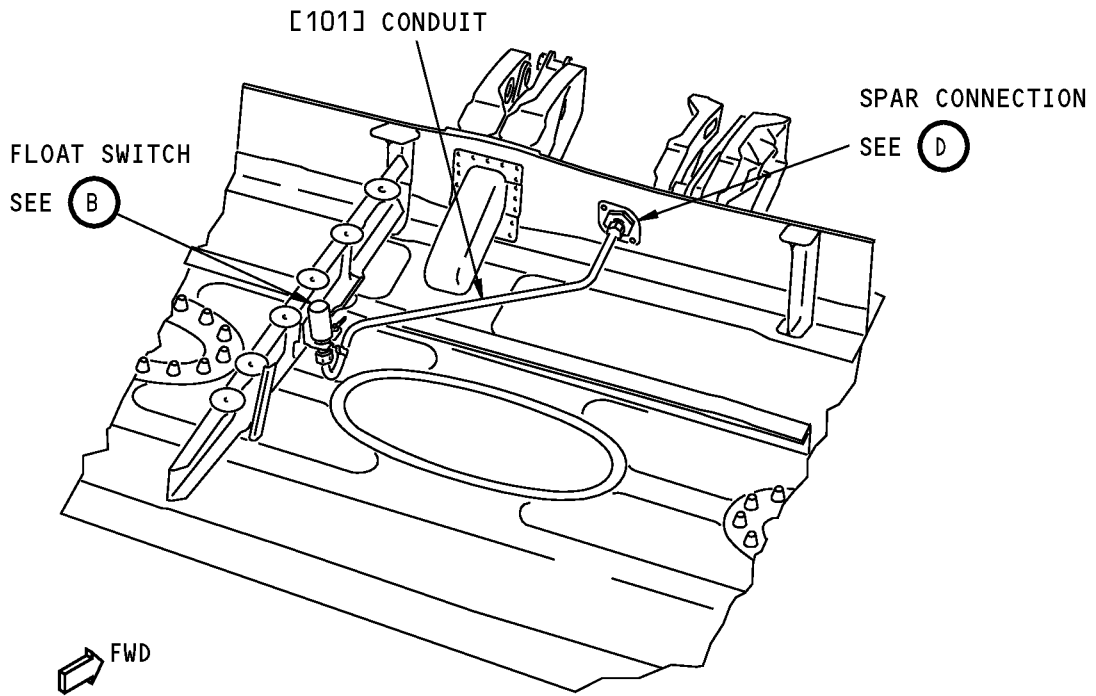
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**LEFT WING
(RIGHT WING IS EQUIVALENT)**



**FLOAT SWITCH CONDUIT
(MAIN TANK 1 IS SHOWN,
MAIN TANK 2 IS EQUIVALENT)**

(A)

**Main Fuel Tank Float Switch and Conduit Installation
Figure 407 (Sheet 1 of 5)/28-21-71-990-831**

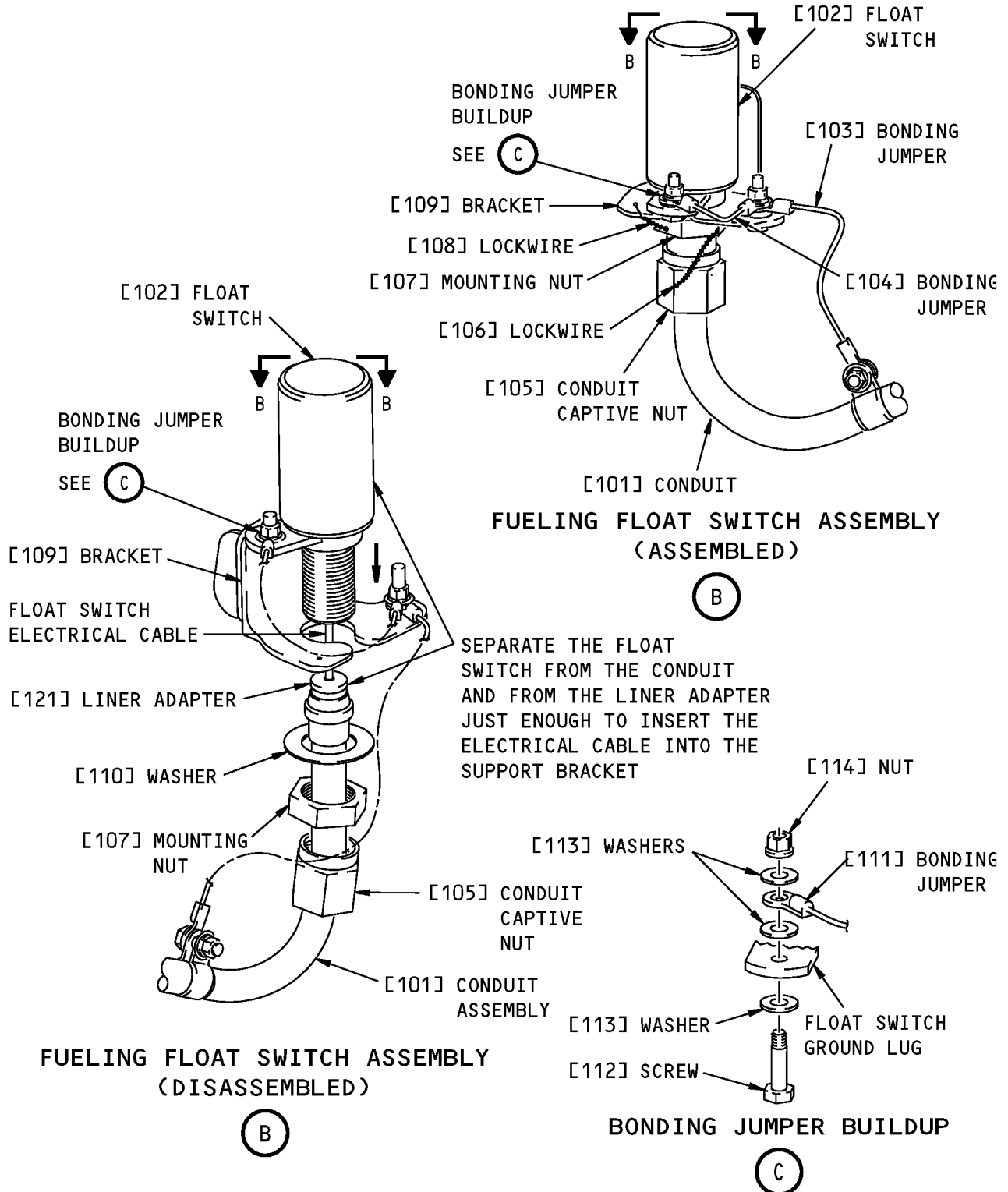
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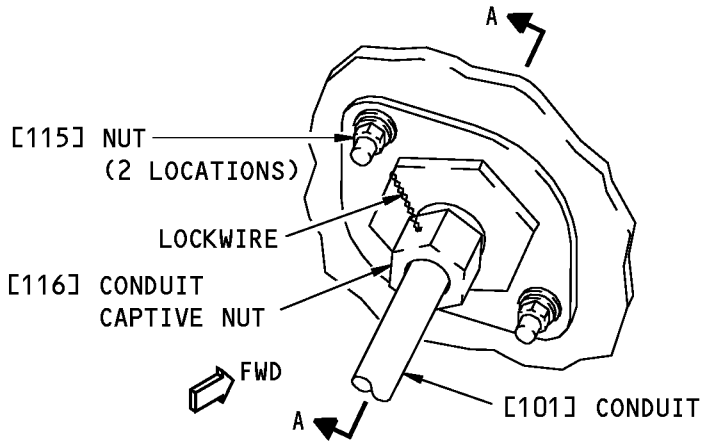
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Main Fuel Tank Float Switch and Conduit Installation
Figure 407 (Sheet 2 of 5)/28-21-71-990-831

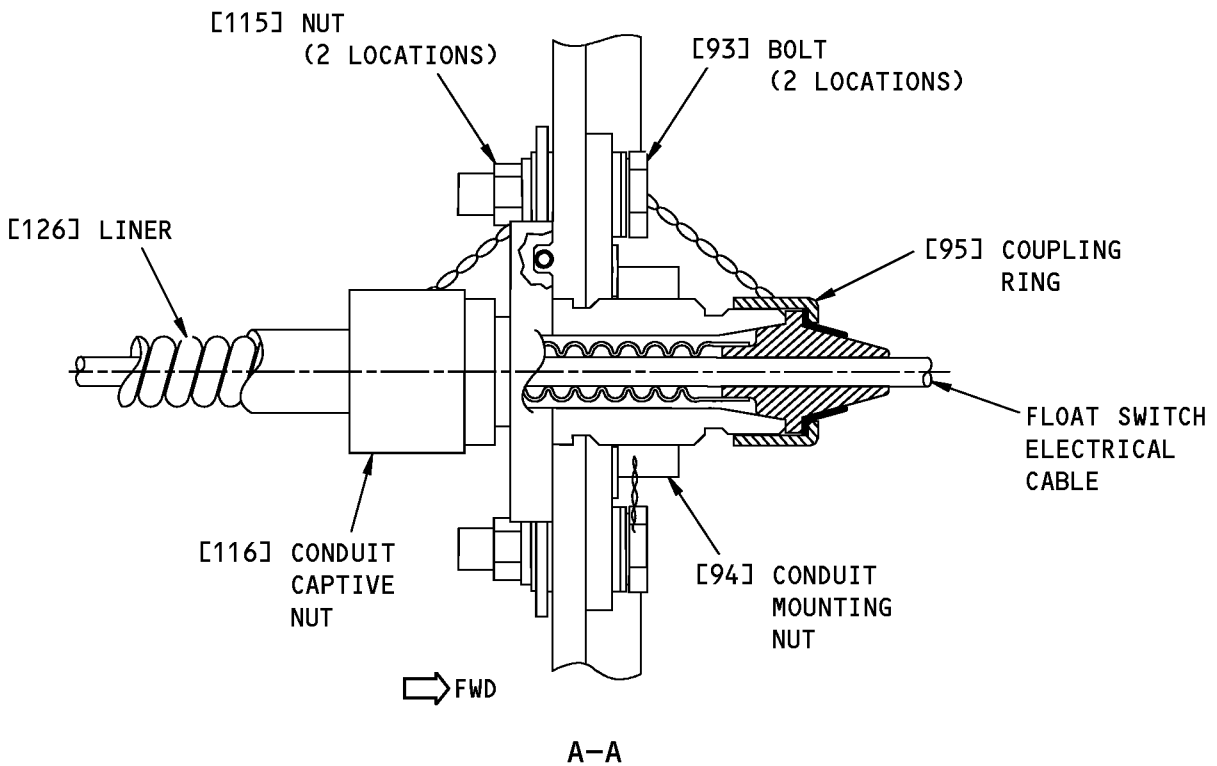
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**SPAR CONNECTION
(ASSEMBLED)**

(D)



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**Main Fuel Tank Float Switch and Conduit Installation
Figure 407 (Sheet 3 of 5)/28-21-71-990-831**

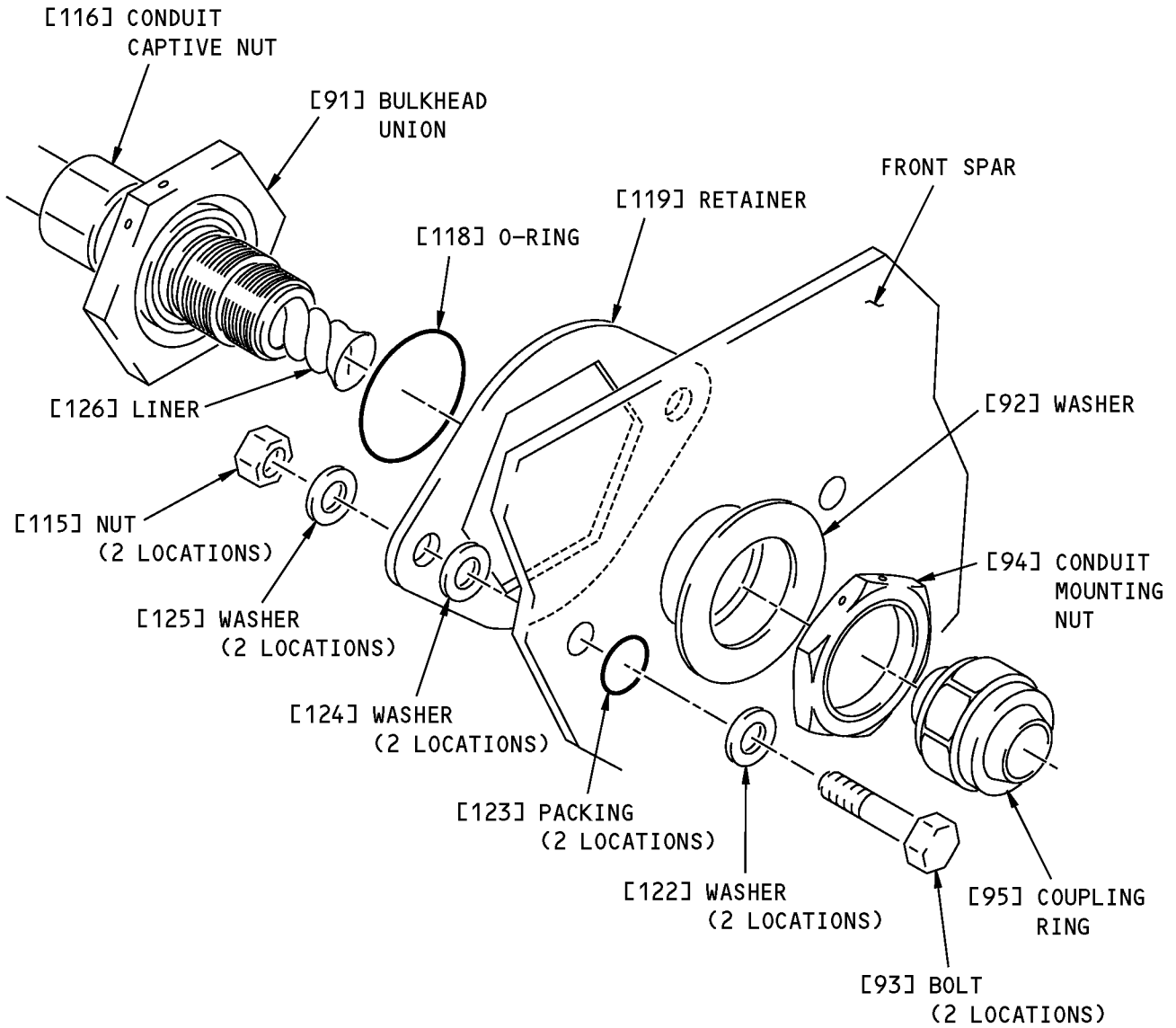
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**SPAR CONNECTION
(DISASSEMBLED)**

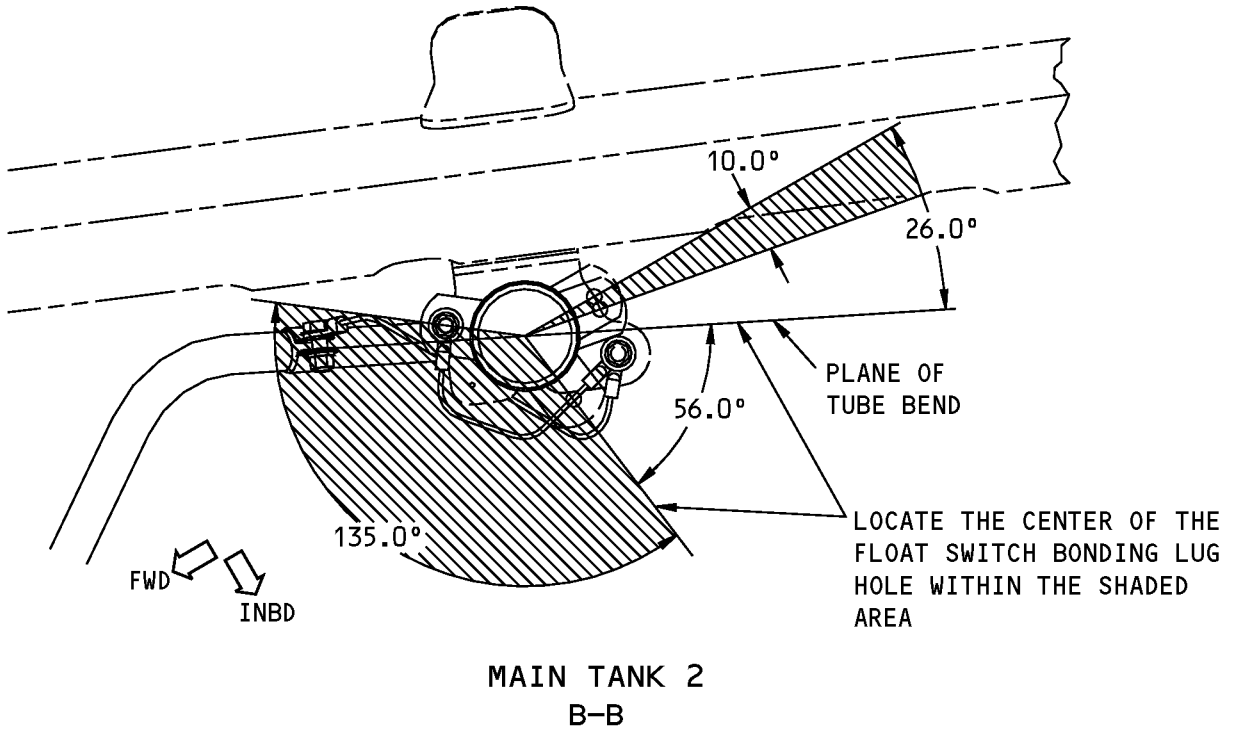
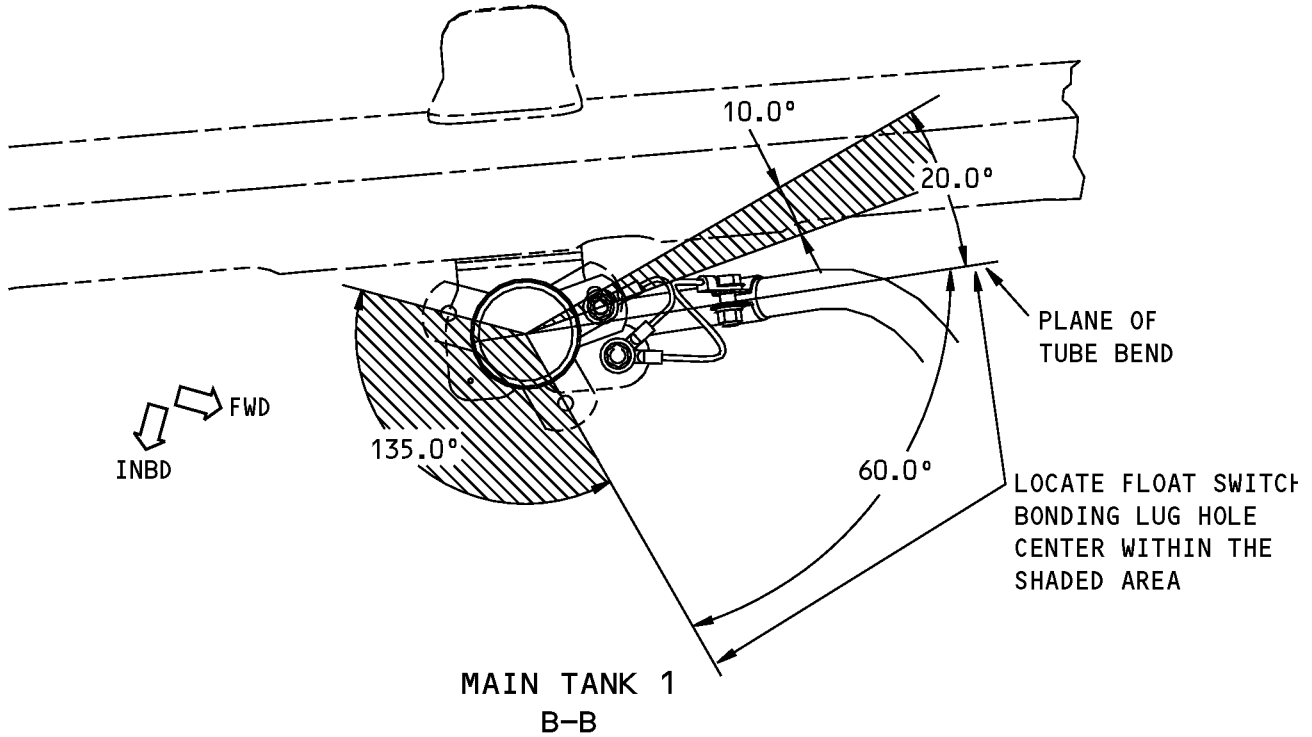
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**Main Fuel Tank Float Switch and Conduit Installation
Figure 407 (Sheet 4 of 5)/28-21-71-990-831**

EFFECTIVITY
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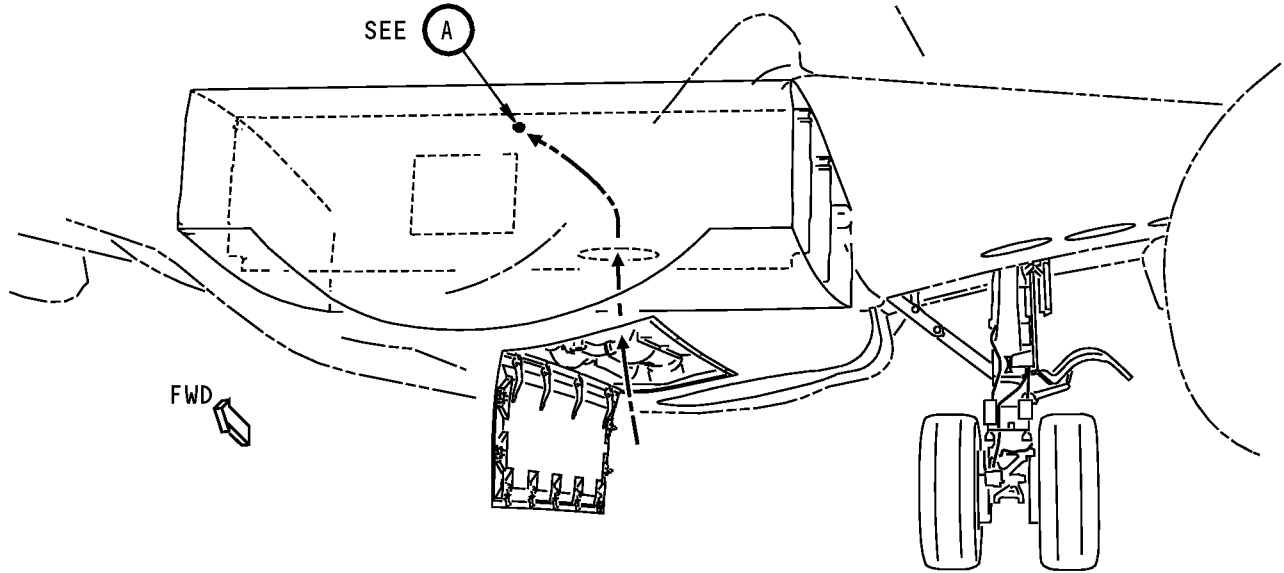
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**Main Fuel Tank Float Switch and Conduit Installation
Figure 407 (Sheet 5 of 5)/28-21-71-990-831**

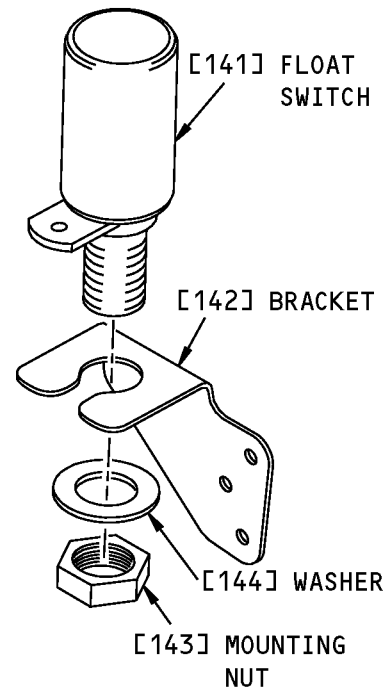
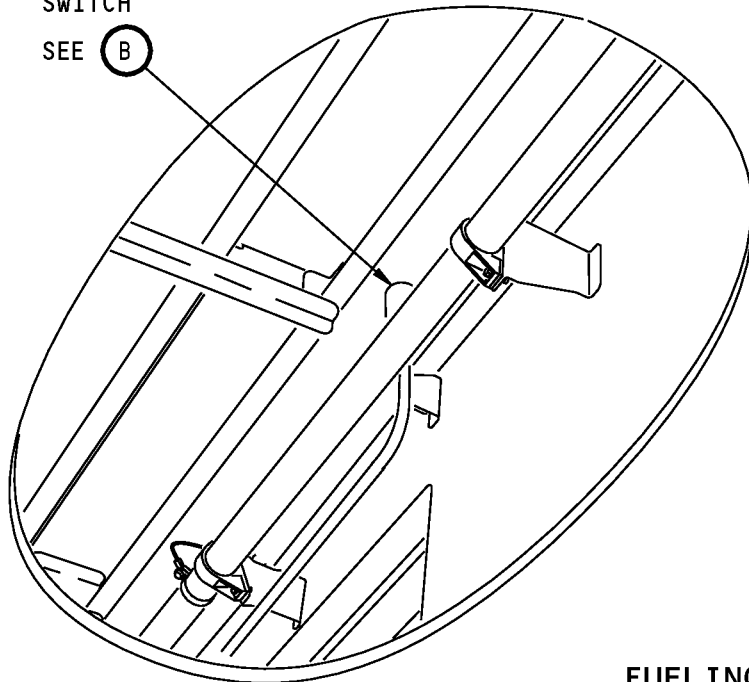
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FUELING
FLOAT
SWITCH

SEE (B)



FUELING FLOAT SWITCH ASSEMBLY

(A)

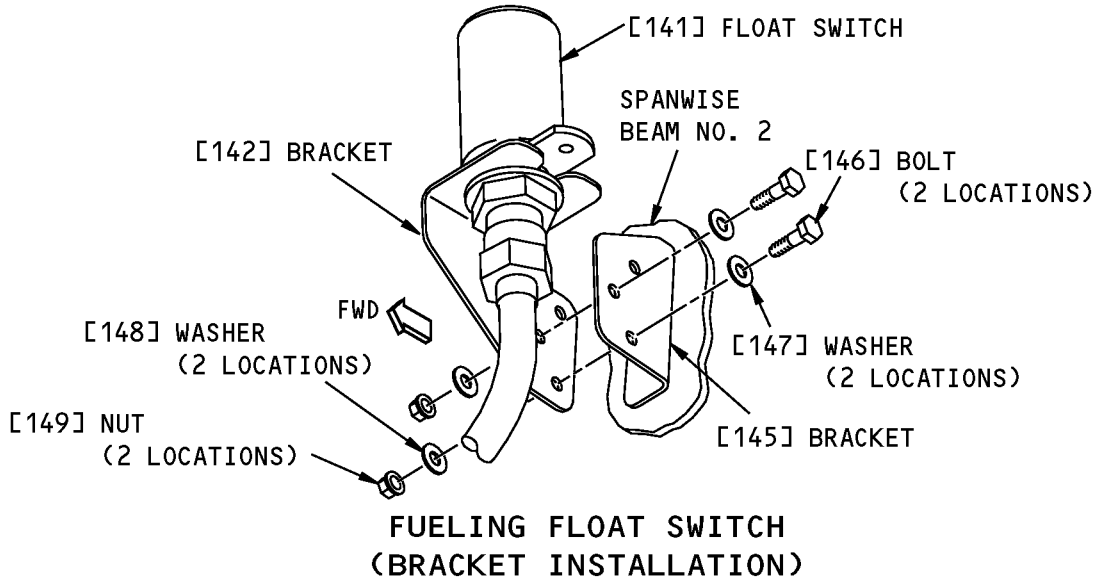
(B)

Center Tank Fueling Float Switch Installation
Figure 408 (Sheet 1 of 5)/28-21-71-990-832

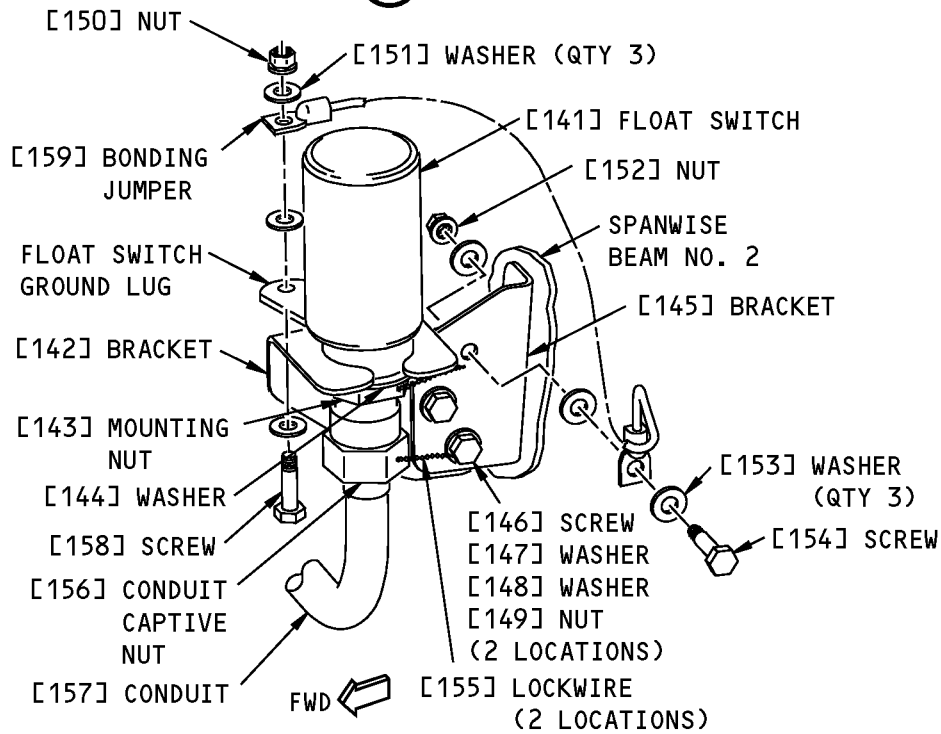
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(B)

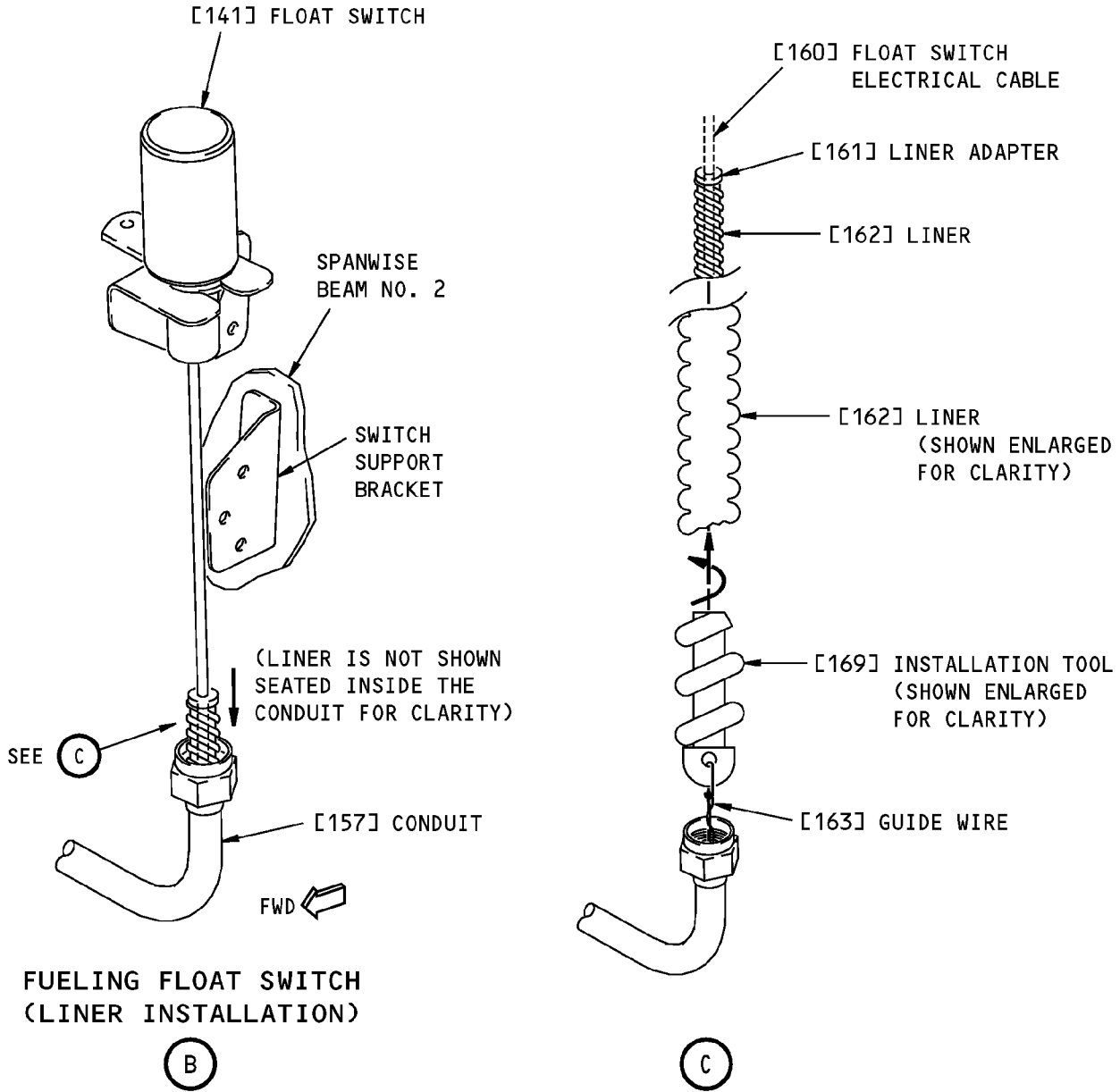


(B)

**Center Tank Fueling Float Switch Installation
Figure 408 (Sheet 2 of 5)/28-21-71-990-832**

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026 POST SB 737-28A1142

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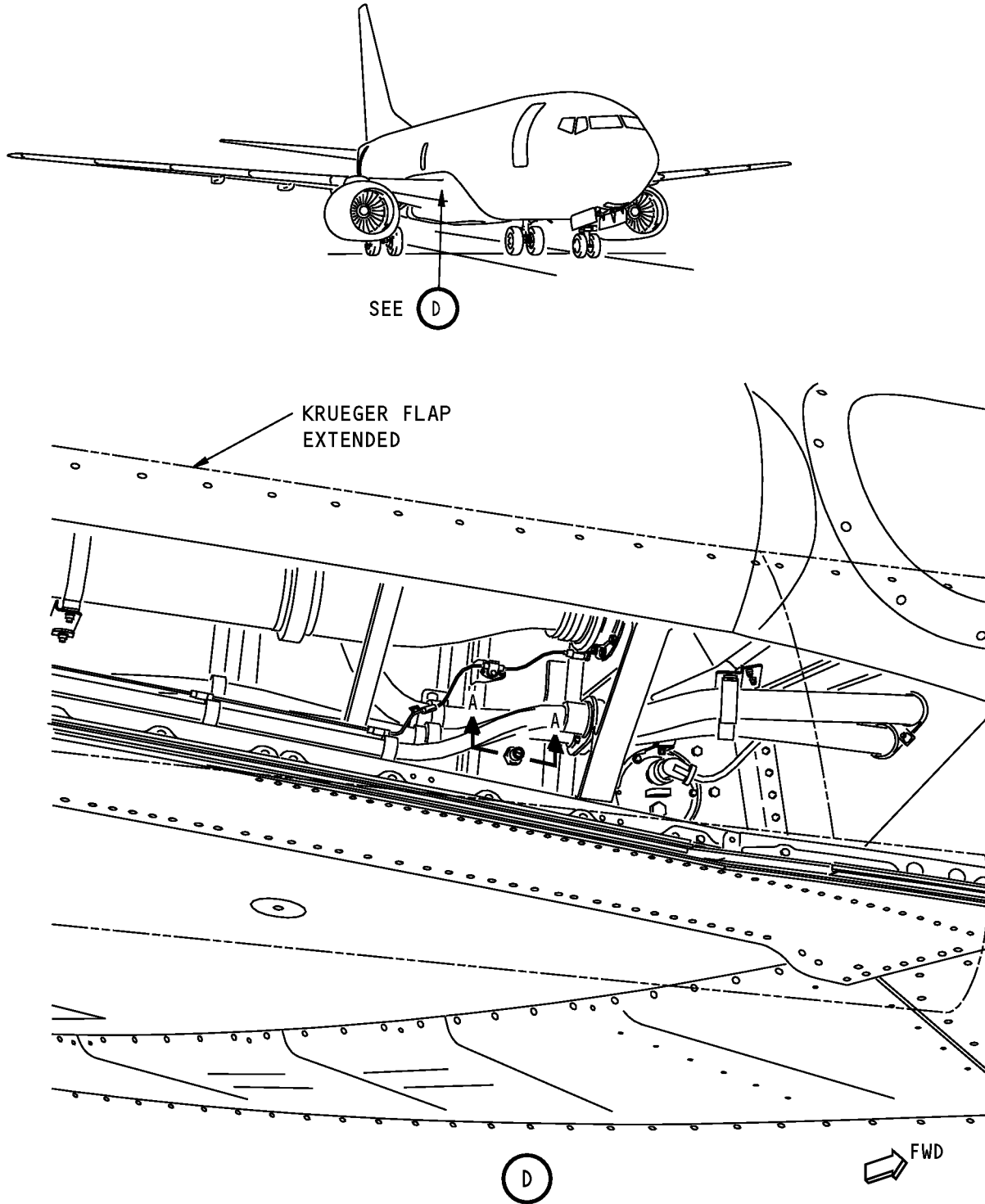


**Center Tank Fueling Float Switch Installation
Figure 408 (Sheet 3 of 5)/28-21-71-990-832**

EFFECTIVITY
HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025, 026 POST SB 737-28A1142

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**Center Tank Fueling Float Switch Installation
Figure 408 (Sheet 4 of 5)/28-21-71-990-832**

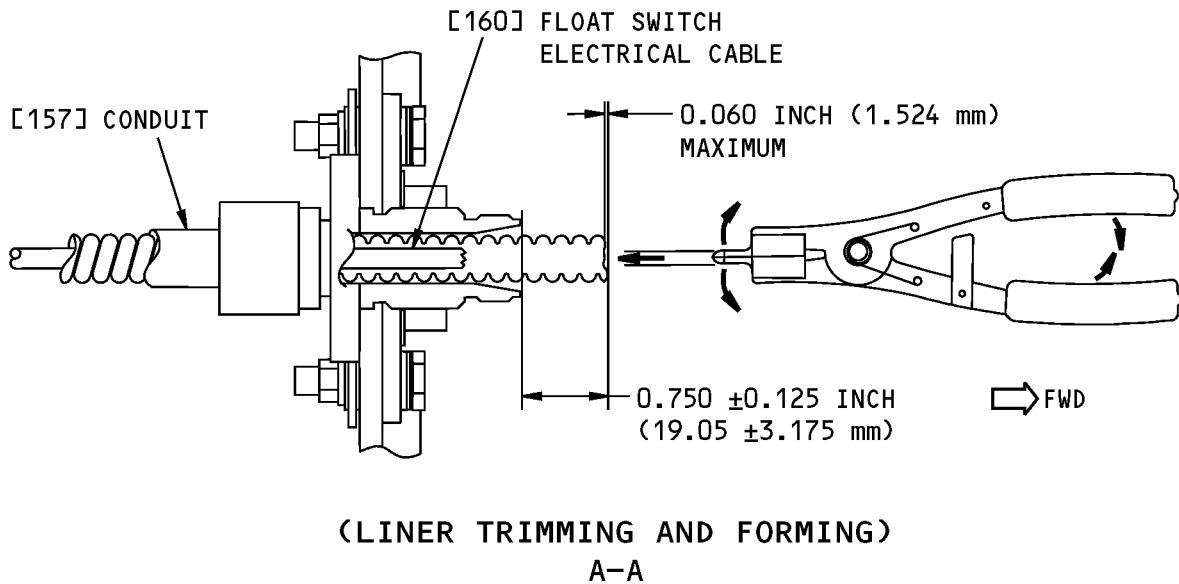
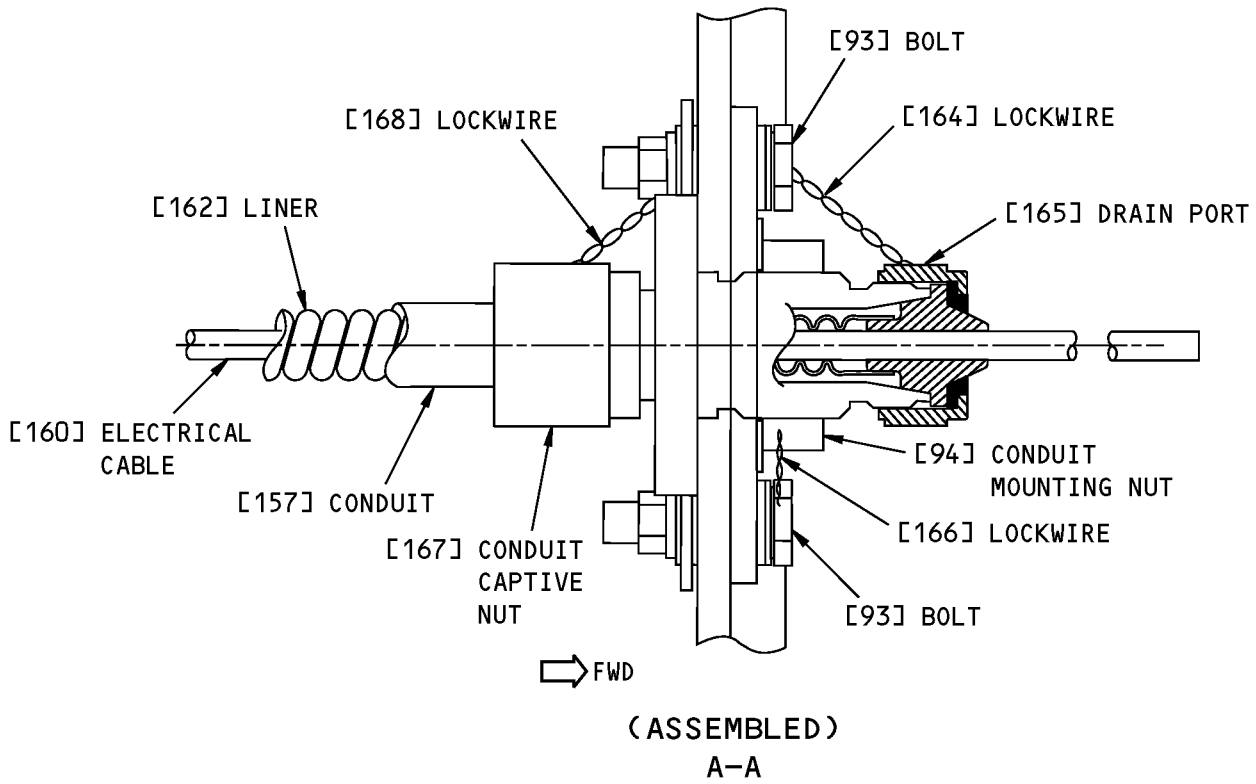
EFFECTIVITY
HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025,
026 POST SB 737-28A1142

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**Center Tank Fueling Float Switch Installation
Figure 408 (Sheet 5 of 5)/28-21-71-990-832**

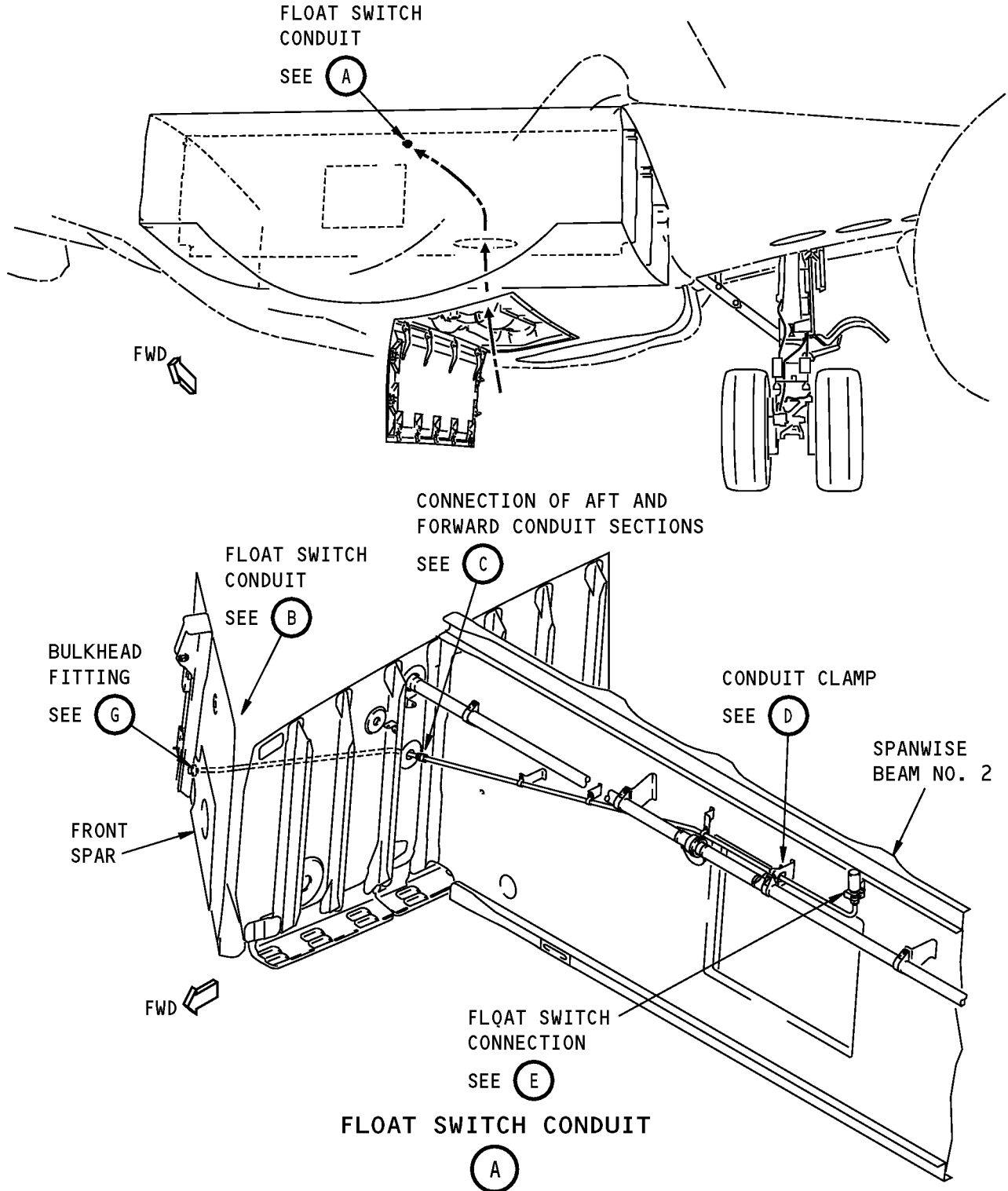
EFFECTIVITY
HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025,
026 POST SB 737-28A1142

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Center Fuel Tank Float Switch Conduit Installation
Figure 409 (Sheet 1 of 5)/28-21-71-990-833

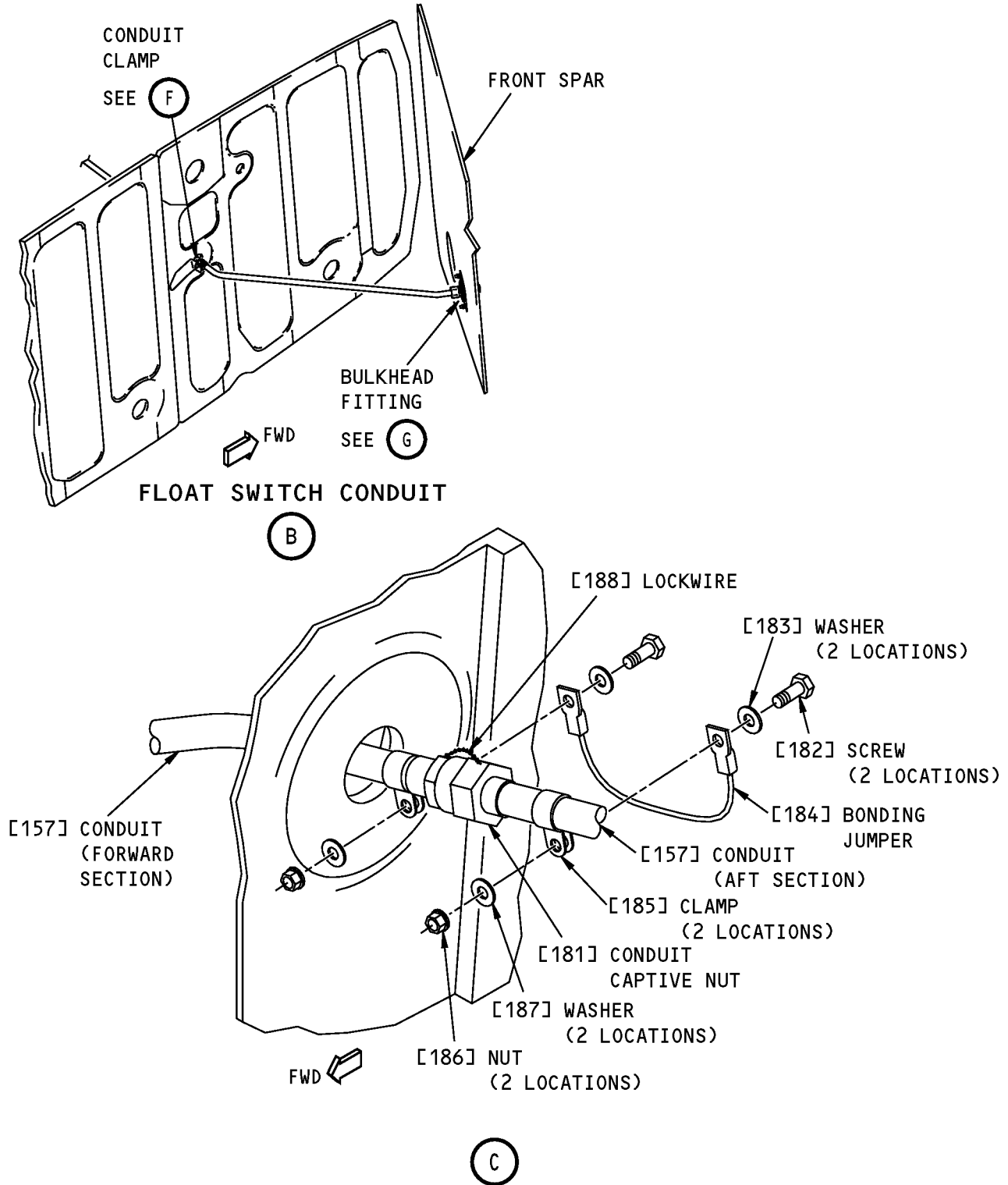
EFFECTIVITY
HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025,
026 POST SB 737-28A1142

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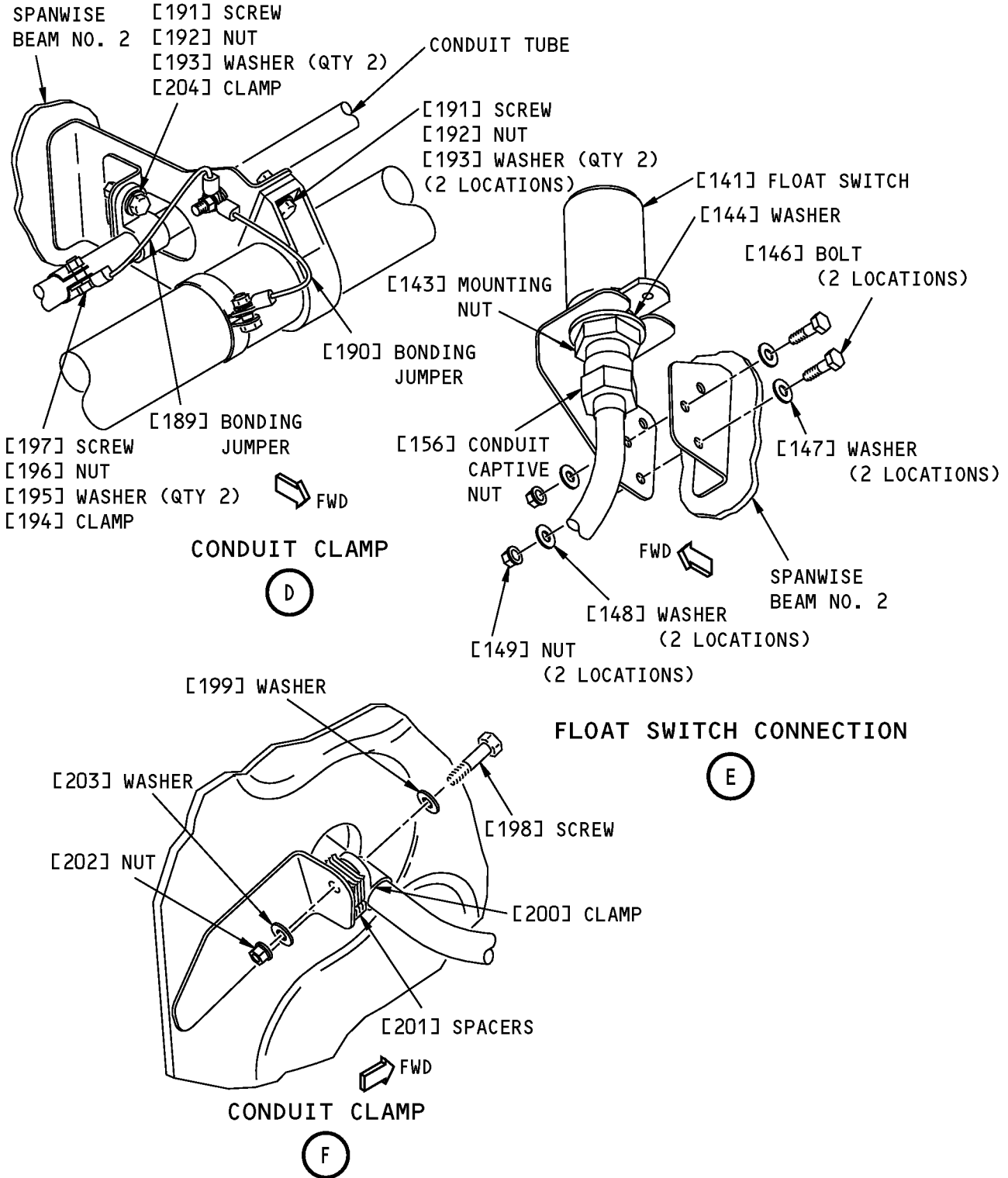


**Center Fuel Tank Float Switch Conduit Installation
Figure 409 (Sheet 2 of 5)/28-21-71-990-833**

EFFECTIVITY
HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025,
026 POST SB 737-28A1142

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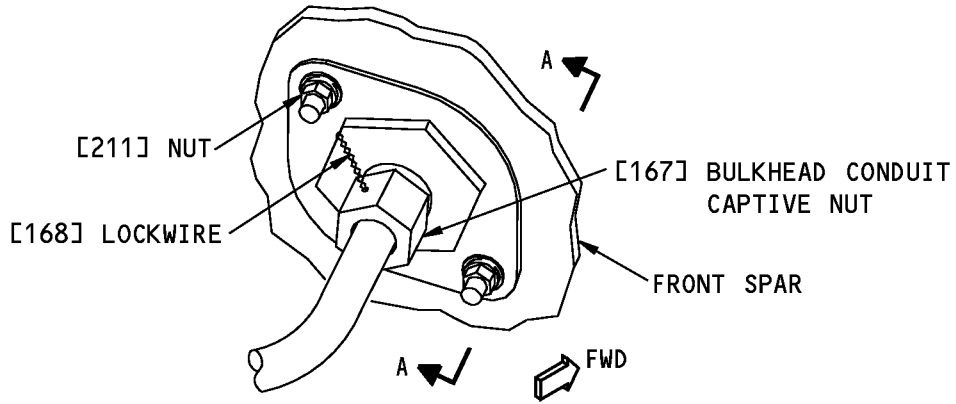
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**Center Fuel Tank Float Switch Conduit Installation
Figure 409 (Sheet 3 of 5)/28-21-71-990-833**

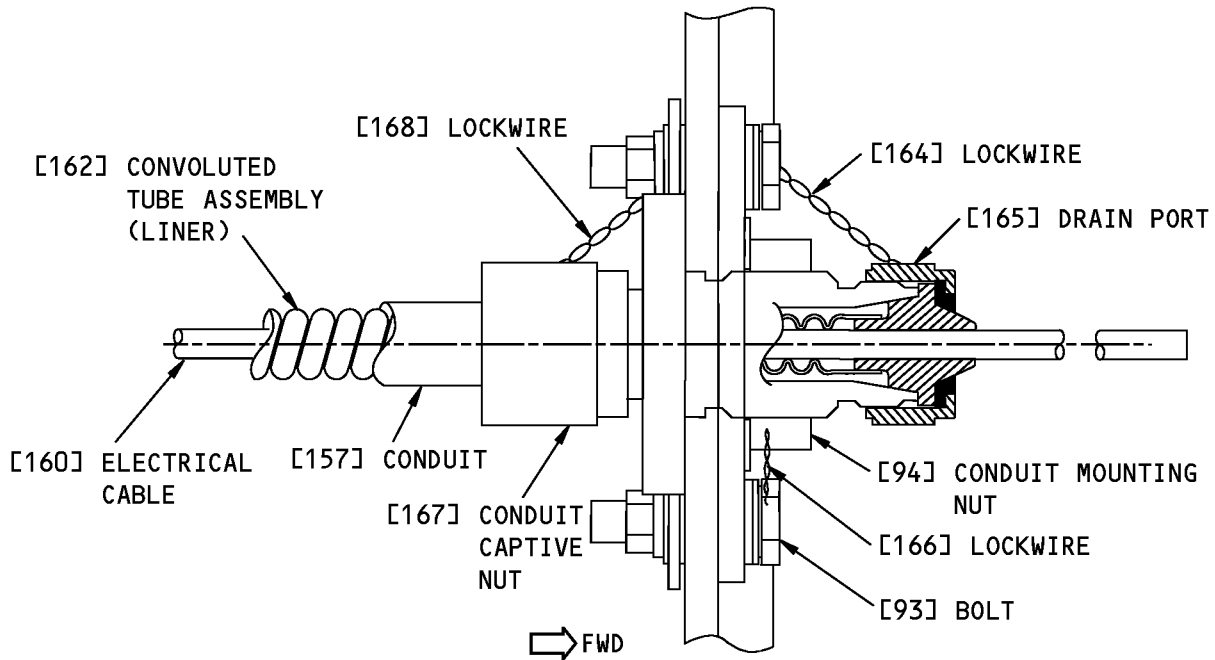
EFFECTIVITY
HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025, 026 POST SB 737-28A1142

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**BULKHEAD FITTING
(ASSEMBLED)**

G



A-A

N89955 S0006571879_V2

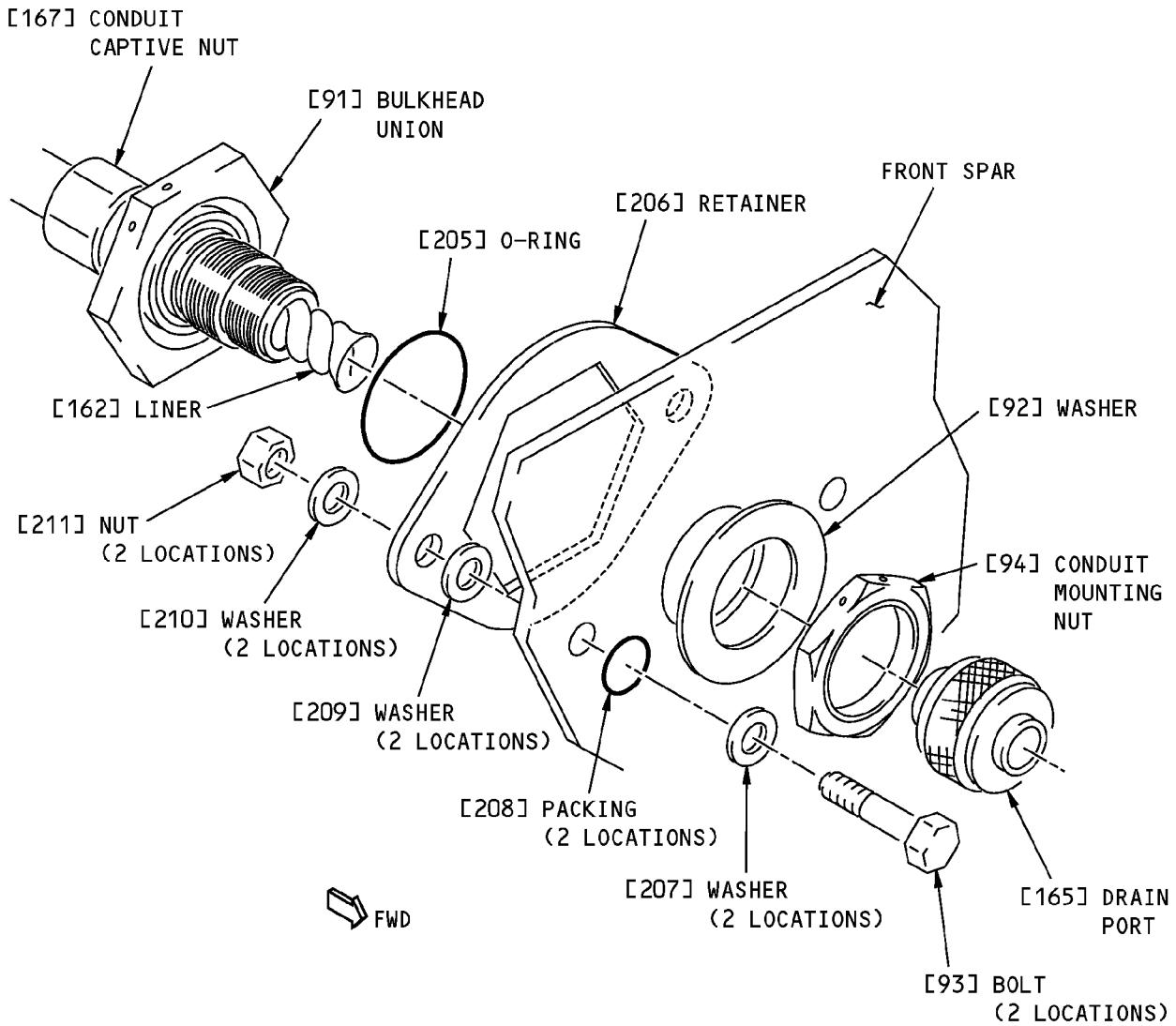
**Center Fuel Tank Float Switch Conduit Installation
Figure 409 (Sheet 4 of 5)/28-21-71-990-833**

EFFECTIVITY
HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025,
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**BULKHEAD FITTING
(DISASSEMBLED)**

G

**Center Fuel Tank Float Switch Conduit Installation
Figure 409 (Sheet 5 of 5)/28-21-71-990-833**

EFFECTIVITY
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TASK 28-21-71-400-802

5. Float Switch Installation

Figure 406, Figure 407, Figure 408, Figure 409)

A. General

- (1) CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).
(2) In the No. 1 and No. 2 tanks, the Type II float switch conduit must be replaced if the float switch is replaced. The float switch and conduit for the No. 1 or No. 2 tank are supplied as a single assembly. In the center tank, the conduit for the Type II float switch contains a liner which must be replaced each time the float switch is replaced.

B. References

Table with 2 columns: Reference, Title. Rows include 20-10-44-400-801 Lockwires Installation (P/B 401), 27-81-00-080-801 Leading Edge Flap and Slat Locks Removal (P/B 201), etc.

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Table with 2 columns: Reference, Description. Rows include SPL-4325 Test Equipment - Float Switch Conduit - 737 With Center Tank Type II Switch, SPL-5674 Adapter - Wire Puller, SPL-5675 Pliers - Spreader, Conduit Flare.

D. Consumable Materials

Table with 3 columns: Reference, Description, Specification. Rows include A00247 Sealant - Pressure And Environmental - Chromate Type, D00504 Grease - Petrolatum, G00150 Tape - Teflon Film With Silicon Adhesive, 5 mil - Permaceal P-421.

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(Continued)

Reference	Description	Specification
G50152	Tape - Flat Braided Lacing, Nomex, Hydraulic Fluid Resistant, Max 260 degrees F	BMS13-54, Type III, Grade D, Class 1, Finish C

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

F. Access Panels

Number	Name/Location
131AB	Center Tank Access
532PB	Main Tank Access Door - Wing Station 576
632PB	Main Tank Access Door - Wing Station 576

G. No. 1 or No. 2 Tank Float Switch and Conduit Assembly Installation Procedure (TYPE II FLOAT SWITCH)

(Figure 406, Figure 407)

SUBTASK 28-21-71-420-054

CAUTION: SEPARATE THE FLOAT SWITCH FROM THE CONDUIT JUST ENOUGH TO SLIP THE FLOAT SWITCH CABLE INTO THE BRACKET SLOT, WHILE KEEPING THE LINER FROM SLIDING OUT OF THE CONDUIT. TOO MUCH SEPARATION CAN CAUSE THE LOSS OF MOISTURE SEAL IN THE CONDUIT.

(1) For the float switch in the No. 1 or No. 2 tank, separate the float switch [102] from the conduit [101] and from the liner adapter [121] sufficiently to slide the float switch cable into the bracket slot (Figure 407).

SUBTASK 28-21-71-420-055

(2) Put the electrical cable for the float switch into the slot on the float switch mounting bracket [109].

SUBTASK 28-21-71-640-001

(3) Lubricate O-ring [118] with grease, D00504, and install it on the bulkhead union [91].

SUBTASK 28-21-71-420-056

(4) Put the bulkhead union [91] with the O-ring [118] and retainer [119] into the hole in the front spar (Figure 407).

(a) Make sure the liner [126] extends out of the union [91] sufficiently to be attached to the coupling ring [95] subsequently.

SUBTASK 28-21-71-420-057

(5) Install the float switch mounting nut [107] and the washer [110] (Figure 407).

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- (a) Tighten the mounting nut with your hand only.

SUBTASK 28-21-71-420-058

- (6) Install the conduit captive nut [105].

- (a) Tighten the conduit captive nut [105] with your hand only.

SUBTASK 28-21-71-420-059

- (7) From outside the tank, install the washer [92] and the conduit mounting nut [94] on the bulkhead union [91] (Figure 407).

- (a) Tighten the nut on to the union with your hand only.

SUBTASK 28-21-71-420-060

- (8) Put the retainer [119] in its correct position to align the mounting holes on the retainer [119] with the bolt holes in the front spar.

- (a) Do not install the retainer yet, because the installation torque that you will apply to the union could break the retainer if it is installed.

SUBTASK 28-21-71-420-061

- (9) Inside the tank, turn the bulkhead union [91] to mate with the retainer [119] when it is in its position for installation.

SUBTASK 28-21-71-420-062

- (10) Outside the tank, tighten the conduit mounting nut [94] to a torque of 360 ± 18 in-lb (41 ± 2 N·m).

SUBTASK 28-21-71-420-063

- (11) Do these steps to install the retainer [119]:

- (a) Outside the tank, install the two bolts [93] with the washer [122] and O-ring [123] and that go through the holes in the front spar for the retainer.

- (b) Inside the tank, install the two washers [124, 125] and nuts [115] that hold the retainer [119] in its position.

SUBTASK 28-21-71-420-064

CAUTION: TURN THE FLOAT SWITCH JUST ENOUGH TO PUT THE CENTER OF THE FLOAT SWITCH BONDING LUG HOLE WITHIN THE SHADED AREA SHOWN. IF YOU TURN THE FLOAT SWITCH TOO MUCH, IT CAN CAUSE THE FLOAT SWITCH TO SEPARATE FROM THE ELECTRICAL CABLE SOONER THAN NECESSARY.

- (12) Inside the tank, turn the float switch so that the center of the float switch bonding lug hole is within the shaded area shown in view B-B (Figure 407) in a position that causes the minimum torsional load on the float switch cable.

SUBTASK 28-21-71-420-065

- (13) Do these steps to tighten the parts that attach the float switch [102] (Figure 407):

- (a) Tighten the float switch mounting nut [107] to a torque of 280 ± 14 in-lb (32 ± 2 N·m).

- (b) Tighten the conduit captive nut [105] for the float switch to a torque of 280 ± 14 in-lb (32 ± 2 N·m).

- (c) Tighten the bulkhead conduit captive nut [116] to a torque of 280 ± 14 in-lb (32 ± 2 N·m) (Figure 407).

- (d) Loosen the float switch mounting nut [107] sufficiently to relax the torque temporarily (Figure 407).

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- (e) Loosen the conduit captive nut [105] for the float switch sufficiently to relax the torque temporarily.
- (f) Loosen the bulkhead conduit captive nut [116] sufficiently to relax the torque temporarily (Figure 407).
- (g) The final torque for each of these nuts must be witnessed and written in the maintenance records for the airplane:
 - 1) Tighten the float switch mounting nut [107] to a final torque of 280 ± 14 in-lb (32 ± 2 N·m).
 - 2) Tighten the conduit captive nut [105] for the float switch to a final torque of 280 ± 14 in-lb (32 ± 2 N·m).
 - 3) Tighten the bulkhead conduit captive nut [116] to a final torque of 280 ± 14 in-lb (32 ± 2 N·m).
 - 4) Make sure the final torque for each of these nuts is written in the maintenance records.

SUBTASK 28-21-71-420-084

- (14) Outside of the tank, install the coupling ring [95] on the end of the bulkhead union [91].
 - (a) Make sure the grommet end of the coupling ring [95] is firmly installed inside the clear liner [126].
 - (b) Tighten the coupling ring [95] to a torque of 35 ± 3 in-lb (4 ± 0 N·m).

SUBTASK 28-21-71-420-066

- (15) Do these steps to install the bonding jumpers (Figure 407):
 - (a) Install the bonding jumper [104] on the ground lug for the float switch [102].
 - 1) Choose a jumper whose length will prevent too much loose bonding jumper after the bonding jumper is installed.
 - (b) Install the other end of bonding jumper [104] on the ground lug on the switch bracket [109].
 - 1) Adjust the jumper lug position as necessary to remove the loose part of the bonding jumper.
 - (c) Install the bonding jumper [103] on the ground lug on the switch support bracket [109].
 - (d) Install the other end of bonding jumper [103] on the conduit with the clamp, screw, washer, and nut.
 - 1) Adjust the jumper lug position as necessary to remove the loose part of the bonding jumper.

SUBTASK 28-21-71-760-006

- (16) Measure the resistance from the float switch ground lug to the primary structure of the wing rib (SWPM 20-20-00).
 - (a) Make sure the resistance is less than 0.010 ohm (10 milliohms).

SUBTASK 28-21-71-765-001

- (17) Measure the resistance from the conduit [101] to the primary structure of the wing rib (SWPM 20-20-00).
 - (a) Make sure the resistance is less than 0.010 ohm (10 milliohms).

SUBTASK 28-21-71-765-002

- (18) Measure the resistance from the terminal of the bonding jumper [103] on the bracket [109] to the bracket [109] (SWPM 20-20-00).

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- (a) Make sure the resistance is less than 0.0010 ohm (1 milliohm).

SUBTASK 28-21-71-765-003

- (19) At the other end of the bonding jumper [103], measure the resistance from the terminal of the bonding jumper [103] to the conduit [101] (SWPM 20-20-00).

- (a) Make sure the resistance is less than 0.0015 ohm (1.5 milliohms).

SUBTASK 28-21-71-420-067

- (20) Install lockwire in these locations:

- (a) Install lockwire from the bulkhead conduit captive nut [116] to the nut [115] (Figure 407) (TASK 20-10-44-400-801).
- (b) Install lockwire [108] from the mounting nut [107] for the float switch to the float switch bracket [109] (Figure 407) (TASK 20-10-44-400-801).
- (c) Install lockwire [106] from the conduit captive nut [105] to the mounting nut [107] (Figure 407) (TASK 20-10-44-400-801).
- (d) Outside the tank, install lockwire from the conduit mounting nut [94] to the bolt [93] (Figure 406) (TASK 20-10-44-400-801).
- (e) Install lockwire from the coupling ring [95] to the bolt [93] (Figure 406) (TASK 20-10-44-400-801).
- (f) Install lockwire from the bulkhead union [91] to the bolt [93] (Figure 406) (TASK 20-10-44-400-801).

SUBTASK 28-21-71-420-068

- (21) Do these steps to splice the float switch electrical cable to the airplane wire harness:

- (a) Cut the float switch electrical cable as necessary to permit a wire splice to the airplane wire harness without leaving more than 1 in. (25 mm) of excess wire.
- (b) Splice the float switch electrical cable to the airplane wire harness with the applicable crimp tool (SWPM 20-30-12).
- (c) Apply sealant, A00247, to the splice and each end of the splice.

NOTE: Make sure the splice has a full layer of sealant on it.

- (d) Move the sleeve, filled with sealant, A00247, to the center of the splice.

NOTE: Make sure there are no air bubbles in the sleeve.

- (e) Use the lockstitch to tie a knot with tape, G50152, approximately 0.25 in. (6.35 mm) from each end of the sleeve.
- (f) Record the splice number number on the sleeve.
- (g) Put two layers of Permacel P-421 tape, G00150, over the splice to prevent damage from water and fuel.
- (h) Use the lockstitch to tie a knot with tape, G50152, approximately 0.25 in. (6.35 mm) from each end of the sleeve.
- (i) Remove the tags from the wires.

H. Center Tank Float Switch Installation Procedure (TYPE II FLOAT SWITCH)

(Figure 406, Figure 408, Figure 409)

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SUBTASK 28-21-71-420-069

- (1) Install the float switch [141] in the bracket [142] with the float switch mounting nut and washer (Figure 408).
 - (a) Leave the mounting nut loose to permit the float switch to align itself with the position where the torsional load is

NOTE: This permits the float switch to turn to the position that keeps the torsional load on the electrical cable to a minimum during subsequent steps.

SUBTASK 28-21-71-420-070

- (2) Do these steps to put the conduit [157] into its position (Figure 409):
 - (a) Apply grease, D00504, to the threads of the two sections of the conduit.
 - (b) Put the two sections of the conduit into their positions.
 - (c) Attach the forward section of the conduit to the aft section.
 - 1) Hand-tighten this connection.
 - (d) Attach the forward section of the conduit to the front spar bulkhead union [91].

SUBTASK 28-21-71-420-071

WARNING: INSTALL A NEW LINER EVERY TIME THE CONDUIT IS REPLACED AND EVERY TIME THE FLOAT SWITCH IS REPLACED. THE LINER IS NECESSARY TO KEEP THE FLOAT SWITCH WIRING SAFE FROM CONTACT WITH FUEL. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (3) Do these steps to install the liner [162] and the electrical cable [77] in the conduit (Figure 408):
 - (a) Put the wire puller adapter, SPL-5674, into the non-ferrule end of the liner [162] (Figure 408).
 - (b) Attach a guide wire [163] (10 feet or 3 meters long) to the wire puller adapter, SPL-5674.
 - (c) At the end of the conduit adjacent to the float switch, push the guide wire [163] through the conduit [157] until the guide wire comes out of the far end of the conduit at the front spar.
 - (d) Insert the electrical cable for the float switch into the ferrule end of the liner [162] until it touches the wire puller adapter, SPL-5674, at the other end of the liner [162].
 - (e) Put the liner and the float switch electrical cable into the open end of the conduit as a single unit.
 - (f) Pull on the guide wire and push on the liner and electrical cable together.
 - (g) Turn the liner as necessary to make it easier to put the liner and electrical cable into the conduit.
 - (h) Continue to put the liner and electrical cable into the conduit until the liner adapter is seated inside the conduit.
 - (i) Remove the wire puller adapter, SPL-5674, and guide wire and discard them.

SUBTASK 28-21-71-640-002

- (4) Lubricate O-ring [205] with grease, D00504, and install it on the bulkhead union [91].

SUBTASK 28-21-71-420-086

- (5) Put the bulkhead union [91] with the O-ring [205] and retainer [206] into the hole in the front spar (Figure 409).
 - (a) Make sure the liner [162] extends out of the bulkhead union [91] sufficiently to be attached to the drain port [165] subsequently.

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SUBTASK 28-21-71-420-087

- (6) From outside the tank, install the washer [92] and the conduit mounting nut [94] on the bulkhead union [91] (Figure 409).
 - (a) Tighten the conduit mounting nut [94] on to the union with your hand only.

SUBTASK 28-21-71-420-088

- (7) Put the retainer [206] in its correct position to align the mounting holes on the retainer [206] with the bolt holes in the front spar.
 - (a) Do not install the retainer yet, because the installation torque that you will apply to the union could break the retainer if it is installed.

SUBTASK 28-21-71-420-089

- (8) Inside the tank, turn the bulkhead union [91] to mate with the retainer [206] when it is in its position for installation.

SUBTASK 28-21-71-420-090

- (9) Outside the tank, tighten the conduit mounting nut [94] to a torque of 360 ± 18 in-lb (41 ± 2 N·m).

SUBTASK 28-21-71-420-091

- (10) Do these steps to install the retainer [206]:
 - (a) Outside the tank, install the two bolts [93] with the washer [207] and O-ring [208] that go through the holes in the front spar for the retainer [206].
 - (b) Inside the tank, install the two washers [209, 210] and nuts [211] that hold the retainer [206] in its position.

SUBTASK 28-21-71-420-072

CAUTION: BE CAREFUL NOT TO DAMAGE THE ELECTRICAL CABLE IN THE CONDUIT WHILE YOU WORK WITH THE LINER. DAMAGE TO EQUIPMENT CAN OCCUR.

- (11) Do these steps to trim and flare the end of the liner [162] (Figure 408).
 - (a) Make sure the coupling nuts that connect the two conduit sections and the forward conduit section to the front spar are hand tight.
 - (b) Hold the end of the liner that extends out of the front spar bulkhead union so the liner adapter is seated firmly inside the conduit.
 - (c) Pull the float switch electrical cable back out of the liner just sufficiently so that the end of the electrical cable is inside the union.
 - (d) Trim the liner at 90 degrees to its center line so that 0.750 ± 0.125 in. (19.050 ± 3.175 mm) extends out of the union when the liner adapter is firmly seated inside the conduit.
 - (e) With the plier, SPL-5675, flare the liner.
 - 1) Form the cut end of the liner [162] to accept the shoulder of the drain port assembly.
 - 2) After you form the cut end of the tube assembly, the edge perimeter of the tube assembly must be even to within 0.060 in. (1.524 mm).
 - (f) Push the float switch electrical cable out past the trimmed end of the liner.
 - (g) Pull any extra electrical cable out through the liner.

SUBTASK 28-21-71-420-073

- (12) Install the bracket [142] and float switch [141] that you assembled before in its position on spanwise beam No. 2 with only the two lower sets of bolts [146], washers [147,148], and nuts [149] (Figure 408).

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SUBTASK 28-21-71-760-007

- I (13) Measure the resistance from the bracket to spanwise beam No. 2.
 - (a) Make sure the resistance is less than 0.010 ohm (10 milliohms).

SUBTASK 28-21-71-420-074

- I (14) Do these steps for the installation of the conduit (Figure 409):
 - (a) Align the conduit so the conduit can be connected to the float switch.
 - (b) Make sure the conduit lines up with positions of the clamps to be installed in the subsequent two steps.
 - (c) Loosely install the clamp [204], screw [191], washers [193], and nut [192].
 - (d) Loosely install the clamp [200], screw [198], washers [199,203], nut [202], and spacers [201] (as necessary).
 - 1) First install the clamp with no spacers between the clamp and bracket.
 - 2) Install spacers as necessary to remove pre-loading of the conduit sections.
 - 3) You can use a maximum of six spacers to do this.

SUBTASK 28-21-71-420-075

- I (15) Tighten the float switch mounting nut [143] to a torque of 280 ± 14 in-lb (32 ± 2 N·m) (Figure 408).

SUBTASK 28-21-71-420-076

- I (16) Do these steps to complete the float switch installation (Figure 408):
 - (a) Apply grease, D00504, to the threads of the conduit captive nut [156].
 - (b) Tighten the conduit captive nut [156] to a torque of 280 ± 14 in-lb (32 ± 2 N·m).
 - (c) Loosen the conduit captive nut [156] again to relax the torque.
 - (d) The subsequent step must be witnessed and written in the maintenance documentation for the airplane.
 - (e) Tighten the conduit captive nut [156] again to a final torque of 280 ± 14 in-lb (32 ± 2 N·m).
 - (f) Make sure the final torque is written in the maintenance records.

SUBTASK 28-21-71-420-077

- I (17) Do these steps to complete the conduit installation:
 - (a) Tighten the conduit captive nut [181] at the conduit join to a torque of 280 ± 14 in-lb (32 ± 2 N·m) (Figure 409).
 - (b) Loosen the conduit captive nut [181] again to relax the torque.
 - (c) Tighten the bulkhead conduit captive nut [167] at the front spar bulkhead union to a torque of 280 ± 14 in-lb (32 ± 2 N·m).
 - (d) Loosen the conduit captive nut [167] again to relax the torque.
 - (e) The subsequent two steps must be witnessed and written in the maintenance documentation for the airplane.
 - (f) Tighten the conduit captive nut [181] at the conduit join to a final torque of 280 ± 14 in-lb (32 ± 2 N·m).
 - (g) Tighten the conduit captive nut [167] at the front spar bulkhead union to a final torque of 280 ± 14 in-lb (32 ± 2 N·m).

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HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025, 026 POST SB 737-28A1142 (Continued)

- (h) Make sure the final torques on these conduit captive nuts are written in the maintenance records.
- (i) Install the clamp [200].
 - 1) Add or remove spacers as necessary to remove pre-load in the conduit.
 - 2) Make sure the minimum clearance between the conduit and structure at the attach point is 0.1 in. (2.5 mm).
- (j) Install the bonding jumper [190] connected to the fuel tube (Figure 409).
- (k) Install the bonding jumper [189] from the bracket to the conduit clamp.
- (l) Measure the resistance from terminal of bonding jumper [189] and bonding jumper [190] to the bracket structure to which the bonding jumper is mounted.
 - 1) For each bonding jumper, the resistance must be less than 0.0010 ohm (1 milliohm).
- (m) Measure the resistance from the conduit tube to spanwise beam No. 2.
 - 1) Make sure the resistance is less than 0.010 ohm (10 milliohms).
- (n) Measure the resistance from the terminal of the bonding jumper [189] and the conduit tube.
 - 1) Make sure the resistance is less than 0.0015 ohm (1.5 milliohms).
- (o) Measure the resistance from the refueling tube to spanwise beam No. 2.
 - 1) Make sure the resistance from the refueling tube to spanwise beam No. 2 is less than 0.010 ohm (10 milliohms).
- (p) Install the bonding jumper [184].
- (q) Measure the resistance from each terminal of bonding jumper [184] to the conduit [157].
 - 1) Make sure the resistance is less than 0.0015 ohm (1.5 milliohms).
- (r) Measure the resistance from each section of the conduit [157] (FWD and AFT) to side of body rib.
 - 1) Make sure the resistance is less than 0.030 ohm (30 milliohms).

SUBTASK 28-21-71-420-078

- (18) At the front spar, cut the electrical cable to a length of 38.00 ± 2.00 in. (965.20 ± 50.80 mm) beyond point where it comes out of the front spar.

SUBTASK 28-21-71-420-079

- (19) Do these steps to complete the installation of the float switch (Figure 408):
 - (a) Clean the bonding surface on the float switch ground lug.
 - (b) Clean the bonding surface on the float switch bracket. .
 - (c) Install the bonding jumper [159] on the float switch ground lug with the screw [158], nut [150], and washers [151] (Figure 408).
 - (d) Install the other end of bonding jumper [159] on the float switch bracket [145] with the screw [154], nut [152], and washers [153].

SUBTASK 28-21-71-760-008

- (20) Measure the resistance from the float switch lug to spanwise beam number 2 (SWPM 20-20-00).
 - (a) Make sure the resistance is less than 0.010 ohm (10 milliohms).

SUBTASK 28-21-71-420-080

- (21) Install lockwire in these locations (Figure 408):

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- (a) Install lockwire [155] from the screw [154] to the float switch mounting nut [143].
- (b) Install lockwire [155] from the screw [146] to the conduit captive nut [156].

SUBTASK 28-21-71-020-024

(22) Install lockwire in these locations (TASK 20-10-44-400-801) (Figure 409):

- (a) Install lockwire [168] from the bulkhead conduit captive nut [167] to the bulkhead union [91].
- (b) Install lockwire [188] from the conduit captive nut [181] at the conduit join to the fitting on the FWD conduit section.

SUBTASK 28-21-71-790-005

(23) Do these steps to do a pressure test of the conduit and float switch:

- (a) Install a Test Assembly, SPL-4325, into the center tank float switch conduit at the front spar to permit you to do the pressure test.

NOTE: The float switch cable and the end of the convoluted tube that comes out of the union must be inserted into the Test Assembly, SPL-4325, to permit the conduit to be pressurized.

- (b) Attach a pressure source to the Test Assembly, SPL-4325.

NOTE: The pressure source must be able to supply and control pressures from 0 to 6 psig (41 kPa). It must have an absolute accuracy of ± 1 psig (7 kPa) and be capable of showing changes in pressure of 0.05 psig (0.34 kPa).

- (c) Pressurize the float switch conduit to 5 ± 1 psig (34 ± 7 kPa).
- (d) Close the test bench shutoff valve to hold the pressure in the conduit.
- (e) Permit the pressure to become stable for 1 - 2 minutes.
- (f) Write the pressure in the conduit.
- (g) Make sure the pressure in the conduit is 5 ± 1 psig (34 ± 7 kPa).
- (h) Permit the conduit to hold pressure for 1 - 2 minutes.
- (i) Write the pressure in the conduit.
- (j) Make sure the pressure is ± 0.05 psig (0.34 kPa) of the pressure written at the start of the test.
- (k) Slowly reduce the pressure from the float switch conduit.
- (l) Remove the Test Assembly, SPL-4325, from the center tank float switch conduit.

SUBTASK 28-21-71-210-002

(24) Before you install the drain port assembly [165], make sure it is witnessed that the liner [162] is installed in the conduit.

NOTE: The liner is important to the safety of the float switch installation. This is the last step where a person can make sure it is installed and document that fact.

- (a) Make sure the installation of the liner in the conduit is written in the maintenance records for the airplane.

SUBTASK 28-21-71-420-081

(25) Do these steps to install the drain port assembly [165] (Figure 406, Figure 409):

- (a) Put the float switch electrical cable [160] into the hole in the drain port assembly [165].

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HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025, 026 POST SB 737-28A1142 (Continued)

- (b) Slide the drain port assembly [165] along the electrical cable [160] to the front spar bulkhead union [91].
- (c) Install the drain port [165] on the front spar bulkhead union [91].
NOTE: Make sure the drain port shoulder is seated inside the liner [162].
- (d) Tighten the drain port [165] to a torque of 10 ± 1 in-lb (1 ± 0 N·m).
- (e) Install lockwire [164] from the drain port [165] to the bolt [93] (TASK 20-10-44-400-801) (Figure 406).
- (f) Install lockwire [166] from the conduit mounting nut [94] to the bolt [93] (TASK 20-10-44-400-801) (Figure 409).

SUBTASK 28-21-71-420-082

- I (26) Do these steps to splice the float switch electrical cable to the airplane wire harness:
 - (a) Cut the electrical cable as necessary to permit a wire splice to the airplane wire harness without leaving more than 1.0 in. (25.4 mm) of excess wire.
 - (b) Splice the float switch electrical cable to the airplane wire harness with the applicable crimp tool (SWPM 20-30-12).
 - (c) Apply sealant, A00247, to the splice and each end of the splice.
NOTE: Make sure the splice has a full layer of sealant on it.
 - (d) Move the sleeve, filled with sealant, A00247, to the center of the splice.
NOTE: Make sure there are no air bubbles in the sleeve.
 - (e) Use the lockstitch to tie a knot with tape, G50152, approximately 0.25 in. (6.35 mm) from each end of the sleeve.
 - (f) Record the splice number on the sleeve.
 - (g) Put two layers of Permacel P-421 tape, G00150, over the splice to prevent damage from water and fuel.
 - (h) Use the lockstitch to tie a knot with tape, G50152, approximately 0.25 in. (6.35 mm) from each end of the sleeve.
 - (i) Remove the tags from the wires.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 28-21-71-410-003

- (1) Install the access panels that you removed to get access to the fuel tank.
 - (a) For the No. 1 or No. 2 tank, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532PB	Main Tank Access Door - Wing Station 576

or open this access panel:

<u>Number</u>	<u>Name/Location</u>
632PB	Main Tank Access Door - Wing Station 576

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

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HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025, 026 POST SB 737-28A1142 (Continued)

(b) Install this access panel:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

for the center tank. To do this, do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801

SUBTASK 28-21-71-650-005

(2) Fill the tank with fuel and make sure the float switch stops the refuel operation correctly (TASK 28-21-00-700-801).

SUBTASK 28-21-71-790-006

(3) With fuel in the tank, do a check for fuel leakage at the bulkhead fitting for the conduit.

(a) No leakage is permitted.

SUBTASK 28-21-71-080-003

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT REMOVE THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this task: Leading Edge Flap and Slat Locks Removal, TASK 27-81-00-080-801.

SUBTASK 28-21-71-860-009

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS. THE LEADING EDGE AND THE TRAILING EDGE CONTROL SURFACES CAN EXTEND AND RETRACT QUICKLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(5) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

————— **END OF TASK** —————

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FUELING FLOAT SWITCH - INSPECTION/CHECK

1. General

- A. There are two types of float switch that can be installed. The Type I float switch installation has an elbow joint immediately below the float switch. The conduit for the Type I float switch does not contain a liner. The Type II float switch does not have an elbow joint below the float switch. The Type I float switch has a red float shell. The Type II float switch has a green float shell. Service Bulletin 737-28-1142 replaces the Type I float switch installation with the Type II float switch installation.
- B. The data in this procedure is applicable only for the Type II float switch installed in the center tank.
- C. This procedure has two tasks:
 - (1) A task to inspect the drain slots in the drain port
 - (2) A task to make sure the conduit liner is installed and that the conduit does not have leakage

TASK 28-21-71-210-801

2. Drain Port Inspection

(Figure 601)

A. General

- (1) This task is applicable for the drain port for the Type II float switch conduit installed in the center tank.

B. References

Reference	Title
20-10-44-400-801	Lockwires Installation (P/B 401)

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

D. Procedure

SUBTASK 28-21-71-020-026

- (1) Do these steps to remove the drain port:
 - (a) Find the drain port for the center tank conduit.
 - (b) Remove the lockwire for the drain port.
 - (c) Loosen the drain port from the conduit and slide it along the wire back from the front spar bulkhead union.

SUBTASK 28-21-71-210-003

- (2) Do these steps to examine the six (6) drain slots of the drain port and to clean them if it is necessary:
 - (a) With a flashlight, make sure each of the six slots in the drain port are not blocked.
 - (b) If any of the drain slots are blocked, clean them with compressed air.
 - 1) Apply compressed air from the side of the drain port that is towards the fuel tank when it is installed.
 - (c) Make sure the blockage is removed and the six slots are open to permit drainage of the conduit.

<p>EFFECTIVITY</p> <p>HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025, 026 POST SB 737-28A1142</p>

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SUBTASK 28-21-71-210-004

(3) Make sure there is no indication of fuel leakage from the conduit.

SUBTASK 28-21-71-210-005

(4) Make sure a liner (clear convoluted plastic tube) is installed in the conduit.

SUBTASK 28-21-71-420-083

(5) Do these steps to re-install the drain port:

(a) Slide the drain port assembly along the electrical cable [160] to the front spar bulkhead union.

(b) Install the drain port on the front spar bulkhead union.

NOTE: Make sure the drain port shoulder is seated inside the formed liner.

(c) Tighten the drain port to a torque of 9.0 - 11.0 inch-pounds.

(d) Install lockwire from the coupling nut to the bolt (TASK 20-10-44-400-801).

————— **END OF TASK** —————

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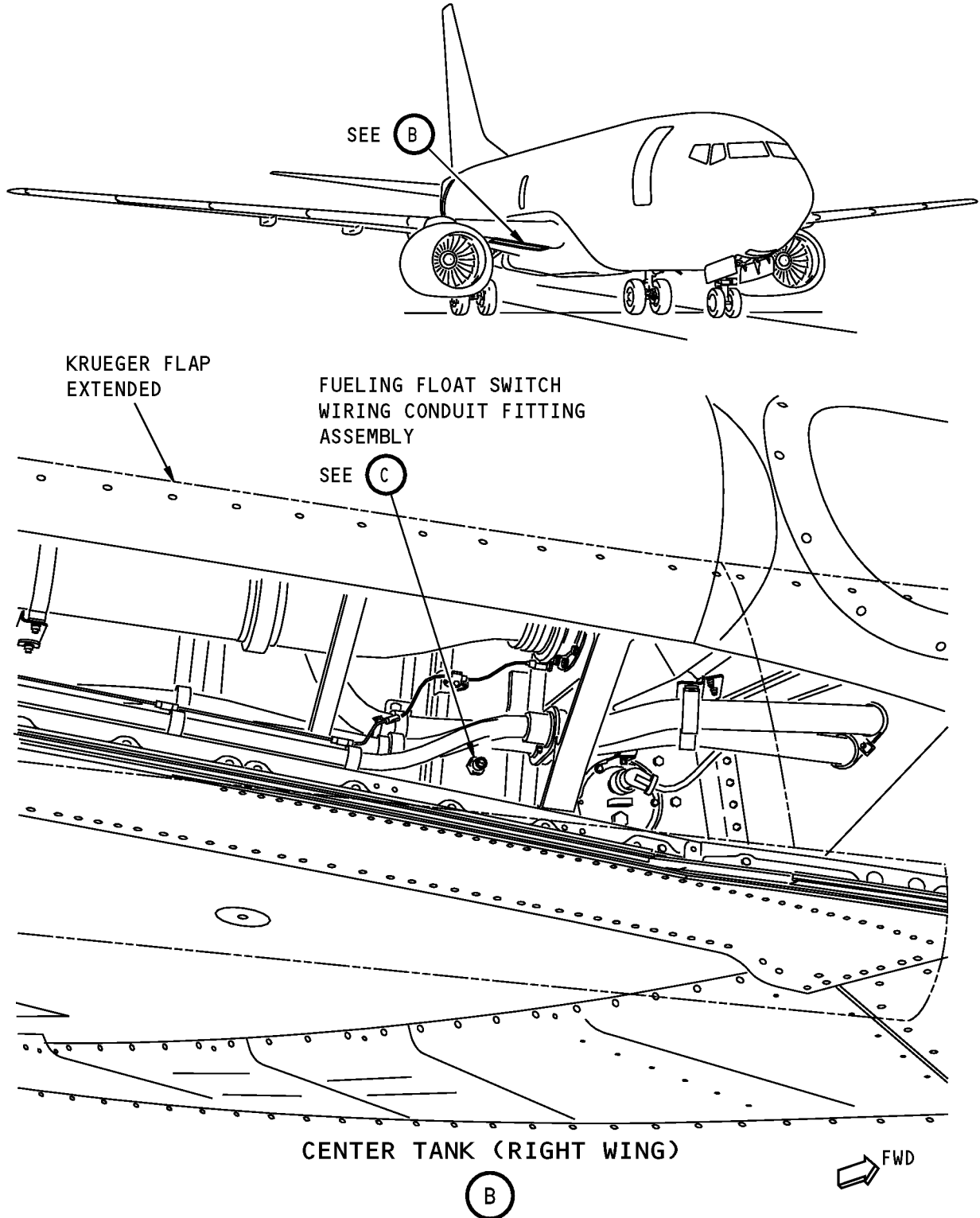
**HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025,
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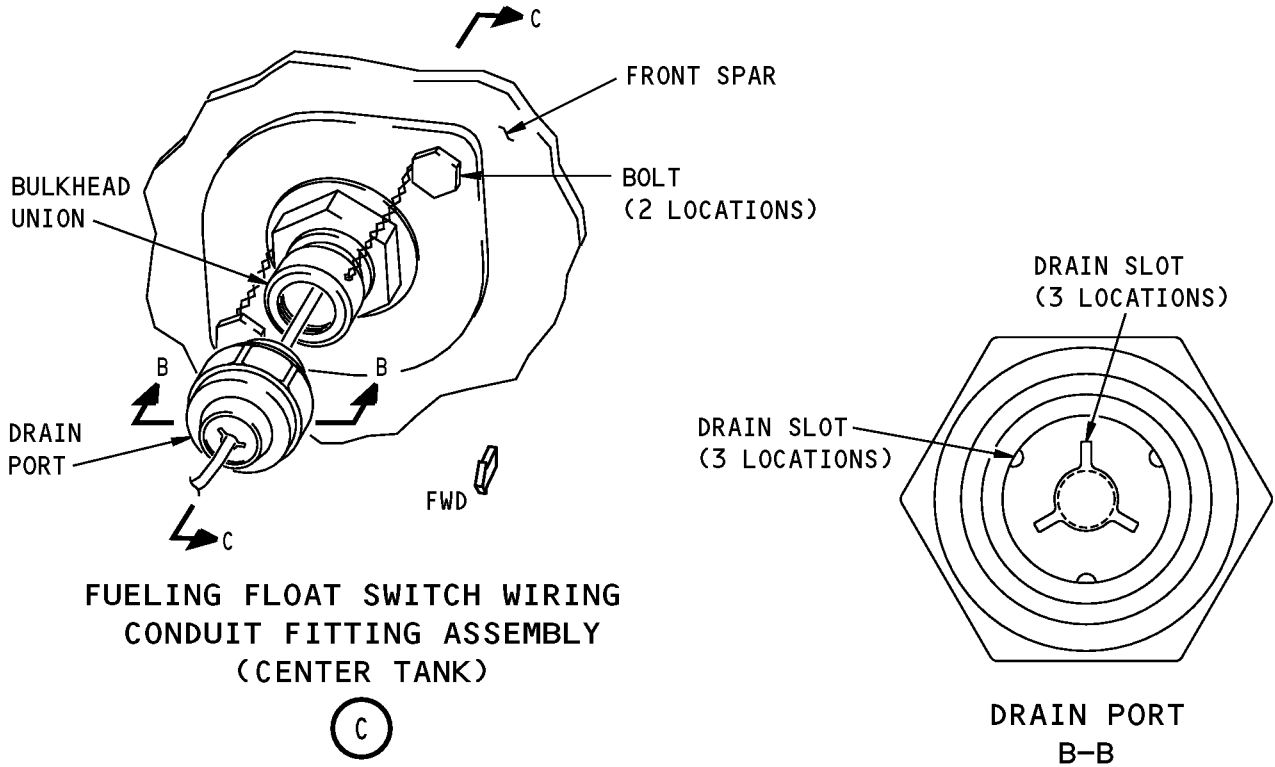


**Center Fueling Float Switch Wiring Conduit Inspection (Type II)
Figure 601 (Sheet 1 of 2)/28-21-71-990-824**

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HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025,
026 POST SB 737-28A1142

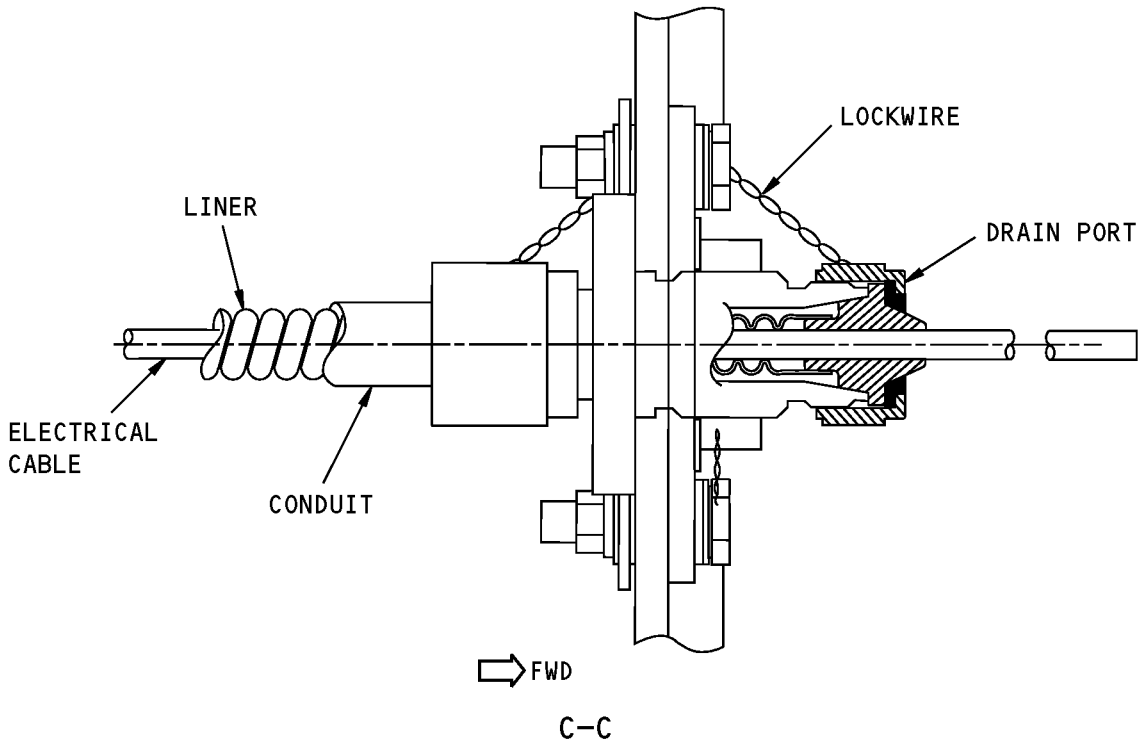
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**FUELING FLOAT SWITCH WIRING
CONDUIT FITTING ASSEMBLY
(CENTER TANK)**

C



**Center Fueling Float Switch Wiring Conduit Inspection (Type II)
Figure 601 (Sheet 2 of 2)/28-21-71-990-824**

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HAP 021-024, 028-054, 101-999; HAP 001-013, 015-020, 025,
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FUELING POWER CONTROL SWITCH - MAINTENANCE PRACTICES

1. General

A. This procedure has four tasks:

- (1) A task to remove the fueling power control switch sensor magnet.
- (2) A task to install the fueling power control switch sensor magnet.
- (3) A task to remove the actuator switch for the fueling power control switch
- (4) A task to install the actuator switch for the fueling power control switch

TASK 28-21-81-000-801

2. Remove the Fueling Power Control Switch Sensor Magnet

(Figure 201)

A. References

Reference	Title
WDM 28-44-11	Wiring Diagram Manual

B. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

C. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

D. Procedure

SUBTASK 28-21-81-860-001

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	3	C00032	FUEL FUELING CONT
A	4	C01441	FUEL FUELING IND

SUBTASK 28-21-81-010-001

(2) Open this access panel:

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-21-81-020-001

(3) Disconnect the sensor hot wire at pin 11 of the fueling panel disconnect receptacle D4578J (WDM 28-44-11).

SUBTASK 28-21-81-020-002

(4) Disconnect the sensor ground wire at the ground terminal screw (WDM 28-44-11).

SUBTASK 28-21-81-020-003

(5) Remove the screws [1], nuts [3], and washers [2] to remove the sensor mounting bracket [4] with the sensor magnet [5].

————— **END OF TASK** —————

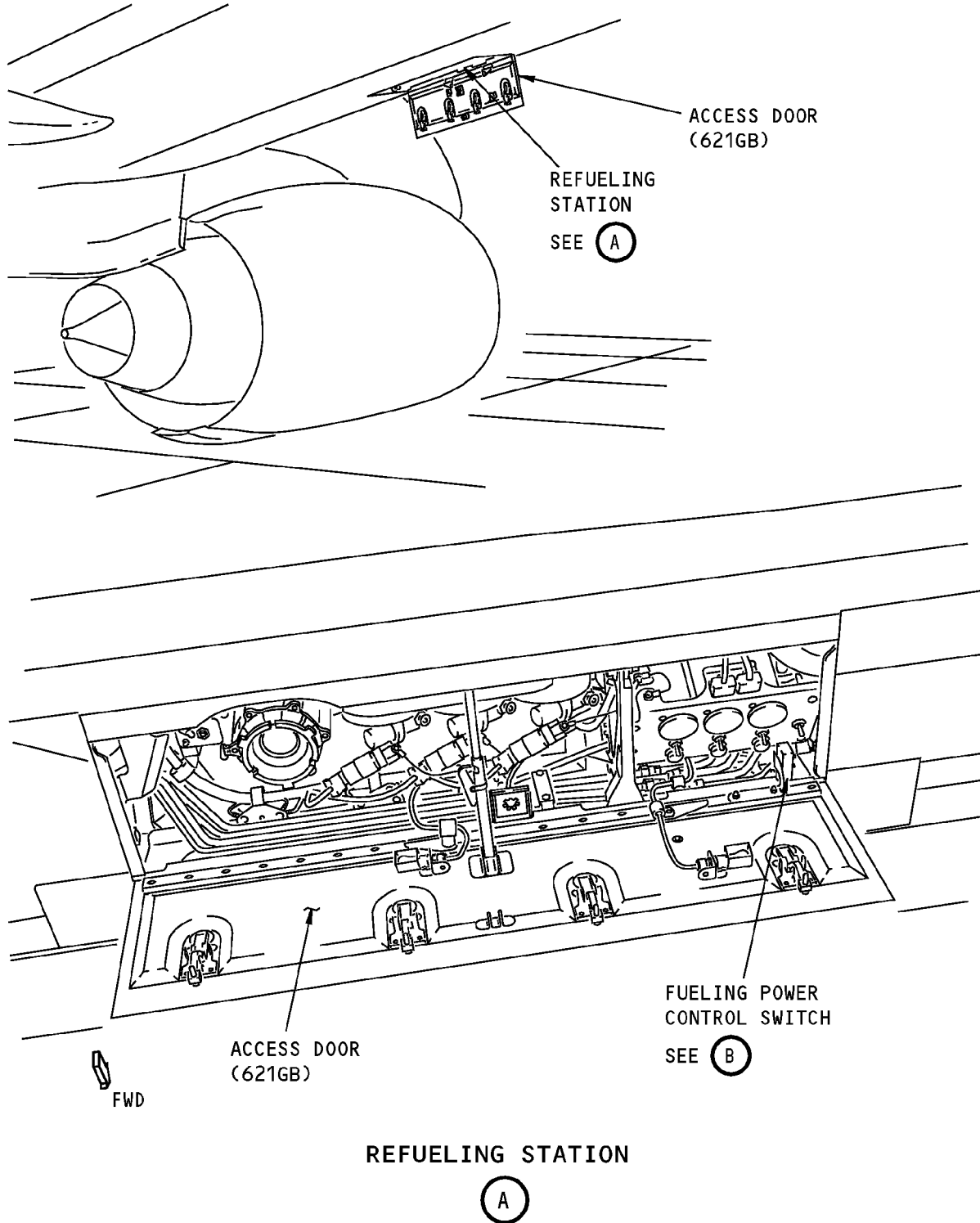
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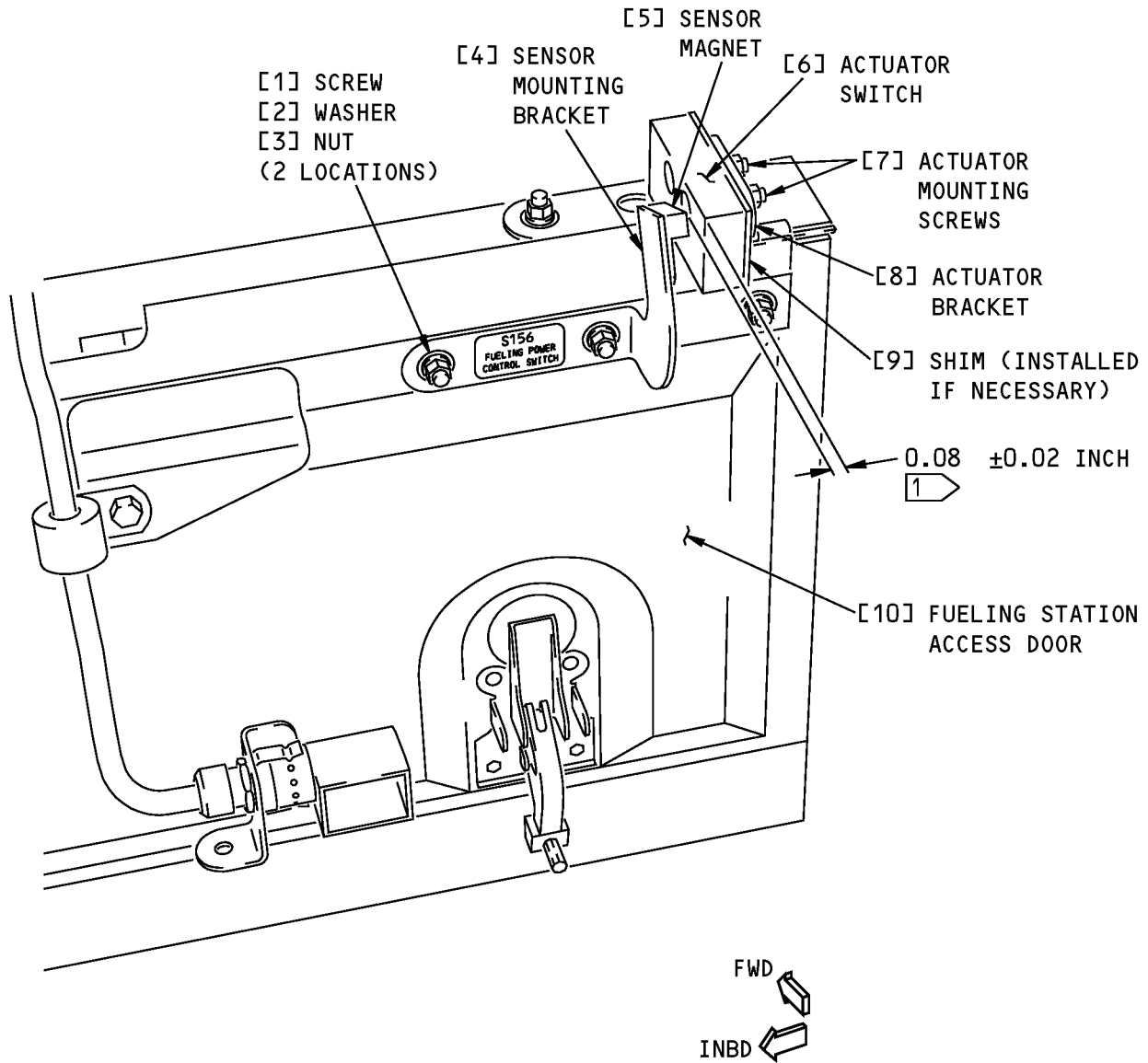


**Fueling Power Control Switch Installation
Figure 201 (Sheet 1 of 2)/28-21-81-990-801**

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1 USE A NON-MAGNETIC FEELER GAGE.

FUELING POWER CONTROL SWITCH

B

**Fueling Power Control Switch Installation
Figure 201 (Sheet 2 of 2)/28-21-81-990-801**

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TASK 28-21-81-400-801

3. Install the Fueling Power Control Switch Sensor Magnet

(Figure 201)

A. References

Reference	Title
WDM 28-44-11	Wiring Diagram Manual

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
5	Sensor magnet	28-21-81-01-030	HAP ALL

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

E. Procedure

SUBTASK 28-21-81-420-001

- (1) Install the sensor mounting bracket [4] and the sensor magnet [5] with the mounting screws [1], nuts [3], and washers [2].

SUBTASK 28-21-81-420-002

- (2) Connect the sensor hot wire to pin 11 of the fueling panel disconnect receptacle D4578J (WDM 28-44-11).

SUBTASK 28-21-81-420-003

- (3) Connect the sensor ground wire to the ground terminal screw (WDM 28-44-11).

SUBTASK 28-21-81-820-001

- (4) Use the non-magnetic feeler gage to make sure the clearance is correct between the actuator switch [6] and the magnet [5].

NOTE: The clearance must be 0.080 ± 0.020 inch (2.032 ± 0.508 mm) at all the positions of the access door between the open and closed positions.

SUBTASK 28-21-81-860-002

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	3	C00032	FUEL FUELING CONT
A	4	C01441	FUEL FUELING IND

SUBTASK 28-21-81-710-001

- (6) Fully open the access panel below and make sure the fueling panel floodlights come on to make sure the sensor magnet is installed correctly.

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Open this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-21-81-410-001

(7) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

————— END OF TASK —————

TASK 28-21-81-350-801

4. Remove the Actuator Switch for the Fueling Power Control Switch

A. References

<u>Reference</u>	<u>Title</u>
WDM 28-44-11	Wiring Diagram Manual

B. Location Zones

<u>Zone</u>	<u>Area</u>
621	Right Wing - Leading Edge to Front Spar

C. Access Panels

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

D. Procedure

SUBTASK 28-21-81-860-003

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

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	3	C00032	FUEL FUELING CONT
A	4	C01441	FUEL FUELING IND

SUBTASK 28-21-81-010-002

(2) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-21-81-020-004

(3) Disconnect the sensor hot wire at pin 11 of the fueling panel disconnect receptacle D4578J (WDM 28-44-11).

SUBTASK 28-21-81-020-005

(4) Disconnect the sensor ground wire at the ground terminal screw (WDM 28-44-11).

SUBTASK 28-21-81-020-006

(5) Loosen and remove the actuator mounting screws [7].

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SUBTASK 28-21-81-160-001

(6) Remove the actuator switch [6].

————— **END OF TASK** —————

TASK 28-21-81-350-802

5. Install the Actuator Switch for the Fueling Power Control Switch

(Figure 201)

A. References

Reference	Title
WDM 28-44-11	Wiring Diagram Manual

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
6	Switch	28-21-81-01-070	HAP ALL

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

E. Procedure

SUBTASK 28-21-81-160-002

(1) Put the actuator switch [6] in its position.

SUBTASK 28-21-81-820-002

(2) Make sure the clearance is correct between the sensor magnet [5] and the actuator switch [6].

SUBTASK 28-21-81-820-003

(3) Do these steps to adjust the clearance if it is necessary.

(a) Add a shim [9] or equivalent between the actuator switch [6] and the actuator bracket [8].

1) Adjust the shim [9] to give the correct clearance between the sensor magnet [5] and the actuator switch [6].

SUBTASK 28-21-81-020-007

(4) Install the screws [7] on the actuator bracket [8] and tighten them.

SUBTASK 28-21-81-020-008

(5) Connect the sensor ground wire at the ground terminal screw (WDM 28-44-11).

SUBTASK 28-21-81-020-009

(6) Connect the sensor hot wire at pin 11 of the fueling panel disconnect receptacle D4578J (WDM 28-44-11).

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SUBTASK 28-21-81-860-004

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

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	3	C00032	FUEL FUELING CONT
A	4	C01441	FUEL FUELING IND

SUBTASK 28-21-81-710-002

(8) Fully open the access panel below and make sure the fueling panel floodlights come on to make sure the actuator switch is installed correctly.

Open this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-21-81-010-003

(9) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

————— **END OF TASK** —————

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ENGINE FUEL FEED SYSTEM - ADJUSTMENT/TEST

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains these tasks:
 - (1) Engine Fuel Feed Pumps and Crossfeed Valves - Functional Test
 - (2) Engine Fuel Spar Valve - Electrical and Indication Test
 - (3) Fuel Shutoff Valve Battery - Test
 - (4) Engine Fuel Spar Valve Installation - Test
 - (5) Fuel Scavenge System - Operational Test
 - (6) Fuel Boost Pump Output Pressure Test

HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206

- (7) Center Tank Boost Pump Auto Shutoff Functional Test

HAP ALL

- (8) Engine Fuel Suction Feed - Operational Test

HAP 001-013, 015-026, 028-030, 037-054, 101-999; HAP 031-036 POST SB 737-28A1248

- (9) Center Tank Fuel Pump Uncommanded On - Functional Test
- (10) Pump Reversal - Operational Test

HAP ALL

TASK 28-22-00-730-801

2. Engine Fuel Feed Pumps - Functional Test

(Figure 501, Figure 503, Figure 504)

A. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
24-22-00-860-811	Supply Electrical Power (P/B 201)

B. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
211	Flight Compartment - Left
212	Flight Compartment - Right
521	Left Wing - Leading Edge to Front Spar

C. Prepare for the Test

SUBTASK 28-22-00-860-001

- (1) Make sure the switches are in the positions shown (Table 501):

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HAP ALL

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Table 501/28-22-00-993-807 Fuel Pump and Crossfeed Valve Test

SWITCH/CONTROL	POSITION	LOCATION
APU FIRE HANDLE	NORMAL	P8 AISLE STAND
CROSSFEED VALVE	CLOSED	P5 OVERHEAD PANEL
FUEL PUMP - TANK 1 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 1 - FWD	OFF	P5 OVERHEAD PANEL
FUEL PUMP - CTR TANK LEFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - FWD	OFF	P5 OVERHEAD PANEL
FUEL PUMP - CTR TANK RIGHT	OFF	P5 OVERHEAD PANEL
ENG 1 FIRE HANDLE	NORMAL	P8 AISLE STAND
ENG 2 FIRE HANDLE	NORMAL	P8 AISLE STAND
ENG 1 START LEVER	CUTOFF	P8 AISLE STAND
ENG 2 START LEVER	CUTOFF	P8 AISLE STAND

SUBTASK 28-22-00-860-002

(2) Make sure that these circuit breakers are closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1
B	5	C00540	FUEL SPAR VALVE IND
B	7	C00361	FUEL CROSS FEED VALVE
C	4	C01471	FUEL SHUTOFF VALVES PWR PACK
C	6	C01472	FUEL SHUTOFF VALVES BUS

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 001-013, 015-026, 028-036			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

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HAP 001-013, 015-026, 028-036 (Continued)

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 001-013, 015-026, 028-036			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP ALL			

SUBTASK 28-22-00-860-003

(3) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-22-00-650-001

- (4) Make sure the fuel tanks have the fuel quantities as follows (Figure 501):
 - (a) Make sure there is 500 LB (250 KG) of fuel (or more) in the No. 1 tank.
 - (b) Make sure there is 500 LB (250 KG) of fuel (or more) in the No. 2 tank.
 - (c) Make sure there is 1000 LB (500 KG) of fuel (or more) in the center fuel tank.
 - (d) To refuel the fuel tanks (if it is necessary), do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

D. Test of the Fuel Boost Pumps - Control and Indication

SUBTASK 28-22-00-860-081

WARNING: DO NOT OPERATE ANY FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. FUEL VAPORS IN THE TANK MAY IGNITE AND CAUSE A FIRE OR EXPLOSION.

- (1) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
 - (a) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 28-22-00-210-001

- (2) Make sure the amber LOW PRESSURE light is on for these switches, on the P5 Overhead Panel:
 - (a) FUEL PUMP TANK 1 - AFT
 - (b) FUEL PUMP TANK 1 - FWD
 - (c) FUEL PUMP TANK 2 - AFT
 - (d) FUEL PUMP TANK 2 - FWD

SUBTASK 28-22-00-860-004

- (3) Set the FUEL PUMP TANK 1 - FWD switch, on the P5 Overhead Panel, to the ON position.

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- (a) Make sure the amber LOW PRESSURE light goes off, for the FUEL PUMP TANK 1 - FWD switch on the P5 Overhead Panel.

NOTE: The LOW PRESSURE light will go off within 90 seconds.

SUBTASK 28-22-00-860-005

- (4) Set the FUEL PUMP TANK 1 - FWD switch, on the P5 Overhead Panel, to the OFF position.
 - (a) Make sure the amber LOW PRESSURE light is on, for the FUEL PUMP TANK 1 - FWD switch on the P5 Overhead Panel.

SUBTASK 28-22-00-860-006

- (5) Set the FUEL PUMP TANK 1 - AFT switch, on the P5 Overhead Panel, to the ON position.
 - (a) Make sure the amber LOW PRESSURE light goes off, for the FUEL PUMP TANK 1 - AFT switch on the P5 Overhead Panel.

NOTE: The LOW PRESSURE light will go off in within 90 seconds.

SUBTASK 28-22-00-860-007

- (6) Set the FUEL PUMP TANK 1 - AFT switch, on the P5 Overhead Panel, to the OFF position.
 - (a) Make sure the amber LOW PRESSURE light is on, for the FUEL PUMP TANK 1 - AFT switch on the P5 Overhead Panel.

SUBTASK 28-22-00-860-008

- (7) Set the FUEL PUMP TANK 2 - FWD switch, on the P5 Overhead Panel, to the ON position.
 - (a) Make sure the amber LOW PRESSURE light goes off, for the FUEL PUMP TANK 2 - FWD switch on the P5 Overhead Panel.

NOTE: The LOW PRESSURE light will go off in within 90 seconds.

SUBTASK 28-22-00-860-009

- (8) Set the FUEL PUMP TANK 2 - FWD switch, on the P5 Overhead Panel, to the OFF position.
 - (a) Make sure the amber LOW PRESSURE light is on, for the FUEL PUMP TANK 2 - FWD switch on the P5 Overhead Panel.

SUBTASK 28-22-00-860-010

- (9) Set the FUEL PUMP TANK 2 - AFT switch, on the P5 Overhead Panel, to the ON position.
 - (a) Make sure the amber LOW PRESSURE light goes off, for the FUEL PUMP TANK 2 - AFT switch on the P5 Overhead Panel.

NOTE: The LOW PRESSURE light will go off in within 90 seconds.

SUBTASK 28-22-00-860-011

- (10) Set the FUEL PUMP TANK 2 - AFT switch, on the P5 Overhead Panel, to the OFF position.
 - (a) Make sure the amber LOW PRESSURE light is on, for the FUEL PUMP TANK 2 - AFT switch on the P5 Overhead Panel.

HAP 001-013, 015-026, 028-030 PRE SB 737-28A1206

SUBTASK 28-22-00-860-012

- (11) Do these steps to do a test of the left center boost pump:
 - (a) Open this circuit breaker:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

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HAP 001-013, 015-026, 028-030 PRE SB 737-28A1206 (Continued)

- (b) Set the FUEL PUMP CTR TANK - LEFT switch, on the P5 Overhead Panel, to the ON position.
- (c) Make sure the amber LOW PRESSURE light, for the FUEL PUMP CTR TANK - LEFT switch, is on.
- (d) Close this circuit breaker:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

- (e) Make sure the amber LOW PRESSURE light, for the FUEL PUMP CTR TANK - LEFT switch, goes off.

NOTE: The LOW PRESSURE light will go off within 90 seconds.

- (f) Open this circuit breaker:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

- (g) Make sure the amber LOW PRESSURE light, for the FUEL PUMP CTR TANK - LEFT switch, comes on again.
- (h) Set the FUEL PUMP CTR TANK - LEFT switch, on the P5 Overhead Panel, to the OFF position.
- (i) Make sure the amber LOW PRESSURE light, for the FUEL PUMP CTR TANK - LEFT switch, goes off.
- (j) Close this circuit breaker:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

SUBTASK 28-22-00-860-013

- (12) Do these steps to do a test of the right center boost pump:

- (a) Open this circuit breaker:

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT

- (b) Set the FUEL PUMP CTR TANK - RIGHT switch, on the P5 Overhead Panel, to the ON position.
- (c) Make sure the amber LOW PRESSURE light, for the FUEL PUMP CTR TANK - RIGHT switch, is on.
- (d) Close this circuit breaker:

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT

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HAP 001-013, 015-026, 028-030 PRE SB 737-28A1206 (Continued)

- (e) Make sure the amber LOW PRESSURE light, for the FUEL PUMP CTR TANK - RIGHT switch, goes off.

NOTE: The LOW PRESSURE light will go off within 90 seconds.

- (f) Open this circuit breaker:

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT

- (g) Make sure the amber LOW PRESSURE light, for the FUEL PUMP CTR TANK - RIGHT switch, comes on again.
- (h) Set the FUEL PUMP CTR TANK - RIGHT switch, on the P5 Overhead Panel, to the OFF position.
- (i) Make sure the amber LOW PRESSURE light, for the FUEL PUMP CTR TANK - RIGHT switch, goes off.
- (j) Close this circuit breaker:

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-00-710-001

- (13) Do these steps to do a test of the MASTER CAUTION lights and the FUEL annunciator light:
 - (a) On the P5 panel, set all the six switches for the boost pumps to the ON position.
 - 1) Make sure all of the LOW PRESSURE lights on the P5 panel go off.
 - 2) Make sure the two MASTER CAUTION lights (right and left) are off.
 - 3) Make sure the FUEL annunciator light on the MASTER CAUTION panel are off.
 - 4) If it is necessary, push the MASTER CAUTION light on the right MASTER caution panel to reset the MASTER CAUTION panel.
 - (b) Put the FUEL PUMP - TANK 1 - FWD switch back to OFF.
 - 1) Make sure the LOW PRESSURE light for the FWD boost pump for the No. 1 tank comes on.
 - (c) Put the FUEL PUMP - TANK 1 - AFT switch back to OFF.
 - 1) Make sure the LOW PRESSURE light for the AFT boost pump for the No. 1 tank comes on.
 - 2) Make sure the right and left MASTER CAUTION lights and the FUEL annunciator light come on.
 - (d) Put the two boost pump switches for the No. 1 tank back to ON.
 - (e) Make sure the right and left MASTER CAUTION lights and the FUEL annunciator light go off.
 - (f) Put the FUEL PUMP - TANK 2 - FWD switch to OFF.
 - 1) Make sure the LOW PRESSURE light for the FWD boost pump for the No. 2 tank comes on.

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HAP 001-013, 015-026, 028-030 PRE SB 737-28A1206 (Continued)

- (g) Put the FUEL PUMP - TANK 2 - AFT switch to OFF.
 - 1) Make sure the LOW PRESSURE light for the AFT boost pump for the No. 2 tank comes on.
 - 2) Make sure the MASTER CAUTION and the FUEL annunciator light come on.
- (h) Put the boost pump switches for the No. 2 tank back to the ON position.
- (i) Make sure MASTER CAUTION light and FUEL annunciator light go off.
- (j) Open this circuit breaker:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

- 1) Make sure the LOW PRESSURE light for the left center boost pump comes on.

- (k) Open this circuit breaker:

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT

- 1) Make sure the LOW PRESSURE light for the right center boost pump comes on.
- 2) Make sure the MASTER CAUTION light and the FUEL annunciator light come on.

- (l) Close these circuit breakers:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT

- 1) Make sure the MASTER CAUTION light and the FUEL annunciator light go off.

- (m) On the P5 panel, set all six boost pump switches back to OFF.

HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206

SUBTASK 28-22-00-720-027

- (14) Do this task: Center Tank Boost Pump Auto Shutoff Functional Test, TASK 28-22-00-720-805.

HAP ALL

————— END OF TASK —————

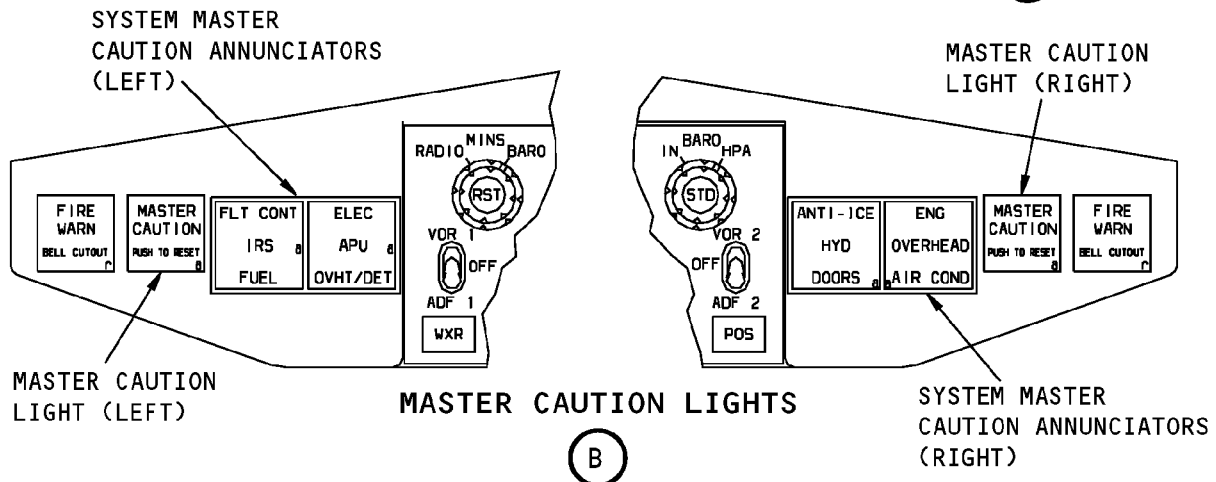
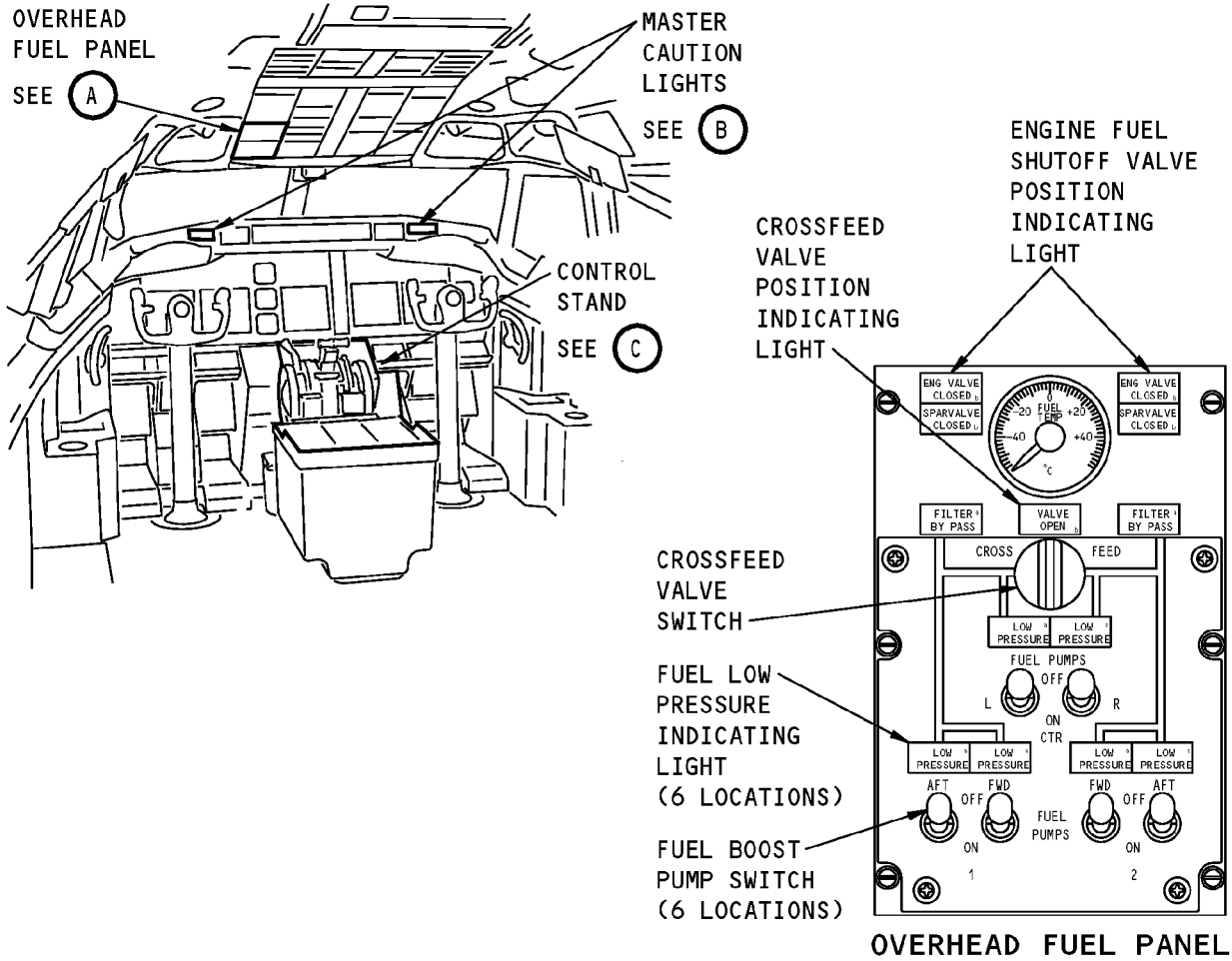
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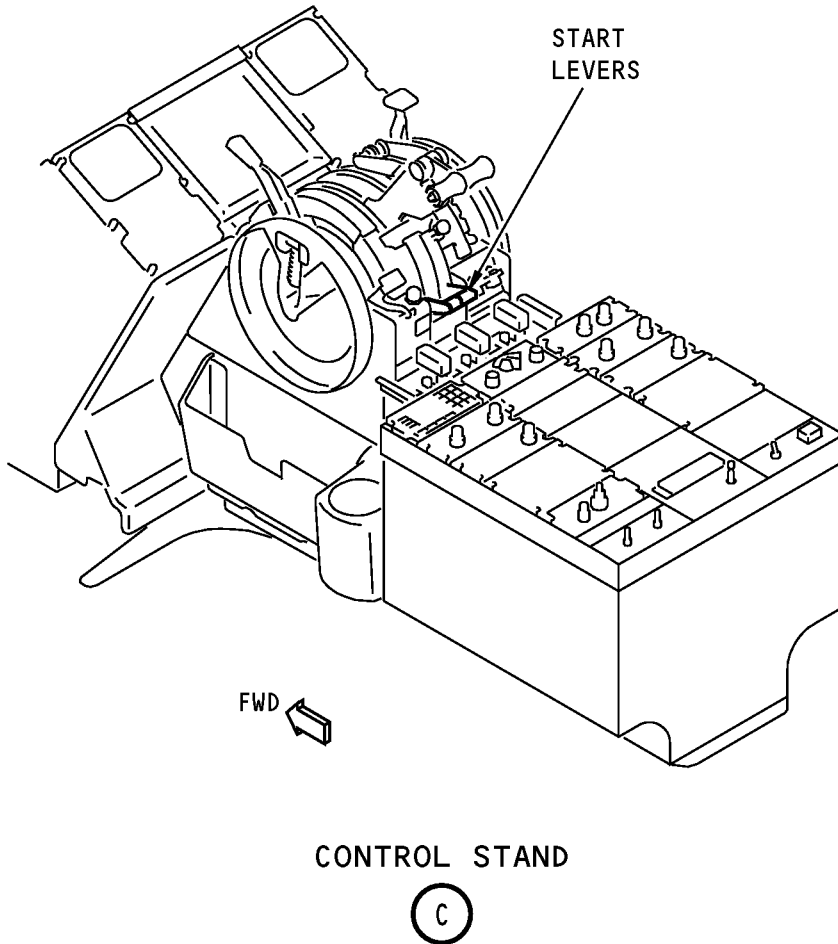
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Engine Fuel Feed System
Figure 501 (Sheet 1 of 2)/28-22-00-990-816

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**Engine Fuel Feed System
Figure 501 (Sheet 2 of 2)/28-22-00-990-816**

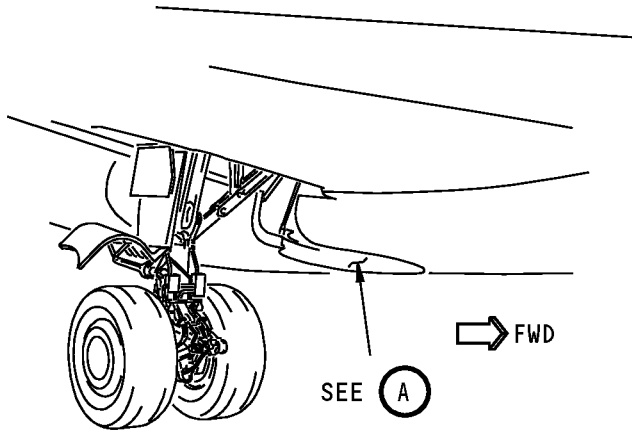
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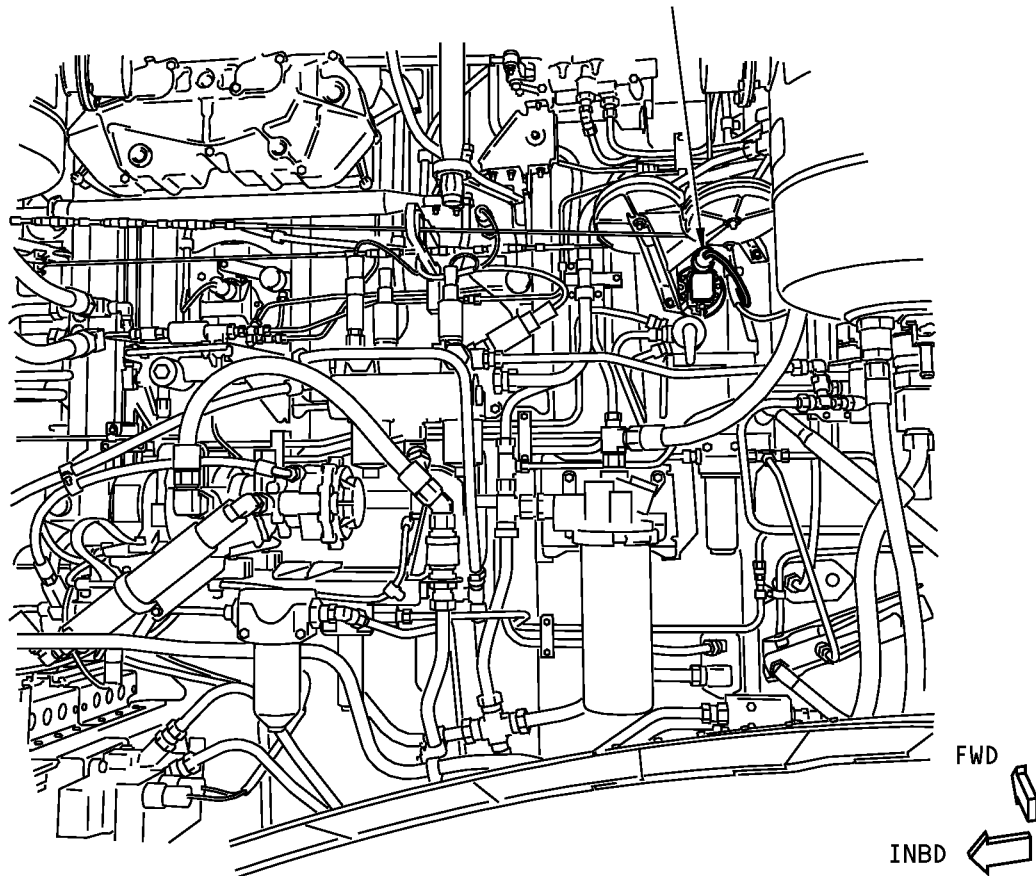
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CROSSFEED VALVE



**MAIN LANDING GEAR WHEEL WELL
(RIGHT SIDE IS SHOWN)**

(A)

**Crossfeed Valve Location
Figure 502/28-22-00-990-817**

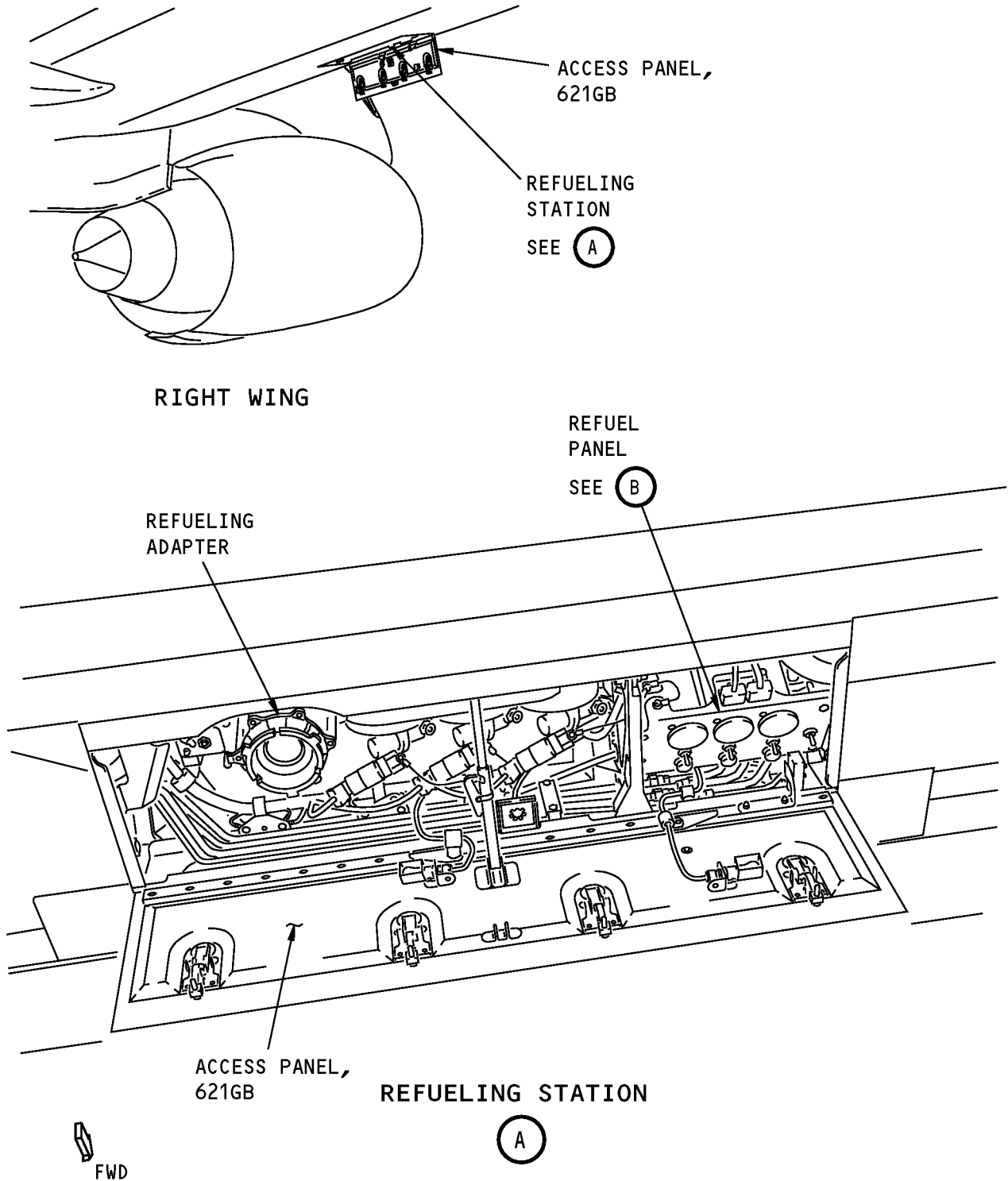
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**Refueling Station Location
Figure 503 (Sheet 1 of 2)/28-22-00-990-818**

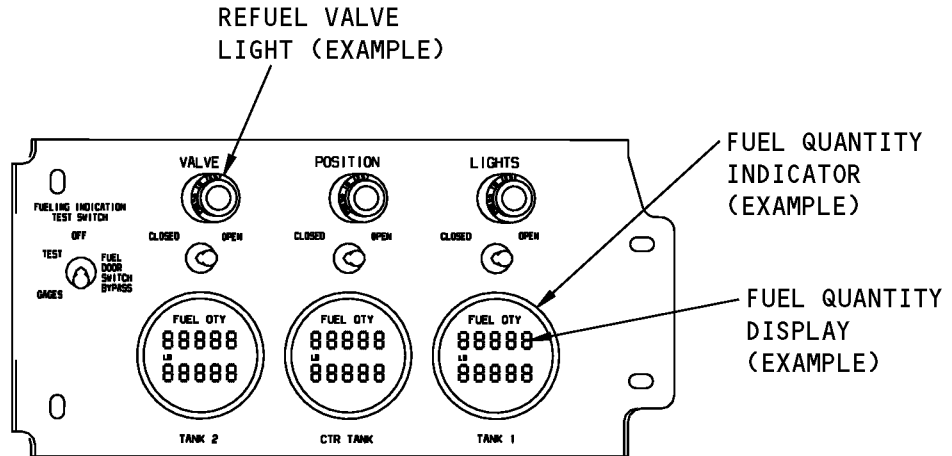
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REFUEL PANEL

B

**Refueling Station Location
Figure 503 (Sheet 2 of 2)/28-22-00-990-818**

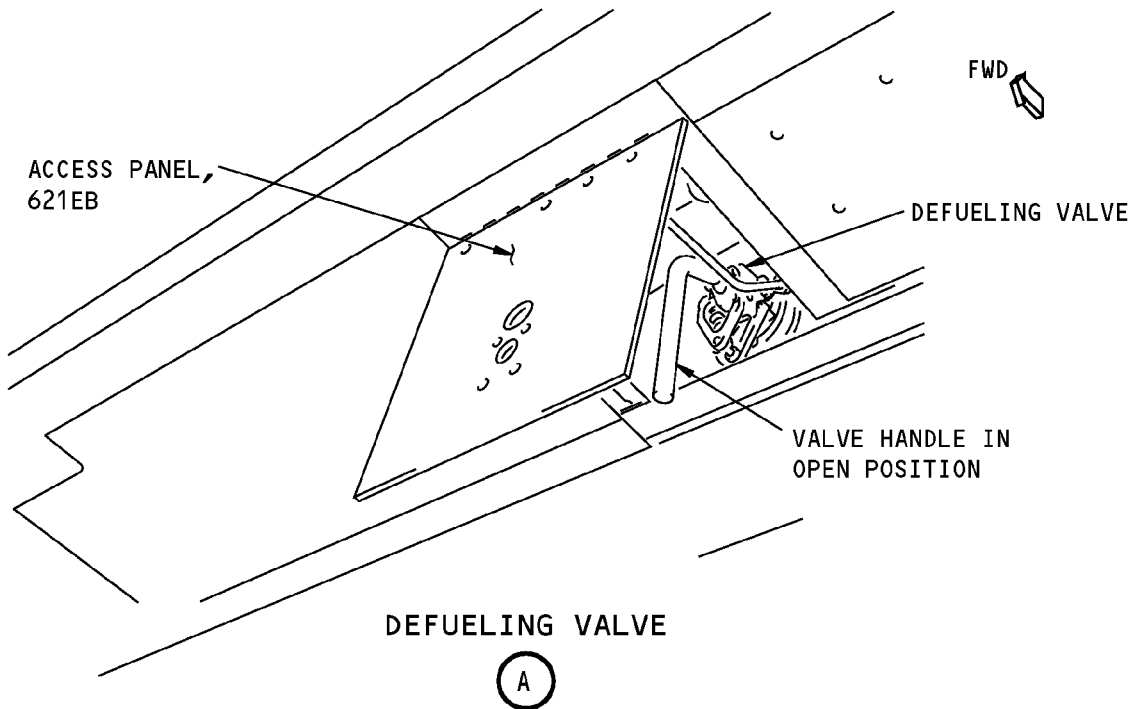
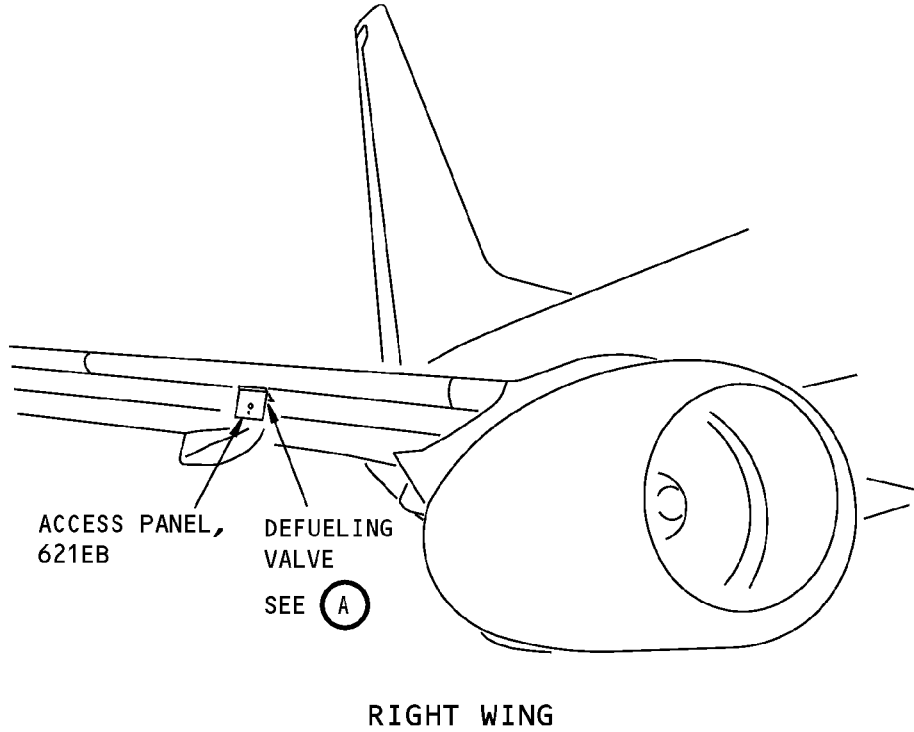
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**Defueling Valve Location
Figure 504/28-22-00-990-819**

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TASK 28-22-00-730-802

3. Crossfeed Valve - Functional Test

(Figure 501, Figure 502, Figure 503, Figure 504)

A. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
24-22-00-860-811	Supply Electrical Power (P/B 201)

B. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
211	Flight Compartment - Left
212	Flight Compartment - Right
521	Left Wing - Leading Edge to Front Spar

C. Access Panels

Number	Name/Location
621EB	Defuel Access Panel - Slat Station 95.15
621GB	Refuel Access Panel - Slat Station 143.27

D. Prepare for the Test

SUBTASK 28-22-00-860-066

- (1) Make sure the switches are in the positions shown (Table 502):

Table 502/28-22-00-993-816 Fuel Pump and Crossfeed Valve Test

SWITCH/CONTROL	POSITION	LOCATION
APU FIRE HANDLE	NORMAL	P8 AISLE STAND
CROSSFEED VALVE	CLOSED	P5 OVERHEAD PANEL
FUEL PUMP - TANK 1 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 1 - FWD	OFF	P5 OVERHEAD PANEL
FUEL PUMP - CTR TANK LEFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - FWD	OFF	P5 OVERHEAD PANEL
FUEL PUMP - CTR TANK RIGHT	OFF	P5 OVERHEAD PANEL
ENG 1 FIRE HANDLE	NORMAL	P8 AISLE STAND
ENG 2 FIRE HANDLE	NORMAL	P8 AISLE STAND
ENG 1 START LEVER	CUTOFF	P8 AISLE STAND
ENG 2 START LEVER	CUTOFF	P8 AISLE STAND

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SUBTASK 28-22-00-860-067

(2) Make sure that these circuit breakers are closed:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1
B	5	C00540	FUEL SPAR VALVE IND
B	7	C00361	FUEL CROSS FEED VALVE
C	4	C01471	FUEL SHUTOFF VALVES PWR PACK
C	6	C01472	FUEL SHUTOFF VALVES BUS

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 001-013, 015-026, 028-036			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 001-013, 015-026, 028-036			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP ALL			

SUBTASK 28-22-00-860-068

(3) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-22-00-650-007

(4) Make sure the fuel tanks have the fuel quantities as follows (Figure 501):

(a) Make sure there is 500 LB (250 KG) of fuel (or more) in the No. 1 tank.

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- (b) Make sure there is 500 LB (250 KG) of fuel (or more) in the No. 2 tank.
- (c) Make sure there is 1000 LB (500 KG) of fuel (or more) in the center fuel tank.
- (d) To refuel the fuel tanks (if it is necessary), do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

E. Test the Engine Fuel Crossfeed Valves

SUBTASK 28-22-00-860-069

- (1) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

(Figure 503).

SUBTASK 28-22-00-860-070

- (2) On the wing fueling panel, P15, put the switch for the fueling shutoff valve for the No. 2 tank in the OPEN position.

SUBTASK 28-22-00-860-071

- (3) Do these steps to open the defuel valve (Figure 504):

- (a) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
621EB	Defuel Access Panel - Slat Station 95.15

- (b) Set the defueling valve handle to OPEN.

SUBTASK 28-22-00-860-072

- (4) On the P5 Overhead Panel, set the CROSSFEED valve switch to the OPEN position.

- (a) Make sure the VALVE OPEN light for the crossfeed valve comes on bright during valve transit.
- (b) Make sure the VALVE OPEN light stays on dim after the valve is fully open.

SUBTASK 28-22-00-860-073

- (5) Push the FUEL PUMP TANK 1 - FWD switch, on the P5 Overhead Panel, to the ON position.

- (a) Make sure a minimum of 200 LB (100 KG) of fuel is transferred from the left main tank to the right main tank.

NOTE: The fuel will transfer in approximately 2 minutes.

SUBTASK 28-22-00-860-074

- (6) Push the FUEL PUMP TANK 1 - FWD switch, on the P5 Overhead Panel, to the OFF position.

SUBTASK 28-22-00-860-075

- (7) Set the CROSSFEED switch, on the P5 Overhead Panel, to the CLOSED position.

- (a) Make sure the VALVE OPEN light for the crossfeed valve goes from dim to bright during valve transit.
- (b) Make sure the VALVE OPEN light goes off after the valve is fully closed.

SUBTASK 28-22-00-860-076

- (8) Set the FUEL PUMP TANK 1 - FWD switch, on the P5 Overhead Panel, to the ON position.

- (a) Make sure no fuel is transferred, as shown on the fuel quantity indicators, from the No. 1 tank to the No. 2 tank.

NOTE: Three minutes is sufficient time to make sure there is no fuel transfer.

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SUBTASK 28-22-00-860-077

(9) Set the FUEL PUMP TANK 1 - FWD switch, on the P5 Overhead Panel, to the OFF position.

SUBTASK 28-22-00-860-078

(10) On the wing fueling panel, P15, set the switch for the fueling shutoff valve for the No. 2 tank to the CLOSED position.

SUBTASK 28-22-00-860-079

(11) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-22-00-860-080

(12) Put the defuel valve handle to the closed position.

SUBTASK 28-22-00-410-003

(13) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621EB	Defuel Access Panel - Slat Station 95.15

————— END OF TASK —————

TASK 28-22-00-710-801

4. Engine Fuel Spar Valve - Electrical Control and Indication Test

(Figure 501, Figure 505)

A. General

(1) This test checks the left and right engine fuel spar valves indication and electrical control.

B. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
426	Engine 2 - Thrust Reverser, Right

C. Spar Valve Electrical Control and Indication Test

SUBTASK 28-22-00-860-026

(1) Make sure the switches are in the positions shown (Table 503):

Table 503/28-22-00-993-808 Spar Valve Electrical Control and Indication Test

SWITCH/CONTROL	POSITION	LOCATION
APU FIRE HANDLE	NORMAL	P8 AISLE STAND
CROSSFEED VALVE	CLOSED	P5 OVERHEAD PANEL
FUEL PUMP - TANK 1 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 1 - FWD	OFF	P5 OVERHEAD PANEL
FUEL PUMP - CTR TANK LEFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - FWD	OFF	P5 OVERHEAD PANEL

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SWITCH/CONTROL	POSITION	LOCATION
FUEL PUMP - CTR TANK RIGHT	OFF	P5 OVERHEAD PANEL
ENG 1 FIRE HANDLE	NORMAL	P8 AISLE STAND
ENG 2 FIRE HANDLE	NORMAL	P8 AISLE STAND
ENG 1 START LEVER	CUTOFF	P8 AISLE STAND
ENG 2 START LEVER	CUTOFF	P8 AISLE STAND

SUBTASK 28-22-00-760-012

WARNING: OBEY THE APPLICABLE SHOP PROCEDURES FOR MAINTENANCE ON ENERGIZED ELECTRICAL SYSTEMS. SHORT CIRCUITS AND ELECTRICAL SHOCK TO PERSONS CAN OCCUR.

CAUTION: DO NOT TURN THE ENGINE FIRE HANDLES OR APU FIRE HANDLES. IF YOU TURN THE HANDLES, THIS WILL CAUSE THE FIRE BOTTLES TO DISCHARGE.

(2) Do these steps to do a check of each of the two redundant wires that supply power to close the engine fuel spar valve:

(a) Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1
C	6	C01472	FUEL SHUTOFF VALVES BUS

- (b) To do a check of the left spar valve, disconnect the connector for the left spar valve actuator, D788.
- (c) To do a check of the right spar valve, disconnect the connector for the right spar valve actuator, D790.
- (d) For the left spar valve, do a check for 0 VDC power (2.0 VDC maximum) between these pins on the connector, D788:

Table 504/28-22-00-993-822

D788		D788
pin 5	-----	pin 7
pin 6	-----	pin 7

- (e) For the right spar valve, do a check for 0 VDC power (2.0 VDC maximum) between these pins on the connector, D790:

Table 505/28-22-00-993-823

D790		D790
pin 5	-----	pin 7
pin 6	-----	pin 7

- (f) For the left spar valve, do a continuity check between pins 5 and 6 on the connector, D788.

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- 1) Make sure the resistance is 5 ohms or less.
- (g) For the right spar valve, do a continuity check between pins 5 and 6 on the connector, D790.
 - 1) Make sure the resistance is 5 ohms or less.
- (h) Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1
C	6	C01472	FUEL SHUTOFF VALVES BUS

- (i) For the left spar valve, do a check for 28 VDC power (26.0 VDC minimum, 30.0 VDC maximum) between these pins on the connector, D788:

Table 506/28-22-00-993-818

D788	D788
pin 5 -----	pin 7
pin 6 -----	pin 7

- (j) For the right spar valve, do a check for 28 VDC power (26.0 VDC minimum, 30.0 VDC maximum) between these pins on the connector, D790:

Table 507/28-22-00-993-819

D790	D790
pin 5 -----	pin 7
pin 6 -----	pin 7

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1
C	6	C01472	FUEL SHUTOFF VALVES BUS

- (l) For the left spar valve, re-connect the connector for the left spar valve actuator, D788.
- (m) For the right spar valve, re-connect the connector for the right spar valve actuator, D790.
- (n) Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1
C	6	C01472	FUEL SHUTOFF VALVES BUS

SUBTASK 28-22-00-720-001

- (3) Do these steps to test the left spar valve:
 - (a) Make sure the Engine START switches are in the OFF position, on the P5 overhead panel.
 - (b) Put a DO-NOT-OPERATE placard on the left and right engine START switches, on the P5 overhead panel.

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

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	C01103	ENGINE 1 START VALVE

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
C	4	C00154	ENGINE 2 START VALVE

- (d) Put the ENG 1 START LEVER to the IDLE position, on the P8 Aisle Stand (Figure 501).
- (e) Make sure the position indication light of the left spar valve shows these effects:
- 1) The light comes on bright to show a change in the position.
 - 2) The light goes off to show that the spar valve is open.
- (f) Examine the position of the manual override lever on the left spar valve to make sure that the valve is open.

CAUTION: DO NOT TURN THE FIRE HANDLE. IF YOU TURN THE FIRE HANDLE, THE FIRE EXTINGUISHING EQUIPMENT WILL DISCHARGE.

- (g) Pull the L FIRE HANDLE to the FIRE position, on the P8 Aisle Stand (Figure 501).
- (h) Make sure the position indication light for the left spar valve shows these effects:
- 1) The light comes on bright to show a change in the valve position.
 - 2) The light stays on dim to show that the spar valve is closed.
- (i) Examine the position of the manual override lever on the left spar valve to make sure that the valve is closed (Figure 505).

CAUTION: DO NOT TURN THE FIRE HANDLE. IF YOU TURN THE FIRE HANDLE, THE FIRE EXTINGUISHING EQUIPMENT WILL DISCHARGE.

- (j) Push the L FIRE HANDLE to the NORMAL position, on the P8 Aisle Stand.
- (k) Make sure the position indication light for the left spar valve shows these effects:
- 1) The light comes on bright to show a change in the valve position.
 - 2) The light goes off to show that the spar valve is open.
- (l) Put the ENG 1 START LEVER to the CUTOFF position, on the P8 Aisle Stand.
- (m) Make sure the position indication light for the left spar valve shows these effects:
- 1) The light comes on bright to show a change in the valve position.
 - 2) The light stays on dim to show that the spar valve is closed.
- (n) Remove the DO-NOT-OPERATE placards from the left and right engine START switches, on the P5 overhead panel.
- (o) Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	C01103	ENGINE 1 START VALVE

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
C	4	C00154	ENGINE 2 START VALVE

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SUBTASK 28-22-00-700-003

- (4) Do these steps to test the right spar valve:
- (a) Make sure the Engine START switches are in the OFF position, on the P5 overhead panel.
 - (b) Put a DO-NOT-OPERATE placard on the left and right engine START switches, on the P5 overhead panel.
 - (c) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	C01103	ENGINE 1 START VALVE

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
C	4	C00154	ENGINE 2 START VALVE

- (d) Put the ENG 2 START LEVER to the IDLE position, on the P8 Aisle Stand (Figure 501).
- (e) Make sure the position indication light of the right spar valve shows these effects:
 - 1) The light comes on bright to show a change in the position.
 - 2) The light goes off to show that the spar valve is open.
- (f) Examine the position of the manual override lever on the right spar valve to make sure that the valve is open.

CAUTION: DO NOT TURN THE FIRE HANDLE. THE FIRE EXTINGUISHING AGENT WILL BE DISCHARGED.

- (g) Pull the R FIRE HANDLE to the FIRE position, on the P8 Aisle Stand (Figure 501).
- (h) Make sure the position indication light for the right spar valve shows these effects:
 - 1) The light comes on bright to show a change in the valve position.
 - 2) The light stays on dim to show that the spar valve is closed.
- (i) Examine the position of the manual override lever on the right spar valve to make sure the valve is closed (Figure 505).

CAUTION: DO NOT TURN THE FIRE HANDLE. THE FIRE EXTINGUISHING AGENT WILL BE DISCHARGED.

- (j) Push the R FIRE HANDLE to the NORMAL position, on the P8 Aisle Stand.
- (k) Make sure the position indication light for the right spar valve shows these effects:
 - 1) The light comes on bright to show a change in the valve position.
 - 2) The light goes off to show that the spar valve is open.
- (l) Put the ENG 2 START LEVER to the CUTOFF position, on the P8 Aisle Stand.
- (m) Make sure the position indication light for the right spar valve shows these effects:
 - 1) The light comes on bright to show a change in the valve position.
 - 2) The light stays on dim to show that the spar valve is closed.
- (n) Remove the DO-NOT-OPERATE placards from the left and right engine START switches, on the P5 overhead panel.

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

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	C01103	ENGINE 1 START VALVE

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
C	4	C00154	ENGINE 2 START VALVE

————— **END OF TASK** —————

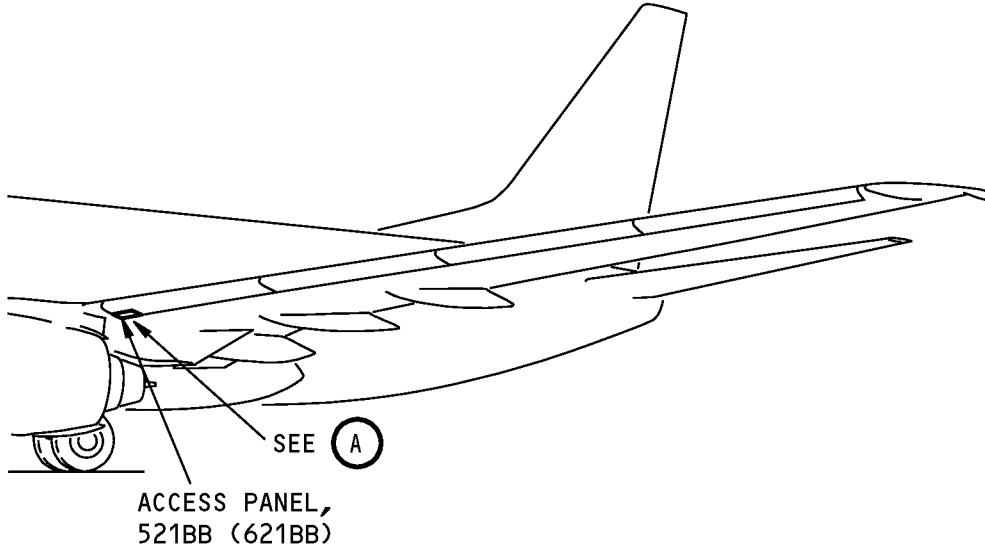
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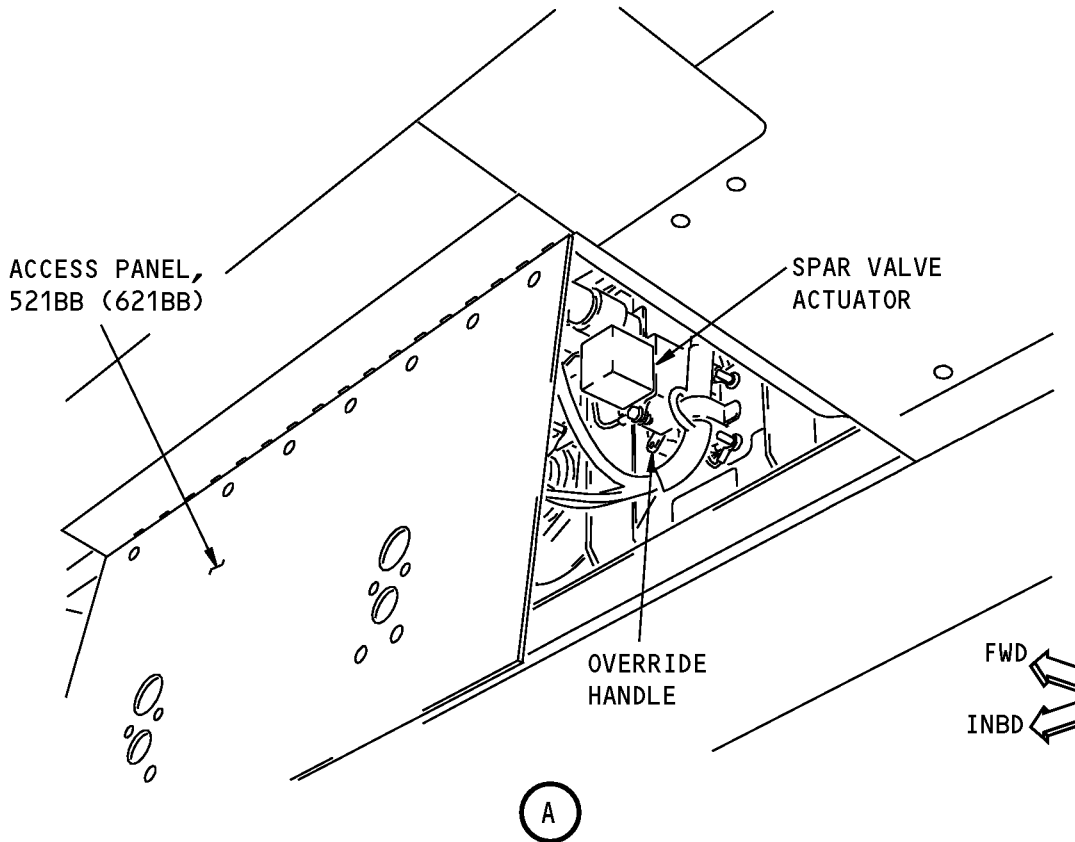
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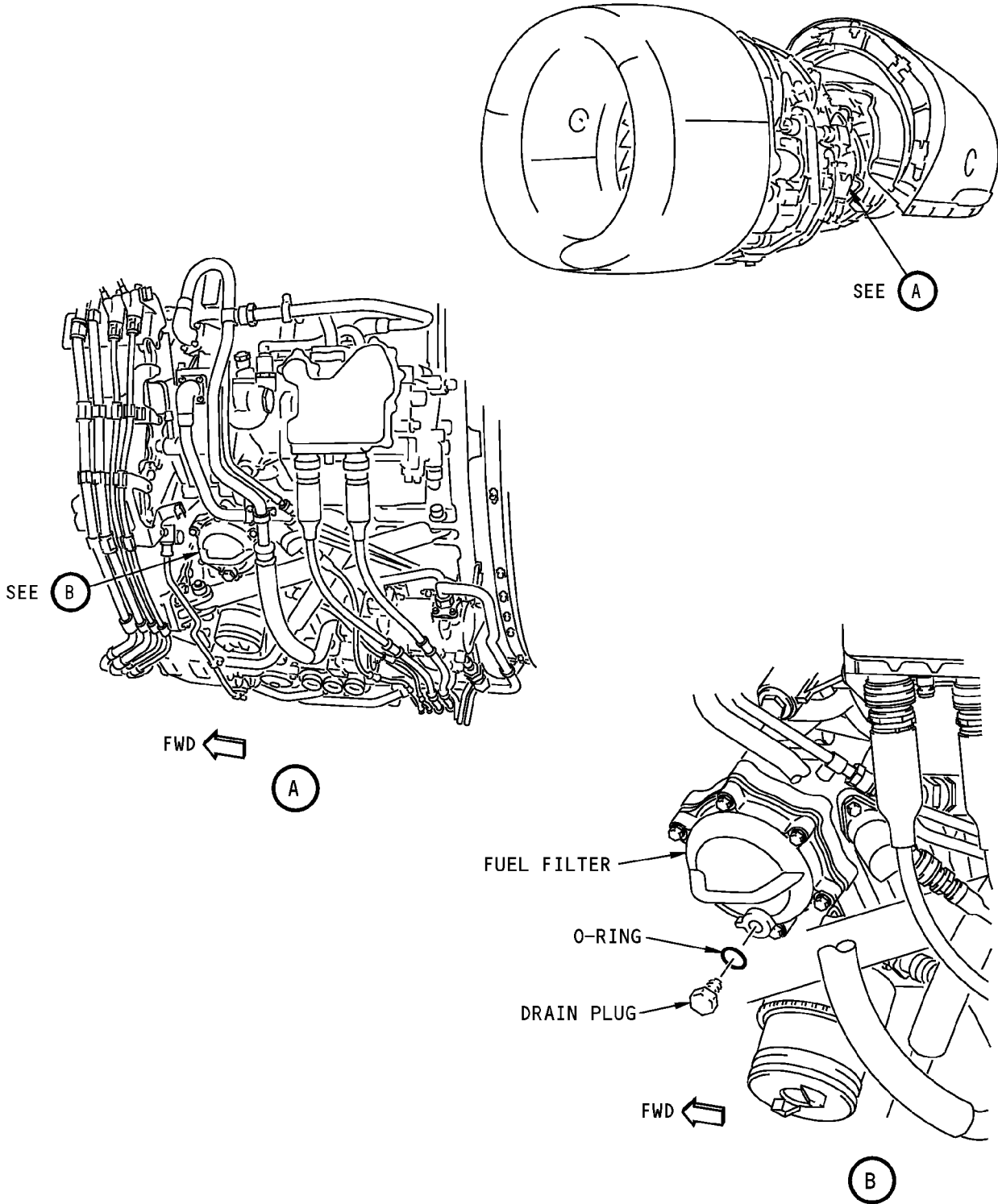
**LEFT WING
(RIGHT WING IS OPPOSITE)**



**Spar Valve Actuator Location
Figure 505/28-22-00-990-820**

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**Fuel Filter Drain Location
Figure 506/28-22-00-990-821**

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TASK 28-22-00-720-801

5. Fuel Shutoff Valve Battery - Test

(Figure 501)

A. General

- (1) This procedure is a scheduled maintenance task.
- (2) This procedure has one task:
 - (a) Fuel Shutoff Valve Battery Test. This test makes sure the battery is charged correctly and wiring required for valve operation is OK.

B. References

Reference	Title
WDM 28-21-21	Wiring Diagram Manual

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right

D. Prepare for the Test

SUBTASK 28-22-00-860-027

- (1) Make sure these switches are in the positions shown (Table 508):

Table 508/28-22-00-993-809 Fuel Shutoff Valve Battery Test

SWITCH/CONTROL	POSITION	LOCATION
APU FIRE HANDLE	NORMAL	P8 AISLE STAND
FUEL CROSSFEED VALVE	CLOSED	P5 OVERHEAD PANEL
FUEL PUMP - TANK 1 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 1 - FWD	OFF	P5 OVERHEAD PANEL
FUEL PUMP - CTR TANK LEFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - FWD	OFF	P5 OVERHEAD PANEL
FUEL PUMP - CTR TANK RIGHT	OFF	P5 OVERHEAD PANEL
L ENG FIRE HANDLE	NORMAL	P8 AISLE STAND
R ENG FIRE HANDLE	NORMAL	P8 AISLE STAND
ENG NO. 1 START LEVER	CUTOFF	P8 AISLE STAND
ENG NO. 2 START LEVER	CUTOFF	P8 AISLE STAND

SUBTASK 28-22-00-860-028

- (2) Make sure that these circuit breakers are closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2

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Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

SUBTASK 28-22-00-860-065

(3) Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	4	C01471	FUEL SHUTOFF VALVES PWR PACK
C	6	C01472	FUEL SHUTOFF VALVES BUS

E. Fuel Shutoff Valve Battery Test

SUBTASK 28-22-00-710-002

(1) Do these steps to test the fuel shutoff valve battery operation:

NOTE: This test makes sure the wiring and the diode R669 operate correctly (WDM 28-21-21). If the diode or wiring are bad the battery can lose its charge without flight deck indication.

NOTE: For this test, it is only necessary to test one spar valve.

- (a) Put the left or right engine start lever to the IDLE position, on the P8 Control Stand.
- (b) Make sure the indication light for the applicable engine fuel spar valve shows these effects:
 - 1) The light goes from dim to bright to show a change in the valve position.
 - 2) The light goes off to show that the spar valve is open.

NOTE: You can examine the position of the manual override lever on the spar valve to make sure that the valve is open.

- (c) Put the left or right engine start lever to the CUTOFF position.
- (d) Make sure the indication light for the applicable engine fuel spar valve shows these effects:
 - 1) The light comes on bright to show a change in the valve position.
 - 2) The light stays on dim to show that the spar valve is closed.

NOTE: You can examine the position of the manual override lever on the spar valve to make sure that the valve is closed.

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	4	C01471	FUEL SHUTOFF VALVES PWR PACK
C	6	C01472	FUEL SHUTOFF VALVES BUS

————— END OF TASK —————

TASK 28-22-00-720-804

6. Engine Fuel Spar Valve Installation - Test

(Figure 501, Figure 504, Figure 506)

A. General

- (1) This procedure has one task:
 - (a) Spar Valve and Adapter/Shaft Test. This test makes sure the spar valves close and do not leak.

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B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
28-22-11 P/B 401	SPAR VALVE - REMOVAL/INSTALLATION
71-00-00-700-801-F00	Test 3A - Idle-Power Leak Check (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

D. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00672 [CP5070]	Grease - Petrolatum	VV-P-236

E. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
414	Engine 1 - Fan Cowl, Right
416	Engine 1 - Thrust Reverser, Right
424	Engine 2 - Fan Cowl, Right
426	Engine 2 - Thrust Reverser, Right

F. Prepare for the Test

SUBTASK 28-22-00-860-061

- (1) Make sure these switches are in the positions shown (Table 509):

Table 509/28-22-00-993-817 Engine Fuel Spar Valve Test

SWITCH/CONTROL	POSITION	LOCATION
APU FIRE HANDLE	NORMAL	P8 AISLE STAND
FUEL CROSSFEED VALVE	CLOSED	P5 OVERHEAD PANEL
FUEL PUMP - TANK 1 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 1 - FWD	OFF	P5 OVERHEAD PANEL
FUEL PUMP - CTR TANK LEFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - FWD	OFF	P5 OVERHEAD PANEL
FUEL PUMP - CTR TANK RIGHT	OFF	P5 OVERHEAD PANEL
L ENG FIRE HANDLE	NORMAL	P8 AISLE STAND
R ENG FIRE HANDLE	NORMAL	P8 AISLE STAND
ENG NO. 1 START LEVER	CUTOFF	P8 AISLE STAND

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SWITCH/CONTROL	POSITION	LOCATION
ENG NO. 2 START LEVER	CUTOFF	P8 AISLE STAND

SUBTASK 28-22-00-860-062

(2) Make sure that these circuit breakers are closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP ALL			

SUBTASK 28-22-00-650-006

(3) Make sure the fuel tanks have the fuel quantities that follow (Figure 501):

- (a) Make sure there is more than 1000 lb (454 kg) of fuel in each main fuel tank.
- (b) To refuel the fuel tanks (if it is necessary), do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

G. Spar Valve and Adapter/Shaft Test

SUBTASK 28-22-00-860-063

WARNING: BE CAREFUL WHEN YOU DO WORK ON THE ENGINE PARTS AFTER THE ENGINE IS STOPPED. THE ENGINE PARTS CAN STAY HOT FOR ALMOST 1 HOUR. DO NOT TOUCH HOT PARTS WITHOUT APPLICABLE GLOVES. HOT PARTS CAN CAUSE AN INJURY. DO NOT LET THE ENGINE FUEL STAY ON YOUR SKIN. FLUSH THE FUEL FROM YOUR SKIN WITH WATER. THE FUEL IS POISONOUS AND CAN BE ABSORBED INTO YOUR BODY.

(1) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

SUBTASK 28-22-00-860-064

(2) Do these steps to do a check of the engine fuel spar valves:

NOTE: This check makes sure the spar valves close correctly.

- (a) Put the 5 gallon (19 liters) fuel resistant container, STD-1054, below each fuel pump.

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- (b) Make sure the left and right engine start levers on the P8 Aisle Stand, are in the CUTOFF position.

NOTE: This step makes sure the spar valves are commanded closed.

- (c) Do these steps to remove the fuel filter drain plug and drain the fuel supply line (Figure 506):

- 1) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the fuel filter drain plug.
- 2) Remove the drain plug and let the fuel drain.
- 3) Remove and discard the O-ring from the drain plug.
- 4) Let the fuel drain completely.

NOTE: If the fuel continues to drain after approximately 5 gal (19 l) has drained, re-install the drain plug to stop the fuel flow. It is possible that the engine fuel spar valve is open because of a damaged adapter shaft or valve body. Refer to SPAR VALVE - REMOVAL/INSTALLATION, PAGEBLOCK 28-22-11/401, to replace the adapter shaft or valve body before you continue with this task.

- (d) Monitor the fuel leakage from the inlet fuel line until the drops per minute is constant.
- (e) Make a written record of the drops per minute.

WARNING: DO NOT OPERATE ANY FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. FUEL VAPORS IN THE TANK MAY IGNITE AND CAUSE A FIRE OR EXPLOSION.

- (f) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
- 1) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.
- (g) Set these pump switches, on the P5 Overhead Panel, to the ON position.
- 1) FUEL PUMP TANK 1 - AFT
 - 2) FUEL PUMP TANK 2 - AFT
- (h) Make sure the rate of fuel drops per minute, that leak from the left and right fuel inlet lines, does not increase.
- (i) Set these pump switches, on the P5 Overhead Panel, to the OFF position.
- 1) FUEL PUMP TANK 1 - AFT
 - 2) FUEL PUMP TANK 2 - AFT
- (j) Do these steps to install the fuel pump drain plug (Figure 506):
- 1) Lubricate a new O-ring with grease, D00672 [CP5070] and install it on the drain plug.
 - 2) Lubricate the threads of the drain plug with grease, D00601 [CP2101].
 - 3) Install the drain plug.
 - a) Tighten the drain plug to 50 ±5 in-lb (6 ±1 N·m).
 - 4) Attach a lockwire to the drain plug.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-00-700-002

- (1) Do a leak check of the low pressure fuel pump (Test 3A - Idle-Power Leak Check, TASK 71-00-00-700-801-F00).

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SUBTASK 28-22-00-940-001

(2) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

END OF TASK

TASK 28-22-00-720-802

7. Fuel Scavenge System - Operational Test

(Figure 501)

A. General

- (1) This procedure is a scheduled maintenance task.
- (2) The fuel scavenge system has a motive flow inlet in the center tank, a jet pump driven by the left forward boost pump, and a float valve in the No. 1 tank.
- (3) This procedure makes sure the float valve opens and closes correctly. It also makes sure that the fuel scavenge system moves fuel from the center tank to the No. 1 tank.

B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
24-22-00-860-811	Supply Electrical Power (P/B 201)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right

D. Prepare for the Test

SUBTASK 28-22-00-860-031

(1) Make sure the switches are in the positions shown (Table 510) (Figure 501):

Table 510/28-22-00-993-810 Fuel Scavenge System Test

SWITCH/CONTROL	POSITION	LOCATION
APU FIRE HANDLE	NORMAL	P8 AISLE STAND
CROSSFEED VALVE	CLOSED	P5 OVERHEAD PANEL
FUEL PUMP - TANK 1 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 1 - FWD	OFF	P5 OVERHEAD PANEL
FUEL PUMP - CTR TANK LEFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - FWD	OFF	P5 OVERHEAD PANEL
FUEL PUMP - CTR TANK RIGHT	OFF	P5 OVERHEAD PANEL
L ENG FIRE HANDLE	NORMAL	P8 AISLE STAND
R ENG FIRE HANDLE	NORMAL	P8 AISLE STAND
L ENG START LEVER	CUTOFF	P8 AISLE STAND

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SWITCH/CONTROL	POSITION	LOCATION
R ENG START LEVER	CUTOFF	P8 AISLE STAND

SUBTASK 28-22-00-860-032

(2) Make sure that these circuit breakers are closed:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 001-013, 015-026, 028-036			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 001-013, 015-026, 028-036			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT

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SUBTASK 28-22-00-860-033

(3) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-22-00-650-003

(4) Make sure the fuel tanks have the fuel quantities as follows (Figure 501):

(a) Make sure there is between 100 lb (45 kg) - 4100 lb (1860 kg) of fuel in the No. 1 fuel tank.

NOTE: This makes sure that the fuel level is below the fuel scavenge float valve and above the forward boost pump inlet.

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- (b) Make sure there is between 500 lb (227 kg) - 6800 lb (3084 kg) of fuel in the center fuel tank.

NOTE: This step makes sure there is sufficient fuel in the center tank to scavenge. This step also makes sure that the scavenge fuel flow rate is not increased because of the head pressure of a large quantity of fuel in the center tank.

- (c) To refuel the fuel tanks (if it is necessary), do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.
- (d) To defuel the fuel tanks (if it is necessary), do this task: Fuel Tank Defueling, TASK 28-26-00-650-801.

E. Test of the Fuel Scavenge System

SUBTASK 28-22-00-860-082

WARNING: DO NOT OPERATE ANY FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. FUEL VAPORS IN THE TANK MAY IGNITE AND CAUSE A FIRE OR EXPLOSION.

- (1) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
- (a) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 28-22-00-860-034

- (2) Do these steps to operate the fuel scavenge system:
- (a) On the P5 Overhead Panel, make sure the LOW PRESSURE light for the FUEL PUMP TANK 1 - FWD switch is on.
- (b) Set the FUEL PUMP TANK 1 - FWD switch, on the P5 Overhead Panel, to the ON position (Figure 501).
- (c) Make sure the LOW PRESSURE light for the FUEL PUMP TANK 1 - FWD switch goes off within 90 seconds after you set the FUEL PUMP TANK 1 - FWD switch to the ON position.
- (d) Operate the pump for a maximum of 30 minutes to get a minimum fuel transfer of 110 lb (50 kg).
- (e) Make sure the No. 1 tank fuel quantity increases by a minimum of 110 lb (50 kg) within 30 minutes.
- (f) Make sure the center tank fuel quantity decreases by a minimum of 110 lb (50 kg) within 30 minutes.

SUBTASK 28-22-00-860-035

- (3) Set the FUEL PUMP TANK 1 - FWD switch, on the P5 Overhead Panel, to the OFF position.

SUBTASK 28-22-00-650-004

- (4) Refuel the No. 1 fuel tank with 6000 lb (2722 kg) (2,730 kilograms) of fuel (TASK 12-11-00-650-802).

NOTE: This step closes the fuel scavenge float valve.

SUBTASK 28-22-00-860-036

- (5) Set the FUEL PUMP TANK 1 - FWD switch, on the P5 Overhead Panel, to the ON position.

SUBTASK 28-22-00-860-037

- (6) Let the pumps operate for 30 minutes.
- (a) Make sure the No. 1 tank fuel quantity does not increase.
- (b) Make sure the center tank fuel quantity does not decrease.

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SUBTASK 28-22-00-860-038

(7) Set the FUEL PUMP TANK 1 - FWD switch, on the P5 Overhead Panel, to the OFF position.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-00-650-005

(1) To refuel the fuel tanks (if no more work is necessary), do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

————— END OF TASK —————

TASK 28-22-00-720-803

8. Fuel Boost Pump Output Pressure Test

A. General

(1) This procedure does a check of the output pressure of each of the boost pumps for the center tank, the No. 1 tank, and the No. 2 tank. The boost pumps for the center tank are also called "override pumps". The output pressure is measured at the fuel filter drain of one of the engines. If a pump does not supply a minimum output pressure, that pump could have a problem. Also, if one of the No. 1 or No. 2 tank boost pumps has more than a maximum pressure, that pump could have a problem.

B. References

Reference	Title
71-00-00-700-801-F00	Test 3A - Idle-Power Leak Check (P/B 501)
73-11-02-000-801-F00	Fuel Filter Removal (P/B 401)
73-11-02-400-801-F00	Fuel Filter Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

D. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Test Preparation

SUBTASK 28-22-00-860-052

(1) Make sure the APU is not operating.

SUBTASK 28-22-00-860-053

(2) Make sure there is a minimum of 600 pounds (270 kilograms) of fuel in the No. 1 tank, a minimum of 600 pounds (270 kilograms) of fuel in the No. 2 tank, and a minimum of 15,000 pounds (6800 kilograms) of fuel in the center tank.

SUBTASK 28-22-00-860-054

(3) Make sure the engine start switches and the boost pump switches are in the OFF position.

SUBTASK 28-22-00-860-055

(4) Make sure the APU is commanded off and the engine start levers are in the CUTOFF position.

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F. Test Procedure

SUBTASK 28-22-00-010-006

- (1) Open the left fan cowl at one of the engines.

SUBTASK 28-22-00-480-006

- (2) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the engine fuel filter housing drain plug.

SUBTASK 28-22-00-020-001

- (3) Remove the drain plug from the fuel filter housing (TASK 73-11-02-000-801-F00).

NOTE: Fuel will drain from the opening. Make sure the pressure gage hose fitting is prepared for installation to keep fuel leakage to a minimum.

- (a) Discard the O-ring.

SUBTASK 28-22-00-480-007

- (4) Attach the pressure gage hose fitting at the fuel filter housing.

NOTE: Use a .5625-18 UNJF or .5625-18 UNF fitting.

SUBTASK 28-22-00-860-056

- (5) Open the airplane fuel crossfeed valve.

SUBTASK 28-22-00-860-057

- (6) Move to the RUN position the start lever for the engine that has the pressure gage attached.

SUBTASK 28-22-00-860-083

WARNING: DO NOT OPERATE ANY FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. FUEL VAPORS IN THE TANK MAY IGNITE AND CAUSE A FIRE OR EXPLOSION.

- (7) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.

- (a) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 28-22-00-720-002

- (8) Do these steps for each of the fuel boost pumps and override pumps in the center tank (FUEL PUMP - TANK 1 - AFT, FUEL PUMP - TANK 1 - FWD, FUEL PUMP - CTR TANK LEFT, FUEL PUMP - TANK 2 - AFT, FUEL PUMP - TANK 2 FWD, FUEL PUMP - CTR TANK RIGHT):

- (a) Make sure only one boost pump or override pump is turned on each time you do these steps.

NOTE: Do not try to test more than one boost pump at a time.

- (b) To operate the left or right center boost pump, you must be in the flight compartment to continuously monitor for the amber LOW PRESSURE light.

- 1) If the amber LOW PRESSURE light stays on, set the FUEL PUMP CTR TANK - LEFT or RIGHT switch, on the P5 Overhead Panel, to the OFF position.

- (c) Open the bleed valve on the pressure gage hose until fuel comes out of the drain valve.

- (d) Close the bleed valve.

- (e) Record the pressure shown on the pressure gage as the "Pump OFF" pressure.

- (f) Push the applicable boost pump switch to the ON position.

- (g) Open the bleed valve on the pressure gage hose and drain fuel for approximately 10 seconds.

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- (h) Close the bleed valve.
- (i) After approximately 20 seconds, examine the gage to see if the pressure has become stable.
- (j) Record the pressure shown on the pressure gage as the "Pump ON" pressure.
- (k) Push the applicable boost pump switch to the OFF position.
- (l) Open the bleed valve on the pressure gage hose to release the pressure in the fuel line.

G. Calculate the Boost Pump Output Pressure

SUBTASK 28-22-00-970-002

- (1) To find the output pressure for one of the boost pumps or override pumps, subtract the "Pump OFF" pressure from the "Pump ON" pressure that you measured for that pump.

SUBTASK 28-22-00-970-003

WARNING: MAKE SURE YOU REPLACE A FUEL BOOST PUMP OR AN OVERRIDE PUMP WITH LOW OUTPUT PRESSURE. LOW BOOST PUMP PRESSURE CAN CAUSE PROBLEMS WITH THE ENGINE IN FLIGHT.

- (2) Do these steps for a main tank (No. 1 or No. 2 tank) boost pump:
 - (a) If the difference between the "Pump ON" pressure and the "Pump OFF" pressure is less than 12 psig, then replace that main tank boost pump.
 - (b) If the difference between the "Pump ON" pressure and the "Pump OFF" pressure is more than 24 psig, then replace that main tank boost pump.

SUBTASK 28-22-00-970-004

WARNING: MAKE SURE YOU REPLACE A FUEL BOOST PUMP OR AN OVERRIDE PUMP WITH LOW OUTPUT PRESSURE. LOW BOOST PUMP PRESSURE CAN CAUSE PROBLEMS WITH THE ENGINE IN FLIGHT.

- (3) Do this step for an override pump (center tank boost pump):
 - (a) If the difference between the "Pump ON" pressure and the "Pump OFF" pressure is less than 28 psig, then replace that override pump (center tank boost pump).

H. Put the Airplane Back To Its Usual Condition

SUBTASK 28-22-00-860-058

- (1) When you have done the test on all six boost pumps (including the two override pumps for the center tank), make sure all six fuel pump switches are set to OFF.

SUBTASK 28-22-00-860-059

- (2) Put the engine start lever back to the CUTOFF position.

SUBTASK 28-22-00-860-060

- (3) Close the airplane fuel crossfeed valve.

SUBTASK 28-22-00-420-001

- (4) Install a new O-ring on the drain plug (TASK 73-11-02-400-801-F00).

SUBTASK 28-22-00-080-005

- (5) Remove the pressure hose fitting from the engine fuel filter housing.

NOTE: Fuel will drain from the opening. Make sure that the drain plug is prepared for installation to keep fuel leakage to a minimum.

SUBTASK 28-22-00-420-002

- (6) Install the drain plug in the engine fuel filter housing (TASK 73-11-02-400-801-F00).

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SUBTASK 28-22-00-790-001

(7) Do this task: Test 3A - Idle-Power Leak Check, TASK 71-00-00-700-801-F00.

END OF TASK

HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206

TASK 28-22-00-720-805

9. Center Tank Boost Pump Auto Shutoff Functional Test

(Figure 501, Figure 507 or Figure 508)

A. General

- (1) This procedure is a scheduled maintenance task.
- (2) ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on airworthiness limitation instructions (ALIs).
- (3) Do this task to do the requirements of 28-AWL-19.
- (4) If it is not possible to do the Auto Shutoff Functional Test with APU power, do these procedures:
 - (a) Alternative Auto Shutoff Functional Test for the Left Center Boost Pump
 - (b) Alternative Auto Shutoff Functional Test for the Right Center Boost Pump

B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
49-11-00-860-801	APU Starting and Operation (P/B 201)
49-11-00-860-802	APU Usual Shutdown (P/B 201)

C. Tools/Equipment

Reference	Description
STD-836	Stopwatch

D. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
211	Flight Compartment - Left
212	Flight Compartment - Right

E. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

F. Prepare to Do the Functional Test

SUBTASK 28-22-00-865-001

- (1) Make sure that these circuit breakers are closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	12	C00132	MASTER CAUTION ANNUNCIATOR BUS 1
B	13	C00131	MASTER CAUTION ANNUNCIATOR BAT

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HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206 (Continued)

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
C	3	C01637	BOOST PMP CTR TNK L AUTO SHUT OFF-DC
C	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC
HAP 031-036; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206			
D	7	C01639	BOOST PUMP CTR TNK L AUTO SHUT OFF-AC
E	7	C01640	BOOST PUMP CTR TNK R AUTO SHUT OFF-AC
HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206			
E	11	C00313	INDICATOR MASTER DIM SECT 1
F	12	C00318	INDICATOR MASTER DIM SECT 6

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 031-036; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 031-036; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206			

SUBTASK 28-22-00-410-004

- (2) Make sure this access panel is closed:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-22-00-860-085

- (3) Make sure the FUEL PUMP CTR TANK - LEFT and FUEL PUMP CTR TANK - RIGHT switches, on the P5 Overhead Panel, are in the OFF position.

NOTE: This will reset the auto shutoff circuit.

SUBTASK 28-22-00-651-001

- (4) Make sure there is a minimum of 2000 lb (907 kg) of fuel in the center fuel tank.
 - (a) To refuel the fuel tank (if it is necessary), do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

G. Auto Shutoff Functional Test for the Left Center Boost Pump

NOTE: This test requires APU power. If you do this test for the left center boost pump, you do not have to do the Alternative Auto Shutoff Functional Test for the Left Center Boost Pump.

SUBTASK 28-22-00-860-131

- (1) If the APU is not operating, do this task: APU Starting and Operation, TASK 49-11-00-860-801.

SUBTASK 28-22-00-720-032

- (2) Put the GRD PWR switch, on the P5 Overhead Panel, to the OFF position.

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HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206 (Continued)

SUBTASK 28-22-00-720-033

(3) Put the APU GEN (left) switch, on the P5 Overhead Panel, to the ON position.

SUBTASK 28-22-00-720-034

(4) Put the BUS TRANS switch, on the P5 Overhead Panel, to the OFF position.

(a) Make sure the 2 TRANSFER BUS OFF light is on.

(b) Make sure the 1 TRANSFER BUS OFF light is off.

SUBTASK 28-22-00-720-003

(5) Put the FUEL PUMP CTR TANK - LEFT switch, on the P5 Overhead Panel, to the ON position.

SUBTASK 28-22-00-720-004

(6) Make sure the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - LEFT switch goes off.

SUBTASK 28-22-00-720-005

(7) Put and hold, for 1 to 5 seconds, the test switch, S1, on the P61-8 Fuel Test Panel to the L AUTO SHUTOFF position and then release it.

SUBTASK 28-22-00-720-006

(8) Make sure the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - LEFT switch, on the P5 Overhead Panel, stays off.

SUBTASK 28-22-00-720-007

(9) Start a stopwatch, STD-836, as you put and hold the test switch, S1, on the P61-8 panel to the L AUTO SHUTOFF position.

SUBTASK 28-22-00-720-008

(10) When the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - LEFT switch, on the P5 Overhead Panel, comes on (in approximately 15 seconds), stop the stopwatch, STD-836, and release the test switch, S1, on the P61-8 panel.

SUBTASK 28-22-00-720-009

(11) Make sure the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - LEFT switch, on the P5 Overhead Panel, stays on.

SUBTASK 28-22-00-720-010

(12) Make sure the stopwatch, STD-836, shows 15 ± 2 seconds.

SUBTASK 28-22-00-720-011

(13) Put the FUEL PUMP CTR TANK - LEFT switch, on the P5 Overhead Panel, to the OFF position.

SUBTASK 28-22-00-280-003

(14) Listen and make sure the left center boost pump does not operate.

SUBTASK 28-22-00-720-036

(15) Put the APU GEN (right) switch, on the P5 Overhead Panel, to the ON position.

(a) Make sure the 2 TRANSFER BUS OFF light is off.

(b) Make sure the 1 TRANSFER BUS OFF light is off.

SUBTASK 28-22-00-720-035

(16) Put the BUS TRANS switch, on the P5 Overhead Panel, to the AUTO position.

(a) Make sure the 2 TRANSFER BUS OFF light is off.

(b) Make sure the 1 TRANSFER BUS OFF light is off.

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HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206 (Continued)

SUBTASK 28-22-00-720-052

(17) Put the APU GEN (right) switch, on the P5 Overhead Position, to the OFF position

SUBTASK 28-22-00-720-053

(18) Put the APU GEN (left) switch, on the P5 Overhead Position, to the OFF position

H. Alternative Auto Shutoff Functional Test for the Left Center Boost Pump

NOTE: This test requires ground power. If you do this test for the left center boost pump, you do not have to do the Auto Shutoff Functional Test for the Left Center Boost Pump.

SUBTASK 28-22-00-720-037

(1) Put the GRD PWR switch, on the P5 Overhead Panel, to the ON position.

SUBTASK 28-22-00-860-125

(2) Make sure that this circuit breaker is closed:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
F	5	C03002	XFR BUS 1 SECT 2

SUBTASK 28-22-00-860-126

(3) Open these circuit breakers and install safety tags:

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
F	5	C03012	XFR BUS 2 SECT 2
F	6	C00817	MAIN BUS 2

SUBTASK 28-22-00-720-057

(4) Put the FUEL PUMP CTR TANK - LEFT switch, on the P5 Overhead Panel, to the ON position.

SUBTASK 28-22-00-720-058

(5) Make sure the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - LEFT switch goes off.

SUBTASK 28-22-00-720-059

(6) Put and hold, for 1 to 5 seconds, the test switch, S1, on the P61-8 Fuel Test Panel to the L AUTO SHUTOFF position and then release it.

SUBTASK 28-22-00-720-060

(7) Make sure the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - LEFT switch, on the P5 Overhead Panel, stays off.

SUBTASK 28-22-00-720-061

(8) Start a stopwatch, STD-836, as you put and hold the test switch, S1, on the P61-8 panel to the L AUTO SHUTOFF position.

SUBTASK 28-22-00-720-062

(9) When the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - LEFT switch, on the P5 Overhead Panel, comes on (in approximately 15 seconds), stop the stopwatch, STD-836, and release the test switch, S1, on the P61-8 panel.

EFFECTIVITY HAP ALL

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HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206 (Continued)

SUBTASK 28-22-00-720-063

(10) Make sure the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - LEFT switch, on the P5 Overhead Panel, stays on.

SUBTASK 28-22-00-720-064

(11) Make sure the stopwatch, STD-836, shows 15 ± 2 seconds.

SUBTASK 28-22-00-720-065

(12) Put the FUEL PUMP CTR TANK - LEFT switch, on the P5 Overhead Panel, to the OFF position.

SUBTASK 28-22-00-280-006

(13) Listen and make sure the left center boost pump does not operate.

SUBTASK 28-22-00-720-038

(14) Put the GRD PWR switch, on the P5 Overhead Panel, to the OFF position.

SUBTASK 28-22-00-860-127

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

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
F	5	C03012	XFR BUS 2 SECT 2
F	6	C00817	MAIN BUS 2

I. Auto Shutoff Functional Test for the Right Center Boost Pump

NOTE: This test requires APU power. If you do this test for the right center boost pump, you do not have to do the Alternative Auto Shutoff Functional Test for the Right Center Boost Pump.

SUBTASK 28-22-00-860-132

(1) If the APU is not operating, do this task: APU Starting and Operation, TASK 49-11-00-860-801.

SUBTASK 28-22-00-720-039

(2) Put the APU GEN (right) switch, on the P5 Overhead Panel, to the ON position.

SUBTASK 28-22-00-720-040

(3) Put the BUS TRANS switch, on the P5 Overhead Panel, to the OFF position.

(a) Make sure the 1 TRANSFER BUS OFF light is on.

(b) Make sure the 2 TRANSFER BUS OFF light is off.

SUBTASK 28-22-00-720-012

(4) Put the FUEL PUMP CTR TANK - RIGHT switch, on the P5 Overhead Panel, to the ON position.

SUBTASK 28-22-00-720-013

(5) Make sure the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - RIGHT switch goes off.

SUBTASK 28-22-00-720-014

(6) Put and hold, for 1 to 5 seconds, the test switch, S2, on the P61-8 Fuel Test Panel to the R AUTO SHUTOFF position and then release it.

SUBTASK 28-22-00-720-015

(7) Make sure the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - RIGHT switch, on the P5 Overhead Panel, stays off.

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HAP ALL

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SUBTASK 28-22-00-720-016

- (8) Start a stopwatch, STD-836, as you put and hold the test switch, S2, on the P61-8 panel in the R AUTO SHUTOFF position.

SUBTASK 28-22-00-720-017

- (9) When the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - RIGHT switch, on the P5 Overhead Panel, comes on (in approximately 15 seconds), stop the stopwatch, STD-836, and release the test switch, S2, on the P61-8 panel.

SUBTASK 28-22-00-720-018

- (10) Make sure the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - RIGHT switch, on the P5 Overhead Panel, stays on.

SUBTASK 28-22-00-720-019

- (11) Make sure the stopwatch, STD-836, shows 15 ± 2 seconds.

SUBTASK 28-22-00-720-020

- (12) Put the FUEL PUMP CTR TANK - RIGHT switch, on the P5 Overhead Panel, to the OFF position.

SUBTASK 28-22-00-280-004

- (13) Listen and make sure the right center boost pump does not operate.

SUBTASK 28-22-00-720-054

- (14) Put the APU GEN (left) switch, on the P5 Overhead Panel, to the ON position.

- (a) Make sure the 2 TRANSFER BUS OFF light is off.
(b) Make sure the 1 TRANSFER BUS OFF light is off.

SUBTASK 28-22-00-720-041

- (15) Put the BUS TRANS switch, on the P5 Overhead Panel, to the AUTO position.

- (a) Make sure the 1 TRANS BUS OFF light is off.
(b) Make sure the 2 TRANS BUS OFF light is off.

SUBTASK 28-22-00-720-055

- (16) Put the APU GEN (right) switch, on the P5 Overhead Position, to the OFF position

SUBTASK 28-22-00-720-056

- (17) Put the APU GEN (left) switch, on the P5 Overhead Position, to the OFF position

J. Alternative Auto Shutoff Functional Test for the Right Center Boost Pump

NOTE: This test requires ground power. If you do this test for the right center boost pump, you do not have to do the Auto Shutoff Functional Test for the Right Center Boost Pump.

SUBTASK 28-22-00-720-043

- (1) Put the GRD PWR switch, on the P5 Overhead Panel, to the ON position.

SUBTASK 28-22-00-860-128

- (2) Make sure that these circuit breakers are closed:

Power Distribution Panel Number 2, P92

Table with 4 columns: Row, Col, Number, Name. Contains data for XFR BUS 2 SECT 2 and MAIN BUS 2.

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HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206 (Continued)

SUBTASK 28-22-00-860-129

(3) Open this circuit breaker and install safety tag:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
F	5	C03002	XFR BUS 1 SECT 2

SUBTASK 28-22-00-720-066

(4) Put the FUEL PUMP CTR TANK - RIGHT switch, on the P5 Overhead Panel, to the ON position.

SUBTASK 28-22-00-720-067

(5) Make sure the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - RIGHT switch goes off.

SUBTASK 28-22-00-720-068

(6) Put and hold, for 1 to 5 seconds, the test switch, S2, on the P61-8 Fuel Test Panel to the R AUTO SHUTOFF position and then release it.

SUBTASK 28-22-00-720-069

(7) Make sure the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - RIGHT switch, on the P5 Overhead Panel, stays off.

SUBTASK 28-22-00-720-070

(8) Start a stopwatch, STD-836, as you put and hold the test switch, S2, on the P61-8 panel in the R AUTO SHUTOFF position.

SUBTASK 28-22-00-720-071

(9) When the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - RIGHT switch, on the P5 Overhead Panel, comes on (in approximately 15 seconds), stop the stopwatch, STD-836, and release the test switch, S2, on the P61-8 panel.

SUBTASK 28-22-00-720-072

(10) Make sure the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - RIGHT switch, on the P5 Overhead Panel, stays on.

SUBTASK 28-22-00-720-073

(11) Make sure the stopwatch, STD-836, shows 15 ± 2 seconds.

SUBTASK 28-22-00-720-074

(12) Put the FUEL PUMP CTR TANK - RIGHT switch, on the P5 Overhead Panel, to the OFF position.

SUBTASK 28-22-00-280-007

(13) Listen and make sure the right center boost pump does not operate.

SUBTASK 28-22-00-720-044

(14) Put the GRD PWR switch, on the P5 Overhead Panel, to the OFF position.

SUBTASK 28-22-00-860-130

(15) Remove the safety tag and close this circuit breaker:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
F	5	C03002	XFR BUS 1 SECT 2

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HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206 (Continued)

K. Master Caution Functional Test for the Center Tank Boost Pumps Auto Shutoff

SUBTASK 28-22-00-720-045

- (1) Put the APU GEN (left) switch, on the P5 Overhead Panel, to the ON position

SUBTASK 28-22-00-720-046

- (2) Put the APU GEN (right) switch, on the P5 Overhead Panel, to the ON position

SUBTASK 28-22-00-720-047

- (3) Put the BUS TRANS switch, on the P5 Overhead Panel, to the OFF position.

- (a) Make sure the 1 TRANSFER BUS OFF light is off.

- (b) Make sure the 2 TRANSFER BUS OFF light is off.

SUBTASK 28-22-00-720-021

- (4) Put the FUEL PUMP CTR TANK - LEFT and RIGHT switches, on the P5 Overhead Panel, to the ON position.

SUBTASK 28-22-00-720-022

- (5) Make sure the amber LOW PRESSURE lights for the FUEL PUMP CTR TANK - LEFT and RIGHT switches, on the P5 Overhead Panel, are off.

SUBTASK 28-22-00-720-026

- (6) Push the MASTER CAUTION light on the right Master Caution panel to reset the Master Caution panel.

- (a) Make sure the two MASTER CAUTION lights (right and left) are off.

- (b) Make sure the FUEL annunciator light on the left Master Caution panel is off.

SUBTASK 28-22-00-720-023

- (7) For the left center boost pump, do these steps:

- (a) Set the stopwatch, STD-836, to zero.

- (b) Put and hold the test switch, S1, on the P61-8 Fuel Test Panel to the L AUTO SHUTOFF position.

- (c) When the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - LEFT switch, on the P5 Overhead Panel, comes on (in approximately 15 seconds), start the stopwatch, STD-836, and release the test switch, S1, on the P61-8 panel

- (d) When the MASTER CAUTION and FUEL annunciator lights, on the MASTER CAUTION panel, come on, stop the stopwatch, STD-836.

- (e) Make sure the stopwatch, STD-836, shows 10 ± 2 seconds.

- (f) Put the FUEL PUMP CTR TANK - LEFT switch, on the P5 Overhead Panel, to the OFF position and then to the ON position.

- (g) Make sure the amber LOW PRESSURE lights for the FUEL PUMP CTR TANK - LEFT and RIGHT switches, on the P5 Overhead Panel, are off.

- (h) Push the MASTER CAUTION light on the right Master Caution panel to reset the Master Caution panel.

- 1) Make sure the two MASTER CAUTION lights (right and left) are off.

- 2) Make sure the FUEL annunciator light on the left Master Caution panel is off.

SUBTASK 28-22-00-720-024

- (8) For the right center boost pump, do these steps:

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- (a) Set the stopwatch, STD-836, to zero.
- (b) Put and hold the test switch, S2, on the P61-8 Fuel Test Panel to the R AUTO SHUTOFF position.
- (c) When the amber LOW PRESSURE light for the FUEL PUMP CTR TANK - RIGHT switch, on the P5 Overhead Panel, comes on (in approximately 15 seconds), start the stopwatch, STD-836, and release the test switch, S2, on the P61-8 panel
- (d) When the MASTER CAUTION and FUEL annunciator lights, on the MASTER CAUTION panel, come on, stop the stopwatch, STD-836.
- (e) Make sure the stopwatch, STD-836, shows 10 ± 2 seconds.
- (f) Put the FUEL PUMP CTR TANK - RIGHT switch, on the P5 Overhead Panel, to the OFF position and then to the ON position.
- (g) Make sure the amber LOW PRESSURE lights for the FUEL PUMP CTR TANK - LEFT and RIGHT switches, on the P5 Overhead Panel, are off.
- (h) Push the MASTER CAUTION light on the right Master Caution panel to reset the Master Caution panel.
 - 1) Make sure the two MASTER CAUTION lights (right and left) are off.
 - 2) Make sure the FUEL annunciator light on the left Master Caution panel is off.

SUBTASK 28-22-00-720-025

- (9) Put the FUEL PUMP CTR TANK - LEFT and RIGHT switches, on the P5 Overhead Panel, to the OFF position.

SUBTASK 28-22-00-280-005

- (10) Listen and make sure the left and right center boost pumps do not operate.

SUBTASK 28-22-00-720-048

- (11) Put the BUS TRANS switch, on the P5 Overhead Panel, to the AUTO position.
 - (a) Make sure the 1 TRANS BUS OFF light is off.
 - (b) Make sure the 2 TRANS BUS OFF light is off.

SUBTASK 28-22-00-720-049

- (12) Put the APU GEN (left) switch, on the P5 Overhead Panel, to the OFF position

SUBTASK 28-22-00-720-050

- (13) Put the APU GEN (right) switch, on the P5 Overhead Panel, to the OFF position

SUBTASK 28-22-00-720-051

- (14) Put the GRD PWR switch, on the P5 Overhead Panel, to the ON position.

SUBTASK 28-22-00-860-114

- (15) If the APU is not necessary to do other tasks, do this task: APU Usual Shutdown, TASK 49-11-00-860-802.

————— END OF TASK —————

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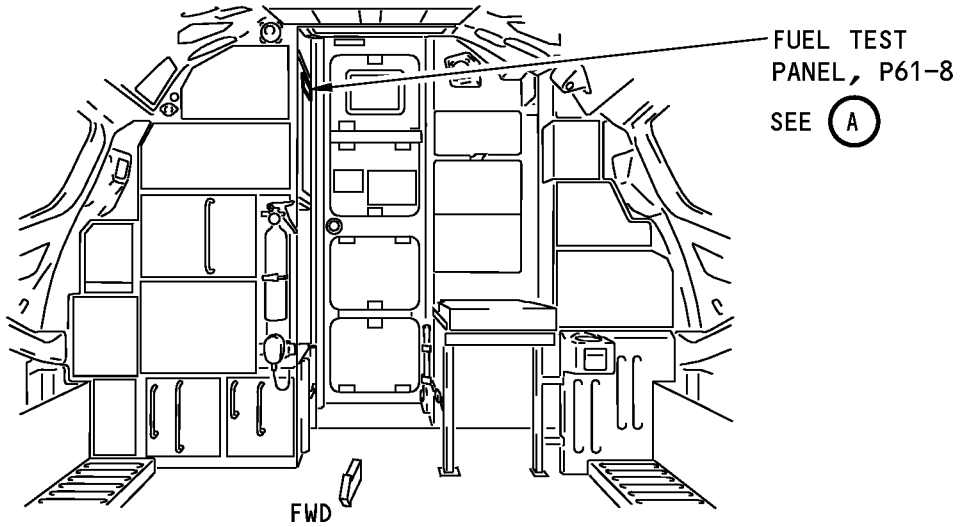
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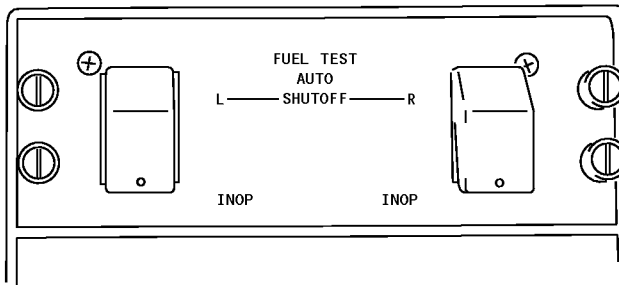
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FLIGHT COMPARTMENT



FWD ←

FUEL TEST PANEL, P61-8

(A)

454907 S0000142433_V2

Fuel Test Panel, P61-8
Figure 507/28-22-00-990-822

EFFECTIVITY
HAP 031-054, 101-999; HAP 001-011 POST SB 737-31-1136
AND POST SB 737-28A1206; HAP 012, 013, 015-026, 028-030
POST SB 737-28A1206

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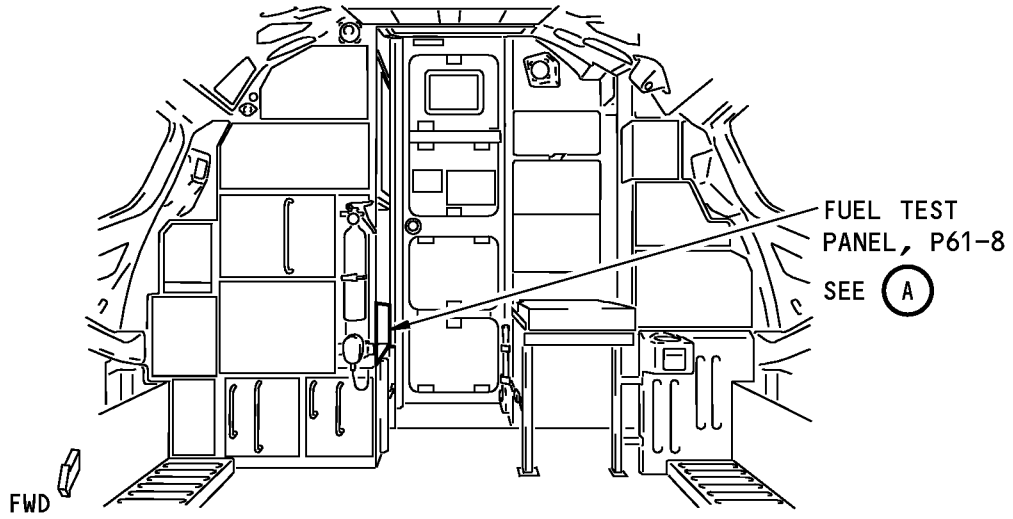
BOEING PROPRIETARY - Copyright © Unpublished Work - See title page for details

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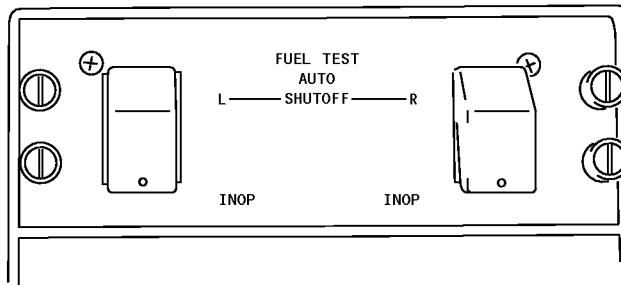
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FLIGHT COMPARTMENT



FWD ←

FUEL TEST PANEL, P61-8

(A)

1500121 S0000272998_V2

Fuel Test Panel, P61-8
Figure 508/28-22-00-990-824

EFFECTIVITY
HAP 001-011 PRE SB 737-31-1136 AND POST SB 737-28A1206

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TASK 28-22-00-710-802

10. Engine Fuel Suction Feed - Operational Test

A. General

(1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-805-F00	Engine Ground Safety Precautions (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)
FIM 28-22 TASK 819	Engine Fuel Suction Feed Operational Test Failed - Fault Isolation

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right

D. Procedure

NOTE: Do this test with one of the two subsequent fuel quantity configurations.

SUBTASK 28-22-00-860-087

(1) For this test, make sure that these quantities of fuel are in the fuel tanks:

Tank	Fuel Quantity
Center Tank	0 lb (0 kg) - 30 lb (14 kg)
Main Tank 1	1870 lb (848 kg) - 2080 lb (943 kg)
Main Tank 2	1870 lb (848 kg) - 2080 lb (943 kg)

- (a) To add fuel to one or more tanks, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802 or Tank to Tank Fuel Transfer, TASK 28-26-00-650-802.
- (b) To remove fuel from one or more tanks, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801 or Tank to Tank Fuel Transfer, TASK 28-26-00-650-802.
- (c) Make sure the Crossfeed switch, on the P5 Overhead Panel, is set to the CLOSED position.

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (d) Operate all four main tank boost pumps. To do this, set the switches on the P5 Overhead Panel to the ON position:
 - 1) FUEL PUMP TANK 1 - AFT
 - 2) FUEL PUMP TANK 1 - FWD
 - 3) FUEL PUMP TANK 2 - AFT
 - 4) FUEL PUMP TANK 2 - FWD

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WARNING: OBSERVE PROPER SAFETY PRECAUTIONS AROUND RUNNING ENGINE. WEAR EAR PROTECTORS AND STAY CLEAR OF ENGINE HAZARD AREAS. SEE "ENGINE GROUND SAFETY PRECAUTIONS" FOR ENGINE HAZARD DESCRIPTION.

- (e) Do these steps to do the test:
 - 1) Obey all the safety precautions around the running engines (TASK 71-00-00-800-805-F00).
 - 2) Start the two engines (TASK 71-00-00-800-807-F00).
 - 3) Let the engines operate at idle power, with the boost pumps on for a minimum of two minutes.
 - 4) Stop the operation of all four main tank boost pumps. To do this, set these switches on the P5 Overhead Panel to the OFF position:
 - a) FUEL PUMP TANK 1 -AFT
 - b) FUEL PUMP TANK 1 - FWD
 - c) FUEL PUMP TANK 2 - AFT
 - d) FUEL PUMP TANK 2 - FWD
 - 5) Make sure that the two engines continue to operate for a minimum of 5 minutes.
- (f) Shut down the two engines (TASK 71-00-00-700-819-F00).
- (g) If one or both engines did not operate for the full 5 minutes, do this task: FIM 28-22 TASK 819.

SUBTASK 28-22-00-860-112

- (2) For this test, two engine runs are necessary with the subsequent quantities of fuel in the fuel tanks:
 - (a) Run 1

Tank	Fuel Quantity
Center Tank	0 lb (0 kg) - 30 lb (14 kg)
Main Tank 1	Any quantity above 1870 lb (848 kg) and within 1000 lb (454 kg) of Main Tank 2
Main Tank 2	Any quantity above 1870 lb (848 kg) and within 1000 lb (454 kg) of Main Tank 1

- 1) To add fuel to one or more tanks, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802 or Tank to Tank Fuel Transfer, TASK 28-26-00-650-802.
- 2) To remove fuel from one or more tanks, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801 or Tank to Tank Fuel Transfer, TASK 28-26-00-650-802.
- 3) Make sure the Crossfeed switch, on the P5 Overhead Panel, is set to the CLOSED position.

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- 4) Operate all four main tank boost pumps. To do this, set the switches on the P5 Overhead Panel to the ON position:

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- a) FUEL PUMP TANK 1 - AFT
- b) FUEL PUMP TANK 1 - FWD
- c) FUEL PUMP TANK 2 - AFT
- d) FUEL PUMP TANK 2 - FWD

WARNING: OBSERVE PROPER SAFETY PRECAUTIONS AROUND RUNNING ENGINE. WEAR EAR PROTECTORS AND STAY CLEAR OF ENGINE HAZARD AREAS. SEE "ENGINE GROUND SAFETY PRECAUTIONS" FOR ENGINE HAZARD DESCRIPTION.

- 5) Do these steps to do the test:
 - a) Obey all the safety precautions around the running engines (TASK 71-00-00-800-805-F00).
 - b) Start the two engines (TASK 71-00-00-800-807-F00).
 - c) Let the engines operate at idle power, with the boost pumps on for a minimum of two minutes.
 - d) Stop the operation of all four main tank boost pumps. To do this, set these switches on the P5 Overhead Panel to the OFF position:
 - <1> FUEL PUMP TANK 1 - AFT
 - <2> FUEL PUMP TANK 1 - FWD
 - <3> FUEL PUMP TANK 2 - AFT
 - <4> FUEL PUMP TANK 2 - FWD
 - e) Make sure the two engines continue to operate for a minimum of 5 minutes.
- 6) Shut down the two engines (TASK 71-00-00-700-819-F00).
- 7) If one or both engines did not operate for the full 5 minutes, do this task: FIM 28-22 TASK 819

(b) Run 2

Tank	Fuel Quantity
Center Tank	Any quantity
Main Tank 1	1870 lb (848 kg) - 2080 lb (943 kg)
Main Tank 2	1870 lb (848 kg) - 2080 lb (943 kg)

- 1) To add fuel to one or more tanks, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802 or Tank to Tank Fuel Transfer, TASK 28-26-00-650-802.
- 2) To remove fuel from one or more tanks, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801 or Tank to Tank Fuel Transfer, TASK 28-26-00-650-802.
- 3) Make sure the Crossfeed switch, on the P5 Overhead Panel, is set to the CLOSED position.

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- 4) Operate all four main tank boost pumps. To do this, set the switches on the P5 Overhead Panel to the ON position:

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- a) FUEL PUMP TANK 1 - AFT
b) FUEL PUMP TANK 1 - FWD
c) FUEL PUMP TANK 2 - AFT
d) FUEL PUMP TANK 2 - FWD

WARNING: OBSERVE PROPER SAFETY PRECAUTIONS AROUND RUNNING ENGINE. WEAR EAR PROTECTORS AND STAY CLEAR OF ENGINE HAZARD AREAS. SEE "ENGINE GROUND SAFETY PRECAUTIONS" FOR ENGINE HAZARD DESCRIPTION.

- 5) Do these steps to do the test:
a) Obey all the safety precautions around the running engines (TASK 71-00-00-800-805-F00).
b) Start the two engines (TASK 71-00-00-800-807-F00).
c) Let the engines operate at idle power, with the boost pumps on for a minimum of two minutes.
d) Stop the operation of all four main tank boost pumps. To do this, set these switches on the P5 Overhead Panel to the OFF position:
< 1 > FUEL PUMP TANK 1 - AFT
< 2 > FUEL PUMP TANK 1 - FWD
< 3 > FUEL PUMP TANK 2 - AFT
< 4 > FUEL PUMP TANK 2 - FWD
e) Make sure the two engines continue to operate for a minimum of 5 minutes.
6) Shut down the two engines (TASK 71-00-00-700-819-F00).
7) If one or both engines did not operate for the full 5 minutes, do this task: FIM 28-22 TASK 819

END OF TASK

HAP 001-013, 015-026, 028-030, 037-054, 101-999; HAP 031-036 POST SB 737-28A1248

TASK 28-22-00-720-806

11. Center Tank Fuel Boost Pump Power Failed On - Functional Test

A. General

- (1) This procedure is a scheduled maintenance task.
(2) ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on airworthiness limitation instructions (ALIs).

B. References

Table with 2 columns: Reference, Title. Row 1: 28-00-00-910-801, Airworthiness Limitation Precautions (P/B 201)

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

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HAP 001-013, 015-026, 028-030, 037-054, 101-999; HAP 031-036 POST SB 737-28A1248 (Continued)

Reference	Description
COM-1322	Multimeter (Analog / Digital with sufficient internal Voltage to measure long cable) (Part #: 1587, Supplier: 89536, A/P Effectivity: 737-ALL) (Part #: 260-8XPI, Supplier: 55026, A/P Effectivity: 737-ALL) (Part #: MODEL 8 MK7, Supplier: 00426, A/P Effectivity: 737-ALL)

D. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
211	Flight Compartment - Left
212	Flight Compartment - Right

E. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

F. Prepare for the Test

SUBTASK 28-22-00-860-091

(1) Make sure the fuel tanks contain the subsequent quantities of fuel:

Tank	Fuel Quantity
Center Tank	Minimum of 3000 lbs (1364 kgs)
Left Main Tank	0-7000 lbs (0-3182 kgs)
Right Main Tank	0-7000 lbs (0-3182 kgs)

SUBTASK 28-22-00-860-092

(2) Make sure the boost pump switches are in the OFF position (Table 511):

Table 511/28-22-00-993-821

SWITCH/CONTROL	POSITION	LOCATION
FUEL PUMP - TANK 1 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 1 - FWD	OFF	P5 OVERHEAD PANEL
FUEL PUMP - CTR TANK LEFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - CTR TANK RIGHT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP - TANK 2 - FWD	OFF	P5 OVERHEAD PANEL

EFFECTIVITY
HAP ALL

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737-600/700/800/900

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HAP 001-013, 015-026, 028-030, 037-054, 101-999; HAP 031-036 POST SB 737-28A1248 (Continued)

SUBTASK 28-22-00-860-094

(3) Make sure that these circuit breakers are closed:

F/O Electrical System Panel, P6-3

Row Col Number Name

HAP 037-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206; HAP 031-036 POST SB 737-28A1248

C 3 C01637 BOOST PMP CTR TNK L AUTO SHUT OFF-DC

HAP 037-054, 101-999

D 7 C01659 FUEL AUTO S/O UCPO BST PUMP CTR TNK L AC

HAP 001-013, 015-026, 028-030, 037-054, 101-999; HAP 031-036 POST SB 737-28A1248

F 12 C00318 INDICATOR MASTER DIM SECT 6

Power Distribution Panel Number 1, P91

Row Col Number Name

HAP 037-054, 101-999

D 5 C00845 FUEL BOOST PUMP CTR TANK LEFT

HAP 001-013, 015-026, 028-030; HAP 031-036 POST SB 737-28A1248

D 6 C00845 FUEL BOOST PUMP CTR TANK LEFT

HAP 001-013, 015-026, 028-030, 037-054, 101-999; HAP 031-036 POST SB 737-28A1248

SUBTASK 28-22-00-865-004

(4) Make sure that these circuit breakers are closed:

F/O Electrical System Panel, P6-3

Row Col Number Name

HAP 037-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206; HAP 031-036 POST SB 737-28A1248

C 7 C01638 BOOST PMP CTR TNK R AUTO SHUT OFF-DC

HAP 037-054, 101-999

E 7 C01658 ENGINE FUEL AUTO S/O UCPO BST PUMP CTR TNK R AC

HAP 001-013, 015-026, 028-030, 037-054, 101-999; HAP 031-036 POST SB 737-28A1248

E 11 C00313 INDICATOR MASTER DIM SECT 1

Power Distribution Panel Number 2, P92

Row Col Number Name

HAP 037-054, 101-999

D 5 C00846 FUEL BOOST PUMP CTR TANK RIGHT

HAP 001-013, 015-026, 028-030; HAP 031-036 POST SB 737-28A1248

D 6 C00846 FUEL BOOST PUMP CTR TANK RIGHT

HAP 001-013, 015-026, 028-030, 037-054, 101-999; HAP 031-036 POST SB 737-28A1248

EFFECTIVITY HAP ALL

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AIRCRAFT MAINTENANCE MANUAL

HAP 001-013, 015-026, 028-030, 037-054, 101-999; HAP 031-036 POST SB 737-28A1248 (Continued)

SUBTASK 28-22-00-010-011

(5) Get access to the secondary relay terminals, R962 and R963 (Figure 509).

Open this access panel:

<u>Number</u>	<u>Name/Location</u>
117A	Electronic Equipment Access Door

- (a) To get access to relay terminal R962, remove the floor panel at station 371 LBL 35.
- (b) To get access to relay terminal R963, remove the floor panel at station 361 RBL 36.

G. Test of the Left Center Tank Relay

SUBTASK 28-22-00-860-095

(1) Put the CTR Tank Left Fuel Pump switch to the ON position.

SUBTASK 28-22-00-210-010

(2) Make sure the CTR Tank Left LOW PRESSURE indication light comes on and then goes off.

SUBTASK 28-22-00-760-018

(3) Measure the voltage between the secondary relay R962 terminals A1, A2, B1, B2, C1, C2 and the case ground with a Multimeter, COM-1322.

- (a) Make sure the voltage is 105 - 125 volts AC.

SUBTASK 28-22-00-860-103

(4) Put the CTR Tank Left Fuel Pump switch to the OFF position.

SUBTASK 28-22-00-760-019

(5) Measure the voltage between the secondary relay R962 terminals A1, A2, B1, B2, C1, C2 and the case ground with a Multimeter, COM-1322.

NOTE: For the lowest voltage reading, set the VOM to the lowest AC voltage range, but make sure the reading is still within range of full scale.

- (a) Make sure the voltage is less than 10 volts AC.

SUBTASK 28-22-00-760-020

(6) Measure the resistance between the subsequent R962 relay terminals with a Multimeter, COM-1322 or equivalent to minimize AC voltage noise pickup in this open circuit test:

NOTE: The measurements between the pins are continuity checks, not bonding resistance checks.

A1	A2
B1	B2
C1	C2

- (a) Make sure the resistance is 1 meg-ohm or more.

SUBTASK 28-22-00-860-104

(7) Put the CTR Tank Left Fuel Pump switch to the ON position.

SUBTASK 28-22-00-210-014

(8) Make sure the CTR Tank Left LOW PRESSURE indication light comes on and then goes off.

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HAP 001-013, 015-026, 028-030, 037-054, 101-999; HAP 031-036 POST SB 737-28A1248 (Continued)

SUBTASK 28-22-00-710-004

- (9) Push and hold the L FUEL TEST AUTO SHUTOFF test switch on the P61-8 panel until the CTR Tank Left LOW PRESSURE indication light comes on after approximately 15 seconds.

SUBTASK 28-22-00-710-005

- (10) Release the L FUEL TEST AUTO SHUTOFF test switch.

SUBTASK 28-22-00-760-021

- (11) Measure the voltage between the secondary relay R962 terminals A1, A2, B1, B2, C1, C2 and the case ground with a Multimeter, COM-1322.

NOTE: For the lowest voltage reading, set the VOM to the lowest AC voltage range, but make sure the reading is still within range of full scale.

- (a) Make sure the voltage is less than 10 volts AC.

SUBTASK 28-22-00-760-022

- (12) Measure the resistance between the subsequent R962 relay terminals with a Multimeter, COM-1322 or equivalent to minimize AC voltage noise pickup in this open circuit test:

NOTE: The measurements between the pins are continuity checks, not bonding resistance checks.

Table with 2 columns and 3 rows: A1, A2; B1, B2; C1, C2

- (a) Make sure the resistance is 1 meg-ohm or more.

SUBTASK 28-22-00-860-096

- (13) Put the CTR Tank Left Fuel Pump switch to the OFF position.

SUBTASK 28-22-00-860-097

- (14) Put the CTR Tank Left Fuel Pump switch to the ON position.

SUBTASK 28-22-00-210-011

- (15) Make sure the CTR Tank Left LOW PRESSURE indication light comes on and then goes off.

SUBTASK 28-22-00-860-098

- (16) Put the CTR Tank Left Fuel Pump switch to the OFF position.

H. Test of the Right Center Tank Relay

SUBTASK 28-22-00-860-105

- (1) Put the CTR Tank Right Fuel Pump switch to the ON position.

SUBTASK 28-22-00-210-015

- (2) Make sure the CTR Tank Right LOW PRESSURE indication light comes on and then goes off.

SUBTASK 28-22-00-760-023

- (3) Measure the voltage between the secondary relay R963 terminals A1, A2, B1, B2, C1, C2 and the case ground using Multimeter, COM-1322.

- (a) Make sure the voltage is 105 - 125 volts AC.

SUBTASK 28-22-00-860-106

- (4) Put the CTR Tank Right Fuel Pump switch to the OFF position.

Table with EFFECTIVITY and HAP ALL headers

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HAP 001-013, 015-026, 028-030, 037-054, 101-999; HAP 031-036 POST SB 737-28A1248 (Continued)

SUBTASK 28-22-00-760-024

- (5) Measure the voltage between the secondary relay R963 terminals A1, A2, B1, B2, C1, C2 and the case ground with a Multimeter, COM-1322.

NOTE: For the lowest voltage reading, set the VOM to the lowest AC voltage range, but make sure the reading is still within range of full scale.

- (a) Make sure the voltage is less than 10 volts AC.

SUBTASK 28-22-00-760-025

- (6) Measure the resistance between the subsequent R963 relay terminals with a Multimeter, COM-1322 or equivalent to minimize AC voltage noise pickup in this open circuit test:

NOTE: The measurements between the pins are continuity checks, not bonding resistance checks.

Table with 2 columns and 3 rows: A1, B1, C1 vs A2, B2, C2

- (a) Make sure the resistance is 1 meg-ohm or more.

SUBTASK 28-22-00-860-107

- (7) Put the CTR Tank Right Fuel Pump switch to the ON position.

SUBTASK 28-22-00-210-016

- (8) Make sure the CTR Right LOW PRESSURE indication light comes on and then goes off.

SUBTASK 28-22-00-720-028

- (9) Push and hold the R FUEL TEST AUTO SHUTOFF test switch on the P61-8 panel until the CTR Tank Right LOW PRESSURE indication light comes on after approximately 15 seconds.

SUBTASK 28-22-00-720-029

- (10) Release the R FUEL TEST AUTO SHUTOFF test switch.

SUBTASK 28-22-00-760-026

- (11) Measure the voltage between the secondary relay R963 terminals A1, A2, B1, B2, C1, C2 and the case ground with a Multimeter, COM-1322.

NOTE: For the lowest voltage reading, set the VOM to the lowest AC voltage range, but make sure the reading is still within range of full scale.

- (a) Make sure the voltage is less than 10 volts AC.

SUBTASK 28-22-00-760-027

- (12) Measure the resistance between the subsequent R963 relay terminals with a Multimeter, COM-1322 or equivalent to minimize AC voltage noise pickup in this open circuit test:

NOTE: The measurements between the pins are continuity checks, not bonding resistance checks.

Table with 2 columns and 3 rows: A1, B1, C1 vs A2, B2, C2

- (a) Make sure the resistance is 1 meg-ohm or more.

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HAP 001-013, 015-026, 028-030, 037-054, 101-999; HAP 031-036 POST SB 737-28A1248 (Continued)

SUBTASK 28-22-00-860-108

(13) Put the CTR Tank Right Fuel Pump switch to the OFF position.

SUBTASK 28-22-00-860-109

(14) Put the CTR Tank Right Fuel Pump switch to the ON position.

SUBTASK 28-22-00-210-017

(15) Make sure the CTR Tank Right LOW PRESSURE indication light comes on and then goes off.

SUBTASK 28-22-00-860-110

(16) Put the CTR Tank Right Fuel Pump switch to the OFF position.

I. Put the Airplane Back to Its Usual Position

SUBTASK 28-22-00-410-006

(1) Install the applicable floor panel at station 371 LBL 35 or station 361 RBL 36.

SUBTASK 28-22-00-410-005

(2) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
117A	Electronic Equipment Access Door

————— END OF TASK —————

EFFECTIVITY
HAP ALL

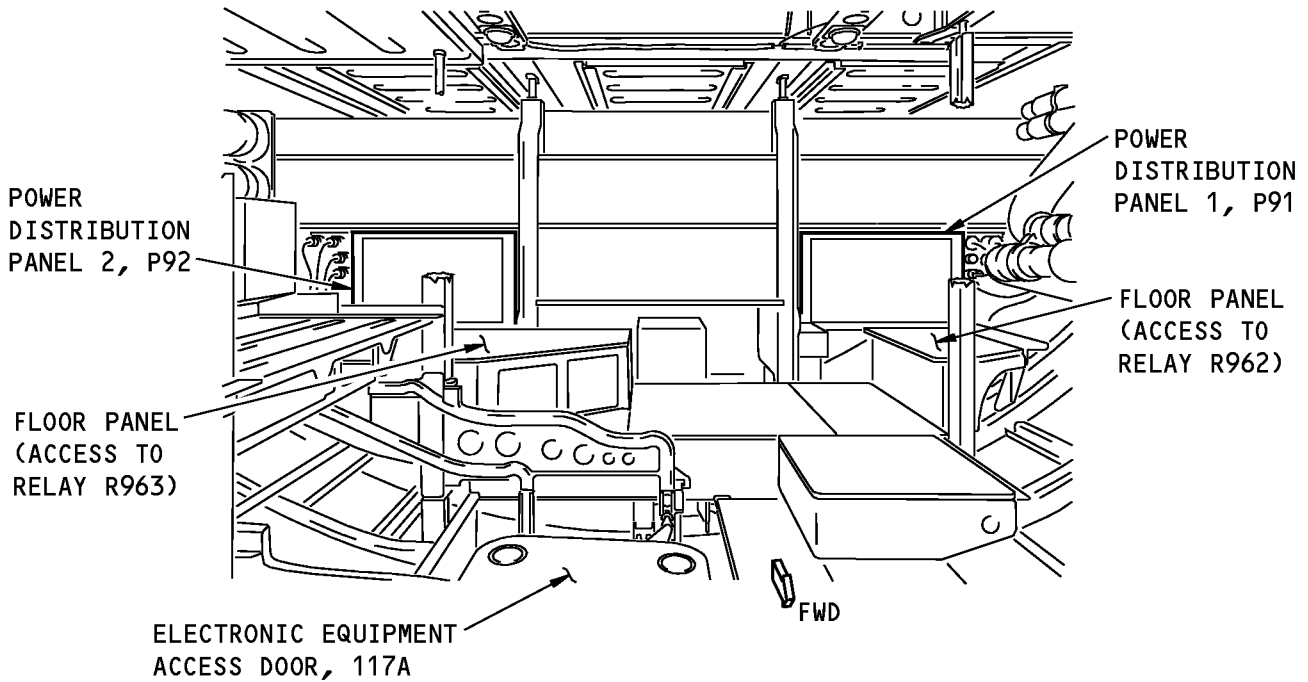
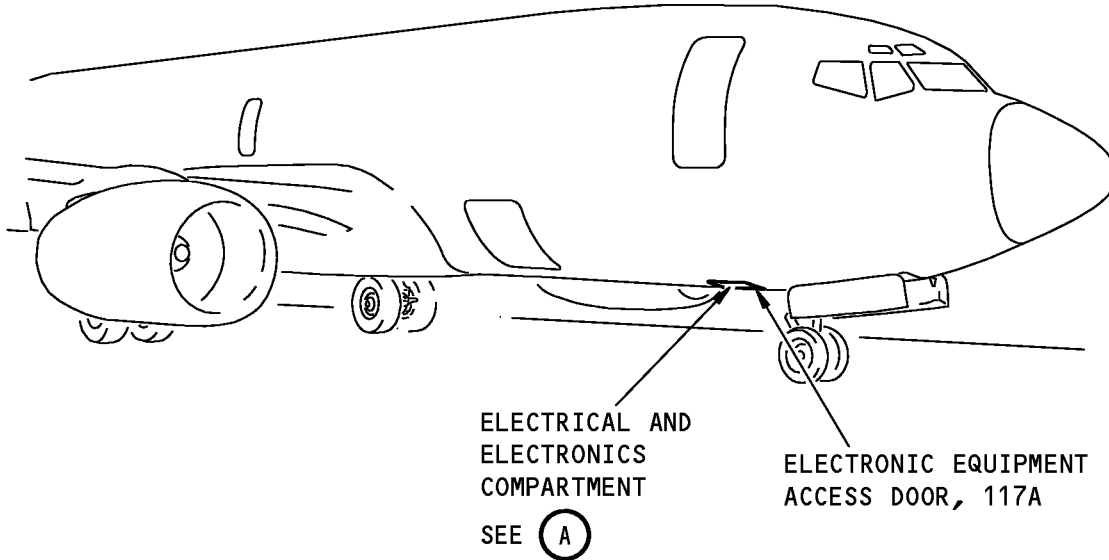
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ELECTRICAL AND ELECTRONICS COMPARTMENT

(A)

Center Tank Power Failed On Functional Test
Figure 509/28-22-00-990-823

<p>EFFECTIVITY</p> <p>HAP 001-013, 015-026, 028-030, 037-054, 101-999; HAP 031-036 POST SB 737-28A1248</p>
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HAP 001-013, 015-026, 028-030, 037-054, 101-999; HAP 031-036 POST SB 737-28A1248 (Continued)

TASK 28-22-00-710-803

12. Pump Reversal - Operational Test

A. General

- (1) Do this test after the left secondary relay, R962, or the right secondary relay, R963, has been removed and replaced.

B. References

Table with 2 columns: Reference, Title. Rows: 28-26-00-650-802 Tank to Tank Fuel Transfer (P/B 201), WDM 28-23-11 Wiring Diagram Manual

C. Location Zones

Table with 2 columns: Zone, Area. Rows: 211 Flight Compartment - Left, 212 Flight Compartment - Right

D. Pump Reversal Operational Test

SUBTASK 28-22-00-010-012

- (1) Get access to the flight compartment.

SUBTASK 28-22-00-865-005

- (2) Make sure that these circuit breakers are closed:

CAPT Electrical System Panel, P18-2

Table with 4 columns: Row, Col, Number, Name. Rows: D 2 C01372 DISPLAY CTR UPR, D 5 C01359 DISPLAY DEU 1 PRI

F/O Electrical System Panel, P6-1

Table with 4 columns: Row, Col, Number, Name. Rows: D 9 C01362 DISPLAY DEU 2 HOLDUP, D 10 C01361 DISPLAY DEU 1 HOLDUP, D 11 C01360 DISPLAY DEU 2 PRI, E 12 C01373 DISPLAY CTR LWR

F/O Electrical System Panel, P6-3

Table with 4 columns: Row, Col, Number, Name. Rows: A 4 C01441 FUEL FUELING IND, A 5 C00398 FUEL QTY 2, A 6 C00397 FUEL QTY 1

SUBTASK 28-22-00-710-008

- (3) Do these steps to test the left center tank fuel pump to make sure there is enough pump pressure: (a) Make a written record of the initial quantity of fuel in the center tank. (b) Prepare to transfer fuel from the center tank to the left main tank with the left center tank fuel pump (Tank to Tank Fuel Transfer, TASK 28-26-00-650-802). (c) Put the CTR Tank Left Fuel Pump Switch to the ON position.

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HAP 001-013, 015-026, 028-030, 037-054, 101-999; HAP 031-036 POST SB 737-28A1248 (Continued)

- 1) Keep the CTR Tank Left Fuel Pump Switch in the ON position for two minutes.
- (d) After two minutes, put the CTR Tank Left Fuel Pump Switch to the OFF position.
- (e) Make a written record of the final quantity of fuel in the center tank.
- (f) Calculate the quantity of fuel that was transferred from the center tank to the left main tank.
 - 1) Subtract the initial fuel quantity from the final fuel quantity.
- (g) Make sure the difference is 400 lb (181 kg) or more.
- (h) If the difference is less than 400 lb (181 kg), make sure the wiring to the R962 relay is connected correctly (WDM 28-23-11).

SUBTASK 28-22-00-710-009

- (4) Do these steps to do a test of the right center tank fuel pump to make sure there is enough pump pressure:
 - (a) Make a written record of the the initial quantity of fuel in the center tank.
 - (b) Prepare to transfer fuel from the center tank to the right main tank with the right center tank fuel pump (Tank to Tank Fuel Transfer, TASK 28-26-00-650-802).
 - (c) Put the CTR Tank Right Fuel Pump Switch to the ON position.
 - 1) Keep the CTR Tank Right Fuel Pump Switch in the ON position for two minutes.
 - (d) After two minutes, put the CTR Tank Right Fuel Pump Switch to the OFF position.
 - (e) Make a written record of the final quantity of fuel in the center tank.
 - (f) Calculate the quantity of fuel that was transferred from the center tank to the right main tank.
 - 1) Subtract the initial fuel quantity from the final fuel quantity.
 - (g) Make sure the difference is 400 lb (181 kg) or more.
 - (h) If the difference is less than 400 lb (181 kg), make sure the wiring to the R962 relay is connected correctly (WDM 28-23-11).

————— **END OF TASK** —————

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ENGINE FUEL FEED SYSTEM - INSPECTION/CHECK

1. General

A. This procedure contains scheduled maintenance task data.

TASK 28-22-00-210-801

2. Fuel Pumps - Visual Inspection

A. General

- (1) This procedure is a scheduled maintenance task.
- (2) This task does a visual inspection of the fuel system boost pumps for the No. 1 tank, the No. 2 tank, and the center tank.
- (3) This inspection is necessary for the installation of 60B92404-6 or -7 pumps (No. 1 or No. 2 tank) and for 60B89004-10 or -12 pumps (center tank). This inspection is not necessary for 60B92404-8, -10 and subsequent pumps (No. 1 or No. 2 tank) or for 60B89004-14, -16 and subsequent pumps (center tank).

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
27-81-00-080-801	Leading Edge Flap and Slat Locks Removal (P/B 201)
27-81-00-480-801	Leading Edge Flap and Slat Locks Installation (P/B 201)
27-81-00-860-803	Leading Edge Flaps and Slats Extension (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
28-22-41-000-801	Remove the Motor Impeller (P/B 401)
32-00-01-080-801	Landing Gear Downlock Pins Removal (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
CPM 20-40-00, Part I	General

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

D. Prepare for the Check

SUBTASK 28-22-00-860-046

- (1) Supply the electrical power if necessary (TASK 24-22-00-860-811).

SUBTASK 28-22-00-860-047

WARNING: MAKE SURE ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE FLAPS AND SLATS, AND THE TRAILING EDGE FLAPS. THESE SURFACES WILL MOVE AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Do this task: Leading Edge Flaps and Slats Extension, TASK 27-81-00-860-803.

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SUBTASK 28-22-00-480-004

WARNING: MAKE SURE YOU INSTALL THE LEADING EDGE SLAT ACTUATOR LOCKS TO PREVENT ACCIDENTAL OPERATION OF THE LEADING EDGE SLATS. THE LEADING EDGE SLATS CAN MOVE QUICKLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(3) Do this task: Leading Edge Flap and Slat Locks Installation, TASK 27-81-00-480-801.

SUBTASK 28-22-00-480-005

WARNING: USE THE PROCEDURE TO INSTALL THE GROUND LOCK ASSEMBLIES. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Make sure the ground lock assemblies are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-00-860-048

(5) Open these circuit breakers and install safety tags:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 001-013, 015-026, 028-036			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 001-013, 015-026, 028-036			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP ALL			

EFFECTIVITY
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SUBTASK 28-22-00-010-005

- (6) Go out to each fuel pump location.

NOTE: Refer to the table below for pump location (Table 601).

Table 601/28-22-00-993-813

Boost Pump Access	Boost Pump Identification
Left inboard rear spar, forward of landing gear door	Left Aft Boost Pump
Left front spar outboard of side-of-body rib	Left Forward Boost Pump
Left rear spar center tank, center section	Left Center Boost Pump
Right inboard rear spar, forward of landing gear door	Right Aft Boost Pump
Right front spar outboard of side-of-body rib	Right Forward Boost Pump
Right rear spar center tank, center section	Right Center Boost Pump

SUBTASK 28-22-00-210-005

- (7) At each pump, do a visual inspection of the wire terminal assembly (Figure 601).
 - (a) Disconnect the electrical connector and look for these conditions on the two sides of the connector:
 - 1) Indication of fuel leakage.
 - 2) Discoloration caused by too much heat.
 - 3) Corrosion
 - a) To remove corrosion, refer to (CPM 20-40-00, Part I)
 - 4) Other types of damage

SUBTASK 28-22-00-210-006

- (8) If the visual check shows that the fuel pump is OK, do this task: Fuel Pumps - Insulation Resistance Check, TASK 28-22-00-200-801

SUBTASK 28-22-00-210-007

- (9) If the visual check shows that the fuel pump is not OK, do these steps:
 - (a) Replace the applicable fuel pump motor/impeller unit (TASK 28-22-41-000-801).
 - (b) Do this task: Fuel Pumps - Insulation Resistance Check, TASK 28-22-00-200-801.

E. Put the Airplane Back to the Usual Condition

NOTE: Do this procedure only when you have completed the inspection procedure for all pumps. This equipment is also necessary to do the insulation resistance check.

SUBTASK 28-22-00-080-003

WARNING: CAREFULLY REMOVE THE LEADING EDGE FLAP AND SLAT ACTUATORS LOCKOUT SET. THE LEADING EDGE FLAPS AND SLATS CAN MOVE QUICKLY IF YOU DO NOT REMOVE THE LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Do this task: Leading Edge Flap and Slat Locks Removal, TASK 27-81-00-080-801.

<p>EFFECTIVITY HAP ALL</p>	
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SUBTASK 28-22-00-860-049

WARNING: MAKE SURE ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE FLAPS AND SLATS, AND THE TRAILING EDGE FLAPS. THESE SURFACES WILL MOVE AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 28-22-00-080-004

WARNING: DO THE CORRECT PROCEDURE TO REMOVE THE LOCKS. THE DOORS MOVE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Do this task: Landing Gear Downlock Pins Removal, TASK 32-00-01-080-801.

SUBTASK 28-22-00-860-050

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

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 001-013, 015-026, 028-036			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 001-013, 015-026, 028-036			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT

HAP ALL

SUBTASK 28-22-00-860-051

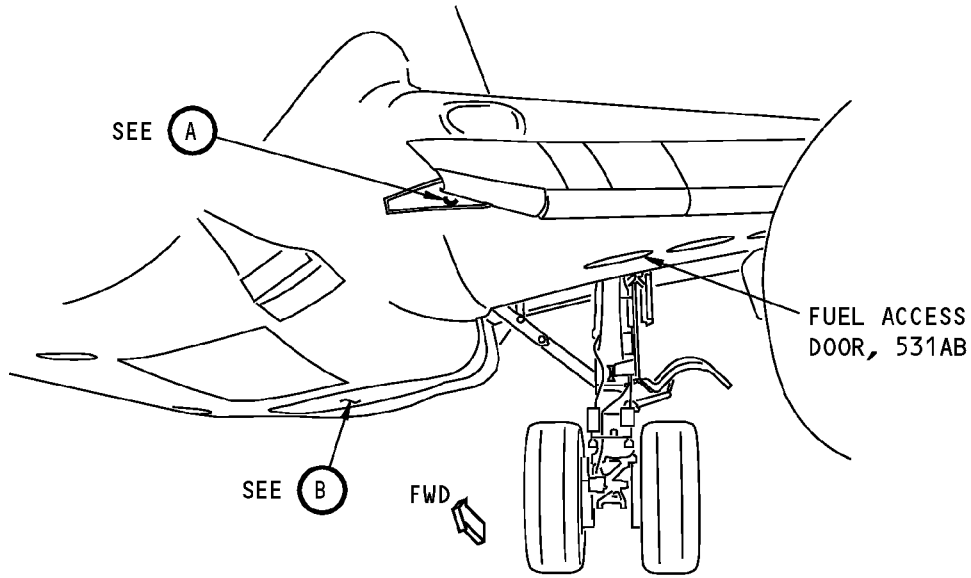
(5) Remove the electrical power if it is not needed for another task (TASK 24-22-00-860-812).

————— **END OF TASK** —————

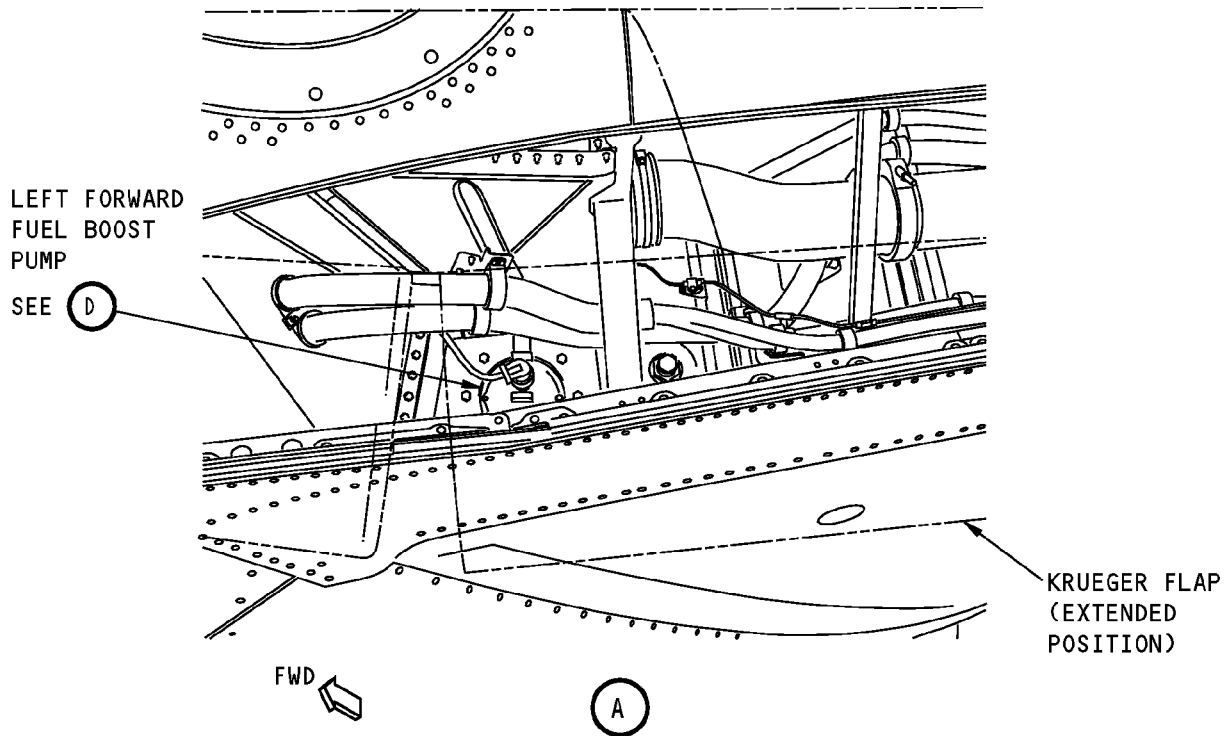
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**LEFT WING
(RIGHT WING IS OPPOSITE)**



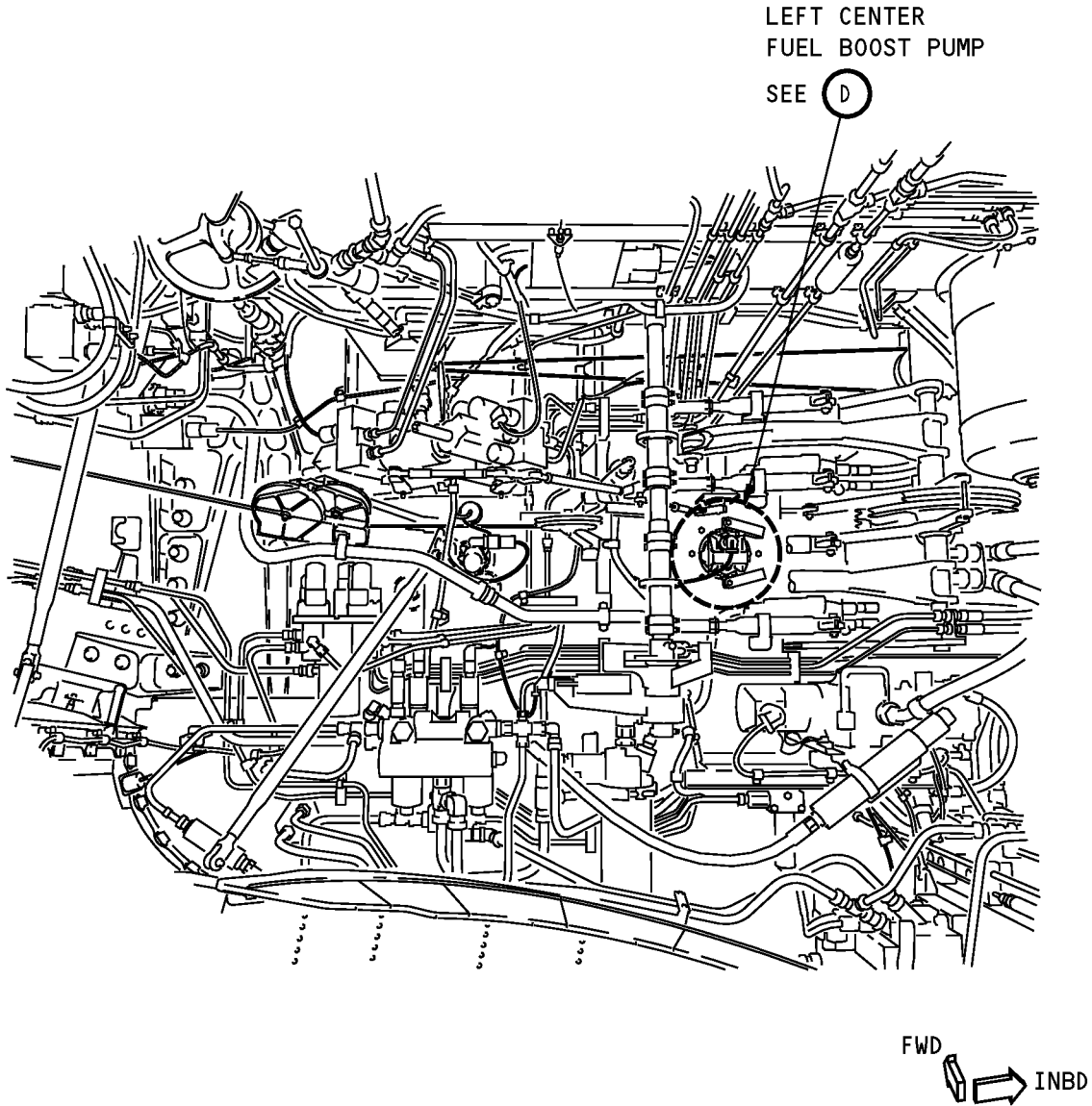
**Fuel Boost Pump Inspection
Figure 601 (Sheet 1 of 4)/28-22-00-990-811**

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**MAIN LANDING GEAR WHEEL WELL
(LEFT SIDE IS SHOWN, RIGHT SIDE IS EQUIVALENT)**

(B)

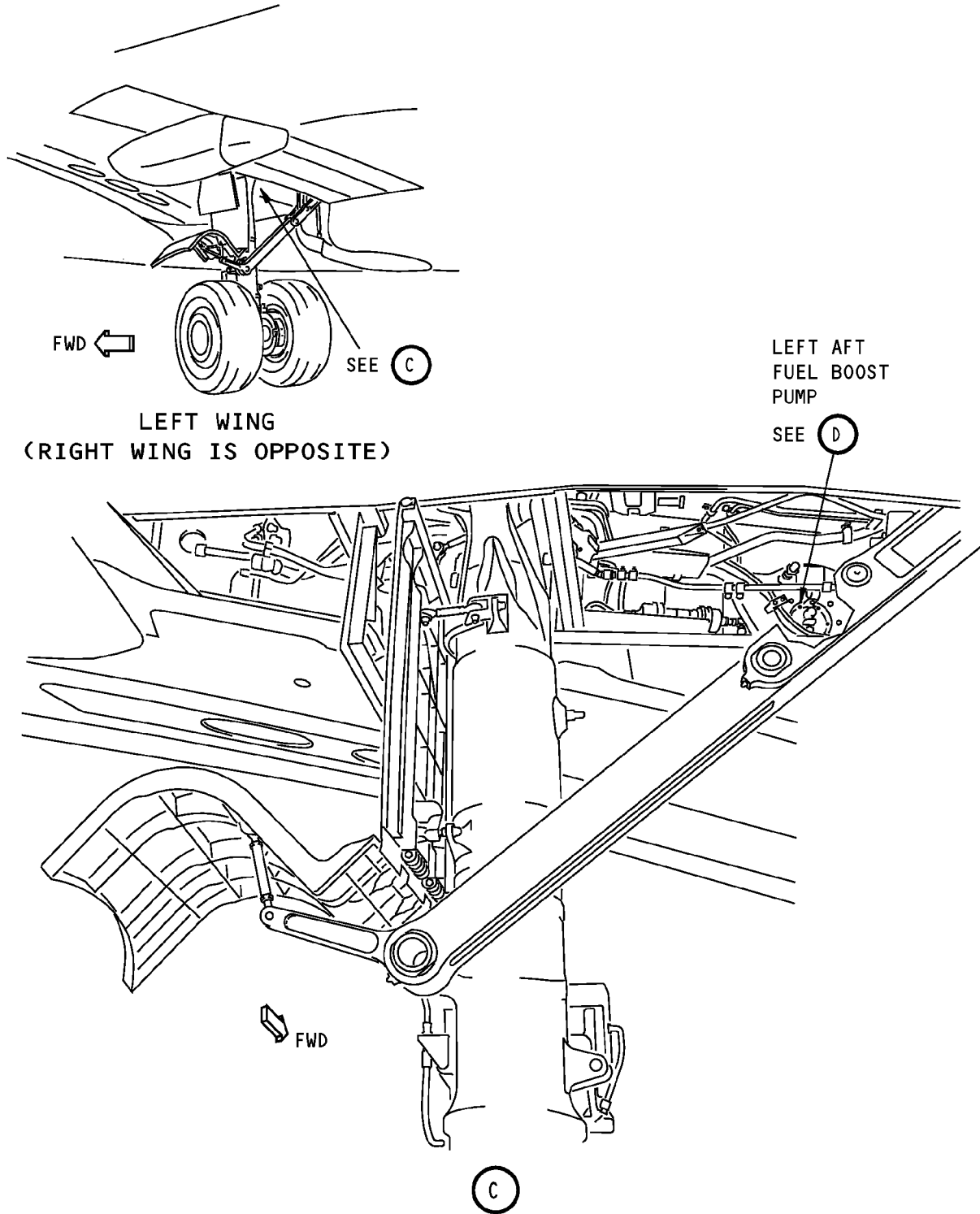
**Fuel Boost Pump Inspection
Figure 601 (Sheet 2 of 4)/28-22-00-990-811**

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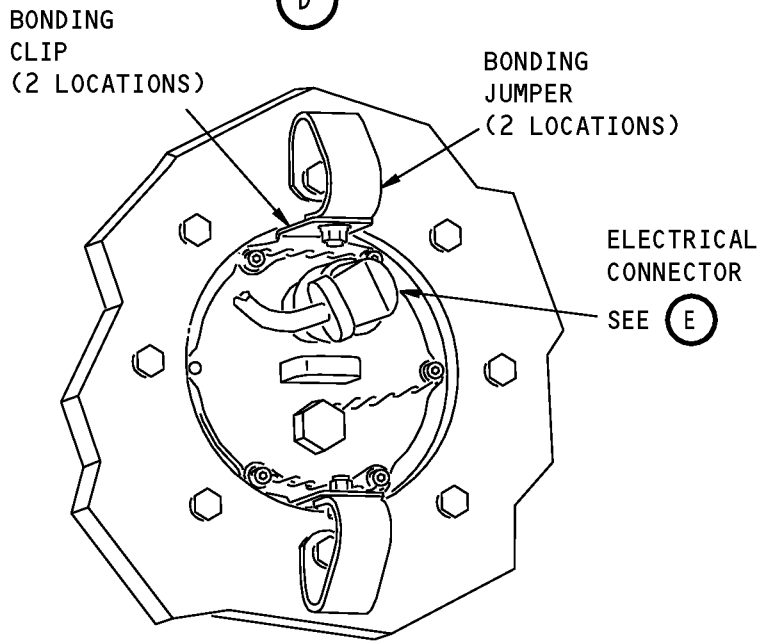
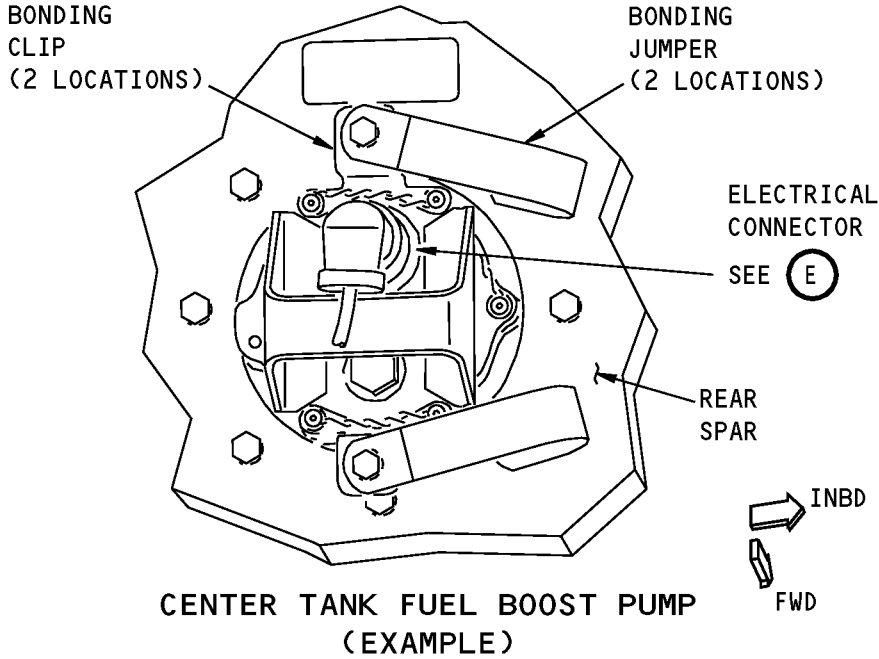


Fuel Boost Pump Inspection
Figure 601 (Sheet 3 of 4)/28-22-00-990-811

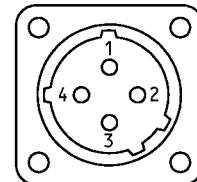
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NO. 1 OR NO. 2 TANK FUEL BOOST PUMP (EXAMPLE)

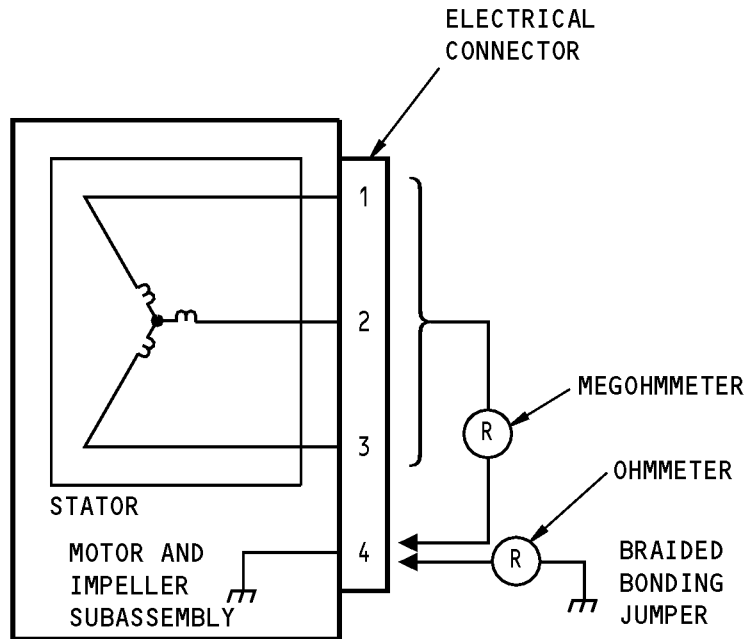


ELECTRICAL CONNECTOR

Fuel Boost Pump Inspection
Figure 601 (Sheet 4 of 4)/28-22-00-990-811

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**Schematic for Fuel Boost Pump Inspection
Figure 602/28-22-00-990-815**

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TASK 28-22-00-200-801

3. Fuel Pumps - Insulation Resistance Check

(Figure 601, Figure 602)

A. General

- (1) This procedure is a scheduled maintenance task.
- (2) This task does an insulation resistance check of the fuel system boost pumps for the No. 1 tank, the No. 2 tank, and the center tank.
- (3) An insulation resistance test is necessary for 60B92404-6 or -7 pumps (No. 1 or No. 2 tank) and for 60B89004-10 or -12 pumps (center tank). An insulation resistance test is not necessary for 60B92404-8 or -10 pumps (No. 1 or No. 2 tank) or for 60B89004-14 or -16 pumps (center tank).
- (4) The insulation resistance checks can be done with the fuel pumps installed on the airplane or removed from the airplane. If the fuel pump is removed from the airplane, you must do the insulation resistance check within 2 hours.
- (5) A special megohmmeter is necessary to do the electrical check with the fuel pump installed on the airplane. The megohmmeter must have 10 VDC and 500 VDC voltage supply options with a maximum short circuit current of 5 milliamperes. The megohmmeter, COM-10724, is recommended.

NOTE: Test equipment for the low voltage on-wing safety check (initial check) must be limited to a maximum short circuit power dissipation of 0.05 Watts. Test equipment for the high voltage on-wing check (final check) must be limited to a maximum short circuit power dissipation of 2.5 Watts.

- (6) When you use the megohmmeter, COM-10724, it is recommended that the megohmmeter be insulated from any metal work stands. It is also recommended that protective clothing (rubber gloves, insulated shoes, etc.) be worn when you make these measurements. The megohmmeter should be plugged into a grounded receptacle to reduce the possibility of electrical shock.

B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
27-81-00-080-801	Leading Edge Flap and Slat Locks Removal (P/B 201)
27-81-00-480-801	Leading Edge Flap and Slat Locks Installation (P/B 201)
27-81-00-860-803	Leading Edge Flaps and Slats Extension (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
28-22-41-000-801	Remove the Motor Impeller (P/B 401)
28-22-41-400-801	Install the Motor Impeller (P/B 401)
28-22-41-710-801	Fuel Boost Pump Operational Test (P/B 401)
32-00-01-080-801	Landing Gear Downlock Pins Removal (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
SWPM 20-20-00, para I	Standard Wiring Practices Manual

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

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Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)
COM-10724	Megohmmeter (10-50 VDC, 50-100 VDC, 100-500 VDC, 500-1090 VDC, 50-200 T Ohms, + /-2%) (Part #: 1864-9700, Supplier: 62015, A/P Effectivity: 737-ALL)

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

E. Prepare for the Check

SUBTASK 28-22-00-860-039

(1) Supply the electrical power if necessary (TASK 24-22-00-860-811).

SUBTASK 28-22-00-860-040

(2) Do these steps if they were not done before:

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE FLAPS AND SLATS AND THE TRAILING EDGE FLAPS. THE LEADING EDGE FLAPS AND SLATS AND THE TRAILING EDGE FLAPS WILL EXTEND. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Do this task: Leading Edge Flaps and Slats Extension, TASK 27-81-00-860-803.

WARNING: MAKE SURE YOU INSTALL THE LEADING EDGE SLAT ACTUATOR LOCKS TO PREVENT ACCIDENTAL OPERATION OF THE LEADING EDGE SLATS. THE LEADING EDGE SLATS CAN MOVE QUICKLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(b) Do this task: Leading Edge Flap and Slat Locks Installation, TASK 27-81-00-480-801.

WARNING: USE THE PROCEDURE TO INSTALL THE GROUND LOCK ASSEMBLIES. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(c) Make sure the ground lock assemblies are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-00-650-008

(3) Refuel the center or the No. 1 or No. 2 fuel tank, as applicable (TASK 12-11-00-650-802).

NOTE: This step makes sure the fuel pump housing is covered in each case. This makes sure that the fuel pump is not exposed to air during the electrical test.

NOTE: These fuel requirements are only necessary for fuel pumps that are being tested on the airplane.

(a) For the forward fuel boost pumps, refuel the No. 1 or No. 2 tanks to 300 lb (136 kg) minimum.

(b) For the aft fuel boost pumps, refuel the No. 1 or No. 2 tanks to 300 lb (136 kg) minimum.

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(c) For the center tank fuel boost pumps, refuel the center fuel tank to 14,000 lb (6350 kg) minimum.

SUBTASK 28-22-00-860-041

(4) Open these circuit breakers and install safety tags:

Power Distribution Panel Number 1, P91

Table with 4 columns: Row, Col, Number, Name. Lists fuel boost pumps for P91 including HAP 037-054, 101-999 and HAP 001-013, 015-026, 028-036.

Power Distribution Panel Number 2, P92

Table with 4 columns: Row, Col, Number, Name. Lists fuel boost pumps for P92 including HAP 037-054, 101-999 and HAP 001-013, 015-026, 028-036.

F. Fuel Pump Wire Terminal Assembly Inspection

NOTE: It is necessary to do these three procedures at each pump: Fuel Pump Continuity Check, Initial Insulation Resistance Check, and the Final Insulation Resistance Check.

SUBTASK 28-22-00-010-003

(1) Go out to each fuel pump location.

NOTE: Refer to the table below for pump location (Table 602).

Table 602/28-22-00-993-814

Table with 2 columns: Boost Pump Access, Boost Pump Identification. Lists locations for Left Aft Boost Pump and Left Forward Boost Pump.

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Boost Pump Access	Boost Pump Identification
Left rear spar center tank, center section	Left Center Boost Pump
Right inboard rear spar, forward of landing gear door	Right Aft Boost Pump
Right front spar outboard of side-of-body rib	Right Forward Boost Pump
Right rear spar center tank, center section	Right Center Boost Pump

G. Fuel Pump Continuity Check

SUBTASK 28-22-00-010-004

- (1) Disconnect the electrical connector from the pump motor/impeller unit.

SUBTASK 28-22-00-860-042

WARNING: MAKE SURE THE METER USED TO MEASURE THE BONDING JUMPER CONTINUITY IS RESISTANT TO EXPLOSION. IF NOT, IT IS POSSIBLE THAT AN EXPLOSION OR FIRE CAN OCCUR.

- (2) Use the bonding meter, COM-1550 (SWPM 20-20-00, para I).

SUBTASK 28-22-00-760-001

- (3) Measure the resistance between pin 4 of the electrical connector and the braided bonding jumper on the fuel pump (Figure 601).

NOTE: The measurement between pin 4 and the bonding jumper is a continuity check, not a bonding resistance check.

SUBTASK 28-22-00-760-002

- (4) Record the resistance measured between pin 4 and the braided bonding jumper on the data sheet (Figure 603).

SUBTASK 28-22-00-760-003

- (5) If the resistance is less than 2 ohms, do this procedure: Initial Insulation Resistance Check.

SUBTASK 28-22-00-760-004

- (6) If the resistance is more than 2 ohms, do these steps:
 - (a) Replace the applicable fuel pump motor/impeller unit (TASK 28-22-41-000-801, TASK 28-22-41-400-801).
 - (b) Do the continuity/resistance checks for the replacement fuel pump.
 - 1) Start with this procedure: Fuel Pump Continuity Check.
 - (c) Record the continuity/resistance values for the replacement pump on the Fuel Pump Inspection Data Sheet - Replacement Pump (Figure 603).

H. Initial Insulation Resistance Check

SUBTASK 28-22-00-480-003

- I (1) Use the instructions provided with the megohmmeter, COM-10724, to calibrate the equipment.

SUBTASK 28-22-00-760-005

- (2) RESISTANCE CHECK WITH THE FUEL PUMP REMOVED FROM THE AIRPLANE; Do these steps to check the insulation resistance:
 - (a) Remove the fuel pump motor/impeller unit(s) (TASK 28-22-41-000-801).
 - (b) Do this procedure on the removed pumps, within two hours: Final Insulation Resistance Check.

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SUBTASK 28-22-00-760-006

CAUTION: DO THE RESISTANCE CHECK AT 10 VDC FIRST. THE FUEL PUMPS ARE IN FLAMMABLE LEAKAGE ZONES. EACH PUMP IS TESTED AT 10 VDC BEFORE IT IS TESTED AT 500 VDC. THE INITIAL 10 VDC CHECK IS TO FIND OUT IF A FUEL PUMP HAS LOW INSULATION RESISTANCE WHICH CAN ARC OR OVERHEAT WHEN A HIGH VOLTAGE IS APPLIED. THE RESULTS OF THE 10 VDC CHECK WILL TELL YOU IF IT IS SAFE TO DO THE 500 VDC CHECK WITH THE FUEL PUMP INSTALLED ON THE AIRPLANE.

(3) RESISTANCE CHECK WITH THE FUEL PUMP INSTALLED ON THE AIRPLANE; Do these steps to check the insulation resistance (initial check):

NOTE: These steps are done at 10 VDC to prevent arcing or overheat in a flammable leakage zone when high voltage is applied to a pump with low insulation resistance.

- (a) Use the instructions provided with the megohmmeter, COM-10724, to calibrate the equipment.
- (b) Disconnect the electrical connector from the pump motor/impeller unit.

WARNING: MAKE SURE A MODEL 1864 (OR EQUIVALENT) MEGOHMMETER IS USED TO MEASURE THE INSULATION RESISTANCE. IF NOT, IT IS POSSIBLE THAT AN EXPLOSION OR FIRE CAN OCCUR.

(c) Do these steps to connect the megohmmeter, COM-10724, for the 10 VDC check:

NOTE: Keep the leads that connect to pump connector pins as short as possible (3 feet/1 meter or less) to prevent problems with the resistance measurements.

- 1) Plug the megohmmeter into a grounded receptacle.
 - a) Make sure the ground strap is connected from the grounded receptacle to the +UNKNOWN terminal.

NOTE: This makes sure the megohmmeter is grounded.

- 2) Connect the +UNKNOWN probe to the pump connector pin 4 (ground).
- 3) Connect the -UNKNOWN probe to the pump connector pin 1.
- 4) Set the multiplier dial to the lowest range (100K).
- 5) Set the TEST VOLTAGE switches to 10V.
- 6) Set the measure switch to the MEASURE position.

(d) Do these steps to measure the resistance at the pump:

- 1) Turn the multiplier switch until the meter reading is less than 5.

NOTE: The resistance is the meter reading multiplied by multiplier switch setting.

- 2) Measure the resistance between pin 4 and pin 1 on the fuel pump electrical connector (Figure 601).

NOTE: If the pump resistance is very high, the megohmmeter value will increase with time. For any resistance over 100 megohms it is not necessary to get the actual resistance value. Stop the measurement once the megohmmeter value is more than 100 megohms. Record the measurement on the data sheet as > 100 megohms.

- 3) Record the resistance measured between pin 4 and pin 1 on the Fuel Pump Inspection Data Sheet (Figure 603).
- 4) Set the function switch to the DISCHARGE position.

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- 5) Do these steps again to measure the resistance between pin 4 and the remaining pins on the fuel pump connector, pins 2 and 3.
- (e) Do an analysis of the test results:
 - 1) If each resistance measured between pin 4 and pins 1, 2 and 3 is more than 1 megohm, do this procedure: Final Insulation Resistance Check.
 - 2) If any resistance measured between pin 4 and pins 1, 2, and 3 is less than or equal to 1 megohm, do these steps:
 - a) Replace the pump motor/impeller unit (TASK 28-22-41-000-801, TASK 28-22-41-400-801).
 - b) Do the continuity/resistance checks again for the replacement fuel pump.
 - c) Start with this procedure: Fuel Pump Continuity Check.
 - d) Record the continuity/resistance values for the replacement pump on the Fuel Pump Inspection Data Sheet (Figure 603).

I. Final Insulation Resistance Check

NOTE: If the fuel pump is installed on the airplane, you must use the model 1864 megohmmeter (or equivalent) to do the electrical check. The megohmmeter must have 10 VDC and 500 VDC voltage supply options with a maximum short circuit current of 5 milliamperes.

NOTE: If the fuel pump is removed from the airplane, a standard megohmmeter can be used to do the electrical check. The megohmmeter must have a 500 VDC voltage supply option.

SUBTASK 28-22-00-760-007

WARNING: IF THE FUEL PUMP IS INSTALLED ON THE AIRPLANE, MAKE SURE A MODEL 1864 (OR EQUIVALENT) MEGOHMMETER IS USED TO MEASURE THE INSULATION RESISTANCE. IF NOT, IT IS POSSIBLE THAT AN EXPLOSION OR FIRE CAN OCCUR.

- (1) Do these steps to connect the megohmmeter, COM-10724, or standard megohmmeter for the 500 VDC check:

NOTE: Keep the leads that connect to pump connector pins as short as possible (3 feet/1 meter or less) to prevent problems with the resistance measurements.

- (a) Calibrate the megohmmeter if it is necessary.
- (b) Connect the megohmmeter into a grounded receptacle.
 - 1) Make sure the ground strap is connected from the grounded receptacle to the +UNKNOWN terminal.

NOTE: This makes sure the megohmmeter is grounded.

- (c) Connect the +UNKNOWN probe to the pump connector pin 4 (ground).
- (d) Connect the -UNKNOWN probe to the pump connector pin 1.
- (e) Set the multiplier dial to the lowest range (1M).
- (f) Set the TEST VOLTAGE switches to 500V.
- (g) Set the measure switch to the MEASURE position.

SUBTASK 28-22-00-760-008

- (2) Do these steps to measure the resistance at the pump:

- (a) Turn the multiplier switch until the meter reading is less than 5.

NOTE: The resistance is the meter reading multiplied by the multiplier switch setting.

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- (b) Measure the resistance between pin 4 and pin 1 on the fuel pump electrical connector (Figure 601).

NOTE: If the pump resistance is very high, the megohmmeter value will increase with time. For any resistance over 100 megohms it is not necessary to get the actual resistance value. Stop the measurement once the megohmmeter value is more than 100 megohms. Record the measurement on the data sheet as > 100 megohms.

- (c) Record the resistance measured between pin 4 and pin 1 on the Fuel Pump Inspection Data Sheet (Figure 603).
- (d) Set the function switch to the DISCHARGE position.
- (e) Do these steps again to measure the resistance between pin 4 and the remaining pins on the fuel pump connector, pins 2 and 3.
- (f) Put the power switch to the OFF position and remove the test probes.

SUBTASK 28-22-00-760-009

- (3) Do an analysis of the test results:

- (a) If each resistance measured between pin 4 and pins 1, 2 and 3 is equal to or more than 5 megohms, then the fuel pump resistance check is satisfactory.

- 1) If the insulation check is satisfactory, do these steps:

- a) If the motor/impeller unit was removed for the test, re-install the motor/impeller unit (TASK 28-22-41-400-801).
- b) If the motor/impeller unit was not removed for the test, connect the electrical connector for the motor/impeller unit and do this task: Fuel Boost Pump Operational Test, TASK 28-22-41-710-801.

- (b) If any resistance measured between pin 4 and pins 1, 2, and 3 is below 1 megohm, do these steps:

- 1) Replace the motor/impeller unit (TASK 28-22-41-000-801, TASK 28-22-41-400-801).
- 2) Do the continuity/resistance checks again for the new fuel pump.
- 3) Start with this procedure: Fuel Pump Continuity Check.
- 4) Record the continuity/resistance values for the replacement pump on the Fuel Pump Inspection Data Sheet (Figure 603).

- (c) If any resistance measured between pin 4 and pins 1, 2, and 3 is between 1 and 5 megohm, do these steps:

- 1) It is recommended that the motor/impeller unit be replaced (TASK 28-22-41-000-801, TASK 28-22-41-400-801).
- 2) If the motor/impeller unit is not replaced, continue to do the scheduled insulation resistance checks.

SUBTASK 28-22-00-760-010

- (4) Continue to do the visual and insulation resistance checks for the remaining fuel pumps.

J. Put the Airplane Back to the Usual Condition

NOTE: Do this procedure only when you have completed the inspection procedure for all pumps. This equipment is also necessary to do the visual inspection of the boost pumps.

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SUBTASK 28-22-00-080-001

WARNING: CAREFULLY REMOVE THE LEADING EDGE FLAP AND SLAT ACTUATORS LOCKOUT SET. THE LEADING EDGE FLAPS AND SLATS CAN MOVE QUICKLY IF YOU DO NOT REMOVE THE LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Do this task: Leading Edge Flap and Slat Locks Removal, TASK 27-81-00-080-801.

SUBTASK 28-22-00-860-043

WARNING: MAKE SURE ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE FLAPS AND SLATS, AND THE TRAILING EDGE FLAPS. THESE SURFACES WILL MOVE AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 28-22-00-080-002

WARNING: DO THE CORRECT PROCEDURE TO REMOVE THE LOCKS. THE DOORS MOVE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Do this task: Landing Gear Downlock Pins Removal, TASK 32-00-01-080-801.

SUBTASK 28-22-00-860-044

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

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 001-013, 015-026, 028-036			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

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HAP 037-054, 101-999 (Continued)

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 001-013, 015-026, 028-036			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP ALL			

SUBTASK 28-22-00-860-045

(5) Remove the electrical power if it is not needed for another task (TASK 24-22-00-860-812).

————— **END OF TASK** —————

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737-600/-700/-800/-900 FUEL PUMP INSPECTION DATA SHEET														
AIRPLANE TAIL NUMBER:			HOURS/CYCLES:			DATE:			NEW PUMP (IF NEEDED)					
PUMP NAME	INSTALLED PUMP			RESIS-TANCE IN OHMS	RESISTANCE IN MEGOHMS						PART NO.	SERIAL NO.		
	PART NUMBER	SERIAL NUMBER	TSO/TSN OVHL/NEW		10V DC			500V DC						
					PIN 1	PIN 2	PIN 3	PIN 1	PIN 2	PIN 3				
TANK 1 FWD BOOST PUMP				PIN 4										
TANK 1 AFT BOOST PUMP														
TANK 2 FWD BOOST PUMP														
TANK 2 AFT BOOST PUMP														
LEFT CENTER BOOST PUMP														
RIGHT CENTER BOOST PUMP														

Fuel Pump Inspection Data Sheet
Figure 603 (Sheet 1 of 2)/28-22-00-990-812

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PLEASE PROVIDE ADDITIONAL DATA HERE	COMMENTS	
	SERIAL NUMBER	
	PART NUMBER	

Fuel Pump Inspection Data Sheet
Figure 603 (Sheet 2 of 2)/28-22-00-990-812

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TASK 28-22-00-211-801

4. Fuel Pump Motor-Impeller Inspection

A. General

- (1) ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on airworthiness limitation instructions (ALIs).
- (2) This task does an inspection of the stator lead wire bundle for chafing in the fuel pump motor impellers.
- (3) This inspection is necessary for the installation of fuel boost pump motor-impellers prior to part number 60B92404-8 (No. 1 or No. 2 fuel tanks), and prior to part number 60B89004-14 (center tank). This inspection is not necessary for part number 60B92404-8 and subsequent pumps (No. 1 or No. 2 fuel tanks), and part number 60B89004-14 and subsequent pumps (center tank).

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
27-81-00-480-801	Leading Edge Flap and Slat Locks Installation (P/B 201)
27-81-00-860-803	Leading Edge Flaps and Slats Extension (P/B 201)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

D. Prepare for the Check

SUBTASK 28-22-00-861-001

- (1) Supply electrical power if it is necessary (TASK 24-22-00-860-811).

SUBTASK 28-22-00-866-001

WARNING: MAKE SURE THAT PERSONNEL AND EQUIPMENT STAY AWAY FROM THE LEADING EDGE FLAPS AND SLATS, TRAILING EDGE FLAPS, AND DRIVE MECHANISMS. THE FLAPS, SLATS, AND DRIVE MECHANISMS MOVE QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (2) Do this task: Leading Edge Flaps and Slats Extension, TASK 27-81-00-860-803.

SUBTASK 28-22-00-866-002

WARNING: INSTALL THE LOCK ON LEADING EDGE FLAP ACTUATOR CAREFULLY TO PREVENT THE ACCIDENTAL OPERATION OF THE LEADING EDGE FLAPS. THE LEADING EDGE FLAPS CAN MOVE QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

- (3) Do this task: Leading Edge Flap and Slat Locks Installation, TASK 27-81-00-480-801.

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SUBTASK 28-22-00-910-001

WARNING: MAKE SURE YOU INSTALL THE GROUND LOCK ASSEMBLIES IN ALL LANDING GEAR. ACCIDENTAL RETRACTION OF THE LANDING GEAR CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (4) Make sure the ground lock assemblies are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-00-865-002

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

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 001-013, 015-026, 028-036			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 001-013, 015-026, 028-036			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP ALL			

SUBTASK 28-22-00-010-009

- (6) Go to the six fuel pump locations.

NOTE: Refer to the table below for pump location (Table 601).

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Table 603/28-22-00-993-820

Boost Pump Access	Boost Pump Identification
Left inboard rear spar, forward of landing gear door	Left Aft Boost Pump
Left front spar outboard of side-of-body rib	Left Forward Boost Pump
Left rear spar center tank, center section	Left Center Boost Pump
Right inboard rear spar, forward of landing gear door	Right Aft Boost Pump
Right front spar outboard of side-of-body rib	Right Forward Boost Pump
Right rear spar center tank, center section	Right Center Boost Pump

HAP 001-013, 015-026, 028-030 PRE SB 737-28A1197

SUBTASK 28-22-00-200-001

- (7) Inspect the motor-impellers per the instructions in SB 28A1197, Revision 1 or 2.

NOTE: New motor-impellers, part number 60B92404-10 and subsequent (main tanks) and part number 60B89004-16 and subsequent (center tank), are available to replace the earlier models. These units have an internal retainer to prevent chafing of the wire bundle.

NOTE: The letter T will be stamped on the identification plate of the motor impeller after the serial number if the pump has been inspected.

HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1197

SUBTASK 28-22-00-210-009

- (8) Make sure the fuel pump has been inspected for the stator lead (or internal) wire chafing condition.

NOTE: The letter T will be stamped on the identification plate of the motor impeller after the serial number if the pump has been inspected.

————— **END OF TASK** —————

<p>EFFECTIVITY</p> <p>HAP ALL</p>
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SPAR VALVE - MAINTENANCE PRACTICES

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains a task to functionally check the spar valve actuator electrical bonding path.

TASK 28-22-11-720-801

2. Spar Valve Actuator - Functional Check

(Figure 28-22-11-990-806)

A. General

- (1) This procedure is a scheduled maintenance task.
- (2) ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on airworthiness limitation instructions (ALIs).

B. References

Reference	Title
20-30-88	AIRPLANE STRUCTURE CLEANING SOLVENTS (Series 88)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-600-801	Apply the Corrosion Resistant Finish (Topcoat) (P/B 701)
28-22-11-300-801	Rework the Electrical Faying Surface Bonds for the Spar Valve (P/B 401)
28-22-11-990-806	Figure: Spar Valve Actuator Installation (P/B 401)
28-41-42-700-801	FQIS Shield Ground Terminal - Test (P/B 501)
51-21-41-370-802	Apply Alodine 600, 1200 or 1200S Solution (P/B 701)
SWPM 20-20-00	Electrical Bonds and Grounds

C. Consumable Materials

Reference	Description	Specification
A50051	Sealant - Temperature Resistant, Integral Fuel Tank Sealant - Pro-Seal 890B	SAE AMS-S-8802, Class B
A50105	Sealant - Integral Fuel Tank Sealed Electrical Faying Surface Bond	SAE AMS-S-8802 Class A
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
C00064	Coating - Aluminum Chemical Conversion	BAC5719, Type II, Class A (MIL-C-5541, Class A)
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20, Type II
C50033	Chromated Conversion Coating for Aluminum - Alodine 1200	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

EFFECTIVITY

HAP 032-036; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

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D. Location Zones

<u>Zone</u>	<u>Area</u>
521	Left Wing - Leading Edge to Front Spar
621	Right Wing - Leading Edge to Front Spar

E. Access Panels

<u>Number</u>	<u>Name/Location</u>
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

F. Prepare for the Procedure

SUBTASK 28-22-11-865-010

- (1) Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	5	C00540	FUEL SPAR VALVE IND

SUBTASK 28-22-11-865-011

- (2) For the left spar valve actuator,

Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	4	C00359	FUEL SPAR VALVE ENG 1

SUBTASK 28-22-11-865-012

- (3) For the right spar valve actuator,

Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2

SUBTASK 28-22-11-010-043

- (4) Open the applicable access panel(s):

<u>Number</u>	<u>Name/Location</u>
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

G. Procedure

SUBTASK 28-22-11-010-039

- (1) Get access to the applicable spar valve actuator on the front spar of the left or right main tank.

SUBTASK 28-22-11-010-040

- (2) Disconnect the electrical connector from the actuator.

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HAP 032-036; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

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SUBTASK 28-22-11-010-041

- (3) Remove the screw, two washers, and bonding jumper from the actuator.

SUBTASK 28-22-11-765-016

- (4) Measure the electrical bonding resistance between the connector flange and the front spar (SWPM 20-20-00).
 - (a) Do this measurement with the bonding jumper and the electrical connector disconnected.
 - (b) Make sure the bonding jumper does not touch the actuator during the bonding measurement.
 - (c) Make sure the bonding resistance is 0.01 ohm (10 milliohms) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

SUBTASK 28-22-11-420-041

- (5) Do these steps to install the bonding jumper to the actuator:
 - (a) Clean the contact surfaces with a cotton wiper, G00034, soaked with Series 88 solvent, B01008 (SUBJECT 20-30-88).
 - 1) Rub dry with a clean, dry cotton wiper, G00034.
 - 2) Continue to clean and dry the surface until the dry cotton wiper, G00034, stays clean.
 - (b) Apply a thin continuous layer of sealant to both surfaces of the bonding jumper terminal and the two washers.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- 1) Use Pro Seal 890A or PR-1440A sealant, A50105, for the faying surface seal.
- 2) Make sure the sealant layer is approximately 0.005 in. (0.127 mm) thick.
- (c) Install the screw, two washers, and bonding jumper to the actuator.
- (d) Tighten the screw to 20 in-lb (2.3 N·m).

SUBTASK 28-22-11-765-017

- (6) Measure the electrical bonding resistance between the upper housing of the actuator and the attached terminal of the bonding jumper (SWPM 20-20-00) (View C).
 - (a) Do not touch the screw when you make the bonding measurement.
 - (b) Make sure the bonding resistance is 0.001 ohm (1.0 milliohm) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- 1) If the bonding resistance is more than 0.001 ohm (1.0 milliohm), then do the applicable procedure in this task: Rework the Electrical Faying Surface Bonds for the Spar Valve, TASK 28-22-11-300-801.

- (c) Apply a cap seal of Pro-Seal 890B sealant, A50051 (or PR-1440B), over the screw and the terminal of the bonding jumper.

SUBTASK 28-22-11-765-018

- (7) Measure the electrical bonding resistance between the FQIS shield ground terminal and the front spar (SWPM 20-20-00).

EFFECTIVITY

HAP 032-036; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

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- (a) Do not touch the screw when you make the bonding measurement.
- (b) Make sure the bonding resistance is 0.014 ohm (14.0 milliohms) or less.
 - 1) If the bonding resistance is more than 0.014 ohm (14.0 milliohms), then do this task: FQIS Shield Ground Terminal - Test, TASK 28-41-42-700-801.
- (c) Apply a cap seal of Pro-Seal 890B sealant, A50051 (or PR-1440B), over the FQIS shield ground terminal.

SUBTASK 28-22-11-916-008

- (8) Apply protective finishes to the bare metal areas of the front spar (TASK 28-11-00-600-801).

NOTE: Re-apply the protective coating to the front spar where the electrical bonding probe removed the finishes.

- (a) These are the protective finishes:
 - 1) Alodine 600 coating, C00064
 - 2) BMS 10-20 coating, C00307.

SUBTASK 28-22-11-916-009

- (9) Apply Alodine 1200 coating, C50033, to all bare metal areas of the actuator (TASK 51-21-41-370-802).

NOTE: Re-apply the protective coating to the actuator where the electrical bonding probe removed the finish and any bare metal areas around the bonding jumper installation that are not covered with sealant.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-11-861-006

- (1) Connect the electrical connector to the actuator.

SUBTASK 28-22-11-410-014

- (2) Close the applicable access panel(s):

<u>Number</u>	<u>Name/Location</u>
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

SUBTASK 28-22-11-865-013

- (3) Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	5	C00540	FUEL SPAR VALVE IND

SUBTASK 28-22-11-865-014

- (4) For the left actuator,

Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	4	C00359	FUEL SPAR VALVE ENG 1

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SUBTASK 28-22-11-865-015

(5) For the right actuator,

Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2

————— **END OF TASK** —————

EFFECTIVITY

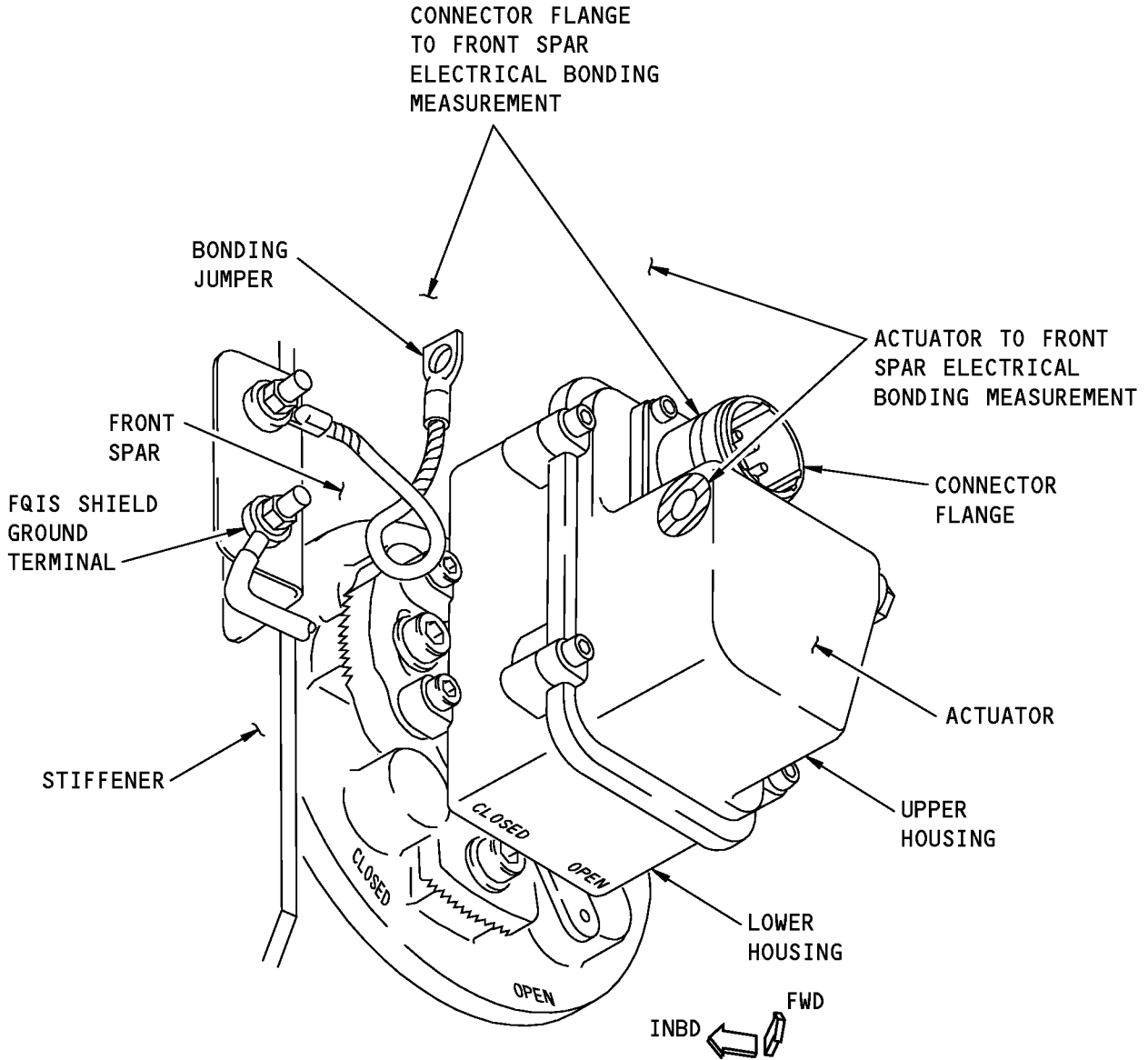
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**ELECTRICAL BONDING MEASUREMENT
(BONDING JUMPER DISCONNECTED)**

(C)

1326393 S0000234182_V2

**Spar Valve Actuator Functional Check
Figure 201/28-22-11-990-809**

EFFECTIVITY
HAP 032-036; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

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SPAR VALVE - REMOVAL/INSTALLATION

1. General

- A. The spar valve contains three parts: the actuator, the valve adapter, and the valve body.
- B. It is not necessary to defuel the fuel tank to remove the actuator. It is necessary to defuel the fuel tank to remove the valve adapter or valve body.
- C. This procedure contains these tasks:
 - (1) Remove the Actuator of the Spar Valve
 - (2) Install the Actuator of the Spar Valve
 - (3) Remove the Valve Adapter of the Spar Valve
 - (4) Install the Valve Adapter of the Spar Valve
 - (5) Remove the Valve Body of the Spar Valve
 - (6) Install the Valve Body of the Spar Valve

HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

- (7) Rework the Electrical Faying Surface Bonds for the Spar Valve

HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207

TASK 28-22-11-000-801

2. Remove the Actuator of the Spar Valve

(Figure 401)

A. Location Zones

Zone	Area
521	Left Wing - Leading Edge to Front Spar
621	Right Wing - Leading Edge to Front Spar

B. Access Panels

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

C. Prepare to Remove the Actuator (View A)

SUBTASK 28-22-11-860-009

- (1) Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	5	C00540	FUEL SPAR VALVE IND

SUBTASK 28-22-11-860-001

- (2) For the left spar valve actuator,

Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

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HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207 (Continued)

SUBTASK 28-22-11-860-002

- (3) For the right spar valve actuator,
Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2

SUBTASK 28-22-11-010-001

- (4) Open the applicable access panel(s):

<u>Number</u>	<u>Name/Location</u>
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

D. Remove the Actuator (View B)

SUBTASK 28-22-11-860-012

- (1) Move the manual override lever [1] to the fully CLOSED position.

SUBTASK 28-22-11-010-010

- (2) Disconnect the electrical connector [5] from the actuator [4].

SUBTASK 28-22-11-010-011

- (3) Remove the old sealant from the bonding jumper [8], fasteners and bonding jumper tab.

SUBTASK 28-22-11-010-012

- (4) Remove the screw [6], three washers [7], nut [9], and bonding jumper [8] from the bonding jumper tab on the actuator [4].

SUBTASK 28-22-11-010-013

- (5) Remove the lockwire from the actuator mounting screws [3].

SUBTASK 28-22-11-010-014

- (6) Remove the actuator mounting screws [3] and the washers [2] (four locations).

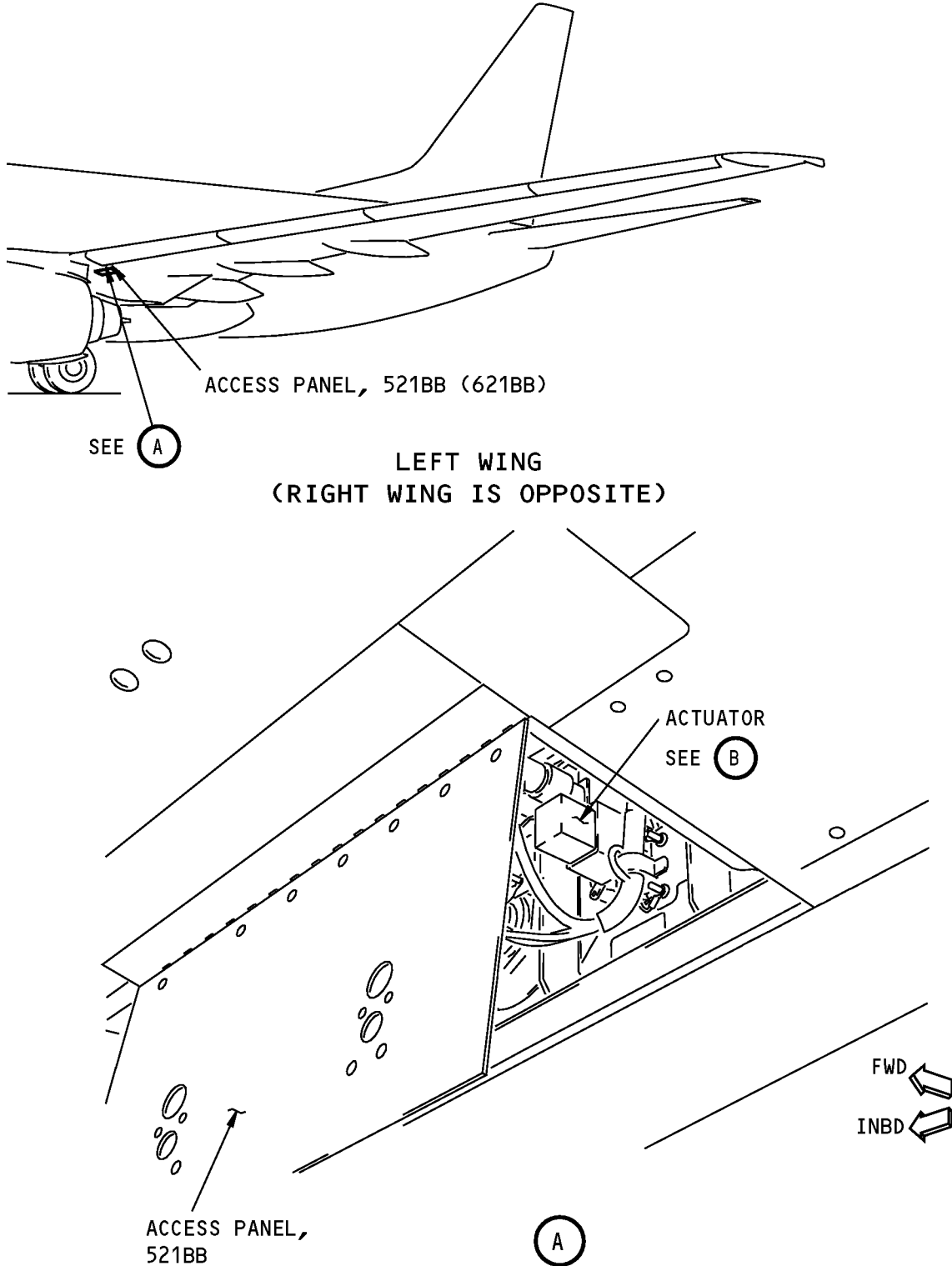
SUBTASK 28-22-11-010-015

- (7) Remove the actuator [4].

————— END OF TASK —————

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**Spar Valve Actuator Installation
Figure 401 (Sheet 1 of 2)/28-22-11-990-804**

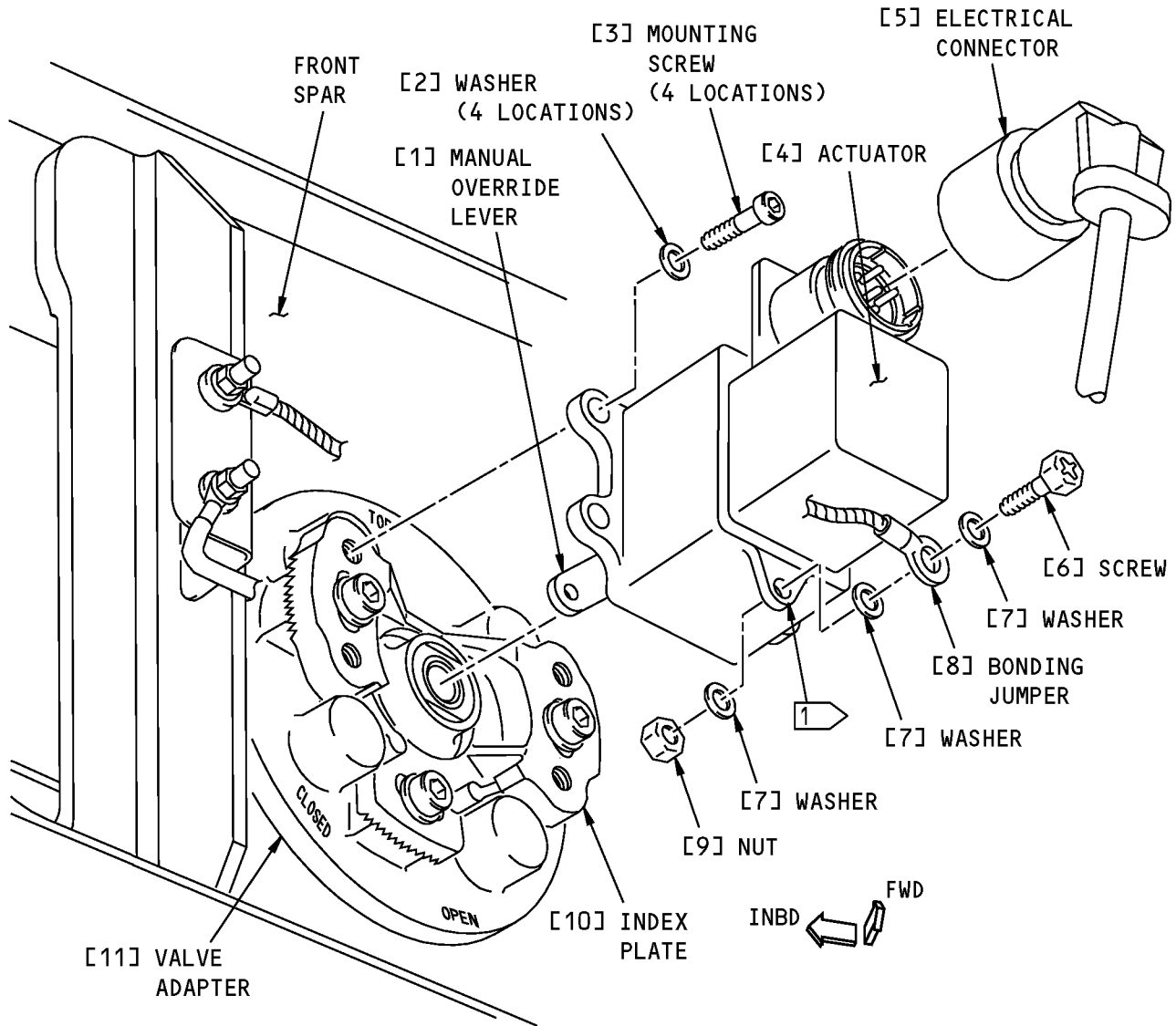
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ACTUATOR

B

- 1 PREPARE THE FAYING SURFACE OF THE BONDING JUMPER AND BONDING JUMPER TAB FOR AN ELECTRICAL SURFACE BOND. APPLY A FILLET SEAL TO THE BONDING JUMPER TERMINAL (SWPM 20-20-00).

**Spar Valve Actuator Installation
Figure 401 (Sheet 2 of 2)/28-22-11-990-804**

EFFECTIVITY
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HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207 (Continued)

TASK 28-22-11-400-801

3. Install the Actuator of the Spar Valve

(Figure 401)

A. References

Reference	Title
20-30-88	AIRPLANE STRUCTURE CLEANING SOLVENTS (Series 88)
20-30-92-910-801	Final Cleaning Prior to General Sealing (Series 92) (P/B 201)
24-22-00-860-811	Supply Electrical Power (P/B 201)
28-11-00-600-801	Apply the Corrosion Resistant Finish (Topcoat) (P/B 701)
28-22-00-710-801	Engine Fuel Spar Valve - Electrical Control and Indication Test (P/B 501)
51-21-41-370-802	Apply Alodine 600, 1200 or 1200S Solution (P/B 701)
SWPM 20-20-00	Electrical Bonds and Grounds

B. Tools/Equipment

Reference	Description
STD-123	Brush - Soft Bristle

C. Consumable Materials

Reference	Description	Specification
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
B01012	Solvent - Final Cleaning Prior To General Sealing (AMM 20-30-92/201) - Series 92	
C00064	Coating - Aluminum Chemical Conversion	BAC5719, Type II, Class A (MIL-C-5541, Class A)
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20, Type II
C50033	Chromated Conversion Coating for Aluminum - Alodine 1200	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5
G50021	Pad - General Purpose Scrubbing - Scotch-Brite 96W	

D. Location Zones

Zone	Area
521	Left Wing - Leading Edge to Front Spar
621	Right Wing - Leading Edge to Front Spar

EFFECTIVITY
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HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207 (Continued)

E. Access Panels

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

F. Install the Spar Valve Actuator (View B)

SUBTASK 28-22-11-110-001

(1) Remove the old sealant from these components (TASK 20-30-92-910-801):

- (a) actuator [4] (if re-used)
- (b) bonding jumper [8], screw [6], washers [7], nut [9].

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(c) To remove the remaining sealant, grease, oil, dirt, and other contamination from the components, use one of these brushes/pads soaked with Series 92 solvent, B01012 (TASK 20-30-92-910-801):

- 1) soft bristle brush, STD-123
- 2) cotton wiper, G00034
- 3) Scotch-Brite 96W pad, G50021

SUBTASK 28-22-11-980-002

(2) Move the manual override lever [1] of the actuator to the CLOSED position.

SUBTASK 28-22-11-820-001

(3) Align the actuator output shaft with the adapter shaft.

SUBTASK 28-22-11-210-001

(4) Make sure the two spaces for teeth on the adapter shaft align with the actuator output shaft.

SUBTASK 28-22-11-420-001

(5) Put the actuator output shaft into the adapter shaft.

NOTE: The mounting feet on the actuator automatically align with the mounting points on the index plate.

SUBTASK 28-22-11-420-002

(6) Install the four actuator mounting screws [3] and washers [2].

SUBTASK 28-22-11-430-004

(7) Tighten the actuator mounting screws [3] to 20 in-lb (2.3 N·m).

SUBTASK 28-22-11-420-003

(8) Install the lockwire on the actuator mounting screws [3].

SUBTASK 28-22-11-765-004

(9) Do these steps to prepare the bonding jumper [8] and fasteners for an electrical faying surface bond (SWPM 20-20-00):

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- (a) Final clean the contact surfaces of the actuator [4], bonding jumper [8], and the fasteners with a cotton wiper, G00034, soaked with Series 88 solvent, B01008 (SUBJECT 20-30-88).
- (b) Rub dry with a clean, dry cotton wiper, G00034.
- (c) Continue to clean and dry the surface until the dry cotton wiper, G00034, stays clean.

SUBTASK 28-22-11-420-004

- (10) Install the screw [6], three washers [7], bonding jumper [8], and nut [9] to the actuator [4].

SUBTASK 28-22-11-220-001

- (11) Make sure the bonding resistance between the actuator [4] and the front spar is 0.010 ohm (10 milliohms) or less (SWPM 20-20-00).

SUBTASK 28-22-11-430-001

- (12) Apply a cap seal of BMS5-142 sealant, A02315, on the bonding jumper to fully cover the bonding jumper terminal with sealant.

SUBTASK 28-22-11-916-003

- (13) Do this task to apply protective finishes to the bare metal areas of the front spar: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

NOTE: Re-apply the protective coating to the front spar where the electrical bonding probe removed the finishes.

- (a) These are the protective finishes:
 - 1) Alodine 600 coating, C00064
 - 2) BMS 10-20 coating, C00307.

SUBTASK 28-22-11-916-004

- (14) Do this task to apply Alodine 1200 coating, C50033, to any bare metal areas of actuator [4]: Apply Alodine 600, 1200 or 1200S Solution, TASK 51-21-41-370-802.

NOTE: Re-apply the protective coating to the actuator [4] where the electrical bonding probe removed the finish and any bare metal areas around the bonding jumper tab that are not covered with sealant.

SUBTASK 28-22-11-860-017

- (15) Connect the electrical connector [5] to the actuator [4].

G. Spar Valve Actuator Operational Test

SUBTASK 28-22-11-860-010

- (1) Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	5	C00540	FUEL SPAR VALVE IND

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SUBTASK 28-22-11-860-003

(2) For the left actuator,

Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	4	C00359	FUEL SPAR VALVE ENG 1

SUBTASK 28-22-11-860-004

(3) For the right actuator,

Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2

SUBTASK 28-22-11-860-005

(4) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-22-11-710-001

(5) For the actuator that you installed, do this task: Engine Fuel Spar Valve - Electrical Control and Indication Test, TASK 28-22-00-710-801

H. Put the Airplane Back to the Usual Condition

SUBTASK 28-22-11-410-003

(1) Close the applicable access panel(s):

<u>Number</u>	<u>Name/Location</u>
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

END OF TASK

HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

TASK 28-22-11-000-804

4. Remove the Actuator of the Spar Valve

(Figure 402)

A. Location Zones

<u>Zone</u>	<u>Area</u>
521	Left Wing - Leading Edge to Front Spar
621	Right Wing - Leading Edge to Front Spar

B. Access Panels

<u>Number</u>	<u>Name/Location</u>
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

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C. Prepare for the Procedure (View A)

SUBTASK 28-22-11-862-001

- (1) Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	5	C00540	FUEL SPAR VALVE IND

SUBTASK 28-22-11-862-002

- (2) For the left spar valve actuator,
Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	4	C00359	FUEL SPAR VALVE ENG 1

SUBTASK 28-22-11-862-003

- (3) For the right spar valve actuator,
Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2

SUBTASK 28-22-11-010-009

- (4) Open the applicable access panel(s):

<u>Number</u>	<u>Name/Location</u>
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

D. Remove the Actuator (View B)

SUBTASK 28-22-11-010-016

- (1) Move the manual override lever [1] to the fully CLOSED position.

SUBTASK 28-22-11-010-017

- (2) Disconnect the electrical connector [5] from the actuator [15].

SUBTASK 28-22-11-010-018

- (3) Remove the sealant from the bonding jumper [14] and fasteners at the actuator attachment location.

SUBTASK 28-22-11-010-019

- (4) Remove the screw [12], two washers [13], and bonding jumper [14] from the actuator [15].

SUBTASK 28-22-11-010-020

- (5) Remove the actuator mounting screws [3] and the washers [2] (four locations).

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SUBTASK 28-22-11-010-021

(6) Carefully disassemble the actuator [15] from the index plate [10].

NOTE: The actuator and index plate are bonded with faying surface sealant.

SUBTASK 28-22-11-010-022

(7) Remove the actuator [15].

————— **END OF TASK** —————

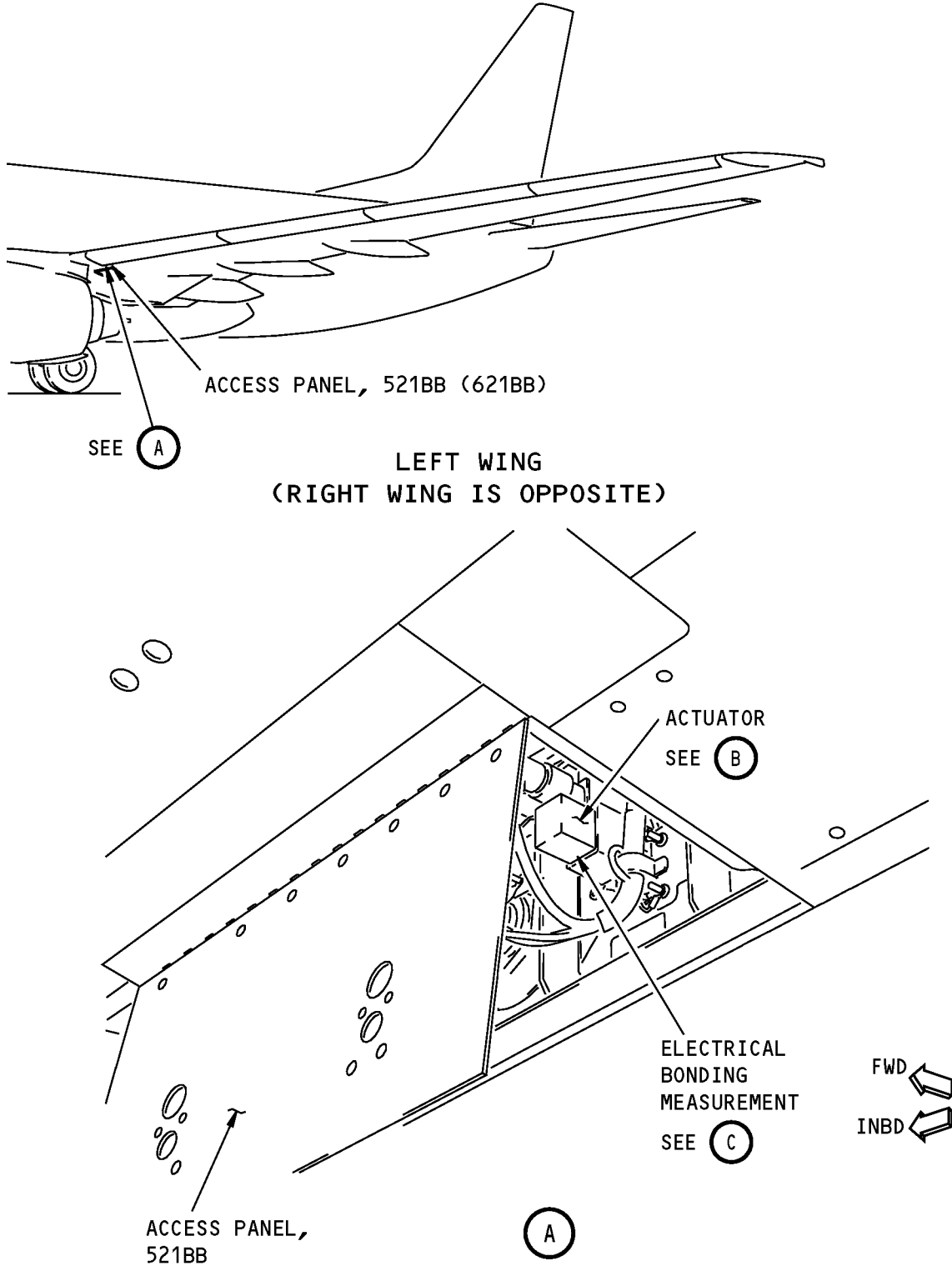
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**Spar Valve Actuator Installation
Figure 402 (Sheet 1 of 6)/28-22-11-990-806**

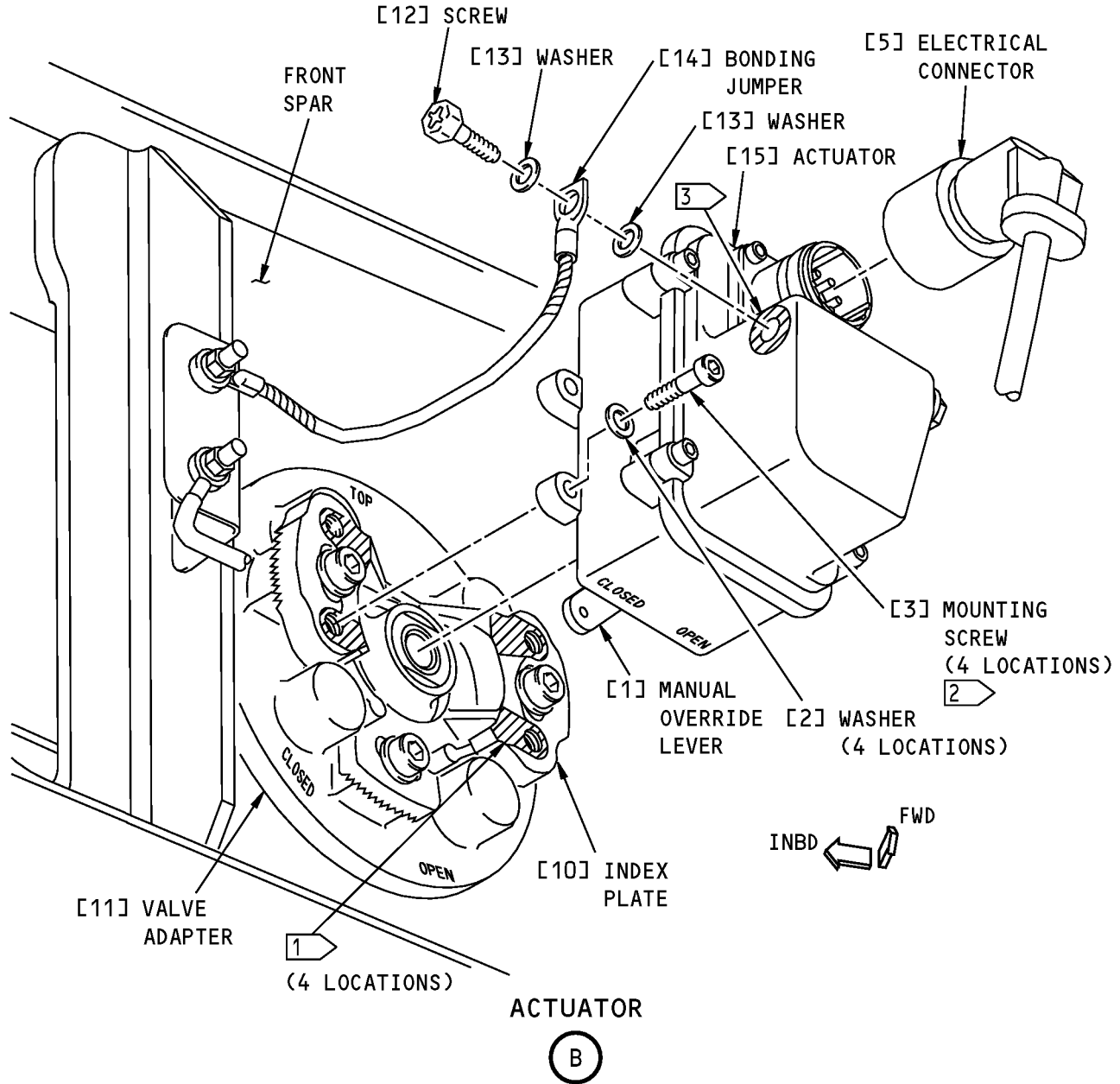
EFFECTIVITY
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- 1 PREPARE AND INSTALL THE CONTACT SURFACES OF THE INDEX PLATE AND ACTUATOR FEET (4 LOCATIONS) WITH A SEALED ELECTRICAL FAYING SURFACE BOND (SWPM 20-20-00).
- 2 APPLY SEALANT TO THE SHANK AND THREADS OF THE MOUNTING SCREWS.
- 3 PREPARE AND INSTALL THE CONTACT SURFACES OF ACTUATOR AND BONDING JUMPER BUILD-UP WITH A SEALED ELECTRICAL FAYING SURFACE BOND (SWPM 20-20-00). AFTER INSTALLATION, APPLY A FILLET SEAL TO THE BONDING JUMPER INSTALLATION.

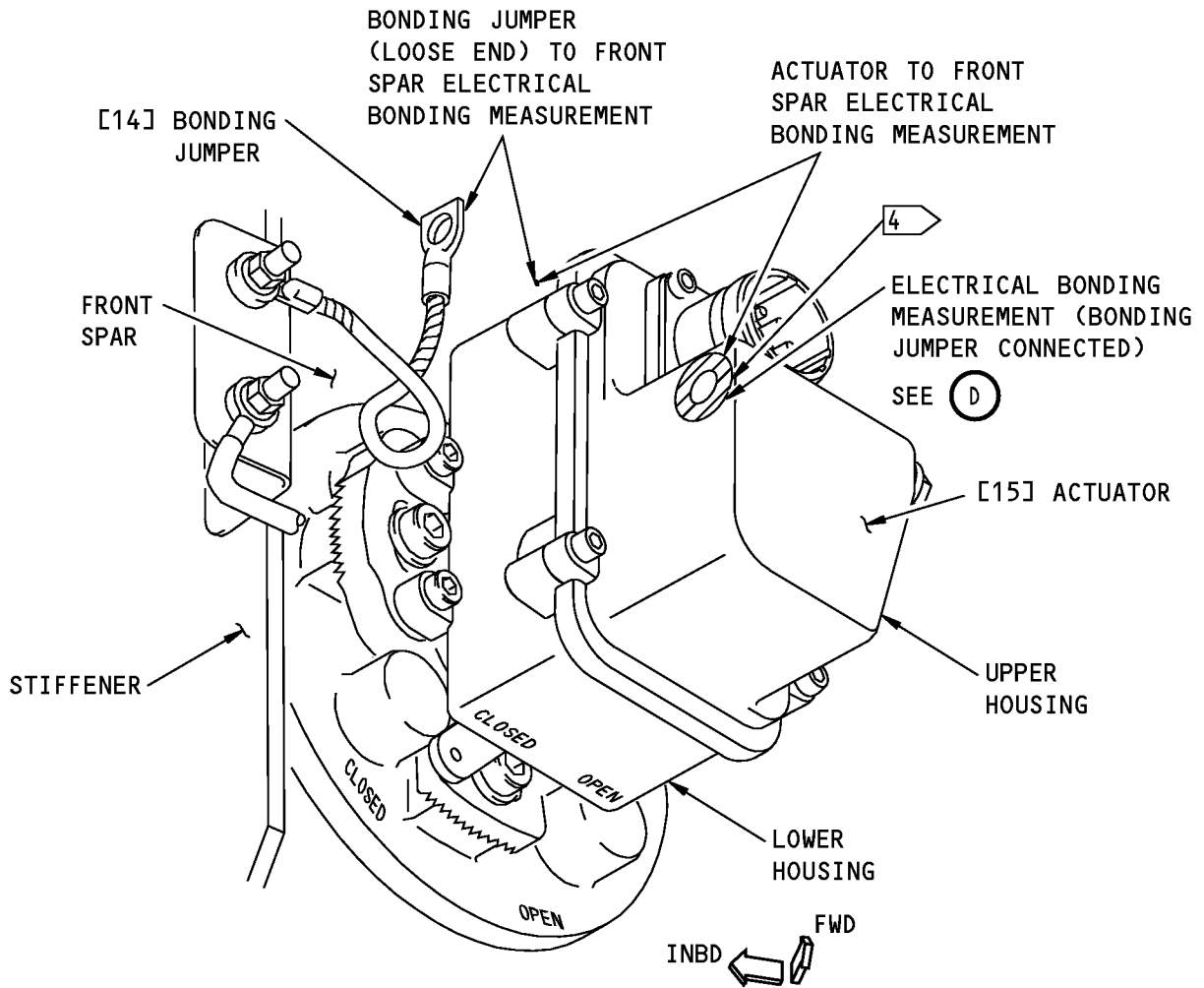
Spar Valve Actuator Installation
Figure 402 (Sheet 2 of 6)/28-22-11-990-806

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**ELECTRICAL BONDING MEASUREMENT
(BONDING JUMPER DISCONNECTED)**

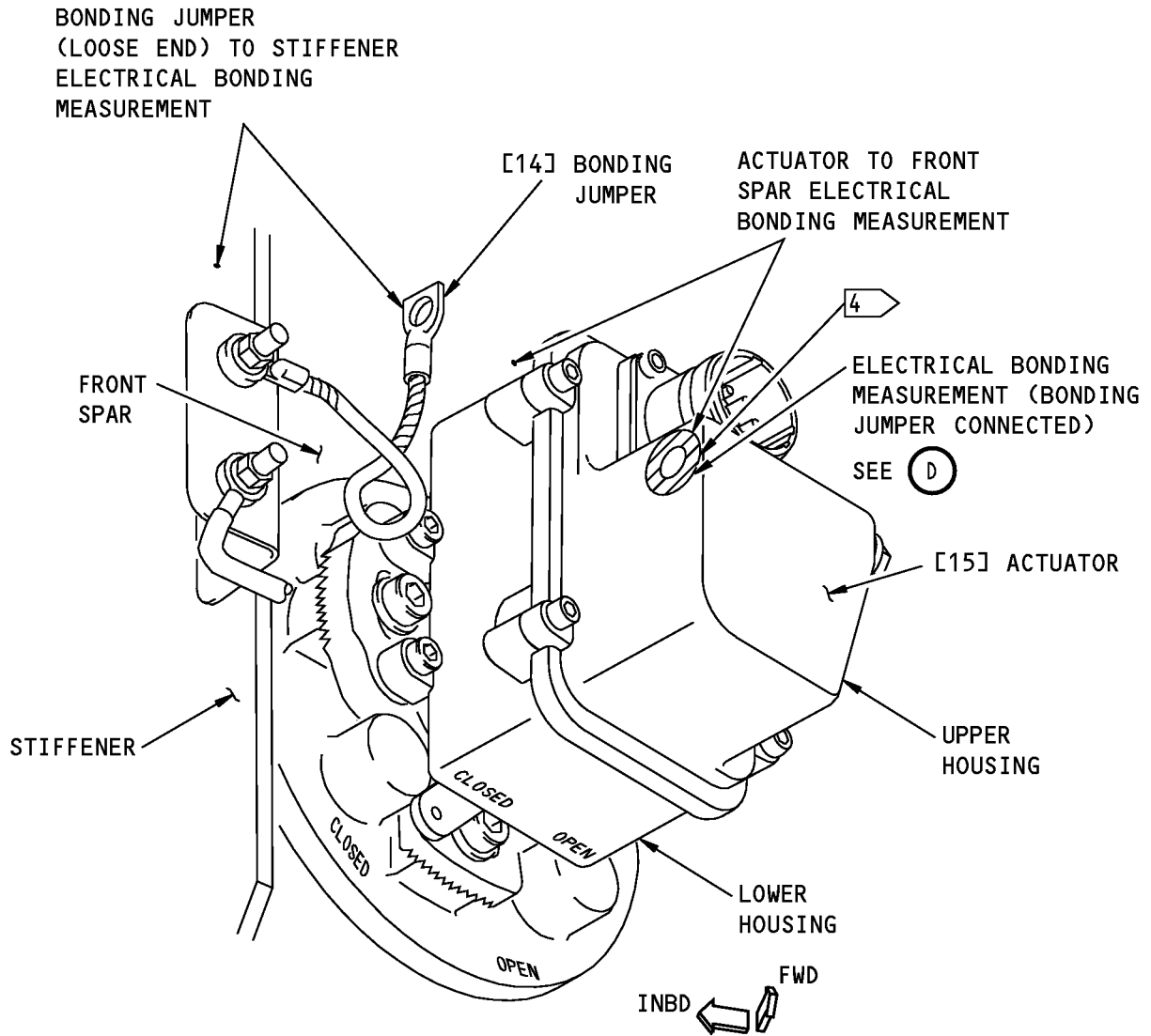
(C)

4 BARE METAL CONTACT SURFACE OF THE ACTUATOR AT THE BONDING JUMPER INSTALLATION.

**Spar Valve Actuator Installation
Figure 402 (Sheet 3 of 6)/28-22-11-990-806**

EFFECTIVITY
HAP 037-054, 101-999

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**ELECTRICAL BONDING MEASUREMENT
(BONDING JUMPER DISCONNECTED)**

(C)

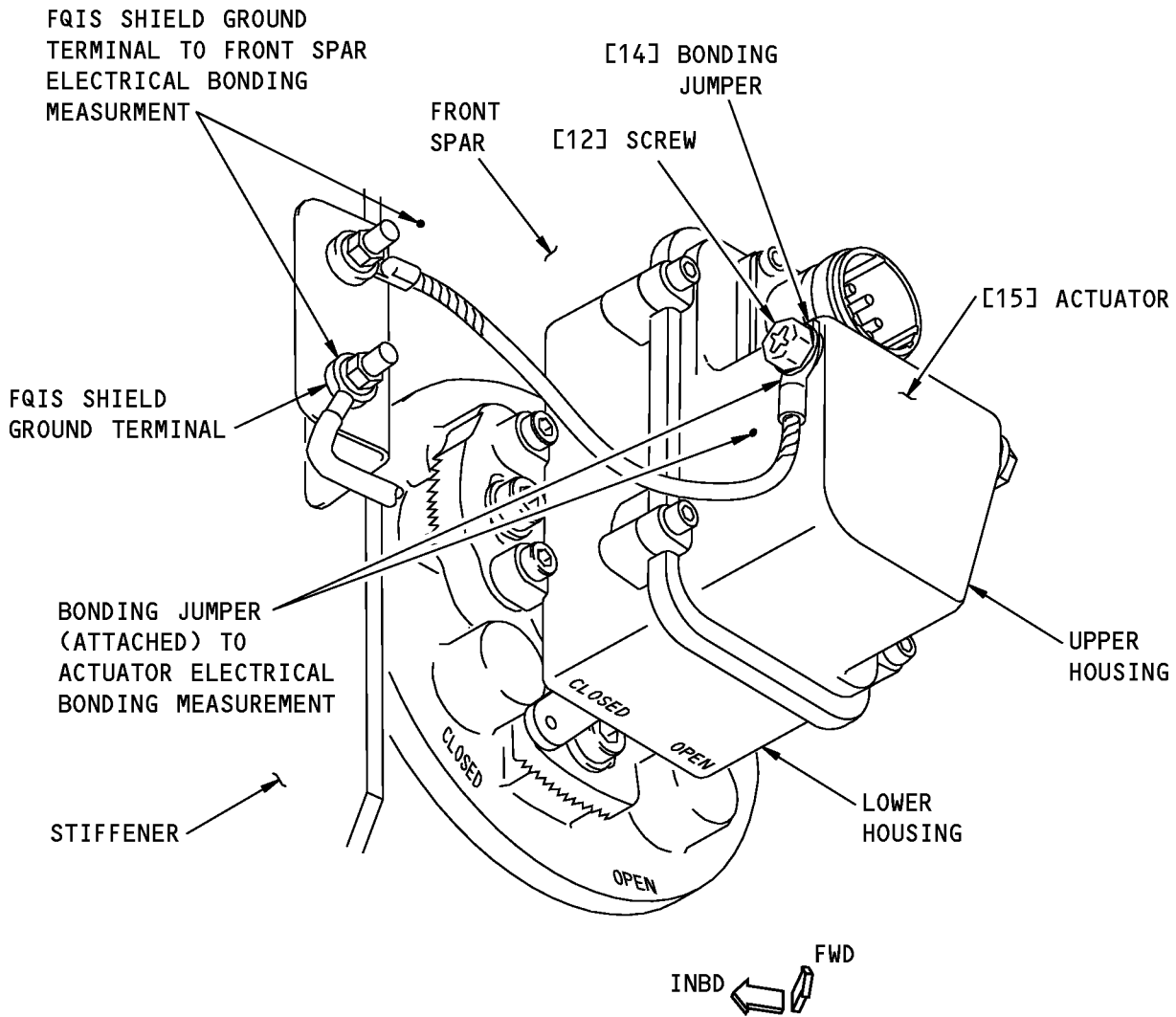
4 BARE METAL CONTACT SURFACE OF THE ACTUATOR AT THE BONDING JUMPER INSTALLATION.

**Spar Valve Actuator Installation
Figure 402 (Sheet 4 of 6)/28-22-11-990-806**

EFFECTIVITY
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**ELECTRICAL BONDING MEASUREMENT
(BONDING JUMPER CONNECTED)**

D

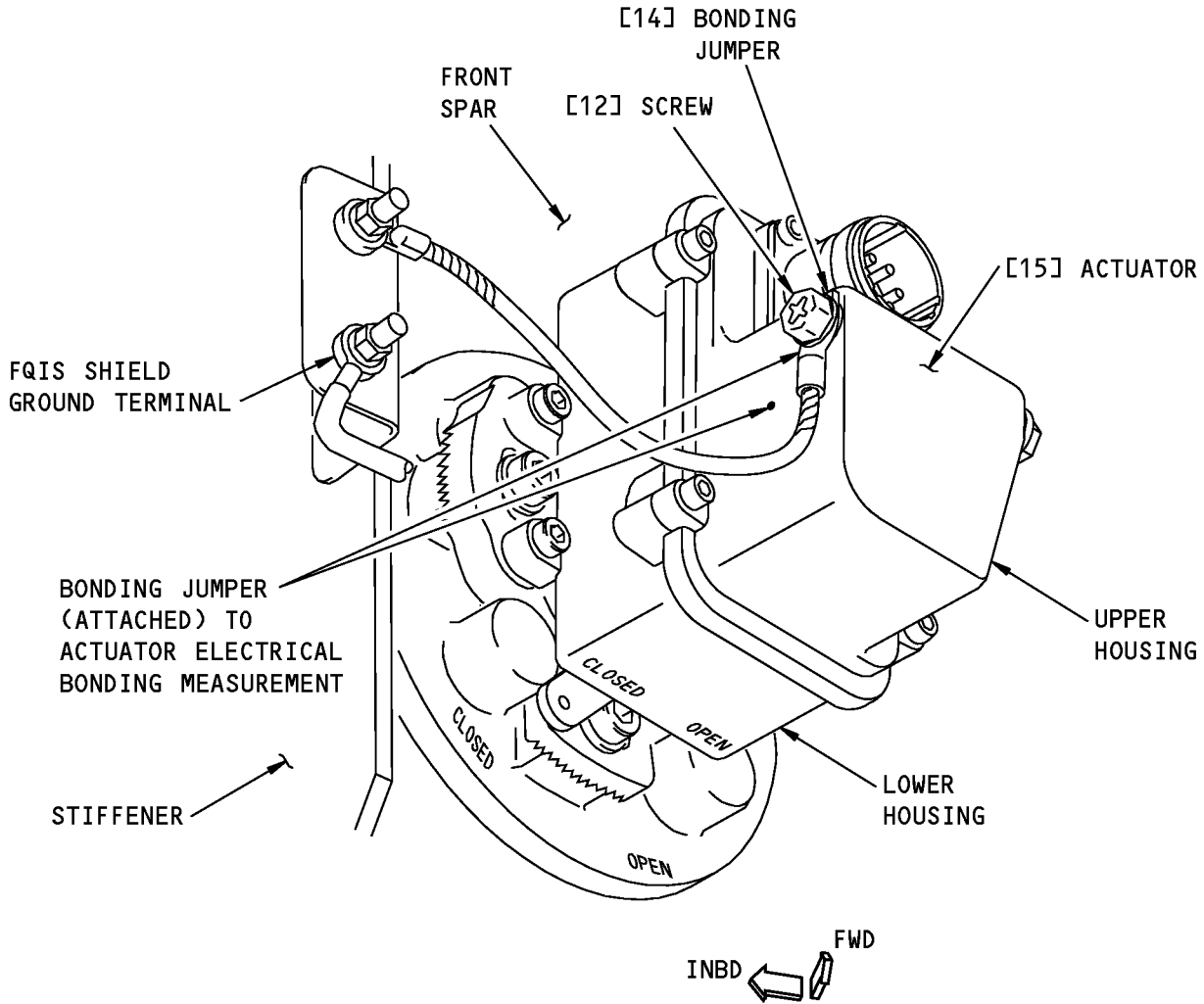
**Spar Valve Actuator Installation
Figure 402 (Sheet 5 of 6)/28-22-11-990-806**

EFFECTIVITY
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**ELECTRICAL BONDING MEASUREMENT
(BONDING JUMPER CONNECTED)**

D

**Spar Valve Actuator Installation
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TASK 28-22-11-400-804

5. Install the Actuator of the Spar Valve

(Figure 402)

A. References

Reference	Title
20-30-88-910-801	Final Cleaning of Metal Prior to Non-structural Bonding (Series 88) (P/B 201)
20-30-92-910-801	Final Cleaning Prior to General Sealing (Series 92) (P/B 201)
24-22-00-860-811	Supply Electrical Power (P/B 201)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-600-801	Apply the Corrosion Resistant Finish (Topcoat) (P/B 701)
28-22-00-710-801	Engine Fuel Spar Valve - Electrical Control and Indication Test (P/B 501)
28-41-42-700-801	FQIS Shield Ground Terminal - Test (P/B 501)
51-21-41-370-802	Apply Alodine 600, 1200 or 1200S Solution (P/B 701)
SWPM 20-20-00	Electrical Bonds and Grounds

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-2481	Tool - Sealant Removal, BAC5000, PSD 6-184 Approved (Part #: 1-6390-A, Supplier: 63318, A/P Effectivity: 737-ALL) (Part #: 10810, Supplier: \$0855, A/P Effectivity: 737-ALL) (Part #: 234350, Supplier: \$0857, A/P Effectivity: 737-ALL) (Part #: 311, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: 411B60, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: 411B90, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: DAD5013, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: DFD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: J5-0275-2010, Supplier: 435R8, A/P Effectivity: 737-ALL) (Part #: SCD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: ST982LF, Supplier: 3Z323, A/P Effectivity: 737-ALL) (Part #: TS1275-4, Supplier: 1DWR5, A/P Effectivity: 737-ALL)
COM-4746	Handle - Sealant Removal Tool (Part #: 310/1, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: SHN0272, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: SHR0272-T, Supplier: 1DWR5, A/P Effectivity: 737-ALL)
STD-123	Brush - Soft Bristle

C. Consumable Materials

Reference	Description	Specification
A50051	Sealant - Temperature Resistant, Integral Fuel Tank Sealant - Pro-Seal 890B	SAE AMS-S-8802, Class B
A50105	Sealant - Integral Fuel Tank Sealed Electrical Faying Surface Bond	SAE AMS-S-8802 Class A

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(Continued)

Reference	Description	Specification
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
B01012	Solvent - Final Cleaning Prior To General Sealing (AMM 20-30-92/201) - Series 92	
C00064	Coating - Aluminum Chemical Conversion	BAC5719, Type II, Class A (MIL-C-5541, Class A)
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20, Type II
C50033	Chromated Conversion Coating for Aluminum - Alodine 1200	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5
G50021	Pad - General Purpose Scrubbing - Scotch-Brite 96W	

D. Location Zones

Zone	Area
521	Left Wing - Leading Edge to Front Spar
621	Right Wing - Leading Edge to Front Spar

E. Access Panels

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

F. Procedure (View B)

SUBTASK 28-22-11-140-001

(1) Remove the old sealant and clean the actuator [15], index plate [10], and the fasteners (if reused).

(a) Use sealant removal tool, COM-2481, and sealant tool removal handle, COM-4746 (or equivalent), to remove the old sealant from the index plate [10] and the actuator [15].

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(b) To remove the remaining sealant, grease, oil, dirt, and other contamination from the components, use one of these brushes/pads soaked with Series 92 solvent, B01012 (TASK 20-30-92-910-801):

- 1) soft bristle brush, STD-123
- 2) cotton wiper, G00034
- 3) Scotch-Brite 96W pad, G50021

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SUBTASK 28-22-11-420-020

- (2) Do these steps to prepare the actuator [15] and the index plate [10] for a sealed electrical faying surface bond (SWPM 20-20-00):

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- (a) Final clean the contact surfaces with a cotton wiper, G00034, soaked with Series 88 solvent, B01008 (TASK 20-30-88-910-801).
- (b) Rub dry with a clean, dry cotton wiper, G00034.
- (c) Continue to clean and dry the surface until the dry cotton wiper, G00034, stays clean.
- (d) Apply a thin continuous layer of sealant to the contact area of the actuator feet (four locations).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

- 1) Use Pro Seal 890A or PR-1440A sealant, A50105, for the faying surface seal.
 - 2) Make sure the sealant layer is approximately 0.005 in. (0.127 mm) thick.
- (e) Apply sealant to the shank and the threads of the four actuator mounting screws [3].

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

- 1) Use Pro Seal 890A or PR-1440A sealant, A50105, for the wet installation of the actuator mounting screws [3].
- 2) Make sure the sealant applied to the fasteners is approximately 0.060 in. (1.524 mm) thick.

SUBTASK 28-22-11-420-021

- (3) Do these steps to install the actuator [15] to the index plate [10]:

- (a) Make sure the manual override lever [1] on the actuator is in the CLOSED position.
- (b) Align the actuator output shaft with the valve adapter [11].
- (c) Make sure the two spaces for teeth on the valve adapter [11] align with the actuator output shaft.
- (d) Put the actuator output shaft into the valve adapter.

NOTE: The mounting feet on the actuator automatically align with the mounting points on the index plate.

- (e) Install the four actuator mounting screws [3] and the washers [2].

NOTE: Lockwire is not necessary for the actuator mounting screws [3].

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- (f) Tighten the actuator mounting screws [3] to 20 in-lb (2.3 N-m).
- (g) Make sure the sealant is continuously squeezed out along the edges of the contact surfaces.
- (h) If there are gaps, bubbles or voids in the sealant squeeze out, then disassemble and apply more sealant.
- (i) Shape the squeezed out sealant into a fillet seal.
- (j) As an option, remove the extra squeezed out sealant.

NOTE: Make sure the sealant that remains is flush with the mating part edges.

SUBTASK 28-22-11-765-002

- (4) Measure the electrical bonding resistance between the upper housing of the actuator [15] (at the bare metal bonding jumper installation location) and the front spar (SWPM 20-20-00) (View C).
 - (a) Do this measurement with the bonding jumper [14] and the electrical connector [5] disconnected.
 - (b) Make sure the bonding jumper [14] does not touch the actuator [15] during the bonding measurement.
 - (c) Make sure the bonding resistance is 0.004 ohm (4.0 milliohms) or less.

NOTE: If you have replaced the valve adapter [11], then make sure the bonding resistance is 0.003 ohm (3.0 milliohms) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

- 1) If the bonding resistance is more than 0.004 ohm (4.0 milliohms), then do the applicable procedure in this task: Rework the Electrical Faying Surface Bonds for the Spar Valve, TASK 28-22-11-300-801.

NOTE: If you have replaced the valve adapter [11] and the bonding resistance is more than 0.003 ohm (3.0 milliohms), then do the applicable procedure in this task: Rework the Electrical Faying Surface Bonds for the Spar Valve, TASK 28-22-11-300-801.

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SUBTASK 28-22-11-765-014

- (5) Measure the electrical bonding resistance between the loose end of the bonding jumper [14] and the stiffener (SWPM 20-20-00) (View C).
 - (a) Make sure the bonding resistance is 0.0015 ohm (1.5 milliohms) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

- 1) If the bonding resistance is more than 0.0015 ohm (1.5 milliohms), then do the applicable procedure in this task: Rework the Electrical Faying Surface Bonds for the Spar Valve, TASK 28-22-11-300-801.

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SUBTASK 28-22-11-765-013

(6) Measure the electrical bonding resistance between the loose end of the bonding jumper [14] and the front spar (SWPM 20-20-00) (View C).

(a) Make sure the bonding resistance is 0.0015 ohm (1.5 milliohms) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

1) If the bonding resistance is more than 0.0015 ohm (1.5 milliohms), then do the applicable procedure in this task: Rework the Electrical Faying Surface Bonds for the Spar Valve, TASK 28-22-11-300-801.

HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

SUBTASK 28-22-11-420-023

(7) Do these steps to install the bonding jumper [14] to the actuator [15]:

(a) Final clean the contact surfaces with a cotton wiper, G00034, soaked with Series 88 solvent, B01008 (TASK 20-30-88-910-801).

1) Rub dry with a clean, dry cotton wiper, G00034.

2) Continue to clean and dry the surface until the dry cotton wiper, G00034, stays clean.

(b) Install the screw [12], two washers [13], and bonding jumper [14] to the actuator [15].

(c) AIRPLANES WITHOUT ACTUATOR MA30A1001;

Tighten the screw [12] to 20 in-lb (2 N·m).

(d) AIRPLANES WITH ACTUATOR MA30A1001;

Tighten the screw [12] to 35 in-lb (4 N·m).

SUBTASK 28-22-11-765-012

(8) Measure the electrical bonding resistance between the upper housing of the actuator [15] and the attached terminal of the bonding jumper [14] (SWPM 20-20-00) (View D).

(a) Do not touch the screw [12] when you make the bonding measurement.

(b) Make sure the bonding resistance is 0.001 ohm (1.0 milliohm) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

1) If the bonding resistance is more than 0.001 ohm (1.0 milliohm), then do the applicable procedure in this task: Rework the Electrical Faying Surface Bonds for the Spar Valve, TASK 28-22-11-300-801.

(c) Apply a cap seal of Pro-Seal 890B sealant, A50051, (or PR-1440B) over the screw [12] and the terminal of the bonding jumper [14].

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HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207 (Continued)

HAP 032-036; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

SUBTASK 28-22-11-765-015

- (9) Measure the electrical bonding resistance between the FQIS shield ground terminal and the front spar (SWPM 20-20-00) (View D).
 - (a) Do not touch the FQIS shield ground terminal when you make the bonding measurement.
 - (b) Make sure the bonding resistance is 0.007 ohm (7.0 milliohms) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

- 1) If the bonding resistance is more than 0.007 ohm (7.0 milliohms), then do this task: FQIS Shield Ground Terminal - Test, TASK 28-41-42-700-801.

HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

SUBTASK 28-22-11-916-002

- (10) Do this task to apply protective finishes to the bare metal areas of the front spar: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

NOTE: Re-apply the protective coating to the front spar where the electrical bonding probe removed the finishes.

- (a) These are the protective finishes:
 - 1) Alodine 600 coating, C00064
 - 2) BMS 10-20 coating, C00307.

SUBTASK 28-22-11-916-001

- (11) Do this task to apply Alodine 1200 coating, C50033, to any bare metal areas of the actuator [15]: Apply Alodine 600, 1200 or 1200S Solution, TASK 51-21-41-370-802.

NOTE: Re-apply the protective coating to the actuator [15] where the electrical bonding probe removed the finish and any bare metal areas around the bonding jumper installation that are not covered with sealant.

SUBTASK 28-22-11-430-003

- (12) Connect the electrical connector [5] to the actuator [15].

G. Spar Valve Actuator Operational Test

SUBTASK 28-22-11-865-001

- (1) Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	5	C00540	FUEL SPAR VALVE IND

SUBTASK 28-22-11-865-002

- (2) For the left actuator,

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HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207 (Continued)

Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	4	C00359	FUEL SPAR VALVE ENG 1

SUBTASK 28-22-11-865-003

(3) For the right actuator,

Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2

SUBTASK 28-22-11-861-004

(4) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-22-11-710-005

(5) For the actuator that you installed, do this task: Engine Fuel Spar Valve - Electrical Control and Indication Test, TASK 28-22-00-710-801.

H. Put the Airplane Back to the Usual Condition

SUBTASK 28-22-11-410-006

(1) Close the applicable access panel(s):

<u>Number</u>	<u>Name/Location</u>
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

END OF TASK

HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207

TASK 28-22-11-000-802

6. Remove the Valve Adapter of the Spar Valve

(Figure 403)

A. General

(1) The valve adapter and shaft assembly (valve adapter) is used to connect the actuator to the spar valve body. The valve adapter consists of these components:

- (a) Index plate
- (b) Adapter plate
- (c) Adapter shaft (with U-joint connection).

B. References

<u>Reference</u>	<u>Title</u>
06-43-00-800-801	Engine and Nacelle Strut Access Doors and Panels (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)

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HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207 (Continued)

(Continued)

Reference	Title
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-2481	Tool - Sealant Removal, BAC5000, PSD 6-184 Approved (Part #: 1-6390-A, Supplier: 63318, A/P Effectivity: 737-ALL) (Part #: 10810, Supplier: \$0855, A/P Effectivity: 737-ALL) (Part #: 234350, Supplier: \$0857, A/P Effectivity: 737-ALL) (Part #: 311, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: 411B60, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: 411B90, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: DAD5013, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: DFD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: J5-0275-2010, Supplier: 435R8, A/P Effectivity: 737-ALL) (Part #: SCD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: ST982LF, Supplier: 3Z323, A/P Effectivity: 737-ALL) (Part #: TS1275-4, Supplier: 1DWR5, A/P Effectivity: 737-ALL)
COM-4746	Handle - Sealant Removal Tool (Part #: 310/1, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: SHN0272, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: SHR0272-T, Supplier: 1DWR5, A/P Effectivity: 737-ALL)

D. Location Zones

Zone	Area
434	Engine 1 - Aft Strut Fairing
444	Engine 2 - Aft Strut Fairing
511	Left Wing - Leading Edge To Front Spar
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
611	Right Wing - Leading Edge to Front Spar
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

E. Access Panels

Number	Name/Location
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2
532BB	Main Tank Access Door - Wing Station 265
632BB	Main Tank Access Door - Wing Station 265

F. Prepare for the Procedure

SUBTASK 28-22-11-650-005

- (1) Defuel the applicable main fuel tank (TASK 28-26-00-650-801) or transfer fuel out of the applicable tank (TASK 28-26-00-650-802).

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SUBTASK 28-22-11-860-018

WARNING: OBEY THE PRECAUTIONS FOR PURGING, AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Obey the fuel tank entry precautions (TASK 28-11-00-910-802).

SUBTASK 28-22-11-650-006

(3) Drain and purge the applicable main fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-22-11-010-024

(4) Remove the applicable access panel(s):

<u>Number</u>	<u>Name/Location</u>
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2

Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801.

SUBTASK 28-22-11-010-025

(5) Remove the applicable access panel(s):

<u>Number</u>	<u>Name/Location</u>
532BB	Main Tank Access Door - Wing Station 265
632BB	Main Tank Access Door - Wing Station 265

Main Tank Access Door Removal, TASK 28-11-11-000-801

G. Remove the Valve Adapter

SUBTASK 28-22-11-010-026

(1) Do these steps on the outside of the fuel tank:

- (a) For the applicable left or right spar valve actuator, do this task: Remove the Actuator of the Spar Valve, TASK 28-22-11-000-801.
- (b) Use a sealant removal tool to scrap away the old sealant from the periphery of the adapter plate (View A-A).
 - 1) Use sealant removal tool, COM-2481 and sealant tool removal handle, COM-4746 or equivalent.

SUBTASK 28-22-11-010-027

WARNING: DO THE PURGING AND FUEL TANK ENTRY PROCEDURE. FAILURE TO FOLLOW THE PURGING AND FUEL TANK ENTRY PROCEDURE COULD CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Go inside the applicable main tank and do these steps (TASK 28-11-00-910-802):

- (a) Go to the valve adapter [11] (View B).
- (b) Remove the old sealant from the four bolts [21] (View A-A).
- (c) Remove the bolts [21] and the washers [22] (four locations) to disconnect the valve adapter [11].
- (d) Disengage the adapter shaft from the spar valve body [20] (View C).

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SUBTASK 28-22-11-010-028

(3) Go out of the tank and remove the valve adapter [11].

————— **END OF TASK** —————

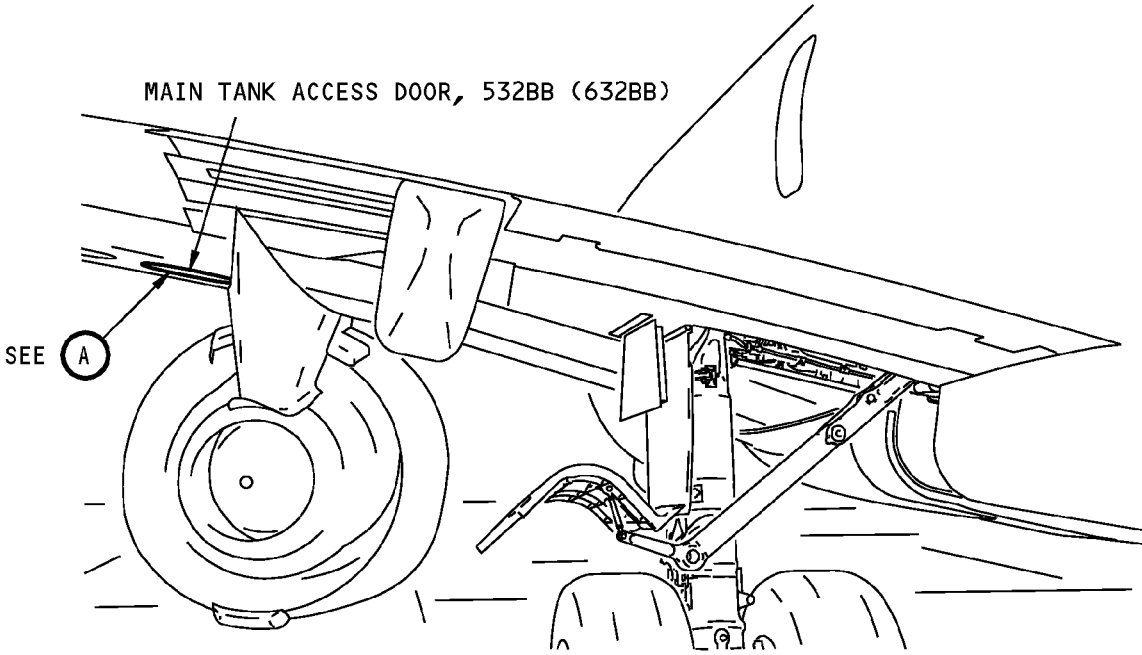
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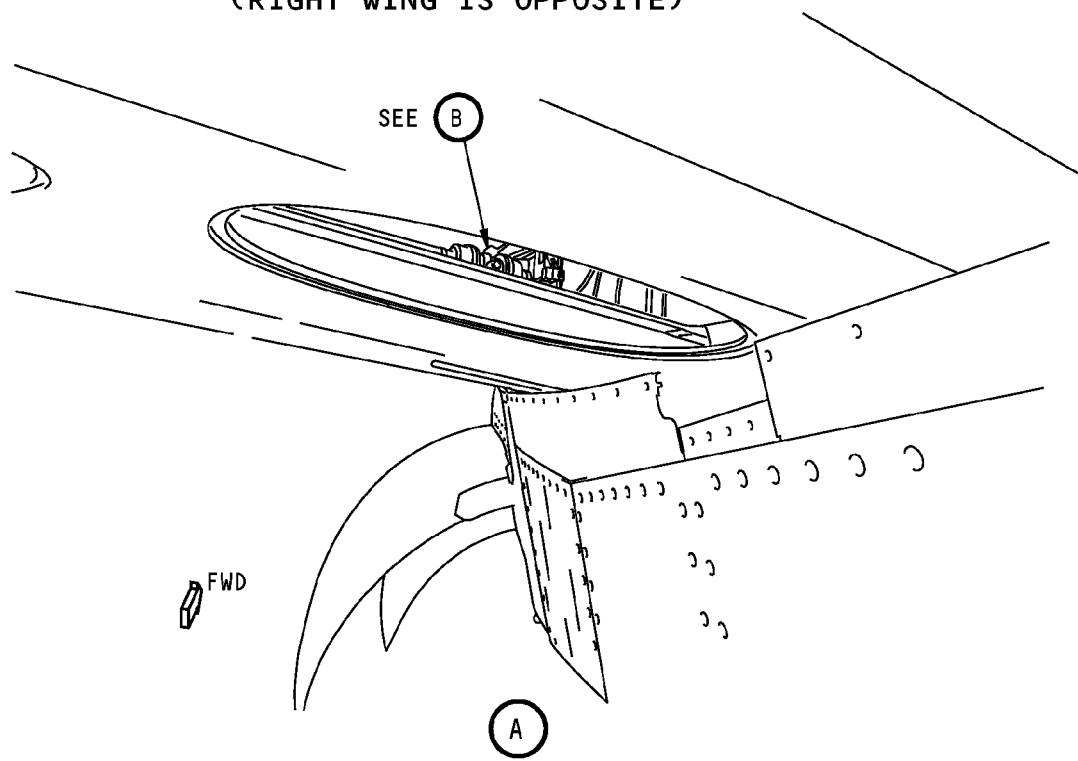
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**LEFT WING
(RIGHT WING IS OPPOSITE)**

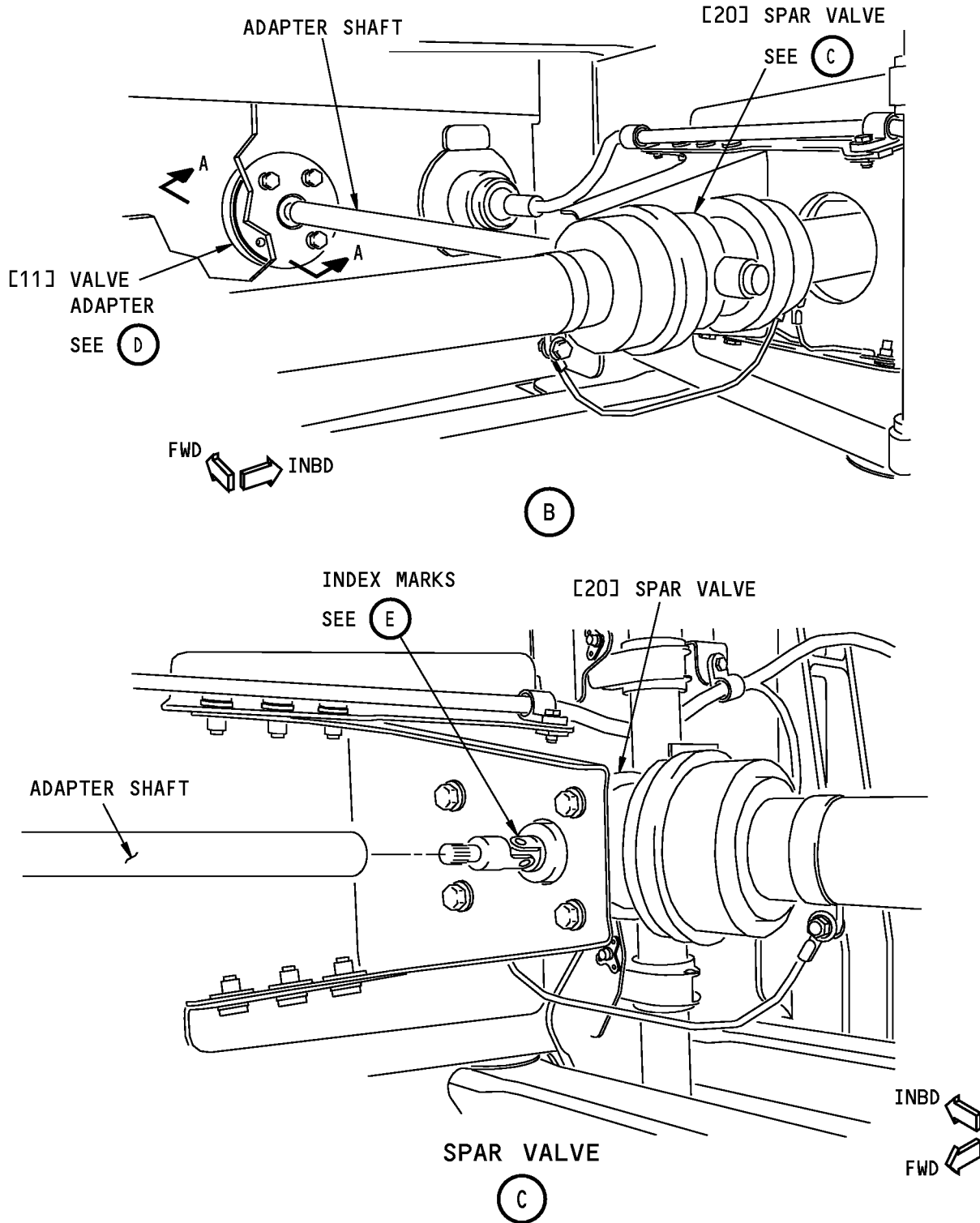


**Spar Valve Adapter Installation
Figure 403 (Sheet 1 of 4)/28-22-11-990-805**

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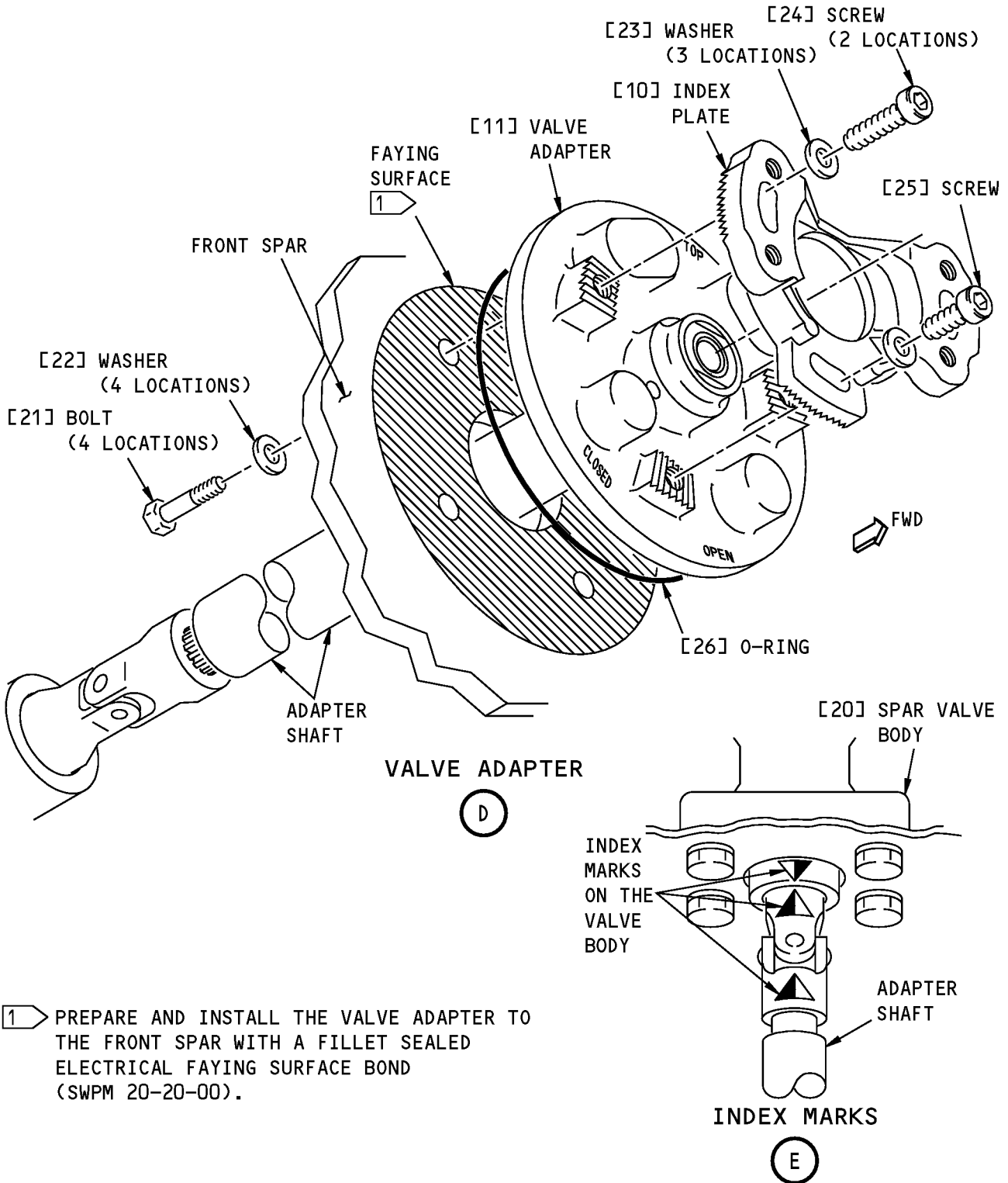
**Spar Valve Adapter Installation
Figure 403 (Sheet 2 of 4)/28-22-11-990-805**

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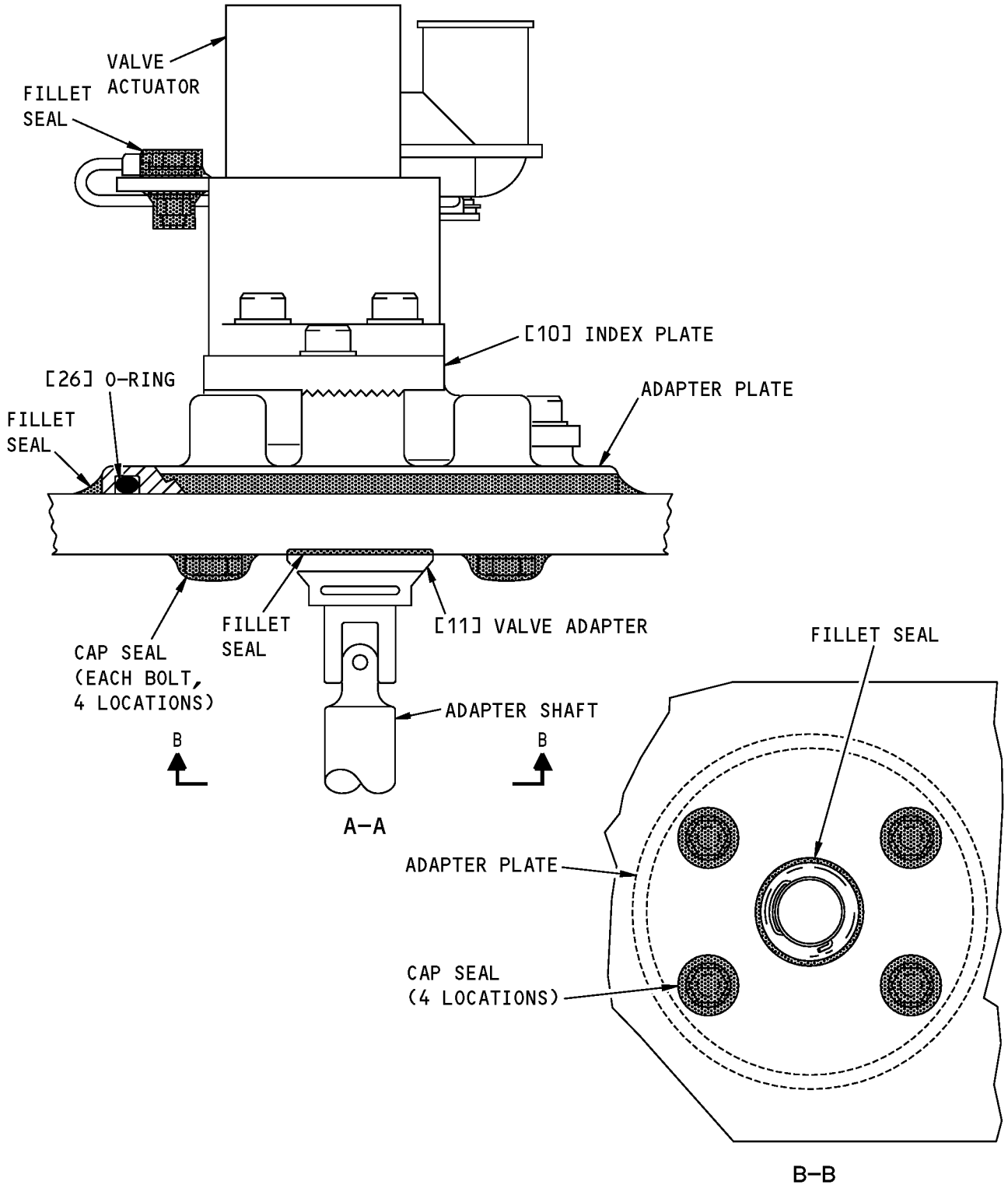
1 PREPARE AND INSTALL THE VALVE ADAPTER TO THE FRONT SPAR WITH A FILLET SEALED ELECTRICAL FAYING SURFACE BOND (SWPM 20-20-00).

Spar Valve Adapter Installation
Figure 403 (Sheet 3 of 4)/28-22-11-990-805

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**Spar Valve Adapter Installation
Figure 403 (Sheet 4 of 4)/28-22-11-990-805**

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TASK 28-22-11-400-802

7. Install the Valve Adapter of the Spar Valve

(Figure 403)

A. General

- (1) This task contains these procedures:
 - (a) Install the Valve Adapter
 - (b) Install the Index Plate
 - (c) Spar Valve Operational Tests
 - (d) Put the Airplane Back to the Usual Condition

B. References

Reference	Title
06-43-00-800-801	Engine and Nacelle Strut Access Doors and Panels (P/B 201)
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
20-30-88	AIRPLANE STRUCTURE CLEANING SOLVENTS (Series 88)
20-30-92-910-801	Final Cleaning Prior to General Sealing (Series 92) (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-600-801	Apply the Corrosion Resistant Finish (Topcoat) (P/B 701)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-22-00-710-801	Engine Fuel Spar Valve - Electrical Control and Indication Test (P/B 501)
28-22-00-720-804	Engine Fuel Spar Valve Installation - Test (P/B 501)
51-21-41-370-802	Apply Alodine 600, 1200 or 1200S Solution (P/B 701)
51-31-00-390-804	Fillet Seal Application (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

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HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207 (Continued)

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)
COM-2481	Tool - Sealant Removal, BAC5000, PSD 6-184 Approved (Part #: 1-6390-A, Supplier: 63318, A/P Effectivity: 737-ALL) (Part #: 10810, Supplier: \$0855, A/P Effectivity: 737-ALL) (Part #: 234350, Supplier: \$0857, A/P Effectivity: 737-ALL) (Part #: 311, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: 411B60, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: 411B90, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: DAD5013, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: DFD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: J5-0275-2010, Supplier: 435R8, A/P Effectivity: 737-ALL) (Part #: SCD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: ST982LF, Supplier: 3Z323, A/P Effectivity: 737-ALL) (Part #: TS1275-4, Supplier: 1DWR5, A/P Effectivity: 737-ALL)
COM-4746	Handle - Sealant Removal Tool (Part #: 310/1, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: SHN0272, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: SHR0272-T, Supplier: 1DWR5, A/P Effectivity: 737-ALL)
STD-123	Brush - Soft Bristle

D. Consumable Materials

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS 5-95
A00436	Sealant - Fuel Tank	BMS5-45 (Supersedes BMS 5-26)
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
B01012	Solvent - Final Cleaning Prior To General Sealing (AMM 20-30-92/201) - Series 92	
C00064	Coating - Aluminum Chemical Conversion	BAC5719, Type II, Class A (MIL-C-5541, Class A)
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20, Type II
C50033	Chromated Conversion Coating for Aluminum - Alodine 1200	
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5
G50021	Pad - General Purpose Scrubbing - Scotch-Brite 96W	

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E. Location Zones

Zone	Area
434	Engine 1 - Aft Strut Fairing
444	Engine 2 - Aft Strut Fairing
511	Left Wing - Leading Edge To Front Spar
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
611	Right Wing - Leading Edge to Front Spar
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

F. Access Panels

Number	Name/Location
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
532BB	Main Tank Access Door - Wing Station 265
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02
632BB	Main Tank Access Door - Wing Station 265

G. Install the Valve Adapter

SUBTASK 28-22-11-110-005

- (1) Remove the old sealant and clean the front spar contact area, valve adapter [11], and the fasteners (if re-used).
 - (a) To remove the sealant from the front spar use a sealant removal tool, COM-2481 and sealant tool removal handle, COM-4746 or equivalent.

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (b) To remove the remaining sealant, grease, oil, dirt, and other contamination from the components, use one of these brushes/pads soaked with Series 92 solvent, B01012 (TASK 20-30-92-910-801):
 - 1) soft bristle brush, STD-123
 - 2) cotton wiper, G00034
 - 3) Scotch-Brite 96W pad, G50021

SUBTASK 28-22-11-110-002

- (2) Do these steps to prepare the valve adapter [11] and the front spar for a fillet sealed electrical faying surface bond (View D):

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WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (a) Final clean the contact surfaces of the valve adapter [11] and the front spar with a cotton wiper, G00034 soaked with Series 88 solvent, B01008 (SUBJECT 20-30-88).
- (b) Rub dry with a clean, dry cotton wiper, G00034.
- (c) Continue to clean and dry the surface until the dry cotton wiper, G00034 stays clean.

SUBTASK 28-22-11-420-024

- (3) On the outside of the airplane, do these steps:
 - (a) Put a thin layer of petrolatum grease, D00504 on the new O-ring [26].
 - (b) Put the O-ring [26] in the O-ring groove of the valve adapter [11].
 - (c) Put the adapter shaft attached to the valve adapter [11] through the hole in the front spar.

SUBTASK 28-22-11-420-007

WARNING: DO THE PURGING AND FUEL TANK ENTRY PROCEDURE. FAILURE TO FOLLOW THE PURGING AND FUEL TANK ENTRY PROCEDURE COULD CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Go into the fuel tank to the spar valve location (TASK 28-11-00-910-802) (View A).

SUBTASK 28-22-11-420-025

- (5) Do these steps to install the valve adapter [11]:
 - (a) Make sure the index marks on the spar valve body [20] are aligned (View E).

NOTE: A small misalignment of the index marks is satisfactory.
 - (b) Engage the adapter shaft of the valve adapter [11] with the spar valve body [20] (View C).
 - (c) Make sure the shoulder of the valve adapter [11] does not bind in the opening of the front spar.
 - (d) Install the four bolts [21] and washers [22] to attach the valve adapter [11] to the front spar.

SUBTASK 28-22-11-220-002

- (6) Measure the bonding resistance between the adapter plate of the valve adapter [11] and the front spar with an electrical bonding meter, COM-1550 (SWPM 20-20-00).
 - (a) Make sure the bonding resistance is not more than 0.0005 ohms (0.5 milliohms).

SUBTASK 28-22-11-390-001

- (7) On the inside of the fuel tank apply BMS5-45 sealant, A00436 to these components (View B-B):
 - (a) A cap seal on the four bolts [21] (TASK 51-31-00-390-804).
 - (b) A fillet seal on the periphery of the front spar penetration and the stationary part of the adapter plate.

NOTE: Make sure the sealant does not touch the adapter shaft or other parts of the valve adapter that rotate.

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HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207 (Continued)

SUBTASK 28-22-11-390-002

- (8) On the outside of the fuel tank, apply a fillet seal of BMS5-95 sealant, A00247 around the periphery of the valve adapter [11] (TASK 51-31-00-390-804) (View A-A).

SUBTASK 28-22-11-916-005

- (9) Do this task to apply protective finishes to the bare metal areas of the front spar: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

NOTE: Re-apply the protective coating to the front spar at all bare metal areas not covered by the fillet seal, and where the electrical bonding probe removed the finishes.

- (a) These are the protective finishes:

- 1) Alodine 600 coating, C00064
- 2) BMS 10-20 coating, C00307.

SUBTASK 28-22-11-916-006

- (10) Do this task to apply Alodine 1200 coating, C50033 to any bare metal areas of the valve adapter [11]: Apply Alodine 600, 1200 or 1200S Solution, TASK 51-21-41-370-802.

NOTE: Re-apply the protective coating to the valve adapter [11] where the electrical bonding probe removed the finish.

SUBTASK 28-22-11-860-013

- (11) Do this task to close the fuel tank: Fuel Tank Closure, TASK 28-11-00-410-801.

- (a) Close the applicable access panel(s):

<u>Number</u>	<u>Name/Location</u>
532BB	Main Tank Access Door - Wing Station 265
632BB	Main Tank Access Door - Wing Station 265

Main Tank Access Door Installation, TASK 28-11-11-400-801.

SUBTASK 28-22-11-820-014

- (12) Do this task: Spar Valve Alignment, TASK 28-22-11-820-801.

H. Install the Index Plate

SUBTASK 28-22-11-820-012

- (1) Do this procedure after you have correctly aligned and marked the alignment position of the index plate [10] and the valve adapter [11] per this task: Spar Valve Alignment, TASK 28-22-11-820-801.

SUBTASK 28-22-11-420-034

- (2) Do these steps to install the index plate [10]:
- (a) Align the index plate [10] and the valve adapter [11] with the mark that you made during spar valve alignment procedure.
 - (b) Install the two index screws [24] and washers [23] to the top index mounting positions and the index screw [25] and washer [23] to the bottom index position.
 - (c) Tighten the index screws to 22 ± 1 in-lb (2.5 ± 0.1 N·m).
 - (d) Lockwire the two top index screws [24] and the bottom index screw [25] to the index plate [10].

SUBTASK 28-22-11-420-035

- (3) Do this task: Install the Actuator of the Spar Valve, TASK 28-22-11-400-801.

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I. Spar Valve Operational Tests

NOTE: These tests will make sure the spar valve electrical operation is correct, the spar valve plate alignment is correct, and that there are no fuel leaks through the front spar.

SUBTASK 28-22-11-710-006

(1) For the applicable spar valve, do these tasks:

(a) Engine Fuel Spar Valve - Electrical Control and Indication Test, TASK 28-22-00-710-801.

NOTE: This test is done when you install the valve actuator.

(b) Engine Fuel Spar Valve Installation - Test, TASK 28-22-00-720-804.

SUBTASK 28-22-11-650-009

(2) Do this leak check if you have replaced the valve adapter [11]:

NOTE: The leak check is only necessary if you have done a fuel tank entry and replaced the valve adapter [11]. It is not necessary if you have replaced or aligned the index plate [10] for adjustment purposes only.

(a) Refuel the tank that contains the replaced valve adapter [11] to a minimum of 4400 pounds (2000 kilograms) (TASK 12-11-00-650-802).

NOTE: This is the fuel quantity necessary to make sure there are no leaks at the front spar.

(b) Make sure there are no fuel leaks at the valve adapter [11] installation on the front spar.

(c) Make sure there are no fuel leaks at the applicable access door(s):

Number	Name/Location
532BB	Main Tank Access Door - Wing Station 265
632BB	Main Tank Access Door - Wing Station 265

J. Put the Airplane Back to the Usual Condition

SUBTASK 28-22-11-410-007

(1) Close the applicable access panel(s):

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

SUBTASK 28-22-11-410-009

(2) Close the applicable access door(s):

Number	Name/Location
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2

Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801.

END OF TASK

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TASK 28-22-11-000-805

8. Remove the Valve Adapter of the Spar Valve

(Figure 404)

A. General

(1) The valve adapter and shaft assembly (valve adapter) is used to connect the actuator to the spar valve body. The valve adapter consists of these components:

- (a) Index plate
- (b) Adapter plate
- (c) Adapter shaft (with U-joint connection).

B. References

Reference	Title
06-43-00-800-801	Engine and Nacelle Strut Access Doors and Panels (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-2481	Tool - Sealant Removal, BAC5000, PSD 6-184 Approved (Part #: 1-6390-A, Supplier: 63318, A/P Effectivity: 737-ALL) (Part #: 10810, Supplier: \$0855, A/P Effectivity: 737-ALL) (Part #: 234350, Supplier: \$0857, A/P Effectivity: 737-ALL) (Part #: 311, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: 411B60, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: 411B90, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: DAD5013, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: DFD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: J5-0275-2010, Supplier: 435R8, A/P Effectivity: 737-ALL) (Part #: SCD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: ST982LF, Supplier: 3Z323, A/P Effectivity: 737-ALL) (Part #: TS1275-4, Supplier: 1DWR5, A/P Effectivity: 737-ALL)
COM-4746	Handle - Sealant Removal Tool (Part #: 310/1, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: SHN0272, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: SHR0272-T, Supplier: 1DWR5, A/P Effectivity: 737-ALL)

D. Location Zones

Zone	Area
434	Engine 1 - Aft Strut Fairing
444	Engine 2 - Aft Strut Fairing
511	Left Wing - Leading Edge To Front Spar

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Zone	Area
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
611	Right Wing - Leading Edge to Front Spar
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

E. Access Panels

Number	Name/Location
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2
532BB	Main Tank Access Door - Wing Station 265
632BB	Main Tank Access Door - Wing Station 265

F. Prepare for the Procedure

SUBTASK 28-22-11-650-007

- (1) Defuel the applicable main fuel tank (TASK 28-26-00-650-801) or transfer fuel out of the applicable tank (TASK 28-26-00-650-802).

SUBTASK 28-22-11-860-019

WARNING: OBEY THE PRECAUTIONS FOR PURGING, AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Obey the fuel tank entry precautions (TASK 28-11-00-910-802).

SUBTASK 28-22-11-650-008

- (3) Drain and purge the applicable main fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-22-11-010-029

- (4) Remove the applicable access panel(s):

Number	Name/Location
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2

Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801.

SUBTASK 28-22-11-010-030

- (5) Remove the applicable access panel(s):

(TASK 28-11-11-000-801)

Number	Name/Location
532BB	Main Tank Access Door - Wing Station 265
632BB	Main Tank Access Door - Wing Station 265

G. Remove the Valve Adapter

SUBTASK 28-22-11-010-031

- (1) Do these steps on the outside of the fuel tank:
 - (a) For the applicable left or right spar valve actuator, do this task: Remove the Actuator of the Spar Valve, TASK 28-22-11-000-804.

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- (b) Use a sealant removal tool to scrap away the old sealant from the periphery of the adapter plate (View A-A).
 - 1) Use sealant removal tool, COM-2481 and sealant tool removal handle, COM-4746 or equivalent.

SUBTASK 28-22-11-010-032

WARNING: DO THE PURGING AND FUEL TANK ENTRY PROCEDURE. FAILURE TO FOLLOW THE PURGING AND FUEL TANK ENTRY PROCEDURE COULD CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Go inside the applicable main tank and do these steps (TASK 28-11-00-910-802):
 - (a) Go to the valve adapter [11] location (View B).
 - (b) Remove the old sealant from the four bolts [21] and the valve adapter [11] front spar penetration (View A-A).
 - (c) Remove the bolts [21] and the washers [22] (four locations) to disconnect the valve adapter [11].
 - (d) Disengage the adapter shaft from the spar valve body [20] (View C).

SUBTASK 28-22-11-010-033

- (3) Go out of the tank and remove the valve adapter [11].

H. Remove the Index Plate

NOTE: Do these steps if you will reuse the valve adapter and the attached index plate or if you need to remove the index plate to align the valve body. If the task is to discard the old valve adapter and install a new valve adapter, it is not necessary to disassemble the index plate.

SUBTASK 28-22-11-020-022

- (1) Do these steps to remove the index plate [10] from the valve adapter [11] (View D):
 - (a) Remove the lockwire from screws [24] and screw [25] (3 locations).
 - (b) Remove screws [24], screw [25] and the washers [23].
 - (c) Carefully disassemble the index plate and the adapter plate.

NOTE: The two plates are bonded with faying surface sealant.

————— **END OF TASK** —————

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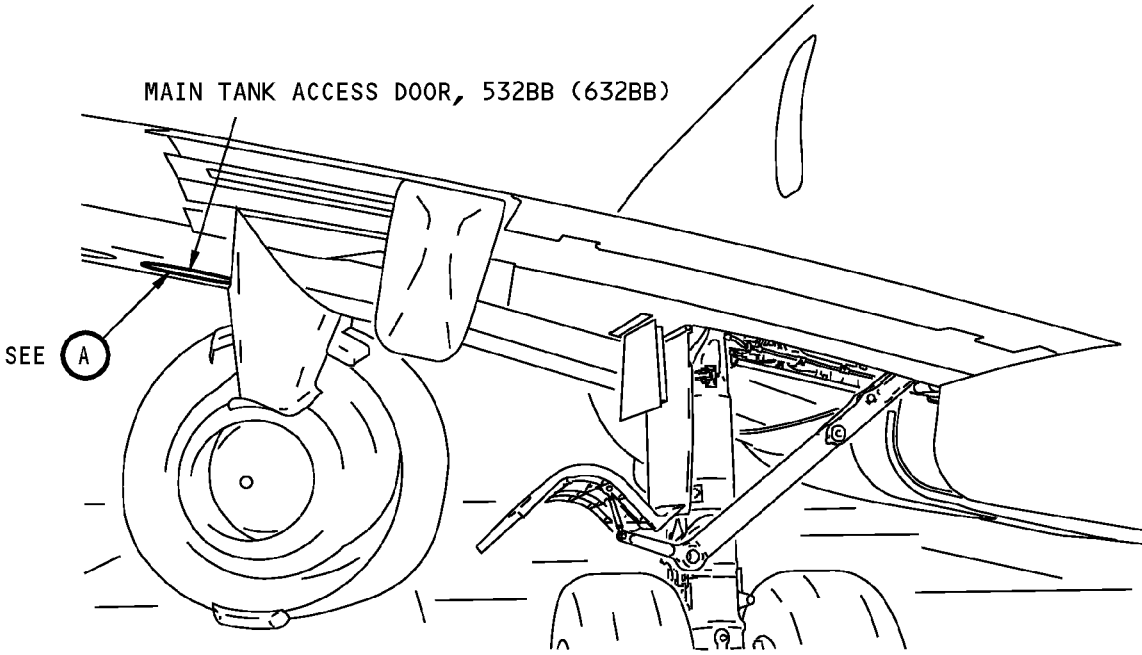
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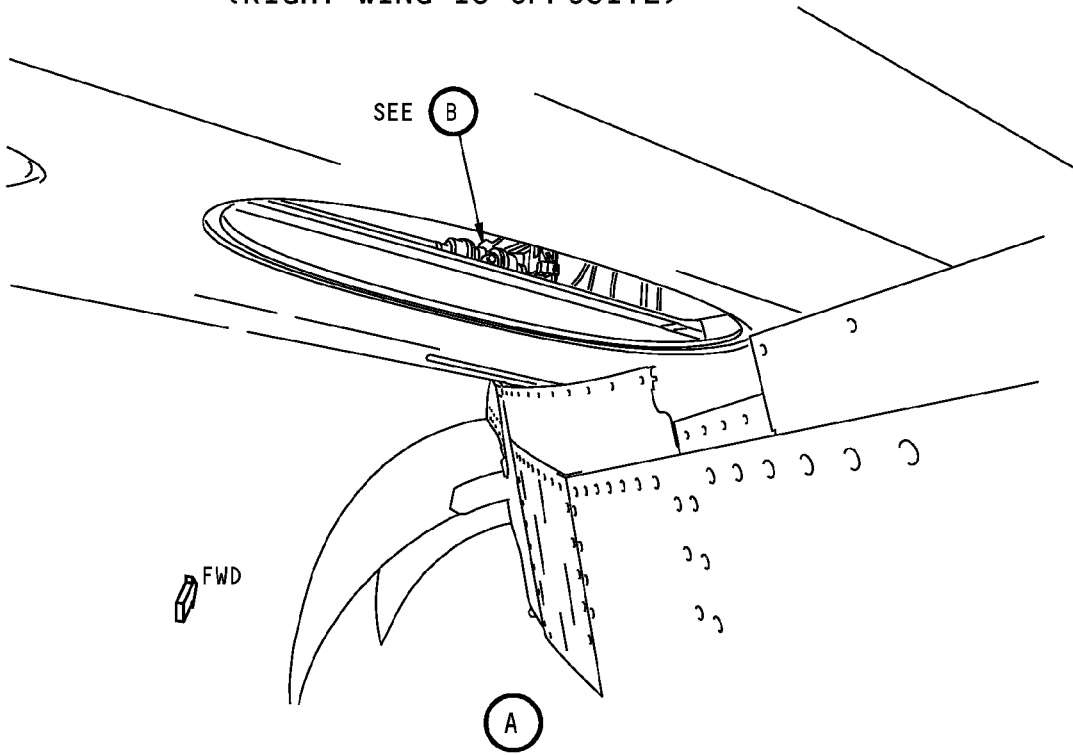
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**LEFT WING
(RIGHT WING IS OPPOSITE)**



**Spar Valve Adapter Installation
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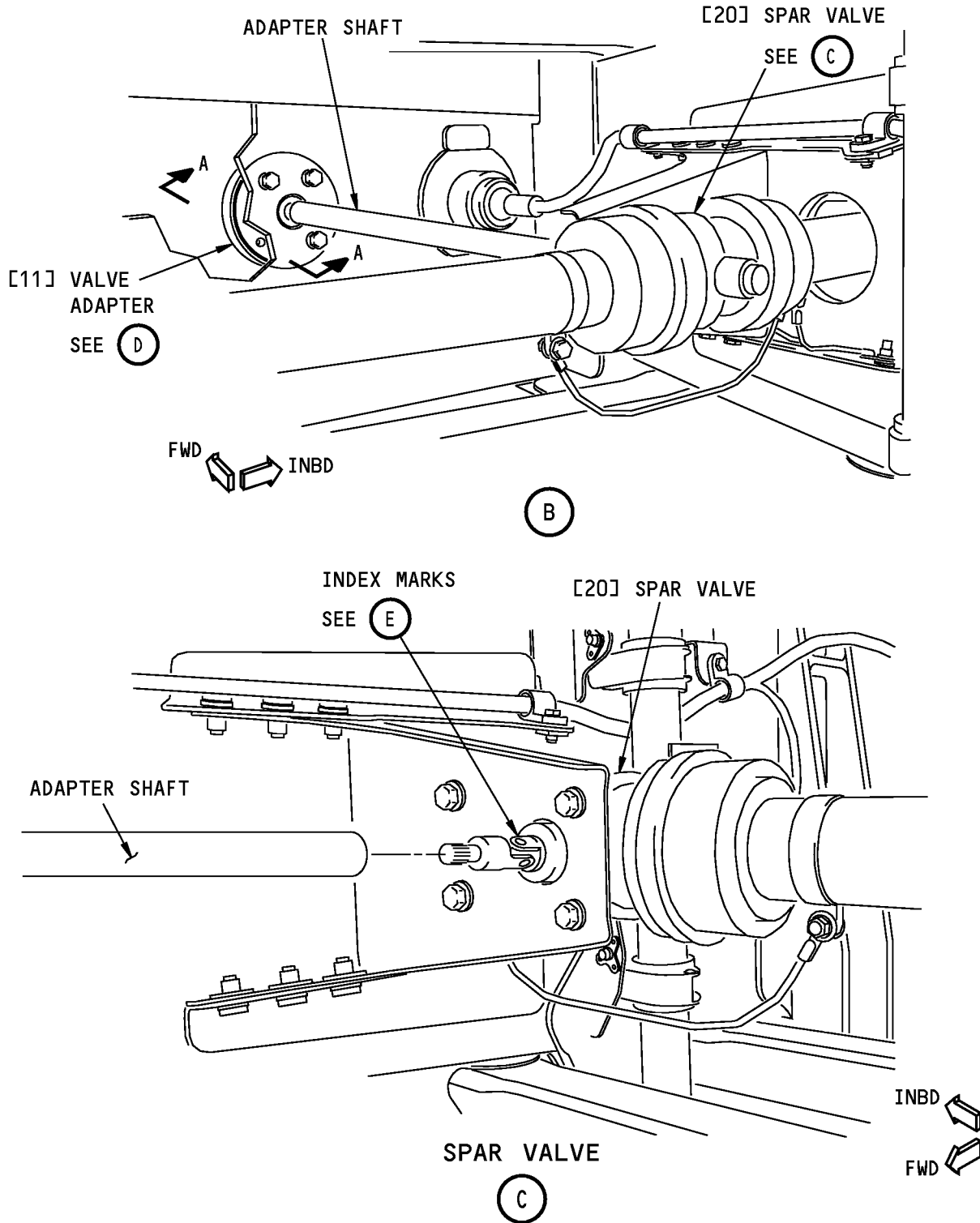
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**Spar Valve Adapter Installation
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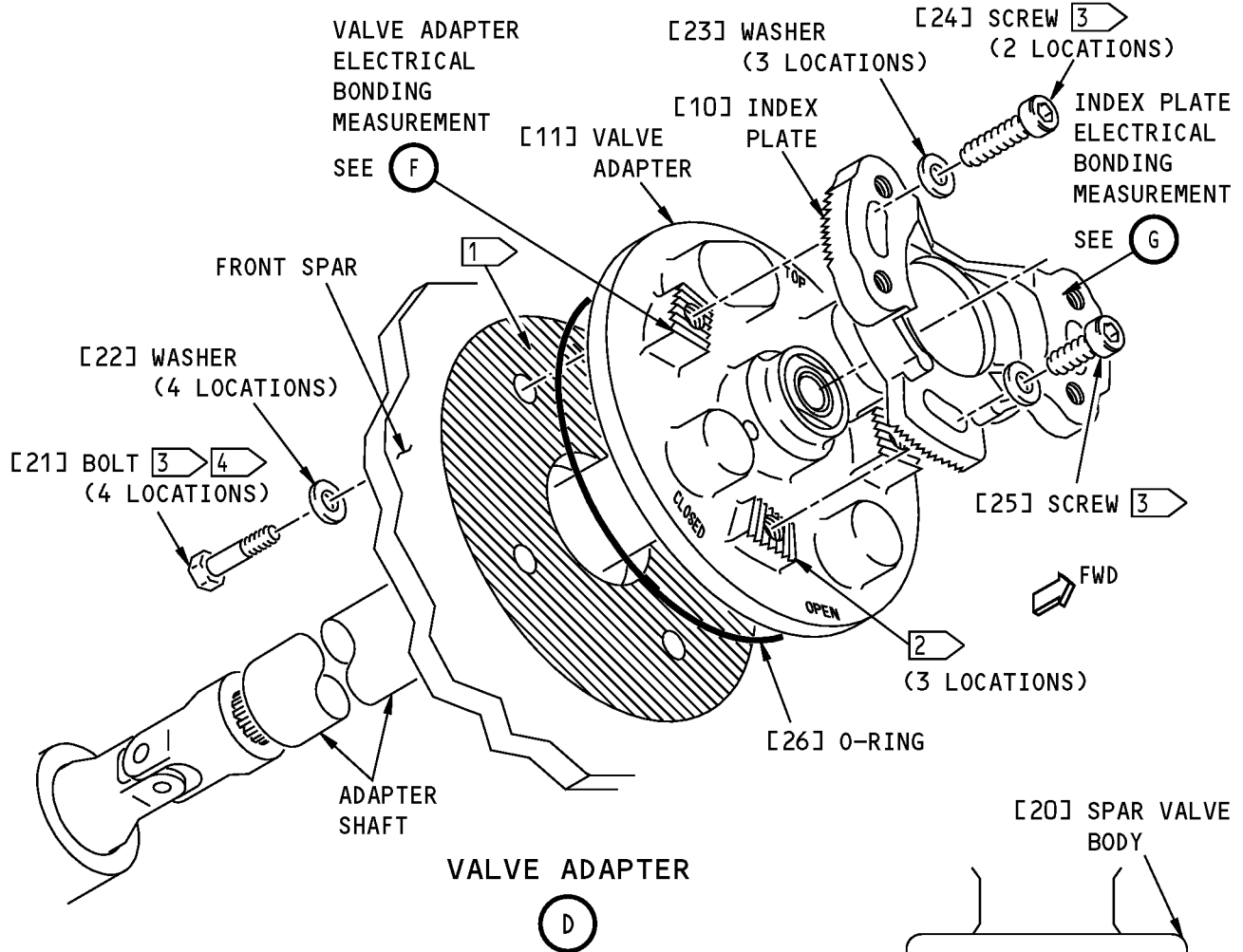
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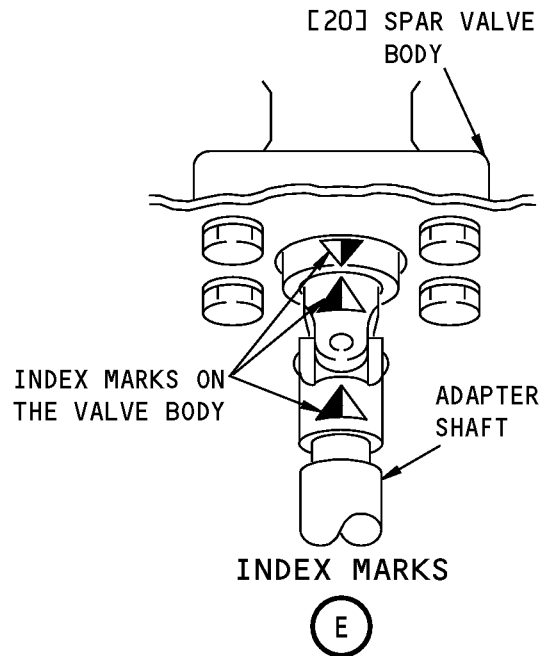
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- 1 PREPARE AND INSTALL THE VALVE ADAPTER TO THE FRONT SPAR WITH A FILLET SEALED ELECTRICAL FAYING SURFACE BOND (SWPM 20-20-00).
- 2 PREPARE AND INSTALL THE SERRATED CONTACT SURFACES OF THE VALVE ADAPTER AND INDEX PLATE WITH A SEALED ELECTRICAL FAYING SURFACE BOND (3 LOCATIONS) (SWPM 20-20-00).
- 3 APPLY SEALANT TO THE SHANK AND THREADS OF THE FASTENERS DURING THE INSTALLATION.
- 4 AFTER INSTALLATION, APPLY A CAP SEAL TO THE HEAD OF THE FASTENERS.

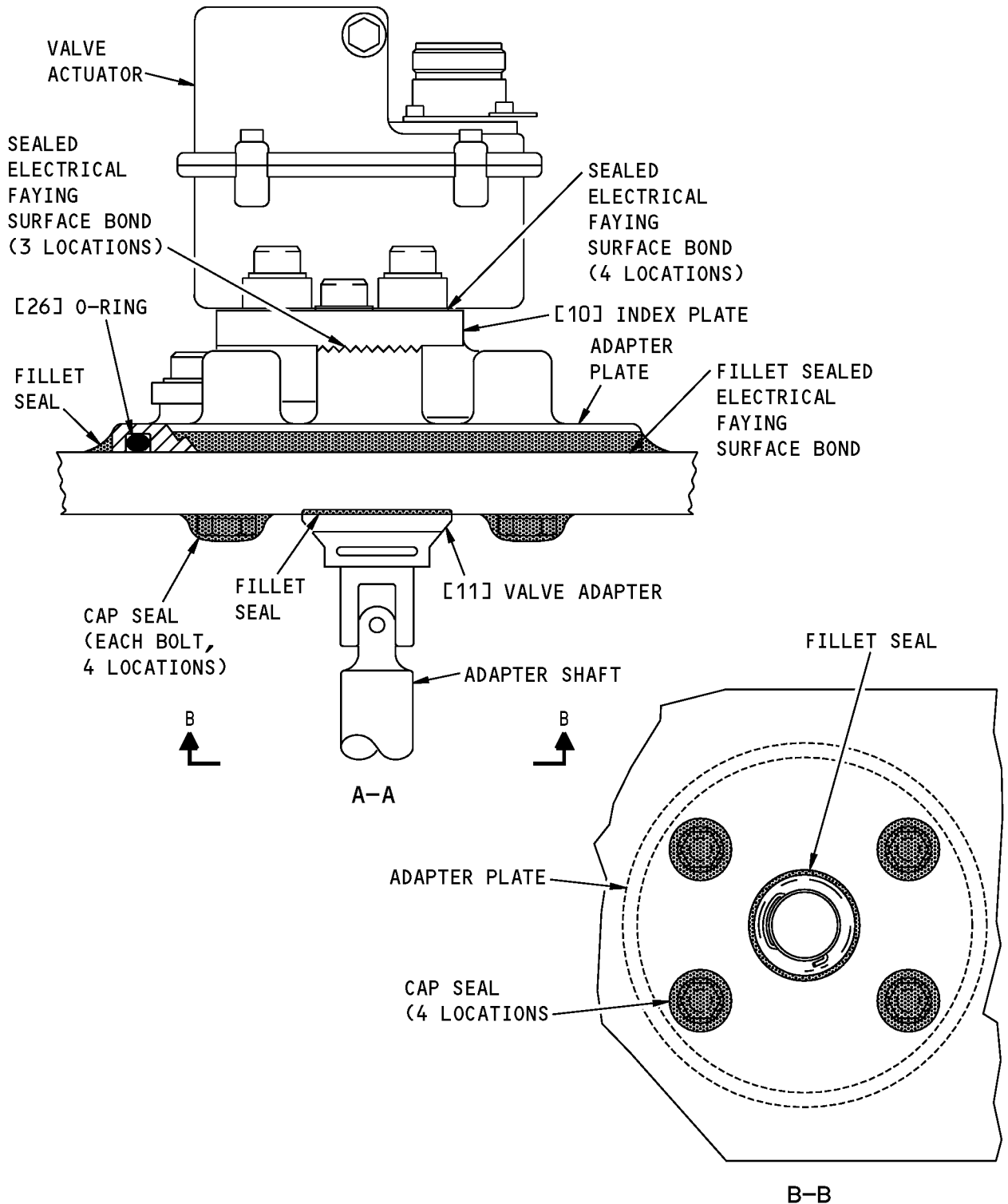


Spar Valve Adapter Installation
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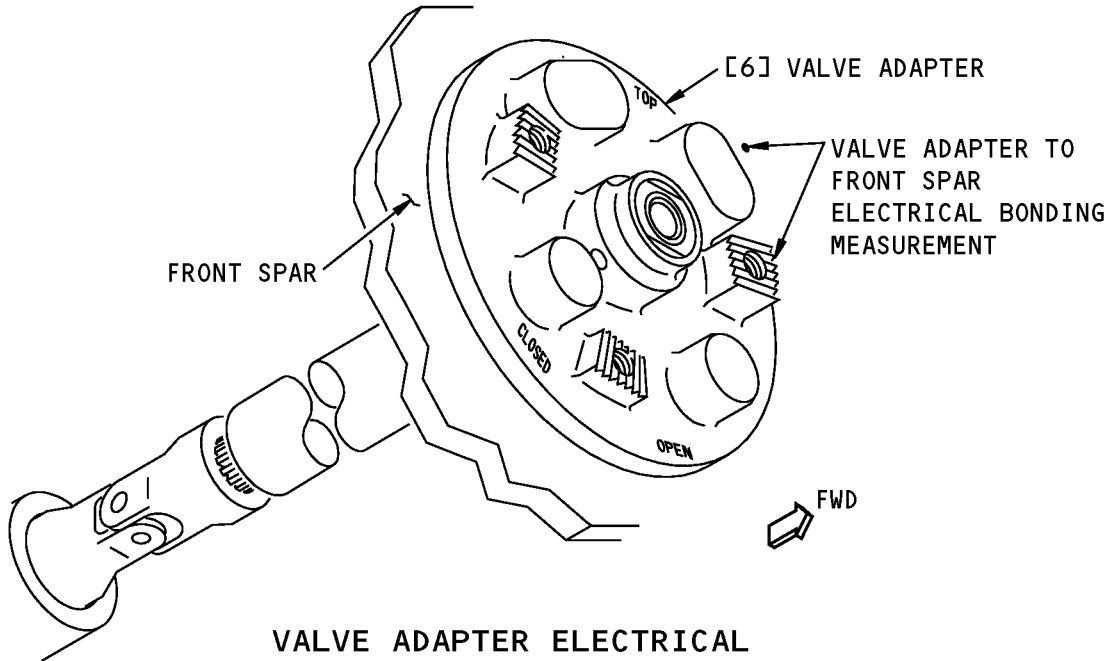
Spar Valve Adapter Installation
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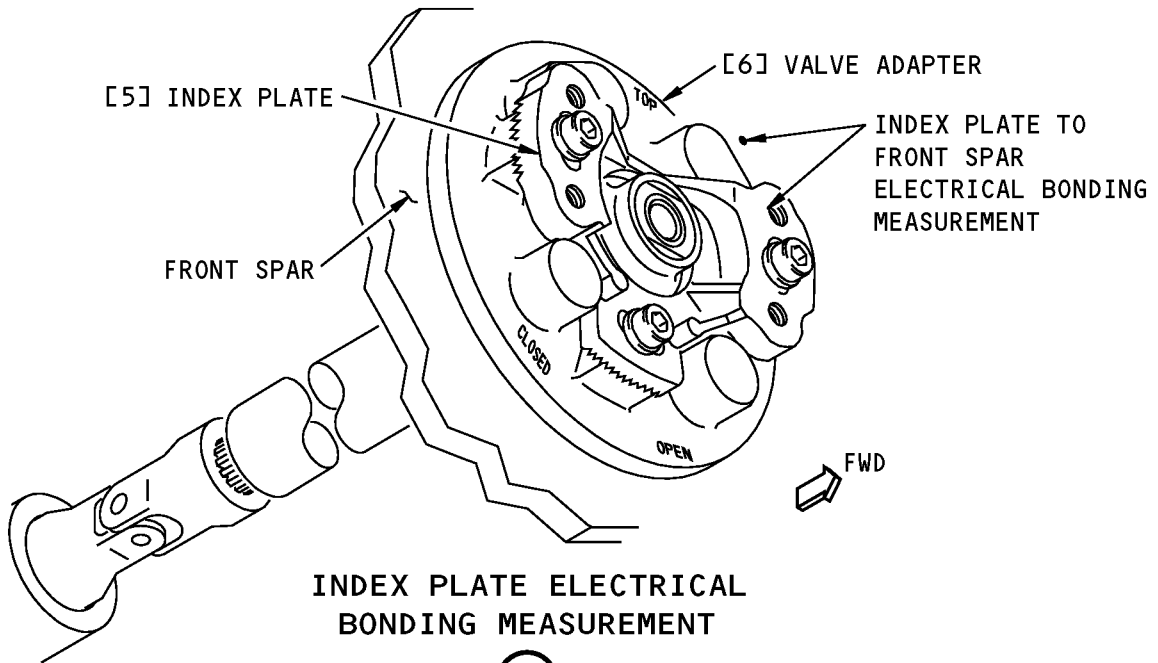
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VALVE ADAPTER ELECTRICAL BONDING MEASUREMENT

F



INDEX PLATE ELECTRICAL BONDING MEASUREMENT

G

Spar Valve Adapter Installation
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TASK 28-22-11-400-805

9. Install the Valve Adapter of the Spar Valve

(Figure 404)

A. General

- (1) This task contains these procedures:
 - (a) Install the Valve Adapter
 - (b) Install the Index Plate
 - (c) Spar Valve Operational Tests
 - (d) Put the Airplane Back to the Usual Condition

B. References

Reference	Title
06-43-00-800-801	Engine and Nacelle Strut Access Doors and Panels (P/B 201)
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
20-30-88-910-801	Final Cleaning of Metal Prior to Non-structural Bonding (Series 88) (P/B 201)
20-30-92-910-801	Final Cleaning Prior to General Sealing (Series 92) (P/B 201)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-600-801	Apply the Corrosion Resistant Finish (Topcoat) (P/B 701)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-22-00-710-801	Engine Fuel Spar Valve - Electrical Control and Indication Test (P/B 501)
28-22-00-720-804	Engine Fuel Spar Valve Installation - Test (P/B 501)
51-31-00-390-804	Fillet Seal Application (P/B 201)
SWPM 20-20-00	Electrical Bonds and Grounds

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

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Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)
COM-2481	Tool - Sealant Removal, BAC5000, PSD 6-184 Approved (Part #: 1-6390-A, Supplier: 63318, A/P Effectivity: 737-ALL) (Part #: 10810, Supplier: \$0855, A/P Effectivity: 737-ALL) (Part #: 234350, Supplier: \$0857, A/P Effectivity: 737-ALL) (Part #: 311, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: 411B60, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: 411B90, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: DAD5013, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: DFD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: J5-0275-2010, Supplier: 435R8, A/P Effectivity: 737-ALL) (Part #: SCD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: ST982LF, Supplier: 3Z323, A/P Effectivity: 737-ALL) (Part #: TS1275-4, Supplier: 1DWR5, A/P Effectivity: 737-ALL)
COM-4746	Handle - Sealant Removal Tool (Part #: 310/1, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: SHN0272, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: SHR0272-T, Supplier: 1DWR5, A/P Effectivity: 737-ALL)
STD-123	Brush - Soft Bristle

D. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
A50105	Sealant - Integral Fuel Tank Sealed Electrical Faying Surface Bond	SAE AMS-S-8802 Class A
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
B01012	Solvent - Final Cleaning Prior To General Sealing (AMM 20-30-92/201) - Series 92	
C00064	Coating - Aluminum Chemical Conversion	BAC5719, Type II, Class A (MIL-C-5541, Class A)
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20, Type II
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5
G50021	Pad - General Purpose Scrubbing - Scotch-Brite 96W	

E. Location Zones

Zone	Area
434	Engine 1 - Aft Strut Fairing
444	Engine 2 - Aft Strut Fairing
511	Left Wing - Leading Edge To Front Spar

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Zone	Area
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
611	Right Wing - Leading Edge to Front Spar
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

F. Access Panels

Number	Name/Location
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
532BB	Main Tank Access Door - Wing Station 265
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02
632BB	Main Tank Access Door - Wing Station 265

G. Install the Valve Adapter

SUBTASK 28-22-11-120-002

- (1) Remove the old sealant and clean the front spar, valve adapter [11], index plate [10], and the fasteners (if re-used).
 - (a) Use sealant removal tool, COM-2481, and sealant tool removal handle, COM-4746 (or equivalent), to remove the old sealant from the front spar.
 - (b) If new, use an abrasive pad to remove the anodized finish from the faying surfaces of the valve adapter [11] and index plate [10] (SWPM 20-20-00).

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (c) To remove the remaining sealant, grease, oil, dirt, and other contamination from the components, use one of these brushes/pads soaked with Series 92 solvent, B01012 (TASK 20-30-92-910-801):
 - 1) soft bristle brush, STD-123
 - 2) cotton wiper, G00034
 - 3) Scotch-Brite 96W pad, G50021

SUBTASK 28-22-11-110-003

- (2) Do these steps to prepare the valve adapter [11] and the front spar for a fillet sealed electrical faying surface bond (View D):

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WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (a) Final clean the contact surfaces of the valve adapter [11] and the front spar with a cotton wiper, G00034, soaked with Series 88 solvent, B01008 (TASK 20-30-88-910-801).
- (b) Rub dry with a clean, dry cotton wiper, G00034.
- (c) Continue to clean and dry the surface until the dry cotton wiper, G00034, stays clean.

SUBTASK 28-22-11-430-005

- (3) On the outside of the airplane, do these steps:
 - (a) Put a thin layer of petrolatum grease, D00504, on the new O-ring [26].
 - (b) Put the O-ring [26] in the O-ring groove of the valve adapter [11].
 - (c) Put the adapter shaft attached to the valve adapter [11] through the hole in the front spar.
 - (d) Make sure the shoulder of the valve adapter [11] does not bind in the opening of the front spar.

SUBTASK 28-22-11-010-034

WARNING: DO THE PURGING AND FUEL TANK ENTRY PROCEDURE. FAILURE TO FOLLOW THE PURGING AND FUEL TANK ENTRY PROCEDURE COULD CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Go into the applicable main tank to the spar valve location (TASK 28-11-00-910-802) (View A).

SUBTASK 28-22-11-420-027

- (5) Do these steps to install the valve adapter [11]:
 - (a) Make sure that the index marks on the spar valve body [20] are aligned (View E).

NOTE: A small misalignment of the index marks is satisfactory.
 - (b) Engage the adapter shaft of the valve adapter [11] with the spar valve body [20] (View C).
 - (c) Apply sealant to the shank and the threads of the four bolts [21].

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

 - 1) Use BMS5-45 Class B sealant, A00767, for the wet installation of the bolts [21].
 - 2) Make sure the sealant applied to the fasteners is approximately 0.060 in. (1.524 mm) thick.
 - (d) Install the four bolts [21] and washers [22] to attach the valve adapter [11].

SUBTASK 28-22-11-765-005

- (6) On the outside of the fuel tank, measure the bonding resistance between one of the raised serrated surfaces of the valve adapter [11] (bare metal surface) and the front spar (View F).
 - (a) Use an electrical bonding meter, COM-1550 (SWPM 20-20-00).

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- (b) Make sure the bonding resistance is 0.0005 ohm (0.5 milliohm) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- 1) If the bonding resistance is more than 0.0005 ohm (0.5 milliohm), then do the applicable procedure in this task: Rework the Electrical Faying Surface Bonds for the Spar Valve, TASK 28-22-11-300-801.

SUBTASK 28-22-11-420-028

- (7) On the inside of the tank, apply a fillet seal of BMS5-45 Class B sealant, A00767, to these components (TASK 51-31-00-390-804) (View A-A):

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- (a) The four bolts [21]
(b) The periphery of the front spar penetration and the stationary part of the adapter plate.

NOTE: Make sure the sealant does not touch the adapter shaft or other parts of the valve adapter that rotate.

SUBTASK 28-22-11-420-029

- (8) On the outside of the tank, apply a fillet seal of BMS5-45 Class B sealant, A00767, around the periphery of the valve adapter [11] (TASK 51-31-00-390-804) (View A-A).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

SUBTASK 28-22-11-860-015

- (9) Do this task to close the fuel tank: Fuel Tank Closure, TASK 28-11-00-410-801.

- (a) Close the applicable access panel(s):

<u>Number</u>	<u>Name/Location</u>
532BB	Main Tank Access Door - Wing Station 265
632BB	Main Tank Access Door - Wing Station 265

Main Tank Access Door Installation, TASK 28-11-11-400-801.

SUBTASK 28-22-11-820-010

- (10) Do this task: Spar Valve Alignment, TASK 28-22-11-820-801.

H. Install the Index Plate

SUBTASK 28-22-11-820-011

- (1) Do this procedure after you have correctly aligned and marked the alignment position of the index plate and adapter plate per this task: Spar Valve Alignment, TASK 28-22-11-820-801.

SUBTASK 28-22-11-020-021

- (2) Remove the index plate [10] from the valve adapter [11].

SUBTASK 28-22-11-420-030

- (3) Do these steps to prepare the index plate [10] and the valve adapter [11] for a sealed electrical faying surface bond (SWPM 20-20-00):

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- (a) Protect the alignment reference mark when you clean the index plate [10] and the valve adapter [11] for the electrical bond.

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (b) Final clean the contact surfaces with a cotton wiper, G00034, soaked with Series 88 solvent, B01008 (TASK 20-30-88-910-801).
- (c) Rub dry with a clean, dry cotton wiper, G00034.
- (d) Continue to clean and dry the surface until the dry cotton wiper, G00034, stays clean.
- (e) Apply a thin continuous layer of sealant to the serrated surface of the index plate [10] (three locations).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- 1) Use Pro Seal 890A or PR-1440A sealant, A50105, for the faying surface seal.
- 2) Make sure the sealant layer is approximately 0.005 in. (0.127 mm) thick.

- (f) Apply sealant to the shank and the threads of the two top index screws [24] and the bottom index screw [25].

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- 1) Use Pro Seal 890A or PR-1440A sealant, A50105, for the wet installation of the index screws.
- 2) Make sure the sealant applied to the fasteners is approximately 0.060 in. (1.524 mm) thick.

SUBTASK 28-22-11-420-039

- (4) Do these steps to install the index plate [10]:

- (a) Align the index plate [10] and the valve adapter [11] with the alignment reference mark that you made during the spar valve alignment procedure.
- (b) Install the two index screws [24] and washers [23] to the top index mounting hole positions.
- (c) Install the index screw [25] and washer [23] to the bottom index mounting hole position.
- (d) Tighten the index screws to 22 ± 1 in-lb (2.5 ± 0.1 N·m).
- (e) Make sure the sealant is continuously squeezed out along the edges of the contact surfaces.
- (f) If there are gaps, bubbles or voids in the sealant squeeze out, then disassemble and apply more sealant.
- (g) Shape the squeezed out sealant into a fillet seal (TASK 51-31-00-390-804).

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- (h) As an option, remove the extra squeezed out sealant.

NOTE: Make sure the sealant that remains is flush with the mating part edges.

SUBTASK 28-22-11-765-006

- (5) Measure the bonding resistance between one of the actuator feet contact surfaces on the index plate [10] (bare metal surface) and the front spar (View G).
- (a) Use an electrical bonding meter, COM-1550 (SWPM 20-20-00).
- (b) Make sure the bonding resistance is 0.002 ohm (2.0 milliohm) or less.
- 1) If the bonding resistance is more than 0.002 ohm (2.0 milliohms), then do the applicable procedure in this task: Rework the Electrical Faying Surface Bonds for the Spar Valve, TASK 28-22-11-300-801.

SUBTASK 28-22-11-420-036

- (6) Lockwire the two top index screws [24] and the bottom index screw [25] to the index plate [10].

SUBTASK 28-22-11-790-002

- (7) Do this task: Install the Actuator of the Spar Valve, TASK 28-22-11-400-804.

SUBTASK 28-22-11-370-004

- (8) Do this task to apply protective finishes to the bare areas of the front spar: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

NOTE: Re-apply the protective finishes to the front spar at all bare areas not covered by the fillet seal, and where the electrical bonding probe removed the finishes.

- (a) These are the protective finishes:
- 1) Alodine 600 coating, C00064
- 2) BMS 10-20 coating, C00307.

I. Spar Valve Operational Tests

NOTE: These tests will make sure the spar valve electrical operation is correct, the spar valve plate alignment is correct, and that there are no fuel leaks through the front spar.

SUBTASK 28-22-11-760-003

- (1) For the applicable spar valve, do these tasks:
- (a) Engine Fuel Spar Valve - Electrical Control and Indication Test, TASK 28-22-00-710-801.
- NOTE:** This test is done when you install the valve actuator.
- (b) Engine Fuel Spar Valve Installation - Test, TASK 28-22-00-720-804.

SUBTASK 28-22-11-790-006

- (2) Do this leak check if you have replaced the valve adapter [11]:

NOTE: The leak check is only necessary if you have done a fuel tank entry and replaced the valve adapter [11]. It is not necessary if you have replaced or aligned the index plate [10] for adjustment purposes only.

- (a) Refuel the tank that contains the replaced valve adapter [11] to a minimum of 4400 pounds (2000 kilograms) (TASK 12-11-00-650-802).

NOTE: This is the fuel quantity necessary to make sure there are no leaks at the front spar.

- (b) Make sure there are no fuel leaks at the valve adapter [11] installation on the front spar.

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HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207 (Continued)

(c) Make sure there are no fuel leaks at the applicable access door(s):

<u>Number</u>	<u>Name/Location</u>
532BB	Main Tank Access Door - Wing Station 265
632BB	Main Tank Access Door - Wing Station 265

J. Put the Airplane Back to the Usual Condition

SUBTASK 28-22-11-410-010

(1) Close the applicable access panel(s):

<u>Number</u>	<u>Name/Location</u>
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

SUBTASK 28-22-11-410-011

(2) Close the applicable access door(s):

<u>Number</u>	<u>Name/Location</u>
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2

Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801.

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END OF TASK

TASK 28-22-11-820-801

10. Spar Valve Alignment

(Figure 405)

A. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

<u>Reference</u>	<u>Description</u>
COM-1587	Wrench - Torque, 30 in-lbs (4 N-m) (Part #: TE3FUA, Supplier: 55719, A/P Effectivity: 737-ALL)
SPL-1771	Equipment - Alignment, Fuel Shutoff Valve (Part #: B28009-1, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

B. Location Zones

<u>Zone</u>	<u>Area</u>
621	Right Wing - Leading Edge to Front Spar
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

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C. Prepare for the Procedure

SUBTASK 28-22-11-010-038

- (1) Prepare the valve adapter [11] for the alignment procedure.

HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207

- (a) If not previously removed, do this task: Remove the Actuator of the Spar Valve, TASK 28-22-11-000-801

HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

- (b) If not previously removed, do this task: Remove the Actuator of the Spar Valve, TASK 28-22-11-000-804

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- (c) If not previously removed, remove the index plate [10] from the adapter plate.

D. Spar Valve Alignment

SUBTASK 28-22-11-480-001

- (1) Do these steps to install the alignment tool [64] (fuel shutoff valve alignment equipment, SPL-1771) in the valve adapter [11] (View B):
 - (a) Position the index plate and align the serrated surfaces of the index plate and adapter plate.
 - (b) Loosely install the bottom index screw [65] to the index plate [10].
 - (c) Install the alignment tool [64].
 - (d) Put the alignment tool [64] in its position with the two guide pins in the holes left by the two alignment screws [61] that you removed. (scale [62] should be on the top of the tool).
 - (e) Make sure the spline on the tool engages with the spline on the shaft.

SUBTASK 28-22-11-820-004

- (2) Do these steps to align the valve adapter [11] (Procedure 1, optional to Procedure 2):

NOTE: This procedure finds the point where the internal valve butterfly engages the valve seal. The torque necessary to turn the shaft increases as the butterfly engages the seal, then decreases again as the butterfly leaves the other side of the seal. Once the edge of the seal is found, the valve shaft will then be turned to center the butterfly on the seal.

- (a) Put the tool handle in the extreme counterclockwise position.
- (b) Slowly and smoothly turn the handle to the extreme clockwise position while you note the changes in the torque necessary to turn the handle.
- (c) Do the previous steps as many times as necessary to find the point in the rotation where the torque necessary to turn the handle increases significantly.
- (d) If you cannot find the position in the rotation where the torque increases significantly, then use Procedure 2 below.
- (e) Put the shaft in the extreme counterclockwise position again.
- (f) Slowly and smoothly turn the handle of the tool clockwise until a distinct increase in torque is found and immediately stop turning the handle.
- (g) Read the scale [62] on the tool.

NOTE: This is the point where the valve butterfly starts to engage the edge of the seal.

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- (h) Turn the handle 13 degrees more in the clockwise direction (the scale is calibrated in degrees).

NOTE: The valve butterfly is now centered on the valve seal.

NOTE: If you turn the handle past the target value, do not turn the handle back in the counterclockwise direction again. You must start the procedure again with the handle in the extreme counterclockwise position.

SUBTASK 28-22-11-820-005

- (3) Do these steps to align the valve adapter [11] (Procedure 2, optional to Procedure 1):

NOTE: A torque wrench (30 in-lbs), COM-1587 is necessary to do this procedure.

- (a) Put the tool handle in the extreme counterclockwise position.
- (b) Slowly and smoothly turn the tool handle to the extreme clockwise position while you monitor the torque that you apply to the handle.
- (c) Write down the maximum torque that you apply to the tool while you turn it from the extreme counterclockwise position to the extreme clockwise position.
- (d) Turn the tool back to the extreme counterclockwise position.
- (e) Turn the shaft clockwise again at approximately the same rate that you used before.
- (f) Stop at the position where the torque increases to approximately two-thirds of the maximum torque that you wrote down before.
- (g) Read the scale on the tool at this position.

NOTE: This is the position where valve butterfly starts to engage the edge of the seal.

- (h) Turn the handle 13 more degrees in the clockwise direction past the reading from the previous step.

NOTE: The butterfly valve is now centered on the valve seal.

NOTE: If you turn the valve past the target value, do not turn it back in the counterclockwise direction. You must start again with the tool handle in the extreme counterclockwise position.

SUBTASK 28-22-11-820-006

- (4) Tighten the lockscrew [63] on the alignment tool [64] to keep the alignment tool [64] in its position on the valve adapter [11].

SUBTASK 28-22-11-820-007

- (5) Turn the index plate [10] until the actuator mounting holes in the index plate are aligned with the two upper holes for the alignment screws [61].

SUBTASK 28-22-11-820-008

- (6) Insert the two alignment screws [61] into the holes for the actuator mounting screws to hold the index plate [10] in alignment with the valve adapter [11] (this is the final adjustment of the position of the index plate).

SUBTASK 28-22-11-420-011

- (7) Tighten the bottom index screw [65].

SUBTASK 28-22-11-020-009

- (8) Carefully disengage the two alignment screws [61].

SUBTASK 28-22-11-080-001

- (9) Loosen the lockscrew [63] and carefully remove the alignment tool [64].

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SUBTASK 28-22-11-420-012

- (10) Use a fine point felt pen to apply a reference mark between the index plate [10] and the adapter plate of the valve adapter [11] at one of the serrated attachment points.

HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207

SUBTASK 28-22-11-420-013

- (11) Continue with the index plate installation procedure in this task: Install the Valve Adapter of the Spar Valve, TASK 28-22-11-400-802.

HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

SUBTASK 28-22-11-420-031

- (12) Continue with the index plate installation procedure in this task: Install the Valve Adapter of the Spar Valve, TASK 28-22-11-400-805.

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————— **END OF TASK** —————

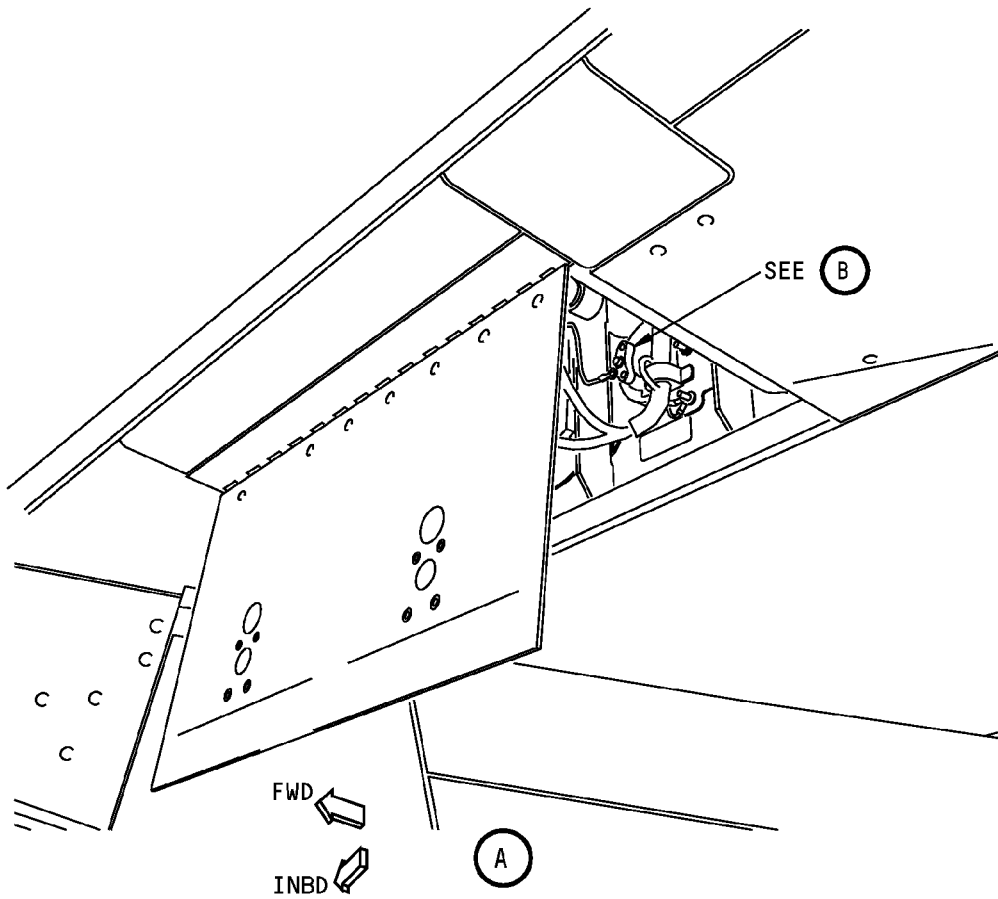
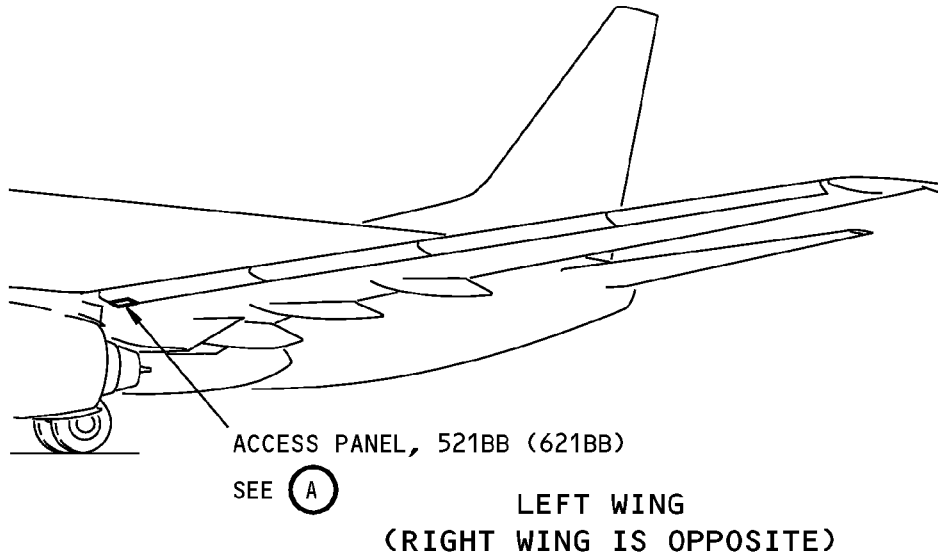
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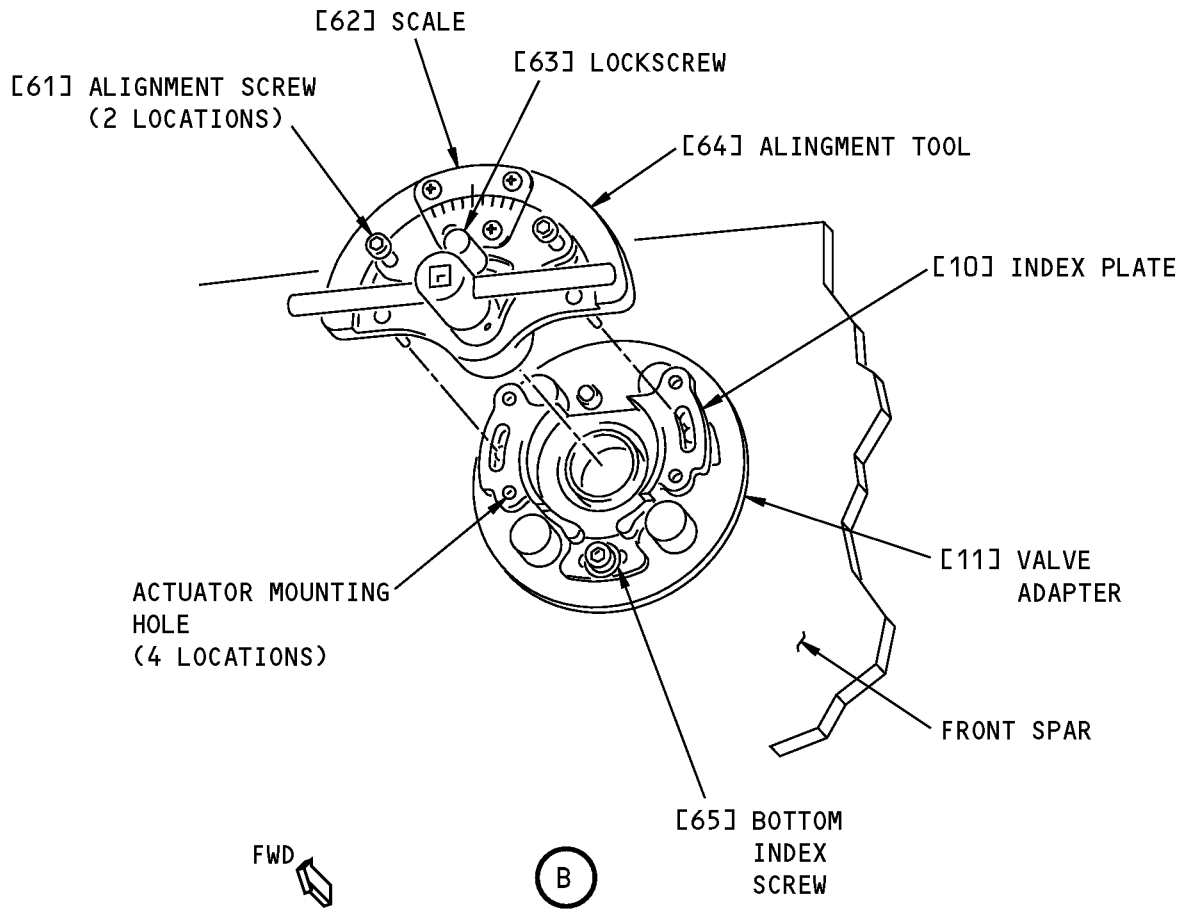
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**Spar Valve Alignment
Figure 405 (Sheet 1 of 2)/28-22-11-990-803**

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Spar Valve Alignment
Figure 405 (Sheet 2 of 2)/28-22-11-990-803

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TASK 28-22-11-000-803

11. Remove the Valve Body of the Spar Valve

(Figure 406)

A. References

Reference	Title
06-43-00-800-801	Engine and Nacelle Strut Access Doors and Panels (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-22-15-000-801	Fuel Line, Fitting and Coupling - Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

B. Location Zones

Zone	Area
434	Engine 1 - Aft Strut Fairing
444	Engine 2 - Aft Strut Fairing
511	Left Wing - Leading Edge To Front Spar
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
611	Right Wing - Leading Edge to Front Spar
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Access Panels

Number	Name/Location
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2
532BB	Main Tank Access Door - Wing Station 265
632BB	Main Tank Access Door - Wing Station 265

D. Prepare for the Procedure

SUBTASK 28-22-11-860-006

- (1) Set the fuel control switch to the cutoff position.

SUBTASK 28-22-11-650-003

- (2) Defuel the applicable main fuel tank (TASK 28-26-00-650-801) or transfer fuel out of the applicable tank (TASK 28-26-00-650-802).

SUBTASK 28-22-11-860-020

WARNING: OBEY THE PRECAUTIONS FOR PURGING, AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (3) Obey the fuel tank entry precautions (TASK 28-11-00-910-802).

SUBTASK 28-22-11-650-004

- (4) Drain and purge the applicable main fuel tank (TASK 28-11-00-910-802).

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SUBTASK 28-22-11-010-007

(5) Open the applicable access panel(s):

<u>Number</u>	<u>Name/Location</u>
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2

Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801.

SUBTASK 28-22-11-010-004

(6) Remove the applicable fuel tank access door(s):

(TASK 28-11-11-000-801)

<u>Number</u>	<u>Name/Location</u>
532BB	Main Tank Access Door - Wing Station 265
632BB	Main Tank Access Door - Wing Station 265

Main Tank Access Door Removal, TASK 28-11-11-000-801.

E. Remove the Valve Body of the Spar Valve

SUBTASK 28-22-11-010-005

WARNING: DO THE PURGING AND FUEL TANK ENTRY PROCEDURE. FAILURE TO FOLLOW THE PURGING AND FUEL TANK ENTRY PROCEDURE COULD CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Go into the applicable main tank (TASK 28-11-00-910-802).

SUBTASK 28-22-11-020-010

(2) Disconnect the two flexible full couplings [32] from each side of the spar valve body [20] (TASK 28-22-15-000-801) (View B).

SUBTASK 28-22-11-020-011

(3) Hold the spar valve body [20] and remove the four screws [33] and washers [34] (View C).

SUBTASK 28-22-11-020-012

(4) Disengage the spar valve body [20] from the adapter shaft (View C).

SUBTASK 28-22-11-020-013

(5) Remove the spar valve body [20].

SUBTASK 28-22-11-480-002

(6) Put covers on the open ends of the fuel line [31] to keep unwanted materials out.

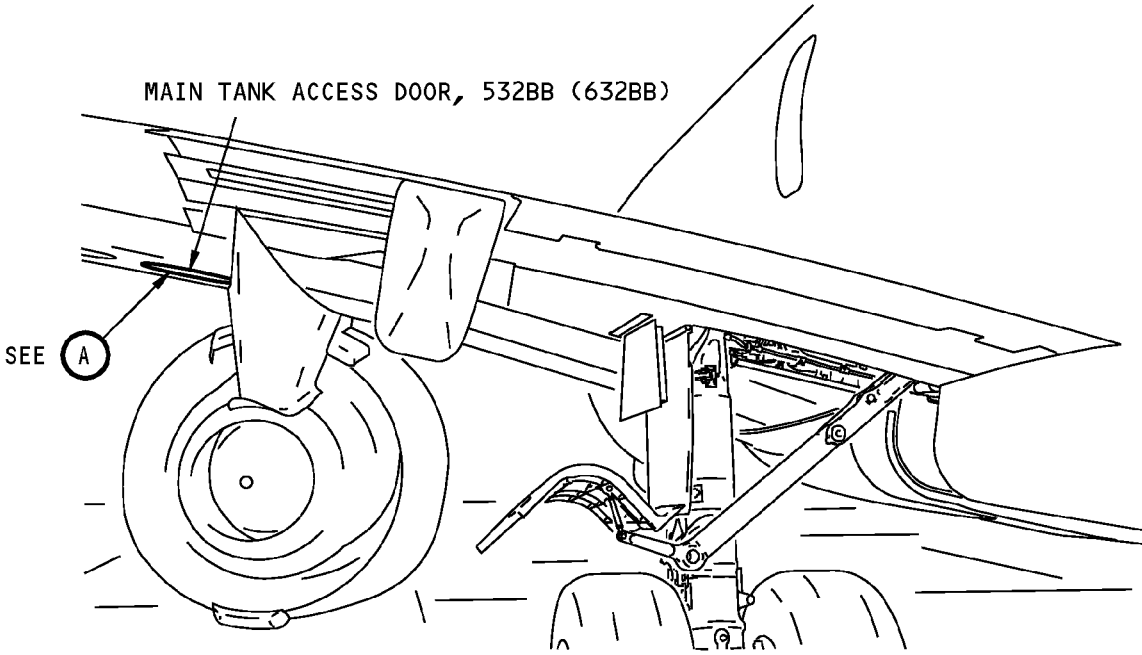
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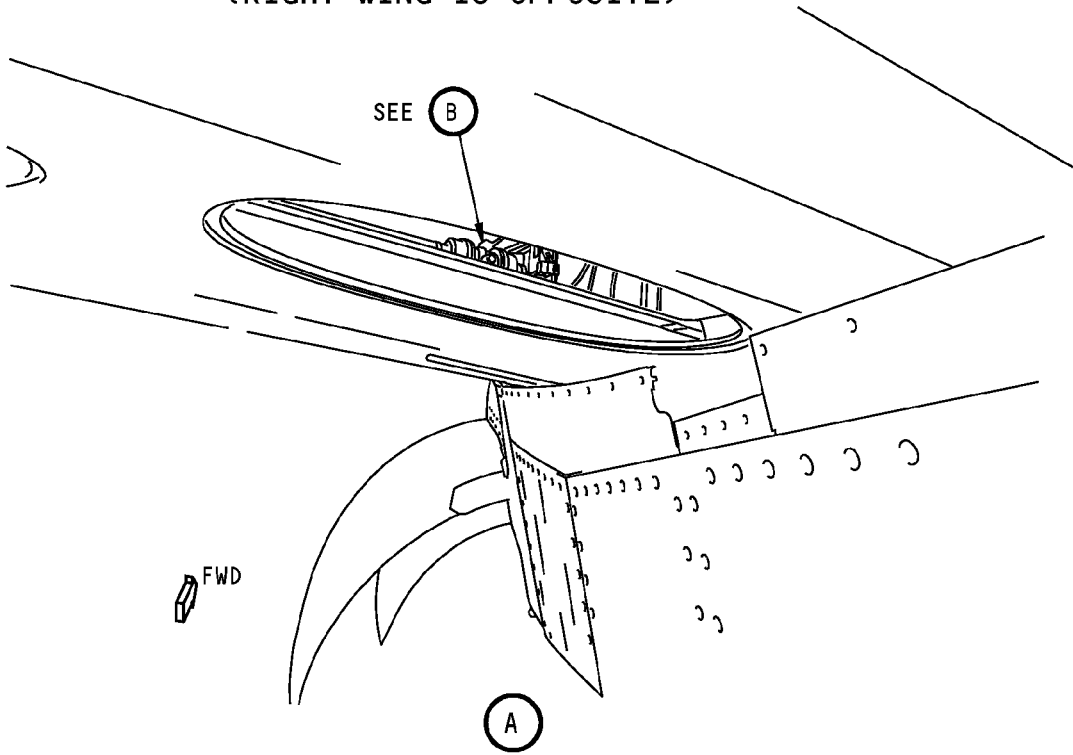
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**LEFT WING
(RIGHT WING IS OPPOSITE)**



**Spar Valve Body Installation
Figure 406 (Sheet 1 of 2)/28-22-11-990-807**

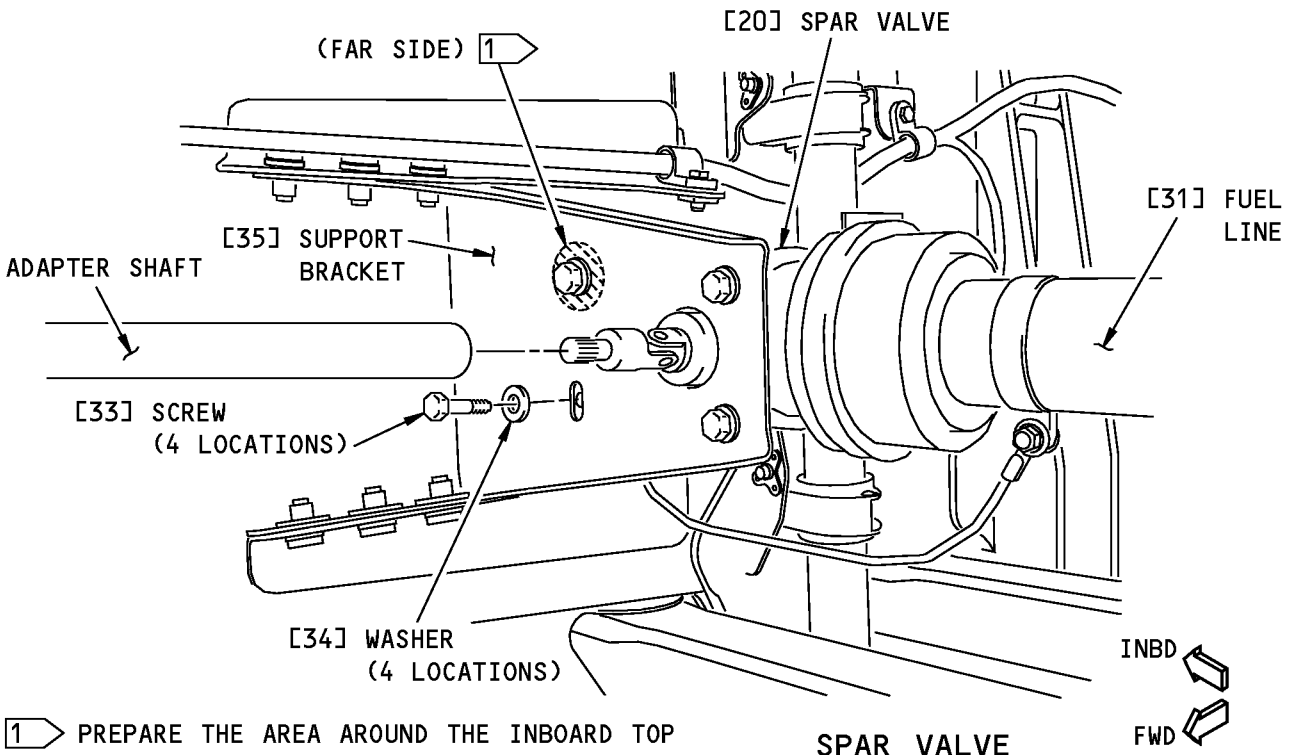
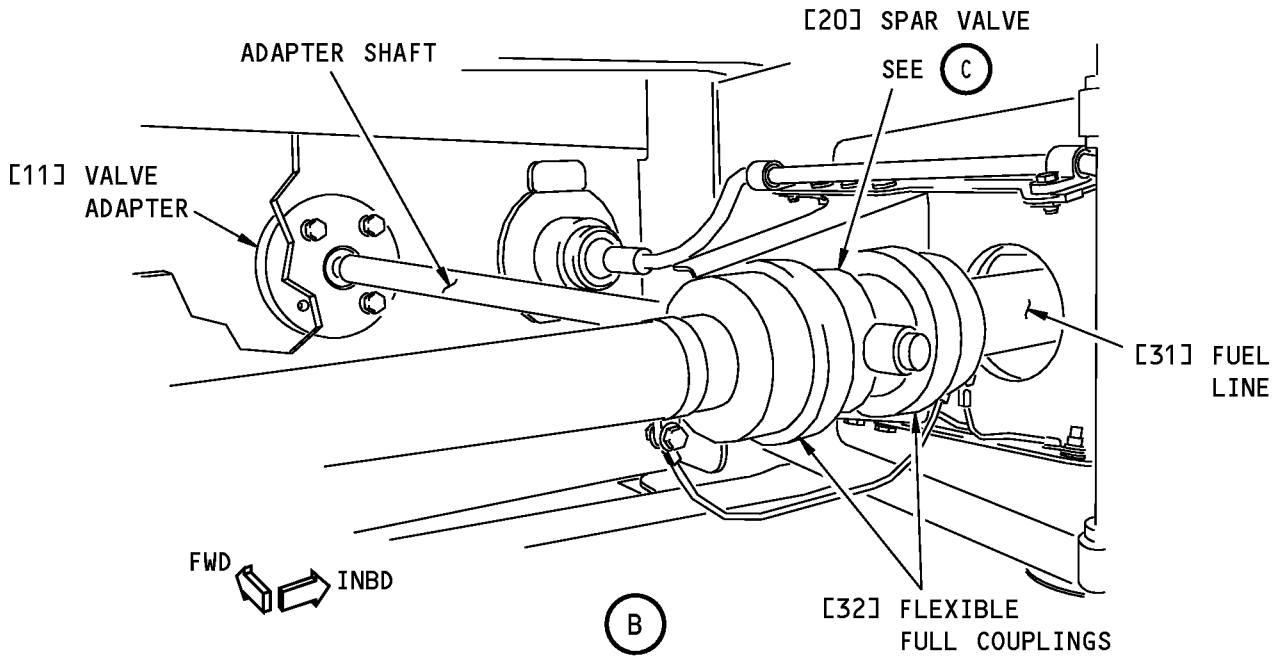
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- 1 PREPARE THE AREA AROUND THE INBOARD TOP FASTENER HOLE AND THE CONTACT SURFACE OF THE VALVE BODY FOR AN UNSEALED ELECTRICAL FAYING SURFACE BOND (SWPM 20-20-00).

Spar Valve Body Installation
Figure 406 (Sheet 2 of 2)/28-22-11-990-807

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TASK 28-22-11-400-803

12. Install the Valve Body of the Spar Valve

(Figure 406)

A. References

Reference	Title
06-43-00-800-801	Engine and Nacelle Strut Access Doors and Panels (P/B 201)
20-30-88	AIRPLANE STRUCTURE CLEANING SOLVENTS (Series 88)
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-22-00-720-804	Engine Fuel Spar Valve Installation - Test (P/B 501)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)
SWPM 20-20-00	Standard Wiring Practices Manual

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)

C. Consumable Materials

Reference	Description	Specification
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

D. Location Zones

Zone	Area
434	Engine 1 - Aft Strut Fairing
444	Engine 2 - Aft Strut Fairing
511	Left Wing - Leading Edge To Front Spar
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
611	Right Wing - Leading Edge to Front Spar
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

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E. Access Panels

Number	Name/Location
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2
532BB	Main Tank Access Door - Wing Station 265
632BB	Main Tank Access Door - Wing Station 265

F. Install the Valve Body

SUBTASK 28-22-11-010-006

WARNING: DO THE PURGING AND FUEL TANK ENTRY PROCEDURE. FAILURE TO FOLLOW THE PURGING AND FUEL TANK ENTRY PROCEDURE COULD CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Go into the applicable main tank (TASK 28-11-00-910-802).

SUBTASK 28-22-11-080-002

- (2) Remove the covers from the fuel line [31].

SUBTASK 28-22-11-110-004

- (3) Do these steps to prepare the inboard top fastener hole of the support bracket [35] and the contact surface of the spar valve body [20] for an unsealed electrical faying surface bond (View C):

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (a) Final clean the contact surfaces of the support bracket [35] and the spar valve body [20] with a cotton wiper, G00034 soaked with Series 88 solvent, B01008 (SUBJECT 20-30-88).
- (b) Rub dry with a clean, dry cotton wiper, G00034.
- (c) Continue to clean and dry the surface until the dry cotton wiper, G00034 stays clean.

SUBTASK 28-22-11-420-032

- (4) Turn the universal joint fitting on the spar valve body [20] until the index marks are aligned.

NOTE: A small misalignment of the index marks is satisfactory.

SUBTASK 28-22-11-420-033

- (5) Put the spar valve body [20] into position.

SUBTASK 28-22-11-210-003

- (6) Make sure "TOP" shows on the top of the spar valve body [20].

SUBTASK 28-22-11-420-015

- (7) Engage the universal joint fitting on the spar valve body [20] into the adapter shaft.

SUBTASK 28-22-11-820-009

- (8) Align the spar valve body [20] with the support bracket [35].

SUBTASK 28-22-11-420-016

- (9) Install the four screws [33] and washers [34].

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SUBTASK 28-22-11-220-003

(10) Measure the bonding resistance between the spar valve body [20] and the airplane structure with an electrical bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure the bonding resistance is not more than 0.010 ohms (10 milliohms).

SUBTASK 28-22-11-420-019

(11) Connect the two flexible full couplings [32] between the spar valve body [20] and the fuel line [31] (TASK 28-22-15-400-801).

SUBTASK 28-22-11-860-016

(12) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

SUBTASK 28-22-11-410-002

(13) Install the applicable left or right main tank access door(s):

<u>Number</u>	<u>Name/Location</u>
532BB	Main Tank Access Door - Wing Station 265
632BB	Main Tank Access Door - Wing Station 265

Main Tank Access Door Installation, TASK 28-11-11-400-801.

SUBTASK 28-22-11-410-004

(14) Install the applicable access panel(s):

<u>Number</u>	<u>Name/Location</u>
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2

Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801.

SUBTASK 28-22-11-860-007

(15) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-22-11-710-004

(16) Do this test to do a leak check of the engine fuel spar valve that you replaced:

(a) Do this task: Engine Fuel Spar Valve Installation - Test, TASK 28-22-00-720-804.

SUBTASK 28-22-11-860-008

(17) Remove the electrical power if it is not necessary for other tasks (TASK 24-22-00-860-812).

END OF TASK

HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

TASK 28-22-11-300-801

13. Rework the Electrical Faying Surface Bonds for the Spar Valve

A. General

(1) This task contains these procedures:

- (a) Rework the Faying Surface Bond - Actuator to Index Plate
- (b) Rework the Faying Surface Bond - Index Plate to Adapter Plate
- (c) Rework the Faying Surface Bond - Adapter Plate to Front Spar
- (d) Rework the Bonding Jumper Bond

(2) Do this task if the measurement for the electrical bonding resistance is more than the allowed resistance value.

(3) The motor operated valve uses two electrical bonding paths:

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HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207 (Continued)

- (a) One bonding path is from the upper housing of the actuator through the bonding jumper to the stiffener.
- (b) The second bonding path is from the upper housing of the actuator to the bare metal surface of the front spar. The bond path is through the bare metal faying surfaces of the actuator (at the mounting feet), index plate, and adapter plate to the bare metal surface of the front spar.

NOTE: The actuator is divided into two sections, the upper housing section and the lower housing section. The two housing sections are separated by an electrical faying surface. You cannot repair or rework the faying surface between the housing sections at the airplane. When you do an electrical bonding measurement, make sure the measurement is done on the upper housing section of the actuator.

- (4) If the electrical bonding resistance is more than the maximum allowed resistance, you must disassemble the components, rework the faying surface, assemble the components, and then re-check the electrical bonding resistance. Continue to rework the faying surfaces until the electrical resistance between the components is within allowable resistance values.
- (5) Because the build-up of the spar valve includes several faying surface bonds, you may not know which faying surface bond is the cause of the problem. This task will help you isolate the location of the faying surface bond that needs to be reworked. The procedure does a check of the faying surface bond downstream of the bond that is in question.

B. References

Reference	Title
20-30-88-910-801	Final Cleaning of Metal Prior to Non-structural Bonding (Series 88) (P/B 201)
28-41-42-700-801	FQIS Shield Ground Terminal - Test (P/B 501)
SWPM 20-20-00	Electrical Bonds and Grounds

C. Consumable Materials

Reference	Description	Specification
A50051	Sealant - Temperature Resistant, Integral Fuel Tank Sealant - Pro-Seal 890B	SAE AMS-S-8802, Class B
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

D. Location Zones

Zone	Area
521	Left Wing - Leading Edge to Front Spar
621	Right Wing - Leading Edge to Front Spar

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HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207 (Continued)

E. Rework the Faying Surface Bond - Actuator to Index Plate

(Figure 402), (Figure 404)

NOTE: Do the steps in this procedure if the measurement for the electrical bonding resistance between the upper housing of the actuator and the front spar is more than 0.004 ohm (4.0 milliohms). The measurement is done with the bonding jumper and the electrical connector disconnected from the actuator.

NOTE: This is the repair bonding resistance value. The valve adapter installation bonding resistance value is 0.003 ohm (3.0 milliohm).

SUBTASK 28-22-11-010-035

(1) Do this task: Remove the Actuator of the Spar Valve, TASK 28-22-11-000-804.

SUBTASK 28-22-11-765-007

(2) Do these steps to do a check of the index plate to structure bonding path:

NOTE: These steps will tell you if the actuator to index plate faying surface bond is the cause of the problem, or if the index plate to adapter faying surface bond is the cause of the problem.

- (a) Remove the sealant and clean one of the contact surfaces on the index plate [10].
- (b) Measure the bonding resistance between the contact surface on the index plate [10] (bare metal surface) and the front spar (SWPM 20-20-00) (Figure 404, View G).
- (c) Make sure the bonding resistance is 0.002 ohm (2.0 milliohms) or less.
- (d) If the bonding resistance is not satisfactory, then do the steps in this procedure: Rework the Faying Surface Bond - Index Plate to Adapter Plate.
- (e) If the bonding resistance is satisfactory, then continue with the subsequent steps.

SUBTASK 28-22-11-040-001

(3) Do this task: Install the Actuator of the Spar Valve, TASK 28-22-11-400-804.

NOTE: This task will rework the faying surface bond and re-install the actuator.

SUBTASK 28-22-11-765-008

- (4) During the installation, do a check of the electrical bonding resistance between the upper housing of the actuator [15] and the front spar (SWPM 20-20-00) (Figure 402, View C).
 - (a) Do this measurement with the bonding jumper [14] and the electrical connector [5] disconnected.
 - (b) Make sure the bonding jumper [14] does not touch the actuator [15] during the bonding measurement.
 - (c) Make sure the bonding resistance is 0.004 ohm (4.0 milliohms) or less.

NOTE: This is the repair bonding resistance value. The valve adapter installation bonding resistance value is 0.003 ohm (3.0 milliohm).

- (d) If the bonding resistance is not satisfactory, then repeat the steps in this procedure.
- (e) If the bonding resistance is satisfactory, then continue with the steps to install the actuator [15] (TASK 28-22-11-400-804).

SUBTASK 28-22-11-710-008

(5) If you have replaced the valve adapter [11] or adjusted the index plate [10], then continue with the steps in this procedure: Spar Valve Operational Tests (TASK 28-22-11-400-805).

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F. Rework the Faying Surface Bond - Index Plate to Adapter Plate

(Figure 404)

NOTE: Do the steps in this procedure if the measurement for the electrical bonding resistance between the index plate and the front spar is more than 0.002 ohm (2.0 milliohms). The measurement is done with the actuator removed.

SUBTASK 28-22-11-010-036

(1) Do this procedure: Remove the Index Plate (TASK 28-22-11-000-805).

SUBTASK 28-22-11-765-009

(2) Do these steps to check the adapter plate to front spar bonding path:

NOTE: These steps will tell you if the index plate to adapter plate faying surface bond is the cause of the problem, or if the adapter plate to front spar faying surface bond is the cause of the problem.

- (a) Remove the sealant and clean one of the serrated contact surfaces on the valve adapter [11].
- (b) Measure the bonding resistance between the serrated contact surface on the valve adapter [11] and the front spar (SWPM 20-20-00) (View F).
- (c) Make sure the bonding resistance is 0.0015 ohm (1.5 milliohms) or less.

NOTE: This is the repair bonding resistance value. The valve adapter installation bonding resistance value is 0.0005 ohm (0.5 milliohm).

- (d) If the bonding resistance is not satisfactory, then do the steps in this procedure: Rework the Faying Surface Bond - Adapter Plate to Front Spar.
- (e) If the bonding resistance is satisfactory, then continue with the subsequent steps.

SUBTASK 28-22-11-040-002

(3) Do these steps to install the index plate [10]:

NOTE: These steps will re-align the spar valve, rework the faying surface, and re-install the index plate.

- (a) Do this task: Spar Valve Alignment, TASK 28-22-11-820-801.
- (b) Do this procedure: Install the Index Plate (TASK 28-22-11-400-805).

SUBTASK 28-22-11-765-010

(4) During the installation, check the electrical bonding resistance between the index plate [10] and the front spar (SWPM 20-20-00) (View G):

- (a) Make sure the bonding resistance is 0.002 ohm (2.0 milliohms) or less.
- (b) If the bonding resistance is not satisfactory, then repeat the steps in this procedure.
- (c) If the bonding resistance is satisfactory, then continue with the procedure to install the index plate [10] (TASK 28-22-11-400-805).

SUBTASK 28-22-11-760-001

(5) After you install the index plate [10], do this procedure: Spar Valve Operational Tests (TASK 28-22-11-400-805).

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G. Rework the Faying Surface Bond - Adapter Plate to Front Spar

(Figure 404)

NOTE: Do the steps in this procedure if the measurement for the electrical bonding resistance between the adapter plate and the front spar is more than 0.0015 ohm (1.5 milliohms).

SUBTASK 28-22-11-010-037

- (1) Do this procedure: Remove the Valve Adapter (TASK 28-22-11-000-805).

NOTE: A fuel tank entry is necessary to rework the faying surface of the valve adapter.

SUBTASK 28-22-11-040-003

- (2) Do this procedure: Install the Valve Adapter (TASK 28-22-11-400-805).

NOTE: These steps will rework the faying surface, and re-install the valve adapter.

SUBTASK 28-22-11-765-011

- (3) During the installation, do a check of the electrical bonding resistance between the valve adapter [11] and the front spar (SWPM 20-20-00) (View F).
 - (a) Make sure the bonding resistance is 0.0005 ohm (0.5 milliohm) or less.
 - (b) If the bonding resistance is not satisfactory, then repeat the steps in this procedure.
 - (c) If the bonding resistance is satisfactory, then continue with the steps to install the valve adapter [11] (TASK 28-22-11-400-805).

SUBTASK 28-22-11-040-004

- (4) After you install the valve adapter [11], do this procedure: Install the Index Plate (TASK 28-22-11-400-805).

H. Rework the Bonding Jumper Bond

(Figure 402)

HAP 032-036; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

NOTE: Do the steps in this procedure if the measurement for the electrical bonding resistance between the bonding jumper terminal and the stiffener is more than 0.0015 ohm (1.5 milliohms). The measurement is done with the bonding jumper disconnected from the actuator.

HAP 037-054, 101-999

NOTE: Do the steps in this procedure if the measurement for the electrical bonding resistance between the bonding jumper terminal and the front spar is more than 0.0015 ohm (1.5 milliohms). The measurement is done with the bonding jumper disconnected from the actuator.

HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

SUBTASK 28-22-11-030-003

- (1) Remove the sealant from the bonding jumper terminal attached to the structure.

SUBTASK 28-22-11-020-023

- (2) Remove the nut, two washers, and the bonding jumper.

SUBTASK 28-22-11-420-037

- (3) Do these steps to install the bonding jumper to the structure:

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WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (a) Final clean the contact surfaces with a cotton wiper, G00034, soaked with Series 88 solvent, B01008 (TASK 20-30-88-910-801).
 - 1) Rub dry with a clean, dry cotton wiper, G00034.
 - 2) Continue to clean and dry the surface until the dry cotton wiper, G00034, stays clean.
- (b) Install the nut, washers, and the bonding jumper to the structure.
- (c) Tighten the nut to 32 ± 3 in-lb (4 ± 1 N-m).

HAP 032-036; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

- (d) Measure the electrical bonding resistance between the loose end of bonding jumper and the stiffener (SWPM 20-20-00) (View C).
 - 1) Make sure the bonding resistance is 0.0015 ohm (1.5 milliohms) or less.

HAP 037-054, 101-999

- (e) Measure the electrical bonding resistance between the loose end of bonding jumper and the front spar (SWPM 20-20-00) (View C).
 - 1) Make sure the bonding resistance is 0.0015 ohm (1.5 milliohms) or less.

HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

- (f) If the bonding resistance is not satisfactory, then repeat the steps in this procedure.
- (g) Apply a cap seal of Pro-Seal 890B sealant, A50051, (or PR-1440B) over the nut and the terminal of the bonding jumper.

SUBTASK 28-22-11-420-038

- (4) Continue with this task: Install the Actuator of the Spar Valve, TASK 28-22-11-400-804.

HAP 032-036; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

SUBTASK 28-22-11-765-019

- (5) If you do the tests for the FQIS shield ground terminal, then continue with this task: FQIS Shield Ground Terminal - Test, TASK 28-41-42-700-801.

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SUBTASK 28-22-11-710-007

- (6) If you have replaced the valve adapter [11] or adjusted the index plate [10], then continue with the steps in this procedure: Spar Valve Operational Tests (TASK 28-22-11-400-805).

————— END OF TASK —————

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SPAR VALVE - INSPECTION/CHECK

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains a functional check of the bonding resistance of the spar valve actuator.

TASK 28-22-11-200-801

2. Spar Valve Actuator - Bonding Resistance Check

(Figure 601)

A. General

- (1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
SWPM 20-20-00	Electrical Bonds and Grounds

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)

D. Location Zones

Zone	Area
521	Left Wing - Leading Edge to Front Spar
621	Right Wing - Leading Edge to Front Spar

E. Access Panels

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

F. Prepare for the Procedure

SUBTASK 28-22-11-865-004

- (1) Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	5	C00540	FUEL SPAR VALVE IND

SUBTASK 28-22-11-865-005

- (2) For the left spar valve actuator,

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Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	4	C00359	FUEL SPAR VALVE ENG 1

SUBTASK 28-22-11-865-006

(3) For the right spar valve actuator,

Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2

SUBTASK 28-22-11-010-042

(4) Open the applicable access panel(s):

<u>Number</u>	<u>Name/Location</u>
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

G. Electrical Bonding Measurement

SUBTASK 28-22-11-710-009

(1) Move the manual override lever to the fully CLOSED position.

SUBTASK 28-22-11-862-004

(2) Disconnect the electrical connector from the actuator.

SUBTASK 28-22-11-765-020

(3) Measure the electrical bonding resistance between the between the actuator (at the electrical connector flange) and the spar with a bonding meter, COM-1550 (SWPM 20-20-00) .

(a) Make sure the bonding resistance is 0.005 ohm (5.0 milliohms) or less.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-11-861-005

(1) Connect the electrical connector to the actuator.

SUBTASK 28-22-11-410-013

(2) Close the applicable access panel(s):

<u>Number</u>	<u>Name/Location</u>
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

SUBTASK 28-22-11-865-007

(3) Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	5	C00540	FUEL SPAR VALVE IND

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SUBTASK 28-22-11-865-008

(4) For the left actuator,

Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	4	C00359	FUEL SPAR VALVE ENG 1

SUBTASK 28-22-11-865-009

(5) For the right actuator,

Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	3	C00360	FUEL SPAR VALVE ENG 2

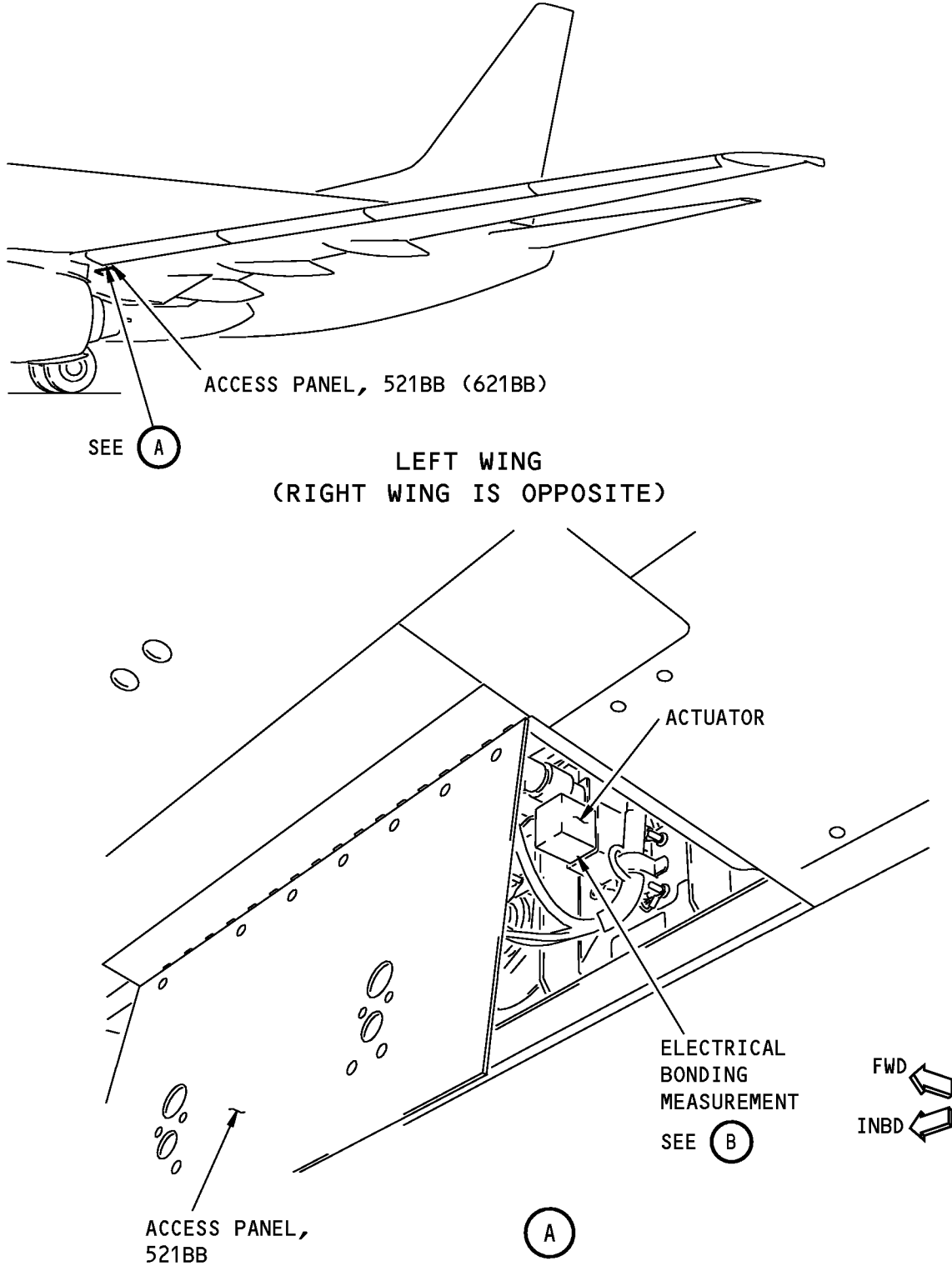
————— **END OF TASK** —————

<p>EFFECTIVITY</p> <p>HAP 037-054, 101-999</p>
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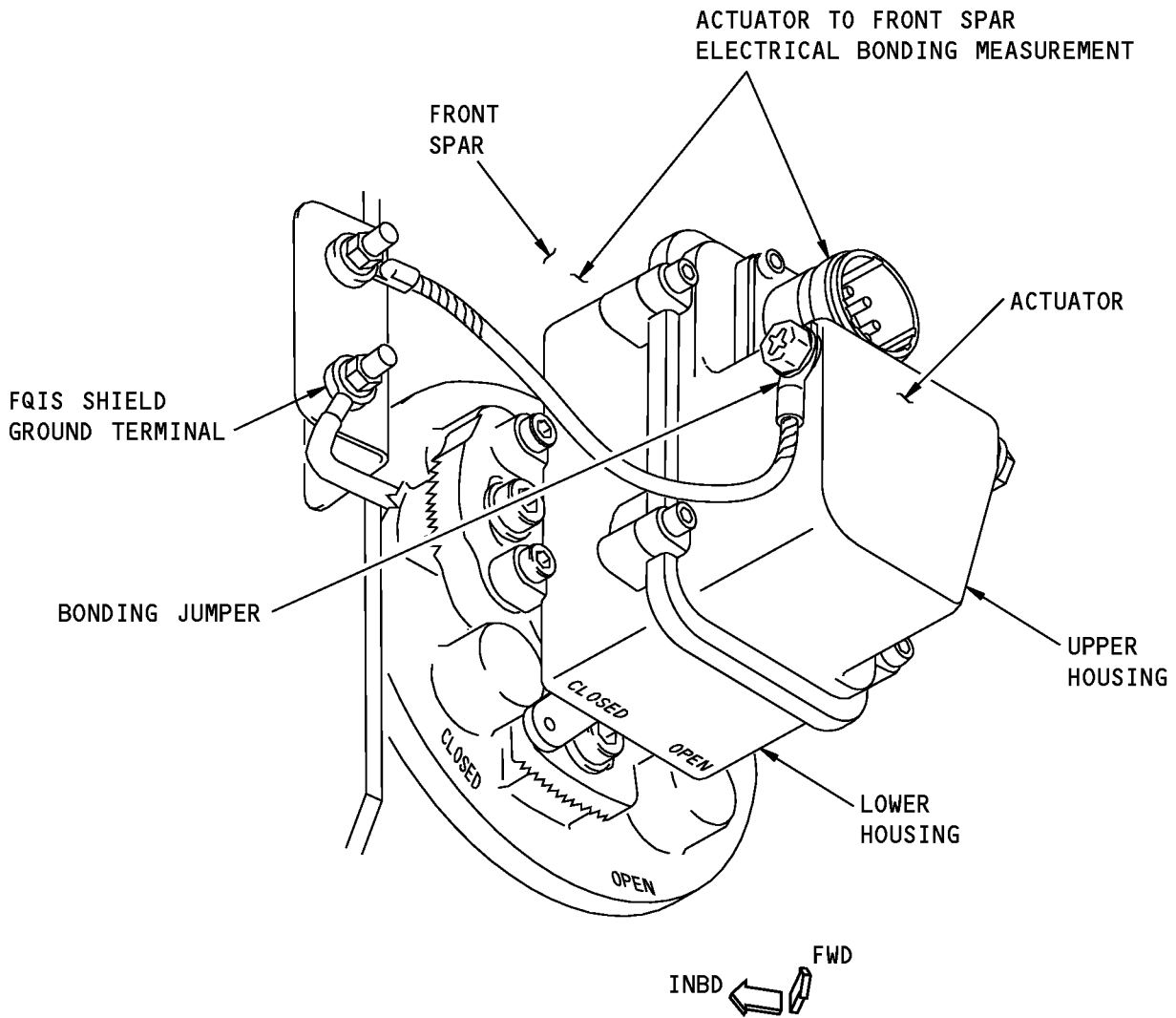
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**Spar Valve Actuator - Bonding Resistance Check
Figure 601 (Sheet 1 of 2)/28-22-11-990-810**

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ELECTRICAL BONDING MEASUREMENT

(B)

**Spar Valve Actuator - Bonding Resistance Check
Figure 601 (Sheet 2 of 2)/28-22-11-990-810**

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WATER SCAVENGE JET PUMP - REMOVAL/INSTALLATION

1. General

- A. There is one water scavenge jet pump in each main fuel tank. There are two water scavenge jet pumps in the center fuel tank.
- B. This procedure has these tasks:
 - (1) Center Tank Water Scavenge Jet Pump Nozzle Assembly Removal
 - (2) No. 1 or No. 2 Tank Water Scavenge Jet Pump Nozzle Assembly Removal
 - (3) Center Tank Water Scavenge Jet Pump Removal
 - (4) No. 1 or No. 2 Tank Water Scavenge Jet Pump Removal
 - (5) Center Tank Water Scavenge Jet Pump Nozzle Assembly Installation
 - (6) No. 1 or No. 2 Tank Water Scavenge Jet Pump Nozzle Assembly Installation
 - (7) Center Tank Water Scavenge Jet Pump Installation
 - (8) No. 1 or No. 2 Tank Water Scavenge Jet Pump Installation

TASK 28-22-13-000-801

2. Center Tank Water Scavenge Jet Pump Nozzle Assembly - Removal

(Figure 401)

A. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right

B. Procedure

SUBTASK 28-22-13-010-001

- (1) To remove the nozzle assembly [6] of the water scavenge jet pumps, do these steps:

NOTE: The nozzle assembly [6] contains two parts, the jet nozzle [6A] and the nozzle plug [6B]. It is not necessary to separate these parts.

- (a) Get access to the applicable water scavenge jet pump, installed on the rear spar, out of the fuel tank (Figure 401).
- (b) Remove the lockwire [1] from the nozzle assembly [6].
- (c) Remove the nozzle assembly [6] as a unit from the pump assembly [2].

NOTE: There is an internal check valve in the housing that will prevent a fuel spill.

- (d) Discard the O-ring [7].

————— **END OF TASK** —————

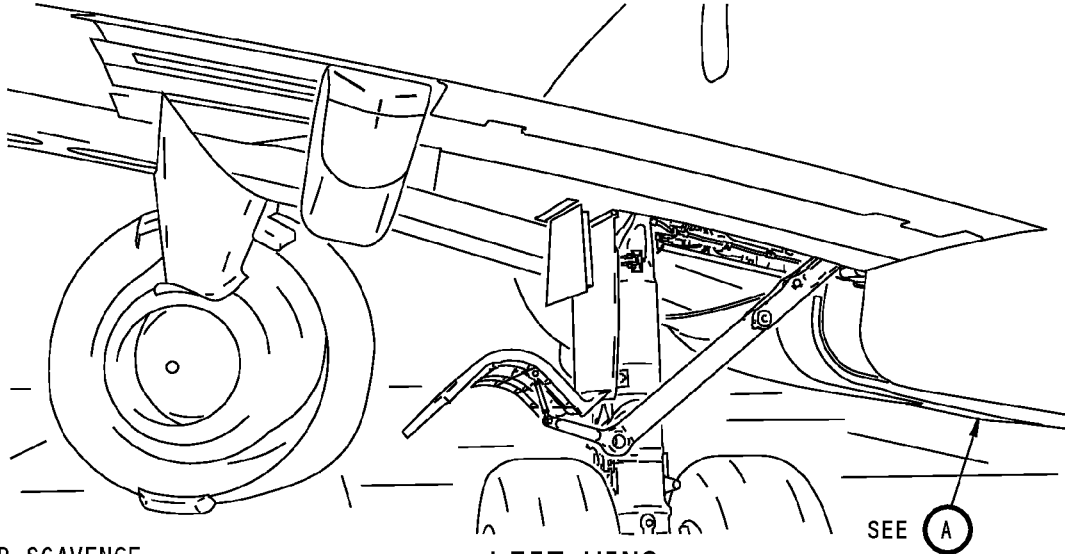
EFFECTIVITY
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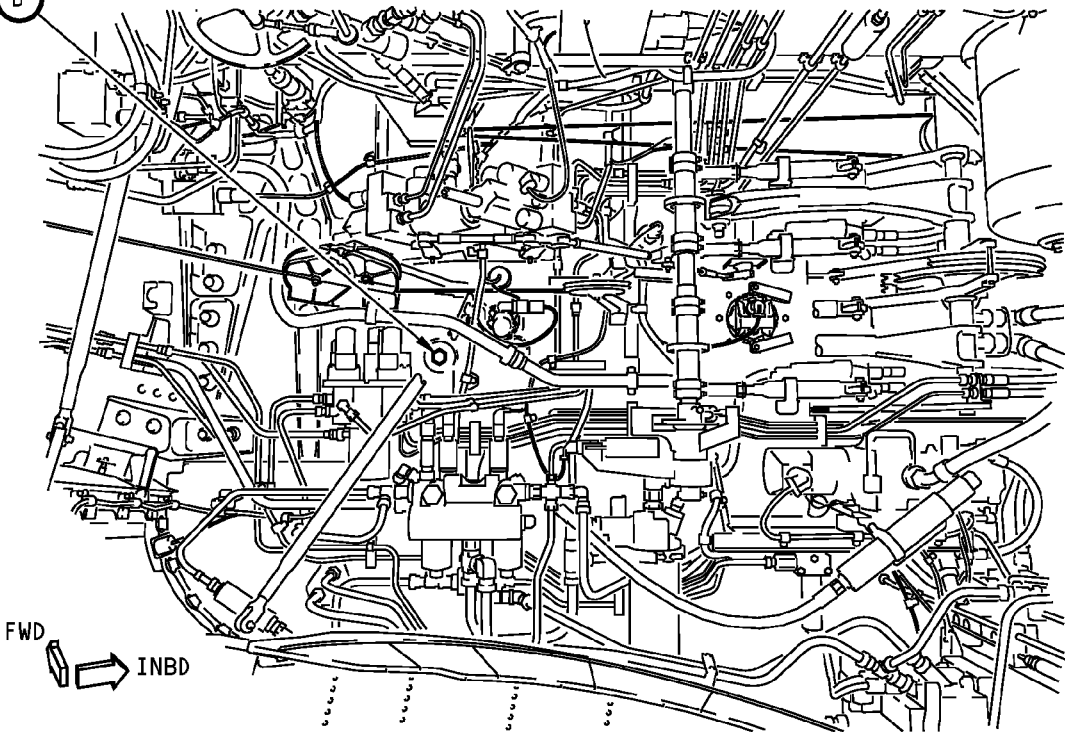
AIRCRAFT MAINTENANCE MANUAL



WATER SCAVENGE
JET PUMP

LEFT WING
(RIGHT WING IS EQUIVALENT)

SEE (B)



MAIN LANDING GEAR WHEEL WELL
(LEFT SIDE IS SHOWN, RIGHT SIDE IS EQUIVALENT)

(A)

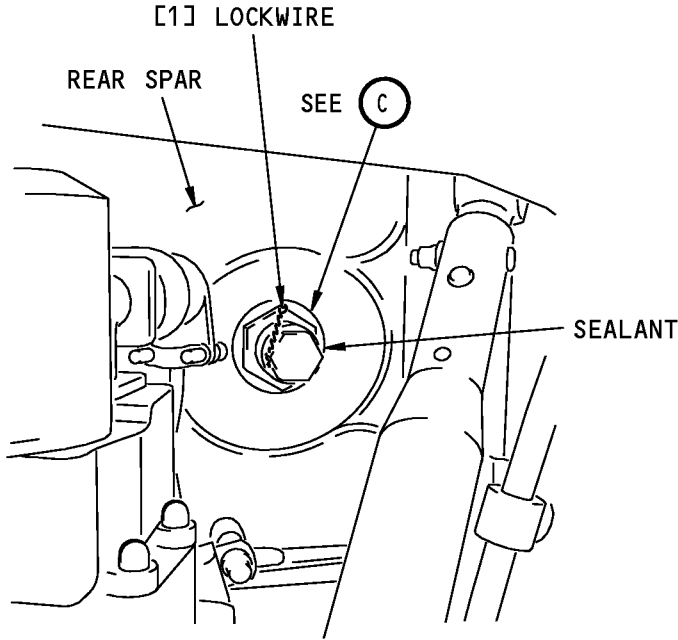
Center Tank Water Scavenge Jet Pump Nozzle Assembly Installation
Figure 401 (Sheet 1 of 2)/28-22-13-990-801

EFFECTIVITY
HAP ALL

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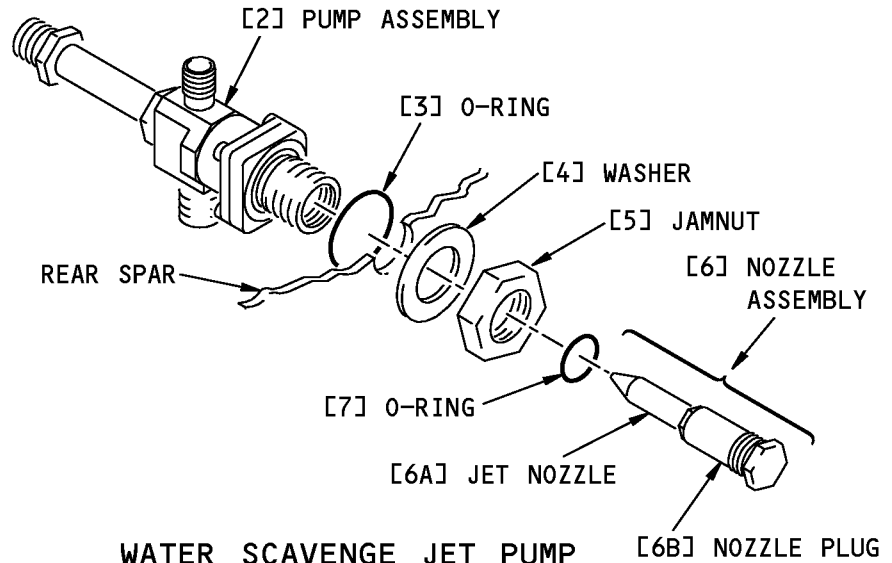
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(EXAMPLE)

(B)



**WATER SCAVENGE JET PUMP
(EXAMPLE, EXTERIOR ACCESS)**

(C)

G07920 S0006571976_V2

**Center Tank Water Scavenge Jet Pump Nozzle Assembly Installation
Figure 401 (Sheet 2 of 2)/28-22-13-990-801**

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TASK 28-22-13-000-802

3. No. 1 or No. 2 Tank Water Scavenge Jet Pump Nozzle Assembly - Removal

(Figure 402)

A. Location Zones

Zone	Area
551	Left Wing - Rear Spar To Landing Gear Support Beam
651	Right Wing - Rear Spar to Landing Gear Support Beam

B. Access Panels

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel
651DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

C. Procedure

SUBTASK 28-22-13-010-006

(1) To remove the nozzle assembly [6] of the water scavenge jet pumps, do these steps:

NOTE: The nozzle assembly [6] contains two parts, the jet nozzle [6A] and the nozzle plug [6B]. It is not necessary to separate these parts.

(a) To get access to the applicable water scavenge jet pump, installed on the rear spar, out of the fuel tank, do this step:(Figure 402).

Open the applicable access panels:

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel
651DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

(b) Remove the lockwire [1] from the nozzle assembly [6].

(c) Remove the nozzle assembly [6] as a unit from the pump assembly [2].

NOTE: There is an internal check valve in the housing that will prevent a fuel spill.

(d) Discard the O-ring [7].

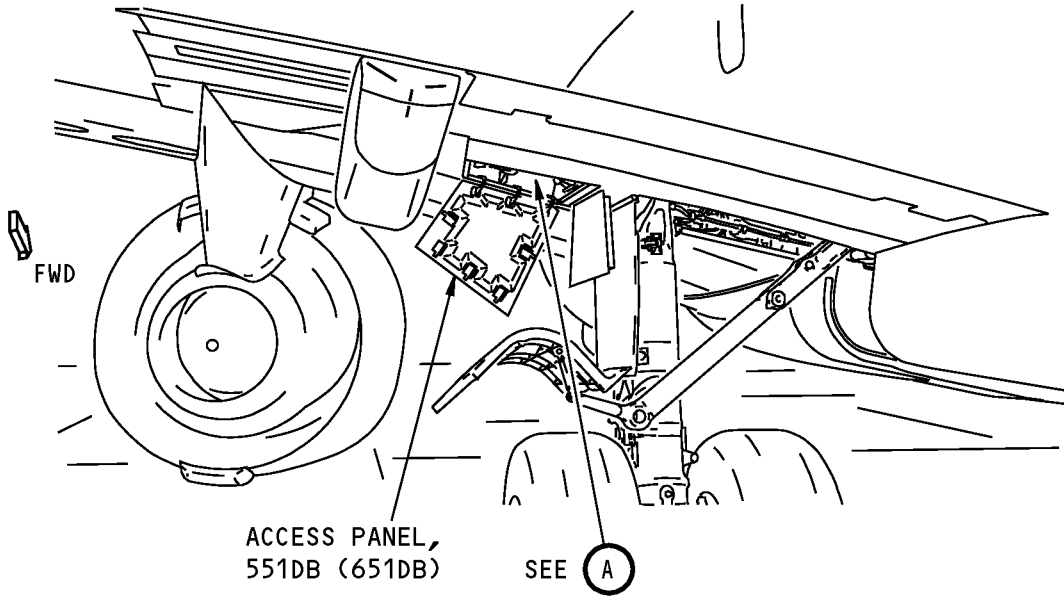
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EFFECTIVITY
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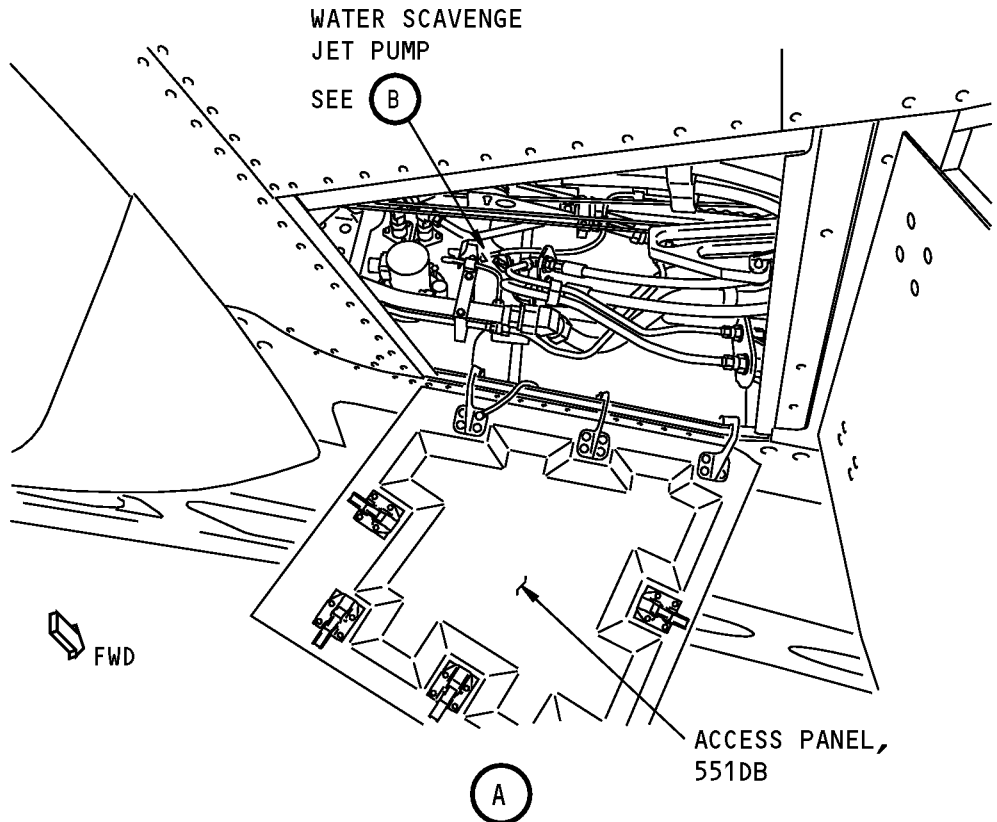
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**LEFT WING
(RIGHT WING IS EQUIVALENT)**



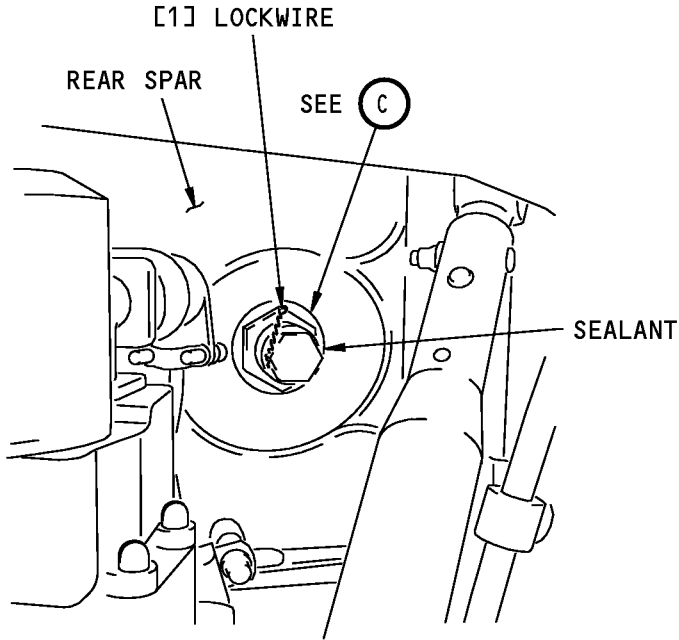
**No. 1 or No. 2 Tank Water Scavenge Jet Pump Nozzle Assembly Installation
Figure 402 (Sheet 1 of 2)/28-22-13-990-802**

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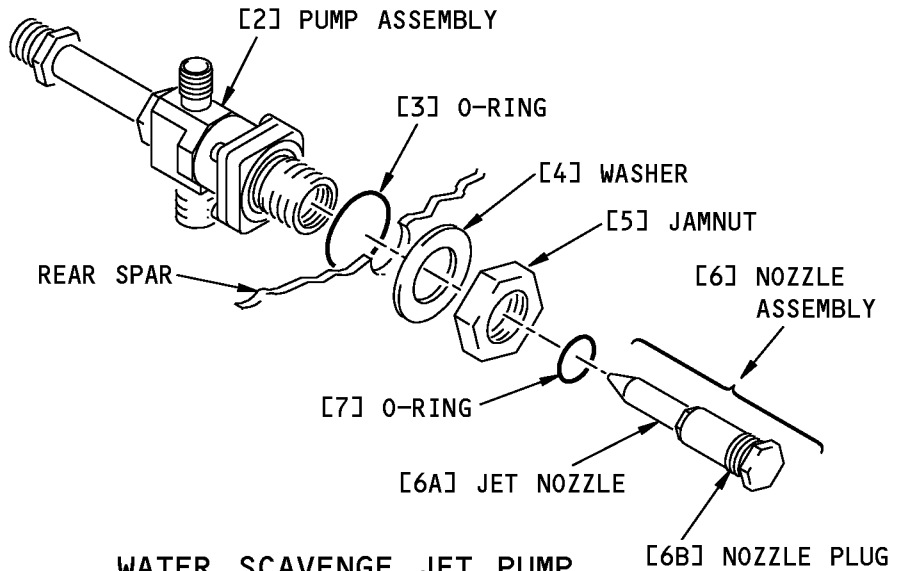
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(EXAMPLE)

(B)



WATER SCAVENGE JET PUMP
(EXAMPLE, EXTERIOR ACCESS)

(C)

L01110 S0006571979_V2

No. 1 or No. 2 Tank Water Scavenge Jet Pump Nozzle Assembly Installation
Figure 402 (Sheet 2 of 2)/28-22-13-990-802

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TASK 28-22-13-000-803

4. Center Tank Water Scavenge Jet Pump - Removal

(Figure 401, Figure 403)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

B. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right

C. Access Panels

Number	Name/Location
131AB	Center Tank Access

D. Procedure

SUBTASK 28-22-13-010-007

(1) To remove the pump assembly [2], do these steps:

- (a) Defuel the center fuel tank to remove the center tank water scavenge jet pump.
 - 1) To remove the fuel from the center tank, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801
or, do this task: Tank to Tank Fuel Transfer, TASK 28-26-00-650-802.
- (b) Remove the jamnut [5] and washer [4] from the pump assembly [2], from out of the fuel tank.
- (c) To prepare the applicable fuel tank for entry, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.
- (d) To remove the water scavenge jet pump in the center tank, remove this access panel:

Number	Name/Location
131AB	Center Tank Access

(TASK 28-11-31-000-801).
- (e) Go into the center fuel tank.
- (f) Disconnect the coupling nut [22] between the motive flow line and the pump assembly [2].
- (g) Disconnect the coupling nut [23] between the scavenge inlet line and the pump assembly [2].
- (h) Disconnect the coupling nut [21] between the outlet line and the pump assembly [2].
- (i) Remove the pump assembly [2].
 - 1) Discard the O-ring [3].

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- (j) Install caps on the open fuel lines to keep unwanted materials out.

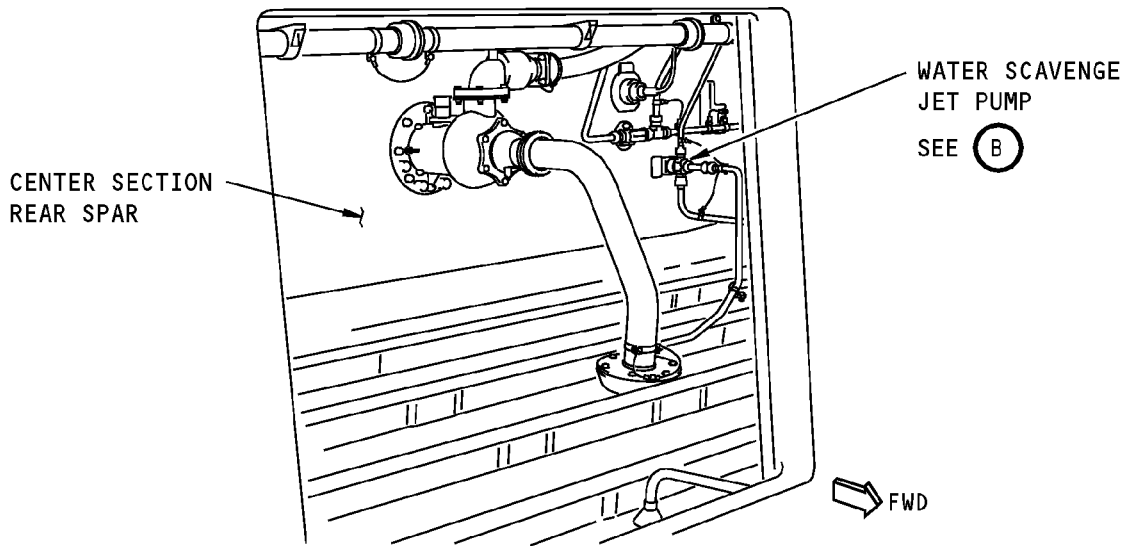
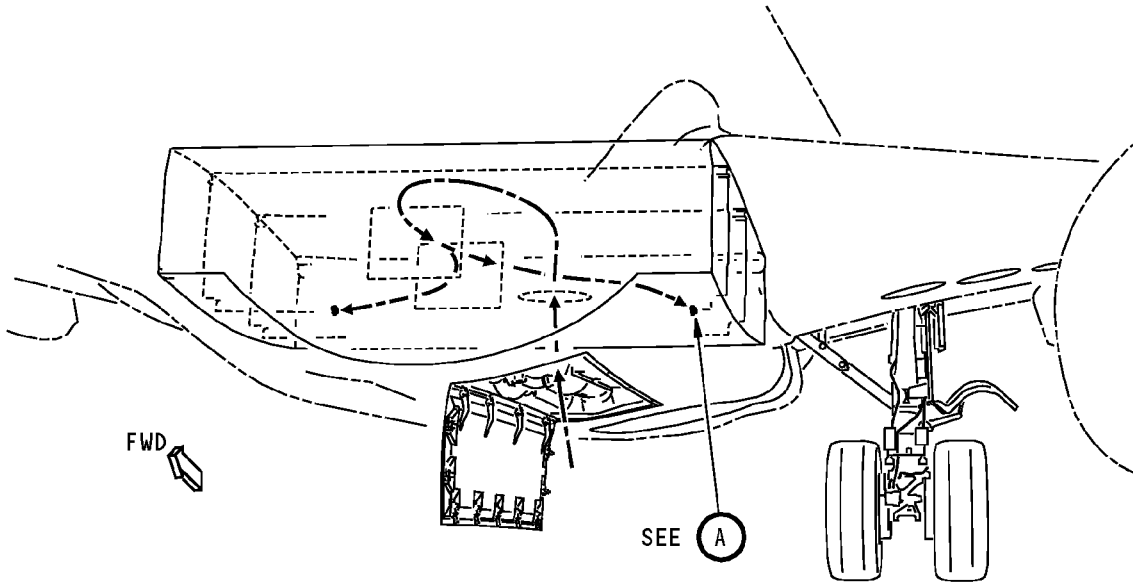
————— **END OF TASK** —————

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HAP ALL

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**CENTER FUEL TANK
(LEFT SIDE IS SHOWN,
RIGHT SIDE IS EQUIVALENT)**

A

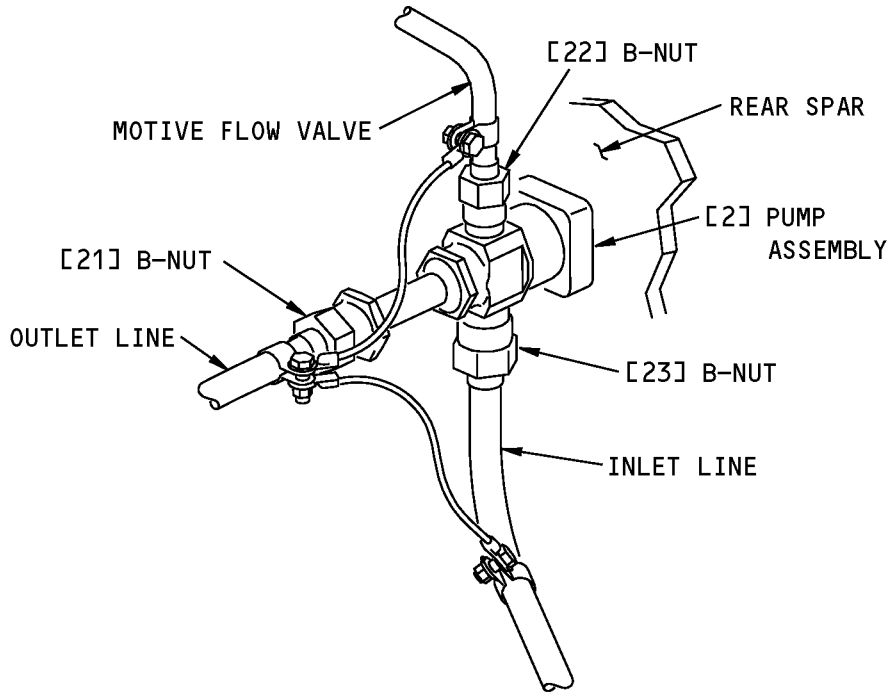
**Center Tank Water Scavenge Jet Pump Installation
Figure 403 (Sheet 1 of 2)/28-22-13-990-805**

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**WATER SCAVENGE JET PUMP
(EXAMPLE, INTERIOR ACCESS)**

B

**Center Tank Water Scavenge Jet Pump Installation
Figure 403 (Sheet 2 of 2)/28-22-13-990-805**

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TASK 28-22-13-000-804

5. No. 1 or No. 2 Tank Water Scavenge Jet Pump - Removal

(Figure 402, Figure 404)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

B. Location Zones

Zone	Area
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Access Panels

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

D. Procedure

SUBTASK 28-22-13-010-008

(1) To remove the pump assembly [2], do these steps:

- (a) Defuel the No. 1 or the No. 2 fuel tank to remove the No. 1 tank or the No. 2 tank water scavenge jet pump.
 - 1) To remove fuel from the No. 1 tank or the No. 2 tank, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801
 - or, do this task: Tank to Tank Fuel Transfer, TASK 28-26-00-650-802.
- (b) Remove the jamnut [5] and washer [4] from the pump assembly [2], from out of the fuel tank.
- (c) To prepare the applicable fuel tank for entry, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.
- (d) To remove the water scavenge jet pump in the No. 1 tank, remove this access panel:

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216

(TASK 28-11-11-000-801).
- (e) To remove the water scavenge jet pump in the No. 2 tank, remove this access panel:

Number	Name/Location
632AB	Main Tank Access Door - Wing Station 216

(TASK 28-11-11-000-801).
- (f) Go into the applicable fuel tank.
- (g) Disconnect the coupling nut [22] between the motive flow line and the pump assembly [2].

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- (h) Disconnect the coupling nut [23] between the scavenge inlet line and the pump assembly [2].
- (i) Disconnect the coupling nut [21] between the outlet line and the pump assembly [2].
- (j) Remove the pump assembly [2].
 - 1) Discard the O-ring [3].
- (k) Install caps on the open fuel lines to keep unwanted materials out.

————— **END OF TASK** —————

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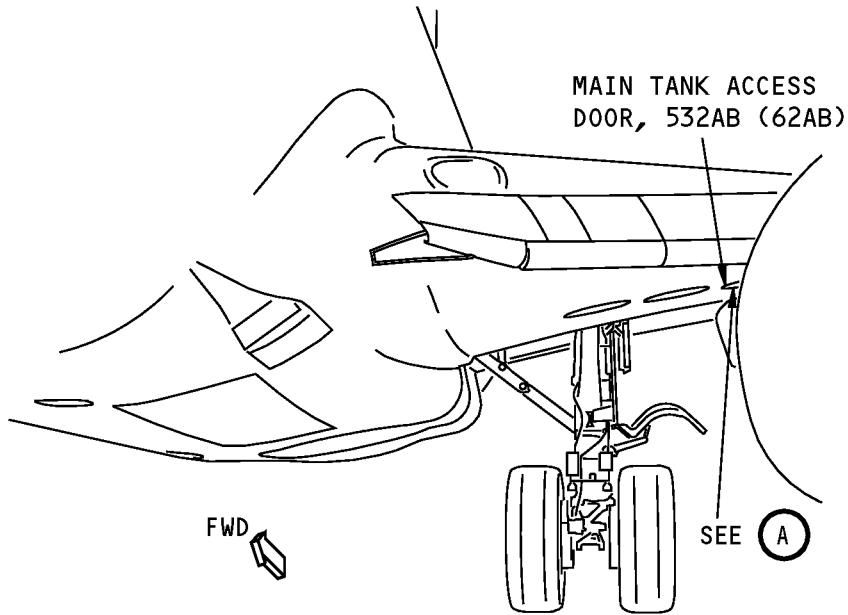
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No. 1 or No. 2 Tank Water Scavenge Jet Pump Installation
Figure 404 (Sheet 1 of 2)/28-22-13-990-806

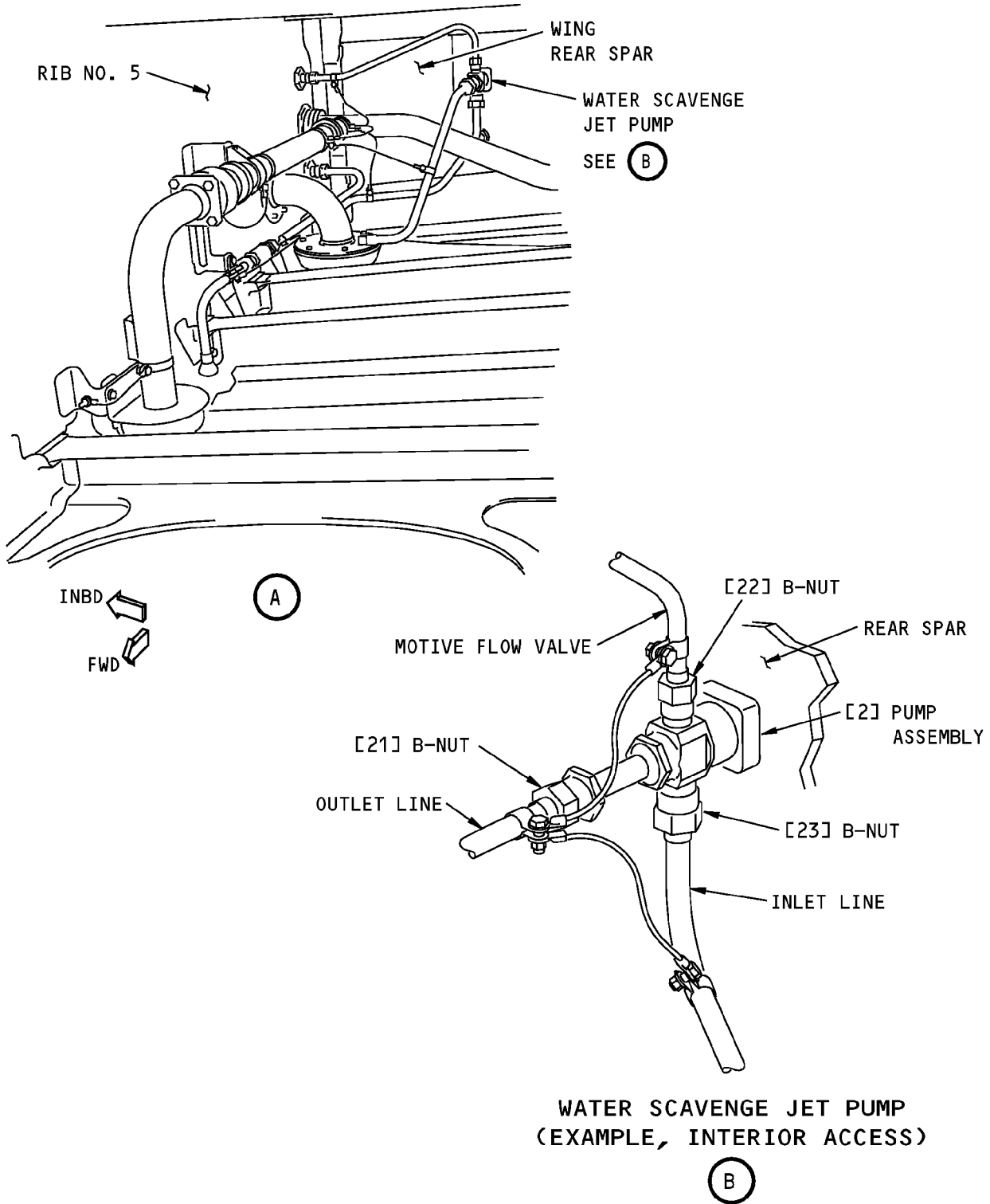
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**No. 1 or No. 2 Tank Water Scavenge Jet Pump Installation
Figure 404 (Sheet 2 of 2)/28-22-13-990-806**

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TASK 28-22-13-400-801

6. Center Tank Water Scavenge Jet Pump Nozzle Assembly - Installation

(Figure 401)

A. References

Reference	Title
20-10-44-400-801	Lockwires Installation (P/B 401)

B. Consumable Materials

Reference	Description	Specification
D00504	Grease - Petrolatum	VV-P-236

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
6A	Jet nozzle	28-22-52-01-310	HAP 001-013, 015-026, 028-030
		28-22-52-01A-320	HAP 031-054, 101-999
		28-22-52-03A-145	HAP 001-013, 015-026, 028-030
6B	Nozzle plug	28-22-52-03B-170	HAP 031-054, 101-999
		28-22-52-01-300	HAP 001-013, 015-026, 028-030
		28-22-52-01A-310	HAP 031-054, 101-999
7	O-ring	28-22-52-03A-135	HAP 001-013, 015-026, 028-030
		28-22-52-03B-160	HAP 031-054, 101-999
		28-22-52-01-305	HAP 001-013, 015-026, 028-030
		28-22-52-01A-315	HAP 031-054, 101-999
		28-22-52-03A-140	HAP 001-013, 015-026, 028-030
		28-22-52-03B-165	HAP 031-054, 101-999

D. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right

E. Procedure

SUBTASK 28-22-13-420-001

- (1) To install the nozzle assembly of a center tank water scavenge jet pump, do these steps:
 - (a) Get access to the applicable water scavenge jet pump, installed on the rear spar, out of the fuel tank (Figure 401).
 - (b) Apply a thin layer of petrolatum grease, D00504, to the new O-ring.
 - (c) Install the nozzle assembly [6] and O-ring [7] into the pump assembly [2].

NOTE: The nozzle assembly [6] contains two parts, the jet nozzle [6A] and the nozzle plug [6B].

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- (d) Tighten the nozzle assembly [6] to 160 in-lbs.
(e) Install lockwire between the nozzle assembly [6] and the jamnut [5] (TASK 20-10-44-400-801).

SUBTASK 28-22-13-710-001

- (2) To do a test of the water scavenge jet pumps for leaks, operate the applicable center tank fuel boost pump (left or right) and look for leakage at the pump installation on the rear spar.

END OF TASK

TASK 28-22-13-400-802

7. No. 1 or No. 2 Tank Water Scavenge Jet Pump Nozzle Assembly - Installation

(Figure 402)

A. References

Table with 2 columns: Reference, Title. Row: 20-10-44-400-801, Lockwires Installation (P/B 401)

B. Consumable Materials

Table with 3 columns: Reference, Description, Specification. Row: D00504, Grease - Petrolatum, VV-P-236

C. Expendables/Parts

Table with 4 columns: AMM Item, Description, AIPC Reference, AIPC Effectivity. Rows for Jet nozzle (6A) and Nozzle plug (6B) with multiple AIPC references and effectivity codes.

D. Location Zones

Table with 2 columns: Zone, Area. Rows: 551, Left Wing - Rear Spar To Landing Gear Support Beam; 651, Right Wing - Rear Spar to Landing Gear Support Beam

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E. Access Panels

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel
651DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

F. Procedure

SUBTASK 28-22-13-420-008

(1) To install the nozzle assembly of the water scavenge jet pump(Figure 402), do these steps:

- (a) To get access to the applicable water scavenge jet pump, installed on the rear spar, out of the fuel tank, do this step.

If it is not open, open the applicable access panels:

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel
651DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

- (b) Apply a thin layer of petrolatum grease, D00504, to the new O-ring.
- (c) Install the nozzle assembly [6] and O-ring [7] into the pump assembly [2].

NOTE: The nozzle assembly [6] contains two parts, the jet nozzle [6A] and the nozzle plug [6B].

- (d) Tighten the nozzle assembly [6] to 160 in-lbs.
- (e) Install lockwire between the nozzle assembly [6] and the jamnut [5] (TASK 20-10-44-400-801).

- (f) Close these access panels:

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel
651DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

that you opened to get access.

SUBTASK 28-22-13-710-002

(2) To do a test of the water scavenge jet pumps for leaks, operate the applicable fuel boost pump (the aft boost pump in the No. 1 or No. 2 tank) and look for leakage at the pump installation on the rear spar.

- (a) Monitor the fuel quantities for an uncommanded fuel transfer from the No. 1 or No. 2 tank to the center tank while you operate the boost pump.

————— **END OF TASK** —————

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TASK 28-22-13-400-803

8. Center Tank Water Scavenge Jet Pump - Installation

(Figure 403)

A. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)

C. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142
D00504	Grease - Petrolatum	VV-P-236

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Pump assembly	28-22-52-01-295	HAP 001-013, 015-026, 028-030
		28-22-52-01A-305	HAP 031-054, 101-999
		28-22-52-03A-130	HAP 001-013, 015-026, 028-030
3	O-ring	28-22-52-03B-155	HAP 031-054, 101-999
		28-22-52-01A-070	HAP 031-054, 101-999
		28-22-52-03A-150	HAP 001-013, 015-026, 028-030
		28-22-52-03B-100	HAP 031-054, 101-999

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

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F. Access Panels

Number	Name/Location
131AB	Center Tank Access

G. Procedure

SUBTASK 28-22-13-010-009

- (1) To install the center tank water scavenge jet pump [2], do these steps:
 - (a) For the center fuel tank, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.
 - (b) Remove the fuel line covers installed on the open fuel lines to keep unwanted materials out.
 - (c) Go into the center fuel tank.
 - (d) Lubricate a new O-ring [3] with a thin grease, D00504, or petrolatum jelly.
 - (e) Install the O-ring [3] onto the pump assembly [2].
 - (f) Put the pump assembly [2] in its position and install the washer [4] and jamnut [5] from out of the fuel tank.

NOTE: Make sure the fuel lines align before you tighten the jamnut [5].

- 1) Tighten the jamnut [5] to a torque of 340-380 pound-inches.
- (g) Measure the bonding resistance between the pump assembly [2] and the airplane structure with an electrical bonding meter, COM-1550.
 - 1) Make sure the bonding resistance is less than 0.001 ohm.
- (h) Connect the coupling nut [22] between the motive flow line and the pump assembly [2].
- (i) Connect the coupling nut [23] between the scavenge inlet line and the pump assembly [2].
- (j) Connect the coupling nut [21] between the outlet line and the pump assembly [2].
- (k) Apply a fillet seal of sealant, A00767, between the pump assembly [2] and the rear spar (in the fuel tank).
- (l) Apply a fillet seal of sealant, A02315, between the jamnut [5] and the rear spar (out of the fuel tank).

SUBTASK 28-22-13-410-002

- (2) Do these steps to close the fuel tank:
 - (a) Do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801
Install the center tank access panel:

Number	Name/Location
131AB	Center Tank Access

- (b) Refuel the airplane. To do this, (TASK 12-11-00-650-802)

SUBTASK 28-22-13-710-003

- (3) To do a test of the water scavenge jet pumps for leaks, operate the applicable center tank fuel boost pump (left or right) and look for leakage at the pump installation on the rear spar.

————— **END OF TASK** —————

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TASK 28-22-13-400-804

9. No. 1 or No. 2 Tank Water Scavenge Jet Pump - Installation

(Figure 404)

A. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)

C. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142
D00504	Grease - Petrolatum	VV-P-236

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Pump assembly	28-22-52-01-295	HAP 001-013, 015-026, 028-030
		28-22-52-01A-305	HAP 031-054, 101-999
		28-22-52-03A-130	HAP 001-013, 015-026, 028-030
3	O-ring	28-22-52-03B-155	HAP 031-054, 101-999
		28-22-52-01A-070	HAP 031-054, 101-999
		28-22-52-03A-150	HAP 001-013, 015-026, 028-030
		28-22-52-03B-100	HAP 031-054, 101-999

E. Location Zones

Zone	Area
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

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F. Access Panels

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

G. Procedure

SUBTASK 28-22-13-010-010

(1) To install the water scavenge jet pump [2], do these steps:

WARNING: OBEY THE FUEL TANK ENTRY PRECAUTIONS. FAILURE TO OBEY THE FUEL TANK ENTRY PRECAUTIONS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (a) For the applicable fuel tank, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.
- (b) Remove the fuel line covers installed on the open fuel lines to keep unwanted materials out.
- (c) Go into the applicable fuel tank.
- (d) Lubricate a new O-ring [3] with a thin grease, D00504, of petrolatum jelly.
- (e) Install the O-ring [3] onto the pump assembly [2].
- (f) Put the pump assembly [2] in its position and install the washer [4] and jamnut [5] from out of the fuel tank.

NOTE: Make sure the fuel lines align before you tighten the jamnut [5].

- 1) Tighten the jamnut [5] to a torque of 340-380 pound-inches.
- (g) Measure the bonding resistance between the pump assembly [2] and the airplane structure with an electrical bonding meter, COM-1550.
 - 1) Make sure the bonding resistance is less than 0.001 ohm.
- (h) Connect the coupling nut [22] between the motive flow line and the pump assembly [2].
- (i) Connect the coupling nut [23] between the scavenge inlet line and the pump assembly [2].
- (j) Connect the coupling nut [21] between the outlet line and the pump assembly [2].
- (k) Apply a fillet seal of sealant, A00767, between the pump assembly [2] and the rear spar (in the fuel tank).
- (l) Apply a fillet seal of sealant, A02315, between the jamnut [5] and the rear spar (out of the fuel tank).

SUBTASK 28-22-13-410-003

(2) Do these steps to close the fuel tank:

(a) Install the applicable access panels:

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

(b) To refuel the airplane, (TASK 12-11-00-650-802)

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SUBTASK 28-22-13-710-004

- (3) To do a test of the water scavenge jet pumps for leaks, operate the applicable fuel boost pump (the aft boost pump in the No. 1 or No. 2 tank) and look for leakage at the pump installation on the rear spar.
 - (a) For the water scavenge jet pumps in the No. 1 tank or the No. 2 tank, monitor the fuel quantities for an uncommanded fuel transfer from the No. 1 or No. 2 tank to the center tank while you operate the boost pump.

————— END OF TASK —————

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AIRCRAFT MAINTENANCE MANUAL

WATER SCAVENGE JET PUMP - INSPECTION/CHECK

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure has these tasks:
 - (1) Center tank water scavenge jet pump check
 - (2) No. 1 or No. 2 tank water scavenge jet pump check
- C. The water scavenge jet pumps operate continuously when the related boost pumps operate. The aft boost pump in the No. 1 or No. 2 tank causes pressure which operates the water scavenge jet pump. The left and right boost pumps in the center tank cause pressure which operates the left and right water scavenge jet pump. The water scavenge pumps have no parts that move. Regular inspections of the water scavenge pumps are necessary to make sure there is no pump blockage.

TASK 28-22-13-200-801

2. Center Tank Water Scavenge Jet Pump Check

(Figure 601)

A. General

- (1) This procedure is a scheduled maintenance task.

B. Tools/Equipment

Reference	Description
STD-123	Brush - Soft Bristle

C. Consumable Materials

Reference	Description	Specification
B00074	Solvent - Degreasing	MIL-PRF-680 (Supersedes P-D-680)

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
6A	Jet nozzle	28-22-52-01-310	HAP 001-013, 015-026, 028-030
		28-22-52-01A-320	HAP 031-054, 101-999
		28-22-52-03A-145	HAP 001-013, 015-026, 028-030
		28-22-52-03B-170	HAP 031-054, 101-999
6B	Nozzle plug	28-22-52-01-300	HAP 001-013, 015-026, 028-030
		28-22-52-01A-310	HAP 031-054, 101-999
		28-22-52-03A-135	HAP 001-013, 015-026, 028-030
		28-22-52-03B-160	HAP 031-054, 101-999
7	O-ring	28-22-52-01-305	HAP 001-013, 015-026, 028-030
		28-22-52-01A-315	HAP 031-054, 101-999
		28-22-52-03A-140	HAP 001-013, 015-026, 028-030
		28-22-52-03B-165	HAP 031-054, 101-999

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E. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right

F. Prepare for the Check

SUBTASK 28-22-13-480-001

- (1) Put the container below the pump to catch the fuel.

G. Procedure

SUBTASK 28-22-13-020-001

- (1) Do these steps to loosen and remove the nozzle assembly [6] from the pump housing.
 - (a) Remove the lockwire [1] that attaches the nozzle assembly to the jamnut [5].
 - (b) Loosen the nozzle assembly [6] from the pump.
 - (c) Remove the nozzle assembly [6] from the pump housing.

NOTE: The flapper valve in the pump housing closes to prevent fuel leakage when you move the nozzle assembly [6] away from the pump.

- (d) Discard the O-ring [7].

SUBTASK 28-22-13-020-002

- (2) Loosen and remove the jet nozzle [6A] from the nozzle plug [6B].

SUBTASK 28-22-13-210-001

- (3) Make sure the holes of the jet nozzle [6A] are clean and have no blockage.

SUBTASK 28-22-13-110-001

WARNING: DO NOT USE CLEANING SOLVENT NEAR AN OPEN FLAME OR IN HIGH TEMPERATURE AREAS. CLEANING SOLVENT CAN CAUSE A FIRE. INJURY TO PERSONS CAN OCCUR.

CAUTION: DO NOT USE ABRASIVE CLEANSERS, STEEL WOOL, OR SCOURING PADS ON THE NOZZLE. DAMAGE TO THE NOZZLE CAN OCCUR.

- (4) If it is necessary, do these steps to clean the jet nozzle [6A]:
 - (a) Clean the jet nozzle [6A] with solvent, B00074 or equivalent.
 - (b) If necessary you can use a soft bristle brush, STD-123 to clean the jet nozzle.
 - (c) Dry the nozzle with moisture-free compressed air or nitrogen.

SUBTASK 28-22-13-420-002

- (5) Install the new O-ring [7], lightly lubricated with fuel, into the groove on the nozzle plug [6B].

SUBTASK 28-22-13-420-003

- (6) Install the jet nozzle [6A] and nozzle plug [6B] and tighten it to a torque between 65 and 75 pound-inches (7.3-8.5 newton-meters).

SUBTASK 28-22-13-420-004

- (7) Do these steps to install the nozzle assembly [6] in the pump housing:
 - (a) Put the nozzle assembly [6] into the pump housing.
 - (b) Tighten the nozzle plug in the pump housing to a torque between 155 and 165 pound-inches.

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(c) Install lockwire [1] from the nozzle assembly [6] to the jamnut [5].

SUBTASK 28-22-13-710-005

(8) Do these steps to do a leak test of the center tank water scavenge jet pumps:

(a) Operate the applicable center tank fuel boost pump (left or right).

(b) Look for leakage at the water scavenge jet pump installation on the rear spar.

————— **END OF TASK** —————

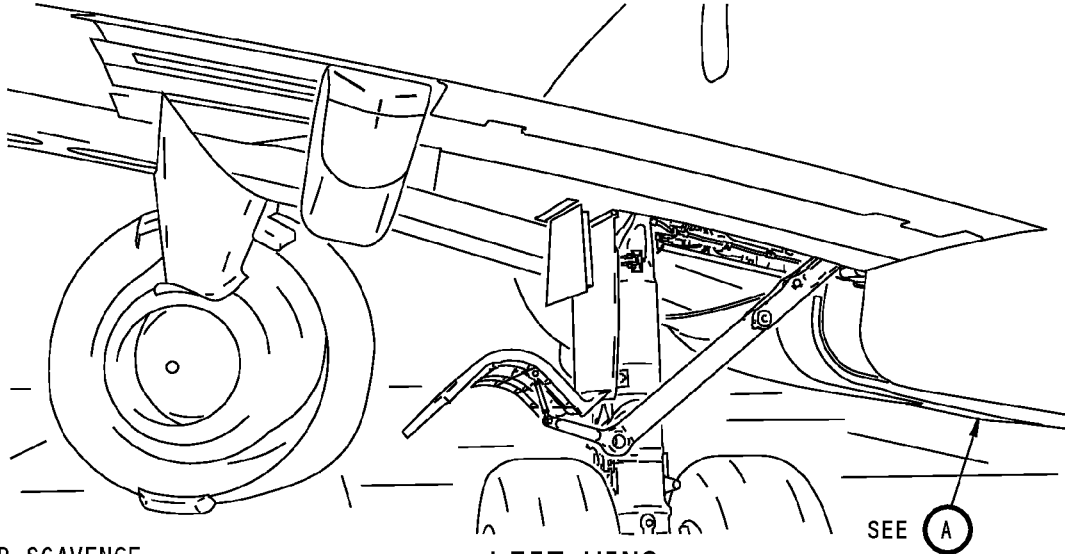
EFFECTIVITY
HAP ALL

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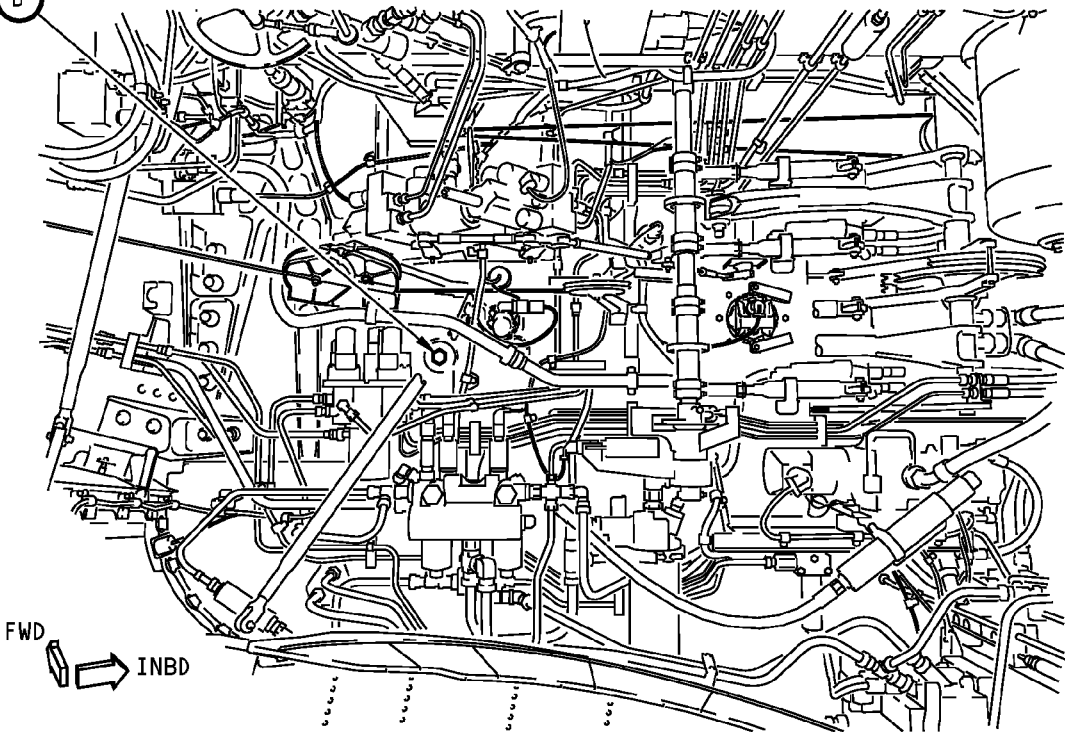
AIRCRAFT MAINTENANCE MANUAL



WATER SCAVENGE
JET PUMP

LEFT WING
(RIGHT WING IS EQUIVALENT)

SEE (B)



MAIN LANDING GEAR WHEEL WELL
(LEFT SIDE IS SHOWN, RIGHT SIDE IS EQUIVALENT)

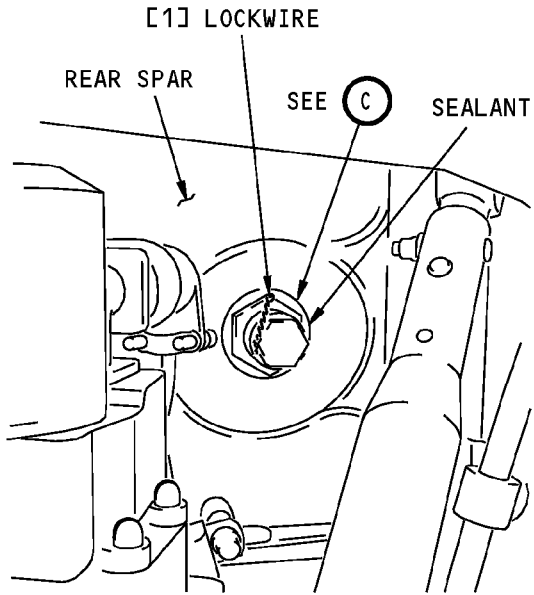
(A)

**Water Scavenge Ejector Pump Inspection
Figure 601 (Sheet 1 of 2)/28-22-13-990-803**

EFFECTIVITY
HAP ALL

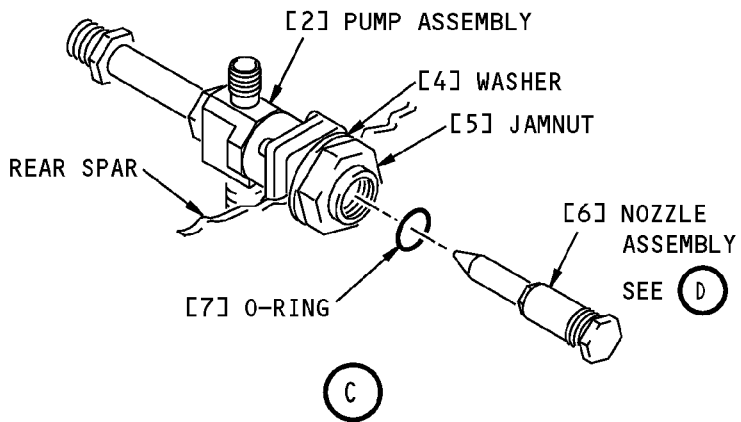
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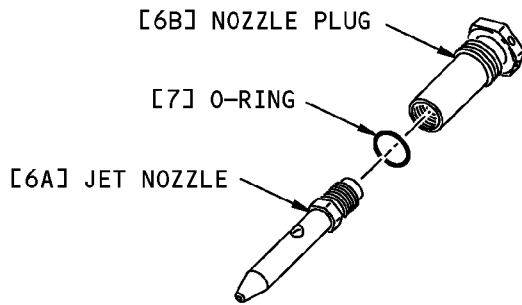


(EXAMPLE)

(B)



(C)



NOZZLE ASSEMBLY

(D)

**Water Scavenge Ejector Pump Inspection
Figure 601 (Sheet 2 of 2)/28-22-13-990-803**

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TASK 28-22-13-200-802

3. No. 1 or No. 2 Tank Water Scavenge Jet Pump Check

(Figure 602)

A. General

(1) This procedure is a scheduled maintenance task.

B. Tools/Equipment

Reference	Description
STD-123	Brush - Soft Bristle

C. Consumable Materials

Reference	Description	Specification
B00074	Solvent - Degreasing	MIL-PRF-680 (Supersedes P-D-680)

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
6A	Jet nozzle	28-22-52-01-310	HAP 001-013, 015-026, 028-030
		28-22-52-01A-320	HAP 031-054, 101-999
		28-22-52-03A-145	HAP 001-013, 015-026, 028-030
6B	Nozzle plug	28-22-52-03B-170	HAP 031-054, 101-999
		28-22-52-01-300	HAP 001-013, 015-026, 028-030
		28-22-52-01A-310	HAP 031-054, 101-999
7	O-ring	28-22-52-03A-135	HAP 001-013, 015-026, 028-030
		28-22-52-03B-160	HAP 031-054, 101-999
		28-22-52-01-305	HAP 001-013, 015-026, 028-030
		28-22-52-01A-315	HAP 031-054, 101-999
		28-22-52-03A-140	HAP 001-013, 015-026, 028-030
		28-22-52-03B-165	HAP 031-054, 101-999

E. Location Zones

Zone	Area
551	Left Wing - Rear Spar To Landing Gear Support Beam
651	Right Wing - Rear Spar to Landing Gear Support Beam

F. Access Panels

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel
651DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

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G. Prepare for the Check

SUBTASK 28-22-13-010-004

(1) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

or open this access panel:

<u>Number</u>	<u>Name/Location</u>
651DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

SUBTASK 28-22-13-480-002

(2) Put the container below the pump to catch the fuel.

H. Procedure

SUBTASK 28-22-13-020-003

(1) Do these steps to loosen and remove the nozzle assembly [6] from the pump housing.

- Remove the lockwire [1] that attaches the nozzle assembly to the jamnut [5].
- Loosen the nozzle assembly [6] from the pump.
- Remove the nozzle assembly [6] from the pump housing.

NOTE: The flapper valve in the pump housing closes to prevent fuel leakage when you move the nozzle assembly [6] away from the pump.

(d) Discard the O-ring [7].

SUBTASK 28-22-13-020-004

(2) Loosen and remove the jet nozzle [6A] from the nozzle plug [6B].

SUBTASK 28-22-13-210-002

(3) Make sure the holes of the jet nozzle [6A] are clean and have no blockage.

SUBTASK 28-22-13-110-002

WARNING: DO NOT USE CLEANING SOLVENT NEAR AN OPEN FLAME OR IN HIGH TEMPERATURE AREAS. CLEANING SOLVENT CAN CAUSE A FIRE. INJURY TO PERSONS CAN OCCUR.

CAUTION: DO NOT USE ABRASIVE CLEANSERS, STEEL WOOL, OR SCOURING PADS ON THE NOZZLE. DAMAGE TO THE NOZZLE CAN OCCUR.

(4) If it is necessary, do these steps to clean the jet nozzle [6A]:

- Clean the jet nozzle [6A] with solvent, B00074 or equivalent.
- If necessary you can use a soft bristle brush, STD-123 to clean the jet nozzle.
- Dry the nozzle with moisture-free compressed air or nitrogen.

SUBTASK 28-22-13-420-005

(5) Install the new O-ring [7], lightly lubricated with fuel, into the groove on the nozzle plug [6B].

SUBTASK 28-22-13-420-006

(6) Install the jet nozzle [6A] and nozzle plug [6B] and tighten it to a torque between 65 and 75 pound-inches (7.3-8.5 newton-meters).

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SUBTASK 28-22-13-420-007

- (7) Do these steps to install the nozzle assembly [6] in the pump housing:
 - (a) Put the nozzle assembly [6] into the pump housing.
 - (b) Tighten the nozzle plug in the pump housing to a torque between 155 and 165 pound-inches (17.5-18.6 newton-meters).
 - (c) Install lockwire [1] from the nozzle assembly [6] to the jamnut [5].

SUBTASK 28-22-13-710-006

- (8) Do these steps to do a leak test of the No. 1 or No. 2 tank water scavenge jet pump:
 - (a) Operate the applicable fuel boost pump (the aft boost pump in the No. 1 or No. 2 tank).
 - (b) Look for leakage at the water scavenge jet pump installation on the rear spar.

SUBTASK 28-22-13-010-005

- (9) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

or close this access panel:

<u>Number</u>	<u>Name/Location</u>
651DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

————— **END OF TASK** —————

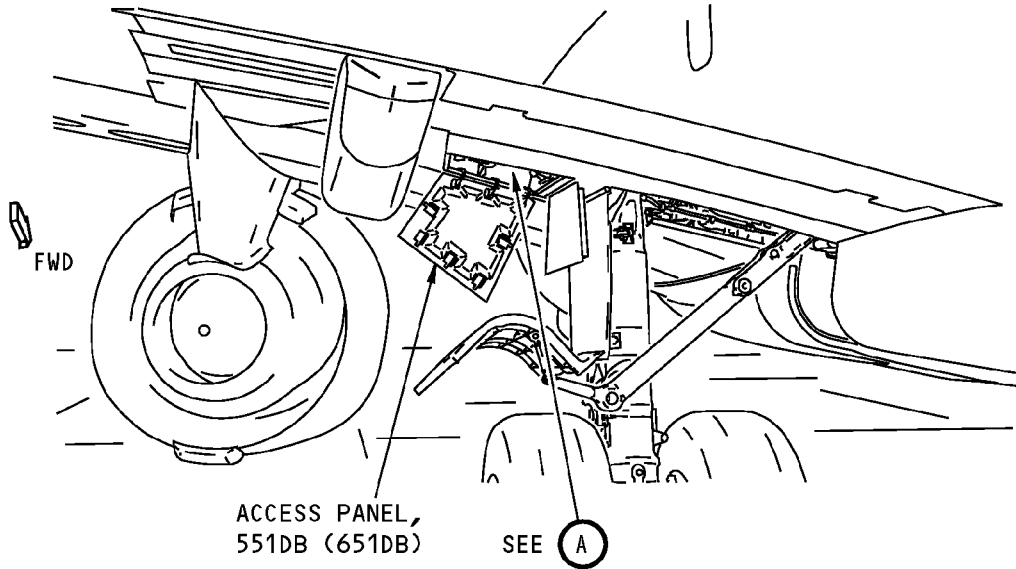
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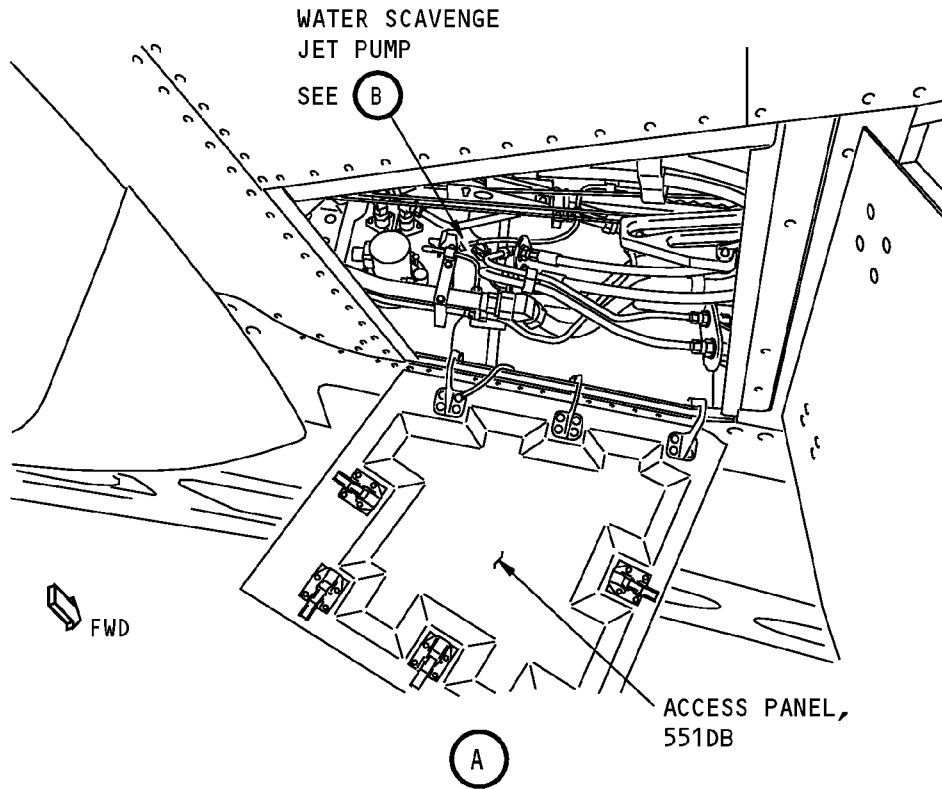
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**LEFT WING
(RIGHT WING IS EQUIVALENT)**



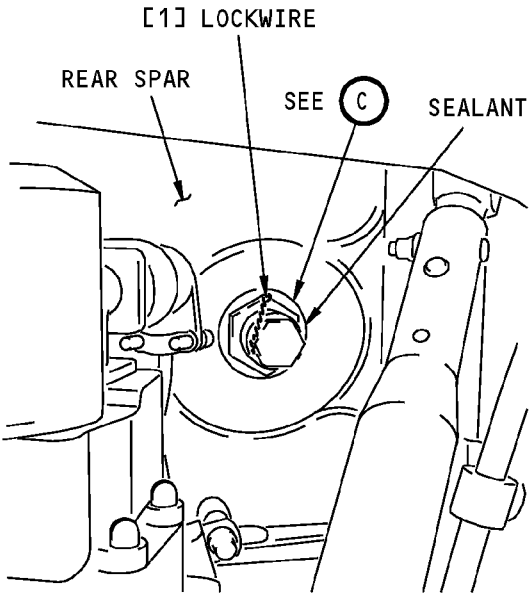
**Water Scavenge Jet Pump Inspection
Figure 602 (Sheet 1 of 2)/28-22-13-990-804**

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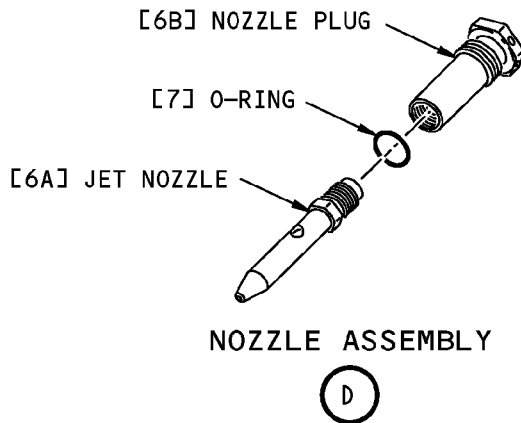
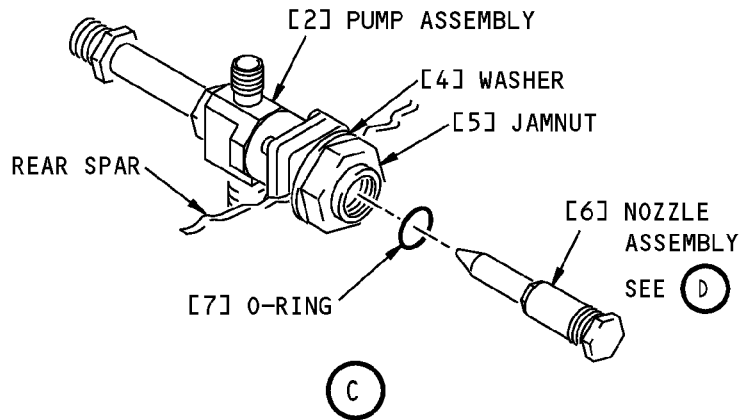
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(EXAMPLE)

(B)



(D)

**Water Scavenge Jet Pump Inspection
Figure 602 (Sheet 2 of 2)/28-22-13-990-804**

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AIRCRAFT MAINTENANCE MANUAL

EMERGENCY FUEL SHUTOFF BATTERY - REMOVAL/INSTALLATION

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains two tasks. The first task removes the emergency fuel shutoff battery. The second tasks installs the emergency fuel shutoff battery.

TASK 28-22-14-000-801

2. Emergency Fuel Shutoff Battery - Removal

(Figure 401)

A. General

- (1) This procedure is a scheduled maintenance task.

B. Location Zones

Zone	Area
212	Flight Compartment - Right

C. Procedure

SUBTASK 28-22-14-860-001

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	4	C01471	FUEL SHUTOFF VALVES PWR PACK
C	6	C01472	FUEL SHUTOFF VALVES BUS

SUBTASK 28-22-14-020-001

- (2) Open the P6-12 panel on the right side of the flight compartment behind the first officer's seat (Figure 401).

SUBTASK 28-22-14-020-002

- (3) Remove the four screws [2] that attach the battery [1] to the back of the stowage bin.
- (4) Close the P6-12 panel.

SUBTASK 28-22-14-020-003

- (5) Remove the battery [1] and disconnect the electrical connector [3].

————— **END OF TASK** —————

TASK 28-22-14-400-801

3. Emergency Fuel Shutoff Battery - Installation

(Figure 401)

A. General

- (1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
28-22-00-720-801	Fuel Shutoff Valve Battery - Test (P/B 501)

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C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Battery	28-22-14-01-005	HAP 001-013, 015-026, 028-030
		28-22-14-01A-005	HAP 031-054, 101-999

D. Location Zones

Zone	Area
212	Flight Compartment - Right

E. Procedure

SUBTASK 28-22-14-020-004

(1) Open the P6-12 panel on the right side of the flight compartment behind the first officer's seat (Figure 401).

SUBTASK 28-22-14-420-001

(2) Connect the electrical connector [3] to the battery [1].

SUBTASK 28-22-14-420-002

(3) Put the battery [1] in its position and install the four screws [2].

(4) Close the P6-12 panel.

SUBTASK 28-22-14-860-002

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	4	C01471	FUEL SHUTOFF VALVES PWR PACK
C	6	C01472	FUEL SHUTOFF VALVES BUS

SUBTASK 28-22-14-860-003

(6) Let the battery [1] charge for 1 hour.

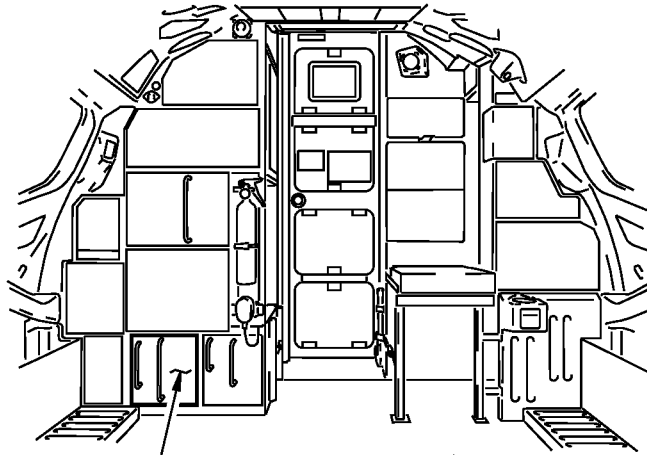
SUBTASK 28-22-14-710-001

(7) To test the engine fuel spar valve, do this task: Fuel Shutoff Valve Battery - Test, TASK 28-22-00-720-801.

END OF TASK

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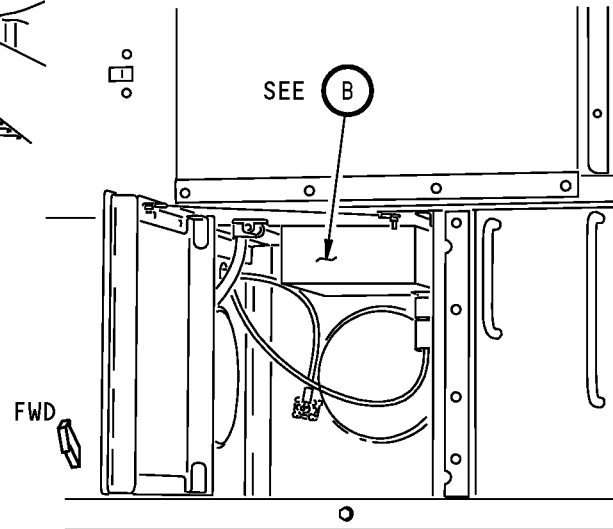
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CIRCUIT BREAKER
PANEL (P6-12)

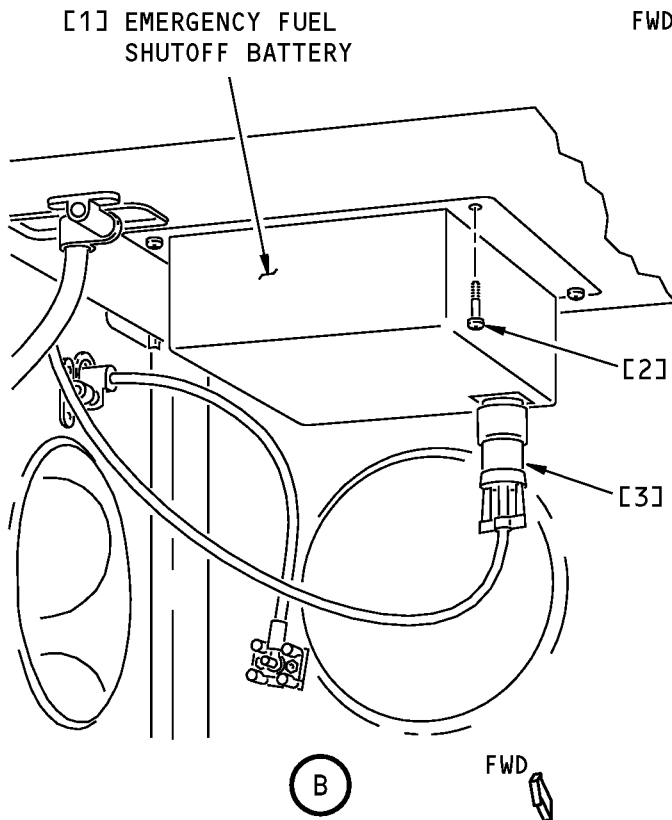
SEE (A)

FLIGHT COMPARTMENT



CIRCUIT BREAKER PANEL (P6-12)
(DOOR SHOWN OPEN)

(A)



[1] EMERGENCY FUEL
SHUTOFF BATTERY

[2] SCREW
(4 LOCATIONS)

[3] ELECTRICAL
CONNECTOR

(B)

Emergency Fuel Shutoff Battery Installation
Figure 401/28-22-14-990-802

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AIRCRAFT MAINTENANCE MANUAL

FUEL FEED MANIFOLD AND COUPLINGS - REMOVAL/INSTALLATION

1. General

- A. This procedure gives examples of the removal and installation procedures for the fuel feed lines and fittings. There are three types of fittings: a flexible full coupling, flexible half coupling, and a rigid coupling.
- B. This procedure contains two tasks. The first task gives examples for fuel line and fitting removal. The second task gives examples for fuel line and fitting installation.
- C. It is not necessary to replace the aluminum tubing for the fuel system (Types 2024, 5052, and 6061) if the damage is not more than the damage limits in (TASK 28-22-15-700-801).
- D. For approved repair of fuel systems aluminum tubing, refer to the (Aluminum Fuel Tubes - Temporary Weld Repair Method, TASK 20-10-51-300-811), "Repair of Aluminum Fuel Tubes".

TASK 28-22-15-000-801

2. Fuel Line, Fitting and Coupling - Removal

(Figure 401)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-22-15-700-801	Engine and APU Fuel Feed, Shroud, and Fuel Vent Line and Couplings Dent Criteria - Inspection/Check (P/B 601)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)

B. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
430	Subzone - Engine 1, Nacelle Strut
440	Subzone - Engine 2, Nacelle Strut
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Procedure

SUBTASK 28-22-15-650-001

- (1) To remove tubing in the fuel tanks, defuel all of the fuel tanks.
 - (a) Do this task: Fuel Tank Defueling, TASK 28-26-00-650-801.

SUBTASK 28-22-15-650-002

- (2) Do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-22-15-010-001

- (3) To remove the applicable main fuel tank access door(s):

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(a) Do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

SUBTASK 28-22-15-010-002

(4) To remove the applicable center fuel tank access door(s):

(a) Do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801.

SUBTASK 28-22-15-940-001

(5) Go into the applicable fuel tank.

D. Fuel Lines and Fittings Removal

SUBTASK 28-22-15-020-009

(1) To remove the bonding jumpers, do these steps (Figure 401):

(a) Remove the bolts, washers and nuts to disconnect the bonding jumpers.

SUBTASK 28-22-15-020-001

(2) To remove the clamps from the fuel lines, do these steps (Figure 402):

(a) Remove the screws, washers and nuts to disconnect the clamps for the fuel lines from the airplane structure.

SUBTASK 28-22-15-020-010

(3) To remove flexible half couplings, do these steps (Figure 403):

(a) Remove the lockwire from the coupling.

(b) Loosen the coupling nut [1].

(c) Discard the O-ring [2].

(d) Inspect the retaining rings [3], and coupling nut [1] for wear (TASK 28-22-15-700-801).

1) Replace these components if it is necessary.

SUBTASK 28-22-15-020-011

(4) To remove flexible full couplings, do these steps (Figure 404):

(a) Remove the lockwire from the coupling [25].

(b) Loosen the coupling nut [21].

(c) Discard the O-rings [22].

(d) Inspect the retaining rings [23], retainer halves [24], coupling [25], and coupling nut [21] for wear (TASK 28-22-15-700-801).

1) Replace these components if it is necessary.

SUBTASK 28-22-15-020-012

(5) To remove the rigid couplings, do these steps (Figure 405):

(a) Remove the lockwire from the coupling.

(b) Loosen the coupling nut [41].

(c) Discard the O-ring [42].

(d) Inspect the retaining ring [43] and coupling nut [41] for wear (TASK 28-22-15-700-801).

1) Replace these components if it is necessary.

SUBTASK 28-22-15-020-013

(6) To remove fuel line bulkhead fittings, do these steps (Figure 406):

(a) Remove the sealant if it is necessary.

(b) Remove the lockwire from the coupling nut [61].

(c) Remove the coupling nut [61] from the body [70].

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- (d) Discard the O-ring [62].
- (e) Inspect the retaining rings [67] and coupling nut [61] for wear (TASK 28-22-15-700-801).
 - 1) Replace these components if it is necessary.
- (f) Remove the nut [69] from the body [70].
- (g) Remove the nut [65] and washer [66] from the body [70] to remove the O-ring [64] from the bulkhead.
- (h) Discard the O-ring [64].

SUBTASK 28-22-15-020-014

- (7) Remove the fuel lines, support clamps, and bonding jumpers as necessary.

————— **END OF TASK** —————

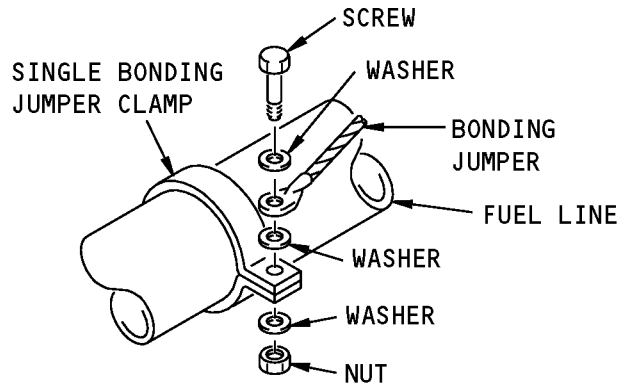
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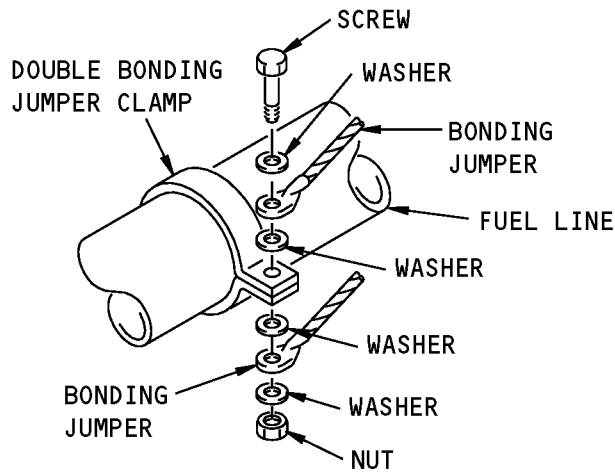
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**SINGLE BONDING JUMPER CLAMP
(EXAMPLE)**



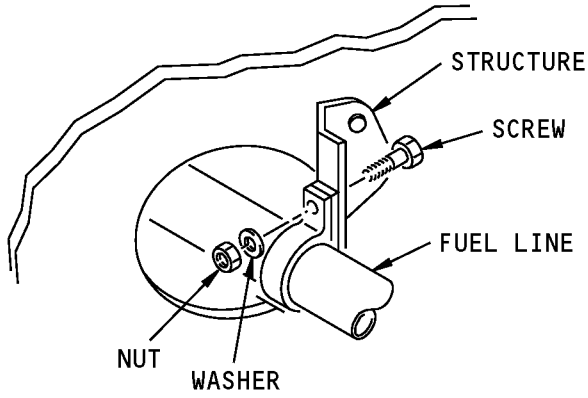
**DOUBLE BONDING JUMPER CLAMP
(EXAMPLE)**

**Bonding Jumper Clamp Installation
Figure 401/28-22-15-990-801**

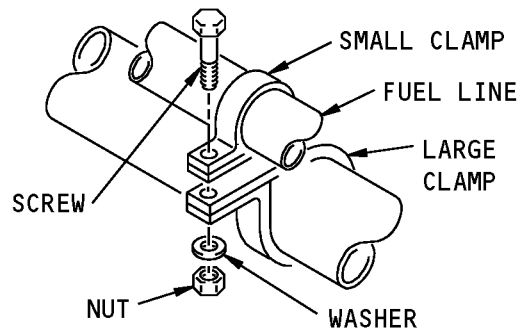
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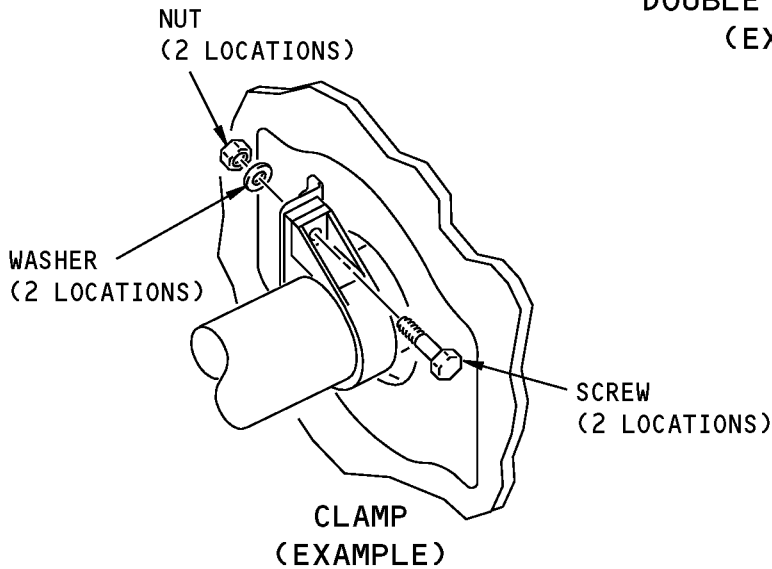
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**LOOP CLAMP
(EXAMPLE)**



**DOUBLE LOOP CLAMP
(EXAMPLE)**



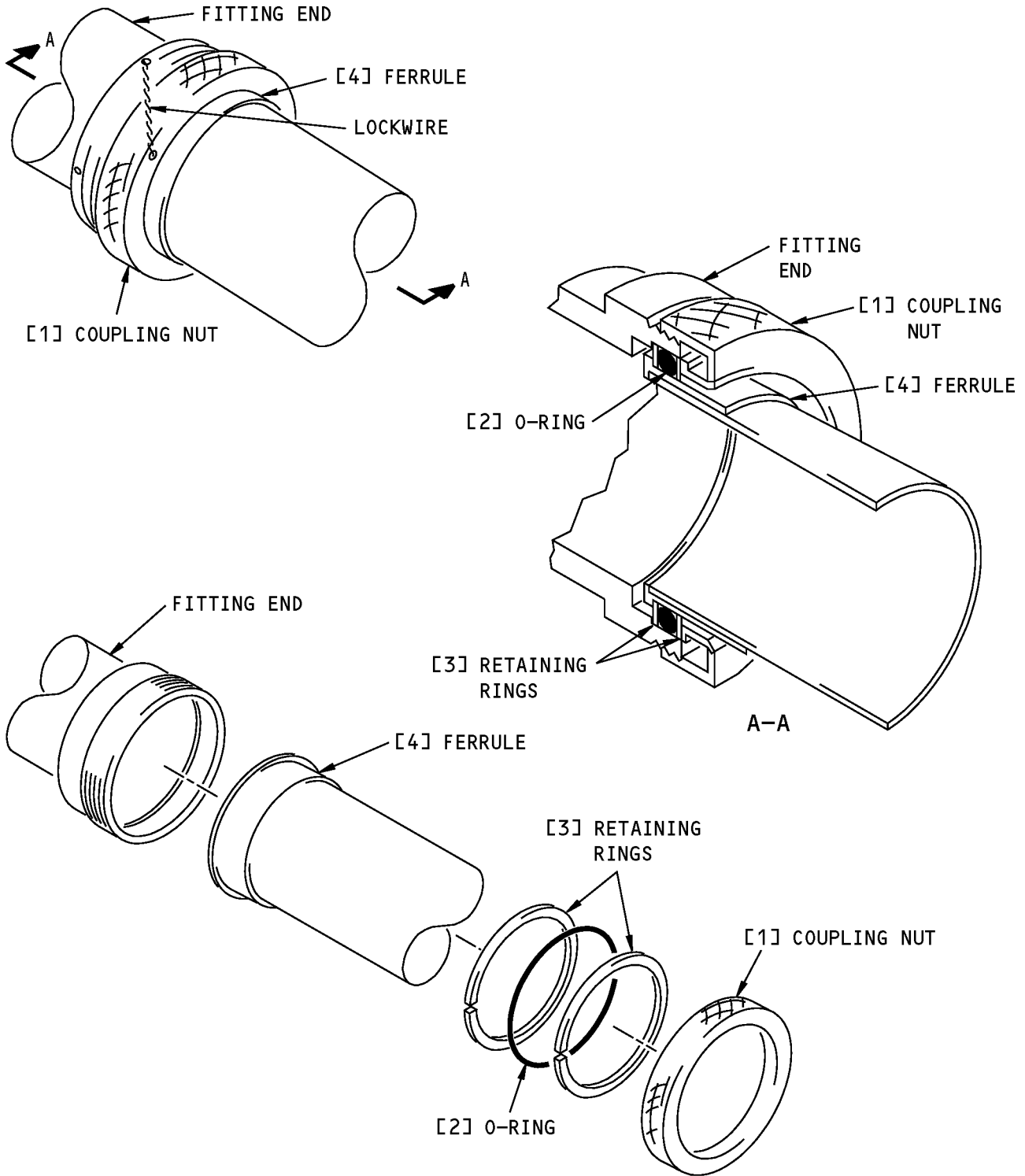
**Fuel Feed Manifold and Couplings Installation
Figure 402/28-22-15-990-802**

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Flexible Half Coupling Installation
Figure 403/28-22-15-990-803

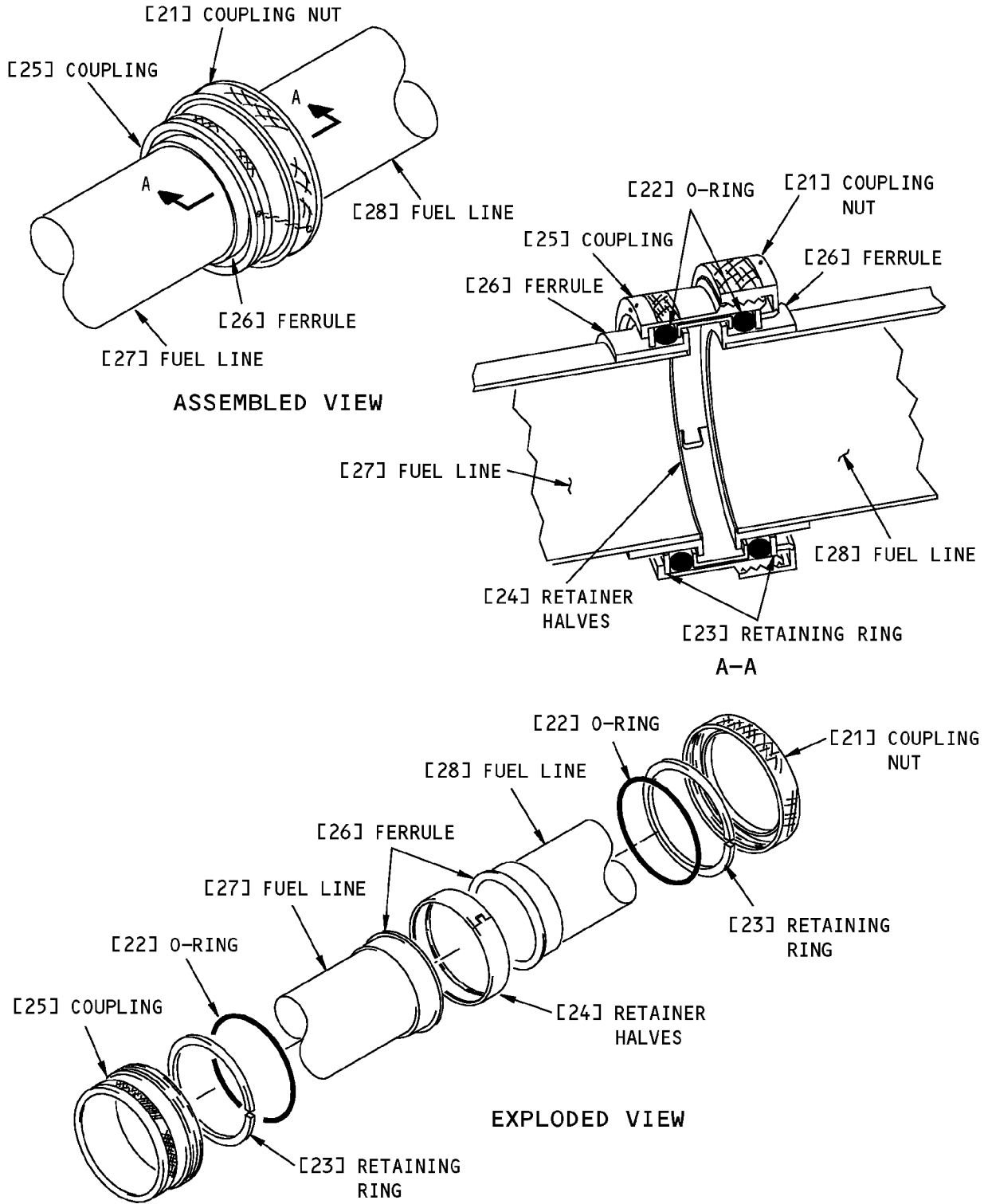
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Flexible Full Coupling Installation
Figure 404 (Sheet 1 of 2)/28-22-15-990-804

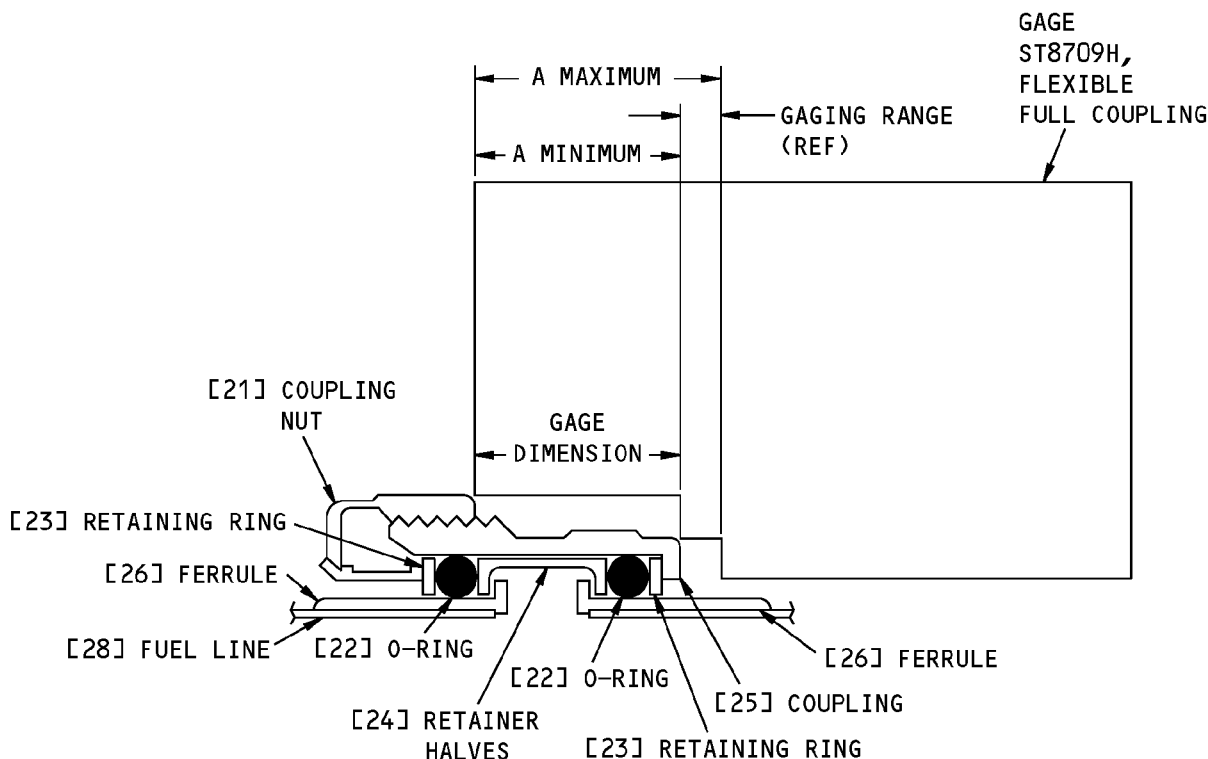
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FLEXIBLE FULL COUPLING WITH GAGE

SIZE	MAX GAGE ①	MIN GAGE ①	GAGE NO. ST8709H	SIZE	MAX GAGE ①	MIN GAGE ①	GAGE NO. ST8709H
08	0.59	0.47	1	36	0.93	0.76	4
10	0.59	0.47	1	40	0.93	0.76	4
12	0.69	0.55	2	48	0.93	0.76	4
16	0.75	0.60	3	56	1.03	0.88	5
20	0.75	0.60	3	64	1.03	0.88	5
24	0.93	0.76	4	72	1.16	0.99	6
28	0.93	0.76	4	80	1.39	1.22	7
32	0.93	0.76	4	88	1.39	1.22	7

① DIMENSIONAL REQUIREMENTS FOR ASSEMBLING FLEXIBLE FULL COUPLING

FLEXIBLE FULL COUPLING DIMENSIONS

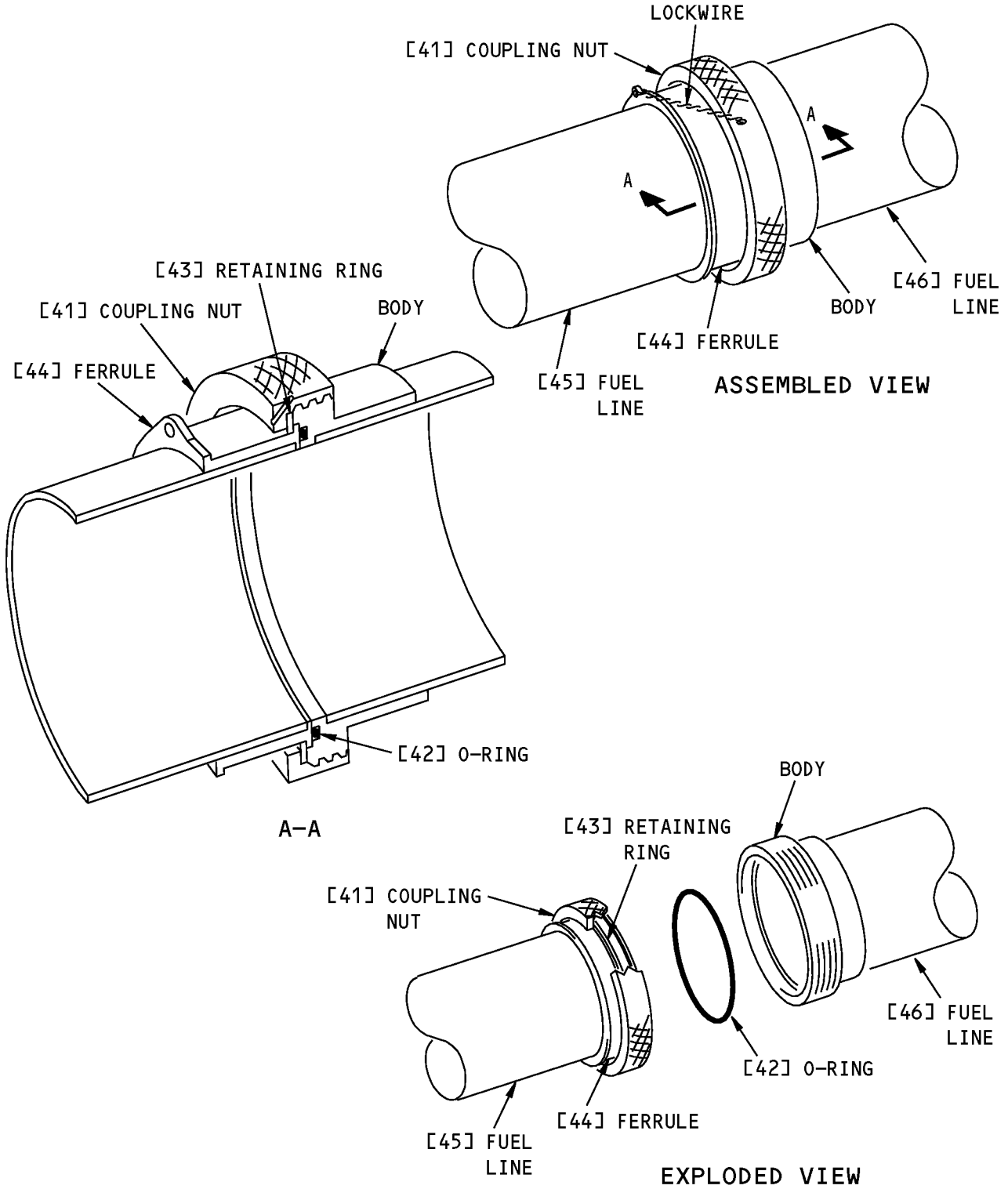
**Flexible Full Coupling Installation
Figure 404 (Sheet 2 of 2)/28-22-15-990-804**

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Rigid Coupling Installation
Figure 405/28-22-15-990-805

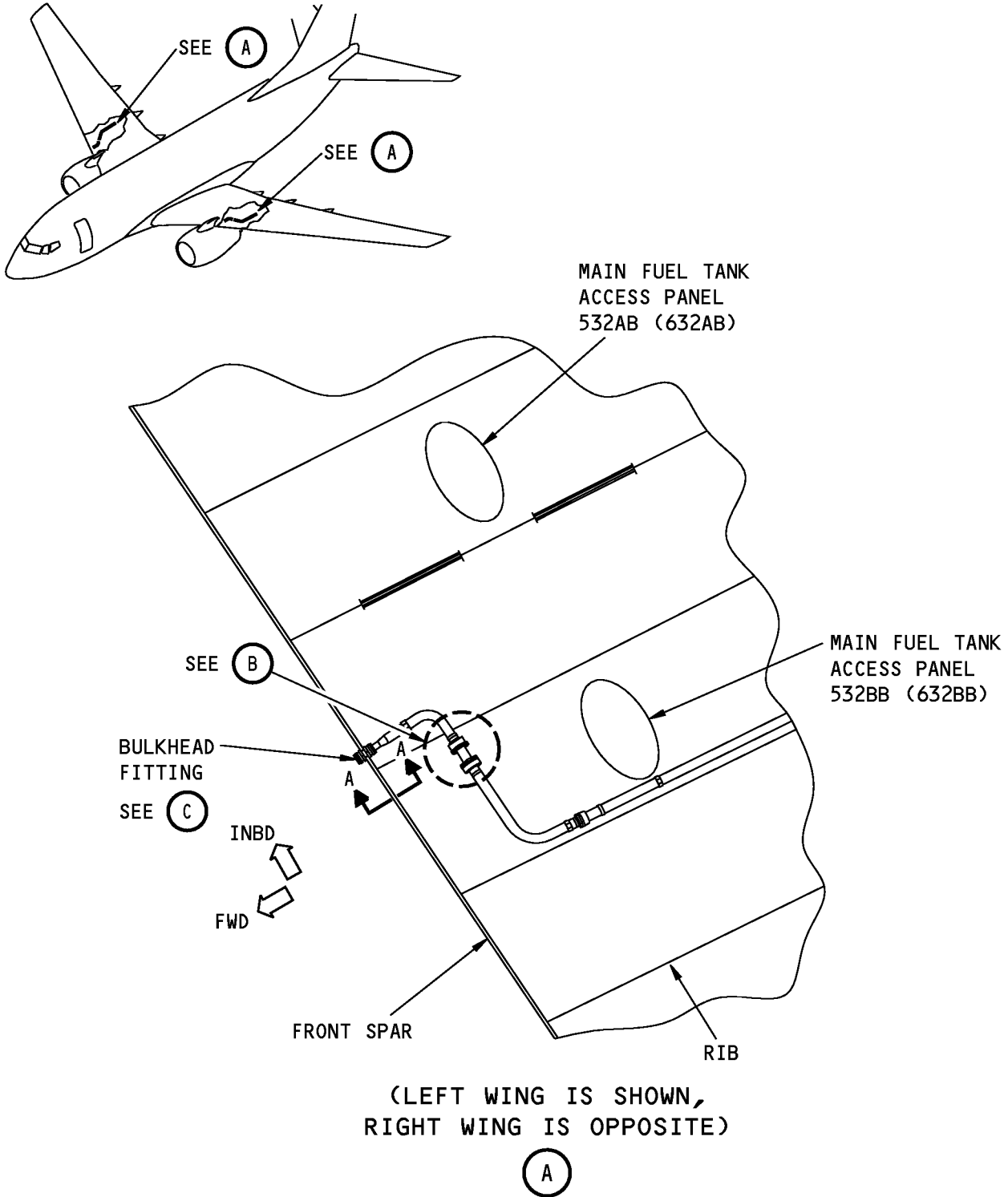
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Bulkhead Fitting Installation
Figure 406 (Sheet 1 of 3)/28-22-15-990-806

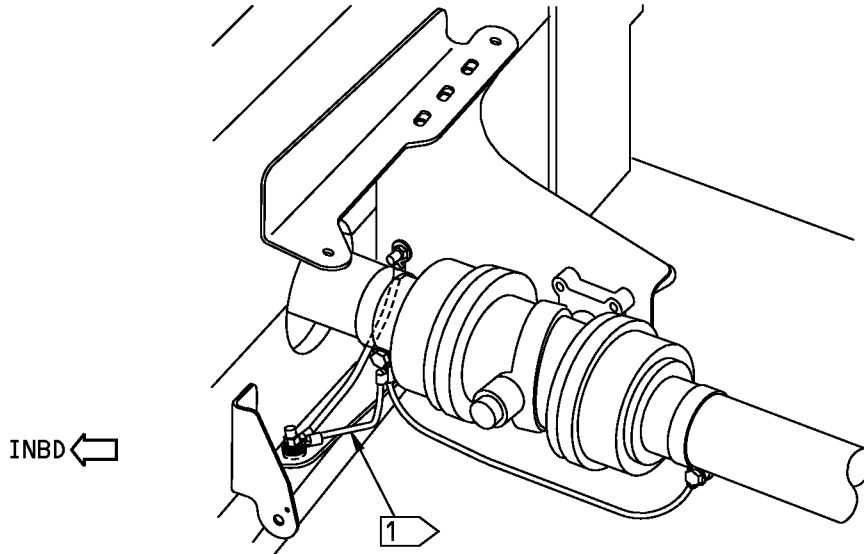
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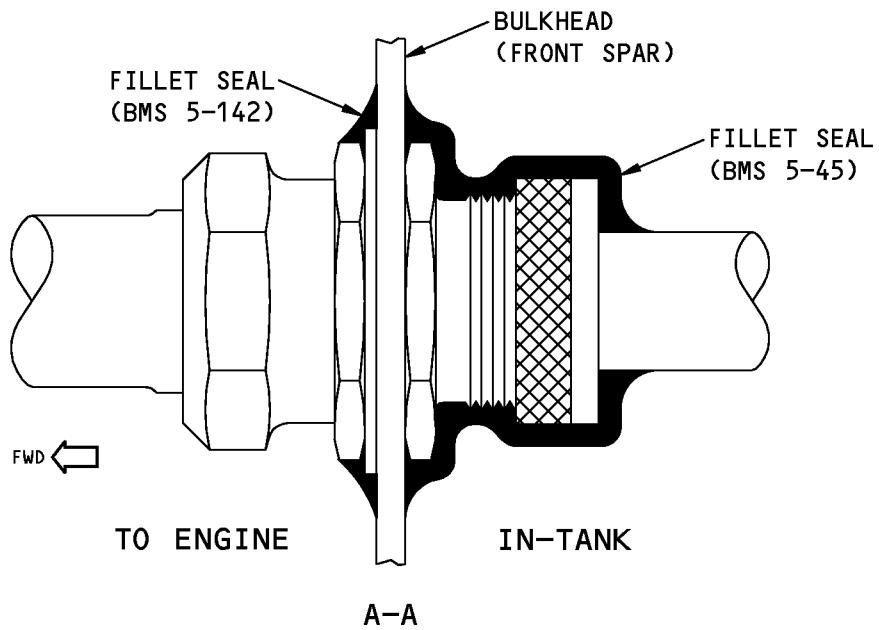
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(VIEW IN THE FORWARD DIRECTION)

(B)



1 BONDING JUMPER LOCATED BETWEEN THE STRUCTURE INSIDE THE TANK AND THE FIRST TUBE THAT MATES WITH THE BULKHEAD FITTING.

F79225 S0006572012_V3

**Bulkhead Fitting Installation
Figure 406 (Sheet 2 of 3)/28-22-15-990-806**

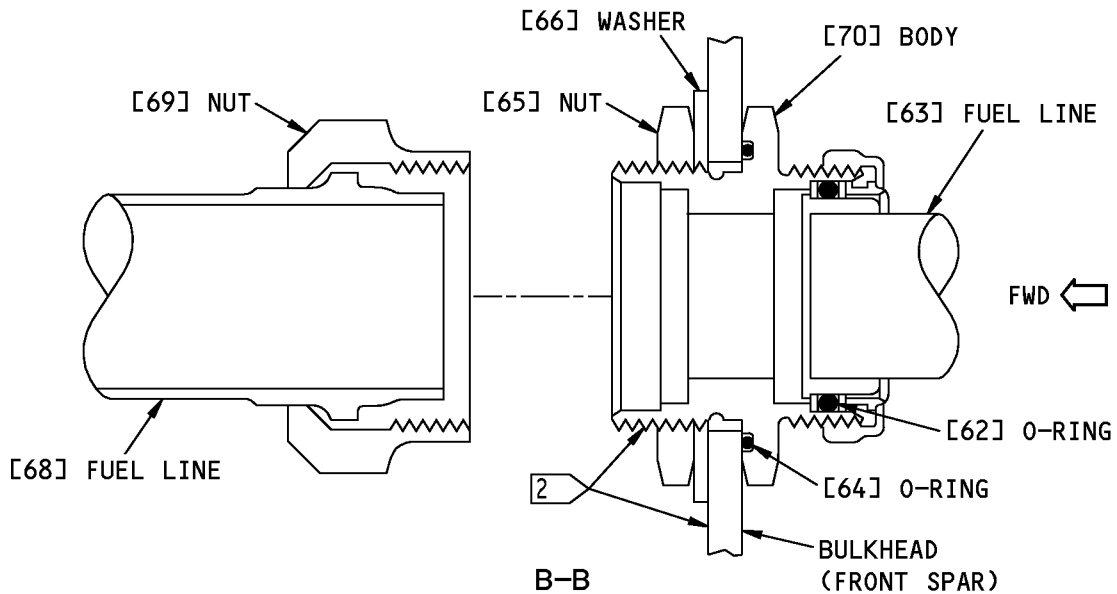
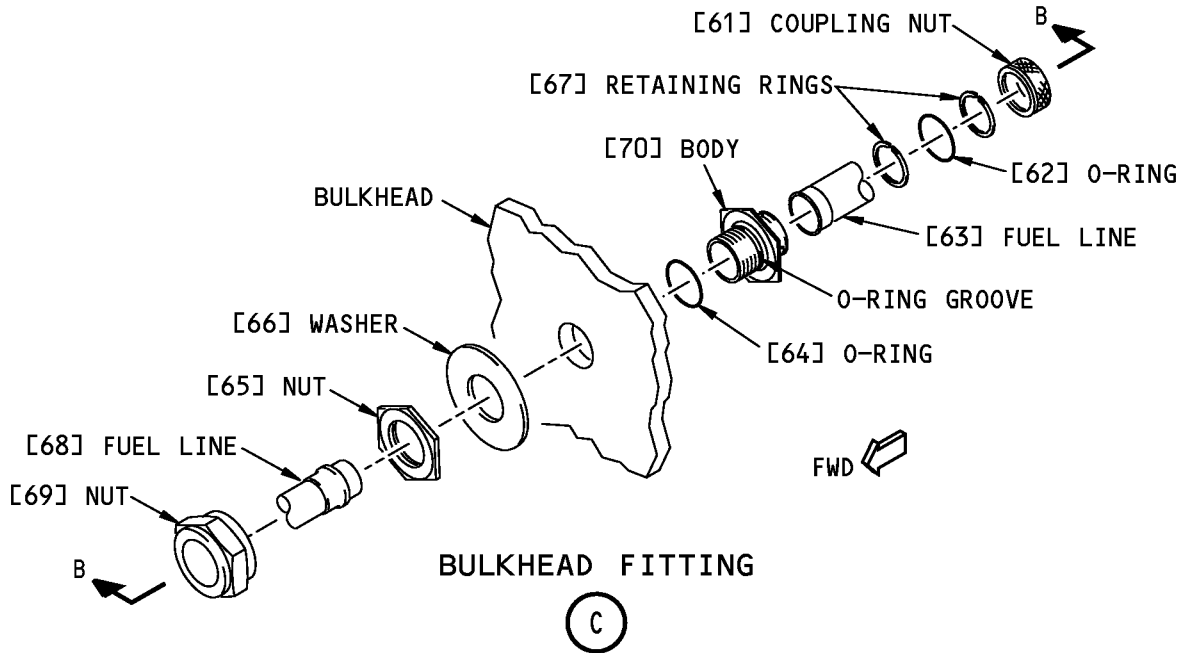
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2 RESISTANCE FROM THREADS ON BULKHEAD FITTING TO BULKHEAD (FRONT SPAR) MUST BE 0.0005 OHM (0.5 MILLIOHM) OR LESS.

U34039 S0000192988_V3

Bulkhead Fitting Installation
Figure 406 (Sheet 3 of 3)/28-22-15-990-806

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TASK 28-22-15-400-801

3. Fuel Line, Fitting and Coupling - Installation

(Figure 401)

A. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
20-10-44-400-801	Lockwires Installation (P/B 401)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-15-710-801	Engine Fuel Feed Manifold - Leak Test (P/B 601)
SWPM 20-20-00	Electrical Bonds and Grounds

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)

C. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142
C00862	Coating - Chemical Conversion - Alodine 600	
D00504	Grease - Petrolatum	VV-P-236

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
430	Subzone - Engine 1, Nacelle Strut
440	Subzone - Engine 2, Nacelle Strut
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50
633	Right Wing - Surge Tank, Rib 22 to Rib 25, Wing Station 643.50 to Wing Buttock Line 616.75

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E. Procedure

SUBTASK 28-22-15-940-002

WARNING: OBEY THE FUEL TANK ENTRY PRECAUTIONS. FAILURE TO OBEY THE FUEL TANK ENTRY PRECAUTIONS COULD CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Go into the applicable fuel tank, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-22-15-420-001

- (2) Install the bolts, washers and nuts to loosely connect the clamps for the fuel lines to the structure or support brackets (Figure 402).

SUBTASK 28-22-15-420-002

- (3) To install the bulkhead fittings, do these steps (Figure 406):
 - (a) Do these steps to clean the bulkhead fitting and the surfaces on the front spar to provide a good electrical bond:
 - 1) Clean and remove the finish from the threads and surfaces of the bulkhead fitting (SWPM 20-20-00).
 - 2) Polish the bulkhead fitting flange.
 - a) Remove the anodic surface finish with 320 grit, or finer, to make a flat bare metal surface all the way around the mating surface (SWPM 20-20-00).
 - b) Remove a minimum quantity of material.
 - 3) Clean the wing front spar web area, both wet and dry sides.
 - a) Remove contamination and dirt from the contact areas of the front spar (SWPM 20-20-00).
 - b) Clean the surrounding surface to prepare for applying alodine and sealant (SWPM 20-20-00).
 - 4) Polish the fay surface area of the front spar web at the mating surface of the bulkhead fitting flange using 320 grit emory paper or finer.
 - a) Remove a minimum quantity of material.

NOTE: The anodic surface finish is less than 0.0001 inch (0.0025 mm).
 - b) Polish and clean to a minimum of 0.0625 in. (1.59 mm) diameter more than the spar fitting on the dry side.
 - c) Polish and clean to a minimum of 0.0625 in. (1.59 mm) diameter more than the nut on the wet side.

CAUTION: KEEP THE TIME THAT THE METAL SURFACES ARE BARE TO A MINIMUM. IF THE SURFACES STAY BARE FOR MORE THAN FOUR HOURS, RUB THEM LIGHTLY AGAIN BEFORE YOU APPLY THE CONVERSION COATING.

- 5) Apply Alodine 600 coating, C00862 to the inside and outside surfaces of the front spar web.
 - a) Apply Alodine 600 coating, C00862 to the bare metal surfaces with a small clean brush.
- (b) Apply a thin layer of petrolatum grease, D00504, to the new O-ring [64].
- (c) Put the O-ring [64] on the body [70], and put the body [70] in its position in the bulkhead.

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- (d) Install the nut [65] and washer [66] to the body [70] in the bulkhead.
- 1) While someone holds the body [70] and fuel line [63] on the wet side, torque the nut [65] to 500 ± 25 in-lb (56 ± 3 N·m).

- (e) Measure the bonding resistance from the threads on the body [70] to the bulkhead (front spar), View B-B (Figure 406)(SWPM 20-20-00).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- 1) Make sure the resistance is 0.0005 ohm (0.5 milliohm) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- (f) Put the coupling nut [61] on the ferrule of the fuel line [63].

CAUTION: DO NOT TWIST THE RETAINING RING OUT OF SHAPE. IF THE RETAINING RING IS DAMAGED, FUEL LEAKS AT THE FITTING COULD OCCUR.

- (g) Put a retaining ring [67] on the ferrule to hold the coupling nut [61] on the fuel line [63].

- (h) Apply a thin layer of petrolatum grease, D00504, to the new O-ring [62].

CAUTION: DO NOT USE THE SAME O-RING FOR THE FUEL LINE FITTINGS AFTER YOU TIGHTEN THE COUPLING ONE TIME. YOU MUST INSTALL NEW O-RINGS OR FUEL LEAKS CAN OCCUR.

- (i) Install the O-ring [62] on the fuel line [63].

CAUTION: DO NOT TWIST THE RETAINING RING OUT OF SHAPE. IF THE RETAINING RING IS DAMAGED, FUEL LEAKS AT THE FITTING COULD OCCUR.

- (j) Put the second retaining ring [67] on the ferrule of the fuel line [63].

- (k) Make sure the fuel line [63] aligns to the body [70] of the bulkhead fitting.

CAUTION: DO NOT USE TOOLS TO TIGHTEN THE FUEL LINE FITTINGS. DAMAGE TO THE FITTING COMPONENTS COULD OCCUR OR THE ADJACENT FITTINGS COULD LOOSEN.

- (l) Hand tighten the coupling nut [61] to connect the fuel line [63].

- (m) Back off the coupling nut [61] one turn and again, retighten the coupling nut [61] by hand.

- (n) Install the lockwire on the coupling nut [61].

- (o) Install the nut [69] on the fuel line [68].

- (p) Torque the nut [69] to 750 ± 38 in-lb (85 ± 5 N·m)

- (q) Loosen the torque on the nut [69] to relieve tension in the fuel line [68].

- (r) Again, torque the nut [69] to 750 ± 38 in-lb (85 ± 5 N·m) to connect the fuel line [68].

- (s) On the forward side of the front spar, apply a fillet seal of sealant, A02315 to the joint between the outside diameter of the engine fuel feed spar bulkhead fitting nut [65] and washer [66], and the wing front spar web, View A-A (Figure 406.).

- 1) Seal to a minimum of 0.1875 in. (4.7625 mm) diameter more than the nut [65] on the other side of the front spar web.

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- (t) On the aft side of the front spar (inside the tank), apply a fillet seal of sealant, A00767 to the engine fuel feed tube fitting threads and nut threads, View A-A (Figure 406).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- 1) The sealant must extend to the flat dimension of the nut [61] and at least two threads of the bulkhead fitting.

- (u) On the aft side of the front spar (inside the tank), apply a full-bodied fillet seal of sealant, A00767 from the aft side of the front spar to the adjacent fuel line, View A-A (Figure 406).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- 1) Seal to a minimum thickness of 0.10 in. (2.54 mm).
2) Seal to a minimum of 0.1875 in. (4.7625 mm) diameter more than the spar fitting on the front spar web.

- (v) Clean the wing front spar area of all particles and dust caused by the fay surfacing process.

SUBTASK 28-22-15-420-003

- (4) To install the rigid couplings on the fuel line, do these steps (Figure 405):

- (a) Loosen the adjacent clamps and couplings before you install the rigid coupling.

NOTE: This will prevent a preload on the rigid coupling.

- (b) Put the coupling nut [41] on the ferrule [44] of the fuel line.

CAUTION: DO NOT TWIST THE RETAINING RING OUT OF SHAPE. IF THE RETAINING RING IS DAMAGED, FUEL LEAKS AT THE FITTING COULD OCCUR.

- (c) Put a new retaining ring [43] on the ferrule to hold the coupling nut [41] on the fuel line.

- (d) Make sure the fuel lines [45], [46] align correctly.

NOTE: You must align the fuel tubes correctly for rigid couplings. If you do not align the fuel lines correctly a fuel leak will occur.

- (e) Apply a thin layer of petrolatum grease, D00504, to the new O-ring [42].

CAUTION: DO NOT USE THE SAME O-RING FOR THE FUEL LINE FITTINGS AFTER YOU TIGHTEN THE COUPLING ONE TIME. YOU MUST INSTALL NEW O-RINGS OR FUEL LEAKS CAN OCCUR.

- (f) Install the O-ring [42] on the fuel line [45].

- (g) Make sure the two fuel lines [45], [46] align end to end.

CAUTION: DO NOT USE TOOLS TO TIGHTEN THE FUEL LINE FITTINGS. DAMAGE TO THE FITTING COMPONENTS COULD OCCUR OR THE ADJACENT FITTINGS COULD LOOSEN.

- (h) Manually tighten the coupling nut [41] of the rigid coupling to connect fuel lines.

- (i) Install the lockwire between the coupling nut [41] and the ferrule [44] (TASK 20-10-44-400-801).

- (j) Tighten the adjacent clamps and couplings.

SUBTASK 28-22-15-420-004

- (5) To install the flexible half couplings on the fuel line, do these steps (Figure 403):

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(a) Put the coupling nut [1] on the ferrule [4] of the fuel line.

CAUTION: DO NOT TWIST THE RETAINING RING OUT OF SHAPE. IF THE RETAINING RING IS DAMAGED, FUEL LEAKS AT THE FITTING COULD OCCUR.

(b) Put one retaining ring [3] on the ferrule [4] to hold the coupling nut [1] on the fuel line.

(c) Apply a thin layer of petrolatum grease, D00504, to the new O-ring [2].

CAUTION: DO NOT USE THE SAME O-RING FOR THE FUEL LINE FITTINGS AFTER YOU TIGHTEN THE COUPLING ONE TIME. YOU MUST INSTALL NEW O-RINGS OR FUEL LEAKS CAN OCCUR.

(d) Put the new O-ring [2] on the ferrule [4].

CAUTION: DO NOT TWIST THE RETAINING RING OUT OF SHAPE. IF THE RETAINING RING IS DAMAGED, FUEL LEAKS AT THE FITTING COULD OCCUR.

(e) Put the second retaining ring [3] on the ferrule [4].

(f) Put the fuel line into the half coupling fitting.

CAUTION: DO NOT USE TOOLS TO TIGHTEN THE FUEL LINE FITTINGS. DAMAGE TO THE FITTING COMPONENTS COULD OCCUR OR THE ADJACENT FITTINGS COULD LOOSEN.

(g) Manually tighten the coupling nut [1].

(h) Install the lockwire between the coupling nut [1] and the ferrule [4] (TASK 20-10-44-400-801).

SUBTASK 28-22-15-420-005

(6) To install the flexible full couplings on the fuel lines, do these steps (Figure 404):

(a) Put the coupling nut [21] on the ferrule [26] of fuel line [28].

(b) Put the coupling [25] on the ferrule [26] of the opposite fuel line [27].

CAUTION: DO NOT TWIST THE RETAINING RING OUT OF SHAPE. IF THE RETAINING RING IS DAMAGED, FUEL LEAKS AT THE FITTING COULD OCCUR.

(c) Put one retaining ring [23] on each ferrule to hold the coupling nut [21] and coupling [25] on the ends of each fuel line [27], [28].

(d) Apply a thin layer of petrolatum grease, D00504, to the new O-ring [22].

CAUTION: DO NOT USE THE SAME O-RING FOR THE FUEL LINE FITTINGS AFTER YOU TIGHTEN THE COUPLING ONE TIME. YOU MUST INSTALL A NEW O-RING OR FUEL LEAKS CAN OCCUR.

(e) Put one O-ring [22] on each ferrule [26].

(f) Align the ends of the fuel lines [27], [28] with a 0.12 ± 0.03 inch clearance between the ferrules [26].

(g) Put the retainer halves [24] together on the ferrules [26] to connect fuel lines [27], [28].

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CAUTION: DO NOT USE TOOLS TO TIGHTEN THE FUEL LINE FITTINGS. DAMAGE TO THE FITTING COMPONENTS COULD OCCUR OR THE ADJACENT FITTINGS COULD LOOSEN.

(h) Manually tighten the coupling nut [21] to the necessary dimension (Figure 404).

NOTE: You can use the coupling gage ST8709H to make sure a flexible full coupling is installed correctly. The flexible full couplings can catch and feel tight when the coupling nut is not fully installed. The coupling gage ST8709H will show a coupling nut that is not installed correctly.

(i) Install lockwire between the coupling nut [21] and the coupling [25] (TASK 20-10-44-400-801).

SUBTASK 28-22-15-420-006

(7) Tighten the clamps on the fuel line to the structure or support brackets (Figure 402).

SUBTASK 28-22-15-420-010

(8) Tighten the support brackets to the structure with bolts, washers, and nuts (if the support brackets are not riveted).

SUBTASK 28-22-15-210-001

(9) Make sure the fuel line does not touch the structure.

SUBTASK 28-22-15-210-002

(10) Make sure the distance between the fuel line and the structure is a minimum of 0.25 in. (6.35 mm).

NOTE: This does not include the area near the support bracket.

SUBTASK 28-22-15-420-011

(11) Install the bolts, washers and nuts to connect the bonding jumpers and clamps (Figure 401).

SUBTASK 28-22-15-420-012

(12) Install a bonding jumper between the structure inside the tank and the first tube that mates with the bulkhead fitting (Figure 406).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

SUBTASK 28-22-15-220-001

(13) Measure the bonding resistances with an electrical bonding meter, COM-1550.

(a) Measure the bonding resistance from the structure inside the tank to the first tube that mates with the bulkhead fitting (SWPM 20-20-00).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

1) Make sure the resistance is 0.010 ohm (10 milliohms) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

(b) Make sure the bonding resistance between the fuel lines and the airplane structure is not more than 0.01 ohm.

(c) Make sure the bonding resistance between the fuel lines (just forward and aft of the front spar) and the airplane structure is less than 0.0025 ohm.

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SUBTASK 28-22-15-080-002

(14) Remove all the tools and equipment from the fuel tank.

SUBTASK 28-22-15-410-001

(15) To install the applicable main fuel tank access doors, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

SUBTASK 28-22-15-410-002

(16) To install the applicable center fuel tank access doors, do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801.

SUBTASK 28-22-15-710-001

(17) To test the engine fuel feed manifold for leakage, do this task: Engine Fuel Feed Manifold - Leak Test, TASK 28-22-15-710-801.

SUBTASK 28-22-15-650-003

(18) To refuel the fuel tanks (if no more work is necessary), do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

————— **END OF TASK** —————

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FUEL FEED MANIFOLD COUPLINGS - INSPECTION/CHECK

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains two tasks. These are the tasks:
 - (1) Engine Fuel Feed Manifold - Leakage Test
 - (2) Fuel Tube Dent Criteria - Inspection/Check

TASK 28-22-15-710-801

2. Engine Fuel Feed Manifold - Leak Test

(Figure 601, Figure 602, Figure 603, Figure 604)

A. General

- (1) This procedure is a scheduled maintenance task.
- (2) This test is a positive pressure test of the engine fuel feed manifold. It can be used to find and isolate leakage in the engine fuel feed manifold.

B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
24-22-00-860-812	Remove Electrical Power (P/B 201)
24-22-00-860-813	Supply External Power (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-00-02-000-801-F00	Power Plant Removal (P/B 401)
71-11-02-000-801-F00	Remove the Fan Cowl Panel (Selection) (P/B 401)
71-11-02-400-801-F00	Install the Fan Cowl Panel (Selection) (P/B 401)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
SPL-1776	Equipment - Test, Engine Fuel Feed Manifold (Part #: C28014-1, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER)
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

D. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00672 [CP5070]	Grease - Petrolatum	VV-P-236

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E. Location Zones

Zone	Area
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

F. Prepare for Test

SUBTASK 28-22-15-650-004

- (1) Completely defuel the fuel tanks (TASK 28-26-00-650-801).

SUBTASK 28-22-15-650-005

- (2) Make sure the APU start switch is in the OFF position.

SUBTASK 28-22-15-650-006

- (3) Do these steps to make sure the engine fuel valves are in the correct positions:

NOTE: There are two sets of engine fuel valves. The first set are the high pressure shutoff valves (HPSOV) which are installed on the engines. The second set are the spar valves which are installed in the main fuel tanks. For this test both HPSOV are closed when both engine fuel spar valves are open.

- (a) Make sure the engine start levers on the control stand are in the CUTOFF position.
- (b) Make sure the Engine START switches are in the OFF position, on the P5 overhead panel.
- (c) Put a DO-NOT-OPERATE placard on the left and right engine START switches, on the P5 overhead panel.
- (d) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

- (e) On the P5 fuel system panel, set the CROSSFEED switch to the open position.
- (f) Make sure the VALVE OPEN light for the crossfeed valve comes on bright during valve transit and then stays on dim to show that the crossfeed valve is open.
- (g) Move the engine start levers on the P10 Control Stand to the IDLE position.

NOTE: This opens the fuel spar valves.

- (h) On the P5 panel, make sure the two SPAR VALVE CLOSED lights are off.

SUBTASK 28-22-15-860-001

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

SUBTASK 28-22-15-010-003

- (5) Do this task: Remove the Fan Cowl Panel (Selection), TASK 71-11-02-000-801-F00.

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SUBTASK 28-22-15-010-004

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSERS: YOU MUST RETRACT THE LEADING EDGES, YOU MUST DEACTIVATE THE LEADING EDGES, THEN YOU MUST DEACTIVATE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(6) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

SUBTASK 28-22-15-860-002

WARNING: REMOVE THE ELECTRICAL POWER BEFORE YOU DISCONNECT A FUEL, HYDRAULIC OR ELECTRICAL LINE. AN ACCIDENTAL OPERATION OF THE PRESSURIZED FLUIDS OR ELECTRICAL CIRCUITS CAN CAUSE A FIRE. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(7) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

SUBTASK 28-22-15-680-001

(8) Do these steps to drain the fuel supply line (Figure 602):

- (a) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the fuel filter drain plug [23].
- (b) Remove the drain plug [23] and let the fuel drain.
- (c) Remove and discard the O-ring [22] from the drain plug [23].
- (d) Lubricate a new O-ring [22] with grease, D00672 [CP5070] and install it on the drain plug [23].
- (e) Lubricate the threads of the drain plug [23] with grease, D00601 [CP2101].
- (f) Install the drain plug [23].
 - 1) Tighten the drain plug [23] to 50 ± 5 in-lb (6 ± 1 N·m).
- (g) Attach a lockwire to the drain plug [23].

SUBTASK 28-22-15-020-002

(9) Disconnect the engine fuel supply line at the quick disconnect panel (Figure 601) (TASK 71-00-02-000-801-F00).

SUBTASK 28-22-15-480-001

(10) Connect the engine fuel feed manifold test equipment, SPL-1776, to the engine fuel supply line (Figure 603).

G. Engine Fuel Feed Manifold - Leak Test

SUBTASK 28-22-15-860-003

(1) Do these steps to test the fuel feed manifold for leaks:

- (a) Close the bleed valve on the engine fuel feed manifold test equipment, SPL-1776, at the left engine.
- (b) Use the regulator to apply 40 ± 2 psig (276 ± 14 kPa) air pressure to the fuel supply line at the left engine.
- (c) Close the shutoff valve on the engine fuel feed manifold test equipment, SPL-1776, to hold a pressure of 40 ± 2 psig (276 ± 14 kPa).
- (d) Make sure the pressure is stable.
- (e) Make a written record of the time.

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- (f) Make sure the pressure at the left fuel supply line does not decrease more than 1.5 psi (10.3 kPa) in 10 minutes.
- (g) If the pressure does not decrease more than 1.5 psi (10.3 kPa) in 10 minutes, the fuel feed manifold is OK.
 - 1) Do this procedure: Put the Airplane Back to Its Usual Condition
- (h) If the pressure decreases more than 1.5 psi (10.3 kPa) in 10 minutes, there is a leak in the fuel feed manifold.

SUBTASK 28-22-15-790-001

- (2) To find the general location of the leak in the fuel manifold, do these steps (Figure 604):
 - (a) Close the right spar valve and do the test again.
 - (b) If the pressure does not decrease by more than 1.5 psi (10.3 kPa) in 10 minutes, the leak is between the right spar valve and the right engine fuel valve.
 - (c) If the pressure decreases by more than 1.5 psi (10.3 kPa) in 10 minutes, close the crossfeed valve and do the test again.
 - (d) If the pressure does not decrease by more than 1.0 psi (6.9 kPa) in 10 minutes, the leak is between the crossfeed valve and the right spar valve.
 - (e) If the pressure decreases by more than 1.0 psi (6.9 kPa) in 10 minutes, close the left spar valve and do the test again.
 - (f) If the pressure does not decrease by more than 1.0 psi (6.9 kPa) in ten minutes, the leak is between the crossfeed valve and the left spar valve.
 - (g) If the pressure decreases by more than 1.0 psi (6.9 kPa) in ten minutes, the leak is between the left spar valve and the test equipment on the left engine.

SUBTASK 28-22-15-360-001

- (3) After you find the general location of the leak, do these steps to find the exact location of the leak:
 - (a) For the applicable tank, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.
 - (b) Pressurize the fuel feed manifold at the inlet line for the left engine.
 - (c) Go into the applicable fuel tank to isolate the leak (TASK 28-11-00-910-802).
 - (d) Do a leak check of the fuel feed lines and couplings in the area where the pressure test failed:

CAUTION: YOU CANNOT TIGHTEN THE FUEL LINE COUPLING AFTER THE INITIAL INSTALLATION. YOU MUST INSTALL NEW O-RINGS WHEN YOU TIGHTEN THE FUEL LINE COUPLING AGAIN OR A FUEL LEAK CAN OCCUR.

- (e) If a coupling has a leak, disconnect the coupling, replace the O-rings, and then connect the coupling (TASK 28-22-15-400-801).
- (f) If a fuel line has a leak, or has damage, remove and install a new fuel line (TASK 28-22-15-400-801).

SUBTASK 28-22-15-790-002

- (4) After you repair a leak, do these steps:
 - (a) Pressurize the complete fuel feed manifold to 40 psi (276 kPa) from the inlet fuel line for the left engine to the right engine.
 - (b) If the pressure does not decrease by more than 1.5 psi (10.3 kPa) in 10 minutes, the system is OK.

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H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-15-410-003

- (1) To remove the engine fuel feed manifold test equipment, SPL-1776, from the engine fuel supply line, do these steps:
 - (a) Put the fuel crossfeed switch, on the P5 Overhead Panel, to the CLOSED position.
 - (b) Put the engine start levers on the P10 Control Stand to the CUTOFF position.
 - NOTE: This closes the fuel spar valves.
 - (c) On the P5 panel, make sure the two SPAR VALVE CLOSED lights are dim.

CAUTION: DRAIN ALL OF THE FUEL IN THE FUEL SUPPLY LINE. IF YOU DO NOT DRAIN ALL OF THE FUEL, FUEL WILL SPILL FROM THE FUEL SUPPLY LINE ONTO THE ENGINE.

- (d) Open the bleed valve on the engine fuel feed manifold test equipment, SPL-1776, to drain any fuel that remains in the fuel supply line.
- (e) Remove the engine fuel feed manifold test equipment, SPL-1776, from the fuel supply line.

SUBTASK 28-22-15-410-004

- (2) Connect the left engine fuel supply line to the quick disconnect panel (Figure 601).

SUBTASK 28-22-15-860-006

- (3) Do this task: Supply External Power, TASK 24-22-00-860-813.

SUBTASK 28-22-15-700-001

- (4) Do a leak check of the main fuel supply line, refer to the Power Plant Test reference table, do this task: Power Plant Test Reference Table, TASK 71-00-00-800-811-F00.

SUBTASK 28-22-15-860-007

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

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	8	C01103	ENGINE 1 START VALVE

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
C	4	C00154	ENGINE 2 START VALVE

SUBTASK 28-22-15-010-005

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS). IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (6) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

SUBTASK 28-22-15-410-005

- (7) Do this task: Install the Fan Cowl Panel (Selection), TASK 71-11-02-400-801-F00.

SUBTASK 28-22-15-650-007

- (8) Remove the DO-NOT-OPERATE placards from the left and right engine START switches, on the P5 overhead panel.

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SUBTASK 28-22-15-650-008

- (9) Refuel the fuel tanks. To refuel, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

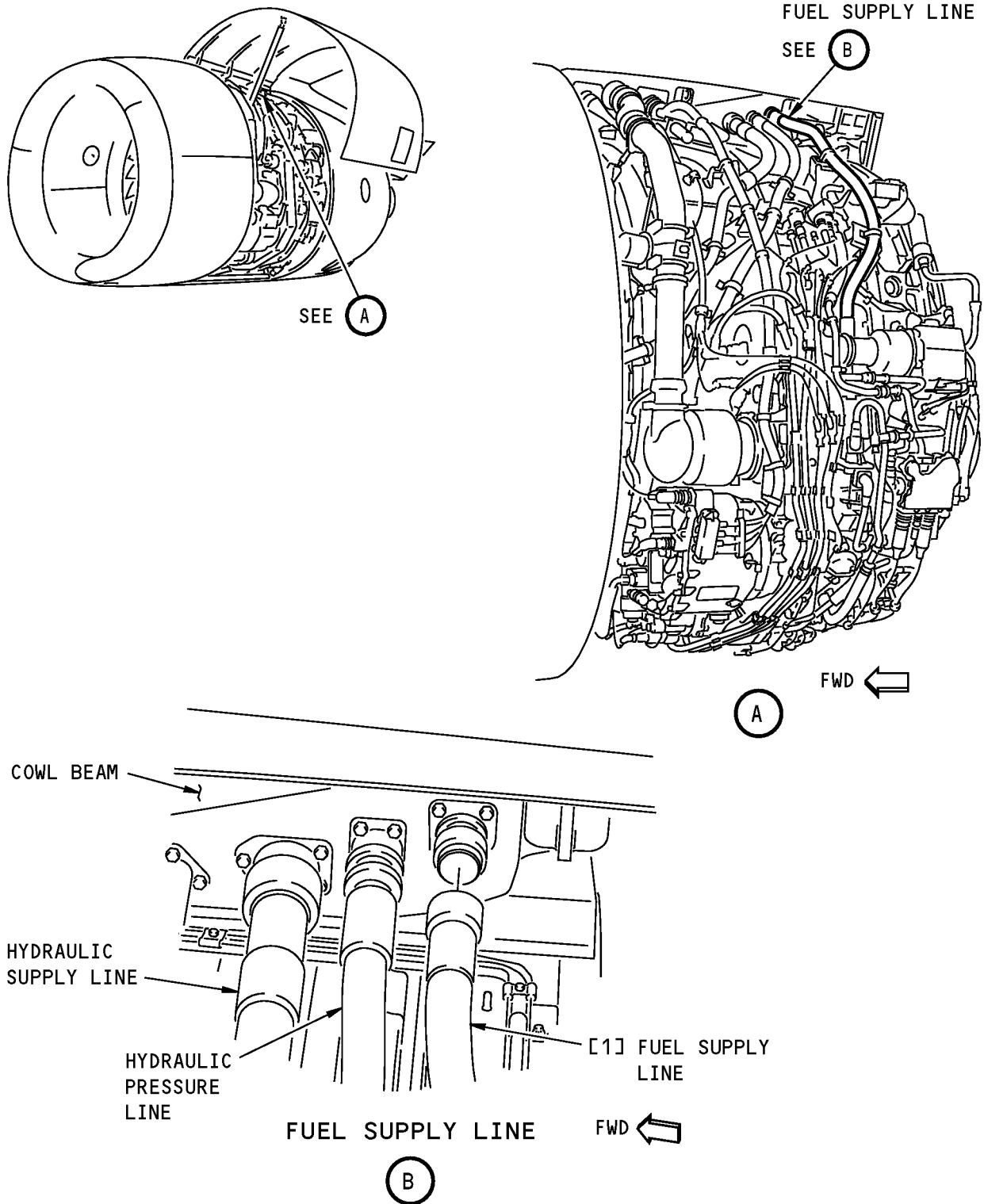
————— **END OF TASK** —————

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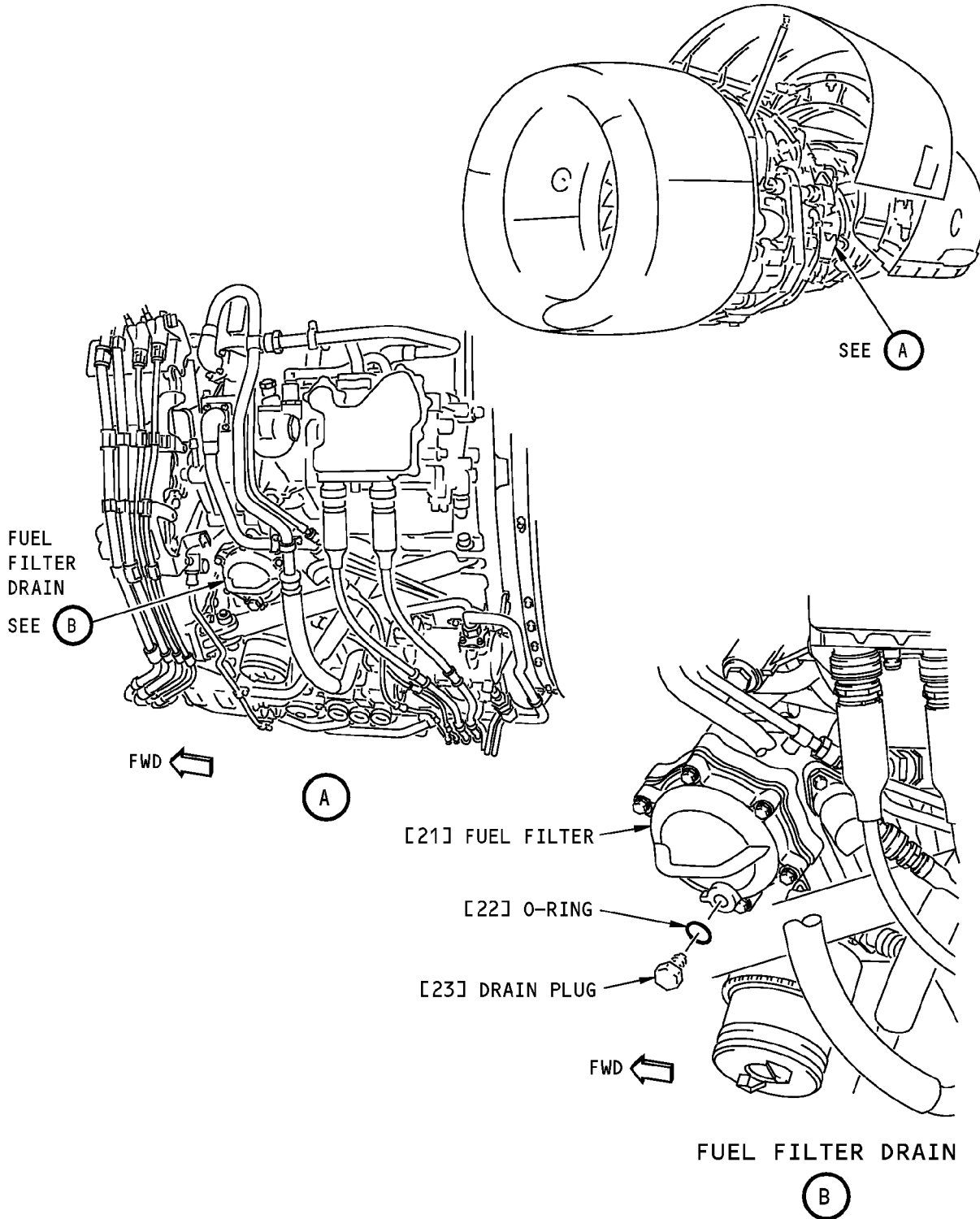
Fuel Supply Line Disconnect for Fuel-Feed Manifold Pressure Check
Figure 601/28-22-15-990-811

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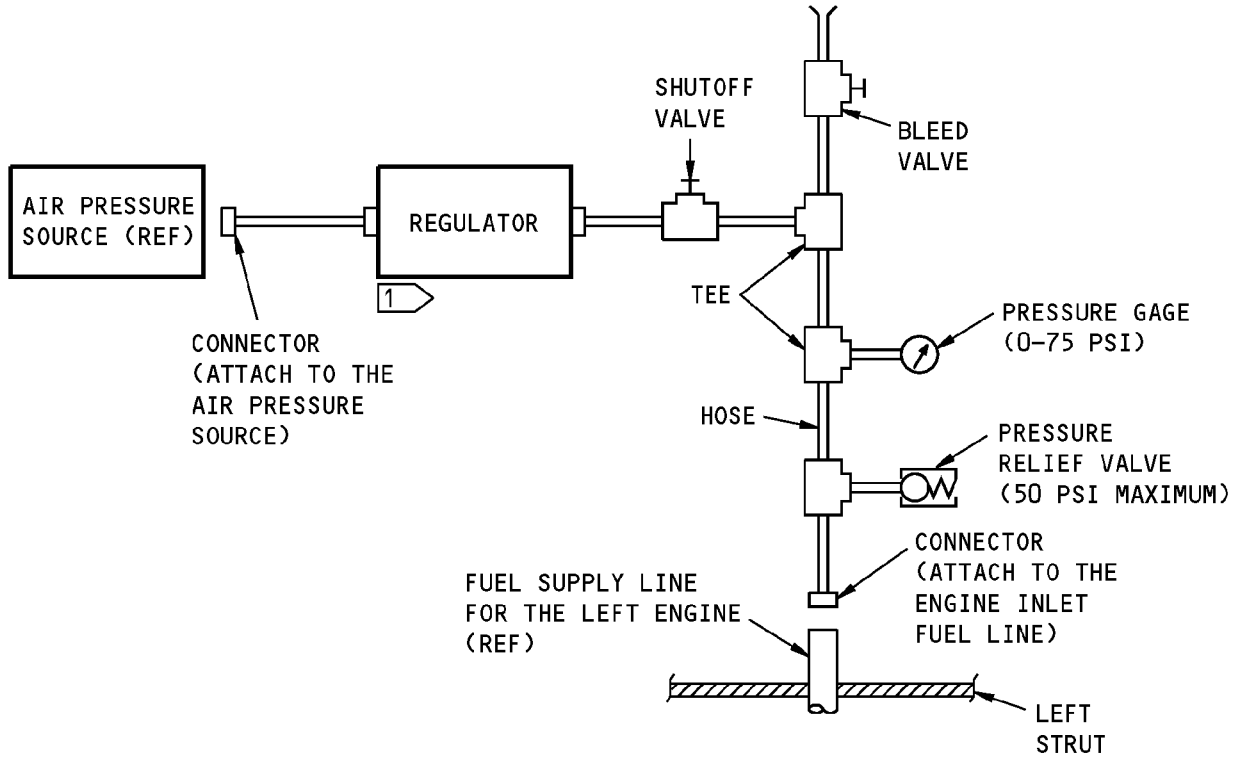


**Fuel Filter Drain Location
Figure 602/28-22-15-990-812**

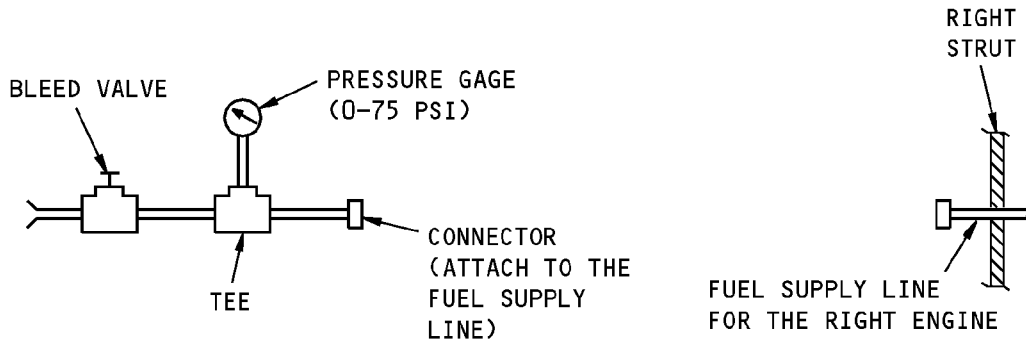
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PRESSURE CHECK EQUIPMENT - LEFT FUEL SUPPLY LINE



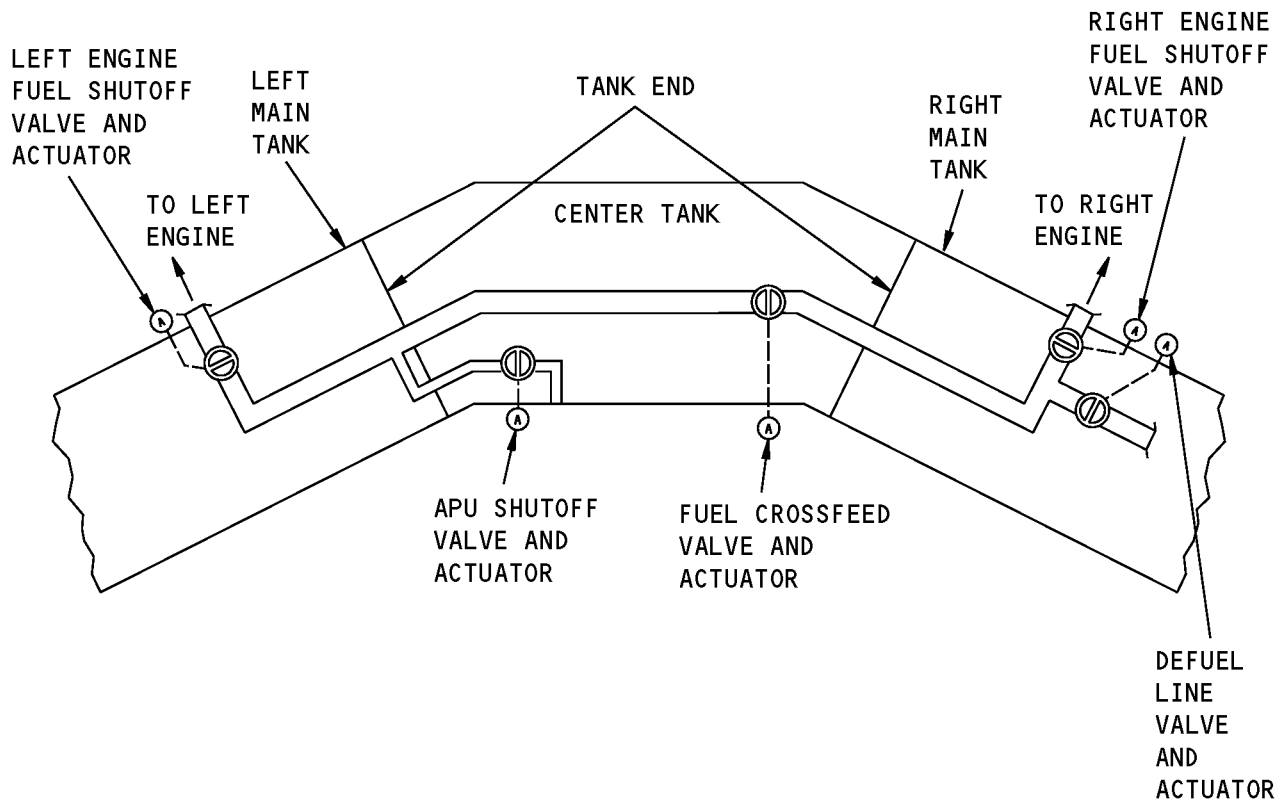
PRESSURE CHECK EQUIPMENT - RIGHT FUEL SUPPLY LINE

1 REGULATOR WHICH CAN DECREASE AIR PRESSURE TO 40 PSIG.

**Pressure Check Equipment
Figure 603/28-22-15-990-813**

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LEGEND :

⊕ VALVE BODY

Ⓐ ACTUATOR

**Fuel Feed Manifold - Simplified Schematic
Figure 604/28-22-15-990-814**

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TASK 28-22-15-700-801

3. Engine and APU Fuel Feed, Shroud, and Fuel Vent Line and Couplings Dent Criteria - Inspection/Check

A. General

- (1) These inspection criteria apply to the engine fuel feed lines, the pressure refueling lines, the APU shroud, the fuel vent lines, and the related couplings.

B. References

Reference	Title
20-10-51-000-801	Flareless Tubing Assembly Removal (P/B 401)
20-10-51-300-811	Aluminum Fuel Tubes - Temporary Weld Repair Method (P/B 801)
28-22-15-000-801	Fuel Line, Fitting and Coupling - Removal (P/B 401)

C. Procedure

SUBTASK 28-22-15-210-003

- (1) Visually examine all the fuel tubing to make sure it is tightly and correctly attached.

SUBTASK 28-22-15-420-007

- (2) Adjust the installation of the tubes which are not correctly attached.

SUBTASK 28-22-15-210-004

- (3) Visually examine all the fuel tubing for these types of damage and make sure the damage is permitted.
 - (a) Make an inspection for cracks.
 - 1) Make sure there are no cracks.
 - (b) Make an inspection for dents (areas that are pushed into the tubing).
 - 1) All dents must have an area that is large compared to the depth of the dent.
 - 2) No single dent in the tubing is permitted to decrease the diameter of the tube by more than 2.5 percent.
 - 3) If there are multiple dents, the total dent depth (individual depths added together) in any section five times the tube diameter long, must be no more than ten percent of the tube diameter.
 - 4) The dents in the tubing must be farther than one diameter of the tube from the end of the tube.
 - 5) The dents in the tubing must not have an area of more than 0.125 square inches (80.6 square millimeters).
 - 6) If the dent is on the outer part of a bend in the tube, the dent must not have a depth of more than 0.015 inches (.38 mm).
 - (c) Do an inspection for nicks.
 - 1) The nicks in the tubing must have a rounded bottom.
 - 2) The nicks in the tubing must not have a depth of more than 0.004 inch.
 - 3) You must remove all the burrs from the nick if there are some burrs.
 - (d) Do an inspection for fretting.
 - 1) Fretting must not have a depth of more than 0.004 inch (0.102 mm).
 - (e) Do an inspection for scoring.
 - 1) If you find some small scoring, you can make it smooth again, but obey these conditions:

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- a) The scoring must not be on the outer part of a bend.
- b) You must not remove more than 0.004 inch (0.102 mm) of metal.
- (f) Do an inspection for tubes with a cross section that is not fully circular (tubes with ovality).
 - 1) Calculate the percent ovality with this formula:

NOTE: percent ovality =

$$\frac{\text{OD Max} - \text{OD Min}}{\text{OD Nominal}} \times 100\%$$

- a) OD Max is the maximum outer diameter of the tube
- b) OD Min is the minimum outer diameter of the tube
- c) OD Nominal is the outer diameter of the tube at a position where the tube is circular or almost circular.
- 2) The percent ovality must not be more than 10 percent.
- 3) The percent ovality must be more than 5 percent for tubes with a diameter of more than 2 inches (50.8 mm).
- (g) Do an inspection for wrinkles.

NOTE: The height of a wrinkle is the distance between a straight line that touches the high point of a wrinkle and a straight line that touches the low point of a wrinkle.

- 1) Wrinkles must not have a height larger than the applicable maximum wrinkle height given in this table:

Table 601/28-22-15-993-801 Allowable Wrinkle Height

Tube Diameter inches (mm)	Maximum Wrinkle Height inches (mm)
less than 1 (25.4)	0.020
1 to 1.99 (25.4-50.55)	0.030 (0.762)
2 to 2.99 (50.8-75.95)	0.040 (1.016)
3 or more (76.2)	0.050 (1.27)

SUBTASK 28-22-15-350-001

- (4) Repair or replace all the tubes which have damage that is not permitted (TASK 20-10-51-000-801, TASK 28-22-15-000-801, or TASK 20-10-51-300-811).

SUBTASK 28-22-15-210-005

- (5) Visually examine all the couplings for external indications of these types of damage and make sure the damage is permitted.
 - (a) Do an inspection for cracks.
 - 1) No cracks are permitted.
 - (b) Do an inspection for scratches.
 - 1) The scratches in the couplings must not have a depth of more than 0.004 inch (0.102 mm).
 - (c) Do an inspection for nicks.
 - 1) The nicks in the couplings must have rounded bottoms.
 - 2) The nicks in the couplings must not have a depth of more than 0.004 inch.
 - 3) You must remove all the burrs around the nick.

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- (d) Do an inspection for worn areas (galling).
 - 1) No worn areas in the surfaces that have an O-ring seal are permitted.

SUBTASK 28-22-15-350-002

- (6) Replace all the couplings which have damage that is not permitted (TASK 28-22-15-000-801).

————— **END OF TASK** —————

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FUEL SCAVENGE FLOAT-OPERATED SHUTOFF VALVE - REMOVAL/INSTALLATION

1. General

- A. The fuel scavenge float-operated shutoff valve is part of the center tank fuel scavenge system. The fuel scavenge float-operated shutoff valve is found in the left main tank.
- B. The fuel scavenge float-operated shutoff valve lets fuel flow into the left main fuel tank when the left main fuel tank is less than two-thirds full. The valve prevents fuel flow into the left main fuel tank when the left main fuel tank is full.
- C. The fuel scavenge float-operated shutoff valve will be referred to as "the valve" in this procedure.
- D. This procedure contains two tasks. The first task removes the valve. The second task installs the valve.

TASK 28-22-16-000-801

2. Fuel Scavenge Float-Operated Shutoff Valve - Removal

(Figure 401)

A. References

Reference	Title
06-43-00-800-801	Engine and Nacelle Strut Access Doors and Panels (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

B. Location Zones

Zone	Area
434	Engine 1 - Aft Strut Fairing
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50

C. Access Panels

Number	Name/Location
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
532BB	Main Tank Access Door - Wing Station 265

D. Procedure

SUBTASK 28-22-16-650-001

- (1) Defuel the left main fuel tank (TASK 28-26-00-650-801) or transfer fuel out of the left main tank (TASK 28-26-00-650-802).

SUBTASK 28-22-16-940-001

- (2) For the left main fuel tank, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802

SUBTASK 28-22-16-010-003

- (3) Remove this access panel:

Number	Name/Location
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1

Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801.

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SUBTASK 28-22-16-010-001

(4) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532BB	Main Tank Access Door - Wing Station 265

(TASK 28-11-11-000-801).

SUBTASK 28-22-16-940-002

(5) Go into the left main fuel tank.

SUBTASK 28-22-16-010-002

(6) Find the valve [1] near the front spar.

SUBTASK 28-22-16-020-001

(7) Remove the four screws [6], washers [5], and nuts [2] that attach the valve [1] and the bonding jumper [3] to the support bracket.

SUBTASK 28-22-16-020-005

(8) Remove the lockwire from the valve [1].

SUBTASK 28-22-16-020-002

(9) Loosen the coupling nut [4] to disconnect the valve [1] from the tubing.

SUBTASK 28-22-16-420-001

(10) Put a cap on the open end of the tubing to keep out unwanted material.

SUBTASK 28-22-16-020-003

(11) Remove the valve [1] from the fuel tank.

————— **END OF TASK** —————

EFFECTIVITY
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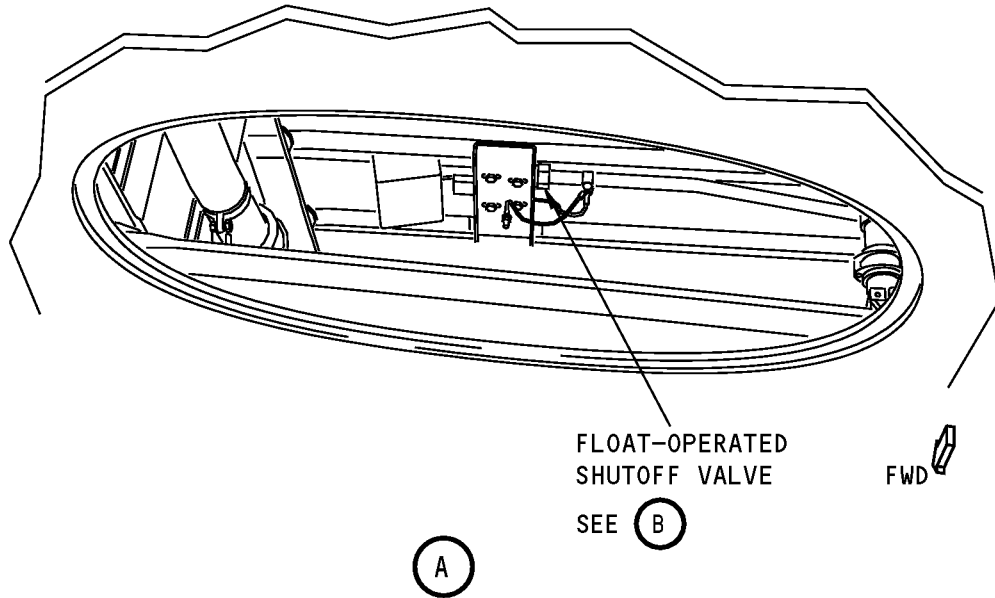
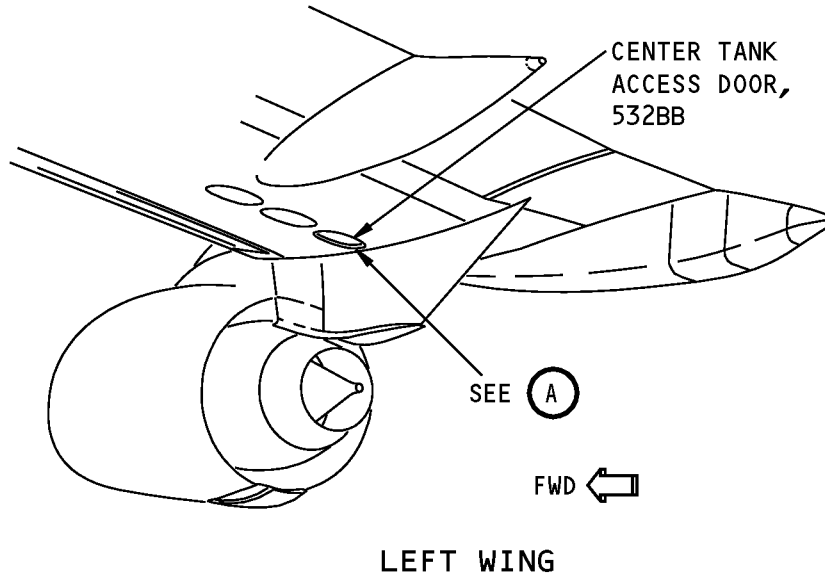
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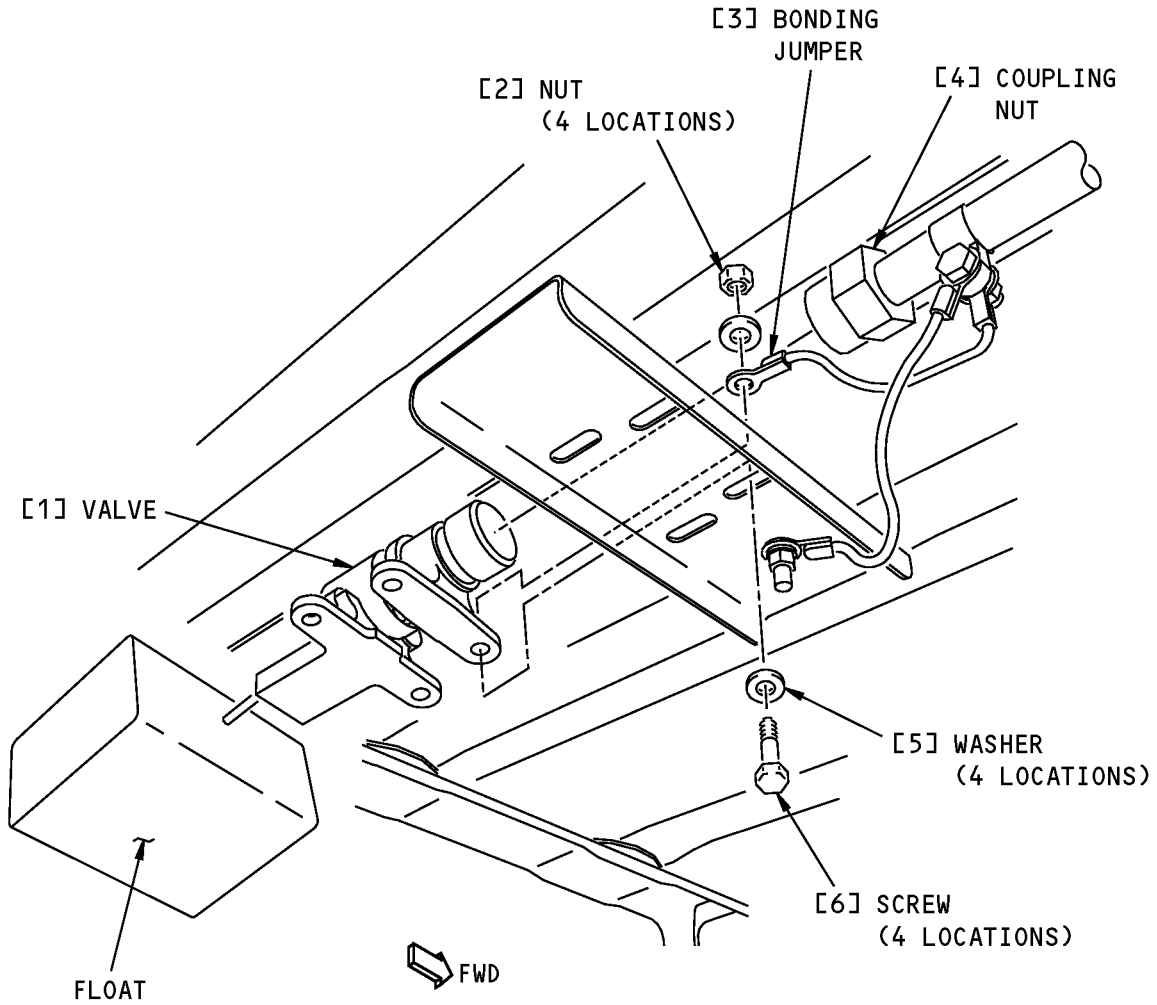
**Float-Operated Shutoff Valves Installation
Figure 401 (Sheet 1 of 2)/28-22-16-990-801**

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FLOAT-OPERATED SHUTOFF VALVE

(B)

**Float-Operated Shutoff Valves Installation
Figure 401 (Sheet 2 of 2)/28-22-16-990-801**

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TASK 28-22-16-400-801

3. Fuel Scavenge Float-Operated Shutoff Valve - Installation

(Figure 401)

A. References

Reference	Title
06-43-00-800-801	Engine and Nacelle Strut Access Doors and Panels (P/B 201)
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
20-10-44-400-801	Lockwires Installation (P/B 401)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-22-00-720-802	Fuel Scavenge System - Operational Test (P/B 501)

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Valve	28-22-00-02-560	HAP 001-013, 015-026, 028-030
		28-22-00-02A-275	HAP 031-054, 101-999

D. Location Zones

Zone	Area
434	Engine 1 - Aft Strut Fairing
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50

E. Access Panels

Number	Name/Location
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
532BB	Main Tank Access Door - Wing Station 265

F. Procedure

SUBTASK 28-22-16-940-003

(1) Do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-22-16-940-004

(2) Go into the left main fuel tank.

SUBTASK 28-22-16-020-004

(3) Remove the cap on the open end of the fuel scavenge tubing if one is installed.

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SUBTASK 28-22-16-420-002

- (4) Put the valve [1] in its position and install the four screws [6], washers [5], and nuts [2] and the bonding jumper [3] to the support bracket.

NOTE: Make sure the bonding surfaces are clean.

SUBTASK 28-22-16-420-003

- (5) Tighten the coupling nut [4] to connect the valve [1] to the tubing.

SUBTASK 28-22-16-760-001

- (6) Measure the bonding resistance between the valve [1] and the fuel tube with an electrical bonding meter, COM-1550.

(a) Make sure the bonding resistance is not more than 0.01 ohm.

SUBTASK 28-22-16-420-004

- (7) Install lockwire between the valve [1] and the coupling nut [4] (TASK 20-10-44-400-801).

SUBTASK 28-22-16-220-001

- (8) Make sure there is 0.2 in. (5.1 mm) of clearance between the valve [1] and the fuel tank structure and wiring, in all positions.

SUBTASK 28-22-16-410-001

- (9) Install this access panel:

Table with 2 columns: Number, Name/Location. Row 1: 532BB, Main Tank Access Door - Wing Station 265

(TASK 28-11-11-400-801).

SUBTASK 28-22-16-410-002

- (10) Install this access panel:

Table with 2 columns: Number, Name/Location. Row 1: 434CL, Aft Strut Fairing, Left Access To Fuel Door, Strut 1

Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801.

SUBTASK 28-22-16-650-002

- (11) Do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

SUBTASK 28-22-16-700-001

- (12) Do this task: Fuel Scavenge System - Operational Test, TASK 28-22-00-720-802.

END OF TASK

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FUEL SCAVENGE JET PUMP - REMOVAL/INSTALLATION

1. General

A. This procedure contains four tasks. The first task removes the nozzle assembly of the fuel scavenge jet pump. The second task installs the nozzle assembly of the fuel scavenge jet pump. The third task removes the fuel scavenge jet pump. The fourth task installs the fuel scavenge jet pump.

TASK 28-22-17-020-801

2. Nozzle Assembly of the Fuel Scavenge Jet Pump - Removal

(Figure 401)

A. References

Reference	Title
27-81-00-480-801	Leading Edge Flap and Slat Locks Installation (P/B 201)
27-81-00-860-803	Leading Edge Flaps and Slats Extension (P/B 201)

B. Location Zones

Zone	Area
511	Left Wing - Leading Edge To Front Spar

C. Procedure

SUBTASK 28-22-17-860-003

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE AND TRAILING EDGE FLAP DRIVE MECHANISMS. THE LEADING EDGE AND THE TRAILING EDGE CONTROL SURFACES CAN EXTEND AND RETRACT QUICKLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) To get access to the nozzle assembly of the fuel scavenge pump on the front spar, extend the leading edge slats and flaps (TASK 27-81-00-860-803).

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL THE LE SLAT SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Install the flap locks on the leading edge slats and flaps (TASK 27-81-00-480-801).

SUBTASK 28-22-17-010-004

(2) To remove the nozzle assembly of the fuel scavenge jet pump, do these steps:

- (a) The nozzle assembly [12] contains two parts, the nozzle [12A] and the plug [12B]. It is not necessary to separate these parts.
- (b) Get access to the fuel scavenge jet pump, installed on the front spar, out of the fuel tank (Figure 401).
- (c) Remove the lockwire from the nozzle assembly [12].
- (d) Remove the nozzle assembly [12] from the pump assembly [8].

NOTE: There is an internal check valve in the housing that will prevent a fuel spill.

(e) Discard the O-ring [13].

END OF TASK

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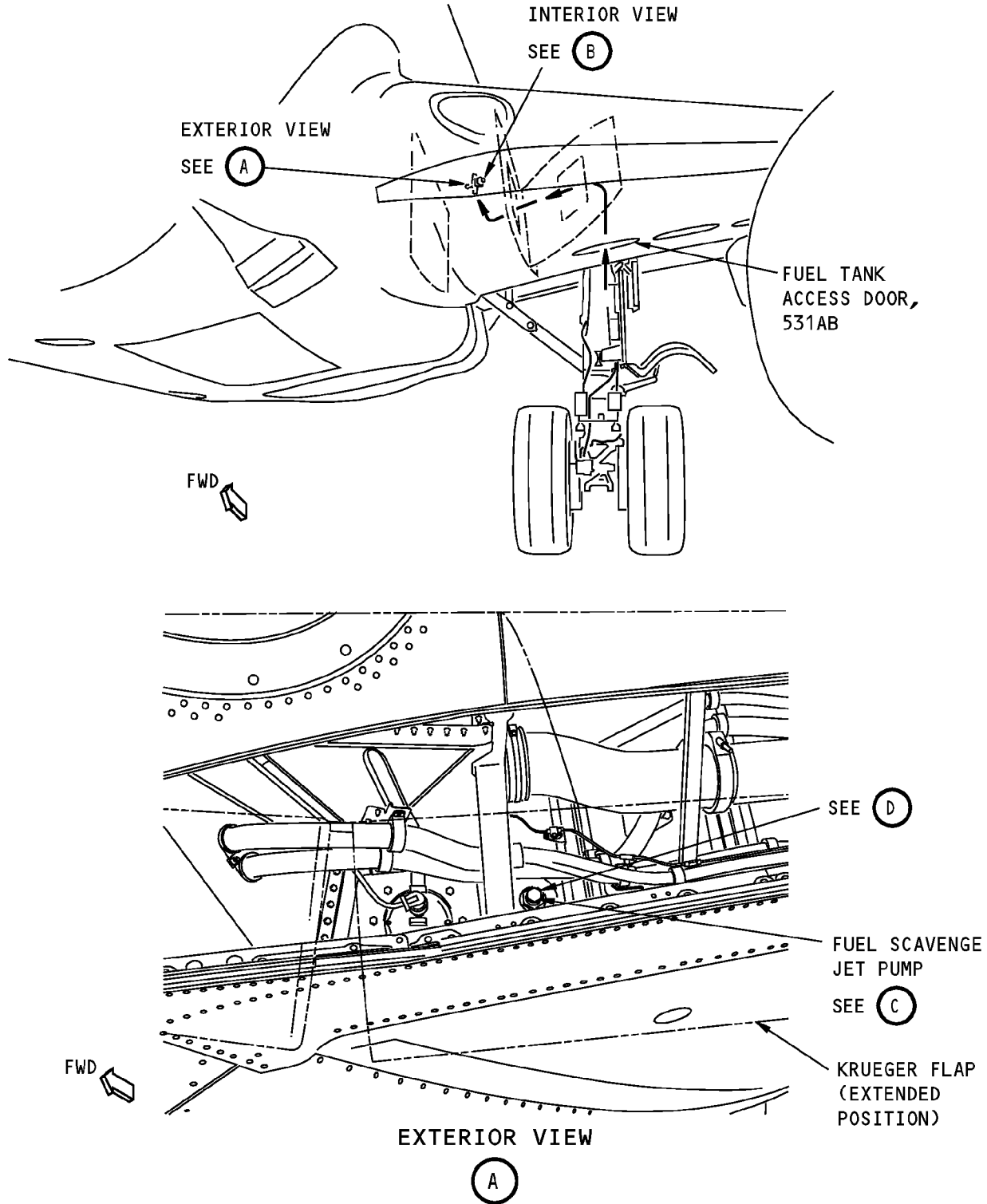
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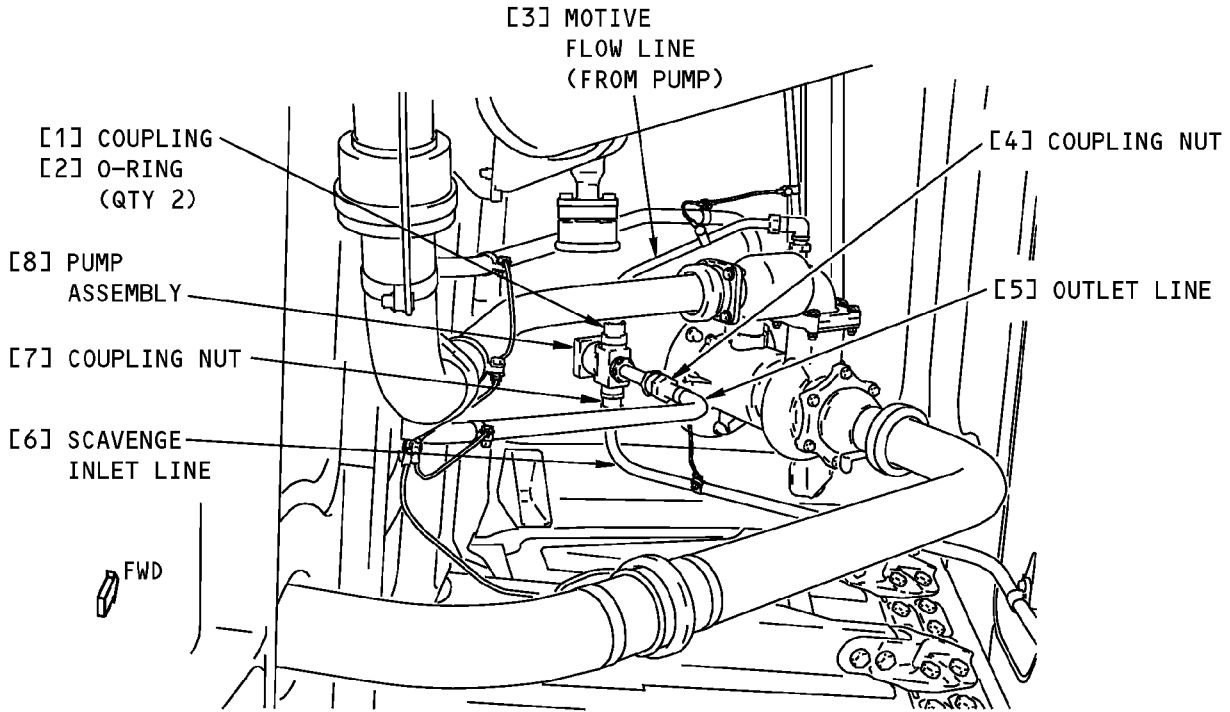


**Fuel Scavenge Jet Pump Installation
Figure 401 (Sheet 1 of 2)/28-22-17-990-802**

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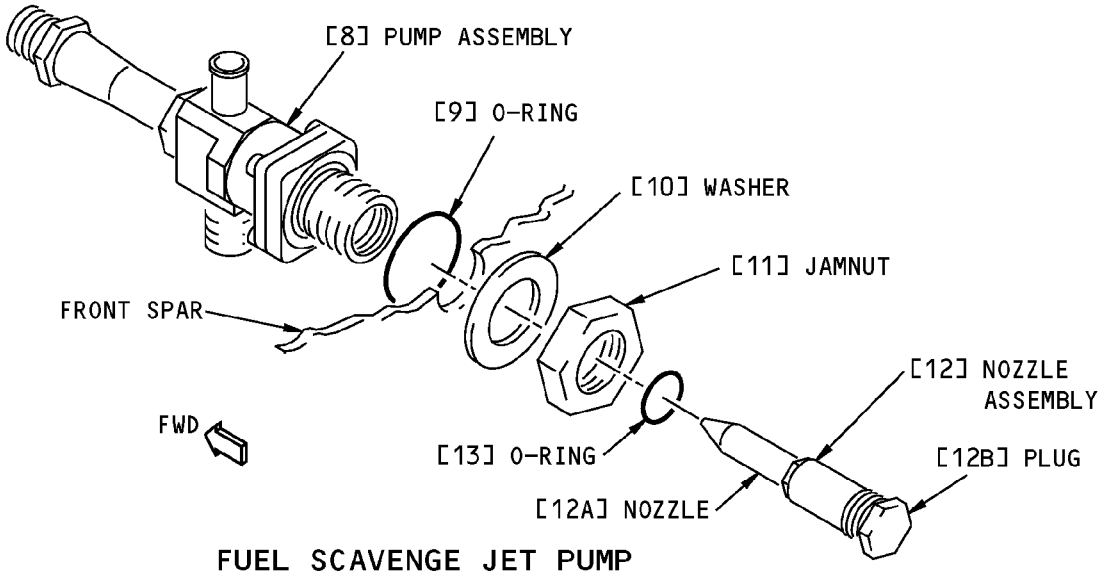
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INTERIOR VIEW

(B)



FUEL SCAVENGE JET PUMP

(C)

**Fuel Scavenge Jet Pump Installation
Figure 401 (Sheet 2 of 2)/28-22-17-990-802**

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TASK 28-22-17-420-801

3. Nozzle Assembly of the Fuel Scavenge Jet Pump - Installation

(Figure 401)

A. References

Reference	Title
20-10-44-400-801	Lockwires Installation (P/B 401)
27-81-00-080-801	Leading Edge Flap and Slat Locks Removal (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)

B. Consumable Materials

Reference	Description	Specification
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142
D00504	Grease - Petrolatum	VV-P-236

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
12A	Nozzle	28-22-00-02-580	HAP 001-013, 015-026, 028-030
		28-22-00-02A-295	HAP 031-054, 101-999
12B	Plug	28-22-00-02-570	HAP 001-013, 015-026, 028-030
		28-22-00-02A-285	HAP 031-054, 101-999
13	O-ring	28-22-00-02-575	HAP 001-013, 015-026, 028-030
		28-22-00-02A-290	HAP 031-054, 101-999

D. Location Zones

Zone	Area
511	Left Wing - Leading Edge To Front Spar

E. Procedure

SUBTASK 28-22-17-420-002

- (1) To install the nozzle assembly of the fuel scavenge jet pump, do these steps:
 - (a) Get access to the fuel scavenge jet pump, installed on the front spar, out of the fuel tank (Figure 401).
 - (b) Apply a thin layer of petrolatum grease, D00504, to the new O-ring [13] and install it on the nozzle assembly [12].
 - 1) The nozzle assembly [12] contains two parts, the nozzle [12A] and the plug [12B]. It is not necessary to separate these parts.
 - (c) Install the nozzle assembly [12] into the pump assembly [8].
 - (d) Tighten the nozzle assembly [12] to a torque of 200 in-lbs.
 - (e) Install lockwire between the nozzle assembly [12] and the jamnut [11] (TASK 20-10-44-400-801).
 - (f) Apply sealant, A02315, between the jamnut [11] and the front spar if it is necessary.

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WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL THE LE SLAT SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (g) Remove the flap locks from the leading edge slats if you installed them before (TASK 27-81-00-080-801).

SUBTASK 28-22-17-860-004

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE AND TRAILING EDGE FLAP DRIVE MECHANISMS. THE LEADING EDGE AND THE TRAILING EDGE CONTROL SURFACES CAN EXTEND AND RETRACT QUICKLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Retract the leading edge slats if they are extended (TASK 27-81-00-860-804).

————— **END OF TASK** —————

TASK 28-22-17-000-801

4. Fuel Scavenge Jet Pump - Removal

(Figure 401)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-22-15-000-801	Fuel Line, Fitting and Coupling - Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

B. Location Zones

Zone	Area
511	Left Wing - Leading Edge To Front Spar
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5

C. Access Panels

Number	Name/Location
531AB	Center Tank Access Door - Wing Station 168

D. Procedure

SUBTASK 28-22-17-020-001

- (1) Do this task: Nozzle Assembly of the Fuel Scavenge Jet Pump - Removal, TASK 28-22-17-020-801.

SUBTASK 28-22-17-010-002

- (2) To remove the pump assembly [8] for the fuel scavenge jet pump, do these steps:
 - (a) Defuel the center fuel tank and the No. 1 tank (TASK 28-26-00-650-801) or transfer all the fuel out of the center tank and the No. 1 tank (TASK 28-26-00-650-802).
 - (b) For the center fuel tank, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802
 - (c) For the left center fuel tank, do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801.

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Remove this access panel:

Number	Name/Location
531AB	Center Tank Access Door - Wing Station 168

- (d) Remove the jamnut [11] and washer [10] from the pump assembly [8], from out of the fuel tank.
- (e) Go into the center fuel tank.
- (f) Disconnect the coupling [1] between the motive flow line [3] and the pump assembly [8] (TASK 28-22-15-000-801).
 - 1) Discard the O-ring [2].
- (g) Disconnect the coupling nut [7] between the scavenge inlet line [6] and the pump assembly [8].
- (h) Disconnect the coupling nut [4] between the outlet line [5] and the pump assembly [8].
- (i) Remove the pump assembly [8] from the fuel tank.
 - 1) Discard the O-ring [9].
- (j) Install covers on the open fuel lines to keep unwanted materials out.

————— END OF TASK —————

TASK 28-22-17-400-801

5. Fuel Scavenge Jet Pump - Installation

(Figure 401)

A. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
20-10-44-400-801	Lockwires Installation (P/B 401)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-00-720-802	Fuel Scavenge System - Operational Test (P/B 501)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)

B. Consumable Materials

Reference	Description	Specification
A00436	Sealant - Fuel Tank	BMS5-45 (Supersedes BMS 5-26)
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142
D00504	Grease - Petrolatum	VV-P-236

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	O-ring	28-22-00-02-405	HAP 001-013, 015-026, 028-030
8	Pump assembly	28-22-00-02A-230	HAP 031-054, 101-999
		28-22-00-02-565	HAP 001-013, 015-026, 028-030
		28-22-00-02A-280	HAP 031-054, 101-999

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(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
9	O-ring	28-22-00-02-585	HAP 001-013, 015-026, 028-030
		28-22-00-02A-300	HAP 031-054, 101-999

D. Location Zones

Zone	Area
511	Left Wing - Leading Edge To Front Spar
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5

E. Access Panels

Number	Name/Location
531AB	Center Tank Access Door - Wing Station 168

F. Procedure

SUBTASK 28-22-17-650-001

(1) For the center fuel tank, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-22-17-010-003

(2) To install the pump assembly [8], do these steps:

- (a) Remove the fuel line covers installed on the open fuel lines to keep unwanted materials out.
- (b) Go into the fuel tank.
- (c) Apply a thin layer of petrolatum grease, D00504, to the new O-ring [9].
- (d) Install the O-ring [9] onto the pump assembly [8].
- (e) Put the pump assembly [8] in its position in the fuel tank and install the washer [10] and jam-nut [11] from out of the fuel tank.

NOTE: Make sure the fuel lines align before you tighten the jam-nut [11].

- 1) Tighten the jamnut [11] to between 425-480 pound-inches (48-54 newton-meters).

- (f) Apply a thin layer of petrolatum grease, D00504, to the new O-ring [2].
- (g) Install the O-ring [2] and connect the coupling [1] between the motive flow line [3] and the pump assembly [8] (TASK 28-22-15-400-801).
- (h) Install lockwire to the coupling [1] (TASK 20-10-44-400-801).
- (i) Connect the coupling nut [7] between the inlet scavenge line [6] and the pump assembly [8].
- (j) Connect the coupling nut [4] between the outlet line [5] and the pump assembly [8].
- (k) Apply a fillet seal of sealant, A00436, between the pump assembly [8] and the front spar (in the fuel tank).
- (l) Apply a fillet seal of sealant, A02315, between the jamnut [11] and the front spar (out of the fuel tank).
- (m) For the left center tank, do this step(TASK 28-11-31-400-801):.

Install this access panel:

Number	Name/Location
531AB	Center Tank Access Door - Wing Station 168

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(n) Do this task: Fuel Scavenge System - Operational Test, TASK 28-22-00-720-802.

(o) Do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

SUBTASK 28-22-17-020-002

(3) Do this task: Nozzle Assembly of the Fuel Scavenge Jet Pump - Installation, TASK 28-22-17-420-801.

————— **END OF TASK** —————

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ENGINE FUEL CROSSFEED VALVE - REMOVAL/INSTALLATION

1. General

- A. The engine fuel crossfeed valve has an actuator installed out of the fuel tank. An adapter shaft and valve body are installed in the fuel tank.
- B. The engine fuel crossfeed valve actuator is installed on the rear spar of the center fuel tank, to the right of the body centerline. It is not necessary to defuel the center fuel tank to remove the actuator. It is necessary to defuel the center fuel tank to remove the adapter shaft. It is necessary to defuel all the fuel tanks to remove the valve body.
- C. This procedure contains these tasks:
 - (1) Remove the Actuator of the Engine Fuel Crossfeed Valve
 - (2) Install the Actuator of the Engine Fuel Crossfeed Valve
 - (3) Remove the Valve Adapter of the Engine Fuel Crossfeed Valve
 - (4) Install the Valve Adapter of the Engine Fuel Crossfeed Valve
 - (5) Remove the Valve Body of the Engine Fuel Crossfeed Valve
 - (6) Install the Valve Body of the Engine Fuel Crossfeed Valve
 - (7) Crossfeed Valve Alignment

HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

- (8) Rework the Electrical Faying Surface Bonds for the Engine Fuel Crossfeed Valve

HAP ALL

- (9) Crossfeed Valve Operational Test

HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207

TASK 28-22-21-000-801

2. Remove the Actuator of the Engine Fuel Crossfeed Valve

(Figure 401)

A. References

Reference	Title
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

B. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

C. Prepare to Remove the Actuator (View A)

SUBTASK 28-22-21-862-001

- (1) Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	7	C00361	FUEL CROSS FEED VALVE

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HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207 (Continued)

SUBTASK 28-22-21-490-001

WARNING: MAKE SURE YOU INSTALL THE GROUND LOCK ASSEMBLIES IN ALL LANDING GEAR. ACCIDENTAL RETRACTION OF THE LANDING GEAR CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(2) Do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

SUBTASK 28-22-21-010-007

(3) Go to the crossfeed valve location on the rear spar in the main landing gear wheel well (right side) (View A).

D. Remove the Actuator (View B)

SUBTASK 28-22-21-020-014

(1) Move the manual override lever [9] to the fully CLOSED position.

SUBTASK 28-22-21-020-015

(2) Disconnect the electrical connector [1] from the actuator [2].

SUBTASK 28-22-21-020-016

(3) Remove the old sealant from the bonding jumper [10], fasteners and bonding jumper tab.

SUBTASK 28-22-21-020-017

(4) Remove the screw [11], three washers [8], nut [7], and bonding jumper [10] from the bonding jumper tab on the actuator [2].

SUBTASK 28-22-21-020-018

(5) Remove the lockwire from the mounting screws [3].

SUBTASK 28-22-21-020-019

(6) Remove the four mounting screws [3] and the washers [4].

SUBTASK 28-22-21-020-020

(7) Remove the actuator [2].

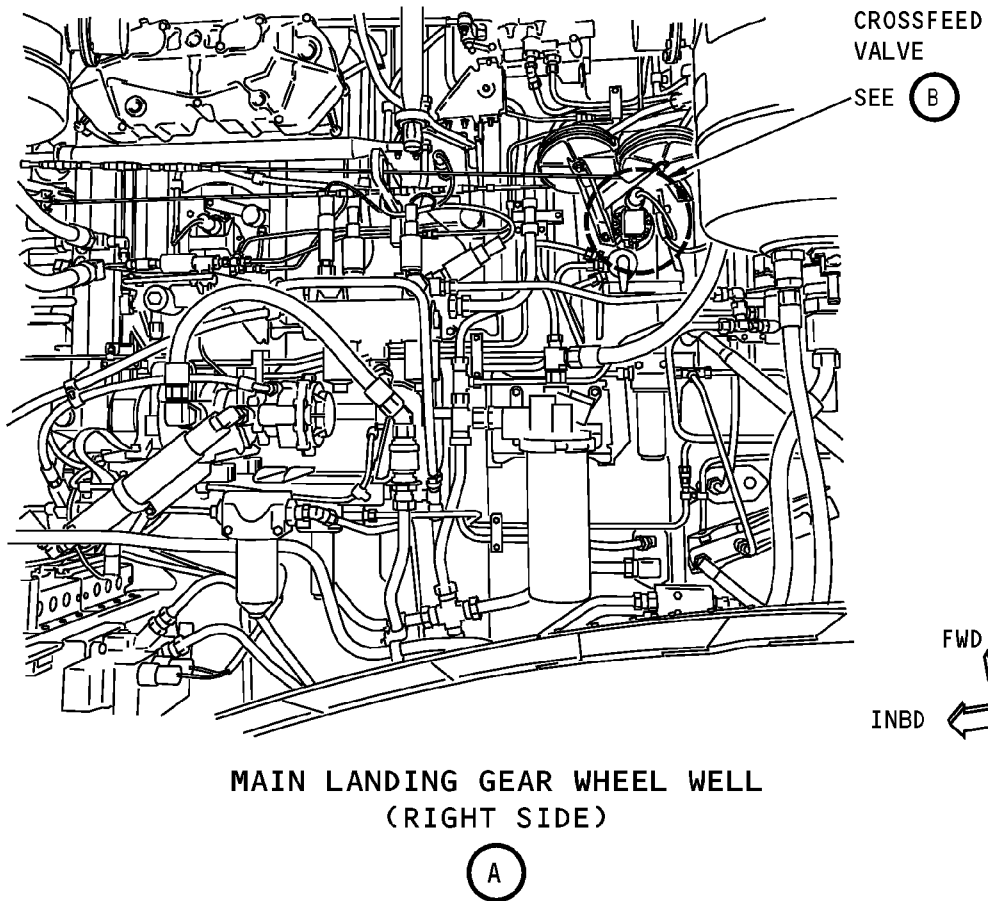
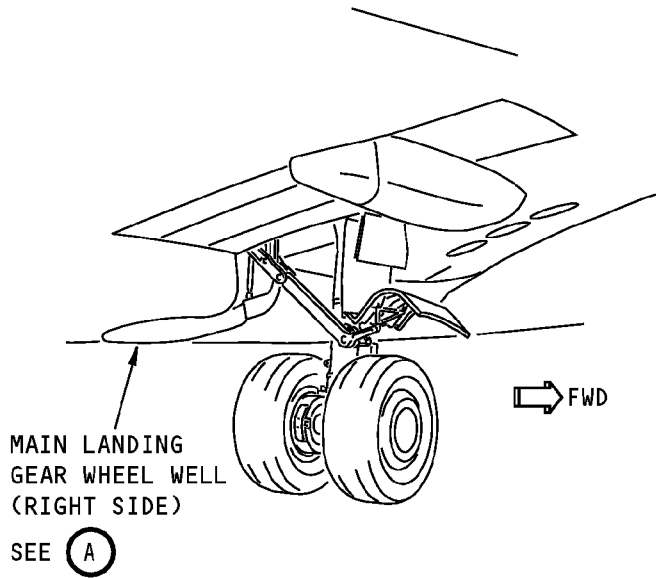
————— END OF TASK —————

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**Crossfeed Valve Actuator Installation
Figure 401 (Sheet 1 of 2)/28-22-21-990-804**

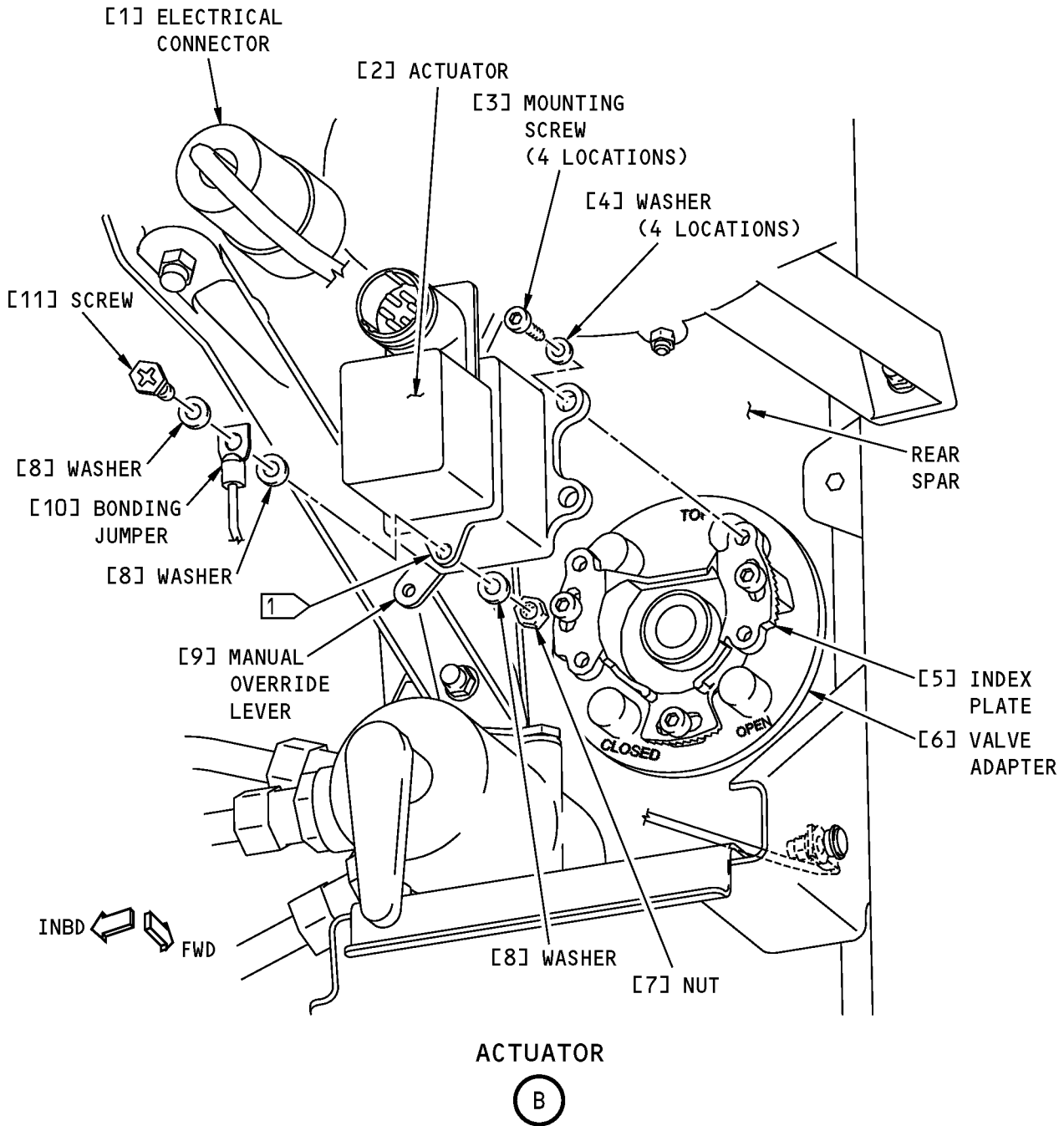
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1 PREPARE THE FAYING SURFACE OF THE BONDING JUMPER AND BONDING JUMPER TAB FOR AN ELECTRICAL SURFACE BOND. APPLY A FILLET SEAL TO THE BONDING JUMPER TERMINAL (SWPM 20-20-00).

**Crossfeed Valve Actuator Installation
Figure 401 (Sheet 2 of 2)/28-22-21-990-804**

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TASK 28-22-21-400-801

3. Install the Actuator of the Engine Fuel Crossfeed Valve

(Figure 401)

A. References

Reference	Title
20-30-88	AIRPLANE STRUCTURE CLEANING SOLVENTS (Series 88)
20-30-92-910-801	Final Cleaning Prior to General Sealing (Series 92) (P/B 201)
28-11-00-600-801	Apply the Corrosion Resistant Finish (Topcoat) (P/B 701)
32-00-01-080-801	Landing Gear Downlock Pins Removal (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
51-21-41-370-802	Apply Alodine 600, 1200 or 1200S Solution (P/B 701)
SWPM 20-20-00	Electrical Bonds and Grounds

B. Tools/Equipment

Reference	Description
STD-123	Brush - Soft Bristle

C. Consumable Materials

Reference	Description	Specification
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
B01012	Solvent - Final Cleaning Prior To General Sealing (AMM 20-30-92/201) - Series 92	
C00064	Coating - Aluminum Chemical Conversion	BAC5719, Type II, Class A (MIL-C-5541, Class A)
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20, Type II
C50033	Chromated Conversion Coating for Aluminum - Alodine 1200	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5
G50021	Pad - General Purpose Scrubbing - Scotch-Brite 96W	

D. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

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E. Install the Spar Valve Actuator (View B)

SUBTASK 28-22-21-867-001

WARNING: CHECK THAT GROUND LOCK ASSEMBLIES ARE INSTALLED IN MAIN LANDING GEAR TO PREVENT INADVERTENT OPERATION OF GEAR. INJURY TO PERSONNEL AND/OR EQUIPMENT COULD RESULT IF GEAR RETRACTS.

- (1) Make sure the ground locks are installed on the landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-21-140-001

- (2) Remove the old sealant from these components (TASK 20-30-92-910-801):

- (a) actuator [2] (if re-used)
- (b) bonding jumper [10], screw [11], nut [7] and washers [8].

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- (c) To remove the remaining sealant, grease, oil, dirt, and other contamination from the components, use one of these brushes/pads soaked with Series 92 solvent, B01012 (TASK 20-30-92-910-801):

- 1) soft bristle brush, STD-123
- 2) cotton wiper, G00034
- 3) Scotch-Brite 96W pad, G50021

SUBTASK 28-22-21-420-020

- (3) Move the manual override lever [9] of the actuator to the CLOSED position.

SUBTASK 28-22-21-420-021

- (4) Align the actuator output shaft with the adapter shaft.

SUBTASK 28-22-21-420-022

- (5) Make sure the two spaces for teeth on the adapter shaft align with the actuator output shaft.

SUBTASK 28-22-21-420-023

- (6) Put the actuator output shaft into the adapter shaft.

NOTE: The mounting feet on the actuator automatically align with the mounting points on the index plate.

SUBTASK 28-22-21-420-024

- (7) Install the four mounting screws [3] and the four washers [4].

SUBTASK 28-22-21-420-025

- (8) Tighten the mounting screws [3] to 20 in-lb (2.3 N·m).

SUBTASK 28-22-21-420-026

- (9) Install the lockwire on the mounting screws [3].

SUBTASK 28-22-21-110-001

- (10) Do these steps to prepare the bonding jumper [10] and the fasteners for an electrical faying surface bond (SWPM 20-20-00):

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- (a) Final clean the contact surfaces of the actuator [2], bonding jumper [10], and the fasteners with a cotton wiper, G00034, soaked with Series 88 solvent, B01008 (SUBJECT 20-30-88).
- (b) Rub dry with a clean, dry cotton wiper, G00034.
- (c) Continue to clean and dry the surface until the dry cotton wiper, G00034, stays clean.

SUBTASK 28-22-21-420-027

- (11) Install the nut [7], three washers [8], bonding jumper [10], and screw [11] to the actuator [2].

SUBTASK 28-22-21-765-001

- (12) Make sure the bonding resistance between the actuator [2] and the rear spar is 0.010 ohm (10 milliohms) or less (SWPM 20-20-00).

SUBTASK 28-22-21-420-028

- (13) Apply a cap seal of BMS5-142 sealant, A02315, on the bonding jumper [10] to fully cover the bonding jumper terminal with sealant.

SUBTASK 28-22-21-916-002

- (14) Do this task to apply protective finishes to the bare metal areas of the rear spar: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

NOTE: Re-apply the protective coating to the rear spar where the electrical bonding probe removed the finishes.

- (a) These are the protective finishes:
 - 1) Alodine 600 coating, C00064
 - 2) BMS 10-20 coating, C00307.

SUBTASK 28-22-21-916-001

- (15) Do this task to apply Alodine 1200 coating, C50033, to any bare metal areas of the actuator [2]: Apply Alodine 600, 1200 or 1200S Solution, TASK 51-21-41-370-802.

NOTE: Re-apply the protective coating to the actuator [2] where the electrical bonding probe removed the finish and any bare metal areas around the bonding jumper tab that are not covered with sealant.

SUBTASK 28-22-21-410-004

- (16) Connect the electrical connector [1] to the actuator [2].

F. Crossfeed Valve Actuator Operational Test

SUBTASK 28-22-21-860-005

- (1) Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	7	C00361	FUEL CROSS FEED VALVE

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SUBTASK 28-22-21-710-001

(2) Do this task: Crossfeed Valve Operational Test, TASK 28-22-21-710-801.

G. Put the Airplane Back to the Usual Condition

SUBTASK 28-22-21-210-004

WARNING: OBEY THE PROCEDURE FOR THE REMOVAL OF THE DOWNLOCK PINS. IF YOU MOVE THE CONTROL LEVER FOR THE LANDING GEAR TO THE UP POSITION, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(1) Remove the ground locks installed on the landing gear if they are not needed for other tasks (TASK 32-00-01-080-801).

END OF TASK

HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

TASK 28-22-21-000-804

4. Remove the Actuator of the Engine Fuel Crossfeed Valve

(Figure 402)

A. References

Reference	Title
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

B. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

C. Prepare for the Procedure

SUBTASK 28-22-21-862-002

(1) Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	7	C00361	FUEL CROSS FEED VALVE

SUBTASK 28-22-21-490-002

WARNING: MAKE SURE YOU INSTALL THE GROUND LOCK ASSEMBLIES IN ALL LANDING GEAR. ACCIDENTAL RETRACTION OF THE LANDING GEAR CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(2) Do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

SUBTASK 28-22-21-010-008

(3) Go to the crossfeed valve location on the rear spar in the main landing gear wheel well (right side) (View A).

D. Remove the Actuator (View B)

SUBTASK 28-22-21-420-029

(1) Move the manual override lever [9] to the fully CLOSED position.

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SUBTASK 28-22-21-420-030

(2) Disconnect the electrical connector [1] from the actuator [15].

SUBTASK 28-22-21-140-002

(3) Remove the sealant from the bonding jumper [13] and fasteners at the actuator attachment location.

SUBTASK 28-22-21-420-032

(4) Remove the screw [14], two washers [12], and bonding jumper [13] from the actuator [15].

SUBTASK 28-22-21-420-033

(5) Remove the four mounting screws [3] and the washers [4].

SUBTASK 28-22-21-420-034

(6) Carefully disassemble the actuator [15] from the index plate [5].

NOTE: The actuator and index plate are bonded with faying surface sealant.

SUBTASK 28-22-21-420-035

(7) Remove the actuator [15].

————— **END OF TASK** —————

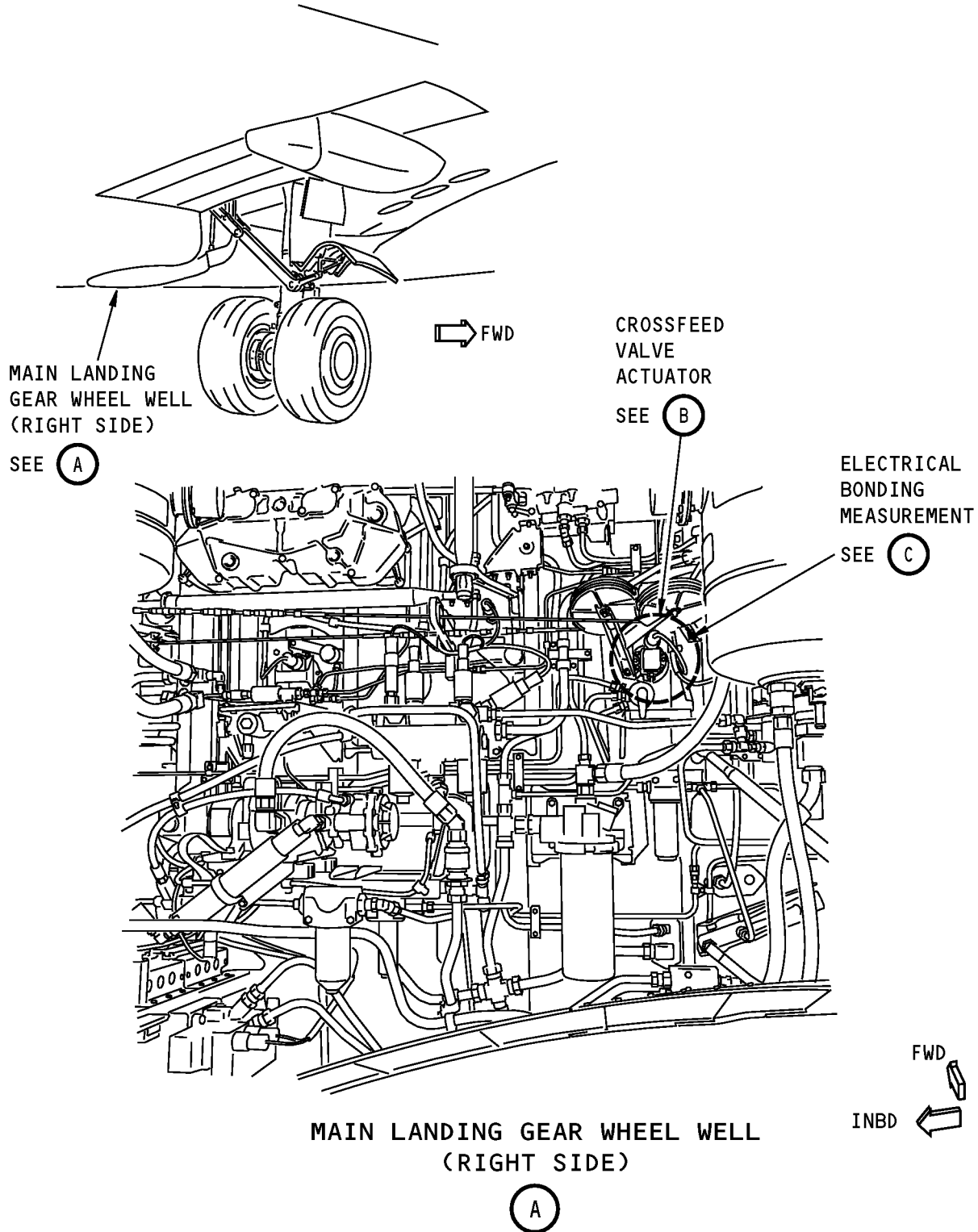
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**Crossfeed Valve Actuator Installation
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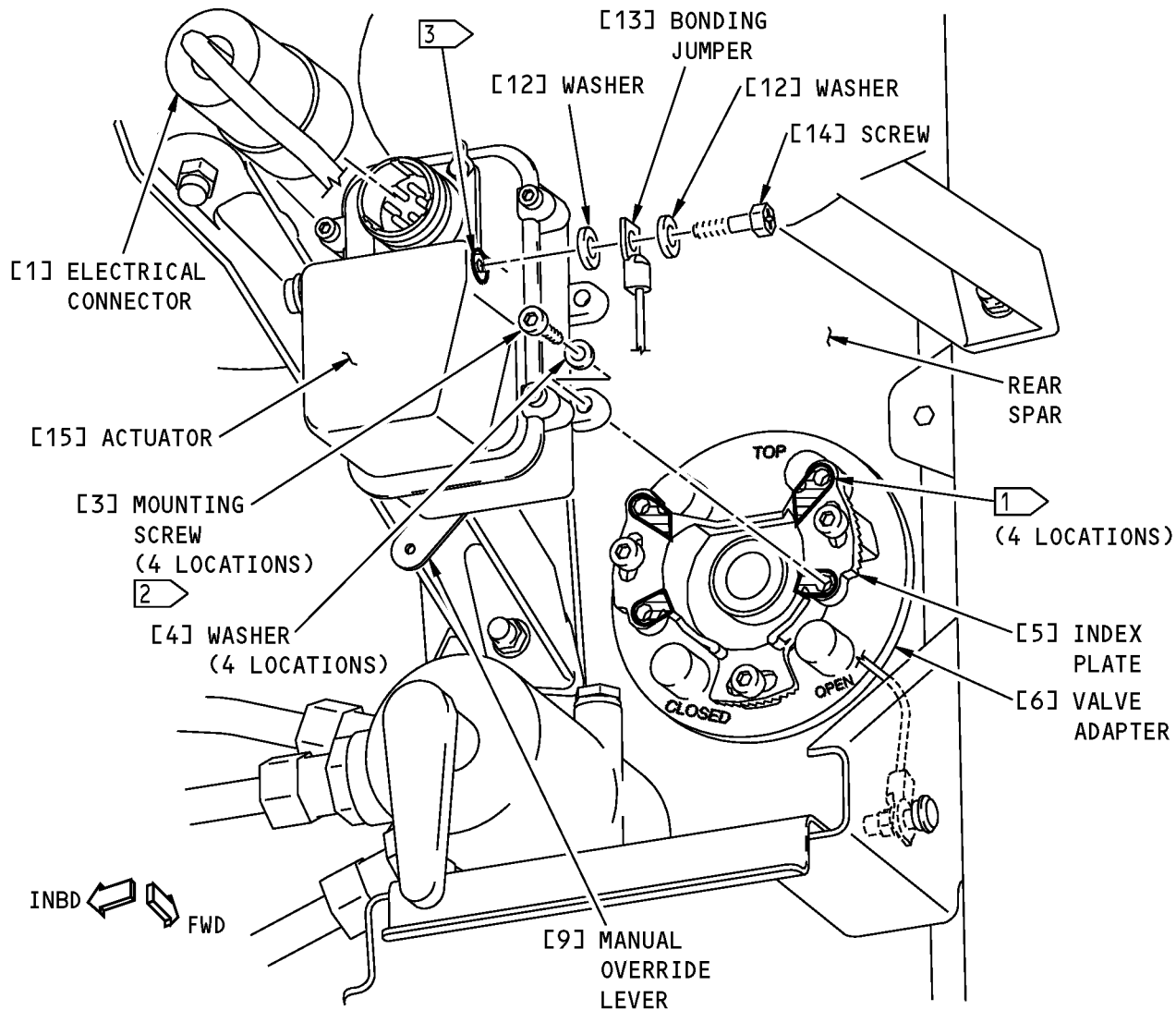
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ACTUATOR

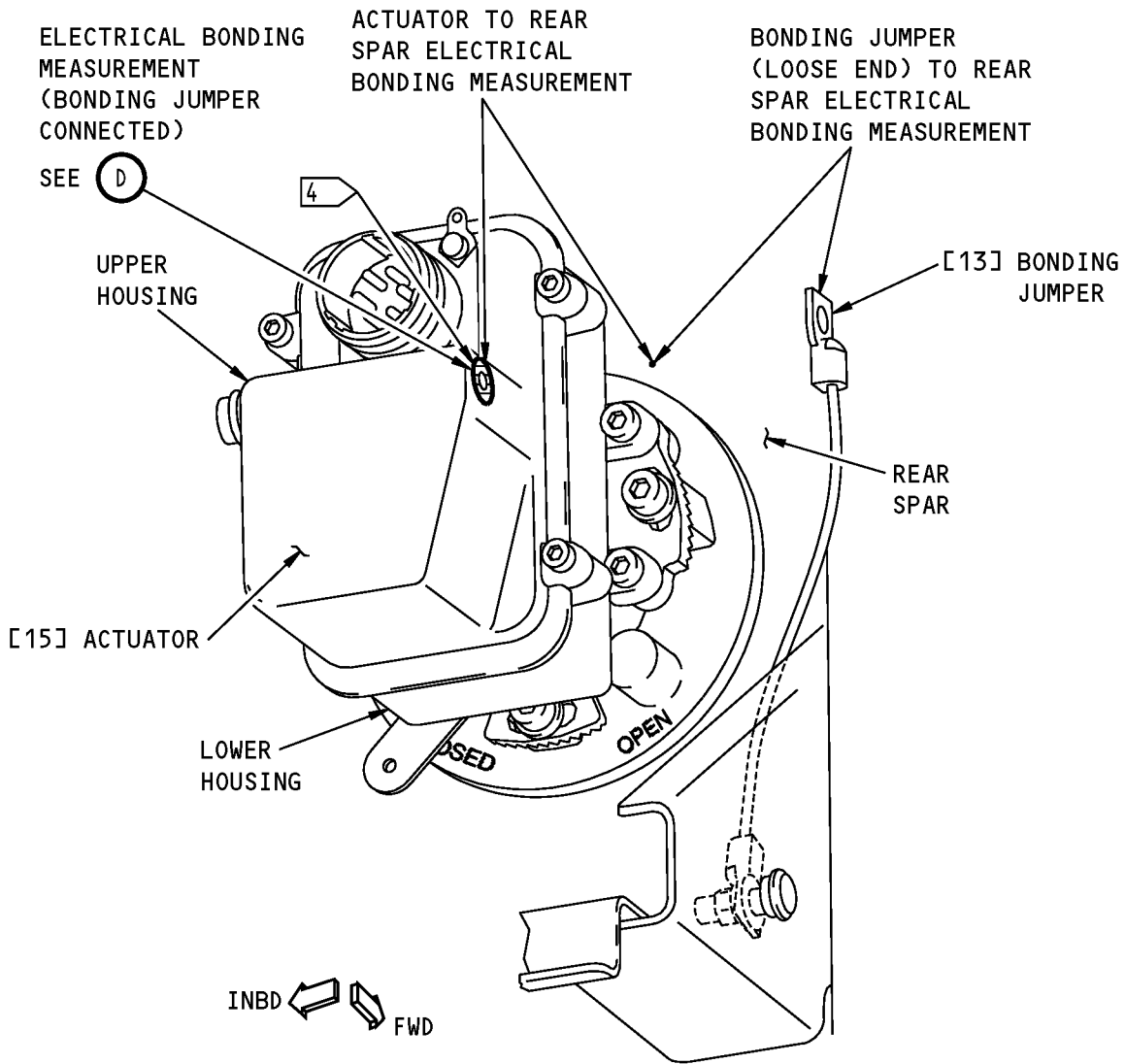
(B)

- 1 ▷ PREPARE AND INSTALL THE CONTACT SURFACES OF THE INDEX PLATE AND ACTUATOR FOOTPADS (4 LOCATIONS) WITH A SEALED ELECTRICAL FAYING SURFACE BOND (SWPM 20-20-00).
- 2 ▷ APPLY SEALANT TO THE SHANK AND THREADS OF THE MOUNTING SCREWS.
- 3 ▷ PREPARE AND INSTALL THE CONTACT SURFACES OF ACTUATOR AND BONDING JUMPER BUILD-UP WITH A SEALED ELECTRICAL FAYING SURFACE BOND (SWPM 20-20-00). AFTER INSTALLATION, APPLY A FILLET SEAL TO THE BONDING JUMPER INSTALLATION.

Crossfeed Valve Actuator Installation
Figure 402 (Sheet 2 of 4)/28-22-21-990-806

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**ELECTRICAL BONDING MEASUREMENT
(BONDING JUMPER DISCONNECTED)**

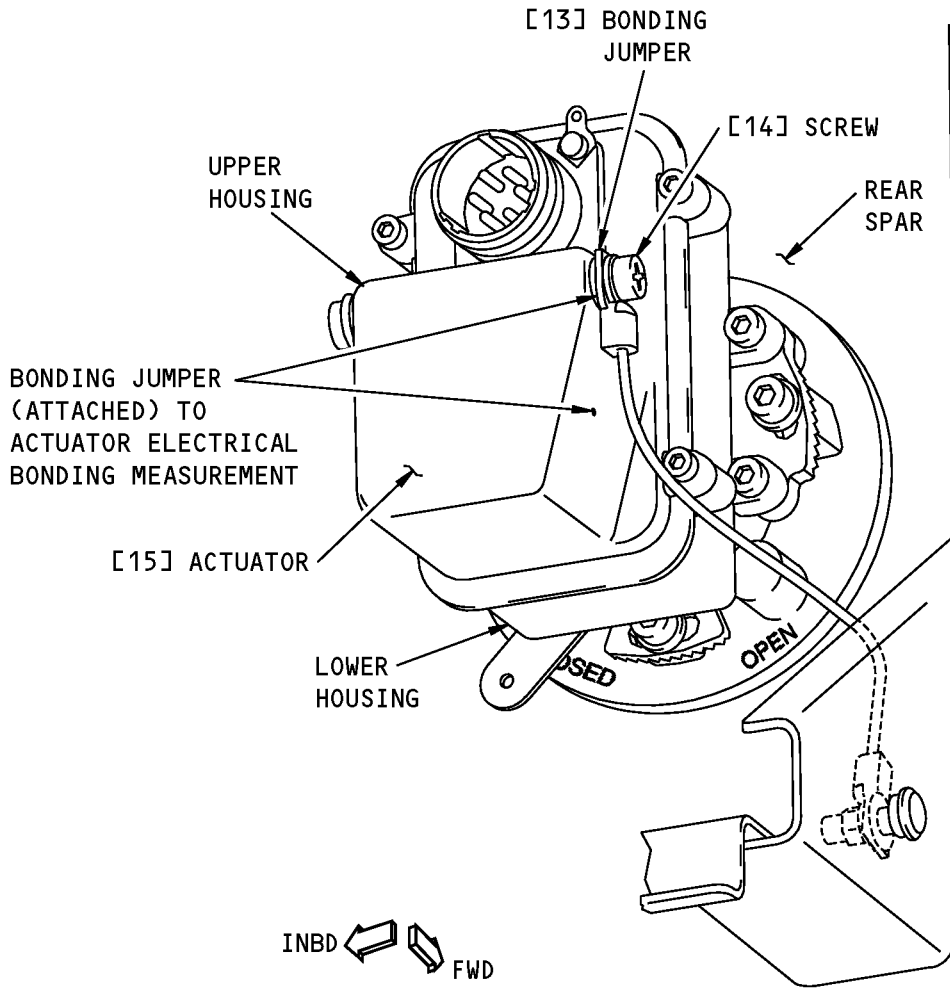
C

4 BARE METAL CONTACT SURFACE OF THE ACTUATOR
AT THE BONDING JUMPER INSTALLATION.

**Crossfeed Valve Actuator Installation
Figure 402 (Sheet 3 of 4)/28-22-21-990-806**

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**ELECTRICAL BONDING MEASUREMENT
(BONDING JUMPER CONNECTED)**

(D)

**Crossfeed Valve Actuator Installation
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TASK 28-22-21-400-804

5. Install the Actuator of the Engine Fuel Crossfeed Valve

(Figure 402)

A. References

Reference	Title
20-30-88	AIRPLANE STRUCTURE CLEANING SOLVENTS (Series 88)
20-30-92-910-801	Final Cleaning Prior to General Sealing (Series 92) (P/B 201)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-600-801	Apply the Corrosion Resistant Finish (Topcoat) (P/B 701)
32-00-01-080-801	Landing Gear Downlock Pins Removal (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
51-21-41-370-802	Apply Alodine 600, 1200 or 1200S Solution (P/B 701)
SWPM 20-20-00	Electrical Bonds and Grounds

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-2481	Tool - Sealant Removal, BAC5000, PSD 6-184 Approved (Part #: 1-6390-A, Supplier: 63318, A/P Effectivity: 737-ALL) (Part #: 10810, Supplier: \$0855, A/P Effectivity: 737-ALL) (Part #: 234350, Supplier: \$0857, A/P Effectivity: 737-ALL) (Part #: 311, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: 411B60, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: 411B90, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: DAD5013, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: DFD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: J5-0275-2010, Supplier: 435R8, A/P Effectivity: 737-ALL) (Part #: SCD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: ST982LF, Supplier: 3Z323, A/P Effectivity: 737-ALL) (Part #: TS1275-4, Supplier: 1DWR5, A/P Effectivity: 737-ALL)
COM-4746	Handle - Sealant Removal Tool (Part #: 310/1, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: SHN0272, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: SHR0272-T, Supplier: 1DWR5, A/P Effectivity: 737-ALL)
STD-123	Brush - Soft Bristle

C. Consumable Materials

Reference	Description	Specification
A50051	Sealant - Temperature Resistant, Integral Fuel Tank Sealant - Pro-Seal 890B	SAE AMS-S-8802, Class B
A50105	Sealant - Integral Fuel Tank Sealed Electrical Faying Surface Bond	SAE AMS-S-8802 Class A
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	

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Reference	Description	Specification
B01012	Solvent - Final Cleaning Prior To General Sealing (AMM 20-30-92/201) - Series 92	
C00064	Coating - Aluminum Chemical Conversion	BAC5719, Type II, Class A (MIL-C-5541, Class A)
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20, Type II
C50033	Chromated Conversion Coating for Aluminum - Alodine 1200	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5
G50021	Pad - General Purpose Scrubbing - Scotch-Brite 96W	

D. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

E. Procedure (View B)

SUBTASK 28-22-21-490-003

WARNING: CHECK THAT GROUND LOCK ASSEMBLIES ARE INSTALLED IN MAIN LANDING GEAR TO PREVENT INADVERTENT OPERATION OF GEAR. INJURY TO PERSONNEL AND/OR EQUIPMENT COULD RESULT IF GEAR RETRACTS.

- (1) Make sure the ground locks are installed on the landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-21-110-002

- (2) Remove the old sealant and clean the actuator [15], index plate [5], and the fasteners (if reused).
 - (a) Use sealant removal tool, COM-2481, and sealant tool removal handle, COM-4746 (or equivalent), to remove the old sealant.

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- (b) To remove the remaining sealant, grease, oil, dirt, and other contamination from the components, use one of these brushes/pads soaked with Series 92 solvent, B01012 (TASK 20-30-92-910-801):
 - 1) soft bristle brush, STD-123
 - 2) cotton wiper, G00034
 - 3) Scotch-Brite 96W pad, G50021

SUBTASK 28-22-21-110-003

- (3) Do these steps to prepare the actuator [15] and the index plate [5] for a sealed electrical faying surface bond (SWPM 20-20-00):

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- (a) Final clean the contact surfaces with a cotton wiper, G00034, soaked with Series 88 solvent, B01008 (SUBJECT 20-30-88).
- (b) Rub dry with a clean, dry cotton wiper, G00034.
- (c) Continue to clean and dry the surface until the dry cotton wiper, G00034, stays clean.
- (d) Apply a thin continuous layer of sealant to the contact area of the actuator feet (four locations).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

- 1) Use Pro Seal 890A or PR-1440A sealant, A50105, for the faying surface seal.
 - 2) Make sure the sealant layer is approximately 0.005 in. (0.127 mm) thick.
- (e) Apply sealant to the shank and the threads of the four mounting screws [3].

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

- 1) Use Pro Seal 890A or PR-1440A sealant, A50105, for the wet installation of the mounting screws [3].
- 2) Make sure the sealant applied to the fasteners is approximately 0.060 in. (1.524 mm) thick.

SUBTASK 28-22-21-420-036

- (4) Do these steps to install the actuator [15] to the index plate [5]:
 - (a) Make sure the manual override lever [9] on the actuator is in the CLOSED position.
 - (b) Align the actuator output shaft with the valve adapter [6].
 - (c) Make sure the two spaces for teeth on the valve adapter [6] align with the actuator output shaft.
 - (d) Put the actuator output shaft into the valve adapter [6].

NOTE: The mounting feet on the actuator automatically align with the mounting points on the index plate.

- (e) Install the four mounting screws [3] and the washers [4].

NOTE: Lockwire is not necessary for the mounting screws [3].

- (f) Tighten the mounting screws [3] to 20 in-lb (2.3 N·m).
- (g) Make sure the sealant is continuously squeezed out along the edges of the contact surfaces.

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- (h) If there are gaps, bubbles or voids in the sealant squeeze out, then disassemble and apply more sealant.
- (i) Shape the squeezed out sealant into a fillet seal.
- (j) As an option, remove the extra squeezed out sealant.

NOTE: Make sure the sealant that remains is flush with the mating part edges.

SUBTASK 28-22-21-765-002

- (5) Measure the electrical bonding resistance between the upper housing of the actuator [15] (at the bare metal bonding jumper installation location) and the rear spar (SWPM 20-20-00) (View C).
 - (a) Do this measurement with the bonding jumper [13] and the electrical connector [1] disconnected.
 - (b) Make sure the bonding jumper [13] does not touch the actuator [15] during the bonding measurement.
 - (c) Make sure the bonding resistance is 0.004 ohm (4.0 milliohms) or less.

NOTE: If you have replaced the valve adapter [6], then make sure the bonding resistance is 0.003 ohm (3.0 milliohms) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

- 1) If the bonding resistance is more than 0.004 ohm (4.0 milliohms), then do the applicable procedure in this task: Rework the Electrical Faying Surface Bonds for the Engine Crossfeed Valve, TASK 28-22-21-300-801.

NOTE: If you have replaced the valve adapter [6] and the bonding resistance is more than 0.003 ohm (3.0 milliohms), then do the applicable procedure in this task: Rework the Electrical Faying Surface Bonds for the Engine Crossfeed Valve, TASK 28-22-21-300-801.

SUBTASK 28-22-21-765-014

- (6) Measure the electrical bonding resistance between the loose end of the bonding jumper [13] and the rear spar (SWPM 20-20-00) (View C).
 - (a) Make sure the bonding resistance is 0.0015 ohm (1.5 milliohms) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

- 1) If the bonding resistance is more than 0.0015 ohm (1.5 milliohms), then do the applicable procedure in this task: Rework the Electrical Faying Surface Bonds for the Engine Crossfeed Valve, TASK 28-22-21-300-801.

SUBTASK 28-22-21-420-037

- (7) Do these steps to install the bonding jumper [13] to the actuator [15]:
 - (a) Final clean the contact surfaces with a cotton wiper, G00034, soaked with Series 88 solvent, B01008 (SUBJECT 20-30-88).

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- 1) Rub dry with a clean, dry cotton wiper, G00034.
- 2) Continue to clean and dry the surface until the dry cotton wiper, G00034, stays clean.

(b) Install the bonding jumper [13], screw [14], and the two washers [12] to the actuator [15].

(c) AIRPLANES WITHOUT ACTUATOR MA30A1001;

Tighten the screw [14] to 20 in-lb (2.3 N·m).

(d) AIRPLANES WITH ACTUATOR MA30A1001;

Tighten the screw [14] to 35 in-lb (4 N·m).

SUBTASK 28-22-21-765-013

(8) Measure the electrical bonding resistance between the upper housing of the actuator [15] and the attached terminal of the bonding jumper [13] (SWPM 20-20-00) (View C).

(a) Do not touch the screw [14] when you make the bonding measurement.

(b) Make sure the bonding resistance is 0.001 ohm (1.0 milliohm) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

- 1) If the bonding resistance is more than 0.001 ohm (1.0 milliohm), then do the applicable procedure in this task: Rework the Electrical Faying Surface Bonds for the Engine Crossfeed Valve, TASK 28-22-21-300-801.

(9) Apply a cap seal of Pro-Seal 890B sealant, A50051 (or PR-1440B), over the screw [14] and the terminal of the bonding jumper [13].

SUBTASK 28-22-21-916-003

(10) Do this task to apply protective finishes to the bare metal areas of the rear spar: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

NOTE: Re-apply the protective coatings to the rear spar where the electrical bonding probe removed the finish.

(a) These are the protective finishes:

1) Alodine 600 coating, C00064

2) BMS 10-20 coating, C00307.

SUBTASK 28-22-21-916-004

(11) Do this task to apply Alodine 1200 coating, C50033, to any bare metal areas of the actuator [15]: Apply Alodine 600, 1200 or 1200S Solution, TASK 51-21-41-370-802.

NOTE: Re-apply the protective coating to the actuator [15] where the electrical bonding probe removed the finish and any bare metal areas around the bonding jumper installation that are not covered with sealant.

SUBTASK 28-22-21-410-005

(12) Connect the electrical connector [1] to the actuator [15].

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F. Crossfeed Valve Actuator Operational Test

SUBTASK 28-22-21-861-001

- (1) Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

Table with 4 columns: Row, Col, Number, Name. Row B, Col 7, Number C00361, Name FUEL CROSS FEED VALVE

SUBTASK 28-22-21-760-002

- (2) Do this task: Crossfeed Valve Operational Test, TASK 28-22-21-710-801.

G. Put the Airplane Back to the Usual Condition

SUBTASK 28-22-21-090-001

WARNING: OBEY THE PROCEDURE FOR THE REMOVAL OF THE DOWNLOCK PINS. IF YOU MOVE THE CONTROL LEVER FOR THE LANDING GEAR TO THE UP POSITION, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

- (1) Remove the ground locks installed on the landing gear if they are not needed for other tasks (TASK 32-00-01-080-801).

END OF TASK

HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207

TASK 28-22-21-000-802

6. Remove the Engine Fuel Crossfeed Valve Adapter

(Figure 403)

A. General

- (1) The valve adapter and shaft assembly (valve adapter) is used to connect the actuator to the crossfeed valve body. The valve adapter consists of these components:
(a) Index plate
(b) Adapter plate
(c) Adapter shaft (with U-joint connection).

B. References

Table with 2 columns: Reference, Title. Rows include 28-11-00-910-802, 28-11-31-000-801, 28-26-00-650-801 with corresponding titles.

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

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Reference	Description
COM-2481	Tool - Sealant Removal, BAC5000, PSD 6-184 Approved (Part #: 1-6390-A, Supplier: 63318, A/P Effectivity: 737-ALL) (Part #: 10810, Supplier: \$0855, A/P Effectivity: 737-ALL) (Part #: 234350, Supplier: \$0857, A/P Effectivity: 737-ALL) (Part #: 311, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: 411B60, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: 411B90, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: DAD5013, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: DFD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: J5-0275-2010, Supplier: 435R8, A/P Effectivity: 737-ALL) (Part #: SCD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: ST982LF, Supplier: 3Z323, A/P Effectivity: 737-ALL) (Part #: TS1275-4, Supplier: 1DWR5, A/P Effectivity: 737-ALL)
COM-4746	Handle - Sealant Removal Tool (Part #: 310/1, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: SHN0272, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: SHR0272-T, Supplier: 1DWR5, A/P Effectivity: 737-ALL)

D. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

E. Access Panels

Number	Name/Location
131AB	Center Tank Access

F. Prepare for the Procedure

SUBTASK 28-22-21-650-001

(1) Defuel the center fuel tank (TASK 28-26-00-650-801).

SUBTASK 28-22-21-910-001

WARNING: OBEY THE PRECAUTIONS FOR PURGING, AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Obey the fuel tank entry precautions (TASK 28-11-00-910-802).

SUBTASK 28-22-21-650-003

(3) Drain and purge the center fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-22-21-010-001

(4) Remove this access panel:

Number	Name/Location
131AB	Center Tank Access

(a) Do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801.

G. Remove the Valve Adapter

SUBTASK 28-22-21-020-021

(1) Do these steps on the outside of the fuel tank:

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- (a) Do this task: Remove the Actuator of the Engine Fuel Crossfeed Valve, TASK 28-22-21-000-801.
- (b) Use a sealant removal tool to scrap away the old sealant from the periphery of the adapter plate (View A-A).
 - 1) Use sealant removal tool, COM-2481 and sealant tool removal handle, COM-4746 or equivalent.

SUBTASK 28-22-21-020-022

WARNING: DO THE PURGING AND FUEL TANK ENTRY PROCEDURE. FAILURE TO FOLLOW THE PURGING AND FUEL TANK ENTRY PROCEDURE COULD CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Go inside the center wing tank (TASK 28-11-00-910-802):
 - (a) Go to the valve adapter [6] location (View B).
 - (b) Remove the old sealant from the bolts [26] (View A-A).
 - (c) Remove the four bolts [26] and the washers [27] to disconnect the valve adapter [6].
 - (d) Disengage the shaft attached to the valve adapter [6] from the crossfeed valve body [21] (View C).

SUBTASK 28-22-21-020-023

- (3) Go out of the tank and remove the valve adapter [6].

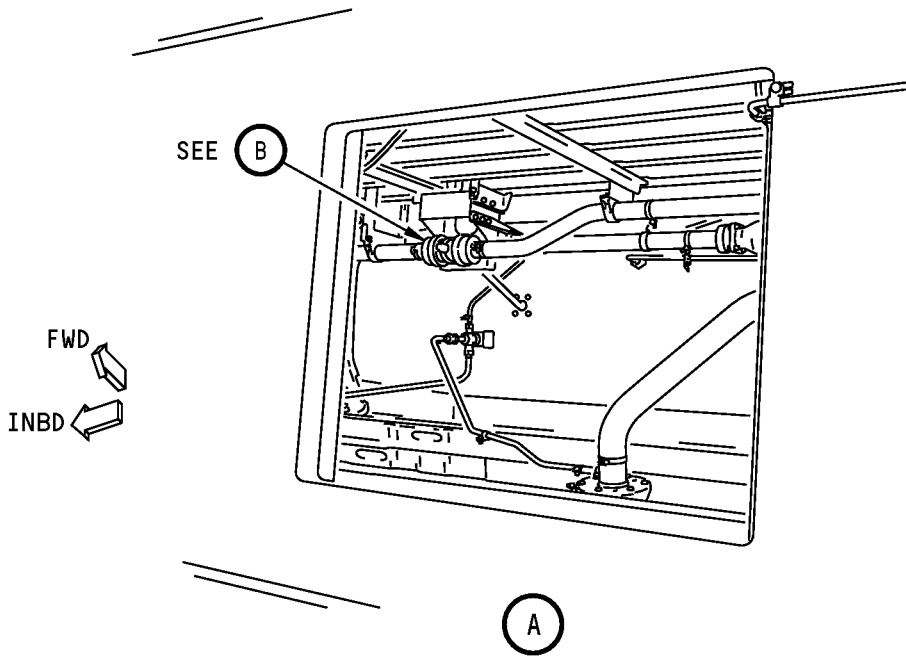
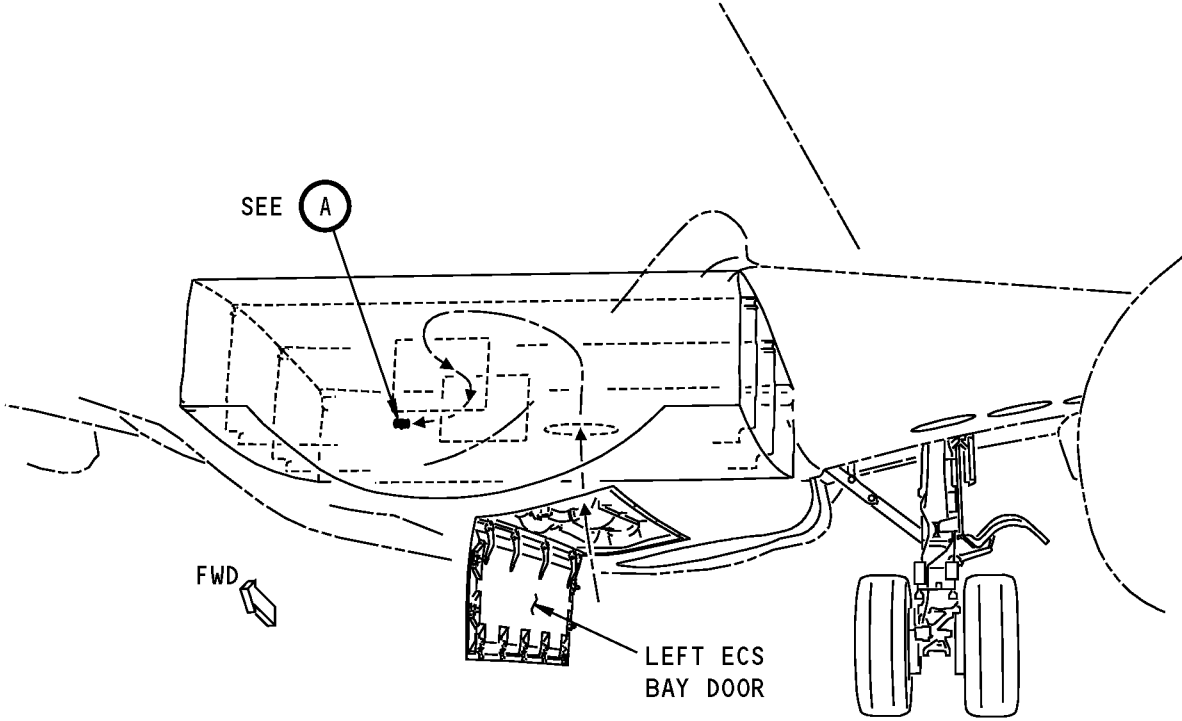
————— **END OF TASK** —————

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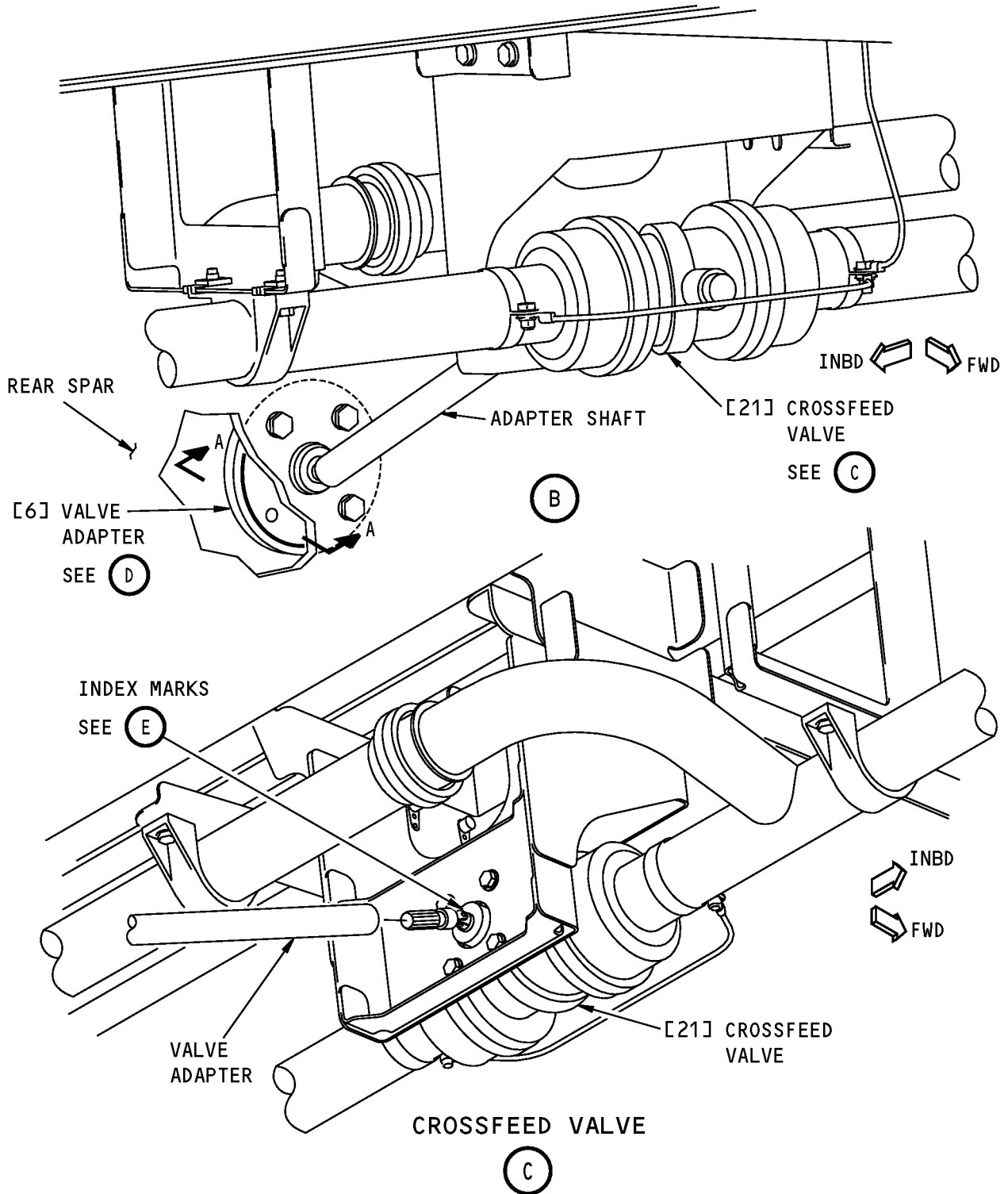
**Crossfeed Valve Adapter Installation
Figure 403 (Sheet 1 of 4)/28-22-21-990-807**

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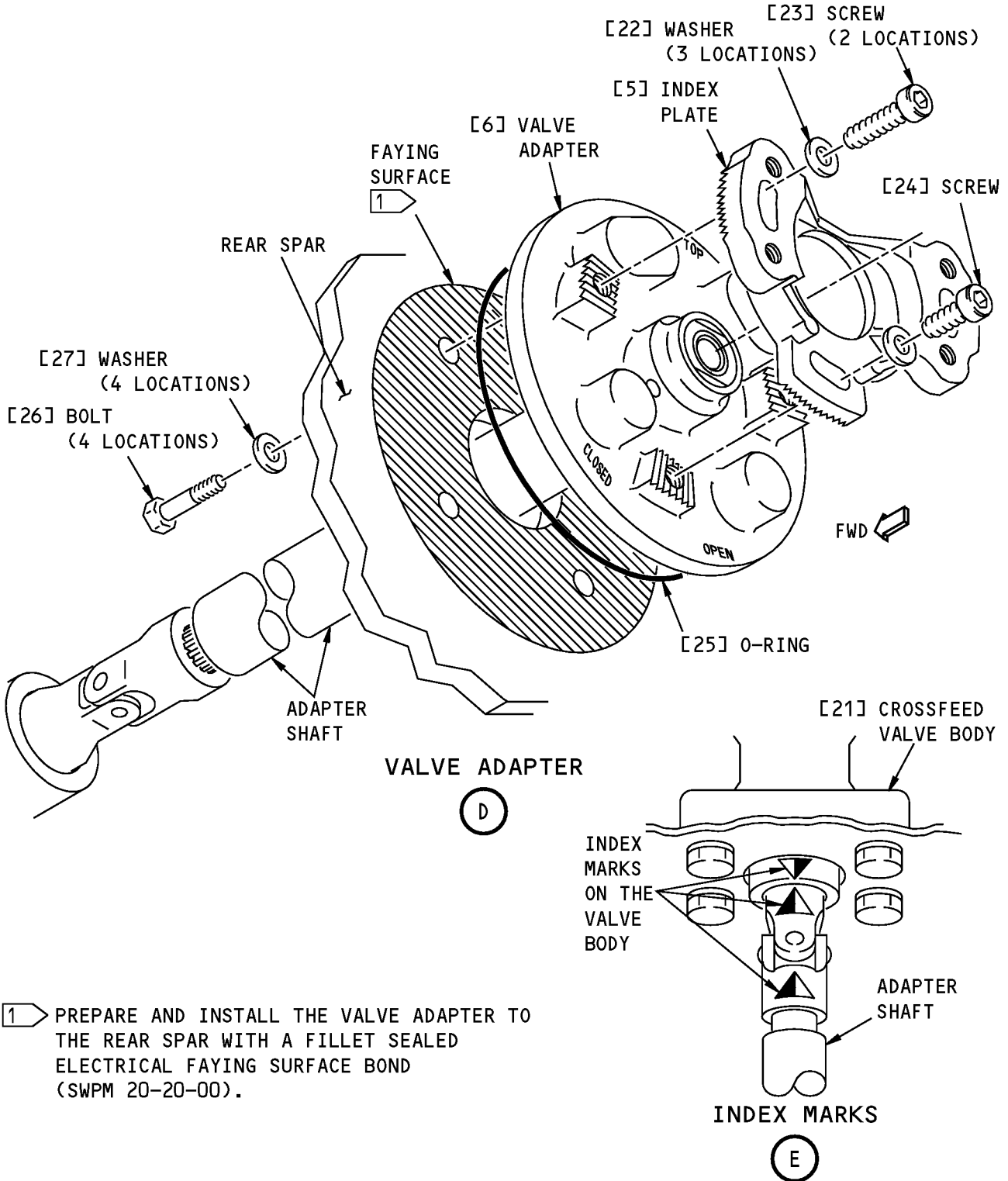


**Crossfeed Valve Adapter Installation
Figure 403 (Sheet 2 of 4)/28-22-21-990-807**

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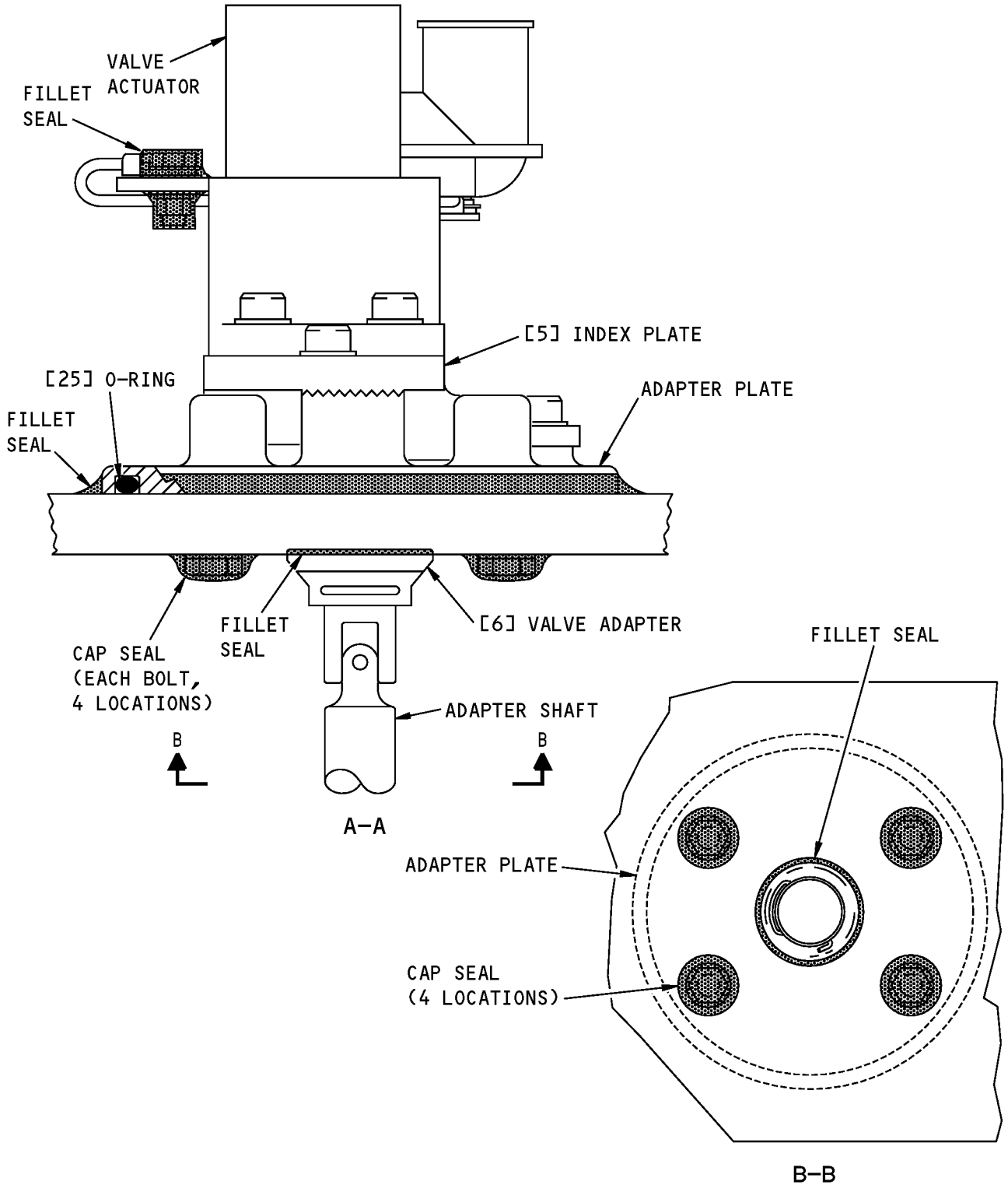


1 PREPARE AND INSTALL THE VALVE ADAPTER TO THE REAR SPAR WITH A FILLET SEALED ELECTRICAL FAYING SURFACE BOND (SWPM 20-20-00).

Crossfeed Valve Adapter Installation
Figure 403 (Sheet 3 of 4)/28-22-21-990-807

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TASK 28-22-21-400-802

7. Install the Engine Fuel Crossfeed Valve Adapter

(Figure 403)

A. General

- (1) This task contains these procedures:
 - (a) Install the Valve Adapter
 - (b) Install the Index Plate
 - (c) Crossfeed Valve Operational Tests
 - (d) Put the Airplane Back to the Usual Condition

B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
20-30-88	AIRPLANE STRUCTURE CLEANING SOLVENTS (Series 88)
20-30-92-910-801	Final Cleaning Prior to General Sealing (Series 92) (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-600-801	Apply the Corrosion Resistant Finish (Topcoat) (P/B 701)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-00-730-802	Crossfeed Valve - Functional Test (P/B 501)
32-00-01-080-801	Landing Gear Downlock Pins Removal (P/B 201)
51-21-41-370-802	Apply Alodine 600, 1200 or 1200S Solution (P/B 701)
51-31-00-390-804	Fillet Seal Application (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)
COM-2481	Tool - Sealant Removal, BAC5000, PSD 6-184 Approved (Part #: 1-6390-A, Supplier: 63318, A/P Effectivity: 737-ALL) (Part #: 10810, Supplier: \$0855, A/P Effectivity: 737-ALL) (Part #: 234350, Supplier: \$0857, A/P Effectivity: 737-ALL) (Part #: 311, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: 411B60, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: 411B90, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: DAD5013, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: DFD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: J5-0275-2010, Supplier: 435R8, A/P Effectivity: 737-ALL) (Part #: SCD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: ST982LF, Supplier: 3Z323, A/P Effectivity: 737-ALL) (Part #: TS1275-4, Supplier: 1DWR5, A/P Effectivity: 737-ALL)

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Reference	Description
COM-4746	Handle - Sealant Removal Tool (Part #: 310/1, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: SHN0272, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: SHR0272-T, Supplier: 1DWR5, A/P Effectivity: 737-ALL)
STD-123	Brush - Soft Bristle

D. Consumable Materials

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS 5-95
A00436	Sealant - Fuel Tank	BMS5-45 (Supersedes BMS 5-26)
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
B01012	Solvent - Final Cleaning Prior To General Sealing (AMM 20-30-92/201) - Series 92	
C00064	Coating - Aluminum Chemical Conversion	BAC5719, Type II, Class A (MIL-C-5541, Class A)
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20, Type II
C50033	Chromated Conversion Coating for Aluminum - Alodine 1200	
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5
G50021	Pad - General Purpose Scrubbing - Scotch-Brite 96W	

E. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

F. Access Panels

Number	Name/Location
131AB	Center Tank Access

G. Install the Valve Adapter

SUBTASK 28-22-21-140-003

- (1) Remove the old sealant and clean the rear spar contact area, valve adapter [6], and the fasteners (if reused).
 - (a) To remove the sealant from the rear spar use a sealant removal tool, COM-2481 and sealant tool removal handle, COM-4746 or equivalent.

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WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (b) To remove the remaining sealant, grease, oil, dirt, and other contamination from the components, use one of these brushes/pads soaked with Series 92 solvent, B01012 (TASK 20-30-92-910-801):
- 1) soft bristle brush, STD-123
 - 2) cotton wiper, G00034
 - 3) Scotch-Brite 96W pad, G50021

SUBTASK 28-22-21-110-004

- (2) Do these steps to prepare the valve adapter [6] and the rear spar for a fillet sealed electrical faying surface bond (View D):

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (a) Final clean the contact surfaces of the valve adapter [6] and the rear spar with a cotton wiper, G00034 soaked with Series 88 solvent, B01008 (SUBJECT 20-30-88).
- (b) Rub dry with a clean, dry cotton wiper, G00034.
- (c) Continue to clean and dry the surface until the dry cotton wiper, G00034 stays clean.

SUBTASK 28-22-21-420-038

- (3) On the outside of the airplane, do these steps (View D):
- (a) Put a thin layer of petrolatum grease, D00504 on the new O-ring [25].
 - (b) Put the O-ring [25] in the O-ring groove of the valve adapter [6].
 - (c) Put the adapter shaft attached to the valve adapter [6] through the hole in the rear spar.

SUBTASK 28-22-21-410-006

WARNING: DO THE PURGING AND FUEL TANK ENTRY PROCEDURE. FAILURE TO FOLLOW THE PURGING AND FUEL TANK ENTRY PROCEDURE COULD CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Go into the fuel tank to the crossfeed valve location (View B).

SUBTASK 28-22-21-420-039

- (5) Do these steps to install the valve adapter [6]:
- (a) Make sure the index marks on the crossfeed valve body [21] are aligned (View E).
NOTE: A small misalignment of the index marks is satisfactory.
 - (b) Engage the adapter shaft of the valve adapter [6] with the crossfeed valve body [21] (View C).

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(c) Make sure the shoulder of the valve adapter [6] does not bind in the opening of the rear spar.

(d) Install the four bolts [26] and washers [27] to attach the valve adapter [6] to the rear spar.

SUBTASK 28-22-21-765-004

(6) Measure the bonding resistance between the adapter plate of the valve adapter [6] and the rear spar with an electrical bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure the bonding resistance is not more than 0.0005 ohm (0.5 milliohm).

SUBTASK 28-22-21-390-004

(7) On the inside of the fuel tank apply BMS5-45 sealant, A00436 to these components (View B-B):

(a) A cap seal on the four bolts [26] (TASK 51-31-00-390-804).

(b) A fillet seal on the periphery of the rear spar penetration and the stationary part of the adapter plate.

NOTE: Make sure the sealant does not touch the adapter shaft or the other parts of the valve adapter that rotate.

SUBTASK 28-22-21-390-005

(8) On the outside of the fuel tank, apply a fillet seal of BMS5-95 sealant, A00247 around the periphery of the valve adapter [6] (TASK 51-31-00-390-804) (View A-A).

SUBTASK 28-22-21-916-005

(9) Do this task to apply protective finishes to the bare metal areas of the rear spar: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

NOTE: Re-apply the protective coating to the rear spar at all bare metal areas that are not covered by the fillet seal, and where the electrical bonding probe removed the finishes.

(a) These are the protective finishes:

1) Alodine 600 coating, C00064

2) BMS 10-20 coating, C00307.

SUBTASK 28-22-21-916-006

(10) Do this task to apply Alodine 1200 coating, C50033 to any bare metal areas of the valve adapter [6]: Apply Alodine 600, 1200 or 1200S Solution, TASK 51-21-41-370-802.

NOTE: Re-apply the protective coating to the valve adapter [6] where the electrical bonding probe removed the finish.

SUBTASK 28-22-21-860-012

(11) Do this task to close the fuel tank: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Install this access panel:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

(TASK 28-11-31-400-801).

SUBTASK 28-22-21-820-007

(12) Do this task: Crossfeed Valve Alignment, TASK 28-22-21-820-801.

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H. Install the Index Plate

SUBTASK 28-22-21-820-008

- (1) Do this procedure after you have correctly aligned and marked the alignment position of the index plate [5] and the valve adapter [6] per this task: Crossfeed Valve Alignment, TASK 28-22-21-820-801.

SUBTASK 28-22-21-420-040

- (2) Do these steps to install the index plate [5]:
 - (a) Align the index plate [5] and the valve adapter [6] with the mark that you made during crossfeed valve alignment procedure.
 - (b) Install the two index screws [23] and washers [22] to the top index mounting positions and the index screw [24] and washer [23] to the bottom index position.
 - (c) Tighten the index screws to 22 ± 1 in-lb (2.5 ± 0.1 N·m).
 - (d) Lockwire the two top two index screws [23] and the bottom screw [24] to the index plate [5].

SUBTASK 28-22-21-420-041

- (3) Do this task: Install the Actuator of the Engine Fuel Crossfeed Valve, TASK 28-22-21-400-801.

I. Crossfeed Valve Operational Tests

NOTE: These tests will make sure the crossfeed valve electrical operation is correct, the crossfeed valve plate alignment is correct, and that there are no fuel leaks through the rear spar.

SUBTASK 28-22-21-710-005

- (1) Do these tasks:
 - (a) Crossfeed Valve Operational Test, TASK 28-22-21-710-801
NOTE: This test is done when you install the valve actuator.
 - (b) Crossfeed Valve - Functional Test, TASK 28-22-00-730-802.

SUBTASK 28-22-21-790-001

- (2) Do this leak check if you have replaced the valve adapter [6]:

NOTE: The leak check is only necessary if you have done a fuel tank entry and replaced the valve adapter [6]. It is not necessary if you have replaced or aligned the index plate [5] for adjustment purposes only.

- (a) Refuel the center fuel tank to a minimum of 13,000 pounds (5900 kilograms) (TASK 12-11-00-650-802).

NOTE: This is the fuel quantity necessary to make sure there are no leaks at the rear spar.

- (b) Make sure there are no fuel leaks at the valve adapter [6] installation on the rear spar.
- (c) Make sure there is no fuel leaks at this access door:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

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J. Put the Airplane Back to the Usual Condition

SUBTASK 28-22-21-090-002

WARNING: OBEY THE PROCEDURE FOR THE REMOVAL OF THE DOWNLOCK PINS. IF YOU MOVE THE CONTROL LEVER FOR THE LANDING GEAR TO THE UP POSITION, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

- (1) Remove the ground locks installed on the landing gear if they are not needed for other tasks (TASK 32-00-01-080-801).

END OF TASK

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TASK 28-22-21-000-805

8. Remove the Engine Fuel Crossfeed Valve Adapter

(Figure 404)

A. General

- (1) The valve adapter and shaft assembly (valve adapter) is used to connect the actuator to the crossfeed valve body. The valve adapter consists of these components:
(a) Index plate
(b) Adapter plate
(c) Adapter shaft (with U-joint connection).

B. References

Table with 2 columns: Reference, Title. Rows include 28-11-00-910-802, 28-11-31-000-801, 28-26-00-650-801.

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

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HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207 (Continued)

Reference	Description
COM-2481	Tool - Sealant Removal, BAC5000, PSD 6-184 Approved (Part #: 1-6390-A, Supplier: 63318, A/P Effectivity: 737-ALL) (Part #: 10810, Supplier: \$0855, A/P Effectivity: 737-ALL) (Part #: 234350, Supplier: \$0857, A/P Effectivity: 737-ALL) (Part #: 311, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: 411B60, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: 411B90, Supplier: 3DN12, A/P Effectivity: 737-ALL) (Part #: DAD5013, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: DFD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: J5-0275-2010, Supplier: 435R8, A/P Effectivity: 737-ALL) (Part #: SCD5019, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: ST982LF, Supplier: 3Z323, A/P Effectivity: 737-ALL) (Part #: TS1275-4, Supplier: 1DWR5, A/P Effectivity: 737-ALL)
COM-4746	Handle - Sealant Removal Tool (Part #: 310/1, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: SHN0272, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: SHR0272-T, Supplier: 1DWR5, A/P Effectivity: 737-ALL)

D. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

E. Access Panels

Number	Name/Location
131AB	Center Tank Access

F. Prepare for the Procedure

SUBTASK 28-22-21-650-004

(1) Defuel the center fuel tank (TASK 28-26-00-650-801).

SUBTASK 28-22-21-860-013

WARNING: OBEY THE PRECAUTIONS FOR PURGING, AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Obey the fuel tank entry precautions (TASK 28-11-00-910-802).

SUBTASK 28-22-21-650-005

(3) Drain and purge the center fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-22-21-010-009

(4) Remove this access panel:

Number	Name/Location
131AB	Center Tank Access

(a) Do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801.

G. Remove the Valve Adapter

SUBTASK 28-22-21-020-024

(1) Do these steps on the outside of the fuel tank:

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HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207 (Continued)

- (a) Do this task: Remove the Actuator of the Engine Fuel Crossfeed Valve, TASK 28-22-21-000-804.
- (b) Use a sealant removal tool to scrap away the old sealant from the periphery of the adapter plate (View A-A).
 - 1) Use sealant removal tool, COM-2481 and sealant tool removal handle, COM-4746 or equivalent.

SUBTASK 28-22-21-020-025

WARNING: DO THE PURGING AND FUEL TANK ENTRY PROCEDURE. FAILURE TO FOLLOW THE PURGING AND FUEL TANK ENTRY PROCEDURE COULD CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Go into the center tank and do these steps:
 - (a) Go to the valve adapter [6] location (View B).
 - (b) Remove the old sealant from the four bolts [26] and the valve adapter [6] rear spar penetration (View A-A).
 - (c) Remove the four bolts [26] and the washers [27] to disconnect the valve adapter [6].
 - (d) Disengage the adapter shaft attached to the valve adapter [6] from the crossfeed valve body [21] (View C).

SUBTASK 28-22-21-020-026

- (3) Go out of the tank and remove the valve adapter [6] from the rear spar.

H. Remove the Index Plate

NOTE: Do these steps if you will reuse the valve adapter and the attached index plate or if you need to remove the index plate to align the valve body. If the task is to discard the old valve adapter and install a new valve adapter, it is not necessary to disassemble the index plate.

SUBTASK 28-22-21-020-027

- (1) Do these steps to remove the index plate [5] from the valve adapter [6] (View D):
 - (a) Remove the lockwire from the two index screws [23] and index screw [24].
 - (b) Remove index screws [23], index screw [24], and the washers [22].
 - (c) Carefully disassemble the index plate [5] and the valve adapter [6].

NOTE: The two plates are bonded with faying surface sealant.

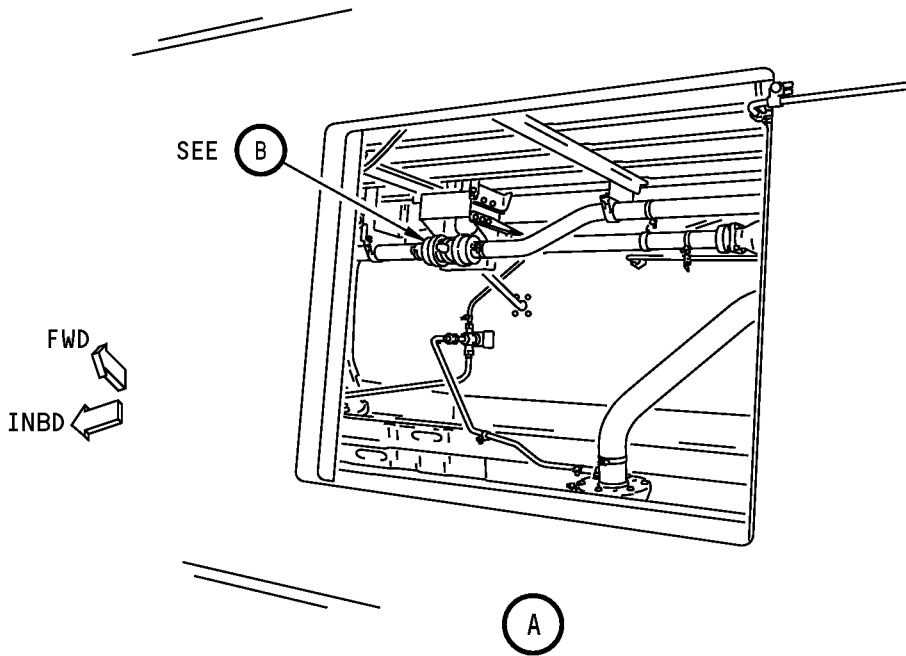
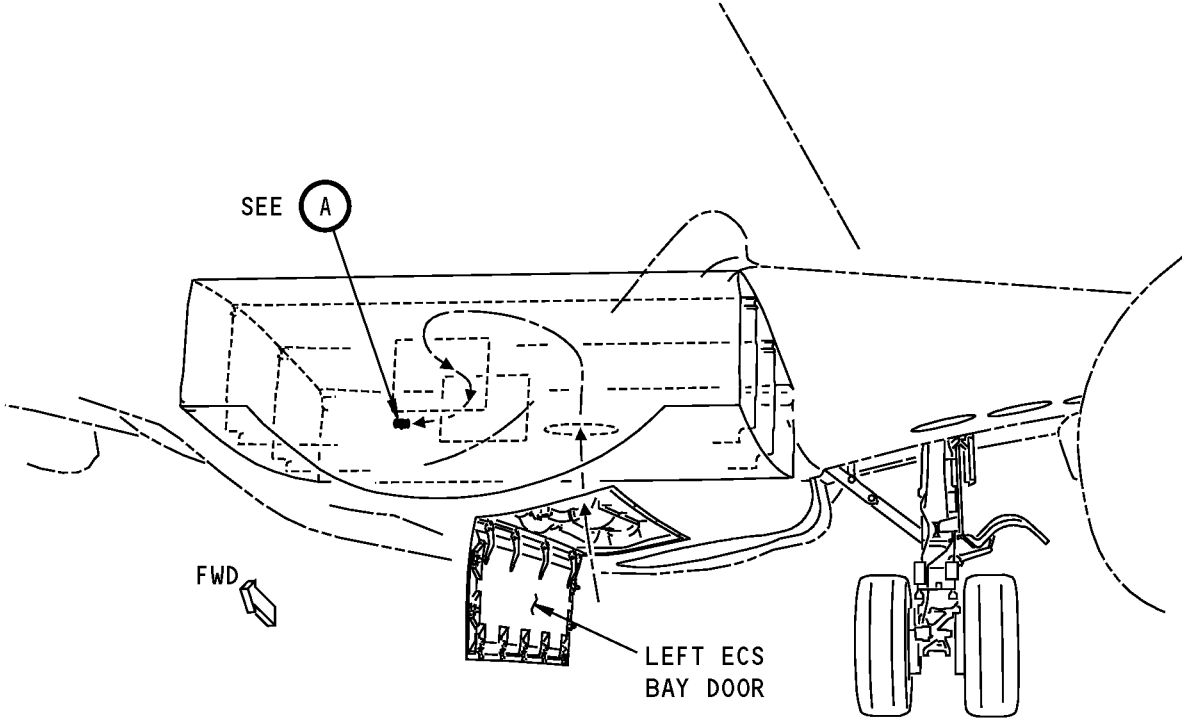
————— **END OF TASK** —————

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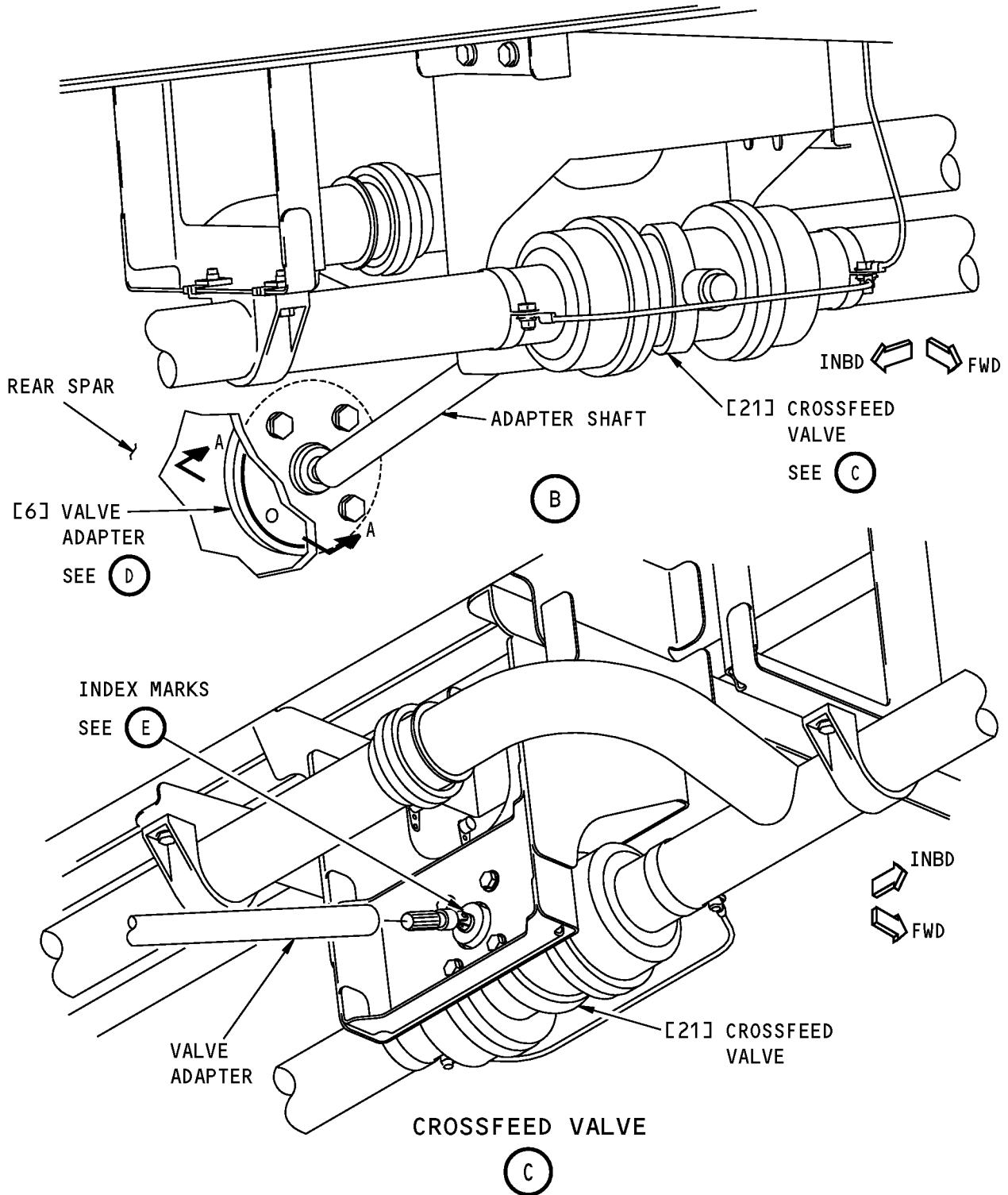
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**Crossfeed Valve Adapter Installation
Figure 404 (Sheet 1 of 5)/28-22-21-990-808**

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HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST
SB 737-28A1207

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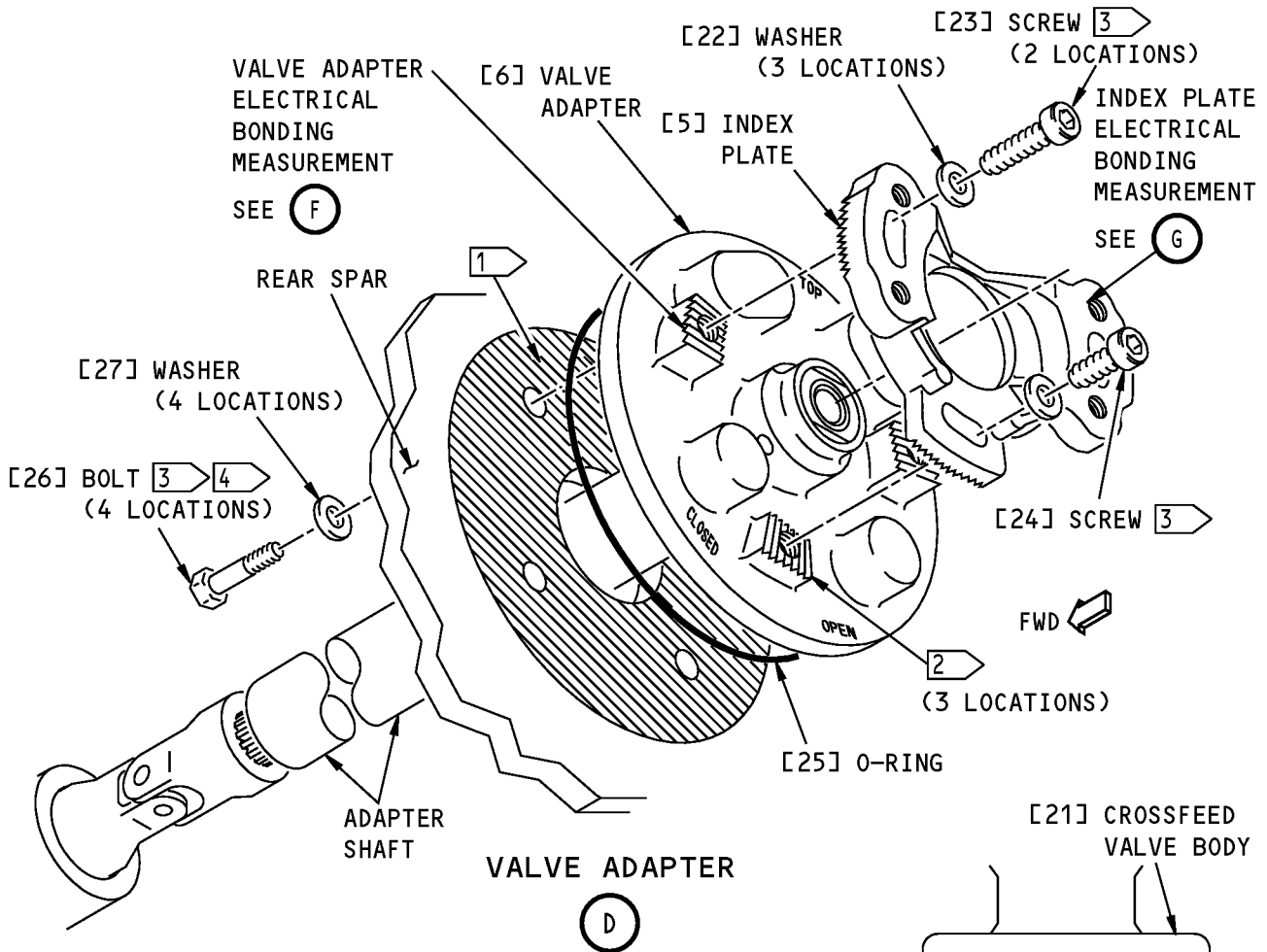


**Crossfeed Valve Adapter Installation
Figure 404 (Sheet 2 of 5)/28-22-21-990-808**

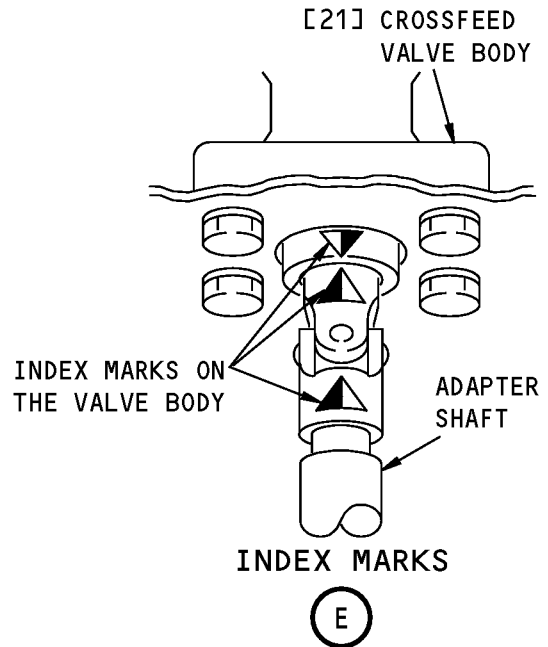
EFFECTIVITY
HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST
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- 1 PREPARE AND INSTALL THE VALVE ADAPTER TO THE REAR SPAR WITH A FILLET SEALED ELECTRICAL FAYING SURFACE BOND (SWPM 20-20-00).
- 2 PREPARE AND INSTALL THE SERRATED CONTACT SURFACES OF THE VALVE ADAPTER AND INDEX PLATE WITH A SEALED ELECTRICAL FAYING SURFACE BOND (3 LOCATIONS) (SWPM 20-20-00).
- 3 APPLY SEALANT TO THE SHANK AND THREADS OF THE FASTENERS DURING THE INSTALLATION.
- 4 AFTER INSTALLATION, APPLY A CAP SEAL TO THE HEAD OF THE FASTENERS.



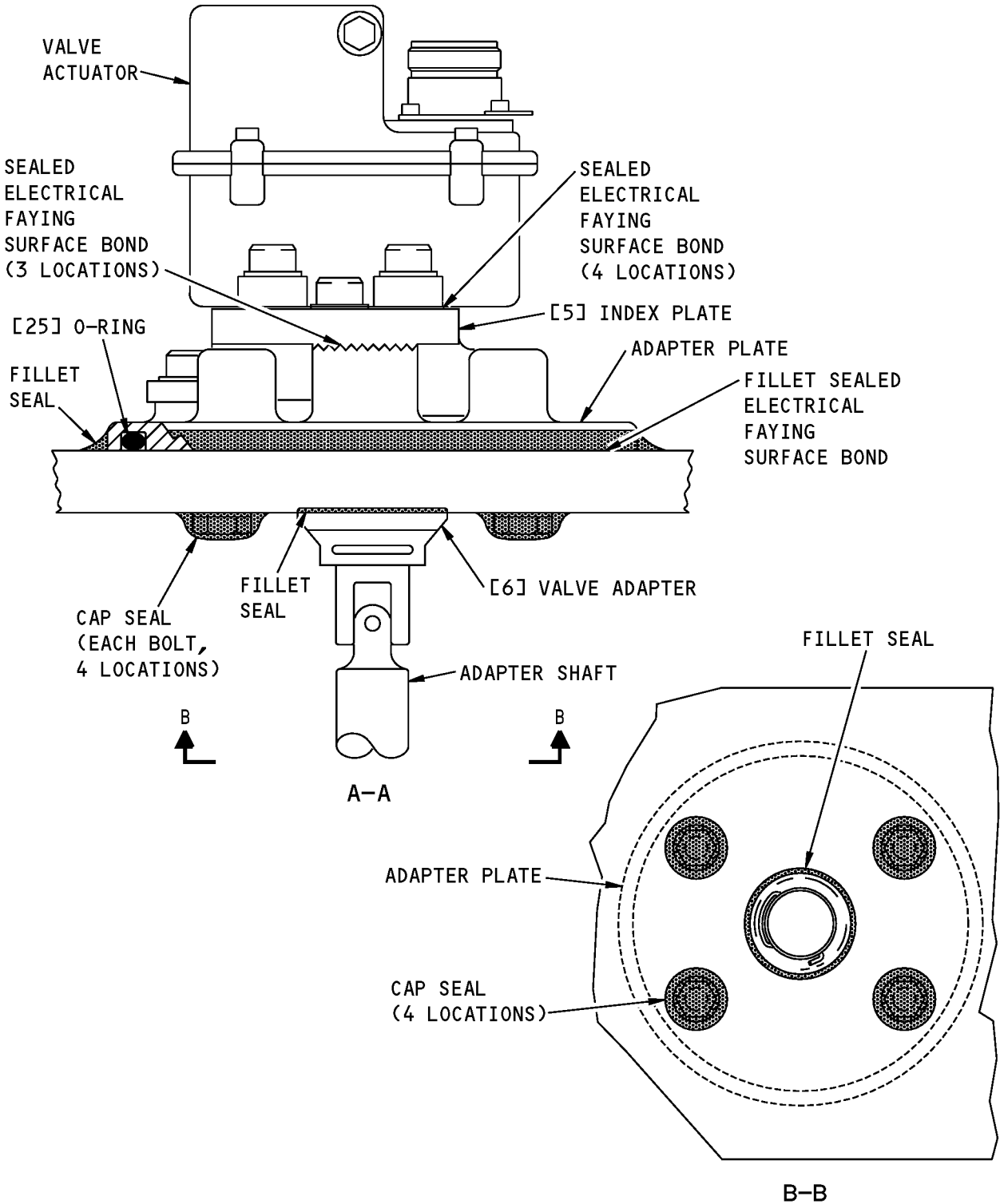
Crossfeed Valve Adapter Installation
Figure 404 (Sheet 3 of 5)/28-22-21-990-808

EFFECTIVITY
 HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST
 SB 737-28A1207

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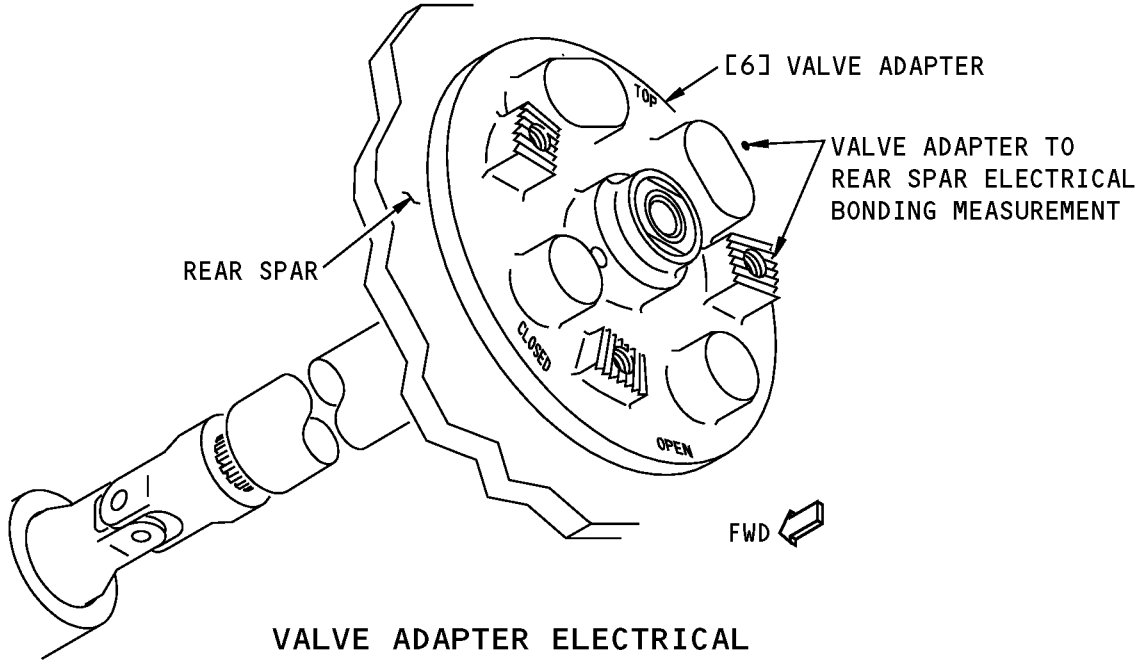


**Crossfeed Valve Adapter Installation
Figure 404 (Sheet 4 of 5)/28-22-21-990-808**

EFFECTIVITY
HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST
SB 737-28A1207

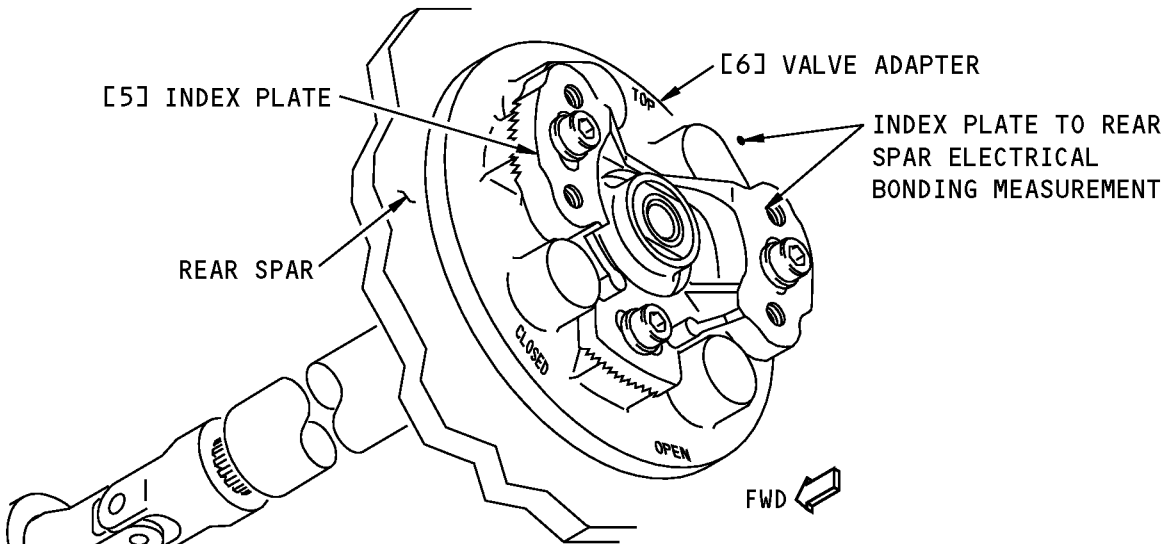
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**VALVE ADAPTER ELECTRICAL
BONDING MEASUREMENT**

F



**INDEX PLATE ELECTRICAL
BONDING MEASUREMENT**

G

**Crossfeed Valve Adapter Installation
Figure 404 (Sheet 5 of 5)/28-22-21-990-808**

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HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST
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HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207 (Continued)

TASK 28-22-21-400-805

9. Install the Engine Fuel Crossfeed Valve Adapter

(Figure 404)

A. General

- (1) This task contains these procedures:
(a) Install the Valve Adapter
(b) Install the Index Plate
(c) Crossfeed Valve Operational Tests
(d) Put the Airplane Back to the Usual Condition

B. References

Table with 2 columns: Reference, Title. Lists various maintenance references such as Pressure Refuel Procedure, AIRPLANE STRUCTURE CLEANING SOLVENTS, etc.

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Table with 2 columns: Reference, Description. Lists tools and equipment like Meter - Bonding, Sealant Removal, etc.

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HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207 (Continued)

(Continued)

Reference	Description
COM-4746	Handle - Sealant Removal Tool (Part #: 310/1, Supplier: KA861, A/P Effectivity: 737-ALL) (Part #: SHN0272, Supplier: \$0856, A/P Effectivity: 737-ALL) (Part #: SHR0272-T, Supplier: 1DWR5, A/P Effectivity: 737-ALL)
STD-123	Brush - Soft Bristle

D. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
A50105	Sealant - Integral Fuel Tank Sealed Electrical Faying Surface Bond	SAE AMS-S-8802 Class A
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
B01012	Solvent - Final Cleaning Prior To General Sealing (AMM 20-30-92/201) - Series 92	
C00064	Coating - Aluminum Chemical Conversion	BAC5719, Type II, Class A (MIL-C-5541, Class A)
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20, Type II
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5
G50021	Pad - General Purpose Scrubbing - Scotch-Brite 96W	

E. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

F. Access Panels

Number	Name/Location
131AB	Center Tank Access

G. Install the Valve Adapter

SUBTASK 28-22-21-140-004

- (1) Remove the old sealant and clean the rear spar, valve adapter [6], index plate [5], and the fasteners (if re-used).
 - (a) Use sealant removal tool, COM-2481 and sealant tool removal handle, COM-4746 (or equivalent) to scrap away the old sealant from the rear spar.
 - (b) If new, use an abrasive pad to remove the anodized finish from the faying surfaces of the valve adapter [6] and index plate [5] (SWPM 20-20-00).

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HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207 (Continued)

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (c) To remove the remaining sealant, grease, oil, dirt, and other contamination from the components, use one of these brushes/pads soaked with Series 92 solvent, B01012 (TASK 20-30-92-910-801):
- 1) soft bristle brush, STD-123
 - 2) cotton wiper, G00034
 - 3) Scotch-Brite 96W pad, G50021

SUBTASK 28-22-21-110-005

- (2) Do these steps to prepare the valve adapter [6] and the rear spar for a fillet sealed electrical faying surface bond (View D):

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- (a) Final clean the contact surfaces of the valve adapter [6] and the rear spar with a cotton wiper, G00034 soaked with Series 88 solvent, B01008 (SUBJECT 20-30-88).
- (b) Rub dry with a clean, dry cotton wiper, G00034.
- (c) Continue to clean and dry the surface until the dry cotton wiper, G00034 stays clean.

SUBTASK 28-22-21-420-045

- (3) On the outside of the airplane, do these steps:

- (a) Put a thin layer of petrolatum grease, D00504 on the new O-ring [25].
- (b) Put the O-ring [25] in the O-ring groove of the valve adapter [6].
- (c) Put the adapter shaft attached to the valve adapter [6] through the hole in the rear spar.
- (d) Make sure the shoulder of the valve adapter [6] does not bind in the opening of the rear spar.

SUBTASK 28-22-21-410-007

WARNING: DO THE PURGING AND FUEL TANK ENTRY PROCEDURE. FAILURE TO FOLLOW THE PURGING AND FUEL TANK ENTRY PROCEDURE COULD CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Go into the center tank to the crossfeed valve location (TASK 28-11-00-910-802) (View A).

SUBTASK 28-22-21-420-043

- (5) Do these steps to install the valve adapter [6]:

- (a) Make sure that the index marks on the body of the crossfeed valve body [21] are aligned (View E).

NOTE: A small misalignment of the index marks is satisfactory.

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- (b) Engage the adapter shaft of the valve adapter [6] with the crossfeed valve body [21] (View C).
- (c) Apply sealant to the shank and the threads of the four bolts [26].

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801 for important information on Critical Design Configuration Control Limitations (CDCCLs).

- 1) Use BMS5-45 Class B sealant, A00767 for the wet installation of the bolts [26].
- 2) Make sure the sealant applied to the fasteners is approximately 0.060 in. (1.524 mm) thick.

- (d) Install the four bolts [26] and washers [27] to attach the valve adapter [6].

SUBTASK 28-22-21-765-005

- (6) On the outside of the fuel tank, measure the bonding resistance between one of the raised serrated surfaces of the valve adapter [6] (bare metal surface) and the rear spar (View F).

- (a) Use an electrical bonding meter, COM-1550 (SWPM 20-20-00).
- (b) Make sure the bonding resistance is 0.0005 ohm (0.5 milliohm) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801 for important information on Critical Design Configuration Control Limitations (CDCCLs).

- 1) If the bonding resistance is more than 0.0005 ohm (0.5 milliohm), then do the applicable procedure in this task: Rework the Electrical Faying Surface Bonds for the Engine Crossfeed Valve, TASK 28-22-21-300-801.

SUBTASK 28-22-21-420-044

- (7) On the inside of the tank, apply a fillet seal of BMS5-45 Class B sealant, A00767 to these components (TASK 51-31-00-390-804) (View A-A):

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801 for important information on Critical Design Configuration Control Limitations (CDCCLs).

- (a) The four bolts [26]
- (b) The periphery of the rear spar penetration and the stationary part of the adapter plate.

NOTE: Make sure the sealant does not touch the adapter shaft or other parts of the valve adapter that rotate.

SUBTASK 28-22-21-420-046

- (8) On the outside of the tank, apply a fillet seal of BMS5-45 Class B sealant, A00767 around the periphery of the valve adapter [6] (TASK 51-31-00-390-804) (View A-A).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801 for important information on Critical Design Configuration Control Limitations (CDCCLs).

SUBTASK 28-22-21-410-008

- (9) Do this task to close the fuel tank: Fuel Tank Closure, TASK 28-11-00-410-801.

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- (a) Install this access panel:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

Do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801.

SUBTASK 28-22-21-820-009

- (10) Do this task: Crossfeed Valve Alignment, TASK 28-22-21-820-801.

H. Install the Index Plate

SUBTASK 28-22-21-820-010

- (1) Do this procedure after you have correctly aligned and marked the alignment position of the index plate and adapter plate per this task: Crossfeed Valve Alignment, TASK 28-22-21-820-801.

SUBTASK 28-22-21-020-028

- (2) Remove the index plate [5] from the valve adapter [6].

SUBTASK 28-22-21-110-006

- (3) Do these steps to prepare the index plate [5] and the valve adapter [6] for a sealed electrical faying surface bond (SWPM 20-20-00):

- (a) Protect the alignment reference mark when you clean the index plate [5] and the valve adapter [6] for the electrical bond.

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- (b) Final clean the contact surfaces with a cotton wiper, G00034 soaked with Series 88 solvent, B01008 (SUBJECT 20-30-88).
- (c) Rub dry with a clean, dry cotton wiper, G00034.
- (d) Continue to clean and dry the surface until the dry cotton wiper, G00034 stays clean.
- (e) Apply a thin continuous layer of sealant to the serrated surface of the index plate [5] (three locations).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801 for important information on Critical Design Configuration Control Limitations (CDCCLs).

- 1) Use Pro Seal 890A or PR-1440A sealant, A50105 for the faying surface seal.
- 2) Make sure the sealant layer is approximately 0.005 in. (0.127 mm) thick.

- (f) Apply sealant to the shank and the threads of the two top index screws [23] and the bottom index screw [24].

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801 for important information on Critical Design Configuration Control Limitations (CDCCLs).

- 1) Use Pro Seal 890A or PR-1440A sealant, A50105 for the wet installation of the index screws.

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- 2) Make sure the sealant applied to the fasteners is approximately 0.060 in. (1.524 mm) thick.

SUBTASK 28-22-21-420-047

- (4) Do these steps to install the index plate [5]:
 - (a) Align the index plate [5] and the valve adapter [6] with the alignment reference mark that you made during the crossfeed valve alignment procedure.
 - (b) Install the two index screws [23] and washers [22] to the top index mounting hole positions.
 - (c) Install the index screw [24] and washer [22] to the bottom index mounting hole position.
 - (d) Tighten the index screws to 22 ± 1 in-lb (2.5 ± 0.1 N·m).
 - (e) Make sure the sealant is continuously squeezed out along the edges of the contact surfaces.
 - (f) If there are gaps, bubbles or voids in the sealant squeeze out, then disassemble and apply more sealant.
 - (g) Shape the squeezed out sealant into a fillet seal (TASK 51-31-00-390-804).
 - (h) As an option, remove the extra squeezed out sealant.

NOTE: Make sure the sealant that remains is flush with the mating part edges.

SUBTASK 28-22-21-765-006

- (5) Measure the bonding resistance between one of the actuator feet contact surfaces on the index plate [5] (bare metal surface) and the rear spar (View G).
 - (a) Use an electrical bonding meter, COM-1550 (SWPM 20-20-00).
 - (b) Make sure the bonding resistance is 0.002 ohm (2.0 milliohm) or less.
 - 1) If the bonding resistance is more than 0.002 ohm (2.0 milliohms), then do the applicable procedure in this task: Rework the Electrical Faying Surface Bonds for the Engine Crossfeed Valve, TASK 28-22-21-300-801.

SUBTASK 28-22-21-420-048

- (6) Lockwire the two top two screws [23] and the bottom screw [24] to the index plate [5].

SUBTASK 28-22-21-420-049

- (7) Do this task: Install the Actuator of the Engine Fuel Crossfeed Valve, TASK 28-22-21-400-804.

SUBTASK 28-22-21-370-004

- (8) Do this task to apply protective finishes to the bare metal areas of the rear spar: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

NOTE: Re-apply the protective coating to the rear spar at all bare metal areas not covered by the fillet seal, and where the electrical bonding probe removed the finishes.

- (a) These are the protective finishes:
 - 1) Alodine 600 coating, C00064
 - 2) BMS 10-20 coating, C00307.

I. Crossfeed Valve Operational Tests

NOTE: These tests will make sure the crossfeed valve electrical operation is correct, the crossfeed valve plate alignment is correct, and that there are no fuel leaks through the rear spar.

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HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207 (Continued)

SUBTASK 28-22-21-760-003

(1) Do these tasks:

(a) Crossfeed Valve Operational Test, TASK 28-22-21-710-801

NOTE: This test is done when you install the valve actuator.

(b) Crossfeed Valve - Functional Test, TASK 28-22-00-730-802.

SUBTASK 28-22-21-790-002

(2) Do this leak check if you have replaced the valve adapter [6]:

NOTE: The leak check is only necessary if you have done a fuel tank entry and replaced the valve adapter [6]. It is not necessary if you have replaced or aligned the index plate [5] for adjustment purposes only.

(a) Refuel the center fuel tank to a minimum of 13,000 pounds (5900 kilograms) (TASK 12-11-00-650-802).

NOTE: This is the fuel quantity necessary to make sure there are no leaks at the rear spar.

(b) Make sure there are no fuel leaks at the valve adapter [6] installation on the rear spar.

(c) Make sure there is no fuel leaks at this access door:

Number	Name/Location
131AB	Center Tank Access

J. Put the Airplane Back to the Usual Condition

SUBTASK 28-22-21-090-003

WARNING: OBEY THE PROCEDURE FOR THE REMOVAL OF THE DOWNLOCK PINS. IF YOU MOVE THE CONTROL LEVER FOR THE LANDING GEAR TO THE UP POSITION, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(1) Remove the ground locks installed on the landing gear if they are not needed for other tasks (TASK 32-00-01-080-801).

HAP ALL

END OF TASK

TASK 28-22-21-820-801

10. Crossfeed Valve Alignment

(Figure 405)

A. References

Reference	Title
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

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Reference	Description
COM-1587	Wrench - Torque, 30 in-lbs (4 N-m) (Part #: TE3FUA, Supplier: 55719, A/P Effectivity: 737-ALL)
SPL-1771	Equipment - Alignment, Fuel Shutoff Valve (Part #: B28009-1, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

C. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

D. Prepare for the Procedure

SUBTASK 28-22-21-490-004

WARNING: MAKE SURE YOU INSTALL THE GROUND LOCK ASSEMBLIES IN ALL LANDING GEAR. ACCIDENTAL RETRACTION OF THE LANDING GEAR CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

SUBTASK 28-22-21-010-011

(2) Go to the crossfeed valve location on the rear spar in the main landing gear wheel well (right side) (View A).

HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207

SUBTASK 28-22-21-010-003

(3) If not done previously, do this task: Remove the Actuator of the Engine Fuel Crossfeed Valve, TASK 28-22-21-000-801.

HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

SUBTASK 28-22-21-010-010

(4) If not done previously, do this task: Remove the Actuator of the Engine Fuel Crossfeed Valve, TASK 28-22-21-000-804.

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SUBTASK 28-22-21-010-012

(5) If not done previously, remove the index plate [5] from the adapter plate.

E. Crossfeed Valve Alignment

SUBTASK 28-22-21-820-011

- (1) Do these steps to install the alignment tool [64] (fuel shutoff valve alignment equipment, SPL-1771) in the valve adapter [6] (View B):
 - (a) Position the index plate and align the serrated surfaces of the index plate and adapter plate.
 - (b) Loosely install the bottom index screw [66] to the index plate [5].
 - (c) Install the alignment tool [64].
 - (d) Put the alignment tool [64] in its position with the two guide pins in the holes left by the two alignment screws [61] that you removed. (the scale [62] should be on the top of the tool).
 - (e) Make sure the spline on the alignment tool [64] engages with the spline on the shaft.

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SUBTASK 28-22-21-820-012

(2) Do these steps to align the valve adapter [6] (Procedure 1, optional to Procedure 2):

NOTE: This procedure finds the point where the internal valve butterfly engages the valve seal. The torque necessary to turn the shaft increases as the butterfly engages the seal, then decreases again as the butterfly leaves the other side of the seal. Once the edge of the seal is found, the valve shaft will then be turned to center the butterfly on the seal.

- (a) Put the tool handle in the extreme counterclockwise position.
- (b) Slowly and smoothly turn the handle to the extreme clockwise position while you note the changes in the torque necessary to turn the handle.
- (c) Do the previous steps as many times as necessary to find the point in the rotation where the torque necessary to turn the handle increases significantly.
- (d) If you cannot find the position in the rotation where the torque increases significantly, then use Procedure 2 below.
- (e) Put the shaft in the extreme counterclockwise position again.
- (f) Slowly and smoothly turn the handle of the tool clockwise until a distinct increase in torque is found and immediately stop turning the handle.
- (g) Read the scale [62] on the tool.

NOTE: This is the point where the valve butterfly starts to engage the edge of the seal.

- (h) Turn the handle 13 degrees more in the clockwise direction (the scale is calibrated in degrees).

NOTE: The valve butterfly is now centered on the valve seal.

NOTE: If you turn the handle past the target value, do not turn the handle back in the counterclockwise direction again. You must start the procedure again with the handle in the extreme counterclockwise position.

SUBTASK 28-22-21-820-013

(3) Do these steps to align the valve adapter [6] (Procedure 2, optional to Procedure 1):

NOTE: A torque wrench (30 in-lbs), COM-1587 is necessary to do this procedure.

- (a) Put the tool handle in the extreme counterclockwise position.
- (b) Slowly and smoothly turn the tool handle to the extreme clockwise position while you monitor the torque that you apply to the handle.
- (c) Write down the maximum torque that you apply to the tool while you turn it from the extreme counterclockwise position to the extreme clockwise position.
- (d) Turn the tool back to the extreme counterclockwise position.
- (e) Turn the shaft clockwise again at approximately the same rate that you used before.
- (f) Stop at the position where the torque increases to approximately two-thirds of the maximum torque that you wrote down before.
- (g) Read the scale [62] on the tool at this position.

NOTE: This is the position where valve butterfly starts to engage the edge of the seal.

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- (h) Turn the handle 13 more degrees in the clockwise direction past the reading from the previous step.

NOTE: The butterfly valve is now centered on the valve seal.

NOTE: If you turn the valve past the target value, do not turn it back in the counterclockwise direction. You must start again with the tool handle in the extreme counterclockwise position.

SUBTASK 28-22-21-820-014

- (4) Tighten the lockscrew [63] on the alignment tool [64] to keep the tool in its position on the valve adapter [6].

SUBTASK 28-22-21-820-015

- (5) Turn the index plate [5] until the actuator mounting holes in the index plate are aligned with the two upper holes for the alignment screws [61].

SUBTASK 28-22-21-820-016

- (6) Insert the two alignment screws [61] into the holes for the actuator mounting screws to hold the index plate [5] in alignment with the adapter plate (this is the final adjustment of the position of the index plate).

SUBTASK 28-22-21-820-017

- (7) Tighten the bottom index screw [66].

SUBTASK 28-22-21-820-018

- (8) Carefully remove the two alignment screws [61].

SUBTASK 28-22-21-820-019

- (9) Loosen the lockscrew [63] and carefully remove the alignment tool [64].

SUBTASK 28-22-21-820-020

- (10) Use a fine point felt pen to apply a reference mark between the index plate [5] and the adapter plate of the valve adapter [6] at one of the serrated attachment points.

HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207

SUBTASK 28-22-21-420-050

- (11) Continue with the index plate installation procedure in this task: Install the Engine Fuel Crossfeed Valve Adapter, TASK 28-22-21-400-802.

HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

SUBTASK 28-22-21-420-051

- (12) Continue with the index plate installation procedure in this task: Install the Engine Fuel Crossfeed Valve Adapter, TASK 28-22-21-400-805.

HAP ALL

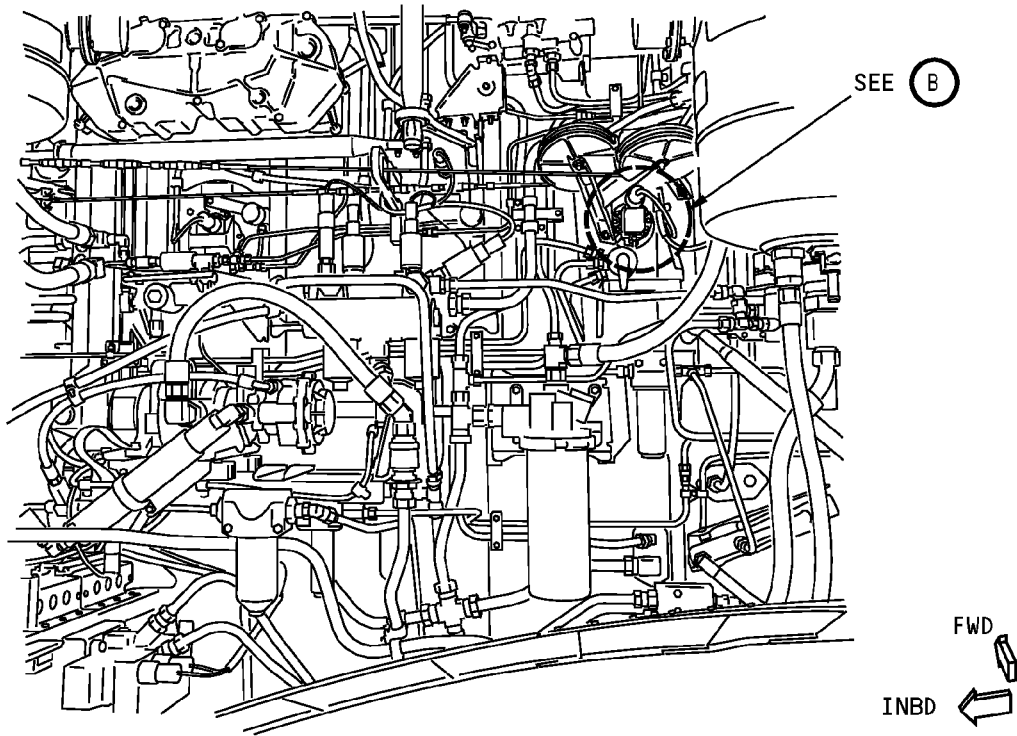
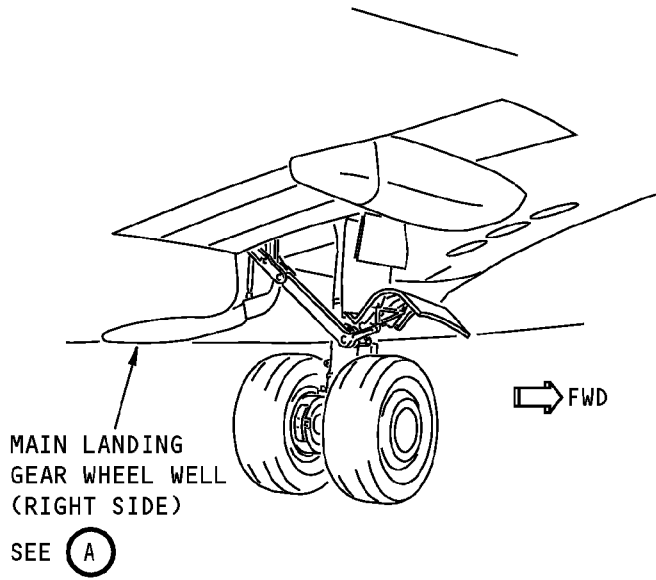
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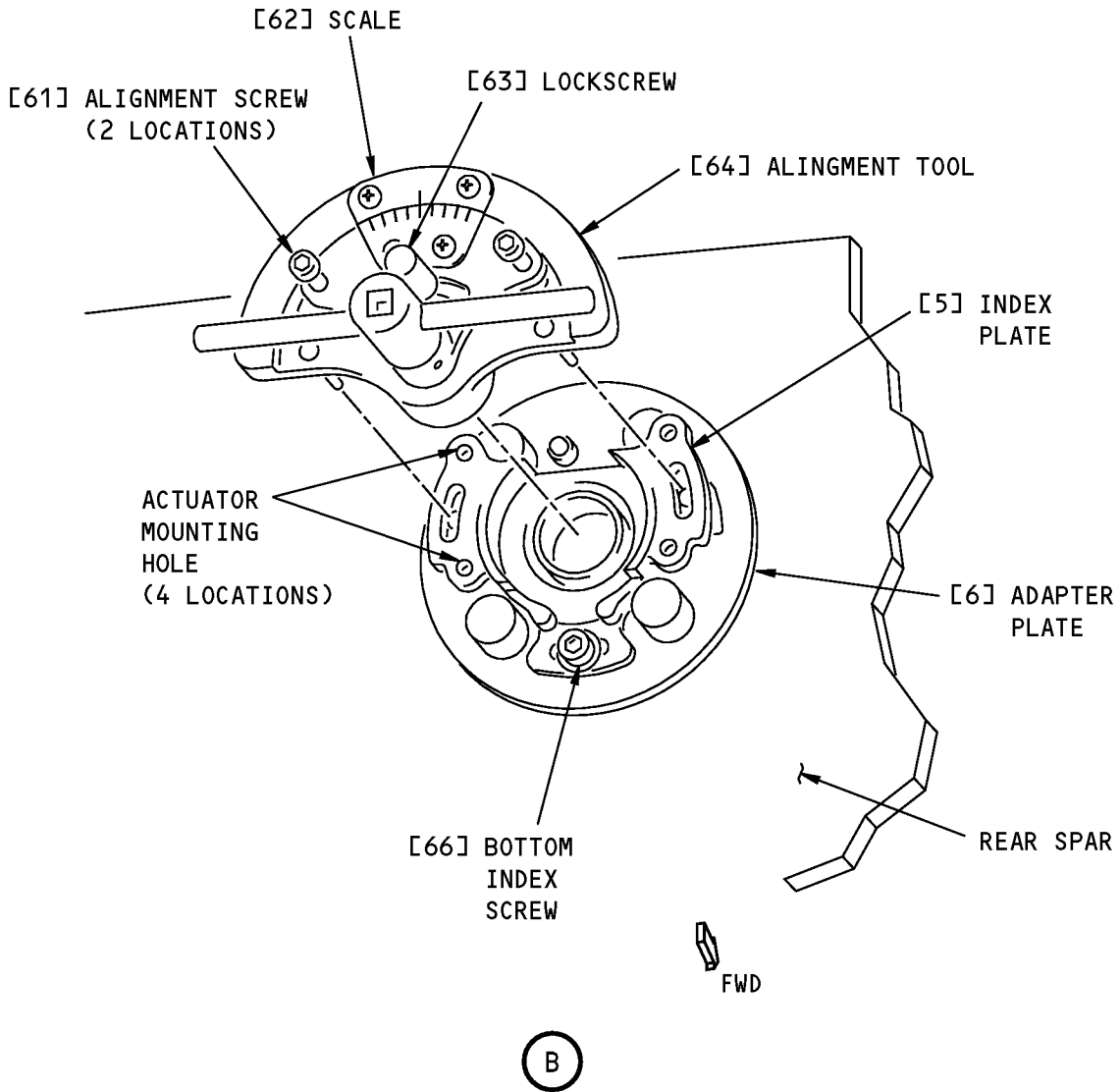
**MAIN LANDING GEAR WHEEL WELL
(RIGHT SIDE)**

(A)

**Crossfeed Valve Alignment
Figure 405 (Sheet 1 of 2)/28-22-21-990-805**

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Crossfeed Valve Alignment
Figure 405 (Sheet 2 of 2)/28-22-21-990-805

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TASK 28-22-21-000-803

11. Remove the Engine Fuel Crossfeed Valve Body

Figure 406

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-22-15-000-801	Fuel Line, Fitting and Coupling - Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)

B. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

C. Access Panels

Number	Name/Location
131AB	Center Tank Access

D. Prepare for the Procedure

SUBTASK 28-22-21-650-002

(1) Defuel the center, No. 1 and No. 2 fuel tanks (TASK 28-26-00-650-801).

SUBTASK 28-22-21-910-002

WARNING: OBEY THE PRECAUTIONS FOR PURGING, AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do the fuel tank purging and entry procedure for the center tank (TASK 28-11-00-910-802).

SUBTASK 28-22-21-010-004

(3) Remove the center tank access door:

Number	Name/Location
131AB	Center Tank Access

(TASK 28-11-31-000-801).

E. Remove the Crossfeed Valve Body

SUBTASK 28-22-21-010-005

WARNING: DO THE PURGING AND FUEL TANK ENTRY PROCEDURE. FAILURE TO FOLLOW THE PURGING AND FUEL TANK ENTRY PROCEDURE COULD CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Go into the center fuel tank to the crossfeed valve location (TASK 28-11-00-910-802) (View A).

SUBTASK 28-22-21-020-009

(2) Disconnect the two flexible full couplings [32] from each side of the crossfeed valve body [21] (TASK 28-22-15-000-801)(View B).

SUBTASK 28-22-21-020-010

(3) Hold the crossfeed valve body [21] and remove the four screws [34] and washers [35] that attach the crossfeed valve body [21] to the support bracket [33] (View C).

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SUBTASK 28-22-21-020-011

- (4) Disengage the crossfeed valve body [21] from the adapter shaft attached to the valve adapter [6] (View C).

SUBTASK 28-22-21-020-012

- (5) Remove the crossfeed valve body [21].

SUBTASK 28-22-21-480-002

- (6) Put the covers on the openings in the fuel line [31] to keep unwanted materials out.

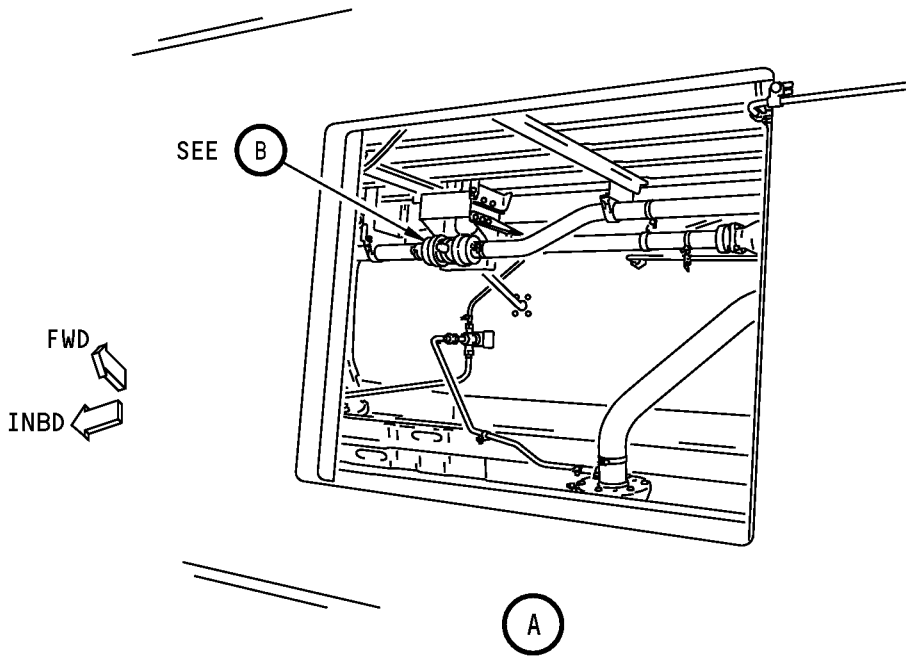
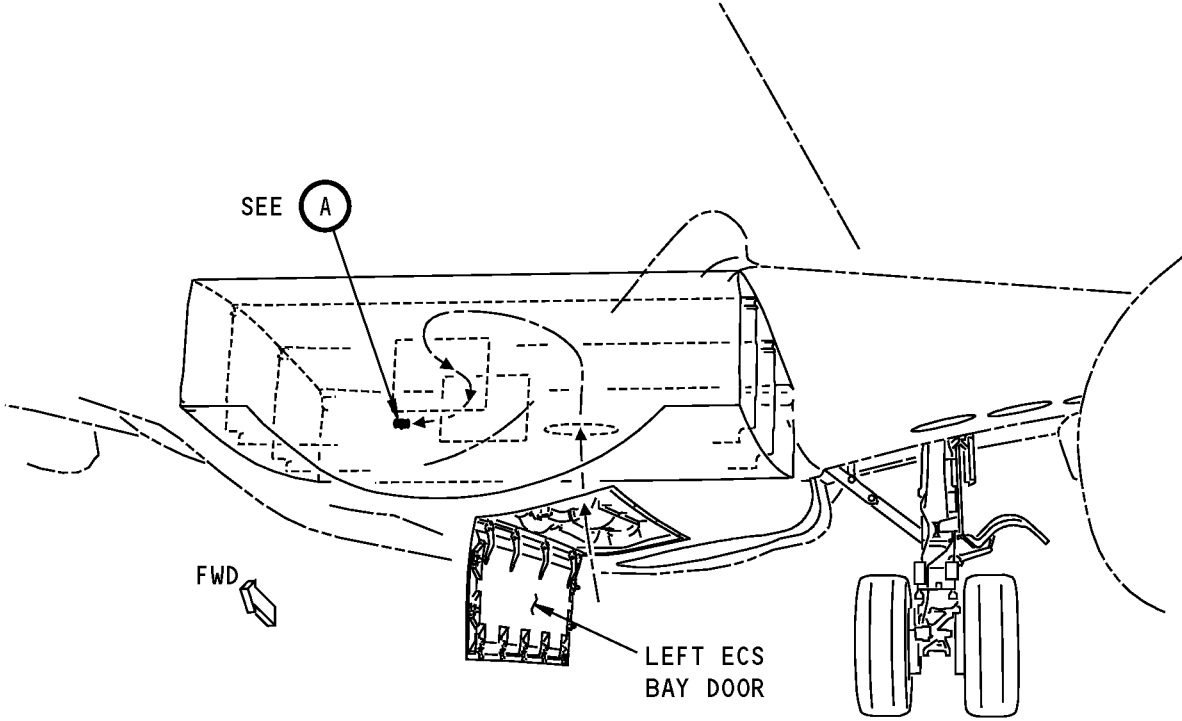
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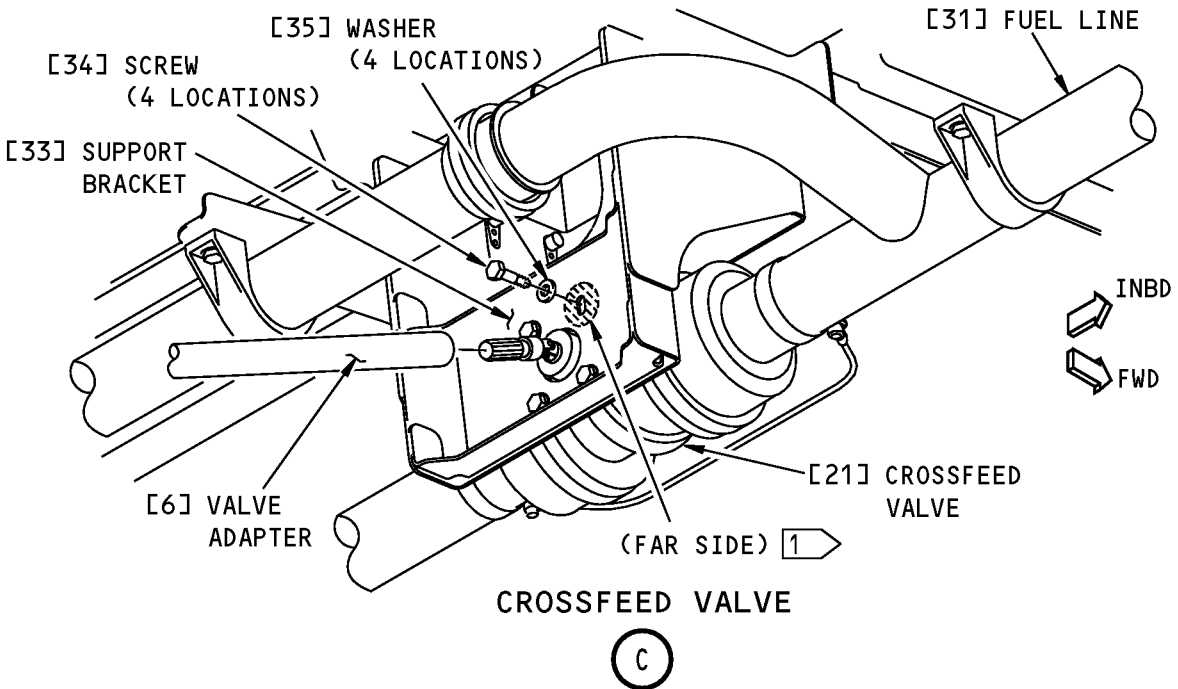
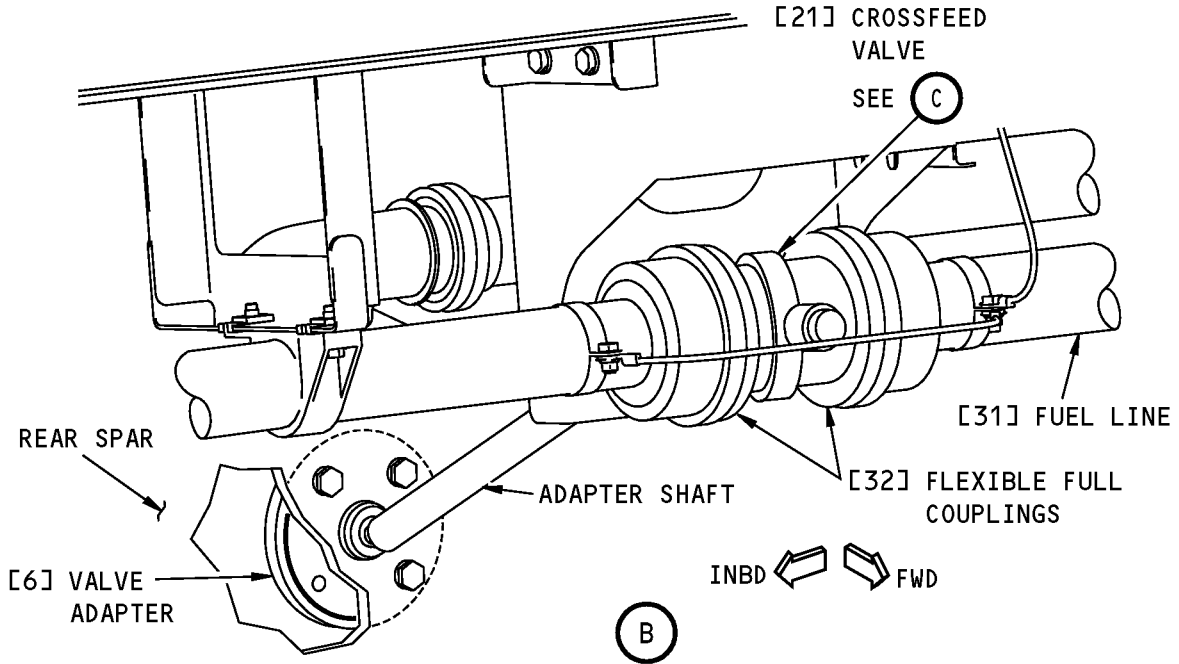
**Crossfeed Valve Body Installation
Figure 406 (Sheet 1 of 2)/28-22-21-990-809**

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1 PREPARE THE AREA AROUND THE INBOARD TOP FASTENER HOLE AND THE CONTACT SURFACE OF THE VALVE BODY FOR AN UNSEALED ELECTRICAL FAYING SURFACE BOND (SWPM 20-20-00).

**Crossfeed Valve Body Installation
Figure 406 (Sheet 2 of 2)/28-22-21-990-809**

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TASK 28-22-21-400-803

12. Install the Engine Fuel Crossfeed Valve Body

(Figure 406)

A. References

Reference	Title
20-30-88	AIRPLANE STRUCTURE CLEANING SOLVENTS (Series 88)
24-22-00-860-811	Supply Electrical Power (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-00-730-802	Crossfeed Valve - Functional Test (P/B 501)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)
SWPM 20-20-00	Standard Wiring Practices Manual

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)

C. Consumable Materials

Reference	Description	Specification
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

D. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

E. Access Panels

Number	Name/Location
131AB	Center Tank Access

F. Procedure

SUBTASK 28-22-21-010-006

WARNING: DO THE PURGING AND FUEL TANK ENTRY PROCEDURE. FAILURE TO FOLLOW THE PURGING AND FUEL TANK ENTRY PROCEDURE COULD CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Go into the center wing tank to the crossfeed valve location (TASK 28-11-00-910-802).

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SUBTASK 28-22-21-020-013

- (2) Remove the covers from the fuel lines [31].

SUBTASK 28-22-21-110-007

- (3) Do these steps to prepare the inboard top fastener hole of the support bracket [33] and the contact surface of the crossfeed valve body [21] for an unsealed electrical faying surface bond (View C):

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (a) Final clean the contact surfaces of the support bracket [33] and the crossfeed valve body [21] with a cotton wiper, G00034 soaked with Series 88 solvent, B01008 (SUBJECT 20-30-88).
- (b) Rub dry with a clean, dry cotton wiper, G00034.
- (c) Continue to clean and dry the surface until the dry cotton wiper, G00034 stays clean.

SUBTASK 28-22-21-420-052

- (4) Turn the universal joint fitting on the crossfeed valve body [21] until the index marks are aligned.

NOTE: A small misalignment of the index marks is satisfactory.

SUBTASK 28-22-21-420-053

- (5) Put the crossfeed valve body [21] into position.

SUBTASK 28-22-21-210-006

WARNING: MAKE SURE THE PLACARD "TOP" SHOWS ON THE TOP SIDE OF THE VALVE BODY DURING INSTALLATION. FAILURE TO INSTALL THE VALVE BODY CORRECTLY CAN CAUSE INJURY OR DAMAGE.

- (6) Make sure "TOP" shows on the top of the crossfeed valve body [21].

SUBTASK 28-22-21-420-054

- (7) Engage the universal joint fitting on the crossfeed valve body [21] into the valve adapter [6].

SUBTASK 28-22-21-420-055

- (8) Align the crossfeed valve body [21] with the support bracket [33].

SUBTASK 28-22-21-420-015

- (9) Engage the crossfeed valve body [21] with the adapter shaft attached to the valve adapter [6].

SUBTASK 28-22-21-420-017

- (10) Install the four screws [34] and the washers [35] to attach the mounting flange on the support bracket [33] to the crossfeed valve body [21].

SUBTASK 28-22-21-765-007

- (11) Measure the bonding resistance between the crossfeed valve body [21] and the airplane structure with an electrical bonding meter, COM-1550 (SWPM 20-20-00).
 - (a) Make sure the bonding resistance is not more than 0.010 ohms (10 milliohms).

SUBTASK 28-22-21-420-056

- (12) Connect the two flexible full couplings [32] between the crossfeed valve body [21] and the fuel line [31] (TASK 28-22-15-400-801).

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SUBTASK 28-22-21-410-009

(13) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

SUBTASK 28-22-21-410-003

(14) Install this access panel:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

(TASK 28-11-31-400-801).

SUBTASK 28-22-21-861-002

(15) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-22-21-710-004

(16) Do this task: Crossfeed Valve - Functional Test, TASK 28-22-00-730-802.

END OF TASK

HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

TASK 28-22-21-300-801

13. Rework the Electrical Faying Surface Bonds for the Engine Crossfeed Valve

A. General

- (1) This task contains these procedures:
 - (a) Rework the Faying Surface Bond - Actuator to Index Plate
 - (b) Rework the Faying Surface Bond - Index Plate to Adapter Plate
 - (c) Rework the Faying Surface Bond - Adapter Plate to Rear Spar
 - (d) Rework the Bonding Jumper Bond
 - (2) Do this task if the measurement for the electrical bonding resistance is more than the allowed resistance value.
 - (3) The motor operated valve uses two electrical bonding paths:
 - (a) One bonding path is from the upper housing of the actuator through the bonding jumper to the airplane structure.
 - (b) The second bonding path is from the upper housing of the actuator to the bare metal surface of the rear spar. The bond path is through the bare metal faying surfaces of the actuator (at the mounting feet), index plate, and adapter plate to the bare metal surface of the rear spar.
- NOTE:** The actuator is divided into two sections, the upper housing section and the lower housing section. The two housing sections are separated by an electrical faying surface. You cannot repair or rework the faying surface between the housing sections at the airplane. When you do an electrical bonding measurement, make sure the measurement is done on the upper housing section of the actuator.
- (4) If the electrical bonding resistance is more than the maximum allowed resistance, you must disassemble the components, rework the faying surface, assemble the components, and then re-check the electrical bonding resistance. Continue to rework the faying surfaces until the electrical resistance between the components is within allowable resistance values.
 - (5) Because the build-up of the crossfeed valve includes several faying surface bonds, you may not know which faying surface bond is the cause of the problem. This task will help you isolate the location of the faying surface bond that needs to be reworked. The procedure does a check of the faying surface bond downstream of the bond that is in question.

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B. References

Reference	Title
20-30-88	AIRPLANE STRUCTURE CLEANING SOLVENTS (Series 88)
SWPM 20-20-00	Electrical Bonds and Grounds

C. Consumable Materials

Reference	Description	Specification
A50051	Sealant - Temperature Resistant, Integral Fuel Tank Sealant - Pro-Seal 890B	SAE AMS-S-8802, Class B
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

D. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

E. Rework the Faying Surface Bond - Actuator to Index Plate

(Figure 402), (Figure 404)

NOTE: Do the steps in this procedure if the measurement for the electrical bonding resistance between the upper housing of the actuator and the rear spar is more than 0.004 ohm (4.0 milliohms). The measurement is done with the bonding jumper and the electrical connector disconnected from the actuator.

NOTE: This is the repair bonding resistance value. The valve adapter installation bonding resistance value is 0.003 ohm (3.0 milliohm).

SUBTASK 28-22-21-010-013

- (1) Do this task: Remove the Actuator of the Engine Fuel Crossfeed Valve, TASK 28-22-21-000-804.

SUBTASK 28-22-21-765-008

- (2) Do these steps to check the index plate [5] to rear spar bonding path:

NOTE: These steps will tell you if the actuator to index plate faying surface bond is the cause of the problem, or if the index plate to adapter plate faying surface bond is the cause of the problem.

- (a) Remove the sealant and clean one of the contact surfaces on the index plate [5].
- (b) Measure the bonding resistance between the contact surface on the index plate [5] (bare metal surface) and the rear spar (SWPM 20-20-00) (Figure 404, View G).
- (c) Make sure the bonding resistance is 0.002 ohm (2.0 milliohms) or less.
- (d) If the bonding resistance is not satisfactory, then do the steps in this procedure: Rework the Faying Surface Bond - Index Plate to Adapter Plate.
- (e) If the bonding resistance is satisfactory, then continue with the subsequent steps.

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SUBTASK 28-22-21-420-057

- (3) Do this task: Install the Actuator of the Engine Fuel Crossfeed Valve, TASK 28-22-21-400-804.

NOTE: This task will rework the faying surface bond and re-install the actuator.

SUBTASK 28-22-21-765-009

- (4) During the installation, do a check of the electrical bonding resistance between the upper housing of the actuator [2] and the rear spar (SWPM 20-20-00) (Figure 402, View C):
- (a) Do this measurement with the bonding jumper [13] and the electrical connector [1] disconnected.
 - (b) Make sure the bonding jumper [13] does not touch the actuator [2] during the bonding measurement.
 - (c) Make sure the bonding resistance is 0.004 ohm (4.0 milliohms) or less.
NOTE: This is the repair bonding resistance value. The valve adapter installation bonding resistance value is 0.003 ohm (3.0 milliohms).
 - (d) If the bonding resistance is not satisfactory, then repeat the steps in this procedure.
 - (e) If the bonding resistance is satisfactory, then continue with the steps to install the actuator [2] (TASK 28-22-21-400-804).

SUBTASK 28-22-21-710-007

- (5) If you have replaced the valve adapter [6] or adjusted the index plate [5], then continue with the steps in this procedure: Crossfeed Valve Operational Tests (TASK 28-22-21-400-805).

F. Rework the Faying Surface Bond - Index Plate to Adapter Plate (Figure 404)

NOTE: Do the steps in this procedure if the measurement for the electrical bonding resistance between the index plate and the rear spar is more than 0.002 ohm (2.0 milliohms). The measurement is done with the actuator removed.

SUBTASK 28-22-21-020-029

- (1) Do this procedure: Remove the Index Plate (TASK 28-22-21-000-804).

SUBTASK 28-22-21-765-010

- (2) Do these steps to check the adapter plate to rear spar bonding path:

NOTE: These steps will tell you if the index plate to adapter plate faying surface bond is the cause of the problem, or if the adapter plate to rear spar faying surface bond is the cause of the problem.

- (a) Remove the sealant and clean one of the serrated contact surfaces on the valve adapter [6].
- (b) Measure the bonding resistance between the serrated contact surface on the valve adapter [6] and the rear spar (SWPM 20-20-00) (View F).
- (c) Make sure the bonding resistance is 0.0015 ohm (1.5 milliohms) or less.

NOTE: This is the repair bonding resistance value. The valve adapter installation bonding resistance value is 0.0005 ohm (0.5 milliohm).

- (d) If the bonding resistance is not satisfactory, then do the steps in this procedure: Rework the Faying Surface Bond - Adapter Plate to Rear Spar.
- (e) If the bonding resistance is satisfactory, then continue with the subsequent steps.

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SUBTASK 28-22-21-420-058

(3) Do these steps to install the index plate [5]:

NOTE: These steps will re-align the crossfeed valve, rework the faying surface, and re-install the index plate.

- (a) Do this task: Crossfeed Valve Alignment, TASK 28-22-21-820-801.
- (b) Do this procedure: Install the Index Plate (Install the Engine Fuel Crossfeed Valve Adapter, TASK 28-22-21-400-805).

SUBTASK 28-22-21-765-011

(4) During the installation, check the electrical bonding resistance between the index plate [5] and the rear spar (SWPM 20-20-00) (View G):

- (a) Make sure the bonding resistance is 0.002 ohm (2.0 milliohms) or less.
- (b) If the bonding resistance is not satisfactory, then repeat the steps in this procedure.
- (c) If the bonding resistance is satisfactory, then continue with the procedure to install the index plate [5] (TASK 28-22-21-400-805)

SUBTASK 28-22-21-710-006

(5) After you install the index plate [5], do this procedure: Crossfeed Valve Operational Tests (TASK 28-22-21-400-805).

G. Rework the Faying Surface Bond - Adapter Plate to Rear Spar
(Figure 404)

NOTE: Do the steps in this procedure if the measurement for the electrical bonding resistance between the adapter plate and the rear spar is more than 0.0015 ohm (1.5 milliohms).

SUBTASK 28-22-21-020-030

(1) Do this procedure: Remove the Valve Adapter (TASK 28-22-21-000-805).

NOTE: A fuel tank entry is necessary to rework the faying surface of the valve adapter.

SUBTASK 28-22-21-420-059

(2) Do this procedure: Install the Valve Adapter (TASK 28-22-21-400-805).

NOTE: These steps will rework the faying surface, and re-install the valve adapter.

SUBTASK 28-22-21-765-012

(3) During the installation, check the electrical bonding resistance between the valve adapter [6] and the rear spar (SWPM 20-20-00) (View F).

- (a) Make sure the bonding resistance is 0.0005 ohm (0.5 milliohm) or less.
- (b) If the bonding resistance is not satisfactory, then repeat the steps in this procedure.
- (c) If the bonding resistance is satisfactory, then continue with the steps to install the valve adapter [6] (TASK 28-22-21-400-805).

SUBTASK 28-22-21-420-060

(4) After you install the valve adapter [6], do this procedure: Install the Index Plate (TASK 28-22-21-400-805).

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HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207 (Continued)

H. Rework the Bonding Jumper Bond

(Figure 402)

NOTE: Do the steps in this procedure if the measurement for the electrical bonding resistance between the bonding jumper terminal and the rear spar is more than 0.0015 ohm (1.5 milliohms). The measurement is done with the bonding jumper disconnected from the actuator.

SUBTASK 28-22-21-020-031

(1) Remove the sealant from the bonding jumper terminal attached to the structure.

SUBTASK 28-22-21-420-061

(2) Remove the nut, two washers, and the bonding jumper.

SUBTASK 28-22-21-420-062

(3) Do these steps to install the bonding jumper to the structure:

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(a) Final clean the contact surfaces with a cotton wiper, G00034 soaked with Series 88 solvent, B01008 (SUBJECT 20-30-88).

1) Rub dry with a clean, dry cotton wiper, G00034.

2) Continue to clean and dry the surface until the dry cotton wiper, G00034 stays clean.

(b) Install the nut, washers, and the bonding jumper to the structure.

(c) Tighten the nut to 31 ± 3 in-lb (4 ± 1 N·m).

(d) Measure the electrical bonding resistance between the loose end of bonding jumper and the rear spar (SWPM 20-20-00) (View C).

1) Make sure the bonding resistance is 0.0015 ohm (1.5 milliohms) or less.

(e) Apply a cap seal of Pro-Seal 890B sealant, A50051 (or PR-1440 Class B) over the nut and the terminal of the bonding jumper.

SUBTASK 28-22-21-420-063

(4) Continue with this task: Install the Actuator of the Engine Fuel Crossfeed Valve, TASK 28-22-21-400-804.

SUBTASK 28-22-21-710-008

(5) If you have replaced the valve adapter [6] or adjusted the index plate [5], then continue with the steps in this procedure: Crossfeed Valve Operational Tests (TASK 28-22-21-400-805).

HAP ALL

————— END OF TASK —————

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TASK 28-22-21-710-801

14. Crossfeed Valve Operational Test

(Figure 407 or Figure 408)

A. References

<u>Reference</u>	<u>Title</u>
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)

B. Location Zones

<u>Zone</u>	<u>Area</u>
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

C. Procedure

SUBTASK 28-22-21-860-006

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-22-21-860-007

(2) Make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	7	C00361	FUEL CROSS FEED VALVE

SUBTASK 28-22-21-860-008

(3) Set the CROSSFEED VALVE switch on the overhead panel, P5, to the open position.

SUBTASK 28-22-21-210-008

(4) Make sure the position indication light shows these effects:

- (a) The position indication light comes on brightly to show a change in the crossfeed valve position.
- (b) The position indication light stays on dimly to show that the crossfeed valve is open.

SUBTASK 28-22-21-210-009

(5) Make sure the manual override lever for the crossfeed valve is in the OPEN position.

SUBTASK 28-22-21-860-009

(6) Set the CROSSFEED VALVE switch on the P5 panel to the closed position.

SUBTASK 28-22-21-210-010

(7) Make sure the position indication light for the crossfeed valve shows these effects:

- (a) The position indication light comes on brightly to show a change in the crossfeed valve position.
- (b) The position indication light goes off to show the crossfeed valve is closed.

SUBTASK 28-22-21-210-011

(8) Make sure the manual override lever for the crossfeed valve is in the CLOSED position.

<p>EFFECTIVITY</p> <p>HAP ALL</p>	
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SUBTASK 28-22-21-860-010

- (9) If it is not necessary for other tasks, do this task: Remove Electrical Power,
TASK 24-22-00-860-812.

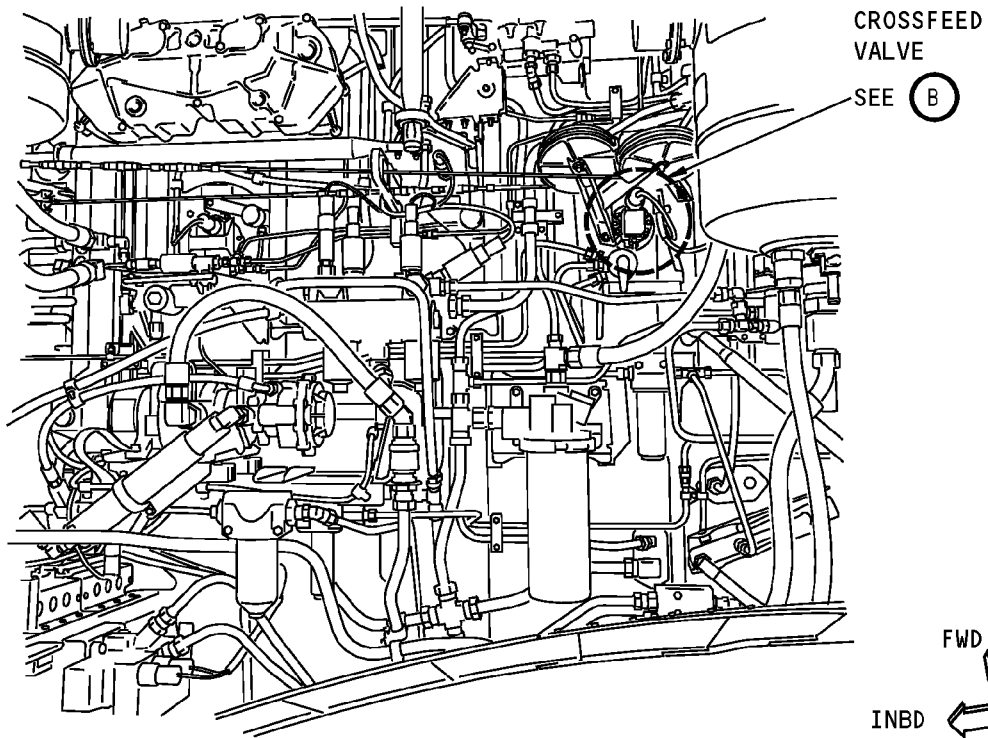
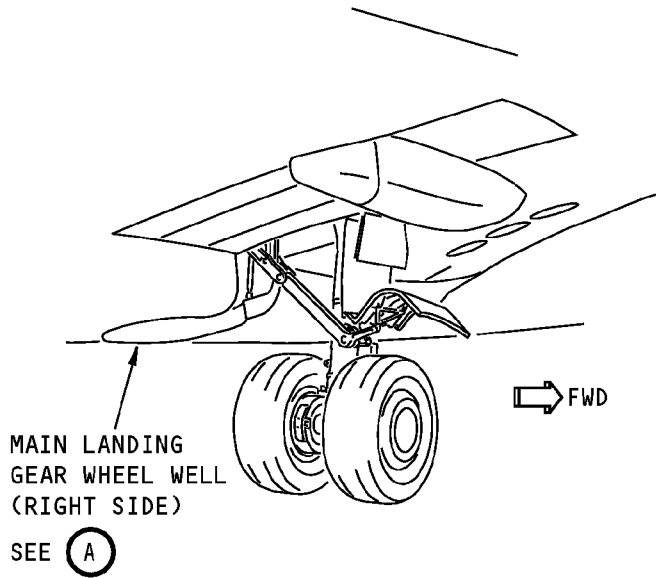
————— **END OF TASK** —————

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**MAIN LANDING GEAR WHEEL WELL
(RIGHT SIDE)**

(A)

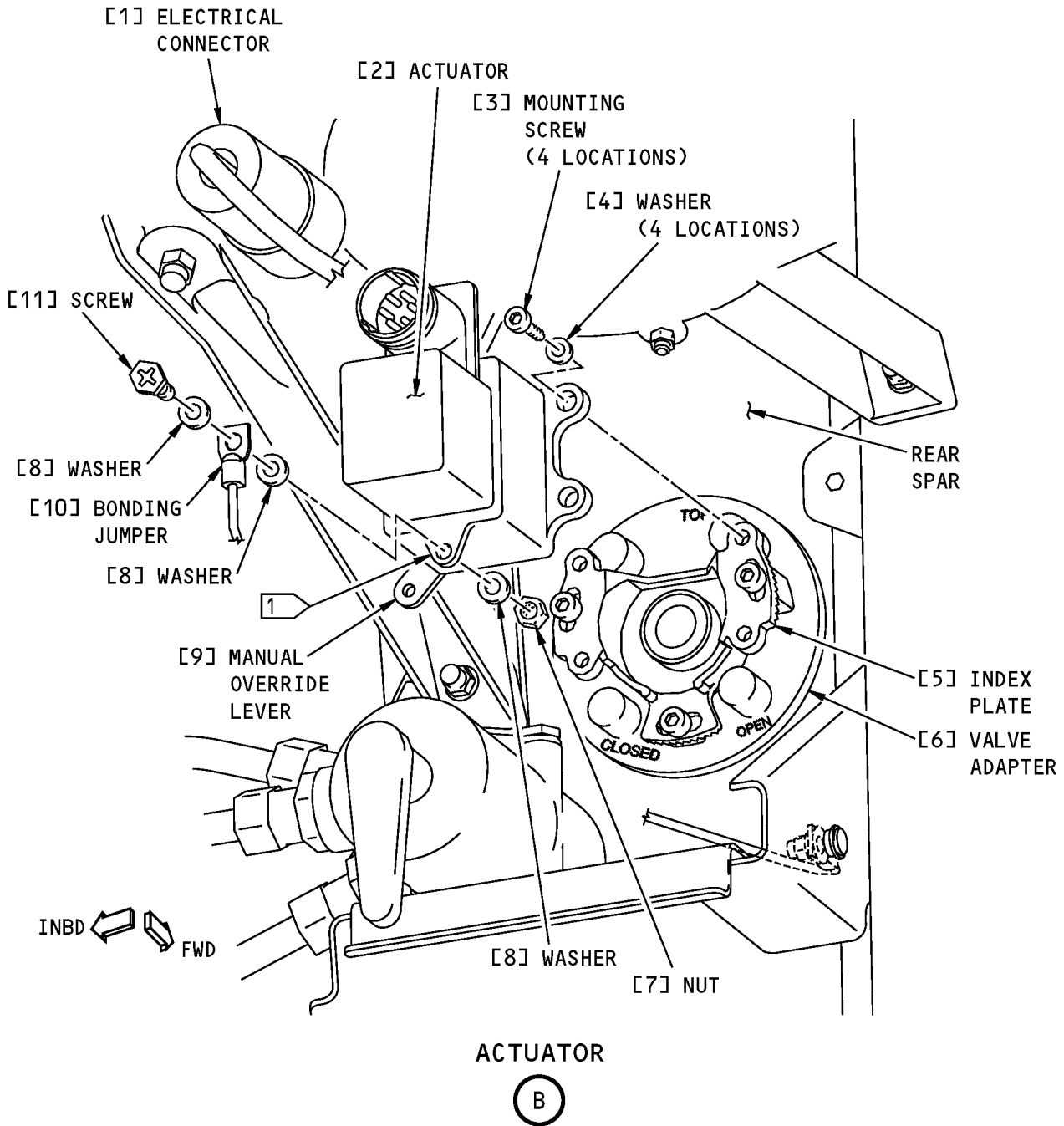
**Crossfeed Valve Actuator Installation
Figure 407 (Sheet 1 of 2)/28-22-21-990-810**

EFFECTIVITY
HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207

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1 PREPARE THE FAYING SURFACE OF THE BONDING JUMPER AND BONDING JUMPER TAB FOR AN ELECTRICAL SURFACE BOND. APPLY A FILLET SEAL TO THE BONDING JUMPER TERMINAL (SWPM 20-20-00).

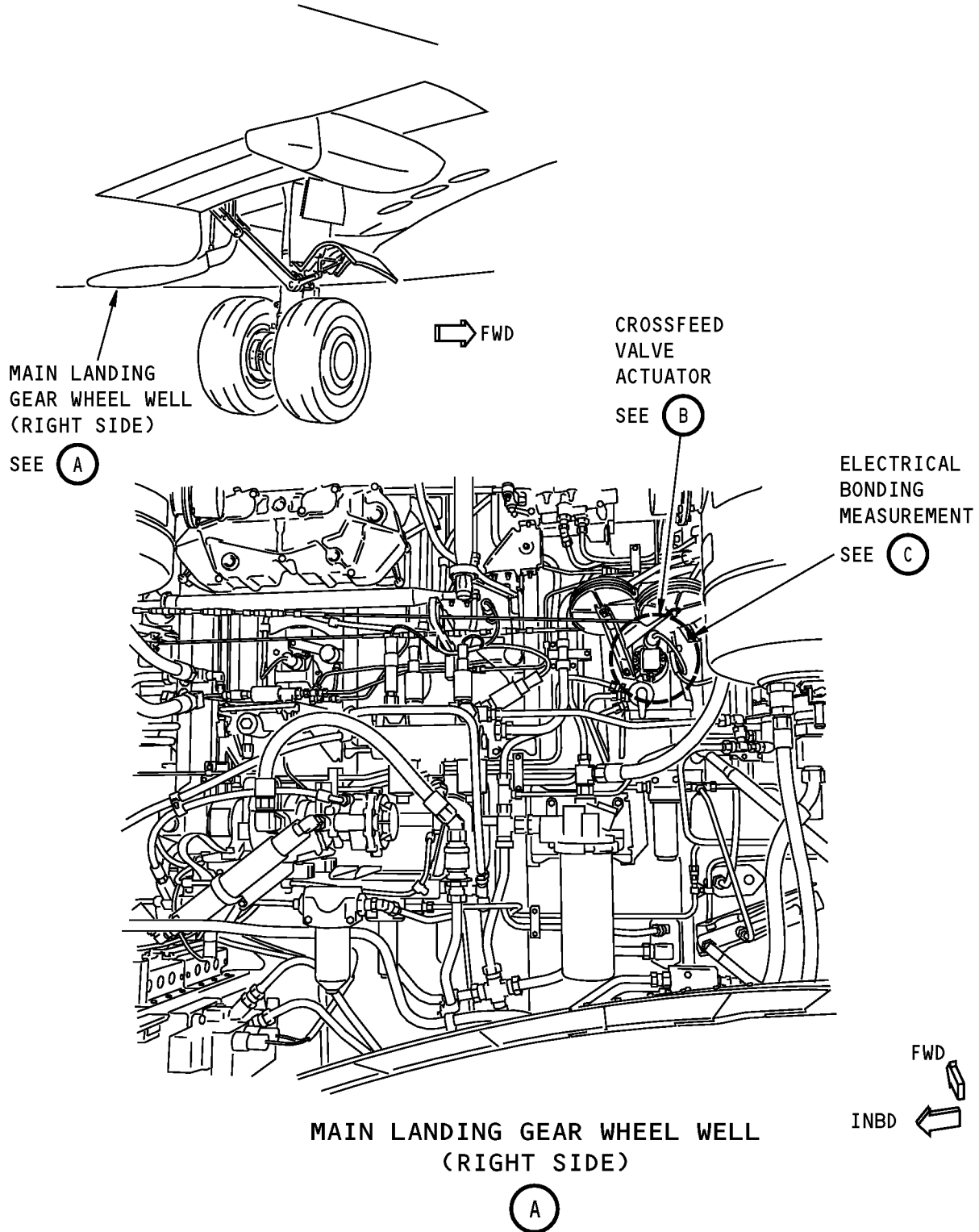
**Crossfeed Valve Actuator Installation
Figure 407 (Sheet 2 of 2)/28-22-21-990-810**

EFFECTIVITY
HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207

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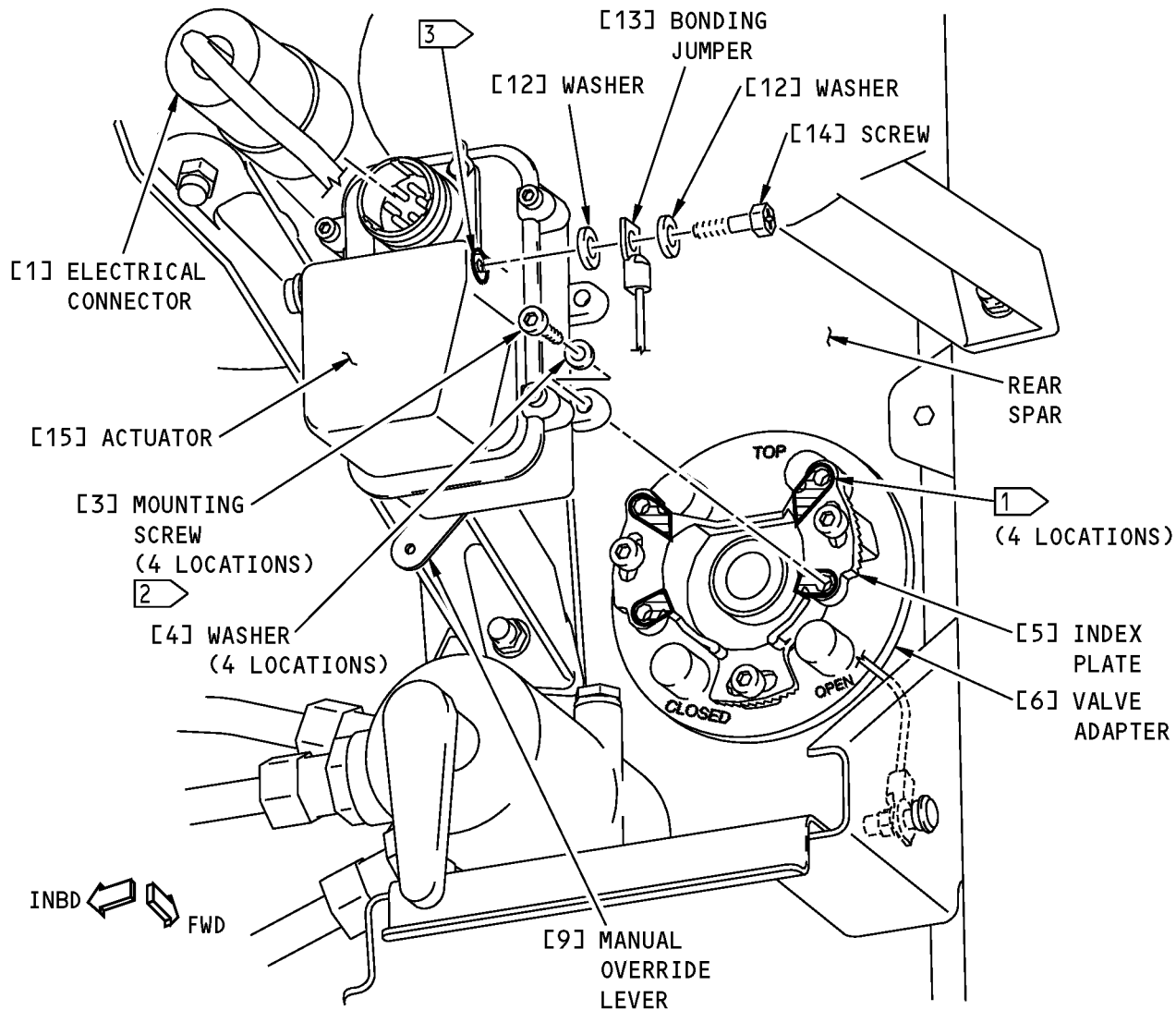


**Crossfeed Valve Actuator Installation
Figure 408 (Sheet 1 of 4)/28-22-21-990-811**

EFFECTIVITY
HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST
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ACTUATOR

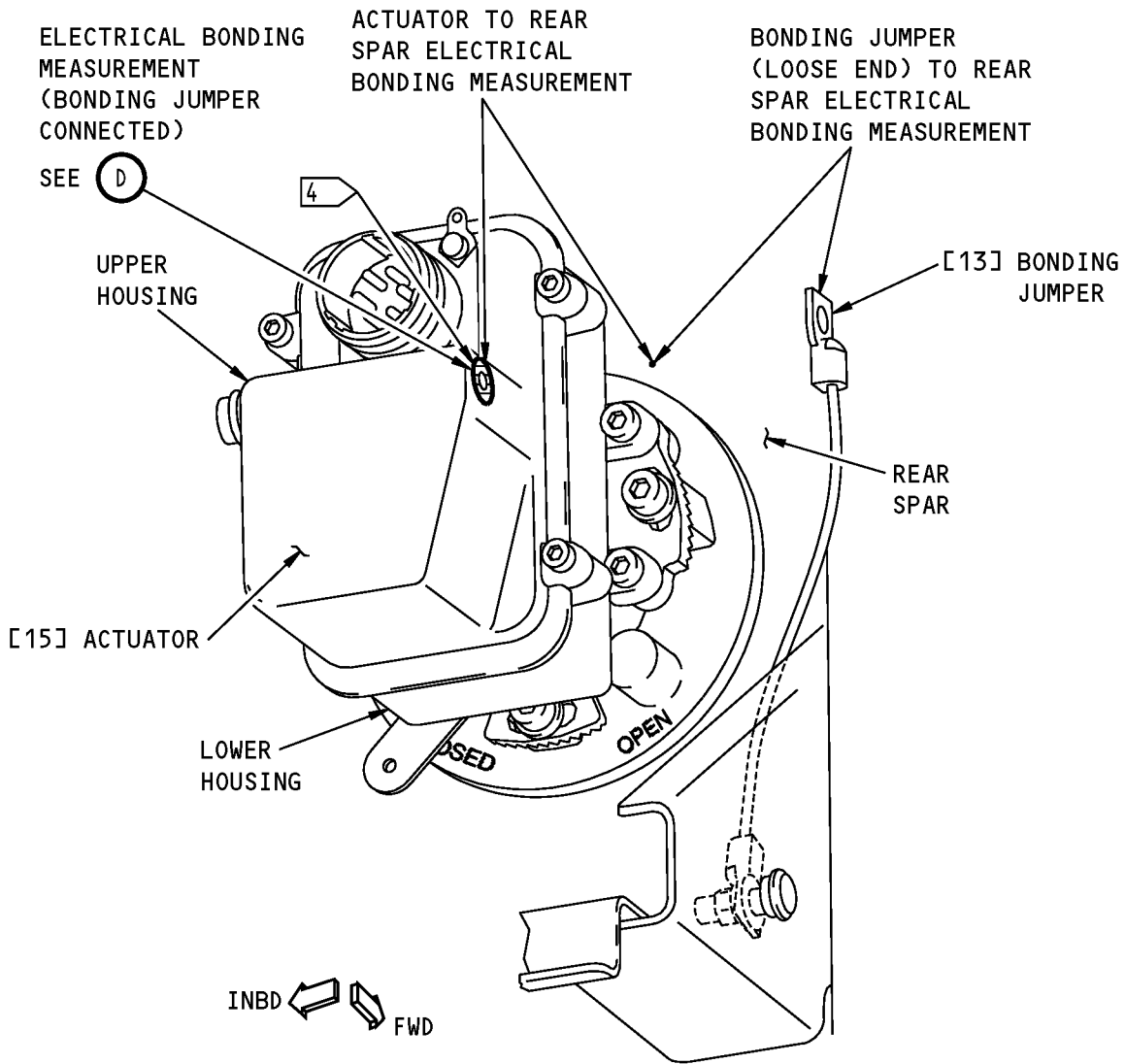
(B)

- 1 ▷ PREPARE AND INSTALL THE CONTACT SURFACES OF THE INDEX PLATE AND ACTUATOR FOOTPADS (4 LOCATIONS) WITH A SEALED ELECTRICAL FAYING SURFACE BOND (SWPM 20-20-00).
- 2 ▷ APPLY SEALANT TO THE SHANK AND THREADS OF THE MOUNTING SCREWS.
- 3 ▷ PREPARE AND INSTALL THE CONTACT SURFACES OF ACTUATOR AND BONDING JUMPER BUILD-UP WITH A SEALED ELECTRICAL FAYING SURFACE BOND (SWPM 20-20-00). AFTER INSTALLATION, APPLY A FILLET SEAL TO THE BONDING JUMPER INSTALLATION.

Crossfeed Valve Actuator Installation
Figure 408 (Sheet 2 of 4)/28-22-21-990-811

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**ELECTRICAL BONDING MEASUREMENT
(BONDING JUMPER DISCONNECTED)**

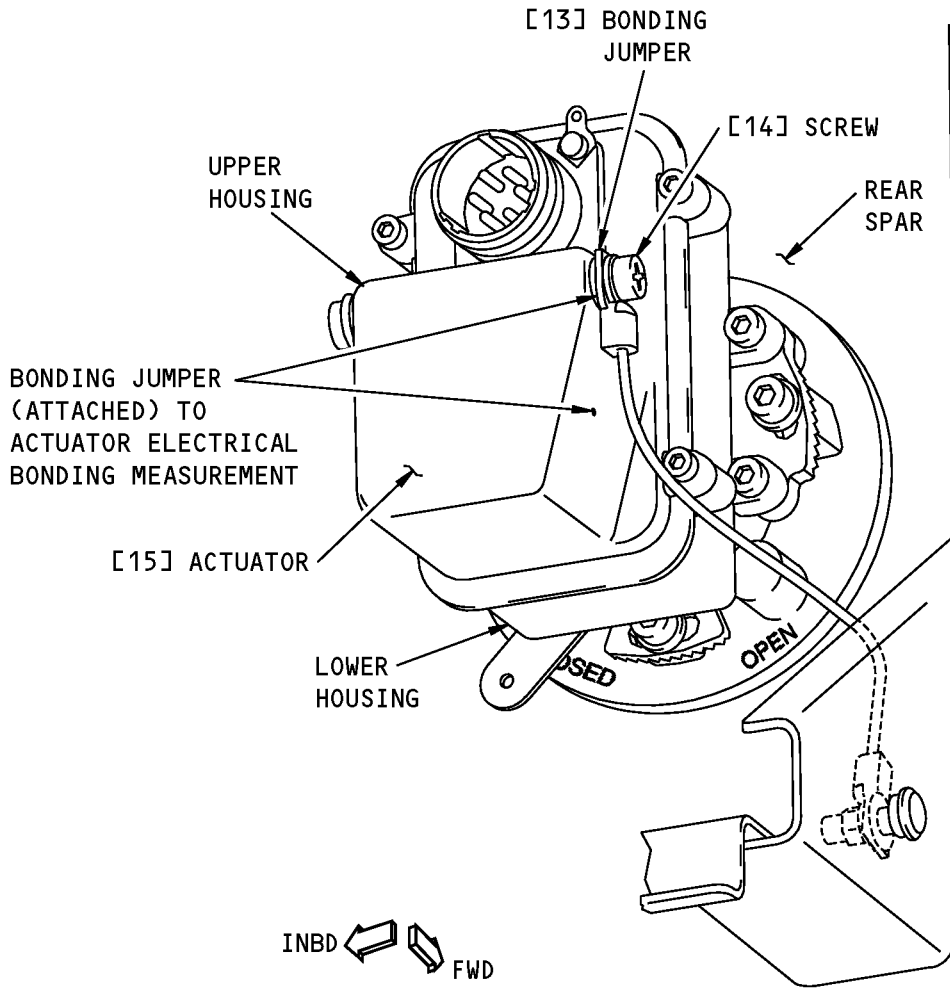
(C)

4 BARE METAL CONTACT SURFACE OF THE ACTUATOR AT THE BONDING JUMPER INSTALLATION.

**Crossfeed Valve Actuator Installation
Figure 408 (Sheet 3 of 4)/28-22-21-990-811**

EFFECTIVITY
HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST
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**ELECTRICAL BONDING MEASUREMENT
(BONDING JUMPER CONNECTED)**

D

**Crossfeed Valve Actuator Installation
Figure 408 (Sheet 4 of 4)/28-22-21-990-811**

EFFECTIVITY
HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST
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ENGINE FUEL CROSSFEED VALVE - INSPECTION/CHECK

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains a functional check of the bonding resistance of the engine fuel crossfeed actuator.

TASK 28-22-21-200-801

2. Engine Fuel Crossfeed Valve Actuator - Bonding Resistance Check

(Figure 601)

A. General

- (1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
32-00-01-080-801	Landing Gear Downlock Pins Removal (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
SWPM 20-20-00	Electrical Bonds and Grounds

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)

D. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

E. Prepare for the Procedure

SUBTASK 28-22-21-490-005

WARNING: MAKE SURE YOU INSTALL THE GROUND LOCK ASSEMBLIES IN ALL LANDING GEAR. ACCIDENTAL RETRACTION OF THE LANDING GEAR CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

SUBTASK 28-22-21-865-001

- (2) Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	7	C00361	FUEL CROSS FEED VALVE

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SUBTASK 28-22-21-560-001

- (3) Go to the crossfeed valve location on the rear spar in the main landing gear wheel well (right side).

F. Electrical Bonding Measurement

SUBTASK 28-22-21-710-009

- (1) Move the manual override lever to the fully CLOSED position.

SUBTASK 28-22-21-862-003

- (2) Disconnect the electrical connector from the actuator.

SUBTASK 28-22-21-765-016

- (3) Measure the electrical bonding resistance between the between the crossfeed valve actuator (at the connector flange) and the spar with a bonding meter, COM-1550 (SWPM 20-20-00) (View C).
 - (a) Make sure the bonding resistance is 0.005 ohm (5.0 milliohms) or less.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-21-861-003

- (1) Connect the electrical connector to the actuator.

SUBTASK 28-22-21-865-002

- (2) Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	7	C00361	FUEL CROSS FEED VALVE

SUBTASK 28-22-21-090-004

WARNING: OBEY THE PROCEDURE FOR THE REMOVAL OF THE DOWNLOCK PINS. IF YOU MOVE THE CONTROL LEVER FOR THE LANDING GEAR TO THE UP POSITION, THE LANDING GEAR CAN RETRACT. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

- (3) Remove the ground locks installed on the landing gear if they are not needed for other tasks (TASK 32-00-01-080-801).

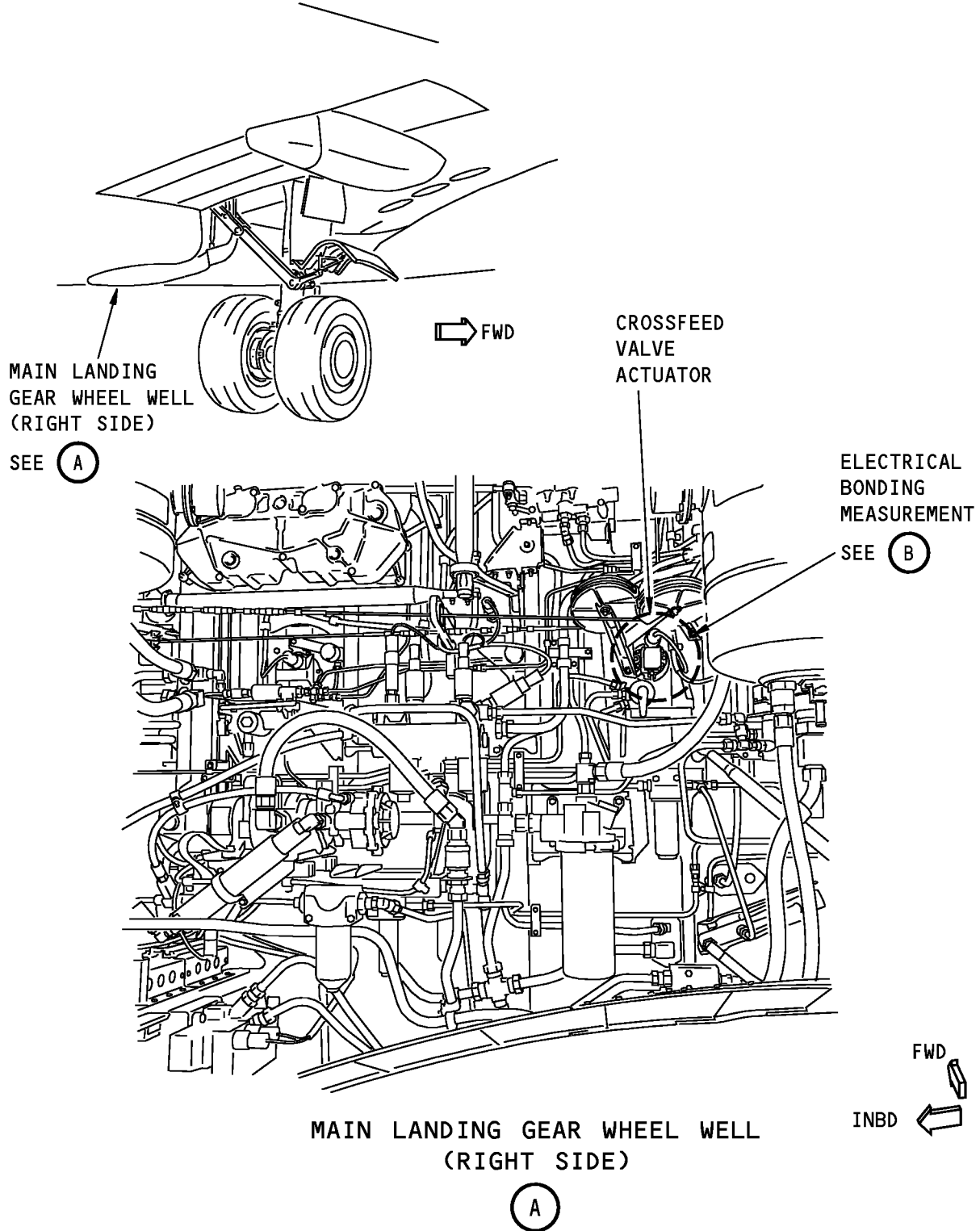
————— END OF TASK —————

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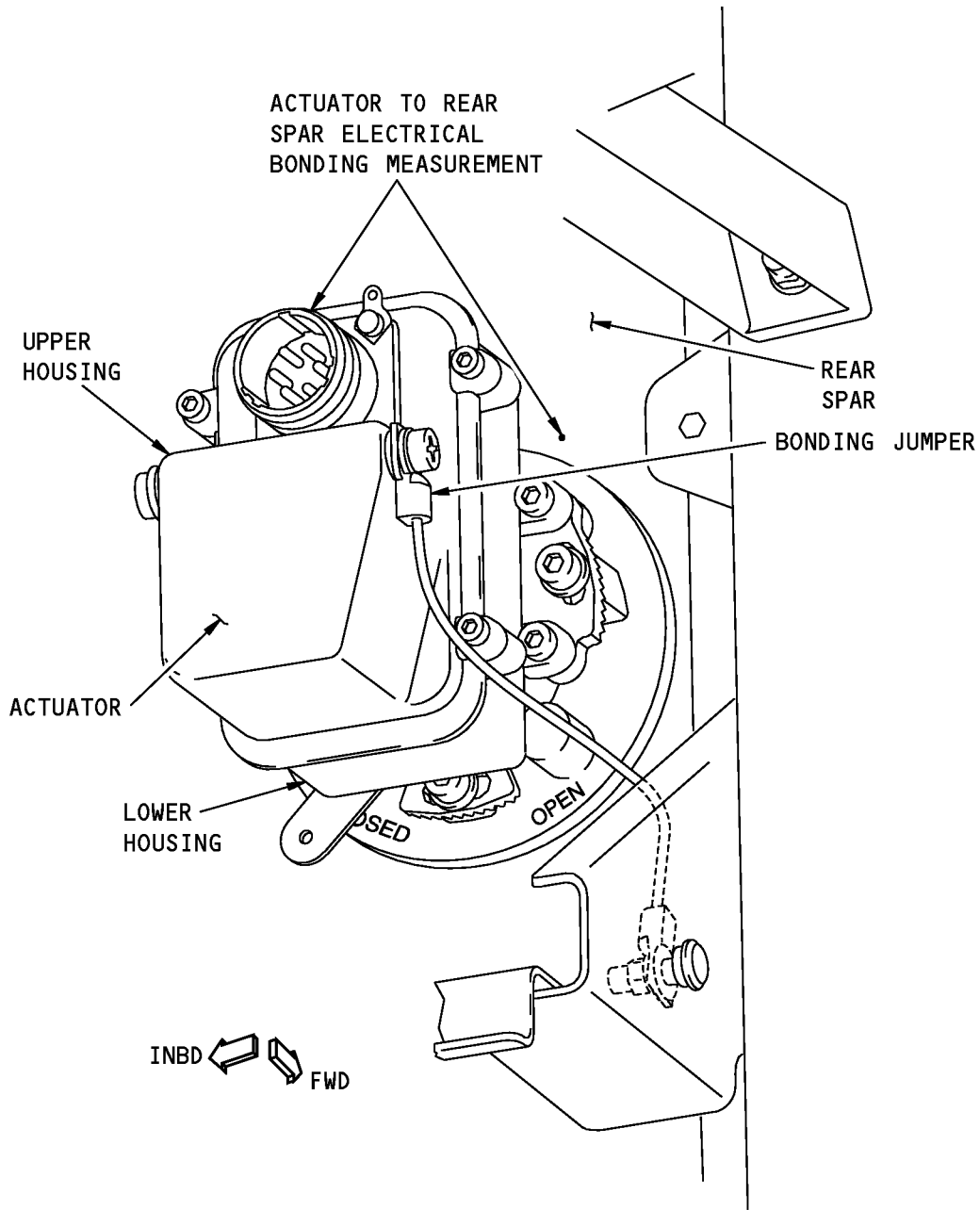
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Engine Fuel Crossfeed Valve Actuator - Bonding Resistance Check
Figure 601 (Sheet 1 of 3)/28-22-21-990-812

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ELECTRICAL BONDING MEASUREMENT

B

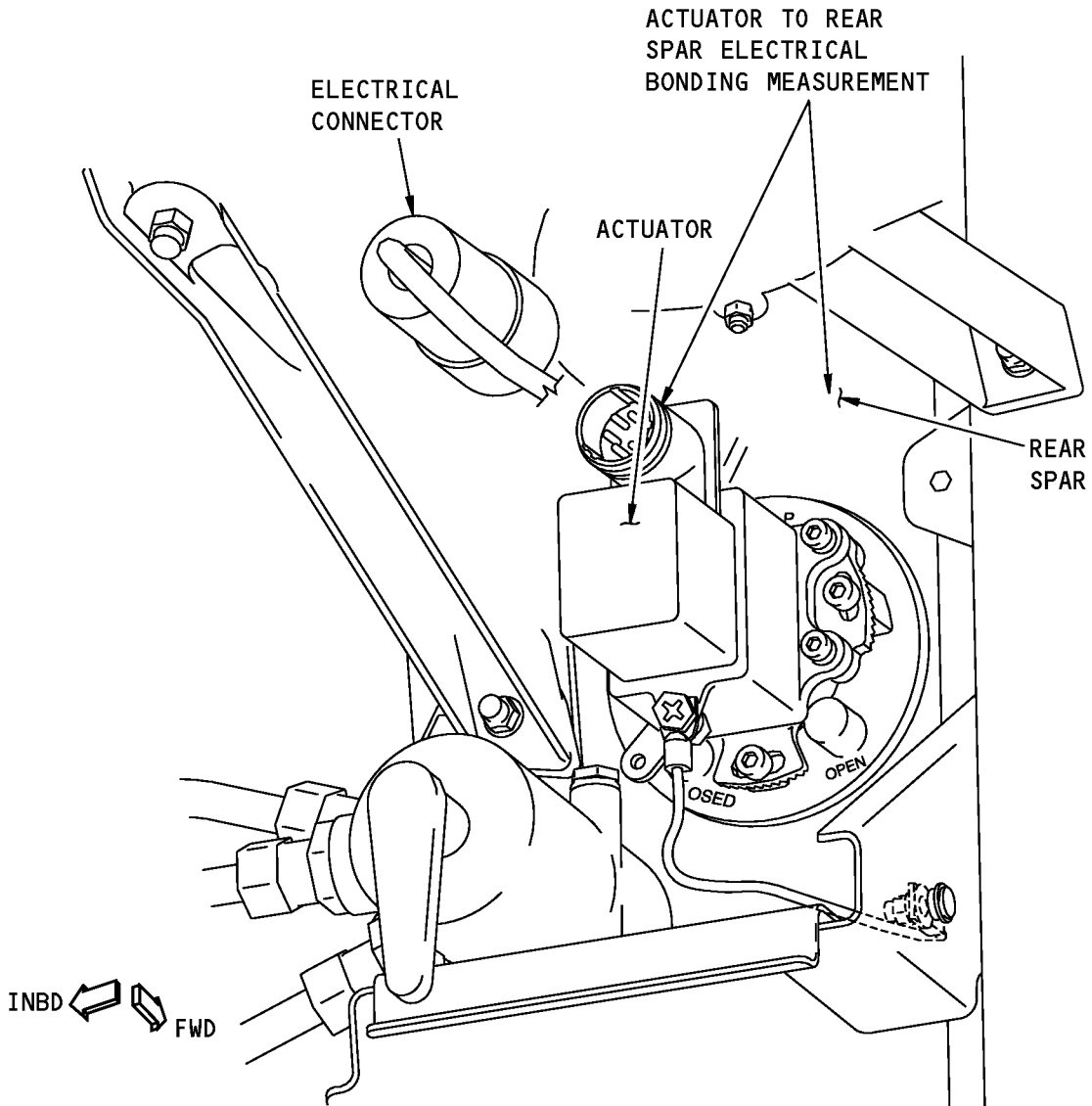
**Engine Fuel Crossfeed Valve Actuator - Bonding Resistance Check
Figure 601 (Sheet 2 of 3)/28-22-21-990-812**

EFFECTIVITY
HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST
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ELECTRICAL BONDING MEASUREMENT

B

**Engine Fuel Crossfeed Valve Actuator - Bonding Resistance Check
Figure 601 (Sheet 3 of 3)/28-22-21-990-812**

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FUEL BOOST PUMP - REMOVAL/INSTALLATION

1. General

- A. There is a left forward fuel boost pump and a left aft fuel boost pump which move fuel from the No. 1 fuel tank. There is a right forward fuel boost pump and right aft boost pump which move fuel from the No. 2 fuel tank. There is a left center tank fuel boost pump and a right center tank fuel boost pump which move fuel from the center fuel tank. The left aft fuel boost pump and the right aft fuel boost pump are installed on the inboard rear spar, forward of each main landing gear door. The left forward fuel boost pump and right forward fuel boost pump are installed on the front spar, immediately outboard of the side of body rib. The left center tank fuel boost pump and the right center tank fuel boost pump are installed on the rear spar of the center section of the center fuel tank. To get access to the left center boost pump, it is necessary to remove a pogo which is part of the aileron control unit linkage in the left wheel well.
- B. Each fuel boost pump contains four parts: the motor impeller, the housing, the discharge check valve and the removal check valve.
- C. It is necessary to defuel the applicable fuel tank to remove the housing, the discharge check valve and the removal check valve. It is not necessary to defuel the applicable fuel tank to remove the motor impeller.

HAP 001-013, 015-026 PRE SB 737-28-1172

- D. The inlets for the left and right center tank boost pumps are installed at different fore-and-aft positions with respect to the rear spar. This can cause the low pressure lights for these pumps to come on at unexpected times.
 - (1) The inlet for the left center boost pump is installed on the left side of the center tank immediately aft of spanwise beam No. 1 (the spanwise beam immediately forward of the rear spar). The inlet for the right center boost pump is installed on the right side of the center tank immediately forward of the rear spar. Thus, the left center boost pump inlet is substantially forward of the right center boost pump inlet. In a landing attitude, the right center tank boost pump inlet becomes uncovered when the center tank fuel quantity decreases to approximately 1000 lb (454 kg). The left center boost pump inlet is installed further forward in the center tank to permit the left boost pump to supply fuel from the center tank with low fuel in the center tank. The left center boost pump inlet stays covered when the center tank has a fuel quantity less than approximately 1000 lb (454 kg) and the effective pitch of the airplane is negative. Negative pitch usually occurs during landings and braking situations on the ground. The left center boost pump inlet stays covered in this situation while the right center boost pump becomes uncovered because it is further aft.
 - (2) Thus, on takeoff, when the center tank has only a small quantity of fuel (approximately 3000 lb (1361 kg) or less), this can cause the left center boost pump inlet to be uncovered. This is because the left center boost pump inlet is further forward in the center tank. The right center boost pump inlet stays covered in this situation because it is further aft. Thus, with low fuel in the center tank, it is possible for the low pressure light for the left center boost pump to come on unexpectedly during takeoff or other times when the airplane has a large positive pitch.

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- E. This procedure contains six tasks. The six tasks are:
 - (1) Remove the Motor Impeller
 - (2) Install the Motor Impeller
 - (3) Fuel Boost Pump and Override Pump Priming
 - (4) Remove the Housing
 - (5) Install the Housing

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(6) Boost Pump Operational Test

F. The procedure to remove and install the removal check valve is in (TASK 28-22-51-400-801). The procedure to remove and install the discharge check valve is in (TASK 28-22-61-000-801).

TASK 28-22-41-000-801

2. Remove the Motor Impeller

(Figure 401, Figure 402, Figure 403, Figure 404, Figure 405, Figure 406)

A. References

Reference	Title
27-81-00-480-801	Leading Edge Flap and Slat Locks Installation (P/B 201)
27-81-00-860-803	Leading Edge Flaps and Slats Extension (P/B 201)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
SPL-1769	Puller - Boost Pump, Main Tank (Part #: B28003-1, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
STD-4049	Container - Fuel Resistant, 1 Gallon (4 Liters)

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

D. Procedure

SUBTASK 28-22-41-860-001

(1) Do these steps to get access to the motor impeller [1] of the forward boost pumps:

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE FLAPS AND SLATS AND THE TRAILING EDGE FLAPS. THE LEADING EDGE FLAPS AND SLATS AND THE TRAILING EDGE FLAPS WILL EXTEND. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Do this task: Leading Edge Flaps and Slats Extension, TASK 27-81-00-860-803.

WARNING: MAKE SURE YOU INSTALL THE LEADING EDGE SLAT ACTUATOR LOCKS TO PREVENT ACCIDENTAL OPERATION OF THE LEADING EDGE SLATS. THE LEADING EDGE SLATS CAN MOVE QUICKLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(b) Do this task: Leading Edge Flap and Slat Locks Installation, TASK 27-81-00-480-801.

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SUBTASK 28-22-41-010-001

- (2) To get access to the motor impeller [1] of the aft fuel boost pumps, go through the applicable left or right main shock strut door.

SUBTASK 28-22-41-010-002

- (3) To get access to the motor impeller [1] of the center tank fuel boost pumps, do these steps:

WARNING: MAKE SURE THE DOWNLOCK PINS ARE INSTALLED ON ALL THE LANDING GEAR. WITHOUT THE DOWNLOCK PINS, THE LANDING GEAR CAN RETRACT AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) If downlock pins are not installed, do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

- (b) To get access to the left center tank fuel boost pump, do these additional steps (Figure 404):

- 1) Remove the pin [28], nut [27], washer [26], bushing [24], washer [22], and bolt [23] to disconnect the pogo [21] from the power control unit [25]:

NOTE: Be careful not to change the length of the pogo [21]. If you change the length of the pogo [21], it will be necessary to re-adjust the length when you re-install it.

- 2) Remove the bolts [29] and washers [30] to disconnect the bracket assembly from the power control unit [25].
- 3) Pull the pogo [21] aft, away from the rear spar of the center tank to get access to the left center tank boost pump.

NOTE: It is not necessary to remove the bolt at the left of the pogo [21] that attaches the pogo [21] to the aileron feel and centering unit.

SUBTASK 28-22-41-860-011

- (4) For the No. 1 tank aft fuel boost pump,
Open these circuit breakers and install safety tags:

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP ALL			

SUBTASK 28-22-41-860-012

- (5) For the No. 1 tank forward fuel boost pump,
Open these circuit breakers and install safety tags:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP ALL			

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SUBTASK 28-22-41-860-013

- (6) For the No. 2 tank aft fuel boost pump,
Open these circuit breakers and install safety tags:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP ALL			

SUBTASK 28-22-41-860-014

- (7) For the No. 2 tank forward fuel boost pump,
Open these circuit breakers and install safety tags:

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP ALL			

SUBTASK 28-22-41-860-015

- (8) For the center tank left fuel boost pump,
Open these circuit breakers and install safety tags:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 001-013, 015-026, 028-036			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP ALL			

SUBTASK 28-22-41-860-016

- (9) For the center tank right fuel boost pump,
Open these circuit breakers and install safety tags:

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 001-013, 015-026, 028-036			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP ALL			

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SUBTASK 28-22-41-020-001

(10) Disconnect the electrical connector [5] from the motor impeller [1].

SUBTASK 28-22-41-020-002

(11) Loosen but do not remove the drain plug [6].

SUBTASK 28-22-41-020-003

(12) Remove the bonding clips [4].

(a) Remove any sealant applied to the bonding clips [4] or mounting screws [2] as necessary.

SUBTASK 28-22-41-020-004

(13) Remove the two mounting screws [2], at the 1 O'clock and 7 O'clock positions, from the fuel boost pump.

SUBTASK 28-22-41-420-001

(14) Install a MS35275-250 screw at the 1 O'clock and 7 O'clock positions of the fuel boost pump.

SUBTASK 28-22-41-020-005

(15) Remove the remaining mounting screws [2] from the fuel boost pump.

SUBTASK 28-22-41-480-001

(16) Put the 1 gallon (4 l) fuel resistant container, STD-4049 below the motor impeller [1] to catch fuel.

SUBTASK 28-22-41-020-006

(17) Pull the motor impeller [1] out 0.6 in. (15.2 mm) (or to the MS35275-250 screws) from the housing [10] to let the removal check valve close.

(a) For the No. 1 and No. 2 tank fuel boost pumps, use the puller, SPL-1769 to pull out the motor impeller [1].

SUBTASK 28-22-41-020-007

CAUTION: MAKE SURE FUEL DOES NOT CONTINUOUSLY DRAIN. IF FUEL CONTINUOUSLY DRAINS, THE REMOVAL CHECK VALVE IS NOT CLOSED AND YOU MUST INSTALL THE MOTOR IMPELLER [1] AND DEFUEL THE FUEL TANK.

(18) Remove the drain plug [6].

SUBTASK 28-22-41-650-001

(19) If fuel continuously drains, do these steps:

(a) Install the motor impeller [1].

(b) Defuel the applicable fuel tank (TASK 28-26-00-650-801).

NOTE: Defuel the No. 1 tank for the forward or aft boost pump for the No. 1 tank. Defuel the center tank and the No. 1 tank for the left center tank boost pump. Defuel the center tank and the No. 2 tank for the right center tank boost pump. Defuel the No. 2 tank for the forward or aft boost pump for the No. 2 tank.

(c) Remove the motor impeller [1].

SUBTASK 28-22-41-020-008

(20) After the motor impeller [1] drains, remove the two MS35275-250 screws.

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SUBTASK 28-22-41-020-009

CAUTION: HAVE A REPLACEMENT MOTOR IMPELLER [1] AVAILABLE. WHEN YOU REMOVE THE MOTOR IMPELLER [1], FUEL CAN FALL IN DROPS INTO THE HOUSING [10] FROM ORIFICES IN THE JET PUMP PRESSURE LINE.

I (21) For the boost pumps for the No. 1 or the No. 2 tank, remove the motor impeller [1] from the housing [10].

(a) Discard the O-ring [7], O-ring [8], and O-ring [9].

SUBTASK 28-22-41-020-021

CAUTION: HAVE A REPLACEMENT MOTOR IMPELLER [1] AVAILABLE. WHEN YOU REMOVE THE MOTOR IMPELLER [1], FUEL CAN FALL IN DROPS INTO THE HOUSING [10] FROM ORIFICES IN THE JET PUMP PRESSURE LINE.

I (22) For the left center boost pump, remove the motor impeller [1] from the housing [10].

(a) Discard the O-ring [7], O-ring [8], and O-ring [9].

SUBTASK 28-22-41-020-022

CAUTION: HAVE A REPLACEMENT MOTOR IMPELLER [1] AVAILABLE. WHEN YOU REMOVE THE MOTOR IMPELLER [1], FUEL CAN FALL IN DROPS INTO THE HOUSING [10] FROM ORIFICES IN THE JET PUMP PRESSURE LINE.

I (23) For the right center boost pump, remove the motor impeller [1] from the housing [10].

(a) Discard the O-ring [7], O-ring [8], and O-ring [9].

————— **END OF TASK** —————

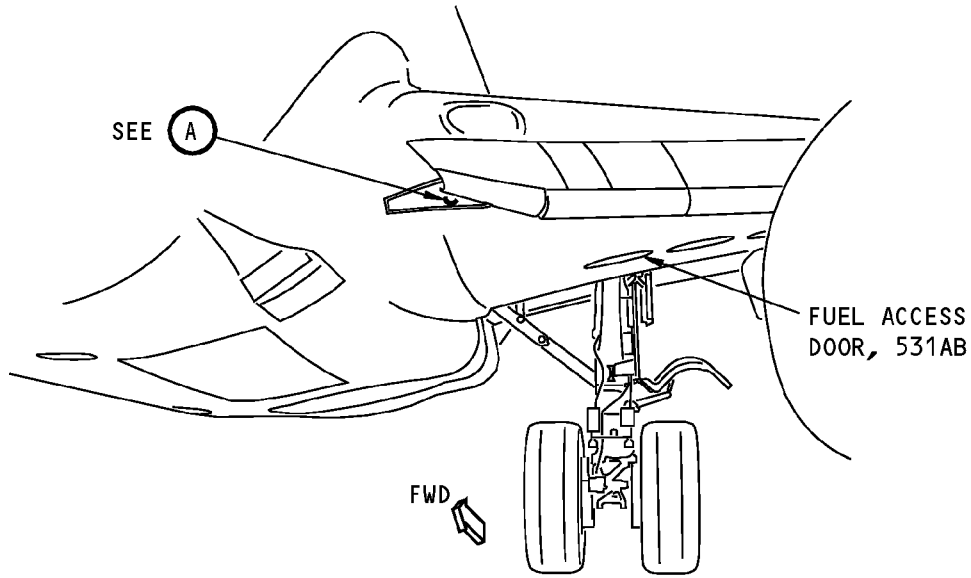
EFFECTIVITY
HAP ALL

D633A101-HAP

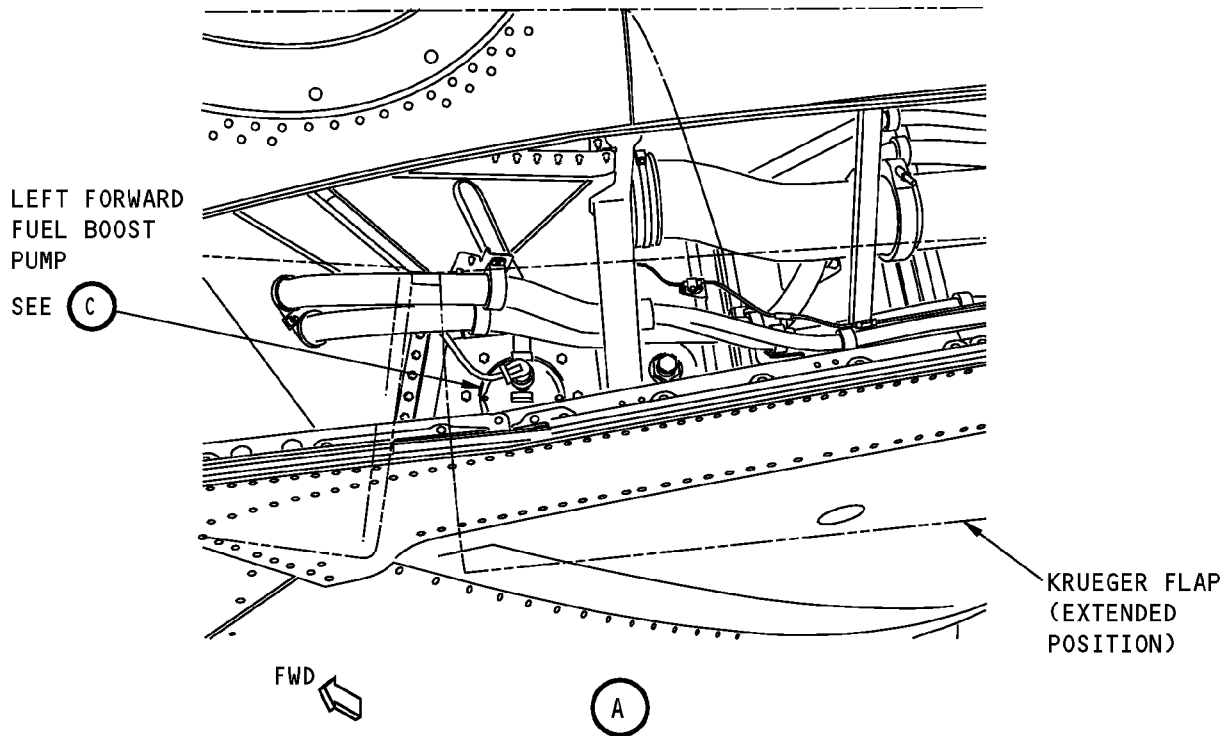
28-22-41

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**LEFT WING
(RIGHT WING IS OPPOSITE)**



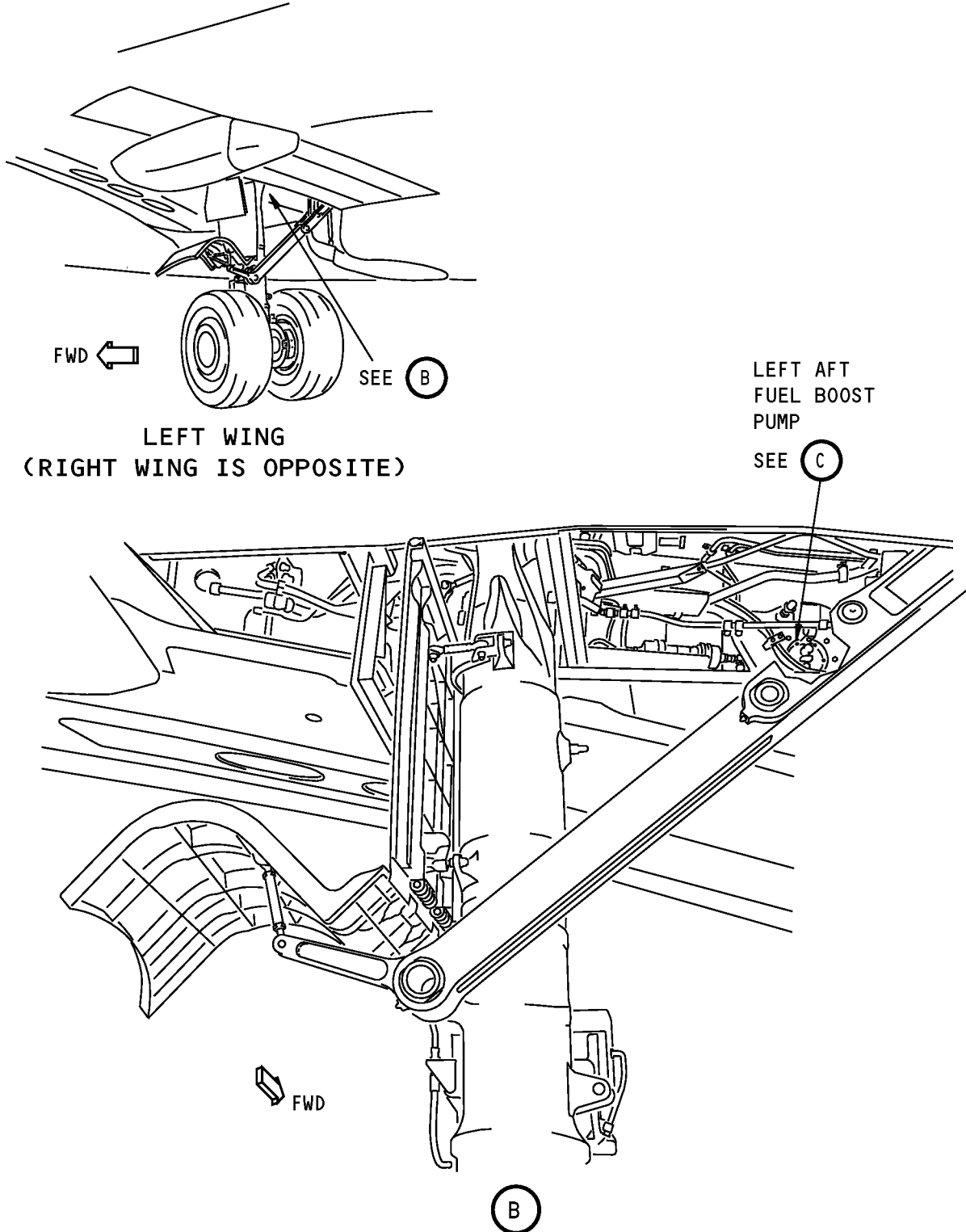
**No. 1 or 2 Tank Fuel Boost Pump Installation
Figure 401 (Sheet 1 of 3)/28-22-41-990-808**

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FWD ←

SEE (B)

LEFT AFT
FUEL BOOST
PUMP

SEE (C)

LEFT WING
(RIGHT WING IS OPPOSITE)

↙ FWD

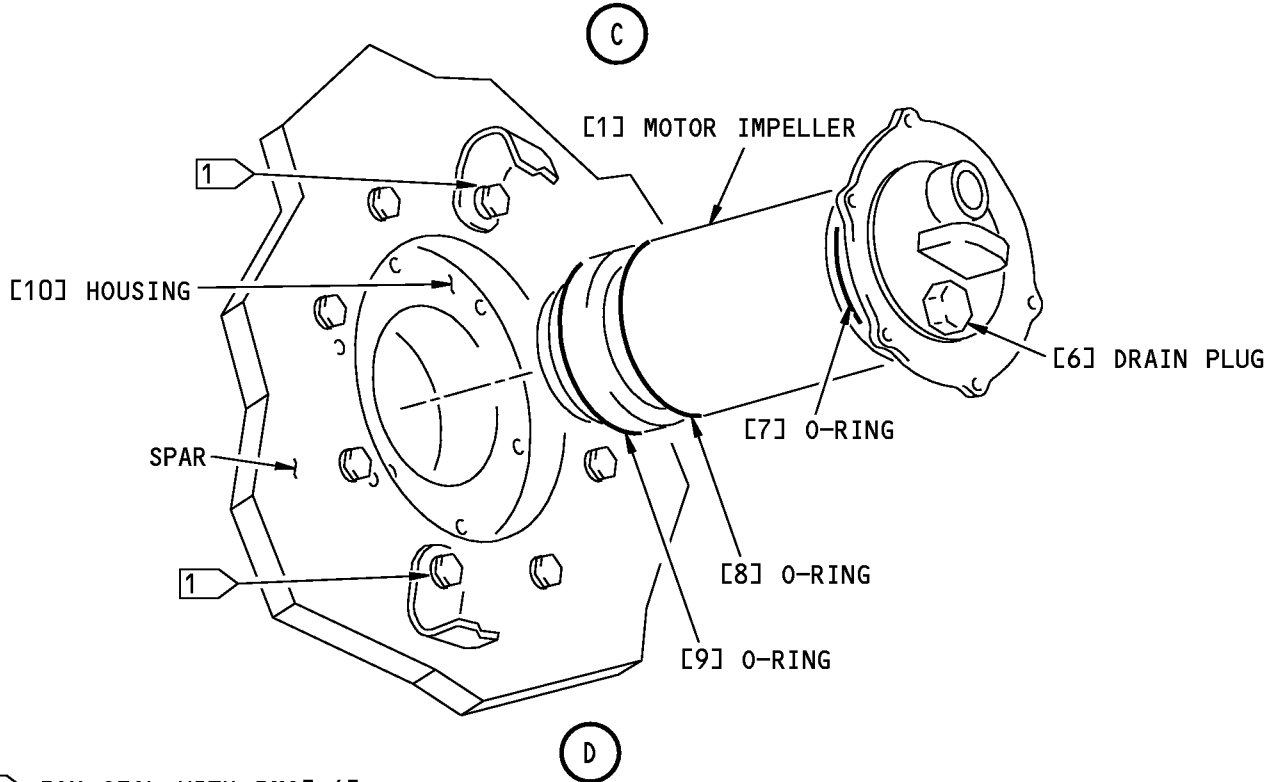
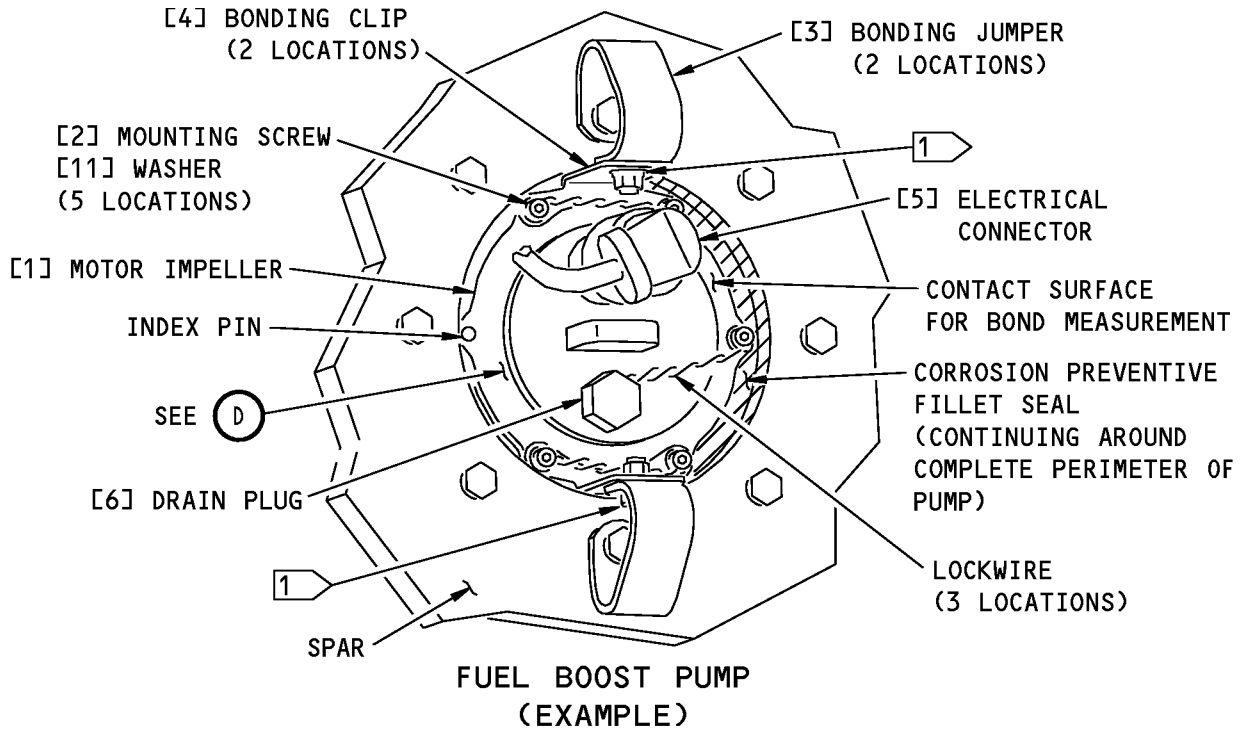
(B)

**No. 1 or 2 Tank Fuel Boost Pump Installation
Figure 401 (Sheet 2 of 3)/28-22-41-990-808**

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[1] FAY SEAL WITH BMS5-45

F97710 S0006572060_V2

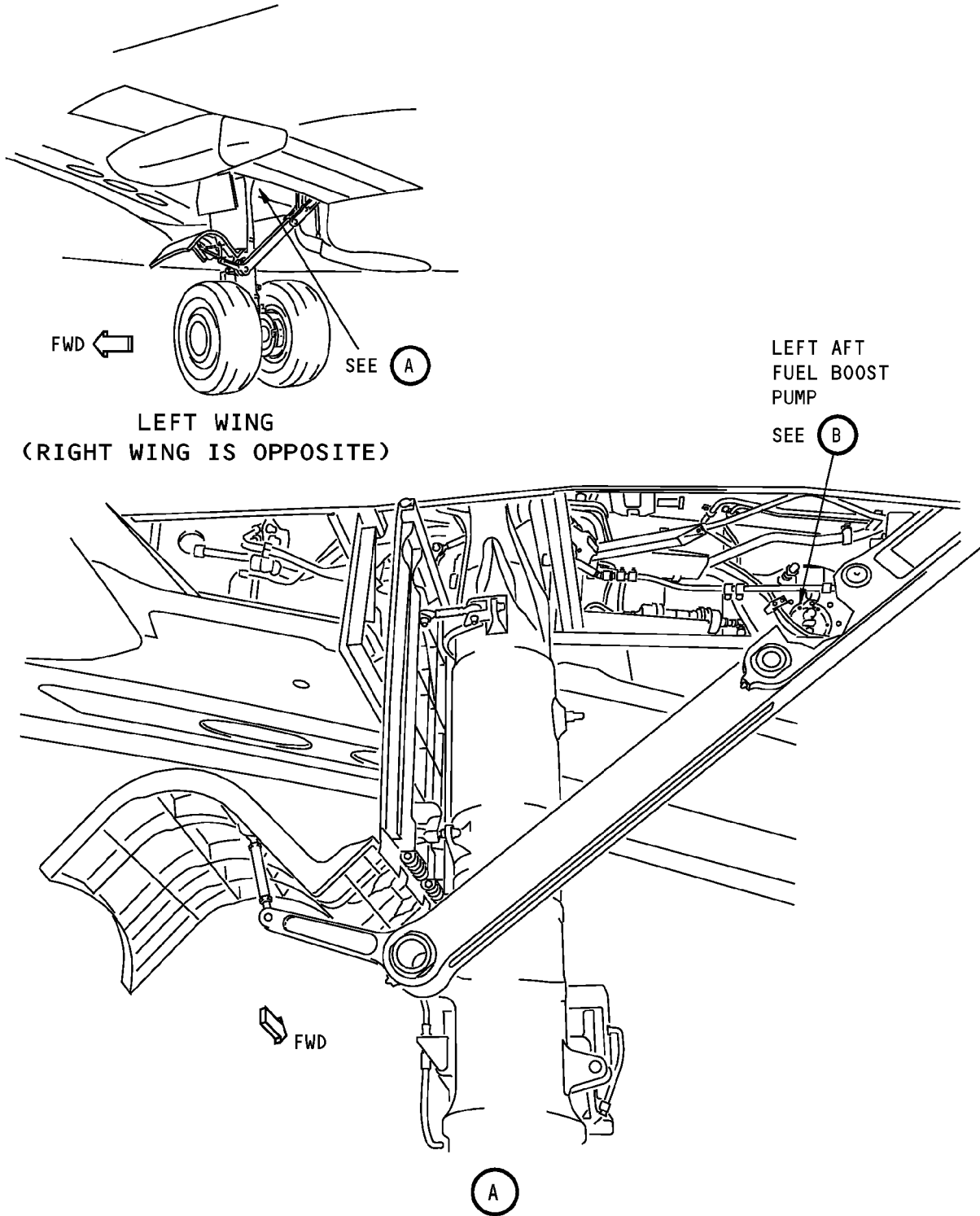
**No. 1 or 2 Tank Fuel Boost Pump Installation
Figure 401 (Sheet 3 of 3)/28-22-41-990-808**

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LEFT WING
(RIGHT WING IS OPPOSITE)

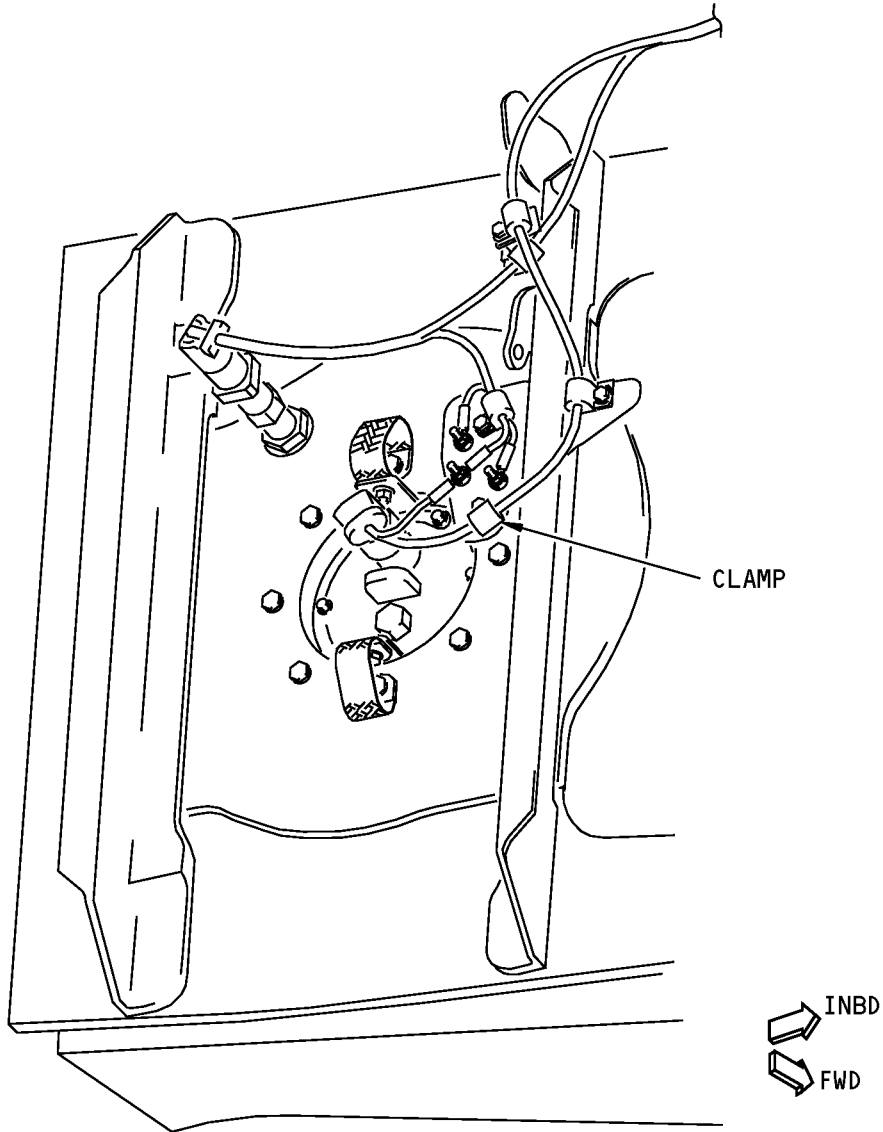
LEFT AFT
FUEL BOOST
PUMP

SEE (B)

**No. 1 or 2 Tank Aft Fuel Boost Pump Wiring Check
Figure 402 (Sheet 1 of 2)/28-22-41-990-809**

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HAP ALL

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LEFT AFT FUEL BOOST PUMP

B

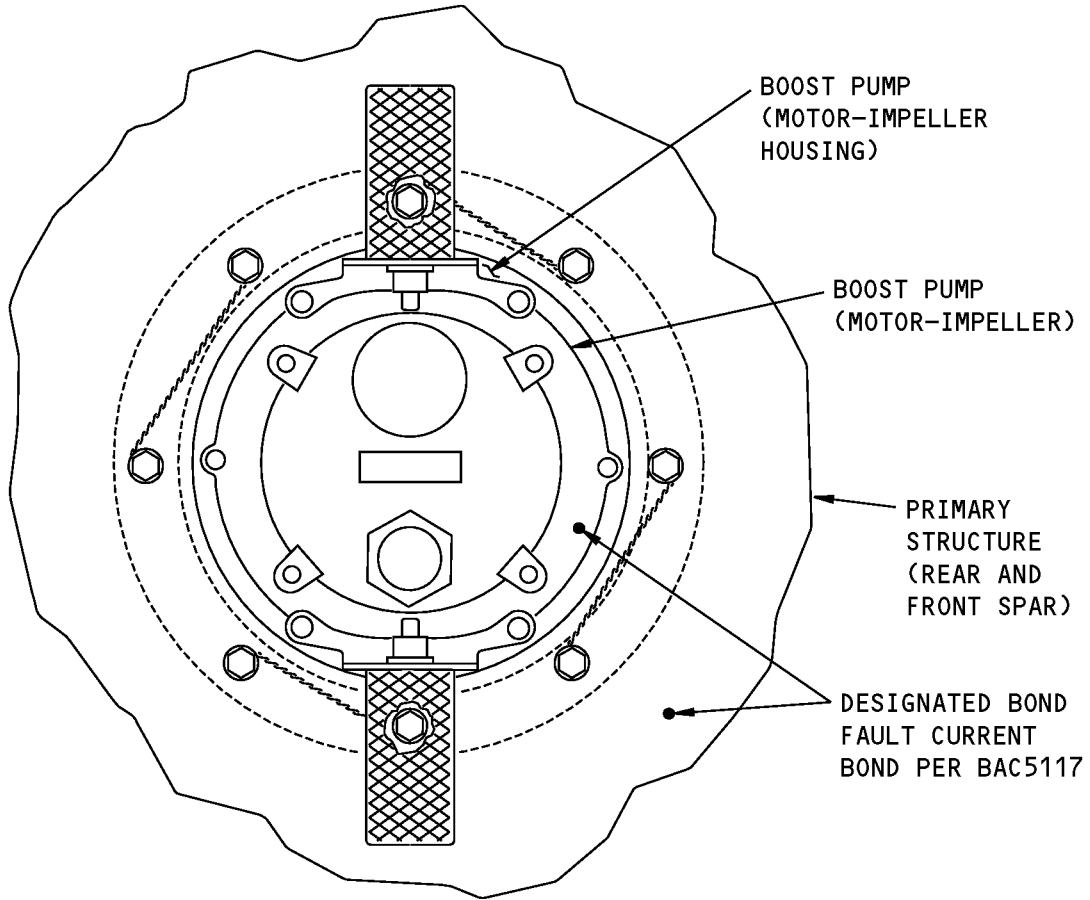
**No. 1 or 2 Tank Aft Fuel Boost Pump Wiring Check
Figure 402 (Sheet 2 of 2)/28-22-41-990-809**

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NOTE: MEASURE RESISTANCE PER BAC5117. MEASURE PUMP MOTOR-IMPELLER AT POINTS INDICATED TO PRIMARY STRUCTURE $<0.0004\Omega$.

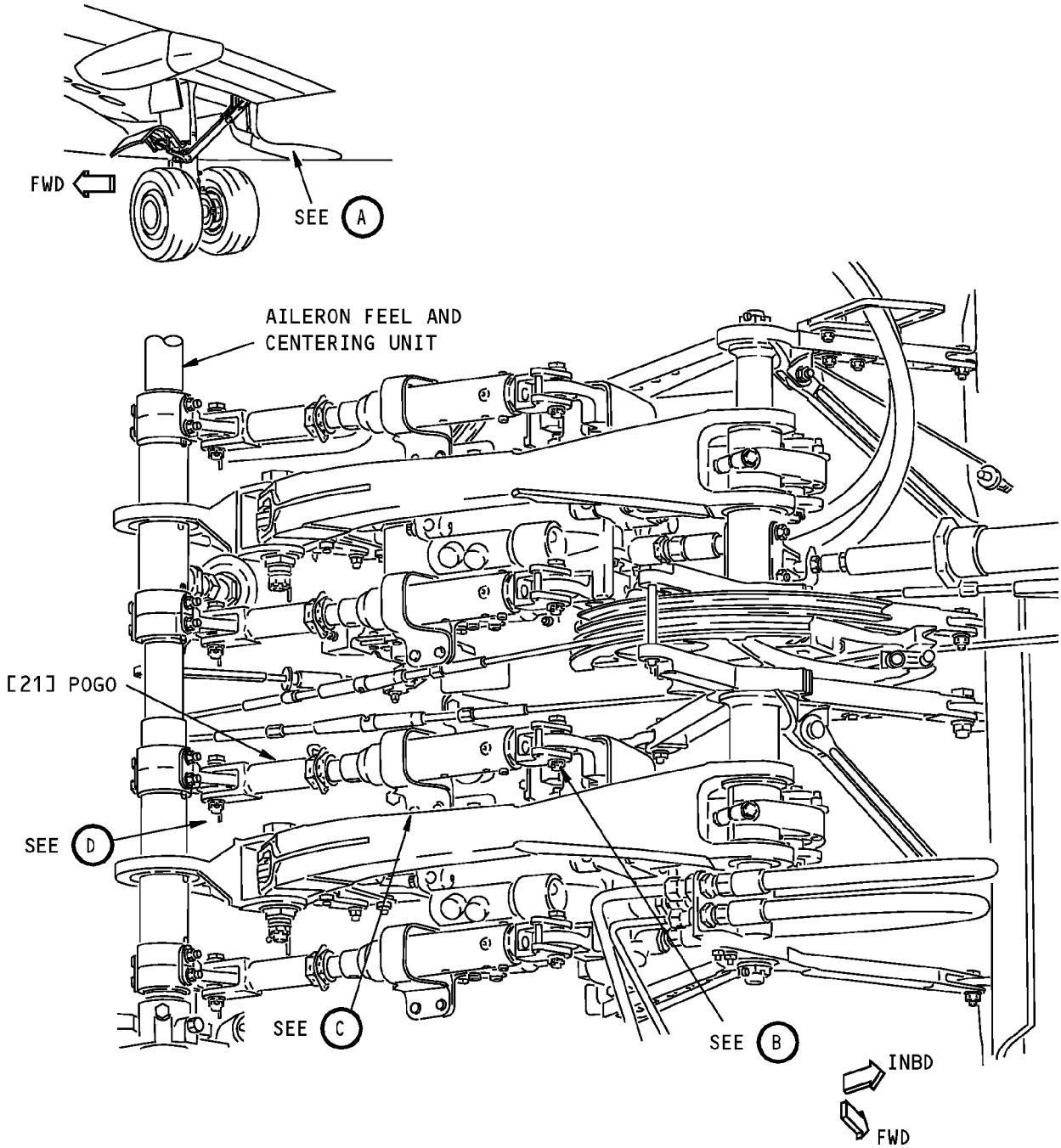
**No. 1 or No. 2 Tank Boost Pump Resistance Measurement - Probe Locations
Figure 403/28-22-41-990-810**

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**MAIN LANDING GEAR WHEEL WELL
(LEFT SIDE)**

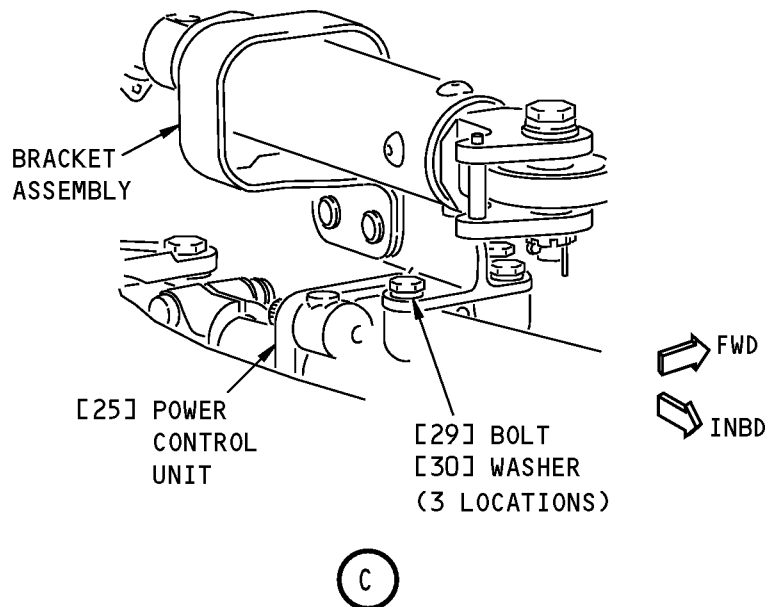
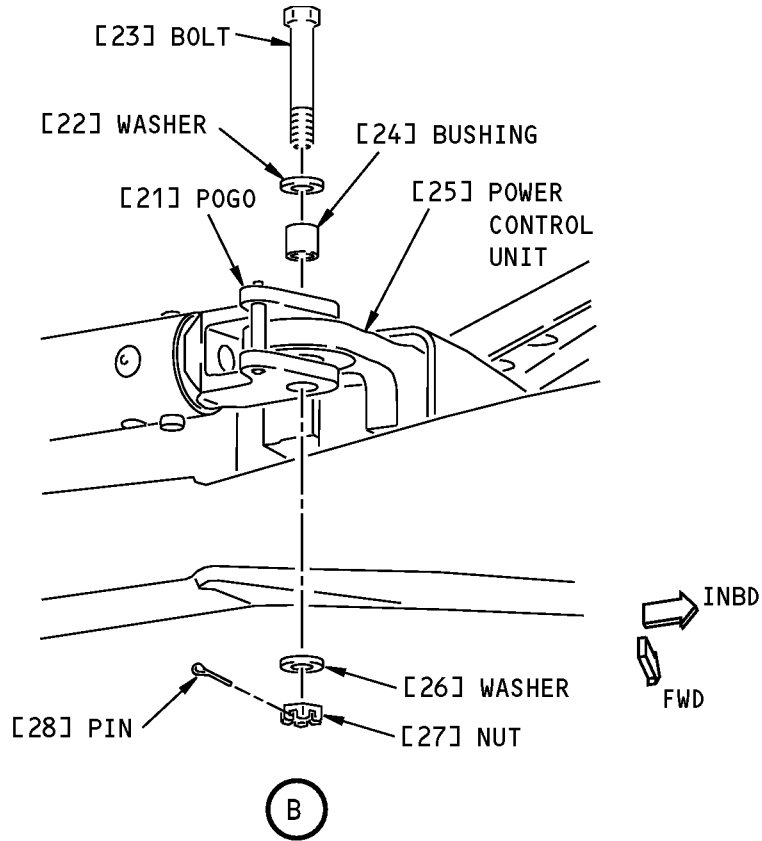
(A)

**Left Center Tank Fuel Boost Pump Installation
Figure 404 (Sheet 1 of 3)/28-22-41-990-811**

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**Left Center Tank Fuel Boost Pump Installation
Figure 404 (Sheet 2 of 3)/28-22-41-990-811**

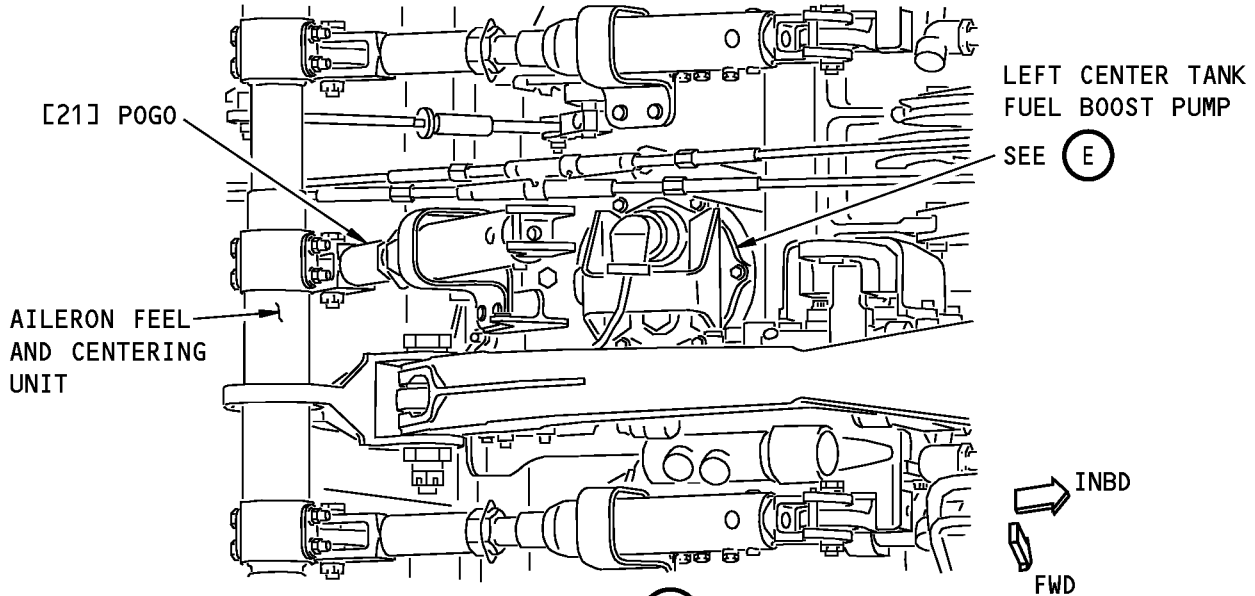
EFFECTIVITY
HAP ALL

28-22-41

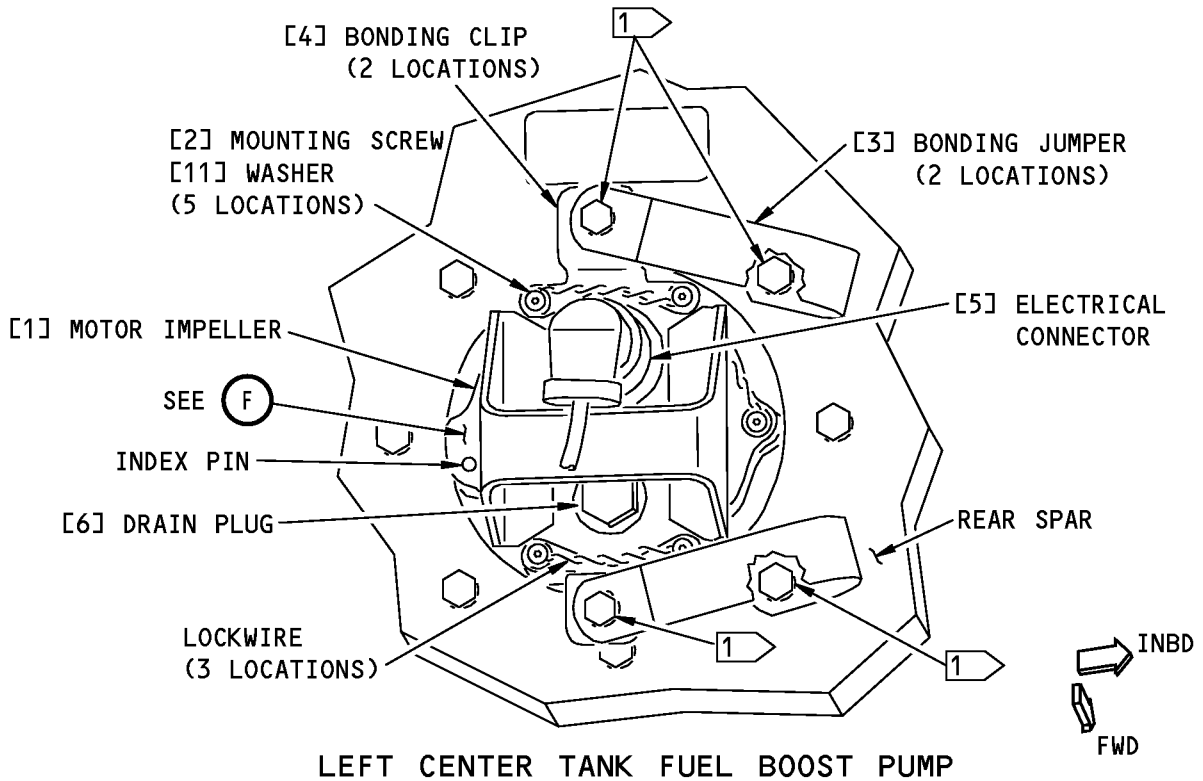
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(D)



(E)

1 FAY SEAL WITH BMS5-45

H31111 S0006572066_V2

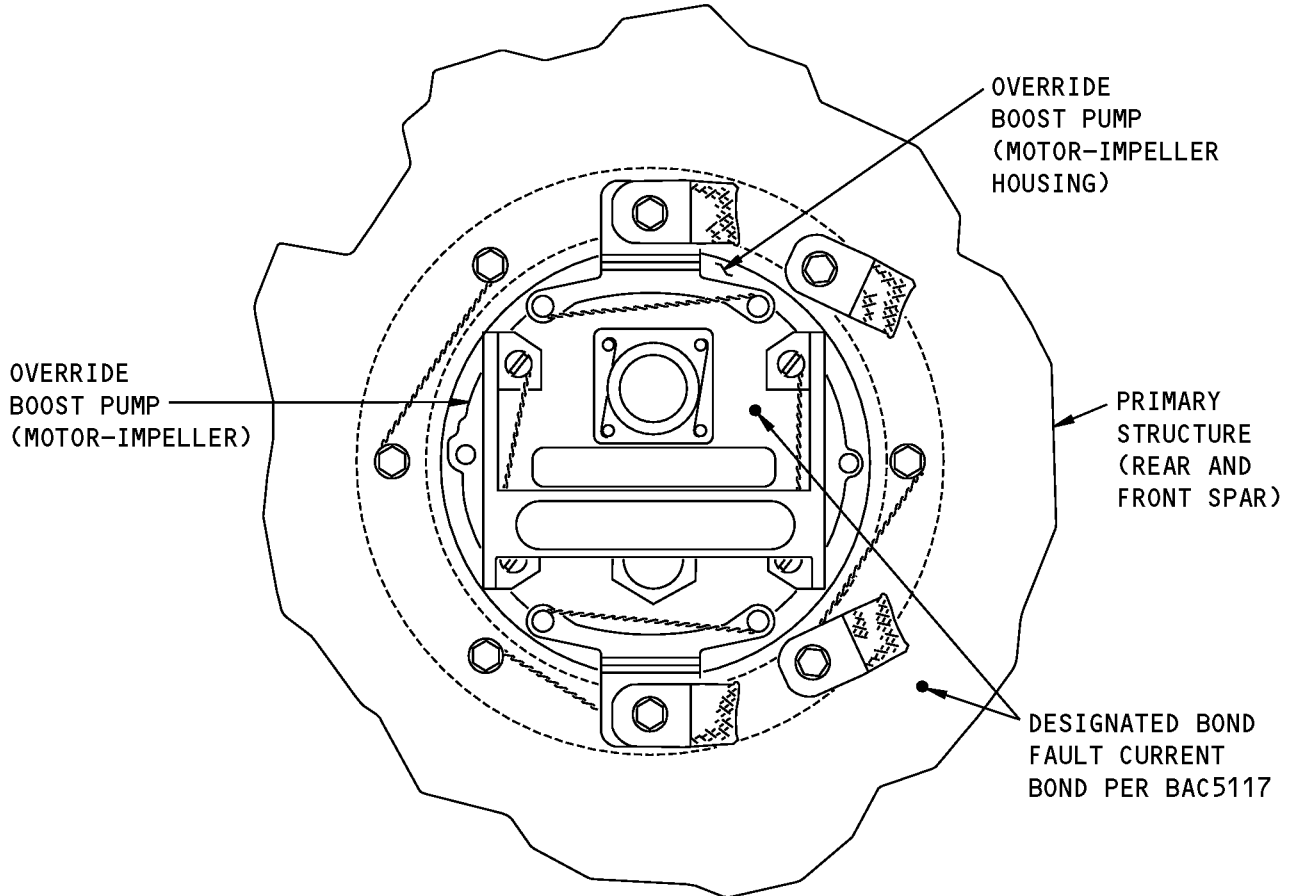
Left Center Tank Fuel Boost Pump Installation
Figure 404 (Sheet 3 of 3)/28-22-41-990-811

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NOTE: MEASURE RESISTANCE PER BAC5117. MEASURE IMPELLER MOTOR AT POINTS INDICATED TO THE PRIMARY STRUCTURE $<0.0004\Omega$.

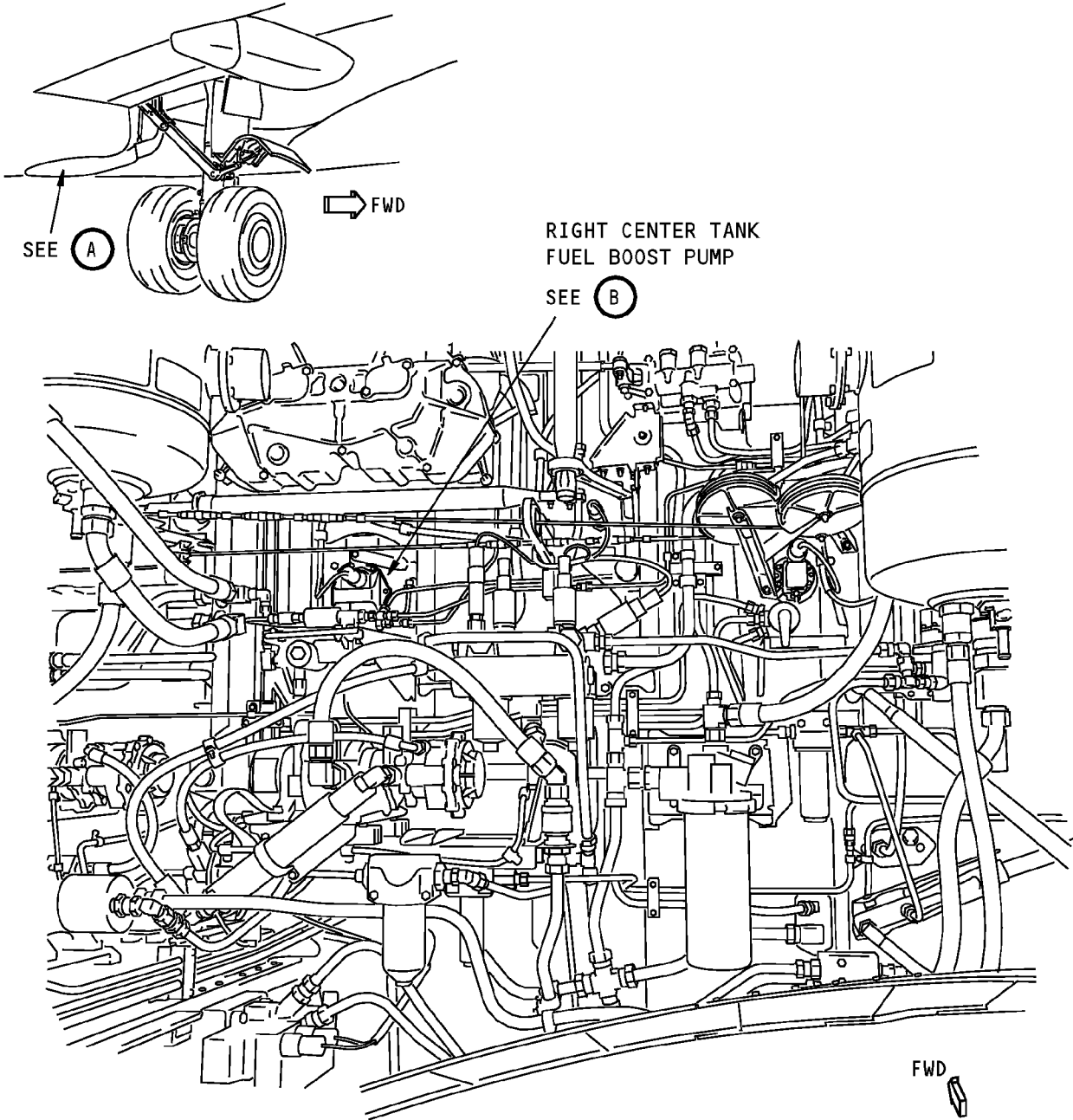
**Center Tank Boost Pump Resistance Measurement - Probe Locations
Figure 405/28-22-41-990-812**

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RIGHT CENTER TANK
FUEL BOOST PUMP

SEE **B**

MAIN LANDING GEAR WHEEL WELL
(RIGHT SIDE)

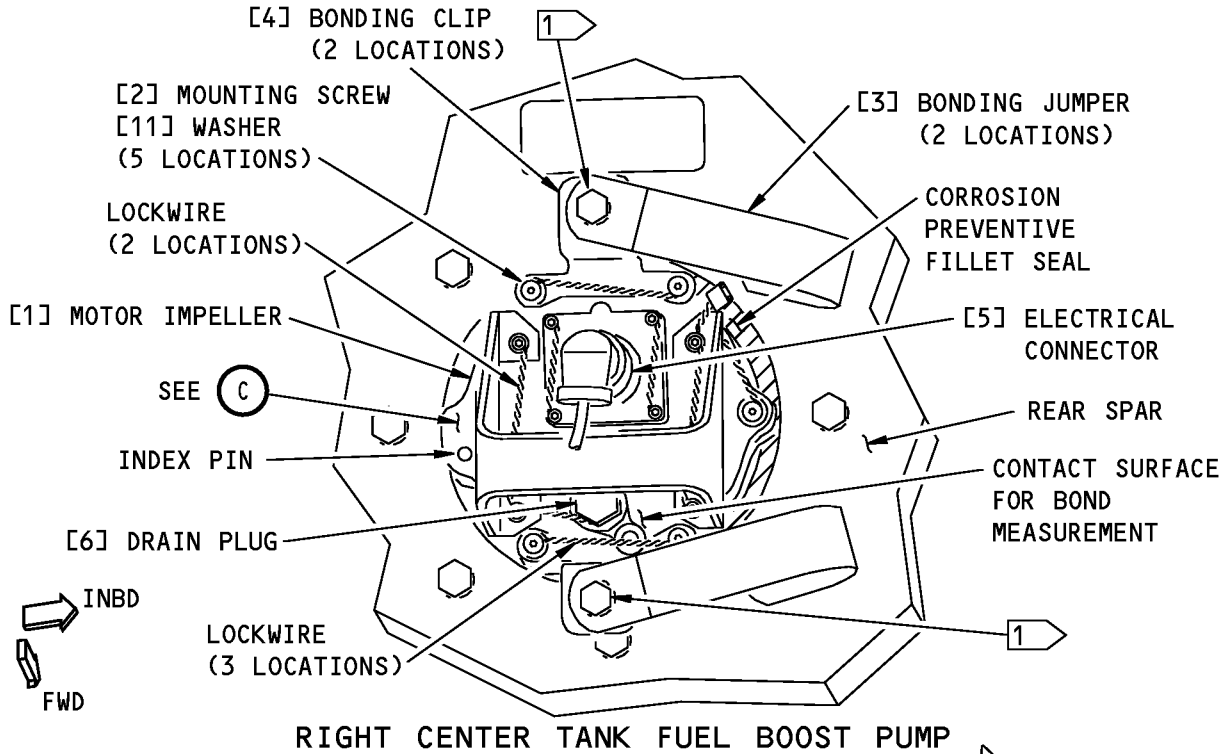
A

Right Center Tank Fuel Boost Pump Installation
Figure 406 (Sheet 1 of 2)/28-22-41-990-813

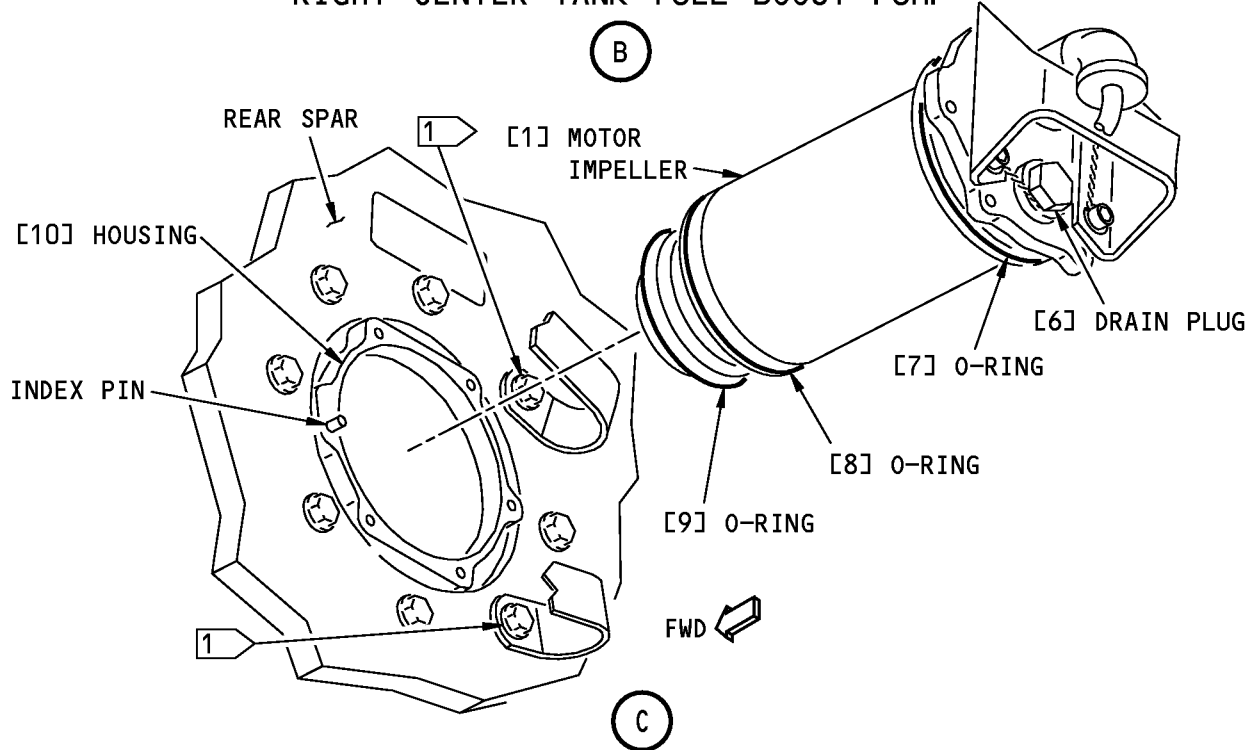
EFFECTIVITY
HAP ALL

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RIGHT CENTER TANK FUEL BOOST PUMP



1 FAY SEAL WITH BMS5-45

H31288 S0006572072_V3

**Right Center Tank Fuel Boost Pump Installation
Figure 406 (Sheet 2 of 2)/28-22-41-990-813**

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TASK 28-22-41-400-801

3. Install the Motor Impeller

(Figure 401, Figure 403, Figure 404, Figure 405, Figure 406)

A. General

- (1) An insulation resistance test is necessary for the installation of 60B92404-6 or -7 pumps (No. 1 or No. 2 tank) and for 60B89004-10 or -12 pumps (center tank). An insulation resistance test is not necessary for 60B92404-8 or -10 and subsequent pumps (No. 1 or No. 2 tank) or for 60B89004-14 or -16 and subsequent pumps (center tank).

B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
24-22-00-860-814	Remove External Power (P/B 201)
27-11-00-820-802	Pogo and Power Control Unit (PCU) Adjustment (P/B 501)
27-81-00-080-801	Leading Edge Flap and Slat Locks Removal (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-22-00-200-801	Fuel Pumps - Insulation Resistance Check (P/B 601)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
AIPC 28-22-41-05	Aircraft Illustrated Parts Catalog
SWPM 20-20-00, Para 3I	Standard Wiring Practices Manual
SWPM 20-20-00, Section 2	Standard Wiring Practices Manual

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)
SPL-1585	Kit - Rigging Pins, All Systems (Part #: F70207-109, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Consumable Materials

Reference	Description	Specification
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142
D00504	Grease - Petrolatum	VV-P-236
G02272	Fuel - Turbine, Aviation (Grades JP-4, JP-5, JP-5/JP-8ST)	MIL-DTL-5624

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Motor impeller	28-22-41-05-030	HAP 031-054, 101-999
		28-22-41-05-031	HAP 031-054, 101-999
		28-22-41-05-195	HAP ALL
7	O-ring	28-22-41-05-066	HAP 031-054, 101-999

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(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
7 (cont.)		28-22-41-05-200	HAP ALL
8	O-ring	28-22-41-05-064	HAP 031-054, 101-999
		28-22-41-05-205	HAP ALL
9	O-ring	28-22-41-05-062	HAP 031-054, 101-999
		28-22-41-05-210	HAP ALL

F. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

G. Procedure

SUBTASK 28-22-41-480-004

WARNING: MAKE SURE THE DOWNLOCK PINS ARE INSTALLED ON ALL THE LANDING GEAR. WITHOUT THE DOWNLOCK PINS, THE LANDING GEAR CAN RETRACT AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) If downlock pins are not installed, do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

HAP 001-013, 015-026, 028-030 PRE SB 737-28A1197

SUBTASK 28-22-41-210-010

WARNING: MAKE SURE THAT AN INTERNAL INSPECTION OF THE ROUTING OF THE STATOR LEAD WIRES IN THE FUEL PUMP WAS DONE. INCORRECT ROUTING OF THE STATOR LEAD WIRES CAN CAUSE AN INTERNAL CHAFING CONDITION THAT CAN CAUSE AN ELECTRICAL SHORT. AN ELECTRICAL SHORT IN THE PUMP MOTOR CAN CAUSE A FIRE, OR EXPLOSION WHEN THE FUEL PUMP INLET IS OUT OF THE FUEL.

- (2) Make sure the fuel pump has been inspected for the stator lead (or internal) wire chafing condition.

NOTE: The letter T will be stamped on the identification plate of the motor impeller after the serial number if the pump has been inspected. The pumps are subject to the inspection requirements of SB 28A1197. An airworthiness directive (FAA AD 2002-19-52) expands the inspection requirement to all fuel pumps prior to installation.

NOTE: New motor-impellers, part number 60B92404-10 and subsequent (No. 1 or No. 2 tank) and part number 60B89004-16 and subsequent (center tank) can be installed, but do not have a letter T stamped on the identification plate of the motor impeller. These new motor-impellers have an internal retainer to prevent chafing of the wire bundle.

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HAP 001-013, 015-026, 028-030 PRE SB 737-28A1197 (Continued)

HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1197

SUBTASK 28-22-41-210-011

WARNING: MAKE SURE THAT AN INTERNAL INSPECTION OF THE ROUTING OF THE STATOR LEAD WIRES IN THE FUEL PUMP WAS DONE. INCORRECT ROUTING OF THE STATOR LEAD WIRES CAN CAUSE AN INTERNAL CHAFING CONDITION THAT CAN CAUSE AN ELECTRICAL SHORT. AN ELECTRICAL SHORT IN THE PUMP MOTOR CAN CAUSE A FIRE, OR EXPLOSION WHEN THE FUEL PUMP INLET IS OUT OF THE FUEL.

- (3) Make sure the fuel pump has been inspected for the stator lead (or internal) wire chafing condition.

NOTE: The letter T will be stamped on the identification plate of the motor impeller after the serial number if the pump has been inspected.

HAP ALL

SUBTASK 28-22-41-160-001

- (4) Clean all machined surfaces on the motor impeller [1] and the surfaces that touch on the housing [10] (View A).

SUBTASK 28-22-41-210-007

- (5) Make sure the wire bundle for the boost pump has a clamp installed as shown in (Figure 402).

SUBTASK 28-22-41-110-001

- (6) Clean the mating surfaces of the motor impeller [1] and the housing [10] (SWPM 20-20-00, Section 2).

SUBTASK 28-22-41-420-002

- (7) For the No. 1 or No. 2 tank boost pumps, install the new O-ring [7], O-ring [8], and O-ring [9] in the grooves of the motor impeller [1].

SUBTASK 28-22-41-420-018

- (8) For the left center tank boost pump, install the new O-ring [7], O-ring [8], and O-ring [9].

SUBTASK 28-22-41-420-019

- (9) For the right center tank boost pump, install the new O-ring [7], O-ring [8], and O-ring [9].

SUBTASK 28-22-41-640-001

- (10) Apply a thin layer of grease, D00504, to O-ring [7], O-ring [8], and O-ring [9].

SUBTASK 28-22-41-650-002

- (11) Put 1/2 to 1 pint of fuel, G02272, into two smaller slots in the upper side of the motor impeller [1].

SUBTASK 28-22-41-980-001

- (12) Turn the motor impeller [1] to make sure fuel touches the internal parts of the fuel boost pump.

SUBTASK 28-22-41-420-003

- (13) For the boost pumps for the No. 1 or the No. 2 tank, put the motor impeller [1] into the housing [10].

NOTE: Be careful not to damage O-ring [7], O-ring [8], and O-ring [9] when you put the motor impeller [1] into the housing [10].

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SUBTASK 28-22-41-420-020

(14) For the left center tank boost pump, put the motor impeller [1] into the housing [10].

NOTE: Be careful not to damage the O-ring [7], O-ring [8], and O-ring [9] when you put the motor impeller [1] into the housing [10].

SUBTASK 28-22-41-420-021

(15) For the right center tank boost pump, put the motor impeller [1] into the housing [10].

NOTE: Be careful not to damage the O-ring [7], O-ring [8], and O-ring [9] when you put the motor impeller [1] into the housing [10].

SUBTASK 28-22-41-210-001

(16) Make sure the drain plug [6] is installed and lockwire is installed on the drain plug [6].

SUBTASK 28-22-41-820-001

(17) Turn the motor impeller [1] until the index hole aligns with the index pin in the housing [10].

SUBTASK 28-22-41-420-004

(18) Install the bonding clips [4] with the bonding jumpers [3] attached (SWPM 20-20-00, Para 3I).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-14.

SUBTASK 28-22-41-420-005

(19) Install the mounting screws [2] and washers [11] on the motor impeller [1].

SUBTASK 28-22-41-760-002

(20) Measure the bonding resistance between the motor impeller [1] and the airplane structure with an electrical bonding meter, COM-1550 (Figure 403, Figure 405).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-14.

(a) Make sure the resistance is 0.0004 ohm (0.4 milliohm) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-14.

(b) If the bonding resistance requirement is not satisfied, do these steps:

1) Clean all faying surfaces (jumper terminal lugs and tabs on the boost pump for the upper and lower terminal lugs) (SWPM 20-20-00, Section 2).

2) Make sure the correct washers (bare finish) are used in the build-up adjacent to the tinned jumper lugs (AIPC 28-22-41-05).

a) If the correct washers are not installed, install the correct washers.

3) Do the bonding resistance check again.

SUBTASK 28-22-41-420-006

(21) Install the lockwire on the mounting screws [2].

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SUBTASK 28-22-41-390-002

- (22) Make sure there is a fay seal of sealant, A02315, on the applicable locations of the bonding jumpers [3] (Figure 401, Figure 402, Figure 404).
- (a) The sealant must cover the area around each jumper terminal and the fastener head to protect the conductive path between spar and the motor impeller [1].

HAP ALL; AIRPLANES WITH NO. 1 OR NO. 2 TANK BOOST PUMP 60B92404-6 OR -7 OR CENTER TANK BOOST PUMP 60B89004-10 OR -12

SUBTASK 28-22-41-760-001

- (23) For the pump that you installed, do this task: Fuel Pumps - Insulation Resistance Check, TASK 28-22-00-200-801.

NOTE: This step is not applicable for No. 1 or No. 2 tank boost pump 60B92404-10 and subsequent or center tank boost pump 60B89004-16 and subsequent.

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SUBTASK 28-22-41-420-007

- (24) Connect the electrical connector [5] to the motor impeller [1].

SUBTASK 28-22-41-650-003

- (25) Refuel the center or the No. 1 or No. 2 fuel tank, as applicable (TASK 12-11-00-650-802).
- (a) If it is not possible to refuel the tanks to the specified quantities, do one of the alternative procedures to prime the boost pump (TASK 28-22-41-420-801).
- (b) For the forward fuel boost pumps, refuel the No. 1 or No. 2 tanks to 500 lb (227 kg) minimum.
- (c) For the aft fuel boost pumps, refuel the No. 1 or No. 2 tanks to 500 lb (227 kg) minimum.
- (d) For the center tank fuel boost pumps, refuel the center fuel tank to 14,000 lb (6350 kg) minimum.

SUBTASK 28-22-41-210-002

- (26) Make sure there are no fuel leaks at the fuel boost pump.

SUBTASK 28-22-41-710-001

- (27) For the applicable pump, do this task: Fuel Boost Pump Operational Test, TASK 28-22-41-710-801

SUBTASK 28-22-41-410-004

- (28) If the pogo [21] was removed to get access to the left center tank boost pump, do these steps (Figure 404):

NOTE: Be careful not to change the length of the pogo [21].

- (a) Connect the bracket assemblies to the power control unit [25] with bolts [29] and washers [30].
- (b) Connect the pogo [21] to the power control unit [25] with bolt [23], washer [22], bushing [24], washer [26], nut [27] and pin [28].

NOTE: You must install the bolt [23] with the bolt head up.

- (c) Make sure you can easily install and remove the rig pin A/S-4, from the rig pin kit, SPL-1585, in the aileron bus drum (TASK 27-11-00-820-802).

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- (d) If you cannot easily install and remove the rig pin A/S-4, do this task: Pogo and Power Control Unit (PCU) Adjustment, TASK 27-11-00-820-802

NOTE: This step should not be necessary if the length of the pogo [21] was not changed while it was removed.

SUBTASK 28-22-41-480-002

- (29) If the leading edge slat actuator locks were extended, do these steps:

WARNING: MAKE SURE YOU INSTALL THE LEADING EDGE SLAT ACTUATOR LOCKS TO PREVENT ACCIDENTAL OPERATION OF THE LEADING EDGE SLATS. THE LEADING EDGE SLATS CAN MOVE QUICKLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (a) Do this task: Leading Edge Flap and Slat Locks Removal, TASK 27-81-00-080-801.

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE FLAPS AND SLATS AND THE TRAILING EDGE FLAPS. THE LEADING EDGE FLAPS AND SLATS AND THE TRAILING EDGE FLAPS WILL RETRACT. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (b) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 28-22-41-860-003

- (30) If electrical power is not necessary for other tasks, do this task: Remove External Power, TASK 24-22-00-860-814

END OF TASK

TASK 28-22-41-420-801

4. Fuel Boost Pump and Override Pump Priming

(Figure 401, Figure 404, Figure 406)

A. General

- (1) This task contains a procedure to prime a boost pump or override pump without adding a large quantity of fuel to the applicable tank.

B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
20-10-44-400-801	Lockwires Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

D. Consumable Materials

Reference	Description	Specification
G01048	Lockwire - Corrosion Resistant Steel (0.032 In. Dia.)	NASM20995~C32
G02272	Fuel - Turbine, Aviation (Grades JP-4, JP-5, JP-5/JP-8ST)	MIL-DTL-5624
G50225	Lockwire - Corrosion Resistant Steel, 0.020 inch diameter	NASM20995~C20

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E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

F. Procedure

SUBTASK 28-22-41-020-020

- (1) Do these steps to prime the boost pump through the boost pump housing drain hole:
 - (a) Remove the drain plug [6] from the applicable boost pump.
 - (b) Put approximately 1.5 pt (0.7 l) of fuel, G02272, into the drain hole.
 - (c) Install the drain plug [6] on the applicable boost pump.
 - 1) Tighten the drain plug [6] to a torque of 45 ± 5 in-lb (5 ± 1 N·m).
 - 2) Install lockwire, G01048, or lockwire, G50225, to the drain plug [6].
 - (d) For the applicable pump, do this task: Fuel Boost Pump Operational Test, TASK 28-22-41-710-801.
 - 1) If the operational test is ok, then attach the drain plug [6] with lockwire (TASK 20-10-44-400-801).
 - a) The boost pump is correctly primed.
 - b) No more steps are necessary.
 - 2) If the operational test is not ok, then continue.

SUBTASK 28-22-41-420-017

- (2) Remove the applicable boost pump impeller unit (TASK 28-22-41-000-801).
 - (a) Remove the drain plug [6].
 - (b) Put the impeller unit in a 5 gallon (19 liters) fuel resistant container, STD-1054, of fuel, G02272, but keep the electrical connector on the impeller unit out of the fuel.
 - (c) Install the drain plug [6] again.
 - (d) Hold the pump in the correct direction with the open fuel slot on the top.

NOTE: This will make sure that the fuel does not drain out of the impeller unit before you install it.
 - (e) Make sure there is no fuel on the electrical connector on the impeller unit.
 - (f) Immediately install the applicable boost pump impeller unit (TASK 28-22-41-400-801).
 - (g) Tighten the drain plug [6] to a torque of 45 ± 5 in-lb (5 ± 1 N·m).
 - (h) For the applicable pump, do this task: Fuel Boost Pump Operational Test, TASK 28-22-41-710-801.
 - 1) If the operational test is ok, then attach the drain plug [6] with lockwire (TASK 20-10-44-400-801).
 - a) The boost pump is correctly primed.
 - b) No more steps are necessary.
 - 2) If the operational test is not ok, then continue.

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SUBTASK 28-22-41-650-009

(3) Refuel the center or the No. 1 or No. 2 fuel tank, as applicable (TASK 12-11-00-650-802).

NOTE: These are the minimum fuel quantities necessary to make sure the boost pumps are primed correctly.

- (a) For the forward fuel boost pumps, refuel the No. 1 or No. 2 tanks to 500 lb (227 kg) minimum.
- (b) For the aft fuel boost pumps, refuel the No. 1 or No. 2 tanks to 500 lb (227 kg) minimum.
- (c) For the center tank fuel boost pumps, refuel the center fuel tank to 14,000 lb (6350 kg) minimum.

————— **END OF TASK** —————

TASK 28-22-41-000-802

5. Remove the Housing

(Figure 407)

A. References

Reference	Title
27-81-00-480-801	Leading Edge Flap and Slat Locks Installation (P/B 201)
27-81-00-860-803	Leading Edge Flaps and Slats Extension (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-22-21-710-801	Crossfeed Valve Operational Test (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-42-11-000-801	Remove the Pressure Switch (P/B 401)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

B. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

C. Access Panels

Number	Name/Location
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
631AB	Center Tank Access Door - Wing Station 168

D. Procedure

SUBTASK 28-22-41-480-005

WARNING: MAKE SURE THE DOWNLOCK PINS ARE INSTALLED ON ALL THE LANDING GEAR. WITHOUT THE DOWNLOCK PINS, THE LANDING GEAR CAN RETRACT AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) If downlock pins are not installed, do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

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SUBTASK 28-22-41-650-004

(2) Defuel the center fuel tank (TASK 28-26-00-650-801).

SUBTASK 28-22-41-650-005

(3) For the forward or aft boost pump housing for the No. 1 tank or for the left center boost pump housing, defuel the No. 1 tank (TASK 28-26-00-650-801).

SUBTASK 28-22-41-650-006

(4) For the forward or aft boost pump housing for the No. 2 tank or for the right center boost pump housing, defuel the No. 2 tank (TASK 28-26-00-650-801).

SUBTASK 28-22-41-860-017

(5) Do these steps to make sure the crossfeed valve is closed:

(a) Do this task: Crossfeed Valve Operational Test, TASK 28-22-21-710-801.

(b) Make sure the crossfeed valve is set to the closed position and the crossfeed position indicator light is off.

SUBTASK 28-22-41-650-007

(6) Drain and purge the center fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-22-41-860-004

(7) To remove the forward boost pump housing for the No. 1 or the No. 2 tank, do these steps:

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE FLAPS AND SLATS AND THE TRAILING EDGE FLAPS. THE LEADING EDGE FLAPS AND SLATS AND THE TRAILING EDGE FLAPS WILL EXTEND. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Do this task: Leading Edge Flaps and Slats Extension, TASK 27-81-00-860-803.

WARNING: MAKE SURE YOU INSTALL THE LEADING EDGE SLAT ACTUATOR LOCKS TO PREVENT ACCIDENTAL OPERATION OF THE LEADING EDGE SLATS. THE LEADING EDGE SLATS CAN MOVE QUICKLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(b) Do this task: Leading Edge Flap and Slat Locks Installation, TASK 27-81-00-480-801.

SUBTASK 28-22-41-010-003

(8) To remove the forward or aft fuel boost pump housing in the No. 1 tank, remove this access panel:

(TASK 28-11-31-000-801)

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

or open this access panel:

<u>Number</u>	<u>Name/Location</u>
631AB	Center Tank Access Door - Wing Station 168

SUBTASK 28-22-41-010-004

(9) To remove the center tank fuel boost pump housing, do these steps:

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WARNING: USE THE APPLICABLE PROCEDURE TO INSTALL THE GROUND LOCK ASSEMBLIES. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

(b) Remove this access panel:

(TASK 28-11-31-000-801)

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

SUBTASK 28-22-41-020-010

(10) Do this task: Remove the Motor Impeller, TASK 28-22-41-000-801.

SUBTASK 28-22-41-940-001

WARNING: OBEY THE FUEL TANK ENTRY PRECAUTIONS. FAILURE TO OBEY THE FUEL TANK ENTRY PRECAUTIONS COULD CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(11) Obey the fuel tank entry precautions (TASK 28-11-00-910-802).

SUBTASK 28-22-41-010-005

(12) Go into the center fuel tank.

SUBTASK 28-22-41-020-011

(13) Disconnect the discharge check valve [41] from the housing [10] (View C).

CAUTION: IF THE DISCHARGE CHECK VALVE [21] IS REMOVED BY DISCONNECTING THE COUPLING, FUEL WILL ENTER THE CENTER TANK FROM THE WING TANK.

(a) Remove the four screws [59], washers [58], and nuts [52] from the discharge check valve [41] (View D).

(b) Remove the O-rings [57].

SUBTASK 28-22-41-210-003

(14) Disconnect the removal check valve [43] from the housing [10].

(a) Remove the six screws [44], washers [45], and nuts [46] from the removal check valve [43] (View C).

(b) Remove the O-ring [47] (View C).

SUBTASK 28-22-41-020-012

(15) Disconnect the bonding jumpers [3] from the spar on the wing (View D).

SUBTASK 28-22-41-020-013

(16) Remove the flexible full coupling [51] and the two O-rings to disconnect the coolant and vapor discharge line at the coolant and vapor discharge port [50].

SUBTASK 28-22-41-020-014

(17) Remove the nut [61], ring, and O-ring [60] to remove the ejector pump pressure line [62] (View D), if installed.

SUBTASK 28-22-41-020-015

(18) Remove the nut [55], ring, and O-ring [54] to remove the pressure sensor line [53] (View D).

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- (a) Make sure the pressure sense line [53] is drained.

NOTE: This will help to prevent the collection of water in the pressure sense line. Water can freeze and cause damage to the pressure sense line. You can loosen the connection for the pressure sense line at the pressure switch (TASK 28-42-11-000-801) to help remove the fuel and water from the pressure sense line. You may have to flush the pressure sense line to remove all the water.

SUBTASK 28-22-41-020-016

- (19) Hold up the housing [10] from the inner side of the center fuel tank.

SUBTASK 28-22-41-020-017

- (20) Remove the mounting bolts [48] from out of the center fuel tank (View D).

SUBTASK 28-22-41-020-018

- (21) Remove the gaskoseal [49] (View D).

SUBTASK 28-22-41-020-019

- (22) Remove the housing [10] from the center fuel tank.

END OF TASK

TASK 28-22-41-400-802

6. Install the Housing

(Figure 407)

A. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-814	Remove External Power (P/B 201)
27-81-00-080-801	Leading Edge Flap and Slat Locks Removal (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
51-31-00-390-804	Fillet Seal Application (P/B 201)
SOPM 20-30-88	Solvents For Final Cleaning Metal Before Non-Structural Bonding (Series 88)
SWPM 20-20-00	Electrical Bonds and Grounds
SWPM 20-20-00, Para 3I	Standard Wiring Practices Manual

B. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142
A50110	Sealant	BMS5-45 Class B-2
A50155	Sealant - Fuel Tank	BMS5-45 Class C

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Reference	Description	Specification
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
41	Discharge check valve	28-22-71-05-250 28-22-71-05-330	HAP ALL
47	O-ring	28-22-51-05-040 28-22-51-05-140 28-22-51-05-180	HAP 031-054, 101-999 HAP ALL
49	Gask-o-seal	28-22-41-05-140 28-22-41-05-280	HAP ALL
50	Vapor discharge port	28-22-41-05-082 28-22-41-05-250 28-22-41-05-390	HAP 031-054, 101-999 HAP ALL
54	O-ring	28-22-15-05-065	HAP ALL

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

E. Access Panels

Number	Name/Location
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
631AB	Center Tank Access Door - Wing Station 168

F. Procedure

SUBTASK 28-22-41-480-006

WARNING: MAKE SURE THE DOWNLOCK PINS ARE INSTALLED ON ALL THE LANDING GEAR. WITHOUT THE DOWNLOCK PINS, THE LANDING GEAR CAN RETRACT AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) If downlock pins are not installed, do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

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SUBTASK 28-22-41-210-009

WARNING: MAKE SURE THAT AN INTERNAL INSPECTION OF THE ROUTING OF THE STATOR LEAD WIRES IN THE FUEL PUMP WAS DONE. INCORRECT ROUTING OF THE STATOR LEAD WIRES CAN CAUSE AN INTERNAL CHAFING CONDITION THAT CAN CAUSE AN ELECTRICAL SHORT. AN ELECTRICAL SHORT IN THE PUMP MOTOR CAN CAUSE A FIRE, OR EXPLOSION WHEN THE FUEL PUMP INLET IS OUT OF THE FUEL.

- (2) Make sure the fuel pump has been inspected for the stator lead (or internal) wire chafing condition.

NOTE: The pumps are subject to the inspection requirements of SB 28A1197. An airworthiness directive (FAA AD 2002-19-52) expands the inspection requirement to all fuel pumps prior to installation.

SUBTASK 28-22-41-940-002

WARNING: OBEY THE FUEL TANK ENTRY PRECAUTIONS. FAILURE TO OBEY THE FUEL TANK ENTRY PRECAUTIONS COULD CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Obey the fuel tank entry precautions (TASK 28-11-00-910-802).

SUBTASK 28-22-41-820-002

- (4) Align the housing [10] with the spar of the wing (View D).

SUBTASK 28-22-41-420-008

- (5) Put a new gask-o-seal [49] between the housing [10] and the spar.

SUBTASK 28-22-41-420-009

- (6) Install the mounting bolt [48] and washer [47].
 - (a) Do these steps to install the bonding jumpers [3] with the two longer mounting bolts [48].
 - 1) Clean the contact surfaces with a cotton wiper, G00034, soaked with Series 88 solvent, B01008 (SOPM 20-30-88).
 - a) Rub dry with a clean, dry cotton wiper, G00034.
 - b) Continue to clean and dry the surface until the cotton wiper, G00034, stays clean.
 - 2) Install the mounting bolt [48], two washers, and bonding jumper [3] (SWPM 20-20-00, Para 3I).
 - (b) Do these steps to install the six shorter mounting bolts [48] in the locations without the bonding jumpers [3].
 - 1) Apply sealant to the shank and threads of the six mounting bolts [48].
 - a) Use sealant, A50110 or sealant, A50155, for the wet installation of the mounting bolts [48].
 - 2) Install the the six shorter mounting bolts [48] in the locations without the bonding jumpers [3].
 - 3) Apply a cap seal of sealant, A50110, or sealant, A02315, to cap seal the mounting bolts [48].

SUBTASK 28-22-41-420-010

- (7) Install lockwire on the mounting bolts [48].

SUBTASK 28-22-41-420-011

- (8) Do these steps to connect the ejector pump pressure line [62] (not on all pumps) at the discharge check valve [41].

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- (a) Put the nut [61] on the elbow [63].
- (b) Install a new O-ring [60] on the elbow [63].
- (c) Install the elbow [63] on the discharge check valve [41].
- (d) Install the ejector pump pressure line [62] on the elbow [63].
- (e) Tighten the nut [61].
- (f) Install lockwire on the nut [61].

SUBTASK 28-22-41-420-012

- (9) Do these steps to connect the pressure sensor line [53] at the discharge check valve [41].
 - (a) Put the nut [55] on the ferrule.
 - (b) Put the ring on the ferrule between the ferrule and the nut [55].
 - (c) Install a new O-ring [54] in the coupling body.
 - (d) Install the nut [55] onto the coupling body.
 - (e) Install lockwire on the nut [55].

SUBTASK 28-22-41-420-013

- (10) For the No. 1 tank or No. 2 tank boost pumps, install the flexible full coupling [51] to attach the coolant and vapor discharge line to the coolant and vapor discharge port [50] (TASK 28-22-15-400-801).

SUBTASK 28-22-41-420-014

- (11) Install a new O-ring [47] and the six screws [44], washers [45] and nuts [46] to attach the removal check valve [43] (View C).

SUBTASK 28-22-41-420-015

- (12) Install a new O-ring [57] and four screws [59], washers [58] and nuts [52] to attach the discharge check valve [41].

SUBTASK 28-22-41-390-003

- (13) Apply a fillet seal of sealant, A00767, to the surface inside the fuel tank where the housing [10] touches the spar (TASK 28-11-00-300-803).

SUBTASK 28-22-41-390-004

- (14) For center tank left and right fuel boost pumps, apply a fillet seal of sealant, A02315, to the surface outside the fuel tank where the pump housing [10] touches the spar (TASK 51-31-00-390-804).

SUBTASK 28-22-41-760-003

- (15) Measure the bonding resistance between the housing [10] and the structure in the tank (SWPM 20-20-00).

- (a) Make sure the resistance is 0.001 ohm (1 milliohm) or less.

SUBTASK 28-22-41-410-001

- (16) For the center tank left and right fuel boost pumps, install this access panel:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

(TASK 28-11-31-400-801).

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SUBTASK 28-22-41-410-002

(17) For the No. 1 tank fuel boost pumps, install this access door:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

or close this access panel:

<u>Number</u>	<u>Name/Location</u>
631AB	Center Tank Access Door - Wing Station 168

(TASK 28-11-31-400-801).

SUBTASK 28-22-41-650-008

(18) Refuel the center or No. 1 or No. 2 fuel tanks (TASK 12-11-00-650-802).

- (a) For the forward fuel boost pumps, refuel the No. 1 or No. 2 fuel tank to 300 lb (136 kg) minimum.
- (b) For the aft fuel boost pumps, refuel the No. 1 or No. 2 fuel tanks to 300 lb (136 kg) minimum.
- (c) For the center tank fuel boost pumps, refuel the center fuel tank to 14,000 lb (6350 kg) minimum.

SUBTASK 28-22-41-210-004

(19) Make sure there are no fuel leaks at the spar where you installed the the fuel boost pump.

SUBTASK 28-22-41-420-016

(20) Do this task: Install the Motor Impeller, TASK 28-22-41-400-801.

SUBTASK 28-22-41-480-003

(21) If the leading edge slat actuator locks were installed, do these steps:

WARNING: MAKE SURE YOU INSTALL THE LEADING EDGE SLAT ACTUATOR LOCKS TO PREVENT ACCIDENTAL OPERATION OF THE LEADING EDGE SLATS. THE LEADING EDGE SLATS CAN MOVE QUICKLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (a) Do this task: Leading Edge Flap and Slat Locks Removal, TASK 27-81-00-080-801.

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE FLAPS AND SLATS AND THE TRAILING EDGE FLAPS. THE LEADING EDGE FLAPS AND SLATS AND THE TRAILING EDGE FLAPS WILL RETRACT. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (b) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 28-22-41-860-005

(22) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-22-41-860-006

(23) If electrical power is not necessary for other tasks, do this task: Remove External Power, TASK 24-22-00-860-814

————— **END OF TASK** —————

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TASK 28-22-41-710-801

7. Fuel Boost Pump Operational Test

A. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
24-22-00-860-811	Supply Electrical Power (P/B 201)

B. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

C. Procedure

SUBTASK 28-22-41-860-018

- (1) For the No. 1 tank aft fuel boost pump,

Remove the safety tags and close these circuit breakers:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP ALL			

SUBTASK 28-22-41-860-019

- (2) For the No. 1 tank forward fuel boost pump,

Remove the safety tags and close these circuit breakers:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP ALL			

SUBTASK 28-22-41-860-020

- (3) For the No. 2 tank aft fuel boost pump,

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Remove the safety tags and close these circuit breakers:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
------------	------------	---------------	-------------

HAP 037-054, 101-999

D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
---	---	--------	----------------------------

HAP 001-013, 015-026, 028-036

D	4	C00828	FUEL BOOST PUMP TANK 2 AFT
---	---	--------	----------------------------

HAP ALL

SUBTASK 28-22-41-860-021

- (4) For the No. 2 tank forward fuel boost pump,

Remove the safety tags and close these circuit breakers:

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
------------	------------	---------------	-------------

HAP 037-054, 101-999

D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
---	---	--------	----------------------------

HAP 001-013, 015-026, 028-036

D	4	C00829	FUEL BOOST PUMP TANK 2 FWD
---	---	--------	----------------------------

HAP ALL

SUBTASK 28-22-41-860-022

- (5) For the center tank left fuel boost pump,

Remove the safety tags and close these circuit breakers:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
------------	------------	---------------	-------------

HAP 037-054, 101-999

D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
---	---	--------	-------------------------------

HAP 001-013, 015-026, 028-036

D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT
---	---	--------	-------------------------------

HAP ALL

SUBTASK 28-22-41-860-023

- (6) For the center tank right fuel boost pump,

Remove the safety tags and close these circuit breakers:

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
------------	------------	---------------	-------------

HAP 037-054, 101-999

D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
---	---	--------	--------------------------------

HAP 001-013, 015-026, 028-036

D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT
---	---	--------	--------------------------------

HAP ALL

SUBTASK 28-22-41-860-008

- (7) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

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SUBTASK 28-22-41-650-010

- (8) Make sure the fuel tank for the applicable fuel boost pump has the fuel quantity as follows:
- (a) No. 1 tank - 500 lb (227 kg) of fuel (or more)
 - (b) No. 2 tank - 500 lb (227 kg) of fuel (or more).
 - (c) Center fuel tank - 1000 lb (454 kg) of fuel (or more).
 - (d) To refuel the fuel tanks (if it is necessary), do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

SUBTASK 28-22-41-860-024

WARNING: DO NOT OPERATE A FUEL PUMP IF THE AMBER PRESS LIGHT COMES ON AND STAYS ON. IT CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE TANK WHICH WILL CAUSE A FIRE OR EXPLOSION. FIRES AND EXPLOSIONS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (9) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
- (a) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 28-22-41-860-009

- (10) Put the applicable fuel boost pump switch on the fuel management control panel on the overhead panel, P5, to the ON position.
- (a) For the No. 1 tank aft fuel boost pump, the switch is FUEL PUMP TANK 1 - AFT.
 - (b) For the No. 1 tank forward fuel boost pump, the switch is FUEL PUMP TANK 1 - FWD.
 - (c) For the Left center tank fuel boost pump, the switch is FUEL PUMP CTR TANK - LEFT.
 - (d) For the No. 2 aft fuel boost pump, the switch is FUEL PUMP TANK 2 - AFT.
 - (e) For the No. 2 forward fuel boost pump, the switch is FUEL PUMP TANK 2 - FWD.
 - (f) For the Right center tank fuel boost pump, the switch is FUEL PUMP CTR TANK - RIGHT switch .

SUBTASK 28-22-41-280-001

- (11) Listen and make sure the applicable fuel boost pump operates.
- (a) To operate the left or right center fuel boost pump, you must be in the flight compartment to continuously monitor for the amber LOW PRESSURE light.

SUBTASK 28-22-41-210-005

- (12) Make sure the applicable LOW PRESSURE light on the fuel management panel of the P5 panel goes off.
- (a) For the left or right center fuel boost pump, if the amber LOW PRESSURE light stays on, set the applicable FUEL PUMP CTR TANK - LEFT or RIGHT switch, on the P5 Overhead Panel, to the OFF position.

SUBTASK 28-22-41-860-010

- (13) Put the applicable fuel boost pump switch to the off position.

SUBTASK 28-22-41-280-002

- (14) Listen and make sure the applicable fuel boost pump does not operate.

SUBTASK 28-22-41-210-006

- (15) For the No. 1 or No. 2 tank fuel boost pumps, make sure the applicable LOW PRESSURE light comes on.

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SUBTASK 28-22-41-210-008

(16) For the center tank fuel boost pumps, make sure the applicable LOW PRESSURE light stays off.

————— **END OF TASK** —————

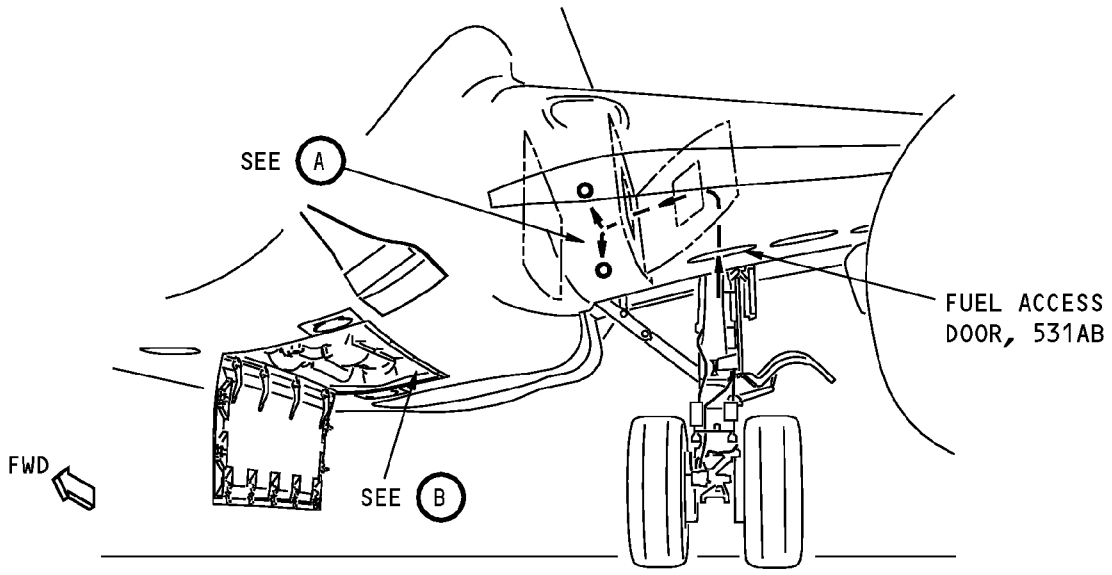
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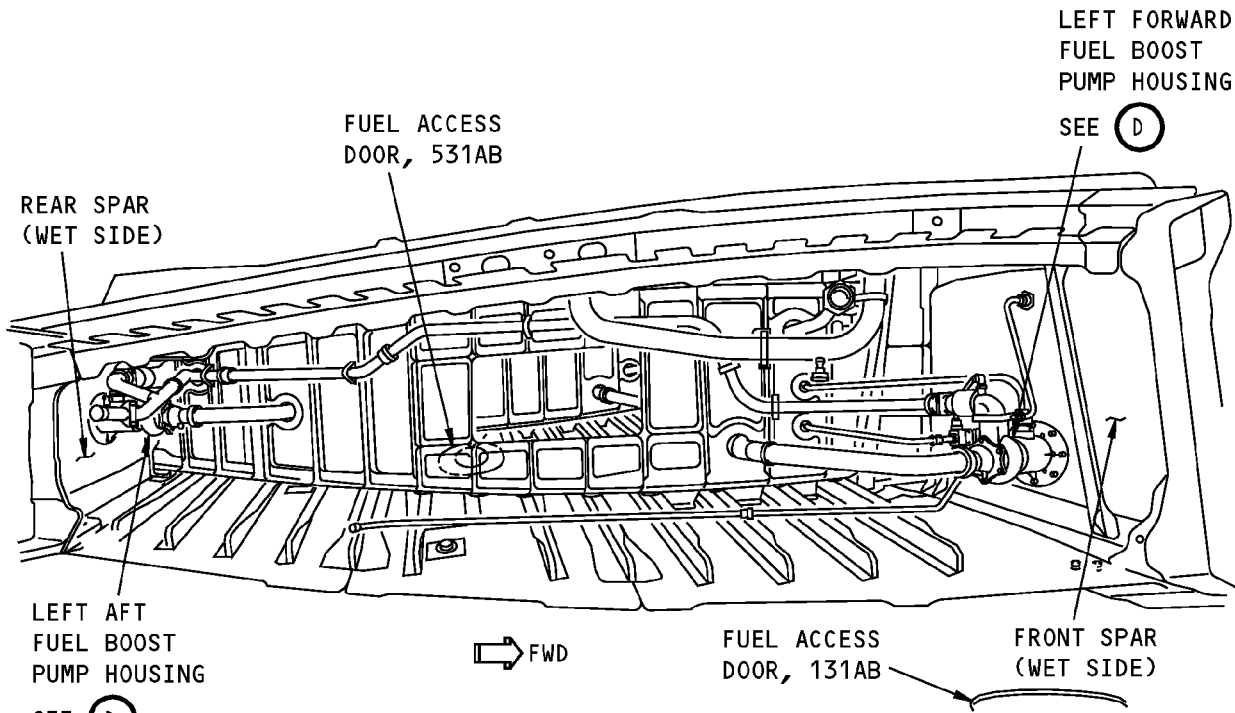
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**LEFT WING
(RIGHT WING IS OPPOSITE)**



CENTER FUEL TANK

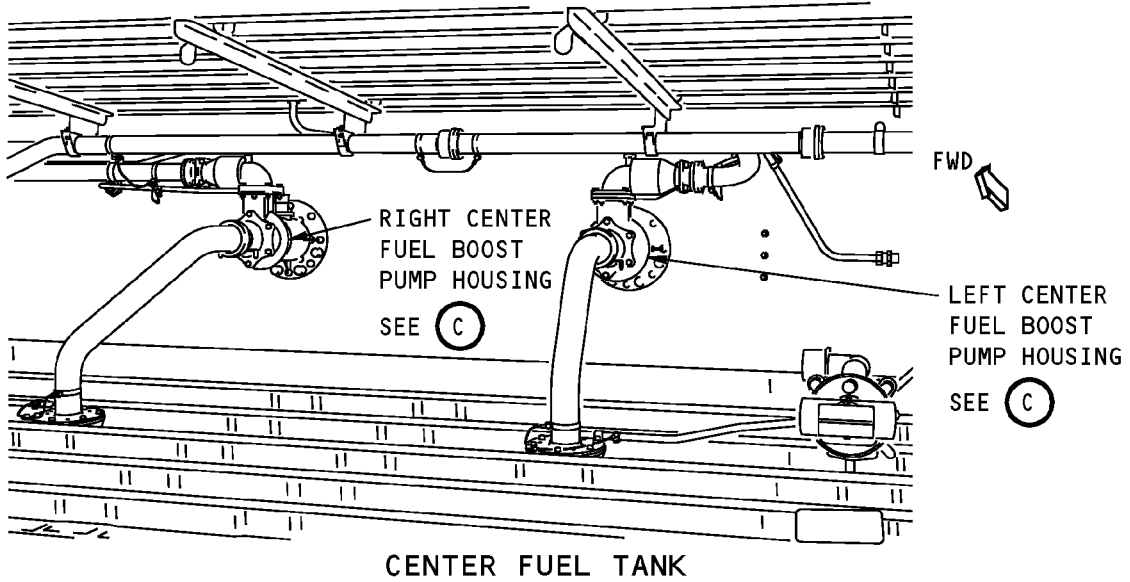
(A)

**Fuel Boost Pump Housing Installation
Figure 407 (Sheet 1 of 4)/28-22-41-990-814**

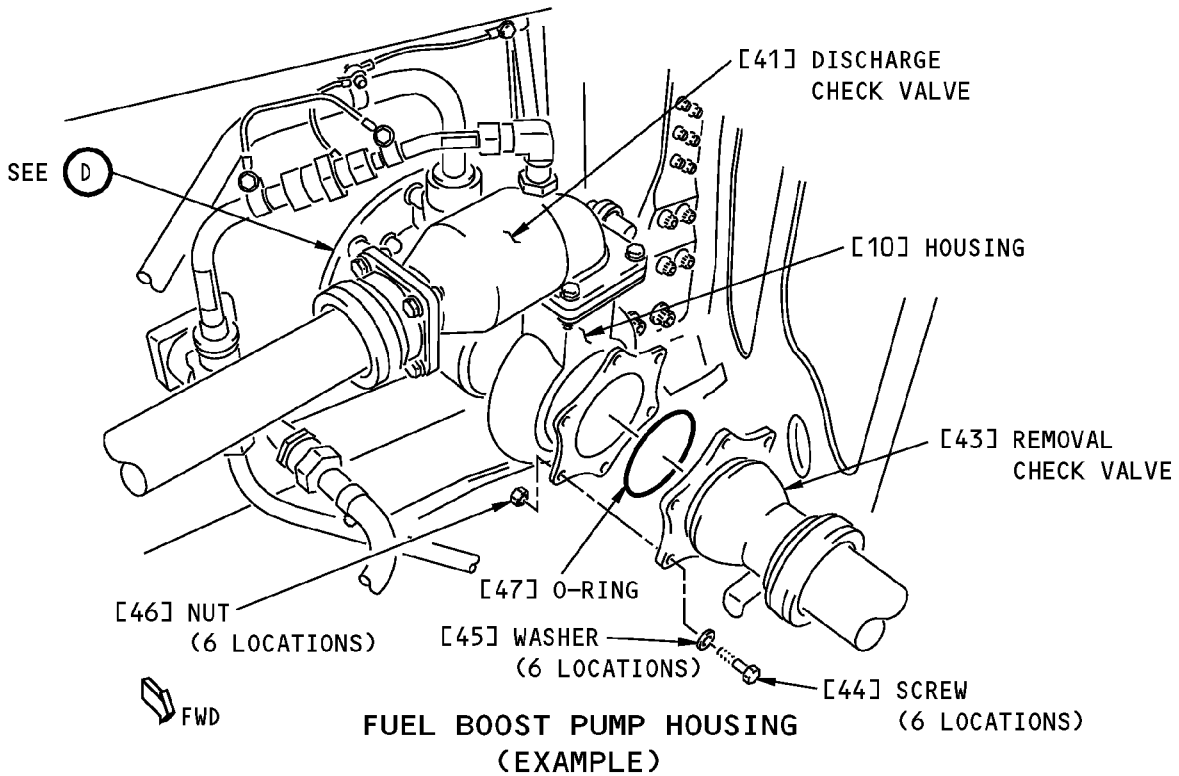
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(B)



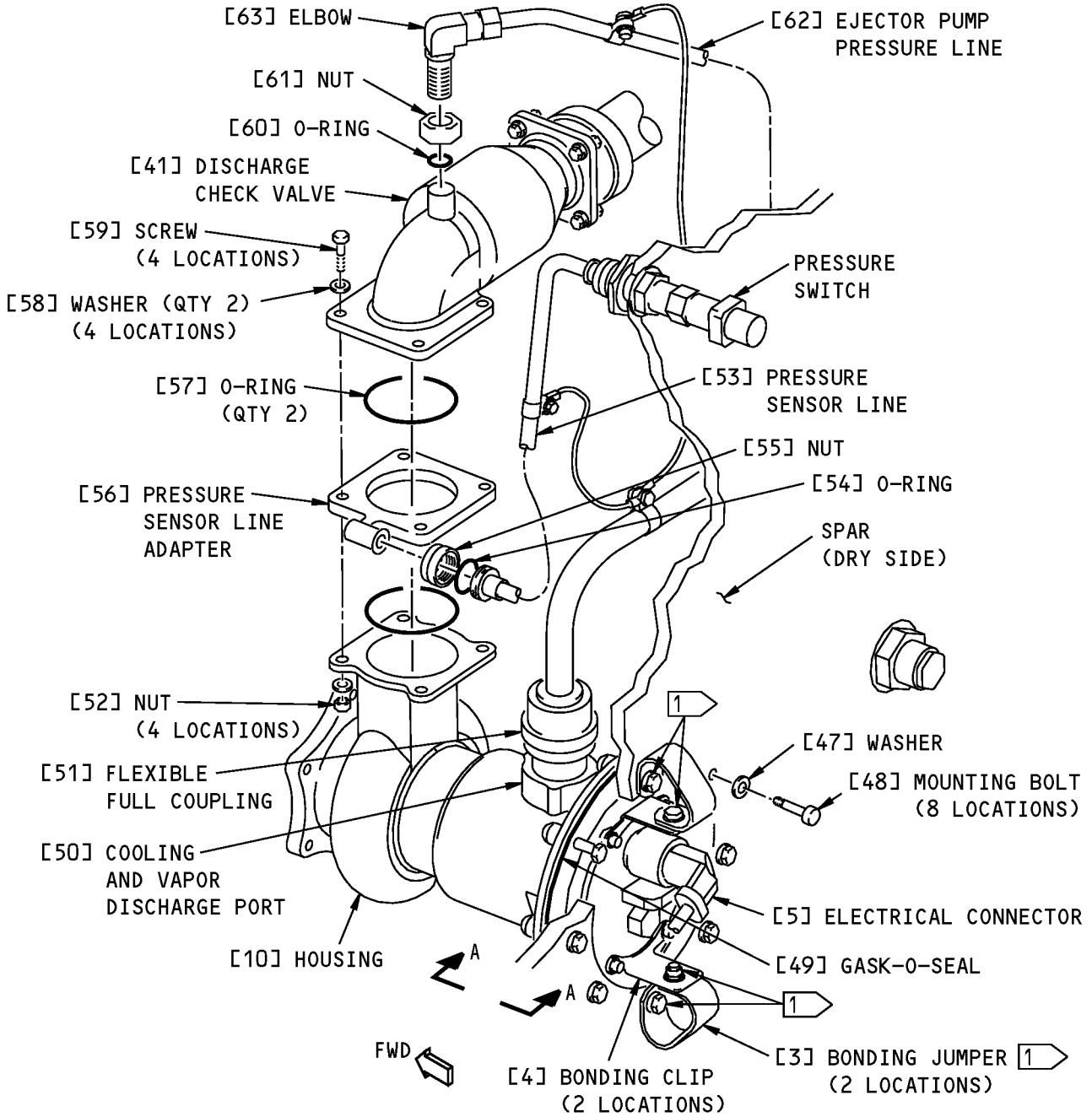
(C)

Fuel Boost Pump Housing Installation
Figure 407 (Sheet 2 of 4)/28-22-41-990-814

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**FUEL BOOST PUMP HOUSING
(EXAMPLE)**

1 FILLET SEAL WITH BMS 5-142

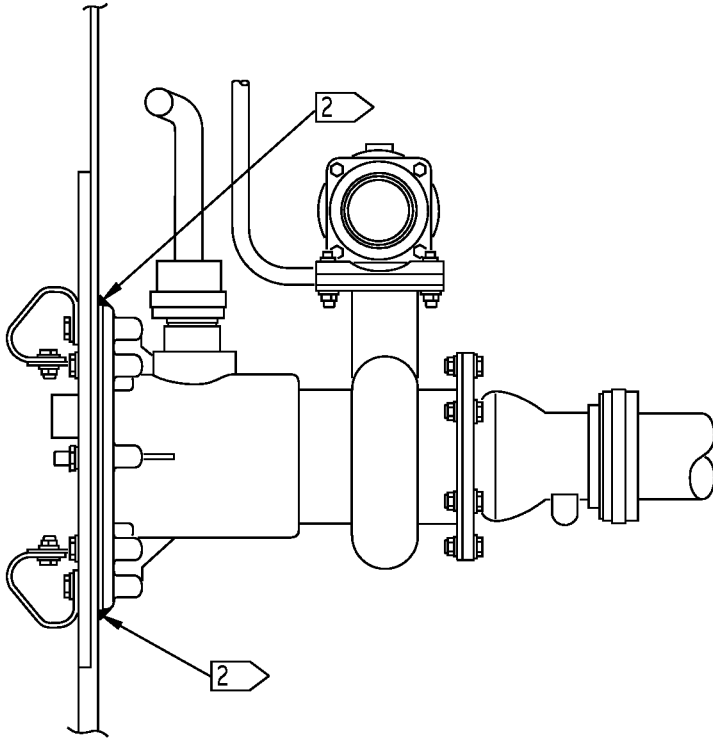
D

**Fuel Boost Pump Housing Installation
Figure 407 (Sheet 3 of 4)/28-22-41-990-814**

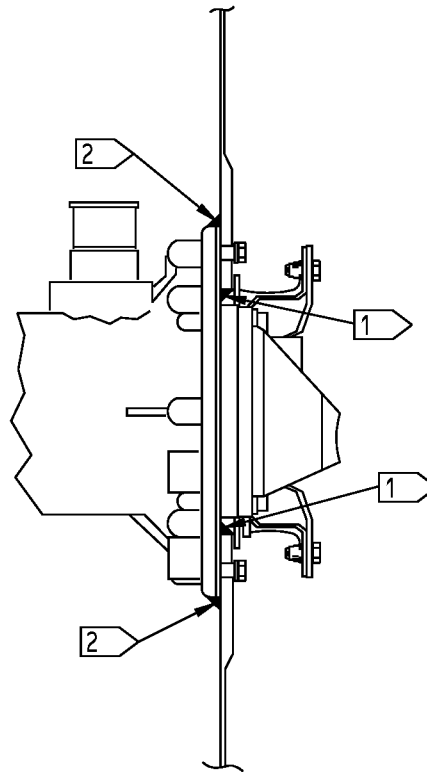
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**NO. 1 OR NO. 2 TANK
BOOST PUMP SEALING
A-A**



**CENTER TANK BOOST PUMP SEALING
A-A**

- 1 FILLET SEAL WITH BMS5-142
- 2 FILLET SEAL WITH BMS5-45

**Fuel Boost Pump Housing Installation
Figure 407 (Sheet 4 of 4)/28-22-41-990-814**

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FUEL BOOST PUMP - ADJUSTMENT/TEST

1. General

A. This procedure contains scheduled maintenance task data.

TASK 28-22-41-720-802

2. Ground Fault Interrupter (GFI) - Operational Test

A. General

- (1) This procedure is a scheduled maintenance task.
- (2) ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on airworthiness limitation instructions (ALIs).

B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
24-22-00-860-811	Supply Electrical Power (P/B 201)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

D. Prepare for Test

SUBTASK 28-22-41-860-050

- (1) Make sure that these circuit breakers are closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
E	11	C00313	INDICATOR MASTER DIM SECT 1
F	12	C00318	INDICATOR MASTER DIM SECT 6

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
HAP 039-054, 101-999; HAP 037, 038 POST SB 737-28A1201			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036 POST SB 737-28A1201			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 039-054, 101-999; HAP 037, 038 POST SB 737-28A1201			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 001-013, 015-026, 028-036 POST SB 737-28A1201			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 039-054, 101-999; HAP 037, 038 POST SB 737-28A1201			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 001-013, 015-026, 028-036 POST SB 737-28A1201			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

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HAP 039-054, 101-999; HAP 001-013, 015-026, 028-036 POST SB 737-28A1201

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HAP 001-013, 015-026, 028-036 POST SB 737-28A1201 (Continued)

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 039-054, 101-999; HAP 037, 038 POST SB 737-28A1201			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036 POST SB 737-28A1201			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 039-054, 101-999; HAP 037, 038 POST SB 737-28A1201			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 001-013, 015-026, 028-036 POST SB 737-28A1201			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 039-054, 101-999; HAP 037, 038 POST SB 737-28A1201			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 001-013, 015-026, 028-036 POST SB 737-28A1201			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 039-054, 101-999; HAP 001-013, 015-026, 028-038 POST SB 737-28A1201			

(2) Make sure the boost pump switches are in the positions shown in Table 501.

Table 501/28-22-41-993-803

SWITCH/CONTROL	POSITION	LOCATION
FUEL PUMP TANK 1 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP TANK 1 - FWD	OFF	P5 OVERHEAD PANEL
FUEL PUMP CTR TANK - LEFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP CTR TANK - RIGHT	OFF	P5 OVERHEAD PANEL
FUEL PUMP TANK 2 - AFT	OFF	P5 OVERHEAD PANEL
FUEL PUMP TANK 2 - FWD	OFF	P5 OVERHEAD PANEL

SUBTASK 28-22-41-860-051

(3) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-22-41-650-012

- (4) Make sure the fuel tank for the applicable fuel boost pump has the fuel quantity as follows:
- (a) No. 1 tank - 500 lb (227 kg) of fuel (or more)
 - (b) No. 2 tank - 500 lb (227 kg) of fuel (or more).
 - (c) Center fuel tank - 2000 lb (907 kg) of fuel (or more).
 - (d) To refuel the fuel tanks (if it is necessary), do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

<p>EFFECTIVITY</p> <p>HAP 039-054, 101-999; HAP 001-013, 015-026, 028-038 POST SB 737-28A1201</p>

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E. Ground Fault Interrupter (GFI) Relay Operational Test

SUBTASK 28-22-41-860-052

WARNING: DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (1) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
 - (a) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 28-22-41-860-053

- (2) Put the applicable fuel boost pump switch on the fuel management control panel on the overhead panel, P5, to the ON position.
 - (a) For the No. 1 tank aft fuel boost pump, the switch is FUEL PUMP TANK 1 - AFT.
 - (b) For the No. 1 tank forward fuel boost pump, the switch is FUEL PUMP TANK 1 - FWD.
 - (c) For the left center tank fuel boost pump, the switch is FUEL PUMP CTR TANK - LEFT.
 - (d) For the No. 2 aft fuel boost pump, the switch is FUEL PUMP TANK 2 - AFT.
 - (e) For the No. 2 forward fuel boost pump, the switch is FUEL PUMP TANK 2 - FWD.
 - (f) For the right center tank fuel boost pump, the switch is FUEL PUMP CTR TANK - RIGHT switch .

SUBTASK 28-22-41-280-017

- (3) Listen and make sure the applicable fuel boost pump operates.

SUBTASK 28-22-41-210-036

- (4) Make sure the applicable LOW PRESSURE light on the fuel management panel of the P5 panel goes off.
 - (a) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 28-22-41-860-054

- (5) Push the applicable ground fault interrupter (GFI) relay TEST button in the power distribution panel, P91 or P92.

NOTE: The GFI relays are found inside the P91 and P92 panels. You will need to open the panels to get access to the GFI relays.

- (a) For the No. 1 tank aft fuel boost pump, the relay is R18, found on the P92 panel.
- (b) For the No. 1 tank forward fuel boost pump, the relay is R19, found on the P91 panel.
- (c) For the left center tank fuel boost pump, the relay is R54, found on the P91 panel.
- (d) For the No. 2 aft fuel boost pump, the relay is R20, found on the P91 panel.
- (e) For the No. 2 forward fuel boost pump, the relay is R21, found on the P92 panel.
- (f) For the right center tank fuel boost pump, the relay is R55, found on the P92 panel.

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HAP 039-054, 101-999; HAP 001-013, 015-026, 028-038 POST
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SUBTASK 28-22-41-210-043

- (6) Make sure the RESET button on the applicable GFI relay has moved up, and shows a white band.

NOTE: The RESET button, found at the top edge of the GFI relay, moves up to expose a narrow white band when the GFI circuit turns off the relay due to a ground fault, or when you push the TEST button found on the top surface of the relay.

SUBTASK 28-22-41-280-018

- (7) Listen and make sure the applicable fuel boost pump does not operate.

SUBTASK 28-22-41-210-037

- (8) For the No. 1 or No. 2 tank fuel boost pumps, make sure the applicable LOW PRESSURE light comes on.

SUBTASK 28-22-41-210-038

- (9) For the center tank fuel boost pumps, make sure the applicable LOW PRESSURE light comes on.

SUBTASK 28-22-41-860-055

- (10) Put the applicable fuel boost pump switch on the fuel management control panel on the overhead panel, P5, to the OFF position.

SUBTASK 28-22-41-710-002

- (11) To make sure that the applicable fuel boost pump does not operate when the GFI circuit turns off the relay, do the subsequent steps:
 - (a) Put the applicable fuel boost pump switch on the fuel management control panel on the overhead panel, P5, to the ON position.
 - (b) Listen and make sure the applicable fuel boost pump does not operate.
 - (c) For the No. 1 or No. 2 tank fuel boost pumps, make sure the applicable LOW PRESSURE light comes on.
 - (d) For the center tank fuel boost pumps, make sure the applicable LOW PRESSURE light comes on.
 - (e) Put the applicable fuel boost pump switch on the fuel management control panel on the overhead panel, P5, to the OFF position.

SUBTASK 28-22-41-860-056

- (12) Push the applicable RESET button on the applicable GFI relay in.
 - (a) Make sure the RESET button does not move back out and the white band does not show.

SUBTASK 28-22-41-860-057

- (13) Put the applicable fuel boost pump switch on the fuel management control panel on the overhead panel, P5, to the ON position.

SUBTASK 28-22-41-280-019

- (14) Listen and make sure the applicable fuel boost pump operates.

SUBTASK 28-22-41-210-040

- (15) Make sure the applicable LOW PRESSURE light on the fuel management panel of the P5 panel goes off.
 - (a) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 28-22-41-860-058

- (16) Put the applicable fuel boost pump switch on the fuel management control panel on the overhead panel, P5, to the OFF position.

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SUBTASK 28-22-41-280-020

(17) Listen and make sure the applicable fuel boost pump does not operate.

SUBTASK 28-22-41-210-041

(18) For the No. 1 or No. 2 tank fuel boost pumps, make sure the applicable LOW PRESSURE light comes on.

SUBTASK 28-22-41-210-042

(19) For the center tank fuel boost pumps, make sure the applicable LOW PRESSURE light stays off.

————— **END OF TASK** —————

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FUEL SYSTEM MODULE, P5-2 - REMOVAL/INSTALLATION

1. General

A. This procedure contains three tasks:

- (1) Removal of the Fuel System Module, P5-2
- (2) Installation of the Fuel System Module, P5-2
- (3) Operational Test of the Fuel System Module, P5-2.

TASK 28-22-43-020-801

2. Removal of the Fuel System Module, P5-2

(Figure 401)

A. Location Zones

<u>Zone</u>	<u>Area</u>
211	Flight Compartment - Left
212	Flight Compartment - Right

B. Procedure

SUBTASK 28-22-43-860-001

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

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	7	C00355	FUEL TEMP IND
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1
B	5	C00540	FUEL SPAR VALVE IND
B	7	C00361	FUEL CROSS FEED VALVE
E	11	C00313	INDICATOR MASTER DIM SECT 1
F	12	C00318	INDICATOR MASTER DIM SECT 6

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 001-013, 015-026, 028-036			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

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HAP 037-054, 101-999 (Continued)

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 001-013, 015-026, 028-036			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP ALL			

SUBTASK 28-22-43-860-002

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

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
C	4	C01471	FUEL SHUTOFF VALVES PWR PACK
C	6	C01472	FUEL SHUTOFF VALVES BUS
C	11	C01275	MASTER CAUTION ANNUNCIATOR CONT 1
E	3	C01321	ENGINE FUEL ENGINE 2 HPSOV CONT
E	4	C01396	ENGINE FUEL ENGINE 2 HPSOV IND
E	5	C01320	ENGINE FUEL ENGINE 1 HPSOV CONT
E	6	C01395	ENGINE FUEL ENGINE 1 HPSOV IND

HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206

SUBTASK 28-22-43-860-011

(3) Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
C	3	C01637	BOOST PMP CTR TNK L AUTO SHUT OFF-DC
C	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC
HAP 031-036; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206			
D	7	C01639	BOOST PUMP CTR TNK L AUTO SHUT OFF-AC
E	7	C01640	BOOST PUMP CTR TNK R AUTO SHUT OFF-AC

HAP ALL

SUBTASK 28-22-43-020-001

(4) Loosen the six quick-release fasteners on the baseplate of the P5-2 module.

SUBTASK 28-22-43-020-002

(5) Disconnect the connectors D626, D628, and D616 from the rear of the P5-2 module.

SUBTASK 28-22-43-020-003

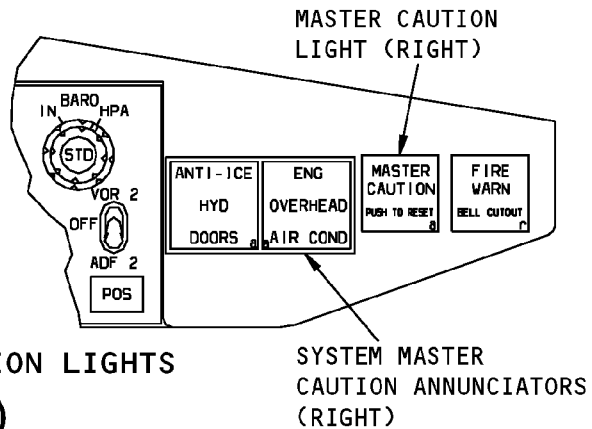
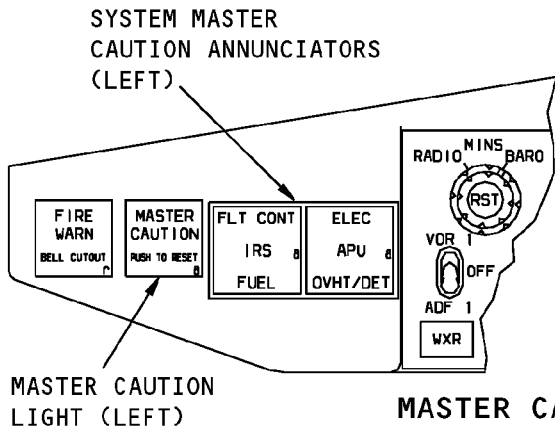
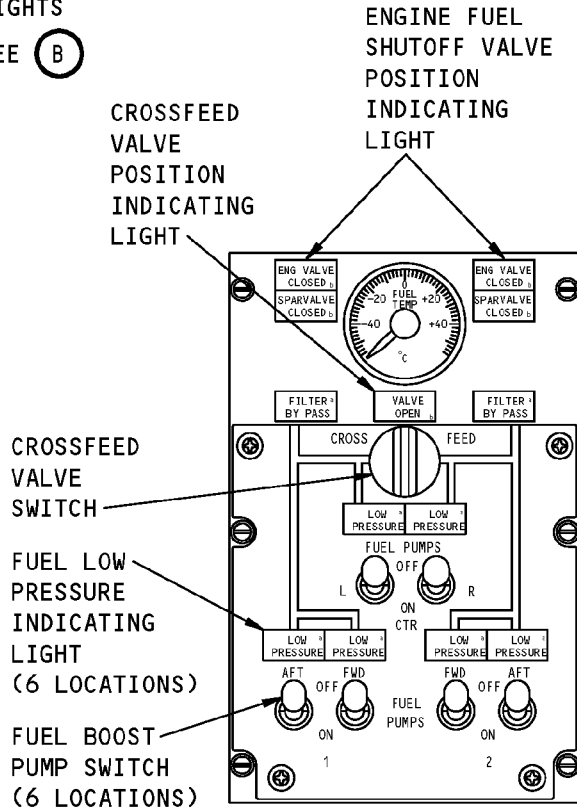
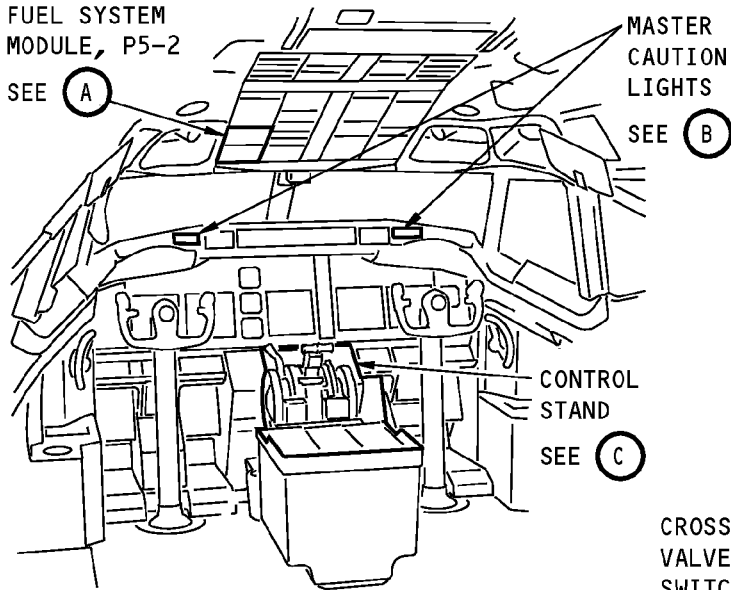
(6) Remove the P5-2 module from the P5 panel.

END OF TASK

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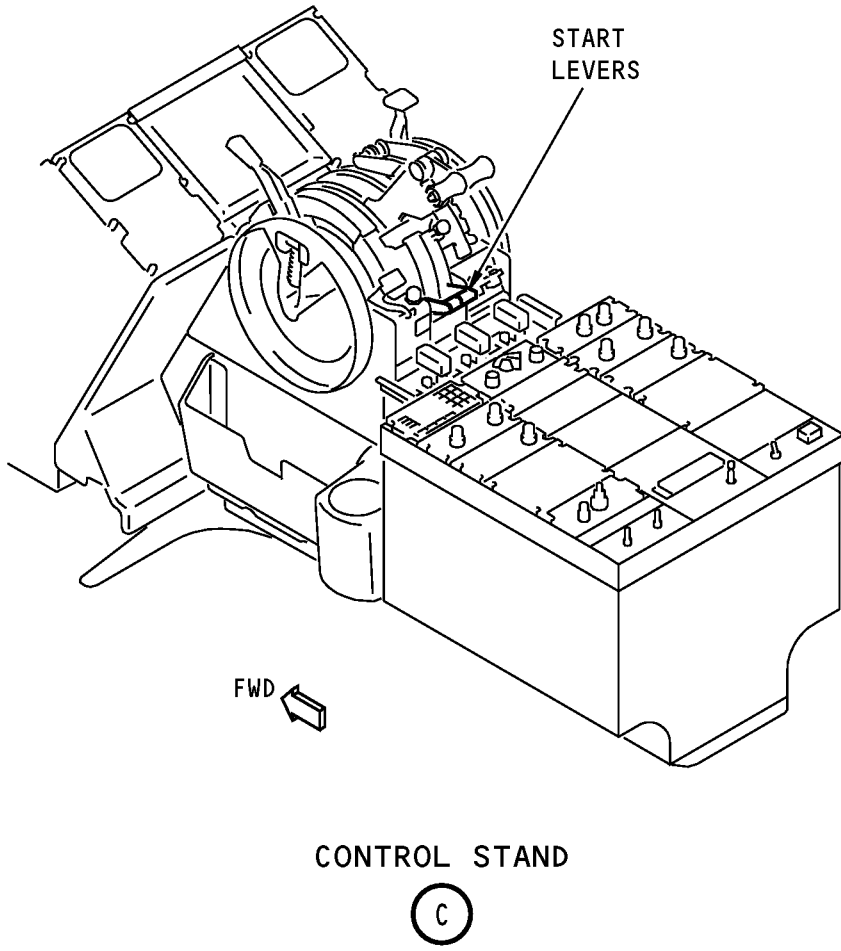


Fuel System Module, P5-2
Figure 401 (Sheet 1 of 2)/28-22-43-990-803

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Fuel System Module, P5-2
Figure 401 (Sheet 2 of 2)/28-22-43-990-803

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TASK 28-22-43-420-801

3. Installation of the Fuel System Module, P5-2

(Figure 401)

A. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right

B. Procedure

SUBTASK 28-22-43-420-001

(1) Move the P5-2 module close to its position in the P5 panel.

SUBTASK 28-22-43-420-002

(2) Connect the connectors D616, D626, and D628 to the rear of the P5-2 module.

SUBTASK 28-22-43-420-003

(3) Install the P5-2 module in its position with the six quick-release fasteners on the baseplate.

SUBTASK 28-22-43-710-001

(4) Do this task: Operational Test of the Fuel System Module, P5-2, TASK 28-22-43-710-801.

————— **END OF TASK** —————

TASK 28-22-43-710-801

4. Operational Test of the Fuel System Module, P5-2

(Figure 401, Figure 402)

A. References

Reference	Title
24-22-00-860-813	Supply External Power (P/B 201)
24-22-00-860-814	Remove External Power (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
73-21-00-700-804-F00	EEC TEST (P/B 501)
SSM 76-21-11	System Schematics Manual

B. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right

C. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2

D. Procedure

SUBTASK 28-22-43-860-003

(1) Supply external power to the airplane if power is not supplied. To do this, do this task: Supply External Power, TASK 24-22-00-860-813

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SUBTASK 28-22-43-860-004

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

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	7	C00355	FUEL TEMP IND
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1
B	5	C00540	FUEL SPAR VALVE IND
B	7	C00361	FUEL CROSS FEED VALVE
E	11	C00313	INDICATOR MASTER DIM SECT 1
F	12	C00318	INDICATOR MASTER DIM SECT 6

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP ALL			

SUBTASK 28-22-43-860-005

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

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
C	4	C01471	FUEL SHUTOFF VALVES PWR PACK
C	6	C01472	FUEL SHUTOFF VALVES BUS
C	11	C01275	MASTER CAUTION ANNUNCIATOR CONT 1
E	3	C01321	ENGINE FUEL ENGINE 2 HPSOV CONT
E	4	C01396	ENGINE FUEL ENGINE 2 HPSOV IND
E	5	C01320	ENGINE FUEL ENGINE 1 HPSOV CONT
E	6	C01395	ENGINE FUEL ENGINE 1 HPSOV IND

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HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206

SUBTASK 28-22-43-860-012

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	3	C01637	BOOST PMP CTR TNK L AUTO SHUT OFF-DC
C	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC

HAP 031-036; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206

D	7	C01639	BOOST PUMP CTR TNK L AUTO SHUT OFF-AC
E	7	C01640	BOOST PUMP CTR TNK R AUTO SHUT OFF-AC

HAP ALL

SUBTASK 28-22-43-860-006

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

HAP 001-013, 015-026, 028-036

D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT
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Power Distribution Panel Number 2, P92

Row	Col	Number	Name
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

HAP 001-013, 015-026, 028-036

D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT
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HAP ALL

SUBTASK 28-22-43-710-002

- (6) On the P5-2 module, make sure the SPAR VALVE CLOSED light for engine No. 1 is dimly on.

SUBTASK 28-22-43-860-007

- (7) On the P5-2 module, make sure the ENG VALVE CLOSED indication light for engine No. 1 is dimly on.

SUBTASK 28-22-43-710-003

- (8) Move the ENGINE 1 start lever to the IDLE position.

SUBTASK 28-22-43-710-004

- (9) Make sure the SPAR VALVE CLOSED light for Engine No. 1 comes on bright while the valve goes from the closed to the open position.

SUBTASK 28-22-43-710-005

- (10) Make sure the SPAR VALVE CLOSED light for Engine No. 1 goes off a maximum of six seconds after you moved the Engine No. 1 start lever to the IDLE position.

SUBTASK 28-22-43-710-027

- (11) Make sure the ENG VALVE CLOSED light for Engine No. 1 comes on bright after you move the Engine No. 1 start lever to the IDLE position.

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SUBTASK 28-22-43-760-001

(12) Do these steps to make sure ENG VALVE CLOSED light for Engine No. 1 is off when the HPSOV is open and the start lever is in IDLE position:

(a) To get access to the hydromechanical unit (HMU) found at approximately 8 o'clock, do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

Open this access panel:

<u>Number</u>	<u>Name/Location</u>
413	Left Fan Cowl, Engine 1

(b) Disconnect connector DP1207 at the HMU and jumper pin 1 to pin 2 in DP1207 (SSM 76-21-11).

NOTE: On P5-2 modules part number 233A3202-1 and -2, it is necessary to attach a jumper between pins 1 and 2 to cause the ENG VALVE CLOSED light to go off. On P5-2 modules part number 233A3202-3 and subsequent, the ENG VALVE CLOSED light goes off when you disconnect connector DP1207.

(c) On the P5-2 panel, make sure that the ENG VALVE CLOSED light for Engine No. 1 is off.

(d) Remove the jumper from connector DP1207 and re-connect DP1207 to the HMU.

(e) On the P5-2 panel, make sure that the ENG VALVE CLOSED light for Engine No. 1 is on bright.

(f) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
413	Left Fan Cowl, Engine 1

SUBTASK 28-22-43-710-006

(13) Move the ENGINE No. 1 start lever to the CUTOFF position.

SUBTASK 28-22-43-760-002

(14) Make sure the SPAR VALVE CLOSED light for Engine No. 1 is dimly on.

SUBTASK 28-22-43-710-007

(15) Make sure the SPAR VALVE CLOSED light for Engine No. 2 is dimly on.

SUBTASK 28-22-43-860-008

(16) On the P5-2 module, make sure the ENG VALVE CLOSED indication light for engine No. 2 is dimly on.

SUBTASK 28-22-43-710-008

(17) Move the engine No. 2 start lever to the IDLE position.

SUBTASK 28-22-43-710-009

(18) Make sure the SPAR VALVE CLOSED light for Engine No. 2 comes on bright while the valve goes from the closed to the open position.

SUBTASK 28-22-43-710-010

(19) Make sure the SPAR VALVE CLOSED light for Engine No. 2 goes off a maximum of six seconds after you moved the Engine No. 2 start lever to the IDLE position.

SUBTASK 28-22-43-710-028

(20) Make sure the ENG VALVE CLOSED light for Engine No. 2 comes on bright after you move the Engine No. 2 start lever to the IDLE position.

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SUBTASK 28-22-43-760-003

(21) Do these steps to make sure ENG VALVE CLOSED light for Engine No. 2 is off when the HPSOV is open and the start lever is in IDLE position:

(a) To get access to the hydromechanical unit (HMU) found at approximately 8 o'clock, do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

Open this access panel:

<u>Number</u>	<u>Name/Location</u>
423	Left Fan Cowl, Engine 2

(b) Disconnect connector DP1207 at the HMU and jumper pin 1 to pin 2 in DP1207 (SSM 76-21-11).

NOTE: On P5-2 modules part number 233A3202-1 and -2, it is necessary to attach a jumper between pins 1 and 2 to cause the ENG VALVE CLOSED light to go off. On P5-2 modules part number 233A3202-3 and subsequent, the ENG VALVE CLOSED light goes off when you disconnect connector DP1207.

(c) On the P5-2 panel, make sure that the ENG VALVE CLOSED light for Engine No. 2 is off.

(d) Remove the jumper from connector DP1207 and re-connect DP1207 to the HMU.

(e) On the P5-2 panel, make sure that the ENG VALVE CLOSED light for Engine No. 2 is on bright.

(f) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
423	Left Fan Cowl, Engine 2

SUBTASK 28-22-43-710-011

(22) Move the ENGINE No. 2 start lever to the CUTOFF position.

SUBTASK 28-22-43-760-004

(23) Make sure the SPAR VALVE CLOSED light for Engine No. 2 is dimly on.

SUBTASK 28-22-43-710-012

(24) On the P5-2 module, make sure the fuel temperature needle is not against the lower stop or the upper stop.

SUBTASK 28-22-43-710-013

(25) Make sure that the VALVE OPEN indication light for the crossfeed valve is off.

SUBTASK 28-22-43-710-014

(26) Set the FUEL CROSSFEED VALVE switch to the OPEN position.

SUBTASK 28-22-43-710-015

(27) Make sure the VALVE OPEN indication light for the crossfeed valve is on bright while the valve goes from the closed position to the open position.

SUBTASK 28-22-43-710-016

(28) Make sure the VALVE OPEN light for crossfeed valve position becomes dim a maximum of six seconds after you set the FUEL CROSSFEED VALVE switch to OPEN.

SUBTASK 28-22-43-710-017

(29) Set the FUEL CROSSFEED VALVE switch to CLOSED.

SUBTASK 28-22-43-710-018

(30) Make sure the LOW PRESSURE lights for each of these boost pumps are on:

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- (a) TANK 1 - AFT
- (b) TANK 1 - FWD
- (c) TANK 2 - AFT
- (d) TANK 2 - FWD

SUBTASK 28-22-43-710-019

(31) Move the switches for these pumps to ON:

- (a) CTR LEFT
- (b) CTR RIGHT

SUBTASK 28-22-43-710-020

(32) Make sure the LOW PRESSURE lights for these pumps come on:

- (a) CTR - LEFT
- (b) CTR - RIGHT

SUBTASK 28-22-43-710-021

(33) Move the switches for these pumps to OFF:

- (a) CTR - LEFT
- (b) CTR - RIGHT

SUBTASK 28-22-43-710-022

(34) On the P7 glare shield, make sure the FUEL light on the master caution system annunciator is on.

SUBTASK 28-22-43-710-023

(35) Push the MASTER CAUTION annunciator light on the P7 glare shield.

SUBTASK 28-22-43-710-024

(36) Make sure the FUEL light on the master caution annunciator goes off.

SUBTASK 28-22-43-710-025

(37) Push the FUEL light on the master caution systems annunciator.

SUBTASK 28-22-43-710-026

(38) Make sure the FUEL light on the master caution systems annunciator comes on.

SUBTASK 28-22-43-710-029

(39) To do a test of the FILTER BYPASS lights, do this task: EEC TEST, TASK 73-21-00-700-804-F00 to make sure the FILTER BYPASS lights come on and go off as expected.

SUBTASK 28-22-43-860-009

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

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 001-013, 015-026, 028-036			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

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HAP 001-013, 015-026, 028-036 (Continued)

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 001-013, 015-026, 028-036			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP ALL			

SUBTASK 28-22-43-860-010

- (41) Remove external power from the airplane if it is not necessary for other tasks. To do this, do this task: Remove External Power, TASK 24-22-00-860-814

————— **END OF TASK** —————

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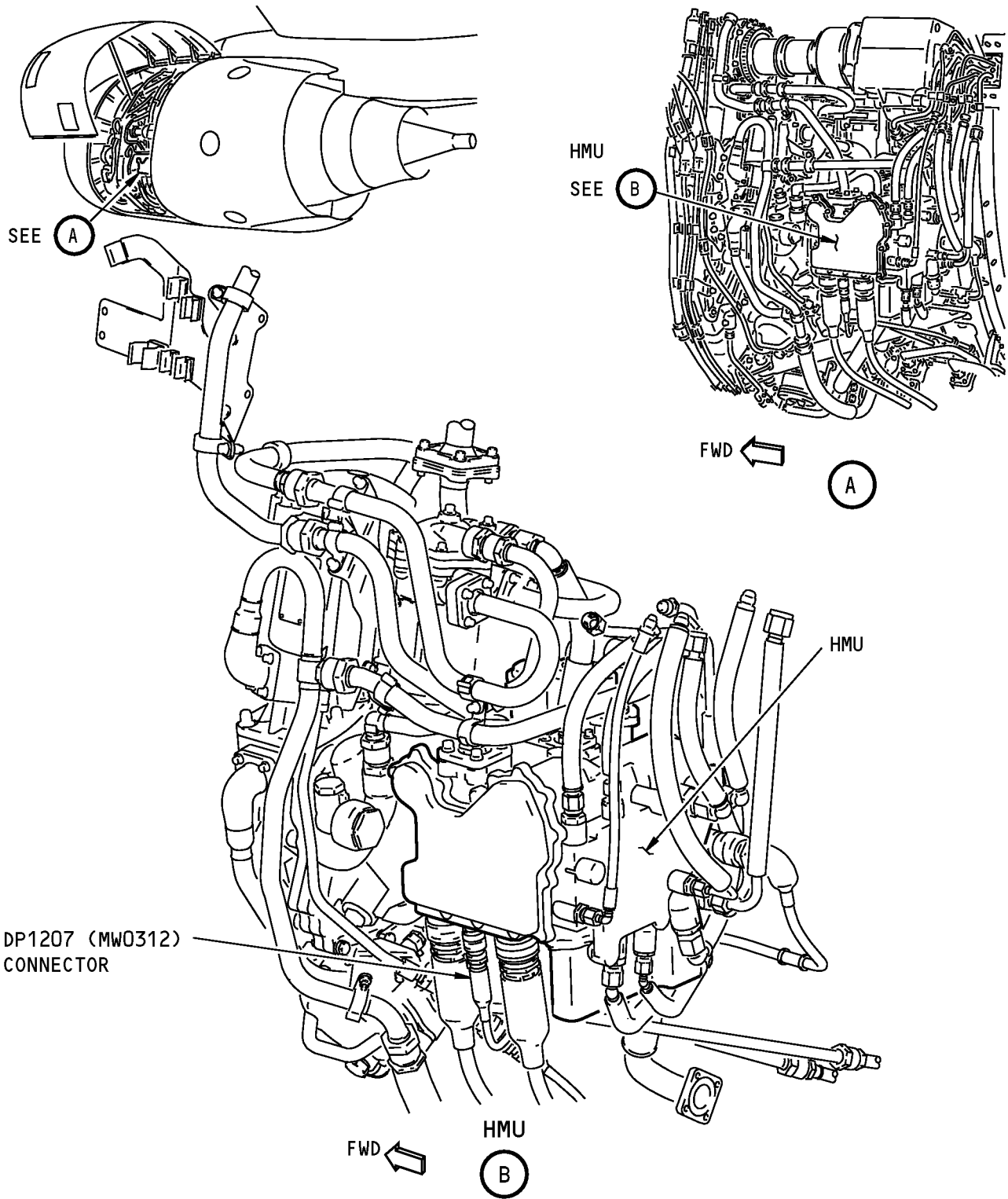
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**Hydromechanical Unit (HMU) Location
Figure 402/28-22-43-990-804**

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BOOST PUMP REMOVAL CHECK VALVE - REMOVAL/INSTALLATION

1. General

- A. A removal check valve attaches to each of the six fuel boost pumps. The fuel boost pumps are installed on the front and rear spars. The removal check valve lets you remove the motor impeller without defueling the fuel tank.
- B. This procedure contains two tasks. The first task removes the removal check valve. The second task installs the removal check valve.

TASK 28-22-51-000-801

2. Remove the Removal Check Valve

(Figure 401)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-22-15-000-801	Fuel Line, Fitting and Coupling - Removal (P/B 401)
28-22-21-710-801	Crossfeed Valve Operational Test (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)

B. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Access Panels

Number	Name/Location
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
631AB	Center Tank Access Door - Wing Station 168

D. Procedure

SUBTASK 28-22-51-650-001

- (1) Defuel the center fuel tank (TASK 28-26-00-650-801).

SUBTASK 28-22-51-650-005

- (2) If you are scheduled to remove the removal check valve for a boost pump in the No. 1 tank or for the left boost pump in the center tank, defuel the No. 1 tank.

SUBTASK 28-22-51-650-006

- (3) If you are scheduled to remove the removal check valve for a boost pump in the No. 2 tank or for the right boost pump in the center tank, defuel the No. 2 tank.

SUBTASK 28-22-51-860-001

- (4) Do these steps to make sure the crossfeed valve is closed:

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- (a) Do this task: Crossfeed Valve Operational Test, TASK 28-22-21-710-801.
- (b) Make sure the crossfeed valve is set to the closed position and the crossfeed position indicator light is off.

SUBTASK 28-22-51-650-004

- (5) Drain and purge the center fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-22-51-010-001

- (6) To remove the removal check valves of the fuel boost pumps in the No. 1 tank, remove this access panel:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

(TASK 28-11-31-000-801).

SUBTASK 28-22-51-010-002

- (7) To remove the removal check valves of the fuel boost pumps in the No. 2 tank, remove this access panel:

<u>Number</u>	<u>Name/Location</u>
631AB	Center Tank Access Door - Wing Station 168

(TASK 28-11-31-000-801).

SUBTASK 28-22-51-010-003

- (8) To remove the removal check valves of the center tank fuel boost pumps, remove the center tank access door:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

(TASK 28-11-31-000-801).

SUBTASK 28-22-51-940-001

- (9) Obey the fuel tank entry precautions (TASK 28-11-00-910-802).

SUBTASK 28-22-51-010-004

- (10) Go into the center fuel tank.

SUBTASK 28-22-51-020-001

- (11) Disconnect the flexible half coupling [3] between the removal check valve [2] and pump inlet line (TASK 28-22-15-000-801).

SUBTASK 28-22-51-020-002

- (12) Remove all fittings from the length of the pump inlet line that connects to the removal check valve [2] (TASK 28-22-15-000-801).

SUBTASK 28-22-51-020-003

- (13) Move the pump inlet line away from the removal check valve [2].

SUBTASK 28-22-51-020-004

- (14) Remove the six screws [4], washers [5], and nuts [7] from the flange of the removal check valve [2].

SUBTASK 28-22-51-020-005

- (15) Remove the O-ring [6].

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SUBTASK 28-22-51-020-006

(16) Remove the removal check valve [2].

————— **END OF TASK** —————

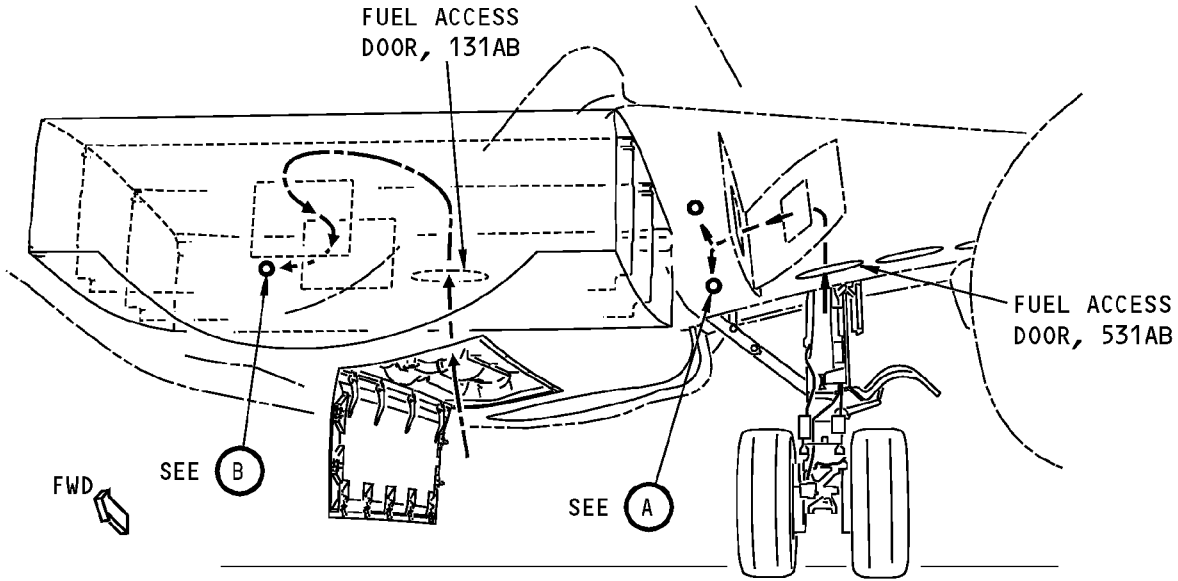
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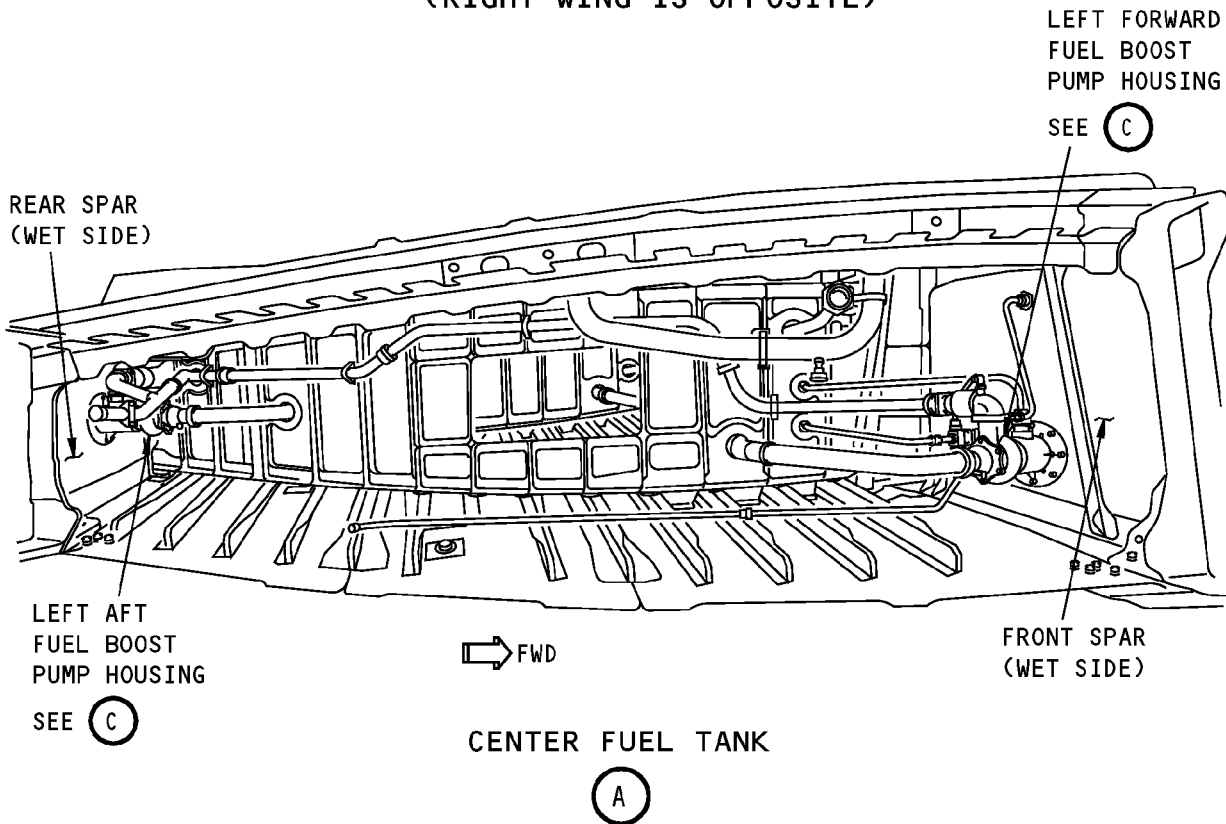
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**LEFT WING
(RIGHT WING IS OPPOSITE)**



**Boost Pump Removal Check Valve Installation
Figure 401 (Sheet 1 of 2)/28-22-51-990-802**

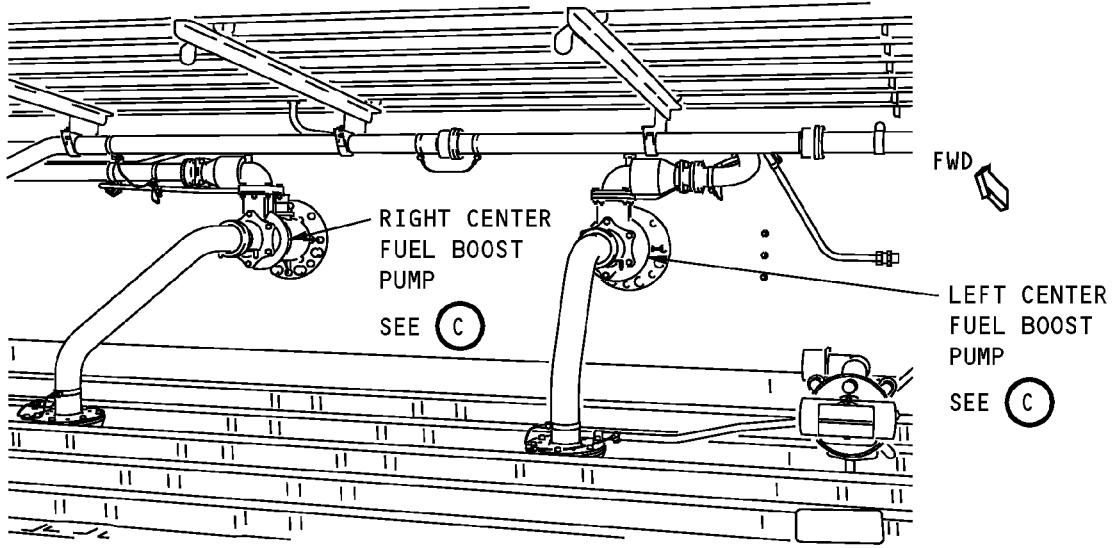
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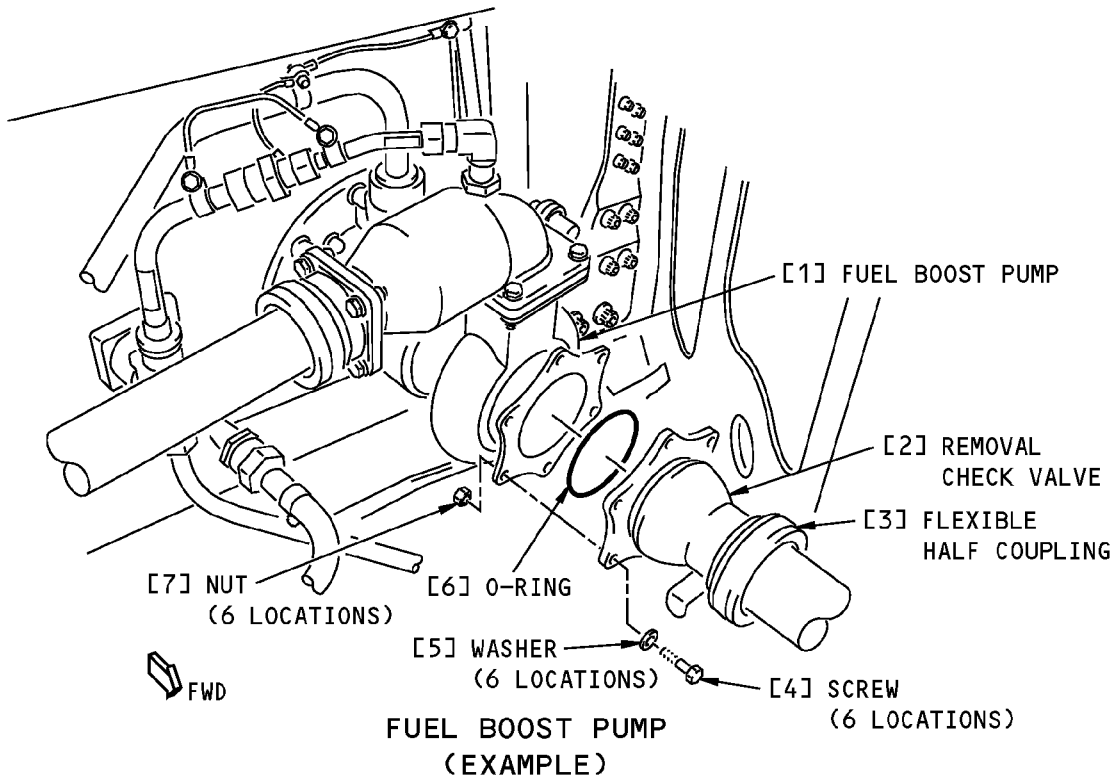
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CENTER FUEL TANK

(B)



FUEL BOOST PUMP
(EXAMPLE)

(C)

Boost Pump Removal Check Valve Installation
Figure 401 (Sheet 2 of 2)/28-22-51-990-802

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TASK 28-22-51-400-801

3. Install the Removal Check Valve

(Figure 401)

A. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)
28-22-41-000-801	Remove the Motor Impeller (P/B 401)
28-22-41-400-801	Install the Motor Impeller (P/B 401)

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
SPL-1769	Puller - Boost Pump, Main Tank (Part #: B28003-1, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Removal check valve	28-22-51-05-035	HAP 031-054, 101-999
		28-22-51-05-135	HAP ALL
		28-22-51-05-175	HAP ALL
6	O-ring	28-22-51-05-040	HAP 031-054, 101-999
		28-22-51-05-180	HAP ALL

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

E. Access Panels

Number	Name/Location
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
631AB	Center Tank Access Door - Wing Station 168

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F. Procedure

SUBTASK 28-22-51-940-002

WARNING: OBEY THE FUEL TANK ENTRY PRECAUTIONS. FAILURE TO OBEY THE FUEL TANK ENTRY PRECAUTIONS COULD CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Obey the fuel tank entry precautions (TASK 28-11-00-910-802).

SUBTASK 28-22-51-420-001

(2) Put a new O-ring [6] in the groove on the flange of the removal check valve.

SUBTASK 28-22-51-820-001

(3) Align the flange of the removal check valve [2] with the flange of the fuel boost pump [1].

SUBTASK 28-22-51-420-002

(4) Install the six screws [4], washers [5] and nuts [7] with the bonding jumper on one of the screws.

SUBTASK 28-22-51-420-003

(5) Install the flexible half coupling [3] to attach the pump inlet line and the removal check valve [2] (TASK 28-22-15-400-801).

SUBTASK 28-22-51-420-004

(6) Install all the fittings on the pump inlet line (TASK 28-22-15-400-801).

SUBTASK 28-22-51-010-005

(7) For the removal check valves of the fuel boost pumps in the No. 1 tank, install this access panel:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

(TASK 28-11-31-400-801).

SUBTASK 28-22-51-010-006

(8) For the removal check valves of the fuel boost pumps in the No. 2 tank, install this access panel:

<u>Number</u>	<u>Name/Location</u>
631AB	Center Tank Access Door - Wing Station 168

(TASK 28-11-31-400-801).

SUBTASK 28-22-51-010-007

(9) For the removal check valves of the center tank fuel boost pumps, install the center tank access door.

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

(TASK 28-11-31-400-801).

SUBTASK 28-22-51-710-001

(10) To do an operational test of a removal valve for the No. 1 tank forward or the No. 1 tank aft boost pump, do these steps:

- Add a minimum of 300 pounds (140 kilograms) of fuel to the No. 1 tank. To do this, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802
- Pull the motor impeller [1] out 1.5 inches (38.1 mm) (or to the MS35275-250 screws) from the housing [10] to let the removal check valve close. To do this, do this task: Remove the Motor Impeller, TASK 28-22-41-000-801
- Use the puller, SPL-1769 to pull out the motor impeller [1].

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(d) Remove the drain plug.

CAUTION: MAKE SURE FUEL DOES NOT CONTINUOUSLY DRAIN. IF FUEL CONTINUOUSLY DRAINS, THE REMOVAL CHECK VALVE IS NOT CLOSED AND YOU MUST INSTALL THE MOTOR IMPELLER [1] AND DEFUEL THE FUEL TANK.

(e) Make sure fuel does not continuously drain from the drain port.

(f) Re-install the drain plug.

(g) Re-install the applicable boost pump impeller for the removal valve that you installed. To do this, do this task: Install the Motor Impeller, TASK 28-22-41-400-801

SUBTASK 28-22-51-710-002

(11) To do an operational test of a removal valve for the left or right center tank, do these steps:

(a) Add a minimum of 14,000 pounds (6400 kilograms) of fuel to the No. 1 tank. To do this, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802

(b) Pull the motor impeller [1] out 1.5 inches (38.1 mm) (or to the MS35275-250 screws) from the housing [10] to let the removal check valve close. To do this, do this task: Remove the Motor Impeller, TASK 28-22-41-000-801

(c) Remove the drain plug.

CAUTION: MAKE SURE FUEL DOES NOT CONTINUOUSLY DRAIN. IF FUEL CONTINUOUSLY DRAINS, THE REMOVAL CHECK VALVE IS NOT CLOSED AND YOU MUST INSTALL THE MOTOR IMPELLER [1] AND DEFUEL THE FUEL TANK.

(d) Make sure fuel does not continuously drain from the drain port.

(e) Re-install the drain plug.

(f) Re-install the applicable boost pump impeller for the removal valve that you installed. To do this, do this task: Install the Motor Impeller, TASK 28-22-41-400-801

————— END OF TASK —————

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MAIN TANK FUEL BOOST PUMP BYPASS VALVE - REMOVAL/INSTALLATION

1. General

- A. There is one fuel boost pump bypass valve in each main fuel tank. The bypass valve lets suction fuel flow to the engine if the two fuel boost pumps in one of the wing tanks do not operate. Each bypass valve is found between stringers 5 and 6 at immediately outboard of the No. 1 tank wall or the No. 2 tank wall. The bypass valve is installed in the suction feed line, downstream of the filter screen.
- B. This procedure contains two tasks. The first task removes the bypass valve. The second task installs the bypass valve.
- C. The fuel boost pump bypass valve is referred to as "the bypass valve" in this procedure.

TASK 28-22-61-000-801

2. Remove the Fuel Boost Pump Bypass Valve

(Figure 401)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-22-15-000-801	Fuel Line, Fitting and Coupling - Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)

B. Location Zones

Zone	Area
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Access Panels

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

D. Procedure

SUBTASK 28-22-61-650-001

- (1) Defuel the applicable No. 1 or No. 2 fuel tank (TASK 28-26-00-650-801).

SUBTASK 28-22-61-650-002

- (2) Drain and purge the applicable No. 1 or No. 2 tank (TASK 28-11-00-910-802).

SUBTASK 28-22-61-010-001

- (3) Remove the applicable No. 1 tank or No. 2 tank access door:

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216

or open this access panel:

Number	Name/Location
632AB	Main Tank Access Door - Wing Station 216

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(TASK 28-11-11-000-801).

SUBTASK 28-22-61-940-001

(4) Obey the fuel tank entry precautions (TASK 28-11-00-910-802).

SUBTASK 28-22-61-010-002

(5) Go into the fuel tank.

SUBTASK 28-22-61-010-003

(6) Find the bypass valve.

SUBTASK 28-22-61-020-001

(7) To remove the bypass valve, do these steps:

- (a) Remove the screws [1], washers [2], and nuts [3] from the mounting brackets that attach the suction feed line [4] to the end rib of the fuel tank.
- (b) Remove the coupling between the bypass valve [8] and the suction feed line [10] (TASK 28-22-15-000-801).
- (c) Remove the screws [5], washers [6], and nuts [7] on the flange that connects the bypass valve to the suction feed line.
- (d) Remove the bypass valve.
- (e) Put covers on the open ends of the suction feed line to keep unwanted materials out.

————— **END OF TASK** —————

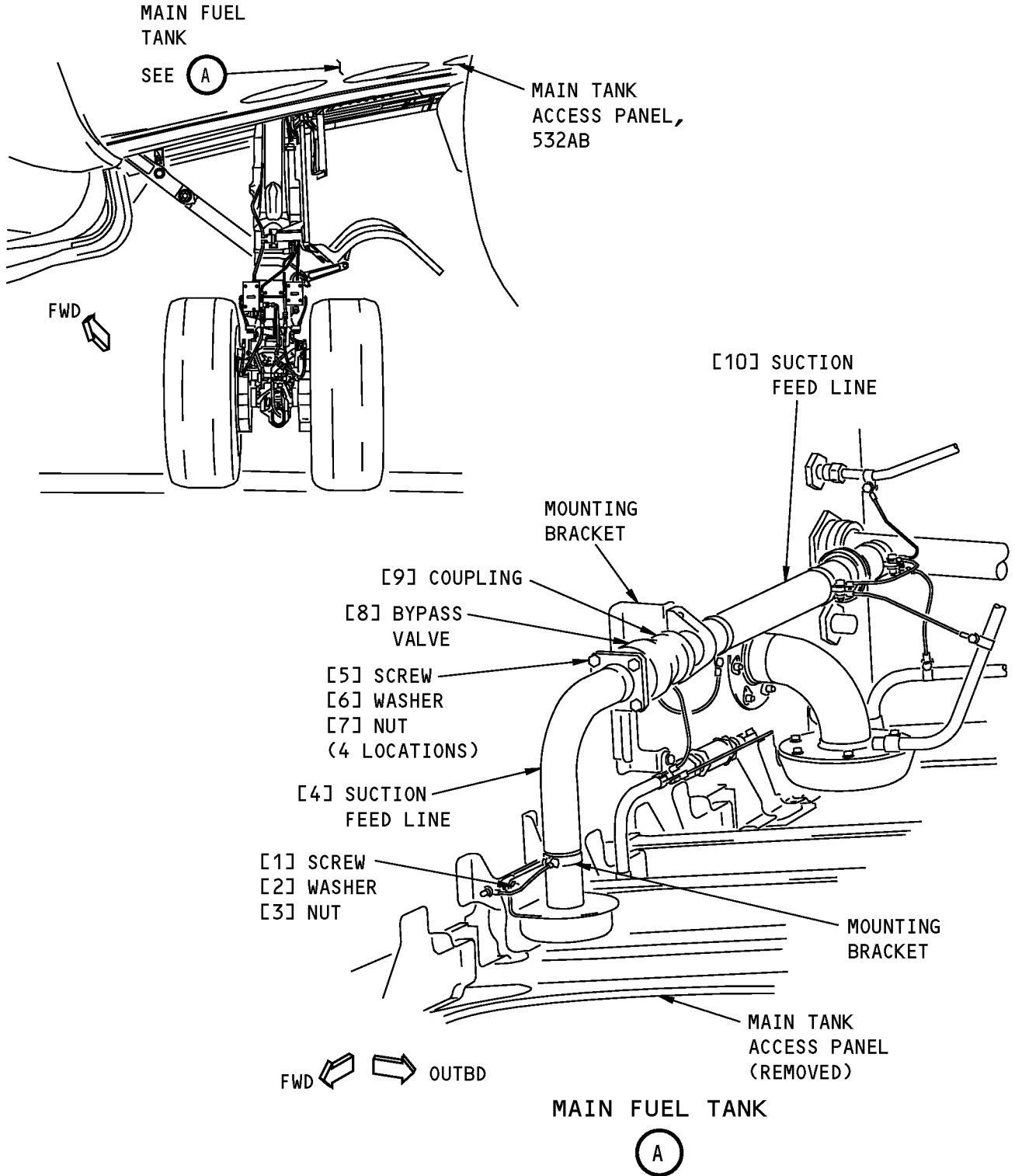
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Main Tank Fuel Boost Pump Bypass Valve Installation
Figure 401/28-22-61-990-802

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TASK 28-22-61-400-801

3. Install the Fuel Boost Pump Bypass Valve

(Figure 401)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)

B. Location Zones

Zone	Area
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Access Panels

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

D. Procedure

SUBTASK 28-22-61-940-002

(1) Obey the fuel tank entry precautions (TASK 28-11-00-910-802).

SUBTASK 28-22-61-010-004

(2) Go into the fuel tank.

SUBTASK 28-22-61-420-001

(3) To install the bypass valve, do these steps:

- (a) Remove the covers from the open ends of the suction feed lines.
- (b) Align the bypass valve with the suction feed line.
- (c) Put a new O-ring between the flange on the suction feed line [4] and the flange of the bypass valve [8].
- (d) Install the screws [5], washers [6], and nuts [7] on the flanges to attach the bypass valve [8] to the suction feed line [4].
- (e) Install the coupling [9] between the bypass valve [8] and the suction feed line [10] (TASK 28-22-15-400-801).
- (f) Install the screws [1], washers [2], and nuts [3] to attach the mounting brackets to the end rib of the fuel tank.

SUBTASK 28-22-61-410-001

(4) Install this access panel:

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216

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or close this access panel:

<u>Number</u>	<u>Name/Location</u>
632AB	Main Tank Access Door - Wing Station 216

(TASK 28-11-11-400-801).

————— **END OF TASK** —————

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BOOST PUMP DISCHARGE CHECK VALVE - REMOVAL/INSTALLATION

1. General

- A. A discharge check valve is installed on each fuel boost pump in all three tanks. The discharge check valve prevents the flow of fuel back through the fuel boost pump.
- B. This procedure contains two tasks. The first task removes the discharge check valve. The second task installs the discharge check valve.

TASK 28-22-71-000-801

2. Remove the Discharge Check Valve

(Figure 401)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-22-21-710-801	Crossfeed Valve Operational Test (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)

B. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Access Panels

Number	Name/Location
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
631AB	Center Tank Access Door - Wing Station 168

D. Procedure

SUBTASK 28-22-71-650-001

- (1) Defuel the center fuel tank (TASK 28-26-00-650-801).

SUBTASK 28-22-71-860-002

- (2) For the discharge check valves for the center tank boost pumps, also defuel the No. 1 tank and the No. 2 tank (TASK 28-26-00-650-801).

SUBTASK 28-22-71-650-002

- (3) For the discharge check valves for the No. 2 tank boost pumps, defuel the No. 2 tank (TASK 28-26-00-650-801).

NOTE: You can move the fuel to the No. 1 tank to do this if it has sufficient capacity for the fuel.

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SUBTASK 28-22-71-650-003

- (4) For the discharge check valve for the No. 1 tank boost pumps, defuel the No. 1 tank (TASK 28-26-00-650-801).

NOTE: You can move the fuel to the No. 2 tank to do this if it has sufficient capacity for the fuel.

SUBTASK 28-22-71-860-003

- (5) Do these steps to make sure the crossfeed valve is closed:
- (a) Do this task: Crossfeed Valve Operational Test, TASK 28-22-21-710-801.
 - (b) Make sure the crossfeed valve is set to the closed position and the crossfeed position indicator light is off.

SUBTASK 28-22-71-650-004

- (6) Drain and purge the center fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-22-71-010-001

- (7) To remove the discharge check valve of the fuel boost pumps in the No. 1 tank, remove this access panel:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

(TASK 28-11-31-000-801).

SUBTASK 28-22-71-010-002

- (8) To remove the discharge check valve of the fuel boost pumps in the No. 2 tank, remove this access panel:

<u>Number</u>	<u>Name/Location</u>
631AB	Center Tank Access Door - Wing Station 168

(TASK 28-11-31-000-801).

SUBTASK 28-22-71-010-003

- (9) To remove the discharge check valve of the center tank fuel boost pumps, remove this access panel:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

(TASK 28-11-31-000-801).

SUBTASK 28-22-71-940-001

- (10) Obey the fuel tank entry precautions (TASK 28-11-00-910-802).

SUBTASK 28-22-71-020-001

- (11) Do these steps to remove the elbow [18]:
- (a) Disconnect the ejector pump pressure line [21] at the B-nut [20] that is connected to the elbow [18].
 - (b) Loosen the nut [15].
 - (c) Remove the elbow [18].
 - (d) Discard the O-ring [14].

SUBTASK 28-22-71-020-002

- (12) Remove the nut [2], the nut [5], the ring [4], and the O-ring [3] at the pressure sensor line [1].

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SUBTASK 28-22-71-020-003

- (13) Remove the four screws [22], the washers [17], the nuts [16] and one O-ring [24] from the valve flange [19].

NOTE: This disconnects the discharge check valve [13] from the pump discharge line [23].

SUBTASK 28-22-71-020-004

- (14) Remove the four bolts [12], washers [11], and nuts [6] from the discharge check valve [13].

SUBTASK 28-22-71-020-005

- (15) Remove the discharge check valve [13].

SUBTASK 28-22-71-020-006

- (16) Remove the O-ring [8] and O-ring [10]].

————— **END OF TASK** —————

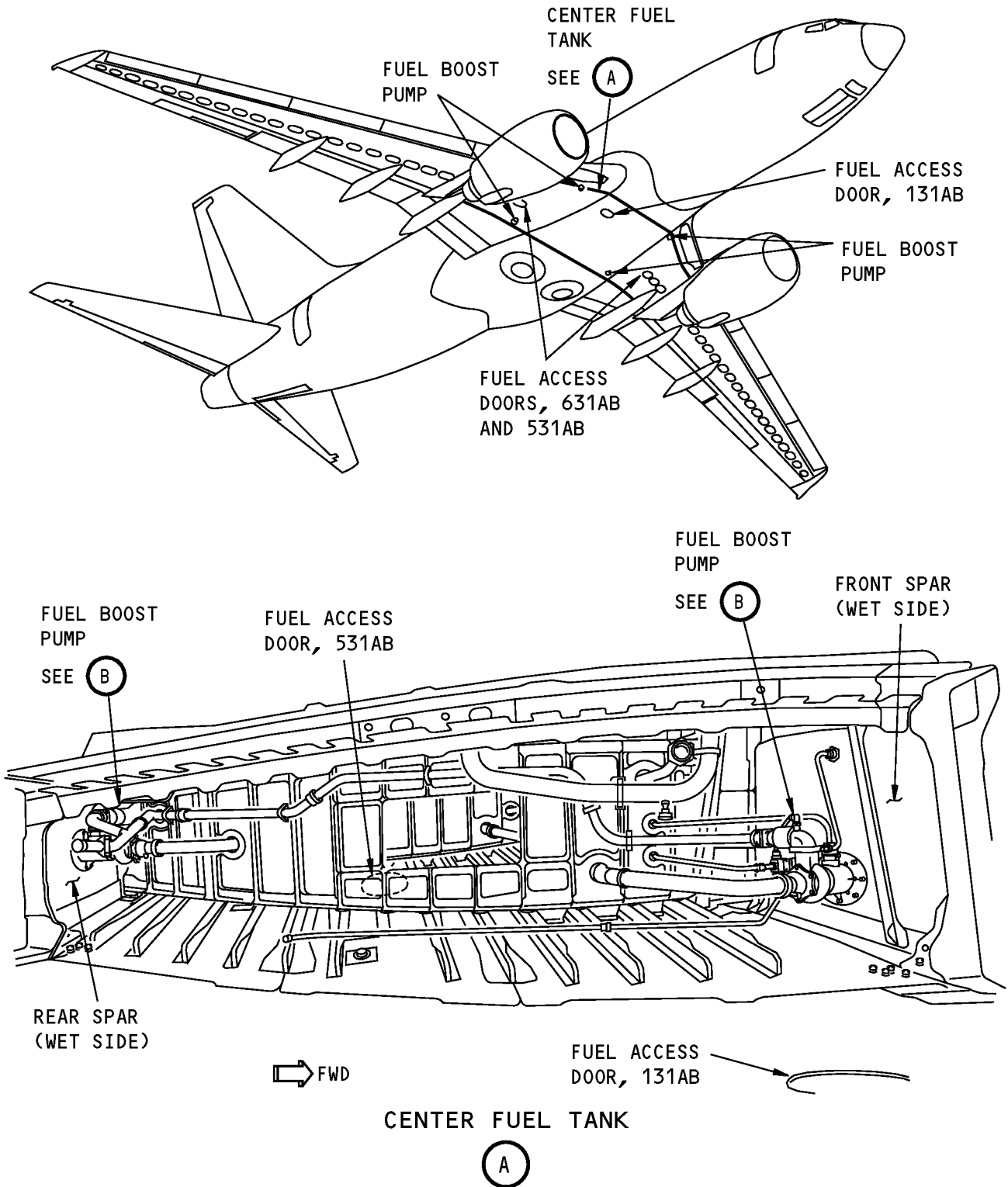
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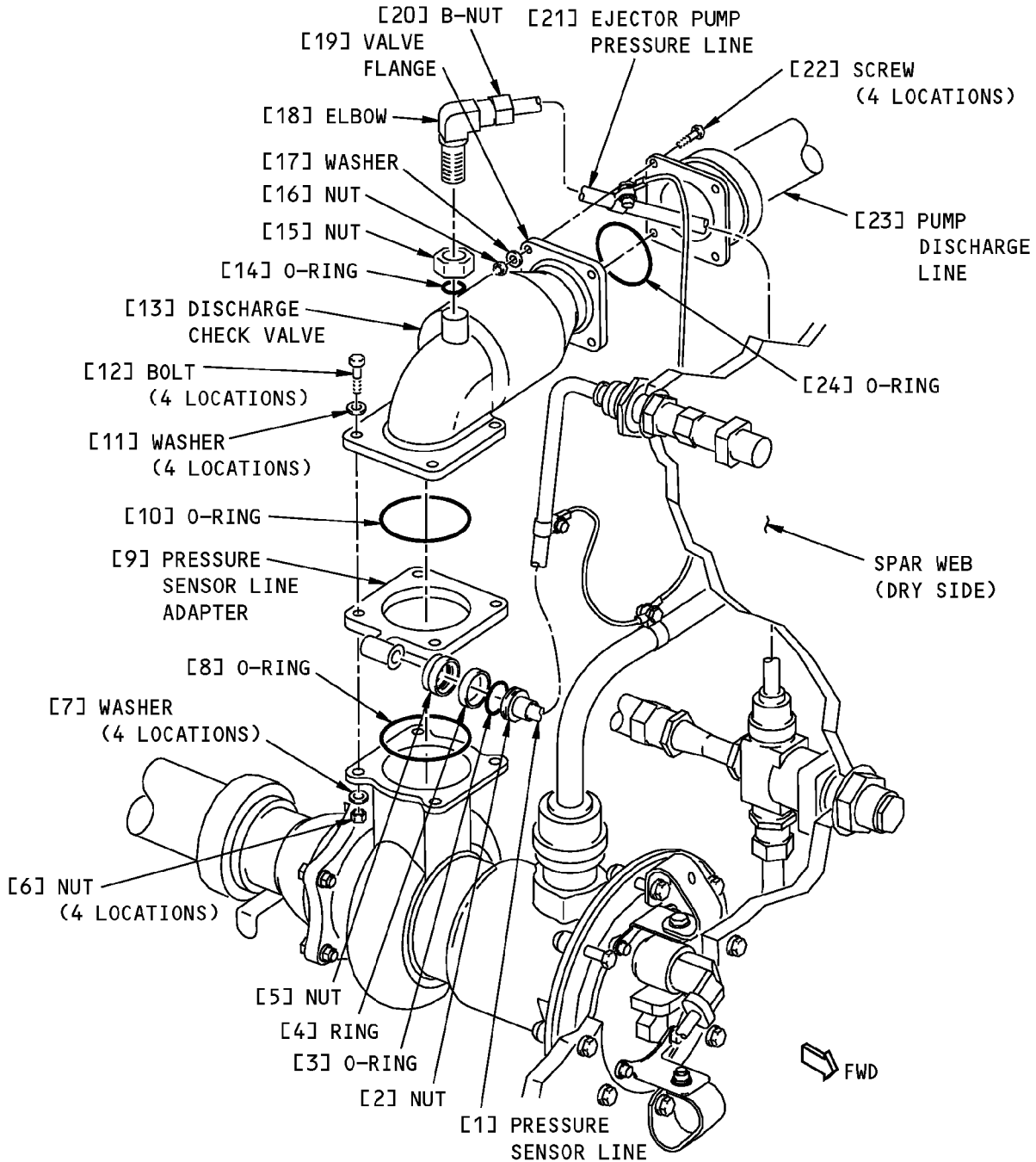


**Boost Pump Discharge Check Valve Installation
Figure 401 (Sheet 1 of 2)/28-22-71-990-802**

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**FUEL BOOST PUMP
(EXAMPLE)**

(B)

**Boost Pump Discharge Check Valve Installation
Figure 401 (Sheet 2 of 2)/28-22-71-990-802**

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TASK 28-22-71-400-801

3. Install the Discharge Check Valve

(Figure 401)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
8	O-ring	28-22-71-05-062	HAP 031-054, 101-999
		28-22-71-05-255	HAP ALL
		28-22-71-05-335	HAP ALL
10	O-ring	28-22-71-05-062	HAP 031-054, 101-999
		28-22-71-05-255	HAP ALL
		28-22-71-05-335	HAP ALL
13	Discharge check valve	28-22-71-05-060	HAP 031-054, 101-999
		28-22-71-05-250	HAP ALL
		28-22-71-05-330	HAP ALL
		28-22-71-05A-060	HAP 001-013, 015-026, 028-030
14	O-ring	28-22-00-02-410	HAP 001-013, 015-026, 028-030
		28-22-71-05-276	HAP ALL
		28-22-71-05-360	HAP ALL
24	O-ring	28-22-71-05-040	HAP 031-054, 101-999
		28-22-71-05-230	HAP ALL
		28-22-71-05-310	HAP ALL
		28-22-71-05A-040	HAP 001-013, 015-026, 028-030

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Access Panels

Number	Name/Location
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
631AB	Center Tank Access Door - Wing Station 168

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E. Procedure

SUBTASK 28-22-71-940-002

(1) Obey the fuel tank entry precautions (TASK 28-11-00-910-802).

SUBTASK 28-22-71-420-001

(2) Install the pressure sensor line adapter [9] and O-ring [8] on the boost pump housing.

SUBTASK 28-22-71-420-002

(3) Put a new O-ring [10] in the groove of the discharge check valve [13] that attaches to the housing.

SUBTASK 28-22-71-820-001

(4) Align the discharge check valve [13] with the housing and the pump discharge line [23].

SUBTASK 28-22-71-420-003

(5) Install the four bolts [12], washers [11], and nuts [6] to attach the discharge check valve [13] to the boost pump housing.

SUBTASK 28-22-71-420-004

(6) Put a new O-ring [24] in the valve flange [19] that attaches to the pump discharge line [22].

SUBTASK 28-22-71-420-005

(7) Install the four screws [22], washers [17] and nuts [16] to attach the pump discharge line [23] to the discharge check valve [13].

SUBTASK 28-22-71-420-006

(8) Connect the ejector-pump pressure line [21] to the discharge check valve [13].

- (a) Install the nut [15] on the elbow [18].
- (b) Install a new O-ring [14] on the elbow [18].
- (c) Install the nut [15] on the coupling body.
- (d) Install lockwire on the nut [15].

SUBTASK 28-22-71-420-007

(9) Connect the pressure sensor line [1] to the discharge check valve [13].

- (a) Install the ferrule on the pressure sensor line [1].
- (b) Put a nut [2] on the adapter [9].
- (c) Put a ring [4] on the adapter [9] between the ferrule and the nut [2].
- (d) Install a new O-ring [3] in the coupling body.
- (e) Install the nut [2] on the coupling body.
- (f) Install lockwire on the nut [2].

SUBTASK 28-22-71-410-001

(10) For the discharge check valve of the fuel boost pumps in the center tank, install this access panel:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

(TASK 28-11-31-400-801).

SUBTASK 28-22-71-010-004

(11) For the discharge check valve of the fuel boost pumps in the No. 1 tank, install this access panel:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

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(TASK 28-11-31-400-801).

SUBTASK 28-22-71-010-005

(12) For the discharge check valve of the fuel boost pumps in the No. 2 tank, install this access panel:

<u>Number</u>	<u>Name/Location</u>
631AB	Center Tank Access Door - Wing Station 168

(TASK 28-11-31-400-801).

————— **END OF TASK** —————

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APU FUEL FEED SYSTEM - ADJUSTMENT/TEST

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure gives an operational test for the APU fuel feed system. A procedure to pressurize the APU fuel line to do a test for leaks is found in (TASK 28-25-04-790-801). A procedure to pressurize the shroud for the APU fuel line is found in (TASK 28-25-05-790-801).

TASK 28-25-00-710-801

2. Operational Test - APU Fuel Feed System

(Figure 501)

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

B. Prepare for Test

SUBTASK 28-25-00-860-001

- (1) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-25-00-860-002

- (2) Make sure the APU FIRE switch on the Fire Protection Panel, P8, is in the NORMAL position.

SUBTASK 28-25-00-860-003

- (3) Make sure the APU master control switch on the overhead panel, P5, is in the OFF position.

SUBTASK 28-25-00-910-001

WARNING: MAKE SURE THE DOWNLOCK PINS ARE INSTALLED ON ALL THE LANDING GEAR. WITHOUT THE DOWNLOCK PINS, THE LANDING GEAR CAN RETRACT AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) If landing gear downlocks are not installed, do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801

C. Test APU Fuel Feed System

SUBTASK 28-25-00-860-004

- (1) Make sure the manual override handle on the actuator of the APU fuel shutoff valve is in the CLOSED position (Figure 501).

NOTE: The actuator is installed on the rear spar of the center fuel tank, at approximately two feet to the left of the airplane centerline.

SUBTASK 28-25-00-860-005

- (2) Make sure that these circuit breakers are closed:

Battery Shield, J9

Row	Col	Number	Name
A	5	C01340	BATTERY BUS

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	14	C00033	AUX POWER UNIT CONT

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Standby Power Control Unit, M01720

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	4	C00169	SW HOT BAT BUS

SUBTASK 28-25-00-860-006

CAUTION: DO NOT SET THE APU MASTER SWITCH TO THE START POSITION. THIS WILL START THE APU.

(3) Set the APU master switch on the overhead panel, P5, to the ON position.

SUBTASK 28-25-00-210-001

(4) Make sure the manual override handle on the APU fuel shutoff valve moves to the open position in less than ten (10) seconds.

SUBTASK 28-25-00-860-007

CAUTION: DO NOT TURN THE FIRE SWITCH. IF YOU TURN THE FIRE SWITCH, THE CONTENTS OF THE FIRE BOTTLE CAN ACCIDENTALLY RELEASE AND CAUSE DAMAGE.

(5) Pull the APU FIRE switch on the Fire Protection Panel, P8, to the FIRE position.

SUBTASK 28-25-00-210-002

(6) Make sure the manual override handle on the APU fuel shutoff valve moves to the closed position.

SUBTASK 28-25-00-710-001

(7) Make sure the APU fault light on the P5 panel comes on to show fire shutdown.

SUBTASK 28-25-00-860-008

(8) Push the APU FIRE switch to the NORMAL position.

SUBTASK 28-25-00-860-014

CAUTION: DO NOT SET THE APU MASTER SWITCH TO THE START POSITION. THIS WILL START THE APU.

(9) Set the APU master switch to OFF and then set the APU master switch to ON again.

SUBTASK 28-25-00-210-003

(10) Make sure the manual override handle on the APU fuel shutoff valve moves to the open position.

SUBTASK 28-25-00-210-004

(11) Make sure the APU FAULT light on the P5 panel goes off.

D. Put the Airplane Back to Its Usual Condition

SUBTASK 28-25-00-860-009

(1) Set the APU start switch on the P5 panel to OFF.

SUBTASK 28-25-00-210-005

(2) Make sure the manual override handle on the APU fuel shutoff valve moves to the closed position.

SUBTASK 28-25-00-860-010

(3) If electrical power is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812

————— END OF TASK —————

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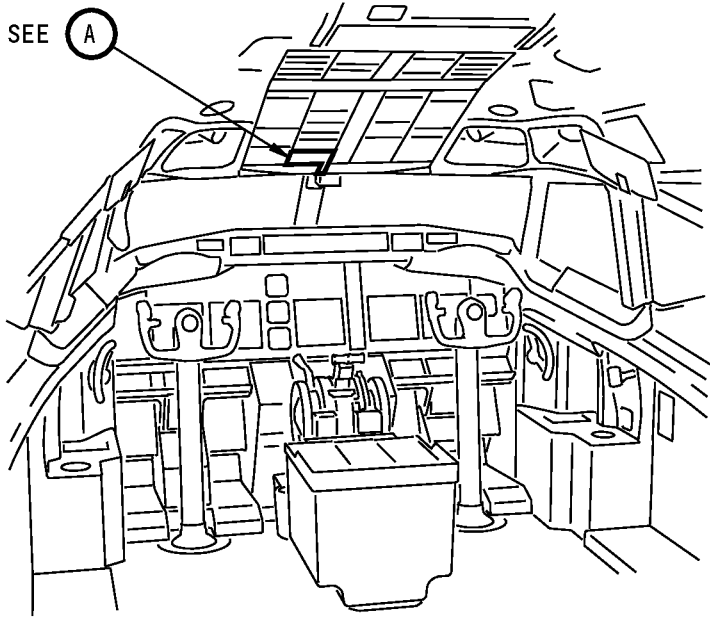
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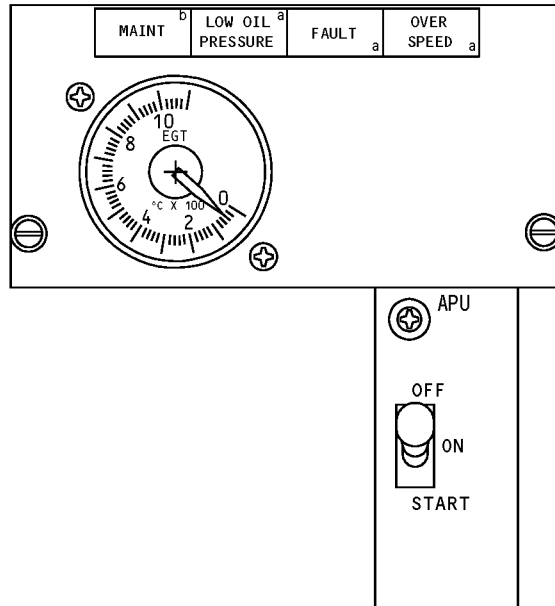
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APU START SWITCH
AND INDICATORS

SEE (A)



FLIGHT COMPARTMENT



APU START SWITCH AND INDICATORS

(A)

APU Fuel Feed System Test
Figure 501 (Sheet 1 of 3)/28-25-00-990-802

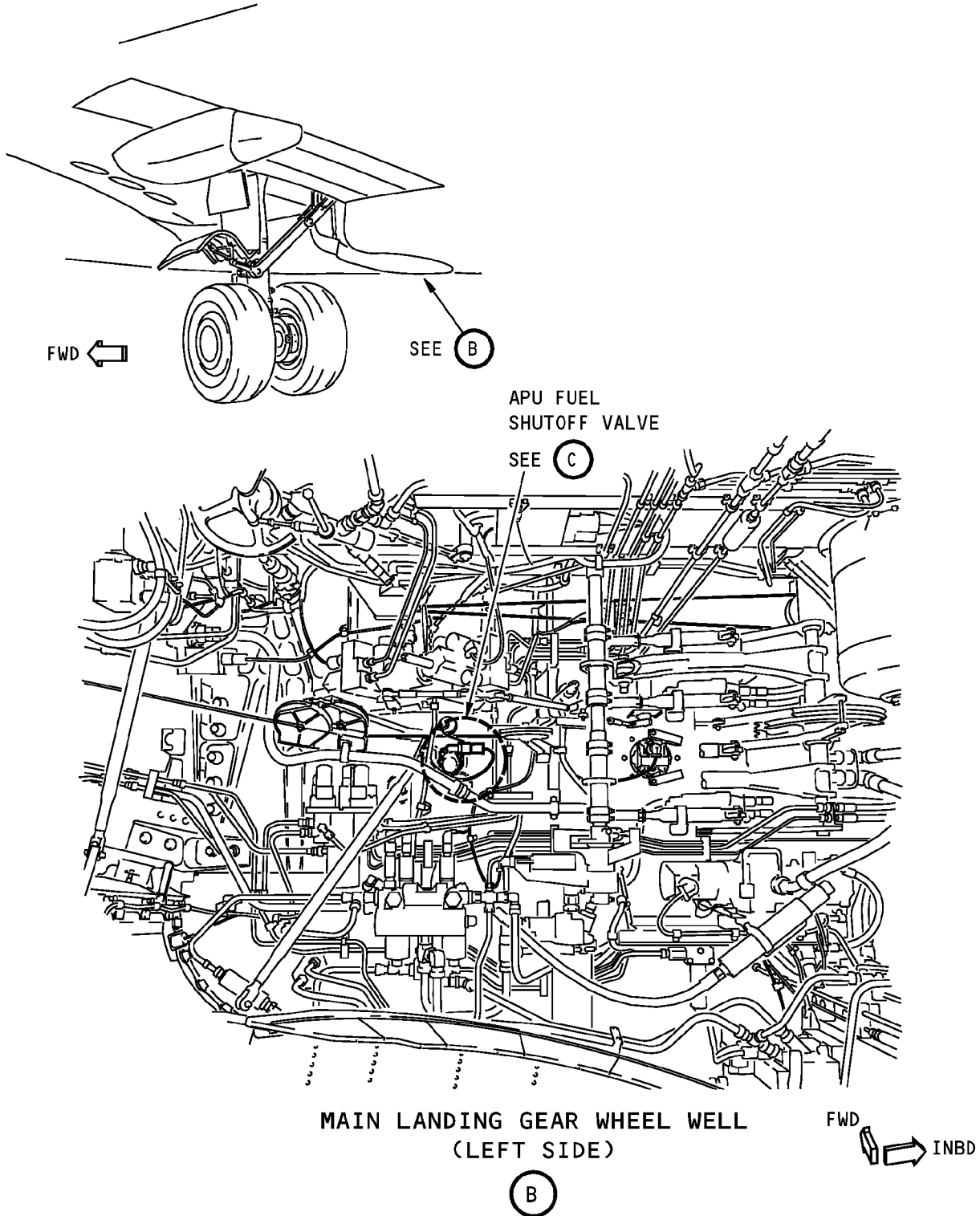
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**APU Fuel Feed System Test
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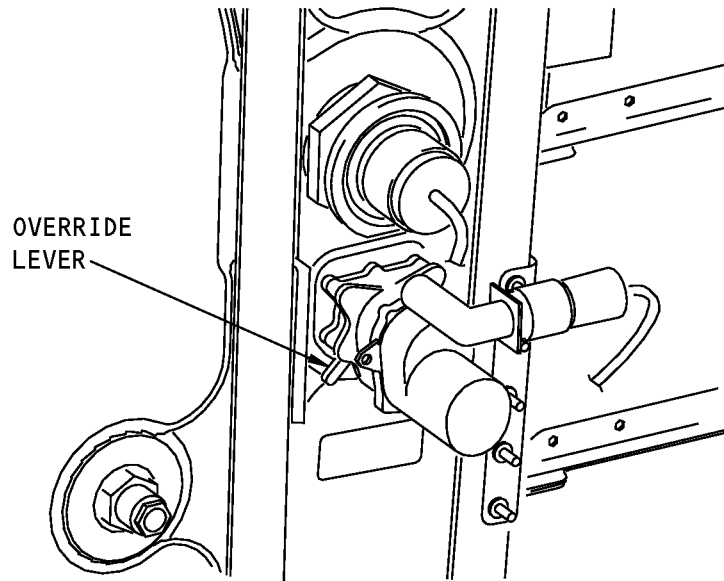
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APU FUEL SHUTOFF VALVE



APU Fuel Feed System Test
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APU FUEL SHUTOFF VALVE - REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) The removal of the actuator assembly for the APU shutoff valve.
 - (2) The installation of the actuator assembly for the APU shutoff valve.
 - (3) The operational test of the APU shutoff valve.
 - (4) The removal of the valve body assembly for the APU
 - (5) The installation of the valve body assembly for the APU.
- B. The APU shutoff valve is installed on the left wing rear spar in the wheel well. It has these primary assemblies:
 - (1) The actuator assembly
 - (2) The valve body assembly.
 - (3) The mounting adapter
- C. The APU shutoff valve actuator, V43, is also referred to as the "APU fuel shutoff valve".
- D. The actuator assembly is attached with bolts to a mounting adapter. You can replace it without the replacement of the valve body assembly. These procedures are necessary to replace the valve body assembly:
 - (1) Remove the actuator assembly.
 - (2) Remove the mounting adapter.
 - (3) Defuel the center fuel tank.

TASK 28-25-02-000-801

2. APU Shutoff Valve Actuator Assembly Removal

(Figure 401)

A. References

Reference	Title
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

B. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left

C. Procedure.

SUBTASK 28-25-02-860-001

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	19	C01344	APU FIRE SW POWER

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	14	C00033	AUX POWER UNIT CONT

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SUBTASK 28-25-02-210-001

WARNING: USE THE CORRECT PROCEDURE TO INSTALL THE GROUND LOCK ASSEMBLIES. THE LANDING GEAR CAN RETRACT QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

SUBTASK 28-25-02-020-001

(3) Disconnect the electrical connector [1] from the APU shutoff valve actuator assembly [2].

SUBTASK 28-25-02-020-002

(4) Disconnect the bonding jumper from the actuator assembly [2].

SUBTASK 28-25-02-020-003

CAUTION: HOLD THE ACTUATOR ASSEMBLY UP TO MAKE SURE ITS WEIGHT IS NOT ON THE SHAFT. YOU CAN CAUSE DAMAGE TO THE SHAFT.

(5) Hold the actuator assembly [2] up and remove the mounting screws [3].

SUBTASK 28-25-02-020-004

(6) Remove the actuator assembly [2].

- (a) Carefully move the actuator assembly [2] away from the mounting adapter [5] until the output shaft is out of the mating part.
- (b) Lift the actuator assembly [2] out of the airplane.

————— **END OF TASK** —————

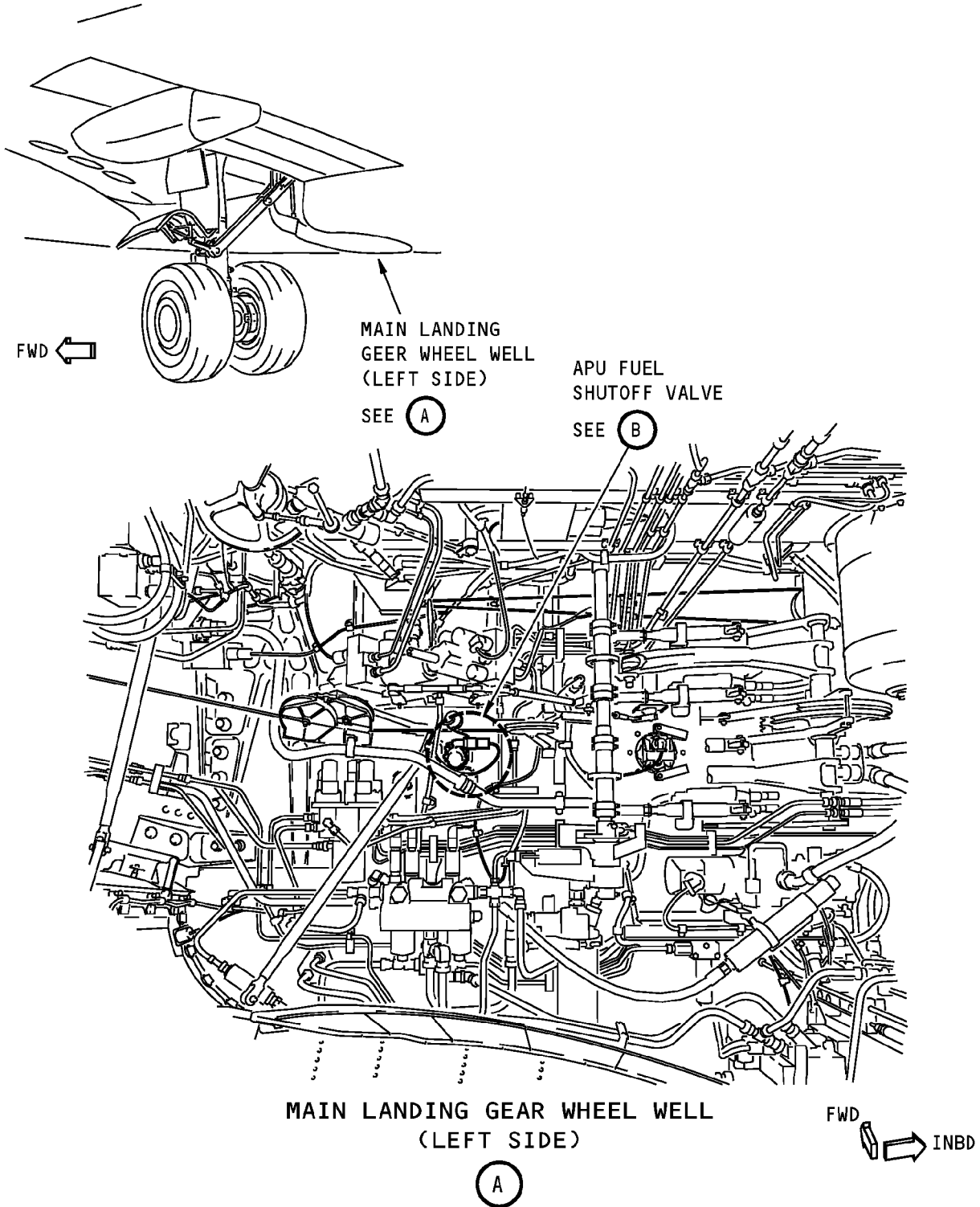
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**APU Fuel Shutoff Valve Actuator Installation
Figure 401 (Sheet 1 of 2)/28-25-02-990-803**

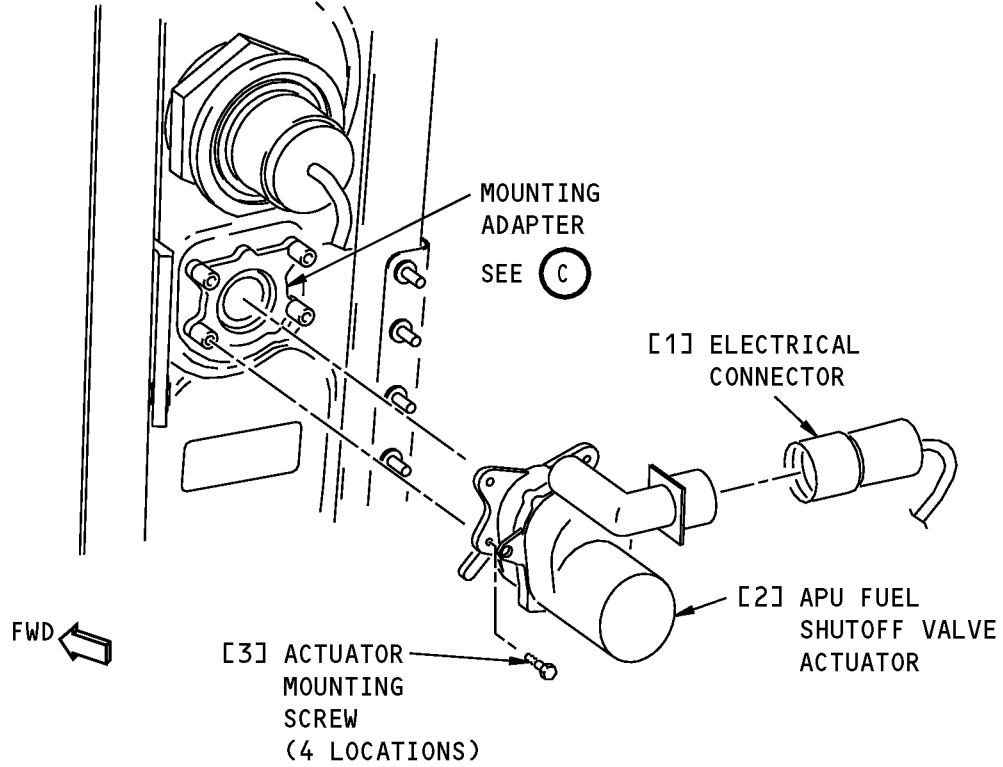
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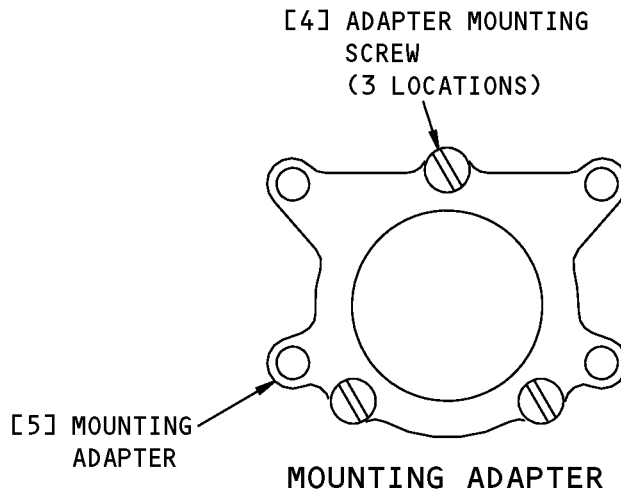
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APU FUEL SHUTOFF VALVE

(B)



(C)

**APU Fuel Shutoff Valve Actuator Installation
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TASK 28-25-02-400-801

3. APU Shutoff Valve Actuator Assembly Installation

Figure 401

A. References

Reference	Title
20-10-44-400-801	Lockwires Installation (P/B 401)
32-00-01-080-801	Landing Gear Downlock Pins Removal (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
SWPM 20-20-00	Standard Wiring Practices Manual

B. Consumable Materials

Reference	Description	Specification
D00016	Grease - Aircraft, General Purpose, Wide Temperature Range	MIL-PRF-81322

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Actuator assembly	28-25-51-03-035	HAP 001-013, 015-026, 028-030
		28-25-51-07-045	HAP 031-054, 101-999

D. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left

E. Procedure

SUBTASK 28-25-02-210-002

WARNING: USE THE CORRECT PROCEDURE TO INSTALL THE GROUND LOCK ASSEMBLIES. THE LANDING GEAR CAN RETRACT QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Make sure the ground lock assemblies are installed (TASK 32-00-01-480-801).

SUBTASK 28-25-02-940-001

(2) Apply a thin layer of the grease, D00016 to the keyway of the output shaft.

SUBTASK 28-25-02-420-001

CAUTION: HOLD THE ACTUATOR ASSEMBLY UP TO MAKE SURE ITS WEIGHT IS NOT ON THE SHAFT. YOU CAN CAUSE DAMAGE TO THE SHAFT.

(3) Put the output shaft into the input shaft.

(a) Turn the output shaft until the keyway is aligned with the key in the input shaft.

(b) Carefully move the output shaft into the input shaft until the actuator mounting lugs touch the mounting adapter.

SUBTASK 28-25-02-420-002

(4) If the mounting holes on the APU shutoff valve actuator assembly [2] are not aligned with the mating holes, carefully turn the assembly to align the holes.

SUBTASK 28-25-02-420-003

(5) Install mounting screws [3] on the actuator assembly [2].

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- (a) Tighten the mounting screws [3] to a torque of 15-20 inch-pounds (1.7-2.3 newton-meters).
(b) Install lockwire on each mounting screw [3] (TASK 20-10-44-400-801).

SUBTASK 28-25-02-420-004

- (6) Connect the bonding jumper to the actuator assembly [2].

SUBTASK 28-25-02-280-001

- (7) Do a check of the electrical bond (SWPM 20-20-00).

NOTE: The bonding resistance must not be more than 0.01 ohm.

SUBTASK 28-25-02-420-005

- (8) Connect the electrical connector [1] to the actuator assembly [2].

SUBTASK 28-25-02-860-002

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

F/O Electrical System Panel, P6-2

Table with 4 columns: Row, Col, Number, Name. Row B, Col 19, Number C01344, Name APU FIRE SW POWER

F/O Electrical System Panel, P6-4

Table with 4 columns: Row, Col, Number, Name. Row A, Col 14, Number C00033, Name AUX POWER UNIT CONT

SUBTASK 28-25-02-710-001

- (10) Do this task: APU Shutoff Valve Operational Test, TASK 28-25-02-710-801.

SUBTASK 28-25-02-210-003

WARNING: USE THE CORRECT PROCEDURE TO REMOVE THE GROUND LOCK ASSEMBLIES. THE LANDING GEAR CAN RETRACT QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (11) Do this task: Landing Gear Downlock Pins Removal, TASK 32-00-01-080-801.

END OF TASK

TASK 28-25-02-710-801

4. APU Shutoff Valve Operational Test

(Figure 401)

A. Location Zones

Table with 2 columns: Zone, Area. Rows: 133 (Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left), 211 (Flight Compartment - Left), 212 (Flight Compartment - Right)

B. Procedure

SUBTASK 28-25-02-860-003

- (1) Make sure that these circuit breakers are closed:

Battery Shield, J9

Table with 4 columns: Row, Col, Number, Name. Row A, Col 5, Number C01340, Name BATTERY BUS

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F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	19	C01344	APU FIRE SW POWER

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	14	C00033	AUX POWER UNIT CONT

Standby Power Control Unit, M01720

Row	Col	Number	Name
B	4	C00169	SW HOT BAT BUS

SUBTASK 28-25-02-860-004

(2) Set the battery switch to the ON position.

SUBTASK 28-25-02-710-002

(3) Set the APU master switch to the ON position.

(a) Make sure the valve override handle moves to the OPEN position.

SUBTASK 28-25-02-710-003

(4) Set the APU master switch to the OFF position.

(a) Make sure the valve override handle moves to the CLOSED position after a maximum of ten (10) seconds.

SUBTASK 28-25-02-860-005

(5) Set the battery switch to the OFF position.

END OF TASK

TASK 28-25-02-000-802

5. APU Shutoff Valve Body Assembly Removal

(Figure 401, Figure 402)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-22-00-730-802	Crossfeed Valve - Functional Test (P/B 501)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

B. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left

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D. Access Panels

Number	Name/Location
131AB	Center Tank Access

E. Procedure

SUBTASK 28-25-02-650-002

- (1) Defuel the No. 1 tank. To do this, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801 or, do this task: Tank to Tank Fuel Transfer, TASK 28-26-00-650-802

SUBTASK 28-25-02-650-003

- (2) Defuel the center fuel tank (TASK 28-26-00-650-801) and prepare to go into it (TASK 28-11-00-910-802).

SUBTASK 28-25-02-650-004

- (3) If there is fuel in the No. 2 tank, make sure the crossfeed valve is closed and has no leakage. To do this, do this task: Crossfeed Valve - Functional Test, TASK 28-22-00-730-802

NOTE: This step makes sure there is no fuel leakage from the No. 2 tank while the APU valve body is removed.

- (a) As an alternative, you can remove the fuel from the No. 2 tank. To do this, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801

SUBTASK 28-25-02-010-001

- (4) Get access to the wing rear spar.

- (a) Remove this access panel to get access to the center fuel tank:

Number	Name/Location
131AB	Center Tank Access

(TASK 28-11-31-000-801).

SUBTASK 28-25-02-020-005

- (5) Do this task: APU Shutoff Valve Actuator Assembly Removal, TASK 28-25-02-000-801.

SUBTASK 28-25-02-020-006

- (6) Put the 5 gallon (19 liters) fuel resistant container, STD-1054 below the valve and disconnect the APU fuel line.

- (a) Remove unions [21] and keep them for the installation.
- (b) Remove the O-rings [22] and discard them.

SUBTASK 28-25-02-020-007

CAUTION: DO NOT LET THE VALVE BODY ASSEMBLY FALL. YOU WILL CAUSE DAMAGE TO THE FUEL TANK SEAL.

- (7) Do these steps to remove the valve body [23]:

- (a) Two persons are necessary to do this task.
 - 1) One person must be out of the tank.
 - 2) One person must be in the tank.
- (b) The person in the tank must hold the valve body assembly up.
- (c) The person out of the tank must remove the adapter mounting screws [4] that attach the adapter to the valve body assembly [23].

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- (d) Move the valve body assembly [23] away from the rear spar.

————— **END OF TASK** —————

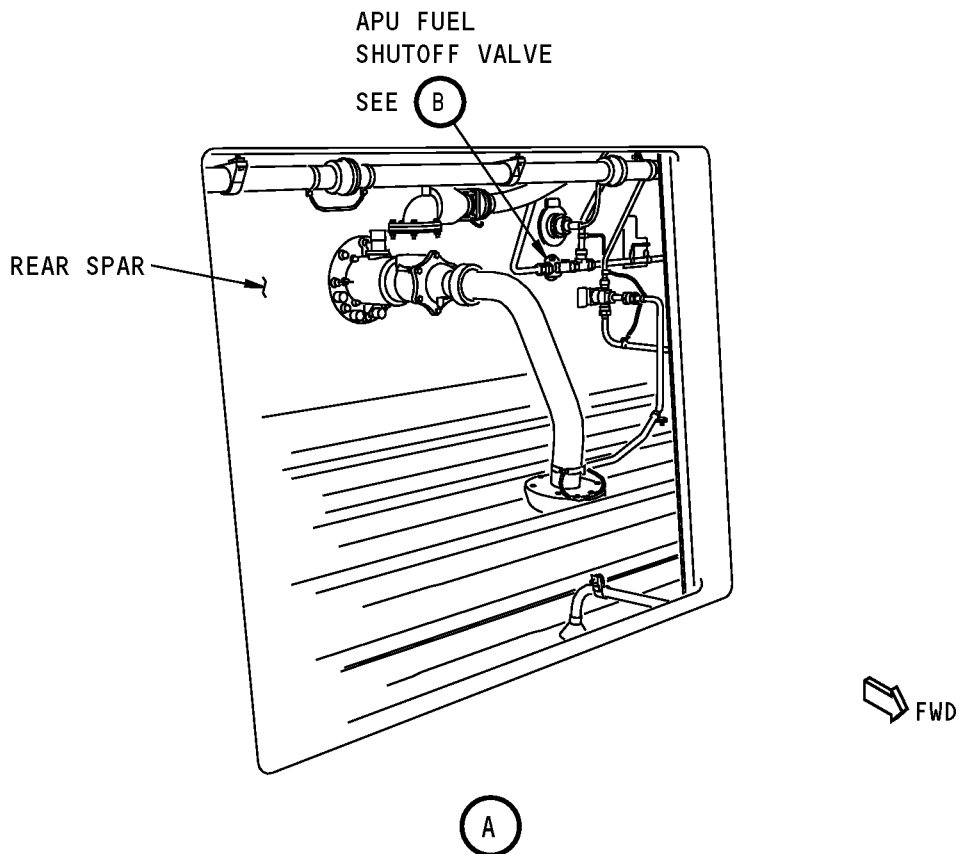
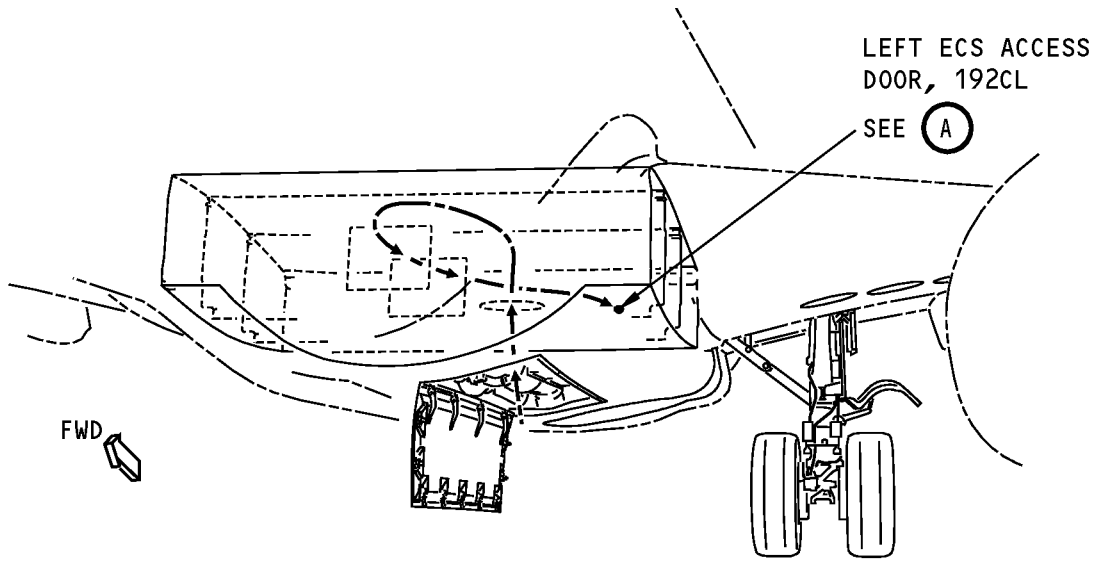
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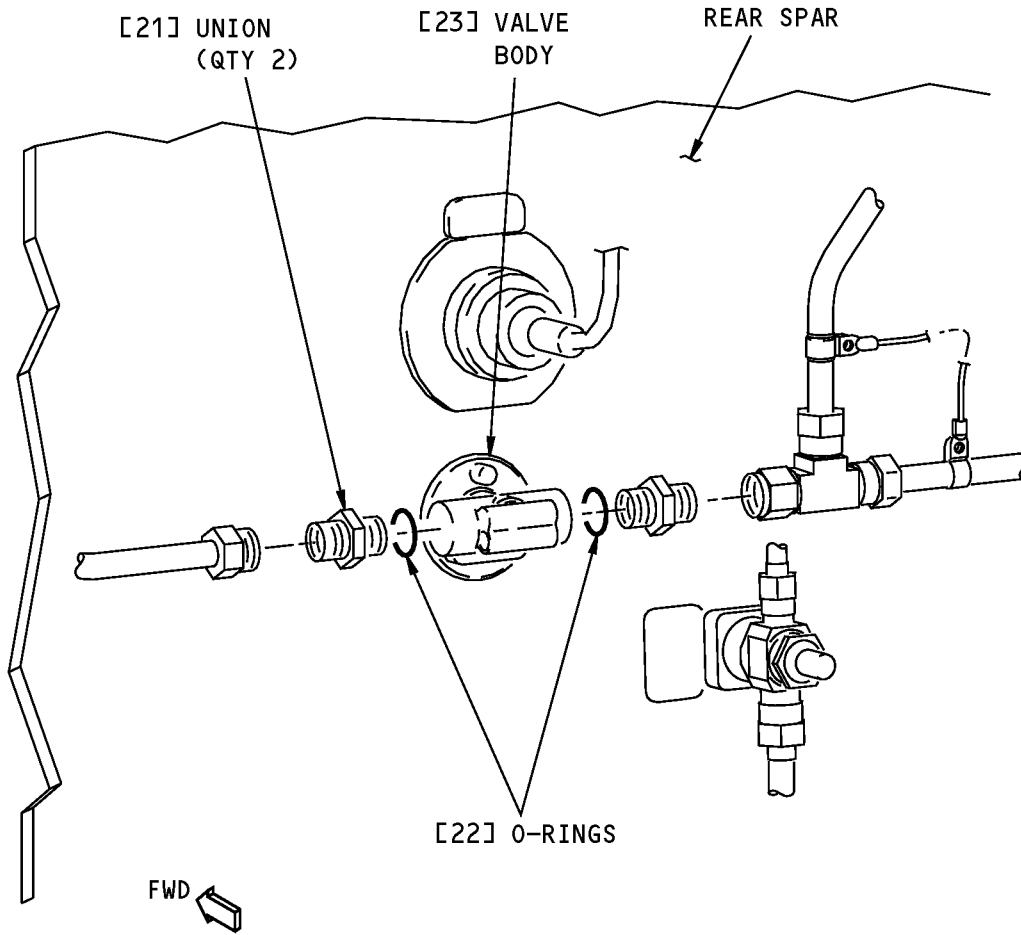
**APU Fuel Shutoff Valve Body Installation
Figure 402 (Sheet 1 of 2)/28-25-02-990-804**

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APU FUEL SHUTOFF VALVE

(B)

**APU Fuel Shutoff Valve Body Installation
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TASK 28-25-02-400-802

6. APU Shutoff Valve Body Assembly Installation

(Figure 401, Figure 402)

A. References

Reference	Title
20-10-44-400-801	Lockwires Installation (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)

B. Consumable Materials

Reference	Description	Specification
B00083	Solvent - Aliphatic Naphtha (For Acrylic Plastics)	TT-N-95 Type II, ASTM D-3735 Type III
C00913	Compound - Corrosion Inhibiting Material, Nondrying Resin Mix	BMS 3-27

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
22	O-rings	28-25-51-06-070	HAP 001-013, 015-026, 028-030
23	Body	28-25-51-06-072	HAP 031-054, 101-999
		28-25-51-03-120	HAP 001-013, 015-026, 028-030
		28-25-51-07-130	HAP 031-054, 101-999

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left

E. Access Panels

Number	Name/Location
131AB	Center Tank Access

F. Procedure

SUBTASK 28-25-02-160-001

- (1) Clean these surfaces with solvent, B00083 and dry them with a clean lintfree cloth.
 - (a) The O-ring groove of the valve body [23]
 - (b) The machined surfaces of the valve body [23]
 - (c) The machined surfaces of the rear spar.

SUBTASK 28-25-02-420-006

- (2) Install some new O-rings [22], lightly lubricated with fuel, on the unions [21] and install them in the valve body [23].

SUBTASK 28-25-02-420-007

- (3) Install a new O-ring, lightly lubricated with fuel, in the groove on the valve body [23].

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SUBTASK 28-25-02-420-008

CAUTION: DO NOT LOOSEN OR PUT THE O-RING OUT OF ITS CORRECT SHAPE WHEN YOU INSTALL THE VALVE BODY ASSEMBLY. THE O-RING WILL NOT MAKE A GOOD SEAL.

- (4) Do these steps to install the valve body [23]:
- One person out of the tank and one person in the tank are necessary for this task.
 - The person in the tank must put the valve body [23] in the correct position between the fittings on the APU line.
 - The person out of the tank must hold the valve body [23] up until it is installed.
 - From outside the tank, do these steps to install the mounting adapter [5]:
 - Install the three mounting screws [4] wet with compound, C00913 that attach the mounting adapter [3] to the valve body [23].
 - Tighten the three mounting screws [4] to a torque of 25-35 inch-pounds (2.8-4 newton-meters).
 - Install lockwire on each of the three mounting screws [4] (TASK 20-10-44-400-801).

SUBTASK 28-25-02-420-009

- (5) Attach the APU fuel line to the valve body [23] (TASK 28-22-15-400-801).

SUBTASK 28-25-02-420-010

- (6) Do this task: APU Shutoff Valve Actuator Assembly Installation, TASK 28-25-02-400-801.

SUBTASK 28-25-02-710-004

- (7) If you did not do it as part of the actuator installation procedure, do this task: APU Shutoff Valve Operational Test, TASK 28-25-02-710-801

SUBTASK 28-25-02-410-001

- (8) Install this access panel:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

(TASK 28-11-31-400-801).

————— **END OF TASK** —————

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APU FUEL SHUTOFF VALVE - INSPECTION/CHECK

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains a functional check of the bonding resistance between the structure and the APU fuel shutoff valve actuator.

TASK 28-25-02-200-801

2. APU Fueling Shutoff Valve Actuator - Bonding Resistance Check

(Figure 601)

A. General

- (1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
32-00-01-080-801	Landing Gear Downlock Pins Removal (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
SWPM 20-20-00	Electrical Bonds and Grounds

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)

D. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left

E. Procedure

SUBTASK 28-25-02-865-001

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	19	C01344	APU FIRE SW POWER

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	14	C00033	AUX POWER UNIT CONT

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SUBTASK 28-25-02-490-001

WARNING: USE THE CORRECT PROCEDURE TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

SUBTASK 28-25-02-862-001

(3) Disconnect the electrical connector from the APU shutoff valve actuator assembly.

SUBTASK 28-25-02-765-001

(4) Measure the electrical bonding resistance between the APU fueling shutoff valve actuator (at the electrical connector flange) and the spar with a bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure the resistance is 0.010 ohm (10 milliohms) or less.

SUBTASK 28-25-02-861-001

(5) Connect the electrical connector to the actuator assembly.

SUBTASK 28-25-02-865-002

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

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
B	19	C01344	APU FIRE SW POWER

F/O Electrical System Panel, P6-4

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	14	C00033	AUX POWER UNIT CONT

SUBTASK 28-25-02-090-001

WARNING: USE THE CORRECT PROCEDURE TO REMOVE THE DOOR LOCKS. THE DOORS CAN OPEN AND CLOSE QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

(7) Do this task: Landing Gear Downlock Pins Removal, TASK 32-00-01-080-801.

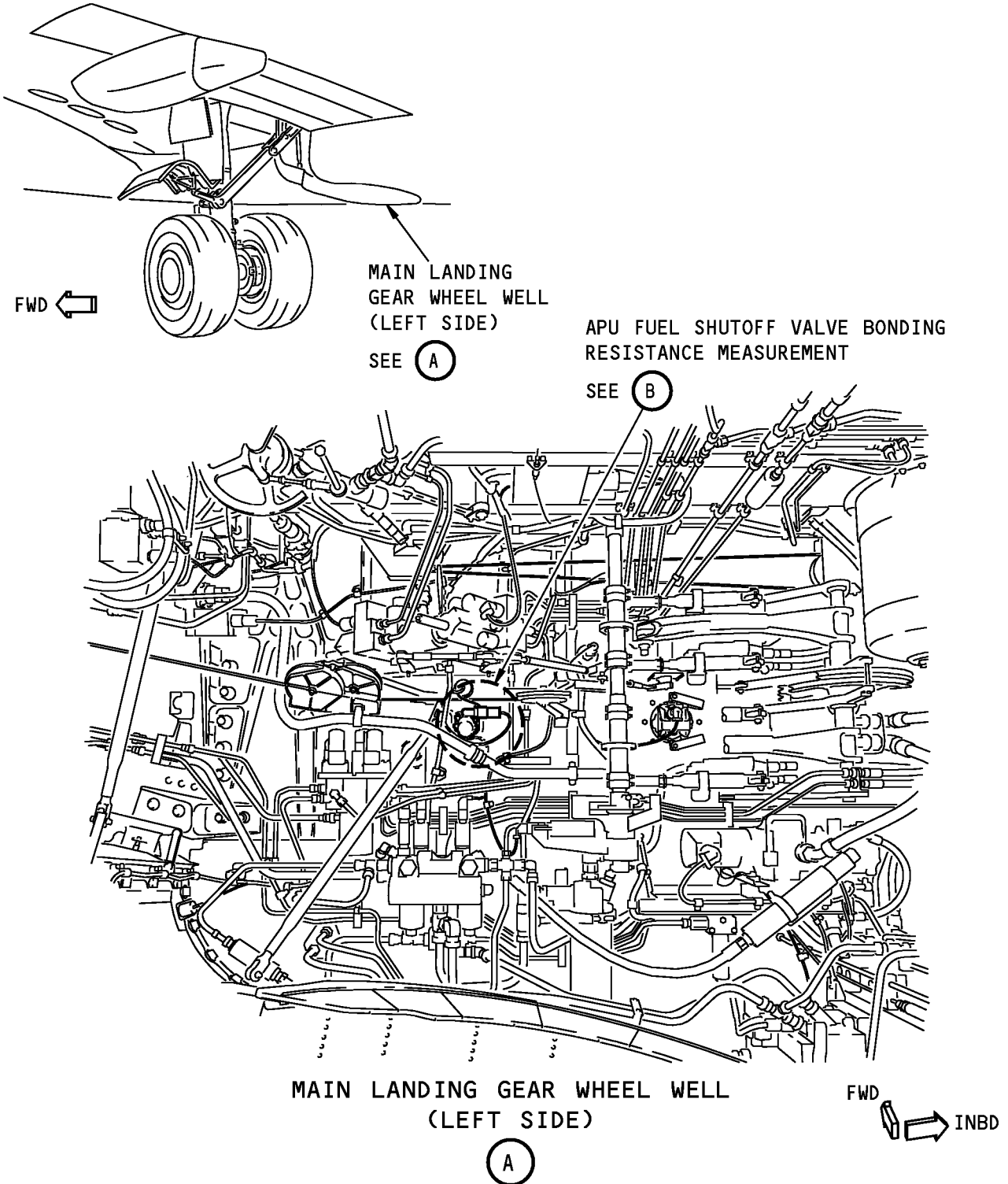
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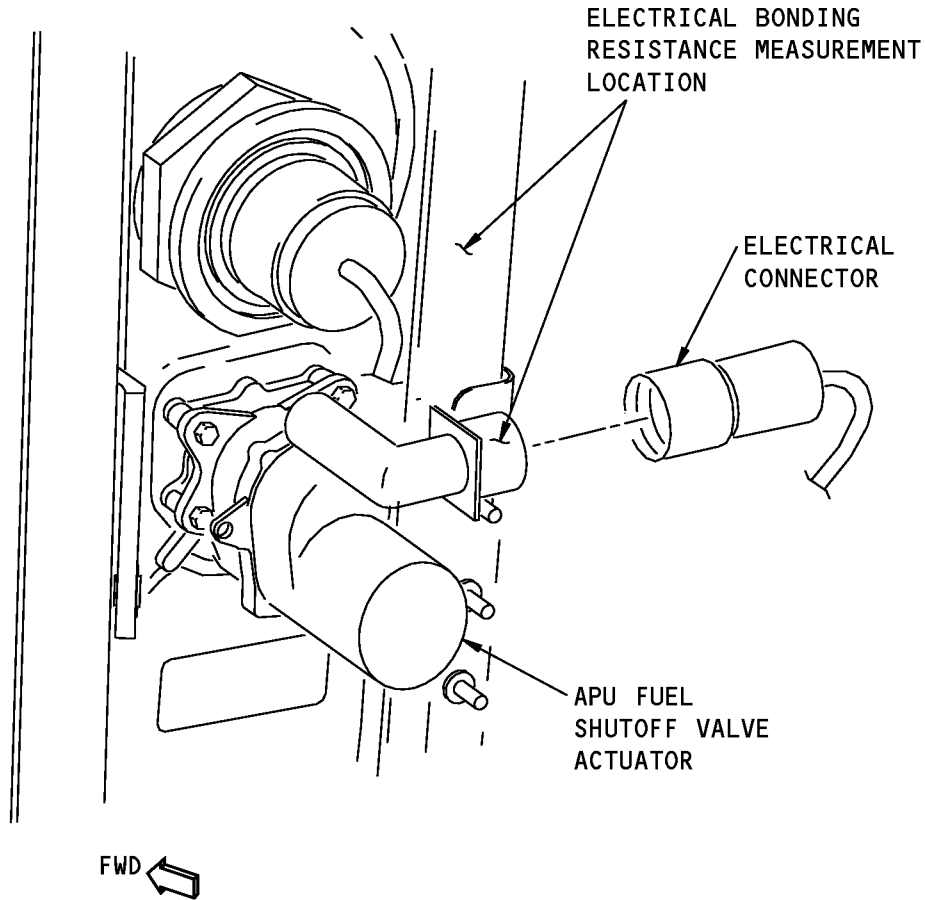
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**APU Fueling Shutoff Valve Actuator - Bonding Resistance Check
Figure 601 (Sheet 1 of 2)/28-25-02-990-805**

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**APU FUEL SHUTOFF VALVE
BONDING RESISTANCE MEASUREMENT**

B

**APU Fueling Shutoff Valve Actuator - Bonding Resistance Check
Figure 601 (Sheet 2 of 2)/28-25-02-990-805**

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APU FUEL FEED LINE - REMOVAL/INSTALLATION

1. General

- A. The APU fuel feed line supplies fuel to the APU from the engine fuel feed line. If the engine fuel feed pumps are not operating, the APU fuel line supplies fuel to the APU from the suction inlet in the No. 1 tank.
- B. The APU fuel feed line is referred to as the APU fuel line in this procedure.
- C. To make the removal and the installation easier, the APU fuel line is divided into two parts.
 - (1) The part that goes from the bypass inlet in the No. 1 tank to the top skin of the wing center section.

NOTE: This part of the APU fuel line has the connection with the engine fuel feed line.

- (2) The part that goes from the top skin of the wing center section to the APU firewall.

NOTE: This part of the APU fuel line has a shroud.

TASK 28-25-04-000-801

2. APU Fuel Line Removal (No. 1 Tank and Center Tank)

Figure 401

A. References

Reference	Title
20-10-51-000-801	Flareless Tubing Assembly Removal (P/B 401)
24-22-00-860-813	Supply External Power (P/B 201)
24-22-00-860-814	Remove External Power (P/B 201)
28-11-00-910-801	Purging and Fuel Tank Entry Precautions (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-22-15-000-801	Fuel Line, Fitting and Coupling - Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

B. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50

D. Access Panels

Number	Name/Location
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
531BB	Center Tank Access Door - Wing Station 192
532AB	Main Tank Access Door - Wing Station 216

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E. Procedure

SUBTASK 28-25-04-860-001

(1) Do this task: Supply External Power, TASK 24-22-00-860-813.

SUBTASK 28-25-04-860-002

WARNING: CAREFULLY DO ALL OF THE SAFETY PROCEDURES TO DEFUEL THE FUEL TANK. AN EXPLOSION, INJURIES TO PERSONS, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Defuel the No. 1 tank and the center tank (TASK 28-26-00-650-801) or transfer all the fuel from the No. 1 tank and the center tank, do this task: Tank to Tank Fuel Transfer, TASK 28-26-00-650-802.

SUBTASK 28-25-04-860-003

(3) Do this task: Remove External Power, TASK 24-22-00-860-814.

SUBTASK 28-25-04-010-001

(4) To get access to the APU fuel line, remove these access panels:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
531BB	Center Tank Access Door - Wing Station 192
532AB	Main Tank Access Door - Wing Station 216

(TASK 28-11-11-000-801), (TASK 28-11-31-000-801).

SUBTASK 28-25-04-860-004

WARNING: CAREFULLY DO ALL OF THE SAFETY PROCEDURES TO PREPARE TO GO INTO THE FUEL TANK. AN EXPLOSION, INJURIES TO PERSONS, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(5) For the No. 1 tank and the center tank, do this task: Purging and Fuel Tank Entry Precautions, TASK 28-11-00-910-801

SUBTASK 28-25-04-020-001

(6) Remove the flareless fittings (TASK 20-10-51-000-801) and the rigid couplings (TASK 28-22-15-000-801) to disconnect the APU fuel line.

- (a) Drain all fuel remaining in the APU fuel line into a 5 gallon (19 liters) fuel resistant container, STD-1054.
- (b) Discard all of the O-rings.

SUBTASK 28-25-04-020-002

(7) Remove the bonding jumpers and clamps from the APU fuel line (TASK 28-22-15-000-801).

SUBTASK 28-25-04-020-003

(8) Disconnect the clamps where it is necessary (TASK 28-22-15-000-801).

SUBTASK 28-25-04-020-004

(9) Remove the APU fuel line from the tank.

————— **END OF TASK** —————

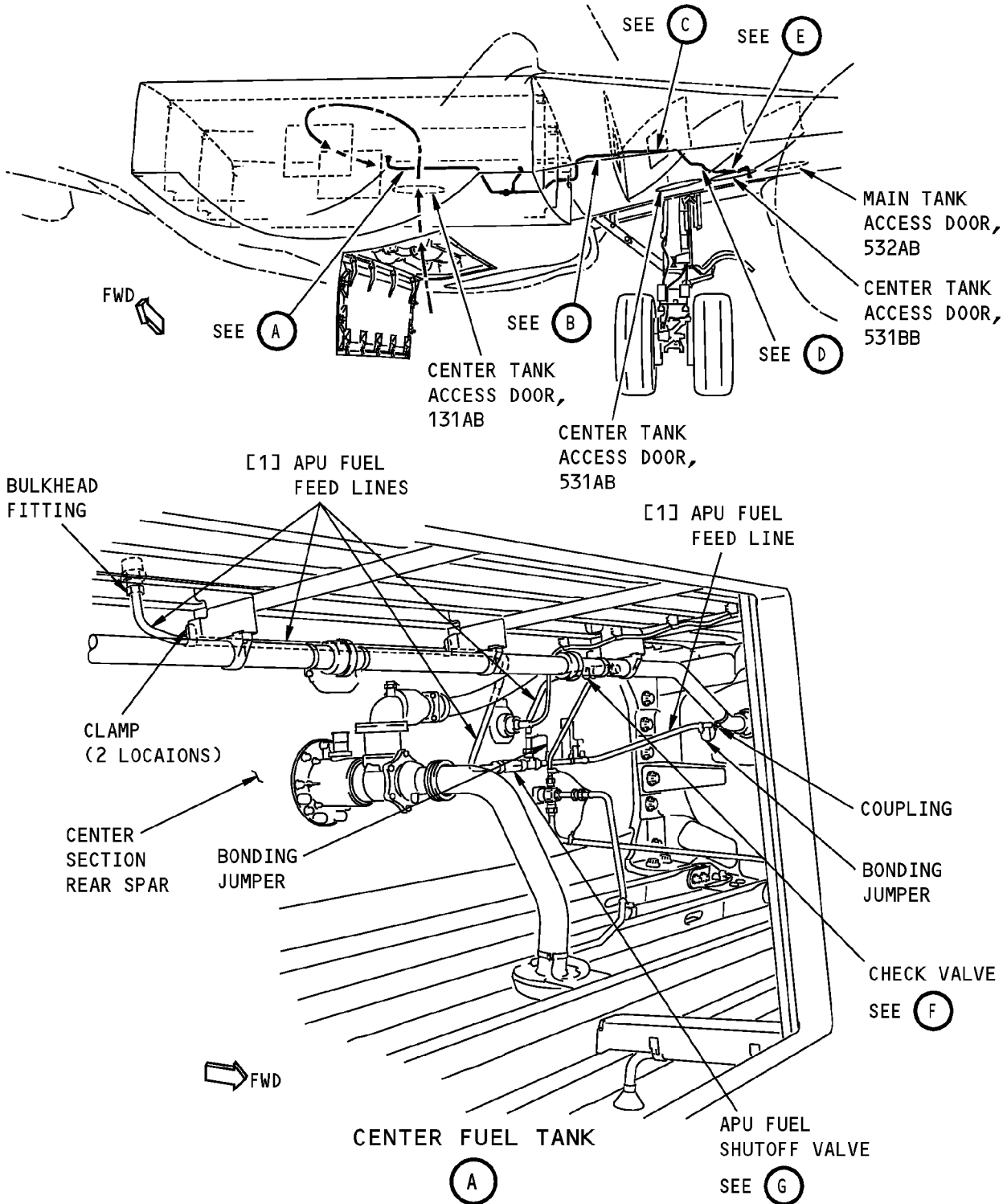
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**APU Fuel Feed Line Installation
Figure 401 (Sheet 1 of 7)/28-25-04-990-802**

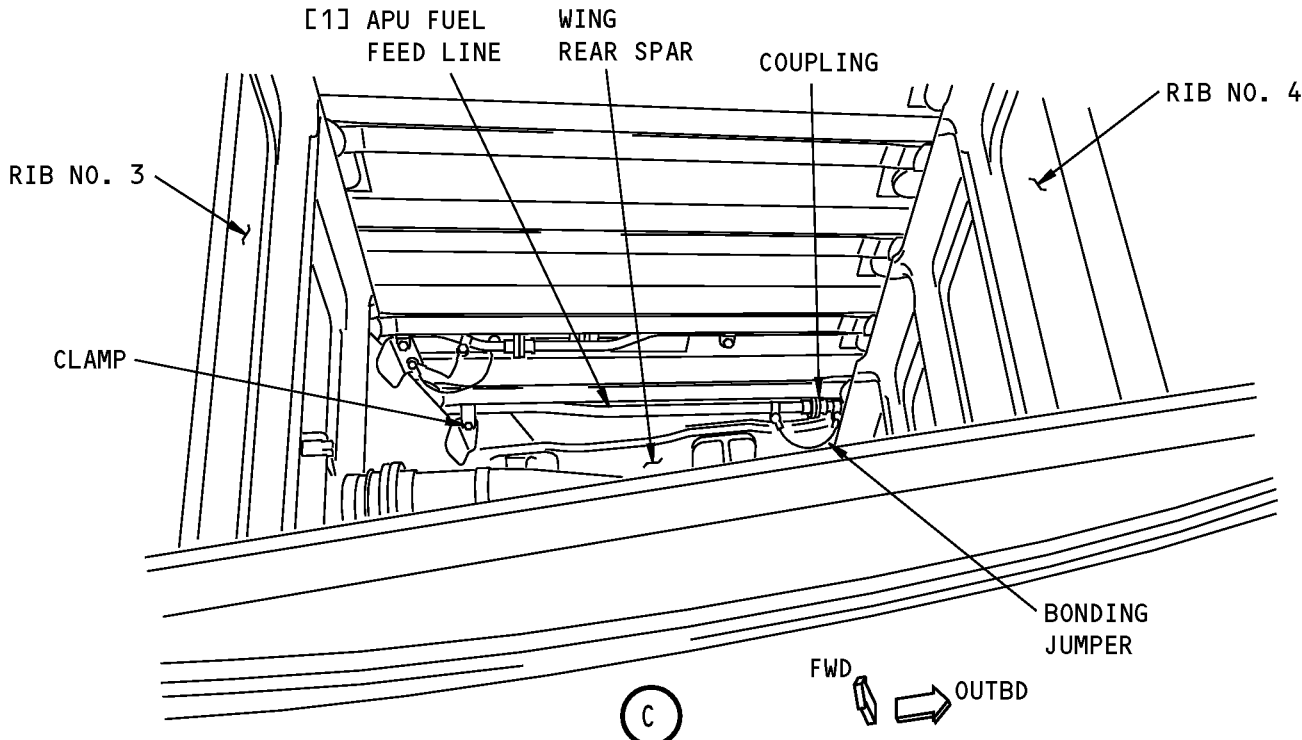
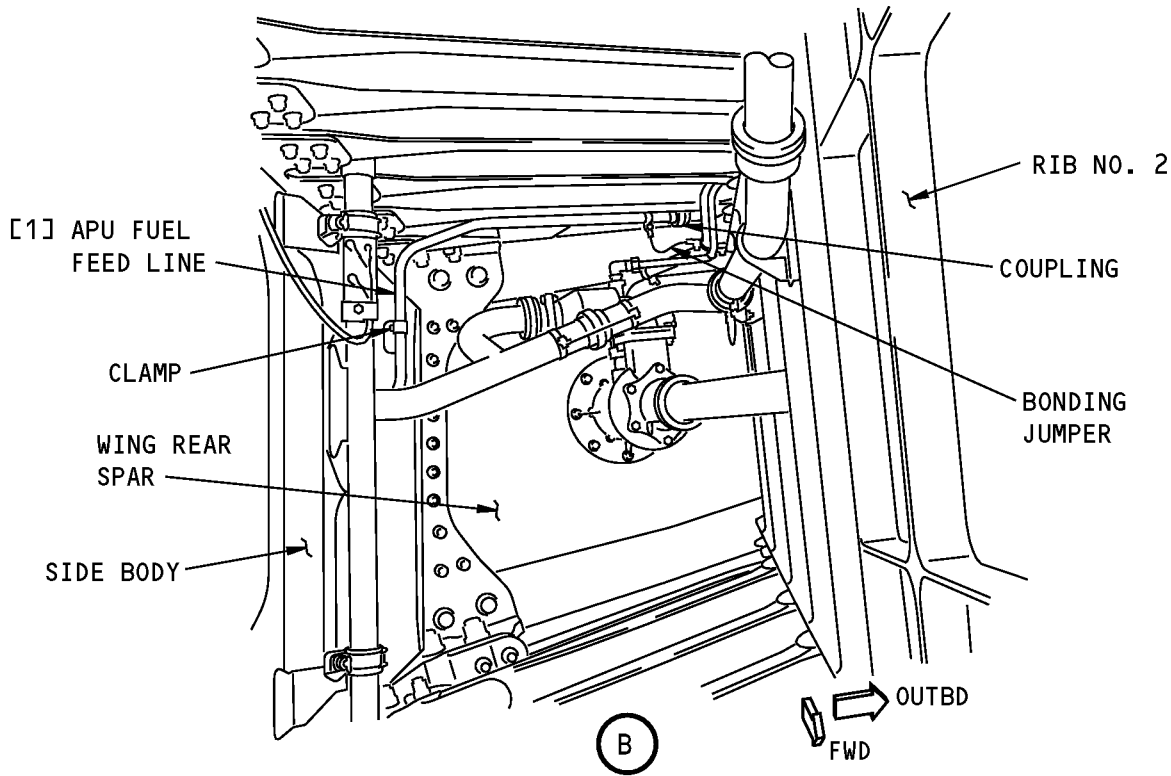
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APU Fuel Feed Line Installation
Figure 401 (Sheet 2 of 7)/28-25-04-990-802

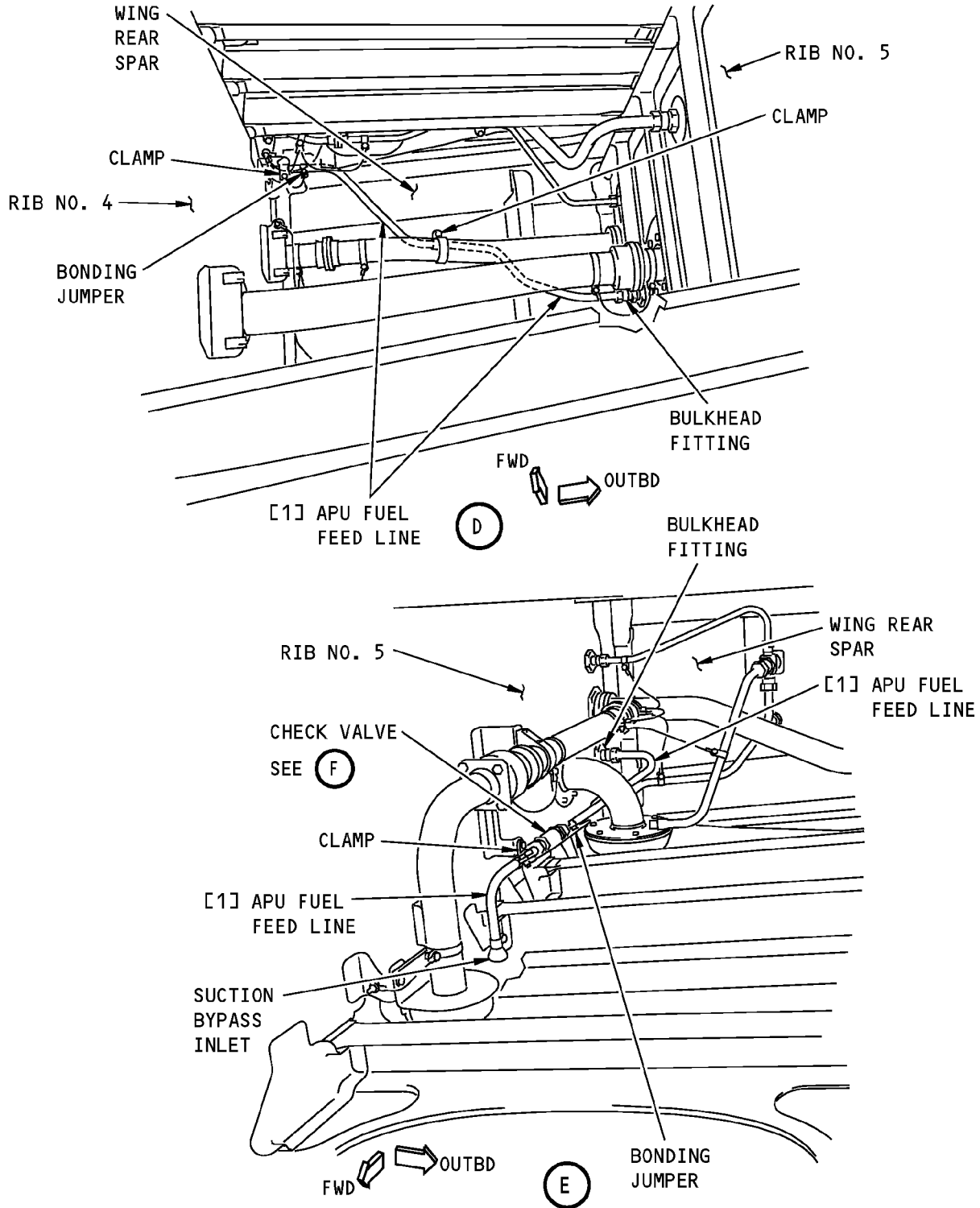
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APU Fuel Feed Line Installation
Figure 401 (Sheet 3 of 7)/28-25-04-990-802

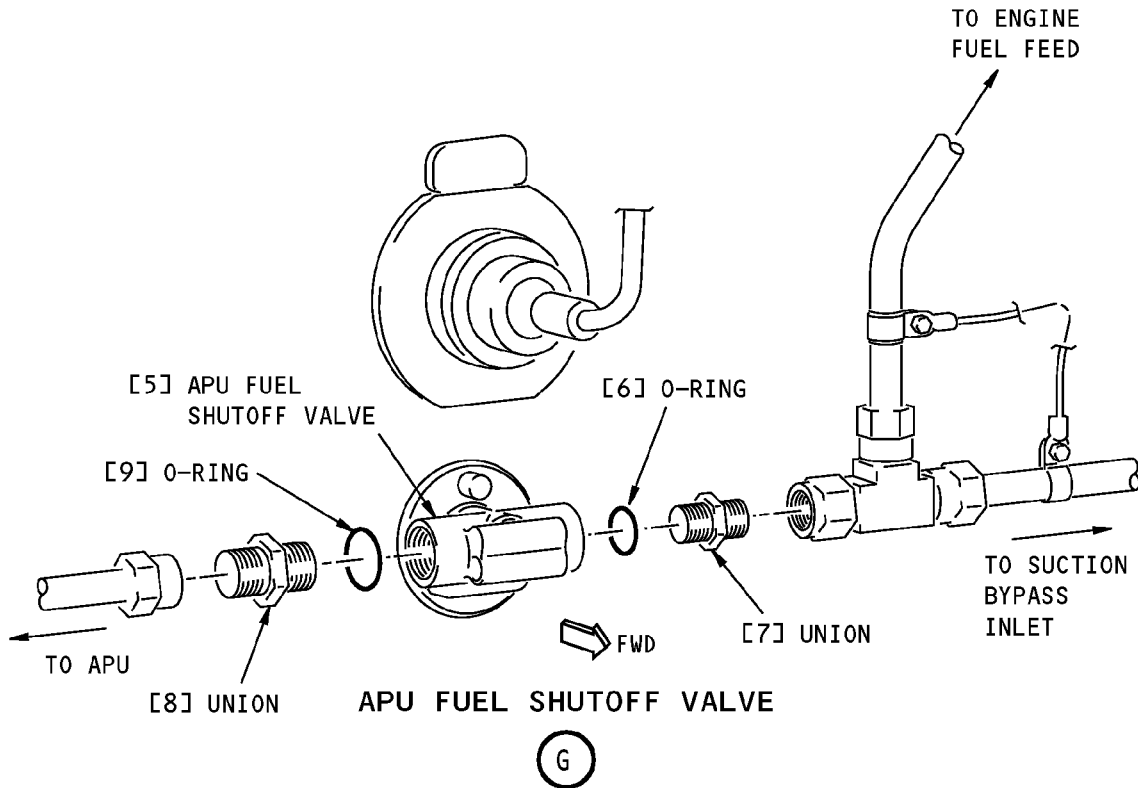
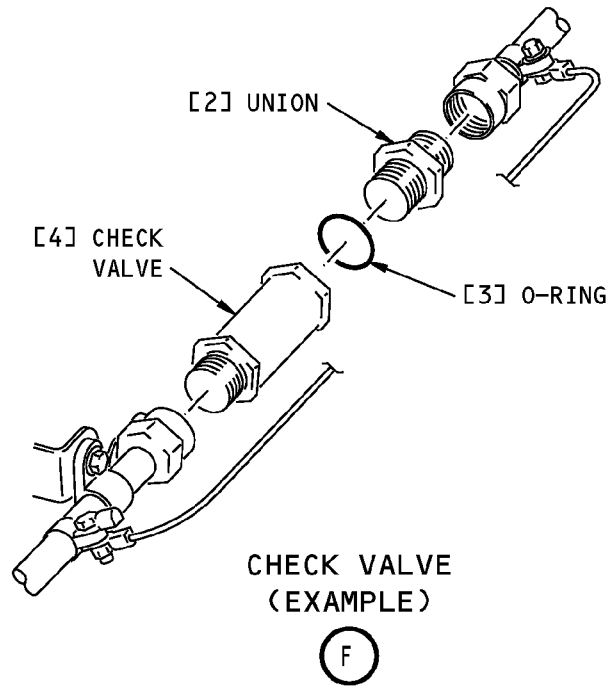
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APU Fuel Feed Line Installation
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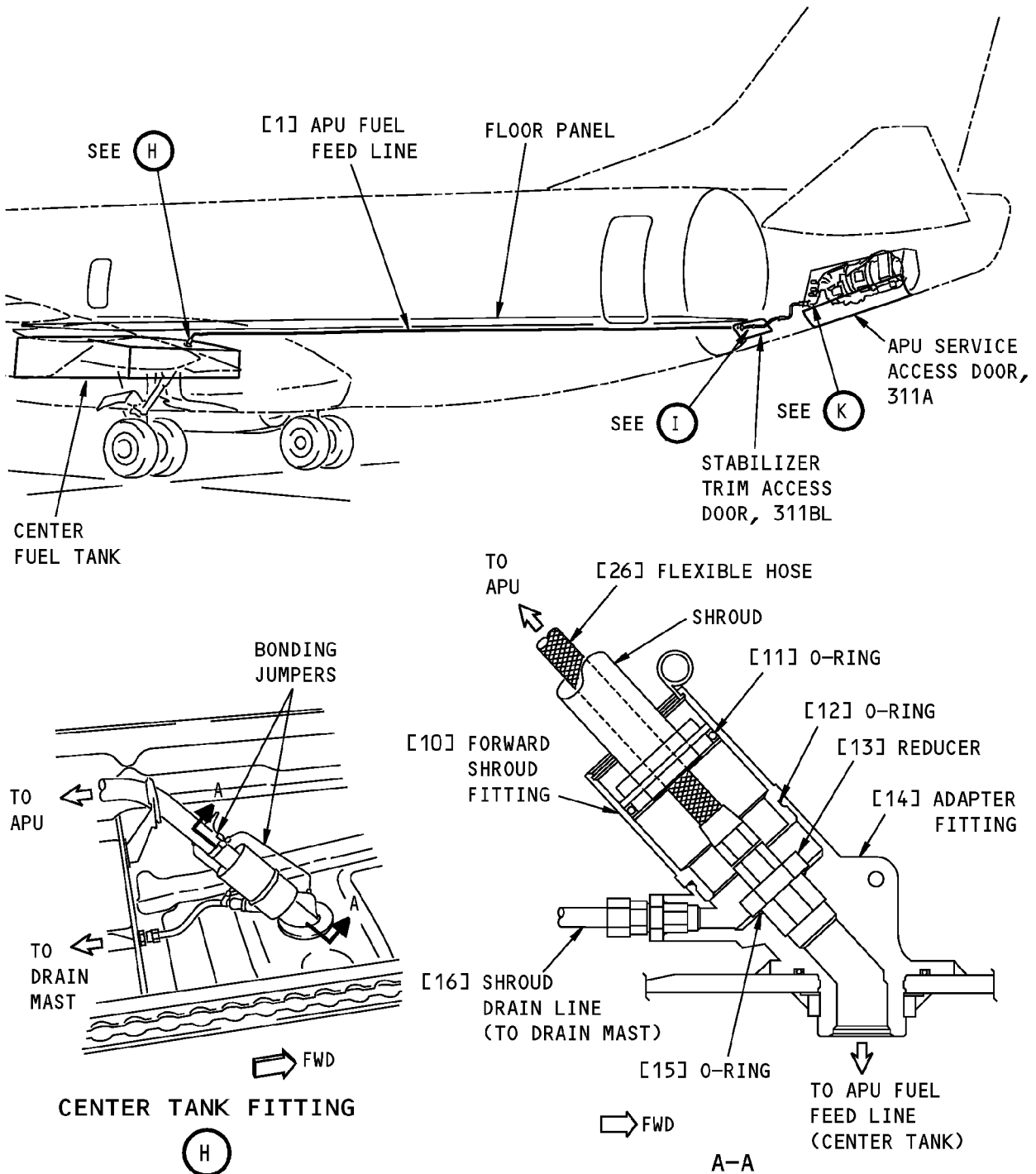
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APU Fuel Feed Line Installation
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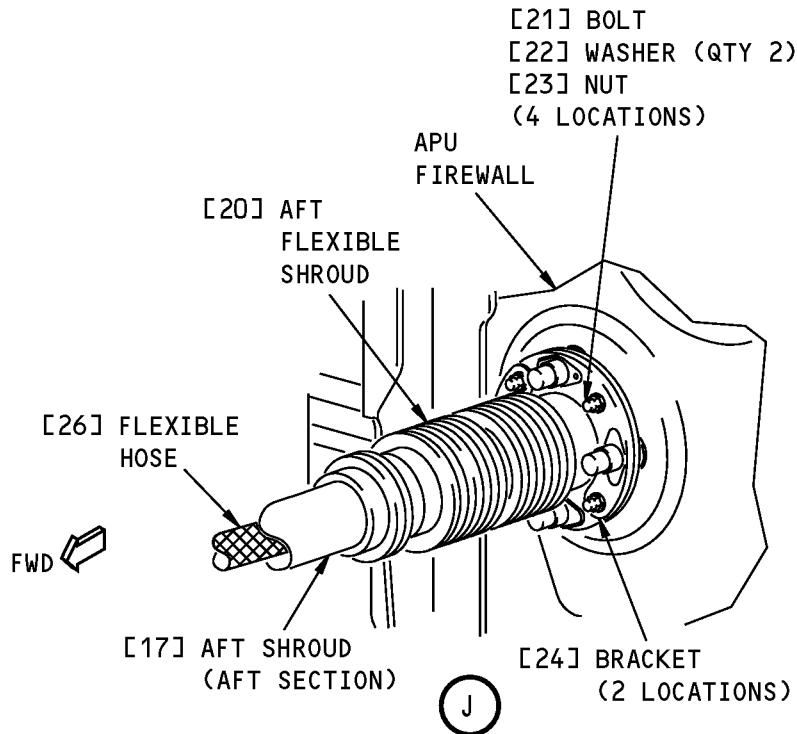
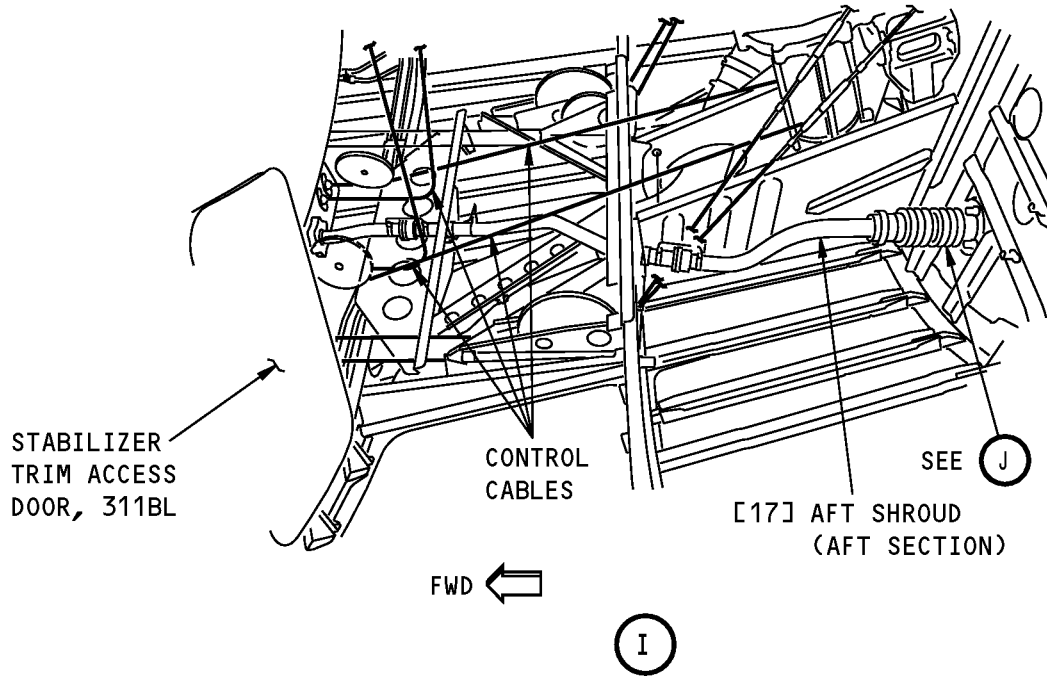
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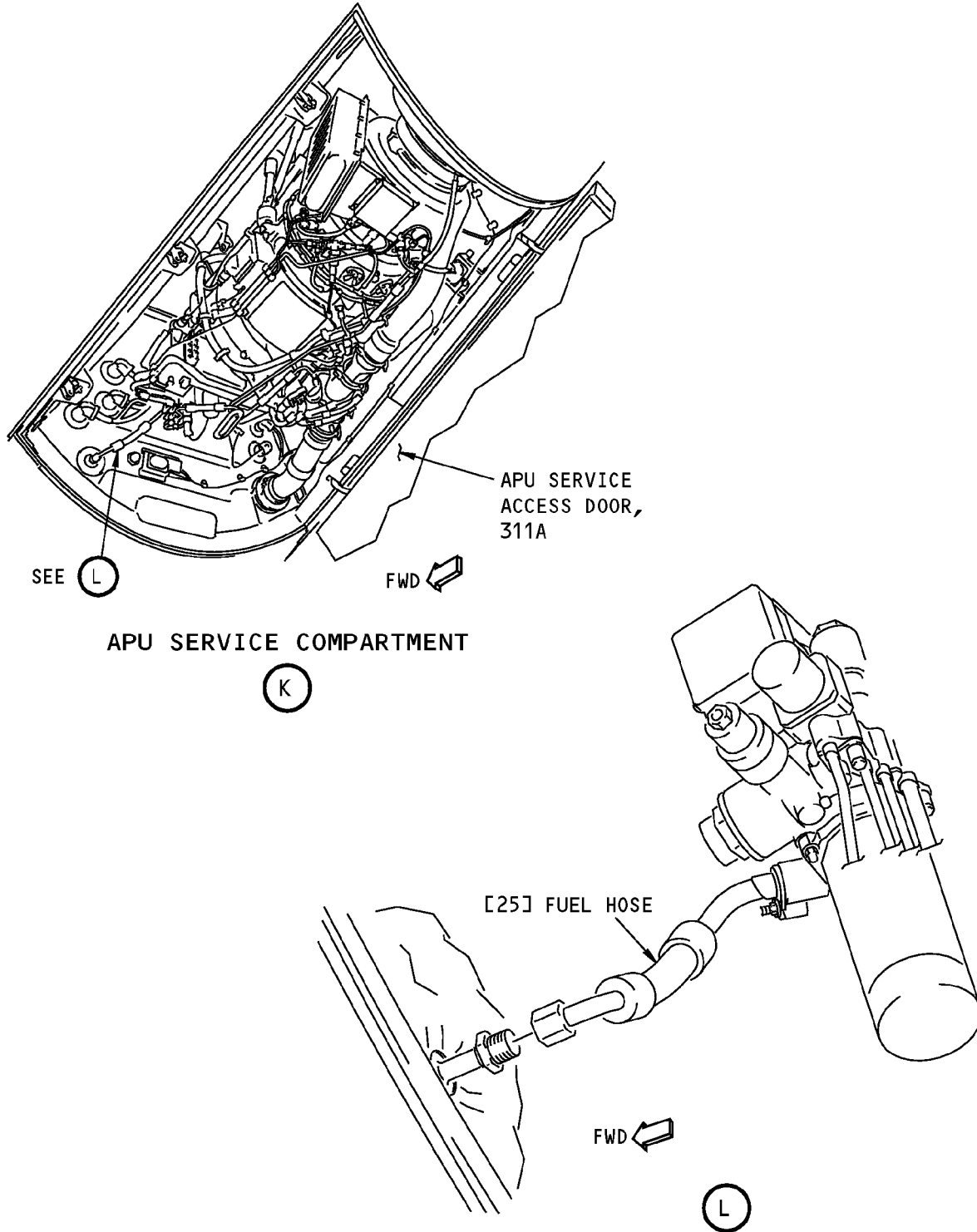
**APU Fuel Feed Line Installation
Figure 401 (Sheet 6 of 7)/28-25-04-990-802**

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**APU Fuel Feed Line Installation
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TASK 28-25-04-400-801

3. APU Fuel Feed Line Installation (No. 1 Tank and Center Tank)

Figure 401

A. References

Reference	Title
20-10-44-400-801	Lockwires Installation (P/B 401)
20-10-51-400-804	Flareless Tubing Assembly Installation (P/B 401)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)
28-22-15-700-801	Engine and APU Fuel Feed, Shroud, and Fuel Vent Line and Couplings Dent Criteria - Inspection/Check (P/B 601)

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1550	Meter - Bonding (Approved Explosion Proof & Intrinsically Safe) (Part #: C15292 (MODEL T477W), Supplier: 01014, A/P Effectivity: 737-ALL) (Part #: M1, Supplier: 3AD17, A/P Effectivity: 737-ALL) (Part #: M1B, Supplier: 3AD17, A/P Effectivity: 737-ALL)

C. Consumable Materials

Reference	Description	Specification
D00504	Grease - Petrolatum	VV-P-236

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50

E. Access Panels

Number	Name/Location
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
531BB	Center Tank Access Door - Wing Station 192
532AB	Main Tank Access Door - Wing Station 216

F. Procedure

SUBTASK 28-25-04-420-001

- (1) Loosely put the APU tubes in their correct position in the tank.

SUBTASK 28-25-04-420-002

- (2) Loosely connect the clamps that hold the APU fuel line to the structure or support brackets (TASK 28-22-15-400-801).

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SUBTASK 28-25-04-640-001

(3) Apply a thin layer of petrolatum grease, D00504, to the new O-rings.

SUBTASK 28-25-04-420-003

(4) Install new O-rings in the couplings.

(a) Inspect the couplings for wear and replace if necessary (TASK 28-22-15-700-801).

SUBTASK 28-25-04-420-004

(5) Install the support brackets to the structure with bolts, washers, and nuts.

SUBTASK 28-25-04-420-005

CAUTION: DO NOT USE TOOLS TO TIGHTEN THE RIGID COUPLINGS. DAMAGE TO THE COMPONENTS COULD OCCUR OR THE ADJACENT FITTINGS COULD LOOSEN.

(6) Install the flareless fittings (TASK 20-10-51-400-804) and rigid couplings (TASK 28-22-15-400-801) to connect the APU fuel line .

SUBTASK 28-25-04-410-001

(7) Install lockwire on the rigid couplings (TASK 20-10-44-400-801).

SUBTASK 28-25-04-420-006

(8) Tighten the clamps on the APU fuel line (TASK 28-22-15-400-801).

SUBTASK 28-25-04-420-007

(9) Install the bolts, washers and nuts to connect the bonding jumpers between APU fuel line and the support brackets (TASK 28-22-15-400-801).

SUBTASK 28-25-04-220-001

(10) Measure the bonding resistance across the bonding jumpers with an electrical bonding meter, COM-1550.

(a) Make sure the bonding resistance is not more than 0.010 ohm.

SUBTASK 28-25-04-790-001

(11) Do this task: APU Fuel Line Leak Test (with air), TASK 28-25-04-790-801.

SUBTASK 28-25-04-860-005

(12) Remove all of the tools and equipment from the fuel tanks.

SUBTASK 28-25-04-410-002

(13) Install these access panels: that you removed to get access to the APU fuel line:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
531BB	Center Tank Access Door - Wing Station 192
532AB	Main Tank Access Door - Wing Station 216

(TASK 28-11-11-000-801), (TASK 28-11-31-000-801).

END OF TASK

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TASK 28-25-04-400-802

4. APU Fuel Line Removal (Center Wing Section to APU Firewall)

A. References

Reference	Title
24-22-00-860-814	Remove External Power (P/B 201)
25-27-15-000-801	Carpet Removal (P/B 401)
53-21-00-000-801	Passenger Cabin Floor Panel Removal (P/B 401)

B. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

C. Location Zones

Zone	Area
230	Subzone - Passenger Compartment - Body Station 360.00 to 663.75
240	Subzone - Passenger Compartment - Body Station 663.75 to Body Station 1016.00

D. Access Panels

Number	Name/Location
311BL	Stabilizer Trim Access Door

E. Procedure

SUBTASK 28-25-04-010-002

- (1) Remove the aisle carpets at station 660 (immediately aft of the overwing emergency exit) (TASK 25-27-15-000-801).

SUBTASK 28-25-04-010-003

- (2) Remove the floor panel at Station 660 (immediately aft of the overwing emergency exit) (TASK 53-21-00-000-801) to get access to the interconnect fitting on the center tank.

SUBTASK 28-25-04-860-006

- (3) Do this task: Remove External Power, TASK 24-22-00-860-814.

SUBTASK 28-25-04-860-007

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

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	19	C01344	APU FIRE SW POWER

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	14	C00033	AUX POWER UNIT CONT

SUBTASK 28-25-04-020-005

- (5) Loosen the forward shroud fitting [10] from the adapter fitting [14] on the center tank (Figure 401), view H.

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SUBTASK 28-25-04-020-006

WARNING: DO NOT CONNECT THE ELECTRICAL POWER TO THE AIRPLANE WHEN THE FUEL LINES ARE DISCONNECTED. CAREFULLY DO ALL OF THE SAFETY PRECAUTIONS FOR PROCEDURES WITH OPEN TANKS. AN EXPLOSION, BAD INJURIES TO PERSONS, AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (6) Do these steps to disconnect the flexible hose [26] from the center tank adapter fitting [14]:
- (a) Loosen the forward shroud fitting [10] until it is against the reducing ferrule on the APU shroud.
 - (b) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the drain mast for the APU shroud.
 - (c) Loosen the reducer [13] on the flexible hose to disconnect the flexible hose from the center tank adapter fitting [14].
 - (d) Move the flexible hose from the adapter fitting [14].
 - (e) Remove the O-ring [12] from the shroud and discard it.
 - (f) Remove the O-ring [15] from the reducer [13] and discard it.

SUBTASK 28-25-04-010-004

- (7) Open this access panel to get access to the APU aft shroud:

<u>Number</u>	<u>Name/Location</u>
311BL	Stabilizer Trim Access Door

SUBTASK 28-25-04-020-007

- (8) Disconnect the aft part of the APU aft shroud from the aft flexible shroud [20] installed in the forward side of the APU firewall (Figure 401), view J.

SUBTASK 28-25-04-020-008

- (9) Move the aft flexible shroud [20] back to get access to disconnect the fuel hose [25] from the fitting on the forward side of the APU firewall.

SUBTASK 28-25-04-020-009

- (10) Disconnect the coupling of the aft APU shroud immediately forward of the connection to the aft flexible shroud [20] (Figure 401), view J.

SUBTASK 28-25-04-020-010

- (11) Remove the aft section of the aft APU shroud [17], view I.

SUBTASK 28-25-04-020-011

- (12) Do these steps to remove the flexible hose [25] from the APU shroud:

- (a) Hold the exposed part of the flexible hose firmly.
- (b) Pull the flexible hose [25] in the aft direction until it is completely removed from the shroud.

NOTE: This step removes the complete length of the flexible hose which you disconnected from the center tank fitting at the forward end. It may be necessary to twist and turn the flexible hose in the shroud to get it to move freely.

- (c) Move the flexible hose [25] through the opening for this access panel:

<u>Number</u>	<u>Name/Location</u>
311BL	Stabilizer Trim Access Door

————— **END OF TASK** —————

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TASK 28-25-04-400-803

5. APU Fuel Line Installation (Center Wing Section to APU Firewall)

A. References

Reference	Title
20-10-17-400-801	O-Rings Installation (P/B 401)
20-50-11-910-801	Standard Torque Values (P/B 201)
24-22-00-860-814	Remove External Power (P/B 201)
25-27-15-400-801	Carpet Installation (P/B 401)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)
28-25-05-790-801	APU Fuel Line Shroud and Drain Line Leak Test (P/B 401)
53-21-00-400-801	Passenger Cabin Floor Panel Installation (P/B 401)

B. Location Zones

Zone	Area
230	Subzone - Passenger Compartment - Body Station 360.00 to 663.75
240	Subzone - Passenger Compartment - Body Station 663.75 to Body Station 1016.00

C. Access Panels

Number	Name/Location
311BL	Stabilizer Trim Access Door

D. Procedure

SUBTASK 28-25-04-560-001

(1) Put the flexible hose [26] through this access panel:

Number	Name/Location
311BL	Stabilizer Trim Access Door

SUBTASK 28-25-04-420-008

(2) Put the forward end of the flexible hose [26] into the aft end of the APU shroud (Figure 401), view I.

SUBTASK 28-25-04-420-009

(3) Continue to put the fuel line into the main shroud until the fuel line is against the adapter fitting [14] for the center tank (Figure 401), view H.

SUBTASK 28-25-04-020-012

(4) Pull the forward shroud fitting [10] away from the adapter fitting [14].

SUBTASK 28-25-04-420-010

(5) Do these steps to connect the flexible hose (Figure 401), view H.

(a) Lubricate and install a new O-ring [12] (TASK 20-10-17-400-801).

(b) If the reducer [13] is not already installed in the flexible hose with a new O-ring [15], then do these steps:

- 1) Lubricate and install a new O-ring [15] on the reducer [13] (TASK 20-10-17-400-801).
- 2) Install the reducer [13] on the end of the flexible hose [26].

(c) Put the flexible hose [26] and the shroud into the forward shroud fitting [10].

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(d) Connect the flexible hose to the adapter fitting [14] with the reducer [13].

NOTE: Do not attach the forward shroud fitting until you complete the leak check for the fuel line.

1) Tighten the reducer in the adapter fitting to a standard torque (TASK 20-50-11-910-801).

SUBTASK 28-25-04-020-013

(6) Do these steps to install the aft section of the APU aft shroud (Figure 401), view I:

- (a) Put the aft section of the APU aft shroud [17] on the aft end of the flexible hose.
(b) Connect the aft section of the aft APU shroud to the adjacent section of the APU shroud (TASK 28-22-15-400-801).
(c) Push the aft flexible shroud [20] aft to get access to the fitting at the APU firewall for the flexible hose.
(d) Connect the aft end of the flexible hose to the fitting at the APU firewall (Figure 401).

NOTE: Do not attach the APU shroud [17] to the aft flexible shroud [20] until you complete the leak check of the fuel line.

SUBTASK 28-25-04-790-002

(7) Do this task: APU Fuel Line Leak Test (with air), TASK 28-25-04-790-801.

SUBTASK 28-25-04-420-012

(8) Do these steps to connect the fuel line shroud to the center tank (Figure 401), view H.

- (a) Engage and tighten the forward flexible fitting [10] on the center tank adapter fitting [14] to a torque of 630 - 770 inch-pounds.

SUBTASK 28-25-04-420-013

(9) Connect the coupling of the aft section of the APU shroud to the aft flexible shroud [20] (Figure 401), view J.

SUBTASK 28-25-04-790-003

(10) Do this task: APU Fuel Line Shroud and Drain Line Leak Test, TASK 28-25-05-790-801.

E. Put the Airplane Back to Its Usual Condition

SUBTASK 28-25-04-860-008

(1) Set the crossfeed valve switch on the P5 panel in the closed position.

SUBTASK 28-25-04-410-004

(2) Install the floor panel at STA 660 (TASK 53-21-00-400-801).

SUBTASK 28-25-04-410-005

(3) Install the aisle carpets (TASK 25-27-15-400-801).

SUBTASK 28-25-04-860-015

(4) Close these circuit breakers:

F/O Electrical System Panel, P6-2

Table with 4 columns: Row, Col, Number, Name. Row B, Col 19, Number C01344, Name APU FIRE SW POWER

F/O Electrical System Panel, P6-4

Table with 4 columns: Row, Col, Number, Name. Row A, Col 14, Number C00033, Name AUX POWER UNIT CONT

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SUBTASK 28-25-04-860-009

- (5) If electrical power is not necessary for other tasks, do this task: Remove External Power, TASK 24-22-00-860-814.

SUBTASK 28-25-04-410-006

- (6) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
311BL	Stabilizer Trim Access Door

————— END OF TASK —————

TASK 28-25-04-790-801

6. APU Fuel Line Leak Test (with air)

A. General

- (1) This procedure does an air pressure test of the APU fuel feed line from the APU to the bypass inlet in the No. 1 tank.

B. Tools/Equipment

<u>Reference</u>	<u>Description</u>
STD-1201	Gauge - Pressure, 0-75 PSIG (0-518 KPa)
STD-3940	Air Source - Regulated, Dry Filtered, 0 to 150 psig

C. Access Panels

<u>Number</u>	<u>Name/Location</u>
315A	APU Cowl Door

D. Pressurize the APU Fuel Line with Air and Do a Check for Leaks

SUBTASK 28-25-04-860-010

- (1) Manually open the APU fuel shutoff valve with the override lever.

SUBTASK 28-25-04-010-005

- (2) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
315A	APU Cowl Door

SUBTASK 28-25-04-860-011

- (3) Disconnect the APU flex line in the APU compartment at the APU firewall (Figure 401), View L.

SUBTASK 28-25-04-860-012

- (4) Install a 0 to 150 psig dry filtered regulated air source, STD-3940 and pressure gauge, STD-1201 on the fitting at the APU firewall.

SUBTASK 28-25-04-790-004

- (5) Pressurize the APU fuel feed line to a maximum of 40 psig.

SUBTASK 28-25-04-790-005

- (6) Keep the pressure on the fuel line for minimum of 5 minutes.

SUBTASK 28-25-04-790-006

- (7) There must be no pressure decrease.

SUBTASK 28-25-04-790-007

- (8) If there is leakage look for indications of leakage and make the necessary repairs.

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SUBTASK 28-25-04-790-008

- (9) Do these steps to put the airplane back to its usual condition:
- (a) Permit the pressure to decrease to zero.
 - (b) Remove the 0 to 150 psig dry filtered regulated air source, STD-3940 and pressure gauge, STD-1201 from the APU flex line.
 - (c) Connect the APU flex line to its fitting on the APU again (Figure 401), View L.

SUBTASK 28-25-04-410-007

- (10) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
315A	APU Cowl Door

————— **END OF TASK** —————

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APU FUEL FEED LINE SHROUD - REMOVAL/INSTALLATION

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure has four tasks:
 - (1) A task to remove the main shroud for the APU fuel-feed line
 - (2) A task to install the main shroud for the APU fuel-feed line
 - (3) A task to remove the aft shroud for the APU fuel-feed line
 - (4) A task to install the aft shroud for the APU fuel-feed line.
 - (a) The APU fuel-feed line shroud is referred to as the APU shroud.
- C. The APU shroud has this routing:
 - (1) The forward end starts at the adapter fitting installed on the upper panel of the center tank (Figure 401), View A.
 - (2) The aft end of the shroud ends at the flexible shroud which is attached to the forward side of the APU firewall.
- D. To make the removal procedure easier, the APU shroud is divided into two parts. The part that goes from the top of the center tank to the forward side of the pressure bulkhead is referred to as the main shroud. The part that goes from the aft side of the pressure bulkhead to the APU firewall is referred to as the aft shroud.

TASK 28-25-05-000-801

2. Main APU Fuel Feed Line Shroud Removal

(Figure 401)

A. References

Reference	Title
24-22-00-860-812	Remove Electrical Power (P/B 201)
25-27-15-000-801	Carpet Removal (P/B 401)
28-25-04-400-802	APU Fuel Line Removal (Center Wing Section to APU Firewall) (P/B 401)
53-21-00-000-801	Passenger Cabin Floor Panel Removal (P/B 401)

B. Location Zones

Zone	Area
141	Aft Cargo Compartment - Left
142	Aft Cargo Compartment - Right
241	Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Left

C. Access Panels

Number	Name/Location
311BL	Stabilizer Trim Access Door

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D. Procedure

SUBTASK 28-25-05-010-001

- (1) Get the access to the fitting and the parts that attach the main shroud.

NOTE: You can get access to the shroud clamps between Station 947 and Station 1016 by a different procedure. You can remove the access panels in the aft wall of the aft cargo compartment.

- (a) Remove the aisle carpets (TASK 25-27-15-000-801) between Station 616 and Station 1016.
- (b) Remove the floor panels (TASK 53-21-00-000-801) between Station 616 and Station 1016.

SUBTASK 28-25-05-860-001

- (2) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

SUBTASK 28-25-05-020-001

WARNING: DO NOT CONNECT THE ELECTRICAL POWER TO THE AIRPLANE WHEN THE FUEL LINES ARE DISCONNECTED. CAREFULLY DO ALL OF THE SAFETY PRECAUTIONS FOR PROCEDURES WITH OPEN FUEL TANKS. AN EXPLOSION AND INJURIES TO PERSONS CAN OCCUR.

- (3) Remove the flexible hose [11] from the main shroud [1].

NOTE: If you are scheduled to remove the flexible hose [11], refer to the applicable procedure (TASK 28-25-04-400-802).

- (a) Do these steps to disconnect the flexible hose [11] from the center tank adapter fitting [7] (Figure 401), view A:
 - 1) Put a container below the APU shroud drain mast to catch fuel.
 - 2) Loosen the forward shroud fitting [10] until it is against the ferrule on the shroud [3].
 - 3) Disconnect the coupling nut for the flexible hose [11] from the center tank adapter fitting [7].

NOTE: When you disconnect the flexible hose [11], a small quantity of fuel will spill from the flexible hose and drain from the drain mast for the APU shroud.

- (a) Engage the forward shroud fitting [10] again and tighten it.
- (a) Move the fuel line and the shroud out of the interior of the adapter fitting [7].
- (a) Remove the O-ring [4] from the shroud and discard it.
- (b) To get access to the aft shroud, open this access panel:
(Figure 401, view B)

<u>Number</u>	<u>Name/Location</u>
311BL	Stabilizer Trim Access Door
- (c) Disconnect the aft shroud (aft section) [15] from the aft flexible shroud [20].
- (d) Pull the aft flexible shroud [20] back toward the APU firewall and disconnect the APU fuel line connection at the APU firewall.
- (e) Pull the flexible hose [11] through the main shroud [1] and stow the flexible hose [11] in the aft compartment.

SUBTASK 28-25-05-020-002

- (4) Do these steps to remove the main shroud [1] from the floor beams:

- (a) Loosen and remove the clamps that attach the main shroud to the airplane structure.

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- (b) Remove the tube couplings and bonding components so you can remove the shroud through the floor beam holes.
- (c) Pull the main shroud [1] forward.
- (d) Turn the main shroud [1] until it is clear of the control cables.
- (e) Lift the main shroud [1] until it is clear of the floor panels.

SUBTASK 28-25-05-020-003

- (5) Remove the main shroud [1] from the airplane through the aft entry door.

————— **END OF TASK** —————

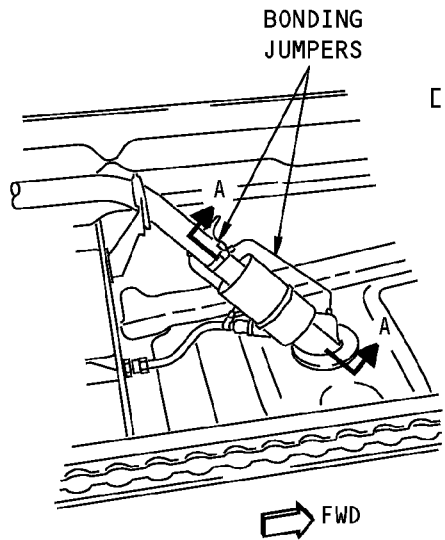
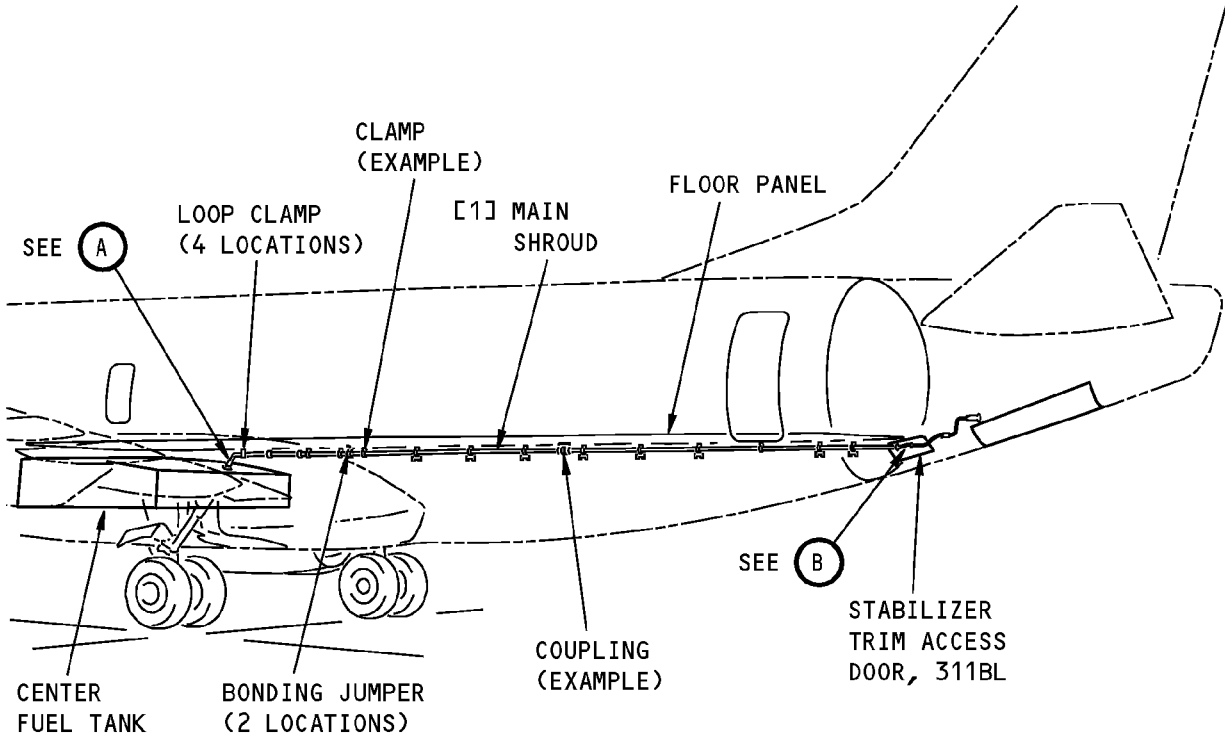
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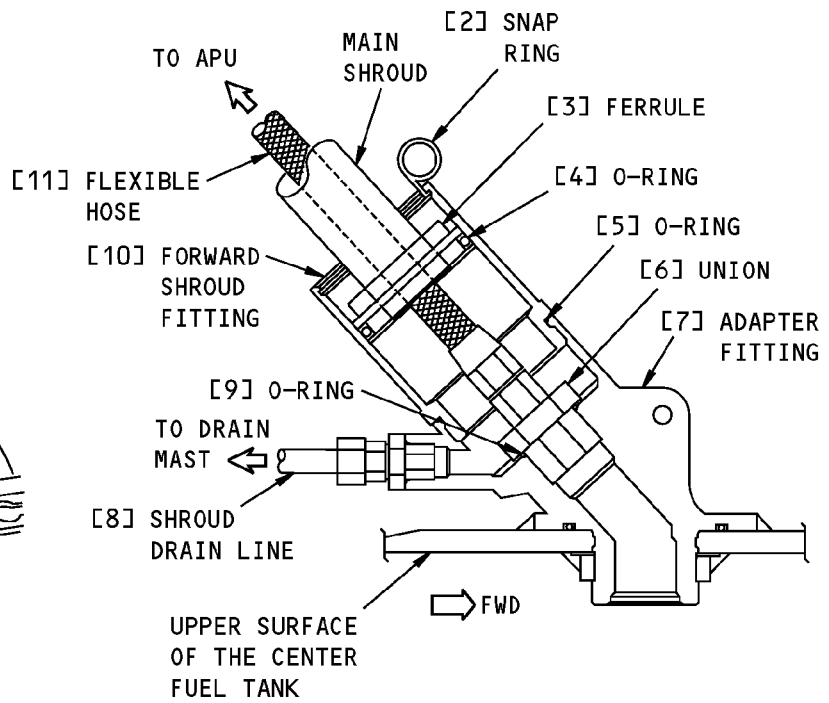
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CENTER TANK FITTING

(A)



A-A

**APU Fuel Feed Line Shroud Installation
Figure 401 (Sheet 1 of 2)/28-25-05-990-801**

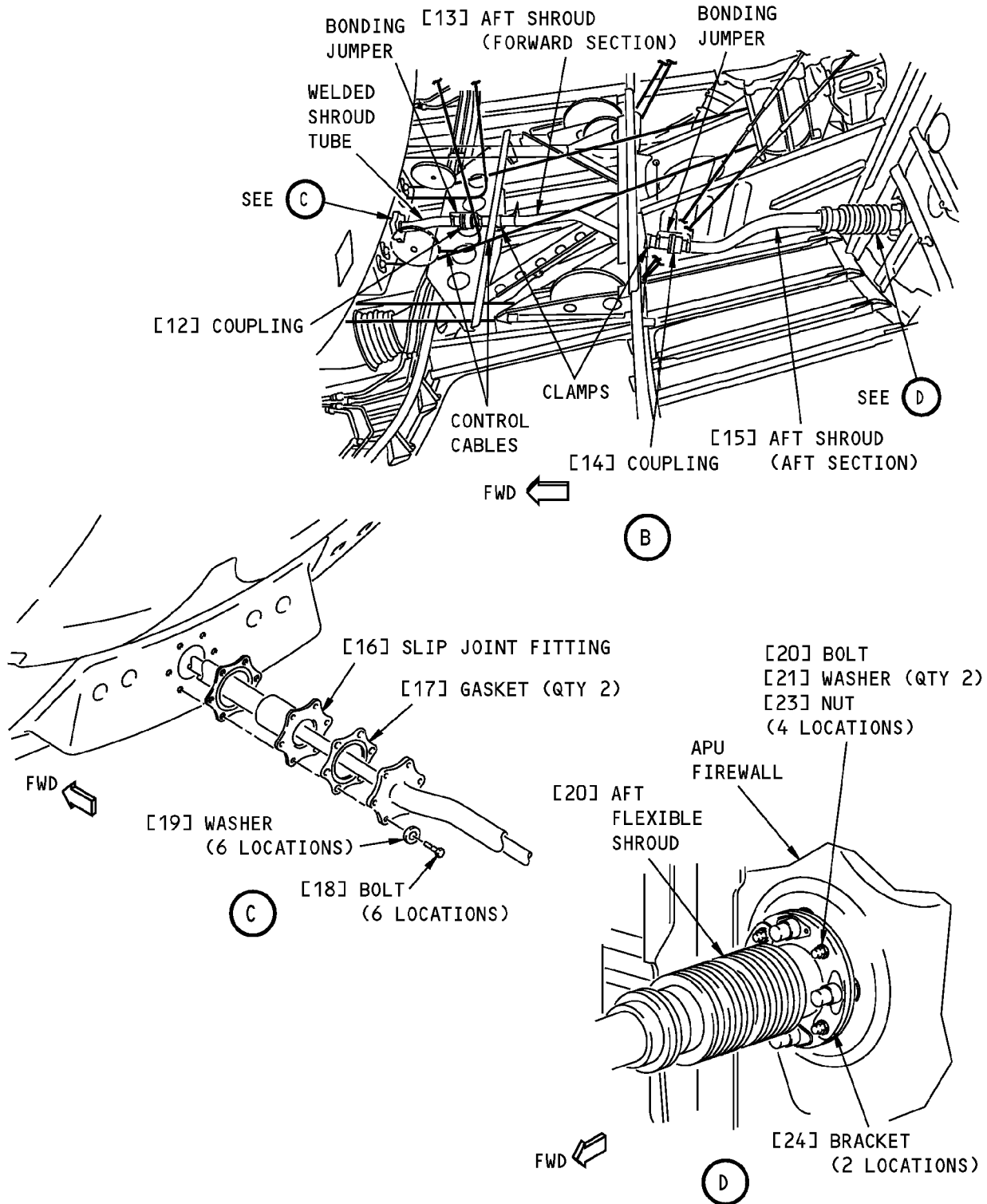
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APU Fuel Feed Line Shroud Installation
Figure 401 (Sheet 2 of 2)/28-25-05-990-801

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TASK 28-25-05-400-801

3. Main APU Fuel Feed Line Shroud Installation

(Figure 401)

A. References

Reference	Title
20-50-11-910-801	Standard Torque Values (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
25-27-15-400-801	Carpet Installation (P/B 401)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)
28-25-04-790-801	APU Fuel Line Leak Test (with air) (P/B 401)
53-21-00-400-801	Passenger Cabin Floor Panel Installation (P/B 401)

B. Location Zones

Zone	Area
141	Aft Cargo Compartment - Left
142	Aft Cargo Compartment - Right
241	Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Left

C. Access Panels

Number	Name/Location
311BL	Stabilizer Trim Access Door

D. Procedure

SUBTASK 28-25-05-420-001

- (1) Do these steps to put the main shroud [1] in the correct position.
 - (a) Put the main shroud [1] through the aft entry door.
 - (b) Put the aft end of the main shroud [1] through the opening in the passenger cabin floor above the rear spar of the center wing section.
 - (c) Move the main shroud [1] aft through the floor beams.

SUBTASK 28-25-05-420-002

- (2) Install a new O-ring on the aft end fitting of the main shroud.

SUBTASK 28-25-05-420-003

- (3) Put the main shroud [1] into the slip joint fitting [16] on the pressure bulkhead.

SUBTASK 28-25-05-420-005

- (4) Install the first clamp aft of the forward shroud fitting for the main shroud.
 - (a) Turn the main shroud [1] until the shroud slips into the center tank adapter fitting [7].
 - (b) Put a new O-ring on the end of the shroud.
 - (c) Install the clamp.

SUBTASK 28-25-05-420-006

- (5) Do these steps to install the remaining support clamps and the couplings for the main shroud (Figure 401) (TASK 28-22-15-400-801):
 - (a) Loosely install the support clamps.

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- (b) Install the couplings and the bonding jumpers for the main shroud.

NOTE: Make sure there are new O-rings in each coupling.

- (c) Tighten the support clamps.

SUBTASK 28-25-05-420-007

- (6) Do these steps to connect the flexible hose [11]:

- (a) Put the flexible hose through the aft shroud (forward section) [13].
- (b) Move the flexible hose in the forward direction until it touches the center tank adapter fitting [7].
- (c) Remove the forward shroud fitting from the center tank adapter fitting [7] (if it is connected).
- (d) Put a new O-ring [4] in the forward shroud fitting.
- (e) Connect the coupling nut for the flexible hose [11] and tighten it to a standard torque (TASK 20-50-11-910-801).

NOTE: Do not attach the flange for the flexible shroud until you complete the fuel leak check.

SUBTASK 28-25-05-790-001

- (7) Do this task: APU Fuel Line Leak Test (with air), TASK 28-25-04-790-801.

SUBTASK 28-25-05-420-014

- (8) Do these steps to connect the aft shroud (aft section) [15] to the aft flexible shroud [20] at the APU firewall (Figure 401), view D:

- (a) Push the aft flexible shroud [20] aft to get access to the flexible hose coupling.
- (b) Connect the aft APU shroud to the aft flexible shroud at the APU firewall.

SUBTASK 28-25-05-420-009

- (9) Do these steps to install the forward shroud fitting [10] (Figure 401):

- (a) Put a new O-ring [5] in the adapter fitting [7].
- (b) Engage the forward shroud fitting [10] in the center tank adapter fitting [7].
- (c) Tighten the forward shroud fitting to a torque of 660 - 730 inch-pounds.

SUBTASK 28-25-05-790-002

- (10) Do this task: APU Fuel Line Shroud and Drain Line Leak Test, TASK 28-25-05-790-801.

E. Put the Airplane Back to Its Usual Condition

SUBTASK 28-25-05-410-001

- (1) Install the floor panels (TASK 53-21-00-400-801).

SUBTASK 28-25-05-410-002

- (2) Install the aisle carpets (TASK 25-27-15-400-801).

SUBTASK 28-25-05-860-002

- (3) If electrical power is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812

SUBTASK 28-25-05-410-003

- (4) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
311BL	Stabilizer Trim Access Door

————— END OF TASK —————

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TASK 28-25-05-000-802

4. Aft APU Fuel-Feed Line Shroud Removal

(Figure 401)

A. References

Reference	Title
24-22-00-860-812	Remove Electrical Power (P/B 201)
28-22-15-000-801	Fuel Line, Fitting and Coupling - Removal (P/B 401)

B. Location Zones

Zone	Area
141	Aft Cargo Compartment - Left
142	Aft Cargo Compartment - Right
241	Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Left

C. Access Panels

Number	Name/Location
311BL	Stabilizer Trim Access Door

D. Procedure

SUBTASK 28-25-05-860-003

(1) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

SUBTASK 28-25-05-010-002

(2) Open this access panel:

Number	Name/Location
311BL	Stabilizer Trim Access Door

SUBTASK 28-25-05-020-004

WARNING: DO NOT CONNECT THE ELECTRICAL POWER TO THE AIRPLANE WHEN THE FUEL LINES ARE DISCONNECTED. CAREFULLY DO ALL OF THE SAFETY PRECAUTIONS FOR PROCEDURES WITH OPEN FUEL TANKS. AN EXPLOSION AND BAD INJURIES TO PERSONS CAN OCCUR.

(3) Do these steps to disconnect the APU fuel-feed line:

- (a) Loosen the coupling nut assembly to disconnect the aft APU shroud from the aft flexible shroud at the APU firewall.
- (b) Push the aft flexible shroud [20] aft to get access to the flexible hose coupling.
- (c) Put a container below the flexible hose coupling to catch fuel.
- (d) Disconnect the flexible hose coupling.

SUBTASK 28-25-05-020-005

(4) Do these steps to remove the aft APU shroud:

- (a) Remove the bolts [18] that connect the slip joint fitting [16] to the aft pressure bulkhead (Figure 401), view C.
- (b) Remove the shroud support clamps that hold the aft APU shroud (TASK 28-22-15-000-801), (Figure 401), view B.

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- (c) Remove the couplings from the aft shroud to permit the shroud to go through the holes in the floor beams (TASK 28-22-15-000-801).
- (d) Move the shroud and the seal gaskets [17] off the fuel line.
- (e) Remove the shroud and the gaskets from the airplane through the opening for this access panel:

<u>Number</u>	<u>Name/Location</u>
311BL	Stabilizer Trim Access Door

————— END OF TASK —————

TASK 28-25-05-400-802

5. Aft APU Fuel Feed Line Shroud Installation

(Figure 401)

A. References

<u>Reference</u>	<u>Title</u>
24-22-00-860-812	Remove Electrical Power (P/B 201)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)
28-25-04-790-801	APU Fuel Line Leak Test (with air) (P/B 401)

B. Location Zones

<u>Zone</u>	<u>Area</u>
141	Aft Cargo Compartment - Left
142	Aft Cargo Compartment - Right
241	Aft Passenger Compartment - Station 663.75 to Aft Pressure Bulkhead - Left

C. Access Panels

<u>Number</u>	<u>Name/Location</u>
311BL	Stabilizer Trim Access Door

D. Procedure

SUBTASK 28-25-05-420-011

- (1) Install the aft shroud.
 - (a) Put the gaskets [17], slip joint fitting [16], and the welded shroud tube on the flexible hose (Figure 401), view D.
 - 1) Move these parts forward into their position at the aft pressure bulkhead.
 - 2) Feed the shroud tubes over the flexible hose, working forward to aft, until the flexible hose and the shroud can be reconnected at the flexible shroud.
 - 3) Move the shroud in the forward direction until it touches the pressure bulkhead.
 - (b) Install the support clamps for the shroud (two locations) (TASK 28-22-15-400-801).
 - 1) Loosely attach the clamps to the pressure bulkhead.
 - (c) Align the slip joint fitting [16], the gaskets [17], and the shroud (Figure 401), view C.
 - 1) Install the mounting bolts and the washers for the slip joint fitting [16] and the gaskets [17] (Figure 401).
 - (d) Tighten the support bolts for the shroud.

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SUBTASK 28-25-05-420-012

(2) Connect the flexible hose [11] at the APU firewall.

NOTE: Do not attach the APU shroud to the flexible shroud until you complete the leak check of the fuel line.

SUBTASK 28-25-05-790-003

(3) Do this task: APU Fuel Line Leak Test (with air), TASK 28-25-04-790-801.

SUBTASK 28-25-05-420-015

(4) Connect and tighten the coupling nut assembly to connect the aft APU shroud (aft section) [15] to the aft flexible shroud [20] at the APU firewall.

SUBTASK 28-25-05-790-004

(5) Do this task: APU Fuel Line Shroud and Drain Line Leak Test, TASK 28-25-05-790-801.

E. Put the Airplane Back to Its Usual Condition

SUBTASK 28-25-05-860-004

(1) If electrical power is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812

SUBTASK 28-25-05-410-004

(2) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
311BL	Stabilizer Trim Access Door

————— **END OF TASK** —————

TASK 28-25-05-790-801

6. APU Fuel Line Shroud and Drain Line Leak Test

(Figure 402)

A. General

(1) This procedure is a scheduled maintenance task.

B. References

<u>Reference</u>	<u>Title</u>
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

<u>Reference</u>	<u>Description</u>
SPL-1782	Hose - Test, Leak, APU Fuel Line Shroud (Part #: A28005-50, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Opt Part #: A28005-42, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-1783	Adapter - Leak Test, APU Fuel Line Shroud (Part #: A28005-48, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
STD-1234	Air Source - Regulated, Dry Filtered, Compressed 90-130 PSIG (6.0 CFM)

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D. Location Zones

Zone	Area
139	Keel Beam, (Part) Body Station 540.00 to Body Station 727.00

E. Pressurize the APU Shroud and Do a Check for Leaks

SUBTASK 28-25-05-910-001

WARNING: MAKE SURE THE DOWNLOCK PINS ARE INSTALLED ON ALL THE LANDING GEAR. WITHOUT THE DOWNLOCK PINS, THE LANDING GEAR CAN RETRACT AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) If landing gear downlocks are not installed, do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

SUBTASK 28-25-05-020-006

- (2) Install the adapter, SPL-1783 and APU fuel line shroud leak test hose, SPL-1782, on the drain mast.

SUBTASK 28-25-05-420-013

- (3) Connect the compressed (90-130 PSIG, 6.0 CFM) dry filtered regulated air source, STD-1234 to the APU fuel line shroud leak test hose, SPL-1782.

SUBTASK 28-25-05-780-001

- (4) Slowly and continuously apply pressure to the APU shroud and drain line system until the pressure is 18 psi plus or minus 1 psi (124 +/- 7 kPa).

NOTE: Make sure the pressure is stable at 18 +/- 1 psi (124 +/- 7 kPa).

- (a) Remove the air pressure source and monitor the pressure for ten (10) minutes.
- (b) The pressure must not decrease more than 0.2 psi (1.4 kPa) during the ten minutes.

SUBTASK 28-25-05-780-002

- (5) Slowly and continuously decrease the pressure to zero.

SUBTASK 28-25-05-080-001

- (6) Do these steps to remove the test equipment:
 - (a) Remove the adapter tool from the drain mast.

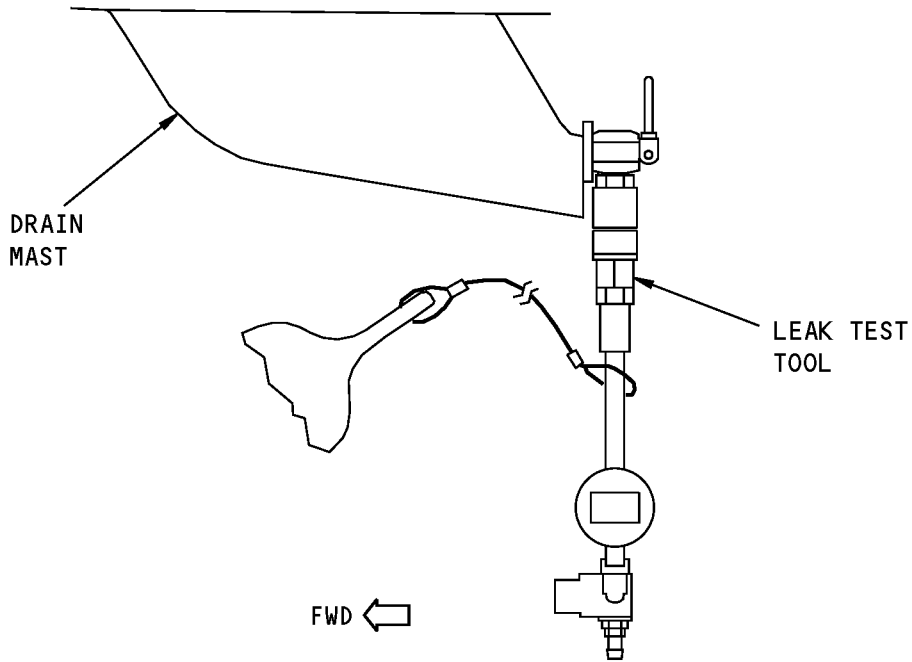
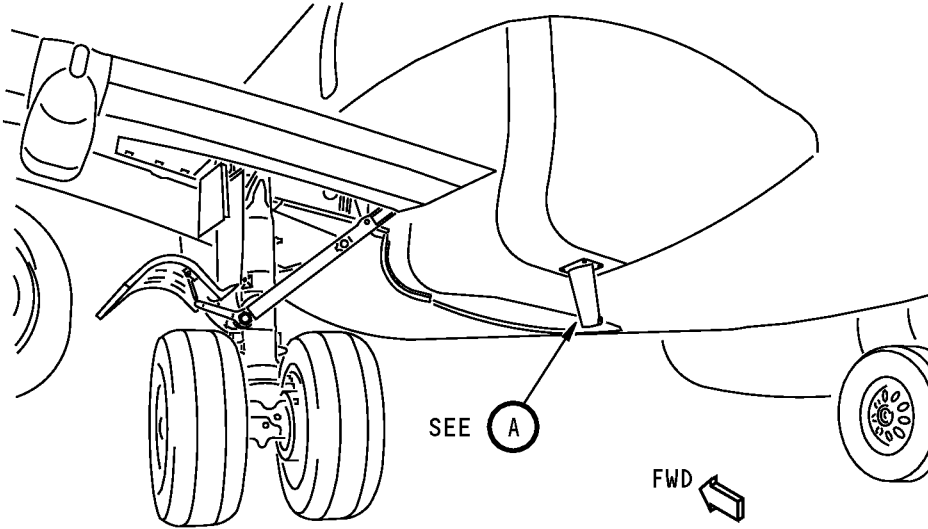
————— **END OF TASK** —————

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A

**APU Shroud Leak Test Equipment
Figure 402/28-25-05-990-805**

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APU CHECK VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

- (1) The removal of the APU check valve
- (2) The installation of the APU check valve.

TASK 28-25-06-000-801

2. APU Check Valve Removal

(Figure 401)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-22-00-730-802	Crossfeed Valve - Functional Test (P/B 501)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)

B. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

C. Access Panels

Number	Name/Location
131AB	Center Tank Access

D. Procedure

SUBTASK 28-25-06-650-001

- (1) Defuel the center fuel tank and the No. 1 tank or transfer fuel out of them. To do this, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801.

SUBTASK 28-25-06-860-001

- (2) If there is fuel in the No. 2 tank, make sure the crossfeed valve is closed and has no leakage. To do this, do this task: Crossfeed Valve - Functional Test, TASK 28-22-00-730-802
 - (a) As an alternative, you can remove fuel from the No. 2 tank. To do this, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801

SUBTASK 28-25-06-010-001

- (3) Do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801
Remove this access door for the center wing section:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

SUBTASK 28-25-06-940-001

- (4) Do the Purging and Fuel Tank Entry Procedure for the center tank. To do this, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802

SUBTASK 28-25-06-010-002

- (5) In the center tank, carefully loosen the couplings that attach the check valve [2] to the APU fuel feed line [1].

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SUBTASK 28-25-06-020-001

(6) Remove the check valve [2] and the union [3] as a set.

————— **END OF TASK** —————

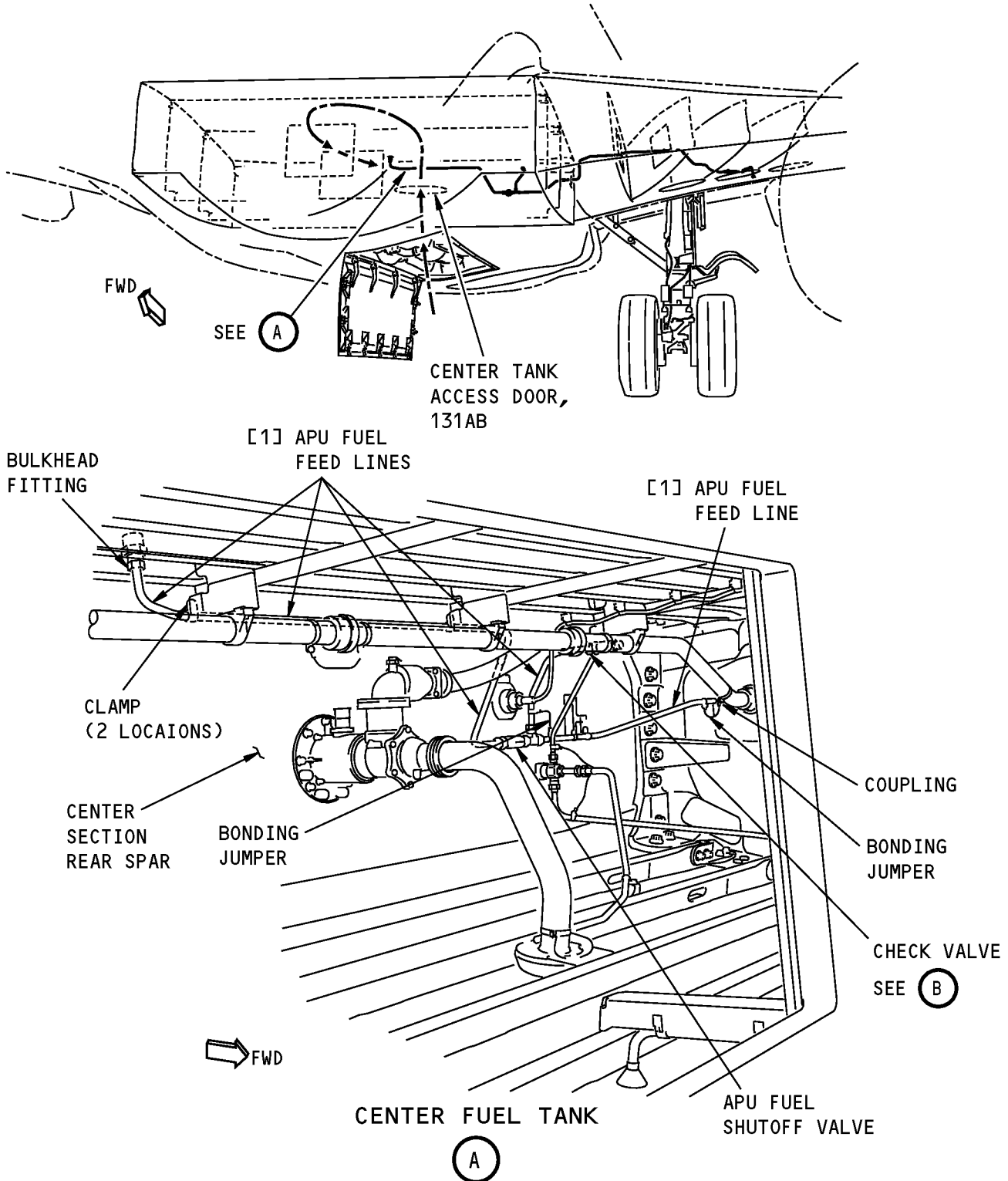
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APU Check Valve Installation
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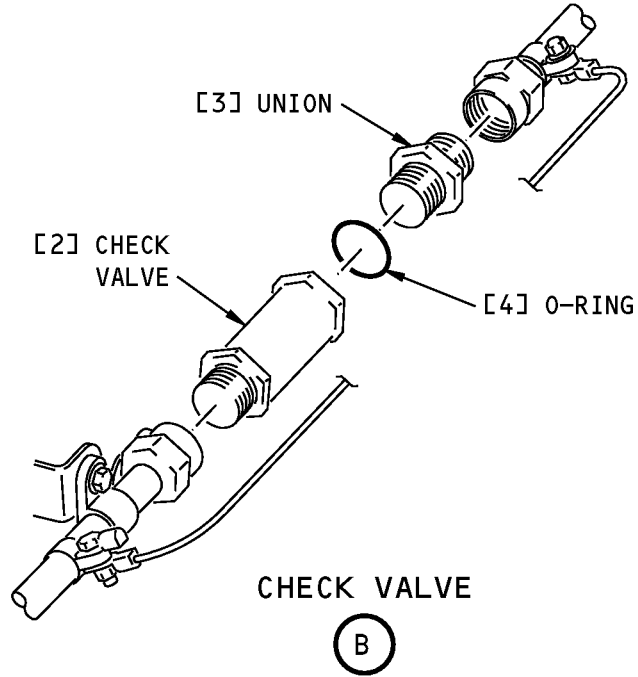
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APU Check Valve Installation
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TASK 28-25-06-400-801

3. APU Check Valve Installation

Figure 401

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
49-31-00-700-802	APU Fuel Supply Flow Check (P/B 201)

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Check valve	28-22-52-03-240	HAP 031-054, 101-999
		28-25-51-06-075	HAP 001-013, 015-026, 028-030
3	Union	28-22-52-03-230	HAP 031-054, 101-999
		28-25-51-06-055	HAP 001-013, 015-026, 028-030
4	O-ring	28-22-52-03-235	HAP 031-054, 101-999
		28-25-51-06-070	HAP 001-013, 015-026, 028-030

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

D. Access Panels

Number	Name/Location
131AB	Center Tank Access

E. Procedure

SUBTASK 28-25-06-420-001

- (1) Put the check valve [2], O-ring [4], and union [3] as a set in their position between the two ends of the APU fuel line.

SUBTASK 28-25-06-420-002

- (2) Make sure the arrow on the check valve points in the aft direction (away from the engine fuel feed manifold).

SUBTASK 28-25-06-420-003

- (3) Attach the check valve to the ends of the APU fuel line with the couplings on those ends.
 - (a) Tighten each of the couplings to a torque of 340-380 inch-pounds.

SUBTASK 28-25-06-420-004

- (4) Do the applicable steps to close the center tank (TASK 28-11-00-910-802).

SUBTASK 28-25-06-010-003

- (5) Do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801

Install this access door for the center wing section:

Number	Name/Location
131AB	Center Tank Access

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SUBTASK 28-25-06-710-001

(6) Do this task: APU Fuel Supply Flow Check, TASK 49-31-00-700-802.

————— **END OF TASK** —————

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APU FUEL FEED LINE SHROUD DRAIN MAST - REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks:
(1) APU Fuel Feed Line Shroud Drain Mast - Removal
(2) APU Fuel Feed Line Shroud Drain Mast - Installation
B. The APU Fuel Feed Line Shroud Drain Mast is referred to as the Drain Mast in this procedure.

TASK 28-25-07-020-801

2. APU Fuel Feed Line Shroud Drain Mast - Removal

(Figure 401)

A. References

Table with 2 columns: Reference, Title. Row: 53-51-21-000-801, Aft Wing To Body Fairing Panel Removal (P/B 401)

B. Location Zones

Table with 2 columns: Zone, Area. Row: 194, Lower Wing-To-Body Fairing - Aft of Wheel Well

C. Access Panels

Table with 2 columns: Number, Name/Location. Row: 194GL, Aft Wing To Body Fairing Panel

D. Procedure

SUBTASK 28-25-07-010-001

- (1) To get access to the drain lines that go through the drain mast, remove this access panel:

Table with 2 columns: Number, Name/Location. Row: 194GL, Aft Wing To Body Fairing Panel

- (a) These panels are immediately aft of the drain mast. To do this, do this task: Aft Wing To Body Fairing Panel Removal, TASK 53-51-21-000-801

SUBTASK 28-25-07-020-001

- (2) Disconnect the hydraulic vent line [1] and the APU fuel shroud drain line [6] from the drain mast fittings.

- (a) Discard the O-rings [5] from the APU fuel shroud drain line [6].

SUBTASK 28-25-07-020-002

- (3) Disconnect the two bonding jumpers [11] and [16].

SUBTASK 28-25-07-020-003

- (4) Loosen the four bolts [3] that attach the drain mast assembly [4] to the airplane structure.

SUBTASK 28-25-07-020-004

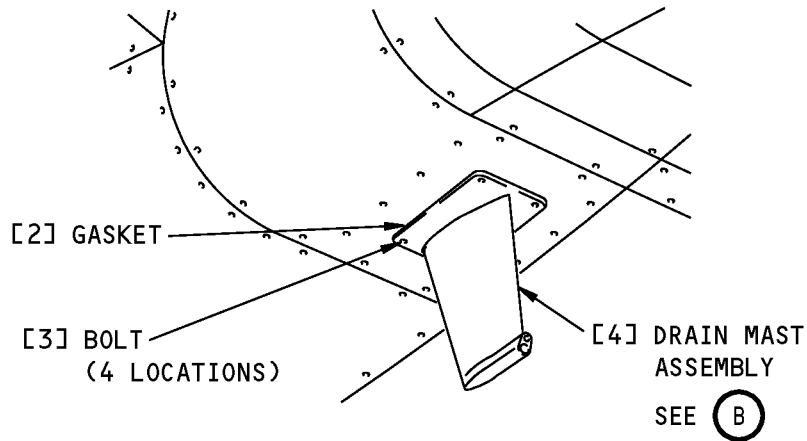
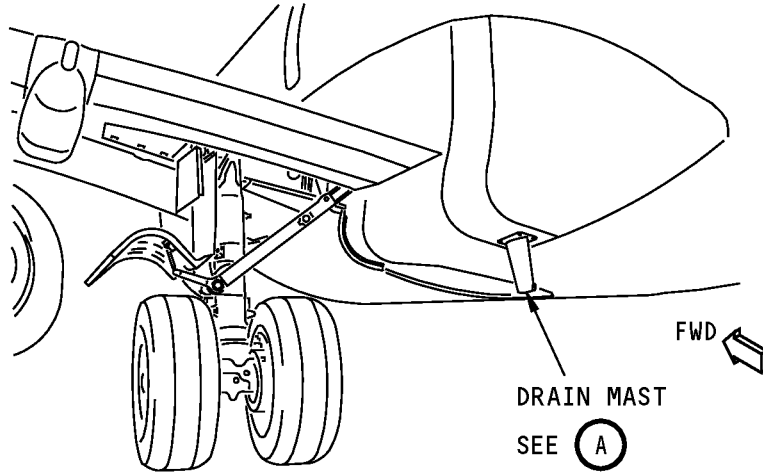
- (5) Carefully separate the drain mast [4] from the fairing with a sealant removal tool.

- (a) Discard the gasket [2].
(b) Remove any remaining sealant.

END OF TASK

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DRAIN MAST

(A)

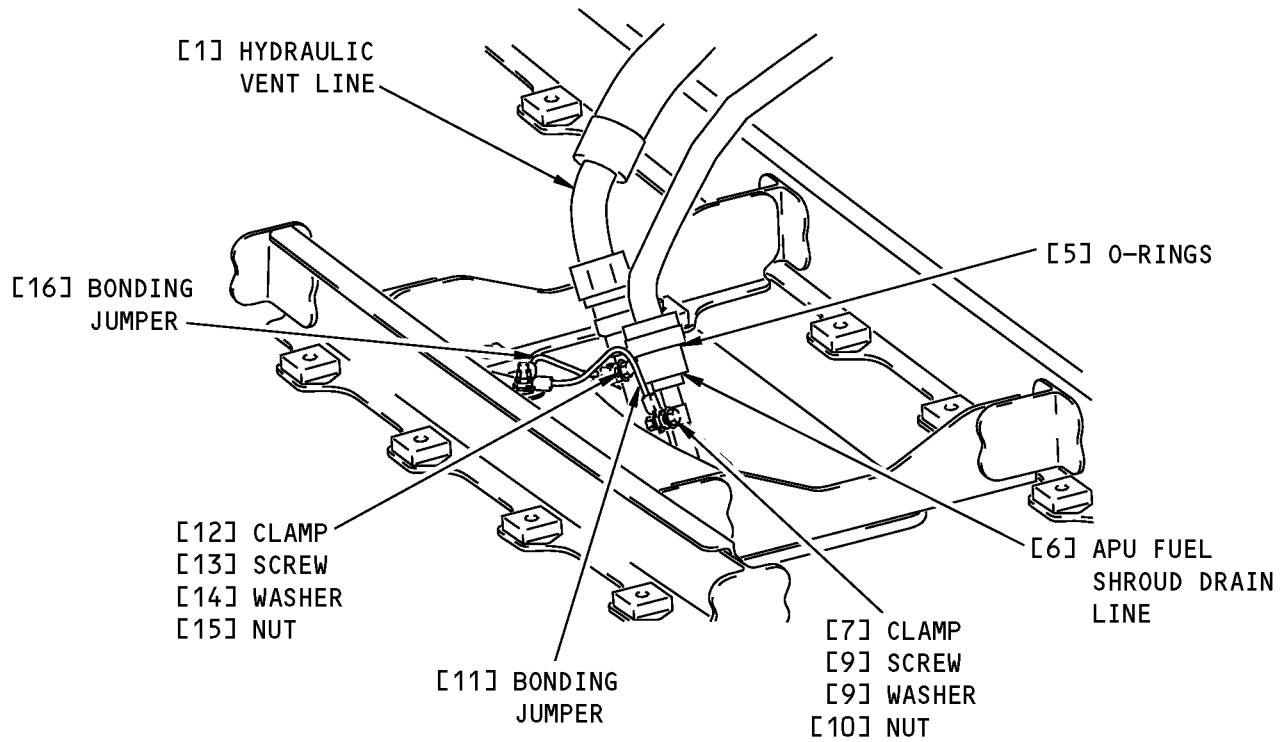
**APU Shroud Drain Mast Installation
Figure 401 (Sheet 1 of 2)/28-25-07-990-802**

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DRAIN MAST ASSEMBLY

B

**APU Shroud Drain Mast Installation
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TASK 28-25-07-020-802

3. APU Fuel Feed Line Shroud Drain Mast - Installation

(Figure 401)

A. General

- (1) You can put 3M 8671 tape, G02496, on the drain mast to help prevent erosion.

B. References

Reference	Title
20-10-51-400-804	Flareless Tubing Assembly Installation (P/B 401)
20-50-11-910-801	Standard Torque Values (P/B 201)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)
51-31-00-390-804	Fillet Seal Application (P/B 201)
53-51-21-400-801	Aft Wing To Body Fairing Panel Installation (P/B 401)
SWPM 20-20-00	Standard Wiring Practices Manual

C. Consumable Materials

Reference	Description	Specification
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142
G02496	Tape - Polyurethane Outdoor - 3M 8671	

D. Location Zones

Zone	Area
194	Lower Wing-To-Body Fairing - Aft of Wheel Well

E. Access Panels

Number	Name/Location
194GL	Aft Wing To Body Fairing Panel

F. Procedure

SUBTASK 28-25-07-420-001

- (1) Do these steps to install the drain mast [4] in its position:
 - (a) Install a new gasket [2] on the drain mast [4].
 - (b) Put the drain mast [4] with the gasket [2] in its position on the fairing.
 - (c) Install the four bolts [3] and tighten them (TASK 20-50-11-910-801).

SUBTASK 28-25-07-020-005

- (2) Do these steps to connect the hydraulic vent line [1] and the APU fuel shroud drain line [6] to the drain mast:
 - (a) Connect the couplings for the hydraulic vent line (TASK 20-10-51-400-804).
 - 1) Tighten the couplings.
 - 2) Make the coupling secure with lockwire.
 - (b) Install two new O-rings [5] in the coupling for the APU fuel shroud drain line [6].
 - (c) Connect the couplings for the APU fuel shroud drain line (TASK 28-22-15-400-801).
 - 1) Tighten the couplings.
 - 2) Make the coupling secure with lockwire.

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SUBTASK 28-25-07-020-006

- (3) Connect the two bonding jumpers [11] and [16] with the clamps [12,7], screws [9,13], washer [9,14], and nut [10,15].

SUBTASK 28-25-07-760-001

- (4) Do an electrical bonding check from each drain mast tube to the primary structure of the airplane (SWPM 20-20-00).

- (a) Make sure the resistance from each tube to primary structure is a maximum 0.010 ohms.

SUBTASK 28-25-07-390-001

- (5) Apply a fillet seal of sealant, A02315, around the bonding clamps (TASK 51-31-00-390-804).

SUBTASK 28-25-07-390-002

- (6) Apply a fillet seal of sealant, A02315, around the flange of the drain mast [4] (TASK 51-31-00-390-804).

SUBTASK 28-25-07-010-002

- (7) Install this access panel that was removed to get access to the drain lines that go through the drain mast.

<u>Number</u>	<u>Name/Location</u>
194GL	Aft Wing To Body Fairing Panel

- (a) To do this, do this task: Aft Wing To Body Fairing Panel Installation, TASK 53-51-21-400-801

————— **END OF TASK** —————

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DEFUELING - MAINTENANCE PRACTICES

1. General

- A. This procedure has these tasks:
 - (1) A task to defuel the fuel tanks
 - (2) A task to transfer fuel from one tank to a different tank.
- B. If the heat exchanger for the hydraulic system is above the surface of the fuel, it can become too hot.
- C. You can defuel all of the tanks at the same time. You can also defuel only one of the tanks. If you defuel only one tank, make sure the fuel and the fuel fumes in the other tanks do not go into the tank you defueled.
- D. When thunderstorms or lightning are within a 10 mile (16 kilometer) radius of the immediate area, the defueling procedure should stop.
- E. Strong wind conditions can cause a build-up of static electricity. Large charges of static electricity can develop on support equipment while parked as a result of the movement of dust particles and air currents during strong wind conditions. Strong wind conditions also cause the unwanted movement of items or equipment which can hit the airplane or injure persons. Wind gusts can damage the airplane structure. Defueling procedures should stop if strong wind conditions are present.
- F. You must carefully do all of these safety precautions:
 - (1) The safety precautions for defueling in this manual
 - (2) The safety precautions that the airport tells you to do
 - (3) The safety precautions that the airline tells you to do.
- G. If you do not obey these safety precautions, a fire or an accident can easily occur.
- H. Do not operate an engine driven or electric motor driven pump in the hydraulic system if the No. 1 tank or the No. 2 tank has less than 1675 pounds (760 kilograms) of fuel (TASK 29-11-00-860-801).
- I. Low Pressure light Illumination During Defueling and Fuel Transfer
 - (1) Very high flow conditions can occur during defueling and fuel transfer operations. The high flow condition can decrease the back pressure in the refuel manifold. The lack of back pressure can reduce the output pressure of the fuel pumps to a level where the LOW PRESSURE light comes on. During these high flow conditions the LOW PRESSURE light does not indicate that a pump is running dry or that the pump has failed.
 - (2) To monitor pump performance during high flow conditions it is necessary to monitor the pump low pressure indication and the fuel quantity indication. If the pump LOW PRESSURE light comes on (steady on) and the fuel quantity for the tank does not continue to decrease, it is possible that the pump is running dry or that the pump has failed. The pump switch must be selected off and remain off until you can evaluate and repair the cause of the no-transfer condition.

TASK 28-26-00-650-801

2. Fuel Tank Defueling

(Figure 201, Figure 202)

- A. General
 - (1) There are three different procedures that you can use to defuel the fuel tanks:
 - (a) Defuel through the pressure fueling receptacle with the airplane boost pumps and the defueling (suction) pump on the refuel truck. This procedure defuels all of the tanks at the same time. It is the fastest procedure to defuel the tanks.
 - (b) Defuel through the pressure fueling receptacle with the airplane boost pumps only.

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- (c) Defuel through the pressure fueling receptacle with the defueling (suction) pump on the fuel truck only. This procedure can be used only on the No. 2 tank. Use this procedure only if it is necessary. It is a very slow procedure to be used only in emergencies.
- (2) With pressure defueling (boost pumps operate), or with pressure and suction together, you can defuel all of the fuel tanks to the level of the sump drain valves.
- (3) The airplane usually must have the correct attitude (0-degree roll, -1.14 degree pitch, nose down) to defuel it correctly.
- (4) To completely defuel the center tank, do these steps:
 - (a) Adjust the airplane to 0-degree roll, +2 degrees pitch, nose up, if it is possible.
NOTE: This will minimize the quantity of fuel that remains in the center tank.
 - (b) Make sure the No. 1 tank has sufficient capacity available for the fuel to be scavenged from the center tank.
NOTE: The scavenge systems operates only when the No. 1 tank fuel quantity is less than 5000 lb (2268 kg).
 - (c) Operate the forward No. 1 fuel boost pump to supply the motive flow during fuel scavenging.

B. References

Reference	Title
12-11-00-650-804	Drain the Fuel from the Sumps after Defueling (P/B 301)
20-40-11-910-801	Static Grounding (P/B 201)
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
33-18-00-710-802	Master Dim and Test - Operational Test (P/B 201)
49-11-00-860-801	APU Starting and Operation (P/B 201)

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Access Panels

Number	Name/Location
621EB	Defuel Access Panel - Slat Station 95.15
621GB	Refuel Access Panel - Slat Station 143.27

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- E. Defuel through the Pressure Fueling Receptacle With the Airplane Boost Pumps and the Defueling (Suction) Pump on the Fuel Truck

NOTE: It is necessary to operate the boost pumps.

SUBTASK 28-26-00-860-051

CAUTION: DO NOT OPERATE THE HYDRAULIC SYSTEM IF THERE IS LESS THAN A SUFFICIENT QUANTITY OF FUEL IN THE APPLICABLE TANK. DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Do not operate an engine-driven or electric motor-driven pump in the hydraulic system if the No. 1 tank or the No. 2 tank has less than 1675 lb (760 kg) of fuel (TASK 29-11-00-860-801).

SUBTASK 28-26-00-860-001

- (2) Electrically ground the airplane and the fuel truck (TASK 20-40-11-910-801).

SUBTASK 28-26-00-860-002

- (3) Connect the electrical power to the airplane (TASK 24-22-00-860-811).

NOTE: If you are not scheduled to defuel the No. 1 tank fully, you can use the APU to supply electrical power. You must have a minimum quantity of fuel in the No. 1 tank to use the APU (TASK 49-11-00-860-801).

SUBTASK 28-26-00-860-003

- (4) Make sure all circuit breakers for the fuel system on the P6 panel are closed.

SUBTASK 28-26-00-710-002

- (5) Do the master dim and test system operational test (TASK 33-18-00-710-802).

NOTE: Make sure the fuel pump low pressure lights are operative.

SUBTASK 28-26-00-860-004

- (6) If you are scheduled to defuel the No. 1 tank or the center tank, do these steps:

- (a) Set the crossfeed valve switch on the P5 panel to OPEN.
- (b) Make sure the valve position light is on dim (blue).

SUBTASK 28-26-00-010-001

- (7) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-26-00-020-001

- (8) Remove the cap on the fueling receptacle (if installed).

SUBTASK 28-26-00-480-001

- (9) Connect the bonding cable on the defueling hose to the ground jack on the wing.

NOTE: The bonding cable is not necessary if there is electrical continuity between the nozzle and the receptacle.

SUBTASK 28-26-00-480-002

CAUTION: BEFORE DEFUEL OPERATION, MAKE SURE THE HOSE NOZZLE AND HOSE-END CONTROL VALVE (IF USED) ARE CONFIGURED PER THE SUPPLIER'S MAINTENANCE MANUAL. FAILURE TO DO SO COULD CAUSE DAMAGE TO THE AIRPLANE.

- (10) Connect defueling hose nozzle to the fueling receptacle.

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SUBTASK 28-26-00-860-005

- (11) Open the shutoff handle on the defueling hose nozzle.

NOTE: The defueling nozzle must have a filter screen.

SUBTASK 28-26-00-860-006

- (12) Make sure the two spar valves are closed.

SUBTASK 28-26-00-860-007

- (13) Make sure the switches for the fueling shutoff valves on the P15 panel are in the CLOSED position.

SUBTASK 28-26-00-860-008

- (14) Make sure the valve position lights are off.

SUBTASK 28-26-00-970-001

- (15) Make sure you know the correct quantity of fuel in the tanks.

- (a) Write the fuel quantity for the tank or the tanks that you are scheduled to defuel.
- (b) Hold the test switch on the P15 panel in the TEST GAGES position for one second.

NOTE: The test blanks the fueling indicators display for two seconds, then all LED segments go on for two seconds. This sequence continues as long as you hold the TEST SWITCH. If you hold the TEST SWITCH for more than 20 seconds, the test mode will time out and the indicator will go back to its usual operating mode. If an internal fault is found during the test, the indicator will show Ind FAIL.

- (c) Release the switch.
- (d) Make sure the indicator goes back to its initial value with a tolerance of ± 10 pounds (± 10 kilograms).

SUBTASK 28-26-00-010-002

- (16) Open this access panel:

(Figure 202)

<u>Number</u>	<u>Name/Location</u>
621EB	Defuel Access Panel - Slat Station 95.15

SUBTASK 28-26-00-860-009

- (17) Open the defueling valve.

SUBTASK 28-26-00-860-010

- (18) Set the crossfeed valve control on the P5 panel to open the crossfeed valve.

NOTE: If you are scheduled to defuel the No. 2 tank (right side), it is not necessary to open or to close the crossfeed valve.

- (a) Make sure the valve position light is on dim (blue).

SUBTASK 28-26-00-860-055

WARNING: DO NOT OPERATE ANY FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. FUEL VAPORS IN THE TANK MAY IGNITE AND CAUSE A FIRE OR EXPLOSION.

- (19) Obey these fuel pump limitations during the pump operation:

- (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.

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- (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on unless there is a reduced back-pressure condition.

NOTE: When you defuel or transfer with minimum backpressure to the pumps, it is possible for the LOW PRESSURE light(s) to come on. In this case, monitor tank quantity and set the pump switch to OFF if tank quantity is not changing.

- 1) If one LOW PRESSURE light comes on because of a reduced back-pressure condition, do these steps:
a) Put the applicable fuel boost pump switch to OFF and continue defueling.
b) If the remaining LOW PRESSURE light for the fuel boost pump switch for the tank comes on, monitor the tank quantity.
c) If the fuel quantity for the tank does not change, then immediately set the fuel boost pump switch to OFF.
d) For the No. 1 or No. 2 tank, do not operate the main boost pumps with fuel quantities less than 100 lb (45 kg).
e) For the center tank, do not operate the center tank boost pumps with fuel quantities less than 2000 lb (907 kg).
2) If two LOW PRESSURE lights for the fuel boost pump switches in the tank come on at the same time, do these steps:
a) For the No. 1 or No. 2 tanks, put the AFT fuel boost pump switch to OFF and continue to monitor the tank quantity.
b) For the center tank, put one of the fuel boost pump switches to OFF and continue to monitor the tank quantity.
c) If the fuel quantity in the tank does not change, immediately put the remaining fuel boost pump switch to OFF.
d) For the No. 1 or No. 2 tank, do not operate the main boost pumps with fuel quantities less than 100 lb (45 kg).
e) For the center tank, do not operate the center tank boost pumps with fuel quantities less than 2000 lb (907 kg).

HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206

- (c) If the center tank boost pump automatic shutoff system turns off the center tank boost pump(s) because of a reduced back-pressure condition, do these steps:
1) On the P5 Overhead Panel, set the switches for all main tank boost pumps to the OFF position.
2) Open the indicated circuit breakers and install safety tags:

F/O Electrical System Panel, P6-3

Table with 4 columns: Row, Col, Number, Name. Contains entries for BOOST PMP CTR TNK L AUTO SHUT OFF-DC, BOOST PMP CTR TNK R AUTO SHUT OFF-DC, BOOST PUMP CTR TNK L AUTO SHUT OFF-AC, and BOOST PUMP CTR TNK R AUTO SHUT OFF-AC.

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- 3) Continue from where you were last in the fuel transfer procedure.

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(d) To defuel an airplane with passengers on board, do not permit the fuel quantity in any of the fuel tanks to become less than 2000 lb (907 kg).

SUBTASK 28-26-00-860-011

(20) On the P5 panel, set the switches for the fuel boost pumps to the positions shown in this table:

Table 201/28-26-00-993-801

	SWITCH POSITION FOR DEFUELING		
	TANK NO. 1	TANK NO. 2	CENTER TANK
FUEL PUMPS AFT 1	ON	OFF	OFF
FUEL PUMPS FWD 1	ON	OFF	OFF
FUEL PUMPS AFT 2	OFF	ON	OFF
FUEL PUMPS FWD 2	OFF	ON	OFF
FUEL PUMPS L CTR	OFF	OFF	ON
FUEL PUMPS R CTR	OFF	OFF	ON

SUBTASK 28-26-00-650-001

(21) Start the defueling pump on the refuel truck.

SUBTASK 28-26-00-650-002

(22) Defuel the applicable tank until the fuel quantity indicator shows the specified quantity of fuel in the tank.

(a) You can also defuel the tank until the applicable boost pump LOW PRESSURE light goes on.

(b) Set the applicable boost pump switches to OFF.

SUBTASK 28-26-00-860-012

(23) On the P5 panel, set the switch for the fuel crossfeed valve to CLOSE.

(a) Make sure the position light is bright when the valve position changes.

(b) Make sure the position light goes off when the valve is closed.

SUBTASK 28-26-00-860-013

(24) Stop the defueling pump on the fuel truck.

SUBTASK 28-26-00-860-014

(25) Close the defueling valve.

HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206

SUBTASK 28-26-00-860-062

(26) Make sure that these circuit breakers are closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	3	C01637	BOOST PMP CTR TNK L AUTO SHUT OFF-DC
C	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC

HAP 031-036; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206

D	7	C01639	BOOST PUMP CTR TNK L AUTO SHUT OFF-AC
E	7	C01640	BOOST PUMP CTR TNK R AUTO SHUT OFF-AC

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HAP 031-036; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206 (Continued)

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SUBTASK 28-26-00-410-001

(27) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621EB	Defuel Access Panel - Slat Station 95.15

SUBTASK 28-26-00-860-015

(28) Close the fuel shutoff handle on the hose nozzle.

SUBTASK 28-26-00-080-001

(29) Disconnect the nozzle of the defueling hose from the fueling receptacle.

SUBTASK 28-26-00-080-002

(30) Disconnect the bonding jumper from the ground jack on the airplane if there is a bonding jumper.

SUBTASK 28-26-00-420-001

(31) Put the cap on the fueling receptacle (if installed).

SUBTASK 28-26-00-410-002

(32) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-26-00-860-016

(33) If it is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812.

SUBTASK 28-26-00-680-001

(34) Do this task: Drain the Fuel from the Sumps after Defueling, TASK 12-11-00-650-804.

F. Defuel through Pressure Fueling Receptacle With the Airplane Boost Pump Only

SUBTASK 28-26-00-860-052

CAUTION: DO NOT OPERATE THE HYDRAULIC SYSTEM IF THERE IS LESS THAN A SUFFICIENT QUANTITY OF FUEL IN THE APPLICABLE TANK. DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do not operate an engine-driven or electric motor-driven pump in the hydraulic system if the No. 1 tank or the No. 2 tank has less than 1675 lb (760 kg) of fuel (TASK 29-11-00-860-801).

SUBTASK 28-26-00-860-017

(2) Ground the airplane and the fuel truck (TASK 20-40-11-910-801).

SUBTASK 28-26-00-860-018

(3) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

NOTE: If you are not scheduled to defuel the No. 1 tank fully, you can use the APU to supply electrical power. You must have a minimum quantity of fuel in the No. 1 tank to use the APU (TASK 49-11-00-860-801).

SUBTASK 28-26-00-860-019

(4) Make sure all circuit breakers for the fuel system on the P6 panel are closed.

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SUBTASK 28-26-00-860-020

- (5) If you are scheduled to defuel the No. 1 tank or the center tank, do these steps:
- (a) Set the crossfeed valve switch on the P5 panel to OPEN.
 - (b) Make sure the valve position light is dim (blue).

SUBTASK 28-26-00-010-003

- (6) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-26-00-020-002

- (7) Remove the cap on the fueling receptacle (if installed).

SUBTASK 28-26-00-480-003

- (8) Connect the bonding cable on the defueling hose to the ground jack on the wing.

NOTE: The bonding cable is not necessary if there is electrical continuity between the nozzle and the receptacle.

SUBTASK 28-26-00-480-004

CAUTION: BEFORE DEFUEL OPERATION, MAKE SURE THE HOSE NOZZLE AND HOSE-END CONTROL VALVE (IF USED) ARE CONFIGURED PER THE SUPPLIER'S MAINTENANCE MANUAL. FAILURE TO DO SO COULD CAUSE DAMAGE TO THE AIRPLANE.

- (9) Connect defueling hose nozzle to the fueling receptacle.

SUBTASK 28-26-00-860-021

- (10) Open the shutoff handle on the defueling hose nozzle.

NOTE: The defueling nozzle must have a filter screen.

SUBTASK 28-26-00-860-022

- (11) Make sure the two spar valves are closed.

SUBTASK 28-26-00-860-023

- (12) Make sure the switches for the fueling shutoff valves on the P15 panel are in the CLOSED position.

SUBTASK 28-26-00-860-024

- (13) Make sure the valve position lights are off.

SUBTASK 28-26-00-970-002

- (14) Make sure you know the correct quantity of fuel in the tanks.

- (a) Write the fuel quantity for the tank or the tanks that you are scheduled to defuel.
- (b) Hold the test switch on the P15 panel in the TEST GAGES position for one second.

NOTE: The test blanks the fueling indicators display for two seconds, then all LED segments go on for two seconds. This sequence continues as long as you hold the TEST SWITCH. If you hold the TEST SWITCH for more than 20 seconds, the test mode will time out and the indicator will go back to its usual operating mode. If an internal fault is found during the test, the indicator will show Ind FAIL.

- (c) Release the switch.
- (d) Make sure the indicator goes back to its initial value with a tolerance of ± 10 pounds (± 10 kilograms).

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SUBTASK 28-26-00-010-004

(15) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
621EB	Defuel Access Panel - Slat Station 95.15

(Figure 202).

SUBTASK 28-26-00-860-025

(16) Open the defueling valve.

SUBTASK 28-26-00-860-026

(17) On the P5 panel, set the switch for the crossfeed valve to OPEN.

NOTE: If you are scheduled to defuel the No. 2 tank (right side), it is not necessary to open or to close the crossfeed valve.

(a) Make sure the valve position light is on dim (blue).

SUBTASK 28-26-00-860-056

WARNING: DO NOT OPERATE ANY FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. FUEL VAPORS IN THE TANK MAY IGNITE AND CAUSE A FIRE OR EXPLOSION.

(18) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.

(a) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on unless there is a reduced back-pressure condition.

NOTE: When you defuel or transfer fuel with minimum backpressure to the pumps, it is possible for the LOW PRESSURE light(s) to come on. In this case, monitor tank quantity and set the pump switch to OFF if tank quantity is not changing.

- 1) If one LOW PRESSURE light comes on because of a reduced back-pressure condition, do these steps:
 - a) Put the applicable fuel boost pump switch to OFF and continue defueling.
 - b) If the remaining LOW PRESSURE light for the fuel boost pump switch for the tank comes on, monitor the tank quantity.
 - c) If the fuel quantity for the tank does not change, then immediately set the fuel boost pump switch to OFF.
 - d) For the No. 1 or No. 2 tank, do not operate the main boost pumps with fuel quantities less than 100 lb (45 kg).
 - e) For the center tank, do not operate the center tank boost pumps with fuel quantities less than 2000 lb (907 kg).
- 2) If two LOW PRESSURE lights for the fuel boost pump switches in the tank come on at the same time, do these tasks:
 - a) For the No. 1 or No. 2 tanks, put the AFT fuel boost pump switch to OFF and continue to monitor the tank quantity.
 - b) For the center tank, put one of the fuel boost pump switches to OFF and continue to monitor the tank quantity.
 - c) If the fuel quantity in the tank does not change, immediately put the remaining fuel boost pump switch to OFF.

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- d) For the No. 1 or No. 2 tank, do not operate the main boost pumps with fuel quantities less than 100 lb (45 kg).
e) For the center tank, do not operate the center tank boost pumps with fuel quantities less than 2000 lb (907 kg).

HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206

- (b) If the center tank boost pump automatic shutoff system turns off the center tank boost pump(s) because of a reduced back-pressure condition, do these steps:
1) On the P5 Overhead Panel, set the switches for all main tank boost pumps to the OFF position.
2) Open the indicated circuit breakers and install safety tags:

F/O Electrical System Panel, P6-3

Table with 4 columns: Row, Col, Number, Name. Contains entries for BOOST PMP CTR TNK L AUTO SHUT OFF-DC and BOOST PMP CTR TNK R AUTO SHUT OFF-DC.

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Table with 4 columns: Row, Col, Number, Name. Contains entries for BOOST PUMP CTR TNK L AUTO SHUT OFF-AC and BOOST PUMP CTR TNK R AUTO SHUT OFF-AC.

HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206

- 3) Continue from where you were last in the fuel transfer procedure.

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- (c) To defuel an airplane with passengers on board, do not permit the fuel quantity in any of the fuel tanks to become less than 2000 lb (907 kg).

SUBTASK 28-26-00-860-027

- (19) On the P5 panel, set the switches for the fuel boost pumps to the positions shown in this table:

Table 202/28-26-00-993-802

Table with 4 columns: Switch Position, Tank No. 1, Tank No. 2, Center Tank. Rows include FUEL PUMPS AFT 1, FUEL PUMPS FWD 1, FUEL PUMPS AFT 2, FUEL PUMPS FWD 2, FUEL PUMPS L CTR, and FUEL PUMPS R CTR.

SUBTASK 28-26-00-650-003

- (20) Defuel the applicable tank until the fuel quantity indicator shows the specified quantity of fuel in the tank.

SUBTASK 28-26-00-860-028

- (21) Close the crossfeed valve with the applicable switch on the P5 panel.

SUBTASK 28-26-00-860-029

- (22) Close the defueling valve.

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SUBTASK 28-26-00-860-061

(23) Make sure that these circuit breakers are closed:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
C	3	C01637	BOOST PMP CTR TNK L AUTO SHUT OFF-DC
C	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC
HAP 031-036; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206			
D	7	C01639	BOOST PUMP CTR TNK L AUTO SHUT OFF-AC
E	7	C01640	BOOST PUMP CTR TNK R AUTO SHUT OFF-AC

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SUBTASK 28-26-00-410-003

(24) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621EB	Defuel Access Panel - Slat Station 95.15

SUBTASK 28-26-00-860-030

(25) Close the fuel shutoff handle on the hose nozzle.

SUBTASK 28-26-00-420-002

(26) Put the cap on the fueling receptacle (if installed).

SUBTASK 28-26-00-080-003

(27) Disconnect the nozzle of the defueling hose from the fueling receptacle.

SUBTASK 28-26-00-080-004

(28) Disconnect the bonding jumper from the ground jack on the airplane if there is a bonding jumper.

SUBTASK 28-26-00-860-031

(29) If electrical power is not necessary for other tasks, (TASK 24-22-00-860-812)

SUBTASK 28-26-00-680-002

(30) Do this task: Drain the Fuel from the Sumps after Defueling, TASK 12-11-00-650-804.

G. Defuel the No. 2 Tank through Pressure Fueling Receptacles With the Fuel Truck Defueling (Suction) Pump Only

NOTE: This defueling procedure can only be used on the No. 2 tank. Use it only in an emergency when you cannot use electrical power on the airplane. The defueling nozzle must have a filter screen.

NOTE: The recommended procedures for defueling are given above: (1) Defuel through the Pressure Fueling Receptacle With the Airplane Boost Pumps and the Defueling (Suction) Pump on the Fuel Truck (2) Defuel through Pressure Fueling Receptacle With the Airplane Boost Pump Only.

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SUBTASK 28-26-00-860-053

CAUTION: DO NOT OPERATE THE HYDRAULIC SYSTEM IF THERE IS LESS THAN A SUFFICIENT QUANTITY OF FUEL IN THE APPLICABLE TANK. DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Do not operate an engine-driven or electric motor-driven pump in the hydraulic system if the No. 1 tank or the No. 2 tank has less than 1675 lb (760 kg) of fuel (TASK 29-11-00-860-801).

SUBTASK 28-26-00-860-032

- (2) Electrically ground the airplane and the fuel truck (TASK 20-40-11-910-801).

SUBTASK 28-26-00-010-005

- (3) Open this access panel:
(Figure 202)

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-26-00-020-003

- (4) Remove the cap on the fueling receptacle (if installed).

SUBTASK 28-26-00-860-033

- (5) Connect the bonding cable on the defueling hose nozzle to the ground jack on the wing.

NOTE: The bonding cable is not necessary if there is electrical continuity between the nozzle and the receptacle.

SUBTASK 28-26-00-480-005

CAUTION: BEFORE DEFUEL OPERATIONS, MAKE SURE THE HOSE NOZZLE AND HOSE-END CONTROL VALVE (IF USED) ARE CONFIGURED PER THE SUPPLIER'S MAINTENANCE MANUAL. FAILURE TO DO SO COULD CAUSE DAMAGE TO THE AIRPLANE.

- (6) Connect the defueling hose nozzle to the fueling receptacle.

SUBTASK 28-26-00-860-034

- (7) Open the shutoff handle on the hose nozzle.

SUBTASK 28-26-00-010-006

- (8) Open this access panel:
(Figure 202)

<u>Number</u>	<u>Name/Location</u>
621EB	Defuel Access Panel - Slat Station 95.15

SUBTASK 28-26-00-860-035

- (9) Set the defueling valve to the OPEN position.

SUBTASK 28-26-00-860-036

- (10) Make sure the crossfeed valve is closed.

SUBTASK 28-26-00-650-004

- (11) Start the defueling operation.

NOTE: If it is not easy to get fuel to flow from the airplane, use the fuel truck to pump the airplane lines full of fuel (pressure-prime) then start the defueling pumps on the fuel truck.

- (a) Use the pump on the fuel truck to fill the airplane fuel lines with fuel (pressure prime).

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(b) Start the defueling pumps on the fuel truck.

SUBTASK 28-26-00-650-005

(12) Continue to defuel the airplane until the fuel measuring sticks show the correct quantity of fuel in the No. 2 tank.

(a) You can also continue to defuel the airplane until the flowmeter on the fuel truck shows no fuel flow.

SUBTASK 28-26-00-650-006

(13) Stop the defueling pump on the fuel truck.

SUBTASK 28-26-00-860-037

(14) Close the defueling valve.

SUBTASK 28-26-00-410-004

(15) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621EB	Defuel Access Panel - Slat Station 95.15

SUBTASK 28-26-00-860-038

(16) Close the shutoff handle on the nozzle of the fuel hose.

SUBTASK 28-26-00-080-005

(17) Disconnect the nozzle ground cable from the airplane ground jack.

SUBTASK 28-26-00-080-006

(18) Disconnect the defueling hose nozzle.

SUBTASK 28-26-00-420-003

(19) Put the cap on the fueling receptacle (if installed).

SUBTASK 28-26-00-410-005

(20) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-26-00-410-006

(21) Install the access panels that you removed before this step (TASK 28-11-11-400-801).

SUBTASK 28-26-00-650-007

(22) If you are scheduled to defuel the tanks completely, do this task: Drain the Fuel from the Sumps after Defueling, TASK 12-11-00-650-804.

END OF TASK

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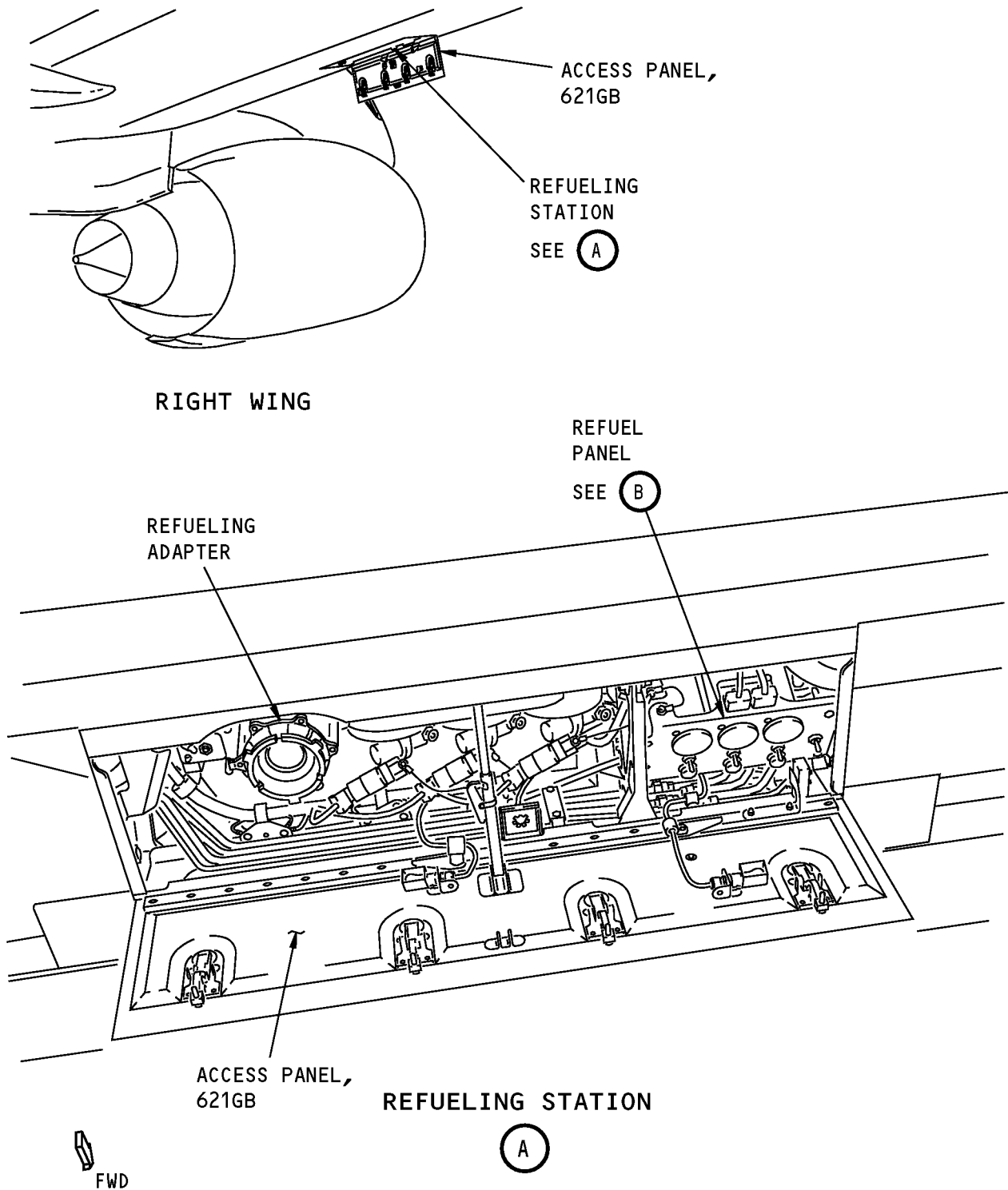
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**Refueling Station Component Location
Figure 201 (Sheet 1 of 2)/28-26-00-990-804**

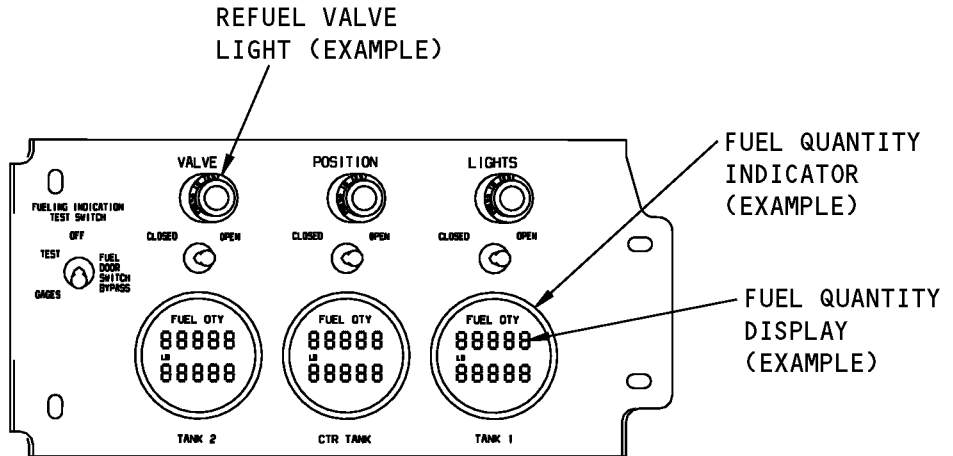
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REFUEL PANEL

B

**Refueling Station Component Location
Figure 201 (Sheet 2 of 2)/28-26-00-990-804**

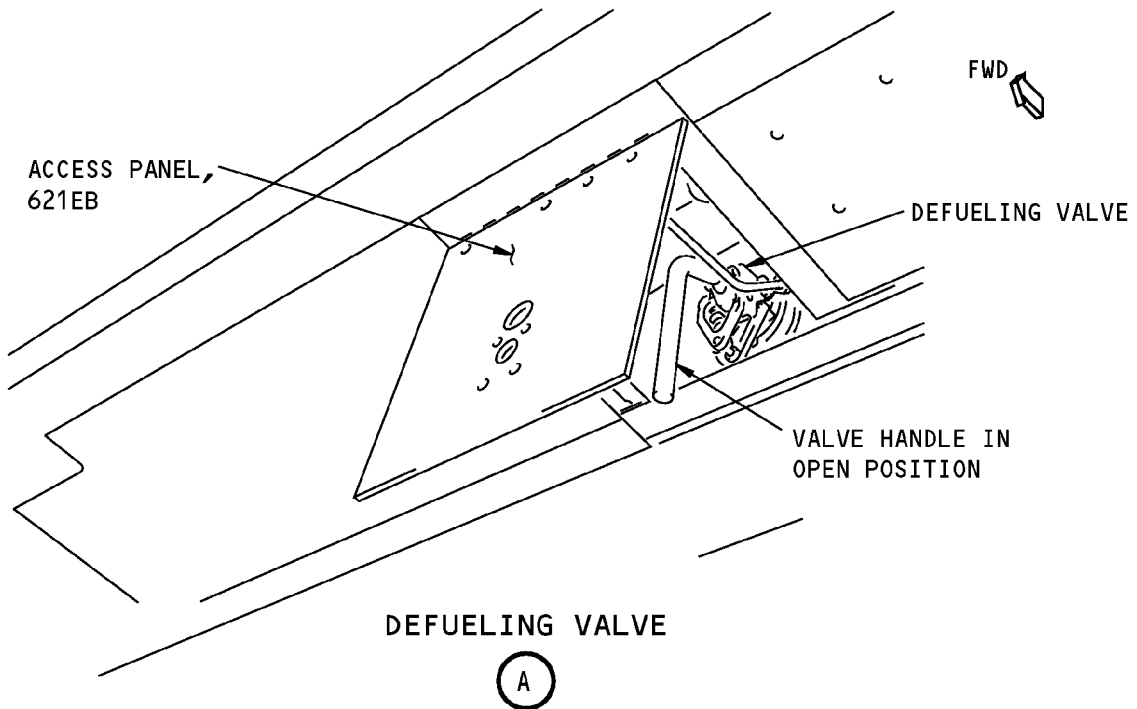
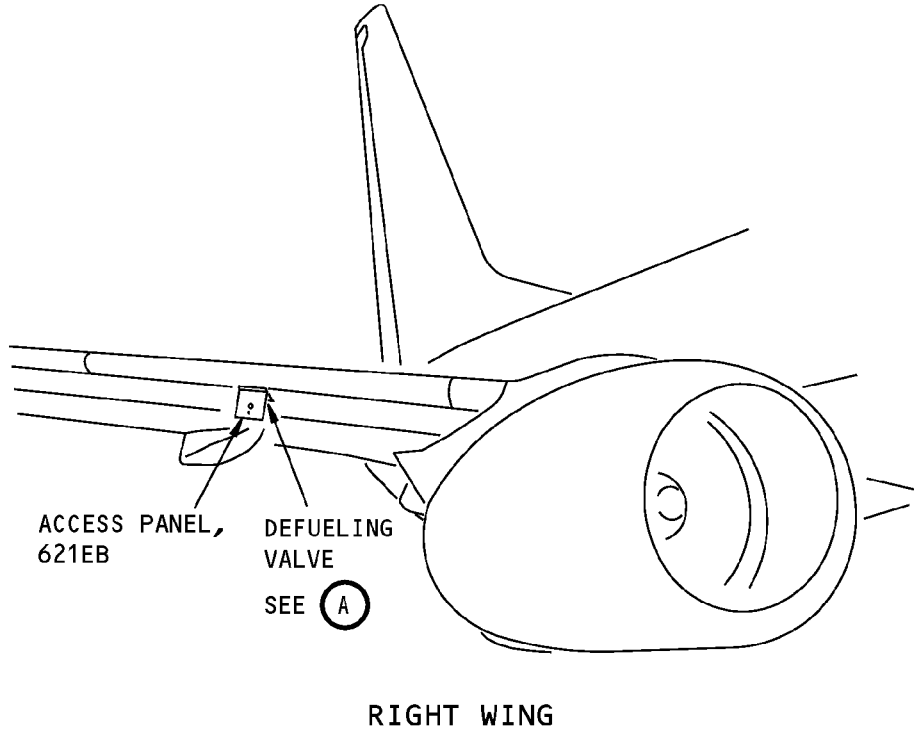
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**Defueling Valve Component Location
Figure 202/28-26-00-990-805**

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TASK 28-26-00-650-802

3. Tank to Tank Fuel Transfer

A. General

- (1) If it is necessary to defuel only one of the tanks, you can move the fuel from that tank to a different tank. For example, you can use this procedure when you must repair a fuel leak. The procedure is almost the same as the procedure to defuel the tank with the boost pumps.
- (2) Make sure you monitor the fuel quantity in each tank when you move the fuel from one tank to a different tank.

B. References

Reference	Title
12-11-00-650-804	Drain the Fuel from the Sumps after Defueling (P/B 301)
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
33-18-00-710-802	Master Dim and Test - Operational Test (P/B 201)
49-11-00-860-801	APU Starting and Operation (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right

D. Access Panels

Number	Name/Location
621EB	Defuel Access Panel - Slat Station 95.15
621GB	Refuel Access Panel - Slat Station 143.27

E. Procedure

SUBTASK 28-26-00-860-054

CAUTION: DO NOT OPERATE THE HYDRAULIC SYSTEM IF THERE IS LESS THAN A SUFFICIENT QUANTITY OF FUEL IN THE APPLICABLE TANK. DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Do not operate an engine-driven or electric motor-driven pump in the hydraulic system if the No. 1 tank or the No. 2 tank has less than 1675 lb (760 kg) of fuel (TASK 29-11-00-860-801).

SUBTASK 28-26-00-860-039

- (2) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

NOTE: If you are not scheduled to defuel the No. 1 tank fully, you can supply power with the APU (TASK 49-11-00-860-801). Do a check for minimum fuel quantities and other data before you start the APU.

SUBTASK 28-26-00-860-040

- (3) Make sure all of the circuit breakers for the fuel system on the P6 panel are closed.

SUBTASK 28-26-00-710-003

- (4) Do the master dim and test system operational test (TASK 33-18-00-710-802).

NOTE: Make sure the fuel pump low pressure lights operate.

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SUBTASK 28-26-00-860-041

(5) Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

SUBTASK 28-26-00-860-042

(6) If you are scheduled to transfer fuel out of the No. 2 tank, make sure the crossfeed valve switch is in the CLOSE position.

SUBTASK 28-26-00-860-043

(7) If you are scheduled to transfer fuel out of the No. 1 tank or the center tank, set the crossfeed valve switch to the OPEN position.

SUBTASK 28-26-00-010-007

(8) Open this access panel for the refuel station:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

(Figure 201).

SUBTASK 28-26-00-710-001

(9) Set the fueling valve switches to OPEN to make sure the valve position lights operate correctly.

SUBTASK 28-26-00-860-044

(10) Find the fueling valve switch for the tank that will get the fuel that you are scheduled to transfer.

- (a) Set that fueling valve switch to OPEN.
- (b) Make sure all of the other fueling valve switches are in the CLOSE position.

SUBTASK 28-26-00-010-008

(11) Open this access panel for the defueling valve:

<u>Number</u>	<u>Name/Location</u>
621EB	Defuel Access Panel - Slat Station 95.15

- (a) Set the defueling valve handle to OPEN.

SUBTASK 28-26-00-860-058

WARNING: DO NOT OPERATE ANY FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. FUEL VAPORS IN THE TANK MAY IGNITE AND CAUSE A FIRE OR EXPLOSION.

(12) Obey these fuel pump limitations during the pump operation:

- (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.

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- (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on unless there is a reduced back-pressure condition.

NOTE: When you defuel or transfer fuel with minimum backpressure to the pumps, it is possible for the LOW PRESSURE light(s) to come on. In this case, monitor tank quantity and set the pump switch to OFF if tank quantity is not changing.

- 1) If one LOW PRESSURE light comes on because of a reduced back-pressure condition, do these steps:
a) Put the applicable fuel boost pump switch to OFF and continue defueling.
b) If the remaining LOW PRESSURE light for the fuel boost pump switch for the tank comes on, monitor the tank quantity.
c) If the fuel quantity for the fuel tank does not change, then immediately set the fuel pump switch(es) to OFF.
d) For the No. 1 or No. 2 tank, do not operate the main boost pumps with fuel quantities less than 100 lb (45 kg).
e) For the center tank, do not operate the center tank boost pumps with fuel quantities less than 2000 lb (907 kg).
2) If two LOW PRESSURE lights for the fuel boost pump switches in the tank come on at the same time, do these steps:
a) For the No. 1 or No. 2 tanks, put the AFT fuel boost pump switch to OFF and continue to monitor the tank quantity.
b) For the center tank, put one of the fuel boost pump switches to OFF and continue to monitor the tank quantity.
c) If the fuel quantity in the tank does not change, immediately put the remaining fuel boost pump switch to OFF.
d) For the No. 1 or No. 2 tank, do not operate the main boost pumps with fuel quantities less than 100 lb (45 kg).
e) For the center tank, do not operate the center tank boost pumps with fuel quantities less than 2000 lb (907 kg).

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- 3) If the center tank boost pump automatic shutoff system turns off the center tank boost pump(s) because of a reduced back-pressure condition, refer to Table 203 to do these steps:

NOTE: The table contains a list of configurations into which you can put the airplane. Configuration A shows the basic conditions to use when the automatic shutoff system does not cause problems.

Table 203/28-26-00-993-804

Table with 8 columns: Configuration (A-G) and 4 rows: FUEL PUMPS AFT 1, FUEL PUMPS FWD 1, FUEL PUMPS AFT 2, FUEL PUMPS FWD 2. Values are OFF or ON.

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HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206 (Continued)

(Continued)

FUEL PUMPS L CTR	ON	ON	ON	ON	ON	ON	ON
FUEL PUMPS R CTR	ON	ON	ON	ON	ON	ON	ON
DEFUELING VALVE ^{*[1]}	OPEN	OPEN	OPEN	½	½	½	OPEN
Circuit Breaker C01637 ^{*[2]}	X	X	X	X	X	X	O
Circuit Breaker C01638 ^{*[2]}	X	X	X	X	X	X	O
Circuit Breaker C01639 ^{*[2]}	X	X	X	X	X	X	O
Circuit Breaker C01640 ^{*[2]}	X	X	X	X	X	X	O

*[1] ½ = "half-open/half-closed"

*[2] X = "closed", O = "open"

- a) Turn on the fuel boost pumps for the tank that will receive the fuel.

NOTE: Turning on the main tank boost pumps will increase back-pressure to the center tank boost pumps.

< 1 > If you must transfer fuel from the center tank into the No. 1 tank, put the airplane in configuration B.

< 2 > If you must transfer fuel from the center tank into the No. 2 tank, put the airplane in configuration C.

< 3 > Continue from where you were last in the fuel transfer procedure.

- b) If the main tank boost pumps did not solve the problem, do these steps to put the airplane in configuration D:

< 1 > On the P5 Overhead Panel, set the switches for the applicable main tank boost pumps to the OFF position.

< 2 > Manually set the defueling valve to a half-open/half-closed position.

< 3 > Continue from where you were last in the fuel transfer procedure.

- c) If adjusting the defueling valve did not solve the problem, do these steps:

< 1 > Keep the defueling valve in the half-open/half-closed position.

< 2 > Set the applicable fuel pump switches, on the P5 Overhead Panel, to the positions indicated in Table 203.

< a > If you must transfer fuel from the center tank into the No. 1 tank, put the airplane in configuration E.

< b > If you must transfer fuel from the center tank into the No. 2 tank, put the airplane in configuration F.

< 3 > Continue from where you were last in the fuel transfer procedure.

- d) If the automatic shutoff system continues to prevent the fuel transfer, do these steps to put the airplane in configuration G:

< 1 > On the P5 Overhead Panel, set the switches for all main tank boost pumps to the OFF position.

< 2 > Set the defueling valve to the OPEN position.

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<3> Open the indicated circuit breakers and install safety tags:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	3	C01637	BOOST PMP CTR TNK L AUTO SHUT OFF-DC
C	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC

HAP 031-036; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206

D	7	C01639	BOOST PUMP CTR TNK L AUTO SHUT OFF-AC
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HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206

<4> Continue from where you were last in the fuel transfer procedure.

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- (c) To transfer fuel with passengers on board, do not permit the fuel quantity in any of the fuel tanks to become less than 2000 lb (907 kg).

SUBTASK 28-26-00-860-045

- (13) To move fuel out of a tank, use this table to set the boost pump switch positions to remove the fuel from that tank:

Table 204/28-26-00-993-803

FUEL BOOST PUMP SWITCH	SWITCH POSITION FOR DEFUELING		
	TANK NO. 1	TANK NO. 2	CENTER TANK
FUEL PUMPS AFT 1	ON	OFF	OFF
FUEL PUMPS FWD 1	ON	OFF	OFF
FUEL PUMPS AFT 2	OFF	ON	OFF
FUEL PUMPS FWD 2	OFF	ON	OFF
FUEL PUMPS L CTR	OFF	OFF	ON
FUEL PUMPS R CTR	OFF	OFF	ON

SUBTASK 28-26-00-650-008

- (14) Continue to move the fuel until the fuel quantity indicator shows the necessary quantity of remaining fuel in the tank.
 - (a) You can also monitor the applicable low pressure light to show when the applicable tank is empty.
 - (b) When the applicable low pressure lights come on, the applicable tank is empty.
 - (c) Set the applicable boost pump switches to OFF.

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SUBTASK 28-26-00-860-059

(15) Make sure that these circuit breakers are closed:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
C	3	C01637	BOOST PMP CTR TNK L AUTO SHUT OFF-DC
C	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC
HAP 031-036; HAP 001-013, 015-026, 028-030 POST SB 737-28A1206			
D	7	C01639	BOOST PUMP CTR TNK L AUTO SHUT OFF-AC
E	7	C01640	BOOST PUMP CTR TNK R AUTO SHUT OFF-AC

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SUBTASK 28-26-00-860-046

(16) Set the fueling valve switches to the CLOSE position on the refuel panel (P15).

SUBTASK 28-26-00-410-007

(17) Close this access panel for the refuel station:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-26-00-860-047

(18) Close the defueling valve.

SUBTASK 28-26-00-410-008

(19) Close this access panel for the defueling valve:

<u>Number</u>	<u>Name/Location</u>
621EB	Defuel Access Panel - Slat Station 95.15

SUBTASK 28-26-00-860-048

(20) Set the crossfeed valve switch in the CLOSE position if you opened it before this step.

SUBTASK 28-26-00-860-049

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

CAPT Electrical System Panel, P18-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

SUBTASK 28-26-00-860-050

(22) If it is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812.

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SUBTASK 28-26-00-680-003

- (23) If you are scheduled to drain the sump fuel, do this task: Drain the Fuel from the Sumps after Defueling, TASK 12-11-00-650-804.

————— **END OF TASK** —————

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DEFUELING VALVE - REMOVAL/INSTALLATION

1. General

A. The defueling valve has these three primary assemblies:

- (1) The actuator handle assembly
- (2) The adapter shaft
- (3) The valve body

B. This procedure has seven tasks:

- (1) The removal actuator handle assembly
- (2) The installation of the actuator handle assembly
- (3) The removal of the adapter shaft
- (4) The installation of the adapter shaft
- (5) The alignment of the adapter shaft
- (6) The removal of the valve body
- (7) The installation of the valve body

C. You must fully defuel and purge the No. 2 tank to remove the adapter shaft or the valve body.

TASK 28-26-11-010-801

2. Removal of the Actuator Handle Assembly

(Figure 401)

A. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

B. Access Panels

Number	Name/Location
621EB	Defuel Access Panel - Slat Station 95.15

C. Procedure

SUBTASK 28-26-11-010-001

(1) Open this access panel to get access to get access to the defueling valve actuator handle:

Number	Name/Location
621EB	Defuel Access Panel - Slat Station 95.15

NOTE: The access door is on the forward side of the front spar and on the outboard side of the No. 2 engine.

SUBTASK 28-26-11-860-001

(2) Make sure the actuator handle is in the closed position.

SUBTASK 28-26-11-020-001

(3) Remove the mounting screws [1] and washers [2] that attach the defueling valve handle [6] to the index plate [4].

SUBTASK 28-26-11-020-002

(4) Carefully remove the defueling valve handle [6] from the opening in the front spar.

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SUBTASK 28-26-11-420-001

- (5) Make sure you did not move the adapter shaft if you are not scheduled to remove the adapter shaft.

————— **END OF TASK** —————

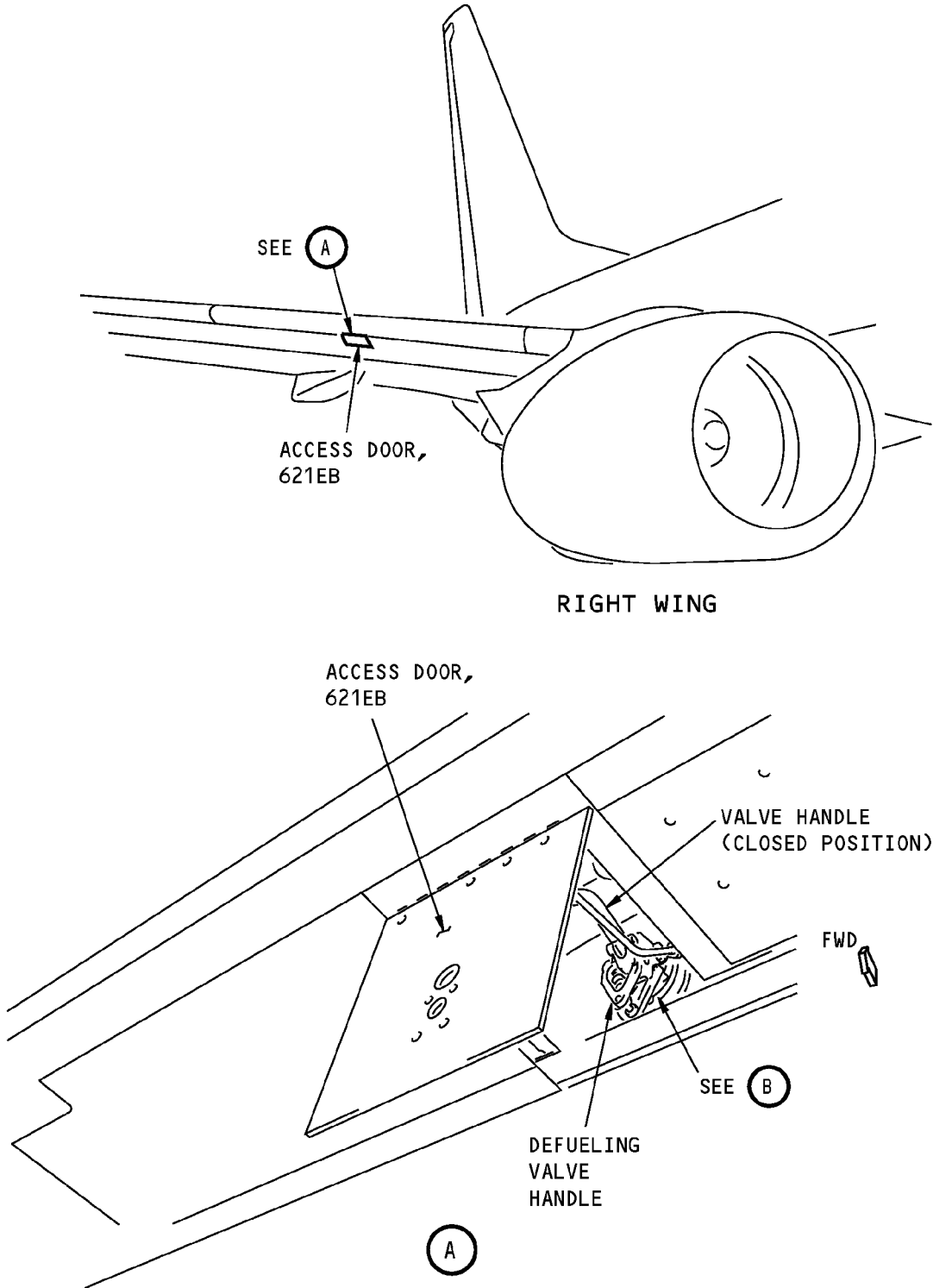
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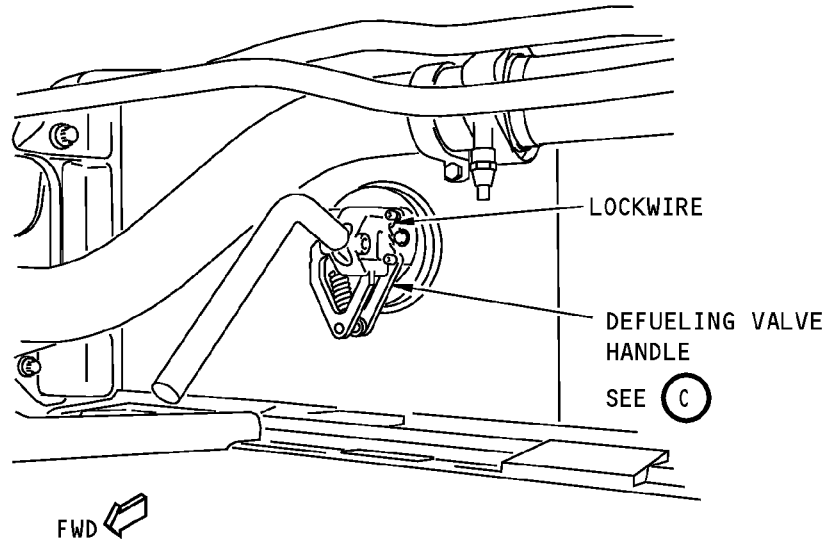


**Defueling Valve Handle Installation
Figure 401 (Sheet 1 of 2)/28-26-11-990-804**

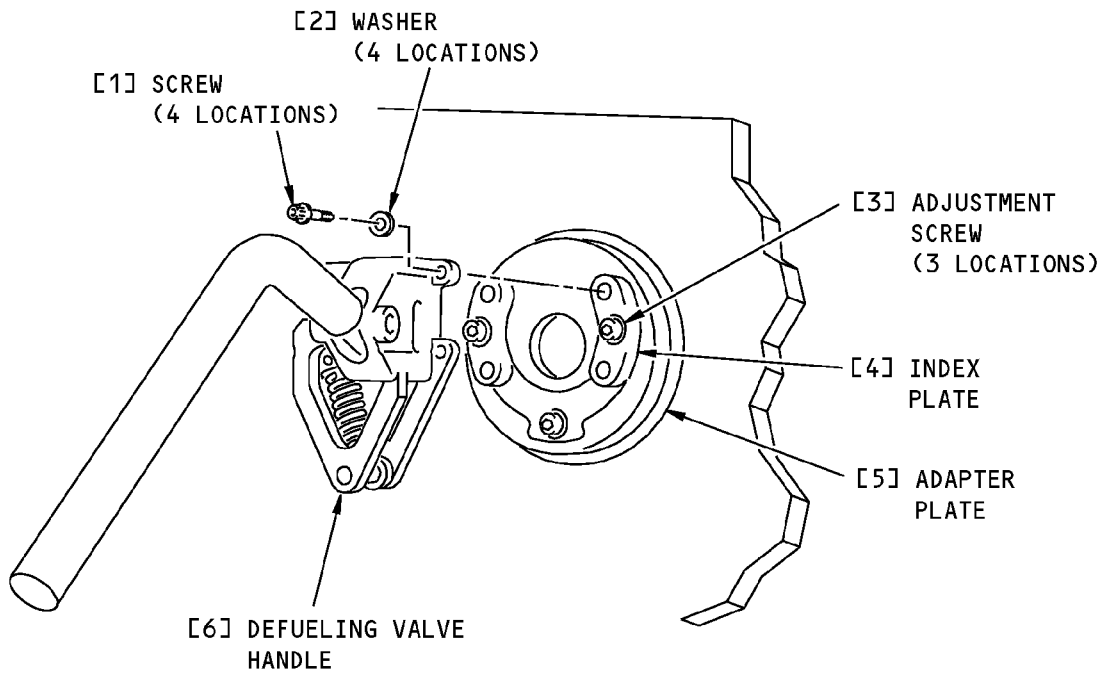
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(B)



DEFUELING VALVE HANDLE

(C)

**Defueling Valve Handle Installation
Figure 401 (Sheet 2 of 2)/28-26-11-990-804**

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TASK 28-26-11-400-801

3. Defueling Valve Actuator Handle Installation

(Figure 401)

A. References

Reference	Title
51-31-00-390-805	Fastener Seal Application (P/B 201)

B. Consumable Materials

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS 5-95

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
6	Defueling valve handle	28-21-52-05-015	HAP 001-013, 015-026, 028-030
		28-21-52-05A-025	HAP 031-054, 101-999

D. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

E. Access Panels

Number	Name/Location
621EB	Defuel Access Panel - Slat Station 95.15

F. Procedure

SUBTASK 28-26-11-860-002

(1) Move the handle on the actuator handle assembly to the closed position.

SUBTASK 28-26-11-420-002

(2) Put the mating shaft of the defueling valve handle [6] on the adapter shaft.

(a) Make sure the two teeth spaces on the adapter shaft align with the mating shaft of the actuator handle.

NOTE: The mounting feet on the defueling valve actuator automatically align with the mounting points on the index plate.

SUBTASK 28-26-11-420-003

(3) Do these steps to attach the defueling valve handle [6] to the index plate with the mounting screws.

(a) Install and seal the mounting screws [1] and washers [2] with sealant, A00247 (TASK 51-31-00-390-805).

SUBTASK 28-26-11-410-001

(4) Close this access panel:

<u>Number</u>	<u>Name/Location</u>

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(Continued)

Number	Name/Location
621EB	Defuel Access Panel - Slat Station 95.15

END OF TASK

TASK 28-26-11-010-802

4. Adapter Shaft Removal

(Figure 402)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-22-21-710-801	Crossfeed Valve Operational Test (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

B. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Access Panels

Number	Name/Location
632DB	Main Tank Access Door - Wing Station 313

D. Procedure

SUBTASK 28-26-11-860-007

- (1) Do these steps to make sure the crossfeed valve is closed:
 - (a) Do this task: Crossfeed Valve Operational Test, TASK 28-22-21-710-801.
 - (b) Make sure the crossfeed valve is set to the closed position and the crossfeed position indicator light is off.

SUBTASK 28-26-11-860-003

WARNING: CAREFULLY DO ALL OF THE SAFETY PROCEDURES TO DEFUEL THE FUEL TANK AND TO GO INTO IT. AN EXPLOSION, INJURIES TO PERSONS, AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Remove all fuel from the No. 2 tank and the center tank. To do this, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801
 - or, do this task: Tank to Tank Fuel Transfer, TASK 28-26-00-650-802

SUBTASK 28-26-11-860-004

- (3) Do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-26-11-010-002

- (4) Remove this access panel for the No. 2 tank to get access to the aft side of the front wing spar:

Number	Name/Location
632DB	Main Tank Access Door - Wing Station 313

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(Main Tank Access Door Removal, TASK 28-11-11-000-801)

SUBTASK 28-26-11-020-003

(5) Do this task: Removal of the Actuator Handle Assembly, TASK 28-26-11-010-801.

SUBTASK 28-26-11-010-003

(6) Get access to the defueling valve through the access opening in the fuel tank.

SUBTASK 28-26-11-020-004

(7) Remove the four screws [22] and washers [21] which attach the adapter plate [5] to the front spar.

SUBTASK 28-26-11-020-005

(8) Disengage the adapter shaft [26] from the defueling valve [25].

SUBTASK 28-26-11-020-006

(9) From out of the fuel tank, pull the adapter shaft [26] through the hole in the front spar to remove it.

————— **END OF TASK** —————

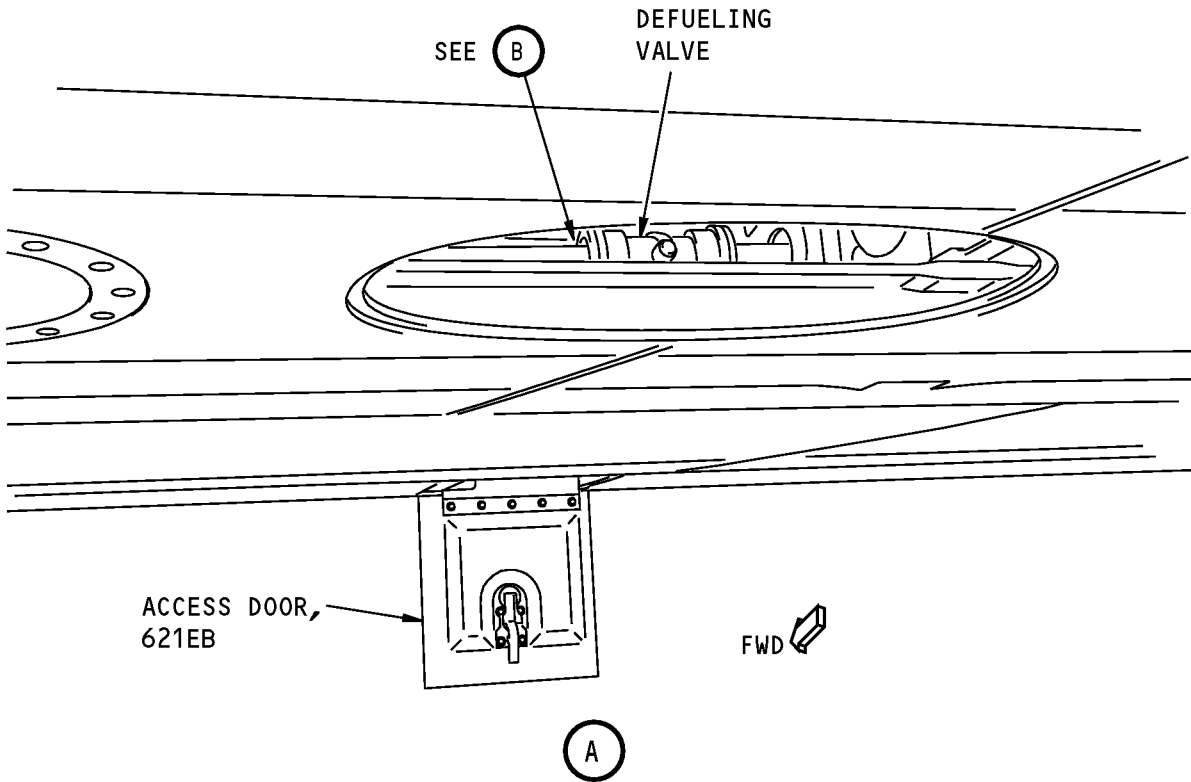
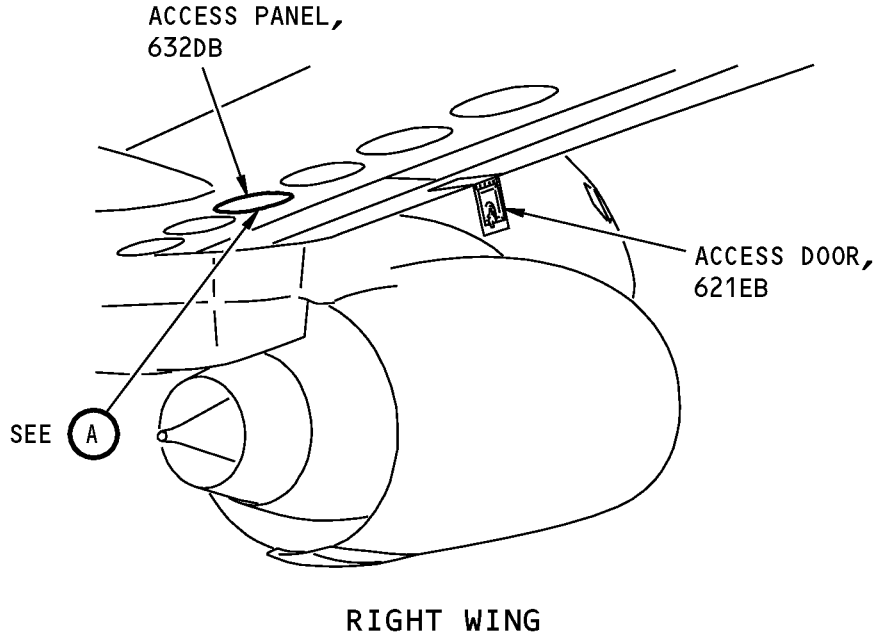
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**Defueling Valve Installation
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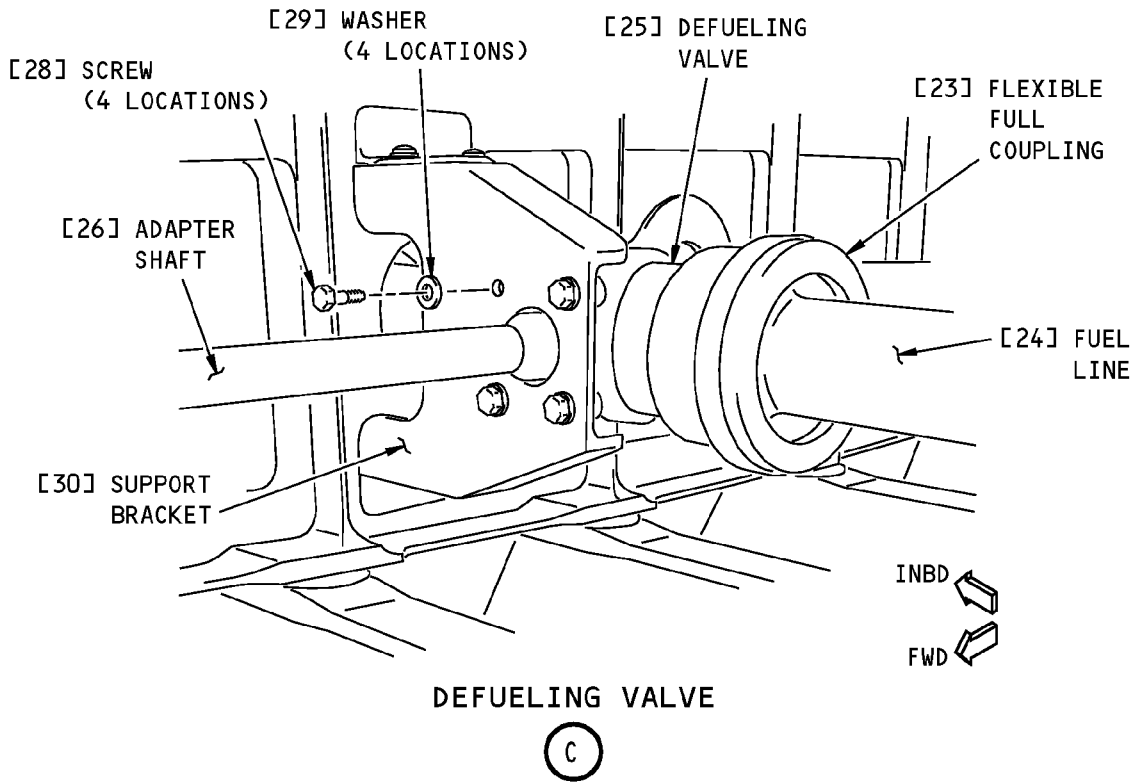
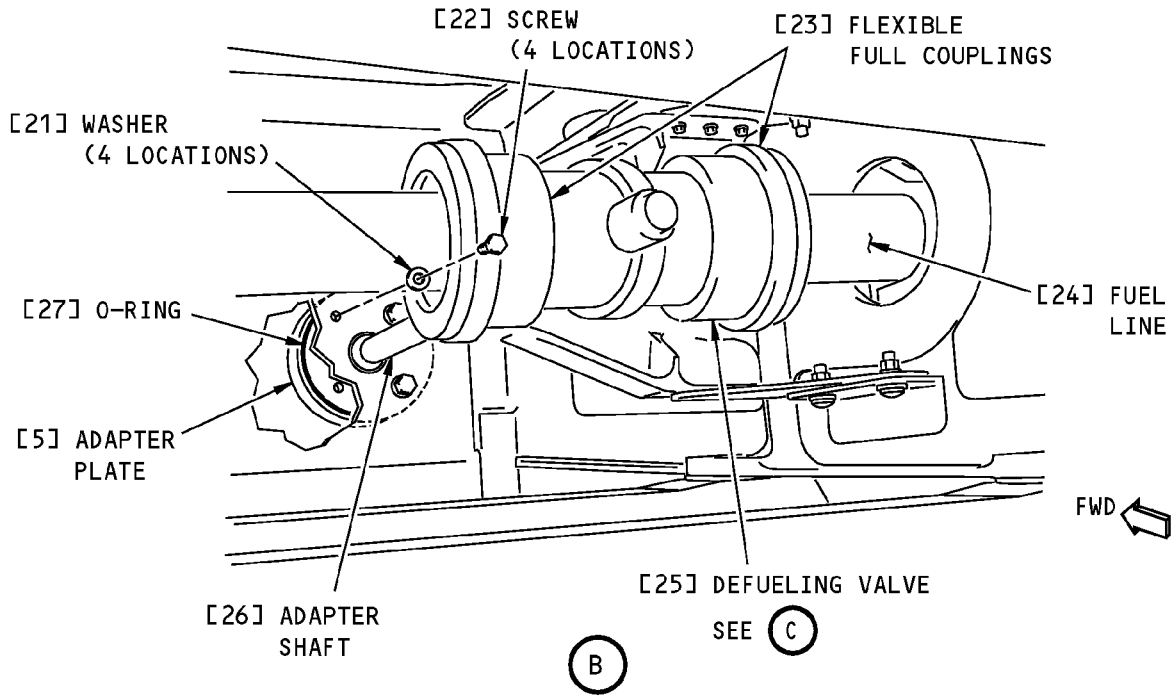
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Defueling Valve Installation
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TASK 28-26-11-410-801

5. Adapter Shaft Installation

(Figure 402)

A. References

Reference	Title
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
26	Adapter shaft	28-26-01-01-005	HAP 001-013, 015-026, 028-030
		28-26-01-01A-005	HAP 031-047, 054, 101-106
27	O-ring	28-26-01-01-017	HAP 001-013, 015-026, 028-030
		28-26-01-01A-020	HAP 031-047, 054, 101-106

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Access Panels

Number	Name/Location
632DB	Main Tank Access Door - Wing Station 313

E. Procedure

SUBTASK 28-26-11-420-004

(1) Install a new O-ring [27] in the groove on the adapter plate [5].

SUBTASK 28-26-11-420-005

(2) Put the adapter shaft [26] through the hole in the front spar.

SUBTASK 28-26-11-420-006

(3) Engage the adapter shaft [26] with the defueling valve [25].

(a) Make sure the two teeth spaces on the spline of the adapter shaft align with the teeth spaces in the rotor on the defueling valve [25].

(b) Make sure the spline on the adapter shaft [26] is correctly engaged with the spline on the rotor of the defueling valve [25].

SUBTASK 28-26-11-820-001

(4) Make sure the adapter plate [5] moves freely in the opening of the front spar.

SUBTASK 28-26-11-420-007

(5) Install the four screws [22] and washers [21] to attach the adapter plate [5] and adapter shaft [26] to the front spar.

SUBTASK 28-26-11-410-002

(6) Do this task: Adapter Shaft Alignment, TASK 28-26-11-820-801.

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SUBTASK 28-26-11-410-003

(7) Close this access panel:

Number	Name/Location
632DB	Main Tank Access Door - Wing Station 313

Main Tank Access Door Installation, TASK 28-11-11-400-801.

END OF TASK

TASK 28-26-11-820-801

6. Adapter Shaft Alignment

(Figure 403)

A. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1587	Wrench - Torque, 30 in-lbs (4 N-m) (Part #: TE3FUA, Supplier: 55719, A/P Effectivity: 737-ALL)
SPL-1771	Equipment - Alignment, Fuel Shutoff Valve (Part #: B28009-1, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

B. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Procedure

SUBTASK 28-26-11-010-004

(1) If it is not removed, do this task: Removal of the Actuator Handle Assembly, TASK 28-26-11-010-801

SUBTASK 28-26-11-480-001

- (2) Do these steps to install the alignment tool (fuel shutoff valve alignment equipment, SPL-1771) in the adapter plate [5]:
- Remove the top two index screws from the index plate.
 - Loosen the bottom index screw but do not remove it.
 - Install the alignment tool.
 - Put the alignment tool in its position with the two guide pins in the holes left by the two index screws that you removed (the scale should be on the top of the tool).
 - Make sure the spline on the tool engages with the spline on the shaft.

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SUBTASK 28-26-11-820-002

(3) Do these steps to align the adater shaft (Procedure 1, optional to Procedure 2):

NOTE: This procedure finds the point where the internal valve butterfly engages the valve seal. The torque necessary to turn the shaft increases as the butterfly engages the seal, then decreases again as the butterfly leaves the other side of the seal. Once the edge of the seal is found, the valve shaft will then be turned to center the buterfly on the seal.

- (a) Put the tool handle in the extreme counterclockwise position.
- (b) Turn the handle slowly in the clockwise direction at a constant rate while you note the changes in the torque necessary to turn the handle.
- (c) Do the previous steps as many times as necessary to find the point in the rotation where the torque necessary to turn the handle increases significantly.
- (d) If you cannot find the position in the rotation where the torque increases significantly, then use Procedure 2 below.
- (e) Put the shaft in the extreme counterclockwise position again.
- (f) Slowly and smoothly turn the handle of the tool clockwise until a distinct increase in torque is found and immediately stop turning the handle.
- (g) Read the scale on the tool.

NOTE: This is the point where the valve butterfly starts to engage the edge of the seal.

- (h) Turn the handle 13 degrees more in the clockwise direction (the scale is calibrated in degrees).

NOTE: The valve butterfly is now centered on the valve seal.

NOTE: If you turn the handle past the target value, do not turn the handle back in the couterclockwise direction again. You must start the procedure again with the handle in the extreme counterclockwise position.

SUBTASK 28-26-11-820-003

(4) Do these steps to align the adapter shaft (Procedure 2, optional to Procedure):

NOTE: A torque wrench (30 in-lbs), COM-1587 is necessary to do this procedure.

- (a) Put the tool handle in the extreme counterclockwise position.
- (b) Slowly and smoothly turn the tool handle to the extreme clockwise position while you monitor the torque that you apply to the handle.
- (c) Write down the maximum torque that you apply to the tool while you turn it from the extreme counterclockwise position ot the extreme clockwise position.
- (d) Turn the tool back to the extreme counterclockwise position.
- (e) Turn the shaft clockwise again at approximately the same rate that you used before.
- (f) Stop at the position where the torque increases to approximatley two-thirds of the maximum torque that you wrote down before.
- (g) Read the scale on the tool at this position.

NOTE: This is the position where valve butterfly starts to engage the edge of the seal.

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- (h) Turn the handle 13 more degrees in the clockwise direction past the reading from the previous step.

NOTE: The butterfly valve is now centered on the valve seal.

NOTE: If you turn the valve past the target value, do not turn it back in the counterclockwise direction. You must start again with the tool handle in the extreme counterclockwise position.

SUBTASK 28-26-11-820-004

- (5) Tighten the lock screw on the alignment tool to keep the adapter shaft in its position.

SUBTASK 28-26-11-820-005

- (6) Turn the index plate until the actuator mounting holes in the index plate are aligned with the two upper holes for the actuator mounting screws.

SUBTASK 28-26-11-820-006

- (7) Insert the two align screws into the holes for the actuator mounting screws to hold the index plate in alignment with the mounting plate (this is the final adjustment of the position of the index plate).

SUBTASK 28-26-11-420-008

- (8) Tighten the bottom index screw to a torque of 44-46 inch pounds.

SUBTASK 28-26-11-020-007

- (9) Carefully remove the align screws.

SUBTASK 28-26-11-080-001

- (10) Carefully remove the alignment tool from the index plate.

SUBTASK 28-26-11-420-009

- (11) Install the top two index screws in the index plate [4] and tighten them to a torque of 21-23 inch-pounds.

SUBTASK 28-26-11-420-010

- (12) Install lockwire on the index screws.

SUBTASK 28-26-11-410-004

- (13) Do this task: Defueling Valve Actuator Handle Installation, TASK 28-26-11-400-801.

————— **END OF TASK** —————

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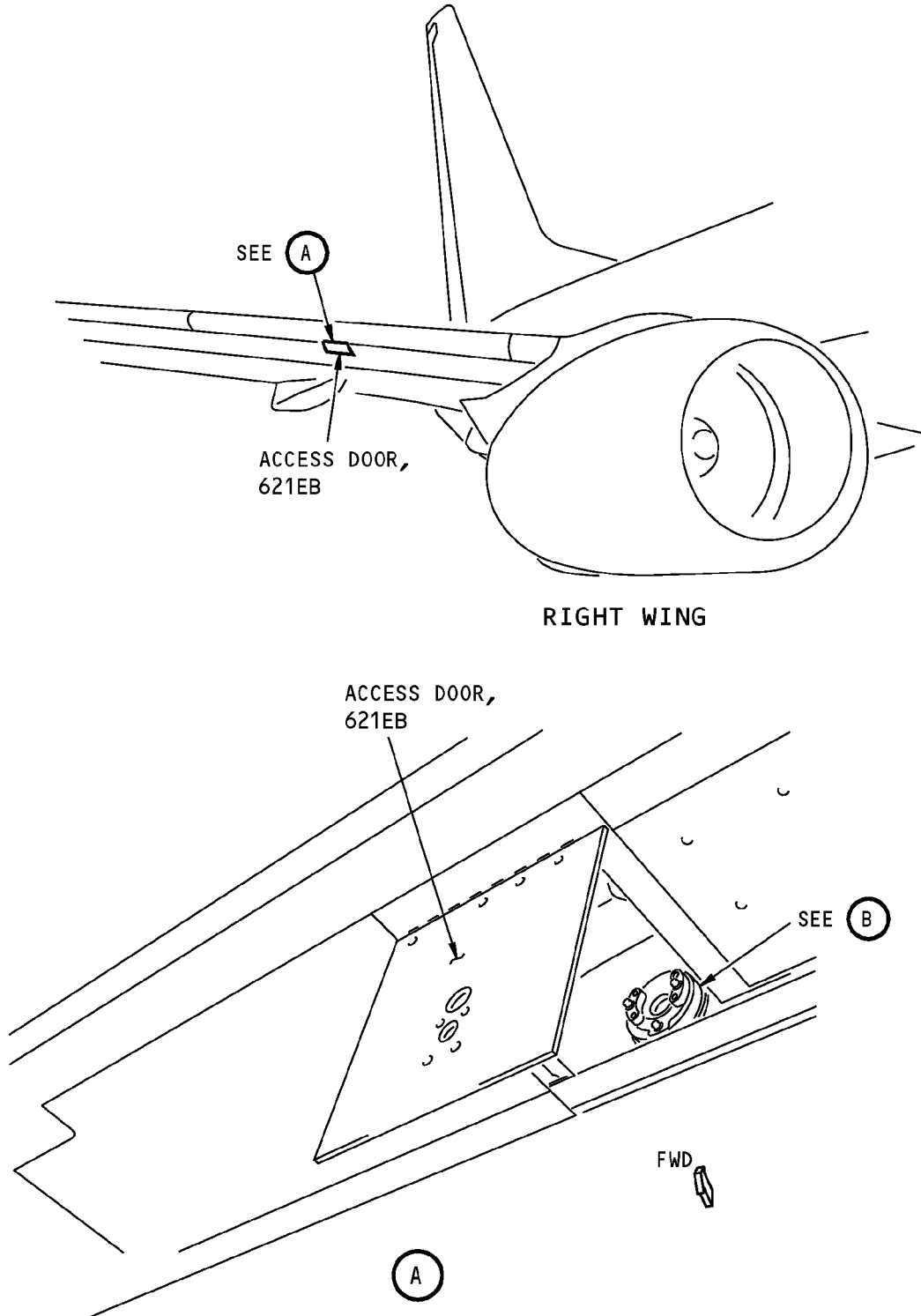
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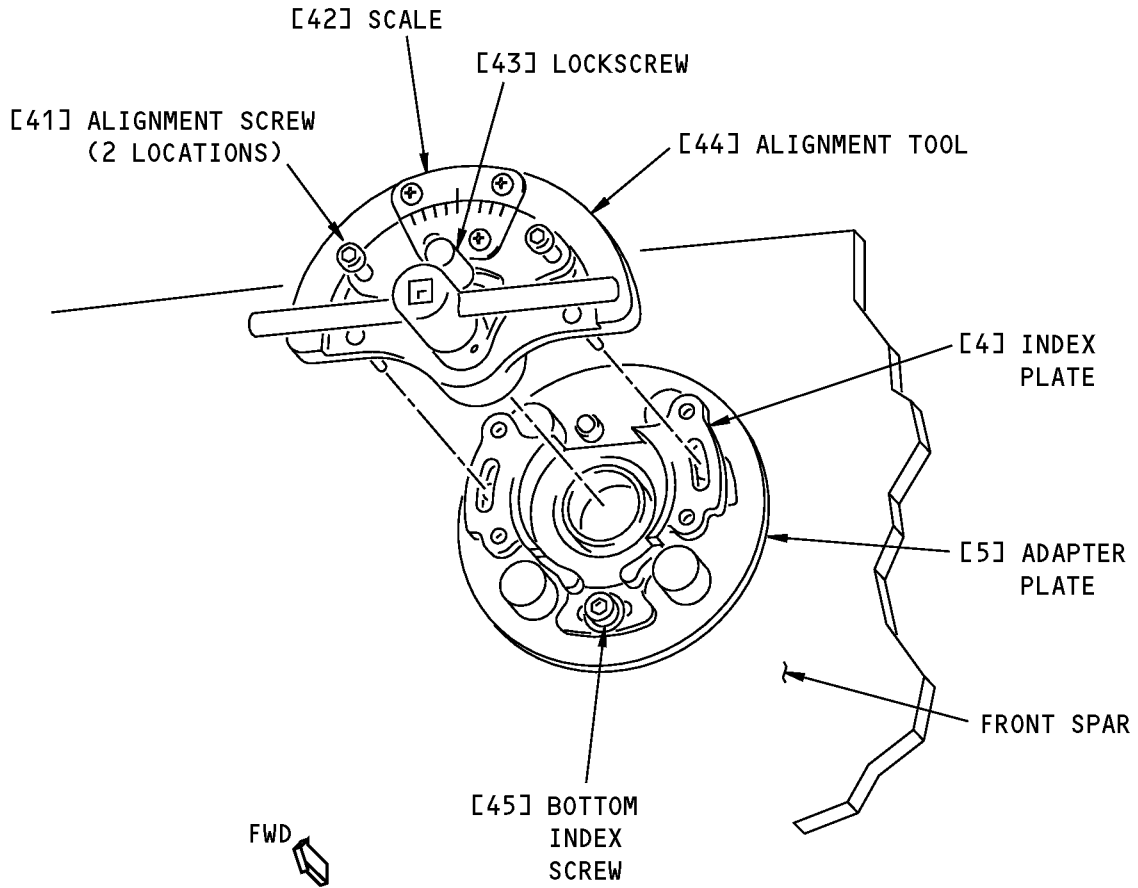
Defueling Valve Alignment
Figure 403 (Sheet 1 of 2)/28-26-11-990-805

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Defueling Valve Alignment
Figure 403 (Sheet 2 of 2)/28-26-11-990-805

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TASK 28-26-11-020-801

7. Valve Body Removal

(Figure 402)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-22-15-000-801	Fuel Line, Fitting and Coupling - Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)

B. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Access Panels

Number	Name/Location
632DB	Main Tank Access Door - Wing Station 313

D. Procedure

SUBTASK 28-26-11-860-005

WARNING: CAREFULLY DO ALL OF THE SAFETY PROCEDURES TO DEFUEL THE FUEL TANK AND TO GO INTO IT. AN EXPLOSION, INJURIES TO PERSONS, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Fuel Tank Defueling, TASK 28-26-00-650-801.

SUBTASK 28-26-11-860-006

(2) Do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-26-11-010-005

(3) Remove this access panel for the No. 2 tank to get access to the aft side of the wing front spar:

Number	Name/Location
632DB	Main Tank Access Door - Wing Station 313

Main Tank Access Door Removal, TASK 28-11-11-000-801

SUBTASK 28-26-11-010-006

(4) Go into the No. 2 tank and find the valve body (defueling valve) [25].

SUBTASK 28-26-11-020-008

(5) Disconnect the flexible full coupling [23] from each side of the valve body [25] (TASK 28-22-15-000-801).

SUBTASK 28-26-11-020-009

(6) Hold the valve body [25] and remove the four screws [28] that attach the valve body [25] to the support bracket [30].

SUBTASK 28-26-11-020-010

(7) Disengage the valve body [25] from the adapter shaft [26].

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SUBTASK 28-26-11-020-011

(8) Remove the valve body [25].

SUBTASK 28-26-11-480-002

(9) Put covers on the holes in the fuel line to keep unwanted materials out.

END OF TASK

TASK 28-26-11-420-801

8. Valve Body Installation

(Figure 402)

A. References

Reference	Title
20-10-51-760-801	Electrical Resistance Specifications in the Fuel Tank Check (P/B 401)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
25	Valve body	28-26-01-01-020	HAP 001-013, 015-026, 028-030
		28-26-01-01A-025	HAP 031-047, 054, 101-106

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Access Panels

Number	Name/Location
632DB	Main Tank Access Door - Wing Station 313

E. Procedure

SUBTASK 28-26-11-080-002

(1) Remove the covers from the fuel line.

SUBTASK 28-26-11-820-007

(2) Align the index marks on the valve body (defueling valve) [25] and the adapter shaft [26].

SUBTASK 28-26-11-420-011

(3) Engage the valve body [25] in the adapter shaft [26].

- (a) Make sure the two teeth spaces on the spline of the adapter shaft align with the teeth spaces in the rotor on the defueling valve [25].
- (b) Make sure the spline on the adapter shaft [26] is correctly engaged with the spline on the rotor of the defueling valve [25].

SUBTASK 28-26-11-210-001

(4) Make sure the surfaces that touch on the support bracket [30] and the valve body [25] are clean.

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SUBTASK 28-26-11-820-008

- (5) Align the valve body [25] with the support bracket [30].

SUBTASK 28-26-11-420-012

- (6) Install the four washers [29] and screws [28] through the support bracket [30] to attach to the valve body [25].

SUBTASK 28-26-11-760-001

- (7) Do a check of the bonding resistance from the valve body [25] to the support bracket [30] (TASK 20-10-51-760-801).

(a) Make sure the bonding resistance is not more than 0.01 ohms.

SUBTASK 28-26-11-420-013

- (8) Connect the flexible full couplings [23] that attach the valve body to the fuel line (TASK 28-22-15-400-801).

SUBTASK 28-26-11-010-007

- (9) Install this access panel: for the No. 2 tank

<u>Number</u>	<u>Name/Location</u>
632DB	Main Tank Access Door - Wing Station 313

(Main Tank Access Door Installation, TASK 28-11-11-400-801).

SUBTASK 28-26-11-710-001

- (10) To do an operational test of the defueling valve, do these steps:

(a) Add a minimum of 300 pounds (140 kilograms) to the No. 1 tank.

(b) Transfer a minimum of 100 pounds (40 kilograms) from the No. 1 tank to the No. 2 tank. To do this, do this task: Tank to Tank Fuel Transfer, TASK 28-26-00-650-802

(c) With the defuel valve in the closed position, do the steps to transfer fuel from the No. 1 tank to the No. 2 tank (TASK 28-26-00-650-802).

(d) Monitor the fuel quantity indicators for the No. 1 and the No. 2 tank for five minutes.

(e) Make sure there is no fuel transfer as shown by the fuel quantity indicating system.

(f) Make sure all boost pumps are off and the crossfeed valve and defuel valve are closed.

————— **END OF TASK** —————

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FUEL QUANTITY INDICATING SYSTEM (FQIS) - ADJUSTMENT/TEST

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure has three tasks. The first task is an operational test of the fuel quantity indicating system (FQIS). The second task is a comparison check of the FQIS with the fuel measuring sticks. The third task is a system test of the FQIS.
- C. The operational test makes sure the FQIS operates correctly.
- D. The comparison check makes sure the fuel quantity shown agrees with the correct quantity of fuel in the fuel tanks.
- E. The system test makes sure the total capacitance for the tank units and the compensators are in the permitted limits for the FQIS precision.

TASK 28-41-00-710-801

2. Operational Test - Fuel Quantity Indicating System

A. General

- (1) This procedure is a scheduled maintenance task.
- (2) This procedure contains:
 - (a) A check of the load select indicators on the fueling control panel, P15.
 - (b) A fuel quantity BITE procedure to be done from the control display unit in the flight compartment.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
FIM 28-41 TASK 801	FQIS BITE Procedure

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
621	Right Wing - Leading Edge to Front Spar

D. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

E. Prepare for Checks

SUBTASK 28-41-00-860-001

- (1) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

F. Check of the Load Select Indicators

(Figure 501)

SUBTASK 28-41-00-010-001

- (1) Open this access panel:

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

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SUBTASK 28-41-00-210-001

- (2) Make sure the display on each load select indicator shows the quantity of fuel in each fuel tank.

SUBTASK 28-41-00-710-001

- (3) Select and hold the FUELING INDICATION TEST SWITCH on the refuel control panel in the TEST GAGES position.
 - (a) Make sure all of the refuel quantity indicators operate correctly.

NOTE: The test blanks the fueling indicators display for two seconds, then all LED segments go on for two seconds. This sequence continues as long as you hold the TEST SWITCH. If you hold the TEST SWITCH for more than 20 seconds, the test mode will time out and the indicator will go back to its usual operating mode. If an internal fault is found during the test, the indicator will show Ind FAIL.

- (b) Release the FUELING INDICATION TEST SWITCH.

SUBTASK 28-41-00-210-002

- (4) Make sure the display on each load select indicator shows the quantity of fuel in each fuel tank.

SUBTASK 28-41-00-410-001

- (5) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

G. Fuel Quantity BITE Test Procedure

(Figure 502)

SUBTASK 28-41-00-740-001

- (1) Do the BITE procedure for the FQIS
 - (a) If you are not at the CDU Initial Reference Index (INIT/REF INDEX), or one of the FQIS BITE menus, then do these steps:
 - 1) Push the INIT REF function key.
 - 2) If the POS INIT display shows, then push the line select key next to the INDEX prompt.

NOTE: This makes the CDU Initial Reference Index (INIT/REF INDEX) show.
 - (b) On the Control Display Unit (CDU), push the line select key next to the MAINT prompt on the CDU Initial Reference Index.

NOTE: This brings you to the MAINT BITE INDEX.
 - (c) Push the line select key next to the FQIS prompt.
 - (d) Do these steps to look for maintenance messages in CURRENT STATUS:
 - 1) Push the line select key next to the CURRENT STATUS prompt.
 - 2) If there are faults shown, do the corrective action for the faults shown (FIM 28-41-00).
 - a) If there is more than one page of faults in CURRENT STATUS, then use the NEXT PAGE key and the PREV PAGE key to see all of the maintenance messages.

NOTE: The number of pages of faults in CURRENT STATUS are shown in the upper right corner of the display. If a fault shows the message FAULT NO LONGER PRESENT, then the fault was corrected while the CURRENT STATUS display was on.

- 3) If NO PRESENT FAULTS shows on the CURRENT STATUS display, then continue. No current faults are found in the system.

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- 4) Push the line select key next to the INDEX prompt.

NOTE: This will bring you back to the FQIS BITE TEST main menu.

- (e) Do these steps to do the FQIS ground test:

- 1) Push the line select key next to the GROUND TEST prompt.

- a) Push the line select key next the YES prompt to verify that you want to do the ground test.

- 2) When the ground test is complete, the display will show GROUND TEST COMPLETE PASS or FAIL.

- 3) If the display shows GROUND TEST COMPLETE PASS, then there are no faults found in the FQIS.

NOTE: If faults show in CURRENT STATUS, then keep a record of the faults for later fault isolation of intermittent faults. The corrective action given for each fault found in CURRENT FAULTS can also be used to correct intermittent faults that occur frequently.

- 4) If the display shows GROUND TEST COMPLETE FAIL, then do the corrective action for the faults shown (FIM 28-41 TASK 801).

- a) If there is more than one page of faults in GROUND TEST FAULTS, then use the NEXT PAGE key and the PREV PAGE key to see all of the maintenance messages.

NOTE: The number of pages of faults in GROUND TEST FAULTS are shown in the upper right corner of the display.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-41-00-860-002

- (1) If electrical power is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812.

————— **END OF TASK** —————

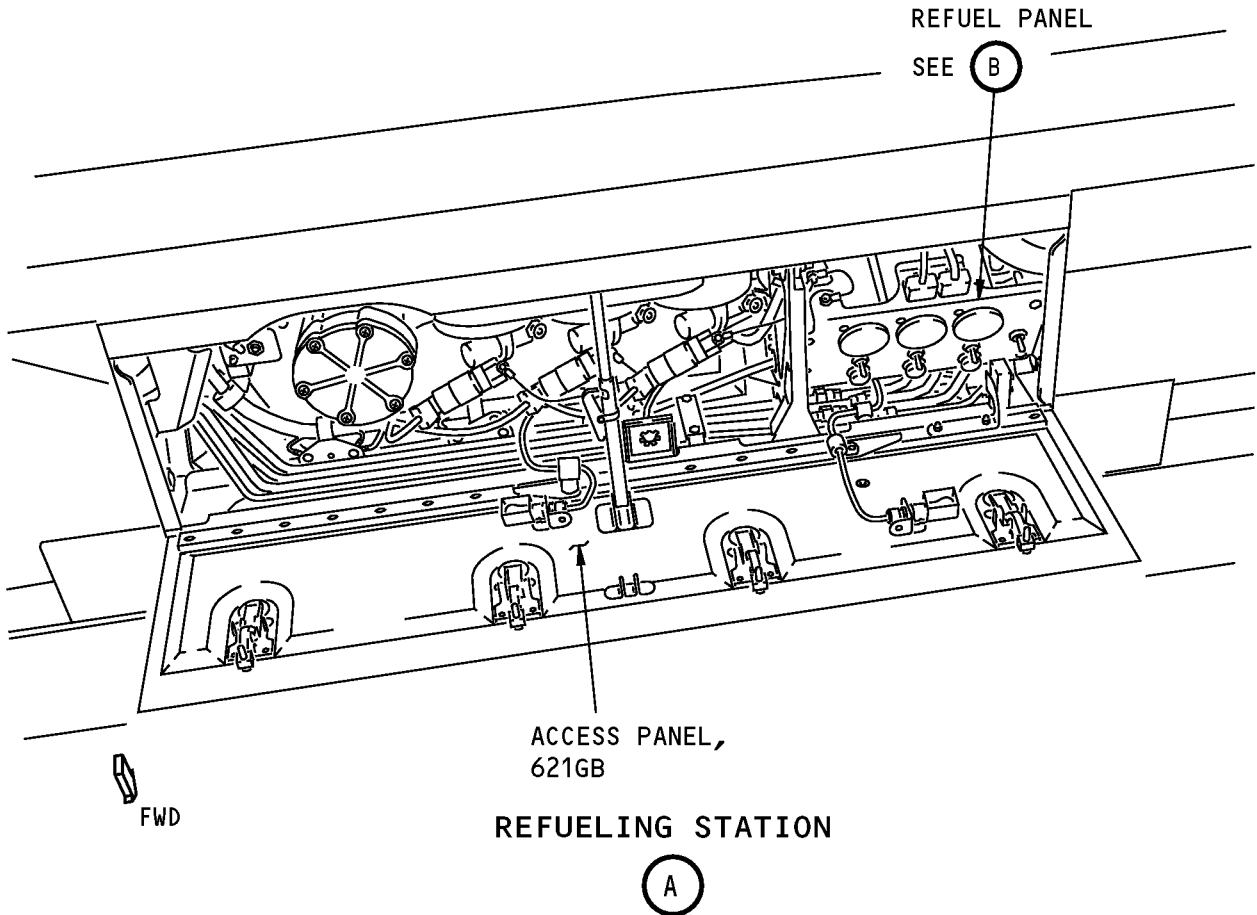
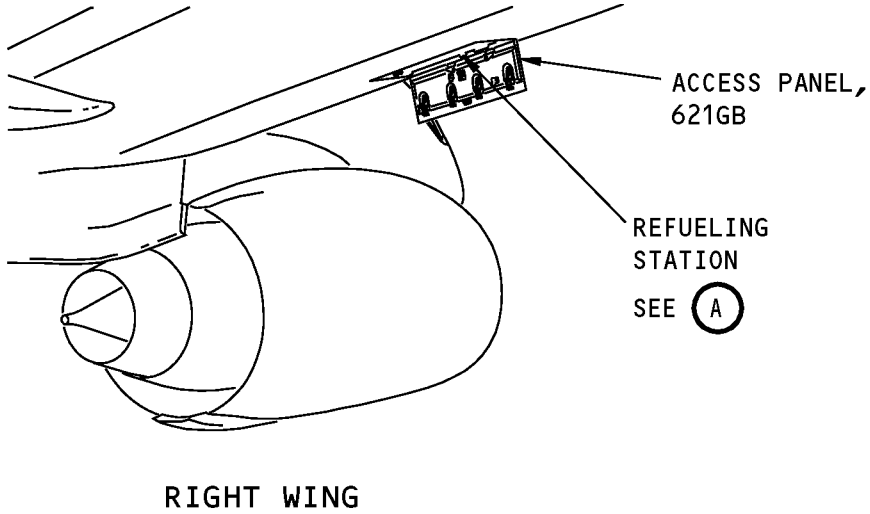
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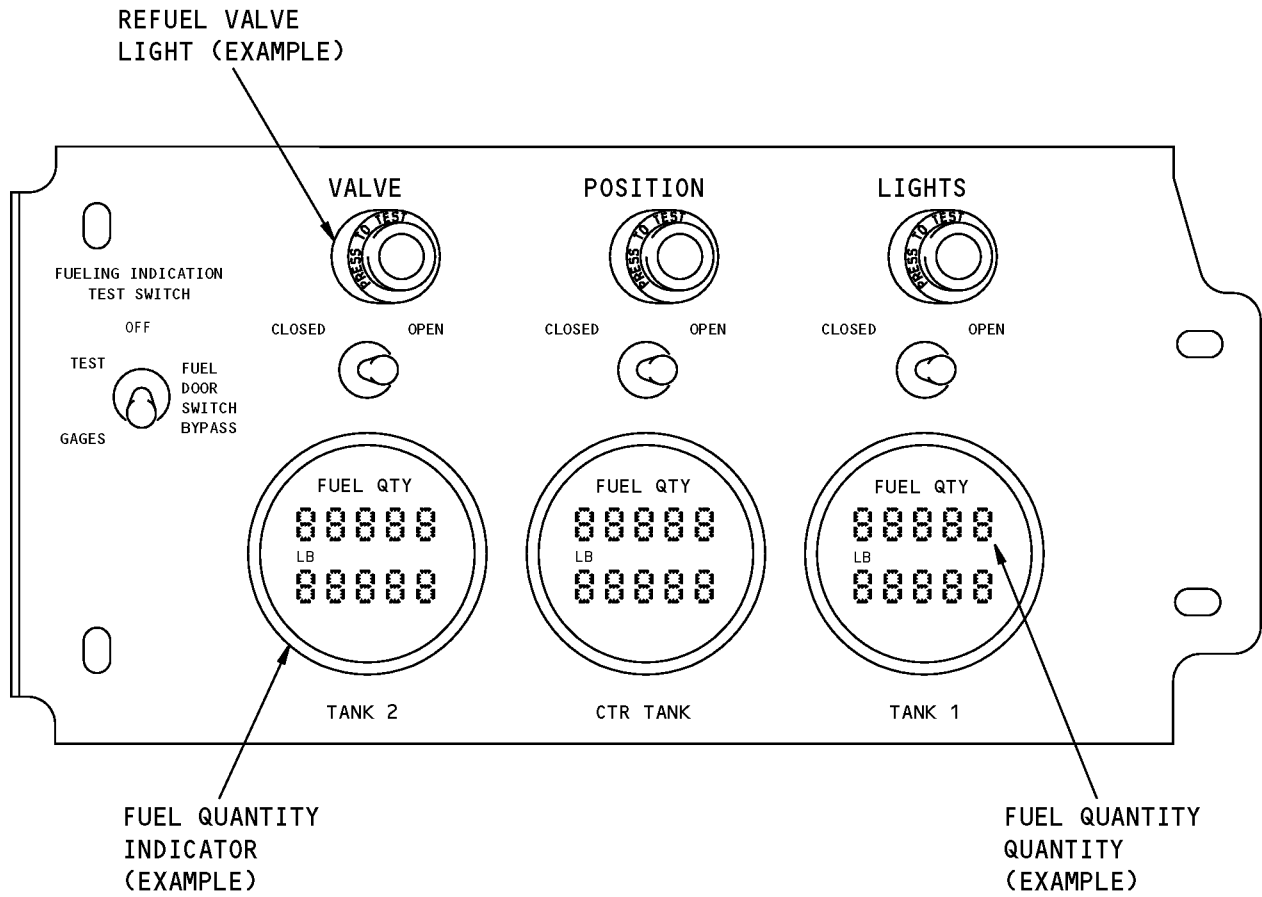
**Refuel Panel
Figure 501 (Sheet 1 of 2)/28-41-00-990-804**

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REFUEL PANEL

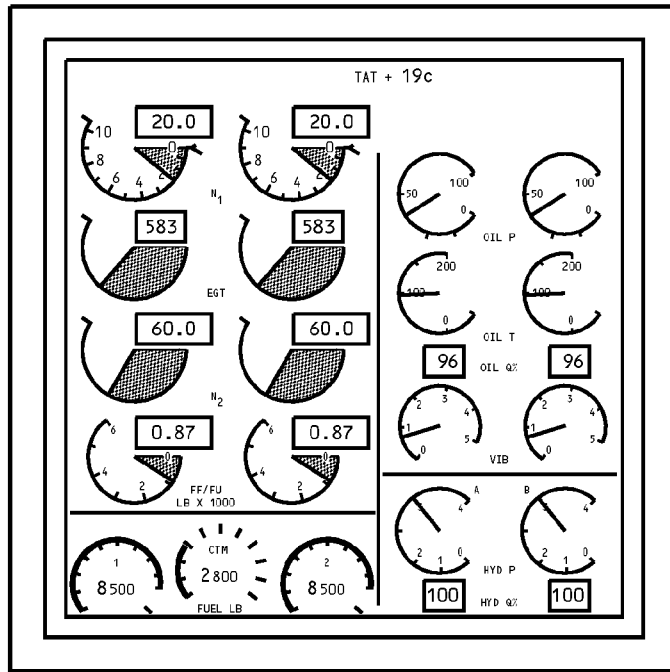
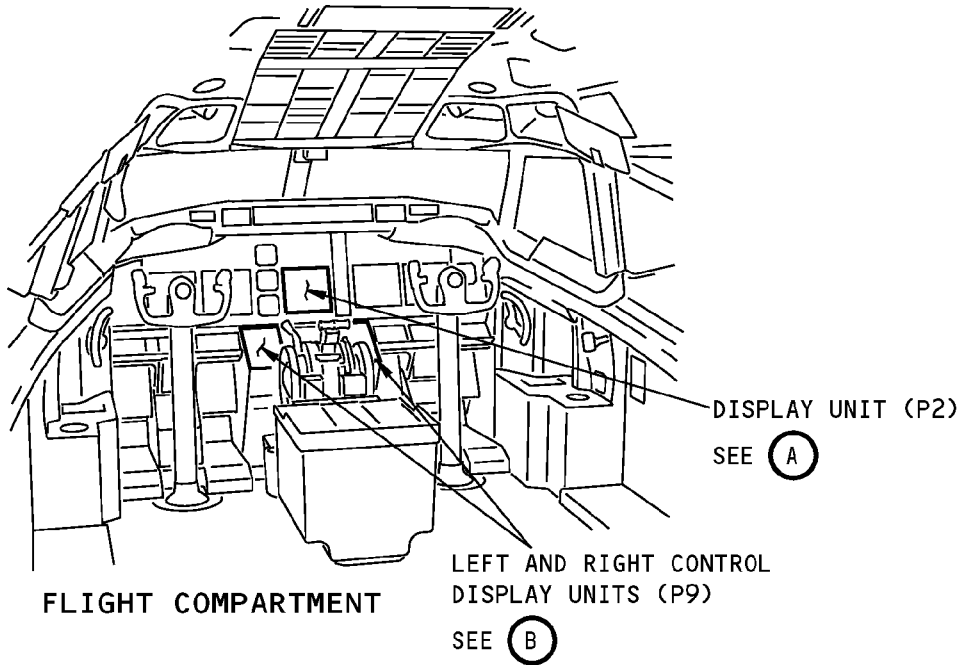
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Refuel Panel
Figure 501 (Sheet 2 of 2)/28-41-00-990-804

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DISPLAY UNIT (P2)

(A)

Fuel Quantity Indicating System Test
Figure 502 (Sheet 1 of 2)/28-41-00-990-807

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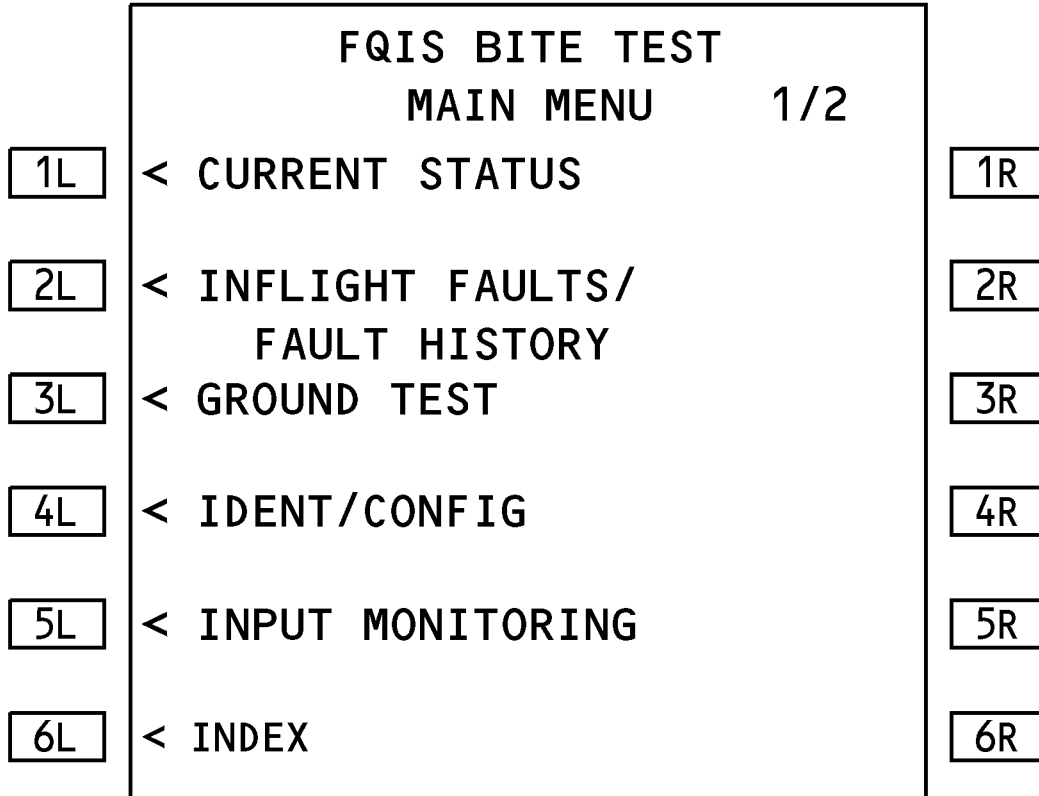
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NEXT PREV

CONTROL DISPLAY UNIT (P9)



Fuel Quantity Indicating System Test
Figure 502 (Sheet 2 of 2)/28-41-00-990-807

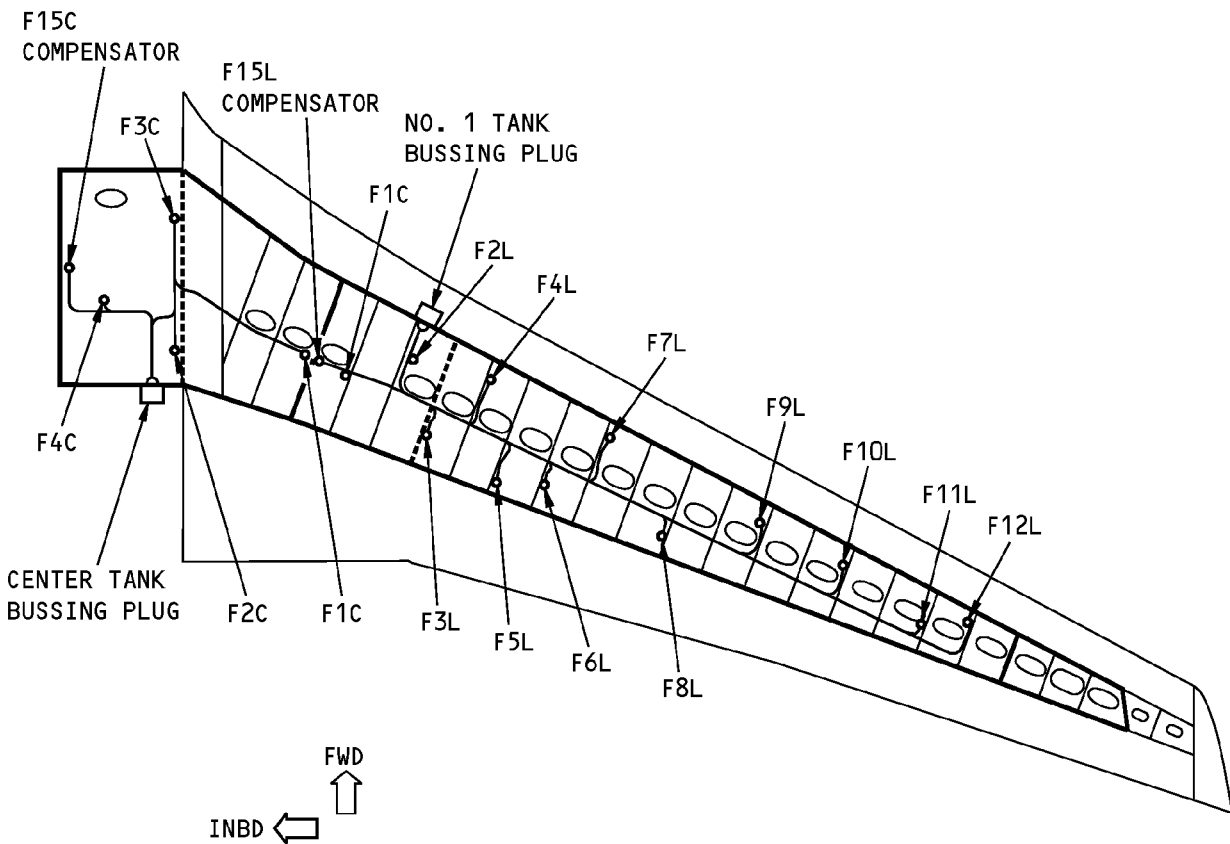
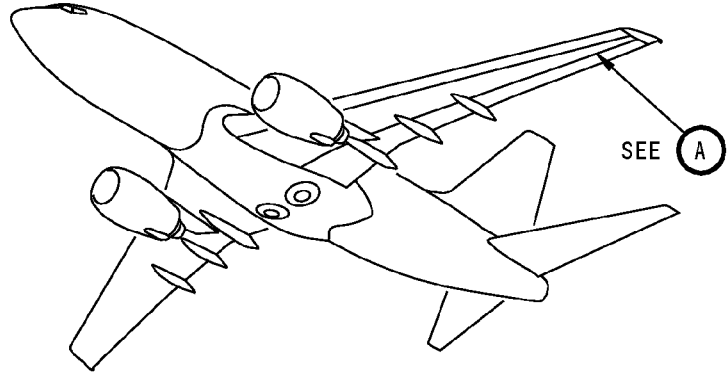


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**LEFT WING
(BOTTOM VIEW)**

A

**Fuel Quantity Indicating System
Figure 503 (Sheet 1 of 2)/28-41-00-990-808**

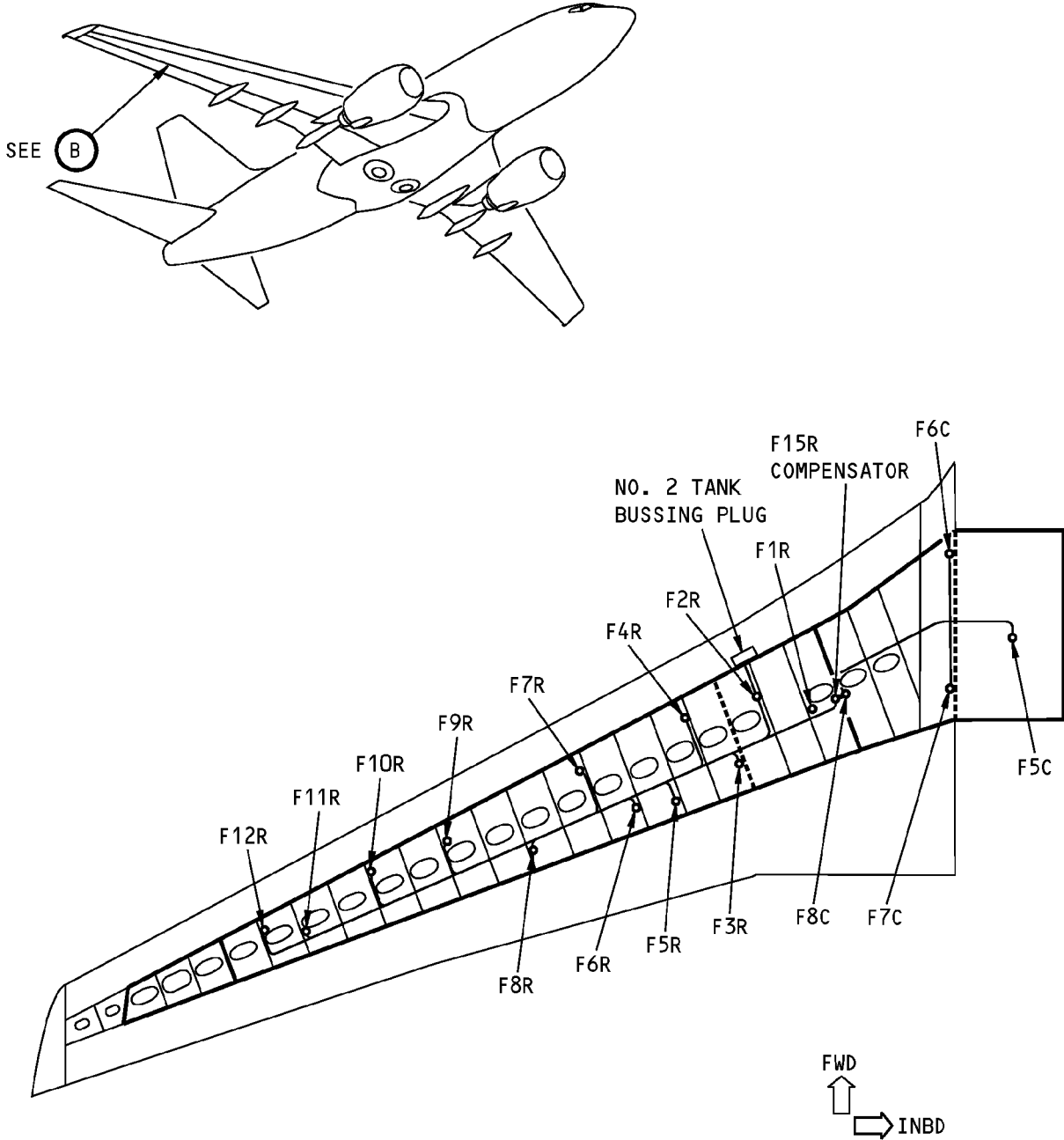
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**RIGHT WING
(BOTTOM VIEW)**

(B)

**Fuel Quantity Indicating System
Figure 503 (Sheet 2 of 2)/28-41-00-990-808**

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TASK 28-41-00-720-801

3. Comparison Check - Fuel Quantity Indicating System (FQIS) with the Fuel Measuring Sticks

A. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)

B. Location Zones

Zone	Area
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

D. Comparison Check of the Fuel Quantity Indicating System (FQIS) with the Fuel Measuring Sticks

SUBTASK 28-41-00-860-003

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-41-00-010-002

(2) Open this access panel:

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-41-00-650-004

(3) Make sure there is a minimum of 3000 lb (1361 kg) of fuel in the center tank and a minimum of 1000 lb (454 kg) of fuel in the main tanks.

(a) To refuel the fuel tank (if it is necessary), do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802.

SUBTASK 28-41-00-970-001

(4) Use the fuel measuring sticks to calculate the fuel quantity for each fuel tank.

SUBTASK 28-41-00-220-001

(5) Make sure the difference between the calculated fuel quantity (with the fuel measuring sticks) for each tank and the fuel quantity shown on the load select indicators on the P15 panel and the center instrument panel, P2 in the flight compartment is in the subsequent range:

- (a) Main tank +/- 350 lbs
- (b) Main tank +/- 160 kgs
- (c) Center tank +/- 1160 lbs
- (d) Center tank +/- 520 kgs

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SUBTASK 28-41-00-410-002

(6) Close this access panel:

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-41-00-860-004

(7) If electrical power is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812.

————— END OF TASK —————

TASK 28-41-00-730-801

4. System Test - Fuel Quantity Indicating System

A. General

(1) The fuel quantity processor unit, M121, will do a capacitance test of the tank units and compensators.

NOTE: This test is a dry capacitance test (no fuel in the tank).

B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
12-11-00-650-804	Drain the Fuel from the Sumps after Defueling (P/B 301)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)
28-41-21-710-801	Tank and Compensator Units Test (P/B 501)
FIM 28-41 TASK 801	FQIS BITE Procedure

C. Dry Capacitance Test in the Main Equipment Center (No Fuel in the Tank)

SUBTASK 28-41-00-740-002

(1) Do this task: Operational Test - Fuel Quantity Indicating System, TASK 28-41-00-710-801.

- (a) If the BITE test shows faults, then do the corrective action for the fault shown.
- (b) If the BITE test does not show faults, then continue.

SUBTASK 28-41-00-650-001

(2) Defuel the applicable fuel tank (TASK 28-26-00-650-801) or transfer fuel out of the applicable tank (TASK 28-26-00-650-802).

SUBTASK 28-41-00-650-002

(3) Drain the fuel from the applicable fuel tank (TASK 12-11-00-650-804).

SUBTASK 28-41-00-730-001

(4) On the Control Display Unit (CDU), push the line select key next to the MAINT prompt on the CDU Initial Reference Index.

NOTE: This brings you to the MAINT BITE INDEX.

- (a) Push the line select key next to the FQIS prompt.
- (b) Push the line select key next to the INPUT MONITORING prompt.
- (c) Push the NEXT key to get to the second INPUT MONITORING page.

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- (d) Make sure the quantities shown under TANK UNIT CAP are in this range for the applicable tank:
1) No. 1 Tank and No. 2 Tank: 399.40 pf maximum/390.30 pf minimum
2) Center Tank: 574.50 pf maximum/563.00 pf minimum
(e) Make sure the quantities shown under COMPENSATOR CAP are in this range for the applicable tank:
1) 59.2 pf maximum/57.6 pf minimum

NOTE: These values apply to the No. 1, No. 2, and the center tank.

SUBTASK 28-41-00-730-002

- (5) If the capacitances are not in the correct range for empty tank capacitances, do this task: FIM 28-41 TASK 801.
(a) If the BITE test shows faults, then do the corrective action for the fault shown.
(b) If the BITE test does not show faults, then do the tank unit and compensator test from the wing spar (TASK 28-41-21-710-801) to isolate the problem.

SUBTASK 28-41-00-650-003

- (6) If no more tests are necessary, refuel the applicable tank (TASK 12-11-00-650-802).

END OF TASK

TASK 28-41-00-730-802

5. Wet Capacitance System Check - Fuel Quantity Indicating System

A. General

- (1) The fuel quantity processor unit, M121, will do a capacitance test of the tank units and compensators.
(2) This capacitance check can be used if it is easier to add fuel to a tank than to drain it to empty. In some isolated cases, it is possible that problems can appear with a full fuel tank that do not appear with an empty fuel tank. The recommended procedure to find problems with the FQIS equipment is to do the Tank and Compensator Units Test (TASK 28-41-21-710-801) before you do the steps in the task below. Wet capacitance values change with fuel properties and fuel temperature. The capacitance values supplied in this procedure are approximate and only to be used to identify further fault isolation.

B. References

Table with 2 columns: Reference, Title. Rows include 12-11-00-650-802 (Pressure Refuel Procedure), 28-41-21-710-801 (Tank and Compensator Units Test), and FIM 28-41 TASK 801 (FQIS BITE Procedure).

C. Wet Capacitance Check in the Main Equipment Center (Tanks Filled to Full Capacity)

(Figure 503)

SUBTASK 28-41-00-740-003

- (1) Do this task: Operational Test - Fuel Quantity Indicating System, TASK 28-41-00-710-801.
(a) If the BITE test shows faults, then do the corrective action for the fault shown.
(b) If the BITE test does not show faults, then continue.

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SUBTASK 28-41-00-650-005

- (2) Add fuel to the applicable fuel tank until the float switch closes the applicable fueling shutoff valve (fill the tank to its full capacity). To do this, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802

SUBTASK 28-41-00-730-003

- (3) On the Control Display Unit (CDU), push the line select key next to the MAINT prompt on the CDU Initial Reference Index.

NOTE: This brings you to the MAINT BITE INDEX.

- (a) Push the line select key next to the FQIS prompt.
- (b) Push the line select key next to the INPUT MONITORING prompt.
- (c) Push the NEXT key to get to the second INPUT MONITORING page.
- (d) Make sure the quantities shown under TANK UNIT CAP are approximately the same as the capacitance value shown below for the applicable tank:

NOTE: Wet capacitance values change with fuel properties and fuel temperature. The capacitance values supplied below are the approximate capacitances when the tank units and compensator are fully covered with fuel. These values must only be used with caution and to identify further fault isolation.

- 1) No. 1 Tank: 830 pf
 - 2) No. 2 Tank: 830 pf
 - 3) Center Tank: 1190 pf
- (e) Make sure the quantities shown under COMPENSATOR CAP are approximately equal to 121 pf for the applicable tank.

NOTE: These values apply to the No. 1, No. 2, and the center tank.

SUBTASK 28-41-00-730-004

- (4) If the capacitances are not in the correct range for empty tank capacitances, do this task: FIM 28-41 TASK 801.
 - (a) If the BITE test shows faults, then do the corrective action for the fault shown.
 - (b) If the BITE test does not show faults, then do the tank unit and compensator test from the wing spar (TASK 28-41-21-710-801) to isolate the problem.

————— **END OF TASK** —————

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TANK AND COMPENSATOR UNITS - REMOVAL/INSTALLATION

1. General

- A. This procedure has two tasks:
 - (1) A task to remove the tank unit or the compensator unit;
 - (2) A task to install the tank unit or the compensator unit.
- B. The procedure is the same for the tank units or the compensator units.
- C. The access to the tank units or compensator units is different for each unit.

TASK 28-41-21-000-801

2. Remove the Tank Unit or the Compensator Unit

(Figure 401)

A. References

Reference	Title
24-22-00-860-812	Remove Electrical Power (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)

B. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Procedure

SUBTASK 28-41-21-860-001

- (1) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

SUBTASK 28-41-21-860-002

WARNING: CAREFULLY DO ALL OF THE SAFETY PROCEDURES TO PREPARE TO GO INTO THE FUEL TANK. AN EXPLOSION, INJURY TO PERSONS, AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) For the applicable tank, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802

SUBTASK 28-41-21-010-002

- (3) Get access to the tank unit [2], tank unit [3], tank unit [4], or tank unit [5] or the compensator [1] through the access panel opening and the rib access openings (TASK 28-11-11-000-801) or (TASK 28-11-31-000-801).

SUBTASK 28-41-21-020-001

- (4) Disconnect the wires from the electrical terminals on the unit.

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SUBTASK 28-41-21-020-002

(5) Loosen the wire clamp on the unit.

SUBTASK 28-41-21-020-003

(6) Open the two camloc clamps that hold the tank unit in its position.

SUBTASK 28-41-21-020-004

CAUTION: MOVE THE TANK UNITS AND THE COMPENSATOR UNITS CAREFULLY. YOU CAN CAUSE DAMAGE TO THE PROPERTIES OF THE TANK UNITS AND THE COMPENSATOR UNIT.

(7) Remove the tank unit or compensator unit.

————— **END OF TASK** —————

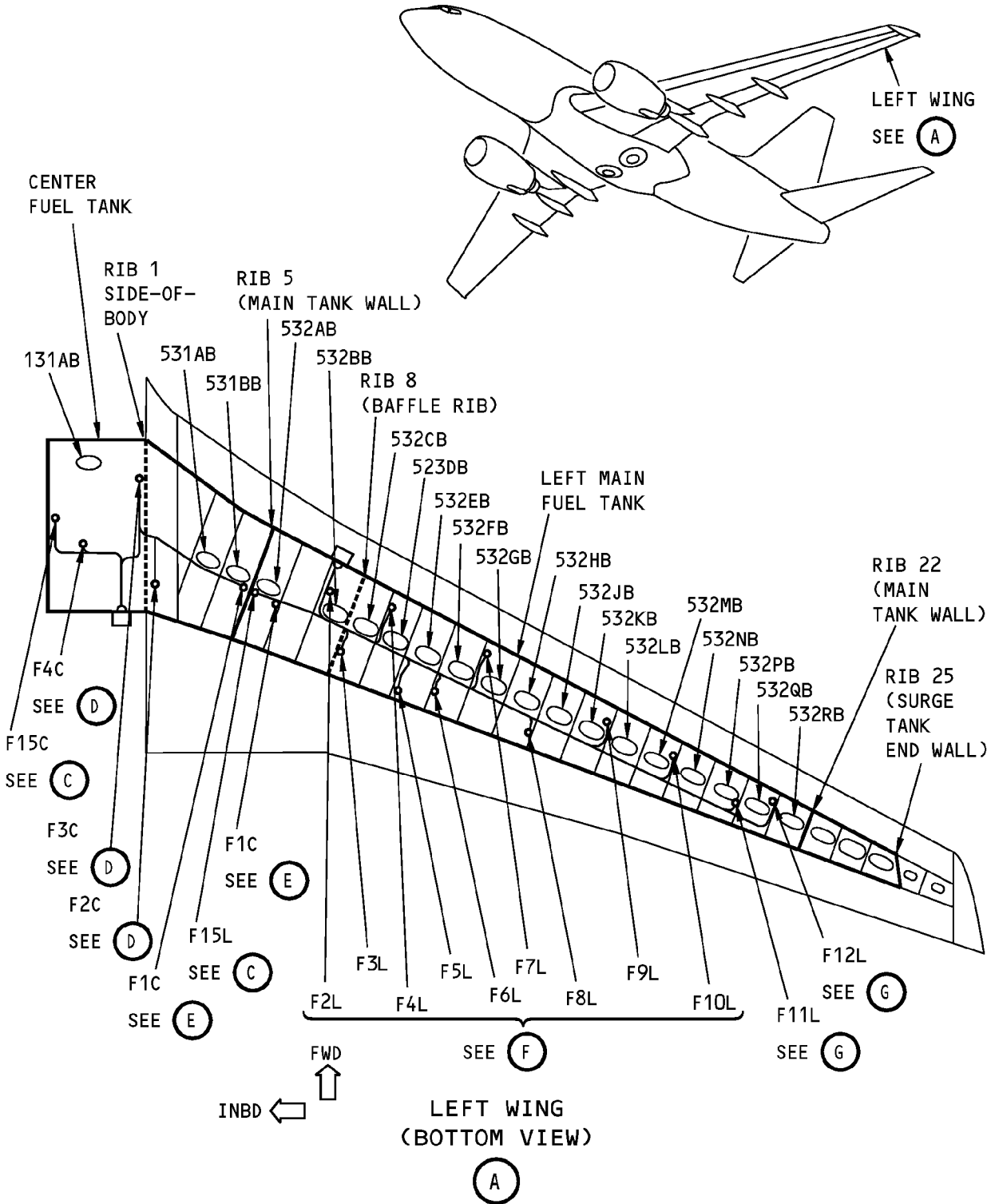
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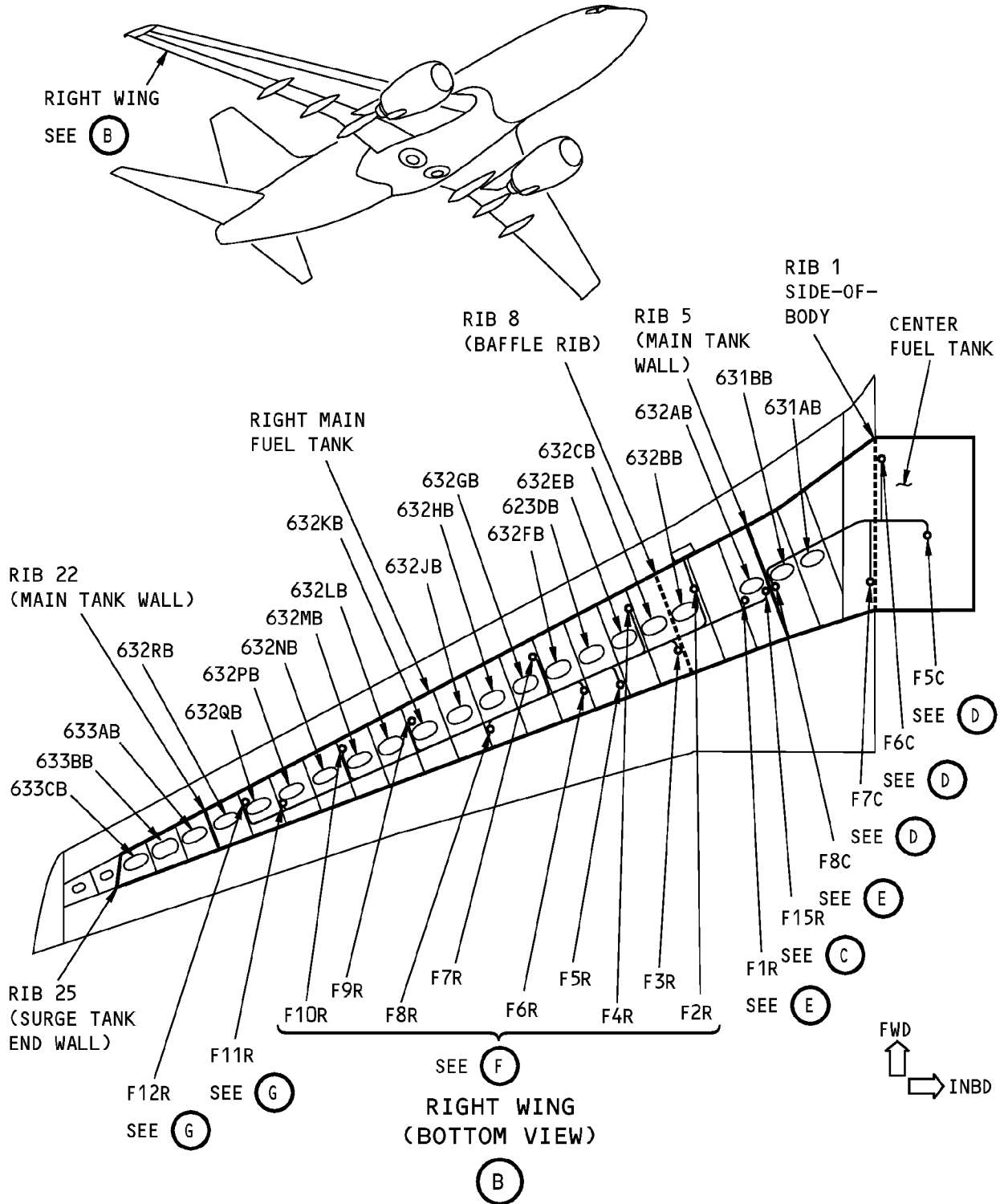


**Tank and Compensator Unit Installation
Figure 401 (Sheet 1 of 4)/28-41-21-990-804**

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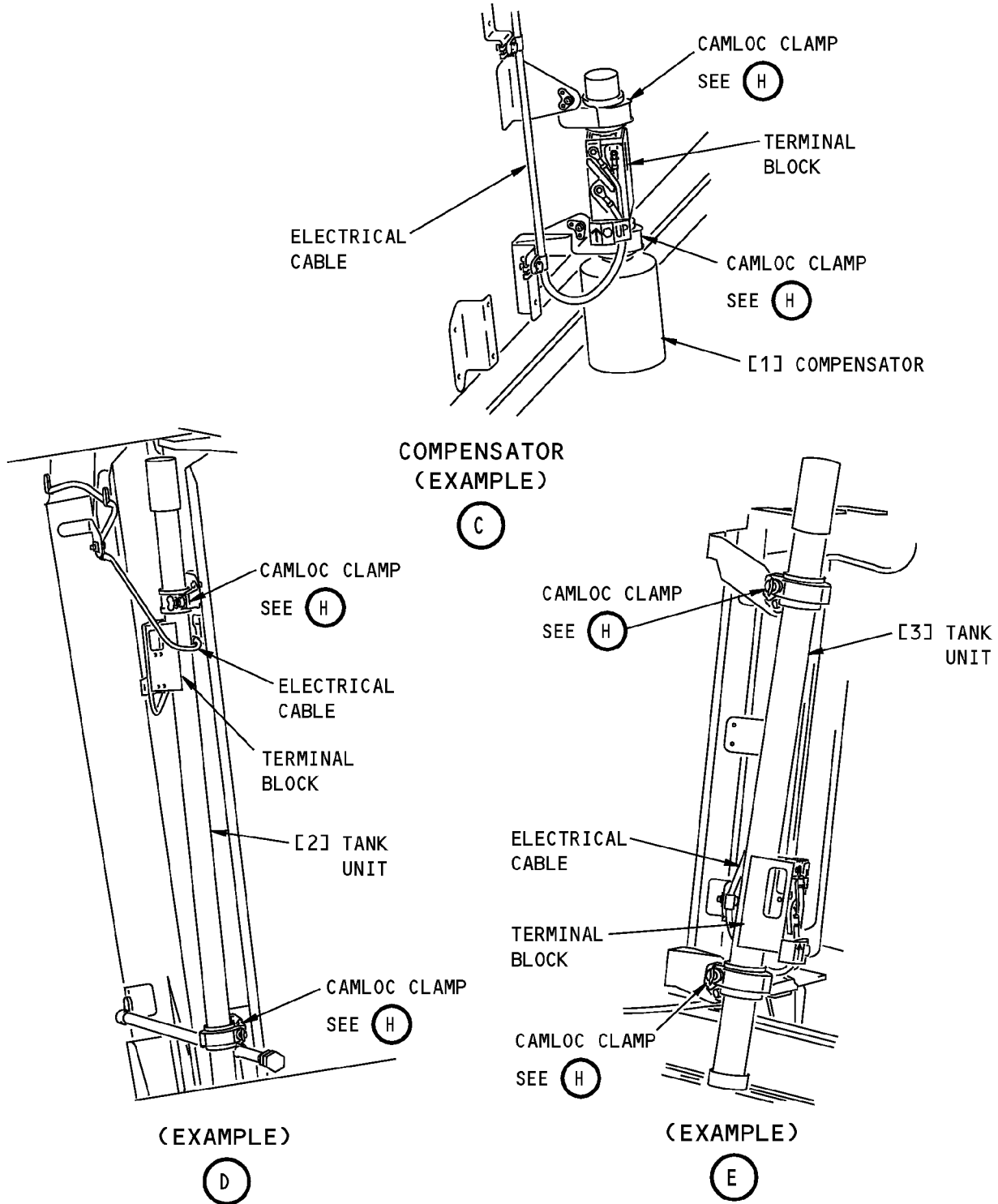


**Tank and Compensator Unit Installation
Figure 401 (Sheet 2 of 4)/28-41-21-990-804**

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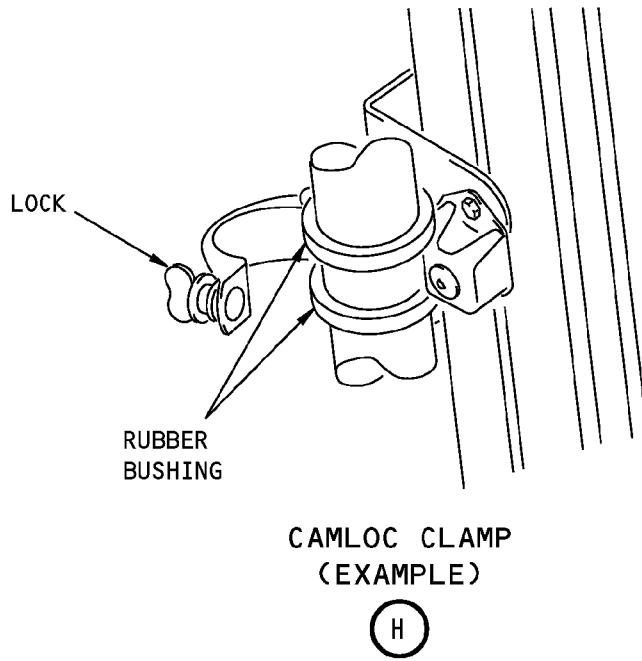
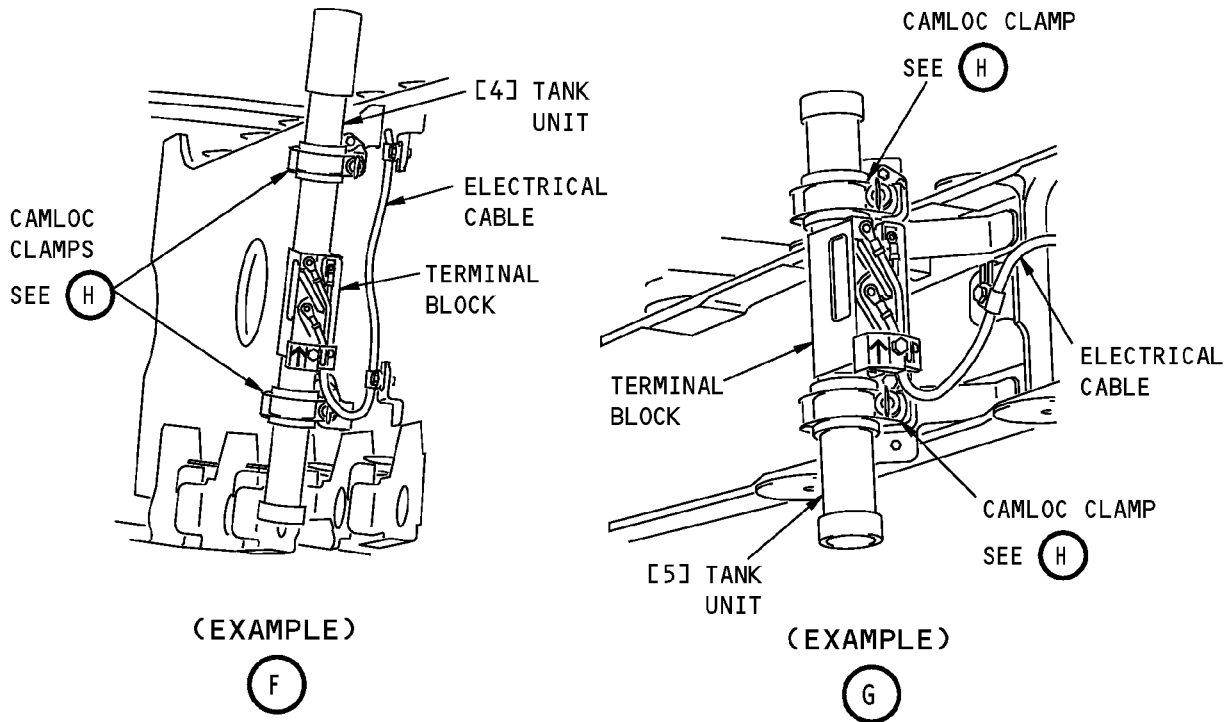


**Tank and Compensator Unit Installation
Figure 401 (Sheet 3 of 4)/28-41-21-990-804**

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**Tank and Compensator Unit Installation
Figure 401 (Sheet 4 of 4)/28-41-21-990-804**

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TASK 28-41-21-400-801

3. Install the Tank Unit or Compensator Unit

(Figure 401)

A. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
24-22-00-860-811	Supply Electrical Power (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-41-00-730-801	System Test - Fuel Quantity Indicating System (P/B 501)
SWPM 20-10-11	Standard Wiring Practices Manual
SWPM 20-10-12	Standard Wiring Practices Manual
SWPM 20-10-19	Standard Wiring Practices Manual

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Compensator	28-41-00-02-020	HAP 001-013, 015-026, 028-030
		28-41-00-02A-020	HAP 031-054, 101-999
		28-41-00-03-020	HAP 001-013, 015-026, 028-030
2	Tank unit	28-41-00-03A-020	HAP 031-054, 101-999
		28-41-00-02-010	HAP 001-013, 015-026, 028-030
		28-41-00-02A-010	HAP 031-054, 101-999
		28-41-00-03-010	HAP 001-013, 015-026, 028-030
3	Tank unit	28-41-00-03A-010	HAP 031-054, 101-999
		28-41-00-02-015	HAP 001-013, 015-026, 028-030
		28-41-00-02-025	HAP 001-013, 015-026, 028-030
		28-41-00-02A-015	HAP 031-054, 101-999
		28-41-00-02A-025	HAP 031-054, 101-999
		28-41-00-03-015	HAP 001-013, 015-026, 028-030
		28-41-00-03-025	HAP 001-013, 015-026, 028-030
		28-41-00-03A-015	HAP 031-054, 101-999
4	Tank unit	28-41-00-03A-025	HAP 031-054, 101-999
		28-41-00-02-030	HAP 001-013, 015-026, 028-030
		28-41-00-02-035	HAP 001-013, 015-026, 028-030
		28-41-00-02-040	HAP 001-013, 015-026, 028-030
		28-41-00-02-045	HAP 001-013, 015-026, 028-030
		28-41-00-02-050	HAP 001-013, 015-026, 028-030

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(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
4 (cont.)		28-41-00-02-055	HAP 001-013, 015-026, 028-030
		28-41-00-02-060	HAP 001-013, 015-026, 028-030
		28-41-00-02-065	HAP 001-013, 015-026, 028-030
		28-41-00-02-070	HAP 001-013, 015-026, 028-030
		28-41-00-02A-030	HAP 031-054, 101-999
		28-41-00-02A-035	HAP 031-054, 101-999
		28-41-00-02A-040	HAP 031-054, 101-999
		28-41-00-02A-045	HAP 031-054, 101-999
		28-41-00-02A-050	HAP 031-054, 101-999
		28-41-00-02A-055	HAP 031-054, 101-999
		28-41-00-02A-060	HAP 031-054, 101-999
		28-41-00-02A-065	HAP 031-054, 101-999
		28-41-00-02A-070	HAP 031-054, 101-999
		28-41-00-03-030	HAP 001-013, 015-026, 028-030
		28-41-00-03-035	HAP 001-013, 015-026, 028-030
		28-41-00-03-040	HAP 001-013, 015-026, 028-030
		28-41-00-03-045	HAP 001-013, 015-026, 028-030
		28-41-00-03-050	HAP 001-013, 015-026, 028-030
		28-41-00-03-055	HAP 001-013, 015-026, 028-030
		28-41-00-03-060	HAP 001-013, 015-026, 028-030
		28-41-00-03-065	HAP 001-013, 015-026, 028-030
		28-41-00-03-070	HAP 001-013, 015-026, 028-030
		28-41-00-03A-030	HAP 031-054, 101-999
		28-41-00-03A-035	HAP 031-054, 101-999
		28-41-00-03A-040	HAP 031-054, 101-999
		28-41-00-03A-045	HAP 031-054, 101-999
		28-41-00-03A-050	HAP 031-054, 101-999
		28-41-00-03A-055	HAP 031-054, 101-999
		28-41-00-03A-060	HAP 031-054, 101-999
		28-41-00-03A-065	HAP 031-054, 101-999
		28-41-00-03A-070	HAP 031-054, 101-999
5	Tank unit	28-41-00-02-075	HAP 001-013, 015-026, 028-030
		28-41-00-02A-075	HAP 031-054, 101-999
		28-41-00-03-075	HAP 001-013, 015-026, 028-030
		28-41-00-03A-075	HAP 031-054, 101-999

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C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Procedure

SUBTASK 28-41-21-420-001

- (1) Put the tank unit [2], tank unit [3], tank unit [4], or tank unit [5] or the compensator [1] in its position.

SUBTASK 28-41-21-420-002

- (2) Close the camloc clamps around the tank unit or compensator unit to install it in the correct position.

SUBTASK 28-41-21-420-003

- (3) Connect the wires to the electrical terminals on the unit (SWPM 20-10-11) (SWPM 20-10-12) (SWPM 20-10-19).

NOTE: Adjust wire slack to maintain a clearance of 0.5 inch between the wire and components or structure. If 0.5 inch clearance is not possible, you must maintain a minimum clearance of 0.125 inches.

SUBTASK 28-41-21-420-004

- (4) Tighten the screws to these torque ranges:
 - (a) LO-Z 23-35 pound-inches (2.6-4 newton-meters)
 - (b) SHIELD 15-20 pound-inches (1.7-2.3 newton-meters)
 - (c) HI-Z 12-15 pound-inches (1.4-1.7 newton-meters)

SUBTASK 28-41-21-210-001

- (5) Make sure that the screw holds each terminal tightly and the terminal will not turn.

SUBTASK 28-41-21-210-002

- (6) Make sure there is a drip loop in the wire as shown on the illustration.

NOTE: Water drops can collect on the wire and fall on the electrical terminals. The drip loop will prevent this.

SUBTASK 28-41-21-420-005

- (7) Tighten the wire clamp nut to 7-9 pound inches (0.8-1 newton-meter).

SUBTASK 28-41-21-410-002

- (8) Install the access panel for the fuel tank (TASK 28-11-11-400-801) or (TASK 28-11-31-400-801).

SUBTASK 28-41-21-860-003

- (9) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-41-21-820-001

- (10) Do this task: System Test - Fuel Quantity Indicating System, TASK 28-41-00-730-801.

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SUBTASK 28-41-21-650-002

(11) If it is necessary, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802

————— **END OF TASK** —————

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TANK AND COMPENSATOR UNITS - ADJUSTMENT/TEST

1. General

A. This procedure measures the capacitance of each tank unit and the compensator. It also measures the insulation resistance of the related wiring.

TASK 28-41-21-710-801

2. Tank and Compensator Units Test

(Figure 501, Figure 502)

A. References

Reference	Title
27-81-00-080-801	Leading Edge Flap and Slat Locks Removal (P/B 201)
27-81-00-480-801	Leading Edge Flap and Slat Locks Installation (P/B 201)
27-81-00-860-803	Leading Edge Flaps and Slats Extension (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-41-41-000-801	Bussing Plug Removal (P/B 401)
28-41-41-400-801	Bussing Plug Installation (P/B 401)

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1770	Tester - Fuel Gauge System, Includes V.T.O. Capability (Part #: 361-012-001, Supplier: 26055, A/P Effectivity: 737-200, -300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: PSD40-1, Supplier: 89305, A/P Effectivity: 737-ALL) (Part #: PSD60-2R, Supplier: 41364, A/P Effectivity: 737-ALL)
COM-1780	Cables - Adapter, Fuel Quantity Indicating System (FQIS) Tester (Part #: PSD737-1, Supplier: 41364, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

C. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Test of the Tank and Compensator Units Resistance and Capacitance

SUBTASK 28-41-21-730-001

- (1) Use this test unit or one of its approved equivalents to do this test:
 - (a) tester, COM-1770 with applicable test cables

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SUBTASK 28-41-21-800-001

- (2) This test adapter kit or one of its approved equivalents can be used to do the test:
- (a) cables, COM-1780

SUBTASK 28-41-21-800-003

- (3) The table below supplies more data about the approved FQIS test units and adapter equipment:

Table 501/28-41-21-993-808

Test Unit	Adapter Equipment
JcAir PSD60-2R, PSD60-2, PSD60-1, or PSD40	JcAir PSD 737-1 cable
Gull 361-012-001	JcAir PSD 737-1 cable with adapter PSD 40-524B or with adapter Barfield 112-00007
Barfield 101-00540 MOD8000	Barfield 101-00562 cable or JcAir PSD 737-1 cable

SUBTASK 28-41-21-650-001

- (4) Defuel the airplane or defuel the applicable fuel tank only, and drain the sump fuel (TASK 28-26-00-650-801).

SUBTASK 28-41-21-860-004

WARNING: MAKE SURE ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE FLAPS AND SLATS, AND THE TRAILING EDGE FLAPS. THESE SURFACES WILL MOVE AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) To test the tank units in the No. 1 or the No. 2 tank, extend the leading edge flaps (TASK 27-81-00-860-803).

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) Install safety locks on the leading edge flaps (TASK 27-81-00-480-801).

SUBTASK 28-41-21-860-005

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	3	C00032	FUEL FUELING CONT
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-41-21-020-005

- (7) To test the equipment in the No. 1 tank or the No. 2 tank, at the wing front spar, remove the applicable bussing plug from the bulkhead receptacle (TASK 28-41-41-000-801).

SUBTASK 28-41-21-020-006

- (8) To test the equipment in the center tank, remove the center tank bussing plug from the bulkhead receptacle (TASK 28-41-41-000-801).

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SUBTASK 28-41-21-480-001

(9) Connect the adapter plug on the test harness to the tank and compensator unit receptacle (Figure 501).

SUBTASK 28-41-21-480-002

(10) Connect the system tester to the test harness (Figure 501).

SUBTASK 28-41-21-710-001

(11) Measure the insulation resistance of each tank unit and compensator unit.

NOTE: Resistance must not be less than the quantity shown in the table below.

Table 502/28-41-21-993-804

COMPONENT	PIN NUMBER *†1	INSULATION RESISTANCE (MEGOHMS)		
		A to B	A to GRD	B to GRD
NO. 1 (L) OR NO. 2 (R) FUEL TANK				
F15 (L,R)	3 AND 1	2000	10	10
F1 (L,R)	6 AND 1	250	10	10
F2 (L,R)	7 AND 1	250	10	10
F3 (L,R)	8 AND 1	250	10	10
F4 (L,R)	9 AND 1	250	10	10
F5 (L,R)	10 AND 1	250	10	10
F6 (L,R)	11 AND 1	250	10	10
F7 (L,R)	12 AND 1	250	10	10
F8 (L,R)	13 AND 1	250	10	10
F9 (L,R)	14 AND 1	250	10	10
F10 (L,R)	15 AND 1	250	10	10
F11 (L,R)	16 AND 1	250	10	10
F12 (L,R)	17 AND 1	250	10	10
CENTER TANK				
F15C	3 AND 1	2000	10	10
F1C	6 AND 1	250	10	10
F2C	7 AND 1	250	10	10
F3C	8 AND 1	250	10	10
F4C	9 AND 1	250	10	10
F5C	10 AND 1	250	10	10
F6C	11 AND 1	250	10	10
F7C	12 AND 1	250	10	10
F8C	13 AND 1	250	10	10

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*[1] Pin numbers correspond to numbers on the test harness and pin numbers on the airplane connector receptacle. A to B, A to GRD, and B to GRD correspond to the system tester switch positions in the table below.

Table 503/28-41-21-993-806

GULL TESTER	SIMMONDS (JcAIR TESTER)
A TO B = COAX TO TANK OR COMP	A TO B = LO-Z TO HI-Z OR COMP TO HI-Z
A TO GRD = COAX TO SHIELD	A TO GRD = HI-Z TO GND
B TO GRD = TANK OR COMP TO SHIELD	B TO GRD = LO-Z TO GND OR COMP TO GND

SUBTASK 28-41-21-710-002

(12) Measure the capacitance of each tank unit and compensator unit.

NOTE: The capacitance must be as shown in the table below.

Table 504/28-41-21-993-805

COMPONENT	PIN NUMBER ^[1]	EMPTY CAPACITANCE (PICOFARADS)
NO. 1 (L) OR NO. 2 (R) FUEL TANK		
F15 (L,R)	3 AND 1	57.60 - 58.70
F1 (L,R)	6 AND 1	62.91 - 64.69
F2 (L,R)	7 AND 1	40.84 - 42.34
F3 (L,R)	8 AND 1	40.21 - 41.71
F4 (L,R)	9 AND 1	27.66 - 29.16
F5 (L,R)	10 AND 1	31.13 - 32.63
F6 (L,R)	11 AND 1	36.88 - 38.38
F7 (L,R)	12 AND 1	29.48 - 30.98
F8 (L,R)	13 AND 1	36.48 - 37.98
F9 (L,R)	14 AND 1	32.55 - 34.05
F10 (L,R)	15 AND 1	27.11 - 28.61
F11 (L,R)	16 AND 1	10.82 - 12.32
F12 (L,R)	17 AND 1	10.82 - 12.32
CENTER TANK		
F15C	3 AND 1	57.60 - 58.70
F1C	6 AND 1	34.80 - 36.30
F2C	7 AND 1	74.91 - 76.93
F3C	8 AND 1	97.09 - 99.55
F4C	9 AND 1	74.17 - 76.17
F5C	10 AND 1	74.17 - 76.17

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(Continued)

COMPONENT	PIN NUMBER * ^[1]	EMPTY CAPACITANCE (PICOFARADS)
F6C	11 AND 1	97.09 - 99.55
F7C	12 AND 1	74.91 - 76.93
F8C	13 AND 1	34.80 - 36.30

*[1] Pin numbers correspond to numbers on the test harness and pin numbers on the airplane connector receptacle.

SUBTASK 28-41-21-080-001

(13) Remove the bolts from the adapter plug.

SUBTASK 28-41-21-080-002

(14) Remove the adapter plug.

SUBTASK 28-41-21-480-003

CAUTION: BE CAREFUL WITH THE CONNECTOR PINS AND SOCKETS. THE CONNECTOR RECEPTACLE IS PART OF THE TANK WIRE HARNESS. IF THERE IS DAMAGE TO THE RECEPTACLE, IT IS NECESSARY TO REMOVE THE ASSEMBLY.

(15) Connect the bussing plug to the receptacle (TASK 28-41-41-400-801).

SUBTASK 28-41-21-710-003

(16) Do the procedure again for the other fuel tanks.

SUBTASK 28-41-21-860-006

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	3	C00032	FUEL FUELING CONT
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-41-21-080-003

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT REMOVE THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(18) Remove the leading edge flap locks if you installed them before (TASK 27-81-00-080-801).

SUBTASK 28-41-21-860-007

WARNING: MAKE SURE ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE FLAPS AND SLATS, AND THE TRAILING EDGE FLAPS. THESE SURFACES WILL MOVE AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(19) Retract the leading edge flaps if they are extended (TASK 27-81-00-860-804).

END OF TASK

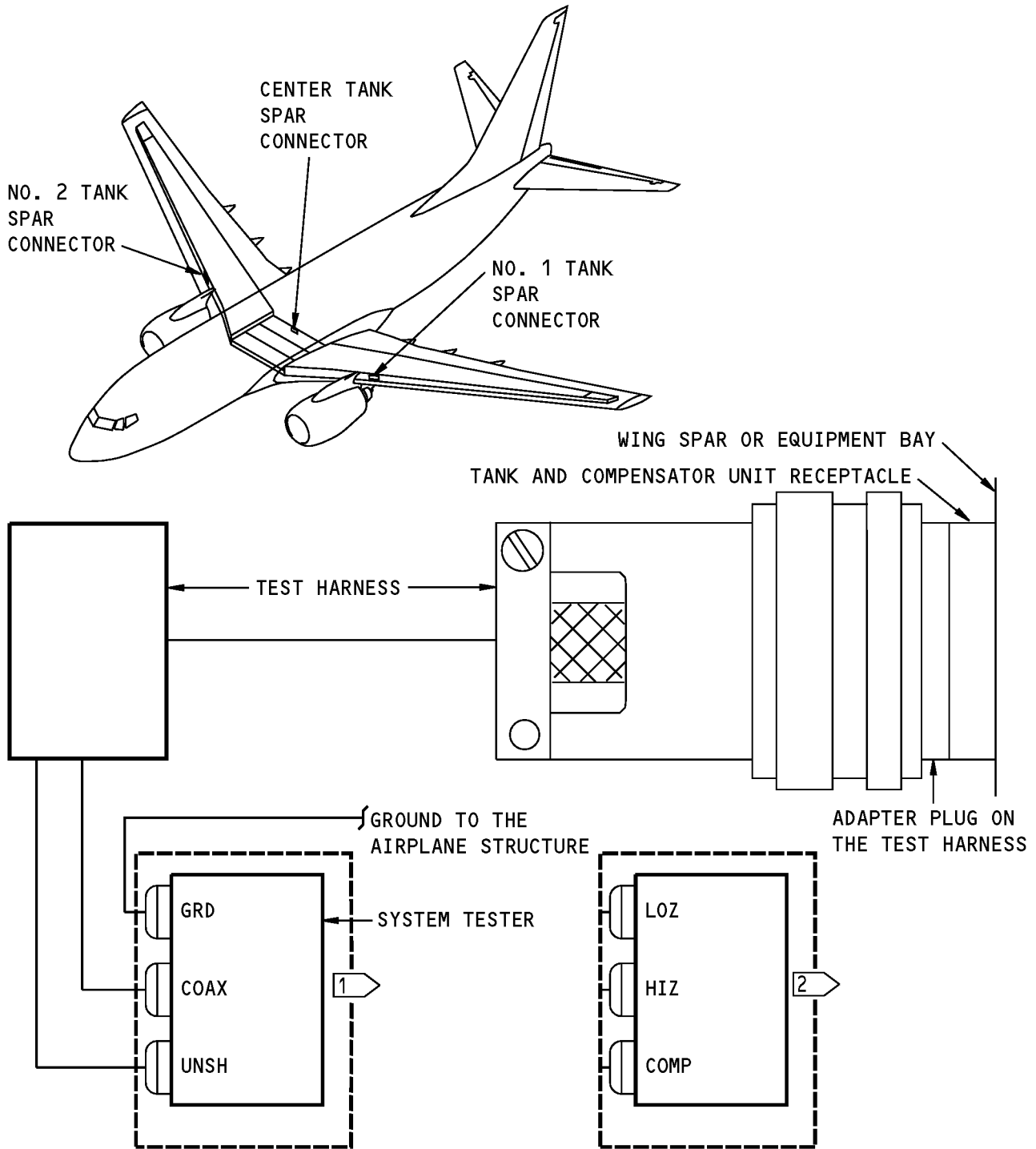
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- 1 GULL OR BARFIELD SYSTEM TESTER
- 2 SIMMONDS SYSTEM TESTER

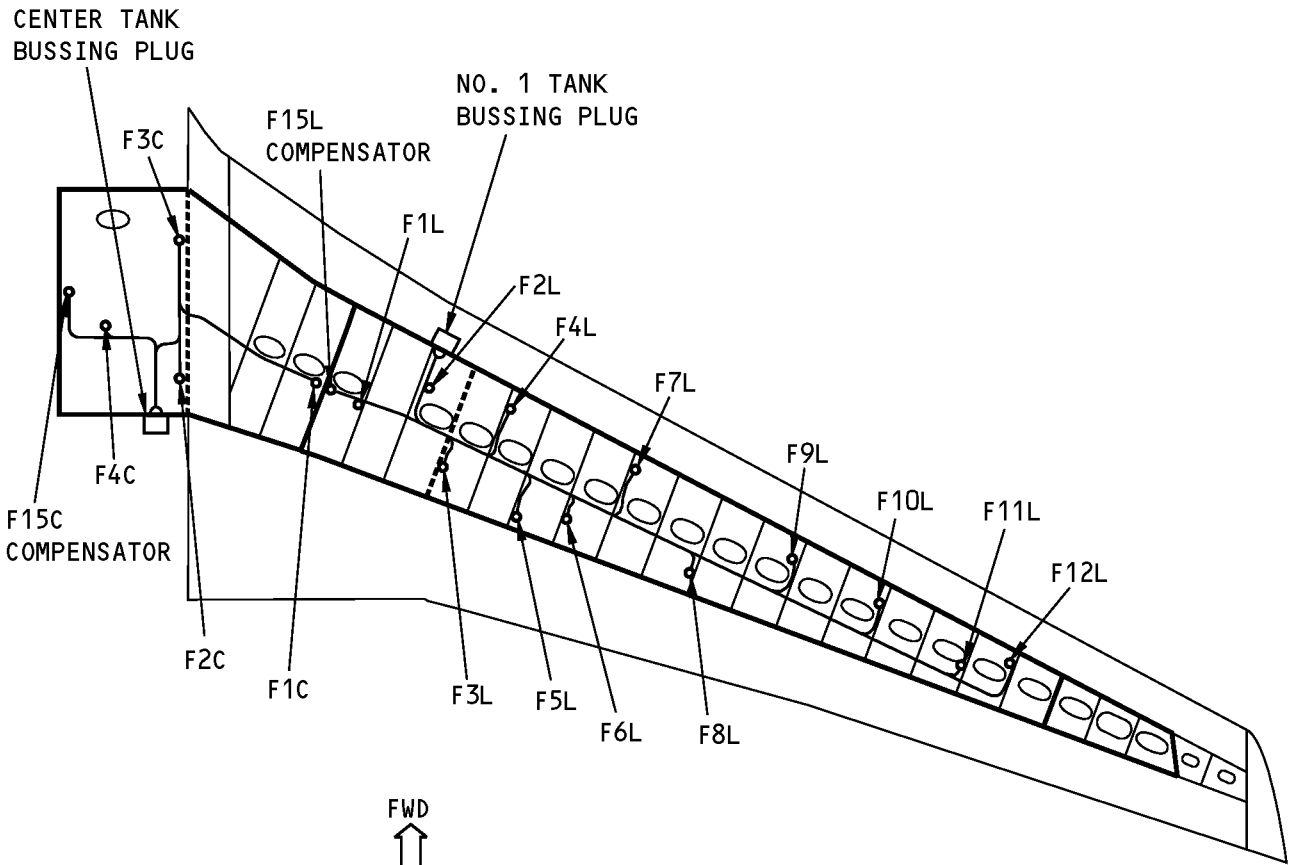
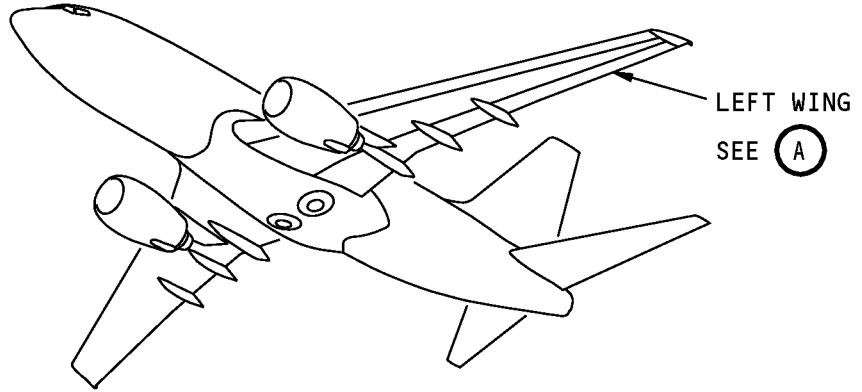
**Tank Unit and Compensator Unit Test Connections
Figure 501/28-41-21-990-805**

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**LEFT WING
(BOTTOM VIEW)**

(A)

**Tank Unit and Compensator Unit Test
Figure 502 (Sheet 1 of 2)/28-41-21-990-806**

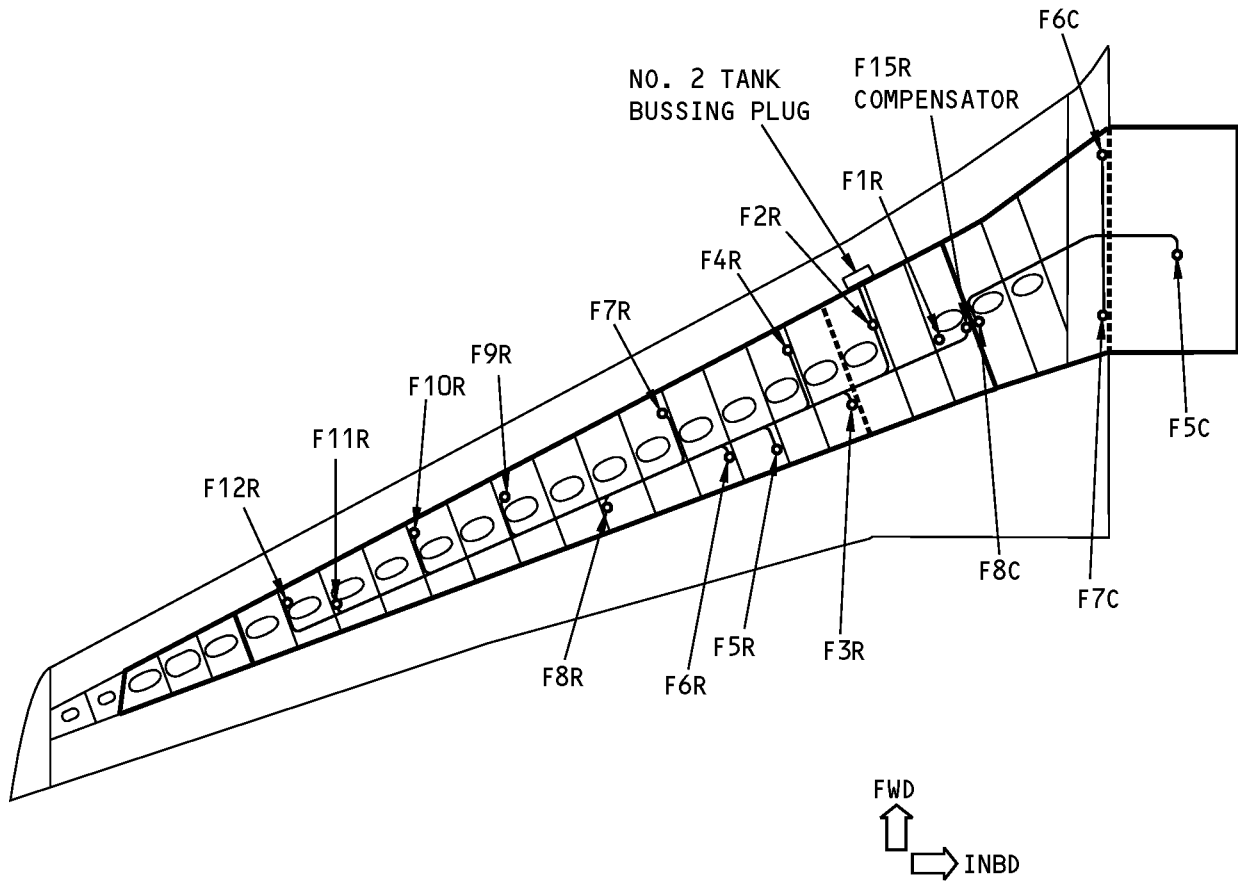
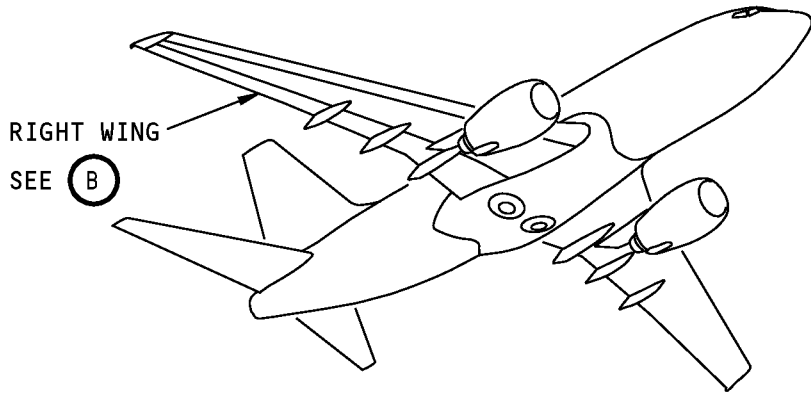
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**RIGHT WING
(BOTTOM VIEW)**

(B)

**Tank Unit and Compensator Unit Test
Figure 502 (Sheet 2 of 2)/28-41-21-990-806**

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TASK 28-41-21-710-802

3. Tank and Compensator Units Wet Capacitance Check

(Figure 501, Figure 502)

A. General

- (1) This capacitance check can be used if it is easier to add fuel to a tank than to drain it to empty. In some isolated cases, it is possible that problems can appear with a full fuel tank that do not appear with an empty fuel tank. The recommended procedure to find problems with the FQIS equipment is to do the Tank and Compensator Units Test (TASK 28-41-21-710-801) before you do the steps in the task below. Wet capacitance values change with fuel properties and fuel temperature. The capacitance values supplied in this procedure are approximate and only to be used to identify further fault isolation.

B. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
27-81-00-080-801	Leading Edge Flap and Slat Locks Removal (P/B 201)
27-81-00-480-801	Leading Edge Flap and Slat Locks Installation (P/B 201)
27-81-00-860-803	Leading Edge Flaps and Slats Extension (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
28-41-41-000-801	Bussing Plug Removal (P/B 401)
28-41-41-400-801	Bussing Plug Installation (P/B 401)

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-1770	Tester - Fuel Gauge System, Includes V.T.O. Capability (Part #: 361-012-001, Supplier: 26055, A/P Effectivity: 737-200, -300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: PSD40-1, Supplier: 89305, A/P Effectivity: 737-ALL) (Part #: PSD60-2R, Supplier: 41364, A/P Effectivity: 737-ALL)
COM-1780	Cables - Adapter, Fuel Quantity Indicating System (FQIS) Tester (Part #: PSD737-1, Supplier: 41364, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

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E. Tank and Compensator Units Wet Capacitance Check

SUBTASK 28-41-21-730-002

(1) Use one of these approved test units to do this test:

- (a) tester, COM-1770 with applicable test cables

SUBTASK 28-41-21-800-007

(2) This test adapter kit or one of its approved equivalents can be used to do the test:

- (a) cables, COM-1780

SUBTASK 28-41-21-650-003

(3) Add fuel to the applicable fuel tank until the float switch closes the applicable fueling shutoff valve (fill the tank to its full capacity). To do this, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-802

SUBTASK 28-41-21-860-008

WARNING: MAKE SURE ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE FLAPS AND SLATS, AND THE TRAILING EDGE FLAPS. THESE SURFACES WILL MOVE AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) To test the tank units in the No. 1 or the No. 2 tank, extend the leading edge flaps (TASK 27-81-00-860-803).

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) Install safety locks on the leading edge flaps (TASK 27-81-00-480-801).

SUBTASK 28-41-21-860-009

(5) Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	3	C00032	FUEL FUELING CONT
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-41-21-020-007

(6) To test the equipment in the No. 1 tank or the No. 2 tank, at the wing front spar, remove the applicable bussing plug from the bulkhead receptacle (TASK 28-41-41-000-801).

SUBTASK 28-41-21-020-008

(7) To test the equipment in the center tank, remove the center tank bussing plug from the bulkhead receptacle (TASK 28-41-41-000-801).

SUBTASK 28-41-21-480-004

(8) Connect the adapter plug on the test harness to the tank and compensator unit receptacle (Figure 501).

SUBTASK 28-41-21-480-005

(9) Connect the system tester to the test harness (Figure 501).

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SUBTASK 28-41-21-710-004

(10) Measure the capacitance of each tank unit and compensator unit.

NOTE: Wet capacitance values change with fuel properties and fuel temperature. The capacitance values supplied in the table below are the approximate tank unit and compensator capacitances when these units are fully covered with fuel. These values must only be used with caution and to identify further fault isolation.

Table 505/28-41-21-993-807

COMPONENT	PIN NUMBER ^{*[1]}	WET CAPACITANCE (PICOFARADS)
NO. 1 (L) OR NO. 2 (R) FUEL TANK		
F15 (L,R)	3 AND 1	121.5
F1 (L,R)	6 AND 1	135.1
F2 (L,R)	7 AND 1	87.9
F3 (L,R)	8 AND 1	86.5
F4 (L,R)	9 AND 1	60.0
F5 (L,R)	10 AND 1	67.1
F6 (L,R)	11 AND 1	79.5
F7 (L,R)	12 AND 1	63.6
F8 (L,R)	13 AND 1	78.3
F9 (L,R)	14 AND 1	70.2
F10 (L,R)	15 AND 1	58.6
F11 (L,R)	16 AND 1	20.9 ^{*[2]}
F12 (L,R)	17 AND 1	15.7 ^{*[2]}
CENTER TANK		
F15C	3 AND 1	121.5
F1C	6 AND 1	74.9
F2C	7 AND 1	161.4
F3C	8 AND 1	209.0
F4C	9 AND 1	159.3
F5C	10 AND 1	159.3
F6C	11 AND 1	209.0
F7C	12 AND 1	161.4
F8C	13 AND 1	74.9

*[1] Pin numbers correspond to numbers on the test harness and pin numbers on the airplane connector receptacle.

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*[2] Tank unit is not completely covered in fuel at volumetric shutoff (VSO). This is an approximate wet capacitance value for the fuel level at VSO and can be different.

SUBTASK 28-41-21-080-004

(11) Remove the bolts from the adapter plug.

SUBTASK 28-41-21-080-005

(12) Remove the adapter plug.

SUBTASK 28-41-21-480-006

CAUTION: BE CAREFUL WITH THE CONNECTOR PINS AND SOCKETS. THE CONNECTOR RECEPTACLE IS PART OF THE TANK WIRE HARNESS. IF THERE IS DAMAGE TO THE RECEPTACLE, IT IS NECESSARY TO REMOVE THE ASSEMBLY.

(13) Connect the bussing plug to the receptacle (TASK 28-41-41-400-801).

SUBTASK 28-41-21-710-005

(14) Do the procedure again for the other fuel tanks.

SUBTASK 28-41-21-860-010

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

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	3	C00032	FUEL FUELING CONT
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-41-21-080-006

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT REMOVE THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(16) Remove the leading edge flap locks if you installed them before (TASK 27-81-00-080-801).

SUBTASK 28-41-21-860-011

WARNING: MAKE SURE ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE FLAPS AND SLATS, AND THE TRAILING EDGE FLAPS. THESE SURFACES WILL MOVE AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(17) Retract the leading edge flaps if they are extended (TASK 27-81-00-860-804).

————— **END OF TASK** —————

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TANK AND COMPENSATOR UNITS - CLEANING/PAINTING

1. General

- A. This procedure has one task, to clean the tank units and the compensator unit. The procedure removes microbial contamination from these units.

TASK 28-41-21-110-801

2. Clean the Tank Unit or the Compensator Unit

A. References

Reference	Title
28-41-21-000-801	Remove the Tank Unit or the Compensator Unit (P/B 401)
28-41-21-400-801	Install the Tank Unit or Compensator Unit (P/B 401)

B. Tools/Equipment

Reference	Description
STD-123	Brush - Soft Bristle
STD-1158	Container - 20 Gallon (76 Liter)

C. Consumable Materials

Reference	Description	Specification
B00673	Detergent - Liquid - Liqui-Nox	
G02418	Water - De-ionized	

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

E. Procedure

SUBTASK 28-41-21-010-001

- (1) Remove the applicable tank unit or the compensator (TASK 28-41-21-000-801).

SUBTASK 28-41-21-110-001

- (2) Fill a large 20 gallon (76 liter) container, STD-1158 with hot de-ionized water, G02418 (125 +/- 5 degrees F, 50 +/- 3 degrees C) and Liqui-Nox detergent, B00673 or equivalent.
- Put the tank unit or compensator fully into the solution of Liqui-Nox detergent, B00673 and de-ionized water, G02418 for between 30 and 40 minutes.
 - Shake the tank unit or compensator in the tank.
 - Remove all contamination with a soft bristle brush, STD-123.
 - Do not make scratches in the tank unit or the compensator.
 - Make sure you remove all of the microbial contamination.

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SUBTASK 28-41-21-110-002

- (3) Fill a different 20 gallon (76 liter) container, STD-1158 with clean unheated de-ionized water, G02418.
 - (a) Quickly move the tank unit(s) from the detergent container to the rinse container.
 - (b) Do not permit the detergent to dry on the tank unit(s).
 - (c) Keep the tank unit(s) in the rinse container for five minutes to remove all of the detergent.

SUBTASK 28-41-21-170-001

- (4) Remove the tank unit(s) from the rinse container.

SUBTASK 28-41-21-160-001

- (5) Flush the tank unit with clean de-ionized water, G02418.

SUBTASK 28-41-21-160-002

- (6) Hang the clean tank unit in a circulating air oven set at 125 +/- 5 degrees F (50 +/- 3 degrees C) for two hours.
 - (a) If an oven is not available, hang the tank unit in the open air until it is dry.

SUBTASK 28-41-21-410-001

- (7) Install the tank unit or the compensator (TASK 28-41-21-400-801).

————— **END OF TASK** —————

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TANK AND COMPENSATOR UNIT BUSSING PLUG - REMOVAL/INSTALLATION

1. General

- A. There are three tank and compensator unit bussing plugs, one for each fuel tank. The removal and installation procedures for each plug are the same, only the location is different. Two bussing plugs are installed on the front spar and one on the rear spar in the wheel well area (Figure 401).

TASK 28-41-41-000-801

2. Bussing Plug Removal

(Figure 401)

A. References

Reference	Title
20-10-44-000-801	Lockwires Removal (P/B 401)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
SWPM 20-61-11	Standard Wiring Practices Manual

B. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
511	Left Wing - Leading Edge To Front Spar
611	Right Wing - Leading Edge to Front Spar

C. Access Panels

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

D. Procedure

SUBTASK 28-41-41-860-001

- (1) To get access to the bussing plug for the No. 1 tank on the left front spar, open this access panel:

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02

SUBTASK 28-41-41-010-001

- (2) To get access to the bussing plug for the No. 2 tank on the right front spar, open this access panel:

Number	Name/Location
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

SUBTASK 28-41-41-480-001

- (3) Do this step to get access to the bussing plug for the center tank:

WARNING: USE THE APPLICABLE PROCEDURE TO INSTALL THE GROUND LOCK ASSEMBLIES. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) Make sure the ground lock assemblies are installed on the nose and main landing gear (TASK 32-00-01-480-801).

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SUBTASK 28-41-41-860-002

(4) Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	3	C00032	FUEL FUELING CONT
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-41-41-020-001

(5) Loosen the nut [4] to disconnect the ground wire [3].

SUBTASK 28-41-41-020-002

(6) Remove the lockwire that attaches the bussing plug [2] to the jamnut (TASK 20-10-44-000-801).

SUBTASK 28-41-41-020-004

(7) Carefully remove the bussing plug [2] from the penetration connector [1] (SWPM 20-61-11).

SUBTASK 28-41-41-020-006

(8) Carefully remove the bussing plug [2] from the wire harness [7] (SWPM 20-61-11).

————— **END OF TASK** —————

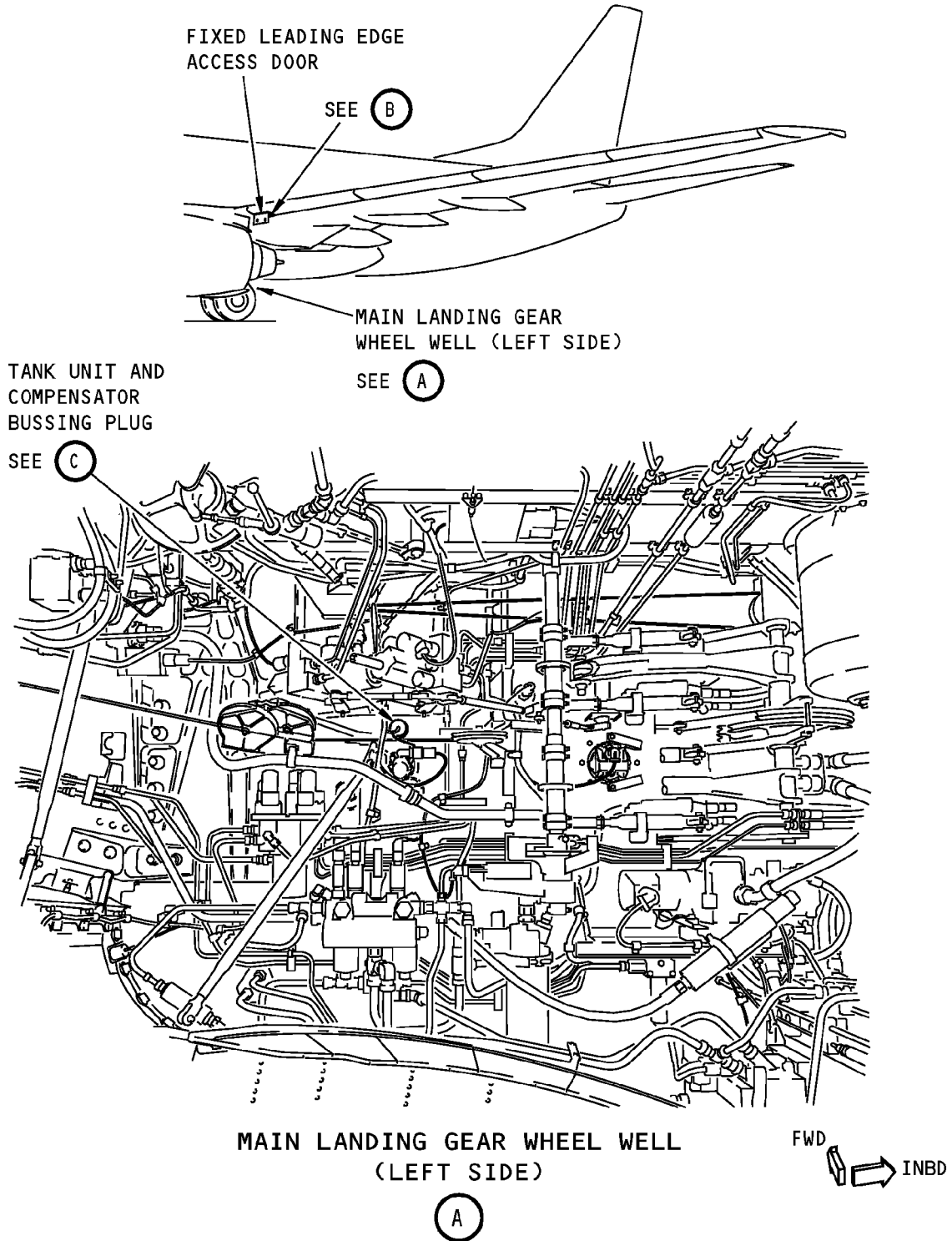
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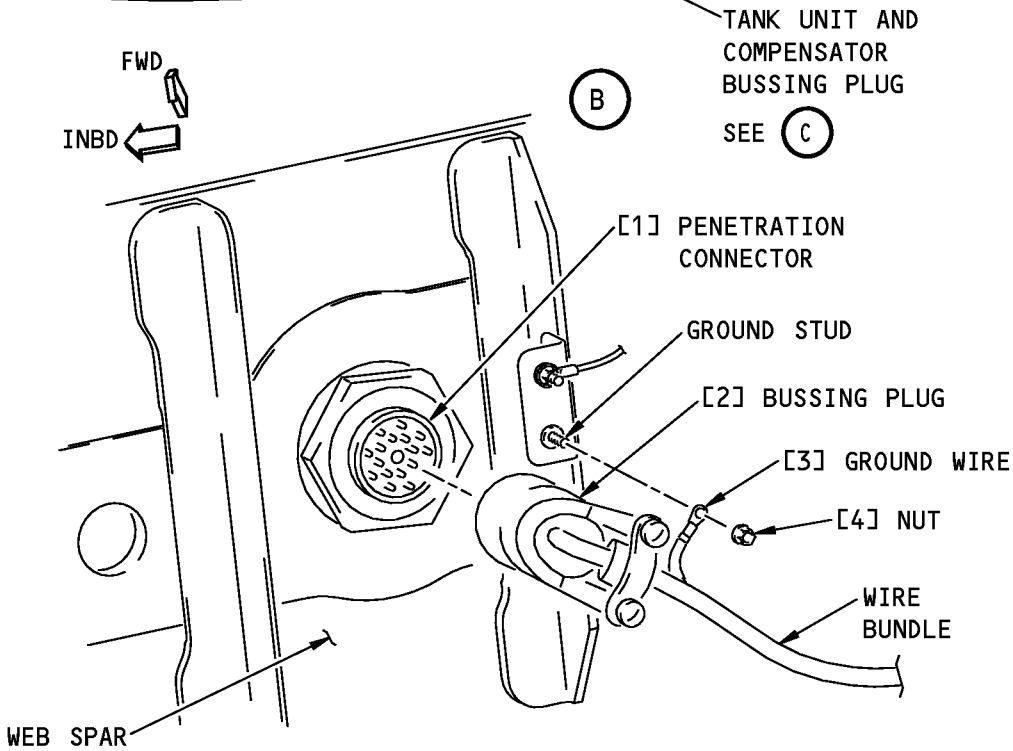
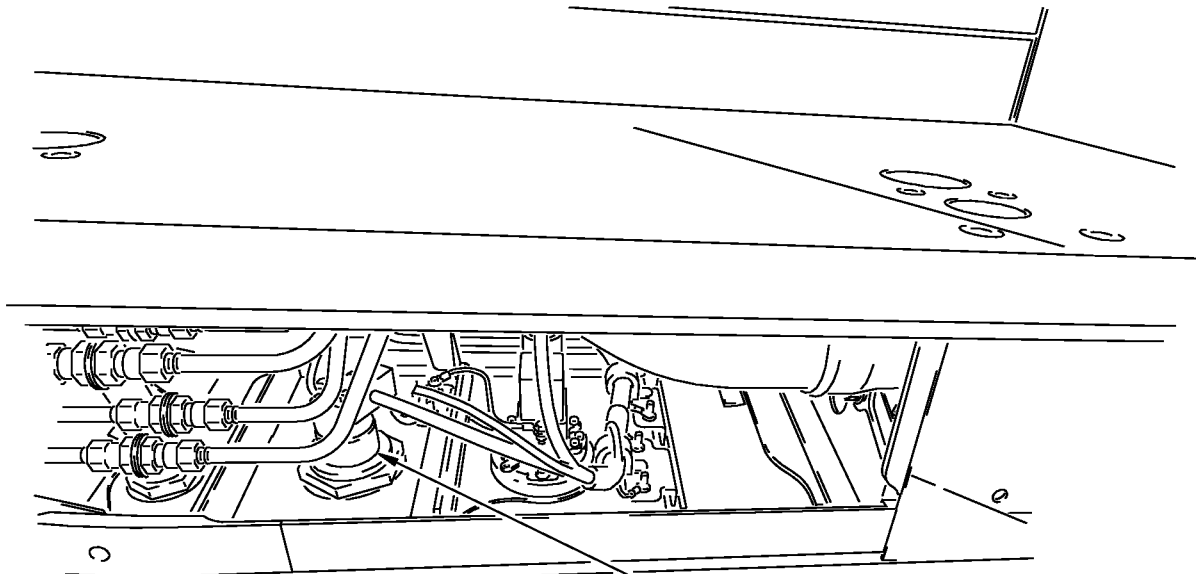
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Tank Unit and Compensator Bussing Plug Installation
Figure 401 (Sheet 1 of 2)/28-41-41-990-802

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TANK UNIT AND
COMPENSATOR
BUSSING PLUG
SEE (C)

TANK UNIT AND COMPENSATOR BUSSING PLUG
(FIXED LEADING EDGE INSTALLATION IS SHOWN, MAIN
LANDING GEAR WHEEL WELL IS EQUIVALENT)

(C)

Tank Unit and Compensator Bussing Plug Installation
Figure 401 (Sheet 2 of 2)/28-41-41-990-802

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TASK 28-41-41-400-801

3. Bussing Plug Installation

Figure 401

A. References

Reference	Title
20-10-44-400-801	Lockwires Installation (P/B 401)
28-41-00-710-801	Operational Test - Fuel Quantity Indicating System (P/B 501)
SWPM 20-61-11	Standard Wiring Practices Manual

B. Consumable Materials

Reference	Description	Specification
B00083	Solvent - Aliphatic Naphtha (For Acrylic Plastics)	TT-N-95 Type II, ASTM D-3735 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

C. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
511	Left Wing - Leading Edge To Front Spar
611	Right Wing - Leading Edge to Front Spar

D. Access Panels

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

E. Procedure

SUBTASK 28-41-41-110-001

- (1) Clean the machined surface on the rear of the bussing plug and seal that touches the surface around the receptacle with solvent, B00083.

SUBTASK 28-41-41-160-001

- (2) Rub the surfaces dry with a clean, cotton wiper, G00034.

SUBTASK 28-41-41-420-001

- (3) Install the bussing plug [2] into the penetration connector [1] (SWPM 20-61-11).

SUBTASK 28-41-41-020-005

- (4) Install lockwire to attach the bussing plug [2] to the jamnut (TASK 20-10-44-400-801).

SUBTASK 28-41-41-420-002

- (5) Attach the ground wire [3] to its ground point and tighten the nut [4].

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SUBTASK 28-41-41-860-003

(6) If it was opened, close the applicable access panel:

<u>Number</u>	<u>Name/Location</u>
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

SUBTASK 28-41-41-860-005

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

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	3	C00032	FUEL FUELING CONT
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-41-41-710-001

(8) Do this task: Operational Test - Fuel Quantity Indicating System, TASK 28-41-00-710-801.

————— **END OF TASK** —————

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FQIS SPAR PENETRATION CONNECTOR - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

- (1) Spar penetration connector removal
- (2) Spar penetration connector installation

TASK 28-41-42-020-801

2. FQIS Spar Penetration Connector - Removal

(Figure 401, Figure 402)

A. References

Reference	Title
06-43-00-800-801	Engine and Nacelle Strut Access Doors and Panels (P/B 201)
20-10-44-000-801	Lockwires Removal (P/B 401)
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-22-15-000-801	Fuel Line, Fitting and Coupling - Removal (P/B 401)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
SWPM 20-61-11	Standard Wiring Practices Manual

B. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
434	Engine 1 - Aft Strut Fairing
444	Engine 2 - Aft Strut Fairing
511	Left Wing - Leading Edge To Front Spar
521	Left Wing - Leading Edge to Front Spar
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
611	Right Wing - Leading Edge to Front Spar
621	Right Wing - Leading Edge to Front Spar
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Access Panels

Number	Name/Location
131AB	Center Tank Access
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02
532BB	Main Tank Access Door - Wing Station 265
532CB	Main Tank Access Door - Wing Station 290
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02
632BB	Main Tank Access Door - Wing Station 265

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D. Procedure

SUBTASK 28-41-42-860-001

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

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-41-42-860-002

- (2) To get access to the spar connector for the No. 1 tank on the left front spar, open this access panel:

<u>Number</u>	<u>Name/Location</u>
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 36.02

SUBTASK 28-41-42-010-001

- (3) To get access to the spar connector for the No. 2 tank on the right front spar, open this access panel:

<u>Number</u>	<u>Name/Location</u>
621BB	Engine Fuel Spar Valve Access Panel - Slat Station 36.02

SUBTASK 28-41-42-480-001

- (4) Do this step to get access to the spar penetration connector [1] for the center tank:

WARNING: USE THE APPLICABLE PROCEDURE TO INSTALL THE GROUND LOCK ASSEMBLIES. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) Make sure the ground lock assemblies are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-41-42-020-001

- (5) Loosen the nut [4] to disconnect the ground wire [3].

SUBTASK 28-41-42-020-002

- (6) Remove the lockwire that attaches the bussing plug [2] to the jamnut (TASK 20-10-44-000-801).

SUBTASK 28-41-42-020-003

- (7) Carefully remove the bussing plug [2] from the spar penetration connector [1] (SWPM 20-61-11).

SUBTASK 28-41-42-020-004

- (8) Loosen the jamnut [5] that holds the spar penetration connector [1] in its position.

- (a) Remove the jamnut [5].
- (b) For the center tank connector, remove the spacer [6].
- (c) Remove any sealant that remains on the spar penetration connector [1].

SUBTASK 28-41-42-010-004

- (9) Do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

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For the No. 1 tank, remove these access panels:

<u>Number</u>	<u>Name/Location</u>
532BB	Main Tank Access Door - Wing Station 265
532CB	Main Tank Access Door - Wing Station 290

(a) To get to access panel, 532BB, remove this access panel:

<u>Number</u>	<u>Name/Location</u>
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1

(TASK 06-43-00-800-801).

SUBTASK 28-41-42-010-005

(10) Do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

For the No. 2 tank, remove these access panels:

<u>Number</u>	<u>Name/Location</u>
532CB	Main Tank Access Door - Wing Station 290
632BB	Main Tank Access Door - Wing Station 265

(a) To get to access panel, 632BB, remove this access panel:

<u>Number</u>	<u>Name/Location</u>
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2

(TASK 06-43-00-800-801).

SUBTASK 28-41-42-010-006

(11) Do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801.

For the center tank, remove this access panel:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

SUBTASK 28-41-42-650-001

WARNING: YOU MUST CAREFULLY DO ALL OF THE SAFETY PROCEDURES TO PREPARE TO GO INTO THE APPLICABLE TANK. AN EXPLOSION, INJURY TO PERSONS, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(12) For the applicable tank, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-41-42-010-002

(13) Go into the applicable fuel tank to find the FQIS wire bundle connection on the spar (Figure 402) (TASK 28-11-00-910-802).

SUBTASK 28-41-42-010-007

(14) To get access to the spar penetration connector in the No. 2 tank, remove the section of refuel tubing 344A2201-13 between ribs 7 and 9 (TASK 28-22-15-000-801).

(a) Discard the O-rings.

SUBTASK 28-41-42-160-001

(15) Remove the sealant around the edge of the wire bundle connection with the receptacle on the spar if there is some sealant.

SUBTASK 28-41-42-020-005

(16) Remove the electrical disconnect on the wire harness [2] from the spar penetration connector [1].

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SUBTASK 28-41-42-140-001

- (17) Remove the sealant from the spar penetration connector [1] and the surface of the spar around the spar penetration connector (Figure 402) (TASK 28-11-00-300-803).

SUBTASK 28-41-42-020-006

- (18) Remove the spar penetration connector [1] from the spar penetration.

————— **END OF TASK** —————

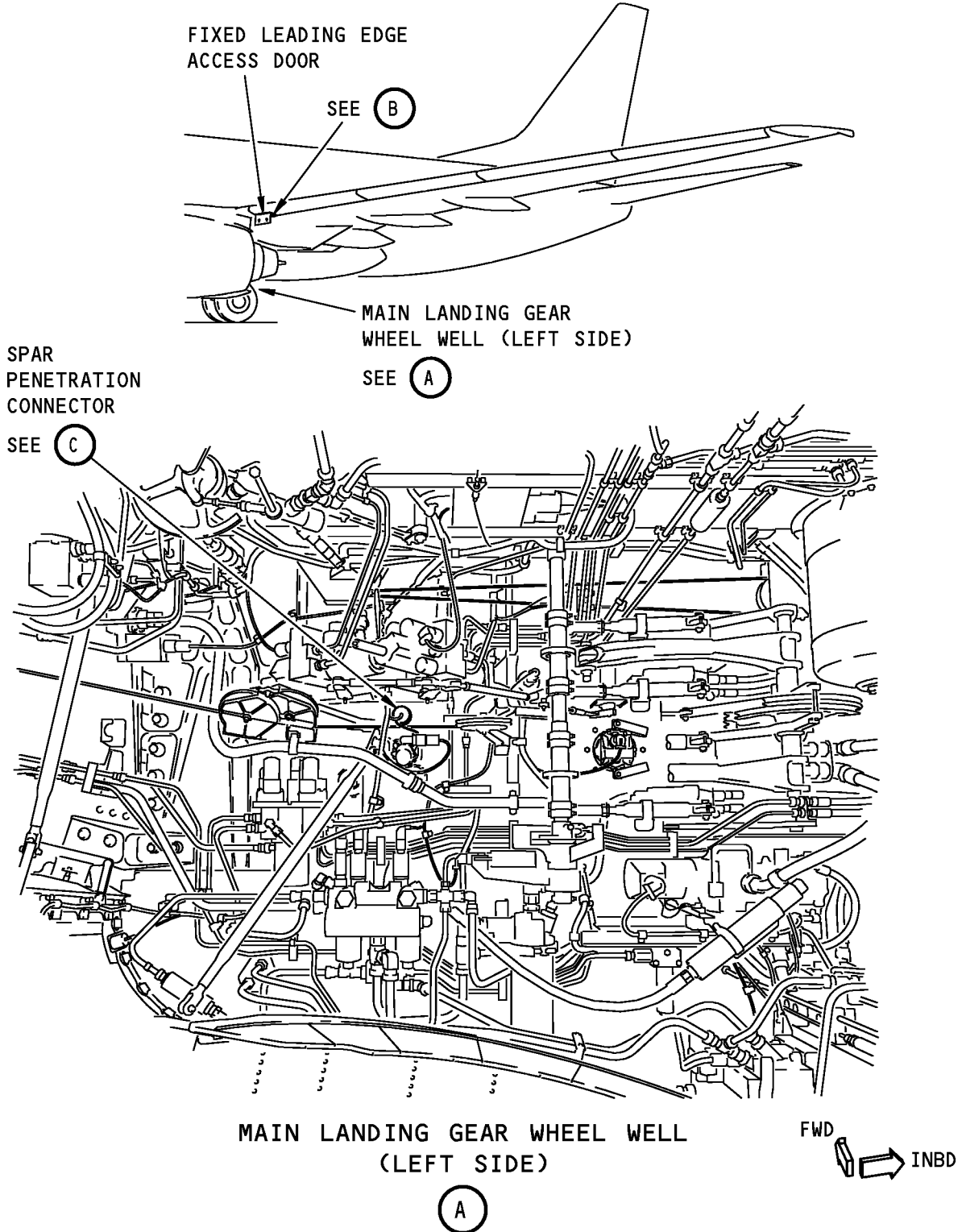
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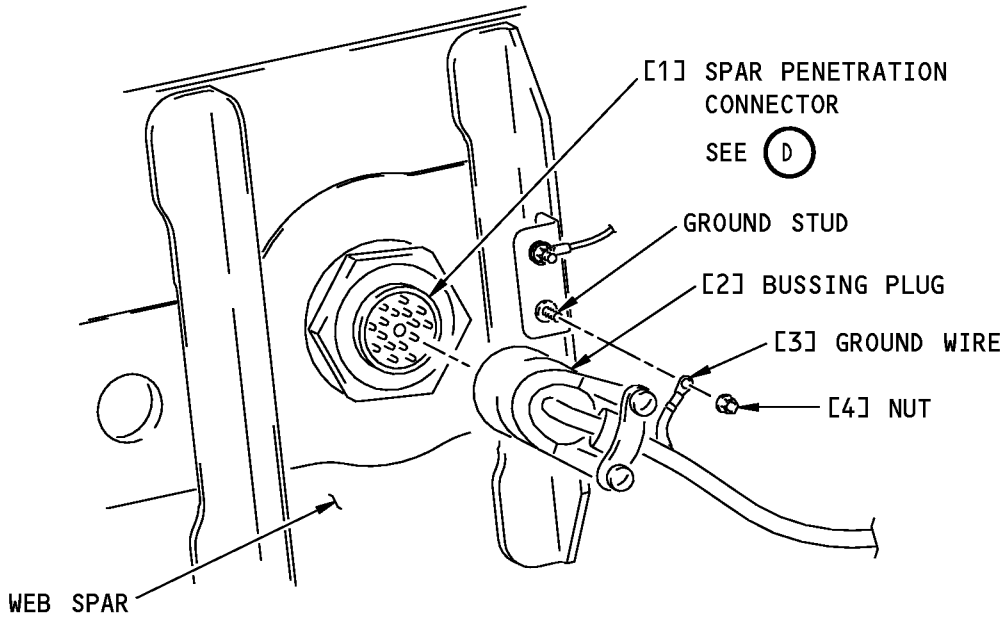
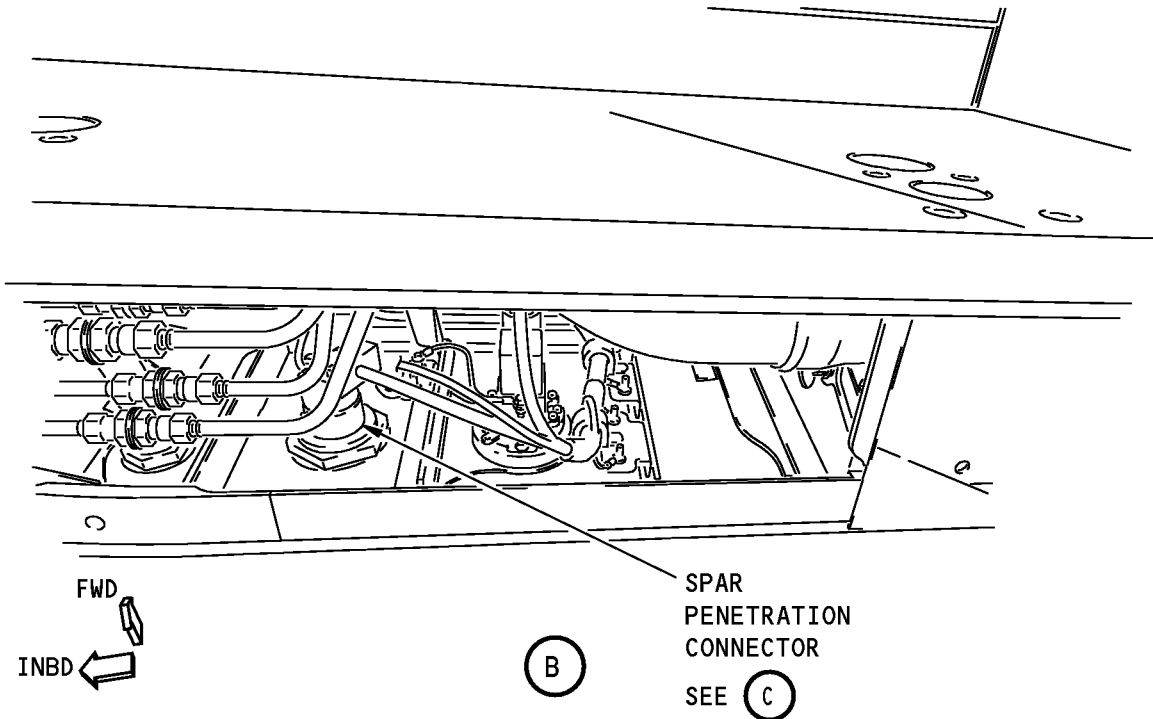
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FQIS Penetration Connector Installation (Exterior)
Figure 401 (Sheet 1 of 3)/28-41-42-990-803

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**SPAR PENETRATION CONNECTOR
(FIXED LEADING EDGE INSTALLATION IS SHOWN, MAIN
LANDING GEAR WHEEL WELL IS EQUIVALENT)**

(C)

**FQIS Penetration Connector Installation (Exterior)
Figure 401 (Sheet 2 of 3)/28-41-42-990-803**

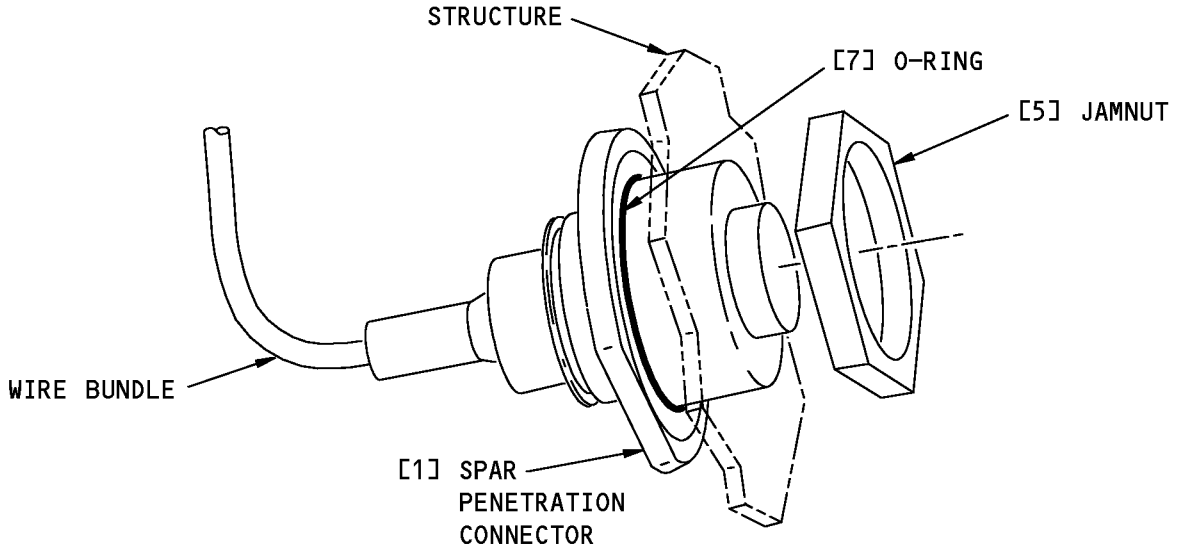
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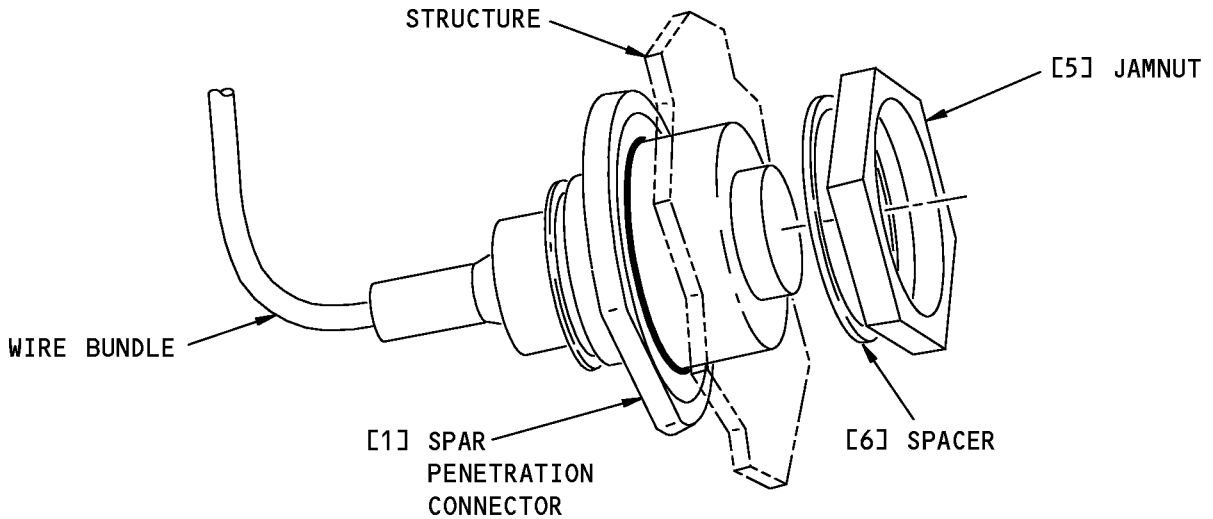
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**SPAR PENETRATION CONNECTOR
FOR THE NO. 1 OR NO. 2 TANK
(FIXED LEADING EDGE)**

(D)



**SPAR PENETRATION CONNECTOR FOR THE CENTER TANK
(LANDING GEAR WHEEL WELL)**

(D)

M15747 S0006572301_V3

**FQIS Penetration Connector Installation (Exterior)
Figure 401 (Sheet 3 of 3)/28-41-42-990-803**

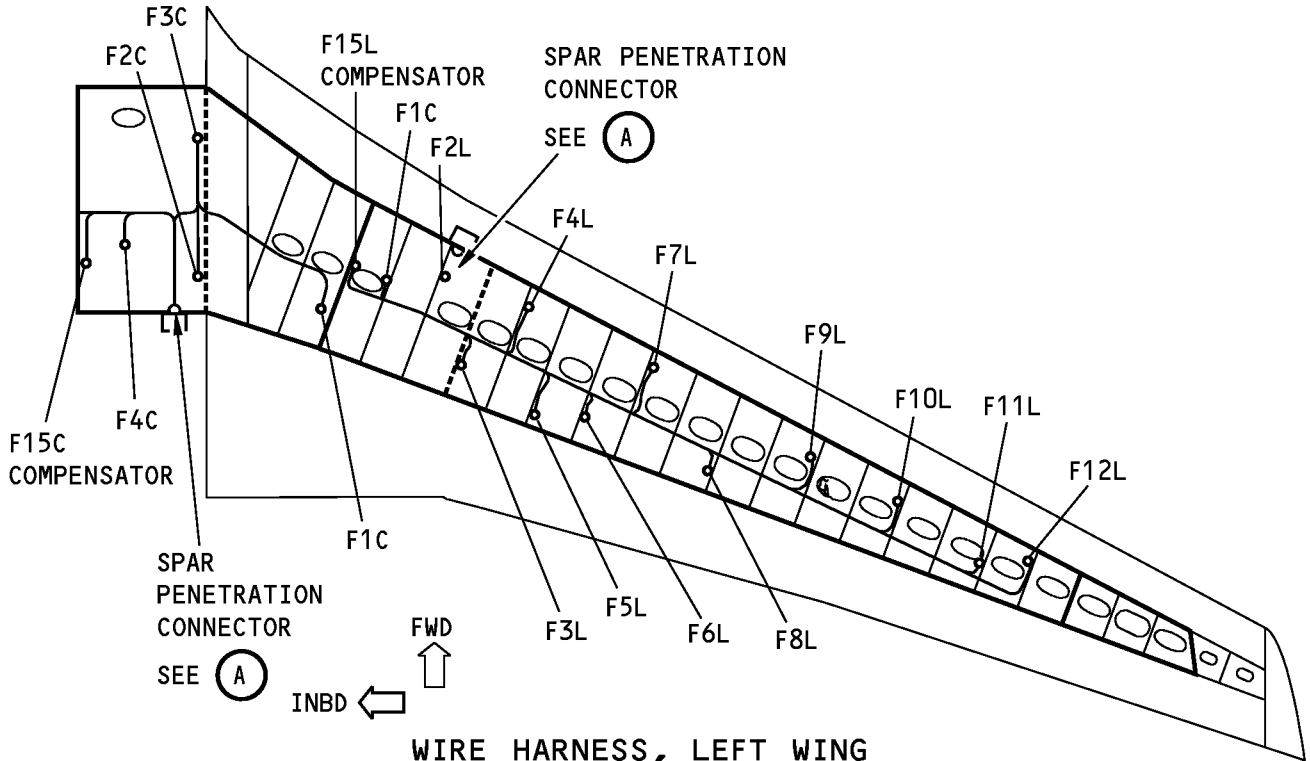
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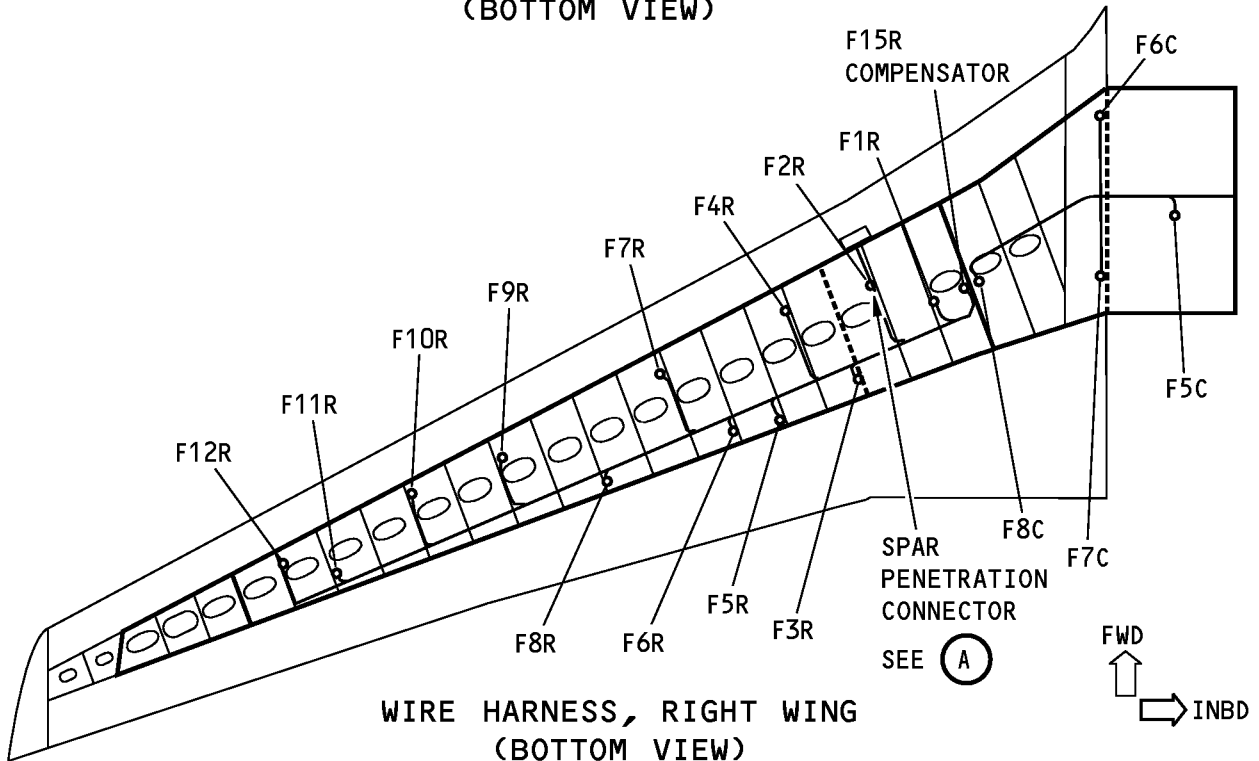
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**WIRE HARNESS, LEFT WING
(BOTTOM VIEW)**

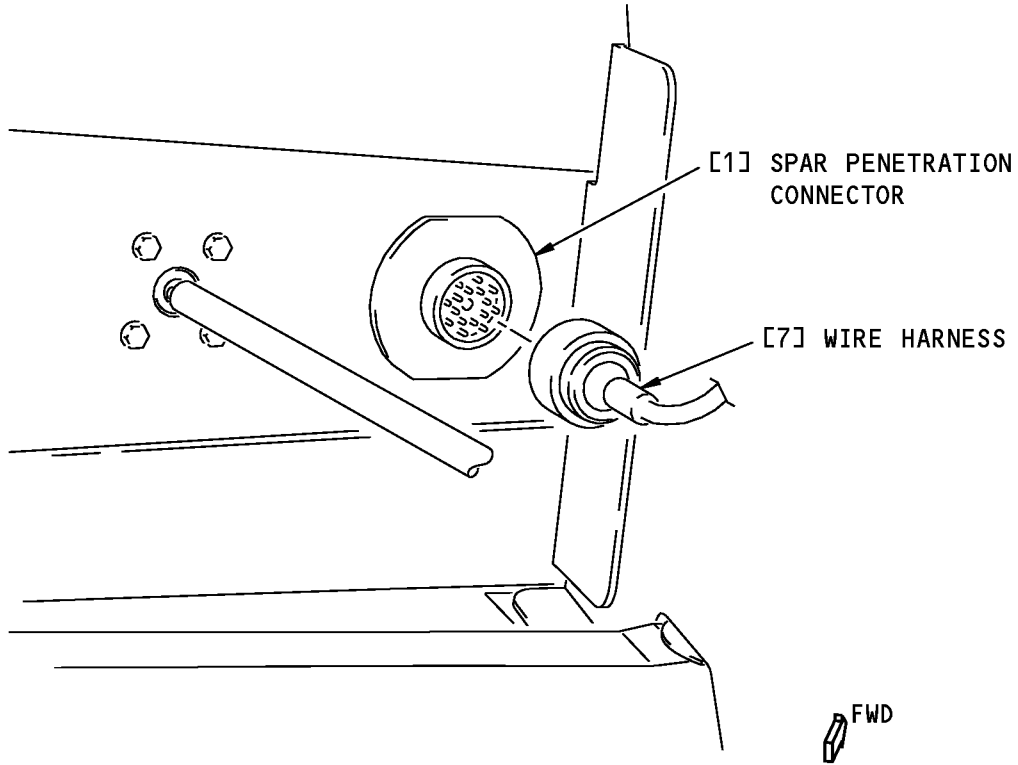


**WIRE HARNESS, RIGHT WING
(BOTTOM VIEW)**

**FQIS Penetration Connector Installation (Interior)
Figure 402 (Sheet 1 of 2)/28-41-42-990-804**

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**SPAR PENETRATION CONNECTOR
(EXAMPLE)**

A

**FQIS Penetration Connector Installation (Interior)
Figure 402 (Sheet 2 of 2)/28-41-42-990-804**

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TASK 28-41-42-420-801

3. FQIS Spar Penetration Connector - Installation

(Figure 401, Figure 402)

A. References

Reference	Title
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
20-10-44-400-801	Lockwires Installation (P/B 401)
20-30-88	AIRPLANE STRUCTURE CLEANING SOLVENTS (Series 88)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-00-400-801	Fuel Tank Closure Leak Check (P/B 601)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-22-15-400-801	Fuel Line, Fitting and Coupling - Installation (P/B 401)
28-41-00-730-801	System Test - Fuel Quantity Indicating System (P/B 501)
28-41-42-700-801	FQIS Shield Ground Terminal - Test (P/B 501)
51-31-00-390-804	Fillet Seal Application (P/B 201)
SWPM 20-20-00	Electrical Bonds and Grounds
SWPM 20-61-11	Standard Wiring Practices Manual

B. Consumable Materials

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS 5-95
A00436	Sealant - Fuel Tank	BMS5-45 (Supersedes BMS 5-26)
A00767	Sealant - Fuel Tank	BMS5-45
A50051	Sealant - Temperature Resistant, Integral Fuel Tank Sealant - Pro-Seal 890B	SAE AMS-S-8802, Class B
A50105	Sealant - Integral Fuel Tank Sealed Electrical Faying Surface Bond	SAE AMS-S-8802 Class A
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

C. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
511	Left Wing - Leading Edge To Front Spar
611	Right Wing - Leading Edge to Front Spar

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D. Expendable Parts

SUBTASK 28-41-42-800-001

(1) O-ring - MS29513-233

SUBTASK 28-41-42-800-002

(2) O-rings - MS29513-326 (2 required)

SUBTASK 28-41-42-800-003

(3) O-ring - MS29513-030

E. Procedure

SUBTASK 28-41-42-650-002

WARNING: YOU MUST CAREFULLY DO ALL OF THE SAFETY PROCEDURES TO PREPARE TO GO INTO THE APPLICABLE TANK. AN EXPLOSION, INJURY TO PERSONS, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) For the applicable tank, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-41-42-420-001

(2) Make sure there is a new O-ring [7] (MS29513-233) installed in the O-ring groove of the spar penetration connector [1].

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

SUBTASK 28-41-42-010-003

(3) Go into the applicable fuel tank to find the penetration for the spar penetration connector [1] (Figure 402) (TASK 28-11-00-910-802).

SUBTASK 28-41-42-420-002

(4) Put the spar penetration connector [1] into its position in the spar penetration (Figure 402)

SUBTASK 28-41-42-765-001

(5) Measure the bonding resistance between the spar penetration connector [1] and the structure in the tank (SWPM 20-20-00).

(a) Make sure the resistance is 0.001 ohm (1 milliohm) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

SUBTASK 28-41-42-420-003

(6) Connect the electrical connector of the FQIS wire bundle to the new spar penetration connector [1].

SUBTASK 28-41-42-390-001

(7) Apply a fillet seal of sealant, A00436 or sealant, A00767 (TASK 28-11-00-300-803).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

SUBTASK 28-41-42-420-004

(8) Go out of the tank and find the spar penetration on the exterior of the tank (Figure 401).

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SUBTASK 28-41-42-420-005

- (9) For the center tank connector, put the spacer [6] in its position on the spar penetration connector [1].

SUBTASK 28-41-42-420-006

- (10) Install the jamnut [5] on the spar penetration connector [1].
- (a) Tighten the jamnut [5] to a torque of 325 - 350 inch-pounds (36.7 - 40 Nm).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- (b) Make the jamnut [5] secure with lockwire (TASK 20-10-44-400-801).

SUBTASK 28-41-42-420-007

- (11) Apply a fillet seal of sealant, A00247 around the spar penetration connector [1].(TASK 51-31-00-390-804).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

SUBTASK 28-41-42-420-008

- (12) Install the bussing plug [2] into the spar penetration connector [1] (SWPM 20-61-11).

SUBTASK 28-41-42-020-007

- (13) Install lockwire to attach the bussing plug [2] to the jamnut [5] (TASK 20-10-44-400-801).

HAP 001-013, 015-026, 028-031 PRE SB 737-28A1207

SUBTASK 28-41-42-420-009

- (14) Attach the FQIS shield ground wire [3] to its ground point and tighten the nut [4].

HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207

SUBTASK 28-41-42-420-010

- (15) For the center tank, attach the FQIS shield ground wire [3] to its ground point and tighten the nut [4].

- (16) For the main tank, do these steps to install the FQIS shield ground wire [3] to the structure:

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (a) Final clean the contact surfaces with a cotton wiper, G00034 soaked with Series 88 solvent, B01008 (AIRPLANE STRUCTURE CLEANING SOLVENTS (Series 88), SUBJECT 20-30-88).
- 1) Rub dry with a clean, dry cotton wiper, G00034.
 - 2) Continue to clean and dry the surface until the dry cotton wiper, G00034 stays clean.
- (b) Apply a thin continuous layer of sealant to both surfaces of the FQIS shield ground wire [3] and the two washers.
- 1) Use Pro Seal 890A or PR-1440A sealant, A50105, for the faying surface seal.

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HAP 032-054, 101-999; HAP 001-013, 015-026, 028-031 POST SB 737-28A1207 (Continued)

- 2) Make sure the sealant layer is approximately 0.005 in. (0.127 mm) thick.
- (c) Install the nut [4], washers, and FQIS shield ground wire [3] to the structure.
- (d) Tighten the nut to 20 in-lb (2 N·m).

SUBTASK 28-41-42-765-003

- (17) For the main tank FQIS shield ground wire [3], measure the electrical bonding resistance between the nut [4] and the spar web (SWPM 20-20-00).
 - (a) Do this measurement with the electrical connector of the adjacent spar valve actuator disconnected.
 - (b) Make sure the bonding resistance is 0.007 ohm (7.0 milliohms) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).
 - (c) If the bonding resistance is more than 0.007 ohm (7.0 milliohms), then do the subsequent steps:
 - 1) Measure the electrical bonding resistance between the upper housing of the spar valve actuator and the bonding jumper terminal on the spar valve.
 - 2) Do not touch the screw on the jumper terminal lug when you make the bonding measurement.
 - 3) Do this measurement with the electrical connector disconnected.
 - 4) Make sure the bonding resistance is 0.001 ohm (1.0 milliohm) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).
 - 5) If the bonding resistance is more than 0.001 ohm (1.0 milliohms), then do this task: FQIS Shield Ground Terminal - Test, TASK 28-41-42-700-801

- (18) Apply a cap seal of Pro-Seal 890B sealant, A50051 (or PR-1440B) over the nut [4] and the bonding jumper terminal.

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SUBTASK 28-41-42-010-008

- (19) For the spar penetration connector [1] in the No. 2 tank, install the section of refuel tubing (344A2201-13) between ribs 7 and 9 that you removed to get access to the spar penetration connector [1].
 - (a) Lubricate and install 2 new O-rings MS29513-326 in the inboard end of the tubing 344A2201-13.
 - (b) Lubricate and install a new O-ring MS29513-030 in the outboard end of the tubing 344A2201-13.
 - (c) Install the tubing (344A2201-13) again. To do this, do this task: Fuel Line, Fitting and Coupling - Installation, TASK 28-22-15-400-801

SUBTASK 28-41-42-410-002

- (20) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

SUBTASK 28-41-42-410-001

- (21) Install the access panels that you removed (TASK 28-11-11-400-801).

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SUBTASK 28-41-42-860-003

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

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-41-42-820-001

(23) Do this task: System Test - Fuel Quantity Indicating System, TASK 28-41-00-730-801.

SUBTASK 28-41-42-650-003

(24) Refuel the applicable fuel tank (TASK 12-11-00-650-802).

SUBTASK 28-41-42-790-001

(25) Monitor the spar penetration where you installed the new spar penetration connector [1] for leakage for a minimum of one hour (TASK 28-11-00-400-801).

END OF TASK

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FQIS SHIELD GROUND TERMINAL - ADJUSTMENT/TEST

1. General

A. This procedure has one task, a test of the FQIS shield ground terminal.

TASK 28-41-42-700-801

2. FQIS Shield Ground Terminal - Test

(Figure 28-41-42-990-803)

A. General

- (1) This task is only applicable for the FQIS spar penetration connector for the main tanks and the spar valves.
- (2) This task has these procedures:
 - (a) Rework the Bonding Jumper Bond
 - (b) Rework the Faying Surface Bond - Actuator to Index Plate
 - (c) Rework the Faying Surface Bond - Index Plate to Adapter Plate
 - (d) Rework the Faying Surface Bond - Adapter Plate to Front Spar.
- (3) Do this task if the measurement for the electrical bonding resistance is more than the permitted resistance value.
- (4) The motor operated valve uses two electrical bonding paths:
 - (a) One bonding path is from the upper housing of the actuator through the bonding jumper to the stiffener.
 - (b) The second bonding path is from the upper housing of the actuator to the bare metal surface of the front spar. The bond path is through the bare metal faying surfaces of the actuator (at the mounting feet), index plate, and adapter plate to the bare metal surface of the front spar.

NOTE: The actuator is divided into two sections, the upper housing section and the lower housing section. The two housing sections are separated by an electrical faying surface. You cannot repair or rework the faying surface between the housing sections at the airplane. When you do an electrical bonding measurement, make sure the measurement is done on the upper housing section of the actuator.
- (5) If the electrical bonding resistance is more than the maximum permitted resistance, you must disassemble the components, rework the faying surface, assemble the components, and then re-check the electrical bonding resistance. Continue to rework the faying surfaces until the electrical resistance between the components is within the permitted resistance values.
- (6) Because the build-up of the spar valve includes several faying surface bonds, you may not know which faying surface bond is the cause of the problem. This task will help you isolate the location of the faying surface bond that needs to be reworked. The procedure does a check of the faying surface bond downstream of the bond that is in question.

B. References

Reference	Title
20-30-88	AIRPLANE STRUCTURE CLEANING SOLVENTS (Series 88)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-22-11-000-804	Remove the Actuator of the Spar Valve (P/B 401)
28-22-11-000-805	Remove the Valve Adapter of the Spar Valve (P/B 401)
28-22-11-300-801	Rework the Electrical Faying Surface Bonds for the Spar Valve (P/B 401)

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(Continued)

Reference	Title
28-22-11-400-804	Install the Actuator of the Spar Valve (P/B 401)
28-22-11-400-805	Install the Valve Adapter of the Spar Valve (P/B 401)
28-22-11-820-801	Spar Valve Alignment (P/B 401)
28-22-11-990-806	Figure: Spar Valve Actuator Installation (P/B 401)
28-22-11-990-808	Figure: Spar Valve Adapter Installation (P/B 401)
28-41-42-420-801	FQIS Spar Penetration Connector - Installation (P/B 401)
28-41-42-990-803	Figure: FQIS Penetration Connector Installation (Exterior) (P/B 401)
SWPM 20-20-00	Electrical Bonds and Grounds

C. Consumable Materials

Reference	Description	Specification
A50051	Sealant - Temperature Resistant, Integral Fuel Tank Sealant - Pro-Seal 890B	SAE AMS-S-8802, Class B
A50105	Sealant - Integral Fuel Tank Sealed Electrical Faying Surface Bond	SAE AMS-S-8802 Class A
B01008	Solvent - Final Cleaning Of Metal Prior To Non-Structural Bonding (AMM 20-30-88/201) - Series 88	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5

D. Location Zones

Zone	Area
521	Left Wing - Leading Edge to Front Spar
621	Right Wing - Leading Edge to Front Spar

E. Rework the Bonding Jumper Bond

(Figure 28-22-11-990-806)

SUBTASK 28-41-42-010-012

- (1) Disconnect the electrical connector from the actuator.

SUBTASK 28-41-42-010-013

- (2) Remove the sealant from the bonding jumper and fasteners at the actuator attachment location.

SUBTASK 28-41-42-010-014

- (3) Remove the screw, two washers, and bonding jumper from the actuator.

SUBTASK 28-41-42-765-009

- (4) Measure the electrical bonding resistance between the between the loose end of the bonding jumper and the stiffener (SWPM 20-20-00).

- (a) Make sure the bonding resistance is 0.0015 ohm (1.5 milliohms) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- (b) If the bonding resistance is more than 0.0015 ohm (1.5 milliohms), then do this procedure: Rework the Bonding Jumper Bond (TASK 28-22-11-300-801).

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- (c) If the bonding resistance is less than 0.0015 ohm (1.5 milliohms), then do the steps in this procedure: Rework the Faying Surface Bond - Actuator to Index Plate.

F. Rework the Faying Surface Bond - Actuator to Index Plate

(Figure 28-22-11-990-806) (Figure 28-22-11-990-808)

SUBTASK 28-41-42-765-012

- (1) Measure the electrical bonding resistance between the between the upper housing of the actuator and the front spar (SWPM 20-20-00).

- (a) Make sure the bonding resistance is 0.004 ohm (4.0 milliohms) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- (b) If the bonding resistance is less than 0.004 ohm (4.0 milliohms), then do these steps to install the bonding jumper to the actuator:

- 1) Final clean the contact surfaces with a cotton wiper, G00034 soaked with Series 88 solvent, B01008 (AIRPLANE STRUCTURE CLEANING SOLVENTS (Series 88), SUBJECT 20-30-88).

- a) Rub dry with a clean, dry cotton wiper, G00034.

- b) Continue to clean and dry the surface until the dry cotton wiper, G00034 stays clean.

- 2) Apply a thin continuous layer of sealant to both surfaces of the bonding jumper terminal and the two washers.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- a) Use Pro Seal 890A or PR-1440A sealant, A50105 for the faying surface seal.

- b) Make sure the sealant layer is approximately 0.005 in. (0.127 mm) thick.

- 3) Install the screw, two washers, and bonding jumper to the actuator.

- 4) Tighten the screw to 20 in-lb (2 N·m)

- 5) Measure the electrical bonding resistance between the upper housing of the actuator and the attached terminal of the bonding jumper (SWPM 20-20-00) (View D).

- a) Do not touch the screw when you make the bonding measurement.

- b) Make sure the resistance is 0.001 ohm (1.0 milliohm) or less.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

- c) If the bonding resistance is more than 0.001 ohm (1.0 milliohm), then do the applicable procedure in this task: Rework the Electrical Faying Surface Bonds for the Spar Valve, TASK 28-22-11-300-801.

- 6) Apply a cap seal of Pro-Seal 890B sealant, A50051 (or PR-1440B) over the screw and the terminal of the bonding jumper.

- (c) If the bonding resistance is more than 0.004 ohm (4.0 milliohms), then continue with the subsequent steps.

SUBTASK 28-41-42-010-015

- (2) Do this task: Remove the Actuator of the Spar Valve, TASK 28-22-11-000-804

EFFECTIVITY

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SUBTASK 28-41-42-765-014

- (3) Do these steps to do a check of the index plate to structure bonding path:
 - (a) Remove the sealant and clean one of the contact surfaces on the index plate.
 - (b) Measure the bonding resistance between one of the actuator feet contact surfaces on the index plate (bare metal surface) and the front spar (SWPM 20-20-00) (Figure 28-22-11-990-808, View G).
 - (c) Make sure the bonding resistance is 0.002 ohm (2.0 milliohms) or less.
 - (d) If the bonding resistance is more than 0.002 ohm (2.0 milliohms), then do the steps in this procedure: Rework the Faying Surface Bond - Index Plate to Adapter Plate.
 - (e) If the bonding resistance is less than 0.002 ohm (2.0 milliohms), then continue with the subsequent steps.

SUBTASK 28-41-42-040-003

- (4) Do this task: Install the Actuator of the Spar Valve, TASK 28-22-11-400-804
NOTE: This task will rework the faying surface bond and re-install the actuator.
- (5) If during the installation of the actuator, the bonding resistance value between the upper housing of the actuator and the spar web is more than 0.004 ohm (4.0 milliohms), then replace the actuator (TASK 28-22-11-000-804, TASK 28-22-11-400-804).

G. Rework the Faying Surface Bond - Index Plate to Adapter Plate (Figure 28-22-11-990-808)

SUBTASK 28-41-42-010-016

- (1) Do this procedure: Remove the Index Plate (TASK 28-22-11-000-805).

SUBTASK 28-41-42-765-018

- (2) Do these steps to do a check of the adapter plate to front spar bonding path:
 - (a) Remove the sealant and clean one of the serrated contact surfaces on the valve adapter.
 - (b) Measure the bonding resistance between the serrated contact surface on the valve adapter and the front spar (SWPM 20-20-00) (View F).
 - (c) Make sure the bonding resistance is 0.0015 ohm (1.5 milliohms) or less.
 - (d) If the bonding resistance is more than 0.0015 ohm (1.5 milliohms), then do the steps in this procedure: Rework the Faying Surface Bond - Adapter Plate to Front Spar.
 - (e) If the bonding resistance is less than 0.0015 ohm (1.5 milliohms), then continue with the subsequent steps.

SUBTASK 28-41-42-420-013

- (3) Do these steps to install the index plate:
NOTE: These steps will re-align the spar valve, rework the faying surface, and re-install the index plate.
 - (a) Do this task: Spar Valve Alignment, TASK 28-22-11-820-801.
 - (b) Do this procedure: Install the Index Plate (TASK 28-22-11-400-805).

SUBTASK 28-41-42-420-015

- (4) Do this task: Install the Actuator of the Spar Valve, TASK 28-22-11-400-804
- (5) If during the installation of the actuator, the bonding resistance value between the upper housing of the actuator and the spar web is more than 0.004 ohm (4.0 milliohms), then replace the actuator (TASK 28-22-11-000-804, TASK 28-22-11-400-804).

EFFECTIVITY

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H. Rework the Faying Surface Bond - Adapter Plate to Front Spar

(Figure 28-22-11-990-808)

SUBTASK 28-41-42-020-008

- (1) Do this task: Remove the Valve Adapter of the Spar Valve, TASK 28-22-11-000-805.

NOTE: A fuel tank entry is necessary to rework the faying surface of the valve adapter.

SUBTASK 28-41-42-420-014

- (2) Do this task: Install the Valve Adapter of the Spar Valve, TASK 28-22-11-400-805

NOTE: These steps will rework the faying surface, and re-install the valve adapter.

SUBTASK 28-41-42-420-016

- (3) Do this task: Install the Actuator of the Spar Valve, TASK 28-22-11-400-804

- (4) If during the installation of the actuator, the bonding resistance value between the upper housing of the actuator and the spar web is more than 0.004 ohm (4.0 milliohms), then replace the actuator (TASK 28-22-11-000-804, TASK 28-22-11-400-804).

SUBTASK 28-41-42-420-018

- (5) Continue with this task: FQIS Spar Penetration Connector - Installation, TASK 28-41-42-420-801.

————— **END OF TASK** —————

EFFECTIVITY

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FUEL TANK BULKHEAD (SPAR) RECEPTACLE WIRE HARNESS - REMOVAL/INSTALLATION

1. General

A. This procedure has one task:

(1) A task to replace the wire harness that goes to the receptacle on the wing spar.

B. Repair and overhaul of the FQIS tank wire harness must be per SWPM 20-14-12.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

TASK 28-41-44-400-801

2. FQIS Wire Harness Replacement

(Figure 401)

A. General

(1) CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on Critical Design Configuration Control Limitations (CDCCLs).

B. References

Reference	Title
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-41-00-730-801	System Test - Fuel Quantity Indicating System (P/B 501)
SWPM 20-10-11	Standard Wiring Practices Manual
SWPM 20-10-12	Standard Wiring Practices Manual
SWPM 20-10-19	Standard Wiring Practices Manual

C. Wire Bundle Installation Drawing References

SUBTASK 28-41-44-800-001

(1) DWG 288A1178, Wire Bundle Installation - Center Tank, Wing

SUBTASK 28-41-44-800-002

(2) DWG 288A1273, Wire Bundle Installation - Left Center Tank, Wing

SUBTASK 28-41-44-800-003

(3) DWG 288A1274, Wire Bundle Installation - Left Main Tank, Wing

SUBTASK 28-41-44-800-004

(4) DWG 288A1283, Wire Bundle Installation - Right Center Tank, Wing

SUBTASK 28-41-44-800-005

(5) DWG 288A1284, Wire Bundle Installation - Right Main Tank, Wing

D. Procedure

SUBTASK 28-41-44-860-001

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

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SUBTASK 28-41-44-650-001

WARNING: YOU MUST CAREFULLY DO ALL OF THE SAFETY PROCEDURES TO PREPARE TO GO INTO THE APPLICABLE TANK. AN EXPLOSION, INJURY TO PERSONS, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) For the applicable tank, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-41-44-010-001

(3) Go into the applicable fuel tank with the replacement wire harness (TASK 28-11-00-910-802).

SUBTASK 28-41-44-160-001

(4) Remove the sealant around the edge of the wire bundle connection with the receptacle on the spar if there is some sealant.

SUBTASK 28-41-44-020-001

(5) Remove the electrical disconnect on the wire harness [2] from the spar penetration connector [1].

SUBTASK 28-41-44-420-001

(6) Connect the electrical disconnect of the new wire harness [2] to the spar penetration connector [1].

SUBTASK 28-41-44-420-002

(7) Replace the wire harness (SWPM 20-10-11) (SWPM 20-10-12) (SWPM 20-10-19).

NOTE: Adjust wire slack to maintain a clearance of 0.5 inch between the wire and components or structure. If 0.5 inch clearance is not possible, you must maintain a minimum clearance of 0.125 inches.

- (a) Install the new wire harness while you remove the wire harness that is installed.
- (b) Make sure the new wire harness has the same routing as the wire bundle that you removed.
- (c) To install the tank wiring harness and clamps, refer to these Boeing drawings:
 - 1) DWG 288A1178, Wire Bundle Installation - Center Tank, Wing
 - 2) DWG 288A1273, Wire Bundle Installation - Left Center Tank, Wing
 - 3) DWG 288A1274, Wire Bundle Installation - Left Main Tank, Wing
 - 4) DWG 288A1283, Wire Bundle Installation - Right Center Tank, Wing
 - 5) DWG 288A1284, Wire Bundle Installation - Right Main Tank, Wing

NOTE: To get between rib 6 and rib 7 of each main tank, go into the tank at WSTA 216. Remove only one of the two access panels on rib 6. (Do not remove both panels unless the engine is removed).

SUBTASK 28-41-44-420-003

(8) Connect the wires to the electrical terminals on each compensator or tank unit.

- (a) Let the drip loop stay in the wire after you install the wire bundle.

SUBTASK 28-41-44-420-004

(9) Tighten the screws to these torque ranges:

- (a) HI Z (COAX) 12-25 pound-inches (1.4-2.8 newton-meters)
- (b) HI Z (SHIELD) 15-20 pound-inches (1.7-2.3 newton-meters)
- (c) LOW Z (TANK UNIT/COMPENSATOR) 25-35 pound-inches (2.8-4 newton-meters)

SUBTASK 28-41-44-410-001

(10) Install the access panels that you removed (TASK 28-11-11-400-801).

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SUBTASK 28-41-44-860-002

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

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-41-44-820-001

(12) Do this task: System Test - Fuel Quantity Indicating System, TASK 28-41-00-730-801.

END OF TASK

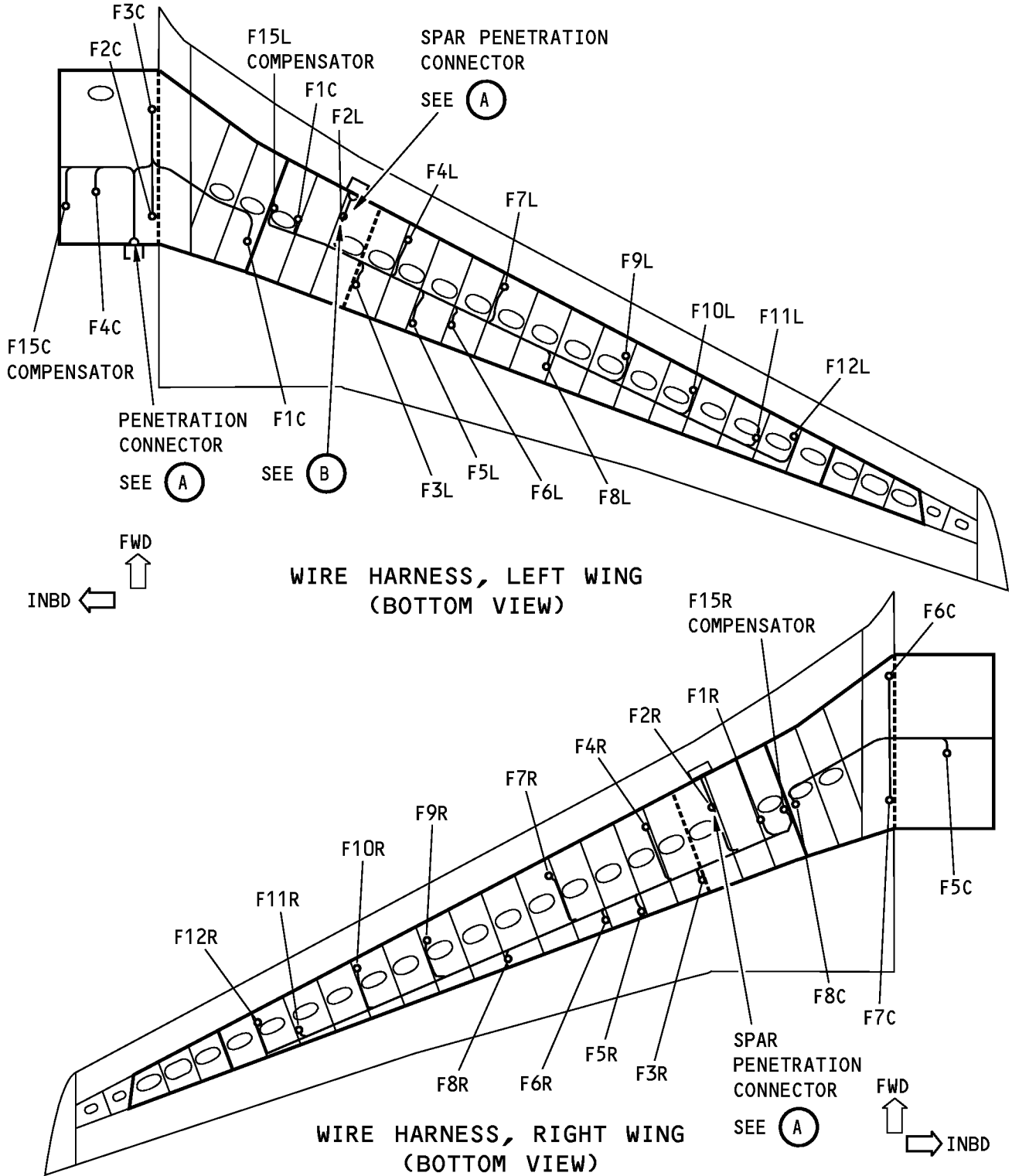
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FQIS Wire Harness Installation
Figure 401 (Sheet 1 of 3)/28-41-44-990-802

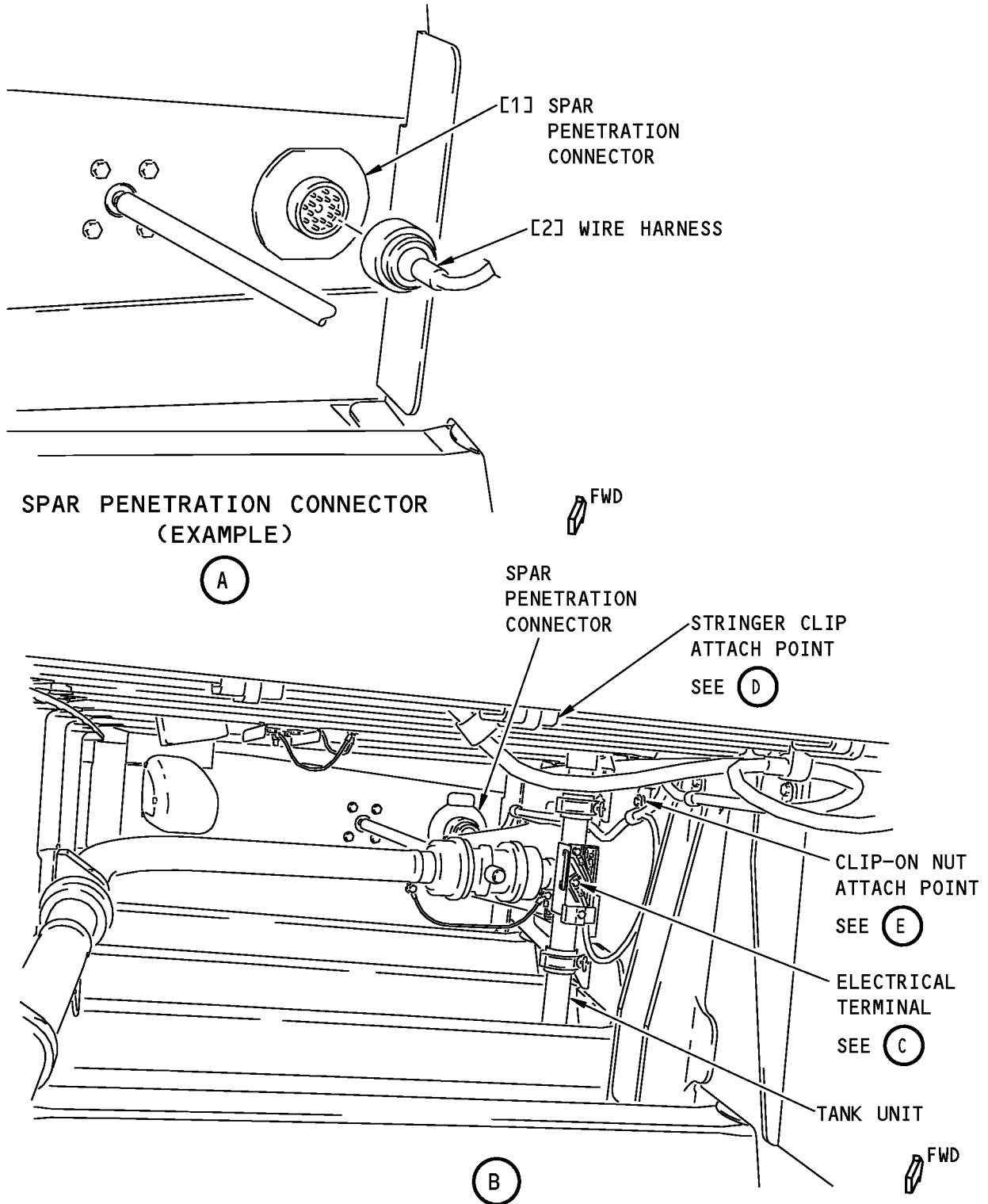
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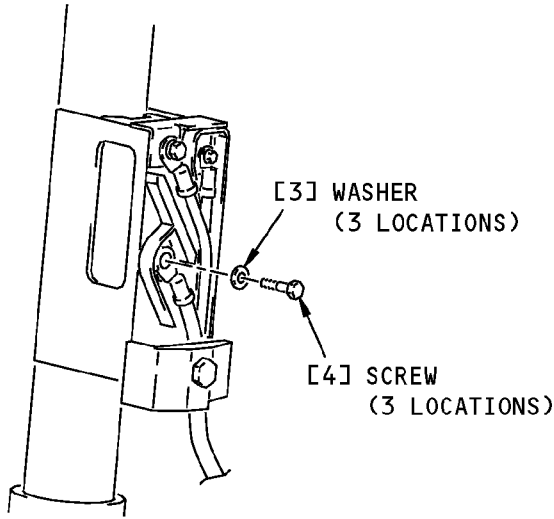
**FQIS Wire Harness Installation
Figure 401 (Sheet 2 of 3)/28-41-44-990-802**

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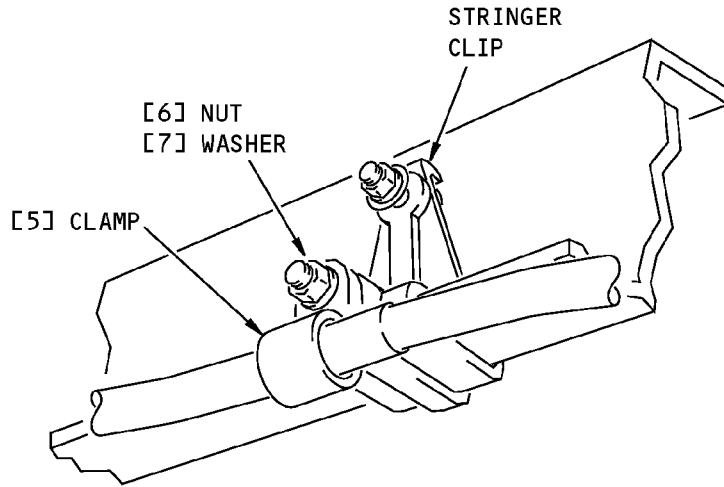
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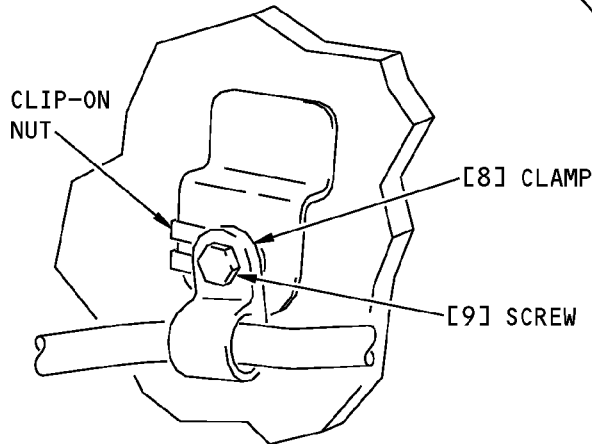
ELECTRICAL TERMINAL
(EXAMPLE)

(C)



STRINGER CLIP ATTACH POINT
(EXAMPLE)

(D)



CLIP-ON NUT ATTACH POINT
(EXAMPLE)

(E)

FQIS Wire Harness Installation
Figure 401 (Sheet 3 of 3)/28-41-44-990-802

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FUEL TANK BULKHEAD (SPAR) RECEPTACLE WIRE HARNESS - INSPECTION/CHECK

1. General

- A. This procedure contains scheduled maintenance task data.
- B. This procedure contains these tasks:
 - (1) FQIS Wiring and Component Visual Inspection
 - (2) FQIS, No. 1 Tank - Inspection
 - (3) FQIS, No. 2 Tank - Inspection
 - (4) FQIS, Center Tank - Inspection

TASK 28-41-44-210-801

2. FQIS Wiring and Component Visual Inspection

A. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

B. Procedure

SUBTASK 28-41-44-210-001

- (1) Examine the wiring for these problems:
 - (a) Insulation that is abraded, cracked or over-stressed.
 - (b) Conductors or shields that are broken or exposed.
 - (c) Clearance from the structure that is not sufficient.
 - (d) Clamps that are loose or missing.
 - (e) Wiring that is routed incorrectly.

SUBTASK 28-41-44-210-002

- (2) Examine the compensators and tank units for these problems:
 - (a) Make sure the wiring is correctly attached to the terminals.
 - (b) Wiring to the terminals that is damaged or is incorrectly routed.
 - (c) An end cap that is missing.
 - (d) Clearance from the structure that is not sufficient.
 - (e) Mounting brackets and hardware that are loose.
 - (f) Terminals that are bent.
 - (g) Do an inspection of the electrical connectors and seals for damage, wear, or fuel leakage.

————— **END OF TASK** —————

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TASK 28-41-44-280-801

3. FQIS, No. 1 Tank - Inspection

A. General

(1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
06-43-00-800-801	Engine and Nacelle Strut Access Doors and Panels (P/B 201)
06-44-00-800-801	Finding an Access Door or Panel on the Wings (P/B 201)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)

C. Location Zones

Zone	Area
434	Engine 1 - Aft Strut Fairing
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50

D. Access Panels

Number	Name/Location
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1
532AB	Main Tank Access Door - Wing Station 216
532AZ	Main Tank Inner Access at Rib 6
532BB	Main Tank Access Door - Wing Station 265
532BZ	Main Tank Inner Access at Rib 6
532CB	Main Tank Access Door - Wing Station 290
532DB	Main Tank Access Door - Wing Station 313
532EB	Main Tank Access Door - Wing Station 337
532FB	Main Tank Access Door - Wing Station 367
532GB	Main Tank Access Door - Wing Station 390
532HB	Main Tank Access Door - Wing Station 417
532JB	Main Tank Access Door - Wing Station 443
532KB	Main Tank Access Door - Wing Station 470
532LB	Main Tank Access Door - Wing Station 496
532MB	Main Tank Access Door - Wing Station 523
532NB	Main Tank Access Door - Wing Station 549
532PB	Main Tank Access Door - Wing Station 576
532QB	Main Tank Access Door - Wing Station 602
532RB	Main Tank Access Door - Wing Station 629

E. Procedure

SUBTASK 28-41-44-750-001

(1) For the area in the No. 1 fuel tank between rib No. 5 (inboard tank end) and rib No. 7, do these steps:

(a) Remove this access panel:

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216

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To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532AB	Main Tank Access Door - Wing Station 216

- (c) For the area in the No. 1 fuel tank between rib No. 6 and rib No. 7, remove only one of these access panels on rib No. 6 (unless the engine is removed):

<u>Number</u>	<u>Name/Location</u>
532AZ	Main Tank Inner Access at Rib 6
532BZ	Main Tank Inner Access at Rib 6

To do this, do this task: Finding an Access Door or Panel on the Wings, TASK 06-44-00-800-801.

- (d) For all FQIS wiring and components between Rib No. 5 and Rib No. 7, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

- (e) If it is removed and access is not necessary for subsequent tasks, install the applicable access panel(s) on rib No. 6:

<u>Number</u>	<u>Name/Location</u>
532AZ	Main Tank Inner Access at Rib 6
532BZ	Main Tank Inner Access at Rib 6

To do this, do this task: Finding an Access Door or Panel on the Wings, TASK 06-44-00-800-801.

- (f) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532AB	Main Tank Access Door - Wing Station 216

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

SUBTASK 28-41-44-280-001

- (2) For the area in the No. 1 fuel tank between rib No. 7 and rib No. 8, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1

(Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801).

- (b) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532BB	Main Tank Access Door - Wing Station 265

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

- (c) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532BB	Main Tank Access Door - Wing Station 265

- (d) For all FQIS wiring and components between Rib No. 7 and Rib No. 8, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

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- (e) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532BB	Main Tank Access Door - Wing Station 265

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

- (f) Install this access panel:

<u>Number</u>	<u>Name/Location</u>
434CL	Aft Strut Fairing, Left Access To Fuel Door, Strut 1

(Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801).

SUBTASK 28-41-44-280-002

- (3) For the area in the No. 1 fuel tank between rib No. 8 and rib No. 9, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532CB	Main Tank Access Door - Wing Station 290

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532CB	Main Tank Access Door - Wing Station 290

- (c) For all FQIS wiring and components between Rib No. 8 and Rib No. 9, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532CB	Main Tank Access Door - Wing Station 290

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-003

- (4) For the area in the No. 1 fuel tank between rib No. 9 and rib No. 10, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532DB	Main Tank Access Door - Wing Station 313

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532DB	Main Tank Access Door - Wing Station 313

- (c) For all FQIS wiring and components between Rib No. 9 and Rib No. 10, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532DB	Main Tank Access Door - Wing Station 313

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

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SUBTASK 28-41-44-280-004

(5) For the area in the No. 1 fuel tank between rib No. 10 and rib No. 11, do these steps:

(a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532EB	Main Tank Access Door - Wing Station 337

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

(b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532EB	Main Tank Access Door - Wing Station 337

(c) For all FQIS wiring and components between Rib No. 10 and Rib No. 11, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

(d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532EB	Main Tank Access Door - Wing Station 337

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-750-002

(6) For the area in the No. 1 fuel tank between rib No. 11 and rib No. 12, do these steps:

(a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532FB	Main Tank Access Door - Wing Station 367

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

(b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532FB	Main Tank Access Door - Wing Station 367

(c) For all FQIS wiring and components between Rib No. 11 and Rib No. 12, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

(d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532FB	Main Tank Access Door - Wing Station 367

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-750-003

(7) For the area in the No. 1 fuel tank between rib No. 12 and rib No. 13, do these steps:

(a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532GB	Main Tank Access Door - Wing Station 390

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

(b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532GB	Main Tank Access Door - Wing Station 390

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- (c) For all FQIS wiring and components between Rib No. 12 and Rib No. 13, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801
- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532GB	Main Tank Access Door - Wing Station 390

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-005

- (8) For the area in the No. 1 fuel tank between rib No. 13 and rib No. 14, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532HB	Main Tank Access Door - Wing Station 417

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532HB	Main Tank Access Door - Wing Station 417

- (c) For all FQIS wiring and components between Rib No. 13 and Rib No. 14, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532HB	Main Tank Access Door - Wing Station 417

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-006

- (9) For the area in the No. 1 fuel tank between rib No. 14 and rib No. 15, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532JB	Main Tank Access Door - Wing Station 443

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532JB	Main Tank Access Door - Wing Station 443

- (c) For all FQIS wiring and components between Rib No. 14 and Rib No. 15, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532JB	Main Tank Access Door - Wing Station 443

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-007

- (10) For the area in the No. 1 fuel tank between rib No. 15 and rib No. 16, do these steps:

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- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532KB	Main Tank Access Door - Wing Station 470

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532KB	Main Tank Access Door - Wing Station 470

- (c) For all FQIS wiring and components between Rib No. 15 and Rib No. 16, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532KB	Main Tank Access Door - Wing Station 470

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-008

- (11) For the area in the No. 1 fuel tank between rib No. 16 and rib No. 17, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532LB	Main Tank Access Door - Wing Station 496

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532LB	Main Tank Access Door - Wing Station 496

- (c) For all FQIS wiring and components between Rib No. 16 and Rib No. 17, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532LB	Main Tank Access Door - Wing Station 496

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-009

- (12) For the area in the No. 1 fuel tank between rib No. 17 and rib No. 18, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532MB	Main Tank Access Door - Wing Station 523

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532MB	Main Tank Access Door - Wing Station 523

- (c) For all FQIS wiring and components between Rib No. 17 and Rib No. 18, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

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- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532MB	Main Tank Access Door - Wing Station 523

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-010

- (13) For the area in the No. 1 fuel tank between rib No. 18 and rib No. 19, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532NB	Main Tank Access Door - Wing Station 549

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532NB	Main Tank Access Door - Wing Station 549

- (c) For all FQIS wiring and components between Rib No. 18 and Rib No. 19, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532NB	Main Tank Access Door - Wing Station 549

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-011

- (14) For the area in the No. 1 fuel tank between rib No. 19 and rib No. 20, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532PB	Main Tank Access Door - Wing Station 576

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
532PB	Main Tank Access Door - Wing Station 576

- (c) For all FQIS wiring and components between Rib No. 19 and Rib No. 20, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
532PB	Main Tank Access Door - Wing Station 576

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-012

- (15) For the area in the No. 1 fuel tank between rib No. 20 and rib No. 21, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
532QB	Main Tank Access Door - Wing Station 602

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To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

Table with 2 columns: Number, Name/Location. Row 1: 532QB, Main Tank Access Door - Wing Station 602

- (c) For all FQIS wiring and components between Rib No. 20 and Rib No. 21, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

Table with 2 columns: Number, Name/Location. Row 1: 532QB, Main Tank Access Door - Wing Station 602

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-013

- (16) For the area in the No. 1 fuel tank between rib No. 21 and rib No. 22, do these steps:

- (a) Remove this access panel:

Table with 2 columns: Number, Name/Location. Row 1: 532RB, Main Tank Access Door - Wing Station 629

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

Table with 2 columns: Number, Name/Location. Row 1: 532RB, Main Tank Access Door - Wing Station 629

- (c) For all FQIS wiring and components between Rib No. 21 and Rib No. 22, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

Table with 2 columns: Number, Name/Location. Row 1: 532RB, Main Tank Access Door - Wing Station 629

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

END OF TASK

TASK 28-41-44-280-802

4. FQIS, No. 2 Tank - Inspection

A. General

- (1) This procedure is a scheduled maintenance task.

B. References

Table with 2 columns: Reference, Title. Rows: 06-43-00-800-801 Engine and Nacelle Strut Access Doors and Panels (P/B 201); 06-44-00-800-801 Finding an Access Door or Panel on the Wings (P/B 201); 28-11-11-000-801 Main Tank Access Door Removal (P/B 401); 28-11-11-400-801 Main Tank Access Door Installation (P/B 401)

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C. Location Zones

Zone	Area
444	Engine 2 - Aft Strut Fairing
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Access Panels

Number	Name/Location
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2
632AB	Main Tank Access Door - Wing Station 216
632AZ	Main Tank Inner Access at Rib 6
632BB	Main Tank Access Door - Wing Station 265
632BZ	Main Tank Inner Access at Rib 6
632CB	Main Tank Access Door - Wing Station 290
632DB	Main Tank Access Door - Wing Station 313
632EB	Main Tank Access Door - Wing Station 337
632FB	Main Tank Access Door - Wing Station 367
632GB	Main Tank Access Door - Wing Station 390
632HB	Main Tank Access Door - Wing Station 417
632JB	Main Tank Access Door - Wing Station 443
632KB	Main Tank Access Door - Wing Station 470
632LB	Main Tank Access Door - Wing Station 496
632MB	Main Tank Access Door - Wing Station 523
632NB	Main Tank Access Door - Wing Station 549
632PB	Main Tank Access Door - Wing Station 576
632QB	Main Tank Access Door - Wing Station 602
632RB	Main Tank Access Door - Wing Station 629

E. Procedure

SUBTASK 28-41-44-750-004

(1) For the area in the No. 2 fuel tank between rib No. 5 (inboard tank end) and rib No. 7, do these steps:

(a) Remove this access panel:

Number	Name/Location
632AB	Main Tank Access Door - Wing Station 216

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

(b) Go into the opening for:

Number	Name/Location
632AB	Main Tank Access Door - Wing Station 216

(c) For the area in the No. 2 fuel tank between rib No. 6 and rib No. 7, remove only one of these access panels on rib No. 6 (unless the engine is removed):

Number	Name/Location
632AZ	Main Tank Inner Access at Rib 6
632BZ	Main Tank Inner Access at Rib 6

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To do this, do this task: Finding an Access Door or Panel on the Wings, TASK 06-44-00-800-801.

- (d) For all FQIS wiring and components between Rib No. 5 and Rib No. 7, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.
- (e) If it is removed and access is not necessary for subsequent tasks, install the applicable access panel(s) on rib No. 6:

<u>Number</u>	<u>Name/Location</u>
632AZ	Main Tank Inner Access at Rib 6
632BZ	Main Tank Inner Access at Rib 6

To do this, do this task: Finding an Access Door or Panel on the Wings, TASK 06-44-00-800-801.

- (f) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632AB	Main Tank Access Door - Wing Station 216

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

SUBTASK 28-41-44-280-014

- (2) For the area in the No. 2 fuel tank between rib No. 7 and rib No. 8, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2

(Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801).

- (b) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632BB	Main Tank Access Door - Wing Station 265

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

- (c) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632BB	Main Tank Access Door - Wing Station 265

- (d) For all FQIS wiring and components between Rib No. 7 and Rib No. 8, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

- (e) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632BB	Main Tank Access Door - Wing Station 265

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

- (f) Install this access panel:

<u>Number</u>	<u>Name/Location</u>
444CR	Aft Strut Fairing, Right Access To Fuel Door, Strut 2

(Engine and Nacelle Strut Access Doors and Panels, TASK 06-43-00-800-801).

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SUBTASK 28-41-44-280-015

(3) For the area in the No. 2 fuel tank between rib No. 8 and rib No. 9, do these steps:

(a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632CB	Main Tank Access Door - Wing Station 290

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

(b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632CB	Main Tank Access Door - Wing Station 290

(c) For all FQIS wiring and components between Rib No. 8 and Rib No. 9, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

(d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632CB	Main Tank Access Door - Wing Station 290

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-016

(4) For the area in the No. 2 fuel tank between rib No. 9 and rib No. 10, do these steps:

(a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632DB	Main Tank Access Door - Wing Station 313

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

(b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632DB	Main Tank Access Door - Wing Station 313

(c) For all FQIS wiring and components between Rib No. 9 and Rib No. 10, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

(d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632DB	Main Tank Access Door - Wing Station 313

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-017

(5) For the area in the No. 2 fuel tank between rib No. 10 and rib No. 11, do these steps:

(a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632EB	Main Tank Access Door - Wing Station 337

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

(b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632EB	Main Tank Access Door - Wing Station 337

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- (c) For all FQIS wiring and components between Rib No. 10 and Rib No. 11, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801
- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632EB	Main Tank Access Door - Wing Station 337

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-750-005

- (6) For the area in the No. 2 fuel tank between rib No. 11 and rib No. 12, do these steps:
 - (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632FB	Main Tank Access Door - Wing Station 367

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632FB	Main Tank Access Door - Wing Station 367

- (c) For all FQIS wiring and components between Rib No. 11 and Rib No. 12, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801
 - (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632FB	Main Tank Access Door - Wing Station 367

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-018

- (7) For the area in the No. 2 fuel tank between rib No. 12 and rib No. 13, do these steps:
 - (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632GB	Main Tank Access Door - Wing Station 390

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632GB	Main Tank Access Door - Wing Station 390

- (c) For all FQIS wiring and components between Rib No. 12 and Rib No. 13, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801
 - (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632GB	Main Tank Access Door - Wing Station 390

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-019

- (8) For the area in the No. 2 fuel tank between rib No. 13 and rib No. 14, do these steps:

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- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632HB	Main Tank Access Door - Wing Station 417

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632HB	Main Tank Access Door - Wing Station 417

- (c) For all FQIS wiring and components between Rib No. 13 and Rib No. 14, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632HB	Main Tank Access Door - Wing Station 417

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-020

- (9) For the area in the No. 2 fuel tank between rib No. 14 and rib No. 15, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632JB	Main Tank Access Door - Wing Station 443

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632JB	Main Tank Access Door - Wing Station 443

- (c) For all FQIS wiring and components between Rib No. 14 and Rib No. 15, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632JB	Main Tank Access Door - Wing Station 443

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-021

- (10) For the area in the No. 2 fuel tank between rib No. 15 and rib No. 16, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632KB	Main Tank Access Door - Wing Station 470

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632KB	Main Tank Access Door - Wing Station 470

- (c) For all FQIS wiring and components between Rib No. 15 and Rib No. 16, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

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- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632KB	Main Tank Access Door - Wing Station 470

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-022

- (11) For the area in the No. 2 fuel tank between rib No. 16 and rib No. 17, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632LB	Main Tank Access Door - Wing Station 496

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632LB	Main Tank Access Door - Wing Station 496

- (c) For all FQIS wiring and components between Rib No. 16 and Rib No. 17, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632LB	Main Tank Access Door - Wing Station 496

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-023

- (12) For the area in the No. 2 fuel tank between rib No. 17 and rib No. 18, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632MB	Main Tank Access Door - Wing Station 523

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632MB	Main Tank Access Door - Wing Station 523

- (c) For all FQIS wiring and components between Rib No. 17 and Rib No. 18, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632MB	Main Tank Access Door - Wing Station 523

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-024

- (13) For the area in the No. 2 fuel tank between rib No. 18 and rib No. 19, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632NB	Main Tank Access Door - Wing Station 549

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To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632NB	Main Tank Access Door - Wing Station 549

- (c) For all FQIS wiring and components between Rib No. 18 and Rib No. 19, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632NB	Main Tank Access Door - Wing Station 549

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-025

- (14) For the area in the No. 2 fuel tank between rib No. 19 and rib No. 20, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632PB	Main Tank Access Door - Wing Station 576

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632PB	Main Tank Access Door - Wing Station 576

- (c) For all FQIS wiring and components between Rib No. 19 and Rib No. 20, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632PB	Main Tank Access Door - Wing Station 576

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-026

- (15) For the area in the No. 2 fuel tank between rib No. 20 and rib No. 21, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
632QB	Main Tank Access Door - Wing Station 602

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
632QB	Main Tank Access Door - Wing Station 602

- (c) For all FQIS wiring and components between Rib No. 20 and Rib No. 21, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
632QB	Main Tank Access Door - Wing Station 602

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To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

SUBTASK 28-41-44-280-027

(16) For the area in the No. 2 fuel tank between rib No. 21 and rib No. 22, do these steps:

(a) Remove this access panel:

Number	Name/Location
632RB	Main Tank Access Door - Wing Station 629

To do this, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801

(b) Go into the opening for:

Number	Name/Location
632RB	Main Tank Access Door - Wing Station 629

(c) For all FQIS wiring and components between Rib No. 21 and Rib No. 22, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

(d) If access is not necessary for subsequent tasks, install this access panel:

Number	Name/Location
632RB	Main Tank Access Door - Wing Station 629

To do this, do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801

————— END OF TASK —————

TASK 28-41-44-280-803

5. FQIS, Center Tank - Inspection

A. General

(1) This procedure is a scheduled maintenance task.

B. References

Reference	Title
28-11-31-000-801	Center Tank Access Door - Removal (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)

C. Location Zones

Zone	Area
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

D. Access Panels

Number	Name/Location
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
531BB	Center Tank Access Door - Wing Station 192
631AB	Center Tank Access Door - Wing Station 168
631BB	Center Tank Access Door - Wing Station 192

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E. Procedure

SUBTASK 28-41-44-750-006

- (1) For the area in the center tank on the left side between rib No. 4 and rib No. 5 (tank end), do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
531BB	Center Tank Access Door - Wing Station 192

To do this, do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
531BB	Center Tank Access Door - Wing Station 192

- (c) For all FQIS wiring and components between Rib No. 4 and Rib No. 5, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
531BB	Center Tank Access Door - Wing Station 192

To do this, do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801

SUBTASK 28-41-44-280-028

- (2) For the area in the center tank on the left side between rib No. 1 (side of body rib) and rib No. 4, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

To do this, do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

- (c) For all FQIS wiring and components between Rib No. 1 and Rib No. 4, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
531AB	Center Tank Access Door - Wing Station 168

To do this, do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801

SUBTASK 28-41-44-280-029

- (3) For the area in the center tank on the right side between rib No. 4 and rib No. 5 (tank end), do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
631BB	Center Tank Access Door - Wing Station 192

To do this, do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801

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- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
631BB	Center Tank Access Door - Wing Station 192

- (c) For all FQIS wiring and components between Rib No. 4 and Rib No. 5, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
631BB	Center Tank Access Door - Wing Station 192

To do this, do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801

SUBTASK 28-41-44-280-030

- (4) For the area in the center tank on the right side between rib No. 1 (side of body rib) and rib No. 4, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
631AB	Center Tank Access Door - Wing Station 168

To do this, do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
631AB	Center Tank Access Door - Wing Station 168

- (c) For all FQIS wiring and components between Rib No. 1 and Rib No. 4, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
631AB	Center Tank Access Door - Wing Station 168

To do this, do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801

SUBTASK 28-41-44-280-031

- (5) For the area of the center tank in the center wing section, do these steps:

- (a) Remove this access panel:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

To do this, do this task: Center Tank Access Door - Removal, TASK 28-11-31-000-801

- (b) Go into the opening for:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

- (c) For all FQIS wiring and components in the wing center section, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

- (d) If access is not necessary for subsequent tasks, install this access panel:

<u>Number</u>	<u>Name/Location</u>
131AB	Center Tank Access

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To do this, do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801

————— **END OF TASK** —————

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REFUEL QUANTITY INDICATOR - REMOVAL/INSTALLATION

1. General

- A. This procedure has two tasks:
 - (1) A task to remove the refuel quantity indicator.
 - (2) A task to install the refuel quantity indicator.
- B. 737 SB 28-1200 (inspection for wire chafing behind the P15 refuel panel) reduces the service loop for the refuel quantity indicators. To remove the refuel quantity indicators, it is necessary to lower the refuel panel (P15), disconnect the electrical connector from the refuel quantity indicator and then remove the refuel quantity indicator from the refuel panel.
- C. The refuel quantity indicator is also called the refuel quantity indicator. In this procedure it is also referred to as the "indicator".

TASK 28-41-61-000-801

2. Refuel Quantity Indicator Removal

(Figure 401)

A. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

B. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

C. Procedure

SUBTASK 28-41-61-860-001

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	3	C00032	FUEL FUELING CONT
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-41-61-010-001

- (2) Open this access panel:

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-41-61-010-003

- (3) Do these steps to remove the refuel panel (P15):
 - (a) Remove the bolts [5] and washers [6] (4 locations) to disconnect the refuel panel (P15).
 - (b) Remove the nut [7] and washer [8] to disconnect the bonding jumper [9] from the refuel panel.
 - (c) Remove the refuel panel from the refueling station.

SUBTASK 28-41-61-020-007

- (4) Do these steps to remove the refuel quantity indicator:

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- (a) Disconnect the applicable electrical connector [1] from the rear of the indicator [3].
- (b) Put a tag or mark on the electrical connector [1] and the indicator [3].
- (c) Loosen the clamp screw [2] of the applicable indicator [3].
- (d) Remove the indicator [3] through the forward side of the refuel panel.

————— **END OF TASK** —————

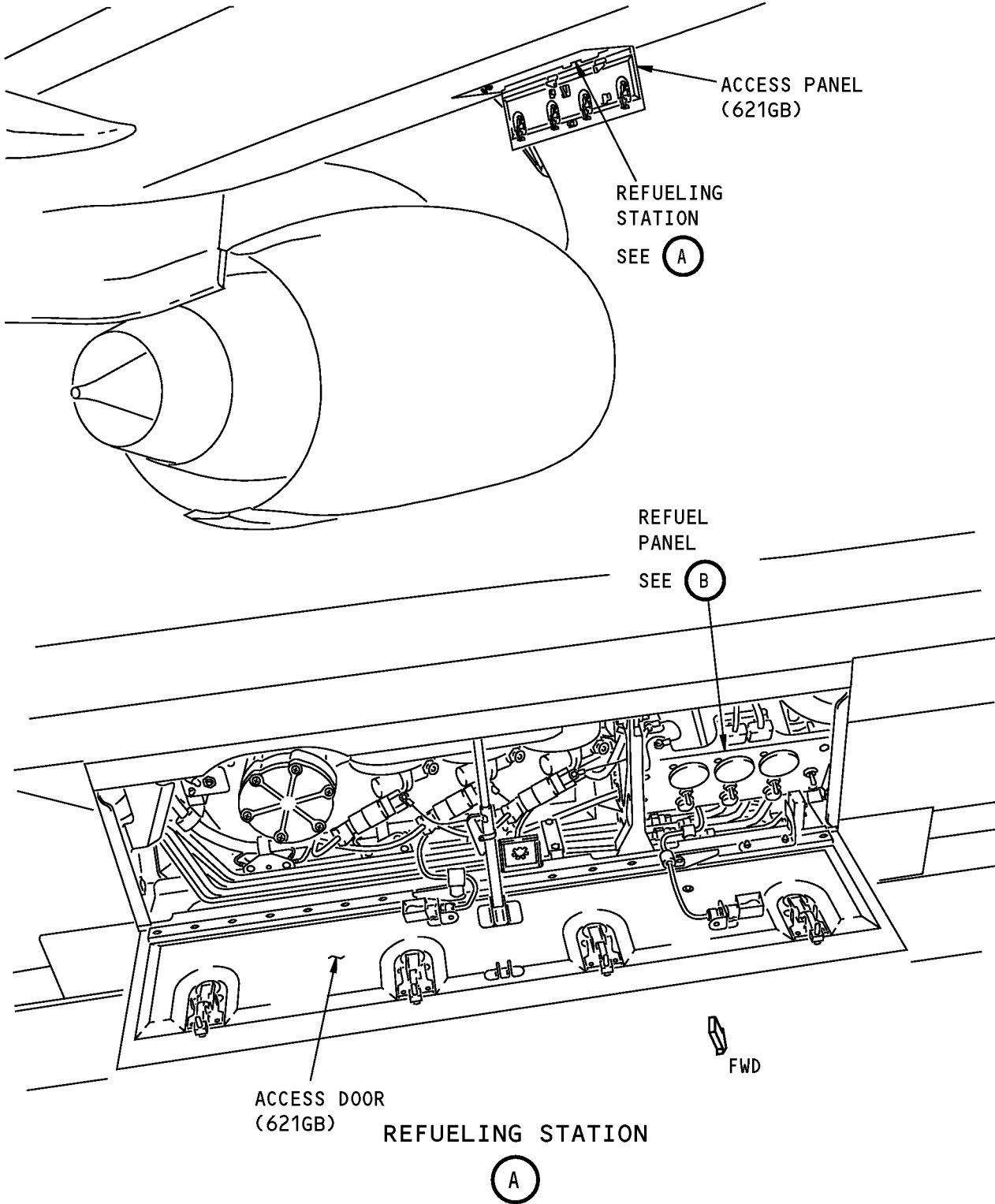
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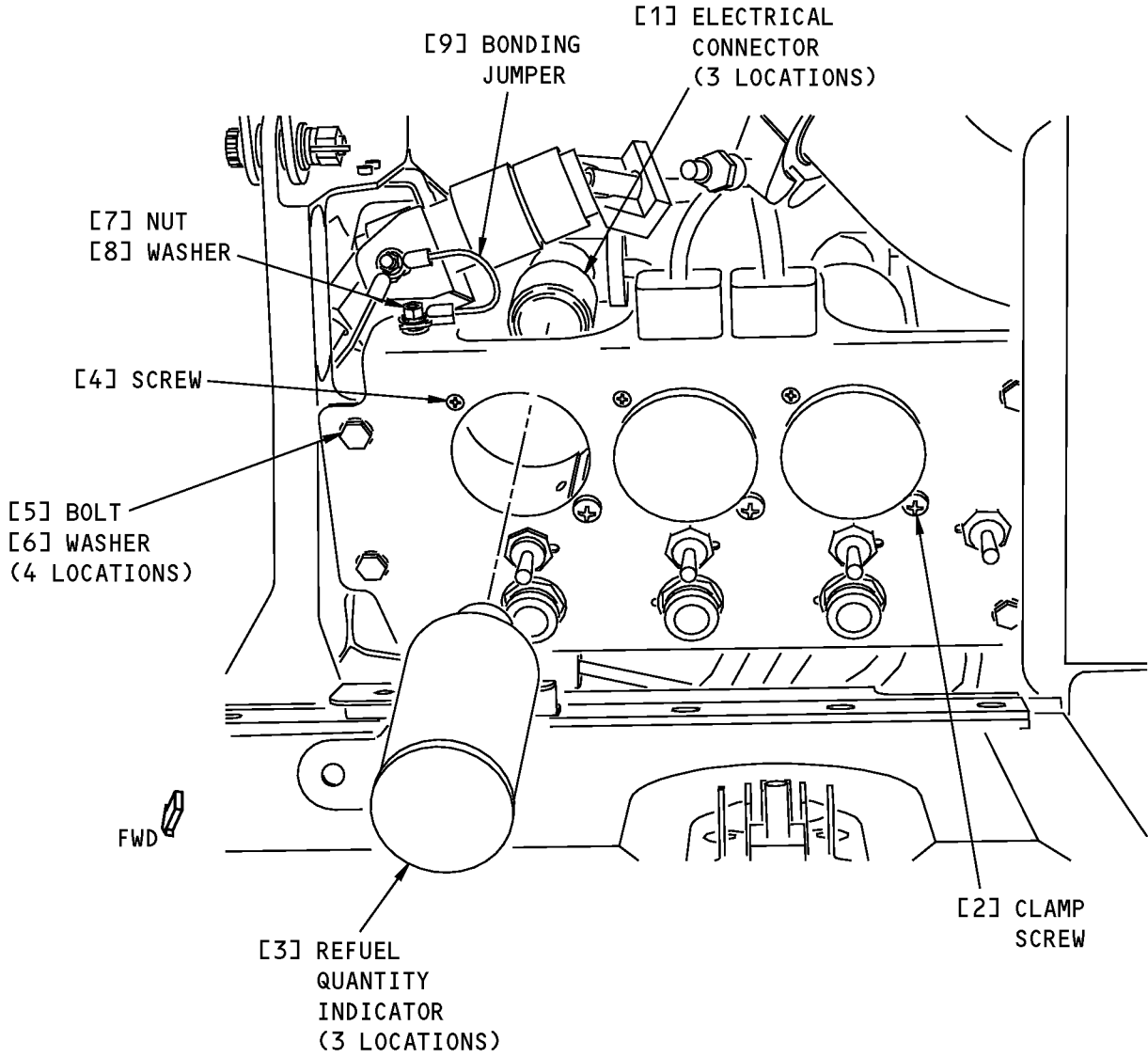
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**Refuel Quantity Indicators Installation
Figure 401 (Sheet 1 of 2)/28-41-61-990-802**

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REFUEL PANEL

B

**Refuel Quantity Indicators Installation
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TASK 28-41-61-400-801

3. Refuel Quantity Indicator Installation

(Figure 401)

A. References

Reference	Title
28-21-00-211-801	Refuel Panel Wire Bundle Inspection (P/B 601)
SWPM 20-20-00	Electrical Bonds and Grounds

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	Indicator	28-21-51-02-005	HAP ALL

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Access Panels

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

E. Inspection

SUBTASK 28-41-61-860-003

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	3	C00032	FUEL FUELING CONT
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-41-61-010-002

- (2) Open this access panel:

Number	Name/Location
621GB	Refuel Access Panel - Slat Station 143.27

if it is not open.

- (a) Remove the pins that attach the linkage assemblies to the access door.

SUBTASK 28-41-61-210-003

- (3) Do a visual inspection of the refuel panel (P15) W0024 wire bundle (TASK 28-21-00-211-801).

NOTE: A visual inspection is recommended each time a refuel quantity indicator [3] is removed.

F. Installation Procedure

SUBTASK 28-41-61-420-001

- (1) Do these steps to install the refuel quantity indicator [3].
 - (a) Install the indicator [3] in the refuel panel.
 - (b) Tighten the clamp screw [2] on the indicator [3].

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- (c) Connect the electrical connector [1] to the indicator [3].
- (d) Remove the temporary tags or marks on the electrical connector [1] and indicator [3].

SUBTASK 28-41-61-410-004

- (2) Do these steps to install the refuel panel:
 - (a) Prepare these surfaces for an electrical faying surface bond (SWPM 20-20-00):
 - 1) Contact surface of the refuel panel where the bonding jumper attaches.
 - 2) Contact surface of the bonding jumper [9] and washer [8].
 - (b) Put the refuel panel in its correct position between the support members for the leading edge.
 - (c) Install the bolts [5] and washers [6] (4 locations) to attach the refuel panel.
 - (d) Attach the bonding jumper [9] to the refuel panel with the nut [7] and washer [8].

SUBTASK 28-41-61-765-001

- (3) Do these steps to do a check of the electrical bonding resistance (SWPM 20-20-00):
 - (a) Measure the electrical resistance between the refuel panel and the airplane structure.
 - 1) Make sure the resistance is less than 0.002 ohm (2 milliohms).

SUBTASK 28-41-61-410-005

- (4) Install the pins and the washers that attach the linkages to the access door.

G. Operational Test

SUBTASK 28-41-61-860-002

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

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	3	C00032	FUEL FUELING CONT
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-41-61-710-002

- (2) Push each fueling valve position light.
 - (a) Make sure each fueling valve position light comes on.

NOTE: The lights are PRESS-TO-TEST.

SUBTASK 28-41-61-710-001

- (3) Set the FUELING INDICATION TEST SWITCH on the refuel control panel to the TEST position.
 - (a) Make sure all of the refuel quantity indicators operate correctly.

NOTE: The test blanks the fueling indicators display for two seconds, then all LED segments go on for two seconds. This sequence continues as long as you hold the TEST SWITCH. If you hold the TEST SWITCH for more than 20 seconds, the test mode will time out and the indicator will go back to its usual operating mode. If an internal fault is found during the test, the indicator will show Ind FAIL.

SUBTASK 28-41-61-710-003

- (4) Make sure the fueling shutoff valves operate correctly.
 - (a) Set the switch for the fueling shutoff valve for the No. 1 tank to OPEN.
 - (b) Make sure the indication light for the fueling shutoff valve for the No. 1 tank comes on.

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- (c) Set the switch for the fueling shutoff valve for the No. 1 tank to CLOSE.
- (d) Make sure the indication light for the fueling shutoff valve for the No. 1 tank goes off.
- (e) Set the switch for the fueling shutoff valve for the No. 2 tank to OPEN.
- (f) Make sure the indication light for the fueling shutoff valve for the No. 2 tank comes on.
- (g) Set the switch for the fueling shutoff valve for the No. 2 tank to CLOSE.
- (h) Make sure the indication light for the fueling shutoff valve for the No. 2 tank goes off.
- (i) Set the switch for the fueling shutoff valve for the center tank to OPEN.
- (j) Make sure the indication light for the fueling shutoff valve for the center tank comes on.
- (k) Set the switch for the fueling shutoff valve for the center tank to CLOSE.
- (l) Make sure the indication light for the fueling shutoff valve for the center tank goes off.

SUBTASK 28-41-61-410-003

(5) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

————— **END OF TASK** —————

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FQIS PROCESSOR - REMOVAL/INSTALLATION

1. General

- A. The fuel quantity processor unit collects signals from all FQIS system components, calculates the fuel quantity in each fuel tank and transmits this information to the P2 Display Unit in the flight compartment and to the fuel quantity indicators on the P15 refueling panel on the right wing. The processor is installed in the radar bay immediately forward of the nose landing gear wheel well.
- B. The fuel quantity processor unit (FQPU) is referred to as "the processor" in this procedure.
- C. This procedure contains two tasks. The first task removes the processor. The second task installs the processor.

TASK 28-41-81-000-801

2. Remove the Fuel Quantity Processor Unit

(Figure 401)

A. References

Reference	Title
20-40-12-000-802	ESDS Handling for Metal Encased Unit Removal (P/B 201)

B. Location Zones

Zone	Area
112	Area Forward of Nose Landing Gear Wheel Well

C. Access Panels

Number	Name/Location
112A	Forward Access Door

D. Procedure

SUBTASK 28-41-81-860-001

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-41-81-010-001

- (2) Open this access panel:

Number	Name/Location
112A	Forward Access Door

SUBTASK 28-41-81-910-001

CAUTION: DO NOT REMOVE THE FQIS PROCESSOR UNLESS A HARD FAULT CODE SHOWS THAT IT IS FAULTY. FREQUENT REMOVALS AND INSTALLATIONS OF THE FQIS PROCESSOR CAN ACCIDENTALLY DAMAGE THE CONNECTOR PINS AND CAUSE NUISANCE FAULT CODES AND NUISANCE STATUS CODES.

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(CAUTION PRECEDES)

CAUTION: DO NOT TOUCH THE FQIS PROCESSOR BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE FQIS PROCESSOR.

(3) Do this task: ESDS Handling for Metal Encased Unit Removal, TASK 20-40-12-000-802.

SUBTASK 28-41-81-020-001

(4) Disconnect the electrical connectors D11304, D11306, D11308, D11352, D11354.

SUBTASK 28-41-81-020-002

(5) While you hold up the processor [1], loosen and remove the four bolts [2] and washers [3] that hold the processor [1] in its position.

SUBTASK 28-41-81-020-003

(6) Remove the processor [1] or from the radar bay.

————— **END OF TASK** —————

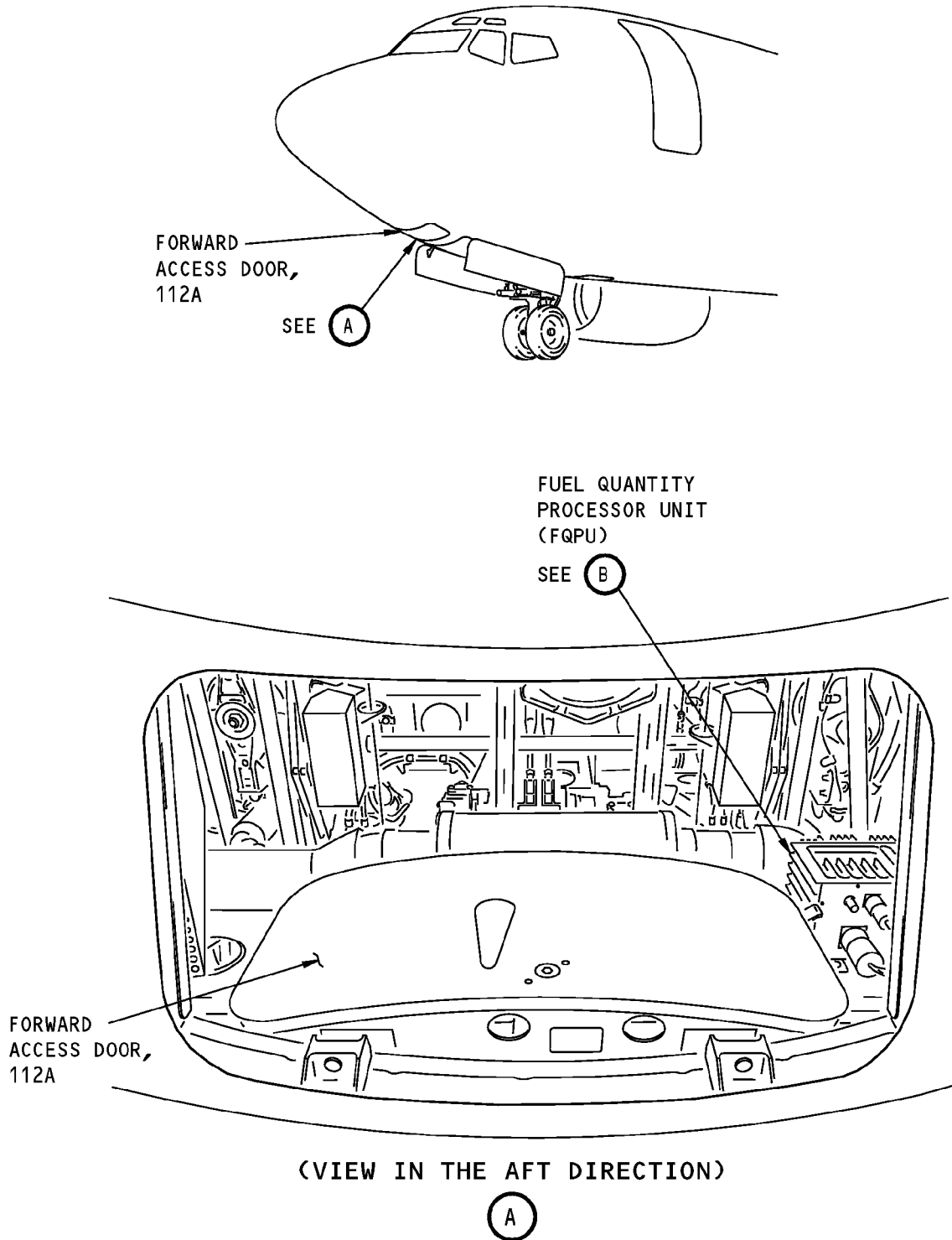
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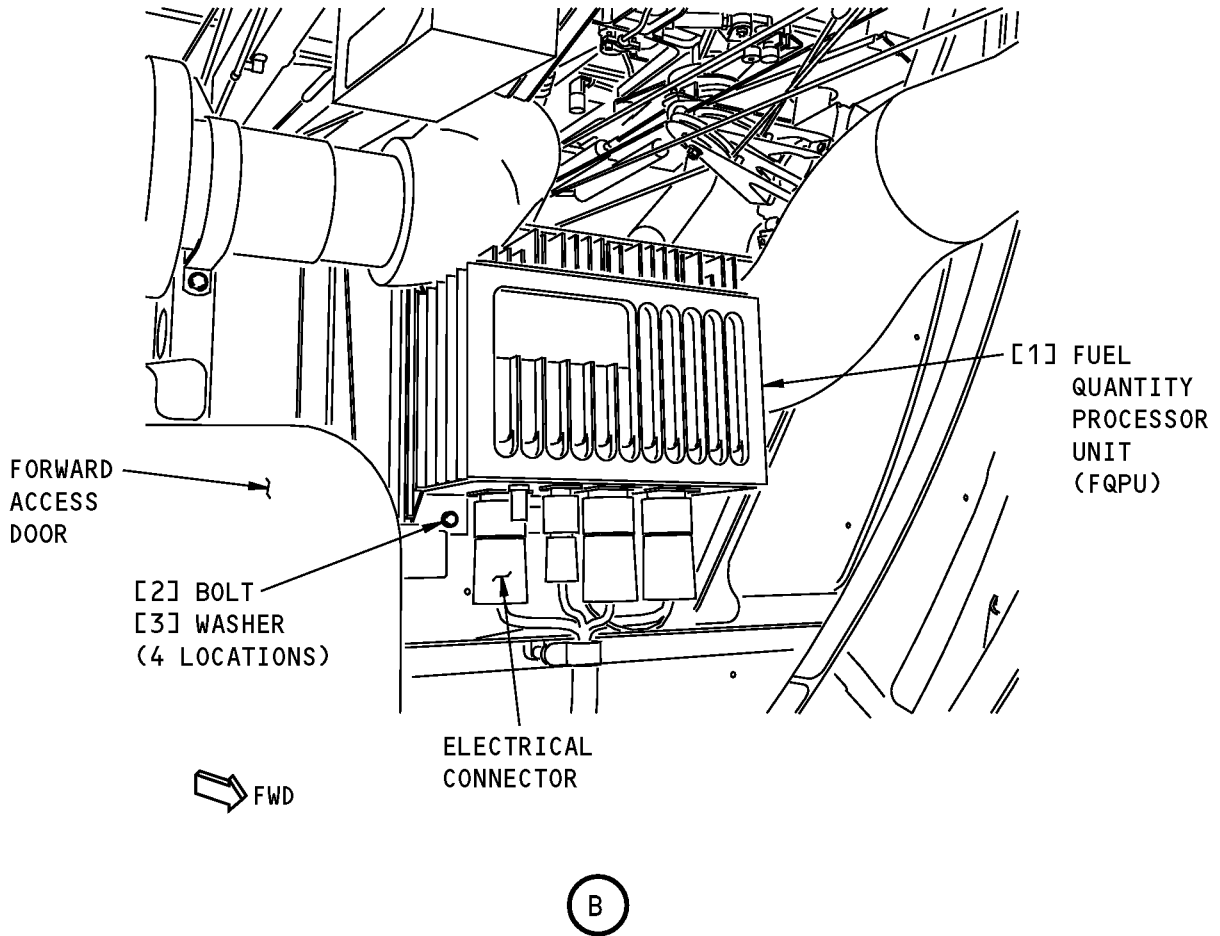


Fuel Quantity Processor Unit (FQPU) Installation
Figure 401 (Sheet 1 of 2)/28-41-81-990-802

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**Fuel Quantity Processor Unit (FQPU) Installation
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TASK 28-41-81-400-801

3. Install the Fuel Quantity Processor Unit

(Figure 401)

A. References

Reference	Title
20-40-12-400-802	ESDS Handling for Metal Encased Unit Installation (P/B 201)
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
28-41-00-710-801	Operational Test - Fuel Quantity Indicating System (P/B 501)

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Processor	28-41-81-01-010	HAP ALL

C. Location Zones

Zone	Area
112	Area Forward of Nose Landing Gear Wheel Well

D. Access Panels

Number	Name/Location
112A	Forward Access Door

E. Procedure

SUBTASK 28-41-81-210-001

(1) Make sure the connector sockets on connectors D11304, D11306, D11308, D11352, D11354 are not damaged.

SUBTASK 28-41-81-910-003

(2) Make sure the pins on the processor [1] that go into the sockets on connectors D11304, D11306, D11308, D11352, D11354 are not damaged.

SUBTASK 28-41-81-910-002

CAUTION: DO NOT DAMAGE THE PINS WHEN YOU INSTALL THE FQIS PROCESSOR. DAMAGE TO THE PINS CAN CAUSE NUISANCE FAULT CODES AND NUISANCE STATUS CODES. DO NOT TOUCH THE PROCESSOR BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE PROCESSOR.

(3) Do this task: ESDS Handling for Metal Encased Unit Installation, TASK 20-40-12-400-802.

SUBTASK 28-41-81-410-001

(4) While you hold up the processor [1], install the four bolts and washers that hold the processor in its position.

SUBTASK 28-41-81-420-001

(5) Connect electrical connectors D11304, D11306, D1308, D11352, and D11354 to the processor [1].

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SUBTASK 28-41-81-860-002

(6) Close these circuit breakers:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-41-81-860-003

(7) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-41-81-740-001

(8) Do this task: Operational Test - Fuel Quantity Indicating System, TASK 28-41-00-710-801.

SUBTASK 28-41-81-410-002

(9) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
112A	Forward Access Door

SUBTASK 28-41-81-860-004

(10) If electrical power is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812

————— **END OF TASK** —————

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FUEL BOOST PUMP PRESSURE SWITCH - REMOVAL/INSTALLATION

1. General

A. There are six pressure switches, one for each of these pumps:

- (1) Left aft fuel boost pump
- (2) Left forward fuel boost pump
- (3) Left center fuel boost pump
- (4) Right aft fuel boost pump
- (5) Right forward fuel boost pump
- (6) Right center fuel boost pump

B. This procedure contains two tasks. The first task removes the pressure switch. The second task installs the pressure switch.

TASK 28-42-11-000-801

2. Remove the Pressure Switch

(Figure 401)

A. References

Reference	Title
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

B. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
511	Left Wing - Leading Edge To Front Spar
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
611	Right Wing - Leading Edge to Front Spar
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

C. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door
511AT	Inboard Leading Edge, Strakelet Upper Panel
611AT	Inboard Leading Edge, Strakelet Upper Access Panel

D. Remove the Pressure Switch of the Left Aft Fuel Boost Pump

SUBTASK 28-42-11-860-001

WARNING: USE THE APPLICABLE PROCEDURE TO INSTALL THE GROUND LOCK ASSEMBLIES. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Make sure the ground lock assemblies are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-42-11-010-001

- (2) Get access to the pressure switch [1] immediately inboard of the left main landing gear.

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SUBTASK 28-42-11-010-005

- (3) To get access to the P92 panel.

Open this access panel:

<u>Number</u>	<u>Name/Location</u>
117A	Electronic Equipment Access Door

SUBTASK 28-42-11-860-002

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

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP ALL			

SUBTASK 28-42-11-020-001

- (5) Remove the electrical connector [3] from the pressure switch [1] (Figure 401).

SUBTASK 28-42-11-210-001

WARNING: MAKE SURE THE QUANTITY OF FUEL IS LESS THAN THE SPECIFIED MAXIMUM. IF THE QUANTITY OF FUEL IS MORE THAN THE SPECIFIED MAXIMUM, FUEL CAN DRAIN FROM THE FUEL TANK WHEN YOU REMOVE THE PRESSURE SWITCH AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (6) Do these steps to make sure the fuel tanks contain less than the minimum quantity of fuel:
 - (a) Make sure the fuel quantity in the center tank is not more than 11,400 pounds (5180 kilograms).

NOTE: The fuel quantity is shown on the central display unit (P2).
 - (b) Completely defuel the No. 1 tank or transfer the fuel out of it (TASK 28-26-00-650-801)

SUBTASK 28-42-11-020-002

- (7) Remove the pressure switch [1] from the boss on the rear spar (Figure 401).

E. Remove the Pressure Switch of the Left Forward Fuel Boost Pump

SUBTASK 28-42-11-860-003

- (1) To get access to the pressure switch for the left forward boost pump.

Open this access panel:

<u>Number</u>	<u>Name/Location</u>
511AT	Inboard Leading Edge, Strakelet Upper Panel

SUBTASK 28-42-11-010-006

- (2) To get access to the P91 panel.

Open this access panel:

<u>Number</u>	<u>Name/Location</u>
117A	Electronic Equipment Access Door

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SUBTASK 28-42-11-860-004

(3) Open these circuit breakers and install safety tags:

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP ALL			

SUBTASK 28-42-11-420-001

(4) Remove the electrical connector [3] from the pressure switch [1] (Figure 401).

SUBTASK 28-42-11-210-031

WARNING: MAKE SURE THE QUANTITY OF FUEL IS LESS THAN THE SPECIFIED MAXIMUM. IF THE QUANTITY OF FUEL IS MORE THAN THE SPECIFIED MAXIMUM, FUEL CAN DRAIN FROM THE FUEL TANK WHEN YOU REMOVE THE PRESSURE SWITCH AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(5) Do these steps to make sure the fuel tanks contain less than the minimum quantity of fuel:

(a) Make sure the fuel quantity in the center tank is not more than 11,400 pounds (5180 kilograms).

NOTE: The fuel quantity is shown on the central display unit (P2).

(b) Completely defuel the No. 1 tank or transfer the fuel out of it (TASK 28-26-00-650-801)

SUBTASK 28-42-11-020-003

(6) Remove the pressure switch [1] from the boss on the front spar (Figure 401).

(a) Discard the O-ring [2].

F. Remove the Pressure Switch of the Left Center Fuel Boost Pump

SUBTASK 28-42-11-860-005

WARNING: USE THE APPLICABLE PROCEDURE TO INSTALL THE GROUND LOCK ASSEMBLIES. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Make sure the ground lock assemblies are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-42-11-010-007

(2) To get access to the P91 panel.

Open this access panel:

<u>Number</u>	<u>Name/Location</u>
117A	Electronic Equipment Access Door

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SUBTASK 28-42-11-860-006

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

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 001-013, 015-026, 028-036			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP ALL			

SUBTASK 28-42-11-020-004

- (4) Remove the electrical connector [3] from the pressure switch [1] (Figure 401).

SUBTASK 28-42-11-210-027

WARNING: MAKE SURE THE QUANTITY OF FUEL IS LESS THAN THE SPECIFIED MAXIMUM. IF THE QUANTITY OF FUEL IS MORE THAN THE SPECIFIED MAXIMUM, FUEL CAN DRAIN FROM THE FUEL TANK WHEN YOU REMOVE THE PRESSURE SWITCH AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Make sure the fuel quantity in the center tank is less than 11,400 pounds (5180 kilograms).

NOTE: The fuel quantity is shown on the central display unit (P2).

SUBTASK 28-42-11-020-005

- (6) Remove the pressure switch [1] from the boss on the rear spar (Figure 401).

- (a) Discard the O-ring [2].

G. Remove the Pressure Switch of the Right Aft Fuel Boost Pump

SUBTASK 28-42-11-860-007

WARNING: USE THE APPLICABLE PROCEDURE TO INSTALL THE GROUND LOCK ASSEMBLIES. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Make sure the ground lock assemblies are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-42-11-010-002

- (2) Get access to the pressure switch [1] immediately inboard of the right main landing gear.

SUBTASK 28-42-11-010-008

- (3) To get access to the P91 panel.

Open this access panel:

<u>Number</u>	<u>Name/Location</u>
117A	Electronic Equipment Access Door

SUBTASK 28-42-11-860-008

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

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

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HAP 037-054, 101-999 (Continued)

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT

HAP ALL

SUBTASK 28-42-11-020-006

(5) Remove the electrical connector [3] from the pressure switch [1] (Figure 401).

SUBTASK 28-42-11-210-032

WARNING: MAKE SURE THE QUANTITY OF FUEL IS LESS THAN THE SPECIFIED MAXIMUM. IF THE QUANTITY OF FUEL IS MORE THAN THE SPECIFIED MAXIMUM, FUEL CAN DRAIN FROM THE FUEL TANK WHEN YOU REMOVE THE PRESSURE SWITCH AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(6) Do these steps to make sure the fuel tanks contain less than the minimum quantity of fuel:

(a) Make sure the fuel quantity in the center tank is not more than 11,400 pounds (5180 kilograms).

NOTE: The fuel quantity is shown on the central display unit (P2).

(b) Completely defuel the No. 2 tank or transfer the fuel out of it (TASK 28-26-00-650-801)

SUBTASK 28-42-11-020-007

(7) Remove the pressure switch [1] from the boss on the rear spar (Figure 401).

(a) Discard the O-ring [2].

H. Remove the Pressure Switch of the Right Forward Fuel Boost Pump

SUBTASK 28-42-11-860-009

(1) To get access to the pressure switch for the right forward boost pump.

Open this access panel:

<u>Number</u>	<u>Name/Location</u>
611AT	Inboard Leading Edge, Strakelet Upper Access Panel

SUBTASK 28-42-11-010-009

(2) To get access to the P92 panel.

Open this access panel:

<u>Number</u>	<u>Name/Location</u>
117A	Electronic Equipment Access Door

SUBTASK 28-42-11-860-010

(3) Open these circuit breakers and install safety tags:

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

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HAP 037-054, 101-999 (Continued)

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD

HAP ALL

SUBTASK 28-42-11-020-008

(4) Remove the electrical connector [3] from the pressure switch [1] (Figure 401).

SUBTASK 28-42-11-210-033

WARNING: MAKE SURE THE QUANTITY OF FUEL IS LESS THAN THE SPECIFIED MAXIMUM. IF THE QUANTITY OF FUEL IS MORE THAN THE SPECIFIED MAXIMUM, FUEL CAN DRAIN FROM THE FUEL TANK WHEN YOU REMOVE THE PRESSURE SWITCH AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(5) Do these steps to make sure the fuel tanks contain less than the minimum quantity of fuel:

(a) Make sure the fuel quantity in the center tank is not more than 11,400 pounds (5180 kilograms).

NOTE: The fuel quantity is shown on the central display unit (P2).

(b) Completely defuel the No. 2 tank or transfer the fuel out of it (TASK 28-26-00-650-801)

SUBTASK 28-42-11-020-009

(6) Remove the pressure switch [1] from the boss on the front spar (Figure 401).

(a) Discard the O-ring [2].

I. Remove the Pressure Switch of the Right Center Fuel Boost Pump

SUBTASK 28-42-11-860-011

WARNING: USE THE APPLICABLE PROCEDURE TO INSTALL THE DOWNLOCK PINS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Make sure the ground lock assemblies are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-42-11-010-010

(2) To get access to the P92 panel.

Open this access panel:

<u>Number</u>	<u>Name/Location</u>
117A	Electronic Equipment Access Door

SUBTASK 28-42-11-860-012

(3) Open these circuit breakers and install safety tags:

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 001-013, 015-026, 028-036			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT

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SUBTASK 28-42-11-020-010

- (4) Remove the electrical connector [3] from the pressure switch [1] (Figure 401).

SUBTASK 28-42-11-210-030

WARNING: MAKE SURE THE QUANTITY OF FUEL IS LESS THAN THE SPECIFIED MAXIMUM. IF THE QUANTITY OF FUEL IS MORE THAN THE SPECIFIED MAXIMUM, FUEL CAN DRAIN FROM THE FUEL TANK WHEN YOU REMOVE THE PRESSURE SWITCH AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Make sure the fuel quantity in the center tank is not more than 11,400 pounds (5180 kilograms).

NOTE: The fuel quantity is shown on the central display unit (P2).

SUBTASK 28-42-11-020-011

- (6) Remove the pressure switch [1] from the boss on the rear spar (Figure 401).
 - (a) Discard the O-ring [2].

————— **END OF TASK** —————

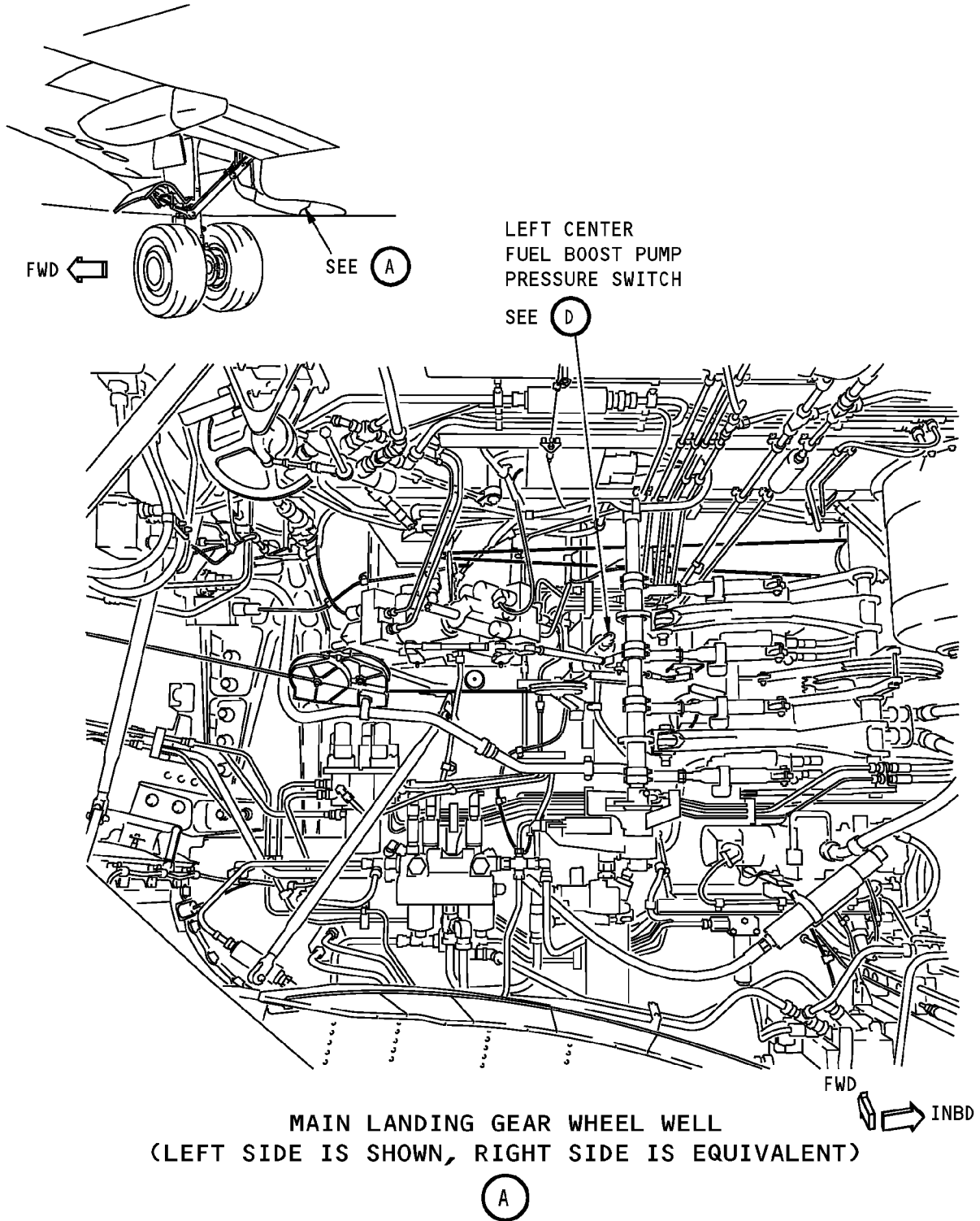
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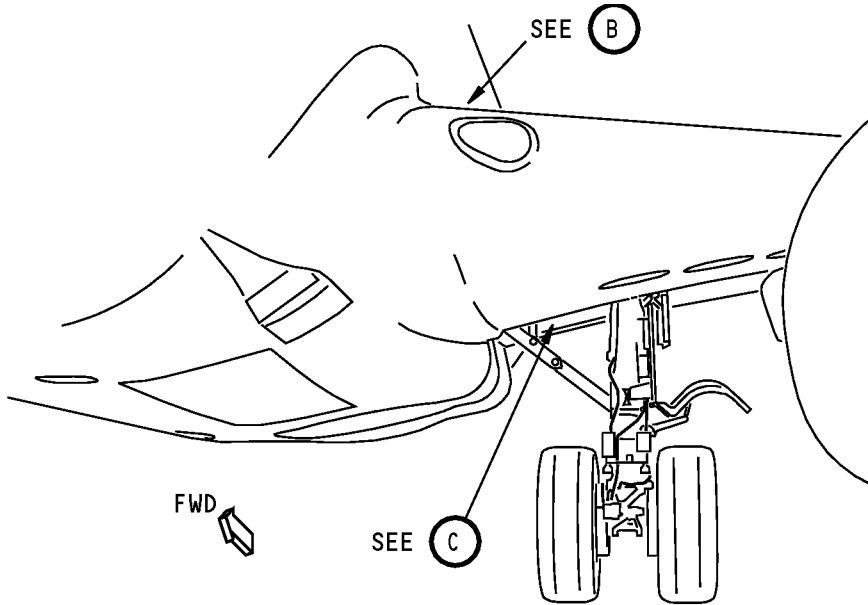
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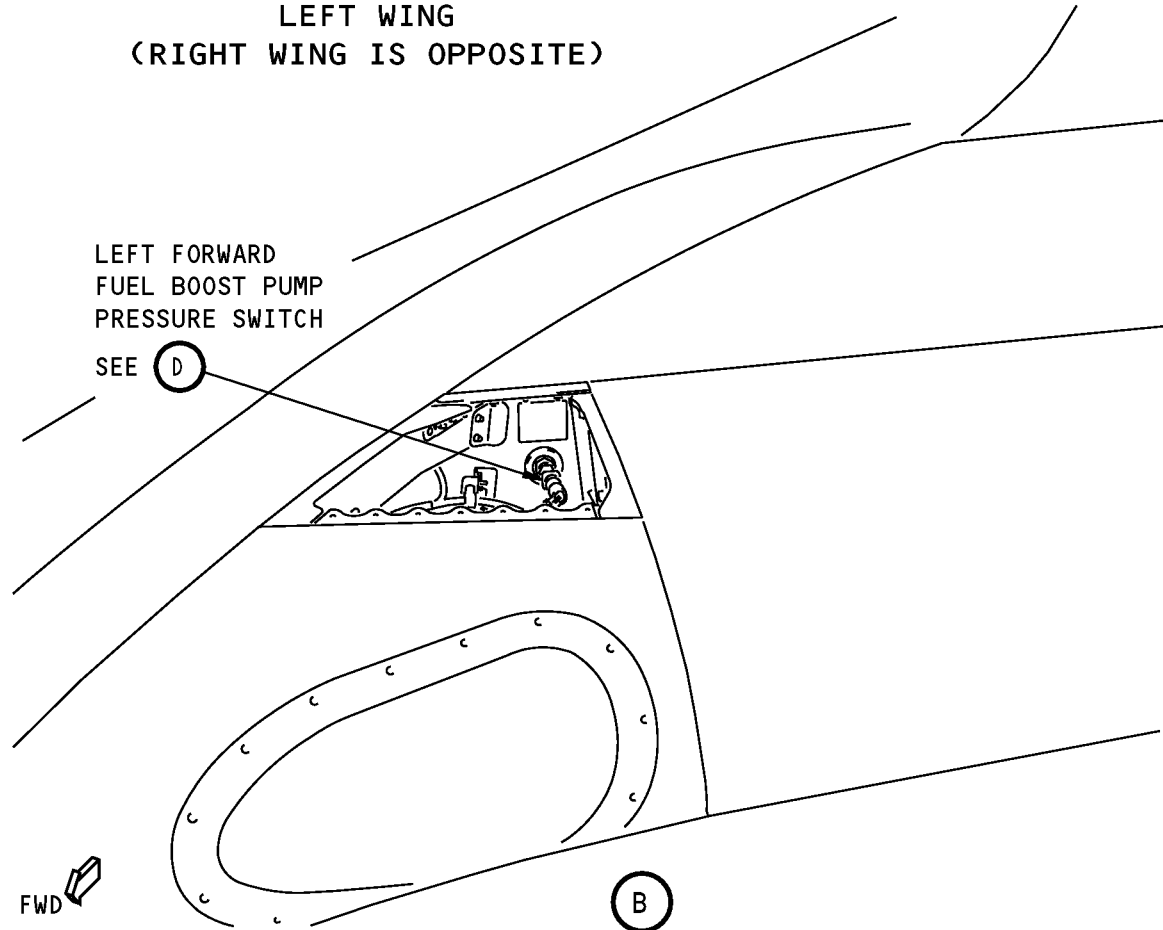
**Fuel Boost Pump Pressure Switch Installation
Figure 401 (Sheet 1 of 3)/28-42-11-990-802**

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**LEFT WING
(RIGHT WING IS OPPOSITE)**



**LEFT FORWARD
FUEL BOOST PUMP
PRESSURE SWITCH**

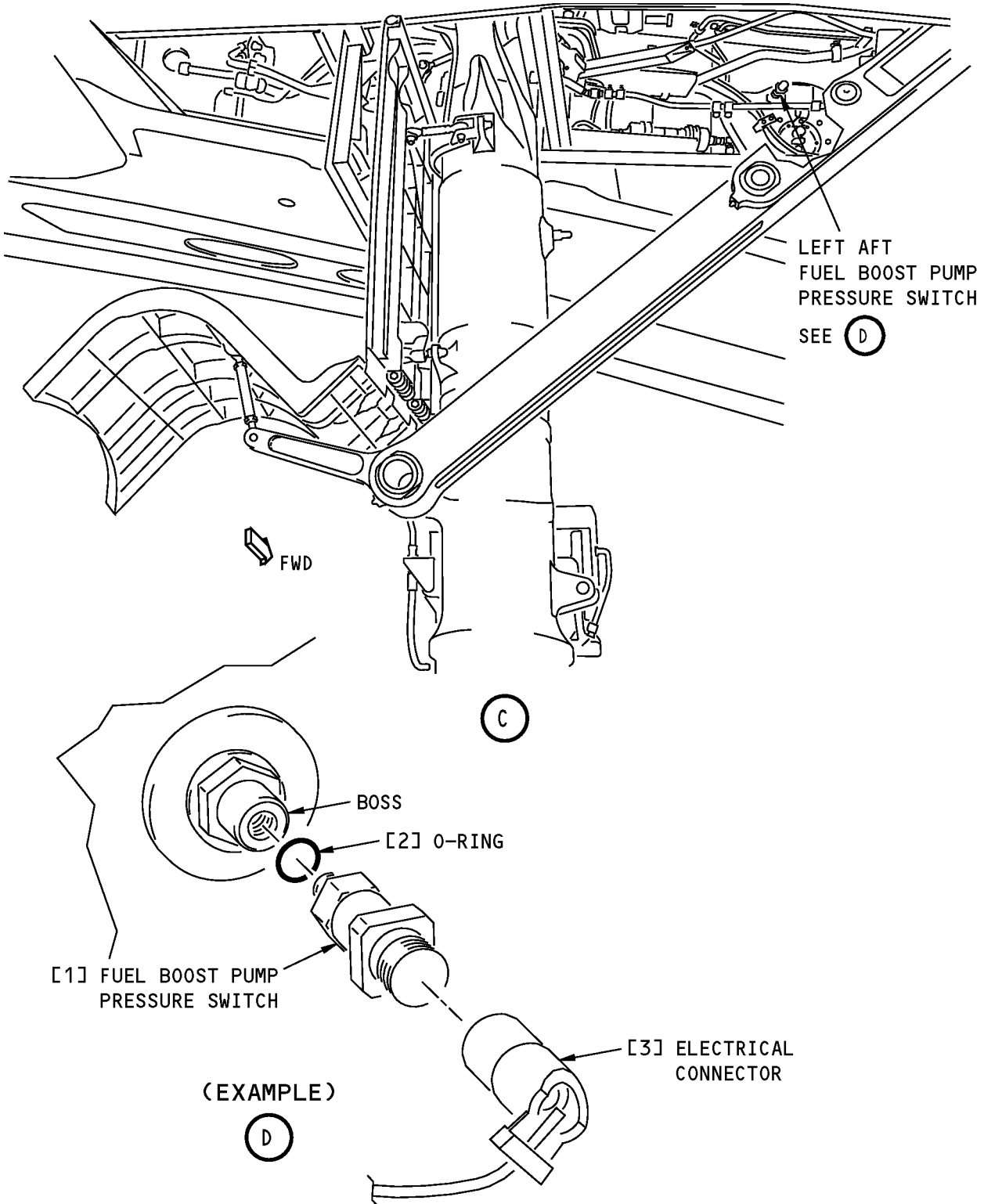
SEE **(D)**

**Fuel Boost Pump Pressure Switch Installation
Figure 401 (Sheet 2 of 3)/28-42-11-990-802**

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**Fuel Boost Pump Pressure Switch Installation
Figure 401 (Sheet 3 of 3)/28-42-11-990-802**

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TASK 28-42-11-420-801

3. Install the Pressure Switch

(Figure 401)

A. General

WARNING: DO NOT OPERATE ANY FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. FUEL VAPORS IN THE TANK MAY IGNITE AND CAUSE A FIRE OR EXPLOSION.

(1) Obey these precautions at all times during this task:

- (a) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.
- (b) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

B. References

Reference	Title
20-10-17-400-801	O-Rings Installation (P/B 401)
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
32-00-01-080-801	Landing Gear Downlock Pins Removal (P/B 201)
SWPM 20-60-03	Special Protection of Electrical Connectors

C. Consumable Materials

Reference	Description	Specification
G50170	Compound - Corrosion Inhibiting Compound, Soft Film, Exterior Use - AV25	
G50171	Compound - Corrosion Inhibiting Compound, Interior Application - D5026NS or ZC-026	

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Pressure switch	28-22-00-01-005	HAP 001-013, 015-026, 028-031
		28-42-11-05-020	HAP ALL
		28-42-11-05A-005	HAP 001-013, 015-026, 028-030
2	O-ring	28-22-00-01-020	HAP 001-013, 015-026, 028-031
		28-42-11-05-025	HAP ALL
		28-42-11-05A-020	HAP 001-013, 015-026, 028-030

E. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
511	Left Wing - Leading Edge To Front Spar
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5

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(Continued)

Zone	Area
611	Right Wing - Leading Edge to Front Spar
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

F. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door
511AT	Inboard Leading Edge, Strakelet Upper Panel
611AT	Inboard Leading Edge, Strakelet Upper Access Panel
621GB	Refuel Access Panel - Slat Station 143.27

G. Install the Pressure Switch of the Left Aft Fuel Boost Pump

SUBTASK 28-42-11-420-002

(1) Install a new O-ring [2] on the pressure switch [1] (TASK 20-10-17-400-801).

SUBTASK 28-42-11-420-003

(2) Install the pressure switch [1] in the boss on the rear spar.

SUBTASK 28-42-11-420-004

(3) Install lockwire on the pressure switch.

SUBTASK 28-42-11-212-001

(4) Before you connect the electrical connector, [3] examine the connector for corrosion.

WARNING: DO THE STEPS BELOW IF THE AIRPLANE OPERATES WHERE DEICING FLUID THAT CONTAINS POTASSIUM FORMATE OR POTASSIUM ACETATE IS USED. ALSO, DO THE STEPS FOR ALL AIRPLANES THAT YOU FOUND CORROSION IN THE ELECTRICAL CONNECTORS IN THE MAIN WHEEL WELL. THE ELECTRICAL CONNECTORS ARE IN A SYSTEM THAT IS NECESSARY FOR SAFE FLIGHT.

(5) If there is corrosion , refer to SWPM 20-60-03

(6) Apply the compound, D5026NS or ZC-026 compound, G50171 to the connector [3]. SWPM 20-60-03

SUBTASK 28-42-11-420-005

(7) Install the electrical connector [3] on the pressure switch [1].

NOTE: Corrosion inhibiting compound is applied to the exterior of the mated electrical connectors after the operational test is completed.

SUBTASK 28-42-11-860-013

(8) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-42-11-210-008

(9) Make sure the LOW PRESSURE AFT - 1 light of the fuel management panel on the overhead panel, P5, comes on.

SUBTASK 28-42-11-860-014

(10) Close these circuit breakers:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
HAP 037-054, 101-999			
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

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HAP 037-054, 101-999 (Continued)

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 001-013, 015-026, 028-036			
D	2	C00826	FUEL BOOST PUMP TANK 1 AFT
HAP ALL			

SUBTASK 28-42-11-010-011

(11) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
117A	Electronic Equipment Access Door

SUBTASK 28-42-11-860-015

(12) Set the FUEL PUMPS AFT - 1 switch of the fuel management panel on the P5 panel to the ON position.

SUBTASK 28-42-11-210-009

(13) Make sure the LOW PRESSURE AFT - 1 light goes off in 15 seconds or less.

SUBTASK 28-42-11-860-016

(14) Push the FUEL PUMPS AFT - 1 switch to the off position.

SUBTASK 28-42-11-210-010

(15) Make sure the LOW PRESSURE AFT - 1 light comes on.

SUBTASK 28-42-11-860-017

(16) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

SUBTASK 28-42-11-390-001

(17) Apply the AV25 compound, G50170 to the mated electrical connector assembly [3] completely, until the compound drips from the connector. SWPM 20-60-03

NOTE: Do not remove the excess corrosion inhibiting compound.

SUBTASK 28-42-11-860-018

WARNING: USE THE APPLICABLE PROCEDURE TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(18) Do this task: Landing Gear Downlock Pins Removal, TASK 32-00-01-080-801.

H. Install the Pressure Switch of the Left Forward Fuel Boost Pump

SUBTASK 28-42-11-420-006

(1) Install a new O-ring [2] on the pressure switch [1] (TASK 20-10-17-400-801).

SUBTASK 28-42-11-020-012

(2) Install the pressure switch [1] in the boss on the front spar.

SUBTASK 28-42-11-020-013

(3) Install lockwire on the pressure switch [1].

SUBTASK 28-42-11-212-002

(4) Before you connect the electrical connector, [3] examine the connector for corrosion.

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WARNING: DO THE STEPS BELOW IF THE AIRPLANE OPERATES WHERE DEICING FLUID THAT CONTAINS POTASSIUM FORMATE OR POTASSIUM ACETATE IS USED. ALSO, DO THE STEPS FOR ALL AIRPLANES THAT YOU FOUND CORROSION IN THE ELECTRICAL CONNECTORS IN THE MAIN WHEEL WELL. THE ELECTRICAL CONNECTORS ARE IN A SYSTEM THAT IS NECESSARY FOR SAFE FLIGHT.

- (5) If there is corrosion , refer to SWPM 20-60-03
- (6) Apply the compound, D5026NS or ZC-026 compound, G50171 to the connector [3]. SWPM 20-60-03

SUBTASK 28-42-11-020-014

- (7) Install the electrical connector [3] on the pressure switch [1].

NOTE: Corrosion inhibiting compound is applied to the exterior of the mated electrical connectors after the operational test is completed.

SUBTASK 28-42-11-860-019

- (8) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-42-11-210-011

- (9) Make sure the LOW PRESSURE FWD - 1 light of the fuel management panel on the overhead panel, P5, comes on.

SUBTASK 28-42-11-860-020

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

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP 001-013, 015-026, 028-036			
D	2	C00827	FUEL BOOST PUMP TANK 1 FWD
HAP ALL			

SUBTASK 28-42-11-010-012

- (11) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
117A	Electronic Equipment Access Door

SUBTASK 28-42-11-860-021

- (12) Push the FUEL PUMPS FWD - 1 switch of the fuel management panel on the P5 panel to the ON position.

SUBTASK 28-42-11-210-012

- (13) Make sure the LOW PRESSURE FWD - 1 light goes off in 15 seconds or less.

SUBTASK 28-42-11-860-022

- (14) Push the FUEL PUMPS FWD - 1 switch to the off position.

SUBTASK 28-42-11-210-013

- (15) Make sure the LOW PRESSURE FWD - 1 light comes on.

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SUBTASK 28-42-11-390-002

- (16) Apply the AV25 compound, G50170 to the mated electrical connector assembly [3] completely, until the compound drips from the connector. SWPM 20-60-03

NOTE: Do not remove the excess corrosion inhibiting compound.

SUBTASK 28-42-11-860-023

- (17) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
511AT	Inboard Leading Edge, Strakelet Upper Panel

that you opened before to get access to the pressure switch [1].

SUBTASK 28-42-11-860-024

- (18) If electrical power is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812

I. Install the Pressure Switch of the Left Center Tank Fuel Boost Pump

SUBTASK 28-42-11-420-007

- (1) Install a new O-ring [2] on the pressure switch [1] (TASK 20-10-17-400-801).

SUBTASK 28-42-11-020-015

- (2) Install the pressure switch [1] in the boss on the front spar.

SUBTASK 28-42-11-020-016

- (3) Install lockwire on the pressure switch [1].

SUBTASK 28-42-11-212-003

- (4) Before you connect the electrical connector, [3] examine the connector for corrosion.

WARNING: DO THE STEPS BELOW IF THE AIRPLANE OPERATES WHERE DEICING FLUID THAT CONTAINS POTASSIUM FORMATE OR POTASSIUM ACETATE IS USED. ALSO, DO THE STEPS FOR ALL AIRPLANES THAT YOU FOUND CORROSION IN THE ELECTRICAL CONNECTORS IN THE MAIN WHEEL WELL. THE ELECTRICAL CONNECTORS ARE IN A SYSTEM THAT IS NECESSARY FOR SAFE FLIGHT.

- (5) If there is corrosion , refer to SWPM 20-60-03

- (6) Apply the compound, D5026NS or ZC-026 compound, G50171 to the connector [3] SWPM 20-60-03

SUBTASK 28-42-11-020-017

- (7) Install the electrical connector [3] on the pressure switch [1].

NOTE: Corrosion inhibiting compound is applied to the exterior of the mated electrical connectors after the operational test is completed.

SUBTASK 28-42-11-860-025

- (8) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-42-11-210-014

- (9) Make sure the LOW PRESSURE CTR L light of the fuel management panel on the overhead panel, P5, is off.

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SUBTASK 28-42-11-860-026

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

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
HAP 001-013, 015-026, 028-036			
D	6	C00845	FUEL BOOST PUMP CTR TANK LEFT

HAP ALL

SUBTASK 28-42-11-010-013

(11) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
117A	Electronic Equipment Access Door

SUBTASK 28-42-11-010-003

(12) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-42-11-210-034

(13) Make sure there is a minimum of 3000 pounds (1360 kilograms) of fuel in the center tank.

SUBTASK 28-42-11-860-027

(14) Set the FUEL PUMPS CTR L switch of the fuel management panel on the P5 panel to the ON position.

SUBTASK 28-42-11-210-015

(15) Make sure the LOW PRESSURE CTR L light comes on, then goes off in 15 seconds or less.

SUBTASK 28-42-11-860-028

(16) Set the FUEL PUMPS CTR L switch to the off position.

SUBTASK 28-42-11-210-016

(17) Make sure the LOW PRESSURE CTR L light is off.

SUBTASK 28-42-11-390-003

(18) Apply the AV25 compound, G50170 to the mated electrical connector assembly [3] completely, until the compound drips from the connector. SWPM 20-60-03

NOTE: Do not remove the excess corrosion inhibiting compound.

SUBTASK 28-42-11-410-001

(19) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-42-11-860-029

WARNING: USE THE APPLICABLE PROCEDURE TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(20) Do this task: Landing Gear Downlock Pins Removal, TASK 32-00-01-080-801.

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SUBTASK 28-42-11-860-030

- (21) If it is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812

J. Install the Pressure Switch of the Right Aft Fuel Boost Pump

SUBTASK 28-42-11-420-008

- (1) Install a new O-ring [2] on the pressure switch [1] (TASK 20-10-17-400-801).

SUBTASK 28-42-11-420-009

- (2) Install the pressure switch [1] in the boss on the rear spar.

SUBTASK 28-42-11-420-010

- (3) Install lockwire on the pressure switch [1].

SUBTASK 28-42-11-212-004

- (4) Before you connect the electrical connector, [3] examine the connector for corrosion.

WARNING: DO THE STEPS BELOW IF THE AIRPLANE OPERATES WHERE DEICING FLUID THAT CONTAINS POTASSIUM FORMATE OR POTASSIUM ACETATE IS USED. ALSO, DO THE STEPS FOR ALL AIRPLANES THAT YOU FOUND CORROSION IN THE ELECTRICAL CONNECTORS IN THE MAIN WHEEL WELL. THE ELECTRICAL CONNECTORS ARE IN A SYSTEM THAT IS NECESSARY FOR SAFE FLIGHT.

- (5) If there is corrosion , refer to SWPM 20-60-03
- (6) Apply the compound, D5026NS or ZC-026 compound, G50171 to the connector [3] SWPM 20-60-03

SUBTASK 28-42-11-420-011

- (7) Install the electrical connector [3] on the pressure switch [1].

NOTE: Corrosion inhibiting compound is applied to the exterior of the mated electrical connectors after the operational test is completed.

SUBTASK 28-42-11-860-031

- (8) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-42-11-210-017

- (9) Make sure the LOW PRESSURE AFT - 2 light of the fuel management panel on the overhead panel, P5, comes on.

SUBTASK 28-42-11-860-032

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

Power Distribution Panel Number 1, P91

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
HAP 001-013, 015-026, 028-036			
D	4	C00828	FUEL BOOST PUMP TANK 2 AFT

HAP ALL

SUBTASK 28-42-11-010-014

- (11) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
117A	Electronic Equipment Access Door

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SUBTASK 28-42-11-860-033

- (12) Push the FUEL PUMPS AFT - 2 switch of the fuel management panel on the P5 panel to the ON position.

SUBTASK 28-42-11-210-018

- (13) Make sure the LOW PRESSURE AFT - 2 light goes off in 15 seconds or less.

SUBTASK 28-42-11-860-034

- (14) Set the FUEL PUMPS AFT - 2 switch to the off position.

SUBTASK 28-42-11-210-019

- (15) Make sure the LOW PRESSURE AFT - 2 light comes on.

SUBTASK 28-42-11-860-035

- (16) If it is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812

SUBTASK 28-42-11-390-004

- (17) Apply the AV25 compound, G50170 to the mated electrical connector assembly [3] completely, until the compound drips from the connector. SWPM 20-60-03

NOTE: Do not remove the excess corrosion inhibiting compound.

SUBTASK 28-42-11-860-036

WARNING: USE THE APPLICABLE PROCEDURE TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (18) Do this task: Landing Gear Downlock Pins Removal, TASK 32-00-01-080-801.

K. Install the Pressure Switch of the Right Forward Fuel Boost Pump

SUBTASK 28-42-11-420-012

- (1) Install a new O-ring [2] on the pressure switch [1] (TASK 20-10-17-400-801).

SUBTASK 28-42-11-020-018

- (2) Install the pressure switch [1] in the boss on the front spar.

SUBTASK 28-42-11-020-019

- (3) Install lockwire on the pressure switch [1].

SUBTASK 28-42-11-212-005

- (4) Before you connect the electrical connector, [3] examine the connector for corrosion.

WARNING: DO THE STEPS BELOW IF THE AIRPLANE OPERATES WHERE DEICING FLUID THAT CONTAINS POTASSIUM FORMATE OR POTASSIUM ACETATE IS USED. ALSO, DO THE STEPS FOR ALL AIRPLANES THAT YOU FOUND CORROSION IN THE ELECTRICAL CONNECTORS IN THE MAIN WHEEL WELL. THE ELECTRICAL CONNECTORS ARE IN A SYSTEM THAT IS NECESSARY FOR SAFE FLIGHT.

- (5) If there is corrosion , refer to SWPM 20-60-03

- (6) Apply the compound, D5026NS or ZC-026 compound, G50171 to the connector [3] SWPM 20-60-03

SUBTASK 28-42-11-020-020

- (7) Install the electrical connector [3] on the pressure switch [1].

NOTE: Corrosion inhibiting compound is applied to the exterior of the mated electrical connectors after the operational test is completed.

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SUBTASK 28-42-11-860-037

(8) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-42-11-210-020

(9) Make sure the LOW PRESSURE FWD - 2 light of the fuel management panel on the overhead panel, P5, comes on.

SUBTASK 28-42-11-860-038

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

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
HAP 001-013, 015-026, 028-036			
D	4	C00829	FUEL BOOST PUMP TANK 2 FWD

HAP ALL

SUBTASK 28-42-11-010-015

(11) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
117A	Electronic Equipment Access Door

SUBTASK 28-42-11-860-039

(12) Set the FUEL PUMPS FWD - 2 switch of the fuel management panel on the P5 panel to the ON position.

SUBTASK 28-42-11-210-021

(13) Make sure the LOW PRESSURE FWD - 2 light goes off in 15 seconds or less.

SUBTASK 28-42-11-860-040

(14) Set the FUEL PUMPS FWD - 2 on the P5 panel to the OFF position.

SUBTASK 28-42-11-210-022

(15) Make sure the LOW PRESSURE FWD - 2 light comes on.

SUBTASK 28-42-11-390-005

(16) Apply the AV25 compound, G50170 to the mated electrical connector assembly [3] completely, until the compound drips from the connector.SWPM 20-60-03

NOTE: Do not remove the excess corrosion inhibiting compound.

SUBTASK 28-42-11-860-041

(17) Close this access panel that you opened before to get access to the pressure switch:

<u>Number</u>	<u>Name/Location</u>
611AT	Inboard Leading Edge, Strakelet Upper Access Panel

SUBTASK 28-42-11-860-042

(18) If it is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812

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L. Install the Pressure Switch of the Right Center Fuel Boost Pump

SUBTASK 28-42-11-420-013

- (1) Install a new O-ring [2] on the pressure switch [1] (TASK 20-10-17-400-801).

SUBTASK 28-42-11-020-021

- (2) Install the pressure switch [1] in the boss on the front spar.

SUBTASK 28-42-11-020-022

- (3) Install lockwire on the pressure switch [1].

SUBTASK 28-42-11-212-006

- (4) Before you connect the electrical connector, [3] examine the connector for corrosion.

WARNING: DO THE STEPS BELOW IF THE AIRPLANE OPERATES WHERE DEICING FLUID THAT CONTAINS POTASSIUM FORMATE OR POTASSIUM ACETATE IS USED. ALSO, DO THE STEPS FOR ALL AIRPLANES THAT YOU FOUND CORROSION IN THE ELECTRICAL CONNECTORS IN THE MAIN WHEEL WELL. THE ELECTRICAL CONNECTORS ARE IN A SYSTEM THAT IS NECESSARY FOR SAFE FLIGHT.

- (5) If there is corrosion , refer to SWPM 20-60-03

- (6) Apply the compound, D5026NS or ZC-026 compound, G50171 to the connector [3] SWPM 20-60-03

SUBTASK 28-42-11-020-023

- (7) Install the electrical connector [3] on the pressure switch [1].

NOTE: Corrosion inhibiting compound is applied to the exterior of the mated electrical connectors after the operational test is completed.

SUBTASK 28-42-11-860-043

- (8) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-42-11-210-023

- (9) Make sure the LOW PRESSURE CTR R light of the fuel management panel on the overhead panel, P5, is off.

SUBTASK 28-42-11-860-044

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

Power Distribution Panel Number 2, P92

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
HAP 037-054, 101-999			
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT
HAP 001-013, 015-026, 028-036			
D	6	C00846	FUEL BOOST PUMP CTR TANK RIGHT

HAP ALL

SUBTASK 28-42-11-010-016

- (11) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
117A	Electronic Equipment Access Door

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SUBTASK 28-42-11-010-004

(12) Open this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-42-11-210-035

(13) Make sure there is a minimum of 3000 pounds (1360 kilograms) of fuel in the center tank.

SUBTASK 28-42-11-860-045

(14) Push the FUEL PUMPS CTR R switch on the fuel management panel on the P5 panel to the ON position.

SUBTASK 28-42-11-210-024

(15) Make sure the LOW PRESSURE CTR R light comes on, then goes off in 15 seconds or less.

SUBTASK 28-42-11-860-046

(16) Set the FUEL PUMPS CTR R switch to the off position.

SUBTASK 28-42-11-210-025

(17) Make sure the LOW PRESSURE CTR R light is off.

SUBTASK 28-42-11-390-006

(18) Apply the AV25 compound, G50170 to the mated electrical connector assembly [3] completely, until the compound drips from the connector. SWPM 20-60-03

NOTE: Do not remove the excess corrosion inhibiting compound.

SUBTASK 28-42-11-410-002

(19) Close this access panel:

<u>Number</u>	<u>Name/Location</u>
621GB	Refuel Access Panel - Slat Station 143.27

SUBTASK 28-42-11-860-047

WARNING: USE THE APPLICABLE PROCEDURE TO REMOVE THE LANDING GEAR DOWNLOCK PINS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(20) Do this task: Landing Gear Downlock Pins Removal, TASK 32-00-01-080-801.

SUBTASK 28-42-11-860-048

(21) If it is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812

————— **END OF TASK** —————

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FUEL TEMPERATURE INDICATING SYSTEM - ADJUSTMENT/TEST

1. General

- A. This procedure has these tasks:
(1) Fuel Temperature Indicating System Test
(2) Fuel Temperature Bulb Resistance Test.
B. The fuel temperature indicating system test has these two parts:
(1) A test of the fuel temperature bulb
(2) A test of the fuel temperature indicator.
C. To do the test for the bulb, you measure the temperature at the bulb with a master thermometer. You then compare the value on the temperature indicator with the value on the master thermometer.
D. To do the test for the temperature indicator, you compare the value on the airplane temperature indicator with the value on a spare temperature indicator.

NOTE: The spare temperature indicator is not installed on the airplane, but is equipment necessary to do the test.

TASK 28-43-00-710-801

2. Fuel Temperature Indicating System Test

(Figure 501 Figure 502)

A. References

Table with 2 columns: Reference, Title. Rows: 24-22-00-860-811 Supply Electrical Power (P/B 201), 24-22-00-860-812 Remove Electrical Power (P/B 201)

B. Tools/Equipment

Table with 2 columns: Reference, Description. Row: STD-1336 Thermometer - Digital, 0-150 +/- 2 Degrees F, with a Probe, Thermocouple or Equivalent

C. Location Zones

Table with 2 columns: Zone, Area. Rows: 211 Flight Compartment - Left, 551 Left Wing - Rear Spar To Landing Gear Support Beam

D. Procedure

SUBTASK 28-43-00-860-001

- (1) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-43-00-860-002

- (2) Make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-3

Table with 4 columns: Row, Col, Number, Name. Row: A, 7, C00355, FUEL TEMP IND

SUBTASK 28-43-00-860-003

- (3) Permit the temperature to become stable for 10 minutes.

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SUBTASK 28-43-00-970-001

(4) Write the values shown on the airplane temperature indicator on the P5 panel.

SUBTASK 28-43-00-010-001

(5) Open the fixed trailing edge access panel immediately outboard of the left main landing gear.

SUBTASK 28-43-00-020-001

(6) Remove the fuel temperature bulb.

NOTE: The fuel temperature bulb is on the aft side of the aft spar. It is on the outboard side of the left main landing gear.

(a) Turn the locking cap for the temperature bulb to release the bulb from the pin.

(b) Pull the bulb from the housing.

SUBTASK 28-43-00-970-002

(7) Measure the temperature in the bulb housing.

(a) Put the 0-150 +/- 2 degrees F digital thermometer, STD-1336 in the bulb housing.

(b) Permit the temperature to become stable.

(c) Write the temperature shown on the thermometer.

SUBTASK 28-43-00-970-003

(8) Compare the value on the 0-150 +/- 2 degrees F digital thermometer, STD-1336 and the value on the fuel temperature indicator.

(a) The two values must be the same with a tolerance of $\pm 4^{\circ}\text{C}$.

SUBTASK 28-43-00-420-001

(9) Put the fuel temperature bulb back in the housing.

SUBTASK 28-43-00-860-004

(10) Open this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	7	C00355	FUEL TEMP IND

SUBTASK 28-43-00-710-001

(11) Monitor the value shown on the fuel temperature indicator.

(a) The pointer on the indicator must go back to its usual position at the bottom of the scale.

SUBTASK 28-43-00-970-004

(12) Write the value shown on the fuel temperature indicator.

SUBTASK 28-43-00-020-002

(13) Disconnect the electrical connector from the fuel temperature indicator on the airplane.

SUBTASK 28-43-00-420-002

(14) Connect the electrical connector to a spare fuel temperature indicator.

NOTE: This fuel temperature indicator is not installed on the airplane. A new or certified fuel temperature indicator is used to make sure the fuel temperature indicator installed on the airplane operates correctly.

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SUBTASK 28-43-00-860-005

(15) Close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	7	C00355	FUEL TEMP IND

SUBTASK 28-43-00-970-005

(16) Compare the value shown on the spare indicator with the value from the fuel temperature indicator that you wrote before this step.

(a) The values must be the same with a tolerance of $\pm 5^{\circ}\text{C}$.

SUBTASK 28-43-00-860-006

(17) Open this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	7	C00355	FUEL TEMP IND

SUBTASK 28-43-00-020-003

(18) Disconnect the spare fuel temperature indicator.

SUBTASK 28-43-00-420-003

(19) Connect the fuel temperature indicator on the airplane to the electrical connector.

SUBTASK 28-43-00-860-007

(20) Close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	7	C00355	FUEL TEMP IND

SUBTASK 28-43-00-970-006

(21) Make sure the value shown on the fuel temperature indicator is the same as it was before you did the test.

SUBTASK 28-43-00-410-001

(22) Close the fixed leading edge access door immediately outboard of the left main landing gear.

SUBTASK 28-43-00-860-008

(23) If electrical power is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812.

————— **END OF TASK** —————

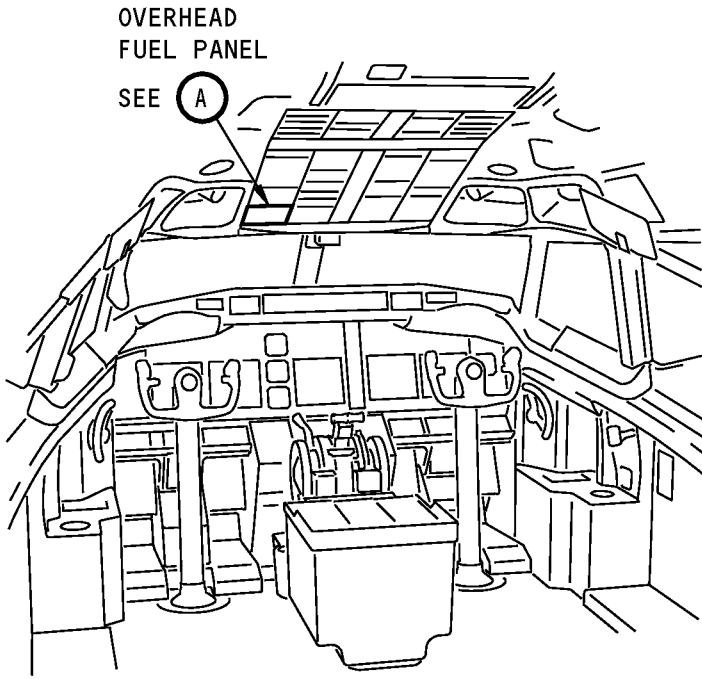
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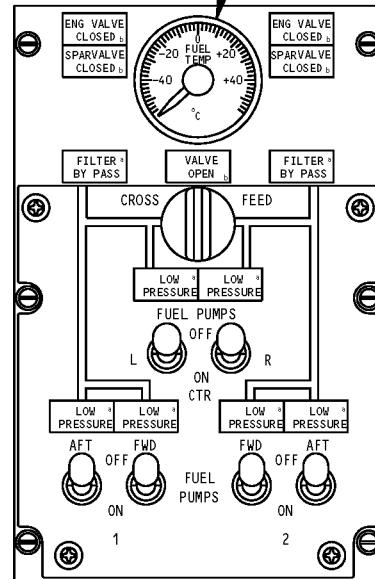
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FLIGHT COMPARTMENT

FUEL TEMPERATURE INDICATOR



OVERHEAD FUEL PANEL

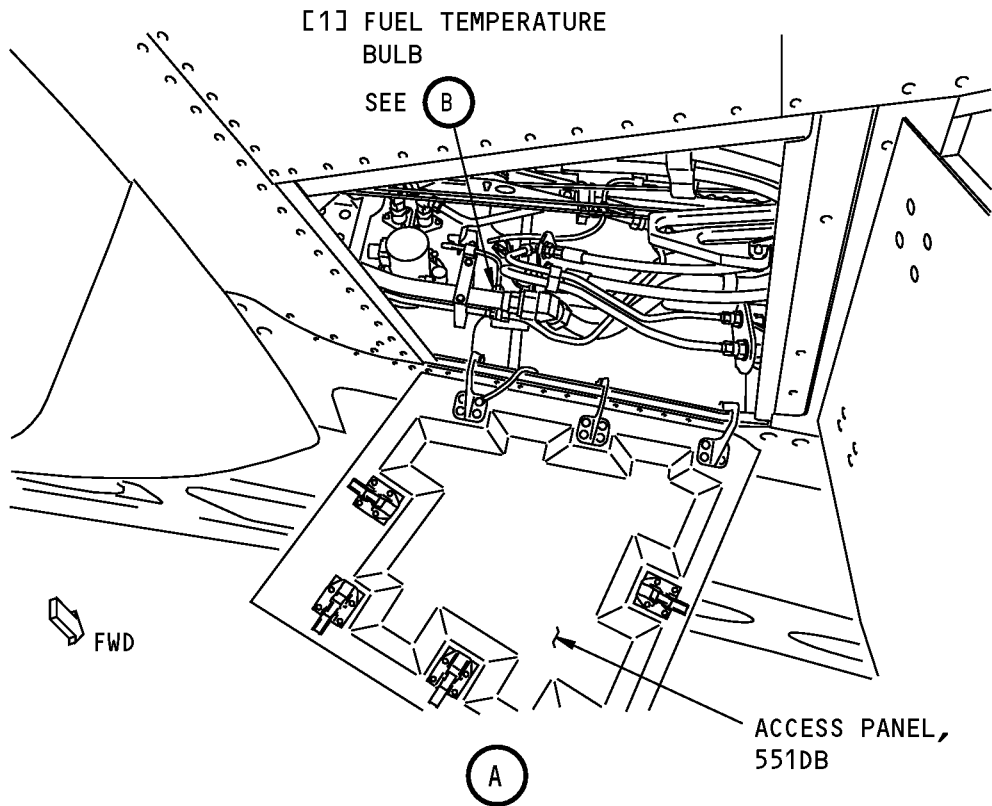
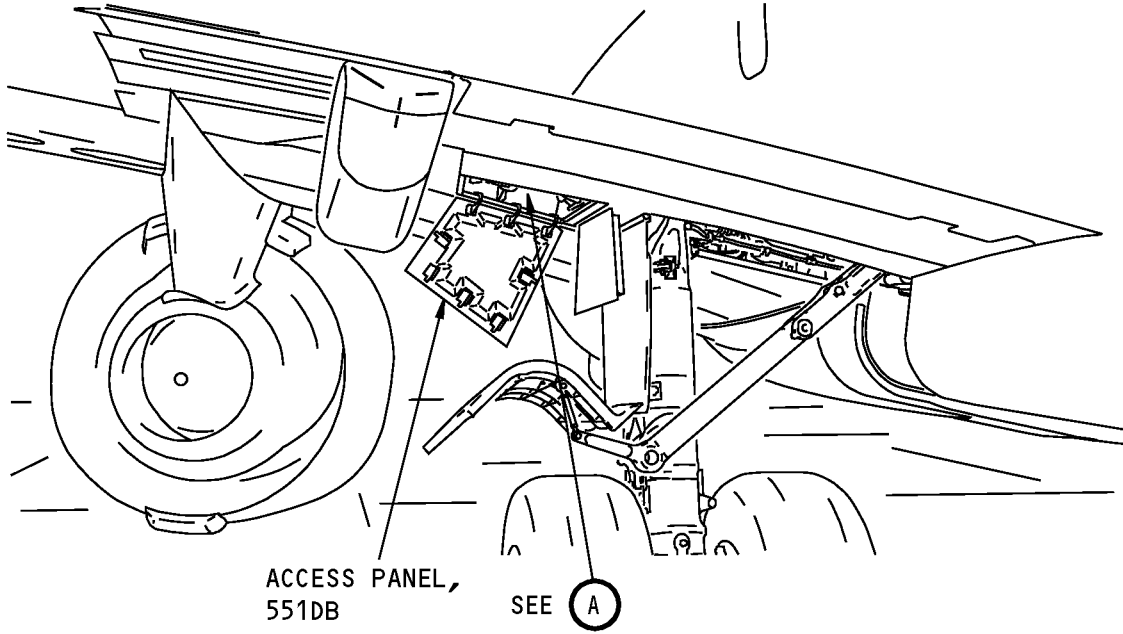


**Fuel Temperature Indicator
Figure 501/28-43-00-990-803**

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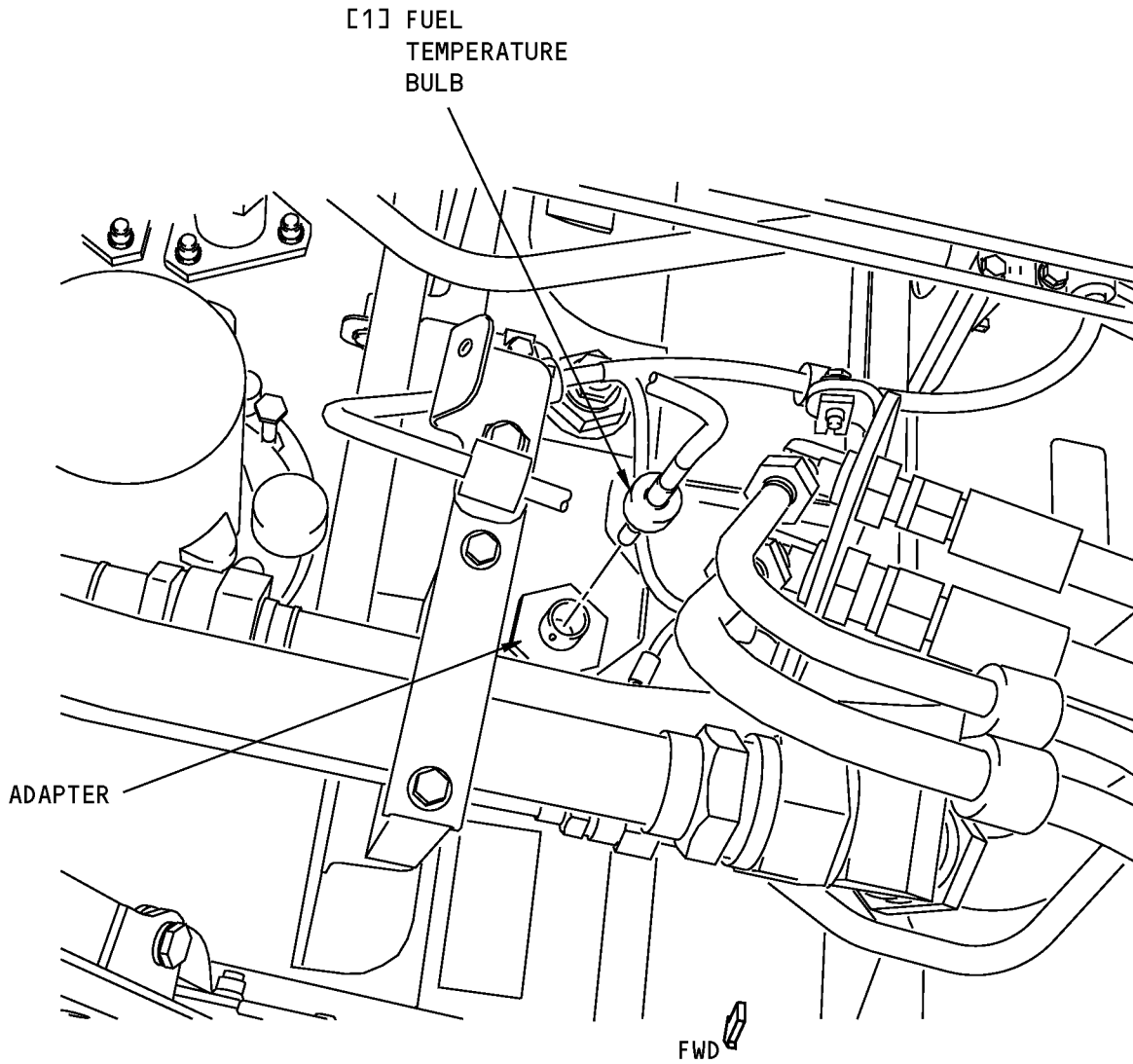
**Fuel Temperature Bulb Location
Figure 502 (Sheet 1 of 2)/28-43-00-990-804**

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FUEL TEMPERATURE BULB

(B)

**Fuel Temperature Bulb Location
Figure 502 (Sheet 2 of 2)/28-43-00-990-804**

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TASK 28-43-00-760-801

3. Fuel Temperature Bulb Resistance Test

(Figure 501 Figure 502)

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
WDM 28-42-11	Wiring Diagram Manual

B. Tools/Equipment

Reference	Description
STD-1336	Thermometer - Digital, 0-150 +/- 2 Degrees F, with a Probe, Thermocouple or Equivalent

C. Location Zones

Zone	Area
211	Flight Compartment - Left
551	Left Wing - Rear Spar To Landing Gear Support Beam

D. Procedure

SUBTASK 28-43-00-860-009

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-43-00-860-010

(2) Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	7	C00355	FUEL TEMP IND

SUBTASK 28-43-00-010-002

(3) Open the fixed trailing edge access panel immediately outboard of the left main landing gear.

SUBTASK 28-43-00-020-004

(4) Do these steps to remove the fuel temperature bulb:

NOTE: The fuel temperature bulb is on the aft side of the aft spar. It is on the outboard side of the left main landing gear.

(a) Turn the locking cap for the temperature bulb to release the bulb from the pin.

(b) Pull the bulb from the housing.

SUBTASK 28-43-00-970-007

(5) Measure the temperature in the bulb housing.

(a) Put the 0-150 +/- 2 degrees F digital thermometer, STD-1336 in the bulb housing.

(b) Permit the temperature to become stable.

(c) Write the temperature shown on the 0-150 +/- 2 degrees F digital thermometer, STD-1336.

SUBTASK 28-43-00-020-005

(6) Disconnect the connector, D616, from the fuel temperature indicator in the flight compartment (WDM 28-42-11).

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SUBTASK 28-43-00-020-006

- (7) Disconnect the ground GD476-DC on the A leg of the temperature sensor wiring (WDM 28-42-11).

SUBTASK 28-43-00-970-008

- (8) Measure the resistance from pin 3 to pin 4 on the connector D616.

SUBTASK 28-43-00-970-009

- (9) Use the subsequent table of sensor temperature and resistance values to compare the resistance measurement with the temperature of the sensor.

NOTE: The resistance measured by this procedure includes the resistance of the wiring between the indicator and the sensor, approximately 0.8 ohms for 100 feet (30.5 meters) of wiring.

Table 501/28-43-00-993-801

TEMPERATURE (degrees Celsius)	RESISTANCE (ohms)
-30	80.56 + 0.40
-20	83.77 + 0.40
-10	87.04 + 0.40
0	90.38 + 0.40
10	93.80 + 0.40
20	97.31 + 0.40
30	100.91 + 0.40
40	104.60 + 0.40
50	108.39 + 0.40
60	112.28 + 0.40

SUBTASK 28-43-00-420-004

- (10) Connect the connector, D616, to the fuel temperature indicator in the flight compartment again (WDM 28-42-11).

SUBTASK 28-43-00-420-005

- (11) Connect the ground GD476-DC on the A leg of the temperature sensor wiring to ground again (WDM 28-42-11).

SUBTASK 28-43-00-420-006

- (12) Do these steps to install the temperature bulb again:
 - (a) Hold the temperature bulb by the locking cap.
 - (b) Put the fuel temperature bulb into the bulb housing.
 - (c) Push the fuel temperature bulb into the housing until it touches the pin.
 - (d) Turn the locking cap to lock it around the pin.

SUBTASK 28-43-00-410-002

- (13) Close the fixed leading edge access door immediately outboard of the left main landing gear.

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SUBTASK 28-43-00-860-011

(14) Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

<u>Row</u>	<u>Col</u>	<u>Number</u>	<u>Name</u>
A	7	C00355	FUEL TEMP IND

SUBTASK 28-43-00-860-012

(15) If electrical power is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812.

————— **END OF TASK** —————

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FUEL TEMPERATURE BULB - REMOVAL/INSTALLATION

1. General

- A. This procedure has two tasks:
(1) A task to remove the fuel temperature bulb
(2) A task to install the fuel temperature bulb.

TASK 28-43-11-000-801

2. Fuel Temperature Bulb Removal

Figure 401

A. Location Zones

Table with 2 columns: Zone, Area. Row 1: 561, Left Wing - Rear Spar to Trailing Edge, Outboard Of Inboard Flap, Inboard of Fixed Trailing Edge

B. Procedure

SUBTASK 28-43-11-860-001

- (1) Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Table with 4 columns: Row, Col, Number, Name. Row 1: A, 7, C00355, FUEL TEMP IND

SUBTASK 28-43-11-010-001

- (2) Open the fixed trailing edge access panel immediately outboard of the landing gear.

SUBTASK 28-43-11-020-001

- (3) Cut the wires that go to the fuel temperature bulb.

NOTE: The fuel temperature bulb is on the aft side of the aft spar. It is immediately outboard of the left main landing gear.

SUBTASK 28-43-11-020-002

- (4) Push the temperature bulb into the adapter with a maximum force of 4 pounds (17.8 newtons).

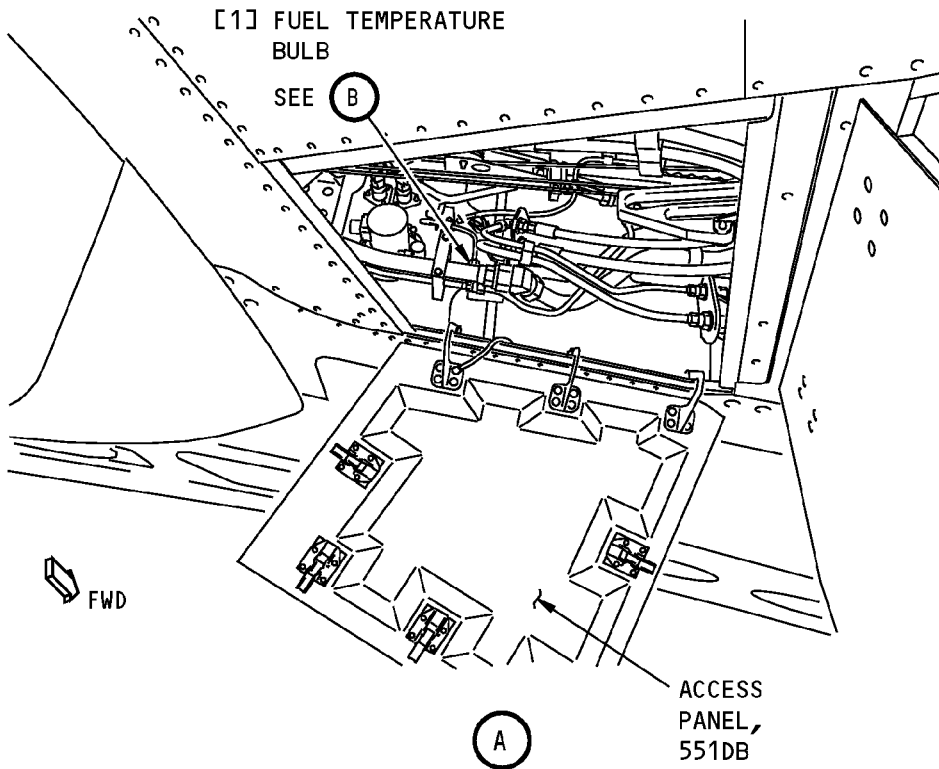
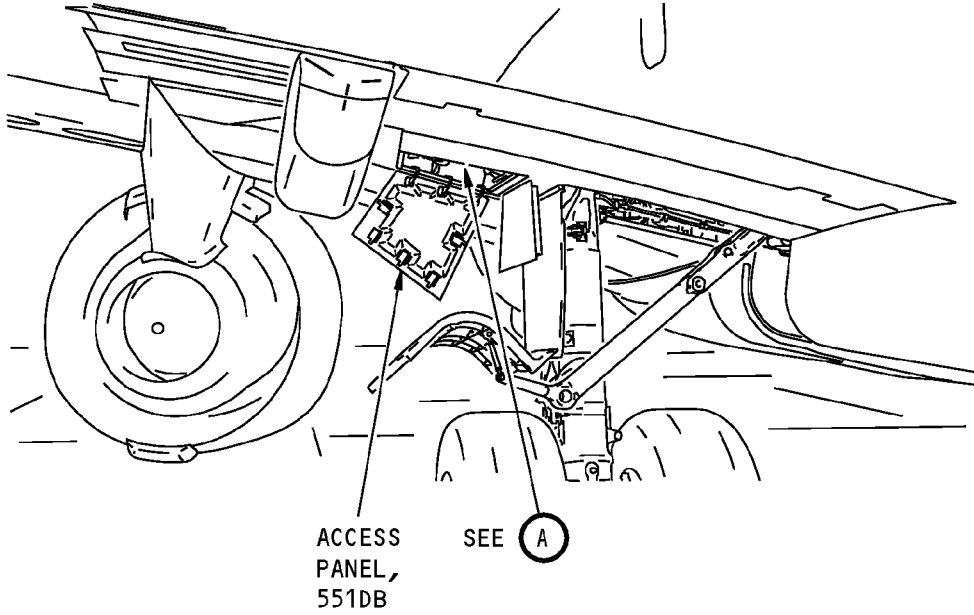
SUBTASK 28-43-11-020-003

- (5) Turn the bulb until it is free and pull the fuel temperature bulb [1] out of the adapter.

END OF TASK

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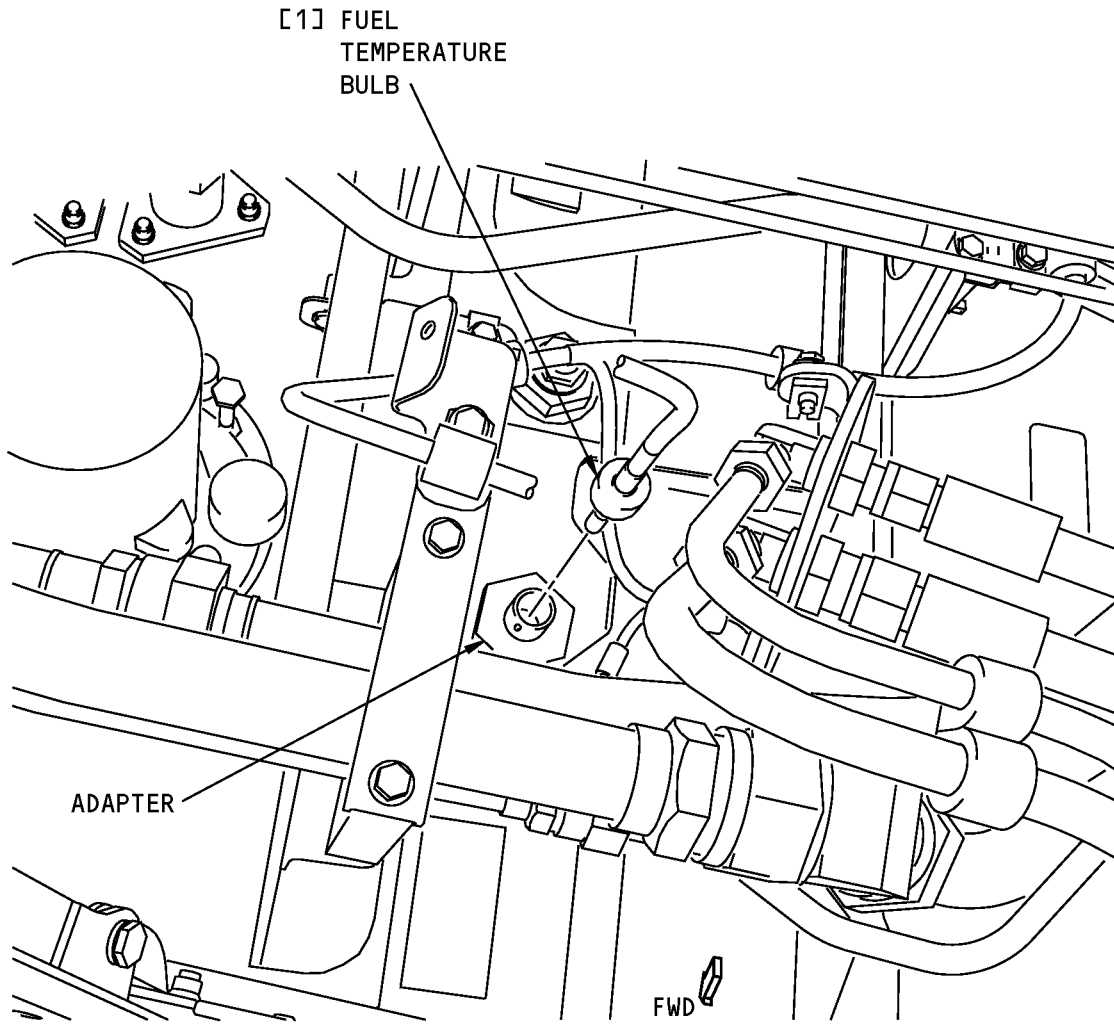
**Fuel Temperature Bulb Installation
Figure 401 (Sheet 1 of 2)/28-43-11-990-802**

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FUEL TEMPERATURE BULB

B

**Fuel Temperature Bulb Installation
Figure 401 (Sheet 2 of 2)/28-43-11-990-802**

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TASK 28-43-11-400-801

3. Fuel Temperature Bulb Installation

(Figure 401)

A. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fuel temperature bulb	28-11-61-01-055	HAP 001-013, 015-026, 028-030
		28-11-61-02-035	HAP 031-054, 101-999

C. Procedure

SUBTASK 28-43-11-420-001

(1) Hold the temperature bulb by the locking cap.

SUBTASK 28-43-11-420-002

(2) Put the fuel temperature bulb [1] into the adapter.

SUBTASK 28-43-11-420-003

(3) Push the fuel temperature bulb into the adapter until it touches the pin.

SUBTASK 28-43-11-420-004

(4) Turn the locking cap to lock it around the pin.

SUBTASK 28-43-11-420-005

(5) Make a splice from the wires on the fuel temperature bulb to the airplane wire bundle.

SUBTASK 28-43-11-860-002

(6) Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	7	C00355	FUEL TEMP IND

SUBTASK 28-43-11-860-003

(7) Do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 28-43-11-710-001

(8) Monitor the fuel temperature on the indicator.

(a) Make sure the indicator shows the correct temperature.

SUBTASK 28-43-11-410-001

(9) Close the fixed trailing edge access panel immediately outboard of the landing gear.

SUBTASK 28-43-11-860-004

(10) If electrical power is not necessary for other tasks, do this task: Remove Electrical Power, TASK 24-22-00-860-812

————— END OF TASK —————

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FUEL TEMPERATURE INDICATOR - REMOVAL/INSTALLATION

1. General

- A. This procedure has two tasks:
(1) Fuel temperature indicator removal
(2) Fuel temperature indicator installation

TASK 28-43-21-020-801

2. Fuel Temperature Indicator Removal

(Figure 401)

A. Location Zones

Table with 2 columns: Zone, Area. Row 1: 211, Flight Compartment - Left

B. Procedure

SUBTASK 28-43-21-020-001

(1) Do these steps to remove the fuel temperature indicator from the P5-2 overhead panel:

(a) Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Table with 4 columns: Row, Col, Number, Name. Row 1: A, 7, C00355, FUEL TEMP IND

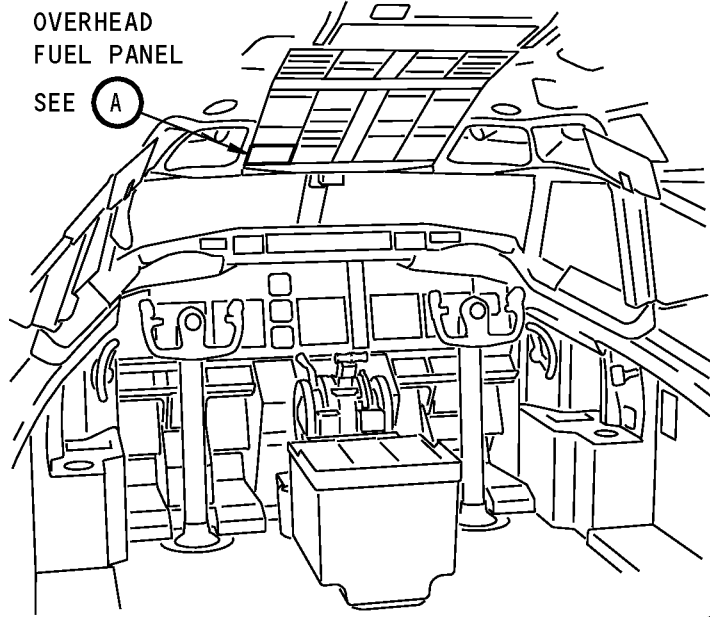
- (b) Loosen the 6 quarter-turn fasteners that hold the P5-2 overhead panel.
(c) Carefully pull the P5-2 overhead panel away from the rest of the P5 panel until there is sufficient access to the part of the fuel temperature indicator behind the face of the P5-2 panel.
(d) Disconnect the electrical connector from the fuel temperature indicator [1].
(e) Loosen the release screw to loosen the clamp that holds the fuel temperature indicator [1] in its position.
(f) Remove the fuel temperature indicator from the P5-2 panel.

END OF TASK

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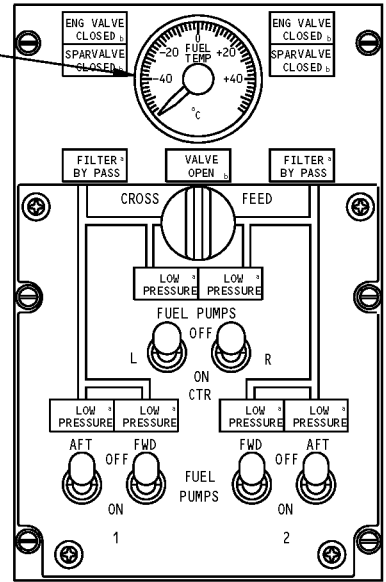


OVERHEAD FUEL PANEL

SEE (A)

FUEL TEMPERATURE INDICATOR

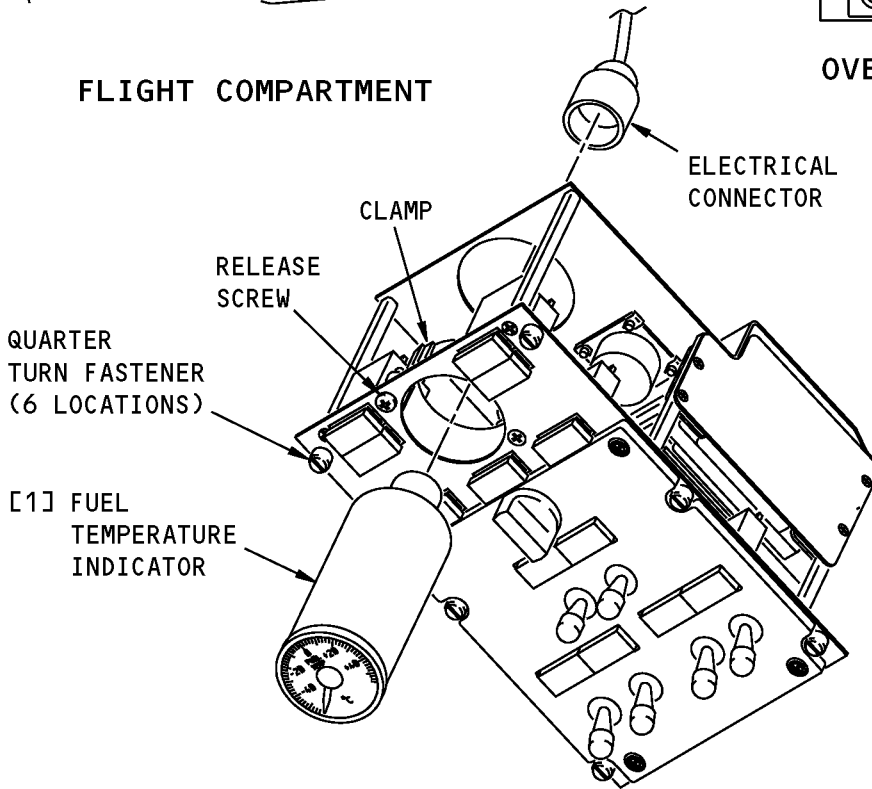
SEE (B)



OVERHEAD FUEL PANEL

(A)

FLIGHT COMPARTMENT



FUEL TEMPERATURE INDICATOR

(B)

Fuel Temperature Indicator Installation
Figure 401/28-43-21-990-801

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TASK 28-43-21-020-802

3. Fuel Temperature Indicator Installation

(Figure 401)

A. References

Reference	Title
28-43-00-710-801	Fuel Temperature Indicating System Test (P/B 501)

B. Location Zones

Zone	Area
211	Flight Compartment - Left

C. Procedure

SUBTASK 28-43-21-020-002

- (1) Do these steps to install the fuel temperature indicator from the P5-2 overhead panel:
 - (a) Put the fuel temperature indicator in its position in the P5-2 panel.
 - (b) Tighten the release screw to tighten the clamp that holds the fuel temperature indicator [1] in its position.
 - (c) Connect the electrical connector to the fuel temperature indicator [1].
 - (d) Carefully put the P5-2 overhead panel into its position in the P5 panel until there is sufficient access to the part of the fuel temperature indicator behind the face of the P5-2 panel.
 - (e) Tighten the 6 quarter-turn fasteners that hold the P5-2 overhead panel.
 - (f) Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	7	C00355	FUEL TEMP IND

SUBTASK 28-43-21-720-001

- (2) Do this task: Fuel Temperature Indicating System Test, TASK 28-43-00-710-801.

————— **END OF TASK** —————

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MEASURING STICK - REMOVAL/INSTALLATION

1. General

- A. This procedure has two tasks:
 - (1) A task to remove the fuel measuring sticks
 - (2) A task to install the fuel measuring sticks.
- B. The fuel measuring stick has a float at the top. This float holds the top of the fuel measuring stick at the top of the fuel in the tank.
- C. It is not necessary to defuel the fuel tanks to remove the fuel measuring stick.
- D. To remove the housing for the fuel measuring stick, it is necessary to remove the access panel where the housing is installed (TASK 28-11-11-000-801) or (TASK 28-11-31-000-801).

TASK 28-44-11-000-801

2. Fuel Measuring Stick Removal

(Figure 401)

A. Location Zones

Zone	Area
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

B. Procedure

SUBTASK 28-44-11-860-001

- (1) Turn the screwdriver slot counterclockwise to release the applicable fuel measuring stick (Figure 401).

SUBTASK 28-44-11-020-001

- (2) Use snap ring pliers or a spanner wrench to remove the retainer [8] from the mounting base [3] or [36] (Figure 401).

SUBTASK 28-44-11-020-002

- (3) Pull the stick subassembly [35] from the housing [26] with the retainer [8], the spring [30], and the two guides [29].

NOTE: You can feel a small force when the steel armature on the stick subassembly goes through the magnet in the float.

SUBTASK 28-44-11-020-003

- (4) Remove the latch [9] from the stick subassembly [35].

SUBTASK 28-44-11-860-002

- (5) Keep the latch [9] for installation of the fuel measuring stick.

SUBTASK 28-44-11-790-001

- (6) Do these steps to do a check for fuel leakage in the housing of the fuel measuring stick:
 - (a) Make sure the applicable tank contains sufficient fuel to cover the base of the fuel measuring stick housing.

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Table 401/28-44-11-993-807

TABLE 601. Fuel Necessary to Cover the Center Tank Measuring Sticks		
Fuel Measuring Stick Number	FUEL (LBS)	FUEL (KGS)
Stick No. 1	9197	4172
Stick No. 2	13722	6224

Table 402/28-44-11-993-808

TABLE 602. Fuel Necessary to Cover the No. 1 or No. 2 Tank Measuring Sticks		
Fuel Measuring Stick Number	FUEL (LBS)	FUEL (KGS)
Stick No. 3	1167	529
Stick No. 4	3402	1543
Stick No. 5	5665	2570
Stick No. 6	6710	3044
Stick No. 7	7570	3434
Stick No. 8	8262	3747

- (b) Monitor the opening for the fuel measuring stick for five minutes after you remove the fuel measuring stick to make sure there is no fuel leakage.

————— **END OF TASK** —————

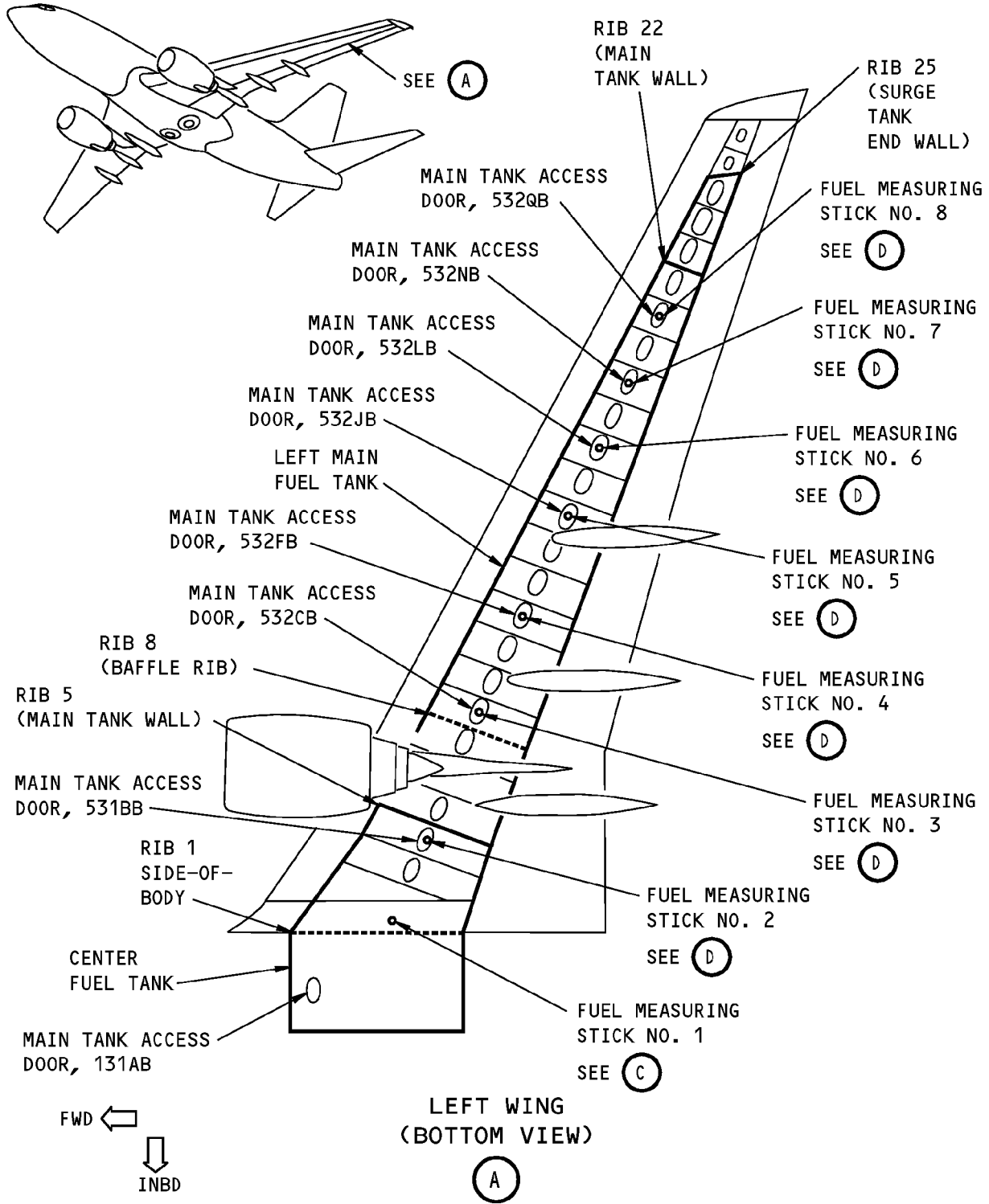
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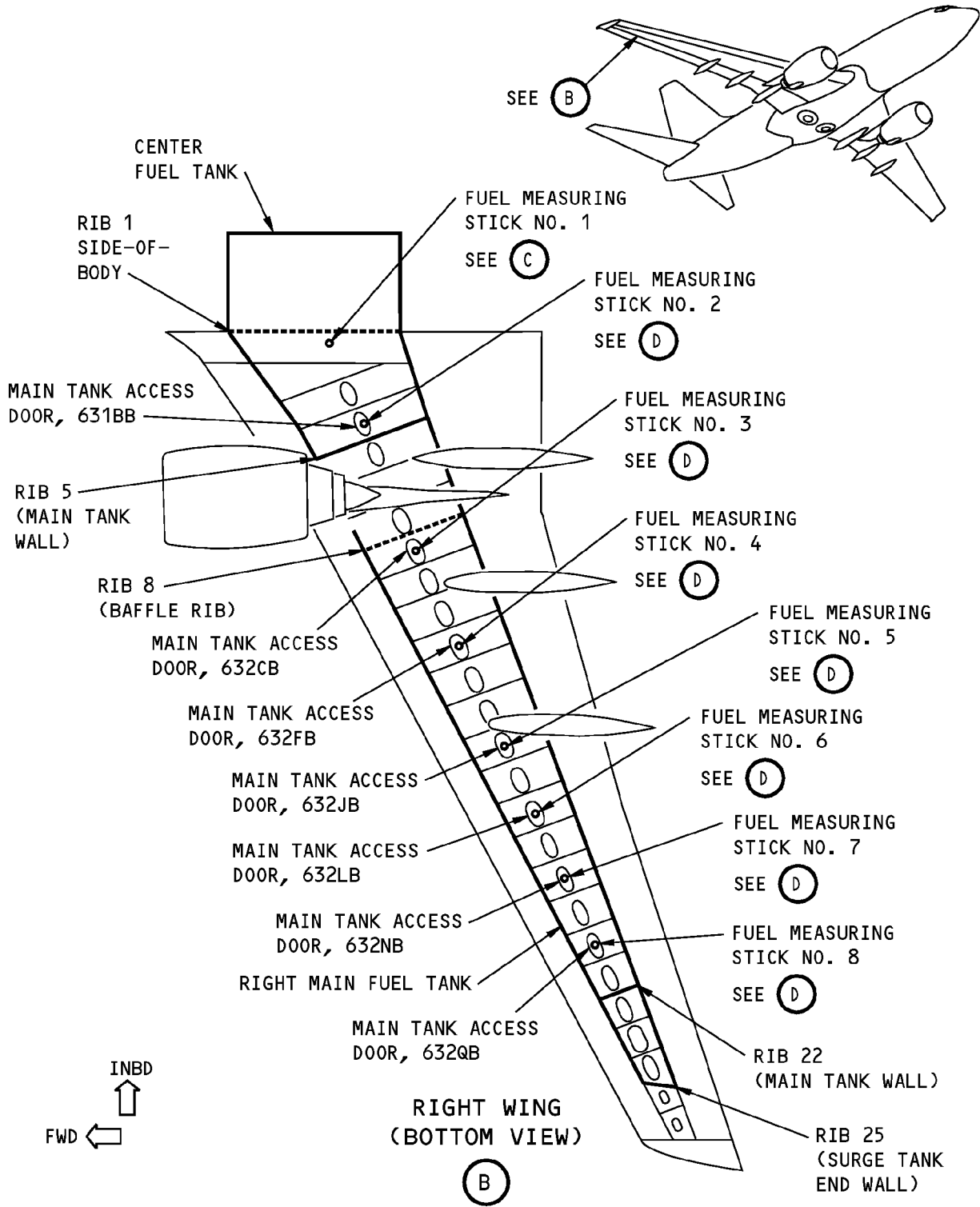


**Fuel Measuring Stick Installation
Figure 401 (Sheet 1 of 5)/28-44-11-990-803**

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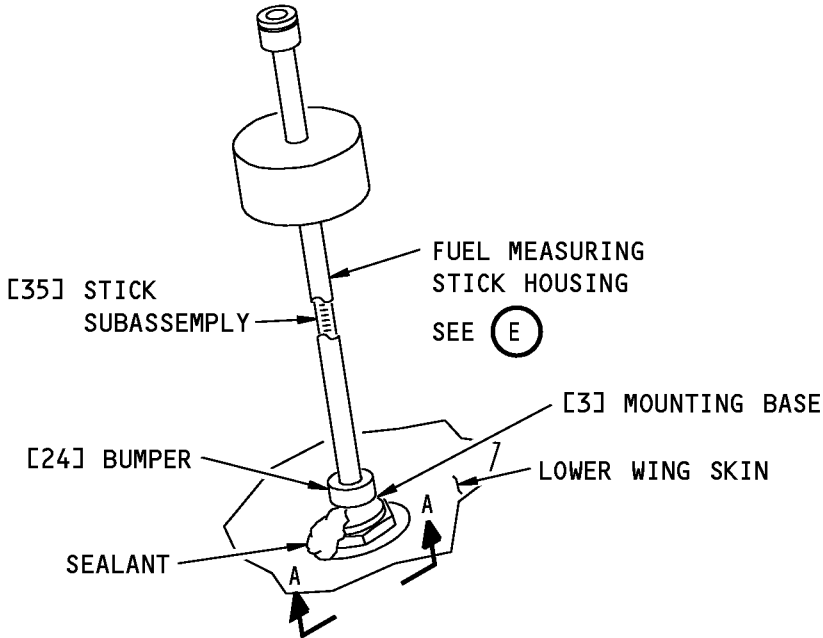
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**Fuel Measuring Stick Installation
Figure 401 (Sheet 2 of 5)/28-44-11-990-803**

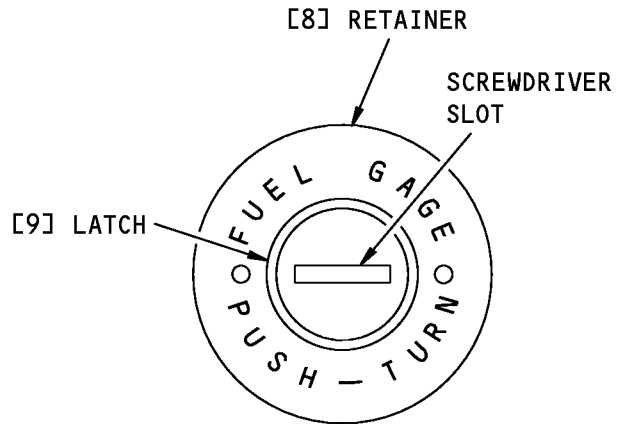
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**FUEL MEASURING STICK INSTALLATION
(STICK NO. 1)**

(C)



**RETAINER
(VIEW FROM BELOW THE WING)**

A-A

F80676 S0006572369_V3

**Fuel Measuring Stick Installation
Figure 401 (Sheet 3 of 5)/28-44-11-990-803**

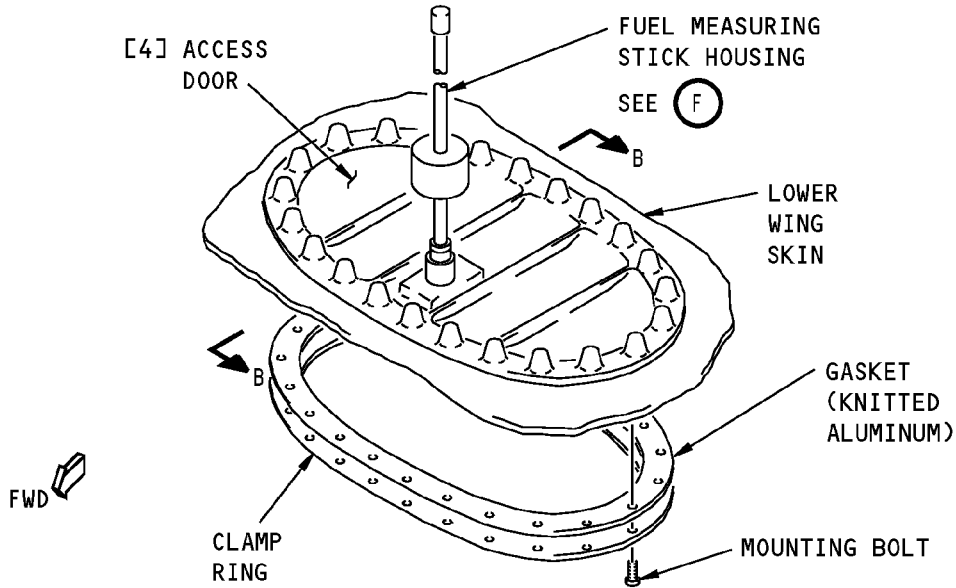
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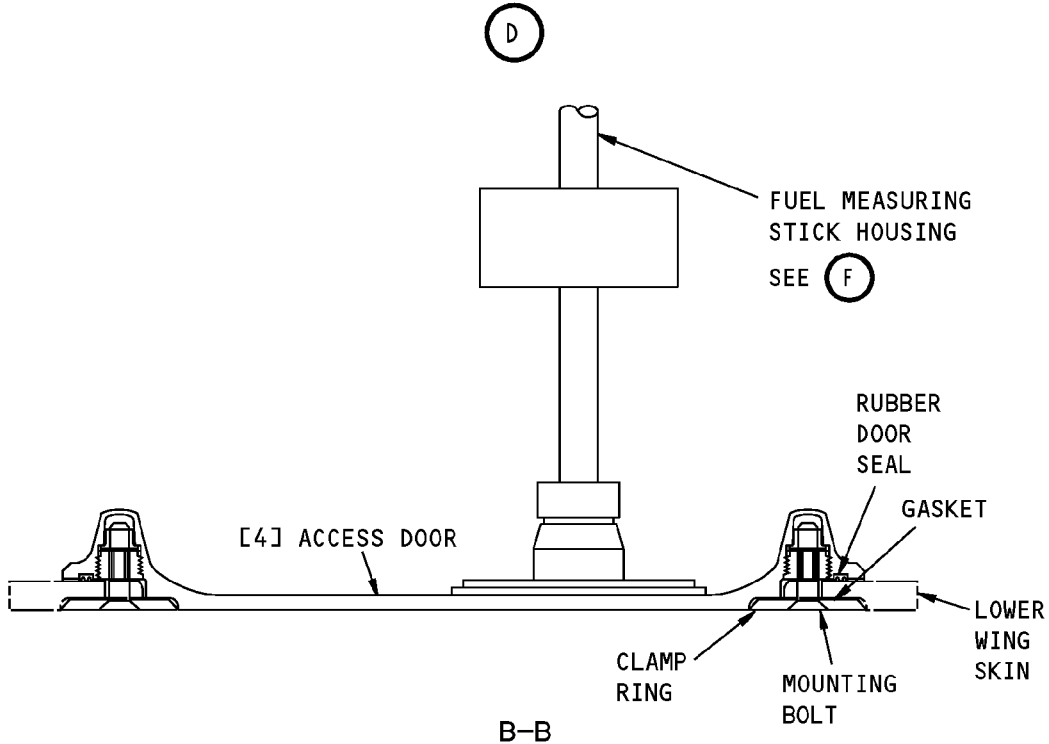
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**FUEL MEASURING STICK INSTALLATION
(STICK NO. 2,3,4,5,6,7 AND 8)**

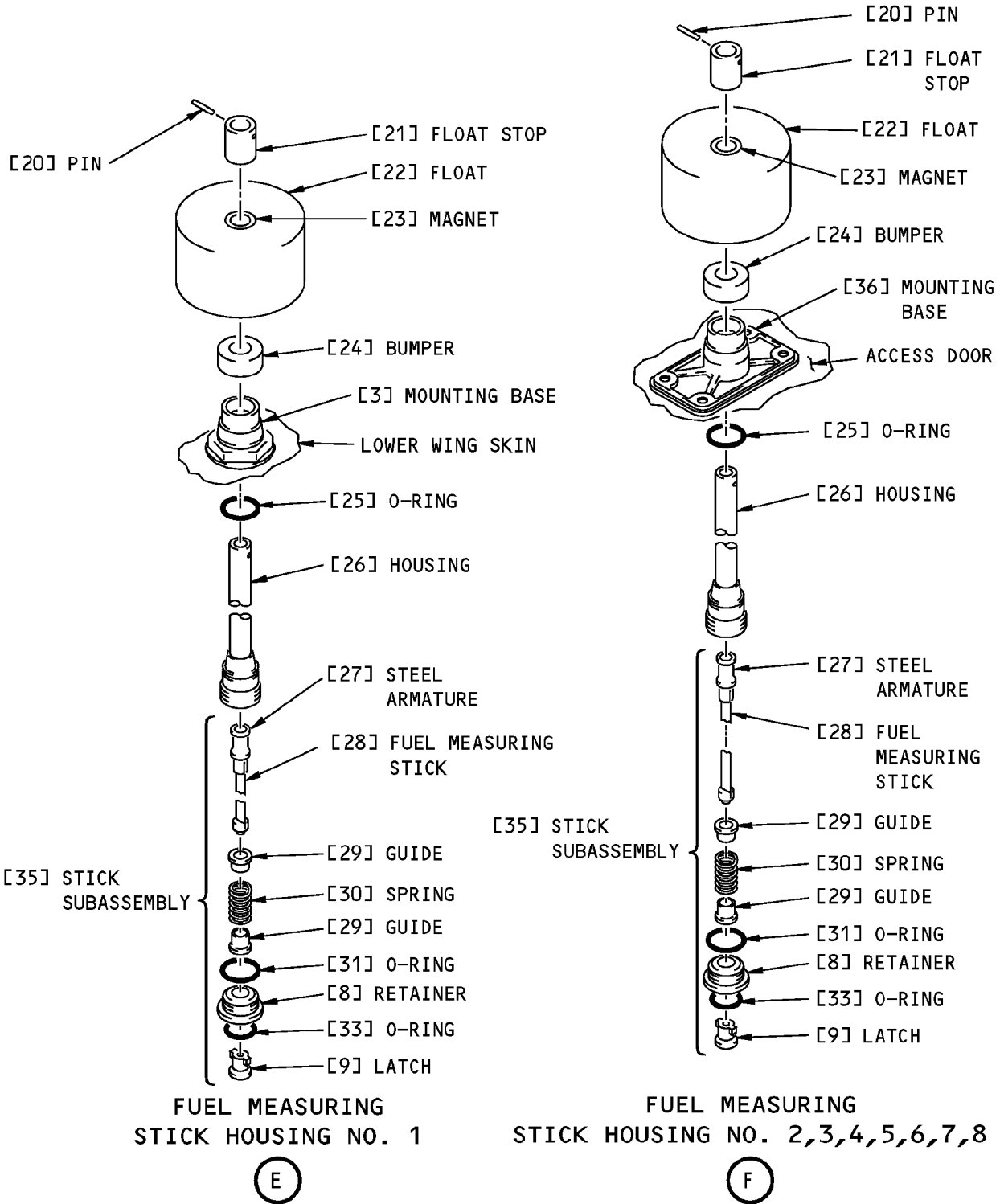


**Fuel Measuring Stick Installation
Figure 401 (Sheet 4 of 5)/28-44-11-990-803**

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Fuel Measuring Stick Installation
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TASK 28-44-11-400-801

3. Fuel Measuring Stick Installation

(Figure 401)

A. Location Zones

Zone	Area
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

B. Procedure

SUBTASK 28-44-11-420-001

- (1) Install new O-rings [31] and [33] on the retainer [8] (Figure 401).

SUBTASK 28-44-11-790-002

- (2) Do these steps to do a check for fuel leakage in the housing of the fuel measuring stick:
 - (a) Make sure the applicable tank contains sufficient fuel to cover the base of the fuel measuring stick housing.

Table 403/28-44-11-993-809

TABLE 601. Fuel Necessary to Cover the Center Tank Measuring Sticks		
Fuel Measuring Stick Number	FUEL (LBS)	FUEL (KGS)
Stick No. 1	9197	4172
Stick No. 2	13722	6224

Table 404/28-44-11-993-810

TABLE 602. Fuel Necessary to Cover the No. 1 or No. 2 Tank Measuring Sticks		
Fuel Measuring Stick Number	FUEL (LBS)	FUEL (KGS)
Stick No. 3	1167	529
Stick No. 4	3402	1543
Stick No. 5	5665	2570
Stick No. 6	6710	3044
Stick No. 7	7570	3434
Stick No. 8	8262	3747

- (b) Make sure there are no indications of fuel leakage from the housing before you install the fuel measuring stick in the opening.

SUBTASK 28-44-11-420-002

- (3) With the latch [9] of the stick subassembly removed, install the stick subassembly in the housing [26].

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SUBTASK 28-44-11-420-003

- (4) Install the guide [29], the spring [30], the second guide [29], and the retainer [8] in the housing [26].

SUBTASK 28-44-11-420-004

- (5) Use a spanner wrench to tighten the retainer [8] in the housing to a torque of 75-85 pound-inches.

SUBTASK 28-44-11-420-005

- (6) Lower the stick subassembly [35], and install the latch [9] on the stick subassembly [35].

SUBTASK 28-44-11-860-003

- (7) Push the stick subassembly [35] into the housing [26].

SUBTASK 28-44-11-860-004

- (8) Turn the screwdriver slot on the latch [9] clockwise to lock the fuel measuring stick into the correct position (Figure 401).

————— **END OF TASK** —————

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FUEL MEASURING STICK - REPAIRS

1. General

- A. This procedure contains a task to replace the O-ring(s) that make a seal between the tube assembly and the housing for the magnetic fuel measuring sticks. If this location is not sealed correctly, it can be a cause of fuel leakage.

TASK 28-44-11-360-802

2. Replacement of the O-Ring Seal Between the Housing and the Base Assembly

(Figure 801)

A. References

Reference	Title
28-44-11-000-801	Fuel Measuring Stick Removal (P/B 401)

B. Location Zones

Zone	Area
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
632	Right Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing Station 643.50

C. Procedure

SUBTASK 28-44-11-860-008

- (1) Make sure the airplane has a roll between -1 degree and +1 degree (less than one degree left or right roll).

SUBTASK 28-44-11-860-009

- (2) Make sure the airplane has a pitch between -1 and +1 degrees (less than one degree pitch up or down).

SUBTASK 28-44-11-860-010

- (3) Make sure the fuel tank for the applicable fuel measuring stick has less than the maximum quantity of fuel given in the tables below (Table 801) (Table 802).

Table 801/28-44-11-993-803 Maximum Fuel Quantity in Center Tank When the Fuel Measuring Stick Housing is Loosened

Fuel Measuring Stick	FUEL (LBS) ^{*[1]}	FUEL (KGS) ^{*[2]}
1	0	0
2	7774	3533

*[1] Based on a nominal density of 6.76 pounds per U.S. gallon

*[2] Based on a nominal density of 0.810 kilograms per liter

Table 802/28-44-11-993-804 Maximum Fuel Quantity in No. 1 or No. 2 Tank When the Fuel Measuring Stick Housing is Loosened

Fuel Measuring Stick	FUEL (LBS) ^{*[1]}	FUEL (KGS) ^{*[2]}
3	608	276
4	1960	891

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(Continued)

Fuel Measuring Stick	FUEL (LBS) ^{*[1]}	FUEL (KGS) ^{*[2]}
5	4394	1997
6	5746	2611
7	6760	3072
8	7436	3380

*[1] Based on a nominal density of 6.76 pounds per U.S. gallon

*[2] Based on a nominal density of 0.810 kilograms per liter

SUBTASK 28-44-11-010-002

(4) Remove the fuel measuring stick [1] from its housing (TASK 28-44-11-000-801).

SUBTASK 28-44-11-020-008

WARNING: MAKE SURE THE FUEL TANK CONTAINS LESS THAN THE MAXIMUM FUEL GIVEN IN TABLE 1 BEFORE YOU LOOSEN THE HOUSING. A FUEL SPILL CAN OCCUR. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(5) Put a nine sixteenth inch (9/16 inch) hexagonal wrench through the bottom of the base and into the bottom of the housing until it has a good fit.

SUBTASK 28-44-11-020-009

(6) Loosen the housing [3] from the base with the wrench.

SUBTASK 28-44-11-020-010

CAUTION: DO NOT MOVE THE HOUSING MORE THAN NECESSARY. YOU CAN CAUSE DAMAGE TO THE FLOAT AND FLOAT STOP.

(7) Carefully move the housing down until it is possible to remove the O-ring [2] from the end of the housing.

SUBTASK 28-44-11-020-011

(8) Use a plastic pick to remove the O-ring [2] from the housing.

SUBTASK 28-44-11-360-002

(9) Install new O-ring [2] on the housing.

SUBTASK 28-44-11-420-009

(10) Lift the housing into the base assembly.

SUBTASK 28-44-11-420-010

(11) Tighten the housing into the base assembly with the hexagonal wrench to a torque of 40 to 50 pound-inches (4.5-5.6 newton-meters).

SUBTASK 28-44-11-650-002

(12) Refuel the applicable tank until the fuel quantity is more than the minimum quantity shown in the tables below (Table 803) (Table 804).

Table 803/28-44-11-993-805 Minimum Fuel Quantity in Center Tank To Do a Leakage Check After the Repair

Fuel Measuring Stick	FUEL (LBS) ^{*[1]}	FUEL (KGS) ^{*[2]}
1	2840	1291
2	16224	7375

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*[1] Based on a nominal density of 6.76 pounds per U.S. gallon

*[2] Based on a nominal density of 0.810 kilograms per liter

Table 804/28-44-11-993-806 Minimum Fuel Quantity in No. 1 or No. 2 Tank To Do a Leakage Check After the Repair

Fuel Measuring Stick	FUEL (LBS) ^{*[1]}	FUEL (KGS) ^{*[2]}
3	1555	707
4	4124	1875
5	6152	2797
6	7098	3227
7	7842	3565
8	8450	3841

*[1] Based on a nominal density of 6.76 pounds per U.S. gallon

*[2] Based on a nominal density of 0.810 kilograms per liter

SUBTASK 28-44-11-210-002

(13) Do a check for fuel leakage in the area of the fuel measuring stick.

SUBTASK 28-44-11-410-002

(14) If there is no fuel leakage, install the fuel measuring stick again (TASK 28-44-11-000-801).

SUBTASK 28-44-11-420-011

(15) If the fuel leakage continues, replace the housing for the fuel measuring stick.

END OF TASK

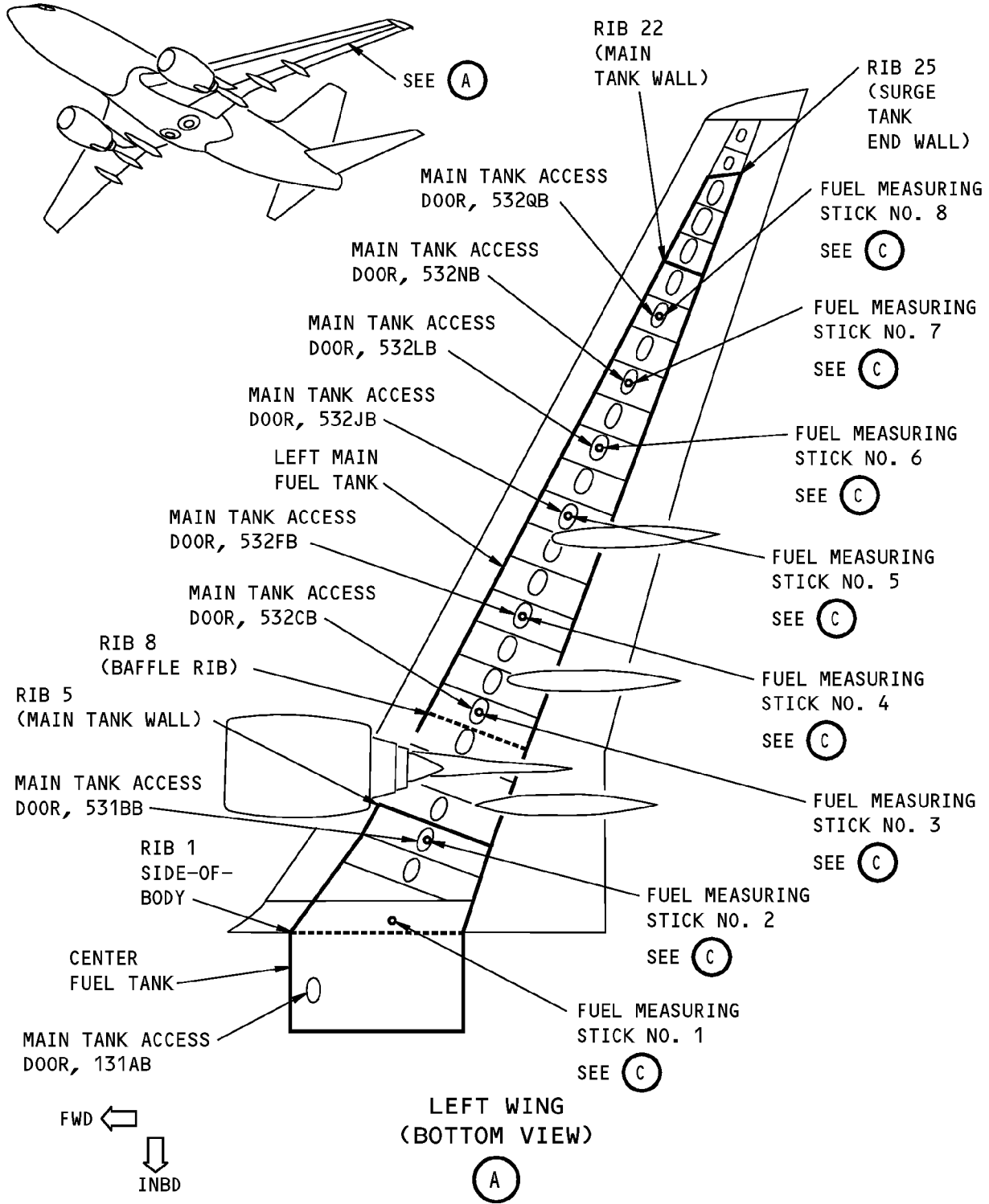
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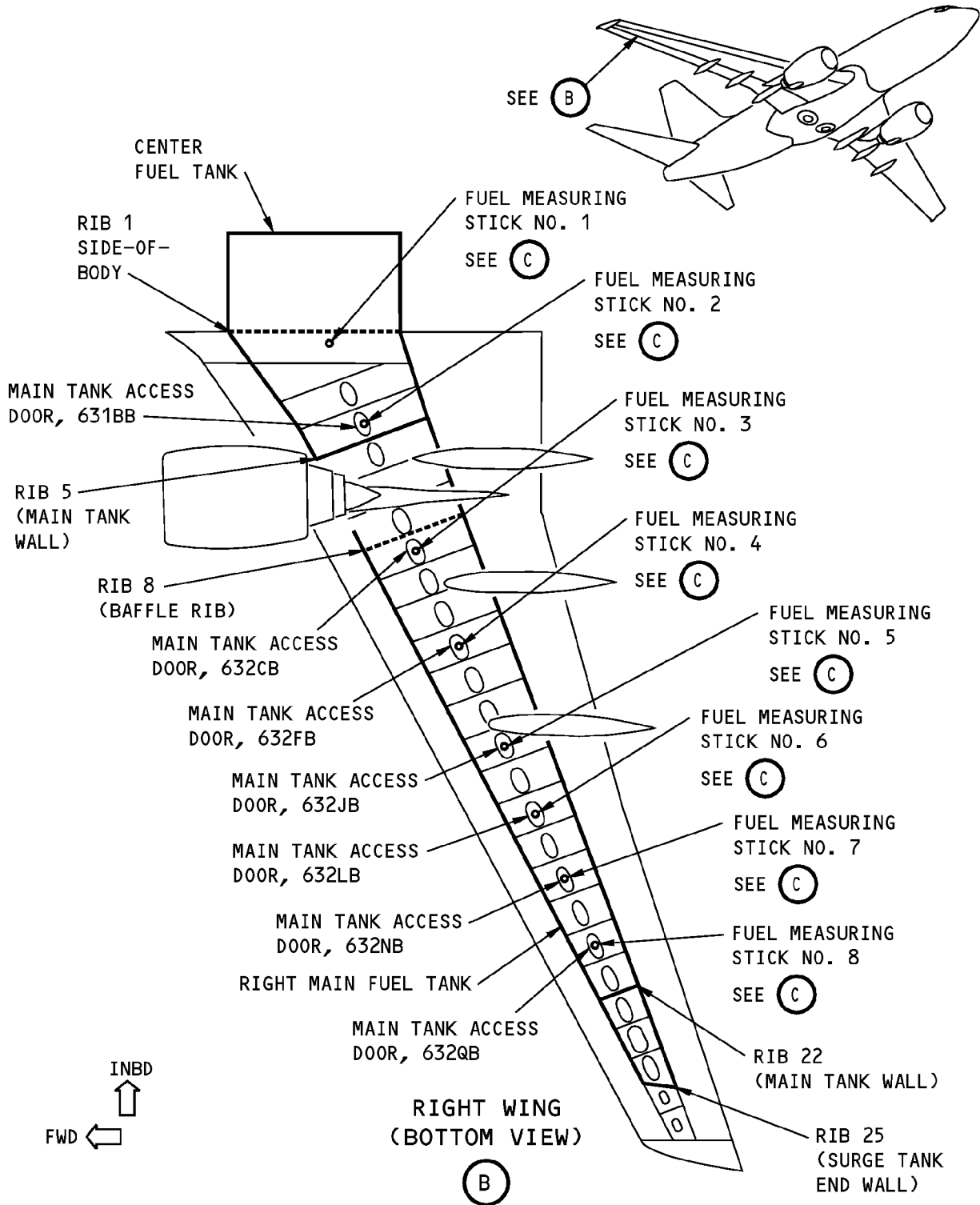
**737-600/700/800/900
AIRCRAFT MAINTENANCE MANUAL**



**Fuel Measuring Stick Installation
Figure 801 (Sheet 1 of 3)/28-44-11-990-802**

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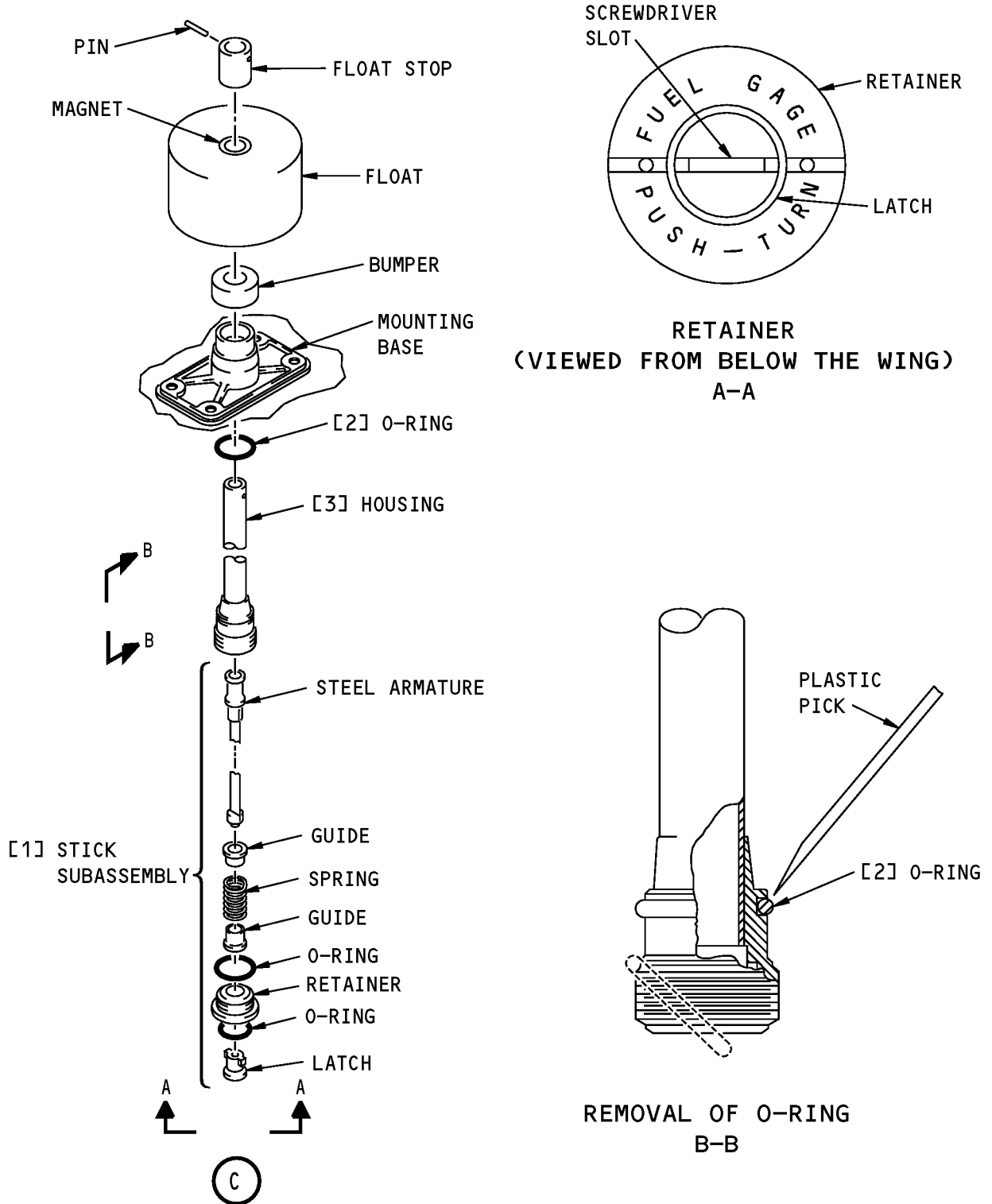


Fuel Measuring Stick Installation
Figure 801 (Sheet 2 of 3)/28-44-11-990-802

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Fuel Measuring Stick Installation
Figure 801 (Sheet 3 of 3)/28-44-11-990-802

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